



CHARLES COUNTY MARYLAND
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**NPDES ANNUAL REPORT
JULY 2011 - JUNE 2012**

Charles County Government
Department of Planning and Growth Management

CHARLES COUNTY, MARYLAND
MUNICIPAL SEPARATE STORM SEWER DISCHARGE PERMIT

02-DP-3322 (MD0068365)

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I. Introduction

Charles County, Maryland received its second, five-year National Pollutant Discharge Elimination System permit on July 31, 2002 for Municipal Separate Storm Sewer Discharge (Permit No. 01-DP-3322). This permit covers stormwater discharges from the municipal separate storm sewer system within the Development District. As part of this comprehensive water quality control permit, the County is required to report to the Maryland Department of the Environment, Water Management Administration (MDE/WMA) annually regarding the status and progress of the permit conditions.

On June 2, 2012, the MDE/WMA completed an audit of Charles County's 2011 Annual Report for the National Pollutant Discharge Elimination System (NPDES) municipal stormwater program. Overall the County was commended for using the latest technology for its geographic information system (GIS) database, implementing monitoring programs, excellent educational programs, and improving the stormwater management and illicit connection detection and elimination programs over the current permit term.

Charles County's NPDES permit is for the five year period ending July 31, 2007. MDE/WMA has been delayed reissuing permits statewide. In June 2012 MDE/WMA submitted a fourth draft permit to Charles County, but the final permit has not yet been issued. Because the Charles County permit is not yet reissued operation continues under the current permit.

In preparation for the anticipated increase in permit requirements and the expansion of permit coverage from the Development District to the entire county, three large contracts have been initiated. These include: Geographical Information Systems (GIS)-related work to expand source-identification county-wide; planning tasks to prepare for implementing Total Maximum Daily Loads (TMDLs); and increased design and engineering of watershed restoration projects.

This report summarizes the actions taken by the County to fulfill the requirements for the tenth year of the NPDES permit. Following each permit condition is a description of the work completed during the reporting year. The sections of the report are numbered to correspond with the permit numbering.

A summary of the County's accomplishments and initiatives this year include:

- reviewing and negotiating the terms in three draft versions of the permit;
- maintaining Environmental Service Fee funding for the NPDES operating budget and design and construction of watershed restoration projects;
- starting to use the dedicated Drainage Improvement budget for implementing improvements in neighborhoods with flooding and severe stream erosion;
- contracting KCI Technologies, Inc. of Sparks, MD for permit monitoring services;
- contracting Spatial Systems Associates, Inc. of Columbia, MD to expand the stormwater

GIS county-wide;

- contracting LimnoTech, Inc. of Washington, D.C. for the preparation of optional wastewater and stormwater scenarios to meet the Chesapeake Bay TMDL waste load allocations for Charles County, as well as local TMDL waste load allocations;
- contracting Vista Consulting, Inc. of Showell, MD to design and engineer watershed restoration projects;
- contracting Sandy Excavating, Inc. of La Plata, MD for construction of two watershed restoration projects;
- continuing follow-up with U.S. Geological Survey (USGS), to finalize a Scientific Investigations Report to summarize and analyze the trends found in 10 years of monitoring data from the Mattawoman Station;
- coordinating local team meetings on the Chesapeake Bay Watershed Phase II Watershed Implementation Plan (WIP); and
- briefing County Commissioners regarding the WIP and obtaining their approval of the proposed Charles County WIP for submitting to MDE.

Ongoing activities include: quarterly NPDES working group meetings for personnel responsible for permit conditions; updating the NPDES MS4 information page on the County's website; partnering with the USGS to maintain a long-term, real-time monitoring station on the Mattawoman Creek; installing nitrogen removal technology on 91 septic systems with Bay Restoration Funding through May 2011; cooperating with the Environmental Protection Agency's partnership in developing the Watershed Resource Registry and continuing to pursue protection of the Mattawoman Creek Stream Valley as refined using Topographic Position Index by the Maryland Department of Natural Resources.

The above efforts are further described under Section IV. Special Programmatic Conditions.

II. Definitions

Terms used in this permit are defined in relevant chapter of the Code of Federal Regulations (CFR) or the Code of Maryland Regulations (COMAR). Terms not defined in CFR or COMAR shall have the meanings attributed by common use unless the context in which they are used clearly requires a different meaning.

III.A. Permit Administration

Overview of Permit Conditions

1. *By 7/31/2003, Charles County shall provide MDE with the names, titles, addresses, phone numbers, and functions of all primary administrative and technical personnel responsible for compliance with this permit.*

NPDES Annual Report, Charles County, MD

2012 Status

Permit requirements are managed by staff within the Departments of Planning and Growth Management and Public Works as shown on the following table.

Table 1: Charles County Personnel Responsible for Permit Compliance

<i>Personnel</i>	<i>Responsibilities</i>
DEPARTMENT OF PLANNING AND GROWTH MANAGEMENT (301-870-3935)	
Mr. Peter Aluotto, Director Charles County Department of Planning & Growth Management aluottop@charlescounty.org	Oversees NPDES MS4 programs implemented by the Department of Planning and Growth Management.
Mr. Steven Ball, Planning Director Planning Division ballst@charlescounty.org	Manages water quality monitoring programs; operating budget, annual permit reports, permit reapplication, and special programmatic tasks.
Mr. Frank Ward, Chief Construction Permits and Inspection Services wardf@charlescounty.org	Manages stormwater, and sediment and erosion control permitting, inspection, and illicit discharge inspection programs.
Mr. John Stevens, Chief Capital Services stevensj@charlescounty.org	Manages impervious area evaluation, and identification and implementation of Watershed Restoration capital projects.
Mr. Jason Groth, Chief Resource Infrastructure Management grothj@charlescounty.org	Manages Geographical Information Systems and water conservation education.
DEPARTMENT OF PUBLIC WORKS (301-870-2778)	
Mr. Bill Shreve, Director Charles County Department of Public Works shreveb@charlescounty.org	Oversees NPDES MS4 programs implemented by the Department of Public Works.
Mr. Dennis Fleming, Chief Environmental Resources Facilities Division flemingd@charlescounty.org	Manages industrial stormwater permits for County properties managed by the Division.
Mr. Stephen Staples, Chief County Roads Facilities Division stapless@charlescounty.org	Manages maintenance of roads, drainage, and stormwater facilities owned by the County.
Mr. Thomas Roland, Chief Parks and Grounds Facilities Division rolandt@charlescounty.org	Manages maintenance of parks and grounds owned by the County or part of the recreational system.
Mr. Ed Gorham, Chief Technical Support Utilities Division gorhame@charlescounty.org	Manages industrial stormwater permits for County wastewater treatment plants.

III.B. Legal Authority

Overview of Permit Conditions

1. *By 7/31/2003, Charles County shall provide MDE with recertification from the County Attorney that it possesses the authority to directly perform the activities described in 40 CFR 122.26 (d)(2)(I), and this permit.*
2. *Charles County shall maintain adequate legal authority, in accordance with NPDES regulations 40 CFR 122.26(d)(2)(I), throughout the term of this permit. In the event that any provision of its legal authority is found to be invalid, the County shall make the necessary changes to maintain adequate legal authority.*

2012 Status

Recertification was provided by the County Attorney via a letter forwarded to Mr. Brian Clevenger of the Maryland Department of the Environment, Water Management Administration, dated June 19, 2003. A copy of this letter was included in the 2003 NPDES Annual Report.

The County will maintain adequate legal authority throughout the term of this permit, and in the event that any provision of its legal authority is found to be invalid, the County will make the necessary changes to maintain adequate legal authority.

III.C. Source Identification

Overview of Permit Conditions

1. *By 7/31/2003, Charles County shall submit an example of its Geographic Information System (GIS) capabilities that includes the identification of all data layers available, the stage of development, metadata, and a description of how data are stored, accessed, and used. The example shall include the following information:*
 - a. *Geologic features: topography, soils, steep slopes, etc.*
 - b. *Land use: existing and planned based on present zoning or current master plans, public and private ownership, and population density.*
 - c. *Resources: streams, stream buffer areas, floodplains, wetlands, forests, forest conservation areas, areas of special concern*
 - d. *Infrastructure: storm drain systems, including major outfalls, inlets, appurtenant conveyances, and associated drainage areas; stormwater management facilities; sanitary sewer systems within the resource areas identified in Part III.C.1.c above; and chemical, physical, and biological*

- monitoring sites.*
- e. Significant discharges: sewage treatment plants, industrial operations, hazardous waste sites, landfills, NPDES permitted sites (both point source and stormwater permittees), impervious areas (e.g. roads, parking lots, and rooftops), known as problem areas (e.g. flood prone of water quality impaired areas), and estimated pollutant loads; and*
 - f. Schedule: time-frame for completing GIS development within the Development District.*

2012 Status

As required by this condition, the County submitted an example of its GIS capabilities in 2003. All coverages were in ArcView shapefile format, projected to Maryland State Plane coordinates in NAD83 datum in meters. Metadata was also included for these coverages.

- 2. By 7/31/2003, Charles County shall submit its database identifying major outfalls. Data shall be submitted on CD-ROM(s) and include all major outfalls, associated inlets, appurtenant conveyances, drainage areas, and private storm drain systems.*

2012 Status

This information was included in the County's June 2002 to July 2003 annual report.

- 3. Charles County shall compile any new source identification information on a continual basis and summarize the data collection in its annual reports.*

2012 Status

Since 2003, the County has annually submitted updated GIS data and summarized the data collection in its annual reports. The most recent GIS updates were submitted to MDE with the 2011 NPDES Annual Report. All coverages were in ArcView shapefile format, and projected to Maryland State Plane coordinates in NAD83 datum in meters.

In fiscal year 2012 the County contracted with Spatial Systems Associates to expand and improve the County's stormwater GIS coverage. This project includes stormwater infrastructure and impervious surfaces. The datasets for this project will include the fields specified by MDE in Attachment A of the County's June 2012 draft NPDES MS4 permit.

Currently the County’s impervious surface is based on Feature Analyst, which is sophisticated computer software that can extract impervious surfaces from high quality digital aerial orthophotography. Because the image radiometry of the pixels varies due to shadows, reflections, and different pavement materials, “training” the software to accurately classify impervious surfaces, requires extensive interaction with the operator. An example of Feature Analyst results are in Figure 1.

As part of the current Spatial Systems Associates project, the County anticipates moving from Feature Analyst to actual impervious surface. This will be done by updating the County’s 2007 planimetric line data to 2011. The updated line data for roads, buildings, and paved areas will then be converted to polygon data. From the 2011 polygon data, actual impervious surface area will be calculated.

Figure 1: Impervious Surface Delineation by Feature Analyst



4. *Annually, Charles County shall submit stormwater management facility construction completion data for MDE’s Urban Best Management Practice database.*

2012 Status

The fiscal year 2012 database of BMP information is included in Appendix A and on the attached CD. It shows a total of 1,198 BMPs, an increase of 15 from the 1183 shown in the records for fiscal year 2011.

III.D. Discharge Characterization

Overview of Permit Conditions

1. *Annually, Charles County shall perform long-term discharge characterization monitoring of an outfall and an associated in-stream monitoring station using the following minimum requirements for chemical, biological, and physical monitoring:*

a. *For Chemical Monitoring:*

- i. *Monitoring shall be performed in the Zekiah Swamp watershed at the outfall and its associated in-stream station in the St. Charles area to characterize runoff from commercial land use;*
- ii. *Continuous flow measurements shall be recorded at the in-stream monitoring station. These data shall be used to facilitate annual and seasonal pollutant load estimates;*
- iii. *Twelve (12) storm events shall be monitored per year at the outfall and in-stream monitoring locations with at least three (3) occurring per quarter. Quarters shall be based on calendar year. If extended dry weather periods occur, base flow samples shall be taken at least once per month at the in-stream monitoring station, and if flow is observed, at the outfall;*
- iv. *Discrete samples of stormwater flow shall be collected at the outfall and in-stream monitoring stations using automated or manual sampling methods. Measurements of pH and water temperature shall be taken; and*
- v. *At least (3) samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to the methods listed under 40 CFR, Part 136 and event mean concentrations (EMCs) shall be developed for the following parameters;*

<i>Biochemical Oxygen Demand (BOD₅)</i>	<i>Total Cadmium</i>
<i>Total Kjeldahl Nitrogen (TKN)</i>	<i>Nitrate plus Nitrite</i>
<i>Total Petroleum Hydrocarbons (TPH)</i>	<i>Total Phosphorus</i>
<i>Total Copper</i>	<i>Total Phenols</i>
<i>Total Zinc</i>	<i>Fecal Coliform</i>
<i>Total Suspended Solids (TSS)</i>	<i>Total Lead</i>
<i>Oil and Grease (Optional)</i>	

b. *For Biological Monitoring*

- i. *Monitoring shall commence with the chemical monitoring; and*
- ii. *The stream reach between the outfall and the in-stream monitoring station shall be monitored each Spring and Fall using the U.S. Environmental Protection Agency's (EPA) Rapid Bioassessment Protocol III or other method approved by MDE.*

- c. *For Physical Stream Assessment:*
 - i. *A geomorphologic stream assessment shall be conducted in the stream reach between the outfall and in-stream monitoring station. This assessment shall include, at a minimum, an annual comparison of permanently monumented stream channel cross-sections, an annual comparison of the stream profile, and a stream habitat assessment using techniques as defined by the EPA's "Rapid Bioassessment Protocol for use in Wadeable Streams and Rivers," or other similar method approved by MDE; and*
 - ii. *Annually, a hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-RAS, HSPF, SWMM, etc.) to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.*

2012 Status

Chemical Monitoring

Charles County continued the long-term chemical monitoring program at the Arthur Middleton Elementary School during the 2011-2012 reporting year.

In order to meet the requirements of the Watershed Restoration section of the MS4 permit, Charles County had identified the Arthur Middleton Elementary School as a suitable site for the installation of a stormwater management wetland, designed to treat the flow passing through the existing storm drain prior to its discharge into the stream channel.

The chemical monitoring program was established at the Arthur Middleton Elementary School in December 2005. The sampling stations were located within an inlet upstream of the proposed wetland and at an instream station below the storm drain outfall. The sites were established prior to the construction of the wetland to develop a pre-retrofit baseline for pollutant inflow to the receiving channel. The inlet was established as Site 002, and the instream station was established as Site 001.

Sampling began at these sites on January 18, 2006, and continued until April 2, 2007, when the sampling array was removed as construction of the wetland began. Construction of the wetland was completed in April, 2008.

In August, 2008, sampling resumed at the Arthur Middleton Elementary School. The inlet was reestablished as the outfall site, and the concrete weir overflow was established as the instream monitoring station.

A sampling array was permanently secured to the storm drain pipe within the inlet to collect continuous flow data. However, during the spring of 2011, storm drain improvements were implemented along the storm drain system draining to the wetland. This included replacement of the inlet where the sampling array was installed. The sampling array was removed as a result of the project. Therefore, for the 2011-2012 reporting year, flow data is only available for sampled events.

Flow data for the instream station was calculated by measuring the flow depth at the weir control structure for the wetland and computing the discharge from a rating table. As such, flow data is only available for the instream station for sampled events.

The number of samples to be collected during the 2011-2012 reporting year was reduced due to the storm drain improvements and contracting constraints. A baseflow sample was collected on December 21, 2011. Storm event samples were collected on December 21, 2011 and again on December 27, 2011.

Table 2: Number of Samples for Chemical Monitoring at the Arthur Middleton Elementary School Stations

Year	Month	Wet Weather Sample		Baseflow Sample	
		Outfall	Instream	Outfall	Instream
2006	January	1	1		
	February	1	1		
	March				
	April	1	1		
	May	1	1		
	June	1	1		
	July	1	1		
	August	1	1		
	September	1	1		
	October	1	1		
	November	1	1		
	December				
2007	January	1	1		
	February	1	1		
	March	1	1		
	April			1	1
2008	August	1	1		
	September	1	1		
	October	1	1		
	November	1	1		
	December	1	1		
2009	January				
	February	1	1	1	1
	March	1	1		
	April	1	1		

Year	Month	Wet Weather Sample		Baseflow Sample	
		Outfall	Instream	Outfall	Instream
	July			1	1
	August			1	1
2010	January	2	2		
	February	1	1		
	March	1	1		
	April	1	1		
	May	1	1		
	June	1	1		
	August	1	1		
2011	December	2	2	1	1

The monitoring protocol consisted of three discrete samples, representative of the rising limb, peak, and falling limb of the storm hydrograph for each storm event, collected at each monitoring station. All samples were collected manually so that fecal coliform and Oil and Grease could also be analyzed. Temperature and pH were monitored in the field during sample collection. Atlantic Coast Labs of Newark, Delaware performed laboratory analyses. No discernable rising, peak, and falling conditions were notable at the instream station during the December 21, 2011 storm event. Therefore, only one sample was able to be taken at the instream station for this event.

The combined results from the chemical monitoring for the current reporting year are contained in Appendix B and included in the NPDES database on cd.

Event Mean Concentrations

Using the available flow data and laboratory results for each discrete sample collected at the sites, event mean concentrations (EMCs) were computed for each constituent.

EMCs were weighted based on the depth of flow for each limb of the storm. Depth was recorded continuously at the outfall station, and during sampling events for the instream station. The chemical concentrations were multiplied by the flow depth, summed and divided by the total flow depth to compute a weighted average for each storm event.

