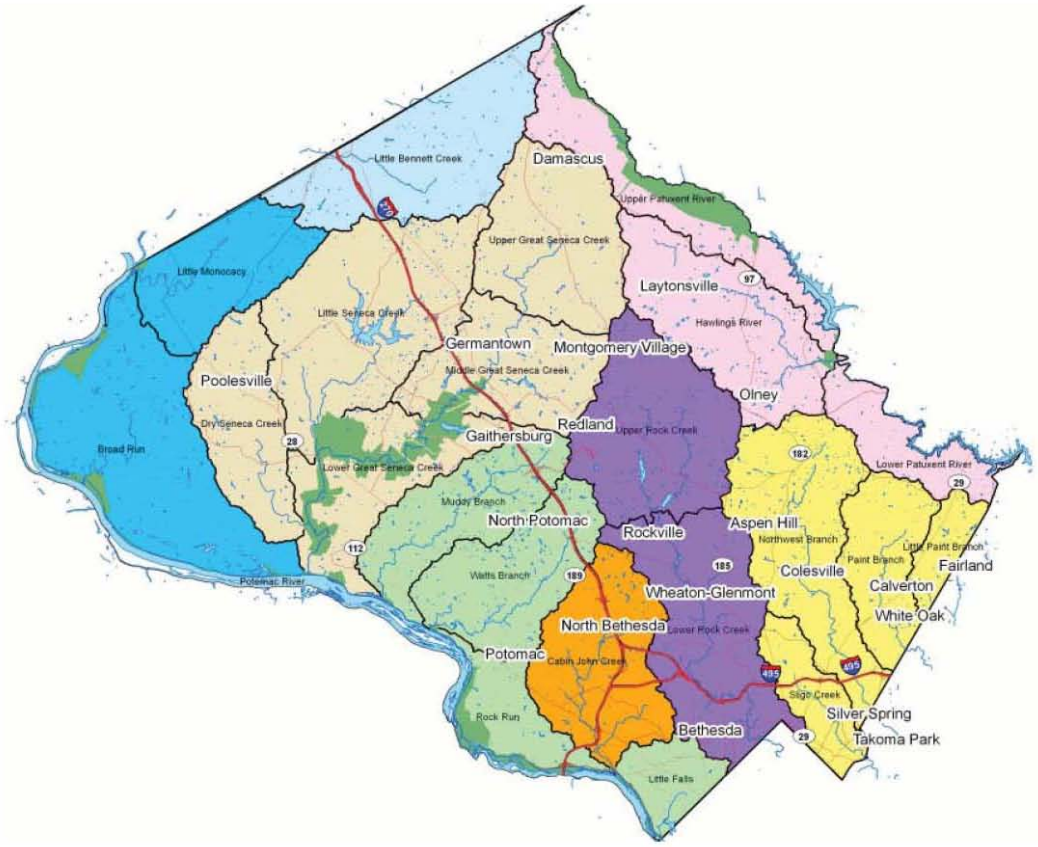
Annual Report for FY11 NPDES Municipal Separate Storm Sewer System Permit



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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
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

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- B. Urban Best Management Practices Associated with GIS Coverage (Part III.C.2)
- C. Impervious Surfaces Associated with GIS Coverage (Part III.C.3)
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- L. Fiscal Analysis (Part III.I)

Appendix B. MDE Letter Approving the Strategy after review.
Appendix C. Montgomery *County Coordinated Implementation Strategy and Watershed Action Plans*, with supporting documents.
Appendix D. Implementing_ESD_Report_FINAL_110910.pdf
Appendix E. *Field Findings, Pollution Detection & Elimination in Sligo Creek, Montgomery County, MD.*, Center for Watershed Protection, July 13, 2011.

Appendix F. Detailed List of Watershed Restoration Projects Completed by FY10 to meet the County's 2001 MS4 Permit 10% Impervious Goal

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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 second report in this current permit cycle (February 16, 2010-February 15, 2015) and covers the County's Fiscal Year 2011 (FY11) for July 1, 2010 to June 30, 2011.

Significant accomplishments in the County's stormwater management program during FY11 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) Program. 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 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 NPDES MS4 Permit.

6. Identify necessary organizational infrastructure changes needed to implement the Strategy.

The MDE approved the Strategy in June 2011. The approval letter can be found attached to this report as Appendix B. A final version of the Strategy ,Watershed Implementation Plans, and supporting documents which reflect MDE and public comments have been included on CD as Appendix C. These documents are publicly-accessible on DEP's website at:

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

The MDE modified the County's second round 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 round 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 liason with the MDE for implementation of the Permit. 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 January 2012.

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.

In July 2010 and March 2011, the County Council passed legislation that 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. Draft stormwater management regulations are currently undergoing review by the County Attorney.

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, and contains new storm drain features added as part of the new construction approval process, 1,404 drainage areas delineated in 2008 for all major stormdrain outfalls (defined as >24"), and over 200 previously unidentified outfalls discovered in the Sligo Creek subwatershed of the Anacostia during DEP's FY11 Illicit Discharge Detection and Elimination (IDDE) investigations. During FY11, DEP also completed an inventory of all MCPS storm drain systems. The new MCPS locations will be integrated into the County's existing storm drain GIS database after undergoing final quality control, and will be submitted in the Permit required storm drain inventory for FY12.

The DEP's Urban Best Management Practices (BMP) database as of June 30, 2011 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.

In July 2010, DEP submitted the current County impervious layer geodatabases to MDE. Since July 2010, based on 2010 aerial photography, DEP has continued to digitize and update impervious areas for the Permit requirements and the County's stormwater utility charge, the

Water Quality Protection Charge (WQPC). The DEP is finalizing new driveway and updating building polygon layers. In addition, DEP is analyzing the existing impervious layers to capture changes in impervious. The updated impervious layer will be submitted with the FY12 MS4 annual permit report in February 2013.

Discharge Characterization

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

Management Programs

Stormwater Facility Maintenance:

The Permit requires the County to conduct preventative maintenance inspections of all stormwater management facilities on at least a triennial basis.

The DEP continues to thoroughly inspect SWM BMP facilities triennially, and assesses repair and maintenance needs. DEP also documents the number of maintenance inspections and enforcement actions. In FY11, DEP oversaw repairs and maintenance of 1,771 SWM BMPs, of which 804 were DEP maintained and 967 were privately owned and maintained.

Implementing Maryland's Stormwater Management Act of 2007

The Permit requires the County to implement stormwater management 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 legislation amending the County's stormwater management ordinance to require non-structural stormwater best management practices to the maximum extent practicable (MEP) for new development and redevelopment projects approved by DPS. The Bill brought County stormwater management requirements into compliance with the Maryland Stormwater Management Act of 2007 and the state implementing regulations adopted 2010. Draft regulations for implementing the new changes to the stormwater management ordinance are currently being reviewed by the County Attorney.

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 techniques to the MEP. The most significant updates required will be accomplished through the Zoning Code rewrite, currently being conducted by the Planning Department of the Maryland- National Capital Park and Planning Commission (M-NCPPC). The Planning Department expects to produce a Public Hearing Draft in late spring 2012.

Erosion and Sediment Control

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 erosion and sediment control enforcement authority, conduct responsible personnel certification classes and report quarterly information on earth disturbances excedding one acre or more.

In FY11, 13,472 ESC inspections were performed. Enforcement actions included 343 notices of violations (NOVs), 27 stop work orders and 146 civil citations which collected $43,926. In February, 2011, the County Council passed legislation increasing the maximum fines for erosion and sediment control violations from $500 for an initial offense and $750 for a repeat offense to $1,000, the maximum civil penalty amount allowed under State law. By increasing the maximum fine, the County signals its commitment to protect its streams and water resources to all sediment control permit holders.

The DPS continues to conduct "responsible personnel certification training" three times a year as required by the Permit. The DPS also continues to report quarterly information on earth disturbances exceeding one acre or more.

The MDE performed an evaluation of the County's ESC program as part of their review of the County's application for the delegation of erosion and sediment control enforcement authority in October and November of 2011. The County will report findings in the next MS4 annual report for FY12.

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.

In FY11, DEP partnered with the Center for Watershed Protection (CWP), other agencies and watershed groups to assess 213 outfalls in 10 miles of the Sligo Creek subwatershed of the Anacostia, using the CWP's *Illicit Discharge Detection and Elimination Manual*, developed to support and guide MS4 communities. The team found that 79% of the outfalls

present were not mapped in the County's storm drain GIS layer and 27% had dry weather flow. Of the outfalls with dry weather flow, the majority were unmapped (74%). Results of dry weather discharge field testing using CWP parameters found 20% more potential illicit discharges than when using Permit required field test parameters, and the CWP parameters (fluoride, ammonia and potassium) were also present in greater concentrations in suspected illicit discharges.

The teams attempted to track 23 of the discharges to their sources. Two discharges were found to be confirmed water main breaks. Initial investigations to identify sources of discharges of the remaining 21 were unsuccessful. In depth, multi-day follow up investigations for four illicit discharges using dye testing and video pipe cameras have not yet identified any of the remaining sources. The DEP will continue to collaborate with other County agencies and with the Washington Suburban Sanitary Commission (WSSC) to attempt to find the source of the discharges.

Enforcement Actions

For FY11, DEP's Division of Environmental Policy and Compliance (DEPC) investigated 122 water quality complaints and 35 hazardous materials incidents, which resulted in the issuance of 34 formal enforcement actions (18 civil citations with fines totaling $9,000 and 16 NOVs) and 29 warning letters.

During FY11, DEP's Illegal Dumping Hotline 240-777-3867 ("DUMP") received 471 complaints, which resulted in 41 formal Enforcement Actions (7 Civil Citations with fines totaling $3,500 and 34 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.

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 presents a comprehensive approach to achieving the County's 2010 Permit requirements including trash reduction strategies and work plans 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 include the Montgomery County Carryout Bag Law, passed by Council in FY11 and implemented beginning January 1, 2012, which requires retail establishments to charge 5 cents for each paper and plastic bag used for customer purchases. The law is expected to divert a large volume of plastic bag litter that is currently found in streets, parks, and waterways. Other initiatives include ongoing education and outreach for recycling and litter reduction, mass media outreach campaigns, litter removal from streets, stormwater ponds,

and transit stops, and enforcement. The DEP contracted with the Metropolitan Washington Council of Governments (MWCOG) to conduct FY12 post-TMDL trash monitoring in the Anacostia and to survey trash in 10 Lower Rock Creek tributaries.

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 NPDES stormwater general permit coverage.

Yearly inspections of County facilities covered under the NPDES General Permit for Storm Water Discharges Associated with Industrial Facilities generally show adequate attention to reducing pollutant runoff from the facilities. In FY12, DGS hired a consultant to develop and update the Pollution Prevention Plans (SWP3) for all facilities. All the County facility operating agencies; DOT, DGS, and DEP, delivered yearly training on the NPDES requirements and implementation to all employees.

Also in 2011, the County completed several environmental compliance Capital Improvement Program (CIP) initiatives. New fabric salt storage structures were installed at three County depots, stormwater improvement projects are being designed for the Silver Spring/Brookville Depot, and two Baysavers and an oil containment sump were added to the Kensington Small Transit Service and Maintenance Facility.

In its second year as a co-permittee, MCPS continues to work with the other County agencies to improve project communication and coordination. MCPS also maintained, repaired, and upgraded storm water facilities, conducted training for staff, prepared and implemented storm water pollution prevention plans at industrial sites, and incorporated ESD stormwater management into construction projects.

Road Maintenance:

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

Street Sweeping:
The County continued its streetsweeping program in FY11, focusing on monthly sweeping of selected arterial routes, which collects more road debris at a lower cost than sweeping residential routes. During FY11, the County did complete an annual sweeping for all residential routes. The DEP has identified 1,262 miles of residential routes as priority for first sweeping because these routes consistently show more material collected per curb mile than the other residential routes. In FY11 the County swept a total of 5,090 curb miles, removing 3,987 tons of material.

Inlet Cleaning:
In FY11, DOT cleaned 1,191 storm drain basins and 17,604 linear feet of storm drain, removing 107 tons of material. The cost was $269,593. For FY12, the County Council

allocated $2,050,070 for storm drain maintenance through the County's stormwater utility fund, the Water Quality Protection Fund (WQPF). The DEP is working with DOT to develop a Memorandum of Understanding to agree upon a workplan for the storm drain program that will meet Permit requirements. The DEP will have input into identifying priority areas from an environmental and water quality perspective and will be able to review work accomplished on a regular basis.

Use of Herbicides:
The County's roadside 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 pesticides or fertilizers for roadside vegetation management.

Application of Sand and Salt:
The DOT reported 85,600 tons of salt and 21,400 tons of sand for a total of 107,000 tons of sand and salt applied to County roadways during FY11. 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 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.

Public Education and Outreach:

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

In FY11, DEP continued to expand its education and outreach programs to meet Permit requirements as well as provide outreach support to other DEP WMD programs. The Strategy included a public outreach and stewardship workplan which 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 continues to track 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 DEP also continues to investigate approaches to quantifying pollutant reductions associated with robust education and outreach programs.

The DEP has also increased outreach to volunteer watershed groups, working closely with community partners to document their stormwater reduction efforts and results. Additionally, DEP is investing in building watershed groups' capacity through an independent contractor. The activities associated with this contract will take place in FY12 and will be focused around increasing group membership and outreach and train the trainer programs to increase neighborhood involvement.

In FY11, DEP hosted or participated in 49 outreach events, an increase of 145% from the previous year. An FY11 highlight was the first annual Community Clean Water Summit, hosted by DEP and funded in part by a Chesapeake Bay Trust (CBT) grant. In other initiatives, DEP increased outreach to minorities, partnered with the Commission on Common Ownership of Communities (CCOC), to develop an outreach and education presentation for realtor and homeowner associations, and developed and presented two professional education credit classes on stormwater pollution to the Greater Capital Area Association of Realtors. Through all the FY11 events, DEP staff members were able to roughly double their face to face outreach efforts from FY10 by directly educating nearly 3,000 citizens.

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.

During 2004, DEP began the watershed inventory in the Great Seneca and Muddy Branch watersheds as cooperative efforts with the United States Army Corps of Engineers (USACE) and the City of Gaithersburg. The DEP expects to complete the study in 2012.

In February 2010, DEP partnered with the USACE - Baltimore District, MWCOG, Prince George's County, the District of Columbia, the 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.

In 2010, DEP conducted biological and habitat watershed screening at established monitoring sites in the Horsepen Branch, Little Monocacy, Rock Run, Northwest Branch and Patuxent subwatersheds. Of the 32 stations monitored, one in the Horsepen Branch and one in the Rock Run subwatersheds were found to be biologically impaired due to degraded habitat. One station in the Lower Patuxent subwatershed was impaired due to factors other than habitat. The DEP will include these stream reaches among those for further field evaluation during the completion of watershed restoration assessments.

Watershed Restoration

The Permit requires the County to implement practices identified in its watershed assessments to control stormwater discharges to the MEP.

Meeting the Permit Impervious Control Requirement:
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. Stormwater BMP CIP projects completed through FY10 achieved stormwater control of 1,091.4 impervious acres. Stream restoration of 20 stream miles added an additional equivalent impervious acreage treatment of 1,055.1 acres, based on the MDE draft guidance *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated* published in June 2011. The total impervious control added through CIP watershed restoration programs was 2,146.5 impervious acres, exceeding the 10% watershed restoration requirement of 2,145.8 acres in the County's second generation Permit, at a cost of $21,932,346.

The DEP is aggressively designing and constructing watershed restoration projects to meet the current Permit's requirement to add control to 20% of the impervious areas not currently controlled to the MEP (4,292 impervious acres, as determined during development of the Strategy). Completed projects have added 24 acres of impervious control. Projects under construction during FY12 or recently completed will treat an additional 275 acres of uncontrolled impervious area. The DEP also has two ESD projects, two new stormwater ponds, 40 stormwater pond retrofits and 14 stream restoration projects in design, which are projected to treat another estimated 1,202 acres of impervious area.

The remaining impervious control will be accomplished by implementing projects identified through watershed assessments as potential future projects, ICC mitigation and stewardship projects, and redevelopment. Projects will be selected through DEP's watershed planning process for further design and implementation to control the remaining 2,791 impervious acres required by the Permit. The DEP also continues to investigate possible equivalent impervious acre credit for alternative non-structural BMPs such as tree planting and reforestation and street sweeping.

Meeting Wasteload Allocations in Watersheds with EPA approved Total Maximum Daily Loads:
The Permit also 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. The 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.* To date, County stormwater control and watershed restoration initiatives have removed from watersheds with applicable TMDL WLAs, 112 Billion MPN/year of *E.coli*, 22,171 Billion MPN/year *Enterococci*, 205 tons/year of sediment, 10,783 lbs/year of nitrogen, 1,242 lbs/year of phosphorus, and 8,919 lbs/ year of trash.

Funding Sources:
During FY11, the County continued to identify funding sources to support project implementation. The six-year Stormwater Management 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 recommended FY13-FY18 budget totals $295.0 million, an increase of $188.7 million, or 177.6 percent from the amended

approved FY11-FY16 budget 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 WQPF.

RainScapes Program:
The DEP's RainScapes program, funded by the WQPF, 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 to encourage property owners to implement 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 Program, which evaluates targeted neighborhoods for County installed on-lot stormwater runoff reduction approaches.

In FY11, RainScapes workshops reached 880 residents. 421 RainScapes Rewards Rebate projects were implemented, treating a total of 6.63 impervious acres. RainScapes Neighborhoods program began installing projects in Glen Echo Heights and the Town of Garrett Park, treating 1.19 impervious acres, and installing 11 conservation landscape projects. The DEP is also developing partnerships with the County's local watershed organizations that will greatly extend DEP's efforts at the neighborhood scale.

Assessment of Controls

The Permit requires that the County use discharge characterization monitoring and additional monitoring data required under the Permit 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 2010, 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 16 storms and 20 baseflow (dry weather) events during 2009 and 2010. For each station, mean concentrations (MCs) were calculated for Permit required parameters during baseflow and first flush stormflow (total petroleum hydrocarbons (TPH) and *Enterococcus*).

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 two-year monitoring period for each parameter except TPH and *Enterococcus*. Mean storm EMCs, baseflow MCs, and storm MCs (for TPH and

Enterococcus) can be found in Table III-H3 below. 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 for 5-day biochemical oxygen demand (BOD), total Kjeldahl nitrogen (TKN), copper, zinc, and storm MCs for TPH, and *Enterococcus* were higher at the outfall than at the instream station.

- At the instream station, flow state had mixed impacts.
    - Mean storm EMCs were higher than baseflow MCs for BOD, TKN, total phosphorous (TP), total suspended solids (TSS), and metals.
    - Mean storm EMCs were lower than baseflow MCs for nitrate plus nitrite, and hardness.
    - First flush storm MCs were lower than baseflow MCs for *Enterococcus*, and TPH .

- Evaluation of the impact of flow state at the outfall is difficult.
    - The outfall station was generally dry, except following rainfall or other non-storm episodic discharges. Baseflow samples could only be obtained on a few occasions. In these samples, the baseflow MCs for *Enterococcus* and TPH were lower than stormflow MCs. The lack of consistent flow could be due to the highly impervious drainage area

Regression analysis of storm hydrographs was also performed for the two years of data. Stormwater hydrographs typically show three limbs: a rising limb during which stream flow increases sometime after rainfall begins, a peak at which stream height and flow volume is greatest and a falling limb when rainfall ceases and stream height and flow volume decrease back to pre-storm levels. Regressions of limb flow volume versus pollutant concentration data showed a significant negative relationship ($p < 0.05$) for 5-day BOD, nitrate and nitrite, hardness, TKN, copper, and zinc at the outfall and for nitrate and nitrite at the instream station. The regressions indicate a linear decrease in pollutant concentrations with increasing flow volume. As flow increases during storms, these pollutants become more diluted. The results are consistent with a highly impervious urban drainage area that lacks stormwater management. Non-point source pollutants, excessive stream bank erosion and a flashy flow regime are the major problems identified.

In March 2010, DEP conducted pre-restoration monitoring of the Breewood tributary benthic community. The Benthic Index of Biological Integrity (BIBI) score for the tributary was 14 out of a possible 40 indicating a *poor* benthic community. A physical habitat assessment was also conducted at the Breewoood tributary to establish a baseline for comparison with future habitat assessments. The results of the 2010 assessment indicate that the habitat is *fair*. 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 Breewood tributary.

Stormwater Management Assessment

Maryland Design Manual Monitoring in Clarksburg:
The DEP submitted monitoring results for the developing Newcut Road Neighborhood tributary to Little Seneca Creek (LSLS104) "test" area as compared to results from the undeveloped Sopers Branch, Little Bennett subwatershed, and (LSLB101) "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, or have been, converted to BMPs. There is a small portion of the test area at the downstream end that was undergoing new construction in 2010. The land composition in the Sopers Branch control area remained unchanged.

The natural hydrology of the test area Clarksburg has been altered dramatically by the development process. On average, the overall amount of precipitation infiltrating into the ground or lost via evapotransporation has steadily declined in the test are while remaining fairly constant in the Sopers Branch control area. The construction phase of development has impacted the test area (LSLS104) tributary channel morphology due to channel straightening, down-cutting, and enlargement. The ability of SWM BMPs designed to mimic pre-construction hydrologic conditions will be evaluated once the construction process has been completed and the SWM BMPs are on-line and functioning as designed.

Program Funding

The Permit requires that the County submit annual expenditures for the capital, operation, and maintenance expenditures in database format specified in Permit Section Part IV. The required database is included in electronic format on CD in Attachment A. During FY11, the reported costs associated with Permit requirements were $30,097,236.

Total Maximum Daily Loads

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. Included in this report is the final County Strategy with final implementation plans for all those watershed groupings which have one or more TMDLs approved by EPA prior to June 2009.

The MDE approved the Strategy in June 2011. The DEP will work with MDE to address any potential technical issues in the Strategy that are not consistent with the MDE guidance published in June 2011, as well as to be compatible with more recent State modeling results and EPA approved TMDLs.

Special Programmatic Conditions

Tributary Strategy-

The Permit encourages the County to assist in implementation of the a Tributary Staregy designed to meet the nutrient and sediment reduction goals for the Chesapeake Bay.

The DEP agreed to serve as the local liaison for scheduling meetings related to Maryland's Chesapeake Bay Watershed Implementation Plan process. The DEP organized two public information meetings (April 2011 and October 2011) on the WIP process and local involvement.

On September 14, 2011, MDE provided the pollutant load allocations by source necessary for the Montgomery County stakeholders to begin next steps in developing the Phase II WIP to meet Chesapeake Bay restoration goals. The DEP submitted the **Montgomery County MD MS4 Phase II WIP**, which included plans from four MS4 Phase 2 permittees and the County Phase I MS4 area to MDE on November 18, 2011. The County's portion of the WIP is based on the Strategy, which ultimately shows that the County can achieve the Phase II WIP nutrient reductions in 2017 and 2020. The County's Phase I/II WIP is posted at the MDE web site for the WIP Phase 2 process:

http://www.mde.state.md.us/programs/Water/TMDL/TMDLImplementation/Pages/WIPPhaseIICountyDocuments.aspx

Comprehensive Planning

The Permit requires the County to "cooperate with the MNCPPC during the development and completion of the Water Resources Element (WRE) of the County's comprehensive land planning process as required by the Maryland Economic Growth, Resource Protection and Planning Act of 1992 (Article 66B, Annotated Code of Maryland)". The County was an active partner during the development of the WRE Functional Plan, providing data and technical review for the water, wastewater, and stormwater requirements. The WRE Functional Plan was approved and adopted by the Montgomery County Planning Board in September 2010. The report is available in electronic format at:

http://www.montgomeryplanning.org/environment/water_resources_plan/documents/WaterResourcesfunctionalplan_web.pdf

The County has continued its cooperation with the MNCPPC through the interagency workgroup for the Permit-required evaluation of County codes to assure 'ESD to the MEP' and during the development of local ordinance changes to meet the requirements of the State's Stormwater Management Act of 2007. The County agencies are routine participants for review and comment as Sector Plan and Master Plan documents are being developed.

Next Steps for FY12

During FY12, the County is continuing to make progress in a number of Permit required areas:

Revising Data Layers and Pollutant Loads Reductions

The 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. The DEP is continually working to improve the accuracy of its stormwater management and watershed restoration information. Since the Strategy was submitted in February 2011, DEP has worked to improve the accuracy of the Urban BMP database by correcting existing drainage areas and by adding approximately 1,000 SWM BMPs and their associated drainage areas. The DEP is also currently digitizing and updating impervious areas for the WQPC using 2010 aerial photography, including adding driveways and updating building polygon layers. The updated impervious layer will be used in combination with the updated SWM BMP drainage areas to provide a corrected boundary and impervious acres within the MS4 area. The County has also updated the Maryland Department of Planning (MDoP) land use from the year 2002 to 2010 to use in revising pollutant loads based on land use.. The updated layers and revised information will be submitted with the FY12 MS4 annual permit report in February 2013.

Treatment to the MEP

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 included in the FY12 report due February 15, 2013.

Funding

The County recognizes the funding challenges presented by the requirements of the Permit. During FY12, the County has been working to modify the current assessment structure of the WQPC. For FY11, County residents in detached single family homes were assessed $70.50 per equivalent residential unit (ERU). Homeowners with attached single family homes (townhomes) are assessed 1/3 of an ERU or $23.27. Multi-family residential and associated non residential properties that drain to residential stormwater facilities are assigned a charge based on their actual imperviousness. The County is considering a number of modifications to the charge to assign fees based on actual impervious for all properties, including all commercial properties, and related to amount of runoff management from the properties. The WQPC for residential properties would have a maximum but would be tiered by amount of impervious per property. The County also hopes to incentivize installation of

stormwater practices by reducing the WQPC for property owners who install such practices. In addition, in FY12, the County Council approved an increase in the WQPC for FY13 from $70.50 per ERU to $92.60 per ERU.

Implementation Rate

The County also recognizes the significant challenge in implementing watershed restoration projects quickly enough to meet the Permit requirements within the current five-year cycle . The DEP advertised two Request for Proposals (RFPs) to obtain contractual support critical to accelerating the watershed restoration implementation rate. One RFP is for comprehensive water resources engineering, which will provide support in all aspects of watershed restoration, project design, analysis, and construction, including engineering need to successfully implement stream restoration, stormwater management facility (new and retrofit) , and ESD projects. The second RFP 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. The contracts will be awarded before the end of FY12 to accommodate a significant ramping up of effort during FY13.

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 January 2012.

Table III-A1. Organization Chart for Montgomery County Permit-Required Programs

Part III. Standard Permit Elements	**RESPONSIBLE PARTY**			
	Department	***Name***	***Title***	***Telephone***
A. Organization Chart	*DEP/WMDC*	Pam Parker	*Senior Planning Specialist*	240-777-7758
B. Legal Authority	*OCA*	Walter Wilson	*Associate County Attorney*	240-777-6759
C. Source Identification				
1. Storm Drain GIS	*DEP/WMD*	Craig Carson	*Manager*	240-777-7709
	DPS	Yung-Tsung Kang	*Senior IT Specialist*	240-777-6636
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. Discharge Characterization (as described in Part III H. Assessment of Controls)				
E. Management Programs				
1. Stormwater Management				
1.a. Stormwater Facility Inspections and	*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*	Ansu John	*Outreach Specialist*	240-777-7786
	DEP/DSW	Dan Locke	*Division Chief*	240-777-6402
Property Management	*DGS*	David E.Dise	*Director*	240-777-9910
Road and Roadside Maintenance	*DOT*	Keith Compton	*Highways Services Division Chief*	240-777-7607

Table III-A1. Organization Chart for Montgomery County Permit-Required Programs				
Part III. Standard Permit Elements	**RESPONSIBLE PARTY**			
	Department	***Name***	***Title***	***Telephone***
Public Education	*DEP/DO*	Ansu John	*Outreach Specialist*	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)				
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
2. Stormwater Management Assessment				
Geomorphology/Hydrologic	*DEP/WND*	Keith Van Ness	*Senior Water Quality Specialist*	240-777-7726
I. Program Funding	*DEPC/WMD* *DEP/WMD* *DPS* *DOT* *DOT* *DGS*	Stan Edwards Steve Shofar Richard Brush Ligia Moss Keith Compton David Dise	*Division Chief* *Division Chief* *Division Chief* *Senior Engineer* *Division Chief* *Director*	240-777-7748 240-777-7736 240-777-6310 240-777-7514 240-777-7607 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.

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.

Table III-B1. List of Contacts for Municipalities Co-permittees

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. The County and MCPS entered into a Memorandum of Understanding (MOU) which defined relative roles and responsibilities concerning Permit requirements. Through this MOU, the County agreed to continue facilities inspections and structural maintenance on SWM BMPs at MCPS sites and to coordinate annual Permit reporting. The MCPS agreed to provide annual updates on all efforts to reduce runoff impacts from MCPS sites and facilities.

In July 2010, the County Council passed Bill 40-10 (the Bill) amending the County's stormwater management ordinance to require management of stormwater runoff through the use of non structural BMPs to the MEP for new development and redevelopment projects approved by the DPS. In response to MDE concerns that a portion of the Bill was less restrictive than State law, the Bill was further amended in March 2011 to limit certain alternative SWM measures to redevelopment only. The Bill then brought County SWM requirements into compliance with the Maryland Stormwater Management Act of 2007 and the State implementing regulations adopted in 2010. The County drafted regulations for implementing the new changes to the stormwater management ordinance; they are currently undergoing review by the County Attorney.

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 electronic (CD) attachment in Appendix A, MDENPDES11.mbd, Parts A-L.

C.1. Storm Drain System

The delivered storm drain inventory (SDI2011M.mdb in the SDI2011M.zip file) is found in this report's electronic (CD) attachment in Appendix A, MDENPDES11.mbd, Part A. 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 database was compiled from three sources. It includes data captured by DPS during the new construction approval process from 2002 until February 15, 2011. It also contains 1,404 drainage areas delineated in 2008 for all major stormdrain outfalls (defined as >24") in the County. The outfall drainage areas are used to help investigate and track sources of illicit discharges in the county. Lastly, over 200 previously unmapped outfalls discovered during the County's FY11 IDDE investigation were added to Part A.

The County continues to improve the storm drain data, adding new information as it becomes available. DEP developed a storm drain inventory for each MCPS site during FY11. All storm drain outfalls on or immediately adjacent to MCPS property were identified and associated drainage areas were delineated. This MCPS site storm drain data will be integrated into the County's existing storm drain GIS database after undergoing final quality control, and will be submitted in the Permit required storm drain inventory for FY12.

C.2. Urban Best Management Practices (BMP)

The County's Urban BMP database as of June 30, 2011 with associated coverage is included electronically in Appendix A, MDENPDES11.mbd, Part B. The database uses the format required for MDE's Annual Report Database, Table B, Urban BMP Database. There are 4,270 records in this database, shown by structure type in Table III-C1. The greatest number of structure types are Oil Grit Separators (810), Flow Splitters (609), Dry Ponds, Quantity Control Only (461), and sand filters (443).

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 due to changes in the County's asset management system and a backlog of data entries. Furthermore, pretreatment and diversion devices have identical DA's to their parent SWM BMPs and are not delineated separately.

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 over the coming year 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 FY12 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 FY12 annual report.

Last Inspection Date - This is a new field. The DEP's inspection data is kept in a separate database and could not be joined with the records in time for this annual report. The records will be joined and the last inspection date reported in the MS4 FY12 annual report.

