

**REPORT FOR THE MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4)
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
PERMIT FOR JULY 1, 2013 THROUGH DECEMBER 31, 2013**

**CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
OFFICE OF COMPLIANCE AND LABORATORIES**

Preface

This report describes the City of Baltimore's MS4 activities from July 1, 2013, through December 31, 2013, in association with its National Pollutant Discharge Elimination System municipal separate storm sewer system discharge permit (Permit Number: MD0068292). Starting for the report for 2011, the City of Baltimore revised their reporting method to match the fiscal year (July 1 to June 30). This report represents the portion of Fiscal Year 2014 which was covered under the previous MS4 permit.

On December 27, 2013, the State of Maryland issued a new permit for the City's storm sewer system. Activities for January 1, 2014, through June 30, 2014, will be discussed in a separate report, which will follow the format outlined in the new permit.

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List of Files on CD-ROM Accompanying Report

City of Baltimore MS4 Permit Report July through December 2013.pdf

This is a copy of this report in an Acrobat file.

As-built Data July through December 2013.xlsx

This is an Excel file listing information on the 10 facilities from 6 development projects for which as-built drawings were received and approved by the Office of Compliance and Laboratories (SWMD) between July and December 2013. This file is discussed in Section D1a.

FY14A folder

This is a folder containing 6 more folders. Each of these folders contains the scanned images from one set of as-built drawings. These as-built drawings were received by SWMD from July through December 2013 and approved by SWMD after field verification. This folder is discussed in Section D1a.

Urban BMP Mgt Practices July through December 2013.xlsx

This is an Excel file with records for the plans approved during July through December 2013 which included constructing BMP facilities. This file is discussed in Section D1a.

Baltimore City NPDES Stormwater Permit Data July through December 2013.mdb

Baltimore City Responsible Personnel Certification

This is an Access table with information on the people who attended this training on October 30, 2013. It is referred to in Section D2a.

Baltimore City Monitoring Sample Results Jul through Dec 2013

This is an Access table with the sample results from July through December 2013 including: stream impact sampling (SIS); ammonia screening (AS); and baseline and discrete stormwater samples from Moores Run monitoring at Hamilton Avenue and Radecke Avenue stations. This table is referred to in Sections D3a and G1a.

Baltimore City Chemical Monitoring Jul through Dec 2013

This is an Access table that contains the results for stormwater EMCs and baseline discrete samples collected from July through December 2013 for monitoring in Moores Run at the Hamilton Avenue and Radecke Avenue stations. It is referred to in Sections D3a and G1a.

NPDES Construction General Perm July through December 2013.xlsx

This is an Excel file with the records of plans which had a planned earth disturbance greater than one acre which were approved during July through December 2013. This file is discussed in Section D2b.

Moore's Run Habitat Assessments 2005 through 2014.xlsx

This is an Excel file listing the habitat assessment scores for the 10 surveys done for the Upper Moore's Run between May 18, 2005, and August 21, 2014, by the Office of Compliance and Laboratories (SWMD). This file is discussed in Section G1cii.

A. Permit Administration

Kimberly L. Burgess, P.E. continued as the liaison with the Maryland Department of the Environment (MDE). Ms. Burgess was the Chief of the Surface Water Management Division (SWMD) within the Bureau of Water and Wastewater, Department of Public Works. Her address is 3001 Druid Park Drive Room 232, Baltimore, MD 21215. Her phone number is (410) 396-0732. Her e-mail address is Kimberly.Burgess@baltimorecity.gov.

B. Legal Authority

The City maintained adequate legal authority in accordance with NPDES regulations 40 CFR 122.26(d)(2)(i) during the period of this report.

C. Source Identification- GIS Data

1. Storm Drain System

No changes have occurred since previous submittals.

2. Urban Best Management Practices (BMP)

Requests for 10 BMPs were received and approved during this reporting period. The details are shown in the file entitled *As-built Data July through December 2013.xlsx*. A comprehensive database, including GIS shape files, to match MDE's geo-reference database requirements was initiated during this reporting period.

3. Impervious Surfaces

No changes have occurred since previous submittals.

4. Monitoring Locations

No changes have occurred since previous submittals.

5. Watershed Restoration

No changes have occurred since previous submittals.

D. Management Programs

1. Stormwater Management

SWMD was responsible for maintaining programmatic and implementation information. During Fiscal Year 2013, there were 134 projects that were exempted from stormwater management based on project size (less than 5,000 square feet of disturbed area); and there were 43 development projects that received final approval for erosion and sediment control and/or stormwater management compliance with Article 7 of the City Code. Four (4) of these projects involved modifications to plans that had been approved prior to July 2013. The plan approvals allow for an approximate total of 89 acres of land disturbance.

There were 16 projects for which the plans had a disturbed area of more than 1 acre, and thus require an NPDES General Construction Permit from MDE.

There were 17 projects for which the plans had the installation of a best management practice (BMP). Taken together the BMPs, if built, these projects would have qualitative control for approximately 17.2 acres of impervious area.

If all 43 projects were constructed as planned, the anticipated increase of impervious area would be approximately 1.6 acres. Here is the breakdown for changes in impervious area for these projects:

- 13 projects have a planned increase in the amount of impervious area for a total increase of 3.3 acres;
- 12 projects have a planned decrease in the amount of impervious area for a total decrease of 4.9 acres;
- 14 projects have no net change in the amount of impervious area; and
- 5 projects have no information listed for amount of existing impervious area and proposed impervious area.

There were 35 projects that received waivers or variance:

- 17 redevelopments;
- 1 quantitative;
- 10 qualitative
- 1 administrative;
- 4 phased; and
- 2 variances.

There were 4 projects that were allowed to meet the associated stormwater management development requirements by using a fee-in-lieu, resulting in a total of \$88,746.00 in collected fees. The total of fees collected breaks down as:

- \$81,571.74 for water quality;
- \$4,112.50 for Cpv;
- \$1,312.50 for Q10; and
- \$1,750.00 for Q100.

a. **New BMPs**

Between July and December 2013, SWMD received 10 sets of as-built drawings for 10 stormwater management BMPs that were installed at 6 development sites. These 6 sets of as-built drawings were scanned into files- each page of the as-built plan as a separate Acrobat file or JPEG image file. The scanned image files for each project were put into a folder named for the tracking number (“ESD” plus the four digit number that was assigned to the project by SWMD when the project’s plans were first submitted for review) and a description of the project such as its address. Table D1a.1 lists information for these 10

facilities. A more extensive version of this table can be found in the Excel file “As-built Data July through December 2013.xlsx” on the CD-ROM accompanying this report. The 12 folders containing the images of the as-built drawings can be found in the folder “FY14A” on the CD-ROM accompanying this report.

Table D1a.1 As-builts Submitted & Approved Between July and December 2013							
ESD#	Facility #	Address	Watershed	Structure Type	Land Use	Drainage Area (acres)	Impervious Area Treated (acres)
5868	BC5868-01	2434 West Belvedere Avenue	Jones Falls	Micro Bioretention	institution	5.23	1.82
6006	BC6006-01	3607 O'Donnell Street	Baltimore Harbor	Sand Filter	commercial	1.37	1.25
6006	BC6006-02	3607 O'Donnell Street	Baltimore Harbor	Sand Filter	commercial	1.37	1.25
6006	BC6006-03	3607 O'Donnell Street	Baltimore Harbor	Sand Filter	commercial	1.84	1.62
6006	BC6006-04	3607 O'Donnell Street	Baltimore Harbor	Underground Storage	commercial	2.74	
6006	BC6006-05	3607 O'Donnell Street	Baltimore Harbor	Underground Storage	commercial	1.84	
6009	BC6009-01	6500 Eastern Avenue	Baltimore Harbor	Sand Filter	commercial	0.13	0.13
6154	BC6154-01	1125 N. Patterson Park Avenue	Baltimore Harbor	rainwater harvesting	institution	0.40	0.28
6226	BC6226-01	30 W. Biddle Street	Jones Falls	Green roof	high density residential	0.25	0.25
6351	BC6351-01	1519 S. Clinton Street	Baltimore Harbor	Sand Filter	commercial	1.29	1.29

During Fiscal Year 2013, SWMD approved for construction 17 plans containing BMPs. A summary table of the BMPs for these projects is provided in the in the Excel file “Urban BMP Mgt Practices FY2013.xlsx” on the CD-ROM accompanying this report.

