Carroll County Maryland

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

ANNUAL REPORT
JULY 15, 2012

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Carroll County

NPDES ANNUAL REPORT

July 15, 2012

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

Preface

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). The format of this report mimics the issued permit by describing each condition as it appears in the permit.

This report covers activities occurring during the permit year from June 30, 2011 through July 1, 2012.

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Part I. Identification

A Current 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 in the report to municipalities 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 that 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 County's new 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 County has requested a meeting to discuss the third draft in late July or early August 2012.

Part II. Definitions

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

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 Deputy Director, of the LUPD, provides direct administration of the permit.

LUPD has one dedicated position, NPDES Compliance Specialist, assigned to the NPDES MS4 program. The NPDES Compliance Specialist 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 Maryland Department of the Environment;
- 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.

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 land development related environmental code, 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 with 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 organization of 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 in place. Chapter 105 of the Carroll County Code, Environmental Management of Storm Sewer Systems, provides Carroll County and the municipalities with a practical and effective tool that establishes effective standards to protect the integrity of the storm sewer systems 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 that affect storm drain system delineation and facility compliance. GIS and GPS are employed to assist in mapping and data analysis to identify drainage systems exhibiting stormwater quality deficiencies for detailed watershed assessment so effective restoration plans may be developed.

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

Mapping continues to move forward for both County and municipal storm drain systems using the County's GIS. Mapping for both the County and municipalities utilize 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, field data collection, and inspections performed by staff allocated to support and advance the system delineation effort.

County storm drain system mapping for the unincorporated areas is concentrated on watersheds located in the more developed eastern half of Carroll County. Prettyboy Reservoir watershed and the Piney Run Reservoir sub-watershed to the South Branch Patapsco watershed were previously completed. Accomplishments for the permit year included initial mapping for approximately 50% of the Liberty Reservoir watershed. In addition, numerous storm drain systems were delineated and mapped in the South Branch of the Patapsco River watershed. Liberty Reservoir watershed storm drain mapping is projected for completion by the first quarter of 2013 followed by the remaining eastern watersheds in the County; South Branch of the Patapsco River, and Patapsco River – Lower North Branch and Loch Raven.

Municipal storm drain system mapping for all incorporated municipalities was evaluated with regard to periodic updating needs and completion of initial baseline mapping. Minor periodic updates are an active and on-going process for each municipality throughout the permit year.

Major updates need to occur for municipalities such as the Town of Mount Airy that have experienced rapid growth resulting in a significant increase of storm drain system infrastructure. Since January 2012, over 75 storm drain projects were input from detailed engineering as-built drawings into the GIS system for the Town of Mount Airy. GPS/GIS field mapping technology is currently being utilized to capture the remaining storm drain systems for the town. Once completed, a final verification process of mapped data is expected by end of summer 2012.

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

Municipality	Status Of Baseline Storm Drain System Mapping	Projected Baseline Map Completion Date	Periodic Updates & Verification
Hampstead	Complete	Complete	Ongoing
Manchester	Complete	Complete	Ongoing
Mt. Airy	Complete	Complete	Ongoing
New Windsor	Complete	Complete	Ongoing
Sykesville	Complete	Complete	Ongoing
Taneytown	Complete	Complete	Ongoing
Union Bridge	Complete	Complete	Ongoing
Westminster	95%	11/30/2012	Ongoing

Initial base mapping for the City of Westminster is a priority for completion in the second half of 2012. Numerous storm drain as-built plan data continues to be input into the GIS system. With additional plan input, field mapping, verification efforts and staff allocations, the initial baseline mapping for Westminster is projected for completion by the fourth quarter of 2012. Projecting forward, the municipalities of Sykesville, Hampstead, Manchester, Taneytown, New Windsor and Union Bridge will receive comprehensive and ongoing updates.

The Carroll County GIS data for storm drain systems includes numerous layers, such as stormwater facilities, storm drain pipes, stormwater structures, drainage areas, etc. The stormwater structures sub-layers include inlets, manholes, risers, end sections and outfalls. The NPDES outfalls (used for field screening) for the County have been maintained in a separate Access database file entitled "NPDESALL," created prior to the GIS storm drain system. The Stormwater Structures "outfall" layer is in the process of being updated with the NPDESALL outfall data resulting in a significant increase in mapped storm drain outfalls that may be potentially screened for illicit discharges. As part of this process a comprehensive review and classification of each outfall will begin during the next permit year based on revised targeting criteria for outfall screenings. Likewise, storm drain mapping and attribute data for each municipality was recently merged into the storm drain system data and is scheduled for updating prior to the fall. This process will result in all stormwater mapping data in one current centralized GIS storm drain mapping system and geodatabase for the Phase I and II jurisdictions. GIS maps and related database information will be distributed to the municipalities. The current NPDES database and other information are included with this report in CD format as Appendix A.

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, review and approvals, drainage area, and additional information. This is the basis for NPDES GIS application mapping of stormwater management Best Management Practices (BMP's).

Mapping of stormwater facilities and associated data within all incorporated municipalities is complete. There are 812 "as-built" certified and approved stormwater facilities throughout the County. All facilities and drainage areas have been mapped with associated data in various watersheds. See the attached CD (Appendix A).

Simultaneously, as development projects are recorded, 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 best management practice, the database will be updated.

The attached CD (Appendix A) includes the County stormwater management database, map of newly added stormwater facilities in the County and map of all stormwater management facilities.

3. Impervious Surfaces

Carroll County continues implementing watershed restoration projects to achieve mitigation related to impervious surface cover. The County performed an analysis of impervious surface cover for the 2012 annual report submittal. The total calculated impervious area cover was adjusted to 6,449 acres.

Included in this submittal is the analysis of impervious cover which includes calculations and adjustments for regions within the rural regions of the County. The regions which were subject to GIS analysis include the Double Pipe Creek Watershed, which includes the County designated Priority Preservation Area, and the County/state delineated Patapsco Rural Legacy Area. These regions were selected for review due to their low population density, rural zoning, and disconnected impervious surfaces. A detailed discussion, analysis, and findings can be reviewed in Appendix B.

The analysis in Appendix B indicates within the rural regions 1,138 areas of delineated impervious surfaces will remain in the County total number of 6,449 acres to be considered for restoration. The adjusted rural treated acres, 2,836, will not be considered for further restoration. A breakdown of the County total impervious surfaces is shown in Table 2.

Table 2
2012 Calculated Impervious Surface

Category	Impervious Acres
Roads	1,541
Driveways	2,079
Parking Lots	671
Sidewalks	2,523
Building Rooftop	42
BMP – SWM	-74
BMP – Residential Drywell	-11
Carroll County Totals	***6,449***

3. Monitoring Locations and Watershed Restoration

The BRM is responsible for monitoring and watershed assessment efforts required under the NPDES MS4 permit, as well as for the survey and verification of existing condition plans, and 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 measurement of the program's efforts. The BRM performs watershed assessments in support of the development of Watershed Management Plans. 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. EISD also supports County NPDES responsibilities by providing stormwater management facility maintenance inspections and assistance with illicit-discharge inspections in the unincorporated areas of the County.

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 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. Currently the County holds easements on approximately 3,338 acres for forest conservation, 489 acres for floodplain, and 1,519 acres for water resource protection. All easements are subject to inspection and monitoring for compliance.

4. Phase II NPDES MS4 Compliance

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. Assistance categories include pollution prevention plan development as needed, illicit-discharge inspections, BMP functional-compliance inspections, maintenance inspections, system mapping, and training. Table 3 provides population estimates for the County and eight municipalities as of May 31, 2012.

Table 3
Carroll County Population Estimates
Municipal and Unincorporated

INCORPORATED MUNICIPALITY	POPULATION [1]
Hampstead	6,333
Manchester	4,983
Mount Airy [2]	9,441 (5,656)
New Windsor	1,406
Sykesville	4,523
Taneytown	6,750
Union Bridge	977
Westminster	18,727
Total CC Incorporated Area Population	*49,356*
Total CC Unincorporated Area Population	*119,215*
Total Carroll County Population	***168,570***

(1) Based on Carroll County Population estimates dated 6/30/12.
(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. In 2010 VERSAR, an environmental consulting firm, was contracted to perform an external review of County and municipal facilities in relation to NPDES industrial permitting requirements. Their assessment facilitated a work plan for the 2011-2012 permit year developed by the County resulting in significant progress for Phase II jurisdictions with regard to facility compliance.

Based upon the report by VERSAR entitled NPDES MS4 Permit Support: Evaluation of Permit Compliance for Industrial Stormwater Discharges at County and Town Facilities, each incorporated municipality evaluated its facilities per the SIC Code applicability and the NPDES MS4 Industrial Permit regulations to ensure compliance. Facility compliance status is represented in Table 4.

Table 4
Carroll County NPDES Phase II Municipalities
NPDES MD Industrial General Permit No. 02-SW Status

Municipality	Applicable	Facility	Status	MDE Registration Number	Expires	Comment
Hampstead	Yes	Public Works Facility (PWF) 4031 Gill Avenue	NE	11NE2213	03/31/2017	
Hampstead	Yes	PWF -S. West Alley (Larry Hentz PWF)	NE	11NE2214	03/31/2017	
Manchester	Yes	PWF 3351 Victory Street	NE	10NE2201	12/14/2015	
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	03/31/2016	
Mount Airy WWTP	Yes	WWTP – 7245 Ridge Road	NE	11NE2258	03/31/2016	
New Windsor	No	PWF	N/A			VERSAR Report – Non SIC Code/No Fleet Mgmt
New Windsor	No	WWTP	N/A			Exempt/Less than 1.0 MGD
Sykesville	Yes	PWF 7547 Main Street	NE	11NE2255	03/31/2016	
Taneytown	Yes	PWFy Ball Park Road	NE	11NE2263	03/21/2016	
Taneytown WWTP	Yes	WWTP – Whippoorwill Drive	NOI	02SW1743		SWPPP in Place
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	02SW2292	60 days after Permit No. 02-SW	SWPPP in Place
Westminster	Yes	Westminster Public Works (Utilities Department) Old Manchester Road	NOI In Progress	Pending	Permit No. 02-SW	SWPPP Plan Preparation & NOI Application in Progress
Westminster WWTP	Yes	WWTP 1161 Old New Windsor Pike	NOI	02SW2252	Permit No. 02-SW	SWPPP in Place

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

The municipalities and County have a formal arrangement to provide other services that support Phase II compliance (Table 5 Review Chart). Table 6 reflects results provided in response to 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 to satisfy compliance.

Table 5
Review, Inspection, and Bonding: Assignment of Responsibilities

Carroll County Code and Activity	Hampstead	Manchester	Mount Airy	New Windsor	Sykesville	Taneytown	Union Bridge	Westminster
Floodplain								
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
Grading								
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
Sediment Control								
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
Stormwater Management								
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
Landscape								
Review*	C	C/C	C/M	?	C/M	C/C	M	M
Bond	C	C	M	C	M	C	M	M
Inspection	C	C	M	C	M	C	M	M
Forest Conservation								
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
Water Resources								
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
Environmental Site Delineation (ESD)								
Review*	N	Y	Y	Y	N	N	Y	N

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 6
Incorporated Municipality Phase II Related Data (2011-2012)

#	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. PC 4th Tues.	TC 2nd & 4th Mon., except June, July, August & Dec. 2nd Mon. only P&Z 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	Aug 13-18	July 2 – 9	Last full wk of July	1st full wk in June	June -Sykesville Fire Department Grounds	June 2012	Last week of May	N/A
3	Yes - Hampstead Day May 21, 2011 HBA Expo (Hampstead Business Association) Feb. 26, 2011	Yes Manchester Day June 4, 2011	May Festival – 3rd weekend in May; Fall Festival – 1st weekend in October	Yes – National Night Out, August Sun. evening concerts; Christmas Tree Lighting	Yes – Fall Festival, Christmas Open House, Summer Concerts in the Park, Fine Arts & Wine Festival, Easter Egg Hunt, Movies at South Branch Park	Yes – Spring Into Spring Movies In The Park Christmas Tree Lighting	No	Yes Flower & Jazz, Fallfest – last week in September
4	Yes - Eagle Scout Tree Planting/North Carroll Farms Park, Litter pick up days sponsored by (local service & faith based groups in cooperation w/town)	Yes - Charlotte's Quest Nature Center Open House – 1st Sunday - May	Yes – Several Tree Plantings at East/West Park & Windy Ridge Park	Yes – Storm drain stenciling	Yes	Yes	Yes	Yes – storm drain stenciling; Arbor Week tree plantings & park tree plantings. Clean up trash and litter Dutter Park SWM Facility
5	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
6	Yes	Yes	Yes	No	Yes	Yes	No	Yes
7	Yes	Yes	Yes	Yes/ No	Yes/ No	Yes	Yes	Yes
8	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	Yes	Yes	Yes	Yes	In Progress	In Progress	No	Yes
11	Yes	Yes	Yes	No	No	No	No	Yes
12	Yes	Not Formal	Yes	No	Yes	Yes	Yes	Yes

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

a. Public Education and Outreach

The eight municipalities have education and outreach systems currently I place. Each has a municipal council and a 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, stormwater runoff, and everyday solutions to help prevent stormwater pollution. Titles of some of the 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." In addition, information is also made available at fairs, municipal events, and in the classroom. These venues offer effective opportunities for public education and outreach related to NPDES MS4 and stormwater pollution.

Municipality websites will be able to directly link to the County's "Protecting Carroll County Waters" NPDES MS4 webpage implemented in June 2012. Various links to resource information pertinent to both Phase I and Phase II jurisdictions including a County pollution compliance phone number will be available to the general public.

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/industry 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 at these meetings or any time. 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 accepted County Code or under their own authority with text taken from an existing County Code. This helps to create consistency within the review process and with enforcement.

c. Illicit Discharge 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 105 of the Carroll County Code. (This Code may be reviewed on the County's website at ccgovernment.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 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 7 reflects the adoption status of Carroll County Code, Chapter 105, by the municipalities and the responsible enforcement authority.

Table 7
Municipal Adoption and Enforcement
Of Carroll County Code Chapter 105
Environmental Management Of Storm Sewer Systems

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

The current Carroll County MS4 permit includes a requirement for the County to perform 100 illicit discharge inspections 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. (Carroll County has performed 115 field screenings with 56, or 49%, of the routine inspections performed within the municipalities. The number of municipal inspections was pro-rated and distributed over the eight municipalities by population density and varied by land use.)

In addition to these annual routine inspections, municipal public works employees are trained to keep alert performing 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, stormwater facility, or flooding issues.

Suspected illicit discharges by routine outfall inspection, via visual observations or through reported complaints 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 2011-2012 permit year is located in Appendix D of this report.

d. Construction Site Runoff

Each municipality has adopted an MDE-approved ordinance to control erosion and sediment during construction. They have adopted the County Code language and rely on County staff for enforcement. The County is in the process of amending Chapter 121, Grading, Erosion, and Sediment Control, to address the recently adopted changes to the Maryland Standards and

Specifications for Soil Erosion and Sediment Control. Upon approval by MDE and adoption by the Board of Commissioners, this document will be forwarded to the municipalities for review and approval as well.

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 Phase II standards and as such, the Clean Water Act.

e. Post Construction Stormwater Management

Just as with erosion and sediment control, 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 relies 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. In addition to having adopted their own ordinance, they have hired a contractor to provide inspection services. As with Section (4) above, 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 includes a variety of measurable actions which includes: pollution prevention, street sweeping, inlet cleaning, employee training, and recycling efforts. Table 5 and Appendix C include tabular information supplied by the municipalities on activities taken that reflect the conditions of the General Permit. As pollution prevention and good housekeeping are the most encompassing of requirements, the data 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 baseline maps to most of the 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 method of sweeping and the disposition of collected material as well as the street miles swept. Please see Appendix C 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 C.

g. Stormwater BMP Database

The NPDES database is included on a CD-ROM as Appendix A. A map of newly permitted stormwater management facilities is also included in Appendix A 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 impacts to the receiving water body as described below. The State of Maryland has developed a database of discharge data collected by numerous permit holders in order to characterize stormwater runoff associated with various stormwater management efforts.

The discharge characterization is implemented through the Assessment of Controls Section of the permit, which outlines 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. Discharge characterization data for this report was collected during the period April1, 2011 through March 31, 2012.

b. Study Area

The discharge characterization is completed in a first order stream that is a tributary to the West Branch of the Patapsco River. The location of the watershed where monitoring is conducted within the County is shown in Figure 1, while the location of the monitoring stations and other watershed features are shown in Figure 2. The study area is located near the topographic divide separating the eastern and western piedmont physiographic provinces. As shown in Figure 2, the unnamed tributary drains the upper-most extent of first order tributary and is located in the Liberty Reservoir watershed.

The Air Business Center regional stormwater management facility discharges via a constructed outfall to a small stream that travels southeast to the confluence with the West Branch of the Patapsco River. 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 Pond has been constructed adjacent to and east of the Air Business Center stormwater management facility. This facility drains to the stream, just downstream of the outfall station. Two small tributaries drain to the main channel from the north, approximately midway between the headwaters and the confluence

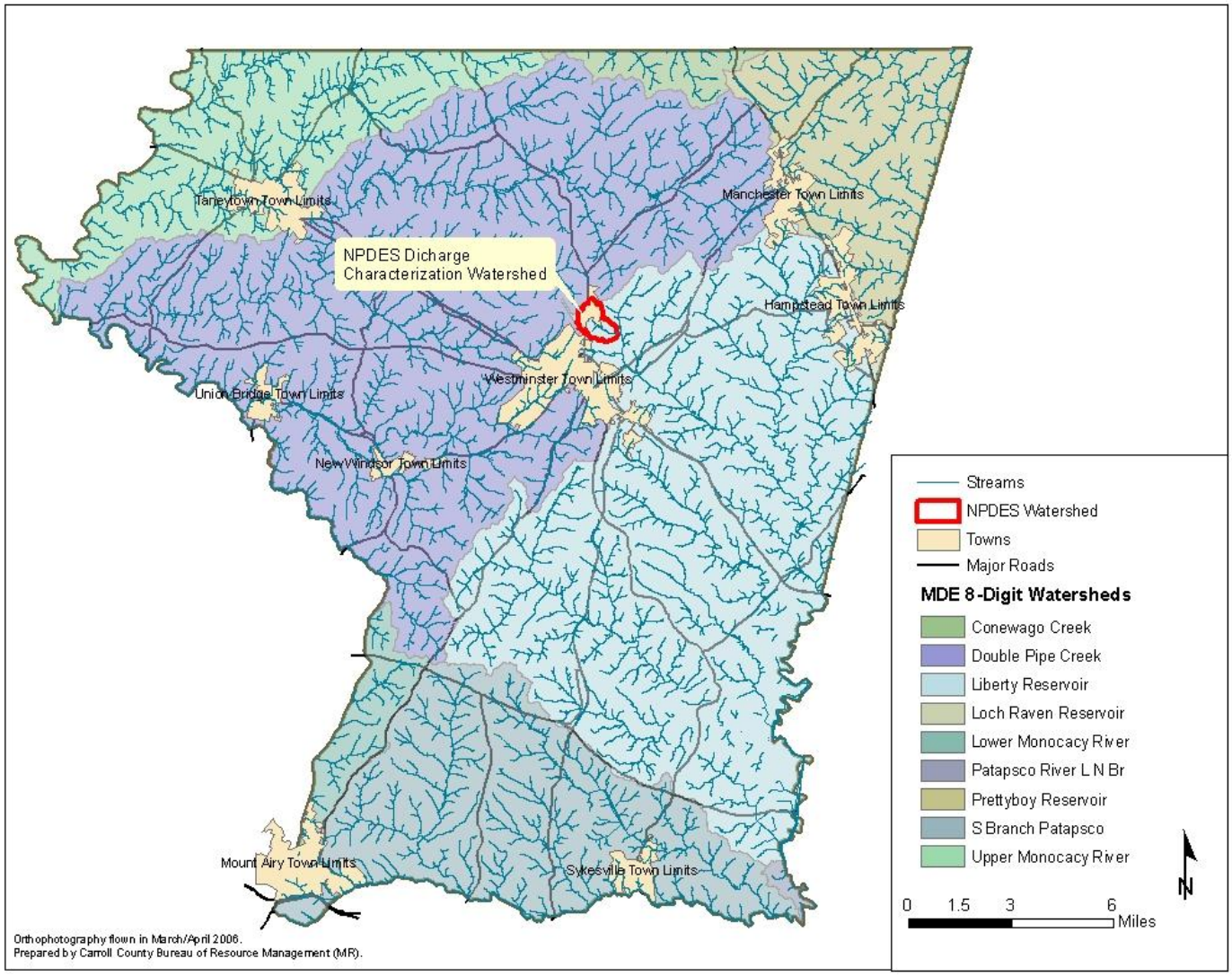


Figure 1: Carroll County NPDES Discharge Characterization Location

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. This data is collected at the two monitoring stations shown in Figure 2**,** where cumulative effects of watershed restoration efforts can be best assessed.

Figure 2: NPDES Discharge Characterization Watershed

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

- Geomorphic stream assessment to include an annual comparison of permanently monumented stream channel cross-sections and a stream profile to evaluate channel stability; and

- A comparison of annual stream profile and survey of permanently monumented cross-sections with baseline conditions for assessing areas of aggradation and degradation.

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

- Samples of eight storm events at each monitoring location, with at least two occurring each calendar year quarter. During extended dry periods, base-flow samples are collected one time per month. 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 Event Mean Concentrations (EMCs) calculated and reported.
- Continuous flow data is collected at the in-stream monitoring station and used to calculate annual and seasonal pollutant loads being exported from the watershed.

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

- 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. Climatologic

Precipitation data was collected from two sources. To pace the chemical sampling stations and differentiate storm limbs, an ISCO model 674 rain gauge is located at the outfall station and communicates with the ISCO model 4250 flow meter. In addition, precipitation data provided by the weather station located in Westminster and operated by Carroll County Government according to National Weather Service standards is used to correlate the outfall station data due to its greater reliability.

b. Hydrologic

In order to understand the hydrologic regime at this first order watershed, it is necessary to collect continuous stream discharge data. To that end, both stations are equipped with instrumentation to collect continuous stream discharge 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 outfall station is also equipped with a model 674 precipitation gauge.

