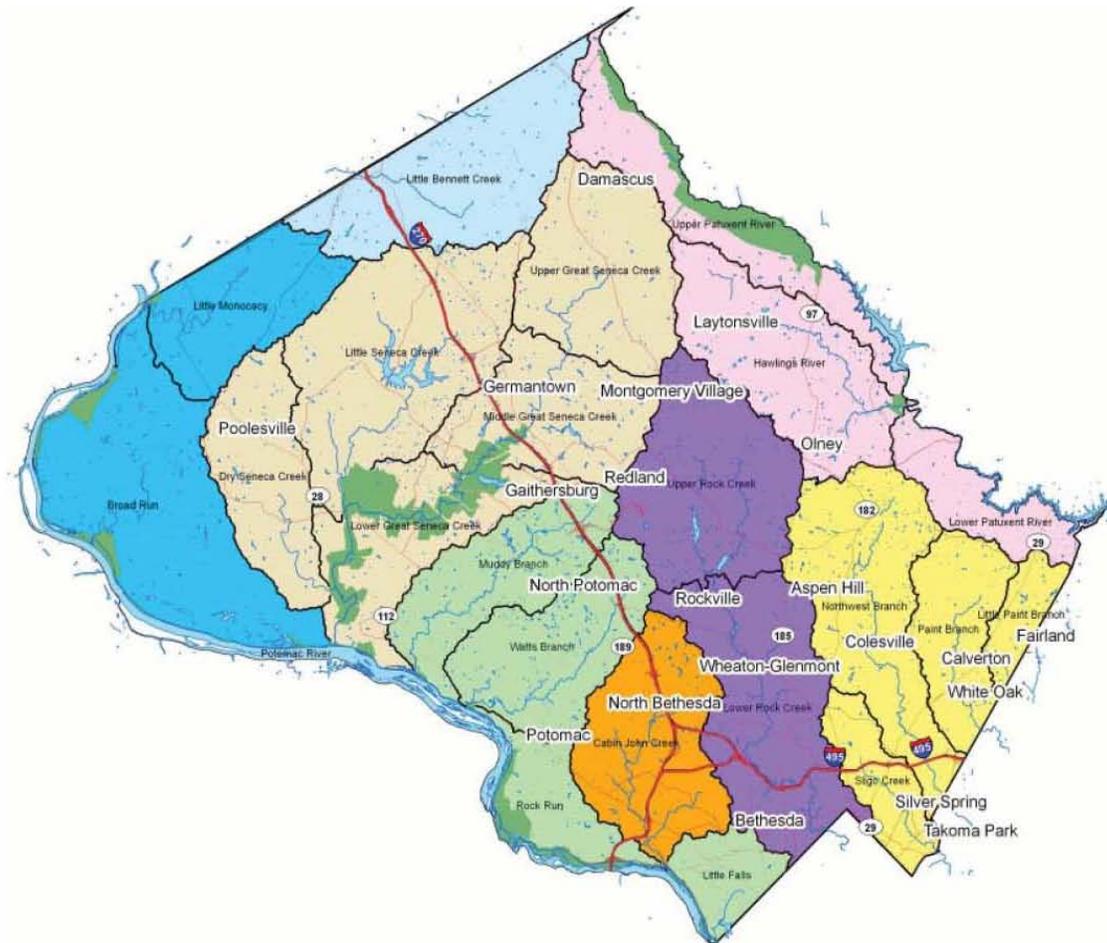




Annual Report for FY13

NPDES Municipal Separate Storm Sewer System Permit



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LIST OF ACRONYMS

BMP	Best Management Practice
CIP	Capital Improvement Program
USACE	U.S. Army Corps of Engineers
DEP	Department of Environmental Protection
DGS	Department of General Services
DPS	Department of Permitting Services
DOT	Department of Transportation
EPA	U.S. Environmental Protection Agency
ESC	Erosion and Sediment Control
ESD	Environmental Site Design
GIS	Geographic Information System
IBI	Index of Biological Integrity
LID	Low Impact Development
MCPS	Montgomery County Public Schools
MDE	Maryland Department of the Environment
MDP	Maryland Department of Planning
MEP	Maximum Extent Practicable
MNCPPC	Maryland National Capital Park and Planning Commission
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
SWM	Stormwater Management
USGS	U.S. Geological Survey
WSSC	Washington Suburban Sanitary Commission
WIP	Watershed Implementation Plan

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LIST OF ATTACHMENTS

ATTACHMENT 1. COMPACT DISK WITH THE FOLLOWING ELECTRONIC FILES

APPENDIX A Annual Report Databases

- MDENPDES13.accdb Required information in ACCESS 2000 database
- A. GIS Storm Drain System Mapping Associated With GIS Coverage (Part III.C.1), 1998 through February 2013
 - B. Urban Best Management Practices Associated with GIS Coverage (Part III.C.2)
 - C. Impervious Surfaces Associated with GIS Coverage (Part III.C.3)
 - D. Watershed Restoration Project Locations Associated with GIS Coverage (Part III.C.5)
 - E. Monitoring Site Locations Associated With GIS Coverage (Part III.C.4.)
 - E.1. Monitoring Site Locations- Use for Multiple Land Use Values in the Drainage Area
 - E.2. Monitoring Site Locations- Use for Multiple Stormwater BMPs in the Drainage Area
 - F. Chemical Monitoring (Part III.H.1.a)
 - G. Pollutant Load Reductions Associated With GIS Coverage (Part III.J.)
 - G.1. Additional Pollutants (Part III.J.)
 - G.2. Pollutant Load Reductions Associated With GIS Coverage (Part III.H.1.a.iv.)
 - G.3. Additional Pollutants (Part III.H.1.a.iv.)
 - H. Biological and Habitat Monitoring (Part III.H.1.b and c.)
 - I. Illicit Discharge Detection and Elimination (Part III.E.3)
 - J. Responsible Person Certification (Part III.E.2.b)
 - K. Quarterly Grading Permit Information Associated with GIS Coverage (Part III.E.2.c)
 - L. Fiscal Analysis (Part III.I)

Appendix B. MDE Letter Approving the Strategy after review.

Appendix C. MCPS Report to the County on MS4 Activities in FY 2013.

Appendix D. Coal Tar Outreach Flyer

Appendix E. Implementing_ESD_Report_FINAL_110910.pdf
Zoning Code ESD changes

Appendix F. MDE SW Triennial Review Letter with County Response

Appendix G. *Field Findings Supplemental, Sligo*, Center for Watershed Protection, 2012
Field Findings memorandum November 2012

Appendix H. Updated SWP3 Plans for County Facilities, SWPPP Annual Inspections FY13

Appendix I. FY13 H2O Summit Agenda

Appendix J. DEP Summary Notes for DEP/MDE Meeting October 2011
DEP Summary Noted from DEP/MDE Meeting November 2012

Appendix K. Strategy Guidance Document

Appendix L. NPDES Water Chemistry Monitoring in the Breewood Tributary of Upper Sligo
Creek, 2009-2012
Breewood Project Fact Sheet
Rationale to Use Breewood tributary for NPDES Required Monitoring

Appendix M. Watershed Restoration Project Monitoring FY2013

Appendix N. Montgomery County NPDES 2003 Annual MS4 Report

Appendix O. Technical Supplement for Watershed Assessment Monitoring for Calendar Year 2012

MONTGOMERY COUNTY MARYLAND
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) DISCHARGE PERMIT

I. BACKGROUND

The Montgomery County Department of Environmental Protection's (DEP) submission to the Maryland Department of the Environment (MDE) fulfills the annual progress report requirement as specified in Part IV of Permit Number 06-DP-3320 MD0068349 (the Permit). The five-year Permit term began February 16, 2010 covering stormwater discharges from the MS4 in Montgomery County, Maryland (the County). This is the fourth report in this current permit cycle (February 16, 2010- February 15, 2015) and covers the County's Fiscal Year 2013 (FY13) for July 1, 2012 to June 30, 2013.

Significant accomplishments in the County's stormwater management program during FY13 are highlighted in the Overview. 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. Information required by the Permit's Attachment A, Annual Report Databases, Parts A. through L. can be found electronically on the compact disc (CD) submission in Appendix A.

The DEP Watershed Management Division (WMD) has primary responsibility for the majority of the Permit requirements, including interagency coordination, annual reporting, source identification, discharge characterization, monitoring, stormwater facility inspection and maintenance enforcement, illicit discharge detection and elimination, watershed public outreach, watershed assessment and restoration. The DEP WMD is also responsible for assessment of stormwater controls, and for tracking progress towards meeting the County's Total Maximum Daily Load (TMDL) urban stormwater wasteload allocations (WLAs) in applicable watersheds. The DEP Division of Solid Waste Services (DSWS) is responsible for all solid waste related programs, including programs to increase awareness of waste reduction and recycling.

The Department of Permitting Services (DPS) is responsible for the County's Stormwater Management (SWM) and Erosion and Sediment Control (ESC) Programs. The Department of Transportation (DOT) is responsible for storm drains, road and roadside maintenance. The Department of General Services, (DGS), DEP's DSWS, and DOT are responsible for their respective property maintenance activities at County-owned Depot facilities covered under the NPDES General Permit for Storm Water Discharges Associated with Industrial Facilities.

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 five year permit cycle. In February 2011, DEP submitted the draft Montgomery County Coordinated Implementation Strategy (the Strategy) and associated Watershed Implementation Plans to MDE with the 2010 MS4 Annual Report. The Strategy presents the restoration and outreach initiatives that are needed to meet the watershed-specific restoration goals and water quality standards, and is referenced frequently in this report. Specifically, the Strategy provides the planning basis for the County to:

1. Meet Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) approved by the U.S. Environmental Protection Agency (EPA).
2. Provide additional stormwater runoff management on impervious acres equal to 20% of the impervious area for which runoff is not currently managed to the maximum extent practicable (MEP).
3. Meet commitments in the *Trash Free Potomac Watershed Initiative 2006 Action Agreement* which include support for regional strategies and collaborations aimed at reducing trash, increasing recycling, and increasing education and awareness of trash issues throughout the Potomac Watershed.
4. Educate and involve residents, businesses, and stakeholder groups in achieving measurable water quality improvements.
5. Establish a reporting framework that will be used for annual reporting as required in the County's Permit.
6. Identify necessary organizational infrastructure changes needed to implement the Strategy.

The MDE approved the Strategy in July 2012. The approval letter can be found attached to this report in Appendix B. A final version of the Strategy, and Watershed Implementation Plans, are accessible on DEP's website at:

<http://www.montgomerycountymd.gov/DEP/water/county-implementation-strategy.html> .

The MDE modified the County's second generation Permit effective January 26, 2004 to add six small localities as co-permittees for coverage under the Phase 2 of the NPDES MS4 Permit Program. These included five municipalities: the Towns of Chevy Chase, Kensington, Poolesville, and Somerset, and Chevy Chase Village; and one special tax district, the Village of Friendship Heights. For the third generation Permit, MDE added the Montgomery County Public Schools (MCPS) as a co-permittee.

II. OVERVIEW

Permit Administration

The Permit requires the County to designate an individual to act as liaison with the MDE for Permit implementation. The Permit also requires the County to submit an organizational chart detailing personnel and groups responsible for major NPDES program tasks.

An updated organization chart and contact information is shown in Table III.A.1. These are the contacts as of February 2014.

Legal Authority

The Permit requires the County to maintain adequate legal authority in accordance with NPDES regulations 40 CFR Part 122 throughout the term of the Permit.

Stormwater Management

In July 2010 and March 2011, the County Council passed Bill 40-10 amending the County's stormwater management law to require management of stormwater runoff through the use of nonstructural BMPs to the MEP for new development and redevelopment projects approved by DPS. In response to MDE concerns that a portion of Bill 40-10 was less restrictive than State law, Bill 40-10 was amended in March 2011 as Expedited Bill 7-11 to limit certain alternative SWM measures to redevelopment only. The bills then 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 revised County stormwater management law maintained 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% of the redevelopment site using ESD to the MEP. County law requires stormwater management to protect 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% of the redevelopment site, and requires the use of ESD to the MEP to meet these standards.

Sediment and Erosion Control

On March 29, 2013, the County Council passed Expedited Bill 1-13, Erosion and Sediment Control, 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, including more stringent stabilization requirements and the establishment of maximum grading unit criteria.

Water Quality Protection Charge

In April 2013, the County Council passed Bill 34-12, Stormwater Management-Water Quality Protection Charge (WQPC). Bill 34-12 modified the structure of the County's original WQPC to comply with the 2012 State HB 987, the Stormwater Management- Watershed Protection and Restoration Program Bill.

Carryout Bag Law

On January 1, 2012, the County's Carryout Bag Law, Bill 11-8, went into effect. The goal of the law was to increase awareness about the problem with disposable bag litter and to reduce the use of carryout bags. The Carryout Bag Law taxes 5 cents for each paper and plastic bag that a customer takes from certain retail establishments to carry purchases out. The Department of Finance is responsible for enforcement of the Bag Law. Restaurants that use paper bags for carryout food do not need to charge the tax.

Coal Tar Sealants

In September 2012, the County Council passed the Coal Tar Pavement Products Law, Bill 21-12, that banned the use of coal tar products, effective December 18, 2012. Under the law, use of a coal-tar based sealant can lead to a fine of up to \$1,000—for both the property owner and the applicator.

Source Identification

The Permit requires the County to submit information for all County watersheds in geographic information systems (GIS) format with associated tables.

The County continues to improve its storm drain mapping to facilitate the identification of pollution sources from the MS4. The County's storm drain inventory can be found in Appendix A, Part A., on the CD attached to this report. For FY14, DEP's information technology (IT) group will take over digitizing new storm drain features added as a result of the new construction approval process. The DEP has also issued an FY14 task order to its MS4 program management consultant team for a storm drain delineation framework and pilot. This task order will assist the County to:

- Obtain a clearer understanding of the storm drain GIS data maintained by different County agencies.
- Develop a framework for integrating and validating GIS data from the various sources
- Develop a County-wide implementation plan for storm drain delineation to be tested in three small pilot areas.

The DEP's Urban Best Management Practices (BMP) database as of June 30, 2013 with associated coverage is included in Appendix A, Part B. The DEP's monitoring locations and locations of watershed restoration projects are also included electronically in Appendix A, Parts C. through I.

The County's impervious area associated with GIS coverage, as of 2009, is included in Appendix A, Part C. In FY13, DEP continued to digitize and update impervious areas for the Permit requirements and the County's stormwater utility charge, the Water Quality Protection Charge (WQPC), based on 2012 aerial photography. The DEP is also working to update the drainage areas of all stormwater BMPs. When complete, DEP will submit an updated layer of County impervious area, BMP drainage areas, and an updated analysis of controlled versus uncontrolled impervious areas. This work should be completed by the end of this current permit cycle in FY15.

Discharge Characterization

The DEP conducts monitoring required under this section at the Breewood Tributary within the Anacostia Watershed and in the Clarksburg Town Center drainage within the Seneca Watershed. Detailed results are presented in the report Part III.H titled '**Assessment of Controls**' set forth below.

Management Programs

Stormwater Management (SWM) Facility Maintenance and Inspection

The Permit requires the County to conduct preventative maintenance inspections of all SWM facilities (BMPs) on at least a triennial basis.

The DEP SWM Facility Maintenance and Inspection Program oversees the triennial inspections, structural and non structural maintenance of all SWM facilities under the County's jurisdiction and assesses repair and maintenance needs. In FY13, there were over 7,000 SWM facilities. DEP also documents the number of maintenance inspections and enforcement actions. During FY13, DEP contractors performed inspections in the middle and western regions of the County. Of the 1,474 SWM facilities due for triennial inspection, 1,348 inspections were conducted. The remaining 126 facilities were not inspected due to site conditions or are currently scheduled to be completed by the end of FY14. In FY13, DEP also performed a total of 20 unscheduled inspections. These occurred in response to public complaints, at facilities being considered for transfer into DEP's SWM facility maintenance program, or to assess conditions after a large storm event.

During FY13, 2,002 SWM facilities were maintained by either the DEP structural maintenance program or by the private owner of the facility. In FY13, DEP began contracting routine maintenance of publically owned LID practices, including Roadway Right-of-Way (ROW), installed to meet the Permit watershed restoration goal.

During FY13, 211 aboveground SWM facilities were determined to be at a high or emergency maintenance need level. These facilities were maintained by the private owner until a final inspection conducted by DEP found them to be in compliance and properly functioning. DEP also issued 150 NOV's for correction of deficiencies noted during the triennial inspection. Of the 150 NOV's, 120 were corrected during FY13 (note, the 120 is included in the 211 total number maintained in FY13). Of the 211 facilities, 91 facilities were maintained due to a NOV issued in FY12. Additionally, DEP sent 214 routine maintenance notification letters to property owners in FY13.

The MCPS Division of Maintenance upgraded and repaired existing underground and above ground SWM facilities in FY13, in preparation for transferring maintenance responsibility to DEP in accordance with a MOU signed by both parties in 2007. Several facilities remain to be transferred; this work is expected to be completed during FY14. MCPS also performed nonstructural maintenance on above ground SWM facilities, and maintained several underground

facilities not eligible for transfer to the County. MCPS also contracts out the maintenance on biofacilities (bioretention and green roofs). The entire cost of the FY13 MCPS SWM facility maintenance and inspection program was \$119,890.

Implementing Maryland's Stormwater Management Act of 2007

The Permit requires the County to implement SWM design policies, principles, methods, and practices found in the 2000 Maryland Stormwater Design Manual and provisions of Maryland's Stormwater Management Act of 2007. The Permit requires the County to modify its SWM ordinances, regulations and new development plan approval processes within one year after State adoption of regulations; April 24, 2009, with an effective date of May 4, 2009. The Permit also requires the County to review local codes and ordinances to identify impediments to and opportunities for promoting ESD to the MEP within one year, and to remove those impediments within two years of the Permit's issuance.

In July 2010 and March 2011, the County Council passed Bill 40-10 amending the County's stormwater management law to require management of stormwater runoff through the use of nonstructural BMPs to the MEP for new development and redevelopment projects approved by DPS. In response to MDE concerns that a portion of Bill 40-10 was less restrictive than State law, Bill 40-10 was amended in March 2011 as Expedited Bill 7-11 to limit certain alternative SWM measures to redevelopment only. The bills then 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 revised County stormwater management law maintained 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% of the redevelopment site using ESD to the MEP. County law requires stormwater management to protect 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% of the redevelopment site, and requires the use of ESD to the MEP to meet these standards.

In 2010, County consultants prepared a final report, *Implementing Environmental Site Design in Montgomery County*, which summarized how the County's codes, regulations, programs, and policies may need to be updated to allow the use of Environmental Site Design (ESD) and low impact development (LID) techniques to the MEP. The most significant updates required will be accomplished through the Zoning Code rewrite, underway by the Planning Department of the Maryland- National Capital Park and Planning Commission (M-NCPPC). The Planning Department transmitted a draft to the County Council in May 2013. At the end of FY13, The Council Planning, Housing and Economic Development committee (PHED) began holding work sessions on the zoning code revision. In FY14, the PHED transmitted their draft to the full Council for review and public hearings. The zoning code rewrite, Zoning Text Amendment (ZTA) 13-04 was approved by Council March 5, 2014.

The DPS has been working with its fellow agencies and some members of the SWM construction community through the Policy and Design Committee and the New Products Committee on design and maintenance aspects of various ESD practices. The goal is to assure

that these practices provide cost-effective designs that provide maximum runoff reduction and pollutant removal but without increasing average maintenance cost per facility. This is critical since the decentralized nature of the ESD approach results in many more structures per site that must be inspected to assure aesthetic (i.e. trash and invasive plant removal) as well as continued function.

The DEP also continues outreach on LID practices to increase community acceptance of these practices and future stewardship for routine housekeeping of the roadside LID practices. Watershed groups, such as the Anacostia Naturalist Society (ANS) and the Friends of Sligo Creek (FoSC) have provided assistance to DEP outreach efforts, both for the “Green Streets” pilot and also for residential properties retrofits through the RainScapes Neighborhoods program. DEP also has developed numerous fact sheets designed to provide assistance to residents in maintenance of their ESD practices.

MDE’s Triennial Stormwater Program Review

The Permit requires the County to maintain programmatic and implementation information according to the requirements established as part of MDE’s triennial stormwater program review.

In April 2013, MDE completed a review of the County’s stormwater management program, evaluating the status of implementing ESD to the MEP in the County’s plan review and approval process. MDE found the County’s program to be acceptable under State law and in compliance with Part III.E.1 of the Permit.

Erosion and Sediment Control (ESC)

The Permit requires the County to maintain an acceptable ESC program, including implementing program improvements identified in any MDE evaluation of the County’s application for the delegation of ESC enforcement authority, conduct responsible personnel certification classes and report quarterly information on earth disturbances exceeding one acre or more.

In FY13, 12,439 ESC inspections were performed. Enforcement actions included 235 NOVs, and 103 civil citations which collected \$67,000 in fines. DPS continues to conduct “responsible personnel certification training” three times a year as required by the Permit. DPS also continues to report to MDE quarterly information on earth disturbances exceeding one acre or more.

On March 29, 2013, the County Council passed Expedited Bill 1-13, Erosion and Sediment Control, 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 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 in November of 2013. Continued delegation was granted by Brian Clevenger, Program Manager of MDE’s Sediment, Stormwater and Dam Safety Program in a letter dated January 6, 2014. In that letter,

MDE stated that it “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”.

Illicit Discharge Detection and Elimination (IDDE)

The Permit requires the County to implement an inspection and enforcement program to ensure that all discharges to and from the MS4 system that are not composed entirely of stormwater are either permitted by MDE or eliminated. The Permit requires the County to field screen 150 outfalls annually, conduct routine surveys of commercial and industrial areas, and maintain an enforcement program to address discharges, dumping and spills.

For FY13, DEP performed outfall screening in the Coquelin Run, Kensington Branch and KenGar Tributaries of the Lower Rock Creek Watershed. DEP screened 156 outfalls and found 35 to have flow (19 with dry weather flows and 16 piped streams). Of the 35 outfalls found to have flow, 11 were flagged for follow up investigations due to elevated water quality parameters measured during the initial screening. Of those 11 outfalls, 8 were found to have normal water chemistry parameters during the follow up visit. One discharge was tracked to a sidewalk cleaning event, and one discharge was referred to WSSC due to elevated chlorine. One discharge is still being investigated by DEP staff.

The DEP also continues to work with WSSC to conduct follow-up site visits for reported sanitary sewer overflows (SSO’s) in Montgomery County. DEP staff performed 82 of these site visits in FY13, to verify the SSO was corrected, ensure adequate cleanup and treatment of all affected areas, and ensure adequate public notice signage was posted. Also, DEP is continuing to work with WSSC’s FOG (Fats, Oils and Grease) Program regarding restaurant grease issues, which have direct effects on storm water quality in Montgomery County.

The DEP continued to work with the Center for Watershed Protection (CWP) to track illicit discharges found during the FY11 IDDE investigation in the Sligo Creek subwatershed. For FY13, the team focused on the Maple Avenue drainage area located in the Sligo Creek subwatershed. Two illicit discharges were discovered:

- One outfall near the Park Ritchie Apartments was found to have elevated levels of ammonia, detergent, and fluoride. Storm drain mapping for the area is inaccurate, and a source for the discharge could not be determined. DEP will explore this storm drain area further in FY14 using closed circuit television (CCTV).
- One storm drain manhole above the Park Ritchie Apartments had dry weather flow with contamination suggesting sanitary system influence. WSSC videotaped the sanitary lines in the vicinity of the manhole and found problems that will require the relining of the sanitary line.

For FY14, DEP is working with CWP under contract to further study and quantify the extent of pollution from anti-microbial agents used in rooftop HVAC systems. During previous year investigations in the Sligo creek watershed, high ammonia discharges in two drainage areas were traced to commercial sites, and were found to originate from air conditioner condensate. Limited

sampling conducted by CWP suggests pollution loading for nitrogen, copper and zinc, but specific management measures and products that contribute to the problem are still unknown. The DEP also budgeted additional funds and obtained contractual support to conduct CCTV investigations in the Maple Avenue and Bennington Road areas in FY14.

Enforcement Actions

For FY13, DEP's Division of Environmental Policy and Compliance (DEPC) investigated 206 water quality issues (124 complaints and 82 SSO's) and 30 hazardous materials related cases, which resulted in the issuance of 25 formal enforcement actions (11 Civil Citations with fines totaling \$6,000 and 14 Notices of Violation (NOVs)) and 20 warning letters.

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 FY13, there were 377 complaints concerning the illegal dumping of solid waste, which resulted in the issuance of 16 Notices of Violation (NOVs) and numerous warning letters. The 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.

Trash and Litter

The Permit requires the County to meet its obligations under the Potomac River Watershed Trash Treaty, including trash abatement program implementation, education, and evaluation.

The Strategy includes trash reduction work plans designed to meet the Potomac Trash Free Treaty goals and the MS4 wasteload allocations for the 2010 Anacostia Trash TMDL. 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 campaign include ongoing education and outreach for recycling and litter reduction, mass media outreach campaigns, and litter removal from streets, stormwater ponds, and transit stops.

On January 1, 2012, the County's Carryout Bag Law, Bill 11-8, went into effect. The Carryout Bag Law taxes 5 cents for each paper and plastic bag that a customer takes from certain retail establishments to carry purchases out. From the implementation to June 2013, over 86 million bags were sold in Montgomery County. In FY13, over 59 million carryout bags were sold, with total revenue collection of \$2.39 million. This represents an average of approximately 4,970,644 carryout bags sold per month. According to the Census Bureau, the Montgomery County population for 2012 is 1,004,709 people. This would average out to a little less than 5 disposable bags bought per county resident each month. In the first month of FY13, the County had 910 registered retailers remitting the bag tax collected from their business. As of June 2013, there are 1,100 registered retailers in the system. Since new retailers are continuing to register and remit

the bag tax, it is too soon to determine any changes in carryout bag usage in the County. The impact of the bill will be re-evaluated and reported in the FY14 Annual MS4 Report.

The DEP continues via contract to conduct trash monitoring and assessment in the Anacostia Watershed. The litter survey and evaluation for instream trash structures in Rock Creek was completed in 2012. FY13 highlights include:

- Completion of three cycles of post-TMDL trash monitoring in the Anacostia watershed with the top three trash items found in the streams being plastic bags, food packaging, and plastic bottles.
- Development and testing of a 'windshield' survey that could be used by volunteers to drive through areas and estimate amount of trash on roadsides. The top three trash items identified from the roadside surveys were paper, food packaging, and miscellaneous, items.
- Finalizing a survey form of trash-reduction efforts by apartment and commercial property managers to be sent out to targeted properties within the Anacostia watershed

Property Management

The Permit requires the County to 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 a NPDES General Permit for Stormwater Associated with Industrial Activities.

Table II.1 shows County facilities covered under the General Permit, which was administratively extended in 2007 by MDE.

Table II.1- County Facilities Covered under the Maryland General Discharge Permit for Storm water Associated with Industrial Activities	
Name Of Facility/ Responsible Agency	Watershed/Acreage
Colesville Highway Maintenance Depot (DOT)	Anacostia/Paint Branch; 12 acres
Damascus Highway Maintenance Depot (DOT)	Potomac/Great Seneca: 1.4 acres
Gaithersburg: Highway Maintenance Facility (DOT)	Potomac/Rock Creek;
Gaithersburg: Equipment Maintenance and Transit Operations Center (EMTOC) (DGS)	
Poolesville Highway Maintenance Facility (DOT)	Potomac/Dry Seneca Creek 4 Acres
Bethesda/Seven Locks Automotive Service Center (DGS)	Potomac/Cabin John Creek: 19 Acres
Bethesda/Seven Locks Highway Maintenance Facility, Sign Shop and Signal Shop (DGS)	
Kensington Small Transit Service Maintenance Facility at Nicholson Court	Potomac/Rock Creek
Silver Spring/Brookville Road Highway Maintenance Facility (DOT)	Potomac/Rock Creek: 18 Acres

Silver Spring/Brookville Road Transit Center/ Fleet Maintenance Center (DGS)	
Shady Grove Processing Facility (DEP)	Potomac/Rock Creek; 43 out of 52.5 acres
Gude Landfill (DEP)	Potomac/Rock Creek; 120 acres
Oaks Landfill (DEP)	Patuxent/Hawlings River (355) and Potomac/Rock Creek;(190)

Yearly stormwater pollution prevention plan (SWPPP) inspections of County facilities covered under the General Permit generally show adequate attention to reducing pollutant runoff from the facilities. In FY12, DGS hired a consultant to develop and update the SWPPPs for all facilities under its responsibility. All the County facility operating agencies; DOT, DGS, and DEP, delivered yearly training on the General Permit requirements to all employees.

In 2008, new Capital Improvement Program (CIP) funding dedicated to environmental compliance was added to the DGS budget. In 2013, the following environmental compliance CIP initiatives were accomplished:

- The Gaithersburg Heavy Equipment Maintenance and Operations Center, Transit Services and Highway Maintenance facility were relocated a few miles away to the County's Equipment Maintenance and Transit Operations Center (EMTOC) located in the Rock Creek watershed. The onsite facilities include many pollution prevention and stormwater management upgrades including a new bus wash facility, heavy equipment storage shed, soil/gravel storage area, salt barns, and Highway Services bays. DGS is removing underground storage tanks (USTs) and contaminated soils from the old location of the Gaithersburg Heavy Equipment Maintenance and Operations Center.
- Updated Spill Prevention Control and Countermeasure (SPCC) Plans were developed for all of the County DGS facilities.
- The DGS is also currently replacing USTs with aboveground storage tanks at all County Fire Stations and expects to complete this work by 2015.
- Construction of the Silver Spring /Brookville Road Depot stormwater improvements continues, which will add two Baysaver water quality structures, and trench drains to improve the water quality from the Transit maintenance facility area. Planned improvements for FY14 include a new permanent structure for bulk storage of highway maintenance materials (topsoil, sand, gravel), and an improved bus steam bay that will reduce incidental discharges to the storm drain system.
- The DGS is also planning to begin routine mechanical sweeping of the parking lots at all the industrial facilities, and increasing the cleaning frequency of facility oil/grit separators. In FY13, all depots were swept once.

The MCPS conducted pollution prevention (P2) training for staff, prepared and implemented SWPPP and SPCC plans at all industrial sites. P2 improvements have been implemented at these sites as recommended by the annual inspections. MCPS also continued to implement an Integrated Pest Management Program (IPM) program at all facilities.

Road Maintenance

The Permit requires the County to continue to implement a program to reduce pollutants associated with road maintenance activities.

Street Sweeping:

In FY13, the County continued its streetsweeping program, focusing on twice monthly sweeping of 229 miles in selected arterial routes, removing 273 tons of material. The sweeping frequency provides equivalents for impervious acreage control and pollutant reduction credit as specified in the Maryland Department of the Environment's (MDE's) June 2011 Draft "Accounting for Stormwater Wasteload Allocations and Impervious Acreage Treated" guidance document. For FY13, the County controlled an impervious acreage equivalent of 16 acres and reduced 409 pounds of Total Nitrogen (TN) and 163 pounds of Total Phosphorous (TP).

The DOT completed annual sweeping for all residential routes. In FY13, DOT swept a total of 4,055 residential curb miles, removing 806 tons of material. However, MDE does not provide for impervious acre credit for once only frequency streetsweeping.

Inlet Cleaning:

For FY13, DOT reported cleaning 803 storm drain inlets, and 15,769 linear feet of storm drain, collecting 494 tons of material at a cost of \$246,200.

Use of Herbicides:

The County's roadside noxious weed spraying program is conducted by Montgomery Weed Control Inc., a cooperative weed control program between Montgomery County Department of Economic Development, Agricultural Services Division, and the Maryland Department of Agriculture, Plant Protection and Weed Management Section. The County uses no other pesticides or any fertilizers for roadside vegetation management.

Application of Sand and Salt:

The DOT reported applying 31,309 tons of salt and 93,005 gallons of salt to County roadways during December through March of FY13. In 2009, DOT had begun a salt brine pilot program on 240 lane miles of primary roads. Salt brine is a 23% salt solution created in a brine maker that has a lower freezing point than salt. In 2010, over 400 lane miles of both primary and secondary roads received salt brine applications using contracted and County equipment. For the 2011-2012 winter season DOT purchased additional salt brine making equipment and storage tanks and expanded the salt brine treatment program to over 800 lane miles of primary, secondary and some neighborhood roads. During 2012, DOT decided to stop ordering sand to use in its de-icing mix, although there was approximately 18,000 tons in stockpile still to use up. Excess sand washing into the local streams had been identified as an issue in certain areas where stream restoration projects had been constructed.

Public Education and Outreach

The Permit requires the County to implement a public education and outreach program to reduce stormwater pollutants.

In FY13, DEP continued to expand its education and outreach programs to meet Permit requirements as outlined in the Strategy public outreach and stewardship work plan (POSWP). The POSWP identified eight major areas of stormwater impact education, including pet waste management, lawn stewardship, anti-littering, stormwater awareness, and establishing a volunteer Stream Stewards program.

The DEP tracks details on watershed outreach events, and has included event information in the Permit required Annual Report Database, Part D, found electronically in Appendix A. The goal for the DEP program is to eventually quantify pollutant reductions associated with behavior changes from its education and outreach programs.

In FY13, DEP hosted or participated in 82 outreach events, an increase of 15% from the previous year. The events educated 10,800 attendees, which is a 67% increase in face to face efforts from FY12. DEP's presence in the community conducting watershed outreach has increased 662% since the program was reinvigorated in FY10. FY13 highlights include:

- **H2O Summit**
DEP and existing partner agencies combined the annual Clean Water Summit with the Washington Suburban Sanitary Commission's (WSSC's) H2O Fest to create a new event, the "H2O Summit". The H2O Summit showcased DEP and WSSC outreach efforts with speaker presentations, and several family friendly workshops. Key topics addressed stream health, stormwater pollution and litter reduction.
- **Stream Stewards**
Stream Steward's program continued to train citizen volunteers to help expand watershed outreach to the community. A total of fifty individuals participated in four different orientation sessions held throughout FY13.
- **WaterWatch Dogs**
DEP is also partnering with community groups to coordinate faster response to reports of illicit discharges. In a pilot project, DEP worked with Water WatchDogs, a neighborhood group formed by two residents who were concerned about the poor water quality of their local streams, and the watershed group, Friends of Sligo Creek (FoSC) to develop a mechanism for reporting pollution incidents. Specific information is transmitted via email straight to DEP field enforcement staff. In FY13, volunteers have reported 13 water pollution problems, and which resulted in 5 investigations and one enforcement action.
- **Pet Waste Station Pilot**
The DEP partnered with three HOAs to launch a pet waste pilot project in the Rock Creek Watershed. Five pet waste stations were installed at two HOA properties that had no previous program to remove and dispose of pet waste. By the end of FY13, a total of 172 pounds of dog waste had been collected from the 5 installed stations.

- **Anti Litter**
The DEP continues its mass media anti-littering campaign by using radio ads, facebook and twitter, community blogs and listservs, local newspapers and magazines and websites. DEP is also collaborating on the regional Potomac Treaty anti-littering campaign by using the regional message on advertisements on transit buses and at transit bus stops.
- **Storm Drain Marking**
The DOT and DEP both have storm drain marking programs, separately administered. DOT's Storm Drain Marking Program offers materials to groups or individuals on request. In FY12, 100 storm drains were marked. In FY13, DOT increased direct outreach about the program to schools and community groups, and 323 drains were marked. DEP works directly with watershed groups to supply watershed-specific storm drain markers. For FY13, 1,200 watershed specific storm drain markers were distributed to 6 watershed groups in Seneca Creek, Little Falls, Muddy Branch, Northwest Branch, Rock Creek and Cabin John Creek. DEP has verified that at least 600 of those markers have been installed to date.
- **Stormwater Management Facility Maintenance Outreach**
The DEP SWM Facility Maintenance Program (SWFMP) created multiple publications and hosted several presentations to increase understanding and awareness of the County's stormwater facility maintenance program. DEP also developed 16 facility maintenance fact sheets for aboveground, underground, and ESD practices, addressing structural and non structural maintenance. The fact sheets focus on the importance of stormwater facility maintenance, actions the public can take to keep facilities in proper working condition and where to go for additional information.
- **Watershed Group Capacity Building**
The DEP continued efforts to build watershed groups' capacity, which ultimately will allow the groups to augment DEP's stormwater pollution prevention education and efforts to foster behavior change.
- **Focused Outreach Efforts to Culturally Diverse Communities**
The DEP continued to reach out to the County's culturally diverse communities, targeting watershed awareness and stormwater runoff reduction. The 2013 H2O Summit included a Watershed 101 session conducted in Spanish. DEP also formed a partnership with a local Hispanic based community group, Granito de Arena, and helped the group conduct their own rain barrel workshop to native Spanish speakers. In the coming year, DEP expects to work with the group to conduct additional watershed education workshops.

Watershed Assessment

The Permit requires the County to conduct a systematic assessment of water quality within all of its watersheds, including identification of water quality improvement opportunities, and the development and implementation of plans to control stormwater discharges to the MEP.

The DEP issued a Task Order to conduct assessments of the Lower Monocacy, Patuxent River, Upper and Lower Potomac Direct, Dry Seneca and Little Seneca watersheds. The watershed assessments began in spring 2013 and will be completed by the end of 2014. These assessments will include identification of environmental site design/low impact development (LID) opportunities, stormwater pond retrofits, new stormwater control opportunities, and potential stream restoration. Watershed implementation plans, which present more detailed implementation planning and schedules to meet regulatory and programmatic targets, will be developed from the assessments in FY14.

In February 2010, DEP partnered with the United States Army Corps of Engineers (USACE) - Baltimore District, the Metropolitan Washington Council of Governments (MWCOG), Prince George's County, the District of Columbia, the Maryland-National Capital Park and Planning Commission (M-NCPPC), MDE, and Maryland Department of Natural Resources (DNR) to release the final Anacostia River Watershed Restoration Plan and Report (ARP). Currently, DEP is developing a project management plan with the USACE. The continued partnership will work towards completing an Anacostia River Ecosystem Restoration Feasibility Study to assess and design restoration opportunities identified in the ARP.

Stream Monitoring

In 2012, DEP monitored the Rock Creek watershed for fish and benthic macroinvertebrates (aquatic insects). A total of 27 stations were monitored, with 12 baseline stations in the Upper Rock Creek subwatershed and eight baseline stations in the Lower Rock Creek subwatershed. Twenty of these stations have been monitored since 1995 to track cumulative changes in stream conditions. Stream conditions in the Upper Rock Creek subwatershed are of higher quality than in the more developed Lower Rock Creek subwatersheds.

Post-restoration project monitoring for the Turkey Branch and Joseph's Branch subwatersheds indicates some improvements associated in time with those projects. For both subwatersheds, the fish community is showing a more rapid response than the aquatic insect community after project construction.

Watershed Restoration

The Permit requires the County to implement practices identified in its watershed assessments to control stormwater discharges to the maximum extent practicable (MEP). The Permit specifically requires the County to complete the implementation of restoration projects identified in the previous Permit term to restore 10% of the County's impervious surface area. The permit also requires the County to complete the implementation of restoration to restore an additional 20% of the County's impervious surface area that is not restored to the MEP.

Achieving the 2001 MS4 Permit Watershed Restoration Goal:

The County's second generation Permit issued in 2001 required the County to restore a watershed or combination of watersheds equal to 10% of County impervious area not treated to the MEP. Using data developed for the Strategy, DEP calculated the 10% watershed restoration goal to be 2,146 acres. In FY11, the County reported that SWM BMP CIP projects completed through FY10 achieved control of 1,091 impervious acres. Based on the MDE draft guidance published in June 2011, DEP also calculated that stream restoration of 20 stream miles added the remaining equivalent impervious acreage treatment of 1,055 acres. Thus the total reported impervious control added through CIP watershed restoration projects was 2,146 impervious acres, meeting the 10% watershed restoration requirement.

Meeting the Permit Impervious Control Requirement:

The DEP has an aggressive watershed restoration projects program to meet the current Permit's requirement to add control to 20% of the impervious areas not currently controlled to the MEP (3,976 impervious acres, as determined in FY13 during reanalysis of County SWM BMP control). Projects completed through FY13 have added control to 548 impervious acres. Projects under construction during FY13 will treat an additional 185 uncontrolled impervious acres. The DEP also has numerous projects in design in FY13, which are projected to treat an estimated 2,425 acres of uncontrolled impervious area. Projects scheduled for design in FY14 and FY15 will add control to an additional estimated 476 impervious acres.

The remaining 342 impervious acres will be met through internal and external partnership projects performed within the County's MS4 area. These projects for example may include efforts to treat uncontrolled impervious surfaces through facility modification and modernizations performed by Montgomery County Department of Transportation, Department of General Services, and Public Schools. The DEP also continues to investigate possible equivalent impervious acre credit for alternative nonstructural BMPs such as tree planting and reforestation.

Meeting Wasteload Allocations in Watersheds with EPA approved Total Maximum Daily Loads:

The Permit requires the County to report progress toward meeting any applicable WLAs developed under EPA approved TMDLs in watersheds where restoration has occurred. The Strategy used the Watershed Treatment Model (WTM) to verify pollutant baseline loads in TMDL watersheds, and estimate pollutant load reductions by SWM BMPs and retrofits constructed after TMDL baseline years. DEP then added nutrients and sediment reductions from stream restoration projects using efficiencies provided in MDE's June 2011 *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated*. The County stormwater control and watershed restoration initiatives implemented after the TMDL baselines for County watersheds have removed an estimated 115 billion MPN/year of *E.coli*, 28,535 billion MPN/year *Enterococci*, 494 tons/year of sediment, 10,130 lbs/year of nitrogen, 1,732 lbs/year of phosphorus, and 7,359 lbs/ year of trash from the watersheds with WLAs. Since 2010, the baseline year of the Chesapeake Bay TMDL, an estimated 2,620 lbs of nitrogen, and 531 lbs. of phosphorous have been removed from Countywide stormwater runoff.

RainScapes Program

The DEP's RainScapes program promotes and implements environmentally friendly landscaping, small scale stormwater control and infiltration projects on residential, institutional, and commercial properties. DEP offers technical and financial assistance to property owners for eligible RainScapes techniques, such as rain gardens, tree planting, rain barrels, and conservation landscaping. The RainScapes program consists of RainScapes Rewards, a rebate program, and the RainScapes Neighborhoods, which evaluates targeted neighborhoods for County installed on-lot stormwater runoff reduction approaches. To date in FY13, over 13 impervious acres are being controlled through RainScapes projects for at least the first inch of rainfall, with many projects controlled up to the 1 year storm event.

The RainScapes program includes significant outreach and training components. The RainScapes for Schools program provides native plants, soil, pots and educational materials to MCPS high school horticulture classes to support instruction on the use of plants in stormwater management. The RainScapes for Landscape Professionals program provides training on project requirements and installation, including specifics of site drainage assessment, rain garden design, and project building opportunities. *DEP also provides workshops on RainScapes Rewards Rebate qualified practices. From 2008- 2013, these workshops have reached 1280 residents, averaging 240 participants each year (2009-2013).* In addition, DEP is evaluating how to expand partnership efforts with local watershed and environmental groups to benefit the RainScapes program.

Funding Sources

During FY13, the County continued to identify funding sources to support project implementation. The six-year SWM Capital Improvement Project (CIP) budgets for FY11-FY16 and FY13-FY18 reflect the significant increase in implementation that will be needed to meet the Permit requirement for adding runoff management. The approved (May 2012) FY13-18 SWM CIP budget for FY13 is \$25,000,000 compared to the approved (May 2011) FY11-16 SWM CIP budget of \$11,445,000 for FY12 and \$8,888,000 for FY11.

The approved FY13-FY18 SWM CIP totals \$235 million, an increase of \$128.7 million, or 121 percent from the amended approved FY11-FY16 program of \$106.3 million. This increase in stormwater management activity will be financed primarily through water quality protection bonds. The debt service for these bonds will be supported by the County's Water Quality Protection Fund (WQPF), its stormwater utility. The CIP budget assumes \$60 million in State aid based on the State's expressed interest in enacting legislation to support stormwater management retrofits and restoration efforts. The RainScapes Program is also funded through the WQPF but not as a CIP category.

Assessment of Controls

The Permit requires that the County use discharge characterization monitoring, along with biological and physical monitoring to assess "the effectiveness of stormwater management programs, County watershed restoration projects, and to document progress towards meeting wasteload allocations (WLAs) indicated in the Total Maximum Daily Loads (TMDLs) approved by the U.S. Environmental Protection Agency (EPA) for watersheds or stream segments located in the County". The Permit specifically requires monitoring where the cumulative effects of

watershed restoration activities (the Breewood Tributary) and the effectiveness of stormwater management practices for stream channel protection (Clarksburg Special Protection Area) can be assessed.

Watershed Restoration Assessment

During 2012, DEP continued pre-restoration water chemistry monitoring in the Breewood Tributary, located in the Sligo Creek subwatershed of the Anacostia. Water samples were collected at an instream station and a stormwater outfall station for a total of 32 storms and 43 baseflow events monitored from 2009 through 2012. For each station, baseflow mean concentrations (MC) were calculated for all Permit required parameters over the three-year monitoring period. MCs were also calculated for total petroleum hydrocarbons (TPH) and *Enterococcus* during first flush stormflow.

Storm event mean concentrations (EMCs) represent the weighted average pollutant concentrations based on samples collected at discrete intervals during a storm. EMCs were calculated and averaged over the three-year monitoring period for each parameter except TPH and *Enterococcus*. The average EMCs and MCs of each parameter at each station were compared:

- Storm samples generally had more concentrated pollutants at the outfall than at the instream station.
- At the instream station, there was not a consistent relationship between flow types and results.
- At the outfall, no clear trends in pollutant concentrations by flow type were found.

The 2010 thru 2012 biological and physical monitoring results provide evidence that the Breewood tributary is impaired and will likely benefit from stream restoration. Monitoring will continue annually to evaluate improvements to the biology and habitat that are anticipated as a result of the restoration efforts.

Stormwater Management Assessment

Maryland Design Manual Monitoring in Clarksburg:

The DEP submitted 2012 monitoring results for the developing Newcut Road Neighborhood tributary to Little Seneca Creek “test” area in the Clarksburg SPA as compared to results from the undeveloped Sopers Branch, Little Bennett subwatershed “control” area to evaluate the effectiveness of the Maryland Design Manual criteria to protect the stream channel. Development in the test area’s drainage is mostly complete, and ESC BMPs are being converted to SWM BMPs. There is a small portion of the test area at the downstream end that was undergoing new construction in 2011. The land uses in the Soper’s Branch control area remained unchanged.

The natural hydrology of the test area has been altered dramatically by the development process. On average, the overall amount of precipitation infiltrating into the ground or lost via evapotranspiration has steadily declined in the test area while remaining fairly constant in the

control area. The construction phase of development has impacted the test area channel morphology due to channel straightening, down-cutting, and enlargement. The ability of SWM BMPs to mimic pre-construction hydrologic conditions will be evaluated once the construction process has been completed and the SWM BMPs are on-line.

Program Funding

The Permit requires that the County submit annual expenditures for the capital, operation, and maintenance expenditures in database format specified in Permit Part IV.

The required database is included in electronic format on CD in Attachment A. During FY13, the reported costs associated with Permit requirements were \$44,773,429.

Total Maximum Daily Loads

The Permit requires development of implementation plans showing how the County will meet the MS4 WLAs for any EPA approved TMDLs within one year of EPA approval.

The County Strategy addressed all existing TMDLs in September 2009, the baseline for the Strategy. Since the baseline date, EPA has approved additional TMDLs, which are shown in Table II.2 below, with the status of their implementation plans.

