



**Municipal Separate Storm  
Sewer System**  
NPDES Permit No. DC0000221

**2011 & 2012  
DC MS4 Annual Report**



Prepared by:  
District Department of the  
Environment



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## List of Acronyms and Abbreviations

AFF	Alice Ferguson Foundation
AFV	Alternative Fuel Vehicle
Army Corps	U.S. Army Corps of Engineers
AWS	Anacostia Watershed Society
Bag Law	Anacostia River Clean Up and Protection Act
BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSS	Combined Sewer System
CWA	Clean Water Act
DCHA	District of Columbia Housing Authority
DCMR	District of Columbia Municipal Regulations
DCPS	District of Columbia Public Schools
DCRA	Department of Consumer and Regulatory Affairs
DC Water	District of Columbia Water and Sewer Authority
DDOE	District Department of the Environment
DDOT	District Department of Transportation
DGS	Department of General Services
District	District of Columbia
District Government	Government of the District of Columbia
DMPED	Deputy Mayor for Planning and Economic Development
DOD	Department of Defense
DOH	Department of Health
DPR	Department of Parks and Recreation
DPW	Department of Public Works
DRES	Department of Real Estate Services
Enterprise Fund	Stormwater Permit Compliance Enterprise Fund
EPA	United States Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FY	Fiscal Year (October–September)
GAO	Government Accounting Office
GAR	Green Area Ratio
GIS	Geographic Information System
GPS	Global Positioning System
GRHC	Green Roofs for Healthy Cities
GSA	General Services Administration
HWD	District Department of the Environment Hazardous Waste Division

IPM	Integrated Pest Management
LID	Low Impact Development
MWEE	Meaningful Watershed Education Experience
MOU	Memorandum of Understanding
MS4	Municipal Separate Storm Sewer System
NEEF	National Environmental Education Foundation
NOI	Notice of Infraction
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NWS	National Weather Service
OCC	Office of the Clean City
OCTO	Office of the Chief Technology Officer
OP	Office of Planning
OPEFM	Office of Public Education Facilities Modernization
O&M	Operation and Maintenance
Permit	National Pollutant Discharge Elimination System Permit
PROW	Public Right-of-Way
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
S-BMP	Shared Best Management Practice
SRC	Stormwater Retention Credit
SWAP	Stormwater Advisory Panel
SWEEP	Solid Waste Education and Enforcement Program
SWM	Stormwater Management
SWMD	District Department of the Environment Stormwater Management Division
SWMP	Stormwater Management Plan
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TWG	Technical Working Group
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VA	U.S. Department of Veterans Affairs
WLA	Wasteload Allocation
WPCCP	Water Pollution Control Contingency Plan
WPD	Watershed Protection Division
WQD	District Department of the Environment Water Quality Division

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**DISTRICT OF COLUMBIA**  
**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM**  
**MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE PERMIT**

**I. INTRODUCTION**

**A. Background**

The Government of the District of Columbia submits this Annual Report on stormwater pollution control for fiscal years (FY) 2011 and 2012 (October 1, 2010 through September 30, 2011 and October 1, 2011 through September 30, 2012, respectively). This report documents activities required to fulfill the requirements of the District of Columbia's (District's) National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. DC0000221 (Permit), reissued on October 7, 2011, as well as additional activities undertaken by the District's stormwater management program to reduce pollutant loadings from the MS4 to the Potomac and Anacostia Rivers and their tributaries.

The District Department of the Environment (DDOE) compiled this report with assistance and input from the District of Columbia Water and Sewer Authority (DC Water), the Department of Public Works (DPW), the District Department of Transportation (DDOT), the Office of Planning (OP), and the Department of General Services (DGS).

**B. Permit Administration**

DDOE was designated by the District Department of the Environment Establishment Act of 2005, D.C. Official Code 8-151.01 *et seq*, as the MS4 Permit Administrator and assumed this responsibility in February of 2007. On February 13, 2009, the District submitted to the United States Environmental Protection Agency (EPA) Region III an application for renewal of its MS4 Permit. A draft of the District's next MS4 Permit was issued on April 19, 2010. The District submitted comments on the draft MS4 Permit for EPA's consideration on June 20, 2010. The final permit was issued on October 12, 2011 and became effective on January 22, 2012. On November 9, 2012, EPA finalized limited modifications to the MS4 Permit to (1) provide additional public notice and input on the permittee's development of the Consolidated Total Maximum Daily Load (TMDL) Implementation Plan; (2) clarify and provide accountability for specific water quality-related outcomes, specifically on the content and timelines for the Consolidated TMDL Implementation Plan; (3) clarify that the District is the sole permittee; and (4) clarify that the District needs to notify the public of a sanitary sewer system overflow.

Read more about DDOE's stormwater permit at the following links:

- MS4 Permit Administration, <http://ddoe.dc.gov/service/separate-storm-sewer-system-ms4-permit>
- MS4 Permit, [http://www.epa.gov/reg3wapd/pdf/pdf\\_npdes/stormwater/DCMS4/FinalPermit2011/DCMS4permit2011.pdf](http://www.epa.gov/reg3wapd/pdf/pdf_npdes/stormwater/DCMS4/FinalPermit2011/DCMS4permit2011.pdf)
- Final Signed Limited Modification to the DC MS4 Permit, [http://www.epa.gov/reg3wapd/pdf/pdf\\_npdes/stormwater/DCMS4/MS4FinalLimitedModDocument/FinalSignedDCMS4LimitedMod%2011\\_9\\_12.pdf](http://www.epa.gov/reg3wapd/pdf/pdf_npdes/stormwater/DCMS4/MS4FinalLimitedModDocument/FinalSignedDCMS4LimitedMod%2011_9_12.pdf)

DDOE has executed independent MOUs with DDOT, DPW, DGS and DC Water. These MOUs require the agencies to implement activities required under the Permit and specify reimbursement amounts for implementation of these activities. Copies of these MOUs are included in Appendices A and B of this report. DDOE also partners with the Department of Parks and Recreation (DPR) and OP to implement Permit activities. An overview of District agency responsibilities for MS4 permit compliance is shown in Table 1.

**Table 1** Agencies Responsible for District MS4 Permit Compliance

Responsible Agency	Compliance Activity
DDOE	MS4 program administration Source identification Wet/dry weather monitoring program Wet weather screening program Flood control projects review Construction management and plan review Pollutant control from hazardous waste sites Pesticide, herbicide, and fertilizer application Promoting LID practices Illicit discharge detection Sediment erosion control Inspection/enforcement
DC Water	Floatables reduction program Pollution prevention Operation and maintenance of sewer infrastructure Catch basin cleaning Illicit discharge detection

Responsible Agency	Compliance Activity
DPW	Street sweeping Seasonal leaf and holiday tree collection program Pollution prevention Household hazardous waste collection Deicing and snow removal Stormwater management at municipal waste transfer stations
DDOT	Pollutant reduction from vehicles and roadways Pollution prevention LID practices in public right-of-way
DGS	LID practices on District-owned properties Pollution prevention
DPR	LID practices in District parks and at District recreation centers Pollution prevention
OP	Planning for neighborhoods, public facilities, parks and open spaces, etc. Urban design and land use review

## 1. Legal Authority

The District developed and maintains the legal authority to control stormwater pollution within the MS4 drainage area.

The legal authority is established by the following laws and regulations:

- MS4 Program Activities: The Comprehensive Stormwater Management Enhancement Amendment Act of 2008, effective July 1, 2009 (D.C. Official Code § 8-151.51 et seq.); the District Department of the Environment Establishment Act of 2005, effective February 15, 2006 (D.C. Law 16-51, as amended; D.C. Official Code §§ 8-151.01 et seq. (2008 Repl. & 2012 Supp.)); the Water Pollution Control Act of 1984, effective March 16, 1985 (D.C. Law 5-188; D.C. Official Code §§8-103.01 et seq.(2008 Repl. & 2012 Supp.)), as amended
- Soil and Sediment Control: The Water Pollution Control Act of 1984, effective March 16, 1985 (D.C. Law 5-188; D.C. Official Code 8-103.07 et seq. (2008 Repl. & 2012 Supp.)); the Soil Erosion and Sedimentation Control Act of 1977, effective Sept. 28, 1977 (21 DCMR §§ 500-507; 21 DCMR §§ 5-11)

- Illicit Discharge and Dumping: The Water Pollution Control Act of 1984, effective March 16, 1985 (D.C. Law 5-188; D.C. Official Code 8-103.07 et seq. (2008 Repl. & 2012 Supp.)), as amended
- Plastic Bag Fee and Enforcement: The Anacostia River Clean-up and Protection Act, effective September 23, 2009 (D.C. Official Code §8-102 et. seq.)
- Coal Tar-Based Pavement Product Ban: Comprehensive Stormwater Management Enhancement Amendment Act of 2008, effective July 1, 2009 (D.C. Official Code § 8-151.81)
- DC Solid Waste Management and Recycling: Title 21 DCMR, Chapter 7, Chapter 8 and Chapter 20

Additional legal authorities are discussed throughout the report where the activities are addressed.

In FY 2011 and FY 2012, no additional laws were added to the legal authority of the District regarding stormwater management (SWM). However, several regulations are in the process of being drafted or finalized. On August 10, 2012, DDOE published for public review and comment the Proposed Rulemaking on Stormwater Management and Soil Erosion and Sediment Control along with the Proposed Stormwater Management Guidebook. An overview of the draft regulations is included in sections II.A.1–II.A.3. On October 5, 2012, DDOE published for public review and comment the Proposed Rulemaking for a Stormwater Fee Discount Program (see section I.B.3). In FY 2012, the District continued to draft regulations for the ban on coal tar. The District continues to enforce the coal tar ban program in the absence of regulations.

## **2. Stormwater Advisory Panel and Technical Workgroup**

The goal of the Stormwater Advisory Panel (SWAP) is to improve water quality of the Anacostia and Potomac Rivers through strategic and collaborative implementation of shared responsibilities under the District's MS4 Permit. This is a cabinet-level group of District agencies with stormwater management responsibilities. DDOE is required to convene this group by the Comprehensive Stormwater Management Enhancement Amendment Act of 2009. SWAP provides a forum for coordinating agency stormwater responsibilities and executive decision-making to overcome obstacles and resolve disputes. The group is required to meet at least twice per year. The dates and attendance for the 2011 and 2012 SWAP meetings are shown in Table 2. DDOE will host the next SWAP meeting early in calendar year 2013.

In addition to SWAP meetings, the Technical Workgroup (TWG) is required to meet monthly to provide ongoing, staff-level coordination on stormwater issues.

**Table 2** Stormwater Advisory Panel Meeting Attendance

	FY 2011 Attendance	FY 2012 Attendance	
Members	September	December	June
DDOT	3	5	6
DC WATER	3	3	3
DDOE	9	10	12
OP	2	2	2
DPW	1	1	1
DPR	1	1	1
DGS	4	2	1
OCA	2		2

### 3. Program Funding and Implementation Costs

#### Funding Sources

The District's Stormwater Permit Compliance Amendment Act of 2000 requires each agency to budget and fund costs for stormwater management activities that they were required to carry out prior to April 20, 2000. Those agencies continue to budget and fund those stormwater management activities listed in Table 1.

In addition, the District's Stormwater Permit Compliance Amendment Act of 2000 established a Stormwater Permit Compliance Enterprise Fund (Enterprise Fund) to provide revenue to implement and administer activities directly required by the MS4 Permit. This law also requires District agencies to maintain budget allocations that support current levels of effort for activities that control pollution from stormwater discharges from the MS4. This funding is derived from each agency's general obligation budget.

Implementation of the budgeted activities substantively fulfills the requirements of the Permit. DDOE will continue current activities to manage stormwater pollution and encourage improved stormwater management techniques.

#### Stormwater Fee and Discount Program

DDOE, as a requirement of the Comprehensive Stormwater Enhancement Amendment Act of 2008, is in the process of establishing a Stormwater Fee Discount Program for District of Columbia Water and Sewer Authority (DC Water) customers. This program will provide discounts to the stormwater fee that appears on the customer's DC Water bill.

Through the MS4 Permit, EPA requires the District to minimize and treat its stormwater to protect the Anacostia and Potomac rivers, their tributaries, and the Chesapeake Bay. In

order to fund the program that responds to this requirement, the District charges each customer a stormwater fee, calculated monthly, that is based on the impervious surface area of their property.

The proposed discount program, known as RiverSmart Rewards, would apply to existing, retrofitted, and newly-constructed best management practices (BMPs) that reduce stormwater runoff from residential and non-residential properties. Discounts would be granted for periods of three years, as long as the customer maintains eligibility. The stormwater fee discount rule (58 DCR 6428) was published on July 29, 2011 for a public comment period that ended on September 16, 2011. DDOE received detailed comments from eleven stakeholder organizations and individuals. Upon review of these comments, DDOE made changes to the first proposal to clarify aspects of the stormwater fee discount program and DDOE's intent for how the program will operate. A second version of the rulemaking was published on October 5, 2012 for a public review and comment period that closed on November 19, 2012. Once the stormwater fee discount program rule is finalized, DDOE will begin to implement the program.

For information on the Stormwater Fee structure, visit  
<http://ddoe.dc.gov/service/changes-districts-stormwater-fee>.

#### The Anacostia River Clean Up and Protection Fund

The Anacostia River Clean Up and Protection Act (Bag Law) requires all District businesses selling food or alcohol to charge \$.05 for each disposable paper or plastic carryout bag. The law allows businesses to keep \$.01 (or \$.02 if it offers a rebate when customers bring their own bag), and the remaining \$.03 or \$.04 is deposited into a dedicated fund, the Anacostia River Clean Up and Protection Fund. This fund is used to implement watershed education programs, stream restoration, trash retention projects, and to purchase and distribute reusable bags for District residents. Tables 3 and 4 summarize Anacostia River Clean Up and Protection Fund revenue and expenditures.

**Table 3** Anacostia River Clean Up and Protection Fund Revenue Summary

Revenue Source	Bag Law Fees	Tax Contributions	Anacostia River License Plate Sales	Bag Law Enforcement Actions	Total
FY 2012 Revenue	\$1,993,183	\$64,118	\$3,484	\$1,059	<b>\$2,061,844</b>



**Table 4** Anacostia River Clean Up and Protection Fund Expenditures

Spending Category	Description	Spending (FY 2011–FY
Grants	Trash capture devices install/ maintain, RiverSmart Homes program, green roofs, education and outreach	\$979,225
Contracts	Stream restoration*	\$501,091
	Bag Law outreach and education, reusable bag distribution	\$680,608
Supplies	Trash cleanup events	\$23,675
Other	Equipment, legal, etc.	\$1,025,140
<b>Total</b>		<b>\$3,209,739</b>

\*Encumbered amount, not fully invoiced

Additional grant awards are in process and should be issued in winter of 2013.

#### Expenditures

The District expends Enterprise Funds and general obligation funds to fulfill its Permit obligations. DDOE budgets Enterprise Funds solely for activities that are specific to Permit compliance. DDOE and other District agencies allocate general funds to complete baseline municipal activities that are necessary to control pollution in MS4 discharges, but are not sufficient to fully comply with the Permit requirements. Enterprise Fund expenditures in FY 2011 and FY 2012 provided for capital construction costs, operation and maintenance (O&M) of structural controls, and programmatic expansion of non-structural controls and programs. Table 5 provides a summary of the Enterprise Fund budget for FY 2013 Permit-required programs.

**Table 5** FY 2013 Enterprise Fund Budget

Permit Section	Topic	FY 2013 Budget
	General MS4 Permit Management	\$1,400,000
4.1	Standard for Long-Term Stormwater Management	\$500,000
4.1	Tree Canopy	\$518,000
4.1	Impervious Surface Retrofits	\$1,500,000
4.1	Green Roofs	\$1,330,000
4.1	Green Landscape Incentives / RiverSmart	\$600,000
4.2	Operation and Maintenance of Stormwater Capture Practices	\$350,000
4.3	Management of District Government Areas	\$800,000
4.3	Enhanced Street Sweeping	\$500,000
4.4	Management of Commercial Institutional Areas	\$550,000
4.5	Management of Industrial Facilities and Spill Response	\$510,000
4.6	Stormwater Management for Construction Sites	\$275,000
4.7	Illicit Discharges and Improper Disposal	\$350,000
4.8	Flood Control Practices	\$150,000
4.9	Public Education and Public Participation	\$225,000
4.10	TMDL Wasteload Allocation Planning and Implementation	\$ 900,000
4.10	Trash TMDL Implementation	\$350,000
5.1	Revised Monitoring Program	\$300,000
5.2	Interim Monitoring	\$550,000
5.3	Monitoring and Analysis Procedures	\$200,000
<b>Total</b>		<b>\$11,858,000</b>

## II. STORMWATER CONTROL MEASURES

This Annual Report delineates the District's FY 2011 and FY 2012 achievements in addressing the required provisions of the Permit. This report cycle covers two reporting periods due to the proximity of reporting dates of the previous and current Permits. Future Annual Reports will contain one full year of data from the previously submitted report.

### A. Standards for Long-Term Stormwater Management

Table 6 includes program elements and strategies the District is required to submit to EPA for review.

**Table 6** Stormwater Management Program Submittal Dates

Element	Submittal Date Required	Submittal Date Actual
Anacostia River Watershed Trash Reduction Calculation Methodology	1 year	01/22/2013*
Tree Canopy Strategy	1 year	01/22/2013
Catch Basin Operation and Maintenance Plan	18 months	Ongoing
Outfall Repair Schedule	18 months	Ongoing
Updated Stormwater Regulations	18 months	Ongoing (submitted to EPA for review on 08/23/2012)
Off-site Mitigation/ Fee-in-Lieu Program	18 months	Ongoing (submitted to EPA for review on 11/06/2012)
Stormwater Management Guidebook	18 months	Ongoing (submitted to EPA for review)
Retrofit Program	2 years	Ongoing
Revised Monitoring Program	30 months	Ongoing
Consolidated TMDL Implementation Plan	30 months	Ongoing
Revised Stormwater Management Program Plan	4 years	Ongoing

\*Found in section II.J of this report.

**Table 7** Numeric Performance Standards and Compliance

Numeric Requirement	Time Period	FY 2012 Achievement
Retrofit 18,000,000 square feet of impervious surfaces	Permit term	698,550 square feet
Retrofit 1,500,000 square feet of impervious surfaces in the transportation right-of-way	Permit term	378,644 square feet
Plant 4,150 trees within the MS4 area (net increase)	Annually	7,846 trees*
Install 350,000 square feet of green roofs on District properties	Permit term	79,137 square feet
Remove 103,188 lbs of trash annually from the Anacostia River	By the fifth year of the permit	90,450 pounds of trash

\*Estimated mortality based on literature review

## **1. Standards for Stormwater Discharges from Development**

In FY 2012, DDOE released a proposed rulemaking to amend chapter 5 (Water Quality and Pollution) of title 21 (Water and Sanitation) of the District of Columbia Municipal Regulations (DCMR), comprehensively amending the stormwater regulations and the soil erosion and sediment control regulations. The proposed rule shifts from the existing regulations' focus on treatment (i.e., filtration) to stormwater retention.

These amendments satisfy the requirements of the Permit, which requires the District to implement a 1.2-inch stormwater retention standard for land-disturbing activities, a lesser retention standard for substantial improvement projects, and provisions for regulated sites to satisfy these standards off site.

On August 10, 2012, DDOE released the District's Proposed Rulemaking on Stormwater Management and Soil Erosion and Sediment Control in the D.C. Register. Soon thereafter, DDOE's Proposed Stormwater Management Guidebook, which provides technical guidance on complying with the requirements in the Proposed Rulemaking, was posted for comments. DDOE accepted comments for 90 days from the date of publication (through November 8, 2012).

To inform stakeholders about the proposed rule and accompanying Guidebook, DDOE hosted numerous training sessions and public hearings. These sessions were held primarily during the 90-day comment period, though some occurred before and after.

The following sessions were held:

- Ten training sessions for the general public on a variety of topics:
  - Achieving stormwater retention performance standards using technical guidance in the Proposed Stormwater Management Guidebook
  - Use of off-site retention by regulated projects to achieve a portion of their stormwater retention volume
  - Generation and certification of tradable Stormwater Retention Credits by sites that exceed their regulatory requirements and by sites that voluntarily retrofit with retention practices
- Ten training sessions for District Agencies
- Three focused training sessions on individual topics:
  - Erosion and sediment control
  - Technical specifications on stormwater best management practices
  - Stormwater Retention Credit trading
- Five meetings to respond to clarifying questions from individual stakeholder groups
- Two public hearings to accept public comments

**FY 2013 Goals:** DDOE continues to reach out to various stakeholder groups to clarify proposed regulations and specifically requested comments and questions from sister agencies, including the Deputy Mayor for Planning and Economic Development

(DMPED), DDOT, DC Water, DGS, the District of Columbia Housing Authority (DCHA), OP, DPR, and DPW. Over the next few months, DDOE will revise the rule to address comments and will reissue a second proposed rule with substantive changes during the spring of 2013. DDOE expects to finalize the rule in July of 2013.

- View information on the Proposed Rulemaking on Stormwater Management and Soil Erosion and Sediment Control at <http://ddoe.dc.gov/proposedstormwaterrule>.
- View information on trainings and training materials at <http://ddoe.dc.gov/node/238942>.

## **2. Code and Policy Consistency, Site Plan Review, Verification and Tracking**

To remove barriers to the implementation of the retention performance standards, the District has drafted and amended environmental legislation and regulations. DDOE has also designed the Stormwater Regulations to work in concert with other sustainability initiatives in the District, including OP's development of Green Area Ratio requirements under the zoning code. Along with code and policy revisions, the District maintains a plan review erosion control program for new construction coupled with a field inspection program to ensure compliance with District erosion control and stormwater regulations.

### International Green Construction Code

The District is moving forward to become one of the first cities in the nation to adopt the new International Green Construction Code, which includes provisions to reduce water consumption, lessen contributions to the city's sewer system, and help to clean up the watershed. The green code will generally apply to all commercial projects and multi-family residential buildings five stories and above, though some specific code sections will only apply to larger projects, new construction, and major renovations.

### Green Building Act

The Green Building Act of 2006 requires all non-residential District public buildings to meet the U.S. Green Building Council's LEED certification standards for environmental performance at the "Silver" level or higher. District-owned or -financed residential projects 10,000 square feet or larger must meet or exceed the Green Communities' certification standard. Beginning January 2012, all new private development projects 50,000 square feet or larger are required to meet LEED certification at the "Certified" level or higher.

### Low Impact and Green Infrastructure Design Standards

DDOT is formulating Low Impact Development (LID) and Green Infrastructure (GI) design standards, including bioretention, permeable pavement, and tree space design. These standards are planned to be complete in FY 2013.

### Low Impact Development Action Plan

DDOT completed the LID Action Plan to identify ways to increase and facilitate LID implementation in DDOT construction projects and public space permit projects.

- View the LID Action Plan at <http://ddot.dc.gov/DC/DDOT/Projects+and+Planning/Environment/Low+Impact+Development>.

### Sustainable DC

In July 2011, Mayor Gray announced Sustainable DC—a planning effort to make the District of Columbia the greenest, healthiest, and most livable city in the nation. OP and DDOE were tasked with leading the Sustainable DC project.

Sustainable DC has engaged people across the city by raising awareness, gathering public input, and involving industry and business leaders. The District will continue outreach efforts until the Sustainable DC project is completed.

In November 2011, Mayor Gray launched nine different public working groups that examined best practices, existing conditions, and public comments to develop key recommendations for the District's first sustainability plan. Over 700 people participated in the working groups throughout the winter of 2011 and 2012 by prioritizing innovative city goals and creating ambitious visions of what the District needs to do over the next 20 years to be sustainable.

In April 2012, the District released *A Vision for a Sustainable DC*, which serves as a framework for a more detailed sustainability plan that will be released in FY 2013. The document is available at <http://sustainable.dc.gov/publication/mayors-vision>. Sustainable DC is the product of extensive public effort and engagement, see Table 8.

**Table 8** Sustainable DC Public Participation

Activity	Number of Participants
Public Meetings and Events	125
Registered email followers	1,600
Active website users	1,100
Unique suggestions submitted online	(more than) 400
Attendees for the Mayor's kick-off meeting	440
Public working groups	9
Working group participants	700
Working group goals and actions	900
<b>Total</b>	<b>5,274</b>

### **3. Off-Site Mitigation and/or Fee-in-Lieu**

The District's Proposed Rulemaking on Stormwater Management and Soil Erosion and Sediment Control will allow regulated sites the option of achieving a portion of their stormwater retention requirement off site, but still within the District, without having to first prove that on-site retention is infeasible. Such sites would have two off-site options: use of Stormwater Retention Credits (SRCs) purchased from the private market or payment of an in-lieu fee to DDOE. To facilitate retention on site, the amendment will also allow a regulated site to exceed the retention requirement in a drainage area ("over-control") in order to compensate for retention that falls short in another drainage area on the site. On-site retention can also be achieved via direct drainage to a Shared Best Management Practice (S-BMP) that may serve multiple sites. Though sites draining into the combined sewer system must retain a minimum volume of stormwater from the entire site, they have the flexibility to over-control without having to meet minimum requirements for retention or treatment in individual drainage areas on the site.

