National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System Permit

FY2017 Annual Report

Reporting Period:
July 1, 2016 to
June 30, 2017

Montgomery County, Maryland

DEPARTMENT OF
ENVIRONMENTAL
PROTECTION

Published by the Montgomery County Department of Environmental Protection for the Maryland Department of the Environment

Contents

List of Acronyms

ARP	Anacostia River Watershed Restoration Plan and Report
BIBI	benthic Index of Biological Integrity
BMP	best management practice
BOD	biochemical oxygen demand
BR	bioretention
BRF	Bay Restoration Fund
CBT	Chesapeake Bay Trust
CIP	Capital Improvement Program
County	Montgomery County
DA	drainage area
DEP	Department of Environmental Protection
DEPC	Division of Environmental Policy and Compliance
DGS	Department of General Services
DHCA	Department of Housing and Community Affairs
DTS	Division of Transit Services
DHS	Division of Highway Services
DOT	Department of Transportation
DPS	Department of Permitting Services
DSWS	Division of Solid Waste Services
EPA	U.S. Environmental Protection Agency
ESC	erosion and sediment control
ESD	Environmental Site Design
FAP	Financial Assurance Plan
FFG	functional feeding groups
FIBI	fish Index of Biological Integrity
FMD	Fleet Management Division
FOG	Fats, Oils, and Grease
FY	Fiscal Year
GIS	geographic information system
GPS	global positioning system
HOA	homeowners association
HSAF	Hotspot Assessment Form
IA	impervious area/acreage
IBI	Index of Biological Integrity

ICC	Intercounty Connector
ID	identification
IDDE	Illicit Discharge Detection and Elimination
IPM	Integrated Pest Management
LID	Low Impact Development
MC	mean concentration
MCPS	Montgomery County Public Schools
MDE	Maryland Department of the Environment
MEP	Maximum Extent Practicable
MNCPPC	Maryland National Capital Park and Planning Commission
MS4	Municipal Separate Storm Sewer System
MWCOG	Metropolitan Washington Council of Governments
NOI	Notice of Intent
NOV	Notice of Violations
NPDES	National Pollutant Discharge Elimination System
NR	not reported
P2	Pollution Prevention
POSWP	Public Outreach and Stewardship Work Plan
RCN	runoff curve number
RCP	Responsible Personnel Certification
ROW	right of way
SDE	spatial database engine
SF	square feet
SFR	single family residential
SPA	Special Protection Area
SSO	sanitary sewer overflow
Strategy	Montgomery County Coordinated Implementation
SWFMP	Stormwater Facility Maintenance Program
SWM	stormwater management
SWPPP	stormwater pollution prevention plan
TMDL	Total Maximum Daily Load
TP	total phosphorous
TPH	total petroleum hydrocarbon
TSS	total suspended solids
USACE	US Army Corps of Engineers
WIP	watershed implementation plan

WLA	wasteload allocation
WMATA	Washington Metropolitan Area Transit Authority
WMOD	Watershed Management Operations Division
WQPC	Water Quality Protection Charge
WTM	watershed treatment model
WVO	Waste Vegetable Oil
WWTP	wastewater treatment plant

List of Figures

List of Tables

List of Attachments

ATTACHMENT 1. COMPACT DISK WITH THE FOLLOWING ELECTRONIC FILES

Appendix A. Annual Report Databases MDENPDES17.accdb:

- Table A. GIS Storm Drain System Mapping Associated with GIS Shapefiles (Part III.C.1)
- Table B. Urban Best Management Practices Associated with GIS Shapefiles (Part III.C.2)
- Table C. Impervious Surfaces Associated with GIS Shapefiles (Part III.C.3)
- Table D. Watershed Restoration Project Locations Associated with GIS Shapefiles (Part III.C.5)
- Table E. Monitoring Site Locations Associated with GIS Shapefiles (Part III.C.4)
- Table E.1. Monitoring Site Locations- Use for Multiple Land Use Values in the Drainage Area
- Table E.2. Monitoring Site Locations- Use for Multiple Stormwater BMPs in the Drainage Area
- Table F. Chemical Monitoring (Part III.H.1.a)
- Table G. Pollutant Load Reductions Associated with GIS Coverage (Part III.J.1.c)
- Table G.1. Additional Pollutants (Part III.J.c)
- Table G.2. Pollutant Load Reductions Associated with GIS Coverage (Part III.H.1.a)
- Table G.3. Additional Pollutants (Part III.J.c)
- Table H. Biological and Habitat Monitoring (Part III.H.1.b and c)
- Table I. Illicit Discharge Detection and Elimination (Part III.E.3.ii)
- Table K. Quarterly Grading Permit Information Associated (Part III.E.2.c)
- Table L. Fiscal Analysis (Part III.I)

Appendix B. MDE Letter and Comments Approving the Strategy after review.
Appendix C. MCPS Report to the County on MS4 Activities in FY 2017.
Appendix D. EPA MS4 inspection Findings and County Response
Appendix E. Implementing_ESD_Report_FINAL_110910.pdf
Zoning CThankode ESD changes
Appendix F. MDE SW Triennial Review Letter with County Response (2013 and 2016)
Appendix G. FY17 Water Quality Cases
Documentation for Commercial and Industrial Surveys
Appendix H. MDE NOI Acceptance Letters
Appendix I. Lower Monocacy Watershed Implementation Plan
Potomac Direct Watershed Implementation Plan
Patuxent River Watershed Implementation Plan
Seneca Creek Watershed Implementation Plan
Summary of 2016 Physical Chemistry Results
Appendix J. Detailed Watershed Restoration Project Tables
Oaks Reforestation Maintenance Documentation
Septic-Sample MDE Submission
Appendix K. Strategy Guidance Document
Appendix L. NPDES Water Chemistry Monitoring in the Breewood Tributary of Upper Sligo Creek, 2009-2016
Appendix M. Montgomery County NPDES 2003 Annual MS4 Report

DEPARTMENT OF
ENVIRONMENTAL
PROTECTION

National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System

Annual Report Summary Fiscal Year 2017

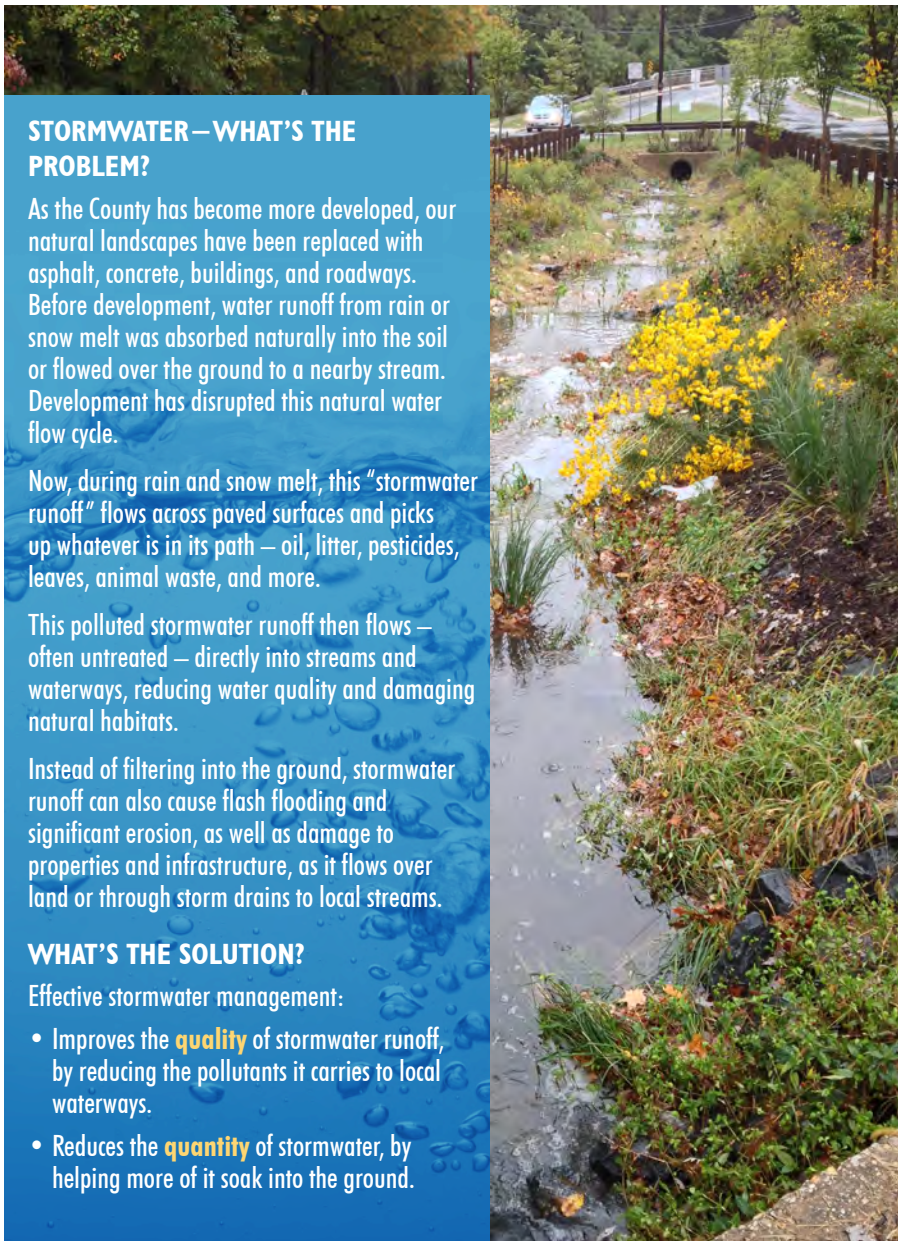
Montgomery County manages multiple programs that assess and address impacts from stormwater and surface water pollution. By implementing a comprehensive stormwater management program, Montgomery County staff work to protect and improve water quality in the County's streams and waterways.

A significant component of the County's stormwater program is its Municipal Separate Storm Sewer System (MS4) Permit, a 5-year permit issued by the Maryland Department of the Environment (MDE).

This Annual Report Summary highlights progress the County has made in fiscal year 2017 (FY17) in meeting the requirements of the MS4 permit.

Major accomplishments in protecting the County's streams during FY17 (July 1, 2016 to June 30, 2017) include:

- As of the end of FY17, the County had restored 2,927 impervious acres, providing treatment of stormwater runoff from 1,009 acres more than in FY16. This restored area achieved 77 percent of the impervious area restoration goal of 3,778 acres in the County's MS4 permit.



STORMWATER—WHAT'S THE PROBLEM?

As the County has become more developed, our natural landscapes have been replaced with asphalt, concrete, buildings, and roadways. Before development, water runoff from rain or snow melt was absorbed naturally into the soil or flowed over the ground to a nearby stream. Development has disrupted this natural water flow cycle.

Now, during rain and snow melt, this "stormwater runoff" flows across paved surfaces and picks up whatever is in its path – oil, litter, pesticides, leaves, animal waste, and more.

This polluted stormwater runoff then flows – often untreated – directly into streams and waterways, reducing water quality and damaging natural habitats.

Instead of filtering into the ground, stormwater runoff can also cause flash flooding and significant erosion, as well as damage to properties and infrastructure, as it flows over land or through storm drains to local streams.

WHAT'S THE SOLUTION?

Effective stormwater management:

- Improves the **quality** of stormwater runoff, by reducing the pollutants it carries to local waterways.
- Reduces the **quantity** of stormwater, by helping more of it soak into the ground.

A Best Management Practice (BMP) is a structural or non-structural device designed to temporarily store or treat runoff to mitigate flooding, reduce pollution, and provide other amenities. It is also known as a **stormwater management facility.**

- In FY17, Department of Environmental Protection (DEP) conducted 2,534 inspections of BMPs, and ensured that preventive maintenance of 3,544 stormwater management BMPs was conducted.
- The Department of Permitting Services (DPS) continued to administer the County's erosion and sediment control program, through approval of stormwater management plans ensuring environmental site design is implemented to maximum extent practicable.
- DEP continued to implement a highly effective illicit discharge detection program which includes public education and outreach, water quality investigations, and illegal dumping investigations. Water quality and illegal dumping complaints are reported through the County's call center for non-emergencies (MC311) or through DEP's website.
- DEP and Department of Transportation (DOT) continued to coordinate with partners for trash removal programs. In FY17, 13,155 pounds of trash were removed from the Anacostia River Watershed.

- The County revamped its street sweeping program, adding 143 additional curb-miles on arterial routes.
- DEP's public education and outreach program continued to grow, reaching more than 19,000 attendees at 170 outreach events. DEP continued to grow the County's pet waste program, working with six neighborhood associations to install nine pet waste stations. The County's Stream Stewards program had 145 volunteers participate in 26 events and activities in FY17.
- DEP continued to focus on updating its data management procedures to add urban BMPs to the County BMP database, with 3,214 BMPs added in FY17 for a total of 11,954 facilities in the database.

Management Programs

To control stormwater runoff and reduce pollution, the County implements a diverse set of management programs that target trash and litter reduction, stormwater facility maintenance and inspections, the detection and elimination of illicit discharges, and public outreach and education.

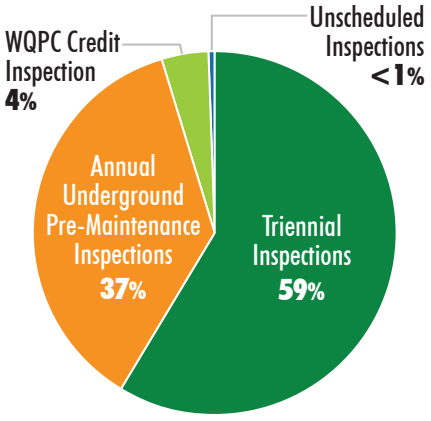
Environmental Site Design (ESD) is a design strategy for maintaining predevelopment runoff characteristics and protecting natural resources. ESD stormwater facilities integrate site design, natural hydrology, and smaller controls to capture and treat runoff.

Stormwater Management Program

Inspection and Maintenance

DEP is responsible for the triennial inspection and ensuring preventive

2,534 Total Inspections Completed



maintenance of more than 11,900 stormwater management facilities under the County's jurisdiction. DEP performs structural maintenance of more than 4,000 stormwater management facilities owned by the County, the public-school system, and the Maryland National Capital Park and Planning Commission, as well as some private facilities. (The private property owner remains responsible for nonstructural maintenance.)

In FY17, DEP conducted 2,534 inspections.

Since 2010, DEP has added more than 5,000 ESD facilities on public and private property, almost doubling the County's BMP inventory in seven years. DEP is also responsible for conducting triennial inspections of these facilities.

- In FY16, DEP worked to develop procedures for inspection of the ESD practices. In FY17, 117 inspections were conducted. Future fiscal years will show increasing numbers of ESD inspections as DEP and the contractor expand capacity.
- To augment ESD inspections performed by the triennial inspection contractor, DEP hired a new contract inspector with expertise in vegetated stormwater practices to begin conducting inspections of ESD practices other than those on single-family residential properties.
- DEP developed and piloted a new online form for self-inspection of residential stormwater management facilities. The form is tied to the WQPC credit. In FY17, 119 letters were sent to property owners; of these, 11 completed the online inspection, resulting in 53 facilities with approved WQPC credit inspections. In FY18, letters will be sent to approximately 1,000 property owners.

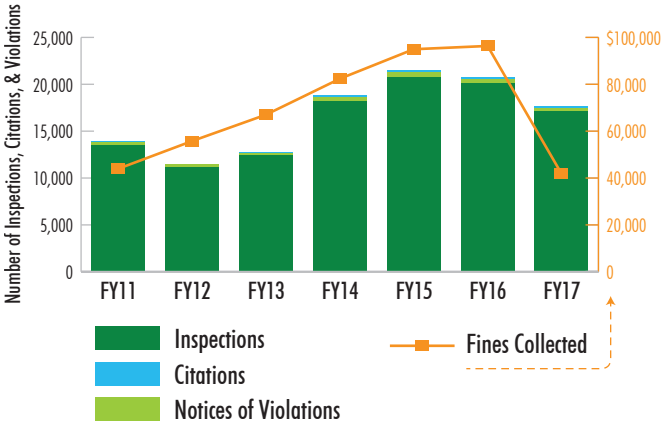
In addition to inspections, DEP's stormwater facility maintenance program oversees structural and non-structural maintenance of all stormwater management facilities under the County's jurisdiction. In FY17, 3,544 facilities were maintained, either by DEP contractors or by the facility owner. All maintenance was performed under the guidance of DEP inspection staff.

Erosion and Sediment Control

The DPS implements an erosion and sediment control program designed to reduce pollutants during construction of new developments and redevelopment. County staff review permit applications, inspect erosion and sediment control practices, issue notices of violations, and collect fines.

MDE continues to evaluate the County's erosion and sediment control program and found it to comply with the permit. No additional improvements to the program are required.

Erosion and Sediment Control Program Enforcement Actions



Illicit Discharge Detection and Elimination

The County implements an inspection and enforcement program to ensure that anything (other than stormwater) that discharges to the MS4 is either permitted or eliminated.

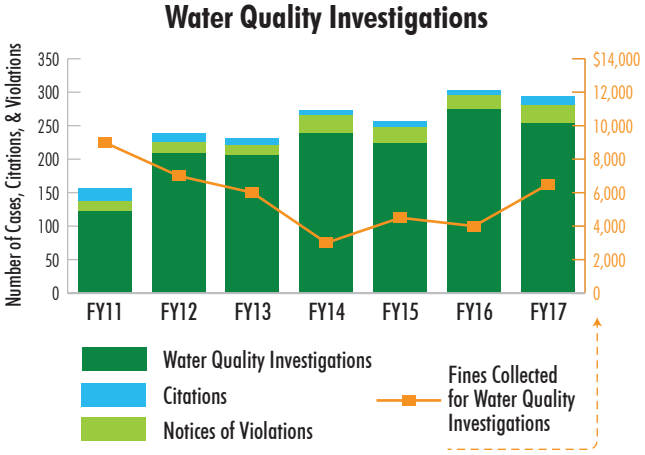
The Water Quality Protection Charge (WQPC) funds Montgomery County's stormwater management programs. The WQPC is assessed based on how much impervious area is on an owner's property, thereby contributing to stormwater runoff. WQPC credits are granted to property owners who install and maintain stormwater facilities on their properties to reduce and/or treat stormwater runoff.

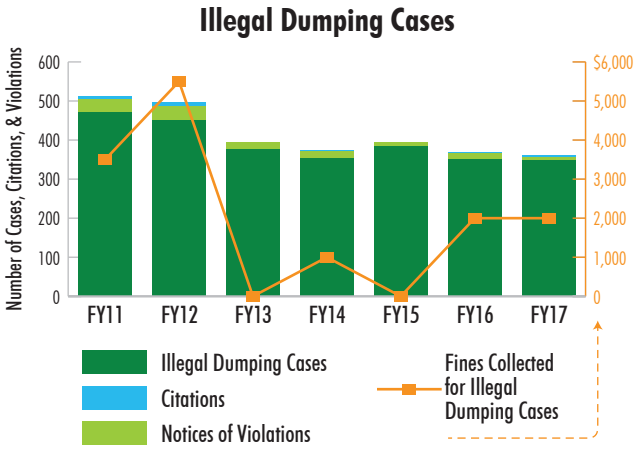
Outfall with milky discharge

Outfall Screening: DEP staff investigate all dry-weather discharges (non-stormwater) that are determined by field-testing to be polluted. These "illicit discharges" are then tracked to their sources and eliminated. In FY17, DEP screened 162 outfalls, found 27 outfalls with dry weather flows, and identified 64 new outfalls that were previously not mapped in the inventory.

From FY11 to FY17, DEP staff assessed 1,188 outfalls by walking the entire reach of waterbodies in four sub-watersheds, capturing most of the existing outfalls in each drainage area. DEP is targeting smaller watersheds with the highest percentages of commercial and industrial areas to identify and eliminate pollutant sources in those areas.

Enforcement: DEP implements a highly-effective enforcement program that has successfully eliminated discharges reported by the public. Water quality and illegal dumping complaints are reported through the County's call center for non-emergencies (MC311) or through DEP's website (https://www.montgomerycountymd.gov/DEP/contact/illegal-dumping.html).





Trash and Litter

The County actively participates in multiple programs and partnerships designed to meet the goals of the Potomac River Watershed Trash Treaty and the 2010 Anacostia TMDL. Initiatives directly related to regional campaigns include ongoing education and outreach for recycling and litter reduction, mass media outreach campaigns, and litter removal from streets, stormwater ponds, and transit stops.

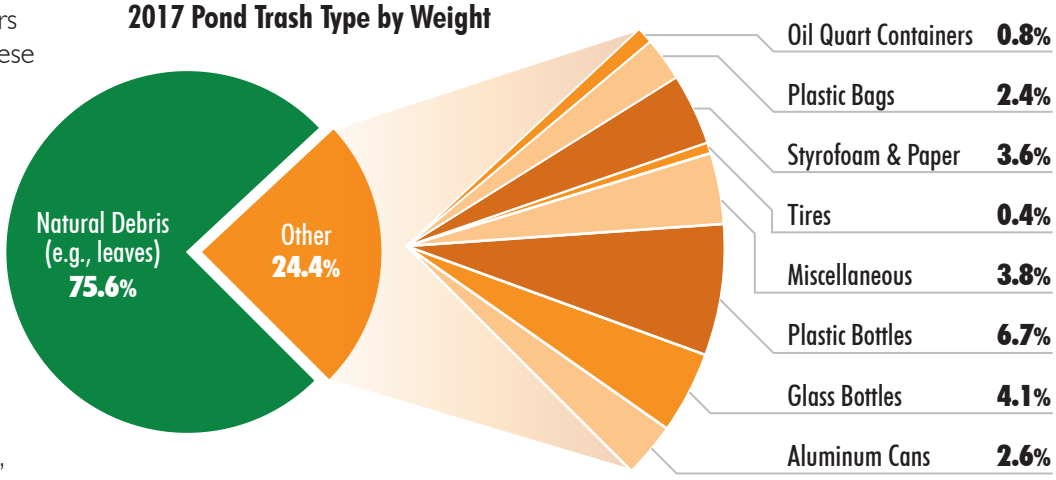
In FY17, DEP distributed approximately 45,000 reusable bags to the community through events, by making the bags available at County Public Library's and by partnering with Manna Foods.

In FY17, the County continued to focus on trash removal in the Anacostia Watershed. DEP is actively installing and retrofitting BMPs that collect trash, which DEP then removes. DEP also sponsors volunteer cleanups. Together, these efforts removed 13,155 pounds of trash from the Anacostia River Watershed in FY17.

DEP continues to monitor trash in the Anacostia Watershed to measure trash reduction efforts. In FY17, DEP developed a community-based social marketing outreach campaign in the White Oak neighborhood, selected from the Anacostia monitoring sites as the neighborhood with the highest recorded trash in the stream. Baseline monitoring was conducted, and the outreach and campaign messaging was pilot-tested with focus groups. Once the campaign has been finalized and implemented in this community, DEP will repeat the same observation surveys in White Oak to assess the campaign's effectiveness in discouraging littering and encouraging proper trash disposal. The campaign and data from pre- and post-monitoring will be reported in FY18.

The County contracts the removal of organic debris and trash from the County-maintained stormwater management facilities, supplemented by volunteer cleanups. In FY17, there were 25 trash collections at 13 different stormwater management facilities. DEP analyzes the types of material collected to help continue to focus its litter reduction programs.

2017 Pond Trash Type by Weight



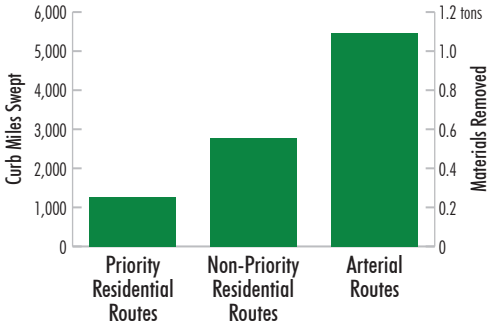
Property Management

All County agencies that operate maintenance facilities must comply with the general permit for stormwater. All facilities have maintained a stormwater pollution prevention plan and implemented good housekeeping, such as routine sweeping. County facilities are inspected monthly and stormwater outfalls on the sites are inspected quarterly. Annual training is delivered to all facility operation employees, including ways to minimize the use of hazardous substances, pollutants, and contaminants, and to prevent their exposure to precipitation and stormwater runoff.

Road Maintenance

Each year, tons of pollutants are prevented from entering the County's streams by street sweeping and cleaning storm drain pipes and inlets. The DOT and DEP jointly oversee the street sweeping program. In FY17, DOT swept 56 residential routes at least once per year. Nineteen of these are "priority" residential routes based on the average tons of material collected per curb mile, lack of adequate stormwater management, and are in a watershed with a water quality impairment from sediment.

FY17 Street Sweeping Program



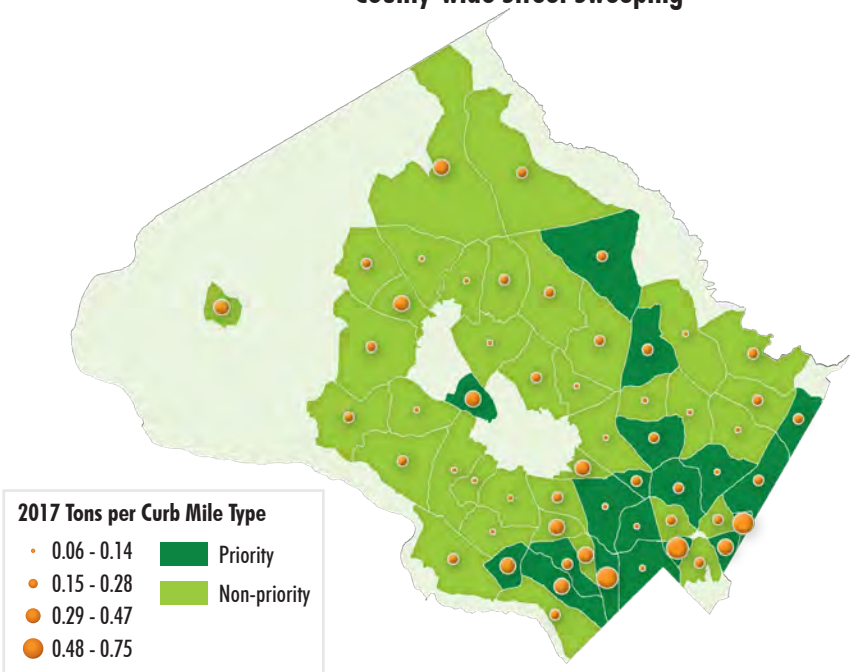
In FY17, DEP also swept arterial routes 24 times. To reduce pollutant loads to County streams, improve highway aesthetics, and progress toward meeting State environmental goals, 143 additional curb-miles were identified in FY17 to be added to the arterial sweeping routes, which will reflect a 63% increase in arterial mileage swept.

In addition, DEP removes material from inlets and storm drains using a vacuum truck or manual labor. The amount of material collected is converted to "impervious acres-equivalence." In FY17, 145 tons of material were removed from inlets and storm drains, the equivalent of 58 impervious acres.

The road maintenance program also includes minimal use of herbicides and no fertilizers for roadside vegetation management.

In addition, de-icing materials (sand, salt, and salt brine) are carefully tracked to improve salt use management. In FY17, the snowfall total was 6.36 inches, which is low compared to the snowfall total (40.35 inches) in FY16. A relatively low amount of salt (20,000 tons) was used in FY17 because of efforts to improve salt management and a small amount of snow from nine winter storms.

County-wide Street Sweeping



Public Education and Outreach

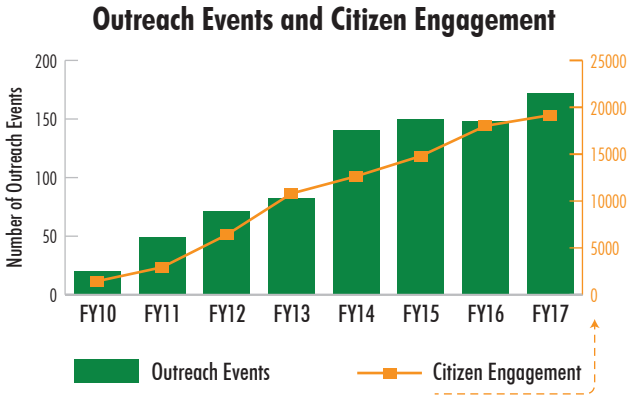
The County continues to implement a robust public education and outreach program designed not only to meet permit requirements, but also to increase local awareness of stormwater management benefits and to bring associated behavior changes. DEP is exploring ways to better quantify pollutant reductions associated with behavior changes related to public education and outreach.

Areas of Significant Outreach Increases in FY17

Public Outreach	Activity/Communication Mechanisms	Percent Increase
	Outreach event engagement	10%
	Outreach impressions	4%
Social Media	Facebook followers	37%
	Twitter followers	39%
	Instagram	95%
	My Green Montgomery eNewsletter	37%
	My Green Montgomery Website	23%
Stream Stewards Program	Volunteer events	30%
	Litter and recyclables collected	19%

Highlights of the FY17 public education and outreach program include:

- **Outreach Events –** DEP hosted or participated in 170 outreach events with more than 19,000 attendees reached by stormwater outreach activities, representing a steady increase over the life of the permit in both the number of events and number of individuals reached. Most outreach activities continue to focus on the Anacostia River and Rock Creek watersheds.
- **Social Media –** The County hired a social media specialist to increase DEP's presence on Facebook, Twitter, and Instagram, resulting in significant increases in social media interaction.
- **Website Improvement –** In January 2017, the DEP website (www.montgomerycountymed.gov/dep) was redesigned to improve usability for mobile and tablet devices, and to update the site to streamline the content, look, and number of pages.



Public outreach event with tree giveaway

"There's no such thing as a poop fairy" public outreach campaign

- **GreenFest –** DEP and 13 community partners collaborated to conduct the 3rd annual GreenFest in Bohrer Park, Gaithersburg. Approximately 700 residents learned how to "green" their lives. GreenFest won a National Association of Counties award in 2017, as well as the Counties Matter Challenge Award for the "100 Ideas at Work".

Volunteers at the biomonitoring booth at GreenFest

- **Pet Waste Stations –** Since DEP initiated a pet waste pilot program in FY14 to help reduce bacterial levels in watersheds, a total of 11,842 pounds of dog waste have been collected. In FY17, DEP worked with six neighborhood associations representing 835 homes. Nine pet waste stations were installed and 725 pounds of dog waste were collected. This effort prevented 7 trillion fecal coliform bacteria from entering the Rock Creek and Anacostia watersheds, as well as preventing 42 pounds of nitrogen and 5 pounds of phosphorous from entering local waterways.
- **Stream Stewards –** The Stream Stewards program promotes champions for neighborhood streams and increases community involvement in stormwater awareness and watershed protection. Activities include watershed ambassadors and keepers, volunteer cleanups, storm drain art, and participation in trainings and events. There were 145 volunteers who participated in 26 events and activities in FY17.

Stream Stewards

Watershed Assessment

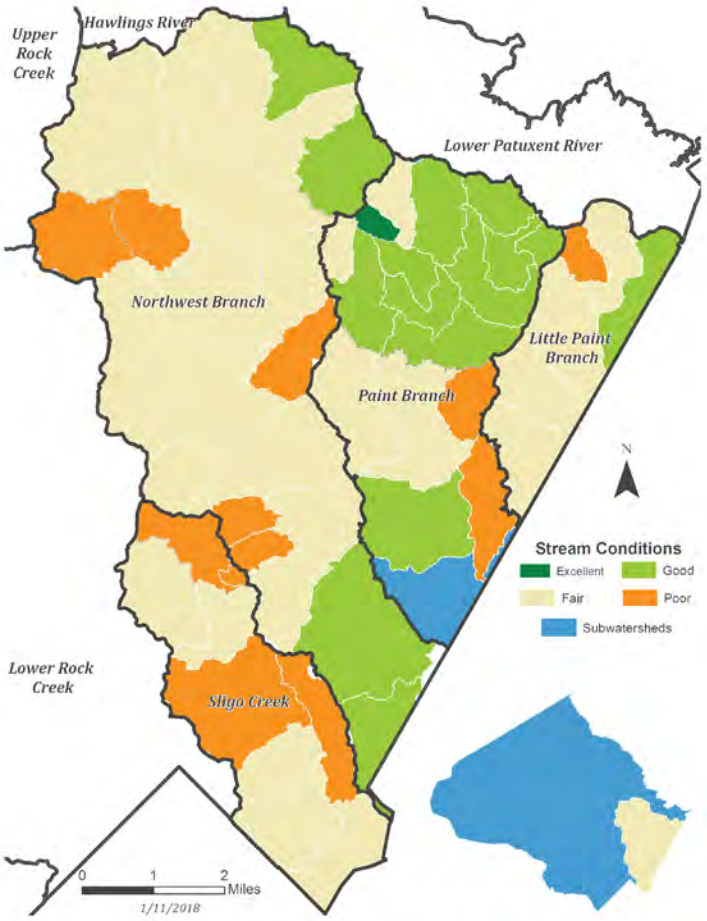
In accordance with the permit, the County has conducted a systematic assessment of water quality within all of its watersheds, identified water quality improvement opportunities, and developed implementation plans to control stormwater discharges. DEP is currently implementing those plans and is updating the Cabin John Creek and Rock Creek Watershed Studies to identify and prioritize future stormwater projects.

DEP monitors the aquatic biological community (fish and benthic organisms) and stream habitat conditions at representative stations in all County watersheds on a rotating basis over a five-year cycle. Results of monitoring enable the County to assess watershed health and changes over time. DEP also adds randomly-selected monitoring stations within each watershed to help assess watershed-wide stream conditions. DEP's full five-year cycle of baseline watershed conditions in the County from 2011 to 2015 is available as an interactive map at: http://www.montgomerycountymd.gov/dep/water/watershed-health.html. This map allows the user to examine the health

of more than 150 sub-watersheds in the County by zooming in or searching by address.

In 2016, DEP began a new cycle of stream monitoring for the County with the Anacostia sub-watersheds: Sligo Creek, Northwest Branch, Paint Branch, and Little Paint Branch. Approximately 39 Anacostia stream sites were sampled for benthic macroinvertebrates and fish. Stream conditions for the watersheds sampled during the 2016 monitoring season demonstrate that changes in stream conditions have generally been marginal. Narrative category changes (bad, fair, good) involving a greater than 10% change occurred at 10 of 39 (27%) stations. While fish populations were generally as expected for the observed habitat ratings, benthic communities were not. Even with restoration improvements to stream habitats, sufficient populations of benthic organisms may not be available to recolonize these more urban areas due to site isolation and the limited mobility of most benthic organisms.

2016 Stream Conditions in Anacostia River Subwatersheds of Montgomery County

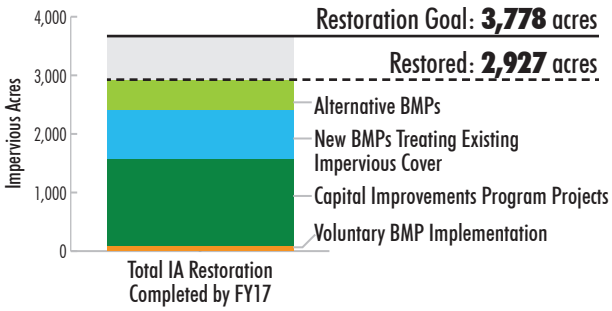


Watershed Restoration

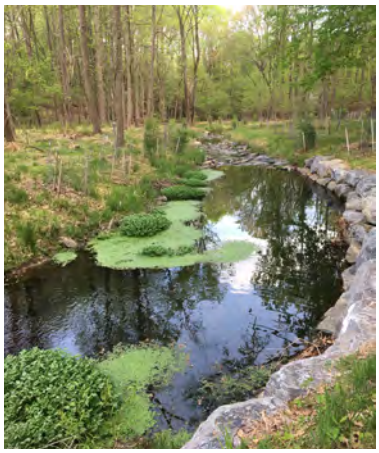
The County's MS4 area comprises 25,119 impervious areas, with 6,230 controlled to the maximum extent practicable by the end of the previous permit (2009). The current permit requires the County to restore 20 percent of the remaining impervious areas, which translates to an additional 3,778 acres.

The County has made significant progress toward meeting this additional requirement for watershed restoration through multiple programs. As of the end of FY17, the County has restored 2,927 impervious acres, an increase of 1,009 from FY16. This restored area reflects 77 percent of the goal of 3,778 acres under the current permit. As of December 2017, the County has 851 impervious acres remaining to achieve the restoration requirements specified in the permit. The County is currently in negotiation with MDE for a consent decree that will require the County to meet this goal by December 2020. Based on progress to date, the County expects to achieve this goal.

Impervious Area Restoration



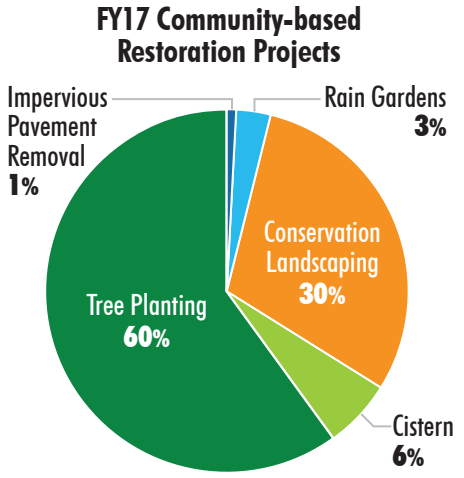
Green streets projects include (top to bottom) tree boxes, bioretention, and planted curb extensions.



Stream restoration on Hollywood

The County is progressing towards its watershed restoration goals through the following types of projects:

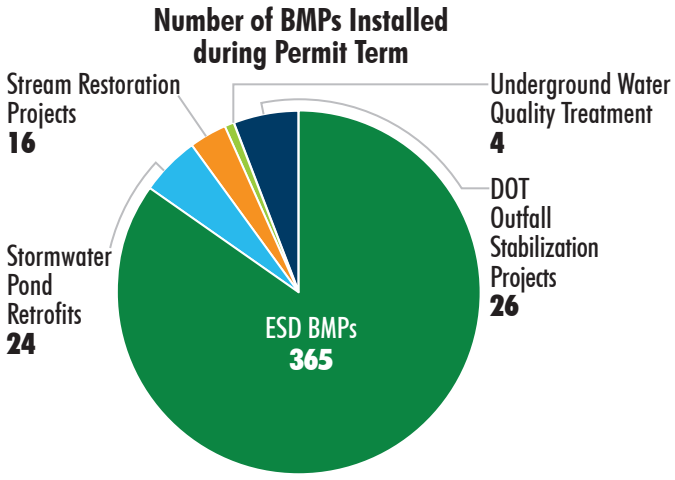
- **Green streets –** The County implemented one of the first Green Street programs in the state, installing more than 360 green street BMPs by FY17. One green street BMP was completed in FY17. Green street BMPs not only capture stormwater, but also create aesthetically-attractive streetscapes, provide natural habitats, and help visually connect neighborhoods, schools, parks, and business districts. (https://www.montgomerycountymd.gov/water/restoration/green-streets.html)
- **Public property BMPs –** DEP continued to design and implement stormwater management projects on public property including school grounds, libraries, parking lots, and community centers. These projects are used to help teach people about the benefits of stormwater management. Twenty-eight public property ESD practices were completed in FY17 for a total of 39 completed through the permit term.
- **Stormwater pond retrofits –** The County retrofitted 7 stormwater ponds in FY17 for a total of 24 over the permit term. Stormwater pond retrofits have focused on the ponds located in the Anacostia River, Rock Creek, and Seneca Creek watersheds. These retrofits include native planting, wetland planting, and native trees to provide ecological habitat benefits.
- **Stream restoration projects –** The County completed 2 stream restoration projects in FY17, restoring more than 2,500 linear feet of stream, and more than 30,000 linear feet during the permit term. Stream restoration projects are focused in the Anacostia River, Rock Creek, and Seneca Creek watersheds.
- **Underground water quality treatment –** Additional water quality benefits can be gained in highlight urbanized areas by installing underground water quality treatment systems. The County completed four such facilities in FY17.
- **Community-based restoration watershed grants –** DEP administers a watershed grant program through the Chesapeake Bay Trust. All watershed grant projects funded in FY15 and four grant projects funded in FY17 were completed by the end of FY17, resulting in about 2.4 acres of impervious area treated by community-based restoration projects.
- **RainScapes program –** DEP implements a RainScapes program to promote and implement environmentally-friendly landscaping and small-scale stormwater management projects on residential, institutional, and commercial properties, and offers technical and financial assistance. RainScapes Rewards provides rebates to property owners who install qualified small-scale stormwater projects. The program has grown in popularity over the years and in FY17, 259 projects were submitted and 107 projects were rebated. During the permit term, RainScapes has reduced runoff from 49.4 impervious acres in the County for at least the first inch of rain.



- **Alternative BMPs –** Alternative BMPs, such as urban tree canopy expansion, urban forest planning, impervious surface removal, connecting septic systems to wastewater treatment plants, catch basin and storm drain cleaning, and street sweeping, provide water quality benefits that give the County additional methods to meet restoration requirements. During the permit term, 522 acres were treated from alternative BMPs.
- **Urban trees and forests –** In 2016, the Chesapeake Bay Program Water Quality Goal Implementation Team approved BMPs for urban tree canopy expansion and urban forest planting. These practices provide pollution reduction credit and equivalent impervious area credit for two types of tree plantings. One type, Urban Tree Canopy Expansion projects, provides credit for every new individual tree planted in developed areas. Many of the urban trees planted in the County are coordinated through the RainScapes and Tree Montgomery programs. Urban Forest Planting projects, the second type, are implemented in urban or suburban areas with the intent of establishing forest ecosystem processes. The County has planted 8,687 individual trees during the permit term, with an equivalent impervious area restoration of 29 acres. The County began a reforestation project at the Oaks Landfill in 2011 and has planted trees on 45 acres to date, the equivalent of restoring 45 acres of impervious area.
- The County has also evaluated its urban BMP database and done a comprehensive review of impervious surfaces and BMP drainage area data, which revealed a significant backlog of BMPs that were missing data. Based on improvement of the BMP inventory and database, the County has identified 832 acres of impervious area that had been treated by new BMPs installed for development projects that are treating existing 2009 impervious area.

The Waterford Condominium project, a RainScapes project installed in FY16, demonstrated newer building techniques for rain gardens and is managing 2,700 square feet of roof area.

The County continues to work toward meeting its goal for restoration of impervious areas. In FY17, new projects under construction will control 416 additional impervious acres. In addition, multiple projects are currently in design and are slated for construction within the next 3 years. Projects in design will achieve stormwater control for more than 1,500 impervious acres, completing the goal of 20 percent reduction or 3,778 acres of impervious area restored.



Assessment of Controls

Watershed Restoration Assessment

The Permit requires the County to assess the effectiveness of its stormwater management program and control measures using pre-restoration and post-restoration watershed monitoring, which includes chemical, physical and biological monitoring. DEP targeted the Breewood tributary in the Anacostia Watershed for comprehensive watershed restoration and assessment efforts.

Within the Breewood Tributary watershed, DEP has previously completed construction of 10 ESD practices along residential roads and 3 RainScapes projects on individual residential properties, which together address runoff from 54 residential properties. Additionally, 1,200 linear feet of stream restoration was completed in FY15. DEP is currently designing 12 ESD practices to treat runoff from the University Towers and 1 ESD practice at the Northwood Presbyterian Church. These projects are scheduled for construction in the first half of 2018.

The Breewood Tributary Restoration Project is designed to quantify the changes in both water quality and water quantity resulting from comprehensive watershed restoration efforts. The project will also provide valuable information regarding how long it takes after completion of restoration projects for benefits to be seen in stream. Benefits of watershed restoration include stabilized streambanks, reduced pollutant load, reduced flooding and improved ecological health.

Stormwater Management Assessment

The permit requires the County to assess the effectiveness of stormwater management practices found in the Maryland Stormwater Design manual for stream channel protection. DEP monitors the developing Newcut Road Neighborhood tributary to the Little Seneca Creek "test" area in the Clarksburg Special Protection Area and compares results to those from the undeveloped Soper's Branch, Little Bennett sub-watershed "control" area to evaluate the

Upstream View of Sligo Creek, Breewood Tributary, Study Area 1, Pre Restoration (2013)

Upstream View of Sligo Creek, Breewood Tributary, Study Area 1, Post-Restoration (2013)

effectiveness of the design manual criteria in protecting the stream channel.

Results of biological, physical, and hydrologic monitoring indicate the stream channel in the test area may still be in a state of flux as the system responds to the conversion from temporary erosion and sediment control BMPs to permanent stormwater management facilities. Post-construction monitoring has not yet been completed. However, from the preliminary results, it appears that the construction phase of development has affected the stream channel, as shown by straightening, down-cutting, and enlargement of the channel.

Program Funding

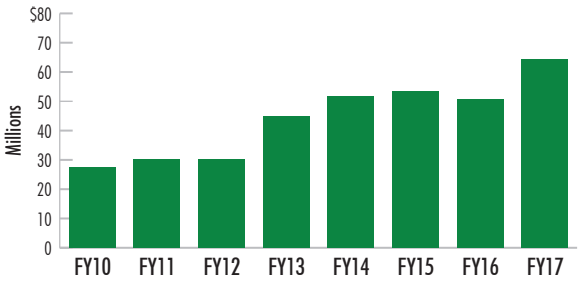
The County has committed to meet stormwater initiatives through a ten-fold increase in capital improvement project funding and an increase in operating budget funding over the permit term.

Total expenditures for all programmatic measures including personnel and capital improvement costs have increased substantially through the permit term, except in FY16, when legal challenges against the WQPC limited expenditures. During FY17, the total expenditures associated with permit requirements was $64,244,630, an increase of 27.1 percent over the permit expenditures in FY16. The increase in expenditure is from increased capital improvement project work in FY17 and from the debt service paid for two revenue bonds. In FY17, 58% of expenditures were for operations and 42% for capital improvements.

Highlights of the stormwater management budget include continuing the planning and implementation of stormwater management projects, public outreach, stream monitoring, and other actions needed to comply with the County's MS4 permit. Expanding the use of public-private contracts and partnerships through a new capital improvement project will help the County meet permit goals in a more cost-effective manner.

Green street Installed as part of the Breewood Tributary Restoration Project

Total MS4 Program Expenditures



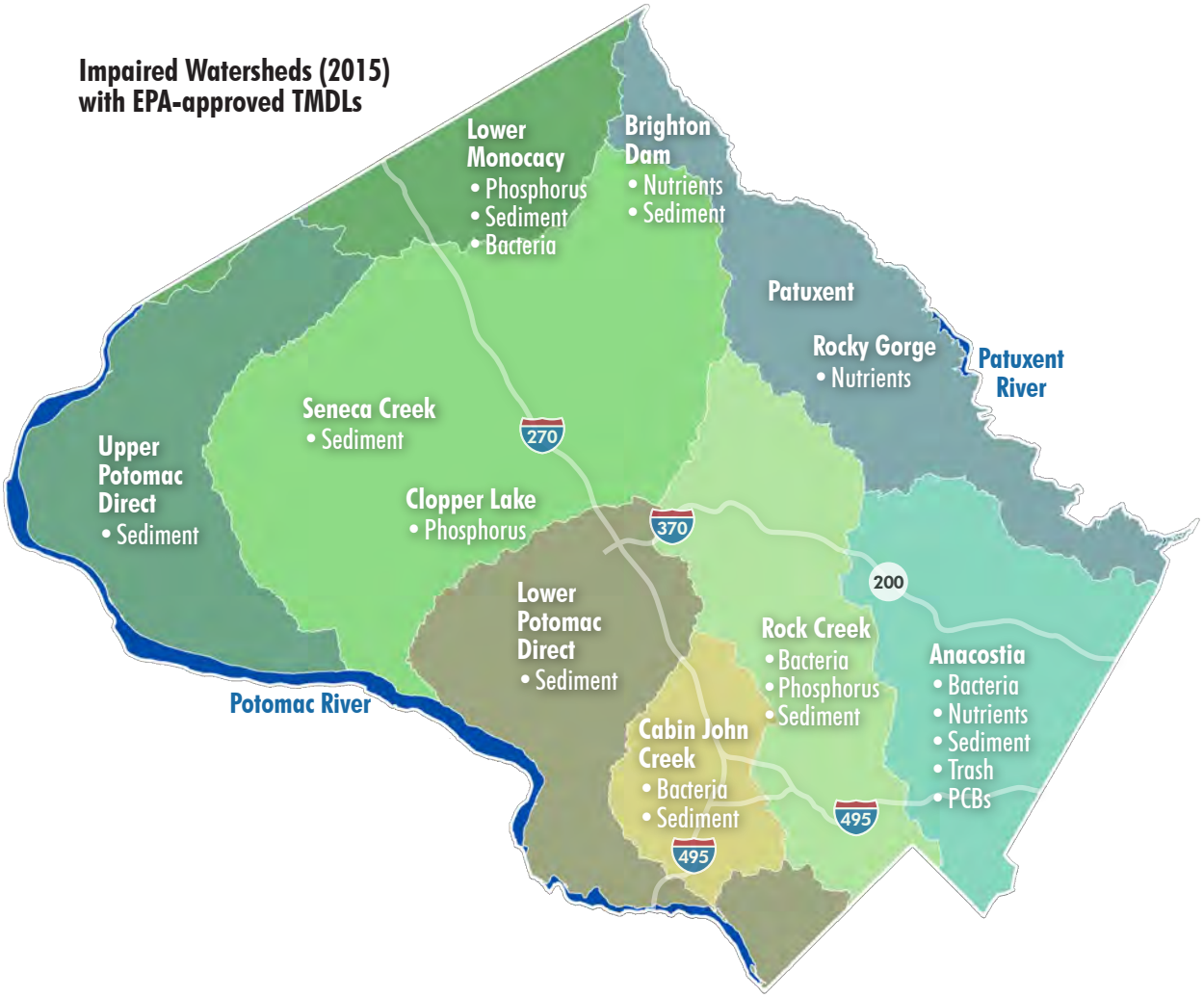
A **TMDL** is a regulatory term that describes the maximum amount of a pollutant that a water body can receive while still meeting water quality standards.

Total Maximum Daily Load

The permit required the County to develop implementation plans to achieve progress toward the County's Waste Load Allocations associated with the TMDLs that existed when the permit was issued in 2010. These plans were developed and submitted within 1 year of the start of the permit, as required.

Additional TMDLs were added after the permit was issued and TMDL implementation plans either have been completed or are included in a County-wide Coordinated Implementation Strategy.

County stormwater controls and watershed restoration initiatives have made progress toward meeting the TMDL goals.



II. Introduction

This submission by the Montgomery County (the County) Department of Environmental Protection's (DEP) to the Maryland Department of the Environment (MDE) fulfills the annual progress report requirement as specified in Part IV of the Municipal Separate Storm Sewer System (MS4) Permit Number 06-DP-3320 MD0068349 (the Permit). The DEP is submitting its eighth report in this current permit cycle (February 16, 2010-February 15, 2015).

The five-year permit term began February 16, 2010, covering stormwater discharges from the MS4 in the County. The Permit term expired on February 15, 2015. The DEP submitted a reapplication for the MS4 permit in the fourth year, annual report submitted on March 31, 2014. As provided in Code of Maryland Regulations (COMAR) § 26.08.04.06A(3), if a new permit is not issued by MDE after timely reapplication by the permittee, "the terms and conditions of the existing permit shall continue and remain fully effective and enforceable." The County continues to implement the requirements of the Permit, which is administratively continued and is now in its eighth year.

The County has made considerable progress in meeting all of the Permit requirements since 2010, including maintaining adequate legal authority, identifying pollutant sources, expanding our stormwater facility maintenance and inspection program, enhancing property management programs to reduce stormwater pollution, expanding our stormwater pollution awareness outreach programs, making progress on meeting the County wasteload allocations for approved Total Maximum Daily Load (TMDL), and assuring adequate funding for the Permit-required programs.

The County has always been a leader in implementing innovative and aggressive stormwater programs, including the 20-percent restoration goal in our current permit. Even with the support of the County Executive and the County Council, the 20-percent goal has proven to be challenging. To continue to progress toward meeting the restoration goal, the County implemented two innovative "pay for performance" contracts totaling $9.5 million. These contracts were executed in 2017.

As of the date of submittal of this report, MDE and DEP have reached tentative agreement on a Consent Decree resolving issues with the County's performance pursuant to the 2010 MS4 permit. The five-year permit required the County to restore 3,778 acres of impervious area. As of the time of the drafting of the Consent Decree, the County had restored 1,918 impervious acres, resulting in a deficit of 1,860.5 impervious acres that have not been restored to the maximum extent practicable. The data presented in this report show that the County has now completed restoration of 2,927 (77%) of the required acres.

The Consent Decree imposes a $300,000 penalty for failure to complete all of the restoration work required by the 2010 permit. The penalty can be satisfied through the construction of one or more MDE-approved Supplemental Environmental Projects by December 31, 2020. In addition, the decree requires that the restoration work remaining under the terms of the 2010 MS4 permit be completed in the same timeframe. Based on progress to date, the County expects to achieve this goal.

The report itself has been organized based on the headings in the Permit's Part III, Standard Permit Conditions, to document implementation of required elements. Required elements of the Permit are presented in a box format in the beginning of each section/sub-section. Information required by the Permit's Attachment A, Annual Report Databases, Tables A through L can be found electronically on the compact disc (CD) submission in Appendix A.

III. Standard Permit Conditions

A. Permit Administration

A. **Permit Administration**

The County shall designate an individual to act as a liaison with the Maryland Department of 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 to MDE an organizational chart detailing personnel and groups responsible for major NPDES program tasks in this permit. MDE shall be notified within 14 days of any changes in personnel or organization relative to NPDES program tasks.

The designated individual to act as a liaison with the Maryland Department of the Environment (MDE) is:

Amy Stevens

Acting Division Chief, Department of Environmental Protection,

255 Rockville Pike, Ste 120,

Rockville MD 20850

240-777-7766

Amy.Stevens@montgomerycountymd.gov

Table III.A.1 shows County personnel responsible for major NPDES program tasks. These are the County's contacts as of February 2018.

