

# *Carroll County Maryland*



## **NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE PERMIT**



**ANNUAL REPORT  
JULY 15, 2014**

## 2014 NPDES MS4 Permit Annual Report

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*Carroll County*  
**NPDES ANNUAL  
REPORT**

*July 15, 2014*



# 2014 NPDES MS4 Permit Annual Report

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

## *Preface*

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This document summarizes Carroll County, Maryland's compliance efforts taken in response to conditions attached to the National Pollutant Discharge Elimination System Permit No. 99-DP-3319 (MD0068331) issued for the County's municipal storm sewer systems. Permit No. 99-DP-3319 is the third generation of the permit required under Section 1342 (p) of the Clean Water Act (ref.: USC, Title 33, Ch. 26, Sub. Ch. IV). It is in response to the specific requirements in 40CRF122.42(c). This report covers activities occurring during the permit year from July 1, 2013, through June 30, 2014.

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## Part I. Identification

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### A. Permit Number

99-DP-3319 (MD0068331)

### B. Permit Area

#### 1. Phase I Compliance (unincorporated areas of Carroll County)

The above-referenced permit covers stormwater discharges from the municipal separate storm sewer systems (MS4) located in the unincorporated areas of Carroll County, Maryland. It excludes areas within the County outside the jurisdiction of County government, i.e., land area within the limits of Carroll County's incorporated municipalities as well as those owned by the State Highway Administration (SHA) and the Federal government. All references to municipalities in the report refer to those located within Carroll County.

#### 2. Phase II Compliance (incorporated areas within Carroll County)

Discharges from systems located within the eight incorporated Carroll County municipalities are covered under General Permit No. 03-IM-5500 (currently pending reissue). Each of the municipalities in Carroll County has filed the Notice of Intent to comply with this permit. Carroll County government works cooperatively with the municipalities to assist them with tasks necessary to comply with the General Permit. Sections of this annual report reflect the progress made by each of the municipalities. The General Permit was effective on April 14, 2003, and expired on April 14, 2008. Per Maryland Department of the Environment (MDE), the current General Permit will be in force until a replacement is issued.

### C. Effective date

July 14, 2005

### D. Expiration Date

July 14, 2010

The current National Pollutant Discharge Elimination System (NPDES) MS4 Permit for Carroll County will be in force until a replacement is issued by the MDE.

Carroll County received a draft version of the next-generation NPDES MS4 permit on November 17, 2010 from MDE for comment. Upon staff review, interaction with MDE, and input from the Carroll County Board of Commissioners, a detailed response letter was submitted to MDE on February 18, 2011.

The County received a second draft permit on October 14, 2011. Staff from the County and MDE met on November 30, 2011 to discuss various aspects of the October 14, 2011 draft. A subsequent third draft permit was received by the County, via e-mail, on January 13, 2012. The



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County met with MDE staff to discuss the third draft on July 24, 2012. The draft permit is currently pending tentative determination by MDE. The tentative determination to issue the stormwater permit was received on June 2, 2014. The public notice for the permit was published on June 27, 2014 and June 30, 2014. The comment period for the proposed permit is open through July 31, 2014.

## Part II. Definitions

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Terms used in the Carroll County permit are defined in relevant chapters 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.

## Part III. Standard Permit Conditions

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### A. Permit Administration

The legal responsibility for maintaining the conditions included in this permit lies with the Carroll County Board of Commissioners. The Commissioners have delegated responsibility to the Carroll County Department of Land Use, Planning, and Development (LUPD) to provide administrative and technical implementation of the NPDES MS4 permit. The LUPD Deputy Director provides direct administration of the permit. An organizational chart for LUPD can be found in Appendix A.

LUPD has one dedicated position, the NPDES Compliance Specialist, assigned to the NPDES MS4 program. The NPDES Compliance Specialist position is jointly funded by Carroll County and the eight incorporated municipalities. Under the direction of the Deputy Director, the NPDES Compliance Specialist implements the NPDES MS4 program requirements. Key responsibilities for this position include:

- Liaison to the MDE;
- Coordinate, manage, and implement Phase I and II permit regulation requirements in accordance with Federal, state and local laws;
- Coordinate with County/municipal personnel, other government officials, and citizens regarding NPDES compliance issues;
- Coordinate illicit discharge inspections and routine surveys with County/municipal personnel to discover and eliminate pollutant sources;
- Design, coordinate, and maintain Geographic Information System (GIS) and Global Positioning System (GPS) applications for NPDES MS4 compliance; and
- Coordinate development of compliance education, training, and outreach programs.

The County/municipal working relationship effectively eliminates the political boundaries as a watershed planning consideration. This working relationship has made compliance with the NPDES MS4 requirements more purposeful and effective.

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The Bureau of Resource Management (BRM) provides vital NPDES MS4 operational and technical support, including fieldwork, GIS mapping, monitoring, inspections, compliance, watershed management, and various other responsibilities. The BRM holds the primary responsibility for external environmental compliance through the administration of Carroll County Government environmental and land development codes, ordinances, and standards. These include stormwater management, floodplain management, forest conservation, landscape enhancement, water resource management, grading, erosion and sediment control, and storm sewer systems management.

Individual compliance with various permits lies with County agencies or municipalities that oversee the facilities. Coordination between these agencies and LUPD regarding NPDES compliance remains a priority. In addition, the County continues to work jointly with the municipalities to ensure ongoing implementation of compliance responsibilities. Any future changes in the administration of this permit will be reported to MDE.

## **B. Legal Authority**

**Continuation of Established Authority** – The legal authority established under the first generation of this permit remains within the Carroll County Code of Public Local Laws and Ordinances. During this permit year, the Code underwent a process of changes to formatting and numbering. The content of the Code was left unchanged. The following chapters of the Code, which are involved in the implementation and enforcement of this permit, are presented below with their new numbering.

<b>Old Chapter #</b>	<b>Title</b>	<b>New Chapter #</b>
105	Environmental Management of Storm Sewer	53
114	Floodplain Management	153
115	Forest Conservation	150
121	Grading, Erosion, and Sediment Control	152
134	Landscape Enhancement of Development	157
191	Stormwater Management	154

Chapter 53, Environmental Management of Storm Sewer, provides Carroll County and the municipalities with a practical, effective tool that establishes standards to protect the integrity of the storm sewer system in the County.

## **C. Source Identification**

The sources of pollutants in stormwater and the systems which convey the runoff are to be identified. Carroll County maintains staffing dedicated to NPDES MS4 compliance efforts, concentrating on those efforts that affect storm drain system delineation and facility compliance. GIS and GPS are employed to assist in mapping and data analysis. These tools are used to identify drainage systems exhibiting stormwater quality deficiencies and complete detailed watershed assessments so effective restoration plans may be developed when necessary.

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## 1. Storm Drain System Mapping & Database (County and Municipalities)

Initial and baseline storm drain system mapping for the unincorporated and incorporated areas is complete. The completion dates for baseline storm drain system mapping related to each of the eight municipalities are shown in **Table 1**. Periodic updates continue for both County and municipal storm drain systems using the County's GIS. Mapping for both the County and municipalities utilizes detailed as-built surveys of newly submitted storm sewer systems in digital format as required through the development process. Other sources for data capture include archives, Maryland State Highway Administration (MSHA) field data collection, and inspections performed by staff allocated to support and advance the system delineation effort.

Periodic updates during the permit year reflect adjustments for MSHA MS4 overlap.

**Table 1**  
**Baseline Storm Drain System Mapping Status**  
**Phase II NPDES MS4 Jurisdictions**

<b>Municipality</b>	<b>Status Of Baseline Storm Drain System Mapping</b>	<b>Periodic Updates &amp; Verification</b>
Hampstead	Completed 7/9/13	6/03/14
Manchester	Completed 7/10/13	3/28/14
Mt. Airy	Completed 1/21/13	6/03/14
New Windsor	Completed 7/3/13	4/21/14
Sykesville	Completed 7/12/13	6/03/14
Taneytown	Completed 6/25/13	3/13/14
Union Bridge	Completed 7/3/13	4/09/14
Westminster	Completed 6/17/13	In Progress

The Carroll County NPDES MS4 geodatabase includes numerous layers such as stormwater facilities, storm drain pipes, stormwater structures, drainage areas, etc. The stormwater structures sub-layer includes inlets, manholes, risers, end sections, and outfalls. NPDES outfalls are maintained in the Stormwater Structures layer, which currently contains 1,578 outfalls, 280 of which are classified as major outfalls that are screened for illicit discharges under dry weather conditions.

Major outfalls are defined as storm drain pipes with a diameter of 36 inches, or greater or open channels that drain more than 50 acres to Waters of the U.S. For industrial land uses, storm drain pipes 12 inches or greater in diameter or open channels that drain more than two acres to Waters of the U.S. are classified as a major outfall.

Storm drain mapping and attribute data for each municipality was merged into the stormwater structures layer in 2013, resulting in one centralized GIS storm drain mapping system and geodatabase for the Phase I and II jurisdictions. The NPDES MS4 geodatabase and other information are included with this report in CD format in Appendix B.

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## 2. Urban Best Management Practices (Stormwater Management Facility Data)

The BRM manages stormwater management facility data for County and municipal jurisdictions in a centralized stormwater management database. The database contains information related to facility location, ownership, review and approvals, drainage area, inspections, and other additional information. This is the basis for the NPDES GIS application mapping of stormwater management Best Management Practices (BMPs).

Mapping of stormwater facilities and associated data within all incorporated municipalities is complete. There are 878 “as-built” certified and approved stormwater facilities throughout the County and municipal jurisdictions. All facilities and drainage areas have been mapped with associated data in various watersheds.

As development projects are constructed, the stormwater facilities and their drainage areas are mapped and linked to data entered into the County’s database. In addition, as stormwater facilities are retrofitted as a BMP, the database is updated.

The attached CD (Appendix B) includes the County stormwater management database map of newly added stormwater facilities in the County.

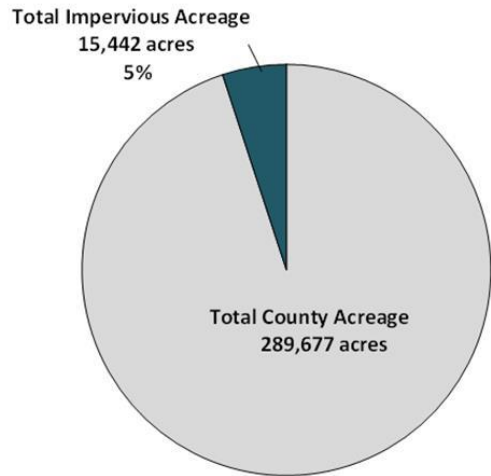
## 3. Impervious Surfaces

Carroll County continues implementing a program of watershed restoration projects to achieve mitigation (i.e. restoration) related to impervious surface areas. Beginning with the 2011 NPDES Annual Report, the County requested consideration of certain rural areas to be regarded as treated (Environmental Site Design to the Maximum Extent Practical or ESD to MEP). A detailed discussion including rationale was provided as Appendix B of the 2012 NPDES Annual Report. The County’s request in the 2012 NPDES Annual Report was a baseline (acres to be treated) reduction of approximately 2,836 acres. Discussions with State personnel indicated a need for the County to provide additional technical analysis prior to acceptance of the proposal. The areas identified as part of the proposal were presented and received and have not changed as part of this report. Therefore, Appendix B of the 2012 NPDES Annual Report is still referenced regarding justification of the regions of the county proposed in this analysis.

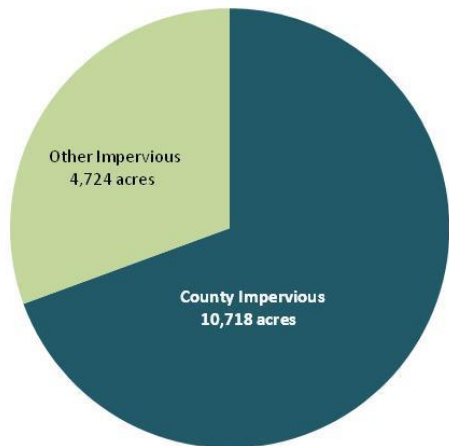
The County and State met numerous times to refine the initial proposal specifically related to analytical procedures and field verifications. The County submitted a draft report in early 2014 which included methodology, field analysis, and final results. A tentative approval of the methodology was received in early February 2014 with a recommendation to provide a final proposal as part of the 2014 NPDES Annual Report submittal. The County’s final report, “Regions Treated by Historical Environmental Site Design within the NPDES Regulated Areas” is found in Appendix C.

The County, as part of its 2013 NPDES Annual Report, reserved the right to adjust the impervious baseline to be restored pending a final outcome of the rural area disconnect analysis and similarly the County again reserves the right to update its baseline calculation with new information where appropriate. Based on the analysis and report found in Appendix C, a revised impervious baseline number is proposed and can be found in **Figure 1**. Carroll County contains approximately 15,442 impervious acres. This includes impervious acres associated with

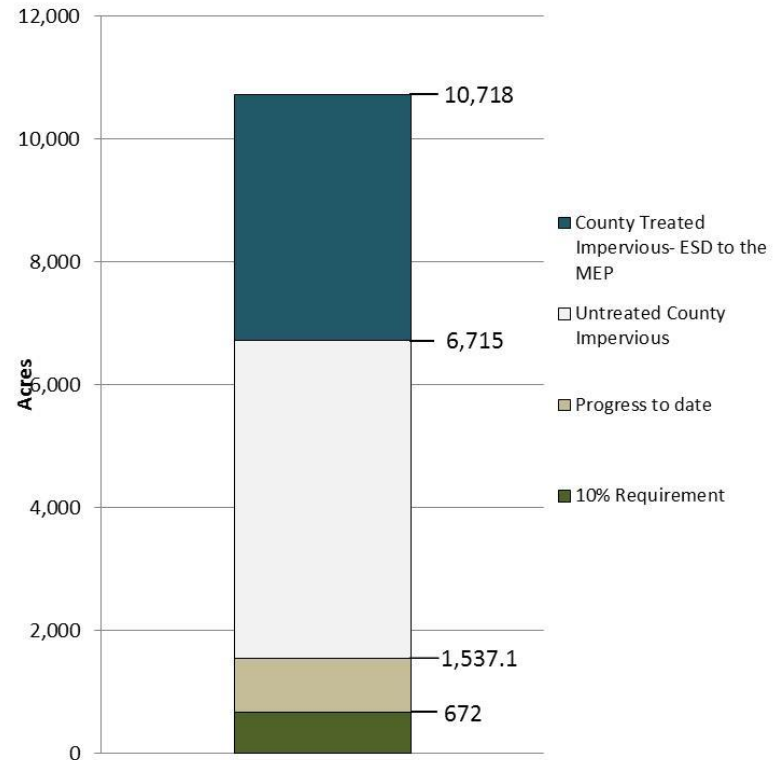
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**Carroll County Total Impervious Acres**



**Breakdown of Impervious Acres in Carroll County**



**Carroll County Impervious Acres Treatment Breakdown**

**Figure 1**

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State/Federal lands, permitted industrial facilities, Phase II municipalities and unincorporated areas. The total impervious coverage in Carroll County is roughly 5 percent and after adjustment for State/Federal lands, permitted industrial facilities, and Phase II municipalities it is only 3.2 percent.

**Figure 1** shows the breakdown of impervious acres treated. As seen in **Figure 1**, not all impervious acres within the unincorporated county or municipalities are considered in need of restoration. Impervious acres created since 2002 and meeting current standards, as well as historical acres shown to be treated through ESD to the MEP, are not candidates for restoration.

**Figure 1** presents the total unincorporated county impervious of 10,718 acres. A total of 6,715 acres of impervious remains after subtracting the 4,003 acres considered treated through ESD to the MEP. These 4,003 acres include acres of approved stormwater management since 2002, plus the 2,570 acres of historically rural treated acres per the report found in Appendix C. This is actually a reduction in the number of impervious acres proposed in previous annual reports (2,836 acres). The result is a revised baseline of untreated imperviousness at 6,715 acres. Applying this new baseline to the current 10 percent restoration requirement, per Part III G.1. in the permit, would result in 672 acres to be restored. The County was to begin implementation of restoration efforts on an additional 10% (672 acres) per Part III G.2. of the permit. This would equate to a total of 1,344 acres to be or begun to be restored through the current permit cycle. As seen in **Figure 1** and discussed in further detail in Part III B. of this report, the County's watershed restoration level is at 1,537.1 acres (22.9%).

## 4. Monitoring Locations and Watershed Restoration

The BRM is responsible for monitoring and watershed assessment efforts required under the NPDES MS4 permit. These efforts include the survey and verification of existing conditions, as well as the performance of site and natural resource assessments, including those involving potential hazards. That responsibility is integral to the NPDES MS4 program, as the results of that work provide the means for measuring program implementation. The BRM's watershed assessments support the development of Watershed Management Plans required in the permit. Staff identifies watershed restoration opportunities and implements watershed improvement projects. (See Sections D, F & G for detailed information)

### a. Environmental Inspections

The Environmental Inspections Services Division (EISD) of the BRM remains responsible for all inspections and enforcement actions necessary to ensure that the conditions established in review, approval, and permitting phases are met. The EISD also contributes to compliance with the County NPDES responsibilities by providing stormwater management facility maintenance inspections and assistance with illicit discharge inspections. During the permit year, EISD performed a total of 7,829 environmental inspections.

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## b. Resource Easement Tracking

The BRM maintains GIS data layers of all environmental easements established during the development process. These easements have specific conditions which provide protection measures to the delineated resources. The easements are perpetual and are dedicated to the Board of County Commissioners and/or relevant municipality in certain cases. Those easements include forest conservation, floodplain, and water resource protection. Certain water resource easements are associated with stream systems on developed property and are based on variable-width criteria. As of June 30, 2014, the County holds easements on approximately 3,619 acres for forest conservation, 583 acres for floodplain, and 1,706 acres for water resource protection. All easements are subject to inspection and monitoring for compliance.

## 5. Phase II NPDES MS4 Compliance (municipalities: minimum control measures)

A cooperative arrangement continues between the County Commissioners and the governments of the County's eight incorporated municipalities regarding Phase II NPDES MS4 implementation and compliance. Carroll County continues to work cooperatively with each of the municipalities to assist them in maintaining their compliance with the Municipal General Permit. County staff meets regularly with municipal representatives regarding Phase II compliance. To help the municipalities meet their minimum control measures, assistance categories include pollution prevention plan development as needed, illicit discharge inspections, BMP functional-compliance inspections, maintenance inspections, system mapping, and training.

**Table 2** provides population estimates for the County and eight municipalities as of June 12, 2014.

**Table 2**  
**Carroll County Population Estimates**  
**Municipal and Unincorporated**

INCORPORATED MUNICIPALITY	POPULATION <sup>(1)</sup>
Hampstead	6,333
Manchester	5,289
Mount Airy <sup>(2)</sup>	9,710 (5,925)
New Windsor	1,409
Sykesville	4,673
Taneytown	6,838
Union Bridge	977
Westminster	18,886
<i>Total CC Incorporated Area Population</i>	<i>50,290</i>
<i>Total CC Unincorporated Area Population</i>	<i>120,237</i>
<b>Total Carroll County Population</b>	<b>170,527</b>

(1) Based on Carroll County Population estimates dated 6/12/14.

(2) Carroll County works with Mount Airy to manage the entirety of the incorporated area, including the Frederick County portion of the municipality. The number shown in parentheses is the population that resides in Carroll County.

The County has worked cooperatively with each of the municipalities implementing a variety of Phase II compliance tasks, including system mapping and illicit discharge inspections. **Table 3** provides the status of permit requirements for municipal facilities with NPDES industrial stormwater permits. A work plan for each permit year is developed by the County to facilitate Phase II jurisdiction compliance.

# 2014 NPDES MS4 Permit Annual Report

**Table 3**  
**Carroll County NPDES Phase II Municipalities**  
**NPDES MD Industrial General Permit No. 02SW/No.12SW Status**

Municipality	Applicable	Facility	Status *	MDE Registration Number	Expires	Comment
Hampstead	Yes	Public Works Facility (PWF) 4031 Gill Avenue	NE	11NE2213	Pending	12SW NOI Submitted
Hampstead	Yes	PWF - S. West Alley (Larry Hentz PWF)	NOT	11NE2214	Pending	NOT (Notice of Termination) Submitted
Manchester	Yes	PWF 3351 Victory Street	NOI	12SW2201	12/31/2018	SWPPP in Place
Manchester WWTP	No	Waste Water Treatment Plant (WWTP)	N/A			Exempt/Less than 1.0 MGD
Mount Airy	Yes	PWF 215 Prospect Road	NE	11NE2257	Pending	SWPPP In Place 12SW NOI Submitted
Mount Airy WWTP	Yes	WWTP – 7245 Ridge Road	NE	11NE2258	Pending	SWPPP In Place 12SW NOI Submitted
New Windsor	No	PWF	N/A			NON-SIC
New Windsor	No	WWTP	N/A			Exempt/Less than 1.0 MGD
Sykesville	No	PWF 7547 Main Street	NOT			NOT (Notice of Termination) - 6/10/14 (NON-SIC)
Taneytown	Yes	PWF Ball Park Road	NE	11NE2263	Pending	SWPPP In Place 12SW NOI Submitted
Taneytown WWTP	Yes	WWTP – Whippoorwill Drive	NOI	02SW1743	Pending	SWPPP In Place 12SW NOI Submitted
Union Bridge WWTP	No	WWTP – Bucher John Road	N/A			Exempt/Less than 1.0 MGD
Westminster	Yes	Westminster Public Works Maintenance Facility (Streets Department) 105 Railroad Avenue	NOI	12SW2292	12/31/2018	SWPPP in Place 12SW NOI Submitted
Westminster	Yes	Westminster Public Works (Utilities Department) Old Manchester Road	NOI	Pending	Pending	SWPPP in Place 12SW NOI Submitted
Westminster WWTP	Yes	WWTP 1161 Old New Windsor Pike	NOI	02SW2252	Pending	SWPPP in Place 12SW NOI Submitted

\* NE – No Exposure Certification (Not An Exemption – Maintain No Exposure/Good Housekeeping Practices)

N/A – Not Applicable (Maintain MS4 Good Housekeeping Practices)

NOI – Notice of Intent – Stormwater Pollution Prevention Plan (SWPPP) Required. Maintain Plan, Inspections, Training & Records

NOT – Notice of Termination



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The municipalities and County have a formal arrangement to provide other services that support Phase II compliance. **Table 4** shows the assignment of responsibilities for review, inspection, and bonding for each municipality.

**Table 4**  
**Review, Inspection, and Bonding: Assignment of Responsibilities**

Carroll County Code and Activity	Hampstead	Manchester	Mount Airy	New Windsor	Sykesville	Taneytown	Union Bridge	Westminster
<b>Floodplain</b>								
Review*	C/C	C/C	C/C	C/C	C/C	N/A	M	C/M
Bond	N/A	N/A	N/A	N/A	N/A	N/A	M	N/A
Inspection	C	C	C	C	C	N/A	M	C
Easement	C	C	C	C	C	N/A	M	M
<b>Grading</b>								
Review*	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
Bond	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Inspection	C	C	C	C	C	C	C/C	C
<b>Sediment Control</b>								
Review*	SCD/S	SCD/S	SCD/S	SCD/S	SCD/S	SCD/S	SCD/S	SCD/S
Bond	C	C	M	C	M	M	C	C
Inspection	C	C	C	C	M/C	C	C	C
<b>Stormwater Management</b>								
Review*	C/C	C/C	C/C	C/C	C/C	M	M	C/M
Bond	C	C	M	M/C	M	M	M	M
Inspection	C	C	C	M/C	M/C	M	M	C
Easement	C	M	M	M	M	M	M	M
<b>Landscape</b>								
Review*	C	C/C	C/M	C	C/M	C/C	M	M
Bond	C	C	M	C	M	C	M	M
Inspection	C	C	M	C	M	C	M	M
<b>Forest Conservation</b>								
Review*	C/C	C/C	C/C	C/C	C/C	C/C	C/C	C/C
Bond	C	C	C	C	C	C	C	C
Inspection	C	C	C	C	C	C	C	C
Easement	C	C	C	C	C	C	C	C
<b>Water Resources</b>								
Review*	C/No Code	C/C	C/C	C/C	C/C	C/ No Code	M	CO/ No Code
Bond	N/A	N/A	N/A	N/A	N/A	N/A	M	N/A
Inspection	N/A	C	N/A	C	C	N/A	M	N/A
Easement	N/A	C	M	C	C	N/A	M	N/A

**Key:** C = County M = Municipality S = State SCD = Carroll Soil Conservation District

\* Review performed by / whose code

Source: Carroll County Bureau of Resource Management

**Table 5** provides results of a questionnaire distributed to each municipality that requested information specific to the requirements of the Municipal General Permit. The results are used in the annual training session to assist in the identification of what may be required of the municipalities. The full questionnaire and responses from each municipality can be reviewed in Appendix D.