On November 6, 2012, DDOE submitted the District's proposed Off-site Mitigation/Fee-in-Lieu Program to EPA for review and comment. Details of the proposed mitigation program, including administrative forms, are contained in the District's Proposed Rulemaking on Stormwater Management and Soil Erosion and Sediment Control (Section 527, and Sections 530 through 534), and the District's Proposed Stormwater Management Guidebook (Chapters 6 and 7, and Appendices C and D).

- View and download the proposed Stormwater Management Guidebook and Proposed Rulemaking on Stormwater Management and Soil Erosion and Sediment Control at <http://ddoe.dc.gov/proposedstormwaterrule>.

### **4. Green Landscaping Incentives Program**

The District is using a series of stormwater incentive programs to help single-family residential and commercial properties, multi-family residences, schools and churches plan and implement stormwater retrofit projects and increase planted areas.

#### The Green Area Ratio

The Green Area Ratio (GAR) is a proposed zoning initiative from OP that applies science based environmental performance standards to new development or major redevelopment projects. GAR would require lot level development to achieve a GAR score relative to the parcel's zoning code.

DDOE has partnered with OP to support implementation of GAR once it becomes part of the Zoning Regulation. OP and DDOE have worked together for the last year and a half to draft details of the proposed GAR zoning regulation. This process has included technical and administrative edits and comments to the proposed regulation. DDOE has

attended two zoning hearings to advance the GAR. DDOE has met three times this year with OP and DCRA to evaluate and identify changes to the DCRA intake process to accommodate the GAR ruling. DDOE developed an appendix on the GAR for the Proposed Stormwater Management Guidebook. DDOE has defined outreach needs for the GAR and outlined a training/briefing presentation on the GAR.

The District's Zoning Commission approved the GAR for "Proposed Action". In a public hearing on November 5, 2012 the Zoning Commission heard evidence and testimony based on OP's request to adopt the regulation and the proposed GAR ratios for various District zones. The GAR must receive approval for "Final Action" by the Zoning Commission. Approval is expected by the end of January 2013. Once the Zoning Commission provides approval of the "Final Action," there will be 6-month transition period.

#### RiverSmart Homes

The District recognizes the importance of targeting homeowners for pollution reduction measures because residential property is the largest single land use type in the city and is the slowest of all construction areas to be redeveloped. Since 2008, DDOE has been implementing an LID retrofit program aimed at single family homes. The program started with eight demonstration sites—one in each ward of the city. It then expanded to a pilot program in the Pope Branch watershed of the city. The RiverSmart Homes Program is now mature and has been open citywide since summer of 2009.

FY 2011 accomplishments include the following:

- Installed 428 rain barrels
- Planted 729 shade trees
- Installed 66 rain gardens
- Implemented BayScaping at 142 properties
- Installed pervious pavers at 28 properties.
- Conducted 1,176 installation audits

FY 2012 accomplishments include the following:

- Installed 739 rain barrels
- Planted 488 shade trees
- Installed 162 rain gardens
- Implemented BayScaping at 198 properties
- Installed pervious pavers at 23 properties.
- Conducted 1,040 installations audits

Stormwater volume reductions and pollutant load reductions are found in Table 9.

- View information on the RiverSmart Homes Program at <http://ddoe.dc.gov/riversmarthomes>.



**Table 9** RiverSmart Homes Stormwater Volume Reductions

Fiscal Year	RiverSmart Homes Practice	Number Installed	Impervious Surface Retrofitted (square feet)	Runoff Retained (gallons)
2011	Rain Barrels <sup>1</sup>	428	89,880	1,506,339
	Rain Gardens <sup>2</sup>	66	29,700	497,756
	Pervious Pavers <sup>3</sup>	28	12,600	211,169
<b>Total</b>		<b>522</b>	<b>132,180</b>	<b>2,215,264</b>
2012	Rain Barrels <sup>1</sup>	739	155,190	2,600,899
	Rain Gardens <sup>2</sup>	162	72,900	1,221,764
	Pervious Pavers <sup>3</sup>	23	10,350	173,460
<b>Total</b>		<b>924</b>	<b>238,440</b>	<b>3,996,123</b>

<sup>1</sup> RiverSmart Homes rain barrels are assumed to treat 210 sf of rooftop area to the 1-inch level.

<sup>2</sup> RiverSmart Homes rain gardens assumed to retain 1 inch of runoff from 450 sf of impervious surface.

<sup>3</sup> RiverSmart Homes permeable pavers assumed to retain 1 inch from retrofitted surface area.

### RiverSmart Communities

The RiverSmart Communities program is an extension of the RiverSmart Homes program to multi-family residences such as condominiums and co-ops, businesses, houses of worship, etc. The current program, RiverSmart Homes, targets private, single-family homeowners to encourage the use of five specific stormwater BMPs (rain gardens, BayScaping, pervious pavement, rain barrels, and shade trees) to control nonpoint source pollution on their property. The RiverSmart Communities Program aims to implement similar practices on a larger scale that is more appropriate for the increased runoff area often seen on larger developments.

The RiverSmart Communities program has received 35 applications from cooperative, condominium, apartments, and churches. Three sites have been approved for funding and are in the design phase. These projects include a permeable pavement parking area, cistern, BayScape, and rain garden.

- View information on the RiverSmart Communities Program at <http://ddoe.dc.gov/service/riversmart-communities>.

### RiverSmart Rebates

The RiverSmart Homes program offers a series of rebates for trees, rain barrels, rain gardens, and impervious surface removal.

### *Rain Barrel Rebate Program*

Property owners who purchase and install a rain barrel from an approved rain barrel list are able to apply for rebate. Rebate amount depends on the volume of the rain barrel. Rain barrels with a capacity of 75 gallons or more are eligible for a \$100 rebate and rain barrels with a capacity of 74 gallons or less are eligible for a \$50 rebate. The rebate program includes conducting outreach to advertise the program through traditional channels and through innovative approaches (e.g., partnerships with local hardware stores). Homeowners are eligible to receive up to two rebates per property. The rain barrel rebate program is administered by the nonprofit organization, DC Greenworks, and paid for through the Enterprise Fund and the Anacostia River Clean Up and Protection Fund.

**Table 10** Rain Barrel Rebate Installations

Rain Barrel Rebate Program			
Rain Barrel Model	Manufacturer	Capacity per Barrel (gallons)	Number of Barrels
Aquabarrel Abe	Aquabarrel	80	5
Earth Minded Rain Station	Aquabarrel	60	4
RiverSafe	RiverSides	132	1
Exaco Round	Exaco	67	1
Ivy	Raub Water Solutions	50	1
Tuscany	Fiskars	57	1
Terra Cotta Rain Wizard	Good Ideas	50	4
ICPRB	ICPRB	60	1
Aquabarrel Classic	Aquabarrel	55	1
Rainwater HOG 75	Rainwater HOG	75	5
Rainwater HOG 51	Rainwater HOG	51	1
<b>Total</b>			<b>25</b>

- View information on the Rain Barrel Rebate Program at <http://ddoe.dc.gov/service/riversmart-homes-rain-barrels>.

### *The Rain Garden, Pervious Paver, and Impervious Surface Removal Rebate*

The Rain Garden, Pervious Paver, and Impervious Surface Removal Rebate Program is for single family homeowners in the District. This rebate is based on how many square feet of impervious area you are treating with a rain garden or pervious pavers/impervious surface removal. Impervious areas can either be rooftops or areas that are covered in concrete, asphalt, etc. The rebate will reimburse homeowners \$1.25 per impervious square foot treated.

- View the Rain Garden, Pervious Paver, and Impervious Surface Removal Rebate application package at <http://ddoe.dc.gov/publication/rain-garden-pervious-paver-and-impervious-surface-removal-rebate-application>.

#### *Shade Tree Rebate*

The Shade Tree Rebate program provides rebates to individuals who purchase and plant a tree on private property— residential or commercial— in the District. Small and medium canopy trees are eligible for rebates up to \$50 per tree and select species noted for their large canopy and environmental benefits qualify for rebates up to \$100 per tree.

- View information on the Shade Tree Rebate at <http://ddoe.dc.gov/service/riversmart-rebates>.

### **5. Retrofit Program for Existing Discharges**

The District is moving forward with developing a retrofit program. The key to this program will be the reconstruction of existing impervious surfaces under the new Stormwater Regulations that are outlined in Section II.A.1. As required by the MS4 permit the Proposed Rulemaking on Stormwater Management and Soil Erosion and Sediment Control adds a new trigger for “major substantial improvement” projects. Major substantial improvement projects are renovations that both 1) have a combined building/structure footprint and land disturbance footprint of 5,000 square feet or greater and 2) have a cost that exceeds 50 percent of the pre-project market value of the building/structure(s).

The District covers 39,202 acres with a total of 16,997 acres of impervious cover, see Tables 11 and 12. DDOE believes that the District can achieve the requirement of 18,035,147 square feet (sf) of impervious surface treatment Districtwide over the 5-year life of the permit. In FY 2012, the District retrofitted a total of 698,550 square feet of impervious surface with 378,644 square feet in the transportation right-of-way.

DDOE’s approach is multi-layered and recognizes the different levels and types of treatment provided by various stormwater controls. To achieve 18,035,147 square feet of treatment, the District is implementing a wide range of stormwater controls. Since many of these projects will be large, multi-year capital projects, the amount achieved each year will vary and cannot readily be broken down into an annual goal.

Among the controls employed are:

- LID, such as green roofs, rain gardens, and permeable pavers
- Stormwater reuse projects
- Public space stormwater controls, including LID on roads and alleys
- Tree planting
- Permanent, DDOE-approved, stormwater controls at developed sites

- Additional enhanced projects that go above and beyond baseline stormwater control activities

**Table 11** Total District Land Area by Watershed

Watershed	Land Area (square feet)	Land Area (acres)
Anacostia River	768,246,713	17,637
Potomac River	518,360,312	11,900
Rock Creek	421,040,752	9,666
<b>Total</b>	<b>1,707,647,777</b>	<b>39,203</b>

**Table 12** Total District Impervious Cover by Watershed

Watershed	Impervious Surface* (acres)	Impervious Surface (square feet)	Percent Impervious Surface
Anacostia River	7,868	342,734,924	44.6
Potomac River	5,463	237,976,429	45.9
Rock Creek	3,666	159,678,779	37.9
<b>Total</b>	<b>16,997</b>	<b>740,390,132</b>	<b>43.4</b>

\* Calculated from the impervious layer available on DCGIS Central and based on the 2005 Planimetrics.

For FY 2012, the following capital projects are being counted towards meeting our retrofit performance standard:

#### Impervious Surface Removal

DDOT's Impervious Surface Removal Project has focused on increasing the green space within the public space of DDOT roadways. This was accomplished through a combination of practices including tree box expansion, tree box creation, continuous strip creation, and large area greening.

#### Green Median Renovation

Existing medians that are finished with a hardscape such as brick, concrete or pavers can be renovated by removing this impervious surface, and replacing with a turf or mulched surface and planting street trees. These changes to the streetscape will result in reductions to the amount of stormwater entering the sewer system and ultimately the District's waterways. The increase in planting locations will result in an expansion in the Urban Tree Canopy.

- View information about DDOT's Green Median and Impervious Surface Removal Projects at

<http://ddot.dc.gov/DC/DDOT/On+Your+Street/Urban+Forestry/ARRA+Projects+to+Enhance+Urban+Tree+Canopy+and+Increase+Green+Infrastructure>.

### Green Alleys

DDOT's Green Alley Projects are designed to reduce the quantity and improve the quality of stormwater within the District's public right-of-way (PROW). DDOT constructed Green Alleys as pilot projects in 2011 and 2012 to determine the effectiveness and durability of the materials.

The initial Green Alley sites are in the Watts Branch Watershed in Ward 7 in the following blocks:

- Alley between 54<sup>th</sup> Street, Blaine Street, 55<sup>th</sup> Street, and Clay Street NE
- Alley between 56<sup>th</sup> Street, Eads Street, and 57<sup>th</sup> Street NE
- Alley between 58<sup>th</sup> Street, Dix Street, 59<sup>th</sup> Street, and Clay Street NE

DDOT constructed its pilot green alleys by replacing gravel, impervious concrete or asphalt surfaces with permeable pavement. Permeable pavement has pores or openings that allow water to pass through the surface, then percolate down through a gravel layer and into the soil below rather than running off into sewers.

With the first alleys now completed, DDOT is monitoring the three sites to determine the effectiveness and durability of the materials. Additional green alleys at QStreet and Ashley Terrace are scheduled for construction in FY 2013 to FY 2014.

- View information about DDOT's Green Alley Project at <http://ddot.dc.gov/DC/DDOT/Projects+and+Planning/Environment/Green+Alley+Projects>.

### Green Roofs

Details of the District's green roof installations are outlined in Section II.A.7 of this report.

### Volume and Pollutant Reductions

As required under Section 4.1.5.3, DDOE calculated the potential pollutant load and volume reductions achieved through the DC Retrofit Program. Table 13 details the runoff reductions from the DDOT green alley, green median renovation and impervious surface removal projects. Table 14 details the runoff reductions from the green roof retrofit installations.

**Table 13** Stormwater Runoff Retained by Retrofit Projects in the Transportation Right-of-Way

Fiscal Year	Watershed	Impervious Surface Retrofitted (square feet)	Impervious Surface Retrofitted (acres)	Runoff Retained (gallons)
2011	Rock Creek	31,478	0.7	<b>556,438.48</b>
	Anacostia	261,848	6.0	<b>3,307,912.52</b>
	Potomac	37,773	0.9	<b>667,715.57</b>
<b>Total</b>		<b>331,099</b>	<b>7.6</b>	<b>4,532,066</b>
2012	Rock Creek	49,332	1.1	<b>683,325.45</b>
	Anacostia	311,694	7.2	<b>3,025,163.73</b>
	Potomac	17,615	0.4	<b>294,465.03</b>
<b>Total</b>		<b>378,641</b>	<b>8.7</b>	<b>4,002,954.20</b>

**Table 14** Stormwater Runoff Retained by Green Roof Retrofit Projects

Fiscal Year	Watershed	Impervious Surface Retrofitted (square feet)	Impervious Surface Retrofitted (acres)	Runoff Retained (gallons)*
2011	Rock Creek	5,080	0.1	192,538
	Anacostia	28,777	0.7	1,090,684
	Potomac	30,216	0.7	1,145,224
<b>Total</b>		<b>64,073</b>	<b>1.5</b>	<b>2,428,446</b>
2012	Rock Creek	1,780	0.0	67,464
	Anacostia	28,330	0.7	1,073,742
	Potomac	19,027	0.4	721,147
<b>Total</b>		<b>49,317</b>	<b>1.1</b>	<b>1,862,353</b>

\* Green roof calculations assume a 4-inch roof depth and 25 percent porosity for all roofs, for an assumed 1-inch retention capacity.

**Table 15** Pollution Load Reductions from Retrofit Projects (pounds/year)

Fiscal Year	Watershed	Impervious Surface Retrofitted (square feet)	Fecal Coliform	TN	TP	TSS	Copper	Lead	Zinc	Trash
2011	Rock Creek	36,558	1.63E+10	0.89	0.37	83.78	0.0622	0.0117	0.1229	0
	Anacostia	290,625	1.67E+12	42.78	6.99	1,763.25	1.476	0.6311	3.675	139.26
	Potomac	67,989	3.01E+10	1.66	0.69	155.82	0.182	0.0694	0.319	0
<b>Total</b>		<b>395,172</b>	<b>1.72E+12</b>	<b>45.33</b>	<b>8.05</b>	<b>2,002.85</b>	<b>1.7202</b>	<b>0.7122</b>	<b>4.1169</b>	<b>139.26</b>
2012	Rock Creek	49,332	3.25E+11	6.30	1.08	269.83	0.21	8.08E-02	5.26E-01	19.90
	Anacostia	311,694	1.88E+12	47.19	7.24	1846.63	1.49	6.48E-01	3.85E+00	159.68
	Potomac	17,615	2.76E+10	0.89	0.23	54.42	0.04	7.24E-03	8.35E-02	1.78
<b>Total</b>		<b>378,641</b>	<b>2.51E+12</b>	<b>54.38</b>	<b>8.55</b>	<b>2,170.88</b>	<b>1.73</b>	<b>0.74</b>	<b>4.45</b>	<b>181.36</b>

In addition to stormwater runoff volume reductions, potential pollutant load reductions resulting from these retrofit projects were estimated for bacteria (i.e., fecal coliform), total nitrogen, total phosphorus, total suspended solids, copper, lead, zinc, and trash, as shown in Table 15. Load reduction estimates for conventional pollutants were based on BMP removal efficiencies contained in the 2005 TMDL Wasteload Allocation (WLA) Implementation Plans for the Rock Creek and Anacostia Watersheds. Load reductions for trash were based on the trash loading coefficients developed for the Anacostia Trash TMDL. These methodologies will be revisited and updated as the District begins to develop its Consolidated TMDL Implementation Plan. For example, estimates for fecal coliform will be updated to estimate *E. coli*. BMP pollutant removal efficiencies will be updated as necessary for other pollutants of concern, as well. Finally, while the Permit's retrofit requirements direct the District to estimate pollutant load reductions for cadmium, there are no established TMDLs in the District for cadmium or waters of the District listed as impaired by cadmium.

Appendix C and D contain the pollutant load reduction and stormwater volume calculations for the above listed retrofit activities.

#### Existing Programs

In FY 2011, DDOT completed construction on the following LID projects:

- The 9<sup>th</sup> Street NE Bridge over New York Avenue and Railroad will be managing stormwater in three bioretention areas.

- Jay Street NE: DDOE installed seven bioretention areas behind the curb in the street section along Watts Branch to reduce flooding and capture street runoff before it enters the stream.

#### Federal Facilities

The District does not have jurisdiction over federal lands to require the installation of structural retrofits to control stormwater pollutants originating from federal lands. However, The District partners fully with many federal agencies to control stormwater and protect the Chesapeake Bay. Some of the agencies include The Department of Defense (DOD), The National Park Service (NPS), Architect of the Capitol, Smithsonian Institution, US General Services Administration (GSA), The US Department of Veterans Affairs (VA) and The Army Corps of Engineers (Army Corps), and more.

In March 2012, the District developed its Chesapeake Bay TMDL Final 2012 Watershed Implementation Plan (WIP). This WIP outlines how the District will carry out the requirements of the federally-issued Chesapeake Bay TMDL, and how we will work with our local stakeholders and federal agencies located within the District's boundaries. To do this, DDOE is tracking and reporting two-year milestones (both for the District and for the Federal Government). The two-year milestone process tracks progress (in two-year increments) towards the 2025 Bay final goal. The progress is tracked by modeling nutrient reductions and the District's implementation of various BMPs.

The District is collecting commitments and progress reports from nine federal agencies on their BMPs for the period of June 2011 to July 2012. By not waiting for two-years to report, the District can better see where areas of improvement might be needed and where areas of strength can be shared.

Additionally, the District is working with federal agencies, EPA Region III, and the EPA Bay Program to develop an MOU detailing stormwater commitments and future collaborations. This MOU is expected to be executed in FY 2013.

#### District-Owned Properties

In October 2011, the Department of Real Estate Services (DRES), Office of Public Education Facilities Modernization, portions of DPR, portions of the Metropolitan Police Department (MPD), and portions of the Fire and Emergency Management Service (FEMS) were combined under one agency now known as the Department of General Services (DGS). DGS is responsible for managing all District-owned property, including construction of new facilities.

DDOE works with the DGS Office of Sustainability and Energy Management to identify LID retrofit projects, as well as incorporation of LID into the construction of new buildings. DGS staff participates in monthly MS4 technical workgroup meetings, and the Director of DGS is a member of Stormwater Advisory Panel.



## 6. Tree Canopy

In FY 2011 and FY 2012, DDOE and the Urban Forestry Administration (UFA) continued drafting an Urban Tree Canopy Plan that lays out concrete actions to reduce the discharge of stormwater pollutants by expanding tree canopy throughout the District. The Urban Tree Canopy Plan was released on the DDOE website for public review on January 22, 2013. It will also be published for public comment in the D.C. Register.

- View the draft Tree Canopy Strategy at <http://ddoe.dc.gov/treecanopyplan>.

### Tree Plantings in the District

In an effort to improve air and water quality, reduce the urban heat island effect, and offset greenhouse gas emissions, the District has adopted a 40 percent tree canopy goal. Currently, UFA plants and maintains the District's street trees. DDOE, with help from nonprofit partners such as Casey Trees and Washington Parks and People, plants trees on private, federal, and other District lands.

- View information about UFA's Tree Planting Program at <http://dc.gov/DC/DDOT/Services/Tree+Services/Tree+Planting>.
- View information about DDOE's Shade Tree Rebate Program at <http://green.dc.gov/service/riversmart-homes-shade-tree-planting>.

DDOE and its partner's planting efforts have added (see Table 16):

- 3,722 trees planted in the MS4 area in FY 2011
- 8,259 trees planted in the MS4 area in FY 2012

Research estimates that street tree annual survival rates ranged from 94 to 97 percent. Based on this research the District is assuming a 5 percent mortality rate. Using this assumption, the District has a net increase of 7,846 trees in FY 2012. D.C. exceeded the minimum number of trees needed annually to reach the District's tree canopy goal of 40 percent by 2035. Additionally, according to the 2011 Tree Report Card by Casey Trees, The District tree canopy covers approximately 35 percent of the total land surface.

**FY 2013 Goals:** UFA and DDOE are currently building capacity to track tree mortality. DDOE will report these figures in future annual reports. For FY 2013, DDOT has committed to plant 6,400 street trees in all eight wards.

**Table 16** Trees Planted by Program for FY 2011 and FY 2012

Program	FY 2011		FY 2012	
	Trees Planted Districtwide	Trees Planted in MS4	Trees Planted Districtwide	Trees Planted in MS4
RiverSmart Homes	729	536	581	429
Casey Trees Tree Planting	1,658			
UFA Street Tree Planting	4,471	2,668	4,725	3,231
Pepco Tree Planting Program			1,165	
Tree Rebate Program	157		317	
Watts Branch Stream Restoration	518	518	4,599	4,599
Other Stream Restoration	0	0	341	0
National Park Service Planting	2,094	0	0	0
<b>Total</b>	<b>9,627</b>	<b>3,722</b>	<b>11,728</b>	<b>8,259</b>
Estimated Annual Stormwater Volume Reduction (gallons)*	12,457,604	4,814,870	15,171,628	10,684,045

\*Stormwater reductions used a Center for Watershed Protection conversion that credits a 10 percent reduction in stormwater from tree cover.

\*Calculations used the estimation that the average annual rainfall in The District is 39.7 inches and that 1 inch of rainfall per acre is equal to 27,000 gallons of stormwater.

## 7. Green Roof Projects

The District has been aggressively retrofitting their existing rooftops with green roofs and installing vegetated roofs on new city-owned buildings. In FY 2011 and FY 2012, the District installed at least 160,638 square feet of green roof on District properties. As a result of this push, the District of Columbia is second only to Chicago in the square footage of green roofs installed according to Green Roofs for Healthy Cities (GRHC) 2011 Annual Industry Survey.

Historically, the District has offered a rebate for installation of a new green roof or the retrofit of an existing roof. Programs offered through DDOE provided varying rebate amounts with varying constraints. For 2012, DDOE has restructured this rebate program to offer a single application process and set dollar rebate of \$5 per square foot regardless of the roof size. The Green Roof Rebate Program is paid for with funds from Anacostia River Clean Up and Protection Fund and the Stormwater Enterprise Fund. Using the American Recovery and Reinvestment Act of 2009 (ARRA) funds, DDOE continued a parallel green roof subsidy program targeted at retrofits of large existing buildings, commercial properties and multifamily dwellings. Of the 79,137 square feet of green

roofs installed throughout the District in FY 2012, 26,287 square feet were installed through the Green Roof Rebate Program (see Table 18). Table 17 details the runoff reductions from the green roof installations throughout the District. Appendix D contains the volume reduction calculations.

DDOE continued tracking green roof projects in the District from its plan review database. The plan review database contains projects that are regulated through the submission of plans because they are over 5,000 square feet in area. This list is regularly updated as additional green roofs are verified through our inspection program.