2. Erosion and Sediment Control

SWMD is responsible for the City’s erosion and sediment control program. During this reporting period, SWMD employed five sediment and erosion control inspectors and one supervisor to routinely inspect all construction activities, as mandated in Article 7, Division II of the City Code.

During this reporting period, the inspectors performed 890 site inspections; issued 153 correction notices. The inspectors investigated 16 complaints related to sediment control.

a. **Responsible Personnel**

The Environmental Compliance and Laboratory Services Division conducted one “responsible personnel” certification class within this reporting period, on October 30, 2013. A total of 48 people received “green cards” after passing the exams administered during this class. Information on those who were certified can be found in table “Baltimore City Responsible Personnel Certification” in the Access database “Baltimore City NPDES Stormwater Permit Data July through December 2013.mdb” on the CD-ROM accompanying this report.

b. **Grading (Earth Disturbances) Permits**

During this reporting period, SWMD approved the plans for 16 projects for which the plans had a disturbed area of more than 1 acre, and thus require an NPDES General Construction Permit from MDE. A summary table of these projects is provided in the file “NPDES Construction General Perm FY2014.xlsx” on the CD-ROM accompanying this report.

3. **Illicit Discharge**

a. **Pollution Source Tracking (PST)**

SWMD relies on two water quality monitoring programs to initiate PSTs: ammonia screening (AS) and stream impact sampling (SIS). The monitoring results from the surveys for the AS and SIS programs for July through December 2013 are listed within table “Baltimore City Monitoring Sample Results Jul through Dec 2013” in the Access database “Baltimore City NPDES Stormwater Permit Data July through December 2013.mdb” on the CD-ROM accompanying this report.

Table D3a.1 lists a breakdown of the number of water quality analyses by watershed and monitoring program for July through December 2013.

Table D3a.1 Monitoring Associated with Illicit Discharge Detection 7/1/2013 to 12/31/2013			
Program	Number of Surveys	Number of Stations Visited (Samples Taken)	Number of Water Quality Analyses Performed
Back River Watershed SIS	6	66	1,170
Baltimore Harbor Watershed SIS	6	54	1,017
Gwynns Falls Watershed SIS	6	54	941
Jones Falls Watershed SIS	6	30	484
Patapsco River Watershed SIS	6	6	112
Quality Control Replicates	24	24	310
Quality Control Blanks for Harbor SIS Enterococci	5	5	5
Back River Watershed Ammonia Screening	18	234	1,151
Baltimore Harbor Watershed Ammonia Screening	18	157	820
Gwynns Falls Watershed Ammonia Screening	18	213	1,014
Jones Falls Watershed Ammonia Screening	21	261	1,166
Patapsco River Watershed Ammonia Screening	18	18	95
Quality Control Replicates for Harbor Ammonia Screening Enterococci	6	6	6
Quality Control Blanks for Harbor Ammonia Screening Enterococci	6	6	6
Total	123	1,093	8,297

The dates for surveys in each watershed for July through December 2013 are listed in Table D3a.2.

Table D3a.2 Dates for Ammonia Screening (AS) and Stream Impact Sampling Surveys (SIS) July through December 2013 in Each Watershed									
Back River		Jones Falls		Gwynns Falls		Baltimore Harbor & Patapsco River			
Date	Type	Date	Type	Date	Type	Date	Type		
Third Quarter Calendar Year 2013 (First Quarter Fiscal Year 2014)									
7/5/2013	AS	7/2/2013	AS	7/3/2013	AS	7/1/2013	SIS		
7/16/2013	AS	7/8/2013	SIS	7/16/2013	AS	7/9/2013	AS		
7/24/2013	AS	7/15/2013	AS	7/22/2013	SIS	7/15/2013	AS+E		
7/29/2013	SIS	7/19/2013	AS	7/30/2013	AS	7/26/2013	AS		
8/8/2013	AS	7/23/2013	AS	8/7/2013	AS	7/30/2013	AS		
8/14/2013	AS	7/31/2013	AS	8/14/2013	AS	8/2/2013	AS+E		
8/20/2013	AS	8/5/2013	SIS	8/19/2013	SIS	8/12/2013	SIS		
8/26/2013	SIS	8/14/2013	AS	8/28/2013	AS	8/20/2013	AS		
9/4/2013	AS	8/20/2013	AS	9/3/2013	AS	8/30/2013	AS		
9/12/2013	AS	8/29/2013	AS	9/11/2013	AS	9/4/2013	AS+E		
9/20/2013	AS	9/3/2013	AS	9/19/2013	AS	9/11/2013	AS		
9/26/2013	AS	9/9/2013	SIS	9/23/2013	SIS	9/16/2013	SIS		
		9/18/2013	AS			9/24/2013	AS		
		9/24/2013	AS						
Fourth Quarter Calendar Year 2013 (Second Quarter Fiscal Year 2014)									
10/3/2013	SIS	10/1/2013	AS	10/1/2013	AS	10/1/2013	AS+E		
10/8/2013	AS	10/9/2013	SIS	10/8/2013	AS	10/15/2013	SIS		
10/16/2013	AS	10/15/2013	AS	10/16/2013	AS	10/24/2013	AS		
10/24/2013	AS	10/23/2013	AS	10/21/2013	SIS	10/30/2013	AS		
10/28/2013	SIS	10/30/2013	AS	10/29/2013	AS	11/5/2013	AS+E		
11/6/2013	AS	11/4/2013	SIS	11/5/2013	AS	11/12/2013	SIS		
11/21/2013	AS	11/12/2013	AS	11/13/2013	AS	11/19/2013	AS		
11/25/2013	SIS	11/19/2013	AS	11/18/2013	SIS	12/3/2013	AS+E		
12/4/2013	AS	12/2/2013	SIS	12/3/2013	AS	12/12/2013	AS		
12/12/2013	SIS	12/11/2013	AS	12/11/2013	SIS	12/16/2013	SIS		
12/19/2013	AS	12/17/2013	AS	12/18/2013	AS	12/24/2013	AS		
12/26/2013	AS	12/24/2013	AS	12/24/2013	AS				
		12/30/2013	AS						

Gray highlight indicates that the survey was done during, or just after, a precipitation event. AS+E means that samples were collected for enterococci MPN counts during the ammonia screening survey.

SWMD initiated 72 PSTs and worked on a total of 99 PSTs from July through December 2013. Table D3a.3 lists by watershed the number of PSTs on which SWMD worked and the number of water quality analyses performed from July through December 2013. Table D3a.4 presents a break down for the 72 PSTs initiated, the count by status (as of August 12, 2014) and by watershed.