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-type 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 stream 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 5.05 software by ISCO is used to complete hydrologic data analysis. Data collected at the monitoring stations is downloaded to a laptop computer via serial communication. New hydrologic data is appended to the existing data record for each station. Discharge and stage hydrographs are prepared using this software. In addition, it is used to calculate both annual and seasonal flows.

c. Physical

During the spring of 2012, Carroll County conducted a geomorphologic assessment for the entire stream reach, from the outfall of the Air Business Center 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 (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-section. The survey crew collected data for the stream channel bottom at the thalweg, the edge of water at each 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. 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.

Table 7
Laboratory Methods and Detection Limits for Parameters Tested

Parameter Tested	Method	Reporting Limit
	First Flush Sample	
pH	EPA 150.1	
Temperature	EPA 170.1	
Specific Conductance	EPA 120.1	1.0 µmhos/cm
Total Petroleum Hydrocarbons	EPA 1664	5.0 mg/L
Escherichia Coli	SM 9223B	2.0 organisms/ 100mL
	Limb Samples	
Nitrate/Nitrite Nitrogen	SM 4500NO3-H	0.02 mg/L
Biochemical Oxygen Demand	SM 5210B	1.0 mg/L
Total Copper	EPA 200.8	2.0 µg/L
Total Lead	EPA 200.8	2.0 µg/L
Total Zinc	EPA 200.8	10.0 µg/L
Total Kjeldahl Nitrogen	SM 4500NH3-C	0.5 mg/L
Total Phosphorus	SM 4500P-E	0.01 mg/L
Total Suspended Solids	SM 2540D	1.0 mg/L

In September 2011, Martel Laboratories, Inc. was awarded a new multi-year contract with Carroll County to conduct MS4 NPDES compliance sampling and analysis. 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 base flow and storm flow events in the same manner as in previous years. The flow monitoring and the EMC calculations methods are the same as those used in previous 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. Event dates are shown in Table 8.

Table 8
2011 – 2012 NPDES Discharge Characterization Sampling Events

Event #	Event Date	Event Type	Rainfall Total (inch)	Rainfall Duration (hour)
2011-04	4/12/2011	Storm	0.76	3
2011-05	5/31/2011	Base Flow	0	0
2011-06	6/30/2011	Base Flow	0	0
2011-07	7/29/2011	Base Flow	0	0
2011-08	8/31/2011	Base Flow	0	0
2011-09	10/19/2011	Storm	0.6	24
2011-10	11/16/2011	Storm	0.6	30
2012-01	1/11/2012	Storm	0.78	16
2012-02	2/27/2012	Base Flow	0	0
2012-03	2/29/2012	Storm	1.01	20

Due to technical errors and equipment failure, as described in Section 3b, when storm flow samples could not be collected, monthly base-flow samples were taken.

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 3, 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 taken from Maryland Biological Stream Survey (MBSS) guidance manuals (Sampling Manual Field Protocols, 2010, http://www.dnr.state.md.us/streams/pdfs/ea-07-01b_fieldRev2011.pdf). The BRM continues to contract with Maryland Department of Natural Resources (DNR) to identify and enumerate all benthic macro invertebrate samples. The samples were processed and identified by Ellen Friedman, DNR principal taxonomist with over 20 years of identification experience.

The assessment of spring habitat also utilized guidance from the 2010 Maryland Biological Stream Survey (MBSS) Sampling Manual: Field Protocols.

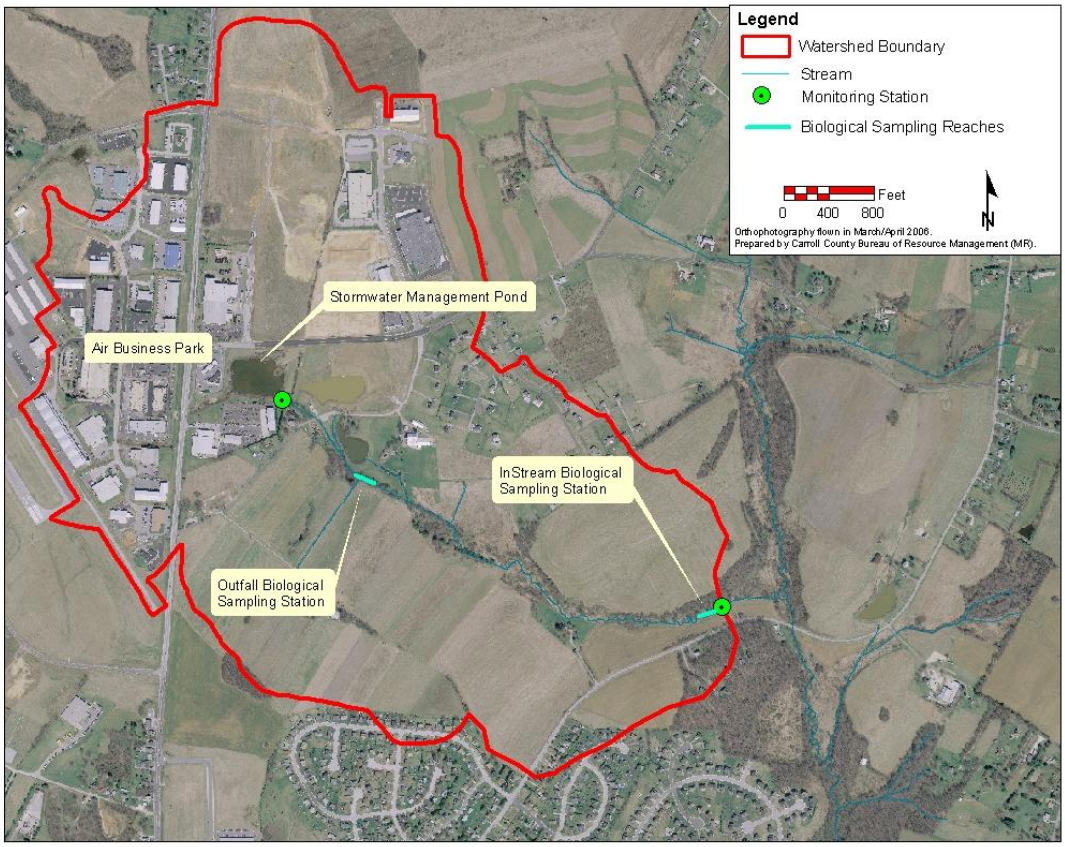


Figure 3:

Biological Monitoring Station Locations

3. Results and Discussion

a. Climatology

Precipitation data is summarized by month in Figure 4 along with monthly summaries for the previous reporting period and the 30-year average monthly precipitation. Precipitation was more during this reporting period compared to last reporting period for all months except February and March. Overall, the 2011-2012 reporting period experienced 6.02 inches more precipitation than the 30-year average.

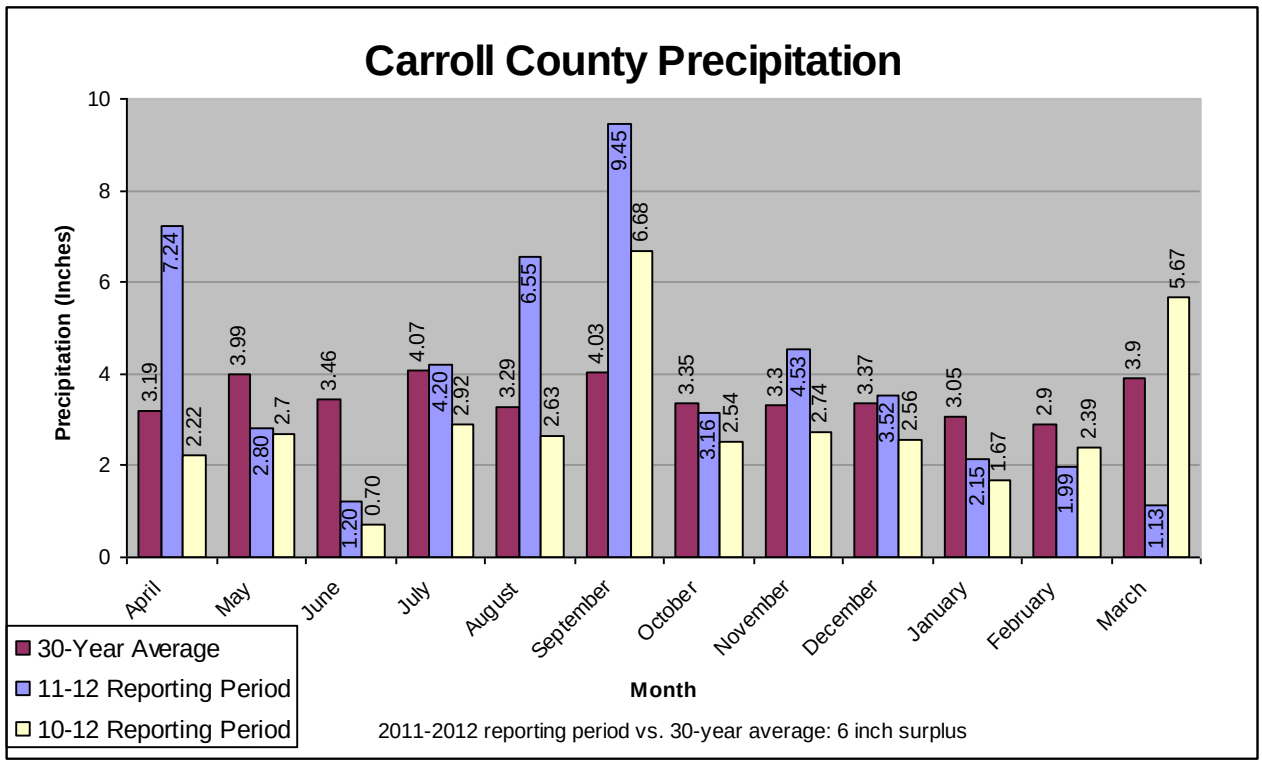


Figure 4: Monthly Precipitation Summary for the Reporting Period

The climate of Carroll County is characterized as temperate and moderately humid. Based on a weather station located in Westminster and operated by the Carroll County Government according to National Weather Service Standards, the average annual temperature is 53° Fahrenheit (F), based on analysis of the past 30 year record. The mean monthly temperature ranges from 31° F in January to 76° F in July (NWS, 2011).

Mean monthly temperatures are summarized in Figure 5 and are compared to the 30-year average monthly temperature. Only the months of August and October experienced mean monthly temperatures less than the 30-year average mean monthly temperatures.

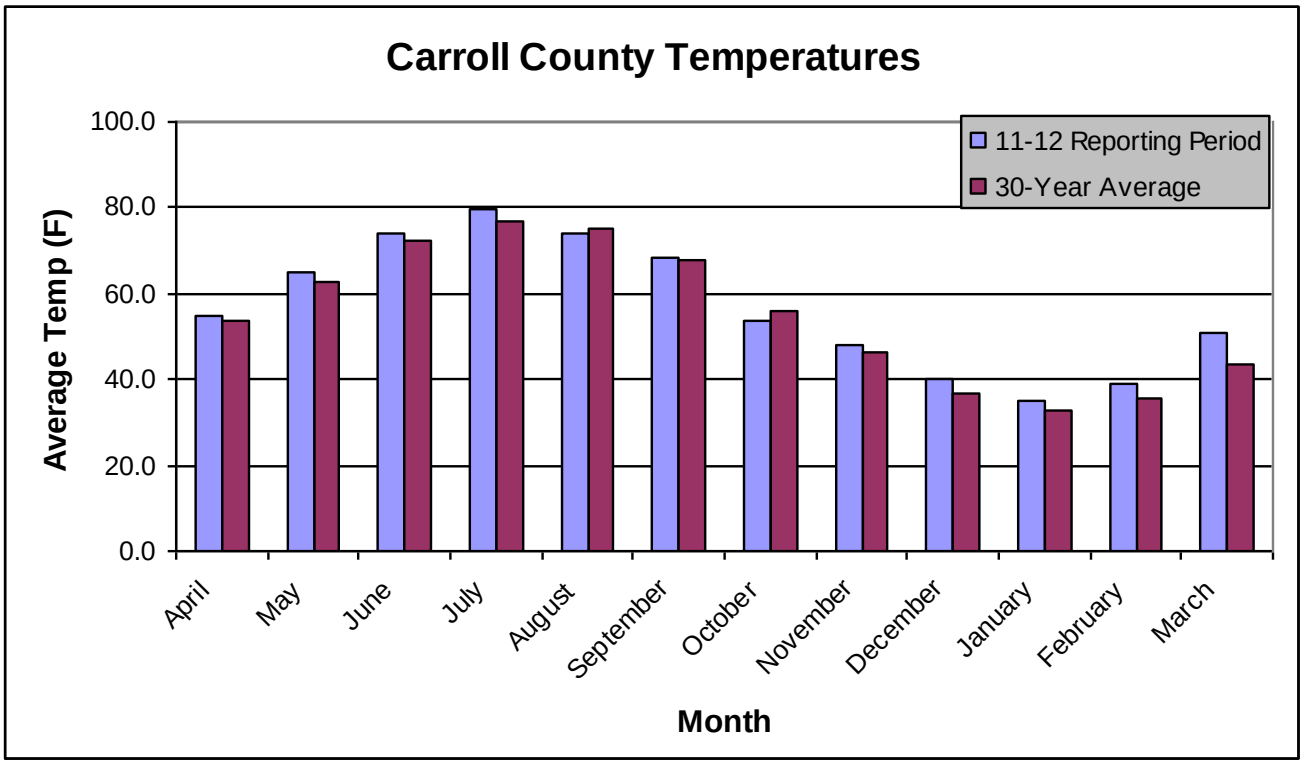


Figure 5: Monthly Temperature Summary for the Reporting Period

b. Hydrologic

Hydrographs have been prepared showing the stage and discharge at both the outfall and in-stream stations for the reporting period. Outfall station stage and discharge are shown in Figures 6 and 7, respectively. In-stream station stage and discharge are shown in Figures 8 and 9, respectively.

A comparison of the stage hydrographs for the two stations indicates that storage by the stormwater facility results in a discharge less than 0.4 feet in all except one storm; April 28, 2011, when 1.97 inches of rain fell during a 6-hour period and stage rose to 0.642 feet. The in-stream station experienced high stage during four storm events. Normal base flow for the in-stream station is approximately 0.4 feet. However, during the event on November 23, 2011, stage rose to 2.67 feet, approximately 0.17 feet above bankfull. For this event 2.57 inches of precipitation fell within 48 hours. Stage also exceeded 1.5 feet during storms on April 28, 2011, at 2.08 feet; September 8, 2011, at 1.99 feet; and December 7, 2011, at 1.57 feet. For these events, precipitation was 1.97 within 6 hours, 4.09 within 48 hours, and 1.58 inches within 24 hours respectively.

Equipment failures or errors occurred at the outfall station from June 29 through August 12, 2011, and again from September 1 through September 20, 2011. A technical error in data storage occurred from November 19 through December 13, 2011. The equipment storage shed at the in-stream station was replaced and therefore, no data was collected at this station from September 30 through October 12, 2011.

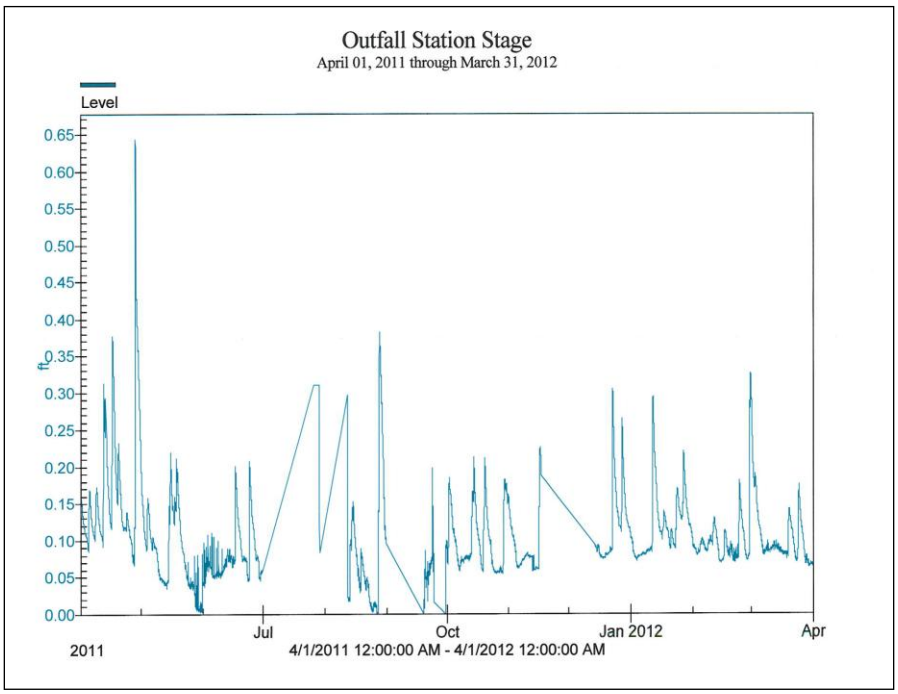


Figure 6: Hydrograph of Outfall Station Stage

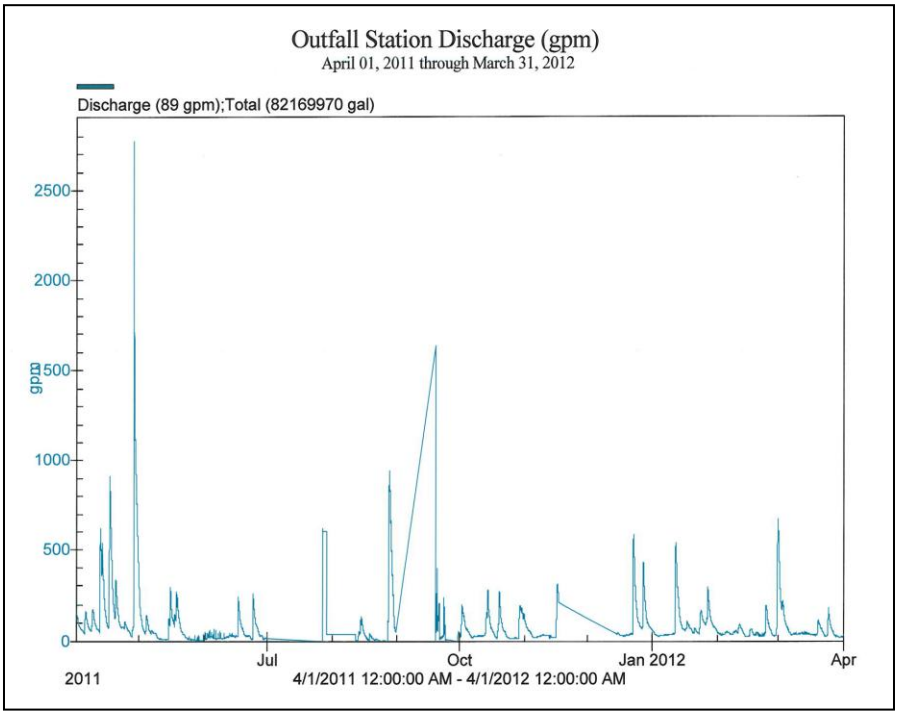


Figure 7: Hydrograph of Outfall Station Discharge

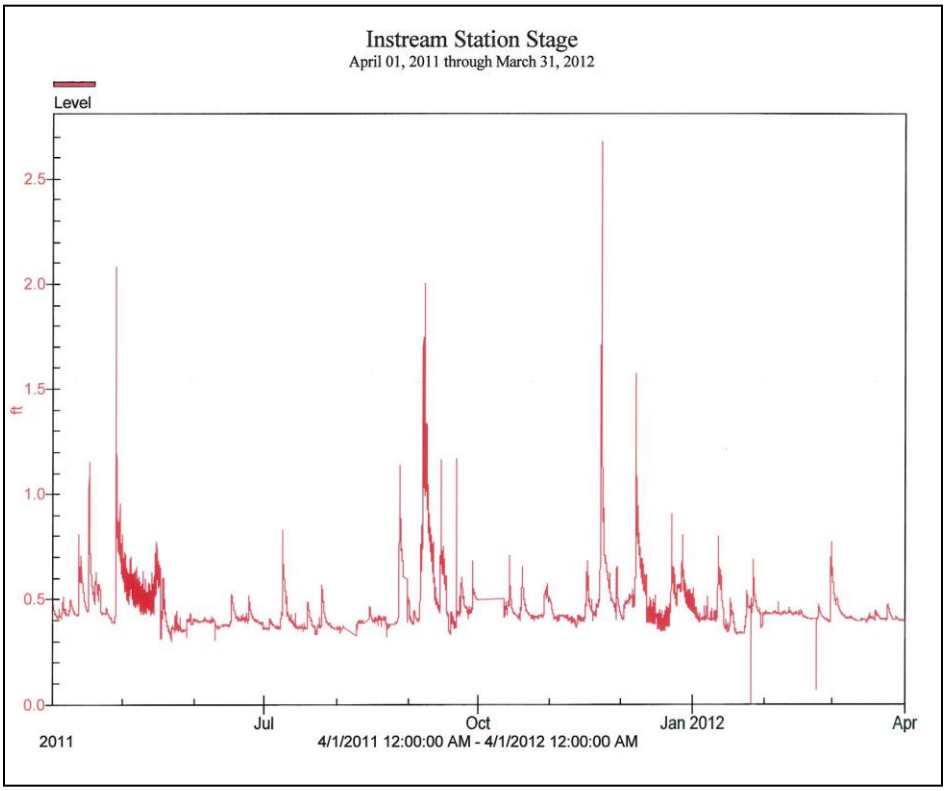


Figure 8: Hydrograph of In-stream Station Stage

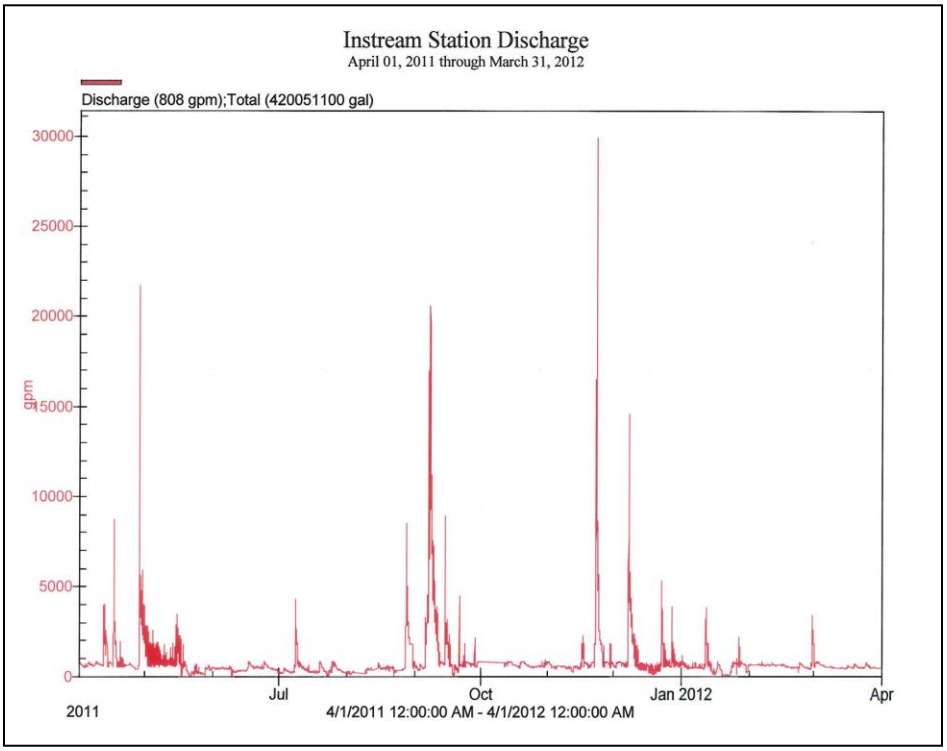


Figure 9: Hydrograph of In-stream Station Discharge

To compare pre-retrofit to post-retrofit stage hydrographs at the outfall station, a hydrograph of stage for the period April 01, 2007 through December 31, 2007 was prepared as shown in Figure 10. Pre-retrofit stage exceeded 0.5 feet during 13 separate events, indicating that retrofit efforts have resulted in a decrease in the number of high-discharge, high-energy events.