**Table 17** Stormwater Runoff Retained by Districtwide Green Roof Installations

Fiscal Year	Size (square feet)	Runoff Retained (gallons)*
2011	111,501	2,565,448
2012	49,137	1,326,293
Total	160,638	

\* Green roof calculations assume a 4-inch roof depth and 25 percent porosity for all roofs, for an assumed 1-inch retention capacity

**Table 18** Summary of District Green Roof Installations Completed in FY 2011 and FY 2012

Sewer System	Watershed	Ownership	Year Built	Funding Source	Project Type	Size (square feet)
MS4	Anacostia	Municipal	2011	ARRA	New	45,000
MS4	Anacostia	Municipal	2011		Retrofit	24,000
CSS	Anacostia	Private	2011	ARRA	Retrofit	10,277
CSS	Anacostia	Private	2011		Retrofit	9,728
MS4	Anacostia	Municipal	2011	Enterprise Fund	Retrofit	8,500
MS4	Rock Creek	Municipal	2011	ARRA	New	7,700
CSS	Potomac	Private	2011	ARRA	Retrofit	6,327
CSS	Potomac	Private	2011		Retrofit	6,195
MS4	Potomac	Federal	2011		Retrofit	5,454
CSS	Rock Creek	Private	2011		Retrofit	5,080
CSS	Potomac	Federal	2011		Retrofit	4,320
CSS	Potomac	Federal	2011		Retrofit	4,320
CSS	Potomac	Federal	2011		Retrofit	3,600
CSS	Anacostia	Municipal	2011	Enterprise Fund	Retrofit	10,000

Sewer System	Watershed	Ownership	Year Built	Funding Source	Project Type	Size (square feet)
MS4	Potomac	Municipal	2012		New	30,000
MS4	Rock Creek	Municipal	2012	Enterprise Fund	Retrofit	1,400
CSS	Anacostia	Private	2012	Other	Retrofit	450
CSS	Potomac	Private	2012	Green Roof Rebate Program	Retrofit	4,602
MS4	Potomac	Private	2012	Green Roof Rebate Program	Retrofit	14,425
CSS	Rock Creek	Private	2012	Green Roof Rebate Program	Retrofit	160
CSS	Rock Creek	Private	2012	Green Roof Rebate Program	Retrofit	220
CSS	Anacostia	Private	2012	Green Roof Rebate Program	Retrofit	4,062
CSS	Anacostia	Private	2012	Green Roof Rebate Program	Retrofit	1,488
CSS	Anacostia	Private	2012	Green Roof Rebate Program	Retrofit	800
CSS	Anacostia	Private	2012	Green Roof Rebate Program	Retrofit	300
CSS	Anacostia	Private	2012	Green Roof Rebate Program	Retrofit	230
CSS	Anacostia	Municipal	2012	ARRA	Retrofit	21,000
Total						160,638

### Structural Assessment

DDOE and DGS were awarded a grant through Mayor Gray's 2012 Sustainable DC Grant program to conduct structural assessments of existing District-owned buildings to see if they can be retrofitted with green roofs. In 2009, DGS conducted a condition assessment of their managed properties and surveyed the materials and space present on each roof to determine if they may be able to accommodate a green roof. However, this survey did not include a structural assessment for each roof. Green roofs can place an additional amount of weight on a building. Having a structural assessment for of the original buildings surveyed by DGS will help both DGS and DDOE plan construction of green roofs throughout the District.

- To read more information about DDOE's green roof program:  
<http://ddoe.dc.gov/greenroofs>
- To learn more about the 2012–2013 Green Roof Rebate Program application process: <http://www.anacostiaws.org/programs/stewardship/green-roofs>

**FY 2013 Goals:** DDOE will continue tracking, inspecting and installing green roofs throughout the District of Columbia. DGS and DDOE will report on the progress of the green roof structural assessment grant and meeting the green roof numeric requirement of the Permit.

## **B. Operation and Maintenance of Retention Practices**

### **1. District-owned and Operated Practices**

The District continues to develop updated operation and maintenance protocols as well as training programs for District-owned on-site retention practices. This will include maintenance needs, inspection frequencies and tracking. DDOE is in the process of creating a new tracking and reporting system. As part of this effort, DDOE inspectors are now using toughbooks in the field and Watershed Protection Division continues to work on automating inspection forms for all Inspection and Enforcement operations as a move toward a totally paperless process. This is expected to streamline regulatory operations by allowing inspectors to have a complete inspection history of any site while in the field, including inspections related to other media.

**FY 2013 Goals:** The District will expand educational training for sister agency employees, particularly with regard to Stormwater Pollution Prevention techniques and good housekeeping training. Since 2009 multiple classes and webinars have been offered throughout the year to a variety of agencies, and this is will continue.

### **2. Non-District-owned and Operated Practices**

DDOE continued to track practices on private property in the District from its plan review database. The review database contains projects that are regulated through the submission of stormwater management plans because they are over 5,000 square feet in area.

### **3. Stormwater Management Guidebook and Training**

DDOE, in partnership with the Center for Watershed Protection, has developed a draft Stormwater Management Guidebook and supporting compliance spreadsheets. Chesapeake Stormwater Network has also provided support for this project. The Draft Guidebook was posted for public comment during August 2012 on the DDOE website, <http://ddoe.dc.gov/draftstormwaterguidebook>. The website contains a link to a downloadable version of the entire Draft Manual, as well as PDF versions of each chapter and each BMP section within Chapter 3 and each individual Appendix. The webpage also contains a link to downloadable versions of several Excel Spreadsheets developed to assist with determining project compliance, and calculating SRCs that a project could earn. The available spreadsheets include the "General Retention Compliance Calculator"

tool, a series of worksheets for the application and review of the proposed “Maximum Extent Practicable” for the reconstruction of existing PROW, and an SRC Calculator to be used by SRC trading program participants. There is also a link to a Google document version of the Rainwater Harvesting Retention Calculator tool.

DDOE held seven Retention Compliance trainings for the general public. Each of these sessions was a daylong workshop that walked participants through a primer on why stormwater matters, what the runoff reduction methodology is, the proposed guidance manual specifications and how to use the compliance worksheets. The workshops included a hands-on problem solving activity that required participants to use the Guidance Manual’s BMP design criteria and the compliance worksheets in an effort to comply with a case scenario. There have been ten trainings for various District Agency partners (DGS, DMPED, DC Water, DDOT, DCHA) and internal trainings for DDOE staff including inspectors, plan reviewers and project managers.

Also open to the general public, there have been two half-day trainings on the proposed SRC trading program and an additional two trainings on the use of off-site retention by regulated sites. DDOE held similar internal sessions for its permit reviewers. DDOE has used local events to provide further outreach on the draft Stormwater Management Guidebook including talks to the MWCOG Anacostia Partnership group, at the DCRA's green symposium, to professional engineering group associations and to local business associations. PDF versions of these training sessions can be found under the resources links at <http://ddoe.dc.gov/node/164302>

The Public Comment period closed on November 8, 2012. Comments submitted can be viewed at <http://ddoe.dc.gov/node/383322>. DDOE is currently reviewing and responding to these comments and incorporating changes to the Guidebook as appropriate. A comment response document is also being prepared.

- View and download the proposed Stormwater Management Guidebook at <http://ddoe.dc.gov/proposedstormwaterrule>.

## **C. Management of District Government Areas**

### **1. Sanitary Sewage System Maintenance Overflow and Spill Prevention Response**

Section 4.3.1 of The Permit was subject to the appeal filed by DC Water. This section was stayed for most of the reporting period. Upon the release of the final modified permit on November 9, 2012 these provisions became active. DDOE continues to work with relevant agencies to implement an effective response protocol for overflows of the sanitary sewer system into the MS4. As required by the Permit, this protocol will contain at a minimum:

- Investigating any complaints received within 24 hours of the incident report
- Responding within two hours to overflows for containment

- Notifying appropriate sewer and public health agencies within 24 hours when the sanitary sewer overflows to the MS4
- Notifying the public in a timely and effective manner when SSO discharges to the MS4 may adversely affect public health

## **2. Public Construction Activities Management**

The District continues to comply with the Development and Redevelopment and the Construction requirements outlined in Section 4.6 of The Permit. Details of this program are found in Section II.F of this report.

## **3. Vehicle Maintenance / Material Storage Facilities / Municipal Operations**

The District operates and maintains the local roadways to reduce the discharge pollutants resulting from vehicular traffic from its SWM systems. Other activities conducted by MS4 Task Force agencies included actions to reduce the amount of pollutants resulting from traffic on public roads that enter SWM systems throughout the District.

The DDOT Stormwater Management Team reviews drawings to resolve drainage issues, ensure proper compliance with erosion and sediment control requirements, ensure use of water quality catch basins (or other water quality practices) in new roadway reconstruction projects, and identify opportunities for installing BMPs and LID. Since 2008, the majority of DDOT roadway reconstruction projects have installed Water Quality Catch Basins to manage stormwater runoff. This catch basin design traps floatables and sediments in specified basins so that they can be removed by maintenance crews.

### Pollution Prevention

DDOE has increased efforts to provide assistance to District agencies, including material storage facilities and equipment storage, in developing stormwater pollution prevention plans to better address spills and contingencies at their facilities. In FY 2012, DDOE received formal pollution prevention plans from DPW and DC Water. Details on The District's snow and ice storage pollution prevention plans are outlined in Section II.C.6 of this report.

### District Fleet

Additionally, DPW has elected to purchase alternative fuel vehicles (AFVs) to reduce particulate vehicle emissions that contribute to stormwater runoff. In FY 2012, DPW purchased 133 AFVs that are powered by natural gas or E-85 (85 percent ethanol, 15 percent gasoline). DPW's fleet now consists of 586 AFVs, 153 vehicles powered by natural gas, 35 electric vehicles and 628 biodiesel powered trucks.

**FY 2013 Goals:** DDOE will continue to provide District agencies with training and compliance assistance for good housekeeping.

#### **4. Landscape and Recreation Facilities Management, Pesticide, Herbicide, Fertilizer and Landscape Irrigation**

##### Integrated Pest Management

DDOE has developed an education and outreach program on Integrated Pest Management (IPM) and Nutrient Management. The purpose of the program is to better inform the public on the proper use and disposal of pesticides and on the use of safer alternatives. The program provides education and outreach activities designed to property owners and managers about environmentally sound practices with regard to the use of pesticides in the yard or garden and the introduction of “good” pests into the landscape. Through DDOE’s Nutrient Management Program, the property owners receive education regarding the proper amount of fertilizer to use on a lawn. In addition to fertilizer use, this program addresses the proper way to mow, the proper use of mulch, and the effects of applying too much mulch.

- View information on the Integrated Pest Management and Nutrient Management Program at <http://ddoe.dc.gov/node/201932>.

##### Trainings and Certification

Furthermore, the DDOE Pesticide Management Program trains commercial applicators in the legal and safe appliance of pesticides and herbicides. Commercial applicators must receive a certification through the program to legally apply pesticides and herbicides in the District. DDOE’s Toxic Substance Division is responsible for developing, updating, and administering examinations to qualified applicants for certification as pesticide applicators in The District of Columbia.

DDOE’s Hazardous Materials Branch tracks certified pesticide applicators throughout the District.

- 1,367 certified applicators in the District as of FY 2011
- 1,377 certified applicators in the District as of FY 2012

##### Inspections

The Toxic Substance Division is also responsible for regulating worker protection, ensuring compliance of both District and federal laws, and inspections of workplaces, worksites, and retail establishments within the District of Columbia that sell, store, or use pesticides.

Inspections are conducted with retailers, wholesalers and distributors for pesticide products not registered in the District or with the EPA, pesticides suspected of being shipped or distributed in violation of the District Pesticide Operations Act, pesticides displayed for sale in a manner to endanger human health and for pesticides that have been suspended or cancelled by the EPA.



### Monitoring

The District waters are tested regularly for the presence of pesticides, herbicides and fertilizers. Pesticides are monitored as part of the overall wet- and dry-weather stormwater sampling and analysis program. In previous years, pesticides have been detected in some of the samples collected from the outfalls.

- View information on the Pesticide Management Program and certification process at <http://ddoe.dc.gov/service/get-certified-pesticide-applicator>.

**FY 2013 Goals:** The District will continue to educate the public on the appropriate use of pesticides, herbicides, and fertilizers to reduce these substances in the MS4; to train District applicators in the safe use and handling of pesticides, herbicides and fertilizer; and to certify pesticide applicators throughout the District. Through the District's monitoring program, sites within the MS4 will continue to be monitored for the presence and levels of pesticides, herbicides, and fertilizer chemicals.

## **5. Storm Drain System Operation and Management and Solids and Floatables Reduction**

The District continues to conduct routine catch basin cleaning and repair activities and floatables removal.

### Catch Basin Cleaning and Outfall Repair

There are approximately 25,000 catch basins located within the public right-of-way in the District. Approximately one-half of these catch basins are in the MS4 area, with the remainder in the CSO area. DC Water, who conducts the operation and maintenance of DC of pipes and conduits carrying stormwater flow, does not differentiate between the two systems for maintenance purposes and works to keep all catch basins clean.

As required under the MS4 Permit, DC Water is currently developing a plan for an optimal catch basin program and outfall repair program. For the catch basin program, contractor support has been hired to coordinate the analysis and inventory of existing catch basins. For the outfall repair program, contractor support has been hired to perform outfall inspections, prioritize repair, develop a standard repair approach and repair schedule. Both programs are on track to be submitted for public notice and review by the EPA by the required 18 month deadline.

While the Optimal Catch Basin Program is under development, DC Water will clean each catch basin in the MS4 annually. Crews operate on a predetermined schedule, cleaning catch basins by ward. During each work day, six two-man crews clean approximately 20 catch basins each.

FY 2011 Catch basin cleaning and repair activities:

- DC Water cleaned 31,660 catch basins.

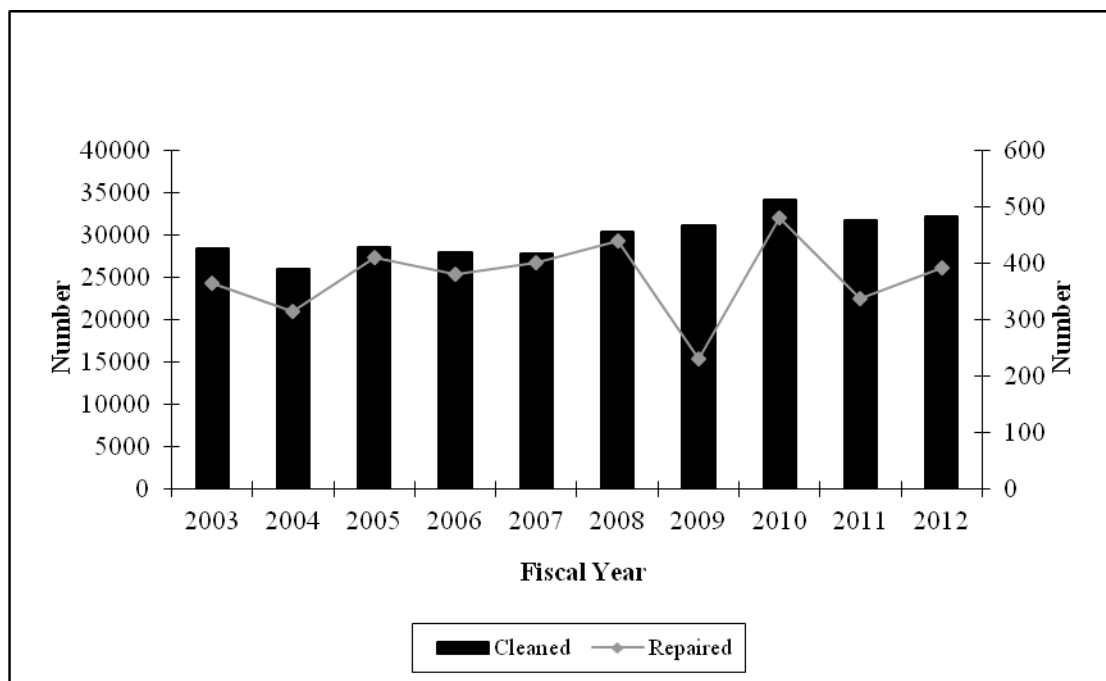
- 17,052 catch basins were located in the MS4 area
- DC Water repaired 337 catch basins

FY 2012 Catch basin cleaning and repair activities:

- DC Water cleaned 32,202 catch basins
- 17,344 catch basins were located in the MS4 area
- DC Water repaired 391 catch basins

The number of catch basins cleaned and repaired has remained relatively constant since FY03. Figure 1 shows the ten-year trend for the cleaning and repair of the District catch basins.

- View information about DC Water's catch basin repair and cleaning activities at [http://www.dewater.com/wastewater\\_collection/catch\\_basin.cfm](http://www.dewater.com/wastewater_collection/catch_basin.cfm).
- View DC Water's catch basin cleaning schedule at [http://www.dewater.com/wastewater\\_collection/basin\\_schedule.pdf](http://www.dewater.com/wastewater_collection/basin_schedule.pdf).



**Figure 1** Number of District catch basins cleaned and repaired.

### Floatables

DC Water continues to conduct the floatables reduction program utilizing skimmer boats on the Potomac and Anacostia Rivers. Activities to remove floatable debris and trash from the rivers as well as accumulated trash on river banks continue five days a week

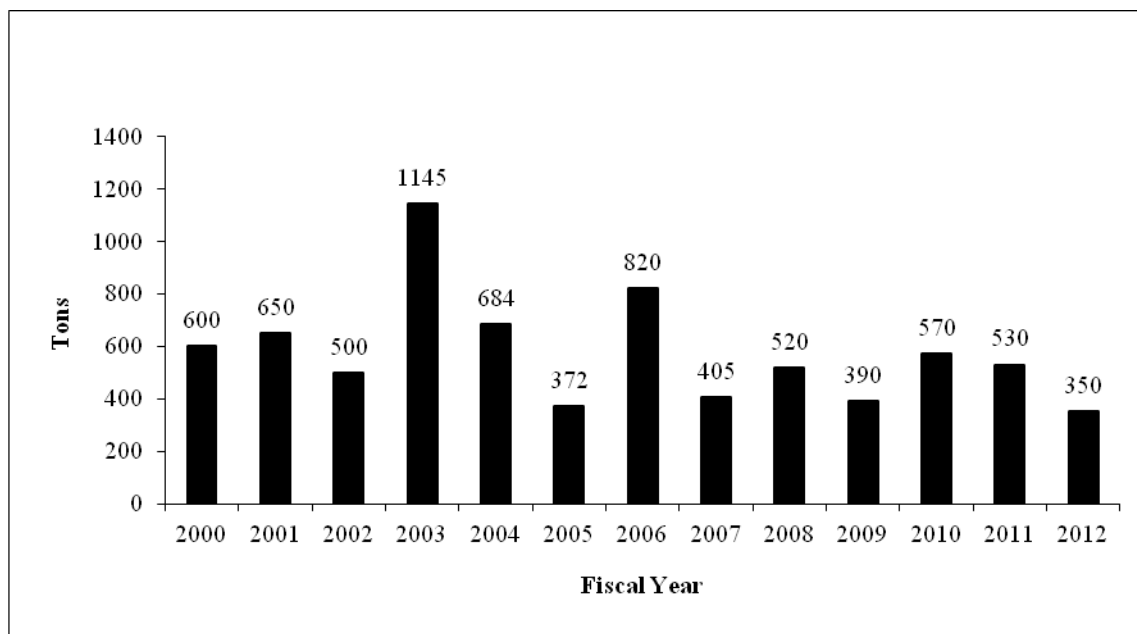
using skimmer boats and support boats. Figure 2 shows the 13-year trend of floatables tonnage removed from the District's rivers.

In FY 2011:

- 530 tons of debris was removed by skimmer boats

In FY 2012:

- 350 tons of debris was removed by skimmer boats



**Figure 2** Thirteen-year trend of floatables removed from the Anacostia and Potomac Rivers.

**FY 2013 Goals:** DC Water will continue to conduct the floatables reduction program utilizing skimmer boats on the Potomac and Anacostia Rivers. Catch basin cleaning and outfall repair activities will continue at current levels until the Catch Basin Cleaning Optimization Plan and Outfall Repair Strategy are finalized, at which point DDOE and DC Water will report on updated cleaning and repair figures.

#### Trash TMDL Compliance

The District continues to comply with the Anacostia River Trash TMDL implementation provisions in Part 4.10 of the MS4 permit. Progress towards meeting our trash reduction goals is outlined in section II.J.1 *Anacostia River Watershed Trash TMDL Implementation*.

## **6. Streets, Alleys, and Roadways**

### Street Sweeping

DPW is responsible for street sweeping activities in the District. DPW uses two basic methods to clean and sweep streets: mechanical street sweeping and litter vacuum personnel, complemented by truck crews that clean streets where the density of parked cars prohibit the effectiveness of mechanical cleaning.

In FY 2012 DPW swept more than 641 acres of roadway, which is in compliance with the Permit. Table 19 illustrates the 12-year trend of street sweeping and litter receptacle activities. Appendix E contains a map of DPW street sweeping routes.

Additional details on how street sweeping is being utilized to meet the Anacostia River Trash TMDL are provided in Section II.J.1 *Street Sweeping Environmental Hotspots*.

**Table 19** DPW Street Sweeping Activities

Fiscal Year	Streets Swept (miles)	Alley Segments Swept	Number of Litter Receptacles Cleaned	Litter and Debris Collected (tons)
2001	34,000	8,751	4,000	3,400
2002	74,490	16,400	4,000	8,920
2003	102,181	41,238	4,050	9,516
2004	103,163	13,354	4,050	9,346
2005	91,649	20,897	4,050	7,755
2006	72,468	3,781	4,200	6,632
2007	68,189	5,944	4,324	6,388
2008	64,955	4,181	4,445	7,411
2009	62,972	3,550	4,445	7,883
2010	87,837	2,397	4,445	7,834
2011	80,489	2,842	4,600	7,872
2012	82,240	3,647	4,600	6,851

- View information about DPW's Street Sweeping Program at <http://dpw.dc.gov/DC/DPW/Services+on+Your+Block/Street+and+Alley+Cleaning/Street+Sweeping,+Alley+Cleaning+and+Litter+Can+Collection?nav=3&vgnextrefresh=1>.

### Snow and Ice Removal

The District implements its snow removal and deicing program operating plan to ensure safe passage on its roadways using deicing materials that provide the minimum impact practicable to the stormwater runoff from snow and ice that enters the MS4. In FY 2012, DPW assumed responsibility for the District's snow removal and deicing program, which had previously been coordinated through DDOT. In FY 2012, The District received 1.5

inches of snow and mobilized snow removal trucks 10 times based on weather predictions.

#### De-icing Activities

The District researches and utilizes the most efficient and environmentally friendly de-icing products. The main tool utilized by DPW for snow and ice control is sodium chloride (rock salt).

DPW expanded the liquid pretreatment of bridges and roadways to include an agricultural product, such as beet juice, which helps to melt snow and ice. This allows DPW to treat the roads and bridges before the precipitation and provide a safer roadway surface. The goal of brine with beet juice additive for pretreatment is to find an alternative deicing product or additive. The overall goal is to use less rock salt to keep roads from accumulating snow or ice, to reduce corrosion on bridges and equipment and protect the environment. DPW has 12 liquid spray tanks/ trucks, 300 pieces of snow removal equipment and a computerized brine making machine that mixes the materials. The District has 60,000 gallons of storage capacity.

#### Training

The District yearly Snow Plow Driver Training Program stresses the importance of sensible salting and proper calibration of spreaders. This program consists of a classroom training that every District driver must attend.

#### Salt Storage

The District operates five salt storage facilities that contain 4,000 of rock salt. At all of the facilities, the runoff is controlled by a stormwater management facility to reduce the amount of pollutants. Four of the five facilities are located within the MS4 area.

The locations of the four facilities inside the MS4 area are (1) Potomac Avenue and R Street, SW, (2) 3815 Fort Drive, NW, (3) 401 Farragut Street, NE, and (4) underneath the Key Bridge. All District salt dome storage facilities are constructed with stormwater BMP structures for load discharge reductions.

#### Snow Storage

If the District needs to haul snow on major snow falls, DPW would utilize Lot 6, 7 and 8 of Robert F. Kennedy Memorial (RFK) Stadium, located in Ward 6. The District utilizes a strategy to minimize the impact of snow removal and stockpiling operations. This include sweeping the storage area prior to the snow event, installing silt fence along the downside of the parking lots and keeping catch basins clean and open.

**FY 2013 Goals:** DPW is expanding the use of liquid applications, Snow Plow Driver Training Program and use of Automated Vehicle Location (AVL) technology to better manage District resources. Additionally, DPW is piloting 25 ceramic rubber plow blades for better snow plowing capacity. With more efficient plowing technology DPW will be able to reduce the use of salt to remove snow.

## **7. Infrastructure Maintenance / Pollution Source Control Maintenance**

The District continues to implement an operation and maintenance program to incorporate good housekeeping at all District facilities.

FY 2011 and FY 2012 pollution source control activities:

- DCRA, DDOE, and DPW enforced regulations as part of their responsibility to manage pollution from stormwater runoff at municipal waste facilities within the District
- DPW worked to control pollutants in runoff from municipal waste facilities, including waste transfer stations and equipment storage and maintenance facilities, by continuing the evaluation of additional BMPs to be incorporated at the Fort Totten and Benning Road transfer stations
- DPW submitted a pollution prevention plan to DDOE. This plan will guide water quality control at the District municipal waste facilities including waste transfer stations and equipment storage and maintenance facilities
- DDOE inspectors visited DPW facilities to ensure compliance with the pollution prevention plans

## **8. Public Industrial Activities Management / Municipal and Hazardous Facilities**

DDOE continues to update industrial facility location data in a geographic information system (GIS), based on field verification for 60 facilities within the MS4 service area that are part of NPDES, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and/or Resource Conservation and Recovery Act (RCRA) databases). DDOE has prepared a database that includes facilities in the District that are registered with federal and state regulators because they generate, store, or have released hazardous materials.