Table D3a.3 Pollution Source Tracking (PST) 7/1/2013 through 12/31/2013			
Watershed	Number of PSTs	Number of Locations Visited	Number of Water Quality Analyses Performed
Back River Watershed	7	28	20
Baltimore Harbor Watershed	38	198	159
Gwynns Falls Watershed	20	125	58
Jones Falls Watershed	33	181	118
Patapsco River Watershed	1	10	12
Totals	99	542	367

Table D3a.4 Pollution Source Tracking Investigations Initiated 7/1/2013 through 12/31/2013						
Status of PST	Back River	Baltimore Harbor	Gwynns Falls	Jones Falls	Patapsco River	Total
Resolved	2	6	9	7	0	24
Problem found, referred to agency, repairs pending	0	6	1	10	0	17
Problem found, referred to agency, not resolved	0	4	1	2	0	7
On-going Investigation	0	0	1	2	1	4
Stopped (ex. trail ended, no problem found)	3	9	1	7	0	20
Total	5	25	13	28	1	72

b. Exterior Lead Paint Removal Waste Control Program

This program is administered by the Pollution Control Section of the Environmental Services Division of the Bureau of Water and Wastewater. Table D3b.1 lists the number of permitted sites and inspection activities for July through December 2013.

Table D3b.1 Exterior Lead Paint Removal Waste Control Program Statistics July through December 2013			
Number of permitted sites	Number of site inspections	Number of stop work notices requiring corrective action	Number of documented illegal discharges to the storm drain system
180	178	12	0

4. Road Construction and Maintenance

a. Street Sweeping and Storm Drain Cleaning

Street Sweeping

From July through December 2013, the street sweepers operated by the Bureau of Solid Waste removed 5,806 tons of debris while sweeping 49,191 miles of street surface. Further discussions of the benefit of street sweeping and its relation to the City's impervious area goal are provided under "Street Sweeping and Inlet Cleaning" in Section F3, "Annual Reporting" of this report.

Storm Drain Cleaning

The Utility Maintenance Division (UMD) of the Bureau of Water and Wastewater removed 460.2 tons of debris from the City's storm drain system from July through December 2013. Further discussions of the benefit of inlet cleaning and its relation to the City's impervious area goal are provided under "Street Sweeping and Inlet Cleaning" in Section F3, "Annual Reporting" of this report.

b. Integrated Pest Management

The Department of Transportation

The Baltimore City Department of Transportation (DOT) applies herbicides from May through September to City Rights of Way. During May 2013 through September 2013 they applied 115 gallons of Brushmaster and 110 gallons of Prosecutor Pro (Lesco brand equivalent of Round Up).

The Department of Recreation and Parks

Recreation and Parks has 6 Public Agency Applicators who are certified by the Maryland Department of Agriculture (MDA). They are required to attend at least 8 hours of continuing education each year to keep their certificate current. Additionally many of the full time staff are Registered Technicians with MDA and can work under the supervision of one of the licensed applicators.

The Horticulture Division uses an IPM strategy to manage both weeds and insect pests that first and foremost uses good cultural controls including manual weeding, improving plant health, proper pruning (particularly for good air movement), and mulching, often with a newspaper base to smother tenacious weeds. When these methods fail, they will use targeted applications of other products using the mildest products, including such things as horticultural oil. They primarily use Glyphosate products for weed control, both as a spray for garden areas and as a cut and paint application for tenacious invasive like Japanese honeysuckle. Pesticide use is minimal. Usually they are only treating

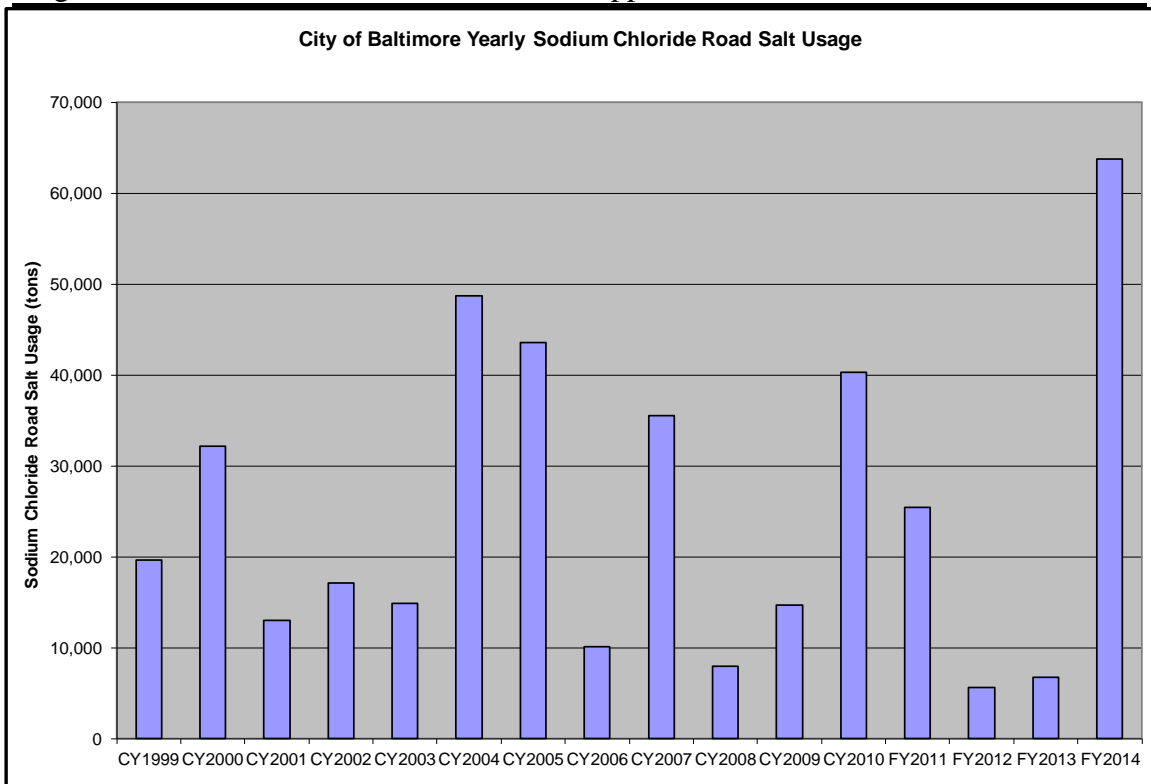
a single plant or a small group of plants. In addition to using the right product, they also strive to apply it at the right time of year for best efficacy based on the life cycle of the weed or pest. Currently they do not do any weed control on turf areas. As public gardens, they are ever mindful of both the perception and the reality of the safety of any applications. Additionally as they install new plants and gardens, they choose cultivars that are resistant to pests and diseases.

The Department of Recreation and Parks applied approximately 63 gallons of Round Up (or an equivalent product) from July through December 2013.

c. Deicing Materials

DOT applied 63,724 tons of sodium chloride between July 2013 and June 2014 (Fiscal Year 2014). The agency did not report how much of this amount was applied specifically between July and December 2013 (the period covered by this report). Figure D5c.1 displays the amount of sodium chloride applied for each calendar year 1999 through 2010 and then each Fiscal Year for 2011 through 2014.

Figure D5c.1 Amount of Sodium Chloride Applied to Roads



5. Public Education

a. Outreach Efforts to the Public

In December 2013, DPW established a Watershed Liaison Section and hired a Watershed Liaison. Responsibilities of the section include providing public outreach and education to community, faith-based, non-profit, and business groups, serving as liaison between DPW and other city agencies, participating in various stakeholder committees and work groups (Healthy Harbor Trash Work Group, Watershed 263 Council, TreeBaltimore, Urban Waters Federal Partnership), and leading public engagement for the MS4 permit.

Beginning in September 2013 DPW Community Liaisons began providing educational programs to public schools. The programs included information on trash reduction, recycling, rat abatement, and storm drains, with the connection between these efforts and the health of the harbor. Included in the presentations is the "Clean up Baltimore" video. Approximately 30 presentations were made during the Fall and Winter of 2013.