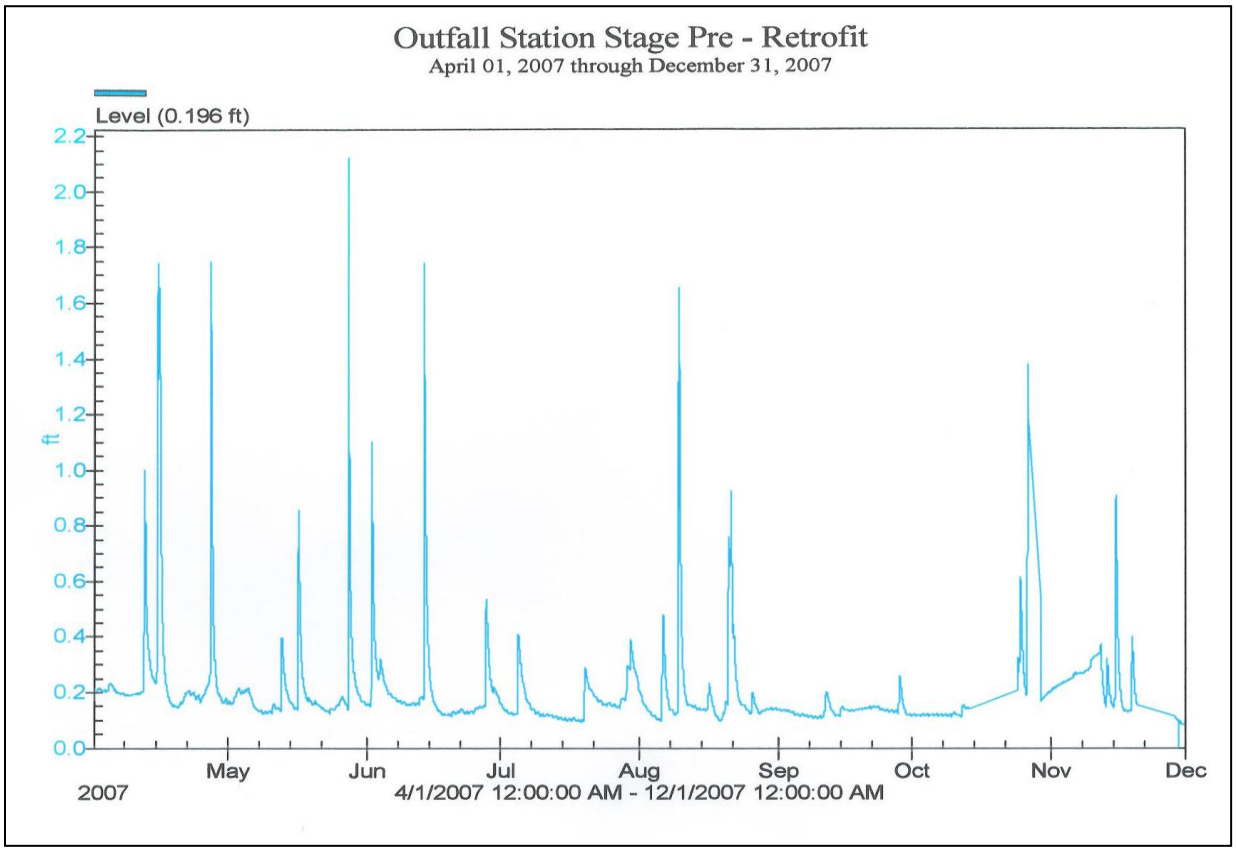


Figure10: Hydrograph of Outfall Stage Pre - Retrofit

c. Physical

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-section 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 initial year this type of monitoring was initiated.

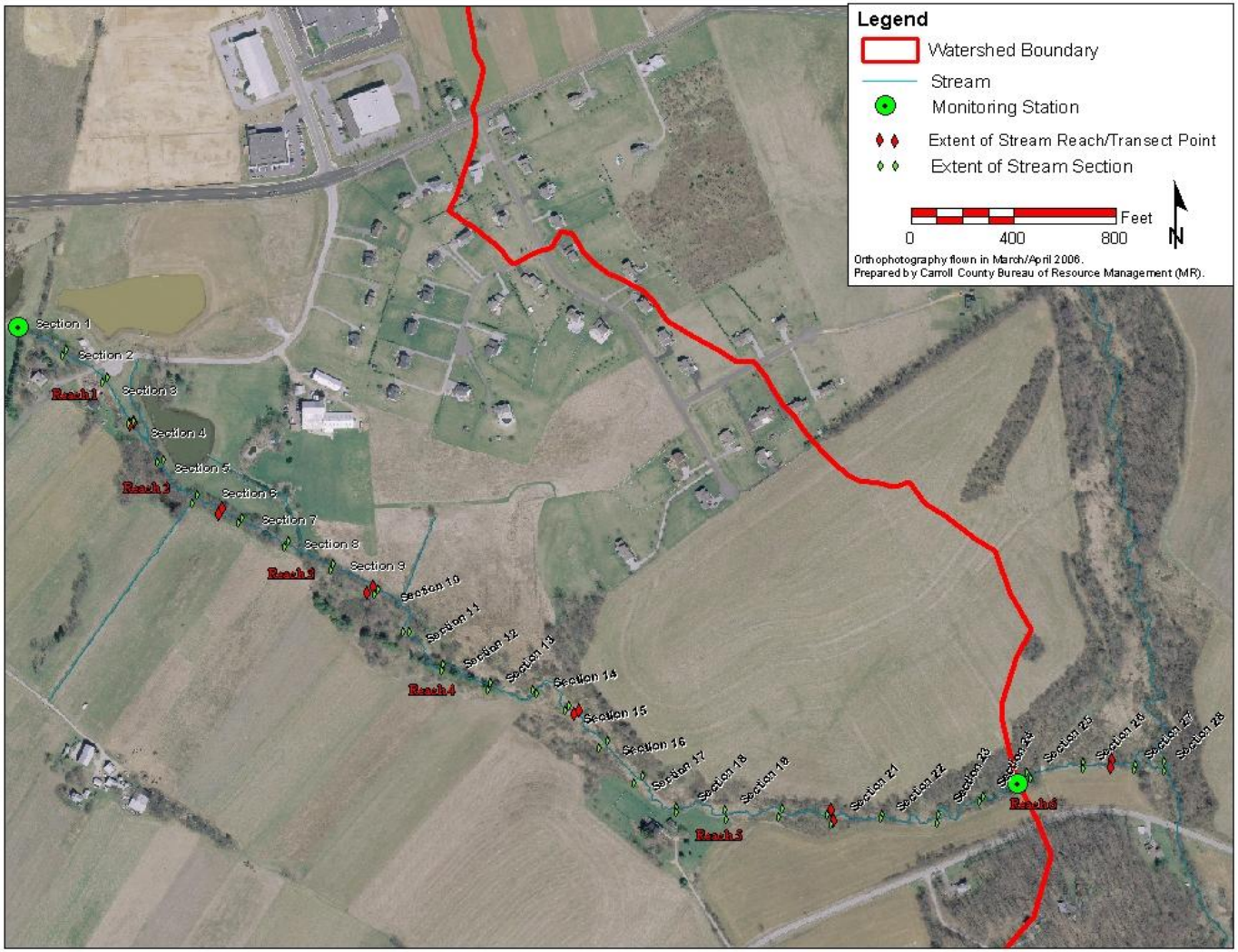


Figure 11: Physical Data Collection Stations

There does not appear to be large-scale degradation or aggradation of the stream channel in the last twelve years. At Cross Section 1, 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. The right edge has been aggraded at this location and now has a much steeper bank. The right edge of water is now located nearly where the left edge of water was located in 2000. 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.

Cross Sections 2 and 3 are generally unchanged since 2000, with only minor changes in stream channel shape. Cross Section 4, located approximately 65 feet downstream of a series of bends and two draws, has shown evidence of aggradation of the channel since 2000. Although the channel has not widened, the channel bottom and associated floodplain have been elevated by almost one foot over that time. Cross Section 5 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 Section 6 indicates that the stream channel has widened by four feet since 2000, extending from a width of five feet to a width of nine feet. This width is unchanged during the past several years. This monumented cross-section 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.

Figure 12 depicts the longitudinal profile of the stream based on results of survey at the 28 cross-section locations. Also included in this figure are the stream gradient calculations for the 2011 and 2003 report years for reference. These locations are spaced at approximate 200-foot intervals for consistent gradient calculations. Overall, the slope of the stream channel is gentle, only exceeding 2% at Stations 5 and 28. Very little change in gradient has occurred over the years as evidenced by comparing the 2003 to 2012 data.

In this figure, increases in gradient between stations are indicative of higher energy and potential for increased channel scour. Station 28 is representative of this type of environment. The cross-section at this location shows bank erosion over the past year, but the channel bottom has not shown evidence of significant scour as shown in the small change in gradient between 2003 and 2012.

Conversely, decreases in gradient between stations are indicative of low energy and potential deposition. Station 14 is indicative of this type of gradient, with a gentle 0.23% slope. The cross-section indicates that the channel bottom has not changed, but the right bank has aggraded almost one foot in the past year and has experienced the filling of almost two feet of stream on the right side. This section is located about 250 feet upstream of monumented reach four, which showed evidence of aggradation in the channel consistent with a low-energy environment.

Table 8 (Cross-Section Station Survey Data) shows the gradient between each of the 28 stations for the period 2006 through 2012. Overall, little change is occurring in the stream channel geometry, based on an analysis of the 28 stream channel cross-sections. 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.

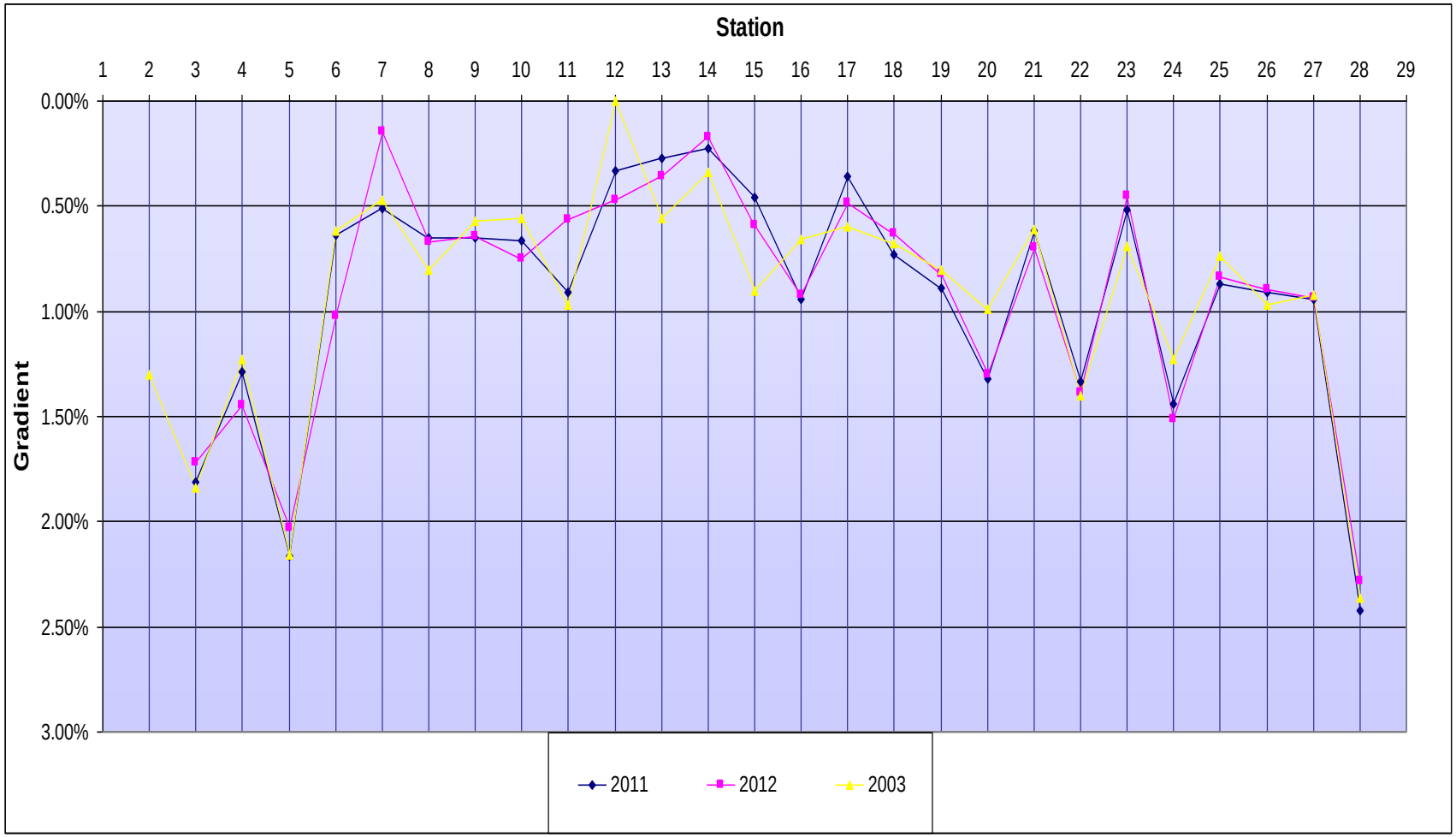


Figure 12: Stream Station Gradient

Table 9: Cross Section Station Survey Results 2006 through 2012

		Cummulative Distance (feet)	2012		2011		2010		2009		2008		2007		2006	
Station Number	Station Distance (feet)		Elevation	Gradient	Elevation	Gradient	Elevation	Gradient	Elevation	Gradient	Elevation	Gradient	Elevation	Gradient	Elevation	Gradient
1	N/A						730.89		730.89		730.89		730.65		-0.12	
2	200.78	201	728.04		728.09		728.01	1.43%	728.04	1.42%	728.01	1.43%	727.97	1.33%	-0.10	-0.01%
3	192.75	394	724.73	1.72%	724.60	1.81%	724.58	1.78%	724.38	1.90%	724.56	1.79%	724.44	1.83%	-0.04	-0.03%
4	197.97	592	721.86	1.45%	722.05	1.29%	722.06	1.27%	721.64	1.38%	721.49	1.55%	721.29	1.59%	0.14	-0.09%
5	194.54	786	717.91	2.03%	717.84	2.16%	717.78	2.20%	717.81	1.97%	717.81	1.89%	717.86	1.76%	717.77	-368.89%
6	201.90	988	715.84	1.03%	716.56	0.63%	716.73	0.52%	716.56	0.62%	716.61	0.59%	716.54	0.65%	0.08	355.47%
7	196.20	1184	715.55	0.15%	715.56	0.51%	715.58	0.59%	715.67	0.45%	715.70	0.46%	715.64	0.46%	0.02	0.03%
8	204.08	1388	714.18	0.67%	714.23	0.65%	714.28	0.64%	714.38	0.63%	714.24	0.72%	714.22	0.70%	-0.18	0.10%
9	200.57	1589	712.89	0.64%	712.93	0.65%	712.80	0.74%	712.89	0.74%	712.78	0.73%	712.79	0.71%	0.06	-0.12%
10	198.22	1787	711.40	0.75%	711.61	0.67%	711.59	0.61%	711.80	0.55%	711.66	0.57%	711.38	0.71%	-0.08	0.07%
11	198.63	1986	710.28	0.56%	709.81	0.91%	709.93	0.84%	710.07	0.87%	710.06	0.81%	710.06	0.66%	0.00	-0.04%
12	203.42	2189	709.32	0.47%	709.14	0.33%	709.16	0.38%	709.22	0.42%	709.58	0.24%	709.48	0.29%	0.02	-0.01%
13	197.40	2386	708.61	0.36%	708.60	0.27%	708.46	0.35%	709.02	0.10%	709.04	0.27%	709.12	0.18%	0.04	-0.01%
14	177.04	2564	708.30	0.18%	708.20	0.23%	708.17	0.16%	708.11	0.51%	707.88	0.66%	707.95	0.66%	0.08	-0.02%
15	143.74	2707	707.45	0.59%	707.54	0.46%	707.02	0.80%	707.06	0.73%	707.06	0.57%	706.89	0.74%	0.04	0.03%
16	203.15	2910	705.58	0.92%	705.62	0.95%	705.44	0.78%	705.64	0.70%	705.55	0.74%	705.17	0.85%	0.00	0.02%
17	195.26	3106	704.64	0.48%	704.92	0.36%	704.78	0.34%	704.78	0.44%	704.48	0.55%	704.24	0.48%	-0.16	0.08%
18	192.58	3298	703.43	0.63%	703.52	0.73%	703.62	0.60%	703.42	0.71%	703.27	0.63%	703.38	0.45%	0.12	-0.15%
19	191.83	3490	701.85	0.82%	701.81	0.89%	701.75	0.97%	701.75	0.87%	701.48	0.93%	701.57	0.94%	0.04	0.04%
20	214.23	3704	699.07	1.30%	698.98	1.32%	698.90	1.33%	698.94	1.31%	698.92	1.19%	698.81	1.29%	-0.08	0.06%
21	191.45	3896	697.74	0.69%	697.80	0.62%	697.73	0.61%	697.75	0.62%	697.69	0.64%	697.75	0.55%	-0.04	-0.02%
22	204.29	4100	694.91	1.39%	695.08	1.33%	694.70	1.48%	694.76	1.46%	694.78	1.42%	694.76	1.46%	-0.04	0.00%
23	220.23	4320	693.92	0.45%	693.94	0.52%	693.90	0.36%	693.81	0.43%	693.73	0.48%	693.64	0.51%	0.06	-0.05%
24	190.59	4511	691.04	1.51%	691.19	1.44%	691.17	1.43%	691.08	1.43%	691.10	1.38%	691.03	1.37%	-0.02	0.04%
25	206.54	4717	689.31	0.84%	689.39	0.87%	689.35	0.88%	689.38	0.82%	689.41	0.82%	689.45	0.76%	-0.02	0.00%
26	215.51	4933	687.38	0.90%	687.43	0.91%	687.38	0.91%	687.50	0.87%	687.59	0.84%	687.69	0.82%	0.00	-0.01%
27	204.12	5137	685.47	0.94%	685.51	0.94%	685.44	0.95%	685.52	0.97%	685.45	1.05%	685.57	1.04%	0.00	0.00%
28	111.36	5248	682.93	2.28%	682.81	2.42%	682.80	2.37%	682.82	2.42%	682.70	2.47%	682.74	2.54%	-0.08	0.07%

d. Chemical

(1) Physical Water Data

For storm events, Event Mean Results of physical analyses of the sampling events for the in-stream and outfall stations are presented below in Tables 10 and 11, respectively.

Table 10: In-stream Station Physical Water Data

Event Number	pH	Conductance (µohms/cm)	Temperature (F)
2011-04	7.5	200	57
2011-05	7.3	360	74
2011-06	7.3	310	69
2011-07	8.8	290	75
2011-08	7.8	190	71
2011-09	6.8	280	60
2011-10	7.2	390	55
2012-01	7.2	330	72
2012-02	7.7	360	50
2012-03	7.2	330	46

Table 11: Outfall Station Physical Water Data

Event Number	pH	Conductance (µohms/cm)	Temperature (F)
2011-04	8.6	310	62
2011-05	8.9	330	82
2011-06	8.8	350	76
2011-07	7.4	210	83
2011-08	8.5	150	72
2011-09	7.7	200	62
2011-10	8.9	560	57
2012-01	8.9	340	73
2012-02	8.8	660	45
2012-03	8.7	660	46

The outfall station generally experienced higher water temperature, conductance, and pH values when compared to the in-stream station. Temperature differences ranged from 8°F during two base-flow sampling events on 2011-05 and 2011-07, to 0°F during a storm event on 2012-03. The higher temperatures are most likely due to two main physical factors. First, solar heating of the pond surface is increasing outfall water temperature in spite of the fact that the retrofit included a drain from the base of the pond. Second, cool groundwater inputs to the stream between the outfall and in-stream stations appear to be moderating the in-stream water temperature.

Conductance at the outfall station ranged from a low of 150 mOhm/cm to 660 mOhm/cm. The in-stream conductance readings ranged from 190 mOhm/cm to 390 mOhm/cm. The outfall station recorded higher conductivity readings during the winter and spring.

Outfall station pH readings range from 8.9 to 7.4, with an average pH of 8.52. The In-stream station ranges from 8.8 to 6.8, with an average pH of 7.48. Higher pH readings at the outfall may be due to local goose populations that have nested near the stormwater facility and natural biological activity occurring within the pond.

(2) Event Mean Concentrations (EMC)

EMC ranges for data collected during the reporting period for each analyte from the outfall station are provided in Table 12, while EMC ranges for data collected during the reporting period for each analyte from the in-stream station are presented in Table 13.

