Carroll County Maryland

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

2016 ANNUAL REPORT

2016 NPDES MS4 Permit Annual Report

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NPDES ANNUAL REPORT

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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. 11-DP-3319 (MD0068331) issued for the County's municipal storm sewer systems. Permit No. 11-DP-3319 is 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 40 CRF122.42(c). This report provides documentation under Carroll County's fourth generation permit from July 1, 2015, through June 30, 2016.

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MDE 2015 Annual Report Assessment Response

ATTACHMENT 1

This section of the annual report addresses documentation received from the state regarding MDE's Assessment and Recommendations related to the previously submitted 2015 Annual Report; therefore, the response to comments from the assessment is focused on the reporting period July 1, 2014 to June 30, 2015. The September 30, 2016, assessment documentation included in *Attachment 1* provided comments related to the reporting period as provided in the submitted annual report. The following is a discussion, presented by permit condition, related to issues which were identified within the assessment.

Source Identification

MDE Comment: *There are discrepancies between the number of BMPs reported in the annual report narrative and contained in the database. The County should review and reconcile those differences.*

Response:

Corrections have been made in the 2016 report regarding the discrepancies.

Stormwater Management

MDE Comment: *The County's next annual report should include a triennial inspection schedule for the City of Taneytown and the Town of Union Bridge to show how these two co-permittees will meet the same permit requirement.*

Response:

In December of 2015, the Town of Union Bridge and Carroll County signed a Stormwater Management Memorandum of Understanding giving Carroll County the authority to administer stormwater management storm sewer systems, plans and permit review and enforcement provisions of the Town's Stormwater Management Code. All stormwater management facilities within the Town limits are part of the County's BMP database and will be inspected every 3 years as required.

The City of Taneytown has an independent consultant performing the plan review, inspection, and enforcement requirements associated with their Code. Taneytown currently has 41 facilities in their inventory, and as noted in the 2016 Annual Report, each facility was inspected for the City between May 24, 2016, and June 8, 2016. Taneytown currently inspects facilities within a year after they are complete, and then every 3 years thereafter. An engineer consultant is currently performing the inspections for all the facilities within the same year.

MDE Comment: *The County should provide similar BMP data for the remaining seven co-permittees in the next annual report.*

Response:

The City of Taneytown reported 41 approved stormwater facilities and after researching their records, the City has only 10 as-builts associated with their approved facilities. They are currently working with their engineer to acquire the remaining as-builts and obtain the necessary documentation relating to these facilities.

The remaining 7 municipalities' facilities are in the County database, with all pertinent information, including as-built status, available for MDE's review.

MDE Comment: *MDE requests that Carroll County review its policies and revise where necessary to ensure that environmental site design (ESD) to the maximum extent practicable (MEP) is implemented for all new development and redevelopment.*

Response:

The following changes have been made to the Stormwater Management Supplement and approved by MDE to meet the 2016 stormwater audit requirements.

- Amended the Stormwater Management plan review checklist to correct geotechnical investigation criteria to match MDE requirements, identify stormwater hot spots, stress ESD requirements, identify regional stormwater management facilities, and reduce drywell drainage areas.
- Amended plates 27 and 28 of the Carroll County Stormwater Management Supplement to reduce the maximum rooftop draining to a single drywell to 1,000 square feet and reduce the maximum size of the drywells to 8' x 8' x 5'.

Illicit Discharge Detection and Elimination (IDDE)

a) ***MDE Comment:*** *MDE requests that the County begin conducting chemical tests of all dry weather flows observed at the screened outfalls.*

b) ***MDE Comment:*** *MDE requests that the County add wet storage stormwater management facility inflows to its screening procedures for every outfall regardless of whether flow is observed at the outfall.*

c) ***MDE Comment:*** *MDE requests that the County revise as needed based on this review and provide these procedures with the County's next annual report.*

d) ***MDE Comment:*** *However, the majority of test numbers are missing. MDE requests that the County include these data in future annual reports.*

Response:

Carroll County's revised IDDE dry weather outfall screening and investigative procedures are provided as part of the CD in Appendix B of the 2016 report. Since 2013, during routine tri-annual BMP maintenance inspections of both wet and dry stormwater management facilities, the BMP inflows (non NPDES outfalls) have been inspected for potential illicit discharge flows. This also occurred during IDDE dry weather screenings. Flows from historically known natural hydrology sources such as first order streams and groundwater springs or seeps were identified as such and noted in reporting table comments for the 2015 permit year. Suspect flows would have been tested or tracked up the system which accounted for identifying two chlorine discharges in 2015 and 2016. Procedures were adjusted at the end of the 2016 screening season to include four flows generated from natural hydrology sources, a first order stream and groundwater to check for potential contaminants for the 2016 permit year. All outfalls screened with a flow were tested and documented in the 2016 Annual Report and the new MS4 geodatabase. This process will be followed with all future permit work.

Litter and Floatables

MDE Comment: *The County should document how these programs relate to its litter and floatables program and provide an update in the next annual report.*

Response:

The programs described in the 2015 report are ongoing. Most have been in place well prior to the 2014 addition of the requirements found in Part IV.D.4. Litter and Floatables. Updates to program numbers, where applicable, will be included in future annual report submittals.

Property Management and Maintenance

a) ***MDE Comment:*** *MDE requests that the County provide information in the next annual report on which co-permittees conduct sweeping and how roads are prioritized for sweeping (e.g., frequency, pounds of debris collected if available).*

b) ***MDE Comment:*** *The County shall continue to collect this information and submit them with each annual report for tracking purposes.*

c) ***MDE Comment:*** *The County shall document in the next annual report whether fertilizer is applied in any public spaces throughout the County, and if so, how it is managed.*

d) ***MDE Comment:*** *The County shall note in the next annual report whether the remaining four co-permittees apply pesticides in their jurisdictions.*

e) ***MDE Comment:*** *The County shall describe in the next annual report how the County coordinates with municipal co-permittees to distribute responsibility of applying deicing materials throughout the County.*

Response:

Pollution reduction activities are a cumulative effort by all permitted entities under one MS4 permit working toward watershed restoration. The County continues to collect pollution reduction information from all co-permittees and provides additional narrative detail and a table in the 2016 report under the Property Management and Maintenance Section D.5. Table 6: MS4 Co-Permittee Reported Pollution Reduction Activities Associated with Facility Maintenance Activities (Parks, Roads, Parking Lots, etc.) has been added to this section to show reported pollution reduction activities conducted by the composite permitted MS4, and then by each co-permittee as requested.

Table 6 in the 2016 Annual Report shows the 5 pollution reduction activities noted in the permit, including street sweeping, reducing the use of chemicals for vegetation management through IPM, etc. and will be provided in future annual reports. A brief discussion of how roads/streets are generally prioritized for street sweeping has been added to the narrative under the street sweeping paragraph of the 2016 annual report as requested. The narrative and Table 6 in the 2016 annual report under Section D.5 discusses the use of IPM practices and notes the use of fertilizers reported by co-permittees. Additional narrative has been added in the 2016 Annual Report narrative under the Section D.5 paragraph entitled "Deicing Materials" discussing how the County coordinates with municipal co-permittees regarding the distribution of responsibility for applying deicing materials throughout the County.

Restoration Plans and TMDLs

MDE Comment: *Carroll County's proposed baseline for untreated impervious areas is 13,104 acres. MDE requires the County to provide supporting material for some of the assumptions and calculations used to derive the baseline number before MDE can approve it. Attachment 2 details the specific information that MDE is requesting.*

Response:

A correction to MDE's statement regarding the proposed untreated impervious acres is requested. As clearly stated on page 43 of the 2015 report and graphically shown on page 45, untreated County impervious acres are 7,092. Further discussion related to the impervious acres baseline can be found as response to comments for Attachment 2.

Assessment of Controls

MDE Comment: *The County will have to increase its efforts in storm sampling to come into compliance with this section of the permit.*

Response:

Prior to the 2016 report, the County was contracting the collection of storm events. In 2015 only 3 storms were collected by the contractor, after only 4 storms in 2014. The County considered a shift in storm event collection, and 6 months into the 2016 reporting year (contractor had collected zero events), took over the field work. In the final 6 months of the 2016 reporting year,

County staff targeted 5 storm events; 2 events were sampled successfully, 2 events did not materialize to produce the necessary limbs for storm event monitoring, and the remaining event had equipment failure with one of the ISCO automated samplers.

For the 2017 reporting period, the County has taken over all field work for storm event monitoring and is dedicated to capturing all of the required events to maintain compliance with Section IV.F.1 of the MS4 permit.

MDE Comment: *The County shall update its database to provide the missing information with the next annual report submission. This will bring the County in line with other jurisdictions' reporting standards for chemical monitoring.*

Response:

The database has been updated as part of the 2016 report submittal with any missing information added or explanation provided.

MDE Comment: *There are other missing variables throughout the data set, such as water temperature and pH data for base flow measurements.*

Response:

The data set has been updated as part of the 2016 report submittal with any missing information added or explanation provided.

MDE Comment: *MDE requests that the County submit metals data in ug/L for all past and new data beginning with next year's annual report.*

Response:

All data has been updated as part of the 2016 report submittal to the requested format.

MDE Comment: *Moving forward, MDE requests that the County either use the template of Table H in Attachment A to submit biological monitoring data, or make use of the geodatabase.*

Response:

The County has utilized MDE's NPDES MS4 geodatabase to submit biological data for the 2016 Annual Report and will continue to use the MS4 geodatabase for all monitoring report requirements moving forward.

ATTACHMENT 2

This section addresses documentation received from the state regarding MDE's Review of Carroll County's Impervious Area Assessment related to the previously submitted 2015 Annual Report.

MDE Comment: *MDE accepts this analysis but asks that the County provide the metadata for the layers used in these calculations. The County should also submit evidence that buildings less than 200 square feet, patios, recreational features, and secondary sidewalks are included in the analysis.*

Response:

As stated in the 2015 Annual Report (page 43), the County added correction factors related to incorporated municipal impervious acres and those acres within the unincorporated regions. The percent adjustment (acres increase) was a result of a random sampling of the areas to account for any inaccuracies in the delineation. No direct metadata was generated. The correction factor was applied as a straight multiplier. The current impervious layer being utilized by the County was developed and modified over many years and represents the best available data.

MDE Comment: *On August 5, 2016, the County submitted a list of 102 SHA properties with an associated 1,338 acres of treated imperviousness. MDE's review of SHA's data indicates that this number is 1,312. The County should work with SHA to reconcile these numbers or provide a justification for allowing the additional 25 acres deduction from the County's baseline.*

Response:

The County contacted SHA in an attempt to resolve the minor discrepancy. To date SHA has not been willing to share their impervious data with the County. Therefore, until SHA is willing to share their data and a resolution agreed upon, the County's 1,338 acres remains.

MDE Comment: *Impervious areas of non-MS4 connected dischargers. The County deducted impervious acres of properties that do not discharge through the County/municipal MS4. MDE considers the County permit coverage to be jurisdiction-wide. As such, this assumption is not acceptable to MDE. The County should add the 943 acres of imperviousness back to its baseline.*

Response:

This issue is currently in dispute between the County and MDE. The County is confident that according to federal law MS4 operators are not responsible for direct discharges by third parties (i.e., non-MS4 connected dischargers). Carroll County is only responsible for discharges to jurisdictional waters from MS4 outfalls that it owns and operates. Therefore, Carroll County does not agree with the inclusion within its baseline of the 943 impervious acres associated with non-MS4 discharges. The 943 acres have been returned to the baseline for this report but only until such time as the issue is resolved by the courts.

MDE Comment: *MDE requests that the County submit with its next annual report the 431 BMPs with the BMP type and impervious area treated in order to receive the 1,843 acres of credit for these facilities.*

Response:

In the current geodatabase maintained by Carroll County, the as-built date for stormwater management BMPs is tracked under a point feature class. The drainage area for each stormwater management BMP is tracked in a separate polygon feature class. Because Carroll County has nested stormwater management BMPs, doing a simple intersect in GIS returns impervious areas that are shown as treated multiple times. The impervious area within some drainage areas is shown as being double and triple counted in the impervious area treatment figures. However, the 1,843 acre figure currently being reported was determined by merging the total treated impervious into one feature.

However, as Carroll County is in the process of populating the MDE geodatabase, the acreage of impervious area treated will be easily determined in future years. Once there is a link between the BMP, the drainage area to the BMP, and the POI, calculating treated impervious area will be far more accurate.

MDE Comment: *MDE requests that the County consolidate its database and clearly label layers so that the database can be more accurately reviewed. For example, there are different layers that contain urban BMP data. In addition, it is not clear if BMPs from all eight County co-permittees are recorded in the database. MDE will not be able to accurately determine the County's baseline until this database is submitted.*

Response:

The County historically maintained data in disparate databases, spreadsheets, and GIS shape files to track information related to our water quality program. We have made every effort to consolidate the information and provide it to MDE for review. However, we recognize that there may be some discrepancies between the datasets.

Over the past year, the County has been consolidating our datasets into a server based geodatabase that meets the reporting requirements outlined by the MDE geodatabase design as well as our own tracking requirements. This is a lengthy process, and we estimate that it will take an additional 6 to 9 months following MDE's finalization of the database design.

In the meantime, the County will submit our data for the 2016 Annual Report in a format that nearly matches the current MDE geodatabase design and meets the reporting requirements of Attachment A of our permit. We will continue working with MDE on a final geodatabase design and a final conflation of our data over the upcoming year.

MDE Comment: *The County cannot claim baseline credit for existing easements, urban buffers or natural occurring floodplain(s) unless the County can provide an explanation for what the BMPs represent, time of construction, inspection and maintenance records for MDE's review.*

Response:

The County inquired (May 2011) and received a response (June 2011) from MDE regarding credit for water resource protection easements adjacent to streams. The response was to count

the easement areas as "Urbaned Grassed Buffers". The credit in the May 2011 "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated", page 24, was then assigned an Impervious Acre Equivalent of .27. Therefore, the County has included those resource protection easements (water and floodplain) which provide the grassed buffers at a rate of 3.7:1 (easement acres/impervious acres equivalent). Both easements are established on lands which are developed (residential, commercial, industrial, and institutional). These easements are held by the Board of County Commissioners in perpetuity. The easements are tracked in a GIS database with the recordation date, size of the easement, development name and file number, type of easement, watershed, and a link to the recorded deed (see Attachment B – 2016 Annual Report). The easements are inspected on a tri-annual basis by Land and Resource Management staff. Among other requirements, soil disturbance is prohibited and the area must be maintained as dense and vigorous vegetation.

Information associated with the current GIS database relating to the individual easements will be assigned a BMP identification number when migrated to the new MDE geodatabase.

MDE Comment: *MDE encourages the County to utilize BMPs approved in MDE's Guidance that the County is not currently implementing (e.g., street sweeping, inlet cleaning, rain barrels, rain gardens). In some cases, the County is not taking credit for BMPs that have been implemented (e.g., load reductions from tree planting activities).*

Response:

The County is not aware of BMPs which are not currently receiving credit. Certainly if MDE has information regarding specific cases, please forward to our attention.

Part I. Identification

A. Permit Number

11-DP-3319 (MD0068331)

B. Permit Area

This permit covers all stormwater discharges from the municipal separate storm sewer systems (MS4) owned or operated by Carroll County, Maryland. This permit covers all stormwater discharges from the municipal separate storm sewer systems (MS4) owned or operated by Carroll County, Maryland (permittee), and the following incorporated municipalities: the Towns of Hampstead, Manchester, Mount Airy, New Windsor, Sykesville, Union Bridge and the Cities of Taneytown and Westminster (co-permittees).

C. Effective Date

December 29, 2014

D. Expiration Date

December 28, 2019

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. Water Quality

The permit requires the co-permittees to manage, implement, and enforce a stormwater management program (SWMP) in accordance with the Clean Water Act (CWA) and corresponding stormwater National Pollutant Discharge Elimination System (NPDES) regulations. According to Maryland Department of the Environment's (MDE) "Basis for Final Determination to Issue Carroll County's NPDES MS4 Permit," the goals of Carroll County's MS4 permit are to control stormwater pollutant discharges and unauthorized discharges into the MS4, to improve water quality within the county's urban watersheds, and to work toward meeting water quality standards (WQS).

In alignment with these goals, 402(p)(3)(B)(iii) of the CWA requires the County to implement "…controls to reduce the discharge of pollutants to the maximum extent practicable, including

management practices, control techniques and systems, design and engineering methods, and such other provisions as the administrator or state determine appropriate for the control of such pollutants." Carroll County and its co-permittees have aggressively and consistently pursued measures to improve water quality and work towards compliance with its NPDES MS4 permit, effectively prohibiting pollutants in stormwater discharges or other unauthorized discharges into the MS4.

The County fully supports its stormwater program through strong fiscal commitments, adequate staffing resources, and coordination between co-permittees. The County's fiscal expenditures and capital budgeting – historically, currently, and planned – demonstrate the implementation of this commitment. Achieving the impervious mitigation goal of this permit shows the County's aggressive implementation toward meeting these goals. Extensive public outreach efforts and interjurisdictional coordination between co-permittees to address mitigation, stormwater pollution prevention, illicit discharge detection and elimination, restoration plan development, and other permit requirements are evidence of the continued commitment and strengthening of the collective stormwater programs of the co-permittees. The co-permittees further demonstrate the commitment to achieve the impervious restoration requirement and other provisions and requirements contained in the permit through the Memorandum of Agreement (MOA) signed by all co-permittees. This MOA obligates funding for the capital costs to meet the permit's impervious restoration requirements associated with the municipalities, as well as overall administrative support by the County.

The U.S. Environmental Protection Agency (EPA), MDE, and the courts have determined that the 20 percent restoration requirement is an approved effluent limit consistent with, and satisfactory for, addressing both the Chesapeake Bay and other applicable Total Maximum Daily Load (TMDL) wasteload allocations (WLAs). The County and the municipal co-permittees continue to actively and aggressively implement an adaptive program of restoration to achieve the fourth generation permit's impervious requirements. As shown in the Program Funding section of this report, the resources needed to support the operating expenses of this program and permit administration, as well as the funding necessary to address the impervious restoration requirement, are programmed and budgeted for the permit term. Additionally, the Management Program and Program Funding sections demonstrate that the programmatic structure is in place to develop restoration plans to address WLAs and approved TMDLs for all of the County's watersheds.

Recognition should be given to conflict between the requirement for specific projects, costs, and deadlines in the restoration plans to meet WLAs and the allowance for an iterative process of continuous, adaptive implementation within the regulatory framework of this permit. Application of the scientific method to the TMDL implementation process should allow for the error and uncertainty in the modeling process by establishing a margin of error, or subsequently a margin of safety, that does not assume the modeling results and WLA are underestimating the effort needed to achieve water quality standards. Rather, a more appropriate adaptive implementation approach for TMDL compliance might be to apply the same approach used with impervious surface area restoration, which sets a percentage to be achieved in each permit term. The current approach expectation is a very specific and substantial commitment of funds and projects that may or may not be needed to achieve WLA and TMDLs.

Part IV. 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 and Resource Management (LRM) to provide administrative and technical implementation of the NPDES MS4 permit. The LRM Director provides direct administration of the permit. An organizational chart for LRM can be found in Appendix A.

LRM has two dedicated positions, NPDES Compliance Specialists, assigned to the NPDES MS4 program. The NPDES Compliance Specialist positions are jointly funded by Carroll County and the eight incorporated municipalities. The addition of a second co-funded NPDES Compliance Specialist position was approved as part of the FY 17 budget process and has been filled. This arrangement was coordinated through the Water Resource Coordination Council (WRCC). Under the direction of the Director, the NPDES Compliance Specialists implement certain aspects of NPDES MS4 program requirements. Key responsibilities for these positions include:

- Liaison to MDE;
- Coordinates, manages, and implements certain permit requirements in accordance with federal, state, and local laws;
- Coordinates with County/municipal personnel, other government officials, and citizens regarding NPDES compliance issues;
- Conducts and coordinates illicit discharge inspection screenings and routine surveys with County/municipal personnel to discover and eliminate pollutant sources;
- Coordinates with County personnel in the design, implementation, and maintenance of the County's NPDES Geographic Information System (GIS) and MDE Geodatabase Submission applications for NPDES MS4 compliance; and
- Coordinates development of compliance education, training, and outreach programs.

The Bureau of Resource Management (BRM) provides vital NPDES MS4 operational and technical support, including fieldwork, GIS operations, 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's environmental and land development codes, ordinances, and standards. These include stormwater management, floodplain management, forest conservation, landscape enhancement, water resource management, grading, erosion and sediment control, and storm sewer systems management.

The County/municipal joint permit eliminates political boundaries as a watershed planning consideration. Specific responsibilities related to permit reporting and support by the municipalities are outlined in the MOA. This working relationship has made compliance with the NPDES MS4 requirements more purposeful and effective. The NPDES Compliance

Specialists support each municipality in storm sewer system mapping, illicit discharge detection and elimination inspections and investigations, visual surveys, public education and outreach efforts, etc.

Annual written agreements between the County and each municipality further delineate services the County will provide to support implementation and compliance with the permit and the environmental and land development codes, ordinances, and standards to support the County's program. **Table 1** shows the assignment of responsibilities for review, inspection, and bonding for each municipality.

Compliance by each individual co-permittee jurisdiction with various other specific permits lies with County agencies or municipalities that oversee the facilities. Coordination between these agencies and LRM regarding NPDES compliance remains a priority. In addition, the County continues to work jointly with the municipalities to ensure ongoing implementation of compliance responsibilities. Any future changes in the administration of this permit will be reported to MDE.

Table 1
Review, Inspection, and Bonding: Assignment of Responsibilities

Carroll County Code & Activity	Hampstead	Manchester	Mount Airy	New Windsor	Sykesville	Taneytown	Union Bridge**	Westminster
Floodplain								
Review*	C/C	C/C	C/C	C/C	C/C	C/C	C/M	C/M
Bond	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Inspection	C	C	C	C	C	N/A	C	M
Easement	C	C	C	C	C	C	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
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	C	C/M
Bond	C	C	M	M/C	M	M	C	M
Inspection	C	C	C	M/C	M/C	M	C	C
Easement	C	M	M	M	M	M	M	M
Landscape								
Review*	C	C/C	C/M	C	C/M	C/C	M	M
Bond	C	C	M	C	M	C	M	M
Inspection	C	C	M	C	M	C	M	M
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

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

Source: Carroll County Bureau of Resource Management

** Review performed by / whose code*

***County assumed responsibilities associated with stormwater management in December 2015.*

B. Legal Authority

Continuation of Established Authority – The legal authority established under this permit remains within the Carroll County Code of Public Local Laws and Ordinances ("County Code"). In addition, the MOA between the County and incorporated municipalities dated October 2014 establishes cost-sharing and co-permittee responsibilities in complying with this permit.

Chapter 53 of the County Code, Environmental Management of Storm Sewer Systems, was adopted by all permit jurisdictions. The chapter gives Carroll County and the municipalities a practical, effective regulatory tool that provides standards to protect the MS4 described in detail under Part 5.3 Management Programs Section of this report.

C. Source Identification

The Maryland Department of Environment published a geodatabase design (GDB) in 2015 to support reporting for municipal NPDES permits. The intent of the GDB is to provide a framework for the data required in "Attachment A" of the NPDES permits. Over the past year, municipalities and MDE have met to discuss the GDB and MDE is currently working on fine tuning the details of the design. In the meantime, MDE requested that if possible, municipalities submit their Attachment A data in the new GDB format.

Over the past year, Carroll County has been migrating data from various internal data sources into the new GDB format. Carroll County will continue to work with MDE to refine the database design, create the new features requested by MDE, and perform quality assurance reviews of our data.

The County did have to make some revisions to the GDB provided by MDE to allow for the County data to be entered. Relationship classes were deleted as not all of the data is complete to support the relationships. Indices were sometimes deleted as null values in the County data did not support being loaded. Many of the not-null fields were changed to allow null values as the County data is not as complete as requested. It is anticipated that discussions with MDE regarding the relevancy of certain fields along with further quality assurance updates on the County data will lead to the County data loading cleanly in the future.

It is the mutual intent of the County and MDE to utilize the new GDB to facilitate the reporting and review of the Carroll County NPDES permit data. This transition period should be considered as a test phase and thus data conversion issues should be expected. We welcome the comments and dialogue that will develop from MDE's review of the data. We ask however that MDE keep in mind that there is a significant level of effort being expended by the County to migrate to this new format and the process is not yet complete. With the finalization of the MDE GDB schema and the ongoing cleanup of the County data, we expect that with our next permit term, the GDB will be functioning as required.

The permit requires identification of the sources of pollutants in stormwater and the systems which convey the runoff. Carroll County maintains staffing dedicated to NPDES MS4 compliance, concentrating on those efforts that relate to storm drain system delineation and facility compliance. GIS and GPS are employed to assist in mapping and data analysis. These tools are used to help identify drainage systems exhibiting stormwater quality deficiencies. GIS and GPS also provide detailed locations for issues identified during the watershed assessments, which aids in developing effective restoration plans.

1. Storm Drain System GIS Database

Carroll County maintains an inventory of storm drain infrastructure to facilitate the identification of source pollutants in stormwater runoff as required by the permit. Management of this information is implemented through the County's GIS that stores data representing the infrastructure using ArcMap 10.3 software. The GIS database has been restructured and

developed by the BRM in conjunction with NPDES, MS4, Geodatabase Design, published in March, 2015. The goal of the County database design is to meet internal recording requirements of the County, while facilitating the reporting parameters of the MDE database. Feature Classes represent graphic features in the GIS database including storm drain structures, such as pipes, inlets, outfalls, major outfalls and associated drainage areas. A new functional classification of structures includes the designation of an NPDES Study Point that includes major outfalls and other targeted outfalls monitored and screened for Illicit Discharge Detection and Elimination (IDDE) purposes. The Appendix B CD MS4 Geodatabase contains outfall and associated drainage area data.

2. Industrial and Commercial Sources

Carroll County maintains an inventory of industrial and commercial land uses and sites it has determined to have the potential to contribute significant pollutants as described in the previous annual report. This inventory is maintained in a geodatabase with periodic additions and subtractions based on the previous year's visual survey observations, and other MS4 permit activities.

3. Urban Best Management Practices (Stormwater Management Facility Data)

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

Currently, there are 883 as-built certified and approved structural stormwater facilities throughout the County and municipalities, excluding the City of Taneytown. All facilities, drainage areas, and outfalls have been mapped with associated data provided. There are 890 non-structural practices throughout the County with as-builts on file. The City of Taneytown reported 41 approved stormwater facilities and after researching their records, the City has only 10 as-builts associated with their approved facilities. They are currently working with their engineer to acquire the remaining as-builts and obtain the necessary documentation relating to these facilities. The City is reporting that no non-structural practices have been approved as of this date.