If the parameter was not detected in the laboratory analysis, a value of zero was used for the low end of the possible range, and the detection limit was used for the high end of the range. The flow-weighted EMCs for each storm were then averaged to determine the average EMC for each parameter at each site. Average flow-weighted EMCs by calendar year for the Arthur Middleton Elementary School (Sites 001 and 002) are provided in Tables 3 and 4.

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Table 3: Annual Average Flow-Weighted EMC and Number of Events Sampled, Site 002 – Arthur Middleton Elementary School

Year	TKN	NOx	TP	TSS	BOD	Pb	Cd	Cu	Zn	TPH	Phenol	O&G	Fecal Col.
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	Mg/L	mg/L	mg/L	mg/L	MPN
	Events	Events	Events	Events	Events	Events	Events	Events	Events	Events	Events	Events	Events
2006	1.73 10	0.67 10	0.29 10	24 10	16 10	0.011 10	0.001 10	0.007 10	0.062 10	2.7 10	0.03 10	3.50 10	4885 10
2007	0.95 4	1.17 4	0.13 4	72 4	5 4	0.022 4	0.001 4	0.011 4	0.049 4	3.3 4	0.03 4	3.27 4	157 4
2008	2.17 5	0.40 5	0.16 5	11 5	9 5	0.071 5	0.002 5	0.011 5	0.284 5	3.9 5	0.04 5	5.59 5	34402 5
2009	1.14 4	0.28 4	0.15 4	17 4	4 4	0.021 4	0.001 4	0.005 4	0.112 4	1.9 4	0.03 4	2.87 4	685 4
2010	1.73 8	0.71 8	0.27 8	68 8	10 6	0.007 8	0.001 8	0.009 8	0.057 8	2.6 8	0.04 8	3.15 8	18,794 8
2011	1.10 3	0.42 3	0.24 3	59 3	3 3	0.007 3	0.0003 3	0.006 3	0.051 3	3 3	0.01 3	3 3	94 3
NURP	2.35	0.960	0.47	140.0	11.0	0.180		0.050	0.180				
MDE	1.75	0.970	0.37	55.1	14.3	0.006		0.014	0.089				

Table 4: Annual Average Flow-Weighted EMC and Number of Events Sampled, Site 001 – Arthur Middleton Elementary School

Year	TKN	NOx	TP	TSS	BOD	Pb	Cd	Cu	Zn	TPH	Phenols	O&G	Fecal Col.
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	Mg/L	mg/L	mg/L	mg/L	MPN
	Events	Events	Events	Events	Events	Events	Events	Events	Events	Events	Events	Events	Events
2006	1.05 10	0.61 10	0.14 10	19 10	4 10	0.008 10	0.001 10	0.005 10	0.055 10	2.5 10	0.03 10	2.85 10	3564 10
2007	0.52 4	1.11 4	0.06 4	27 4	3 4	0.007 4	0.001 4	0.004 4	0.080 4	2.5 4	0.03 4	2.5 4	58 4
2008	0.46 5	0.05 5	0.06 5	7 5	2 5	0.003 5	0.001 5	0.002 5	0.018 5	2.4 5	0.02 5	2.6 5	3524 5
2009	0.95 4	0.06 4	0.08 4	9 4	15 4	0.004 4	0.001 4	0.004 4	0.019 4	1.9 4	0.02 4	2.1 4	109 4
2010	0.53 8	0.44 8	0.06 8	13 8	2 8	0.006 8	0.001 8	0.003 8	0.015 8	3.0 8	0.03 8	3.0 8	4,543 8
2011	0.3 3	0.39 3	0.04 3	9 3	3 3	0.001 3	0.0003 3	0.001 3	0.022 3	3 3	0.01 3	3 3	17 3
NURP	2.35	0.960	0.47	140.0	11.0	0.180		0.050	0.180				
MDE	1.75	0.970	0.37	55.1	14.3	0.006		0.014	0.089				

Discussion

The results of the laboratory analysis (both individual samples and EMCs) were reviewed for the storm and base flow events during the permit period. Findings are summarized below:

Inlet Site (002)

- A first flush effect was not observed for the sampling station. Concentrations were typically higher for peak samples than for rising limb.
- Cadmium, TPH, oil and grease, and phenols were not detected during any event. Biological oxygen demand was only detected in one sample. The other contaminants were detected fairly regularly.
- All of the average EMCs for the sampling period were below literature values from the Nationwide Urban Runoff Project (NURP) taken in the early 1980s, as well as published MDE averages, with the exception of TSS and lead, which were observed above MDE values.

Instream Site (001)

- A first flush effect was not observed.
- All samples collected had concentrations below the detection limit for BOD, TKN, cadmium, lead, TPH, phenols, and oil and grease.
- All the average EMCs for the sampling period were below literature values from the Nationwide Urban Runoff Project (NURP) taken in the early 1980s, as well as published MDE averages, with the exception of total phosphorus, which was below MDE values.

Comparison Between Sites 002 and 001

The upstream monitoring site (002) is located upstream of the wetland. Since there have not been significant changes to the watershed over the course of the monitoring program, the event mean concentrations would be expected to be comparable with data obtained prior to the wetland construction.

In fact, the EMCs are variable, but these continue to be fairly consistent for this sampling station. No significant increasing or decreasing trends are apparent; however, it is notable that for the 2011 samples, fecal coliform values dropped dramatically.

The stormwater wetland was constructed with the intent of reducing the discharge of pollutants to receiving waters. Therefore, it is expected that the event mean concentrations present at the downstream monitoring site (001) would be reduced from previous years. Additionally, a

reduction from the event mean concentrations present at the upstream station (002) would be expected for each event.

During the reporting year, EMCs at the instream station were significantly lower than those found at the outfall station, with the exception of oil and grease. This continues the trend observed in 2010 and 2009, and indicates that the wetland is functioning to improve water quality.

Table 5 below identifies the pollutant removal efficiencies observed for each reporting year, based on the yearly average EMCs. Efficiencies published by MDE in the recent draft *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated: Guidance for National Pollutant Discharge Elimination System Stormwater Permits, June 2011* are provided for NOx, TP, and TSS. Monitoring results for all reporting years since the wetland was constructed have suggested removal efficiencies for the wetland that exceed published values for TP. Removal efficiencies for TSS exceeded published values in 2010 and 2011.

Table 5: Observed Pollutant Removal Efficiencies: 2011-2012 Reporting Year

Year	TKN	NOx	TP	TSS	BOD	Pb	Cd	Cu	Zn	TPH	Phenols	O&G	Fecal Col.
	%	%	%	%	%	%	%	%	%	%	%	%	%
2008	78.8	87.5	62.5	36.4	77.8	95.8	50.0	81.8	93.7	38.5	50.0	53.5	89.8
2009	16.7	78.6	46.7	47.1	-275.0	81.0	0.0	20.0	83.0	0.0	33.3	26.8	84.1
2010	69.4	38.0	77.8	80.9	80.0	0.0	0.0	66.7	73.7	-15.4	25.0	4.8	75.8
2011	72.7	7.1	83.3	84.7	0.0	85.7	0.0	83.3	56.9	0.0	0.0	0.0	81.9
MDE		20.0	45.0	60.0									

Biological and Physical Stream Assessments

Beginning in the Fall of 2005, a study site has been monitored for biological and physical condition on a tributary to Mattawoman Creek. This section summarizes data collected by KCI in the Spring of 2012, which is described in more depth in Appendix C.

The study site is located in northern Charles County between Berry Road and Acton Lane just off Timberbrook Lane. This site was previously identified as part of Charles County's Watershed Restoration Plan and was termed Acton-Hamilton based on the two major roads in the area. The Acton-Hamilton site area is under design for restoration and was therefore one of the study areas selected for further investigation. The Acton-Hamilton long-term site was monitored to establish baseline values in the Fall of 2005 (geomorphic assessment) and the Spring of 2006 (bioassessment). Table 6 lists the field assessment dates including the baseline assessments.

Table 6: Field Assessment Dates

Year	Geomorphic Assessment	Biological Assessment
2005-2006	December 14, 2005	April 17, 2006
2006-2007	January 11, 2007	May 4, 2007
2007-2008	December 12, 2007	April 17, 2008
2008-2009	December 15, 2008	April 29, 2009
2009-2010	December 1, 2009	March 08, 2010
2011	April 26, 2011	April 26, 2011
2012	-	April 27, 2012

The geomorphic assessment includes cross-sections, longitudinal profiles, and particle size analysis. Spring bioassessment monitoring involves the collection of water quality data, sampling, and analysis of the benthic macroinvertebrate community, assessment of physical and habitat features and photo-documentation of site conditions at monitoring stations on the study reach.

Geomorphic Assessment

The channel substrate along the assessment reach is dominated by medium and coarse gravels. There are two cross-sections located within the 358-foot profile. Cross-section 1 shows that both aggradation and erosion have occurred between the baseline and the 2011 (year 6) monitoring (Table 7). Cross-section 2 shows that minor aggradation has occurred in 2011. Table 7 below summarizes the cross-section, profile, and pebble count data for baseline and subsequent monitoring efforts. Changes in bankfull areas for the two cross-sections are primarily due to minor erosion and aggradation associated with typical stream processes. Full results, including graphical depictions of the profile and cross-sections and pebble count data, are included in the 2011 NPDES Annual Report Appendix C. In general, the substrate is highly mobile with extensive point bar formations, areas of channel aggradation and some finer sedimentation in the pools. The channel geometry in 2011 remains consistent with previous years and appears to experience overbank flow in the floodprone zone regularly.

Table 7: Acton-Hamilton Geomorphic Assessment Results

Parameter	Cross Section 1						Cross Section 2					
	2005 0+48.5	2006 0+49.7	2007 0+49.0	2008 0+50	2009 0+51	2011 0+46	2005 3+14	2006 3+12	2007 3+14	2008 3+21	2009 3+15	2011 3+09
Top of Bank Cross-section Area (ft ²)	49.2	53.1	54.0	55.1	53.9	54.5	28.6	27.1	27.6	29.6	29.8	32.5
Bankfull Cross-section Area (ft ²)	24.1	23.5	24.3	23.8	26.2	28.1	18.5	17.0	18.1	18.2	18.1	18.9
Top of Bank Width (ft)	32.3	34.7	34.8	34.9	32.4	33.5	19.5	19.6	19.5	19.7	19.9	21.8
Bankfull Width (ft)	20.9	22.3	21.6	19.7	20.8	20.1	15.0	14.7	14.8	14.3	15	14.9
Mean Depth (ft)	1.2	1.1	1.1	1.2	1.3	1.4	1.2	1.2	1.2	1.3	1.2	1.3
Width-depth Ratio	18.2	21.1	19.2	16.3	16.5	14.3	12.2	12.6	12.0	11.3	12.5	11.8
Velocity (ft/s)	3.8	3.5	3.0	3.2	3.3	3.8	4.0	3.6	3.1	3.3	3.1	3.3
Discharge Rate (cfs)	92.5	82.9	73.0	76.1	85.9	107.2	73.3	61.4	57.1	59.2	55.2	61.8
Entrenchment Ratio	2.4	1.8	2.3	2.5	2.6	2.5	2.7	2.4	3.0	3.1	2.2	2.3
D50 Particle Size (mm)	14	16	18	19	23	20	14	16	18	19	23	20
D84 Particle Size (mm)	28	33	29	30	39	44	28	33	29	30	39	44
Threshold Grain Size (mm)	15	15	10	12	14	18	17	16	11	11	13	17
Channel Slope (%)	0.49	0.49	0.31	0.34	0.4	0.47	0.49	0.49	0.31	0.50	0.4	0.47

Instream Water Quality and Bioassessment

Instream water quality was measured during the bioassessment conducted in the Spring of 2012. Water quality measurements are within the acceptable ranges for *COMAR* regulations, with the exception of pH. The pH in 2012 was 6.23, slightly more acidic than *COMAR* acceptable levels of 6.5-8.5, but is not a major cause for concern. The physical habitat assessment rated the habitat for both fish and benthic macroinvertebrates at the midrange of sub-optimal. The banks were rated as moderately stable with a good riparian zone width and vegetative protection. Table 8 summarizes the water quality and habitat assessment data.

From the baseline assessment to 2012, conditions have generally degraded in the study reach. The PHI rating of “partially degraded” has stayed consistent between years, but the BIBI continued to decrease in 2012. Extensive bar formations have been observed during every monitoring event, but the extensive algae noted in previous monitoring events was not present in 2011 or 2012. Benthic scores have remained in the “Poor” range.

Benthic samples taken at the site have been dominated by midges (family Chironomidae) each year. In 2012 midges made up 82 percent of the sample, 34 percent greater than 2011. The dominant midge species in the sample was pollution-tolerant *Polypedilum* (29 individuals). There was only one pollution-intolerant species, *Synurella* (an amphipod) and one individual was sampled. As in previous year’s samples, there were no individuals within the Ephemeroptera taxa leading to poor scores for the number of Ephemeroptera taxa and percent Ephemeroptera metrics.

Water quality has remained consistent with previous years with the exception of a slightly acidic pH in 2011 and 2012. The biological community received a narrative PHI habitat rating of “Partially Degraded” and BIBI rating of “Poor” for the Spring 2012 assessment.

These ratings are typical with high flashy flows often found in suburban streams, such as this located in central Waldorf. The tributary receives flow from several residential neighborhoods as well as commercial developments, parking areas, and Maryland State Highway Route 301. A large portion of the drainage area does not have stormwater management facilities.

As described in the introduction for biological and physical assessments section, this site is proposed for restoration. The restoration plans are under review for permitting approval. Once the project is completed, continued monitoring will be implemented to evaluate the impacts of the restoration.

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Table 8: Acton-Hamilton Instream Water Quality and Habitat Assessment Data

Year/Time	Instream Water Quality						Habitat & Biol. Assess.	
	pH	DO (mg/L)	Temp (°C)	Conductivity µS/cm	TDS (mg/L)	Turbidity (NTUs)	PHI	BIBI
Spring 2006 11:00AM	7.04	9.09	13.19	214.2	137.0	14.9	74 (partially degraded)	3.6 (Fair)
Spring 2007 8:30AM	7.13	3.62	13.20	214.0	139.0	4.3	74 (partially degraded)	2.7 (Poor)
Spring 2008 7:00PM	6.85	11.17	15.79	186.0	121.3	2.6	71 (partially degraded)	3.0 (Fair)
Spring 2009 11:00AM	6.73	6.97	16.33	236.9	n/a	3.49	78 (partially degraded)	2.7 (Poor)
Spring 2010 8:30AM	7.76	13.52	4.50	395.7	n/a	4.16	72 (partially degraded)	2.7 (Poor)
Spring 2011 8:30AM	6.19	8.82	18.27	174.3	n/a	8.62	73 (partially degraded)	2.4 (Poor)
Spring 2012 8:30 AM	6.23	8.75	12.17	171.5	n/a	6.62	77.8 (partially degraded)	2.1 (Poor)
COMAR Limits	6.5 - 8.5	> 5.0	< 32.0	n/a	n/a	< 150	n/a	n/a

2. *Charles County shall evaluate the effectiveness of a stormwater management system constructed in accordance with the 2000 Maryland Stormwater Design Manual for stream channel protection effectiveness. The assessment shall include:*
 - a. *By 7/31/2003, a small watershed shall be selected to adequately assess the best management practice (BMP) design criteria found in the 2000 Maryland Stormwater Design Manual. The watershed selected shall be either an area where future development is to occur, where existing BMPs control a majority of the drainage area and can be retrofitted to reflect the design manual design criteria, or a combination of both. The selection of the small watershed to be monitored shall be made in consultation with MDE.*
 - b. *Within six months of MDE's approval of the selected watershed to be monitored, Charles County shall survey the stream for the purposes of evaluating channel stability in conjunction with ensuing development or significant retrofitting. Permanently monumented cross-sections shall be established at areas where stream geometry changes and at critical areas in the flow path (e.g., restrictions, etc.). A baseline stream profile shall also be established to assess aggradation and degradation.*
 - c. *In each annual report, Charles County shall provide MDE with a comparison 18 survey for each established cross-section and a comparison survey of the stream profile*
 - d. *A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-RAS, HSPF, SWMM, etc.) to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.*

2012 Status

Maryland Stormwater Manual Effectiveness Study

Since 2003, KCI has monitored the Tributary to Piney Branch to evaluate the effectiveness of stormwater management to adequately provide channel protection. This included survey of five monumented cross sections and 4,500 feet of longitudinal stream profile. This monitoring continued yearly until 2009. In 2010 an inspection was done of the stormwater facility outfalls in the drainage area. See previous NPDES Annual Reports for more information on these evaluations. For the 2011 monitoring, KCI was directed to conduct a survey of an eroded outfall channel draining a stormwater management pond at the North Point High School within the Tributary to Piney Branch watershed. The pond outfall was selected for study due to the presence of channel erosion and potential sediment load entering the Tributary to Piney Branch. The pond is located to the east of the athletic fields at North Point High School in Waldorf. The outfall channel meets the previously monitored reach on the left bank of the Tributary to Piney Branch,

towards the lower quarter of the surveyed reach. The purpose of the monitoring is to document the current physical condition of the outfall channel through survey of a longitudinal profile and cross-section measurements. A total of 406 linear feet of profile was surveyed beginning at the pond outfall. Four cross sections at representative segments of the reach were also surveyed.