DPW Community Liaisons also participated in several events where they provided information on trash reduction, stormwater credits, recycling, and residential water management and pollution reduction:

- Dam Jam
- Liberty Dam Day
- Baltimore Artscape
- Baltimore Book Festival
- Mayor's Back to School Fair
- Mayor's Fall Cleanup

In addition, liaisons attend the Mayor's Cabinet in the Community, the Mayor's Public Safety Meetings, community walk-throughs to assess trash compliance, as well as community meetings throughout the City.

b. Outreach to Industry

The Pollution Control Section of the Environmental Services Division conducts annual inspections of "significant industrial users" of the sanitary sewer system: currently there are 23 significant industrial users. The Pollution Control Section revised their check list in September 2010 to include additional stormwater related industrial site information. A copy of the revised inspection check list was included on the CD-ROM that accompanied the 2010 annual report. Copies of the inspection reports are available to view by appointment at the Pollution Control Section offices.

E. Watershed Assessment and Planning

1. Watershed Management Plans

There are five watersheds at the 8-digit scale into which parts of the City drain: Back River, Baltimore Harbor, Gwynns Falls, Jones Falls and Patapsco River. The City completed watershed studies of Gwynns Falls in 2004, and Jones Falls and Back River in 2008. No further assessments were completed during this reporting period.

2. Watershed Assessment from Chemical Monitoring

E. Coli and Enterococci MPN Count Analysis

Since November 2008, SWMD modified SIS protocol to replace fecal coliform MPN counts with e. coli MPN counts. Since April 2009, SWMD switched to having enterococci MPN counts performed on the Baltimore Harbor and Patapsco River watershed SIS stations and the Lombard Street station in the Jones Falls watershed since enterococci are considered a better indicator to use for marine waters. Since April 2009, SWMD has been collecting samples for enterococci MPN counts at the marine water SIS stations twice each month.

Table E2.1 lists the e. coli MPN count geometric mean and the percentage of surface water dry weather grab samples collected through June 2014 for which the e. coli MPN count was at/ or below each of the four water contact use categories for each freshwater sampling station. Figure E2.1 depicts the percentage of samples for which the e. coli MPN count was at / or below the infrequent full body contact recreation guideline (576 MPN/100 ml) for each freshwater sampling station.

Table E2.2 lists the enterococci MPN count geometric mean and the percentage of surface water dry weather grab samples collected through June 2014 for which the enterococci MPN count was at /or below each of the four water contact use categories for each marine water sampling station. Figure E2.2 depicts the percentage of dry weather samples for which the enterococci MPN count was at below the infrequent full body contact recreation guideline (500 MPN/100 ml) for each marine water sampling station.

Station	ID	Number of Samples	Number of Samples Included for the Geometric Mean	Geometric Mean (MPN/100 ml)	Percent At or Below Frequent Full Body Contact Recreation (235 MPN/100 ml)	Percent At or Below Moderately Frequent Full Body Contact Recreation (298 MPN/100 ml)	Percent At or Below Occasional Full Body Contact Recreation (410 MPN/100 ml)	Percent At or Below Infrequent Full Body Contact Recreation (576 MPN/100 ml)	Percent Above Infrequent Full Body Contact Recreation (576 MPN/100 ml)
<i>Back River Watershed Herring Run Sub-watershed</i>									
PERRING PKWY	HR-1	58	58	766	22%	24%	33%	47%	53%
MT. PLEASANT GC	HR-2	58	58	909	24%	28%	34%	38%	62%
CHINQUAPIN RUN	HR-3	58	58	579	24%	24%	36%	50%	50%
TIFFANY RUN	HR-4	58	58	536	33%	34%	43%	59%	41%
HARFORD RD.	HR-5	58	58	843	17%	22%	38%	45%	55%
WRIGHT AVE.	HR-6	58	58	666	31%	38%	41%	50%	50%
PULASKI HWY.	HR-7	58	58	475	34%	34%	43%	60%	40%
<i>Back River Watershed Moores Run Sub-watershed</i>									
MARY AVE.	MR-1	57	55	2,935	2%	5%	11%	14%	86%
HAMILTON AVE.	MR-2	58	57	2,503	2%	3%	5%	14%	86%
RADECKE AVE.	MR-3	58	58	1,333	9%	10%	28%	34%	66%
BIDDLE ST. & 62ND ST	MR-4	58	58	586	31%	33%	41%	47%	53%
<i>Jones Falls Watershed</i>									
SMITH AVE.	JF-1	62	62	108	73%	76%	77%	82%	18%
WESTERN RUN	JF-2	62	61	709	23%	27%	35%	52%	48%
STONY RUN	JF-3	62	62	300	48%	53%	69%	77%	23%
<i>Gwynns Falls Watershed</i>									
POWDER MILL	GF-1	62	62	653	23%	26%	35%	48%	52%
PURNELL DR.	GF-2	59	59	580	25%	27%	36%	56%	44%
DEAD RUN DNST.	GF-3	58	58	230	50%	53%	69%	78%	22%
GWYNNS FALLS PKWY.	GF-4	59	59	224	53%	54%	63%	71%	29%
GRUN HILTON ST.	GF-5	59	59	2,506	7%	8%	15%	19%	81%
GF HILTON ST.	GF-6	58	58	423	40%	41%	52%	64%	36%
MAIDENS CHOICE	GF-7	58	58	431	36%	41%	52%	67%	33%
GRUN CARROLL PARK	GF-8	58	56	9,207	2%	2%	2%	2%	98%
WASHINGTON BLVD.	GF-9	58	58	2,226	2%	2%	3%	10%	90%

Figure E2.1 Percent E. Coli MPN Counts At or Below the Infrequent Full Body Contact Recreation Guideline (576 MPN/100 ml)