Table III-C1. Total Number of Stormwater BMP Facilities by Structure Type Designation

DEP BMP Structure Type	DEP BMP Structure Type Description	MDE BMP Structure Type	Total Number by Type
AQFIL	Aquafilter	O	9
AQSW	Aquaswirl	O	12
BAYSAV	Baysaver	BS	89
BF	BayFilter	O	9
BR	Bioretention, quality control	BR	111
BRQN	Bioretention, quantity control	BR	1
BS	Bioswale	AS	1
BSFS	Bay Separator- Flowsplitter	O	1
DS	Dry Swale	AS	7
FS	Flow Splitter, Aboveground	FLSP	334
FSU	Flow Splitter, Underground	FLSP	275
INF	Infiltration trench, quality control only	IT	334
INFIL	Infiltrator	IT	3
INFQN	Infiltration trench, quality and quantity control	IT	55
INFU	Infiltration trench, quality control underground	IT	148
INFUQN	Infiltration trench, quality and quantity buried, non-surface fed	IT	12
NS	Nonstructural	O	0
PDIB	Pond-infiltration basin, quality control only	IB	24
PDIBQN	Pond-infiltration basin, quantity control only	IB	36
PDQN	Pond-dry, quantity control only	DP	461
PDQNED	Pond-dry, quantity control and extended detention	EDSD	54
PDQNSF	Pond-dry, quantity control and sand filter base	DP	115
PDWD	Pond-wetland only	SM	14
PDWDED	Pond-wetland, extended detention	SM	101
PDWT	Pond-wet, quality control only	WP	43

Table III-C1. Total Number of Stormwater BMP Facilities by Structure Type Designation			
DEP BMP Structure Type	**DEP BMP Structure Type Description**	**MDE BMP Structure Type**	**Total Number by Type**
PDWTED	Pond-wet, extended detention	EDSW	156
PP	Porous Pavement	PP	4
PSF	Peat sand filter	SF	1
RG	Rain Garden	O	1
SC	Stormchamber	DW	1
SEP	Oil/grit separator	OGS	682
SEPSF	Oil/grit separator and sand filter	SF	128
SF	Sand filter	SF	367
SFQN	Sand filter, quantity control only	SF	28
SFU	Sand filter, underground	SF	48
STC	Stormceptor	SC	219
STFIL	Stormfilter	O	89
SWALE	Vegetated Swale	GS	1
TB	Tree Box	O	9
UG	Underground detention	UGS	276
UGINF	Underground with a stone bottom	UGS	7
V2B1	Environmental 21 V2B1 Stormwater Treatment System	O	2
VORTEC	Vortechnics	O	2
	Total Number of Facilities		4,270

C.3. Impervious Surfaces

In July 2010, DEP submitted current County impervious layer geodatabases to MDE. This is the same information was used to develop the Strategy. The three files transferred to MDE via FTP included:

- MDE.zip (contains the GIS coverages)
- MS4_Impervious 2009 for MDE.xls
- MDE MS4 IMPERVIOUS METADATA.doc

Since that submittal, based on 2010 aerial photography, DEP is digitizing and updating impervious areas for the MS4 Permit and the WQPC. The DEP is finalizing new driveway and updating building polygon layers. In addition, DEP is reviewing and verifying for accuracy existing impervious layers to capture changes in impervious. The updated impervious layer will be submitted with the FY12 MS4 annual permit report in February 2013.

C.4. Monitoring Locations

The GIS coverage and associated attribute information for locations established for chemical, biological, and physical monitoring of watershed restorations efforts required in Part III.H. Assessment of Controls, (Tables E., E.1., and E.2.; Monitoring Site Locations) are submitted electronically on CD in Appendix A, MDENPDES11.mbd, Part E., E.1., and E.2.

C.5. Watershed Restoration

The GIS coverage and associated attribute information for watershed restoration projects proposed, under construction and completed with associated drainage areas, as required in Part III. G. (Table D. Water Quality Improvement Project Locations Associated with GIS Coverage) are submitted electronically on CD in Appendix A, MDENPDES11.mbd, Part C., and D.

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, MDENPDES11.mbd, 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 data reported for FY 11 represents DEP's inspection and maintenance responsibilities as defined in County Code and permit section III.E.1. The DEP's inspections and maintenance programs are funded through the WQPF.

Triennial Inspections:
The DEP is responsible for inspecting over 4,200 SWM facilities. Each facility is on a 3 year inspection cycle (triennial inspections). To accomplish the inspection requirements, DEP has separated the County in three Inspection Regions. (i.e., Region 1 is eastern region, Region 2 central region, Region 3 western region.) The inspections are scheduled for a calendar year. The DEP uses contractors to conduct the triennial inspections.

During FY11, DEP performed inspections in Region 3. During this period, a total of 982 inspections were conducted by our contracted inspectors to assess repair and maintenance needs for SWM facilities under Montgomery County jurisdiction. Table III-E1 shows the total number of inspections by facility type and ownership. The majority of the inspections occurred at four structure types—ponds (226), filtering systems (196), other practices (145), and infiltration

systems (134). The DEP also requires the inspection of flow splitters at the time of any stormwater facility; these inspections are included in the "Other" category.

Table III-E1. Total Number of Initial Inspections by BMP Facility Type and Ownership

BMP Structure Type	Publicly Owned	Privately Owned	Total
Baysaver	0	11	11
Bioretention	6	33	39
Filtering Systems[1]	15	181	196
Stormwater Infiltration	49	85	134
Oil/Grit Separators	10	73	83
Stormwater Ponds[2]	44	182	226
Stormceptors	13	41	54
Underground Storage	0	59	59
Stormwater Wetlands	6	26	32
Open Channel Systems	0	3	3
Other[3]	12	133	145
Total Number of Inspections	***155***	***827***	***982***

[1] This includes all aboveground and underground sand filters, and proprietary filters such as Stormfilters
[2] This includes all dry and wet ponds, and ponds with extended detention
[3.] This includes all other type of devices not captured, including flow splitters

In FY11, DEP also performed a total of 33 unscheduled inspections. These occurred in response to public complaints, at facilities being considered for transfer into DEP's Stormwater Facility Maintenance Program (SWFMP), and to assess conditions after a large storm event

Maintenance:
The DEP SWM facility maintenance program ensures that all SWM facilities in the County are maintained properly. Unless specified in a SWM facility maintenance agreement, all maintenance is the responsibility of the property owner. 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. In order for DEP to have the legal ability to perform the maintenance, the private owner of the facility must have an executed maintenance agreement that specifies the County is responsible for structural maintenance. Once executed, DEP is the sole entity responsible for structural maintenance; the property owner remains responsible for nonstructural maintenance. Of the 4,270 facilities in the maintenance program, there are over 2,000 facilities that are structurally maintained by DEP; 965 are privately owned (e.g., facilities that serve residential properties) and 1,079 are publicly owned (i.e., facilities that serve public schools).

During FY11, 1,771 SWM facilities were maintained by either the County through the DEP maintenance program or by the private owner of the facility. Table III-E2 provides numbers of repairs and maintenance at facilities during FY11 and a narrative summary is included below

Privately Maintained Facilities:
Property owners of aboveground SWM facilities are issued a NOV during the triennial inspection if a facility is found to require repair or maintenance. Property owners are then given 60 days to complete the maintenance and/or repairs specified in NOV. The DEP's SWM facilities inspectors on average complete two follow-up inspections per aboveground facility while the facility is under repair, typically with the property owner or property manager and the repair contractor. Each owner and the owner's repair contractor are required to hold a pre-construction meeting with DEP inspectors to ensure the facility will be maintained properly. The DEP inspectors then complete a final inspection to ensure the work was completed and the facility was maintained or repaired properly. The DEP notifies the property owner once the work is completed to satisfaction. The DEP is also responsible for enforcing nonstructural maintenance requirements for aboveground facilities where DEP performs the structural maintenance.

During FY11, 435 aboveground SWM facilities were maintained, a final inspection was conducted by DEP, and the facilities were considered in compliance and properly functioning. This number includes those facilities where the property owner is only responsible for nonstructural maintenance.

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. The DEP inspectors perform a final inspection on each facility to ensure it was maintained properly. The DEP notifies the property owner once the work is completed to satisfaction.

In FY11, 532 underground facilities were maintained and cleaned to DEP's satisfaction. Any repairs identified were also completed at that time.

DEP Maintained:
In FY11, DEP performed structural maintenance on 259 aboveground SWM facilities. The DEP's maintenance program also performs routine sand filter maintenance on all facilities in the maintenance program. One-hundred and thirty seven (137) facilities had routine sand filter maintenance (i.e., scarification) performed by DEP between July 2010 and June 2011.

The DEP also cleans all underground SWM facilities annually. During FY11, DEP performed the cleaning and made any necessary repairs on 408 underground facilities. In addition, facilities located at County vehicle and road maintenance depots are cleaned twice a year.

Table III-E2. FY11 Repairs and Maintenance	***Number of Facilities***
Privately Owned and Maintained	
Aboveground	435
Underground	532
DEP Maintained	
Aboveground	259
Routine Sand Filter Maintenance	137
Underground	408
Total Number of Facilities Maintained	**1,771**

Stormwater Management Plan Review and Permitting:
The Permit requires the County to implement the stormwater management 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. As indicated in Section III-B, Legal Authority, the County has drafted regulations to implement the new changes to the stormwater management ordinance and they are currently undergoing review by the County Attorney.

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 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 E-3. The Report is included in the electronic Attachment, Appendix D included with this report and can is publicly available on the County's website at:

http://www.montgomerycountymd.gov/content/dep/downloads/Implementing_ESD_Report_FINAL_110910.pdf

Table III-E3. Summary of General Findings

Significant Barriers, Gaps, or Opportunities	Fewer but Important Barriers, Gaps, or Opportunities
• Ch 59. Zoning • Development Approval Process	• 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**
• 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)	• 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 is working with a consultant; Code Studio, with a citizen's advisory group (Zoning Advisory Panel), and with other County agencies to accomplish the rewrite, which should be completed by the end of 2012. The first section was completed during 2010 and defined changes to Agricultural and Residential districts and uses. The second section covers proposed changes for Commercial, Industrial and Mixed Use zones. Other sections of the rewrite expected in 2012 will cover General Development Standards and Administration and Procedures. The General Development Standards section will be the most central to ESD issues, although the Zones sections, especially the commercial, industrial, and mixed use zones, will also be examined for key issues.

The rewrite sections have been reviewed as they become available, first by the Planning Department, then by other County Agencies, and then by the Zoning Advisory Panel and general public. The Planning Department is soliciting as much stakeholder review and input as possible before the release of the Public Hearing Draft. After the release of the Public Hearing Draft there will be additional opportunity for comment during the Public Hearing Draft Review period, and during 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	
Stage 1, Zones Section	
December 2011	Consultant provides draft section on agricultural, residential, commercial, industrial and mixed use zones.
December 2011- March 2012	Zones section is reviewed by the Planning Department, County Agencies and public interest groups
June 2012	Public hearing Draft released
Stage 2-Process and General Development Standards Sections	
January 2012	Draft process section due
March 2012	General Development Standards Section due
March –May 2012	Review by the Planning Department, County agencies and public interest groups.
Complete Zoning Code Rewrite Draft	
Spring 2012	Public hearing Draft released
Summer- Fall 2012	Planning Department work sessions
Winter 2012	Draft to the County Executive and County Council
2013	County Council Review and Public Hearings

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. The biennial evaluation determines whether MDE will delegate sediment and erosion control enforcement authority. During the 2010 biennial evaluation, MDE commended DPS for its ESC program after conducting a field inspection of active construction sites in Montgomery County for compliance with ESC requirements.

"A review of active construction sites in Montgomery County found erosion and sediment controls in good condition," said MDE Water Management Administration director Jay G. Sakai. "Additionally, documentation of problems and routine enforcement by the County inspection staff was found to be very effective in gaining compliance with the approved erosion and sediment control plans. The County's inspection staff should be commended for their hard work and dedication."

In FY11, 13,472 ESC inspections were performed. Enforcement actions included 343 NOVs, 27 stop work orders and 146 civil citations which collected $43, 926.00. In February, 2011, the County Council passed legislation increasing the maximum fines for erosion and sediment control violations from $500 for an initial offense and $750 for a repeat offense to $1,000, which is the maximum amount allowed under State law for a civil penalty. By increasing the maximum fine, the County signals its commitment to protect streams and water resources to all sediment control permit holders.

To prevent a lapse of authority, MDE performed the 2012 biennial inspection of the County's Erosion and Sediment Control program in October and November of 2011. The County will report findings in the next MS4 annual report for FY12.

Responsible Personnel Certification:
At least three times per year, the DPS, Land Development Division, Sediment and Storm Water Section conducts "Responsible Personnel Certification" courses. Documentation on these courses is submitted electronically on CD in Appendix A, MDENPDES11.mbd, Part J. Responsible Personnel Certification.

Quarterly Grading Permits:
Quarterly grading permit information for earth disturbances in the County of one acre or more is submitted electronically on CD in Appendix A, MDENPDES11.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 MS4 are either permitted by MDE or eliminated. The current Permit requires field screening of at least 150 outfalls annually, with water chemistry sampling of dry weather discharges according to parameters specified in the Permit's Attachment A, Annual Report Databases, Part I. Illicit Discharge Detection and Elimination. The DEP's Division of Environmental Policy and Compliance (DEPC) conducts the IDDE investigations, and also is responsible for enforcement of water quality and illegal dumping cases.

During previous Permit cycles, DEP conducted outfall surveys in areas where the County's biological monitoring found streams that had biological impairment not related to physical habitat degradation. The DEP used the County's storm drain GIS layer to identify outfalls in those areas for investigation. Evaluation of prior years' outfall screenings found that the survey protocol did not efficiently identify illicit discharges. For example, from 2007 and 2009, out of 232 outfalls screened, 31 (13%) had dry weather flow and only six were found with chemical field test results greater than the detection limit.

In FY11, DEP partnered with CWP in a pilot project that followed the CWP's Illicit Discharge Detection and Elimination Manual, developed to support and guide MS4 communities. The pilot project focused on the Sligo Creek subwatershed of the Anacostia. For this effort, CWP and DEP also partnered with local environmental groups, such as the Friends of Sligo Creek, the Audubon Naturalist Society, and the Anacostia Watershed Society, as well as local agencies including WSSC, MNCPPC, and the District of Columbia Department of the Environment.

In January 2011, the team assessed 213 outfalls in 10 miles of Sligo Creek watershed, the majority of the outfalls in the watershed. A map of the stream reaches walked for the outfall surveys is shown in Figure III-E1. The complete field findings can be found in the electronic (CD) attachment, Appendix E, *Field Findings, Pollution Detection & Elimination in Sligo Creek, Montgomery County, MD.*, Center for Watershed Protection, July 13, 2011.

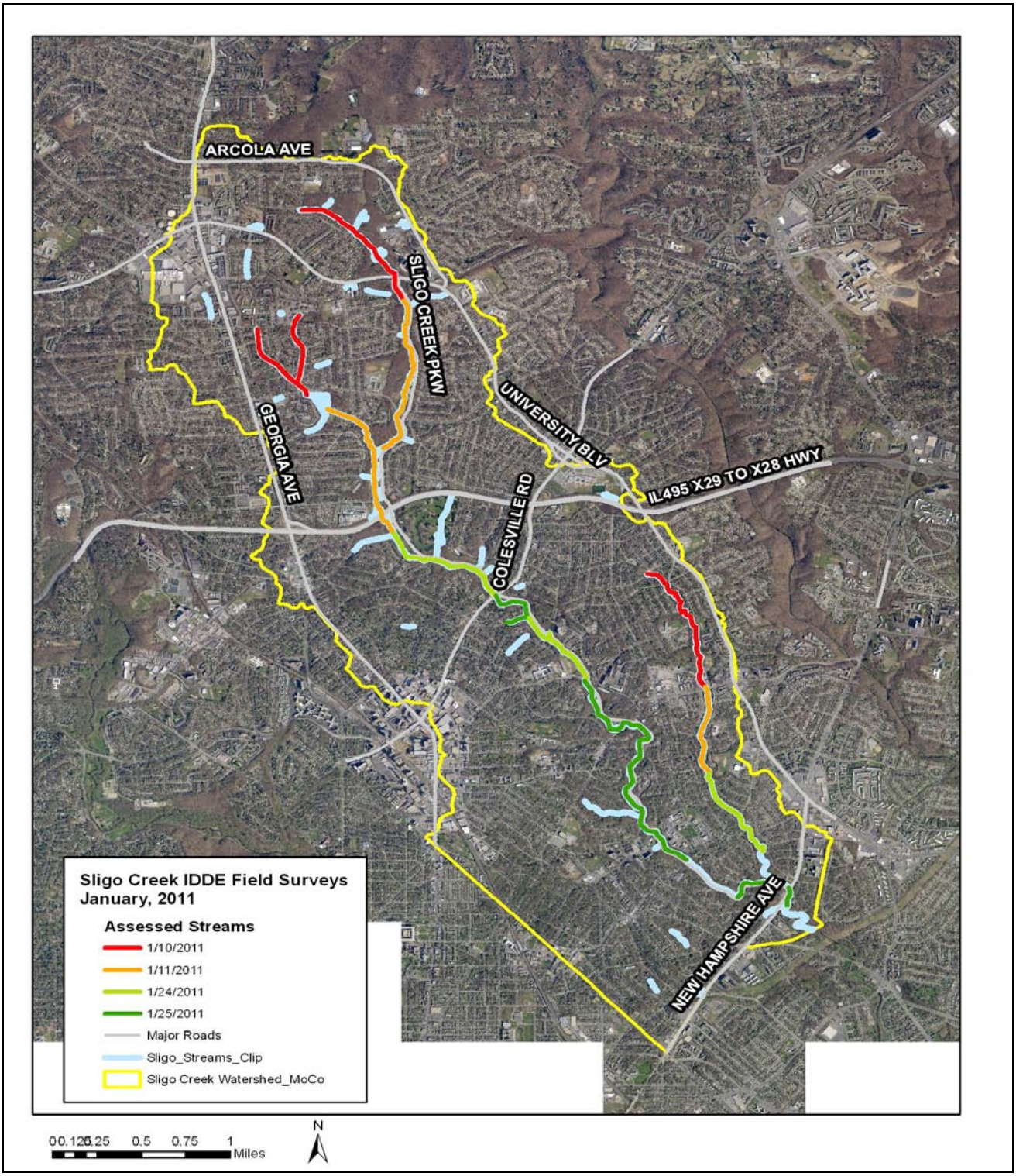


Figure III-E1. Map of Sligo Creek IDDE Field Surveys

Results

The team found that 79% of the outfalls observed were not mapped in the County's storm drain GIS layer, and 27% had dry weather flow. Of the outfalls with dry weather flow, the majority were unmapped (74%). The team used the outfall reconnaissance inventory technique described in Brown et al. (2004) to investigate outfalls with dry weather flow. Discharges were evaluated for physical parameters including flow, Permit required chemical parameters, and additional chemical parameters recommended by CWP: ammonia (NH3), potassium, and fluoride. Results of the field screening for Permit required parameters can be found in the electronic (CD) attachment, Appendix A, MDENPDES11.mbd, Part I.

The results of the illicit discharge survey conducted in Sligo Creek are summarized in Table III-E5, below:

Table III-E5. Field Site Summary	
Total outfalls assessed	213
Number of outfalls assessed that were unmapped	168 (79%)
Total number of outfalls with dry weather flow	58 (27%)
Outfalls with dry weather flow that were unmapped	43 (74%)
Potential illicit discharges as identified by field test results	45 (77%)
Suspected illicit discharge investigations	23

The CWP recommended field test parameters are superior to the Permit required parameters for detecting and quantifying illicit discharges. Ammonia is a good indicator of sewage since it is found in significantly higher concentrations in discharges containing sewage compared to discharges containing groundwater or tap water. Potassium is found at relatively high concentrations in sewage and extremely high concentrations in many industrial process waters. Consequently, potassium can act as a good first screen for industrial wastes, and can also be used in combination with ammonia to distinguish wash waters such as laundry discharges from sewage in freshwater. Chlorine levels can drop below detection level quickly, due to its extreme volatility and interaction with organic materials, making fluoride the preferred indicator of treated drinking (tap) water over chlorine. Detergents are absent in natural waters or tap water, and nearly always present in elevated concentrations in illicit discharges. Sewage and wash water discharges contain detergents used to clean clothes or dishes, and industrial process waters can contain detergents from industrial or commercial cleansers.

Threshold levels for illicit discharge screening parameters are defined in Table III-E6.

Table III-E6. Threshold levels for screening parameters used in Sligo Creek illicit discharge surveys

Parameter	Threshold	Source
Ammonia (NH3)	>0.1 mg/L	Brown et al (2004)
Fluoride	0.25 mg/L	Brown et al (2004)
Detergents	0.25 mg/L	Brown et al (2004)
Potassium	5 ppm	Guidance extrapolated from Lilly and Sturm (2010)

Highlights of the IDDE screening tests are provided below in Table III-E7, with full results for each outfall in the Field Findings Repot included in the electronic Attachment, Appendix E.

Table III-E7. Illicit Discharge Summary for Flowing Outfalls

Total outfalls with dry weather flows	**58**
Discharges with potential mixed wastewaters or other discharge of unknown origin (ammonia >0.1 mg/L)	30 (60%)
Potential tap water discharges (Fl >0.25 mg/L anionic surfactants< .25mg/l, NH3<0.1 mg/l))	2 (3%)
Potential wash water discharges (anionic surfactants >0.25 mg/L and ammonia <.01 mg/l)	13 (22%)
Discharges below threshold levels	13 (22%)

Discussion

Results of dry weather discharge outfall screening using CWP parameters found 45 suspected illicit discharges. The Permit required parameters yielded 29 potentially illicit discharges, with the majority of the positive results due to the presence of detergents (23), which is also a CWP parameter. Excluding positive detergent results, the Permit required parameter field tests (i.e. using only copper, chlorine, and phenols) yielded only 8 chlorine positive discharges, 6 of which were also positive for phenol and copper. At all outfalls with discharges that were positive for one or more Permit required parameters, there was also detection of one or more CWP parameters (Figure III-E2). Most of the Permit-required parameters, if present, were measured at the method detection level of .01 mg/l while concentrations detected for the CWP parameters were consistently above method detection limits. This indicates greater sensitivity for detecting illicit discharges using the CWP parameters and methods rather than the Permit-required parameters and methods.

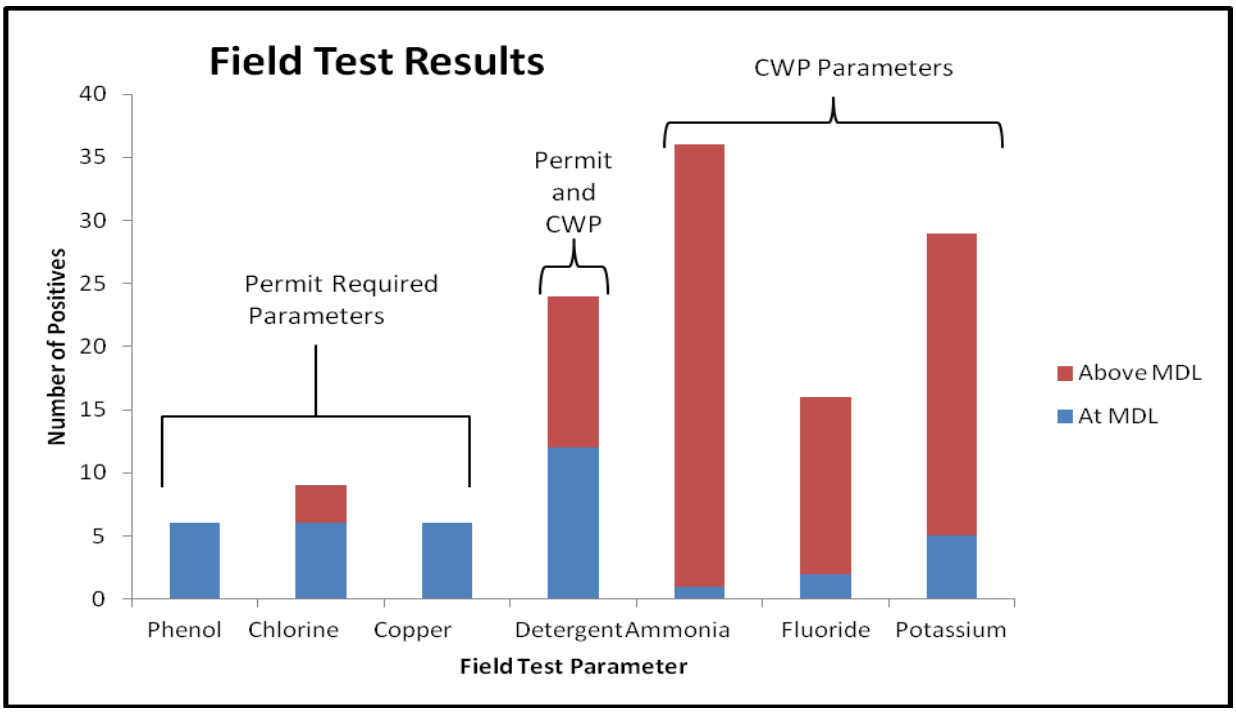


Figure III-E2. Comparison of Field Test Positives by Parameter during the CWP/DEP IDDE Investigation in Sligo Creek

The DEP recommends that future IDDE investigations use an amended list of required test parameters. Testing for the Permit required field parameters copper, chlorine and phenol in the past have not historically added information useful in characterizing and isolating illicit discharges. Adding the additional field test parameters ammonia, potassium and fluoride, however, can help distinguish between groundwater and major types of discharges such as industrial wastewater, sewage, wash water (laundry discharge) and tap water, providing useful information that may aid the difficult task of identifying sources of illicit discharges.

Potential Illicit Discharge Investigations:
The CWP and DEP conducted further investigations of 23 outfalls with illicit discharges identified during the outfall surveys. The primary goal of the investigations was to identify the source of the contaminated discharges using indicator monitoring, primarily with ammonia, and physical characteristics such as flow or odor, and by tracing the discharges up the storm drain lines to their sources. Of the 23 outfalls investigated, two discharges were confirmed water main breaks and were referred to WSSC. Initial investigations to identify sources of discharges in the remaining 21 were unsuccessful. In depth, multi-day follow up investigations for four illicit discharges using dye testing and pipe cameras have not yet identified any of the remaining sources, although the investigations are continuing.

Tracking illicit discharges is problematic for a number of reasons. Tracking the discharge above ground by looking into up-gradient manholes is often not successful due to incomplete or missing storm drain information, paved over manholes, or intermittent flow. When above

ground tracking fails, DEP must use a pipe camera. The DOT has a camera and crew, but their availability is limited and difficult to schedule. The camera itself, with a 500 foot cable, is often not long enough to successfully track the discharge to its source. The DEP has also experienced difficulty tracking the pipe camera location from above ground due to underground utility interference with the sensor indicating the camera's location within the pipe. The DEP also found that some illicit discharges can consist of several smaller flows combining via the underground pipe system. IDDE investigations also require large blocks of staff time, often from more than one agency.

To increase success in identifying and eliminating illicit discharges, DEP proposes to modify future IDDE investigation by focusing on small watersheds with documented or potential water quality problems related to illicit discharges. Watersheds that drain predominantly commercial and industrial areas will be given priority for investigation and will meet the Permit requirement to survey such areas for illicit discharges. IDDE investigations will include physically walking the subwatersheds systematically to identify dry weather flow and unmapped outfalls. The DEP also proposes to add the additional field test parameters fluoride, potassium and ammonia to the existing Permit required list of parameters. The DEP requests that MDE re-examine requiring phenol, copper and chlorine in IDDE field tests because of their limited usefulness. Eliminating parameters that produce no useful results will allow DEP to conduct more time efficient and cost effective IDDE surveys.

For FY12, DEP has targeted the Bethesda mainstem subwatershed of Lower Rock Creek-especially Brookville Road, Grubb Road, and the Donnybrook tributary. Several water quality concerns have been noted these areas during watershed assessment and restoration project work.

For future consideration, CWP also has been studying and quantifying pollutant reductions that would result from eliminating illicit discharges. The DEP will partner with CWP as they continue to explore possible pollutant reduction credits that could be used to meet the Permit requirements when discharges are successfully eliminated.

Water Quality Investigations during FY 2011 (7/1/10 – 6/30/11):
For FY11, DEPC investigated 122 water quality complaints and 35 hazardous materials incidents, which resulted in 34 formal enforcement actions (18 civil citations with fines totaling $9,000 and 16 NOVs) and 29 warning letters. The formal enforcement actions are summarized in the following table:

Table III-E8. FY11 Enforcement Actions

No.	Case Number	Date Issued	Citation/Notice of Violation	Violation	Defendant	Defendant's Address
1	24590	3/30/2011	$500	Diesel Fuel Discharge	Richard F. Kline, Inc.	7700 Grove Rd., Frederick
2	24657	4/15/11	$500	Fuel Oil Discharge	Davis & Davis Air Conditioning	10530 Detrick Ave., Kensington
3	23499	8/17/10	$500	Diesel Fuel Discharge	Take It Away Refuse	12500 Deoudes Rd., Boyds
4	23513	7/22/10	$500	Wastewater Discharge	Big, Fat, Ugly Crabs	19201 Frederick Rd., Germantown

Table III-E8. FY11 Enforcement Actions

No.	Case Number	Date Issued	Citation/Notice of Violation	Violation	Defendant	Defendant's Address
5	23627	8/10/10	$500	Cement Discharge	Hamilton Construction	4949 St. Elmo Ave., Bethesda
6	23627	8/10/10	$500	Cement Discharge	Hamilton Construction	4949 St. Elmo Ave., Bethesda
7	23778	9/24/10	$500	Wastewater Discharge	Germantown Auto Spa	1259 Emmans Rd., Woodbine
8	23876	10/22/10	$500	Wastewater Discharge	Potomac Disposal	11840 Beekman Pl., Potomac
9	23876	10/22/10	$500	Wastewater Discharge	Potomac Disposal	11840 Beekman Pl., Potomac
10	24240	12/30/10	$500	Cement Discharge	Rockville Fuel & Feed	14901 Southlawn La., Rockville
11	24240	12/30/10	$500	Cement Discharge	Rockville Fuel & Feed	14901 Southlawn La., Rockville
12	24329	5/19/11	$500	Diesel Fuel Discharge	Washington Adventist Hospital	1801 Research Blvd., Rockville
13	24329	5/19/11	$500	Diesel Fuel Discharge	Washington Adventist Hospital	1801 Research Blvd., Rockville
14	24601	4/04/11	$500	Diesel Fuel Discharge	Henry's Wrecker Service	8661 Garfield Ave., Silver Spring
15	24710	6/17/11	$500	Cooking Grease Discharge	Tysons Buffet	5550 Randolph Rd., Rockville
16	24710	6/17/11	$500	Cooking Grease Discharge	Tysons Buffet	5550 Randolph Rd., Rockville
17	25139	6/23/11	$500	Cooking Grease Discharge	Ledos Pizza	9805 Main St., Damascus
18	25139	6/23/11	$500	Cooking Grease Discharge	Ledos Pizza	9805 Main St., Damascus
19	24554	4/11/11	NOV	Waste Oil Discharge	Bacon Trucking Co.	18474 Brooke Rd., Sandy Spring
20	24590	3/30/11	NOV	Diesel Fuel Discharge	Richard F. Kline, Inc.	7700 Grove Rd., Frederick
21	23499	7/07/10	NOV	Vehicle Fluids Discharge	Take It Away Refuse	12500 Deoudes Rd., Boyds
22	23499	7/07/10	NOV	Vehicle Fluids Discharge	United Rentals	8301 Beechcraft Ave., Gaithersburg
23	23499	7/14/10	NOV	Vehicle Fluids Discharge	Campbell's Curbside Disposal	PO Box 326, Boyds
24	23627	8/11/10	NOV	Cement Discharge	Rockville Fuel & Feed	14901 Southlawn La., Rockville
25	23635	8/16/10	NOV	Wastewater Discharge	Chicken Place Restaurant	2418 University Blvd., Wheaton
26	23917	10/5/10	NOV	Wastewater Discharge	Mama Lucia Restaurant	4916 Elm St., Bethesda
27	23934	10/14/10	NOV	Cement Discharge	Ana Portillo	4104 Independence St., Rockville
28	24370	2/11/11	NOV	Vehicle Fluids Discharge	CJ's Trucking	15498 Old Columbia Pike, Burtonsville
29	24406	6/28/11	NOV	Vehicle Fluids Discharge	Sylvia York	14362 Beaker Ct., Burtonsville
30	24480	3/15/11	NOV	Vehicle Fluids Discharge	William Torrible	17466 Hoskinson Rd., Poolesville
31	24577	4/05/11	NOV	Wastewater Discharge	Pioneer Construction	8288 Telegraph Rd., Odenton
32	24601	4/04/11	NOV	Vehicle Fluids Discharge	Henry's Wrecker Service	8661 Garfield Ave., Silver Spring
33	24965	5/26/11	NOV	Swimming Pool Discharge	Wagner Aquatics	16620 Whites Ferry Rd., Boyds
34	25042	6/22/11	NOV	Wastewater Discharge	Montgomery Hills Carwash	9500 Georgia Ave., Silver Spring

Illegal Dumping:
During FY11, DEP's Illegal Dumping Hotline 240-777-3867 ("DUMP") received 471 complaints, which resulted in 41 formal Enforcement Actions (7 Civil Citations with fines totaling $3,500 and 34 NOVs) and numerous Warning Letters. The vast majority of complaints concerned bags of trash, vegetation (leaves and brush), or other unwanted materials either dumped or being stored on private or public property. Only a small percentage of these cases represented a potential for direct runoff of contaminated material into a storm drain or receiving system. Complaint resolution invariably involved removal and proper disposal of trash and debris and proper storage (i.e. under cover) of other materials.