Table II.2- TMDLs Approved Since 2009		
WATERSHED	TMDL	Status of Implementation Plan
Anacostia	PCB	Implementation Plan Submitted in 2013
Cabin John Creek	Sediment	Required Reductions Shown in Strategy
Lower Monocacy	Bacteria	Implementation Plan Complete 2014
Lower Monocacy	Phosphorous	Implementation Plan Complete 2014
Potomac River Direct	Sediment	Implementation Plan Complete 2014
Rock Creek	Sediment	Required Reductions Shown in Strategy
Rock Creek	Phosphorous	Required Reductions Shown in Strategy
Seneca Creek	Sediment	Implementation Plan Complete 2014

The MDE approved the Strategy in July 2012. DEP will work with MDE throughout the rest of this Permit cycle to address any potential inconsistencies between the approach used in the Strategy relative to the MDE guidance published after the Strategy was submitted or to more recent State modeling results and EPA approved TMDLs.

Special Programmatic Conditions

Tributary Strategy

The DEP continued to serve as the local liaison for activities related to Maryland's Watershed Implementation Plan (WIP) process. There were no local meetings held during FY13 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. This included participating in the WIP Technical meetings held by MDE in January and March of 2013 and coordinating the submission for local progress in July 2013. Implementation remains on track as proposed in the WIP Phase 2 document submitted to MDE in November 2011.

Comprehensive Planning

The County agencies are routine participants for review and comment as MNCPPC Sector Plan and Master Plan documents are being developed. In addition, DEP provides data and analysis of local stream conditions for use in local planning efforts. During FY13, this data were used in the White Flint II Sector Plan and the Burtonsville Crossroads Neighborhood Study. The data in the Burtonsville data documented the good quality of the benthic community in certain headwater streams and was a factor considered in the adopted planning recommendations.

Next Steps for FY14

During FY14, the County is continuing to make progress in a number of Permit required areas:

Improving County Data

The County MS4 impervious area, impervious area treated to the MEP, and pollutant loads were all calculated for the Strategy using data available to DEP in 2009. Since then, DEP continually works to improve the accuracy of its stormwater management and watershed restoration information. Since the Strategy was submitted in February 2011, DEP has digitized and updated County impervious areas using 2012 aerial photography, including adding driveways and building polygon layers. DEP is also continually updating the urban SWM BMP database, and is now working to ensure that all SWM BMP's have accurate drainage areas delineated. The updated impervious layer will be used in combination with the updated SWM BMP drainage areas to provide a corrected MS4 area boundary and impervious acres calculation. The updated layers and revised information will be submitted with the FY14 MS4 annual permit report in February 2015.

The DEP is also working to improve the accuracy of its storm drain layer. DEP issued an FY14 task order to its MS4 program management consultant team for a storm drain delineation framework and pilot to obtain a clearer understanding of the storm drain GIS data maintained by different County agencies, develop a framework for integrating and validating GIS data from the various sources, and develop a County-wide implementation plan for storm drain delineation to be tested in three small pilot areas.

Recalculating Pollutant Load Reductions

In June 2011, subsequent to the Strategy development and submittal, MDE released guidance for determining impervious area and pollutant load baselines, impervious area control and wasteload reductions for SWM BMPs. To address inconsistencies between the MDE guidance and the County Strategy, and to develop more accurate baselines using improved data, DEP will re-analyze its baseline of impervious area treatment and pollutant load reductions, and recalculate goals needed to meet the Permit requirements. This re-analysis will be completed for the next generation MS4 Permit.

Restoration Project Implementation and Interagency Coordination

In FY13, DEP began discussions with State Highway Administration (SHA), MCPS, WSSC, and other agencies to coordinate data for impervious acre control resulting from their respective projects. The goal of the coordination is to ensure that all impervious area control is accounted for without being “double counted”. DEP and the agencies will be working towards developing a protocol for determining how the impervious acre control will be credited toward meeting any permit required restoration goal.

Ensuring Effective Maintenance and Inspections of ESD Practices

The DEP has a robust SWM BMP Maintenance and Inspection program that ensures the proper functioning and maintenance of over 7,000 facilities. Since the County modified its Stormwater Management Ordinance in 2010 to comply with Maryland’s Stormwater Management Act of 2007, over 600 new ESD practices have been added to the urban BMP database. In addition, 1,200 nonstructural practices installed before the 2010 Ordinance must now be placed on a triennial inspection schedule because DEP is treating the non-structural practices as ESD. DEP is working to develop an effective process to incorporate these practices into the urban BMP database, and ensure that all required maintenance and inspections occur.

III. STANDARD PERMIT CONDITIONS

A. Permit Administration

An updated organization chart and contact information is shown in Table III.A1. These are the County's contacts as of March 2014.

<i>Table III.A1- Organization Chart for Montgomery County Permit-Required Programs</i>				
Part III. Standard Permit Elements	RESPONSIBLE PARTY			
	<i>Department</i>	<i>Name</i>	<i>Title</i>	<i>Telephone</i>
A. <i>Organization Chart</i>	DEP/WMD	Pam Parker	Senior Planning Specialist	240-777-7758
B. <i>Legal Authority</i>	OCA	Walter Wilson	Associate County Attorney	240-777-6759
C. <i>Source Identification</i>				
1. Storm Drain GIS	DEP/WMD	Craig Carson	Manager	240-777-7709
	DEP/DO	Vicky Wan	IT Manager	240-777-7722
2. Urban Best Management Practices GIS	DEP/WMD	Amy Stevens	Manager	240-777-7766
3. Impervious Surfaces GIS	DEP/DO	Vicky Wan	IT Manager	240-777-7722
4. Monitoring Locations	DEP/WMD	Keith Van Ness	Senior Water Quality Specialist	240-777-7726
D. <i>Discharge Characterization (as described in Part III H. Assessment of Controls)</i>				
E. <i>Management Programs</i>				
1. <i>Stormwater Management</i>				
1.a. Stormwater Facility Inspections and Maintenance	DEP/WMD	Amy Stevens	Manager	240-777-7766
1.b. Stormwater Management Permitting and Plan Review- Implement 2000 Maryland Stormwater Design Manual, and provisions of Maryland's Stormwater Management Act	DPS	Richard Brush	Manager	240-777-6343
2. Erosion and Sediment Control	DPS	Derek Isensee	Manager	240-777-6344
3. Illicit Connection Detection and Elimination Program	DEP/DEPC	Steve Martin	Field Program Manager	240-777-7746
4. Trash and Litter	DEP/WMD	Pam Parker	Senior Planning Specialist	240-777-7786
	DEP/DSW	Dan Locke	Division Chief	240-777-6402

Table III.A1- Organization Chart for Montgomery County Permit-Required Programs				
Part III. Standard Permit Elements	RESPONSIBLE PARTY			
	<i>Department</i>	<i>Name</i>	<i>Title</i>	<i>Telephone</i>
Property Management	DGS	David E. Dise	Director	240-777-9910
Road and Roadside Maintenance	DOT	Keith Compton	Highways Services Division Chief	240-777-7607
Public Education	DEP/WMD	Meosotis Curtis	Manager	240-777-7786
	DEP/WMD	Ryan Zerbe	Watershed Outreach Planner	240-777-7744
F. Watershed Assessment				
Countywide Monitoring	DEP/WMD	Keith Van Ness	Senior Water Quality Specialist	240-777-7726
Assessments and Project Implementation	DEP/WMD	Craig Carson	Manager	240-777-7709
G. Watershed Restoration				
Assessments and Project Implementation	DEP/WMD	Craig Carson	Manager	240-777-7709
Annual Reporting	DEP/WMD	Pam Parker	Senior Planning Specialist	240-777-7758
H. Assessment of Controls (also see D. Discharge Characterization)				
H.1. Watershed Restoration Assessment				
Water Chemistry Monitoring	DEP/WMD	Pam Parker	Senior Planning Specialist	240-777-7758
Biological and Physical Habitat Monitoring	DEP/WMD	Keith Van Ness	Senior Water Quality Specialist	240-777-7726
Design Manual Criteria Evaluation	DEP/WMD	Keith Van Ness	Senior Water Quality Specialist	240-777-7726
	DPS	Leo Galanko	Senior Permitting Services Specialist	240-777-6242
H.2. Stormwater Management Assessment				
Geomorphology/Hydrologic	DEP/WND	Keith Van Ness	Senior Water Quality Specialist	240-777-7726
I. Program Funding	DEPC/WMD	Stan Edwards	Division Chief	240-777-7748
	DEP/WMD	Steve Shofar	Division Chief	240-777-7736
	DPS	Richard Brush	Division Chief	240-777-6310
	DOT	Ligia Moss	Senior Engineer	240-777-7514
	DOT	Keith Compton	Division Chief	240-777-7607
	DGS	David Dise	Director	240-777-9910
J. TMDL	DEP/WMD	Meosotis Curtis	Manager	240-777-7711
Part IV. Program Review and Annual Progress Reporting	DEP/WMD	Pam Parker	Senior Planning Specialist	240-777-7758
Part V. Special Programmatic Conditions	DEP/WMD	Meosotis Curtis	Manager	240-777-7711

DEPARTMENT ADDRESSES:

*DEP/DEPC: Department of Environmental Protection/ Division of Environmental Policy and Compliance
255 Rockville Pike, Ste 120, Rockville MD 20850*

*DEP/DO: Department of Environmental Protection/ Director's Office
255 Rockville Pike, Ste 120, Rockville MD 20850*

*DEP/WMD: Department of Environmental Protection//Watershed Management Division
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*

*DPWT/DHS: Department of Public Works and Transportation/Division of Highway Services
101 Orchard Ridge Dr. 2nd Flr. Gaithersburg MD 20878*

*DPWT/DO: Department of Public Works and Transportation/Division of Operations
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

The County continues to maintain all authority required to meet the requirements of the MS4 permit.

Adding 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 NPDES MS4 Permit Program. The County is continuing its oversight, inspection, and enforcement authority over these five municipalities: the Towns of Chevy Chase, Kensington, Poolesville, and Somerset, and Chevy Chase Village; and one special tax district, the Village of Friendship Heights. The contacts for these municipalities are shown in Table III.B1.

<i>Table III.B1- List of Contacts for Municipalities Co-permittees</i>			
Municipality	Contact Name and Title	Address	Telephone
Chevy Chase Village	Shana R. Davis-Cook, Manager	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, Director of Public Works	3710 Mitchell St. 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	4510 Cumberland Avenue Chevy Chase, MD 20815	301-654-1258

The MDE added MCPS as a co-permittee for the County's MS4 permit issued February 2010. MCPS has designated the following staff responsible for implementing stormwater management

programs and coordination on NPDES MS4 permit issues; Brian Mullikin, Environmental Team Leader, Division of Maintenance, and Agustin Diaz, Environmental Specialist. MCPS has provided a detailed annual report on MS4 related activities which can be found in Appendix C in the CD attachment to this report, *MCPS Report to the County on MS4 Activities in FY 2013*. Information on MCPS MS4 related activities is included in this report as appropriate.

Compliance with the Maryland Stormwater Management Act of 2007

In July 2010 and March 2011, the County Council passed Bill 40-10 and Expedited Bill 11-7 which together brought the County's stormwater management ordinance into compliance with the Maryland Stormwater Management Act of 2007 and associated state implementing regulations adopted in 2010.

On March 29, 2013, the County Council passed Expedited Bill 1-13, Erosion and Sediment Control, 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, including more stringent stabilization requirements and the establishment of maximum grading unit criteria.

Water Quality Protection Charge

In April 2013, The County Council passed Bill 34-12, Stormwater Management-Water Quality Protection Charge (WQPC). Bill 34-12 modified the structure of the County's original WQPC to comply with the 2012 State HB 987, the Stormwater Management- Watershed Protection and Restoration Program Bill.

The County's original WQPC (2001) was assessed based on an "equivalent residential unit" or ERU, defined as 2,406 square feet, or the median impervious area associated with a single family detached residence in Montgomery County. Attached townhomes were assessed 1/3 of an ERU, and condominiums and apartments were assessed a fee based on their actual impervious. "Associated" non residential properties (i.e. properties that drain into stormwater facilities that also serve residential properties) were also charged a fee based on their actual impervious. The County Council is required to set the ERU rate each year. In FY13, the rate was \$92.60 per ERU, and the County raised approximately \$23 million for watershed protection and restoration programs.

Modifications to the WQPC in FY13 (effective FY14) under Bill 34-12 included applying the charge to all properties, including non-residential, not otherwise exempt under state law. It also allows property owners to obtain a credit for on-site stormwater management practices. The Bill exempts owner-occupied residential property owners that can demonstrate substantial financial hardship from the WQPC, and also phases in increases to the WQPC. The WQPC creates 7 payment tiers based on the actual amount of the property's impervious surfaces. Other changes include establishing a program to award grants to non-profit organizations for water quality protection or improvement projects.

Coal Tar Sealant Ban

In September 2012, the County Council passed a Bill 21-12, Coal Tar Pavement Products, that banned the use of coal tar products, effective December 18, 2012. Coal tar is a byproduct of coal processing and contains high levels of polycyclic aromatic hydrocarbons (PAHs). Some PAHs are known human carcinogens. Studies have shown that when coal tar-based sealants are applied on parking lots and driveways, PAHs can be released into nearby surface waters, where they can accumulate in sediments at levels potentially harmful to aquatic wildlife. The presence of PAHs in sediments may increase costs to businesses, homeowner's associations and others charged with maintaining stormwater management facilities. Under the law, use of a coal-tar based sealant can lead to a fine of up to \$1,000—for both the property owner and the applicator. An informational flyer about the ban is available online in downloadable form in [English](#) and [Spanish](#), and can also be found in Appendix D.

Carryout Bag Law

On January 1, 2012, the County's Carryout Bag Law (Bill 11-8) went into effect. The goal of the law was to increase awareness about the problem with disposable bag litter and to reduce the use of carryout bags. The Carryout Bag Law taxes 5 cents for each paper and plastic bag that a customer takes from certain retail establishments to carry purchases out. The County continues outreach efforts for its 'Bring Your Bag, Fight Litter' campaign via web information: <http://www.montgomerycountymd.gov/bag/> and follow up from MC311 inquiries. DEP ensures that the retailer has the correct information about how to implement the Bag Tax and submit payments. The Department of Finance is responsible for enforcement of the Bag Law. Restaurants that use paper bags for carryout food do not need to charge the tax.

C. Source Identification

The following information is submitted for all County watersheds in Geographic Information Systems (GIS) format as required by the Permit in Part IV. and Attachment A, Annual Report Databases, Parts A.-L. The information can be found in this report's CD attachment in Appendix A, MDENPDES13.accdb, Parts A-L.

C.1. Storm Drain System

The County's storm drain inventory is found in Appendix A, MDENPDES13.accdb, Part A. Storm Drain System Mapping Associated with GIS Coverage. Each storm drain feature type is a feature class. Each feature class is a table in the database including both spatial and attribute information.

The storm drain inventory was compiled from three sources. It includes data captured by DPS during the new construction approval process from 2002 until January 10, 2013. It includes 1,404 drainage areas delineated in 2008 for all major storm drain outfalls (defined as >24") in the County, used to help investigate and track sources of illicit discharges in the county. Thirdly, the inventory contains information for all storm drain outfalls on or immediately adjacent to MCPS property with associated drainage area.

For FY14, DEP's Information Technology (IT) group will take over digitizing new storm drain features added as a result of the new construction approval process.

The DEP has also issued an FY14 task order to its MS4 Implementation Consultant for a storm drain delineation framework and pilot. This task order will assist the County to:

- Obtain a clearer understanding of the storm drain GIS data maintained by different County agencies.
- Develop a framework for integrating and validating GIS data from the various sources
- Develop a County-wide implementation plan for storm drain delineation to be tested in three small pilot areas.

C.2. Urban Best Management Practices

The County's Urban BMP database as of June 30, 2013 with associated coverage is included electronically in Appendix A, MDENPDES13.mbd, Part B. The database uses the format required for by the Permit's Attachment A., Annual Report Databases, Table B, Urban Best Management Practices (BMPs). There are 7,115 records in this database, shown by structure type in Table III.C1. The greatest numbers of structure types are Dry Wells (1,555), Flow Splitters (902), Sand filters (739), and Oil Grit Separators (679).

There are a few data fields in the Urban BMP database with consistently missing data or data irregularities. Explanation for why data is missing follows:

Drainage Area (DA) –Some structure drainage areas have not yet been delineated for a number of reasons. Pretreatment and diversion devices have identical DA's to their parent SWM BMPs and are not delineated separately. Drainage areas for ESD practices are not being delineated at this time due to the level of effort needed to delineate a very small drainage area for a large number of practices (over 1,500) added to the database in FY13. DEP is instead concentrating on delineating the drainage areas of other, more significant SWM structures that are currently back logged.

Built Date – For many of the pre-1996 structures, the date was not recorded and cannot be determined from existing paper files. DEP is making an effort to add built date data for the facilities entered into the database after 1996. Those facilities where a date cannot be determined have an entry date of 01/01/1111.

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.

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 for it is not known if a permit number existed. This place holder number is “0000000000” and is DEP’s final attempt to recover the data from the paper files. All original permit numbers known for the facilities built prior to 1986 were 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 DPS in order 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 DEP will focus to pull the permit number from the paper files and as-built plans to populate this field.

ADC Map –The DEP made a concerted effort to populate the ADC Map field with the most recent ADC Map Book locations. The DEP’s efforts specifically focus on those facilities that lack the MD grid coordinate data as it is understood that ADC map book location can be used in place of the Maryland grid coordinates. The DEP continues to default to populating this field when MD grid coordinates are not available.

RCN – The DEP’s new asset and maintenance management system requires a number for all number fields. Those records with an RCN of “0” are records where the RCN was not provided in the paper files.

Construction Purpose – This is a new field and the data must be created for all existing BMPs. The DEP will populate the data for the MS4 FY14 annual report.

Impervious Area – This is a new field and the data must be created for all existing BMPs. The DEP will populate the data for the MS4 FY14 annual report.

Last Inspection Date - This is a new field. The data reported is for the schedule month of inspection. Actual inspection date is now being tracked in a separate field in our database (where it previously was not), and we began reporting out the actual date with this report and will continue to improve the data in the FY14 and FY15 reports.

WQ Volume – This is a new field and the data must be created for all existing BMPS. The DEP will populate the data for the MS FY14 annual report.

<i>Table III.C1- FY13 Total Number of Stormwater BMP Facilities by Structure Type Designation</i>			
Practice Type	Code	Description	Number
Attenuation Swale	SW	Includes dry swales, wet swales, grass swales, and ESDSW	73
Bioretention	BR	Includes Bioretention, microbioretention (ESDMB), and raingarden (ESDRG)	241
Detention Structure	DP	Includes dry ponds	647
Dry Well	DW	Includes dry wells, stormchambers, raintank, and ESDDW	1,555
Environmental Site Design	ESD	Includes Environmental Site Design practices and Micro-infiltration trenches	82
Extended Detention, Dry	EDSD	Dry ponds with extended detention	64
Extended Detention, Wet	EDSW	Wet ponds with extended detention	158
Flow Splitter	FLSP		902
Hydrodynamic Structure: Oil Grit Separator	OGS	Includes Oil Grit Separators and water quality inlets	679
Hydrodynamic Structure: BaySaver	BS	Baysavers	134
Hydrodynamic Structure: Stormceptor	SC	Stormceptors	238
Infiltration Basin	IB	Includes infiltration basins with quality and quantity control	60
Infiltration Trench	IT	Includes, infiltration trench with quality and quantity control, and buried surface fed,	656
Other	OTH	Includes structure types not identified by an MDE code, including stormfilters, aquafilters, aquaswirls, bayseparator-flowsplitters, Snouts, Treeboxes, Vortecnic, Vortsentry, and V2B1	337
Porous Pavement	PP	Includes porous concrete, asphalt, and pavers, and ESDPERMP	29
Sand Filter	SF	Includes surface sand filters and underground sand filters	739
Shallow Marsh	SM	Includes all constructed wetlands, artificial wetlands, shallow wetlands, and wetlands with extended detention	120
Wet Pond	WP	Includes retention ponds and wet ponds	44
Underground Storage	UGS	Includes underground storage vaults, pipes, and storage pipes with infiltration	357
Total Number of Facilities			7,115

C.3. Impervious Surfaces

The County's 2009 impervious area with associated coverage can be found in Appendix A, MDENPDES13.mbd, Part C. Impervious Surfaces Associated with GIS Coverage. This impervious information was used to develop the Strategy.

In FY13, DEP continued to digitize and update impervious areas for the Permit requirements and the WQPC, based on 2012 aerial photography. The DEP is also working to update the drainage areas of all stormwater BMPs. When complete, DEP will submit an updated layer of County impervious area, BMP drainage areas, and an updated analysis of controlled versus uncontrolled impervious areas. This work should be completed by the end of the current permit cycle in FY15.

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 Part III.H. Assessment of Controls, (Tables E., E.1., and E.2.; Monitoring Site Locations) can be found in Appendix A, MDENPDES13.accdb, Part 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, MDENPDES13.accdb, Part D. Water Quality Improvement Project Locations Associated with GIS Coverage.

D. Discharge Characterization

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 SWM programs and watershed restoration projects and to document progress towards meeting WLAs indicated in the TMDLs approved by the EPA for watersheds or stream segments located in the County. Discharge characterization results and County progress towards meeting WLAs can be found in Appendix A, MDENPDES12.accdb, Parts 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 Program

Facility Inspections and Maintenance:

The DEP SWM Facility Maintenance and Inspection Program oversees inspection and maintenance for all SWM facilities in the County, thus ensuring that all are maintained properly. The program is facilitated by a team of two field supervisors, six inspectors, three engineers, a planning specialist, landscape architect, and office assistant.

The data reported for FY13 represents DEP’s inspection and maintenance responsibilities as defined in County Code and Permit Part III.E.1. DEP’s SWM Facility Maintenance and Inspection Programs are funded by the WQPF.

Triennial Inspections:

The DEP is responsible for inspecting all SWM facilities under County jurisdiction to assess repair and maintenance needs. In FY13, there were over 7,000 SWM facilities. Facilities are inspected every three years (triennial inspections) using contracted inspectors. DEP has separated the County in three geographical Inspection Regions (Figure III.E1).

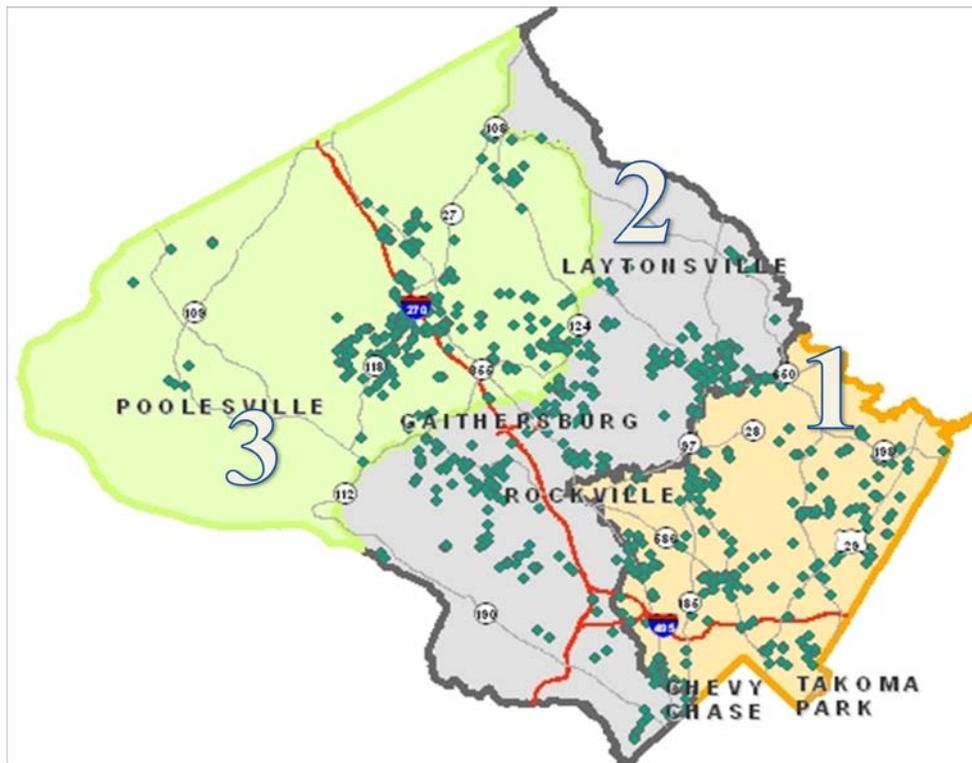


Figure III.E1- Map of the Stormwater Facility Maintenance Regions

During FY13, DEP contractors performed inspections in Region 2 and 3. Of the 1,474 SWM facilities due for triennial inspection, 1,348 inspections were conducted. The remaining 126 facilities were not inspected due to site conditions or are currently scheduled to be completed by FY14.

Table III.E1 shows the total number of completed inspections by facility type and ownership for the FY13 reporting period. The majority of the inspections occurred at four structure types—ponds (350), filtering systems (255), oil/grit separators (193), and other types (215). DEP also requires the inspection of flow splitters at the time of any stormwater facility; these inspections are included in the “Other” category.

In FY13, DEP also performed a total of 20 unscheduled inspections. These occurred in response to public complaints, at facilities being considered for transfer into DEP's SWM facility maintenance program, and to assess conditions after a large storm event.

Table III.E1- Total Number of Initial Inspections by BMP Facility Type and Ownership			
BMP Structure Type	Publicly Owned	Privately Owned	Total
Environmental Site Design	0	5	5
Filtering Systems ¹	43	212	255
Stormwater Infiltration	46	92	138
Oil/Grit Separators	73	120	193
Proprietary Hydrodynamic ²	9	77	86
Stormwater Ponds ³	77	273	350
Underground Storage	10	64	74
Stormwater Wetlands	6	22	28
Open Channel Systems	0	4	4
Other ⁴	31	184	215
Total Number of Inspections	295	1,053	1,348

¹ This includes all aboveground and underground sand filters, proprietary filters such as Stormfilters, and Chapter 3 bioretention

² This includes BaySaver, Stormceptor, vortechinices, and other proprietary hydrodynamic devices

³ This includes all dry and wet ponds, and ponds with extended detention

⁴This includes all other type of devices not captured, including flow splitters

Maintenance:

In 2003, the County enacted legislation giving DEP the authority to perform structural maintenance, including cleaning of underground facilities, on residential and associated non-residential SWM facilities. DEP then developed a process, including an executed maintenance agreement, by which private property owners can transfer their facility into the DEP structural maintenance program. If a facility has not been transferred into DEP's structural maintenance program, all structural and non structural maintenance is the responsibility of the private property owner. DEP maintained maintenance program includes only structural practices (mostly those in Chapter 3 of the 2000 Maryland Stormwater Design Manual); all ESD located on private property remains the responsibility of the property owner.

The DEP SWM Facility Maintenance and Inspection Program oversees the triennial inspections, structural and non structural maintenance of all SWM facilities under the County's jurisdiction. There are two work sections based whether the SWM facilities are structurally maintained by DEP or by the private property owner:

- SWM Facilities publically or privately owned and structurally maintained by DEP
 - Includes over 3,000 facilities, more 1,600 of which are privately owned (i.e., facilities that serve residential properties) and over 1,300 are publicly owned (i.e., facilities that serve public schools).
- SWM facilities privately owned and structurally maintained by the private property owners.
 - DEP’s program ensures and enforces maintenance on over 4,100 privately owned facilities.

During FY13, 2,002 SWM facilities were maintained by either the DEP structural maintenance program or by the private owner of the facility. Table III.E2 provides numbers of repairs and maintenance at facilities during FY13 and a narrative summary is included below.

<i>Table III.E2- FY13 Repairs and Maintenance</i>	<i>Number of Facilities</i>
<i>Privately Owned and Maintained</i>	
Aboveground	211
Underground	600
<i>DEP Structurally Maintained</i>	
Aboveground	437
Routine Sand Filter Maintenance	98
Underground	656
Total Number of Facilities Maintained	2,002

Privately Maintained Aboveground Facilities- Determining Maintenance Criticality:

During FY12- FY13, DEP launched a new protocol to rank the maintenance criticality for facilities. The maintenance level is determined using the observations and results of the triennial inspection and is used to determine the type of notification and enforcement action DEP will initiate with the property owners. The following maintenance criticality levels are used:

EMERGENCY: Failure to perform repairs may result in a threat to public health and safety or significant structure failure and must be corrected immediately. Examples of situations with an Emergency level:

- Evidence of a dam embankment overtopping
- Dam embankment slope failure
- Sinkholes on dam embankment
- Seepage through the dam embankment
- Major damages or joint failures or blockages of the principal spillway control structure and outfall barrel/pipe(s)
- Missing manhole/access covers
- Evidence of significant settlement or pavement failures above underground structures

HIGH: Repairs necessary to ensure the proper functioning of the facility, which, if not performed, could affect the structural integrity of the facility and impact water quality within the watershed. Deficiencies must be corrected within 60 days. Examples of situations with a High level:

- Blockage of low flow pipe or orifices
- Gully erosion or blockage of flow paths and drainage entry points into the facility preventing water from entering the facility
- Pipe and Culvert Joint Repairs
- Filter media replacement
- Repair of broken, damaged or missing components in hydrodynamic, filtration and underground structures
- Trees, vines, woody plant, and excessive overgrowth of vegetation on Dams
- Bioretention facilities with excessive weeds and noxious/invasive weeds
- Tree boxes with missing or dead plants

ROUTINE: Repairs necessary to ensure proper functioning of the facility, which must be performed regularly and should be corrected within 60 days. If the deficiencies are not performed within the following 12 months they could elevate criticality of repairs to high level. Examples of situations with a Routine level:

- Mowing of dam embankments
- Replenishment of mulch on bioretention/vegetated facilities
- Replacement of plants in bioretention/vegetated facilities
- Sediment removal in infall and outfall channels
- Trash and debris removal
- Joint parging
- Corrosion repairs of metal components (trash racks, etc.)

Property owners of aboveground SWM facilities with a maintenance level of emergency or high are issued a Notice of Violation (NOV) via e-mail or letter, including a maintenance work order listing required corrective actions. Property owners of a facility found to have a high maintenance level have 60 days to complete the maintenance and/or repairs; property owners of facilities given an emergency maintenance level must complete repairs immediately.

Each owner and the owner's repair contractor are required to hold pre-construction and follow up inspections with DEP inspectors to ensure the facility will be maintained properly. DEP inspectors are available to answer questions or provide technical assistance while the facility is being maintained and will visit the site as requested by the contractor or property owner. The DEP inspectors must complete a final inspection to ensure the work was completed and the facility was maintained or repaired properly. DEP inspector notifies the property owner once the deficiencies are corrected, finalizes the maintenance work order, and closes the NOV.

Property owners of aboveground SWM facilities with a maintenance level of routine are sent a notification that describes the maintenance needs identified during the inspection, which should be completed within 60 days of receipt of the notification letter. A DEP inspector is identified in the notification and is available to answer questions or help the property owner improve their maintenance efforts for the facility. DEP is also responsible for ensuring nonstructural maintenance requirements (mowing, trash and debris pick-up, and landscaping) are completed

for aboveground facilities where DEP performs the structural maintenance. Typically, non-structural maintenance is considered routine work and a notification is sent to a property owner if routine non-structural maintenance needs are identified during the inspection.

During FY13, 211 aboveground SWM facilities were determined to be at a high or emergency maintenance level. These facilities were maintained by the private owner until a final inspection conducted by DEP found them to be in compliance and properly functioning. This number includes those facilities where the property owner is only responsible for nonstructural maintenance. DEP issued 150 NOVs for correction of deficiencies noted during the triennial inspection. Of the 150 NOVs, 120 were corrected during FY13 (note, the 120 is included in the 211 total number maintained in FY13). Of the 211 facilities, 91 facilities were maintained due to a NOV issued in FY12. Additionally, DEP sent 214 routine maintenance notification letters to property owners in FY13.

Privately Maintained Underground Facilities

The DEP requires owners of underground SWM facilities to perform an annual maintenance cleaning each year. Property owners of underground SWM facilities are given 45 days to complete the cleaning. DEP inspectors perform a final inspection on each facility to ensure it was maintained properly. DEP notifies the property owner once the work is completed to satisfaction. In FY13, 600 underground facilities were privately maintained. Any repairs identified were also completed at that time.

DEP Maintained Aboveground Facilities:

In FY13, DEP used a general contractor to perform structural maintenance on 437 aboveground SWM facilities. This type of maintenance is considered routine and usually involves actions such as removing minor accumulations of sediment, unblocking clogged low flows, minor concrete repair, erosion repair, restoring/replenishing media, installing plants, and debris removal. DEP also performs routine maintenance on all sand filters for facilities in the maintenance program. 98 surface sand filters had routine sand filter maintenance (i.e., scarification) performed by DEP and 11 facilities have regular mowing and monthly trash removal performed by DEP contractors.

DEP Maintained Underground Facilities

The DEP policy requires maintenance of underground SWM BMPs annually. Based on observation and experience, DEP staff responsible for enforcing the policy felt strongly that many underground facilities remained clean and functioning for longer periods of time, and did not need to be maintained every year.

In FY13, DEP developed a new inspection protocol for DEP maintained underground stormwater management facilities to determine whether maintenance was needed for any given underground facility. Inspection criteria were established using best professional judgment, engineering expertise, and manufacturers' recommendations. These criteria were then used to determine whether a facility was functioning properly and/or needed maintenance. Maintenance was completed when the inspection determined it necessary. No maintenance was performed if the facility was in good condition, functioning properly and would continue to do so for at least another year.

In the beginning of FY13, 821 underground stormwater facilities were scheduled for annual maintenance. Approximately 340 facilities were cleaned and maintained as part of their triennial inspections. DEP piloted the new inspection protocol on the remaining 481 facilities and determined that 250 did not require any maintenance and would continue to function properly for at least another year without it. DEP continues to gather data on the condition of the underground facilities and their tendency to require less than yearly maintenance. Note that each underground facility is cleaned, inspected and maintained every three years at minimum as part of the required triennial inspection.

During FY13, DEP performed the cleaning and/or repairs on 656 underground facilities. The facilities included 33 located at County vehicle and road maintenance depots that are maintained twice a year, 3 BaySavers at a bus depot that are maintained 6 times a year, and 3 Stormceptors at the Transfer Station that are maintained 3 times a year.

Maintenance of MS4 Restoration LID Projects

In FY13, DEP began contracting routine maintenance of publically owned LID practices, including Roadway Right-of-Way (ROW), installed to meet the Permit watershed restoration goal. 47 micro-bioretenion or raingarden practices were maintained monthly, on a specific schedule to accommodate adjacent property owners. A four person crew was trained and dedicated to the maintenance work to ensure consistency. The contractor was compensated for one hour of labor per crew at a cost of \$175/per facility per month. Additional costs for materials, including plants, mulch, and watering brought the estimated total cost to \$2,200 per facility per fiscal year for routine monthly maintenance. Maintenance tasks varied according to season and included weeding, removing trash and other debris, edging, removing sediment from the inlet, mulch raking and replenishment, pruning, watering and plant replacement.

Frequency and type of maintenance varies depending on several factors including size, plant palettes, impacts from stormwater, humans, and vehicles, safety, and visibility. Monthly maintenance of the LID facilities successfully addresses the maintenance variability and ensures that the practices are functioning as designed to treat stormwater runoff. DEP has incorporated lessons learned to improve future contracting needs for all DEP-maintained LID practices in the County, better educate neighbors, landowners, school, and park administrators with LID facilities, and lower overall costs through more efficient maintenance planning. Also, the adjacent landowners have commented on their appreciation for our care of the LIDs and how they are better cared for than many private gardens.

Inspection and Maintenance Outreach Activities

In FY13, the DEP SWM Facility Maintenance Program created multiple publications and hosted several presentations to increase understanding and awareness of Montgomery County stormwater facility maintenance. For more information, please Part III.E.7. Public Education.

Co-Permittee Structural and Nonstructural Maintenance on SWM BMPS-MCPS:

The MCPS Division of Maintenance upgraded and repaired existing underground and above ground SWM facilities in 2013, in preparation for transferring maintenance responsibility to DEP in accordance with a MOU signed by both parties in 2007. Several facilities remain to be transferred; this work is expected to be completed during FY14.

The MCPS also performed nonstructural maintenance on above ground SWM facilities, and maintained several underground facilities not eligible for transfer to the County. MCPS also contracts out the maintenance on biofacilities (bioretention and green roofs). The entire cost of the FY13 MCPS SWM facility maintenance and inspection program was \$119,890.

Stormwater Management Plan Review and Permitting-Complying with the Maryland Stormwater Management Act of 2007:

The Permit requires the County to implement the SWM 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*. The Permit requires the County to modify its SWM ordinances, regulations and new development plan approval processes within one year after State adoption of regulations; April 24, 2009, with an effective date of May 4, 2009.

In July 2010 and March 2011, the County Council passed Bill 40-10 amending the County's stormwater management law to require management of stormwater runoff through the use of nonstructural BMPs to the MEP for new development and redevelopment projects approved by DPS. In response to MDE concerns that a portion of Bill 40-10 was less restrictive than State law, Bill 40-10 was amended in March 2011 as Expedited Bill 7-11 to limit certain alternative SWM measures to redevelopment only. The bills then 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 revised County stormwater management law maintained 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% of the redevelopment site using ESD to the MEP. County law requires stormwater management to protect 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% of the redevelopment site, and requires the use of ESD to the MEP to meet these standards.

The DPS has been reviewing all development projects submitted since then to assure compliance with the 2007 Stormwater Design Manual. Consequently, there has been a considerable increase in type and number of nonstructural practices for new development and redevelopment in the County.

Stormwater Management Plan Review and Permitting- Incorporating ESD

The Permit also requires the County to review local codes and ordinances to identify impediments to and opportunities for promoting ESD to the MEP within one year, and to remove those impediments within two years of the Permit's issuance.

In December 2010, the County released the report *Implementing Environmental Site Design in Montgomery County*, which summarizes how the County's codes, regulations, programs, and policies may need to be updated to allow the use of ESD and low impact development (LID) techniques to the MEP. The most significant barriers, gaps and opportunities were identified in the County's Zoning Ordinance and the Development Review Process. The review is

summarized in Table III.E3. The Report is included in the CD Attachment as Appendix E and is publicly available on the County's website at:

http://www6.montgomerycountymd.gov/content/dep/downloads/water/Implementing_ESD_Report_FIN_AL_110910.pdf

<i>Table III.E3- Summary of General Findings, ESD Barriers, Gaps and Opportunities</i>	
Significant Barriers, Gaps, or Opportunities	Fewer but Important Barriers, Gaps, or Opportunities
<ul style="list-style-type: none"> • Ch 59. Zoning • Development Approval Process 	<ul style="list-style-type: none"> • Ch 22. Fire Safety Code • Ch 26. Housing and Building Maintenance Standards • Ch 49. Streets and Roads • Ch 50. Subdivision of Land • Commercial-Residential ZTA
Limited Barriers, Gaps, or Opportunities	No Barriers or Gaps
<ul style="list-style-type: none"> • Ch 8. Buildings • Ch 22A. Forest Conservation - Trees • Ch 40. Real Property • Ch 41. Recreation and Recreation Facilities • Ch 58. Weeds • Trees, Approved Technical Manual (MNCPPC) 	<ul style="list-style-type: none"> • Chapter 14. Development Districts • Chapter 18A. Environmental Sustainability • Chapter 21. Fire and Rescue Services • Chapter 24B. Homeowners' Associations • Chapter 27A. Individual Water Supply and Sewage Disposal Facilities • Chapter 36. Pond Safety • Chapter 44. Schools and Camps • Chapter 45. Sewers, Sewage Disposal and Drainage • Chapter 54A. Transit Facilities • Chapter 56. Urban Renewal and Community Development • Guidelines for Environmental Management of Development in Montgomery County (Maryland National Capital Park and Planning Commission)

In 2007, the M-NCPPC Department of Planning began a review and rewrite of the County's antiquated zoning code, Chapter 59, as ordered by the Montgomery County Council. The Planning Department worked with a consultant, a citizen's advisory group (Zoning Advisory Panel), and with other County agencies to accomplish the rewrite. A completed Consolidated Draft was released July 2012. The rewrite sections were reviewed as they became available, first by the Planning Department, then by other County Agencies, and then by the Zoning Advisory Panel and general public. A summary of ESD code review recommendations and how they were addressed during the Zoning Code rewrite can be found on the CD attachment to this Report as Appendix E.

There had been significant additional opportunity for comment during the Public Hearing Draft Review period, and in the Planning Board and County Council review processes. Table III.E4, below, shows the timeline for the Planning Department zoning code rewrite.

Table III.E4- Draft Zoning Code Rewrite Timeline	
Complete Zoning Code Rewrite Draft	
July 2012	Consolidated Draft (Public Hearing Draft) released
Summer- Fall 2012	Planning Department work sessions
December 2012- January 2013	Finalize Planning Board Consolidated Draft
May 12, 2013	Draft transmitted to the County Council for review
Summer 2013- Fall 2013	The Council Planning, Housing and Economic Development committee (PHED) holding work sessions
November 12 and 14, 2013	Full Council will hold public hearings on the Revised preliminary draft text.
December 2013	PHED finalized the PHED draft, which can be found at http://montgomeryplanning.org/development/zoning/
March 5, 2014	County Council approved the Zoning Code

Additional Efforts to Incorporate ESD

The DPS has been working with its fellow agencies and some members of the stormwater management construction community through a Policy and Design Committee and a New Products Committee on design and maintenance aspects of various LID practices. The goal is to assure that these practices provide cost-effective designs that provide maximum runoff reduction and pollutant removal without increasing average maintenance cost per facility.

The County’s Executive Branch (DPS, DOT, and DEP) and Planning Board agencies continue working together on the “Streamlining the Development Process” initiative. The workgroup presented recommendations to Council in September 2012 that identified areas for improvement including publication of approved LID technologies to facilitate implementation, adopting guidelines for use of LID practices in the right of way, and completing and publishing Context-Sensitive Road Designs. There was a public meeting on recommendations on November 27th, 2012.

<http://permittingservices.montgomerycountymd.gov/DPS/streamlinedevelopment/StreamliningDevelopment.aspx>

The DEP is working with DOT to include ESD measures in the County ROW, as part of a “Green Streets” pilot program. For more information see Part G. Watershed Restoration. County partners have learned much through the evaluation, design, and construction process, particularly working with limitations presented from existing gray infrastructure that cannot be readily re-located. DEP and DOT are now drafting technical standards for some of these practices, which will greatly facilitate implementation and reduce overall costs for using these practices as retrofits.

The DEP also continues to invest considerable staff time for LID techniques outreach to communities. The goal is to increase community acceptance of these practices and future stewardship for routine housekeeping of the roadside LID practices. Watershed groups, such as the Anacostia Naturalist Society (ANS) and the Friends of Sligo Creek (FoSC) have provided assistance to DEP outreach efforts, both for the “Green Streets” pilot and also for residential properties retrofits through the RainScapes Neighborhoods program. In FY13, DEP’s SWM Facility Maintenance Program (SWFMP) also developed numerous fact sheets designed to provide assistance to residents in maintenance of their ESD practices including rain barrels, rain gardens, grass swales, buried dry wells, porous pavements, and green roofs. The fact sheets are available on DEP’s website at <http://www.montgomerycountymd.gov/DEP/water/stormwater-facilities.html>.

MDE Review of the County’s Stormwater Management Program

In April 2013, MDE completed a review of the County’s stormwater management program, evaluating the status of implementing ESD to the MEP in the County’s plan review and approval process. MDE found the County’s program to be acceptable under State law and in compliance with Part III.E.1 of the Permit. MDE’s approval letter, with the County’s response, can be found in Appendix F.E.2. Erosion and Sediment Control.

The Permit requires the County to implement improvements identified in MDE’s biennial evaluation of the County’s ESC program. 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 in November of 2013. Continued delegation was granted through June 30, 2016 by Brian Clevenger, Program Manager of MDE’s Sediment, Stormwater and Dam Safety Program in a letter dated January 6, 2014. 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”.

In FY13, 12,439 ESC inspections were performed. Enforcement actions included 235 NOVs, and 103 civil citations which collected \$67,000.

On March 29, 2013, the County Council passed Expedited Bill 1-13, Erosion and Sediment Control, 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, including more stringent stabilization requirements and the establishment of maximum grading unit criteria.

Responsible Personnel Certification:

At least three times per year, the DPS, Land Development Division, Sediment and Storm Water Section conducts a “Responsible Personnel Certification” course. Documentation on these courses can be found in Appendix A, MDENPDES13.mbd, Part J. Responsible Personnel Certification.

Quarterly Grading Permits:

Quarterly grading permit information for earth disturbances in the County of one acre or more can be found in Appendix A, MDENPDES13.mbd, Part K. Quarterly Grading Permit Information.

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

The Permit requires the County to implement an inspection and enforcement program to ensure that all non-stormwater discharges to the municipal separate storm sewer system are either permitted by MDE or eliminated. 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.

For FY13, DEP performed outfall screening in late February and early March. DEP screened a total of 156 outfalls and found 35 to have flow (19 with dry weather flows and 16 piped streams). DEP focused on outfalls contained within the Coquelin Run, Kensington Branch and KenGar Tributaries of the Lower Rock Creek Watershed, Fig. III.E2, below. Screening teams walked the entire length of the streams within the watershed to identify all outfalls. This method allowed DEP to identify 87 new outfalls that were previously not mapped in the County's storm drain inventory. Of the 69 outfalls with existing permanent ID numbers, 16 were either improperly identified as outfalls or missing in the field. Errors in outfall location or type as shown on the existing maps were reported and will be corrected in the County's storm drain inventory, and the 87 new outfalls identified will be added. The dry weather flows were analyzed for ammonia, potassium and fluoride, in addition to the Permit required water chemistry parameters.

Of the 35 outfalls found to have flow, 11 were flagged for follow up investigations due to elevated water quality parameters measured during the initial screening. Of those 11 outfalls, 8 were found to have normal water chemistry parameters during the follow up visit. One discharge was tracked to a sidewalk cleaning event, and one discharge was referred to WSSC due to elevated chlorine. One discharge is still being investigated by DEP staff.

The DEP is also continuing to work with WSSC by performing follow-up site visits for reported sanitary sewer overflows (SSO's) in Montgomery County, and performed 82 of these site visits in FY13. The purpose of 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 FOG (Fats, Oils and Grease) Program regarding restaurant grease issues, which have direct effects on storm water quality in Montgomery County.

For FY14, DEP will screen outfalls in the Little Falls Branch Watershed.

The DEP experience continues to show high level of effort required to track down illicit discharges. This has prompted a cooperative effort with the Center for Watershed Protection (CWP) in the hopes of increasing the likelihood of identifying and eliminating sources of water pollution through the storm drain system.