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

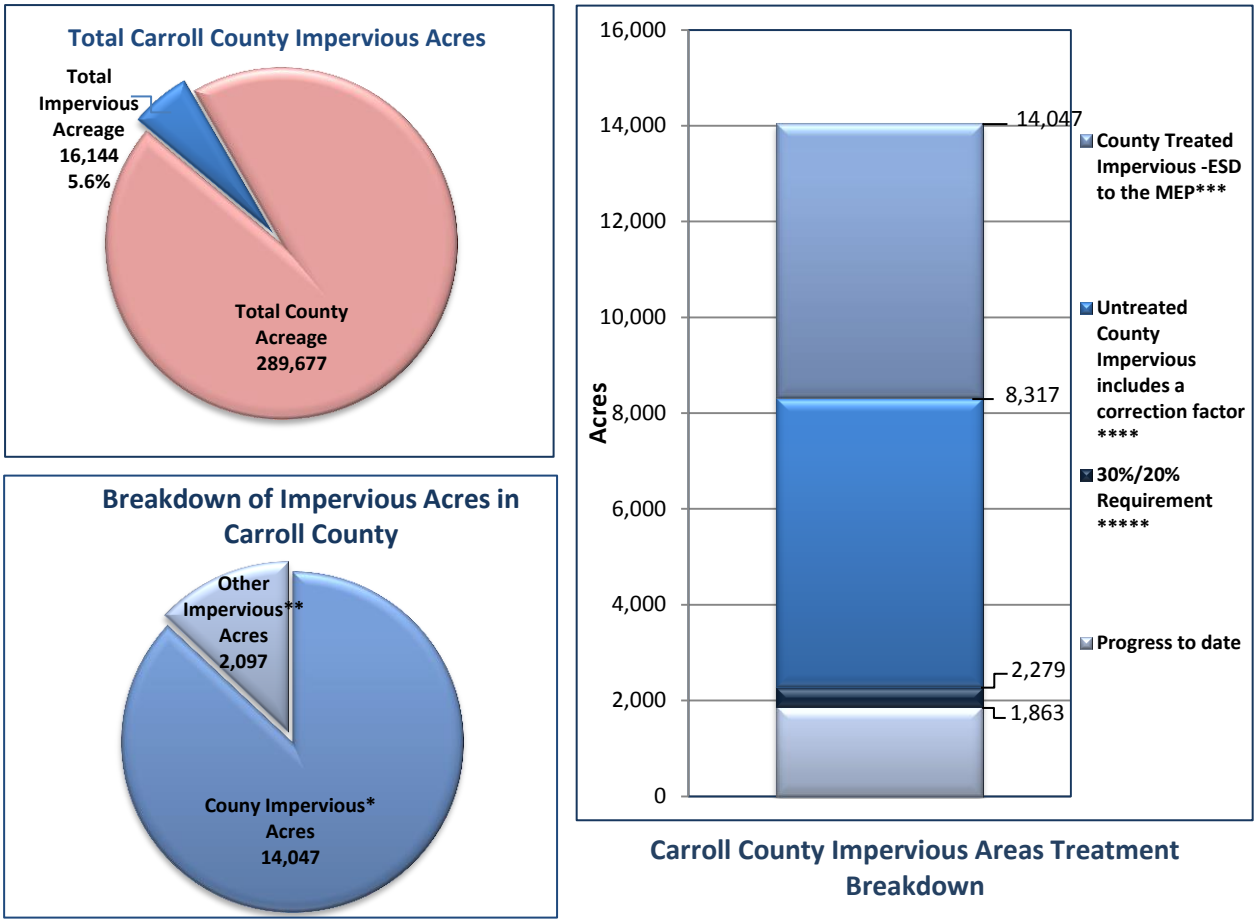
Appendix B includes the County stormwater management database map of newly added stormwater facilities in the County.

4. Impervious Surfaces

An impervious surface area assessment consistent with the methods described in the MDE document *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for NPDES Stormwater Permit* (August 2014) was submitted in the 2015 Annual Report. However, the County makes no representation by submittal of this assessment that full and complete accounting of the impervious surface area is provided. Rather, the County has applied a correction factor to account for minor feature adjustments and mapping limitations, which results in an increase to the total impervious area.

In accordance with comments received by MDE dated September 30, 2016, the 943 acres of Non-MS4 Connected Discharges (impervious acres which do not discharge through the County's municipal MS4) were added back into the untreated impervious acreage number. Also, added into the untreated impervious acreage number was 282 acres which, after further analysis of the drainage areas associated with post-2002 stormwater management facilities, were determined to be double counted. These changes take the total County impervious area from 13,104 acres to 14,047 acres and the untreated County impervious area from 7,092 acres to 8,317 acres. This, and future refinements, will be made to the assessment by the County based on new or additional information.

The total untreated impervious area of 8,317 acres includes 6,155 acres within the County and 2,162 acres located in municipalities. The total 2,279 acres required for restoration, as seen in **Figure 1**, includes the 30 percent total requirement (10% in 3rd generation permit plus an additional 20% in the 4th generation permit) for 1,847 acres in the County and 20 percent requirement of 432 acres in the municipalities.



* This number includes a correction factor.

** Other Impervious includes SHA (1,338 acres), Permitted Facilities (457 acres), Railroad ROW (302 acres).

*** County Treated Impervious ESD to the MEP includes Rural Disconnect (3,887 acres) and Post-2002 SWM (1,843 acres).

**** Untreated Impervious Area: County (6,155 acres) + Municipal (2,162 acres). This number includes a correction factor.

***** Treatment Requirement: County 30% (1,847 acres) + Municipal 20% (432 acres)

Figure 1: Carroll County Fourth Generation Permit Impervious Surface Assessment

5. Monitoring Locations and Watershed Restoration

The BRM is responsible for monitoring and watershed assessment efforts required under the NPDES MS4 permit. These efforts include the survey and verification of existing conditions as well as the performance of site and natural resource assessments and potential water quality issues. These efforts are integral to the NPDES MS4 program since the results provide a means for measuring program implementation. The BRM's watershed assessments support the

development of restoration plans required in the permit. Staff identifies watershed restoration opportunities and implements watershed improvement projects. Efforts related to these items are provided in Part IV.E. of this report.

6. Water Quality Improvement Projects

Carroll County continues to vigorously apply its watershed restoration efforts, i.e., impervious surface mitigation and water quality improvements. Projects are designed, managed, and implemented by LRM and BRM through a capital improvement program, which is titled "Watershed Assessment and Improvement (NPDES)" in the Carroll County Community Investment Plan (CIP). Funding for operating (administrative/technical) and capital (engineering and construction functions) is discussed in detail in Part IV.G. of this report.

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

- rehabilitating and upgrading older stormwater management facilities to current standards;
- implementing BMPs to manage existing untreated impervious areas; and
- planting stream buffers.

From July 1, 2015, through June 30, 2016, construction occurred on 2 stormwater management retrofit projects, equaling 37.96 acres of treated impervious area and 88.15 acres of treated drainage area. A new bio-filtration facility was installed at the Carroll County Farm Museum, treating .45 acres of impervious area and 6.54 acres of drainage area. Tree plantings totaling 36.5 acres occurred in the following areas: City of Westminster, Town of New Windsor, Double Pipe Creek Watershed, and the Upper Monocacy Watershed, which equated to 12.02 acres of treated impervious area. **Table 2** provides an overview of restoration projects from 1997-2016 according to watershed.

The BRM maintains GIS data layers of all environmental easements established during the development process. These easements have specific conditions which provide protection measurements to the delineated resources. The easements are perpetual and dedicated to the Board of County Commissioners and/or relevant municipality in certain cases. Those easements include forest conservation, floodplain, and water resource protection. Certain water resource easements are associated with stream systems on developed property and are based on variable-width criteria. These easements, per County Code, provide additional stream protection and runoff treatment related to development which is not part of a state or federal requirement. As of June 30, 2016, the County holds easements on approximately 3,923.63 acres for forest conservation, 614.94 acres for floodplain, and 1,847.11 acres for water resource protection. All easements are subject to inspection and monitoring for compliance.

Table 2 Water Quality Improvements - Watershed Restoration Projects (1997-2016)							
Project Name	**MDE Watershed Name**	**Drainage Area**	**Reported Impervious Area**	**Acres Planted**	**Total Nitrogen (lbs/year)**	**Total Phosphorus (lbs/year)**	**TSS (Tons/year)**
Forest Buffer Easements (To date)	Double Pipe Creek		35.13		500.37	17.71	3.96
Friendship Overlook/Diamond Hills Section 2	Double Pipe Creek	82.01	18.11		338.04	31.90	8.70
Grass Buffer Easements (To date)	Double Pipe Creek		69.08		827.72	43.94	9.84
Inlet Cleaning (Updated Yearly)	Double Pipe Creek		1.08		9.39	3.76	0.56
Street Sweeping (Updated Yearly)	Double Pipe Creek		4.11		35.27	3.92	2.63
Sunnyside Farms	Double Pipe Creek	30.20	9.36		128.71	13.61	3.90
Tree Plantings	Double Pipe Creek		20.71	54.49	388.40	18.04	2.17
			157.57		**2227.90**	**132.88**	**31.76**
Bateman SWM Pond	Liberty Reservoir	47.25	7.40		324.80	20.72	4.53
Carroll County Times	Liberty Reservoir	6.60	0.50		15.00	12.16	4.49
Collins Estate	Liberty Reservoir	32.68	6.36		150.01	13.68	3.66
Diamond Hills Section 5	Liberty Reservoir	51.80	16.26		221.10	23.48	6.74
Edgewood	Liberty Reservoir	38.00	12.12		314.76	24.91	6.07
Eldersburg Elementary School	Liberty Reservoir	1.45	1.00		7.93	1.17	0.37
Elderwood Village	Liberty Reservoir	15.28	4.94		73.31	7.89	2.27
Forest Buffer Easements (To date)	Liberty Reservoir		186.95		2663.15	94.25	21.10
Grass Buffer Easements (To date)	Liberty Reservoir		139.58		1672.60	88.79	19.88
Heritage Heights	Liberty Reservoir	21.40	4.10		98.12	8.91	2.38
Hickory Ridge	Liberty Reservoir	23.75	4.80		188.27	12.82	2.92
High Point	Liberty Reservoir	9.40	1.82		74.27	4.99	1.13
Inlet Cleaning (Updated Yearly)	Liberty Reservoir		14.15		123.81	49.52	7.43
Longwell County Park	Liberty Reservoir	211.20	142.80		45.00	36.48	13.47
Marriott Wood I Facility #1	Liberty Reservoir	3.00	0.56		12.20	1.10	0.29
Marriott Wood I Facility #2	Liberty Reservoir	7.12	2.04		33.84	3.49	0.99
Marriott Wood II	Liberty Reservoir	11.62	1.92		52.74	4.60	1.20
Oklahoma II Foothills	Liberty Reservoir	23.72	6.06		111.08	11.01	3.06
Oklahoma Phase I	Liberty Reservoir	24.44	7.27		116.63	12.19	3.47

Project Name	MDE Watershed Name	Drainage Area	Reported Impervious Area	Acres Planted	Total Nitrogen (lbs/year)	Total Phosphorus (lbs/year)	TSS (Tons/year)
Quail Meadows	Liberty Reservoir	55.40	14.50		248.31	24.75	6.92
Street Sweeping (Updated Yearly)	Liberty Reservoir		1.88		16.50	1.83	1.19
Sun Valley	Liberty Reservoir	12.80	3.27		91.39	6.73	1.58
Tree Plantings	Liberty Reservoir		5.43	14.29	101.86	4.73	0.57
Upper Patapsco Phase I -Naganna Pond	Liberty Reservoir	24.50	10.00		121.72	14.34	4.27
Upper Patapsco Phase II -Hoff Pond	Liberty Reservoir	77.30	2.98		296.46	20.32	4.55
Westminster Airport Pond	Liberty Reservoir	204.84	85.00		1016.16	120.37	35.91
Westminster Community Pond	Liberty Reservoir	250.22	43.92		1013.56	89.48	23.60
Westminster High School	Liberty Reservoir	115.00	42.12		562.81	63.56	18.63
Wilda Drive	Liberty Reservoir	6.75	1.60		27.99	2.70	0.74
			771.33		**9795.39**	**780.97**	**203.39**
Inlet Cleaning (Updated Yearly)	Loch Raven Reservoir		3.79		33.19	13.28	1.99
Piney Run	Loch Raven Reservoir	397.04	258.07		70.20	56.91	21.01
			261.86		**103.39**	**70.19**	**23.00**
Forest Buffer Easements (To date)	Lower Monocacy		4.13		58.87	2.08	0.47
Grass Buffer Easements (To date)	Lower Monocacy		5.04		60.42	3.21	0.72
Inlet Cleaning (Updated Yearly)	Lower Monocacy		0.39		3.46	1.38	0.21
Tree Plantings	Lower Monocacy		4.64	12.21	87.03	4.04	0.49
			14.21		**209.78**	**10.71**	**1.88**
Forest Buffer Easements (To date)	Prettyboy		16.11		229.50	8.12	1.82
Grass Buffer Easements (To date)	Prettyboy		21.65		259.38	13.77	3.08
Hampstead Impervious Area Removal	Prettyboy		0.13		0.34	0.22	0.06
Inlet Cleaning (Updated Yearly)	Prettyboy		6.92		60.54	24.21	3.63
Tree Plantings	Prettyboy		1.79	4.73	33.72	1.56	0.19
			46.60		**583.48**	**47.88**	**8.78**
Arthur Ridge	S Branch Patapsco River	51.17	5.14		215.17	16.73	4.10
Benjamin's Claim	S Branch Patapsco River	47.10	15.78		202.60	22.04	6.39
Benjamin's Claim Basin B	S Branch Patapsco River	1.33	0.55		5.89	0.69	0.21
Braddock Manor West	S Branch Patapsco River	49.30	7.65		222.86	19.12	4.95

Project Name	MDE Watershed Name	Drainage Area	Reported Impervious Area	Acres Planted	Total Nitrogen (lbs/year)	Total Phosphorus (lbs/year)	TSS (Tons/year)
Brimfield	S Branch Patapsco River	34.69	17.23		306.14	28.87	7.48
Carrolltowne 2A Gemini Drive	S Branch Patapsco River	87.73	34.43		385.30	44.54	13.20
Carrolltowne 2B	S Branch Patapsco River	34.61	10.38		146.96	15.36	4.38
Chung	S Branch Patapsco River	102.93	10.00		0.00	0.00	0.00
Clipper Hills - Gardenia	S Branch Patapsco River	33.19	11.08		142.71	15.51	4.49
Clipper Hills - Hilltop	S Branch Patapsco River	43.82	13.40		186.48	19.62	5.61
Eldersburg Estates 3-5	S Branch Patapsco River	34.90	8.16		144.57	13.89	3.82
Forest Buffer Easements (To date)	S Branch Patapsco River		86.70		1235.00	43.71	9.78
Grass Buffer Easements (To date)	S Branch Patapsco River		43.38		519.86	27.60	6.18
Harvest Farms 1A	S Branch Patapsco River	43.80	11.25		183.02	18.13	5.05
Inlet Cleaning (Updated Yearly)	S Branch Patapsco River		4.88		42.70	17.08	2.56
Jenna Estates	S Branch Patapsco River	15.35	0.50		0.00	0.00	0.00
Parrish Park	S Branch Patapsco River	94.23	18.20		391.20	35.47	9.48
South Carroll High School - Fine Arts Addition	S Branch Patapsco River	28.19	14.32		220.41	21.09	5.45
Tree Plantings	S Branch Patapsco River		5.73	15.08	107.00	4.99	0.60
Winfield Fire Department Addition	S Branch Patapsco River	3.13	0.22		20.79	1.13	0.23
			318.98		**4678.66**	**365.57**	**93.94**
Forest Buffer Easements (To date)	Upper Monocacy		5.63		80.26	2.84	0.64
Grass Buffer Easements (To date)	Upper Monocacy		9.68		116.00	6.17	1.38
Inlet Cleaning (Updated Yearly)	Upper Monocacy		0.18		1.58	0.63	0.10
Tree Plantings	Upper Monocacy		10.67	28.09	200.22	9.30	1.12
			26.17		**398.06**	**18.94**	**3.23**

Note: * Nutrient reductions were derived from Chesapeake Stormwater Network's *Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects* guidance document dated January, 2015.

Yearly totals relating to Alternative Urban Best Management Practices are not included in this table; these practices can be found in Table 3 of the report.

D. Management Programs

The Environmental Inspections Services Division (EISD) of the BRM is responsible for all inspections and enforcement actions necessary to ensure that the conditions established in the review, approval, and permitting phases are met. The EISD also contributes to compliance with the County NPDES responsibilities by providing stormwater management facility maintenance inspections and assistance with illicit discharge inspections and visual surveys. During the permit year, EISD performed a total of 9,824 environmental inspections.

1. Stormwater Management

The County stormwater management program is the responsibility of the BRM within LRM and implements Chapter 151 of the Carroll County Code of Public Local Laws and Ordinances. A programmatic change occurred in December of 2015 when the Town of Union Bridge and Carroll County signed a Stormwater Management Memorandum of Understanding (MOU). This MOU gives Carroll County the authority to administer stormwater management, storm sewer systems, plans and permit review, and enforcement provisions of the Town Stormwater Management Code. The implementation of Chapter 151 is also applied to the municipalities of Hampstead, Manchester, Mount Airy, New Windsor, and Sykesville. The City of Westminster has its own approved stormwater management code, which is implemented by the County. The City of Taneytown implements an approved stormwater management code independent of the County (see **Table 1**). Reviews performed by the County are the responsibility of the Program Engineer and the Stormwater Management Review Assistant. Review and approval of stormwater management during the period of July 1, 2015, through June 30, 2016, consisted of 473 plans reviewed, 30 structural as-builts, and 230 non-structural as-builts approved.

Residential stormwater management facilities and storm sewer systems in unincorporated areas are owned by the County while the municipalities own the residential facilities in their respective jurisdictions. All commercial and industrial facilities in the County and municipalities are maintained by the property owners. Database information on facilities located in Carroll County and an updated map are contained in Appendix B of this report.

Inspections of facilities in the County and 7 of the 8 municipalities are handled by EISD. Maintenance inspections are performed each calendar year. The following is a breakdown of the 883 structural stormwater management facilities currently being inspected: 269 will be inspected during calendar year 2017, 238 will be inspected in 2018, and 376 will be inspected in 2019. Each facility is inspected every 3 years, with letters sent to the owner indicating the condition of the facility and the amount of time allowed for compliance to be achieved. In the case of County-owned structures, the notice is sent to the Bureau of Facilities, Bureau of Road Operations, and BRM. The EISD performed 394 inspections this year; 364 individual facilities were inspected; resulting in 30 re-inspections and 120 corrective actions. Follow-up inspections are performed to ensure compliance has been achieved in a timely matter. As of June 30, 2016, 80 of those facilities have been brought into compliance. In cases where violations still exist, Notices of Violation are sent, allowing an additional amount of time to resolve issues. During the period of July 1, 2015, to June 30, 2016, 30 Notices of Violation were issued. The remaining 40 have been notified, and EISD is awaiting corrective action.

Currently, there are 890 non-structural practices throughout the county. The inventory of these structures is currently in Microsoft Access; however, it is being incorporated into the new MDE geodatabase format. These structures will be inspected every 3 years starting with FY 2017, when approximately 313 will be inspected, 313 in FY 2018, and 264 in FY 2019.

According to COMAR 26.17.02, preventative maintenance inspections of all ESD treatment systems and structural stormwater management facilities must be conducted at least on a triennial basis. This function is performed by the County for all municipalities except the City of Taneytown. Taneytown performs its own inspections. Maintenance inspection information of all ESD treatment practices and structural stormwater management facilities is maintained according to COMAR 26.17.02.

Town of Union Bridge

In December of 2015, the Town of Union Bridge and Carroll County signed a MOU giving Carroll County the authority to administer stormwater management, storm sewer systems, plans and permit review, as well as enforcement.

City of Taneytown

Stormwater management structures and infrastructure intended for ownership by the City are inspected as constructed, typically by City staff and the City's consultant engineer. Frequency of inspections, and reports of such inspections, are determined by project specific factors. Reports, including narratives and photographs, are submitted to the Department of Public Works (DPW) for maintenance per the Department's State-approved records retention schedule. Facilities intended to be deeded to the City are typically the product of residential development projects, which may include storm sewer system improvements, ESD features, stormwater management structures, and transfer of real property or deeds of easement. Projects involving stormwater management on City-owned properties, or involving City-owned facilities, are also subject to construction inspections by the City or its contractor. Park development projects and construction of or improvements to existing water, sewer, or stormwater infrastructure, are typical of these projects. These projects follow the same construction inspection, reporting, and report retention process as other projects intended for City ownership.

Stormwater management facilities, whether ESD, structural BMPs, or other features that are intended to remain under private ownership, are inspected during construction by the developer's engineer in accordance with approved construction drawings, utilizing an inspection schedule incorporated into the stormwater management plan. The City's consultant engineer reviews and approves stormwater management plans prior to construction, and upon completion of projects, completes a review of stormwater "as-built" drawings, which are certified by the developer's engineer, prior to release of construction surety. The City's DPW also provides inspection of completed stormwater facilities and coordinates with the City consultant engineer on approvals. As-built plans are maintained by the City's Planning and Zoning Department in accordance with the Department's State-approved retention schedule.

The City of Taneytown is required to inspect all public and private stormwater management facilities every 3 years under the City of Taneytown's stormwater management ordinance. Per

the City's "Stormwater Management Facilities Inspection Report" prepared by the City's consulting engineer, all stormwater management facilities within the City of Taneytown are inspected on a triennial basis. The consulting engineer inspected 41 stormwater management facilities for the City between May 24, 2016, and June 8, 2016.

2. Erosion and Sediment Control

The EISD of the BRM is responsible for inspection and enforcement of erosion and sediment control in accordance with Chapter 152 of the County Code. MDE has delegated sediment control enforcement authority to Carroll County through June 30, 2017. Inspection statistics relating to grading permits and inspections during the reporting timeframe are as follows: 154 grading permits issued and 3,784 sediment control inspections completed.

All inspections are recorded with notices sent for both violations and compliance. In 8 cases, Stop Work Orders were posted for severe violations, which in most instances required compliance within 36 hours. Currently, there are still 4 outstanding violations.

Grading permits are issued on all projects with disturbance in excess of 5,000 square feet. Pre-construction meetings are held to discuss the project and meet with the site foreman, who holds a valid "Responsible Personnel Certification" as required by MDE.

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

3. Illicit Discharge Detection and Elimination (IDDE)

The permit requires that an inspection and enforcement program continue to be implemented to ensure that all discharges to and from the MS4 that are not composed entirely of stormwater are either permitted by MDE, exempt under the NPDES Phase 1 MS4 permit, or eliminated. Carroll County Government provides support for illicit discharge monitoring, detection, and elimination in cooperation with municipal co-permittee responsibilities. The MOA between the County and the municipalities, wherein services are provided in support of the permit, satisfies part of this requirement. No modifications to municipal ordinances and regulations related to the County Code Chapter 53, "Environmental Management of Storm Sewer Systems," were made in this permit year.

Field screening of at least 100 outfalls annually is performed by the EISD of the BRM and the NPDES Compliance Specialist. Staff participated in annual IDDE training prior to the inspection season. Current standard operating procedures (SOPs) were updated in the County's IDDE Guidance Manual per MDE's 2015 Annual Report comments and are provided on CD under Appendix B. Screening assignments are prepared by County election district groupings and performed by EISD staff most familiar with stormwater management BMP facilities and local land use activities in these areas. Outfalls located in the 8 incorporated municipalities are inspected by the NPDES Compliance Specialist in cooperation with municipal staff most knowledgeable of their local environs.

To facilitate IDDE screening, a new NPDES Study Point classification has been assigned to major NPDES and other targeted outfalls that have greater illicit discharge potential, such as commercial and industrial land uses, densely populated areas, aging sewer infrastructure areas, or areas with past screening history. There are 310 outfalls that currently have the NPDES Study Point designation and will be inspected on a triennial basis. There were 104 IDDE outfalls screened for the permit year. Outfall screenings were distributed among 7 watersheds as follows: Prettyboy Reservoir (10), Loch Raven Reservoir (2), Liberty Reservoir (40), Patapsco River - South Branch (22), Lower Monocacy River (4), Double Pipe Creek (22), and the Upper Monocacy River (4) (see outfall map in Appendix C).

Dry weather screening found 31 outfall flows, which received a chemical field screening test for parameters defined by the permit. Twenty-seven flows were tested at initial screening, and the remaining 4 known instream or groundwater sources were tested as a follow-up per MDE annual report comments. Of the 31 flows screened, a total of 4 outfalls were identified as having potential illicit discharges. One BMP inflow at a wet stormwater management facility was investigated, confirmed as a water utility line break, and eliminated (prior to MDE comments). A storm drain system having low detergent level at the outfall was investigated and later re-screened with negative results. The system will continue to be observed by EISD staff assigned to that area. Two flows with negative field chemical test results, but presenting physical indicators continue to be monitored. One of these having an outfall flow originating from a known natural spring was determined to have nitrate levels consistent with normal groundwater in the region. The geodatabase includes the results of this year's outfall screening and can be found on CD in Appendix B.

Specific industrial and commercial land uses and sites that have a potential to contribute significant pollutants have been identified per PART IV.C.2. SOPs for conducting visual surveys of these commercial and industrial areas are in place for discovering, documenting, and eliminating pollutant sources in the MS4. Prior to conducting visual IDDE surveys, NPDES Compliance Specialist and EISD staff receive training regarding permit regulations, general protocols, terms, form completion, reporting, and follow-up procedures should a significant potential pollutant source be observed. When significant pollutant sources are discovered, the property owner is contacted by the EISD or respective municipal authority. The SOP guidelines and County Code Chapter 53 relating to enforcement measures are followed until the source is eliminated.

A total of 62 visual surveys were conducted during the permit year. Five sites having potential significant pollutant sources of concern were discovered, documented, and eliminated through removal, corrective actions, or implementation of stormwater pollution prevention good housekeeping practices are shown on a table in Appendix C. A Visual Survey (VS), an Accela database, is in place and managed by the County EISD. Other follow-up measures to the survey include sending MS4 Stormwater Pollution Prevention BMP educational materials designed for businesses with typical everyday activities. Updating the commercial/industrial site inventory database will be based on these observations and includes retaining 42 of the sites for future surveys while 20 sites will be removed. Four of these sites were determined to have active NPDES permits (w/pollution prevention plans) per the MDE Wastewater Interactive Search Portal, and the remaining 16 sites had a "no-exposure" condition with regard to significant pollutant sources, such as commercial offices, mini-storage facilities, and vacant business space.

The MS4 permittee is required to maintain a program to address and, if necessary, respond to illegal discharges, dumping, and spills. The County maintains a Stormwater Pollution Hotline for all Carroll County residents as indicated on the County website. "Illicit Discharge Incident Response" SOPs have been implemented and are documented in the County IDDE Guidance Manual to quickly respond to and eliminate potential illicit/pollutant discharges in the MS4. A Pollutant Discharge (PD) Accela database is in place and managed by the County EISD. Calls from the public are investigated and processed through this program and tracked through to abatement. Protocols are also in place for quick response to inter-agency and co-permittee reporting. EISD closely coordinates with respective municipalities for elimination if an incident proves to be an illicit discharge. Sixteen illicit discharge complaints were processed during the permit reporting year. An IDDE investigation summary is located in Appendix C of this report.