The trapezoidal engineered pond outfall channel is stable and extends from station 0+00 at the outfall to station 2+83 where it transitions to a natural channel. Rip rap covers the channel bottom and banks until station 0+34. The channel profile is stable and has a gradual slope of 1.0 percent until station 2+83 where the channel enters the existing forest and a series of minor headcuts have formed and extend for approximately 100 feet. Beginning at the first headcut at 2+83, channel erosion gradually increases in severity and the channel becomes less stable. From station 2+83 to the end of the survey at station 4+06, the slope is 8.0 percent. At station 3+68 a 2.5 foot headcut has formed and bank erosion is moderately severe. Downstream from this headcut the stream becomes more stable and less incised, and meets the main channel approximately 75 feet downstream from the end of the survey at station 4+06. The first three cross sections are in the trapezoidal engineered channel and are very stable. The fourth cross section is directly below the 2.5 foot headcut and shows evidence of scour and bank erosion.

Detailed results of the survey are included in the 2011 NPDES Annual Report. In the 2012 reporting year alternate study locations were considered, which will be further evaluated and determined during the 2013 reporting year.

3. *Annually, Charles County shall describe in detail its monitoring activities for the previous year and include the following:*
 - a. *A detailed description of weather conditions and any equipment failures;*
 - b. *A detailed description of field data collection methods and documentation of any variations to the minimum requirements for chemical, biological, or physical monitoring;*
 - c. *Chemical, biological, and physical monitoring results recorded on MDE's long-term monitoring databases;*
 - d. *An analysis of monitoring data integrating the field results from the chemical, biological, and physical monitoring;*
 - e. *Annual and seasonal pollutant load estimates using the long-term monitoring data;*
 - f. *A comparison survey for each established cross-section and a comparison survey of the stream profile for the monitoring conducted to assess the stream channel protection effectiveness of a stormwater management system constructed in accordance with the 2000 Maryland Stormwater Design Manual; and*
 - g. *Any requests and accompanying justifications for proposed modifications to the monitoring program.*

2012 Status

Monitoring was significantly delayed this year. This is due to anticipation that a new NPDES stormwater permit would be issued immediately at the beginning of the permit term, and a contract for full permit services, including monitoring tasks, could be issued early in the permit term. As the permit term progressed and it was determined a new permit would not be issued during the year, a contract for interim monitoring services was instated for a short period. However, County contracting limits reduced the services that could be acquired.

To avoid this situation in the future, contracts for categories of services are now being issued, instead of a single contract for full permit services. For the 2013 reporting year, bids have been requested under RFP 13-08 to complete the monitoring tasks for a five year period. The selected consultant will comprehensively manage the monitoring requirements, and an adjustment to tasks will be made when permit terms are finalized.

Pollutant loading information is provided in Section III.H.

III.E. Management Programs

Overview of Permit Conditions

1. *Charles County shall maintain an acceptable stormwater management program in accordance with the Environmental Article, Title 4, Subtitle 2, Annotated Code of Maryland. At a minimum, Charles County shall:*
 - a. *Conduct preventative maintenance inspections of all stormwater management facilities at least on a triennial basis. Documentation identifying the facilities inspected, the number of maintenance inspections, follow-up inspections, and enforcement actions(s) used to facilitate inspection order compliance, maintenance inspection schedules, and any other relevant information shall be submitted in the County's annual reports;*
 - b. *Implement the stormwater management design policies, principles, methods, and practices found in the 2000 Maryland Stormwater Design Manual and COMAR;*
 - c. *Track the progress toward satisfying Part III.E.1.b. above; and*
 - d. *Report annually the modifications needed to address problems associated with implementing the 2000 Maryland Stormwater Design Manual in Charles County.*

2012 Status

Stormwater Management Maintenance Inspections

The County continues to conduct preventative maintenance inspections of all stormwater management (swm) devices on a triennial basis. During calendar year 2011 the inspections were comprised of 207 first and third year inspections, 237 compliance inspections, and 33 enforcement inspections. As of December 31, 2011, 219 projects have unacceptable devices, which are listed in Appendix D. This total includes facilities outstanding from previous years' inspections. Detailed inspection reports of each inspection are maintained within the project file folder. Nine certified letters were sent to initiate compliance. No major structural problems were found.

During calendar year 2011, 147 devices identified as unacceptable in 2011 and previous years were brought into compliance. A copy of the County's database showing inspections during calendar year 2011 is included in Appendix E. The entire digital inspection database is included in the Urban Best Management Practice Access database.

Since 1990 the SWM Maintenance Inspections Inventory designates "S" for satisfactorily maintained swm devices and "U" for unsatisfactorily maintained devices. We believe that the vast majority of the issues pertaining to a "U" rating of a swm device do not affect the function of the swm device. We are willing to develop more descriptive designations so that in the future one can easily determine if the function of the device is compromised by simply reviewing the database.

Swm devices that receive a "U" or "unsatisfactory" designation during a triennial maintenance inspection, primarily fall into this category due to the lack of maintenance of the devices. The types of maintenance that is required usually includes, but not limited to the following: mowing, fence repair, removal of woody vegetation, in-flow & out-flow protection repair and minor erosion/stabilization. While these types of maintenance issues still require the structure(s) to be classified as "unsatisfactory" it is the opinion of the Department of Planning and Growth Management (Department) that the pond performance is not substantially degraded in most cases.

A major obstacle of the Department to consistently bring "unsatisfactory" devices into compliance in a timely manner is related to the required delegation of maintenance of swm devices to Homeowners' Associations (HOAs) and private businesses that have little to no experience with the long term maintenance of these facilities. The Department has observed a continued lack of understanding of the responsible parties on how and why they should maintain these facilities. The Department has been conducting annual seminars for the public, specifically on how to properly maintain these facilities and will meet in the field when requested to assist the public to bring the facilities into compliance. However, a major hurdle the responsible parties continue to encounter is they have failed to fiscally plan for the costs of maintenance. The lack of funds requires an extended period of time for a HOA or business to bring a facility into "satisfactory" condition, where the Department works more as a facilitator to assist the HOA or business in lieu of an enforcement authority.

The County is examining the implementation of a Stormwater Utility as allowed under recent State of Maryland legislation passed by the General Assembly. As part of this new Utility, the County may consider fees be imposed on property owners within the unacceptable communities to assist the County in maintaining the SWM sites, with special emphasis on stormwater control structures and secondary emphasis placed on site beautification.

The following table summarizes the information found in the database. Facilities found acceptable and unacceptable are reported based on their status at end of the calendar year.

Table 9: Summary of Stormwater Management Device Inspections

	2005	2006	2007	2008	2009	2010	2011
Total projects inspected	129	97	287	212	131	121	178
Total swm devices inspected	220	259	516	363	268	275	330
Total inspections performed	331	365	761	501	378	427	477
Acceptable swm devices	105 (48%)	207 (80%)	253 (49%)	214 (59%)	140 (52%)	120 (44%)	176 (53%)
Unacceptable swm devices	115 (52%)	52 (20%)	263 (51%)	149 (41%)	128 (48%)	155 (56%)	154 (47%)

*Each project may contain more than one device. The number of inspections is higher than the number of devices, due to repeat inspections of the same device.

Implementing the 2000 Maryland Stormwater Design Manual and Tracking Implementation Progress of the 2000 Stormwater Design Manual and Modifications Needed to Improve Deficiencies

The County continues to implement the stormwater management design policies, principles, methods, and practices found in the 2000 Maryland Stormwater Design Manual and COMAR.

In April 2006, MDE found the County's stormwater program acceptable.

Per the Maryland Stormwater Management Act of 2007, which requires use of environmental site design to the maximum extent practicable, the County adopted new stormwater regulations on July 13, 2010. These regulations went into effect on August 1, 2010. The Notice on the adoption of the Stormwater Management and Storm Drainage Ordinances, including Procedures on Requesting an Administrative Waiver, was included in the 2011 NPDES Annual Report.

The following projects were issued permits in fiscal year 2012, with stormwater management waivers approved on the dates below:

Permit Number	Name	SWM Approval Date
VR 090030	Kahn's (Fadul's) Addition to Pinefield	7/31/2009
VR 080018	Autumn Woods Subdivision, Section 1	5/24/2010
VR 080050	Southwinds, Building 3	7/17/2009
VC 090042	Westlake Square	8/14/2009

In fiscal year 2012, the SWM Waiver Review Fee increased to \$406 + \$81/study point, from the fiscal year 2011 fee of \$390 + \$77/study point over two. Additionally, in fiscal year 2012 the Stormwater Fee-in-lieu structure changed from a per lot charge to \$1.31/square foot disturbed.

The following is a list of the 97 SWM Administrative Waivers requested through fiscal year 2012. Not all requests were approved and not all projects have applied for or been issued permits.

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Table 10: Stormwater Management Waiver Requests

9B Applewood Center	Harvest Ridge Lots 6 & 7	Quicktree Farm
Abberly Square Apartments	Henry Ford Circle Lot 2	Richland's Crossing
Adams Crossing	High Pointe	Ridge Grove Estates
Albion	Highgrove Sections 7 & 8	Rose Hill Plantation
Aspenleigh	Holly Hall	Saddle Ridge
Autumn Hills	Hollybrook Farm	Sailor's Retreat Entrance Plan
Autumn Woods	Homefield (Fieldside)	Scotland Heights
BB&T White Plains Corporate Plaza Unit "H"	Hope Park	Shad Crossing (Formerly Earnshaw)
Beaver Creek	Hunter Springs	Shops @ Waldorf Center
Belmont	Hunter's Brooke	Southwinds Phases 2 & 3
Bensville Acres	Intersection of Rosewick & La Plata Parkway	St. Charles Pumping Station 3B
Boroughs Hall	Keswick	Staples Addition - Festival Way
Brentwood	Key Point Woods	Stoltzfus
Brookwood Estates II	Khan's (Fadul's) Addition to Pinefield	Stonebridge
Bryans Green	Kingsview 6B	Stonewell
Bryan's Road Market Place	Kleen Wave Autowash	Summit Ridge Sections 1 & 2
Bryans Village	Knotting Hill	Swan Point, The Villages of
Chelsea Manor	Langley Estates	The Heritage @ St. Charles
Coachman's Path & Woodville Road	Linden Grove Section I	The Meadows @ Forgotten Farm
CPV St. Charles Gough - Parcel D	Linden Grove section II	The Willows Suidivision
CPV St. Charles Parcel B	McCormick	Timber Ridge
Davenleigh	Middletown South	Town Center South
Deer Park Estates	Mill Spring Estates	Turtle Creek
Dorchester Landing II	Millseat Subdivision	US 301 Park and Ride
Eagle Ridge	Mimosa Addition to Mt. Carmel Woods	Waldorf Tech Park
Fair Fountain Farm	Myers Estates	Waldorf West
Falcon Ridge Subdivision	North Pointe Phase 3	Westlake Square
Fischer's Grant	Oliver's Crossing	Westside Estates 2&3
Gleneagles Neighborhood Parcel Q	Pinecrest Subdivision	White Plains Corporate Plaza
Gleneagles Neighborhood South	Piney Church Road South Realignment	Windsor Manor
Gleneagles North	Piney Grove Estates	Windsor Mill
Groves @ Piney Church	Pleasant Acres Lots 4-8	
Hamilton Heights	Potomac Metal Storage	

The following table summarizes the stormwater management credits applied to single family lots for fiscal year 2012. Rooftop runoff disconnection continues to be the most used credit, as has been demonstrated in previous years.

Table 11: Summary of Fiscal Year 2012 SWM Credits for Residential Single Family Building Permits

Number of approved Residential Building Permits:	356
SWM Credits Approved:	
Rooftop Runoff Disconnection	596
Rooftop Runoff Disconnection – Compensating Drywells	272
Non Rooftop Runoff Disconnection	3
Grass Channel	4
Sheet Flow to Buffer	0
Environmental Site Design	0
Standard Plan	0
Stormwater Management Facility	0
Natural Area of Conservation	0
Rain Garden	0
Rain Barrels	3
Drywells	0

Since the County’s adoption of the stormwater management regulations requiring environmental site design to the maximum extent practicable, a total of 71 projects have submitted Concept SWM Plans, which is Step 1 of the regulation. Of those 71 projects, 37 have also submitted Site SWM Plans, which is Step 2 of the regulation.

2. *Charles County shall maintain its illicit detection and elimination program. At a minimum, Charles County shall:*
 - a. *Ensure that all discharges to the municipal separate storm sewer that are not composed entirely of stormwater are either permitted by MDE or eliminated;*
 - b. *Annually, field screen at least 100 outfalls. Each outfall having a discharge or suspected of having an illicit discharge shall be sampled using a chemical test kit;*
 - c. *Report annually the results of field screening activities on MDE's illicit connection detection database. The following narrative shall also be included: the number of illegal storm drain connections, the results of investigations made, any enforcement used, the disposition of all illegal storm drain system connections found as a result of this portion of Charles County's stormwater management program, and an updated list of targeted outfalls and an inspection schedule; and*
 - d. *Identify all County-owned facilities requiring an NPDES discharge permit and submit documentation that a permit has been obtained for each. The implementation status of pollution prevention plans for these County-owned facilities shall also be submitted with the County's annual reports.*

2012 Status

Illicit Connection Detection

During the fiscal year 2012 screening, 107 sites were inspected. Of these 11 were inaccessible due to overgrown vegetation, high chain link fences, fallen tree over access, or mine sites under State jurisdiction. This includes 15 draining industrial areas, 2 draining institutional, 2 draining extractive, 43 draining commercial areas, 43 draining medium density residential areas, and 2 draining low density residential.

Outfalls that were not sampled during the 2011 reporting year were prioritized for screening in 2012. The screening was conducted in July of 2012. A two-person field crew visited each site following 72-hours of dry weather. The physical condition of each site was recorded on field sheets. The inspection spreadsheet is included in Appendix F and on the cd in Excel.

If a dry-weather flow was present, a sample was taken and tested with a Hach chemical test kit. Tests were conducted for pH, detergents, chlorine, temperature, ammonia nitrogen and nitrate nitrogen. When a chemical test was conducted, and the results showed a high concentration for any contaminant, the site was retested after 4 hours but within 24 hours to verify the results.

The results of the chemical test performed were compared with the accepted statewide averages described in *Dry Weather Flow and Illicit Discharges in Maryland Storm Drain Systems* (MDE, 1997). Using the statewide averages, the 1997 study provides a threshold for each constituent, based on watershed land use. The results from the chemical tests performed during the 2010-reporting year were compared with this threshold to determine which results are considered abnormal for each constituent, and to make recommendations as to which storm drain systems should be investigated further as having possible illicit connections. The thresholds listed were 0.4 ppm for chlorine, and 0.5 ppm for detergents. No state-approved threshold limits exist for nitrate and ammonia. Based on EPA and USGS documentation, values of 2.0 ppm for both constituents appear reasonable. This is consistent with the high outlying values found in previous screening efforts. Review of past data shows that typical pH values in Charles County fall outside the standard threshold range of 6.5 to 8.5. Therefore, for the 2010 reporting year, the following thresholds were used to determine if an upstream investigation was necessary:

- 5.5-8.5 pH
- 0.5 ppm Detergents
- 0.4 ppm Chlorine
- 0.17 ppm Phenols
- 0.21 ppm Copper
- 2.0 ppm Nitrate
- 2.0 ppm Ammonia

When a confirmed high concentration of a contaminant was found, field crews followed the stormdrain system upstream attempting to locate the source of the contamination. Additional tests at upstream structures were conducted as needed, especially where two systems converged.

All data collected during the illicit discharge screening was recorded in a database conforming to the MDE formatting requirements.

The results show that, approximately 40% of the outfalls were partially submerged in stormwater ponds. Several others had standing water, due to not having much, if any slope. Some outfalls appeared to be stream conveyances under roads, and not outfalls from closed systems. These stream conveyances were the only locations with flowing water, thus samples were not taken.

Outfall #56 was sampled again in 2012 due to the previous year inspections finding continued presence of excessive algae and a white residue in the stormdrain pipe. Investigations from previous sampling efforts have been unable to determine the source of the nutrients or white residue; however, the source appears to be located within the Smallwood Village Shopping Center based on tracing the stormdrain system upstream. In August 2011 the Charles County Utilities Department televised the stormdrain system and an adjacent sewer line and found no evidence of an illicit discharge. The 2012 inspection did not find excessive algae or white residue in the stormdrain pipe.

Outfalls #106 and #178 were found to have severe erosion. The erosion at #178 has been addressed in previous years by the County, however the stabilization measures are no longer in place and the erosion is continuing. The erosion at outfall #106 was identified in 2008 and is proposed to be addressed by County project VCI #08-67, however has not yet been constructed.

Outfall #106



Outfall #178



Outfall #159, which drains a large commercial area and flows under U.S. Route 301 in northern Waldorf, was found in 2011 to be discharging high concentrations of ammonia on the 1st and 2nd inspections with a gaseous odor. A windshield survey was performed on the drainage area; however, a specific source of the ammonia was not located. A detailed write-up is in the 2011 NPDES Annual Report. A follow-up inspection in 2012 found heavy iron flocculent.