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## Table 5

### Municipality General Permit Questionnaire (2013-2014)

#	Hampstead	Manchester	Mt. Airy	New Windsor	Sykesville	Taneytown	Union Bridge	Westminster
1.	TC-2nd Tues. @ 7:30 p.m. P&Z-4th Wed. @ 7:00 p.m.	TC 2nd Tues. P&Z 3rd Tues.	TC 1st Mon. @ 7:30pm P&Z Last Mon. @ 7:00pm	TC 1st Wed. P&Z 4th Tues.	TC 2nd & 4th Mon., June, July, August & Dec. 2nd Mon. only PC 1st Mon.	TC 2nd Mon w/Workshop Wed. before TC; P&Z - Last Mon. of the month	TC 4th Mon. P&Z 3rd Thurs.	TC 2nd & 4th Mon. P&Z 2nd Thurs.
2.	Yes - Hampstead Day HBA Expo	Yes – 6/30/14 – 7/5/14 Springfest Black Friday Gas Engine Show Carnival	May Festival – 3rd weekend in May; Fall Festival – 1st weekend in October	No	Fall Festival, Christmas Open House, Summer Concerts in the Park, Fine Arts & Wine Festival, Movies at Cooper Park	Yes – Spring Into Spring Movies In The Park Christmas Tree Lighting Wine Festival Band Festival	No	Flower & Jazz Fallfest Summer Concerts in the Park
3.	Yes		Beautification Committee plants trees	Yes	Yes – Tree planting at Warfield	Tree plantings	Yes	Storm drain stenciling; Arbor Week tree plantings Park tree plantings.
4.	Yes	Yes	Yes	No	Yes Local Events	No	No	Yes
5.	Yes – Oil & Antifreeze (MES)	Yes	Yes Oil & Antifreeze	No	Yes – Oil & Antifreeze managed by MES	Yes – Oil Only	No	Yes- Oil Only
6.	Yes	Yes	Yes Bi-weekly	Yes	Yes – Leaf	Yes	Yes	Yes
7.	Yes	Yes	Yes Bi-weekly	Yes	Yes	Yes	Yes	Yes
8.	Yes	Yes	Yes – Mountairymd.org	Yes	Yes	Yes	Yes	Yes
9.	Yes	Yes	Yes	Yes - County	In Progress	Yes	No	Yes
10.	Yes	Yes	Yes	No	No	Yes	No	WWTP, Street Dept. Utilities
11.	No	Yes	Yes	No	Yes	No	Yes	Yes

1. When are the Town Council (TC) and Planning Commission (P&Z) meetings held?
2. Is there a Municipality fair or other Municipality-wide event held?
3. Has the Municipality had any volunteer efforts that would benefit water quality, i.e., storm drain stenciling, tree planting, etc.?
4. Does the Municipality have an information booth at the Fireman's Carnival and/or at any local fair?
5. Does the Municipality have an oil, antifreeze or gasoline recycling program?
6. Does the Municipality do regular leaf pick-up or street sweeping?
7. Does the Municipality provide for yard waste pick-up?
8. Does the Municipality have a website used for information and/or a newsletter distributed to residents?
9. Has the Municipality adopted the Storm Sewer Ordinance?
10. Does the Municipality have any adopted pollution prevention plans?
11. Does the Municipality use Integrated Pest Management (IPM) for landscape management?

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## **a. Public Education and Outreach**

The eight municipalities have education and outreach systems currently in place. Each has an elected council and an appointed planning commission that disseminate information to their residents as part of their mission. Each municipality has information available to the public and on display regarding the NPDES MS4 Permit. Brochures and pamphlets include; “National Pollutant Discharge Elimination System – Storm Water Pollution Prevention in Your Municipality,” “After The Storm – A Citizen’s Guide to Understanding Stormwater,” and “Make Your Home the Solution to Stormwater Pollution.” Information is also made available at fairs, municipal events, and in the classroom by County and municipal staff. The increasing number of events has offered opportunities for public education and outreach related to NPDES MS4 and stormwater pollution.

Municipality websites link to the County’s “Protecting Carroll County Waters” NPDES MS4 webpage implemented in June 2012. The webpage contains various resource information pertinent to both Phase I and Phase II jurisdictions, including a County pollution compliance phone number that is available to the general public for reporting dumping and spills.

## **b. Public Involvement and Participation**

The municipalities represent the concentrated population centers in Carroll County. Coordinating Phase I with Phase II NPDES MS4 efforts strengthens the basic NPDES MS4 management principle, which is a primary impetus for this permit. As the municipalities do represent County population hubs, they are the most densely developed areas with the most commercial/industrial uses. The municipal planning commissions and their councils serve as consistent forums for the public involvement and participation process. Residents are encouraged to attend and offer input. Numerous development and environmental issues are regularly brought to these meetings and are often resolved in an open discussion format. Currently, the County and many municipalities televise these meetings.

Authority to approve new development plans rests with each individual municipality. Questions and concerns often lead to specific conditions being placed on approvals. In addition, as the County provides review services to all of the municipalities, County personnel often become involved in problem resolution. Lastly, in many cases, the municipalities operate either under adopted County Code or under their own authority with text similar to County Code. This helps to create consistency within the review process and with enforcement. (See **Table 4**).

## **c. Illicit Discharge Detection and Elimination**

One of the responsibilities within the Phase II agreement with the municipalities involves illicit discharge monitoring and elimination. Carroll County adopted an ordinance titled “Environmental Management of Storm Sewer Systems” that has been incorporated as Chapter 53 of the Carroll County Code. (This Code may be reviewed on the County’s website at [cggovernment.carr.org](http://cggovernment.carr.org). Click on Government, Department of the County Attorney, and under Links to Other Documents, click on “Code of Public Local Laws & Ordinances”.) This chapter establishes methods of controlling the introduction of illicit discharges or pollutants into the

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County's separate storm sewer system (CS4) in order to comply with requirements of this permit. This ordinance has been adopted by all of the municipalities in order that they may benefit from the added level of protection that it provides.

The adoption of the ordinance provides each municipality with the enforcement authority, either solely or in conjunction with the County, necessary to comply with Phase II program requirements. **Table 6** reflects the adoption status of Carroll County Code, Chapter 53, by the municipalities and the responsible enforcement authority.

**Table 6**  
**Municipal Adoption and Enforcement**  
**Of Carroll County Code Chapter 53**  
**Environmental Management Of Storm Sewer System**

<b>Town</b>	<b>Enforcement Authority</b>
Hampstead	County
Manchester	County
Mt. Airy	Town/County
New Windsor	County
Sykesville	Town
Taneytown	City
Union Bridge	Town
Westminster	City

An Illicit Discharge Detection and Elimination (IDDE) document entitled "Illicit Discharge Detection and Elimination Manual" is currently utilized to address IDDE problems. This document acts as a guidance manual for Carroll County Government and municipalities of Carroll County.

The current Carroll County MS4 permit includes a requirement for the County to perform 100 illicit discharge dry weather inspections of major outfalls each permit year. MDE has agreed to allow the 100 inspections to be distributed among incorporated and unincorporated areas of the County, thus satisfying both Phase I and II responsibilities. During this permit year, Carroll County performed 106 field screenings, with 100 of those classified as major outfalls. Forty six (46) inspections were performed within the municipalities. The number of municipal inspections are based on the identified major outfalls per municipality divided by 3 for triennial frequency.

In addition to these annual routine inspections, municipal public works employees are trained to perform visual inspections of storm drain systems as they go about their workday. Illicit discharges may also be observed by trained County personnel while performing various inspections such as grading and sediment control and stormwater facility or flooding issues.

Suspected illicit discharges by routine outfall inspection, by visual observation or reported complaint, are investigated through the County BRM EISD. This division closely coordinates with the respective municipality on elimination if an incident proves to be an illicit discharge. An investigation summary and the outfall inspection distribution map for the current permit year is located in Appendix E of this report.

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### d. Construction Site Runoff

Chapter 152, Grading and Sediment Control, is the new reference for the information previously found in Chapter 121 Grading, Erosion, and Sediment Control in the former version of the County Code.

The Soil Conservation District performs the necessary plan review for both County and municipal projects. The County program is approved and regularly reviewed by MDE. As long as that situation remains constant and the County performs the enforcement function consistent with MDE standards, the municipalities will remain in compliance with the Phase II requirements related to construction site runoff.

### e. Post Construction Stormwater Management

Each of the municipalities has an MDE-sanctioned and approved stormwater management program. The City of Westminster and Town of Hampstead have adopted their own stormwater management ordinances. The Towns of Manchester, Mount Airy, New Windsor, and Sykesville have all adopted the County ordinance by reference. Each of those six municipalities rely on the County to review and approve stormwater management plans. The City of Taneytown and Town of Union Bridge also have an MDE-approved stormwater management program and conduct their own review and approvals. In addition to having adopted their own ordinance, they have hired a contractor to provide construction inspection services. As long as the municipalities have approved stormwater management programs, each remains in compliance with Phase II program requirements.

### f. Pollution Prevention and Good Housekeeping

This category encompasses a variety of measurable actions which includes: pollution prevention, street sweeping, inlet cleaning, employee training, and recycling efforts. **Table 5** and Appendix D include tabular information supplied by the municipalities on actions taken that reflect the conditions of the General Permit. As pollution prevention and good housekeeping are the most encompassing of the requirements, the data as shown is organized and presented in such a manner. The data are requested of each municipality yearly and are used to help municipal personnel in the regularly scheduled workshops and training sessions that are designed to support compliance of the General Permit.

The reported categories include the following:

- **Mapping** – Having a useable storm sewer system map helps in compliance and maintenance responsibilities. The County has furnished updated storm drain maps to all municipalities for their use.
- **Street Sweeping** – All but two of the municipalities reported that they regularly sweep their streets. Only Sykesville and New Windsor indicated that they do not have a regular program. Three indicated that they do so with municipal personnel and municipal equipment. Two utilize contractors, and one chose to rely on a local business that supplies the service free of charge. Each was able to indicate the

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method of sweeping and the disposition of collected material, as well as the street miles swept. Please see Appendix D for details.

- **Storm Drain and Inlet Cleaning** – Each of the municipalities were able to furnish information on drainage system and inlet cleaning. Five of the municipalities indicated that this is a regular service, and three clean in response to complaints or clogging problems. They also furnished information on how they performed the task, how often the cleaning was performed, and material disposal method. Details on the reported information for this and the other categories are included in Appendix D.

### **g. Stormwater BMP Database**

The NPDES database is included on a CD-ROM as Appendix B. A map of newly permitted stormwater management facilities is also included in Appendix B of this report.

## **D. Discharge Characterization**

### **1. Introduction**

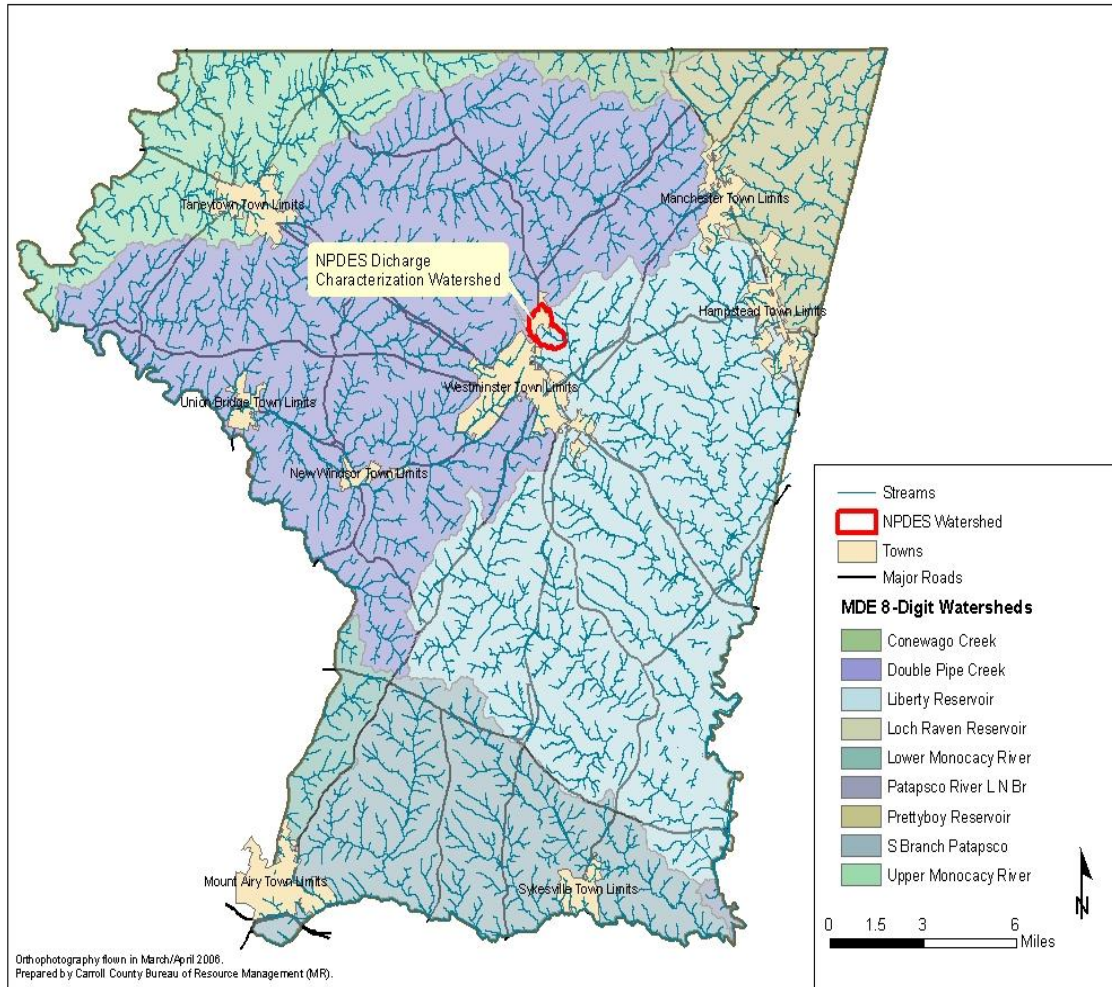
#### **a. Purpose**

Carroll County is required to conduct a discharge characterization as part of its NPDES permit conditions for the purpose of evaluating the efficacy of stormwater management. This component consists of monitoring the discharge from a stormwater management facility as well as assessing impacts to the receiving water body as described below. The State of Maryland has developed a database of discharge data collected by permit holders in order to characterize stormwater runoff associated with various stormwater management efforts.

The discharge characterization is implemented through the Assessment of Controls (Part III.H.) of the permit, which delineates specific data collection and analysis efforts to be undertaken. Carroll County has been collecting data in support of this program component since August 2000 downstream of the stormwater management facility associated with the Air Business Center just north of Westminster. This stormwater management facility was originally constructed as a wet pond in 1979 and was retrofitted in 2008 as a wet pond with forebay to provide water quality, recharge volume, and channel volume protection.

#### **b. Study Area and Requirements**

The discharge characterization is completed in a first order stream that is a tributary to the West Branch of the North Branch Patapsco River. The location of the watershed where monitoring is conducted within the county is shown in **Figure 2**, while the location of the monitoring stations and other watershed features are shown in **Figure 3**. The study area is located near the topographic divide separating the eastern and western piedmont physiographic provinces. As shown in **Figure 3**, the unnamed tributary drains the upper-most extent of the first order tributary and is located in the Liberty Reservoir watershed.



**Figure 2: Carroll County NPDES Discharge Characterization Location**

The Air Business Center regional stormwater management facility discharges through a constructed outfall to a small stream that travels southeast to the confluence with the West Branch. The stream receives the majority of water from the pond, with contribution from overland flow from the drainage basin during precipitation events. A new stormwater management pond at the West Branch Trade Center has been constructed adjacent to and east of the Air Business Center stormwater management facility. This facility drains downstream of the outfall station.

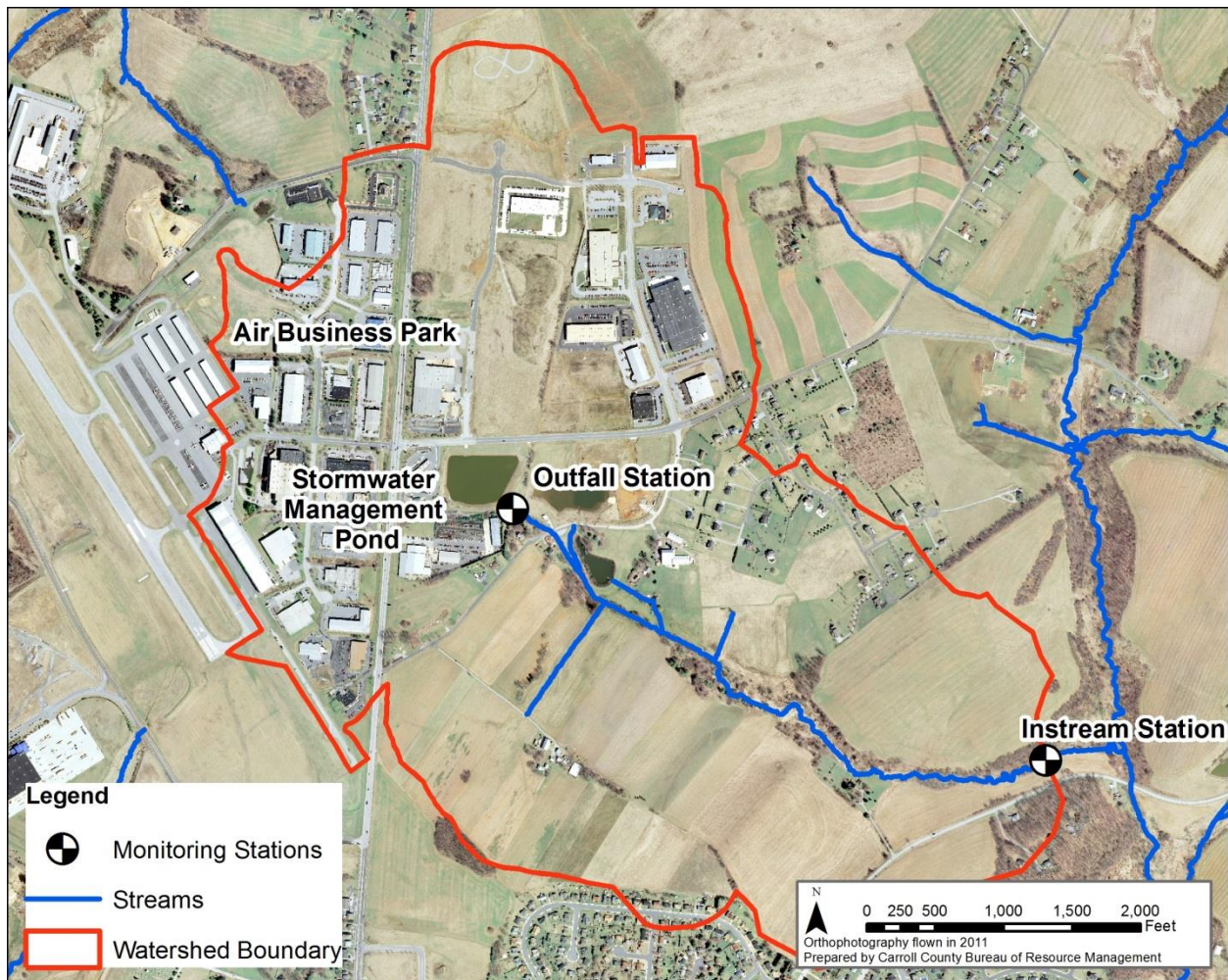
### c. Program Elements

The discharge characterization consists of three primary data collection efforts to assess the effectiveness of the stormwater controls on stream health: physical monitoring, chemical monitoring, and biological monitoring. These data are collected at the two monitoring stations shown in **Figure 3** where the cumulative effects of watershed restoration efforts can best be assessed.

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Physical monitoring is conducted in the spring of each reporting year and consists of the following activities:

- Geomorphic stream assessment to include an annual comparison of permanently monumented stream channel cross-sections and a stream profile to evaluate channel stability;
- A stream habitat assessment for assessing areas of aggradation and degradation; and
- Analysis of the effects of rainfall discharge rates, stage, and continuous flow on geometry (if needed).



**Figure 3: NPDES Discharge Characterization Watershed**

Chemical monitoring is completed throughout the reporting year and requirements consist of the following activities:

- Samples of eight storm events at each monitoring location, with at least two occurring each quarter of the calendar year. During extended dry periods, base-flow samples are collected one time per month.



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- Sampling is completed with automated equipment to include pH and temperature, and each storm limb is characterized.
- Laboratory analysis is completed for a number of chemical constituents, and the Event Mean Concentrations (EMCs) are calculated and reported.

Biological monitoring is completed in the spring of the reporting year and consists of the following activities:

- Assessment of benthic macroinvertebrates at both monitoring stations to assess stream health; and
- Completion of a spring habitat assessment.

## 2. Data Collection and Analysis Methods

### a. Climatological

The climate of Carroll County is characterized as temperate and moderately humid (Meyer and Beall, 1958). The 30-year average county temperature is 54° Fahrenheit (F) with monthly means ranging from 32°F in January to 76°F in July (NOAA, 2014). The 30-year average county precipitation is 43.4 inches with monthly means ranging from 2.5 inches in February to 4.3 inches in July (NOAA, 2014). In previous reporting years, precipitation data were collected from the weather station at the Carroll County Regional Airport. This station is operated by the Carroll County Government in accordance with National Weather Service standards. Temperature data are also collected from this weather station, because the previous weather station is no longer in operation.

### b. Hydrological

To understand watershed hydrology, continuous stream discharge data is necessary. Therefore, both monitoring stations are equipped with instrumentation to collect continuous data. The outfall station has dedicated electric power and is equipped with an ISCO model 4250 flow meter and a model 3700 portable sampler. The in-stream station is also equipped with dedicated ISCO flow measuring and sampling equipment and is powered by a deep cycle, 12-volt marine battery. An ISCO model 6712 portable sampler and model 4230 bubbler flow meter are deployed at this station.

Hydrology data collection at the in-stream station consists of a stilling well, staff plate, and bubbler assembly, which is part of the ISCO flow meter. The instrument converts the hydrostatic pressure required to maintain the bubble rate. This pressure is proportional to the stream stage. County staff regularly collects stage-discharge data to relate stage to discharge. The hydrology data collection at the outfall station consists of a dedicated stage/velocity meter anchored to the outfall pipe. The logging device uses Manning's equation and input from the sensor to convert stage to discharge. The pipe discharge stage is regularly checked to verify the instrumentation is functioning properly.

Flowlink Version 5.1 software by ISCO is used to complete hydrologic data analysis. Data collected at the monitoring stations are downloaded to a laptop computer via serial

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communication. New hydrologic data is appended to the existing data record for each station. The stream characterization data is exported from Flowlink to excel for most analyses.

Due to equipment malfunction, stage-discharge measurements for the in-stream station were unavailable from January 10, 2014 through February 24, 2014. Discharge was estimated during this time from several relationship models using the outfall station as a reference. Analogous storm events from periods with complete data were extracted to create relationship models from those storm events that occurred during the period with missing in-stream discharge measurements. Relationship models were created for each limb of the analogous storm events and were then used to estimate in-stream stage-discharge of the paired storm event using the outfall as the reference.

### c. Geomorphological

During the spring of 2014, Carroll County conducted a geomorphologic assessment for the entire stream reach, from the outfall of the Air Business Park stormwater management facility to the confluence with the West Branch of the Patapsco River. As required, survey points were again collected at the six permanent, monumented cross-sections determined to be representative of each stream reach. At each of these monumented cross-sections, the County survey department collected data for bank slope, toe, stream edges, channel bottoms, and tops.

The County survey crew continues to collect data at each of the 28 segments (at approximately 200-foot intervals) along the same stream reach. The data collected for this effort are similar to the data collected at the six monumented cross-sections, describing the stream channel cross-sections. The survey crew collected data for the stream channel bottom at the thalweg, the edge of water at each stream bank, and the top of each stream bank.

A Level 1 geomorphologic stream assessment has been conducted on the entire stream reach to assess potential geomorphologic changes to the stream. This assessment consisted of two major components: an assessment of stream channel changes and an interpretation of these changes.