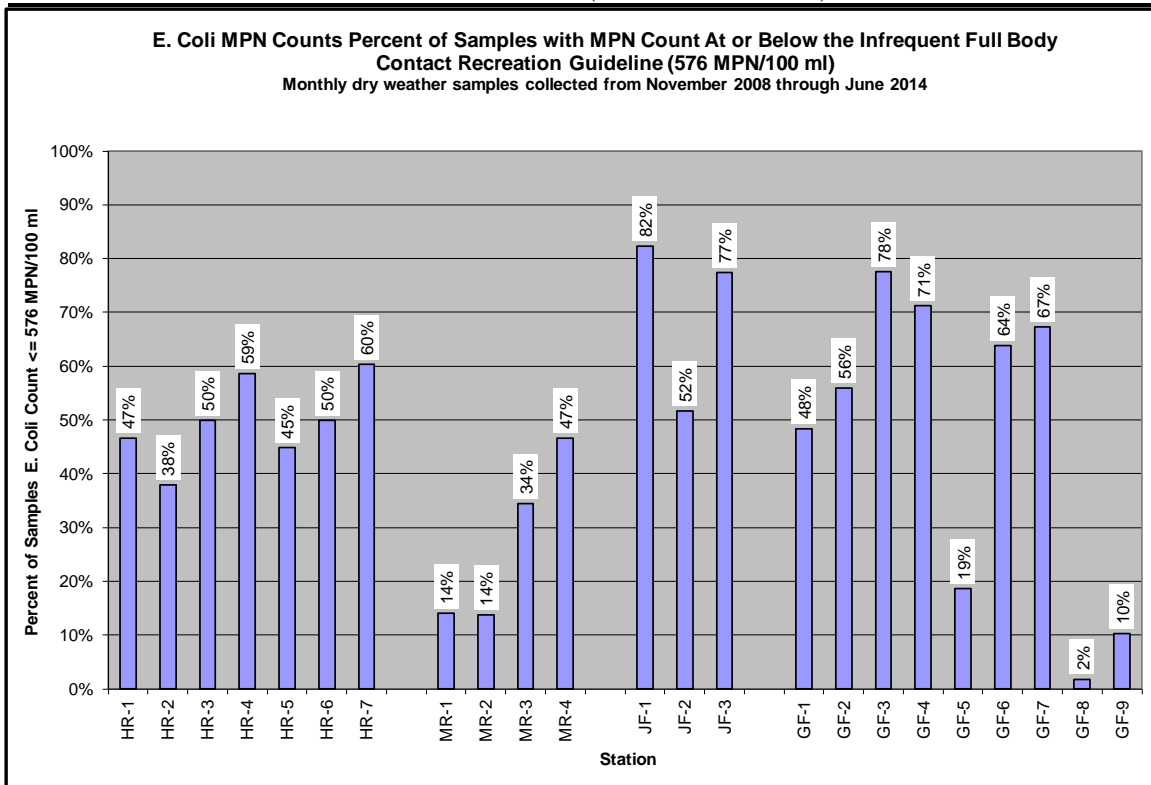
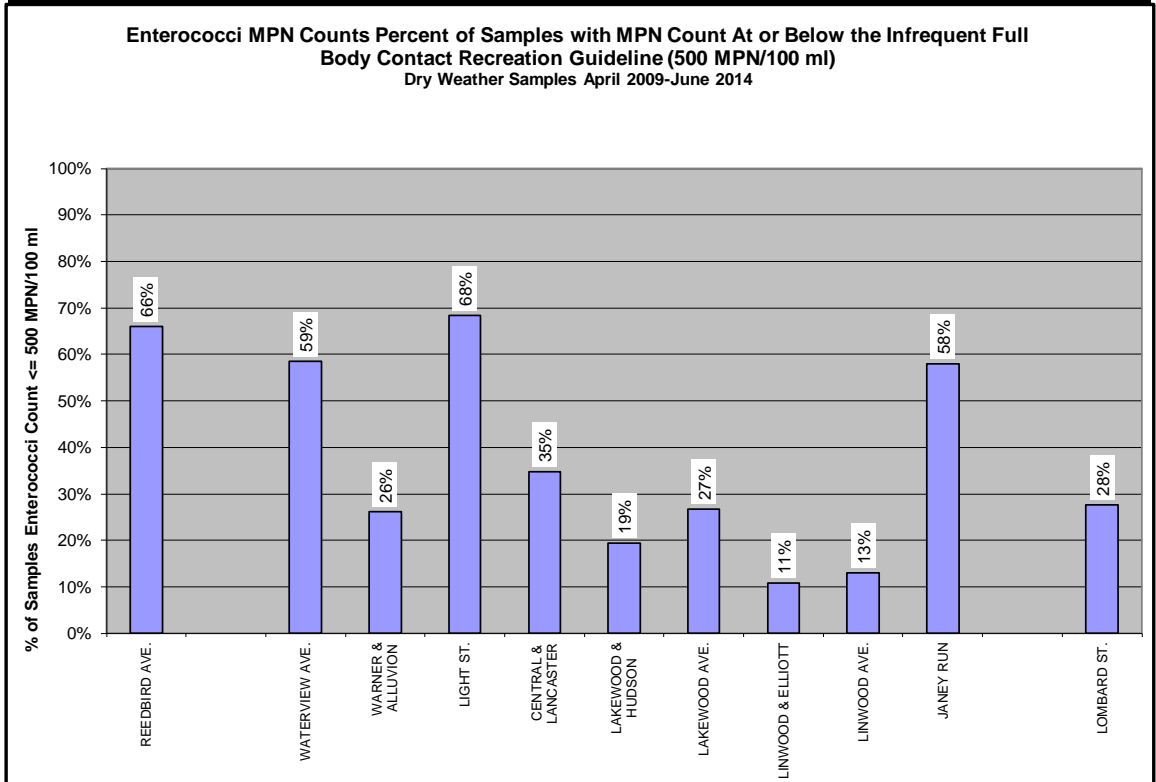


Table E2.2 Enterococci MPN Counts from Dry Weather Samples: Geometric Means and Comparison to State's Criteria for Frequency of Contact (April 2009 through June 2014)								
Station	Number of Samples	Number of Samples Included for the Geometric Mean	Geometric Mean (MPN/100 ml)	Per Cent At or Below Frequent Full Body Contact Recreation (104 MPN/100 ml)	Per Cent At or Below Moderately Frequent Full Body Contact Recreation (158 MPN/100 ml)	Per Cent At or Below Occasional Full Body Contact Recreation (275 MPN/100 ml)	Per Cent At or Below Infrequent Full Body Contact Recreation (500 MPN/100 ml)	Per Cent Above Infrequent Full Body Contact Recreation (500 MPN/100 ml)
Patapsco River Watershed SIS Stations								
REEDBIRD AVE.	112	111	183	43%	51%	60%	66%	34%
Baltimore Harbor Watershed SIS Stations								
WATERVIEW AVE.	111	110	356	23%	28%	42%	59%	41%
WARNER & ALLUVION	111	108	1,150	8%	12%	21%	26%	74%
LIGHT ST.	111	111	175	39%	48%	58%	68%	32%
CENTRAL & LANCASTER	112	111	1,054	7%	13%	23%	35%	65%
LAKESWOOD & HUDSON	36	36	1,663	11%	11%	14%	19%	81%
LAKESWOOD AVE.	116	112	1,342	4%	9%	16%	27%	73%
LINWOOD & ELLIOTT	37	37	2,122	3%	3%	5%	11%	89%
LINWOOD AVE.	116	113	3,859	2%	4%	7%	13%	87%
JANEY RUN	112	110	216	36%	40%	49%	58%	42%
Jones Falls Watershed SIS Stations								
LOMBARD ST.	105	105	1,010	6%	9%	18%	28%	72%

Figure E2.2 Percent Enterococci MPN Counts At or Below the Infrequent Full Body Contact Recreation Guideline (500 MPN/100 ml)



Total Phosphorus and Total Nitrogen Analyses

Table E2.3 lists the percentages for each station of the dry weather grab surface water samples collected from January 2009 through June 2014 which were at or exceeded these nutrient concentration guidelines: total phosphorus at 0.1 mg/L, and total nitrogen (estimated by the sum of total Kjeldahl nitrogen and nitrate+nitrite nitrogen) at 3 mg/L. Following a convention that the State used in its Maryland Water Quality Inventory, 1993-1995, a water quality level was assigned for each station's sample sets: "normal" (shown by

light green highlight) if the percentage was less than 11%; “elevated” (shown by light yellow highlight) if it was between 11% and 25%; and “high” (shown by rose highlight) if it was greater than 25%. The Baltimore Harbor set of stations have the highest levels of phosphorus and nitrogen; the Back River watershed stations have the lowest levels of phosphorus and nitrogen.

Table E2.3 Percent of Dry Weather Samples Exceeding Guidelines for Total Phosphorus or Total Nitrogen (January 2009 through June 2014)		
Station	Percent of Samples Total Phosphorus ≥ 0.1 mg/L	Percent of Samples Total Nitrogen ≥ 3 mg/L
<i>Back River Watershed Herring Run Sub-watershed</i>		
PERRING PKWY	23%	2%
MT. PLEASANT GC	32%	9%
CHINQUAPIN RUN	21%	20%
TIFFANY RUN	12%	5%
HARFORD RD.	21%	7%
WRIGHT AVE.	30%	2%
PULASKI HWY.	12%	9%
<i>Back River Watershed Moores Run Sub-watershed</i>		
MARY AVE.	44%	20%
HAMILTON AVE.	38%	43%
RADECKE AVE.	23%	15%
BIDDLE ST. & 62ND ST.	39%	2%
<i>Jones Falls Watershed</i>		
SMITH AVE.	29%	2%
WESTERN RUN	28%	5%
LINKWOOD	28%	40%
STONY RUN	24%	31%
LOMBARD ST.	37%	8%
<i>Gwynns Falls Watershed</i>		
POWDER MILL	31%	15%
PURNELL DR.	28%	2%
DEAD RUN DNST.	37%	0%
GWYNNNS FALLS PKWY.	39%	13%
GRUN HILTON ST.	37%	13%
GF HILTON ST.	32%	0%
MAIDENS CHOICE	32%	9%
GRUN CARROLL PARK	63%	49%
WASHINGTON BLVD.	27%	2%
Key		
	Normal: $\leq 11\%$ of Samples	
	Elevated: Between 11-25% of Samples	
	High: $>25\%$ of Samples	