County Code Chapter 53 establishes methods of controlling the introduction of illicit discharges or pollutants into the MS4 in order to comply with requirements of the permit. The adoption of the ordinance by each municipality provides enforcement authority, either solely or in conjunction with the County, necessary to comply with permit requirements. **Table 3** lists the municipalities that have adopted County Code Chapter 53 and the responsible enforcement authority.

Table 3
Municipal Adoption and Enforcement Of Carroll County Code Chapter 53, Environmental Management Of Storm Sewer System

Municipality	Enforcement Authority
Hampstead	County
Manchester	County
Mount Airy	Municipal
New Windsor	County
Sykesville	Municipal
Taneytown	Municipal
Union Bridge	County
Westminster	Municipal

An annual NPDES Stormwater Pollution Prevention training event is held each fall for administrative and public works manager/supervisory-level personnel of pertinent County bureaus and the 8 municipalities. An overview of the NPDES permitting program is provided along with MS4 and 12SW Industrial Permit requirements. The training strongly emphasizes good housekeeping BMPs, Stormwater Pollution Prevention Plan practices, IDDE, storm drain technology, public education and participation, employee training, and recordkeeping. Many County and municipal public works staffs are trained through their respective departments to perform visual inspections of storm drain systems as they go about their workday and report potential illicit discharges to their supervisors. County and municipal staffs performing IDDE investigations and enforcement, responding to and reporting illicit discharges, dumping, spills, etc., per the permit, received training coordinated by the LRM NPDES MS4 staff. A total of 293 employees received training during the permit year covering the MS4 permit, general stormwater pollution prevention, good housekeeping/BMPs, and IDDE during the permit year.

4. Litter and Floatables

The permit requires the co-permittees to address problems associated with litter and floatables in waterways that adversely affect water quality. MDE is concerned with litter discharges to receiving waters and has required Carroll County to evaluate its current litter control associated with discharges from its storm drain system. The permit requires that a public outreach and education program be developed and implemented, as needed, on a watershed by watershed basis. The County, via its watershed assessment efforts, has not identified any issue related to litter and floatables within those areas assessed. In addition no state listing or identified TMDL exists within Carroll County related to litter and floatables. Therefore, a problem with litter and floatables is not an identified concern in Carroll County, as it relates to this permit.

Carroll County implements several programs to reduce and control litter along roadways, which ultimately reduces litter to county waterways:

- Seven groups actively volunteer to pick up trash along a mile stretch of roadway once in the fall and once in the spring, as part of the Carroll County DPW Adopt-A-Road program. This program was initiated to control and reduce litter on Carroll County's roads and invites public, individual, and civic group volunteer participation. This program is promoted through an online video entitled, "A Cleaner Carroll" found on the Roads Operations' webpage. Equipment is provided along with safety guidelines and tips on how to pick up trash along roadways for disposal at the County's Resource Recovery Facility. Signs recognizing individual or group efforts in helping keep Carroll clean are provided by the County. Additionally, the Bureau of Facilities provides trash and litter receptacles at facilities where they are considered practical.
- DPW staff spent 1,055 hours on roadside trash pickup in FY 2016. An additional 146.5 hours were spent by trustees from the Sheriff's Office picking up trash. Hours provided by the Sheriff's Office are variable depending on the trustees.
- Trash nuisance remediation is primarily complaint driven and site or address specific. Contractors hired by the Carroll County DPW's Roads Operations abate the trash. In FY 2016, 50 complaints were received, and 9 sites were abated by the County contractors.
- The program for the County and the municipalities includes a combination of trash receptacles along streets and in parks, litter ordinances, street sweeping, trash and recycling collection service, litter collection along roads and in public spaces, trash guards at storm drain inlets, and public education through newsletters, websites, social media, radio, television/cable, informational materials, and special events. Special events include, but are not limited to, clean-up days with local college volunteers and Boy Scouts, festivals, and fairs.

Carroll County has developed and implemented a public education and outreach program to reduce littering and increase recycling, actively seeking to divert waste from the landfill. As seen in **Figure 4**, recycling participation in Carroll County was on the rise from 2008 to 2013. The drop in recycling from 2013 to 2014 can partially be attributable to the County's waste diversion efforts, which result in less waste to recycle. This decrease may also be partially due to the increasing costs of recycling to the companies that use the recycled materials, which, among other factors, has pushed down the market demand. Options for both curbside and drop-off opportunities have increased, as has the type of materials that can be recycled. While pick-up

of recyclables within municipalities is provided by each individual municipality, the County's recycling public education and outreach efforts are implemented countywide, including within the municipalities.

Curbside, single-stream recycling was implemented in 2007 (and expanded in 2008), making it easy and convenient for residents to participate. Most standard household recycling can simply be placed at the curb. Carroll County has taken advantage of grant opportunities to purchase and distribute large recycling containers that add to the ease of handling curbside recycling.

Carroll County's Recycling Operations staff offers voluntary recycling opportunities for all Carroll County residents and businesses. Licensed haulers are required to offer all of their customers a curbside recycling service. For residents or businesses who wish to haul their own waste and recyclables to the landfill, the County provides a drop-off site for waste and a full-service Recycling Center at the Resource Recovery Park plus a drop-off site at Hoods Mill Landfill. Carroll's Resource Recovery Park is conveniently located in the center of the county. There is no charge for recycling.

The Recycling Center accepts all materials recycled through the County's curbside program plus many items that are not eligible for curbside pickup such as textiles, Styrofoam, rigid plastics, grocery and empty clear food bags, electronics, CD/DVD cases and disks, car and truck batteries, used motor oil, antifreeze, waste oil, cooking oil, as well as aluminum can reimbursement. Aluminum can reimbursement fluctuates with the market value. The Resource Recovery Park also accepts white goods/scrap metal for recycling. A Goodwill Donation drop off and The Loading Dock offer recycling of reusable building materials onsite.

Hampstead, Manchester, Mount Airy, Sykesville, and Westminster provide bulk trash pick-up to encourage proper disposal of trash and debris to help promote better water quality. In addition, multiple municipalities have an oil, antifreeze, and/or gasoline recycling program managed by either the municipality or Maryland Environmental Service (MES) at a municipal facility or MES facility.

Since 1994, the County has banned yard waste from being mixed with household waste for disposal or in plastic bags. Citizens countywide can dispose of grass, leaves, and branches in the yard waste area of the Resource Recovery Facility. These items are mulched by a third party. Several municipalities offer curbside yard waste pickup.

Citizens are encouraged to consider backyard composting. The County provides an opportunity to purchase compost bins and rain barrels at a discounted rate in the spring.

The Carroll County Recycling Office offers a semi-annual household hazardous waste collection to ensure household chemicals are properly discarded. The Carroll County Recycling Office diligently works to inform citizens and instill the "Reduce, Reuse, Recycle!" theme.

In 2014, the Maryland General Assembly passed Senate Bill 781, Environment – Recycling – Special Events. The law requires organizers of special events meeting certain criteria to provide a recycling receptacle adjacent to each trash receptacle, ensure recycling receptacles are clearly distinguished from trash receptacles, and ensure that recycled materials are collected for

recycling. Special event organizers must conduct recycling in accordance with the County's Ten-Year Solid Waste Management Plan. The law also required each county to update its plan by October 2015 to address the collection and recycling of recyclable materials from special events.

In FY 2016, the County hosted several "Reduce, Reuse, Recycle!" public outreach efforts as explained below.

1. Two residential household waste drop-off events took place on October 24, 2015, and April 23, 2016. Events such as these provide County residents with a safe means for:
   - disposing of household chemicals;
   - shredding of unneeded documents; and
   - learning about measures to protect the environment.
2. County residents were encouraged to dispose of unused prescription and non-prescription drugs at designated law enforcement agencies in the county.
3. The County hosted a rain barrel and compost bin sale event on April 30, 2016, to provide rain barrels and composting bins to residents at a reduced cost.

Through all recycling efforts, the County has achieved a 42.60 percent recycling waste diversion rate that includes a 5 percent source reduction credit in 2013 (based on MDE's Recycling Report). The State-mandated recycling rate is 35 percent (as of December 31, 2015).

To proactively address changing and future solid waste needs, a Solid Waste Work Group evaluated options and prepared a report with recommendations. A Solid Waste Advisory Council (SWAC) was subsequently established by the Board of County Commissioners in 2014 to help implement recommendations of the various solid waste plans and advise staff.

The Recycling Office hosts a webpage entitled "Recycling" which provides extensive public education materials and opportunities (http://ccgovernment.carr.org/ccg/recycle/). The homepage provides general information and materials on recycling, as well as information targeted to recycling in the home, at schools, and for businesses. All recycling events are posted on the website, and related educational materials and documents are posted and available for download. The Recycling Office also hosts a Facebook page for followers to receive regular information and updates.

In addition to the "Reduce, Reuse, Recycle!" events, information is given out to residents about hard to recycle items such as CFL bulbs, pharmaceuticals, kitchen grease, and latex paint. Recycling program staff also attends many festivals and community events where an educational booth and materials are provided and staff is available to answer questions.

In addition to all the educational materials available on the Recycling website and at events, information is routinely disseminated to the public through mailers, advertisements in local print media, local cable channels, and local radio stations.

The Recycling staff coordinates closely with Carroll County Public Schools (CCPS) and Carroll Community College to address the requirements of House Bill 1290 – Environment – Recycling – Public School Plans (2009) to implement a strategy for collecting, processing, marketing, and

disposing of recyclable materials from public schools. Single-stream recycling was implemented at schools and in residential communities. Various types of collection containers, provided by CCPS, are available throughout the schools. The Carroll County Board of Education is responsible for the administration of the program in all public schools along with its contracts for trash and recycling services.

Additionally, County Recycling staff partners with the CCPS STEM (Science, Technology, Engineering, & Math) programs each year to educate and engage students, usually in elementary school, on issues related to recycling that coincide with the curriculum. This program is available upon request by a school.

The Maryland Recycling Act (MRA) requires all counties and Baltimore City to recycle 15 percent (for populations under 150,000) or 20 percent (for populations over 150,000) of the waste generated. These rates were raised to 20 percent or 35 percent, respectively, for counties by December 31, 2015. In addition, Maryland established a voluntary waste diversion goal of 60 percent and a voluntary recycling rate of 55 percent by 2020. The waste diversion goal is comprised of the recycling rate plus source reduction credits (maximum 5%) that Maryland counties and Baltimore City earn through activities designed to reduce the amount of waste going to the waste stream.

Carroll County continues to exceed the State goal for recycling and receive the maximum credit for waste diversion. Despite the challenges of the recycling market, recycling rates are climbing in the county. In addition, the County continues to provide extensive public outreach efforts and events to promote "Reduce, Reuse, Recycle!" These programs and events continue to provide opportunities to divert waste from the landfills as well as encourage continued recycling and litter control.

Figure 2, "Carroll County MRA Recyclables," and **Figure 3,** "Carroll County Recycling & Waste Diversion Rates," demonstrate the trend in both the recycling weight and rates, respectively, in Carroll County from 2007 to 2014 (2015 data not yet published by MDE). Recycling of MRA recyclables in Carroll County rose steadily from the start and expansion of the program in 2007 and 2008; however, falling oil prices, a strong U.S. dollar, and a weakened economy in China have caused the national and global industry to take a significant downturn since 2011, which have impacted Carroll's recycling market as well. These market conditions, which are beyond the County's control, have subsequently impacted Carroll's recycling rates for MRA recyclables. Although the County is currently paying to dispose of the recyclables, the County continues to encourage recycling to reduce the waste stream to the landfill, and the recycling rate since 2012 is on the rise.

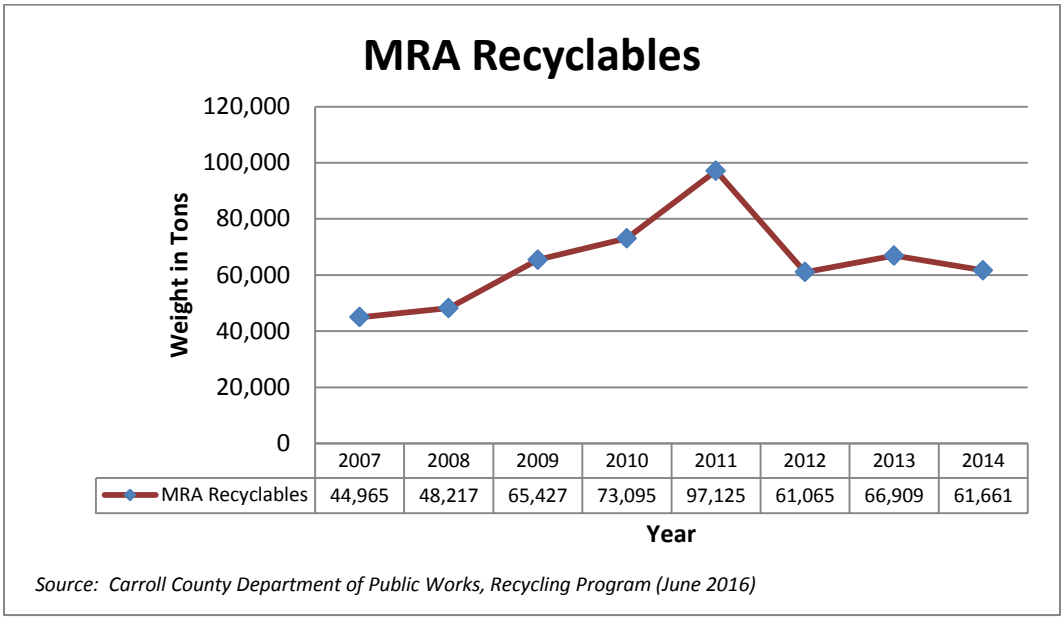


Figure 2: Carroll County MRA Recyclables

Figure 3, "Carroll County Recycling & Waste Diversion Rates," shows the rate of MRA recycling as well as the waste diversion rate. The source reduction credit is reflected in the waste diversion rate (added to the recycling rate).

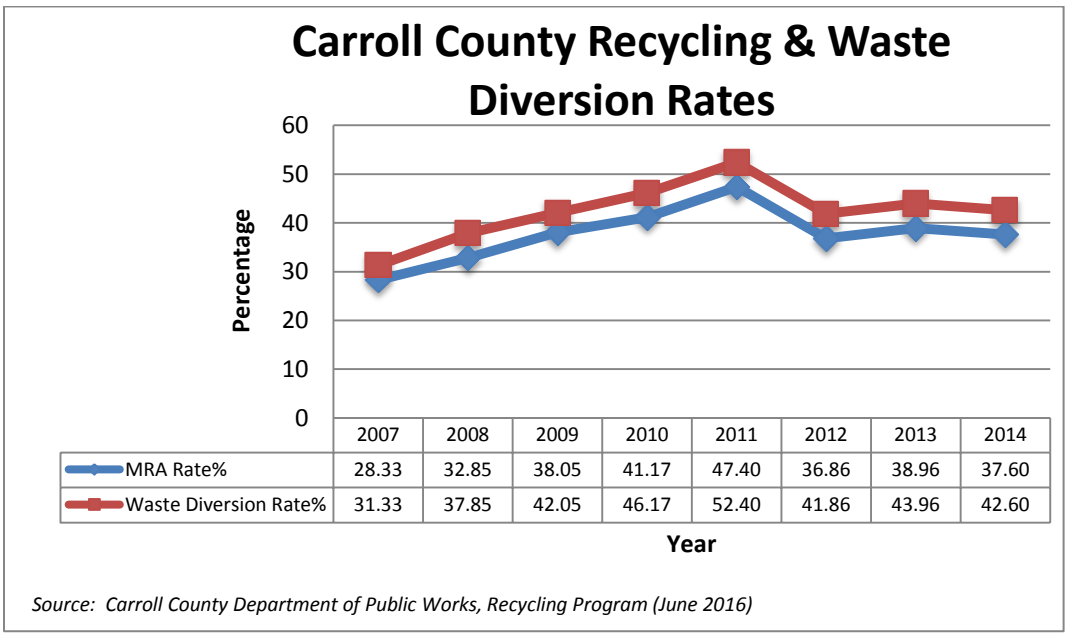


Figure 3: Carroll County Recycling & Waste Diversion Rates

Non-MRA recyclables may include automobile components, construction/building materials, and other materials. The County's MRA recycling rate has decreased since 2011, which is subsequently reflected in the drop in total recycling from 2013 to 2014. However, overall, the County's total recycling still reflects an increase between 2007 and 2014 and is still meeting the 35 percent recycling rate required by the MRA (see **Figure 4).** This success continues to divert

waste from the landfills. The decrease in total recycling overall from 2013 to 2014 is likely due, in part, to the County's waste diversion efforts, resulting in less available resources to recycle.

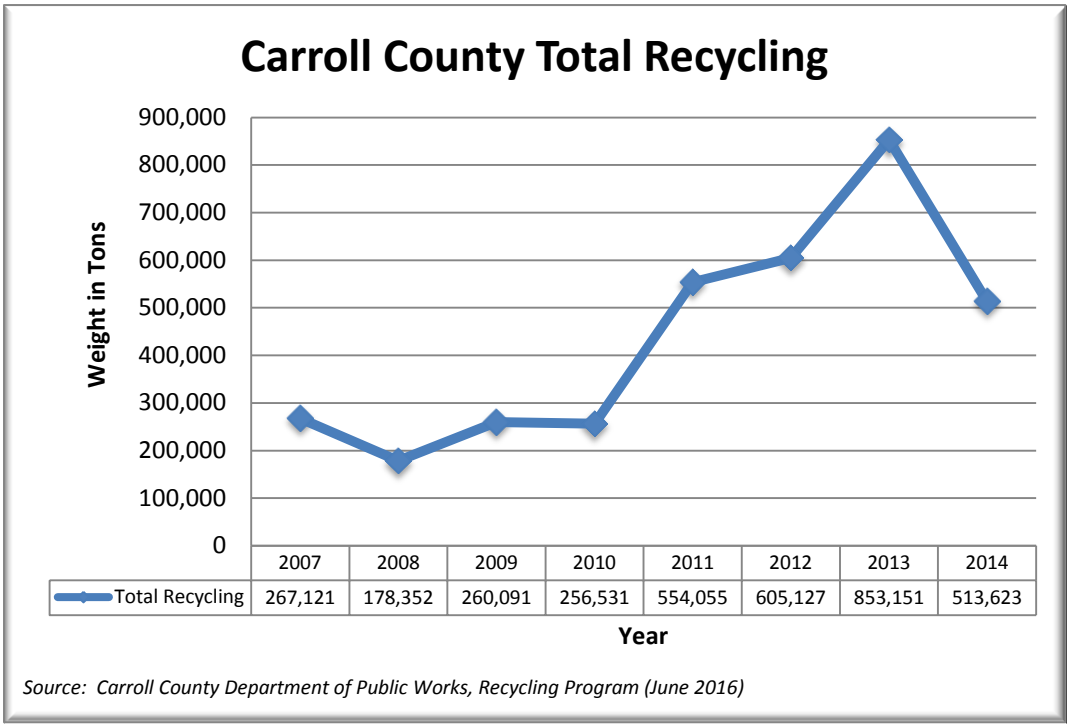


Figure 4: Total Recycling

The County DPW's Bureau of Roads Operations has an "Adopt A Road" program to control and reduce litter on Carroll County's roads, which invites public, individual, and civic group volunteer participation. The program is promoted through an online video entitled "A Cleaner Carroll" found on the Roads Operations' webpage. Equipment is provided along with safety guidelines and tips on how to pick up trash along roadways. Signs recognizing individual or group efforts in helping keep Carroll clean are provided by the County. Additionally, the Bureau of Facilities provides trash and litter receptacles at facilities where they are considered practicable.

5. Property Management and Maintenance

The permit requires a Notice of Intent (NOI) submitted to MDE for each County-owned municipal facility requiring NPDES stormwater general permit coverage. **Table 4** lists those facilities owned by County or municipal co-permittee requiring current 12SW permit registration.

Table 4
Carroll County Co-Permittees – 12SW General Stormwater Industrial Permit Status

County or Municipal Owned Facility	Review Applicability	SWPPP Submitted to MDE	NOI Submittal Date	MDE REGISTRATION
County Regional Airport	5/01/2014	Yes	June 30, 2014	MDE Registration Effective Date 08/11/2014 12SW1755/MDR001755
County Maintenance Center	5/01/2014	Yes	June 30, 2014	MDE Registration Effective Date 08/11/2014 12SW1861/MDR001861
County Northern Municipal Landfill	5/01/2014	Yes	June 30, 2014	MDE Registration Effective Date 08/11/2014 12SW0660/MDR000660
County Hoods Mill Landfill (Convenience Drop-off)	5/01/2014	Yes	June 30, 2014	MDE Registration Effective Date 08/11/2014 12SW0661/MDR000661
Hampstead – Public Works Gill Maintenance Shop	2/18/2014	Yes	June 16, 2014	MDE Registration: 07/30/14 12SW2213 / MDR002213
Manchester Public Works Maintenance Shop	12/19/2013	Yes	May 5, 2014	MDE Registration: 06/04/14 12SW2201/MDR02201
Mount Airy Public Works Maintenance Shop	3/27/2014	Yes	June 6, 2015	MDE Registration: 06/24/15 12SW2257/MDR002257
Mount Airy Public Works WWTP	3/27/2014	Yes	3/30/2015	MDE Registration: 04/10/15 12SW2258/MDR002258
Taneytown Public Works Maintenance Facility	2/20/2014	Yes	June 16, 2014	MDE Registration: 07/17/14 12SW2263 / MDR001743
Taneytown Public Works WWTP	2/20/2014	Yes	June 16, 2014	MDE Registration: 06/26/14 12SW1743 / MDR001743
Westminster Public Works Streets Maintenance Shop	3/04/2014	Yes	March 31, 2014	MDE Registration: 06/26/14 12SW2292/MDR002292
Westminster Public Works WWTP	3/05/2014	Yes	July 3, 2014	MDE Registration: 08/14/14 12SW2252 / MDR002252
Westminster Public Works Utilities	3/07/2014	Yes	June 17, 2014	MDE Registration: 07/28/14 12SW2455 / MDR002455

The permit also requires that the status of stormwater pollution prevention plan (SWPPP) development and implementation for each facility be reviewed, documented, and submitted to MDE annually. **Table 5** reflects each facility manager's response with respect to their facility's SWPPP status. A total of 246 employees participated in 12SW/SWPPP training at their facilities.

Jurisdictions having facilities with 12SW permits listed in **Table 5**, are responsible for developing and maintaining their SWPPPs, which include non-structural BMP/good housekeeping practices. These practices may include proper materials storage, fuel management practices, recycling, secondary containment, spill kits, and spill control measures. Quarterly, inspections of the site include storm drain system infrastructure, visual grab samples, personnel training, and annual evaluations to make plan adjustments that continuously improve on-site pollution prevention effectiveness. Carroll County Regional Airport (CCRA) also has an Oil Operations permit issued by MDE requiring the facility to implement the *Spill Prevention Control and Countermeasures Plan* (SPCC) submitted to MDE as part of the renewal application and inspection process.

Table 5
MS4 Co-Permittee – 12SW General Stormwater Industrial Permit
SWPPP Status (During MS4 Permit Reporting Year)*

Facility	SWPPP Plan Current *Y/N*	SWPPP Implemented *Y/N*	Facility Employees Trained *Y/N / #*	Training *Date(s)*	SWPPP Routine Inspections & Visual Grab Samples Performed *Y/N*	SWPPP Annual Comprehensive Evaluation Performed and Certified *Y/N*	Annual Comprehensive Evaluation Report Prepared and Posted in SWPPP *Date*
County Regional Airport	Y	Y	Y/2	11/6/15	Y	Y	9/23/15
County Maintenance Center	Y	Y	Y/173	11/12/15	Y	Y	(6/29/16 Eval) 9/13/16
Northern Municipal Landfill	Y	Y	Y/8	8/25/15	Y	Y	9/29/15
Hoods Mill Landfill (Convenience Drop-Off)	Y	Y	Y/8	8/25/15	Y	Y	9/29/15
Hampstead – Public Works Gill Maintenance Shop	Y	Y	Y/7	12/14/15	Y	Y	12/14/15
Manchester Public Works Maintenance Shop	Y	Y	Y/4	7/9/15	Y	Y	6/14/16
Mount Airy Public Works Maintenance Shop	Y	Y	Y/3	4/15/16	N	N	N
Mount Airy Public Works WWTP	Y	Y	Y/3	4/15/16	Y	N	N
Taneytown Public Works Maintenance Facility	Y	Y	Y/8	11/6/15	Y	Y	6/27/16
Taneytown Public Works WWTP	Y	Y	Y/3	11/6/15	Y	Y	6/27/16
Westminster Public Works Streets Maintenance Shop	Y	Y	Y/16	12/15/15	Y	Y	6/30/16
Westminster Public Works WTTP	Y	Y	Y/10	12/10/15	Y	Y	10/2/15
Westminster Public Works Utilities	Y	Y	Y/12	12/10/15	Y	Y	6/21/16

*Status reported by jurisdiction.

The permit requires the County to continue to implement a program to reduce pollutants associated with maintenance activities at County-owned facilities, including parks, roadways, and parking lots. County and municipal co-permittees under the MS4 permit, in a cumulative effort, reduce pollutants thru various maintenance activities. NPDES Stormwater Pollution Prevention and IDDE training is provided annually to County and municipal DPW supervisory and crew-level staff. Training includes BMPs for non-hazardous spill or leak containment and clean-up and procedures for reporting to the appropriate authorities.

County-owned facilities including parks, roadways, and parking lots are maintained by numerous bureaus under the Carroll County DPW. The Bureau of Facilities provides general maintenance for over 40 County-owned properties ranging from administrative to park-related facilities having access roads and parking lots. The Bureau of Roads Operations provides routine maintenance of the roads including roadside mowing, patching, drainage work, pipe cleaning and replacement, tree trimming and removal, storm drain maintenance and repair, and surface sealing operations for approximately 973 miles of predominantly rural open section roadways (paved and gravel), 139 bridges, and salt dome facilities. CCRA, with a 5,100-foot runway and supporting tarmac and small parking lot, is maintained by the DPW. Access roads and parking lots for the treatment plants and maintenance facility are maintained under the Bureau of Utilities. The Bureau of Solid Waste maintains access roads to and from the County's active landfill and convenience drop-off location. The Department of Recreation and Park's Bureau of Parks maintains facilities for three natural resource-related parks, while the Department of Economic Development provides maintenance for the Carroll County Farm Museum tourism venue. See **Table 6: MS4 Co-Permittee Reported Pollution Reduction Activities Associated with Facility Maintenance Activities** for co-permittee maintenance pollution reduction efforts.

Street Sweeping

Street sweeping maintenance programs are implemented in numerous municipal co-permittee urban and suburban areas covered by the permit as shown in **Table 6**. Carroll County does not have a street sweeping program for their predominantly rural open section roadways. Carroll Bureau of Solid Waste sweeps weekly at the Carroll County Northern Landfill and monthly, and as needed, at the Hoods Mill residential drop-off facility. Approximately 1,088 linear miles of streets were swept countywide. These services are performed by a combination of County, municipal, and contracted staff. Municipal co-permittees typically prioritize road selections for street sweeping on downtown commercial business districts and higher density residential zoned areas with known heavier traffic patterns expanding out through primary ingress and egress street routes to commercial and residential suburb areas. Street sweeping also occurs in all co-permittee jurisdictions as a BMP when necessary for emergency management or construction-related activities.