Table III.A.1 Organization Chart for Montgomery County Permit-Required Programs

Part III. Standard Permit Elements	Responsible Party			
	Department	Name	Title	Telephone
A. Organization Chart- Liaison with MDE for Permit Implementation	DEP	Amy Stevens	Acting Division Chief	240-777-7766
B. Legal Authority	OCA	Walter Wilson	Associate County Attorney	240-777-6759
C. Source Identification	DEP	Vicky Wan	IT Manager	240-777-7722
D. Discharge Characterization (as described in Part III H. Assessment of Controls)				
E. Management Programs				
1. Stormwater Management				
1.a. Stormwater Facility Inspections and Maintenance	DEP	Pam Parker	Manager	240-777-7758
1.b. Stormwater Management Permitting and Plan Review	DPS	Richard Brush	Division Chief	240-777-6343
2. Erosion and Sediment Control	DPS	Richard Brush	Division Chief	240-777-6343
3. Illicit Connection Detection and Elimination Program	DEP	Steve Martin	Field Program Manager	240-777-7746

Table III.A.1 Organization Chart for Montgomery County Permit-Required Programs				
Part III. Standard Permit Elements	**Responsible Party**			
	Department	**Name**	**Title**	**Telephone**
4. Trash and Litter	DEP	Amy Stevens	Acting Division Chief	240-777-7766
5. Property Management	DGS	David E. Dise	Director	240-777-9910
6. Road and Roadside Maintenance	DOT	Richard Dorsey	Division Chief	240-777-7600
7. Public Education and Outreach	DEP	Amy Stevens	Acting Division Chief	240-777-7766
F. Watershed Assessment Countywide Monitoring	DEP	Amy Stevens	Acting Division Chief	240-777-7766
G. Watershed Restoration				
Assessments and Project Implementation	DEP	Craig Carson	Manager	240-777-7713
H. Assessment of Controls	DEP	Amy Stevens	Acting Division Chief	240-777-7766
I. Program Funding	DEP	Patty Bubar	Acting Director	240-777-7786
J. TMDL	DEP	Amy Stevens	Acting Division Chief	240-777-7766
Part IV. Program Review and Annual Progress Reporting	DEP	Amy Stevens	Acting Division Chief	240-777-7766
Part V. Special Programmatic Conditions	DEP	Amy Stevens	Acting Division Chief	240-777-7766

Notes:

DEPARTMENT ADDRESSES:

DEP - Department of Environmental Protection, 255 Rockville Pike, Ste 120, Rockville MD 20850

DGS - Department of General Services, 101 Monroe Street, 9th Floor, Rockville, MD 20850

DPS - Department of Permitting Services, Division of Land Development Services, 255 Rockville Pike, 2nd floor, Rockville MD 20850

DOT- Department of Transportation, Division of Highway Services, 101 Orchard Ridge Dr. 2nd Flr. Gaithersburg MD 20878

OCA - Office of the County Attorney, 101 Monroe St. 3rd Floor, Rockville, MD 20850

B. Legal Authority

B.	**Legal Authority** Montgomery County shall maintain adequate legal authority in accordance with NPDES regulations 40 CFR part 122 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 the Department within 14 days and specify a schedule for making the necessary changes to maintain adequate legal authority.

The laws of Montgomery County provide sufficient legal authority to enable the County to meet the requirements of the MS4 permit. Those laws are as follows:

B.1 Chapter 19 of the Montgomery County Code – Erosion, Sediment Control, and Stormwater Management

Chapter 19 was enacted to protect, maintain and enhance the public health, safety, and general welfare by establishing minimum requirements and procedures to control the adverse impacts associated with land disturbance and increased stormwater runoff from developed and developing properties. Chapter 19 includes:

- Article I - Establishes the County's legal authority to administer a sediment and erosion control program.
- Article II - Establishes the County's legal authority to administer a stormwater management program.
- Article IV - Establishes the County's authority to prohibit the discharge of pollutants to waterbodies within the County without a state-issued permit and control water quality by establishing an inspection and enforcement regime that includes penalties for noncompliance.

The following modifications to Chapter 19 have occurred during the current Permit cycle:

a. Stormwater Management

In July 2010, the County Council enacted Expedited Bill 40-10 (Stormwater Management – Revisions), which was later amended in July 2011 by Expedited Bill 7-11 (Stormwater Management – Revisions). Together these bills updated the County's stormwater management law to require management of stormwater runoff through the use of nonstructural Best Management Practices (BMPs) to the maximum extent practicable (MEP) for new development and redevelopment projects approved by the County's Department of Permitting Services. They also brought the County's stormwater management law into compliance with the Maryland Stormwater Management Act of 2007 and associated state implementing regulations adopted in 2010.

The County's revised stormwater management law contains more stringent requirements than State law for redevelopment sites to protect water quality. Specifically, the Maryland Stormwater Management Act of 2007 requires management of the first inch of runoff from 50 percent of the redevelopment site using Environmental Site Design (ESD) to the MEP. County law requires stormwater management of the water

quality volume (WQv, the first inch of runoff) and channel protection volume (CPv, the expected runoff from a 1-year 24-hour duration rainfall) from 100 percent of the redevelopment site, and requires the use of ESD to the MEP to meet these standards.

b. Sediment and Erosion Control

In March 2013, the County Council enacted Expedited Bill 1-13 (Erosion and Sediment Control – Special Protection Areas – Amendments), which brings local erosion and sediment control requirements into compliance with the Maryland Stormwater Management Act of 2007 and the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control. The County legislation mirrors the requirements in State law and regulations by, among other things, including more stringent stabilization requirements and the establishment of maximum grading unit criteria. In addition, this law requires persons that engage in land disturbing activity in an area designated as a special protection area to pay a monitoring fee, established by regulation, to the Department of Environmental Protection in lieu of developing and implementing their own best management practices monitoring plan. The monitoring regulation is codified at COMCOR (Code of Montgomery County Regulations) § 19.67.03.01.

c. Water Quality Protection Charge

In April 2013, the County Council enacted Expedited Bill 34-12 (Stormwater Management – Water Quality Protection Charge) to bring County law into compliance with a state law enacted by the General Assembly as House Bill 987 mandating the levying of local charges to pay for stormwater remediation in Phase I jurisdictions.

In April 2015, the County Council enacted Bill 2-15 (Stormwater Management - Water Quality Protection Charge - Credit and Financial Hardship Exemption Deadlines), which extended the deadline for submittal of both requests for credit against the Water Quality Protection Charge (WQPC) and financial hardship exemptions to September 30 of each year, after annual property tax bills are posted in July.

In November 2015, the County Council enacted Expedited Bill 45-15 (Stormwater Management - Water Quality Protection Charge – Curative Legislation) to explicitly designate the WQPC as an excise tax under the County's general taxing authority in response to an adverse court ruling premised on the assumption that the WQPC was intended to function as a fee-for-service.

In June 2016, the County Council enacted Expedited Bill 11-16 (Stormwater Management – Water Quality Protection Charge – Grants – Credit) to authorize the establishment of a watershed restoration grant program for certain owners of improved aircraft landing areas to offset costs of the WQPC, to clarify the eligibility criteria for a property owner to receive a WQPC credit, and expand the timeframe for a property owner to appeal the denial of a request for a credit or adjustment of the amount of the WQPC billed to the property owner. These legislative changes and corresponding regulatory changes (Executive Regulation 12-16AM also adopted in June 2016) modify the credit award to being based on the proportion of the volume of water treated by the stormwater management system. With the credit awards being tied to volume of treatment, a credit of 60 percent will be provided for properties using traditional stormwater management, and up to 80 percent for properties with stormwater management systems that implement ESD to the maximum extent practicable. Additionally, these changes increase the maximum credit for a non-residential or multifamily residential property to 100 percent for treatment of adjacent properties.

d. Coal Tar Sealants

In September 2012, the County Council enacted Bill 21-12 (Erosion, Sediment Control and Stormwater Management - Coal Tar Pavement Products), which banned the use and sale of coal tar products in the County. Under that law, use of a coal-tar based sealant can result in a fine of up to $1,000 for each violation committed by both the property owner and the applicator.

Other legislation in support of water quality protection programs required under the Permit include the following:

e. Carryout Bag Tax (Chapter 52, Article XIV)

In January 2012, the County Council enacted Bill 8-11 (Taxation - Excise Tax - Disposable Carryout Bags), to help the County meet the Permit requirements for litter reduction. The goal of the law was to increase awareness of disposable bag litter pollution and to reduce the use of carryout bags. The carryout bag tax law imposes a tax of 5 cents, which is collected at the point of sale, for each paper and plastic bag that a customer takes from certain retail establishments to carry purchases. The Department of Finance is responsible for enforcing the bag tax law.

f. Expanded Polystyrene Food Service Ware (Chapter 48, Article VI)

In January 2015, the County Council enacted Bill 41-14 (Solid Waste (Trash) - Food Service Products - Packaging Materials – Requirements), which bans the use and sale of expanded polystyrene food service ware and loose fill packaging. The law requires that disposable food service ware purchased and used in the County be either recyclable or compostable. The law is applicable to County agencies, contractors and lessees as of January 1, 2016, and for all other food service businesses as of January 1, 2017. DEP's Division of Solid Waste Services (DSWS) will develop an education campaign to inform food service businesses, certain retailers and consumers about the requirements and the deadlines for compliance.

g. Pesticides – Notice Requirements – Cosmetic Pesticide Use Restrictions (Chapter 33B)

County Bill 52-14 (Pesticides – Notice Requirements – Cosmetic Pesticide Use Restrictions) became law on October 20, 2015. This law accomplishes the following:

1. Regulates the use of certain substances on lawns in the County, and permits only those substances that (a) contain active ingredients recommended by the National Organic Standards Board or (b) that are designated as minimum risk pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act. This provision takes effect on January 1, 2018.

2. Places additional notification requirements on pesticide retailers and applicators.

3. Requires the implementation of a public outreach and education campaign related to the law.

4. Requires the Montgomery County Parks Department to implement a pesticide-free parks program.

h. Solid Waste – Illegal Dumping and Litter Control (Chapter 48)

In March 2016, the County passed Bill 1-16 to amend the existing County law to prohibit the disposal of garbage and other solid waste on certain public and private property and to provide additional penalties as

authorized in a 2015 amendment to State law. Bill 1-16 implements the new authority given to Montgomery County through the Maryland General Assembly's enactment of House Bill 106 to impose additional penalties up to those in the State law.

B.2 Executive Regulation

In April 2016, the County adopted Executive Regulation 16-15 (COMCOR § 19.67.03) to implement the best management practices monitoring fees in the Special Protection Areas. This regulation establishes a fee that a private entity or County public agency must pay to the Department of Permitting Services to cover the cost of monitoring stormwater best management practices for any development project in a Special Protection Area.

B.3 Resolution

In June 2016, the County Council adopted Resolution Number 18-538 to approve the 2016 NPDES MS4 Permit Financial Assurance Plan (FAP). A hearing was held on the FAP on June 14, 2015. On June 30, 2016, Montgomery County provided to MDE the FY16 FAP. On October 17, 2016, MDE acknowledged receipt of the FAP. The submission fulfilled the requirements of the 2015 revisions of the Annotated Code of Maryland, Section 4-202.1 of the Maryland Environmental Article, Watershed Protection and Restoration Programs.

B.4 Co-Permittees

The MDE modified the County's Permit effective January 26, 2004 to add six small localities as co-permittees for coverage under the Phase II of the National Pollutant Discharge Elimination System (NPDES) MS4 Permit Program. In FY17, the County continued its oversight, inspection, and enforcement authority over the Towns of Chevy Chase, Kensington, Poolesville, and Somerset, and Chevy Chase Village; and one special tax district, the Village of Friendship Heights. Municipality contacts are shown in Table III.B.1.

Table III.B.1 List of Contacts for Municipalities Co-permittees

Municipality	Contact Name and Title	Address	Telephone
Chevy Chase Village	Shana R. Davis-Cook, Manager Michael Younes, Director of Municipal Operations	Village Hall 5906 Connecticut Avenue, Chevy Chase, MD 20915	301-654-7300
Friendship Heights	Julian Mansfield, Village Manager	4433 South Park Avenue Chevy Chase, MD 20815	301-656-2797
Town of Chevy Chase	Todd Hoffman, Town Manager	4301 Willow Lane Chevy Chase, MD 20815	301-654-7144
Town of Kensington	Sanford Daily, Town Manager	3710 Mitchell Street Kensington, MD 20895	301-949-2424
Town of Poolesville	Wade Yost, Town Manager	P.O. Box 158 Poolesville, MD 20827	301-428-8927
Town of Somerset	Jeffrey Slavin, Mayor Rich Charnovich, Town Manager	4510 Cumberland Avenue, Chevy Chase, MD 20815	301-654-1258

In January 2010, MDE added Montgomery County Public Schools (MCPS) to the County's Permit as a co-permittee. MCPS designated Brian Mullikin, Environmental Team Leader, Division of Maintenance, and Agustin Diaz, Environmental Specialist, as staff responsible to implement stormwater management programs and coordinate on Permit issues. MCPS provided a detailed annual report on MS4 related activities. MCPSs Report to the County on MS4 Activities in FY16 can be found in Appendix C in the CD attachment to this report. This report includes information on MCPS MS4 related activities as appropriate.

C. Source Identification

C. **Source Identification**

Sources of pollutants in stormwater runoff 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 that effectively improve water quality. The following information shall be submitted for all County watersheds in geographic information system (GIS) format with associated tables as required in PART IV of this permit:

1. Storm drain system: major outfalls, inlets, and associated drainage areas delineated;
2. Urban best management practices (BMP): stormwater management facility data including outfall locations and delineated drainage areas;
3. Impervious surfaces: delineated controlled and uncontrolled impervious areas based on, at a minimum, Maryland's hierarchical eight-digit sub-basins;
4. Monitoring locations: locations established for chemical, biological, and physical monitoring of watershed restoration efforts and the *2000 Maryland Stormwater Design Manual*; and
5. Watershed restoration: restoration projects proposed, under construction, and completed with associated drainage areas delineated.

The County continues to improve geographic information system (GIS) data to accurately account for the impervious area controlled within the MS4 boundary. Data improvements include digitizing impervious areas, updating the urban BMP database and refining existing BMP's drainage areas. The information is submitted for all County watersheds in GIS format as required by the Permit in Part IV and Attachment A, Annual Report Databases, Tables A.-L. The information can be found in this report's CD attachment in Appendix A, MDENPDES17.accdb, Tables A-L.

C.1 Storm Drain System

The County's storm drain outfall inventory is found in Appendix A, MDENPDES17.accdb, Table A. Storm Drain System Mapping Associated with GIS Coverage. Storm drain mapping is continuing to improve, thanks to strong leadership by Department of Transportation (DOT), and consistent interdepartmental collaboration. Significant progress has been made in compiling datasets from many entities in a centralized database, and regularly transferring networks verified as built into an integrated "master" dataset, accessible in a universal location. This master dataset represents data vetted to be in the ground, and is a reliable stand-alone source of storm drain information at the countywide level. DOT also hosts and updates a public web map containing up-to-date storm drain data for the County. Much work is still being devoted to quality assurance/quality control (QA/QC) of older data, and data quality improvements at all stages of the process. New data is also being regularly added from right of way (ROW) and sediment control permits, field surveys, and other sources, building the overall comprehensiveness of the inventory. Additionally, developers now have the option of submitting digital storm drain data via the web map, in CAD-format, or in GIS shapefiles. Looking ahead, discussions about ways to streamline the data input process and take advantage of technological improvements are on-going.

C.2 Urban Best Management Practices

The County's urban BMP database as of June 30, 2017 with associated coverage is included electronically in Appendix A, MDENPDES17.mbd, Table B. The database uses the format required by the Permit's Attachment A., Annual Report Databases and Table B, urban BMPs. There are 11,954 records in this database. This is an increase of 3,214 BMPs (37 percent) from the FY16 Urban BMP Database.

In FY17, DEP continued to improve on the attribute data for BMP built dates, drainage areas, and impervious area for 11,954 BMPs. Table III.C.1 provides a summary of the number of BMPs by structure type in the urban BMP database. The term BMP is also used synonymously with stormwater management facility in this report.

Each year, there are approximately 1,000 new BMPs added to the County BMP inventory. To ensure data accuracy, DEP has developed a process to rigorously review each data point's attributes for quality control and assurance. The urban BMP database is not populated until the attribute data is complete.

Table III.C.1 FY17 Total Number of Stormwater Management BMPs by Structure Type Designation

Practice Type	Code	Description	Number
Detention Structure	DP	Includes dry ponds	742
Environmental Site Design	ESD	Includes micro-infiltration, tree box, rainstore	286
Dry Well	ESDW, DW	Includes dry wells, stormchambers, raintanks	4,496
Green Roof	ESDGR	Includes Green Roofs	61
Infiltration Berm	ESDIB	Includes Infiltration Berms	5
Landscape Infiltration	ESDIL	Includes Landscape Infiltration	68
Microbioretention	ESDMB, BR	Includes Microbioretention and Bioretention	817
Porous Pavement	ESDPERMP, PP	Includes porous concrete, asphalt, and pavers	142
Rain Garden	ESDRG	Includes Rain Gardens	167
Rain Water Harvesting	ESDRH	Includes Rainbarrels and Cisterns	31
Submerged Gravel Wetland	ESDSGW	Includes Submerged Gravel Wetlands	4
Swale	ESDSW, SW	Includes dry swales, grass Swales and bioswales	477
Extended Detention, Dry	EDSD	Includes dry ponds with extended detention	65
Extended Detention, Wet	EDSW	Includes wet ponds with extended detention	158
Hydrodynamic Structure: Oil Grit Separator	OGS	Includes Oil Grit Separators	684
Hydrodynamic Structure: BaySaver	BS	Includes Baysavers	197
Hydrodynamic Structure: Stormceptor	SC	Includes Stormceptor	277
Infiltration Basin	IB	Includes IB with quality and quantity control	63
Infiltration Trench	IT	Includes IT with quality and quantity control	776
Other	OTH	Includes Stormfilters, Aquafilters, Aquaswirls, Bayseparator-flowsplitters, JellyFish, Snouts, Treeboxes, Vortecnics, Vortsentry, V2B1, WQI	715
Sand Filter	SF	Includes surface and underground sand filters	1,022
Shallow Marsh	SM	Includes all constructed wetlands	129

Table III.C.1 FY17 Total Number of Stormwater Management BMPs by Structure Type Designation			
Practice Type	**Code**	**Description**	**Number**
Wet Pond	WP	Includes retention ponds and wet ponds	59
Underground Storage	UGS	Includes underground storage vaults, pipes, and storage pipes with infiltration	513
Total Number of Facilities			**11,954**

The following is summary of the data being reported in Appendix A, Table B for the FY17 Annual Report:

a. Drainage Area

Drainage Area (DA) data is provided for 11,349 BMPs. The remaining 605 are being delineated by a consultant. Approximately, 4,500 have DA developed by using the Point of Interest designation for the BMPs on single family lots. The remaining DA are digitized from the as-built plans.

b. Built Date

All 11,954 BMPs have a built date.

c. Structure Type

The MDE structure type designated as “Other” is frequently used by DEP. An explanation of how DEP classifies structures with an MDE "Other” structure type is included in general comments and the Description portion of Table III.C.1.

d. Permit Number

The DEP has included a “place-holder permit number” for the facilities that were built prior to 1986 and do not have a permit number. Because many of these facilities were built prior to Montgomery County’s authority to permit such facilities, DEP will not be able to recover a permit number from the paper files. This place holder number is “0000000000” and represents DEP’s final attempt to recover the data from the paper files. All original permit numbers known for the facilities built before 1986 have been entered into the database (typically a 6-digit number). In addition, a 10-digit place holder number beginning with 900118XXXX was also entered for those facilities built prior to 1986. This number was created by Department of Permitting Services (DPS) for those facilities to be entered into their database system. The DEP has kept this permit number in order to allow interface with the DPS database. There are also data missing in the permit number field for facilities built after 1986. The remaining 441 are left blank in the case the permit number is discovered.

e. ADC Map

The DEP is no longer using this data field because all data is now geospatially located in the GIS database with an x and y coordinate. This data has not been populated or updated since FY13, and is very likely not consistent with the latest ADC map.

f. Runoff Curve Number

The DEP's new asset and maintenance management system requires a number for all number fields. Those records with a runoff curve number (RCN) of "0" are records where the RCN was not provided in the paper files.

g. Impervious Area

Where available, Table B provides the impervious area in each facility's drainage area, regardless of spatial context. This data should not be used to determine total impervious area treated by the BMPs as the data does not consider how well or completely that facility is treating its impervious area, nor any nested or more downstream facilities. Summation of the data will result in an inflated and erroneous amount of impervious acreage treated. Based on how we currently store our data, and compute our impervious/credit numbers, it is not feasible for us to make the impervious numbers in Table B consistent with any of other datasets.

h. Last Inspection Date

All records in the Urban BMP database have a last inspection date. More information on the inspection data provided in the Urban BMP database is provided in Section III.E.1.

C.3 Impervious Surfaces

The County's 2009 impervious area with associated coverage can be found in Appendix A, MDENPDES17.mbd, Table C. Impervious Surfaces Associated with GIS Coverage. This impervious information was used to develop the Strategy.

DEP continues to digitize and update impervious areas for the County's stormwater utility charge, the WQPC. DEP continues to update and digitize the drainage areas of all BMPs.

C.4 Monitoring Locations

The GIS coverage and associated attribute information for locations established for chemical, biological, and physical monitoring of watershed restoration efforts required in Section III.H. Assessment of Controls (Tables E., E.1., and E.2.; Monitoring Site Locations), can be found in Appendix A, MDENPDES17.accdb, Tables E., E.1., and E.2. Monitoring Site Locations Associated with GIS Coverage.

C.5 Watershed Restoration

The GIS coverage and associated attribute information for watershed restoration projects proposed, under construction and completed with associated drainage areas can be found in Appendix A, MDENPDES17.accdb, Tables D. Water Quality Improvement Project Locations Associated with GIS Coverage.

D. Discharge Characterization

D. **Discharge Characterization**

Montgomery County and 10 other municipalities in Maryland have been conducting discharge characterization monitoring since the early 1990s. From this expansive monitoring, a statewide database has been developed that includes hundreds of storms across numerous land uses. Analyses of this dataset and other research performed nationally effectively characterize stormwater runoff in Maryland for NPDES municipal stormwater purposes. These analyses and additional monitoring data required under this permit shall be used by Montgomery County to assess the following: the effectiveness of stormwater management programs, County watershed restoration projects, and to document progress toward meeting waste load allocations (WLAs) included in Total Maximum Daily Loads (TMDLs) approved by the U.S. Environmental Protection Agency (EPA) for watershed or stream segments located in the County. Details about this monitoring can be found in PART III.H.

The Permit requires that the County use discharge characterization monitoring gathered since the early 1990s and additional monitoring data required under the Permit to assess the effectiveness of its stormwater management programs and watershed restoration projects. The County must also document progress towards meeting the waste load allocations in EPA approved TMDL for watersheds or stream segments located in the County. Discharge characterization results and County progress towards meeting waste load allocations (WLAs) can be found in Appendix A, MDENPDES17.accdb, Tables F., G., G.1., G.2., and H. Details about this monitoring can be found in Part III.H. Assessment of Controls.

E. Management Programs

E.1 Stormwater Management Programs

1. Stormwater Management

An acceptable stormwater management program shall be maintained in accordance with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. At a minimum, the County shall:

a. Conduct preventative maintenance inspections of all stormwater management facilities at least on a triennial basis. Documentation identifying the facilities inspected, the number of maintenance inspections, follow-up inspections, the enforcement action(s) used to ensure compliance, the maintenance inspection schedules, and any other relevant information shall be submitted in the County's annual reports.

b. Implement the stormwater management design policies, principles, methods, and practices found in the *2000 Maryland Stormwater Design Manual* and the provisions of Maryland's *Stormwater Management Act of 2007* (Act). This includes, but is not limited to:

i. Within one year of State adoption of regulations required under the Act, modify the County stormwater management ordinance, regulations, and new development plans review and approval processes in order to implement environmental site design (ESD) to the MEP;

ii. Within one year of State adoption of regulations required under the Act, review existing planning and zoning and public works ordinances and other local codes to identify impediments to, and opportunities for, promoting the implementation of environmental site design (ESD) to the MEP;

iii. Within two years of State adoption of regulations required under the Act, modify those ordinances and codes identified in Part III.E.1.b.ii. above to eliminate impediments to, and promote implementation of, ESD to the MEP; and

iv. Report annually the modifications that have or need to be made to all ordinances, regulations, and new development plans review and approval processes to accommodate the requirements of the Act.

c. Maintain programmatic and implementation information according to the requirements established as part of MDE's triennial stormwater program review.

E.1.a. Stormwater Management Facility Inspections and Maintenance

a. Inventory and Maintenance Responsibilities for SWM Facilities

The Permit requires the County to conduct preventative maintenance inspections of all stormwater management (SWM) facilities on at least a triennial basis. The DEP Stormwater Facility Maintenance Program (SWFMP) oversees inspection and maintenance of all SWM facilities under County jurisdiction.

The DEP performs structural maintenance on facilities owned by the County, MCPS, Maryland National Capital Park and Planning Commission (MNCPPC), and ESD practices located on County property and County right-of-way (ROW). DEP is also responsible to perform structural maintenance on private

practices where maintenance responsibility has been transferred to the County (the private property owner remains responsible for non-structural maintenance). All maintenance of ESD facilities located on private property is the responsibility of the property owners.

The data reported for FY17 represents DEP's inspection and maintenance responsibilities as defined in County Code (Chapter 19) and Part III.E.1 of the Permit. In the Urban BMP database, there are 11,954 SWM facilities (see Part III.C.2.). The breakdown of facility maintenance responsibility and DEP oversight of the facilities is as follows:

- 4,412 SWM facilities are structurally maintained by DEP, of which 1,965 are privately owned (i.e., facilities that serve residential common properties) and 2,447 are publicly owned (i.e., facilities that serve public schools, government, and park properties).

- 7,542 SWM facilities are privately owned and structurally maintained by the private property owners; DEP's program ensures and enforces maintenance for these facilities.

b. Stormwater Management Facility Inspections

The DEP oversees inspection of all SWM facilities under County jurisdiction, both public and privately owned. Inspections that are tracked and reported in the MS4 Annual report include triennial inspections (inspections conducted once every 3 years), annual inspections, WQPC credit -inspections by single family property owners for WQPC credit, and unscheduled inspections conducted for compliance and enforcement, and in response to complaints.

From July 2016 through June 2017 (FY17), 2,534 inspections were conducted by DEP staff and the triennial inspection contractor. Table III.E.1 provides a summary of the inspections conducted from July 1, 2016 to June 30, 2017.

Table III.E.1 Total Number of Inspections Completed (FY17)	
Triennial Inspections	1,487
Annual Underground Pre-Maintenance Inspections	931
WQPC Credit Inspection	106
Unscheduled Inspections (transfer, complaint, maintenance)	10
Total Number of Inspections Completed	2,534

c. Triennial Inspections

Between July 1, 2016 and June 30, 2017, 1,487 triennial inspections were completed by DEP staff or by DEP's inspection contractor. The triennial inspections are preventative maintenance inspections to assess repair and maintenance needs, and are conducted under DEP's triennial inspection contract. The County is divided into three geographical regions for triennial inspections (Figure III.E.1). Reports by fiscal year will always include information on inspection and maintenance in two regions because DEP schedules work on a calendar year basis. Table III.E.2 provides a breakdown of the total number of triennial inspections completed in inspection regions 3 and 1 between July 2016 and June 2017.

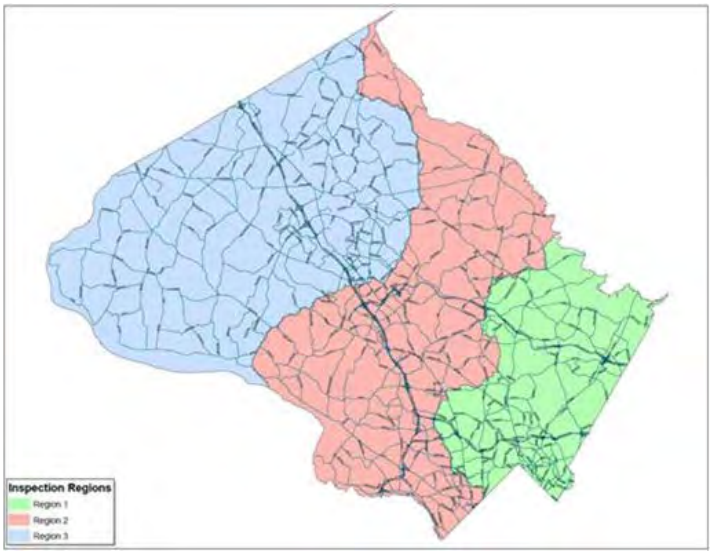


Figure III.E 1. Map of the Stormwater Facility Inspection Regions

Table III.E.2 Triennial Inspections Completed (FY17)
Regions 3 and 1

Inspection Type	Total
Environmental Site Design[1]	153
Filtering Systems[2]	349
Stormwater Infiltrations[3]	131
Oil/Grit Separators	180
Proprietary Hydrodynamic[4]	4
Stormwater Ponds[5]	11
Underground Storage	364
Stormwater Wetlands	0
Open Channel Systems[6]	201
Other[7]	94
Triennial Inspections Completed in FY17	1,487

[1]*Includes Bioretention (BR)*

[2]*Includes all aboveground and underground sand filters, and proprietary filters such as Stormfilters*

[3]*Includes trenches and basins*

[4]*Includes BaySaver, Stormceptor, Vortechs systems, and other proprietary hydrodynamic devices*

[5]*Includes all dry and wet ponds, and ponds with extended detention*

[6]*Includes dry swales and bioswales*

[7]*Includes all other types of devices*

d. Triennial Inspection of ESD Facilities

In FY17, DEP inspected 153 ESD practices; these practices were located primarily on non-residential and public property. DEP faces multiple challenges to completing triennial inspections of ESD practices, particularly because they are mostly located on single family residential (SFR) lots. The main challenges involve gaining access to the facilities for inspection, and developing the capacity of the inspection program to accommodate the growing volume of facilities added to the Urban BMP database each year since 2010.

In July 2010, when ESD was first required by County Code, the County did not require easements for SFR private property to perform the inspections for facilities permitted. In 2016, DEP worked with Department of Permitting Services (DPS) to require Right of Entry and Maintenance Agreements for all new sediment and erosion control permits, and an agreement was approved by the Office of the County Attorney. DPS began requiring the easement on January 1, 2017. However, because there were permits approved between July 2010 and December 2016, there are 4,858 existing facilities on SFR lots where DEP has no legal access via an easement to conduct inspections.

The number of ESD facilities added to DEP's Urban BMP database also presents a challenge. Since 2010, DEP has added over 5,000 ESD facilities on public and private property. DEP has responsibility to conduct triennial inspections of these facilities, however DEP's inspection program must develop both contractual and staff capacity to accomplish the required inspections.

DEP has taken the following actions to address triennial inspections of ESD on commercial, SFR, other residential properties (e.g. HOA properties), and public properties:

- In FY16, DEP worked with the triennial inspection contractor to develop contract prices for inspection of the ESD practices found in the Chapter 5 of the State's Stormwater Design Manual. The prices were finalized in July 2016. In FY17, 117 inspections were conducted under these new contract prices. Future fiscal years will show increasing numbers of ESD inspections as DEP and the contractor expand capacity.
- To augment ESD inspections performed by the triennial inspection contractor, DEP hired a new staff augmentation contract inspector with expertise in vegetated stormwater practices to begin conducting inspections of ESD practices other than those on SFR properties. The contractor is working with other program staff to address outreach and education for proper ESD practice maintenance for the private owners of the facilities.
- DEP included an FY18 budget request for two new ESD program managers that will develop the programs needed to accommodate the rapid growth of ESD facilities. The first program manager will be responsible for inspections of all publicly owned ESD facilities and maintenance of ESD on County government owned properties. The second program manager will develop a program to accomplish inspections of 4,858 ESD facilities on private property, primarily SFR lots. Both positions were approved for the FY18 budget. DEP is developing position descriptions and will advertise the positions as soon as possible.

In addition, DEP is taking the following actions to improve the effectiveness of the triennial inspection program:

- DEP is recruiting a program manager who will be solely assigned to managing the triennial inspection program. The program will greatly benefit from the leadership and focused attention of a full-time staff member.
- DEP will reduce the number of annual inspections of underground facilities in FY18 for those facilities that past inspections have shown do not need annual inspections. This will also allow the reallocation of staff resources toward conducting triennial inspections.

e. Other Types of Inspections

DEP also conducts other inspections of SWM facilities outside of the triennial inspection program. DEP staff inspects underground facilities annually to determine if they need to be cleaned; in FY17, 931 annual inspections were completed at underground facilities. Annual underground pre-maintenance inspections are also preventive maintenance inspections that are conducted to assess maintenance needs; these inspections are conducted from the surface and do not require a confined space inspection as is conducted for triennial inspections of underground facilities. These inspections occur in between the triennial inspection year, when a confined space inspection is performed.

Other types of inspections include inspections in response to public complaints, of facilities being considered for transfer into DEP's SWFMP, and to assess conditions after a large storm event. DEP inspection staff performs unscheduled and compliance follow-up inspections for privately maintained facilities as needed; 10 unscheduled inspections were performed between July 1, 2016 and December 31, 2017.

In FY16, DEP developed, and piloted, a residential ESD self-inspection and maintenance online inspection form. The online inspection form assists owners in inspecting and maintaining the facilities on their properties. The form is tied to the County's WQPC Program, making it easy for the owner to apply for a credit at the time of inspection. DEP plans to continue to work with property owners to provide resources to help them perform yearly inspections and required maintenance on the ESD facilities on their property. DEP recommends owners inspect their ESD facilities on an annual basis and perform maintenance as necessary. If the property owner uses DEP's online form, and performs their inspection and maintenance on a yearly basis, DEP intends to use the inspection data to count toward the triennial inspection requirement. In addition, DEP will also conduct audit inspections of approximately 5 percent of the owner-inspected facilities to ensure the practices are functioning properly. In May 2017, 119 letters were sent to single family property owners with ESD facilities. Eleven property owners filled out the application and the inspection report, which resulted in 53 facilities that had an approved WQPC credit inspection. This represented a 10 percent response rate to the letters. In 2018, DEP intends to target approximately 1,000 properties with this group of letters.

f. Urban BMP Database

In 2017, DEP increased the number of inspections conducted to ensure that all applicable structural BMPs have a valid inspection date, and because a significant number of new BMPs were added to the Urban BMP database in 2017. The Urban BMP Database (Appendix A, Table B) was generated for submittal on December 31, 2017 and includes inspection through December 31, 2017. The last inspection date field within the Urban BMP Database includes triennial inspections, annual pre-maintenance inspections, WQPC credit inspections, unscheduled inspections, and inspections conducted by the DPS as of

December 31, 2017. Over 8,000 BMPs have inspection conducted within the last three years of this reporting period (2013). However, the Urban BMP database also shows that 3,397 of 11,954 facilities (28 percent) have not had a triennial inspection within the last three years (since 2013). The majority of these facilities (3,156) are ESD practices on SFR properties and the remaining 241 practices are structural facilities or ESD practices located on commercial property. In 2017, DEP's data clean-up effort resulted in several structural and ESD facilities dating back to the 1990s that were discovered on old as-built plans. DEP has added these facilities to the Urban BMP Database and is conducting inspections on this backlog of facilities. All the structural facilities and ESD facilities on commercial property will be inspected by the end of FY18.

g. Stormwater Management Facility Maintenance

In addition to inspections, the DEP SWFMP oversees structural and non-structural maintenance of all SWM facilities under the County's jurisdiction. In FY17, 3,544 facilities were maintained, either by DEP contractors or by the facility owner (Table III.E.3). All maintenance was performed under the guidance of DEP inspection staff. In FY17, DEP staff performed 666 follow-up inspections of privately maintained aboveground and underground facilities. Follow up inspections are required to ensure that repair work is completed when a facility's maintenance need is ranked as "high" or "emergency". DEP also conducts follow-up inspections to ensure that routine cleaning/maintenance has been conducted. DEP inspection staff also performs follow-up inspections on publicly maintained facilities once maintenance has been completed to ensure work performed by contractors is acceptable in accordance with maintenance requirements and contract terms; over 500 follow-up inspections were conducted by DEP staff on DEP-maintained facilities.

Table III.E.3 FY17 Stormwater Facility Repairs and Maintenance

Type of Facility	Total
Privately Owned and Maintained	
Aboveground	281
Underground	325
Number of Privately Owned Facilities Maintained by Owner	**606**
Number of Private Maintenance Compliance Inspections	**666**
DEP Maintained	
Aboveground Structurally Maintained	545
Routine Sand Filter Maintenance	25
Mowing and Trash Removal	13
Underground Structurally Maintained	718
ESD/ Low Impact Development (LID) Routine Maintenance	1,618
ESD/LID Facilities Repaired	19
Number of Facilities Maintained by DEP	**2,938**
Total Number of Facilities Maintained (by Owner and DEP)	**3,544**

h. Privately Owned and Maintained Aboveground Facilities

During FY17, 281 aboveground facilities were privately maintained; this number includes facilities issued a Notice of Violation (NOV) in FY16 or FY17. DEP conducted a final inspection for each of these facilities to assure that the facilities were in compliance and properly functioning. Furthermore, DEP issued 200 NOVs requiring correction of deficiencies noted during triennial inspections. Of the 200 NOVs, 157 facilities with a high or emergency maintenance need level were maintained by the private owner in FY17. DEP also transmitted over 113 routine maintenance notification letters to property owners in FY17. Inspectors conducted approximately 562 follow-up inspections to ensure compliance on the NOV and notices issued by DEP.

i. Privately Owned and Maintained Underground Facilities

Private underground facilities are inspected annually in between triennial inspections to assess the condition of the facility (presence of sediment, trash, and debris, and/or repairs) and the need for maintenance. If the facility failed the annual inspection, an NOV is delivered to the owner. DEP inspectors perform a follow-up inspection on each facility to ensure it was maintained properly and notify the property owner once the work is completed to DEP's satisfaction. In FY17, 325 underground facilities were privately maintained. Any repairs identified in the triennial inspection are required to be completed at the same time. DEP issued 149 NOVs for maintenance and repair of privately owned underground facilities. Inspectors conducted approximately 104 follow-up inspections on the underground facilities to ensure compliance on the NOV and notices issued by DEP.

j. DEP Maintained Aboveground Facilities

In FY17, DEP used a general contractor to perform structural maintenance on 545 aboveground SWM facilities. This number includes all inspection repairs identified in triennial inspections, removing minor accumulations of sediment, unblocking clogged low flows, minor concrete repair, erosion repair, restoring/replenishing media, and debris removal. DEP also performs routine maintenance on sand filters for facilities in the DEP maintenance program. Twenty-five surface sand filters had routine sand filter maintenance (i.e., scarification) performed by DEP. Additionally, 13 ponds had regular mowing and monthly trash removal performed by DEP contractors.

In addition to the routine maintenance listed above, DEP removes sediment from DEP structurally maintained ponds via mechanical dredging. In FY17, 2,681 cubic yards of sediment were removed via this method.

k. DEP Maintained ESD Facilities

In FY17, DEP continued conducting monthly maintenance of ESD facilities on County property, including ESD facilities constructed through the Watershed Restoration Program. The facilities include those constructed in the roadway ROW in neighborhoods ("Green Streets"), and those constructed on County owned properties such as civic centers and libraries. DEP's contractor for routine maintenance of above ground SWM facilities conducts the monthly maintenance, and the contractor performed over 1,600 maintenance visits in FY17. In addition, 19 ESD facilities were repaired. In FY18, DEP plans to renovate several of the Green Street facilities to improve the functionality of these systems.

l. DEP Maintained Underground Facilities

During FY17, DEP performed cleaning and repairs on 718 underground facilities. The facilities included 43 located at County maintenance depots that are maintained twice a year, three BaySavers at a bus depot that are maintained six times a year, and three Stormceptors at the Shady Grove Transfer Station that are maintained three times a year.

m. Co-Permittee Structural and Nonstructural Maintenance

MCPS Division of Maintenance upgraded and repaired existing underground and aboveground stormwater facilities in FY17. MCPS staff perform some of the nonstructural maintenance on aboveground stormwater facilities, and some of the work is contracted. The maintenance of 220 bioretention facilities and 985,000 square feet of green roof on MCPS facilities is contracted out.

E.1.b. Stormwater Management Design, Plan Review, and Permitting

The Permit requires the County to maintain programmatic and implementation information according to the requirements established as part of MDE Triennial stormwater program review. The DPS is responsible for implementing the programmatic requirements for the stormwater management plan review and permitting. Table III.E.4 provides detail on the number of reviews and approvals in FY17.

It should be noted here that local stormwater management requirements are stricter than State minimum standards in some ways. For example, MDE standards include a stormwater management exemption for projects that disturb less than 5,000 square feet, while DPS requires sediment control and stormwater management to be addressed for any construction of a new home or commercial building regardless of the disturbance amount. This undoubtedly accounts for many of the waivers of stormwater management issued by DPS in FY17, especially for single family residential teardown projects that may not have otherwise been required to address stormwater management. Likewise, DPS did not follow the State standard for reducing stormwater management compliance for redevelopment projects when it incorporated ESD into the County Code. DPS instead requires redevelopment projects to address ESD to the MEP. This approach, while generally successful in obtaining ESD compliance on most projects, can be expected to generate additional waivers due to limitations of existing site conditions, such as poor soils and shallow receiving storm drain systems.

Table III.E.4 FY16 Permits and Plan Review	
Approved Concept Designs	124
Site Development	3
Final Plans[1]	346
Redevelopment	32
Waivers[2]	218

[1] Total sediment control plan approvals within the fiscal year. Based on unique grading permit number. Includes permits issued for SWM concept applications submitted in prior years, multiple permits under the same concept file number, and projects for which a separate stormwater conceptual submission is not required.

[2] Includes full and partial waivers for residential and non-residential projects. These include teardown/rebuild of existing single-family homes on existing recorded lots, for which a separate stormwater concept submission is not required. Many of these residential rebuilds require at least a partial waiver of stormwater requirements. Whether or not a waiver is granted, all must provide ESD to the maximum extent practicable on the lot. Teardown/rebuild on existing single family lots accounted for all but 15 of the waivers issued in FY17. Of these 15, 3 were for public transportation projects.

E.2 Erosion and Sediment Control

2. Erosion and Sediment Control

An acceptable erosion and sediment control program shall be maintained in accordance with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland. At a minimum, the County shall:

a. Implement program improvements identified in any MDE evaluation of the County's application for the delegation of erosion and sediment control enforcement authority;

b. At least three times per year, conduct responsible personnel certification classes to educate construction site operators regarding erosion and sediment control compliance. Program activity shall be recorded on MDE's "green card" database and submitted as required in PART iv OF THIS PERMIT; AND

c. Report 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.

Section III.E.2 of the Permit requires the County to maintain an acceptable erosion and sediment control (ESC) program, including implementation of improvements identified in MDE's biennial evaluation of the County's ESC program. The Permit also requires the County to conduct responsible personnel certification classes to educate construction site operators regarding erosion and sediment control compliance, and to report quarterly information regarding earth disturbances exceeding 1 acre.

E.2.a MDE Evaluation of County Application for Delegation of ESC Enforcement Authority

i. No Improvements Required by MDE Evaluation of County Delegation

MDE performed a biennial evaluation of the County's ESC program as part of their review of the County's application for the delegation of ESC enforcement authority on October 28, 2015 and November 12, 2015. Continued delegation was granted through June 30, 2018 by Lynn Buhl, Director, Water Management Administration in a letter dated January 28, 2016 (see Appendix F). In that letter, MDE "has also determined that the County's program is in compliance with the erosion and sediment control program elements stipulated in Part III.E.2 of the Montgomery County MS4 Permit".

MDE conducted its delegation review of Montgomery County's Sediment and Erosion Control Program on November 8-9, 2017 with a follow up date of November 22, 2017. The County is eagerly awaiting the results of the latest review and will provide more details and any follow-up actions in the FY18 annual report.

MDE did not identify any improvements that the County was required to make in its ESC Program.

ii. Description of County ESC Program

The DPS is responsible for implementing the ESC program for Montgomery County. The goal of the ESC program is to reduce pollutant loads from new developments and redevelopment during construction. The County employs inspection and enforcement actions by issuing violation notices and stop work orders to enforce compliance of ESC plans. The elements of the program include:

- Review of the grading permit applications for earth disturbance,
- Inspections and enforcement of grading and sediment control regulations,
- Compliance investigations,
- Reporting regarding earth disturbances exceeding 1 acre, and
- Providing training for certification of responsible personnel.

iii. Inspection and Enforcement Actions

Table III.E.5 provides detail on the number of ESC inspections and enforcement actions taken by DPS in FY17.

Table III.E.5 Erosion and Sediment Control Program Enforcement Actions for FY17	
Number of ESC Inspections	17,120
Enforcement Actions	
Number of NOVs	355
Number of Stop Work Orders	63
Number of Civil Citations	137
Civil Citation Fines Collected	$41,855

Table III.E.6 summarizes the County's ESC Control Inspection and Enforcement Program over the Permit term.

Table III.E.6 Summary of County's Erosion and Sediment Control Program Enforcement Actions over the Permit Term (FY11 through FY17)

	FY11	FY12	FY13	FY14	FY15	FY16	FY17	Total
Inspections	13,472	11,191	12,439	18,151	20,793	20,152	17,120	113,318
NOVs	343	248	235	520	511	424	355	2,636
Citations	146	105	103	160	162	115	137	928
Fines Collected	$43,926	$55,750	$67,000	$82,350	$94,955	$96,350	$41,855	$482,186

E.2.b. Responsible Personnel Certification

In 2016, MDE developed an on-line Responsible Personnel Certification training to make it more convenient for personnel to get trained on an as-needed basis without waiting for the regular scheduled training classes. Ray Bahr, Chief, Sediment and Stormwater Program Review Division, MDE, in a personal communication with the DPS Field Supervisor Derek Isensee, indicated that the online class "will constitute Montgomery County's RCP (Responsible Personnel Certification) efforts and comply with the County's MS4 permit conditions." Since the responsible personnel certification training sessions are held online by MDE, data related to training is no longer be reported in this document.

E.2.c Quarterly Grading Permits

Quarterly grading permit information for earth disturbances in the County of 1 acre or more can be found in Appendix A, MDENPDES17.mbd, Table K. Quarterly Grading Permit Information.

E.3 Illicit Discharge Detection and Elimination

3. Illicit Discharge Detection and Elimination

The County shall implement an inspection and enforcement program to ensure that all discharges to and from the municipal separate storm sewer system that are not composed entirely of stormwater are either permitted by MDE or eliminated. At a minimum, activities shall include:

a. Field screening at least 150 outfalls annually. Each outfall having a discharge shall be sampled 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;

b. Conducting routine surveys of commercial and industrial areas for discovering and eliminating pollutant sources. Areas surveyed shall be reported annually;

c. Maintaining a program to address illegal discharges, dumping and spills;

d. Using appropriate enforcement procedures for investigating and eliminating illicit discharges, illegal dumping, and spills. Significant discharges shall be reported to MDE for enforcement and/or permitting; and

e. Reporting illicit discharge detection and elimination activities as specified in PART IV of this permit.

The Permit requires the County to implement an inspection and enforcement program to ensure that all non-stormwater discharges to and from the municipal separate storm sewer system that are not composed entirely of stormwater are either permitted by MDE or eliminated.

E.3.a Outfall Screening

The permit requires field screening of at least 150 outfalls annually, with field water chemistry analysis of dry weather discharges according to parameters specified in the Permit's Attachment A, Annual Report Databases, Part I. Illicit Discharge Detection and Elimination (IDDE). The aim of the outfall screening process is to identify, investigate, and eliminate illegal connections to the County's storm drain system.

i. Approach to Outfall Screening

Beginning in FY11, DEP began using a comprehensive approach to outfall screening that includes walking all stream reaches within a targeted watershed. All outfalls encountered are categorized, documented, and sampled when dry weather flow is found. Outfalls with no flow are assessed for physical indicators such as pipe benthic growth, corrosion, algae, and structural issues. . Outfalls found that are not currently listed in the County's inventory are assigned identification (ID) numbers in the field, photographed, and location marked with a global positioning system (GPS) point. The ID numbers and pertinent data are forwarded to the DEP GIS team for inclusion in the ArcMap stormdrain outfall layer. This method has allowed DEP to document and add over 650 new outfall points to its GIS storm drain layer over 6 years. In addition, numerous structures, such as road/driveway culverts, that were mistakenly

identified in the system as outfalls were corrected. The areas screened in FY17 were comprised of residential and park property. In these land uses, illicit discharge issues were not significant.

ii. Outfall Screening Results in FY17

During May and June 2017, the DEP Division of Environmental Policy and Compliance (DEPC) performed outfall screening in the commercial and industrial areas: Montgomery County Airpark, Oakmont Ave., Olney, East Gude Dr. and Southlawn Lane. These areas are located predominately within the Upper Rock Creek, Middle Seneca Creek Watersheds and parts of the Northwest Branch and Hawlings River Watersheds (Figure III.E.2). The outfalls screened in FY17 are in Appendix A, MDENPDES17.mbd, Table I.

In FY17, DEPC screened a total of 162 outfalls and found 26 outfalls with dry weather flows and identified 64 new outfalls that were previously not mapped in the inventory. Errors in outfall location or type as shown on the existing maps were reported and will be corrected in the GIS inventory; the 64 new outfalls identified will be added to the existing maps. Figure III.E.2 shows the locations of the priority outfalls and other outfalls that were screened during the 2017 IDDE screening program. Appendix G includes a Storm Drain Outfall Screening and Monitoring Field Sheet.

Of the 26 outfalls with dry weather flows, three were found to have elevated chlorine and/or detergent levels at the initial screening and one was found to have a recent sediment deposition. Follow-up investigations performed at these four outfalls showed no further elevated water chemistry parameters at two of the outfalls. The outfall with sediment deposition was tracked back to Southlawn Lane, but source tracking to a specific facility was unsuccessful. The investigation of the fourth outfall, which contained elevated detergent levels is ongoing and is recommended for an in-pipe investigation. A summary of the findings for these four outfalls is shown in Table III.E.7. The remaining 22 outfalls that had dry weather flow during the initial visit did not exhibit abnormal water chemistry parameters, visual characteristics, odor issues, or unusual vegetative growth, and were therefore classified as groundwater discharge.

Table III.E.7 Investigation Results of Suspected Illicit Discharges During FY17

Outfall ID	Location	Problem Found	Resolution
HT563P9226	18269 Leman Lake Dr., Olney	Elevated chlorine level	No further issue found in two subsequent follow up visits. Investigation Closed.
GU121P0071	8321 Beechcraft Ave., Gaithersburg	Elevated detergent level	No further issue found in two subsequent follow up visits. Investigation Closed.
GU121P0370	19407 Kildonan Dr., Gaithersburg	Elevated detergent level	Subsequent visits confirm the issue is ongoing. Recommend confined space entry into pipe to further investigate.
GS561P0057	Southlawn Lane, Rockville	Sediment deposition	Unable to locate exact source due to the number of industrial facilities that discharge to this outfall. Matter referred to MDE for follow-up of industrial permit.

Table III.E.8, summarizes DEP's IDDE program during the Permit term. From FY11 to FY17, DEP assessed 1,188 outfalls by walking the entire reach of waterbodies in four separate subwatersheds, capturing most of the existing outfalls in each drainage area. DEP is targeting subwatersheds with the highest percentages of commercial and industrial areas to identify and eliminate pollutant sources in those areas.

Table III.E.8 Summary of Illicit Discharge Detection and Elimination during the Permit Term (FY11 through FY17)

	Number of Outfalls	Percent of Total
Outfalls Screened	1,188	
Outfalls Unmapped	745	63 % of Total Outfalls Screened
Suspected Illicit Discharges	147	12 % of Total Outfalls Screened
Resulting Investigations	84	7 % of Total Outfalls Screened
Problem Resolved	18	2 % Of Total Outfalls Screened

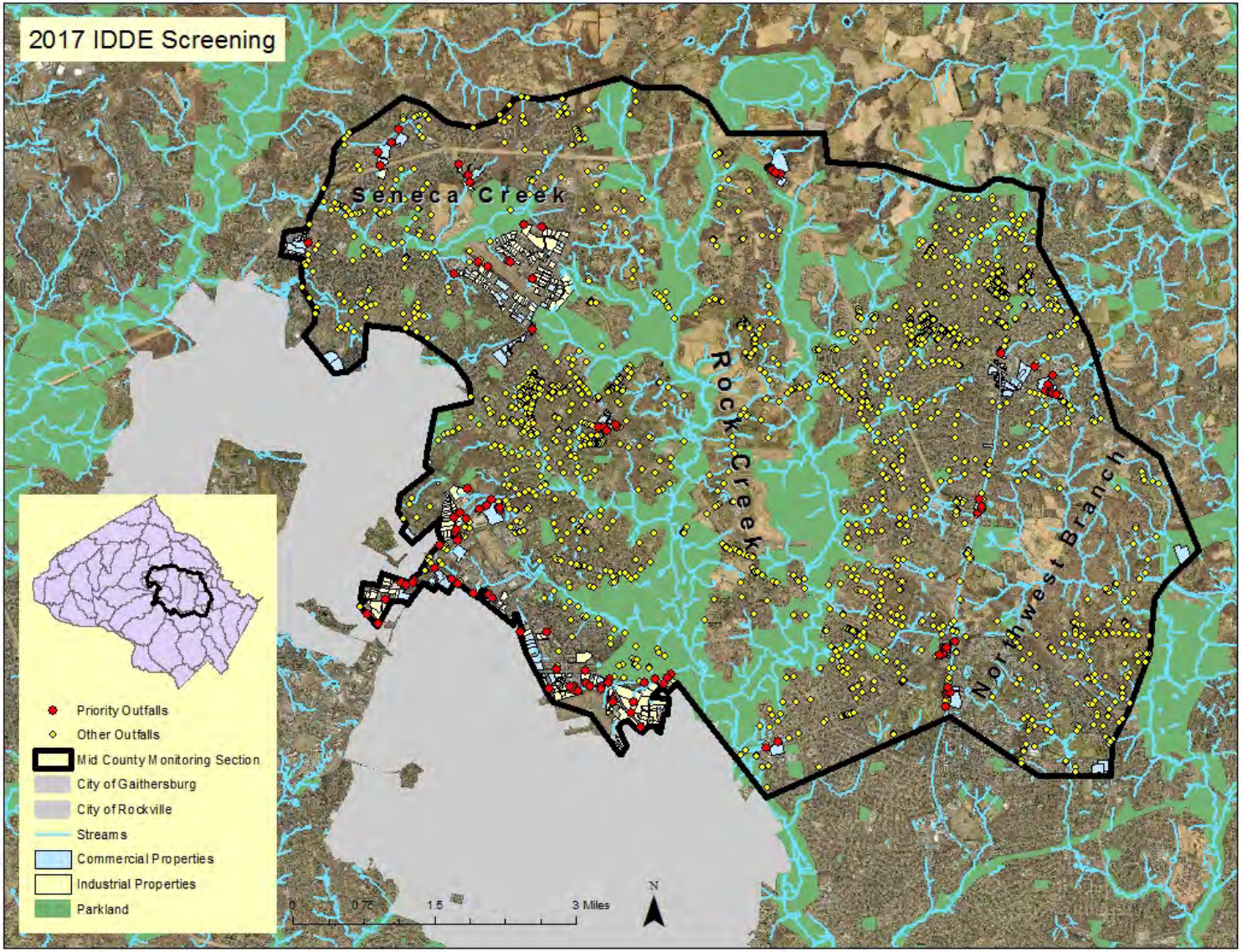


Figure III.E 1 Locations of the FY17 IDDE Screening Outfalls

iii. WSSC Sanitary Sewer Overflow Follow-up Investigations

DEP is continuing to work with WSSC by performing follow-up site visits for reported sanitary sewer overflows (SSO's) in the County, and performed 55 site visits in FY17. The purpose to these follow-up site visits is to verify the SSO has been corrected, ensure adequate cleanup and treatment of all affected areas, and ensure adequate public notice signage has been posted in affected areas. Also, the DEP is continuing to work with WSSC's Fats, Oils and Grease (FOG) Program regarding restaurant grease issues, which have direct effects on stormwater quality in Montgomery County.