Outfall #159



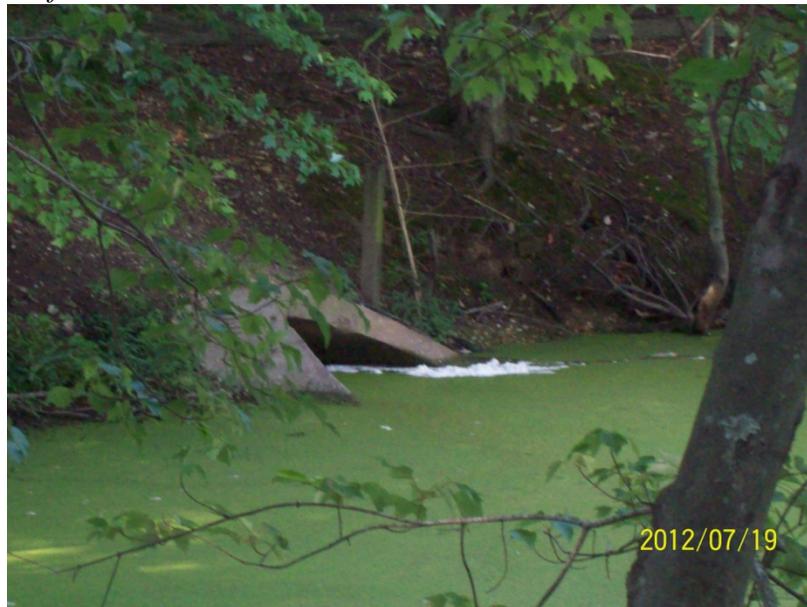
Outfall #98, located near Outfall #159 in northern Waldorf, was also found to have iron flocculent during the 2012 inspection. In 2006 the outfall was sampled and showed high concentrations of ammonia. In 2006, the field team followed the storm drain system upstream, however was not able to locate the source of the ammonia discharge. A detailed write-up is in the 2006 NPDES Annual Report. A photo follows.

Outfall #98



Outfall #62 was the only site to have excessive green algae in the 2012 inspection. The stormwater management pond associated with this outfall is under PGM#80-126. Because the facility was constructed prior to the triennial inspection requirement, it is not in the County's Urban BMP database. The County is following-up to see what options are available to bring the facility into the triennial inspection program.

Outfall #62



Outfall #196, draining a school parking lot was found to have cloudy white water standing in the pipe. An immediate visual survey of the parking lot drains to the outfall showed no signs of a white substance. The outfall in question was reported to the Charles County Public Schools, however they were also unable to identify the source.

Outfall #196



The most common minor problem found at the outfalls inspected in 2012, was 1-2” of sediment buildup in the pipes. Excessive growth was common, and minor metal corrosion and concrete cracking/spalling were noted at several outfalls as well.

The priority outfalls are listed below in Table 12.

Table 12: Field Screening Results for Priority Outfalls

Outfall #	Problem
#62	Excessive green algae in stormwater management pond
#98	High concentration of ammonia in 2006, iron flocculent in 2012
#106	Embankment and outfall erosion and CMP corrosion
#159	High concentration of ammonia in 2011, iron flocculent in 2012
#178	Erosion downstream of outfall
#196	Cloudy white water standing in pipe

Two outfalls (#23 and #96) have been repaired due to structural and erosion concerns that were discovered in 2008. Outfall #54 had improved site conditions found in 2011.

Repairs to several of the outfalls identified as having erosion in the previous inspections have been repaired as listed below in Table 13. Additionally, two areas noted with erosion are being addressed as shown in Table 14.

Table 13: Outfall and Inlet Repair Projects

Outfall	Location	Description	Cost	Date Completed	Acres Treated
179	Beechwood Drive	Outfall Repair	15,000	1-Jul-07	TBD
157	Briarwood	Outfall Repair	4,000	9-Jun-09	TBD
96	St. Charles	Outfall Repair	2,600	16-Jun-09	TBD
54	Kipling Drive	Trash Removal	2,000	9-Jun-09	TBD
139	Shiloh Church Road	Outfall Repair	1,520	1-Jul-10	TBD
14	Theodore Green Blvd.	Outfall Repair	1,800	1-Jul-10	TBD
212	Duckhorn Court	Inlet Repair	475	3-Jun-10	TBD
121	Holly Ave./Dogwood Dr.	Pipe & Outfall Repair	TBD	30-Jun-12	TBD
6	Hampshire Circle	Outfall Repair	4,000	30-Jun-12	TBD
18	Temi Drive	Outfall Repair	4,000	30-Jun-12	TBD
Not in Development District	Duval Drive	Outfall Repair	4,000	30-Jun-12	TBD

Table 14: Stream Restoration and Stormwater Management Pond Repairs

Outfall	Location	Description	Cost	Date Completed	Acres Treated
106	Tanglewood Drive Pond VCI #08-67 (a.k.a. Tawny Road)	Outfall Repair & 400 lf Stream Restoration	TBD	TBD	TBD
207	Holly Tree Lane VCI #08-68	1,200 lf Stream Restoration	TBD	TBD	TBD

County Owned Facilities Requiring a NPDES Discharge Permit

To date, the following County owned facilities requiring a NPDES discharge permit and the status of their pollution prevention plans have been identified in the following table.

Table 15: County Facilities with NPDES Permits

County Owned Facilities	NPDES Discharge Permit #	Pollution Prevention Plan
Landfill #2	97SW registration #: 97-SW-0182 General Permit #: 02-SW (effective 12/1/02-11/30/07)	Unknown
Mattawoman WWTP	97-DP-0472 MD0021865 (effective 10/1/03 - 9/30/08)	Unknown
Mattawoman WWTP	General Permit #: 02-SW MD02SW12 (effective through 11/30/07)	Completed
Cliffton WWTP	92-DP-1457 MD0055557 (effective 5/1/04 - 4/30/09)	Unknown
Cobb Island Systems (groundwater discharge permit)	00-DP-2211 (effective 6/1/00-6/1/05)	Unknown
Jude House WWTP (County does not operate this plant.)	95-DP-1684 MD0057614 (effective 1/1/96-12/31/00)	Unknown
Mount Carmel Woods WWTP	97-DP-1246 MD0053228 (effective 4/1/04-3/31/09)	Unknown
Swan Point WWTP	94-DP-1674 MD0057525 (effective 2/1/04 - 1/31/09)	Unknown

3. *Charles County shall maintain the implementation of its existing program to respond to illegal dumping and spills including procedures for public reporting and citizen complaints.*

2012 Status

On July 1, 2001 the County adopted Water Quality Control Regulations which provides the Department of Planning and Growth Management (PGM) the authority to find and stop illicit discharges into the County’s storm drainage and stream system. Subsequently, PGM adopted an implementation method entitled, “Policy/Procedure: Water Quality Violation Notification, Remediation, Case Documentation and Annual Review for Program Effectiveness and Reporting,” as attached in the appendix of the 2003 Charles County NPDES Annual Report.

On July 13, 2010 the County adopted separate Stormwater Management and Storm Drainage Ordinances, to replace the previously combined Stormwater Management and Drainage Ordinance. At this time Water Quality Regulations were adopted in the *Storm Drainage Ordinance, Section 19.2 Illicit Discharge*.

Under the Policy/Procedure, a Water Quality Control Coordinator is established within PGM to route cases of suspected pollutant discharges to the responsible agency and maintain records of cases for the County’s annual NPDES stormwater permit report.

Cases of suspected pollutant discharges, which are the responsibility of PGM, such as odors or unusual discharges in streams or from the storm drain system are managed by the County’s Stormwater Management Engineer. A Hach test was purchased for the County’s Stormwater Engineer to use for investigation of such cases.

Discharges to the Storm Drain System - The County received the following reports of suspected pollutant discharges in FY2012. Reports are included in Appendix G.

Date Received	Location	Description	Date Completed	Request for Assistance #
23-Aug-11	10810 Charles Street LaPlata, 20646	Dumping of ash from burned building in stream	TBD	Referred to MDE
7-Nov-11	16763 Prince Frederick Rd. Hughesville, 20637	Outfall drain, may drain interior of building	23-Dec-11	110809
20-Dec-11	7019 Evergreen Drive Waldorf, 20601	Sinkhole in road from collapsing pipe and debris in channel	27-Dec-11	120012
18-May-12	Rte. 488 and Kerrick Swamp	Sediment in Kerrick Swamp at MD Rte 488	21-May-12	N/A
26-Jul-12	11309 Acton Drive Waldorf, 20601	Paint from painting pool being washed down the storm drain	20-Aug-12	120453

Construction Related Discharges - In 2000 the County initiated a procedure where County construction inspectors note sediment discharges onto county roads from construction sites. The procedure allows the County to issue a stop work order until the sediment discharge problem is remedied.

4. *Charles County shall consider applying to MDE for delegation of erosion and sediment control enforcement authority. Erosion and sediment control activities in Charles County currently are the responsibility of MDE's Compliance Program. In addition, erosion and sediment control education activities, specifically "responsible personnel" certification classes, are currently conducted by MDE.*
 - a. *By 7/15/04, Charles County shall complete a report evaluating the potential for implementing an erosion and sediment control program. This report shall be submitted to MDE and include feasibility of applying to MDE for delegation of erosion and sediment control enforcement authority in accordance with Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland, benefits, and local support.*
 - b. *Beginning 7/15/03, report quarterly, information regarding earth disturbances exceeding one acre or more. Data submitted as a result of this permit condition shall include site, name, site owner and address, disturbed area, local grading permit number*

2012 Status

- a) The County's NPDES annual report for June 2003 through July 2004 includes the report evaluating the potential for implementing an erosion and sediment control program. Final delegation by MDE occurred in June 2006.

In October and November 2007, MDE performed field reviews of active construction sites to evaluate the program. Significant improvements and the progress made toward addressing violations were noted at that time. Every two years since, MDE has evaluated Charles County's program. MDE's reviews include recommendations for continued improvements related to proper installation of controls and on-site stabilization. Overall, the reviews show continued progress by Charles County and the erosion and sediment control program continues to be acceptable. In February 2012, MDE granted continued sediment and erosion control enforcement authority for the period July 1, 2012 through June 30, 2014.

- b) For the period July 1, 2011 through June 30, 2012 the County issued 116 Development Services permits, of which 17 were revisions and 49 were blanket permits. Additionally, 525 Single Family Dwelling Building permits and 131 Residential Addition permits were issued. Of the permits issued, 40 Development Services permits and 5 Single Family permits propose to disturb greater than one acre. Revisions are not included in those disturbing greater than one acre, since they have been counted in previous years. Appendix H includes the fiscal year 2012 data for earth disturbances greater than one acre.
- 5) *Charles County shall implement and maintain a public education and outreach program to reduce stormwater pollutants. Public outreach and education efforts are to be integrated with the discharge characterization monitoring, watershed restoration, illicit connection detection, erosion and sediment control, and stormwater management program implementation requirements of this permit. These efforts are to be documented and summarized in the County's annual reports. At a minimum, Charles County shall:*
- a. *Provide information regarding the following water quality issues to the general public:*
 - i. *Water conservation;*
 - ii. *Stormwater management facility maintenance;*
 - iii. *Erosion and sediment control;*
 - iv. *Lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice and snow control, cash for clippers, etc.);*
 - v. *Household hazardous waste;*
 - vi. *Litter control, recycling, and composting;*
 - vii. *Car care, mass transit, and alternative transportation;*
 - viii. *Private well and septic system management;*
 - ix. *Pet waste management;*
 - x. *Procedures for public identification and reporting of illicit discharges.*
 - b. *Provide information when requested regarding the following water quality issues to the regulated community:*
 - i. *NPDES permitting requirements;*
 - ii. *Pollution prevention plan development;*
 - iii. *Proper housekeeping; and*
 - iv. *Spill prevention and response.*

2012 Status

- a) The County provides information regarding water quality issues to the general public in various ways, including the website, brochures, news media, and one-on-one. Many of these public outreach programs are spearheaded by Charles County's Recycling & Litter Control Superintendent and the University of Maryland Extension Agent.

Website:

In July 2012, the County began the tenth year of a water quality monitoring project for the Mattawoman Creek with the U.S. Geological Survey. This project funds an existing monitoring station previously funded by the Maryland Department of the Environment. The purpose of this station is to develop a long term record of water quality data for determining trends in the watershed. The station is part of the Chesapeake Bay Programs' Long Term Status and Trends Network.

The County posts information on the NPDES MS4 permit program under the Department of Planning and Growth Management's webpage. Included are a summary of the program, Annual Reports, and numbers to call for suspected pollutant discharges. This webpage was updated in fiscal year 2012. The link to the new webpage is:

<http://www.charlescountymd.gov/pgm/planning/npdes-municipal-separate-storm-sewer-system-permit>

A copy of this new website is included in Appendix I.

The Charles County Government website also provides information on the local VanGo which provides public transit service within the County:

<http://www.charlescountymd.gov/cs/vango/vango>

Because Southern Maryland has very high ridership rates on the commuter express bus into Washington, D.C., citizens access the Maryland Mass Transit Authority(MTA) for route schedules via the Tri-County Council for Southern Maryland website for the available Commuter and Regional Ridesharing Programs:

<http://www.tccsmd.org/index.cfm?Content=72&Menu=27>

Or link directly to MTA's website for bus schedules:

<http://mta.maryland.gov/commuter-bus>

Updated information is posted on county website regularly detailing recycling opportunities, oil/antifreeze collection sites, volume based tag-a-bag sticker locations, etc. Residents can also request recycling bin delivery and other type information through this website: <http://www.charlescountymd.gov/pw/recycling/recycling>

The County operates dog park and subsequently provides etiquette rules for using the park including scooping and disposing of pet waste appropriately.

http://www.charlescounty.org/pf/parks_rec/parks/dogparks.jsp

Water conservation and other natural resource conservation topics are on the University of Maryland Cooperative Extension Service website:

<http://extension.umd.edu/environment/index.cfm>

County environmental planning initiatives including the Mattawoman Creek Watershed Management Plan and the Port Tobacco River Watershed Restoration Action Strategy:

<http://www.charlescountymd.gov/pgm/planning/watershed-planning>

Brochures and news media:

In addition to internet, information is provided by handouts and news media outlets. Educational literature on recycling and composting is periodically mailed to residents, placed in local papers and homeowners's associations' newsletters, and made available in frequently visited locations such as libraries, government building, etc.

The University of Maryland Cooperative Extension Service in Charles County distributes handouts on septic maintenance, lawn care and other topics.

Each year at the County Fair the County distributes information on recycling as well as natural resources and low impact development techniques. As part of the Charles County Commissioners' Environmental Program, several brochures are distributed by the Department of Public Facilities. These include, "Reduce Reuse Recycle Directory" and "It is Easy Being Green." In addition, coloring and activity books titled, "Learn About Water Conservation" and "Keep Our Environment Clean" are provided for children.

One-on-one:

University of Maryland Extension in Charles County promotes environmental stewardship by providing information and educational programs on environmental horticulture, water quality, appropriate and safe fertilizer and pesticide use, and other issues directly to the public, often face-to-face with our citizens, and through mass media.

Extension staff members and trained volunteers answer questions from homeowners and farm operators visiting the Extension office in Charles County, answer telephone inquiries from the public, as well as analyze plant and insect samples submitted by county residents and provide fact sheets and other educational materials as needed.

The Agriculture and Natural Resources Extension Agent promotes water conservation, storm water management, and wise use of pesticides and fertilizers through personal appearances on the county cable station. Recent topics have included proper lawn care.

The Extension Agent and Extension staff provide training to commercial landscapers, and farm operators on proper use of fertilizers and pesticides. This training includes managing storm water and farm ponds, pest control, maintaining good turf to prevent erosion, and an array of other natural resource conservation issues. Extension faculty also train volunteers to become part of the Charles County Master Gardeners, a University of Maryland outreach program providing educational information on environmental horticulture to the public.

Master Gardeners encourage maintaining the quality of our landscapes and environment through the Maryland Bay Wise Yardstick certification program, as well as through field visits throughout the County to assist citizens with their gardening problems. The volunteers also create timely educational displays and hold plant clinics at public events, such as the Charles County Fair. They make presentations to community organizations such as the Kiwanis Clubs and the local libraries, and have an on-going training program at the Charles County Detention Center. They continue to investigate new environmental education opportunities with local schools.

In 2009 through 2012, Extension faculty worked via a public/private partnership with County Government and a local lawn service business, to provide seven 2-hour community workshops on environmentally sound lawn care.

Potomac River Watershed Cleanup

Over 6,000 volunteers have collected tons of debris from Charles County's waterways over the past 15 years. Held annually, on the first Saturday of April from 9:00 a.m. to 12:00 noon, items collected over the years have included cans, bottles, appliances, furniture, toys, boats, and cars! See Section IV. Special Programmatic Conditions for annual data on the cleanup.

Next steps for improving water quality education:

The County will continue working to publicize methods to report illicit discharges, and water conservation techniques, as well as improving distribution of other water quality information as needed.