Inlet Inspection and Cleaning

All co-permittees conduct regularly scheduled, complaint-driven, or clog-driven inlet inspections and clean-out programs. A total of 1,162 storm drain inlets were cleaned out countywide through manual, vacuum, or a combination of both cleaning methods during the permit reporting year. **Table 6** shows each co-permittee's pollution reduction efforts.

Reducing the Use of Pesticides, Herbicides, Fertilizers, and Other Pollutants Associated with Vegetation Management through Increased Use of Integrated Pest Management

Carroll County and all co-permittees employ Integrated Pest Management (IPM) practices to reduce herbicide usage associated with vegetation management through mechanical control. The County's Bureau of Facilities, which manages over 40 properties, utilizes an IPM program resulting in efficient, minimal, and/or no usage of chemical materials in maintenance and turf management practices. No fertilizer usage for vegetation maintenance purposes was reported by

all co-permittees for the permit year. Pollution reduction efforts at the natural resource park venues managed by the Bureau of Parks only use mechanical controls for vegetation management. The CCRA facility has reduced the use of herbicides for vegetation management through increasing mechanical control methods and minimizing application area. The overall management of noxious weed occurrences along County road rights-of-way and on private properties is implemented via an agreement with the Maryland Department of Agriculture (MDA). Employees from MDA perform spot spraying along County rights-of-way as well as private lands.

Deicing Materials

The management of roadway deicing material distribution and applications is the responsibility of each co-permittee within their legal jurisdictional boundaries. Carroll County Roads Operations has installed "Limit of Maintenance" signs marking these jurisdictional lines for road crews to follow for efficient but effective salt applications for public safety.

Co-permittees reduce the use of winter weather deicing materials through research, continual testing and improvement of materials, equipment calibration, and/or employee training as shown in **Table 6**. Research and materials, salt management, and equipment calibration were included in the last supervisor training. All co-permittee jurisdictions have been provided with a copy of the SHA's salt management program/plan.

The County Roads Operations Bureau responds to emergency situations such as snowstorms, flooding, downed trees, and vehicle accidents. The County is divided into 50 snowplow routes. Carroll County employs SOPs that include BMPs for salt management that cover the use of salt from its delivery, storage, and handling at salt storage locations to its placement on roadways during winter storms and post-storm cleanup operations. These practices are reviewed at an annual snow season training event that includes calibration of salt truck equipment.

The County and municipalities manage their salt storage facilities through employee training and the use of good housekeeping BMPs that include sweeping up residual materials into the salt storage structures. On-site spill kits are available at each facility in case of equipment failure during loading operations. In the County, the increased use of salt brine is utilized whenever feasible for pre-wetting of road surfaces in advance of winter storm events forecasted by national and local winter weather advisory sources. This results in the reduction of salt in solid form, when feasible, based on the year's climate conditions. Snow plowing and salt application procedures are designed to limit the number of necessary passes to prevent overlapping and over usage of deicer materials.

Every storm event is treated as a unique event with decisions made based on actual conditions. Pollution reduction measures include area supervisors performing real-time road inspections to determine if application rates are sufficient and efficient to deliver the best road conditions possible for public safety in a cost-effective manner and in the most environmentally sound manner, when practicable. Gravel roads do not receive deicer applications. Stone applications are provided as needed to improve traction. Citizen information is provided on the Roads Operations' webpage entitled "Clearing The Way Through Carroll County Efficiently," which provides instructions for the public that will help salt crews limit the number of return passes

necessary to clear roadways and reduce the amount of salt applications. Staff researches materials, methods, and technologies and attends national and regional seminars and local workshops when possible to stay current on winter road maintenance practices and affordable deicer/chemical technologies with reduced environmental impact.

Table 6
MS4 Co-Permittee Reported Pollution Reduction Activities Associated with Facility Maintenance Activities (Parks, Roads, Parking Lots, etc.)

	Street Sweeping (1)	**Inlet Inspection and Cleaning** (1)	**Integrated Pest Management practices used to reduce the use of pesticides, herbicides, fertilizers, and other pollutants associated with vegetation management**	**Reducing use of deicing materials through research, continual testing and improvement of materials, equipment calibration, employee training, and effective decision making.**	**Ensuring staff receives adequate training in pollution prevention and good housekeeping practices**
Total MS4	✓	✓	✓	✓	✓
Carroll County	✓ Roads/Facilities (6) ✓ Solid Waste (4,5,6)	✓ (7,8)	✓ (2,10)	✓ (11,12,13,14)	✓ (3)
Hampstead	✓ (3,6)	✓ (9,3)	✓ (2,10)	✓ (11,12)	✓ (3)
Manchester	✓ (3,6)	✓ (9,3)	✓ (2,10)	✓ (11,12,13)	✓ (3)
Mount Airy	✓ (3,6)	✓ (9,3)	✓ (2,10)	✓ (11,12,13)	✓ (3)
New Windsor	✓ (6)	✓ (7,8)	✓ (2,10)	✓ (11,12)	✓ (3)
Sykesville	✓ (6)	✓ (9,3)	✓ (2,10)	✓ (11,12)	✓ (3)
Taneytown	✓ (3,4)	✓ (7,8)	✓ (2,10)	✓ (11,12,13)	✓ (3)
Union Bridge	✓ (5,6)	✓ (7,8)	✓ (2,10)	✓ (11,12)	✓ (3)
Westminster	✓ (3,4,5,6)	✓ (7,8)	✓ (2,10)	✓ (11,12,13,14,15)	✓ (3)

(1) Restoration credits applied when approved Alternative BMP parameters met.
(2) No fertilizer usage reported in vegetation maintenance practices. Herbicide usage reported.
(3) Annually
(4) Monthly
(5) Weekly
(6) As Needed - Construction and Emergency
(7) Visual/Daily Maintenance Activities
(8) As Needed - Complaints or Clogging
(9) Visual/Scheduled
(10) Mechanical control primarily used for vegetation management, ie. mowing/hand trimming, etc.
(11) Training, Research or technical Information
(12) Visual observations/effective decision making
(13) Equipment calibration
(14) Salt Brine / Pre-Treatment
(15) Dry Salt/Salt Brine Mix (lower temp activation and less bouncing off road)

Deicers are used at pertinent facilities when winter weather conditions affect public and employee safety. Appropriate applications of chemicals are used at facilities having year round usage but not where facilities are inactive during the winter season, which is a pollution reduction practice.

Proper management of snow and ice at CCRA is essential for safe winter operations. This includes aircraft and support equipment movements during servicing, taxiing, and takeoff. Ensuring safe conditions on the tarmac for outside boarding of passengers, flight crews, and maintenance ground personnel activities is crucial. No de-icing of aircraft is performed at the facility, thereby reducing potential pollutants. Additionally, keeping ahead of winter storm events through using proper mechanical practices minimizes chemical usage until conditions necessitate the use of deicers in dry form. Effective decision making with regard to deicer usage is facilitated through Federal Aviation Administration (FAA) regulations and guidelines, national and local winter weather warning and forecast information, regular surface winter condition inspections, and good communication between experienced Fixed Base Operator (FBO) and CCRA airport management personnel. Research for effective, economical deicers that reduce pollutants includes keeping current with industry-related technical resource bulletins and information.

Staff Training

A total of 293 employees received NPDES MS4 Permit training under Carroll County MS4. Each fall an annual NPDES MS4 permit training workshop event is held for pertinent County and municipal co-permittee managerial and supervisory staff who oversee maintenance activities within their agencies or jurisdictions. The annual workshop was held on November 6, 2015 at Bear Branch Nature Center, Westminster, MD.

Topics included:

- NPDES MS4 Permit Overview and Regulatory Update
- Municipal Stormwater Pollution Prevention " Storm Watch – Everyday BMPs" (training video)
    - Good Housekeeping & Spill Prevention
    - Vehicle & Equipment Washing
    - Vehicle & Equipment Maintenance
    - Spill Reporting & Response
    - Street Maintenance
    - Outdoor Storage of Materials & Wastes
    - Landscaping & Lawn Care
- Municipal Storm Drain System Protection
- Municipal Spill Reporting & Response
- MS4 Permit Management Programs
    - Illicit Discharge Detection and Elimination
    - Public Education (Education/Citizen Reporting)
    - Property Management and Maintenance
- MS4 Permit – Stormwater Restoration Project
- 12SW Industrial General Stormwater Permit
    - Implementation, Corrective Actions, Recordkeeping, Reporting, MDE/EPA Inspections

Co-permittees ensure their pertinent public works maintenance staffs are trained in municipal stormwater pollution prevention and good housekeeping/BMP practices, IDDE and 12SW

SWPPP training for permitted facilities. Of 293 total employees trained under the Carroll County MS4, 257 were maintenance staff.

Carroll County continued to assemble a *Carroll County MS4 Pollution Prevention Maintenance BMP Guidance Manual* for the purpose of reducing pollutants associated with municipal facilities. The document includes a series of non-structural good housekeeping/BMPs and other educational resources maintenance staff can reference when planning, developing maintenance programs, and performing everyday work activities. The manual will be provided, expanded, and periodically updated with practical resources for each co-permittee. The guidance document can be found on CD under Appendix B.

6. Public Education

The permit requires Carroll County to continue to implement a public education and outreach program to reduce stormwater pollutants. Outreach efforts may be integrated with other aspects of the County's activities.

The permit requires maintenance of a compliance hotline or similar mechanism for public reporting of water quality complaints, including suspected illicit discharges, illegal dumping, and spills. Individuals are encouraged to report any evidence of illicit discharge or illegal dumping. Citizens throughout the county can call the non-emergency Stormwater Pollution Prevention Hotline at 410-386-2210.

Carroll County LRM hosts several webpages that provide materials and resources to local residents and businesses.

A dedicated NPDES webpage entitled "Protecting Carroll County Waters" (http://ccgovernment.carr.org/ccg/npdes/) is the primary source of information related to the NPDES MS4 permit. The webpage describes basic information regarding actions the average property owner may take to help prevent stormwater runoff pollution. The page also features the Pollution Prevention Hotline, which is readily visible, to be used for non-emergency concerns. This page also provides helpful links and documents available to download including, but not limited to, 2012 to 2015 annual reports, various EPA and MDE NPDES-related websites, and educational brochures and materials.

The NPDES webpage housed under the BRM website describes some of the basic permit requirements and terms, provides the same basic pollution prevention information found on the "Protecting Carroll County Waters" webpage, and provides another location at which the public can access the 2012 to 2015 annual reports (http://ccgovernment.carr.org/ccg/resmgmt/).

The BRM's website provides further information regarding the County's and municipalities' stormwater program and County and municipal contacts. Educational materials for both children and homeowners are available for viewing or download. The BRM webpage describes the various agricultural and urban BMPs. Copies of the Bureau's quarterly newsletter, *Down to Earth*, are available on the webpage which include educational information and reporting on stormwater activities and program implementation. The Stormwater Pollution Prevention Hotline and emergency numbers are duplicated on this website.

The Carroll County "Environmental Advisory Council" (EAC) webpage (http://ccgovernment.carr.org/ccg/eac/) provides access to materials related to stormwater pollution, TMDLs, recycling and waste reduction, and other relevant environmental topics. All presentations are posted on the webpage for public access and viewing. Reports and information related to relevant projects completed and topics discussed by the EAC are available to view as well.

The "Water Resource Coordination Council" webpage http://ccgovernment.carr.org/ccg/lrm/wrcc/ provides access to the resolution creating the Council. The Memorandum of Agreement (MOA) and Memorandum of Intent (MOI) prescribing the coordination between the County and municipalities, are also available for download.

The website, "Workshop: Carroll County Businesses for Clean Water," provides information on previous and upcoming workshops designed to equip Carroll County businesses with knowledge of the good housekeeping and BMPs that will protect water quality and prevent issues for these businesses in the future. Materials related to stormwater pollution prevention and past workshop presentations are available for viewing by the public as well. (http://ccgovernment.carr.org/ccg/npdes/workshop/)

The Carroll County Recycling Office hosts a webpage, entitled "Recycling," which provides extensive public education materials and opportunities (http://ccgovernment.carr.org/ccg/recycle/). The homepage provides general information and materials on recycling, as well as information targeted to recycling in the home, at schools, and for businesses. All recycling events are posted on the website, and related educational materials and documents are posted and available for download. The Recycling Office also hosts a Facebook page for followers to receive regular information and updates. Public Service Announcements are periodically run on WTTR, the local radio station.

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

All co-permittees provide stormwater pollution prevention materials at their municipal offices, at the Carroll County Office Building, and at various events held throughout the year. The number of specific public education venues, which provided additional opportunities to distribute information related to stormwater management, water quality, and other various environmental issues increased during FY 2016. In addition, all co-permittees participated during the permit year in outreach efforts associated with a workshop for local businesses entitled "Carroll County Businesses for Clean Water," which was held January 5, 2016. All co-permittees also continue to participate in the outreach efforts for a general public workshop to be held in Spring 2017. In addition, storm drain stenciling is implemented throughout the county and is often coordinated as a volunteer or outreach event. A complete listing of specific FY 2016 events can be found in **Table 7**.

Table 7
Carroll County NPDES Phase 1 MS4 Public Outreach Events

Event	Date	Watershed(s)	Description
Westminster Art in the Park	June 4, 2015	◆ Double Pipe Creek ◆ Liberty Reservoir	Booth – materials and direct discussion w/ attendees
Hampstead Day	May 28, 2016	◆ Liberty ◆ Loch Raven ◆ Prettyboy	Materials and direct discussion w/ attendees
Carroll County Employee Appreciation Day	May 18, 2016	◆ Multiple	Booth – recycling materials and direct discussion w/ attendees
Westminster Spring Flower & Jazz Festival	May 7, 2016	◆ Double Pipe Creek ◆ Liberty Reservoir	Booth – materials and direct discussion w/ attendees
Charlotte's Quest Nature Center Spring Fest	May 1, 2016	◆ Prettyboy Reservoir ◆ Double Pipe Creek ◆ Liberty	Booth – materials and direct discussion w/ attendees. Recycling information and a floodplain model exhibit and demonstration also was provided.
Rain Barrel & Composting Event	April 30, 2016	◆ Multiple	The County hosted a rain barrel and composting event to provide rain barrels and composting bins to residents at a reduced cost.
Arbor Day Tree Planting Ceremony	April 29, 2016	◆ Multiple	Tree planting to raise awareness of benefit of trees (ceremony open to public, streamed live, and video archived, materials posted online)
Northrup Grumman Earth Day Event	April 22, 2016	◆ Multiple	Booth – materials and direct discussion w/ attendees
Town Mall Earth Day Event	April 22, 2016	◆ Multiple	Booth – materials and direct discussion w/ attendees
Carroll County Farm Museum Earth Day Celebration & Tree Planting	April 21, 2016	◆ Double Pipe Creek	Consisted of planting the bio retention facility, stormwater education at the Farm Museum SWM pond, tree planting along the stream (outreach to 65 Outdoor School students), micro –invertebrate education, and identification to determine stream health.
Environmental Awareness Awards Presentation	April 21, 2016	◆ Multiple	Awards process used to raise awareness of environmental issues. Winners in 5 different award categories were presented awards by Commissioners and EAC. Summary of winning initiatives posted on EAC webpage. (mtg. open to public, streamed live, and video archived, presentation & materials posted online)
Regional Monocacy Scenic River Watershed Clean-Up	April 16, 2016	◆ Upper Monocacy ◆ Lower Monocacy	Clean-up event to remove trash and debris from storm drains and along stream corridors
McDaniel Clean-Up Day	April 16, 2016	◆ Double Pipe Creek ◆ Liberty Reservoir	Outreach to 20 volunteers from McDaniel College who collected 800 pounds of trash from stream beds and stormwater ponds
Center for Watershed Protection's 2016 National Watershed and Stormwater Conference	April 12, 2016	◆ Multiple	The County helped to promote this conference as an educational opportunity for local residents and businesses, including a link to the conference webpage from the *Protecting Carroll County Waters* webpage.
Carroll County Seniors on the Go Expo	April 6, 2016	◆ Multiple	Booth – materials and direct discussion w/ attendees
Carroll County Home Show	March 12, 2016	◆ Multiple	Booth – materials and direct discussion w/ attendees
Westminster Clean-Up Day	March 5, 2016	◆ Double Pipe Creek ◆ Liberty Reservoir	Outreach to 22 students from McDaniel College who installed medallions on storm drain inlets (172) with "Only Rain Down the Drain." Students hung educational door hangers on 276 homes in the Meadow Creek and Bolton Hills

			developments.
Environmental Advisory Council	January 21, 2015 & February 18, 2015	◆ Countywide	Informational presentation about NPDES Phase I MS4 permit and business community (meeting was open to public, streamed live, and video archived)
Workshop: Businesses for Clean Water	January 5, 2016	◆ Multiple	~25 participants representing businesses and municipalities attended workshop. Educational presentations regarding stormwater related to businesses. Materials created and provided, presentations and materials posted online.
Agricultural Tire Amnesty Program	January 2016	◆ Multiple	Information and materials to program collection of agricultural tires at no cost to prevent dumping of tires.
Carroll Arts Council Festival of Wreaths	November 27-December 6, 2015	◆ Multiple	Booth – materials and direct discussion w/ attendees
Environmental Advisory Council	November 19, 2015	◆ Countywide	Informational presentation Best Available Technology Septic Systems (meeting open to public, presentation & materials posted online)
Westminster Tree Planting	November 4, 2015	◆ Double Pipe Creek	Tree planting – 120 trees planted on 0.5 acres. Outreach to 20 students.
Maintenance Center Tree Planting	November 1, 2015	◆ Double Pipe Creek	Tree planting – 1,880 trees planted on 7.68 acres. Outreach to 105 students.
Filbey Tree Planting	October 21, 2015	◆ South Branch Patapsco River	Tree planting – 750 trees planted on 3.0 acres. Outreach to 60 students.
Taneytown Harvest Festival	October 17, 2015	◆ Upper Monocacy River ◆ Double Pipe Creek	Booth – materials and direct discussion w/ attendees
Westminster FallFest	September 24-27, 2015	◆ Multiple	Enviroscapes Watershed model provided for public education and demonstration
Sykesville Fall Festival	September 17, 2015	◆ South Branch Patapsco River ◆ Liberty	Booth – materials and direct discussion w/ attendees
Environmental Advisory Council	September 16, 2015	◆ Countywide	Informational presentation about Chesapeake Bay TMDLs and Maryland Watershed Implementation Plan (meeting open to public, presentation & materials posted online)
McDaniel Clean-Up Day	August 22, 2015	◆ Double Pipe Creek ◆ Liberty Reservoir	Outreach to 39 volunteers from McDaniel College who collected 1,240 pounds of trash from alleys, streams, stormwater ponds, and garages
Environmental Advisory Council	August 19, 2015	◆ Multiple	Informational presentation about 12 SW General Industrial Permit (meeting open to public, streamed live, and video archived, presentation & materials posted online)
National Night Out	August 4, 2015	◆ Multiple	Booth and materials and direct discussion w/ attendees, including water quality and recycling
Carroll County 4H Fair	August 2-8, 2015	◆ Multiple	Booth and materials and direct discussion w/ attendees, including water quality and recycling
Environmental Advisory Council	July 21, 2015	◆ Multiple	Informational presentation about the current recycling market (meeting open to public, streamed live, and video archived, presentation & materials posted online)
Boys Scouts of America Stormwater Stenciling	July 11, 2015	◆ Prettyboy Reservoir ◆ Double Pipe Creek ◆ Liberty	Boy Scout Troup 320 stenciled 80 storm drains in the Town of Manchester

The County actively utilizes cable TV resources to convey public service information. This may include upcoming events, presentations, good housekeeping BMPs, and other resources. In FY 2016, LRM staff, in conjunction with Carroll's Community Media Center (CMC), developed a proposal to produce a series of videos on BMPs for homeowners. The videos incorporate various sources of pollutants around homes and yards and simple practices homeowners can employ to reduce runoff and prevent pollution. Video production will begin in FY 2017 with the assistance of CMC volunteers. The videos will air on local cable television and be available online and at the County's social media sites.

Further outreach is accomplished by the County through resources, such as social media, radio, informational materials, and rack cards.

Carroll County continues to provide an open forum on environmental issues and concerns through the EAC. This Commissioner-appointed citizen board holds monthly meetings which are open to the public. The EAC functions at the direction of the Carroll County Board of Commissioners; works cooperatively with County environmental staff to research environmental policy issues; advises the Board of County Commissioners on environmental issues; fosters environmental education; and generally acts in the best interest of county residents by promoting effective environmental protection and management principles.

In its role to promote environmental awareness and outreach, every other year the EAC accepts nominations for Environmental Awareness Awards. Winners are recognized in a joint ceremony with the Board of County Commissioners, in the press, and on the EAC's website.

The EAC's Carroll County Environmental Stewardship booklet, generally to be updated every other year, is available on the website and is provided at various venues. The booklet describes various efforts and initiatives undertaken by the County to demonstrate environmental stewardship and protection, including stormwater mitigation and management projects and progress.

The Carroll County Solid Waste Advisory Council (SWAC) was formed in 2014 by the Board of County Commissioners. The purpose of the SWAC is to provide assistance to County staff to advance the sustainable, responsible, and cost effective practices of Solid Waste Management and Recycling in the best interests of the citizens of Carroll County and the environment. The SWAC researches and discusses issues related to solid waste and recycling and provides recommendations to the Board as requested. The SWAC meets on a regular basis, and all meetings are open to the public. Two members of the EAC sit on both councils and report the status of the SWAC initiatives regularly to the other EAC members.

In addition, the Carroll County Recycling Manager sits on the Board of Directors for the Maryland Recycling Network, which provides an additional resource to the County for public education content and influence.

The WRCC was formed in 2007 through a cooperative partnership between the County, the 8 municipalities, and the Carroll County Health Department by a formal joint resolution to discuss and address issues related to water resources. The WRCC discusses and collaborates on pertinent issues related to water, wastewater, and stormwater management. The monthly

meetings, which are open to the public, provide an excellent venue for members to coordinate on various current issues. The WRCC discusses NPDES technical and administrative issues on a regular basis, including monthly updates on co-permittee stormwater projects.

The WRCC serves as the local Watershed Implementation Plan (WIP) team for the development and implementation of Maryland's Phase II WIP and continues in this role to address WIP issues and tasks as they arise.

The town/city councils and the municipal planning commissions meet regularly (**Table 8**). Discussions related to expenditure of funds and approval for stormwater projects may be discussed at these meetings, which are open to the public. The following table ("Co-Permittee Elected Officials and Planning Commissions Regular Meeting Schedule") provides the regular meeting time for each of these public bodies.

Table 8
Co-Permittee Elected Officials and Planning Commissions
Regular Meeting Schedule

	Elected Body	Planning Commission
Board of County Commissioners	Every Thursday	3rd Tuesday & 1st Wednesday of month
Hampstead	2nd Tuesday of month	4th Wednesday of month
Manchester	2nd Tuesday of month	3rd Tuesday of month
Mount Airy	1st Monday of month	Last Monday of month
New Windsor	1st Wednesday and 3rd Monday of month	4th Monday of month
Sykesville	2nd & 4th Monday of month	1st Monday of month
Taneytown	2nd Monday of month, w/ workshops Wednesday before	Last Monday of month
Union Bridge	4th Monday of month	3rd Thursday of month
Westminster	2nd & 4th Monday of month	2nd Thursday of month

The WRCC developed a Public Outreach Plan in permit year 2014-15. The primary goal of the *Carroll County and Municipalities NPDES MS4 Public Outreach Plan* is compliance with the permit. This plan provides a review of the public outreach opportunities currently available to residents and businesses in Carroll County and the municipalities regarding specific requirements of the permit and related stormwater program activities. As a result of this review, activities were suggested to round out those opportunities and improve outreach. The intent is to raise public awareness and encourage residents and businesses to take measures to reduce and prevent stormwater pollution. This is a dynamic, iterative plan, which will be revised on a regular basis as projects are completed and other needs arise. The public outreach plan was submitted as Appendix E of the 2015 Annual Report and is available online as well. **Table 9** indicates the activities/programs under the Public Outreach Plan objectives that have been implemented thus far.

Table 9 Public Outreach Plan Activities Implemented Under Plan Objectives			
Objective	**Activity/Program**	**Page**	**Implementation**
Continue to deliver effective Reduce/Reuse/Recycle public outreach campaign	Take advantage of and share existing resources and initiatives available through Keep America Beautiful (KAB)	25	This is an ongoing effort.
Continue to provide educational material related to litter	Develop additional materials to focus on reducing the amount of litter that reaches waterways	25	Materials for businesses were developed and added to the following webpages: Business Workshop, Carroll Clean Water Partnership
Create comprehensive website that is more user-friendly and accessible	Add materials to website to address broader range of issues and needs	26	Materials directed to businesses were developed and posted to the following webpages: Business Workshop, Carroll Clean Water Partnership.
Increase awareness of compliance hotline availability and improve access	Create a more prominent location on NPDES website for hotline	27	The hotline is easier to see on the Protecting Carroll County Waters webpage, as it is now bold and in a different color. In addition, the hotline was added to the Bureau of Resource Management website.
	Add hotline # to more informational materials	27	The hotline phone number was included on the business outreach materials developed during this permit year.
Educate businesses about permit requirements, good housekeeping measures, and pollution prevention	Conduct workshop to educate businesses	28	A workshop, *Workshop: Carroll County Businesses for Clean Water,* was held on January 5, 2016.
	Create a self-inspection checklist for businesses to identify additional measures they could take	28	A self-inspection checklist was created and provided to participants in the business workshop. The checklist was also posted to the following webpages: Business Workshop, Carroll Clean Water Partnership.
	Develop additional materials to address good housekeeping measures for businesses in the target audience	28	Materials directed to businesses were developed and posted to the following webpages: Business Workshop, Carroll Clean Water Partnership. Materials also provided on courtesy visits to businesses.
Provide opportunities for public participation during the development of watershed assessments and restoration plans	Provide notice on the County's website outlining how public may obtain information on development of watershed assessments and opportunities for comment	29	Prior to completing the assessments, notice is provided on the County's website. In addition, letters are sent to all property owners with a stream on the property to request permission to access and to invite to join. Double Pipe Creek was completed in January 2016, with letters sent October 2015. Watershed assessments have been completed for all watersheds.