The assessment of stream channel changes involves determining channel segment characteristics and assessing dimensional changes. The assessment evaluations include an interpretation of changes in channel response, manifested through a comparative evaluation of channel geometry changes, including cross-sectional dimensions, in the context of the physical setting.

### d. Chemical

Carroll County continues to contract with Martel Laboratories, Inc., in Baltimore, Maryland, to conduct all of the sample collection and lab analyses of the eight required events during the reporting year. The sampling program consists of a first-flush component for total petroleum hydrocarbons, bacteriological constituents, and physical parameters as well as chemical parameters collected during each of the three storm limbs. **Table 7** includes the required parameters for laboratory analysis, the laboratory method, and the corresponding method reporting limit.

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**Table 7**  
**Laboratory Methods and Detection Limits for Parameters Tested**

Parameter Tested	Method	Reporting Limit
<i>First Flush Sample</i>		
pH	EPA 150.1	-
Temperature	EPA 170.1	-
Specific Conductance	SM 2510 B-97	1.0 mmhos/cm
Total Petroleum Hydrocarbons	EPA 1664	5.0 mg/L
Escherichia Coli	SM 9223 B-94	1.0 organisms/ 100mL
<i>Limb Samples</i>		
Nitrate/Nitrite Nitrogen	SM 4500NO3-H00	0.05 mg/L
Biological Oxygen Demand	SM 5210 B-01	2.0 mg/L
Total Copper	EPA 200.8	2.0 mg/L
Total Lead	EPA 200.8	2.0 mg/L
Total Zinc	EPA 200.8	20.0 mg/L
Total Kjeldahl Nitrogen	SM 4500NH3 C-97	0.5 mg/L
Total Phosphorus	SM 4500P-P E-99	0.01 mg/L
Total Suspended Solids	SM 2540 D-97	3.0 mg/L

The County continues to use the same type of monitoring equipment manufactured by ISCO, Inc. to comply with this component of the County's NPDES permit. The in-stream station is equipped with an ISCO Model 6712 auto sampler, whereas the outfall station has an ISCO Model 3700 auto sampler. The outfall sampler is paced with an ISCO Model 4250 level flow meter, while the in-stream sampler is paced using an ISCO Model 4230 bubbler flow meter. Personnel from Martel Labs continue to collect both baseflow and storm flow events in the same manner as in previous years. The flow monitoring and EMC calculation methods are also the same as those used in previous reporting years. Martel Labs continues to send results via e-mail to the County where the new records are appended to the existing Microsoft Access database. The event dates for this reporting year are shown in **Table 8**. Please note that only seven total sampling events are reported.

**Table 8**  
**2013 – 2014 NPDES Discharge Characterization Sampling Events**

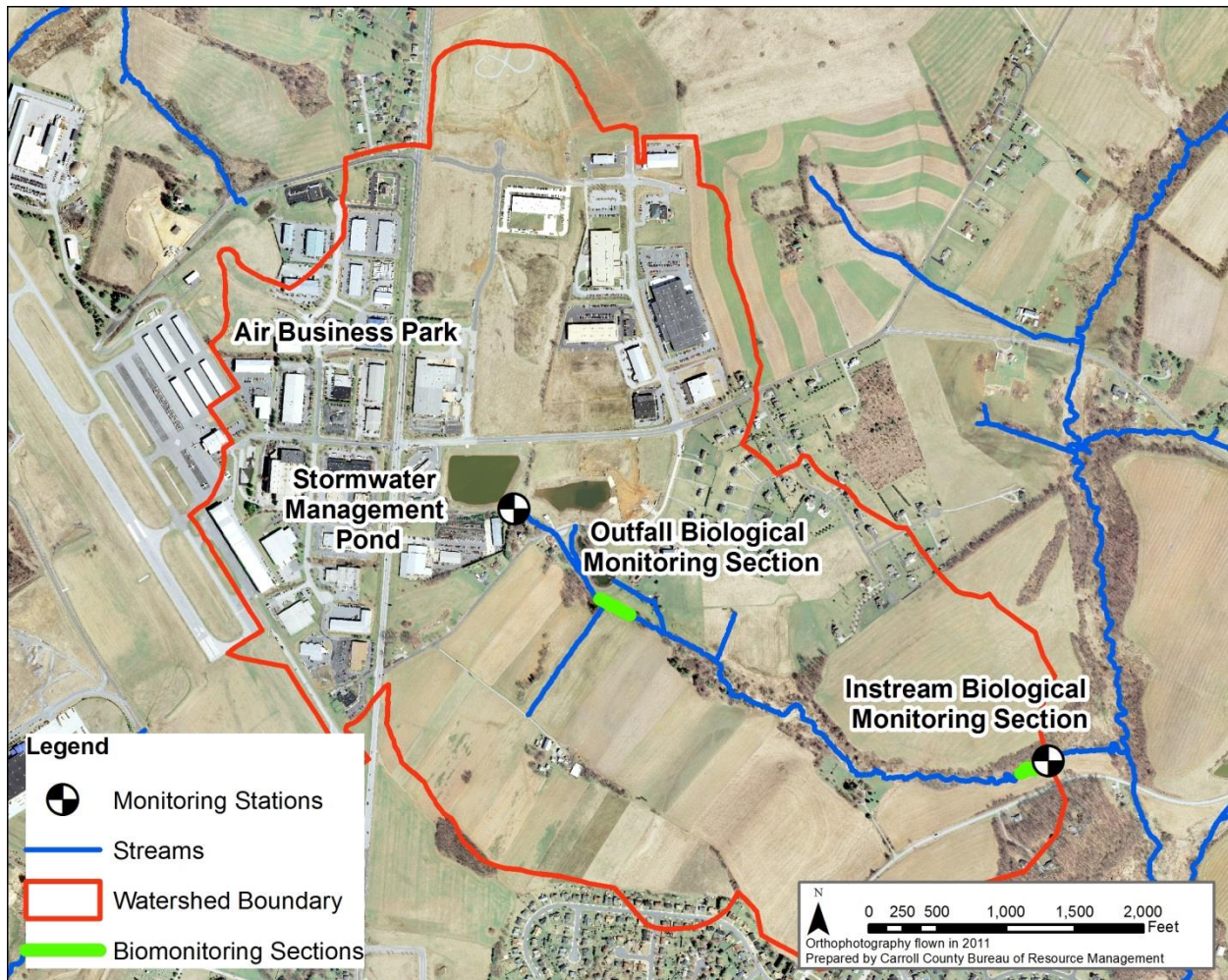
In-stream Physical Water Data				Outfall Physical Water Data			
Event	pH	Water Temp (F)	Conductivity (µmhos/cm)	Event	pH	Water Temp (F)	Conductivity (µmhos/cm)
2013-03	7.8	54	310	2013-03	8.1	58	610
2013-04	7.6	67	280	2013-04	8.1	74	290
2013-05	7.5	69	300	2013-05	7.9	74	250
2013-06	8.1	61	N/A	2013-06	8.8	68	N/A
2013-07	7.4	65	230	2013-07	8.3	70	230
2013-08	7.1	52	480	2013-08	7.3	52	790
2014-01	N/A	N/A	490	2014-01	N/A	N/A	1100

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## e. Biological

Two monitoring sites corresponding to the Outfall and In-stream stations have been characterized since the 2000 reporting period. The 75-meter sampling sites, shown in **Figure 4**, were not randomly selected. Results from the data gathered over the years may reflect changes in stream conditions downstream of the regional stormwater management facility.

Data collection, macroinvertebrate identification, and analytical methods were in accordance with the Maryland Biological Stream Survey (MBSS) guidance manuals (Sampling Manual Field Protocols, 2014 (<http://www.dnr.state.md.us/streams/pdfs/R4Manual.pdf>)). The County continues to contract with Maryland Department of Natural Resources (DNR) to identify and enumerate all benthic macroinvertebrate samples. The samples were processed and identified by Ellen Friedman, DNR principal taxonomist, with over 20 years of identification experience. An Index of Biotic Integrity (IBI) score was calculated using the criteria located in **Table 9**. These six criteria are rated a one, three, or five depending on the species present. The average of all criteria is considered the overall IBI score. Narrative ratings can be found in **Table 10**.



**Figure 4: Biological Monitoring Station Locations**

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**Table 9**  
**MBSS Scoring Criteria for the Piedmont Region**

Metric	IBI Score		
	5	3	1
Number of Taxa	≥25	15-24	<15
Number of EPT	≥11	5.0-10.0	<5
Number of Ephemeroptera	≥4	2.0-3.0	<2
% Intolerant Urban (Tolerance Values 0-3)	≥51	12.0-50	<12
% Chironomidae	≤4.6	4.7-63	>63
% Clingers	≥74	31-73	<31

**Table 10**  
**IBI Score Ranges and Corresponding Narrative Ratings**

IBI Score Range	Narrative Rating	Interpretation
4.0-5.0	Good	Comparable to reference streams considered to be minimally impacted.
3.0-3.9	Fair	Comparable to reference conditions, but some aspects of biological integrity may not resemble the qualities of these minimally impacted streams.
2.0-2.9	Poor	Significant deviation from reference conditions, with many aspects of biological integrity, not resembling the qualities of these minimally impacted streams, indicating some degradation.
1.0-1.9	Very Poor	Strong deviation from reference conditions, with most aspects of biological integrity, not resembling the qualities of these minimally impacted streams, indicating severe degradation.

The assessment of spring habitat also utilized guidance from the MBSS Sampling Manual: Field Protocols. This approach is entirely subjective and bias is often high with this approach, depending on the assessor(s) and other factors. The scoring criteria measures eight parameters as shown in **Table 11**. Each parameter can be scored a maximum of 20 points for a total maximum score of 160 points. Each parameter is subdivided into narrative ratings of poor, marginal, sub-optimal, and optimal.

**Table 11**  
**MBSS Habitat Assessment Criteria**  
**(2014 MBSS Sampling Manual Field Protocols)**

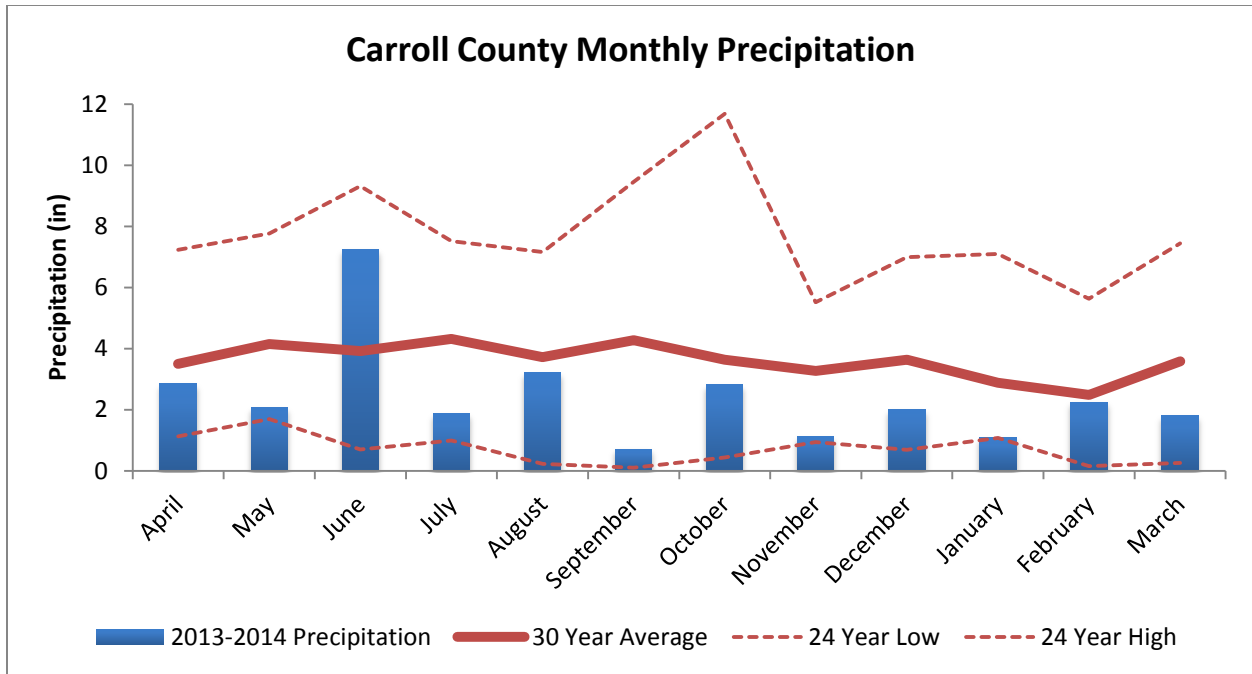
MBSS Stream Habitat Assessment Guidance Criteria Sheet				
Habitat Parameter	Optimal 16-20	Sub-Optimal 11-15	Marginal 6-10	Poor 0-5
<b>1. In-stream Habitat</b>	Greater than 50% of a variety of cobble, boulder, submerged logs, undercut banks, snags, root wads, aquatic plants, or other stable habitat	30-50% of stable habitat. Adequate habitat	10-30% mix of stable habitat. Habitat availability less than desirable	Less than 10% stable habitat. Lack of habitat is obvious
<b>2. Epifaunal Substrate</b>	Preferred substrate abundant, stable, and at full colonization potential (riffles well developed and dominated by cobble; and/or woody debris prevalent, not new, and not transient)	Abundance of cobble with gravel &/or boulders common; or woody debris, aquatic veg., undercut banks, or other productive surfaces common but not prevalent/suited for full colonization	Large boulders and/or bedrock prevalent; cobble, woody debris, or other preferred surfaces uncommon	Stable substrate lacking; or particles are over 75% surrounded by fine sediment or flocculent material
<b>3. Velocity/Depth Diversity</b>	Slow (<0.3 m/s), deep (>0.5 m); slow, shallow (<0.5m); fast (>0.3 m/s), deep; fast, shallow habitats all present	Only 3 of the 4 habitat categories present	Only 2 of the 4 habitat categories present	Dominated by 1 velocity/depth category (usually pools)
<b>4. Pool/Glide/Eddy Quality</b>	Complex cover/&/or depth > 1.5m; both deep (>.5 m)/shallows (<.2 m) present	Deep (>0.5 m) areas present; but only moderate cover	Shallows (<0.2 m) prevalent in pool/glide/eddy habitat; little cover	Max depth <0.2 m in pool/glide/eddy habitat; or absent completely
<b>5. Riffle/Run Quality</b>	Riffle/run depth generally >10 cm, with maximum depth greater than 50 cm (maximum score); substrate stable (e.g. cobble, boulder) & variety of current velocities	Riffle/run depth generally 5-10 cm, variety of current velocities	Riffle/run depth generally 1-5 cm; primarily a single current velocity	Riffle/run depth < 1cm; or riffle/run substrates concreted
<b>6. Embeddedness</b>	Percentage that gravel, cobble, and boulder particles are surrounded by line sediment or flocculent material			
<b>7. Shading</b>	Percentage of segment that is shaded (duration is considered in scoring). 0% = fully exposed to sunlight all day in summer; 100% = fully and densely shaded all day in summer			
<b>8. Trash Rating</b>	Little or no human refuse visible from stream channel or riparian zone	Refuse present in minor amounts	Refuse present in moderate amounts	Refuse abundant and unsightly

### 3. Results and Discussion

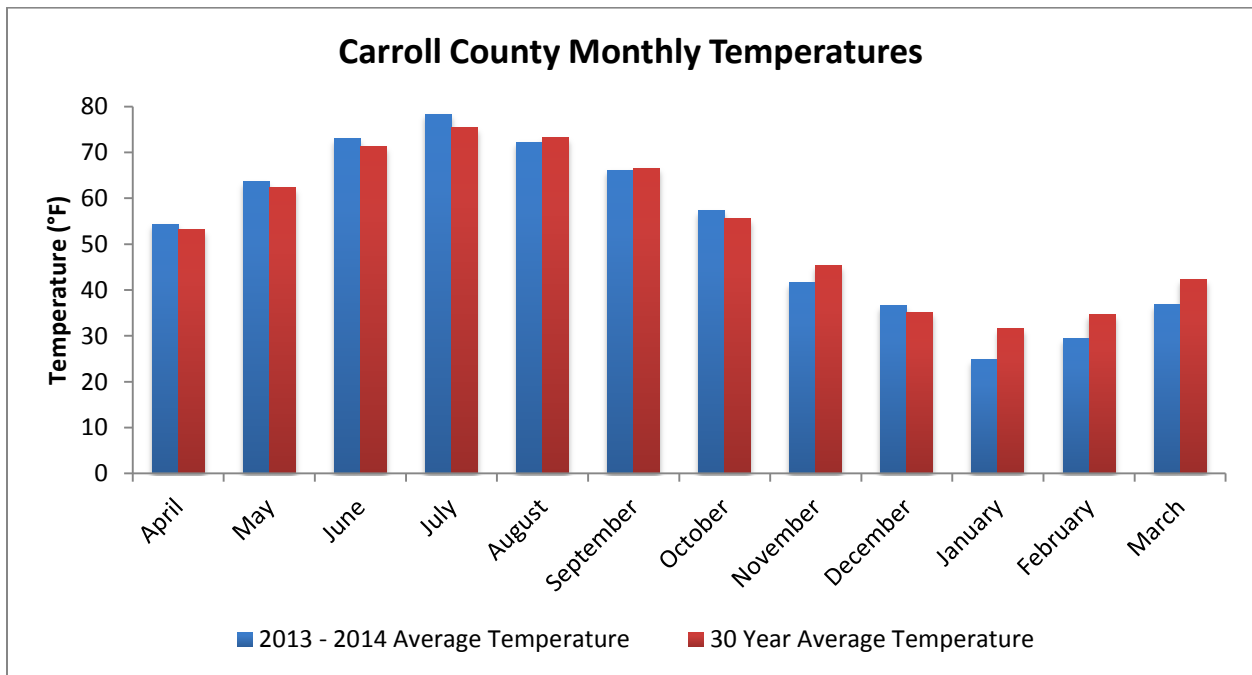
#### a. Climatological

Monthly precipitation data for the 2013 – 2014 reporting year are summarized in **Figure 5**. Also included for reference are 30-year monthly averages and monthly high and low extremes from the previous 24 years. Monthly average precipitation was below average in every month except June. The total precipitation for the reporting period was 29.12 inches, a 14.28 inch deficit from the normal yearly total. This reporting period was the driest since 2002, making this the second driest period since the monitoring stations were installed in 2000.

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**Figure 5: Monthly Precipitation Summary for the Reporting Period**



**Figure 6: Monthly Temperature Summary for the Reporting Period**

Monthly temperature data for the 2012 – 2013 reporting year are summarized in **Figure 6**. The 30-year monthly average temperatures are included for reference. Overall, the reporting period experienced an annual average temperature of 53°F, one degree cooler than the 30-year annual average. Temperatures during the spring and early summer of 2013 were consistently warmer

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than average with a mean temperature disparity from April through July at almost 2°F above normal. The temperatures during the winter of 2014 were consistently much cooler than the 30-year average with temperatures almost 6°F below the 30-year average from January through March.

### b. Hydrological

Hydrographs have been prepared for stage height and discharge for each monitoring station during the reporting period. In-stream and outfall stage heights and discharge measurements, in addition to daily precipitation totals, are shown in **Figures 7 and 8**. This reporting period had a deficit of 14.28 inches from a normal year and did not experience the magnitude and frequency of high stage events as in previous years.

Storage by the stormwater facility results in peak stage heights less than 0.3 feet at the outfall station except for the storm event on October 11, 2013, when 2.15 inches of precipitation was recorded. The stage reached peak height at 0.63 feet with a maximum discharge of 2,608 gallons per minute (gpm). Baseflow at the outfall monitoring station was marginal, typically with a stage height of 0.05 feet. The resulting baseflow discharge was approximately 12 gpm.

Typical stage heights observed for the in-stream monitoring station were approximately 0.4 feet, or 700 gpm. During the October 11, 2013 storm event, stage height reached the peak for the reporting year at 2.17 feet. The resulting discharge was 22,854 gpm. There were three other storm events during this time where stage heights above 1 foot (6,600 gpm) were observed. These occurred on January 11, 2014, February 5, 2014, and March 31, 2014 with stage heights of 1.31 feet, 1.22 feet, and 1.32 feet.

Total, seasonal, and categorical discharges for each monitoring station can be found in **Table 12**. Overall, only 7 percent of the discharge from the in-stream station was contributed from the stormwater pond (outfall station). The total discharge from the in-stream station during this reporting year was approximately 344 million gallons, with 25 million gallons being contributed in total discharge from the outfall station. Two thirds of the total discharge occurred during the autumn and winter seasons with the highest discharge occurring in the winter months. The ratio of outfall to in-stream discharge was fairly constant throughout each season but showed a slight increase during periods of baseflow and drier periods such as during the summer of 2013. This indicates a greater influence of the stormwater outfall during dry periods.

Please note that in-stream stage heights and discharges from January 10, 2014 through February 24, 2014 are estimated values. These data were lost due to equipment failure.