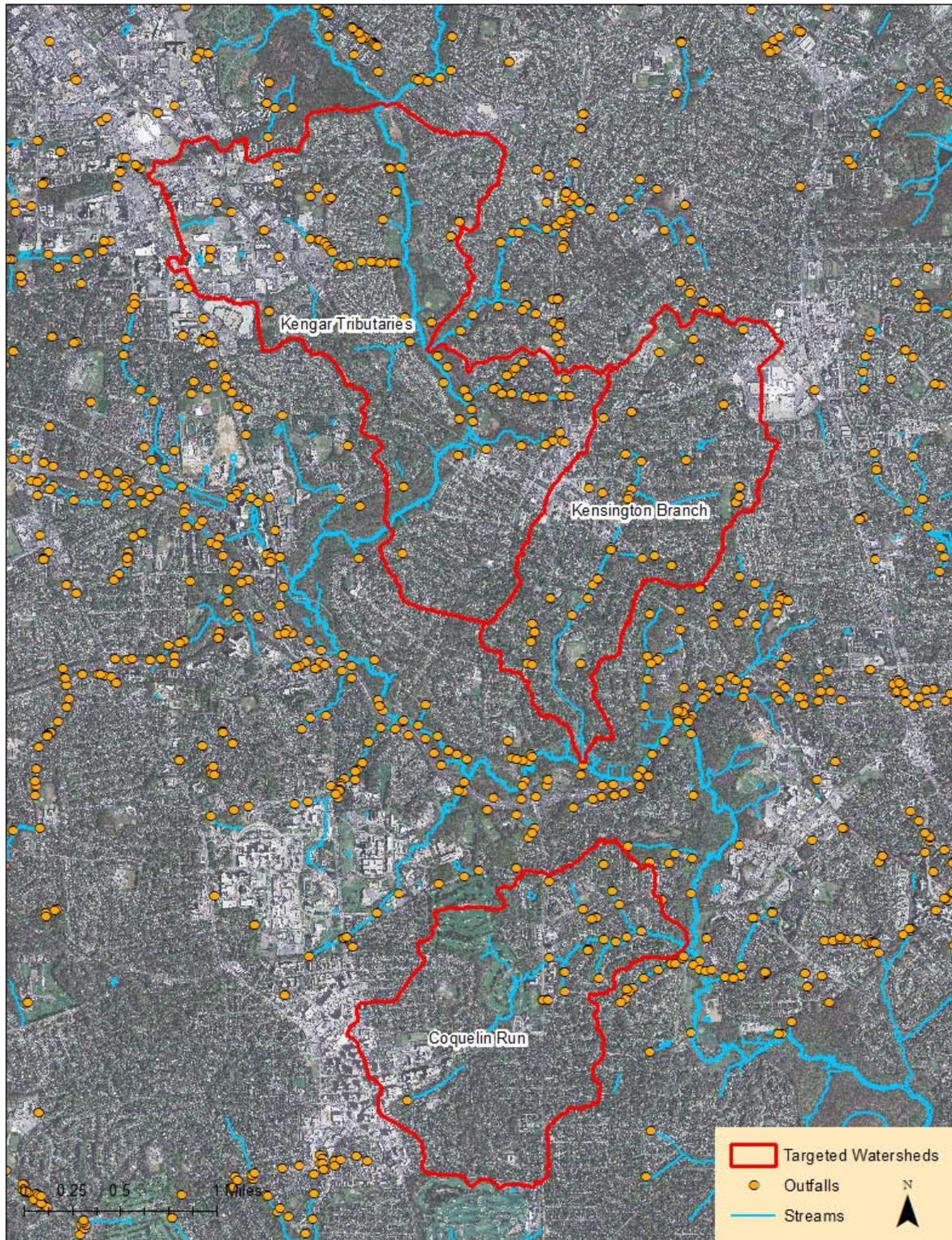


Figure III.E2- FY13 Outfall Screening – Coquelin Run, Kensington Branch and KenGar Tributaries of the Lower Rock Creek Watershed

Continuing IDDE Investigations in the Sligo Creek Watershed

In FY11, DEP partnered with the CWP in a pilot project to screen outfalls and conduct IDDE investigations in the County's Sligo Creek subwatershed. The project followed the protocols in the CWP's Illicit Discharge Detection and Elimination Manual, a screening tool developed to support and guide MS4 communities. The results of that project were summarized for the County's FY11 MS4 Annual Report. During the project, two large drainages in the Sligo Creek subwatershed; the Bennington Avenue outfall and the Maple Avenue outfall, were identified as having potential illicit discharges, but a detailed investigation was beyond the scope of the initial project (Fig.III.E4). For FY12, CWP obtained funding from the Marpat Foundation to conduct a pollution source detection and elimination project in these two drainages. The report of the investigation can be found in the CD in Appendix G, Field Findings Supplemental. For FY13, further investigations were conducted in the Maple Avenue drainage area. The report can be found in Appendix G, as Field Findings, Memorandum, November 15, 2012. Field findings for FY13 are summarized below.

Project Summary

The Maple Ave drainage is over 550 acres with its headwaters in Northeast District of Columbia and its outfall south of the intersection of Maple Ave and Sligo Creek Parkway in Montgomery County. The Maple Ave outfall consists of two 72" concrete pipes (Figure III.E3), and complex underground piping systems in the drainage area.



Figure III.E3- Maple Ave. Outfalls

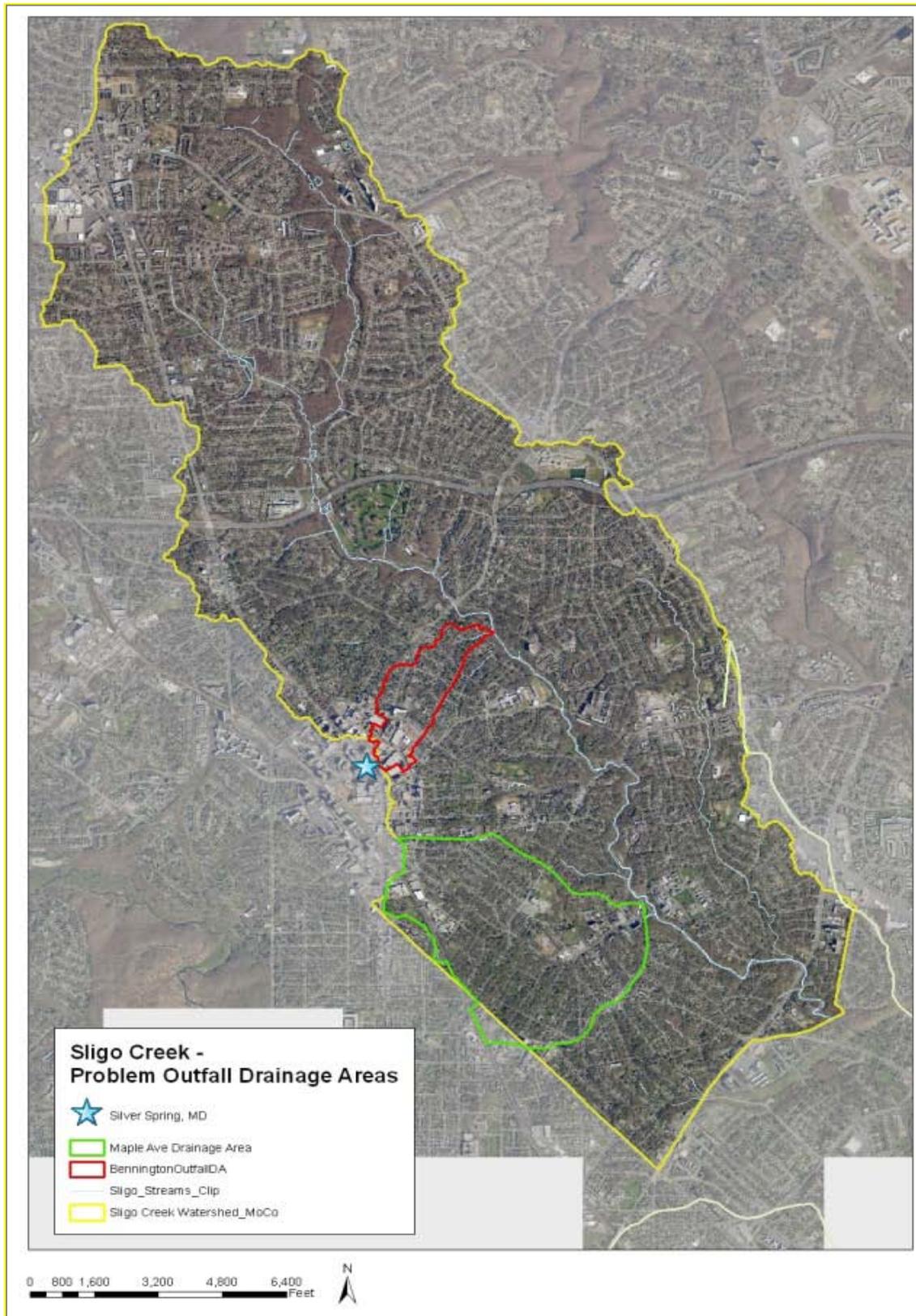


Figure III.E4- Location of Problem Outfall Drainages in the Sligo Creek Watershed, Montgomery County, MD

Field Findings for FY13

In the Maple Avenue drainage area, additional areas of concern were noted:

- One outfall near the Park Ritchie Apartments (Fig.III.E5) was found to have elevated levels of ammonia, detergent, and fluoride. Storm drain mapping for the area is inaccurate, and a source for the discharge could not be determined. Dye testing of the laundry room at the Park Ritchie Apartments was negative. DEP will explore this storm drain area further in FY14 using CCTV.
- One storm drain manhole above the Park Ritchie Apartments had dry weather flow with contamination suggesting sanitary system influence. WSSC videotaped the sanitary lines in the vicinity of the manhole and found problems that will require the relining of the sanitary line. No date has been set for the sanitary line repair.



Figure III.E5- DEP Field Enforcement Staff Taking Samples From a Storm Drain Manhole Behind the Park Ritchie Apartments

Illicit Discharges from Rooftop HVAC Units

For FY14, DEP is working with CWP under contract to further study and quantify the extent of pollution from anti-microbial agents used in rooftop HVAC systems. Limited sampling conducted by CWP suggests pollution loading for nitrogen, copper and zinc, but specific management measures and products that contribute to the problem are still unknown.

Additional Efforts in FY14 to Track Sligo Creek Discharges with Closed Circuit TV Cameras (CCTV)

The DEP budgeted additional funds and obtained contractual support to conduct additional CCTV investigations in the Maple Avenue and Bennington Road areas in FY14.

Water Quality Investigations during FY 2013 (7/1/12 – 6/30/13)

For FY13, the DEP Division of Environmental Policy and Compliance (DEPC) investigated 206 water quality issues (124 complaints and 82 SSO's) and 30 hazardous materials related cases, which resulted in the issuance of 25 formal enforcement actions (11 Civil Citations with fines totaling \$6,000 and 14 Notices of Violation (NOVs)) and 20 warning letters. The formal enforcement actions are summarized in the following table:

Table III.E5- FY13 Enforcement Actions						
No.	Case Number	Date Issued	\$ Fine	Case Type	Case Sub-Type	Citation #
1	26692	7/25/12	\$500	Stormwater	Pollutant Discharge	2Z39883181
2	26699	8/2/12	\$500	Stormwater	Pollutant Discharge	3Z39882034
3	26891	8/17/12	\$500	Water Quality	Sewer Overflow	4Z33852529
4	26891	8/17/12	\$500	Water Quality	Sewer Overflow	3Z33852528
5	26908	8/27/12	\$500	Stormwater	Pollutant Discharge	4Z39882035
6	27362	11/30/12	\$500	Stormwater	Pollutant Discharge	4Z39889651
7	27362	11/30/12	\$500	Stormwater	Pollutant Discharge	5Z39889652
8	27362	3/11/13	\$750	Stormwater	Pollutant Discharge	0Z39889654
9	27362	3/11/13	\$750	Stormwater	Pollutant Discharge	1Z39889655
10	2013488	5/22/13	\$500	Stormwater	Pollutant Discharge	1Z39889676
11	2013865	6/28/13	\$500	Stormwater	Pollutant Discharge	5Z33852530
12	2013376	4/11/12	NOV	Stormwater	Pollutant Discharge	N/A
13	26621	7/6/12	NOV	Stormwater	Pollutant Discharge	N/A
14	26642	7/11/12	NOV	Stormwater	Pollutant Discharge	N/A
15	26670	7/19/12	NOV	Stormwater	Pollutant Discharge	N/A
16	26670	7/19/12	NOV	Stormwater	Pollutant Discharge	N/A
17	26670	7/19/12	NOV	Stormwater	Pollutant Discharge	N/A
18	26909	8/21/12	NOV	Stormwater	Pollutant Discharge	N/A
19	26975	9/5/12	NOV	Stormwater	Pollutant Discharge	N/A
20	27015	9/14/12	NOV	Stormwater	Pollutant Discharge	N/A
21	27116	10/5/12	NOV	Stormwater	Pollutant Discharge	N/A
22	27362	11/30/12	NOV	Stormwater	Pollutant Discharge	N/A
23	2013246	3/4/13	NOV	Stormwater	Pollutant Discharge	N/A
24	2013246	3/4/13	NOV	Stormwater	Pollutant Discharge	N/A
25	2013522	5/16/13	NOV	Water Quality	Chemical Discoloration	N/A

E.4. Trash and Litter

FY13 County Trash Reduction Initiatives:

The DEP continues to implement the enhanced trash reduction components of the Strategy to meet the Permit requirements for progress toward the Potomac Trash Free treaty goals and the Anacostia trash TMDL. The Strategy outlines a number of cost-effective litter control methods to meet targeted reductions. County efforts include anti-litter campaigns, recycling education, enforcement, the Carryout Bag Law, and increased litter removal from County “hot spots”, such as Transit stops.

Anti-Litter Public Awareness Campaign

The County is working with the Anacostia Watershed Restoration Partnership, the Alice Ferguson Foundation, and other regional partners to implement additional initiatives that will help the region meet the goal of a Trash Free Potomac and the Anacostia TMDL for trash. This regional effort has produced a unified anti-litter message for advertising in print media, on buses, and on bus shelters in Montgomery County. The DEP’s outreach and education programs for anti-littering can be found in Part III.E.7, Public Outreach and Education.

Recycling Initiatives:

According to the Maryland Department of the Environment’s Calendar Year 2011 Maryland Waste Diversion Rates and Tonnages Report, Montgomery County’s overall recycling rate was 62.68 percent. The County has a goal to recycle 70 percent of all waste generated in the County by 2020.

The DEP’s Division of Solid Waste Services (DSWS) continues to conduct extensive outreach, education, training and enforcement programs to increase awareness of waste reduction and recycling. During FY13, DSWS staff and Recycling Program volunteers participated in 283 outreach and education events, providing 31,450 people with assistance and information on waste reduction, recycling, buying recycled, composting, grasscycling and other topics. The County continues to use a corps of dedicated volunteers in the Recycling Volunteer Program to educate residents on the benefits of recycling. Together, the volunteers contributed nearly 1,795 hours of direct service with an estimated value of \$44,875. More detailed information on DSWS’s outreach activities and other trash and litter reduction measures can be found in the Division’s Quarterly Reports, posted at: http://www6.montgomerycountymd.gov/swstmpl.asp?url=/content/dep/solidwaste/news/monthly_reports.asp

In FY13, DSWS conducted 10,987 on-site consultations to businesses, organizations and government facilities providing technical assistance, hands-on guidance, and specific recommendations on setting up, maintaining, and expanding waste reduction, recycling, and buying recycled programs.

The DSWS constantly monitors the recycling markets to identify potential opportunities to remove additional materials from the waste stream. DSWS has been operating a model food waste recycling collection project in a County cafeteria since November 2011, diverting 25.6 tons of pre-consumer food waste for commercial composting from the program’s through the end of FY13. DSWS also accepts unused paint, and in FY13, gave away or donated 1,611 gallons of

paint. DSWS also participates in the “Bikes for the World” program, removing 19 tons of bikes for restoration and shipment to countries worldwide. The County Transfer Station has a vendor that accepts Waste Vegetable Oil (WVO) for the sole purpose of bio-diesel production; in FY13, 21 tons of straight vegetable oil were shipped out for processing into biodiesel (<http://www.montgomerycountymd.gov/veggieoil>).

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 fiscal year 2013, there were 377 complaints concerning the illegal dumping of solid waste, which resulted in the issuance of 16 Notices of Violation (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.

Anti-Litter Enforcement in FY13

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

The Department of Housing and Community Affairs (DHCA) Code Enforcement Division investigates and enforces violations of litter codes on private property. In FY13, they handled a total of 3,520 trash/rubbish related complaints, and issued a total of 437 citations. DCHA estimates that 227 tons of trash were removed as a result of their clean and lien program and Alternative Community Service (ACS) efforts to perform weekly collection of street debris in targeted neighborhoods and streets.

Carryout Bag Law

From the implementation of the Carryout Bag Law in January 2012 through June 2013, over 86 million plastic or paper bags were sold in Montgomery County. In FY13, over 59 million carryout bags were sold, with total revenue collection of \$2.39 million. This represents an average of approximately 4,970,644 carryout bags sold per month. According to the Census Bureau, the Montgomery County population for 2012 is 1,004,709 people. This would average out to fewer than 5 carryout bags bought per County resident each month. In the first month of FY13 there were 910 registered retailers in the County remitting the bag tax collected from their business. As of June 2013, there are 1,100 registered retailers in the system. Since new retailers are continuing to register and remit the bag tax, it is too soon to determine any trends in carryout bag usage in the County. The chart below, Fig. III.E6, shows that there has been a steady decline in the average number of bags reported per retailer from January 2012 through August 2013.

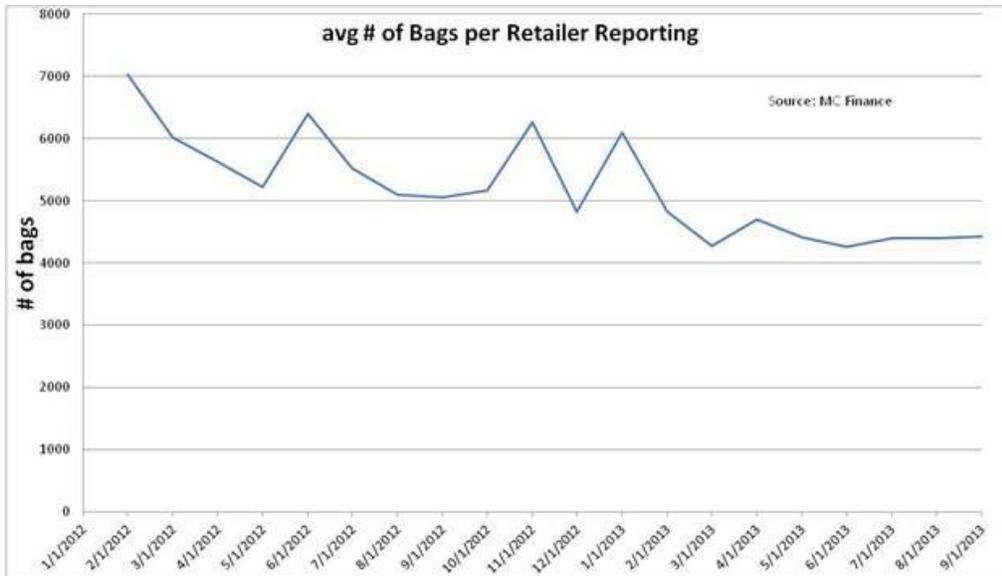


Figure III.E6- Average Number of Bags Reported Per Retailer Reporting

Increased Litter Removal from County Owned Public Areas

The Department of General Services (DGS) is responsible for maintaining outdoor public areas and dedicates resources to ensure that adequate litter disposal receptacles are readily available to the public. The DGS works with the County’s Regional Service Centers and Urban Districts to strategically place units in the most heavily used areas.

The DGS has also partnered with other agencies, and community groups to enhance placement of litter receptacles, and to pilot advanced technology recycling and litter containers. The Wheaton Urban District, part of the Mid County Regional Service area, with grant funds from the State, plans to add approximately 20 solar powered Big Belly litter and recycling units in the downtown area. Big Belly units compact trash at the point of collection, reducing overflows and allowing for less frequent collection. The units can contain over 150 gallons of trash and are fully enclosed. The Silver Spring Urban District, part of the Silver Spring Regional Service Center area, is also piloting Big Belly litter and recycling units.

The Bethesda Urban Partnership (BUP), the Urban District Corporation for the Bethesda Urban District, owns and maintains hundreds of trash containers in the public ROW throughout the downtown area. The BUP also maintains several recycling containers and has partnered with community groups and local businesses to purchase additional recycling containers.

Transit stops (bus stops) are prime litter hotspots. DOT maintains litter containers at all 500 sheltered bus stop locations, 5 transit centers and other high activity areas around the County. Placement of containers are 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 Administration (WMATA) buses. In FY13, the DOT program to remove trash dumped at transit stops around the County netted a total of 397.5 tons of trash with a budget of \$477,000.

The County’s central call center (Montgomery County 311) tracks all calls related to litter on County roads, and clean up is handled by DOT. This information is conveyed to the County’s Police Force in order to increase surveillance of these roadside hotspots.

The County’s **Adopt-A-Road Program**, administered by DOT, supplies 362 community groups with supplies and equipment in exchange for their voluntary service of picking up trash and litter along roadways. 146 groups reported 520 clean ups, picking up a total of 2,262 bags of trash in FY13. 106 groups reported 521 clean ups, picking up a total of 1,687 bags of trash in FY12.

Trash Removal at Stormwater Facilities:

The County contracts the removal of organic debris and trash from 11 stormwater management ponds maintained by the County. A total of 1,761 pounds of inorganic trash (including aluminum, plastic, and glass containers, plastic bags, tires, Styrofoam and paper) were removed in FY13. This is a decrease of 54 pounds from the inorganic trash removed in FY11.

In FY13, as shown in Table III.E6 and Figure III-E7, by weight most of the material removed was organic debris (e.g. leaves, twigs, and branches). Recyclable materials (aluminum, glass and plastic bottles, styrofoam and paper) comprised the bulk of inorganic materials found. These materials could easily have been removed from the waste stream through the County's recycling program. Future trash source control efforts will need to focus on additional ways to keep these recyclables from entering waterways.

Table III.E6- Trash Removed from County Stormwater Management Facilities in FY13 (lbs)

Date	Ponds Cleaned	Aluminum	Glass bottles	Oil quart containers	Plastic Bags	Plastic Bottles	Styrofoam & Paper	Tires	Organic Debris	Total
7/1/2012	11	61	14	3	20	117	42	25	324	606
10/1/2012	10	80	45	3	191	306	51	25	2415	3116
2/1/2013	11	39	74	9	35	74	58		115	403
6/1/2013	11	81	207	5	68	89	16	25		490
Total	43	260	339	20	314	585	167	75	2854	4615

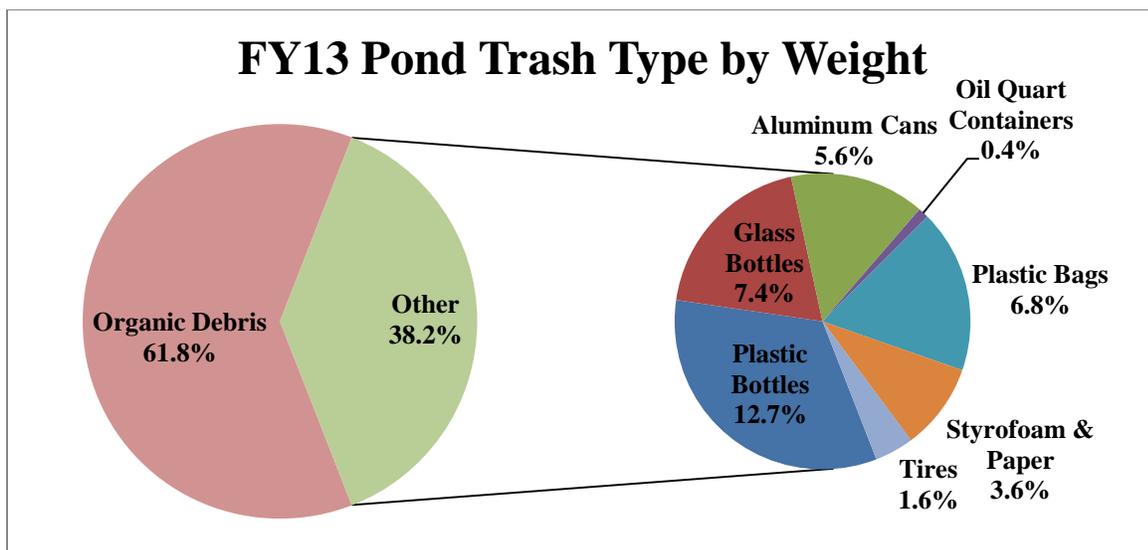


Figure III.E7- Pond Trash Collected in FY13 by Type

The Carryout Bag Law which went into effect on January 1, 2012 (FY12) does not yet appear to have affected amount of bags collected at the ponds. As seen in Figure III.E8, the amount of plastic bags collected went up from 54 pounds in FY2012 to 314 pounds in FY2013. The amount of plastic bottles collected also increased from prior years. These increases could be due to more aggressive collection efforts by the county’s new pond maintenance contractor, although some of the increase in plastic bottles appears to be a shift away from glass bottles and aluminum cans. The amount of glass bottles declined greatly in FY2012 and continued to decline in FY2013. Aluminum cans declined from 542 pounds in FY2012 to 260 pounds in FY2013.

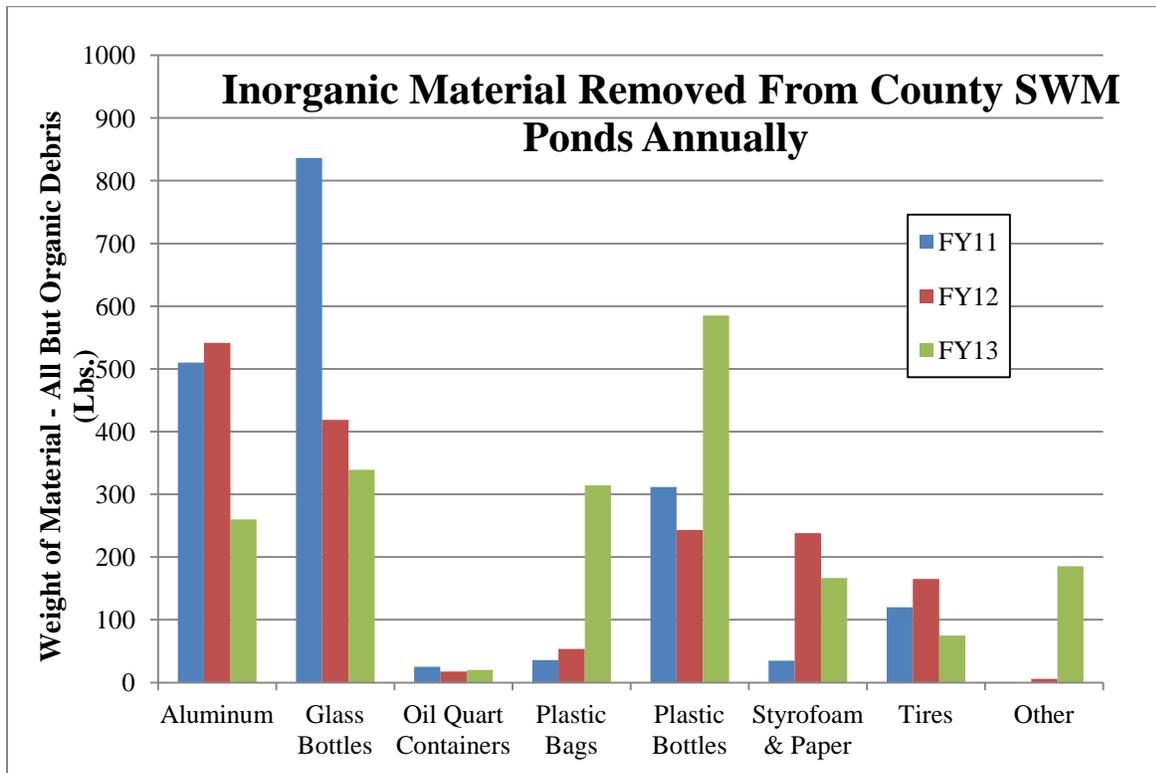


Figure III.E8- Inorganic Material Removed from the SWM Ponds Annually

Storm Drain Inlet and SWM Practices:

DEP continues to test and revise storm drain inlet configurations designed to capture trash, organic debris and sediment at the curbside without impacting flow capacity within the storm drain system. The most recent inlet designs have been installed within the Stewart April Tributary in the Lower Paint Branch as part of the White Oak Green Streets project.

The completed project included: eight modified storm drain inlets, along with six curb extensions and six bio-swales, to reduce trash, debris, and other pollutants that would otherwise flow into the Paint Branch of the Anacostia. Inlet cleaning schedules and other aspects of facility performance are currently being monitored and evaluated.

Post-TMDL Monitoring:

The DEP continues via contract with MWCOG to conduct trash monitoring and assessment in the Anacostia. The litter survey and evaluation for instream trash structures in Rock Creek was completed in 2012. FY13 highlights include:

- Completion of three cycles of post-TMDL trash monitoring in the Anacostia. The Anacostia tributary monitoring follows the same protocols for stream-level and land-based surveys as those used for trash TMDL development. There is not yet a trend showing reductions in trash type or amount.
- Development of a 'windshield' survey that could be used by volunteers to drive through areas and estimate amount of trash on roadsides. The MWCOG surveyed over 130 miles of roads and completed 75 walks to characterize and count trash along the roadside and then compare with trash type and count determined through a drive by survey. The top three trash items identified from the walks were paper, food packaging, and miscellaneous, while the top three trash items found in the streams are plastic bags, food packaging, and plastic bottles.
- A survey of trash-reduction efforts by apartment and commercial property managers has been finalized and will be sent out to targeted properties within the Anacostia watershed.

Cost of Trash Reduction Efforts:

For FY13, the County invested an estimated \$6,826,918 in trash reduction strategies and programs (Table III-E7).

Table III.E7- Estimated FY13 Trash Reduction Costs	
Program	FY11 Cost
Solid Waste Management	\$4,270,353
Enforcement Programs	\$2,041,070
Street Litter Removal	\$479,000
Trash Removal from Stormwater Ponds	\$17,670
Anti-Litter Outreach	\$18,825
Total	\$6,826,918



The pie chart illustrates the distribution of the estimated FY13 trash reduction costs. The largest portion is Solid Waste Program Management at approximately 62%, followed by Enforcement Programs at 30%. Street Litter Removal accounts for 7%, Trash Removal from SWM Ponds for 0.3%, and Anti Litter Outreach for 0.3%.

E.5. Property Management

Table III.E8 lists the County facilities covered under the MDE General Discharge Permit for Storm Water Associated with Industrial Activities (the General Permit). The MDE accepted Notices of Intent (NOI's) for these facilities in March 2003 for coverage until November 30, 2007. The MDE published a draft General Permit in October 2012 and these facilities will be required to file new NOIs after the revised General Permit is final, in 2014.

For most of the facilities, DGS has the overall responsibility for meeting the requirements of the General Permit, including updates to the facilities' stormwater pollution prevention plans (SWPPPs). Agencies housed at the facilities are responsible for implementing portions of the SWPPPs that relate to their operations, and include: DOT (Division of Highway Services (DHS) and Division of Transit Services (DTS)); DEP (DSWS and WMD); 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.

<i>Table III.E8- Status of County Facilities Covered under the Maryland General Discharge Permit for Storm Water Associated with Industrial Activities</i>		
Name Of Facility/ Responsible Agency	Watershed/Acreage	Most Recent Pollution Prevention Inspection and/or Plan (Electronic File included on CD enclosed)
Colesville Highway Maintenance Depot (DOT)	Anacostia/Paint Branch; 12 acres	Stormwater Pollution Prevention Plan updated in FY12. Annual inspections in FY13.
Damascus Highway Maintenance Depot (DOT)	Potomac/Great Seneca: 1.4 acres	Stormwater Pollution Prevention Plan updated in FY12. Annual and semi-annual inspections in FY13.
Gaithersburg: Highway Maintenance Facility (DOT)	Potomac/Rock Creek	Stormwater Pollution Prevention Plans are being developed for these new facilities in FY14. Monthly and Annual inspections in FY13.
Gaithersburg: Equipment Maintenance and Transit Operations Center (EMTOC) (DGS)	Potomac/Rock Creek	
Poolesville Highway Maintenance Facility (DOT)	Potomac/Dry Seneca Creek 4 Acres	Stormwater Pollution Prevention Plan updated in FY12. Annual and semi-annual inspections in FY13.
Seven Locks Automotive Service Center (DGS)	Potomac/Cabin John Creek: 19 Acres	Stormwater Pollution Prevention Plan updated in FY12. Monthly and Annual inspections in FY13.
Bethesda Highway Maintenance Facility, Sign Shop and Signal Shop (DGS)		
Kensington Small Transit	Potomac/Rock Creek	Stormwater Pollution Prevention Plan

Table III.E8- Status of County Facilities Covered under the Maryland General Discharge Permit for Storm Water Associated with Industrial Activities		
Service Maintenance Facility at Nicholson Court		updated in FY12. Monthly and Annual inspections in FY13.
Silver Spring/Brookville Road Highway Maintenance Facility (DOT)	Potomac/Rock Creek: 18 Acres	Stormwater Pollution Prevention Plan updated in FY12. Monthly and Annual inspections in FY13.
Silver Spring/Brookville Road Transit Center/ Fleet Maintenance Center (DGS)		
Shady Grove Processing Facility (DEP)	Potomac/Rock Creek; 43 out of 52.5 acres	Stormwater Pollution Prevention Plan updated annually. Quarterly Inspections performed in FY13
Gude Landfill (DEP)	Potomac/Rock Creek; 120 acres	Stormwater Pollution Prevention Plan updated annually. Quarterly Inspections performed in FY13
Oaks Landfill (DEP)	Patuxent/Hawlings River (355 acres) and Potomac/Rock Creek(190 acres)	Stormwater Pollution Prevention Plan updated annually. Quarterly Inspections performed in FY13

All County facilities have regular stormwater pollution prevention (P2) inspections on at least an annual basis. Many are inspected monthly or quarterly. In FY13, DGS and DOT managed sites consistently had the following P2 related needs, as shown in Table III.E9:

Table III.E9- FY13 Pollution Prevention Needs at County Facilities Covered Under the State General Discharge Permit for Storm Water Associated with Industrial Activities	
Pollution Prevention Need	Action Taken
Depot lots need more frequent sweeping	DGS will fund lot sweeping in FY14
More frequent (daily) housekeeping inspections and small spill clean-up	Facility personnel are trained annually in proper spill clean-up and preventative housekeeping.
Sites need better storage facilities for equipment	Recommended capital improvements are being evaluated for implementation.
Covered storage areas for loose gravels and similar materials with retaining walls separating each product.	Recommended capital improvements are being evaluated for implementation.
Most sites need to be repaved and resurfaced	
SWM facilities need more frequent inspection	Underground SWM facilities at all depots are inspected and cleaned twice annually with additional maintenance as necessary by DEP's Stormwater Maintenance and Inspection program

<i>Table III.E9- FY13 Pollution Prevention Needs at County Facilities Covered Under the State General Discharge Permit for Storm Water Associated with Industrial Activities</i>	
Pollution Prevention Need	Action Taken
Improved storage area for waste oil recycling was recommended for the Poolesville Depot	Covered storage area for the solid waste receiving area is being evaluated. The site is routinely inspected by County contractors.
Parking lot cleaning and inlet protection needed at the Transit area of the Brookville Depot	The County has a contractor to clean the depot parking lots. The contractor will clean the lots using inlet protection to prevent the wash water from entering the storm drain. New stormwater quality structures are being added to the Transit bus area at the Brookville Depot.

Pollution Prevention at DSWS Facilities

The DSWS is responsible for meeting the General Permit requirements at the Gude and Oaks Landfills and the Shady Grove Processing Facility. The DSWS Compliance Officer is responsible for ensuring environmental compliance at Solid Waste operational facilities.

The DSWS quarterly P2 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 landfill berms are well vegetated. The Gude Landfill has a few persistent stormwater depressions and leachate seeps that are repaired promptly. The Shady Grove Processing Facility storm drain inlet screens had some partial blockage from blowing leaf and grinding debris, and were cleaned. Cleaning of three of the stormceptor SWM BMPs were put on a quarterly cleaning schedule (from biannual) to facilitate structure function and sediment removal. Additional trash capture bags were installed on storm drain grates and traps at the Shady Grove Processing Facility, and the site outfall was redone with rip rap and gabion baskets in FY13. The SWPPPs for these facilities are updated annually.

In FY13, DOT, DGS, and DEP continued to deliver yearly training on the General Permit requirements to all facility operation employees. Operation specific training, incorporating annual P2 inspection findings, was delivered at each facility location. Assessments, needs and improvements were covered in this training as well as ways to reduce hazardous substances, pollutants, or contaminants.

In 2008, new CIP funding dedicated to environmental compliance was added to the DGS budget. In 2013, the following environmental compliance CIP initiatives were accomplished:

- As part of the County's Smart Growth Initiative, the Gaithersburg Heavy Equipment Maintenance and Operations Center, Transit Services and Highway Maintenance facility were relocated to the County's Equipment Maintenance and Transit Operations Center

(EMTOC). The onsite facilities include many pollution prevention and stormwater management upgrades including a new bus wash facility, heavy equipment storage shed, soil/gravel storage area, salt barns, and Highway Services bays. The overall project is designed to achieve a LEED (Leadership in Energy and Environmental Design) Gold certification by incorporating innovative features. The EMTOC's environmentally-sensitive design increases the size of existing facilities, but does so within a smaller footprint than the facilities it replaces by using multi-story buildings. The approach has preserved many acres of green space to provide a stream buffer and conserve forest land. A pilot project, the first in the State of Maryland, will reclaim, treat and reuse rainwater for toilet flushing and bus washing, reducing water use by 80 percent. Seventy-five percent of the building roofs, more than four acres, are green to decrease stormwater runoff. New SWP3 plans are being generated for the new facilities.

- The DGS is removing USTs and contaminated soils from the old location of the Gaithersburg Heavy Equipment Maintenance and Operations Center.
- Updated Spill Prevention Control and Counter (SPCC) measures Plans were developed for the County facilities
- DGS is also currently replacing underground storage tanks with aboveground storage tanks at County Fire Stations.
- Construction of the Silver Spring /Brookeville Road Depot stormwater improvements continues, which will add two Baysaver water quality structures, and trench drains to improve the water quality from the Transit maintenance facility area. Planned improvements for FY14 include a new permanent structure for bulk storage of highway maintenance materials (topsoil, sand, gravel), and an improved bus stream bay.
- DGS is also planning to begin routine mechanical sweeping of all the industrial facilities, and increasing the cleaning frequency of facility oil/grit separators. In FY13, all depots were swept.

Annual SWPPP inspections and SWPPP plans can be found in Appendix H in the CD attachment to this report.

County Co-Permittees Property Management:

Town of Poolesville

The Town of Poolesville is the only one of the six small municipal co-permittees that is required to have a General Permit NOI. 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 SWP3 for the site. The Town's Public Works Director is responsible for the SWP3 on this site and conducts weekly inspections to assure compliance. The Town reported no changes for FY13.

MCPS

The MCPS must submit a General Permit NOI for its school bus maintenance yards (Shady Grove, Randolph, Clarksburg, West Farm, and Bethesda Depots). During FY 2013, MCPS performed the annual evaluation of the SWPPPs and Spill Prevention, Control and Countermeasure (SPCC) Plans for all five industrial facilities. Improvements have been implemented at these sites as recommended by the annual inspections. In addition, MCPS maintains thirty underground storage tanks at fifteen facilities. In FY13, MCPS spent \$96,187 on facility pollution prevention.

The MCPS is responsible for training employees in positions that have particular potential for stormwater pollution, primarily maintenance and transportation staff. During FY12, MCPS began performing more in depth in-house stormwater and pollution prevention training for staff in the Fleet and Facilities Maintenance Division. To date, 72 staff members, mainly auto technicians, have received such training within the division of Fleet Maintenance and 190 from Facilities Maintenance. The MCPS goal is provide on line stormwater awareness training to all MCPS support services staff on a five year cycle. FY13 costs for employee P2 training was \$4,778.

The MCPS continues to implement its existing 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 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 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 also has a process to pre-qualify contractors that may be used to perform athletic field maintenance at high school athletic fields in order to have more centralized controls in place over fertilizer and herbicide applications, if necessary. In FY12, MCPS spent \$298,100 on IPM.

The MCPS has also been working very closely with the WSSC on their Fats, Oils, and Grease (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 operational BMPs in all school cafeterias.

E.6 Road Maintenance

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.

Montgomery County Street Sweeping Program:

The DOT oversees a street sweeping program using both DOT and DEP funding. In FY13, the DOT funded street sweeping on residential routes and the DEP funded street sweeping on arterial routes that have high traffic volumes.

The DOT sweeps 56 residential routes shown in Figure III.E9 at least once per year. Nineteen of these routes have been designated as priority residential routes based on the average tons per curb mile collected, the likeliness of inadequate or no stormwater management based on age of development, and 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 in Figure III.E10.

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.

The remaining 37 routes are considered “non-priority” residential routes, but 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.

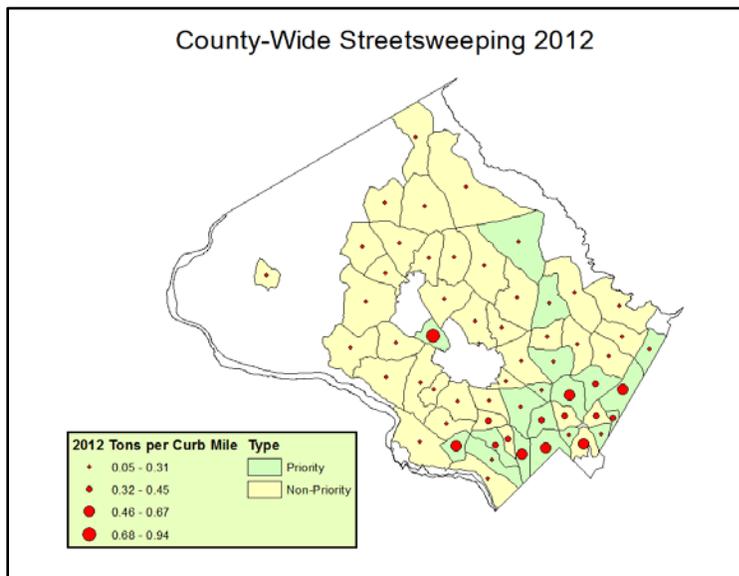


Figure III.E9- Countywide Street Sweeping

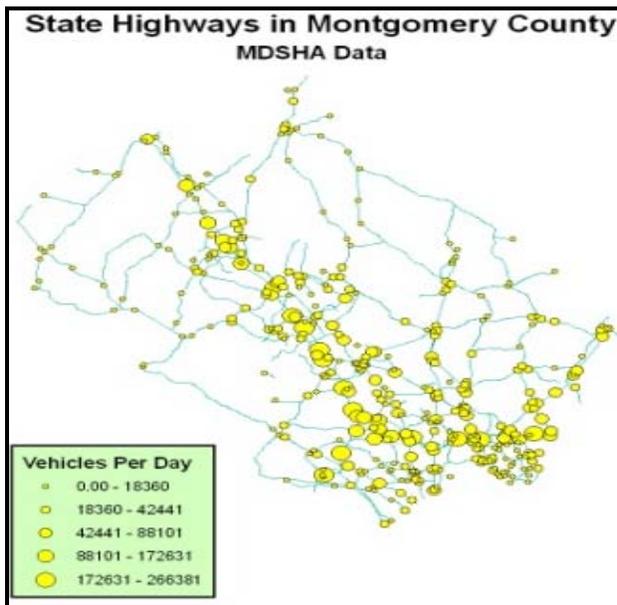


Figure III.E10- Annual Average Daily Traffic 2010

The DEP funds sweeping of selected routes, known as “arterial” routes, shown in Figure III.E11. The arterial routes are larger roads with more commercial activity, traffic and more observed trash. These routes total 229 curb miles, are swept at night when traffic volumes are low. Sweeping is only done on segments of the roads without residential housing because of noise considerations.

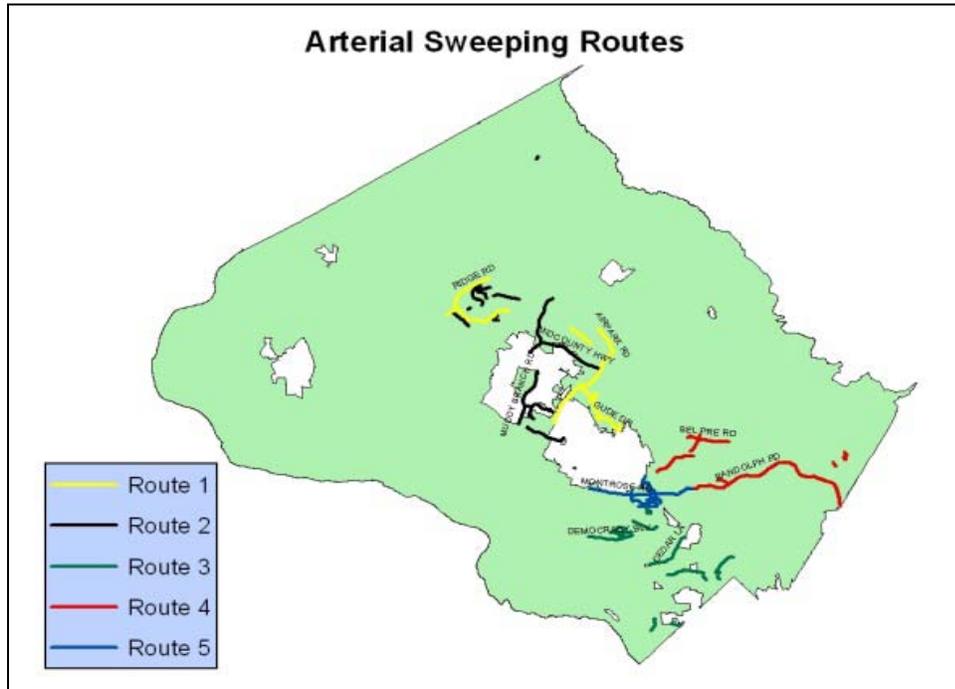


Figure III.E11- Montgomery County Arterial Street Sweeping Routes

A summary of the County’s FY13 street sweeping program is shown in Table III.E10.

Table III.E10- Summary of County’s FY13 Street Sweeping Program						
Category	Materials Removed (tons)	Curb Miles Swept	Tons Material/ Curb Mile	Cost per ton	Cost per curb mile	Total Cost
Priority Residential Routes	350.41	1271.37	0.28	\$264.86	\$73.00	\$92,810.01
Non-Priority Residential Routes	456.12	2784.58	0.16	\$445.66	\$73.00	\$203,274.34
Arterial Routes 23 cycles	273.35	5275.51	0.05	\$771.98	\$40.00	\$211,020.40
Totals	1079.88	9331.46				\$507,104.75
County Average Tons Material/Curb Mile			0.12			

FY13 was the first full year during which DEP swept the arterial routes twice each month all year. Because the cost per mile for sweeping arterial routes is approximately half that of residential routes, DEP was able to increase total miles swept by 25% over FY12 while only increasing total program cost by 17%.

Figure III.E12 shows the tons of materials removed annually by street sweeping based on route type for records available, from 1999 to present. The tons of sand and salt applied were not reported for FY09 and FY10. In 2002, no County street sweeping was conducted due to lack of funding. The amount of material removed seems directly related to the amount of sand applied for de-icing, which is largely determined by the amount of winter precipitation. More snow and ice increases the need for application of sand to the roads, which then becomes more available for collection during street sweeping. In 2012 DOT stopped mixing sand and salt as a routine practice. DOT now applies a salt brine solution before storms and granular salt to accumulated snow. Sand is still used as a spot treatment and during events with a lot of ice, but the amounts of sand used have declined dramatically.

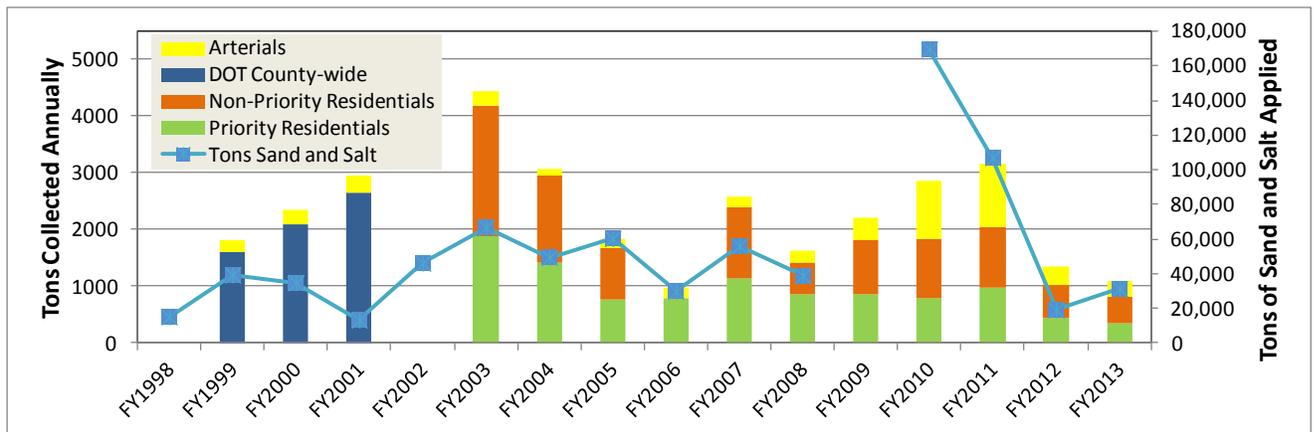


Figure III.E12- Tons of Material Applied During Winter Activities and Collected by Street Sweeping 1998-2012

Figure III.E13 below shows the mileage swept per year by route category. Sweeping all the arterial routes twice monthly for all of FY13 resulted in an increase in total miles swept. More miles were swept in FY13 than any prior year. Overall average cost per mile has fallen steadily as the county has shifted towards arterial sweeping (Figure III.E14).