Continue to build or improve existing partnerships between the County and other entities to promote action, awareness, and recognition	County & Municipalities: WRCC	31	The WRCC continues to meet on a regular basis and looks for ways to expand collaboration and education opportunities.
	County & Municipalities: EAC	31	The EAC continues to meet on a regular basis. The number of issues and projects continues to expand, as does the EAC's public education initiatives.
	County & Municipalities: MOA	32	The County and municipalities continue to work cooperatively toward meeting their collective permit obligations.
	LRM staff & DPW staff	32	DPW staff provided the needed documentation for the Annual Report and continue to implement the Recycling program.
	Public Engagement – Volunteer Opportunities: Individuals / Groups	32	Volunteers assisted with several projects this year: Farm Museum Earth Day Celebration & Tree Planting, Regional Monocacy Scenic River Watershed Clean-Up, McDaniel Clean-Up Days, Westminster Clean-Up Day, Westminster Tree Planting, Maintenance Center Tree Planting, and Filbey Tree Planting. EAC members volunteered at the Westminster Flower & Jazz Festival.
Explore concept of a partnership between the County and the business community to promote action, awareness, and recognition. If Carroll Clean Water Partnership (CCWP) moves forward…	Develop materials for businesses to conduct in-house, self-inspection	33	A self-inspection checklist was created and also posted to the following webpages: Business Workshop, Carroll Clean Water Partnership. It is also provided on courtesy visits to businesses.
	Partner LRM staff w/ WRCC and EAC as sponsors of CCWP, working together to comply w/ permit and provide public outreach	33	LRM staff, WRCC, and EAC continue to work together. A CCWP website was developed and is publicly available.
	Seek feedback at Business Community Workshop on concept	33	Participants in the Business Workshop offered feedback through an evaluation form.
	Develop educational materials focusing on good housekeeping measures for specific types of businesses in target audience	33	Materials were developed specifically for the auto-related industry as well as the food-service industry. Materials were posted to the following webpages: Business Workshop, Carroll Clean Water Partnership.
	Develop eligibility criteria for businesses to become official "Partners"	34	Criteria were developed and attached to the self-inspection checklist.
	Create certificates and window decals to present to official "Partners"	34	Window decals for designated business "Partners" were created and are available.

The "Protecting Carroll County Waters" webpage (http://ccgovernment.carr.org/ccg/npdes/) includes resources related to the regulated community. In addition to the information and materials described above under Public Education for the General Public, brochures are available that describe good housekeeping practices applicable to specific types of businesses that tend to be more vulnerable to having illicit discharges. During FY 2015-16, additional public education materials were developed to provide to businesses in general, as well as specific materials for auto-related and food-industry businesses. The materials are provided at public events and workshops, available online, and provided to property owners during visual inspections and courtesy visits.

During 2015-16, the County's EAC partnered with the WRCC to develop a free workshop designed to help businesses understand stormwater regulations that affect them and good housekeeping practices they can employ. Development and outreach activities began in January 2015 and continued into the FY 2015-16 permit year, including news releases, newsletters, flyers, phone calls, etc. The workshop was held on January 5, 2016. The EAC will partner with the WRCC again in fall of 2016 and winter/spring of 2017 to develop and conduct another free workshop, which will be geared to the general public.

The Carroll Clean Water Partnership (CCWP) program was initiated in January 2016, with its kickoff at the January 5, 2016, *Workshop: Carroll County Businesses for Clean Water*. The CCWP is a cooperative effort of LRM staff, the EAC, and the WRCC. The sponsors of the CCWP hope to foster a business-friendly environment for local businesses to identify and address potential pollutants and good housekeeping measures, and, as a result, gain community recognition for "Partners" for their contribution to achieving clean water. The program aims to assist Partners with voluntary activities related to stormwater pollution prevention. Static cling window decals are provided to Partners. A webpage was developed (http://ccgovernment.carr.org/ccg/npdes/ccwp) and provides informational materials, the self-inspection checklist, event information, a list of Partners (as they are designated), and other relevant information.

Businesses start by assessing their current activities and identifying any specific actions needed to prevent pollution and improve water quality stewardship. For this assessment, a self-inspection checklist, titled "Completing Your Stormwater Pollution Prevention Self-Inspection Checklist and Action Plan," is available to guide business owners in identifying good housekeeping measures that could be implemented. This checklist then may also be used as an action plan to assist businesses in planning. A copy of the checklist is available online at http://ccgovernment.carr.org/ccg/npdes/workshop/doc/SelfInspectionChecklist.pdf?x=1464970673120. County staff is available to assist in this process if desired.

Staff partners with the CCPS Outdoor School Program each year to educate and engage sixth grade students on issues related to water quality that coincide with the curriculum. Sessions are provided on topics such as biological/stream health, stormwater, and the importance and benefits of tree planting.

E. Restoration Plans and Total Maximum Daily Loads

1. Watershed Assessments

Watershed Assessments have been completed for each of the 9 watersheds within Carroll County. Each assessment is completed on the 8-digit level, and further divided down to the 12-digit level for a subwatershed analysis. Each watershed assessment consists of a stream corridor assessment (SCA) and a characterization plan.

The County has conducted SCAs in accordance with the Stream Corridor Assessment Survey Protocols, developed in 2001 by the Maryland Department of Natural Resources (DNR), Watershed Restoration Division. Assessments are performed between January and March by County staff through cooperation of private landowners and municipalities. Landowner permission for access to stream corridors is obtained through a mailing detailing the purpose and timing of the assessment with a return response postcard.

Since 2011, the County has received permission through public participation to assess 786 miles of the 1,464 miles, or approximately 54%, of the stream miles within the County **(Table 10**). Each of the 9 watersheds has been assessed over the 6-year period, completing the last 2 watersheds in winter of 2016.

During each SCA, field teams collect information relating to eroded streambanks, channel alterations, exposed utility pipes, drainage pipe outfalls, fish barriers (debris jams), inadequate streamside buffers, trash dumps, and construction activity that are either in or near the stream. Any unusual conditions are also noted. Each impairment is then ranked on a scale of 1 to 5 in relation to the impairment's severity, accessibility, and correctability. The goal of the numeric ranking is to identify and rank current impairments within the watershed to assist in prioritizing locations for restoration implementation.

In addition to the on-the-ground field assessments, County staff have also conducted a desktop analysis of each of the nine 8-digit watersheds in a characterization plan. Each watershed's characterization plan describes the unique background of the watershed including the natural and human characteristics of the watershed and any water quality and living resource data that has been collected within the watershed. The characterization plans are intended to provide a background on the hydrological, biological, and other natural characteristics of the watershed as well as discuss human characteristics that may have an impact within the watershed.

Table 10
Watershed Assessment Status

8-Digit Watershed	Major Basin	Miles Assessed	Total Miles	% Assessed	Year Assessed
Watersheds Assessed					
Prettyboy	Gunpowder	80	97	82%	2011
Liberty	Patapsco	255	458	56%	2012
South Branch Patapsco	Patapsco	156	218	72%	2013
Lower N. Branch Patapsco	Patapsco	6	6	100%	2014
Lower Monocacy	Monocacy/ Potomac	10	23	43%	2014
Conewago Creek	Susquehanna	11	18	61%	2014
Upper Monocacy	Monocacy/ Potomac	71	128	55%	2015
Double Pipe	Monocacy/ Potomac	266	514	52%	2016
Loch Raven	Gunpowder	2	3	66%	2016
	Total:	***786***	***1,464***	**54%**	

2. Restoration Plans

Information provided in the characterization plan as well as information gathered during the SCA are used as a tool to help direct watershed restoration plans. The restoration plans will be used to identify opportunities for water quality improvements within the watershed as required by the County's NPDES permit and are designed to meet approved TMDLs for affected watersheds. The stats and year completed for each of these is listed in **Table 11.**

Six of the nine 8-digit watersheds in Carroll County have an associated TMDL WLA for developed source types. MDE has received restoration plans for these six watersheds that were developed using the watershed assessments as a foundation. Potential sources of degradation and the actions needed to address impacted areas were evaluated. Each watershed is unique and the process of gathering information about the watershed through the watershed assessments reveals key issues that influence each watershed's restoration plan. The BRM's goals for addressing environmental impacts within the watershed are addressed in the restoration plans.

Each restoration plan focuses on identified impacts discovered during the SCA and prioritizes projects at a 12-digit scale based on the water quality data. These plans present restoration strategies that are proposed to meet watershed-specific water quality standards and associated TMDL WLAs. In addition, restoration goals include the protection of source water and ecologically sensitive and threatened species. Each watershed restoration plan also establishes a reporting framework for project tracking, monitoring, and reporting.

Table 11
Carroll County Watershed Planning Status

Major Watershed	Watershed #	Watershed Name	SCA	Watershed Assessment	Restoration Plan
Conewago Creek	0289	Conewago Creek	2014	2014	N/A
	0290	West Branch Codorus Creek	2014	2014	N/A
Double Pipe Creek	0248	Double Pipe Creek	2016	2016	2016
	0268	Sams Creek	2016	2016	2016
	0269	Sams Creek	2016	2016	2016
	0271	Dickenson Creek	2016	2016	2016
	0272	Little Pipe Creek	2016	2016	2016
	0273	Priestland Branch/Wolf Pit Creek	2016	2016	2016
	0274	Little Pipe Creek	2016	2016	2016
	0275	Turkeyfoot Run	2016	2016	2016
	0276	Little Pipe Creek	2016	2016	2016
	0277	Meadow Branch	2016	2016	2016
	0278	Big Pipe Creek	2016	2016	2016
	0279	Big Pipe Creek	2016	2016	2016
	0280	Big Pipe Creek	2016	2016	2016
	0281	Bear Branch	2016	2016	2016
	0282	Bear Branch	2016	2016	2016
	0283	Big Pipe Creek	2016	2016	2016
	0284	Big Pipe Creek	2016	2016	2016
	0285	Silver Run	2016	2016	2016
	0286	Big Pipe Creek	2016	2016	2016
	0287	Big Pipe Creek	2016	2016	2016
	0288	Deep Run	2016	2016	2016
Liberty Reservoir	1046	Snowden's Run	2009-2010	2013	2016
	1047	Liberty Reservoir	2012	2013	2016
	1048	Roaring Run/Board Run	2012	2013	2016
	1049	Little Morgan Run	2012	2013	2016
	1050	Morgan Run	2012	2013	2016
	1051	West Branch Patapsco River	2012	2013	2016
	1052	East Branch Patapsco River	2012	2013	2016
	1053	Morgan Run	2012	2013	2016
	1054	Morgan Run	2012	2013	2016
	1055	Little Morgan Run	2012	2013	2016
	1056	Middle Run	2012	2013	2016
	1057	Beaver Run	2012	2013	2016
	1058	Deep Run	2012	2013	2016
	1059	East Branch Patapsco River	2012	2013	2016
	1060	Aspen Run	2012	2013	2016
	1061	Cranberry Branch	2012	2013	2016
	1062	West Branch Patapsco River	2012	2013	2016
Lower Monocacy River	0235	South Fork	2014	2014	2016
	0238	North Fork	2014	2014	2016
North Branch Patapsco River	1019	North Branch Patapsco River	2014	2016	N/A
Prettyboy Reservoir	0313	Poplar Run	2011	2012	2015
	0314	Georges/Murphy Run	2011	2012	2015
	0315	Grave/Indian Run	2011	2012	2015
	0316	Gunpowder Falls	2011	2012	2015
	0317	South Branch Gunpowder Falls	2011	2012	2015
Loch Raven	0308	Piney Run	2016	2016	2016

Major Watershed	Watershed #	Watershed Name	SCA	Watershed Assessment	Restoration Plan
South Branch Patapsco River	1020	South Branch Patapsco River	2013	2014	N/A
	1021	Piney Run	2013	2010	N/A
	1022	South Branch Patapsco River	2013	2014	N/A
	1023	Piney Run	2013	2010	N/A
	1024	Piney Run	2013	2010	N/A
	1025	South Branch Patapsco River	2013	2014	N/A
	1026	Tuckers Run	2013	2014	N/A
	1028	South Branch Patapsco River	2013	2014	N/A
	1029	Middle Run	2013	2014	N/A
	1030	Gillis Falls	2013	2014	N/A
	1031	Gillis Falls	2013	2014	N/A
Upper Monocacy River	0247	Upper Monocacy River	2015	2015	2016
	0254	Piney Creek	2015	2015	2016
	0255	Piney Creek	2015	2015	2016
	0256	Upper Monocacy River	2015	2015	2016
	0257	Piney Creek	2015	2015	2016
	0264	Alloway Creek	2015	2015	2016
	0266	Piney Creek	2015	2015	2016
	0267	Piney Creek	2015	2015	2016

Green = Completed, Blue = Completed – DRAFT, Red = In Progress

Carroll County continues implementing an aggressive program related to watershed restoration projects. The County's actual completed restoration as of June 30, 2016, was 1,863 impervious acres and 2,490 acres of drainage area treated. The percentage of treatment as of that date was 82 percent of the 2,279 acres required to be treated. The list of restoration projects and other impervious areas treated is presented in **Table 12.** The table provides a complete accounting of impervious areas as well as drainage area treated.

Figures 5 and 6 depict a graphic representation of acres restored (green), acres under construction (yellow), and acres in design (orange) for projects to restore impervious surfaces and to treat the associated drainage areas. These graphs provide an excellent representation related to the level of true watershed restoration accomplished via the County's restoration efforts. Retrofit projects are designed to treat all of the contributing watershed acres, not just impervious surfaces.

As mentioned previously, in July of 2016, the County submitted to MDE for approval "draft" watershed restoration plans for each stormwater WLA approved by EPA as required in Part IV.E.2.b. of the permit. The actual language of the permit reads, "Within one year of permit issuance, Carroll County shall submit to MDE for approval a restoration plan . . ."; however, Court Orders (Case No. 06-C-15-068141) were issued relating to the submission of the restoration plans which extended the deadline for submission to June 30, 2016, and then again to August 15, 2016.

Draft Restoration Plans were submitted for Prettyboy Watershed, Liberty Watershed, Loch Raven Watershed, Lower Monocacy Watershed, Upper Monocacy Watershed, and Double Pipe Creek Watershed. Included in this submission were the Stream Corridor Assessment and Watershed Characterization of each watershed as well. Once review of the restoration plans is completed by MDE, the County will proceed with the public participation portion of the plans as required in Part IV.E.3 of the permit prior to final approval.

Table 12						
Listing of Watershed Restoration Efforts, July 2016						
NPDES						
Projects Completed						
					Reported	
			Drainage	Project	Impervious	MDE Watershed
Year	**Project Name**	**Project Type**	**Area**	**Status**	**Area**	**Name**
1997	Longwell County Park	600 LF Stream Restoration	211.20	Completed	142.80	Liberty Reservoir
1998	Carroll County Times	200 LF Stream Restoration	6.60	Completed	0.50	Liberty Reservoir
1999	Piney Run	936 LF Stream Restoration	397.04	Completed	258.07	Loch Raven Reservoir
2005	Eldersburg Elementary School	Retrofit	1.45	Completed	1.00	Liberty Reservoir
2006	Chung	Outfall restoration	102.93	Completed	10.00	S Branch Patapsco River
2007	Winfield Fire Department Addition	New Construction	3.13	Completed	0.22	S Branch Patapsco River
2007	Marriott Wood I Facility #1	Retrofit	3.00	Completed	0.56	Liberty Reservoir
2009	Bateman SWM Pond	New Construction	47.25	Completed	7.40	Liberty Reservoir
2009	South Carroll High School - Fine Arts Addition	New Construction	28.19	Completed	14.32	S Branch Patapsco River
2009	Hickory Ridge	Retrofit	23.75	Completed	4.80	Liberty Reservoir
2009	Marriott Wood I Facility #2	Retrofit	7.12	Completed	2.04	Liberty Reservoir
2009	Marriott Wood II	Retrofit	11.62	Completed	1.92	Liberty Reservoir
2009	Westminster Airport Pond	Retrofit	204.84	Completed	85.00	Liberty Reservoir
2009	Collins Estate	Retrofit	32.68	Completed	6.36	Liberty Reservoir
2010	Upper Patapsco Phase I -Naganna Pond	New Construction	24.50	Completed	10.00	Liberty Reservoir
2010	Upper Patapsco Phase II -Hoff Pond	New Construction	77.30	Completed	2.98	Liberty Reservoir
2010	Elderwood Village	Retrofit	15.28	Completed	4.94	Liberty Reservoir
2010	Oklahoma II Foothills	Retrofit	23.72	Completed	6.06	Liberty Reservoir
2010	High Point	Retrofit	9.40	Completed	1.82	Liberty Reservoir
2010	Brimfield	Retrofit	34.69	Completed	17.23	S Branch Patapsco River
2011	Arthur Ridge	Retrofit	51.17	Completed	5.14	S Branch Patapsco River
2011	Oklahoma Phase I	Retrofit	24.44	Completed	7.27	Liberty Reservoir
2011	Edgewood	Retrofit	38.00	Completed	12.12	Liberty Reservoir
2011	Quail Meadows	Retrofit	55.40	Completed	14.50	Liberty Reservoir
2011	Heritage Heights	Retrofit	21.40	Completed	4.10	Liberty Reservoir
2012	Hampstead Impervious Area Removal	Impervious Removal		Completed	0.13	
2012	Wilda Drive	New Construction	6.75	Completed	1.60	Liberty Reservoir

Year	Project Name	Project Type	Drainage Area	Project Status	Reported Impervious Area	MDE Watershed Name
2012	Harvest Farms 1A	Retrofit	43.80	Completed	11.25	S Branch Patapsco River
2012	Parrish Park	Retrofit	94.23	Completed	18.20	S Branch Patapsco River
2012	Clipper Hills - Gardenia	Retrofit	33.19	Completed	11.08	S Branch Patapsco River
2012	Clipper Hills - Hilltop	Retrofit	43.82	Completed	13.40	S Branch Patapsco River
2012	Sun Valley	Retrofit	12.80	Completed	3.27	Liberty Reservoir
2013	Westminster High School	New Construction	115.00	Completed	42.12	Liberty Reservoir
2013	Sunnyside Farms	New Construction	30.20	Completed	9.36	Double Pipe Creek
2013	Westminster Community Pond	New Construction	250.22	Completed	43.92	Liberty Reservoir
2013	Tree Plantings	Tree Plantings		Completed	7.13	
2014	Friendship Overlook/Diamond Hills Section 2	Retrofit	82.01	Completed	18.11	Double Pipe Creek
2014	Diamond Hills Section 5	Retrofit	51.80	Completed	16.26	Liberty Reservoir
2014	Carrolltowne 2B	Retrofit	34.61	Completed	10.38	S Branch Patapsco River
2014	Carrolltowne 2A Gemini Drive	Retrofit	87.73	Completed	34.43	S Branch Patapsco River
2014	Benjamin's Claim	Retrofit	47.10	Completed	15.78	S Branch Patapsco River
2014	Tree Plantings	Tree Plantings		Completed	9.64	
2015	Eldersburg Estates 3-5	Retrofit	34.90	Completed	8.16	S Branch Patapsco River
2015	Braddock Manor West	Retrofit	49.30	Completed	7.65	S Branch Patapsco River
2015	Benjamin's Claim Basin B	Retrofit	1.33	Completed	0.55	S Branch Patapsco River
2015	Tree Plantings	Tree Plantings		Completed	20.25	
2016	Forest Buffer Easements (To date)	Forest Buffer		Completed	334.65	
2016	Grass Buffer Easements (To date)	Grass Buffer		Completed	288.41	
2016	Inlet Cleaning (Updated Yearly)	Inlet Cleaning		Completed	31.39	
2016	Septic Upgrades (To date)	Retrofit		Completed	29.38	
2016	Septic Pumping (Updated Yearly)	Septic Pumping		Completed	236.94	
2016	Street Sweeping (Updated Yearly)	Street Sweeping		Completed	5.99	
2016	Tree Plantings	Tree Plantings		Completed	11.97	
2017	Jenna Estates	Outfall restoration	15.35	Completed	0.50	S Branch Patapsco River
			2490.24		**1863.06**	
			Project in Design			
2017	Finksburg Industrial Park	Retrofit	61.4	Under Construction	22.12	Liberty Reservoir

Year	Project Name	Project Type	Drainage Area	Project Status	Reported Impervious Area	MDE Watershed Name
2017	Miller/Watts	Retrofit	39.65	Under Construction	24.93	Liberty Reservoir
2017	Carroll County Maintenance Center	Retrofit	45.49	Under Construction	13.03	Double Pipe Creek
2017	Small Crossing/Versa Property	Retrofit	27.1	Design	10.40	Prettyboy Reservoir
2017	Small Crossings Bioretention	New Construction	1.1	Design	0.50	Prettyboy Reservoir
2017	Manchester Skate Park	New Construction	99.3	Design	27.46	Double Pipe Creek
2017	Carroll County Farm Museum Basin 'A'	New Construction	6.45	Design	0.45	Double Pipe Creek
2018	Elderwood Village Parcel B/Oklahoma 4 Ph IV	Retrofit	206.88	Design	82.68	Liberty Reservoir
2018	Whispering Valley Phase 4	Retrofit	104.2	Design	25.50	Prettyboy Reservoir
2018	Merridale Gardens	Retrofit	84	Design	24.70	S Branch Patapsco River
2018	Central Maryland (Wet Facility)	Retrofit	87.5	Design	38.30	Liberty Reservoir
2018	Langdon (Jantz)	New Construction	198	Design	92.10	Double Pipe Creek
2018	Blue Ridge Manor	Retrofit	31	Design	7.70	Double Pipe Creek
2019	Shannon Run	Retrofit	152.1	Design	34.10	S Branch Patapsco River
2019	Hawks Ridge	Retrofit	60.9	Design	19.80	S Branch Patapsco River
2019	Eden Farms-Willow Pond	New Construction	168	Design	74.40	Liberty Reservoir
			1373.07		**498.17**	
			Planned Projects			
2018	Central Maryland (Dry Facility)	Retrofit	62.9	Concept	45.00	Liberty Reservoir
2018	Locust wetland	New Construction	36	Concept	11.00	Double Pipe Creek
2018	Roberts Mill	Retrofit	304	Concept	87.00	Upper Monocacy River
2019	Hampstead Regional Facility	Retrofit	331	Concept	85.00	Liberty Reservoir
2020	Squires	Retrofit	38	Concept	10.00	Liberty Reservoir
2020	Taneytown Elementary School	New Construction	190	Concept	48.00	Upper Monocacy River
2021	Piney Ridge Village As-built #57	Retrofit	23.5	Concept	8.00	S Branch Patapsco River
2021	Candice Estates	New Construction	39	Concept	13.00	Lower Monocacy River
2022	Greens of Westminster	Retrofit	141	Concept	76.00	Double Pipe Creek
2022	IDA Property (Mt. Airy)	New Construction	76	Concept	10.50	S Branch Patapsco River
			1241.4		**393.50**	

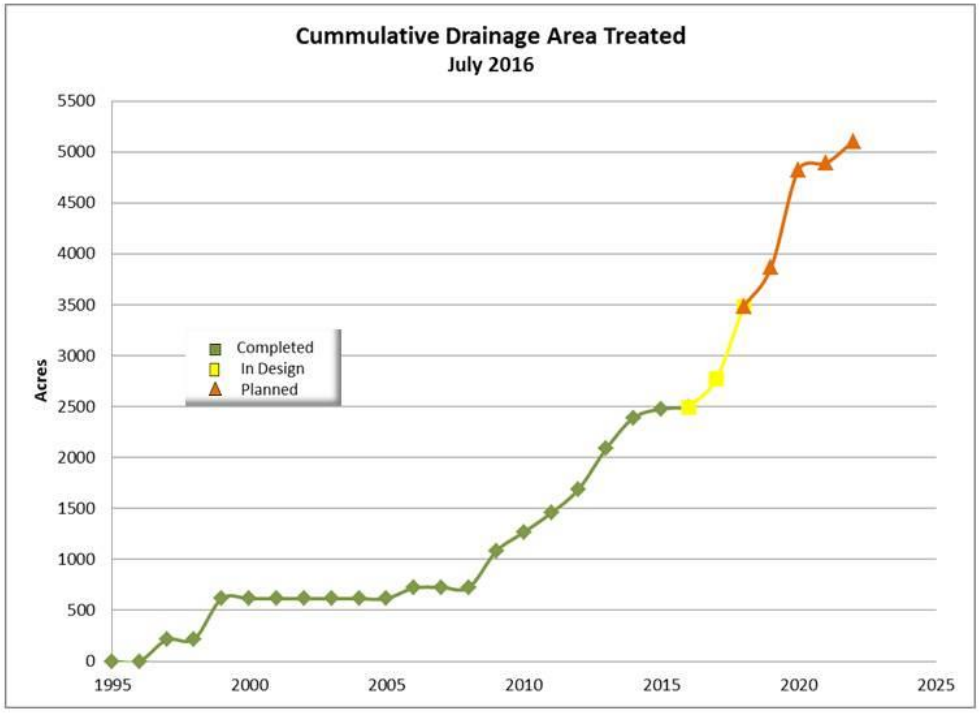


Figure 5: Drainage Area Acres Treated for Constructed, Under Design, and Planned Projects

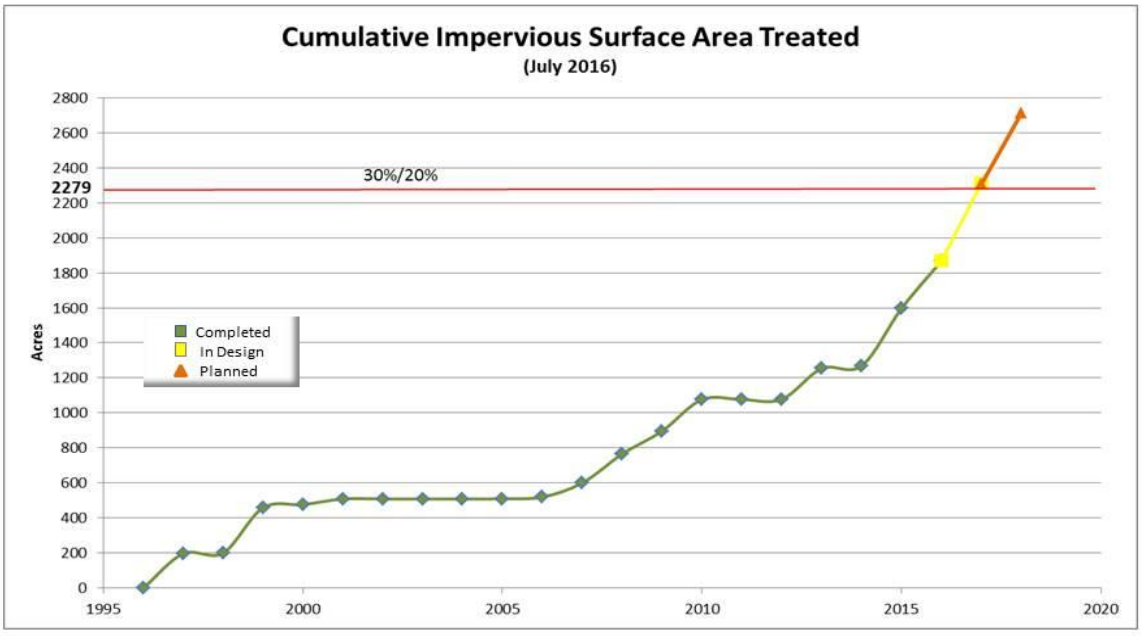


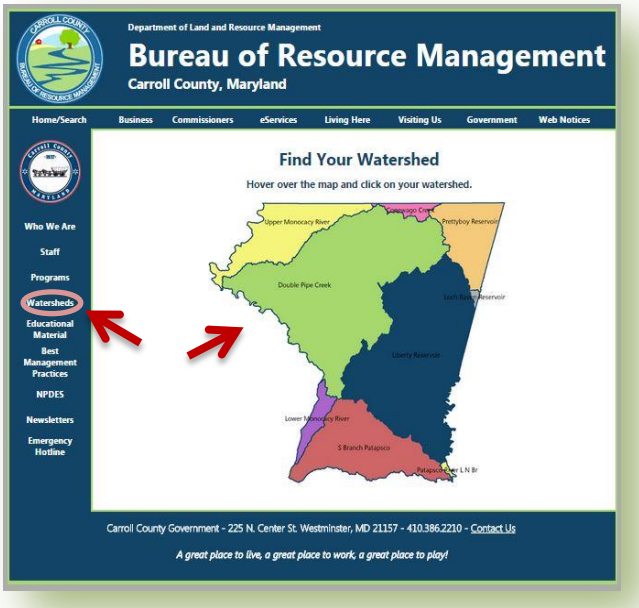
Figure 6: Impervious Surface Acres Treated for Constructed, Under Design, and Planned Projects

3. Public Participation

The process to develop a restoration plan is divided into two main components: the watershed assessment and the restoration plan. At the beginning of the process, every landowner whose property is crossed by a stream is mailed details regarding the assessment and what it involves. Property owners are requested to respond by returning a postcard to indicate if they will voluntarily participate by allowing staff to access their property. Many property owners even participate in the actual stream walk with staff. Staff employs additional means to contact property owners who haven't responded, but whose properties may be able to fill important gaps in the corridor.