E.4. Trash and Litter

The Strategy includes trash reduction strategies and work plans to meet the Potomac Trash Free treaty goals and the MS4 WLAs for the 2010 Anacostia Trash TMDL. The Strategy also provides a workplan for outreach and education that includes specific performance goals to increase residential and commercial recycling rates, improve trash management, and reduce littering. The Strategy showed that the trash load to the Anacostia River could be reduced by 68% using the same structural and non-structural BMP restoration strategies outlined for the bacteria, nutrient, and sediment load reductions. Figure III-E3 shows the trash load reductions over time associated with BMP implementation. Note that stream restoration, riparian reforestation, Pet Waste Education, and streetsweeping will have little effect on trash levels, However, these practices are recommended for implementation in order to meet WLAs for other pollutants.

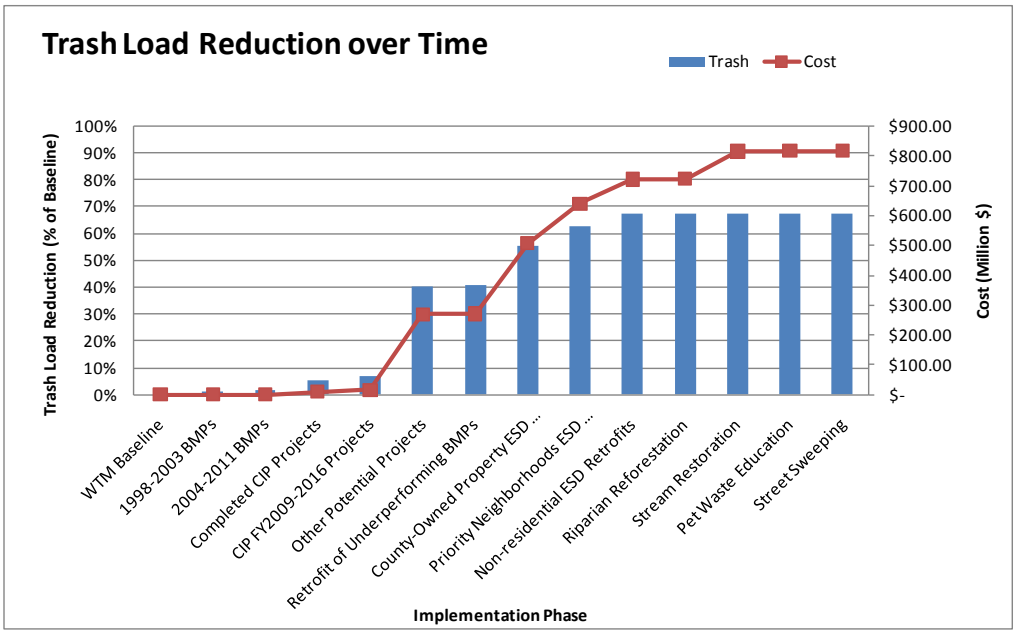


Figure III-E3. Trash Load Reductions over Time

Additional trash reductions were calculated using programmatic practices including anti-littering campaigns, plastic bag bans, recycling programs, adopt-a-road and adopt-a stream, street sweeping, and enforcement. The programmatic practices focus on source reduction and showed a much higher cost-effectiveness (Table III-E9) than shown by the structural and non-structural BMP restoration strategies. However, quantifying the reductions associated with programmatic approaches is not as straight forward as counting the amount of trash collected in SWM ponds or through streetsweeping and may have longer time horizons that lead to widespread behavior change.

Table III-E9. Restoration Cost-effectiveness for Trash Reduction

Rank	***Restoration Strategy***	***Potential Trash Reduction***	***Incremental Cost***	***Unit Cost***
		lbs/year	Million $	lbs/ Million $
1	Recycling Education and Investigations	51,654	0.2	238,837
2	Plastic Bag Ban, and Misc. Enforcement	63,546	1.3	48,882
3	Anti-litter Campaign, Education	23,761	0.9	26,930
4	Retrofit of Underperforming BMPs	1,144	1.2	954
5	Completed Projects	6,598	9.5	696
6	High Priority Projects	2,786	6.4	439
7	Low Priority and Other Potential Projects	56,341	254.3	222
8	Habitat Restoration	266	1.4	188
9	Street Sweeping	204	1.2	164
10	Public Property ESD Retrofits	25,348	236.6	107
11	Priority Neighborhoods ESD Retrofits	12,529	132.8	94
12	Private Non-residential ESD Retrofits	7,547	80.2	94
13	Stream Restoration	-	93.0	-
14	Pet Waste Education	-	0.9	-

FY11 County Trash Reduction Initiatives:
The County is working with the Anacostia Watershed Restoration Partnership, the Alice Ferguson Foundation, and other regional partners to develop initiatives that will help the region meet the goal of a Trash Free Potomac by 2013 and help meet the Anacostia TMDL for trash. This regional effort has produced a unified message (Figure III-E4) for advertising in print media, on buses, and on bus shelters in Montgomery County.

Figure III-E4. Example of Regional Anti-Litter Message

Outreach Initiatives:
The County is conducting a mass-media public outreach campaign against litter pollution using mass transit ads, bus shelter ads, and radio ads which highlight the need to control litter to protect community and environmental health. More on DEP's outreach and education programs to reduce stormwater impacts, including anti-littering, can be found in Section III.E.7, Public Outreach and Education.

Recycling Initiatives:
In FY10, Montgomery County's overall recycling rate was 43.6 percent, a decrease from 44.2 % in FY09. The DEP analysis showed that the drop was due in part to adverse economic conditions. Postal mail volume decreased and newspaper weight, which is related to economic strength, decreased. County residents also were consuming less, and generating less trash. Paper weight has decreased in the recycling stream as businesses continue to go electronic and consume less paper. The County has a goal to recycle 50 percent of all waste generated in the County.

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 FY11, DSWS staff and Recycling Program Volunteers participated in 320 outreach and education events, providing 37,603 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 2,094 hours of direct service with an estimated value of $52,338.

In FY11, DSWS conducted 11,074 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 continued efforts to educate residents of single-family homes and multi-family properties, and businesses about the additional types of materials that can now be recycled in the County including: durable/reusable plastic containers, tubs, lids, pails, buckets, flower pots and empty non-hazardous aerosol cans, as well as coated paper including milk and juice cartons,

frozen food boxes and juice and drink boxes. The DSWS constantly monitors the recycling markets to identify potential future opportunities to remove additional materials from the waste stream.

DOT Programs:
The County's **Adopt-A-Road Program** supplies 290 community groups with supplies in exchange for their voluntary service of picking up trash and litter along roadways. Ninety-nine groups reported 826 clean ups, picking up a total of 2029 bags of trash in FY10. Ninety-one groups reported 842 clean ups, picking up a total of 2042 bags of trash in FY11.

The County's **Storm Drain Marking Program** offers materials to community groups wishing to mark storm drains in their community with reminders about preventing litter and other pollution in the storm drain system and local waterways. In FY10, due to high demand from watershed groups, a total of 447 drains were marked. In FY11, there was less demand, and a total of 68 drains were marked.

Table III-E10. Trash Removed from County Stormwater Management Facilities

Date	Aluminum weight (lbs)	Glass bottles weight (lbs)	Oil quart containers weight (lbs)	Plastic Bags weight (lbs)	Plastic Bottles weight (lbs)	Styrofoam & Paper weight (lbs)	Tires weigh (lbs)	Organic Debris weight (lbs)	Total Weight (lbs)
11/1/2010	159	334	12	8	110	9	75	3000	3707
3/1/2011	111	203	4	9	72	8	45	1300	1752
4/1/2011	96	57	3	9	38	8	0		211
5/1/2011	98	173	6	9	75	8	0	2000	2369
Grand Total	**464**	**767**	**25**	**35**	**295**	**33**	**120**	**6300**	**8039**

As shown in Figure III-E5, by weight most of the material removed was organic debris (e.g. leaves, twigs, and branches). In the 'other' category, recyclable materials (aluminum, glass and plastic bottles, plastic containers) comprised the bulk 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.

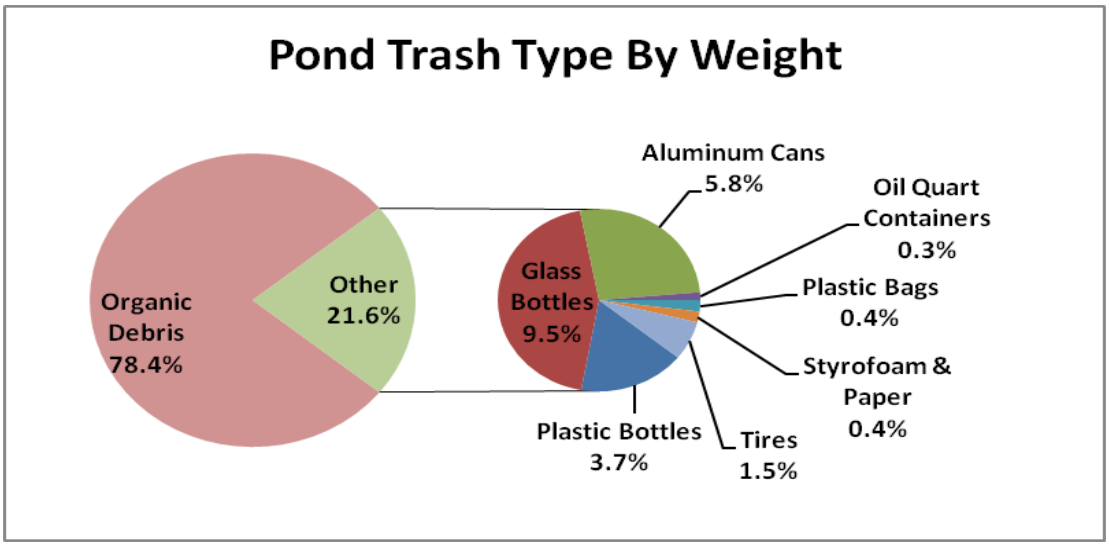


Figure III-E5. Pond Trash Type By Weight

Storm Drain Inlet Practices:
The DEP continues to test and revise storm drain inlet configurations in order to capture trash, organic debris and sediment at the curbside without impacting flow capacity within the storm drain system. The most recent inlet designs are currently being installed along Lockwood Drive and Stewart Lane (White Oak, MD). Once installed, inlet cleaning schedules and other aspects of facility performances will be evaluated. For more information on the White Oak modified storm drain inlets, please see:

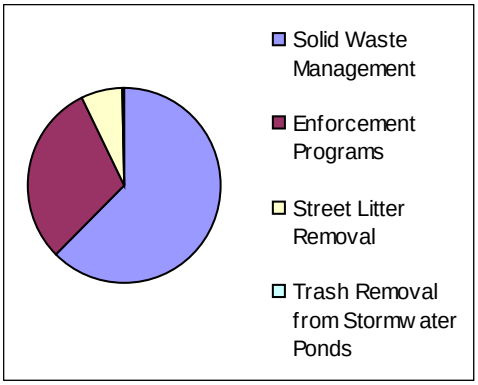
http://www.montgomerycountymd.gov/dectmpl.asp?url=/Content/dep/water/whiteoak.asp

Post-TMDL Monitoring:
The DEP has contracted the MWCOG to conduct post-TMDL trash monitoring in the Anacostia and survey trash in 10 Lower Rock Creek tributaries. The first season of monitoring was completed during summer/early fall of 2011. The Anacostia tributary monitoring follows the same protocols for stream-level and land-based surveys as those used for trash TMDL development. The effort in the Anacostia includes a survey for trash-reduction efforts by apartment and commercial property managers. The Lower Rock Creek surveys include the evaluation of road crossing sites for the cost-effective feasibility of installing trash trapping systems. Results will be available in summer 2012 and reported in the FY2012 MS4 Annual Report.

Cost of Trash Reduction Efforts:
For FY11, the County invested significant resources in trash reduction strategies and programs, and estimated $7,452,320 (Table III-E11). This figure is based on FY10 funding because FY11 costs are not readily available. FY11 trash and litter management costs will be reported in the annual FY12 Permit report.

Table III-E11. Estimated FY11 Trash Reduction Costs

Program	**FY11 Cost**
Solid Waste Management	$4,657,700
Enforcement Programs	$2,256,060
Street Litter Removal	$514,900
Trash Removal from Stormwater Ponds	$23,660
Total	**$7,452,320**



E.5. Property Management

Table III-E12 lists the County facilities covered under the MDE General Discharge Permit for Storm Water Associated with Industrial Activities (the General Permit). The MDE accepted Notice of Intents (NOI's) for these facilities in March 2003 for coverage until November 30, 2007. The MDE is revising the General Permit and these facilities will be required to file NOIs again when the revised General Permit is published.

For most of the facilities, DGS – Facilities Management Division (FMD) has the overall responsibility for meeting the requirements of the NPDES General Discharge Permit for Stormwater Associated with Industrial Activities, including updates to the facilities' stormwater pollution prevention plans (SWP3). Agencies housed at the facilities are responsible for implementing portions of the SWP3 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 FMD. Both the FMD and DHS have Program Managers responsible for environmental compliance for their respective operations at these facilities.

The DSWS is responsible for meeting the NPDES 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.

Table III-E12. Status of County Facilities Covered under the State General Discharge Permit for Storm Water Associated with Industrial Activities

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	Third party inspections and draft updated Stormwater Pollution Prevention Plan completed in December 2011. Monthly and Annual inspections in FY11.
Damascus Highway Maintenance Depot (DOT)	Potomac/Great Seneca: 1.4 acres	Third party inspections and draft updated Stormwater Pollution Prevention Plan completed in December 2011. Monthly and Annual inspections in FY11.
Gaithersburg: Highway Maintenance Facility (DOT)	Potomac/Rock Creek; 26 Acres	Third party inspections and draft updated Stormwater Pollution Prevention Plan completed in December 2011. Monthly and Annual inspections in FY11.
Gaithersburg: Heavy Equipment Maintenance Operations Center (EMOC) (DGS)		
Gaithersburg: Transit Services (co-located with EMOC) (DGS)		
Poolesville Highway Maintenance Facility (DOT)	Potomac/Dry Seneca Creek 4 Acres	Third party inspections and draft updated Stormwater Pollution Prevention Plan completed in December 2011. Monthly and Annual inspections in FY11.
Seven Locks Automotive Service Center (DGS)	Potomac/Cabin John Creek: 19 Acres	Third party inspections and draft updated Stormwater Pollution Prevention Plan completed in December 2011. Monthly and Annual inspections in FY11.
Bethesda Highway Maintenance Facility, Sign Shop and Signal Shop (DOT)		
Kensington Small Transit Service Maintenance Facility at Nicholson Court	Potomac/Rock Creek	Third party inspections and draft updated Stormwater Pollution Prevention Plan completed in December 2011. Monthly and Annual inspections in FY11.
Silver Spring/Brookeville Road Highway Maintenance Facility (DOT)	Potomac/Rock Creek: 18 Acres	Third party inspections and draft updated Stormwater Pollution Prevention Plan completed in December 2011. Monthly and Annual inspections in FY11.
Silver Spring/Brookeville 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 FY11
Gude Landfill (DEP)	Potomac-Rock Creek; 120 acres	Stormwater Pollution Prevention Plan updated annually. Quarterly Inspections performed in FY11
Oaks Landfill (DEP)	Patuxent-Hawlings River and Potomac-Rock Creek;190 out of 545 total	Stormwater Pollution Prevention Plan updated annually. Quarterly Inspections performed in FY11

All County facilities have regular stormwater pollution prevention (P2) inspections on a monthly or quarterly basis, with all facilities also undergoing a more comprehensive annual inspection. In FY11, DGS and DOT managed sites consistently had the following P2 related needs :

Table III-E13. FY11 Pollution Prevention Needs at County Facilities Covered Under the NPDES General Stormwater Permit

Pollution Prevention Need	**Action Taken**
SWP3 plans need to be updated	Third party (consultant) inspections and draft plans completed in December 2011. Plans will be in place and finalized by March 2012.
Depot lots need more frequent sweeping	Operating agencies will sweep monthly
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.
Additional secondary containment for storing some products	Operating agencies installed appropriate secondary containments in FY11. Steps are being taken to improve housekeeping and fluid storage procedures.
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	
Salt domars were in poor shape	New fabric salt storage structures constructed at Poolesville, Colesville and Brookeville Depots.
SWM facilities need more frequent inspection	All SWM facilities at all depots are inspected and cleaned three times annually with additional maintenance as necessary by DEP's Stormwater Maintenance and Inspection program. Two baysavers, and an oil containment sump were installed at the Kensington Small Transit Service and Maintenance Facility to capture any spills, and provide stormwater quality improvements. New stormwater quality structures are being added to the Transit bus area at the Brookeville Depot.

Table III-E13. FY11 Pollution Prevention Needs at County Facilities Covered Under the NPDES General Stormwater Permit	
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.
Improved storage for scrap tires was noted at the Gaithersburg Equipment Maintenance Operations Center	Facility is being relocated next year.
Parking lot cleaning and inlet protection needed at the Transit area of the Brookeville Depot	The County is currently evaluating contractors to clean the depot parking lots. The contractor selected will clean the lots using inlet protection to prevent the washwater from entering the storm drain.

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. Storm drains contained minor amounts of sediment that will were removed. Additional trash capture bags were installed on storm drain grates and traps at the at the Shady Grove Processing Facility, Materials Recycling Center .

In FY11, DOT, DGS, and DEP continued to deliver yearly training on the NPDES 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 2011, the following environmental compliance CIP initiatives were accomplished:

- Updated draft SWP3s were developed after a thorough inspection of each DOT and DGS facility by a third party consultant. The draft SWP3 plans will be finalized and in use by March 2012. The Plans will highlight SWP3 responsibilities per agency so that each agency can dedicate funding to maintain and operate in such manner to prevent the potential of product runoff. Additional CIP funding will be appropriated for follow up design and construction of mitigating measures.
- New fabric Salt Storage structures (42’ wide by 100’ long) were installed at the Silver Spring/Brookville, Coleville and Poolesville Depots. The failing salt domars at these locations were demolished and removed.
- Additional stormwater quality and quantity improvement projects are being designed for the Silver Spring/Brookville Depot, including trench drains, Baysaver installations to replace old oil/grit separators, and retrofit of the facility’s stormwater management pond.

- Two Baysavers, and an oil containment sump were added to the Kensington Small Transit Service and Maintenance Facility to capture any spills, and provide stormwater quality improvements.

County Co-Permittees Property Management:
The Town of Poolesville is the only one of the six small municipal co-permittees that is required to have an NPDES Stormwater General Permit NOI. The Town of Poolesville has a maintenance yard associated with the Poolesville Wastewater Treatment Plant, with outside truck and materials storage on site. The Town of Poolesville maintains a current SWP3 for the site. The only change at this facility during FY11 was the removal of the 2,500 gallon underground storage tank, which was replaced with an aboveground double walled tank. The Town's Public Works Director is responsible for the SWP3 on this site and conducts weekly inspections to assure compliance.

The MCPS also has NPDES Stormwater General Permit NOI for its school bus maintenance yards. The MCPS reports are shown separately in the section below.

MCPS MS4 Activities in FY11:

In its second year as a co-permittee, MCPS continued to work with the other county agencies to improve project communication and coordination. The MCPS also maintained, repaired, and upgraded storm water facilities, conducted training for staff, prepared and implemented storm water pollution prevention plans at industrial sites, and incorporated environmental site design (ESD) into construction projects. Program funding originates in both the capital and operating budgets. Below are details on these permit-related activities:

MCPS Staff Responsible for Coordination on Permit Issues:
Brian Mullikin, Environmental Team Leader, Division of Maintenance. There is also one staff position responsible for implementing these various storm water programs, Agustin C. Diaz, Environmental Specialist.

Coordination with other County Agencies:
The MCPS as co-permittee of the Permit, worked with the county environmental agencies to improve project communication and coordination. The MCPS participated in the County's Clean Water Task Force and in the County’s annual Stormwater Facility Maintenance Contractor Training. The DEP provided information at MCPS school plant operations in- house training day.

In addition, MCPS has been working very closely with WSSC on their Fats, Oils, and Grease program to help reduce and eliminate sanitary sewer overflows that could potentially originate from MCPS sites and negatively impact stream water quality. As part of this process, MCPS has scheduled maintenance and upgrade of grease interceptors, provided training, and implemented BMPs in all school cafeterias.
Amount Spent Calendar Year 2011: $60,445

Structural and Nonstructural Maintenance:
Details of MCPS maintenance activities are shown in Table III-E14. The MCPS Division of Maintenance upgraded and repaired existing underground and aboveground stormwater facilities in FY11, in preparation for transferring maintenance responsibility to the DEP in accordance with the maintenance MOU signed by both parties in 2007. Several facilities remain to be transferred; this work is expected to be completed during 2012.

The MCPS also performed nonstructural maintenance on aboveground stormwater facilities, and maintained several underground facilities not eligible for transfer to the county.
Amount Spent Calendar Year 2011: $329,840

Table III-E14. MCPS Structural And Non-Structural Maintenance Activities In 2011

Underground Facility	**School Coverage**	**Cost $**
1 UG; 4FS	Bethesda ES	$42,240
1 UG;1SEP (repairs)	Clarksburg ES	$65,091
4UG;2UGSF (repairs)	Damascus HS	$24,155
3SEPSF;2UG;2FS	Rockville HS	$35,970
1UG	Rocky Hill MS	$3,880
STC;UG	Wootton HS	$12,900
1 UG;1SEP (repairs)	Lucy Barnsley ES	$11,280
1 UG;1SEP (repairs)	Rock Creek Valley ES	$27,593
Trench drain repair	Clarksburg ES	$81,500
	Total for Underground Facilities	**$304,609**
Above ground Facility	**School Coverage**	**Cost $**
SANFILT (Maint) Safety Fence	Parkland MS	$6,100
BioRETENT POND RESTORE	Lakeland Park MS	$5,971
4SANFILT (MAINT) (Repair)	Lakeland Park MS	$1,178
4SANFILT (MAINT) (Repair)	Watkins Mill ES	$905
STWPOND (Maint)	Thurgood Marshall ES	$1,050
STWPOND (Maint)	Sherwood HS	$1,890
STWPOND (Maint)	Blake HS	$2,730
BioRETENT POND (Maint)	Washington Grove ES	$432
STWPOND (Maint)	Shady Grove Depot	$4,975
	Total for Aboverground Facilities	**$ 25,231**
Total Cost For Maintenance and Inspection		**$329,840**

Training:
The MCPS is responsible for training employees in positions that have particular potential for stormwater pollution; primarily maintenance and transportation staff. During 2011, MCPS began performing more in depth in-house stormwater and P2 training for staff in the Fleet and Facilities Maintenance Division. To date, a total of 202 staff members have received such training. In the coming years, MCPS's goal is to train all targeted maintenance staff, as well as begin a program of re-training on a regular basis for new and current employees.

The MCPS currently contracts much of the aboveground nonstructural maintenance on stormwater facilities. In 2011, eight MCPS maintenance staff members took the three day Storm Water Maintenance class at Montgomery College with the goal of performing more in-house required nonstructural maintenance.
Amount Spent Calendar Year 2011: $6,968

Efforts to Reduce Runoff Impacts From MCPS Facilities and Operations:
The MCPS operates five industrial sites that are categorized under the MDE General Discharge Permit 02-SW. Table III-E15 provides details on activities to reduce runoff impacts from these industrial sites. During the calendar year 2011, MCPS completed SWP3 and Spill Prevention Control and Countermeasure (SPCC) Plans for these industrial sites. The MCPS is currently implementing and monitoring adherence to these plans by conducting monthly and yearly inspections at four sites (Shady Grove, Randolph, Clarksburg and Bethesda Depots).The MCPS will complete plan implementation in 2012 at West Farm Depot, the most modern industrial site owned by MCPS.
Amount Spent Calendar Year 2011: $73,607

Table III-E15. Industrial Facility Compliance Activities To Reduce Runoff Impacts From MCPS Facilities And Operations

Underground Storage Tank (UST) and Fuel Facilities	**Site**	**Cost**
UST REPAIR (piping)	Clarksburg Depot	$16,962
UST Maintenance	Shady Grove Depot	$3,155
SWP3;SPCC	Clarksburg Depot	$17,830
SWP3;SPCC	Bethesda Depot	$17,830
SWP3;SPCC	West Farm Depot	$17,830
	Total for UST and Fuel Facilities	**$73,607**
Training	**Location**	**Cost $**
SWM Facility Maint Class	Montgomery College	$1,368
SWP3;SPCC	Shady Grove; Clarks. Depot	$5,600
	Total for Training	**$6,968**
TOTAL For UST and Fuel Facilities and Training		**$80,575**

Note: SWP3=Stormwater Pollution Prevention Plan;SPCC=Siill Prevention Control and Countermeasure

New Construction and Modernization Projects:
The MCPS had 24 projects completed or under construction in calendar year 2011 that incorporate ESD as part of the approved storm water management plans. Details on expenditures for these projects are shown in Table III-E16. Each plan utilizes ESD to the MEP, as required by new storm water management regulations, through the use of vegetative roofs, bio-retention and bio filtering facilities, micro structures, porous pavements and other innovative devices.
Amount Spent Calendar Year 2011: $4,816,665

Table III-E16. MCPS New Construction, Addition And Modernization Projects In Design Or Underway In 2011

Type	School Name	Project type	Facility Type	Num-ber	Practice	Construction Cost *
ES	Brookhaven	Addition	SWM	2	Grass Swale	$ N/A
				1	Surface-Sand Filter	$ N/A
MS	Cabin John	Modernization	SWM	1	Bioretention	$ 38,192
				1	Bioretention	$ 23,358
				1	Bioretention	$ 6,725
				1	Bioretention	$ 6,725
				1	Storm Filter	$ 94,848
				1	Storm Filter	$ 51,033
				1	Storm Filter	$ 40,013
				1	Storm Filter	$ 33,812
				1	Storm Filter	$ 58,820
				1	Storm Filter	$ 49,081
				1	Storm Filter	$ 22,873
				1	Storm Filter	$ 60,812
				1	Storm Filter	$ 57,864
				1	Storm Filter	$ 30,843
				1	UG-Detention Vault	$ 410,000
ES	Cannon Road	Modernization	SWM	1	Biofilter	$ N/A
			ESD	1	Green Roof	$ N/A
			SWM	1	Infiltration Trench	$ N/A
			SWM	2	UG Sand Filter	$ N/A
ES	Carderock Springs	Modernization	SWM	1	Storm Filter	$ 46,402
				1	Storm Filter	$ 65,020
				1	Storm Filter	$ 108,020
				1	Storm Filter	$ 80,559
				1	UG-detention Vault	$ 377,500
ES	Cresthaven	Modernization	SWM	3	Infiltration Trench	$ N/A

Table III-E16. MCPS New Construction, Addition And Modernization Projects In Design Or Underway In 2011

Type	School Name	Project type	Facility Type	Num-ber	Practice	Construction Cost *
				1	Storm Filter	$ N/A
				1	UG-Detention Vault	$ 43,725
				3	UG Sand Filter	$ N/A
ES	East-Silver Spring	Addition	SWM	1	UG Sand Filter	$ 86,400
				1	UG Sand Filter	$ 86,400
ES	Fairland	Addition	SWM	1	Storm Filter	$ N/A
ES	Farmland	Modernization	SWM	1	Biofilter	$ N/A
			ESD	1	Green Roof	$ N/A
			SWM	1	Infiltration Trench	$ N/A
			SWM	1	Surface-Sand Filter	$ N/A
			SWM	1	UG Sand Filter	$ N/A
ES	Fox Chapel	Addition	SWM SWM	1	UG-Detention Vault	$ N/A
				1	UG Sand Filter	$ 27,000
ES	Garrett Park	Modernization	ESD	1	Green Roof	$ N/A
			SWM	1	UG-Detention Vault	$ 440,000
			SWM	1	UG Sand Filter	$ 119,882
			SWM	1	UG Sand Filter	$ 86,962
			SWM	1	UG Sand Filter	$ 58,157
ES	Harmony Hills	Addition	ESD	1	Vegetated Swale	$ N/A
			SWM	1	Bioretention	$ 10,384
			SWM	1	Bioretention	$ 7,516
ES	Jackson Road	Addition	ESD	1	Green Roof	$ N/A
HS	Johnson, Walter	Modernization	SWM	1	Infiltration Trench	$ N/A
				4	Biofilter	$ N/A
				1	Infiltration Trench	$ N/A
				1	Surface-Sand Filter	$ N/A
				2	Storm Filter	$ N/A
ES	Montgomery Knolls	Addition	SWM	1	UG-Detention Vault	$ 296,296
				1	UG Sand Filter	$ 78,916
				1	UG Sand Filter	$ 57,245
				1	UG Sand Filter	$ 38,283
HS	Northwood	Site(Improved	SWM	1	CS	$ 40,000

Table III-E16. MCPS New Construction, Addition And Modernization Projects In Design Or Underway In 2011

Type	School Name	Project type	Facility Type	Num-ber	Practice	Construction Cost *
		Access)		1	UG Storage	$ 1,600,000
ES	Rock View	Addition		1	Unspecified	$ N/A
ES	Rolling Terrace	School Based Health Center	ESD	1	Green Roof	$ N/A
ES	Seven Locks	Modernization	SWM	1	UG-Detention Vault	$ N/A
				4	UG Sand Filter	$ N/A
ES	Sherwood	Addition	SWM	1	Biofilter	$ 77,000
				1	Detention Pond	$ N/A
ES	Takoma Park	Addition	SWM	2	Baysaver Filter	$ N/A
				1	UG-Detention Vault	$ N/A
ES	Washington Grove	Addition	SWM	1		$ N/A
ES	Whetstone	Addition	SWM	2	Bioretention	$ N/A
				2	Storm Filter	$ N/A
					Total Known Expenses	**$4,816,666**

N/A: costs could not be determined from the schedule of values or were not available at the time of the report

Integrated Pest Management (IPM):
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 any sort of pesticides or herbicides in a school building or on school grounds (COMAR 15.05.02.10). In addition, only certain products are approved for use in and around MCPS facilities 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. The 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.