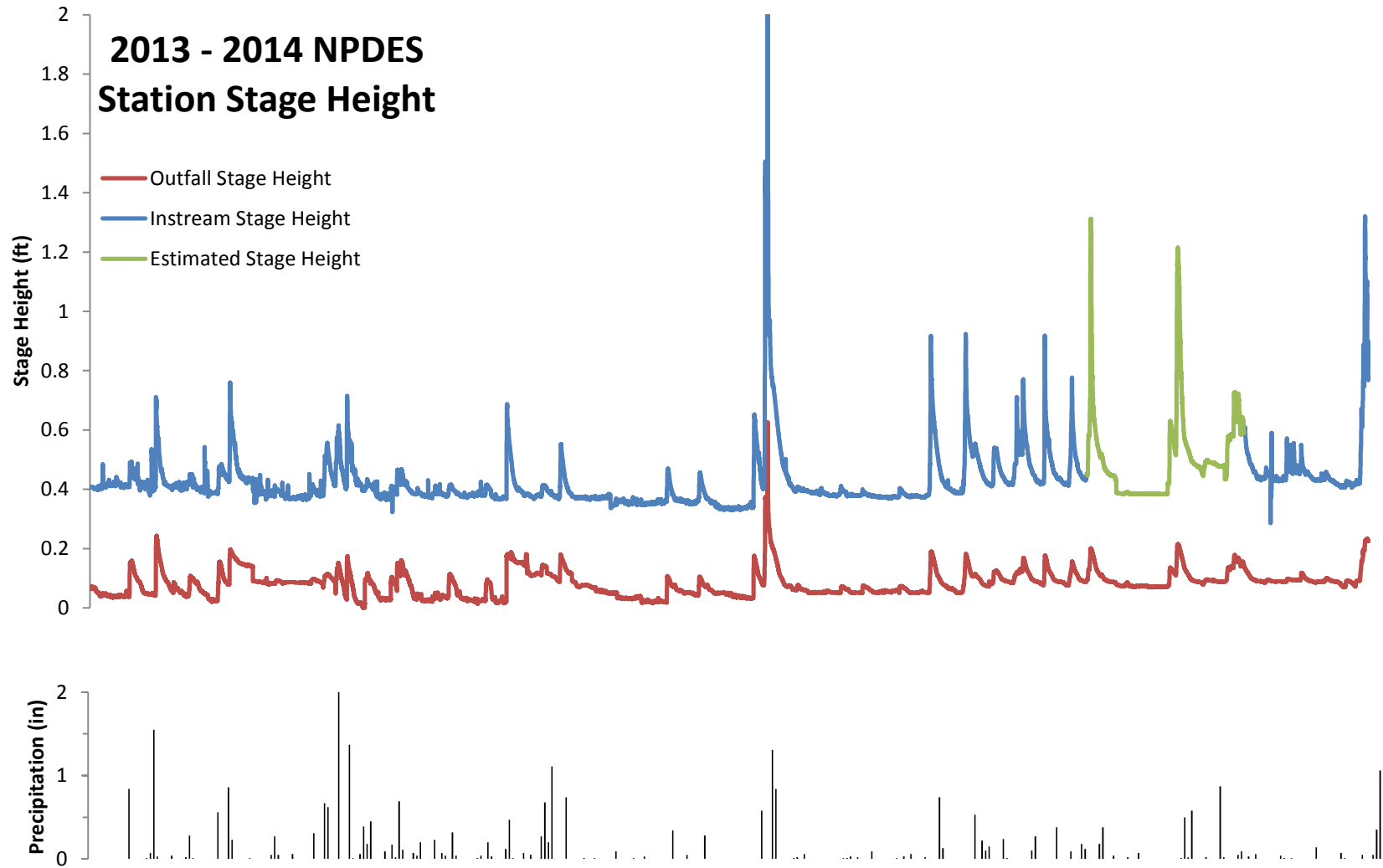


Figure 7: Stage Heights and Daily Precipitation for NPDES Monitoring Stations for the 2013 – 2014 Reporting Year

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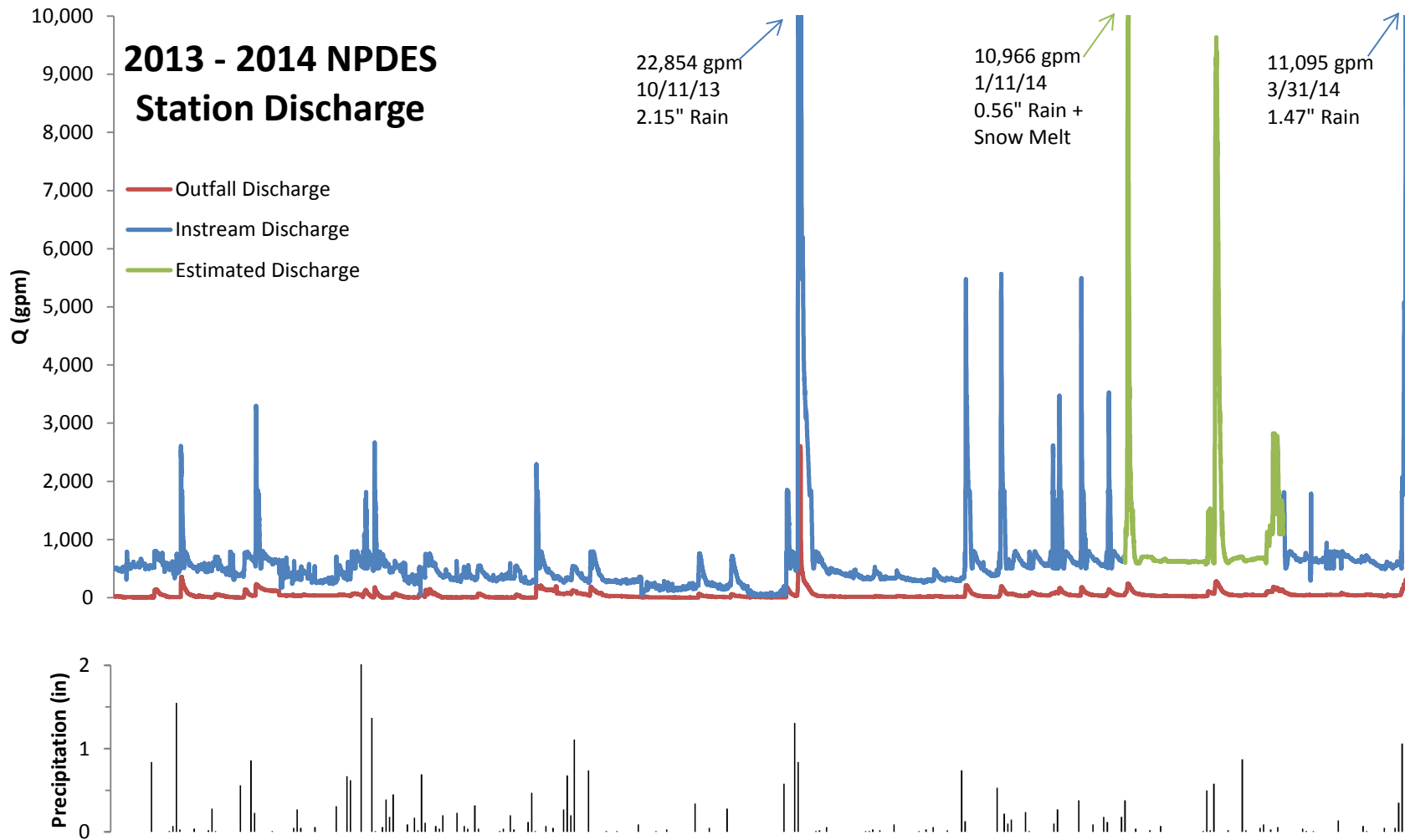


Figure 8: Discharge and Daily Precipitation for NPDES Monitoring Stations for the 2013 – 2014 Reporting Year

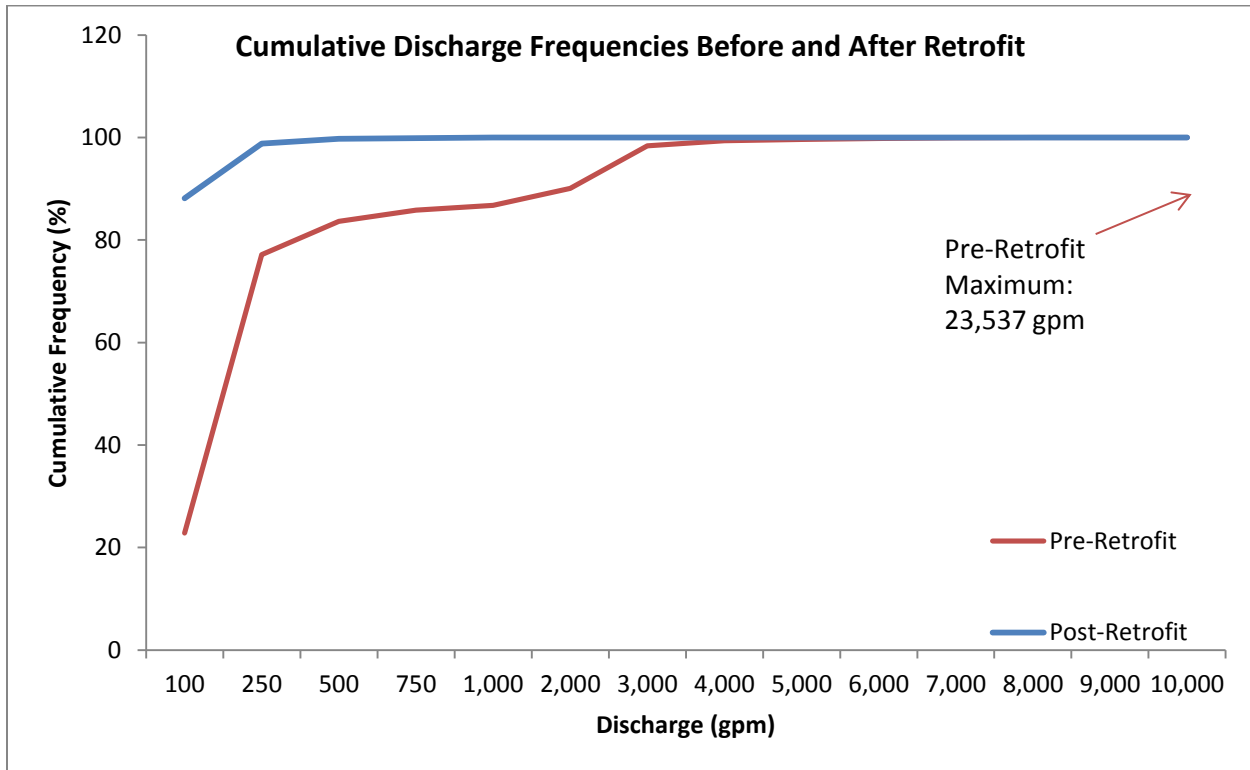
# 2014 NPDES MS4 Permit Annual Report

**Table 12**  
**Categorical Discharges and Stage Heights for the 2013 – 2014 Reporting Year**

	In-stream	Outfall	Difference	Outfall Contribution (%)
<b>Total (gallons)</b>	343,870,233	25,248,371	318,621,862	7
<b>Avg Stage (ft)</b>	0.43	0.08	0.35	-
<b>Median Stage (ft)</b>	0.40	0.08	0.32	-
<b>Avg Q (gpm)</b>	655	48	607	7
<b>Median Q (gpm)</b>	510	35	476	7
<b>Spring Q (gallons)</b>	71,174,555	6,071,325	65,103,231	9
<b>Summer Q (gallons)</b>	42,326,590	4,280,155	38,046,435	10
<b>Autumn Q (gallons)</b>	102,178,076	6,936,137	95,241,939	7
<b>Winter Q (gallons)</b>	128,191,011	7,960,754	120,230,256	6
<b>Dry (&lt;700gpm)</b>	189,261,081	14,058,517	175,202,564	7
<b>Wet (&gt;700gpm)</b>	154,768,912	11,192,221	143,576,691	7

To compare pre- and post-pond retrofit hydrology, cumulative discharge frequency was plotted in **Figure 9**. This figure compares the discharge frequencies from the outfall monitoring station for the 2006–2007 and 2013–2014 reporting years. The maximum discharge during the pre-retrofit period (2007) was an order of magnitude higher than the post-retrofit period (2014). The maximum discharge in 2007 was 23,537 gpm while the maximum in 2014 was only 2,608 gpm. Additionally, the frequency and magnitude of high discharge events was greater during the pre-retrofit period. Eighty-eight percent of all discharge measurements were below or equal to 100 gpm. This contrasts with the pre-retrofit measurements where only 23 percent of measurements were below 100 gpm. Ten percent of all measurements in 2007 were greater than 2000 gallons per minute, which are greater in magnitude than the highest discharges from 2014. It is difficult to determine how much of this variation is due to precipitation disparity between the two years as the 2006 – 2007 reporting period received significantly more precipitation. Discharge data from 2002, the only comparable year for precipitation, was lacking for a proper comparison.

Individual components of the hydrograph below show the distinct mechanism behind any changes in cumulative frequencies throughout the year. **Figure 10** represents two analogous storm events, one before and one after the stormwater retrofit, and a hydrological comparison therein. This figure contains hydrographs before and after retrofit for in-stream and outfall stage heights and discharges. The pre-retrofit event had 0.39 inches of precipitation observed while the post-retrofit event had 0.34 inches of precipitation observed. All pre-retrofit hydrographs show a distinctly steeper slope for the ascending storm limb and greater maximum stage and discharge. This is particularly true at the outfall station where the slope and peak were even more distinct. The outfall to in-stream station discharge ratio for the post-retrofit storm event maintained the 7 percent contribution, as was the case for the overall discharge and separated stormflow for the reporting period. During the pre-retrofit storm, however, the outfall station contributed 70 percent of the total in-stream discharge. The period of baseflow recession after the storm event was much shorter during the pre-retrofit storm. Overall, longer baseflow recessions and lower peak discharges were observed with the current stormwater configuration.



**Figure 9: Outfall Discharge Frequencies for 2007 and 2014**

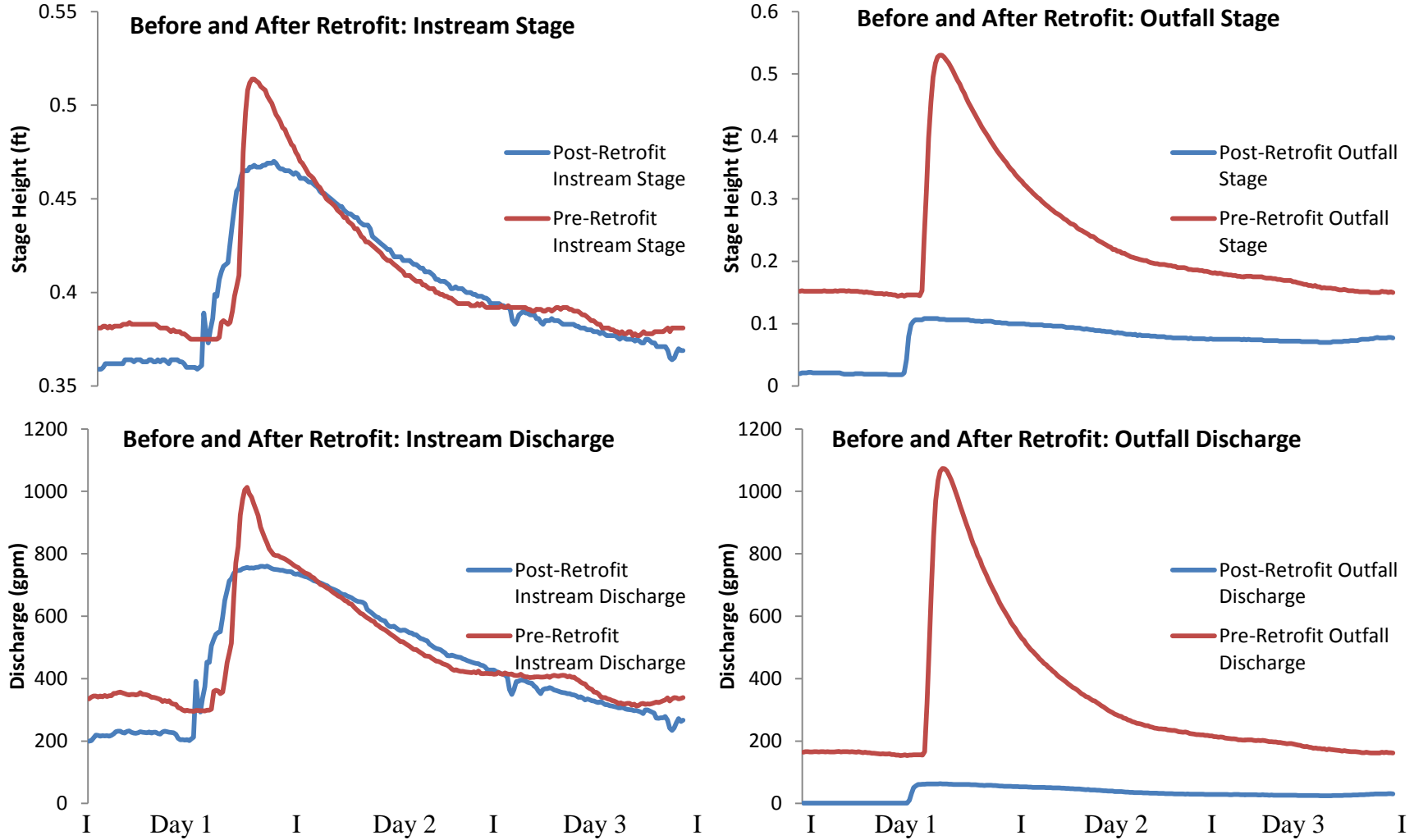
### c. Geomorphological

The physical stream assessment consists of evaluating the six monumented cross-sections and 28 sections for stream physical character, shape, and slope. Physical data collection stations are shown in **Figure 11**.

Results from this year's monumented cross-sections data collection are provided in **Appendix E**. Since this monitoring effort is in part designed to detect changes to the stream system over time, staff compared results from this year at the six permanent cross-sections with results from 2000, the first year this type of monitoring was initiated.

There does not appear to be large scale degradation or aggradation of the stream channel in the last 14 years. At the first cross-sections, located approximately 500 feet downstream of the pond outfall, the left bank has moved approximately two feet to the west but has not experienced any down-cutting. Aggradation along the right edge was observed at this location, and it now has a much steeper bank. This section is located approximately 200 feet downstream of a road culvert, and just upstream of the input location from the West Branch Stormwater Management Pond.

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**Figure 10: Characteristics of Analogous Storms Pre-Retrofit (7/6/2006, 0.39") and Post-Retrofit (9/12/2013, 0.34")**

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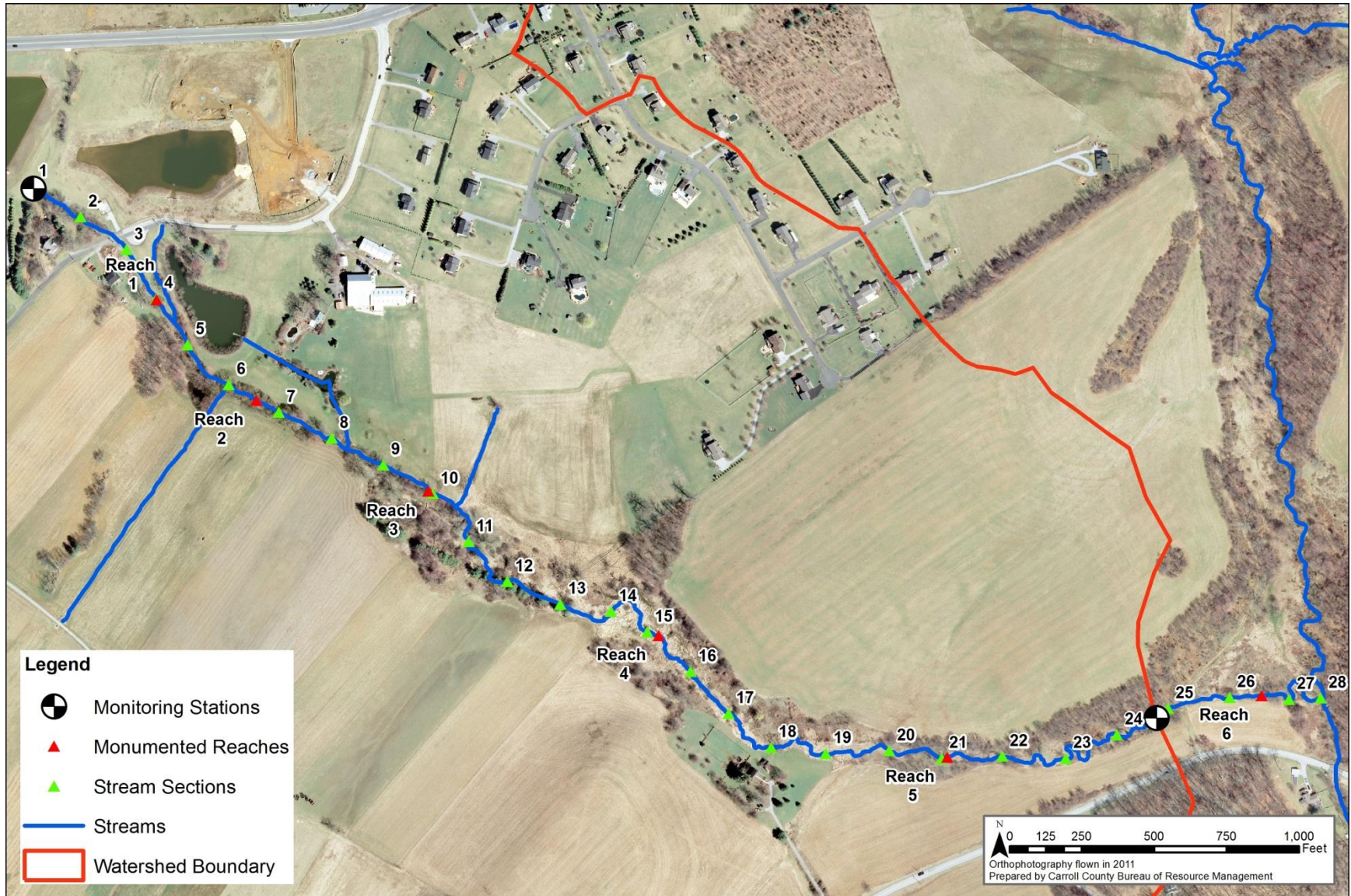


Figure 11: Physical Data Collection Stations

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Cross-sections two and three are generally unchanged since 2000, with only minor changes in stream channel shape. Located approximately 65 feet downstream of a series of bends and two draws, section four has shown relatively significant aggradation of the channel since 2000. The channel bottom and associated floodplain have been elevated by almost one foot since 2000. In the past year, the channel bottom has widened slightly cutting the left bank. Section five is essentially unchanged since 2000; however, the right bank has moved west by approximately one foot, while the left bank has moved east to narrow the channel slightly.

Consistent with past findings, analysis at monumented cross-sections six indicates that the stream channel has widened by four feet since 2000, extending from a width of five (5) feet to a width of nine (9) feet. This width is unchanged during the past several years. This monumented cross-sections is located approximately 200 feet upstream of the confluence on a straight reach of stream that precedes a series of bends. As is discussed below, this region of the stream has the steepest slope and corresponding highest energy for stream bank erosion. Bank soils in this area are of the Manor Series, which is characterized as highly erodible (USDA, 1969).

**Table 13** displays thalweg elevation and section gradient for selected years from 2004 through 2014. One notable observation from the table is the low, and in some cases, negative gradients found in the center section of the tributary. This observation coincides with the section four stream survey which discovered locally significant sediment deposition from year to year, one would expect to find in an area with low gradients.

**Figure 12** displays stream gradients from the current reporting year (2014), 2013, and 2004 as a longitudinal profile along with the locations of the six monumented stream reaches. The overall average gradient has remained unchanged over this period and has remained a gentle slope with only one section above a two (2) percent gradient, but some individual sections have changed significantly. In general, increases in gradient between stations are indicative of higher energy and potential for increased channel scour.

The first third of the stream profile has remained relatively unchanged during this 10-year period, but the gradient is generally higher than that of the final two thirds of the tributary. This can be seen in the survey of monumented section one where the stream channel has laterally moved approximately two feet over this period. The gradient has changed significantly over the second third of the stream profile and ranges from -0.11 percent to 1.07 percent. These ever-changing low gradients can explain why there is so much deposition at monumented section four, which has a roughly flat gradient. The final third of the stream profile changes gradient a number of times, but slopes are relatively similar for 2014 and 2004.

**Figure 13** displays the longitudinal stream profile for elevation and depth of deposition or incision at each of the 28 sections along the profile. Included are the six monumented reaches for reference. The profile shows the low gradients in the center section of the stream and that the areas with lowest gradient have moved downstream, the cause of elevated deposition at monumented reach four. Aggradation and degradation is most significant in the center section of the stream. Elevation change during the past ten years has not exceeded one foot at channel bottom. However, since the stream has two small tributaries, varying bends and straight segments, as well as a number of soils series represented along the channel, it is important to monitor the physical characteristics of the stream channel over time.