The 2016 assessment focused on the Double Pipe Creek Watershed. Property owners granted permission for access to 266 of the 514 stream miles (52%). Due to the cooperation of private landowners, as of June 2016, watershed assessments were achieved in all nine 8-digit watershed basins within the county, assessing over 786 of the 1,464 (54%) stream miles within the County.

For information regarding each individual watershed, please visit the BRM's webpage at http://ccgovernment.carr.org/ccg/resmgmt/, and click on the "Watersheds" tab on the left side of the page or click on the "Watershed of Interest" on the map.



The conditions found during each SCA are summarized in a watershed assessment document. It provides a general summary of the conditions found, including erosion, buffer type/width, etc., as well as related statistics. The completed SCA documents are available to view or download on the BRM webpage under the "Watersheds" tab or by clicking directly on the "Watershed of Interest" on the map (http://ccgovernment.carr.org/ccg/resmgmt/).

Property owners found to have inadequate buffers are sent a letter encouraging them to participate in the County's Stream Buffer Initiative. This initiative is completely voluntary; participating landowners must be willing to grant access to their property for ground preparation, planting, and maintenance of the planting. During the planning phase, staff meets with interested landowners to discuss potential planting areas. Landowners are provided with a native tree species list, which allows them to select the native trees they prefer to be planted on their property. Establishing streamside buffers offers many benefits, including sediment filtration, excess nutrient removal, stream bank stabilization, temperature regulation, and wildlife corridor establishment as well as one-on-one educational opportunities.

4. TMDL Compliance

Carroll County continues to aggressively and consistently pursue measures to improve water quality and work towards meeting applicable stormwater WLAs. The County fully supports achieving pollutant load reductions through strong fiscal commitments, staff resources to implement the stormwater program, and coordination between co-permittees. The County's fiscal expenditures and capital budgeting – historical, current, and planned – demonstrate the implementation of this commitment. The County achieved the impervious mitigation goal of the third generation permit and is working toward meeting the fourth generation permit's impervious area restoration requirement as well. This progress demonstrates the County's aggressive implementation toward meeting these goals.

In addition to 82 percent of the untreated impervious area restored to date, the County tracks and documents pollution load reductions from all completed structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives. **Table 12** provided a detailed list of completed projects and associated pollutant load reductions demonstrating progress toward the TMDL WLAs. Annual TMDL assessments to evaluate the effectiveness of the County's restoration plans and how these plans are working toward achieving compliance with EPA-approved TMDLs will be reported following approval of the restoration plans for the individual watersheds. Attachment B of the County's permit lists the EPA-approved TMDLs for Carroll County.

In addition to nutrient and sediment TMDLs, Attachment B of the County's permit includes TMDLs for mercury. Based on MDE's *Guidance for Developing a Stormwater Wasteload Allocation Implementation Plan for Mercury Total Maximum Daily Loads* (May 2014), atmospheric deposition is the major loading source to mercury-impaired waters in Maryland, primarily originating from power plants. While urban stormwater conveyance systems transport the atmospherically deposited mercury downstream, the impervious surfaces and conveyance systems are not the source. Due to this source of anthropogenic mercury, the guidance document indicates that the majority of TMDL- and WLA-required mercury load reductions are expected to occur at the state and federal level.

The list of EPA-approved TMDLs for Carroll County, found in Attachment B of the permit, also includes bacteria. MDE's *Guidance for Developing a Stormwater Wasteload Allocation Implementation Plan for Bacteria Total Maximum Daily Loads* (May 2014) does not provide quantifiable methodology for tracking and measuring bacteria pollutant load reductions. However, in Carroll County, both bacteria and mercury load reductions will primarily be addressed through the measures and BMPs implemented to address nutrient and sediment TMDLs in the county. Carroll County's primary approach to stormwater retrofits is the use of enhanced infiltration and filtration. This strategy optimizes removal of mercury and bacteria. Therefore, while not strictly quantifiable, this approach provides enhanced removal of these constituents.

More specific details for non-nutrient and non-sediment TMDLs are included in the restoration plans for each individual relevant watershed currently under review with MDE.

The County fully supports its stormwater program through strong fiscal commitments, staffing resources to implement the program, and coordination between co-permittees. The County's fiscal expenditures and capital budgeting – historically, currently, and planned – demonstrate the implementation of this commitment. The co-permittees further demonstrate the commitment to achieve the impervious restoration requirement and other provisions and requirements contained in the permit through the MOA signed by all co-permittees. This MOA obligates funding for the capital costs to meet the permit's impervious restoration requirements associated with the municipalities, as well as overall administrative support by the County.

Carroll County's annual operating expenditures for this program have more than doubled since 2008, from approximately $334,000 annually, to more than $1.1 million annually. From July 2005 to June 2016, the County invested more than $15 million. Over $9 million has been awarded from outside sources (DNR, SHA, and Chesapeake Bay Trust) through grant funding. Additionally, $21.32 million has been reserved for watershed restoration efforts in the Community Investment Program (CIP) for FY 2017 through FY 2022.

For the 14-year period from 2008 to 2021, Carroll County will invest more than $11.0 million in operating expenses, and more than $46.2 million will be available for capital expenditures, for a grand total of $57.2 million – assuming that the County receives no additional grants. Average annual expenditure for the 14-year time period would equal approximately $3.3 million, with the average amount budgeted per year from FY 2017 to 2022 increasing to $3.5 million.

Details required by the permit for net change in pollutant loads, costs for completed projects, and cost estimates for planned projects and programs for meeting applicable stormwater WLAs will be addressed and referenced in the individual watershed restoration plans.

F. Assessment of Controls

1. Introduction

Purpose

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

The discharge characterization is implemented through the Assessment of Controls (Part IV.F.) of the permit, which delineates specific data collection and analysis efforts to be undertaken. Carroll County has been collecting data in support of this program component since August 2000 downstream of the stormwater management facility associated with the Air Business Center just north of Westminster. This stormwater management facility was originally constructed as a wet

pond in 1979 and was retrofitted as a wet pond with forebay to provide water quality, recharge volume, and channel volume protection in 2008.

Study Area and Requirements

The discharge characterization is completed in a first order stream that is a tributary to the West Branch of the North Branch Patapsco River. The location of the watershed where monitoring is conducted within the county is shown in **Figure 7**, while the location of the monitoring stations and other watershed features are shown in **Figure 8**. The study area is located near the topographic divide separating the eastern and western piedmont physiographic provinces. As shown in **Figure 7**, 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. The stream receives the majority of water from the pond, with contribution from overland flow from the drainage basin during precipitation events. A new stormwater management pond at the West Branch Trade Center has been constructed adjacent to and east of the Air Business Center stormwater management facility. This facility drains to the stream, just downstream of the outfall station.

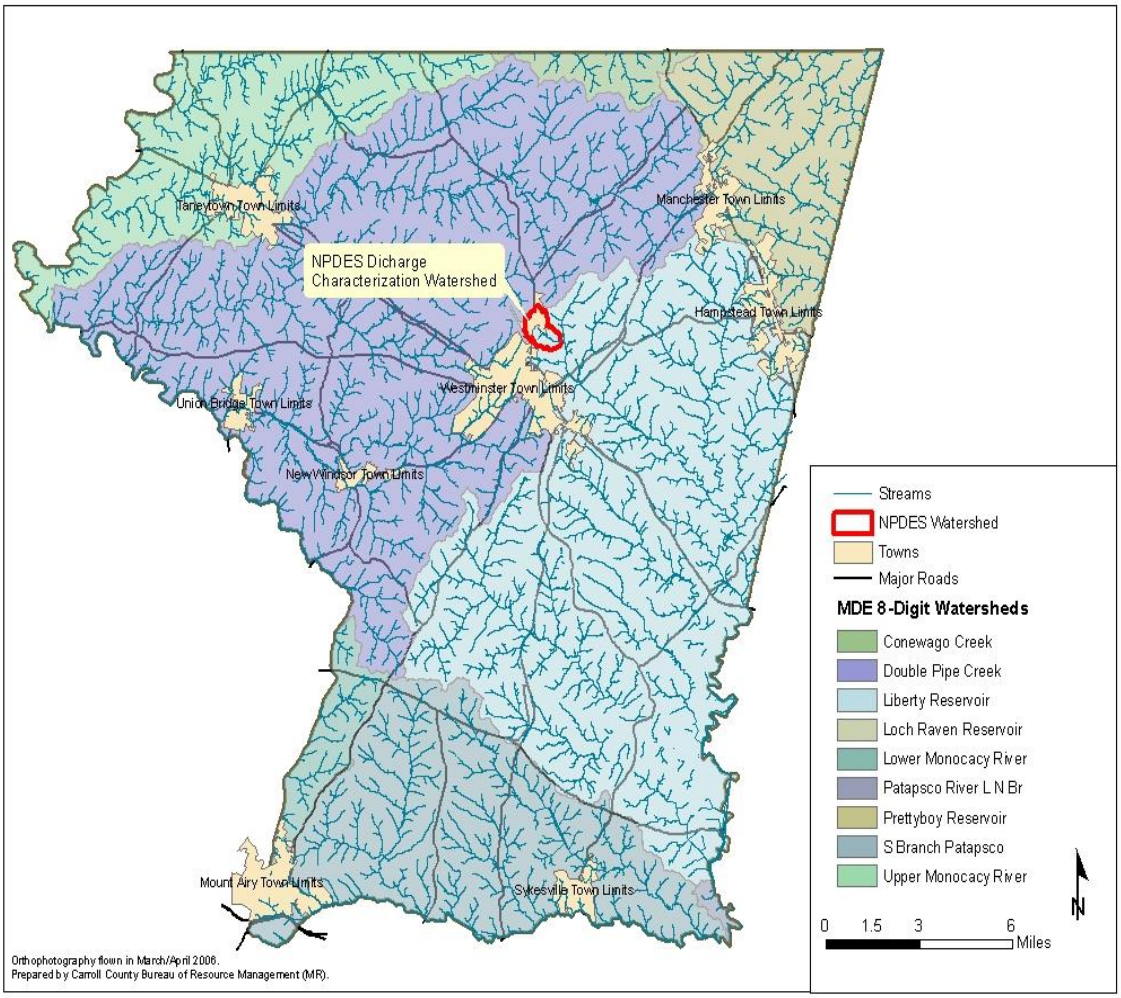


Figure 7: Carroll County NPDES Discharge Characterization Location

Program Elements

The discharge characterization consists of three primary data collection efforts to assess the effectiveness of the stormwater controls on stream health: physical monitoring, chemical monitoring, and biological monitoring. These data are collected at the two monitoring stations shown in **Figure 8** where the cumulative effects of watershed restoration efforts can best be assessed.

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 stream habitat assessment for assessing areas of aggradation and degradation; and

- Analysis of the effects of rainfall discharge rates, stage, and continuous flow on geometry (if needed).

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

- Samples of 8 storm events at each monitoring location, with at least 2 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.

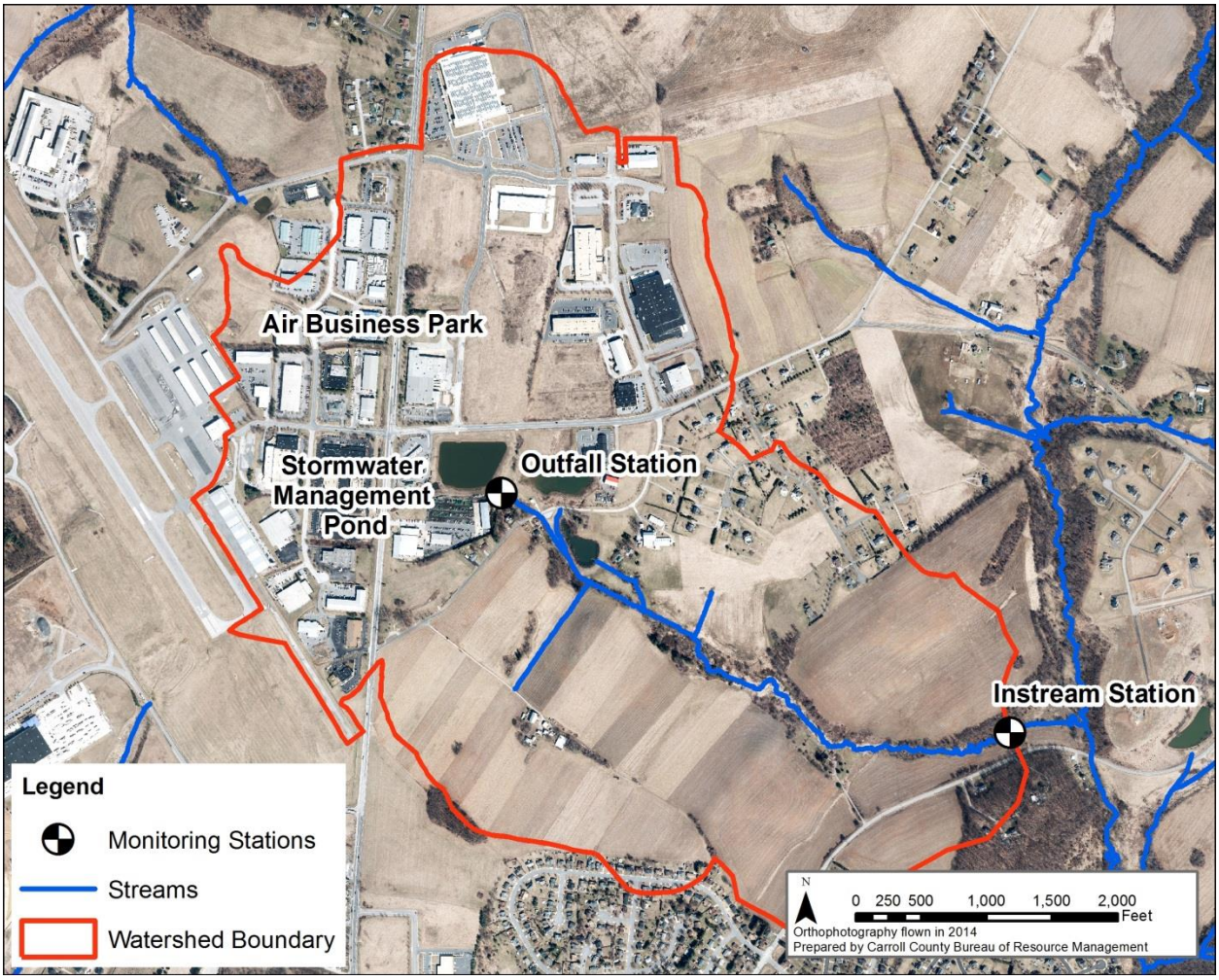


Figure 8: NPDES Discharge Characterization Watershed

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

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

2. Data Collection and Analysis Methods

Climatological

The climate of Carroll County is characterized as temperate and moderately humid (Meyer and Beall, 1958). The 30-year average county temperature is 54° Fahrenheit (F) with monthly means ranging from 32°F in January to 76°F in July (NOAA, 2014). The 30-year average county precipitation is 43.4 inches with monthly means ranging from 2.5 inches in February to 4.3 inches in July (NOAA, 2014). Temperature data were collected from the weather station at the CCRA as in the previous reporting years. This station is operated by the Carroll County Government in accordance with National Weather Service Standards. Precipitation data, previously collected at the CCRA, were collected for this reporting period at the Westminster Waste Water Treatment Plant.

Hydrological

To understand the hydrology in the study watershed, continuous stream discharge data is necessary. Therefore, both monitoring stations are equipped with instrumentation to collect this continuous data. The outfall station has dedicated electric power and is equipped with an ISCO model 4250 flow meter and a model 3700 portable sampler. The instream 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 instream station consists of a stilling well, staff plate, and bubbler assembly which is part of the ISCO flow meter. The instrument converts the hydrostatic pressure required to maintain the bubble rate. This pressure is proportional to the stream stage. County staff regularly collects stage-discharge data to relate stage to discharge. The hydrology data collection at the outfall station consists of a dedicated stage/velocity meter anchored to the outfall pipe. The logging device uses Manning's equation and input from the sensor to convert stage to discharge. The pipe discharge stage is regularly checked to verify the instrumentation is functioning properly.

Flowlink Version 5.1 software by ISCO is used to complete hydrologic data analysis. Data collected at the monitoring stations are downloaded to a laptop computer via serial communication. New hydrologic data is appended to the existing data record for each station. The stream characterization data is exported from Flowlink to Microsoft Excel for most analyses.

Due to equipment malfunctions, stage-discharge measurements for one or both stations were unavailable at various times. Discharge was estimated during these times from several relationship models using the other station as a reference when available. Analogous storm events from periods with complete data were extracted to create relationship models with those

storm events that occurred during periods with missing discharge measurements. Relationship models were created for each limb of the analogous storm events and were then used to estimate stage-discharge of the paired storm event using the other station as the reference.

Geomorphological

During the spring of 2016, Carroll County conducted a geomorphologic assessment for the entire stream reach, from the outfall of the Air Business Park stormwater management facility, to the confluence with the West Branch of the Patapsco River. As required, survey points were again collected at the six permanent, monumented cross-sections determined to be representative of each stream reach. At each of these monumented cross-sections, the County survey department collected data for bank slope, toe, stream edges, channel bottoms, and tops.

The County survey crew continues to collect data at each of the 28 segments (approximately 200 foot intervals) along the same stream reach. The data collected for this effort are similar to the data collected at the 6 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 2 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.

Chemical

Carroll County continues to contract with Martel Laboratories, Inc., in Baltimore, Maryland, to conduct all of the sample collection and lab analyses of the 8 required events during the reporting year. The sampling program consists of a first flush component for total petroleum hydrocarbons, bacteriological constituents, and physical parameters as well as chemical parameters collected during each of the 3 storm limbs. **Table 13** includes the required parameters for laboratory analysis, the laboratory method, and the corresponding method reporting limit.

Table 13
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	SM 2510 B-97	1.0 µmhos/cm
Total Petroleum Hydrocarbons	EPA 1664	5.0 mg/L
Escherichia Coli	SM 9223 B-94	1.0 organisms/ 100mL
Limb Samples		
Nitrate/Nitrite Nitrogen	SM 4500NO3-H00	0.05 mg/L
Biological Oxygen Demand	SM 5210 B-01	2.0 mg/L
Total Copper	EPA 200.8	2.0 µg/L
Total Lead	EPA 200.8	2.0 µg/L
Total Zinc	EPA 200.8	20.0 µg/L
Total Kjeldahl Nitrogen	SM 4500NH3 C-97	0.5 mg/L
Total Phosphorus	SM 4500P-P E-99	0.01 mg/L
Total Suspended Solids	SM 2540 D-97	1.0 mg/L

The County continues to use the same type of storm event monitoring equipment manufactured by ISCO, Inc. to comply with this component of the County's NPDES permit. The instream 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 instream sampler is paced using an ISCO Model 4230 bubbler flow meter. Personnel from Martel Labs collected storm flow events, as in previous years, through November 2015, but County staff recently began storm event sample collection and continued baseflow sample collection. The flow monitoring and EMC calculation methods are the same as those used in previous reporting years. Martel Labs continues to send results via e-mail to the County where the new records are appended to the existing Microsoft Access database.

The event dates for this reporting year are shown in **Table 14.**

Table 14
2015 – 2016 NPDES Discharge Characterization Sampling Events

Event	Date	Instream Physical Water Data			Outfall Physical Water Data		
		pH	Water Temp (F)	Conductivity (µmhos/cm)	pH	Water Temp (F)	Conductivity (µmhos/cm)
2015-08	7/23/2015	8.3	61	290	8.38	76	220
2015-09	8/27/2015	9.4	58	280	10.1	70	230
2015-10	9/24/2015	7.97	55.9	210	7.95	65.5	340
2015-11	10/22/2015	7.02	49.8	300	7.07	54.7	310
2015-12	11/24/2015	7.43	42.4	280	7.81	44.2	230
2015-13	12/17/2015	*	*	290	*	*	270
2016-01	1/21/2016	9.9	36	260	7.98	35.4	250
2016-02	2/29/2016	*	*	510	*	*	850
2016-03	3/24/2016	7.69	49.5	460	7.94	50.5	910
2016-04	4/7/2016	7.42	51.8	*	8.16	41.3	*
2016-05	5/26/2016	7.52	63.3	390	8.15	67.3	470

* Multi-meter malfunction

Biological

Two monitoring sites corresponding to the Outfall and Instream stations have been characterized since the 2000 reporting period. The 75-meter sampling sites, shown in **Figure 9**, 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, macro-invertebrate identification, and analytical methods were in accordance with the Maryland Biological Stream Survey (MBSS) guidance manuals (Sampling Manual Field Protocols, 2014 (http://www.dnr.state.md.us/streams/pdfs/R4Manual.pdf). The County continues to contract with 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. An Index of Biotic Integrity (IBI) score was calculated using the criteria located in **Table 15.** These 6 criteria are rated a 1, 3, or 5 depending on the species present. The average of all criteria is considered the overall IBI score. Narrative ratings can be found in **Table 16.**

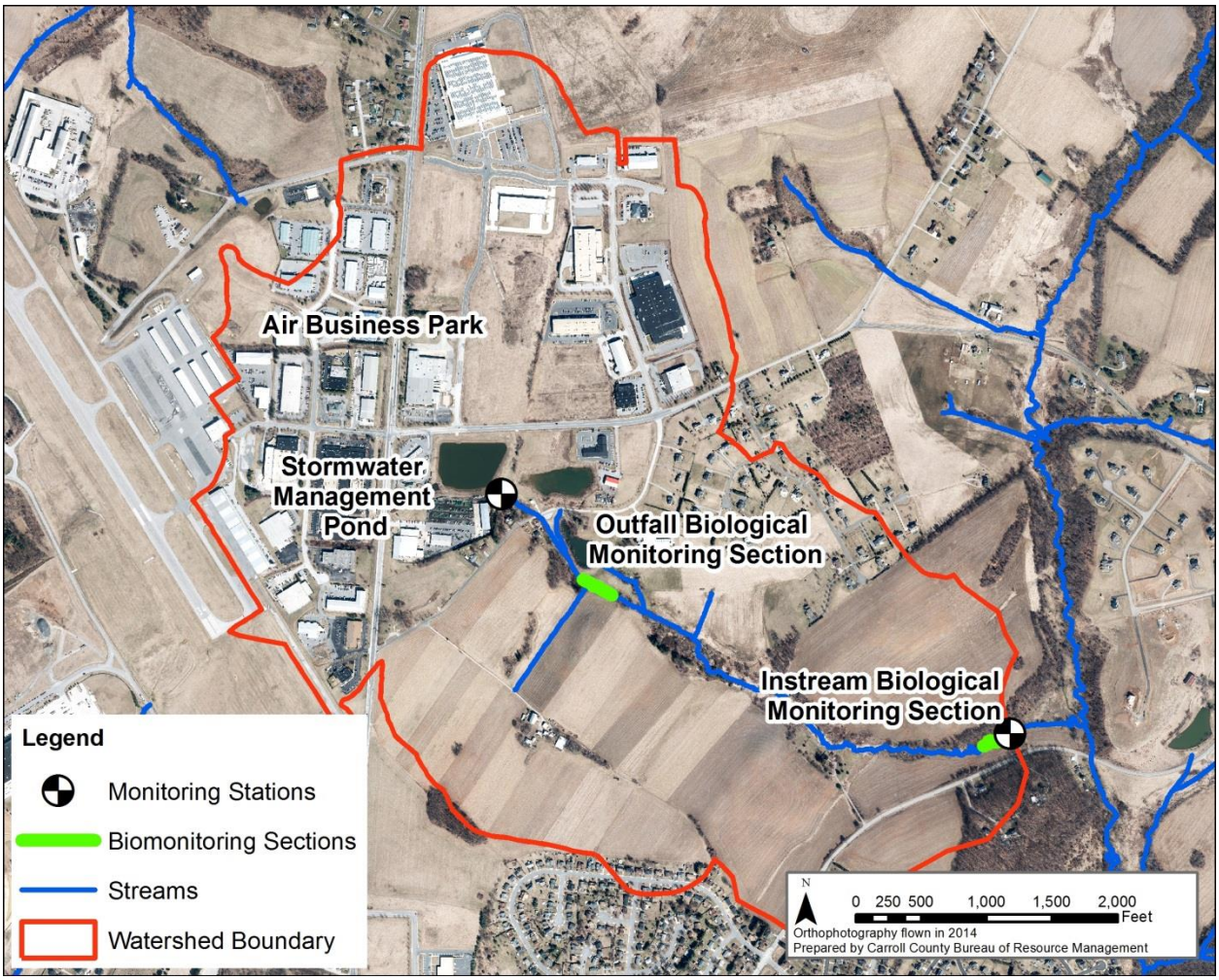


Figure 9: Biological Monitoring Station Locations

Table 15
MBSS Scoring Criteria for the Piedmont Region

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

Table 16
IBI Score Ranges and Corresponding Narrative Ratings

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

The assessment of spring habitat also utilized guidance from the 2014 MBSS Sampling Manual: Field Protocols. This approach is entirely subjective, and bias is often high with this approach, depending on the assessor(s) and other factors. The scoring criteria measures 8 parameters as shown in **Table 17**. Each parameter can be scored a maximum of 20 points for a total maximum score of 160 points. Each parameter is subdivided into narrative ratings of poor, marginal, sub-optimal, and optimal.

Table 17
MBSS Habitat Assessment Criteria
(MBSS Sampling Manual Field Protocols, 2014)

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

3. Results and Discussion

Climatological

Monthly precipitation data for the 2015 – 2016 reporting year are summarized in **Figure 10**. Also included for reference are 30 year monthly averages and monthly high and low extremes from the previous 26 years for which local data are available. The total precipitation for the reporting period was 43.75 inches, a 0.35-inch surplus from the normal yearly total. Relative to normal monthly average precipitation, February 2016 was the wettest month with a surplus of 1.77 inches, while August 2015 was the driest month with a deficit of 2.67 inches. This reporting year was the median year for total precipitation since reporting began at this station in 2000.