The MCPS has also recently added 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 any necessary herbicide applications.

E.6. Road Maintenance and Pollution Prevention

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. There are three categories of street sweeping routes: DOT funded residential routes, DEP funded residential routes and DEP funded arterial routes.

The County sweeps the 56 residential routes shown in Figure III-E6 at least once per year. On most roads, sweeping begins each year early in spring to pick up sand left over from winter storm applications. In 2003, DEP agreed to fund 19 of the 56 County routes as priority residential routes. In selecting the priority routes, DEP evaluated the average tons per curb mile collected during annual street sweeping activities, the likeliness of inadequate or no stormwater management based on age of development, and MDE identification of 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-E7.

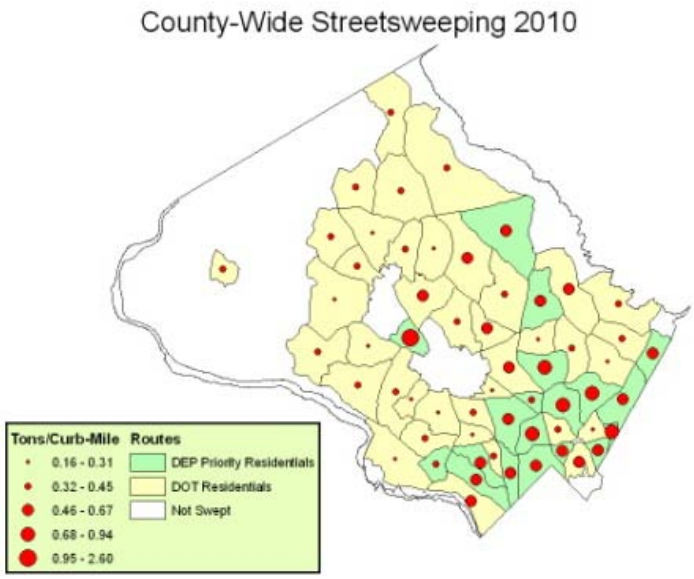


Figure III-E6. Countywide Street Sweeping

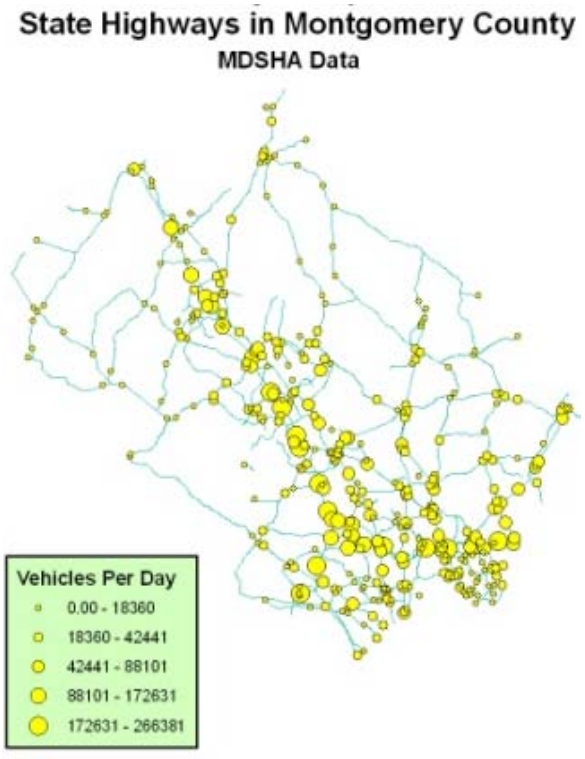


Figure III-E7. Annual Average Daily Traffic 2010

Initial and continued years of analysis has shown that street sweeping in the priority residential areas generally removes more material per curb mile when compared to sweeping of the remaining residential areas. Using this approach, DEP thus directs funding to areas of greatest street sweeping benefit as a pollution control measure. The priority routes are shown in green in Figure III-E6.

The DOT funds the remaining 37 residential route sweepings shown in yellow in Figure III.E6. These DOT residential routes are not swept until after completion of the priority residential routes each year. Some rural areas in the western and northern portions of the County are not included in any of the routes and are not generally swept. The relatively low amount of vehicle traffic and the lack of curbs in these areas make street sweeping impractical. Roadways in Gaithersburg, Rockville and Takoma Park are swept by each municipality as part of their Phase 2 MS4 Permit.

The County also sweeps a third category of roads; arterial routes, shown in Figure III-E8, which are larger roads with more commercial activity, traffic, and based on visual observations, trash. These routes are swept at night when traffic volumes are low, and sweeping is only done on segments of the roads without residential housing because of noise considerations. There are no cars parked on these roads at night which facilitates operations.

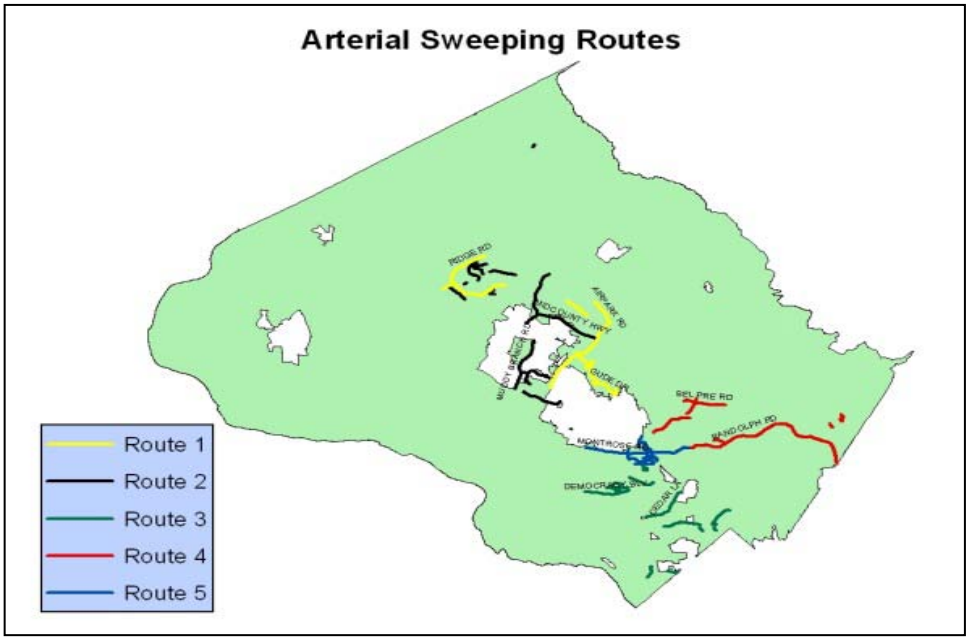


Figure III-E8. Montgomery County Arterial Street Sweeping Routes

Figure III-E9 shows amount of materials removed based on route type for records available, from 1999 to present. Arterial routes produce more material per curb mile than the residential routes. The year to year variability is directly related to amount of winter precipitation and needs for application of de-icing materials--the less applied, the less available for collection during street sweeping. Note that in 2002 no County street sweeping was conducted due to lack of funding.

The arterial routes sweeping cost is much lower than for residential routes, and combined with the average higher materials removed per curb mile, arterial route sweeping is more cost effective than residential route sweeping to prevent roadway dirt and debris from entering the storm drains and receiving streams.

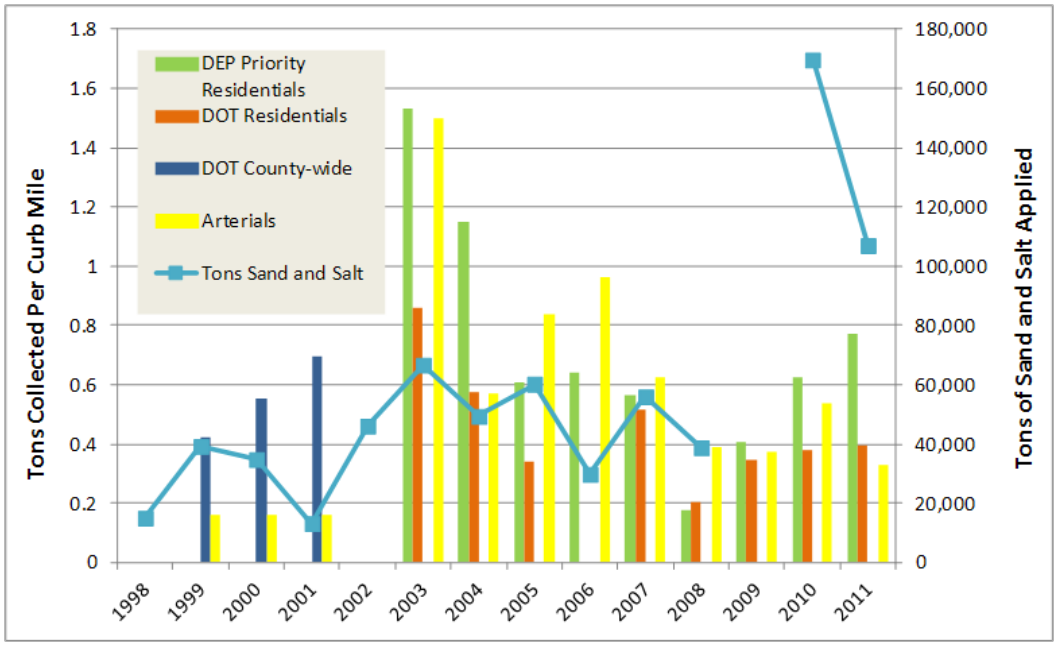


Figure III-E9. Tons of Street Sweeping Material Collected by Montgomery County 1998-2011

In 2009, DEP decided to sweep the arterial routes multiple times and decrease the sweeping frequency of the priority residential routes, leading to a modest decrease in total miles swept since the peak year of 2007, as shown in Figure III-E10. Total miles swept still remain higher than any year before 2007 and costs have decreased greatly. The amount of material collected per year has remained well above what was collected in 2008, as shown in Figure III-E11.

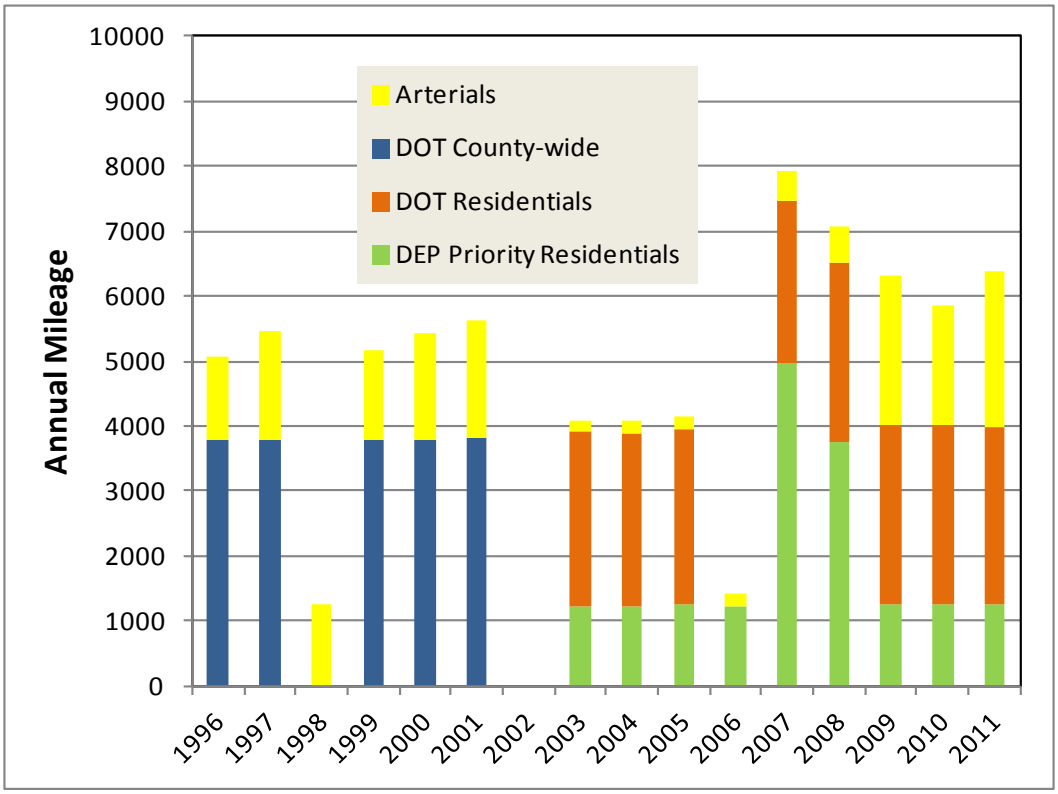


Figure III-E10. Annual Montgomery County Street Sweeping Mileage 1996-2011

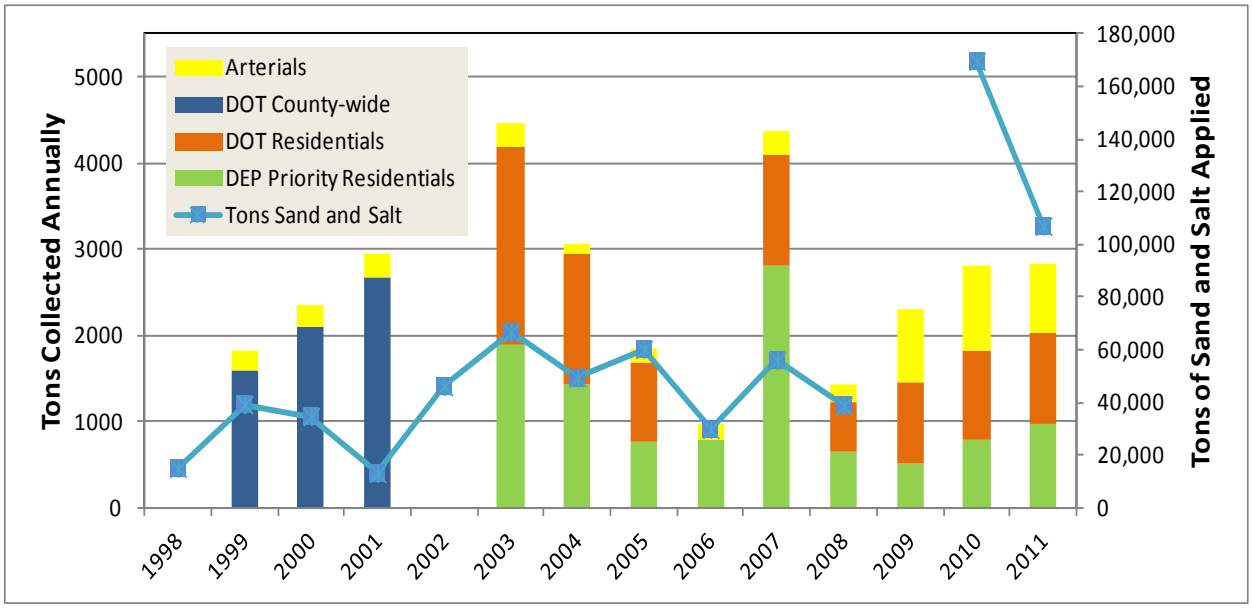


Figure III-E11. Tons of Material Applied During Winter Activities and Collected by Street Sweeping 1998-2011

The County also retained a new street sweeping contractor beginning in 2011. Reilly's Sweeping Inc. has been providing much better data on sweeping efforts by using newer and better equipment (Table III-E17). Reilly's also was able to complete the countywide routes relatively early in the year, which helps remove materials applied during winter storms before it has washed off of road surfaces into the stormwater management system and county streams.

Table III-E17. Summary of County's FY11 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 Route	972	1,262	.77	$94.78	$73	$92,160
DOT Residential Route	1,064	2,704	.39	$185.52	$73	$197,426
Arterial Routes 9 cycles	1,951	1,124	1.76	$38.36	$40	$74,842
Totals	**3,987**	**5,090**				**$364,428**
CountyAverage Tons Material /Curb Mile			**0.78**			

Inlet Cleaning:
For FY11, DOT reported cleaning 1,191 storm drain basins, and 17,604 linear feet of storm drain, collecting 107 tons of material at a cost of $269,593. For FY12, the County Council moved $2,050,070 from the WQPF to DOT's budget for storm drain maintenance. The DEP is working with DOT to develop a MOU and workplan for the storm drain program. The DEP will have input into identifying priority areas from an environmental/water quality perspective, and will be able to review work accomplished on a regular basis.

Roadside Vegetation Management:
The County's roadside weed spraying program 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.

The County uses no pesticides or fertilizers for roadside vegetation management. In FY11, the following herbicides were applied along County roadways:

Table III-E18. Herbicide Usage by Montgomery Weed Control Inc. on Montgomery County Rights of Way

Purpose	2011	2010	2009
State-mandated Treatment for Noxious Weeds	5.20 Gal. Clopyralid 4.55 Gal. Glyphosate	7.53 Gal. Clopyralid 2.57 Gal. Glyphosate	9.06 Gal. Clopyralid 3.49 Gal. Glyphosate
Program Cost	$20,000		
Note: Herbicide use is directly correlated to growing conditions for each season			

Winter Weather Materials Application:
The DOT reported 85,600 tons of salt and 21,400 tons of sand for a total of 107,000 tons of sand and salt applied to County roadways during FY11. The sand and salt deicing operations cost $7,175,858.00 in FY11.

Table III-E19. MCDOT Winter Road Material Usage

	FY2011	FY2010
Salt, tons	85,600.00	169,633
Sand, tons	21,400.00	

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 will be revised to include salt used per route to identify trends in salt usage and improve salt use management.

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.

For the 2011-2012 winter season, DOT purchased additional salt brine making equipment and storage tanks and will expand the salt brine treatment program to over 800 lane miles of primary, secondary and some neighborhood roads. The DOT will track salt application and report yearly.

E.7. Public Education and Outreach:

Compliance Hotline:
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. The County also continues to support the Illegal Dumping Hotline 240-777-3867 ("DUMP") also. More information on the County's central call center is found on the 311 home page at:

http://www3.montgomerycountymd.gov/311/Home.aspx

Watershed Outreach:
The Permit requires the County to develop and implement a public outreach and education program focused on stormwater pollutant reduction with specific goals and deadlines. In FY11, the County submitted the draft Strategy to MDE which included a public outreach and stewardship work plan (POSWP).

The POSWP document outlines eight specific outreach priorities for focus within this Permit cycle. These 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 represented with a unique practice sheet which identifies performance goals, key messages, intended outcomes, targeted audiences, partnerships to develop and nurture, delivery techniques, startup costs, measurement, and timelines and milestones from start up through 2025. The DEP began implementing the first of these eight through the Anti-Littering Campaign during the end of FY11.

Stormwater outreach and education projects for FY11 are included in the electronic (CD) Attachment to this report in Appendix A. MDENPDES11.mbd, Part D. Watershed Restoration Project Locations with GIS Coverage. The DEP events focused on targeting audiences, increasing awareness, encouraging directionally correct measures, and establishing baseline

information through surveys rather than developing performance criteria for directly measuring pollutant reductions from behavior change. Baseline information, once compiled, will help guide POSWP implementation and follow-up measures. The County will report estimates from its watershed outreach efforts once pollutant reduction criteria are established by MDE.

In FY11, DEP hosted or participated in 49 outreach events, an increase of 145% from the previous year, and directly educated nearly 3000 residents, which doubled face to face efforts from the previous year. One highlight was the first annual Community Clean Water Summit (Summit), hosted by DEP and funded in part by a CBT grant. The event was the first opportunity for residents to interface directly with all County watershed groups in one setting. Key presentations covered stream health, stormwater pollution, and litter reduction, including a special presentation made by the anti-litter group "Pickup America". There were 175 participants including local and regional agency staff, representatives from local and regional environmental and community groups, and interested residents.

The CBT grant project included a pre- and post-Summit survey of registered participants. Of those who attended, about 60 responded to both surveys. Eighty-two percent (82%) of those who responded indicated they understood community watershed outreach efforts after the Summit, compared to 58% prior to the Summit, an increase of 24%. There was also a significant increase in the number of respondents who reported knowledge of the local watershed groups, from 56% to 86% of the respondents. As a result of this event, one new County watershed group formed and three more re-committed themselves to a larger presence in the County.

The County watershed groups are vital partners in ongoing peer-to-peer awareness-raising on stormwater pollution reduction. There are eight groups which actively recruit members and conduct community outreach on stormwater reduction through special activities including watershed clean-ups. For future reports, the DEP is working closely with these community partners to document their stormwater reduction efforts and results.

For FY11, the DEP focused on tracking litter removal by the watershed groups. By early 2012, five groups had reported results of their efforts which included:

- Conducting 14 workshops or events highlighting trash problems.
- Reaching 3,000 students at the Maryland Green Schools Youth Summit on the topic of litter
- Hosting seven stream cleanups (independent of other Alice Ferguson Foundation cleanups or the County's Adopt a Road program) where 54 bags of trash were collected by 73 volunteers.

For the 2010 census, 50.7 % of the residents identified themselves as other than non-Hispanic white, reflecting the continued trend of increasing ethnic diversity in the County. . The DEP during FY11 increased its outreach targeted to minority communities. The DEP participated in three culturally specific events: the Asian American Festival, Southern Asian Seventh Day Adventist Church Community and Health Fair and the World of Montgomery festival;

interacting with approximately 1,000 minority residents. The DEP also translated three publications focused on stormwater pollutant reductions in Spanish.

The DEP used CBT grant funding to support its participation at the World of Montgomery festival, and also at two other stormwater education milestones. This included DEP partnership with the Commission on Common Ownership of Communities, to develop an outreach and education presentation for realtor and homeowner associations, identified as target audiences in the POSWP. Over 100 homeowner association representatives attended three outreach events highlighting the Good Neighbor's workshop series, the RainScapes program and the importance and methods of reducing stormwater impacts.

The third activity included producing materials and participating in a professional education credit class on stormwater pollution through the Greater Capital Area Association of Realtors. Two realtor classes were held in FY 11. Attendees at both workshops received follow up stormwater related evaluations. Based on these results, 90% of attendees stated they would relay RainScapes information to their clients; approximately 75% felt they would be able to comfortably point out stormwater features on a property to clients and approximately 89% of attendees indicated that the workshops had increased their knowledge about stormwater and watershed issues.

In FY11, DEP funded three campaigns using mass media public outreach campaigns. These focused on anti-littering, RainScapes promotion and marketing the Community Clean Water Summit, using mass transit ads, bus shelter ads, and radio ads, facebook and twitter, community blogs and listservs, local newspapers and magazines and websites. Tracking activity from all these sources was difficult, but assumptions were made based on contractor provided information (Direct Media, Clear Channel Outdoor, and The Gazette Newspapers). Table III-E20 presents stormwater outreach results based on the report provided for the CBT grant.

Table III-E20. Stormwater Outreach Results From FY11 Mass Media Outreach Campaign

Project Participants	#
Volunteers employed	19
# of attendees at Clean Water Summit	175
# of watershed groups created (Muddy Branch Alliance)	1
# of attendees at culturally diverse events: ,	952
# of new MS4 outreach partnerships formed,	4
Stormwater Outreach Outcomes	
# of publications (print, web, other) produced:	8
# of copies of print publications produced	7,700
# web hits on online publications expected	69,000
# media hits (e.g., newspaper articles, TV and radio stories, etc.) facebook, listservs, twitter, blogs	400,000
# of Events hosted or attended	49
# of Residents directly reached	2,935

The DEP also expanded its RainScapes program outreach during FY11. Two programs, RainScapes for Schools (added in FY09) and the RainScapes Landscape Professionals Training Series (added in FY10) also had good success. The RainScapes for Schools program results in projects in partnership with MCPS to demonstrate stormwater reduction, meet school curricular goals and show linkage to Chesapeake Bay health. The RainScapes Landscape Professionals Training Series has trained over 260 individuals representing a wide range of firms. The RainScapes Program is also forging a partnership with the local community college Landscape Technology program. The first course focused on bioretention maintenance and was offered to local professionals, which helps build capacity within the professional community.

Students at Rockville High School installing conservation landscaping.

Table III-E21 shows statistics on DEP website information trends. Web hits on information related to stormwater pollution around the home increased 23% from 2010 to 2011. By using these additional, direct reach approaches to residents, DEP will be able to expand its outreach impact.

Table III-E21. FY11 DEP Web Traffic Trends

Rank	Page Topic	FY11 Views	% increase from FY10
1	Solid Waste Collection services	32,500	16
26	DEP Water Home Page	4,000	17
39	RainScapes Techniques	3,415	24
40	RainScapes Rebates	2,496	16
67	Stormwater Home Page	1,196	20
69	Residential Stormwater Awareness Page	1,118	23
71	Restoration Techniques	1,119	29
87	Targeted Neighborhoods	858	19
93	RainScapes Manual	802	19
95	RainScapes Resources	839	34

F. Watershed Assessment

The County 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, with more detailed implementation planning and schedules to meet regulatory and programmatic targets to control stormwater discharges to the MEP.

The draft Strategy submitted to MDE in February 2011 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 is included electronically (CD) with this report in Appendix C.

Implementations plans were developed for those watersheds with existing EPA approved TMDLs or in the case of Muddy and Watts Branch, for which watershed assessments and project inventories had been previously compiled. The watershed implementations plans used for Strategy development identify BMPs, quantify treatment by those practices, determine the watershed restoration potential, evaluate the ability of the watersheds to meet applicable TMDLs though 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.

Watershed pre-assessments were developed for all other areas of the County. These include a description of environmental conditions, potential problems, and preliminary restoration areas identified by desk top analysis. The status and schedule of watershed restoration planning is shown in Table III-F2. As shown in Table III-G8., in Section III.G. Watershed Restoration, below, DEP budgeted $433, 800 in FY10 and $749,130 in FY11 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) CCIS Draft Watershed Implementation Plan (2011) Project Implementation Ongoing *Revise Implementation Plan FY17*	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	
Rock Creek		CCIS Draft Watershed Implementation Plan (2011) Watershed Assessment (2001) Implementation (Action) Plan (2001) Project Implementation Ongoing *Revise Implementation Plan FY15*	Bacteria (2002)
Cabin John Creek		CCIS Draft Watershed Implementation Plan (2011) Watershed Assessment (2004) Project Implementation Ongoing *Revise Implementation Plan FY16*	Bacteria (2002) Sediment (2011)
Seneca Creek	ALL	*Develop Implementation Plan FY12*	Sediment 2011
	Great Seneca Creek (including Clopper Lake)	CCIS Draft Watershed Implementation Plan (2011) MC-USACE Draft Watershed *Assessment (Final expected 2012)* Project Implementation Ongoing	Clopper Lake : Phosphorus and Sediment (1998)
	Dry Seneca and Little Seneca	CCIS Draft Pre-Assessment (2011)	
Lower Monocacy		CCIS Draft Watershed Implementation Plan (2011) *Develop Implementation Plan FY13*	Sediment (2009) Bacteria (2009)
Upper Potomac Direct	Little Monocacy and Broad Run	CCIS Draft Pre-Assessment (2011) *Develop Implementation Plan FY14*	

Table III-F2. Status of Montgomery County Watersheds' Assessments			
8 Digit Watershed	**Planning Subwatershed**	**CCIS=County Coordinated Implementation Strategy**	**TMDLs**
Lower Potomac Direct	**ALL**	*Develop Implementation Plan FY2013*	
	Rock Run and Little Falls	CCIS Draft Pre-Assessment (2010)	
	Muddy Branch	CCIS Draft Implementation Plan 2011for Muddy and Watts Branch MC-USACE Draft Watershed Assessment (Final expected 2012) Project Implementation Ongoing	
	Watts Branch	CCIS Draft Implementation Plan 2011 for Muddy and Watts Branch Watershed Assessment (2006)	
Patuxent	**ALL**	CCIS Draft Pre-Assessment and Implementation Plan (2011) *Revise Implementation Plan FY12*	
	Rocky Gorge Reservoir	CCIS Draft Pre- Assessment and Implementation Plan (2011)	Phosphorus (2008)
	Hawlings River (tributary to Rocky Gorge)	Assessment (2003) Action Plan (2003) Under Implementation	
	Triadelphia Reservoir	CCIS Draft Pre- Assessment and Implementation Plan (2011)	Phosphorus and Sediment(2008)

Status of Watershed Assessments:
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 delayed due to limited Federal funding, but is expected to be completed in 2012.

Anacostia River Restoration Plan (February 2010)
In 2007, the County in partnership with the USACE - Baltimore District, MWCOG, Prince George's County, the District of Columbia, MNCPPC, MDE, and DNR initiated the ARP. The scope of the ARP was to identify and prioritize restoration opportunities for developing a 10 year restoration plan for the Anacostia River watershed. The final report, 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 Countywide 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 fish and benthic macroinvertebrate (aquatic insect) species Typically, the higher the score, the higher quality of biological condition at that monitoring location. The DEP identifies narrative categories based on the distribution of the IBI scores and comparison 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 in all County watersheds at least once every 5 years. Streams in the Special Protection Areas (SPAs) are monitored yearly. The County categorizes small watersheds as impaired or unimpaired by analyzing and comparing the fish and benthic macroinvertebrate IBI's, and habitat condition scores. Impaired streams -those which show biological conditions in the 'fair' or 'poor' categories are evaluated for possible habitat or non-habitat related environmental stressors. Benthic ratings only are used in smaller drainage areas of less than 300 acres. These 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 2010, DEP conducted watershed screening at established monitoring sites in the Horsepen Branch, Little Monocacy, Rock Run, Northwest Branch and Patuxent subwatersheds. Fish and benthic macroinvertebrates were monitored at 23 sites, and 9 sites with drainage areas less than 300 acres were monitored for benthics only. Figures III-F1 and III-F2 show comparisons of benthic macroinvertebrate and fish biological conditions respectively with habitat conditions of sites monitored in 2010. The black diagonal line shows expected direct correspondence between biological and habitat conditions; good biology with good habitat and poor biology with poor habitat. Note that there are more stations for the comparison using benthic data than using fish data. That is because the stations in smaller drainage areas were only sampled for the benthic community.

Of the 32 stations, two were found to be biologically impaired due to degraded habitat. These were stations RORO102 and HBHB217. One station, LPRG202, was impaired due to factors other than habitat. Of these three stations, only station (RORO102) had a drainage area larger than 300 acres and was sampled for both biological communities. These three stream reaches will undergo additional evaluation when the DEP conducts restoration assessments in these subwatersheds.