E.3.b Routine Pollutant Surveys of Commercial and Industrial Areas

i. Procedures for Conducting Pollutant Surveys of Commercial and Industrial Areas

The permit requires the County to conduct routine surveys of commercial and industrial areas for discovering and eliminating pollutant sources. DEP conducted 48 hotspot surveys of commercial/industrial sites as part of the comprehensive IDDE program. In addition, DEP selected areas for outfall screening based on results of the pollutant surveys of commercial and industrial areas, which are detailed below. The documentation for these procedures are provided in Appendix G.

Commercial and Industrial Survey Area Selection Process: DEP uses GIS to research the "Land Use Codes" field in "SDE.Property" layer related to commercial and industrial properties. A table showing the land use codes including a description and pollutant potential is included in Appendix G. The GIS spatial database engine (SDE) Property layer is maintained and managed by the Montgomery County Department of Technology Services.

Properties containing restaurants, vehicle repair businesses, and light industrial are classified as high priority sites. In addition, sites located within 100 feet of a storm drain inlet are given additional priority ranking. The search of the current GIS SDE Property layer showed a total of 2,103 sites (566 industrial and 1,537 commercial). Of the 2,103 total industrial and commercial sites, 1,193 are located within 100 feet of a storm drain inlet.

Equipment Needed for Commercial and Industrial Surveys:

- Site information packet (see Survey Process below for details)
- iPhone/iPad with Hotspot Assessment Form (HSAF)
- Stormdrain test kit
- Manhole hook(s)
- Flashlight
- Long handle dipper
- Spill absorbent, spill pads and spill boom
- Hard hat, safety boots, gloves (leather and chemical resistant), safety glasses and safety vest

Commercial and Industrial Survey Process:

Routine surveys of commercial and industrial areas for discovering and eliminating pollutant sources involve the following steps:

- Contact property owner, property management company, and business about intent to survey the property.
- Prepare site information packet to include: aerial map showing the local storm drain system and surface water features, research nearby outfalls to determine if they are appropriately identified and mapped (if not identified in the system, the staff member will need to complete the applicable outfall screening forms), HSAF, research results of complaint database and previous local outfall

screening activities, documented research if the facility has a general or specific NPDES Permit issued by MDE, NOV form and Civil Citation booklet, and a copy of Montgomery County Code, Chapter 19 Water Quality Control Ordinance.

- With the permission of the senior facility representative on site, walk the site and check all areas noted on the HSAF paying particular attention to observe, photograph and document on the HSAF any issues that could result in illicit discharge of pollutants to the stormdrain system.
- Immediately report issues to the facility representative on site stressing that corrective actions are required as soon as possible, or enforcement action can be taken.
- Upon completion of the survey, staff shall open a case in CaseBase (DEP database system) linking the HSAF in the documents tab, entering all actions, documents and photos.

The Staff member shall then follow up within a few days to ensure corrective actions have been taken. If unresolved actions remain, the staff member will issue the appropriate enforcement action requiring compliance within a reasonable period of time.

ii. Results of the Commercial and Industrial Surveys

The Permit requires the County to conduct routine surveys of commercial and industrial areas for discovering and eliminating pollutant sources and report those annually. In FY17 DEP performed 48 hotspot surveys of properties located in the following commercial and industrial areas: Montgomery County Airpark, Oakmont Avenue in Gaithersburg, Olney Town Center, Hillcrest Avenue, and Georgia Avenue in Olney, East Gude Drive and Southlawn Lane. The surveys resulted in enforcement actions, as presented in Table III.E.9.

Based on the hotspot surveys, the DEP investigated water quality issues and related cases, which resulted in the issuance of 4 NOVs, 2 written notices, and 2 verbal warnings. The formal Enforcement Actions (NOV issued) are summarized in Table III.E.9, and the entire list of investigated issues is provided in Appendix G.

Table III.E.9 Summary of Stormwater Discharge Enforcement Cases based on Commercial and Industrial Survey Results for FY17

Case No.	Location Description	Issue	Enforcement action	Resolved
20171213	Rock Creek Village Shopping Center	Grease containers	NOV	Yes
20171214	Fair Hill Shopping Center	Grease	NOV	Yes
20171215	Leisure World Shopping Ctr	Grease containers	NOV	Yes
20171252	Amazon	Oil stains	Written Notice	Yes
20171301	Norbeck Center	Grease	Written Notice	Yes
20171303	Disalvatore Realty	Grease	NOV	Yes
20172351	507 E Gude	Grease	Verbal warning	Yes
20172358	702 E Gude	Car washing	Verbal warning	Yes

E.3.c Program to Address Illegal Discharges, Dumping and Spills

In FY17, the County met permit requirements to maintain a program to address and respond to illegal discharges, dumping, and spills. Information on illegal dumping can be found at:

https://www.montgomerycountymd.gov/DEP/contact/illegal-dumping.html

The County maintains a 311 call service that citizens can utilize to report environmental concerns. DEP is responsible for investigating and enforcing clean-up for non-emergency fuel, oil or chemical spills which do not pose an immediate risk to public health or safety. The description of the 311 spill response hotline can be found at:

http://www3.montgomerycountymd.gov/311/Solutions.aspx?SolutionId=1-3G15WH

DEPC investigates illegal dumping complaints. Details of the enforcement actions over the permit term are summarized in Table III.E.10.

During FY17, there were 348 complaints concerning the illegal dumping of solid waste, which resulted in the issuance of 13 formal Enforcement Actions (4 Civil Citations with fines totaling $2,000 and 9 NOVs) and numerous Warning Letters. The vast majority of complaints concerned bags of trash, vegetation (leaves and brush), or other unwanted materials either dumped or being stored on private or public property. Only a small percentage of these cases represented a potential for direct runoff of contaminated material into a storm drain or receiving system. Complaint resolution invariably involved removal and proper disposal of trash and debris and proper storage (i.e. under cover) of other materials.

E.3.d Water Quality Investigations in FY 2017

In FY17, the DEPC investigated 273 water quality issues (198 complaints, 55 SSOs and 20 hazardous materials-related cases), which resulted in the issuance of 40 formal Enforcement Actions (12 Civil Citations with fines totaling $6,500 and 28 NOVs) and 58 Warning Letters. The formal Enforcement Actions are summarized in Table III.E.10, and the entire list of investigated water quality issues is provided Appendix G. Of the 273 water quality issues investigated in FY17, 272 were resolved and one investigation is ongoing.

Table III.E.10 FY17 Stormwater Discharge Enforcement Cases

No.	Case No.	Date Issued	Fine	Case Type	Case Sub-Type	Citation No.
1	20161621	7/1/16	$500	Stormwater	Pollutant Discharge	1Z39889718
2	20161871	7/29/16	$500	Stormwater	Pollutant Discharge	0Z39883242
3	20161296	8/2/16	$750	Stormwater	Pollutant Discharge	0Z39889801
4	20161296	8/2/16	$750	Stormwater	Pollutant Discharge	1Z39889802
5	20162430	11/3/16	$500	Stormwater	Pollutant Discharge	0Z39889808
6	20162466	11/14/16	$500	Stormwater	Pollutant Discharge	3Z39889811
7	20162466	11/14/16	$500	Stormwater	Pollutant Discharge	4Z39889812
8	20162509	11/28/16	$500	Stormwater	Pollutant Discharge	1Z39883243
9	20171140	2/14/17	$500	Stormwater	Pollutant Discharge	2Z39883244

Table III.E.10 FY17 Stormwater Discharge Enforcement Cases						
No.	**Case No.**	**Date Issued**	**Fine**	**Case Type**	**Case Sub-Type**	**Citation No.**
10	20171140	2/14/17	$500	Stormwater	Pollutant Discharge	3Z39883245
11	20171359	4/19/17	$500	Stormwater	Pollutant Discharge	0Z33852532
12	20171458	4/20/17	$500	Stormwater	Pollutant Discharge	4Z39882049
13	20161904	7/11/16	NOV	Stormwater	Pollutant Discharge	N/A
14	20161999	2/27/16	NOV	Stormwater	Pollutant Discharge	N/A
15	20161871	7/1/2016	NOV	Stormwater	Pollutant Discharge	N/A
16	20161915	7/13/16	NOV	Hazmat	Improper Storage/Handling	N/A
17	20162304	10/4/16	NOV	Water Quality	Surface Water - Unidentified	N/A
18	20162345	10/12/16	NOV	Stormwater	Pollutant Discharge	N/A
19	20162396	10/26/16	NOV	Stormwater	Pollutant Discharge	N/A
20	20162400	10/27/16	NOV	Stormwater	Pollutant Discharge	N/A
21	20162447	11/8/16	NOV	Stormwater	Pollutant Discharge	N/A
22	20162491	11/16/16	NOV	Stormwater	Pollutant Discharge	N/A
23	20162511	11/23/16	NOV	Stormwater	Pollutant Discharge	N/A
24	20162545	12/2/16	NOV	Stormwater	Pollutant Discharge	N/A
25	20162561	12/6/16	NOV	Stormwater	Pollutant Discharge	N/A
26	20171152	2/13/17	NOV	Stormwater	Pollutant Discharge	N/A
27	20171167	2/14/17	NOV	Stormwater	Pollutant Discharge	N/A
28	20171206	2/24/17	NOV	Stormwater	Pollutant Discharge	N/A
29	20171213	2/27/17	NOV	Water Quality	Surface Water – Hotspot Survey	N/A
30	20171214	2/27/17	NOV	Water Quality	Surface Water – Hotspot Survey	N/A
31	20171215	2/27/17	NOV	Water Quality	Surface Water – Hotspot Survey	N/A
32	20171303	3/20/17	NOV	Water Quality	Surface Water – Hotspot Survey	N/A
33	20171368	4/4/17	NOV	Stormwater	Pollutant Discharge	N/A
34	20171369	4/4/17	NOV	Stormwater	Pollutant Discharge	N/A
35	20171371	4/4/17	NOV	Stormwater	Pollutant Discharge	N/A

Table III.E.10 FY17 Stormwater Discharge Enforcement Cases						
No.	**Case No.**	**Date Issued**	**Fine**	**Case Type**	**Case Sub-Type**	**Citation No.**
36	20171485	4/27/17	NOV	Stormwater	Pollutant Discharge	N/A
37	20171507	5/2/17	NOV	Stormwater	Pollutant Discharge	N/A
38	20171585	5/18/17	NOV	Stormwater	Pollutant Discharge	N/A
39	20171617	5/25/17	NOV	Stormwater	Pollutant Discharge	N/A
40	20171848	6/19/17	NOV	Water Quality	Surface Water – Hotspot Survey	N/A

E.4 Trash and Litter

4. Trash and Litter

In 2006, Montgomery County committed to the goal of a trash free Potomac River by 2013 and signed the *Potomac River Watershed Trash Treaty* with other Washington, D.C. metropolitan area jurisdictions. Activities to meet obligations under the Treaty are specified in the *Trash Free Potomac Watershed Initiative 2006 Action Agreement* and include trash abatement program implementation, education, and evaluation to improve the quality of the Potomac River and its tributaries. The Potomac River Watershed Trash Treaty is incorporated by reference into this permit.

Consistent with the Potomac River Watershed Trash Treaty, Montgomery County shall:

a. Support and implement regional strategies to reduce trash and increase recycling;

b. As part of its public education program described in Part III.E.7 below, within one year of permit issuance, develop a work plan to implement a public outreach and education campaign with specific performance goals and corresponding deadlines to increase residential and commercial recycling rates, improve trash management, and reduce littering;

c. Within one year of permit issuance, establish baseline conditions of trash being discharged to and from the storm drain system and develop a trash reduction strategy and work plan for the Montgomery County portion of the Anacostia Watershed detailing control measures and deadlines by which those measures will be implemented to meet the 2013 goal of a trash free Potomac River. MDE shall review the work plan and approve it, if it meets the requirements of this permit;

d. In conformance with the County's trash reduction strategy, implement approved control measures according to the schedule specified in the Anacostia trash reduction work plan to eliminate the discharge of trash and debris from the County storm drain system;

e. Evaluate and modify local trash reduction strategies with an emphasis on source reduction and proper disposal;

f. Conduct a public participation process in the development of the trash reduction strategy that includes:

    i. Notice in a local newspaper and the County's web site outlining how the public may obtain information and provide comments to the County regarding the trash reduction strategy;

    ii. Procedures for providing the strategy to interested parties upon request;

    iii. A minimum 30-day public comment period; and

    iv. A summary of how the County addressed or will address any material public comments received.

g. Submit annually, a report which details progress toward implementing the requirements of the Trash Free Potomac Watershed Initiative 2006 Action Agreement. The report shall describe the status of trash and litter elimination efforts including resources (e.g., personnel and financial) expended and the effectiveness of the program components described above toward meeting the goals of the Anacostia Watershed trash reduction strategy developed according to PART III.E.4.d. above

E.4.a. Regional Strategies and Workplan to Reduce Trash and Increase Recycling

The Permit requires the County to implement multi-faceted trash abatement and anti-littering programs to meet goals of the Potomac River Watershed Trash Treaty, and achieve trash reductions to meet the County's WLA in the Anacostia River Trash TMDL. Specific Permit requirements include County participation in regional strategies to reduce trash and increase recycling, public outreach and education work plans to increase residential and commercial recycling rates, improve trash management, and reduce littering, and a trash reduction strategy for the Anacostia Watershed.

a. Trash Reduction Strategy and Work Plans

The Anacostia Trash Reduction Strategy and work plans were developed as part of the County's overall Coordinated Implementation Strategy. The County is also working with the Anacostia Watershed Restoration Partnership, the Alice Ferguson Foundation, and other partners to meet regional trash reduction goals. Initiatives directly related to the regional campaigns include ongoing education and outreach for recycling and litter reduction, mass media outreach campaigns, and litter removal from streets, stormwater ponds, and transit stops.

b. Carryout Bag Tax

DEP outreach on the County's Carryout Bag Tax has increased in focus. In FY16, outreach planners launched an enhanced outreach campaign working with the County's Public Information Office to make improvements to the Carryout Bag tax website http://www.montgomerycountymd.gov/bag, create new focused advertising, and provide updated outreach materials (flyers, point of sale cards, posters, etc.) to retailers, restaurants and the public. In FY17, the County has mainly worked on distributing these materials to businesses. The County has also worked to identify businesses that should potentially be reporting bag sales through the law to the County who were not enrolled in our online system. 162 new businesses were enrolled into the registered retailers' system in FY17, many of which came from this effort. In FY17, DEP also distributed approximately 45,000 reusable bags to the community through events, stocking them at every County Public Library, and County's partnership with Manna Foods.

From the implementation of the Carryout Bag Tax (January 2012) to June 2017, there have been over 330 million non-reusable bags sold in the County. Approximately 65 million were sold in FY17, with about 5.4 million sold per month. According to the Census Bureau, the County population estimate for 2015 is 1,040,116 people. This averages out to about five disposable bags bought per County resident each month. In FY17, registered retailers paying the bag fee increased from 1,301 to 1,463. DEP does not have enough data to definitively report a change in bag usage for the County.

c. Ban on Use and Sale of Expanded Polystyrene Materials

DSWS also continued efforts to educate businesses, certain retailers, County agencies, contractors and lessees, and the public about Montgomery County's ban on the use and sale of expanded polystyrene (Styrofoam®) food service ware and loose fill packaging peanuts. DSWS continues to provide notification to food service businesses that all food service ware used and distributed must be either recyclable or compostable in the County. DSWS posts annual updates on information pertaining to

alternative recyclable and compostable food service ware on the DSWS website, and investigates complaints received regarding non-compliance.

d. Recycling and Waste Diversion Initiatives

According to the MDE's Calendar Year 2015 Maryland Waste Diversion Rates & Tonnages Report, Montgomery County, Maryland's overall recycling and waste diversion rate, was 61 percent. The County has a goal to reduce waste and recycle 70 percent of all waste by 2020.

The County has a robust waste reduction, reuse and recycling outreach and education program, with a strong volunteer component. During FY17, staff and DSWS Recycling Program volunteers participated in 265 outreach and education events, providing 33,800 people with assistance and information on waste reduction, reuse, recycling, buying recycled, composting, grass cycling and other topics. Volunteers contributed nearly 1,245 hours of direct service with an estimated value of $32,867. More detailed information on DSWS outreach activities and other trash and litter reduction measures can be found in the Division's Quarterly Reports, posted at:

http://www.montgomerycountymd.gov/sws/about/quarterly-reports.html

DSWS constantly monitors reuse opportunities and recycling markets to identify potential opportunities to remove additional materials from the waste stream, redirect them for reuse by others, and/or divert them for recycling:

- DSWS has operated a model food scrap recycling collection demonstration project at the Montgomery County Executive Office Building in Rockville since November 2011. This project, in which pre-consumer food scraps generated in the building's cafeteria are separated for recycling collection, has diverted a total of 111.7 tons of food scraps for commercial composting through the end of FY17.
- The food scrap recycling collection program has been expanded to also include pre-consumer food scraps generated from the cafeterias at the Montgomery County Council Office Building in Rockville and the Montgomery County Public Safety Headquarters Building in Gaithersburg.
- DSWS accepts unused paint and offers it to residents or donates it to charities. In FY17, the County distributed 1,023 gallons of free latex paint to residents through the County's "Paint Store" and approximately 171 tons of latex paint were donated to nonprofit organizations and charities servicing Maryland and the world.
- DSWS collects bicycles for restoration and distribution to countries around the world. In FY17 "Bikes for the World" removed 11.4 tons of restorable bikes from the waste stream and shipped them to countries worldwide.
- The Montgomery County Shady Grove Processing Facility and Transfer Station has a vendor that accepts Waste Vegetable Oil (WVO) for the sole purpose of bio-diesel production. In FY17, 32.4 tons of straight vegetable oil was shipped out for processing into biodiesel.

The County also gave away 4.5 tons of usable donated construction and building materials and 15 tons of books that were dropped off for donation at the Transfer Station in FY17.

e. Trash Removal from County ROW

The County 311 call center tracks all calls related to litter on County roads, and cleanup is handled by DOT. This information is conveyed to the County's Police force to increase surveillance of these roadside hotspots.

The DOT's Adopt-A-Road Program supplies community groups who adopt 458 roads (some groups adopt more than one road) with equipment in exchange for their voluntary service of picking up trash and litter along roadways. 189 groups reported 924 clean ups, picking up a total of 2,489 (40 to 55 gallons) bags of trash in FY17. Over 1,770 volunteers assisted with the cleanings.

f. Increased Litter Removal from County Owned Public Areas

Transit stops (bus stops) are prime litter hotspots. DOT maintains litter containers at all 520 sheltered bus stop locations, 5 transit centers and other high activity areas around the County. Placement of containers is prioritized based on stop activity, and many of the locations are shared by both the County Ride On Transit System and the Washington Metropolitan Area Transit Authority (WMATA) buses. In FY17, the DOT program to remove trash dumped at transit stops around the County netted a total of 327 tons of trash with a budget of $482,989.

g. Illegal Dumping Enforcement

Montgomery County has a 311 call service center for non-emergency services where citizens can report incidents involving environmental problems, including illegal dumping. Outside normal business hours citizens can report issues through the MC311 and DEP websites. During FY17, there were 348 complaints concerning the illegal dumping of solid waste, which resulted in the issuance of 13 formal Enforcement Actions (4 Civil Citations with fines totaling $2,000 and 9 NOVs) and numerous Warning Letters. The vast majority of complaints concerned bags of trash, vegetation (leaves and brush), or other unwanted materials either dumped or being stored on private or public property. Only a small percentage of these cases represented a potential for direct runoff of contaminated material into a storm drain or receiving system. Complaint resolution invariably involved removal and proper disposal of trash and debris and proper storage (i.e. under cover) of other materials.

h. Anti-Litter Enforcement in FY17

The County's Police Force participated in the annual Litter Enforcement Month, conducting additional vigilance and community engagement on litter, especially with teens in urban areas.

The Department of Housing and Community Affairs (DHCA) Code Enforcement Division investigates and enforces violations of litter code on private property. In FY17, they handled 3,426 trash/rubbish related complaints, and issued 452 civil citations. DCHA estimates that 280 tons of trash were removed as a result of their "clean or lien" program.

The DSWS also investigates and enforces compliance with the County's solid waste and recycling regulations.

E.4.b. Trash Baseline in the Anacostia Watershed

The TMDL baseline load for trash is 228,683 lbs./yr. (Table III.J.2)

E.4.c. Trash Removal in the Anacostia Watershed

The DEP's Watershed Restoration Program, described in Section III.G, is actively installing SWM practices to meet the Permit's impervious area stormwater control requirement. Many of these practices are structural and do not allow trash to pass. Debris tends to build up around forebays, around plants and internal elements, and around the outlets. DEP ensures that the trash is removed from the facilities through the SWFMP. In the Anacostia, BMPs installed or retrofitted after the baseline year of the Trash TMDL removed 12,043 pounds of trash from the watershed in FY17.

Through volunteer clean-ups sponsored by DEP, 1,112 pounds of trash were removed from the Anacostia Watershed in FY17. DEP is working with several groups, agencies and departments to improve our reporting on the trash removal in the Anacostia watershed and anticipates providing more data in the FY18 Annual report. Combining the information from the BMPs installed or retrofitted after the baseline year of the Trash TMDL with the volunteer cleanups in the Anacostia watershed, the County has removed 13,155 pounds of trash from the Anacostia watershed, a 6 percent reduction from the TMDL baseline (Table III.E.11).

Table III.E.11 Summary of Anacostia River Watershed Trash Removal in FY17	
	Pounds of Trash Removed
Volunteer cleanups	1,112
Stormwater Management BMPs	12,043
Total	**13,155**

In 2016, the three jurisdictions in the Anacostia Watershed began meeting regularly as part of the Anacostia Trash Reduction Workgroup organized through Metropolitan Washington Council of Governments (MWCOG). The intent of this group is to standardize the Anacostia Watershed trash TMDL/MS4 reporting metrics amongst the jurisdictions. The first reporting metric the group worked on together was to determine the correct reduction factor of trash bags collected from volunteer cleanups done in all jurisdictions. Considering the MS4 allocation and wet weight reduction, the County determined that 16.05 pounds of trash for each trash bag collected at a volunteer cleanup within the Anacostia Watershed should be counted towards meeting the trash TMDL requirements. DEP will be using this metric in the future reporting of volunteer cleanup trash removal towards meeting the County's trash TMDL requirements starting in FY18. The Anacostia Trash Reduction Workgroup is continuing to work on standardizing reporting metrics for street sweeping, trash traps, and education and outreach.

DEP is considering the possibility of installing a trash trap within the Anacostia Watershed area of the County potentially in FY19 and has contracted with MWCOG to conduct a feasibility study within the watershed to determine the best possible locations for the County to install a Band-A-Long style trash trap. This study will be completed by the end of FY18.

E.4.d. Evaluate and Modify Local Trash Reduction Strategies

a. Anacostia Watershed Trash Monitoring- Post TMDL

The DEP continues to conduct trash monitoring and assessment in the Anacostia watershed through a contract with the MWCOG. Monitoring to date includes:

- Completed seven cycles of post-TMDL trash monitoring in the Anacostia watershed. The Anacostia tributary monitoring follows the same protocols for stream-level and land-based surveys as those used for trash TMDL development. Five items (i.e., plastic bags, plastic bottles, cloth/carpeting, carryout plastic bags and aluminum cans) comprise 82 percent of the total weight of the trash collected in FY17. As anticipated, the weight of expanded polystyrene is the lowest among these selected items. The weight of all plastic bags (e.g., carryout and other bags) is the highest among all trash items.

- In FY17, the DEP continued work on a community based social marketing contract to develop an outreach campaign in the White Oak neighborhood to discourage littering and encourage proper trash disposal. This area was chosen from the Anacostia trash monitoring sites. It is the site with the highest recorded trash in the stream. Baseline monitoring was conducted within this specific neighborhood before the contract was awarded for comparison. Focus groups were conducted and pilot testing of campaign messaging has taken place. Once the campaign has been finalized and implemented in this community, DEP will redo the same observation surveys in White Oak again to see if there was any change in litter found to determine the campaign's effectiveness. The campaign and data from pre- and post- monitoring will be reported next year for FY18.

b. Trash Removal at Stormwater Facilities

The County contracts the removal of organic debris and trash from the County maintained SWM facilities. These trash collections are augmented by citizen volunteer clean-ups. In FY17, there were 25 trash collections at 13 different facilities. One of the 25 collections was performed by volunteers. Cleanings are scheduled on an as-needed basis and the frequency is related to the number of storms that wash in large amounts of trash. Information on the trash and organic debris is summarized and analyzed by DEP to better understand what is captured in stormwater management ponds. This information is not used to calculate the TMDL reductions for the Anacostia trash TMDL.

A total of 2,752 pounds of inorganic trash (including aluminum, plastic and glass containers, plastic bags, tires, styrofoam, paper and miscellaneous items), and an estimate of 8,539 pounds (converted from cubic yards using the EPA estimates of conversion factors) of organic trash were removed in FY17 (Table III.E.12.)

Table III.E.12 Trash Collected from Ponds in FY17 (Pounds)											
Date	**Ponds Cleaned**	**Aluminum**	**Glass bottles**	**Oil quart containers**	**Plastic Bags**	**Plastic Bottles**	**Styrofoam & Paper**	**Tires**	**Organic Debris**	**Misc.**	**Total**
9/8/2016	1	25	14	0	45	78	48	0	0	34	**244**
9/9/2016	1	29	9	0		90	15	0	0	3	**146**
10/16/2016	1									150	**150**
10/20/2016	1	4	28	7	1	18	17	38	0	5	**117**
10/24/2016	1	3	16	0	0	13	0	0	400	1	**432**
10/26/2016	1	4	14	0	1	7	0	0	0	0	**24**
10/27/2016	1	5	18	0	7	27	5	0	0	2	**62**
10/28/2016	2	14	17	0	5	32	3	9	0	3	**82**
10/31/2016	2	18	60	4	4	46	0	0	0	2	**133**
11/1/2016	2	12	76	25	3	55	7	0	800		**976**
11/2/2016	1	20	44	0	2	27	9	0		25	**125**
11/3/2016	1	6	23	18	1	39	0	0	139		**224**
11/10/2016	1	2	2	0	10	8	6	0	1	3	**32**
1/30/2017	1	12	17	3	12	42	23	0	0	22	**131**
1/31/2017	3	44	39	20	37	57	36	0	2800	59	**3092**
2/1/2017	2	20	37	8	35	59	19	0	1200	42	**1420**
2/2/2017	2	25	31	9	79	63	140	0	0	42	**389**
2/7/2017	1	49	20	3	27	95	81	0	2800	41	**3116**
Total	24	289	463	95	266	755	408	47	8539	431	**11291**
Percent		2.6%	4.1%	0.8%	2.4%	6.7%	3.6%	0.4%	75.6%	3.8%	100.0%

Recyclable materials (aluminum, glass and plastic bottles) comprised about 13 percent of all materials found (Table III.E.12). Over the past 7 years, there has been a shift away from glass bottles and a corresponding increase in plastic bottles. In FY17 plastic bottles made up 6.7 percent by weight of the inorganic items collected at the ponds (Figure III.E.3). More pounds of plastic bottles were collected than any of the other categories of inorganic trash.

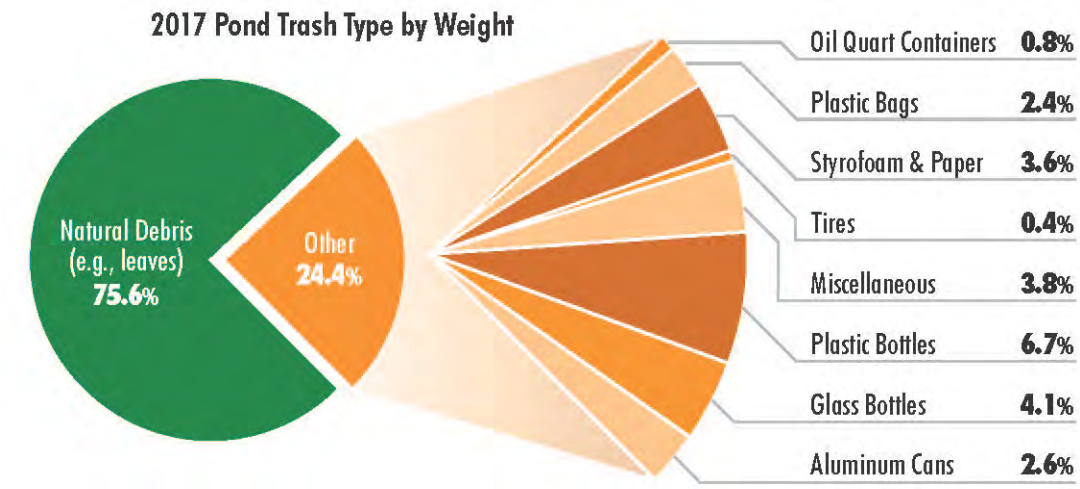


Figure III.E 3. Trash and Organic Debris Collected from Stormwater Ponds by Weight

E.4.e. Anti-Litter Education and Public Outreach

In FY17, DEP continued to work with active community groups to support and expand local cleanup efforts particularly in the Anacostia watershed. IMPACT Silver Spring, a local nonprofit that has partnered with DEP, continued to conduct annual community cleanups near the East County Community Center. The DEP supported four other volunteer cleanups both organized by communities in the Anacostia Watershed and DEP sponsored cleanup events in FY17. From these five events, volunteers removed a total of just over 1,112 pounds of trash from the Anacostia Watershed (Table III.E.13).

Table III.E.13 Summary of the Volunteer Trash Clean-Ups Conducted in FY17

Location	Date	Bags	Lbs. Collected
Oakview Cleanup	10/1/2016	23	244.88
Wheaton pond cleanup	10/16/2016	23	*150*
Silver Spring - Avenal Dr.	4/30/2017	51	560
Lombardy road and Lockridge Drive (Silver Spring)	4/22/2017	20	92
East County Community Cleanup	4/22/2017	8	65
Total		**125**	**1,112**

E.4.f. Annual Progress Report

a. Cost of Trash Reduction Efforts

For FY17, the County invested an estimated $7,292,778 in trash reduction strategies and programs (Table III.E.14 and Figure III.E.4).

Table III.E.14 Estimated Trash Reduction Costs for Various Programs in FY17

Program	Costs
Solid Waste Program Management	$4,514,363
Enforcement Programs	$1,949,359
Street Litter Removal	$484,989
Trash Removal from SWM Ponds	$21,727
Anti-Litter Outreach	$322,340
Total	**$7,292,778**

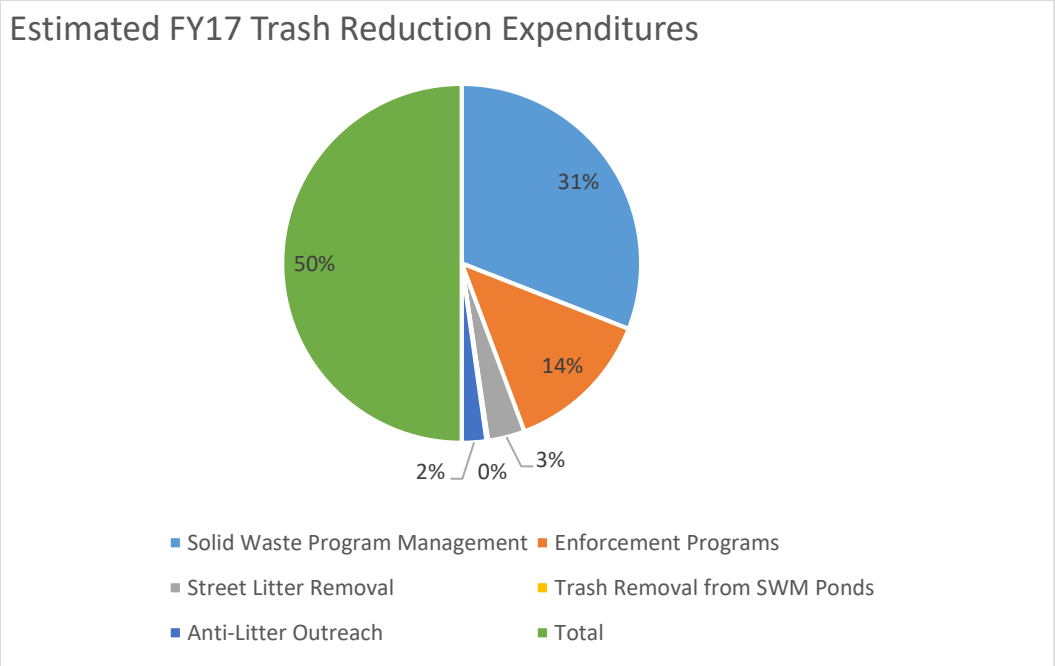


Figure III.E 4 Estimated FY17 Percentage of Trash Reduction Cost

E.5 Property Management

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

The County has 11 facilities covered under the MDE General Discharge Permit for Stormwater Associated with Industrial Activities. These facilities are listed in Table III.E.15. The MDE accepted Notices of Intent (NOIs) for these facilities in August 2014 for coverage until December 31, 2018. All facilities covered under the General Permit For Discharges of Stormwater Associated With Industrial Activity (12-SW) had maintained up-to-date coverage and a stormwater pollution prevention plan (SWPPP), including at Montgomery County Public Schools facilities. During the implementation of the SWPPPs, the County identified good housekeeping needs and implemented those at facilities, including routine sweeping, annual training, and capital improvements. The MDE's acceptance letters are included in Appendix H.

For most of the facilities, the DGS has the overall responsibility for meeting the requirements of the General Permit, including updates to the facilities' SWPPP. Agencies housed at the facilities are responsible for implementing portions of the SWPPP that relate to their operations, and include: DOT Division of Highway Services (DHS) and Division of Transit Services (DTS); DEP DSWS and Watershed Management Operations Division (WMOD); and DGS Fleet Management Division (FMD). Both the FMD and DHS have program managers responsible for environmental compliance for their respective operations at these facilities.

E.5.a Pollution Prevention at DOT and DGS Facilities

All County facilities covered under the MDE General Discharge Stormwater Permit 12-SW have annual comprehensive stormwater pollution prevention (SWPPP) inspections. They are also inspected monthly, and receive quarterly water quality monitoring of Stormwater outfall locations. It was found that at some locations, County staff has not been able to maintain the required quarterly stormwater quality monitoring, therefore supplemental services from an outside third party environmental consultant were employed for FY17 and FY18. In addition, annual training and site inspections are performed by DOT representatives.

In FY17, DOT, DGS, and DEP continued to deliver yearly training on the General Permit requirements to all facility operation employees. Operation-specific training, incorporating annual SWPPP inspection findings, was delivered at each facility location. Assessments, needs, and improvements were covered in this training as well as ways to minimize the use of hazardous substances, pollutants, or contaminants, and to prevent their exposure to precipitation and stormwater runoff. DGS has transitioned to a computer based training system which is developing a "Pollution Prevention Training Module." While in process, DGS staff training was not completed in FY17.

Table III.E.15 Inventory and Status of County Facilities Covered under the Maryland General Discharge Permit for Stormwater Associated with Industrial Activities

Name of Facility and Responsible Agency	Application/ NPDES Number	Watershed/Acreage	Status	SWPPP Status
Colesville Highway Maintenance Depot (DOT)	12SW0267/ MDR00267	Anacostia River-02140205, 11.73 acres	NOI accepted for registration under the NPDES General Permit. Coverage until Dec. 31, 2018	Last Updated in 2013
Damascus Highway Maintenance Depot (DOT)	12SW0269/ MDR000269	Seneca Creek-02140208, 1.4 acres	NOI accepted for registration under the NPDES General Permit. Coverage until Dec. 31, 2018	Last Updated in 2013
EMTOC (DGS)	12SW0277/ MDR000277	Rock Creek-02140206, 15.1 acres	NOI accepted for registration under the NPDES General Permit. Coverage until Dec. 31, 2018	Last Updated in 2013
Gaithersburg Highway Maintenance Depot (DOT)	12SW2487/ MDR002487	Rock Creek-02140206, 0 acres	NOI accepted for registration under the NPDES General Permit. Coverage until Dec. 31, 2018	Last Updated in 2013
Poolesville Highway Maintenance Depot (DOT)	12SW0268/ MDR000268	Seneca Creek-02140208: 4 acres	NOI accepted for registration under the NPDES General Permit. Coverage until Dec. 31, 2018	Last Updated in 2013
Seven Locks Maintenance Center (DGS) [Including Bethesda Highway Maintenance Depot (DOT)]	12SW0265/ MDR000265	Cabin John Creek-02140207, 18.86 acres	NOI accepted for registration under the NPDES General Permit. Coverage until Dec. 31, 2018	Last Updated in 2013
Kensington Small Transit Service Maintenance Facility at Nicholson Court (DGS)	12SW2311/ MDR002311	Rock Creek-02140206, 3.31 acres	NOI accepted for registration under the NPDES General Permit. Coverage until Dec. 31, 2018	Last Updated in 2013
Silver Spring Highway Maintenance Depot (DOT)/Bus Maintenance Facility (DGS)	12SW0278/ MDR000278	Rock Creek-02140206, 17.47 acres	NOI accepted for registration under the NPDES General Permit. Coverage until Dec. 31, 2018	Last Updated in 2013
Shady Grove Processing Facility (DEP)	02SW0262/ MDR000262	Rock Creek-02140206, 52.5 acres	NOI accepted for registration under the NPDES General Permit. Coverage until Dec. 31, 2018	Last Updated in 2015
Gude Landfill (DEP)	02SW0263	Rock Creek-02140206: 120 acres	NOI accepted for registration under the NPDES General Permit. Coverage until Dec. 31, 2018	Last Updated in 2015
Oaks Landfill (DEP)	02SW0264	Patuxent River -02121107, Rock Creek-0240206: 190 acres	NOI accepted for registration under the NPDES General Permit. Coverage until Dec. 31, 2018	Last Updated in 2015

E.5.b Pollution Prevention at DSWS Facilities

The DEP's DSWS is responsible for meeting the General Permit requirements at the Shady Grove Processing Facility and at the Gude and Oaks Landfills. The DSWS Environmental Compliance Manager, Senior Engineer, and Engineer I are responsible for ensuring environmental compliance at Solid Waste operational facilities.

The DSWS quarterly stormwater inspection reports indicate that the Oaks and Gude Landfills and the Shady Grove Processing Facility are in good shape. Litter is picked up on the sites and along the perimeter fence lines regularly and the landfills are well vegetated. The Gude Landfill is routinely inspected and stormwater depressions and leachate seeps are identified and repaired as required. The Shady Grove Processing Facility storm drain inlet screens and "capture bags" that screen trash are routinely inspected and cleaned.

E.5.c Annual Staff Training

Annual site-specific training continued to be conducted for facility staff at several depots, landfills, and transfer station. As requested by MDE, training dates and number of staff in attendance are provided in Table III.E.16.

Table III.E.16 Summary of the Pollution Prevention (P2) Training

Depot	Training Date	Number of Staff in Attendance
Colesville Highway Maintenance Depot (DOT)	10/25/2017	31
Damascus Highway Maintenance Depot (DOT)	11/2/2017	10
Gaithersburg Highway Maintenance Depot (DOT)	10/31/2017	58
Poolesville Highway Maintenance Depot (DOT)	10/27/2017	12
Seven Locks Maintenance Center (DGS) [Including Bethesda Highway Maintenance Depot (DOT)]	10/26/2017	31
Silver Spring Highway Maintenance Depot (DOT)/Bus Maintenance Facility (DGS)	11/3/2017	30
Shady Grove Processing Facility Gude, Landfill, Oaks Landfill (DEP)	12/21/2016	14
Shady Grove Processing Facility Gude, Landfill, Oaks Landfill (DEP)	1/12/2017	2
Shady Grove Processing Facility Gude, Landfill, Oaks Landfill (DEP)	1/13/2017	4
	Total:	**192**

E.5.d County Co-Permittees Property Management

a. Town of Poolesville

The Town of Poolesville is the only one of the six small municipal co-permittees that is required to have a MDE General Discharge Stormwater Permit 12-SW. The Town of Poolesville has a maintenance yard associated with the Poolesville Wastewater Treatment Plant, with outside truck and materials storage, and maintains a current SWPPP for the site. The Town's Public Works Director is responsible for the SWPPP on this site and conducts weekly inspections to assure compliance. The Town reported no changes for FY17.

b. Montgomery County Public Schools

MCPS operates five industrial sites (Shady Grove, Randolph, Clarksburg, West Farm, and Bethesda Depots) that are categorized under MDE General Discharge Stormwater Permit 12-SW (Table III.E.17). MCPS treats 100 percent of the impervious surfaces at the five industrial sites as confirmed by an engineering assessment of the stormwater facilities. During FY14, MCPS updated the SWPPP for all five industrial sites as required by MDE General Discharge Stormwater Permit 12-SW. MCPS is responsible for ongoing monthly and annual site evaluation for all five industrial facilities. In addition, quarterly visual monitoring is conducted at outfalls described in the SWPPP. Improvements have been implemented at these sites as recommended by the annual inspections.

MCPS is responsible for training employees in positions that have potential for stormwater pollution; primarily maintenance and transportation staff. In FY12, a contractor performed in depth in-house stormwater and pollution prevention training for staff in the Department of Facilities Management. In FY16, stormwater pollution prevention refresher training was provided to eight Fleet Maintenance fueling station staff. In FY17, twenty-nine Division of Maintenance staff attended the March 21, 2016 Montgomery County DEP stormwater facility maintenance training. For FY18, MCPS plans to develop stormwater awareness training for MCPS staff in positions that have potential for storm water pollution. Also in FY17, a new maintenance depot was opened in Gaithersburg. MCPS is in the process of drafting a NOI and SWPPP for the MDE General Discharge Storm Water Permit 12-SW.

MCPS maintains 26 underground storage tanks at 15 facilities per MDE regulations. In addition, MCPS operates a wastewater treatment plant at Darnestown Elementary School.

Table III.E.17 Inventory and Status of MCPS Facilities Covered under the Maryland General Discharge Permit for Stormwater Associated with Industrial Activities

Name of Facility/ Responsible Agency	Application/ NPDES Number	Watershed/ Acreage	Status	SWPPP Status
Bethesda Fleet Maintenance/ Bethesda Facilities Maintenance Depot	12SW0524/ MDR000524	Cabin John Creek 6.2 acres	NOI accepted for registration under the NPDES General Permit. Coverage until Dec. 31, 2018	Last updated in FY14.
Randolph Fleet Maintenance/ Randolph Facilities Maintenance	12SW0522/ MDR000522	Anacostia River 9.3 acres	NOI accepted for registration under the NPDES General Permit. Coverage until Dec. 31, 2018	Last updated in FY14.

Table III.E.17 Inventory and Status of MCPS Facilities Covered under the Maryland General Discharge Permit for Stormwater Associated with Industrial Activities

Name of Facility/ Responsible Agency	Application/ NPDES Number	Watershed/ Acreage	Status	SWPPP Status
Shady Grove Fleet Maintenance/ Shady Grove Facilities Maintenance	12SW0523/ MDR000522	Rock Creek 15 acres	NOI accepted for registration under the NPDES General Permit. Coverage until December 31, 2018	Last updated in FY14.
West Farm Transportation Depot	12SW1258/ MDR001258	Anacostia River 5.06 acres	NOI accepted for registration under the NPDES General Permit. Coverage until December 31, 2018	Last updated in FY14.
Clarksburg Fleet Maintenance/Clarksburg Facilities	12SW0525/ MDR000525	Seneca Creek 15.11 acres	NOI accepted for registration under the NPDES General Permit. Coverage until December 31, 2018	Last updated in FY14.

c. Integrated Pest Management at MCPS

MCPS implements an Integrated Pest Management (IPM) Program at all schools, centers and facilities, with an emphasis on physical rather than chemical measures for pest control, in accordance with MCPS Regulation ECF-RB, Pesticides Use in Schools. Under Maryland Law, only licensed and registered pest control workers may apply any sort of pesticides or herbicides in a school building or on school grounds (COMAR 15.05.02.10). In addition, only certain products are approved for use in and around MCPS facilities by certified pest applicators and all chemicals used undergo a thorough safety review by professional staff. State law also enumerates very specific requirements about the storage, use, signage and notification required for pesticide applications. MCPS IPM staff work with facility occupants to stress the need for proper sanitation measures and structural exclusion to control pests, using pesticides only when all other measures have failed.

MCPS has a process to pre-qualify contractors who perform athletic field maintenance at high school athletic fields to have more centralized controls in place over fertilizer and herbicide applications.

d. Coordination with other County Agencies

As co-permittee on the countywide MS4 permit, MCPS worked with the county environmental agency to improve project communication and coordination, as follows:

- In 2010, MCPS signed a new Memorandum of Understanding with Montgomery County DEP outlining the various responsibilities of both agencies under the new MS4 permit.
- Since 2012, MCPS has participated in the County task forces on Low Impact Development and MS4 Coordination.
- As a co-permittee, MCPS was a participant in the EPA inspection of the County's MS4 program in 2014.

- MCPS cooperates with the County in promoting the RainScapes for Schools program, managed by the county.
- MCPS provides annual reports to county agencies on mandatory and non-mandatory recycling activities.

MCPS has been working very closely with the WSSC on their FOG program to reduce and eliminate SSOs that could potentially originate from MCPS sites and negatively impact stream water quality. As part of this process, MCPS has scheduled the installation and clean out of grease interceptors, provided training, and implemented BMPs in all school cafeterias.

E.6 Road Maintenance

6. Road Maintenance

The County shall continue to implement a program to reduce pollutants associated with road maintenance activities. The road maintenance program shall include:

a. Street sweeping;

b. Inlet cleaning;

c. Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with roadside vegetation management through increased use of integrated pest management (IPM); and

d. Controlling the overuse, and to the MEP, reducing use of winter weather deicing materials through continual testing and improvement of materials, equipment calibration, employee training, and effective decision-making.

The County shall report annually on the changes in practices and the pollutant reductions resulting from the road maintenance program.

The Permit requires the County to reduce pollutants associated with roadways by implementing a road maintenance program that includes street sweeping, inlet cleaning, reducing the use of pesticides, herbicides, fertilizers and other pollutants associated with roadway vegetation management, and controlling the overuse of winter weather deicing materials.

This section describes the pollutant reduction methodologies related to ongoing road maintenance programs in the County. The overall goal of these activities is to reduce the amount of trash and sediment from entering streams and waterways, improve street aesthetics, and aid in meeting the State environmental goals,

E.6.a. Montgomery County Street Sweeping Program

i. Description of Street Sweeping Program – Miles Swept

The County's street sweeping program continues to help reduce pollutants associated with road maintenance activities (Table III.E.18). The County utilizes both mechanical and vacuum street sweepers to remove debris and litter from streets. The DOT and DEP jointly oversee the street sweeping program that is funded entirely by DEP. In FY17, DOT administered street sweeping on residential routes, and DEP administered arterial route sweeping (arterial routes are larger roads with more commercial activity, traffic and more observed trash).

The DOT sweeps 56 residential routes shown on Figure III.E.5 at least once per year. Nineteen of these routes have been designated as "priority" residential routes based on the average tons of material collected per curb mile, lack of adequate stormwater management, and are located in a watershed with a water quality impairment from sediment. These routes also tend to coincide with areas in the County of the highest annual average daily traffic as shown on Figure III.E.6. Sweeping is scheduled so that the priority residential routes are swept first early in the Spring to more effectively recover material applied during winter storms.

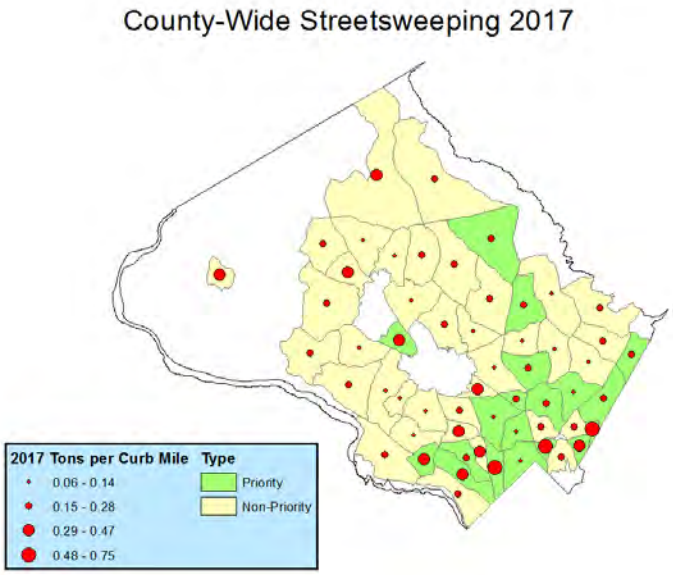


Figure III.E.5 Countywide Street Sweeping – Tons of Materials Collected per Curb Mile

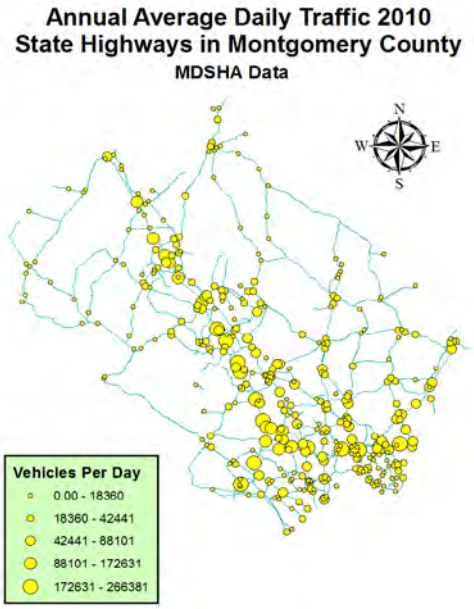


Figure III.E 6 Annual Average Daily Traffic (2010)

The remaining 37 DOT swept routes are considered "non-priority" residential routes, and are generally swept once per year following priority residential route sweeping. Some residential roads in rural areas (western and northern) of the County are not swept. The relatively low amount of vehicle traffic and the lack of curbs in these areas make street sweeping impractical. As in past years, more material was collected in FY17 from the priority areas (0.20 tons/curb mile) than the non-priority areas (0.16 tons/curb mile). Sweeping some areas, particularly in the western part of the County, produced more material per curb mile than in past years. This may be related to the switch to a new contractor in December 2016. The prior contractor used broom sweepers while the new contractor uses vacuum sweepers.

The DEP oversees sweeping of the arterial routes, which are swept at night when traffic volumes are low. In FY17, DEP swept the arterial routes 24 times. Figure III.E.7 shows the arterial routes swept in FY17 and mileage added for FY18. To reduce pollutant loads to County streams, improve highway aesthetics and make progress towards meeting State environmental goals, additional mileage was identified in FY17 for addition to the arterial sweeping routes. Most of this roadway was swept as part of the residential routes prior to November 2015. At that time, the routes were redefined to maximize environmental benefits in the Rock Creek and Anacostia River watersheds which have TMDLs for sediment and phosphorus. In 2017, DEP decided to increase the arterial mileage for environmental reasons and to help meet MS4 permit requirements. These roads were selected since they are known to be suitable regarding traffic, configuration, and maintenance. Reintroducing these roads to the arterial sweeping program will increase the arterial mileage from 227 to 370 curb miles per cycle. This 143 curb mile per cycle addition is expected to produce a 63% increase in arterial mileage swept in FY18.

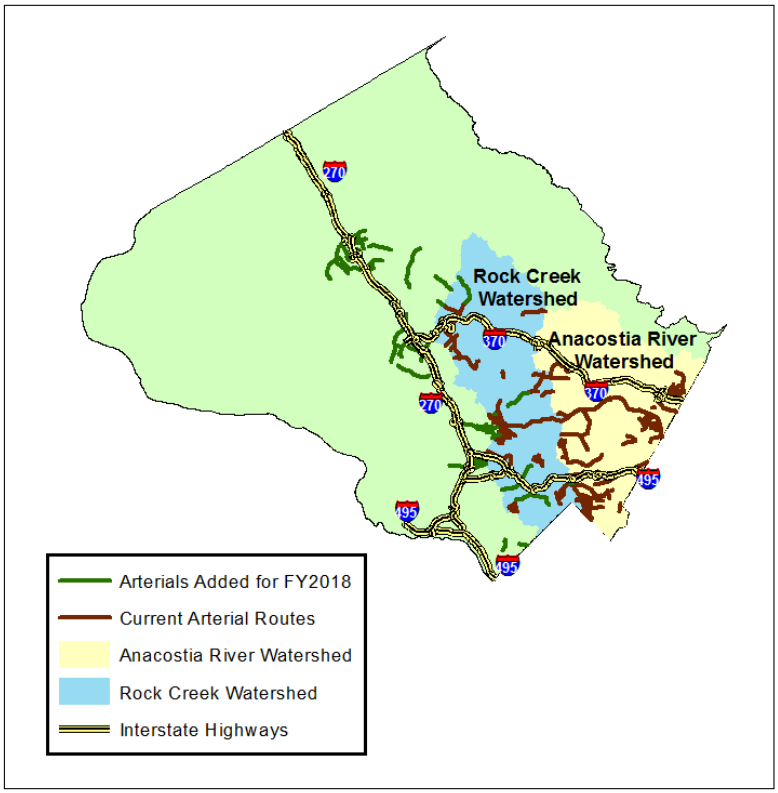


Figure III.E 7 Current and future Montgomery County Arterial Street Sweeping Routes

Table III.E.18 Summary of the County's FY17 Street Sweeping Program

Category	Materials Removed (tons)	Curb Miles Swept	Tons Material Collected/ Curb Mile	Cost per ton	Cost per Curb Mile	Total Cost
Priority Residential Routes	254	1,271	0.20	$190.65	$38.15	$48,498.95
Non-Priority Residential Routes	446	2,784	0.16	$238.15	$38.15	$106,231.73
Arterial Routes 24 cycles	333	5,453	0.06	$638.11	$38.92	$212,228.86
Totals	**1,033**	**9,508**				**$366,959.54**
County Average Tons Material/Curb Mile			0.11			

ii. Description of Street Sweeping Program – Materials Removed

Figure III.E.8 shows tons of materials removed annually by street sweeping from FY99 to FY17 in the priority and non-priority residential areas and arterials. This figure also includes tons of salt, tons of sand/salt and tons of sand applied during the winter period. From FY98 through FY10, data on salt and sand applied during winter period is presented, however, data for FY09 was not reported. Starting in FY11, separate data for application of salt and sand was available and is presented in this figure. Use of salt was higher in the last few years and dropped in FY17. Sand was not used for the last 3 years (Table III.E.22).