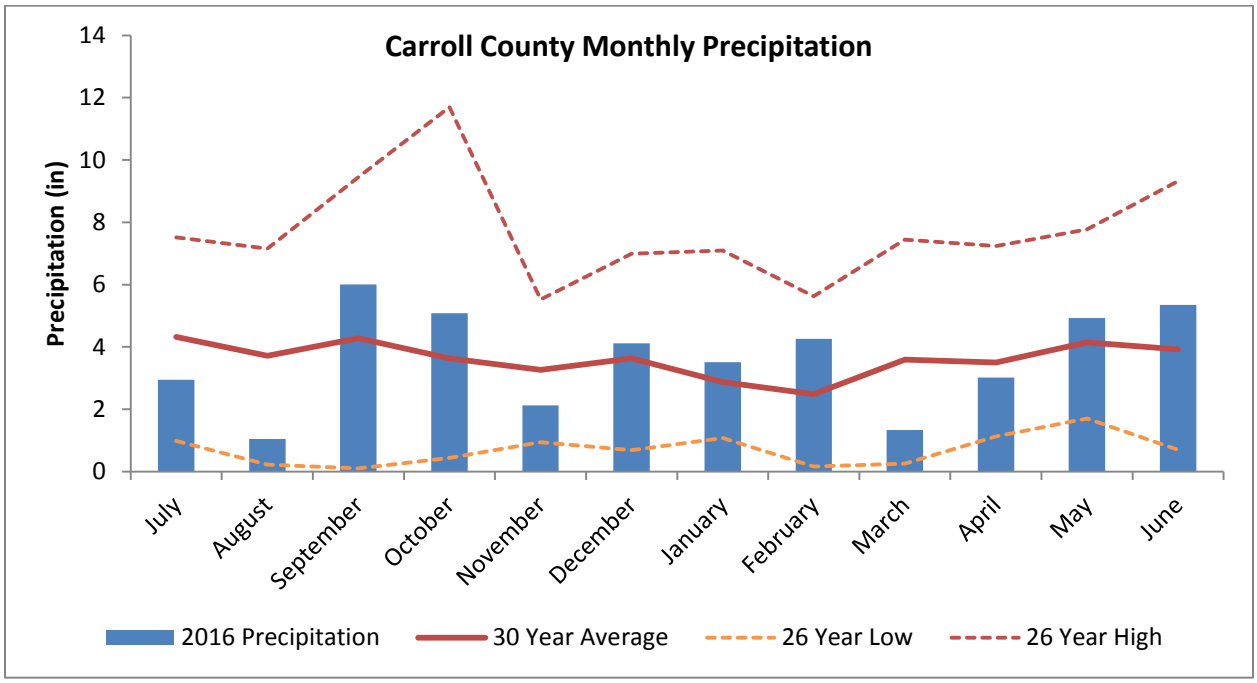


Figure 10: Monthly Precipitation Summary for the 2015 – 2016 Reporting Period

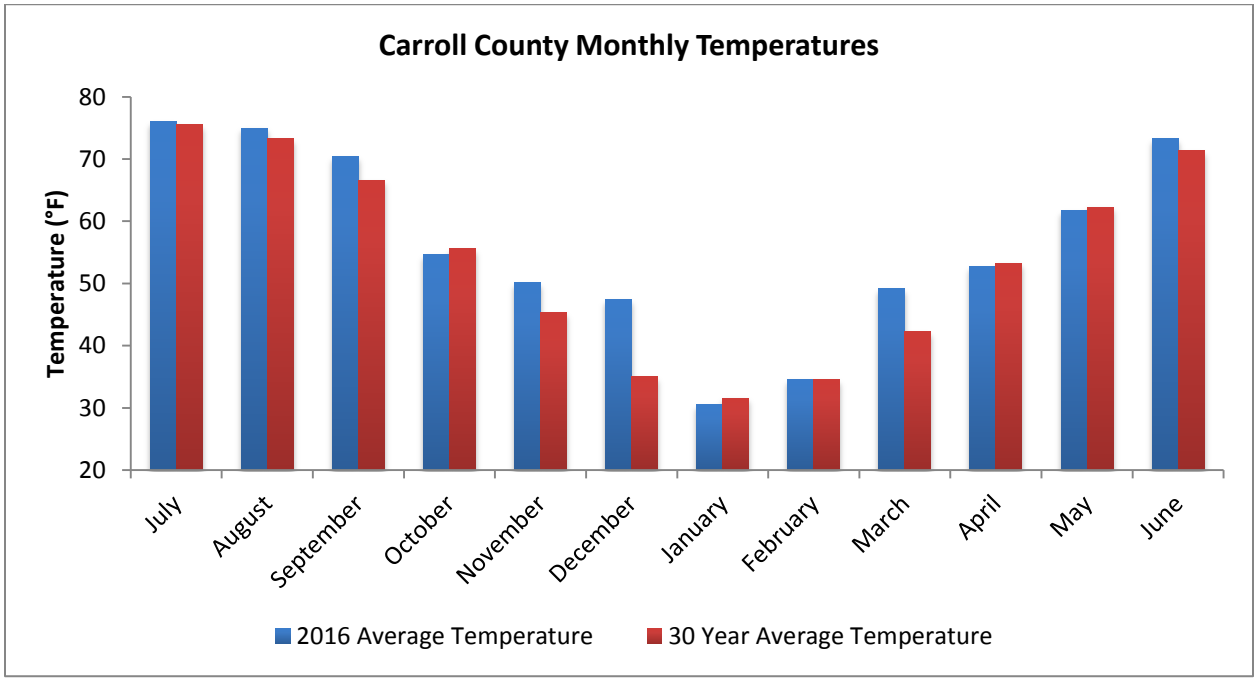


Figure 11: Monthly Temperature Summary for the 2015 – 2016 Reporting Period

Monthly temperature data for the 2015 – 2016 reporting year are summarized in **Figure 11**. The 30 year monthly average temperatures are included for reference. Overall, the reporting period experienced an annual average temperature of 56.3°F, 2.4 degrees cooler than the 30 year annual

average. Five of the 12 months were cooler than average, with those months averaging only 0.7 degrees cooler than normal. Seven of the 12 months were warmer than average, with those months averaging 4.6 degrees warmer than normal. December 2015 in particular was significantly warmer than normal, with a 12.3 degree increase from normal temperatures.

Hydrological

Hydrographs have been prepared for stage height and discharge for each monitoring station during the reporting period. Instream and outfall stage heights and discharge measurements, in addition to daily precipitation totals, are shown in **Figures 12 and 13,** respectively. This reporting period had a surplus of 0.35 inches from a normal year and experienced a moderate frequency of storm events.

Storage by the stormwater facility results in peak stage heights less than 0.6 feet at the outfall station except for the storm event on September 29-30, 2015, when more than 2.5 inches of precipitation was recorded. The stage reached peak height at close to 1 foot with a maximum discharge of 6,607 gallons per minute (gpm). Baseflow at the outfall monitoring station was marginal, typically with a stage height of 0.11 feet. The resulting baseflow discharge was approximately 64 gpm.

Typical stage heights observed for the instream monitoring station were approximately 0.38 feet, or 353 gpm. During the October 27-28, 2015, and February 24, 2016, storm events, stage height reached the peak for the reporting year at almost 1.9 feet. The resulting discharge was 19,000 gpm. There were 4 other storm events during this time where stage heights above 1 foot (6,600 gpm) were observed. These occurred on September 30, 2015, December 23, 2015, February 3, 2016, and February 16, 2016, with stage heights of 1.28, 1.07, 1.64, and 1.39, respectively.

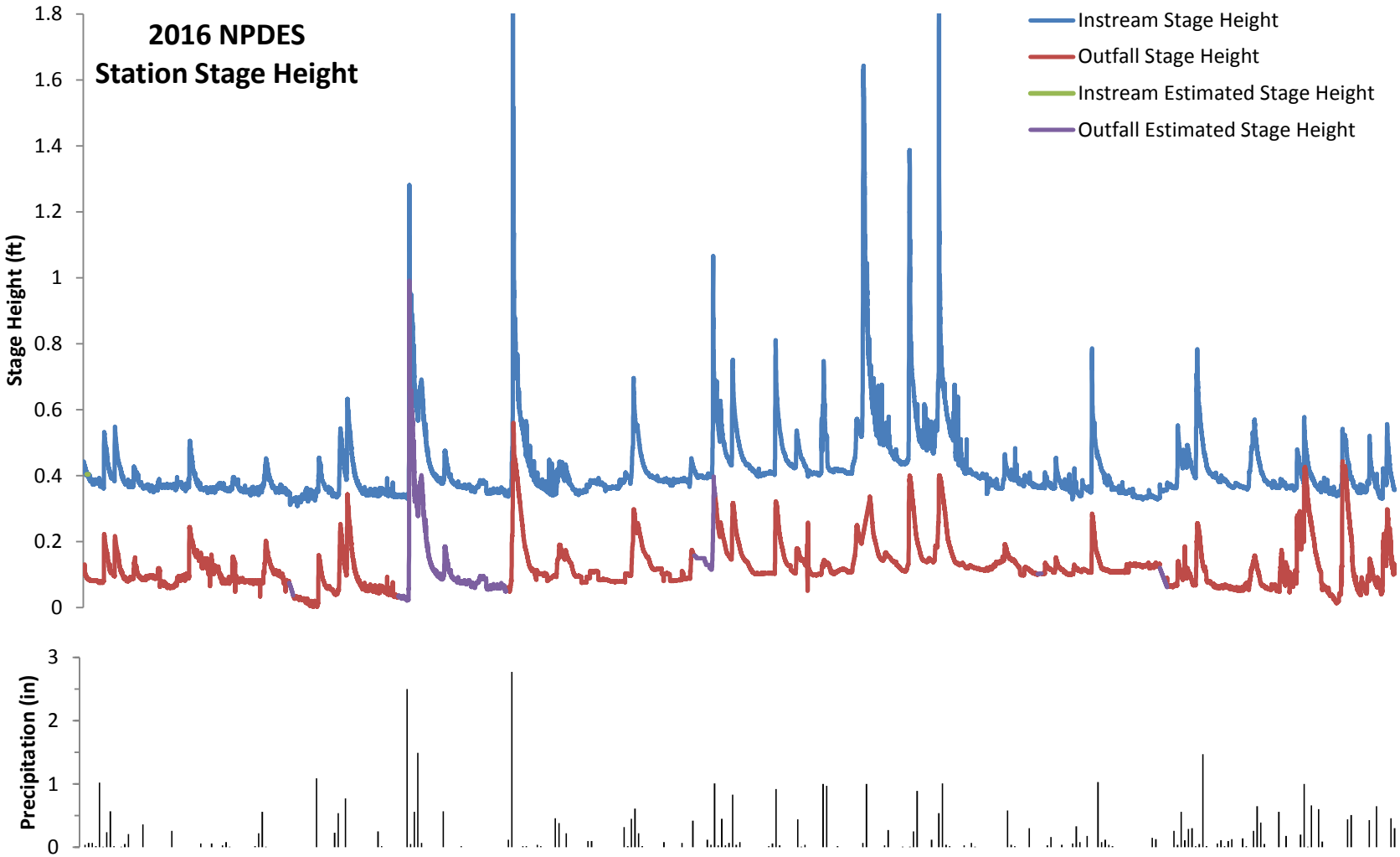


Figure 12: Stage Heights and Daily Precipitation for NPDES Monitoring Stations for the 2016 Reporting Year

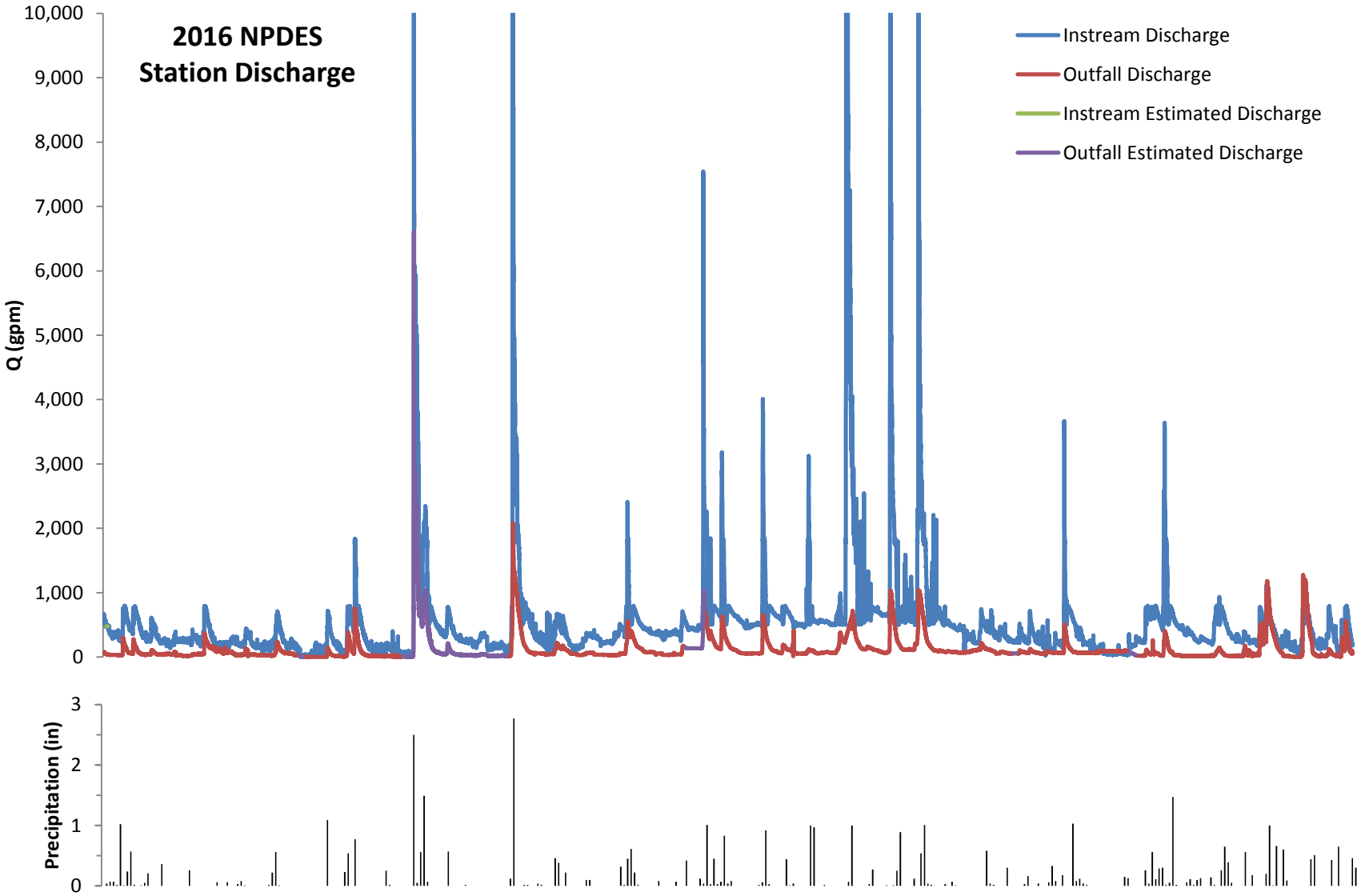


Figure 13: Discharge and Daily Precipitation for NPDES Monitoring Stations for the 2016 Reporting Year

Total, seasonal, and categorical discharges for each monitoring station can be found in **Table 18**. Overall, only 24 percent of the discharge from the instream station was contributed from the stormwater pond (outfall station). The total discharge from the instream station during this reporting year was approximately 280 million gallons, with 66 million gallons being contributed in total discharge from the outfall station. About 40 percent of the total discharge occurred during the winter months. The ratio of outfall to instream discharge moved between 30 and 17 percent, depending on the season, with higher contribution from the outfall station occurring in spring.

Please note that stage heights and discharges from both stations were periodically estimated. These data were lost due to equipment failure.

Table 18
Categorical Discharges and Stage Heights for the 2016 Reporting Year

	Instream	Outfall	Difference	Outfall Contribution (%)
Total (gallons)	280,153,180	65,790,824	214,362,356	24
Avg Stage (ft)	0.42	0.12	0.29	-
Median Stage (ft)	0.38	0.11	0.27	-
Avg Q (gpm)	533	125	408	24
Median Q (gpm)	353	64	289	18
Spring Q (gallons)	47,406,269	14,389,601	33,016,668	30
Summer Q (gallons)	43,099,336	11,314,494	31,784,842	26
Autumn Q (gallons)	76,449,619	20,556,739	55,892,881	27
Winter Q (gallons)	113,197,955	19,529,990	93,667,965	17
Dry (<700gpm)	148,948,854	34,161,962	114,781,892	23
Wet (>700gpm)	131,209,326	31,628,862	99,580,464	24

To compare pre- and post-pond retrofit hydrology, cumulative discharge frequency was plotted in **Figure 14**. This figure compares the discharge frequencies from the outfall monitoring station for the 2007 and 2016 reporting years. The maximum discharge during the pre-retrofit period (2007) was an order of magnitude higher than the post-retrofit period (2016). The maximum discharge in 2007 was 23,537 gpm, while the maximum in 2016 was only 6,607 gpm. This maximum value has been estimated due to equipment failure at the time of the storm event; the maximum known discharge was 2,608 gpm. Additionally, the frequency and magnitude of high discharge events was greater during the pre-retrofit period. A total of 71 percent of all discharge measurements were below or equal to 100 gpm. This contrasts with the pre-retrofit measurements where only 23 percent of measurements were below 100 gpm. Ten percent of all measurements in 2007 were greater than 2,000 gallons per minute, which are greater in magnitude than most of the highest discharges from 2016.

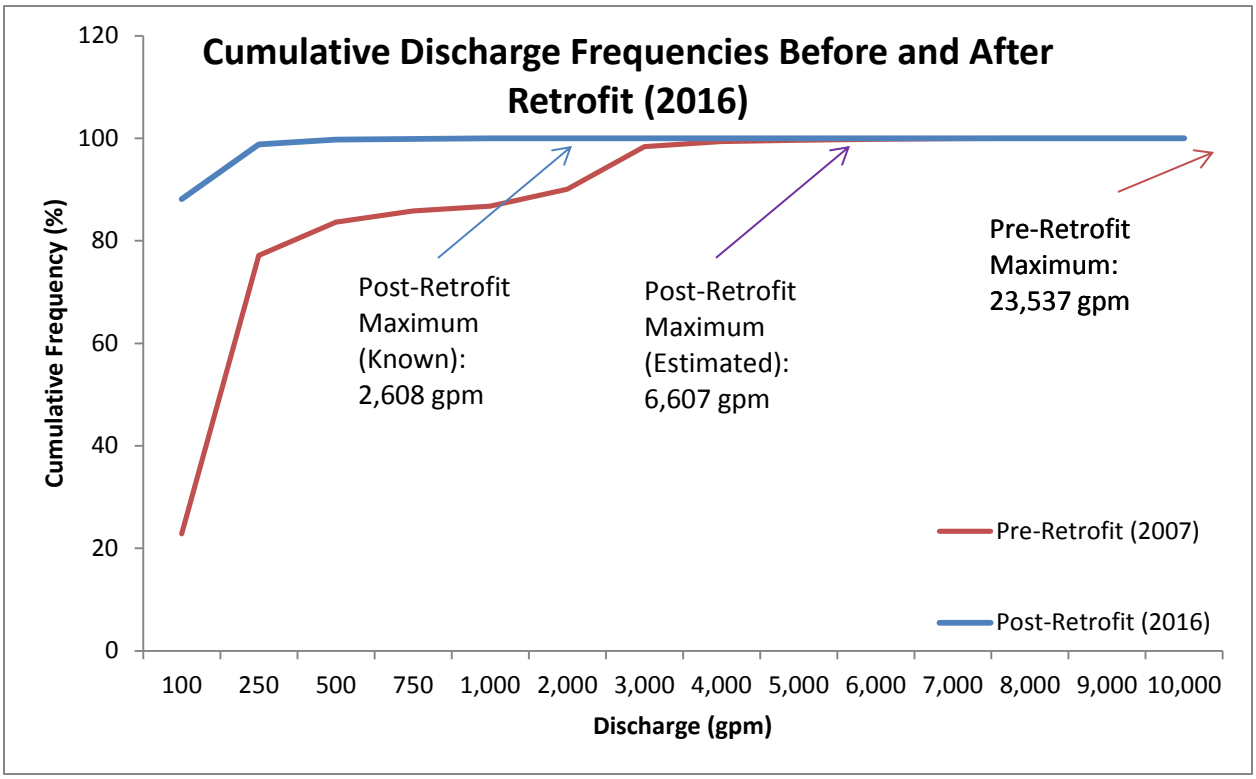


Figure 14: Outfall Discharge Frequencies for 2007 and 2016

Looking at individual components of the hydrograph allows one to observe the distinct mechanism behind any changes in cumulative frequencies throughout the year. **Figure 15** represents 2 analogous storm events, one before and one after the stormwater retrofit, and a hydrological comparison therein. This figure contains hydrographs before and after retrofit for instream and outfall stage heights and discharges. Unlike previous years, which compared storm events with nearly identical precipitation totals, this comparison is of a significantly larger storm event to the same pre-retrofit storm.

The pre-retrofit event had 0.39 inches of precipitation observed while the post-retrofit event had 1.03 inches of precipitation observed. Despite the higher precipitation total and intensity, the ascending limb for the post-retrofit outfall station still had a lower slope and peak discharge than the hydrograph of the pre-retrofit outfall station with a smaller storm event. The outfall to instream station discharge ratio for the post-retrofit storm event maintained a ~27 percent contribution, as was roughly the case for the overall discharge and separated stormflow for the reporting period. During the pre-retrofit storm, however, the outfall station contributed ~70 percent of the total instream discharge. The lesser contribution during the post-retrofit storm event is evident in the instream station hydrographs. The post-retrofit storm event at the instream station has a higher volume discharged than that of the pre-retrofit storm, even with less volume discharged from the outfall station. The period of baseflow recession after the storm event was much shorter during the pre-retrofit storm as well. Overall, longer baseflow recessions and lower peak discharges were observed with the current stormwater configuration.

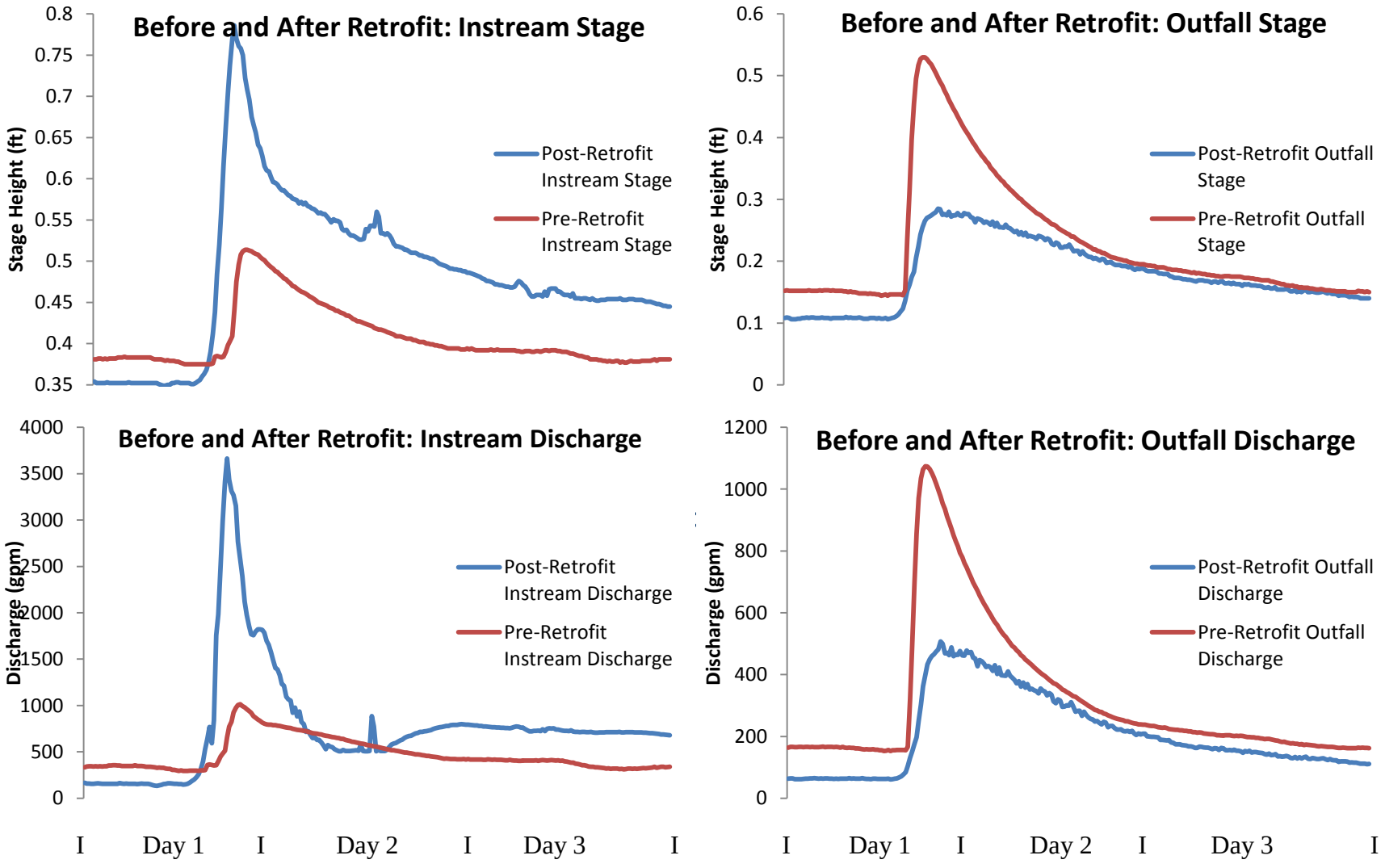


Figure 15: Characteristics of Analogous Storms Pre-Retrofit (7/23/2006, 0.39") and Post-Retrofit (4/7/2016, 1.03")

Geomorphological

The physical stream assessment consists of evaluating the 6 monumented cross-sections and 28 sections for stream physical character, shape, and slope. Physical data collection stations are shown in **Figure 16**.

Results from this year's monumented cross-section data collection are provided in Appendix D. 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 6 permanent cross-sections with results from 2000, the initial year this type of monitoring was initiated.

There does not appear to be large scale degradation or aggradation of the stream channel in the last 16 years. At the first cross-section, located approximately 500 feet downstream of the pond outfall, the left bank has moved approximately 2 to 3 feet to the west, but has not experienced any down-cutting. Aggradation along the right edge was observed at this location, and it now has a much steeper bank. This section is located approximately 200 feet downstream of a road culvert, and just upstream of the input location from the West Branch Stormwater Management Pond.