Table E2.3 Percent of Dry Weather Samples Exceeding Guidelines for Total Phosphorus or Total Nitrogen (January 2009 through June 2014)		
Station	Percent of Samples Total Phosphorus ≥ 0.1 mg/L	Percent of Samples Total Nitrogen ≥ 3 mg/L
<i>Baltimore Harbor Watershed</i>		
LINWOOD & ELLIOTT ¹	40%	73%
LINWOOD AVE.	75%	50%
LAKWOOD & HUDSON ¹	33%	93%
LAKWOOD AVE.	53%	36%
CENTRAL & LANCASTER	48%	14%
LIGHT ST.	50%	13%
WARNER & ALLUVION	49%	24%
WATERVIEW AVE.	32%	17%
JANEY RUN	37%	17%
<i>Patapsco River Watershed</i>		
REEDBIRD AVE.	40%	13%
¹ Sampling began at LINWOOD & ELLIOTT and LAKWOOD & HUDSON in March 2013.		
Key		
	Normal: $\leq 11\%$ of Samples	
	Elevated: Between 11-25% of Samples	
	High: $>25\%$ of Samples	

3. Watershed Assessment from Biological Monitoring

SWMD conducts biological monitoring for benthic macroinvertebrates between March and May each year. The results from 2013 were presented in the Fiscal Year 2013 Annual Report. The monitoring for 2014 was done after the period covered by this report and will be presented in a later report.

F. Watershed Restoration

1. Restoration Monitoring

Station and Type	Number of Surveys or Storm Events	Number of Samples	Number of Water Quality Analyses Performed
Linkwood Baseline	6	6	65
Powder Mill Baseline	6	6	111
Linkwood Storm	2	12	60
Powder Mill Storm	2	13	65
Kennison Storm	0	0	0
Total			301

2. Annual Reporting

The 5-year MS4 permit that expired in January 2010 required the City to restore or treat 20% of the City's impervious area, which amounts to 4,675 impervious acres out of a total of 23,373 impervious acres. As a means of measuring how well the practices implemented under the permit have met the goal of treating 20% of the impervious area, the City has estimated the amount of phosphorus annually controlled (retained or removed) by these practices. The State assumes that each acre of impervious surface area generates 2.35 pounds of phosphorus per year. The State set the efficiency for treatment at 40% removal of the phosphorus load, which is 0.94 pounds of phosphorus per year per acre of impervious area. Therefore, the control by a non-traditional practice for each 0.94 pounds of phosphorus is equivalent to the traditional treatment of one acre of impervious area. Thus the goal of treating 20% of the City's impervious area can be described as either the traditional treatment of 4,675 impervious acres or the control of 4,390 pounds of phosphorus per year. Below is a discussion of the SWMD's method of estimating the amount of phosphorus annually retained or removed by each of these groups of practices: street sweeping and inlet cleaning; volume control BMPs; stream restoration; and school and vacant lot greening with asphalt removal.

Street Sweeping and Inlet Cleaning:

The tonnage of debris collected is multiplied by the median concentration of phosphorus (120 ppm) in the debris collected from the Hamilton Street Sweeping Study to relate the benefit of the City's Street Sweeping and Inlet Cleaning Program to percent impervious area treated. The estimated amount of phosphorus removed by street sweeping and inlet cleaning is

converted to an equivalent area of impervious surface treated using the assumptions that the average total phosphorus loading for 1 acre of impervious area is 2.35 pounds per acre per year; and a traditional BMP should remove 40% of the phosphorus. Therefore, each 0.94 pounds of phosphorus controlled by a non-traditional practice is the equivalent of traditional treatment of one acre of impervious surface.

Volume Control BMPs:

The volume-control BMPs (see Table F3.1) treat runoff from approximately 1,679 acres, of which, 831 acres are covered with impervious surface. The three completed projects have a combined treatment volume of 13.3 acre-feet. One acre-foot of treatment volume provides the necessary water quality treatment volume of 13.3 acres of impervious area.

Project	Status	Watershed Area (acres)	Impervious Area (acres)	Treatment Volume (acre-feet)	Equivalent Treatment Impervious Area (acre)	Estimated Annual Phosphorus Removal (lbs)
Completed						
Brooklyn Park Stormwater BMP	Completed 2004	306	138	7.5	100	94
Gwynns Run Stormwater BMP	Completed 2003	1,373	693	5.8	77	72
Watershed 263 Six BMPs	Completed 2009			0.037	0.5	0.5
Total Completed		1,679	831	13.3	178	167

Stream Restoration:

In previous annual reports by using phosphorus loading rate reduction as a proxy, the City maintained that each 16.25 feet of the City’s stream restoration projects was equivalent to 100% treatment of one acre of impervious surface. This assertion is different from that espoused by the Chesapeake Bay Program. Using phosphorus reduction as a proxy and the efficiencies approved by the Chesapeake Bay Program, each 90 feet of a stream restoration project results in the same amount of phosphorus reduction as achieved using a traditional practice with a 40% treatment on the runoff from one acre of impervious surface. The City uses the equivalency supported by the Chesapeake Bay Program for this report. To date the City’s stream restoration projects have modified about 13,225 feet, which is equivalent to traditional practices treating 151 acres of impervious surface.

Table F3.2 Stream Restoration Projects			
Project	Stream Length (feet)	Phosphorus Reduction (lbs/year)	MS4 Permit Impervious Area Credit Claimed (acres)
Completed			
Biddison Run Phase I	1,500	16.1	17.1
Lower Stony Run	1,850	19.8	21.1
Maidens Choice Stream #1	2,700	28.9	30.7
Middle Stony Run	2,750	29.4	31.3
Upper Stony Run	2,325	24.9	26.5
ER4014 Western Run Stream Restoration Project 1	2,100	22.5	23.9
Total for Completed Projects	13,225	141.5	150.5
Pending (in Design Phase or Out for Bid)			
ER4018 Powder Mill Environmental Restoration Project 1	3,900	41.7	44.4
Open Channel Improvements- East Stony Run	800	8.6	9.1
Lower Stony Run Stream Restoration	5,000	53.5	56.9
Biddison Run Stream Stabilization (Project ER4023)	6,900	73.8	78.5
Total for Completed & Pending Projects	29,825	319.1	339.5

School and Vacant Lot Greening with Asphalt Removal:

The various school and vacant lot greening projects that have been detailed in previous reports have resulted in 18 acres of asphalt removed (see Table F3.3). Note that previously reported pavement removal projects have been solely limited to those projects completed by SWMD.

In the draft guidance document Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, which the Maryland Department of the Environment published in June 2011, impervious surface area removal is considered a land use change. The projects listed in Table F3.4 are considered to have changed the listed amount of acres from impervious to pervious. The guidance document estimates that the practice of converting impervious surface to pervious surface results in a reduction of phosphorus load of 1.47 pounds per acre per year. The guidance document allows an equivalent impervious area treatment credit of 0.62 acres per acre that was changed from impervious to pervious surface. The projects completed through 2010 converted 17.65 acres of impervious surface to pervious surface for an estimated reduction of 25.9 pounds of phosphorus per year. For the projects listed in Table F3.4, the City claims an equivalent treatment credit of 10.9 acres, which represents 0.05% of the City's total impervious area and 0.23% toward the requirement to treat 20% of the impervious area.