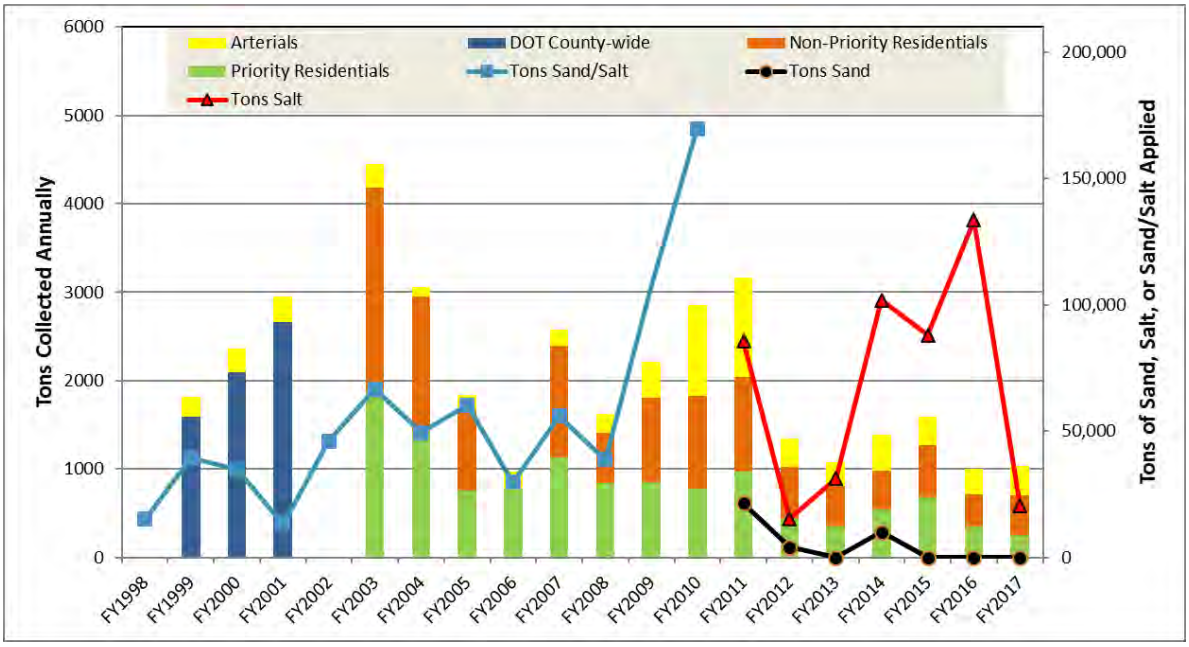


Figure III.E 8 Tons of Material Applied During Winter Activities and Collected by Street Sweeping (1998-2017)

Figure III.E.9 shows the annual street sweeping mileage from FY99 to FY17. From FY96 through FY01 data were represented as arterials and DOT county-wide area. Starting in FY03, mileage of street sweeping on residential routes, both priority and non-priority, along with arterials are presented (Figure III.E.9).

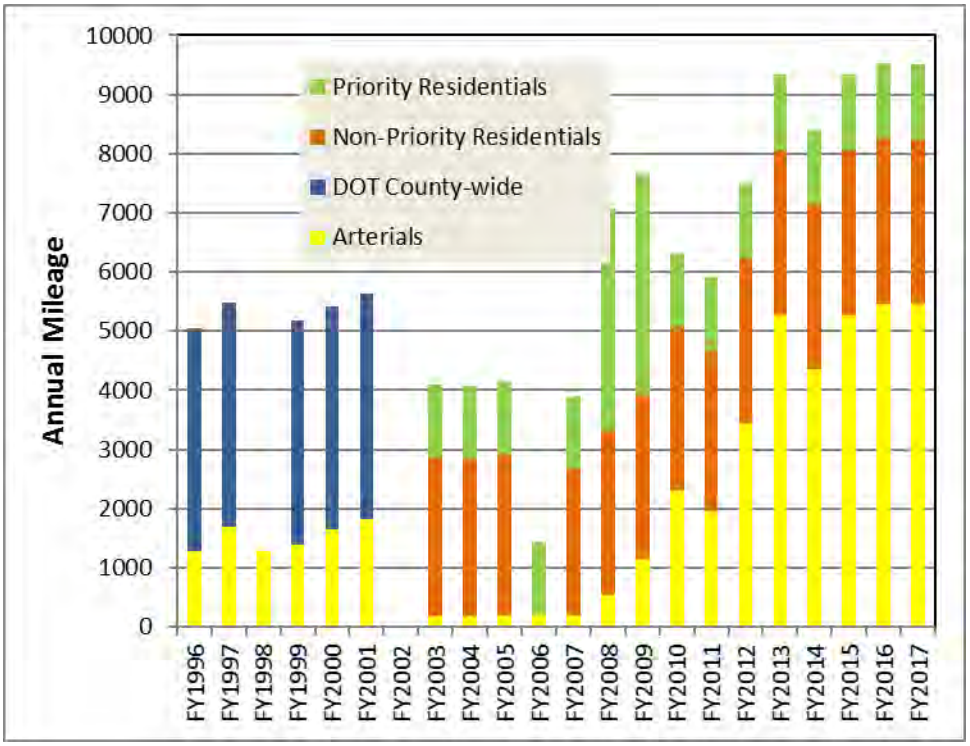


Figure III.E.9 Annual Montgomery County Street Sweeping Mileage 1996-2017

Figure III.E.10 shows the annual street sweeping mileage and average cost per mile for the program from FY05 through FY17. The cost of the program decreased over time with notable decline in FY17 mainly due to change in the contractor.

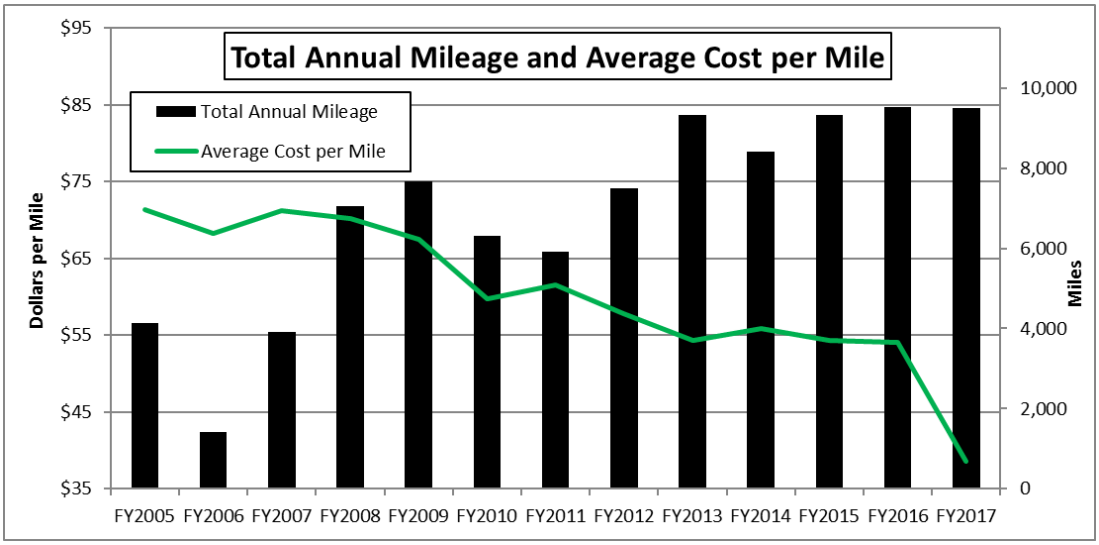


Figure III.E.10 Montgomery County Street Sweeping Mileage and Average Cost 2005-2017

Calculating Equivalent Impervious Acreage and Pollutant Reductions for TMDL Watersheds and Countywide

In FY12, the County began sweeping 229 miles of roadway identified as arterial routes twice monthly. The routes were realigned in FY15. Table III.E.19 shows the miles of arterial routes, along with the percent of the total arterial routes, currently swept in the Anacostia and Rock Creek watersheds in FY17. The arterial routes were swept 24 times. This sweeping frequency allows the County to take credit for stormwater control for impervious acreage equivalent and stormwater pollutant load reductions in the 8 digit Anacostia and Rock Creek watersheds that have approved TMDLs. The credits were calculated according to MDE's August 2014 Draft Guidance "*Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated*", Table 3.E. Alternative Urban BMPs.

Table III.E.19 Summary of the Arterial Street Sweeping Program by Watershed in FY17

MD8DIG	Watershed	Miles Swept	Percent	Impervious Area Credit (acres)	Total Nitrogen Removal (lbs.)	Total Phosphorous Removal (lbs.)	TSS removal (tons)
02140205	Anacostia	124.66	54.9%	73.1	639.5	255.8	38.4
02140206	Rock Creek	102.53	45.1%	60.1	526.0	210.4	31.6
Grand Total		**227.19**	**100.0%**	133.2	1165.5	466.2	69.9

Note: Total amount of Material Collected from Arterial Routes in FY17=333 tons

E.6.b. Inlet Cleaning

Table III.E.20 compares the DOT inlet cleaning program for this Permit cycle from 2010 and FY11 to FY17. FY17 impervious acres' equivalence treated is 58.0 acres, as calculated using guidance from "*Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated*", MDE, August 2014.

Material removed from inlets and storm drains is completed by using a vacuum truck or manual labor. Material removed via a vacuum truck is disposed of at the Oaks Leachate treatment facility, all other litter and debris are taken to the Shady Grove Transfer Station.

Table III.E.20 DOT Inlet Cleaning, by FY10-FY17

Year	No. Inlets Cleaned	Linear Ft. Cleaned	Debris Collected (tons)	IA Equivalence Treated	Cost
FY17	594	40,679	145	58.0	$512,524
FY16	603	35,792	153	61.2	$315,165
FY15	2,218	31,180	346	138.4	$353,226
FY14	648	20,710	217	86.8	$418,353
FY13	803	15,769	494	197.6	$246,200
FY12	811	14,382	367	146.8	$275,392
FY11	1,191	17,604	107	42.8	$269,593
2010	2,011	24,128	181	72.4	Not Reported

E.6.c. Roadside Vegetation Management

Montgomery Weed Control, Inc. conducts the County's State required roadside weed spraying program for noxious weeds. Specialized spray equipment achieves cost efficient control with minimal use of herbicides. Operational BMPs are always followed. All personnel employed by Montgomery Weed Control, Inc. are pesticide applicators registered and trained in compliance with the State Pesticide Applicator's Law. Other than for noxious weed control, the County uses no other pesticides, and no fertilizers, for roadside vegetation management. Table III.E.21 shows the amount of herbicides applied along County roadways from FY11-FY17.

Table III.E.21 Herbicide Usage by Montgomery Weed Control Inc. on Montgomery County Rights of Way

Purpose	FY17	FY16	FY15	FY14	FY13	FY12	FY11
State-mandated Treatment for Noxious Weeds	7.89 Gal Clopyralid 0.14 Gal Glyphosate	5.74 Gal Clopyralid 2.5 Gal Glyphosate	8.29 Gal Clopyralid 1.10 Gal Glyphosate	7.35 Gal Clopyralid 2.58 Gal Glyphosate	4.84 Gal Clopyralid 4.10 Gal Glyphosate	4.78 Gal. Clopyralid 4.55 Gal. Glyphosate	5.20 Gal. Clopyralid 4.55 Gal. Glyphosate
Program Cost	$22,000	$22,000	$22,000	$22,000	$22,765	$22,000	$20,000

Note: Herbicide use is directly correlated to growing conditions for each season

E.6.d. Winter Weather Deicing Materials Application

The DOT uses plowing and salting to achieve a desired level of winter weather roadway treatment. The DOT follows the October 2011 Maryland State Highway Administration Salt Management Plan. All application equipment is calibrated once a year. In FY11, DOT launched a new online system to track the status and progress of roadway treatment and plowing during winter weather events. In FY12, the Snow Tracking Application was revised to include salt used per route to identify trends in salt usage and improve salt use management.

To reduce the use of salt as a winter weather deicing material, in 2009, DOT began a salt brine pilot program on 240 lane miles of primary roads. Salt brine is a 23 percent salt solution created in a brine maker and stored in tanks until used. Brine has a freezing point of -6 degrees F and continues to work when salt, which loses effectiveness at 20 degrees F, does not. A contractor sprays the salt brine on highways 2 hours to 2 days prior to the onset of frozen precipitation to prevent snow and ice from bonding to pavements. In FY17, DOT sprayed a total of 147,122 gallons of salt brine to treat 2,473 lane miles.

Table III.E.22, compares DOT's winter weather deicing materials use from FY10 to FY17. In FY17, the snowfall total was 6.36 inches, which is low compared to the snowfall total (i.e., 40.35 inches) in FY16. A relatively low amount of salt was used in FY17 due to efforts to improve salt management and a small amount of snow from 9 winter storms.

Table III.E.22 DOT Winter Weather Deicing Material Usage from FY10-FY17.								
	FY17	**FY16**	**FY15**	**FY14**	**FY13**	**FY12**	**FY11**	**FY10**
Winter Storms	9	5[1]	28	NR[2]	NR	NR	NR	NR
Inches of Snow	6.36	40.35	36.9[1]	52.8[1]	12.7[1]	3.7[1]	12.6[1]	73.2[1]
Salt, tons	20,408	133,517	87,900	111,787	31,309	15,200	85,600	169,633 sand & salt
Sand, tons	0	0	0	10,000	0	3,800	21,400	
Salt Brine, gallons	147,122	43,000	36,400	121,787	93,005	122,031	NR	NR

1 NOAA LOCAL CLIMATOLOGICAL DATA WASHINGTON, D.C. (KIAD)

2 NR=not Reported

E.7 Public Education and Outreach

7. Public Education

The 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 within one year of permit issuance, develop a work plan to implement a public outreach and education campaign with specific performance goals and deadlines to:

a. Establish and publicize a compliance hotline for the public reporting of suspected illicit discharges, illegal dumping, and spills.

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

i. Increasing water conservation;

ii. The importance of community stormwater management 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. Car care;

vii. Improving private well and septic system management; and

viii. Proper pet waste management.

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.

d. Provide information regarding trash and littering as prescribed in Part III.E.4 above.

Montgomery County maintains a robust public outreach and education program to reduce stormwater pollution. In FY16, MDE commended the County for its various public education and outreach efforts. The County continues to conduct and expand those activities. The public outreach and education campaigns for FY17 are featured in this section as well as throughout the report.

E.7.a Compliance Hotline and Communication Mechanisms

The County continues to use environmental education, outreach, and stewardship through various communication mechanisms to work with and support local citizens to address stormwater quality issues and the MS4 permit requirements. For this effort, the County utilizes multi-media approaches and various community platforms to involve a majority of audiences, such as citizens, culturally diverse communities, schools, faith communities, businesses, and organizations to create a campaign to educate them on environmental issues and implement various practices. Provided below is a summary of the

communication mechanisms for public reporting of suspected illicit discharges, illegal dumping, and spills.

i. MC311

The Permit requires the County to establish and publicize a compliance hotline for public reporting of spills, illegal dumping, and suspected illicit discharges. The County maintains a call center that allows citizens to call one number (311) for all concerns in the County, including surface water quality concerns. More information can be found on the 311 home page at:
http://www3.montgomerycountymd.gov/311/Home.aspx

ii. My Green Montgomery

In FY17, the My Green Montgomery online education portal (http://www.mygreenmontgomery.org) continued its long-term strategy as the news and communication arm of the DEP. It expanded its presence on social media platforms through partnerships and in the community at public events.

During the fiscal year, eighty-four blogs were posted on the website with 24 focused on water topics or GreenFest. The most visited water focused blogs were on RainScapes trainings, how to become or hire a RainScapes professional and how to install green projects at garden style apartments and condos. The My Green Montgomery website had 24,931 users in FY17 (a 22.8 percent increase over the previous fiscal year) and 56,130 pageviews.

iii. Newsletters

The monthly My Green Montgomery monthly e-newsletter continued its strong growth to 2,830 subscribers, a 37.4 percent increase in readers from the previous fiscal year. The Rainscapes and Stormwater facilities groups continue to issue e-newsletters.

iv. DEP Website

The DEP website (www.montgomerycountymd.gov/dep) was redesigned in January 2017 to improve usability for mobile and tablet devices. This opportunity was taken to launch a complete update of the DEP website to streamline the content, look and number of pages.

Due to the redesign, the data for the website for FY17 is from January 3 to June 30. The new website received 62,967 users with 190,401 page views. The top water pages were on public water supply, RainScapes, well and septic service and stormwater maintenance.

At the end of 2017, there are more than 7,514 pictures on the DEP Flickr website and 67 videos on County's YouTube channel.

v. Social Media

The County hired a social media specialist in FY17 to increase the department's social media presence. The Department's Facebook, Twitter, and Instagram presence all increased from FY16. On Facebook, My Green Montgomery now has over 1,000 followers, and on Twitter over 1,500 followers. Water-focused content was featured on both platforms throughout FY17. In celebration of National Water Quality Month, strategic emphasis was placed on water-related updates including photos, facts, and live updates.

vi. Montgomery County GreenFest website

The Montgomery County GreenFest website (www.montgomerycountygreenfest.org) had 18,922 unique page views and 8,302 users. 31.9 percent of those visitors were during the week of GreenFest.

E.7.b Summary of FY17 Public Education and Outreach

In FY17, DEP events continued to focus on targeting specific audiences, increasing stormwater awareness, encouraging directionally corrective measures, and establishing baseline information through surveys. The baseline information will help guide follow-up measures. DEP will continue to search for ways to estimate pollutant reductions from behavior change, beyond those documented in the Strategy, or will default to criteria when established by MDE.

The DEP hosted or participated in 170 outreach events in FY17. There were over 19,000 attendees directly educated because of outreach efforts in FY17. Figure III.E.11 presents a steady increase in outreach activities by DEP over the course of the most recent Permit cycle. Figures III.E.12 and III.E.13 present a breakdown of stormwater outreach impressions and events, respectively, in various watersheds in FY17. The majority of outreach activities continue to be conducted in the Anacostia River and Rock Creek watersheds, which follows the intent of the Strategy.

i. Summary of FY17 Activities

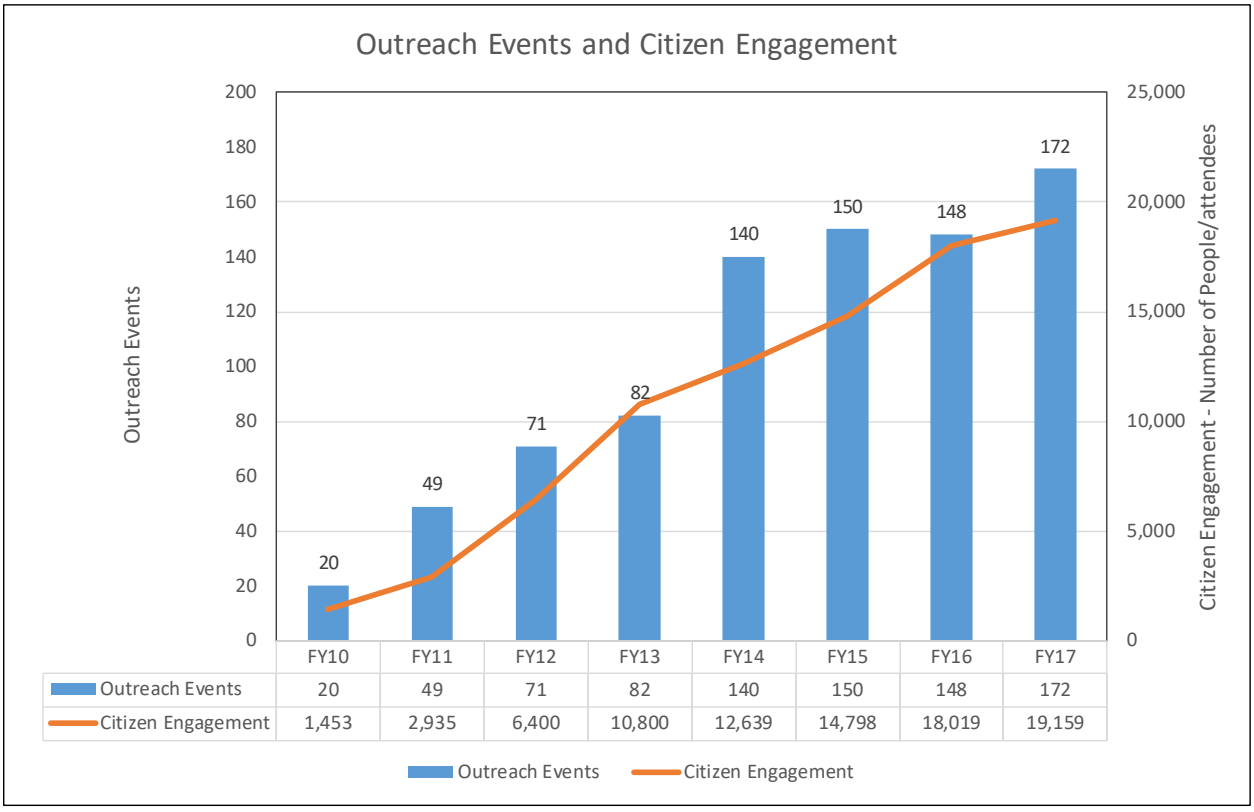


Figure III.E 11 Increased Outreach Over Time

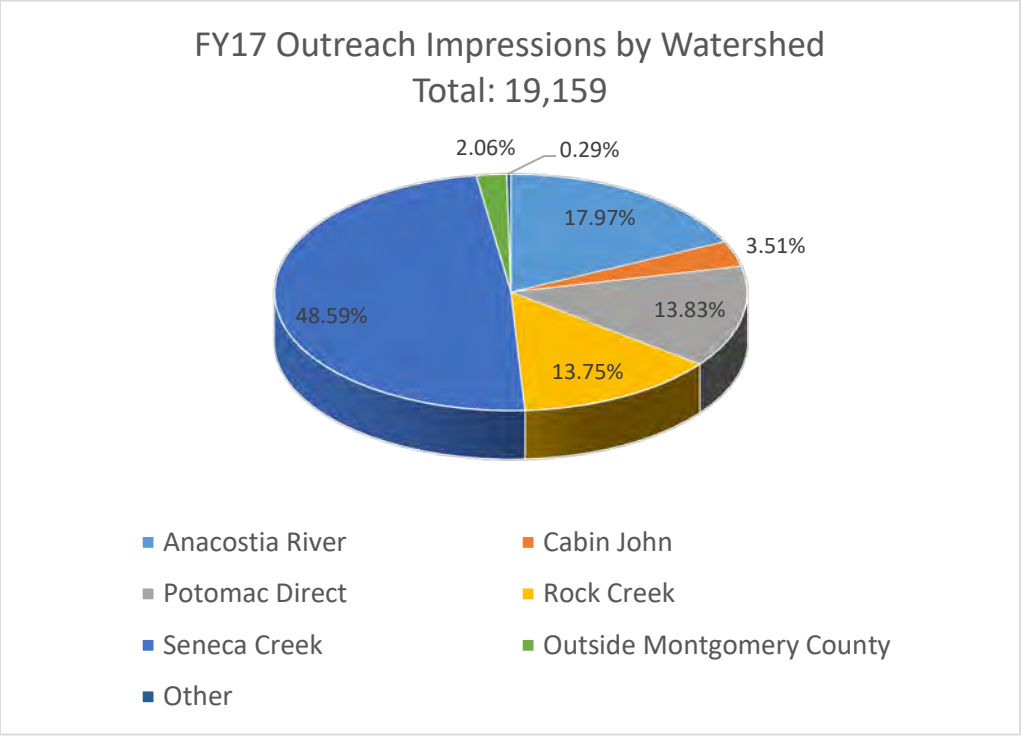


Figure III.E 12 Outreach Impressions by Watershed in FY17

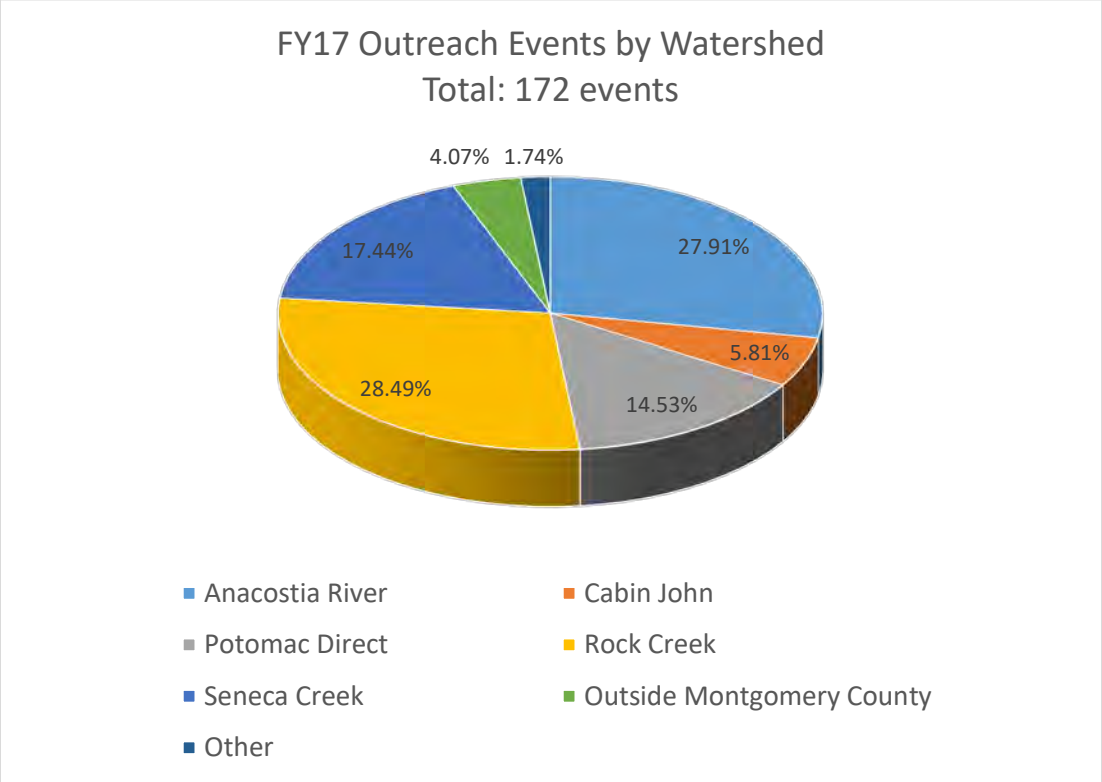


Figure III.E 13 Outreach Events by Watershed in FY17

Table III.E.23 provides a summary of FY17 areas of significant documented outreach increases from FY16. More details on each of these programs may be found below.

Table III.E.23 Areas of Significant Outreach Increases in FY17

Public Outreach	Activity/Communication Mechanisms	Percent Increase
	Outreach Event Engagement	10%
	Outreach Impressions	3.7%
Social Media Presence	Facebook Followers	37%
	Twitter Followers	39%
	Instagram	95%
	My Green Montgomery eNewsletter	37.4%
	My Green Montgomery Website	22.8%
Stream Stewards Program	Volunteer Events	30%
	Litter & Recyclables Collected	19%

ii. Outreach Database

DEP began using a new outreach database that tracks outreach activities across multiple DEP programs, including watershed restoration. The new database increases reporting efficiency by standardizing data required for each outreach effort. DEP planners use the database to coordinate events that occur in close proximity or time frames, allowing for enhanced outreach. Metrics tracked include: type of event and location including watershed, event date, number of impressions, volunteer participation, topics covered, and media coverage.

iii. Focused Efforts to Provide Outreach to Culturally Diverse Communities

As of FY17, the population in Montgomery County has increased 7 percent since 2010. According to the US Census Bureau, 45 percent of the population identified themselves as White, non-Hispanic. Hispanic and African American populations were each 19 percent, and the Asian population increased to 15.4 percent (http://www.census.gov/quickfacts/table/PST045215/24031,00). Approximately 39 percent of households speak a language other than English in the home. DEP recognizes the need to develop outreach targeted to the County's increasingly diverse demographics, and provides translation services for many of its public outreach materials. DEP also provides onsite translations at DEP restoration projects and during enforcement.

E.7.c Public Outreach and Stewardship Work Plan Implementation

The Permit requires the County to develop and implement a public outreach and education program focused on stormwater pollution reduction. To meet this requirement, the County developed a Public Outreach and Stewardship Work Plan (POSWP) as part of the County's overall Strategy. The POSWP includes practice sheets for eight specific outreach campaigns such as: pet waste management, lawn stewardship, anti-littering, stormwater awareness, establishing a volunteer program, riparian reforestation, roof runoff reduction and parking lot recharge. Each practice sheet identifies performance goals, key messages, intended outcomes, targeted audiences, partnerships to develop, delivery techniques, startup costs, measurement objectives, timelines and milestones from start up through 2025. The practice sheets along with outreach recommendations developed for each County Watershed Implementation Plan make up the POSWP, which can be found online at: https://www.montgomerycountymd.gov/DEP/Resources/Files/ReportsandPublications/Water/Countywide%20Implementation%20Strategy/Watershed-Outreach-Plan-2012.pdf.

i. Pet Waste Management Program (POSWP Priority Practice #1)

Since DEP initiated a pet waste pilot program to help reduce bacterial levels in watersheds (between FY14 and FY17) a total of 11,842 pounds of dog waste have been collected. In FY17, DEP worked with 6 associations. Each association had a small number of households. A total of 9 stations were in the ground for FY17 and a total of 725 pounds of dog waste were collected. This resulted in preventing 7 trillion fecal coliform bacteria from entering the Rock Creek and Anacostia watersheds, along with reducing 42 pounds of nitrogen and 5 pounds of phosphorous from entering local waterways.

Three communities that started the program in FY16 adopted four stations in FY17.

- Greencastle Wood Community, 2 stations adopted
- Westwood Gardens, 1 station adopted
- Saddle Ridge, 1 station adopted

In addition, contact is maintained with the "graduate" communities to provide outreach materials as needed. Through our communication, we have found that all of them have continued to maintain their pet waste program. Two of the communities even added stations to their programs using their own funds.

- National Park Seminary, acquired one additional station bringing their total number of stations to **5**
- Townes of Gloucester, acquired one additional station bringing their total number of stations to **5**

In FY17, DEP continued to recruit new HOAs and added two additional communities to the program for a total of two stations. The two additional HOAs are located in the Rock Creek watershed. Each community was surveyed prior to the stations being installed; a total of 622 pre-surveys were mailed out.

Each household of the graduating HOAs received a post survey; a total of 213 post surveys were mailed out. At the end of the 12-month program, each community received a report with the pre- and post-surveys along with weights for each station located in their community for the entire year. Based on the data and surveys, the communities decided on whether to adopt the stations or not. One community decided against adopting one station after their one-year program finished. In addition, DEP continued to educate County residents about the importance of picking up after their dog by distributing information at outreach events. An outreach piece, a lawn sign that was created last year (Figure III.E.14), has been distributed to homeowner associations and homeowners interested in placing the lawn sign on their yard.

Figure III.E.14 Pet Waste Lawn Sign

Table III.E.24 provides more information for each HOA that participated in the program in FY17.

Table III.E.24 Community Associations participating in the Pet Waste Program in FY17					
Community Name	**Number of Homes**	**Watershed**	**City**	**Number of Stations**	**Lbs. collected**
Greencastle Wood Community Association	38	Anacostia	Burtonsville	2	42
Saddle Ridge	49	Rock Creek	Silver Spring	1	109
Tartan Ridge	62	Anacostia	Silver Spring	1	153
Westwood Gardens	64	Anacostia	Silver Spring	2	84
Bel Pre-Recreational Association (a pool with land where people in the community walk their dogs)	422	Rock Creek	Silver Spring	1	174
Gran Bel Condominiums	200	Rock Creek	Silver Spring	2	163
Total	**835**			**9**	**725**

Table III.E.25 summarizes the number of pet waste stations and waste collected by watershed and fiscal year.

Table III.E.25 Summary of Pet Waste Program FY14 to FY17			
Fiscal Year	**Watersheds**		
	Anacostia River	**Rock Creek**	**Total**
Number of Stations			
FY14	N/A	7	7
FY15	11	10	21
FY16	16	16	32
FY17	5	4	9
Pounds of Pet Waste Collected			
FY14	N/A	1,669	1,669
FY15	932	705	1,637
FY16	2,180	5,631	7,811
FY17	279	446	725
Total Pounds Collected	**3,391**	**8,451**	**11,842**

In FY17 DEP expanded the program to cover the entire County, outside of Municipalities. Outreach was carried out to the additional geographical areas in the County, as a result in FY18 it is projected that an additional 60 stations will be installed through the program.

ii. Innovative Stormwater Management Outreach and Stewardship (POSWP Practice #4)

This priority practice focuses on promoting public understanding and support of stormwater management practices, particularly environmental site design and watershed restoration. This includes the creation of new programming and initiatives intent on encouraging and evaluating social behavior change.

(a) H2O Summit and Third Annual Montgomery County GreenFest

A decision was made to move the H2O Summit to the fall of each year from the spring. As a result, no H2O Summit was conducted in FY17.

The DEP along with 13 community partners collaborated to conduct the 3rd annual GreenFest in Bohrer Park, Gaithersburg. Approximately 700 residents were in attendance to learn how to "green" their lives. Not only did the GreenFest win a NACO award in 2017, it also won the Counties Matter Challenge Award for the "100 Ideas at Work". Approximately 700 residents attended the 2017 GreenFest. Despite a larger media campaign, unfavorable weather and a change in venue resulted in a decrease in attendance in 2017.

Water education and stormwater focuses at the 2017 GreenFest were the biomonitoring and Story of Stormwater booths as well as the new Stream Maze activity.

Volunteers at the Biomonitoring booth at GreenFest

Participant running in the Stream Maze at GreenFest

Greenfest blog: https://mygreenmontgomery.org/2017/greenfest-special-focus-engaging-kids/

(b) Caching the Rain Stormwater Awareness Program

The "Caching the Rain" geotrail is a scavenger hunt geocaching activity with a stormwater pollution outreach focus. DEP set up geocaches at six locations primarily in the lower (more urban) part of the county near stormwater facilities. Participants answer stormwater-related trivia questions at each station and verify their answers in a survey once they complete the trail. The six locations have been visited over 1,200 times, collectively. Table III.E.26 represents the surveyed increases relative to FY16 in awareness of participants after completing the Caching the Rain Geotrail for specific topic areas.

Table III.E.26 Catching the Rain Stormwater Awareness Program Statistics

Topic (awareness)	Increase (compared to FY16)
Awareness of Local Watersheds	93%
Knowledge of local Stormwater Facilities	55.4%
Behaviors/Action Steps to improve the Environment	48.4%
Knowledge of Stormwater Pollution	43%

As shown in Table III.E.25, there is a slight increasing trend of the program statistics on behavior change compared to FY16. Other facts about the Caching program include:

- 163 citizens have completed the geotrail and received a souvenir coin since the geotrail's launch.
- The Caching the Rain Geotrail has been "favorited" and shared by participants a total of 55 times.
- Of the behaviors/action steps the participants learned about during the geotrail, 62 percent said they would be highly interested/likely to add a RainScapes practice to their property.

- 46 percent were willing to reduce the amount of fertilizer and pesticides they use on their property.
- 46 percent were also willing to plant a native tree on their property.
- 44 percent stated they would be likely to volunteer for an environmental cause.
- 83 percent stated they recycle on a regular basis.

(c) Watershed Group Capacity Building

DEP concluded its capacity building contract with River Network in FY16 however, DEP continued to provide limited support in FY17. Watershed groups remained focused on continuing their efforts on the three recommended trainings issued in the FY16 report:

- **Fundraising** - Board's Role in Fundraising, How to Solicit a Gift, Major Donor Fundraising
- **Planning** - How to develop an Annual Work Plan, Developing an Annual Budget; and
- **Organizational Assessment** - Analyze organizational and programmatic data for all County watershed groups, Comparing Montgomery County data to Chesapeake Bay and/or organizations nationwide to determine trends.

As part of a Chesapeake Bay Trust Grant, the Eyes of Paint Branch Watershed group was reinvigorated and has made strides to reestablish their board and conducted several activities in FY17.

(d) Watershed Group Accomplishments

During FY17, ten watershed groups actively recruited members and conducted special activities including educational events, roadway and watershed clean-ups, and invasive plant work days. These groups include the Eyes of Paint Branch, Friends of Sligo Creek, Friends of Ten Mile Creek, the Neighbors of Northwest Branch, the Rock Creek Conservancy, the Little Falls Watershed Alliance, the Friends of Cabin John Creek, the Muddy Branch Alliance, the Seneca Creek Watershed Partners and the Watts Branch Alliance.

The DEP staff continued collaborating with the local watershed groups and the Stormwater Partners Network to further advertise the Department's Green Infrastructure Definition and Policy for watershed restoration which was finalized at the end of FY16. The Stormwater Partners were active in promoting ESD in FY17 and worked with the DEP to coordinate several walking tours of green infrastructure practices and assist in public meetings on projects. They also conducted several community presentations and outreach events, particularly in the neighborhoods where green street projects were identified. Via a NFWF grant, the Rock Creek Conservancy conducted three focus groups in the Wheaton Woods neighborhood focused on the installation of RainScapes practices and the associated green streets projects. The results of the focus groups were helpful to DEP in determining a portion of the community's mindset towards these practices.

Watershed groups have continued to have an increased presence in the County. Individual outreach activities and reporting data can be found on the watershed groups' individual websites and Facebook accounts.

iii. Stream Stewards Outreach and Stewardship Campaign (POSWP Priority Practice #5)

This priority practice includes programs that promote champions for neighborhood streams and increased community involvement in stormwater issue awareness and watershed protection. Table III.E.27 provides a summary of the Stream Steward volunteer activities for FY17.

Table III.E.27 FY17 Stream Stewards Volunteer Activities			
Volunteer Opportunity	**Number of Hours**	**Number of Volunteers[1]**	**Service Value[2]**
Office Assistance/ Intern	113	2	$3,010.32
Orientations including FrogWatch	171	104	$4,555.44
Watershed Ambassador	491.5	99	$13,093.56
Watershed Keeper	386	174	$10,283.04
DEP Cleanups	230	115	
General Cleanups	10	5	
Storm drain art	104	26	
Planting/Tree protector removals	42	28	
Total	**1,161.50**	**145**	**$30,942.36**

[1]*Total number of volunteers = the total number of individuals that volunteered with DEP throughout the year and not the total number of times they volunteered. Some volunteer participated in multiple events.*

[2] *Service value per Independent Sector (http://www.independentsector.org/volunteer_time) rate of $26.64 per volunteer hour in Maryland.*

There were 145 volunteers that helped by participating in 26 activities including:

- 2016 Montgomery County Agricultural Fair
- Nine DEP sponsored cleanups:
  - Oakview community cleanup, October 1, 2016
  - Wheaton Regional Stormwater Pond, October 16, 2016
  - Goshen Dr. and Odenhal Road Cleanup, October 22, 2016, March 11, 2017, April 8, 2017 and April 29, 2017
  - Lombardy Rd. and Lockridge Dr., April 22, 2017
  - Churchill Village Community Cleanup, April 22, 2017
  - Avenal Dr., April 30, 2017
- Cold Spring Elementary School Stormwater facility Weeding project, October 17, 2016
- Two interns volunteered with during the summer for a total of 113 hours in the first half of FY17
- Fifty volunteers participated in two orientations conducted on August 4 and August 6, 2016.
- One hundred twenty-one volunteers participated in a FrogWatch classroom and/or field trainings.
- Twenty-six volunteers helped paint two storm drains at the Germantown Library in June 2017 in honor of Chesapeake Awareness week.
- Forty volunteers helped during the annual GreenFest in May 6, 2017.
- Volunteers collected **3,575** pounds of trash/recyclables during the cleanups.
- To maintain communications with the volunteers; quarterly announcements were emailed to more than 900 active and potential volunteers.

(a) Stream Monitoring Interns

The DEP Biological Monitoring Section conducts detailed biological, chemical, and physical assessments of County watersheds on a 5-year rotating basis (see Section III.F. Watershed Assessment). DEP recruits and trains volunteer interns each year to assist with the monitoring and laboratory analysis. In FY16, six volunteers donated a total of 903 hours to the stream monitoring program, helping staff to analyze and monitoring water quality and area resource conditions in the County. This results in a service value to the County in the amount of $21,798. In combination with the Stream Stewards program, this results in over 2,000 hours of donated time to the County, a total service value from the community of nearly $53,000.00.

iv. Watershed Restoration and Outreach grants: POSWP Priority Practice #4 and 5

The DEP administered the Montgomery County Watershed Restoration and Outreach Grant Program in FY17 for eligible non-profit organizations. Nearly $1 million in grant projects have been funded using the Chesapeake Bay Trust as a conduit. FY17 marked the second-time grants were funded to non-profits through the water quality protection charge funds. A total of 23 grants have been funded thus far (13 in FY15 and 10 in FY17). At the close of FY17 all of the round 1 grants were completed as well as 4 of the round 2 grants.

Conservation Landscaping and Community Mural Installed at Glenville with MC Housing Partnership

The grant program funded projects that reduce pollutants through community-based restoration practices as well as projects focused on public engagement through education, outreach, and stewardship. A priority focus area was on nonprofit-owned properties with larger areas of impervious surfaces. Restoration and outreach projects were largely focused on congregations and for projects in the Anacostia and Rock Creek watersheds.

Grantee Accomplishments included:

Scared Grounds Outreach Flyer

- Round 1 Grants:
  - Rock Creek Park in Your Backyard - Rock Creek Conservancy
    - 10 outreach events
    - 5 conservation landscaping installations
      - North Chevy Chase Christian Church
      - Glenwood Pool
      - Grand Bel Pre II
      - Audubon Naturalist Society
      - Kensington Park Senior Center
  - Stakeholder Engagement at Glenville & Grand Bel II - Montgomery Housing Partnership
    - Hosted 4 outreach events
    - Conducted conservation landscape installations at
      - Glenville Rd Apartments
      - Grand Bell II Apartments
  - Stormwater Outreach & Stewardship in the Cabin John Watershed - Friends of Cabin John Creek
    - Conducted an awareness survey
      - Residents were willing to spend $500 or more for a stormwater solution
      - 200% increase in Rainscapes program awareness
    - Conducted formal community meetings in 4 neighborhoods
      - 111 attendees
      - 66 requests for site assessments
      - 48 site assessment reports conducted
      - 1 conservation landscaping installation
      - 45 rain barrel installations
  - Water WatchDogs Program Expansion – Friends of Sligo Creek
    - Conducted 2 Bike Ride for Clean Water events, engaging over 100 riders
    - https://mygreenmontgomery.org/2017/70-cyclists-ride-length-sligo-creek-clean-water/
    - Conducted 7 Water WatchDogs workshops
    - Conducted 2 boat tours of the Anacostia River
    - Created 4 new publications
    - Over 100 participants engaged
  - Rain Gardens Ripple through Montgomery County - Anacostia RiverKeepers
    - 3 cistern installations
      - St. Camillus Catholic Church (530 gallons)
      - Silver Spring United Methodist (865 gallons)
      - St. Luke's Lutheran (660 gallons)
    - Created a community video highlighting the projects and the effects of stormwater on the Sligo Creek:

https://drive.google.com/file/d/0B02DwtxDypi0SVBrTy0zQi1Uc2M/view?usp=sharing.
- Created outreach materials
- Hosted 4 community workshops

- Sacred Grounds, Engaging the Faith-based Community in Watershed Management - National Wildlife Federation
  - Conducted outreach to 520 congregations in Montgomery County
  - Conducted 3 workshops (115 attendance, representing 60 congregations)
  - Conducted 2 webinars (35 in attendance, representing 22 congregations)
  - 21 project applications were submitted to the RainScapes program
  - Video was created highlighting the Sacred Grounds and RainScapes Programs: https://drive.google.com/file/d/0B02DwtxDypi0SVBrTy0zQi1Uc2M/view?usp=sharing.

- Enhancing the Green on Greenery Lane (Glenwaye Gardens Condominiums) – Bethesda Green
  - Installed 6 cisterns
  - Created a project video: https://vimeo.com/194717051
  - Installedconservation landscape
  - Installed 200 trees and 850 native plants.
  - Hosted 3 community events and recruited over 100 volunteers from the neighborhood and through Leadership Montgomery.

- Community Based Restoration and Outreach at the Sandy Spring Friends School
  - Installed 4 cisterns capturing 6,250 gallons in a typical 2-inch rain storm
  - Installed 4 pet waste stations (weighed weekly, Average of 14 lbs. were collected on a weekly basis)
  - Installed 1 rain garden, 1 conservation landscaping and educational signage
  - Installed a 300-foot mycelium buffer and native plants along their pond, Peaceful Haven and Tanglewood locations
  - Hosted 4 educational workshops

Student volunteers at Sandy Springs constructing a conservation landscaping

- Campus Stormwater Assessment & Public Watershed Restoration Demonstration - Audubon Naturalist Society
  - Conducted a campus wide stormwater assessment
  - Completed designs for 2 new stormwater BMPs, through future CBT funding installed a rain garden
  - Conducted 4 community workshops
- Stormwater Management Education Video - Chesapeake Conservation Landscaping Council
  - Created an educational video highlighting the RainScapes Program and Hometown Habitats
- Neighbor to Neighbor Outreach and Restoration - Caredrock Springs Citizens Association
  - Conducted outreach to 400+ home community
  - Conducted 3 workshops
  - Implemented a conservation landscaping community demonstration practice
- Bringing the Watershed Stewards Academy to Montgomery County – Muddy Branch Alliance
  - Created a needs assessment document for starting a Watershed Stewards Academy in Montgomery County

- Round 2 Grants (completed projects):
  - Trees for Sacred Places – Alliance for the Chesapeake Bay
    - Installed 337 native trees at 7 congregations across Montgomery County
    - Conducted 7 educational workshops
    - Engaged over 200 volunteers

- Broadmore Hills Impervious Removal and Native Replanting – Metropolitan Washington Council of Governments
  - Removed 1,476 SF of Pavement (old basketball court)
  - Planted 35 native trees
  - Engaged the homeowners' association
- Rain Gardens Ripple through Montgomery County (Continuation) – Anacostia RiverKeepers
  - Installed one 833 SF rain garden at Silver Spring United Methodist Church
- Pleasant View Historic Site
  - Installed a 2100 SF conservation landscaping at the Pleasant View Historic Site
  - Engaged over 100 volunteers
  - Project highlights can be found at: http://eartheast.org/new-page/

Volunteers at Pleasant View

v. RainScapes Program Outreach

The DEP's RainScapes program promotes and implements small scale stormwater control and infiltration projects on residential, institutional, and commercial properties. The multi-faceted program is designed to provide information and training to residents and landscape professionals, as well as incentives and project delivery to County sites. For more information on the incentive programs; RainScapes Rewards and RainScapes Neighborhoods, please see Part III.G. The following is an update on RainScapes Program outreach efforts for programs in County schools to landscape professionals and to County residents.

(a) RainScapes Programs in Montgomery County Public Schools

Since FY10, two RainScapes programs are offered through MCPS; the RainScapes for Schools and the RainScapes for Schools Growing program:

The RainScapes for Schools program implements ESD projects on MCPS property. Projects installed include rain gardens and conservation landscapes which provide runoff reduction while also providing a hands on location for curriculum lessons. Since 2008, the program has supported 16 school based projects accessible to students from K-12. Locations of participating schools are shown in Figure III.E.15.

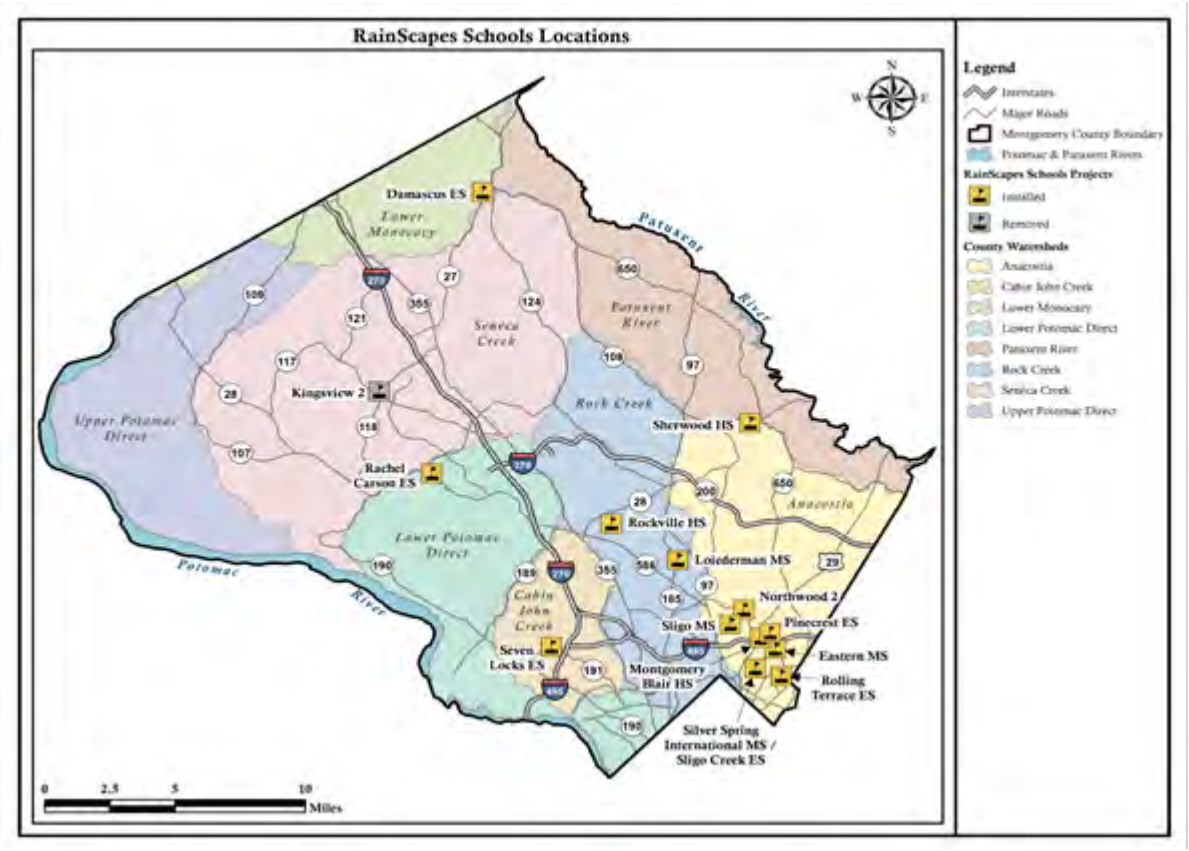


Figure III.E.15 RainScapes for Schools Demonstration Projects

The RainScapes for Schools Growing program (Figure III.E.16) provides native plants, and educational materials to several MCPS high school and Montgomery College horticulture classes to support instruction on growing and using plants in stormwater management. Plants from the program have been used in community-based projects and in RainScapes workshops as take home materials. In spring FY17, nearly 1,000 plants were used as replacement plantings in DEP and MCPS ESD and RainScapes for Schools projects, watershed group community projects, and RainScapes workshops. This program supports the MCPS High School Environmental Horticulture Program, which now includes stormwater management as part of their curriculum designed to introduce high school students to the job field opportunities in horticulture and green infrastructure.

Figure III.E.16 Native Plants Grown by High School Students installed at Kensington Parkwood ES Butterfly Garden

(b) RainScapes Workshops and Professional Training

In FY17, RainScapes continued to train local designers and contractors focusing on site assessment, rain garden design, and project requirements for RainScapes Rewards projects. RainScapes provided training in cooperation with the Landscape Technology Program of Montgomery College [Figure III.E.17]), and at conferences in Maryland and North Carolina.

Figure III.E.17 Montgomery College Students Learning How to Install a Rain Garden

RainScapes program staff also provided training and sharing of lessons learned with other MS4 municipalities starting up similar incentive based programs both within the state of Maryland and outside of Maryland. Materials, including technical information, inspection documents, process details and formats; 15 attended that workshop. Also staff prepared training webinar content and curricular content review for the new certification programs launched in FY17: Chesapeake Bay Landscape Professional and the National Green Infrastructure Certified Professional.

(c) RainScapes Training for Communities and Watershed Groups and Grants

For FY17, DEP RainScapes refined customized outreach approaches to specific focus communities such as faith based organizations, civic associations, home owner associations, private pools and the commercial sector. The newest major effort has been directed to congregations and neighborhood scale efforts have been redirected to focus on a neighbor to neighbor approach to outreach.

Figure III.E.18 RainScapes Staff Explaining Rain Barrel assembly at Brookside Gardens Rain Barrel Workshop

(d) FY17 Highlights of RainScapes Program Outreach

- The RainScapes program continues to participate in departmental wide outreach efforts, as demonstrated in the Greenfest Rain Garden set up this past Spring. Other events included PARK(ing) day, the H2O Summit and other broad environmental topic events. Outreach efforts, in addition to in-person events have broadened to include a higher use of social media and radio advertising to spread the information of our program to a broader audience.

- Congregational outreach continued both under the auspices of MC-CBT grants and additional time directly provided by RainScapes staff. As a result of the efforts, an additional 11 congregations in Montgomery County have been working with RainScapes staff, to determine what is best for their congregational sites and four projects were installed (3 rebate and 1 grant) which were used by the congregations to share the message that their faith practice and watershed stewardship were demonstrated with a RainScapes project. The majority of congregational work has been in the Rock Creek and Anacostia Watersheds, with Cabin John also having a number of congregations interested in a site assessment and then doing a project. The numbers shown include congregations who have had site assessments but have not installed a project yet. Overall, 35 congregations have installed a RainScapes project using the RainScapes Rewards program and three have installed projects using the CBT Watershed Grants. The Grant sponsored outreach and workshops via the NWF grant called “Sacred Grounds” was a very effective tool for reaching a broader cross section of the demographic in the County.

- Application numbers for RainScapes Rewards continued to be strong, with more people attending each event motivated to do their part at home. Projects which capture larger amounts of stormwater in FY17 continue the pattern of growth in understanding that the problems of watersheds have solutions that start at home. This is suggesting that the impact of sustained effective outreach efforts and effective educational materials and training of professionals is positive. Figure III.E.19 shows of the number of RainScapes Reward Projects submitted since 2008; 1,923 projects had been submitted by the end of FY17. FY17 continued to show application numbers that were consistent with the previous two years, reflecting capacity gained by additional staffing in FY15. Training Landscape Professionals continues to be an effective tactic for recruiting projects as the portion of DIY projects declined and the number of professionally designed and installed projects increased.