Table 12
Outfall EMC Range for the Reporting Period

Outfall	Range	
Analyte (units)	Minimum	Maximum
BOD (mg/l)	3	38.27
TKN (mg/l)	0.5	1.7
Nitrate + Nitrite (mg/l)	0.04	1.2
Phosphorus (mg/l)	0.04	0.21
TSS (mg/l)	4	43
Copper (ug/l)	2	4.29
Lead (ug/)	2	2
Zinc (ug/)	12.7	34.48
TPH (mg/l)	0.54	6
E. Coli (mpn)	0.36	980

Table 13
In-stream EMC Range for the Reporting Period

Instream	Range	
Analyte (units)	Minimum	Maximum
BOD (mg/l)	1	31
TKN (mg/l)	0.5	1.86
Nitrate + Nitrite (mg/l)	1.7	10
Phosphorus (mg/l)	0.06	2.29
TSS (mg/l)	3	198.35
Copper (ug/l)	2	7.6
Lead (ug/)	2	4.04
Zinc (ug/)	10	39.5
TPH (mg/l)	0.5	5
E. Coli (mpn)	10.81	1553

The EMCs used for these tables are those at the detection limit for each analyte. EMC ranges for all analyses performed at the outfall station for the 2007 through 2012 reporting periods are shown in Table 14 by reporting year. EMC ranges for all analyses performed at the in-stream station for the 2007 through 2012 reporting periods are shown in Table 15 by reporting year.

Table 14
Outfall Station EMC Ranges for 2007 through 2012 Reporting Periods

OUTFALL	UNITS	2007		2008		2009		2010		2011		2012	
ANALYTE		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Biological Oxygen Demand	mg/L	2.00	6.52	2.00	14.00	2.00	8.00	3.00	7.00	2	38.4	3	38.27
TKN	mg/L	0.50	0.80	0.50	2.20	0.50	2.10	0.70	2.04	0.67	3.1	0.5	1.7
NO2/NO2	mg/L	0.20	0.94	0.02	0.72	0.14	0.85	0.05	1.01	0.02	0.99	0.04	1.2
Phosphorus	mg/L	0.09	0.35	0.04	0.38	0.05	0.09	0.03	0.19	0.03	0.73	0.04	0.21
TSS	mg/L	6.00	65.75	4.00	85.84	5.00	51.50	3.00	39.68	3	276.18	4	43
Copper	µg/L	2.00	18.53	2.00	9.06	2.00	5.71	2.00	4.79	2	7.29	2	4.29
Lead	µg/L	2.00	7.00	2.00	84.50	2.00	2.00	2.00	2.23	2	5.22	2	2
Zinc	µg/L	18.50	100.99	10.00	89.10	13.00	28.61	10.00	43.79	10	39.53	12.7	34.48
TPH	mg/L	0.33	5.00	1.00	5.00	5.00	5.30	0.56	5.00	0.31	5	0.54	6

Table 15
In-stream Station EMC Ranges for 2007 through 2012 Reporting Period

INSTREAM	UNITS	2007		2008		2009		2010		2011		2012	
ANALYTE		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Biological Oxygen Demand	mg/L	2.00	6.52	2.00	14.00	2.00	8.00	1.00	6.08	1	21.61	1	31
TKN	mg/L	0.50	0.80	0.50	2.20	0.50	2.10	0.50	2.29	0.5	2.03	0.5	1.86
NO2/NO2	mg/L	0.20	0.94	0.02	0.72	0.14	0.85	1.80	7.10	0.04	7.9	1.7	10
Phosphorus	mg/L	0.09	0.35	0.04	0.38	0.05	0.09	0.02	0.39	0.05	0.59	0.06	2.29
TSS	mg/L	6.00	65.75	4.00	85.84	5.00	51.50	4.00	193.00	1	292.4	3	198.35
Copper	µg/L	2.00	18.53	2.00	9.06	2.00	5.71	2.00	7.90	2	11.48	2	7.6
Lead	µg/L	2.00	7.00	2.00	84.50	2.00	2.00	2.00	3.73	2	7.08	2	4.04
Zinc	µg/L	18.50	100.99	10.00	89.10	13.00	28.61	10.00	38.30	10	38.96	10	39.5
TPH	mg/L	0.33	5.00	1.00	5.00	5.00	5.30	0.34	5.00	0.34	12.4	0.5	5

(3) Annual Pollutant Loads

A discharge hydrograph was created for the reporting period for the in-stream station based on continuous discharge monitoring conducted at this station. Base-flow is delineated on this hydrograph coinciding with a discharge rate of approximately 700 gallons per minute (gpm). Therefore, all discharge greater than 700 gpm were considered storm flow.

Calculation of the total annual loads passing the in-stream station for each constituent were then completed converting the results from either micrograms per liter or milligrams per liter, to pounds per gallon. This result is multiplied by the annual flow in gallons to yield the total annual mass in pounds (Table 16). The total discharge volumes do not include periods of equipment failure or other error, as discussed in Section 3b of the Discharge Characterization.

Table 16
Annual Pollutant Loads at the In-stream Station

Discharge		BOD load lb/year	TKN load lb/year	NO2/NO3 load lb/year	Phosphorus load lb/year	TSS load lb/year	Copper load lb/year	Lead load lb/year	Zinc load lb/year	TPH load lb/year
164,999,550	BASEFLOW									
		2,755	689	9,503	262	9,641	3	3	15	6,886
233,024,475	STORM									
		9,725	3,242	4,834	804	272,233	11	7	51	1,062

(4) Seasonal Pollutant Loads

Seasonal pollutant load estimates for the in-stream station are provided in Table 17**.** These loads are calculated by deriving seasonal median concentrations for constituents and multiplying by the seasonal flow at the in-stream station.

Results indicate that approximately 70% of the annual phosphorus load occurred during the fall months when discharge volumes were also high and only storm samples were collected.

The total suspended solids results indicate that 65% of this load was also delivered during the fall season and associated with higher discharges. This is to be expected since suspended solids are related to storm flows and erosion.

Table 17
Seasonal Pollutant Load Calculations for the In-stream Station

Discharge	SEASON	BOD load lb/year	TKN load lb/year	NO2/NO3 load lb/year	Phosphorus load lb/year	TSS load lb/year	Copper load lb/year	Lead load lb/year	Zinc load lb/year	TPH load lb/year
101,256,285	SPRING									
		4,226	423	5,832	228	5,916	2	2	22	4,226
110,509,785	SUMMER									
		922	1,015	3,413	148	12,914	2	2	10	4,612
112,873,500	FALL									
		5,302	1,238	2,603	1,244	166,755	6	4	31	1,731
73,384,455	WINTER									
		3,063	509	1,837	179	72,069	2	2	9	1,062

(5) Biological

A complete list of species found at each site and the frequency of their occurrence can be found in Appendix F. MBSS scoring criteria for the genus level benthic macro invertebrate Index of Biotic Integrity (IBI) for the Eastern Piedmont region of Maryland are shown in Table 18. 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. Then, a corresponding narrative rating for each station was determined in accordance with MBSS standards, which is shown in Table 19.

Table 18
MBSS Scoring Criteria for Genus Level Index of Metrics for the Piedmont Region

	Score		
	5	3	1
Number of Taxa	≥25	15-24	<15
Number of EPT	≥11	5.0-10.0	<5
Number Ephemroptera	≥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 19
Average IBI Score Range, Corresponding Narrative Ratings, and Interpretations

IBI Score Range	Corresponding 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.

In 2012, the average biological assessment score for the outfall MBSS monitoring site was 1.33, as shown in Table 20. This result corresponds to a narrative rating of very poor. The average biological assessment score for the in-stream MBSS monitoring site was 3, as shown in Table 21. This score corresponds to a narrative rating of fair.

Table 20
IBI Score for outfall Station

Metric	Result	Score
Number of Taxa	20	3
Number of EPT	0	1
Number Ephemroptera	0	1
% Intolerant Urban	1	1
% Chironomidae	88	1
% Clingers	10	1
	Total Score	***8***
	Average	***1.33***
	Result	**Very Poor**

Table 21
IBI Score for In-stream Station

Metric	Result	Score
Number of Taxa	26	5
Number of EPT	2	1
Number Ephemroptera	07	5
% Intolerant Urban	10	1
% Chironomidae	48	3
% Clingers	59	3
	Total Score	***18***
	Average Result	***3 Fair***

The 2012 spring habitat assessment total score for the outfall MBSS monitoring site was 62 out of 160. This result equates to 39% of the highest possible score. The spring habitat assessment total score for the in-stream MBSS monitoring site was 100 out of 160. This result equates to 63% of the highest possible score. These results are summarized in Table 22**.**

Table 22
Spring Habitat Assessment Results 2012

PARAMETER	Outfall	In-stream
Instream Habitat	8- marginal	11- suboptimal
Epifaunal Substrate	5- poor	11- suboptimal
Velocity/Depth Diversity	6- marginal	12- suboptimal
Pool/Glide/Eddy Quality	8- marginal	10- marginal
Riffle/Run Quality	6- marginal	12- suboptimal
Embeddedness	10- marginal	13- suboptimal
Shading	8- marginal	13- suboptimal
Trash Rating	11-suboptimal	18-optimal
Total Score (max. of 160)	62	100
Score (percent)	39	63

From 2001 to 2012, the outfall monitoring site has remained in poor to very poor condition. Scores for the in-stream station have varied greatly, with 2011 yielding the lowest score in 11 years. Results from 2012 indicate some improvement. The trend in IBI for each station during the period 2001 through 2012 is shown graphically in Figure 13.

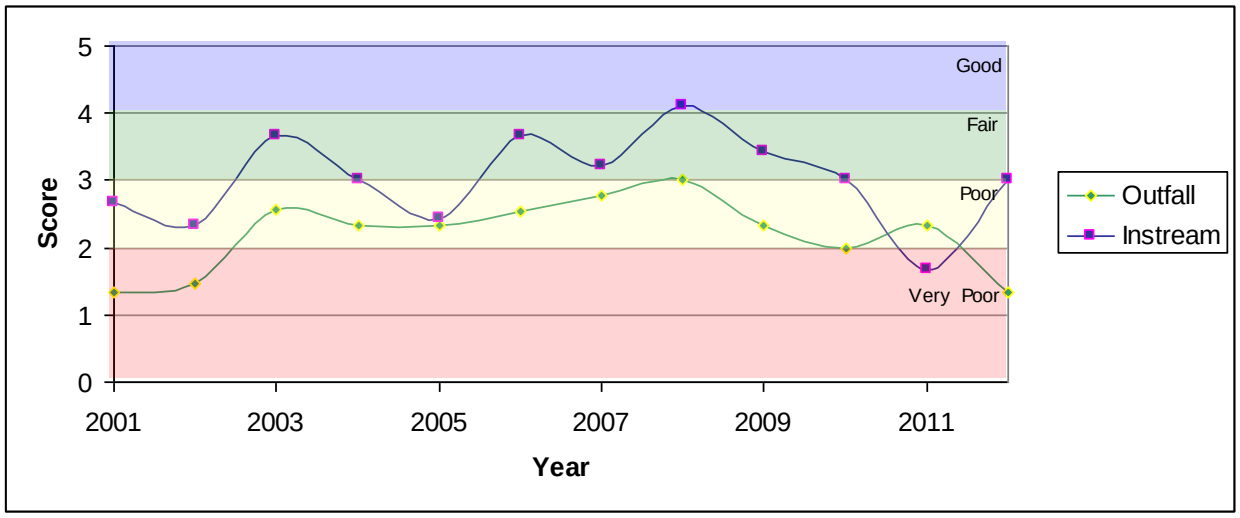


Figure 13: Macroinvertebrate IBI Analysis 2001-2012

A large percentage of *Chironomidae* species, along with few or no *Ephemeroptera, Plecoptera* or *Trichoptera* species, at both sites contributed to low scores.

The total habitat assessment scores at the in-stream station have increased since 2009. The score at the outfall station slightly declined since 2012. Habitat assessments are subjective and do not consider stream gradient or geographic location. Unless large differences in scores are observed, it is unlikely that the physical habitat is changing significantly. It is more likely that slight differences among scores are a result of the difficulties inherent in maintaining consistency using this qualitative assessment. Changes over time in habitat assessment scores, given as a percentage, are shown in Figure 14.

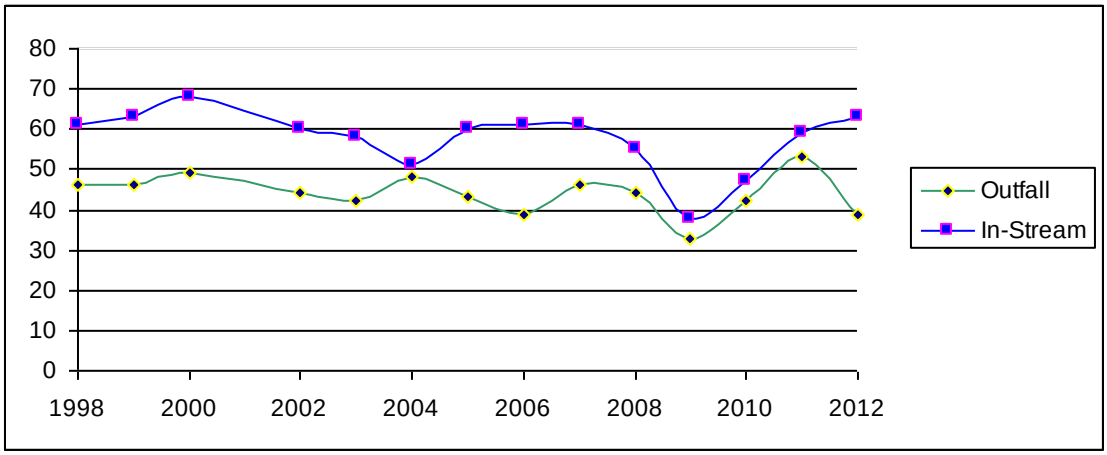


Figure 14: Habitat Assessment Scores As A Percentage Of The Total Score

Areas of eroded banks, little vegetative protection, and high levels of embeddedness contribute to the overall "marginal" rating for the outfall site. These characteristics can also be seen in the channel geomorphology within this stream segment: a straight channel of nearly constant depth and velocity that is slowly scouring the channel bottom over time.

The majority of scores for the in-stream site resulted in a "sub-optimal" ranking. Low diversity in stream velocity, depth, and flow regime contributed to the "marginal" scores for the in-stream site.

E. Management Programs

1. Stormwater Management

The County stormwater management program is the responsibility of the BRM within LUPD. Design and review are the responsibility of the Program Engineer and the Stormwater Management Review Assistant. Carroll County consists of 289,677 acres of land, of which 11,199 acres are treated with stormwater management practices. This equates to 3.9% of the county's land area. Review and approval of stormwater management during the period of June 1, 2011, through May 31, 2012, consisted of 306 plans reviewed and 99 approved as-built inspections.

Residential stormwater management facilities and storm sewer systems in unincorporated areas are owned by the County Commissioners. 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 A of this report.

Inspection of these facilities is 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 227 inspections this year, resulting in 45 corrective actions. Follow-up inspections are performed to ensure compliance has been achieved in a timely matter. In cases where violations still exist, Notices of Violations are sent, allowing an additional amount of time to resolve issues. During the period of June 1, 2011, to May 31, 2012, 32 Notices of Violations were issued.

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, 2013. Inspections relating to building permits, grading permits, forest-harvest grading permits, NPDES storm sewer outfall, and SWM are a large part of the inspection staff's responsibilities.

Inspection statistics during the reporting timeframe were as follows:

- 128 grading permits issued
- 2,111 sediment control inspections

- 115 NPDES storm sewer outfalls inspections
- 227 stormwater management inspections

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

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

3. Illicit Discharge 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. Baseline outfall maps were developed to assist the inspection staff with locating the outfalls. These maps are updated as new storm drain systems are brought online. Currently outfall selections are based on a rotation system but will be updated in the coming permit year. This update will emphasize 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. It is anticipated this approach will be a more effective and efficient use of resources for the detection of illicit discharges.

Inspection staff participated in annual training prior to the inspection season using the guidance manual entitled "Illicit Discharge Detection and Elimination," by the Center for Watershed Protection and Robert Pitt of the University of Alabama, funded in part by the United States Environmental Protection Agency.

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 105, Environmental Management of Storm Sewer System. If the problem is severe enough to warrant immediate correction, then 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. 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 115 routine outfall screenings – 59 in the County

and 56 in the municipalities. Outfall screenings were distributed among seven watersheds as follows: Prettyboy (5), Loch Raven (4), Liberty (63), Patapsco River – South Branch (13), Lower Monocacy (4), Double Pipe Creek (20) and Upper Monocacy River (6) (see outfall Map Appendix D). A total of eight screenings required further investigative action, with no illicit discharge findings. Of the 115 inspections, 20 structural or maintenance observations were forwarded to the Carroll County Bureau of Roads; 6 were sent to the EISD; and 18 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 recently added to the County website for easier reporting by the public. Complaint driven investigations are summarized in Appendix D.

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. Based on COMAR and the qualifications in 40 CFR 122, seven of the facilities require coverage under a General Industrial Storm Water NPDES permit. Table 23 below shows the status for those County facilities registered under the "Maryland General Discharge Permit For Storm Water Associated With Industrial Activities – Discharge Permit No. 02-SW." Throughout the permit year, a comprehensive review of each Stormwater Pollution Prevention Plan (SWPPP) occurred for each facility resulting in updates and/or revisions to improve the effectiveness for which they were designed.

Table 23
County NPDES Industrial Permitted Facilities Status - July 15, 2012*

Carroll County Facility	NOI Registration #	SWPPP Status	Responsibility/ Signatory
Regional Airport	02SW 1755	Update in Progress Completion by 8/2012	Dept of Public Works
Maintenance Facility **	02SW 1861	Update in Progress Completion by 9/2012	Dept of Public Works
Northern Landfill & Transfer Station	02SW 0660	Current	Dept of Public Works
Hood's Mill Landfill (Capped/Closed) & Transfer Station	02SW 0661	Draft In Progress Completion to follow operational changes of T.S.	Dept of Public Works
Hodges Landfill (Capped/Closed)	02SW 0664	Final Draft In Progress Finalized/ 3rd Qtr 2012	Dept of Public Works
John Owings Landfill (Capped/Closed)	02SW 0665	Draft In Progress Finalized/ 3rd Qtr 2012	Dept of Public Works
Bark Hill Landfill (Capped/Closed)	02SW 0662	Draft In Progress Finalized/ 3rd Qtr 2012	Dept of Public Works

*MD General Discharge Permit For Storm Water Associated With Industrial Activities: Discharge Permit No. 02-SW
** SWPPP Includes BMP/Addendums for Salt Dome/Barn Operations (CMF, Bark Hill, Winfield, Hodges)

5. Compliance Status

County reorganization over the past several years found personnel and responsibilities in transition 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 of 2011 for County Public Works management/ supervisory level, SWPPP team members and Risk Management personnel responsible for permit compliance through SWPPP implementation. The training included an overview of the NPDES program, MS4 and Industrial permitting requirements, and an instructional video covering everyday best management practices, including but not limited to, good housekeeping and spill prevention. These training records are kept and maintained by the County LUPD. Annual training was also provided at each permitted facility for County employees having the possibility of interfacing with stormwater pollution in their work duties. Training included classroom instruction and practical application. These training records are kept on-site at each facility. During the permit year, visual, routine and annual inspections were performed and recorded per each facility-specific SWPPP. Inspection records are maintained on-site at each facility location.

The County received notice on April 3, 2012, regarding a pending EPA MS4 Program Inspection to be conducted in late April 2012. Prior to the inspection date, County personnel assembled and forwarded to EPA an extensive array of data and information related to permit requirements. Staff also assembled additional information requested to be available during the inspection. The two-day inspection, held April 26 – 27, included an in-office file and computer database review as well as field inspections. Approximately 22 County employees participated in the inspection process. Representatives from MDE were also present for the two day event.

The inspection included site visits to three Carroll County owned and managed facilities which currently have Notice of Intent (NOI) registration and a SWPPP. In addition a visit to one County closed and capped landfill was also part of the day two inspection. The County acquired much appreciated direction related to SWPPP preparation for these facilities. The two-day process provided County NPDES staff, facility operators, and management with extensive insight and expectations related to permit requirements.

6. External Management Review

In 2010, VERSAR, an environmental consulting firm, was contracted to perform an external review of County and municipal facilities in relation to NPDES industrial permitting requirements. Their assessment facilitated a work plan for the 2011-2012 permit year developed by the County resulting in significant progress for both Phase I and Phase II jurisdictions with regard to facilities.

During this permit year, URS Corporation provided outside technical support and assistance with on-site SWPPP annual inspections. This effort was also utilized as a training opportunity for existing and new SWPPP team members assigned these duties. In addition URS was contracted

to prepare the SWPPP for Hood's Mill Landfill and Transfer Station and updates to both Carroll County Regional Airport and Maintenance Facility.

7. Permit Database

The Department of maintain 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.

8. 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 systems countywide. This information is then used as a basis for regular inspection and maintenance.

The County Bureau of Road 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 week occurrences along road right-of-ways and on private properties is implemented via an agreement with the Maryland Department of Agriculture (MDA). Employees from MDA perform spot spraying along County right-of-ways as well as private lands for a fee.

Carroll County continues to develop alternative deicing 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 deicing program that emphasizes equipment maintenance and calibration in the fall and utilizes a process of pre-wetting salt use for more effective application.

9. Public Education

Public education takes many forms to ensure the 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. 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 or other permit not administered by the County are referred to the applicable agency for investigation.

In this reporting year, Carroll 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 1, 2011, and April 21, 2012. Collection of unused prescription and non-prescription drug "drop off" can be made to the designated law enforcement agencies. Household Hazardous Waste Events also include a service to shred any paper records. Events such as these provide County residents a safe means of disposing of residual household chemicals, shredding of un-needed documents, and an opportunity to learn many ways in which to protect the environment. The County also hosted a rain barrel and composting event on March 31, 2012.

In addition to previous references, 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 community. The Department website provides useful information on programs available to County residents and others. The following is a list of specific public education venues where the County staff participated during the last permit year to disseminate environmental information:

- Carroll County 4-H/FFA Fair – July 29 through August 5, 2011
- Westminster Fall Fest – September 24 through September 25, 2011
- Taneytown Harvest Fest – October 22, 2011
- Earth Day at Carroll Hospital Center – April 19, 2012
- Manchester Spring Fest – May 6,2012
- Westminster Flower & Jazz Festival – May 12, 2012

Carroll County continues to provide an open forum on environmental issues and concerns through its Environmental Advisory Council. This Commissioner-appointed citizen board meets monthly to address County and citizens' topics related to various environmental issues.