Project	Watershed Area (acres)	Percent Impervious	Impervious Area (acres)	Phosphorus Reduction (lbs/year)	MS4 Permit Impervious Area Credit Claimed (acres)
School Greening Phase I	6.75	100%	6.75	9.9	4.2
School Greening Phase II	5.50	100%	5.50	8.1	3.4
School Greening Phase III	4.40	100%	4.40	6.5	2.7
Vacant Lot Greening Phase I	1.00	50%	0.50	0.7	0.3
Yorkwood Elementary School Greening	0.50	100%	0.50	0.7	0.3
Total			17.65	25.9	10.9

Summary of the Estimated Annual Amount of Phosphorus Retained or Removed by the City's BMPs:

Table F3.4 summarizes the estimated amount of phosphorus removed or retained by the City's BMPs that were discussed above. The total estimated annual amount of phosphorus removed by the City's practices that were in place at the time of this report is 3,188 pounds. The permit required the equivalent of treating 20% of the impervious surface area of the City, which is 4,675 acres. The expected amount of phosphorus that 4,675 acres of impervious surface area would generate is 10,986 pounds. Traditional practices are expected to remove 40% of the phosphorus from stormwater; thus the desired phosphorus removal amount for City practices would be 4,395 pounds. The amount controlled by current City practices is only 73% of the goal set by the permit. By this accounting, the City's practices are equivalent to the treatment of only 14.5% of the City's total impervious area by traditional practices. The additional four stream restoration projects listed as pending to which the City has assigned some value in this calculation will bring the equivalent total to 15.3% of the City's total impervious area by traditional practices. Please note that this calculation only includes the projects discussed in this section. In the near future, the City will finish compiling the database of the stormwater management facilities, and then will know how many impervious acres are treated by these facilities. Also in the future, the City hopes that there will be values to assign to non-traditional stormwater treatment practices such as debris collectors, tree planting, and rooftop drain disconnection.

Table F3.4 Estimated Amount of Phosphorus Retained by Practices and Equivalent Amount of Impervious Area Treatment Claimed			
Project Name	Type	Estimated Annual Amount of Phosphorus Withheld (lbs)	MS4 Permit Impervious Area Credit Claimed (acres)
Completed			
Brooklyn Park Stormwater BMP	volume control	94.0	100.0
Gwynns Run Stormwater BMP	volume control	72.0	76.6
Watershed 263 Six BMPs	volume control	0.5	0.5
Biddison Run Phase I	stream restoration	16.1	17.1
Upper Stony Run	stream restoration	24.9	26.5
Middle Stony Run	stream restoration	29.4	31.3
Maidens Choice Stream #1	stream restoration	28.9	30.7
Lower Stony Run	stream restoration	19.8	21.1
ER4014 Western Run Stream Restoration Project 1	stream restoration	22.5	23.9
School Greening Phase I	asphalt removal	9.9	4.2
School Greening Phase II	asphalt removal	8.1	3.4
School Greening Phase III	asphalt removal	6.5	2.7
Vacant Lot Greening Phase I	asphalt removal	0.7	0.3
Yorkwood Elementary School Greening	asphalt removal	0.7	0.3
Total Completed		3,188.2	3,374.9

G. Assessment of Controls

1. Watershed Restoration Assessment

a. Chemical Monitoring

Moore's Run Long-term Discharge Characterization

Table G1a.1 shows the number of sampling events, the number of samples collected, and the number of water quality analyses performed for monitoring associated with the long-term discharge characterization for the Moore's Run during July through December 2013. There were two storm events that were monitored. However, only one storm event was successfully monitored at the Radecke Avenue station because the sampler malfunctioned at the Radecke Avenue station during the storm on August 1, 2013. There were six baseline monitoring events at these stations.

Table G1a.1 Chemical Monitoring for Moores Run Long-term Discharge Characterization 7/1/2013 to 12/31/2013			
Station and Type	Number of Surveys or Storm Events	Number of Samples	Number of Water Quality Analyses Performed
Mary Ave. Baseline	6	6	116
Hamilton Ave. Baseline	6	6	116
Radecke Ave. Baseline	6	6	121
Hamilton Ave. Ammonia Screening	18	18	89
Radecke Ave. Ammonia Screening	18	18	89
Hamilton Storm	2	11	170
Radecke Storm	1	6	96
Total			797

The storm EMCs and baseline sampling results for Radecke Avenue and Hamilton Avenue from July through December 2013 can be found in table “Baltimore City Chemical Monitoring Jul through Dec 2013” in the Access database “Baltimore City NPDES Stormwater Permit Data July through December 2013.mdb” on the CD-ROM accompanying this report. The results for all the discrete samples from all monitoring at these two stations from July through December 2013 can be found in table “Baltimore City Monitoring Sample Results July through December 2013” in that Access database. A list of sampling activities from July through December 2013 at the Hamilton Avenue can be found in Table G1a.2. A list of sampling activities from July through December 2013 at the Radecke Avenue station can be found in Table G1a.3.

Total Petroleum Hydrocarbons (TPH)

The City uses automated samplers to collect samples during storms at the Hamilton Avenue and Radecke Avenue monitoring stations. In order to analyze storm samples for TPH, the samples must be collected manually, and preserved immediately. The City did not have personnel manning these stations during any of the storm events monitored during July through December 2013, due to lack to sufficient resources to respond to off-hour, unpredicted storm events. Thus, no TPH analyses were run on storm samples from July through December 2013.

Water Temperature and pH

The automated sampling equipment installed at the Hamilton Avenue station is capable of operating pH and water temperature sensors; however, the City did not collect pH or water temperature data during any of the storm events successfully monitored at the Hamilton Avenue station during July through December 2013. The equipment used at the Radecke Avenue station cannot operate pH or water temperature sensors.

Table G1a.2 Summary of Monitoring Activities for Hamilton Avenue from July 2013 through December 2013	
Third Quarter Calendar Year 2013 (First Quarter Fiscal Year 2014)	
7/5/2013	Visited site as part of Herring Run Ammonia Screening
7/16/2013	Visited site as part of Herring Run Ammonia Screening
7/24/2013	Visited site as part of Herring Run Ammonia Screening
7/29/2013	Collected 1 grab baseline sample
8/1/2013	Successful storm sampling- designated Event ID 222; submitted 6 storm samples for lab analysis; did not analyze for TPH; did not collect pH or water temperature data
8/8/2013	Visited site as part of Herring Run Ammonia Screening
8/14/2013	Visited site as part of Herring Run Ammonia Screening
8/20/2013	Visited site as part of Herring Run Ammonia Screening
8/26/2013	Collected 1 grab baseline sample
9/4/2013	Visited site as part of Herring Run Ammonia Screening
9/12/2013	Visited site as part of Herring Run Ammonia Screening
9/20/2013	Visited site as part of Herring Run Ammonia Screening
9/26/2013	Visited site as part of Herring Run Ammonia Screening
Fourth Quarter Calendar Year 2013 (Second Quarter Fiscal Year 2014)	
10/3/2013	Collected 1 grab baseline sample
10/8/2013	Visited site as part of Herring Run Ammonia Screening
10/10/2013	Successful storm sampling- designated Event ID 223; submitted 5 storm samples for lab analysis; did not analyze for TPH; did not collect pH or water temperature data
10/16/2013	Visited site as part of Herring Run Ammonia Screening
10/24/2013	Visited site as part of Herring Run Ammonia Screening
10/28/2013	Collected 1 grab baseline sample
11/6/2013	Visited site as part of Herring Run Ammonia Screening
11/21/2013	Visited site as part of Herring Run Ammonia Screening
11/25/2013	Collected 1 grab baseline sample
12/4/2013	Visited site as part of Herring Run Ammonia Screening
12/12/2013	Collected 1 grab baseline sample
12/19/2013	Visited site as part of Herring Run Ammonia Screening
12/26/2013	Visited site as part of Herring Run Ammonia Screening