- b) The County provides the following information when requested regarding NPDES permitting requirements, pollution prevention plan development, proper housekeeping and spill prevention response:
- 1) Maryland Department of the Environment websites:
<http://www.mde.state.md.us/Programs/Permits/Pages/index.aspx>
http://www.mde.state.md.us/programs/Permits/Documents/2008permitguide/WM_A/3.23.pdf
<http://www.mde.state.md.us/programs/Permits/WaterManagementPermits/Pages/Permits/WaterManagementPermits/index.aspx>
 - 2) Maryland Center for Environmental Training located at the College of Southern Maryland, LaPlata branch: <http://www.mcet.org/>
6. *Charles County shall develop and implement a plan to reduce pollutants associated with road maintenance activities. At a minimum, an annual progress report shall be submitted that documents the following activities:*
- a. *Cleaning storm drain inlets;*
 - b. *Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with roadside vegetative management practices through the use of integrated pest management; and*
 - c. *Controlling the overuse of winter weather deicing materials through continual testing and improvement of materials and effective decision-making.*

2012 Status

The Road Division receives several dozen complaints annually, and will clean out silt/trash when the drain is not operating properly. In fiscal year 2012, storm drains and catch basins in were cleaned using a vacuum truck. The vacuum truck removed 75.86 tons of debris at a cost of \$35,325. The list of inlets cleaned is in Appendix J.

The Roads Division used 10 gallons of Round-Up herbicide to control roadside weeds on 1,631.06 miles of County roads in fiscal year 2012. The Division has a roadside herbicide policy in place that was approved in 1998, and is included in the 2003 NPDES MS4 Annual Report.

The Roads Division also sweeps streets two times annually. The mileage is calculated as lane miles. In fiscal year 2012, for a cost of \$50,000, the sweeping company hauled 123 loads of debris to the landfill that weighed a total of 159.35 tons. A list of streets and mileage that is swept twice annually is included in Appendix J.

Roads Division supervisors make every effort to use only the minimum amount of solar salt to effectively treat icy road conditions. Excess salt that may be spilled by salt trucks is cleaned up immediately after a storm.

III.F. Watershed Restoration

Overview of Permit Conditions

1. *Within 12 months of the issuance of this permit, data gathered as a result of prior NPDES activities shall be used to prioritize all watersheds within Charles County in the context of water quality. The methods and scale used to prioritize watersheds shall be determined by Charles County but must include, at minimum, documented water quality problems and the ability to address them. In Charles County's first annual report, the results of this prioritization shall be provided and shall include the methods and scale used as well as the watershed rankings for all land area in the County.*

2012 Status

This task was completed in the June 2002 to July 2003 NPDES Annual Report.

2. *Within 12 months of the issuance of this permit, Charles County shall select a watershed, or a combination of watersheds, to be restored. The selection of the watershed to be restored shall be based upon Charles County's ability to monitor the progress of all those activities identified in PART III.F.3 below to improve water quality. At least one of the following options for watershed selections shall be used:*
 - a. *A combination of the drainage area above the in-stream monitoring station identified in PART III.D. above and additional contiguous areas equaling ten percent of Charles County's untreated impervious area;*
 - b. *A watershed or combination of watersheds equaling ten percent of Charles County's untreated impervious area where surrogate parameters can be used to determine progress toward watershed restoration; or*
 - c. *A combination of PART III.F.2.a. and PART III.F.2.b. above equaling ten percent of Charles County's untreated impervious area.*

2012 Status

In an October 2003 Addendum to the June 2002 - July 2003 NPDES Annual Report, the procedure for identifying the study areas and determining imperviousness was described and is summarized here. County staff and consultants determined that the best method for selecting restoration areas was (b) above.

The 12-digit subwatershed prioritization conducted in 2003 identified part or all of the top nine lowest quality/highest priority for restoration subwatersheds within the Development District.

Thus, the Development District was used as the study area for which untreated impervious calculations were made and where specific study areas for potential restoration/retrofits were identified.

Over the course of preparing watershed restoration studies in 2004, 2007 and 2011, the method for calculating impervious surface has been updated to use the latest available data and technology. In 2004, impervious percentages were calculated for the treated and untreated areas using the 1997 Maryland Department of Planning Land Use/Land Cover GIS data and the recommended imperviousness conversion factors.

In 2007, the impervious coverage was digitized from 2004 aerial photographs using Feature Analyst, a software package that uses ArcGIS and iterative methods to identify color differences on aerial photographs associated with impervious versus open space areas. This method provided a much more accurate measurement of impervious area within the County than was calculated for the 2004 study. In 2010, the impervious area was calculated again using the same ArcGIS software package, and the most recent 2007 aerial photography.

Treated and untreated impervious areas were calculated for the Development District using the following procedure.

- BMP drainage areas were delineated using existing locations of outfalls and their associated drainage areas where data was available. Where data was not available, the remaining BMP drainage areas were delineated using topography and storm drain mapping.
 - Areas draining to BMPs were tagged as ‘treated.’ Areas that did not drain to a BMP were tagged as ‘untreated.’
3. *Within 24 months of the issuance of this permit, Charles County shall complete and submit for MDE approval a detailed assessment of the watershed or combination of watersheds selected in PART III.F.2.above. At a minimum, the assessment shall:*
- a. *Determine current water quality conditions;*
 - b. *Identify and rank water quality problems;*
 - c. *Identify all structural and non-structural water quality improvement opportunities;*
 - d. *Include the results of a visual watershed inspection;*
 - e. *Specify how the restoration efforts will be monitored; and*
 - f. *Provide an estimated cost and a detailed implementation schedule for those improvement opportunities identified in PART III.F.3.c. above.*

After completing the assessment of its selected watershed, Charles County shall submit a detailed watershed assessment for an additional watershed equaling ten percent of the County’s untreated impervious area to MDE by the end of this permit term.

2012 Status

Three watershed restoration studies, dated 2004, 2007, and 2011, have been prepared and are summarized below.

2004 Watershed Restoration Study

Per the 2004 Watershed Restoration Study, the total treated and untreated impervious acres for the entire Development District, were 2,250.12 acres and 3,456.96 acres respectively. Ten percent of the Development District’s untreated impervious surface was 345.70 acres.

To ensure that an adequate number of sites and untreated impervious acres would be selected that would be eventual candidates for restoration/retrofit design, the study areas were selected to be much larger than the 345.70 acre goal. Seven study areas were ultimately selected that together equal 645.45 acres of untreated impervious area, as shown below.

Study Area Name	Total Study Area (acres)	Area Untreated (acres)	Area of Untreated Impervious Cover (acres)
Acton/Hamilton	865.40	577.43	131.42
Briarwood	51.88	51.86	13.30
Bryans Road	16.24	16.24	11.84
Carrington	1,388.95	1,276.45	212.93
Marbella Delight	103.64	101.95	61.13
Pinefield	687.49	686.62	192.75
Pinefield South	95.23	89.21	22.08
Total	3,208.83	2,799.76	645.45

The complete Watershed Restoration Study was provided in the June 2003-July 2004 NPDES Annual Report. The Study found potential improvements that could be applied to restore watershed hydrology and water quality were identified from literature review and prior experience. The improvement alternatives fall into the following six categories, in the preferred order of implementation.

- Source Control Pollution prevention and non-stormwater discharge control programs
- Land Use Land conservation and site design measures. Low Impact Development (LID) site planning measures are included here.
- BMP Retrofits Conversion of existing quantity controls to water quality BMPs
- Multi-site BMPs End-of-pipe structures, such as ponds, wetlands, and outfall treatments
- Onsite BMPs Systems designed to reduce stormwater impact at the lot level. LID structural BMPs are included here.

-Stream Restoration In-stream projects, such as channel stabilization or riparian buffer restoration.

Capital cost estimates were developed for structural BMPs in the form of unit costs, so that an estimate of the cost of retrofitting a large area can be derived from the size of the systems needed to provide treatment. The costs include design, permitting, and construction, but not land or right-of-way acquisition. Annualized costs for BMP maintenance or outreach programs were not included in the costs, either, due to their highly variable nature.

Finally, the approach to developing restoration alternatives for each study area was as follows:

1. Identify the primary impairment in the drainage area.
2. Identify constraints
3. Select potential improvements which address the impairment within the constraints, in the order listed above in Section 3.0
4. Develop cost estimates
5. Prioritize projects based on cost-effectiveness

Feasible alternatives were developed for the seven restoration areas. When combined, they provided treatment for 418.7 acres of impervious area. The prioritization goal was to treat the amount of area required by the permit with the most cost-effective means, measured by the cost to treat one impervious acre. With this measure, the most expensive options were deleted first.

The following table shows a summary of the remaining prioritized management practices to meet the permit goal. The total cost estimate from the 2004 Watershed Restoration Study is approximately \$6,277,440 at about \$18,173 per treated impervious acre.

Table 16: Prioritized Management Practices for Watershed Restoration

Management Practice	Treated Area (ac)	Impervious Area (ac)	Unit of Measure	No. Of Units	Unit Cost	Total Cost	Cost/ Impervious Acre
Lawn Care Education	270.6	81.2	House	687	Varies	Unknown	Unknown
Pet Waste Education	270.6	81.2	House	687	Varies	Unknown	Unknown
Rain Barrels	270.6	81.2	House	687	\$250	\$171,750	\$2,116
Easements	31.0	1.6	Acre	7	\$2,000	\$13,800	\$8,903
Pond Retrofit	59.2	17.8	CF	163,860	NA	\$132,518	\$7,445
Wet Pond	168.3	59.9	CF	226,077	NA	\$192,373	\$3,212
Wetland 1	96.1	31.1	CF	118,883	NA	\$132,004	\$4,244
Wetland 2	67.1	30.3	CF	111,136	NA	\$125,879	\$4,154

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Management Practice	Treated Area (ac)	Impervious Area (ac)	Unit of Measure	No. Of Units	Unit Cost	Total Cost	Cost/ Impervious Acre
Dry Swale- Filtration	117.7	35.6	SY	13,800	\$68	\$938,400	\$26,360
Dry Swale- Infiltration	35.0	10.5	SY	4,066	\$39	\$158,574	\$15,102
Wet Swale	0.0	0.0	SY	0	\$51	\$0	
Grasspave/Infiltration	23.2	7.0	SY	342	\$83	\$28,386	\$4,055
Grasspave/Filtration	0.0	0.0	SY	0	\$146	\$0	
Filtterra Bioretention	146	44.0	Each	176	\$6,000	\$1,056,000	\$24,000
Sidewalk Bioretention	0.0	0.0	SY	0	\$194	\$0	
Median Bioretention	0.0	0.0	SY	0	\$174	\$0	
Parking Lot Bioretention	75.3	57.6	SY	18,694	\$174	\$3,252,756	\$56,471
Green Roofs	0.0	0.0	SY	0	\$135	\$0	
Stream Restoration	0.0	0.0	LF	300	\$250	\$75,000	
TOTAL	993.9	345.4				\$6,277,440	\$18,173

NOTE: Wetland 1 treats some of the same area in Carrington as a wet pond, so this area was removed from the total area treated. Similarly, education and rain barrels treat the same area, so this area was included only once in the total.

The Watershed Restoration Study was presented to the Charles County Commissioners in November 2004, and was approved for implementation. To further refine the proposed projects and the implementation schedule the County separated capital improvements projects (CIP) and outreach projects. See Part III.G. below for further information on the CIP budget.

The following prioritization list includes the three study areas with the greatest amount of impervious surface for restoration: Carrington, Pinefield, and Acton-Hamilton. In addition, Bryans Road is included as a county initiative under the Bryans Road Sub-Area Plan.

The prioritization is based on meeting the 10% restoration goal with the fewest areas of impact, which will enable the County to focus outreach, land acquisition, and management efforts, minimize time and cost of construction, and to completely address water quality in the areas of concentration.

The estimated costs and areas treated have been refined since 2004 and the following table has been updated to reflect this. The updated total areas treated have decreased significantly from original estimates and the average cost per impervious acre treated is now estimated at \$51,350.

Estimated Cost and Implementation Schedule for the 2004 Watershed Restoration Plan:*

		Description	Design	Right-of-Way & Construction	Impervious Treated (acres)
FY06-FY09	Carrington	Shallow Marsh	\$126,675		
	Carrington	Shallow Marsh		\$ 1,502,277	45
FY10-FY11	Bryans Road	Underground Storage	\$64,110		
	Pinefield	Wetpond 1 and Filterras**	\$214,490		
	Acton-Hamilton	Bio-Swales (not feasible)	\$96,860		
FY12-FY13	Bryans Road	Underground Storage		\$ 1,302,005	9
	Pinefield	Wetpond 1		\$ 632,269	23
	Pinefield	Wetpond 2	\$50,000		
	Pinefield – Temi Dr.	Submerged Gravel Wetland	\$52,200		
	Acton-Hamilton	Submerged Gravel Wetland	\$86,000		
FY14-FY15	Pinefield	Wetpond 2		\$500,000	13
	Pinefield – Temi Dr.	Submerged Gravel Wetland		\$650,000	13
	Acton-Hamilton	Submerged Gravel Wetland		\$ 2,000,000	40
		TOTALS	\$640,335	\$6,086,551	131

**Updated in 2012. ** The Pinefield filterras have been designed to treat 13 impervious acres at a cost of \$1,187,731, but have been put on hold. Additional explanation is under item 4 below.*

2007 Watershed Restoration Study

For the 2007 study, impervious coverage was digitized from 2004 aerial photographs using Feature Analyst, a software package that uses ArcGIS and iterative methods to identify color differences associated with impervious versus open space areas. This method provided a much more accurate measurement of impervious area within the County.

Since the goal of the 2004 and 2007 studies was to provide restoration alternatives for a combined total of twenty percent of the untreated impervious area in the Development District, it was important to analyze existing untreated impervious area and impervious area within the study areas using the same methodology. Therefore, the impervious area within the seven study areas discussed in the 2004 Watershed Restoration Study were recalculated using the delineated impervious area values. The results are as follows:

Study Area Name	Total Study Area (acres)	Area Untreated (acres)	Area of Untreated Impervious Cover (acres)
Acton/Hamilton	865.40	577.43	90.07
Briarwood	51.88	51.86	9.93
Bryans Road	16.24	16.24	11.57
Carrington	1388.95	1276.45	151.66
Marbella Delight	103.64	101.95	41.02
Pinefield	687.49	686.62	165.78
Pinefield South	95.23	89.21	18.32
Total	3208.83	2799.76	488.35

The total impervious area within the Development District was approximately 4,581 acres, based on the digitized impervious boundaries. Of that amount, 2,607 acres is currently untreated. The improvement recommendations outlined in the 2004 study addressed the treatment of 402.58 acres of untreated impervious area, as recalculated with the new impervious coverage. This is approximately 15% of the total untreated area in the Development District. Meeting the 20% restoration goal would require an additional 119 acres treated.

For the 2007 Watershed Restoration Study, ten study areas were identified that contained a large percentage of untreated impervious area within an impaired stream system. To ensure that an adequate number of sites and untreated impervious acres would be selected that would be eventual candidates for restoration/retrofit design, the study areas were selected to be much larger than the 119 acre goal. The ten study areas that were ultimately selected equal 276.16 acres of untreated impervious area, as shown below.

Study Area Name	Total Study Area (acres)	Area Untreated (acres)	Area of Untreated Impervious Cover (acres)
Fox Run	33.82	33.82	9.40
Lancaster	42.90	40.84	13.06
West Lake Village	267.59	261.45	63.81
Ryon Woods	140.39	136.80	27.08
White Plains	327.97	231.04	31.21
St. Charles	1609.18	409.67	77.21
Wakefield	49.20	49.20	12.94
Bannister	28.33	28.33	6.30
Hunt Club Estates	135.61	131.55	15.39
Northwood	107.72	61.11	19.76
Total	2742.71	1383.81	276.16

These study areas include impervious area from state highways, which are subject to Maryland State Highway Administration’s (MSHA) Statewide NPDES permit and not part of the County's responsibility. As highway projects are constructed, there may be an opportunity to share funding for BMP construction, along with credit for pollutant removal from runoff subject to both MSHA and County permits.

Of the nine selected areas, three were selected for stream walks (West Lake Village, White Plains, and St. Charles). The inspection consisted of a walk-through of approximately 7,400 linear feet of perennial/ephemeral streams. The inspection included physical and habitat assessment and documentation of problem areas, including:

- Storm drain outfalls
- Stream channel lateral and vertical erosion

- Channel blockages and/or fish obstructions
- Dumping
- Failing septic or sewer systems
- Buffer impairments or encroachments
- Exposed utilities

Study Area	Type of Monitoring
Fox Run	Habitat, geomorphic assessment
Lancaster	Habitat, geomorphic assessment
West Lake Village	Biomonitoring, physical water quality, habitat, water quality grab
Ryon Woods	Geomorphic assessment
White Plains	Biomonitoring, physical water quality, habitat, water quality grab Physical water quality, habitat, water quality grab, geomorphic
St. Charles	assessment
Wakefield	Physical water quality, habitat, water quality grab
Hunt Club Estates	Habitat, geomorphic assessment
Northwood	Physical water quality, habitat, geomorphic assessment

POTENTIAL MANAGEMENT ALTERNATIVES

The improvement alternatives identified to address some of the issues described above fall into the following six categories:

- Source Control: Pollution prevention and non-stormwater discharge control programs
- Land Use: Land conservation and site design measures. Low Impact Development (LID) site planning measures are included here.
- BMP Retrofits: Conversion of existing quantity controls to water quality BMPs
- Multi-site BMPs: End-of-pipe structures, such as ponds, wetlands, and outfall treatments
- Onsite BMPs: Systems designed to reduce stormwater impact at the lot level. LID structural BMPs are included here.
- Stream Restoration: In-stream projects, such as channel stabilization or riparian buffer restoration

Several categories of restoration measures have already been put in place through the County's NPDES permit. These are municipal pollution prevention measures, some residential source controls, and reduction of non-stormwater discharges.