The Water Resource Coordination Council 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 interact on various current issues. The Council took the lead in coordinating and developing the Water Resource Element, a joint document that the County and seven municipalities adopted. The Council 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 Council is participating in discussions concerning development of Phase II Watershed Implementation Plan issues.

A dedicated NPDES webpage entitled "Protecting Carroll County Waters" was recently added to the Carroll County Government website during the permit year. Basic stormwater pollution prevention and education information with links to NPDES related sites including EPA and MDE are provided to inform the public.

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% of the County's impervious acrage covering the current permit period (2005 – 2010) an additional 20% identified for restoration is anticipated for the next permit period. As outlined in section C.4 of this permit submittal, documentation revising the baseline impervious acreage for the unincorporated area of Carroll County , which is currently identified at 6,449, acres has been provided. Therefore, per Section F.2, the current restoration effort targeted is 645 acres and per section F.3 the new total would be 1,290 acres.

Carroll County continues to vigorously apply its efforts at watershed restoration, i.e., impervious surface mitigation and water quality improvement. Projects are managed and implemented by LUPD, BRM through a capital improvement program: Watershed Assessment and Improvement National Pollutant Discharge Elimination System (NPDES). Specific financial levels of effort will be discussed further in Section G, Program Funding. The County continues to focus the majority of its efforts in the Patapsco River Watershed. The majority of the county's population, and thus impervious surface, is located in the eastern portion of the County, which exclusively drains to the Patapsco River System. In addition, these efforts support the County's regional efforts related to the Reservoir Watershed Protection Agreement.

The County continues to undertake and complete projects related to retrofitting through:

- a process to rehabilitate and upgrade older existing stormwater management facilities to current standards;
- management of existing untreated impervious areas; and
- various tree planting initiatives.

Figure 15 provides the 2012 current status of watershed restoration in Carroll County. The green line provides a running total of acres of impervious restoration projects completed or under construction. The July 2012 total is 973.95 acres. The yellow line indicates an additional 556.77 acres of impervious surface which are currently being designed for restoration. The orange line, which represents future projects (703.8 acres indicates the total impervious acres planned for treatment would be 1,726. This represents 89% of the estimated acres needed to achieve the proposed restoration in the next generation draft County MS4 permit. The County acknowledges this slight shortfall, but due to budgetary constraints, capital expenditure estimates beyond the current cycle are not practical. The County will refine workload and project projections in subsequent annual permit submittals.

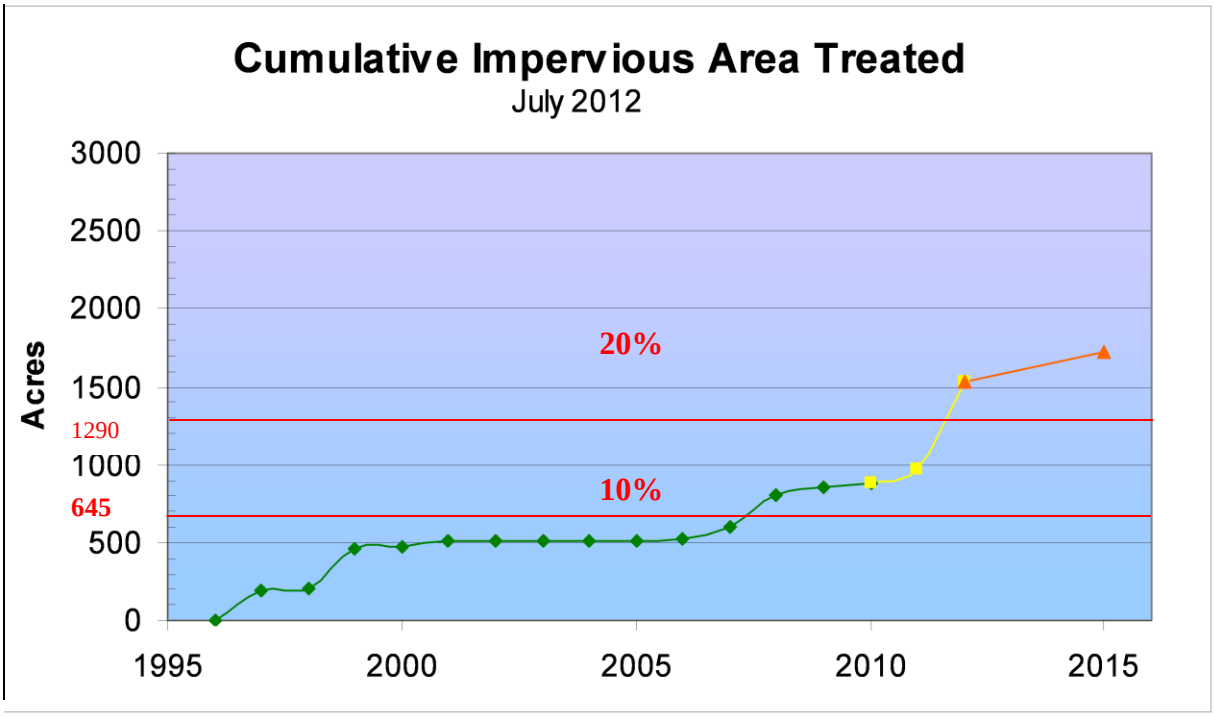


Figure 15. Impervious Surface Acres Treated For Constructed, Designed, And Planned Projects

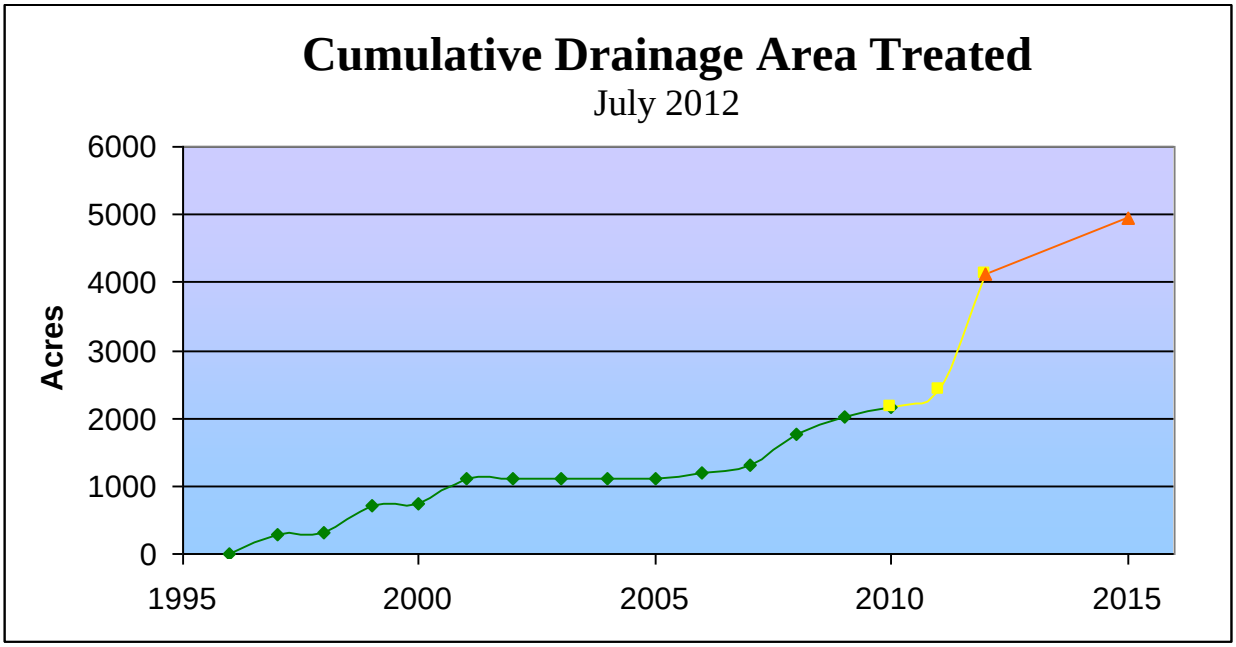


Figure 16. Drainage Area In Acres Treated For Construction, Design, And Planned Projects.

Figure 16 indicates the total drainage acres treated by the restoration projects. Currently, a total of 2,414.73 acres have received water quality treatment via restoration projects. Table 24 lists the projects, color coded to Figures 15 and 16, as of July 2012. An estimate of pollutant load reductions associated with select completed projects can be found in Table 25.

Table 24
Listing of Watershed Restoration Efforts, July 2012
NPDES

Year	Project Name	Project Type	Drainage Area	Project Status	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	0.40	Liberty Reservoir
2000	Piney Run Buffer Project	Riparian Buffer	0.00	Completed	0.00	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
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	1.44	Completed	0.28	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	182.31	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 of two facilities	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
2010	Brimfield	Retrofit	34.69	Completed	17.23	S Branch Patapsco
2010	Hoff Pond	New Construction	101.80	Completed	12.98	Liberty Reservoir
2010	Piney Run Planting (Bank Site #2)	Buffer Planting	21.40	Completed	11.79	S Branch Patapsco

Year	Project Name	Project Type	Drainage Area	Project Status	Treated Impervious	MDE8NAME
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	Heritage Heights	Retrofit	21.40	Completed	4.10	Liberty Reservoir
2011	Sun Valley		12.80	Completed	3.27	
2010	Harvest Farms 1A	Retrofit	43.80	Completed	11.25	S Branch Patapsco
2010	Parrish Park	Retrofit	94.23	Completed	18.20	Liberty Reservoir
	Totals		**2414.73**		**973.95**	
2008	Westminster High School	New Construction	115.00	Design	42.12	Liberty Reservoir
2010	Westminster Community Pond	New Construction	250.22	Design	43.92	Liberty Reservoir
2010	Sullivan Road Regional Facility- Phase II	New Construction	265.00	Design	111.00	Liberty Reservoir
2010	Clipper Hills - Gardenia	Retrofit	33.19	Construction	11.08	S Branch Patapsco
2010	Clipper Hills - Hilltop	Retrofit	77.64	Construction	17.65	S Branch Patapsco
2010	Candice Estates	New Construction	39.00	Design	13.00	Lower Monocacy
2010	Finksburg Industrial Park	Retrofit	124.00	Design	60.00	Liberty Reservoir
2010	Gessell Property (Jantz)	New Construction	289.00	Design	110.00	Double Pipe Creek
2010	Libman Property	New Construction	457.00	Concept	93.00	Liberty Reservoir
2010	Elderwood Village/South Carroll Commercial	Retrofit	135.00	Design	40.00	Liberty Reservoir
2012	Friendship Overlook/Diamond Hills Section 5		83.00	Design	15.00	Double Pipe Creek
	Totals		**1868.05**		**556.77**	
	Springmount Estates	New Construction	60.00	Concept	20.00	Liberty Reservoir
2012	Melstone Valley		165.00		8.00	S Branch Patapsco
2012	Benjamin's Claim		51.26	Design	20.16	S Branch Patapsco
2012	Oklahoma 4 Phase IV		54.00	Design	18.00	Liberty Reservoir
2013	Eldersburg Estates 3-5		29.00	Design	10.50	S Branch Patapsco
2013	Miller/Watts		34.60	Concept	9.32	Liberty Reservoir
2014	Matthews Meadow		26.30		6.60	Liberty Reservoir
2014	Squires		38.00		10.00	Liberty Reservoir
2015	Braddock Manor West		29.00		4.15	S Branch Patapsco
2015	Hunter's Crossing Section 2 #2		23.50		5.43	S Branch Patapsco
2016	Central Maryland (Dry Facility)		62.90		45.00	Liberty Reservoir
2016	Central Maryland (Wet Facility)		87.50		38.30	Liberty Reservoir
	Totals		**661.06**		**195.46**	
	Totals		**4,943.84**		**1,726.18**	

Table 25 - Water Quality Improvements - Watershed Restoration Projects

Project Name	Location	MDE8NAME	TSS (lbs/year)	Total Phosphorus (lbs/year)	Total Nitrogen (lbs/year)	Drainage Area (acres)	Treated Impervious (acres)
Hickory Ridge	Velvet Run Drive Westminster, MD	Liberty Reservoir	2.10	8.32	41.66	23.75	4.80
Bateman SWM Pond	Patapsco Road Finksburg, MD	Liberty Reservoir	3.23	12.83	64.23	47.25	7.40
Marriott Wood I Facility #2	Edenbrooke Court Eldersburg, MD	Liberty Reservoir	0.89	3.54	17.71	7.12	2.04
Marriott Wood II	Fawn Haven Court Eldersburg, MD	Liberty Reservoir	0.84	3.33	16.67	11.62	1.92
Westminster Airport Pond	Magna Way Westminster, MD	Liberty Reservoir	50.32	167.36	395.61	204.84	182.31
Elderwood Village	Monroe Avenue Eldersburg, MD	Liberty Reservoir	2.16	8.57	42.88	15.28	4.94
Collins Estate	Collins Avenue Eldersburg, MD	Liberty Reservoir	2.78	11.03	55.20	32.68	6.36
Arthurs Ridge	Laval Drive Eldersburg, MD	S Branch Patapsco	1.42	4.72	11.15	51.17	5.14
Oklahoma II Foothills	Forest Lane Eldersburg, MD	Liberty Reservoir	2.65	10.51	52.60	23.72	6.06
Oklahoma Phase I	Stillwater Court Eldersburg, MD	Liberty Reservoir	3.18	12.61	63.10	24.44	7.27
Edgewood	Caren Drive Eldersburg, MD	Liberty Reservoir	5.30	21.02	105.20	38.00	12.12
Upper Patapsco Phase I Naganna Pond	Bethel Road Finksburg, MD	Liberty Reservoir	4.37	17.34	86.80	24.50	10.00
Project Name	**Location**	**MDE8NAME**	**TSS (lbs/year)**	**Total Phosphorus (lbs/year)**	**Total Nitrogen (lbs/year)**	**Drainage Area (acres)**	**Treated Impervious (acres)**

Upper Patapsco Phase II Waterway	Bethel Road Finksburg, MD	Liberty Reservoir	0.58	1.65	8.79	50.31	1.80
Upper Patapsco Phase III Hoff Pond	Bethel Road Finksburg, MD	Liberty Reservoir	5.67	22.51	112.67	101.80	12.98
High Point	Oklahoma Road Eldersburg, MD	Liberty Reservoir	0.80	3.16	15.80	9.40	1.82
Brimfield	Brimfield Circle Eldersburg, MD	S Branch Patapsco	7.53	29.88	149.59	34.69	17.23
Campus Heights	Campus Court Westminster, MD	Liberty Reservoir	2.36	6.99	49.56	27.98	5.71
Quail Meadows	Fox Sedge Court Eldersburg, MD	Liberty Reservoir	4.00	13.31	31.47	55.40	14.50
Heritage Heights	Advisory Court Eldersburg, MD	Liberty Reservoir	1.79	7.11	35.59	21.40	4.10
Harvest Farms 1A	Cable Drive Eldersburg, MD	S Branch Patapsco	3.11	10.33	24.41	43.80	11.25
Parrish Park	Caren Drive Eldersburg, MD	Liberty Reservoir	5.02	16.71	39.49	94.23	18.20
Sun Valley	Iroquois Drive, Woodbine, MD	S Branch Patapsco	1.43	5.67	28.38	12.80	3.27
Clipper Hills Gardenia	Gardenia Street, Eldersburg, MD	S Branch Patapsco	4.84	19.21	96.17	33.19	11.08
Clipper Hills Hilltop	MacBeth Way Eldersburg, MD	S Branch Patapsco	7.71	30.61	153.20	77.64	17.65
Total			**111.52**	**398.48**	**1,448.57**	**956.18**	**341.22**

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 will be funding compliance with Permit No. 99-DP-3319 (MD0068331). The analysis is intended to fulfill condition III.G.1 of the permit.

Carroll County employees have received no salary increases in salary since the last report. The only changes to this fiscal assessment have occurred in duty realignments, position upgrades, or title changes.

1. Operational Expenses

a. Specific Position Responsibilities

The following information estimates time spent by each Carroll County Government position on tasks related to compliance with the NPDES permit. In reality, due to the fact that the permit requires Carroll County to maintain an adequate stormwater management and the 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 by delegation, only a percentage related to NPDES 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 **30%** 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 ~**$31,850.00***

(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;
- Oversees and monitors the project progress; and
- Participates in watershed assessment process.

*Total estimated expenditure ~ **$68,905.00***

(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 elimination inspections;
- Liaison to the Maryland Department of the Environment;
- 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 ~ ***$64,510.00***

(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 Annual Report; and
- Tracking expenditures for NPDES projects.

Total estimated expenditure ~ ***$27,476.64***

(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 ~ ***$2,051.00***

(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:

- Schedules environmental inspections, types related correspondence; and
- Tracks investigations related to compliance actions.

Total estimated expenditure ~ ***$4,736.62***

(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 ~**$21,178.34***

(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) **$52,703.00***

(9) **Stormwater Management Program Engineer** - The following general tasks are performed by the Stormwater Management Program Engineer related to NPDES compliance. They require approximately 4**0%** of the position's time:

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

*Total estimated expenditure ~ **$49,970.00***

(10) **Stormwater Management Review Assistant** - The following are general tasks performed by the Stormwater Management Review Assistant related to NPDES compliance. They require approximately 6**0%** of the position's time:

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

*Total estimated expenditure ~ **$54,717.00***

(11) **Watershed Management Specialist** - The following are general tasks performed by the Watershed Management Specialist related to NPDES compliance. The tasks require approximately 8**0%** of the position's time:

- Biological and physical data collection, interpretation, and reporting;
- Technical assistance;
- Watershed management planning and coordination for restoration activities; and
- Coordination and facilitation of local watershed groups.

*Total estimated expenditure ~ **$47,306.00***

(12) Watershed Restoration Specialist - The following are general tasks performed by the Watershed Restoration Specialist 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 ~ ***$47,305.44***

(13) Groundwater Technician - The following are general tasks performed by the Groundwater Technician 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 ~ ***$42,916.00***

(14) Water Resource Technician - The following are general tasks performed by the Water Resource Technician related to NPDES compliance. These tasks require approximately 100**%** of the position's time:

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

Total Estimated expenditure ~ ***$53,645.00***

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

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

Total Estimated expenditure ~ ***$30,440.00***

(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 ~ ***$51,608.00***

(18) **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 ~ ***$6,589.00***

The total estimated salary expenditure for personnel in the 2011/2012 permit year.
$657,907.04

b. Supplies and Contract Services

General supplies necessary to support the NPDES MS4 program for 2011/2012 permit year including educational and training materials, banner for education booth, registration for community events, storm water video and an Enviro Scape for school and community education. ***$2,138.42***

Construction of a building at monitoring station was purchased during the 2011/2012 permit year. ***$1,305.44***

Repair of Isco Sampler for 2011/2012 permit year. **$2,292.18**

Cost of test kits and strips for outfall monitoring and cost chemicals and analysis for physical and biological monitoring for the 2011/2012 permit. ***$9,203.00***

The total expenditures for supplies and contract services in the operating budget in the 2011/2012 permit year. ***$14,939.04***

c. Stormwater Pond Maintenance

The annual maintenance cost of $104,194.83 for County stormwater management facilities was necessary to meet NPDES compliance.

Contractor Cost for 2011/2012	***$16,493.00***
County Labor Cost +30%	***$8,661.83***
Equipment (same no change***)***	***$79,040.00***
Total maintenance cost of stormwater management facilities for permit year 2011/2012	***$104,194.83***

$777,040.91 Total Operating expenditures for 2011/2012 permit year

2. Capital Expense

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 2011/2012 permit year) totals ***$3,145,000.00***

Capital expenditures for the program by year as well as total to date can be found in Table 26. Table 27 provides the approved 2013 – 2018 Community Investment Plan estimates for the two program funds. It is important to note that funding beyond the current year FY13 is subject to future budget review and approval processes. Therefore no guarantee is made to future appropriations beyond FY13.

Table 28; Environmental Compliance is being used to fund the items listed below:

*VERSAR	March 2010 -Environmental compliance assistance with NPDES.	$15,510.00
	November 2010 - Environmental compliance training on	$ 7,759.00
Total	**expenditures 2011/2012 permit year**	***$23,269.00***
URS	Preparation of Northern Landfill's SWPPP and SPCC Plan	$15,544.00
	SWPPP Annual Site Evaluation of County Facilities.	$ 2,410.00
Total	**expenditures 2011/2012 permit year**	***$17,594.00***

***Previous Years – These are items that were not included in the 2011 Annual Report and were funded through the Environmental Compliance CIP Budget.**

Table 26
Carroll County, Maryland –Total NPDES MS4 Capital Expenditures
July 15, 2005 through May 30, 2012

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 – 6/30/11 **	**$23,269.00**
7/1/11 to 6/30/12	**$1,635,671.32**
Total permit expenditures, to date	***$6,961,691.90***

- Capital expenditures beginning in 2008 and subsequent years include project costs associated with the Stormwater Management Facility Maintenance Program.

Approved Community Investment Plan 2013 – 2018

Table 27
Watershed Assessment and Improvement (NPDES)

	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	Prior Allocation	Balance to Complete	Total Project Cost
Engineering/Design	165,000	295,000	150,000	165,000	170,000	175,000			**1,120,000**
Land Acquisition									**0**
Site Work									**0**
Construction	3,690,000	2,995,000	2,880,000	3,250,000	3,500,000	3,675,000			**19,990,000**
Equipment/Furnishings									**0**
Other									**0**
EXPENDITURES									
TOTAL	**3,855,000**	**3,290,000**	**3,030,000**	**3,415,000**	**3,670,000**	**3,850,000**	**0**	**0**	**21,110,000**

Previous years reports have shown expenditures for watershed assessment and improvement projects coming from two CIP accounts. The accounts have been combined and are reflected in Table 27.

Table 28
Environmental Compliance

	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	Prior Allocation	Balance to Complete	Total Project Cost
Engineering/Design									**0**
Land Acquisition									**0**
Site Work									**0**
Construction	75,000	75,000	75,000	75,000	75,000	75,000			**450,000**
Equipment/Furnishings									**0**
Other									**0**
EXPENDITURES									
TOTAL	**75,000**	**75,000**	**75,000**	**75,000**	**75,000**	**75,000**	**0**	**0**	**450,000**

Part IV. Special Programmatic Conditions

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 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 to 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 TMDL efforts. Staff has attended general and regional meetings as well participated in webinars offered by the EPA and MDE. The County via the Water Resource Coordination Council is participating in discussions and development of Phase II Watershed Implementation Plan efforts.