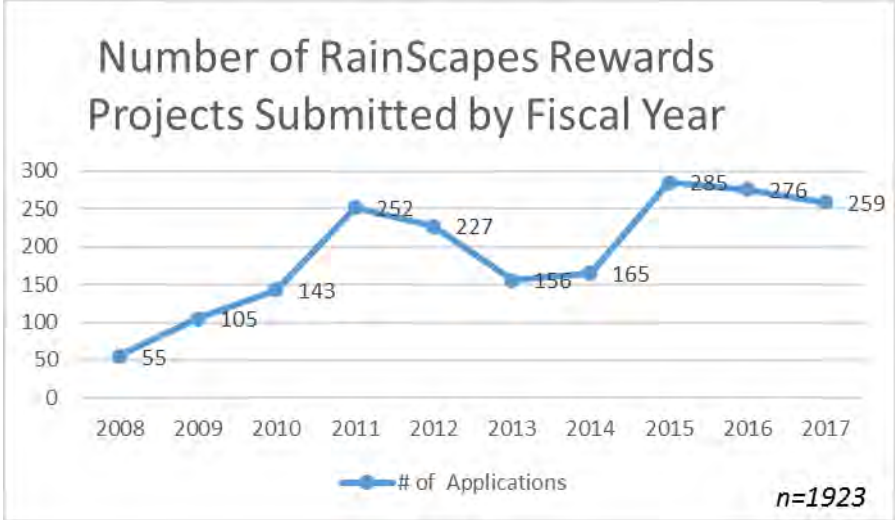


Figure III.E.19 Application Numbers of RainScapes Rewards Projects

- In addition to the overall numbers, over the past three years, the nature of projects being installed has changed, with a doubling of applications for both conservation landscapes and rain gardens as well as for permeable pavement and pavement removal. The dominant projects being installed now can capture more runoff and we have had several instances of neighbors inspiring neighbors to solve runoff problems after talking to each other about their projects.

- RainScapes staff provided technical assistance to the majority of grants awarded under the Montgomery County Chesapeake Bay Trust Grants. Site assessments conducted by RainScapes staff provided the technical guidance and outreach support to allow grant projects to move from discussion to reality. The range of project spanned water harvesting, design review and oversight of installations and workshop planning and delivery.

- Conference presentations at local, regional and national conferences as well as staffing tables at larger events continued. In total, separate from the County Fair, 40 events were provided to about 3,000 people, including hands on workshops and grant related workshops, which educated a broad set of audiences on the topic of Stormwater management and specific things you can do at home, at work and at your place of worship to reduce runoff and improve the environment. Events ranged in attendance from 20-300 per event.

F. Watershed Assessment

1. The County shall conduct a systematic assessment of water quality within all of its watersheds. These watershed assessments shall include detailed water quality analyses, the identification of water quality improvement opportunities, and the development and implementation of plans to control stormwater discharges to the MEP. The overall goal is to ensure that each County watershed has been thoroughly evaluated and has an implementation plan to maximize water quality improvements. At a minimum, the County shall:

   a. Within one year of permit issuance, provide a long-term schedule for the completion of detailed assessments of each watershed in Montgomery County. These assessments shall be performed at an appropriate scale (e.g., Maryland's hierarchical twelve-digit sub-basins). At a minimum, watershed assessments shall:

      i. Determine current water quality conditions;

      ii. Identify and rank water quality problems;

      iii. Identify and prioritize all structural and nonstructural water quality improvement opportunities;

      iv. Include the results of a visual watershed inspection;

      v. Specify how restoration efforts will increase progress toward meeting any applicable WLAs included in EPA approved TMDLs. The County shall modify restoration efforts based on program implementation effectiveness, implementation plans developed according to PART III.J. below, and any TMDLs that are changed during this permit term;

      vi. Specify how the restoration efforts will be monitored and how those data collected will be used to document progress toward meeting applicable WLAs;

      vii. Provide an estimated cost, a detailed implementation schedule, and benchmarks for anticipated pollutant load reductions to show progress toward meeting applicable WLAs for those improvement opportunities identified above; and

      viii. Include a public information component.

   b. Perform watershed assessments based on the established long-term schedule until all land area in Montgomery County is covered by a specific action plan to address the water quality problems identified.

   c. The County shall complete a detailed watershed assessment for the Great Seneca Creek and Muddy Branch watersheds within one year of permit issuance.

   d. Report annually on the status of compliance with the watershed assessment schedule.

F.1.a Watershed Assessment Plan and Schedule

As required by the Permit, DEP continues to develop watershed assessments by evaluating current water quality conditions and then identifying and ranking structural, non-structural and programmatic watershed restoration opportunities for each County watershed. Full watershed assessments include field investigations, prioritized project inventories with structural and non-structural project concepts, and cost estimates. Watershed implementation plans (WIPs) include results from the watershed assessments, and

present more detailed implementation planning and schedules to meet regulatory and programmatic targets.

The Permit required DEP to develop and submit a countywide implementation plan within one-year of Permit issuance to identify how the County would achieve Permit requirements within the 5-year permit cycle. A final version of the Montgomery County Coordinated Implementation Strategy (Strategy), and Watershed Implementation Plans, are accessible on DEP's website at: http://www.montgomerycountymd.gov/DEP/water/county-implementation-strategy.html.

Implementations plans were developed for those watersheds with existing EPA approved TMDLs in 2009, and for watersheds where existing assessments and project inventories had been previously compiled (Muddy and Watts Branch). These plans identified BMPs, quantified treatment by those practices, determined the watershed restoration potential, evaluated the ability of the watersheds to meet applicable TMDLs, and provided schedules and cost estimates. More information on implementation plan development for EPA approved TMDLs is shown in Part III.J. Total Maximum Daily Loads.

F.1.b Watershed Assessment Status

The status and schedule of watershed restoration planning is shown in Table III.F.1.

Table III.F.1 Status of Montgomery County Watersheds' Assessments

8 Digit Watershed	Watershed Assessment Status	TMDLs (Issue Date)
Anacostia	Anacostia Watershed Restoration Plan (2010) Strategy WIP (2011) PCB WIP (2012)	Bacteria (2007) Sediment (2007) Nitrogen (2008) Phosphorous (2008) Trash (2010) PCB (2011)
Rock Creek	Strategy WIP (2011)	Bacteria (2007) Sediment (2011) Phosphorous (2013)
Cabin John Creek	Strategy WIP (2011)	Bacteria (2002) Sediment (2011)
Seneca Creek	Strategy WIP (2011)- Completed for Great Seneca Subwatershed, including Clopper Lake	Clopper Lake: Phosphorus and Sediment (2002)
	WIP Completed FY14	Sediment (2009)
Lower Monocacy	Updated WIP Completed FY14	Sediment (2009) Bacteria (2009) Phosphorus (2013)
Potomac Direct	WIP Completed FY14	Sediment (2011)

Table III.F.1 Status of Montgomery County Watersheds' Assessments		
8 Digit Watershed	**Watershed Assessment Status**	**TMDLs (Issue Date)**
Patuxent- Rocky Gorge and Tridelphia Reservoirs	WIP Complete FY14	Rocky Gorge-Phosphorous (2008) Tridelphia-Phosphorous (2008) Tridelphia- Sediment (2008)

DEP is in the final stages of updating the Cabin John Creek and Rock Creek Watershed Studies to identify and prioritize future projects. In the Rock Creek watershed, 41 sites are being assessed as conceptual projects for new stormwater management BMPs and/or stream restoration. Additionally, 9 neighborhoods in the Rock Creek watershed have been assessed for Green Streets, 3 neighborhoods have been assessed for RainScapes, and 95 miles of streams were field evaluated for stream restoration prioritization. In the Cabin John Creek watershed, 22 sites are being assessed as conceptual projects for new stormwater management BMPs and/or stream restoration. Additionally, 5 neighborhoods in the Cabin John watershed have been assessed for Green Streets, 3 neighborhoods have been assessed for RainScapes, and 40 miles of streams were field evaluated for stream restoration prioritization. These potential project locations are being identified to support future MS4 regulatory requirements. Public meetings are being scheduled for Winter 2018 to review study findings and receive public comment before finalizing concept development. Final report is scheduled for Spring 2018.

F.1.c Great Seneca and Muddy Branch Watersheds Study

During 2004, DEP began the watershed inventories in the Great Seneca and Muddy Branch watersheds as cooperative efforts with the US Army Corps of Engineers (USACE), the City of Gaithersburg, and MNCPPC. These areas represent roughly one-third of the total County land area and include drainage from the densely developed areas of Gaithersburg and Germantown. The study was to be completed by FY13, but is delayed indefinitely due to limited Federal funding. Projects identified in the study are included in the new Seneca WIP, and in DEP's project planning.

F.1.d Summary of Ongoing Watershed Assessment and Restoration Planning

Anacostia River Watershed Restoration Plan

The final report for the inter-jurisdictional restoration of the Anacostia, Anacostia River Watershed Restoration Plan and Report (ARP), was completed in February 2010 (http://www.anacostia.net/plan.html). Currently, DEP is in the process of developing a Continuing Authorities Program Feasibility Cost Sharing Agreement to conduct an ecosystem restoration feasibility study with the USACE to develop stream restoration designs concepts for up to 9.6 miles of streams identified in the ARP. After the concepts designs are developed and the feasibility study is complete in FY18, the study recommendations will be submitted for future USACE funding authorization to finalize designs for future construction. These selected projects contribute towards reducing future WLAs and accounting towards the County impervious area restoration goal.

F.1.e Watershed Screening

DEP's Monitoring Team monitors the biological community and stream habitat conditions at representative stations in all County watersheds on a rotating basis over a five-year cycle, as displayed in Figure III.F.1. DEP then uses a multi-metric Index of Biological Integrity (IBI) to develop narrative ratings of biological conditions in water bodies. A benthic IBI (BIBI) is calculated using benthic macroinvertebrate sampling results. A fish IBI (FIBI) is calculated using fish sampling results. For the

purposes of this report, a combined IBI for benthic insects and fish is used for stations which have a drainage area of more than 350 acres. The combined IBI score is converted to a percentage with 100 percent being the highest possible score. Biological conditions in the water body are then described as *Excellent* (88-100%), *Good* (64-87%), *Fair* (42-63%), and *Poor* (0-41%).

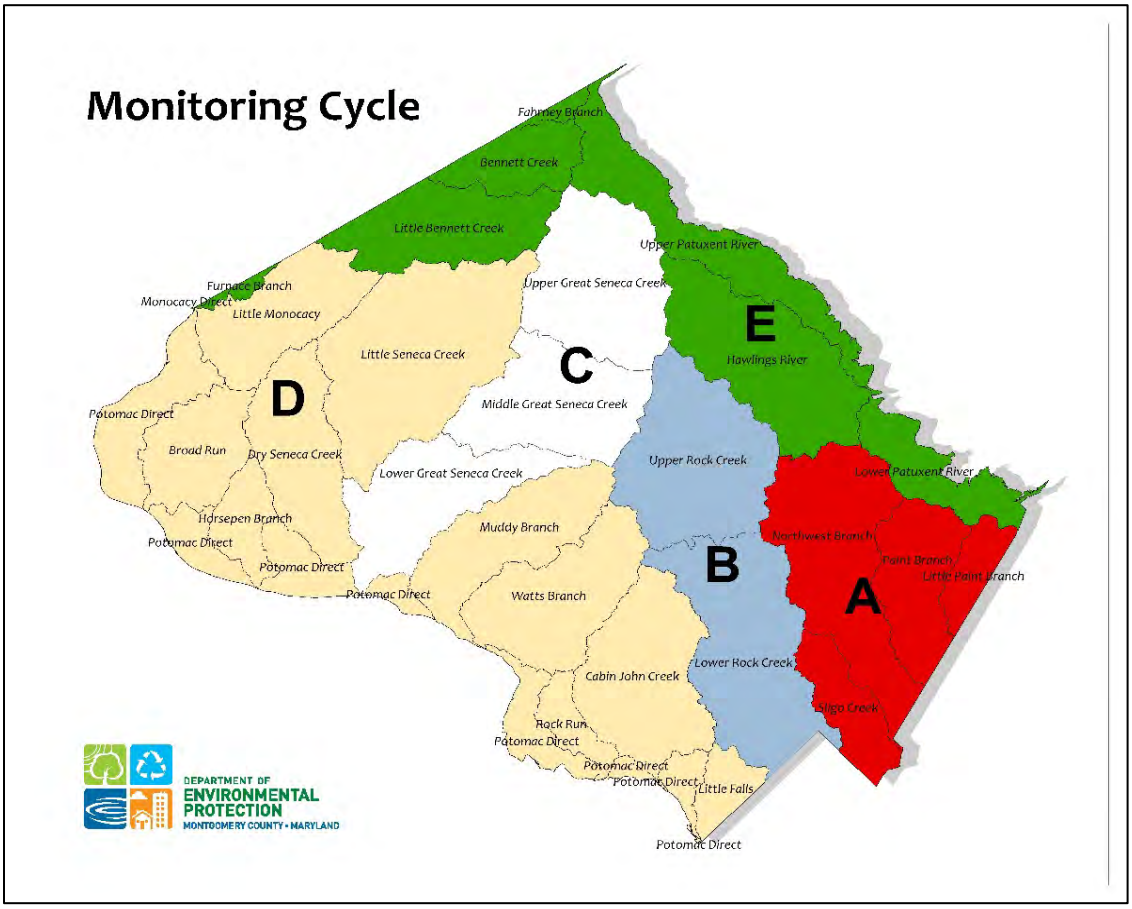


Figure III.F.1 Montgomery County DEP Provisional Baseline Stream Monitoring Cycle; Watershed group A was monitored in 2016, group B was completed in 2017, group C is planned for 2018, group D is planned for 2019, and group E is planned for 2020. Another monitoring cycle will repeat again 2021 to 2025.

For stations with drainage areas less than 350 acres, unless otherwise noted, only the BIBI is converted to a percentage with 100 percent being the highest possible score. IBIs based on benthic insects (BIBIs) only are used in these smaller drainage areas. These small streams typically only support pioneering fish species due to limited habitat. Because of their adaptability to changing habitat and flow conditions, pioneering species are not reliable indicators for rating impairments. DEP's full round of baseline watershed conditions in the County from 2011 to 2015 is available as an interactive map at: http://www.montgomerycountymd.gov/dep/water/watershed-health.html. This map allows the user to examine the health of over 150 subwatersheds in the County by zooming in or searching by address.

The information provided for this report is the calendar year 2016 stream monitoring season, which covers half of FY16 and half of FY17. The monitoring completed in calendar year 2017 (second half of FY17) will be provided in the FY18 Annual Report.

2016 Watershed Screening Results

In 2016, DEP began a new cycle of stream monitoring for the County with the Anacostia subwatersheds (as shown by area A in Figure III.F.1): Sligo Creek, Northwest Branch, Paint Branch, and Little Paint Branch. Approximately 39 Anacostia stream sites were sampled for benthic macroinvertebrates and fish (Figure III.F.2). In addition to long term monitoring sites, the County recently in 2015 added stratified randomly selected stations within each MDE 8-digit watershed. These stations act as representative sites that allow the County to assess watershed wide stream conditions to a known probability.

In 2016, stream conditions in Anacostia subwatersheds ranged from *Poor* to *Good* results (Figure III.F.3). The following sections summarize the 2016 stream conditions. Provided below is a summary of the results in each of these sub-watersheds.

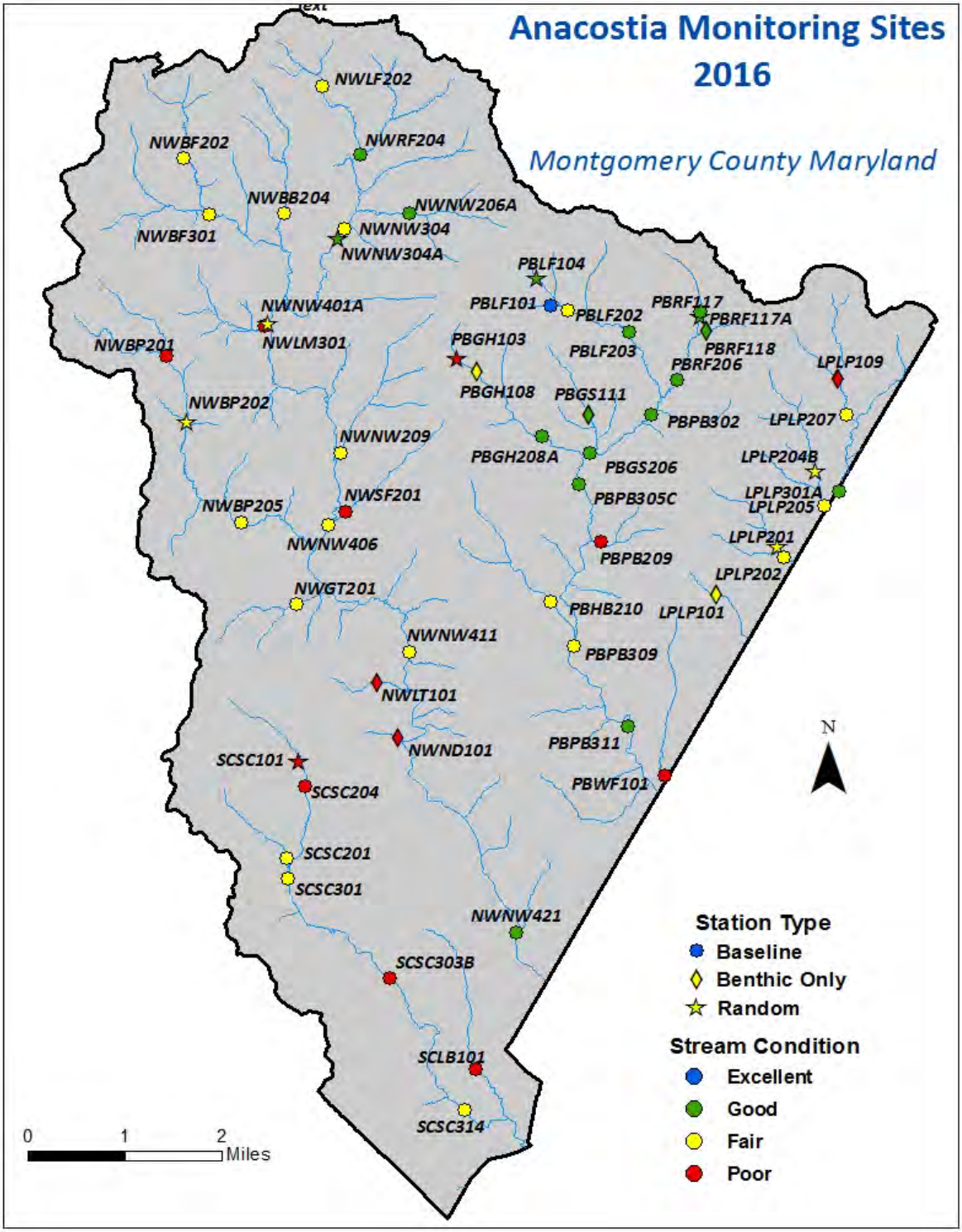


Figure III.F.2. DEP Anacostia stream biological monitoring locations, 2016

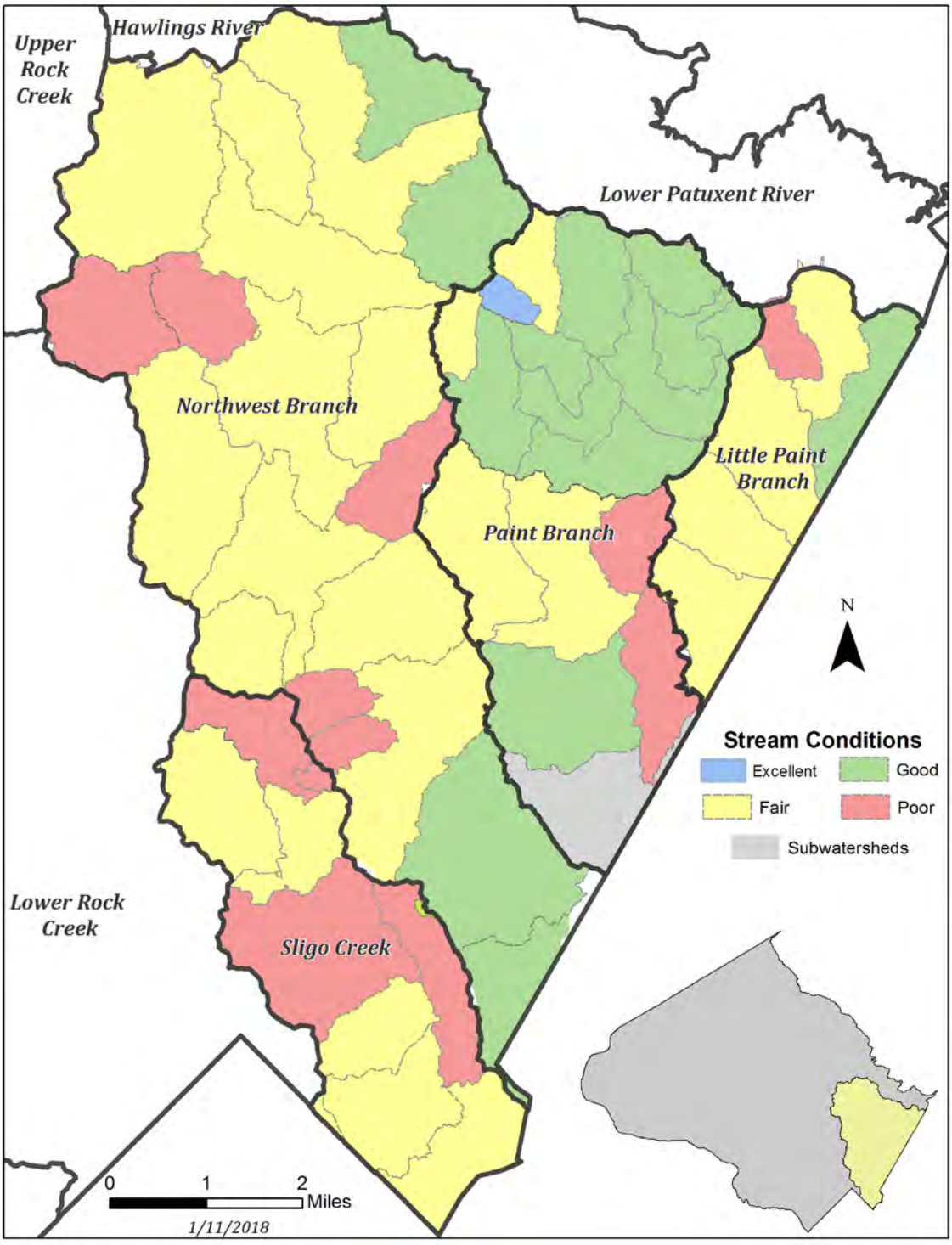


Figure III.F.3 2016 Stream Conditions for Anacostia Subwatersheds

Screening Results for Sligo Creek

The Sligo Creek Watershed is 11.1 square miles, 75 percent of which is in Montgomery County. Sligo Creek flows in a southeasterly direction, from the headwaters around Wheaton, Maryland to the confluence with the Northwest Branch of the Anacostia River outside of the county. The portions in Montgomery County are bounded by Washington, D.C and Prince George's County to the south, University Blvd to the east and north and approximately Georgia Ave on the west. The watershed is heavily urbanized, with impervious cover at approximately 34 percent.

In 2016, seven stations were monitored in the Sligo Creek Watershed. One completely random station, SCSC101, was sampled. As mentioned earlier, the random station acts as a representative site that allows the County to assess watershed wide stream conditions to a known probability. Stream conditions at four of the stations were rated *Poor* while conditions at three stations were rated *Fair* (Figure III.F.4a).

Stream conditions have been predominately *Poor* since 2000 and ranged from *Poor* (22.5%) to *Fair* (48%). While stream conditions have remained generally *Poor* between monitoring rounds, annual mean conditions have increased slightly. The three stations monitored in 2000 averaged 30%, while the six monitored in 2016 averaged 43.1%. Three stations: SCSC201, SCSC301and SCSC314 increased from *Poor* to *Fair* (Figure III.F.4b).

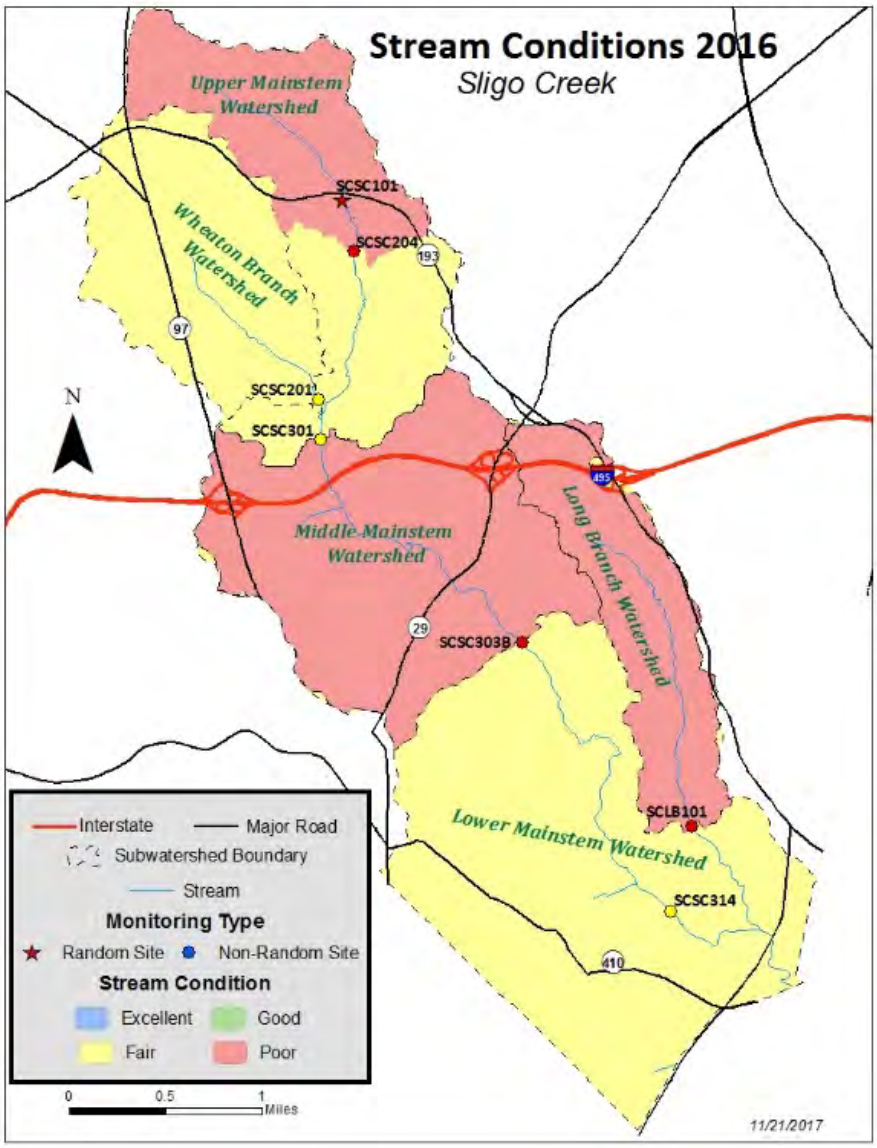


Figure III.F.4a Sligo Creek 2016 Stream Conditions

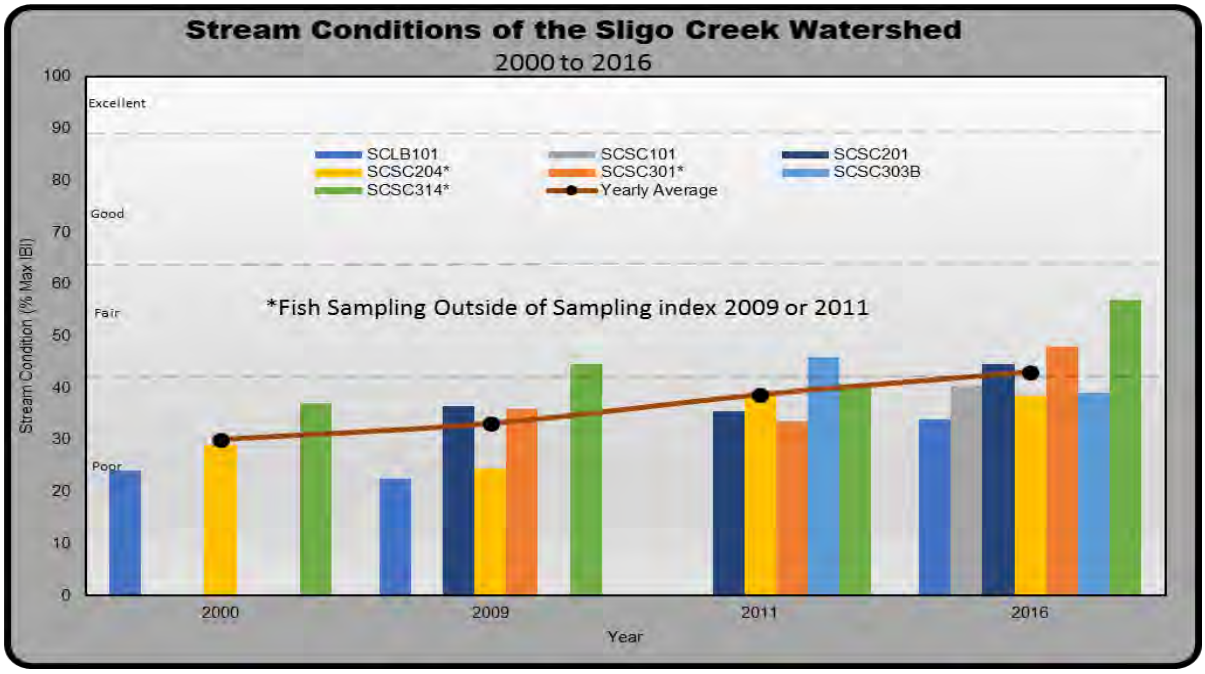


Figure III.F.4b Temporal Trend in Sligo Creek 2016 Stream Conditions

The majority of stations in the Sligo Creek Watershed appear to have impaired biological conditions for reasons other than habitat (Figure III.F.4c). Physical and chemical results at the time of sampling were within the range of prior observed results and don't appear to have negatively affected results (see appendix I). With an estimated 34 percent impervious cover and older and fewer stormwater controls, urban runoff quantity and quality are likely factors in the low ratings.

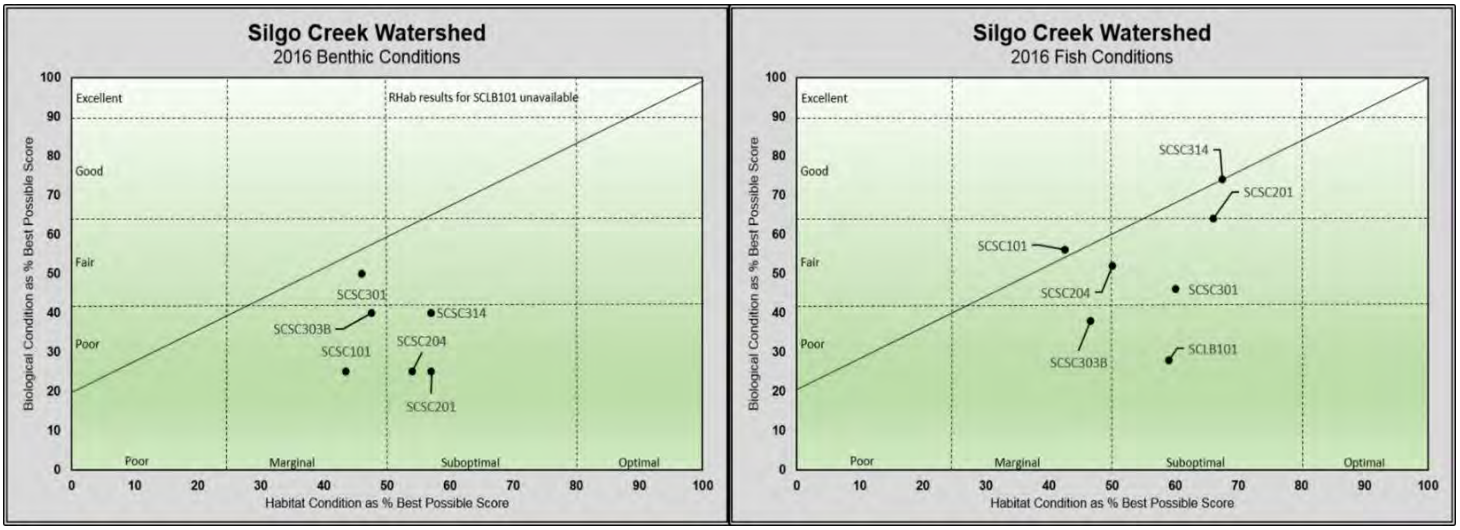


Figure III.F.4c Biological Conditions Vs. Habitat Conditions, Sligo Creek 2016. Rapid habitat assessment results are graphed against biological conditions (as a percent of the best possible score). This helps to identify areas which are impaired for reasons other than habitat. The line in the graphs show the theoretical relationship when the resulting IBI score is expected for the given habitat. If stations fall considerably below the line, biology scores are low despite relatively good habitat. This can be an indication that water quality, or some other variable other than habitat is causing biological impairment. In situ water chemistry is also collected at the time of biological sampling as a way of screening for potential water quality issues.

Screening Results for Northwest Branch

The portion of the Northwest Branch located in Montgomery County is 30.6 square miles. The watershed is bordered by New Hampshire Avenue to the East, Sandy Spring to the north, and Georgia Avenue to the west. Below Randolph Road, the watershed is urbanized with older stormwater management. Development in the remainder of the watershed is generally concentrated around the Rolling Stone, Longmeade, and Bachelor Forest tributaries (Figure III.F.5a).

In 2016, 22 Northwest Branch stations were sampled. Random stations included NWBP202, NWNW304A and NWNW401A. The three stations rated *Good* were located on tributaries to or on the Right Fork of the Northwest Branch (NWNW206A, NWNW304A and NWRF204). Five stations (NWBP201, NWLM301, NWLT101, NWSF101 and NWND101) were rated *Poor*. Conditions for the remaining Northwest Branch stations were *Fair*, ranging from 43 to 63.5 percent (Figure III.F.5b).

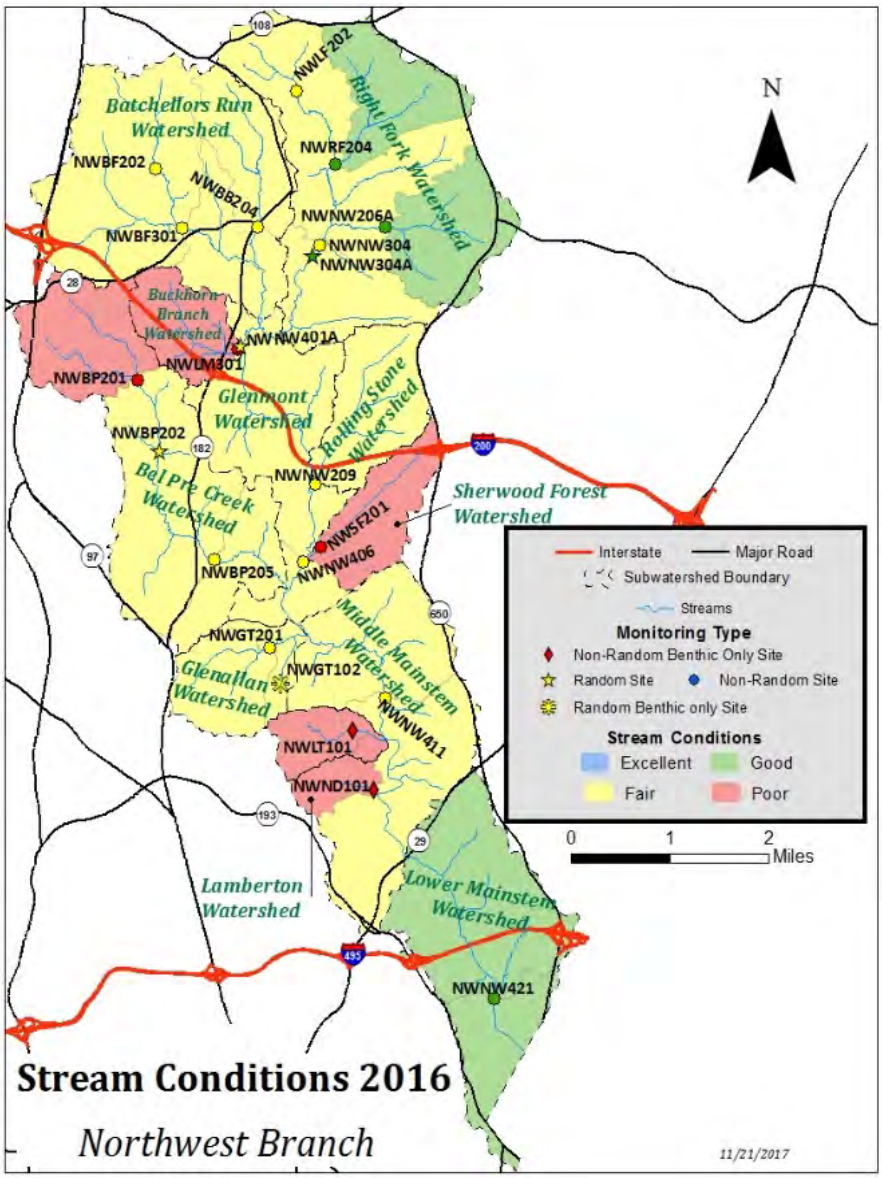


Figure III.F.5a Northwest Branch 2016 Stream Conditions

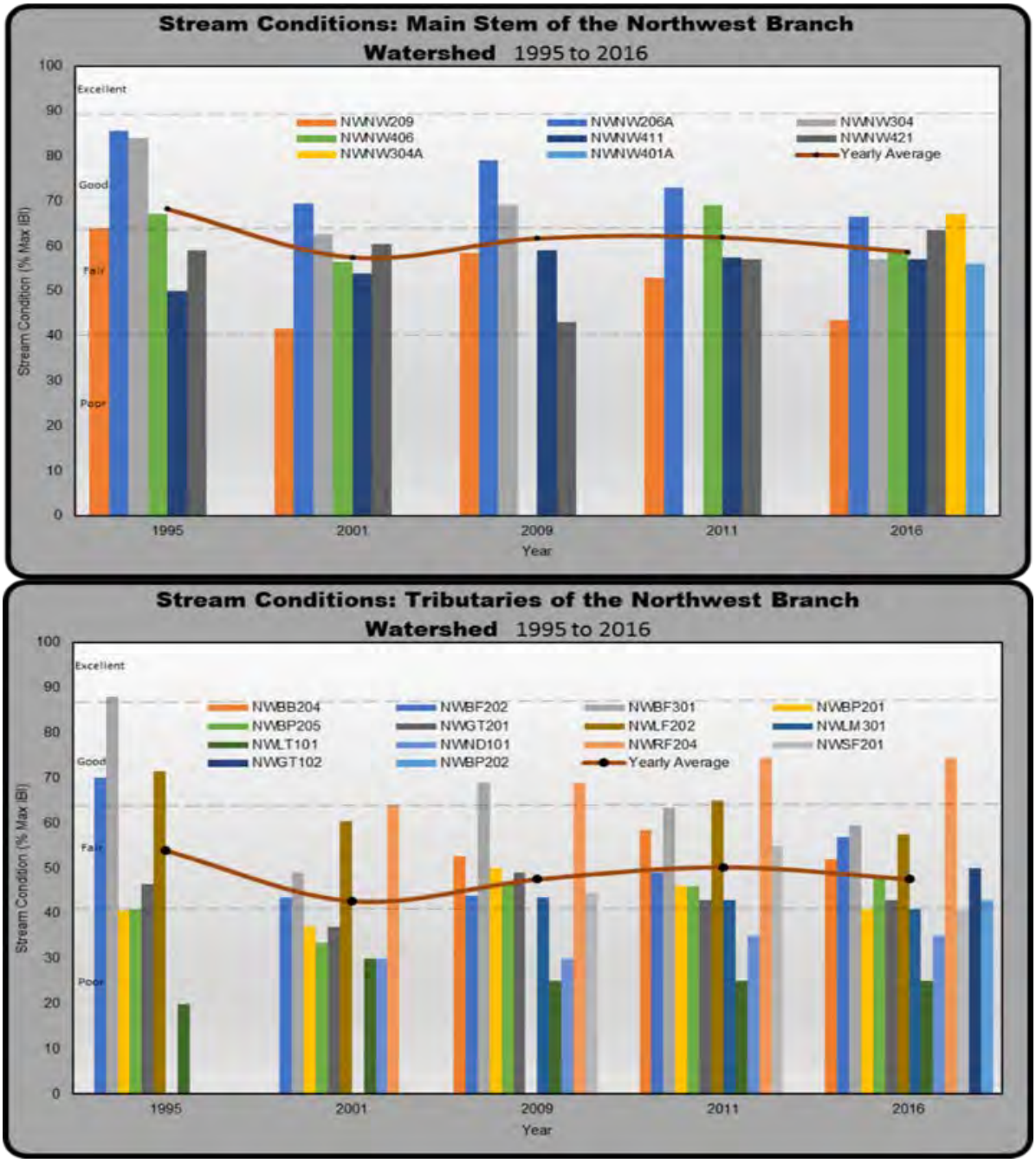


Figure III.F.5b Northwest Branch Stream Condition Trend over Time

Screening Results for Little Paint Branch

In Montgomery County, the Little Paint Branch Watershed is about 5.5 square miles in size. The land use in the watershed is predominately suburban development. The headwaters begin south of Burtonsville, Maryland and tributaries flow southeast before converging with the mainstem of the Little Paint Branch, of which only the most northerly portion is within Montgomery County. Columbia Pike parallels the western boundaries, while Route 200 transverses the lower third of the watershed (Figure III.F.6a).

Of the seven stations monitored in 2016, 70 percent were *Fair*. The unnamed, first order tributary to the Silverwood Tributary was *Poor* (20%) while the main steam Silverwood Tributary was *Good* (66.5%). LPLP204B was randomly chosen to be sampled for the current round and was in *Fair* condition (42.5%). Since monitoring in 2011, stream conditions changed narrative categories at four locations. Conditions at LPLP109 decreased from *Fair* to *Poor*, while conditions at LPLP207 decreased from *Good* to *Fair*. Conditions increased from *Poor* to *Fair* at LPLP101, while conditions at LPLP301A increased from *Fair* to *Good* (Figure III.F.6b).

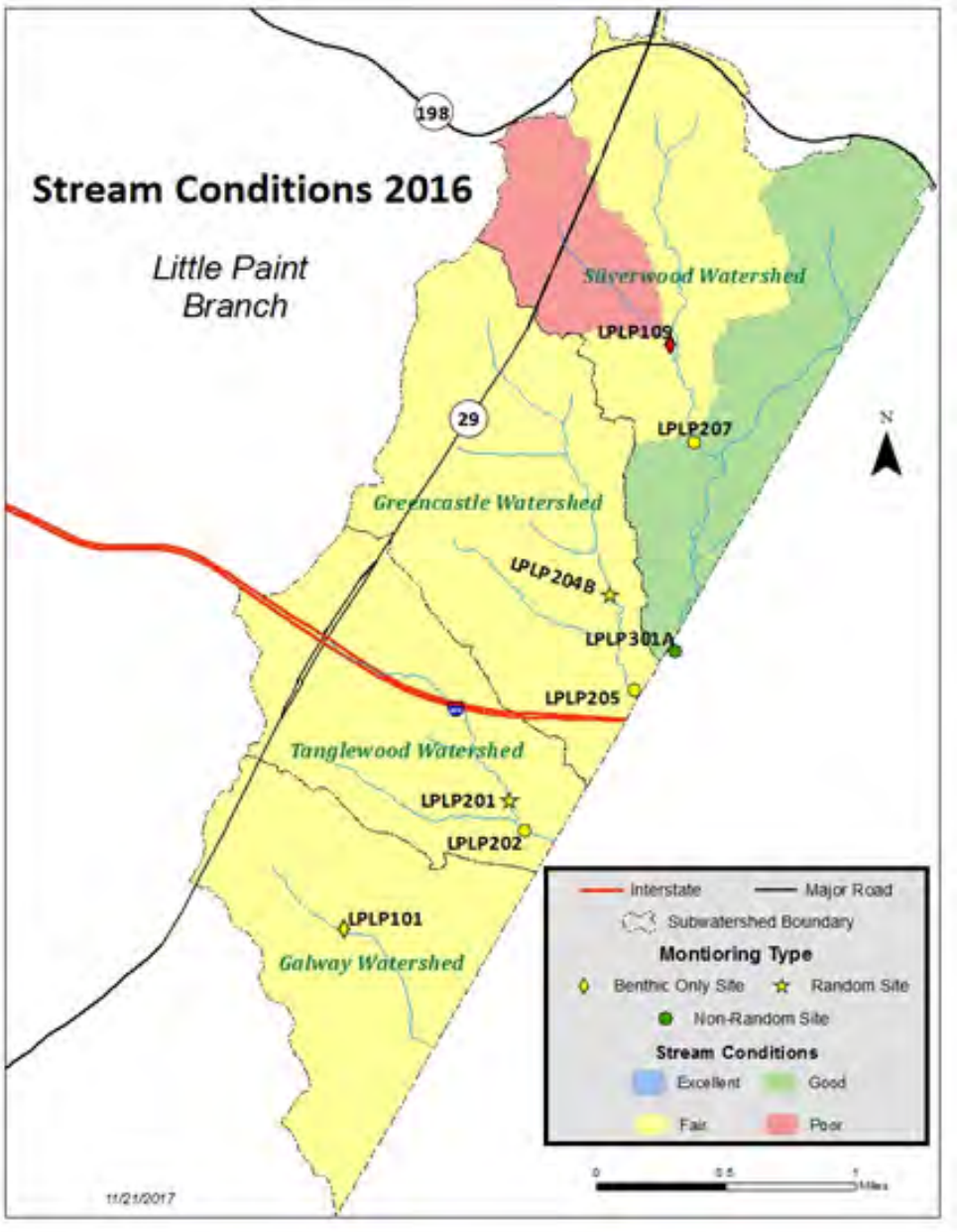


Figure III.F.6a Little Paint Branch 2016 Stream Conditions

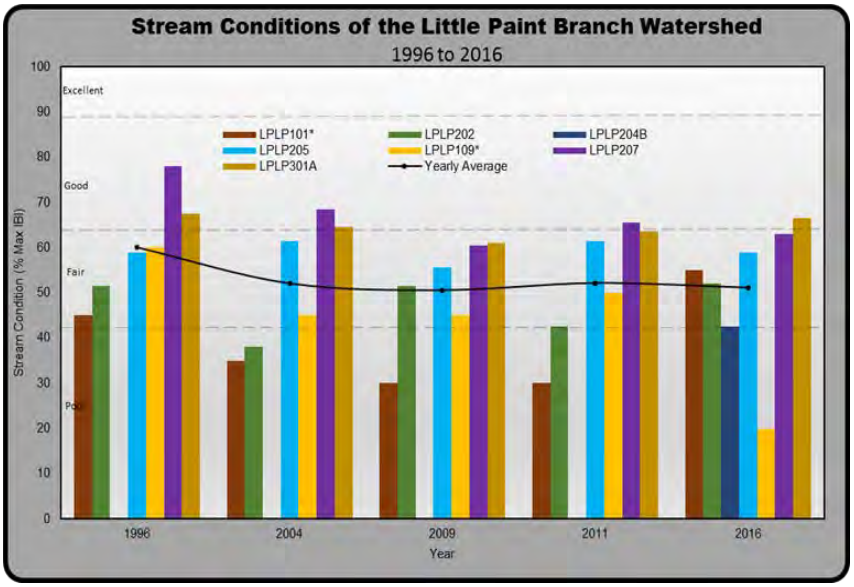


Figure III.F.6b Temporal Trends in Little Paint Branch Stream Conditions

Screening Results for Lower Paint Branch

In Montgomery County, the Paint Branch Watershed comprises about 15 square miles. The Paint Branch flows in a southeasterly direction from the headwaters around Spencerville into Prince George's County where it enters the Northeast Branch of the Anacostia River. The watershed is bordered by Route 198 to the north, by New Hampshire Avenue on the west, and by the County line to the east. The watershed is predominately residential, covering 42 percent of the entire watershed. Impervious cover measures 18 percent in the entire watershed (Figure III.F.7a).

Five Lower Paint Branch stations were sampled in 2016 that were not in the Upper Paint Branch Special Protection Area (SPA). Two were rated *Poor*, two were rated *Fair*, and PBPB311 was rated *Good* (Figure III.F.7b). Since 2004, conditions have generally been *Fair*, ranging from *Poor* (33.5% in 2016) to *Good* (71% in 2009 and 2016).

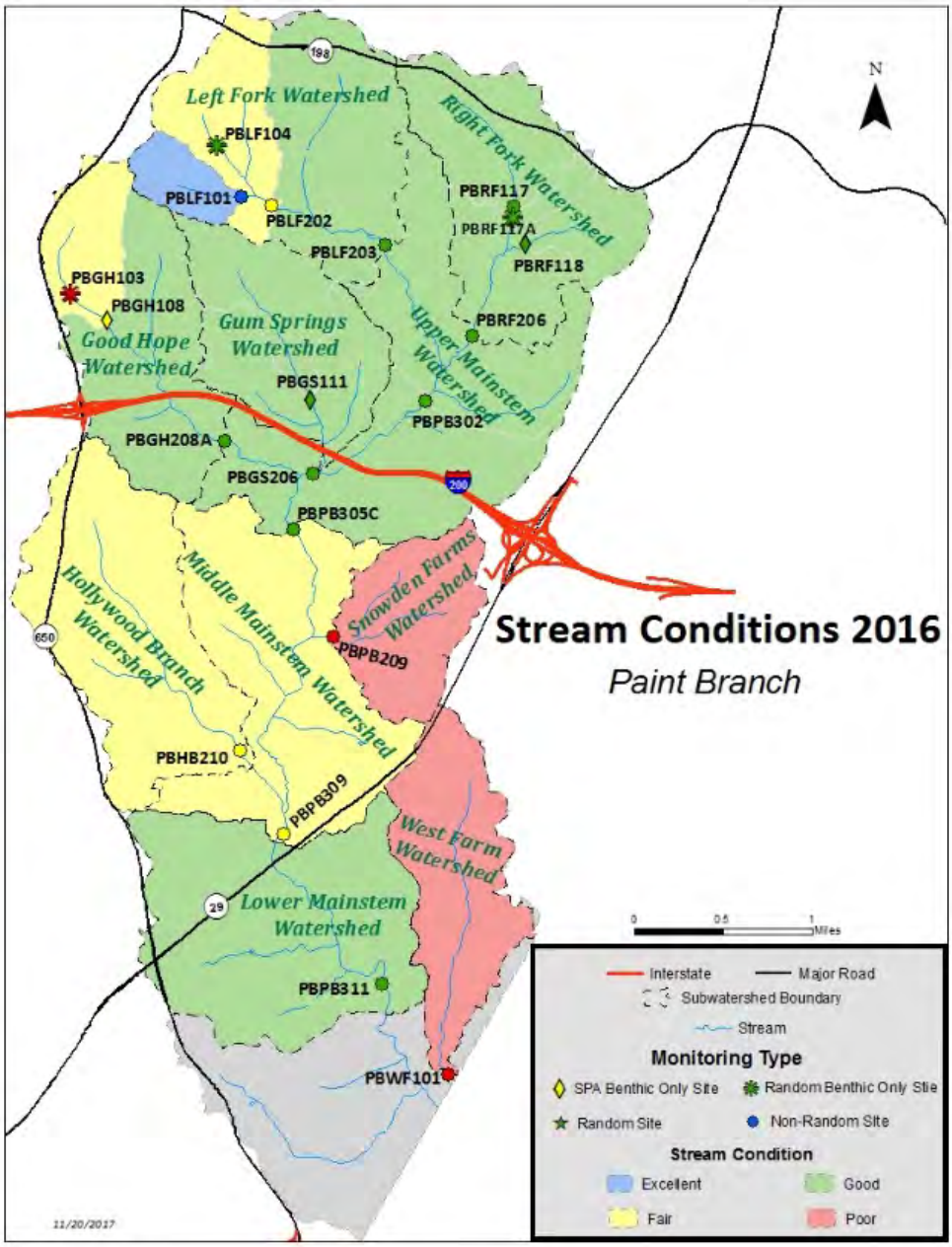


Figure III.F.7a Non-SPA Lower Paint Branch 2016 Stream Conditions

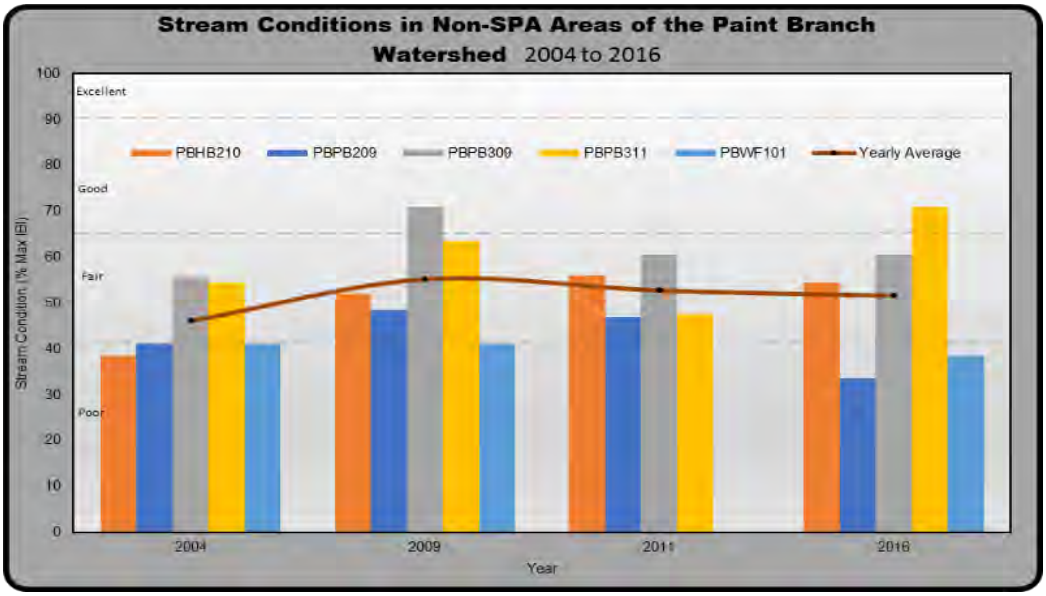


Figure III.F.7b Temporal Trends in Stream Conditions: Non-SPA Lower Paint Branch

Screening Results for Upper Paint Branch Special Protection Area

The Upper Paint Branch SPA is the roughly 7.5 square mile area above Fairland Road and includes the Left and Right Fork, Gum Springs and the Good Hope Tributaries (See Figure III.F.7a). Land use in the watershed is predominately residential.