Currently, forty-two restoration opportunities have been identified within the study areas, which combined would treat approximately 142 untreated impervious acres. These include construction of bioretention areas, small wet ponds, water quality swales, and performing stream

restoration or stabilization of failing outfalls. Site-specific discussions and concept plans are included in the 2007 Watershed Restoration Study Report for the priority projects. Prioritization was based on the level of impairment within the receiving waters, amount of impervious drainage to the project limits, and estimated cost of the project. This Study is included with the 2007 NPDES Annual Report.

The estimated costs and areas treated have been refined since 2007 and the following table has been updated to reflect this. The updated total areas treated have decreased from original estimates, some projects were not feasible, and the estimated cost per acre treated is \$57,418.

Estimated Cost and Implementation Schedule for the 2007 Watershed Restoration Plan:*

		Description	Design	Right-of-Way & Construction	Impervious Treated (acres)
FY12-FY13	Bannister	Retention Pond (not feasible)	\$281,860		
	Fox Run	Regenerative Step Pool Conveyance			
	Lancaster	Stream Restoration (not feasible)			
	Northwood	Regenerative Step Pool Conveyance			
	Ryon Woods	Grass Channel			
	White Plains	Gravel Wetland			
	St. Charles	Retention Pond & Stream Restoration		\$100,000	
FY14-FY15	Fox Run	Regenerative Step Pool Conveyance		\$600,000	10
	Northwood	Regenerative Step Pool Conveyance		\$800,000	23
	Ryon Woods	Grass Channel		\$50,000	1
	White Plains	Gravel Wetland		\$530,000	6
	St. Charles	Retention Pond & Stream Restoration		\$1,600,000	29
		TOTALS	\$381,860	\$3,580,000	69

*Updated in 2012.

2011 Watershed Restoration Study

In January 2010 the County contracted with KCI Technologies, Inc. to prepare a third watershed restoration study for an additional 10% untreated impervious surface. It was determined that the total impervious area within the Development District, based on the 2007 data, was 5,508 acres. Of this 2,863 acres have been identified as untreated. Therefore, the restoration goal for the 2011 study was 286.3 acres, which represents 10% of the untreated impervious area.

A variety of study areas were identified for retrofit. These areas were identified based primarily on the amount of untreated area in the development draining to the sites. The study areas include impervious area from state highways, which are subject to Maryland State Highway Administration's (MSHA's) Statewide NPDES permit and not part of the County's responsibility. As highway projects are constructed there may be an opportunity to share funding for BMP construction, along with credit for pollutant removal from runoff subject to both MSHA and County permits.

The potential project areas were identified in ArcGIS using the treated area polygon and aerial photography. These areas were printed on maps and compared against known proposed development to narrow down the areas most likely for retrofits. 75 individual retrofit sites were identified within the 28 study areas. The proposed impervious area to be treated was approximately 50% of the 286 acre goal. Design and construction of such a large number of sites would be prohibitively expensive. Therefore the majority of sites, with modest to minimal treatment benefits, were eliminated from consideration.

Concept plans were developed for a final list of 17 proposed projects within 9 study areas treating approximately 37 acres of impervious surface. The study estimates the average restoration cost is \$129,000 per impervious acre. See the following table for the list of projects.

Study Area	Number of Proposed Projects
Marbella Delight	3 (Dry Swales, Bioretention)
Northwood	2 (Bioretention, Filterra)
Jenifer Elementary School	1 (Shallow Marsh)
Berry Road North	2 (Bioretention, Dry Swales)
Briarwood	1 (Step Pool Stormwater Conveyance)
Leonardtwn Road	2 (Pond Retrofit, Dry Swales)
Pinefield Center	1 (Retention Pond/ Improved Drainage System)
Potomac Branch Library	1 (Bioretention)
MD-301 Commercial Corridor	4 (Bioretention, Pavement Removal)

The estimated costs and impervious areas treated have been refined since 2011 per the following table.

Estimated Cost and Implementation Schedule for the 2011 Watershed Restoration Plan:*

		Description	Design	Construction	Impervious Treated (acres)
FY12-FY13	Northwood (a.k.a. Holly Station)	Retention Pond, Bioretention & Swale	\$50,000		
FY14-FY15	Northwood (a.k.a. Holly Station)	Retention Pond, Bioretention & Swale		\$450,000	9
		TOTALS	\$50,000	\$450,000	9

*Updated in 2012.

4. *Within 30 months of the issuance of this permit, Charles County shall begin to implement restoration efforts according to the schedule outlined in PART III.F.3.f. above. Annual reports shall document:*
 - a. *The progress toward meeting the schedule identified in PART III.F.3.f. above;*
 - b. *The estimated cost and the actual expenditures for program implementation; and*
 1. *The monitoring data or surrogate parameter analyses used to determine water quality improvements.*

2012 Status

Carrington Watershed Restoration Projects

In fiscal year 2005 the County began the first three CIP watershed restoration projects in Carrington Neighborhood. Two of these are wetland habitat projects on elementary school sites and the third is a water quality feature on neighborhood association property. Success of the proposed Carrington watershed restoration projects depended on support and interest from the community and the schools.

Charles County issued a request for proposals in the Fall of 2005 to have the three Carrington projects designed. Two bids were received, and A. Morton Thomas, Inc. was selected to design and engineer the projects. Design began January 2006, and was completed in the Fall of 2006. Construction of the project was bid in November 2006 and awarded to Environmental Quality Resources, LLC in February 2007.

A ribbon-cutting event for both wetland projects was held on April 16, 2008. The event was titled, "Connecting Children to Nature – Schoolyard Habitat Celebration and Fishing Derby." This event was videotaped for running on the County's and the School's cable channels and was aired in 2008. The Charles County Department of Planning and Growth Management received the *2010 Grand Award* and the *2010 Outstanding Project Award in Environmental* for the projects by the American Council of Engineering Companies of Maryland.

See permit Section III.D.3 for chemical monitoring of the restoration project at Middleton Elementary School.

Pinefield and Acton-Hamilton Watershed Restoration Projects

Request for Proposals (RFP) 08-36 for the design and engineering of these two projects was released in April 2008. The RFP was for full concept and engineering, which was determined to be too open-ended and causing inflated bid pricing. To address the inflated bid pricing,

Addendum #1 was issued in May 2008, postponing bids, until the County could have 25% design completed and remove the uncertainty in project scope. In July 2009, RFP 09-40 was released which included completed concepts. Bids were received in August 2009. Vista Design, Inc. was awarded the contract and began work November 2009. The County's permits are: Pinefield VCI #09-111 and Acton-Hamilton VCI #09-112.

See permit Section III.D.3 for biological and physical monitoring of the restoration project at Acton-Hamilton.

Improvements in Pinefield include expanding a wet pond, adding filterras, as well as pipe repair and outfall replacement of the pipe on Dogwood Drive that daylight behind Holly Avenue and an outfall pipe on Temi Drive.

In 2012, Dogwood Drive Drainage Improvements were bid for construction under RFP 12-04 and completed. This consisted of partially replacing and rehabbing a major drainage pipe that was failing in several locations.

Due to the recent completion of the U.S. Army Corps of Engineers' *Stormwater Improvement Plan for Pinefield*, July 2011, the filterras that had been previously designed and issued construction permits, were put on hold to be potentially superseded or done in conjunction with the U.S. Army Corps of Engineers stormwater drainage improvements. The U.S. Army Corps of Engineers' plan included treating much of the drainage area to the filterras via a less costly retention pond. However designing the retention pond is dependent upon the County obtaining access to the property. The Pinefield Neighborhood Drainage RFP 12-02 was posted for engineering design and permitting of drainage improvements. RFP 12-02 is currently being completed by Vista Design, Inc. and anticipated to have construction permits issued in July 2013.

In 2011 to 2012, Vista Design, Inc. prepared a concept called Temi Drive that will reroute drainage from a corroded steel pipe and eroded outfall, to a gravel wetland that will provide water quality treatment for 13 acres of impervious surface. This concept addresses two problems at once. Following is Figure 2, which is the concept and drainage area for Temi Drive.

Appendix K includes anticipated permitting timelines for the projects currently under design, including Pinefield.

In 2012 the Pinefield NPDES Retrofits RFP 12-18 was issued for construction of the wet pond expansion only and awarded to Sandy Excavating, Inc. Construction began in the August 2012 and is ongoing through the date of this report. Photos of the pond construction follow.



Improvements in Acton-Hamilton were subject to re-evaluation in 2010. This included issuing change orders to (1) delete proposed bioretention facilities and replace with filterstrips, (2) delete dry swales and replace with bioretention, and (3) preliminary surveying, engineering and permitting services in support of a regional stormwater concept.

Staff and the consultant met with Maryland Department of the Environment (MDE) regarding the regional stormwater concept, which MDE supported. A large submerged gravel wetland and wetland facility are currently under design. Setbacks to completing the project, include the recent finding of a sewer line running through the center of the proposed facility, which had not been known to exist in the area. Designing and rerouting the sewer line around the proposed facility is underway in 2012. Final permitting is anticipated in July 2013, with construction starting in 2014.

Bryans Road Watershed Restoration Project

In June 2007, the County hired Johnson, Mirmiran and Thompson (JMT) to develop a preliminary design study report for the Bryans Road Town Common to incorporate stormwater management for the site. On June 11, 2008 JMT presented the final concept to the County Commissioners who agreed to take the project to the Bryans Road Improvement Committee for discussion and proceed with land acquisition and engineering. The project proposes to treat approximately 9+ acres of untreated impervious surface and also serve as a Bryans Road Town Square to help revitalize the town center and increase mixed use development.

In July 2009 the engineering of the Bryans Road Town Common was awarded to Vista Design, Inc. The owner of the property did not allow soil borings during the County's acquisition process, which delayed the engineering until June 2010, when the property was acquired. The engineering under permit VCI #09-78 was completed in late 2011.

In June 2012 the construction of Bryans Road NPDES project was bid under RFP 12-15 and in August 2012 was awarded to Sandy Excavating, Inc. Construction began in the fall of 2012 and completion is expected in May 2013. Photos of the construction and placement of the underground arches follow.



Potomac Heights Community Watershed Restoration Project

Potomac Heights is a 126 acre site in the County’s Development District along the Potomac River just north of the Town of Indian Head. The community is owned by the Potomac Heights Mutual Homeowner's Association (HOA) with no individual home lots. The community was constructed long before codes regulating stormwater were in place. The existing stormwater treatment and drainage system includes improperly placed and non-standard structures, under-sized pipes, lack of appropriate cover, flat or negligible slopes and no means for treating stormwater runoff for quality. In many areas stormwater runoff from the roadways is directed towards homes causing flooding and property damage.

The project includes road improvements, swales, pipes and stormwater facilities to address the flooding problems and water quality management for 20.5 acres of untreated impervious surface. The HOA is primarily interested in drainage improvements, however the County offered to fund any water quality improvements that could be achieved through the proposed drainage improvements.

The project was submitted to the County for permit review in August 2009 under VR #09-77. The total cost for water quality improvements is estimated at \$614,405. This is proposed to be funded through the NPDES program at an average of \$30,000 per treated acre. In early 2010 the project was submitted to MDE for funding assistance. To date the project has not received the needed funding to proceed.

Bannister, Fox Run, Lancaster, Northwood, Ryon Woods and White Plains

The RFP 11-09 for design and engineering of watershed restoration projects was issued for response in January 2011. The County received 17 bids and selected Vista Design, Inc. The project consists of field and research reconnaissance of site-specific data, conceptual, preliminary, semi-final, and final design phases. Public information meetings will be held with the stakeholders of each of the six affected neighborhoods to solicit input and address concerns. The conceptual projects for each community propose to address 54.6 acres of untreated impervious area as described below.

Community	Project Type	Treated Impervious Area
Bannister	Retention Pond	6.3
Fox Run	Outfall Stabilization, Channel Restoration	9.4
Lancaster	Channel Restoration	12.5
Northwood	Channel Restoration, Retention Pond, Infiltration, Bioretention	12.3
Ryon Woods	Channel Restoration, Infiltration	4.7
White Plains	Infiltration/Shallow Wetland	9.4

As design began, it was determined Bannister and Lancaster were not currently feasible and put on hold. The other projects began the design process under the following permits: Fox Run VCI#11-102; Ryon Woods VCI#11-009; and White Plains VCI#12-067. Northwood had previously been a stream restoration project designed and permitted under VCI#08-68 by AB Consulting, Inc. associated with a County road project. However it was determined that redesigning this project into a regenerative step pool conveyance system would provide additional acres of water quality treatment, thus the project evolved into two separate projects: the redesign of the stream restoration, and a separate design for stormwater retention pond, bioretention, and water quality swale. Two bids were received in November 2012 for the Northwood regenerative step pool conveyance, which is expected to be awarded by early 2013. Proposals for the additional best management practices will be sought in early 2013.

Fox Run was issued a construction permit, no right-of-way is needed, and the construction RFP 13-24 is ready to be bid in early 2013. Similarly, Ryon Woods is completely designed and is anticipated to be bid for construction in 2013, however is pending right-of-way acquisition.

Strawberry Hills Stormwater Management and Stream Improvements

In March 2011, the US Army Corps of Engineers, completed the final *Stormwater and Stream Improvement Plan for Strawberry Hills*, under the Floodplain Management Services (FPMS) Program. In April 2011 the final plan was presented to the County Commissioners. This plan was requested by the Department of Planning and Growth Management to be the first step in taking corrective action to address stream erosion and flooding issues in this neighborhood, which was constructed in the early 1970s. The objectives were to: (1) determine the locations and causes of stream instability causing property loss; (2) determine the causes of flooding and the extent and depth, and; (3) develop alternatives and an improvement plan to correct stream instability and eliminate flooding during the 10-year storm event. In July 2011, the County issued RFP 12-13 for construction of the project under permit VCI#10-93. The project consists of outfall improvements and inlet improvements, with minimal disturbance to the stream. Staff continues to pursue this project in terms of a potential stormwater quality project downstream, below an existing stormwater pond.

County Road Projects

As the County improves or expands existing roads there is the opportunity to treat existing untreated impervious surface. Previously the County was pursuing the widening of Acton Lane Phase 3, and Phases 5-7 of the Cross County Connector, however in FY13 these projects were cancelled. In FY13, water quality was added in the Stavors Road Improvement Plan at a cost of \$200,000. In November 2012, engineering of Stavors Road is at 95% completion, under permit VCI #11-60. The County is also pursuing a concept on Billingsley Road south of Carrington.

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Table 17: Watershed Restoration Action Plan and Progress

	Description	Design	Right-of-Way & Construction	Acres Treated	Balance
					286
FY06-FY07	Carrington	126,675			
FY08-FY09	Carrington		1,502,277	45	241
FY10-FY11	Bryans Road	64,110			
	Pinefield	214,490			
	Acton-Hamilton Bioswales (not feasible)	96,860			
FY12-FY13	Bannister (not feasible)				
	Fox Run				
	Lancaster (not feasible)				
	Northwood – Step Pool				
	Ryon Woods				
	White Plains				
	Northwood – Retention Pond, Bioretention & Swale	50,000			
	Bryans Road		1,302,005	9	232
	Pinefield - Wetpond 1		632,269	22	210
	Pinefield – WetPond 2	50,000			
	Pinefield – Temi Drive	52,200			
	Acton-Hamilton – Submerged Gravel Wetland	86,000			
	Stavors Road Improvements	5,000	200,000	4	206
	St. Charles	100,000			
Billingsley Road	20,000				
FY14-FY15	Fox Run		600,000	10	196
	Northwood – Step Pool		800,000	23	173
	Ryon Woods		50,000	1	172
	White Plains		530,000	6	166
	Pinefield – Wetpond 2		500,000	13	153
	Pinefield – Temi Drive		650,000	13	140
	Jenifer Elementary School	50,000			
	Northwood – Retention Pond, Bioretention & Swale		450,000	9	131
	Acton-Hamilton – Submerged Gravel Wetland		2,000,000	40	91
	St. Charles		1,600,000	29	62
	Billingsley Road		75,000	25	37
	Tanglewood	Complete	140,000	4	33
	Future Concept 1	105,000			
	Future Concept 2	105,000			
FY16-FY17	Jenifer Elementary School		173,000	3	30
	Future Concept 1		1,600,000	30	0
	Future Concept 2		1,600,000	30	(30)

Bold indicates final number.