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**Table 13**  
**Cross-sections Station Results for Selected Years 2004 - 2014**

Station	Distance (ft)	2014		2013		2012		2010		2008		2006		2004	
		Elev	Slope	Elev	Slope	Elev	Slope	Elev	Slope	Elev	Slope	Elev	Slope	Elev	Slope
1	0							730.89		730.89		730.68		730.89	N/A
2	201	728.09		728.06		728.04		728.01	1.43%	728.01	1.43%	727.83	1.42%	727.90	1.49%
3	394	724.75	1.73%	724.33	1.94%	724.73	1.72%	724.58	1.78%	724.56	1.79%	724.26	1.85%	724.20	1.92%
4	592	721.79	1.50%	721.71	1.32%	721.86	1.45%	722.06	1.27%	721.49	1.55%	721.30	1.50%	721.51	1.36%
5	786	717.95	1.97%	717.88	1.97%	717.91	2.03%	717.78	2.20%	717.81	1.89%	717.77	1.81%	717.75	1.93%
6	988	716.26	0.84%	716.22	0.82%	715.84	1.03%	716.73	0.52%	716.61	0.59%	716.27	0.74%	715.82	0.96%
7	1184	715.67	0.30%	715.59	0.32%	715.55	0.15%	715.58	0.59%	715.70	0.46%	715.60	0.34%	715.49	0.17%
8	1388	714.33	0.66%	714.30	0.63%	714.18	0.67%	714.28	0.64%	714.24	0.72%	714.30	0.64%	714.42	0.52%
9	1589	712.86	0.73%	712.92	0.69%	712.89	0.64%	712.80	0.74%	712.78	0.73%	712.83	0.73%	712.74	0.84%
10	1787	711.35	0.76%	711.26	0.84%	711.40	0.75%	711.59	0.61%	711.66	0.57%	711.20	0.82%	711.22	0.77%
11	1986	710.17	0.59%	709.66	0.81%	710.28	0.56%	709.93	0.84%	710.06	0.81%	709.58	0.82%	709.61	0.81%
12	2189	709.48	0.34%	709.46	0.10%	709.32	0.47%	709.16	0.38%	709.58	0.24%	709.02	0.28%	709.48	0.06%
13	2386	708.45	0.52%	708.58	0.45%	708.61	0.36%	708.46	0.35%	709.04	0.27%	709.81	-0.40%	709.45	0.02%
14	2564	708.65	-0.11%	708.53	0.03%	708.30	0.18%	708.17	0.16%	707.88	0.66%	707.94	1.06%	707.74	0.97%
15	2707	707.49	0.81%	707.46	0.74%	707.45	0.59%	707.02	0.80%	707.06	0.57%	707.07	0.61%	706.81	0.65%
16	2910	705.31	1.07%	705.45	0.99%	705.58	0.92%	705.44	0.78%	705.55	0.74%	705.20	0.92%	705.18	0.80%
17	3106	704.55	0.39%	704.61	0.43%	704.64	0.48%	704.78	0.34%	704.48	0.55%	704.37	0.43%	704.18	0.51%
18	3298	703.65	0.47%	703.38	0.64%	703.43	0.63%	703.62	0.60%	703.27	0.63%	703.16	0.63%	702.94	0.64%
19	3490	701.66	1.04%	701.60	0.93%	701.85	0.82%	701.75	0.97%	701.48	0.93%	701.48	0.88%	701.69	0.65%
20	3704	699.06	1.21%	699.07	1.18%	699.07	1.30%	698.90	1.33%	698.92	1.19%	698.92	1.19%	698.99	1.26%
21	3896	697.81	0.65%	697.78	0.67%	697.74	0.69%	697.73	0.61%	697.69	0.64%	697.83	0.57%	697.95	0.54%
22	4100	695.20	1.28%	694.93	1.40%	694.91	1.39%	694.70	1.48%	694.78	1.42%	694.90	1.43%	694.62	1.63%
23	4320	694.11	0.49%	694.06	0.40%	693.92	0.45%	693.90	0.36%	693.73	0.48%	693.44	0.66%	693.42	0.54%
24	4511	691.01	1.63%	691.04	1.58%	691.04	1.51%	691.17	1.43%	691.10	1.38%	691.05	1.25%	691.12	1.21%
25	4717	689.45	0.76%	689.32	0.83%	689.31	0.84%	689.35	0.88%	689.41	0.82%	689.52	0.74%	689.65	0.71%
26	4933	687.39	0.96%	687.48	0.85%	687.38	0.90%	687.38	0.91%	687.59	0.84%	687.71	0.84%	687.59	0.96%
27	5137	685.43	0.96%	685.37	1.03%	685.47	0.94%	685.44	0.95%	685.45	1.05%	685.53	1.07%	685.82	0.87%
28	5248	682.97	2.21%	682.92	2.20%	682.93	2.28%	682.80	2.37%	682.70	2.47%	682.71	2.53%	682.83	2.68%



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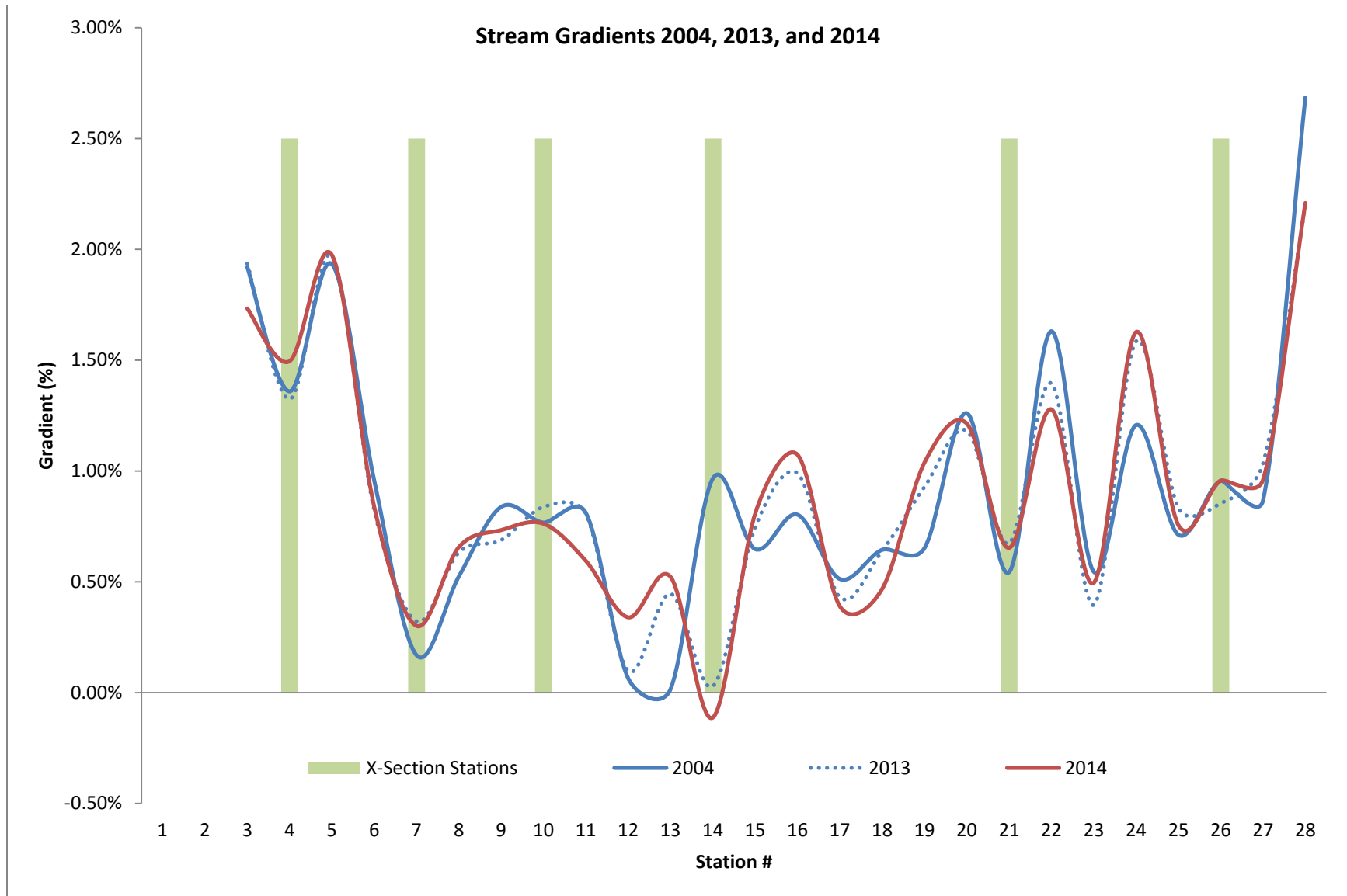


Figure 12: Stream Gradient Change from 2004 – 2014

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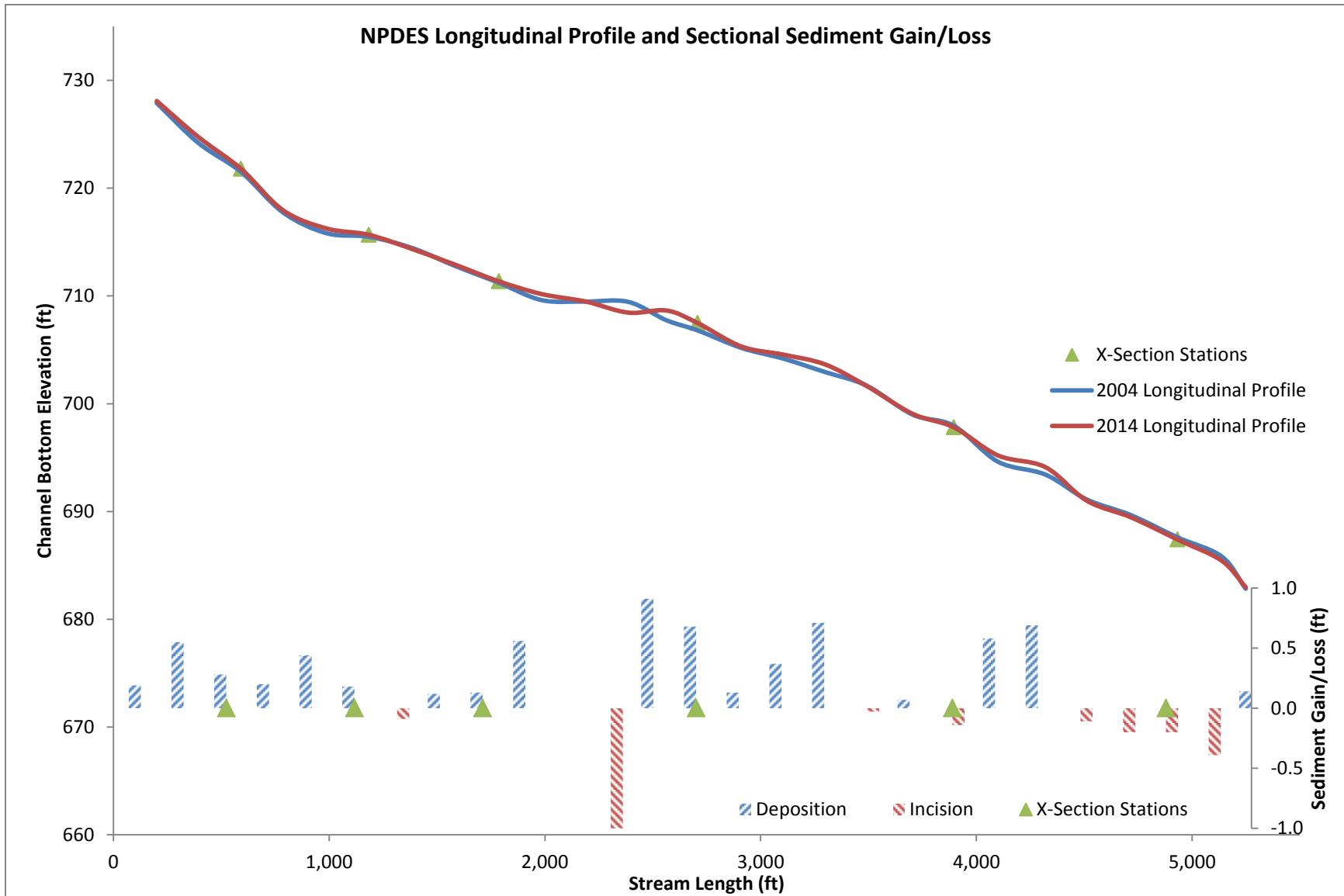


Figure 13: Comparison of Longitudinal Profile and Sectional Deposition/Incision from 2004 - 2014

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### d. Chemical

#### i. Physical Water Data

Physical water analysis results for both monitoring stations are displayed in **Table 14**. Overall, the outfall station water samples were more basic and exhibited higher temperatures and conductivities.

On average, temperatures at the outfall station were 8 percent warmer than those at the in-stream station. Temperature differences ranged from 0°F during storm sampling in December 2013 to 7°F during multiple sampling events. The increased temperatures at the outfall station are most likely due to solar heating of water stored in the pond. Additionally, groundwater interaction and shading at and upstream of the in-stream station could be cooling the water relative to the outfall station.

Conductance was generally greater at the outfall station, 57 percent greater on average. Conductance at the outfall station ranged from 230 µmhos/cm to 1,100 µmhos/cm. The in-stream station ranged from 230 µmhos/cm to 490 µmhos/cm throughout the reporting year. Both stations displayed trends of elevated conductivities in the winter and spring and decreasing conductivity levels throughout the summer and autumn seasons, suggesting that conductance levels may be influenced by de-icing operations during the winter months.

The pH measurements at the outfall were generally more basic with higher variance than those at the in-stream station. The pH measurements at the outfall station averaged 8.1 and ranged from 7.3 to 8.8 pH units. The pH at the in-stream monitoring station averaged 7.6 with a range of 7.1 to 8.1 pH units. Some possible reasons for the increased pH at the outfall station are local goose population and other biological activity within the pond, stormwater interaction with carbonate rocks and concrete used in the construction of the stormwater facility, and influence of roadway derived materials such as road salt.

**Table 14**  
**Physical Water Data for 2013 – 2014 Reporting Year**

In-stream Physical Water Data				Outfall Physical Water Data			
Event	pH	Water Temp (F)	Conductivity (µmhos/cm)	Event	pH	Water Temp (F)	Conductivity (µmhos/cm)
2013-03	7.8	54	310	2013-03	8.1	58	610
2013-04	7.6	67	280	2013-04	8.1	74	290
2013-05	7.5	69	300	2013-05	7.9	74	250
2013-06	8.1	61	N/A	2013-06	8.8	68	N/A
2013-07	7.4	65	230	2013-07	8.3	70	230
2013-08	7.1	52	480	2013-08	7.3	52	790
2014-01	N/A	N/A	490	2014-01	N/A	N/A	1100

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### ii. Event Mean Concentrations

The EMC mean values and ranges observed for the seven storm flow and baseflow events for this reporting year are displayed in **Table 15**. Of the observed analytes, nitrate/nitrite was the only analyte to show a significant difference between the two stations. In this case, nitrates/nitrites were significantly greater at the in-stream station.

**Table 15**  
**EMC Values for 2013 – 2014 Reporting Year**

Event Mean Concentration		In-stream Station			Outfall Station			Significance
Analyte	Units	Mean	Min	Max	Mean	Min	Max	p-value
<b>BOD</b>	mg/L	7.59	2.00	34.00	8.87	2.00	37.00	0.847
<b>TKN</b>	mg/L	0.87	0.50	1.29	1.07	0.74	1.50	0.248
<b>NO2/NO2</b>	mg/L	4.51	1.09	7.60	0.47	0.05	1.70	0.005
<b>Phosphorus</b>	mg/L	0.14	0.02	0.32	0.10	0.05	0.18	0.410
<b>TSS</b>	mg/L	45.36	3.00	105.94	18.13	6.00	31.31	0.135
<b>Copper</b>	mg/L	2.54	2.00	4.24	2.39	2.00	2.99	0.667
<b>Lead</b>	mg/L	2.04	2.00	2.27	2.00	2.00	2.00	0.356
<b>Zinc</b>	mg/L	21.24	2.00	23.88	21.1	20.00	22.76	0.872
<b>TPH</b>	mg/L	5.00	5.00	5.00	5.00	5.00	5.00	1

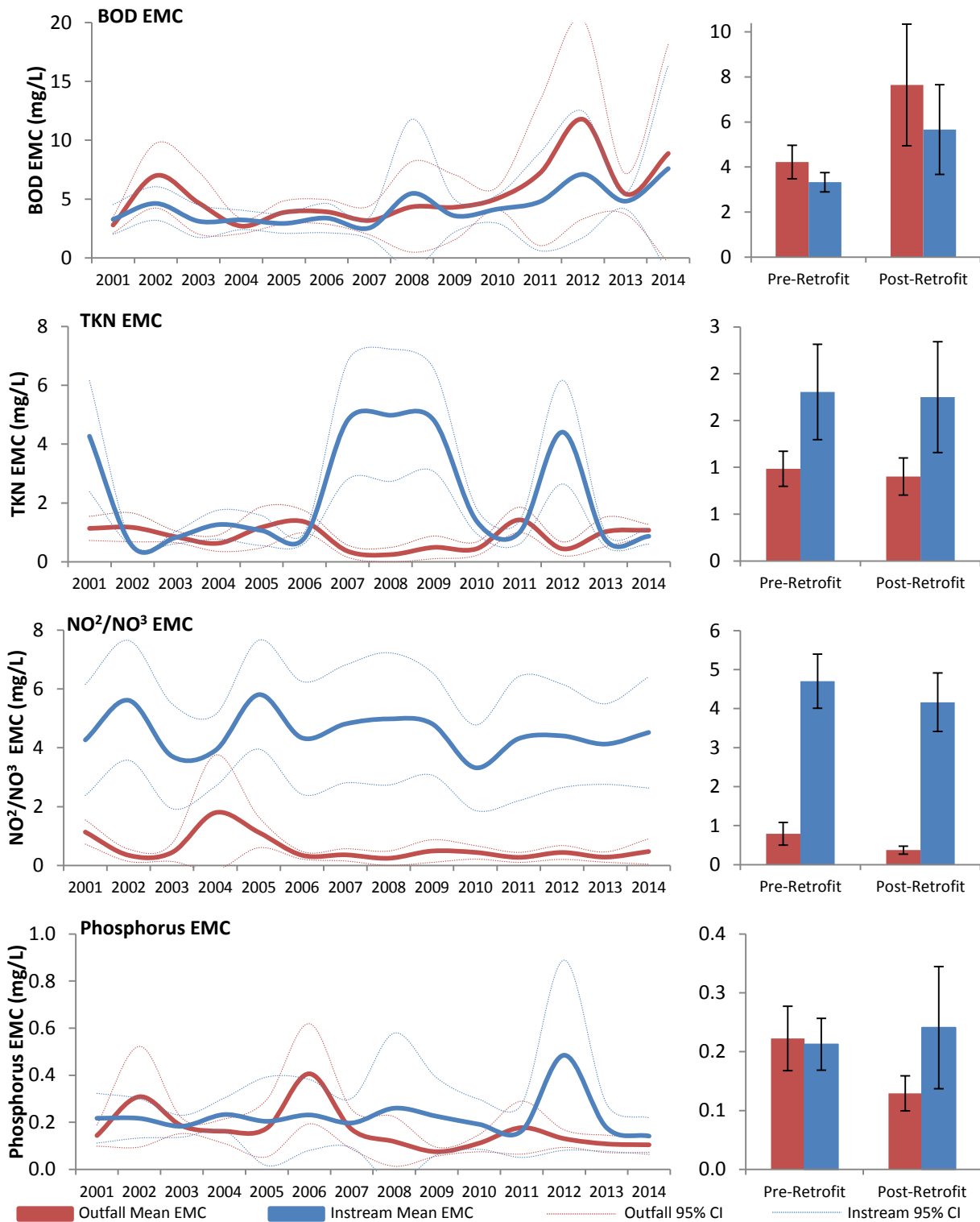
**Figures 14 and 15** present annual mean EMC values for eight analytes from the 2001 through 2014 reporting years. Also presented are mean EMC values before and after the stormwater retrofit. The pre- and post-retrofit graph reinforces this difference with an observed difference in mean EMC concentrations for each station before and after the retrofit; a similar difference was observed with TKN. Though not all mean EMC values were significantly different for the three metals at the in-stream station – Copper, Lead, and Zinc; all EMC values decreased at the outfall station after the retrofit. This is not unexpected given the increased residence within the stormwater facility.

### iii. Annual Pollutant Loads

A discharge hydrograph was created for this reporting period for each monitoring station. Baseflow separation revealed that storm flow was evident above 700 gpm discharge at the in-stream station. Estimations for baseflow, storm flow, and total annual loading based on EMC values and discharge data are located in **Table 16**.

Expectedly, greater analyte loads were observed at the in-stream station. The contribution of analyte loading at the outfall station to total loading (in-stream station) increases during storm flow. Similar to previous observations evident in **Figure 14**, outfall contribution of nitrates/nitrites were low overall. All other analytes had estimated outfall contributions during storm flow of 2 percent to 10 percent. This is elevated relative to baseflow contribution from the outfall station which is under 3 percent of the total loading of each respective analyte.

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**Figure 14: EMC Values from 2001 – 2014 for BOD, TKN, NO<sup>2</sup>/NO<sup>3</sup>, and Phosphorus**

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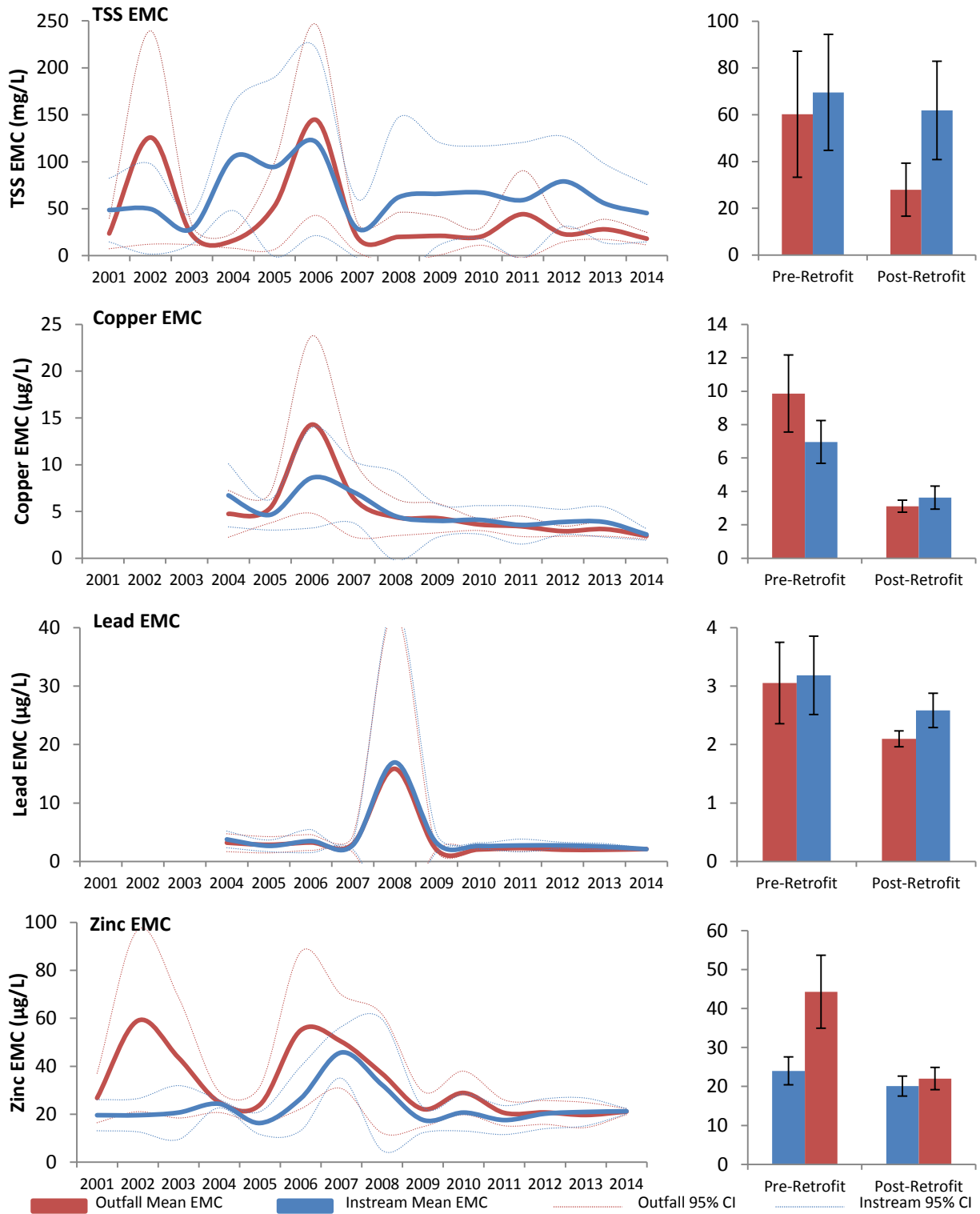


Figure 15: EMC Values from 2001 – 2014 for TSS, Copper, Lead, and Zinc

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**Table 16**  
**Annual Pollutant Loads for the 2013 – 2014 Reporting Year**

Annual Pollutant Loading (Lbs/Year)										
Loc.	Type	BOD	TKN	NO2/NO3	Phosphorus	TSS	Copper	Lead	Zinc	TPH
<b>In-stream</b>	Base	3,159	790	10,898	32	6,318	3	3	32	7,897
	Storm	5,366	1,509	3,526	203	96,152	4	3	29	6,458
	<b>Total</b>	<b>8,525</b>	<b>2,299</b>	<b>14,424</b>	<b>235</b>	<b>102,470</b>	<b>7</b>	<b>6</b>	<b>61</b>	<b>14,355</b>
<b>Outfall</b>	Base	23	12	4	1	141	0.02	0.02	0.24	59
	Storm	529	94	19	8	2,310	0.25	0.19	2	467
	<b>Total</b>	<b>552</b>	<b>106</b>	<b>23</b>	<b>9</b>	<b>2,451</b>	<b>0.27</b>	<b>0.21</b>	<b>2.24</b>	<b>526</b>

#### iv. Seasonal Pollutant Loads

Seasonal discharge for each monitoring station is provided in **Figure 16** for reference. The in-stream station unsurprisingly displayed greater discharges for each season; therefore, it is not unexpected to have greater loadings. Seasonal loadings based on the EMC values and seasonal discharges from **Figure 16** are located in **Table 17**.