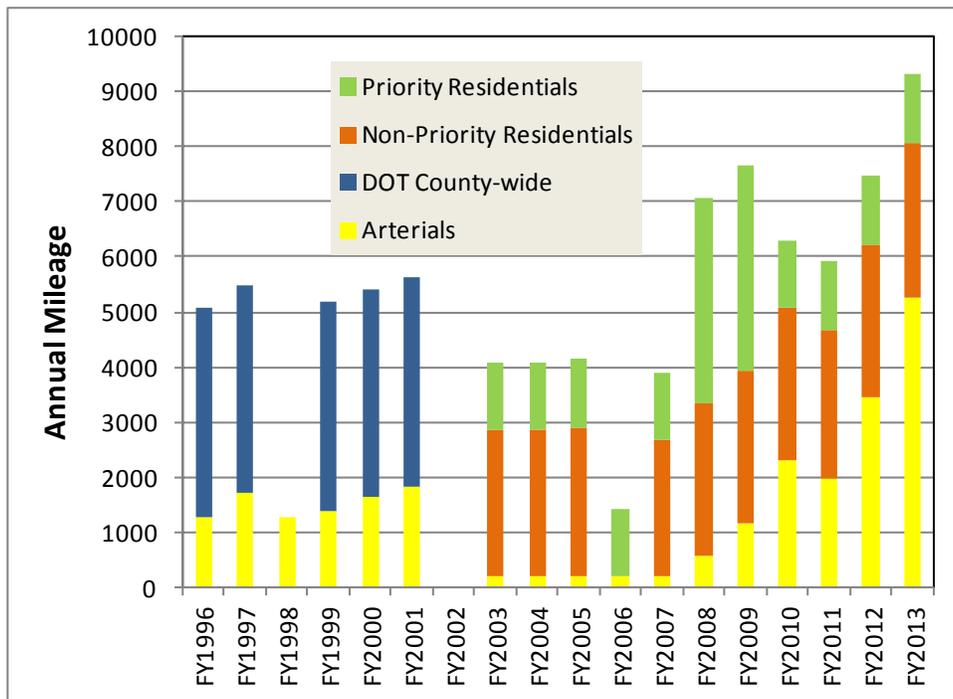


Figure III.E13- Annual Montgomery County Street Sweeping Mileage 1996-2013

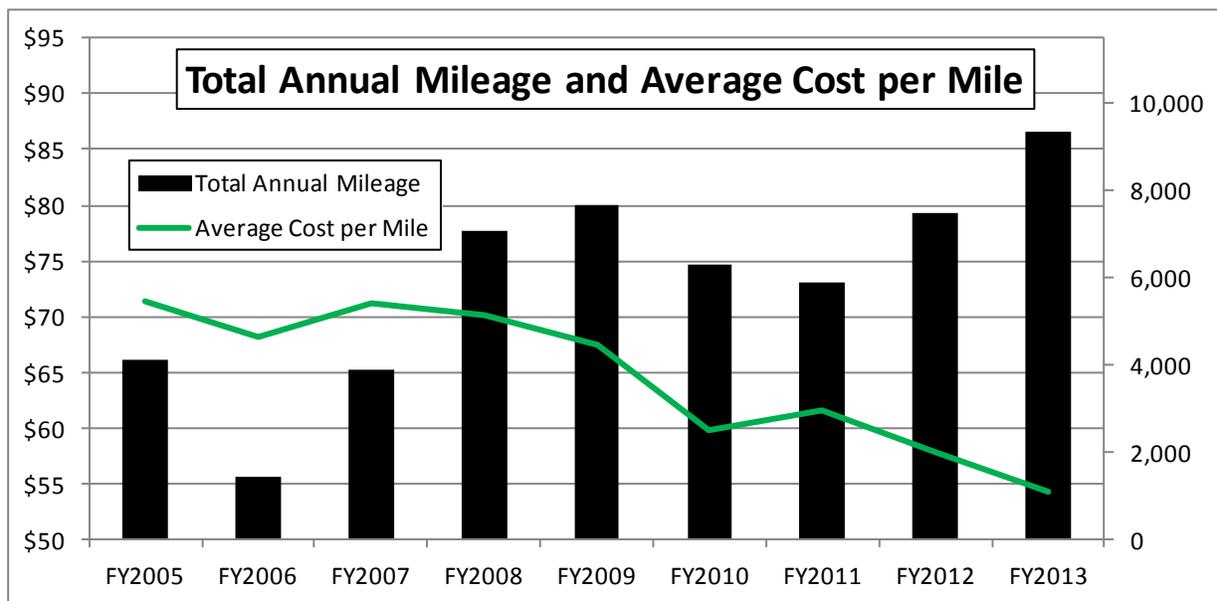


Figure III.E14- Montgomery County Street Sweeping Mileage and Average Cost 2005-2013

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

As previously stated, in FY12 the County began sweeping 229 miles of roadway identified as arterial routes twice monthly. Table III.E11 shows the miles of arterial routes, along with the percent of the total arterial routes, for each watershed. This sweeping frequency allows the County to take credit for stormwater control for impervious acreage equivalent and stormwater pollutant load reductions both Countywide and in applicable 8 digit watersheds with approved TMDLs. The credits were calculated according to MDE’s June 2011 Draft Guidance “Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated”, Part VI. An Equivalent Impervious Acre, and Part V. Alternative Restoration Credits, 1. Street Sweeping, a Mass Loading Approach.

Table III-E11. Arterial Street Sweeping by Watershed FY13

MD8DIG	Watershed	Miles	% of Total Miles	IA Credit (acres)	TN Removal (lbs)	TP Removal (lbs)	TSS Removal (tons)
02131108	Triadelphia Reservoir	0.1	0.1%	0.0	0.3	0.1	0.1
02140202	Potomac Direct	28.8	12.5%	2.0	51.2	20.5	10.2
02140205	Anacostia	28.7	12.5%	2.0	51.2	20.5	10.2
02140206	Rock Creek	86.4	37.7%	6.0	154.4	61.8	30.9
02140207	Cabin John Creek	26.9	11.7%	1.9	48.0	19.2	9.6
02140208	Seneca Creek	58.3	25.4%	4.1	104.0	41.6	20.8
02140302	Lower Monocacy	0.1	0.1%	0.0	0.3	0.1	0.1
	Total	229.4	100.0%	16.0	409.3	163.7	81.9

Notes:
IA= Impervious Area
TN=Total Nitrogen
TP=Total Phosphorus
TSS=Total Suspended Solids

Inlet Cleaning:

For FY13, DOT reported cleaning 803 storm drain inlets, and 15,769 linear feet of storm drain, collecting 494 tons of material at a cost of \$246,200. Table III.E12 below, compares the DOT inlet cleaning program for this Permit cycle from 2010-2013.

Table III.E12- DOT Inlet Cleaning, by Fiscal Year 2010-2013

Year	# Inlets Cleaned	Linear Ft. Cleaned	Debris Collected (units)	Cost
FY13	803	15,769	494	\$246,200
FY12	811	14,382	367	\$275,392
FY11	1,191	17,604	107	\$269,593
2010	2,011	24,128	181	Not Reported

Roadside Vegetation Management:

The County’s roadside weed spraying program for noxious weeds is conducted by Montgomery Weed Control Inc. 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.E13 shows the amount of herbicides applied along County roadways from 2009-2013:

Table III.E13- Herbicide Usage by Montgomery Weed Control Inc. on Montgomery County Rights of Way					
Purpose	2013	2012	2011	2010	2009
State-mandated Treatment for Noxious Weeds	4.84 Gal Clopyralid	4.78 Gal Clopyralid	5.20 Gal. Clopyralid	7.53 Gal. Clopyralid	9.06 Gal. Clopyralid
	4.10 Gal Glyphosate	4.55 Gal Glyphosate	4.55 Gal. Glyphosate	2.57 Gal. Glyphosate	3.49 Gal. Glyphosate
Program Cost	\$22,765	\$22,000	\$20,000	Not available	Not Available
Note: Herbicide use is directly correlated to growing conditions for each season					

Winter Weather Materials Application:

The DOT reported applying 31,309 tons of salt and 93,005 gallons of salt brine to County roadways during FY13. The sand and salt deicing operations cost \$1,628,115 in FY13. Table III.E14, below, compares DOT winter weather deicing materials from FY10-FY13.

Table III.E14- DOT Winter Weather Deicing Material Usage From FY10-FY13. NR=not reported				
	FY13	FY12	FY11	FY10
Salt, tons	31,309	15,200	85,600	169,633 sand and salt combined
Sand, tons	0	3,800	21,400	
Salt Brine, gallons	93,005	122,031	NR	NR

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 on-line 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. In 2012, the DOT discontinued ordering sand for use in de-icing roads. There was a stockpile of approximately 18,000 tons of salt/sand (80%-20%) that continued to be used until depleted.

In 2009, DOT began a salt brine pilot program on 240 lane miles of primary roads. Salt brine is a 23% 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 two hours to two days prior to the onset of frozen precipitation to prevent snow and ice from bonding to pavements. In 2010, over 400 lane miles of both primary and secondary roads received salt brine applications using contracted and County equipment. In the 2011-2012 winter seasons, DOT purchased additional salt brine making equipment and storage tanks and developed the salt brine treatment program to include 678 lane miles of primary, secondary and some neighborhood roads. In FY13, DOT sprayed a total of 93,005 gallons. The cost to treat roadways using all methods of application was \$1,628,115.

E.7. Public Education and Outreach

Compliance Hotline:

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 illicit discharges and spills. More information can be found on the 311 home page at: <http://www3.montgomerycountymd.gov/311/Home.aspx>

Summary of Stormwater Outreach Efforts

Table III.E15 presents a summary of stormwater outreach efforts in FY13:

Table III.E15- Stormwater Outreach Efforts in FY13	
Project Participants	#
Volunteers through Stream Stewards	52
Volunteer hours through Stream Stewards	428
Biomonitoring volunteers	13
Biomonitoring volunteer hours (Laboratory & resource conditions mont.)	347/ 715
# of participants for H2O Summit (including Festival)	490
# of watershed groups working towards incorporation	3
# of watershed groups assisted	9
# of Residents directly reached	10,800
Materials and Events	
# of publications (print, web, other) produced:	33
# of publication copies printed	12,000
# of translated publications	5
# of listserv subscribers (Stormwater maint., Rainscapes & Landscapers)	600/2426/644
# web hits (www.montgomerycountymd.gov)	280,000
# of unique hits on water section of website	95,662
# of unique visitors to www.mygreenmontgomery.org	5,500
# of unique views on water related pages	1,346
# media hits (e.g., newsprint,, TV and radio stories, social media	400,000
# of MGM Facebook & Twitter followers (& Rainscapes program)	196/50 (169)
# of Events hosted or attended	82

Public Outreach and Stewardship Work Plan:

The Permit requires the County to develop and implement a public outreach and education program focused on stormwater pollution reduction with specific goals and deadlines. To meet this requirement, the County developed a public outreach and stewardship work plan (POSWP) as part of the County’s overall Strategy, submitted to MDE in FY11.

The POSWP document outlines eight specific outreach priorities for the current Permit cycle. The priorities include: pet waste management, lawn stewardship, anti-littering, stormwater awareness, establishing a volunteer program, riparian reforestation, roof runoff reduction and parking lot recharge. In the POSWP, each priority is summarized in a practice sheet which 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 POSWP can be found online at <http://www.montgomerycountymd.gov/DEP/Resources/Files/ReportsandPublications/Water/Countywide%20Implementation%20Strategy/Watershed-Outreach-Plan-2012.pdf> .

Pet Waste (POSWP Priority Practice #1)

In FY 13, DEP partnered with three HOAs to launch a pet waste pilot project in the Rock Creek Watershed. Five pet waste stations were installed at two HOA properties that had no previous program to remove and dispose of pet waste. By the end of FY13, a total of 172 pounds of dog waste had been collected from the 5 installed stations. This pilot addresses Part III.E.7.b.viii of the Permit and key messages, partnerships to nurture, delivery techniques and measurements of POSWP priority practice #1.



(a)



(b)

Figures III.E15 (a) Newly Installed Neighborhood Pet Waste Station and (b) Volunteers During a Neighborhood “Dog Walk” to Educate the Neighborhood on Pet Waste Concerns

The DEP also conducted an ad program on County Ride On buses to promote awareness of the link between impaired water quality and pet waste, Figure III.E16, below.



Figure III.E16- Ride On Bus Advertisement Encouraging Clean Up of Pet Waste.

Anti Litter Campaign (POSWP Priority Practice #3)

In FY13, DEP added an additional watershed outreach staff member dedicated to anti-litter outreach (POSWP priority #3, Anti- Littering Outreach and Stewardship Campaign) and implementation of the County's Bag Fee (for more information on the Bag fee, see Part III.E.4, Trash and Litter).

Conducting a mass-media public outreach campaign against litter pollution continued to be a DEP priority in FY13. Using transit ads and bus shelter ads, DEP highlighted the need to control litter and protect community and environmental health. DEP partnered with the Alice Ferguson Foundation (AFF) to run ads in both English and Spanish for two campaigns in FY13, one in fall and one in spring. For the fall campaign, 80 Ride-On buses (Figure III.E17) and 95 bus shelters ran ads in strategic places in the down county area primarily in the Rock Creek and Anacostia watersheds where the largest contribution of trash has been identified. For the spring campaign, 70 Ride-On buses and 95 bus shelters ran ads in the same areas as the fall campaign.



Figure III.E17-Ride On Bus Ad Displayed During the Third Round of Regional Anti-Litter Campaign

DEP has identified an area in the White Oak neighborhood of Silver Spring (Anacostia watershed) that has high amounts of trash. In order to help raise anti-litter awareness and begin an outreach pilot program to the residents in the area, DEP held an Earth Day cleanup on April 20, 2013. For this event, staff worked with local community leaders, the local watershed group, the Eyes of Paint Branch, the Maryland-National Capital Park and Planning Commission staff, the Anacostia Watershed Society, and the White Oak Community Center staff to organize and advertise the event. At the event, 50 volunteers helped to remove 100 bags of trash and 58 tires. Working with these community groups and volunteers along with targeting the White Oak neighborhood addresses item E.7.d. and E.4 of the permit and elements of POSWP priority practice #3.

Stream Stewards Volunteer Program (POSWP Priority Practice #5)

In FY13, DEP’s Stream Steward’s program continued to train citizen volunteers to help expand watershed outreach to the community (<http://www.montgomerycountymd.gov/DEP/water/what-you-can-do.html#stewards>). A total of fifty individuals participated in four different orientation sessions held throughout FY13.

In FY13, Stream Steward volunteers donated 428 hours of their time, an equivalent of \$9,873.08 of service hours, (Table III.E16) by assisting DEP at community events, other outreach events, and by participating in stream clean ups (Figure III.E18). There is now a list-serve with 215 participants to receive monthly updates on DEP volunteer opportunities.

Table III.E16- Stream Steward Volunteer Activities FY13

volunteer opportunities	# of volunteers	# of hours	Service value*
Orientation	50	100	\$ 2,305.00
Watershed Ambassadors	40	325	\$ 7,498.93
Watershed Keepers (includes helping with cleanups and RainScapes related activities)	2	3	\$ 69.15
Total	52⁺	428	\$ 9,873.08

*Service value per Independent Sector (http://www.independentsector.org/volunteer_time)

+ Total number of volunteers is the total number of individuals that volunteered with DEP throughout the year and not the total number of times they volunteered. Some volunteers participated in multiple events.



Figure III.E18- Stream Stewards Assisting in a Local Cleanup Effort

Storm Drain Markers

The DOT's Storm Drain Marking Program offers materials to groups or individuals on request. In FY12, 100 storm drains were marked. In FY13, DOT increased direct outreach about the program to schools and community groups, and 323 drains were marked. More about the DOT program is available at: <http://www.montgomerycountymd.gov/dot-dir/sustainability/stormdrains.html>

The DEP works directly with watershed groups to supply watershed-specific storm drain markers. For FY13, 1,200 watershed specific storm drain markers were distributed to 6 watershed groups in Seneca Creek, Little Falls, Muddy Branch, Northwest Branch, Rock Creek and Cabin John Creek. DEP has verified that at least 600 of those markers have been installed to date.

FY13 County Outreach Events:

Stormwater outreach and education projects for FY13 are included in the electronic (CD) Attachment to this report in Appendix A. MDENPDES13.accdb, Part D. Watershed Restoration Project Locations with GIS Coverage. The DEP events focused on increasing stormwater awareness, encouraging directionally correct measures, and establishing baseline information through surveys. The baseline information will help guide POSWP implementation and 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.

In FY13, DEP hosted or participated in 82 outreach events, an increase of 15% from the previous year. The events educated 10,800 attendees, which is a 67% increase in face to face efforts from FY12.

H2O Summit (Figures III.E19 and 20)

During FY13, DEP and existing partner agencies combined the annual Clean Water Summit with the Washington Suburban Sanitary Commission's (WSSC's) H2O Fest to create a new event, the "H2O Summit". The H2O Summit showcased DEP and WSSC outreach efforts with speaker presentations, and several family friendly workshops. Key topics addressed stream health, stormwater pollution and litter reduction. A total of 60 exhibitors participated in the Summit (an increase of 140% from FY12), and all 8 County watershed groups were represented. There were 129 participants at the speaker portion of the summit and 321 participants registered for the workshop portion of the event. 89% of attendees rated the event highly, with every session and aspect of the event rated above 80%. The highest ranked aspects were the community engagement session and networking opportunities of the event (96% favorable) as well as learning about the County's Green Streets initiative (99% favorable). The H2O Summit Agenda can be found in Appendix I.

The H2O Summit also included a session conducted in Spanish. As a result, one local community group, Granito de Arena, has agreed to partner with DEP to conduct future workshops in Spanish.



Figure III.E19- Young H2O Summit Attendees Learning About Stormwater Impacts and Watershed Concepts



Figure III.E20- Stream Stewards Volunteer, Jamie Attanasio, and Audubon Naturalist Society Volunteer, Cathy Wiss, Educating H2O Summit Attendees About the Value of Macroinvertebrates in the Stream System.

Focused Efforts to Provide Outreach to Culturally Diverse Communities

The DEP continued to identify and participate in activities to reach out to the County's culturally diverse communities in FY13, targeting watershed awareness and stormwater runoff reduction. The 2010 census showed that 50.7 % of Montgomery County residents identified themselves as other than non-Hispanic white, reflecting the increasing ethnic diversity in the County. Using in-house expertise, staff was able to



Figure III.E21- Attendees at the First Rain Barrel Workshop Conducted in Spanish Co-Sponsored by DEP and Granito de Arena.

create/translate 5 watershed outreach and education materials into Spanish and also work other DEP sections to translate during events, publications and or correspondence. A total of 6 events were organized with or for the Latino Community or other cultures in FY13. All of the events were recognized for attracting varied demographic and ethnic participants. These events included the County Agricultural Fair, the World of Montgomery festival; the H2O Summit, Glenmont Forest Community Days, Ama Tu Vida Health Festival, and the Family Services, Inc. Health and Wellness Community Fair.

The 2013 H2O Summit included a Watershed 101 session conducted in Spanish. Afterwards, DEP formed a partnership with a local Hispanic based community group, Granito de Arena, and helped the group conduct their own rain barrel workshop to native Spanish speakers with great success (Figures III.E21 and 22). In the coming year, DEP expects to work with the group to conduct additional watershed education workshops. These efforts highlight the County's outreach to a range of diverse stakeholders including developing partnerships and inclusion in programming to achieve behavior change. This approach is essential across the entire outreach program but can be specifically found as an element in POSWP priority practices #3 and #5 for new partnerships to develop.



Figure III.E21- Happy workshop attendees with their rain barrels!

Stormwater Management Maintenance and Inspection Program Outreach

In FY13, the DEP Stormwater Facility Maintenance Program (SWFMP) created multiple publications and hosted several presentations to increase understanding and awareness of the County's stormwater facility maintenance program. DEP developed 16 facility maintenance fact sheets for aboveground, underground, and ESD practices including: stormwater management ponds, sand filters, infiltration trenches, underground filtering facilities, underground sand filters, underground storage structures, underground hydrodynamic separators, flow splitters, rain barrels, rain gardens, grass swales, buried dry wells, porous pavements, and green roofs. Most fact sheets are 2 pages and contain information on the importance of keeping stormwater facilities maintained, actions the public can take to keep facilities in proper working condition and where to go for additional information. The fact sheets specifically address structural and non structural maintenance for many of the practices. The fact sheets are available on DEP's website at <http://www.montgomerycountymd.gov/DEP/water/stormwater-facilities.html>.

The DEP also drafted two 15 page guidance documents for more detailed information on maintaining vegetated stormwater practices and on adding new plantings to an existing stormwater facility. These will be available on DEP's website in spring 2014.

Also in FY13, the SWFMP distributed 4 quarterly newsletters to over 600 subscribers. The newsletter included helpful seasonal tips on stormwater facility maintenance. Subscribers increased 27% between May 2012 and May 2013. For stormwater professionals, the SWFMP also conducted 2 trainings for contractors and one training for property managers. These trainings focused on the procedures and requirements for performing maintenance on stormwater facilities in Montgomery County.

The DEP Website, My Green Montgomery Website and Department Newsletters

In FY13, DEP filled an outreach position responsible for social media communication with the general public, including My Green Montgomery and an overhaul of the DEP website.

In FY13, the My Green Montgomery online education portal (www.mygreenmontgomery.org) expanded its outreach efforts with the creation of a Facebook page, Twitter page and increased blog outreach and events. By the end of FY13, the Facebook page had 196 likes and the Twitter page had more than 50 followers. Fourteen blog articles were focused on water issues, including a 3-part series on building a rain garden at a church, and articles on the restoration of Booze Creek, community clean-up events and litter prevention. The My Green Montgomery website had over 5,500 unique visitors in FY13 and 1,346 (24%) unique pageviews were of water-themed content.

More than 280,000 people visited the Department of Environmental Protection website (www.montgomerycountymd.gov/dep) in FY13. There were 95,662 unique page views of the water section of the website and visitors spent an average of 2 minutes reading each page this year based on analytics. In FY13, four quarterly newsletters were distributed to over 600 subscribers with helpful seasonal tips on stormwater facility maintenance (a 27% increase from FY12), and over 3,000 subscribers participate in the RainScapes listserves (2 Gazettes).

County Watershed Groups:

Local watershed groups are vital partners in raising awareness on stormwater pollution reduction and behavior change. DEP's outreach strategy includes working with these groups to expand community stormwater outreach as well as help empower and promote the organizations.

Water WatchDogs Program:

Water WatchDogs was formed by two residents in the Sligo Creek Watershed who were concerned about the poor water quality of their local streams. The overall goal of the program is to raise public awareness and involvement in water pollution prevention and to improve water quality in Sligo Creek. The Water WatchDogs worked with DEP and the watershed group, Friends of Sligo Creek (FoSC) to enhance an existing email alert mechanism for reporting pollution incidents. Members are trained to provide specific information that is transmitted via email straight to DEP field enforcement staff. In FY13, volunteers have reported 13 water pollution problems, and which resulted in 5 investigations and one enforcement action.

The program is being promoted via presentations and trainings to community groups such as the Anacostia Watershed Citizens Advisory Committee (AWCAC), the Anacostia and Potomac Riverkeepers, members of area civic associations, and volunteer groups in the watershed. The program is announced via the FoSC website and Action Log (which includes a new webpage specific to the program, <http://www.fosc.org/AL-WaterWatchDog.htm>), and the FoSC listserv. 500 wallet-size information cards and 300 flyers have also been distributed throughout the community (Figure III.E23). The creation of this program directly relates to the key messages, delivery techniques and program measurements in POSWP priority practice #5 Stream Stewards Outreach and Stewardship Campaign.



Figure III.E23- Water WatchDogs Flyer Explaining How to Report Water Pollution Problems

Other Watershed Group Activities

During FY13, there were eight watershed groups actively recruiting members and conducting special activities including adopt-a-road and watershed clean-ups (Figure III.E24) and invasive plant work days. These groups include the Friends of Sligo 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 a new group, the Watts Branch Alliance. For FY13, the DEP continued its focus on tracking litter removal and community outreach by the watershed groups. DEP received reports from four watershed groups for FY13 activities.

The Little Falls Watershed Alliance <http://www.lfwa.org/>:

- Spent nearly 30 hours giving direct presentations to the residents in their watershed. Worked with the local schools, Cub Scout groups, senior center, Whole Foods grocery store, and participating in Green Day at the Bethesda Blues & Jazz Club.
- Conducted 17 stream cleanups collecting 62 bags of trash, 23 bags of recyclables with 83 local volunteers donating a total of 193.5 hours.
- Created a newsletter through Vertical Response as well as Facebook (105 members), Twitter and LinkedIn accounts.

Muddy Branch Alliance <http://www.muddybranch.org/>:

- Worked with over 200 volunteers on hands-on projects such as trash cleanups (18 events, 134 bags of trash) and tree plantings (150 trees planted).
- Hosted or participated in 58 community events or meetings throughout the fiscal year including forming an “incubator” to foster activities of the Seneca Creek Watershed Partners and a new group, the Watts Branch Alliance.
- Hosted their 2nd annual 'Faithfully Picking Up the Potomac' workshop for faith based organizations, a rain barrel fundraiser, a water monitoring and four “Explore the watershed” community events.
- Increased outreach and communications through Facebook, LinkedIn and MailChimp Listserv accounts with 193, 28, and 644 members respectively as well as a community events calendar.
- Continued sponsoring a County Adopt a Road and C&O Canal Trail cleanup segment.
- Received the 2013 Community Leadership Award and the City of Gaithersburg Environmental Award.

The Neighbors of Northwest Branch (NNWB) <http://www.neighborsnwb.org/>

- Reached out to two communities via door to door delivery of outreach materials to residents on action items to improve the health of the local park and stream.
- Offered participants an exciting peek through the microscope at stream life via the Stream Monitoring Team.
- Joined the DEP staff at the County Fair booth to engage visitors about stream protection and Northwest Branch.
- Participated in the H2O Summit cosponsored by the DEP and WSSC. Their watershed specific table displayed maps, posters, brochures, and an electronic pictorial of the Northwest Branch’s beauties, challenges, and the work of NNWB volunteers have done to restore it.
- Presented at the St. Andrews School fair in Kemp Mill with maps, posters, and brochures.

- The stream monitoring team continued to do its annual benthic macroinvertebrates sampling program four times in FY 13, following the Audubon Naturalist Society protocol.
- In cooperation with DEP, the group completed the River Network's in-depth self assessment and participated in 2 trainings to develop a strategic plan.

The **Rock Creek Conservancy** <http://www.rockcreekconservancy.org/>

- Educated over 360 individuals through 14 educational presentations.
- Participated in stream clean ups through the Stream Team program (results are reported by M-NCPPC's).
- Partnered with DEP to implement the pet waste reduction pilot in their watershed.



Figure III.E24- Watershed Group Volunteers Participating in a Stream Cleanup

Developing Additional Capacity in Watershed Groups

In FY13, DEP continued efforts to build watershed groups' capacity, which ultimately will allow them to better assist in stormwater pollution prevention education and fostering behavior change in the County. After last fiscal year's assessment to evaluate programmatic and organizational capacities, each group identified areas for improvement. An additional workshop was conducted in FY13 with a second to follow in FY14. With DEP provided contractor support, the groups analyzed the assessment results and are developing strategic plans and workplans that address weaknesses and build on strengths.

Again this year, DEP provided funding for one representative from each watershed group to attend the annual Chesapeake Watershed Forum (CWF) sponsored by the Alliance for the Chesapeake Bay. The CWF sessions are geared to provide information on grass roots approaches for watershed outreach and implementation. After the CWF, the attendees provided feedback which DEP will use to enhance future capacity building assistance efforts.

RainScapes Program Outreach

The DEP's RainScapes program promotes and implements environmentally friendly landscaping and small scale stormwater control and infiltration projects on residential, institutional, and commercial properties. As of FY13, the program has been developed into a multi-strand program, 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 Part III.G.

RainScapes for Schools and the RainScapes for Schools Growing program entered its 4th year in FY13. Since inception in FY10, the Growing program has provided native plants, soil, pots and educational materials to MCPS high school horticulture classes to support instruction on the use of plants in stormwater management. This program has actively supported and influenced the direction of the new MCPS Environmental Horticulture Program, which now includes storm water management as part of their horticulture curriculum. Plants from the program have been used in community based projects and in RainScapes classes as take home materials. RainScapes for Schools projects have included both conservation landscapes and rain gardens for curriculum support and runoff reduction (Figure III.E24). Some schools have done more than one project; over the past four years (FY10-FY13), the program has supported 11 public school projects.

In FY13, DEP continued to train local designers and contractors on RainScapes project requirements and installation, including specifics of drainage site assessment, rain garden design, and also provided hands on project building opportunities through the RainScapes for Landscape Professionals Program. In addition, training was provided with a local community college, Montgomery College, through the Landscape Technology Program.

The DEP RainScapes team continued to provide workshops focused on RainScapes Rewards Rebate qualified practices. From 2008- 2013, these workshops have reached 1280 residents, averaging 240 participants each year (2009-2013). In addition, DEP is evaluating how to expand partnership efforts with local watershed and environmental groups to benefit the RainScapes Neighborhoods, RainScapes for Schools and RainScapes Rewards components of the program.

FY13 Highlights of RainScapes Outreach include:

- Provided outreach and education materials to over 1000 residents, business owners, and stakeholders at 37 local and regional events as well as staffing the Montgomery County Fair DEP booth which reached many more people.
- Offered training on site assessment and rain gardens to students of the DEP Watershed Keepers program, as well as offering three workshops on Rain Gardens, Rain Barrels, and Conservation Landscapes.
- Initiated joint training with DEP Stormwater Maintenance training and with the Montgomery College Landscape Technology Program.
- Developed a storm water management course for the regional Master Gardener continuing education series.
- Partnered with the Tower Company and MCPS to create a rain garden, conservation landscape and tree planting project at a local middle school for the inaugural Green Apple Day of Service
- Created a 10 minute video illustrating how to assess your site and then install a rain garden and conservation landscape.
- Materials were created to provide information on invasive species, easy plants for sun and shade, how to apply for a rebate, how to dig a perk test and other plant lists for conservation landscapes and were widely distributed at the County Fair.
- Translated our RainScapes brochure into Spanish
- Developed a professionally oriented template on Permeable Pavers and published on DEP's website. This template provides construction guidance for design and installation of

permeable interlocking concrete paving (PICP) systems that are installed to capture the roof runoff and retain the water that falls on the driveway or other areas.

- Completed design on the rain garden templates and will complete the Professionals Rain Garden Manual in FY14
- Accelerated the pace of site assessment, design and installation for RainScapes Neighborhoods areas in the County
- Provided first Spanish language Rain Barrel workshop content and materials for the program, after providing training for the Spanish speaking presenters



Figure III.E25- Rain Garden and Conservation Landscape at Loiderman Middle School – A Cooperative Project with the Tower Company , MCPS and DEP RainScapes to Manage the Flow From 5000 Square Feet of Rooftop Drainage

F. Watershed Assessment

The DEP continues to systematically develop watershed assessments by evaluating current water quality and identifying and ranking structural, non-structural and programmatic watershed restoration opportunities for each County watershed. Full watershed assessments will include field investigations, prioritized project (action) inventories with structural and non-structural project concepts, and cost estimates. Watershed implementation plans include results from the watershed assessments, and present more detailed implementation planning and schedules to meet regulatory and programmatic targets.

The Strategy was developed from implementation plans or pre-assessments for each of the County's 8-digit watershed groupings. These are shown in Table III.F1. The final version of the Strategy can be found online at:

<http://www.montgomerycountymd.gov/dectmpl.asp?url=/content/dep/water/wris.asp#plans> .

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

The status and schedule of watershed restoration planning is shown in Table III.F2. As shown in Table III.G11, in Part III.G. Watershed Restoration, below, DEP budgeted \$749,130 in FY11, \$502,244.23 in FY12, and \$879,435 in FY13 for watershed assessment and planning.

Table III.F1- Montgomery County Watershed Groupings and Plans

Watershed grouping	Implementation Plan	Pre-Assessment
Anacostia	X	
Rock Creek	X	
Cabin John Creek	X	
Seneca Creek		
Great Seneca (including Clopper Lake)	X	
Dry Seneca and Little Seneca		X
Lower Monocacy	X	
Upper Potomac Direct (West of Seneca Creek, not described in any other grouping)		X
Lower Potomac Direct (East of Seneca Creek, not described in any other grouping)		
Muddy Branch and Watts Branch	X	
All other subwatersheds		X
Patuxent (Triadelphia/Brighton Dam and Rocky Gorge)	X	

Table III.F2- Status of Montgomery County Watersheds' Assessments

8 Digit Watershed	Planning Subwatershed	CCIS=County Coordinated Implementation Strategy	TMDLs
Anacostia	All	Anacostia Watershed Restoration Plan (ARP)(2010) Strategy Watershed Implementation Plan (2011) Project Implementation Ongoing <i>Revise Implementation Plan FY17</i>	Bacteria (2002) Sediment (2007) Nutrients (2008) Trash (2010)
	Paint Branch	Upper Assessment (1997) Lower Assessment (2006)	
	Little Paint Branch	Addressed under the ARP	
	Northwest Branch	Assessment (2000)	
	Sligo Creek	Addressed under the ARP	

Table III.F2- Status of Montgomery County Watersheds' Assessments			
8 Digit Watershed	Planning Subwatershed	CCIS=County Coordinated Implementation Strategy	TMDLs
Rock Creek		Strategy Watershed Implementation Plan (2011) Watershed Assessment (2001) Implementation (Action) Plan (2001) Project Implementation Ongoing <i>Revise Implementation Plan FY15</i>	Bacteria (2002)
Cabin John Creek		Strategy Watershed Implementation Plan (2011) Watershed Assessment (2004) Project Implementation Ongoing <i>Revise Implementation Plan FY16</i>	Bacteria (2002) Sediment (2011)
Seneca Creek	ALL	<i>Develop Implementation Plan FY15</i>	Sediment 2011
	Great Seneca Creek (including Clopper Lake)	Strategy Watershed Implementation Plan (2011) Project Implementation Ongoing	Clopper Lake : Phosphorus and Sediment (1998)
	Dry Seneca and Little Seneca	Strategy Pre-Assessment (2011) <i>Watershed Assessment FY14</i>	
Lower Monocacy		Strategy Watershed Implementation Plan (2011) <i>Revise Implementation Plan FY15</i>	Sediment (2009) Bacteria (2009)
Upper Potomac Direct	Little Monocacy and Broad Run	Strategy Pre-Assessment (2010) <i>Watershed Assessment FY14</i> <i>Develop Implementation Plan FY15</i>	
Lower Potomac Direct	ALL	<i>Develop Implementation Plan FY15</i>	
	Rock Run and Little Falls	Strategy Pre-Assessment (2010) <i>Watershed Assessment FY14</i> <i>Develop Implementation Plan FY15</i>	
	Muddy Branch	Strategy Watershed Implementation Plan (2011) for Muddy and Watts Branch Project Implementation Ongoing	
	Watts Branch	Strategy Implementation Plan (2011) for Muddy and Watts Branch Watershed Assessment (2006)	
Patuxent	ALL	Strategy Pre-Assessment and Implementation Plan (2011) <i>Revise Implementation Plan FY15</i>	

Table III.F2- Status of Montgomery County Watersheds' Assessments			
8 Digit Watershed	Planning Subwatershed	CCIS=County Coordinated Implementation Strategy	TMDLs
	Rocky Gorge Reservoir	Strategy Pre- Assessment and Implementation Plan (2011) <u>Watershed Assessment FY14</u>	Phosphorus (2008)
	Hawlings River (tributary to Rocky Gorge)	Assessment (2003) Action Plan (2003) <u>Watershed Assessment FY14</u>	
	Triadelphia Reservoir	Strategy Pre- Assessment and Implementation Plan (2011) <u>Watershed Assessment FY14</u>	Phosphorus and Sediment 2008

Status of Watershed Assessments:

In FY13, a contract was issued to DEP's MS4 management contractor to develop watershed implementation plans for any whole or parts of watersheds not completed within the Strategy. These included the Seneca Creek watershed (pre-assessments for Dry Seneca and Little Seneca to be combined with the Great Seneca subwatershed implementation plan), Lower Potomac Direct watershed (pre-assessment for Lower Potomac Direct to be combined with Muddy Branch and Watts Branch subwatersheds implementation plan) ; and the Upper Potomac Direct watershed (pre-assessment only in the Strategy) . In addition, data review, field assessments and project inventories were being developed for potential restoration projects in the Lower Monocacy and Patuxent Watersheds. DEP hosted public meetings within these watersheds in February 2014 and final watershed assessment reports will be completed by June 2014. DEP will develop final watershed implementation plans for these watersheds by the end of September 2014.

Great Seneca and Muddy Branch Watersheds Study

During 2004, the County began the watershed inventories in the Great Seneca and Muddy Branch watersheds as cooperative efforts with the 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 due to limited Federal funding. Projects identified in the study will be included in the County's FY14 watershed assessment and FY15 watershed implementation plan for the 8 digit HUC Seneca Creek watershed.

Anacostia River Restoration Plan (ARP) (February 2010)

The final report for the most recent inter-jurisdictional restoration of the Anacostia, Anacostia River Watershed Restoration Plan and Report, was completed in February 2010 (<http://www.anacostia.net/plan.html>). Currently, DEP is developing a project management plan with the USACE. The continued partnership will work towards completing an Anacostia River Ecosystem Restoration Feasibility Study to assess and design restoration opportunities identified in the ARP. The inventory of project opportunities and possible enhancements identified

through the ARP provided the basis for the County's watershed implementation plan to meet Permit WLAs, trash reduction requirements, and contribute toward the County impervious area restoration goal. The primary focus will be stream restoration, riparian and upland reforestation, and wetland creation or restoration.

Watershed Screening:

The DEP uses the multi-metric Index of Biological Integrity (IBI) countywide to develop narrative ratings of biological conditions in water bodies. The IBI is calculated by monitoring location based on species--either benthic insects or fish--and is reported as a Benthic Index of Biological Integrity (BIBI) and a Fish Index of Biological Integrity (FIBI). Typically, the higher the index, the higher the quality of biological conditions at that monitoring location. The DEP identifies narrative categories based on the distribution of the IBI scores and how the scores compare with scores at the least-impaired stations in the County. Biological conditions in the water body are then described as *excellent*, *good*, *fair*, and *poor*. Similarly, the numeric scores for habitat conditions at monitored stations are also ranked and assigned a narrative category.

The water chemistry, biological community and stream habitat and conditions are monitored at representative stations in all County watersheds on a rotating basis over a 5 year cycle. The County categorizes the monitored subwatersheds as impaired or unimpaired by analyzing and comparing the BIBIs, FIBIs and habitat condition scores. BIBIs only are used in smaller drainage areas of less than 300 acres. The small streams in these subwatersheds typically support pioneering fish species only, which, because of their adaptability to changing habitat and flow conditions, are not reliable indicators for rating impairments.

In 2012, DEP monitored the Rock Creek watershed for fish and benthic macroinvertebrates (aquatic insects). Collection methods and data analysis techniques have been documented in previous MS4 Permit annual reports. A total of 27 stations were monitored, with 12 baseline stations in the Upper Rock Creek subwatershed and eight baseline stations in the Lower Rock Creek subwatershed. Twenty of these stations have been monitored since 1995 to track cumulative changes in stream conditions. More detailed results are included in Attachment O

In 2004, the County designated that portion of Upper Rock Creek with the highest quality stream conditions as a Special Protection Area (SPA), with new development subject to a maximum of 8% impervious per site and all development undergoing more stringent site and stormwater management review. In addition, the County conducts annual monitoring in the SPA tributaries.

Figure III.F1 shows the overall stream conditions within the Upper Rock Creek watershed in 2012. Stream conditions in the Upper Rock Creek subwatershed are much higher than in the more developed Lower Rock Creek subwatersheds. The streams not monitored during 2012 (shown in gray on Figure III.F1) are much larger and respond much slower to land-based changes than the smaller tributaries. The Turkey Branch and Joseph's Branch subwatersheds have been the focus of significant restoration projects over the past decade and monitoring has indicated some improvements that seem to be associated in time with those projects.

Fish surveys were not conducted on smaller (i.e. first order) streams. These small streams typically provide limited fish habitat and fish diversity tends to be low because of this. The benthic community was analyzed at all streams. The resulting fish or benthic community index of biological integrity (IBI) was used to rate the streams as excellent, good, fair and poor.

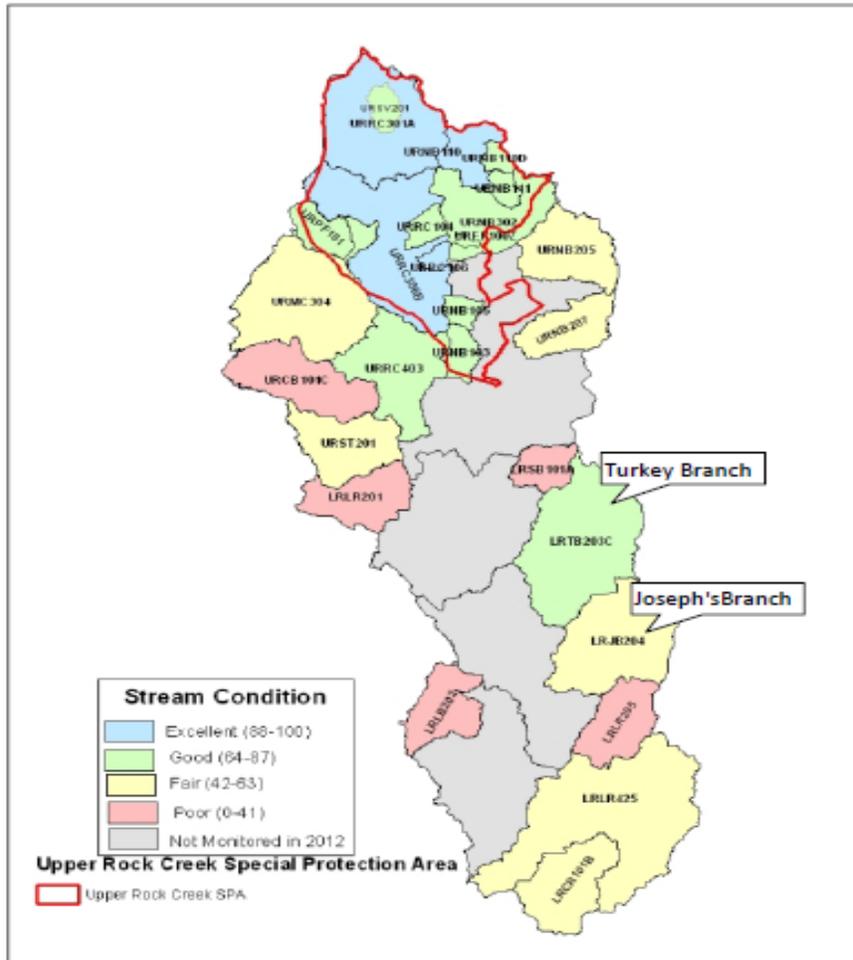


Figure III.F1 Stream Conditions Assessment Within the Rock Creek Watershed, 2012

Benthic Index of Biological Integrity

The results for the benthic IBI (BIBI) scores for 2012 are compared to those for 1996 in Figure III.F2. BIBI scores in both years represented conditions that ranged from poor to excellent. Stream resource conditions on the main stem of Upper Rock Creek improved from fair to excellent. This includes drainage from the Upper Rock Creek Special Protection Area (SPA), established in 2004. In this SPA, the impervious limit is 8% for private development or subdivisions that are served by community sewer. More information on the SPA and annual reports are available at <http://www.montgomerycountymd.gov/DEP/water/special-protection-areas.html>

BIBI scores for tributaries in the southwestern part of the Upper Rock Creek have in general declined since 1996. Recent samples have been composed of more pollutant tolerant benthic organisms than in earlier samples. The consistent poor or fair conditions in these tributaries may be related to their receiving drainage from dense development in the City of Rockville

In the Lower Rock Creek watershed, BIBI scores in 1996 showed poor or fair conditions. In 2012, three stations remained poor while five stations improved from poor to fair. Overall the stations with improvement had more taxa represented and contained less of certain tolerant aquatic insects. While all of the Lower Rock Creek Watershed is highly urbanized, the three stations that remained poor in 2012 have slightly smaller riparian buffers and slightly more imperviousness than the other Lower Rock Creek stations.

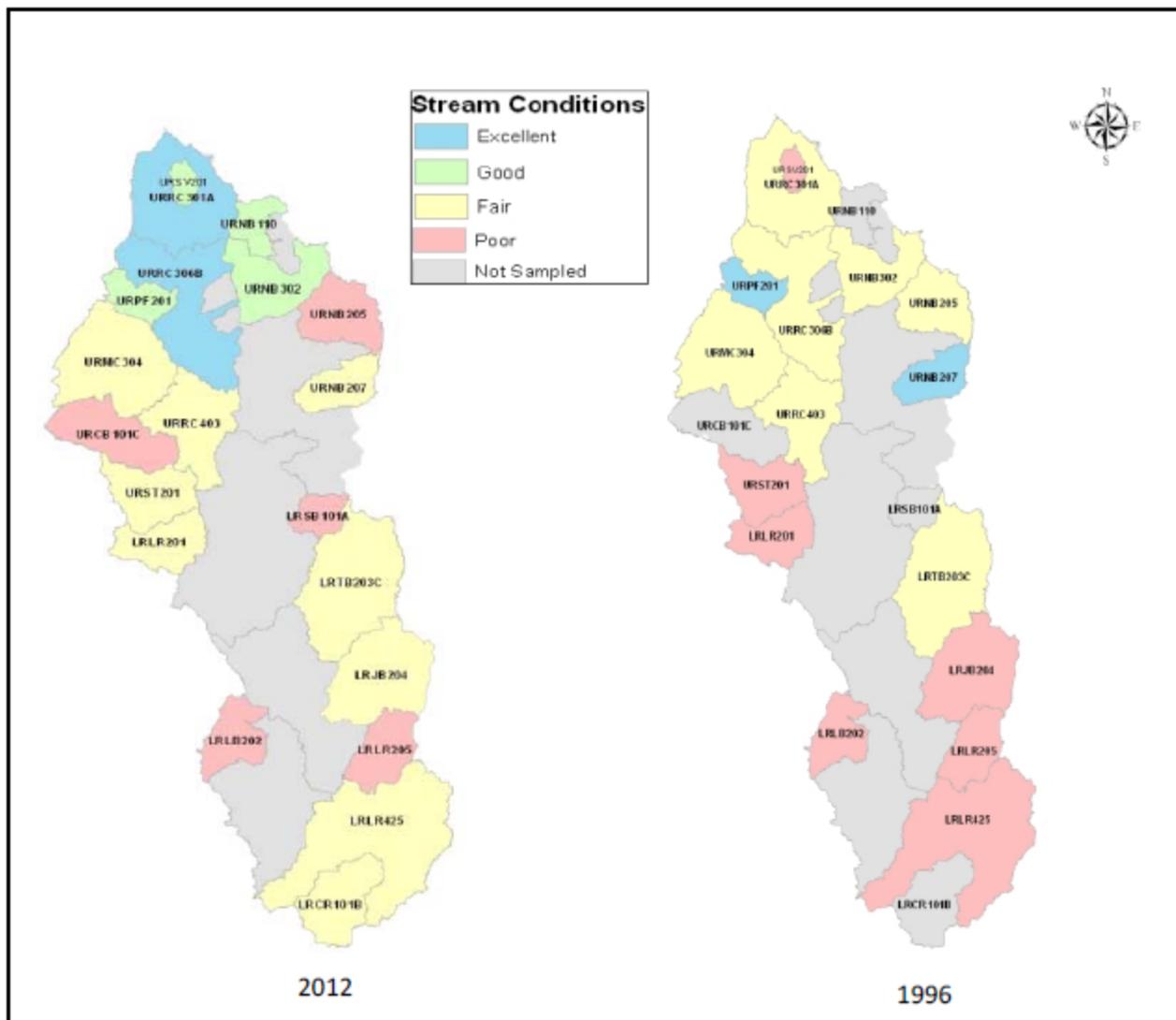


Figure III.F2 Rock Creek Stream Conditions Based on Benthic Index of Biological Integrity. Left = 2012 and Right=1996.