Stream conditions were predominately *Fair* during the 2004 monitoring round, improving and remaining generally *Good* since 2009 (Figure III.F.8). Fifteen stations were monitored in the Paint Branch SPA, including three randomly selected stations: PBGH103, PBLF104 and PBRF117A. The only occurrence of *Poor* (35%) was at the random station PBGH103, a narrow channel immediately upstream of Piping Rock Drive.

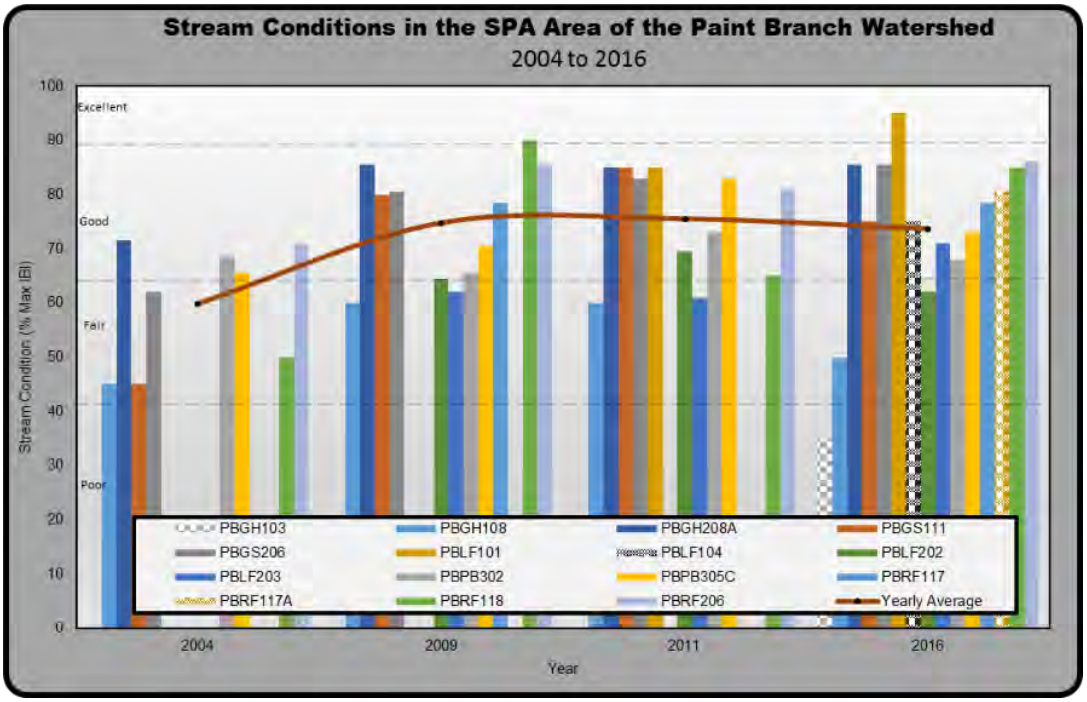


Figure III.F.8 Temporal Trends in Upper Paint Branch SPA Stream Conditions

2016 Watershed Screening Summary

Stream conditions for the watersheds sampled during the 2016 monitoring season are consistent between monitoring rounds. Changes in stream conditions have generally been marginal. Narrative category changes involving a greater than 10% change occurred at 10 (27%) stations.

While fish populations were as expected for the observed habitat ratings for the most part, benthic communities were not. Even with restoration improvements to stream habitats, benthic populations may not be available in the vicinity to recolonize these more urban areas due to site isolation and the limited mobility of most benthic macroinvertebrates.

G. Watershed Restoration

G. Watershed Restoration

The County shall implement those practices identified in PART III.F, to control stormwater discharges to the MEP. The overall goals are to maximize the water quality in a single watershed, or combination of watersheds; use efforts that are definable and the effects of which are measurable; and show progress toward meeting any applicable WLAs developed under EPA approved TMDLs. At a minimum, the County shall:

1. By the end of this permit term, complete the implementation of those restoration efforts that were identified and initiated during the previous permit term to restore ten percent of the County's impervious surface area. The watershed, or combination of watersheds where the restoration efforts are implemented shall be monitored according to PART III.H, to determine effectiveness toward improving water quality.
2. By the end of this permit term, complete the implementation of restoration in a watershed, or combination of watersheds, to restore an additional twenty percent of the County's impervious surface area that is not restored to the MEP. Restoration shall include but not be limited to the use of ESD and other nonstructural techniques, structural stormwater practice retrofitting, and stream channel restoration. These efforts shall be separate from those specified in PART III.G.1 and shall be monitored according to PART III.H, to determine effectiveness toward improving water quality.
3. Report annually:
   a. The monitoring data and surrogate parameter analyses used to determine water quality improvements;
   b. The estimated cost and the actual expenditures for program implementation; and
   c. The progress toward meeting any applicable WLAs developed under EPA-approved TMDLs in the watersheds established in PART III.G.1 and 2, where restoration has occurred.

The Permit requires the County to implement restoration practices identified through watershed assessments to control twenty percent of the County's impervious area not already controlled to the MEP. The *Montgomery County Coordinated Implementation Strategy* (the "Strategy") (DEP, 2011) provides the planning basis to meet the Permit's restoration requirement. DEP developed the Strategy using 2009 data, including impervious area and BMP drainage areas. DEP notes that the Strategy was developed prior to MDE guidance for accounting for stormwater wasteload allocations and impervious acres treated. MDE approved the Strategy in 2012. Figure III.G.1 shows the County area in 2009, subject to the Permit.

The County MS4 area is comprised of 25,119 impervious acres, 6,230 acres of that area were determined to be controlled to the MEP in 2009. The Permit requires the County to restore 20 percent of the remaining 18,889 uncontrolled and inadequately controlled impervious acres, which is 3,778 acres. Table III.G.1 provides a summary of the County controlled and uncontrolled impervious area.

In a letter dated October 11, 2016, MDE approved an increase to the County's restoration goal by one acre (from 3,777 to 3,778). The reason for this increase was due to a number of non-structural BMPs

located on single family lots were not inspected and therefore cannot be credited toward the County's impervious area controlled to the MEP in 2009. MDE approved removing these BMPs from the County's inventory, which removes 40 acres of control and increased the overall restoration goal by one acre. The County is developing a program to address the inspection of these practices to allow for credit in the future.

The County's impervious layer was developed using a 2008 impervious area data layer. This impervious area was approved by MDE when the Strategy was approved in 2012. However, the impervious layer was incomplete when it was digitized and did not account for all the impervious surface conditions that existed in 2008. This incomplete impervious layer was used as the foundation of the County's MS4 calculation. This data layer remained static and was not changed even though DEP had continuously updated its impervious surface data as it refined the information used to develop the Water Quality Protection Charge (WQPC). In 2016 and 2017, DEP conducted a comprehensive effort to understand and update its data. This process is described in more detail in Section III.G.1.d.

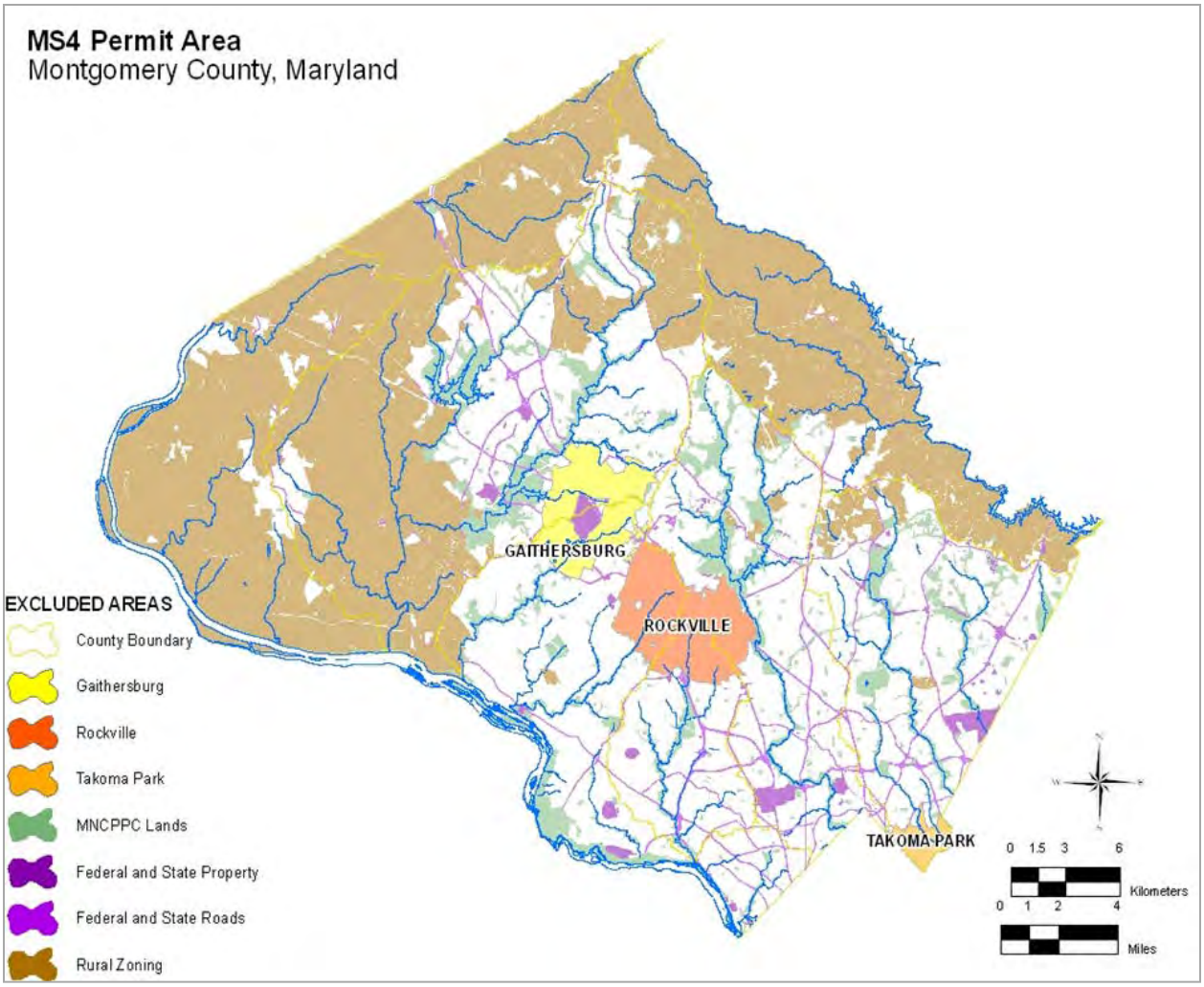


Figure III.G.1 County Area Subject to the MS4 Permit

Table III.G.1. Area for the MS4 Permit Restoration Requirement		
	Description	**Area in Acres**
A.	County MS4 Impervious Area (IA) for the 2010-2015 MS4 Permit	25,119
B.	County IA Controlled to the MEP in 2009 (2016 Revision)	6,230
C.	County MS4 IA Under/Uncontrolled (2016 Revision) (A-B)	18,889
	IA Restoration Requirement (2016 Revision) (20% of C)	**3,778**

G.1 Progress Towards Meeting the Permit Impervious Area Restoration Goal

Throughout the permit term (2010 to present), DEP has worked diligently to design and construct new BMPs, or retrofit existing BMPs to provide more control and treatment to improve water quality. In 2015, the County's permit was administratively continued and in 2016 the County began negotiating a Consent Decree with MDE to determine a path to compliance with the permit. As of FY16, the County had restored 1,918 acres of the 3,778 impervious surface restoration required during the current permit term. Because the permit was administratively continued the County continued aggressively working to complete the restoration goal. By 2017, the Capital Improvement Program (CIP) was well established and the planning and design were underway to ensure that new BMPs or retrofitted BMPs were designed to improve water quality, enhance stream habitat, and minimize physical impact to streams from uncontrolled urban runoff. The County implemented one of the first Green Street programs in the State installing over 360 green street BMPs by early 2017, tackled many planning and permitting challenges as projects were designed and installed, and improved data management through project management software. DEP also continued to work closely with the community and stormwater partners to promote the water quality and economic benefits from the projects under design and construction around the County.

In 2016 and 2017, DEP began a comprehensive evaluation of its programming to ensure the planning and management of the restoration efforts are targeted to be the most environmentally beneficial and cost-effective to ensure the County meets the 20 percent restoration goal required in the Permit.

In the early years of the permit, DEP's primary focus was on the development of the CIP Projects needed to ensure the program would meet the 20 percent restoration goal. However, this same emphasis on implementation resulted in BMP data management that was not able to keep up with the County's rapidly advancing program. In 2016 and 2017, DEP began to evaluate its urban BMP database, and started a comprehensive review of the impervious surface and BMP drainage area data. This effort identified a significant backlog of BMPs that were missing drainage and impervious area calculations. The department analyzed the data to determine the uncaptured controlled impervious area credit. In addition, the County also evaluated the 2014 MDE guidance and Chesapeake Bay Expert Panel guidance to determine if there were alternative BMP (for example, street sweeping or tree canopy) credits the County could claim.

This report details DEP's efforts in the CIP, BMP inventory and database improvement, and evaluation of alternative BMP credit, all of which have resulted in the County identifying a significant increase of impervious area restored that can be counted toward meeting the 20-percent impervious area restoration goal.

As of the end of FY17, the County has restored 2,927 impervious acres, an increase of 1,009 acres from FY16. This restored area achieved 77 percent of the impervious area restoration goal of 3,778 acres. As of December 2017, the County has 851 impervious acres of area remaining for restoration to achieve the restoration requirement specified in the 2010 Permit. The County is currently in negotiation with MDE for a consent decree that will require the County to meet this goal by December 2020. Based on the progress to date, the County expects to achieve this goal in the timeline required by the consent decree.

Table III.G.2, provides a summary of the restoration achievements in FY17 and during the permit term. In this table, the restoration efforts are presented in four categories: CIP Projects, Voluntary BMP Implementation, Alternative BMPs, and New BMPs Treating Existing Impervious Area. The credit for the alternative BMPs is largely based on the guidance provided by MDE titled "*Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated*", August 2014 (MDE 2014).

The significant increase in creditable acreage is due to DEP's enhanced effort to improve the overall data accounting for new BMPs treating existing impervious area and developing a method to capture credit for changing connections of septic systems to wastewater treatment plants. More detail on these credits, as well as all the impervious acreage restoration accomplishments by category are presented in the sections below. Background data for the alternative BMPs, database accounting for new BMPs treating existing impervious area, and detailed tables showing project-specific information for completed projects, projects under construction in FY17, and projects in design are provided in Appendix J.

Table III.G.2. County Projects and Alternative BMPs Credits Completed During the Permit Term and in FY17

CATEGORY	IA[1] Restoration Completed During the Permit Term	IA Restoration Completed in FY17[2]
a. Capital Improvements Program Projects	**1,497.6**	**158.7**
i. ESD/LID Projects	84.9	8.8
Green Streets	40.5	2.4
DOT CIP Green Street Projects	33.1	-
Public Property ESD	8.8	5.5
DGS CIP ESD Project	1.0	-
MCPS ESD Project	0.7	-
Underground Water Quality Treatment	0.9	0.9
ii. Stormwater Pond Retrofits	801.4	124.6
iii. Stream Restoration	307.7	25.4
U.S. Army Corps of Engineers-DEP Stream Restoration Projects	136.1	-
DOT Outfall Stabilization	14.7	-
v. Agency Partnerships Restoration Projects	288.9	-
Intercounty Connector Projects[3]	265.6	-
WSSC Stream Restoration Projects	23.3	-
b. Voluntary BMP Implementation	**74.8**	**29.3**
i. Watershed Management Grants	2.4	2.4
ii. RainScapes	49.4	26.9
iii. Voluntary BMP Earned WQPC Credits	23.0	-
c. Alternative BMPs[4]	**521.8**	**253.2**
i. Impervious Surface Removal	0.4	-
ii. Urban Tree Canopy Expansion	29.0	29.0
Urban Forest Planting	51.4	45.4
iii. Septic Pumping[5]	60.0	10.0
Septic Denitrification	36.1	-
WWTP Connections	153.7	153.7
iv. Street Sweeping[5]	133.2	18.3
Catch Basin Cleaning and Storm Drain Vacuuming[5]	58.0	-3.2
d. New BMPs Treating Existing Impervious Cover6	**832.4**	**567.6**
PROGRESS TOTAL	**2,927**	**1,009**
PERCENTAGE PROGRESS TOWARD RESTORATION GOAL	**77%**	

Notes:

[1]*Impervious Acreage (IA) in acres*
[2]*This column shows the accomplishments completed from July 1, 2016 and June 30, 2017*
[3] *ICC mitigation-restoration projects included the installation of bioswales, pond retrofits, new ponds, and impervious surface removal*
[4]*Includes a combination of permanent and annual practices*
[5]*Annual practices. FY17 IA treated provides the difference between FY16 and FY17. A negative number reflects fewer IA treated in FY17 than in FY16*
[6]*Cumulative number of IA from BMPs installed between 2010 to 2016. Enhanced data analysis was done in FY17, see Section III.G.1.d for more detail*

Capital Improvement Program Projects

In FY17, the DEP's CIP completed construction of 38 BMPs treating 158.7 acres of impervious area. This includes installation of new ESD BMPs, retrofits of existing ponds, and stream restoration projects as described below. Table III.G.3 provides a breakdown on the number and type of CIP BMPs that were constructed or retrofitted in FY17, as well as a summary of the total number of BMPs and retrofit projects completed during the permit term.

ESD/LID Practices

The County has installed 369 ESD/LID practices to date. These practices are installed as part of the County's Green Street Program, or installed on public property. The focus of this work has primarily been in the Anacostia River and Rock Creek Watersheds, two of the most impaired watersheds in the County. These watersheds also have the largest number TMDLs.

Green Streets

"Green Streets" are roadways where ESD practices are constructed within the street ROW to capture and treat stormwater runoff. DEP implements Green Street projects in neighborhoods where stormwater management is not adequate. In addition, DEP collaborates with DOT to implement Green Street projects in areas where DOT is scheduled to do roadway maintenance or renovation. Green Streets are often the most practical stormwater management option in neighborhoods with little open space to install large stormwater practices. The County's Green Street initiative creates aesthetically attractive streetscapes, provides natural habitat, and helps to visually connect neighborhoods, schools, parks, and business districts. Figure III.G.2 illustrates 16 neighborhoods where multiple small scale stormwater practices are either complete or in design to create greener communities in the Rock Creek and Anacostia River watersheds.

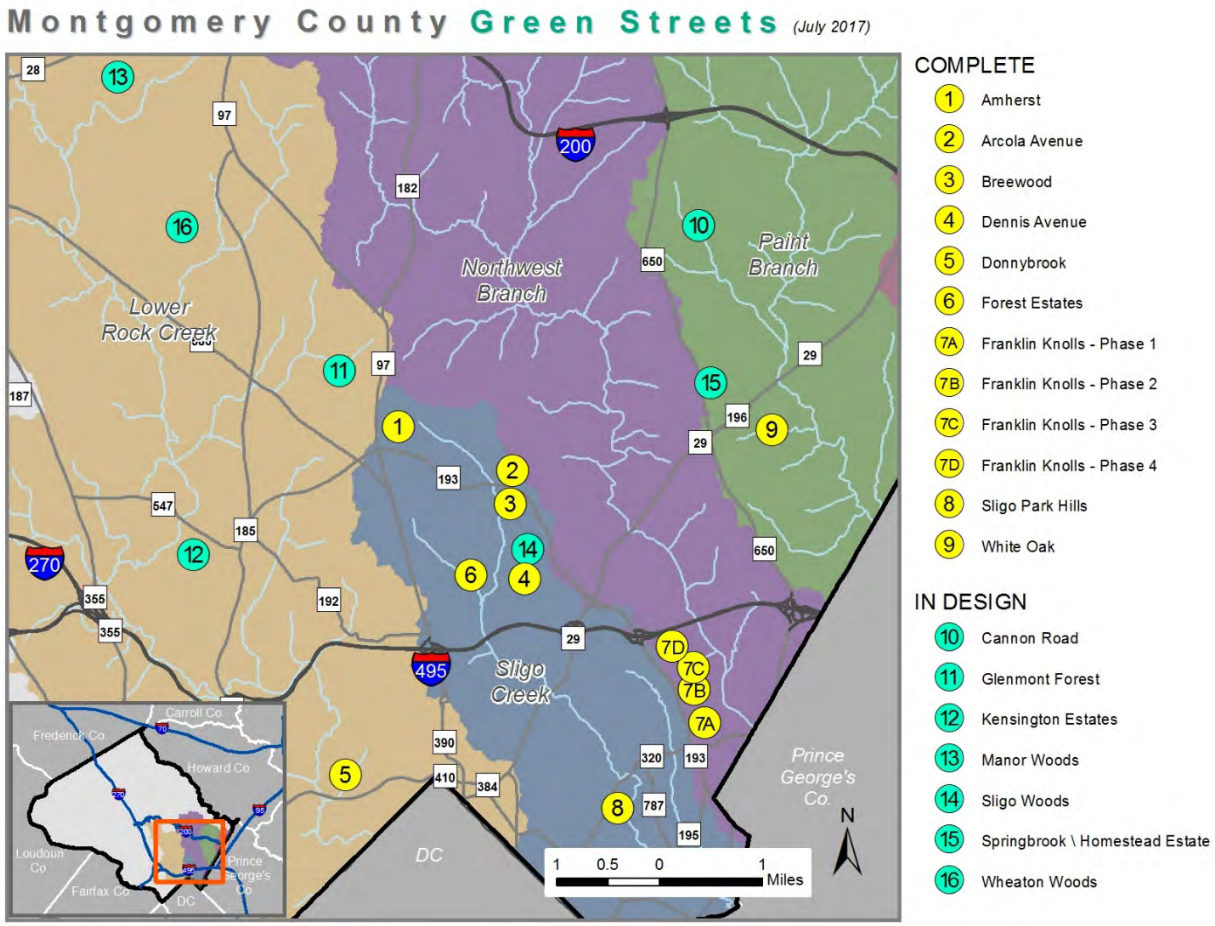


Figure III.G.2 Locations of the Green Street Neighborhoods where multiple small scale stormwater practices are either complete or in design to create greener communities

Public Property ESD

During FY17, the DEP continued to design and implement ESD projects on public property, including school grounds, libraries, parking lots and community centers. Figure III.G.3 shows project locations and status of various school and public facilities through FY17. These projects are used to educate residents and children about the benefits of stormwater management.

As part of the County's strategic planning and implementation of projects, small scale stormwater practices are installed in conjunction with other projects or where no other larger scaled projects are feasible.

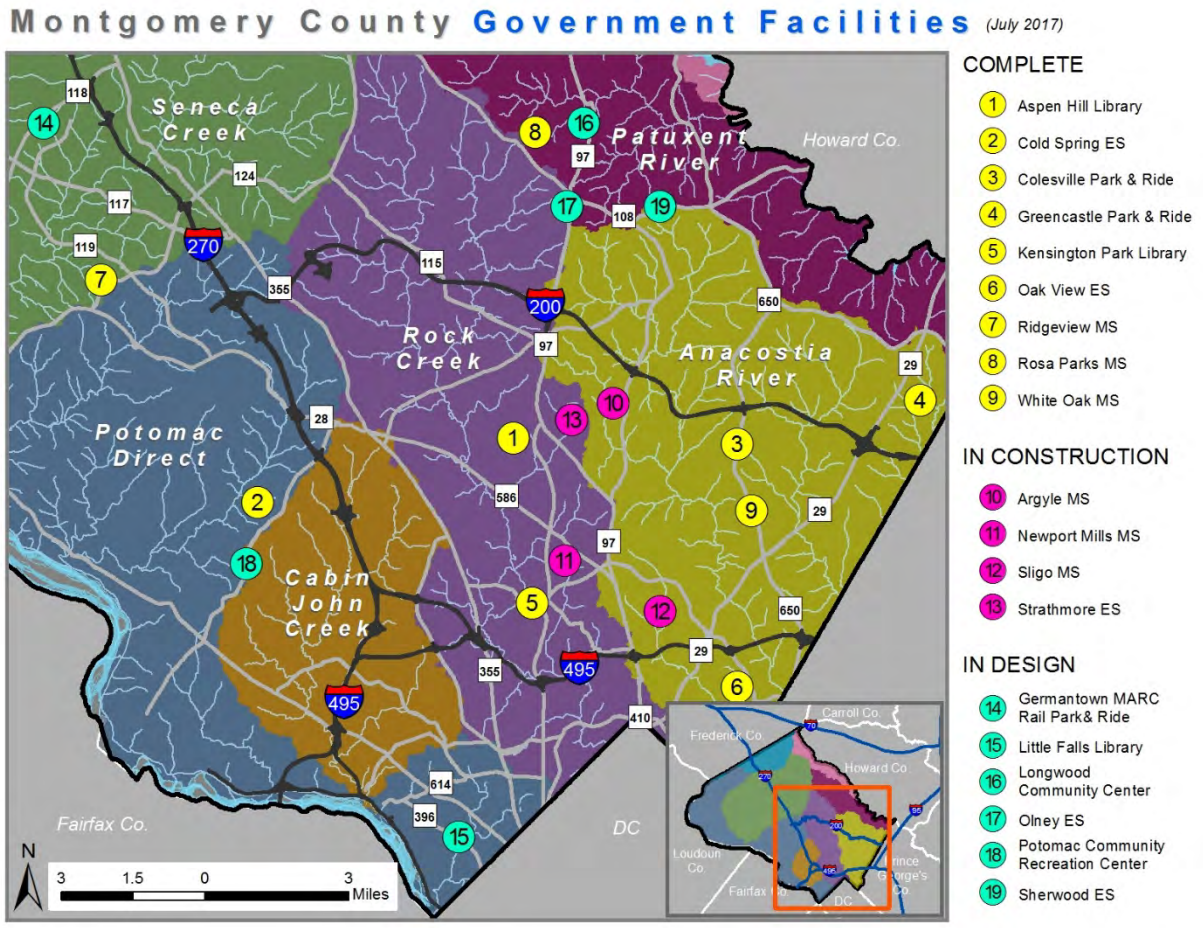


Figure III.G.3 Location of ESD projects on public property

Underground Water Quality Treatment

Sometimes during an ESD project, additional benefit is achieved by installing underground water quality treatment system. The County completed four underground water quality treatment facilities in FY17, treating a total of 0.9 impervious acres. These facilities are especially useful in highly urbanized areas where space for stormwater controls is extremely limited.

Stormwater Pond Retrofits

The County has retrofitted 24 stormwater ponds, and installed 1 new pond during the permit term. The focus of this work has been in the Anacostia River, Rock Creek and Seneca Creek Watersheds. Existing stormwater ponds are upgraded by increasing their capacity to trap and reduce stormwater pollution during storms, to provide water quality volume, and channel protection volume. In addition to meeting the treatment goal and creating channel protection, DEP includes native planting, wetland planting, and native trees with each retrofit to ensure that ecological habitat benefits are also a part of the restoration.

Stream Restoration Projects

The County has completed 16 stream restoration projects restoring over 30,000 linear feet of stream to date. The focus of this work is within the Anacostia River, Rock Creek, and Seneca Creek Watersheds.

Many of the projects in the Anacostia Watershed were completed in partnership with the Army Corps of Engineers. Stream restoration is a set of techniques or methods the County uses to protect adjacent properties and public infrastructure by reducing stream bank erosion, minimizing the down-cutting of stream bed, and restoring aquatic ecosystems (natural stream systems). Restoration techniques typically use natural materials such as rock, logs, and native plants to help slow down stormwater flow and restore the natural meander of curve pattern found in stable streams. Many of the County's stream restoration projects include biological and physical monitoring, which is conducted by DEP and by contractors to understand the effectiveness of each project.

In 2009, DEP launched a multi-year restoration initiative to implement a series of restoration projects, including a stream restoration project, green streets, and RainScapes, to reverse the damage to the Breewood tributary and improve water quality. This tributary has been monitored since 2009 and provides valuable dataset for understanding the effectiveness of the restoration projects. More information about this flagship project and the multi-year watershed study is provided in Section III.H.

Agency Partnerships Restoration Projects

No new agency partnerships restoration projects completed in FY17.

Table III.G.3 Capital Improvement Program Projects by BMP Type Completed during the Permit Term

CATEGORY	Number of BMPs Completed in FY17	IA Treated in FY17 (acre)	Number of BMPs Completed During Permit Term	IA Treated During Permit Term (acre)
i. ESD/LID Projects	**29**	**8.8**	**369**	**84.9**
Green Streets	1	2.4	202	40.5
DOT CIP Green Street Projects	0	0.0	126	33.1
Public Property ESD	24	5.5	35	8.7
DGS CIP ESD Project	0	0.0	1	1.0
MCPS ESD Project	0	0.0	1	0.7
Underground Water Quality Treatment	4	0.9	4	0.9
ii. Stormwater Pond Retrofits[1]	**7**	**126.4**	**24**	**801.4**
iii. Stream Restoration[2]	**2**	**25.4**	**16**	**307.7**
U.S. Army Corps of Engineers-DEP Stream Restoration Projects	0	0.0	7	136.1
DOT Outfall Stabilization Projects	**0**	**0.0**	**26**	**14.7**
iv. Agency Partnerships Restoration Projects	**0**	**0.0**	**272**	**288.9**
Intercounty Connector Projects[6]	0	0.0	266	265.6
WSSC Stream Restoration Projects	0	0.0	6	23.3
Total Number	**38**	**158.7**	**707**	**1,497.6**

[1]DEP installed a new pond on National Institute of Health's campus as a retrofit project
[2]Acres of impervious area restored by stream restoration are determined by dividing the linear feet of stream restored by 100 to calculate the equivalent impervious acreage. 30,770 linear feet/100 = 307.7 acres

Voluntary BMP Implementation

Community Based Restoration Watershed Grants

Since 2015, DEP has administered a watershed grant program through the Chesapeake Bay Trust (CBT). The grant program funds projects that reduce pollutants through community-based restoration practices as well as projects focused on public engagement through education, outreach, and stewardship. CBT has issued 23 grants and over $1 million dollars in funding to nonprofit organizations. Round 1 of grants had 13 projects funded in FY15 and Round 2 had 10 projects funded in FY17. At the close of FY17, all Round 1 grants were completed, as well as 4 of the Round 2 grants. This is the first year the County is reporting about 2.4 impervious acres treated by community based restoration practices. Data is continuing to be provided to the County on the completed Round 1 and 2 community based restoration practices and more projects will be reported in FY18. Table III.G.4 provides a summary of FY17 Watershed Grant projects. More detail on the Watershed Grant projects is also provided in Section III.E.7 of this report, as well as in Appendix J.

Table III.G.4 Summary of FY17 Watershed Grant Projects

Grant Project Types	Number of Practices	IA Treated (acre)
Rain Gardens	2	0.07
Conservation Landscaping	4	0.72
Cistern	9	0.13
Tree Planting	432	1.44
Impervious Pavement Removal	1	0.03
Total Watershed Grant	**448**	**2.39**

RainScapes Program

The DEP's RainScapes program promotes and implements environmentally friendly landscaping and small-scale ESD projects on residential, institutional, and commercial properties. The program offers technical and financial assistance to encourage property owners to implement eligible RainScapes techniques, such as rain gardens, rain barrels or cisterns, conservation landscaping, pavement removal and/or replacement with permeable pavements.

RainScapes projects are designed to provide water quantity benefits by controlling, at a minimum, the first inch of rainfall from a specified impervious area using runoff reduction techniques. The RainScapes program has added impervious runoff reduction to 49.4 impervious acres in the County for at least the first inch of rain from implementation of rain gardens, rain barrels, cisterns, conservation landscaping, pavement removal, and permeable pavement. see Table III.G.5). An additional 426 trees were planted as part of the RainScape program, more information can be found in Table III.G.7. The 49.4 acres have been achieved by a combination of Rewards Rebates, demonstration projects installed by DEP RainScapes on neighborhood and publicly accessible properties, and curricular projects at MCPS schools. Many projects are providing treatment for more than an inch, with many designed to treat the 1-year storm event.

Other RainScapes Community program elements are focused on RainScapes outreach and training, and are described in Part III.E.7, Public Education and Outreach.

RainScapes Rewards

RainScapes Rewards provides rebates to private residential and institutional property owners who install qualified small-scale stormwater projects. RainScapes Rewards Rebate projects (Figure III.G.4 and Table III.G.5) provide a visible presence for stormwater management on private lots across the County and, due to their distribution countywide, are serving to raise both public awareness and demonstration of how small measures and individual actions can have a cumulative impact across the County.

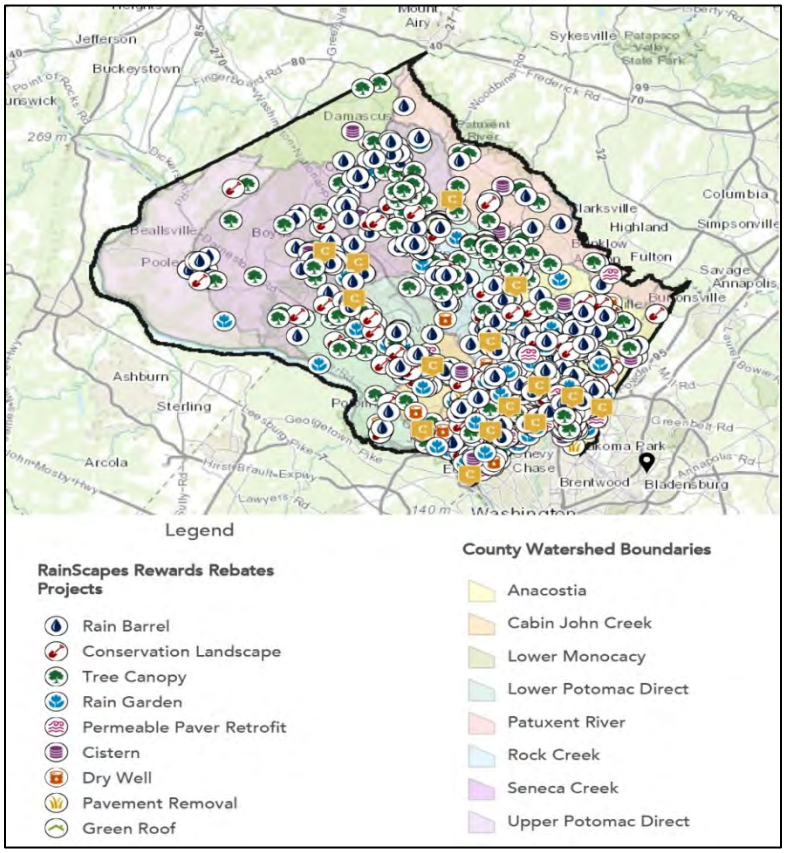


Figure III.G.4 RainScapes Rewards Projects

From FY08 to FY17, 2,190 RainScapes projects have been submitted. In the process of review, many projects either do not get completed or are completed but the participant is not concerned with submitting receipts for a rebate. By the end of FY17, 885 had been paid, leaving 167 in process and/or in design status. The program has grown in popularity over the years and in FY17 259 projects were submitted and 107 projects were rebated. Once installed, these projects have the potential to add MEP runoff reduction, based on the average impervious area on the lots being treated. Rewards projects represent a flexible and effective way to implement restoration on private property with the advantage of sharing the cost of installation and placing the installation responsibility on the property owner, while offering technical oversight to ensure quality of the projects. Maintenance is also the owner's responsibility, which further reduces the cost of these projects to the County over their life-cycle.

RainScapes Communities: Congregations

In FY17, RainScapes Congregations efforts were a continuation of the work to implement the 2015 strategic plan for Congregational Property runoff reduction. This plan looked for ways to focus retrofit opportunities on congregational properties, and therefore, the County launched the RainScapes Congregations program. To date, 27 RainScapes projects have been completed at Congregational sites, adding treatment for an average of 3,600 square feet of impervious area per site. This amounts to a significant proportion of treatment area via Rewards rebates achieved by focusing on this land use category and the majority of treatment area achieved via the Watershed grant projects administered by CBT.

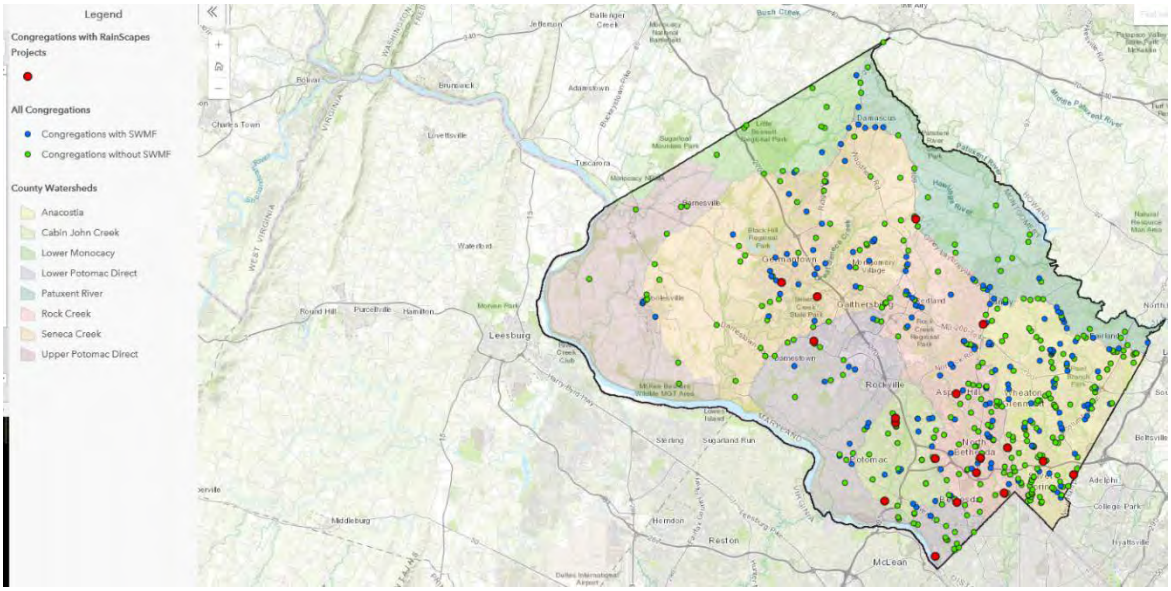


Figure III.G.5 Locations of RainScape Community Congregation Properties

RainScapes Communities: Neighborhood

The RainScapes effort in neighborhoods for FY17 continued to focus on outreach events and providing site assessments to promote the RainScapes Rewards rebate program. Efforts continued in three neighborhoods in the Cabin John Creek watershed, which was selected for this program in FY16. Outreach efforts have consisted primarily of introductory education and promoting the site assessment process. The implementation of the partnership approach using the CBT grant funding of the Friends of Cabin John Creek watershed organization allowed that group to assist the RainScapes Neighborhood program by organizing community meetings and identifying interested property owners to receive site assessments to prepare for a Rewards Rebate project. This effort will continue with additional grant support in the next two fiscal years.

The FY17 efforts also included expanding neighborhood screening for three additional neighborhoods in the Cabin John watershed (Al Marah, Bannockburn Estates and Willerburn Acres) and one in Rock Creek (Wildwood Manor). The FY18 efforts will include the expansion of outreach efforts in these neighborhoods.

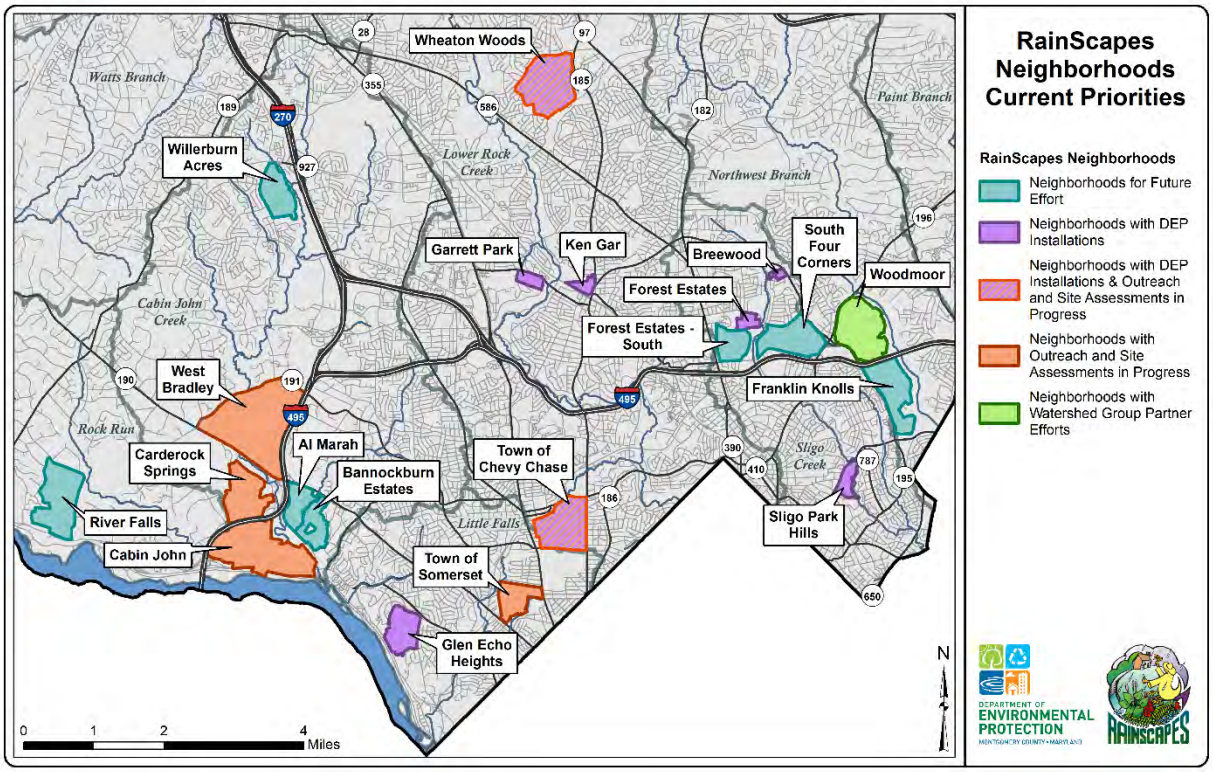


Figure III.G6 Locations RainScapes Neighborhoods of FY17

RainScapes for Schools and other Demonstration Projects

RainScapes demonstration projects have been installed with watershed groups and through the RainScapes for Schools program. Some projects are on private property home owner associations parcels, others are on individual lots, institutional properties, and on MCPS school sites. These projects were placed to provide locally accessible examples to the public and to support MCPS curricular lesson planning with "hands on" opportunities for students. These demonstration sites were also used to train both professionals and local watershed group members on site assessment and installation for RainScapes practices. No new school projects were installed in FY17 but previous projects received maintenance which greatly improved both appearance and functionality (Figure III.G.7).

Figure III.G.7 The Waterford Condominium project: Fall of FY17 was filling in well after being installed in the Spring of FY16. This project demonstrated newer building techniques for rain gardens and is managing 2,700 SF of roof area.

Table III.G.5 Number of Rainscapes Projects by Watershed

HUC-8 WATERSHED	Number of Rain-Scapes Projects	Impervious Acres Treated
Upper Patuxent River	5	0.19
Lower Monocacy River	16	0.48
Rocky Gorge Dam	33	2.41
Cabin John Creek	130	5.28
Potomac Direct	199	8.03
Seneca Creek	142	8.54
Anacostia River	429	11.36
Rock Creek	386	13.10
TOTALS	**1,340**	**49.4**

Voluntary BMP Earned WQPC Credits

No new voluntary BMPs earning WQPC credits were completed in FY17.

Alternative BMP Credits

The credits calculated for alternative BMPs are based on MDE 2014. The alternative BMP credit category had an increase of 253.2 impervious acres in FY17 (see Table III.G.2), which was largely from the addition of alternative BMP categories that were not included in prior reports, including urban tree canopy expansion, urban forest planting, and connecting septic systems to waste water treatment plant. Street sweeping, catch basin cleaning, storm drain vacuuming, and septic pumping are calculated on an annual basis. The following section provides a breakdown of the alternative BMP credit and method of calculations.

Impervious Surface Removal

Some projects result in a net removal of impervious surface. This net removal is credited on a per acre basis. Over the permit term, the county removed 0.4 acres. There were no new acres removed in FY17.

Urban Tree Canopy Expansion and Urban Forest Planting

In 2016, the Chesapeake Bay Program Water Quality Goal Implementation Team approved the "Recommendations of the Expert Panel to Define BMP Effectiveness for Urban Tree Canopy Expansion" (CBP 2016). The recommendations include best management practices for urban tree canopy expansion and urban forest planting developed by the Expert Panel. These recommended urban tree canopy expansion practices provide pollution reduction credit and equivalent impervious area credit for two types of tree plantings. One type is the Urban Tree Canopy Expansion which provides credit for every new individual tree planted in developed areas. This includes trees planted along rights of way and on residential and commercial property. The other is the Urban Forest Planting practice that provides credit at sites where trees are planted to establish forested conditions.

Urban Tree Canopy Expansion Planting

Many of the urban trees planted in the County are coordinated through the RainScapes and Tree Montgomery programs. Tree Montgomery is a program developed and implemented by DEP that provides for the planting of large shade trees throughout the County. The program increases canopy cover and helps raise awareness of the benefits of trees. Trees planted under this program are funded by the Tree Canopy Law that was introduced by County Executive Isiah Leggett and passed by the County Council in 2013. The first tree planting under this program took place in April 2015.

Under the Urban Tree Canopy Expansion credit, each tree planted in developed areas is eligible for a creditable area of 144 square feet, or the equivalent to 300 trees per acre. Therefore, each tree planted converts to 1/300 impervious equivalent acres. This creditable area is based on an estimated annual growth for a 10-year old tree after planting (assuming an initial diameter at breast height of 1-inch at planting). The trees are not required to be planted in a contiguous area. Further, they cannot be part of a buffer planting or stormwater BMP (e.g. bioretention, tree planter). Between 2010 and 2017, the County has planted at least 8,687 individual trees along rights of way and on residential property. This has resulted in nearly 29 acres of equivalent impervious acreage credit. Table III.G.6 provides the claimed credit Urban Tree Canopy Expansion funded by the county. Trees plantings funded by Watershed Grants are reported in Table III.G.6. Additional plantings have been installed and will be documented in future reports.

Table III.G.6 Summary of Urban Tree Canopy Expansion in Montgomery County				
Type of Planting	**Year Tree was Planted**	**Land Use**	**Number of Trees Planted**	**IA Per CBP 2016 (acres)**
Street trees planted in FY11	2010-2011	ROW Turf	422	1.41
Street trees planted in FY12	2011-2012	ROW Turf	437	1.46
Street trees planted in FY13	2012-2013	ROW Turf	863	2.88
Street trees planted in FY14	2013-2014	ROW Turf	848	2.83
Street trees planted in FY15	2014-2015	ROW Turf	1,029	3.43
Street trees planted in FY16	2015-2016	ROW Turf	1,652	5.51
Street trees planted in FY17	2016-2017	ROW Turf	1,761	5.87
RainScape trees planted on residential property	2010-2016	Residential Turf	426	1.42
Tree Montgomery trees planted in FY15	2014-2015	Residential Turf	47	0.16
Tree Montgomery trees planted in FY16	2015-2016	Residential Turf	456	1.52
Tree Montgomery trees planted in FY17	2016-2017	Residential Turf	746	2.49
Total Individual Tree Planting through FY17			**8,687**	**28.97**

Urban Forest Planting

Urban Forest Planting projects are tree planting projects in urban or suburban areas that are not part of a riparian buffer planting, structural BMP or Urban Tree Canopy Expansion BMP. This BMP is implemented with the intent of establishing forest ecosystem processes. It requires that long-term maintenance be implemented in compliance with the requirements as listed in Appendix H of the report (CBP, 2016). This is a land use change BMP converting developed turf grass to forest. The Urban Forest Planting BMP is a 1 to 1 acres of land use change to forest. Table III.G.7 provides the claimed credit for DEP's Urban Forest Planting projects.

A Montgomery County reforestation project began in 2011 at the Oaks Landfill in Laytonsville to convert mowed fields to a forest of native trees. As originally designed, this reforestation project met the criteria outlined in MDE 2014. However, the County is claiming credit for this project using the recommendations found in CBP 2016. The County planted 45 acres of land with a mix of native tree species and installed a fence to prevent damage from deer grazing. From 2011 through 2016, the County intensively managed the non-native invasive species and grasses with several treatments each year. The planting and maintenance were largely funded by two grants through the Chesapeake and Atlantic Coastal Bays 2010 Trust Fund, totaling $257,400. DEP has provided funding as well as leveraged resources for the project. Currently, a long-term maintenance plan, including at least one treatment per year and supplemental planting when needed, is being implemented. The maintenance plan and supporting documentation are provided in Appendix J. The reforestation is developing as expected and is, therefore, successful. As such, and based on the Forestry Working Group recommendation, this results in 45 acres of impervious acreage equivalent treated under the Urban Forest Planting best management practice.

Two additional areas at the Oaks Landfill that are expected to provide more acreage credits through the Urban Forest Planting in the future. These are currently shown as 'in construction' and include a

fragmented strip of forest previously ineligible and an area protected from deer. The fragmented strip is currently forested but did not meet the definition of forest due to its narrow width. Given that it is connected to the 45-acre reforestation site, this existing forest will meet the definition and be added to the 45 acres.

A second deer-protection fence was installed at the Oaks Landfill to protect an additional 10 acres of land that can be planted. The County is managing the non-native invasive plants and monitoring for natural regeneration within this 10-acre fence while exploring opportunities to plant and further maintain the area in FY18 to FY19.

Table III.G.7 Urban Forest Planting Credit in Montgomery County

Urban Reforestation to Pervious Cover	Year Planting Began	Land Use	Acres Planted	IA Per CBP 2016 (acres)
Oaks reforestation planting	2011	Urban turf	45.4	45.4

Septic Pumping, Septic Denitrification, Septic Connections to Waste Water Treatment Plant

Septic Pumping and Septic Denitrification

Tables III.G.2 and III.G.8 include the water quality benefit credits from septic pumping and septic systems with denitrification. Approximately 2,015 septic systems were pumped out in FY17 earning the County 60 impervious acres' credit, an increase of 10 impervious acres from FY16. The septic pumping data was determined by taking total septic waste reported by the WSSC's Hauled Waste Program for FY17. DEP assumed the average septic pumped out from a system is 1,000 gallons. The number of denitrification systems in the County did not change in FY17. 139 septic systems have denitrification, earning the County 36 impervious acres' credit. Septic denitrification data was obtained from the DPS Well and Septic unit and represents all the septic systems installed with a denitrification system as of June 30, 2016.

Septic Connections to a Waste Water Treatment Plant

MDE provides alternative impervious area credit for every septic system that is removed and connected to a Waste Water Treatment Plant (WWTP). This credit is 0.39 IA for each system connected to a WWTP (per MDE 2014). DEP conducted a search for agencies and datasets that track the switch from a private septic to a WWTP. Because septic systems are not tracked by WSSC, DEP developed another method by reviewing the Bay Restoration Fund (BRF) information to determine the number of septic systems that were removed when a connection was made to a WWTP. In accordance with Section 9-1605.2 of the Maryland Environment Article, the County assesses the BRF for properties that do not receive a water and sewer bill via their annual property taxes. Property owners who do receive a water and sewer bill are assessed the BRF via WSSC. Knowing these two variables, DEP assumed that any property whose tax bill includes the BRF line item is on septic while any property whose tax bill does not include the BRF is receiving services from a WWTP.

To validate this assumption, DEP requested property tax bills for the past 10 years (2007-2017) and the current WSSC billing data for the County, to conduct an analysis on properties that originally had a BRF on the tax bill which was then removed and picked up by WSSC. These two variables (removal of the

BRF from the tax bill and subsequent billing by WSSC) are used as the proxy to track those properties that were on a private septic system and then switched to a WWTP. Upon analyzing the 10 years of property tax bills that had a BRF charge (165,428 accounts), levy year 2017 was dropped because the billing was not complete as of the time the data was extracted, and the years prior to the current MS4 Permit term (2007-2008) were also dropped. This resulted in focusing the analysis on the years 2009 through 2016, which captured 120,996 accounts. This dataset was further refined by removing accounts that had only one year of BRF charge, had an inconsistent BRF charge, or were in the Cities of Gaithersburg, Rockville, or Takoma Park. This drastically reduced the number of accounts that had a consistent BRF charge to 1,635 accounts. Because most of the accounts DEP reviewed were past billing records, the records were then matched with the current property accounts to ensure that the properties still exist. This further reduced the number of accounts to 1,592. The 1,592 property accounts were then matched with WSSC's billing record to capture the drop in BRF charge and pickup in WSSC billing; resulting in 1,133 records matched. DEP then reviewed the accounts that had multiple lots subdivided from the original accounts, and isolated 394 individual accounts with septic systems that had been connected to WWTP.

On November 6, 2017, DEP met with MDE to explain this innovative method of determining the number of septic systems removed and properties connected to a WWTP. MDE reviewed the information provided by DEP in seeking credit for the removal of 394 septic systems and the 1,133 connections to a WWTP. MDE acknowledged in a follow-up letter dated December 4, 2017 that MDE accepts the County's methodology for determining the one-to-one relationship of one credit for each single-family home that has its septic system removed and connected to a WWTP. Based on this methodology, DEP has determined that 1,133 records had a total of 394 septic systems removed, which resulted in 153.7 impervious acre credits. MDE requested that the County provide records for the dataset used to conduct the above-mentioned analysis so that MDE could verify the WWTP connections. MDE also requested 10% of the billing data that shows a comparison of Finance charge then a dropped charge and ultimately a pickup (GIS) in WSSC data. This information is provided in Appendix J.

Table III.G.8 Alternative BMP Credit Calculations: Septic Systems

Alternative BMP	Gallons Septic Waste	Avg. Septic System (Gal)	Number of Septic Systems	IA Equivalent	IA Treated[1]
FY16 Septic Pumping	1,659,175	1,000	1,659	0.03	50
FY17 Septic Pumping	2,015,380	1,000	2,015	0.03	60
Septic Denitrification			139	0.26	36
Septic Connections to WWTP (2009-2016)			394	0.39	153.7

1 Impervious Acreage (IA) Treated is obtained by multiplying the Number of Septic Systems by the IA Equivalent (MDE 2014).