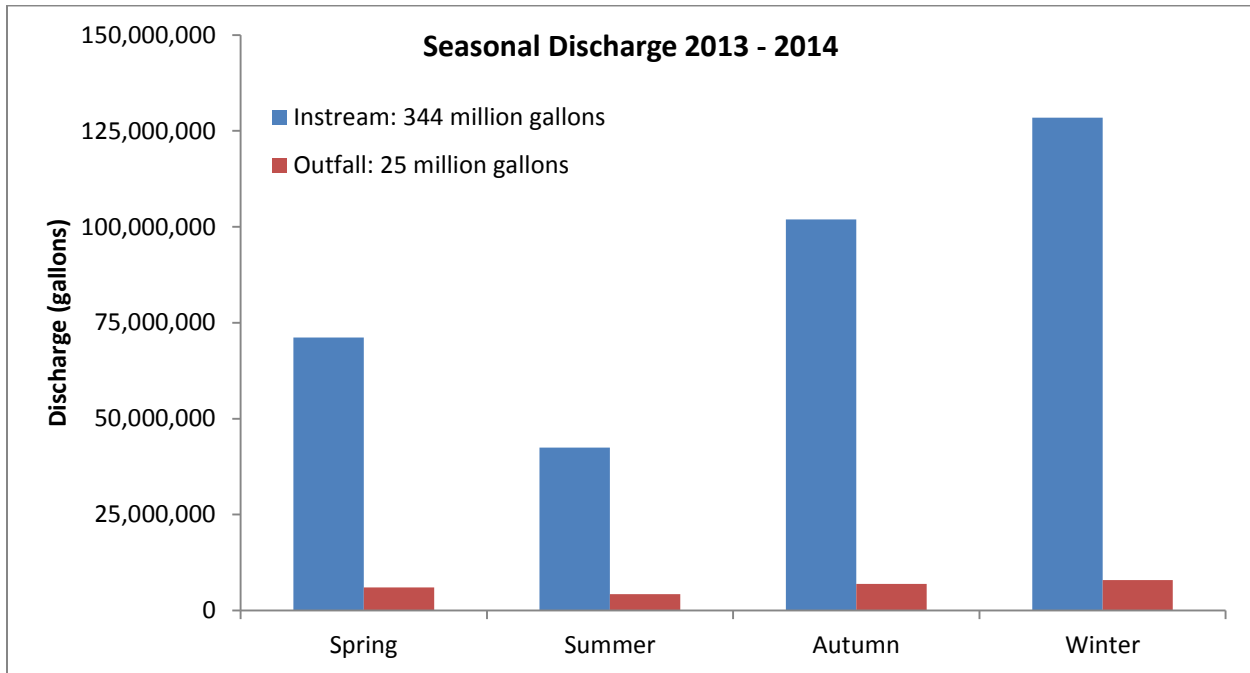
Many of the analytes had the greatest loadings in the winter season. This is not surprising considering that the winter season had the greatest total discharge of the reporting period. Total suspended solids displayed expected results with highest loadings in the spring and autumn when discharge was high and there were many intense storm events. These two seasons had 95 percent of the total suspended solids load for the in-stream station and 75 percent for the outfall station. Phosphorus and nitrates/nitrites both had a single season with the majority of the load. The phosphorus load was greatest in the autumn for the in-stream station, with 62 percent of the total load. Nitrate/nitrite loading, however, was greatest in the winter with 55 percent of the total load occurring during that season. The outfall station consistently correlates to values estimated for the in-stream station.

#### v. Biological

A complete list of species found at each site and the frequency of their occurrence can be found in **Appendix G**. MBSS scoring criteria for the genus level benthic macroinvertebrate IBI for the Eastern Piedmont region of Maryland is shown in **Table 9**. An IBI score was calculated for each station by dividing the total score by the six metrics used for this index, thus deriving an average IBI score. Corresponding narrative ratings were also determined for each station in accordance with MBSS protocols. The narrative rating guidelines can be found in **Table 10**.

The biological health of the outfall and in-stream monitoring stations are summarized by **Tables 18 and 19**. Both stations for the 2014 reporting year displayed poor health ratings. The outfall station had an IBI score of 2, while the in-stream station had an IBI score of 2.33.

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**Figure 16: Seasonal Discharge for the 2013 – 2014 Reporting Year**

**Table 17**  
**Seasonal Pollutant Loads for the 2013 – 2014 Reporting Year**

Seasonal Pollutant Loading (lbs)										
Loc.	Season	BOD	TKN	NO2/NO3	Phosphorus	TSS	Copper	Lead	Zinc	TPH
<b>In-stream</b>	Spring	11,450	667	2,221	75	44,227	1.7	1.2	13.7	2,971
	Summer	1,063	177	2,516	35	2,658	0.7	0.7	7.1	1,772
	Autumn	2,796	994	1,306	216	64,075	2.7	1.8	18.1	4,254
	Winter	2,144	536	7,395	21	3,215	2.1	2.1	21.4	5,359
	<b>Total</b>	<b>17,453</b>	<b>2,374</b>	<b>13,438</b>	<b>347</b>	<b>114,175</b>	<b>7.2</b>	<b>5.8</b>	<b>60.3</b>	<b>14,356</b>
<b>Outfall</b>	Spring	1,100	61	11	5	1,472	0.2	0.1	1.1	253
	Summer	179	43	7	5	466	0.1	0.1	0.7	179
	Autumn	192	49	24	7	1,063	0.1	0.1	1.3	289
	Winter	133	67	113	3	399	0.2	0.1	1.3	333
	<b>Total</b>	<b>1,604</b>	<b>220</b>	<b>155</b>	<b>20</b>	<b>3,400</b>	<b>0.6</b>	<b>0.4</b>	<b>4.4</b>	<b>1,054</b>



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**Table 18**  
**Outfall Station IBI Score for the 2013 – 2014 Reporting Year**

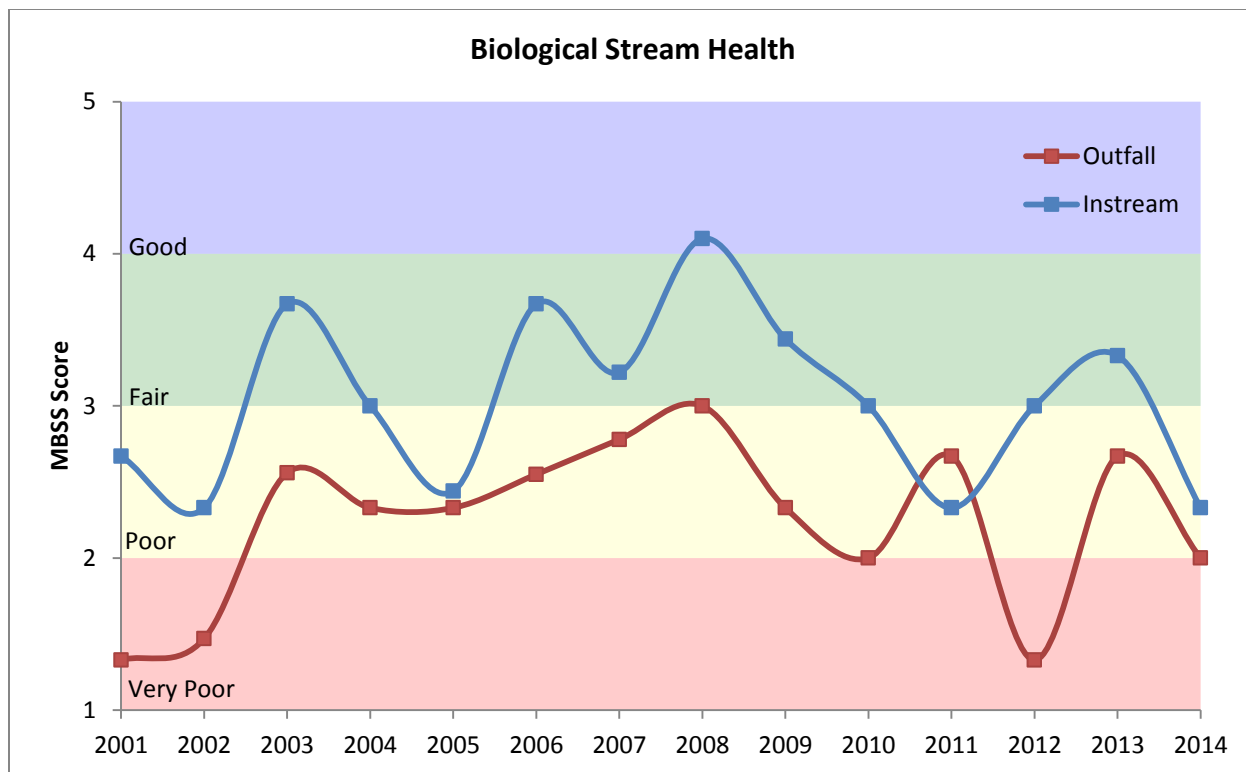
Metric	Result	Score
Number of Taxa	22	3
Number of EPT	0	1
Number Ephemeroptera	0	1
% Intolerant Urban	2	1
% Chironomidae	43	3
% Clingers	56	3
	<b>Total Score</b>	<b>12</b>
	<b>IBI Score</b>	<b>2</b>
	<b>Narrative Rating</b>	<b>Poor</b>

**Table 19**  
**In-stream Station IBI Score for the 2013 – 2014 Reporting Year**

Metric	Result	Score
Number of Taxa	24	3
Number of EPT	5	3
Number Ephemeroptera	1	1
% Intolerant Urban	12	1
% Chironomidae	54	3
% Clingers	57	3
	<b>Total Score</b>	<b>14</b>
	<b>IBI Score</b>	<b>2.33</b>
	<b>Narrative Rating</b>	<b>Poor</b>

**Figure 17** presents these scores annually from 2001 through 2014. The trends of both stations appear to be correlative throughout this time period. On average, the score for the in-stream station remains 0.8 greater than that of the outfall station. The average score for the outfall station is 2.2, which is rated as poor biological health according to MBSS protocols. The average score for the in-stream station is 3, which is on the boundary between poor and fair biological health according to MBSS protocols. The results from the biological survey were very similar with the exception of the presence of a large number of Ephemeroptera within the in-stream reach. This was the only scoring parameter that was different from the outfall stream reach. The outfall station appears to be relatively intolerable for most sensitive species as only 2 percent of the individuals recovered were considered sensitive with a large percentage of tolerant species present.

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**Figure 17: Macroinvertebrate IBI Analysis 2001 – 2014**

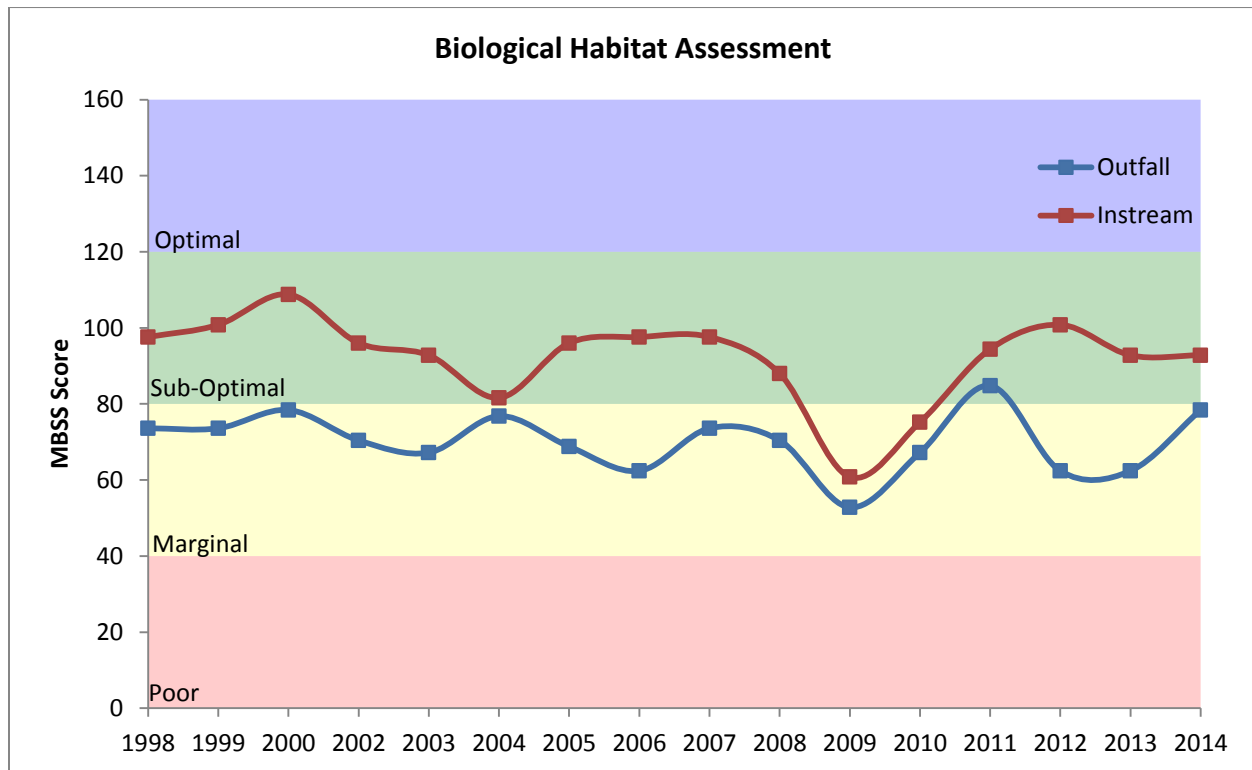
The biological habitat assessment results for each station are summarized in **Table 20**. The scores are a maximum of 160 points based on eight parameters as shown in **Table 11**. Overall, the quality of biological habitat at the in-stream station remains higher than the outfall station, with overall habitat scores of 93 and 78. From 1998 through 2014 (excluding 2001), as shown in **Figure 18**, the stations have average habitat scores of 92 for the in-stream station and 70 for the outfall station. This was a typical year for the in-stream station and better than average for the outfall station regarding quality of habitat. The weakest parameters for both stations are riffle/run quality, embeddedness, and shading.

It should be noted that the habitat assessment is wholly subjective. Slight changes may be a result of inconsistencies in assessor(s) scoring methodology. To show a general relationship between the habitat and biological scores, these have been plotted for the outfall and in-stream stations in **Figures 19 and 20**. These are plotted on each assessment's overall scoring range. Though not unexpected, it is evident that the lower the quality of habitat in this case, the lower the biological quality found in the habitat. Both stations appear to have a one to two year period of latency between habitat and biological changes. The certainty of any evident relationship is low given the high degree of bias and chance that is probable in these assessments.

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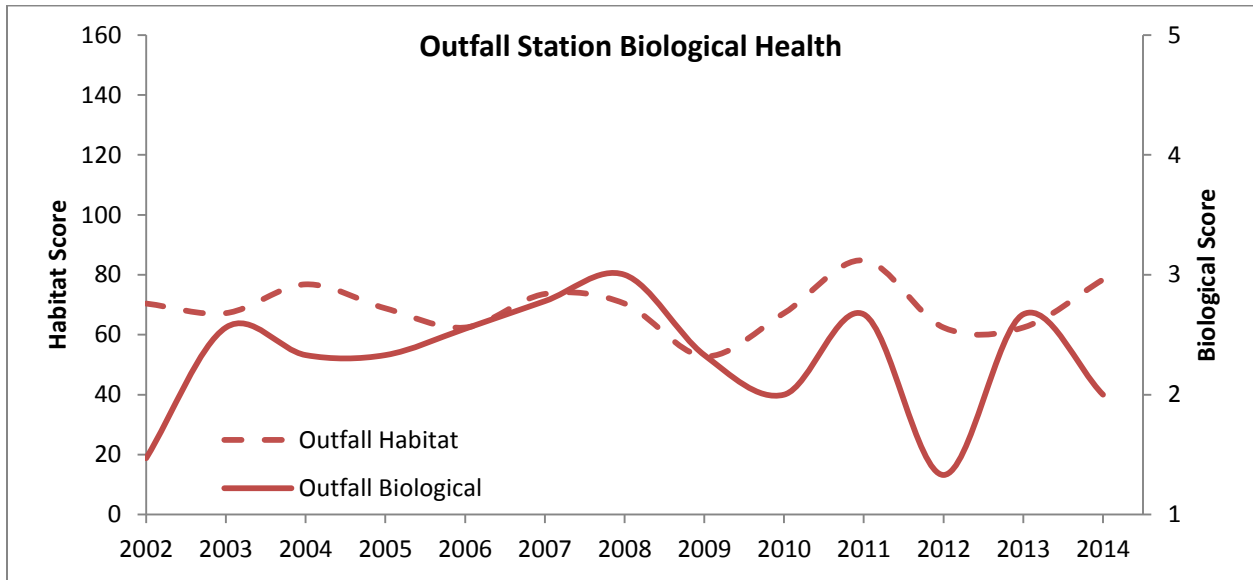
**Table 20**  
**Spring 2014 Habitat Assessment Results**

Parameter	Outfall	Category	In-stream	Category
In-stream Habitat	10	marginal	12	sub-optimal
Epifaunal Substrate	10	marginal	12	sub-optimal
Velocity/Depth Diversity	10	marginal	12	sub-optimal
Pool/Glide/Eddy Quality	9	marginal	11	sub-optimal
Riffle/Run Quality	9	marginal	10	marginal
Embeddedness	10	marginal	10	marginal
Shading	5	poor	10	marginal
Trash Rating	15	sub-optimal	16	optimal
<b>Total Score (max. of 160)</b>	<b>78</b>		<b>93</b>	
<b>Score (percent)</b>	<b>49%</b>		<b>58%</b>	

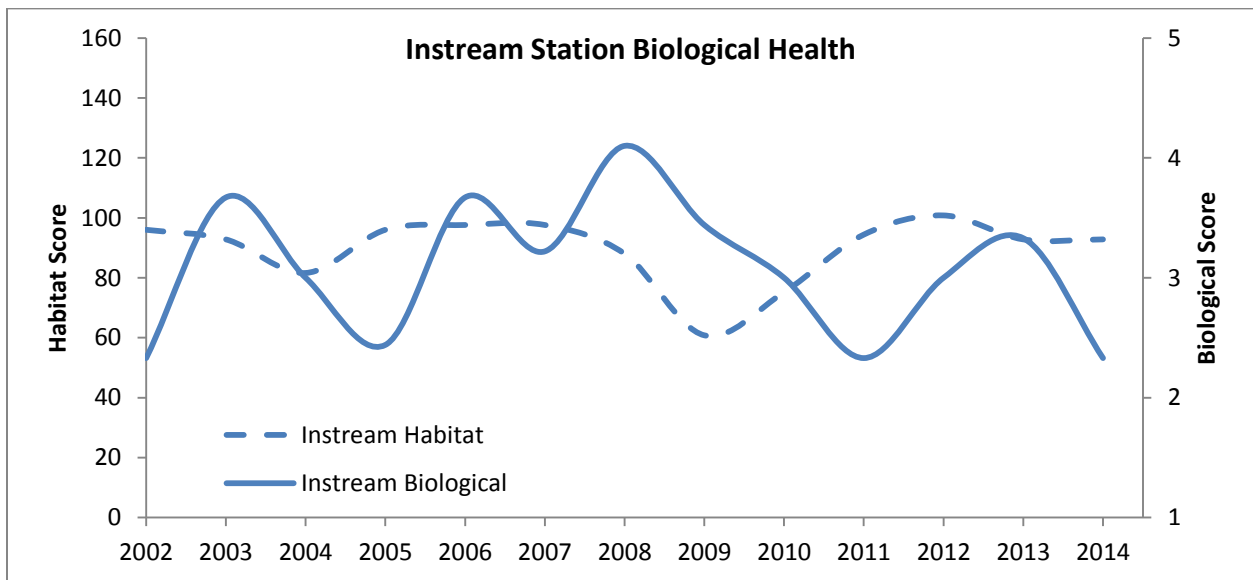


**Figure 18: Comparison of NPDES Station Habitat 1998 – 2014 (Excluding 2001)**

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**Figure 19: Comparison of Outfall Station Habitat and Biological IBI Scores 2002 – 2014**



**Figure 20: Comparison of In-stream Station Habitat and Biological IBI Scores 2002 – 2014**

## **E. Management Programs**

### **1. Stormwater Management**

The County stormwater management program is the responsibility of the BRM within LUPD and implemented via Chapter 151 of the Carroll County Code of Public Local Laws and Ordinances. Reviews are the responsibility of the Program Engineer and the Stormwater Management Review Assistant. Carroll County consists of 289,677 acres of land, of which 11,540 acres of drainage area are treated with stormwater management practices. This equates to 4.0 percent of the County's land area. Review and approval of stormwater management during the period of July 1, 2013, through June 30, 2014 consisted of 368 plans reviewed and 12 approved as-built inspections. There were no programmatic changes undertaken during the reporting period.

Residential stormwater management facilities and storm sewer systems in unincorporated areas are owned by the County. Commercial and industrial facilities are maintained by the property owners. Database information on facilities located in Carroll County and an updated map are contained in Appendix B of this report.

Inspections of these facilities are handled by the EISD. Each facility is inspected every three years, with letters sent to the owner indicating the condition of the facility and the amount of time allowed for compliance to be achieved, if necessary. In the case of County-owned structures, the notice is sent to the Bureau of Facilities. The EISD performed 290 inspections this year, resulting in 98 corrective actions. Follow-up inspections are performed to ensure compliance has been achieved in a timely matter. As of June 30, 2014, 70 of those facilities have been brought into compliance. In cases where violations still exist, Notices of Violations are sent, allowing an additional amount of time to resolve issues. During the period of July 1, 2013, to June 30, 2014, 10 Notices of Violations were issued. The remaining 18 have been notified, and EISD is awaiting corrective action.

### **2. Erosion and Sediment Control**

The EISD of the BRM is responsible for inspection and enforcement of all related codes. MDE has delegated sediment control enforcement authority to Carroll County through June 30, 2015. Inspection statistics relating to building permits, grading permits, and forest-harvest grading permits during the reporting timeframe were as follows:

- 123 grading permits issued
- 2,057 sediment control inspections

All inspections are recorded, with notices sent for both violations and compliance. In 6 cases, Stop Work Orders were posted for severe violations, which in most instances required compliance within 36 hours.

As part of the NPDES permit requirements, grading permits issued with earth disturbance in excess of 1 acre are reported to MDE quarterly.

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During this reporting year, one (1) “Responsible Personnel Certification” class was held on November 20, 2013. Sixty-seven participants attended the training, with “Green Cards” issued to 52. MDE established an on-line certification program in April of 2014. Therefore, customers are now being provided with information relating to the MDE course rather than holding a second class this year.

### 3. Illicit Discharge Detection and Elimination

This program is administered by the BRM with outfall screening inspections in the County performed by the EISD and the NPDES Compliance Specialist. Major outfall screening maps are developed to assist the inspection staff with locating the outfalls. Currently, outfall selection emphasizes screening areas in the county with greater illicit discharge potential such as commercial and industrial land use areas, densely populated areas, and aging sewer infrastructure areas.

EISD staff participated in annual IDDE inspection training on October 31, 2013 prior to the inspection season. Current operating procedures were reviewed. These procedures will be reviewed, updated, and further developed for future use in the next permit year.

Visual inspections are performed to determine the condition of the outfall area, the existence of illicit discharges, and the condition of the storm drain system. If an illicit non-stormwater flow is determined, a notification is sent to the owner regarding corrective actions needed to alleviate the discharge violation per County Code, Chapter 53; Environmental Management of Storm Sewer System. If the problem is severe enough to warrant immediate correction, an investigation begins immediately by inspection staff. If the results of a non-stormwater flow inspection or investigation are inconclusive, additional screenings may be prescribed as appropriate. Depending on the nature of the discharge, the case may be forwarded to an appropriate agency to resolve, such as the Carroll County Bureau of Permits and Inspections or MDE. When structural damage or maintenance needs are observed, the observations are reported to the suitable County agency or municipality.

Illicit discharge inspections must be conducted within both Phase I and Phase II jurisdictions. Based on previous discussions with MDE, it is understood that the required 100 inspections per permit year include Phase I areas in the unincorporated area and the Phase II areas in the incorporated municipalities. Staff conducted 106 routine outfall screenings, with 60 in the County and 46 in the municipalities. Outfall screenings were distributed among 7 watersheds as follows: Prettyboy (6), Loch Raven (5), Liberty (40), Patapsco River – South Branch (13), Lower Monocacy (4), Double Pipe Creek (28) and the Upper Monocacy River (10) (see outfall map, Appendix D). A total of three screenings required further investigative action, with 1 potential illicit discharge. Of the 106 inspections, 6 structural or maintenance observations were forwarded to the Carroll County Bureau of Roads or Facilities, and 12 were sent to various municipalities.

Complaint-driven illicit discharge/dumping events reported by the public or other agencies are also investigated by the EISD. A stormwater pollution phone line with NPDES information was added in June 2012 to the County website for easier reporting by the public. Complaint-driven investigations are summarized in Appendix E.