### Resource Conservation and Recovery Act Inspections

Inspection and monitoring of hazardous waste facilities is the responsibility of DDOE's Hazardous Waste Division (HWD), which has procedures in place to investigate sites and spills. While HWD inspections do not directly address water quality, inspectors report spills (that could pose a water quality threat) to DDOE or DC Water for further water quality investigation.

DDOE continues to conduct inspections of RCRA hazardous waste facilities to determine compliance with hazardous waste regulations. DDOE conducted inspections at the following:

- RCRA Large Quantity Generator (LQG)

- Small Quantity Generator (SQG)
- Conditionally Exempt Small Quantity Generator (CESQG) facilities

There were no spills reported at these facilities in FY 2011 or FY 2012.

FY 2011 and FY 2012 DDOE inspection activities:

- HWD conducted 50 inspections at LQGs, SQGs and CESQGs in FY 2011
- HWD conducted 101 inspections at LQGs, SQGs and CESQGs in FY 2012

Comprehensive Environmental Response, Compensation, and Liability Act Inspections  
In accordance with the Permit, the District tracks industrial facilities within the District that are subject to regulation under the CERCLA.

Based on facility addresses, there are 11 CERCLA sites or facilities with an NPDES permit within the District, as shown in Appendix F. CERCLA status is not permanent as the sites are cleaned-up they are moved off the active list. The list includes private and federally owned sites.

**FY 2013 Goal:** The District will continue to identify and monitor hazardous waste from industries and businesses within the District through the use of inspections and investigations in water quality.

## **9. Emergency Procedures**

The District maintains an illicit discharge and emergency response program designed to detect and eliminate illicit discharges. DDOE, with the support of DC Water and DPW, conduct activities related to illicit discharge detection and elimination.

DDOE personnel continued to investigate potential illicit discharges in response to reports by citizens or government personnel. Calls made to the Office of Emergency Management pertaining to environmental discharge complaints are directed to DDOE. DDOE personnel conduct detailed investigations of each complaint. Often DDOE is able to respond immediately by sending personnel into the field. Depending on the characteristics of the discharge described, DDOE might alternatively refer the case to a more appropriate District agency (e.g., in the case of water main breaks or other sewer infrastructure problems DC Water is contacted to resolve the problem). Depending on the extent and source of the discharge, federal entities such as EPA, U.S. Coast Guard or NPS may be called upon for assistance with sample analysis, investigation, or containment.

DDOE's Water Quality Division (WQD) conducted:

- 20 emergency responses in FY 2011
- 20 emergency responses in FY 2012

**FY 2013 Goals:** The District will continue to perform compliance and enforcement activities in accordance with EPA and District regulations. DDOE personnel will continue to investigate potential illicit discharges in response to reports by citizens or government personnel.

## **10. Municipal Official Training**

District staff who manage, investigate or work on stormwater practices regularly attend relevant trainings on new stormwater technologies. They also attend regional workshops related to stormwater control and Chesapeake Bay restoration efforts. Some examples of this include:

- Members of the monthly MS4 technical workgroup meetings attend EPA and Center for Watershed Protection webinars on the latest stormwater controls and initiatives
- DDOE engineers and inspectors attend refresher training to improve efficiency and effectiveness in plan review
- DDOE staff conduct presentations on pollution prevention plans to District agency staff
- DDOE stormwater staff attended the *Tree Canopy Symposium* held by Casey Trees
- DDOE stormwater staff attended and presented at the *Water Environment Federation (WEF) Stormwater Symposium*
- DDOE engineers and stormwater staff attended a presentation on *Rainwater Harvesting, Infiltration and Ex-filtration BMPs and Hydrodynamic Systems*
- DDOE engineers and stormwater staff participated in a Webinar training on *Rainwater Harvesting* delivered by the Center for Watershed Protection
- DDOE engineers and stormwater staff participated in a Webcast training on *The Design, Installation and Maintenance of Constructed Wetlands and Regenerative Stormwater Management*
- DDOE engineers and stormwater staff participated in an EPA Webinar training on the draft *MS4 Construction General Permits*

## **D. Management of Commercial and Institutional Areas**

DDOE regularly inspects existing stormwater management facilities to ensure that they are in proper working order. It also inspects BMPs to ensure they are adequately maintained. In addition, the DDOE Inspection and Enforcement Branch is responsible for investigating citizen complaints relating to soil erosion and drainage problems, and recommending appropriate solutions. Figure 3 shows the trend in the number of SWM facilities inspected each year.

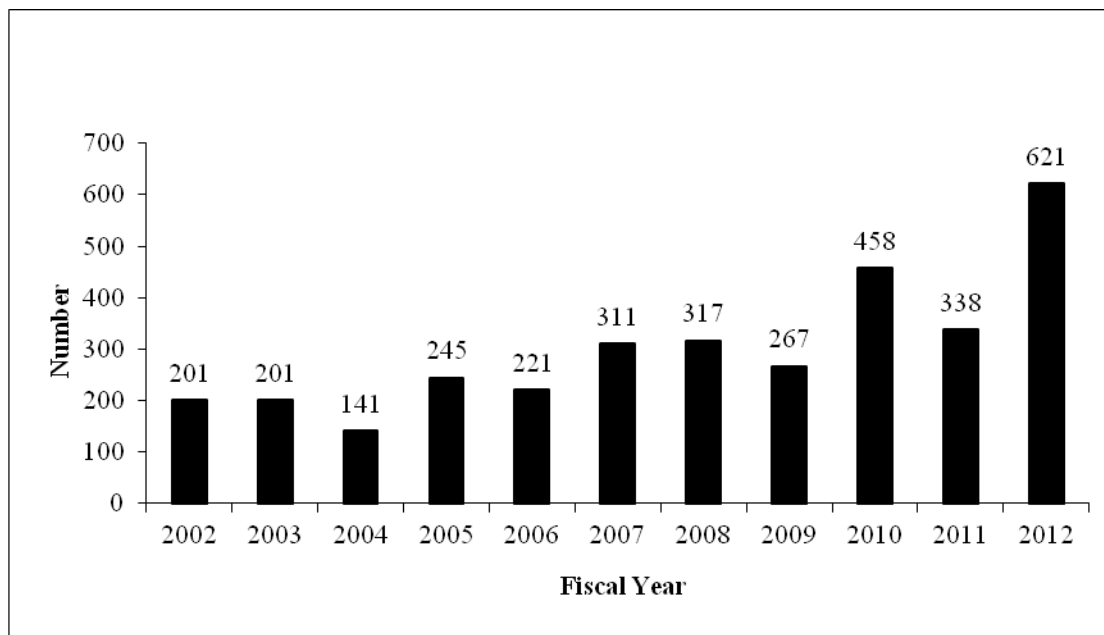


In FY 2011, the Inspection and Enforcement Branch accomplished the following:

- Inspected 338 stormwater management facilities to ensure proper functioning of these facilities
- Inspected 349 stormwater management facilities post-maintenance to ensure compliance
- Reviewed plans for 156 LID practices
- Approved 87 plans for LID practices
- Continued to develop outreach materials, including brochures, web material and presentations
- Added new staff members

In FY 2012, the Inspection and Enforcement Branch accomplished the following:

- Inspected 621 stormwater management facilities to ensure proper functioning of these facilities
- Inspected 578 stormwater management facilities post-maintenance to ensure compliance
- Reviewed plans for 189 LID practices
- Approved 105 plans for LID practices
- Continued to develop outreach materials, including brochures, web material and presentations
- Added new staff members



**Figure 3** Trend in the number of Stormwater Management facilities inspected.

## **1. Inventory of Critical Sources and Source Controls**

DDOE has refined and updated the District's automated database system for tracking stormwater management facilities inspected for maintenance and construction projects with stormwater management BMPs. Through routine inspections and monitoring throughout the District, the District enforces effluent restrictions to the MS4 to meet CWA requirements. The updated database system contains data for BMPs constructed since the inception of the program in the District of Columbia 1988 and has enabled faster and more efficient rescheduling of inspections and retrieval of maintenance records.

**FY 2013 Goals:** DDOE will continue to track SWM facilities inspected and their BMPs through the automated database system.

## **2. Inspection of Critical Sources**

DDOE has an inspection and enforcement program for construction sites in commercial areas. As required under Section 4.4.2 of the Permit, DDOE inspections will occur twice during the term of the permit with an interval of six months between inspections.

## **3. Compliance Assurance**

DDOE continues to perform compliance and enforcement activities in accordance with the Permit. Along with the inspection activities described above, DDOE inspectors have conducted 349 post-maintenance inspections to ensure proper functioning of these facilities. If a facility is out of compliance a Notice of Violation (NOV) is issued with a corrective action plan. Corrective actions outlined in the NOV should clarify the nature of the alleged violation for the benefit of the facility. Corrective actions and deadlines are determined by enforcement staff, in compliance with the law and based upon relevant information. DDOE inspectors perform follow-up inspections after the corrective action deadline on the NOV. If the facility doesn't comply with the corrective measures required in the NOV then a Stop Work Order is issued.

**FY 2013 Goals:** The District will continue to perform compliance and enforcement activities in accordance with EPA regulations.

## **E. Management of Industrial Facilities and Spill Prevention**

The management plan for stormwater pollution control from industrial facilities emphasizes the tracking of facilities through a database system, the monitoring and inspection of industrial facilities, and the District's spill prevention and response program.

#### Industrial Facilities Database

DDOE WQD continues to maintain a database of 232 facilities in the MS4 area in the District with 11 individual or site-specific federal NPDES stormwater permits.

### **F. Management of Construction Activities**

The District maintains a plan review erosion control program for new construction which, coupled with a field inspection program, ensures compliance with the District erosion control regulations. DDOE's Sediment and Stormwater Technical Services Branch reviews construction and grading plans for stormwater management, erosion and sediment control, and flood plain management considerations. As required by EPA, regulations regarding new construction permits, all new construction in the District must have Stormwater Pollution Prevention Plans (SWPPPs) that "identify all potential sources of pollution which may reasonably be expected to affect the quality of stormwater discharges from the construction site." Additionally, DDOT reviews all development and construction site plans that impact the PROW to identify opportunities to reduce impervious surface, maximize tree growing space, and minimize stormwater runoff in the PROW. DDOT reviewed 137 plans in FY 2011 and 420 plans in FY 2012 through preliminary design meetings with developers, public space permit applications, Zoning applications, and DDOT project reviews.

The District already has strong erosion and sediment control regulations in place, requiring an erosion and sediment control permit for any land disturbance over 50 square feet. In comparison, other jurisdictions require that these permits be filed when more than 5,000 square feet of soil are disturbed.

DDOE WPD promoted its *District of Columbia Standards and Specifications for Soil Erosion and Sediment Control and Stormwater Management Guidebook, 2003*. These documents are used by DDOE in the plan review process for new construction. As described in Section II.B.3 of this report, DDOE continues its efforts to revise the Stormwater Guidebook. Engineers from the Technical Services Branch regularly attend relevant trainings on new stormwater technologies. They also attend regional workshops related to stormwater control.

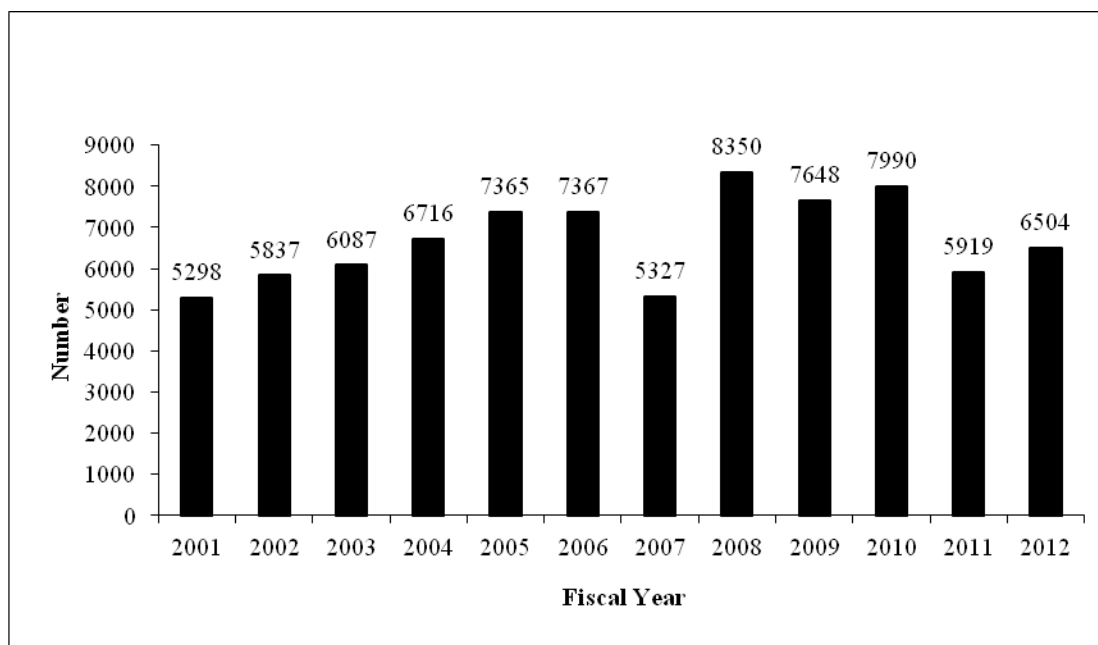
In FY 2011, the Sediment and Stormwater Technical Services Branch accomplished the following:

- Received and reviewed 2,057 Erosion and Sediment Control and construction applications
- Approved 1,976 Erosion and Sediment Control and Stormwater Management construction applications
- Reviewed 26 Environmental Impact Screening Forms (EISFs) after they were reviewed for regulatory compliance
- Filed 44 EPA Stormwater Notices of Intent (NOIs) for construction activities with land disturbance one acre and greater

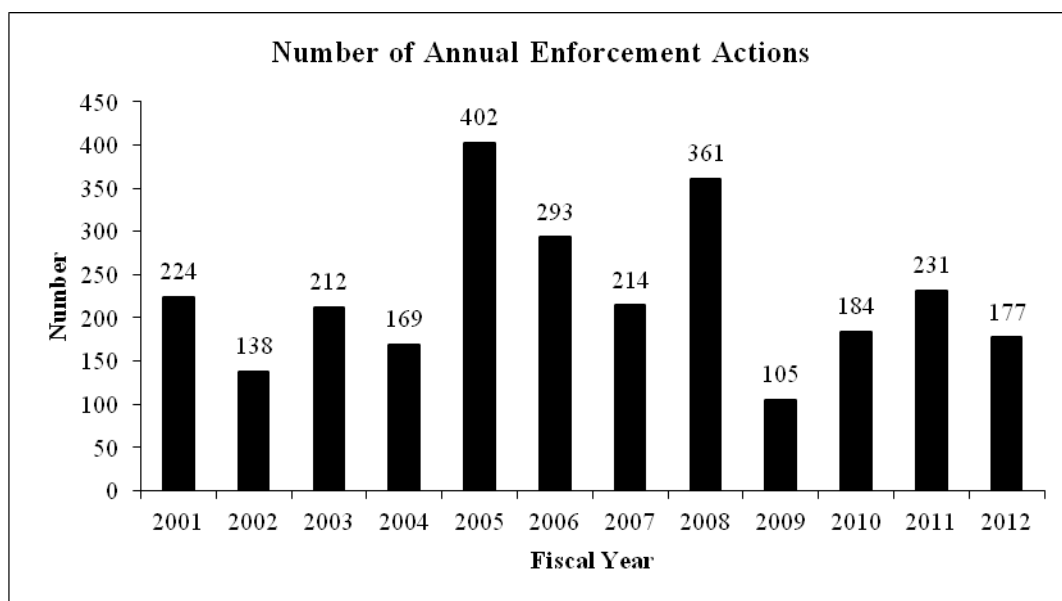
In FY 2012, the Sediment and Stormwater Technical Services Branch accomplished the following:

- Received and reviewed 1,824 Erosion and Sediment Control and construction applications
- Approved 1,730 Erosion and Sediment Control and Stormwater Management construction applications
- Reviewed 17 EISFs after they were reviewed for regulatory compliance
- Filed 60 EPA Stormwater NOIs for construction activities with land disturbance one acre and greater

DDOE conducts site inspections and calculates loading estimates from construction sites within the District. Note that each time DDOE personnel visit a construction site is logged as an “inspection;” as a result individual construction projects may be inspected numerous times. Figure 4 shows the 12-year trend of the construction inspection program. Figure 5 shows the 12-year trend of annual enforcement actions.



**Figure 4** Number of annual inspections.



**Figure 5** Number of annual enforcement actions.

### Training

Educational training for construction site operators is conducted during the site inspection process. This training includes distribution of the District's *Stormwater Management Guidebooks* and the *Erosion & Sediment Control Handbook* (provided as attachments to the 2007 Annual Report), and addresses particular needs and questions of the operators. These books outline the regulatory requirements of the District for construction activity.

**FY 2013 Goals:** The District will continue to review and approve SWM plans and to provide staff refresher training to continually improve efficiency for review and provision of technical assistance. The District will continue to provide educational materials to construction site operators and to enforce the inspection procedure guidelines.

The District will continue inspections of commercial, residential, and road construction projects for the maintenance and implementation of erosion control devices and BMPs. DDOE will continue to track SWM facilities inspected and their BMPs through the automated database system.

### **G. Management of Illicit Discharges and Improper Disposal**

The District maintains an illicit discharge program designed to detect and eliminate illicit discharges within the District. DDOE, with the support of DC Water and DPW, conduct activities related to illicit discharge detection and elimination.

#### Illicit Discharge Enforcement

DDOE investigates illicit discharges and enforces the District's Water Pollution Control Act regulations in accordance with the District's water quality standards.

In FY 2011, DDOE staff conducted:

- 61 illicit discharge investigations
- 20 emergency responses
- 240 targeted facility inspections
- 191 outfall inspections

In FY 2012, DDOE staff conducted:

- 54 illicit discharge investigations
- 20 emergency responses
- 186 targeted facility inspections
- 166 outfall inspections

As a result of the total investigations and inspections, DDOE issued 71 compliance requests in FY 2011 and FY 2012, and has worked with all facilities to obtain compliance. Detailed information on the targeted facility inspections and illicit discharge investigations are provided in Appendix G.

**FY 2013 Goals:** The District will continue to investigating illegal dumping complaints, overgrown lots, poor trash containerization and other sanitation violations; continue the program to detect illicit discharges as described in the upgraded SWM Plan and the Permit, and to prevent improper disposal into the storm sewer system as required by federal regulations. DDOE personnel will continue to investigate potential illicit discharges in response to reports by citizens or government personnel.

#### Outfall Inventory

The existing MS4 infrastructure and outfall location data have been combined with current outfall inspection data to develop a comprehensive inventory of outfalls locations and specifications. Outfall locations are verified in the field during the course of routine inspections as it is needed. DC Water is currently developing a database for storing inspection data that comes in from the field as part of the outfall repair program. This database identifies 415 outfalls as being located in the MS4 area. Table 20 presents the number of these outfalls in the MS4 by watershed.

**Table 20** Number of Outfalls Identified by Watershed

Watershed	Number of Outfalls
Anacostia River	153
Potomac River	125
Rock Creek	137
<b>Total</b>	<b>415</b>

### Illegal Dumping

DPW's Solid Waste Education and Enforcement Program (SWEEP) seeks to maintain clean private and public spaces by investigating illegal dumping complaints, overgrown lots, poor trash containerization and other sanitation violations.

SWEEP activities in FY 2011 included:

- 10,742 responses to requests for action
- 1,657 responses for illegal dumping

SWEEP activities in FY 2012 included:

- 9,851 responses to requests for action
- 3,066 responses for illegal dumping
- View information on DPW SWEEP program at <http://dpw.dc.gov/DC/DPW/Services+on+Your+Block/Street+and+Alley+Cleaning/Solid+Waste+Education+and+Enforcement+Program+%28SWEEP%29>.

### Littering

In December 2008, The Council of the District of Columbia enacted legislation to enable MPD to enforce anti-littering laws. The fine for the littering violation is \$75. This law also allowed MPD to enforce against littering from a vehicle. The penalty for the offense is a \$100 fine, with any appeals adjudicated by the Department of Motor Vehicles. Since this violation is enforced and adjudicated similar to other civil traffic violations, it was immediately implemented across the District.

Due to the ticket and adjudication process for enforcing anti-litter laws being so new, enforcement began with a pilot program in the Fourth District. On August 1, 2012, MPD expanded this pilot project and launched Phase II of the littering enforcement program in the Sixth Police District. Phase I of the project will continue in the 4<sup>th</sup> District (which consists of part of Ward 4). Starting September 1, 2012, officers in the 6<sup>th</sup> District (which consists of part of Wards 7 and 8) began writing valid tickets.

- In 2011, the 4<sup>th</sup> District issued 12 tickets for littering
- Between January 1 and July 31, 2012, the 4<sup>th</sup> District has written 3 tickets for littering
- In 2011, MPD issued a total of 64 tickets for littering from a vehicle
- At this time we do not have the data on how many vehicle littering tickets have been issued in 2012

### Pet Waste

DDOE continues to refine and implement an education and outreach program entitled "Scoop Your Pet's Poop." This program is designed to inform citizens of their legal obligation to manage their pet's waste and to explain the reasons why it is important to do so.

In FY 2012, DDOE staff finalized a Scoop Your Poop brochure and flyer as well as metal road signs. Since the flyers were finalized, over 1,000 have been handed out to community groups and pet stores. Road signs have been distributed to the Department of Health, Department of Parks and Recreation and the NoMa Business Improvement District (BID) for installation.

**FY 2013 Goals:** DDOE will continue to distribute Scoop Your Poop educational materials to District Agencies, pet supply stores, veterinarian offices, Business Improvement Districts and at public events. DDOE will continue to install metal Scoop Your Poop signs at key identified “hot spots” around the District.

- Copies of the flyer and metal sign are included in Appendix H

#### Household Hazardous Waste

The District continues to provide household hazardous waste (HHW) collection and seasonal leaf collection. During FY 2011 and FY 2012, DPW operated monthly HHW drop-off sites at the Ft. Totten Transfer Station. Each Saturday, residents are able bring their HHW materials and unwanted electronics for proper disposal. In addition, DPW provides shredding services for confidential papers. Appendix I contains details of the Districts household hazardous waste collection in FY 2011 and FY 2012.

In FY 2011 DPW leaf and holiday collection:

- 87 tons of holiday trees
- 6,827 tons of leaves

In FY 2012 DPW leaf and holiday collection:

- 127 tons of holiday trees
- 5,659.39 tons of leaves
- View information about DPWs Household Hazardous Waste services at <http://dpw.dc.gov/DC/DPW/Services+on+Your+Block/Recycling/Household+Hazardous+Waste+-+E-cycling-+Document+Shredding>.

**FY 2011 Goals:** The District will strive to increase the number of citizens participating in the household hazardous waste and leaf collection programs through public education and the continuation of HHW collection at one Transfer Station on a monthly basis.

#### Motor Vehicle Fluids and Autobody Repair

Auto repair facilities continue to be targeted for education on proper disposal of waste oil, good housekeeping and spill prevention and response. DDOE has now offered three workshops for auto service sector in the District (September 1, 2011, March 1, 2012 and September 6, 2012). The workshop, *Environmental Compliance & Technical Assistance for Auto Service and Repair Shops*, is offered to managers, owners, and employees of gasoline



stations, repair shops, and maintenance garages. This sector has significant direct impact on the health of DC waters.

DDOE has now reached 59 individuals, mostly managers and owners of gasoline stations and auto repair shops. Several universities have also attended – Gallaudet, Georgetown and Catholic Universities, which manage fleet vehicles. Six DDOE divisions presented this multimedia compliance assistance workshop.

FY 2013 goals: A listening session will be held in March 2013 to provide a chance for representatives from the auto service industry to have further dialogue with DDOE inspectors. This was scheduled as a result of surveys that indicated auto service workers would like further trainings and conversations with inspectors.

- View outreach materials, presentations and workshop information at <http://ddoe.dc.gov/event/environmental-compliance-and-technical-assistance-auto-service-and-repair-shops>.
- Visit DDOE's website for pollution prevention information for the autobody/autoservice industry: <http://ddoe.dc.gov/service/environmental-issues-auto-repair-and-maintenance>.
- View the DDOE Auto Services brochure at [http://ddoe.dc.gov/sites/default/files/dc/sites/ddoe/publication/attachments/2009.05.18\\_Auto\\_Repair\\_Brochure.pdf](http://ddoe.dc.gov/sites/default/files/dc/sites/ddoe/publication/attachments/2009.05.18_Auto_Repair_Brochure.pdf).