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Table 18: Watershed Restoration Details for Completed Projects

	Type of BMP	Drainage Area (ac.)	Impervious Area (ac.)	Impervious Area Treated (%)	Impervious Area Treated (ac.)
Gustavus Brown Elementary School Wetland VCI# 06-34	Shallow Marsh	75.5	25.33	100	25.3
Arthur Middleton Elementary School Wetland VCI #06-35	Shallow Marsh	36.4	13.1	92	12.1
Arthur Middleton Elementary School Weir VCI# 06-35	Existing Channel	60.5	18.1	24	4.5
Fillmore Road Weir VCI #06-36	Existing Channel	33.7	10.1	27.8	2.8
					44.7

Table 19: Watershed Restoration Details for Projects In Permitting and Construction Phases

	Type of BMP	Drainage Area (ac.)	Impervious Area (ac.)	Impervious Area Treated (%)	Impervious Area Treated (ac.)
Bryans Road VCI # 09-78	Underground Storage	18.6	8.9	100	8.9
Pinefield VCI# 09-111	Wetpond Expansion	51	22.3	100	22.3
Acton-Hamilton VCI# 09-112	Submerged Gravel Wetland	393	Pending Mapping	Pending Mapping	40.3 estimated
Fox Run VCI# 11-102	Regenerative Step Pool Conveyance	23.1	9.5	100	9.5
Ryon Woods VCI# 11-99	Regenerative Step Pool Conveyance	4.7	1.4	71.4	1
White Plains VCI# 12-67	Gravel Wetland	192.5	45.4	12.8	5.8
Stavors Roads Improvements VCI# 11-60	Infiltration Pond	11.6	3.9	100	3.9
Tanglewood Drive VCI# 08-67	Regenerative Step Pool Conveyance	51.4	Pending Mapping	Pending Mapping	4 estimated
					95.7

Table 20: Education and Outreach Projects

Location	Description	Cost	Date Completed	Acres Treated
Carrington	Community Watershed Restoration Outreach, BayScapes, & Enviro. Technical Assistance	27,520	12-Apr-08	TBD
Pinefield	Rain Barrel Distribution	TBD	TBD	TBD
Acton-Hamilton	Rain Barrel Distribution	TBD	TBD	TBD

III.G. Program Funding

Overview of Permit Conditions

1. *Annually, Charles County shall submit a fiscal analysis of the capital, operation, and maintenance expenditures necessary to comply with all conditions of this permit.*
2. *Charles County shall maintain adequate program funding to comply with all conditions of this permit.*

2012 Status

Funding Sources

Charles County continues to implement a two-pronged funding approach in order to ensure that adequate funds are available for carrying out permit program conditions.

1. Charles County Environmental Service Fee (ESF) Fund: In 1997 the County adopted a \$2.00 increase to its existing annual ESF for all improved properties county-wide including in the towns, and allocated the increase to the NPDES budget. Since fiscal year 2008 the portion of the ESF allocated to the NPDES budget has been increased as shown on the chart below. As the number of improved properties increases annually in Charles County, the amount collected for the NPDES budget also increases.

Fiscal Year	1998-2007	2008	2009	2010	2011	2012	2013
ESF NPDES Allocation	\$ 2	\$ 4	\$ 5	\$ 6	\$ 8	\$ 12	\$ 14

2. Recordation Fee: In 1997 the County also implemented a NPDES per lot recordation fee of \$81.25 per lot, for all new lots recorded in the Development District. Due to the variation in the number of lots recorded per year the amount collected fluctuates annually.

Fiscal Year	1998-2000	2001-2004	2005-2008	2009-2012	2013
NPDES Lot Recordation Fee	\$ 81.25	\$ 84.50	\$ 87	\$ 117	\$ 121

Consultant expenses in fiscal year 2012 include KCI Technologies, Inc.(NPDES consultant), LimnoTech (Watershed Implementation Plan consultant), AquaLaw (legal consultant), and the County's partnership agreement with USGS to perform water quality monitoring of the Mattawoman Creek.

KCI consulting expenses include: mapping, stream monitoring, illicit discharge inspections, BMP monitoring, and pollutant load estimates. The operating budget sufficiently funded KCI's services through the extensions beyond the end of the permit period. The following tables summarize program funding from fees collected, staff activities and capital improvements.

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The fiscal year 2012 NPDES consulting budget was appropriated as \$306,700. For fiscal years 2011 and 2012, fifty percent of one planner staff salary and fringe is funded by the NPDES program. Beginning in fiscal year 2013, 80% of one planner staff salary, 50% of two stormwater engineers, and 30% of one administrative stormwater staff will be funded by the NPDES program.

Table 21: Program Funding- Fiscal Years 2004 through 2012

	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12
Budget:	156,200	153,000	163,000	151,100	160,600	163,800	184,500	184,500	306,700
Revenue:									
Collected ESF	83,521	85,277	70,802	88,989	181,787	230,212	278,528	375,789	613,290
Collected RF	76,657	80,102	86,906	84,748	54,246	33,705	35,928	80,847	83,187
Carryover Balance	104,918	115,915	157,543	155,765	153,932	171,255	130,341	81,627	227,781
Total	265,095	281,294	321,715	329,502	389,965	435,172	444,797	538,263	924,258
Expenditures:									
Salary & Fringe	0	0	0	0	0	0	0	49,525	53,391
NPDES Consult	86,618	72,691	81,302	85,639	40,853	112,595	89,926	42,140	22,927
WIP Consult	0	0	0	0	0	0	0	0	71,413
Legal Consult	0	0	0	0	0	0	0	7,500	7,500
USGS Monitoring	62,079	47,500	73,235	64,090	68,393	71,603	90,389	117,527	41,764
County	0	0	0	177	0	0	0	16	0
Bond Service	484	3,559	4,949	25,666	109,463	120,633	182,855	217,865	262,258
Balance:	115,915	157,543	155,765	153,932	171,255	130,341	81,627	103,656	465,005
Adjustment of ESF:								124,125	

ESF-Environmental Service Fee, RF-Recordation Fee, WIP-Watershed Implementation Plan

Table 22: Charles County Planning Division Staff Salary

	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12
NPDES Activities	27,620	31,187	19,042	16,388	24,329	20,785	26,720	66,178	65,192
Tributary Teams	3,668	3,444	4,558	2,097	3,510	5,744	1,955	2,739	970
Watershed Plan Implementation:									
Mattawoman Creek			6,236	19,748	24,523	14,447	11,740	771	*
Port Tobacco River			6,768	12,052	3,734	8,820	2,385	329	*
Bay Restoration Fund (BRF)				2,328	1,141				
Total	31,288	34,631	36,604	52,613	57,237	49,796	42,800	70,017	66,162

*Mattawoman Creek and Port Tobacco River Watershed Plan Implementation is no longer individually tracked, and is now tracked as part of the Maryland Phase II WIP effort.

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Funding necessary to implement the Watershed Restoration requirement of the permit is provided through the County's Capital Improvements Program (CIP) budget. This funding was originally approved to begin in FY 2003 at the rate of \$200,000 per year for a five year period totaling \$1 million, and was to cover permit retrofit requirements of the County's first NPDES MS4 permit. Shortly after this approval, the County was issued a new NPDES MS4 permit which increased the retrofit requirements and identified the requirements as Watershed Restoration.

In November 2004 the County Commissioners reviewed and supported the Charles County Watershed Restoration Study and the projects needed to meet the new permit requirements. Subsequently, the County Commissioners increased the fiscal year 2006 - 2011 CIP budget to \$7.69 and the fiscal year 2010 – 2014 budget to \$12.04 million to implement the proposed projects.

In February 2004 the County began issuing bonds for the Capital Improvements (CIP) budget. In March 2007 construction was initiated on the County's first watershed restoration projects, which is reflected by the increased expenditures shown in the table below.

In fiscal year 2011 the County funded a \$25,000 watershed restoration study from the NPDES CIP fund. This study is to identify additional watershed restoration projects for construction.

A service fee associated with the bonds needed for this funding was paid fiscal year 2004 through fiscal year 2012 from the NPDES operating budget. See Appendix L for approved capital budgets.

Table 23: NPDES Capital Improvements Program Expenditures through FY12

	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	TOTAL
Bonds Issued	40,000	0	100,000	1,000,000	400,000	471,800	500,000	1,400,000	700,000	4,611,800
Bonds Expended	40,000	0	100,000	1,000,000	400,000	471,800	500,000	787,617	0	3,299,417

Table 24: Fiscal Year 2012 Capital Improvement Program for NPDES Retrofits

	Budget	Spent
Carrington	1,867,230	1,867,219
Pinefield	455,360	903,179
Acton/Hamilton	308,760	285,139
Bryans Road	551,800	516,312
Fox Run	115,210	87,022
Lancaster	85,360	57,672
Northwood	28,830	28,830
Ryon Woods	89,860	69,172
White Plains	142,040	96,980
NPDES Study	24,740	24,738
NPDES Mapping	23,800	9,282
GIS Mapping	455,540	0
To Be Determined	12,918,470	681,718
TOTAL	17,067,000	4,627,263

Table 25: Capital Improvements Program Appropriation per Year

FY03	214,000
FY 04	220,000
FY 05	224,000
FY 06	72,000
FY 07	778,000
FY 08	1,452,000
FY 09	2,127,000
FY 10	2,409,000
FY 11	2,409,000
FY 12	1,505,000
FY 13	5,657,000
TOTAL	17,067,000

Maryland Phase II Watershed Implementation Plan (Phase II WIP)

Fiscal year 2013 marked the first year, in which County funding was allocated to enhance project pace for the Phase II WIP. A total of \$100,000 was allocated for the purpose of fully funding installation of nitrogen removal technology on septic systems. Currently the BRF grants fund only a portion of the installation based on income, so full grant funding regardless of income, was anticipated to stimulate the number of grant applications. However, to date a program has not been established to use the funding, and no money has been spent.

Future Funding Sources

In fiscal year 2012, the Maryland legislature passed the *Stormwater Management – Watershed Protection and Restoration Program*. The law requires municipalities subject to NPDES Municipal Phase I stormwater permits to adopt and implement a certain system of charges, in a certain manner by a certain date. The County’s current fee ordinance for collecting the stormwater fee does not meet the detailed requirements of the new law, therefore must be revised accordingly.

Several County departments, including Fiscal and Administrative Services, County Attorney’s Office, and Planning and Growth Management, began meeting at the end of fiscal year 2012 to develop the required policies and procedures, which are to be in place by fiscal year 2014.

III.H. Assessment of Controls

Overview of Permit Conditions

1. *Annually, Charles County shall submit estimates of expected pollutant load reductions as a result of its proposed management programs.*

2012 Status

One key component of Charles County’s pollution reduction program is the identification of current pollution loads. This enables the County to identify current trends in water quality within receiving waters and evaluate the success of the overall NPDES MS4 program. The pollutant loading estimate is prepared annually and is determined based on two factors: loads produced from current land uses within the County and reductions from existing stormwater controls.

Beginning late in 2011 through 2012, the County began work on a local evaluation of the Chesapeake Bay Phase II Watershed Implementation Plan (WIP), for the purposes of determining the necessary stormwater controls, also known as urban best management practices (bmps), to achieve the target loads. Part of this work involved using Maryland’s Assessment Scenario Tool (MAST). More discussion of this project is included under Section IV. Special Programmatic Conditions.

It was determined urban nutrient loading rates from MAST were lower than the County’s previous estimates, and the urban sediment loading rates from MAST were higher than the County’s previous estimates. Loads were calculated to edge of stream (EOS), not delivered to the Bay.

	Nitrogen, EOS Lbs/yr	Phosphorus, EOS Lbs/yr	Sediment, EOS Lbs/yr
MAST (urban regulated and non-regulated, impervious and pervious)	246,166.30	25,958.40	6,677,150.30

Because of the work related to the County’s Phase II WIP, the pollutant loading rates were not updated using previous years’ methods, and instead efforts focused on coordinating the County’s Phase II WIP and NPDES MS4 data to develop a single baseline for nutrients and sediment.

Some of the pollutant loading calculations will still be based on assumptions, until final mapping of urban bmps and their drainage areas is completed. This will allow land use and bmp types to be verified. Additionally, compilation of additional bmps not previously counted is occurring. This includes Environmental Site Design (ESD) bmps, single family dwelling bmps, and alternative bmps, such as street sweeping and inlet vacuuming. Following is a discussion of how pollutant loading estimates have been done in previous years, however these estimates are being revised to be consistent with the Phase II WIP and are to be completed with the 2013 NPDES Annual Report.

Pollutant Load Calculations in 2011

In the County's 2011 NPDES Annual Report, the pollutant loading rates were updated from the 2010 calculations based off of several methods and sources. Loading rates for residential and institutional land uses continued to be based off of chemical monitoring results from the Arthur Middleton Elementary School sampling stations. Loading rates for total nitrogen, total phosphorus, and total suspended solids were taken from Chesapeake Bay Program literature in lbs/acre/year, for all other land use categories, except "extractive" and "agricultural buildings", which were developed from the PLOAD manual. Loading rates for biological oxygen demand and lead for commercial, industrial, and transportation land uses were unchanged from 2010, and were taken from the Maryland Department of the Environment's published monitoring results from 1997. Loading rates for the remaining constituents were taken from the National Stormwater Quality Database (2004).

Loading rates for residential and institutional land uses were calculated from sampling event mean concentrations (EMCs) using the Simple Method, which integrates drainage areas, land use, pollutant concentrations, and types of BMPs to determine annual loading and load reductions for each watershed or drainage area. It uses the following parameters:

- Rainfall, P, is the average long-term annual rainfall amount of 39 inches
- Land use coverage for the 2011 estimate was determined from the 2007 Maryland Department of Planning coverage
- Drainage area, A, is based on the coverage of each land use coverage within the County boundary
- Event mean concentrations (EMCs)

Pollutant loads are calculated using A, Rv, and the pollutant concentration, C, which is the Event Mean Concentration (EMC) for a particular pollutant. Because removal efficiencies for nitrogen removal are only reported for TN, the loads have been reported similarly, using the relationship $TN = TKN + NOx$. EMCs are shown in Table 26.

The expected pollutant load computations use chemical monitoring data developed by Charles County as part of the monitoring component of the NPDES MS4 permit. The watershed currently being chemically monitored consists primarily of residential and institutional drainage. Therefore, the event mean concentrations (EMCs) developed as part of the monitoring program are used as pollutant loading rates for the residential and institutional land uses throughout the County.

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Table 26: EMC Data (mg/l)

Land Use	LU Code	TN	TKN	NO3+ NO2	TP	TSS	BOD	Cu	Zn	Pb
Low Density Residential	11	4.21	2.46	1.75	0.42	79.26	25.6	0.02	0.12	0.02
Medium Density Res'l	12	4.21	2.46	1.75	0.42	79.26	25.6	0.02	0.12	0.02
High Density Residential	13	4.21	2.46	1.75	0.42	79.26	25.6	0.02	0.12	0.02
Institutional	16	4.21	2.46	1.75	0.42	79.26	25.6	0.02	0.12	0.02

Spreadsheets showing the pollutant load results are attached as Appendix K of the 2011 NPDES Annual Report, and a summary is shown in Table 27 below.

Table 27: Estimates of Pollutant Loading (lb/yr)

	TN	TP	TSS	BOD	Cu	Zn	Pb
Entire County FY 2011***	2,708,902	1,817,089	22,707	1,817,089	2,639	31,151	3,731
Entire County FY 2010**	487,937	73,413	11,712,911	2,115,516	1,705	15,278	2,204
Entire County FY 2009	427,474	71,437	10,344,933	1,770,138	1,395	12,718	1,821
Entire County FY 2008*	429,412	72,216	10,694,197	1,876,824	1,396	11,437	1,206
Entire County FY 2007	429,412	72,216	10,694,197	1,876,824	1,396	11,437	1,206
Entire County FY 2006	429,205	72,376	11,009,554	1,954,360	1,401	11,414	884
Entire County FY 2005	423,309	72,137	10,893,776	2,061,298	1,338	11,233	908
Entire County FY 2004	398,653	72,963	10,159,796	853,772	1,161	10,769	1,001

*Pollutant loads unchanged from previous reporting year due to no chemical monitoring being performed, and land use data input being unchanged.

**Updated 2007 land use data, generated by the Maryland Department of Planning, was used in FY10 and subsequent years.

***Significant changes to loads result from updates to loading rates in FY11.

As can be seen from Table 27 above, the pollutant loads have increased significantly from the 2010 results. This is a result of the updated loading rates that were used in the model. The pollutant load calculations will continue to be updated as land use information is updated.

The loads presented in Table 27 are those that occur in the storm runoff itself. No attempt was made to estimate pollutants from baseflow or stream erosion outside of what was taken into account by developing the rates. Similarly, the load reductions were not estimated for the volume of runoff which flows to natural wetlands. Wetlands would effectively reduce the pollutants to receiving waters, particularly the Potomac River and the Chesapeake Bay.

Pollutant Load Reductions

Pollutant load reductions resulting from installation of best management practices (BMPs) were calculated by applying the loading rate discussed above to the drainage area to the facility, and multiplying by the pollutant removal efficiency. The pollutant removal efficiencies were developed for BMPs in each category contained in the draft MS4 permits, including: dry detention ponds, hydrodynamic structures, dry extended detention ponds, wet ponds and wetlands, infiltration practices, filtering practices, vegetated open channels, and erosion and sediment control practices.

The pollutant removal efficiencies for each of these categories was taken from the recent MDE publication *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated: Guidance for National Pollutant Discharge Elimination System Stormwater Permits, June 2011* for total nitrogen, total phosphorus, and total suspended solids. Pollutant removal efficiencies for other contaminants were developed from the Center for Watershed Protection (2000) or the International Stormwater BMP Database (2008). Pollutant removal efficiencies used for each BMP category are included in the spreadsheet computations in Appendix K of the 2011 Annual Report.

The BMPs used for the reduction modeling were taken from Charles County's 2011 Urban BMP Database. There were 1,183 BMPs recorded in the database, an increase of 102 facilities over what was used in the calculations in 2010. Not all of the BMPs contained in the database had enough information to be included in the model, such as land use, drainage area, and BMP type. The County is continually refining its data, and as such, the pollutant load reduction computations are improved as more data is available.