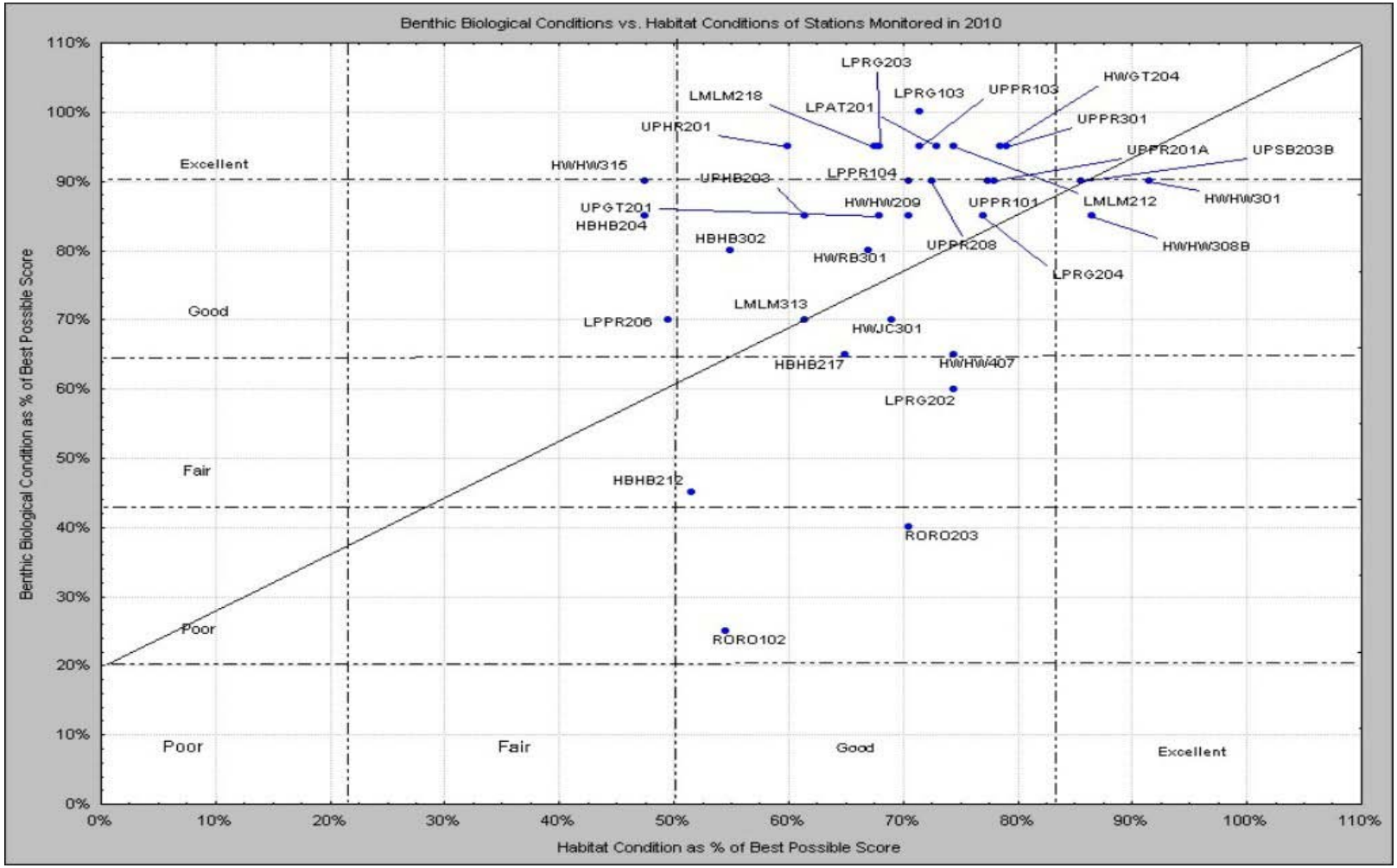


Figure III-F1. Comparison of Benthic Biological Conditions with Habitat Conditions of sites monitored in 2010

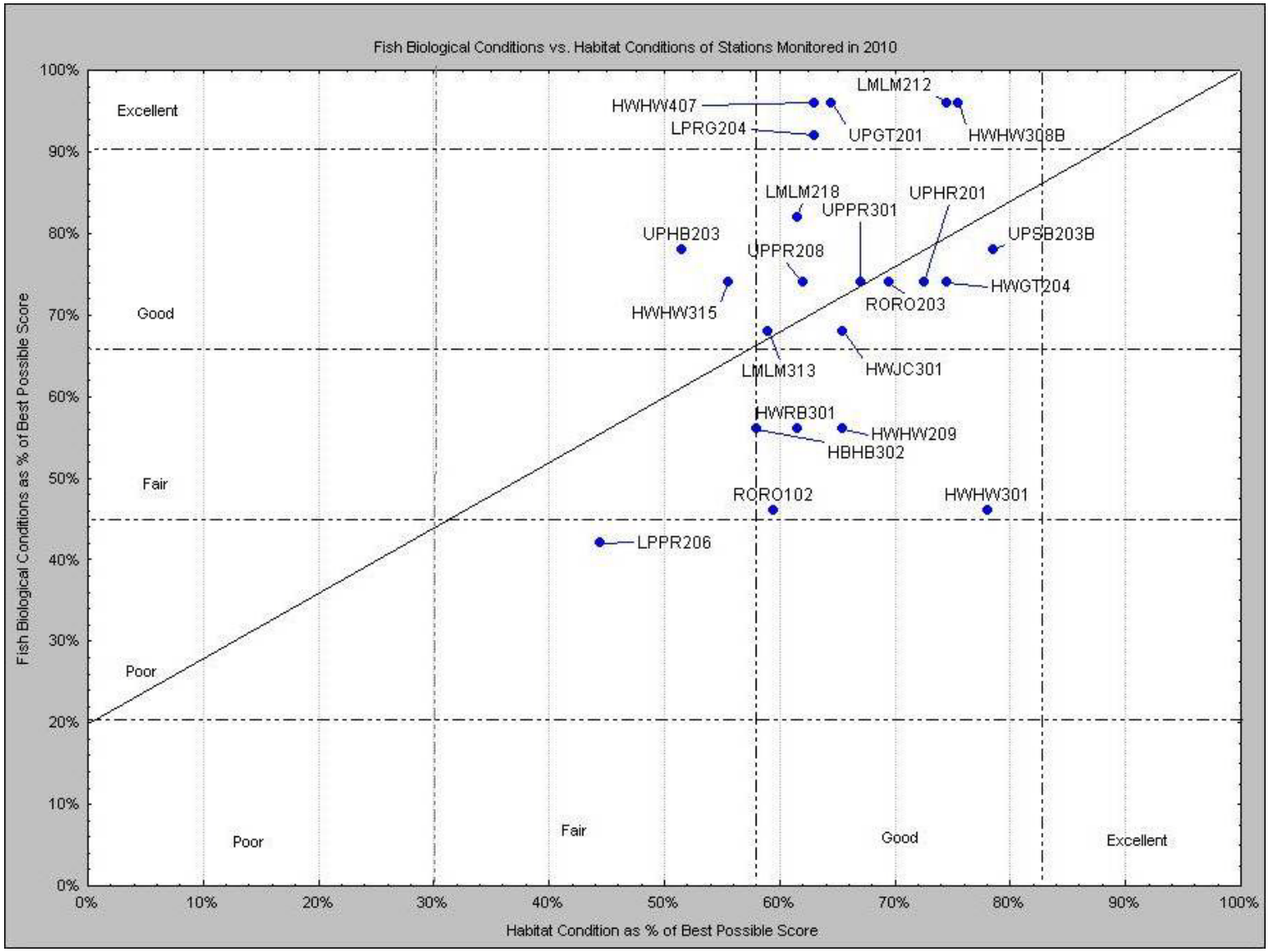


Figure III-F2. Comparison of Fish Biological Conditions with Habitat Conditions of sites monitored in 2010

Biological ratings and physical chemistry of stations with possible impairments are shown in Table III-F3. Physical chemistry results were within the normal range expected for the time of year that sampling occurred. At Station HBHB217, the benthic rating was 'good' but the percent dissolved oxygen was lower than expected, based on air and water temperature.

Table III-F3. Biological Rating and Physical Chemistry of Stations With Possible Impairment (2010)

Station	Sample Date	Monitoring Type	Rating	DO	% Saturation	pH	Conductivity (umhos)	Air Temp	Water Temp
RORO102	4/30/10	Benthics	Poor	11.42	108	7.17	331	23	12.7
RORO102	9/8/10	Fish	Fair	6.57	74	7.7	219	31	21.7
HBHB217	5/7/10	Benthics	Good	7.28	71	7.56	210	15	14.4
LPRG202	4/29/10	Benthics	Fair	12.65	113	7.34	129	13	10

Table III-F4 summarizes the habitat assessments of the impaired stations. These stream segments overall rated *good* for habitat. However, at RORO102 low scores were given for epifaunal substrate, instream cover, sediment deposition and riffle frequency. At HBHB217 there were low scores given for embeddedness, sediment deposition, and channel flow status. At station LPRB202 there were unstable banks, evident from the very low scores for bank vegetation

Table III-F4. Rapid Habitat Assessment Summary of Stations with Possible Impairment (2010)

Station	Benthics Habitat Score	Fish Habitat Score	Summary of Vulnerable Habitat Parameters
RORO102	Good	Good	Low scores in epifaunal substrate, instream cover, sediment deposition and riffle frequency
HBHB217	Good	N/A	Low scores in embeddedness, instream cover and channel flow status
LPRG202	Good	N/A	Very low score for bank vegetation

Horsepen Branch *(four total sites, one fished)*
The Horsepen Branch is a tributary to the Potomac River located in western Montgomery County, with its headwaters in Poolesville. Much of the subwatershed is located in the Agricultural Preserve and the major land use is agriculture. Four stations were monitored in 2010 and biological conditions were either *fair* or *good*. One station monitored, HBHB217 rated slightly lower for benthics than the prior sampling year's "good" rating, likely due to observed habitat impairments. Physiochemical parameters were mostly normal with a dissolved oxygen level toward the low end of the sample's range. Runoff from River Road may contribute to this stream segment.

Hawlings River *(eight total stations, eight fished)*
The Hawlings River is a major tributary of the Patuxent River with diverse land use ranging from agricultural or low density housing upstream of Georgia Avenue, to a mixture of commercial and medium to high density residential land uses in the James Creek tributary below Olney. Eight stations were monitored in 2010, with *good* or *excellent* benthic scores and *fair* to *excellent* fish scores. In the James Creek tributary, benthics were in the "good" category and fish were in the *fair* category.

Little Monocacy *(three total stations, three fished)*
The Little Monocacy is a tributary of the Potomac River. Land uses within this watershed are mostly agriculture with a high percentage of forested land. Benthic conditions were ranked *good* or *excellent*.

Rock Run *(two total stations, two fished)*
Rock Run is a tributary of the Potomac River located in the southern portion of Montgomery County, with headwaters located south of Potomac and low to medium density residential housing land use. Two stations were monitored in Rock Run in 2010.

Station RORO102 below the town of Potomac has more impervious area and had *poor* benthics and *fair* fish. The spring conductivity was 331 umhos, within the range of all stations sampled in 2010. Although the station had *good* habitat, marginal epifaunal substrate, sediment deposition, and limited riffle quality may partially explain the poor benthic community. Low dissolved oxygen levels and the limited summer stream flow likely impaired fish health. The benthic and fish communities at this station in past monitoring have been either marginally *fair* or *poor*.

Station RORO203 was ranked *poor* for benthics, a downgrade from *fair* in prior years. This station is further down stream of RORO102 and is surrounded by slightly less impervious. Fish and habitat were *good*. Physical chemistry results were within range of stations sampled in 2010 and do not seem to be adding to stream impairment.

Lower Patuxent and Upper Patuxent *(15 total stations, eight fished)*
The Lower Patuxent subwatershed begins at the confluence with the Hawlings River, with land use primarily agriculture and low density residential. Seven stations were monitored, with only two segments sampled for both fish and benthics. LPPR 206 had a benthic score of *good* however the fish result was *poor* due to marginal instream cover. The benthic communities only were sampled at five stations. Most were *good* or *excellent* except for Station LPRG202, which had

benthic score of *fair*. The LPRG202 benthic community impairment did not seem to be related to habitat degradation or physiochemical parameters, and past results for benthic sampling have been *good*.

Nine stations were monitored in the Upper Patuxent watershed. All scores for these stations were in either the *good* or *excellent* category.

G. Watershed Restoration

The DEP is implementing projects identified in the watershed assessments to make progress towards controlling stormwater discharges to the MEP and reducing stormwater pollutant loads. Projects include adding SWM BMPs, restoring stream valleys, improving water quality, and addressing damage created by under controlled urban stormwater runoff and pollution. The County is continually assessing emerging stormwater control guidance and improving baseline data critical to watershed planning to ensure that the most beneficial, cost effective projects are selected for implementation.

Figure III-G1 shows the County area, and included impervious surfaces, subject to the MS4 Permit. 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 the electronic attachment (CD) to this report in Appendix A, MDENPDES11.mbd, Parts C-D.

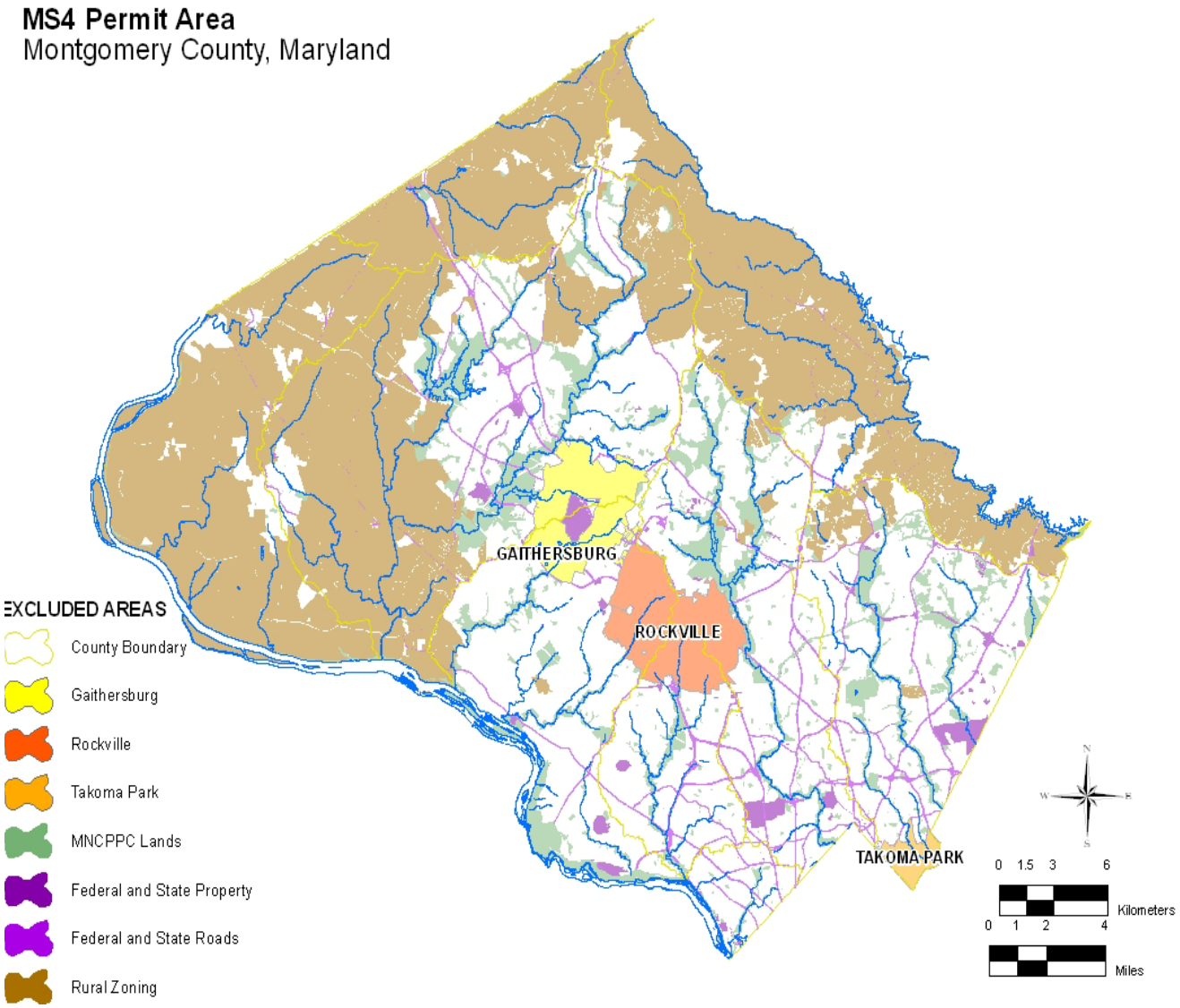


Figure II-G1. County Area Subject to the MS4 Permit

Table III-G1 below provides information on the current status (FY11) of controlled/restored vs. uncontrolled impervious surface areas in the County.

Table III-G1. Impervious Acreage Restoration Goal Progress Summary

Description	Area in Acres
Total County Area	324,552
Total Area of Impervious Surface	35,965
Total County Area Subject to MS4 Permit (1)	138,649
Total County Impervious Area Subject to MS4 Permit	25,119
County MS4 Impervious Area with Effective Stormwater Management	3,661
Under or Uncontrolled Impervious Area Subject to MS4 Permit	21,458
2001 MS4 10% Impervious Goal	2,148
Stormwater Controls Added through FY10	2,146
2010 MS4 20% Impervious Restoration Goal	4,292
Stormwater Control added in FY11	24
Remaining Impervious Area to be Restored by 2015 to Meet Current MS4 Permit Requirements	4,268

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 MS4 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 2,145.8 acres. County SWM BMP CIP projects completed through FY10 achieved control of 1,091.4 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 1,055.1 acres. The total impervious control added through CIP watershed restoration projects was 2,146.5 impervious acres, exceeding the 10% watershed restoration requirement. Total project costs were $21,932,346.

Table III-G2 shows a summary of the projects including costs implemented through FY10. For the CIP budget, ESD projects are shown as 'LID', or low impact development, projects. A detailed list of projects completed is submitted electronically on CD in Appendix F.

Table III-G2. Summary of Watershed Restoration Projects Completed to Meet the 2001 MS4 Permit Impervious Goal			
Watershed and Project Type	**Total Drainage Area (Acre)**	**Impervious Area Controlled (Acre)***	**Cost ($)**
Anacostia River Total	2,589.68	1,313.94	12,314,627
Low Impact Development Project	7.52	3.55	633,999
New Stormwater Pond	317.33	57.14	1,588,411
Stormwater Pond Retrofit	2,264.83	602.83	4,248,284
Stream Restoration	0.00	650.42	5,843,933
Potomac Direct Total	0.00	42.24	978,066
Stream Restoration	0.00	42.24	978,066
Rock Creek Total	789.68	589.38	6,726,798
New Stormwater Pond	367.33	120.59	2,188,282
Stormwater Pond Retrofit	422.35	133.83	546,665
Stream Restoration	0.00	334.96	4,036,942
Rocky Gorge Dam Total	0.00	27.46	479,293
Stream Restoration	0.00	27.46	479,293
Seneca Creek Total	430.64	173.44	1,433,562
Stormwater Pond Retrofit	430.64	173.44	1,433,562
Total for all Watersheds	**3,810.00**	**2,146.46**	**21,932,346**

*Impervious acres controlled by stream restoration projects were derived from the accounting recommendation (Impervious Acreage treated= 1 acre/100 linear feet of stream restored found in Accounting For Stormwater Waste-load Allocations and Impervious Acres Treated, MDE, June 2011.

Establishing the Permit 20% Impervious Control Requirement:
The third generation permit requires the County to add stormwater runoff management to the MEP for an impervious acreage equivalent to 20% of the County's impervious acreage not currently controlled to the MEP. The Strategy guides County progress towards meeting its Permit requirements. The 20% impervious numeric goal (4,292 acres) was derived using land use from 2002, facilities in the Urban BMP database and associated drainage areas as of September 2009, and impervious cover as of 2009.

Subsequently in June 2011, MDE released guidance for documenting and tracking impervious area stormwater runoff control and wasteload reductions for retrofits. The DEP met with MDE in October 2011 to discuss and resolve differences between the MDE guidance and assumptions used in developing the Strategy. Attached in Appendix G is the DEP summary from that meeting and the assumptions that will be used for future accounting of impervious treatment to the MEP.

Since February 2011, DEP has greatly improved the accuracy of baseline data integral to Strategy development, including correcting existing SWM BMP drainage areas, reanalyzing the County's impervious area coverage, and entering backlogged data for hundreds of SWM BMPs. During FY12, DEP intends to reanalyze the existing County impervious and pollutant load baselines, and estimated pollutant load reductions resulting from watershed restoration measures. The DEP's reanalysis will be included in the FY12 report due February, 2013.

Current Implementation Status to Meet the Permit Impervious Restoration Goal:
The DEP is aggressively designing and constructing watershed restoration projects to further address stormwater control requirements outlined in the MS4 permit. Table III-G3 below presents a synopsis of the projects completed, under construction or in design that will be applied towards the current Permit impervious area controlled requirement. There are a total of 567 projects with an anticipated impervious area controlled of 1,500.8 acres.

Table III-G3. Summary of Watershed Restoration Projects Completed, in Construction, and in Design for Compliance with the 2010 MS4 Permit as of FY12

Project Status	**Number of Projects**	**Impervious Area Controlled (Acre)**
Completed	4	24.16
In Construction	17	275.19*
In Design	80	1,201.53*
Rainscapes Rewards Completed Projects	425	6.63**
RainScapes Neighborhoods Completed Projects	41	1.19**
Total	**567**	**1,500.8**

*The Proposed impervious Acres is an estimate and does not reflect the final project computations
** Final impervious area treated through RainScapes Rewards and RainScapes Neighborhood projects is still being analyzed and is not final. Credit for the RainScapes projects will be taken in the FY12 MS4 Annual Report

Table III-G4 below provides detail on completed County projects with associated impervious area. Through FY11, the DEP completed watershed restoration projects to add stormwater control to 24.16 acres of impervious area to be applied towards the Permit restoration goal.

Table III-G4. FY11 Watershed Restoration Projects Completed for Compliance with the 2010 MS4 Permit:

Watershed (8 Digit HUC) and Project	**Total Drainage Area (Acre)**	**Impervious Area Controlled(Acres)**	
Anacostia River Total	**21.72**		**3.54**
Stormwater Pond Retrofit: Peachwood I	21.72	3.54	
Potomac Direct Total	**Not applicable**		**10.56**
Stream Restoration:			
Little Falls - Somerset	Not applicable	5.28	
Little Falls III	Not applicable	5.28	
Rock Creek Total	**Not applicable**		**10.06**
Stream Restoration: Joseph's Branch Phase 3B Spruell Drive	Not applicable	10.06	
Total for All Watersheds	**21.72**		**24.16**

Note: Impervious Acre controlled for Stream Restoration based on MDE Guidance, June 2011.

Projects currently under construction and recently completed will treat another 275 acres of uncontrolled impervious area, and are presented in Table III-G5 below.

Table III-G5. Summary of Watershed Restoration Projects Under Construction FY12

Watershed and Project	**Proposed Impervious Drainage Area (Acre)***	
Anacostia River Total		115.26
Low Impact Development (LID) Project Under Construction Total		**15.99**
Forest Estates Right of Way	3.15	
White Oak (Lockwood Drive and Stewart Lane)	12.84	
Stormwater Pond Retrofit Under Construction Total		**7.40**
Fairland Ridge Dry Pond	7.40	
Stream Restoration Under Construction Total		**91.87**
Batchellors Forest - Batchellors Run East - Bank Erosion	6.34	
Batchellors Forest - Batchellors Run East - Bank Erosion - Reforest	6.34	
Batchellors Forest - Batchellors Run East - Fish Blockage	6.34	
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 - bank erosion - 162	7.92	
Batchellors Run II - Batchellors Forest - eroding banks - 160	7.92	
Bryants Nursery Run I - Unstable Stream Channel	8.71	
Bryants Nursery Run II - Unstable Stream Channel	8.71	
Upper Northwest Branch - Mainstem	21.65	
Cabin John Creek Total		46.46
Stream Restoration Under Construction Total		**46.46**
Lower Booze Creek	46.46	
Rock Creek Total		113.47
ESD Project Under Construction Total		**1.27**
Aspen Hill Library	0.57	
Kensington Park Library	0.70	
New Stormwater Pond Under Construction Total		**112.20**
NIH Pond	112.20	
Total for all Watersheds		**275.19**

*The proposed impervious drainage area is an estimate and does not reflect the final project computations

Figure III-G.2 below shows the FY11 stream restoration project under construction in Lower Booze Creek of the Cabin John Watershed.

Figure II-G2. Lower Booze Creek Stream Restoration Project Under Construction

A summary of projects under design are presented in Table III-G6. The DEP has two LID projects, two new stormwater ponds, 40 stormwater pond retrofits and 14 stream restoration projects currently in design, projected to treat another estimated 1,202 acres of impervious area. The DEP anticipates constructing approximately 40 projects in FY 13. Figure III-E.3 shows a potential SWM BMP retrofit in the Potomac Direct watershed.

Table III-G6. Summary of Watershed Restoration Projects Under Task Order for Design FY12

Watershed and Project	**Number Of Projects**	**Proposed Impervious Drainage Area (Acre)***	
Anacostia River Total	**40**		**350.20**
LID Project in Design	21	29.62	
Stormwater Pond Retrofit in Design	9	178.80	
Stream Restoration in Design	10	141.78	
Cabin John Creek Total	**2**		**7.60**
New Stormwater Pond in Design	2	7.60	
Potomac Direct Total	**9**		**171.06**
LID Project in Design	1	1.69	
Stormwater Pond Retrofit in Design	5	115.70	
Stream Restoration in Design	3	53.67	
Rock Creek Total	**5**		**66.85**
LID Project in Design	1	1.84	
Stormwater Pond Retrofit in Design	3	40.41	
Stream Restoration in Design	1	24.60	
Seneca Creek Total	**24**		**605.82**
LID Project in Design	1	1.96	
Stormwater Pond Retrofit in Design	23	603.85	
Total for All Watersheds	**80**		**1,201.53**

LID=low impact development
*The proposed impervious drainage area is an estimate and does not reflect the final project computations

Figure III-G3Potomac Direct Pond with Retrofit Under Design

Table III-G7 presents a summary of projects identified through watershed assessments as potential future projects. Projects will be selected through the County's watershed planning process for further design and implementation to meet the remaining 2,791 impervious acre needed to meet the 2010 MS4 Permit restoration goal.

Table III-G7. Summary of Watershed Restoration Potential Opportunity Projects Identified for Future Consideration

Watershed and Potential Opportunity Project Type	Number of Projects *	Proposed Impervious Area Treated(Acre) †	
Anacostia River Total	**908**		**5,661**
LID Project	411	2,695	
New Stormwater Pond	7	66	
New Wetland	34	3	
Stormwater Pond Retrofit	220	1,258	
Stream Restoration	236	1,640	
Cabin John Creek Total	**24**		**731**
LID Project	9	66	
Stream Restoration	15	665	
Lower Monocacy River Total	**1**		**1**
LIDD Project	1	1	
Potomac Direct Total	**75**		**2,444**
LID Project	9	14	
Stormwater Pond Retrofit	23	1,501	
Stream Restoration y	43	929	
Rock Creek Total	**65**		**1,743**
LID Project	27	423	
New Stormwater Pond	3	497	
Stormwater Pond Retrofit	18	220	
Stream Restoration	17	603	
Rocky Gorge Reservoir Total	**23**		**846**
LID Project	9	91	
Stream Restoration	14	755	
Seneca Creek Total	**113**		**1,967**
LID Project	11	75	
Stormwater Pond Retrofit	68	858	
Stream Restoration	34	1,035	
Triadelphia Reservoir/Brighton Dam	**1**		**2**
LID Project Potential Opportunities	1	2	
Total for all Watersheds	**1,210**		**13,395**

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
† The proposed impervious drainage area is an estimate and does not reflect final project computations.

Highlights of FY11 Watershed Restoration Projects:

Hollywood Branch Steam Restoration Project:
The Hollywood Branch Stream Restoration Project was identified during the prior Permit cycle as a project required to meet watershed restoration goals. The Project has not been completed, but the County did successfully meet the 10% impervious area restoration goal with other projects. The Hollywood Branch Stream Restoration will be completed during the current Permit term.

This project will mitigate stream degradation caused by past suburban development made 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).

A stream stability assessment along the 2.25 mile Hollywood Branch identified sites where past stormwater impacts require mitigation. The DEP developed stream restoration concept plans and conducted the first public meeting in 2009. The project is currently in final design and the County is submitting required permits for a summer 2012 start of construction. Stream restoration goals include: stabilizing erosive areas, improving floodplain access, enhancing riparian conditions, enhancing stream conditions and improving overall aquatic resources.

Public Property LID:
The County's LID Inventory of Publicly Owned Facilities (Phases I and II) assessed, and prioritized LID opportunities at 53 County owned facilities, three County roadways and five public schools. Progress in FY 11 included construction of six LID devices at the Aspen Hill and Kensington park libraries, and completion of 60% design plans for LID retrofit projects in the Breewood residential neighborhood, Ridgeview Middle school, and within the public Right-of-Way along Arcola Avenue, and Amherst Avenue. The County also produced a final report detailing LID retrofit opportunities at 70 county schools and maintenance facilities. DEP is working with MCPS to implement LID retrofit projects.

Private Property LID - RainScapes Program Overview:
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. The DEP offers technical and financial assistance (funded by the County's Water Quality Protection Charge) to encourage property owners to implement 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 Program, which evaluates small, targeted neighborhood-scale catchments for DEP installed on-lot stormwater runoff reduction approaches that can be integrated into residential landscapes.

The DEP also offers workshops in RainScapes Rewards practices. From 2008- 2011, the workshops have reached 880 residents, averaging 240 participants each year. 421 RainScapes Rewards Rebate projects were implemented in the County through FY11, treating a total of 6.63 impervious acres. Rebate projects are providing a visible presence for stormwater management on private lots across the County and are serving to raise both awareness and action on the part of residents. Canopy tree and conservation landscape projects, while not having a direct metric to value their impervious area stormwater control contribution, represent 43% of installed projects. Figure III-G4 shows a summary of Rainscapes Rewards projects Countywide.

In FY11, the RainScapes Neighborhoods program began installing projects in Glen Echo Heights and the Town of Garrett Park to treat 1.19 impervious acres by installing 11 conservation landscape projects.. In FY12, project implementation expanded into Forest Estates, Breewood, and Town of Chevy Chase neighborhoods. This program targets neighborhoods in priority watersheds with active citizens' group or watershed organizations to leverage education and outreach efforts. Current priority watersheds are the Anacostia and Rock Creek. Projects are also combined when possible with the DOT Right of Way and CIP watershed restoration projects (for example, Breewood Tributary and Forest Estates), in order to maximize the amount of runoff reduction achievable. The Program has a 30% participation goal within a catchment area. Figure III-G5 shows the locations of FY11 Rainscapes Neighborhood projects.

The DEP is developing partnerships with the County's local environmental and watershed organizations to greatly extend the RainScapes efforts at the neighborhood scale. In 2008, the A N S and FoSC provided outreach and education to Sligo Creek residents and installed 12 rain gardens using DEP cost-share for materials and funding from a CBT grant. Program evaluation has allowed refinement of site assessment tools, techniques and reporting mechanisms. As part of the FY12 re-analysis of existing County impervious and pollutant load baselines, DEP will include details on the status of the 2008 rain gardens in the February 15, 2013 Permit annual report. In a follow up to the work begun in 2008, DEP contracted with ANS in 2009 to develop a neighborhood-based screening tool to identify potential projects. The tool would allow trained volunteers to provide environmental outreach, conduct neighborhood site assessments and support implementation of RainScapes projects in specific neighborhoods.