Fish Index of Biological Integrity

Stream conditions associated with the Fish Index of Biological Integrity (FIBI) scores for 2012 are compared to those for 1996 in Figure III.F3. Stream resources conditions ranged from poor to excellent in both years, with poorer conditions in general in the Lower Rock Creek subwatershed.

In 2012, fish sampling was conducted at nine baseline stations in the Upper Rock Creek subwatershed. In 2012, no stations were rated poor. Four stations were rated fair, while five stations were rated good or excellent. Conditions for the mainstem of Upper Rock Creek improved to excellent since 1996.

In the Lower Rock Creek subwatershed, six stations were monitored in both 1996 and 2012. FIBI scores remained in generally poor to fair conditions from 1996 to 2012. In 1996, only one station (Turkey Branch) was rated fair and in 2012 this station was rated good. Three of the five other stations were rated poor in both 1996 and 2012.

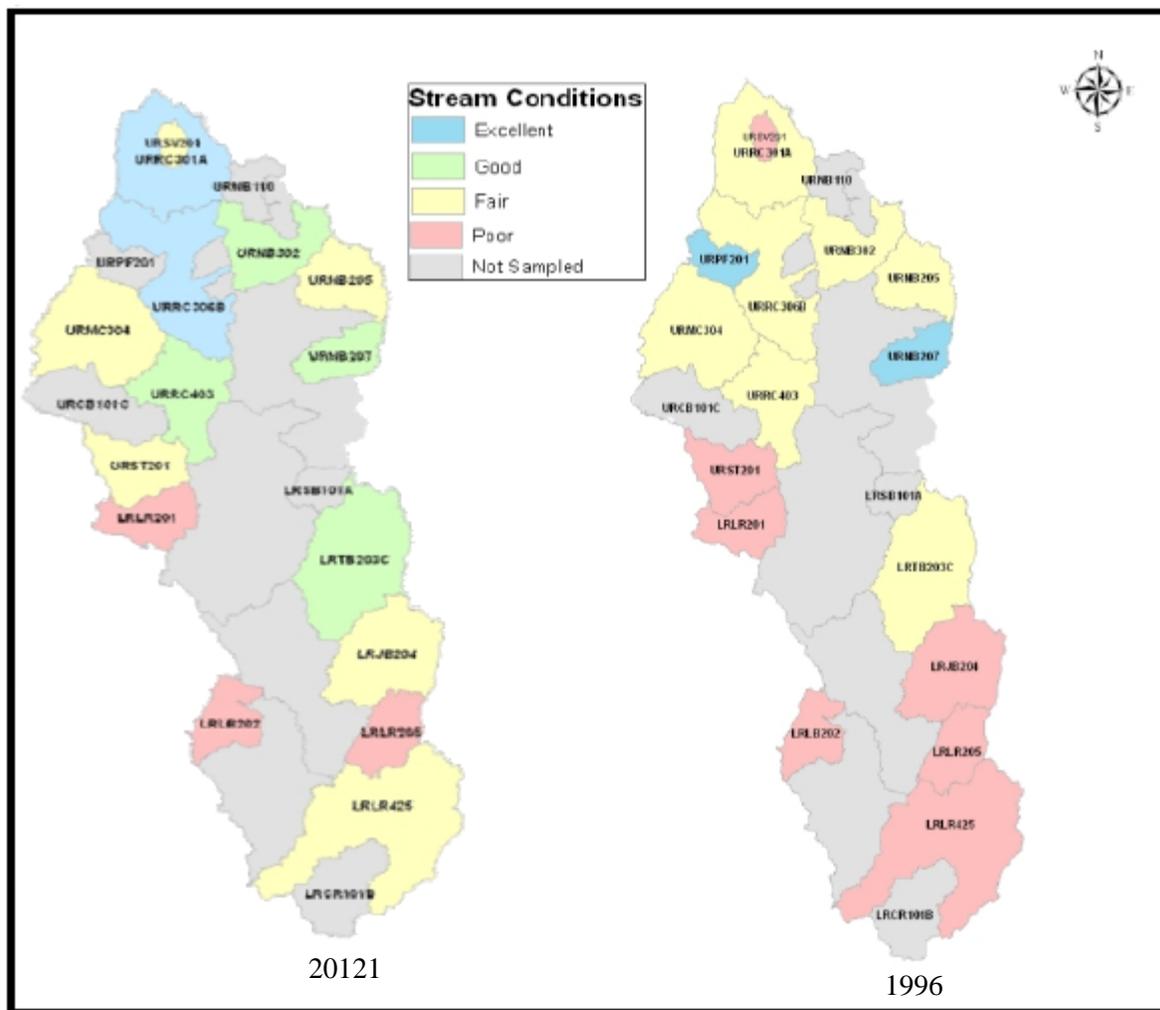


Figure III.F3- Rock Creek Stream Conditions Based on Fish Index of Biological Integrity. Left=2012 and Right=1996.

Rock Creek Restoration

Two subwatersheds, Joseph’s Branch and Turkey Branch, were selected to analyze for changes in biology after multiple restoration projects were completed. The intent is to document cumulative improvements in the stream resources related to the cumulative restoration efforts.

Joseph's Branch

Joseph’s Branch in Lower Rock Creek has been monitored since 1996. In 2001, the Joseph’s Branch Tributary was identified as one of the priority stream restoration sites in *The Rock Creek Watershed Feasibility Study*. Four large stream restoration projects were completed in this watershed between 2005 and 2007. Restoration included bank stabilization, in stream controls to limit erosion, improvement of in stream habitat and riparian buffer reforestation.

The 1,783 acre watershed is highly urbanized with a large number of residential and commercial properties present. The watershed is roughly bordered by Georgia Ave in the East and Beach Drive in the South. The major traffic arteries of Connecticut Ave and Viers Mill Road pass through the watershed. Impervious is approximately 24%. Fish surveys have been conducted and benthic macroinvertebrates have been sampled eight separate times from 1996 to 2010. Resulting IBIs are shown in Table III.F3. More detailed analyses are presented in Attachment O.

Table III.F3- Joseph's Branch Index of Biological Integrity				
B=Benthic; F=Fish				
Year Sampled	BIBI Score	BIBI Narrative	FIBI Score	FIBI Narrative
1996	8	Poor	2.1	Poor
2002	8	Poor	3	Fair
2003	8	Poor	2.1	Poor
2005	8	Poor	2.3	Fair
2007	8	Poor	3	Fair
2008	18	Fair	3	Fair
2009	10	Poor	3.4	Fair
2012	18	Fair	3.2	Fair

BIBI and FIBI scores have slowly increased and stream conditions have improved from 'poor' in 1996 to 'fair' in 2012. In the benthic community, pollutant tolerant taxa continue to dominate although more taxa are present than in 1996, having increased to 13 of the 18 in 2012. Stations which have a FIBI score less than 2.2 are considered impaired. FIBI scores have ranged from 2.1 to 3.4, representing poor to fair conditions. The narratives have remained in fair since 2005, after completion of the first restoration project. Restoration efforts focused on parameters beneficial to fish habitat.

Most notable is the increase in diversity and the addition of minnow species as shown in Figure III.F4. While the community remains characterized as generally pollution tolerant, there has been an increase in the total number of individuals as restoration has proceeded. While incremental

improvements have been noticed following these restoration projects, the significant amount and polluted character of uncontrolled runoff that still exists is likely preventing more noticeable improvements to the benthic and fish communities. Monitoring will continue as runoff management projects are added to the dense development in the drainage.

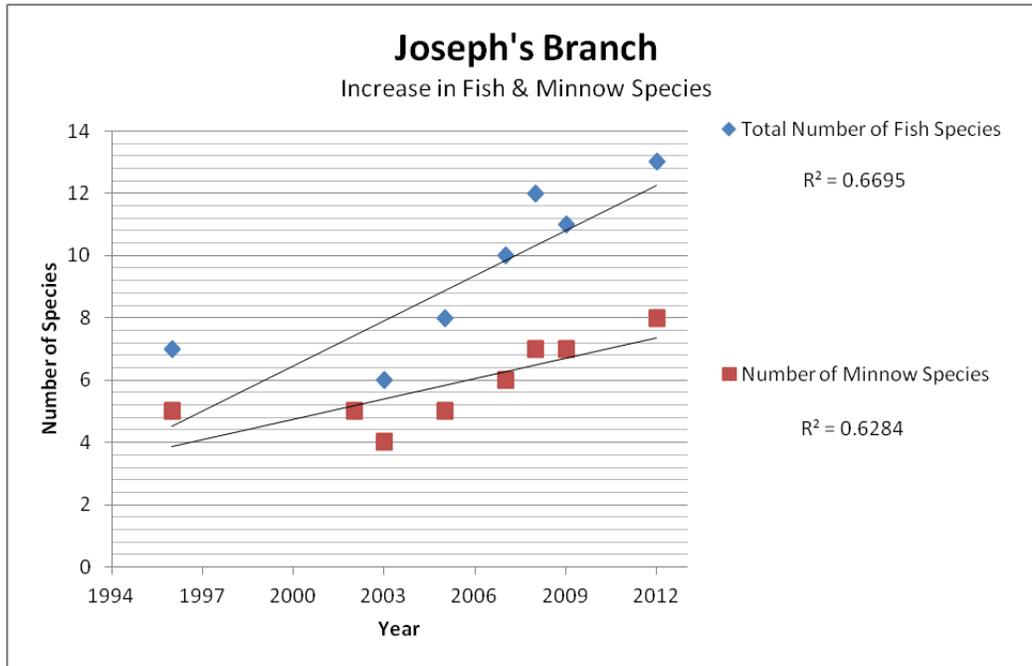


Figure III.F4- Increase in fish and minnow species in Joseph's Branch from 1996 to 2012
R² value greater than 0.6 indicates correlation over time that corresponds to restoration project implementation. Does not prove that restoration projects led to increase

Turkey Branch

The Turkey Branch is a tributary of Lower Rock Creek which a highly urban drainage area and approximately 32% imperviousness. This subwatershed was targeted for restoration during the late 1990's because of the extent of degraded stream habitat and impaired biological community. The DEP sampled the benthic macroinvertebrate communities in 1996, 2003 and 2012. Fish populations were surveyed in 1996, 2002, 2003, 2008 and 2012. Two stormwater wetland ponds and retrofits of existing dry ponds were completed in 2007 as part of restoration activities.

Benthic Macroinvertebrates

Sampling conducted from 1996 through 2012 show an impaired benthic community. Minor changes in the population have affected the metrics since restoration to raise the BIBI scores and stream resource conditions from poor to fair. More detailed analysis is included in Appendix O. Further monitoring will be needed to determine if there are continuing improvements in the benthic community.

Fish

Sampling conducted over the study period (1996, 2002, 2003, 2008 and 2012) have showed differences in the fish community prior to and after reconstruction efforts. FIBI scores ranged from 2.3 (fair) to 4.1 (good) with scores showing increases since the completion of restoration. Total number of fish species has increased over time as shown in Figure III.F5.

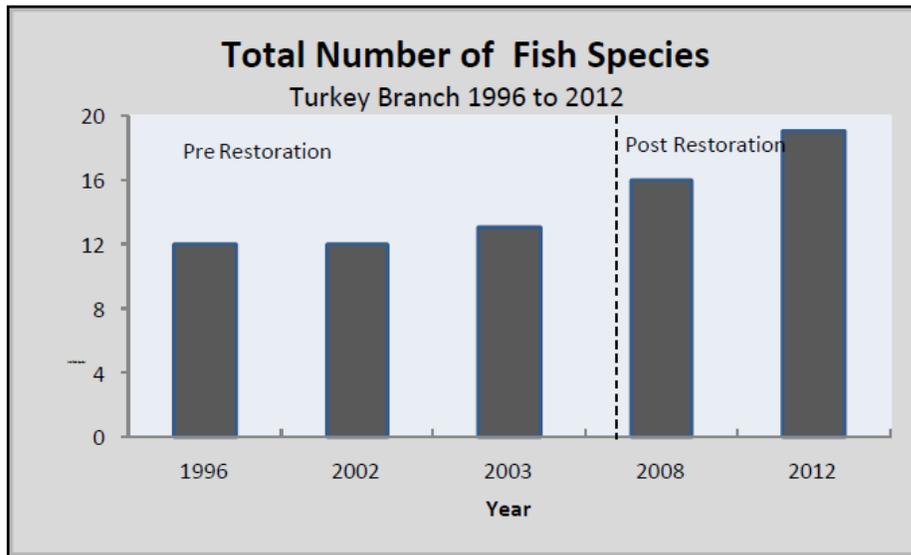


Figure III.F5- Total number of Fish Species in Turkey Branch, Pre and Post Restoration.

Over the course of monitoring the pollution-tolerant minnow Blacknose Dace was dominant four of the five years with 1,335 total individuals. In total, 25 different species have been recorded over the five monitoring dates. The number of American Eels sampled has increased beginning the first year after restoration. Four individuals were counted in 1996 and 2003. In 2008 and 2012, 37 individuals were counted. With only two monitoring events post restoration, further monitoring will be needed to determine long term influences.

G. Watershed Restoration

The DEP is implementing projects and BMPs which will add stormwater management to impervious area not controlled to the MEP at the start of the Permit term. Watershed restoration projects will also improve water quality and minimize physical impacts from uncontrolled urban runoff on streams. Projects are completed primarily through DEP’s Watershed Restoration program, funded through the County’s Capital Improvement Projects (CIP) program and include construction of SWM pond retrofits, new stormwater ponds, ESD practices and stream restoration. DEP is continually assessing emerging stormwater control guidance and improving County data critical to watershed planning to ensure that the most beneficial, and cost effective projects are selected for implementation.

Figure III.G1 shows the County area subject to the Permit. For FY13, DEP recalculated the amount of controlled and uncontrolled impervious area in the County's MS4 area, as described below. Table III.G1 summarizes this recalculated impervious area, as compared to impervious area calculated in the Strategy. The Permit's Attachment A, Annual Report Databases requires submittal of Table C. Impervious Surfaces Associated With GIS Coverage and Table D. Water Quality Improvement Project Locations Associated With GIS Coverage. The required data can be found in Appendix A, MDENPDES13.mbd, Parts C-D.

MS4 Permit Area
Montgomery County, Maryland

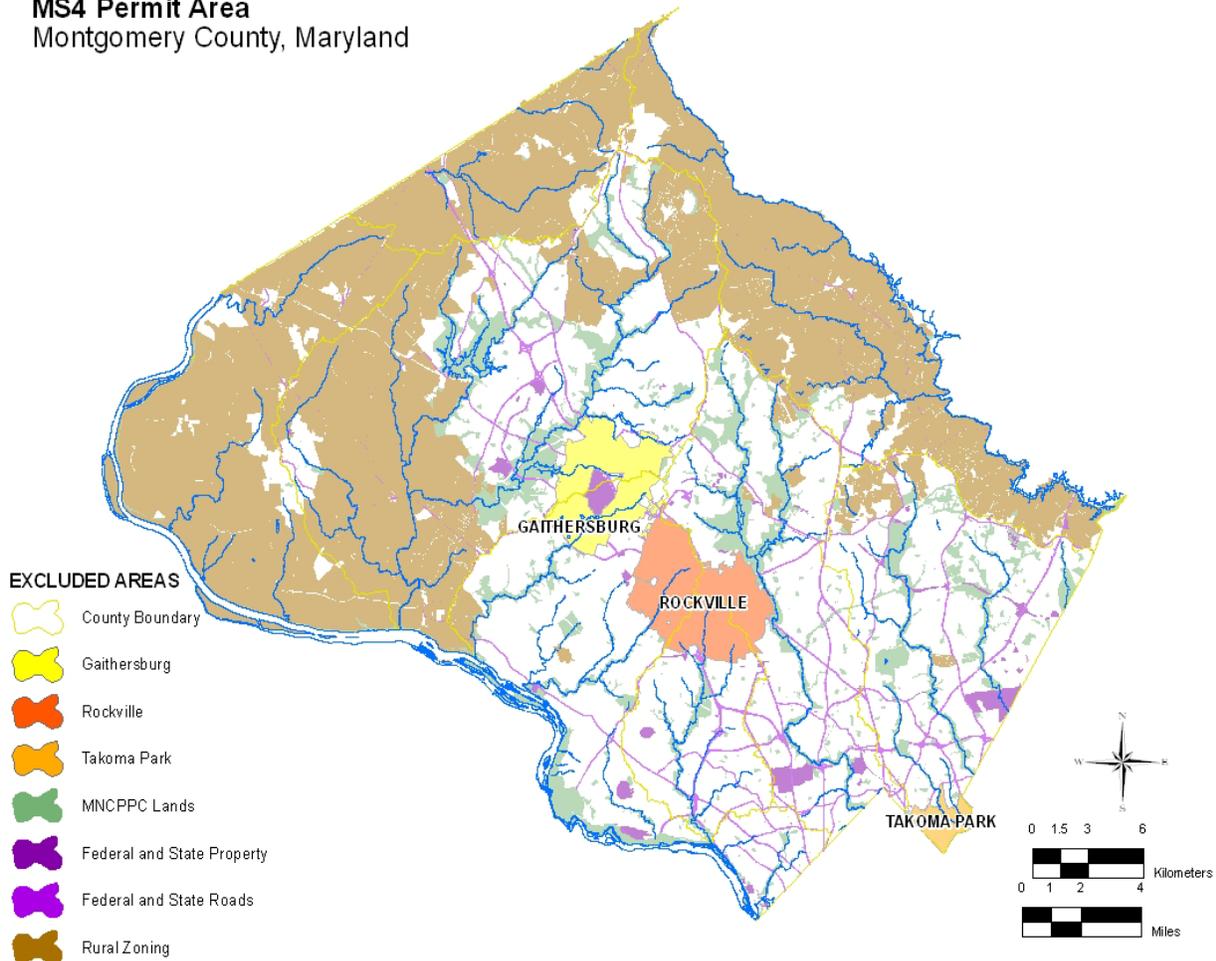


Figure III.G1-County Area Subject to the MS4 Permit

<i>Table III.G1-County Impervious Area Summary</i>		
Description	Area in Acres, From the 2009 Strategy	Area in Acres, Using Updated FY13 Data
Total County Area	324,552	324,552
Total Impervious Area	35,965	35,965
Total County Area Subject to MS4 Permit (1)	138,649	138,649
Total County Impervious Area Subject to MS4 Permit	25,119	25,119
County MS4 Impervious Area with MEP Stormwater Management in 2009	3,661	5,239
Under or Uncontrolled Impervious Area Subject to MS4 Permit	21,458	19,880
1. Exclusions include: Certain zoning codes, parklands, forests, municipalities with own stormwater management programs, state and federal properties, and state and federal maintained roads		

Achieving the 2001 MS4 Permit Watershed Restoration Goal:

The County’s second generation Permit issued in 2001 required the County to restore a watershed or combination of watersheds equaling 10% of Montgomery County’s impervious area not treated to the MEP. The calculated 10% watershed restoration goal was 2,146 acres. Analysis of County SWM BMP CIP projects completed through FY10 showed that they added control to 1,091 impervious acres. Based on the MDE draft guidance published in June 2011, DEP calculated that stream restoration of 20 stream miles added an additional equivalent impervious acreage treatment of 1,055 acres. The total impervious control added through CIP watershed restoration projects was reported in FY11 to be 2,146 impervious acres, meeting the 10% watershed restoration requirement.

Establishing the Current Permit 20% Impervious Control Goal:

The Permit requires the County to restore an additional 20% of the County’s impervious area not currently controlled to the MEP. DEP used 2002 land use data, 2009 urban SWM BMP drainage areas, and 2009 impervious area data to calculate that a 20% impervious area restoration goal would equal 4,292 acres, as presented in the Strategy. The Strategy baseline year was 2009.

The DEP has since improved the accuracy of the Urban BMP database including adding data for hundreds of backlogged SWM BMPs, and updating and correcting SWM BMP drainage areas. This new information included SWM BMPs that were treating impervious area before 2009, but were not credited in the Strategy. It also includes SWM BMPs constructed after Permit issuance in 2010 whose impervious area treatment has not yet been credited towards the Permit’s 20% restoration goal. The new information gathered since 2009 refines the planning data and assumptions used in the Strategy, and allows a more accurate and detailed calculation of controlled and un/under controlled impervious area.

Table III.G2 summarizes the data used in recalculation of the County’s impervious area restoration goal. In the Strategy, the County determined that the impervious area under MS4 control was 25,119 acres, with 3,661 of those acres controlled to the MEP. Using data for SWM BMPs that existed before 2009 but were not credited in the Strategy, the County has determined

that an additional 142 acres were controlled to the MEP by 2009. Based on the MDE guidance published in 2011, the DEP calculated that 2,146 acres of impervious control had been added to meet the 2001 Permit requirements.

The recalculated 2009 area with stormwater control to the MEP is 5,239 impervious acres, leaving 19,880 impervious acres un/under controlled and requiring restoration. Twenty percent of 19,880 acres is 3,976 acres, which is the revised impervious area goal for the 2010 MS4 Permit.

Table III.G2-Recalculation of the County's Impervious Area Restoration Goal	
Description	Impervious Area(Acres)
a. No. of Impervious Acres (IA) under County Control (from the Strategy)	25,119
b. No. of IA Controlled to the MEP (from the Strategy).	2,951*
c. Addition IA Treated by pre FY10 BMPS Not Captured in Strategy	142
d. IA Treated to MEP for 2001 Permit	2,146
e. Total Treated IA Before 2009 (Sum of b + c+ d)	5,239
f. Revised No. of Un/Under Controlled IA (a-e)	19,880
Revised IA Treatment Goal (20% of f)	3,976
*The Strategy determined that 3,661 impervious acres in the County MS4 area had stormwater control in 2009. In FY13, DEP discovered that 710 of those acres were from retrofits completed to meet the impervious acre restoration goal of the 2001 MS4 Permit (2,146 acres). We subtracted those 710 acres from the Strategy's 2009 3,661 impervious acres controlled here to avoid double counting.	

Since 2009, and through FY13, the County has implemented 674 restoration projects adding stormwater control to a total of 405 impervious acres. DEP has also determined from the backlogged and updated SWM BMP data that stormwater controls were added to an additional 143 impervious acres since 2009. The new analysis of County progress towards meeting the 20% impervious restoration goal is shown in Table III.G3, below.

FY14 is the fourth year of the five year MS4 Permit term. DEP expects to refine additional SWM BMP drainage areas by the end of the Permit term. A new County impervious layer was created in 2013 to increase accuracy of the WQPC. A new County impervious baseline will be run with the 2013 impervious data derived from 2012 aerial photography. Using MDE's finalized accounting guidance when it is available, improvements in the SWM BMP location and drainage area data will allow DEP to recalculate pollutant load reductions for wasteload allocations assigned in EPA approved TMDLs.

<i>Table III.G3- FY 13 Restoration Implementation Progress Summary</i>	
Description	Area in Acres, Using Updated Data FY13
2010 MS4 Permit 20% Impervious Area Restoration Goal	3,976
Stormwater Controls Added Since 2009 (From County Backlogged SWM BMP Data)	143
Impervious Area Restored in FY11	24
Impervious Area Restored in FY12	116
Impervious Area Restored in FY13	265
Total Impervious Area Control Implemented Since 2009	548
Impervious Area Associated with Watershed Restoration Projects Under Construction in FY13	185
Impervious Area Associated with Watershed Restoration Projects in Design as of FY13	2,425
Impervious Area Associated with Watershed Restoration Projects for Future Design (FY14 and FY15)	476
Total Acres Restored, Under Construction, In Design, or for Future Design as of FY13	3,634
Remaining Impervious Area to be Treated Through Partnerships for the 2010 MS4 Permit	342

Details for Completed Watershed Restoration Program (CIP) Projects

Table III-G4, below summarizes the number of projects that DEP has completed through FY13.

<i>Table III.G4- FY13 Summary of Watershed Restoration Projects Completed</i>		
Project Status	Number of Projects	Impervious Area Controlled (Acre)
Completed	107	376
RainScapes Rewards Completed Projects	506	11**
RainScapes Neighborhoods Completed Projects	61	2**
Arterial Street Sweeping	n/a	16
Total	674	405
** Final impervious area treated through RainScapes Rewards and RainScapes Neighborhood projects do not include Conservation Landscape Practices and Tree Planting as more guidance in accounting for the equivalent impervious credit is required. Credit for those practices will be taken in the FY14 MS4 Annual Report		

Table III.G5, below provides detail on County projects completed through FY13 in Table III.G4.

Table III.G5- FY13 Summary of Watershed Restoration Projects Completed Through FY13 for Compliance with the 2010 MS4 Permit			
Project Status	Total Drainage Area (Acre)	Impervious Area Controlled (Acre)	
ANACOSTIA RIVER	111.65		83.73
Low Impact Development (LID) Project Total:	36.39		10.00
Arcola Avenue Green Streets - LID37 - SWM#3	0.13	0.05	
Arcola Avenue Green Streets - LID38 - SWM#4A	0.28	0.10	
Arcola Avenue Green Streets - LID39 - SWM#4B	0.28	0.10	
Arcola Avenue Green Streets - LID40 - SWM#5	0.68	0.22	
Arcola Avenue Green Streets - LID41 - SWM#6A	0.79	0.14	
Arcola Avenue Green Streets - LID42 - SWM#6B	0.79	0.14	
Arcola Avenue Green Streets - LID43 - SWM#7	0.29	0.11	
Arcola Avenue Green Streets - LID44 - SWM#8	0.23	0.10	
Arcola Avenue Green Streets - LID45 - SWM#9A	0.20	0.40	
Arcola Avenue Green Streets - LID46 - SWM#9B	0.40	0.40	
Arcola Avenue Green Streets - LID47 - SWM#9C	0.40	0.40	
Arcola Avenue Green Streets - LID48 - SWM#6C	0.79	0.14	
Dennis Avenue Green Streets - Phase 1 - LID53 - SWM#3	0.35	0.10	
Dennis Avenue Green Streets - Phase 1 - LID59 - SWM#8	0.10	0.09	
Dennis Avenue Green Streets - Phase 1 - LID61 - SWM#9A	0.10	0.07	
Dennis Avenue Green Streets - Phase 1 - LID65 - SWM#15	0.17	0.11	
Dennis Avenue Green Streets - Phase 1 - LID68 - SWM#17	2.69	0.72	
Dennis Avenue Green Streets - Phase 1 - LID69 - SWM#19	0.09	0.06	
Dennis Avenue Green Streets - Phase 1 - LID70 - SWM#20	0.08	0.06	
Dennis Avenue Green Streets - Phase 1 - LID75 - SWM#33	0.20	0.07	
Dennis Avenue Green Streets - Phase 2B - LID54 - SWM#3A	0.10	0.09	
Forest Estates Right of Way LID - LID13 - BMP#1	1.04	0.22	
Forest Estates Right of Way LID - LID14 - BMP#3	0.55	0.15	
Forest Estates Right of Way LID - LID15 - BMP#6	0.31	0.12	
Forest Estates Right of Way LID - LID16 - BMP#7	0.09	0.06	

Table III.G5- FY13 Summary of Watershed Restoration Projects Completed Through FY13 for Compliance with the 2010 MS4 Permit

Project Status	Total Drainage Area (Acre)	Impervious Area Controlled (Acre)	
Forest Estates Right of Way LID - LID17 - BMP#8	1.09	0.27	
Forest Estates Right of Way LID - LID18 - BMP#9	0.75	0.23	
Forest Estates Right of Way LID - LID19 - BMP#10	0.38	0.12	
Forest Estates Right of Way LID - LID20 - BMP#12	0.13	0.13	
Forest Estates Right of Way LID - LID21 - BMP#13	0.80	0.32	
Forest Estates Right of Way LID - LID22 - BMP#18	1.91	0.56	
Forest Estates Right of Way LID - LID23 - BMP#21	0.34	0.15	
Forest Estates Right of Way LID - LID24 - BMP#22	0.56	0.28	
Forest Estates Right of Way LID - LID25 - BMP#23	0.46	0.21	
Forest Estates Right of Way LID - LID26 - BMP#25	2.32	0.48	
Forest Estates Right of Way LID - LID27 - BMP#26	0.78	0.26	
Forest Estates Right of Way LID - LID28 - BMP#27	0.83	0.42	
Forest Estates Right of Way LID - LID29 - BMP#41	0.44	0.19	
Forest Estates Right of Way LID - LID30 - BMP#28	0.15	0.07	
Forest Estates Right of Way LID - LID31 - BMP#30	0.21	0.11	
Forest Estates Right of Way LID - LID32 - BMP#35	0.39	0.20	
Forest Estates Right of Way LID - LID33 - BMP#36	0.23	0.11	
Forest Estates Right of Way LID - LID34 - BMP#37	0.30	0.14	
Forest Estates Right of Way LID - LID35 - BMP#43	0.28	0.15	
Forest Estates Right of Way LID - LID36 - BMP#44	0.22	0.11	
White Oak LID (Lockwood Drive and Stewart Lane)	12.69	1.27	
Pavement Removal Total:	0.09		0.09
Arcola Avenue Green Streets - LID - SWM#6B Pavement Removal	0.01	0.01	
Arcola Avenue Green Streets - LID - SWM#6C Pavement Removal	0.01	0.01	
Arcola Avenue Green Streets - LID - SWM#9C Pavement Removal	0.02	0.02	
Arcola Avenue Green Streets - LID38 - SWM#4A Pavement Removal	0.01	0.01	
Arcola Avenue Green Streets - LID39 - SWM#4B Pavement Removal	0.01	0.01	
Arcola Avenue Green Streets - LID40 - SWM#5 Pavement Removal	0.01	0.01	
Arcola Avenue Green Streets - LID41 - SWM#6A Pavement Removal	0.00	0.00	
Arcola Avenue Green Streets - LID43 - SWM#7 Pavement Removal	0.01	0.01	

Table III.G5- FY13 Summary of Watershed Restoration Projects Completed Through FY13 for Compliance with the 2010 MS4 Permit			
Project Status	Total Drainage Area (Acre)	Impervious Area Controlled (Acre)	
Arcola Avenue Green Streets - LID44 - SWM#8 Pavement Removal	0.01	0.01	
Stream Restoration Total:	0.00		62.73
Batchellors Forest - Batchellors Run East - Bank Erosion	0.00	6.34	
Batchellors Forest - Batchellors Run East - Bank Erosion -Reforest	0.00	6.34	
Batchellors Forest - Batchellors Run East - Fish Blockage	0.00	6.34	
Bryants Nursery Run I - Unstable Stream Channel	0.00	8.71	
Bryants Nursery Run II - Unstable Stream Channel	0.00	8.71	
Road Culvert Stabilization - 821 McCeney Avenue (McCeney at Harper)	0.00	0.40	
Road Culvert Stabilization - Burnt Mills Avenue at Hoyle Avenue	0.00	0.75	
Stream Bank Stabilization through Gabion Walls - Woodman Ave Median	0.00	0.00	
Stream Restoration - Bucknell Drive Median Stream Channel	0.00	3.50	
Stream Restoration through Gabion Walls - 9512 Columbia Blvd	0.00	0.00	
Upper Northwest Branch - Mainstem	0.00	21.65	
Stormwater Outfall Stabilization Complete by DOT Total:	0.00		0.00
Outfall Stabilization - 13717 Mills Avenue	0.00	0.00	
Outfall Stabilization - 1517 Menlee Drive	0.00	0.00	
Outfall Stabilization - 611 Lamberton Drive	0.00	0.00	
Outfall Stabilization - Wayne Avenue at Sligo Creek Parkway	0.00	0.00	
Stormwater Pond Retrofit Total:	75.17		10.91
Fairland Ridge Dry PD	53.45	7.36	
Peachwood I	21.72	3.54	
CABIN JOHN CREEK	0.00		49.71
Stream Restoration Total:	0.00		49.71
Lower Booze Creek	0.00	46.46	
Lower Booze Creek - Side Channel	0.00	2.00	
Stream Restoration - 9014 Marseille Drive	0.00	1.25	
Stormwater Outfall Stabilization Complete by DOT Total:	0.00		0.00
Outfall Stabilization - 7208 Helmsdale Road	0.00	0.00	

Table III.G5- FY13 Summary of Watershed Restoration Projects Completed Through FY13 for Compliance with the 2010 MS4 Permit			
Project Status	Total Drainage Area (Acre)	Impervious Area Controlled (Acre)	
POTOMAC DIRECT	116.40		116.26
Low Impact Development (LID) Project Total:	1.25		0.00
Cold Spring Elementary School	1.25	0.00	
Stream Restoration Total:	0.00		10.81
Little Falls - Somerset	0.00	5.28	
Little Falls III	0.00	5.28	
Road Culvert Stabilization - Circle Drive at Spring Drive	0.00	0.25	
Existing Stormwater Facility Partial Impervious Credit Total:	115.14		105.45
Shady Grove Development Park (Shell Oil) - Northern Facility	44.79	49.60	
Shady Grove Development Park (Shell Oil) - Southern Facility	70.36	55.85	
ROCK CREEK	218.18		122.58
Low Impact Development (LID) Project Total:	2.86		1.26
Aspen Hill Library BMP-103	2.04	0.47	
Aspen Hill Library BMP-104	0.32	0.12	
Kensington Park Library BMP-201	0.41	0.22	
Kensington Park Library BMP-203	0.09	0.06	
Kensington Park Library BMP-204	0.00	0.07	
Kensington Park Library BMP-205	0.00	0.32	
Pavement Removal Total:	0.02		0.02
Aspen Hill Library BMP-104 - Pavement Removal	0.01	0.01	
Kensington Park Library - Pavement Removal	0.01	0.01	
Stormwater Outfall Stabilization Complete by DOT Total:	0.00		11.06
Joseph's Branch Phase 3B Spruell Drive	0.00	10.06	
Stream Outfall Restoration - 4305 Havard Street	0.00	1.00	
New Stormwater Pond	215.30		110.24
NIH Pond	215.30	110.24	
ROCKY GORGE DAM	0.00		0.00
Stormwater Outfall Stabilization Complete by DOT Total:	0.00	0.00	
Outfall Stabilization - 1012 Parrs Ridge	0.00	0.00	
SENECA CREEK	3.11		3.64

Table III.G5- FY13 Summary of Watershed Restoration Projects Completed Through FY13 for Compliance with the 2010 MS4 Permit			
Project Status	Total Drainage Area (Acre)	Impervious Area Controlled (Acre)	
Low Impact Development (LID) Project Total:	3.11		1.79
Ridgeview Middle School LID Retrofits - LID77 - BMP #101	1.08	0.77	
Ridgeview Middle School LID Retrofits - LID77 - BMP #105	0.61	0.19	
Ridgeview Middle School LID Retrofits - LID78 - BMP #102	0.49	0.33	
Ridgeview Middle School LID Retrofits - LID78 - BMP #104	0.60	0.32	
Ridgeview Middle School LID Retrofits - LID79 - BMP #103	0.33	0.18	
Stream Restoration Complete by DOT Total:	0.00		1.85
Road Culvert Replacement - Davis Mill Road at Wildcat Road Culvert	0.00	1.00	
Road Culvert Replacement - Prathertown Road Culverts	0.00	0.35	
Stream Restoration - 9412 Emory Grove Road	0.00	0.50	
Stormwater Outfall Stabilization Complete by DOT Total:	0.00		0.00
Outfall Stabilization - Wightman Road at Aspenwood Culverts	0.00	0.00	
TOTAL FOR ALL WATERSHEDS	449.34		375.92
<i>Note: Impervious Acre controlled for Stream Restoration based on MDE Guidance, June 2011.</i>			

Details for Watershed Restoration Projects (CIP) Under Construction

Projects under construction through DEP’s Watershed Restoration (CIP) program in FY13 will treat another 185 acres of uncontrolled impervious area, and are presented in Table III.G6, below.

Table III.G6- Summary of Watershed Restoration Projects Under Construction FY13		
Watershed and Project	Proposed Impervious Drainage Area (Acre)*	
ANACOSTIA RIVER		146.38
LID Projects Under Construction Total:		37.90
Dennis Avenue Green Streets - Phase 1A-1B, 2A-2B	10.35	
Dennis Avenue Green Streets - Phase 3A-B, 4	9.05	
Sligo Park Hills - DOT Partnership	18.50	

Table III.G6- Summary of Watershed Restoration Projects Under Construction FY13		
Watershed and Project	Proposed Impervious Drainage Area (Acre)*	
Stream Restoration Under Construction Total:	78.04	
Batchellors Run I - Batchellors Forest-no riparian buffer golf course	10.03	
Batchellors Run II - Batchellors Forest - Bank erosion - 159	7.92	
Batchellors Run II - Batchellors Forest - eroding banks - 160	7.92	
Sherwood Forest I	29.04	
Woodlawn - Sandy Spring - bank erosion	7.71	
Woodlawn - Sandy Spring - riparian buffer lacks/sediment in culvert	7.71	
Woodlawn - Sandy Spring West - bank erosion left bank at dump site	7.71	
Stormwater Pond Retrofit Under Construction Total:	30.44	
Montgomery Auto Sales Park Regional	21.50	
Naples Manor Dry Pond	8.94	
ROCK CREEK		38.74
Low Impact Development (LID) Project Under Construction:		3.42
Donnybrook Drive	3.42	
Stream Restoration Under Construction:		19.64
Lower Donnybrook	19.64	
Stormwater Pond Retrofit Under Construction Total:		15.68
Georgian Colonies (Condominium Associates #1-4)	4.08	
Georgian Woods Colonies (Georgian Colonies Condo Assoc. #5)	5.00	
Silver Spring Ride-on/Brookville Bus Depot	6.60	
TOTAL FOR ALL WATERSHEDS		185.12
*The proposed impervious drainage area is an estimate and does not reflect the final project computations		

Details of Projects in Design by DEP's Watershed Restoration (CIP) Program in FY13

A summary of projects under design in FY13 are presented in Table III.G7. DEP has 30 LID projects, 68 stormwater pond retrofits, 15 existing stormwater facilities who are being assessed for degree of stormwater controlled, and 14 stream restoration projects currently in design, projected to treat another estimated 2,424.86 acres of impervious area. DEP anticipates constructing approximately 50 projects in FY14.

Table III.G7- Summary of Watershed Restoration Projects Under Task Order for Design FY13			
Watershed and Project	Number Of Projects	Proposed Impervious Drainage Area (Acre)*	
Anacostia River	42		452.44
LID Project in Design	21	78.35	
Stream Restoration in Design	6	165.34	
Stormwater Pond Retrofit in Design	8	91.06	
Existing Stormwater Facility MEP Verification **	7	117.69	
Cabin John Creek	4		25.89
Stormwater Pond Retrofit in Design	4	25.89	
Potomac Direct	20		293.01
LID Project in Design	1	1.31	
Stream Restoration in Design	4	61.53	
Stormwater Pond Retrofit in Design	14	221.16	
Existing Stormwater Facility MEP Verification **	1	9.01	
Rock Creek	14		285.09
LID Project in Design	6	46.35	
Stream Restoration in Design	1	32.20	
Stormwater Pond Retrofit in Design	6	203.26	
Existing Stormwater Facility MEP Verification **	1	3.28	
Rocky Gorge Dam	1		8.98
LID Project in Design	1	8.98	
Seneca Creek	47		1,359.45
LID Project in Design	1	9.60	
Stream Restoration in Design	3	86.60	
Stormwater Pond Retrofit in Design	36	1,079.63	
Existing Stormwater Facility MEP Verification **	7	183.62	
Total for All Watersheds	128		2,424.86
LID=low impact development *The proposed impervious drainage area is an estimate and does not reflect the final project computations **Existing stormwater facilities, previously not credited to the MS4 permit which are being verified they meet the New Stormwater Regulation Requirements. A Site Specific Report will be generated once the facility is fully evaluated to determine credit towards MS4 Permit requirements.			

Details of Projects in Design by DEP's Watershed Restoration (CIP) Program in FY14-FY15

A summary of projects to be designed in FY14-FY15 are presented in Table III.G8. DEP has 18 LID projects, 18 stormwater pond retrofits, and 13 stream restoration projects expected to be in design in FY14-FY15 design. These projects are projected to treat another estimated 476 acres of impervious area.

Table III.G8- Summary of Watershed Restoration Projects Under Task Order for Design FY14-15			
Watershed and Project	Number	Proposed Impervious	
	Of Projects	Drainage Area (Acre)*	
Anacostia River	15		99.50
Low Impact Development	11	69.50	
Stream restoration	4	30.00	
Cabin John Creek	3		27.00
Low Impact Development	1	2.00	
Stream restoration	2	25.00	
Potomac Direct	2		0.00
Stream restoration	2	0.00	
Rock Creek	5		94.30
Low Impact Development	3	14.3	
Stream restoration	2	80.00	
Rocky Gorge Dam	1		1.40
Low Impact Development	1	1.40	
Seneca Creek	23		134.98
Low Impact Development	2	3.15	
Stormwater Pond retrofit	18	113.82	
Stream restoration	3	18	
Other Budgeted FY15 Projects*			118.5
Stormwater Pond retrofit*		48.5	
Stream restoration*		70	
Total for All Watersheds	49		475.68

*individual projects to be identified after completion of remaining Watershed Assessments in September 2014

Accounting for the Remaining Impervious Area to be Treated for the Current Permit Cycle

The remaining 342 impervious acres shown in Table III.G3, above, will be met through internal and external partnership projects performed within the County's MS4 area. These projects for example may include efforts to treat uncontrolled impervious surfaces through facility modification and modernizations performed by Montgomery County Department of Transportation, Department of General Services, and Public Schools.

Table III.G9 presents a summary of projects identified through watershed assessments as potential future projects. This summary does not include projects identified in the new Patuxent, Lower Monocacy, Potomac Direct, and Seneca Creek watershed studies, as these studies are not yet complete.

Table III.G9- Summary of Watershed Restoration Potential Opportunity Projects Identified for Future Consideration			
Watershed and Potential Opportunity Project Type	Number of Projects *	Proposed Impervious Area Treated(Acres) †	
ANACOSTIA RIVER	904		5476.24
LID Project	406	2,638.57	
Existing Stormwater Facility MEP Verification **	18	174.72	
Stream Restoration	236	1,516.87	
Stormwater Outfall Stabilization Potential Opportunity:	1	4.50	
New Stormwater Pond	7	66.06	
Stormwater Pond Retrofit	202	1,072.79	
New Wetland	34	2.73	
CABIN JOHN CREEK	31		841.97
LID Project	9	65.98	
Existing Stormwater Facility MEP Verification **	2	29.00	
Stream Restoration	16	679.23	
New Stormwater Pond	2	7.60	
Stormwater Pond Retrofit	2	60.16	
LOWER MONOCACY RIVER	1		0.77
LID Project	1	0.77	
POTOMAC DIRECT	80		2469.19
LID Project	8	13.05	
Existing Stormwater Facility MEP Verification **	11	161.46	
Stream Restoration	45	907.93	
Stormwater Pond Retrofit	16	1,386.75	
ROCK CREEK	74		1602.79
LID Project	24	381.37	
Existing Stormwater Facility MEP Verification **	12	56.14	
Stream Restoration	17	570.90	
New Stormwater Pond	3	497.00	
Stormwater Pond Retrofit	18	97.39	
ROCKY GORGE DAM	28		938.88
LID Project	8	49.33	
Existing Stormwater Facility MEP Verification **	3	47.87	

Stream Restoration	14	754.94	
Stormwater Pond Retrofit	3	86.73	
SENECA CREEK	106		1,815.61
LID Project	11	74.91	
Existing Stormwater Facility MEP Verification **	11	65.19	
Stream Restoration	35	977.90	
Stormwater Pond Retrofit	49	697.61	
UPPER PATUXENT	1		1.98
LID Project	1	1.98	
TOTAL FOR ALL WATERSHEDS	1,225		13,147.43
<p>LID=low impact development * The Potential Opportunity Projects have not been determined to be fully feasible and some may be dropped during the planning design stage **Existing stormwater facilities, previously not credited to the MS4 permit which are being verified they meet the New Stormwater Regulation Requirements. A Site Specific Report will be generated once the facility is fully evaluated to determine credit towards MS4 Permit requirements. † The proposed impervious drainage area is an estimate and does not reflect final project computations.</p>			

Implementation Rate and Challenges- Meeting with MDE November 16, 2012

In June 2011, subsequent to development of the Strategy, MDE released guidance to account for impervious area treated and wasteload reductions accomplished by stormwater BMPs. The DEP met with MDE in October 2011 to discuss and resolve differences between the MDE guidance and assumptions used in developing the Strategy. The DEP summary from that meeting and the assumptions that will be used for future accounting of impervious treatment to the MEP can be found in Appendix J.

On November 16, 2012, DEP met with MDE to discuss the County’s progress and approach towards meeting the Permit’s watershed restoration requirements. A meeting summary is included on the CD in Appendix J. In that meeting, DEP discussed challenges to meeting MDE’s definition of MEP while designing and constructing restoration practices. Challenges include negotiation with property owners, physical property constraints, utility constraints, permitting, and constructability issues. MDE agreed to consider a project as MEP if it was constructed to achieve the maximum water quality volume (WQv), defined in the June 2011 Guidance Document as 1” of rainfall, after accounting for all site constraints. DEP will provide MDE with post implementation documentation assessing MEP for each restoration site after site constraints are considered.

The challenge of property owner resistance to SWM retrofits was also discussed, specifically resistance to converting dry SWM ponds to wet. MDE agreed that retrofit of a dry SWM pond to control the channel protection volume (CPv) would provide MEP impervious area credit only when all options to provide WQv are determined to be infeasible. MDE will review each situation before approving full MEP.

The DEP has encountered one example of property owner resistance to date. The homeowner's association (HOA) property owner of a dry SWM pond supports DEP's watershed restoration goals and has agreed to upgrade their dry SWM pond to capture the full CPv. The HOA was concerned about maintenance costs of a wet pond, specifically algae control. In addition, DEP determined that physical site constraints would limit the amount of WQv controlled for a wet pond retrofit. DEP is in the design phase of this project and will submit a site specific report in FY14 documenting site constraints, the WQv and CPv calculations, as well documentation of the HOA approval of the dry pond retrofit only.

Current and Future Implementation

In FY13, DEP awarded two contracts for support critical to accelerating the watershed restoration implementation rate. One contract is for comprehensive water resources engineering, which will provide support in all aspects of watershed restoration, project design, analysis, and construction. The second contract is for a MS4 Permit implementation consultant team that will provide program management support in planning, implementing, tracking, monitoring and oversight of watershed restoration projects, including watershed assessments. In FY13, 17 Task Orders were issued for the design of over 48 projects that will treat an estimated 676 impervious acres.

In addition to staff augmentation, DEP has revamped its public correspondence and public meeting materials to help better engage stakeholders. By the end of FY14, DEP will have standardized meeting presentations, project fact sheets, mailings, an upgraded interactive mapping website, and new project web pages. These outreach efforts focus on County residents who live around the proposed projects, and the standardized outreach materials help accelerate individual project schedules. Citizens indicate that the presentations are easy to understand, and appreciate that the public has typically two or more opportunities to participate in public meetings pertaining to their locally proposed project.

Highlights of FY13 Watershed Restoration Projects:

Figure III.G10, below shows highlighted projects the DEP has constructed as part of meeting its goals of the MS4 Permit.