#### Coal Tar Enforcement

During FY 2011 and 2012, the District continued to enforce its prohibition on the sale, use, and permitting of coal tar-based pavement products (enacted during FY 2009).

In FY 2011 DDOE staff:

- Conducted 46 inspections
- Issued 7 NOVs

In FY 2012 DDOE staff:

- Conducted 75 inspections
- Issued 1 NOV
- Issued 1 NOI

DDOE maintains a tipline for citizens to report a business they suspect is in violation of the District's ban on coal tar pavement products.

Coal tar education and outreach efforts are reported in Section II.I.4 of this report.

**FY 2013 Goals:** DDOE will continue the coal tar ban enforcement efforts and continue to draft regulations for the implementation of the ban on coal tar. These activities are funded for FY 2012 at levels of service consistent with historical needs.

- View information about the ban on coal tar at <http://green.dc.gov/coaltarban>.
- View the Coal Tar Pavement Product tipline at <http://green.dc.gov/coaltartip>.

#### Anacostia Clean Up and Protection Act Enforcement

In FY 2011 and FY 2012, the District continued to implement the Bag Law, which requires all District businesses selling food or alcohol to charge \$.05 for each disposable paper or plastic carryout bag.

In FY 2011, DDOE staff:

- Conducted 335 inspections
- Issued 188 NOVs
- Issued 13 NOIs

In FY 2012, DDOE staff:

- Conducted 466 inspections
- Issued 213 NOVs
- Issued 32 NOIs

DDOE maintains a tipline for citizens to report a business they suspect is in violation of the Bag Law.

**FY2013 Goals:** DDOE will continue compliance education and enforcement efforts for the Bag Law Program. These activities are funded for FY 2012 at levels of service consistent with historical needs.

- View information about the Bag Law at <http://green.dc.gov/bags>.
- View the Bag Law tipline at <http://green.dc.gov/baglawtip>.

## **H. Flood Control Projects**

The District's flood control program acts to maintain existing flood controls on its waterways (Watts Branch and the Potomac River Tidal Basin) and ongoing flood impact programs with the Federal Emergency Management Agency (FEMA). These activities seek to minimize flooding impacts due to large storm events.

Flood zone information is critical in determining the availability of flood insurance and eligibility for federal assistance in the event of natural disasters caused by floods.

#### Floodplain Development Procedures and Reviews

The District Floodplain Management Program of the DDOE Watershed Protection Division reviews plans for development projects located in District floodplains. Evaluations are made on quantity control and potential water quality impacts for proposed flood management projects according to the laws and regulations that govern the District Floodplain Management Program. In FY 2011, DDOE processed 98 requests for flood zone determinations at various properties in the District, and 173 in FY 2012.

The above information was reported to FEMA as part of grant program reports.

#### Existing Flood Control Devices Retrofit Assessment

The District of Columbia operates and maintains flood control devices including BMPs, pump stations, flood and tide gates, weirs, canals, and stormwater collection and conveyance systems. The District has levees located at Potomac Park, Lincoln Memorial, Constitution Avenue, Fort McNair, and along Anacostia Park.

#### Impervious Surfaces Evaluation

DDOE continues to review and assess the impervious area on proposed development through the construction plan information submitted with construction permit applications under 20 DCMR and the Water Pollution Control Act of 1984, D.C. Official Code § 8-103.01 *et. seq.*

Additionally, DDOE, in collaboration with OCTO, performed an analysis to determine the percentage of impervious surface on the District floodplains using FEMA Q3 flood data for three floodplain types: 100-year with velocity hazard (Zone A), 100-year floodplain (Zone AE), and 500-year floodplain (Zone X500). Features analyzed included buildings, sidewalks, and roads. The resulting percentage of total impervious surface area that is within the floodplains was calculated using GIS

- View information on federal floodplain management at <http://ddoe.dc.gov/service/floodplain-management>.
- View information on DDOE's Floodplain Management Program at <http://ddoe.dc.gov/service/residential-stormwater-and-flooding>.

**2013 Goals:** The District will continue to review development projects in the Development and Activity Database maintained by the Office of Planning. As well as continue coordination with FEMA and other partners and stakeholders regarding the District's floodplain management program.

### **I. Public Education and Participation**

#### **1. Education and Outreach**

DC Water, DDOT, DPW and DDOE conduct public education activities related to stormwater pollution. The stormwater pollution control public education program entails a mixture of programs targeting:

- Teachers and students
- Businesses
- District employees
- Homeowners and property managers
- Developers and engineers
- General public

## **2. Measurement of Impacts**

DDOE continues to investigate approaches to quantifying pollutant reductions associated with robust education and outreach programs.

In FY 2012, DDOE awarded the Alice Ferguson Foundation (AFF) a grant to conduct a large-scale research project entitled, “The Bag Law Consumption Trends Study.” The study is intended to provide DDOE with statistically significant details on actual bag consumption rates in the District of Columbia since the \$.05 fee requirement took effect on January 1, 2010. The study will also provide an understanding of District residents’ attitudes and behaviors toward single-use bag use from January 2010 to the present. In addition, the study will provide an understanding of the District’s business owners, managers and resident’s attitudes toward single-use bag use and the law’s impact on their businesses, before implementation of the law in January 2010 to present.

**FY 2013 Goals:** DDOE recognizes that human behavior plays an integral part in the amount of trash pollution in local rivers and streams. As a result, DDOE issued a Request for Applications for proposals to conduct targeted implementation of the Regional Litter Prevention Campaign throughout the Anacostia watershed and evaluate behavior change as a result of the campaign.

## **3. Recordkeeping**

DDOE continues to track and record stormwater related public education and outreach activities through the WPD database. Items the WPD database tracks are:

- District Youth receiving environmental education
- District teachers receiving environmental education training
- Agency staff receiving training
- Watershed meetings attended
- Environmental events attended

## **4. Public Involvement and Participation**

The District conducts education and outreach activities for a comprehensive variety of stormwater management issues, including nonpoint source pollution, illicit discharges and pollution prevention, household hazardous waste and litter. These programs range

from volunteer stream cleanup events, storm drain marking, and school and community group presentations to Webbased information and multimedia outreach efforts.

#### Watershed and Environmental Education

DDOE sponsors and implements environmental education and outreach activities targeted to teachers, environmental educators and students throughout the District.

In FY 2011:

- 1,428 youth were provided environmental education
- 21 educators were trained to teach environmental education
- 1,512 individuals were provided with watershed education information
- 602 watershed coordination meetings were attended by DDOE staff
- 57 environmental and watershed events were attended by DDOE staff

In FY 2012:

- 50 educators were trained to teach environmental education
- 300 youth were provided watershed education
- View information about DDOE's watershed education programs at <http://ddoe.dc.gov/service/hands-environmental-learning>.

#### *RiverSmart Schools*

RiverSmart schools works with applicant schools to install LID practices to control stormwater. These practices are specially designed to be functional as well as educational to fit with the school environment. Additionally, schools that take part in the RiverSmart Schools program receive teacher training on how to use the sites to teach to curriculum standards and how to properly maintain the sites.

In FY 2011, DDOE Watershed Protection Division (WPD) accomplished the following:

- Provided 27 teachers with a 4-day workshop on RiverSmart schools site usage and programming

In FY 2012, WPD accomplished the following:

- Created four outdoor habitat learning gardens at four different schools

#### *Stokes Public Charter School*

- Installed permeable pavement with sufficient depth to infiltrate both the stormwater generated from the parking area of approximately 7,000 square feet and from the impervious roadway and play area upslope of the parking lot
- Removed a 1.5-foot diameter invasive tree and planted a native shade tree and shrubs along the north end of the permeable parking lot

- Created an outdoor classroom on the southern side of the campus with seating for 30

#### ***Hardy Middle School***

- Awarded Hardy Middle School a RiverSmart Schools grant to build a new wetland area, butterfly garden and vegetable garden on a marshy patch of grass next to the impervious tennis courts
- Provided students in 6<sup>th</sup> and 7<sup>th</sup> grades with lessons about their local environment and watershed and engaged students in wetland planting activities

#### ***Benjamin Banneker High School***

- Coordinated the installation of a flowthrough, bioretention planter and a 500-gallon cistern to capture and store rainwater from the rooftop
- Installed built-in seating for students using the courtyard

#### ***Walker Jones Education Campus***

- Contracted the construction of a 45foot x 12foot covered classroom
- Installed a 1,300 gallon cistern
- More than 250 students have used the classroom to be taught about rain water harvesting

#### ***Conservation Education (Project Learning Tree, Project WET, and Project WILD)***

These programs are utilized to train educators in innovative techniques for exploring a wide range of environmental concepts with students and teaching critical thinking skills that lead to environmental stewardship (grades K–12).

#### ***Teacher Training Workshops***

Teacher training workshops in environmental education provide teachers with continuing education credits through accredited environmental curriculums that support the DCPS teaching and learning standards and provide students with meaningful environmental education experiences via outdoor activities and events.

#### ***Storm Drain Markers***

In FY 2011, WPD installed 942 storm drain markers throughout the District of Columbia with private citizens, youth groups, individuals from various volunteer groups and DCPS school groups. WPD installed 650 storm drain markers in FY 2012.

#### ***District of Columbia Environmental Education Consortium (DCEEC)***

DDOE helps to organize a network of environmental educators throughout the city so that ideas and resources can be shared among them. DCEEC provides opportunities for networking, event coordination and program partnering among its members. The members provide environmental expertise, professional development opportunities, curricula and resources, and hands-on classroom and field studies to District schools.

### *The Anacostia River Environmental Education Fair*

This annual outdoor event offers District school children a variety of educational experiences designed to promote in them a conservation and stewardship ethic toward their watersheds, the Anacostia and Potomac Rivers, and the Chesapeake Bay. The fair also provides additional resources to District teachers interested in enriching their curriculum through environmental studies.

- The Anacostia Fair took place on Friday, May 6, 2011
- Six DCPS schools, 38 teachers, 400 students, and 19 exhibitors were a part of the event

### *Meaningful Watershed Educational Experiences (MWEEs)*

- AFF, with DDOE funding, successfully conducted 10 overnight field-study trips for 237 4<sup>th</sup> and 5<sup>th</sup> grade students at Hard Bargain Farm from May 17 through October 4, 2011. AFF provided 20 MWEE hours and 4 follow-up hours for 237 students.
- Living Classrooms of the National Capital Region provided 398 MWEE hours and 20 hours of follow-up for 913 4<sup>th</sup> and 5<sup>th</sup> grade students.
- The National Council for Science and the Environment provided 398 MWEE hours and 17 hours of follow-up for 415 students.
- Additional details on MWEEs are outlined in Section II.J.1 of this report.

### Homeowners and Residents

DDOE continues to implement programs targeted at residents and homeowners:

#### *RiverSmart Washington*

RiverSmart Washington is a multi-agency project to install LID neighborhood wide on public and private lands to measure volume reduction. There are two project areas in the Rock Creek Watershed. The MacFarland CSS site is in the Petworth neighborhood and the Lafayette MS4 site is in the Chevy Chase neighborhood. DDOE and DDOT held six project specific meetings with residents in December 2011, February 2012, and July 2012 to present project plans and discuss the stormwater goals and methods of the project. DDOE and DDOT attended seven additional community meetings in FY 2011 and FY 2012 to provide project overview and updates. DDOE and DDOT worked closely with residents in the project areas to determine best placement of stormwater bumpouts and permeable pavement to minimize impacts to street parking and other neighborhood needs. Fact sheets on the project for each neighborhood were provided to residents and posted on DDOT's DTAP project website. The RiverSmart Washington project will start construction in FY 2013.

#### *Green Alleys*

DDOT has been conducting outreach and education to the communities surrounding several Green Alley projects. Fact sheets and "Green Alley Do's and Don'ts" were provided to the residents living on the Green Alleys completed in FY 2012. DDOT held community meetings with residents on the Q Street Green Alley in February and June

2011. DDOT met with residents living on the Ashley Terrace Green Alley to present the project in December 2011 and presented at an additional community meeting in October 2011. Both the Q Street Green Alley and the Ashley Terrace Green Alley are scheduled for construction in FY 2013 to FY 2014.

#### *RiverSmart Homes*

In FY 2011 and FY 2012, DDOE continued the RiverSmart Homes Program that offers incentives to homeowners for implementing various practices (installation of rain barrels and rain gardens, planting large trees, replacing impervious surfaces with pervious surfaces, etc) in their yards that will reduce stormwater runoff. Efforts to date on this program are described in more detail in Section II.A.

#### *Integrated Pest Management/Nutrient Management*

DDOE continues to implement the Integrated Pest Management/Nutrient Management program. Educational materials, such as brochures and videos that provide suggestions on proper lawn fertilization, disposal of household waste, and application of pesticides and herbicides, were distributed to gardeners, homeowners and teachers. The materials were primarily distributed through the Environmental Resource Center at environmental events where the target audience is teachers and District residents.

#### *Clean Marina*

DDOE and NPS of the National Capital Region ( partner with marinas the District to educate the public on environmentally responsible boating practices. The Clean Marina Program encourages marina, boatyard, and boat club operators, as well as the boating public, to reduce pollution through their daily operations and through encouraging boaters to do the same. In FY 2011, DDOE recertified four marinas/ clubs and in FY 2012, DDOE recertified four marinas/ clubs. Additionally, in FY 2011, DDOE implemented the Clean Marina Partner Program and certified one marina partner.

#### Proposed Rulemaking on Stormwater Management and Soil Erosion and Sediment Control

To inform stakeholders about the Proposed Rulemaking and accompanying Guidebook, DDOE hosted numerous training sessions and public hearings. These were held primarily during the 90-day comment period, though some occurred before and after. Additional details about the Proposed Rulemaking and Guidbook can be found in Sections II.A.1 and II.B.3 of this report.

#### Trash and Litter

A major component of DDOE's public education activities in FY 2011 and FY 2012 related to anti-littering and trash prevention efforts. Trash education and outreach activities are detailed in II.J.1 *Education and Outreach*.



*Skip the Bag, Save the River*

As part of the Skip the Bag, Save the River Campaign DDOE purchased 45,000 reusable bags for distribution to District residents. DDOE is partnering with a number of grocery and drug stores, District Government agencies, Council offices and various community service organizations to give reusable bags to low-income and senior District residents. Staff from DDOE's Skip the Bag, Save the River campaigns attended a variety of community events including:

- 2011 H Street Festival
- World Environment Day events
- 2011 and 2012 Live Green DC Festival
- UDC Green Expo

DDOE's Community Outreach Office sent newly designed register decals to all businesses subject to the Bag Law, as well as a letter explaining how the Bag Law works.

DDOE created a new TV ad on the Bag Law that explains how Bag Law money is being spent to clean up our local waterways. In addition, DDOE aired two new Bag Law radio ads on WTOP.

- View the Bag Law television advertisement at <http://www.youtube.com/watch?v=Tm5IRZ37N0s>.

Educational Materials

In FY 2011 and FY 2012, DDOE staff developed educational materials for several specific types of businesses and the general public.

Posters and brochures explaining the ban on coal tar pavement products have been sent to wholesale distributors and supply stores in the District.

Scoop Your Poop brochures and flyers were developed in FY 2012 and distributed to pet supply stores, Business and Improvement Districts and the general public.

Auto repair facilities and autobody shops continue to be targeted for education on proper disposal of waste oil. Educational posters and brochures for auto service employees are currently handed out during all automotive inspections.

- All educational materials can be viewed in Appendix H.

Public Website and Social Media

DDOE continues to maintain and improve its webpage and social media sites that provide information related to components of the District's MS4 permit. The DDOE District Government website was overhauled in FY 2012 and was relaunched in January 2012. This website is updated daily by DDOE staff. There are also links to report documents

prepared by DDOE, documents and plans for public comment, educational materials, trainings and educational activities.

DDOE websites and social media sites:

- [www.ddoe.dc.gov](http://www.ddoe.dc.gov)
- [https://twitter.com/DDOE\\_DC](https://twitter.com/DDOE_DC)
- <https://www.facebook.com/DC.DDOE>
- <http://www.youtube.com/user/DDOEPublicInfo>
- <http://green.dc.gov/release/foilage-newsletter>

From January 1, 2012 until October 2012, [www.ddoe.dc.gov](http://www.ddoe.dc.gov) received over 125,000 visits.

DDOE's e-newsletter, Foliage, published eleven blog posts on stormwater management issues in FY 2011 and FY 2012.

- View Foliage at <http://ddoe.dc.gov/page/foilage-e-newsletter>.

**FY 2013 Goals:** The District will periodically evaluate existing public education materials and revise or develop additional materials as necessary. DDOE will continue to update, add to, and refine the website and social media outreach to display all relevant information including reports, accomplishments and outreach materials.

## **J. Total Maximum Daily Load Wasteload Allocation Planning and Implementation**

### **1. Anacostia River Watershed Trash TMDL Implementation**

This section of the Annual Report is in response to Sections 4.3.5.4 and 4.10 of the MS4 permit promulgated on January 22, 2011. Under this iteration of the permit, the District is required to implement measures by 2017 which will help remove 103,188 lbs of trash per year from the Anacostia River.

In addition, Section 4.10 requires the District to submit a trash reduction calculation methodology with the 2013 Annual Report to EPA for review and approval. Following submittal to EPA, the District will request input from local stakeholders on the methodology and discuss suggested modifications with EPA.

#### Trash Reduction Calculation Methodology

The District has reported in several of the past MS4 Annual Reports on implementation of BMPs noted as acceptable trash reduction practices under §4.10 of the permit. However, many of these practices were implemented before establishment of baseline loads for point and nonpoint sources included in the trash TMDL (e.g., skimmer boats, street sweeping). The District will continue to report on trash reductions via all of these practices, but will only credit practices that were not reflected in the TMDL's baseline

load (e.g., in-stream trash traps not upstream of stream sampling transects). The following practices will be included:

1. In-stream and end-of-pipe best management practices (e.g., trash traps)
2. Skimmer boat activities
3. Stream and River clean-up activities
4. Roadway and block clean-ups
5. Street sweeping environmental hotspots
6. Education and outreach
7. Regulatory approaches (e.g., Bag Fee)

Below is a description of the practices noted above. For some of these practices (e.g., instream and end-of-pipe BMPs; stream clean-up activities), empirical data will be collected which will be reported annually as part of the annual trash reductions. For other practices trash removal efficiencies were developed based on best professional judgment. For most practices, conservative reduction factors were applied due to reflect uncertainty in the data collected. For example, skimmer boats which operate in the lower Anacostia may collect trash deposited through the combined sewer system (CSS), the MS4, upstream of the District or from the main stem of the Potomac via tidal action. For the total trash collected by the skimmer boats, several reduction factors will be applied. First, since only 16.5 percent of the Anacostia watershed lies within the District, a reduction factor of 16.5 percent will be applied to the total amount of trash collected. Next, since 50.8 percent of the District's portion of the Anacostia watershed is served by the MS4, an additional reduction factor of 50.8 percent will be applied to account only for trash discharged from the MS4. Thirdly, since skimmer boats collect debris that may not be considered "trash" for TMDL purposes, another reduction factor of 50 percent is applied. Finally, since a large portion of the trash collected may consist of plastic and glass bottles still full of water, which could increase the weight of trash collected, another reduction factor of 20 percent will be applied.

Below is an example calculation:

A total of 700,000 pounds (lbs) of litter and debris were reported to be collected by DC Water skimmer boat operations between FY 2011 and FY 2012.

$700,000 \times 16.5\%$  (DC's portion of the Anacostia watershed) = 115,793 lbs

Next,  $115,793 \text{ lbs} \times 50.8\%$  (area of the District's portion of the watershed served by the MS4) = 58,776 lbs

Next,  $58,776 \text{ lbs} \times 50\%$  (due to the fact that not all debris collected may be "trash") = 29,388 lbs

Lastly,  $36,881 \text{ lbs} \times 20\%$  (due to the fact that plastic, glass, and metal containers may not be emptied of water) = 5,877 lbs

This section also addresses future implementation of BMPs. For strategic planning purposes, the District has identified “hotspot MS4 sewersheds” for priority placement of BMPs. As new types of practices are implemented, the District will report on their usage in future MS4 Annual Reports, as well as efficiencies and reduction factors applied to those practices.

#### *In-Stream and End-of-Pipe Best Management Practices*

The District has implemented several innovative design solutions for removing trash from local waterways. As early as 2008, the District provided a grant to the Anacostia Watershed Society (AWS) to design and install a custom designed trash removal device in Nash Run, a tributary to the upper Anacostia (Figure 6). The District has also installed a proprietary design, the Bandalong Litter Trap™, both in-stream and at an MS4 outfall along the Anacostia (Figure 7). As mentioned earlier, the first Bandalong was installed near the mouth of Watts Branch, another tributary to the Upper Anacostia, in spring 2009. Two additional Bandalongs, one at an MS4 outfall in southwest DC and an additional trap in Watts Branch at the DC/MD border, were installed in winter 2012.



**Figure 6** Trash removal device custom designed for Nash Run.

In addition, the District completed installation of a custom designed stormwater BMP for collecting trash, organic debris, sediment, oil and other pollutants at an MS4 outfall which drains into Hickey Run in the upper Anacostia watershed (Figure 8). This device cost nearly \$2 million to design and install. This device was designed to collect over 10,000 lbs of trash per year based on calculations for the Hickey Run catchment using the same calculation methodology utilized for development of the trash TMDL.



**Figure 7** Upper Watts Branch bandalong.



**Figure 8** Custom designed stormwater BMP.

The District has been able to collect a considerable amount of empirical data for several of the practices noted above in order to assign efficiencies on their effectiveness. Even though end of pipe BMPs can capture a significant amount of trash, exceptionally high storm events can lead to overflows which lead to trash bypassing a device. All devices must be outfitted with a fail-safe bypass mechanism in order to ensure backwatering will not take place within the sewer system upstream and that flooding events are minimized. In addition, Bandalongs are primarily designed to catch floatables. While a significant amount of the trash load is due to floatable materials (e.g., plastic bags, bottles, Styrofoam), neutrally buoyant materials are not always captured.

At this time, not all devices have been monitored. Due to delays in contracting, regular maintenance of the Hickey Run BMP did not begin until summer 2012, so the District has very limited data on the effectiveness of that device. As more empirical data becomes available the District will provide it in MS4 Annual Reports to EPA.



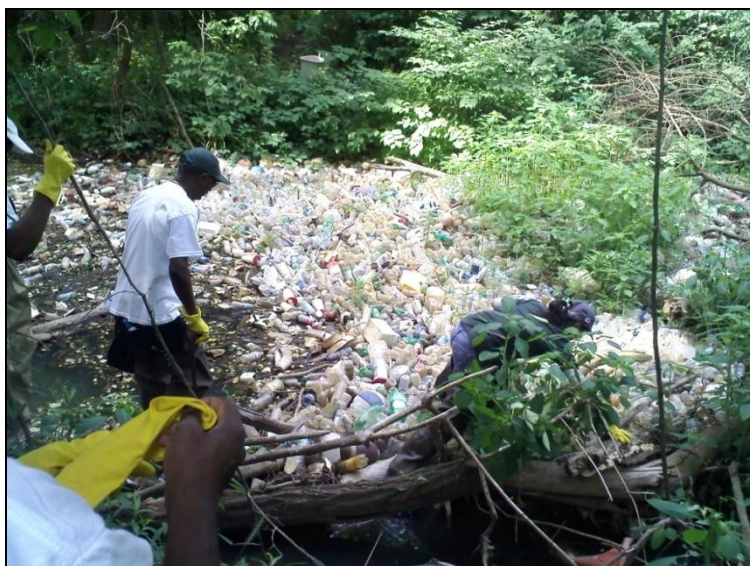
To help plan future implementation of BMPs, efficiencies derived from all empirical data collected to date were calculated. However, for annual reporting purposes, only empirical data collected from regular maintenance of these devices will be reported. Table 21 displays the assumed efficiencies for various in-stream and end-of-pipe devices.

For both cases, the total amount of trash or (in the case of devices which have been installed for more than two years) an average annual load captured in various devices was divided by the trash load for the sewershed which empties to that device. Those loads were developed using the trash loading coefficients developed for the District's portion of the Anacostia trash TMDL.

**Table 21** Efficiencies and Calculation Methodologies Developed for Various End-of-Pipe Practices

Device	Efficiency Calculation Methodology	Total Trash Load (pounds)	Total Trash Collected by Device (pounds)	Efficiency
Bandalong	The total annual amount of trash collected by the Bandalong located at the mouth of Watts Branch between March 2011 and March 2012 was divided by the total trash load for Watts Branch.	11,049	5,923	54%
Custom Designed Trash Traps	The average annual amount of trash collected by the Nash Run custom designed trap between March 2009 and March 2012, was divided by the total trash load for Nash Run	3,529	1,960	56%

To account for total annual trash loads removed, reductions were only applied to trash removed from the Hickey Run BMP. The device was designed to remove the total trash load for the catchment which drains to the BMP, based on the trash loading coefficients developed for the Anacostia trash TMDL. Until further data on its effectiveness is collected, the District assumes that 10,000 pounds of trash are removed from the MS4 by the device. However, since a significant amount of the trash collected will likely be plastic or glass bottles and cans, a reduction factor of 20 percent will be applied since not all of these containers may be emptied by maintenance crews.