APPENDICES

Carroll County
NPDES ANNUAL REPORT

July 15, 2012

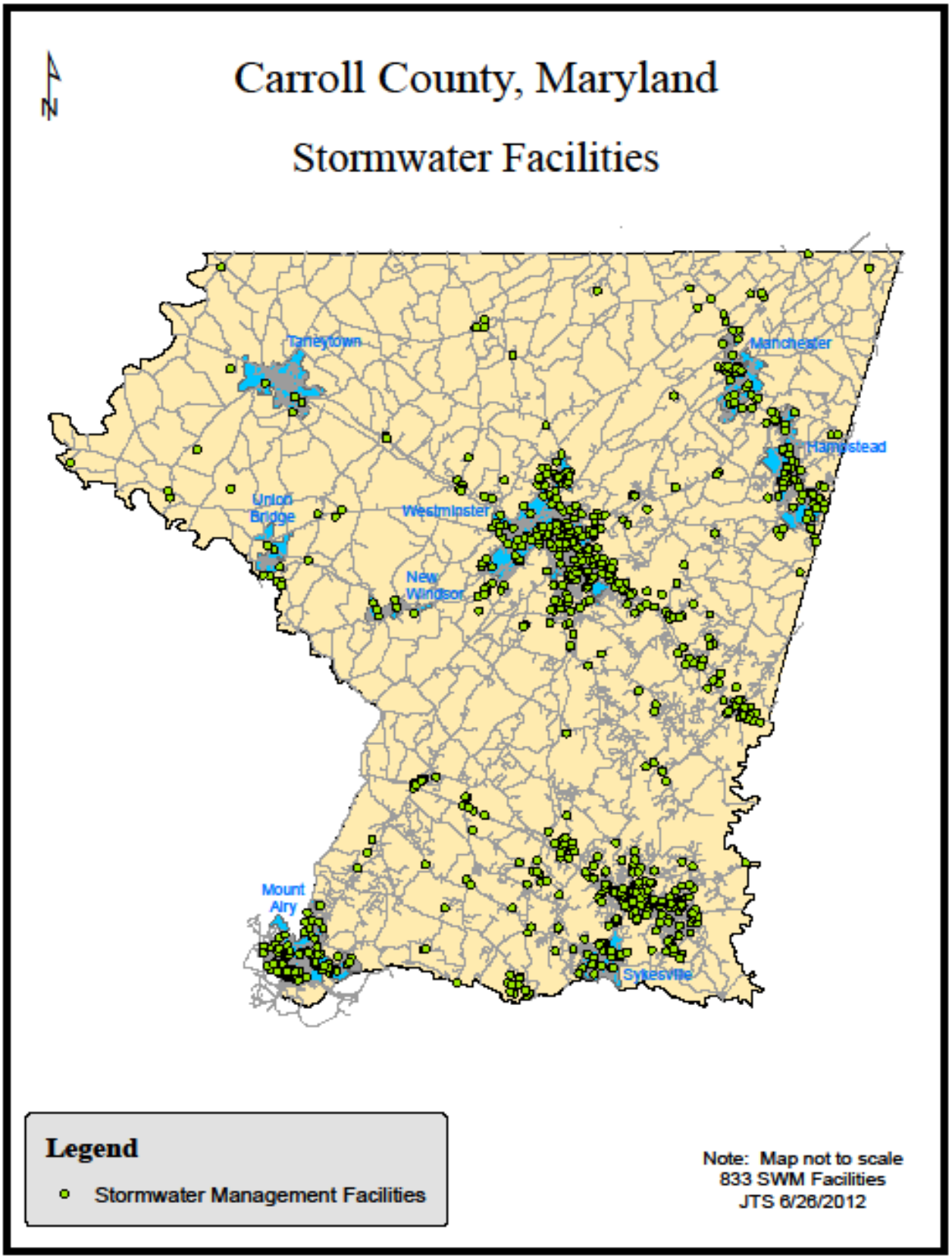
Appendix A

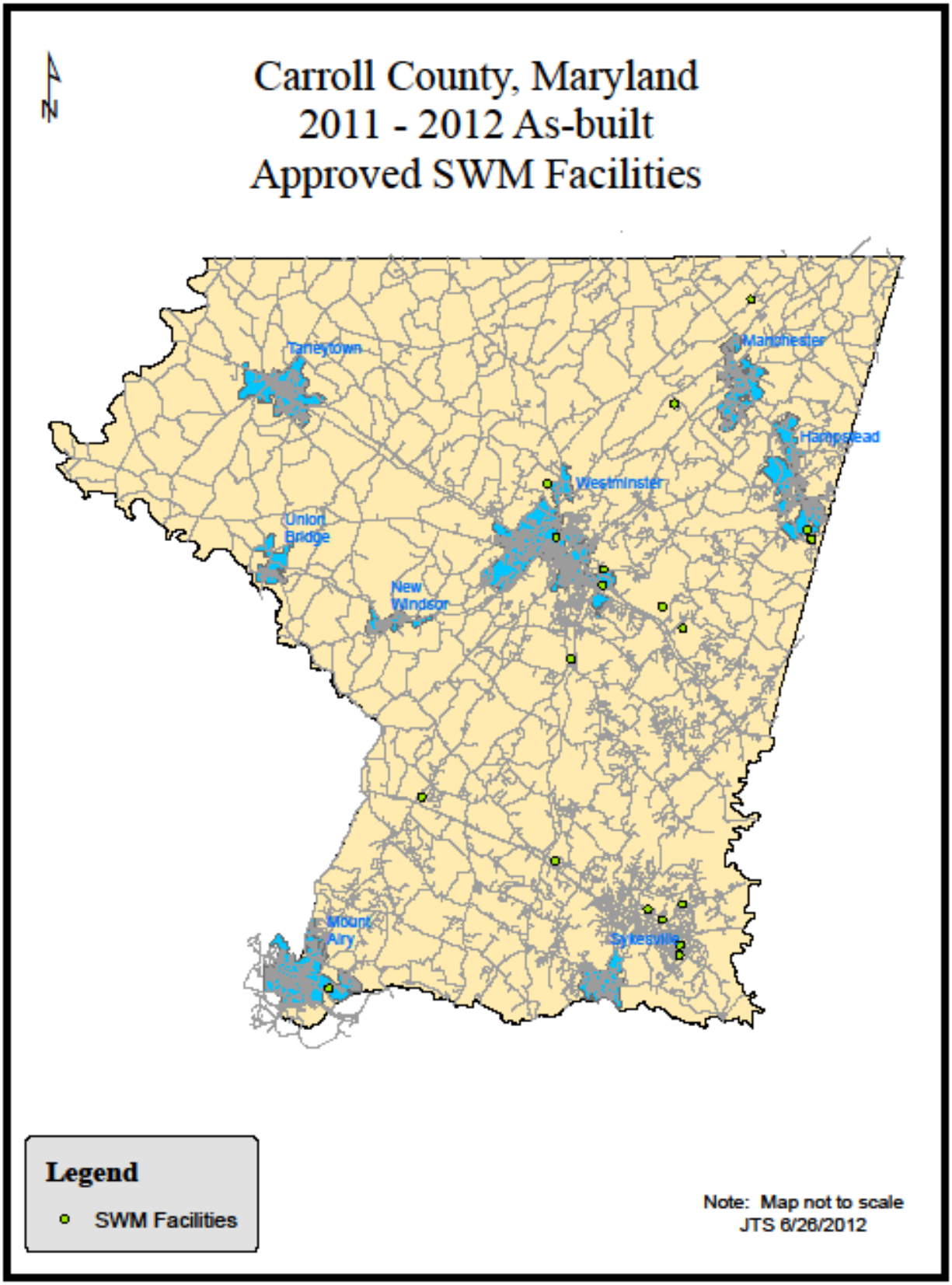
COUNTY STORMWATER MANAGEMENT FACILITIES

AND

COUNTY NPDES MS4 DATABASE CD

2012 NPDES MS4 Permit Annual Report


Carroll County, Maryland
Stormwater Facilities
N
Taneytown
Manchester
Hampstead
Union Bridge
Westminster
New Windsor
Mount Airy
Sykesville
Legend
Stormwater Management Facilities
Note: Map not to scale
833 SWM Facilities
JTS 6/26/2012


Carroll County, Maryland
2011 - 2012 As-built
Approved SWM Facilities
N
Taneytown
Manchester
Hampstead
Westminster
Union Bridge
New Windsor
Mount Airy
Sykesville
Legend
SWM Facilities
Note: Map not to scale
JTS 6/26/2012

APPENDIX B

Carroll County Rural Regions Impervious Cover Analysis

2012 NPDES MS4 Permit Annual Report

APPENDIX B

Impervious Cover Analysis – Double Pipe Creek Watershed and the Upper Patapsco/Upper Gunpowder Rural Legacy Area, Carroll County

1. Background

The purpose of this analysis is to examine the extent and type of impervious surfaces located within two selected rural areas of interest in Carroll County, specifically those regions officially designated either in whole or in part as a priority for land preservation. This analysis is intended to provide support to the Carroll County proposal to reduce the total acres of impervious surface that provide the basis for watershed restoration project requirements as part of the NPDES Permit.

The areas of interest specifically identified for this analysis are shown in Figure B-1. They include the Double Pipe Creek 8-digit watershed which includes the State-approved Priority Preservation Area (PPA) and the County/State-designated Upper Patapsco/Upper Gunpowder Rural Legacy Area located within both Prettyboy and Liberty 8-digit watersheds. This analysis will examine the rural nature of the areas of interest, anticipated future land preservation efforts, existing and future land uses for these areas, as well as the nature and extent of impervious surface cover located within these areas. Justification is also provided as to why it is impractical to consider these areas as part of the impervious surface cover calculations for the County NPDES permit.

2. Rural Character of the Areas of Interest

The Carroll County Master Plan identifies two relevant main elements that direct growth within the County; Designate Growth Areas (DGAs) centered primarily on existing municipalities and areas targeted for agricultural land preservation.

2.1. Analysis of Rural Areas

The DGAs consist of the eight incorporated municipalities and the associated growth areas located in the county that have historically served as market centers for the agricultural base. Today, these eight municipalities and an additional unincorporated County DGA serve as the nucleus for planned growth. The County Master Plan, as well as those of the incorporated municipalities, have been designed and implemented to follow this model. While growth has occurred county-wide, Table B-1 below indicates clearly where the majority of growth has and is occurring and the resulting population densities.

Table B-1 Carroll County, Maryland Land Area, Population and Density					
	Population (May 2012)		Land Area (Miles^2)		Population Density(persons/ Miles^2)
	No.	% of total	No.	% of total	
Unincorporated Rural Areas (Outside Designated Growth Areas)	64,594	38	357	79	181
Current Designated Growth Areas (including Municipalities)	103,915	62	96	21	1082
Total County	168,509	100	453	100	372

For reference, although the U.S. Census generally defines Urban Areas based on total population within a census geography, population densities greater than 1,000 persons per square mile are related to urban areas (U.S. Census, 2012). The table above demonstrates that while population densities within the DGAs are indicative of urban areas, the rural areas of the county have population densities far below those associated with urban areas. The U.S. Census-defined urban areas within Carroll County are shown in Figure B-2. This proposal is only intended to examine two discreet areas located outside of the DGAs in areas that are not defined by the U.S. Census as urban areas.

Carroll County has a Phase I NPDES MS4 permit, which, according to MDE, is applicable to urban jurisdictions with the intent to control pollution in stormwater to the maximum extent possible. This proposal is only related to two rural areas of interest within the County, outside the DGAs.

3. Future Land Preservation Efforts

Carroll County is a traditionally rural, agricultural county. The County has made a significant commitment to the agricultural base by investing in a nation-leading land preservation program. Currently, greater than 61,800 acres of the 289,678 acres (22%) in the County are in permanent agricultural preservation; being a leader amongst all jurisdictions in the nation. While the current land use and population figures s
hown above support the reasoning that these areas are not urban in nature, future development potential must be considered in order to ensure that the rural character of these two areas of interest will be preserved into the future. This will be addressed in large part by preservation programs currently in place to meet these goals.

3.1. Double Pipe Creek Watershed Priority Preservation Area (PPA)

The Agricultural Stewardship Act of 2006 (HB 2), passed by the Maryland General Assembly, requires certified counties to establish PPAs in their comprehensive plans and manage them according to certain criteria. Beginning in FY 2009, certified counties were required to include a PPA Element in their comprehensive plans in order to maintain certification. The PPA Element

identifies areas of agricultural and forestry resource land that would support agricultural production and timber harvesting for the present and future.

The Double Pipe Creek watershed PPA consists of a total of 92,909 acres, as shown in Figure B-3. Of that, 80,736 acres are undeveloped, meaning the current land use is not urban or transportation types, which are the land use categories that result in impervious surface cover requiring stormwater management, and thus restoration. Developed lands within the PPA consist of urban land use classifications and comprise approximately 9,477 acres along with approximately 2,696 acres of transportation land use classifications.

The creation of this PPA allows the County to focus funds toward achieving agricultural preservation. The County has had a longstanding goal of preserving 100,000 acres of agricultural land in order to maintain the sustainability of the agricultural industry in the County. To support attainment of this goal, a portion of the remaining undeveloped land within the Double Pipe Creek watershed PPA is targeted for preservation. The County has a goal of putting 80% of this undeveloped land within the Double Pipe Creek watershed PPA into permanent preservation. This amounts to 64,589 acres within the PPA. Of this acreage, 37,986 acres are already under permanent easement, and 4,583 acres are designated "Remaining Portions" and are protected from further *residential* development, for a total of 42,569 acres. To meet the PPA preservation goal, it is the County's objective to preserve the remaining 22,020 acres in the PPA for agricultural and forestry use through purchase of permanent easements.

Using the agricultural preservation program within the Double Pipe Creek watershed PPA will result in only 16,148 acres of undeveloped land that is not protected via easement. This does not consider constraints to development via zoning and environmental regulations.

3.2. Upper Patapsco/Upper Gunpowder Rural Legacy Area (RLAs)

The Maryland Department of Natural Resources Rural Legacy Program was enacted to protect large, contiguous tracts of cultural and natural resource lands through locally applied grants. This area protects some of the most productive farmland in Carroll County. This area includes most of the drainage basin of the East Branch of the Patapsco River, part of the West Branch, and makes up 16% of the Liberty Reservoir watershed in Carroll County (a drinking water supply for the metropolitan Baltimore area). The area was recently (2011) expanded to include those portions of Gunpowder Watershed located in Carroll County. The expansion accessed an additional 25,050 acres of Rural Legacy-designated land for a combined total of 39,198 acres. The Maryland Historic Trust has identified 33 historic sites, including churches, cemeteries, mills, schoolhouses, and farmhouses relating to the traditional agricultural use of the area. The RLA also includes significant bog turtle habitat, a State-identified threatened species and a federally proposed threatened species (DNR, 2012).

The Upper Patapsco/Upper Gunpowder Rural Legacy Area has approximately 26,521 acres of undeveloped, unpreserved lands. A portion of these remaining undeveloped lands is targeted for preservation. The County has a goal of 22,543 acres or 85% of those lands. Combined with the already preserved 6,797 acres, an overall goal of 75% of the land in the Rural Legacy Area is planned for preservation.

All lands that are preserved via County, State, or County/State easement required a total farm conservation plan. These plans include protection, preservation, and in some cases restoration of critical land and water resources. Each dollar spent by the County directly translates to the continued viability of agricultural as well as significant improvements in farm runoff.

4. Type of Impervious Surface Cover (ISC) within the Areas of Interest

Rural development is limited to residential or agricultural uses according to zoning in the two areas of interest. Support uses associated with development (i.e. industrial/commercial) have been and are directed and concentrated in the county/municipal growth areas according to the County Master Plan and zoning. Thus impervious surfaces are limited to rural residential and agricultural uses as well as existing County/State roadways. No new State roads have been or are planned to be constructed within these two areas of interest. No major County roads have been or are planned to be constructed.

Residential construction in the rural regions has traditionally and currently requires minimal land disturbance. By code, grading and topsoil removal is limited to the home site and driveway. No mass grading of sites for residential development occurs. The lack of disturbance allows for maintenance of field capacity on developed lots. This preserves the pre-development hydrologic character of the site including the initial abstraction during storm events, as well as longer-term infiltration capacities. This is important to naturally minimizing stormwater runoff and impervious surface cover effects.

The areas of interest are predominantly zoned Agricultural or Conservation. These two zones have limited development density with the yield ranging from 1 lot per 3 acres to 1 lot per 15 acres. Combined with the previous discussion related to land preservation priorities, the actual development potential in the region is greatly limited.

As will be further discussed below, the areas of interest are significantly limited in regards to total impervious surfaces. Those surfaces which do occur are treated predominantly via sheet flow and grass swales. Storm drain system mapping within the regions indicates few NPDES outfalls (Figures B-3 and B-4). Total county impervious surfaces account for 2% within the Double Pipe Creek Watershed (outside the DGAs) and 3.1% in the Upper Patapsco/Upper Gunpowder Rural Legacy Area (outside the Growth Area Boundaries) (Table B-2). The actual effective imperviousness, those impervious areas within the catchment directly connected to intermittent or perennial stream channels, is certainly much less. This is an extremely critical fact related to those water bodies directly impacted by “urbanized” impervious surfaces, and simply indicates they do not exist in any significant amount in these regions.

5. Extent of ISC Within the Areas of Interest

Bearing in mind that stormwater management is a function of the amount of ISC, Carroll County utilized GIS in order to quantify the amount of ISC associated with these two rural areas in the County. Analysis was completed to identify the amount of ISC associated with each of the two areas for exclusion from the ISC calculations. DGAs which are not part of the existing NPDES

permit, along with U.S. Census-defined Urban Areas and Urban Clusters were removed from these areas.

Results indicate that there are 1,992 acres of ISC in the Double Pipe Creek watershed as shown in Table B-2. The Patapsco Rural Legacy Area (Table B-2), has 844 acres of impervious surfaces. It is important to note that impervious surfaces associated with the planned growth areas, commercial/industrial uses, and residential properties less than three acres are not included in this total (those areas designated as non-rural or within DGAs on Figures B-3 and B-4).

6. Conclusion

Carroll County requests that the ISC associated with the two areas of interest be excluded from the total ISC quantity for which the County is responsible as part of NPDES watershed restoration project requirements, given the rural nature, historic and anticipated future land preservation efforts, zoning, and the nature of the ISC in these areas. These regions do not by their development character generate elevated stormwater runoff, and, thus, are not being considered in the County's total impervious acres calculation for restoration.

Therefore, the County has reduced the total impervious acres in need of restoration from 9,285 to 6,449. The justification for the reduction in the two areas of interest of the County is based on the following:

- the clear designation of very limited non-urban lands within the regions as delineated by the U.S. Bureau of Census and Maryland Department of Planning,
- official delineation by the County and State of preservation regions via the PPAs and Rural Legacy Area designations,
- the past and future commitment by the Carroll County Commissioners toward land preservation,
- the disconnected nature of impervious surfaces within the rural areas,
- extremely low percentage of total impervious surfaces located within the areas examined,
- the lack of engineered storm drain systems or roads constructed with curb and gutter, and outfalls within the delineated rural areas, and
- the predominant treatment of runoff via sheet flow (residential and roadway), stream buffers (via conservation plans required by preservation easements), and grass swales along roadways.