Street Sweeping, Catch Basin Cleaning and Storm Drain Vacuuming

Tables III.G.2 and III.G.9 include impervious acreage equivalent credits for street sweeping, catch basin cleaning, and storm drain vacuuming. In FY17, the County removed 333 tons of material for street sweeping, which is an increase of 46 tons from FY16. DEP increased the sweeping routes to add more lanes swept, while also focusing on the Rock Creek and Anacostia River watersheds that have TMDLs for sediment and phosphorous. This resulted in an impervious area credit of 133.2 acres, an increase of 18.3 acres from FY16.

The County removed 145 tons of material from catch basin cleaning and storm drain vacuuming, which is a decrease of 8 tons from FY16. This resulted in an impervious acre credit of 58 acres, a decrease of 3.2 acres from FY16. In FY17, the County piloted a pro-active, targeted catch basin cleaning strategy in the Rock Creek and Anacostia River watersheds. This program started with an inspection of each catch basin within neighborhoods that are not included in the street sweeping program. The County's DOT would use a vacuum truck if the material accumulation could not be removed by hand. It is important to emphasize, however, that the County expects to see fluctuations in the impervious acreage in these management programs on a year to year basis because the water quality benefit received is directly tied to the amount of material removed by the maintenance activity. Information on the street sweeping and catch basin cleaning program is also provided in Part III.E.6 Road Maintenance.

Table III.G.9 Alternative BMP Credit Calculations: Street Sweeping, Inlet and Storm Drain Cleaning

Alternative BMP	Tons of Material	IA Equivalent	IA Treated[1]
Street Sweeping FY16	287.31	0.40	114.9
Street Sweeping FY17	333	0.40	133.2
Catch Basin Cleaning, Storm Drain Vacuuming FY16	153	0.40	61.2
Catch Basin Cleaning, Storm Drain Vacuuming FY17	145	0.40	58

[1] *IA Treated is obtained by multiplying the Tons of Material by the IA Equivalent (MDE 2014).*

New BMPs Treating Existing Impervious Area

In FY17, the County is claiming an additional 567.6 impervious area credit for new BMPs that are treating existing impervious surface, bringing the total impervious area credit for new BMPs to 832.4 acres. These new BMPs were installed during the permit term (2010 to 2016). Early in 2017, DEP began a comprehensive effort to update and improve its database system, including evaluating the impervious surface data layer and urban BMPs and their associated drainage areas. The impervious surface area data layer was first digitized in 2009 using 2008 data. Also, in 2009, there was a data layer and drainage area data layer that included all known BMPs in the County at the time.

The 2009 impervious layer was incomplete when digitized in 2008, as it did not account for all the impervious surface conditions that existed in 2008. As mentioned earlier, this incomplete 2009 impervious layer was used as the foundation of the County's MS4 calculation. This data layer remained static and was not changed even though DEP had continuously updated its impervious surface data as it refined the information used to develop the Water Quality Protection (WQPC) charge.

As development occurs in the County, new BMPs are installed to treat new impervious surfaces. The new impervious acreage is not tracked because it is considered "treated" to the MEP with the installation of ESD and structural practices as required by the MDE 2000 Maryland Manual and Montgomery County Code. Furthermore, County Code requires all redevelopment projects to meet new development project requirements, which includes meeting the requirement of ESD to MEP for the project. DEP reviewed MDE's 2014 Guidance and determined that the formerly unmanaged, existing impervious areas may be credited toward impervious acre restoration when it is treated by a BMP from new development or redevelopment.

BMPs are continuously added into DEP's inventory from development or when they are discovered by staff while conducting inspections. Approximately 1,000 new BMPs are added to the BMP inventory each year. The BMP dataset that has been used in reporting is up to date for the inventory of BMPs, and for conducting inspections and maintenance. However, the treatment or drainage area delineation/ digitization of these BMPs has not kept pace with the rapidly increasing inventory of BMPs due to insufficient funding and staff resources. In FY16, DEP contracted with an engineering firm to deliver 100 drainage area delineations per month. Because of this data effort, over 2,000 BMP drainage areas have been added to the database since 2015. These new drainage areas more accurately account for all the BMP treatment areas. Due to the time needed to delineate drainage areas and separate existing impervious area from new impervious area for BMPs added to the inventory, there will always be a lag between addition of the facility and calculation of the impervious acres treated.

On November 6, 2017, DEP met with MDE to explain the methodology and results of DEP's efforts to review and update the drainage and impervious area datasets. MDE acknowledged in a follow-up letter, dated December 4, 2017 that the County's previous calculations did not accurately account for impervious area treated or controlled. In addition, as part of this analysis, DEP identified several BMPs that were installed prior to the permit issuance (2010) but did not have drainage and impervious area and this treated impervious area was not accounted for when the County calculated its baseline. The County requested that the baseline restoration requirement of 3,778 remain unchanged, and in the December 4, 2017 letter, MDE approved that the County could add 23.3 acres to its total impervious area treated. The 23.3 acres is included in the 567.6 additional acreage claimed in FY17. Based on the acknowledgment by MDE on DEP's methodology, analysis, and conclusions for capturing previously unmanaged/controlled impervious area, the County is claiming 832.4 impervious acre credits from new BMPs installed during the permit term and treating existing (2009) impervious area. Detailed data analysis for this credit is provided in Appendix J.

G.2 Watershed Restoration Projects Under Construction and In Design in FY17

The County continues to work toward completing the remaining impervious area restoration. Table III.G.10 summarizes projects under construction and in design in FY17. Projects in construction in FY17 will control 415.9 impervious acres; this will be claimed in the FY18 Annual Report. Projects in design will add control to greater than 1,567.8 additional impervious acres. The majority of projects in design in FY17 are programmed for construction over the next three years. Once built, the projects that are currently in design and construction will achieve stormwater control for more than the 1,983.7 impervious acres, completing the 3,778 acres of impervious area restoration that the Permit requires.

Table III.G.10. County Projects under Construction and in Design in FY17						
	In Construction		In Design		Total	
CATEGORY	Count	IA (acre)	Count	IA (acre)	Count	IA (acre)
Capital Improvements Program Projects Total	88	415.9	140	1,567.8	228	1,983.7
Green Streets[1]	0	0	20	98.2	20	98.2
Public Property ESD[2]	7	7.7	28	13	35	20.7
Stormwater Pond Retrofits	6	161.4	70	941.1	76	1,102.5
Stream Restoration	0	0	15	500.7	15	500.7
Outfall Stabilization			1	2.0	1	2
Agency and Department Partnerships Total	75	246.8	6	12.8	81	259.6
Intercounty Connector	3	76.3	0	-	3	76.3
Washington Suburban Sanitary Commission	72	170.5	6	12.8	78	183.3
PROGRESS TOTAL	88	415.9	140	1567.8	228	1983.7

[1]*Project counts represent entire green streets neighborhoods and will result in multiple ESD facilities once completed*

[2]*Project counts represent individual Government Facility and County School sites which will result in multiple ESD facilities once completed*

H. Assessment of Controls

H. Assessment of Controls

Assessment of controls is critical for determining the effectiveness of the NPDES stormwater management program and progress toward improving water quality. Therefore, the County shall use chemical, biological, and physical monitoring to document progress toward meeting the watershed restoration goals identified in PART III.G and any applicable WLAs developed under EPA approved TMDLs. Additionally, the County shall continue physical stream monitoring in the Clarksburg Special Protection Area to assess the implementation of the 2000 Maryland Stormwater Design Manual. Specific monitoring requirements are described below.

1. Watershed Restoration Assessment

   The County shall continue monitoring in the Lower Paint Branch 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 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:

The Permit requires the County to assess the effectiveness of its stormwater management program and control measures using pre-restoration and post-restoration watershed monitoring, which includes chemical, physical and biological monitoring. The County must also document progress towards meeting the watershed restoration goals identified in Part III.G and any applicable WLAs developed under the EPA approved TMDLs.

Breewood Tributary Restoration Project

The DEP targeted the Breewood tributary for comprehensive watershed restoration efforts. In 2009, MDE approved DEP's proposal to conduct pre- and post-restoration monitoring required in Part III.H.1, Watershed Restoration Assessment, to assess effectiveness of the Breewood tributary restoration efforts.

The tributary is located within the Sligo Creek subwatershed of the Anacostia River watershed as shown on Figure III.H.1. Figure III.H.2 shows the Breewood tributary drainage area and locations of chemical, physical and biological monitoring stations. The Breewood tributary is a 1,200-foot first order stream in a small catchment (63 acres) containing 42 percent impervious area.

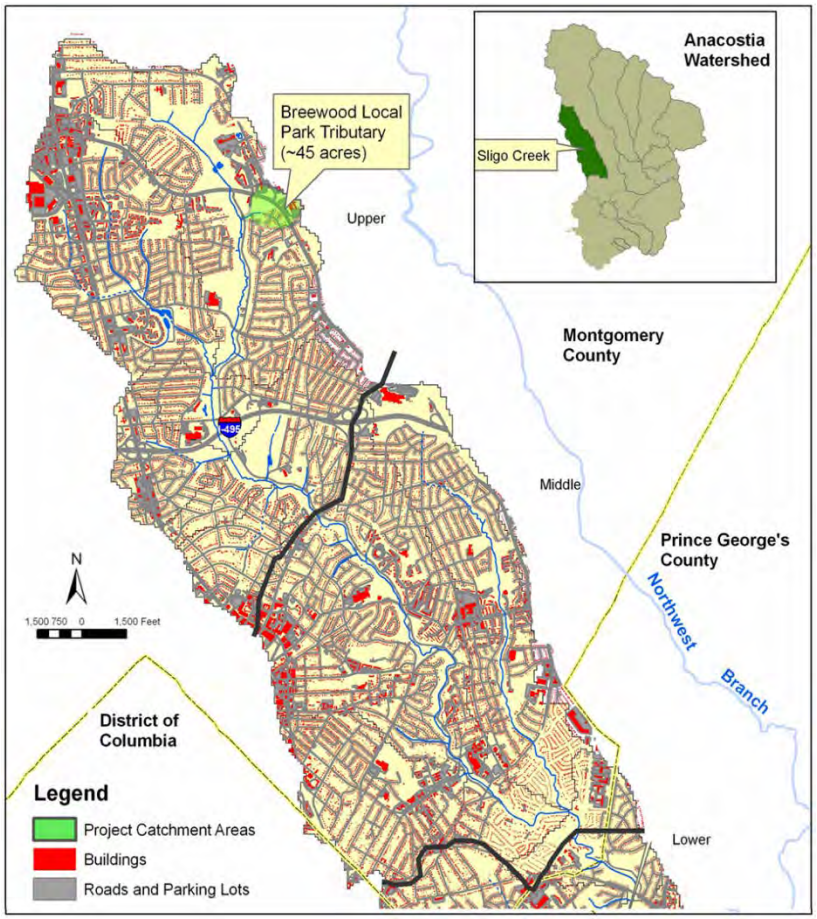


Figure III.H.1 Location of the Breewood Tributary within the Sligo Creek Subwatershed of the Anacostia River Watershed

The catchment is predominantly medium density (quarter acre) residential, and also contains a condominium complex, townhouse development, senior living center, high school and church. There are two primary roads, University Boulevard and Arcola Avenue in the upper portion of the catchment. Curb and gutter designed streets support residential development located in the middle and lower sections of the catchment. In 2009, the majority of the stormwater runoff from the impervious areas was not controlled. This led to a severely unstable stream channel transporting sediment, and other associated pollutants downstream.

The DEP completed construction of 10 ROW ESD practices along residential roads and 3 RainScapes projects on individual residential

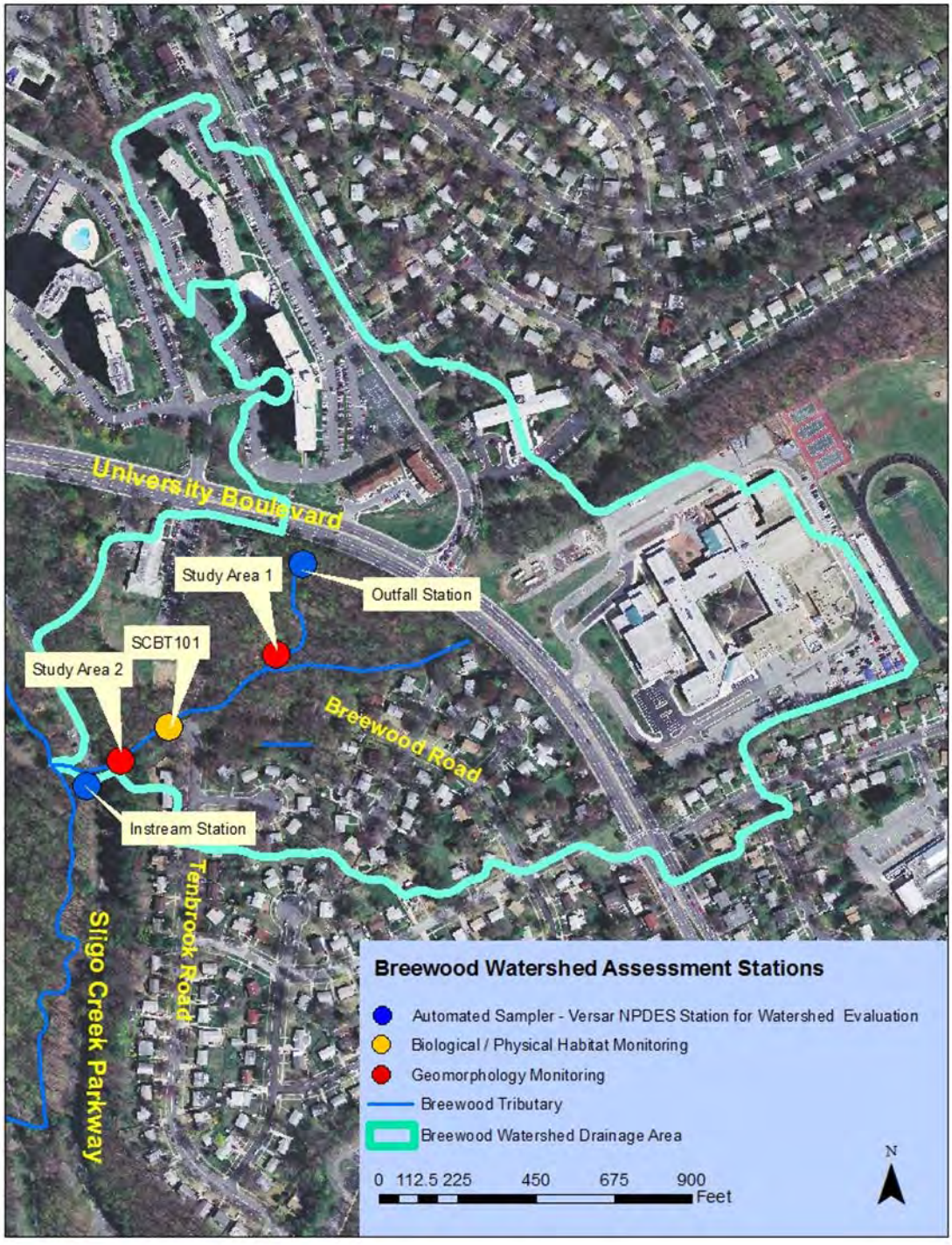


Figure III.H.2 Locations of Stream Chemistry, Biological, Physical Habitat and Geomorphology Monitoring Stations

properties. Overall these projects address runoff from 54 residential properties. Additionally, 1,200 linear feet of stream restoration was completed in FY15. The DEP is currently constructing twelve ESD practices to treat runoff from the University Towers and one ESD practice at the Northwood Presbyterian Church. Benefits of these restoration projects include:

- Stabilized banks to prevent erosion,
- New trees and plants along stream banks,
- Reduced sediment entering Sligo Creek,
- Reduced storm flow in the Breewood Tributary
- Improved water quality in both the Breewood Tributary and Sligo Creek,
- Reconnected the stream to its floodplain,
- Improved ecological health of the Breewood Tributary and adjacent floodplain areas,
- Improved citizen awareness of stormwater impacts and methods to address them.

In FY14, DEP launched a website dedicated to the entire project where project details, information, and status updates are shared. The webpage is located at: https://www.montgomerycountymd.gov/water/restoration/breewood.html. Figure III.H.3 shows the locations of the restoration projects.

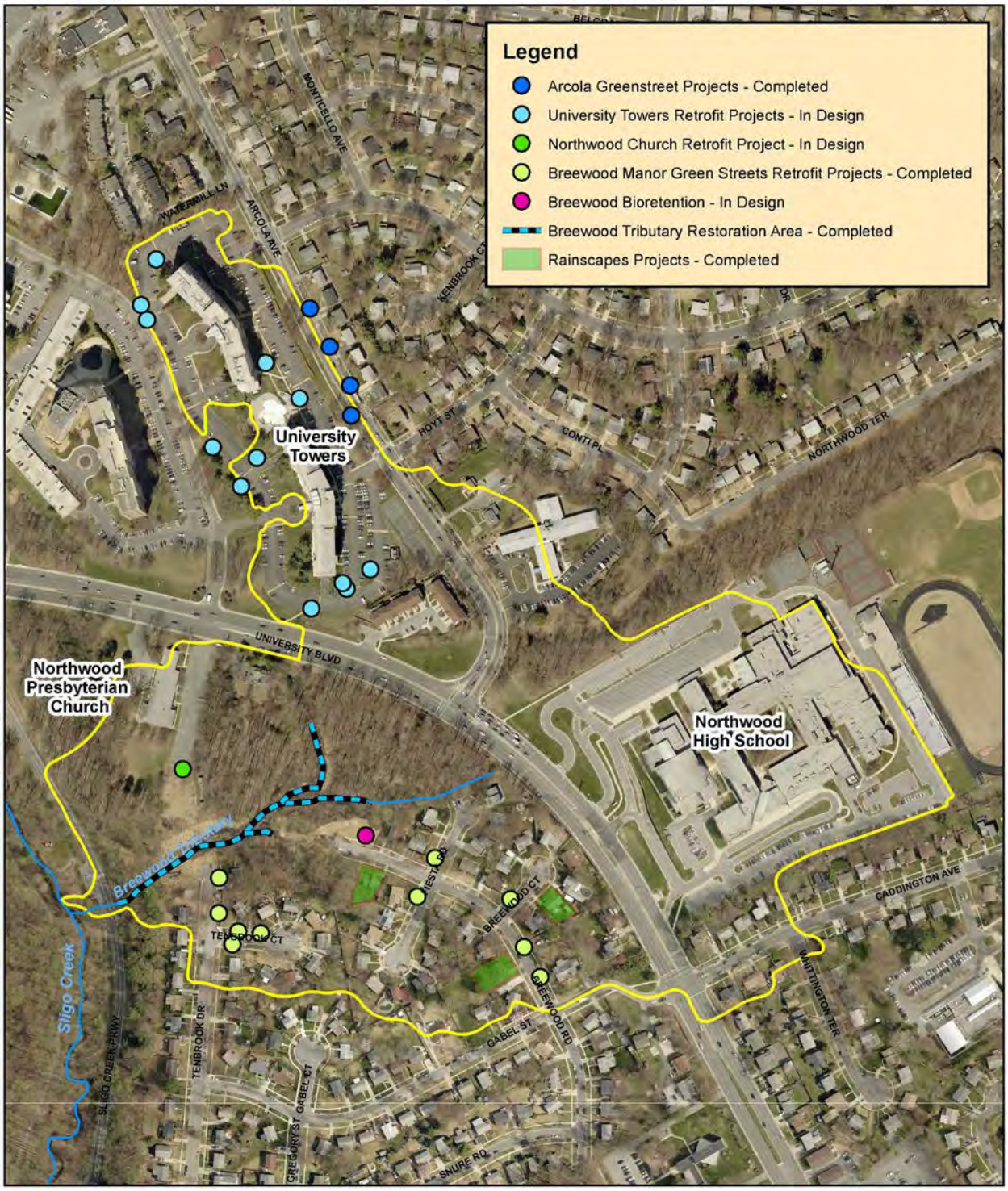


Figure III.H.3 Locations of the Breewood Tributary Restoration Projects

H.1 Watershed Restoration Assessment

H.1.a. Breewood Tributary Chemical Monitoring

During 2016, DEP continued water chemistry monitoring in the Breewood tributary at one storm drain outfall draining University Boulevard and points north (the outfall station) and one instream station downstream of a culvert underneath Sligo Creek Parkway (the instream station), as shown on Figure III.H.2. A continuously recording rain gauge is located at the Wheaton Branch stormwater ponds in Silver Spring, approximately 1 mile southwest of the monitoring stations. Once project implementation is completed, a variety of monitoring approaches will be employed to evaluate the effectiveness of the project. It is anticipated that almost all BMPs will be completed by the summer of 2018. Data are currently being examined for interim results that could be useful in evaluating project effectiveness. Some interim results will be available in the FY18 Annual Report.

The Permit requires reporting of chemical monitoring data which is included electronically in Appendix A, MDENPDES17.accdb, Table F. The summary report NPDES Water Chemistry Monitoring in the Breewood Tributary of Upper Sligo Creek 2009-2016 is also included in the electronic attachment in Appendix L. The information provided for this report is the calendar year 2016 monitoring season, which covers half of FY16 and half of FY17. The monitoring completed in calendar year 2017 (second half of FY17) will be provided in the FY18 Annual Report.

Table III.H.1 shows the drainage area (DA) to each water chemistry station. Table III.H.2 shows the contribution of impervious land uses to total impervious area in the drainage area.

Table III.H.1 Drainage Area to Breewood Water Chemistry Monitoring Stations

Location	Acres
Total DA to the outfall water chemistry station	16.9
Total DA to the instream water chemistry station	62.9
Total DA	63

Table III.H.2. Breewood Tributary Impervious Area 2012

Impervious	Property Type	Acres	Percent of Impervious Area	Percent of Watershed
Buildings (Includes accessory structures)		8.12	31%	13%
	Multi-family Residence	1.02	4%	2%
	Non-Residential	0.53	2%	1%
	Residential Single Family Attached	0.25	1%	0%
	Residential Single Family Detached	1.96	7%	3%
	School	4.36	16%	7%
Parking/Driveway		11.69	44%	19%
	Multi-family Residence	4.01	15%	6%

Table III.H.2. Breewood Tributary Impervious Area 2012				
Impervious	**Property Type**	**Acres**	**Percent of Impervious Area**	**Percent of Watershed**
	Parks and Planning	0.02	0%	0%
	Non-Residential	1.23	5%	2%
	Right of Way	0.24	1%	0%
	Residential Single Family Attached	0.09	0%	0%
	Residential Single Family Detached	0.57	2%	1%
	School	5.54	21%	9%
Road		6.09	23%	10%
	Road	6.09	23%	10%
All other impervious Areas		0.72	3%	1%
	Multi-family Residence	0.54	2%	1%
	Right of Way	0.10	0%	0%
	Residential Single Family Detached	0.08	0%	0%
Grand Total		26.63	100%	42%

Hydrology Modeling

The Permit requires that rainfall to runoff characteristics of the contributing watershed be evaluated using a standard, accepted hydrology model. The County produced a Hydrologic Engineering Center River Analysis System (HEC-RAS) model of the Breewood Tributary watershed as part of the stream restoration design process. The model development was completed in FY14.

Summary of Water Chemistry Monitoring Results

The DEP's contractor installed the monitoring stations, performed water chemistry monitoring (e.g., metals, nutrients), water quality monitoring (e.g., pH, specific conductivity, temperature, dissolved oxygen), continuous flow monitoring, and continuous rainfall monitoring according to methods described in the Quality Assurance and Quality Control Document for Water Chemistry Monitoring at Breewood Road Tributary (Hage and Jones 2010).

Field teams collected baseflow samples monthly and conducted automated storm runoff monitoring, targeting three events per quarter. A total of 66 storms and 88 baseflow events were monitored from 2009 through 2016. For each storm event, samples were collected along the rising, peak, and falling limbs of the hydrograph and then subsequently, a storm event mean concentration (EMC) calculated from the results of these three samples. A total of nine storms were successfully captured during 2016. Montgomery County is committed to capturing the required 12 storm events per year as required in the Permit. The challenge of predicting storms of 0.3 inches or 0.6 inches in depth was the primary reason that the required number of storms was not captured. Since the return intervals are less than one month, and one month, respectively, the opportunities presented for successful storm capture are inherently low and are affected by the time of year. The specified rainfall depths have been established to assure that a representative range of storm sizes is captured and that changes in pollution concentrations and loads can

be discerned. In the current year, the storm capture rate was best during the summer and fall months (100 percent of required storms). This is an improvement as these seasons have been challenging due to unpredictable and convective events in prior years. In addition to difficulties relating to storm size, there were problems getting winter storms in 2016 due to frozen precipitation. Montgomery County is working with the consultant monitoring the project on strategies to improve storm capture efficiency.

Analysis of the flow and water chemistry data collected for this project will be used to evaluate the effectiveness of watershed restoration efforts at improving hydrology and water chemistry. Data collected to date document conditions at baseline, prior to retrofit construction, and during construction. Stream restoration construction took place during November 2014 to March 2015. The culvert and the channel immediately upstream and downstream of the Sligo Creek Parkway road crossing at the instream station were retrofitted to install step pools during early September 2015. In 2016, a large bioretention structure was under construction at the end of Breewood Road. Construction of this project was suspended due to high groundwater levels that necessitated a reevaluation of the design and some modifications. The structure was completed in May 2017. Because of the continued construction in 2016 and associated delays in obtaining post implementation data, an isolated evaluation of the stream restoration was not possible in 2016. An interim evaluation that looks at the cumulative impacts of several portions of the project will be included in the FY18 annual report. Almost all remaining project components will be completed in 2018 and DEP will begin collecting data on the entire project. The County will then be able to evaluate cumulative project impacts as well as impacts of the various larger components of the project evaluate the contribution of various practices.

Monitoring Results

Drainage area size and land use to both the outfall and instream stations affected flow rate, total stormflow volume, and response of flow to rainfall. As expected for rain events, rise in stream stage at the instream station occurred later than rise in stage at the outfall station. Stormflow appears at the outfall faster because its drainage area contains higher percentages of impervious area and connectivity. Flow rate values and total stormflow volumes were generally greater at the instream station as expected given its greater drainage area. The instream station also is somewhat less responsive to small events because of the relatively lower amount of impervious area and greater travel time through the system.

For each station, baseflow mean concentrations (MCs) were calculated for all Permit-required parameters over the eight-year monitoring period.

Storm EMCs represent the weighted average pollutant concentrations based on samples collected at discrete intervals during a storm. EMCs were calculated and averaged over the eight-year monitoring period for each parameter except total petroleum hydrocarbons (TPH) and Enterococcus. Stormflow samples for these parameters were collected only during first flush so MCs were calculated rather than EMCs. The average EMCs and MCs (Table III.H.3) of each parameter at each station were compared, with the following summary of results:

- Storm samples generally had higher concentrations of pollutants at the outfall than at the instream station.
    - Mean storm EMCs for 5-day biochemical oxygen demand (BOD), total Kjeldahl nitrogen (TKN), copper, zinc, and storm MCs for TPH, and Enterococcus were higher at the outfall than at the instream station.
- At the instream station, there was not a consistent relationship between flow type and results.

  - Mean storm EMCs were higher than baseflow MCs for BOD, TKN, total phosphorous (TP), total suspended solids (TSS), and metals.
  - First flush storm MCs were higher than baseflow MCs for Enterococcus.
  - Mean storm EMCs were lower than baseflow MCs for nitrate plus nitrite, and hardness.
- At the outfall station, it was not possible to relate results to flow type.
  - The outfall station was generally dry, except following rainfall or other activities in the catchments. Baseflow samples were obtained on only five occasions. In these samples, the baseflow MCs for Enterococcus and TPH were lower than stormflow MCs.

Table III.H.3 Mean storm EMCs and baseflow MCs (± 1-sigma standard deviation) in Breewood Tributary, 2009-2016. All results in mg/l, except for *Enterococcus* (MPN/100 ml).

Analyte	Mean Storm EMC		Baseflow MC	
	Outfall	Instream	Outfall	Instream
Number of Samples Taken	66	67	5	88
Biochemical Oxygen Demand (5-day)	4.9 ± 4.3	4.0 ± 3.8	14.8 ± 9.7	0.4 ± 1.3
Total Kjeldahl Nitrogen	0.926 ± 0.63	0.79 ± 0.509	2.489 ± 1.765	0.114 ± 0.266
Total Phosphorus	0.035 ± 0.071	0.058 ± 0.12	0.113 ± 0.156	0.000 ± 0.000(a)
Nitrate+Nitrite	0.335 ± 0.209	0.48 ± 0.28	1.449 ± 1.899	2.189 ± 0.853
Total Suspended Solids	51.0 ± 58.0	119.5 ± 122.7	28.8 ± 19.5	4.6 ± 6.3
Total Cadmium	0.00000 ± 0.00002(b)	0.00000 ± 0.00003(b)	0.00000 ± 0.00000(a)	0.00000 ± 0.00000(a)
Total Copper	0.027 ± 0.018	0.02 ± 0.012	0.15 ± 0.164	0.006 ± 0.011
Total Lead	0.006 ± 0.008	0.011 ± 0.013	0.004 ± 0.004	0.0003 ± 0.002
Total Zinc	0.083 ± 0.07	0.051 ± 0.034	0.322 ± 0.474	0.018 ± 0.011
Total Petroleum Hydrocarbon(c)	4 ± 5	1 ± 3	2 ± 3	1 ± 3
Enterococcus(c)	15,183 ± 44,882	3,314 ± 9,460	974 ± 932	199 ± 408
Hardness	40 ± 22	55 ± 37	147 ± 123	126 ± 47

(a) Analytical results below detection limits and therefore means set to zero.

(b) Additional digits added to storm EMC and baseflow MC results to illustrate difference in results.

(c) EMCs are not calculated for TPH or Enterococcus. These values are arithmetic averages of first flush grab results. Number of storm samples taken at each station for TPH = 42; number of storm samples taken for Enterococcus are 39 and 38 at the instream and outfall stations, respectively.

Annual Pollutant Loadings

Annual pollutant loadings for each station during 2016 were computed from separate baseflow annual loadings and stormflow annual loadings. Stormflow annual load for a given parameter at each station was determined by multiplying the average annual EMC (in mg/L) by the total annual stormflow discharge (in

cubic feet) and converting units. Baseflow annual load was determined by multiplying the average annual baseflow MC by the total annual baseflow discharge. The total annual baseflow discharge was obtained by separating baseflow values from the flow rate data record. The total annual stormflow discharge was determined by subtracting total annual baseflow discharge from the total annual discharge (determined by plotting the annual hydrograph in Flowlink). Loading values were calculated from baseflow MCs, stormflow MCs, and stormflow EMCs, and are presented in Table III.H.4, and reported in the electronic attachment to this report, Appendix A., MDENPDES17.accdb, Table G.2. Pollutant Loads Associated with GIS Coverage.

Table III.H.4 Baseflow, Stormflow, and Total Annual Loadings (lbs.) in Breewood Tributary, 2016

Analyte	Stormflow Loading		Baseflow Loading		Total Loading (Stormflow plus Baseflow)	
	Outfall	Instream	Outfall	Instream	Outfall	Instream
Biochemical Oxygen Demand (5-day)	719	698	0	0	719	698
Total Kjeldahl Nitrogen	123	121	0	23	123	144
Total Phosphorus*	5	1	0	0	5	1
Nitrate+Nitrite	48	86	0	265	48	351
Total Suspended Solids	5,772	4,896	0	1,116	5,772	6,012
Total Cadmium*	0	0	0	0	0	0
Total Copper	3	2	0	1	3	3
Total Lead*	1	0	0	0	1	0
Total Zinc	12	7	0	3	12	9
Total Petroleum Hydrocarbons*	7	0	0	0	7	0
Enterococcus	40,427	34,023	0	16,635	40,427	50,658
Hardness	7,721	16,929	0	40,059	7,721	56,988

** Zero load indicates all concentration data below detection limits.*

Continuous Water Quality Monitoring

In June 2014, DEP began continuous monitoring of dissolved oxygen, specific conductivity, temperature, and turbidity at the instream and outfall stations. Through this additional monitoring, DEP hopes to produce more effective information on water quality impairments in this watershed. Information on dissolved oxygen levels could be especially helpful in determining the causes of poor biological communities.

Beginning in November of 2014, some low dissolved oxygen readings were observed, however, instrumentation problems associated with fouling of the dissolved oxygen sensors were also identified. The equipment manufacturer believes that bacteria and algae growing on the sensors may have obstructed

water flow and produced readings of dissolved oxygen levels within the biological organisms growing on the sensor rather than the dissolved oxygen level of the water column. The results reflect the ambient dissolved oxygen level, but interpretation is difficult. The equipment was fitted with wipers in 2016 that regularly clean the sensors to improve accuracy. Wipers were not available for these units prior to 2016.

In 2016, continuous dissolved oxygen data were collected simultaneously by sensors with and without wipers to evaluate the reliability of the baseline data collected without wipers. The data has been found to be generally reliable, although the two instruments showed some differential performance, especially at higher dissolved oxygen readings. The data will permit evaluation of the impact of the project on stream water quality once all the structures have been completed.

The FY18 MS4 Annual Report will contain interim results on the project. Because not all project components will be installed until 2018 and data from some stations will not be available until 2018, interim results of the project will produce conclusions on aggregate impacts of multiple project components. Once all project components have been completed and additional data becomes available, it will be possible to partition impacts among the various components of the project and add clarity to the analysis.

H.1.b. Breewood Tributary Biological Monitoring

As shown on Figure III.H.2, the biological monitoring station is located in the Breewood tributary upstream of the Sligo Creek Parkway and the instream water chemistry monitoring station. Prior to restoration, DEP scientists monitored benthic macroinvertebrates (aquatic insects) at SCBT101 from 2010 to 2014. No fish monitoring is conducted in the Breewood tributary because the drainage area is extremely small and does not provide adequate flow and habitat conditions for a healthy fish population. The Breewood tributary was restored in 2015 and no benthic macroinvertebrate sampling occurred because the site was under active construction. Post-restoration biological sampling began in 2016.

The DEP uses a Benthic Index of Biotic Integrity (BIBI) to assess stream conditions at SCBT101. Pre-restoration (2010-2014) benthic community results will be compared with post-restoration (2016+) data to help evaluate watershed restoration success. There are eight metrics of benthic macroinvertebrate community composition and function that comprise the BIBI. The DEP examines several of these more detailed metrics, including the percentage of functional feeding groups (FFGs) present, taxa richness, taxa composition, and pollution tolerance. Each measurement responds in a predictable way to increasing levels of stressors. Adjustments in the metrics may be seen as the biological community shifts and these smaller scale changes might be seen before the overall BIBI score changes.

FFG classifications organize benthic macroinvertebrates by their feeding strategies (Camann, 2003 and Cummins in Loeb and Spacie, 1994). The five FFGs usually examined in a bio-assessment are: collector gatherers, filtering collectors, shredders, scrapers, and predators. Collector gatherers are the most generalized in feeding and habitat needs and are usually the most abundant FFG because their food source of fine particulate organic matter is abundant. Shredders reduce coarse material (like leaves) into fine material which can then be transported downstream for use by collectors. Shredders are considered specialized feeders and sensitive organisms and are typically well-represented in healthy streams (EPA, 2008). Other FFGs include scrapers and predators. Scrapers scrape and graze on diatoms and other algae, are sensitive to environmental degradation and are associated with high quality streams. Predators attack and consume other insects and macroinvertebrates.

Benthic Macroinvertebrate Results

During the pre-restoration phase, the Breewood Tributary stream condition ranged from *Poor* (20%) to *Fair* (45%). The single occurrence of *Fair* occurred in 2011 (Figure III.H.4). The number of taxa present in samples were moderately high with six taxa found in 2010 and a high of 19 found in 2013. Shredders only accounted for 5% of the FFGs present during pre-restoration and no scrapers were found. Collectors dominated during pre-restoration at 66% (Figure III.H.5).

In the first year of post-restoration, 2016, the stream condition increased to *Fair* (50%). There were 12 taxa present, indicating moderate species richness. Shredders accounted for 1% (one Tipula sp.) of the total sample. Scrapers were found for the first time. However, all were members of the family Physidae, tolerant snails. Collector gatherers accounted for 16%, filterers accounted for 27%, and predators comprised 24% of the sample (Figure III.H.6).

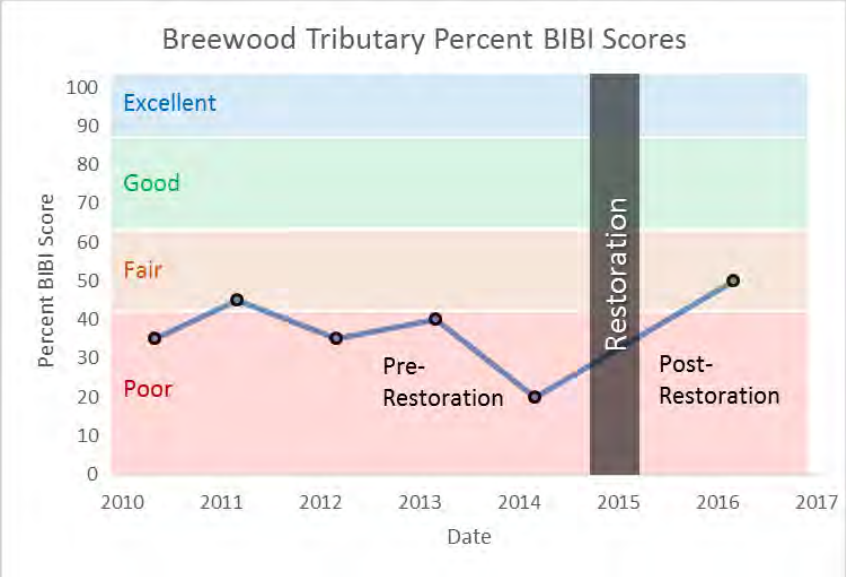


Figure III.H.4 Breewood Tributary (SCBT101) Percent BIBI Scores

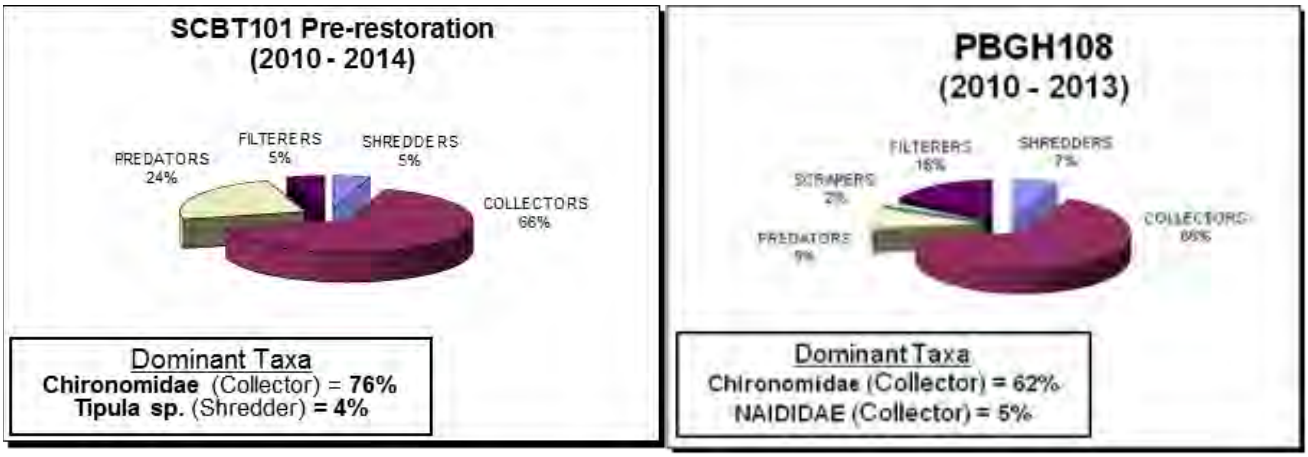


Figure III.H.5 Pre-Restoration Functional Feeding Group Comparison in the Breewood Tributary (SCBT101) and in the Good Hope Tributary (PBGH108)

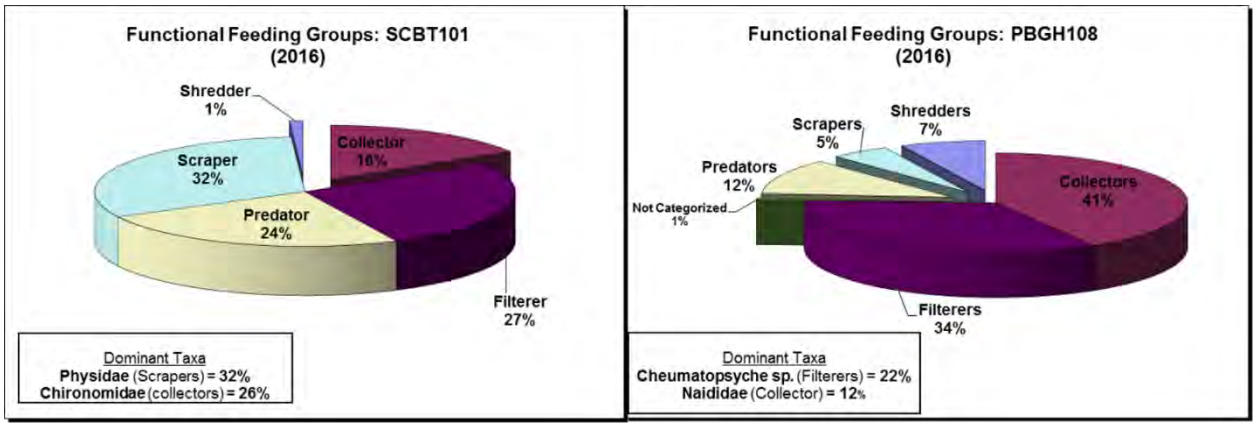


Figure III.H.6 Post-Restoration Functional Feeding Group Comparison in the Breewood Tributary (SCBT101) and in the Good Hope Tributary (PBGH108)

DEP used additional metrics to characterize the benthic macroinvertebrate community of the Breewood tributary. The biotic index, which measures tolerance to organic pollution, remained consistent with prior years. In 2016, it was 6.5 (out of 10), indicating a moderately high tolerance to organic pollution.

Prior to restoration the dominant taxa in the Breewood assessment were members of the Chironomidae (midge) family, which tend to be tolerant of pollution and other environmental stressors (Pedersen and Perkins 1986; Jones & Clark 1987). The percent of Chironomidae decreased from 91% in 2010 to 55% in 2014. The decline in the percent of Chironomidae (currently 26%) continued in 2016. No obvious cause has been identified.

The BIBI score analysis also includes determining the presence of EPT taxa (commonly known as mayfly, stonefly, and caddisfly) which are sensitive species commonly associated with high quality streams. In the 2014 Breewood tributary benthic macroinvertebrate sample, there were very few EPT taxa present. In 2016, only caddisflies were present. These were dominated by the moderately tolerant Hydropsyche and Cheaumatopsyche sp.

H.1.c. Breewood Tributary Physical Habitat Assessment

Pre-Restoration Physical Habitat Analysis

Starting in 2010, DEP performed yearly physical habitat assessments at SCBT101. Pre-restoration monitoring established a baseline for comparison with future habitat assessments. Results indicate that the pre-restoration (2010-2014) habitat consistently rated *Fair*, receiving an average score of 41% and a range from 36 to 49%. DEP found that the stream prior to restoration had poor riffle quality, high embeddedness values, bank instability, and a narrow riparian zone, which lowered the overall habitat score. DEP observed an increase in riffle quality in 2011 and 2012, which contributed to the overall increase in habitat score.

Figure III.H.7 shows a comparison of the Breewood tributary BIBI and habitat conditions with those in the Paint Branch reference stream reach from 2010 to 2016. The reference station, PBGH108 was not monitored in 2014. The habitat score for 2016 was 40% and consistent with pre-construction results. While restoration substantially changed the stream channel, improving instream fish cover, embeddedness and bank stability, epifaunal substrate and channel alteration were negatively impacted. In 2016, biological conditions are as expected for the observed habitat (Figure III.H.5).

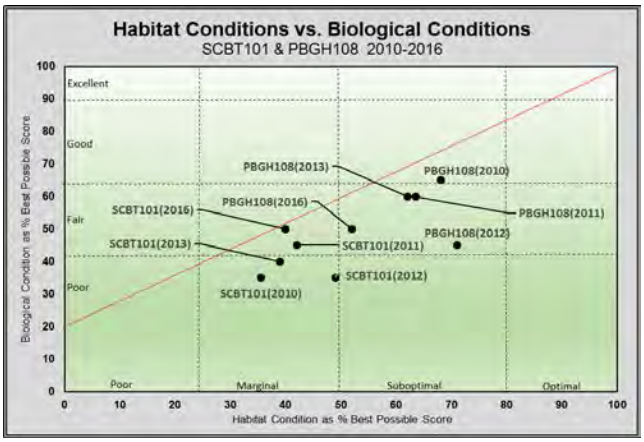


Figure III.H.7 BIBI vs. Habitat Condition at Breewood Tributary and Reference Stream, 2010 through 2016

In-situ Water Chemistry Data

The DEP field team recorded in-situ water chemistry measurements in the Breewood tributary and the reference stream concurrent with the physical habitat assessment. As shown in Table III.H.5, most water quality parameters (dissolved oxygen, pH and temperature) were within the expected range at SCBT101 and the reference stream.

Conductivity was the only parameter which consistently differed among the streams, being elevated (max. 966 umhos) at SCBT101 compared to (max. 212 umhos) at the reference stream. Salt in road runoff from the University Blvd. outfall upstream of the station is the most likely explanation for the unusually high conductivity values recorded. Conductivity values will continue to be tracked to evaluate if this is a consistent pattern and therefore a chronic influence on the benthic community.

Table III.H.5 In Situ Water Chemistry Results at Breewood Tributary (SCBT101) and at the Good Hope Tributary (PBGH108) Reference Stream*

Station	Type	Benthic Community Rating	Date	Dissolved Oxygen (>5mg/l)	% Dissolved Oxygen Saturation	pH	Conductivity (<= 300 umhos)	Air Temp. (deg C)	Water Temp. (deg C)
SCBT101	Benthic	Poor	5/7/2010	8.73	87	7.30	566	21	15.4
SCBT101	Benthic	Fair	3/9/2011	10.57	87	7.83	727	5	7.8
SCBT101	Benthic	Poor	3/19/2012	10.35	90	5.9	565	22	14.3
SCBT101	Benthic	Poor	3/21/2013	11.47	95	7.86	660	2	6.9
SCBT101	Benthic	Poor	3/20/2014	9.05	83	7.56	966	12	12.0
SCBT101	Benthic	Fair	3/9/2016	10.06	90	7.78	N/A	23	11.2
PBGH108	Benthic	Good	4/22/2010	10.69	90	6.24	166	12	11.0
PBGH108	Benthic	Fair	4/18/2011	10.60	104	6.79	143	17	14.4
PBGH108	Benthic	Fair	4/11/2012	11.27	110	7.36	157	14	10.6
PBGH108	Benthic	Fair	3/20/2013	12.31	102	6.27	212	9	7.2
PBGH108	Benthic	Fair	3/17/2016	11.3	108	7.41	239	23	11.2

** PBGH108 was not monitored in 2014. Neither station was monitored in 2015 when the stream restoration was done.*

H.1.d. Breewood Tributary Physical Geomorphic Assessment

DEP established two study areas (20-bankfull widths) in 2010-2011 to assess the physical geomorphology changes over time in the Breewood tributary (Figure III.H.2). Study area 1 extends from the outfall channel below University Boulevard to the Breewood tributary. Study Area 2 extends downstream from the end of Tenbrook Drive to just upstream from Sligo Creek Parkway and includes the biological monitoring station at SCBT101.

Figures III.H.8 and III.H.9 provide representative cross section views of Study Areas 1 and 2 before (2011-2013) and after (2015-2016) restoration. The pre-restoration surveys indicate degraded, entrenched channels with steep banks, little to no floodplain connection, low sinuosity, and high erosion potential. A geomorphic assessment of the Breewood tributary was not conducted in 2014 due to ongoing stream restoration activities.

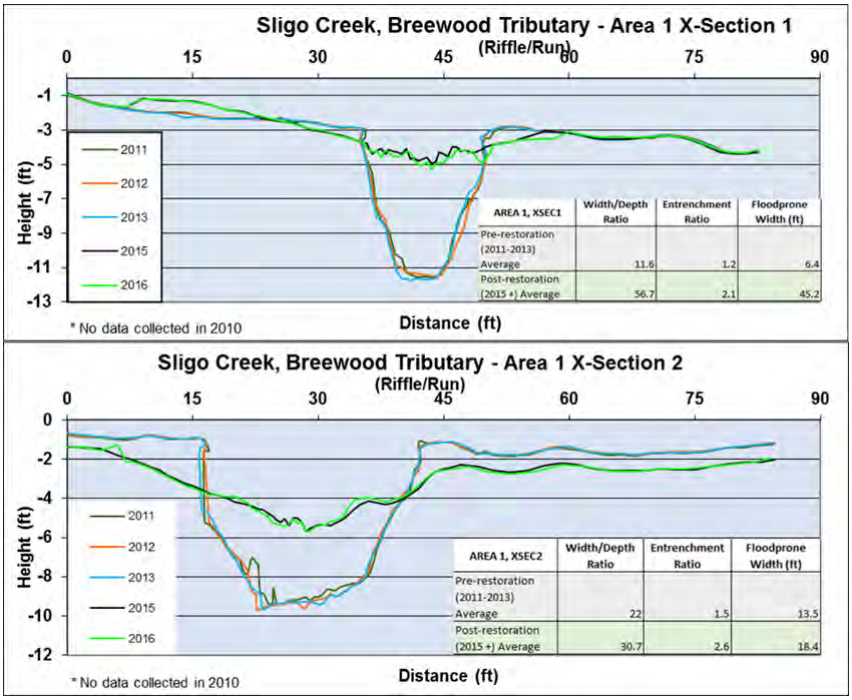


Figure III.H.8 Representative Cross Sections from Breewood Tributary, Study Area 1

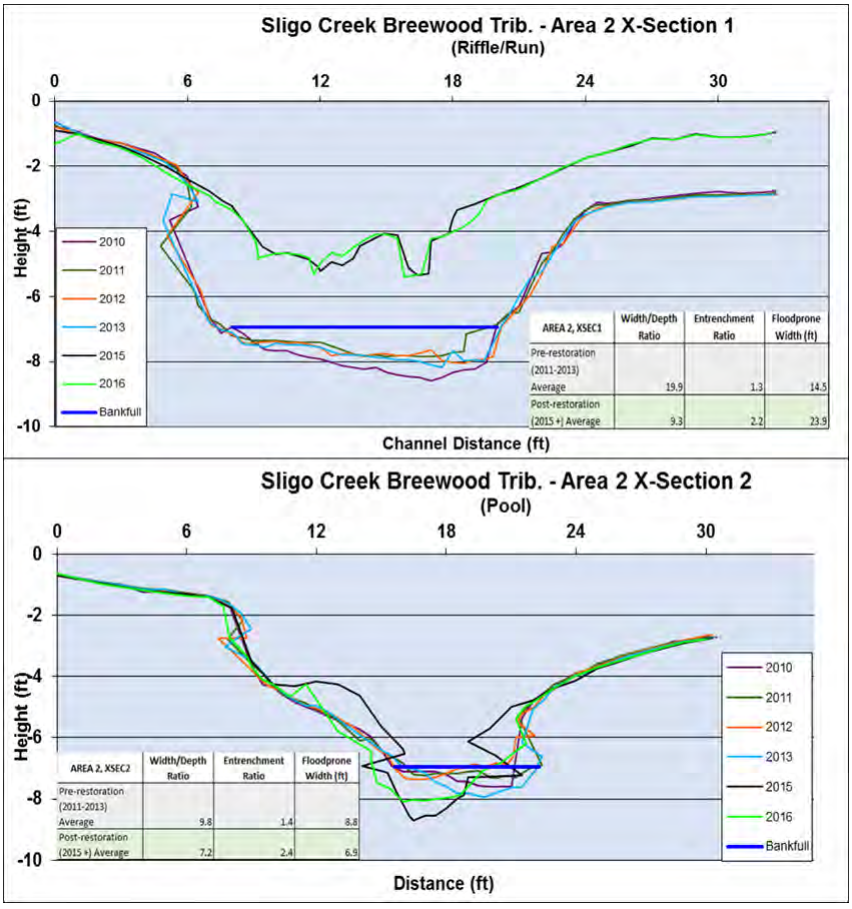


Figure III.H.9 Representative Cross Sections from Breewood Tributary, Study Area 2

The Breewood tributary restoration was completed in 2015 and the first post-restoration surveys were conducted in the winter season. Restoration included the installation of a series of pools and riffle grade controls to mitigate the high erosive flows from the outfall of University Boulevard. Pools dominate the reach after restoration in 2015 (68%) compared to grade control riffles (32%). In 2015, likely due to the post-restoration prevalence of pools, average particle size of the channel substrate also decreased from pre-restoration and was classified as silt/clay in Study Area 1. In 2016, particle size increased to an average size of 39 mm. At Study Area 2, particle size increased after restoration (from 8.7 mm to 40 mm) and remained the same in 2016. This may be an indication that the regenerative stormwater conveyance in Study Area 1 is effectively trapping smaller particles in the step pools and preventing them from entering the lower station.

Figures III.H.8 and III.H.9 show how drastically restoration changed the cross sections of Study Areas 1 and 2. The channel bed was raised and banks graded to open up the cross sections and allow the stream to access the floodplain. Post-restoration (2015-2016) cross section survey results indicate improved width/depth and entrenchment ratios. Entrenchment ratios of 1-1.4 represent entrenched streams, 1.41-2.2 indicate moderately entrenched streams, and ratios greater than 2.2 represent only slightly entrenched streams with a well-developed floodplain.

Restoration has resulted in a more stable channel with lower erosion potential. Erosive stormflows that were once confined and concentrated in an entrenched channel with erodible soils now have space in the floodplain to spread out and slow down. The design intent is for water to filter through the hyporheic zone to reduce surface flow volumes and improve water quality.

Figure III.H.10 provides a photograph of a representative cross-section within Study Area 1, demonstrating the severe down-cutting that was prevalent pre-restoration in this part of the Breewood tributary. Figure III.H.11 shows the Breewood tributary post restoration.

Figure III.H.10 Upstream View of Sligo Creek - Breewood Tributary, Study area 1, Pre-Restoration (2013)

Figure III.H.11 Upstream View of Sligo Creek, Breewood Tributary, Study Area 1, Post-Restoration (2015)

H.1.e. Summary of Biological and Physical Monitoring of the Breewood Tributary

The 2010 through 2014 monitoring results document pre-restoration conditions and provide evidence that the Breewood tributary was impaired. After the stream restoration was completed in 2015, physical geomorphic surveys indicate many dramatic improvements to the channel morphology. The increased floodplain access, reduced erosion, and hyporheic zone interaction are intended to result in many ecological benefits. Monitoring will continue annually to evaluate improvements to the biology and habitat that are anticipated as a result of the restoration efforts.