Table G1a.3 Summary of Monitoring Activities for Radecke Avenue from July 2013 through December 2013	
Third Quarter Calendar Year 2013 (First Quarter Fiscal Year 2014)	
7/5/2013	Visited site as part of Herring Run Ammonia Screening
7/16/2013	Visited site as part of Herring Run Ammonia Screening
7/24/2013	Visited site as part of Herring Run Ammonia Screening
7/29/2013	Collected 1 grab baseline sample
8/1/2013	Unsuccessful storm sampling: automated sampler had a power failure
8/8/2013	Visited site as part of Herring Run Ammonia Screening
8/14/2013	Visited site as part of Herring Run Ammonia Screening
8/20/2013	Visited site as part of Herring Run Ammonia Screening
8/26/2013	Collected 1 grab baseline sample
9/4/2013	Visited site as part of Herring Run Ammonia Screening
9/12/2013	Visited site as part of Herring Run Ammonia Screening
9/20/2013	Visited site as part of Herring Run Ammonia Screening
9/26/2013	Visited site as part of Herring Run Ammonia Screening
Fourth Quarter Calendar Year 2013 (Second Quarter Fiscal Year 2014)	
10/3/2013	Collected 1 grab baseline sample
10/8/2013	Visited site as part of Herring Run Ammonia Screening
10/10/2013	Successful storm sampling- designated Event ID 223; submitted 6 storm samples for lab analysis; did not analyze for TPH; did not collect pH or water temperature data
10/16/2013	Visited site as part of Herring Run Ammonia Screening
10/24/2013	Visited site as part of Herring Run Ammonia Screening
10/28/2013	Collected 1 grab baseline sample
11/6/2013	Visited site as part of Herring Run Ammonia Screening
11/21/2013	Visited site as part of Herring Run Ammonia Screening
11/25/2013	Collected 1 grab baseline sample
12/4/2013	Visited site as part of Herring Run Ammonia Screening
12/12/2013	Collected 1 grab baseline sample
12/19/2013	Visited site as part of Herring Run Ammonia Screening
12/26/2013	Visited site as part of Herring Run Ammonia Screening

Moore Run SWMM Model Results

SWMD did not compute pollution load estimates using the SWMM model for monitoring data collected during July through December 2013. Please see the 2010 Annual Report for SWMM estimates for 1999, and 2003 through 2009.

Moore Run E. Coli MPN Count Analysis

Table E2.1 lists the e. coli MPN count geometric mean and percentage of sample counts which were at or below each of the State's water use contact rules for the dry weather samples collected at the Hamilton Ave. and Radecke Ave. stations between November 2008 and June 2014. These metrics point to poor water quality in terms of bacteria. The storm event mean concentration (EMC) for the e. coli MPN counts are much higher generally by one order of magnitude.

Moore's Run Total Phosphorus and Total Nitrogen Analyses

Table E2.3 listed the percentage of dry weather samples at Hamilton Avenue between January 2009 and June 2014 that were at or exceeded the total phosphorus guideline of 0.1 mg/L as 38%, which rates in the "high" range. The percentage of dry weather samples at Hamilton Avenue that were at or exceeded the total nitrogen guideline of 3 mg/L was 43%, which is in the "high" range. The percentages for the dry weather samples from the Radecke Avenue station were 23% at or exceeding the total phosphorus guideline, which is in the "elevated" range and 15% at or exceeding the total nitrogen guideline, which rates in the "elevated" range.

b. Moore's Run Biological Monitoring

SWMD collects benthic macroinvertebrate samples between March and May each year in the Moore's Run. Samples have been collected at up to four fixed stations: #1367 (previously referred to as BCY119), #1392 (previously referred to as MR03), #1634 (previously referred to as HAMT02) and #1659 (previously referred to as HAMT01). The results from 2013 were presented in the previous report. The monitoring for 2014 was done after the period covered by this report and will be presented in a later report.

c. Physical Monitoring

i. Geomorphologic Stream Assessment of Moore's Run

The City did not conduct a hydrogeomorphological assessment of the Moore's Run during July through December 2013.

ii. Stream Habitat Assessment

SWMD performed a habitat assessment survey of the upper Moore's Run watershed on August 21, 2014. The watershed is located in a highly residential area. The survey area covered Moore's Run from the quadruple cell outfall at Hamilton Avenue to Radecke Avenue. The watershed survey also included the Moore's Run tributary at Todd Avenue. This survey followed the protocols set forth in the Stream Habitat Assessment section in the Maryland Biological Stream Survey Sampling Manual, February 2001, which instructs surveyors to note the following parameters: instream habitat, epifaunal substrate, velocity/depth diversity, pool/glide/eddy quality, riffle/run quality, embeddedness, shading and trash rating. Additional parameters used in this survey were channel alteration, bank vegetative protection, condition of banks and riparian vegetative zone. Each habitat parameter, except percent embeddedness, was rated with a numerical score. Each

score was ranked in one of four categories. The categories from best to worst are optimal, suboptimal, marginal and poor.

The table in the first tab of the Excel file “Moore Run Habitat Assessments 2005 through 2014.xlsx” on the CD-ROM accompanying this report show a comparison of the scores from the surveys done for the following reports:

- 2004 Annual Report (May 18, 2005);
- 2005 Annual Report (May 1, 2006);
- 2006 Annual Report (April 2, 2007);
- 2007 Annual Report (May 5, 2008);
- 2008 Annual Report (April 30, 2009);
- 2009 Annual Report (March 24, 2010);
- 2010 Annual Report (March 3, 2011);
- Report covering January 2011 through June 2012 (June 28, 2012);and
- Fiscal Year 2014 Annual Report (September 3, 2013).

The percent shading data was excluded from this table since all of the surveys from 2005 through 2011 were conducted between March and May, and the leaves would probably not have reached their full growth at the time of those past surveys.

iii. Hydrologic Model

No work was performed on a hydraulic assessment for Moore Run during July through December 2013.

2. Stormwater Management Assessment

This section of the permit requires the City to evaluate the effectiveness of stream restoration as a BMP focusing on the Stony Run Projects. SWMD continued to collect biological and chemical monitoring data in Stony Run during July through December 2013. A discussion of these results can be found in Section F2, “Restoration Monitoring”.

H. Program Funding

The expenditures incurred during this reporting period are listed in Table H.1. These expenditures are funded from a combination of water, wastewater, and stormwater utilities. The stormwater utility is an enterprise fund, established in 2013, to protect the use of revenue received from the stormwater restoration fee and other miscellaneous fees related to the technical plan review and inspection penalties associated with stormwater management and erosion and sediment control. The stormwater restoration fee was established in the City Code in June 2013; the first bills were issued in September 2013.

Table H.1: Fiscal Analysis

Description of Total Annual Cost	FY 14 Expenditure	Estimated Portion of Reporting Period
Legal authority	\$0	\$0
Source ID	\$121,115	\$60,558
Stormwater management	\$840,054	\$420,027
Erosion and sediment	\$396,893	\$198,447
Illicit detection/elimination (IDDE)	\$1,765,662	\$882,831
Trash elimination	\$1,301,384	\$650,692
Property management	\$5,469	\$2,735
Inlet cleaning	\$4,319,011	\$2,159,506
Street sweeping	\$4,217,840	2,108,920
Road maintenance - other	\$0	\$0
Public education	\$278,159	\$139,080
Watershed assessment	\$149,784	\$74,892
Watershed restoration (all projects)	\$1,960,750	\$980,375
Chemical monitoring	\$104,543	\$52,272
Biological monitoring	\$8,857	\$4,429
Physical assessment	\$0	\$0
Design manual monitoring	\$0	\$0
TMDL assessment	\$59,653	\$29,827
Total NPDES program	\$15,529,175	\$7,764,588