Pollutant load reductions were summed for each BMP that had the required data. The total reductions for each contaminant are provided in Appendix K of the 2011 Annual Report and summarized in Table 28 below.

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Table 28: County-Wide Pollutant Loading Reductions (Lb/Yr)

		TN	TP	TSS	BOD	Cu	Zn	Pb
		lbs/yr	lbs/yr	tons/yr	lbs/yr	lbs/yr	lbs/yr	lbs/yr
FY 2011	Total Load	2,708,902	284,403	22,707	1,817,089	2,639	31,151	3,731
	Reductions	9,014	2,508	590	0.00	76	814	150
	Percent Reduced	0.3%	0.9%	2.6%	0.0%	2.9%	2.6%	4.0%
FY 2010	Total Load	487,937	73,413	11,712,911	2,115,516	1,705	15,278	2,204
	Reductions	19,881	2,594	1,096,399	0	154	1,598	0
	Percent Reduced	4.1%	3.5%	9.4%	0.0%	9.0%	10.5%	0.0%
FY 2009	Total Load	427,474	71,437	10,344,933	1,770,138	1,395	12,718	1,821
	Reductions	17,982	2,475	992,584	0	152	1,516	0
	Percent Reduced	4.2%	3.5%	9.6%	0.0%	10.9%	11.9%	0.0%
FY 2008	Total Load	429,412	72,216	10,694,197	1,876,824	1,396	11,437	1,206
	Reductions	18,479	2,543	1,039,673	0	151	1,413	0
	Percent Reduced	4.3%	3.5%	9.7%	0.0%	10.8%	12.4%	0.0%
FY 2007	Total Load	429,412	72,216	10,694,197	1,876,824	1,396	11,437	1,206
	Reductions	17,009	2,384	967,809	0	145	1,352	0
	Percent Reduced	4.0%	3.3%	9.0%	0.0%	10.4%	11.8%	0.0%
FY 2006	Total Load	429,205	72,376	11,009,554	1,954,360	1,401	11,414	884
	Reductions	14,286	1,946	817,645	0	126	1,189	0
	Percent Reduced	3.3%	2.7%	7.4%	0.0%	9.0%	10.4%	0.0%
FY 2005	Total Load	423,309	72,137	10,893,776	2,061,298	1,338	11,233	908
	Reductions	3,438	579	190,951	113	20	207	0
	Percent Reduced	0.8%	0.8%	1.8%	0.0%	1.5%	1.8%	0.0%
FY 2004	Total Load	436,758	77,826	10,477,051	1,019,049	1,187	11,290	929
	Reductions	1,682	314	97,703	54	11	114	0
	Percent Reduced	0.4%	0.4%	1.0%	0.0%	1.0%	1.1%	0.0%

Surrogate Parameters

Charles County has developed a surrogate parameters table to assist in evaluating its Management Programs. Table 29 below contains parameters that represent NPDES Management Program goals. These parameters are documented per calendar year, on a county-wide basis.

Table 29: Surrogate Parameters

Parameter	2004 Total	2005 Total	2006 Total	2007 Total	2008 Total	2009 Total	2010 Total	2011 Total
Litter collected in tons and lane miles	379 4,554	441 4,295	432 6,356	440 6,016	357 6,619	371 5,049	282 1,382	433 2,363
Household hazardous waste collected and recycled (tons)	37	32	31	31	40	45	53	45
Used oil collected and recycled (gal)	55,916	50,426	53,972	48,908	47,361	44,325	45,625	TBD
Antifreeze collected and recycled (gal)	3,750	2,865	2,815	2,680	2,130	3,005	2,655	TBD
Yard waste collected and composted into mulch (tons)	10,653	8,475	11,304	12,492	16,249	11,874	11,094	10,674
Mulch distributed(tons)	6,400	6,500	7,000	8,157	unknown	unknown	unknown	unknown
Tire Amnesty Day (tons)	75	no event	62	63	no event	62	no event	No event
Electronic Recycling (tons) Permanent program began July 1, 2006.	14	no event	83 (July-Dec)	169	193	122	209	231
Adopt a Road Program (groups and miles)	100 125	95 120	100 130	105 135	105 135	100 130	95 125	103 132
# of compost bins sold	927	655	435	no event				
Potomac River Clean- up (tons and volunteers)	70 626	79 830	81 1,085	104 830	41 636	78 2,280	52 964	56 485
# of County staff licensed for pesticide/herbicide application	6 (Roads Div)	6 (Roads Div)	3 (Roads Div)	(Roads Div)	(Roads Div)	(Roads Div)	(Roads Div)	(Roads Div)
# of talks, presentations (MD Extension Office & Environmental Resources Div.	15+	25+	35+	50+	50+	50+	50+	50+

IV. Special Programmatic Conditions

Overview of Permit Conditions

...this NPDES permit requires Charles County to assist with the implementation of the strategy designed to meet the nutrient reduction goals of the Lower Potomac River basin. Coordination between and among other jurisdictions is a major requirements and the identification of those appropriate jurisdictions will occur jointly with MDE. Additionally, deadlines, priorities, and scheduling to satisfy specific conditions will be determined in conjunction with MDE. In any case, progress toward meeting these conditions shall be reported to MDE.

2012 Status

Tributary Strategy Teams

The Lower Potomac Tributary Team did not meet in FY12, however the County continued participating on the Patuxent River Commission. On June 10, 2012, the 25th annual Patuxent River Wade-In was held at Jefferson Patterson Park.

NPDES Permitted Jurisdiction Meetings

The Maryland Department of the Environment hosts quarterly meetings for the NPDES permitted jurisdictions to provide a network for communication that solves permit issues. Meetings were not held from fiscal year 2006 through fiscal year 2010. In fiscal year 2011 a monthly meeting schedule resumed in preparation for the Department's guidance document titled, "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated." The draft was circulated in June 2011. No additional meetings have been held since June 2011.

State Water Quality Advisory Committee

The County continues to maintain membership on this committee and the Watershed Restoration subcommittee. The committee continued to focus on the Chesapeake Bay TMDL and Watershed Implementation Plan, acid mine reclamation, and Marcellus shale drilling, among other issues.

US Army Corps of Engineers 2003 Mattawoman Creek Watershed Management Plan

A partnership agreement between the County and the U.S. Army Corps of Engineers was signed in 1998 to calibrate a computer model that would evaluate several “what-if” scenarios analyzing management options to reduce nitrogen, phosphorus, and sediment to the Mattawoman Creek.

In February 2004 the U.S. Army Corps of Engineers presented the Plan to the County Commissioners. Three recommendations were included in the plan: (1) Stream Valley Protection; (2) Best Management Practices for Future Development; and (3) Best Management Practices for Existing Development. In summary the Plan states, “planned development in the Mattawoman Creek watershed should include local and regional efforts for the purpose of creating an economically developed and environmentally protected area. Balancing these seemingly opposing measures was considered when developing the management scenarios.”

The Planning Division received a Coastal Community Initiative (CCI) Grant through the Maryland Department of Natural Resources to draft ordinance amendments to implement best management practices for future development. Bill 2008-1 addresses reduced parking, use of pervious parking, conservation landscaping and increased shading over parking areas, and became effective May 17, 2008. In 2008, 2009 and 2010 County staff continued to work on draft zoning text to implement the refined Mattawoman Creek Stream Valley delineation prepared by the Maryland Department of Natural Resources under a Coastal Community Initiative (CCI) Grant.

Port Tobacco River Watershed Restoration Action Strategy Grant

The Charles County Commissioners applied for a Port Tobacco River Watershed Restoration Action Strategy (WRAS) Grant through the Maryland Department of the Environment (MDE), which was approved in the Fall of 2004 and continued through 2006. The main focus of the WRAS is to identify and prioritize water quality improvement opportunities to meet the Port Tobacco River Watershed nutrient TMDL and reduce bacteria levels to ranges that are safe for recreational uses in the River.

In the first year of the WRAS grant, the State agencies provided water quality analysis, a stream corridor assessment, a biological stream survey and a watershed characterization report.

Stakeholders which participated on the WRAS Steering Committee, include the Town of LaPlata, the College of Southern Maryland, the Charles County Chamber of Commerce, the Port Tobacco River Conservancy, the Charles County Health Department, the Charles Soil Conservation District, the Maryland Extension Service, and the Southern Maryland Resource Conservation and Development Office.

On June 20, 2006 the County Commissioners adopted the WRAS for implementation. In August 2008, the La Plata Town Council adopted the WRAS for implementation. The full WRAS can be linked to from the County's new watershed planning webpage at:

<http://www.charlescountymd.gov/pgm/planning/watershed-planning>

To implement the WRAS, Charles County has been working under four grants/partnerships. These include: (1) The Bay Restoration Fund to install nitrogen removal septic systems targeted in the watershed FY2007-present; (2) DNR Coastal Communities Initiative grant to develop a commercial component to the County's existing residential transfer of development rights program in FY2009; (3) National Fish and Wildlife Chesapeake Small Watershed grant to revise the County's stormwater management code and to better implement best management practices on new development in FY2008-FY2010; and (4) USGS partnership agreement titled, "Surface-Water and Pore-Water Sampling in Port Tobacco River Watershed, Charles County, MD," for the purpose of better identifying the contaminant source using wastewater compounds in FY2009. The USGS abstract for this project and Open File Report are on <http://pubs.usgs.gov/of/2010/1071/>.

In August 2008, Charles County Government partnered with the Town of La Plata, the Charles Soil Conservation District and the Port Tobacco River Conservancy to apply for a \$3.7 million Local Implementation Grant (LIG) through the Maryland Department of Natural Resources. This proposal is to restore water quality in the La Plata Subwatershed using stormwater retrofits, septic connections, stream restoration, and agricultural best management practices. The project was not awarded funding.

The fiscal year 2013 County approved CIP projects include a project from the Port Tobacco River Watershed Restoration Action Strategy: (1) Upper Port Tobacco River Watershed Sewer Connection Study to be funded in FY2014 from the Sewer Connection Fee. See Appendix L for the approved capital budgets.

Mattawoman Creek Monitoring Station

In July 2012, the County began the tenth year of a water quality monitoring project for the Mattawoman Creek with the U.S. Geological Survey. This project funds an existing monitoring station previously funded by the Maryland Department of the Environment. The purpose of this station is to develop a long term record of water quality data for determining trends in the watershed. The station is part of the Chesapeake Bay Programs' Long Term Status and Trends Network. An advantage of this station is that USGS posts the data on their website for public access: <http://md.waterdata.usgs.gov>

In summer/fall of 2010 the USGS prepared a draft Scientific Investigations Report (SIR) to document the ten years of data. This report was finalized in November 2012. Beginning in the summer/fall of 2012 monitoring continues in the same location, but with an emphasis on collecting integrated samples from the full cross-section of the creek. The purpose is to minimize the dominant influence of Old Women's Run over the Mattawoman Creek mainstem in the samples. A copy of the *USGS Progress Report for Water Quality Monitoring, Mattawoman Creek, Reporting Period July 2011 to September 2012*, is included in Appendix M.

Bay Restoration Fund Grant

In 2008 the County completed installation of the first 32 nitrogen-reducing septic system technology under the \$604,000 grant from Maryland Department of the Environment, received in December 2006. In July 2009 The Charles County Department of Health received an additional grant of \$900,000 from MDE to install an additional 65 nitrogen reducing units, of which 23 have been installed prior to May 2010. As of May 2011, a total of 91 nitrogen units are installed.

Water Resources Element

Charles County began work on these Comprehensive Plan elements, with the assistance of a consultant, Environmental Resources Management, Inc. A draft of the Water Resources Element was completed early in 2009. The Water Resources Element began the public adoption process in the Fall/Winter of 2010, and was adopted by the Charles County Commissioners on May 24, 2011. It is an amendment to the 2006 Charles County Comprehensive Plan. The full plan may be viewed on-line at:

<http://www.charlescounty.org/webdocs/pgm/publications/resourceinfrastructure/wre2006.pdf>

In fiscal year 2012 the County began an extensive public process to update the Comprehensive Plan, including the Water Resources Element.

Environmental Site Design

The County pursued adoption of Environmental Site Design (ESD) Regulations beginning with a public kick-off meeting in January 2009 held at the Government Building and as described in the 2009 NPDES Annual Report. Subsequent ESD training workshops were held in February 2010. The public adoption process for ESD began with a County Commissioner briefing on January 26, 2010, the public hearing was held on February 9, 2010, at which time the project was put on hold until the State adopted new grandfathering provisions. After the grandfathering was approved, the County approved the ordinance with an effective date of August 1, 2010.

Watershed Resources Registry

The Watershed Resources Registry (WRR) is a tool developed as part of a collaborative effort between Maryland state agencies (MDE, DNR, MDE, SHA) and federal agencies (EPA, Fish and Wildlife Service, Army Corps of Engineers, National Marine Fisheries Service, Natural Resources Conservation Service, Federal Highway Administration). The goal in developing the WRR is to identify suitable sites that meet multiple agency priorities and sites that meet multiple environmental goals (i.e. habitat protection and stormwater management). The development of the WRR signals a shift from issuing permits that limit impacts, to proactive preservation and restoration of our most valuable and threatened natural resources. It also serves as a publicly accessible tool in map format that shares the same data between permit applicants that the agency evaluating the application. Currently, the tool has been expanded from Prince George's and Charles County to the entire state of Maryland. The WRR is web-based and can be accessed at: <http://watershedresourcesregistry.com/Default.aspx>

Phase II Watershed Implementation Plan

In February 2011, the Maryland state agencies held a Lower Western Shore Maryland Phase II Watershed Implementation Plan (WIP II) workshop. At this meeting the State designated liaison for the Charles County WIP II met with County representatives and a Team Leader for each County was identified.

March 8, 2011, Dr. Rich Eskin, Maryland Department of the Environment, presented the background and process for the Phase II Watershed Implementation Plan to the Charles County Commissioners. The Charles County Commissioners supported staff in proceeding with an open meeting process to develop the County's Phase II WIP. The open meetings with County staff, environmental organizations, developer organizations, attorneys, state agencies, federal land holders, and the State liaison began in March 2011 and continued monthly through November 2011, which was the original deadline for localities to submit their Phase II WIPs to the State. Charles County submitted its Phase II WIP by the November 18, 2011 due date. This can be found in Appendix M along with the County's new watershed planning webpage.

In August 2011 the County began work with LimnoTech, Inc. to analyze the County's currently planned projects to determine how far these projects advanced the County toward target loads. LimnoTech presented their findings to the County's Phase II WIP workgroup. During the analysis of the pipeline projects and further work on the development of alternate scenarios to bridge the remaining gap to reach the target, LimnoTech coordinated several staff meetings. In November 2012 LimnoTech is continuing their work towards identifying the lowest cost scenarios for the County to achieve the target loads.

Additional Local Activities Related to Water Quality Improvement Coordination.

- Turf management workshops for homeowners titled, *Secrets of a Green Lawn*, were held on August 16, 2011 and March 15, 2012. These are sponsored by the University of Maryland Cooperative Extension, MRW Lawns, Inc, and Charles County Government. The seminar topics include setting expectations for home turf, calculating the correct fertilizer rates, controlling pests and weeds, and the downstream impacts from lawn care practices.
- August 2011, Blue-green algae, called *Microcystis*, was reported at the mouth of Mattawoman Creek.
- Charles County Department of Public Facilities continued to hold Hazardous Waste days on the first Saturday of each month April through December.
- April 2012, the Annual Potomac River Watershed Clean-up was held. There were 485 Charles County citizens participating, who collected 60 tons of trash from local waterways at 31 locations.
- May 2012, an interagency Task Force led by the Maryland Department of Natural Resources, released a report titled, *The Case for Protection of the Watershed Resources of Mattawoman Creek; Recommendations and Management Initiatives to Protect the Mattawoman Ecosystem*. The Task Force consisted of the Maryland Departments of Natural Resources and the Environment, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, Interstate Commission on the Potomac River, and the University of Maryland. The report concluded that the watershed is at a turning point and if the County continues to follow the 2006 Comprehensive Plan this, “virtually assures continuing and dramatic watershed ecosystem deterioration.”
- The County’s Department of Planning and Growth Management held one Continuing Education seminar related to the Municipal Separate Storm Sewer System: June 21, 2012 Seminar on Stormwater Management Issues. The focus of the seminar was on the submission procedures for the Site Stormwater Management Plan (Step 2). Also, Charles County’s Plan Review Consultant (EA Engineering, Science, and Technology, Inc.) made a presentation on Environmental Site Design to the Maximum Extent Practicable.

- A final tree planting in October 2012, marked the completion of a \$20 million, five-year installation of a living shoreline project at Naval Support Facility (NSF) Indian Head. The project includes the construction of a series of breakwaters and sills along approximately 3,500 feet of the eastern shore of the Potomac River, 11 acres of inertial vegetated wetland and 9.5 acres of riparian and upland habitat. Volunteers who helped plant the wetland and upland habitat included AmeriCorps, Maryland Conservation Corps, Charles County Master Gardeners, Baltimore Aquarium Conservation Team, local community and Navy military and civilian personnel.
- In 2012, the Cooperative Oxford Laboratory Coastal Ecosystem Assessment Program concluded the second and final year of water quality monitoring in Nanjemoy Creek for their project: *Assessing the Relationship Between Land Use and Coastal Ecosystem Health in Chesapeake Bay*.