Table III.G10- Highlighted Watershed Restoration Projects for FY14

	Project Name	Impervious Acres Captured:	Photo
<i>Stormwater Pond</i>	NIH Stormwater Management Facility (New Pond)	112.2 Acres	
<i>Stream</i>	Booze Creek	46.5 Acres	
<i>Public Property LID</i>	Ridgeview Middle School	1.79 Acres	

<i>Roadway Low Impact Development (LID)</i>	Arcola Avenue Green Streets	2.39 Acres	
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Hollywood Branch Stream Restoration Project:

The Hollywood Branch Stream Restoration was identified during the prior Permit cycle as a project required meeting watershed restoration goals. The Project will be completed during the current Permit term, and will mitigate stream degradation caused by past suburban development without adequate stormwater controls. Hollywood Branch is located in an eastern Montgomery County suburb and is a second order tributary to Paint Branch (a tributary of the Anacostia River). The DEP developed stream restoration concept plans for the 2.5 mile long reach and conducted the first public meeting in 2009. A stream walk was conducted with residents on May 16, 2012 to obtain any final comments based upon the stream restoration designs. The project is currently in final design and DEP is submitting required permits. Due to the timing of the final design and obtaining remaining easements from private property owners, the stream closure has postponed the instream construction for this project until summer of 2014. Stream restoration goals include: stabilizing erosive areas, improving floodplain access, enhancing riparian conditions, enhancing stream conditions and improving overall aquatic resources.



Figure III.G2- Pre-restoration Conditions at Hollywood Branch (Photos taken: 1/4/12)

Public Property LID:

During FY13, the DEP continued to design and implement LID projects on school grounds, at libraries and community centers and along county roadways within the public right-of-way.

MCPS Properties

In 2010, when MCPS was added to the County's Permit as a co-permittee, DEP and MCPS executed a memorandum of understanding (MOU) defining relative roles and responsibilities concerning Permit requirements. The MOU included provisions for identification and construction of SWM BMPs, including LID practices, on MCPS properties through DEP programs. DEP is working with MCPS to construct stormwater control above that required for new school construction and modernization, and to construct SWM BMP retrofits on other MCPS properties. The MOU also provided for MCPS staff education on SWM BMPs function, and correct non-structural maintenance.

In FY13, MCPS completed 160 stormwater projects that incorporated ESD to the MEP, as required by new storm water management regulations, through the use of vegetative roofs, bioretention and bio filtering facilities, micro bioretention structures, porous pavements and other innovative devices, at a cost of \$10,124,553.

In FY13, DEP continued the assessment of 61 schools located within the Little Seneca Creek, Rock Creek, Little Falls, Cabin John, Muddy Branch, Watts Branch, and Little Bennett subwatersheds for LID retrofit opportunities. The assessments should be complete in FY14. LID retrofit opportunities at these 61 schools will be added to an existing inventory of LID retrofit opportunities at 70 schools (completed in October 2011). The LID retrofit inventory will then include opportunities from 131 schools or 60 % of all schools in the county. DEP meets every two months with Montgomery County Public Schools to coordinate implementation of LID retrofit projects on school sites. The LID retrofit inventory provides a vital planning tool for the coordination meetings.

During FY13, DEP constructed eight (8) LID retrofit projects, providing water quality treatment for a total 2.75 impervious acres, at Cold Spring Elementary School and Ridgeview Middle School. Engineering and design for LID retrofit projects are underway at five additional schools (Olney Elementary School, Rosa Parks Middle School, Oakview Elementary School, Strathmore Elementary School and White Oak Middle School), with construction expected in FY15. Due to safety concerns, all construction activities at MCPS must occur during the summer months when schools are closed, which may result in delays.

Public Facilities

The DEP completed construction of 6 LID projects that treat 1.26 impervious acres at Aspen Hill and Kensington Libraries. LID project engineering and design began in March 2013 at two county owned facilities, Little Falls Library and Bushey Drive Recreation Center, with construction expected in FY15.

Public Right of Way- County “Green Streets” Program

“Green Streets” are roadways where LID practices are constructed within the street right-of-ways to capture stormwater runoff. DEP collaborates with DOT to implement “Green Street” projects in areas where DOT is schedule to do roadway maintenance or renovation. “Green Streets” are part of a County initiative to capture stormwater runoff in neighborhoods with minimal stormwater controls and little open space to install large stormwater practices. They also create aesthetically attractive streetscapes, provide natural habitat, and help visually to connect neighborhoods, schools, parks, and business districts.

The DEP continued to work on implementing LID projects within the ROW along Amherst Ave (2 projects), Arcola Ave (12 projects), Dennis Ave (9 projects), Breewood neighborhood, Forest Estates neighborhood (24 projects), Sligo Park Hills neighborhood, White Oak – Stewart Ln & Lockwood Dr. (12 projects). Figure III.G3, blow, shows the locations of Green Streets Projects.

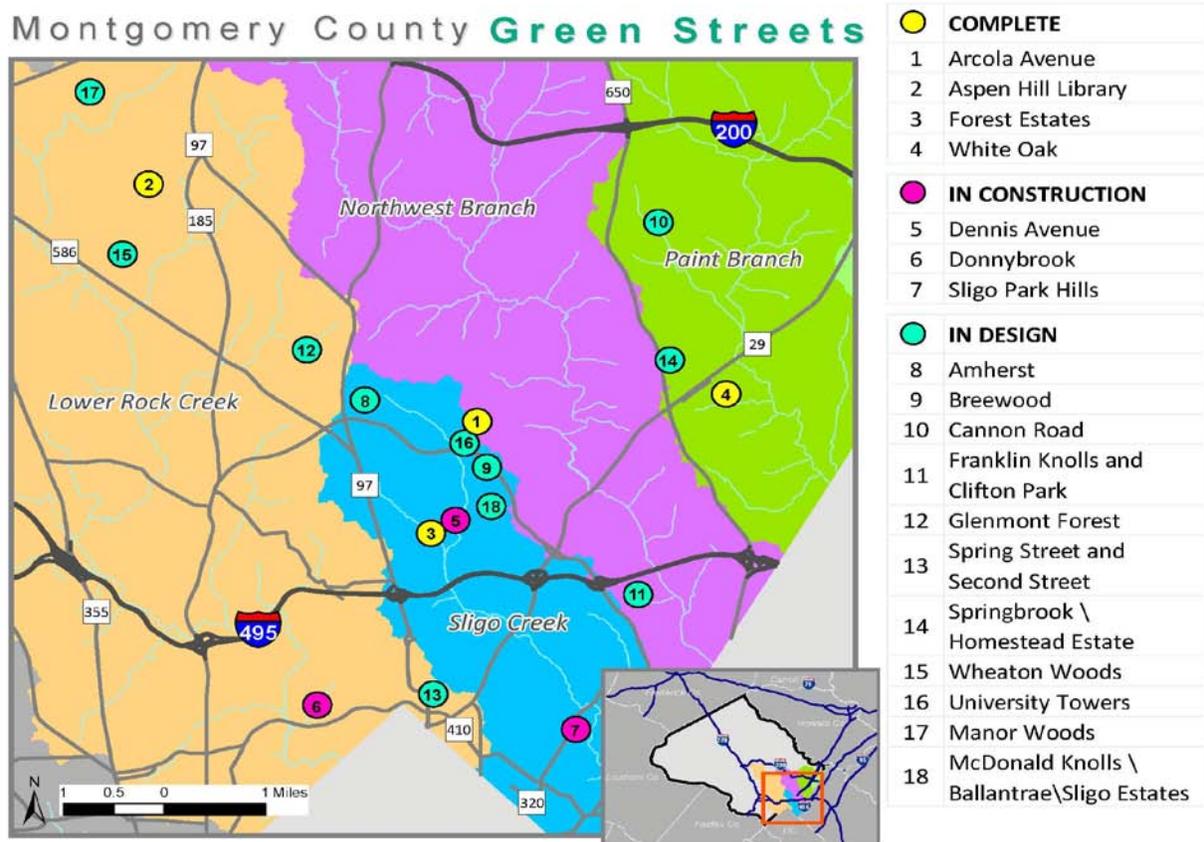


Figure III.G3- Locations of Montgomery County’s Green Streets Projects, FY13



Figure III-G4. Completed Dennis Avenue Green Streets Curb Extensions (Photo taken 9/26/13)



Figure III.G5- Completed Forest Estates Green Streets Project

Private Property LID - RainScapes Program

The DEP's RainScapes program promotes and implements environmentally friendly landscaping and small scale stormwater control and infiltration projects on residential, institutional, and commercial properties to reduce stormwater pollution and achieve measurable water quality benefits. DEP offers technical and financial assistance (funded by the County's WQPC) to encourage property owners to implement eligible RainScapes techniques, such as rain gardens, tree planting, rain barrels, and conservation landscaping. As a program overall, over 13 impervious acres are being controlled as of the end of 2013 for at least the first inch of rain; many projects controlled up to the 1 year storm event.

As of FY13, the program has been developed into a multi-strand program consisting of five identifiable program elements. All program elements are designed to provide information and training to residents and landscape professionals, as well as incentives and project delivery to County sites. Information on two elements- RainScapes Rewards, and RainScapes Neighborhoods, can be found below. The remaining elements are focused on RainScapes outreach, and are described in Part III.E.7, Public Education and Outreach.

RainScapes Rewards provides rebates to residents to implement qualified small scale stormwater projects. In FY13, 160 new RainScapes Rewards projects were reviewed for residential and private institutional properties. 110 projects were accepted, including 18 tree canopy projects. The RainScapes Rewards projects in FY13 met or exceeded the water quality volume control for an additional 1.5 acres of previously uncontrolled impervious area.

By the end of the FY13, 447 RainScapes Rewards Rebate projects have been completed in the County, with a broad geographic distribution. RainScapes Rewards Rebate projects are providing a visible and distributed presence for stormwater management on private lots across the County and are serving to raise both public awareness and action. Canopy tree and conservation landscape projects, while not having a direct metric to measure their impervious area stormwater control contribution, represent 43% of installed projects. Figure III.G shows a summary of RainScapes Rewards project locations that have been installed Countywide as of the end of FY13.

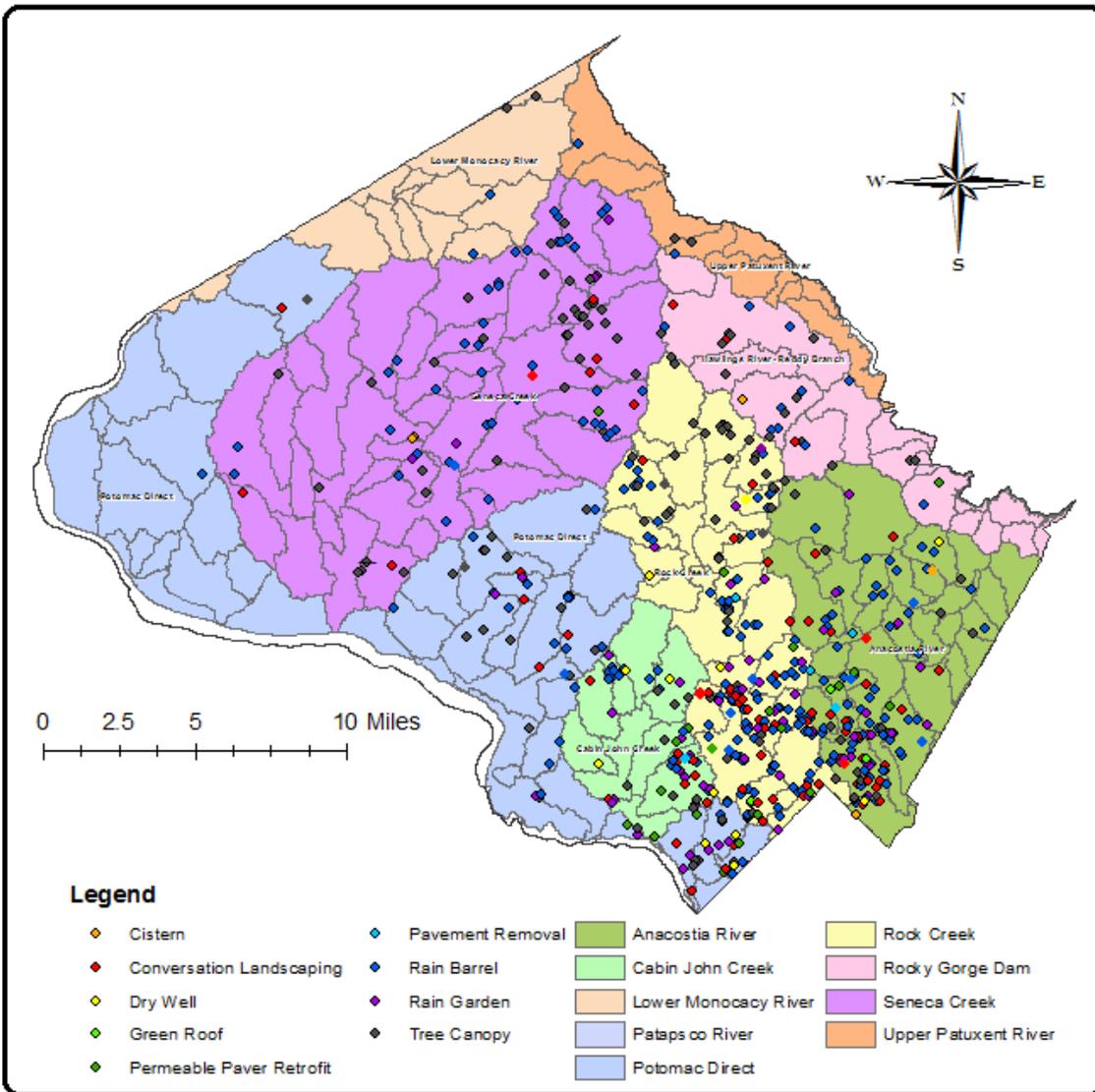


Figure III.G6- RainScapes Rewards Projects Countywide Through FY13

RainScapes Neighborhoods Program evaluates small, targeted neighborhood-scale catchments for on-lot stormwater runoff reduction installed by DEP and affiliated watershed groups. This program element targets neighborhoods in priority watersheds with active citizens' group or watershed organizations to leverage education and outreach efforts. Current priority watersheds

are in the Anacostia and Rock Creek. Projects locations considerations are also combined when possible with the DOT ROW and DEP watershed restoration projects (for example, Breewood Tributary, Forest Estates and Sligo Park Hills), in order to maximize the amount of runoff reduction achievable. The Program has a goal of 30% participation within a catchment area.

In FY12, DEP completed installation of residential rain gardens in Garrett Park, and began outreach, site assessments, and design in the Sligo Park Hills, Forest Estates, Breewood, Wheaton Woods, Ken Gar and the Town of Chevy Chase neighborhoods. In FY13, 1.2 impervious acres were treated in Forest Estates and Sligo Park Hills, for a total of 2 impervious acres treated to date in this permit period. Implementation will continue in FY14. Figure III-G5 shows the locations of FY13 RainScapes Neighborhood projects.

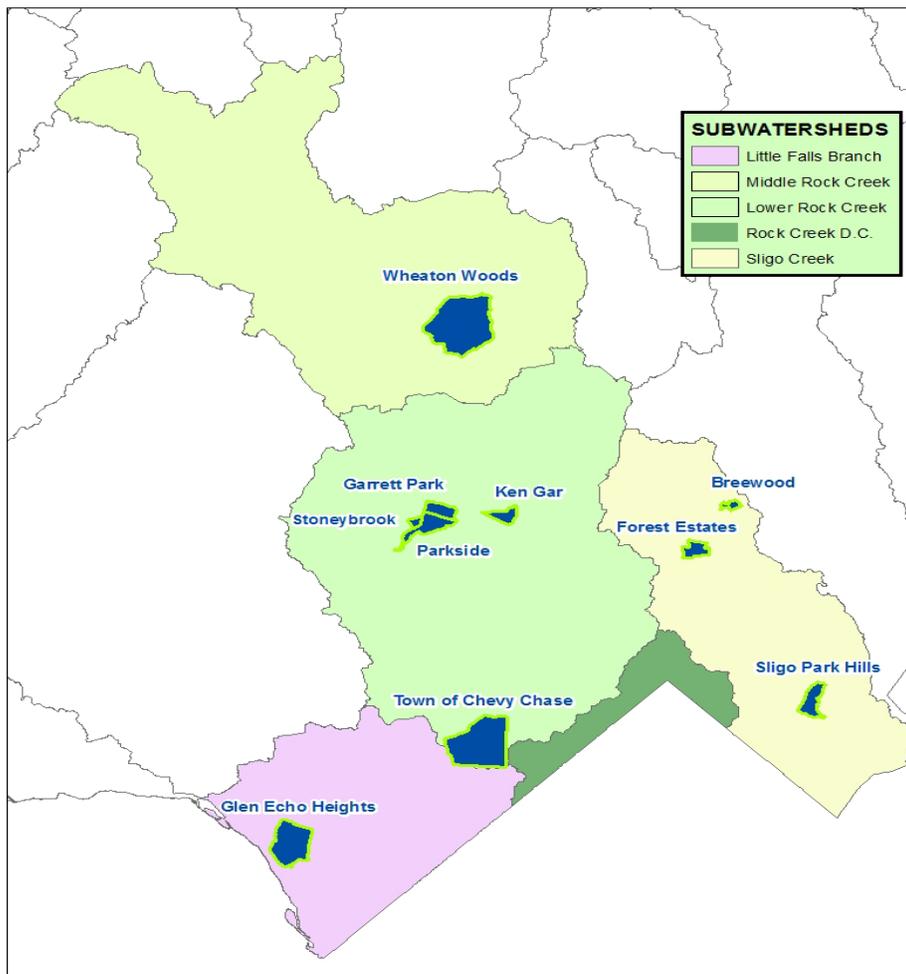


Figure III.G7- Locations of FY13 RainScapes Neighborhoods

FY13 Watershed Restoration Costs:

The Permit requires the County to submit estimated costs and actual expenditures for watershed restoration program implementation. Table III-G8 shows a summary of FY10 thru FY13 costs for both watershed assessments and watershed restoration projects.

Table III.G11-. FY10 –FY13 Capital Improvement Program Costs for Watershed Assessment and Restoration				
Fiscal Year (FY)	FY10	FY11	FY12	FY13
Total annual cost for watershed assessment	\$433,800	\$749,130	\$502,244	\$879,435
Total annual cost for watershed restoration	\$2,942,100	\$3,904,222	\$8,168,571	\$9,274,295
Total Costs	\$3,375,900	\$4,653,352	\$8,670,815	\$10,153,730

During FY13, DEP continued to identify funding sources to support project implementation. The six-year SWM CIP budget for FY13-FY18 reflect the significant increase in implementation that will be needed to meet the Permit requirement for adding runoff management. As shown in Tables III.G12 and III.G13, the approved budget for FY13 is \$25,000,000 compared to \$11,445,000 for FY12 and \$8,888,000 for FY11.

The approved FY13-FY18 SWM Program totals \$235 million, an increase of \$128.7 million, or 121 percent from the amended approved FY11-FY16 program of \$106.3 million. This increase in stormwater management activity will be financed primarily through water quality protection bonds. The debt service for these bonds will be supported by the County’s WQPF. The budget assumes \$60 million in State aid based on the State’s expressed interest in enacting legislation to support stormwater management efforts.

Highlights of the FY13-FY18 SWM CIP Budget include expanded 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. The DEP will also expand the design and construction of /LID SWM facilities, County facilities, roads and schools.

Table III.G12- Department of Environmental Protection FY11-16 Stormwater Management (SWM) Capital Improvement Program (in \$000s) (Approved May 2011)							
Project Type	CIP Cycle Total	FY11	FY12	FY13	FY14	FY15	FY16
SWM Retrofit	52,010	1,785	2,425	11,000	11,500	14,400	10,900
Public Property Low Impact Development	27,975	3,475	4,900	4,900	4,900	4,900	4,900
Miscellaneous Stream Valley Improvement	8,370	1,395	1,395	1,395	1,395	1,395	1,395
SWM Facility Planning	7,025	925	1,200	1,350	1,350	1,100	1,100
SWM Retrofit Anacostia	1,645	0	175	450	510	510	0
Major Structural Repair	9,250	1,300	1,350	1,600	1,650	1,650	1,700
Total	\$106,275	\$8,880	\$11,445	\$20,695	\$21,305	\$23,955	\$19,995

Table III.G13- Department of Environmental Protection Approved (May 2012) FY13-18 Stormwater Management (SWM) Capital Improvement Program Budget (in \$000s)							
Projects	CIP Cycle Total	FY13	FY14	FY15	FY16	FY17	FY18
SWM Retrofit	127,010	11,710	19,700	20,600	20,000	25,000	30,000
SWM Retro- Government Facilities. Low Impact Development	11,425	1,125	1,900	2,100	2,100	2,100	2,100
SWM Retrofit- Roads	49,425	6,015	7,410	9,000	9,000	9,000	9,000
SWM Retrofit Schools	20,100	1,270	1,010	3270	4,850	4850	4,850
Miscellaneous Stream Valley Improvement	9,870	2,070	2,070	2,070	1,220	1,220	1,220
SWM Facility Planning	6,750	1,150	1,150	1,150	1,100	1,100	1,100
SWM Retrofit Anacostia	1,620	310	310	310	230	230	230
Major Structural Repair	8,800	1,350	1,450	1,500	1,500	1,500	1,500
Total	235,000	25,000	35,000	40,000	40,000	45,000	50,000

Progress Towards Meeting Wasteload Allocations for EPA Approved TMDLs:

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. Implementation plan development is addressed in Part III. J. Total Maximum Daily Loads of this report.

The County successfully submitted its Strategy to meet Permit requirements, including the TMDL WLAs in February 2011, one 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.

Table III.G14, 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 June 2011 Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated. The FY13 pollutant load reduction information can also be found in this report's electronic (CD) attachment in Appendix A, MDENPDES11.mbd, Parts G., G.1., and G.3.

The Strategy land cover loading rates and BMP reduction efficiencies do not match those published in the subsequent June 2011 MDE guidance. DEP has been working to update impervious area data, along with updating urban BMP data to include over one thousand new structures with their delineated drainage areas. Once the data is complete, DEP will run the WTM again and address the inconsistencies by correcting the WTM assumptions. This iterative approach will refine the current pollutant reduction estimates and lead to a clearer picture of the reductions associated with the County's watershed restoration efforts.

Table III.G14- TMDL Summary By Impairment									
Impairment	Watershed	Issue Date	Pollutant	County MS4 Baseline Load	Annual Allocation	Units	WLA_{SW} Percent Reduction	Percent Reduction Since Baseline Date*	TMDL Baseline Data Date
Bacteria	Cabin John Creek	2007c	<i>E. coli</i>	44,257	30,670	(Billion MPN/yr)	30.7%	0.40%	2003
	Rock Creek	2007d	Enterococci	453,669	18,195	(Billion MPN/yr)	96.0%	3.50%	2003
	Anacostia River	2007b	Enterococci	247,809	29,978	(Billion MPN/yr)	87.9%	4.80%	2003
	Lower Monocacy River	2009e	<i>E. coli</i>	67,452	9,848	(Billion MPN/yr)	85.4%	0.02%	2003-2004
Sediments	Anacostia River	2007a	TSS	7,682	1,101	(tons/yr)	87.5%	3.10%	1997
	Triadelphia Reservoir	2008b	TSS	29	29	(tons/yr)	0.0%	0.02%	2003
	Clopper Lake	2002	TSS	13	13	(tons/yr)	0.0%	0.00%	2002
	Lower Monocacy River	2009d	TSS	253	99	(tons/yr)	60.8%	0.10%	2000
	Seneca Creek	2011	TSS	5,735	3,185	(tons/yr)	44.6%	1.00%	2005
	Rock Creek	2011	TSS	8,667	5,345	(tons/yr)	38.3%	7.26%	2005
	Cabin John Creek	2011	TSS	3,143	2,430	(tons/yr)	22.7%	1.80%	2005
	Potomac River Direct	2011	TSS	4,365.00	2,783.20	(tons/yr)	36.20%	0.39%	2005

Nutrients	Clopper Lake	2002	Phosphorus	101	55	(lbs/yr)	45.4%	0.00%	2002
	Anacostia River	2008a	Nitrogen	206,312	38,959	(lbs/yr)	81.8%	5.90%	1997
	Anacostia River	2008a	Phosphorus	20,953	3,947	(lbs/yr)	81.2%	6.40%	1997
	Triadelphia Reservoir	2008b	Phosphorus	438	373	(lbs/yr)	15.0%	0.30%	2003
	Rocky Gorge Reservoir	2008b	Phosphorus	4,268	3,628	(lbs/yr)	15.0%	0.23%	2003
	Lower Monocacy River	2013	Phosphorus	1,872	1,305	(lbs/yr)	30.0%		2009
	Rock Creek	2013	Phosphorus	12,503	8,089	(lbs/yr)	35.0%	0.98%	2009
Trash	Anacostia River	2010	Trash	228,683	-	lbs/yr removed	100.0%	4.60%	2010
PCB	Anacostia River- Non Tidal-NWB	2011	PCB	134.5**	2.56	g/yr	98.1%		
PCB	Anacostia River- Non Tidal-NEB	2011	PCB	112.57**	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

*Percent reduction of pollutant by BMPs completed after the TMDL baseline data collection period, as of 2012

**For all known NPDES stormwater discharges in Montgomery County portions of the NEB and the NWB, as identified in the TMDL

H. Assessment of Controls

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. DEP is responsible for requirements under this part of the Permit

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 in Figure III.H1. Figure III.H2 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 35 percent impervious.

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. The majority of the stormwater runoff from the impervious areas is not controlled and has led to a severely unstable stream channel which transports sediment, and other associated pollutants downstream

The DEP's Breewood Tributary Restoration Project is an innovative comprehensive management approach which will link neighborhood outreach and upland watershed source control measures to achieve measurable water quality improvements. Stormwater control measures will include LID practices with stream and wetland restoration. The outreach efforts will focus on increasing resident awareness and active stewardship to protect the tributary and associated local park from trash and runoff pollutants.

The DEP is currently designing 14 right of way LID practices along residential roads and promoting RainScapes techniques to address runoff from 54 residential properties. The project will then enter a second phase with a 1,200 foot stream restoration project, and a LID project on a larger private property bordering the residential properties. A summary of projects proposed for the Breewood tributary is on the CD attachment as Appendix L. Figure III.H3 shows the locations of the restoration projects.

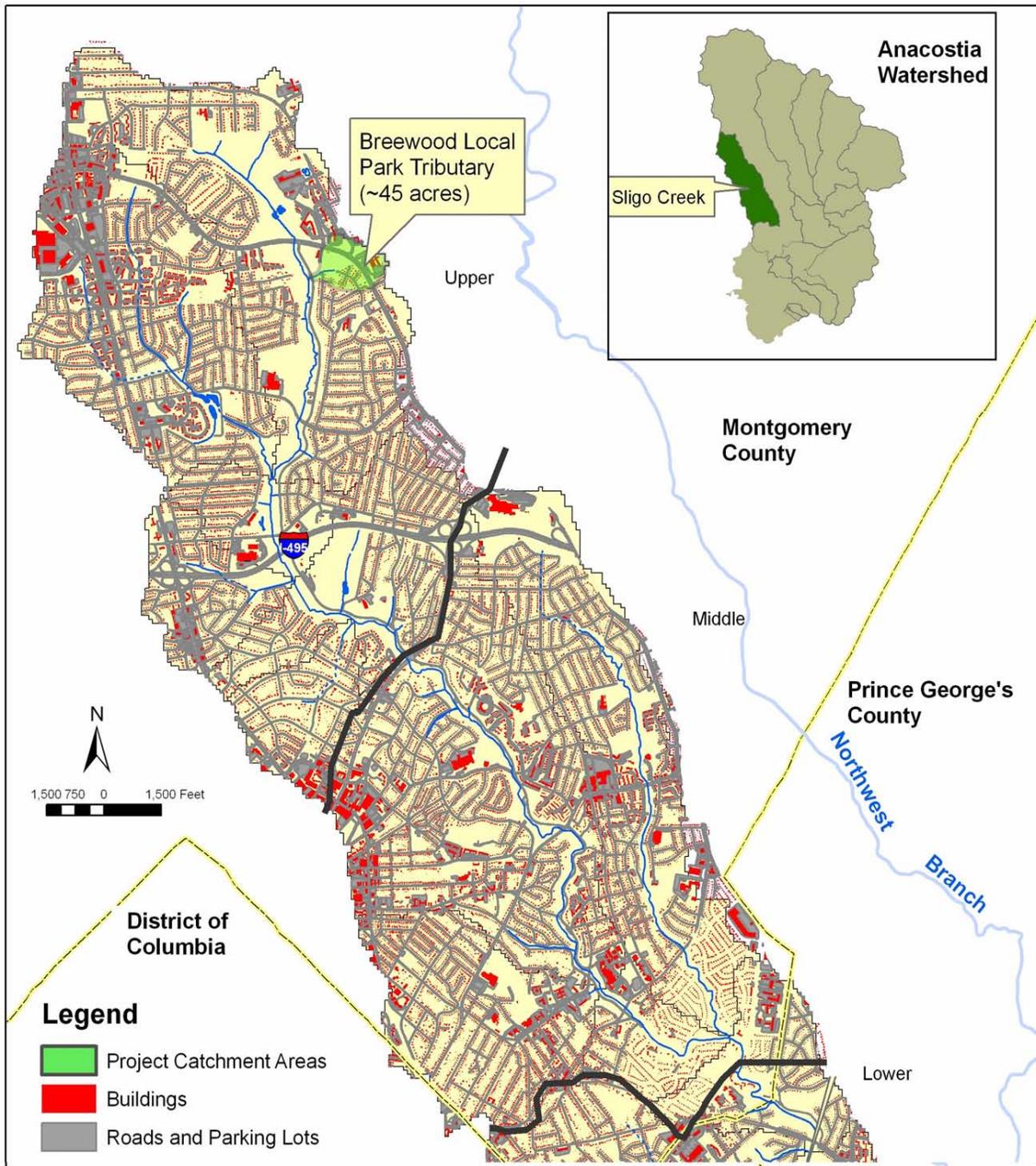


Figure III.H1- Location of the Breewood Tributary Within the Sligo Creek Subwatershed of the Anacostia. Note that the actual size of the Breewood tributary drainage area is 63 acres according to a recent recalculation.



Figure III.H2- Locations of Stream Chemistry, Biological, Physical Habitat and Geomorphology Monitoring Stations, Breewood Tributary of Sligo Creek.



Figure III.H3-Locations of the Breewood Tributary Restoration Projects.

H.1. Watershed Restoration Assessment

Breewood Tributary Chemical Monitoring

During 2012, DEP continued water chemistry monitoring in the Breewood tributary at one storm drain outfall draining University Boulevard and points north (the outfall station) and an instream station downstream of a culvert underneath Sligo Creek Parkway (the instream station), as shown in Figure III.H2. The Permit required chemical monitoring data is included electronically in Appendix A, MDENPDES12.accdb, Part F. The summary report *NPDES Water Chemistry Monitoring in the Breewood Tributary of Upper Sligo Creek 2009-2012* is also included electronically as Appendix L.

Table III.H1 shows the drainage area to each water chemistry station. Table III.H2 shows the contribution of impervious land uses to total impervious area in the drainage area. A continuously recording rain gauge is located at the Wheaton Branch stormwater ponds in Silver Spring, approximately 1 mile southwest of the monitoring stations.

Table III.H1- 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.H2- 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%
	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		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. Montgomery County will be producing a Hydrologic Engineering Center River Analysis System (HEC-RAS) model of the Breewood Tributary watershed as part of the stream restoration design process. This model is at 30% design stage as of September 2012 and should be completed in 2014.

Summary of Water Chemistry Monitoring Results

Station installation, 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 were conducted 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 at a target of three events per quarter. A total of 32 storms and 43 baseflow events were monitored during 2009 through 2012. 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.

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 the first appearance of flow at the outfall station. Storm flow appears at the outfall faster because its drainage area contains higher amounts 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.

For each station, baseflow mean concentrations (MC) were calculated for all Permit required parameters over the four-year monitoring period. MCs were also calculated for total petroleum hydrocarbons (TPH) and *Enterococcus* during first flush stormflow.

Storm event mean concentrations (EMCs) represent the weighted average pollutant concentrations based on samples collected at discrete intervals during a storm. EMCs were calculated and averaged over the four-year monitoring period for each parameter except TPH and *Enterococcus*. The average EMCs and MCs of each parameter at each station were compared:

- Storm samples generally had more concentrated pollutants at the outfall than at the instream station.
 - Mean storm EMCs were higher at the outfall than at the instream station for the following parameters: 5-day biochemical oxygen demand (BOD), total Kjeldahl nitrogen (TKN), copper, zinc, and storm MCs for TPH, and *Enterococcus*.
 - This may be reflective of the larger amount of roadway and parking surface in the outfall station drainage area relative to the instream station drainage area.

- 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 TPH and *Enterococcus*.
 - Mean storm EMCs were lower than baseflow MCs for nitrate plus nitrite, and hardness.
 - The higher pollutant concentrations for most parameters in stormwater are not surprising. Stormwater is known for mobilizing pollutants.
 - The lower concentrations of nitrates and nitrites in stormwater may reflect the solubility of nitrogen in water and the tendency of this nutrient to enter streams through groundwater. Stormwater can have a diluting effect on this parameter.

- 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 catchment. Baseflow samples could only be obtained on a few occasions. In these samples, the baseflow MCs for *Enterococcus* and TPH were lower than storm MCs. The lack of consistent flow is due to the lack of groundwater flow through the stormwater network.

<i>Table IIIH3- Mean storm EMCs and baseflow MCs (mg/l; ± 1-sigma standard deviation) in Breewood Tributary, 2009-2012</i>				
Analyte	Mean Storm EMC		Baseflow MC	
	Outfall	Instream	Outfall	Instream
BOD ₅	5.2 ± 4.6	4.4 ± 3.5	13.1 ± 10.2	0.2 ± 0.7
TKN	1.009 ± 0.735	0.835 ± 0.546	2.500 ± 1.959	0.095 ± 0.246
Total Phosphorus	0.038 ± 0.070	0.073 ± 0.137	0.000 ± 0.000 ^(b)	0.000 ± 0.000 ^(b)
Nitrate+Nitrite	0.357 ± 0.250	0.583 ± 0.292	1.806 ± 2.508	2.653 ± 0.218
TSS	60.6 ± 66.0	163.8 ± 143.9	36.4 ± 23.2	2.9 ± 4.3
Total Cadmium	0.00001 ± 0.00003 ^(c)	0.00002 ± 0.00008 ^(c)	0.0000 ± 0.0000 ^(b)	0.00000 ± 0.00000 ^(b)
Total Copper	0.030 ± 0.018	0.023 ± 0.013	0.217 ± 0.188	0.008 ± 0.015
Total Lead	0.008 ± 0.008	0.012 ± 0.013	0.006 ± 0.003	0.001 ± 0.002
Total Zinc	0.083 ± 0.052	0.055 ± 0.037	0.438 ± 0.626	0.015 ± 0.007
TPH ^(a)	3 ± 4	1 ± 3	3 ± 4	2 ± 3
<i>Enterococcus</i> ^(a)	5,829 ± 14,668	1,039 ± 2,085	1,073 ± 1,212	263 ± 509
Hardness	35.5 ± 19	46 ± 15	174 ± 156	108 ± 10
^(a) EMCs are not calculated for TPH or <i>Enterococcus</i> . These values are arithmetic averages of first flush grab results.				
^(b) Analytical results below detection limits and therefore means set to zero.				
^(c) Additional digits added to storm EMC results to illustrate difference in results.				

Analysis of the data collected by this project is intended to evaluate the effectiveness of watershed restoration efforts at improving hydrology and water quality. Because none of the planned restoration work has taken place yet, the data now serve to document baseline conditions. In the future, a variety of approaches will be employed to evaluate project effectiveness, including analyzing changes in hydrograph sensitivity to rainfall and annual pollutant loadings. While difficult, reducing hydrological impacts is better understood and more easily documented than reducing pollutant concentrations in urban streams. As annual loads depend on concentration and flow volume, changes in watershed hydrology that reduce stormflow volume may have more effect on annual loads than concentration changes.

Data collected from individual storms with similar rainfall characteristics will be examined to see whether completed watershed restoration projects reduce currently seen impacts. Total flow volumes for similar total rainfall events or peak flow levels for a specific rainfall amount can also be compared pre and post restoration. DEP will also try to compare rainfall to flow volume results from the Breewood Tributary to other similarly sized drainage areas.

Because the drainage areas of the instream and outfall stations have very different characteristics and different restoration approaches will be employed in each area, the water chemistry data in the form of EMCs from the two stations will be evaluated separately to determine whether decreases in pollutant concentrations associated with restoration efforts can be identified. Estimated annual loading values will be evaluated to determine changes in overall pollutant contributions at both stations.

Annual Pollutant loadings

The 2012 pre-restoration total annual pollutant loads for TN, TP and TSS were calculated for the Breewood tributary. Results are reported in the CD attachment to this report, Appendix A., MDENPDES12.accdb, Part G.2. Pollutant Loads Associated with GIS Coverage, and shown in Table III.H4.

<i>Table III.H4- Baseflow, stormflow, and total annual loadings (lbs.) in Breewood Tributary, 2012</i>						
Analyte	Stormflow Loading		Baseflow Loading		Total Loading	
	Outfall	Instream	Outfall	Instream	Outfall	Instream
BOD ₅	531	1,808	NS	0.116	531	1,808
TKN	98	257	NS	0 ^(a)	98	257
Total Phosphorus	5	41	NS	0 ^(a)	5	41
Nitrate+Nitrite	50	243	NS	2	50	245
TSS	7,251	74,762	NS	1	7,251	74,763
Total Cadmium	0 ^(a)	0 ^(a)	NS	0 ^(a)	0 ^(a)	0 ^(a)
Total Copper	3	11	NS	0.003	3	11
Total Lead	1	7	NS	0 ^(a)	1	7
Total Zinc	11	29	NS	0.009	11	29
TPH	48	0 ^(a)	NS	0 ^(a)	48	0 ^(a)
Enterococcus	110,760	156,589	NS	140	110,760	156,730
Hardness	5,289	21,517	NS	73	5,289	21,590

^(a) Zero load indicates all concentration data below detection limits.
NS = no concentration data collected during baseflow events at the outfall station.

Breewood Tributary Biological Monitoring:

In March 2010, a biological monitoring station, SCBT101, was established and monitored in the Breewood tributary. As shown in Figure III.H2, the station is located upstream of the Sligo Creek Parkway and the instream water chemistry monitoring station. Station SCBT101 is monitored each spring for benthic macroinvertebrates. No fish monitoring is conducted because of the extremely small drainage area of the tributary.

The County uses a Benthic IBI (BIBI) to assess stream conditions at SCBT101. Pre-restoration benthic community analysis will be compared with post-restoration data to help evaluate watershed restoration success. Eight metrics of benthic macroinvertebrate community composition and function are analyzed. The metrics include examining the percentage of functional feeding groups (FFGs) present, evaluating taxa richness, taxa composition, and pollution tolerance. Each measurement responds in a predictable way to increasing levels of stressors. Changes in the metrics will be seen as the biological community improves and may be seen before the overall BIBI score increase.

Functional Feeding Group (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 bioassessment 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 (U.S. 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.

In 2010, the BIBI score for the tributary was 14 out of a possible 40, indicating a *poor* benthic community. Only six taxa were present, indicating low species richness. Shredders accounted for only 2% of the total sample collected at SCBT101 and no scrapers were found. Collector gatherers accounted for 57% of the sample collected at SCBT101. Filterers accounted for 3% and predator organisms composed 38% of the total sample.

In 2011, the BIBI score for the tributary was 18 out of a possible 40, indicating a *fair* benthic community. There were fourteen taxa present, indicating moderate species richness. Shredders accounted for 11% of the total sample collected at SCBT101 and no scrapers were found. Collector gatherers accounted for 52% of the sample collected at SCBT101. Filterers accounted for 6% and predator organisms composed 31% of the total sample.

In 2012, the BIBI score for the tributary was 14 out of a possible 40, indicating a *poor* benthic community. There were thirteen taxa present, indicating moderate species richness. Shredders accounted for 2% of the total sample collected at SCBT101 and no scrapers were found. Collector gatherers accounted for 64% of the sample collected at SCBT101. Filterers accounted for 4% and predator organisms composed 26% of the total sample.

Figure III.H4 shows the average proportion of each FFG at SCBT101 and in a reference stream reach, the Good Hope tributary to Paint Branch (PBGH108). The benthic community of PBGH108 was rated *good* in 2010 and *fair* in 2011 and 2012. Note that the relative percentage of predator taxa decreases and the percentages of filterer, shredder, and scraper taxa increases with an increase in benthic community rating.

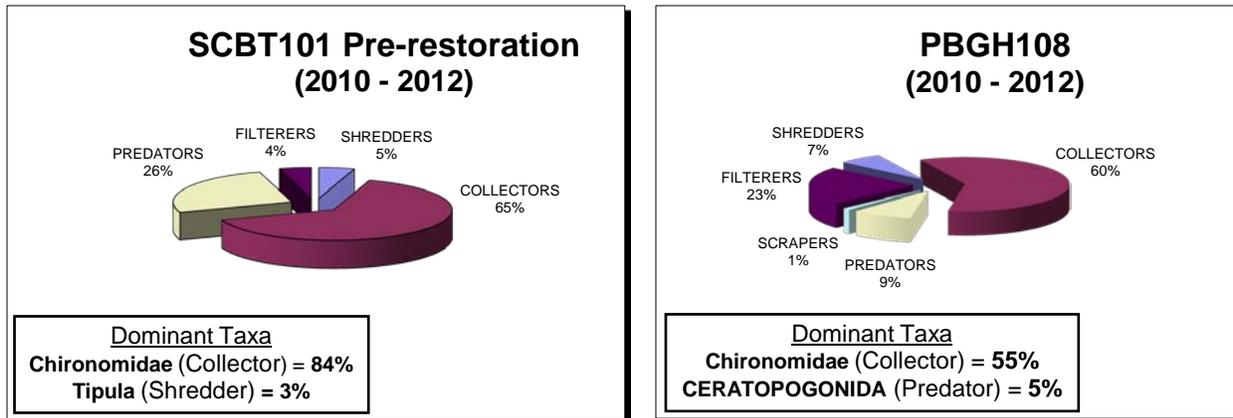


Figure III.H3- Functional Feeding Group Comparison in the Breewood Tributary (SCBT101) and in the Good Hope Tributary (PBGH108).

Other metrics were used to characterize the benthic macroinvertebrate community of the Breewood tributary. The biotic index, which measures tolerance to organic pollution, was 7.05 (out of 10), indicating a relatively high tolerance to organic pollution. In addition, 84% of the benthic macroinvertebrate 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 BIBI score analysis also includes determining the presence of ephemera, plecoptera, and trichoptera (EPT) taxa (commonly known as mayfly, stonefly, and caddisfly) which are sensitive species commonly associated with high quality streams. In the Breewood tributary benthic macroinvertebrate sample, there were very few EPT taxa present.

Breewood Tributary Physical Habitat Assessment:

Starting in 2010, DEP performed yearly physical habitat assessments at SCBT101. Pre-restoration monitoring will establish a baseline for comparison with future habitat assessments. Results indicate that the habitat is *fair/good*, receiving a score of 71 (out of a possible 200) in 2010, a score of 86 in 2011, and a score of 97 in 2012. The poor riffle quality, high embeddedness values, bank instability, and narrow riparian zone all had a deleterious effect on the overall habitat score in the tributary. As a first order headwater stream, the tributary has a high frequency of riffles and minimal channel alteration; factors that had a positive impact on the overall score. An increase in riffle quality was observed in 2011 and 2012, which contributed substantially to the overall increase in habitat score. A non-functioning storm drain outfall was observed near the upper end of the station, which results in overland flow from Tenbrook Drive being channeled into the stream. Figure III.H4 shows a comparison of the Breewood tributary BIBI and habitat conditions with those in the Paint Branch reference stream reach in 2010, 2011, and 2012.

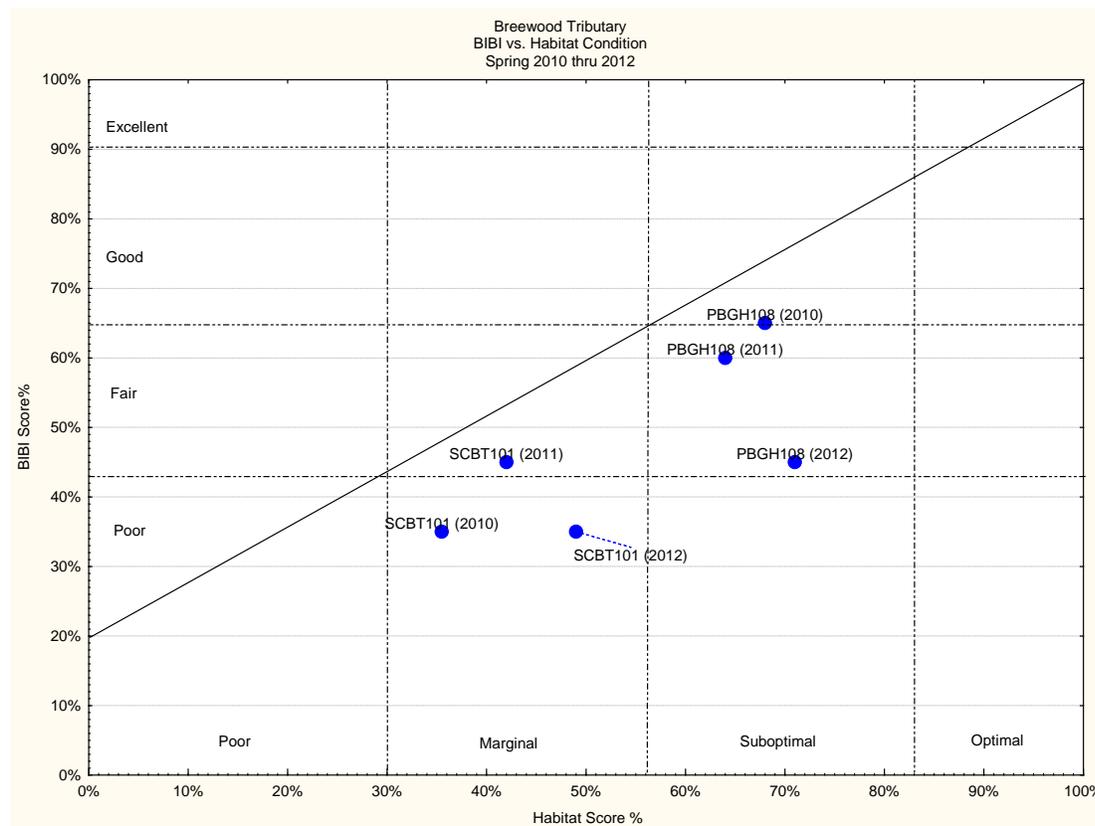


Figure III.H4- BIBI vs. Habitat Condition at Breewood Tributary and Reference Stream, Spring 2010 thru Spring 2012.

In-situ water chemistry measurements were made in the Breewood tributary and the reference stream concurrent with the physical habitat assessment. As shown in Table III.H5, most water quality parameters (dissolved oxygen, pH and temperature) were within the normally expected range at SCBT101 and the reference stream. Conductivity was the only parameter which differed among the streams, being elevated (566 umhos) at SCBT101 compared to less than 200 umhos at the reference stream. 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.H5- 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
PBGH108	Benthic	Good	4/22/2010	10.69	90	6.24	166	12	11.0
PBGH108	Benthic	Fair	4/22/2010	10.60	104	6.79	143	17	14.4
PBGH108	Benthic	Fair	4/11/2012	11.27	110	7.36	157	14	10.6

Breewood Tributary Physical Geomorphic Assessment:

In 2010, DEP established Study Area 2 for physical geomorphic monitoring (20-bankfull widths) in 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. A second study area (Study Area 1) was established in 2011 and extends from the outfall channel below University Boulevard to the Breewood tributary. Study area locations are shown in Figure III-H2.