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## 4. County Property Management

Carroll County owns and operates a number of facilities that are classified as industrial. These facilities principally support the County's responsibilities to provide public infrastructure management including: water and wastewater treatment, solid waste management, roads and facility maintenance, vehicle maintenance, and airport operations. Four facilities require coverage under the new General Industrial Stormwater NPDES permit 12SW. **Table 21** below shows current status for those County facilities registered under the "Maryland General Discharge Permit for Stormwater Associated with Industrial Activities – Discharge Permit No. 02-SW and No. 12-SW." A comprehensive update of each Stormwater Pollution Prevention Plan (SWPPP) occurred for the 4 facilities for submittal to MDE with respective Notice of Intent applications.

**Table 21**  
**County NPDES Industrial Permitted Facilities Status - July 15, 2014**

Carroll County Facility	NOI Registration #	SWPPP Status	12SW Submittal
Regional Airport	02SW 1755	Current/12SW	NOI & SWPPP submitted to MDE
Maintenance Facility	02SW 1861	Current/12SW	NOI & SWPPP submitted to MDE
Northern Landfill & Transfer Station	02SW 0660	Current/12SW	NOI & SWPPP submitted to MDE
Hood's Mill Landfill (Capped/Closed) & Transfer Station	02SW 0661	Current/12SW	NOI & SWPPP submitted to MDE
Hodges Landfill (Capped/Closed)	Terminated 5/29/14	N/A	N/A
John Owings Landfill (Capped/Closed)	Terminated 5/29/14	N/A	N/A
Bark Hill Landfill (Capped/Closed)	Terminated 5/29/14	N/A	N/A

## 5. Road Maintenance (Including storm sewer system maintenance)

County storm sewer systems are inspected regularly, with maintenance performed on inlets and outfalls, as needed. The maintenance includes structural repairs, inlet cleaning, and outfall stabilization. The BRM supplies the Bureau of Roads Operations with up-to-date information on the conditions of storm drain systems countywide, including a spreadsheet noting outfall maintenance needs discovered during IDDE screenings. This information is then used as a basis for regular inspection and maintenance.

The County Bureau of Roads Operations does not use pesticides or herbicides for any road maintenance activities. All roadside maintenance efforts utilize manual or mechanical methods. The overall management of noxious weed occurrences along road rights-of-way and on private properties is implemented via an agreement with the Maryland Department of Agriculture (MDA). Employees from MDA perform spot spraying along County rights-of-way as well as private lands for a fee.

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Carroll County continues to develop alternative de-icing and reduced salt programs. The Bureau of Roads Operations staff regularly participates in conferences and workshops that cover de-icing alternatives as part of the agenda. The County is continuing with a winter de-icing program that emphasizes equipment maintenance, calibration, and training in the fall and utilizes a process of pre-wetting salt use for more effective and efficient application.

### 6. Public Education

Public education takes many forms to ensure that citizens have access to information regarding environmental programs as well as general household environmental management. The County actively utilizes cable TV resources to place public service information on the television.

Carroll County also continues to make available information on County environmental programs and issues. Individuals are encouraged to report any evidence of illicit discharge or illegal dumping. Citizens can call the non-emergency Carroll County stormwater pollution phone line at 410-386-2210. Carroll County regularly informs contractors of their responsibility to secure an NPDES permit at construction sites. In addition, development review applicants are informed of the applicability of any state or federal permit to their project or facility. In connection with discharge complaints, facilities suspected of needing to secure an NPDES permit or other permit not administered by the County are referred to the applicable agency for investigation.

A dedicated NPDES webpage <http://ccgovernment.carr.org/ccg/plan/npdes/> entitled “Protecting Carroll County Waters” under “Living Here” found on the Carroll County Government website provides basic stormwater pollution prevention and education information with links to U.S. Environmental Protection Agency (EPA) and MDE NPDES-related sites for additional information available to the public.

Carroll County Department of Public Works (DPW) has a successful Solid Waste Recycling Program with an extensive public education website under “Living Here” <http://ccgovernment.carr.org/ccg/recycle> for its citizens.

In this reporting year, the County again hosted residential household hazardous waste drop-off events for County residents. Two events took place during this annual reporting period, held on October 19, 2013 and April 19, 2014. These events also included a service to shred any paper records. Events such as these provide County residents with a safe means of disposing of residual household chemicals, shredding of unneeded documents, and an opportunity to learn many ways in which to protect the environment. Collection of unused prescription and non-prescription drug “drop off” can be made to designate law enforcement agencies. The County also hosted a rain barrel and composting event on March 22, 2014, to provide rain barrels and composting bins to residents at reduced cost.

In Carroll County, staff is continuously involved in environmental education efforts. LUPD staff regularly volunteer to speak at schools, community organizations, club meetings, and other venues in an effort to ensure that good and timely environmental information is available to the



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community. The LUPD website provides useful information on programs available to County residents and others.

The number of specific public education venues has increased during this permit year, which provides additional opportunities to distribute information related to stormwater management, water quality and other various environmental issues:

### FALL 2013 SCHEDULE

- November 25: Wakefield Valley Golf Course Tree Planting

### SPRING 2014 SCHEDULE

- March 25: Envirothon Aquatic Education – High School Level
- April 30: Envirothon Aquatic Education – High School Level
- April 22: Earth Day – Piney Ridge Elementary 5<sup>th</sup> Grade – Watershed Modeling and Assessment
- May 4: Charlottes Quest Nature Center Spring Fest – Manchester
- April 10: Cherry Branch Stream Buffer Planting – Union Bridge
- May 10: Westminster Flower & Jazz Festival – Westminster
- May 13: Piney Ridge Elementary 5<sup>th</sup> Grade – Watershed Modeling and Assessment
- April/May: East Middle School “Engineering is Environmental”

### SUMMER 2014 SCHEDULE

- July 26: Liberty Reservoir Day

Carroll County continues to provide an open forum on environmental issues and concerns through its Environmental Advisory Council (EAC). This Commissioner-appointed citizen board meets monthly. The EAC functions at the direction of the Carroll County Board of Commissioners and works cooperatively with County environmental staff to research environmental policy issues; advises the Board of County Commissioners; fosters environmental education; and generally acts in the best interest of County residents by promoting effective environmental protection and management principles. The EAC also serves as the County’s Tree Commission.

The Water Resource Coordination Council (WRCC) was formed in February 2007 through a cooperative partnership and by formal joint resolution to discuss and address issues related to water resources. This council, composed of representatives from the eight municipalities, the County, and the Carroll County Health Department, discuss and collaborate on pertinent issues related to water, wastewater, and stormwater management. The monthly meetings provide an excellent venue for members to coordinate on various current issues. The WRCC took the lead in coordinating and developing the Water Resource Element, a joint document that the County and seven municipalities adopted. The WRCC discusses NPDES technical and administrative issues on a regular basis. The forum provides a much-needed coordination mechanism for NPDES efforts across jurisdictional boundaries. Currently, the WRCC also serves as the local Watershed Implementation Plan (WIP) team for the development and implementation of Maryland’s Phase II WIP and continues in this role to address WIP issues and tasks as they arise.

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During the permit year, the Board of County Commissioners requested the WRCC to review guidelines and recommendations related to the requirements of House Bill 987- Watershed Protection and Restoration Program. The involvement of the WRCC and all the municipal jurisdictions provided an extremely valuable educational opportunity regarding stormwater management and NPDES requirements, which extended to elected officials and the general public

### 7. Compliance Status

County reorganization over the past several years resulted in personnel and responsibilities transitioning in numerous areas, including those related to permit compliance. To strengthen and guide NPDES compliance efforts, an annual work plan was developed. The work plan outlined tasks to ensure key permit requirements are met, including areas of training and inspections.

Annual NPDES training occurred in November 2013 for County DPW management/supervisory level, SWPPP team members, and Risk Management personnel responsible for permit compliance. The training included an overview of the NPDES program, MS4 and industrial permitting requirements, and an instructional video covering IDDE, good housekeeping, and spill prevention. These training records are kept and maintained by the LUPD staff. Annual training is scheduled at each permitted facility for County employees that have the possibility of interfacing with stormwater pollution in their work duties. These training records are kept on-site at each facility. During the permit year, BMPs are performed and inspections scheduled for each permitted facility. Inspection records are maintained on-site at each facility location and adjustments are made to enhance compliance.

On May 20, 2013, the County received a final EPA NPDES MS4 Program Inspection Report conducted in late April 2012. Upon receipt, the County submitted to EPA on July 3, 2013, comments regarding the report findings. The County received correspondence related to the “opportunity to confer and resolve” formal violations related to the audit on November 14, 2013. Included in those documents were a draft Administrative Order on Consent, as well as Consent Agreement and Final Order.

The County and EPA then entered into negotiations regarding the Order on Consent and Consent Agreement and Final Order. The result was an Administrative Order on Consent signed April 3, 2014. Upon delivery of several action items, per the Administrative Order on Consent, the audit process will be complete.

### 8. Permit Database

The Department of Land Use, Planning & Development maintains a computerized database of permits issued to the County. The system provides easy access to all of the permits for which Carroll County is responsible. It includes an e-mail notification system that alerts the responsible individual when commitments are pending, including permit renewals.

### **F & G. Watershed Restoration (F)** **Watershed Assessment and Planning (G)**

The above-referenced sections of the permit provide conditions for watershed improvements directed toward mitigation of impervious surfaces and water quality. Sections F.2 and F.3 require the restoration of 10 percent of the County's untreated impervious acreage for mitigation covering the permit period (2005 – 2010) and the planning of an additional 20 percent to be included in future permitting. As discussed in Part I C.3., Impervious Surfaces, the County is applying the ESD to the MEP standard to a portion of the rural area impervious acres. The County will use 6,715 acres as the baseline for unincorporated untreated impervious acres. Therefore, the 10 percent restoration requirement would apply to 672 impervious acres. An additional 672 acres are to be restored to address the next 10 percent, for a total of 20 percent, or 1,344 acres.

Carroll County continues to vigorously apply its efforts at watershed restoration, i.e., impervious surface mitigation and water quality improvement. Projects are designed, managed, and implemented by LUPD and BRM through a capital improvement program, titled Watershed Assessment and Improvement (NPDES). Funding levels for operating (administrative/technical functions), as well as capital (engineering and construction), are discussed in detail in Part III I.

Projects are identified via the watershed assessment process. The current status of watershed planning can be found in **Figure 21**. This figure identifies the watershed along with the status of stream corridor assessments, watershed assessments, and the development of watershed restoration plans.

The County continues to plan, design, and implement restoration projects including the following:

- rehabilitation and upgrade of older existing stormwater management facilities to current standards;
- management of existing untreated impervious areas; and
- stream buffer tree planting initiatives.

The current status of restored *impervious* acres in Carroll County is depicted in **Figure 22**. The green line in **Figure 22** indicates acres already restored. As of June 30, 2014, approximately 1,537 acres have been restored, which is approximately 23 percent of the 6,715 baseline acres. The yellow line represents acres of impervious surface for which restoration projects are currently in design. The orange line represents future planned projects.

**Figure 23** depicts the total *drainage area* acres treated by the restoration projects. Currently, a total of 3,172 acres of drainage area have received water quality treatment to current standards via restoration projects.

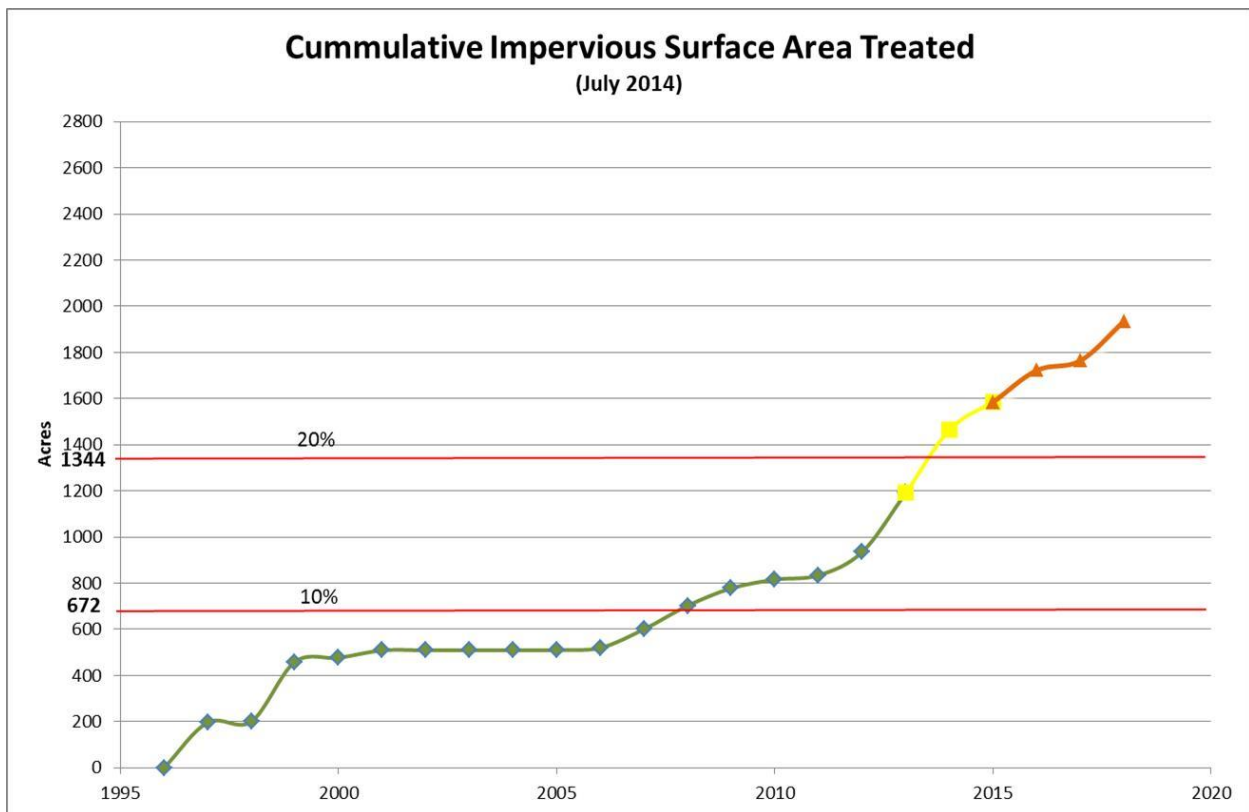
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MAJOR WATERSHED	WATERSHED #	WATERSHED NAME	SCA	WATERSHED CHARACTERIZATION	WATERSHED RESTORATION
Genevage Creek	0289	Genevage Creek	2014		
	0290	West Branch Codorus Creek	2014		
Double Pipe Creek	0248	Double Pipe Creek			
	0268	Sams Creek			
	0269	Sams Creek			
	0271	Dickenson Creek			
	0272	Little Pipe Creek			
	0273	Priestland Branch/Wolf Pit Creek			
	0274	Little Pipe Creek			
	0275	Turkeyfoot Run			
	0276	Little Pipe Creek			
	0277	Meadow Branch			
	0278	Big Pipe Creek			
	0279	Big Pipe Creek			
	0280	Big Pipe Creek			
	0281	Bear Branch			
	0282	Bear Branch			
	0283	Big Pipe Creek			
	0284	Big Pipe Creek			
	0285	Silver Run			
0286	Big Pipe Creek				
0287	Big Pipe Creek				
0288	Deep Run				
Liberty Reservoir	1046	Snowden's Run	2009-2010	2013	
	1047	Liberty Reservoir	2011-2012	2013	
	1048	Roaring Run/Board Run	2011-2012	2013	
	1049	Little Morgan Run	2011-2012	2013	
	1050	Morgan Run	2011-2012	2013	
	1051	West Branch Patapsco River	2011-2012	2013	
	1052	East Branch Patapsco River	2011-2012	2013	
	1053	Morgan Run	2011-2012	2013	
	1054	Morgan Run	2011-2012	2013	
	1055	Little Morgan Run	2011-2012	2013	
	1056	Middle Run	2011-2012	2013	
	1057	Beaver Run	2011-2012	2013	
	1058	Deep Run	2011-2012	2013	
	1059	East Branch Patapsco River	2011-2012	2013	
1060	Aspen Run	2011-2012	2013		
1061	Cranberry Branch	2011-2012	2013		
1062	West Branch Patapsco River	2011-2012	2013		
Lower Monocacy River	0235	South Fork	2014		
	0238	North Fork	2014		
Patapsco River North Branch	1019	North Branch Patapsco River	2014		
Prettyboy Reservoir	0313	Poplar Run	2010-2011	2012	2013
	0314	Georges/Murphy Run	2010-2011	2012	2013
	0315	Grave/Indian Run	2010-2011	2012	2013
	0316	Gunpowder Falls	2010-2011	2012	2013
	0317	South Branch Gunpowder Falls	2010-2011	2012	2013
S Branch Patapsco	1020	South Branch Patapsco River	2013	2014	
	1021	Piney Run	2003	2010	
	1022	South Branch Patapsco River	2013	2014	
	1023	Piney Run	2003	2010	
	1024	Piney Run	2003	2010	
	1025	South Branch Patapsco River	2013	2014	
	1026	Tuckers Branch	2013	2014	
	1028	South Branch Patapsco River	2013	2014	
	1029	Middle Run	2013	2014	
	1030	Gillis Falls	2013	2014	
1031	Gillis Falls	2013	2014		
Upper Monocacy River	0247	Upper Monocacy River			
	0254	Piney Creek			
	0255	Piney Creek			
	0256	Upper Monocacy River			
	0257	Piney Creek			
	0264	Alloway Creek			
	0266	Piney Creek			
0267	Piney Creek				
		Completed			
		Completed- DRAFT			
		In Progress			

Figure 21: Status of Watershed Planning, Carroll County, Maryland

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During the permit year 2013 – 2014, the County completed a total of five (5) stormwater retrofit projects, equaling 123 acres of treated imperviousness and 486.57 acres of treated drainage area. In addition, two (2) tree plantings associated with stream buffer enhancement were implemented which resulted in 5.42 acres of impervious treated. Specific projects completed (green), in design (yellow), and planned (orange) can be found in **Table 22**. An estimate of pollutant load reductions associated with select completed projects can be found in **Table 23**.



**Figure 22: Impervious Surface Acres Treated For Constructed, Designed, And Planned Projects**

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**Figure 23: Drainage Area In Acres Treated For Construction, Design, And Planned Projects.**

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Table 22

Listing of Watershed Restoration Efforts, June 2014

NPDES

Year	Project Name	Project Type	Drainage Area	Project Status	County Treated Impervious	MDE8NAME
1996	Winter Street Shallow Marsh	Wetland Planting	0.00	Completed	0.00	Liberty Reservoir
1997	Longwell County Park Channel Restoration	Restoration	211.20	Completed	142.80	Liberty Reservoir
1997	Longwell County Park Wetland	Shallow Marsh	76.80	Completed	53.76	Liberty Reservoir
1998	Carroll County Times Channel Reconstruction	Restoration	6.60	Completed	0.50	Liberty Reservoir
1998	Carroll County Times SWM Retrofit	Dry Detention Pond	10.26	Completed	3.02	Liberty Reservoir
1998	East Middle School Water Quality Facility	Shallow Marsh	10.18	Completed	0.80	Liberty Reservoir
1999	Carroll County District Court	Retrofit	1.96	Completed	0.00	Liberty Reservoir
1999	Piney Run Channel Reconstruction	Restoration	397.04	Completed	258.07	Loch Raven Reservoir
2000	Carroll County MPC Parking Mgmt.	Retrofit	0.60	Completed	0.60	Liberty Reservoir
2000	Carroll County Times	Retrofit	0.30	Completed	0.30	Liberty Reservoir
2000	Carroll County Times Addition	Retrofit	6.80	Completed	0.00	Liberty Reservoir
2000	Piney Run Buffer Project	Riparian Buffer	0.00	Completed	0.40	Loch Raven Reservoir
2000	Ralph Street Facility	Water Quality Marsh	29.50	Completed	16.50	Liberty Reservoir
2001	Hampstead Valley 3 Dry Retention	Riser Structure Construction	79.19	Completed	32.27	Loch Raven Reservoir
2001	North Woods Trail Dry Retention Facility	Outfall Modification	236.80	Completed	0.00	Loch Raven Reservoir
2001	Roberts Field Wet Retention Pond Retrofit	Riser Structure Modification	47.20	Completed	0.00	Loch Raven Reservoir
2005	Eldersburg Elementary School	Retrofit	1.45	Completed	1.00	Liberty Reservoir
2006	Chung Project	Channel Stabilization	92.00	Completed	10.00	S Branch Patapsco

## 2014 NPDES MS4 Permit Annual Report

Year	Project Name	Project Type	Drainage Area	Project Status	County Treated Impervious	MDE8NAME
2007	Winfield Fire Department Addition	New Construction	3.13	Completed	0.22	S Branch Patapsco
2007	Englar Business Park	Retrofit	95.00	Completed	80.00	Liberty Reservoir
2007	Marriott Wood I Facility #1	Replace	3.00	Completed	0.56	Liberty Reservoir
2008	Neale Court Storm Drain	Retrofit	3.23	Completed	0.64	S Branch Patapsco
2008	Hickory Ridge	Retrofit	23.75	Completed	4.80	Liberty Reservoir
2008	Bateman SWM Pond	New Construction	47.25	Completed	7.40	Liberty Reservoir
2008	Marriott Wood I Facility #2	Retrofit	7.12	Completed	2.04	Liberty Reservoir
2008	Marriott Wood II	Retrofit	11.62	Completed	1.92	Liberty Reservoir
2008	Westminster Airport Pond	Retrofit	204.84	Completed	85.00	Liberty Reservoir
2008	Piney Run Planting (Filbe)	Buffer Planting	47.20	Completed	1.14	S Branch Patapsco
2008	Elderwood Village	Retrofit	15.28	Completed	4.94	Liberty Reservoir
2008	Collins Estate	Retrofit	32.68	Completed	6.36	Liberty Reservoir
2008	Arthur Ridge	Retrofit	51.17	Completed	5.14	S Branch Patapsco
2009	Rickell Property Tree Planting	Tree Planting	4.72	Completed	0.57	Double Pipe Creek
2009	Oklahoma II Foothills	Retrofit	23.72	Completed	6.06	Liberty Reservoir
2009	Oklahoma Phase I	Retrofit	24.44	Completed	7.27	Liberty Reservoir
2009	Deer Park Tree Planting	Buffer Planting	16.28	Completed	0.57	Liberty Reservoir
2009	Piney Run Planting (Bank Site)	Buffer Planting	23.84	Completed	2.09	S Branch Patapsco
2009	Arbor Valley Planting (Piney Run)	Buffer Planting	56.55	Completed	2.89	S Branch Patapsco
2009	Edgewood	Retrofit	38.00	Completed	12.12	Liberty Reservoir
2009	South Carroll High School - Fine Arts Addition	New Construction	28.19	Completed	14.32	S Branch Patapsco
2009	Naganna Pond	New Construction	24.50	Completed	10.00	Liberty Reservoir
2009	High Point	Retrofit	9.40	Completed	1.82	Liberty Reservoir



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Year	Project Name	Project Type	Drainage Area	Project Status	County Treated Impervious	MDE8NAME
2010	Brimfield	Retrofit	34.69	Completed	17.23	S Branch Patapsco
2010	Hoff Pond	New Construction	77.30	Completed	2.98	Liberty Reservoir
2010	Piney Run Planting (Bank Site #2)	Buffer Planting	21.40	Completed	11.79	S Branch Patapsco
2010	Heritage Heights	Retrofit	21.40	Completed	4.10	Liberty Reservoir
2010	Campus Heights	Seepage Wetland System	27.98	Completed	5.71	Liberty Reservoir
2010	Quail Meadows	Retrofit	55.40	Completed	14.50	Liberty Reservoir
2010	Harvest Farms 1A	Retrofit	43.80	Completed	11.25	S Branch Patapsco
2010	Parrish Park	Retrofit	94.23	Completed	18.20	S Branch Patapsco
2010	Clipper Hills - Gardenia	Retrofit	33.19	Completed	11.08	S Branch Patapsco
2010	Clipper Hills - Hilltop	Retrofit	43.82	Completed	13.40	S Branch Patapsco
2010	Sun Valley	Retrofit	12.80	Completed	3.27	Liberty Reservoir
2012	Chrisman Property	New Construction	6.75	Completed	1.60	Liberty Reservoir
2013	Prettyboy Tree Plantings	Buffer Planting	15.69	Completed	1.06	Prettyboy Reservoir
2013	Lower Monocacy Tree Planting	Buffer Planting	11.85	Completed	4.09	Lower Monocacy
2013	Bennett Cerf Tree Planting	Buffer Planting		Completed	0.25	Liberty Reservoir
2009	Westminster High School	New Construction	115.00	Completed	42.12	Liberty Reservoir
2013	Benjamin's Claim	Retrofit	47.10	Completed	15.78	S Branch Patapsco
2013	Friendship Overlook/Diamond Hills Section 2	Retrofit	82.01	Completed	18.11	Double Pipe Creek
2013	Diamond Hills Section 5	Retrofit	51.80	Completed	16.26	Liberty Reservoir
2013	Carrolltowne 2B	Retrofit	34.61	Completed	10.38	S Branch Patapsco
2013	Carrolltowne Gemini Drive	Retrofit	87.73	Completed	34.43	S Branch Patapsco
2013	Westminster Community Pond	New Construction	250.22	Construction	43.92	Liberty Reservoir
2013	Water Resource Easement Buffer	Grass Buffer		Completed	258.40	