**Figure 9** 2011 DDOE “All Hands” event.

Reduction factors were not applied to the Bandalongs or the Nash Run trash trap since crews maintaining those devices empty all cans, bottles, etc. of water before assessing total mass of trash removed during each clean-up event.

#### *Stream and River Clean-up Activities*

The District sponsors several clean-up events on an annual basis throughout the Anacostia watershed. Examples include DDOE All-Hands events, the annual AFF Potomac Trash Clean Up and the AWS Annual Anacostia River Trash Clean-up.

In 2012, AFF received a grant from the National Geographic Society Field Scope program to set up an on-line interactive web-based GIS to track the results from all clean-up events which take place within the Potomac watershed. The District will be working with AFF and other nonprofit partners to update this page as much as possible and extract data for annual reporting to EPA.

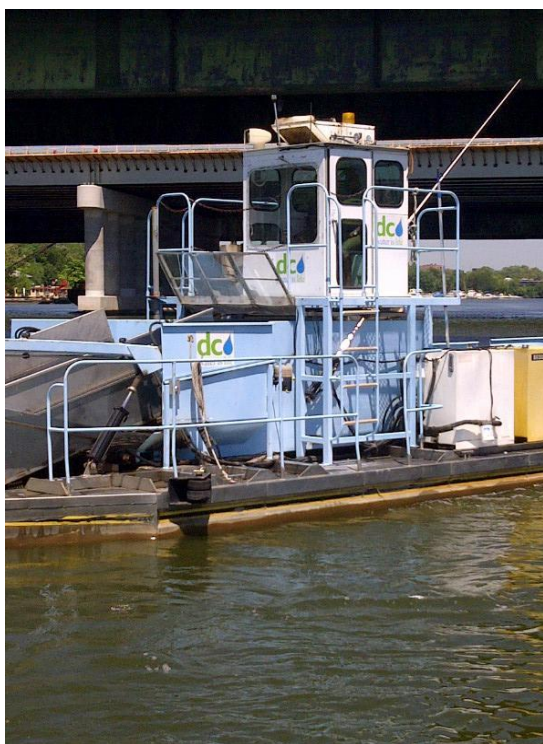
The District will use one of three methods for estimating the total amount of trash collected during each clean-up event:

1. Directly weighing collection bags with a hand scale
2. For a large number of bags, randomly picking three bags and multiplying the average weight of the three (measured with a hand-held scale) by the total number of bags collected
3. Using the AFF and AWS trash clean-up assumption that all full 20 gallon bags weigh 25 pounds

DDOE will be working with nonprofit partners to refine their data collection efforts. In addition, the District will work to account for trash data collected via the AFF Field

Scope website on an annual basis and supply that data to EPA. That website is expected to be publicly accessible sometime in 2013. Appendix J displays the clean-up event tracking sheet which will be updated for each annual report.

For all stream clean-ups a reduction factor of 50.8 percent is first applied to the total mass collected since only 50.8 percent of the District's portion of the Anacostia watershed is served by the MS4. Second, since there is no guarantee that all volunteers which participate in these events empty water from plastic/glass bottles, cans, etc., a second reduction factor of 20 percent will be applied.



**Figure 10** DC Water skimmer boat.

As previously mentioned, DC Water currently operates a skimmer boat fleet to remove trash and other debris from the Anacostia River, between the mouth and the CSX railroad bridge. DC Water estimates that between 350 and 530 tons of debris are removed from the Anacostia River mainstem annually. Because skimmer boats remove trash directly from the mainstem, this practice did not affect development of the baseline loads for the TMDL. In addition, the new MS4 permit directs the District to count skimmer boat operations towards meeting trash reduction goals. Details on the reduction factors applied to this practice are described earlier in this section.



### *Roadway and Block Clean-ups*

The Office of the Clean City (OCC), which resides within the Executive Office of the Mayor, is responsible for carrying out a program known as “Adopt-A-Block.” This program provides local citizens, community groups and other entities with resources to conduct clean-ups along neighborhood blocks four times per year. This program was initiated back in 2005. DDOE has worked with OCC to account for all blocks adopted since promulgation of the trash TMDL. DDOE will be working with OCC to collect as much data as possible from clean-up events for annual reporting. Clean-up sites will be assessed MS4-wide, in addition to the Anacostia MS4 area.

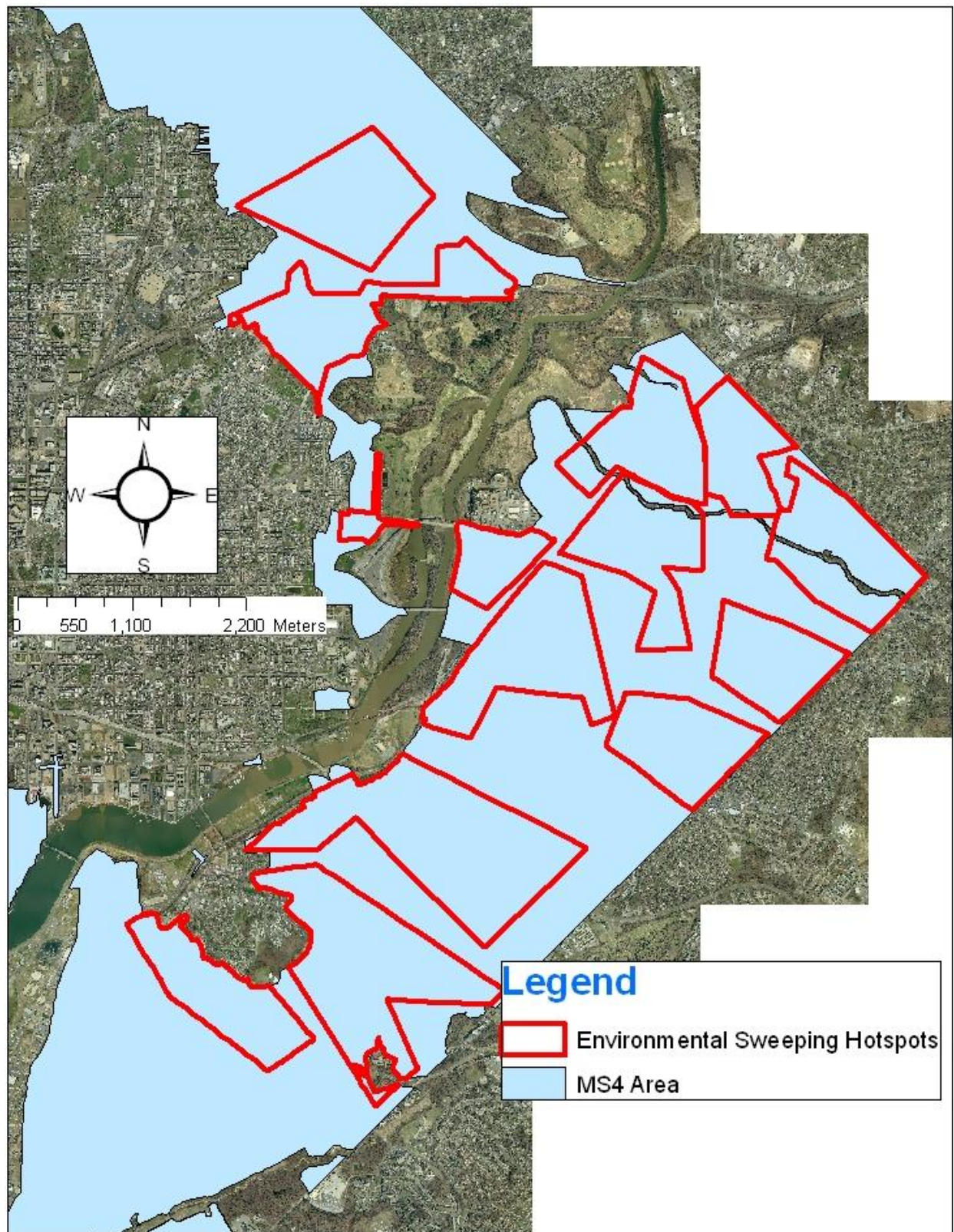
### *Street Sweeping Environmental Hotspots*

DDOE previously funded DPW to develop an enhanced street sweeping program for the District. The purpose of this project was to make sweeping conducted citywide more efficient so that extra time could be spent two days per month sweeping streets identified as environmental hotspots by DDOE. The study was completed in 2010, with implementation of the program taking place in 2011.

These hotspots were identified in the 2008 Anacostia Trash Reduction Strategy developed by AWS under a grant by DDOE. They were based on monitoring which took place along streets in the MS4 area of the District. Street sweeping was identified as an effective strategy in the report for reducing trash along roadways.

To estimate total loads reduced via street sweeping, total trash loads for the streets were estimated based on the TMDL trash loading coefficients. The total area of roadways estimated to be swept was multiplied by the trash load per acre for roadways estimated in the trash TMDL. That number was then divided in half because most of the roadways are unsigned sweeping areas. Sweeping which takes place in those areas is performed on an opportunistic basis. Local car owners are not required to move their cars away from the curb. Therefore only the middle of the roadway is swept in most of these areas. This severely reduces the area treated using this practice, therefore credit is only claimed for treatment of part of the roadway as a load reduction.

Since the hotspots are swept twice per month, eight months out of the year, the total load estimated using the trash loading coefficients was multiplied by 16. That load was then reduced by 50 percent since not all hotspots may be addressed during each sweeping event.



**Figure 11** Street sweeping targets for environmental hotspots.

### *Education and Outreach*

Section 4.9.4.4 of the MS4 permit requires that education and outreach efforts be applied to reducing all pollutant WLAs attributable to the MS4. From 2010–2011, DDOE funded AFF to conduct a behavioral study and concentrated anti-littering education and outreach approach in a neighborhood in the Anacostia watershed. The project, entitled “*Getting to the Source: Understanding District Citizens and Business Community Attitudes Towards Litter and Responses to Anti-litter Messaging and Strategies*,” was implemented in the northeast DC neighborhood of Deanwood, which lies within the Nash Run and Watts Branch watersheds. As part of that project, AFF collected data by conducting focus group sessions with area residents and conducting phone surveys. The information collected led to the development of their campaign “tool box” which contained a variety of visual materials such as posters, bumper stickers and banners.

- A full copy of the final report developed by AFF can be found at <http://ddoe.dc.gov/sites/default/files/dc/sites/ddoe/publication/attachments/AFF%20FINAL%20REPORT%2011-1-11.pdf>

DDOE has been working to disseminate the materials developed throughout the District. Figure 12 shows several of the posters contained in the campaign tool box. In addition, as part of the project, DDOE worked with AFF and National Environmental Education Foundation (NEEF) to develop an anti-littering cartoon. Figure 13 displays a screen capture of an anti-littering cartoon entitled “*Stormwater Sam Saves the Bay!*” Response to *Stormwater Sam* was highly positive with several of the District’s local and regional partners posting the cartoon on their websites and Facebook pages. *Stormwater Sam* was also featured for several months on DC’s public cable TV station.

In order to inspire behavioral change leading to trash reductions, DDOE will be issuing another grant in FY 2013 to conduct a concentrated education and outreach effort throughout the District’s portion of the Anacostia watershed. As part of that grant, the District is requiring the recipient to conduct a follow-up survey to their education and outreach efforts to assess the campaign’s effectiveness. The methodology must follow the Arlington County, VA model for assessing the effectiveness of their pet waste reduction campaign. The grantee must research and come up with a reasonable estimate for the total amount of trash produced by a District resident in the Anacostia per day. When the grantee conducts the survey, they must ask people if they have seen the District’s anti-littering posters, and if so, ask if the campaign has convinced them to stop littering. The grantee will then take the number of people who have responded yes, and multiply that by their assumed average amount of trash produced by each person per day. The grantee must pay particular attention to the geographic location of each individual surveyed so that reductions can be properly attributed to various sewersheds.





**Figure 12** Alice Ferguson Foundation anti-littering campaign materials.



**Figure 13** “Stormwater Sam Saves the Bay!” is an animated cartoon targeting trash reduction.  
View it at <http://green.dc.gov/service/water-district>.

DDOE also conducts education and outreach work in various schools located throughout the District. Beginning in November 2011, meaningful watershed education experiences (MWEEs) for trash were provided via a grant to AFF from DDOE in seven schools in Wards 7 and 8, both of which reside in the Anacostia watershed. The goal of this program is to provide full-day MWEEs to approximately 480 students from 24 third, fourth and fifth grade classes in DC Public Schools. As part of the MWEE, AFF will be implementing their Trash Free Schools Initiative. The initiative entails having each school complete eight steps for declaring their schools trash free (see Table 22). To evaluate the success of this program, AFF will measure pre- and post-tests of their projects to measure content knowledge and behavior change. Feedback from these evaluations will be used to shape future implementation of the program in other schools.

**Table 22** Eight Steps for Completing the AFF Trash Free Schools Initiative

Step	Action	Important Points to Remember	Documentation
1.	Sign the Trash Free School Pledge and Learn	Principal and Green Team Leader must sign Recommended to have entire school sign and put it on display	<input type="checkbox"/> Copy of signed Trash Free School Pledge
2.	Form a Green Team	Must have representation of: Teachers                      Students Administration              Parents Janitorial/Cafeteria	<input type="checkbox"/> Completed Green Team Member List
3.	Complete a Baseline Assessment	Try to have as much participation from your Green Team as possible	<input type="checkbox"/> Completed Baseline Assessment
	Create an Action Plan	Make SMART goals: Specific Measurable Attainable Recordable Timely	<input type="checkbox"/> Trash Free School Action Plan with future goals indicated
4.	Choose a Tracking or Monitoring System	Who will be responsible and how? Make sure the system makes sense for the action plan goals you develop	<input type="checkbox"/> Description* of method; may also include tracking data sheets, photos
5.	Organize a Kickoff Event	Make it fun and creative! Involve the whole school Can be combined with other events	<input type="checkbox"/> Description* of event; may include newsletter, flyers, photos <input type="checkbox"/> Submit Renewal Form online (not applicable to new schools)
6.	Take Action Educate and Inform Litter Prevention Campaign Rethink, Reduce, Reuse, Recycle	Review your action plan Start small Track and monitor Keep clear communication Connect with other Trash Free Schools and your community for support	<input type="checkbox"/> Green Team Meeting Notes <input type="checkbox"/> Description* of actions; may include posters, data sheets, flyers, photos <input type="checkbox"/> Action Plan with details on completed items
7.	Celebrate	Make it fun and creative! Involve the whole school or other events Include a reflection or evaluation piece	<input type="checkbox"/> Description* of event; may include flyers, photos, reflection details
8.	End-of-year Evaluation	Submit and review report card Review Action Plan Begin choosing actions for next year	<input type="checkbox"/> Completed Report Card (submit online)
Steps 1-4: Complete in 1 <sup>st</sup> year    Steps 5-8: Complete every year    * See Report Card for description details			

### *Regulatory Approaches*

The District has been a leader in the Potomac River watershed for adoption of progressive public policy for curbing litter in local waterways. In 2009, the District Council passed the Anacostia River Clean Up and Protection Act. Also known as the “Bag Law,” this legislation called for a \$.05 consumer fee to be placed on all plastic and paper bags used in the sale of merchandise in the District. Similar legislation has been passed elsewhere in the U.S. to curb the amount of plastic debris entering local waterways. Since its promulgation, Montgomery County, MD has adopted similar legislation, and both the Maryland and Virginia General Assemblies have discussed adopting similar policies. DC is leading by example in finding innovative non-structural controls to reducing litter from entering the Potomac watershed.

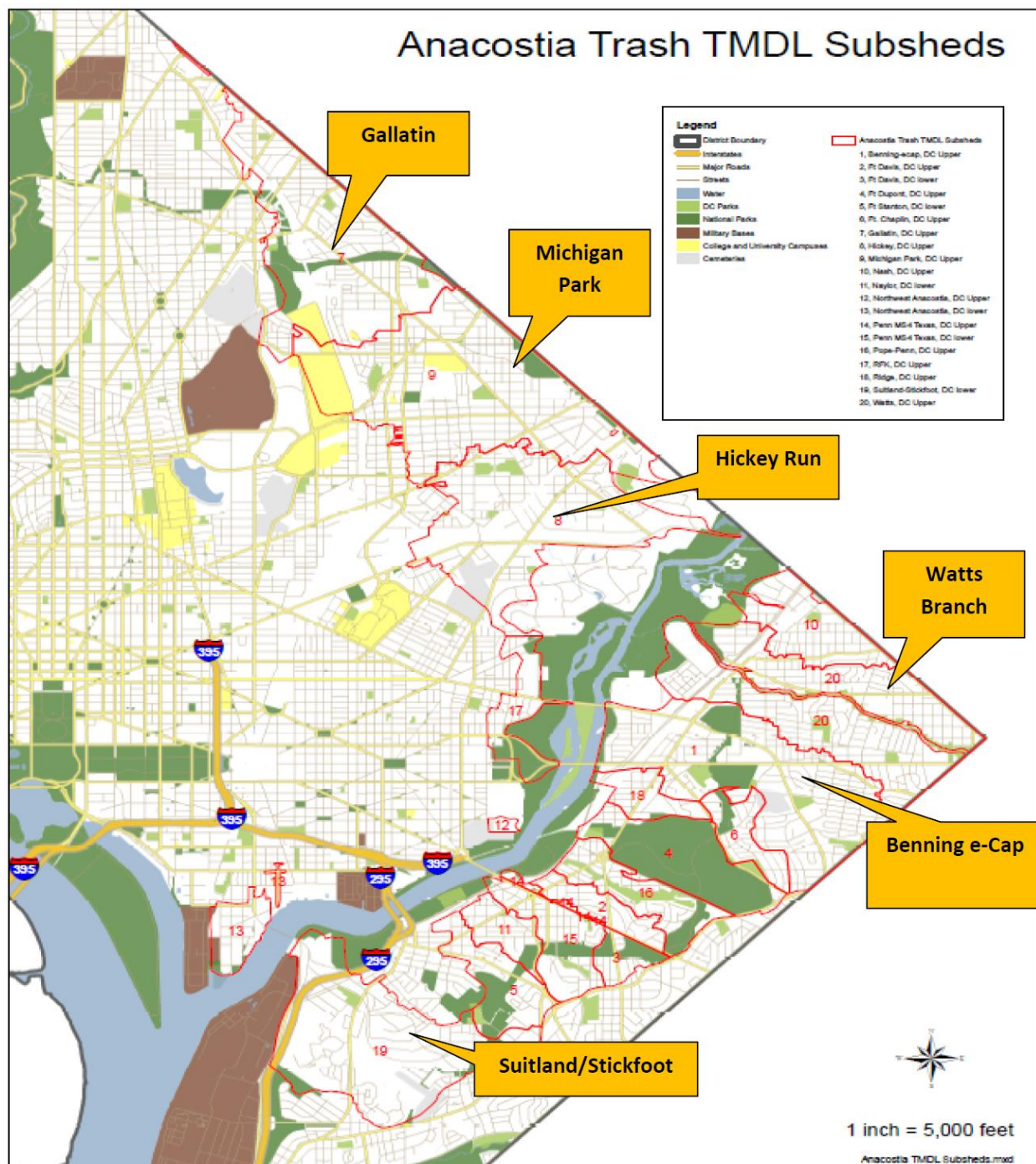
In September 2012, DDOE issued a grant to AFF to study the effectiveness of the Bag Law on local consumers. DDOE will work to use the information collected to refine this efficiency and apply adaptive management to the District’s trash reduction efforts if the efficiency is found to be much lower.

### Implementation of the Trash TMDL

The 2012 MS4 permit requires the District to reduce trash into the MS4 by 103,188 lb annually by January 22, 2017. This means the District must have all of the practices in place to remove this much trash from the Anacostia watershed on an annual basis. To accomplish this, the District must have a strategy to use as a road map for pinpointing opportunities to implement practices.

One of the steps DDOE has taken to pinpoint locations for implementation has been through the identification of “hotspot sewersheds.” These sewersheds possess higher than average trash loads calculated using the land use trash loading coefficients developed for the TMDL. Figure 14 displays the location of the hotspots in the District’s portion of the Anacostia watershed.





**Figure 14** Locations of hotspot sewersheds.



While not environmentally beneficial, the fact that the District is highly impervious and piped makes the development of a trash strategy slightly easier than other jurisdictions with less-developed infrastructure. Most of the hotspots are large sewersheds which drain to one or two MS4 outfalls. The first step the District will take to reduce its trash loads will be to pinpoint locations for installation of end-of-pipe BMPs. DDOE believes that these are the most effective practices at reducing trash loads to the Anacostia. The total estimated trash load (using the land use loading coefficients developed for the TMDL) for all hotspot sewersheds is equal to approximately 81,210 lbs/yr. If Bandalongs were placed at each outfall (assuming an efficiency of 54 percent discussed) then DDOE could effectively eliminate 43,804 lbs of trash per year. If custom designed traps were installed at each of these outfalls (assuming an efficiency of 56 percent) then DDOE could effectively eliminate 45,478 lbs of trash per year.

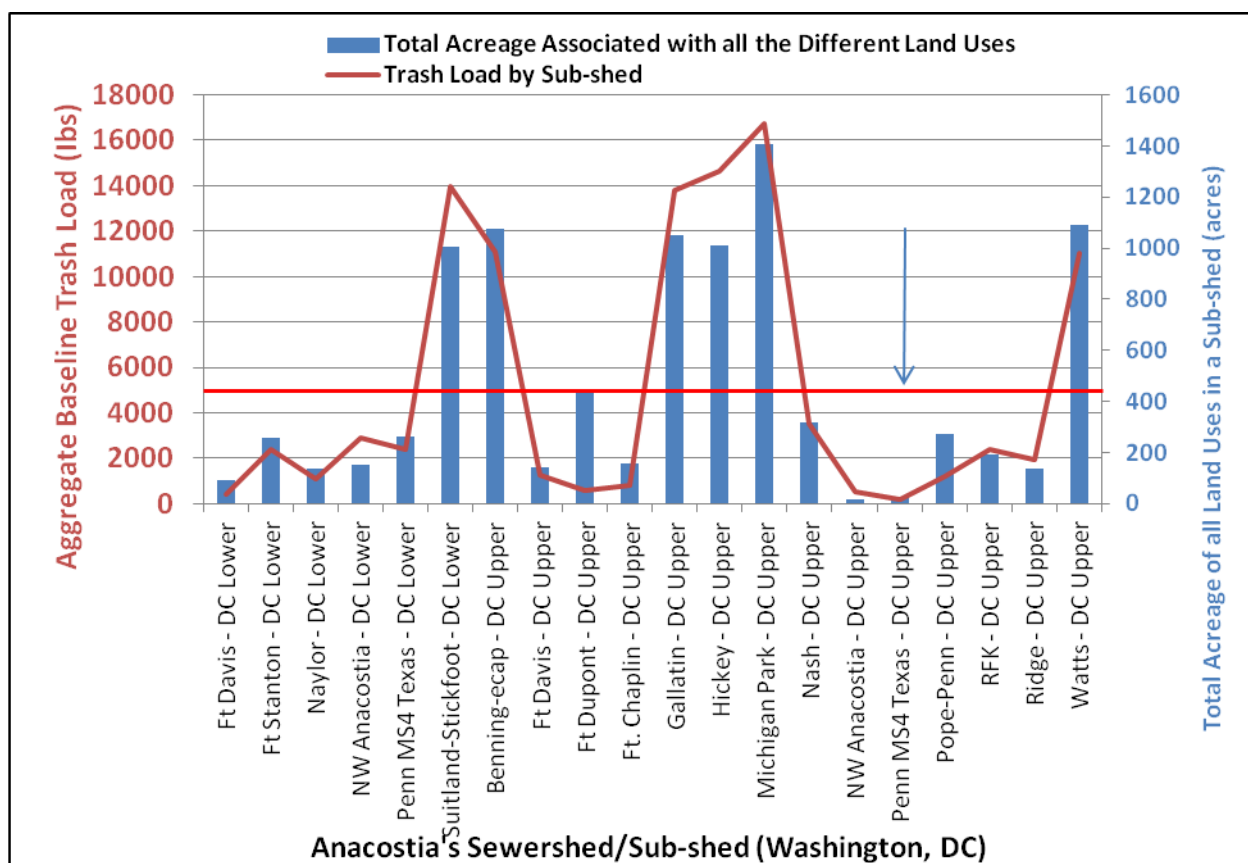
*Putting it All Together*

The calculation methodology used in the implementation towards meeting the District's load reductions is outlined in Table 23. The District will track and report implementation annually. In addition, as new practices are implemented, DDOE will add those to the table along with their respective load reduction calculation methodologies.