Figure III.H5 provides representative cross section views of Study Area 1. In 2011, the average particle size of the channel substrate below the bankfull channel height was 0.062mm, which is classified as fine sand. In 2012, the average particle size of the channel substrate below the bankfull channel height was slightly coarser, at 0.65mm, which is classified as coarse sand. This area of the stream is predominated by riffles and runs. In 2011, riffles accounted for 39% of the reach surveyed and runs accounted for 38% of the reach surveyed. In 2012, riffles accounted for 48% of the reach surveyed and runs accounted for 30% of the reach surveyed. The results of the survey indicate a degraded channel with low sinuosity, and high erosion potential.

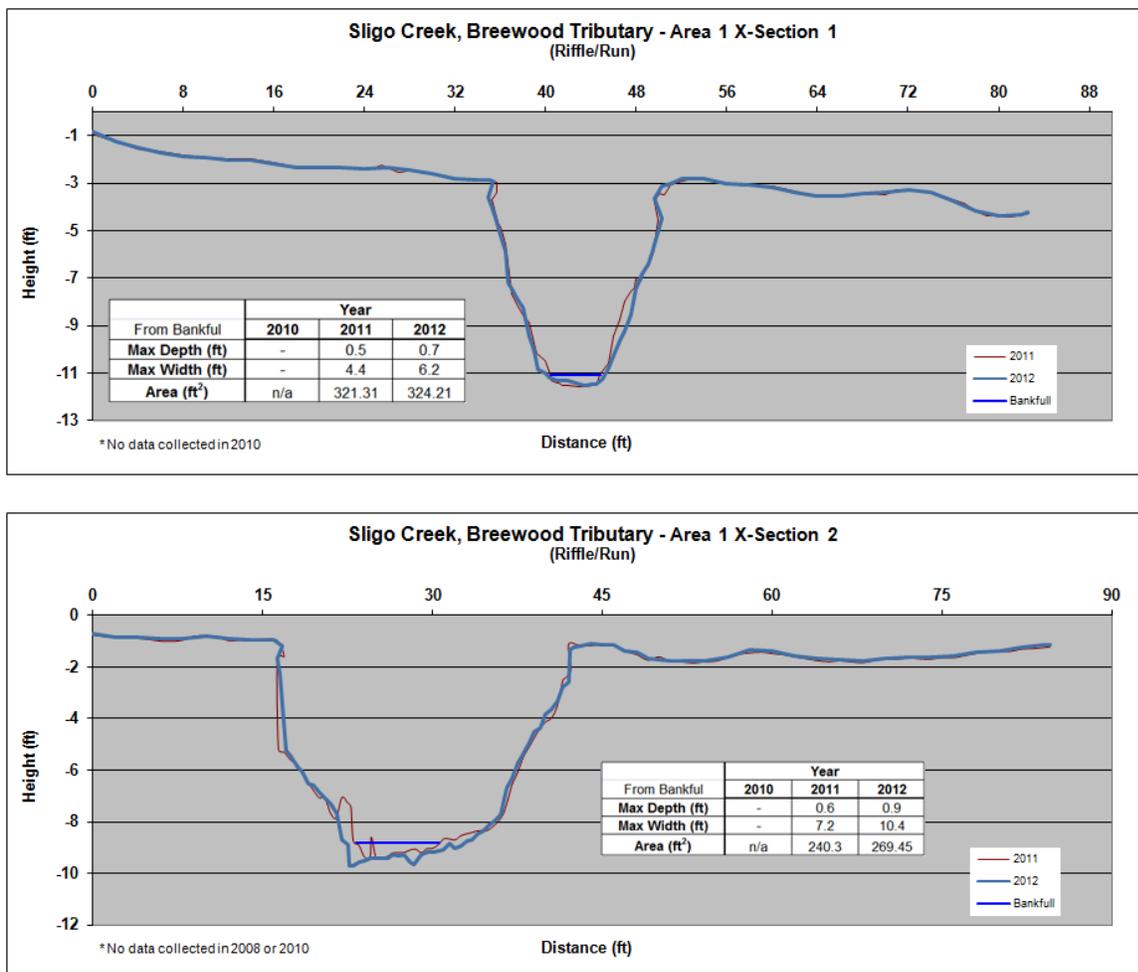


Figure III.H5- Representative Cross Sections From Breewood Tributary, Study Area 1.

Figure III-H7 provides representative cross section views of Study Area 2. The average particle size of the channel substrate below the bankfull channel height ranged from 2.8mm (very fine gravel) to 12mm (medium gravel). This area of the stream is predominated by riffles, which accounted for between 47% and 54% of the reach surveyed. The results of the survey also indicate a degraded channel with low sinuosity, and high erosion potential.

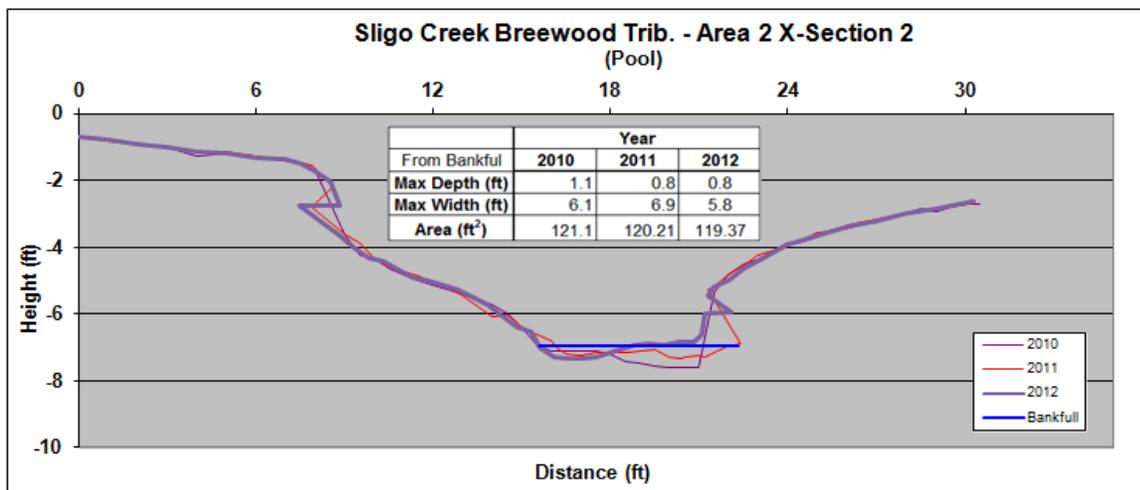
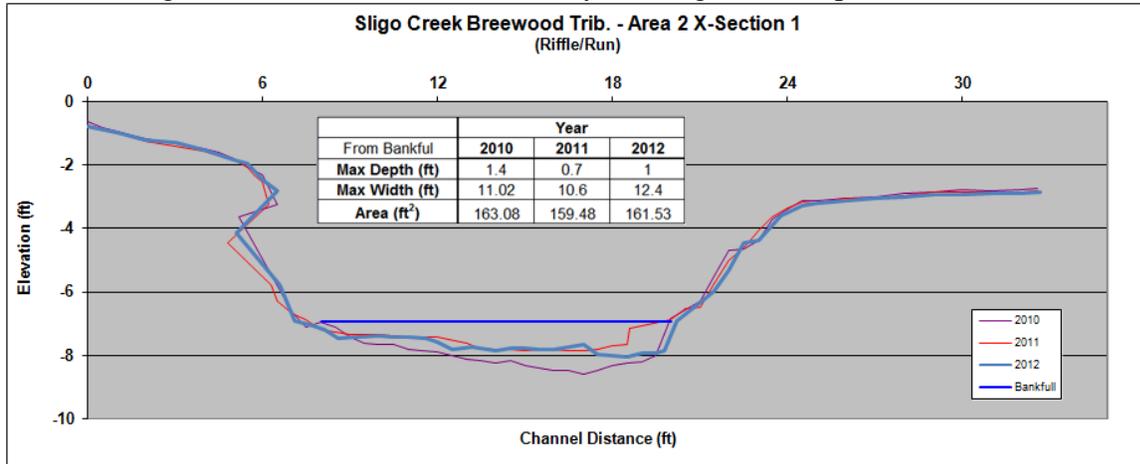


Figure III.H6- Representative Cross Sections From Breewood Tributary, Study Area 2.

Figure III.H8 provides a photograph of a representative cross-section with Study Area 1, demonstrating the severe down-cutting that has occurred in this part of the Breewood tributary.



Figure III.H8.-Downstream View of Sligo Creek, Breewood Tributary, Study Area 1- Cross Section 2.

Summary of Biological and Physical Monitoring:

The 2010 thru 2012 monitoring results provide evidence that the Breewood tributary is impaired and will likely benefit from stream restoration. Monitoring will continue annually to evaluate improvements to the biology and habitat that are anticipated as a result of the restoration efforts.

Additional Monitoring: Watershed Restoration Project Monitoring:

In addition to the Permit required monitoring, DEP monitors stream restoration projects and some associated stormwater retrofits to assess whether project goals are met and to determine how future projects will be designed and built to ensure a positive impact on the aquatic ecosystem. During FY13, DEP summarized monitoring results from restoration projects located in the Patuxent, Northwest Branch, Paint Branch, Little Paint Branch, Anacostia, Rock Creek, and Lower Potomac Direct watersheds. The summary report *Watershed Restoration Project Monitoring* is included electronically as Appendix M.

The County's watershed restoration projects were generally successful in achieving their goals. However, monitoring shows certain goals were more easily and more quickly achieved than others (Figure III.9). Wetland creation had the highest success rate (100%), and improvement in the benthic macroinvertebrate communities had the lowest success rate (38%) so far.

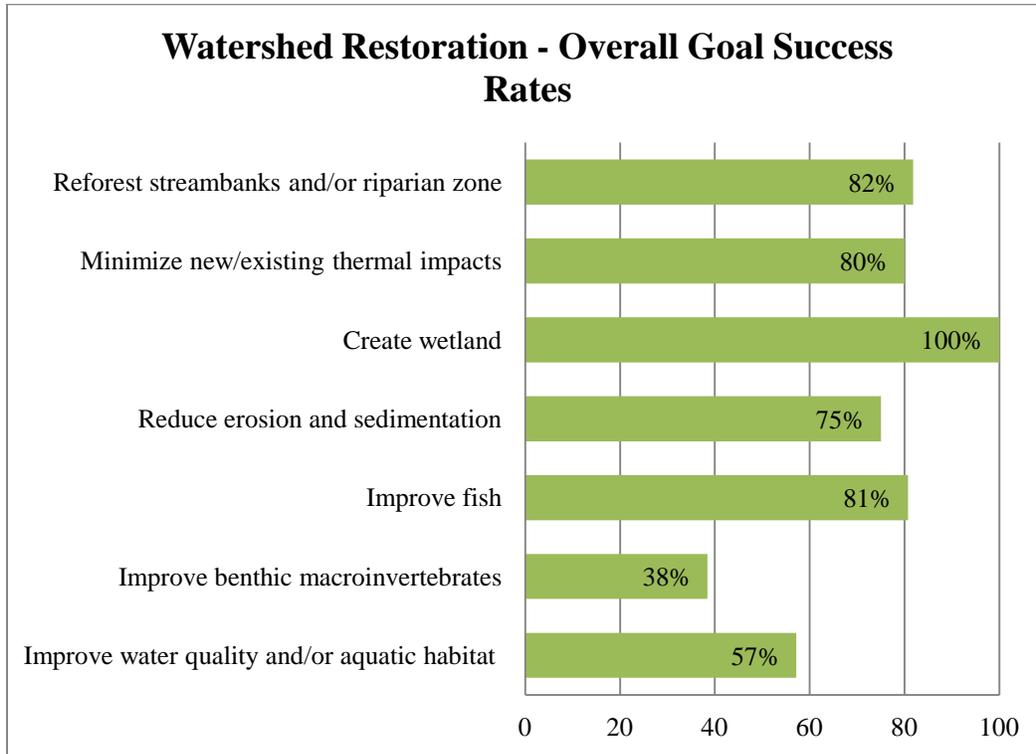


Figure III.H.9 – Relative Success of Watershed Restoration Project Goals for Projects Highlighted in FY11, FY12, and FY13 MS4 Permit Reports.

Water Quality and Aquatic Habitat

Aquatic habitat assessment scores documented improvement following restoration in many projects. However, in some cases, the habitat scores were lower following restoration. This may be related to the age and approach used in the restoration project. For example, stream restoration practices have evolved to integrate more natural materials and “soft” techniques, also known as natural channel design, which tend to improve habitat (Figure III.H10). Projects built prior to 2003 were generally limited to “hard” stream restoration techniques and these techniques were focused mainly on stabilization (armor) rather than habitat improvement (Figure III.H11). Riprap typically does not provide the habitat enhancement that vegetative practices do. While the large, angular rocks provide protection against high flow velocities, they can become fish blockages during normal baseflows and lack smaller void space for benthic macroinvertebrates, fish, and stream salamanders to seek refuge and lay eggs.



Figure III.H10 – Examples of “Soft” Techniques (Natural Channel Design) With Better Habitat



Figure III.H11– Examples of “Hard” Techniques (Armoring) and Poor Habitat

Improving Fish and Benthic Macroinvertebrates

Almost all projects that aimed to improve aquatic communities had more difficulty improving the benthic macroinvertebrates (38% average success rate) than fish (81% average success rate). Benthic macroinvertebrates (Figure III.H12) predominantly re-colonize aquatically from short distances upstream or over short distances from flying adults. In more urban areas, it is possible there may not be sources for re-colonization close enough to project locations. Benthics also are more sedentary (less mobile) and not able to re-colonize as quickly and easily as fish.

Out of the 13 highlighted projects monitored for benthics so far, four projects resulted in a clear improvement in the benthic community, while two others showed only slight improvements. Sligo Creek (FY11 report) has shown improvement in the benthic macroinvertebrate community, but only after more than 10 years of monitoring. The Hawlings River stream restoration project has also exhibited slow improvement in the benthic community. This subwatershed is part of the Patuxent River watershed, is less urban, and more likely connected to sources of healthy benthic communities.



Figure III.H12 – Benthic Macroinvertebrate Monitoring Examples (Left- Dragonfly Nymph Emerging; Middle- Brown Dun Mayfly Nymph (*Ameletus* sp.); Right- Benthic Sampling)

Improving the fish community was a much more attainable goal, with an 81% average success rate (Figure III.H9). It should be noted that the projects that failed to achieve this goal (Little Falls III and Stream Valley Drive) were also reported to lack the necessary hydrology to support a diverse fish population (Figure III.H.13).

Lack of flow, especially during the summer, can prevent fish from migrating and surviving—resulting in a pioneer-dominated community with very low fish abundance and diversity. Stream restoration therefore, may not have an effect on the quality of fish populations in smaller, low-flow stream systems. In these small stream systems, it may be better to rely on benthic macroinvertebrates and/or stream salamanders to show water quality and habitat improvements.



Figure III.H13 – Stream Valley Drive Pre (left) and Post (right) Restoration; Showing Improved Flow and Habitat, but Possibly Not Enough For Diverse Fish Population.

Stream Salamanders

A stream salamander IBI has been developed for Maryland and has undergone several validations. Stream salamanders spend their entire lives instream or closely associated with the stream channel and tend to replace fish as top predator in headwater systems. For this reason, Montgomery County began monitoring stream salamanders in 2009 for smaller, headwater stream restoration projects. Reports on these monitoring efforts are forthcoming and will be available on the MCDEP website.

Streambank Stabilization

Most projects were successful in stabilizing streambanks (Figure III.H14) to reduce erosion and sedimentation, with a 75% average success rate. However, most projects were limited with how much bank grading could be done in order to avoid impact to streambank trees.



Figure III.H14 – Quantitative Survey of Stream Cross Section Example Before (left) and Example After (right) Restoration

Stream Temperatures

Stormwater pond projects highlighted so far have an 80% average success rate at minimizing new or existing temperature impacts to receiving streams. Wet pond stormwater facility retrofit projects tended to be more successful mitigating temperature impacts when there was adequate shading. Also, the Gum Springs parallel pipe proved to be very successful at mitigating temperature impacts from the Oak Springs stormwater pond by diverting and cooling the water underground.

A number of stormwater management pond projects were observed to have significantly warmer downstream stream temperatures as compared to upstream of the pond. However, monitoring data was not collected prior to the pond construction or retrofit, so it is not possible to know if the thermal impacts are as a result of the project or whether they were pre-existing. The Gum Springs Farm pond for example, exhibited higher temperatures observed downstream versus upstream of the pond, but the same temperature relationship existed prior to the pond being constructed.

Improvements in restoration monitoring planning for future projects will allow the County to better document pre-existing conditions in order to more accurately understand how stormwater pond projects affect receiving stream temperatures. Also, monitoring results may help distinguish whether designs are working to mitigate thermal impacts and/or if maintenance activities are needed.

Wetland Creation

Wetland and amphibian habitat creation projects were very effective in producing straightforward, easily monitored results. The goal of creating wetland habitat was 100% successful for projects highlighted so far. Wetlands were typically constructed and planted where there was no existing wetland. Monitoring demonstrated establishment of wetland plants,

soils, hydrology, and amphibians, usually within the first year after construction. There were a few projects that reported issues with invasive plants negatively impacting the native wetland plantings and hydrology.

The Stream Valley Drive vernal pool monitoring documented how large tree branches were utilized by spotted salamanders (obligate vernal pool species) to attach their egg masses to (*Figure III.H15*). These branches were not included in the design plans; they either fell in naturally or were placed unofficially. It is recommended that placing branches for habitat enhancement should become an adopted practice in the design and construction of temporary pools and wetlands.



Figure III.H15 – Stream Valley Drive Constructed Wetland, 2009 (left), Spotted Salamander (Ambystoma maculatum) Adults (middle), and Egg Masses Attached to Tree Branch (right).

Botanical Reforestation

Botanical reforestation efforts have had an overall 85% average success rate for projects highlighted so far. Tree plantings were more successful when larger caliper sized trees were planted. In Turkey Branch, trees planted were smaller caliper sizes, and the majority later died as a result of deer browse, deer rub, and/or invasive plants and vines. Conversely, the Northwest Branch project, with similar deer and invasive plant conditions, had the majority of the planted trees survive. These trees were of a larger caliper size, which likely helped ensure their establishment. Invasive plants and vines were a problem in general at most of the restoration sites. Maintenance may be needed at some of the projects to remove invasives and/or replant.

Conclusions

Watershed restoration works best as a comprehensive approach that employs many different practices intended to recover and protect valuable water resources. Understanding the complex cause and effect of restoration actions on aquatic systems is not easy, but is critical if we want to show measurable results in a cost effective way.

Ideally, the purpose of restoration monitoring is to document whether specific project goals have been met and whether desired improvements to the watershed, as a whole, have been reached. Short-term monitoring (usually within five years) can often show the effect of a specific project on a stream, but long term monitoring (at least 10 years) is needed to show trends within a watershed.

Montgomery County's watershed restoration monitoring program has evolved over the years to collaborate more with the design of the projects themselves. In the early days of the program, monitoring was more of an afterthought, resulting in lack of pre-construction data or lack of relevant data in general. Projects are now typically developed with a clear set of quantifiable goals that can be monitored. Monitoring conducted prior to the construction of a project aids in the design of the project. There is adequate time to collect necessary pre-construction data and ensure a sampling design that fits the design of the specific project.

Many of the projects highlighted in this summary reflect the early days of the program, when project goals didn't necessarily have associated monitoring, or that the monitoring performed was not ideal to show success or failure. More recent projects that are just now being reported on are expected to have more quantifiable results. Also, after many years of continued restoration efforts, certain watersheds have had enough comprehensive restoration performed and enough years of monitoring to begin to show cumulative results. These more recent reports in addition to the detailed reports of the projects mentioned in this summary are forthcoming and will be available on the MCDEP website.

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). Monitoring follows the methods as described in the County's 2003 NPDES Report, Part III.D2, attached to this report as Appendix N. Figure III.H16 shows the locations of these 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 15 through April 30). Fish were not used as indicators for the small first order streams since frequently there is limited fish habitat in these headwater streams.

Figure III.H16 also shows the locations of three 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 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. All the test and control areas have USGS flow gages installed, where continuous stream flow data is being collected. Two 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, and the other gage is located at Black Hill Regional Park.

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 since 2004. The CMP is also using Light Detection and Ranging (LiDAR) imagery to provide greater resolution in mapping landscape changes at this smaller drainage area scale than is possible using traditional aerial photography

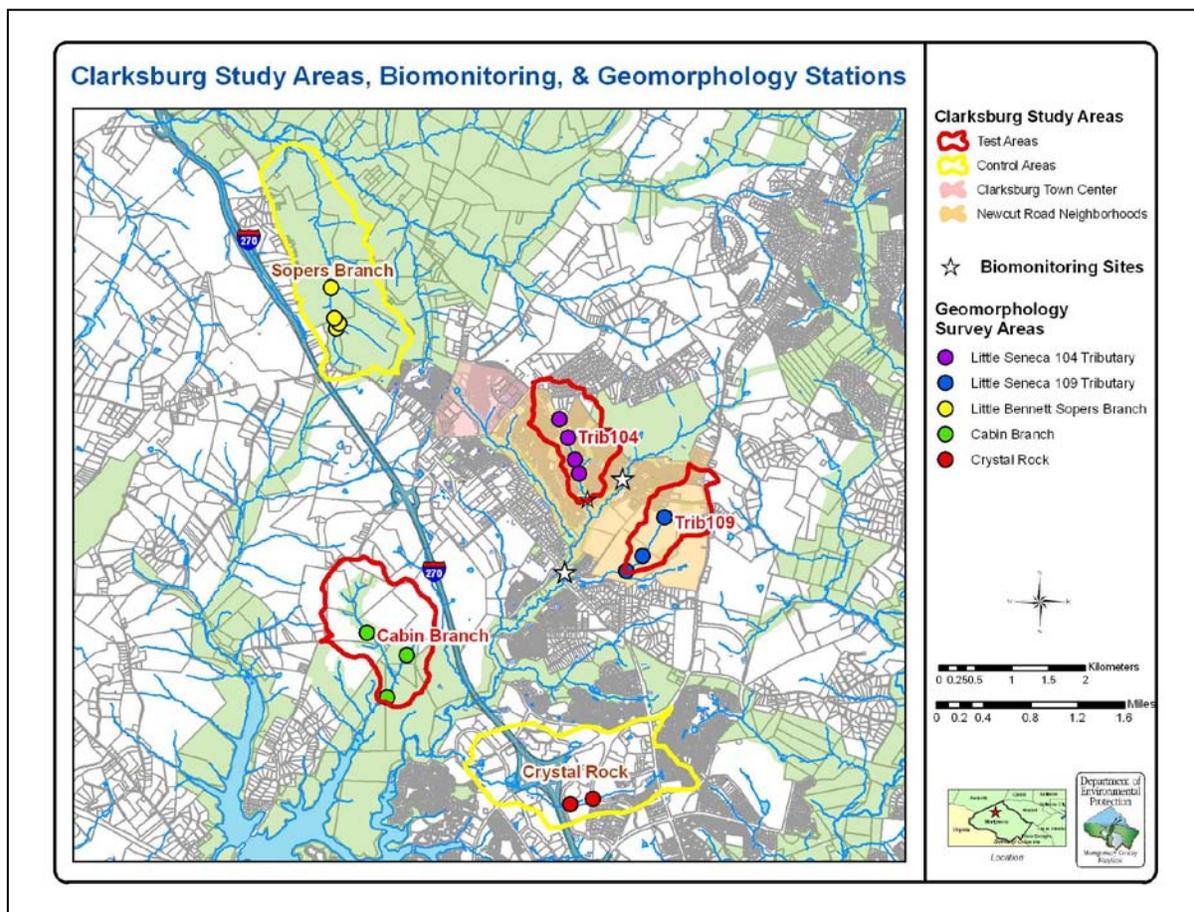


Figure III.H16. Location of the Clarksburg Monitoring Partnership three test areas and two control areas. Also included are biological monitoring stations and geomorphic survey locations.

The DEP performs additional physical stream characteristic and biological stream monitoring throughout the Clarksburg SPA to study the cumulative effects of development. The County annual SPA report includes the results of stream and BMP monitoring and presents a comprehensive analysis of all available biological, chemical, and physical data collected from

1994 through the current reporting calendar year. The County SPA Report and Technical Appendices are available on the Montgomery County website at:
<http://www.montgomerycountymd.gov/dep/water/spareports.asp>

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 Phase I and II are completed, and ESC structures have been converted to SWM structures. The Clarksburg Village Phase I recently transitioned from construction to post construction. There is a small portion of the test area at the downstream end (part of Clarksburg Village Phase II) that, although largely stabilized, was still categorized as in the sediment & erosion control phase. The land composition in the control area drainage catchment remains unchanged.

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 could be accurately captured, two rain gages were established for the Clarksburg Monitoring Partnership at Black Hill Regional Park in Cabin Branch and Little Bennett Regional Park in Soper’s Branch. The data collected provides statistics on pattern and amount of rainfall, storm durations, storm mean intensity, and storm peak intensity.

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 five flow gages is presented in Table III.H6.

Table III.H6- Descriptions of the Five USGS Stream Gages in the Clarksburg Study Area.					
Gage Id. Number	Name	Date Started	DA (mi²)	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

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, 2006, 2007, 2008, 2009, 2010, 2011 and 2012. Water Years cover the period from October 1 of one year to September 30 of the next year.

The 2012 USGS Water Data Report for the two stream gages is available at:

<http://wdr.water.usgs.gov/wy2012/pdfs/01643395.2012.pdf> (Soper's Branch control area)

<http://wdr.water.usgs.gov/wy2012/pdfs/01644371.2012.pdf> (Little Seneca Creek test area)

Summary information on stream characteristics at the test area and the control area will be provided in the 2012 Special Protection Area Report. The report will be available on the Montgomery County website at:

<http://www.montgomerycountymd.gov/dep/water/spareports.asp>.

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 stream gaging station (Doheny et al. 2006). Changes in the TOC of a drainage area can be useful in understanding stream response to impervious area increase. When the conversion process to SWM BMPs has been completed in the test area, TOC will be evaluated to determine if the test area response to rainfall has changed compared to the control area. In this report, we evaluated TOC during the construction period in the test area (USGS Water Years 2008 through 2012). Table III.H7 shows the TOC for the developed test area (LSLS104) stream gage and the control area (LBSB101) stream gage.

<i>Table III.H7- Time of Concentration in Minutes for Water Years 2008-2012</i>		
	Control Station (LBSB101)	Test Station (LSLS104)
Mean	157	67
Median	75	45
Max	1160	550

During the construction period (October 1, 2007 thru September 30, 2012), the TOC was evaluated at the control area stream gage (LBSB101) and at the test area stream gage (LSLS104). On average, the test area tributary responded twice as fast as the control area for the same range of storms exceeding ½" of rainfall (see Figure III.H17).

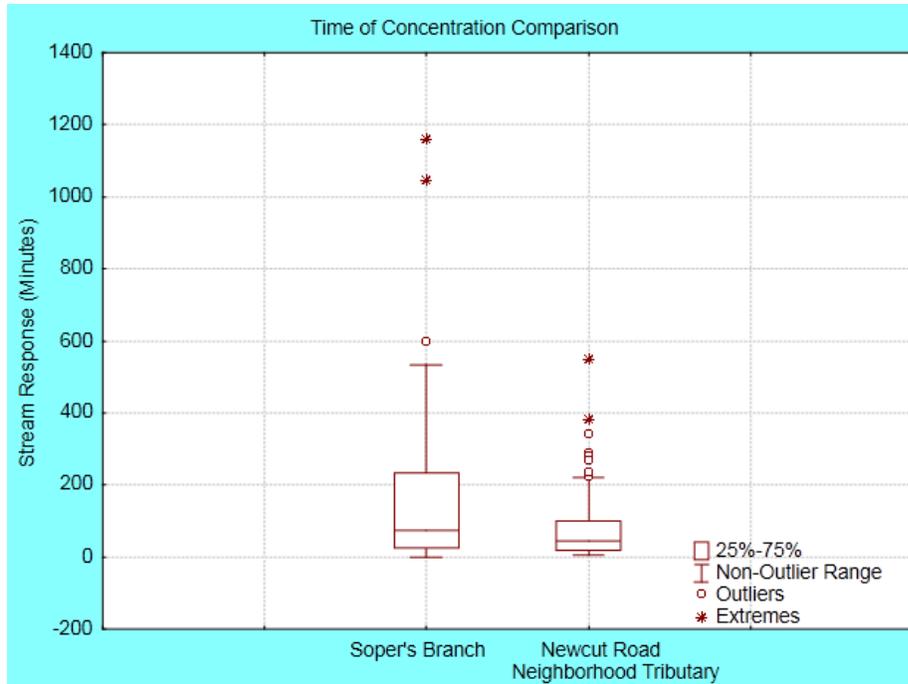


Figure III.H17- Comparison of Time of Concentration (TOC) at the control area (LSLB101) stream gage and at the test area (LSLS104) stream gage for rainfall greater than 1/2" in 24 hours.

Stream Geomorphology Monitoring:

Figures III.H18A 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 become 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.

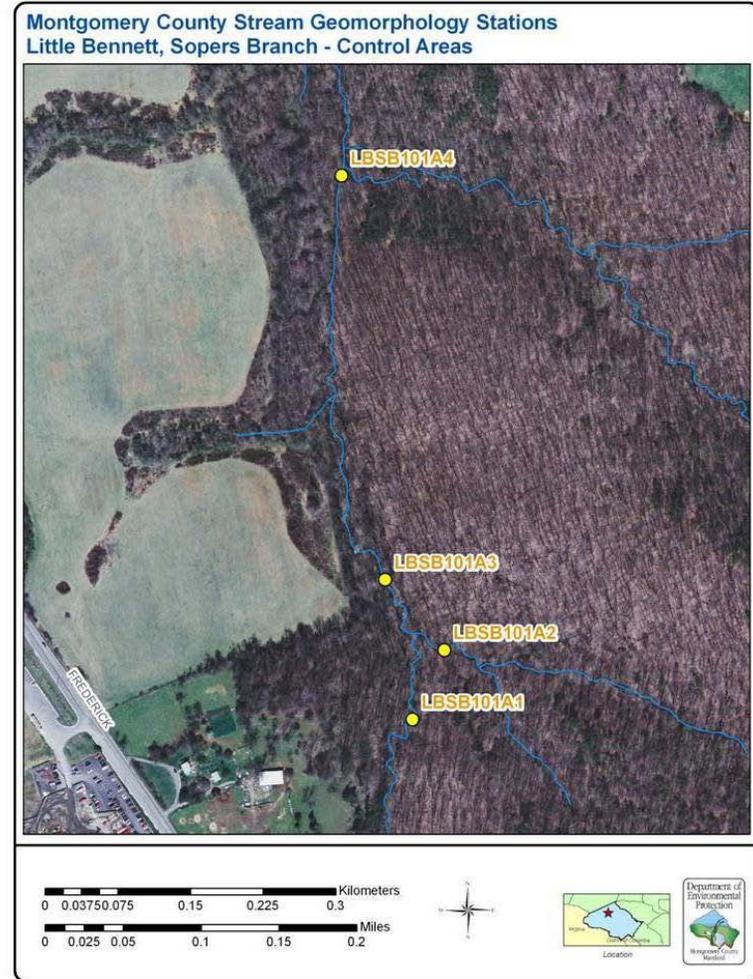
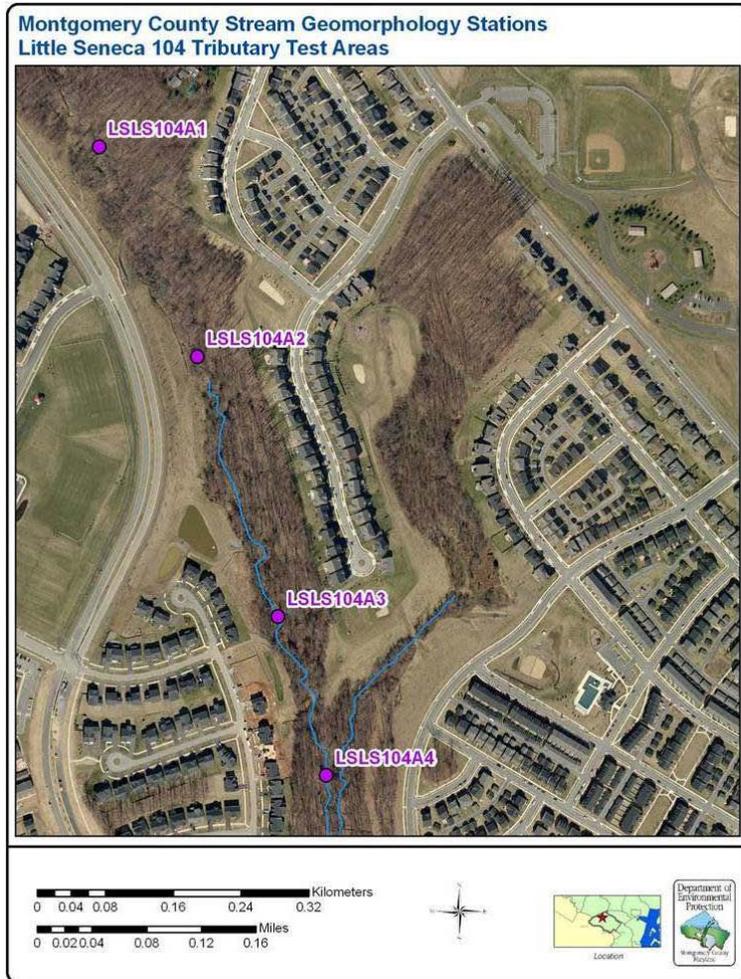


Figure III.H18-Geomorphology Survey Locations: Test Area (A), Control Area (B)

Data Analysis and Interpretation:

As development alters an area's surface hydrology, rainfall infiltration will decrease and stormwater runoff will increase, with corresponding higher peak flows and receiving stream channel scouring. The eroded material is carried away and deposited downstream (aggradation). As the development site stabilizes, the receiving stream enters an erosional phase where the overland sediment supply is reduced and geomorphic readjustment takes place (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. Table III-H8 summarizes sinuosity indices and survey information for the test area (LSLS104) and the control area (LBSB101). Data are shown for the furthest downstream survey area within each reach.

Evaluation of sinuosity over time documents a difference between the test and control stations. Sinuosity is the ratio between the length of the stream and the corresponding length of the stream valley. A ratio of 1:1 would indicate a very straight and channelized stream. From 2003 to 2006 sinuosity ratios went from 1.4 to 1.0. This would be consistent with the increased annual runoff to the test area. After SWM began to be functional in late 2008, the ratio began to increase slightly, and is currently at 1.2. The sinuosity of the control area channel has remained more consistent than in the test area throughout the monitoring period.

The average particle size (D-50) for substrate material in the test area exhibited an increase at the most downstream study area. Increased runoff rates may be flushing the finer particles downstream, while the coarser, parent material aggregates of the stream channel are left in place. Increased impervious may also result in a system which prevents sediment from entering the system naturally. To reach equilibrium, sediment is removed from the stream channel in one location and deposited downstream in another area.

Cross sections from the test area illustrate this process in Figure III-H19. 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 (Figure III.H19). Changes are most evident in the lower portion of the cross section profiles, at or below frequent storm elevation.

In contrast, representative sections from the control area showed little yearly change (Figure III.H20).

Table III.H8- Sinuosity indices and survey information for test area (LSLS104) and control area (LBSB01). Data are shown for furthest downstream survey areas within each reach

Year	Sinuosity Index (SI)								
	'03	'04	'05	'06	'07	'09	'10	'11	'12
LSLS104 A4	1.4	1.4	1.3	1.0	1.0	1.2	1.3	1.2	1.2
LBSB201 A4	1.1	1.1	1.0	1.2	1.2	1.1	1.2	1.0	1.0

Year	Total Longitudinal Slope (%)								
	'03	'04	'05	'06	'07	'09	'10	'11	'12
LSLS104 A4	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.3
LBSB201 A4	1.1	0.9	1.5	1.4	1.4	1.5	1.2	1.3	0.9

Year	D50 (mm)								
	'03	'04	'05	'06	'07	'09	'10	'11	'12
LSLS104 A4	8.2	5.7	5.7	7.1	8.5	14	20	0.062	8.9
LBSB201 A4	16	0.062	8.7	14	9.2	0.062	0.062	0.062	0.062

Year	D50 (particle)								
	'03	'04	'05	'06	'07	'09	'10	'11	'12
LSLS104 A4	Med. Gravel	Fine Gravel	Fine Gravel	Fine Gravel	Med. Gravel	Med. Gravel	Coarse Gravel	Fine Gravel	Med. Gravel
LBSB201 A4	Coarse Gravel	Silt/	Med. Gravel	Med. Gravel	Med. Gravel	Fine Gravel	Fine Gravel	Fine Gravel	Fine Gravel

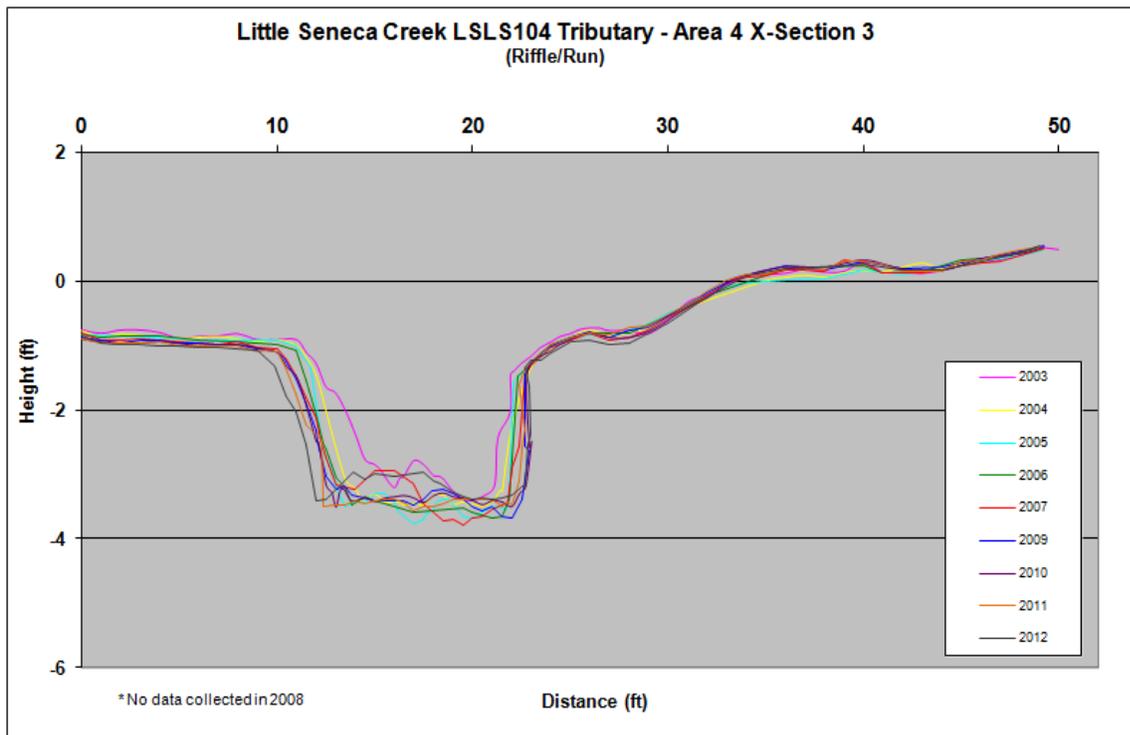
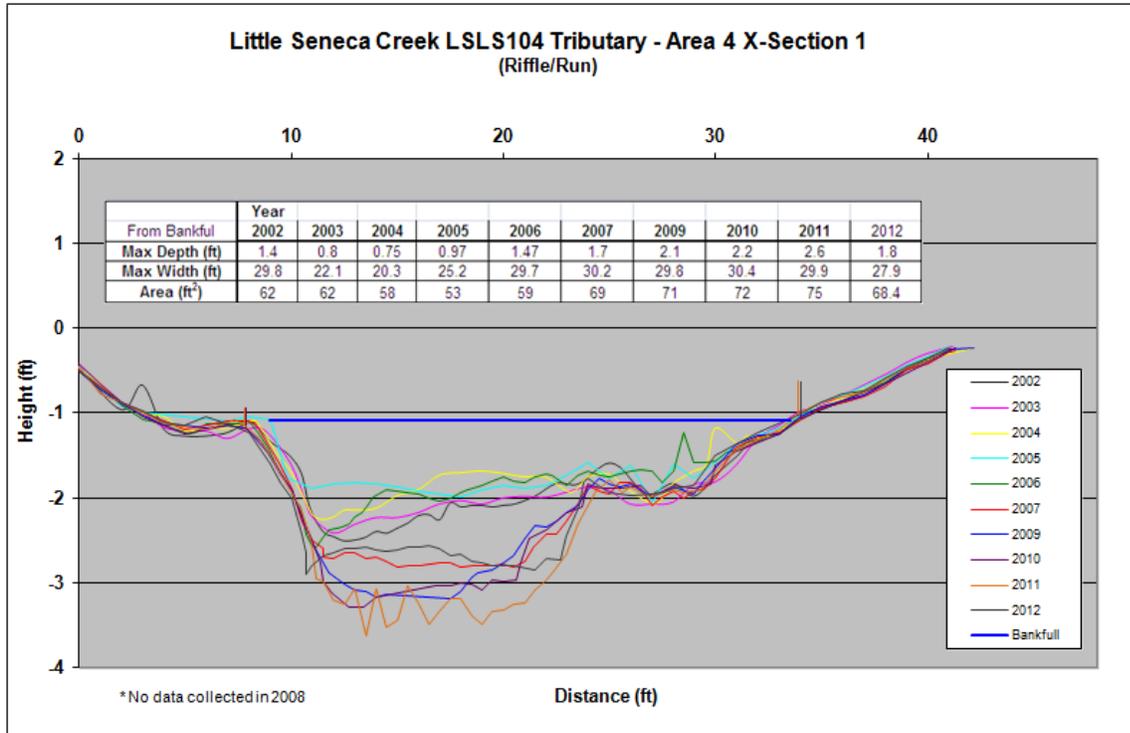


Figure III.H19- Representative cross sections from the test area (LSLS104), cross section location 4 (most downstream location). Cross sections are both measured in riffle/run features.

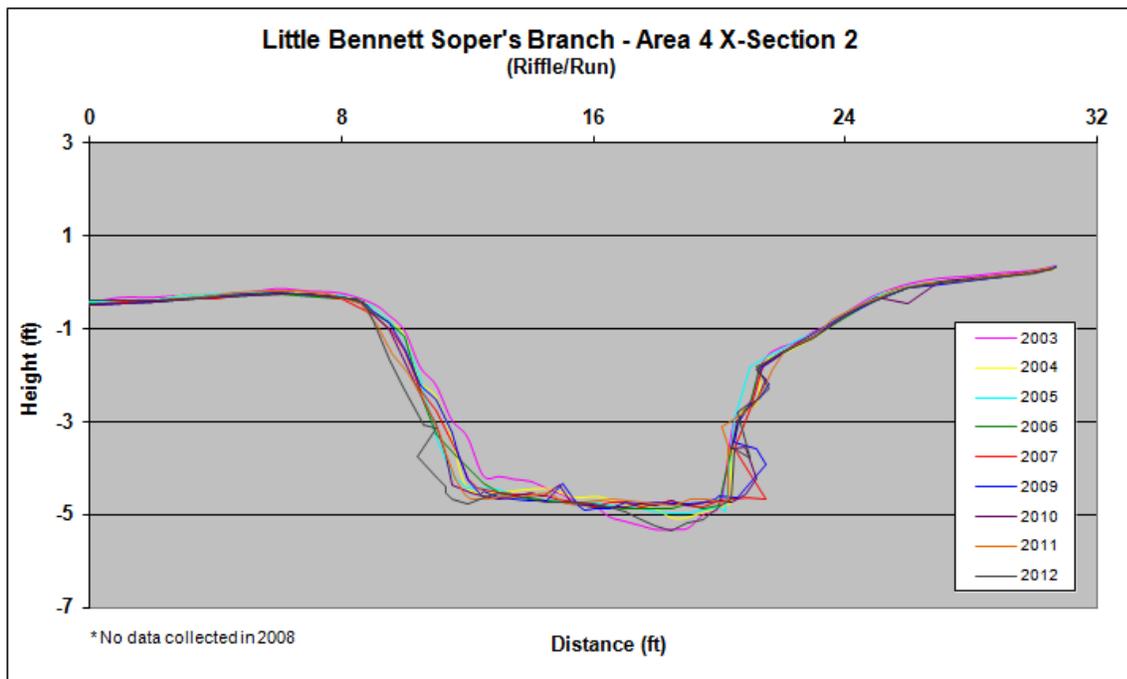
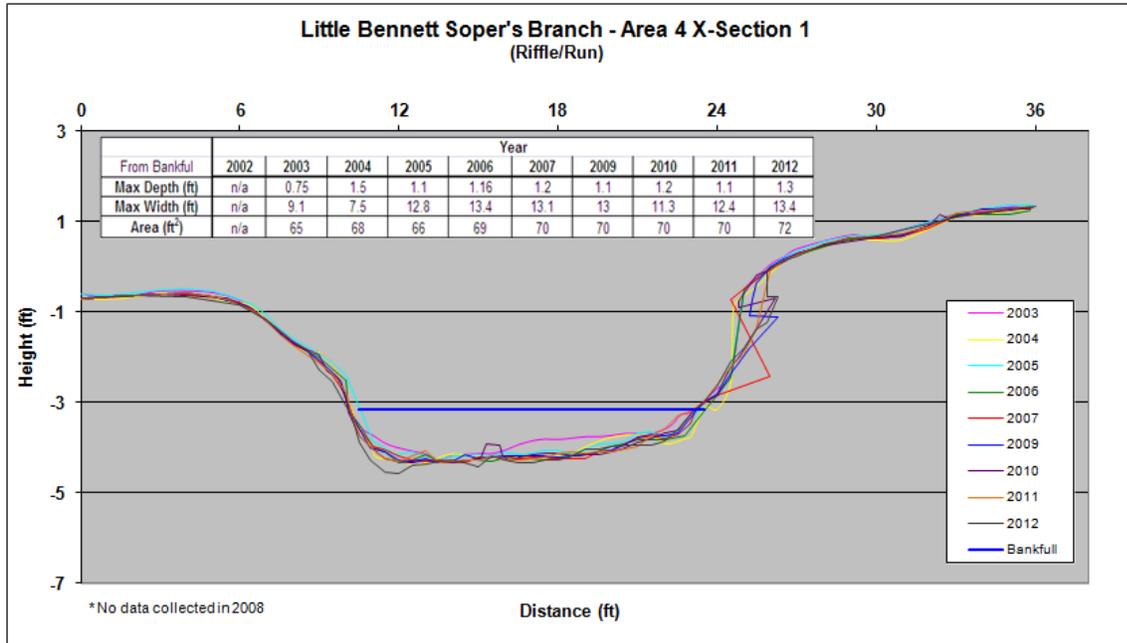
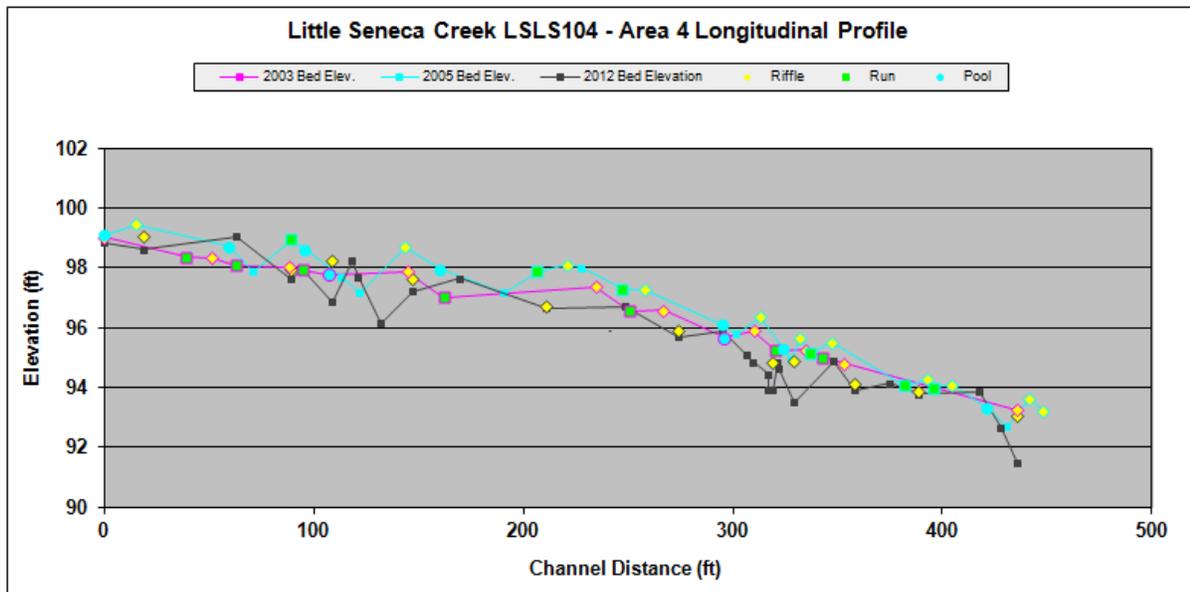


Figure III.H20-Representative cross sections from the control area, cross section location 4 (most downstream location). Cross sections both measured in riffle/run features.