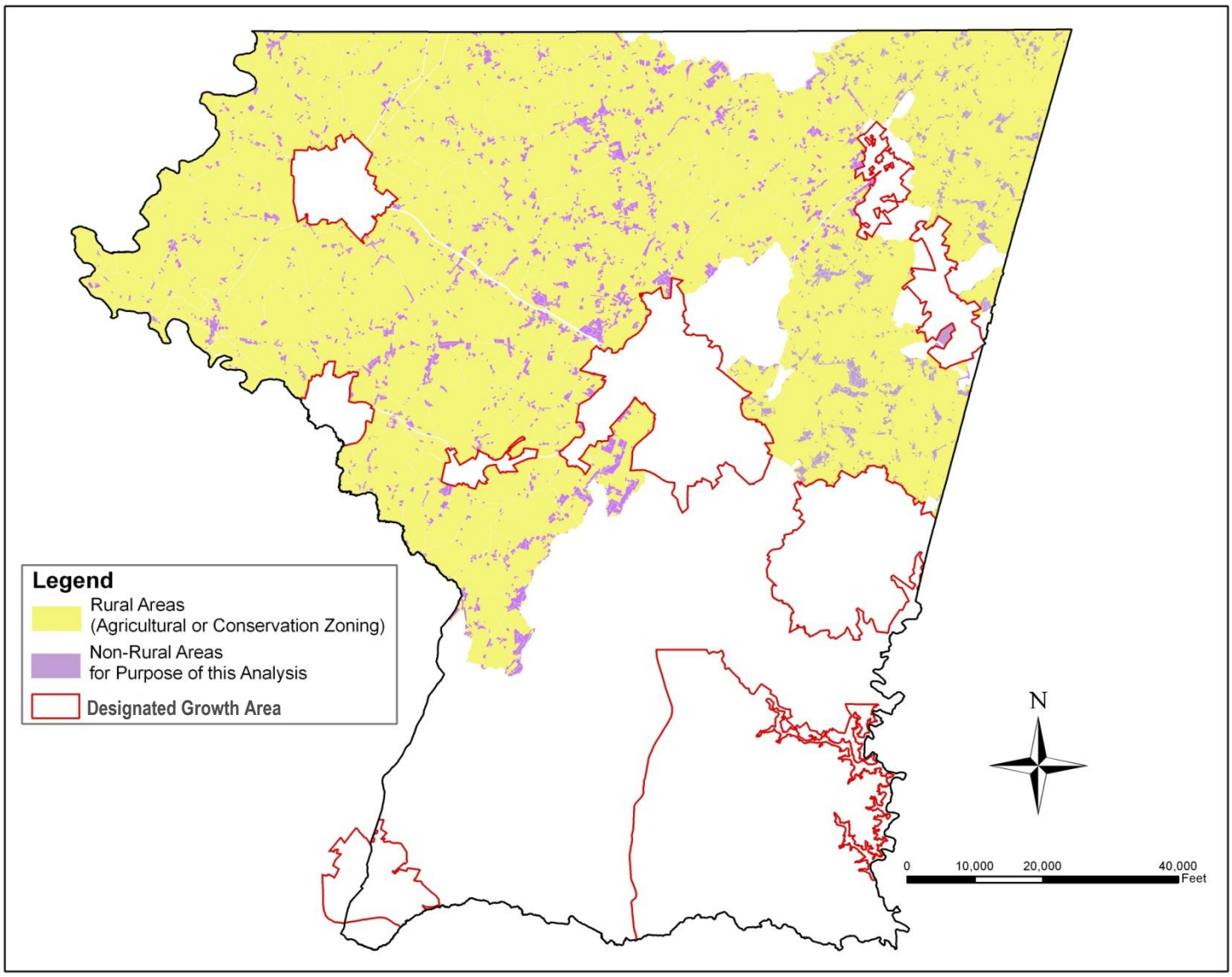


Figure B-1 Carroll County Rural Areas

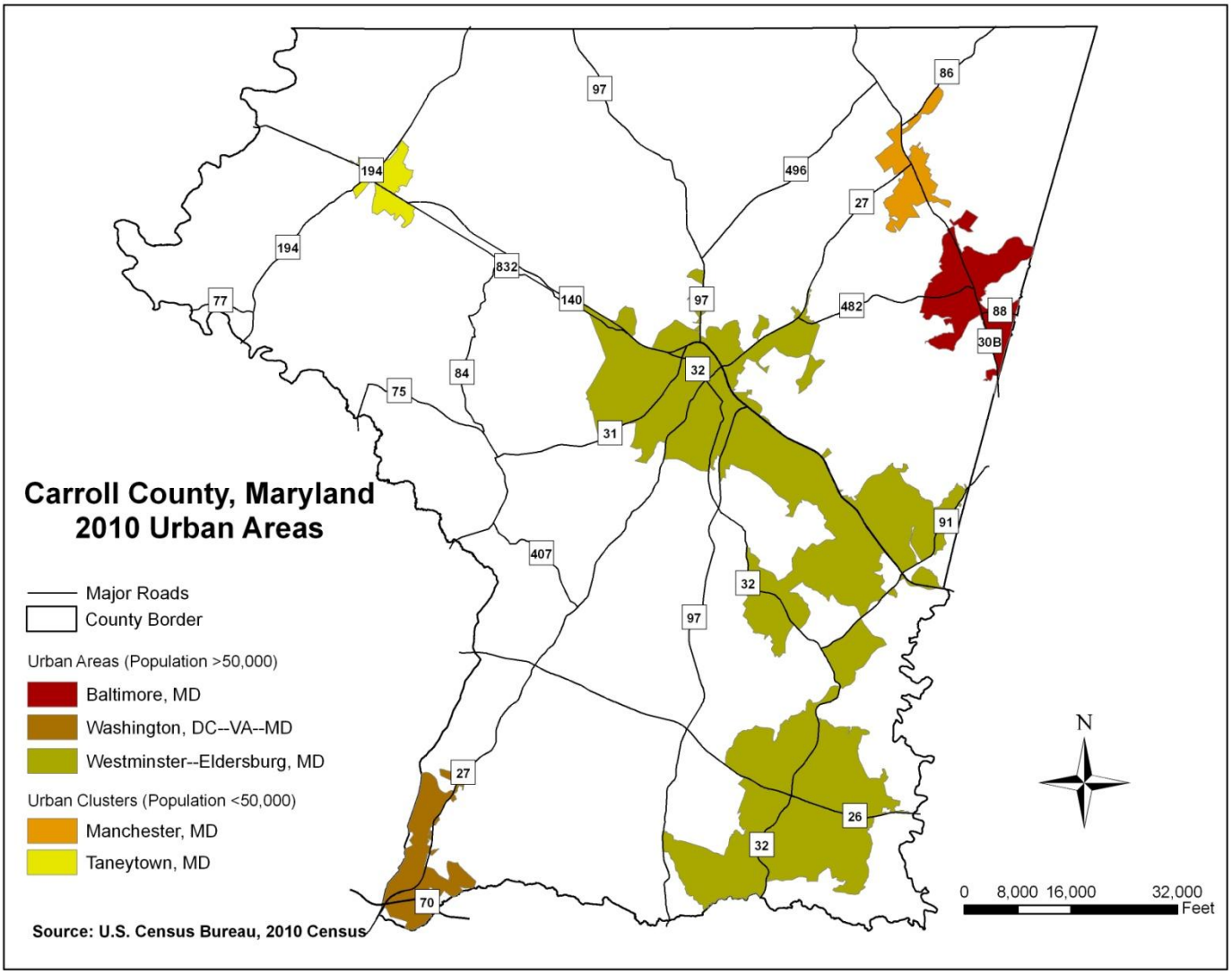


Figure B-2: Urban Areas in Carroll County, Maryland 2010

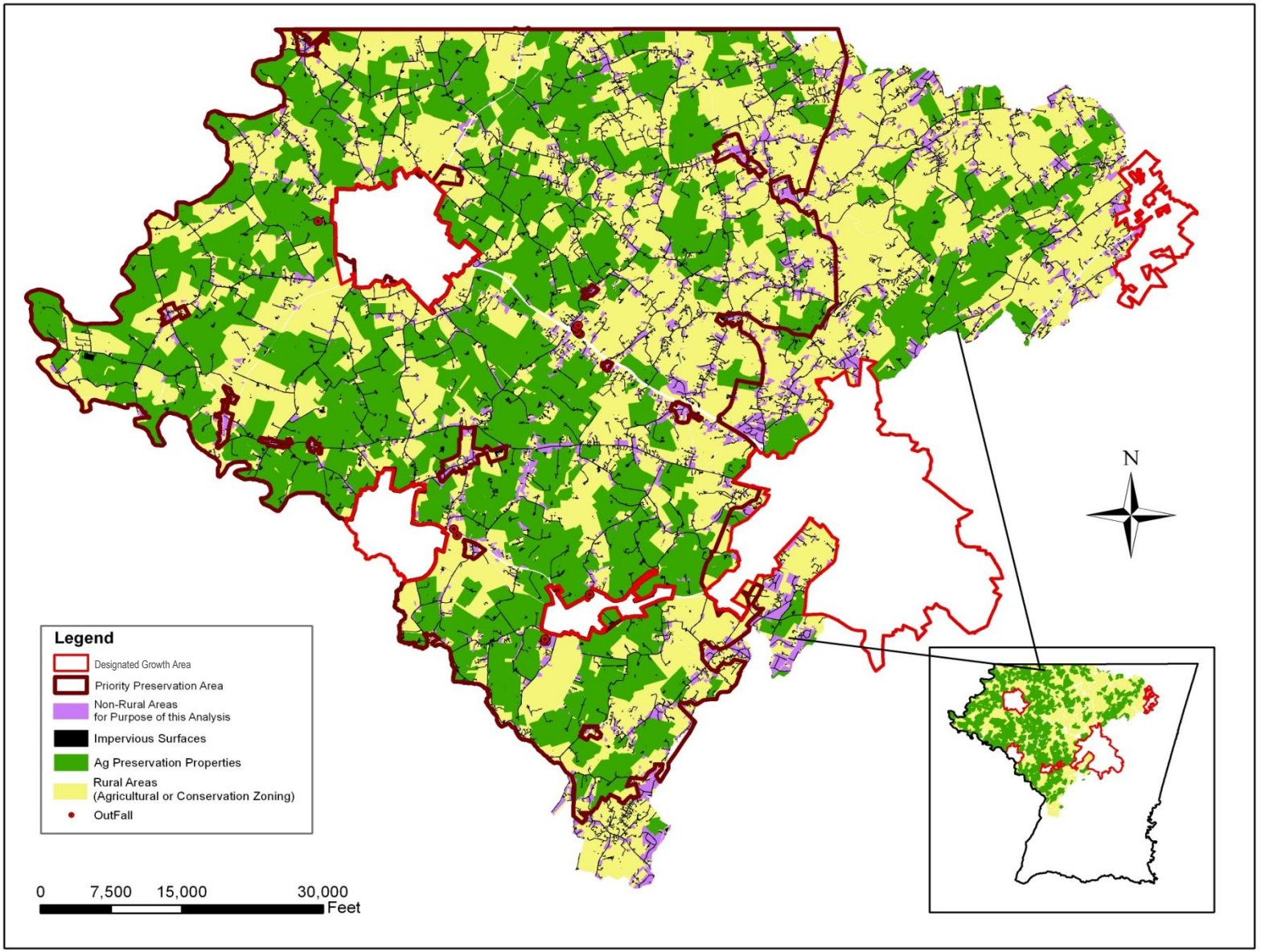


Figure B-3: Double Pipe Watershed Region

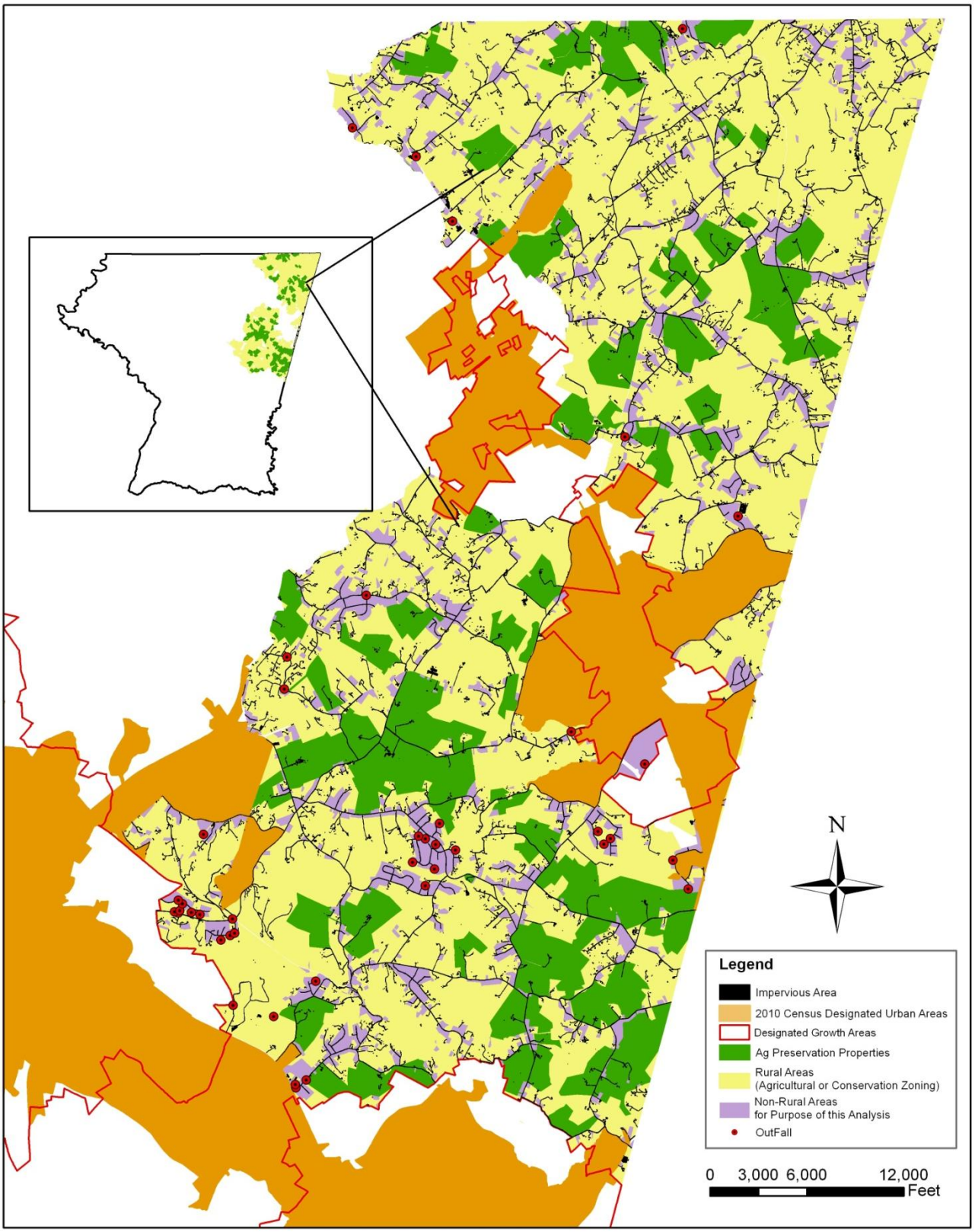


Figure B-4: Patapsco Rural Legacy Area

Table B-2
Impervious Breakdown of County Rural Regions
Breakdown of Impervious Area – Double Pipe Creek Watershed and Upper Patapsco/Upper Gunpowder Rural Legacy Area

Category	2011 Permit Total (acres)	Double Pipe Creek Total (acres)	Upper Patapsco/ Upper Gunpowder Total (acres)	2012 Permit Total (acres)
Roads	2,740	1,048	473	1,219
Driveways	2,670	412	179	2,079
Parking Lots	714	29	14	671
Sidewalks	42	0	0	2,523
Building Rooftop	3,204	503	178	42
SWM	-74			-74
Drywell	-11			-11
Area Total	**9,285**	**1,992**	**844**	**6,449**

Double Pipe Creek

- **Total Watershed Area:**
  132,579 Acres
- **Total Impervious outside DGA:**
  2,934 Acres
- **Impervious outside DGA minus SHA (% total):**
  2,725 Acres (2%)
- **Total Preserved Agriculture Area (% of Total Land Area):**
  50,378 Acres (38%)
- **Preserved Agricultural Impervious:**
  260 Acres
- **Total Rural Area (excluding preservation acres) (% of Total):**
  60,030 (45%)
- **Rural Impervious:**
  684 Acres
- **County Road Impervious:**
  1,048 Acres
- **Total Rural Impervious:**
  1,992 Acres
- **Remaining Impervious Area.****
  733 Acres

Upper Patapsco/Upper Gunpowder Rural Legacy Area

- **Total Watershed Area:**
  40,170 Acres
- **Total Impervious Outside DGA:**
  1,499 Acres
- **Impervious Outside MDP Designated Urban Area Minus SHA:(% of Total Land Area)**
  1,249 Acres (3.1%)
- **Total Preserved Agriculture Area: (% of Total Land Area)**
  7,609 Acres (19%)
- **Preserved Agricultural Impervious:**
  35 Acres
- **Total Residential Area (excluding preservation acres) (% of Total)**
  24,136 Acres (60%)
- **Rural Impervious:**
  336 Acres
- **County Road Impervious:**
  473 Acres
- **Total Rural Impervious:**
  844 Acres
- **Remaining Impervious Area.****
  405 Acres

** Remaining impervious figure represents impervious areas of Carroll County within PPA or RLA, does not include State Highway Administration (SHA) impervious, and includes all industrial/manufacturing parcels as well as lots in the listed rural area that are less than 3 acres in size.

Appendix C

INCORPORATED MUNICIPALITY QUESTIONNAIRE DATA

2012 NPDES MS4 Permit Annual Report

Carroll County, Maryland Phase II NPDES MS4 Government QUESTIONNAIRE
July 2012 Report

Appendix B

Questions	City of Taneytown	City of Westminster	Town of Hampstead	Town of Manchester	Town of Mt. Airy	Town of New Windsor	Town of Sykesville	Town of Union Bridge
A. PUBLIC EDUCATION AND OUTREACH								
1. Has your municipality adopted a goal toward providing public education and outreach?	**No**	**Yes**	**Yes**	**No**	**No**	**No**	**Yes**	**No**
2. Is the municipality's web site used for environmental education and outreach?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**Yes**
3. Are there links on the web site to sites such as MDE, EPA, the Center for Watershed Protection? If so, which web sites:	**Yes, none listed**	**Yes, MDE**	**Yes, MDE, EPA, EPA/NPDES**	**Yes, MDE, EPA, AWWA, TMDL Information**	**No**	**No**	**Yes Carroll Co. Govt. & State of MD**	**Yes, EPA - NPDES**
4. Does your municipality sponsor a regular event where environmental information may be available for residents? If yes, please name the event and when it occurs:	**No**	**Yes, Fallfest – 9/22/11 – 9/25/11 & Flower and Jazz 5/22/12**	**Yes, Hampstead Day, Hampstead Business Expo,**	**Yes - Nature Center Springfest 1st Sunday in May at Charlottes Quest Nature Center**	**No**	**No**	**Yes – Fall Festival in October by Sykesville businesses w/town participation**	**No**
B. PUBLIC PARTICIPATION AND INVOLVEMENT								
1. Has your municipality adopted a goal toward providing public education and outreach?	**No**	**Yes**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
2. Does your municipality sponsor regular events such as storm drain stenciling, tree plantings, etc? If YES, please indicate the type of event and if any occurred over the past year (6/1/08 - 5/31/09)	**No**	**Yes, Arbor Week tree plantings, stencil storm drains,**	**Yes, Tree planting North Carroll Farms, Community re-organizing Tree Committee**	**Yes, Tree Planting @ Nature Center each fall; storm drain stenciling all year by Boy Scouts & DPW.**	**Yes, the town Park & Recreation Commission & Beatification Committee have sponsored tree plantings on town owned property**	**Yes Stencil Stormdrains,**	**No**	**No**
3. Please outline what opportunities residents have for public participation and involvement in municipal affairs or events:	**Mayor & City Council Meetings and Workshops Planning & Zoning meetings,**	**City Council Meetings, Tree Commission Meetings**	**Monthly Town Council and Planning & Zoning Commission meetings. Town's Tree Commission and other local Boards and Commissions. All events are open to general public. Residents can volunteer for committees and attend meetings. Post on facebook**	**Monthly Town meetings; Monthly Planning/Zoning meetings; Nature Foundation Recycling Committee;**	**The tree planting events have been discussed at open meetings and put in the local press. Also notification on the website has been done.**	**Council meetings; & work sessions;**	**Serve on Council, Commissions, Committees. Town events always need volunteers to help.**	**Attend Council Meetings & Planning and Zoning Meetings**
C. ILLICIT DISCHARGE, DETECTION/ELIMINATION								
1. Has your municipality adopted an ordinance that provides the required authority for system and illicit discharge control and enforcement? If so, please provide the County with a copy. If NO, when is adoption planned:	**Yes, copy sent to County in the past, no changes since that**	**Yes**	**Yes, copy sent to County in the past, no changes since that submission**	**Yes, copy sent to County in the past, no changes since that submission**	**Yes, copy sent to County in the past, no changes since that submission**	**Yes 96-9, 173 B4 of Town Code**	**Yes, copy sent to County in the past, no changes since that submission**	**No, no adoption date listed**

Carroll County, Maryland Phase II NPDES MS4 Government QUESTIONNAIRE
July 2012 Report

Appendix B

Questions	City of Taneytown	City of Westminster	Town of Hampstead	Town of Manchester	Town of Mt. Airy	Town of New Windsor	Town of Sykesville	Town of Union Bridge
	submission							
2. Are your crews currently trained to report water quality problems and illicit discharges they see when they are cleaning?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**
D. CONSTRUCTION SITE RUNOFF CONTROL								
1. Has your municipality adopted an ordinance that provides the required authority for erosion and sediment control? If so, please provide the County with a copy. If NO, when is adoption planned:	**Yes, copy provided to County in past**	**Yes, copy provided to County in past**	**Yes, copy provided to County in past**	**Yes, copy has been provided to County in the past**	**Yes, copy has been provided to County in the past**	**Yes, a copy has been provided to the County in the past**	**Yes, a copy has been provided to the County in the past**	**Yes, governed by the County Ordinance, which applies to Town.**
2. Does the County provide plan review, inspection & enforcement services under the ordinance? If NO, who provides enforcement:	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
E. POST CONSTRUCTION RUNOFF CONTROL								
1. Has your municipality adopted an ordinance that provides the required authority for stormwater management? If so, please provide the County with a copy. If NO, when is adoption planned:	**Yes, copy provided to County in past**	**Yes, copy provided to County in past**	**Yes, copy has been provided to the County in the past**	**Yes, copy provided to County in past**	**Yes, copy has been provided to County in the past**	**Yes, copy has been provided to County in the past**	**Yes, a copy has been provided to the County in the past**	**Yes, , a copy has been provided to the County in the past**
2. Does the County provide review, inspection and enforcement services under the ordinance? If NO, who provides enforcement:	**No City of Taneytown**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No, Town Engineer except for carryover agreement applicable to Jackson Ridge**
F. POLLUTION PREVENTION, GOOD HOUSEKEEPING								
1. Mapping	**County provides per Town County agreement**	**County provides per Town County agreement**	**County provides per Town County agreement**	**County provides per Town County agreement**	**County provides per Town County agreement**	**County provides per Town County agreement**	**County provides per Town County agreement**	**County provides per Town County agreement**
2. Would you provide a separate list of industrial facilities within your town limits that may have the potential to discharge in to the storm sewer system?	**Evapco Inc. Flowserv Pump Corp.**	**List attached**	**Black & Decker), Sauder Eggs, Ridge Engineering, Jos A. Bank Distribution**	**Manchester Auto Parts, Manchester Motors, Longview nursing home, Rohrbaughs Bus Co. & Caltriders Garage**	**No list attached**	**Brethern Center, New Windsor Automotive, Gerbers Gangue, New Windsor Fire Co.**	**No industrial facilities in Town limits.**	**Lehigh Cement, Stambaugh's Inc., Maryland Midland Railway**
3. Street Sweeping								
a. Does your community have a current street sweeping program?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**No**	**Yes**
If NO, skip to F. # 4; if YES, please answer the following questions:								
b. Is your program performed by municipal personnel or by a contractor?	**Contractor**	**Municipal personnel**	**Contractor**	**Municipal personnel**	**Municipal personnel**	**N/A**	**N/A**	**Neither, done by Lehigh Cement Co. for the Town at No Charge**
c. If work is performed by municipal personnel, does your municipality own its own equipment, or is it leased or rented?	**Left blank**	**Own Equipment**	**Left blank**	**Own equipment**	**Own equipment**	**N/A**	**N/A**	**N/A**
d. Please select what street sweeping equipment is most commonly used in your community. List all	**Mechanical brush with**	**Mechanical brush**	**Sweeper - Mechanical**	**Mechanical brush sweeper**	**Mechanical brush with vacuum**	**N/A**	**N/A**	**Mechanical brush with**

Carroll County, Maryland Phase II NPDES MS4 Government QUESTIONNAIRE
July 2012 Report