**Table 23** Annual Trash Load Reductions

Activity Category	Activity	Load Reduction	Calculation Methodology
End-of-Pipe and In-Stream BMPs	Watts Branch Bandalongs	4,143	Based on empirical data collected. Data for the lower Watts Branch Bandalong was collected between January & September 2012. Data on the upper Watts Bandalong was collected between December 2011 and November 2012.
	Nash Run Trash Trap	1,894	Annual average (2009–2012) based on empirical data.
	Hickey Run BMP	2,000	Based on assumed efficiency of 100 percent capture for design capture of device. A reduction factor of 20 percent is then applied since glass and plastic bottles may not be emptied of water.
	James Creek Bandalong	327	Based on empirical data collected.
Roadway and Block Cleanups	Adopt-A-Block Program	NA	Collaborating with Office of the Clean City to collect empirical clean-up data.

Activity Category	Activity	Load Reduction	Calculation Methodology
Sweeping Environmental Hotspots	Sweeping Environmental Hotspots	72,384	Total amount of trash removed was estimated based on trash loading coefficients for roadways. The trash load was then multiplied by the total area of roadways swept within the environmental hotspots. The resulting load was then divided by two because roughly half of the roadway (the middle of the road) is swept in these areas because they are unsigned. Environmental hotspots within the Anacostia watershed are swept twice per month, 8 months out of the year, in addition to other signed and unsigned areas throughout the MS4 area. Total amount of trash calculated using the methodology above is multiplied by 16. A reduction factor of 50 percent is then applied since an entire hotspot may not be swept during each sweeping event.
Clean-Up Activities	Clean-Up Events	3,825	Based on empirical data collected (see additional table for tracking of each clean-up event) during the 2012 Anacostia Watershed Society Earth Day Clean-Up. A reduction factor of 50.8 percent is first applied, which accounts for the District's portion of the Anacostia being served by the MS4. A second reduction factor of 20 percent is applied to account for the fact that not all plastic and glass bottles collected may be emptied of water before trash is weighed.
	Skimmer Boats	5,877	Total amount of trash and debris removed is multiplied by 16.5 percent, since this represents the proportion of the watershed which lies within DC. A second reduction factor of 50.8 percent is applied to account for the area of the District's portion of the watershed served by the MS4. A third reduction factor of 50 percent is applied since not all material collected by the skimmer boats may be trash. Finally, a fourth reduction factor of 20 percent is applied since not all plastic and glass bottles collected are emptied of water.
Education and Outreach	Watershed Wide Anacostia Campaign	NA	Efficiency being assessed.
	Trash MEWEEs	NA	Efficiency being assessed.
Regulatory Approaches	Bag Law	NA	Efficiency being assessed.
<b>Total</b>		<b>90,450</b>	



**Figure 15** Total loads of trash from sewersheds in the Anacostia watershed.

DDOE will continue to collect empirical data on all end of pipe BMPS and adjust efficiencies for future TMDL planning purposes. DDOE will strive to install as many end of pipe BMPs as possible over the next five years.

Stream cleanups will continue to be implemented across the Anacostia watershed. This is a highly valuable practice that can yield extremely large load reductions. DDOE alone collected over 1,400 lbs at one event in 2011 and with 30 events per year cleanups could have the potential to reduce loads by 42,000 lbs. As mentioned earlier, DDOE will work with local nonprofit partners to accurately account for all clean up events that take place in the Anacostia watershed each year. In addition, methodologies used to estimate the total amount of trash collected at each clean up event will be tracked as accurately as possible.

Education and outreach efforts will be conducted watershed wide. However, because load reductions attributed to the anti-littering campaign will be estimated using an equation containing assumptions, DDOE will carefully track results from the survey to reduce the occurrence of double counting. Other education and outreach efforts will be employed as opportunities arise. DDOE will continue to work with local nonprofits on projects to help influence behavior and trash loads.

DDOE strongly believes in the immediate utility of end of pipe BMPs. However, these trash collection devices require constant maintenance, which may not be sustainable over the long term. To more holistically address issues of trash pollution in the Anacostia watershed, DDOE will work to implement effective education and outreach efforts that will lead to major changes in behavior. The development of the anti-littering campaign underscores how seriously the District is taking the issue of trash. The theme of this campaign is “Getting to the Source,” or in other words, people. One of the major findings of the behavioral study was that when local citizens saw how trash affects their local community, they became more serious about not littering. This led to one of the campaign tag lines “Your Litter Hits Close to Home.” By making people see the negative impacts trash can have on aesthetics and public health, citizens will hopefully work harder to reduce their “footprint” of litter.

#### Monitoring for Trash in the Anacostia Watershed

DDOE will issue a grant in FY 2013 for a nonprofit to monitor six MS4 outfalls or stream transects in the District for trash. Three of those outfalls will be in the Anacostia watershed.

As part of this initiative, the District will also examine lessons learned from conducting trash monitoring to develop the most comprehensive and cost-effective approach to monitoring trash. DDOE has a relatively large amount of experience at conducting trash monitoring, a lot of which contributed to the trash TMDL. Couple that with lessons learned from the yet to be implemented outfall monitoring program, DDOE will be hopeful that the new approach will help serve as a local and national model for assessing the effectiveness of various BMPs at reducing trash in local waterways.

#### Current Progress

Using the calculation methodology described above, DDOE currently estimates that 90,450 pounds of trash are being removed from the Anacostia River annually from practices listed in Table 22. This is 12,738 lbs short of the annual trash reduction requirement contained in the permit. DDOE recognizes that numerous assumptions were made in performing these calculations. For example, DDOE assumed 100 percent capture of the trash load for the catchment draining to the Hickey Run BMP. The BMP was designed to capture that amount of trash. However, overflows due to extreme rain events may reduce the efficiency of this device. DDOE will continue to refine our BMPs based on the collection of empirical data and adaptively manage attainment of our annual trash reduction commitment based on the information gathered.

**2013 Goals:** DDOE is optimistic that the District will attain the reductions necessary by January 2017. DDOE is committed to continuing to support new technologies and policy approaches that will help eliminate trash in the Anacostia watershed. In addition, DDOE will use lessons learned in the Anacostia to expand reduction of trash throughout all of the District’s watersheds.

## **2. Hickey Run TMDL Implementation**

As of FY 2007, Hickey Run is no longer on the 303(d) list of Impaired Waters for oil and grease. The District continues to monitor for oil and grease in the Hickey Run watershed as part of its Water Quality monitoring program.

DDOE installed a large BMP after more than seven years of design and coordination with the landowner, USDA National Arboretum. Placed at a stormwater outfall under New York Avenue, the BMP captures trash and sediment from the stream before it flows through the Arboretum and into the Anacostia River. The BMP, a Terre Kleen (TK45), was installed in Hickey Run on October 26, 2011. To capture oil and grease, DDOE is planning to install booms at the Terre Kleen BMP.

## **3. Consolidated TMDL Implementation Plan**

The TMDL Implementation Planning provisions of the MS4 permit were stayed pending resolution of an appeal of the permit initiated by environmental organizations. A permit modification resulting from that appeal and clarifying those TMDL provisions had been published for public comment and became final on November 9, 2012. Upon finalization of that permit modification, the Permit's TMDL Implementation Planning requirements became effective. In the meantime, DDOE has begun developing a project Scope of Work while preparing to seek consultant support for this TMDL Implementation Plan development process.

# **III. MONITORING AND ASSESSMENT OF CONTROLS**

## **A. Status of Revised Monitoring Program Development**

The Revised Monitoring Program provisions of the MS4 permit were stayed pending resolution of an appeal of the permit initiated by environmental organizations. A permit modification resulting from that appeal and clarifying those TMDL provisions had been published for public comment and were finalized on November 9, 2012. Upon finalization of that permit modification, the Permit's Revised Monitoring Program requirements became effective. DDOE has begun developing a project Scope of Work while preparing to seek consultant support for the TMDL Implementation Plan development process and Revised Monitoring Program.

## **B. Interim Monitoring**

The contract for the Interim sampling and analysis work has been awarded to Apex Companies, LLC (Apex). The contractor is in the process of finalizing the Quality Assurance Project Plan (QAPP). Once the QAPP is in place, sampling will start.

While this contract was being finalized, monitoring under the previous regime continued. The previous MS4 Permit, issued on August 19, 2004, required that three wet weather and

two dry weather events be sampled and analyzed as part of the characterization of the stormwater discharges. This report contains a description of the monitoring sites, the sampled storm characteristics, the sampling activities, the analytical results at the nine sites, and the estimated annual loads for selected parameters. A comparison of the results with the prior monitoring rotation is also presented.

#### Monitoring Stations

Samples were collected and analyzed in accordance with the monitoring requirements included in the Permit and 40 CFR 122.26(d)(2)(iii). At each of the nine Anacostia River sites, at least three wet weather and two dry weather sampling were planned in this monitoring rotation. The nine representative monitoring sites and the associated drainage areas are provided in Table 24. Appendix K contains maps of the monitoring location and the land use make-up of their respective catchments.

**Table 24** Anacostia River Watershed Monitoring Stations

Site Number	Sampling Location	Drainage Area (acres)
1	Stickfoot Sewer – 2400 block of Martin Luther King, Jr. Ave. SE, near Metro bus entrance	616.3
2	O Street Stormwater Pump Station – 125 O Street SE – just outside front gate of station	25.4
3	Anacostia High School/Anacostia Recreation Center – corner of 17 <sup>th</sup> Street and Minnesota Avenue SE	251.8
4	Gallatin and 14 <sup>th</sup> Streets NE – across from this intersection in a large outfall	662.4
5	Varnum and 19 <sup>th</sup> Place NE – 2100 Block of Varnum Street NE	517.4
6	Nash Run – intersection of Anacostia Drive and Polk Street NE	13.4
7	East Capitol Street – 200 Block of Oklahoma Avenue NE	16.7
8	Ft. Lincoln – Newton BMP- in the brush along the side of New York Ave, west after the bridge	5.7
9	Hickey Run – 33 <sup>rd</sup> and V Streets NE, across the road from the post office access	8.5

Sampling and analysis results for the wet weather sampling events reported on EPA Form 3320-1 Discharge Monitoring Report are included in Appendix L. This data and a copy of the Annual Report have been submitted electronically to EPA via NetDMR. Additional sampling and analysis results are contained in Appendix M.

### Weather Information

During the monitoring period March 2011 to February 2012, the rainfall patterns have been unpredictable, with accumulations well below or above the monthly averages on record. Table 25 lists the actual and average precipitation at the Ronald Reagan National Airport.

A number of the rainfall events were in the form of short duration thunderstorms followed by a lengthy dry period. The spatial distribution of the rainfall through the region and the city also presented special challenges in the collection of samples for analysis. Table 26 lists a summary of the wet weather events.

**Table 25** Precipitation Record for the District of Columbia

Year	Precipitation			
	Month	Actual (inches) *	Number of Days in Month with Storms >0.10 inches	Monthly Average (inches)
2011	March	4.40	7	3.48
	April	3.20	7	3.06
	May	1.70	5	3.99
	June	1.68	4	3.78
	July	3.03	5	3.73
	August	8.92	9	2.93
	September	8.84	9	3.72
	October	3.91	9	3.40
	November	1.94	4	3.17
	December	4.90	6	3.05
2012	January	2.19	6	2.81
	February	2.33	4	2.62

\* Measured with gauge at Ronald Reagan National Airport.

**Table 26** Storm Characteristics for Anacostia River Watershed Wet Weather Sampling Events

Date	Precipitation (inches)	Duration (hours)	Time to Previous Measurable Rainfall (approx. days)	Sites Sampled
04-05-11	0.42	7	4.0	9
04-12-11	0.19	3	3.5	4
05-04-11	0.56	10	9.5	3, 5, 6
07-08-11	0.60	9	4.0	1, 2
08-03-11	0.28	8	7.0	4, 7, 8*
09-20-11	0.16	3	11.0	1, 2, 4, 6
10-19-11	0.40	6	4.5	5, 7, 8*, 9
11-16-11	0.30	9	17.0	1, 2, 6
11-29-11	0.41	5	5.8	3, 5
12-06-11	0.24	7	5.8	7, 9
01-27-12	0.63	6	6.0	8
02-16-12	0.15	5	4.0	3

\* No sufficient flow

### C. Wet Weather Discharge Monitoring

Anacostia River watershed sites 1 through 9 were sampled during wet weather flows from April 2011 to February 2012. Table 27 below shows the ambient water quality results from sampling.

The geometric mean of the analytical results for each station for twenty priority pollutants is provided in Table 28. The highest mean concentration of total suspended solids (TSS) was reported at Ft. Lincoln-Newton BMP (1,400 mg/L), and the lowest was reported at Nash Run (24.3 mg/L). All other stations had TSS concentrations between 26.0 and 303.9 mg/L. Stickfoot Sewer had the highest biochemical oxygen demand (BOD) concentrations (63.6 mg/L) among all stations, while all other stations ranged from 5.3 (Hickey Run) to 33.0 mg/L (Nash Run). Total nitrogen (TN) concentrations from Anacostia River stations ranged from 0.03 (Hickey Run) to 5.21 mg/L (Stickfoot Sewer) and total phosphorus (TP) concentrations ranged from 0.05 (Hickey Run) to 1.10 mg/L (Ft. Lincoln-Newton BMP). Most of the Anacostia stations had high fecal coliform (FC) concentrations ranging from 370 (Hickey Run) to 12,699 MPN/100 mls (East Capitol St.). Oil and grease (O&G) was detected at only one site (Stickfoot Sewer) at 3.76 mg/L. Relatively high concentrations of zinc (49.3 to 107.6 µg/L) and copper (7.5 to 58.3 µg/L) were measured from all Anacostia stations. Lead concentration ranged from 1.26 (O Street Stormwater Pump Station) to 54.0 µg/L. None of the stations had detectable concentrations for PAHs, chlordane, heptachlor, dieldrin, DDT, DDE, DDD, or PCBs. Complete analytical results are included in Appendix N.



**Table 27** Ambient Water Quality Data for Wet Weather Sampling at Anacostia River Stations

Site ID	Location	Date	Water Temp (°C)	pH	DO (mg/L)*	TRC (mg/L)	Cond (µS)
1	Stickfoot Sewer	07/08/11	24.4	7.45	9.50	0	190
		09/02/11	21.3	7.65	8.30	0	620
		11/16/11	17.2	7.1	5.90	-	1140
2	O Street Stormwater Pump Station	07/08/11	24.8	7.25	9.80	0	350
		09/02/11	21.4	7.56	7.12	0	580
		11/16/11	18.6	7.30	8.60	<0.03	570
3	Anacostia High School	05/04/11	23.4	7.56	8.01	0.76	109.1
		11/29/11	16.4	7.25	14.28	0	86
		02/16/12	15.9	6.87	9.61	<0.03	3600
4	Gallatin and 14 <sup>th</sup> St. NE	04/12/11	12.4	8.09	8.25	0	730
		08/03/11	23.1	7.22	8.24	0	840
		09/02/11	16.1	7.37	9.05	<0.03	490
5	Varnum and 19 <sup>th</sup> Pl. NE	05/04/11	17.4	7.34	10.24	<0.03	750
		10/19/11	18.5	7.44	10.80	0	190
		11/29/11	15.6	7.01	15.33	0	150
6	Nash Run	05/04/11	15.7	7.17	9.45	1	93.6
		09/02/11	16.1	7.22	8.41	<0.03	150
		11/16/11	15.3	6.88	10.20	0	56
7	East Capitol St.	08/03/11	20.2	6.52	6.00	0	740
		10/19/11	19.2	6.6	7.64	0	430
		12/06/11	17.6	6.75	14.09	0	560
8	Ft. Lincoln-Newton BMP	NSF					
		NSF					
		01/27/12	13.1	7.2	10	<0.03	3200
9	Hickey Run	04/05/11	10.5	7.11	9.11	<0.03	84
		10/19/11	16.8	7.12	9.14	<0.03	130
		12/06/11	16.6	7.31	8.82	0	140

\* Field measurements were taken as percent saturation.

NSF – No sufficient flow

Table 28 Summary Data of Wet Weather Events (2011–2012)

Parameters (mg/L, unless otherwise noted)																				
Station	TSS	BOD	TN	TP	FC <sup>a</sup>	O&G	Zn <sup>bc</sup>	Pb <sup>bc</sup>	Cu <sup>bc</sup>	As <sup>bc</sup>	PAH 1 <sup>c</sup>	PAH 2 <sup>c</sup>	PAH 3 <sup>c</sup>	Chlordane <sup>c</sup>	Heptachlor <sup>c</sup>	Dieldrin <sup>c</sup>	DDT <sup>c</sup>	DDE <sup>c</sup>	DDD <sup>c</sup>	PCBs <sup>d</sup>
Stickfoot Sewer	303.9 (n=3)	63.6 (n=3)	5.21 (n=3)	0.60 (n=3)	7,427 (n=3)	3.76 <sup>d</sup> (n=3)	102.5 (n=3)	18.6 (n=3)	39.3 (n=3)	0.70 <sup>d</sup> (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)
O Street Stormwater Pump Station	32.3 (n=3)	14.3 (n=3)	3.37 (n=3)	0.32 (n=3)	7,427 (n=3)	ND <sup>d</sup> (n=3)	49.3 (n=3)	1.26 <sup>d</sup> (n=3)	51.5 (n=3)	0.67 <sup>d</sup> (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)
Anacostia High School	44.2 (n=3)	9.04 (n=3)	2.60 (n=3)	0.22 (n=3)	1,687 (n=3)	ND (n=3)	58.0 (n=3)	6.6 (n=3)	29.7 (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)
Gallatin and 14 <sup>th</sup> St., NE	45.4 (n=3)	14.1 (n=3)	3.12 (n=3)	0.35 (n=3)	5,769 (n=3)	ND (n=3)	107.6 (n=3)	2.09 <sup>d</sup> (n=3)	20.7 (n=3)	1.30 <sup>d</sup> (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)
Varnum and 19 <sup>th</sup> Pl., NE	33.1 (n=3)	30.6 (n=3)	0.29 <sup>d</sup> (n=3)	0.46 (n=3)	6,073 (n=3)	ND (n=3)	59.1 (n=3)	8.30 (n=3)	22.4 (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)
Nash Run	24.3 (n=3)	33.0 (n=3)	4.94 (n=3)	0.37 (n=3)	6,454 (n=3)	ND (n=3)	103.4 (n=3)	4.30 (n=3)	58.3 (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)
East Capitol St.	86.8 (n=3)	17.5 (n=3)	0.28 <sup>d</sup> (n=3)	0.36 (n=3)	12,699 (n=3)	ND (n=3)	96.4 (n=3)	17.1 (n=3)	17.7 (n=3)	3.30 (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)
Ft. Lincoln- Newton BMP	1,400 (n=1)	22.0 (n=1)	5.30 (n=1)	1.10 (n=1)	1,600 (n=1)	ND (n=1)	250 (n=1)	57.0 (n=1)	49.0 (n=1)	3.70 (n=1)	ND (n=1)	ND (n=1)	ND (n=1)	ND (n=1)	ND (n=1)	ND (n=1)	ND (n=1)	ND (n=1)	ND (n=1)	ND (n=1)
Hickey Run	26.0 (n=1)	5.41 (n=3)	0.03 <sup>d</sup> (n=3)	0.049 (n=3)	370 (n=3)	ND (n=3)	52.7 (n=3)	2.70 (n=3)	7.50 (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)	ND (n=3)

Values represent geometric mean for each station.  
TSS: total suspended solids  
BOD: biological oxygen demand  
TN: total nitrogen  
TP: total phosphorus  
FC: fecal coliform bacteria  
O&G: oil and grease  
PCB: total PCBs  
ND: non-detect  
NSF: non sufficient flow  
<sup>a</sup>Units are in MPN/100mls  
<sup>b</sup>Total recoverable metals  
<sup>c</sup>Units are in µg/L  
<sup>d</sup>Geometric mean was calculated using half of detection limit or reporting limit if the analysis results show “none detected” or “below reporting limit”

#### **D. Dry Weather Monitoring**

Due to the dry weather conditions, four of the nine sampling sites (Varnum Street and 19<sup>th</sup> Plae , Nash Run, Hickey Run, and Ft. Lincoln-Newton BMP) yielded no or insufficient flow for sample analysis. Table 29 below shows the ambient water quality results of the dry weather sampling. Table 30 presents the dry weather flow data for selected parameters at the remaining five stations.

The highest concentration of TSS was observed at the East Capitol St. site (509 mg/L). BOD concentrations ranged between 2.12 mg/L (O Street Stormwater Pump Station) to 71.2 mg/L (Stickfoot Sewer). The highest mean concentration of TN was reported at Stickfoot Sewer (18.0 mg/L), and the lowest was reported at East Capitol Street (0.23 mg/L). Stickfoot Sewer had the highest TP concentration (2.23 mg/L) compared to other stations, which ranged from 0.17 to 1.44 mg/L. Fecal coliform bacteria concentrations were highest at Stickfoot Sewer and Anacostia High School (16,000 and 1,140 MPN/100 mls, respectively) and lowest at East Capitol (11 MPN/100 mls). Fecal coliform concentrations at Stickfoot Sewer were noticeably higher during dry weather event (16,000 MPN/100 mls) than wet weather event (7,427 MPN/100 mls). No measurable concentration of O&G was reported at any of the sampled sites.

The highest mean concentration of zinc was reported at O Street Stormwater Pump Station (250 µg/L), and the lowest was reported at Stickfoot Sewer (2.4 µg/L). All other stations had zinc concentrations between 22.2 and 110 µg/L. Copper concentrations ranged from 5.1 (Stickfoot Sewer) to 34.0 µg/L (Nash Run) during dry weather events. Two Anacostia stations had relatively high lead concentrations including East Capitol St. (10.7 mg/L) and O Street Stormwater Pump Station (12.0 mg/L), while all other stations had lead concentrations below 4.4 µg/L. Anacostia High School was the only station that had detectable concentrations (3.0 µg/L) of arsenic during the two sample collections. During the dry weather events, Nash Run had highest concentrations for TSS, BOD, TP, O&G, and copper, and O Street Stormwater Pump Station had highest concentrations for TN, zinc, and lead.

None of the stations had detectable concentrations for PAHs, chlordane, heptachlor, dieldrin, DDT, DDE, or DDD, and PCBs. Complete analytical results are included in Appendix N.

**Table 29** Ambient Water Quality Data for Dry Weather Sampling at Anacostia River Stations

Site No.	Location	Date	Water Temp (°C)	pH	DO*	TRC (mg/L)	Cond (µS)
1	Stickfoot Sewer	06/01/11	22.6	7.50	9.30	0	860
		07/08/11	24.4	7.41	4.78	0	900
2	O Street Stormwater Pump Station	05/23/11	28.7	7.24	9.75	<0.03	1200
		06/23/11	24.1	7.54	11.41	0	1100
3	Anacostia High School	04/04/11	19.3	8.62	8.35	0.21	351
		06/01/11	20.9	7.70	11.75	0.09	620
4	Gallatin and 14 <sup>th</sup> St., NE	05/13/11	16.4	6.95	11.60	0	760
		06/23/11	22.1	7.17	10.35	0	760
5	Varnum and 19 <sup>th</sup> Pl., NE	NSF					
		NSF					
6	Nash Run	NSF					
		NSF					
7	East Capitol St.	05/13/11	17.3	6.18	7.26	0	710
		07/19/11	19.4	6.08	8.42	0	820
8	Ft. Lincoln-Newton BMP	NSF					
		NSF					
9	Hickey Run	NSF					
		NSF					

\* Field measurements were taken as percent saturation.

NSF - No sufficient flow

Table 30 Summary Data of Dry Weather Events (2011–2012)

Parameters (mg/L, unless otherwise noted)																				
Station	TSS	BOD	TN	TP	FC <sup>a</sup>	O&G	Zn <sup>bc</sup>	Pb <sup>bc</sup>	Cu <sup>bc</sup>	As <sup>bc</sup>	PAH 1 <sup>c</sup>	PAH 2 <sup>c</sup>	PAH 3 <sup>c</sup>	Chlordane <sup>c</sup>	Heptachlor <sup>c</sup>	Dieldrin <sup>c</sup>	DDT <sup>c</sup>	DDE <sup>c</sup>	DDD <sup>c</sup>	PCBs <sup>c</sup>
Stickfoot Sewer	64.7 (n=2)	71.2 (n=2)	18.0 (n=2)	2.23 (n=2)	16,000 (n=2)	ND (n=2)	54.5 (n=2)	1.45 (n=2)	15.5 (n=2)	0.8 <sup>d</sup> (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)
O Street Stormwater Pump Station	41.1 (n=2)	2.12 (n=2)	3.21 (n=2)	0.22 (n=2)	894 (n=2)	ND (n=2)	34.5 (n=2)	3.78 (n=2)	16.4 (n=2)	0.89 <sup>d</sup> (n=2)	ND (n=1)	ND (n=1)	ND (n=1)	ND (n=1)	ND (n=1)	ND (n=1)	ND (n=1)	ND (n=1)	ND (n=1)	0.66 (n=1)
Anacostia High School	11.4 (n=2)	5.08 (n=2)	2.01 (n=2)	0.30 (n=2)	1,140 (n=2)	ND (n=2)	9.70 (n=2)	0.40 <sup>d</sup> (n=2)	5.72 (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=1)	0.70 (n=1)
Gallatin and 14 <sup>th</sup> St., NE	30.2 (n=2)	3.74 <sup>d</sup> (n=2)	3.11 (n=2)	0.17 (n=2)	192 (n=2)	ND (n=2)	42.9 (n=2)	1.60 (n=2)	6.23 (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2))	ND (n=2)
Varnum and 19 <sup>th</sup> Pl., NE	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nash Run	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
East Capitol St.	509.1 (n=2)	15.7 (n=2)	0.23 (n=2)	1.44 (n=2)	11 (n=2)	ND (n=2)	169.7 (n=2)	74.0 (n=2)	52.4 (n=2)	3.13 (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)	ND (n=2)
Ft. Lincoln-Newton BMP	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Hickey Run	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Values represent the geometric mean for each station.  
TSS: total suspended solids; BOD: biological oxygen demand; TN: total nitrogen; TP: total phosphorus; FC: fecal coliform bacteria; O&G: oil and grease; PCB: total PCBs  
ND: non-detect  
<sup>a</sup>Units are in MPN/100mls  
<sup>b</sup>Total recoverable metals  
<sup>c</sup>Units are in µg/L  
<sup>d</sup>geometric mean was calculated using half of detection limit or reporting limit if the analysis results show “none detected” or “below reporting limit”  
--- No data available due to no dry weather flow.