Figure III.H21 shows results of longitudinal profiles, looking parallel to the stream channel, for the test area (LSLS104) and for the control area (Sopers Branch), respectively. The stream bed elevation in the test area tributary has shown considerable instability since construction was initiated, and features frequently change as sediment loads move through the system. The channel depth and channel width at the downstream study area has increased since construction began, likely in response to changes in hydrology. Whereas, at the control station, more consistency was observed in the stream bed elevation and feature type over the same time period. The channel area 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. An examination of the percent of riffle/run to percent pool at the test and the control sites revealed no observable trends.

The results presented are preliminary as the ESC control devices have not all been converted to SWM structures. 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 evinced by straightening, down-cutting, and enlargement of the channel.



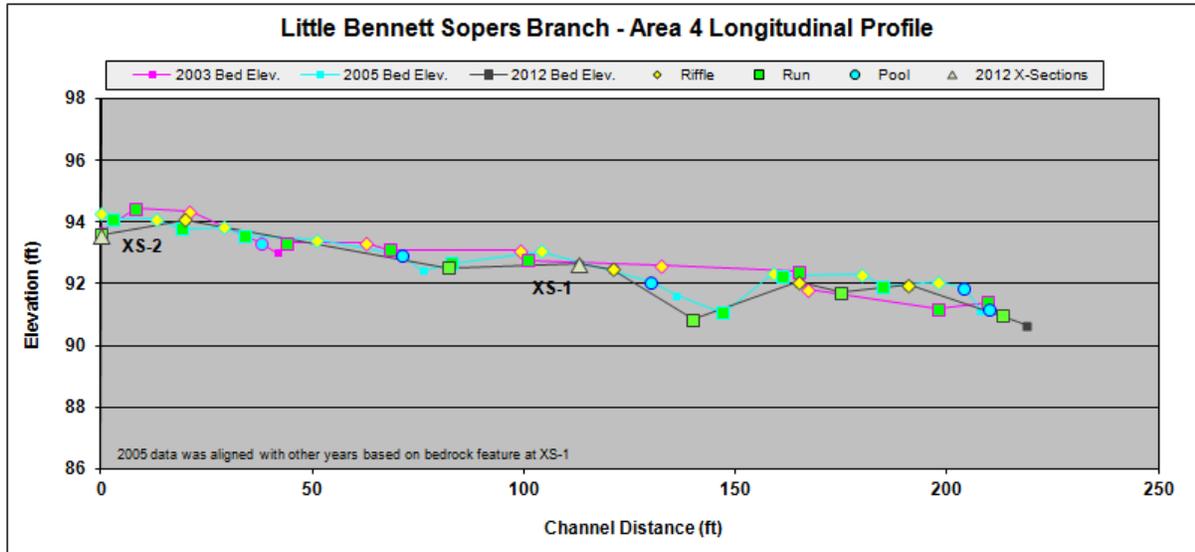


Figure III.H21. Longitudinal Profiles Test Area (LSLS104) and Sopers Branch Control, Study Area Location 4 (Most Downstream Location).

I. Program Funding

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, MDENPDES12.mbd, Parts A-L. The required database is included in electronic format in Appendix A, MDENPDES12.acddb., Part L. Fiscal Analysis. A discussion of the CIP budget for stormwater management including watershed assessment and restoration is presented in Part III.G Watershed Restoration.

During FY13, the reported total funding associated with Permit requirements was \$44,773,429, an increase of 48% over the Permit costs in FY12. For FY13, DEP is reporting all costs associated with MS4 Program requirements including reporting costs, administrative costs, overhead, and debt service. It does not include operational DOT and DGS costs associated with property management, pollution prevention, because these agencies do not have a way to separate out these specific costs from their other operating costs.

<i>Table III.I1- Total Funding for County MS4 Related Programs By Fiscal Year (in 000s).</i>				
Fiscal Year (FY):	FY0	FY11	FY12	FY13
Total Budgeted	\$27,415	\$30,097	\$30,302	44,773
Increase between fiscal years		9.7%	.70%	48%

J. TMDLs

The Permit requires development of implementation plans to meet County MS4 WLAs for any EPA approved TMDLs in County watersheds within one year of EPA approval. The final revised Strategy includes implementation plans for all those watersheds groupings which have one or more EPA-approved TMDLs prior to June 2009.

A summary of the Strategy’s projected progress towards MS4 water quality requirements is presented in Table III.J1. For TMDL planning purposes, the County is delineated into 8 watershed groupings based on the eight-digit USGS hydrologic unit codes (HUCs). Figure III.J1 shows those watersheds with MDE identified impairments and EPA-approved TMDLs as of January 2012.

Table III.J1 – Summary of the Strategy’s Progress Toward MS4 Water Quality Requirements

Countywide Watersheds							
Summary of Implementation Plan schedule with expected MS4 permit area WLA compliance endpoints							
	2015	2017	2020	2025	2030	Permit/ TMDL Targets 2017	Permit/ TMDL Targets 2020
Impervious Area Treated (acres)	4,302	6,014	7,722	10,518	11,154	6,008	7,723
% of Impervious Area Treated by ESD	18%	34%	47%	60%	63%		
Impervious Area Treatment Cost (Million \$)	305	622	987	1,687	1,884		
% of Cost for ESD	53%	66%	70%	80%	80%		
Nitrogen (% Reduction)	18%	25%	36%	46%	51%	9%	20%
Phosphorus (% Reduction)	17%	23%	34%	44%	46%	12%	34%
Sediment (% Reduction)	23%	34%	54%	60%	62%	20%	37%
Bacteria (% Reduction)	11%	15%	20%	28%	30%		
Trash (% Reduction)	18%	26%	33%	41%	42%		

Assumptions:

1. Does not include repeated Outreach and Education costs beyond FY2015
2. Does not include an inflation multiplier

The MDE approved the Strategy in July 2012. The approval letter can be found attached to this report as Appendix B. The County will continue to work with MDE to address any potential technical issues in the Strategy that are inconsistent with MDE modeling efforts. A final version of the Strategy incorporating MDE and public comments including the Watershed Implementation Plans and supporting documents are publicly available on the DEP website at: <http://www.montgomerycountymd.gov/dectmpl.asp?url=/content/dep/water/wris.asp#plans>

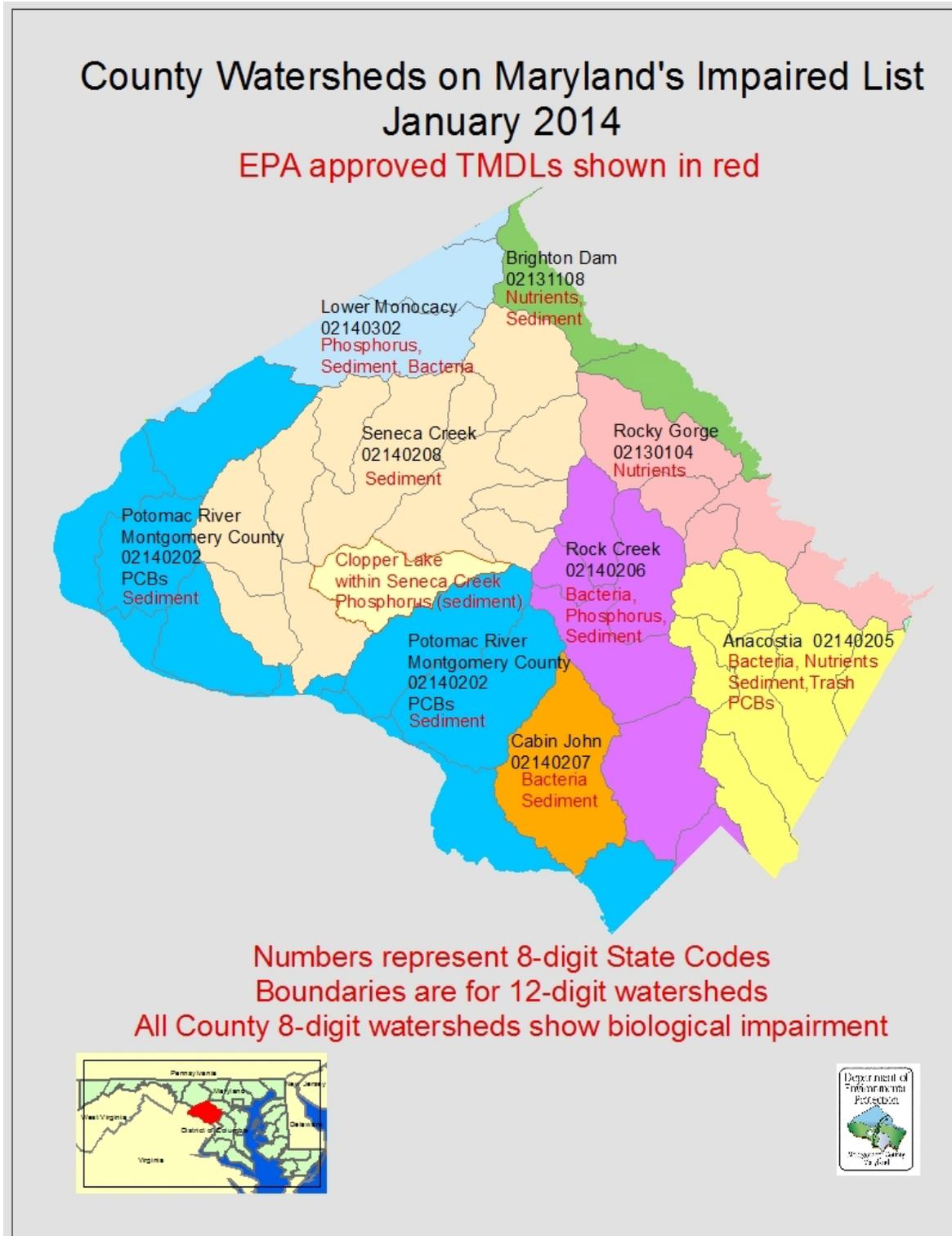


Figure III.J1- County Watersheds with impairments and EPA approved TMDLs.

TMDLs Issued Since June 2009:

Table III.J2 shows the TMDLs approved by EPA since the Strategy was developed in 2009.

Table III.J2- TMDLs Approved Since 2009		
WATERSHED	TMDL	Status of Implementation Plan
Anacostia	PCB	Implementation Plan Submitted in 2013
Cabin John Creek	Sediment	Required Reductions Shown in Strategy
Lower Monocacy	Bacteria	Implementation Plan Complete 2014
Lower Monocacy	Phosphorous	Implementation Plan Complete 2014
Potomac River Direct	Sediment	Implementation Plan Complete 2014
Rock Creek	Sediment	Required Reductions Shown in Strategy
Rock Creek	Phosphorous	Required Reductions Shown in Strategy
Seneca Creek	Sediment	Implementation Plan Complete 2014

Cabin John Creek Sediment, Rock Creek Sediment and Rock Creek Phosphorous

Three of the new TMDLs; Cabin John Creek sediment, Rock Creek sediment, and Rock Creek phosphorous, will be met by restoration activities implemented as part of the Strategy. Table III.J3 below compares the baseline loads, WLAs and % reductions specified by the Cabin John sediment, Rock Creek sediment and Rock creek phosphorous TMDLs.

Table III.J3- Watershed TMDL Summary				
Watershed/TMDL	Baseline Load for MC Phase I (tons/yr)	WLA (tons/yr)	Target Reduction (tons/yr)	% Reduction
Cabin John/Sediment	3143.6	2430.1	713.5	22.7
Rock Creek/Sediment	8666.7	5345	3322	38.3%
Rock Creek/Phosphorous	12,503	8,089	4,414	35%

Tables III.4 and 5 show the sediment and phosphorous reductions that will be achieved by the Strategy.

Table III.J4- Summary of the Implementation Plan Schedule For the Cabin John Creek Watershed with Expected TMDL Compliance Endpoints						
Fiscal Year		2015	2017	2020	2025	2030
Impervious Treated (acres)		187	380	570	1,018	1,018
ESD (% Impervious)		52%	72%	78%	87%	87%
Cost (Million \$)		23	65	114	215	219
ESD (% Cost)		92%	91%	86%	90%	88%
% Reduction from baseline	TN	21%	27%	39%	55%	58%
	TP	20%	26%	35%	49%	51%
	TSS	6%	17%	60%	91%	100%
	Bacteria	16%	22%	27%	40%	40%
	Trash	6%	12%	19%	34%	34%

Table III.J5- Summary of the Implementation Plan Schedule For the Rock Creek Watershed with Expected TMDL Compliance Endpoints						
Fiscal Year		2015	2017	2020	2025	2030
Impervious Treated (acres)		1,541	1,961	2,381	3,625	3,989
ESD (% Impervious)		17%	28%	36%	57%	61%
Cost (Million \$)		87	172	262	566	658
ESD (% Cost)		70%	79%	79%	89%	90%
% Reduction from baseline	TN	24%	30%	38%	55%	61%
	TP	25%	30%	38%	54%	60%
	TSS	38%	50%	92%	100%	100%
	Bacteria	21%	27%	33%	50%	55%
	Trash	17%	24%	31%	50%	55%

Lower Monocacy Bacteria and Phosphorous, Seneca Creek Sediment, Potomac Direct Sediment: The DEP is currently conducting watershed studies of Lower Monocacy, and Potomac Direct which will result in watershed implementation plans, as described in Part F. Watershed Assessment. The plans will show how the County will implement identified restoration opportunities to meet the wasteload allocations of those TMDLs.

Chesapeake Bay TMDL:

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

IV. ANNUAL REPORTING

Annual progress reports are required under 40 CFR 122.42(c). This Permit report fulfills this requirement.

C. Reapplication for NPDES Stormwater Discharge Permit

The current MS4 Permit was issued in February 15, 2010, and requires the County to reapply for NPDES stormwater discharge permit coverage in its fourth year annual report. The reapplication must include an executive summary of the NPDES SWM program that specifically describes how the County is meeting the overall goal of ensuring that each County watershed has been thoroughly evaluated and the County's progress in implementing water quality improvements to the Maximum Extent Practicable (MEP).

At a minimum, the application summary shall include:

- *Montgomery County's NPDES stormwater program goals*
- *Program summaries for the permit term regarding:*
 - *Illicit connection detection and elimination results*
 - *Watershed restoration status including County totals for impervious acres, impervious acres controlled by stormwater management, the current status of watershed restoration projects and acres managed, and documentation of progress towards meeting WLA's developed under EPA approved TMDLs as of the date of issuance of the permit.*
 - *Pollutant load reductions as a result of this permit and an evaluation of whether TMDLs are being achieved.*
 - *Other relevant data and information for describing County programs*
- *Program Operation and capital improvement costs for the permit term*
- *Descriptions of any proposed permit conditions changes based on analyses of the successes and failures of the County's efforts to comply with the conditions of this Permit.*

This is the fourth year annual MS4 Permit report. Required elements of the reapplication follow. The County has taken every step available to it in its efforts to meet Permit requirements as evidenced by the large number of stormwater retrofit projects, restructuring the WQPC, the large commitment of County funding to stormwater management CIP for watershed restoration and its extensive urban BMP inspection and maintenance program. The County has also increased its focus on source control through outreach designed to increase awareness and produce behavior change.

Montgomery County Stormwater Goals

The Permit required DEP to develop and submit a countywide implementation plan within one year of Permit issuance that would identify how the County would achieve Permit requirements within the five year permit cycle. In February 2011, DEP submitted the draft Montgomery County Coordinated Implementation Strategy (the Strategy) and associated Watershed Implementation Plans to MDE with the 2010 MS4 Annual Report. MDE approved the Strategy

in June 2011. The Strategy presents the restoration and outreach initiatives that are needed to meet the watershed-specific restoration goals and water quality standards. Specifically, the Strategy provides the planning basis for the County to:

7. Meet Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) approved by the U.S. Environmental Protection Agency (EPA).
8. Provide additional stormwater runoff management on impervious acres equal to 20% of the impervious area for which runoff is not currently managed to the MEP.
9. Meet commitments in the *Trash Free Potomac Watershed Initiative 2006 Action Agreement* which include support for regional strategies and collaborations aimed at reducing trash, increasing recycling, and increasing education and awareness of trash issues throughout the Potomac Watershed.
10. Educate and involve residents, businesses, and stakeholder groups in achieving measurable water quality improvements.
11. Establish a reporting framework that will be used for annual reporting as required in the County's Permit.
12. Identify necessary organizational infrastructure changes needed to implement the Strategy.

Program Summaries

IDDE

The Permit requires the County to implement an inspection and enforcement program to ensure that all discharges to and from the MS4 system that are not composed entirely of stormwater are either permitted by MDE or eliminated. The Permit requires at a minimum:

- *Field screening at least 150 outfalls annually.*
- *Conducting routine surveys of commercial and industrial areas*
- *Maintaining a program to address illegal discharges, dumping, spills.*
- *Using appropriate enforcement procedures for investigating and eliminating illicit discharges, illegal dumping, and spills.*

Outfall Surveys

In previous Permits, DEP conducted outfall surveys in areas where the County's monitoring program found biological impairments not related to physical habitat degradation. DEP then used the County's storm drain layer to identify outfalls in those areas for investigation. Evaluation of that method found that the protocol did not effectively identify illicit discharges. For example, from 2007-2009, 231 outfalls were screened, but only six outfalls (2.5%) were found with dry weather discharges that exceeded the detection levels of the Permit required field chemical tests.

In FY11, DEP partnered with the Center for Watershed Protection (CWP) to perform a pilot IDDE investigation of the Sligo Creek subwatershed of the Anacostia following protocols in the CWP's Illicit Discharge Detection and Elimination Manual. The CWP protocol added two elements that greatly improved the efficiency of the investigations. The team physically walked the entire reach of the targeted waterbody, allowing comprehensive evaluation of the frequency of problems, and provided information that will improve the accuracy of the County's storm drain GIS layer. The protocol also added additional field test parameters, notably ammonia, potassium, and fluoride, which provided more information on possible sources of the discharges and increased the likelihood of source identification and elimination.

From FY11-FY13, DEP assessed 562 outfalls by walking the entire reach of waterbodies in three 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 address Part III.E.3.b. DEP found that 408 (73%) of the outfalls observed were not present in the County's storm drain GIS layer, and 77 (14%) outfalls had dry weather flow with field test results suggesting illicit discharges (Table IV.C1). DEP investigated 55 of the suspected illicit discharges found in the field, but were only successful in identifying the sources of 9 (1.9%). Tracking illicit discharges in heavily urban areas is problematic for a number of reasons. Tracking the discharge above ground by looking into up gradient manholes is often not successful due to missing storm drain information, very complex storm drain systems, paved over manholes, or intermittent flow. For FY14, DEP has obtained contractual support to begin detailed closed circuit television (CCTV) investigations into the remaining unidentified discharges. DEP is also working with DOT on methodology and funding to improve the accuracy of the County's storm drain layer.

For the current permit term, DEP partnered each year with the CWP to continue to investigate the suspected illicit discharges in the Sligo Creek subwatershed, focusing on the drainage areas of two large outfalls, the Maple Avenue outfall and the Bennington outfall. Results to date have identified:

- Ammonia discharges traced to building heating, ventilation, and air conditioning (HVAC) units. DEP partnered with CWP in FY14 for a pilot evaluation of the extent of HVAC discharges in the Sligo Creek urban area. The results will be presented in the FY14 report.
- Multiple discharges with detergents and ammonia concentrations suggesting sanitary system influence coming from complex underground storm drain systems. These discharges are very difficult to track above ground due to storm drain map inaccuracies, the transient nature of the discharges, and private property accessibility issues. In FY14, DEP will use contractor provided CCTV services to attempt to identify their sources.
- Several hot spot issues were identified primarily in the solid waste storage areas of commercial establishments, including leaking dumpsters and restaurant grease spillage.

Table IV.C1 Illicit Discharge Detection and Elimination Summary, FY11-FY13		
		% of Total
Complaints received	643	
Enforcement Actions	100	15% of Complaints Received
Outfalls Screened	562	
Outfalls Unmapped	408	73% of Total Outfalls Screened
Suspected Illicit Discharges	77	14% of Total Outfalls Screened
Resulting Investigations	55	9% of Total Outfalls Screened
Problem Resolved	9	1.9% Of Total Outfalls Screened

Water Quality Enforcement Program

DEP’s Division of Environmental Policy and Compliance has a highly effective environmental enforcement group that has great success in eliminating discharges reported by the public. Over the first 4 years of the permit term, the group has responded to 643 water quality related complaints, which led to 100 enforcement actions (15%), as shown in Table IV.C1 above.

DEP is also partnering with community groups for faster response when a pollution discharge is reported. In January 2012, the DEPC established an e-mail process for Friends of Sligo Creek (FoSC) members to report water quality incidents directly to DEPC staff. Subsequently, two residents formed a neighborhood group, Water WatchDogs to work with DEP and the FoSC to enhance reporting and facilitate follow up for pollution incidents. Members are trained to provide specific information that is transmitted via email straight to DEP field enforcement staff. In FY13, volunteers reported 13 incidents covering a wide range of water pollution problems, resulting in 5 investigations with one enforcement action.

WATERSHED RESTORATION SUMMARY

The Permit requires the County implement practices identified in Part III.F (Watershed Assessment) to control stormwater discharges to the MEP. At a minimum the County shall:

- *By the end of the permit term, complete the implementation of those restoration efforts that were identified and initiated during the previous term to restore 10% of the County’s impervious surface area.*
- *Complete the restoration in a watershed, or combination of watersheds, to restore an additional 20% of the County’s impervious area that is not restored to the MEP.*

Achieving the 2001 MS4 Permit Watershed Restoration Goal:

The County's second generation Permit issued in 2001 required the County to restore a watershed or combination of watersheds equaling 10% of Montgomery County's impervious area not treated to the MEP. The calculated 10% watershed restoration goal was 2,146 acres. Analysis of County SWM BMP CIP projects completed through FY10 showed additional control to 1,091 impervious acres. Based on the MDE draft guidance published in June 2011, DEP calculated that stream restoration of 20 stream miles added an additional equivalent impervious acreage treatment of 1,055 acres. The total impervious control added through CIP watershed restoration projects was reported in FY11 to be 2,146 impervious acres, meeting the 10% watershed restoration requirement.

Achieving the 2010 MS4 Permit Watershed Restoration Goal:

The Permit requires the County to restore an additional 20% of the County's impervious area not currently controlled to the MEP. DEP calculated that a 20% impervious area restoration goal would equal 4,292 acres, as presented in the Strategy. The Strategy baseline year was 2009.

The DEP has since improved the accuracy of the Urban BMP database including adding data for hundreds of backlogged SWM BMPs, and updating and correcting SWM BMP drainage areas. This new information includes SWM BMPs that were treating impervious area before 2009, but were not credited in the Strategy. It also includes SWM BMPs constructed after Permit issuance in 2010 whose impervious area treatment has not yet been credited towards the Permit's 20% restoration goal. The new information gathered since 2009 refines the planning data and assumptions used in the Strategy, and allows a more accurate and detailed calculation of controlled and un/under controlled impervious area.

The impervious restoration goal re-calculation is shown in this report in Part III.G Watershed Restoration. The new restoration goal was determined to be 3,976 impervious acres. DEP shows in this FY13 MS4 Annual Report that projects already constructed, projects currently in construction, and projects currently in design will control 3,634 acres. The remaining 342 impervious areas will be met through internal and external partnership projects performed within the County's MS4 area. These projects for example may include efforts to treat uncontrolled impervious surfaces through facility modification and modernizations performed by Montgomery County Department of Transportation, Department of General Services, and Public Schools.

Since 2009, and through FY13, DEP has constructed 674 restoration projects adding stormwater control to a total of 405 impervious acres. DEP has also determined from the backlogged and updated SWM BMP data that stormwater controls were added to an additional 143 impervious acres since 2009. Watershed restoration projects under construction in FY13 will treat another 185 acres of uncontrolled impervious area.

At the start of this Permit cycle, the County realized the significant challenge in implementing watershed restoration projects quickly enough to meet the Permit requirements within the current five-year cycle. The DEP explored innovative approaches for project management and oversight, such as obtaining contractual support for the greatly increased workload. In FY13,

DEP negotiated two contracts critical to accelerating the watershed restoration project implementation rate. One contract is for comprehensive water resources engineering, which provides support in all aspects of watershed restoration, project design, analysis, and construction, including engineering needed to successfully implement stream restoration, SWM BMPs (new and retrofit), and ESD projects. The second contract is for a MS4 program management consultant team and provides program management support in planning, implementing, tracking, monitoring and oversight of watershed restoration projects, and for completing watershed assessments to identify additional project opportunities.

With this contractual support, DEP is designing 30 LID projects, 68 stormwater pond retrofits, and assessing 15 existing stormwater facilities for degree of stormwater controlled. An additional 14 stream restoration projects are also currently in design. These restoration projects are expected to treat another estimated 2,424.86 acres of impervious area. DEP anticipates constructing approximately 50 projects in FY14.

For FY14 and FY15, DEP has 18 LID projects, 18 stormwater pond retrofits, and 13 stream restoration projects expected to be in design. These projects are estimated to treat another 476 acres of impervious area.

Projects identified in the ongoing watershed studies will be selected through the DEP's watershed planning process for further design and implementation to meet the remaining 342 impervious acre needed to meet the 2010 MS4 Permit restoration goal.

A detailed account of County watershed restoration progress towards meeting the permit requirements can be found in Section III.G. of this report and is summarized below in Table IV.C2.

<i>Table IV.C2- FY 13 Restoration Implementation Progress Summary</i>	
Description	Area in Acres, Using Updated Data FY13
a. Total County Impervious Area Subject to MS4 Permit	25,119
b. County MS4 Impervious Area with MEP Stormwater Management in 2009	5,239
c. Under or Uncontrolled Impervious Area Subject to MS4 Permit (Difference a-b)	19,880
d. 2010 MS4 Permit 20% Impervious Area Restoration Goal* (c x 20%)	3,976
e. Stormwater Controls Added Since 2009 (From County Backlogged SWM BMP Data)	143
f. Impervious Area Restored in FY11	24
g. Impervious Area Restored in FY12	116
h. Impervious Area Restored in FY13	265
i. Total Impervious Area Control Implemented Since 2009 (Sum of e + f + g + h)	548
j. Impervious Area Associated with Stormwater Restoration Projects Under Construction in FY13	185
k. Impervious Area Associated with Stormwater Restoration Projects in Design as of FY13	2,425
l. Impervious Area Associated with Restoration Projects for Future Design (FY14 and FY15)	476
m. Remaining Impervious Area to be Treated for the 2010 MS4 Permit (difference d - i - j - k - l)	342
*This recalculated impervious goal is based on information not available at the time of Strategy development.	

PROGRESS TOWARDS MEETING WLA's and POLLUTANT LOAD REDUCTIONS

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.

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.

Table IV.C3, 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 June 2011 DRAFT Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated. The FY13 pollutant load reduction information can also be found in this report’s electronic (CD) attachment in Appendix A, MDENPDES11.mbd, Parts G., G.1., and G.3.

Because the Strategy was developed prior to MDE’s June 2011 DRAFT Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, it contains different land cover loading rates and pollutant removal efficiencies based on the best information available at the time. DEP has been working to update impervious area data, along with updating urban BMP data to include over one thousand new structures with their delineated drainage areas. Once the data is updated, DEP will run the WTM again using MDE’s assumptions. This iterative approach will refine the current pollutant reduction estimates and lead to a clearer picture of the reductions associated with the County’s watershed restoration efforts.

Table IV.C3- Summary of County Progress Towards Meeting TMDL WLAs

Impairment	Watershed	Issue Date	Pollutant	Units	WLA _{SW} Percent Reduction	Percent Reduction Since Baseline Date	TMDL Baseline Data Date
Bacteria	Cabin John Creek	2007c	<i>E. coli</i>	(Billion MPN/yr)	30.7%	0.40%	2003
	Rock Creek	2007d	Enterococci	(Billion MPN/yr)	96.0%	3.50%	2003
	Anacostia River	2007b	Enterococci	(Billion MPN/yr)	87.9%	4.80%	2003
	Lower Monocacy River	2009e	<i>E. coli</i>	(Billion MPN/yr)	85.4%	0.02%	2003-2004
Sediments	Anacostia River	2007a	TSS	(tons/yr)	87.5%	3.10%	1997
	Triadelphia Reservoir	2008b	TSS	(tons/yr)	0.0%	0.02%	2003
	Clopper Lake	2002	TSS	(tons/yr)	0.0%	0.00%	2002
	Lower Monocacy River	2009d	TSS	(tons/yr)	60.8%	0.10%	2000
	Seneca Creek	2011	TSS	(tons/yr)	44.6%	1.00%	2005
	Rock Creek	2011	TSS	(tons/yr)	38.3%	7.26%	2005
	Cabin John Creek	2011	TSS	(tons/yr)	22.7%	1.80%	2005
	Potomac River Direct	2011	TSS	(tons/yr)	36.20%	0.39%	2005
Nutrients	Clopper Lake	2002	Phosphorus	(lbs/yr)	45.4%	0.00%	2002
	Anacostia River	2008a	Nitrogen	(lbs/yr)	81.8%	5.90%	1997

	Anacostia River	2008a	Phosphorus	(lbs/yr)	81.2%	6.40%	1997
	Triadelphia Reservoir	2008b	Phosphorus	(lbs/yr)	15.0%	0.30%	2003
	Rocky Gorge Reservoir	2008b	Phosphorus	(lbs/yr)	15.0%	0.23%	2003
	Lower Monocacy River	2013	Phosphorus	(lbs/yr)	30.0%		2009
	Rock Creek	2013	Phosphorus	(lbs/yr)	35.0%	0.98%	2009
Trash	Anacostia River	2010	Trash	lbs/yr removed	100.0%	4.60%	2010
PCB	Anacostia River-Non Tidal-NWB	2011	PCB	g/yr	98.1%		
PCB	Anacostia River-Non Tidal-NEB	2011	PCB	g/yr	98.6%		

OTHER PROGRAM ACCOMPLISHMENTS

The County has made much progress over the last 4 years towards meeting all of its Permit requirements. Highlights include:

Stormwater Management

The DEP SWM Facility Maintenance and Inspection Program oversees the triennial inspections, structural and non structural maintenance of all SWM BMPs under the County's jurisdiction and assesses repair and maintenance needs. From FY11- FY13, the number of SWM BMPS under County jurisdiction has grown from 4,200 to 7,000. From FY11- FY13, DEP oversaw 3,578 triennial inspections and 5,440 SWM BMPs were maintained by either the DEP structural maintenance program or by the private owner of the facility. In FY13, DEP began contracting routine maintenance of publically owned LID practices, including Roadway Right-of-Way (ROW), installed to meet the Permit watershed restoration goal.

In July 2010 and March 2011, the County Council passed Bill 40-10 amending the County's stormwater management law to require management of stormwater runoff through the use of nonstructural BMPs to the MEP for new development and redevelopment projects approved by DPS. In response to MDE concerns that a portion of Bill 40-10 was less restrictive than State law, Bill 40-10 was amended in March 2011 as Expedited Bill 7-11 to limit certain alternative SWM measures to redevelopment only. The bills then 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 revised County stormwater management law maintained 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% of the redevelopment site using ESD to the MEP. County law requires stormwater management to protect 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% of the redevelopment site, and requires the use of ESD to the MEP to meet these standards.

Sediment and Erosion Control

On March 29, 2013, the County Council passed Expedited Bill 1-13, Erosion and Sediment Control, 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, including more stringent stabilization requirements and the establishment of maximum grading unit criteria.

Water Quality Protection Charge

In April 2013, the County Council passed Bill 34-12, Stormwater Management-Water Quality Protection Charge (WQPC). Bill 34-12 modified the structure of the County's original WQPC to comply with the 2012 State HB 987, Stormwater Management- Watershed Protection and Restoration Program Bill.

Ensuring ESD to the MEP

In 2010, County consultants prepared a final report, Implementing Environmental Site Design in Montgomery County, which summarized how the County's codes, regulations, programs, and policies may need to be updated to allow the use of Environmental Site Design (ESD) and low impact development (LID) techniques to the MEP. The most significant updates required will be accomplished through the Zoning Code rewrite, underway by the Planning Department of the Maryland- National Capital Park and Planning Commission (M-NCPPC). The Planning Department transmitted a draft to the County Council in May 2013. At the end of FY13, The Council Planning, Housing and Economic Development committee (PHED) began holding work sessions on the zoning code revision. In FY14, the PHED transmitted their draft to full Council for review and public hearings. The Zoning Code rewrite, Zoning Text Amendment (ZTA) 13-04, was approved on March 5, 2014.

Montgomery County Carryout Bag Law

On January 1, 2012, Bill 11-8, the County's Carryout Bag Law went into effect. The goal of the law is to increase awareness about the problem with bag litter in our local waterways and to reduce use of those types of disposable bags. The Carryout Bag Law taxes 5 cents for each paper and plastic bag that a customer takes from certain retail establishments to carry purchases out. As of June 2013, there were 1,100 registered retailers in the system. In FY13, the number of registered retailers continued to increase and it was felt too soon to determine how this bill is affecting carryout bag use for the County. Number of carryout bags used and numbers of plastic bags found in local streams will be evaluated for changes during FY14 and results reported in the FY14 Annual MS4 Report.

Street Sweeping

In FY13, the County continued its streetsweeping program, focusing on twice monthly sweeping of 229 miles in selected arterial routes, removing 273 tons of material. The sweeping frequency provides equivalents for impervious acreage control and pollutant reduction credit as specified in the Maryland Department of the Environment's (MDE's) June 2011 Draft "Accounting for

Stormwater Wasteload Allocations and Impervious Acreage Treated” guidance document. For FY13, the County controlled an impervious acreage equivalent of 16 acres and reduced 409 pounds of Total Nitrogen (TN) and 163 pounds of Total Phosphorous (TP).

The County Department of Transportation (DOT) continues the annual sweeping for all residential routes. In FY12 the County swept a total of 4,055 residential curb miles, removing 806 tons of material.

Public Education and Outreach

In FY13, DEP continued to expand its education and outreach programs to meet Permit requirements as outlined in the Strategy Public Outreach and Stewardship Work Plan (POSWP). Projects focused on stormwater impact education, pet waste management, lawn stewardship, anti-littering, stormwater awareness, and establishing a volunteer Stream Stewards program. Over the first four years of the permit term, DEP has participated in 200 events focused on stormwater awareness, representing direct contact with an estimated 20,000 residents. The RainScapes program hosted an additional 80 workshops on small scale stormwater practices for homeowners and landscape professionals, reaching an additional 3,000 residents.

The County continues to work with the Anacostia Watershed Restoration Partnership, the Alice Ferguson Foundation, and other partners to meet regional trash reduction goals with a focus on outreach. Initiatives directly related to the regional anti-litter campaign include ongoing education and outreach for recycling and litter reduction, mass media outreach campaigns, and litter removal from streets, stormwater ponds, and transit stops.

Watershed Assessments

In FY13, DEP issued a Task Order to complete assessments of all County watersheds or subwatersheds not addressed during the two previous Permit cycles, which will meet the Permit requirement to conduct a systematic assessment of water quality within all watersheds. The watershed assessments began in spring 2013 and will be completed by the end of 2014. These assessments will include identification of LID opportunities, stormwater pond retrofits, new stormwater control opportunities, and potential stream restoration projects. Watershed implementation plans, which present more detailed implementation planning and schedules to meet regulatory and programmatic targets, will be developed from the assessments in FY14.

Program Operation and Capital Improvement Costs for the Permit Term

The permit requires that “Adequate program funding to comply with all conditions of this permit shall be maintained”.

The County’s MS4 related programs are funded through the County’s stormwater utility fee, known as the Water Quality Protection Charge (WQPC). The County’s original WQPC (2001) was assessed based on an “equivalent residential unit” or ERU, defined as 2,406 square feet, or the median impervious area associated with a single family detached residence in Montgomery County. “Associated” non residential properties (i.e. properties that drain into stormwater facilities that also serve residential properties) were also charged a fee based on their actual

impervious. The County Council is required to set the ERU rate each year. In FY13, the rate was \$92.60 per ERU, and the County raised approximately \$23 million for watershed protection and restoration programs.

In April 2013, the County Council passed Bill 34-12, Stormwater Management-Water Quality Protection Charge (WQPC). Bill 34-12 modified the structure of the County’s original WQPC to comply with the 2012 State HB 987, Stormwater Management- Watershed Protection and Restoration Program Bill. Modifications (effective FY14) included applying the charge to all properties, including non-residential, not otherwise exempt under state law. It also allows property owners to obtain a credit for on-site stormwater management practices. The Bill exempts owner-occupied residential property owners that can demonstrate substantial financial hardship from the WQPC, and also phases in increases to the WQPC. The WQPC creates seven payment tiers based on the actual amount of the property’s impervious surfaces. Other changes include establishing a program to award grants to non-profit organizations for water quality protection or improvement projects.

CAPITAL IMPROVEMENT PROJECT COSTS

The Permit requires the County to submit estimated costs and actual expenditures for watershed restoration program implementation.

FY10-FY13 Costs for Watershed Restoration Programs

Table IV.C4 below shows a summary of FY10 thru FY13 actual costs for both watershed assessments and watershed restoration projects. Over the Permit term, from FY10-FY13, costs associated with watershed assessment and restoration have increased 201%.

<i>Table IV.C4-FY10 –FY13 Capital Improvement Program Costs for Watershed Assessment and Restoration</i>				
Fiscal Year (FY)	FY10	FY11	FY12	FY13
Total annual cost for watershed assessment	\$433,800	\$749,130	\$502,244	\$879,435
Total annual cost for watershed restoration	\$2,942,100	\$3,904,222	\$8,168,571	\$9,274,295
Total Costs	\$3,375,900	\$4,653,352	\$8,670,815	\$10,153,730

FY10-FY13 SWM CIP Budget

The six-year SWM CIP budget for FY13-FY18 reflected the significant increase in implementation that will be needed to meet the Permit requirements for adding runoff management. As shown in Tables IV.C5 and IV.C6 below, the approved budget for FY13 was \$25,000,000 compared to \$11,445,000 for FY12 and \$8,888,000 for FY11.

The approved FY13-FY18 SWM CIP budget totaled \$235 million, an increase of \$128.7 million, or 121 percent from the amended approved FY11-FY16 SWM CIP budget of \$106.3 million. This increase in stormwater management activity was financed primarily through water quality

protection bonds. The debt service for these bonds is supported by the County's WQPF. The budget assumed \$60 million in State aid based on the State's expressed interest in enacting legislation to support stormwater management efforts.

Table IV.C5- Department of Environmental Protection FY11-16 Stormwater Management (SWM) Capital Improvement Program (in \$000s) (Approved May 2011)							
Project Type	CIP Cycle Total	FY11	FY12	FY13	FY14	FY15	FY16
SWM Retrofit	52,010	1,785	2,425	11,000	11,500	14,400	10,900
Public Property Low Impact Development	27,975	3,475	4,900	4,900	4,900	4,900	4,900
Miscellaneous Stream Valley Improvement	8,370	1,395	1,395	1,395	1,395	1,395	1,395
SWM Facility Planning	7,025	925	1,200	1,350	1,350	1,100	1,100
SWM Retrofit Anacostia	1,645	0	175	450	510	510	0
Major Structural Repair	9,250	1,300	1,350	1,600	1,650	1,650	1,700
Total	\$106,275	\$8,880	\$11,445	\$20,695	\$21,305	\$23,955	\$19,995

Table IV.C6- Department of Environmental Protection Approved (May 2012) FY13-18 Stormwater Management (SWM) Capital Improvement Program Budget (in \$000s)							
Projects	CIP Cycle Total	FY13	FY14	FY15	FY16	FY17	FY18
SWM Retrofit	127,010	11,710	19,700	20,600	20,000	25,000	30,000
SWM Retro- Government Facilities. Low Impact Development	11,425	1,125	1,900	2,100	2,100	2,100	2,100
SWM Retrofit- Roads	49,425	6,015	7,410	9,000	9,000	9,000	9,000
SWM Retrofit Schools	20,100	1,270	1,010	3270	4,850	4850	4,850
Miscellaneous Stream Valley Improvement	9,870	2,070	2,070	2,070	1,220	1,220	1,220
SWM Facility Planning	6,750	1,150	1,150	1,150	1,100	1,100	1,100
SWM Retrofit Anacostia	1,620	310	310	310	230	230	230
Major Structural Repair	8,800	1,350	1,450	1,500	1,500	1,500	1,500
Total	235,000	25,000	35,000	40,000	40,000	45,000	50,000

The County Executive’s recommended FY15-FY20 SWM CIP budget (Table IV.C7 below) was presented to the County Council in March 2014 and totals \$363.6 million, an increase of \$128.7 million, or 54.7% from the amended approved FY13-FY18 SWM CIP budget of \$235 million.

Highlights of the recommended FY15-FY20 SWM CIP budget include:

- Continue the planning and implementation of stormwater controls, public outreach, stream monitoring, and other actions needed to comply with the Permit.
- Expand the design and construction of LID practices throughout the County, including County facilities.
- Construct new stormwater management facilities and retrofit old stormwater controls to prevent property damage, improve water quality, and protect habitat.
- Perform major structural repairs on public and private stormwater facilities accepted into the County’s maintenance program.
- Continue to repair damaged stream channels and tributaries in stream valley parks and priority watersheds.
- Expand the County’s efforts to prevent trash pollution.

<i>Table IV.C7 - Department of Environmental Protection Recommended (March 2014) FY15-20 Stormwater Management (SWM) Capital Improvement Program (CIP) Budget (in \$000s)</i>							
Projects	CIP Cycle Total	FY15	FY16	FY17	FY18	FY19	FY20
SWM Retrofit	146,470	18,726	22,968	23,408	23,732	27,696	29,940
SWM Retro- Government Facilities. Low Impact Development	17,732	3,026	2,816	2,820	3,270	2,900	2,900
SWM Retrofit- Roads	98,420	12,740	14,080	26,320	16,010	15,170	14,100
SWM Retrofit Schools	24,930	3,470	6,280	3,480	3,900	3,900	3,900
Miscellaneous Stream Valley Improvement	42,573	6,393	5,440	9,640	8,900	6,100	6,100
SWM Facility Planning	8,400	1,150	1,250	1,350	1,450	1,550	1,650
SWM Retrofit Interagency	2,060	310	310	350	350	350	350
Major Structural Repair	23,070	7,350	1,450	3,540	3,000	3,000	3,000
Total	363,655	53,345	56,724	70,368	60,612	60,666	61,940

MS4 RELATED PROGRAM FUNDING

During FY13, the reported total funding for programs associated with Permit requirements was \$44,773,429, an increase of 48% over the Permit costs in FY12. For FY13, DEP is reporting all costs associated with MS4 Program requirements including reporting costs, administrative costs, overhead, and debt service. It does not include operational DOT and DGS costs associated with property management and pollution prevention, because these agencies do not have a way to

separate out these specific costs from their other operating costs. Table IV.C8 below shows costs for MS4 programs from FY10 to FY13.

Table IV.C8- Total Funding for County MS4 Related Programs By Fiscal Year (in 000s). (excluding DOT and DGS Operational Property Management and Pollution Prevention)				
Fiscal Year (FY):	FY0	FY11	FY12	FY13
Total Budgeted	\$27,415	\$30,097	\$30,302	44,773
Increase between fiscal years		9.7%	.70%	48%

Proposed Permit Condition Changes

The County feels that the reapplication summary above shows an extraordinary level of commitment towards meeting its Permit requirements, and towards the ultimate goal of improving water quality. The County looks forward to continuing to work cooperatively with MDE to develop an effective and acceptable next generation Permit. Along these lines, the County would welcome a reapplication meeting with MDE to discuss the following concerns and considerations, especially in light of recent legal challenges to the Maryland MS4 Permits:

Assessing the Current Implementation Rate for Watershed Restoration

As the watershed restoration program continues to accelerate, the County feels that assessing implementation issues and BMP effectiveness is becoming an increasingly important area for discussion. There is much more we need to know regarding how effective practices are in improving water quality, and therefore how best to make our watershed restoration program cost-effective. Future restoration projects will focus more heavily on identifying and constructing smaller scale SWM practices with expected large cost increases to meet goals related to runoff management from impervious areas. This focus will likely result in significant cost increases and a commensurate increase in the WQPC, with consequences for Montgomery County taxpayers. The County is also still evaluating the effect of adding so many small practices in our densely developed areas, e.g. will there be any impacts to consider by increasing infiltrating stormwater near underground utilities? The County also needs more time and experience to learn how best to handle inspection and maintenance requirements for the expected thousands of new ESD practices required to meet the existing restoration goal.

Discussing Possible MS4 Program Efficiencies

The County would also like to explore with MDE ways to improve efficiencies in Permit related programs (e.g., in particular for implementation and tracking success in watershed restoration) by discussing the structure of MS4 Permit, co-permittees, and Phase II jurisdictions within the County.

Potomac Trash Free Treaty

The County would like to discuss deleting the reference to the Potomac Trash Free Treaty which expired in 2013 and had a goal of a trash free Potomac by 2013. This would be consistent with the Prince George's County Final Determination issued in January 2014. The County remains committed to preventing trash and litter from getting into our storm drains and our local streams.

SWM Design Manual Assessment

We would like to discuss allowing the County the flexibility to design a program that will better evaluate the effectiveness of the State's stormwater design manual requirements. Documenting the success of the ESD approach in reducing water quantity and quality impacts requires more than the currently limited focus on stream channel morphology

Watershed Assessments, Implementation Plans and Workplans

The County has completed all required watershed assessments, implementation plans and workplans required by the Permit. The County requests that the next MS4 permit allow the County to focus on implementation of the existing plans rather than be required to begin a second round of assessments for watersheds already completed in earlier Permit cycles. .

V. SPECIAL PROGRAMMATIC CONDITIONS

A. Tributary Strategy

The DEP continued to serve as the local liaison for activities related to Maryland's Watershed Implementation Plan (WIP) process. There were no local meetings held during FY13 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. This included participating in the WIP Technical meetings held by MDE in January and March of 2013 and coordinating the submission for local progress in July 2013. Implementation remains on track as proposed in the WIP Phase 2 document submitted to MDE in November 2011.

B. Comprehensive Planning

The County agencies are routine participants for review and comment as MNCPPC Sector Plan and Master Plan documents are being developed. In addition, the DEP provides data and analysis of local stream conditions for use in local planning efforts. During FY13, this data were used in the White Flint II Sector Plan and the Burtonsville Crossroads Neighborhood Study. The data in the Burtonsville data documented the good quality of the benthic community in certain headwater streams and was a factor considered in the adopted planning recommendations.

EPA Region III Inspection

In June 2013, EPA Region III inspected the County's MS4 Permit programs over two days, including office visits and field inspections. The inspection primarily focused on the County's stormwater management facility maintenance and inspections program, sediment and erosion control program, IDDE program, and inspection of County facilities covered under the General Discharge Permit for Stormwater Associated with Industrial Facilities.