H.2 Stormwater Management Assessment

The Permit requires the County to assess effectiveness of stormwater management practices found in the 2000 Maryland Stormwater Design Manual for stream channel protection. During the previous permit cycle, MDE approved DEP's proposal to conduct the required monitoring within a developing area of the Clarksburg Special Protection Area (SPA). Specific monitoring requirements include an annual stream profile and survey of permanently mounted cross-sections, and comparison to baseline conditions.

The DEP established monitoring stations in two drainage areas: a "positive control" where the drainage area will remain undeveloped and mostly forested and a "test area" where development occurs in the contributing drainage area. The test area is located in the Newcut Road Neighborhood tributary to Little Seneca Creek (LSLS104). The control area is located in Soper's Branch to the Little Bennett Creek (LBSB101). Methodology is described in the County's 2003 NPDES Report, Part III.D.2, attached to this

report as Appendix M. Figure III.H.12 shows the locations of the two areas and their contributing drainage areas, with the control area shown in yellow labeled “Soper’s Branch”, and the test area shown in red labeled “Trib 104”.

Both drainage areas include a stream gage at the bottom of each study catchment. The test and control areas are also visited once per year to monitor biological conditions, habitat, and physical-chemical data. Benthic macroinvertebrates are monitored during the spring index period (March 1 through April 30). Fish were not used as indicators for the small first order streams since there is often limited fish habitat due to lack of sufficient flow.

Figure III.H.12 also shows the locations of four other areas monitored as part of the Clarksburg Monitoring Partnership (CMP), a consortium of local and federal agencies and universities. Two additional test areas were initially selected for the CMP: one area also in the Newcut Road Neighborhood (shown as Trib109) and one in the Cabin Branch Neighborhood (shown as Cabin Branch). One additional control area (shown as Crystal Rock) was set up in an existing developed area in Germantown. More recently, a test area has been established within the Ten Mile Creek watershed.

All the test and control areas have United States Geological Survey (USGS) flow gages installed, where continuous stream flow data is being collected. Four rain gages monitor area rainfall and document local rainfall intensities to correlate rainfall to stream flow. One gage is located at Little Bennett Regional Park, two gages are located within Black Hill Regional Park, and one gage is located within the headwaters of Ten Mile Creek at the Kingsley School Environmental Center. Figure III.H.12 also depicts the location of a study area (shown in red) in the Ten Mile Creek watershed. This study area contains two USGS flow gages as well as two rain gages.

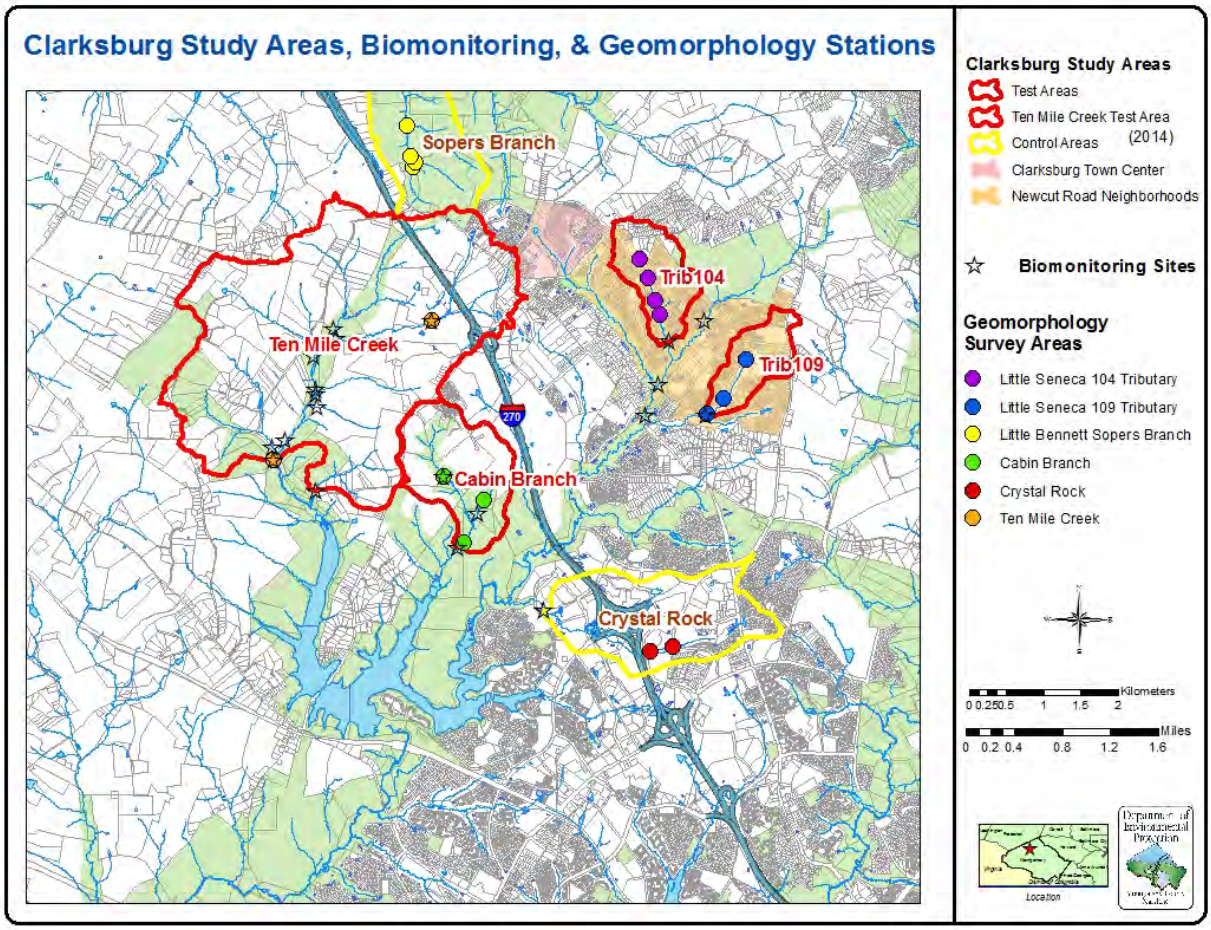


Figure III.H.12 Location of the Clarksburg Monitoring Partnership Four Test Areas and Two Control Areas, including biological and geomorphic survey locations.

The CMP is using a Before, After, Control, Impact (BACI) design or paired catchment (watershed) design (Farahmand et al. 2007) approach to assess the land use changes and the impacts to stream conditions. The CMP has been monitoring stream conditions since 2004. The CMP is also using Light Detection and Ranging (LiDAR) elevation data and imagery to provide greater resolution in mapping landscape changes at this smaller drainage area scale than is possible using traditional aerial photography.

H.2.a. Status of Development in the Clarksburg SPA Permit Required Test Area

The drainage catchment to the test area (LSLS104) primarily contains two developments. The Greenway Village Phases I through IV are completed, and ESC structures have been converted to SWM facilities. The Clarksburg Village Phase I transitioned from construction to post construction in 2011. There are two small portions within the test area (Clarksburg Village Phase II and Greenway Village Phase V) that, although largely stabilized, are still categorized in the ESC phase. The land composition in the control area drainage catchment remains unchanged.

H.2.b. Precipitation, Infiltration, and Annual Flows

Average annual precipitation is about 42 inches in the Baltimore-Washington area (NWS 2008). Average monthly precipitation varies slightly throughout the year but localized spring and summer thunderstorms

can cause significant variations in precipitation among nearby locations (Doheny et al. 2006; James 1986). To assure that such localized events were accurately captured, two rain gages were established for the CMP at Black Hill Regional Park in Cabin Branch (2004) and Little Bennett Regional Park in Soper's Branch (2003). Two additional rain gages were installed in 2014 to monitor precipitation events in Ten Mile Creek. The data collected provides statistics on pattern and amount of rainfall, storm durations, storm mean intensity, and storm peak intensity.

H.2.c. Hydrologic Data Analysis and Interpretation

Stream flow gages continue to provide data that allows the calculation of instantaneous peak discharge and daily mean discharge as well as stream height response during storm events. Descriptive information on the seven flow gages is presented in Table III.H.6.

Table III.H.6. Descriptions of the USGS Stream Gages in the Clarksburg Study Area

Gage Id. Number	Name	Date Started	DA (mi^2)	DA (acres)	Closest Test or Control Area
01644371	Newcut Road Neighborhood tributary to Little Seneca Creek Near Clarksburg, MD ("Test Area")	5/2004	0.43	275.2	Test Area (LSLS104)
01643395	Soper's Branch at Hyattstown, MD ("Control Area")	2/2004	1.17	748.8	Control Area (LBSB201)
01644375	Little Seneca Creek Tributary Near Germantown, MD	6/2004	1.35	864	Crystal Rock
01644372	Little Seneca Creek Tributary at Brink, MD	6/2004	0.37	236.8	LSLS109
01644380	Cabin Branch Near Boyds, MD	6/2004	0.79	505.6	Cabin Branch
01644388	Ten Mile Creek Near Clarksburg	6/2013	3.37	2156.8	LSTM301A
01644390	Ten Mile Creek Near Boyds	10/2010	4.48	2867.2	LSTM304

Annual runoff from stream gages in the test area (USGS gage 01644371) and the control area (USGS Gage 01643395) was compared to rainfall data from the Cabin Branch and Soper's Branch rain gages to determine how much average annual precipitation infiltrates into the groundwater or is released into the atmosphere through evapotranspiration within the drainage areas of the gages. Data were obtained from the online Water Year Reports published by the USGS, Baltimore Office (Doheny 2009, personal communication) for water years 2005 through 2016. Water Years cover the period from October 1 to September 30 of each year. The 2015 USGS Water Data Reports for the two stream gages are available at: https://waterdata.usgs.gov/nwis

H.2.d. Time of Concentration

Time of concentration (TOC) is defined as the difference in time between the start of rainfall and when discharge begins to increase at the gaging station (Doheny et al. 2006). This parameter is useful in understanding the stream response to clearing and grading and subsequent land use changes and increasing imperviousness. With less area for precipitation to infiltrate, runoff reaches the stream in a shorter amount of time. The Maryland erosion and sediment control requirements attempt to moderate this during construction by providing storage for one inch of rainfall from the site undergoing construction. However, local site constraints and weather patterns may not allow for storage of one inch of rainfall from the site for every storm. For example, the storms may be back-to-back storms or an unexpected condition discovered such as the BMP being located so that the local groundwater is intercepted.

Flow and rain data collection have not been consistent over the study period due to issues such as equipment malfunction. The number of storms considered for each station is listed in Table III.H.7 and only includes storm events where a response occurred. Storm events were chosen over a variety of durations, intensities and seasons.

Table III.H.7 Storm Events Used in TOC Analysis

Station Name	DA[1] (acres)	Year / Number of Storms										
		2005	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Soper's Branch	749	5	6	4	14	14	8	4	12	10	8	17
Newcut Road Neighborhood Tributary	275	8	0	4	14	16	8	5	18	15	20	28

[1] *DA = Drainage Area*

Time of Concentration in Soper's Branch has been variable over the course of the study period (Figure III.H.13). Average TOC ranged from 17 minutes in 2008 to 263 minutes in 2009. All averages were over 125 minutes except in 2008. Multiple results were greater than 400 minutes with maximum TOCs ranging from 25 minutes in 2008 to 1040 minutes in 2011.

No pre-construction results are available for the Newcut Road Neighborhood Tributary; the USGS flow gage was not installed until after construction was complete. The average TOC at the Newcut Road Neighborhood Tributary ranges from 48 minutes in 2013 to 136 minutes in 2005 (Figure III.H.14). Averages have been consistently less than 100 minutes. Maximum TOC ranges from 200 minutes in 2008 to 495 minutes in 2015. The relatively consistent nature of the results may be attributed to SWM in the watershed. During rain events, runoff reaches the SWM structures relatively quickly. If functioning properly, these structures release flow at predetermined rate. Trends will continue to be monitored over time.

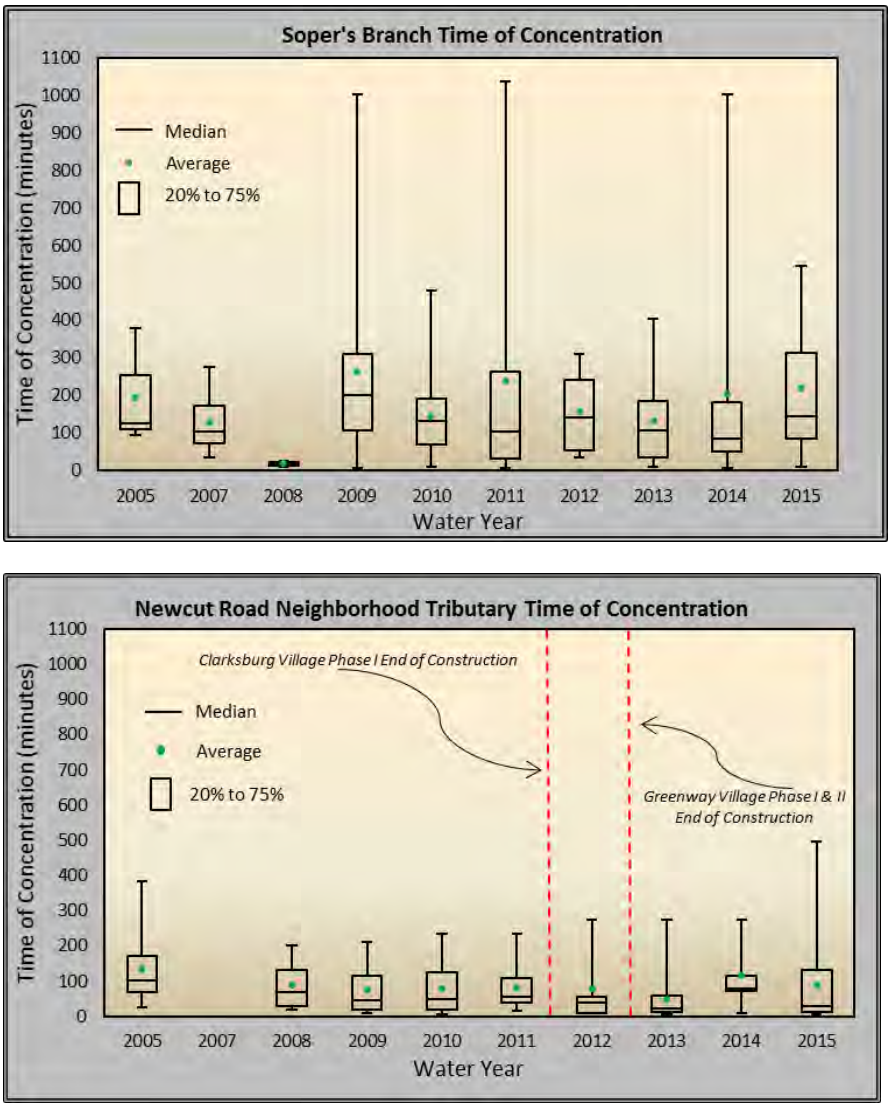


Figure III.H.13 Time of Concentration for Soper's Branch and Newcut Road Neighborhood Tributary 2005-2016

H.2.e. Stream Geomorphology Monitoring

Figures III.H.14 A and B provide survey locations for the stream geomorphology monitoring in the test area tributary and in the control area. Multiple surveys were completed in both areas to document the temporal change in stream channel morphology. Survey information includes longitudinal profiles, cross sections, bed composition (pebble counts), and sinuosity.

Surveys were established within similar habitat sections of each study stream. At that time, the upstream habitat sections were steeply-graded, straight channels (low sinuosity index) consisting mostly of riffle habitat. More downstream sections were characterized by decreasing slopes, increasing sinuosity and pools becoming more prevalent. There are four channel cross-section locations in both study areas, labeled from 1-4, with location 4 representing the most downstream cross-section location. All cross

sections used in this comparison were measured in riffle/run stream areas. Riffle/run areas serve as grade control for the stream and are areas that resist changes to cross-section features.

H.2.f. Data Analysis and Interpretation

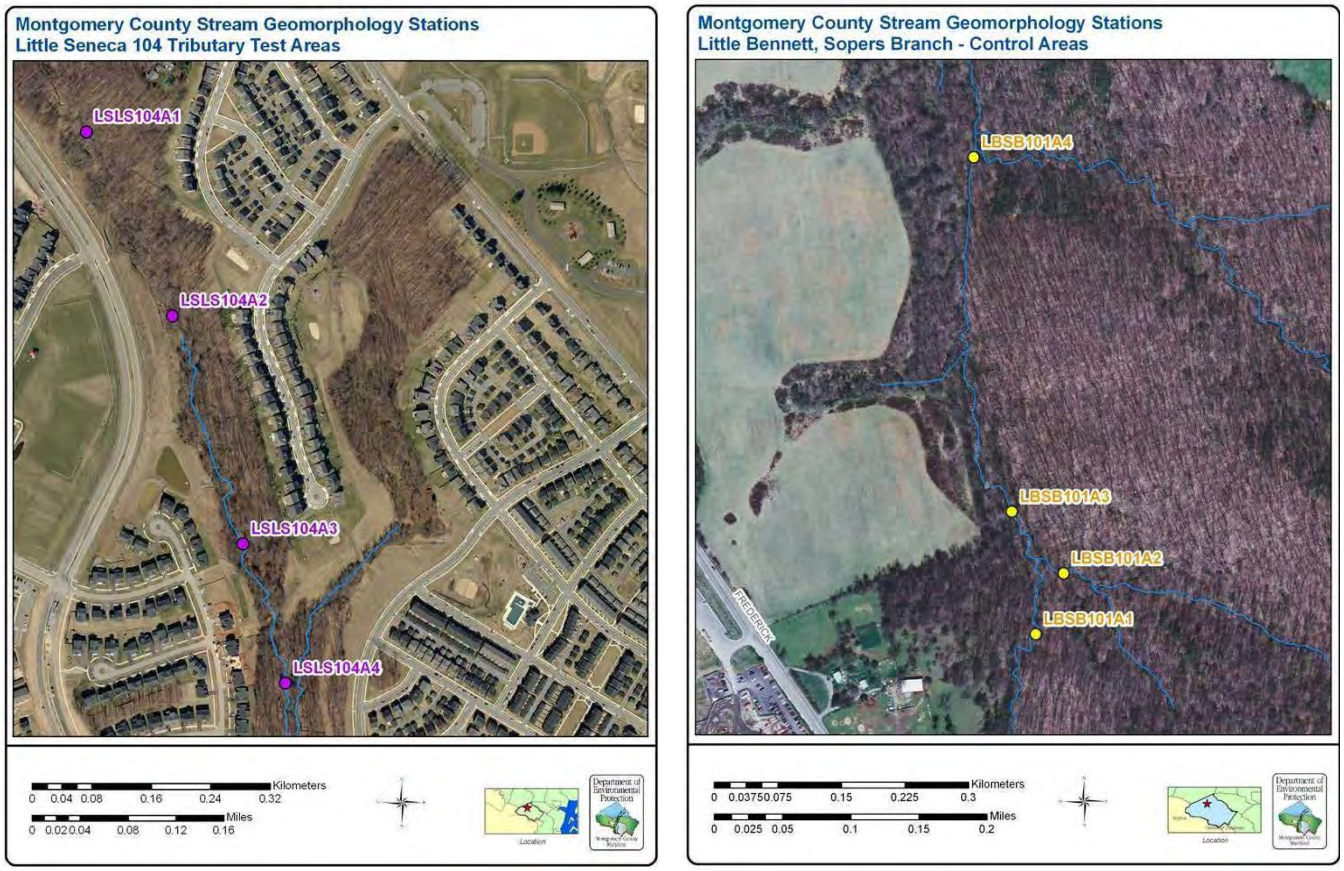


Figure III.H.14 Geomorphology Survey Locations: Test Area (A), Control (B)

As development alters an area's surface hydrology, rainfall infiltration will decrease and stormwater runoff will increase, with corresponding higher peak flows and scour in the receiving stream channel. The eroded material is carried away and deposited downstream (aggradation). As the development site stabilizes, less aggradation of the stream from overland sediment occurs (Paul and Meyer 2001). To document stream physical changes during development, DEP conducts annual monitoring of cross-sections, pebble counts for average particle size, stream bed elevation, and measures of sinuosity.

The average particle size (D-50) for substrate material in the test area exhibited an increase at the most downstream study area (LSLS104A4) through 2010. In 2011 the average particle size decreased at the test area for the first time since 2004. This corresponds with the beginning of the post-construction period at Clarksburg Village Phase I. The average particle size since 2011 has fluctuated between fine gravel and medium gravel. Increased runoff rates during the construction period may have been flushing the finer particles downstream, while the coarser, parent material aggregates of the stream channel were left in place. Increased impervious may result in more runoff and thus more sediment reaching the stream. To reach equilibrium, sediment is removed from the stream channel in one location and deposited

downstream in another area. Little change in particle size over time would be an indication that the system has reached equilibrium.

Cross section graphs from the test area illustrate change over time (Figure III.H.15). The cross sections generally show channel aggradation corresponding to the most active years of construction (2004, 2005 and 2006), and then channel degradation and some widening from 2007 to 2011 as the test area neared final elevations and stabilization. In 2012, approximately one foot of aggradation was observed in cross section 1. In 2013 and 2014, little change was noted. In 2015 however, the channel in cross section 1 scoured out approximately 1 foot. Changes are most evident in the lower portion of the cross-section profiles, at or below frequent storm elevation. Little change was observed in 2016.

Minor change occurred in the Newcut Rd Test Area 4 cross section 3, with slight scouring on the left channel and increased deposition on the right, likely due to a debris jam downstream of the cross section (Figures III.H.15 and III.H.16).

In contrast, representative sections from the control area (Figure III.H.17) showed that the channel area at the control station has also increased, but not as rapidly as at the test area. This is consistent with more stable hydrologic pattern and possibly indicative of less sediment moving through the system.

Figure III.H.18 shows longitudinal profiles, looking parallel to the stream channel, for the test area (LSLS104) and for the control area (Soper's Branch). The stream bed elevation in the test area tributary has shown considerable instability since construction initiated in 2005, and features frequently change as sediment loads move through the system. Whereas, over the same time period, greater consistency was observed in stream bed elevation and feature type at the control station. An examination of the percent of riffle/run to percent pool at the test and the control sites revealed no observable trends.

The results indicate the stream channel at the test area may still be in a state of flux as the system responds to the conversion from ESC to SWM facilities. Post-construction monitoring has not yet been completed. However, from the preliminary results, it appears that the construction phase of development has impacted the test area channel morphology, as evidenced by straightening, down-cutting, and enlargement of the channel.

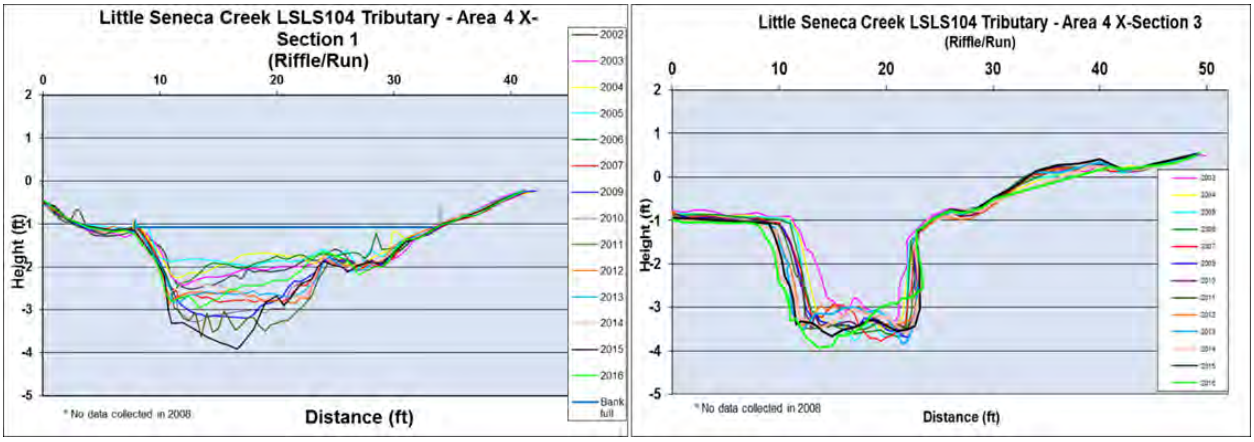


Figure III.H.15 Newcut Rd Neighborhood Test Area 4 Cross Sections, 2002 to 2016

Figure III.H.16 Comparison between Newcut Rd Tributary test area 4 cross section 2015 (left) and 2016 (right)

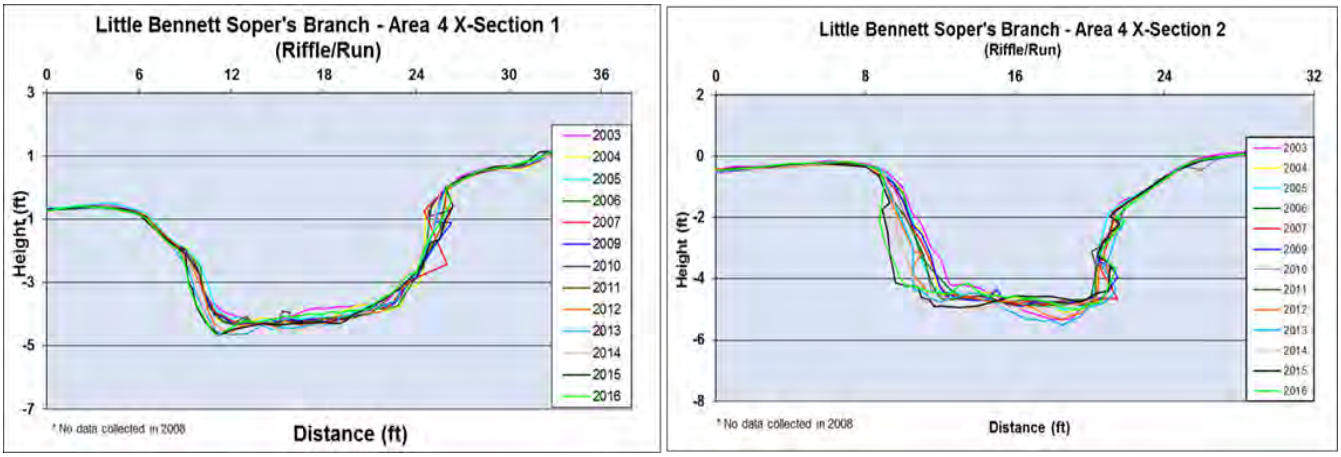


Figure III.H.17 Little Bennett Soper's Branch Control Area 4 Cross Sections, 2003 to 2016

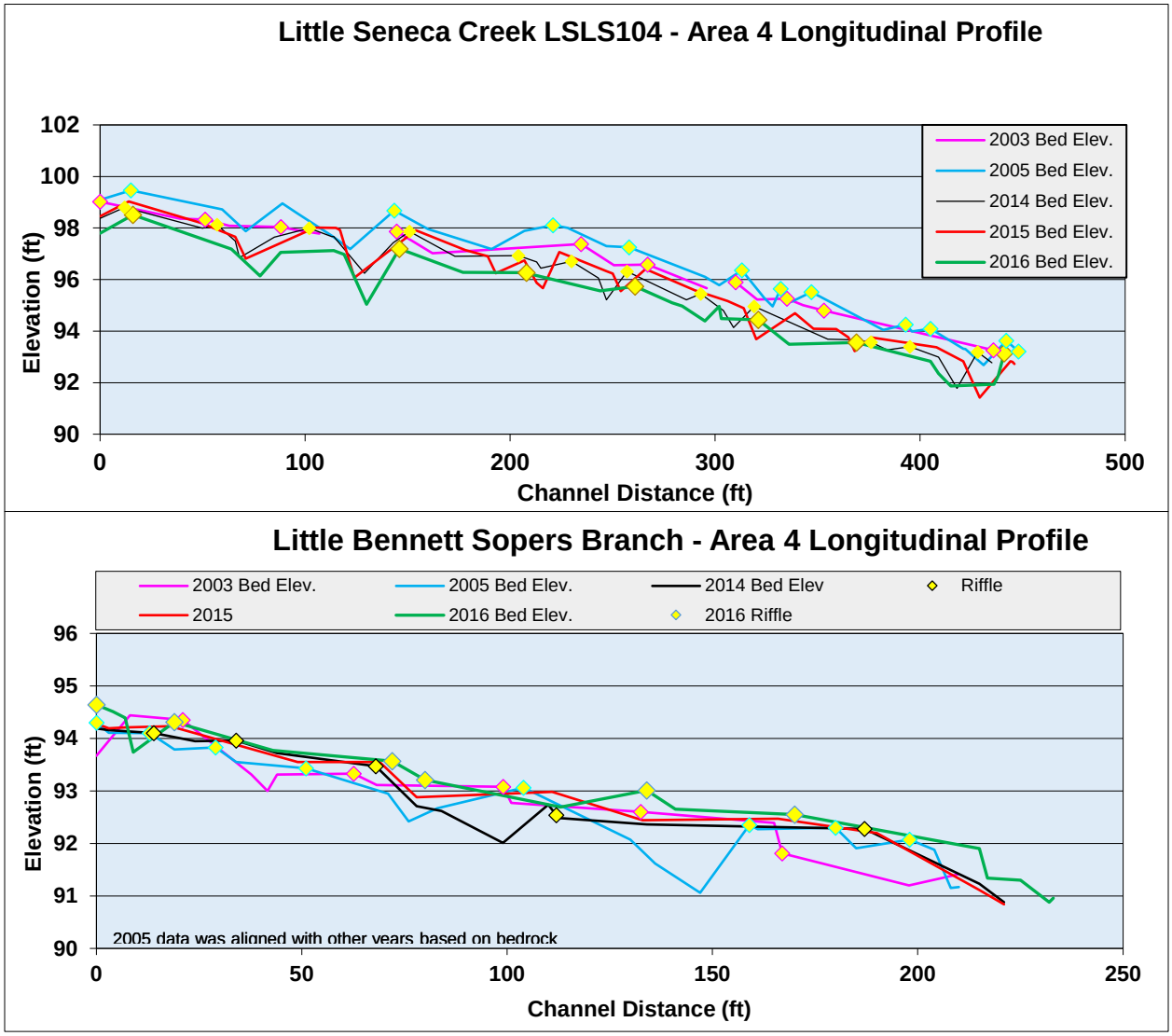


Figure III.H.18 Longitudinal profiles for Newcut Rd Tributary test and Soper's Branch control areas, 2003 to 2016

I. Program Funding

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

The Permit requires that the County submit annual funding for the capital, operation, and maintenance expenditures in database format specified in Permit Part IV Attachment A. This section provides a summary of the capital, operation, and maintenance expenditures, as well as the revenue generated by the WQPC.

Beginning with FY13, the expenditures reported includes data from multiple departments within the County and includes expenditures from MCPS, a co-permittee. The expenditure data does not include operational Department of Transportation and General Services costs associated with pollution prevention on County property because these agencies do not have a way to separate out these specific costs from their other operating costs.

During FY17, the reported total expenditures associated with Permit requirements (Table III.I.1) was $64,244,630 an increase of 27.1 percent over the Permit expenditures in FY16. The increase in expenditure is from an increased CIP work in FY17 and from the debt service paid for two revenue bonds.

MDE requested a breakdown of the capital costs, operational costs, and, if applicable, the amount of funds raised by the WQPC. Table III.I.2 provides a breakdown of the operating and capital expenditures for FY17, and Table III.I.3 provides a summary of the actual revenue generated in FY17. The expenditures provided in Table III.1 and 2 are provided in detail by program area in in Appendix A, MDENPDES17.accdb., Table L. Fiscal Analysis. The FY17 report includes revenue generated from the WQPC, BMP Monitoring Fee, Tree Canopy Fee, and Bag Tax.

The Tree Canopy Fee is collected to support the Tree Montgomery Program. Fees collected from the Tree Canopy Law is used to establish new trees as close to the disturbed area as possible. The Tree Canopy Law limits the use of the fees to only planting trees. County staff cannot be hired with the funds nor can other tree budgets be supplanted by these funds. These funds are being reported because the County is also claiming Urban Tree Canopy Expansion equivalent impervious area credit from the trees planted through funding from the Tree Canopy Law (see Section G.)

Table III.I.1 Total Expenditures for County MS4 Related Programs by Fiscal Year (in 000s)								
Fiscal Year (FY)	**FY10**	**FY11**	**FY12**	**FY13**	**FY14**	**FY15**	**FY16**	**FY17**
Total Expenditures[1]	$27,415	$30,097	$30,302	$44,773	$51,728	$53,506	$50,536	$64,245
Change Between FY	N/A	9.8%	0.7%	47.8%	15.5%	3.4%	(5.6%)	27.1%

[1]Personnel, administrative and debt service costs not reported FY10-FY12. Total budgeted includes all operating expenditures for County MS4 permit including general funded, special enterprise funded programs for DEP and DPS, and WQPC funded programs. Also includes debt service payment for capital program, and general funded and WQPC capital improvement programs

Table III.I.2 Breakdown of Operating and Capital Expenditures FY17	
	Expenditures
Operating Expenditures[1]	$37,575,389
Capital Expenditures[2]	$26,669,241
Total Expenditures	**$64,244,630**

[1]All operating expenditures for County MS4 permit including general funded, special enterprise funded programs for DEP and DPS, and WQPC funded programs. Also includes debt service payment for capital program.

[2]Includes General funded and WQPC capital improvement programs

Table III.I.3 FY17 Revenues	
	FY17
WQPC Revenues	$34,813,777
BMP Monitoring Fee Revenue	$1,049,948
Tree Canopy Fee Revenue	$703,249
Bag Tax Revenue	$2,607,512
Total Revenues	**$39,174,486**

I.1 FY17 Watershed Restoration Expenditures

The Permit requires the County to submit estimated costs and actual expenditures for the watershed restoration program implementation. Table III.I.4 shows a summary of FY10 through FY17 CIP costs for both watershed assessments and watershed restoration projects. As noted in FY16 Annual Report, there was a decrease in expenditures between FY15 and FY16 due to the legal challenges against the WQPC. The reduction in work can be seen in the reduced expenditures in FY16 as compared to FY15 and FY17. The legal challenges were resolved in FY16 and CIP projects resumed in FY17. The resumed work is reflected in the increased expenditures in FY17.

Table III.I.4 FY10-FY16 Capital Improvement Program Expenditures for Watershed Assessment and Restoration

Fiscal Year	Total Annual Expenditures from Watershed Assessments	Total Annual Expenditures from Watershed Restoration	Total Expenditures
FY10	$433,800	$2,942,100	$3,375,900
FY11	$749,130	$3,904,222	$4,653,352
FY12	$502,244	$8,168,571	$8,670,815
FY13	$879,435	$9,274,295	$10,153,730
FY14	$1,658,517	$16,490,211	$18,148,728
FY15	$659,634	$16,934,497	$17,594,131
FY16	$432,084	$10,293,457	$10,725,541
FY17	$990,436	$17,933,330	$18,923,766
Total	**$6,305,280**	**$85,940,683**	**$92,245,963**

During FY17, DEP continued to identify funding sources to support project implementation. The amended FY17-FY22 SWM and restoration CIP budget reflects a significant change in implementation that will be needed to meet the Permit requirement for adding runoff management (Table III.I.5). The approved budget for FY17 is $57,487,000 compared to $56,724,000 for FY16, $53,345,000 for FY15, $35,000,000 for FY14 and $25,000,000 for FY13.

On January 16, 2018, the County Executive released his recommended FY19-24 CIP Program Budget. This budget recommends $245.8 million (Table III.I.6) for the SWM CIP Program. This recommended CIP budget was developed with the intent of limiting increases in the WQPC. After analyzing the overall program implementation rate to date, the FY19-24 CIP implementation rate has been adjusted to more realistic level for most projects. Because of this analysis and additional DEP efforts to bring down program costs, the total 6-year (FY19 to FY24) program expenditures have decreased by $101.3 million, a 28.9 percent reduction to the amended FY17-22 CIP program of $345.5 million. In addition, DEP is pursuing low-cost Maryland Water Quality Revolving Loan Funds to support the CIP program. Highlights of the SWM CIP budget include continuing the planning and implement of stormwater management project, public outreach, stream monitoring, and other actions needed to comply with the County MS4 permit. Expanding the use of Public-Private Contracts and Partnerships through a new CIP project the MS4 permit goals in a more cost-effective manner. Construction of stormwater management facilities, retrofits of old stormwater management facilities, repairs to damaged stream channels and tributaries in stream valley parks and priority watersheds, and structural repairs to County maintained stormwater management facilities, as well as an upstream flooding project by the Wheaton Branch Pond. DEP will also expand the design and construction of ESD SWM facilities, County facilities, roads and schools.

Table III.I.5 Department of Environmental Protection Amended FY17-22 Stormwater Management (SWM) Capital Improvement Program Budget (in 000$)*

Projects	CIP Cycle Total	FY17	FY18	FY19	FY20	FY21	FY22
SWM Retrofit Countywide	97,780	21,939	19,225	19,425	18,000	9,654	9,537
SWM Retro-Government Facilities. Low Impact Development	12,678	3,452	2,314	2,239	1,718	1,524	1,431
SWM Retrofit- Roads	116,843	9,426	11,182	25,038	26,115	23,838	21,244
SWM Retrofit Schools	13,253	2,486	1,948	2,505	2,287	2,141	1,886
Miscellaneous Stream Valley Improvement	61,273	8,880	10,952	12,571	13,716	8,548	6,606
SWM Facility Planning	6,671	2,126	1,323	997	773	799	653
SWM Retrofit Anacostia	11,950	1,599	5,081	60	728	2,674	1,808
Major Structural Repair	21,710	4,629	3,404	2,169	3,585	4,852	3,071
Wheaton Reg. Dam Flooding Mitigation	3,350	0	159	50	50	275	2,816
Total	**345,508**	**54,537**	**55,588**	**65,054**	**66,972**	**54,305**	**49,052**

*This does not reflect amendments made to the budget in FY17-18.

Table III.I.6 Department of Environmental Protection County Executive Recommended (January 2018) FY19-24 Stormwater Management (SWM) Capital Improvement Program Budget (in 000$)

Projects	CIP Cycle Total	FY19	FY20	FY21	FY22	FY23	FY24
SWM Retrofit Countywide	58,034	26,242	13,832	3,607	4,602	4,930	4,821
SWM Retro-Government Facilities. Low Impact Development	6,560	1,331	435	465	1,428	1,443	1,458
SWM Retrofit- Roads	25,405	5,049	9,404	4,653	2,074	2,099	2,126
SWM Retrofit Schools	6,907	1,248	1,331	500	1,265	1,276	1,287
Miscellaneous Stream Valley Improvement	67,822	16,269	20,625	5,180	8,528	8,582	8,638
SWM Facility Planning	7,706	1,697	1,723	1,026	1,055	1,086	1,119

Table III.I.6 Department of Environmental Protection County Executive Recommended (January 2018) FY19-24 Stormwater Management (SWM) Capital Improvement Program Budget (in 000$)

Projects	CIP Cycle Total	FY19	FY20	FY21	FY22	FY23	FY24
SWM Retrofit Anacostia	2,295	160	195	485	485	485	485
Major Structural Repair	16,027	2,856	3,948	3,414	2,253	1,383	2,173
SWM Public/Private Agreements	50,200	120	220	12,540	12,540	12,440	12,340
Wheaton Reg. Dam Flooding Mitigation	4,891	50	50	275	2,816	1,700	-
Total	**245,847**	**55,022**	**51,763**	**32,145**	**37,046**	**35,424**	**34,447**

I.2 Financial Assurance Plan

On June 30, 2016, Montgomery County provided to MDE the FY16 FAP. The submission fulfilled the requirements of the 2015 revisions of the Annotated Code of Maryland, Section 4-202.1 of the Maryland Environmental Article, Watershed Protection and Restoration Programs. On October 17, 2016, MDE acknowledged receipt of Montgomery County's FAP. MDE stated that "after reviewing Montgomery County's 2016 FAP MDE has determined that the County has demonstrated that it has sufficient funding in its FAP." The expenditures and revenue data provided to MDE in Montgomery County's FAP uses different assumption than the information required for this MS4 Annual Report and therefore should not be compared. Furthermore, the FAP is not a project planning tool and should not be used to compare to MS4 progress (both actual and planned) provided in this (FY17) Annual Report.

J. TMDLs

J. **Total Maximum Daily Loads**

1. Section 402(p)(3)(B)(iii) of the Clean Water Action (CWA) states that municipal storm sewer system permits must require stormwater controls to reduce the discharge of pollutants to the MEP. By regulation at 40 CFR§122.44, EPA further requires that BMPs and programs implemented pursuant to this permit must be consistent with applicable WLAs developed under EPA approved TMDLs. The overall goals of Maryland's NPDES municipal stormwater permit program are to control stormwater pollutant discharges by implementing the BMPs and programs required by this permit, show progress toward meeting WLAs developed under EPA approved TMDLs, and contribute to the attainment of water quality standards according to the CWA.

In order to accomplish these goals, this permit requires in Part III.J.2. below, that the County develop TMDL implementation plans that include estimates of pollutant loading reductions (benchmarks) to be achieved by specific deadlines and describe those actions necessary to meet the storm drain system's share of ELAs in EPA approved TMDLs. These implementation plans may be in addition or complementary to the watershed assessments required in PART III.F. above and include ongoing watershed restoration efforts required in this permit, as appropriate. Implementation plan benchmarks shall be based on data available to and generated by the County and used as interim goals for guiding adaptive management activities. All EPA approved TMDL's that establish WLA's applicable to the County's storm drain system are incorporated by reference into this permit.

2. Within one year of the effective date of this permit or the approval of an applicable TMDL by EPA, whichever is later, the County shall submit to MDE for review and approval a TMDL implementation plan for each EPA approved TMDLs for a watershed or portion of a watershed covered by this permit. The implementation plans shall include:

   a. The actions and deadlines by which those actions must be taken to meet the required pollutant load reduction benchmarks and WLAs within the specified time frame;

   b. A description of how ongoing watershed restoration efforts will be modified to address any applicable WLAs;

   c. A schedule and cost estimate to implement the complete watershed restoration efforts necessary to meet established WLA benchmarks;

   d. A description of a plan that will be used when benchmarks are not met and projected funding is inadequate;

   e. A public participation component that includes:

      i. Notice in a local newspaper and the County's web site outlining how the public may obtain information and provide comments to the County regarding implementation plans;

      ii. Procedures for providing the plan to interested parties upon request;

      iii. A minimum 30-day comment period; and

iv. A summary in the next annual report of how the County addressed or will address any material public comments received.

3. As reflected in PART III.H. above, the assessment to determine whether the conditions of this permit are satisfied, the MEP standard is reached, and whether progress toward meeting applicable WLAs is realized is critical. Therefore, complete and accurate annual reporting, pursuant to PART IV of this permit is required to allow for regulatory review of the permittee's stormwater management program and continued assessment of waters of the state.

4. If EPA approved TMDL WLAs are not being met according to the benchmarks and deadlines contained in the County's TMDL implementation plans, an iterative approach shall be used where additional or alternative stormwater controls are proposed and implemented in order to achieve WLAs. The permittee shall evaluate and document progress toward meeting TMDL requirements within the jurisdiction on an annual basis. This assessment shall describe specific actions undertaken pursuant to the permit and if necessary, how these actions will be modified, and the deadlines by which they will be modified to achieve compliance with EPA approved TMDLs. This assessment shall include complete descriptions of the analytical methodology used to evaluate the effectiveness of restoration efforts; include summaries of monitoring data, descriptions of statistical analysis and/or other modeling approaches used to evaluate the data, and GIS data; and a detailed description of sampling protocols.

5. MDE shall review the annual assessment and any proposed modifications to the TMDL implementation plan and approve the modifications, if they are adequate.

The Permit requires development of implementation plans to meet County MS4 WLAs for any EPA approved TMDL in County watersheds within one year of EPA approval. The County must also report progress towards meeting those WLAs where watershed restoration is occurring.

J.1.a TMDL Implementation Plans

The County successfully submitted the *Montgomery County Coordinated Strategy*, as was required to meet Permit requirements, including meeting the TMDL WLAs, in February 2011, 1 year after issuance of the Permit. The Strategy used the watershed treatment model (WTM) to verify pollutant baseline loads in TMDL watersheds, and estimate pollutant load reductions of a variety of completed and planned structural, non-structural, and programmatic watershed restoration practices. Pollutant load reduction efficiencies were selected based on the best information available during model development. The model estimated pollutant treatment by SWM BMPs and retrofits constructed after TMDL baseline years. Details on the WTM assumptions can be found in the *Montgomery County Coordinated Strategy, Appendix B, Modeling Framework*, which can be found in Appendix K.

Figure III.J.1 shows those watersheds with MDE identified impairments and EPA-approved TMDLs as of January 2015.

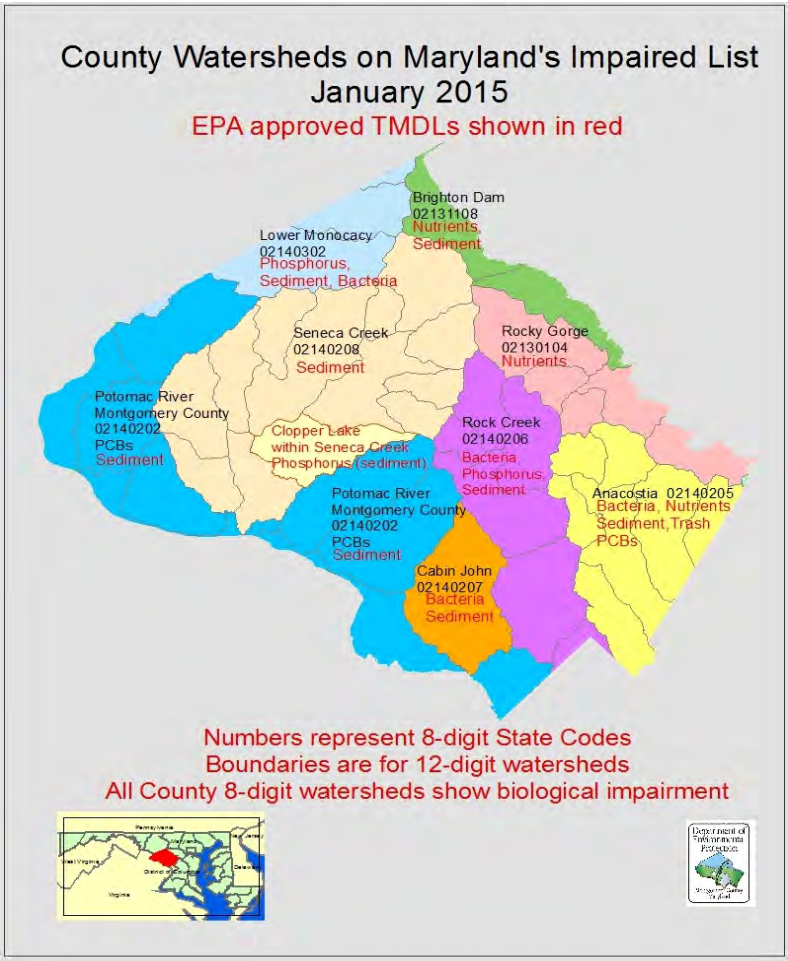


Figure III.J.1 County Watersheds with Impairments and EPA Approved TMDLs

J.1.b TMDLs Issued Since June 2009

Table III.J.1 shows the TMDLs approved by EPA for Montgomery County with the status of their implementation plans. The Strategy addressed all existing TMDLs as of September 2009. Individual implementation plans were developed for TMDLs approved after 2009.

Table III.J.1 Status of TMDLs Implementation Plan

Watershed	TMDL	Status of Implementation Plan
Anacostia River	PCB	Implementation Plan Submitted in 2013
	Nitrogen	Required Reductions Shown in Strategy
	Phosphorus	Required Reductions Shown in Strategy

Table III.J.1 Status of TMDLs Implementation Plan		
Watershed	**TMDL**	**Status of Implementation Plan**
	Sediment	Required Reductions Shown in Strategy
	Bacteria	Required Reductions Shown in Strategy
	Trash	Required Reductions Shown in Strategy
Cabin John Creek	Sediment	Required Reductions Shown in Strategy
	Bacteria	Required Reductions Shown in Strategy
Lower Monocacy	Bacteria	Implementation Plan Completed in 2014
	Phosphorous	Implementation Plan Completed in 2014
Potomac River Direct	Sediment	Implementation Plan Completed in 2014
Rock Creek	Sediment	Required Reductions Shown in Strategy
	Phosphorous	Required Reductions Shown in Strategy
	Bacteria	Required Reductions Shown in Strategy
Seneca Creek	Sediment	Implementation Plan Completed in 2014
Clopper Lake	Sediment	Required Reductions Shown in Strategy
Triadelphia Reservoir	Sediment	Required Reductions Shown in Strategy
	Phosphorous	Required Reductions Shown in Strategy
Rocky Gorge Reservoir	Phosphorous	Required Reductions Shown in Strategy

J.1.c Progress Towards Meeting Wasteload Allocations for EPA Approved TMDLs

Table III.J.2, below summarizes watershed-specific TMDLs and pollutant reductions achieved by watershed restoration projects constructed after TMDL baseline data date. The reductions include nutrients and sediment reductions from stream restoration projects using efficiencies provided in MDE's August 2014 *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated*. The FY17 pollutant load reduction information can also be found in this report's electronic (CD) attachment in Appendix A, MDENPDES17.mbd, Table G., G.1., and G.3.

The Strategy land cover loading rates and BMP reduction efficiencies do not match those published in the subsequent August 2014 MDE guidance. In 2018, DEP will begin to evaluate using CAST model for local TMDL progress reporting. DEP will work with MDE to ensure that the data is accurately captured and explained in the FY18 annual report.

J.1.d Chesapeake Bay TMDL

Information on the County's Phase II WIP submittal for the Chesapeake Bay TMDL is presented in Part V. Special Programmatic Conditions, A. Tributary Strategy.

Table III.J.2 TMDL Summary by Impairment

Impairment	Watershed	Issue Date	Pollutant	County MS4 Baseline Load	Annual Allocation	Units	WLAsw Percent Reduction	Percent Reduction Since Baseline Date[1]	TMDL Baseline Data Date
Bacteria	Cabin John Creek	2007c	E. coli	44,257	30,670	(Billion MPN/yr)	30.7%	0.6%	2003
	Rock Creek	2007d	Enterococci	453,669	18,195	(Billion MPN/yr)	96.0%	3.8%	2003
	Anacostia River	2007b	Enterococci	247,809	29,978	(Billion MPN/yr)	87.9%	7.1%	2003
	Lower Monocacy River	2009e	E. coli	67,452	9,848	(Billion MPN/yr)	85.4%	1.3%	2003-2004
Sediments	Anacostia River	2007a	TSS	7,682	1,101	(tons/yr)	85.7%	27.1%	1997
	Triadelphia Reservoir	2008b	TSS	29	29	(tons/yr)	0.0%	0.02%	2003
	Clopper Lake	2002	TSS	13	13	(tons/yr)	0.0%	0%	2002
	Lower Monocacy River	2009d	TSS	253	99	(tons/yr)	60.8%	1.2%	2000
	Seneca Creek	2011	TSS	5,735	3,185	(tons/yr)	44.6%	23.3%	2005
	Rock Creek	2011	TSS	8,667	5,345	(tons/yr)	38.3%	11.0%	2005
	Cabin John Creek	2011	TSS	3,143	2,430	(tons/yr)	22.7%	3.8%	2005
	Potomac River Direct	2011	TSS	4,365	2,783	(tons/yr)	36.20%	4.3%	2005
Nutrients	Clopper Lake	2002	Phosphorus	101	55	(lbs/yr)	45.4%	0%	2002
	Anacostia River	2008a	Nitrogen	206,312	38,959	(lbs/yr)	81.8%	9.4%	1997
	Anacostia River	2008a	Phosphorus	20,953	3,947	(lbs/yr)	81.2%	36.4%	1997
	Triadelphia Reservoir	2008b	Phosphorus	438	373	(lbs/yr)	15.0%	0.3%	2003
	Rocky Gorge Reservoir	2008b	Phosphorus	4,268	3,628	(lbs/yr)	15.0%	6.1%	2003
	Lower Monocacy River	2013	Phosphorus	1,872	1,305	(lbs/yr)	30.0%	0.2%	2009
	Rock Creek	2013	Phosphorus	12,503	8,089	(lbs/yr)	35.0%	5.2%	2009

Table III.J.2 TMDL Summary by Impairment

Impairment	Watershed	Issue Date	Pollutant	County MS4 Baseline Load	Annual Allocation	Units	WLAsw Percent Reduction	Percent Reduction Since Baseline Date[1]	TMDL Baseline Data Date
Trash	Anacostia River	2010	Trash	228,683	-	lbs/yr removed	100.0%	6%	2010
PCB	Anacostia River- Non Tidal-NWB	2011	PCB	134.5[2]	2.56	g/yr	98.1%		
PCB	Anacostia River- Non Tidal-NEB	2011	PCB	112.57[2]	1.53	g/yr	98.6%		

Adapted from "2010 Status of Approved Stormwater Wasteload Allocations for NPDES Regulated Stormwater Entities in Montgomery County," April 27, 2010 by Jeff White, MDE, and additional email 11/13/13

[1] Percent reduction of pollutant by BMPs completed after the TMDL baseline data collection period, as of FY17

[2] For all known NPDES stormwater discharges in Montgomery County portions of the NEB and the NWB, as identified in the TMDL

IV. ANNUAL REPORTING

Annual progress reports are required under 40 CFR 122.42(c). This Permit report fulfills this requirement.

V. SPECIAL PROGRAMMATIC CONDITIONS

A. Tributary Strategy

The DEP continued to serve as the local liaison for activities related to Maryland's WIP process. In July 2014, the MDE published the results of its evaluation of local programs in meeting 2012-2013 Milestones. The County received 'High' ratings for most of these categories including resource enhancements, legal authority, organizational enhancements, and planning/studies. The County's stormwater sector received 'High' ratings in every category. The County received a "Medium" rating in the review category "addresses appropriate sectors (comprehensiveness)" because there were no milestones developed for pollution reduction from the septic sector. The County plans to develop milestones in the septic sector in the future. The complete evaluation is available on the MDE web site:

http://www.mde.state.md.us/programs/Water/TMDL/TMDLImplementation/Documents/Milestones/2012-2013/Local/Evaluations/Local_2013_Milestone_Summary_Evaluations.pdf

There were no local meetings held during FY17 related to the WIP efforts. However, the DEP continued to coordinate with the four Phase 2 MS4 Permit localities as MDE moved forward with the next phase in the Maryland WIP process.

B. Comprehensive Planning

The County agencies are routine participants for review and comment as MNCPPC Sector Plan and Master Plan documents are being developed.