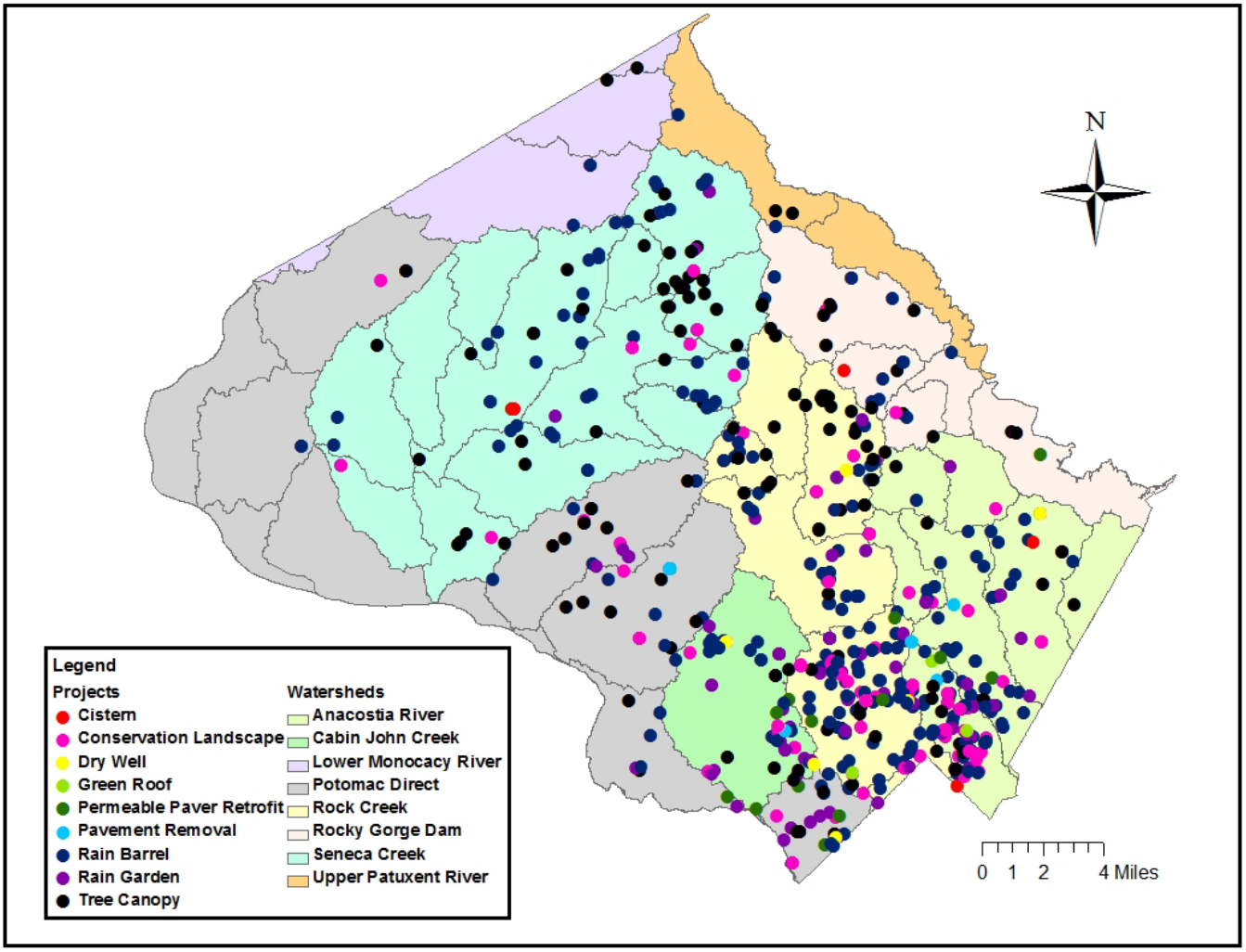


Figure III-G4. RainScapes Rewards Projects Countywide through FY11

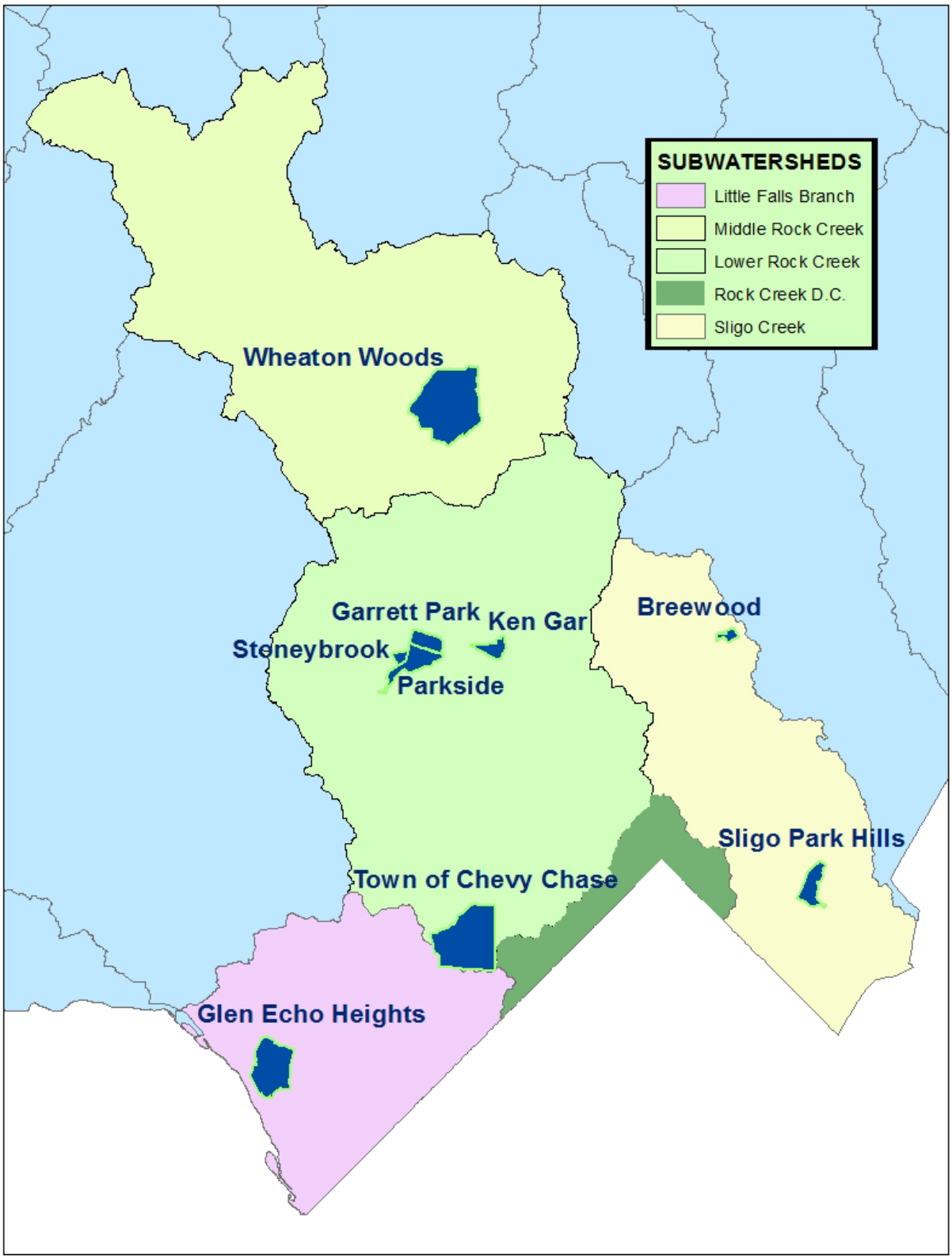


Figure III-G5. Locations of Current RainScapes Neighborhoods

FY11 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 and FY11 costs for both watershed assessments and watershed restoration projects.

Table III-G8. FY10 and FY11 Capital Improvement Program Costs for Watershed Assessment and Restoration

Fiscal Year (FY)	FY10	FY11
Total annual cost for watershed assessment	$433,800	$749,130
Total annual cost for watershed restoration	$2,942,100	$3,904,222
Total Costs	$3,375,900	$4,653,352

During FY11, the County continued to identify funding sources to support project implementation. The six-year SWM 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. As shown in Tables III-G19 and III-G10, the approved budget for FY13 is $35,000,000 compared to $11,445,000 for FY12 and $8,888,000 for FY11.

The approved FY13-FY18 SWM Program totals $295.0 million, an increase of $188.7 million, or 177.6 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 S WM 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-G9. Department of Environmental Protection FY11-16 Stormwater Management (SWM) Capital Improvement Progam (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-G10. 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	*154,010*	*16,210*	*24,200*	*25,100*	*24,500*	*29,500*	*34,500*
SWM Retro-Government Facilities. Low Impact Development	*17,425*	*2,125*	*2,900*	*3,100*	*3,100*	*3,100*	*3,100*
SWM Retrofit- Roads	*64425*	*8515*	*9910*	*11500*	*11500*	*11500*	*11500*
SWM Retrofit Schools	*20100*	*1270*	*1010*	*3270*	*4850*	*4850*	*4850*
Miscellaneous Stream Valley Improvement	*15,870*	*3,070*	*3,070*	*3,070*	*2,220*	*2,220*	*2,220*
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	*14,800*	*2,350*	*2,450*	*2,500*	*2,500*	*2,500*	*2,500*
Total	**295,000**	**35,000**	**45,000**	**50,000**	**50,000**	**55,000**	**60,000**

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 Strategy used the WTM to verify pollutant baseline loads in TMDL watersheds, and estimate pollutant load reductions of a variety of completed and planned watershed restoration structural, non-structural and programmatic 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*, included, along with the final version of the Strategy, electronically with this report as Appendix C., and can also be found on the DEP website (http://www.montgomerycountymd.gov/dectmpl.asp?url=/content/dep/water/wris.asp).

Table III-G11, 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 FY11 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 are not consistent with MDE guidance which was published in June 2011 after the required February 2011 submittal date for the Strategy. The County will address the inconsistencies by correcting the WTM assumptions and improving County data inputs. The revised results of the model will be reported in the FY12 report due February 15, 2013.

Table III-G11. Montgomery County TMDL Summary by Impairment

Impairment	Watershed	Date	Pollutant	TMDL Percent Reduction	County MS4 Baseline Load	Annual Allocation	Reduction to date FY11	Units	WLA_{SW} Percent Reduction	Percent Reduction Since Baseline Date*	TMDL Baseline Data Date
Bacteria	Cabin John Creek	2007c	*E. coli*	52.0%	44,257	30,670	112	(Billion MPN/yr)	30.7%	0.2%	2003
	Rock Creek	2007d	Enterococci	97.0%	453,669	18,195	11,313	(Billion MPN/yr)	96.0%	2.5%	2003
	Anacostia River	2007b	Enterococci	86.0%	247,809	29,978	10,859	(Billion MPN/yr)	87.9%	4.4%	2003
	Lower Monocacy River	2009e	*E. coli*	88.0%	67,452	9,848		(Billion MPN/yr)	85.4%	0%	2004
Sediments	Anacostia River	2007a	TSS	85.0%	7,682	1,101	205	(tons/yr)	87.5%	2.7%	1997
	Triadelphia Reservoir	2008b	TSS	29.0%	29	29		(tons/yr)	0.0%	0.0%	2003
	Clopper Lake	2002	TSS	0.0%	13	13		(tons/yr)	0.0%	0.0%	2002
	Lower Monocacy River	2009d	TSS	38.0%	172	68		(tons/yr)	60.8%	0.0%	2003
Nutrients	Anacostia River	2008a	Nitrogen	78.8%	206,312	38,959	10783	(lbs/yr)	81.8%	5.2%	1997
	Anacostia River	2008a	Phosphorus	79.7%	20,953	3,947	1,232	(lbs/yr)	81.2%	5.9%	1997
	Triadelphia Reservoir	2008b	Phosphorus	58.0%	438	373		(lbs/yr)	15.0%	0.0%	2003
	Rocky Gorge Reservoir	2008b	Phosphorus	48.0%	4,268	3,628	10	(lbs/yr)	15.0%	0.2%	2003
	Clopper Lake	2002	Phosphorus	39.3%	101	55		(lbs/yr)	45.4%	0.0%	2002
Trash	Anacostia River	2010	Trash	100.0%	228,683	-	8,919	lbs/yr removed	100.0%	3.9%	2010

Adapted from "2010 Status of Approved Stormwater Wasteload Allocations for NPDES Regulated Stormwater Entities in Montgomery County," April 27, 2010 by Jeff White, MDE

*Percent reduction of pollutant by BMPs, BMP retrofits and stream restoration completed after the TMDL baseline data collection period, as of FY2011. Includes Watershed Restoration CIP Projects

H. Assessment of Controls:

The Permit requires the County to assess the effectiveness of its stormwater management program and control measures. Pre-restoration and post restoration watershed monitoring, including chemical, physical and biological monitoring is used to assess implemented control measures. 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 section of the Permit

Breewood Tributary Restoration Project:
In 2009, the MDE approved DEP's proposal for the Breewood tributary to conduct monitoring required in Part III.H.1, Watershed Restoration Assessment to monitor the results from the proposed comprehensive restoration effort in this small drainage area. The tributary location within the Sligo Creek subwatershed of the Anacostia River watershed is 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 located in upper Sligo Creek within the Anacostia Watershed.

The catchment is predominantly medium density (quarter acre) residential, with a condominium complex, townhouse development, senior living center, high school and church located within the drainage area. Two primary roads, University Boulevard and Arcola Avenue contribute runoff in the upper portions of the catchment. The residential roads are curb and gutter designed streets supporting the residential development located in the middle and lower sections of the Breewood tributary. The majority of the stormwater runoff from the impervious areas is not controlled and has led to the severely unstable stream channel responsible for transporting 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 including LID practices with stream and wetland restoration to achieve measurable water quality improvements. The outreach efforts will focus on increasing resident awareness and their 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 can be found on DEP's website at: http://www.montgomerycountymd.gov/content/dep/downloads/BreewoodFactSheet.pdf and is attached in the electronic (CD) submission to this report in Appendix H.

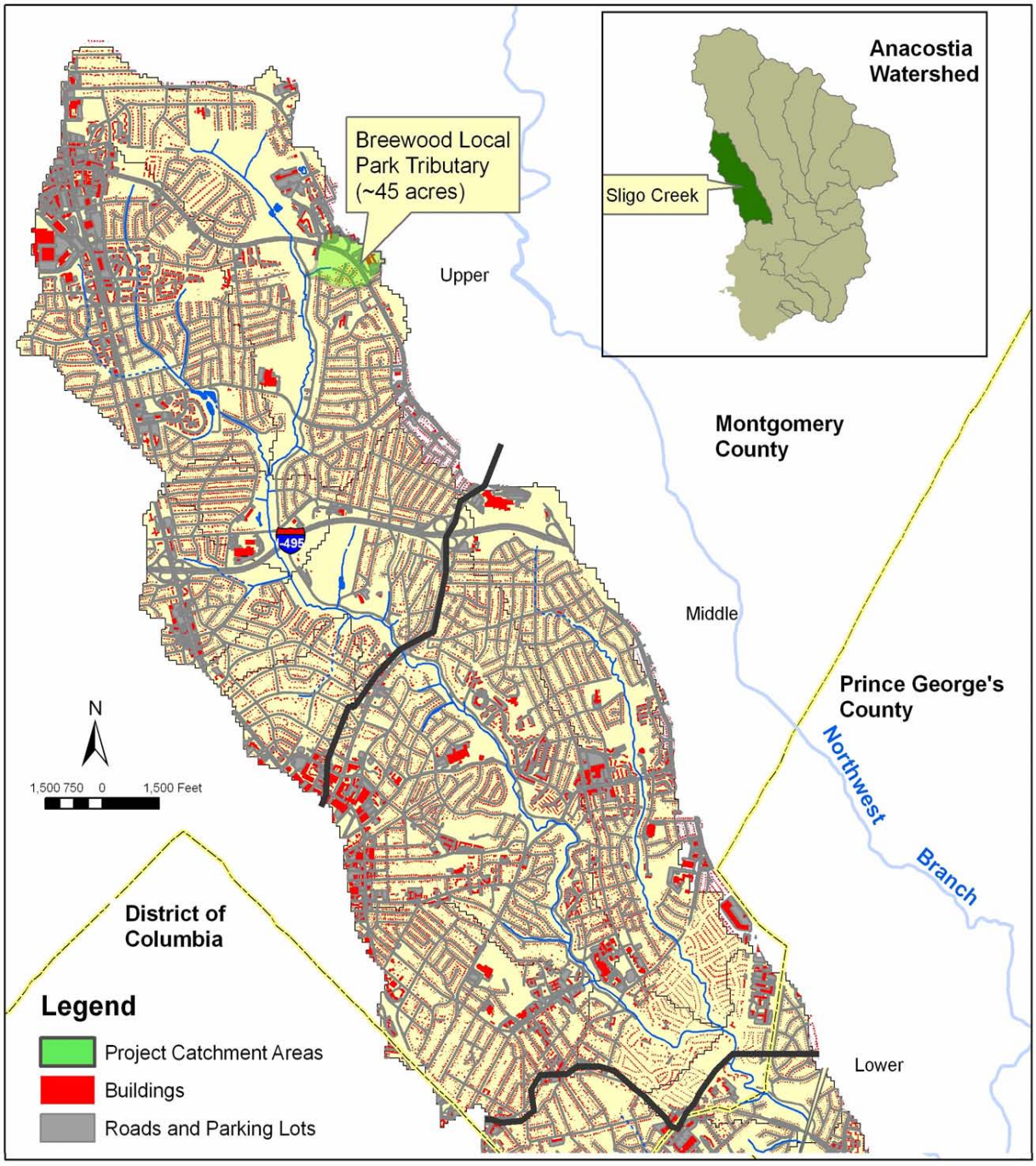


Figure III-H1. Location of the Breewood Tributary Within the Sligo Creek Subwatershed of the Anacostia

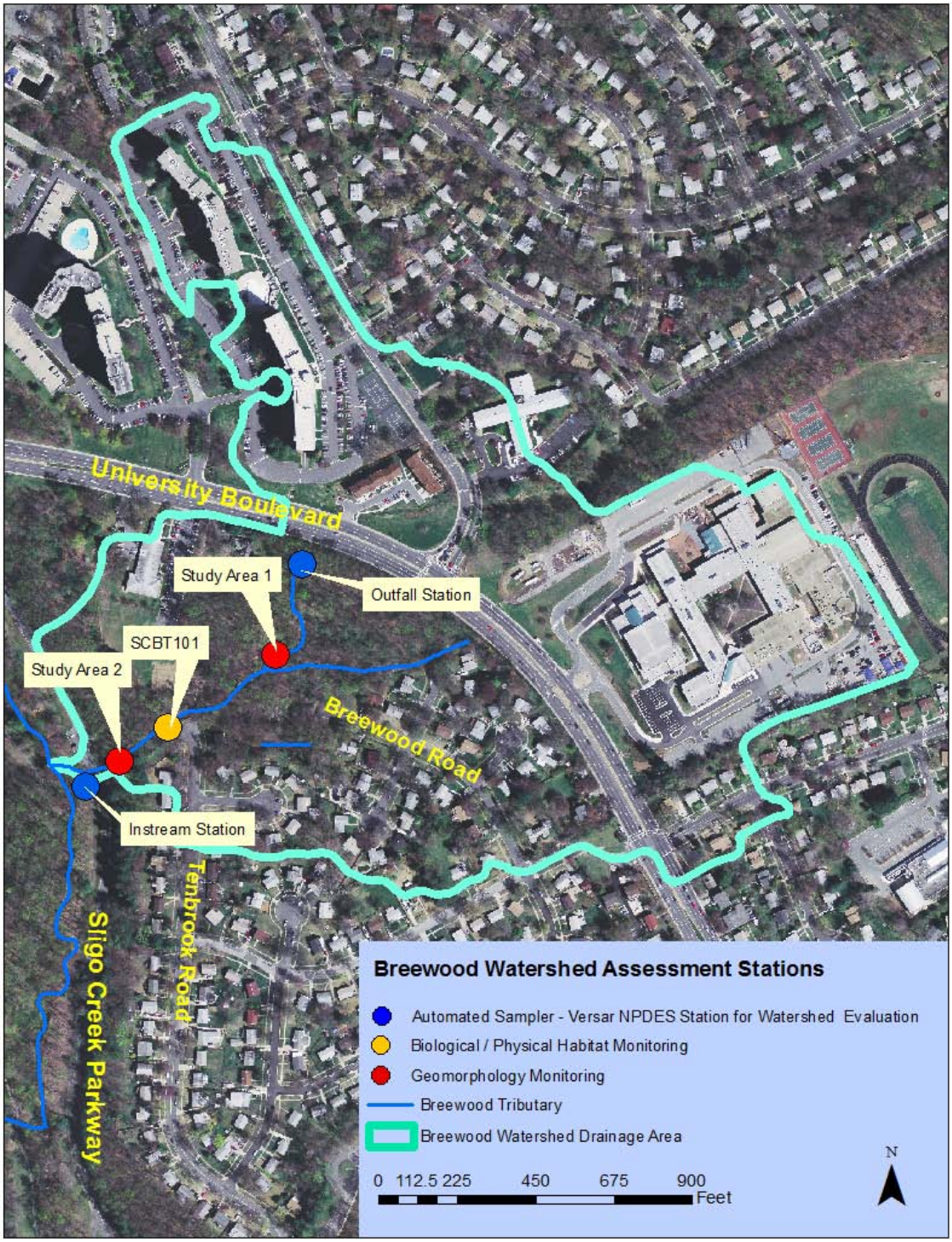


Figure III-H2. Locations of Stream Chemistry, Biological, Physical Habitat and Geomorphology Monitoring Stations, Breewood Tributary of Sligo Creek.

H.1. Watershed Restoration Assessment

Breewood Tributary Chemical Monitoring:
During 2010, 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. 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. Summary of percent impervious area by land use within the Breewood Tributary drainage area (Metropolitan Washington Council of Governments 2008) Approximate, Will Be Updated for FY12 MS4 Annual Report.

Impervious Land Use Category	**% of Total Impervious in the Breewood Tributary**
1. Roads	**38**
a. State/Federal	23
b. Local	15
2. Parking Lots:	**32**
a. Public/Institutional	22
b. Private	10
3. Roofs	**22**
a. Public/Institutional	9
b. Private (Non-Single Family)	2
c. Single Family Homes	11
4. Other	**8**
a. Single Family Driveways	4.6
b. Sidewalks	3.4
Total Acres of Impervious Surface	14.89
Avg. Impervious Cover (%)	33.13%
No. of Single Family Homes	51

The Permit required chemical monitoring data is included electronically in Appendix A, MDENPDES11.mbd, Part F. The summary report *NPDES Water Chemistry Monitoring in the Breewood Tributary of Upper Sligo Creek 2009-2010* is also included electronically as Appendix I.

The region experienced 13.8% higher rainfall amounts during 2009 than in an average year. Conversely, in 2010, rainfall was 3.6% less than in an average year. The 2009 period also included much higher than normal amounts (115%) recorded in December. A plot of statewide average rainfall measured during 2009-2010 is shown in Figure III-H3.

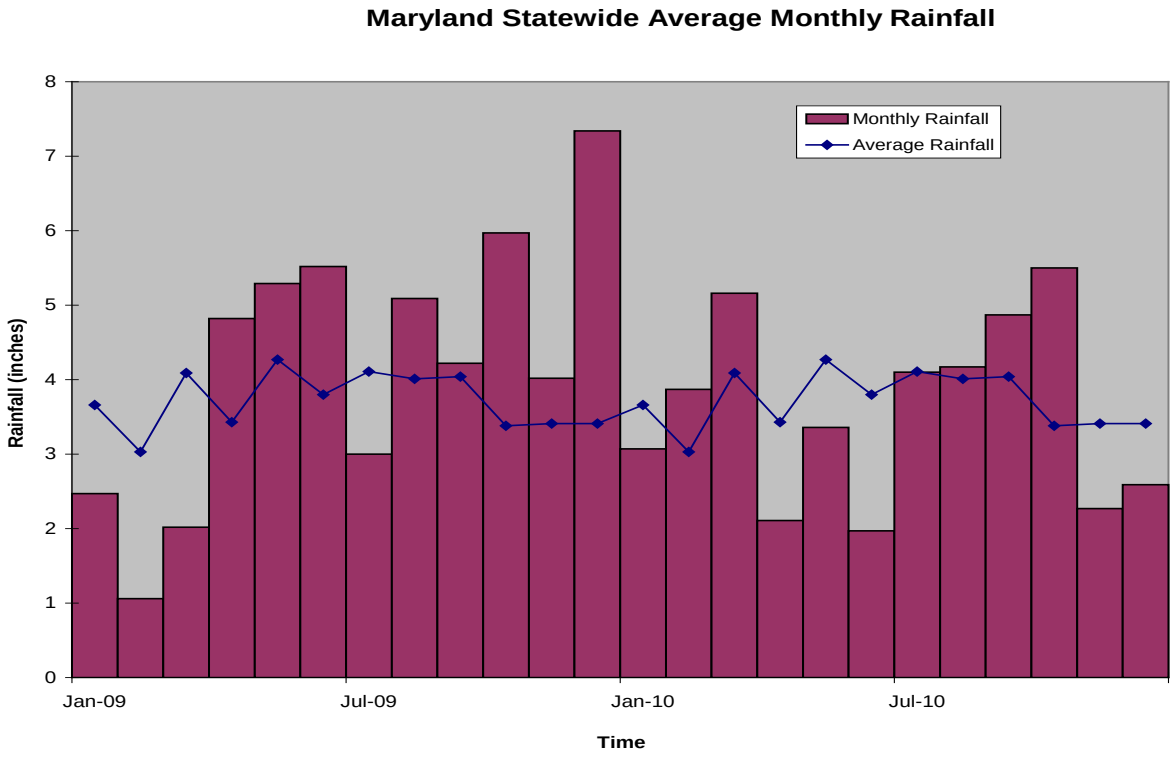


Figure III-H3. Plot of long-term Maryland statewide average (1971-2000 time period) monthly rainfall plotted with statewide monthly results from 2009-2010 (Northeast Regional Climate Center, 2009-2010). Observed and time average data reflect statewide area average monthly rainfall.

The 16.9 acres of drainage to the outfall station represent 27% of the total 63 acres to the instream station. Under normal conditions, there was no dry weather flow present at the outfall station. The outfall station drains an area with significant directly connected impervious including major roadways and parking lots compared to the more heterogeneous land uses, including large forested and lawn areas, which drain to the instream station.

The relatively smaller drainage area to the outfall compared to the larger drainage area to the instream station affected flow rate, total stormflow volume, and response of flow to rainfall. Flow rate in volume per time and total stormflow volumes were usually greater at the instream station than at the outfall. As expected, for rain events in the catchment, the first appearance of flow at the outfall preceded rise in stream height at the instream station. The time between the onset of rainfall and rise in stream height at the instream station was an average of 3.33 minutes greater than the time between the onset of rainfall and appearance of first runoff at the outfall.

Hydrology Modeling:
The Permit requires that rainfall to runoff characteristics of the contributing subwatershed be evaluated using a standard, accepted hydrology model. A Hydrologic Engineering Center River Analysis System (HEC-RAS) model of the Breewood Tributary catchment will be produced as part of the stream restoration design process. This model should be completed in 2012.

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 logging, and continuous rainfall logging were conducted according to methods described in the Breewood Tributary Monitoring Quality Assurance and Quality Control Plan (Hage and Jones 2010). Field teams collected baseflow samples monthly and conducted automated storm runoff monitoring at a target rate of three events per quarter, for a total of 16 storms and 20 baseflow events during 2009 and 2010.

For both stations, mean concentrations (MCs) were calculated for Permit required parameters during baseflow. MCs were also calculated for total petroleum hydrocarbons (TPH) and *Enterococcus* in 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 two-year monitoring period for each parameter except TPH and *Enterococcus*. Mean storm EMCs, baseflow MCs, and storm MCs (for TPH and *Enterococcus)* can be found in Table III-H3 below. 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 for 5-day biochemical oxygen demand (BOD), total Kjeldahl nitrogen (TKN),copper, zinc, and storm MCs for TPH, and *Enterococcus* were higher at the outfall than at the instream station.

- At the instream station, flow state had mixed impacts.
    - Mean storm EMCs were higher than baseflow MCs for BOD, TKN, total phosphorous (TP), total suspended solids (TSS), and metals.
    - Mean storm EMCs were lower than baseflow MCs for nitrate plus nitrite, and hardness.
    - First flush storm MCs were lower than baseflow MCs for *Enterococcus*, and TPH .

- Evaluation of the impact of flow state at the outfall is difficult.
    - The outfall station was generally dry, except following rainfall or other non-storm episodic discharges. Baseflow samples could only be obtained on a few occasions. In these samples, the baseflow MCs for *Enterococcus* and TPH were lower than stormflow MCs. The lack of consistent flow could be due to the highly impervious drainage area.

Regression analysis of the stations' storm hydrographs was also performed for the two years of data. Storm water hydrographs typically show three limbs: a rising limb during which stream flow increases sometime after rainfall begins, a peak at which stream height and flow volume is greatest and a falling limb when rainfall ceases and stream height and flow volume decrease back to pre-storm levels. Regressions of limb flow volume versus pollutant concentration data suggest that there was a significant relationship ($p < 0.05$) for 5-day BOD, nitrate and nitrite, hardness, TKN, copper, and zinc at the outfall and for nitrate and nitrite at the instream station. The regressions suggested that this relationship was of decreasing concentration with increasing corresponding limb flow volume for all of these analytes. The results are consistent with a highly impervious urban drainage area that lacks stormwater management. Non-point source pollutants, excessive stream bank erosion and a flashy flow regime are the major problems identified.

Other preliminary statistical analyses were performed for the data collected during 2009-2010. These results can be found in the summary report, Appendix I.

Table III-H3. Mean storm EMCs and baseflow MCs (mg/l; ± 1-sigma standard deviation) in Breewood Tributary, 2009-2010

Analyte	Mean Storm EMC		Baseflow MC	
	Outfall	Instream	Outfall[a]	Instream
BOD 5	5.6 ± 5.1	5.0 ± 2.9	13.1 ± 10.2	0.2 ± 0.9
TKN	0.969 ± 0.675	0.943 ± 0.608	2.845 ± 2.638	0.131 ± 0.284
Total Phosphorus	0.034 ± 0.077	0.108 ± 0.159	0.000 ± 0.000[b]	0.000 ± 0.000[b]
Nitrate+Nitrite	0.309 ± 0.161	0.541 ± 0.253	1.806 ± 2.508	2.683 ± 0.214
TSS	57.9 ± 70.0	160.3 ± 171.0	36.4 ± 23.2	3.4 ± 5.1
Total Cadmium	0.00001 ± 0.00004[c]	0.00005 ± 0.00012[c]	0.0000 ± 0.0000[b]	0.0000 ± 0.0000[b]
Total Copper	0.033 ± 0.020	0.024 ± 0.016	0.220 ± 0.266	0.009 ± 0.008
Total Lead	0.008 ± 0.008	0.011 ± 0.012	0.006 ± 0.003	0.001 ± 0.004
Total Zinc	0.080 ± 0.058	0.055 ± 0.046	0.438 ± 0.626	0.015 ± 0.008
TPH[a]	5 ± 4	3 ± 4	4 ± 3	3 ± 4
Enterococcus[a]	1,689 ± 1,006	223 ± 346	1,245 ± 1,661	334 ± 641
Hardness	31 ± 16	44 ± 13	174 ± 156	103 ± 9

The 2010 pre-restoration total annual pollutant loads for TN, TP and TSS were calculated for the Breewood tributary. Results are reported in the electronic attachment to this report, Appendix A., MDENPDES11.mbd., Part G.2. Pollutant Loads Associated with GIS Coverage, and shown in Table III-H4.