Appendix B

Questions	City of Taneytown	City of Westminster	Town of Hampstead	Town of Manchester	Town of Mt. Airy	Town of New Windsor	Town of Sykesville	Town of Union Bridge
appropriate:	**vacuum assist**	**sweeper; Mechanical brush w/ vacuum assist; side walk litter sweeper**	**Brush**		**assist sweeper**			**vacuum assist**
e. If owned, please indicate the number of each type of street sweeper that is part of the fleet used in your community:	**N/A**	**(1) Mechanical brush; (1) mechanical brush with vacuum assist; (1) side walk sweeper**	**N/A**	**Sweeper Mechanical brush** **Sweeper: Vacuum**	**Mechanical brush with vacuum assist sweeper;**	**N/A**	**N/A**	**N/A**
f. Do you also target any of the following specific pollutant sources as part of the street sweeping program?	**Litter (paper products, glass, metal & other road hazards), leaves, sediment/dirt**	**Litter (paper products, glass, metal & other road hazards), leaves sediment/dirt**	**Litter (paper products, glass, metal & other road hazards), leaves, sediment/dirt**	**Litter (paper products, glass, metal & other road hazards Leaves**	**Litter (paper products, glass, metal & other road hazards), leaves, sediment/dirt**	**N/A**	**N/A**	**None targeted**
g. Can you provide an estimate of the proportion of public streets in your community that are swept at least on an annual basis?	**70%**	**70%**	**100%**	**90%**	**100%**	**N/A**	**N/A**	**20%**
h. Do you have an estimate of the total length of streets in your community?	**30 miles**	**64**	**23.892 miles**	**19.58 miles**	**42 miles**	**N/A**	**N/A**	**No**
i. If so, can you estimate the approximate total length of streets in your community that are swept at least once a year?	**Left blank**	**54**	**all 23.892 miles**	**17.62 miles**	**42 miles**	**N/A**	**N/A**	**No**
j. Can you estimate the sum total of linear miles swept during this Year?	**Left Blank**	**900 miles**	**all 23.892 miles**	**≈14.6 miles**	**20 miles Sweeper broke down & repaires**	**N/A**	**N/A**	**No**
k. Do you schedule sweeping to pick-up de-icing material and winter debris in the early spring?	**Yes**	**Yes**	**Yes**		**Yes**		**N/A**	**No**
l. Briefly describe how you dispose of material collected from the street sweeper.	**Carroll County Landfill**	**Load onto roll off dumpster, landfill**	**Landfill**	**Landfill and Town Fill Dirt Area**		**N/A**	**N/A**	**Taken care of by Lehigh Cement Co.**
m. Do you have an estimate of the weight or volume of sediments collected from street sweeping?	**Yes**	**Yes 94.14 tons**	**Yes**	**Yes**	**No**	**N/A**	**N/A**	**No**
n. If you utilize Town personnel, do you have a training program for street sweeper operators?	**N/A, work performed by contractor**	**No**	**N/A, work performed by contractor**	**Yes**	**Yes**	**N/A**	**N/A**	**N/A**
o. Do you have any data on the average sweeping cost per mile?	**Left Blank**	**No**	**Yes - $225.97/mile**	**No**	**Left Blank**	**N/A**	**N/A**	**No, no charge to town**
p. Can you estimate or measure the volume of materials collected annually during street sweeping operations either in pounds, tons, or cubic yards? Amount of materials collected:	**57.50 cubic yards**	**94.14 tons**	**29.56 Tons**	**Weight 83,625 Pounds**	**Left Blank**	**N/A**	**N/A**	**N/A**
4. Storm Drain and Inlet Cleaning								
a. Does your community clean out storm drains and/or inlets?	**Yes, cleanouts are regularly scheduled**	**Yes, but only in response to complaints or clogging problems**	**Yes, cleanouts are regularly scheduled**	**Yes, but only in response to complaints or clogging problems**	**Yes, cleanouts are regularly scheduled**	**No**	**Yes, cleanouts are regularly scheduled**	**Yes, cleanouts are regularly scheduled**

Carroll County, Maryland Phase II NPDES MS4 Government QUESTIONNAIRE
July 2012 Report **Appendix B**

Questions	City of Taneytown	City of Westminster	Town of Hampstead	Town of Manchester	Town of Mt. Airy	Town of New Windsor	Town of Sykesville	Town of Union Bridge
b. Please provide how many storm drains and/or inlets are cleaned out annually in your community, OR select a range from the following list: What % of the total inlets does this number represent?	**1 – 50** **80%**	**35 = 4%**	**150 to 200**	**100-150; representing 90% of total # of inlets**	**100 - 150**	**< 10**	**100 to 150 range**	**1 to 50 range**
c. Can you estimate the total proportion of all storm drains and/or inlets that are cleaned out on an annual basis?	**Left Blank**	**4% of combined**	**98% of combined**	**50%**	**100% of storm drains** **100% inlets**	**N?A**	**100% storm drain**	**100% storm drain**
d. Based on the storm drains and/or inlets that are cleaned out, what is the typical "clean out" frequency?	**Approximate - 3 times/yr.**	**Other – Complaints/ street overlay**	**Once a years**	**Once every 2 years**	**Once a years**	**Once every 3 -5 years**	**Once a year**	**Once a year**
e. What method or equipment is most commonly used to clean out storm drains and/or inlets?	**Manual, Vacuum**	**Manual; Hydraulic-suction cleaner; Vacuum Bucket Loaders**	**Manual, Bucket Loader**	**Manual, Bucket loaders**	**Manual & Vacuum**	**Manual**	**Manual**	**Manual**
f. Briefly Describe how you dispose of material collected from storm drain and/or inlet cleanouts.	**Carroll County landfill**	**Taken to landfill (14.07 tons)**	**Landfill**	**Trash and litter is separated from sediment, sediment is then added to fill dirt fill site. Leaves collected are also mixed with fill dirt.**	**Is contained in compost pile then hauled to landfill**	**Placed in yard waste dumpster and taken to Landfill**	**Put with recycling yard waste**	**Material placed on Town-owned land**
g. What is the best estimate of annual expenditures for the storm drain cleanout program, to include inlets (labor, equipment, etc.)?	**Don't know**	**$1,819 Total Cost/Year $56 per storm**	**$4,185 Total cost/year**	**$11,250 total cost/year; with $160.00 cost per storm drain cleanout**	**Don't Know**	**<$500.00 Total cost/year**	**$3,500.00 Total cost/ year**	**$100.00 total cost/year**
h. Can you provide a weight or tonnage for collected materials?	**No**	**14.07 tons**	**No**	**No**	**Left Blank**	**N/A**	**10-15 tons**	**No**

Appendix D

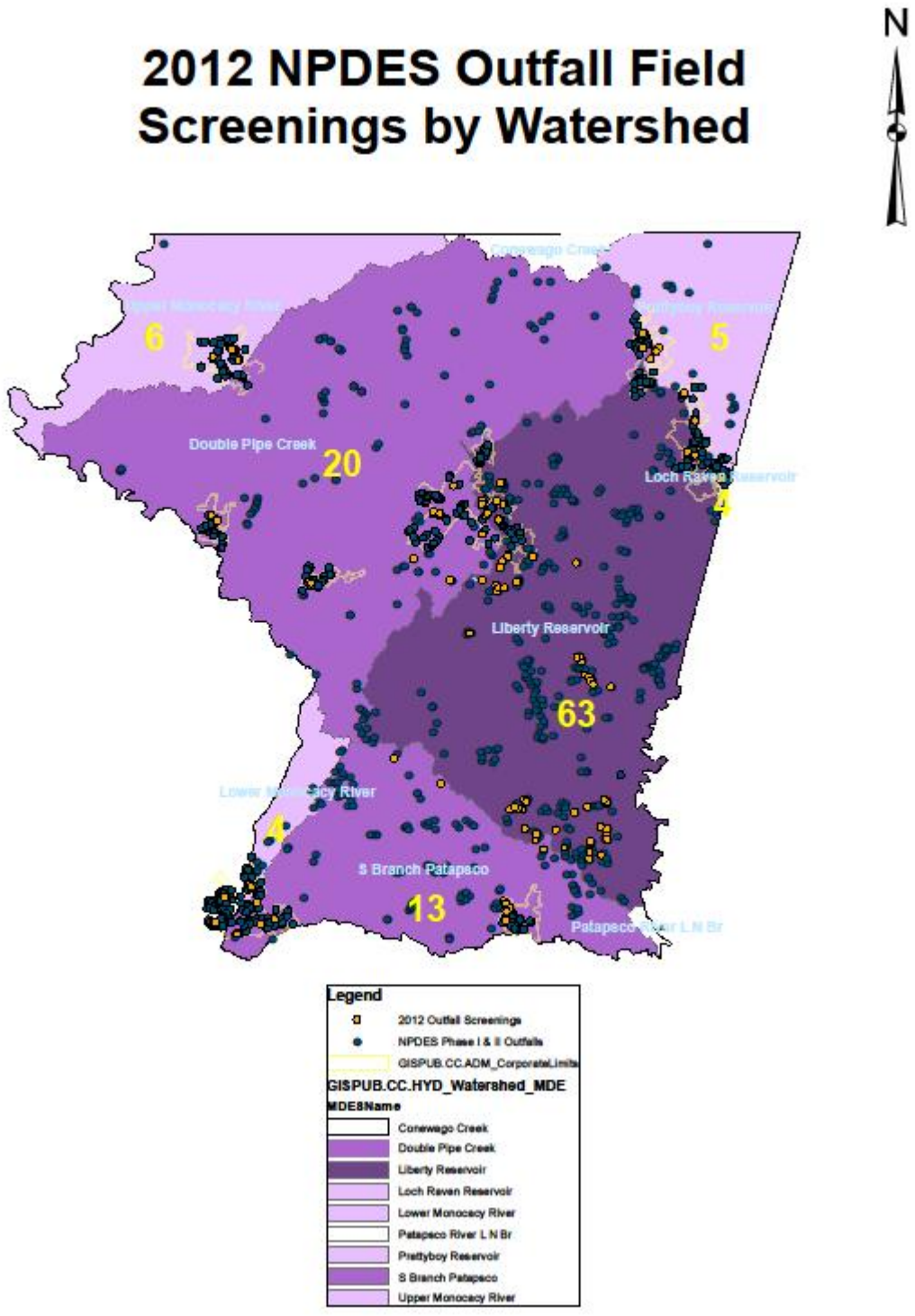
ILLICIT DISCHARGE

2012 NPDES MS4 Permit Annual Report

2011-2012 Illicit Discharges

Table:
Illicit Discharge Complaints Processed from July 16, 2011 - June 30, 2012

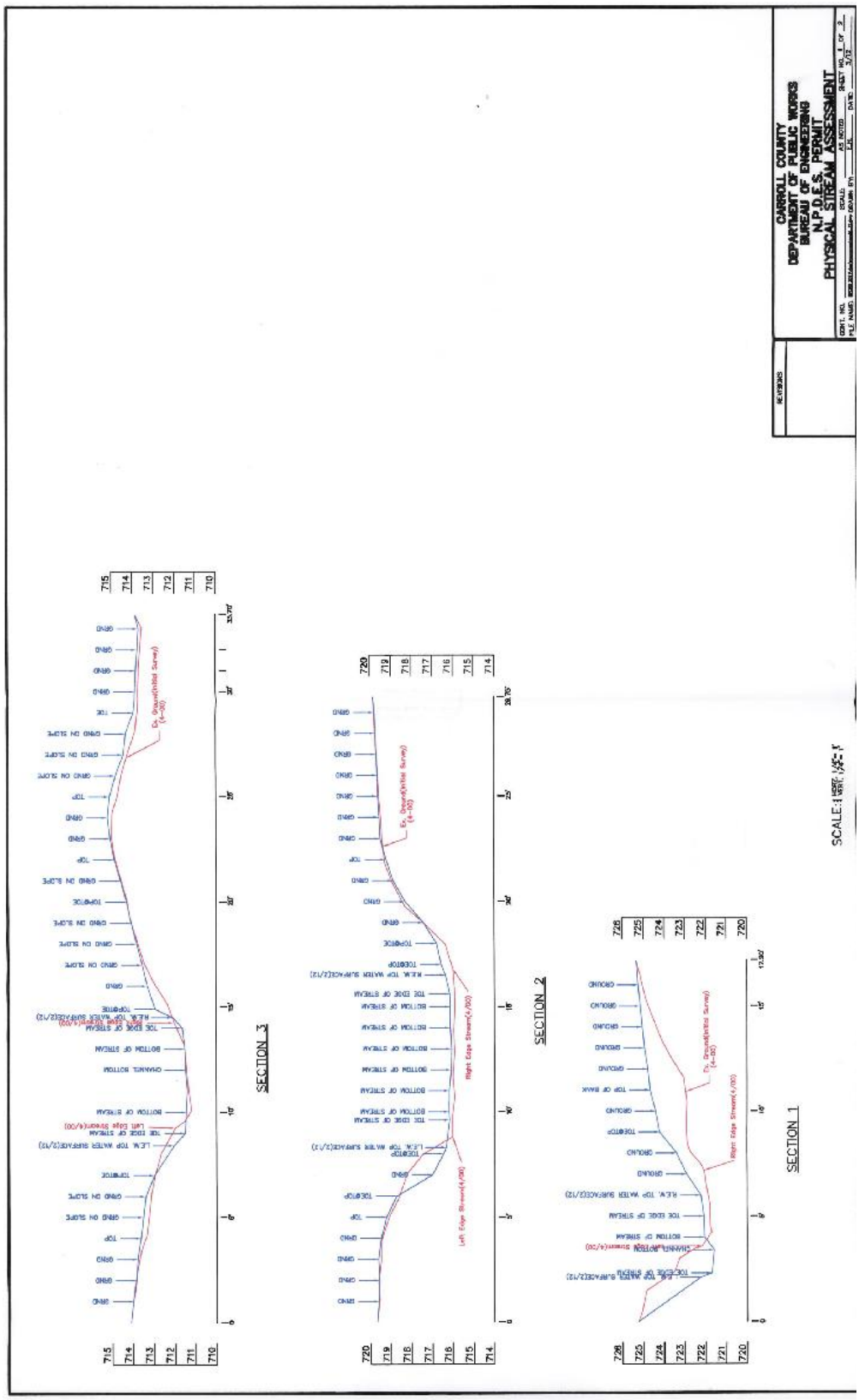
Case No.	Complaint/Date	ACTION TAKEN	STATUS	Jurisdiction/Location
IDI-12-001	Field staff reported dry weather discharge from local business near stream. 02/12/2012	Investigation resulting in citation issued per County Code 105 Environmental Storm Sewer.	Referral to Department of Permits & Inspections. Discharge Eliminated. **Case Closed**	Municipality/106 George Street,Union Bridge, MD
IDI-12-002	Municipal Public Works staff reported pressure washing discharge to SHA inlet at commercial site. 04/26/2012	Reported to SHA Environmental Compliance. SHA EC requested assistance. Investigation revealed no discharge at outfall pipe and partial "on board" waste water treatment BMP's performed by pressure washing contractor.	Notice sent to owner and contractor making them aware of non-stormwater pollution/discharge regulations, educational and best management practices information including inlet protection. Reviewed with MDE. Contractor in contact w/MDE and revising BMP's as needed. **Case Closed**	Municipality/3281 Main Street, Manchester MD

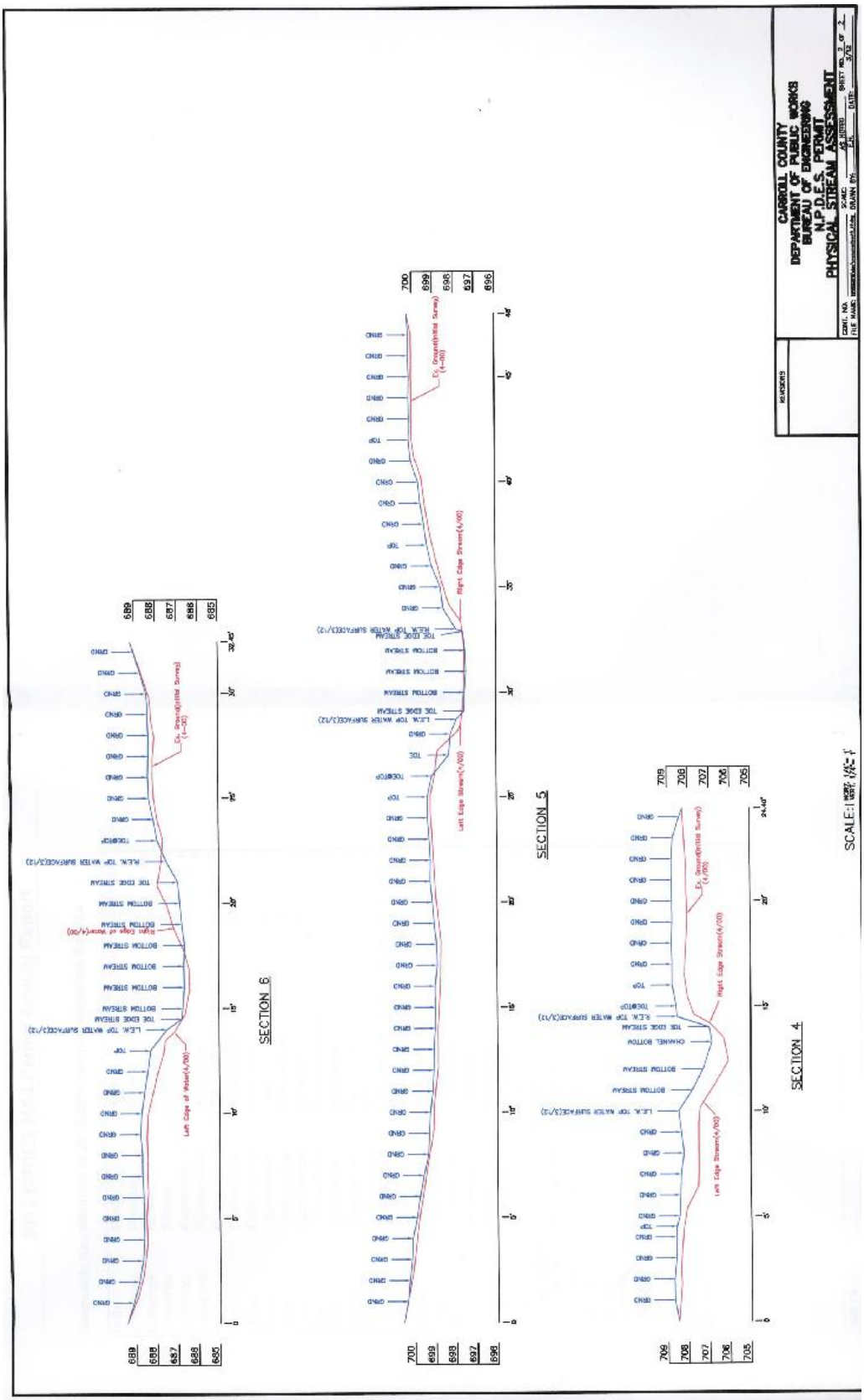

2012 NPDES Outfall Field Screenings by Watershed
N
6
5
Double Pipe Creek
20
Loch Raven Reservoir
7
Liberty Reservoir
63
4
S Branch Patapsco
13
Legend
2012 Outfall Screenings
NPDES Phase I & II Outfalls
GISPUB.CC.ADM_CorporateLimits
GISPUB.CC.HYD_Watershed_MDE
MDEName
Conewago Creek
Double Pipe Creek
Liberty Reservoir
Loch Raven Reservoir
Lower Monocacy River
Patapsco River L N Br
Prettyboy Reservoir
S Branch Patapsco
Upper Monocacy River

Appendix E

Stream Cross Sections

2012 NPDES MS4 Permit Annual Report


CARROLL COUNTY
DEPARTMENT OF PUBLIC WORKS
BUREAU OF ENGINEERING
N.P.D.E.S. PERMIT
PHYSICAL STREAM ASSESSMENT
REVISIONS
SECTION 3
SECTION 2
SECTION 1
SCALE: 1" = 5'


CARROLL COUNTY
DEPARTMENT OF PUBLIC WORKS
BUREAU OF ENGINEERING
N.P.D.E.S. PERMIT
PHYSICAL STREAM ASSESSMENT
SECTION 6
SECTION 5
SECTION 4
SCALE: 1" = 5'

Appendix F

Taxonomic Identification of 2012 Benthic Macro Invertebrate Results

2012 NPDES MS4 Permit Annual Report

Taxonomic Identification of 2010-2011 Macroinvertebrate Results

Order	Family	Taxon	Outfall	Instream
Coleoptera	Dytiscidae	Neoporus	1	
Coleoptera	Elmidae	Optioservus		10
Coleoptera	Elmidae	Stenelmis	6	5
Coleoptera	Psephenidae	Ectopria		1
Coleoptera	Ptilodactylidae	Anchytarsus		6
Diptera	Ceratopogonidae	CERATOPOGONIDAE	1	2
Diptera	Chironomidae	Chaetocladius	1	
Diptera	Chironomidae	Corynoneura		7
Diptera	Chironomidae	Diamesa	6	7
Diptera	Chironomidae	Orthocladiinae	3	
Diptera	Chironomidae	Orthocladius	94	20
Diptera	Chironomidae	Parametriocnemus	1	3
Diptera	Chironomidae	Polypedilum	1	10
Diptera	Chironomidae	Rheocricotopus		9
Diptera	Chironomidae	Rheotanytarsus		4
Diptera	Chironomidae	Tanypodinae	1	
Diptera	Chironomidae	Tanytarsus	3	
Diptera	Chironomidae	Thienemanniella		1
Diptera	Chironomidae	Thienemannimyia Group	4	1
Diptera	Chironomidae	Tvetenia	1	3
Diptera	Empididae	EMPIDIDAE	1	
Diptera	Simuliidae	Prosimulium		2
Diptera	Simuliidae	Simulium	1	4
Diptera	Tipulidae	Antocha		2
Ephemeroptera	Baetidae	Diphetor		6
Ephemeroptera	Heptageniidae	HEPTAGENIIDAE		1
Gordioidea	Gordiidae	GORDIIDAE	1	
Haplotaxida	Naididae	NAIDIDAE		2
Isopoda	Asellidae	Caecidotea	1	
Lumbriculida	Lumbriculidae	LUMBRICULIDAE	1	
Trichoptera	Hydropsychidae	Cheumatopsyche	1	10
Trichoptera	Hydropsychidae	Hydropsyche	1	8
Trichoptera	Philopotamidae	Chimarra		7
Trichoptera	Uenoidae	Neophylax		3
Tricladida	Dugesiidae	Cura		1
		Total Individuals	130	135