## E. Trash Monitoring

Trash monitoring activities are reported in section II.J of this report.

## F. Area and/or Source Identification Program

The District is highly urbanized, with little available land for further development. The MS4 drainage area contains approximately 26,500 acres (two-thirds of the District). The combined sewer overflow (CSO) drainage area encompasses approximately 12,640 acres (one-third of the District). All new development and redevelopment of existing areas is subject to the District's stormwater regulations with a review by DDOE. The land use and impervious area must be indicated on all plans submitted to DDOE for review and inspection. No single development plan reviewed to date has sufficient land area to make a significant impact to the MS4 system. The cumulative impacts of the proposed and new developments reviewed in FY 2011 and FY 2012 have not resulted in a significant change for the existing land use activities in the portion of the District served by the MS4. Table 31 provides the existing land use by planning area in the District (MS4 and CSO).

**Table 31** Acres of Existing Land and Water Use by Planning Area

Land Use Type	Planning Area											
	Capitol Hill	Central Washington	Far northeast & southeast	Far southeast & southwest	Lower Anacostia waterfront/near southwest	Mid city	Near northwest	Rock creek east	Rock creek west	Upper northeast	Citywide	Percent (%)
Road Rights-of-Way	759	899	1,338	906	477	628	716	1,311	1,760	1,223	10,018	25
Single Family Detached Homes	6	0	775	164	7	15	84	919	2,324	641	4,936	13
Single Family Attached Homes/ Row Homes	520	10	641	328	30	497	340	606	290	611	3,874	10
Low-Rise Apts.	43	10	436	555	106	136	110	85	185	189	1,856	5
High-Rise Apts.	4	26	20	44	26	59	65	25	109	25	402	1
Commercial	97	448	129	63	122	144	220	106	170	296	1,795	5
Industrial	5	16	12	5	42	21	6	16	0	295	418	1
Local Public Facilities	72	47	154	441	47	54	75	131	67	102	1,110	3
Federal Facilities (excl. parks)	47	481	4	1,067	409	1	1	412	283	76	2,781	7
Institutional	42	67	71	117	22	142	249	163	659	730	2,262	6
Permanent Open Space	296	678	1,321	729	533	141	354	878	2,011	1,038	7,980	20
Rail, Utilities Communication,	1	36	223	74	11	97	6	83	4	321	857	2
Vacant	66	58	179	188	51	36	33	22	111	99	843	2
<b>Total Land</b>	<b>1,958</b>	<b>2,776</b>	<b>5,305</b>	<b>4,687</b>	<b>1,884</b>	<b>1,971</b>	<b>2,259</b>	<b>4,757</b>	<b>7,982</b>	<b>5,645</b>	<b>39,225</b>	<b>100</b>

Land Use Type	Planning Area											
	Capitol Hill	Central Washington	Far northeast & southeast	Far southeast & southwest	Lower Anacostia waterfront/near southwest	Mid city	Near northwest	Rock creek east	Rock creek west	Upper northeast	Citywide	Percent (%)
Water	117	509	135	1,791	1,295	46	239	19	313	89	4,554	
Total Land and Water	2,075	3,284	5,440	6,474	3,179	2,017	2,498	4,776	8,288	5,735	43,766	

Source: Office of Planning, Comprehensive Plan District Elements, December 2006

## G. Pollutant Loading

The annual pollutant loads for each sewershed sampled were calculated by the Simple Method (EPA 1992) utilizing the wet weather event mean concentrations, the total drainage area, and land use distribution within each sewershed.

Table 32 presents the annual loads for pollutants specified in 40 CFR 122.21(g)(7). Also included are the annual loads for fecal coliform bacteria and oil and grease. Based upon the pollutant loadings calculated for eight District of Columbia Anacostia River monitoring sites, a cumulative load for the entire District of Columbia portion of the Anacostia River watershed was estimated. This cumulative load assumes that the eight sample stations are representative of the watershed. Table 33 presents the pollutant loading for the subwatersheds draining to the monitoring locations.

**Table 32** Anacostia River Watershed Pollutant Event Mean Concentration (2011–2012)

Event Mean Concentrations for Designated Parameters (mg/L)														
Station	BOD	COD	TDS	TSS	TN	TKN	TP	DP	FC <sup>b</sup>	O&G	Cd <sup>a</sup>	Cu <sup>a</sup>	Pb <sup>a</sup>	Zn <sup>a</sup>
Stickfoot Sewer	63.6 (n=3)	107.3 (n=3)	251.0 (n=3)	303.9 (n=3)	5.21 (n=3)	4.99 (n=3)	0.60 (n=3)	0.19 (n=3)	7,427 (n=3)	3.76 <sup>c</sup> (n=3)	ND <sup>c</sup> (n=3)	0.039 (n=3)	0.019 (n=3)	0.10 (n=3)
O Street Stormwater Pump Station	14.3 (n=3)	38.4 (n=3)	320.0 (n=3)	32.3 (n=3)	3.37 (n=3)	2.85 (n=3)	0.32 (n=3)	0.14 (n=3)	7,427 (n=3)	ND <sup>c</sup> (n=3)	ND (n=3)	0.052 (n=3)	0.0013 <sup>c</sup> (n=3)	0.049 (n=3)
Anacostia High School	9.04 (n=3)	29.4 (n=3)	290.0 (n=3)	44.2 (n=3)	2.60 (n=3)	2.28 (n=3)	0.22 (n=3)	0.030 <sup>c</sup> (n=3)	1,687 (n=3)	ND (n=3)	ND (n=3)	0.030 (n=3)	0.0066 (n=3)	0.058 (n=3)
Gallatin & 14 <sup>th</sup> St., NE	14.1 (n=3)	50.1 (n=3)	446.0 (n=3)	45.5 (n=3)	3.12 (n=3)	2.19 (n=3)	0.35 (n=3)	0.036 <sup>c</sup> (n=3)	5,769 (n=3)	ND (n=3)	0.0002 <sup>c</sup> (n=3)	0.021 (n=3)	0.0021 <sup>c</sup> (n=3)	0.11 (n=3)
Varnum and 19 <sup>th</sup> Pl., NE	30.6 (n=3)	69.5 (n=3)	189.0 (n=3)	33.1 (n=3)	0.29 <sup>c</sup> (n=3)	1.69 <sup>c</sup> (n=3)	0.46 (n=3)	0.02 <sup>c</sup> (n=3)	6,073 (n=3)	ND (n=3)	ND (n=3)	0.022 (n=3)	0.0083 (n=3)	0.059 (n=3)
Nash Run	33.0 (n=3)	57.5 (n=3)	87.0 (n=3)	24.3 (n=3)	4.94 (n=3)	4.89 (n=3)	0.37 (n=3)	0.065 <sup>c</sup> (n=3)	6,454 (n=3)	ND (n=3)	ND (n=3)	0.058 (n=3)	0.0043 (n=3)	0.10 (n=3)
East Capitol St.	17.5 (n=3)	35.7 (n=3)	314.8 (n=3)	86.8 (n=3)	0.28 <sup>c</sup> (n=3)	1.03 (n=3)	0.36 (n=3)	ND <sup>c</sup> (n=3)	12,699 (n=3)	ND (n=3)	0.001 (n=3)	0.018 (n=3)	0.017 (n=3)	0.096 (n=3)
Ft. Lincoln	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD
Hickey Run	5.41 (n=3)	20.9 (n=3)	76.7 (n=3)	26.0 (n=1)	0.03 <sup>c</sup> (n=3)	ND <sup>c</sup> (n=3)	0.049 (n=3)	0.006 <sup>c</sup> (n=3)	370 (n=3)	ND (n=3)	ND (n=3)	0.0075 (n=3)	0.0027 (n=3)	0.053 (n=3)

<sup>a</sup>Total Recoverable Metals

<sup>b</sup>Units are in MPN/100mls

<sup>c</sup>Geometric mean was calculated using half of detection limit or reporting limit if the analysis results show “none detected” or “below reporting limit”

ND: none –detected

NSF: non sufficient flow

NSD: not sufficient data



Table 33 Anacostia River Watershed Annual Pollutant Loading (2011–2012)

Loadings for Designated Parameters (pounds/year)														
Station	BOD	COD	TDS	TSS	TN	TKN	TP	DP	Cd <sup>a</sup>	Cu <sup>a</sup>	Pb <sup>a</sup>	Zn <sup>a</sup>	O&G	FC <sup>b</sup>
Stickfoot Sewer	263,720.00	445,199.00	1,040,455.00	1,259,821.00	21,597.00	20,685.00	2,487.00	788.00	ND	163.00	77.10	425.00	15,586.00	1.4E+14
O Street Stormwater Pump Station	3,191.00	8,570.00	71,413.00	7,208.00	752.00	636.00	71.41	31.24	ND	11.49	0.28	11.00	ND	7.5E+12
Anacostia High School	14,660.00	100,590.00	470,291.00	71,695.00	4,216.00	3,697.00	357.00	48.65	ND	48.16	10.70	94.06	ND	1.2E+13
Gallatin and 14 <sup>th</sup> St., NE	65,627.00	233,516.00	2,078,806.00	211,982.00	14,54.00	10,208.00	1,612.00	166.00	1.03	96.48	9.74	502.00	ND	1.2E+14
Varnum and 19 <sup>th</sup> Pl., NE	101,124.00	229,677.00	624,588.00	109,386.00	958.00	5,585.00	1,520.00	66.09	ND	74.03	27.43	195.00	ND	9.1E+13
Nash Run	2,665.00	4,661.00	7,028.00	1,964.00	399.00	395.00	30.27	5.24	ND	4.71	0.35	8.35	ND	2.4E+12
East Capitol St.	2,121.00	4,326.00	38,129.00	10,516.00	33.91	125.00	44.09	0.70	0.12	2.14	2.07	11.68	ND	7.0E+12
Fort Lincoln	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD
Hickey Run	418.00	2,729.00	15,036.00	2,007.00	2.32	68.69	3.81	0.47	ND	0.58	0.21	4.07	ND	2.3E+12
Cumulative Load for all monitoring sites	453,526.00	1,029,268.00	4,345,746.00	1,674,579.00	42,501	41,399	6,125.58	1,106.39	1.15	400.59	127.88	1,251.16	15,586.00	3.8E+14
Anacostia Watershed Load Estimates	3,944,644	8,952,298	37,798,158	14,565,042	369,664	360,079	53,277	9,619	9.99	3,483	1,112	10,880	135,564	3.3E+15

<sup>a</sup>Total Recoverable Metals  
<sup>b</sup>Units are in MPN/100mls  
ND: none –detected  
NSF: non sufficient flow  
NSD: not sufficient data

## H. Trend Analysis

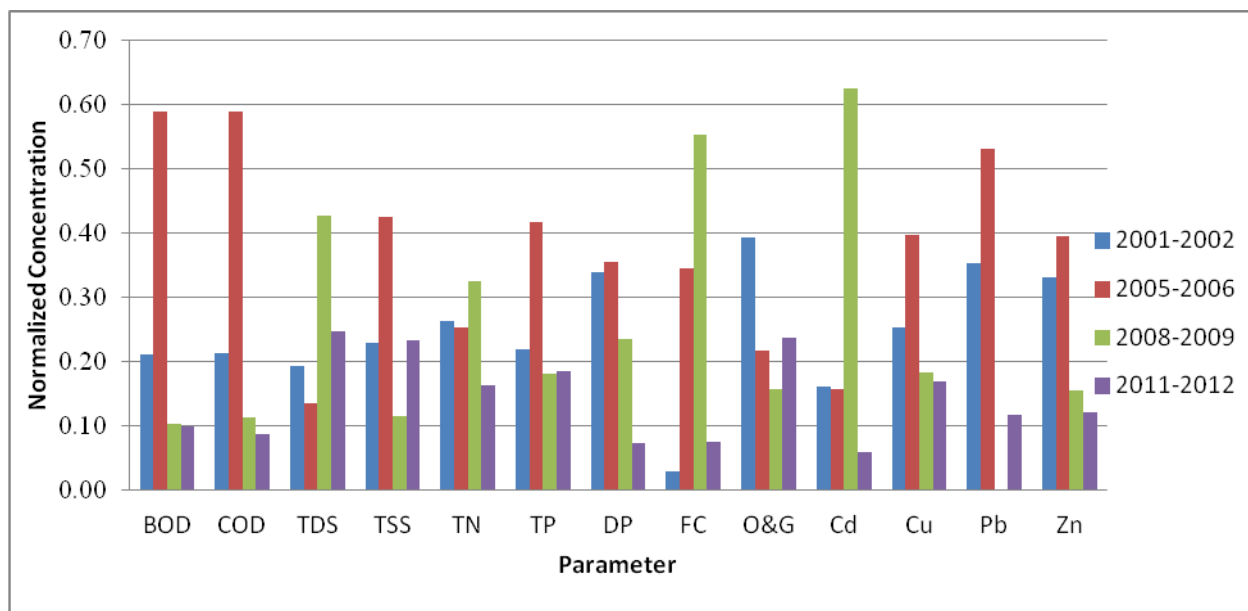
To date the Anacostia River watershed monitoring stations have been sampled on four separate rotations during the periods of 2001–2002, 2005–2006, 2008–2009 and 2011–2012. The data covers a total of eighty three stormwater sampling events. The data set for the 2001–2002, 2005–2006 and 2008–2009 rotations are submitted to the EPA in the DMRs dated April 19, 2003, August 19, 2006, and April 12, 2009, respectively. This report contains the data collected during the 2011–2012 period. Table 34 below shows the mean concentrations for selected parameters analyzed during the four rotations.

The concentrations for all parameters are lower than the average over the four rotations. BOD, COD, TN, DP, Cd, Cu and Zn are lower in this rotation (2011–2012 period) than those observed in prior rotations, while the remaining, TOP, TSS, TDS, FC, O&G and Pb are at or slightly higher than any one of the concentrations observed during prior rotations. Figure 16 depicts the variations.

**Table 34** Mean Pollutant Concentrations for Anacostia River Sites

Parameter	Unit	Rotation 1 (2001–2002)	Rotation 2 <sup>a</sup> (2005–2006)	Rotation 3 (2008–2009)	Rotation 4 (2011–2012)
BOD	mg/L	44.4	124	21.44	20.84
Cadmium	total µg/L	0.35	0.34	1.36	1.2
COD	mg/L	110	305	58.4	45.4
Copper	µg/L	41.2	64.9	29.8	27.5
Fecal Coliform	MPN	2,090	24,500	39,362	5,323
Lead	µg/L	19.0	28.5	ND	6.3
Nitrogen	total mg/L	3.56	3.42	4.39	2.20
Oil and Grease	mg/L	6.25	3.45	2.49	3.76
Phosphorus	dissolved mg/L	0.233	0.244	0.161	0.05
Phosphorus	total mg/L	0.353	0.673	0.291	0.30
Total Dissolved Solids	mg/L	172	120	379	219
Total Suspended Solids	mg/L	65.6	121	32.49	66
Zinc	µg/L	142	169	66.5	51.8

<sup>a</sup> Partial dataset



**Figure 16** Water quality trends in the Anacostia River watershed.

To supplement the data, the sampling and analysis results for the 83 stormwater samples collected from 2001 to 2012 at the nine Anacostia River watershed sites were examined. Table 35 shows the range of concentrations for the parameters reported above the detection or the reporting limits. Six of the compounds detected among the volatile organic compounds and acid extractable compounds, were detected only once, Toluene is the most prevalent in this group.

Bis(2-ethylhexyl)phthalate is the most prevalent in the base neutral extractable compounds category. Cyanide, Phenols and eleven metals were detected at varying frequencies and concentrations. Mercury, Selenium, Beryllium, and Thallium were observed in less than three percent of the samples. Arsenic and Cyanide were detected in 17 and 37 percent of the samples, respectively. Metals are relatively ubiquitous, Lead, Copper, Nickel, Zinc and Chromium encountered more frequently. Among the conventional pollutants, fecal coliform is detected at higher frequency and concentration.

**Table 35** Detected Parameters in the Anacostia River Watershed

Parameter	Unit	Concentration	
		From	To
(A) Volatile Organic Compounds			
Benzene	µg/L	1.2	1.2
Bromodichloromethane	µg/L	1.6	1.6
Chloroform	µg/L	0.8	3.6
1,1,2-Trichloroethylene	µg/L	1	1
1,1,2,2-Tetrachloroethylene	µg/L	1.2	21
1,2-Dichloroethane	µg/L	0.5	0.5
Methylene chloride	µg/L	5.7	5.7
Tetrachloroethene	µg/L	50	657
Toluene	µg/L	0.09	19
Trichloroethylene(trichloroethene)	µg/L	1	2.2
(B) Acid Extractable Compounds			
4-Nitrophenol	µg/L	0.07	0.07
Phenol	µg/L	0.8	0.8
(C) Base/Neutral Extractable Compounds			
1,2-diphenylhydrazine as azobenzene	µg/L	0.5	0.5
Bis(2-ethylhexyl)phthalate	µg/L	1.8	120
Butylbenzylphthalate	µg/L	9.8	45
Diethylphthalate	µg/L	23	24
Di-n-butylphthalate	µg/L	5	5
Di-n-octyl phthalate	µg/L	12	12
Chrysene	µg/L	0.7	0.7
Fluoranthene	µg/L	0.9	1.4
Napthalene	µg/L	5.6	5.6
Pyrene	µg/L	0.9	0.9
(D) Pesticides/PCBs			
4,4'-DDT	µg/L	0.004	0.012
4,4'-DDE	µg/L	0.002	0.011
Delta-BHC	µg/L	0.0035	0.0035
Gamma-BHC	µg/L	0.002	0.011
Dieldrin	µg/L	0.002	0.002
Endosulfan I (Alpha-Endosulfan)	µg/L	0.002	0.002
Heptachlor epoxide	µg/L	0.007	0.007
Total PCBs	µg/L	0.0012	0.108
(E) Metals, Cyanide, and Phenols			
Antimony, Total	mg/L	0.002	0.0057
Arsenic, Total	mg/L	0.002	0.046
Beryllium, Total	mg/L	0.0005	0.0016
Cadmium, Total	mg/L	0.0003	0.012
Chromium, Total	mg/L	0.0019	0.164

Parameter	Unit	Concentration	
		From	To
(E) Metals, Cyanide, and Phenols (continued)			
Copper, Total	mg/L	0.006	0.45
Lead, Total	mg/L	0.002	0.1
Mercury, Total	mg/L	0.0001	0.01
Nickel, Total	mg/L	0.0025	0.033
Selenium, Total	mg/L	0.001	0.005
Silver, Total	mg/L	0.0011	0.0011
Thallium, Total	mg/L	0.002	0.053
Zinc, Total	mg/L	0.02	0.89
Cyanide, Total	mg/L	0.0016	0.048
Phenols, Total	mg/L	0.003	0.64
(F) Conventional Pollutants			
Total Suspended Solids	mg/L	6	1100
Total Dissolved Solids	mg/L	20	2600
COD	mg/L	12	750
BOD <sub>5</sub>	mg/L	3.6	200
Oil and Grease	mg/L	2	116
E. Coli	MPN/100 mls	2000	>1600000
Fecal Coliform	MPN/100 mls	70	>1600000
Fecal Streptococcus	MPN/100 mls	21.5	300,000
Total Kjeldahl Nitrogen (TKN)*	mg/L	0.66	8.1
Nitrate + Nitrite (NO <sub>2</sub> + NO <sub>3</sub> )	mg/L	0.058	5.2
Dissolved Phosphorous	mg/L	0.012	0.73
Total Phosphorous (TP)	mg/L	0.017	1.5
Chlorophyll (a)	mg/m^3	0.72	44
Hardness	mg/L	20	360
Total Nitrogen	mg/L	0.9	9.6
Dioxin (2,3,7,8-TCDD)	pg/L	4	7.4

#### IV. OTHER REPORTING REQUIREMENTS

##### A. Assessment of Controls

Under the previous permit and this reporting cycle the District assessed the effects of the SWM program through the following metrics and processes. However, methodologies for assessing the effects of the SWM program will continue to be developed and refined as DDOE moves forward with the TMDL Implementation Plan process.

In order to help provide direct assessment of the SWM program impact on water quality, the District is continuing its long-term monitoring program. The program rotates stormwater sampling from the Potomac watershed to the Anacostia watershed to the Rock Creek watershed

on an annual rotation. By focusing monitoring in one watershed during a given year, a more complete measure of pollutant loading from that watershed is obtained.

Within each watershed, DDOE has selected outfalls that are representative of the MS4 for inclusion in the discharge monitoring program. By monitoring representative outfalls, an economy of time, effort, and resources can be made in assessing the impacts of the SWM program on pollutant discharge from the MS4 as a whole. Programs such as removing illicit connections, improved erosion and sediment controls for construction sites, and refurbishment of municipal waste transfer and salt storage areas will result in immediate and predictable reductions to pollutant loading to stormwater runoff in a known watershed. Such measures require monitoring data and runoff modeling to quantify results.

Monitoring provides measurement of the pollutant levels in a watershed so as to evaluate the removal of pollutants by structural BMPs. These BMPs may include LID techniques, catch basin filters and/or inserts, oil and grease traps and flow reduction devices incorporated by new construction and redevelopment throughout the District. These structures are placed on individual sites by residents, businesses, and federal facilities and are designed to control the water flow and pollutants from the land area of that specific site. A reduction of pollutants at a monitoring site cannot be expected until after a significant amount of the monitored watershed area is controlled by BMPs.

The pollutant removal efficiency of a BMP is typically expressed as a percentage reduction in the concentration of a particular pollutant. In order to evaluate the effect of a BMP, knowledge of the pollutant level (in the water flowing from the site) prior to BMP construction is required. After construction, monitoring data should provide a new measure of the level of the pollutant so that a percentage reduction can be estimated. Examples of this may be a 70 percent reduction of oil and grease in a BMP installed near an automotive repair shop, or 80 percent reduction of floatable trash (TSS) in a BMP near a public park area.

Progress of the SWM program under the SWM plan can also be assessed indirectly utilizing statistics regarding stormwater management activities reported by District agencies. While these measures are qualitative and not quantitative, the level of effort, equipment and manpower for each SWM activity under the SWM plan help to provide indirect measurement of pollution reduction achieved. Programs such as public education and contractor and equipment operator training produce effects that are dispersed over time and location. Impacts to the pollutant levels of the MS4 are usually indirectly measured by tracking the number of persons trained or through testing of comprehension.

Some SWM plan measures, such as long-term traffic and transit planning, and programs implemented by consumers like rain leader disconnection or other small-scale residential BMP installations, require significant time in planning and implementation. Thus, effects of today's work may not be measurable within the term of the current permit, or even the following one. Such measures, while quantifiable, require extended time intervals of measurement, or estimates of future implementation rates and efficiencies.

## **B. Modeling**

The current MS4 Permit requires the District to calculate and track pollutant load reductions from the retrofit of impervious surfaces and implementation of LID. Pollutant load reductions will be calculated through a variety of indicators, including desktop modeling of BMP efficiency, biological indicators, stream health assessments and monitoring data.

Another major component of the District's MS4 Permit is the requirement to develop a consolidated TMDL Implementation Plan. The development of this Implementation Plan presents an opportunity to engage in a strategic planning and analysis effort, with the ultimate objective of forecasting the level of investment and amount of time required to achieve TMDL WLAs and to achieve District water quality standards. In developing an Implementation Plan, DDOE will rely on modeling, GIS analyses, data analysis, and water quality monitoring. Modeling will be used to estimate load reductions achieved by runoff reduction and BMPs implementation, via the Watershed Treatment Model or other appropriate tools. Additional information about the consolidated TMDL Implementation Plan is found in section II.J.3 of this report.