Table III-H4. Pre-Restoration 2010 Total Annual Pollutant Loads in the Breewood Tributary

Pollutant	Units	Instream	Outfall
Total Nitrogen	lbs/year	2,488	525
Total Phosphorus	lbs/year	34	4
Total Suspended Solids	lbs/year	48,796	8,403
Biochemical Oxygen Demand (5-day)	lbs/year	1,383	992
Cadmium	lbs/year	0	0
Copper	lbs/year	11	19
Lead	lbs/year	3	1
Zinc	lbs/year	26	53
Total Petroleum Hydrocarbons	lbs/year	3,261	1,021
Enterococcus		388,080	289,314

Breewood Tributary Biological Monitoring:

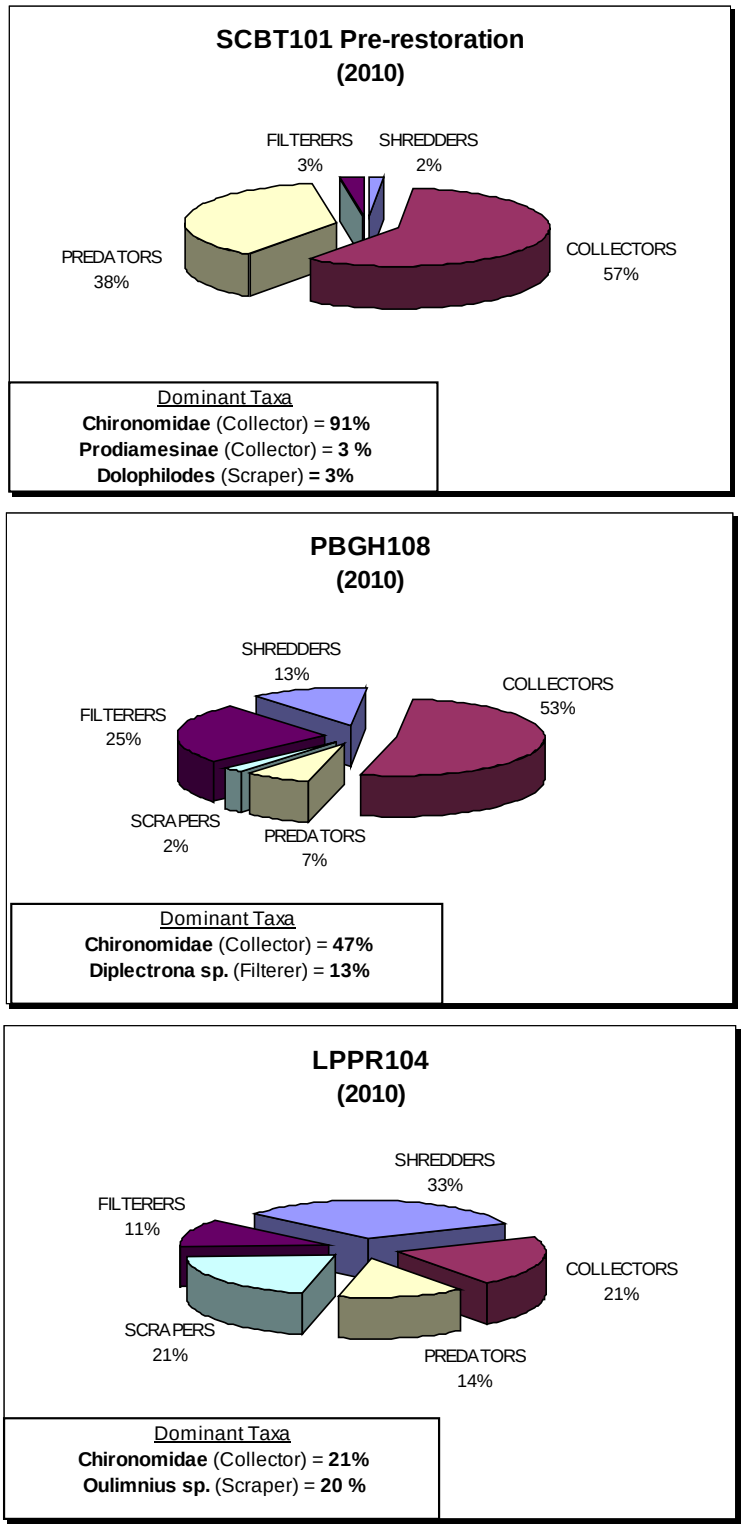
In March 2010, a biological monitoring station, SCBT101, was established and monitored in the Breewood tributary. As shown in Figure III-H2, the station is located upstream of the Sligo Creek Parkway and the instream water chemistry monitoring station. Station SCBT101 is monitored each spring for benthic macroinvertebrates. No fish monitoring is conducted since only tolerant, pioneer species would be expected in this small stream, having a drainage area less than 300 acres.

The County uses the Benthic IBI (BIBI) to assess biological 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. Examining the details of the benthic communities provides more information on possible impairing factors than available just from the BIBI score alone.

The FFG classifications are ecological classifications that distinguish benthic macroinvertebrates based on how they process food (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. Collectors 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 the diatoms and on other algae that grow attached on exposed surfaces, and are sensitive to environmental degradation and also 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. There were only six taxa present, indicating low species richness. Shredders accounted for only 2% of the total sample collected at SCBT101 and no Scrapers, were found, Collectors, generalists who do not require the complex habitat needed for the more sensitive FFGs, accounted for 57% of the sample collected at SCBT101. Filterers accounted for 3% and predator organisms composed 38% of the total sample.

Figure III-H4 shows the proportion of each FFG at SCBT101and in two reference stream reaches, one in the Good Hope tributary to Paint Branch (PBGH108) and the other in a tributary to the Lower Patuxent River (LPPR104). The benthic community of the Good Hope tributary was rated 'Good' while that in the Lower Patuxent River tributary was rated 'Excellent'. Note that the relative percentage of taxa in the category 'collector' decreases and the percentages for 'filterers'. 'shredders; and 'scrapers' increases with increases in benthic community rating



.Figure III-H4. Functional Feeding Group Comparison in the Breewood Tributary (SCBT101), Good Hope Tributary (PBGH108), and tributary to the Lower Patuxent (LPPR104.)

The biotic index is another metric to characterize the benthic macroinvertebrate community. The biotic index is based on tolerance to organic pollution. The biotic index for the Breewood sample was 6.79 (out of 10), indicating a relatively high tolerance to organic pollution. In addition, 81% 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). Lastly, the BIBI score analysis includes determining the presence of ephemerella, 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:
In March 2010, DEP performed a physical habitat assessment at SCBT101. Pre-restoration monitoring will establish a baseline for comparison with future habitat assessments. Results indicate that the habitat is *fair*, receiving a score of 71 (out of a possible 200). 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. 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-H5 shows a comparison of the Breewood tributary BIBI and habitat conditions with those in the Paint Branch and Lower Patuxent streams in Spring 2010. While habitat conditions are similar at the Paint Branch (PBGH108) and Lower Patuxent (LPPR104) stations, the BIBI scores are much higher for the Lower Patuxent. The data is not shown but there are differences in specific habitat parameters between these two stations, with the PBGH108 station showing lower scores for embeddedness, sediment deposition, and bank stability than at LPPR104.

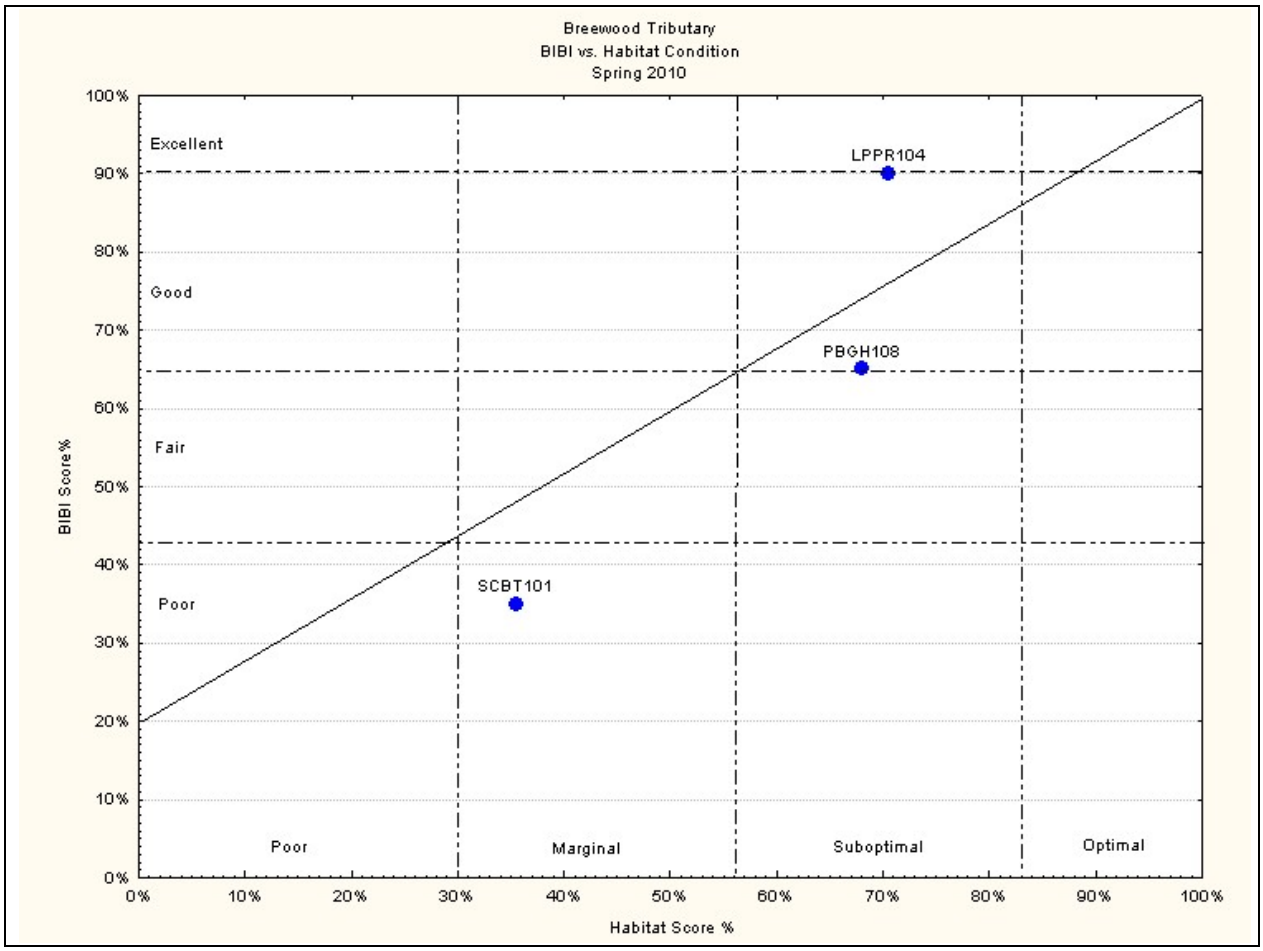


Figure III-H5. BIBI at Breewood Tributary and Reference Streams vs. Habitat Condition, Spring 2010

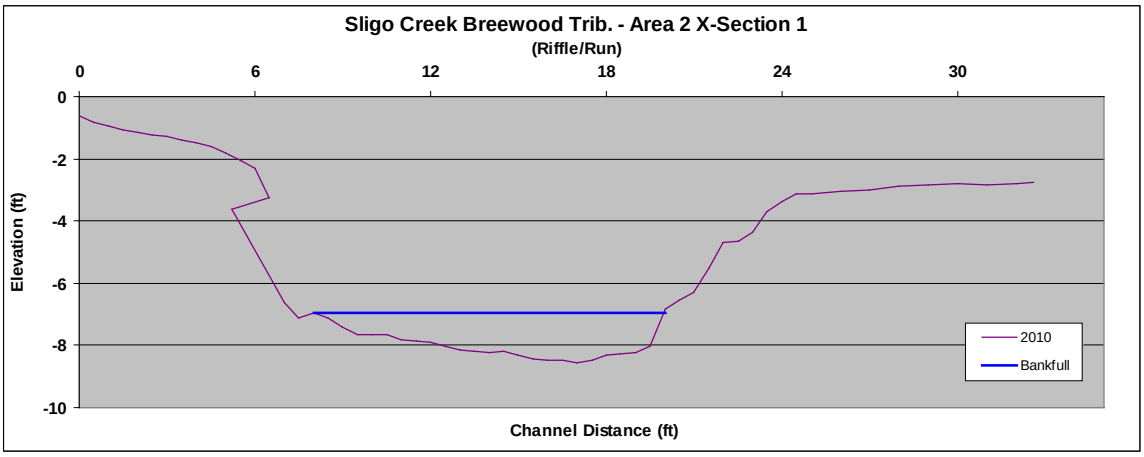
In-situ water chemistry measurements were made in the Breewood tributary and the reference streams concurrent with the physical habitat assessment. As shown in Table III-H5, most water quality parameters (dissolved oxygen, pH and temperature) were within the normally expected range at SCBT101 and the reference streams . 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 streams. 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 Two Reference Streams

STATION	SCBT101 ('Poor' Station)	LPPR104 (Reference Station)	PBGH108 (Reference Station)
TYPE	Benthic	Benthic	Benthic
Benthic Community	Poor	Good	Excellent
DATE	05/07/2010	4/29/2010	4/22/2010
Dissolved Oxygen (> 5 mg/l)	8.73	10.72	10.69
% Dissolved Oxygen Saturation	87	101	97
PH (6.5-8.5)	7.30	6.4	6.24
Conductivity (<= 300 umhos)	566	103	166
Air Temperature (deg C)	21	15	12
Water Temperature (deg C)	15.4	12.9	11

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. 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-H6 provides Study Area 2 representative cross section views. The average particle size of the channel substrate below the bankfull channel height was 2.8mm, which is classified as very fine gravel. This area of the stream is predominated by riffles, which accounted for 81% of the reach surveyed. The results of the survey indicate a degraded channel with low sinuosity, and high erosion potential. Results for both stations will be reported in the FY12 Annual MS4 Report.



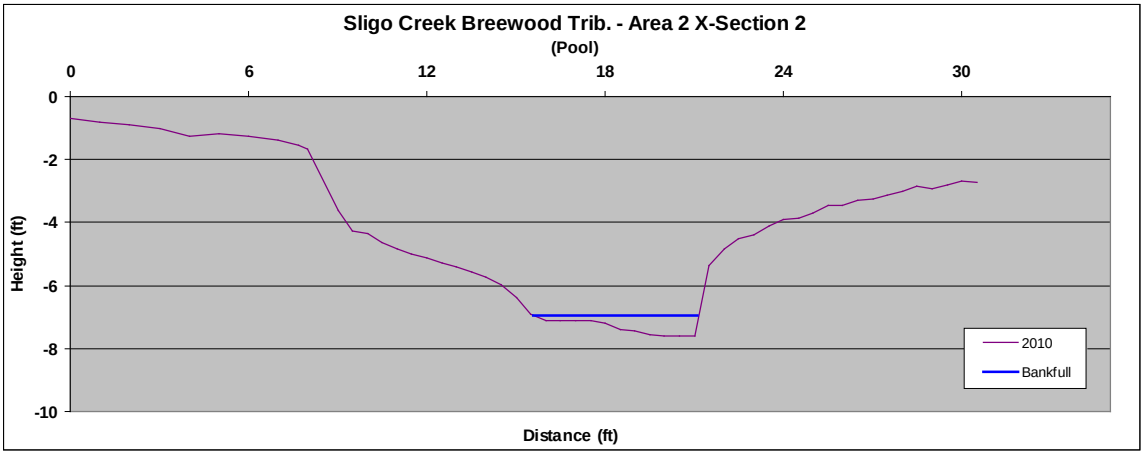


Figure III-H6. Representative Cross Sections From Breewood Tributary, Study Area 2.

Figure III-H7 provides a photograph of a representative cross-section with Study Area 2, demonstrating the severe down-cutting that has occurred in this part of the Breewood tributary.

Figure III-H7. Upstream View of Sligo Creek, Breewood Tributary, Study Area 2- Cross Section 1.

Summary of Biological and Physical Monitoring:
The 2010 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

Watershed Restoration Project Monitoring:
In addition to the Permit-required monitoring, DEP conducts monitoring of all of its stream restoration projects and some associated stormwater retrofits to determine how future projects will be designed and built to ensure a positive impact on the aquatic ecosystem.

The DEP conducts monitoring beyond the baseline requirements set forth by the regulatory agencies to ensure all project goals are met. During FY11 and FY12, DEP produced summaries of monitoring results from restoration projects located in the Anacostia subwatersheds of Northwest Branch, Paint Branch, and Sligo Creek, and the Rock Creek subwatershed of Lower Rock Creek. These projects are shown Figure III-H9. The summary report *Watershed Restoration Project Monitoring* is also included electronically as Appendix J.

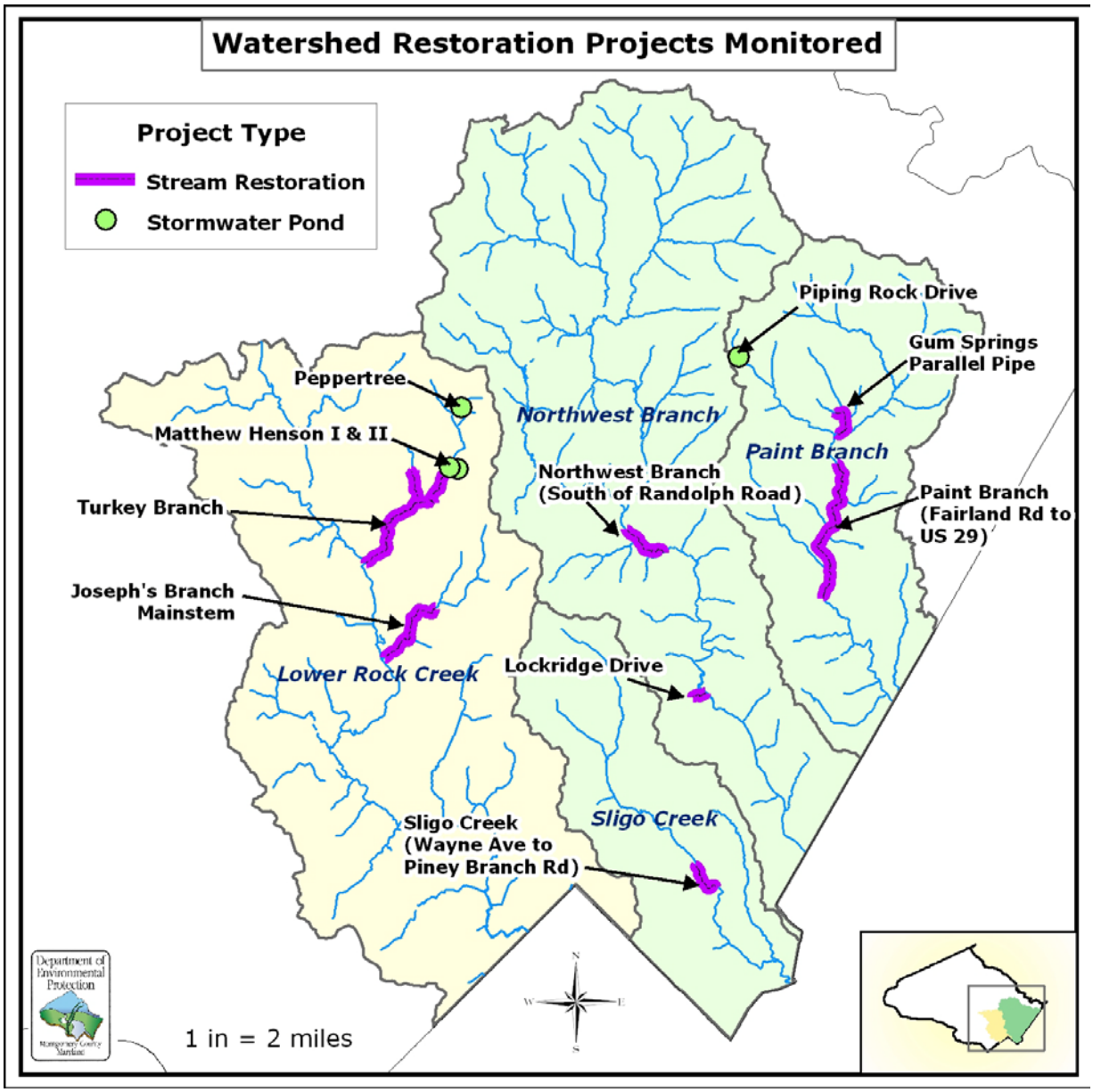


Figure III-H9. Highlighted Watershed Restoration Projects in Montgomery County, MD

Summary of Restoration Monitoring Results:
The DEP'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.

Improving Water Quality and Aquatic Habitat:
Almost all projects that aimed to improve aquatic communities had more difficulty improving the benthic macroinvertebrates than fish. This difference could be related to how benthics are more sedentary and not able to re-colonize as quickly and easily as fish. Sligo Creek has shown a slight improvement in the benthic macroinvertebrate community after more than 10 years of monitoring. The fish community in Sligo Creek improved after restocking of the fish community since there was an identified fish blockage downstream of the restored area.. For certain projects, there may also be more of a design emphasis on creating fish habitat over benthic habitat. Many of the stream restorations focused on deepening over-widened channels and constructing fish habitat. The resulting restored streams were dominated by fish-friendly pool habitat with minimal benthic riffle habitat.

Stabilizing Streambanks:
Most projects were successful in stabilizing stream banks to reduce erosion and sedimentation. However, most projects were limited with how much bank grading could be done in order to avoid impact to stream bank trees.

Mitigating Runoff Temperatures:
Wet pond stormwater facility retrofit projects tended to be more successful mitigating temperature impacts when there was adequate shading. One project, the Gum Springs parallel pipe project in Paint Branch, proved to be very successful at mitigating temperature impacts from the Oak Springs stormwater pond by diverting and cooling the water underground.

Creating Wetlands:
Most of the wetland and amphibian habitat creation projects were very effective in producing straightforward, easily monitored results. Wetlands were typically constructed and planted where there was no existing wetland. Monitoring demonstrated the establishment of wetland plants, soils, hydrology, and amphibians, usually within the first year after construction.

Reforesting Stream Buffers:
Tree plantings were more successful when larger caliper sized trees were planted. In Turkey Branch in Lower Rock Creek, 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.

Conclusions from Restoration Monitoring:
The DEP's watershed restoration monitoring program has evolved since the early 1990's 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. The current approach is to provide 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 did not 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 included in the FY12 MS4 permit annual report.

Table III-H6 presents a brief description of the project monitoring and assessment of effectiveness associated with the Turkey Branch subwatershed restoration. This was one of the two restoration projects required to meet the previous Permit watershed restoration commitments.

Completed: Late Winter, 2007

Project Description: The Turkey Branch Restoration included:
1. Upgrading a stormwater pond (Peppertree Farm),
2. Building two new stormwater ponds (Matthew Henson I and II),
3. Completing 3.6 miles of stream improvements from Georgia Avenue downstream to below Veirs Mill Road where the Turkey Branch subwatershed empties into Rock Creek mainstem.

Goal	Result
Improve aquatic habitat conditions	Partially successful – frequency of riffles improved at all sites; some sites had improved fish and benthic habitat and others had a decline.
Improve water quality	Partially successful – increasing trend in the fish community, general declining trend in the benthic macroinvertebrate community.
Avoid introduction of new thermal impacts	Partially successful – no thermal impacts were observed downstream of Matthew Henson I or Peppertree stormwater ponds but were observed downstream of Matthew Henson II.
Reduce stream erosion and sedimentation	Unable to determine - monitoring delayed until 2011 due to missing survey monuments. Results will be available in 2011 reporting.
Reduce erosive stream flows	Unable to determine - monitoring delayed until 2011 due to missing survey monuments. Results will be available in 2011 reporting.
Create wetlands	Successful - open water, emergent and scrub shrub wetlands now exist in the restoration area that was previously open field
Reforest riparian zone	Partially successful – trees have been planted and allowed to grow in the restoration area that was previously sparsely vegetated; however, many plantings have died and most planted areas have extensive invasive species present.

Photos & Figures

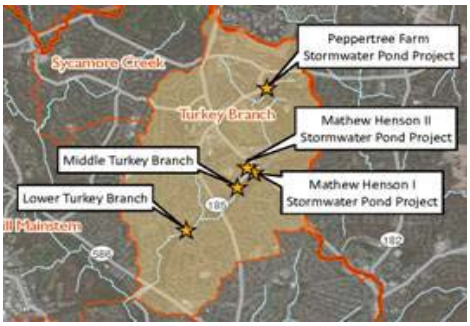


Figure 1 - Turkey Branch Restoration Locations

Figure 2 - Peppertree Farm Stormwater Pond (2009)

Figure 3 - Reforestation in Turkey Branch

Table III-H6. Turkey Branch Subwatershed Restoration - Summary of Project Goal Results

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 a proposal to monitor within a developing area of the Clarksburg Special Protection Area (SPA). Specific requirements include an annual stream profile and survey of permanently mounted cross-sections, and comparison to baseline conditions.

To meet the Permit requirements, DEP established monitoring stations in two drainage areas; a "positive control" where the drainage area will remain mostly forested and a "test area" where development is occurring 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 Sopers Branch to the Little Bennett Creek (LBSB101). Monitoring follows the methods as described in the County's 2003 NPDES Report, attached to this report as Appendix K. Figure III-H10 shows the locations of these two areas and their contributing drainage areas. In Figure III-H10, the control area is shown in yellow and labeled "Sopers Branch". The test area is shown in red and 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 twice 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) and fish are monitored during the summer index period (June 1 through October 31).

Figure III-H10 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 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 United States Geological Survey (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.

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, and 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 possible using traditional aerial photography.

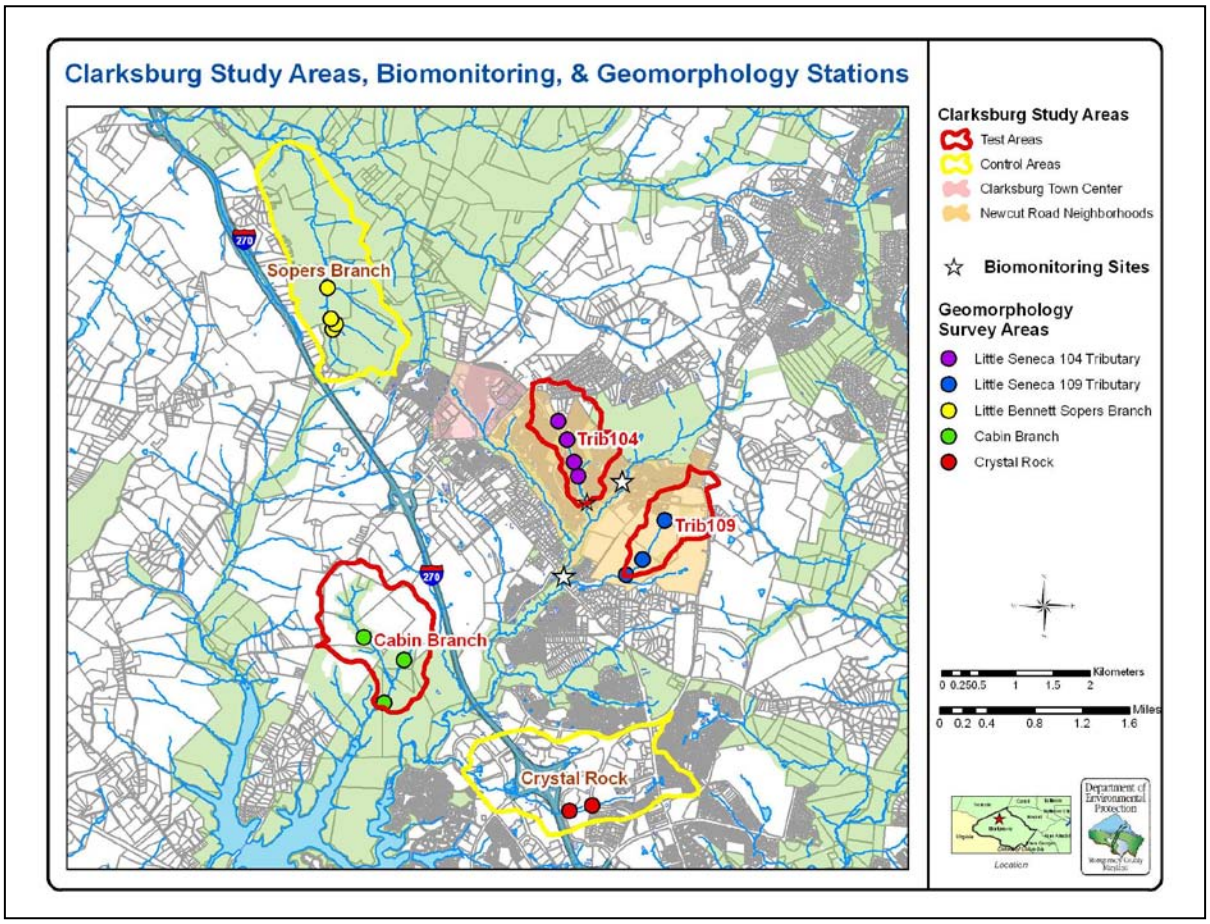


Figure III-H10. Location of the Clarksburg Monitoring Partnership three test areas and two control areas. Also included are biological monitoring stations and geomorphic survey locations.

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 development is completed, and ESC structures have been mostly converted to SWM structures. The Clarksburg Village Phase I development is currently transitioning from construction to post construction with many properties largely stabilized, and ESC structures being converted to SWM structures. There is a small portion of the test area at the downstream end that was undergoing new construction in 2010. The land composition in the control area (Sopers Branch) drainage catchment remained unchanged.

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-H7

Table III-H7 Descriptions of the Five USGS Stream Gages in the Clarksburg Study Area.

Gage Id. Number	Name	Date Started	DA (mi^2)	DA (acres)	Closest Test or Control Area
01644371	Newcut Road Neighborhood tributary to Little Seneca Creek Near Clarksburg, MD ("Test Area")	5/2004	0.43	275.2	Test Area (LSLS104)
01643395	Sopers 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

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 in Sopers Branch. The data collected provides statistics on pattern and amount of rainfall, storm durations, storm mean intensity, and storm peak intensity.

Annual runoff from stream gages in the test area (USGS gage 01644371) and the Sopers Branch control area (USGS Gage 01643395) was compared to rainfall data from the Cabin Branch and Sopers Branch rain gages to determine how much average annual precipitation infiltrates into the groundwater or is released into the atmosphere through evapotransporation 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 and 2010. Water Years cover the period from October 1 of one year to September 30 of the next year. The 2010 USGS Water Data Report for the two stream gages will be provided in the 2010 Special Protection Area Report; Technical Appendix for Chapter 4- Stream Characteristics. The report and Technical Appendices 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. In this report, we have evaluated TOC during the construction period in the test area (USGS Water Years 2008, 2009, and 2010). When the conversion process to SWM BMPs has been completed, TOC will be evaluated to determine if the test area (LSLS104) response to rainfall has changed compared to the Sopers Branch control area. Table III-H8 shows the TOC for the developed test area (LSLS104) stream gage and the Sopers Branch control area (LSLB101) stream gage.

Table III-H8. Time of Concentration in Minutes for Water Years 2008-2010

	Sopers Branch Control Station (LSLB101)	**Test Station (LSLS104))**
Mean	149	69
Max	1045	550

During three years of the construction period (October 1, 2007 thru September 30 2010), the TOC was evaluated at the Sopers Branch control area stream gage (LSLB101) and at the test area stream gage (LSLS104). On average, the test area tributary responded twice as fast as the Sopers Branch control area for the same range of storms exceeding ½" of rainfall (see Figure III-H11).