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Year	Project Name	Project Type	Drainage Area	Project Status	County Treated Impervious	MDE8NAME
2013	Floodplain Easement Buffers	Grass Buffer		Completed	43.88	
2014	Septic Pumping (updated yearly)			Completed	150.00	
2014	Wakefield Valley Tree Planting	Buffer Planting		Completed	3.35	Double Pipe Creek
2014	Liberty Tree Plantings	Buffer Planting		Completed	2.07	Liberty Reservoir
<b>Totals</b>			<b>3,171.56</b>		<b>1,537.10</b>	
2013	Sullivan Road Regional Facility-Phase II	New Construction	67.38	Design	39.49	Liberty Reservoir
2013	Sullivan Road Regional Facility-Phase III	Retrofit	43.30	Design	15.36	Liberty Reservoir
2013	Finksburg Industrial Park	Retrofit	61.40	Design	22.12	Liberty Reservoir
2013	Windemere	Retrofit	107.00	Concept	33.00	Liberty Reservoir
2014	Elderwood Village Parcel B/Oklahoma 4 Ph IV	Retrofit	206.88	Design	87.28	Liberty Reservoir
2014	Eldersburg Estates 3-5	Retrofit	34.90	Design	8.16	S Branch Patapsco
2014	Miller/Watts	Retrofit	39.65	Design	24.93	Liberty Reservoir
2015	Langdon (Jantz)	New Construction	198.00	Design	3.00	Double Pipe Creek
2017	Braddock Manor West	Retrofit	29.00	Design	4.15	S Branch Patapsco
2017	Carroll County Maintenance Center	Retrofit	48.50	Design	16.50	Double Pipe Creek
<b>Totals</b>			<b>836.01</b>		<b>253.99</b>	
2015	Shannon Run/Hawks Ridge	Retrofit	208.00		4.00	S Branch Patapsco
2016	Eden Farms La Triomphe	Retrofit	168.00		35.00	Liberty Reservoir
2016	Whispering Valley Phase 4	Retrofit	95.00		1.00	Prettyboy Reservoir
2016	Westminster Highlands	Retrofit	300.00		59.00	Double Pipe Creek
2016	Manchester Skate Park	New Construction	98.30	Concept	24.00	Double Pipe Creek
2017	Squires	Retrofit	38.00		10.00	Liberty Reservoir

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Year	Project Name	Project Type	Drainage Area	Project Status	County Treated Impervious	MDE8NAME
2017	Hunter's Crossing Section 2 #2	Retrofit	23.50		5.43	S Branch Patapsco
2017	Small Crossing/Versa Property	Retrofit	35.50		0.30	Prettyboy Reservoir
2018	Central Maryland (Dry Facility)	Retrofit	62.90		45.00	Liberty Reservoir
2018	Central Maryland (Wet Facility)	Retrofit	87.50		38.30	Liberty Reservoir
2018	Candice Estates	New Construction	39.00	Design	13.00	Lower Monocacy
2018	Springmount Estates	New Construction	60.00	Concept	20.00	Liberty Reservoir
<b>Totals</b>			<b>1,215.70</b>		<b>255.03</b>	

**Totals**

**5,223.27**

**2,046.12**

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**Table 23**  
**Water Quality Improvements - Watershed Restoration Projects (2008-2014)**

PROJECT NAME	LOCATION	MDE8NAME	DRAINAGE AREA	IMPERVIOUS AREA	Pounds Reduced		
					TSS (lbs./year)	Total Phosphorus (lbs./year)	Total Nitrogen (lbs./year)
Hickory Ridge	Velvet Run Drive	Liberty Reservoir	23.75	4.80	3.36	17.50	184.62
Bateman SWM Pond	Patapsco Road	Liberty Reservoir	47.25	7.40	5.88	32.14	364.86
Marriott Wood I Facility #2	Edenbrooke Court	Liberty Reservoir	7.12	2.04	1.04	4.23	28.02
Marriott Wood II	Fawn Haven Court	Liberty Reservoir	11.62	1.92	1.25	5.67	44.92
Westminster Airport Pond	Magna Way	Liberty Reservoir	204.84	85.00	28.49	108.77	410.47
Elderwood Village	Monroe Avenue	Liberty Reservoir	15.28	4.94	2.40	9.58	60.44
Collins Estate	Collins Avenue	Liberty Reservoir	32.68	6.36	3.81	16.79	126.88
Arthur Ridge	Laval Drive	S Branch Patapsco	51.17	5.14	3.35	16.53	97.97
Oklahoma II Foothills	Snowdens Run Road and Forest Lane	Liberty Reservoir	23.72	6.06	3.22	13.46	92.91
Oklahoma Phase I	Stillwater Court	Liberty Reservoir	24.44	7.27	3.64	14.77	96.32
Edgewood	Caren Drive and Cecil Way	Liberty Reservoir	38.00	12.12	2.40	9.58	60.44
Naganna Pond	Bethel Road	Liberty Reservoir	24.50	10.00	4.49	17.20	98.09

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PROJECT NAME	LOCATION	MDE8NAME	DRAINAGE AREA	IMPERVIOUS AREA	TSS (lbs./year)	Total Phosphorus (lbs./year)	Total Nitrogen (lbs./year)
High Point	Oklahoma Road	Liberty Reservoir	9.40	1.82	1.30	6.83	72.98
Brimfield	Brimfield Circle	S Branch Patapsco	34.69	17.23	8.69	38.34	281.28
Hoff Pond	Bethel Road	Liberty Reservoir	77.30	2.98	5.26	29.06	293.27
Campus Heights	Campus Court	Liberty Reservoir	27.98	5.71	3.77	14.61	30.98
Quail Meadows	Fox Sedge Court	Liberty Reservoir	55.40	14.50	5.72	23.80	108.60
Heritage Heights	Advisory Court	Liberty Reservoir	21.40	4.10	2.48	10.94	83.05
Harvest Farms 1A	Cable Drive	S Branch Patapsco	43.80	11.25	4.47	18.68	85.80
Parrish Park	Caren Drive and Ryon Court	S Branch Patapsco	94.23	18.20	8.22	36.21	182.89
Sun Valley	Iroquois Drive Woodbine, MD	S Branch Patapsco	12.80	3.27	1.43	10.29	100.28
Clipper Hills Gardenia	Gardenia Street Eldersburg, MD	S Branch Patapsco	33.19	11.08	5.32	21.12	131.49
Clipper Hills Hilltop	MacBeth Drive Eldersburg, MD	S Branch Patapsco	43.82	13.40	6.63	26.81	172.90
Chrisman Property	Wilda Drive Westminster, MD	Liberty Reservoir	6.75	1.60	0.88	3.72	26.37
Westminster High School	MD Route 32 S Westminster, MD	Liberty Reservoir	115.00	42.12	19.58	76.48	457.70
Benjamin's Claim	Jay Road Eldersburg, MD	S Branch Patapsco	47.10	15.78	7.56	30.03	186.62
Carrolltowne 2B	Keel Drive Eldersburg, MD	S Branch Patapsco	34.61	10.38	3.88	15.74	68.22

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PROJECT NAME	LOCATION	MDE8NAME	DRAINAGE AREA	IMPERVIOUS AREA	TSS (lbs./year)	Total Phosphorus (lbs./year)	Total Nitrogen (lbs./year)
Carrolltowne 2A	Gemini Drive Eldersburg, MD	S Branch Patapsco	87.73	34.43	15.66	60.37	350.47
Diamond Hills Section 5	Federal Ann Court Westminster, MD	Liberty Reservoir	51.80	16.26	7.97	32.06	204.63
Friendship Overlook/Diamond Hills Section 2	Morningstar Way Westminster, MD	S Branch Patapsco	82.01	18.11	7.68	33.02	159.81
Westminster Community Pond	MD 140 & MD 97 Westminster, MD	Liberty Reservoir	250.22	66.68	26.11	108.29	490.85
<b>Total</b>			1,633.60	461.95	205.94	862.60	5,154.14

Note \*Nutrient reductions were derived from MDE's "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated – Guidance for NPDES Stormwater Permits" June (Draft) 2011.

## **H. Assessment of Controls**

The requirements of this section have been included in Section D. Discharge Characterization.

## **I. Program Funding**

The fiscal analysis illustrates how Carroll County continues program funding for compliance with Permit No. 99-DP-3319 (MD0068331). The analysis is intended to fulfill condition Part III.I of the permit.

### **1. Operational Expenses**

#### **a. Watershed Protection and Restoration Program (House Bill 987)**

The Maryland legislature in its 2012 session passed House Bill 987: Stormwater Management – Watershed Protection and Restoration Program. This legislation then became Chapter 151 of the Annotated Code of Maryland. The purpose of the legislation was to require NPDES MS4 Phase I jurisdictions to establish a fee to help cover stormwater remediation costs. The law allows each jurisdiction the ability to determine the level and structure of the fee, as well as other components of the required program. The legislation, in addition to a fee, required the establishment of a Watershed Protection and Restoration Fund. Those monies deposited in the Fund are to be used for specific purposes only. The fund and fee were to be adopted and implemented on or before July 1, 2013.

The Carroll County Board of County Commissioners, at its regularly scheduled meeting on June 27, 2013, adopted Resolution #888-2013 A-D concerning compliance with Chapter 151. The resolutions established the Fund as well as certain funding for stormwater management costs, an annual evaluation of stormwater remediation allocations, and a general funding of compliance with the Environmental Article §4-202.1 of the State Code.

Correspondence received from MDE in early August 2013 requested an update on the status of implementation related to HB 987. In October, the County submitted the above-referenced resolutions for review. In late October 2013, a letter was received from the Maryland Office of the Attorney General indicating non-compliance with §4-202.1 of the Environmental Article. The letter offered the “opportunity to resolve these violations prior to the initiation of formal enforcement.” The County and State entered into formal negotiations which extended into early 2014.

Late in February 2014, the County provided a proposal regarding requirements of the Watershed Protection and Restoration Program. The State’s response, which was immediately received, acknowledged and accepted the proposal and affirmed compliance with §4-202.1(E)(3)(ii)(3) of the Environmental Article, which sets a stormwater remediation fee.

The Fund and the agreed upon funding in the proposal related to operating expenses have been adopted by the Board of County Commissioners and can be seen in **Figure 24**.

## Watershed Protection and Restoration Fund

The Watershed Protection and Restoration Special Revenue Fund was established in FY 15 to ensure adequate funding for operating expenses related to the County's National Pollutant Discharge Elimination System (NPDES) Permit and Watershed Restoration efforts. Property Tax revenue equal to the projected operating expenses for this purpose will be dedicated to the fund on an annual basis.

Sources of Funding	FY 13 Actual	FY 14 Budget	FY 15 Budget	Increase (Decrease)
Dedicated Property Tax	\$0	\$0	\$1,066,890	\$1,066,890
<b>Total Sources of Funding</b>	<b>\$0</b>	<b>\$0</b>	<b>\$1,066,890</b>	<b>\$1,066,890</b>

Uses of Funding	FY 13 Actual	FY 14 Budget	FY 15 Budget	Increase (Decrease)
Personnel	\$0	\$0	\$907,950	\$907,950
Operating	0	0	158,940	158,940
<b>Total Uses of Funding</b>	<b>\$0</b>	<b>\$0</b>	<b>\$1,066,890</b>	<b>\$1,066,890</b>

**Figure 24: Watershed Protection and Restoration Fund**

### b. Specific Position Responsibilities

The following information estimates time spent by each Carroll County Government position on tasks related to compliance with the NPDES MS4 permit. In reality, due to the fact that the permit requires Carroll County to maintain an adequate stormwater management program and an erosion and sediment control program, the totality of those elements of the budget should be included. However, since the stormwater management program is required by legislation and the erosion and sediment control program has been accepted by Carroll County through delegation, only a percentage related to NPDES MS4 compliance, other than those programs, has been reported. Each contributing function is identified by job title and indicates a percentage of time spent compared to their overall responsibilities. These expenditures are the sum of salary and fringe.

- (1) **Deputy Director, Department of Land Use, Planning & Development** - The following general tasks are performed by the Deputy Director of Land Use, Planning & Development requiring approximately **50%** of the position's time:
  - Administration of the permit;
  - Report writing and compilation responsibility;
  - Monitoring of project progress; and
  - Any other necessary activity to ensure compliance.

*Total estimated expenditures ~\$60,573.00*



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- (2) **Chief, Bureau of Resource Management** –The following general tasks are performed by the Bureau Chief, requiring approximately **75%** of the position's time.

- Coordinates the BRM staff to perform tasks required under permit;
- Identifies projects and coordinates budgeting;
- Oversees and monitors the project progress; and
- Participates in watershed assessment process.

*Total estimated expenditure ~ \$80,036.00*

- (3) **NPDES Compliance Specialist** – This position is **100%** dedicated to the NPDES MS4 compliance effort. The salary is funded through an agreement with the municipalities related to Phase II compliance. The position is responsible for the following tasks:

- Phase I and II storm sewer system mapping;
- Phase II illicit discharge detection and elimination inspections;
- Liaison to MDE;
- Coordinate, manage, and implement Phase I and II permit regulation requirements in accordance with Federal, state, and local laws;
- Coordinate with County/municipal personnel, other government officials, and citizens regarding NPDES compliance issues;
- Coordinate illicit discharge inspections and routine surveys with County/municipal personnel to discover and eliminate pollutant sources;
- Design, coordinate, and maintain Geographic Information System (GIS) and Global Positioning System (GPS) applications for NPDES MS4 compliance; and
- Coordinate development of compliance education, training, and outreach programs.

*Total estimated expenditure ~ \$80,424.00*

- (4) **Administrative Office Associate I** - The following general tasks are performed by the Administrative Office Associate I, requiring approximately **30%** of the position's time:

- Administrative support for the Deputy Director;
- Maintaining compliance deadline tickler system;
- Assisting in the preparation of the Annual Report; and
- Tracking expenditures for NPDES projects.

*Total estimated expenditure ~ \$21,279.00*

- (5) **Office Associate IV** - The following general tasks are performed by the Office Associate, requiring approximately **5%** of the position's time, essentially in coordination of BRM staff support for the permit.

- Management of data base; and
- Coordination and scheduling of trainings.

*Total estimated expenditure ~ \$2,960.00*

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(6) **Office Associate III** - The following general tasks are performed by the Office Associate supporting the inspection staff, requiring approximately **10%** of the position's time:

- Scheduling environmental inspections, types related correspondence; and
- Tracking investigations related to compliance actions.

*Total estimated expenditure ~ \$5,695.00*

(7) **Division Head – Environmental Inspection Services Division** - The following are general tasks that are performed by the Division Head related to NPDES compliance. This requires approximately **30%** of the position's time:

- Phase I illicit discharge inspections;
- Coordination of regular site inspections;
- Phase I stormwater management facility maintenance inspections; and
- Stormwater management facility maintenance and other related enforcement action.

*Total estimated expenditure ~ \$25,694.00*

(8) **Environmental Inspectors (4 total)** - The following general tasks are performed by the Environmental Inspectors related to NPDES compliance. They require approximately **25%** of one inspector's time:

- Regular illicit discharge inspections; and
- Field investigations.

*Total estimated expenditure (for all four inspectors) ~ \$60,705.00*

(9) **Stormwater Management Program Engineer** - The following general tasks are performed by the Stormwater Management Program Engineer related to NPDES compliance. They require approximately **40%** of the position's time:

- Design activities on special projects; and
- Technical assistance related to permit compliance.

*Total estimated expenditure ~ \$52,879.00*

(10) **Stormwater Management Review Assistant** - The following are general tasks performed by the Stormwater Management Review Assistant related to NPDES compliance. They require approximately **60%** of the position's time:

- Maintenance inspections;
- Review of SWM plan submittals;
- Field monitoring of special projects; and
- Database management.

*Total estimated expenditure ~ \$53,410.00*

(11) **Watershed Management Specialist** - The following are general tasks performed by the Watershed Management Specialist related to NPDES compliance. The tasks require approximately **80%** of the position's time:

- Biological and physical data collection, interpretation, and reporting;
- Technical assistance;
- Watershed management planning and coordination for restoration activities; and

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- Coordination and facilitation of local watershed groups.

*Total estimated expenditure ~ \$60,648.00*

**(12) Watershed Restoration Engineer** - The following are general tasks performed by the Watershed Restoration Engineer related to NPDES compliance. These tasks require approximately **80%** of the position's time:

- Design of stormwater management retrofit projects;
- Field management and contractor oversight during construction of stormwater retrofit projects;
- GIS data management; and
- General technical assistance.

*Total estimated expenditure ~ \$89,698.00*

**(13) Water Resource Supervisor** - The following are general tasks performed by the Water Resource Supervisor related to NPDES compliance. These tasks require approximately **80%** of the position's time:

- Watershed management planning;
- Biological and physical data collection, interpretation, and reporting; and
- Technical assistance.

*Total Estimated expenditure ~ \$44,728.00*

**(14) Water Resource Technician** - The following are general tasks performed by the Water Resource Technician related to NPDES compliance. These tasks require approximately **80%** of the position's time:

- GIS data input; and
- Field delineation of storm drains, drainage areas, and best management practices.

*Total Estimated expenditure ~ \$56,889.00*

**(15) Water Resource Specialist (2 total)** - The following are general tasks performed by the Water Resource Specialist to NPDES compliance. These tasks require approximately **80%** of the positions' time:

- Coordination and facilitation of local watershed groups;
- Watershed management planning; and
- Biological and physical data collection, interpretation, and reporting.

*Total Estimated expenditure (for 2 Water Resource Specialist) ~ \$120,138.00*

**(16) Floodplain Management Specialist** - The following are general tasks performed by the Floodplain Management Specialist related to NPDES compliance. These tasks require approximately **80%** of the position's time:

- GIS data input;
- Field delineation of storm drains, drainage areas, and best management practices; and
- Prepares GIS maps and information for watershed planning.

*Total estimated expenditure ~ \$64,335.00*

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(17) **Forest Conservation Specialist** - The following are general tasks performed by the Forest Conservation Specialist related to NPDES compliance. These tasks require approximately **10%** of the position's time:

- Provides technical assistance with buffer and tree plantings on public and private properties; and
- Watershed Management Planning.

*Total estimated expenditure ~ \$8,241.00*

(18) **Watershed Grants Analyst** - The following are general tasks performed by the Watershed Grants Analyst related to NPDES compliance. These tasks require approximately **100%** of the position's time:

- Securing financial assistance through various sources (i.e. non-profit organizations, State/Federal, private);
- Working with homeowners on small projects associated with grants;
- Administration and reporting associated with any grants received; and
- Preparing newsletters and website information for keeping the public informed about the County's efforts related to improving our water quality.

*Total estimated expenditure ~ \$70,443.00*

*The total estimated salary expenditure for personnel in the 2013/2014 permit year*

**\$958,775.00.**

### c) **Supplies and Contract Services**

Nitrate testing kits, thermometer, swing sampler and pole, easel and materials for public education, hip boots, and biological monitoring chemicals for sampling.

**\$1,275.00**

Expenses for physical and biological monitoring analysis, monitoring shed and monitoring equipment for the 2013/2014 permit year.

**\$26,887.50**

*Total expenditures for supplies and contract services in the Operating Budget for 2013/2014 permit year.*

**\$28,162.50**

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### d) Stormwater Pond Maintenance

The annual maintenance cost of **\$120,614.19** for County stormwater management facilities was necessary to meet NPDES compliance.

Contractor Cost for 2013/2014	\$21,199.50
County Labor Cost +30%	\$16,365.56
Equipment (same, no change)	<u>\$79,040.00</u>
<i>Total maintenance cost for stormwater management facilities in permit year 2013/2014</i>	<u><u>\$116,605.06</u></u>

**Total Operating expenditures for 2013/2014 permit year**  
**\$958,775 + \$28,162.50 + \$116,605.06 = \$1,103,542.56**

## 2. Capital Expenses

A capital budget was established early in the program to support compliance needs for the County's NPDES MS4 permit responsibilities. Capital expenditures in this program are principally associated with the permit's Watershed Assessment and Restoration requirements.

*Watershed Assessment and Improvement project appropriation for 2013/2014 permit year:*  
**\$3,045,000.00**

Cumulative capital expenditures for the program since 2005 can be found in **Table 24**. **Table 25** and **Table 26** provide the approved 2015 – 2020 Community Investment Plan estimates for program funds. It is important to note that funding beyond the current year FY15 is subject to future budget review and approval processes. Therefore, no guarantee is made to future appropriations beyond FY15.

**Table 24**  
**Total NPDES MS4 Capital Expenditures**  
**Carroll County, Maryland**  
**July 15, 2005 through May 30, 2014**

Permit Year	Capital Expenditure
7/15/05 to 6/30/06	\$36,040.19
7/1/06 to 6/30/07	\$53,593.00
7/1/07 to 6/30/08	\$1,978,829.14
7/1/08 to 5/30/09	\$816,823.30
7/1/09 to 5/30/10	\$1,744,986.91
7/1/10 to 6/30/11	\$672,479.04
7/1/10 to 6/30/11	\$23,269.00
7/1/11 to 6/30/12	\$1,635,671.32
7/1/12 to 6/30/13	\$1,012,067.26
<b>7/1/13 to 6/30/14</b>	<b>\$2,147,337.51</b>
<b>Total permit expenditures, to date</b>	<b>\$10,101,454.66</b>

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## Approved Community Investment Plan 2015 – 2020

**Table 25**  
**Watershed Assessment and Improvement (NPDES)**

	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	Prior Allocation	Balance to Complete	Total Project Cost
Engineering/Design	150,000	165,000	170,000	175,000	175,000	180,000			<b>1,015,000</b>
Land Acquisition									<b>0</b>
Site Work									<b>0</b>
Construction	2,883,000	3,000,000	3,180,000	3,300,000	3,500,000	3,720,000			<b>19,583,000</b>
Equipment/Furnishings									<b>0</b>
Other									<b>0</b>
<b>EXPENDITURES</b>									
<b>TOTAL</b>	<b>3,033,000</b>	<b>3,165,000</b>	<b>3,350,000</b>	<b>3,475,000</b>	<b>3,675,000</b>	<b>3,900,000</b>	<b>0</b>	<b>0</b>	<b>20,598,000</b>

**Table 26**  
**Environmental Compliance**

	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	Prior Allocation	Balance to Complete	Total Project Cost
Engineering/Design									<b>0</b>
Land Acquisition									<b>0</b>
Site Work									<b>0</b>
Construction	75,000	75,000	75,000	75,000	75,000	75,000			<b>450,000</b>
Equipment/Furnishings									<b>0</b>
Other									<b>0</b>
<b>EXPENDITURES</b>									
<b>TOTAL</b>	<b>75,000</b>	<b>75,000</b>	<b>75,000</b>	<b>75,000</b>	<b>75,000</b>	<b>75,000</b>	<b>0</b>	<b>0</b>	<b>450,000</b>

### Part IV. Special Programmatic Conditions

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Carroll County staff members participate in many inter-jurisdictional efforts related to stormwater management, reservoir protection, water supply management, water reuse, and other water issues. These efforts involve numerous entities, including, but not limited to, the Baltimore Metropolitan Reservoir Management Agreement, Maryland Tributary Teams, Stormwater Management Regulation Updates, water reuse regulation development and update, and various other initiatives. Participation in regional and statewide management and protection issues will continue to be a priority for Carroll County.

Staff has a very close working relationship with the local Soil Conservation District Board. County and District staff coordinate efforts on projects as well as provide technical assistance to one another. This has been a very important relationship for Carroll County where projects are located in the urban/rural fringe areas.

Carroll County has been an active participant regarding the Bay Total Maximum Daily Load (TMDL) efforts. Staff has attended general and regional meetings as well as participated in webinars offered by the EPA and MDE. The County, via the Water Resource Coordination Council, participated in discussions and development of Phase II WIP efforts, and continues to address issues related to the WIP as they may arise.