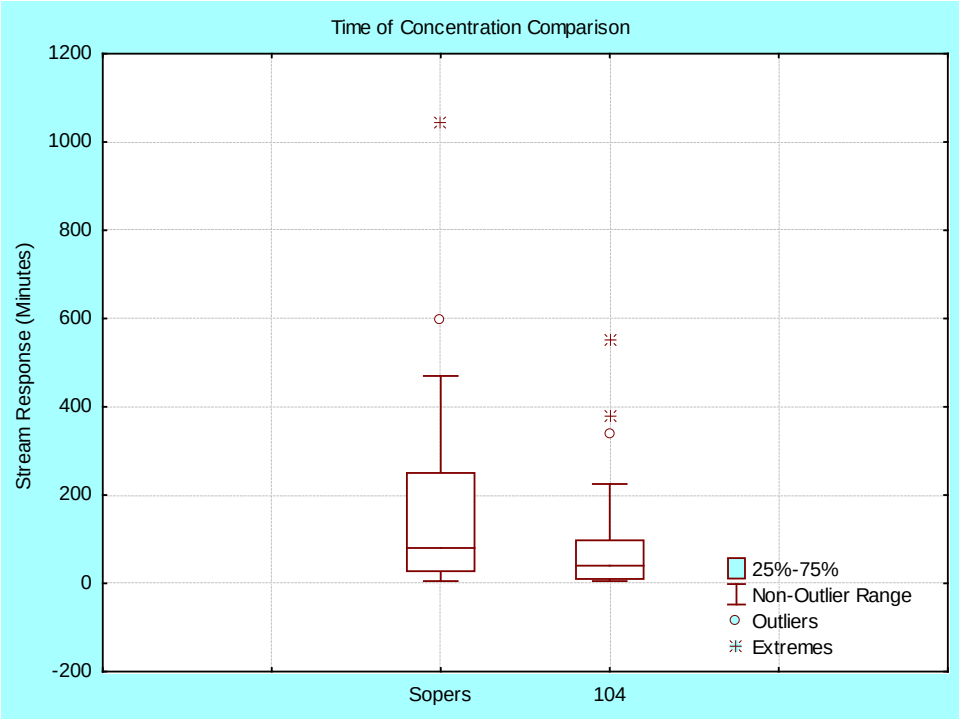


Figure III-H11. Comparison of Time of Concentration (TOC) at the Sopers Branch control area stream gage and at the test area (LSLS104) stream gage for rainfall greater than 1/2" in 24 hours.

Stream Geomorphology Monitoring:

Figures III-H12A and B provides survey locations for the stream geomorphology monitoring in the test area tributary and in the Sopers Branch 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.

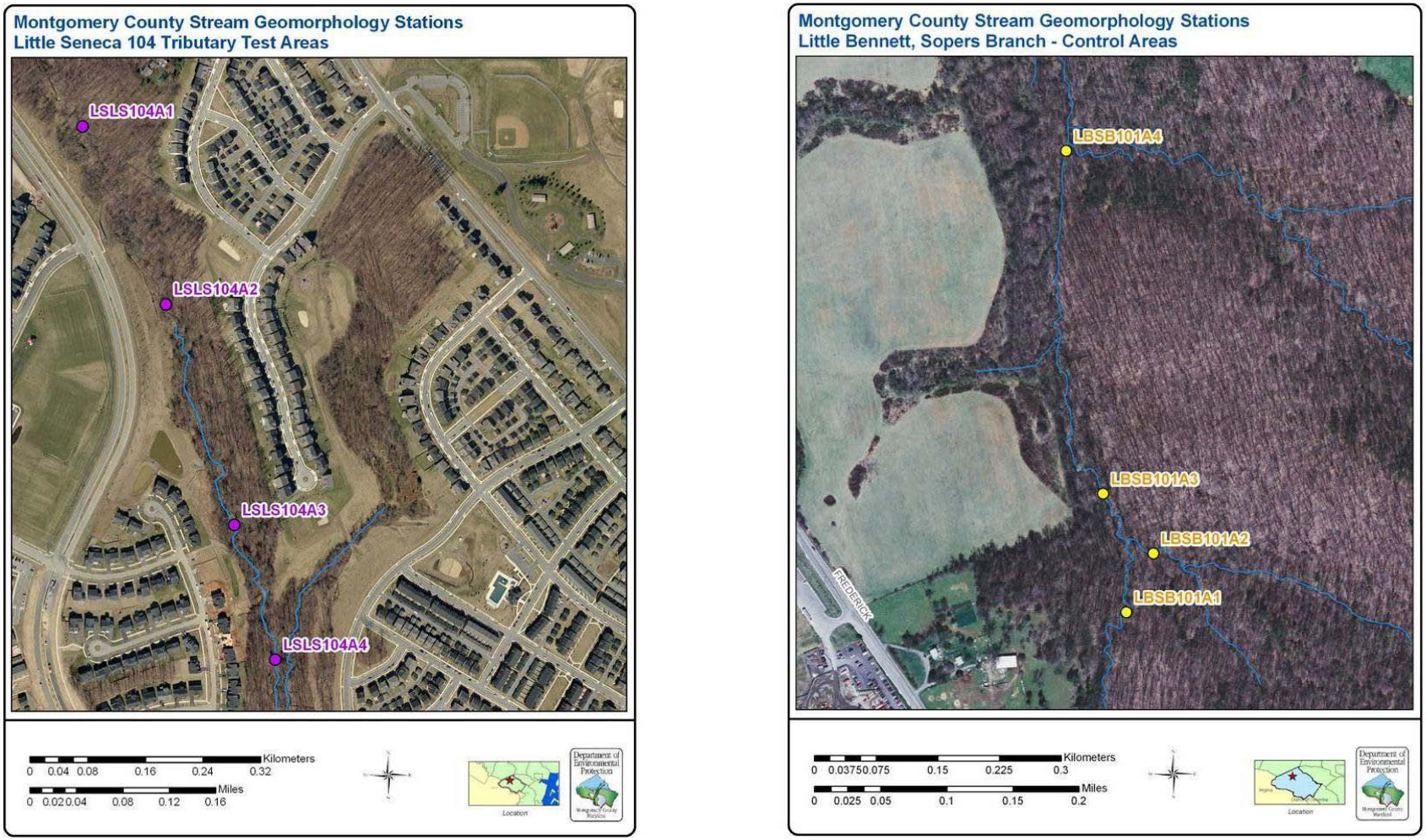


Figure III-H12. Geomorphology Survey Locations: Newcut Road Neighborhood Tributary to Little Seneca Creek Test Area (A), Sopers Branch Control Area (B)

Data Analysis and Interpretation:

As development alters an area's surface hydrology, rainfall infiltration decreases, and stormwater runoff increases 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-H9 summarizes sinuosity indices and survey information for the test area (LSLS104) and the Sopers Branch control area (LBSB101). Data are shown for the furthest downstream areas where surveys were taken 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. Sinuosity indices for the test area reveal the stream has straightened over time (ratios went from 1.4 to 1.0 in just four years). This would be consistent with the increased annual runoff from that tributary shown in the previous section on hydrology. In 2009 and 2010, increased sinuosity was documented, possibly in response to the stabilization of this area as land development activities decreased. The sinuosity of Sopers Branch control area 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.

Table III-H9. Sinuosity indices and survey information for Newcut Road Tributary to Little Seneca Creek test area (LSLS104) and Sopers Branch control area (LBSB01), Data are shown for furthest downstream areas within each test and control.

	Sinuosity						
Year	'03	'04	'05	'06	'07	'09	'10
Test Area (LSLS104) A4	1.4	1.4	1.3	1.0	1.0	1.2	1.3
Control Area (LBSB101) A4	1.1	1.1	1.0	1.2	1.2	1.1	1.2

	Total Longitudinal Slope (%)						
Year	'03	'04	'05	'06	'07	'09	'10
Test Area (LSLS104) A4	1.3	1.3	1.3	1.3	1.4	1.4	1.4
Control Area (LBSB101) A4	1.1	0.9	1.5	1.4	1.4	1.5	1.2

	D50 (mm)						
Year	'03	'04	'05	'06	'07	'09	'10
Test Area (LSLS104) A4	8.2	5.7	5.7	7.1	8.5	14	20
Control Area (LBSB101) A4	16	0.062	8.7	14	9.2	0.062	0.062
	Particle						
Year	'03	'04	'05	'06	'07	'09	'10
Test Area (LSLS104) A4	Med. Gravel	Fine Gravel	Fine Gravel	Fine Gravel	Med. Gravel	Med. Gravel	Coarse Gravel
Control Area (LBSB101) A4	Coarse Gravel	Silt/ Clay	Med. Gravel	Med. Gravel	Med. Gravel	Fine Gravel	Fine Gravel

Cross sections from the test area (LSLS104) illustrate this process in Figure III-H13. 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 2010 as the test area (LSLS104) neared final elevations and stabilization (Figure III-H13). 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 Sopers Branch control area showed little yearly change (Figure III-H14).

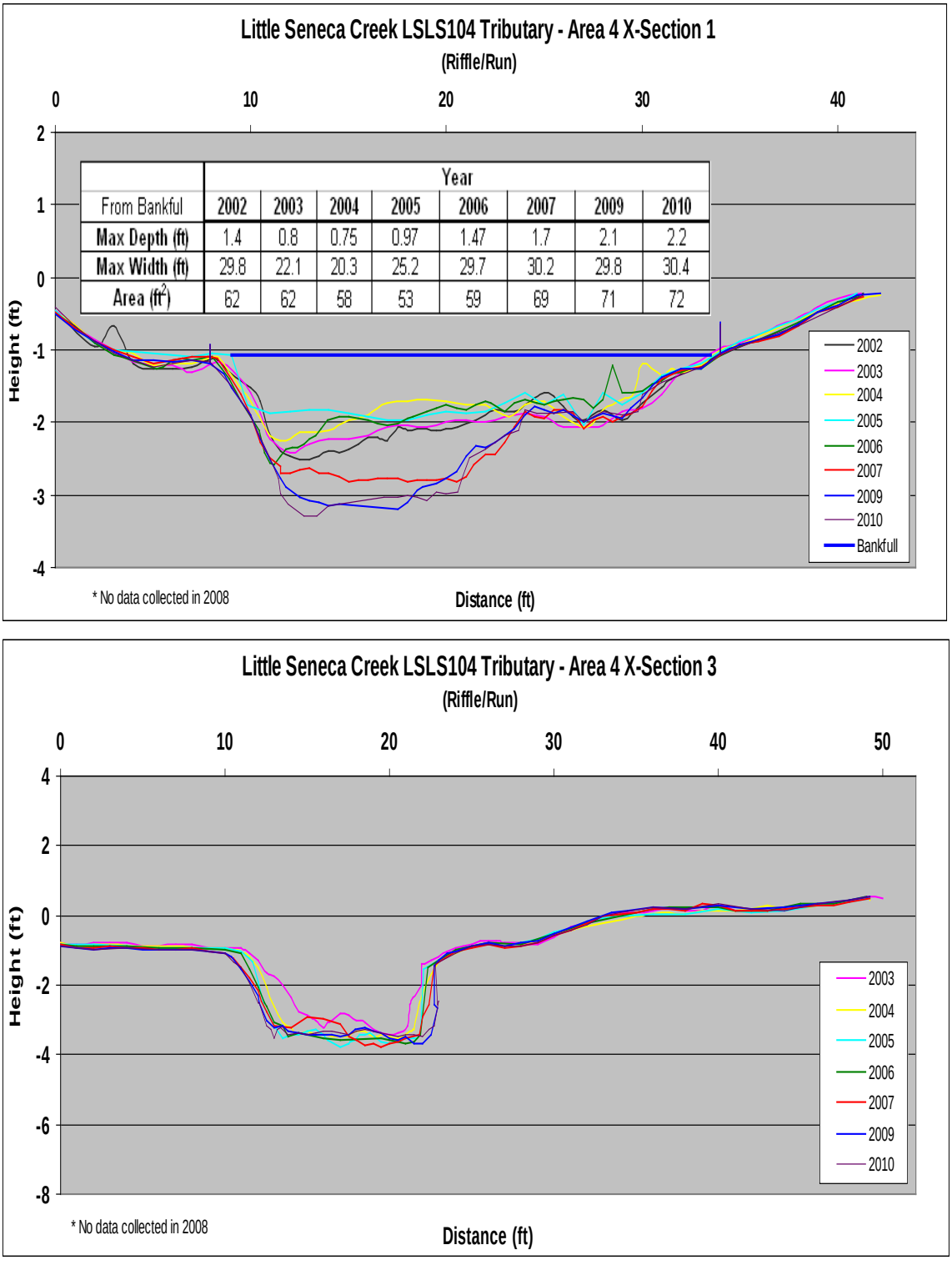
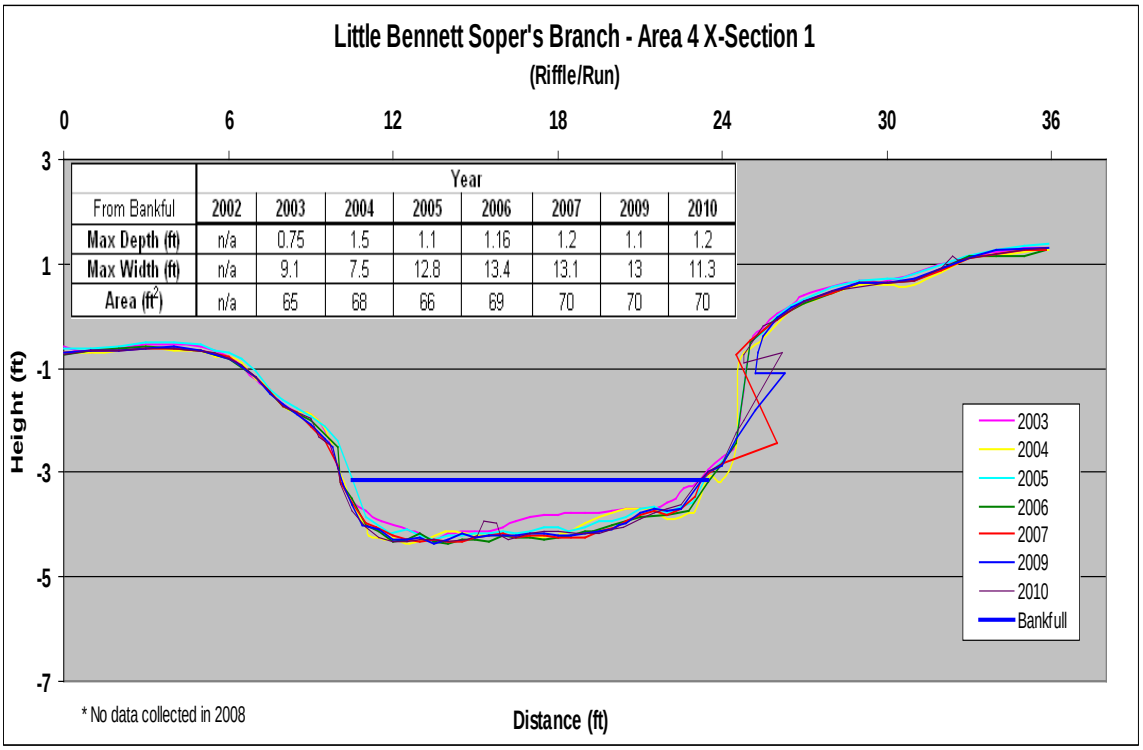


Figure III-H13. Representative cross sections from the Newcut Road Neighborhood tributary to Little Seneca creek test area (LSLS104), cross section location 4(most downstream location). Cross sections are both measured in Riffle/run features.



	Year							
From Bankful	2002	2003	2004	2005	2006	2007	2009	2010
Max Depth (ft)	n/a	0.75	1.5	1.1	1.16	1.2	1.1	1.2
Max Width (ft)	n/a	9.1	7.5	12.8	13.4	13.1	13	11.3
Area (ft^2)	n/a	65	68	66	69	70	70	70

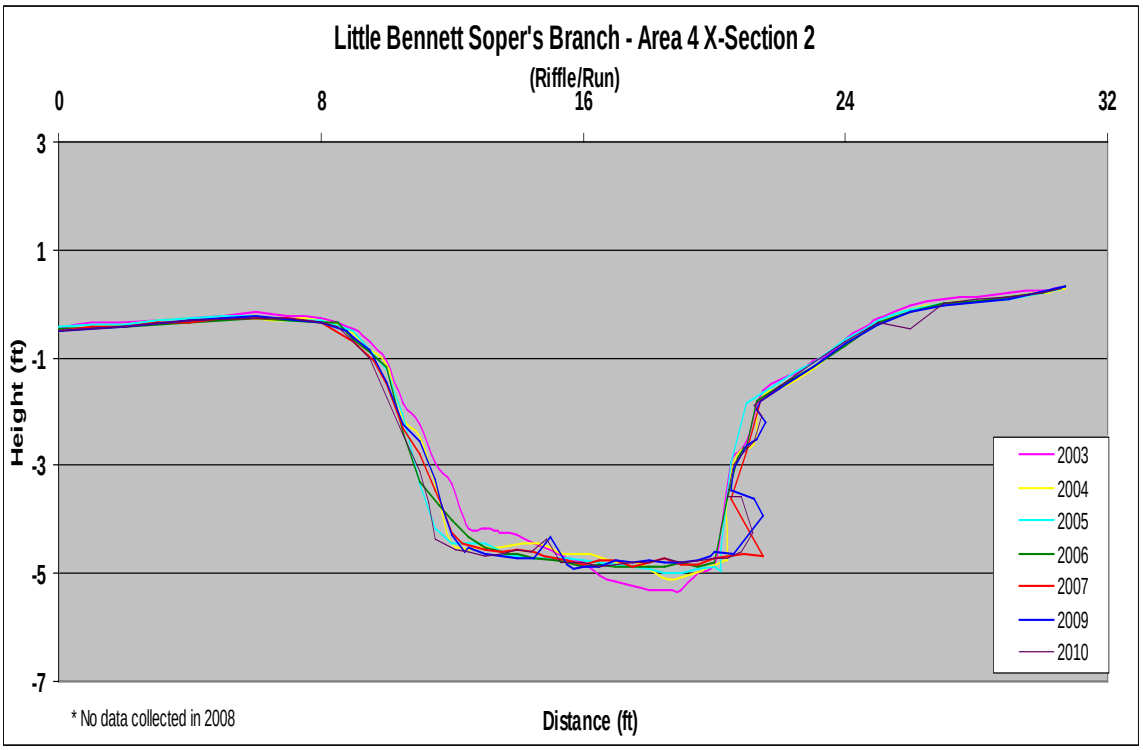


Figure III-H14. Representative cross sections from the Sopers Branch control area, cross section location 4 (most downstream location). Cross sections both measured in Riffle/run features.

Figure III-H15 shows results of longitudinal profiles, looking parallel to the stream channel, for the test area (LSLS104). 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 continue to increase in response to changes in hydrology. An examination of the percent of riffle/run to percent pool at the test and the control sites revealed no observable trends.

Results presented herein are preliminary as the ESC control devices have not all been converted to SWM structures and therefore post-construction monitoring is not completed. However, from the preliminary results, it appears that the construction phase of development has impacted the test area (LSLS104) tributary channel morphology due to channel straightening, down-cutting, and enlargement.

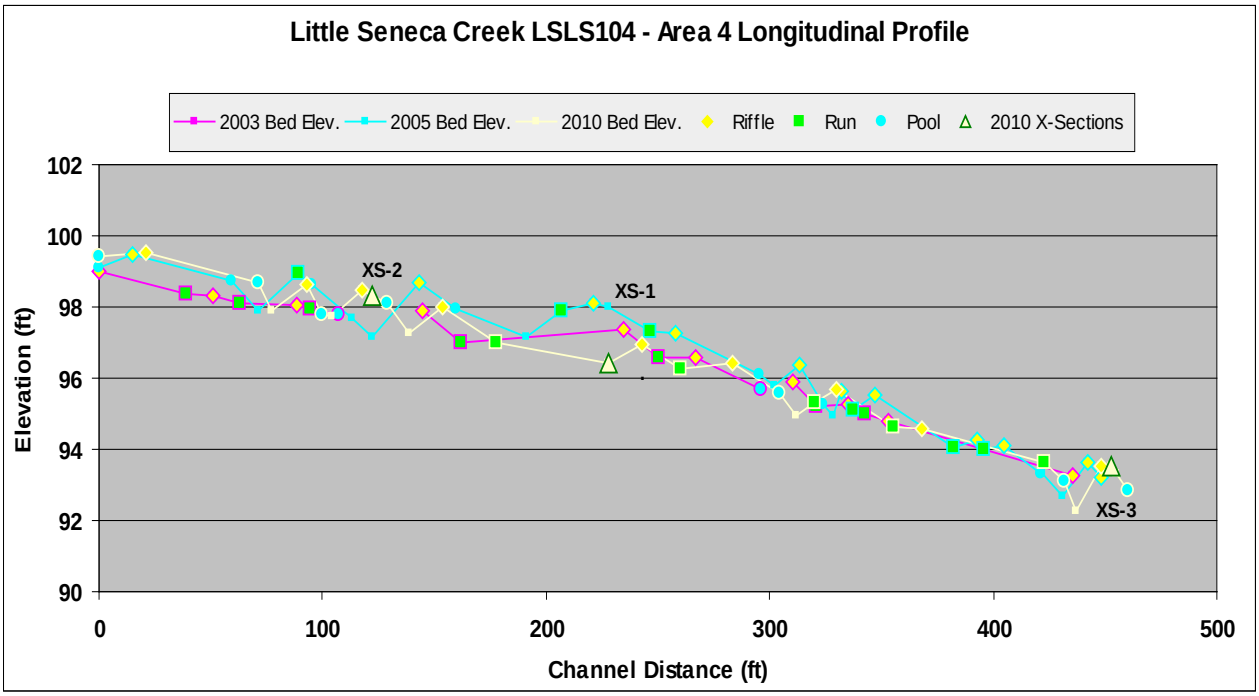


Figure III-H15. Longitudinal profiles Newcut Road Neighborhood tributary to Little Seneca creek test area(LSLS104) cross section location 4 (most downstream location).

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 Section Part IV Attachment A, MDENPDES11.mbd, Parts A-L. The required database is included in electronic format in Appendix A, MDENPDES11.mbd, Part L. Fiscal Analysis. A discussion of the CIP budget for stormwater management including watershed assessment and restoration is presented in Section III.G Watershed Restoration.

During FY11, the reported total funding associated with Permit requirements was $30,097,236.63. This includes an estimate for trash and litter management based on FY10 numbers because comparable FY11 numbers were not readily available. It does not include operational DOT and DGS costs associated with property management, because these agencies do not have a way to separate out these specific costs from their other operating costs. As a comparison, the total budgeted in FY10 was $27,415,836, with an increase of 9.7%.

Table III-I1. Total Funding for County MS4 Related Programs By Fiscal Year (in 000s).

Fiscal Year (FY):	FY10	FY11
Total Budgeted	$27,415	$30,097
Increase between fiscal years		9.7%

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 submitted with this report 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 2011.

Table III-J1 – County Watersheds with impairments and EPA approved TMDLs

Table III-J1.

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 inclde repeated Outreach and Education costs beyond FY2015
2. Does not include an inflatoin multiplier

The Permit requires a public participation component for the implementation plans. The DEP provided information on the draft Strategy at an April 2011 public meeting. There was a 30 day comment period. Public comments and County response are posted on the County website at:
http://www.montgomerycountymd.gov/content/dep/downloads/mastercommentscompilednov2011.pdf

The MDE approved the Strategy in June 2011. The approval letter can be found attached to this report as Appendix B. The County will 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 have been included on CD in Appendix C. These are also publicly available on the DEP website at:
http://www.montgomerycountymd.gov/dectmpl.asp?url=/content/dep/water/wris.asp#plans

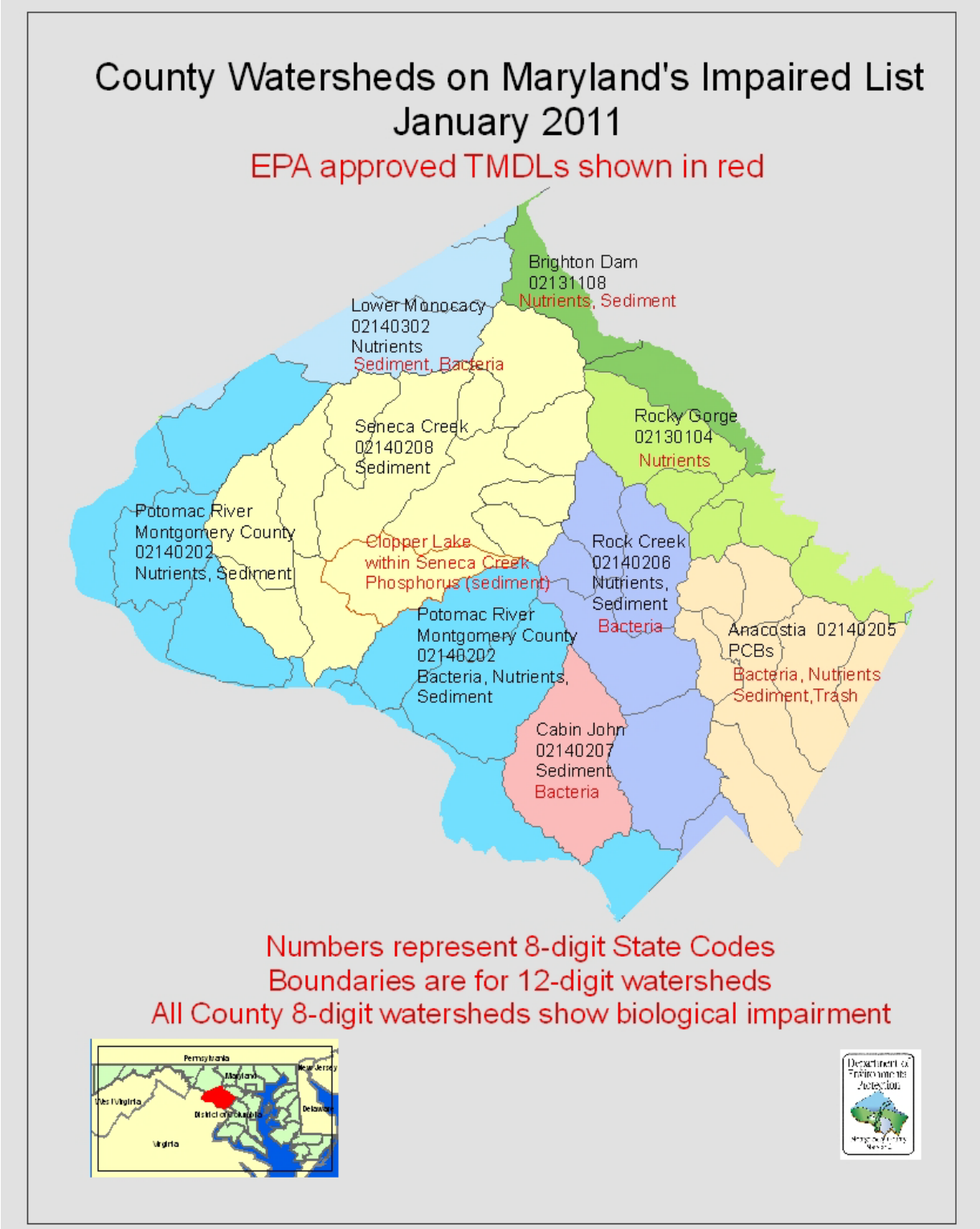


Figure III-J1. County Watersheds with impairments and EPA approved TMDLs.

TMDLs Issued Since June 2009:

Lower Monocacy Watershed:
The EPA approved a TMDL for bacteria (E.coli) for the Lower Monocacy Watershed in December 3, 2009. The Lower Monocacy Watershed Implementation Plan submitted with the Strategy does not contain an implementation plan for bacteria since EPA approval occurred after work began on the Strategy. The bacteria TMDL implementation plan has not been developed because of that watershed's low priority for restoration. The watershed has only a small amount of land area under the County's MS4 Permit area (10%) and only 8% impervious with excellent to good existing stream biological and habitat conditions. There are other County areas with more immediate stormwater retrofit needs and EPA approved TMDLs, including the Patuxent and Seneca Creek watersheds.

Seneca Creek, Rock Creek and Cabin John Watersheds:
EPA approved sediment TMDLs for the Seneca Creek, Rock Creek, and Cabin John Watersheds on September 20, 2011. The County will revise the watershed implementation plans by September 2012 for Rock Creek and Cabin John watersheds to reflect the MS4 WLAs for sediment. For Seneca Creek, the existing Strategy reflects a combination of the Great Seneca Creek implementation plan and the Dry Seneca and Little Seneca Pre-Assessment. During FY12, the DEP will work to complete a unified Seneca Creek Watershed Assessment which will address the sediment MS4 WLA.

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

Septic systems represent nitrogen and, potentially, bacteria sources to streams and other water bodies. As part of the Chesapeake Bay WIP development, the County is evaluating the Countywide septic allocations and considering what strategies would be cost-effective to reduce those loads. During FY11, the DEP convened an initial meeting with those agencies involved in planning and permitting septic systems in the County (DEP, DPS, and the Health Department) to begin gathering data on numbers of systems to compare with Chesapeake Bay Program assumptions.

Based on preliminary review of County data, there are approximately 15,321 properties with septic systems. The MAST estimates show approximately 31,913 properties on septic. The County is moving forward to determine why there is such a difference in the MAST estimates and the extent of resources necessary and potential sources of funding to develop a comprehensive approach to address issues associated with County septic systems.

PART V. SPECIAL PROGRAMMATIC CONDITIONS

A Tributary Strategy

The DEP agreed to serve as the local liaison for scheduling meetings related to Maryland's WIP process. The DEP organized two public information meetings (April 2011 and October 2011) on the WIP process and local involvement. Information presented and attendees at the two public information meetings are posted at:

http://www.mde.state.md.us/programs/Water/TMDL/TMDLImplementation/Pages/MontgomeryTeam.aspx

On September 14, 2011, the MDE provided the loads allocation by source necessary for the Montgomery County stakeholders to begin next steps in developing the Phase II WIP. The DEP agreed to compile and submit to MDE a joint document which included the County's implementation plan and those for the four MS4 Phase 2 permittees in the County. These are the cities of Gaithersburg, Rockville, Takoma Park, and the MNCPPC-Department of Parks.

The County submitted the **Montgomery County MD MS4 Phase I/ II WIP Contributions** to MDE on November 18, 2011. The County's portion of the WIP is based on the Strategy submitted to MDE on February 15, 2011. More details on the County Phase II WIP will be provided in the FY12 Permit annual report. The Strategy was developed to achieve the stormwater nutrient reductions published in the Maryland Phase I WIP. The Strategy shows that the County can achieve the MD Phase II WIP nutrient reductions for 70% implementation by the year 2017 and 100% implementation by the year 2020 The report is posted on the State's web site at:

http://www.mde.state.md.us/programs/Water/TMDL/TMDLImplementation/Pages/WIPPhaseIICountyDocuments.aspx

B. Comprehensive Planning

The Permit requires the County to "cooperate with the Maryland National Capital Park and Planning Commission (Commission) during the development and completion of the Water Resources Element (WRE) of the Commission's comprehensive land planning process as required by the Maryland Economic Growth, Resource Protection and Planning Act of 1992 (Article 66B, Annotated Code of Maryland)". The County was an active partner during the development of the WRE Functional Plan, providing data and technical review for the water, wastewater, and stormwater requirements. The WRE Functional Plan was approved and adopted by the Montgomery County Planning Board in September 2010. The report is available in electronic format at:

http://www.montgomeryplanning.org/environment/water_resources_plan/documents/WaterResourcesfunctionalplan_web.pdf

The County has continued its cooperation with the MNCPPC through the interagency workgroup for the Permit-required evaluation of County codes to assure 'ESD to the MEP' and during the development of local ordinance changes to meet the requirements of the State's Stormwater Management Act of 2007. The County agencies are routine participants for review and comment as Sector Plan and Master Plan documents are being developed.

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