Cross-sections 2 and 3 are still generally unchanged since 2000, with only minor changes in stream channel shape. Located approximately 65 feet downstream of a series of bends and 2 draws, cross-section 4 has shown relatively significant aggradation of the channel since 2000. The channel bottom and associated floodplain have been elevated by almost one foot since 2000. In the past year, the channel bottom has moved slightly cutting the left bank. This aggradation explains the reduction of stream gradient from approximately 1 percent to 0 percent over the previous 10 years. Cross-section 5 is essentially unchanged since 2000; however, the channel has widened, relative to 2000 and 2015, over the previous year.

Consistent with past findings, analysis at monumented cross-section 6 indicates that the stream channel has widened by 4 feet since 2000, extending from a width of 5 feet to a width of 9 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 (USDA, 1969).

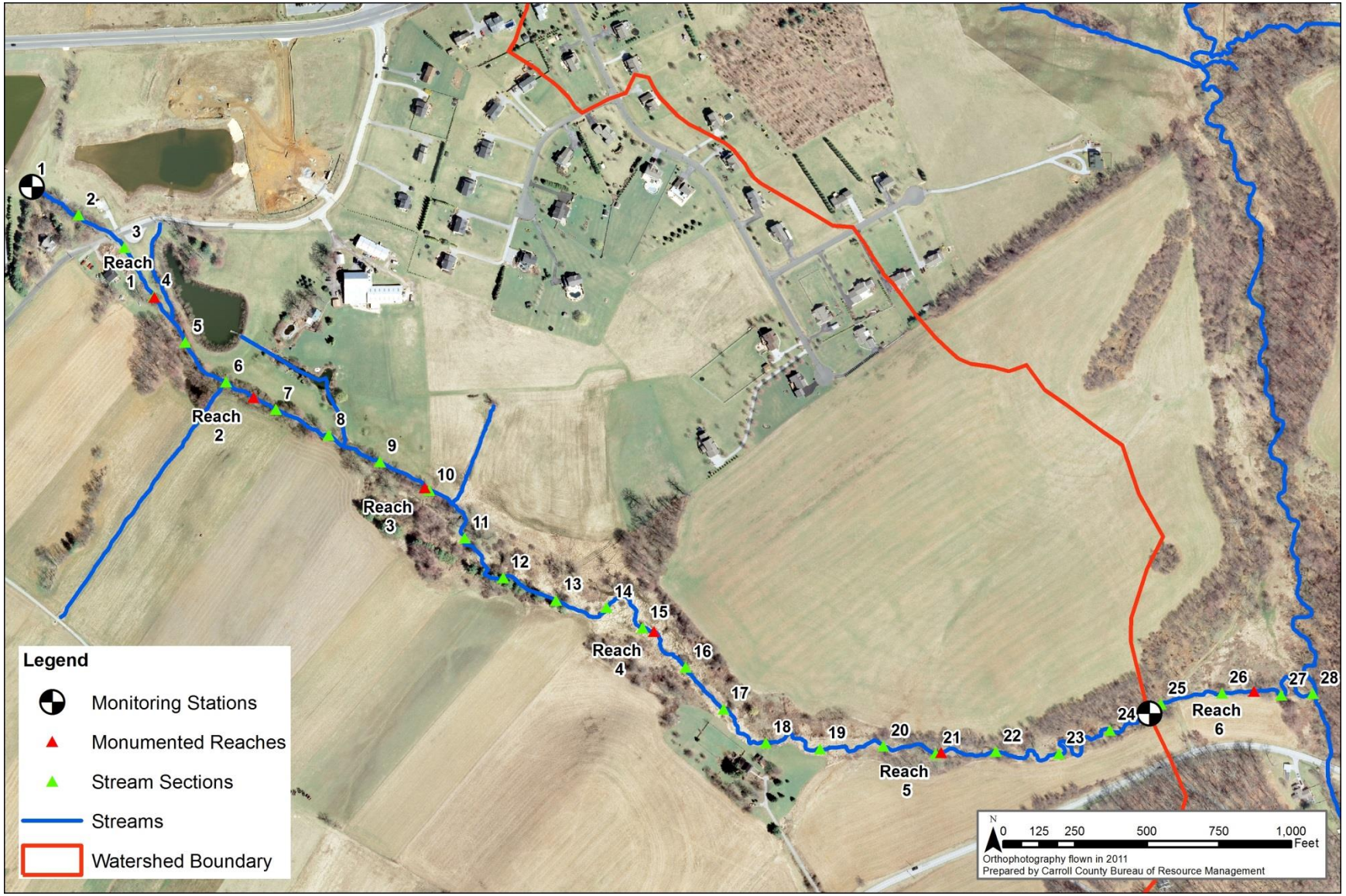


Figure 16: Physical Data Collection Stations

Table 19 displays thalweg elevation and section gradient for selected years from 2004 through 2016. One notable observation from the table is the low gradients found in the center section of the tributary. This observation coincides with the section 4 stream survey which discovered locally significant sediment deposition from year to year, which one would expect to find in an area with low gradients.

Figure 17 displays stream gradients from the current reporting year (2016), 2015, and 2004 as a longitudinal profile along with the locations of the 6 monumented stream reaches. The overall average gradient has remained unchanged over this period and has remained a gentle slope with only one section above a 2 percent gradient, but some individual sections have changed significantly. In general, increases in gradient between stations are indicative of higher energy and potential for increased channel scour. The first third of the stream profile has remained relatively unchanged during this period, but the gradient is generally higher than that of the final two thirds of the tributary. This can be seen in the survey of monumented section one where the stream channel has moved laterally approximately 2 to 3 feet over this period. The gradient has changed significantly over the second third of the stream profile and ranges from -0.11 percent to 1.07 percent. These ever-changing low gradients can explain why there is so much deposition at monumented section 4 which has roughly a flat gradient. The final third of the stream profile changes gradient a number of times, but slopes are relatively similar for 2016 and 2004. The slope at station 22 has a decreasing gradient while station 24 has an increasing gradient over time.

Figure 18 displays the longitudinal stream profile for elevation and depth of deposition or incision at each of the 28 sections along the profile. Included are the 6 monumented reaches for reference. The profile shows the low gradients in the center section of the stream and that the areas with lowest gradient have moved down stream, causing elevated deposition at monumented reach 4. Aggradation and degradation are most significant in the center section of the stream. Elevation change during the past 10 years has not exceeded 1 foot at channel bottom. However, since the stream has 2 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.

Table 19
Cross-Section Station Results for Selected Years 2004 - 2016

		2016		2015		2012		2010		2008		2006		2004	
Station	**Distance (ft)**	**Elev**	**Slope**	**Elev**	**Slope**	**Elev**	**Slope**	**Elev**	**Slope**	**Elev**	**Slope**	**Elev**	**Slope**	**Elev**	**Slope**
1	0							730.89		730.89		730.68		730.89	N/A
2	201	728.13		728.12		728.04		728.01	1.43%	728.01	1.43%	727.83	1.42%	727.90	1.49%
3	394	725.03	1.61%	724.68	1.78%	724.73	1.72%	724.58	1.78%	724.56	1.79%	724.26	1.85%	724.20	1.92%
4	592	721.75	1.66%	721.87	1.42%	721.86	1.45%	722.06	1.27%	721.49	1.55%	721.30	1.50%	721.51	1.36%
5	786	718.09	1.88%	718.02	1.98%	717.91	2.03%	717.78	2.20%	717.81	1.89%	717.77	1.81%	717.75	1.93%
6	988	716.14	0.97%	715.85	1.07%	715.84	1.03%	716.73	0.52%	716.61	0.59%	716.27	0.74%	715.82	0.96%
7	1184	715.79	0.18%	715.59	0.13%	715.55	0.15%	715.58	0.59%	715.70	0.46%	715.60	0.34%	715.49	0.17%
8	1388	714.47	0.65%	714.14	0.71%	714.18	0.67%	714.28	0.64%	714.24	0.72%	714.30	0.64%	714.42	0.52%
9	1589	712.97	0.75%	712.94	0.60%	712.89	0.64%	712.80	0.74%	712.78	0.73%	712.83	0.73%	712.74	0.84%
10	1787	711.22	0.88%	711.17	0.89%	711.40	0.75%	711.59	0.61%	711.66	0.57%	711.20	0.82%	711.22	0.77%
11	1986	709.63	0.80%	709.93	0.62%	710.28	0.56%	709.93	0.84%	710.06	0.81%	709.58	0.82%	709.61	0.81%
12	2189	709.39	0.12%	709.44	0.24%	709.32	0.47%	709.16	0.38%	709.58	0.24%	709.02	0.28%	709.48	0.06%
13	2386	708.66	0.37%	708.52	0.47%	708.61	0.36%	708.46	0.35%	709.04	0.27%	709.81	-0.40%	709.45	0.02%
14	2564	708.54	0.07%	708.55	-0.02%	708.30	0.18%	708.17	0.16%	707.88	0.66%	707.94	1.06%	707.74	0.97%
15	2707	707.42	0.78%	707.43	0.78%	707.45	0.59%	707.02	0.80%	707.06	0.57%	707.07	0.61%	706.81	0.65%
16	2910	705.44	0.97%	705.19	1.10%	705.58	0.92%	705.44	0.78%	705.55	0.74%	705.20	0.92%	705.18	0.80%
17	3106	704.16	0.66%	704.16	0.53%	704.64	0.48%	704.78	0.34%	704.48	0.55%	704.37	0.43%	704.18	0.51%
18	3298	703.65	0.26%	703.5	0.34%	703.43	0.63%	703.62	0.60%	703.27	0.63%	703.16	0.63%	702.94	0.64%
19	3490	701.74	1.00%	701.62	0.98%	701.85	0.82%	701.75	0.97%	701.48	0.93%	701.48	0.88%	701.69	0.65%
20	3704	699.12	1.22%	698.98	1.23%	699.07	1.30%	698.90	1.33%	698.92	1.19%	698.92	1.19%	698.99	1.26%
21	3896	697.80	0.69%	697.8	0.62%	697.74	0.69%	697.73	0.61%	697.69	0.64%	697.83	0.57%	697.95	0.54%
22	4100	695.57	1.09%	695.2	1.27%	694.91	1.39%	694.70	1.48%	694.78	1.42%	694.90	1.43%	694.62	1.63%
23	4320	694.18	0.63%	694.1	0.50%	693.92	0.45%	693.90	0.36%	693.73	0.48%	693.44	0.66%	693.42	0.54%
24	4511	691.14	1.60%	691.1	1.57%	691.04	1.51%	691.17	1.43%	691.10	1.38%	691.05	1.25%	691.12	1.21%
25	4717	689.47	0.81%	689.45	0.80%	689.31	0.84%	689.35	0.88%	689.41	0.82%	689.52	0.74%	689.65	0.71%
26	4933	687.45	0.94%	687.44	0.93%	687.38	0.90%	687.38	0.91%	687.59	0.84%	687.71	0.84%	687.59	0.96%
27	5137	685.78	0.82%	685.7	0.85%	685.47	0.94%	685.44	0.95%	685.45	1.05%	685.53	1.07%	685.82	0.87%
28	5248	683.13	2.38%	683.34	2.12%	682.93	2.28%	682.80	2.37%	682.70	2.47%	682.71	2.53%	682.83	2.68%

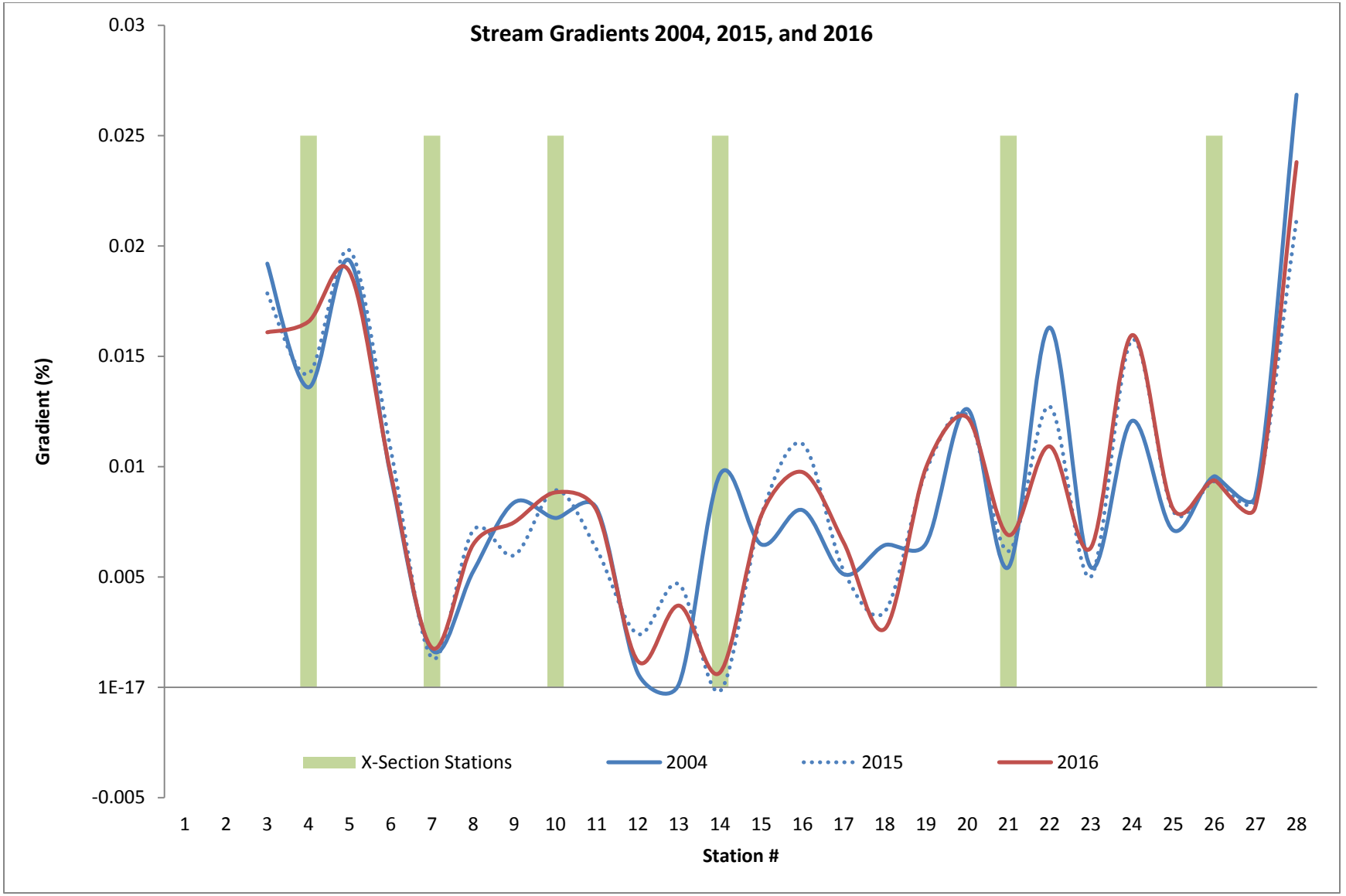


Figure 17: Stream Gradient Change from 2004, 2015, and 2016

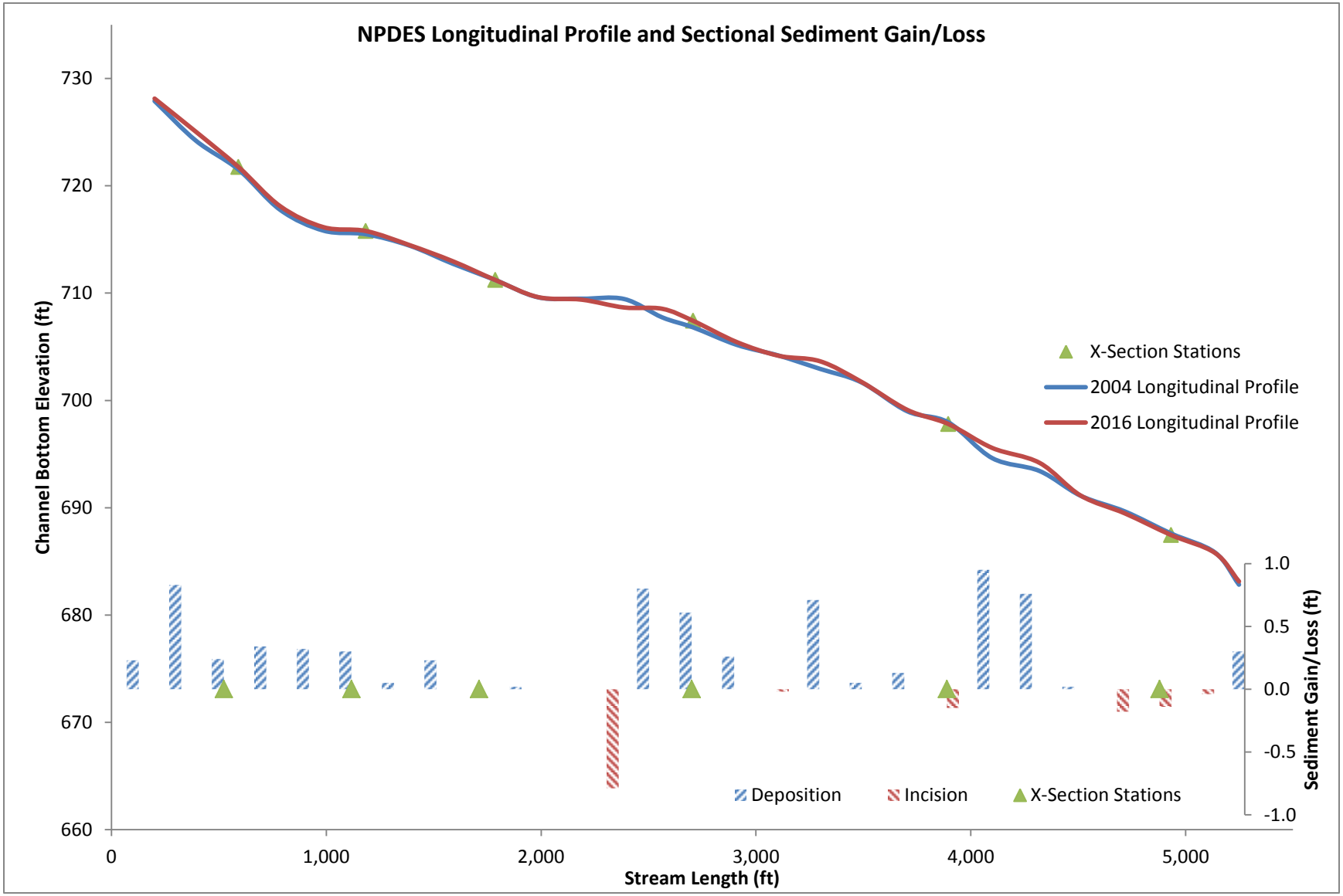


Figure 18: Comparison of Longitudinal Profile and Sectional Deposition/Incision from 2004 and 2016

Chemical

Physical Water Data

Physical water analysis results for both monitoring stations are displayed in **Table 20**. Overall, the outfall station water samples were slightly more basic and exhibited higher temperatures and conductivities as in previous years.

On average, temperatures at the outfall station were 4 percent warmer than those at the instream station. Temperature differences ranged from 0.6°F during baseflow sampling in January 2016 to 15°F during July 2015. The increased temperatures at the outfall station are most likely due to solar heating of water stored in the pond. Additionally, groundwater interaction and shading at and upstream of the instream station could be cooling the water relative to the outfall station.

Conductance was generally greater at the outfall station, 18 percent greater on average. Conductance at the outfall station ranged from 220 µmhos/cm to 910 µmhos/cm. The instream station ranged from 210 µmhos/cm to 510 µmhos/cm throughout the reporting year. Both stations displayed trends of elevated conductivities in the winter and spring and decreasing conductivity levels throughout the summer and autumn seasons, suggesting that conductance levels may be influenced by deicing operations during the winter months.

Table 20
Physical Water Data for 2016 Reporting Year

Event	Date	Instream Physical Water Data			Outfall Physical Water Data		
		pH	Water Temp (F)	Conductivity (µmhos/cm)	pH	Water Temp (F)	Conductivity (µmhos/cm)
2015-08	7/23/2015	8.3	61	290	8.38	76	220
2015-09	8/27/2015	9.4	58	280	10.1	70	230
2015-10	9/24/2015	7.97	55.9	210	7.95	65.5	340
2015-11	10/22/2015	7.02	49.8	300	7.07	54.7	310
2015-12	11/24/2015	7.43	42.4	280	7.81	44.2	230
2015-13	12/17/2015	*	*	290	*	*	270
2016-01	1/21/2016	9.9	36	260	7.98	35.4	250
2016-02	2/29/2016	*	*	510	*	*	850
2016-03	3/24/2016	7.69	49.5	460	7.94	50.5	910
2016-04	4/7/2016	7.42	51.8	*	8.16	41.3	*
2016-05	5/26/2016	7.52	63.3	390	8.15	67.3	470

* Multi-meter malfunction

In past years, pH measurements at the outfall were generally more basic with higher variance than those at the instream station. Measurements of pH at both stations, however, were slightly above 8 and ranged from 7.0 to 10.1 pH units. This pattern is atypical, as the pH at the outfall station is generally more basic, possibly due to the local goose population, biological activity within the pond, stormwater interaction with carbonate rocks and concrete used in the construction of the stormwater facility, and influence of roadway derived materials such as road salt.

Event Mean Concentrations

The mean EMC values and ranges observed for the 11 storm flow and baseflow events for this reporting year are displayed in **Table 21**. Of the observed analytes, Nitrate/Nitrite was the only one to show a significant difference between the 2 stations for this reporting year. In this case, Nitrates/Nitrites were significantly greater at the instream station.

Table 21
EMC Values for 2016 Reporting Year

Event Mean Concentration		Instream Station			Outfall Station			Significance
Analyte	**Units**	**Mean**	**Min**	**Max**	**Mean**	**Min**	**Max**	**p-value**
BOD	mg/L	4.28	2.00	9.03	5.00	4.00	7.80	0.312
TKN	mg/L	1.07	0.50	5.58	0.91	0.50	1.90	0.738
NO^3/NO^2	mg/L	5.34	2.72	7.10	0.44	0.05	0.84	$4.6x10^{-7}$
Phosphorus	mg/L	0.08	0.01	0.73	0.07	0.03	0.12	0.796
TSS	mg/L	55.09	1.00	557.58	18.15	8.00	43.55	0.480
Copper	µg/L	3.42	2.00	17.57	3.30	2.00	9.18	0.941
Lead	µg/L	2.62	2.00	8.79	2.01	2.00	2.16	0.352
Zinc	µg/L	26.72	20.00	70.78	25.90	20.00	33.40	0.871
TPH	mg/L	5.00	5.00	5.00	5.00	5.00	5.00	1

Figures 19 and 20 present annual mean EMC values for 8 analytes from the 2001 through 2016 reporting years. Also presented are mean EMC values before and after the stormwater retrofit. The only analyte with a significant observed difference between the outfall and instream stations consistently from 2001 through 2016 was Nitrates/Nitrites, with the exception of the 2004 reporting year. The pre- and post-retrofit graph reinforces this difference with an observed difference in mean EMC concentrations for each station before and after the retrofit; a similar difference was observed with TKN. Though not all mean EMC values were significantly different for the 3 metals at the instream station, all EMC values for Copper, Lead, and Zinc decreased at the outfall station after the retrofit. This is not unexpected given the increased residence within the stormwater facility. Please note that a single outlying measurement in July 2014 caused a large increase in average Zinc for this reporting year.

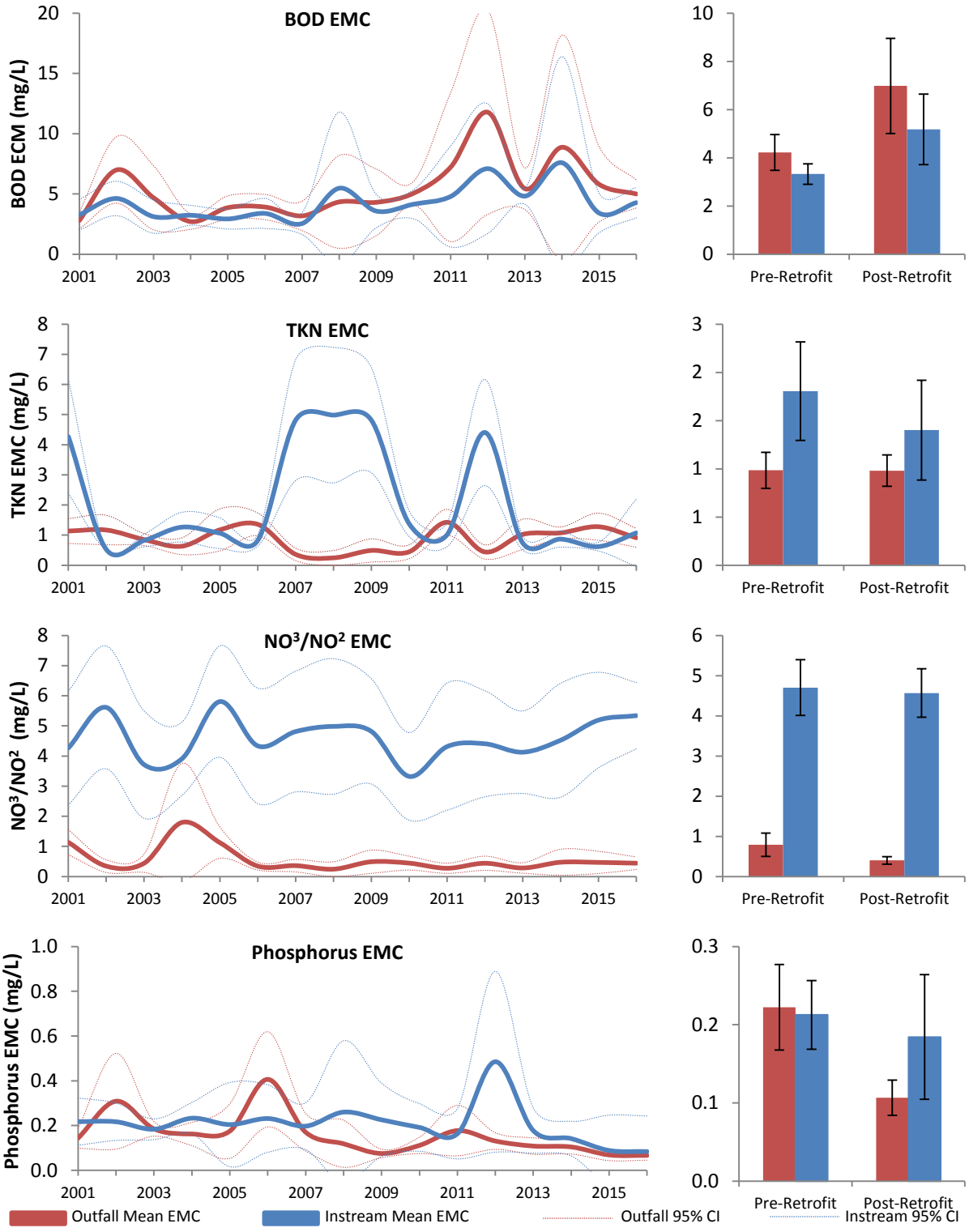


Figure 19: EMC Values from 2001 – 2016 for BOD, TKN, NO^2/NO^3, and Phosphorus

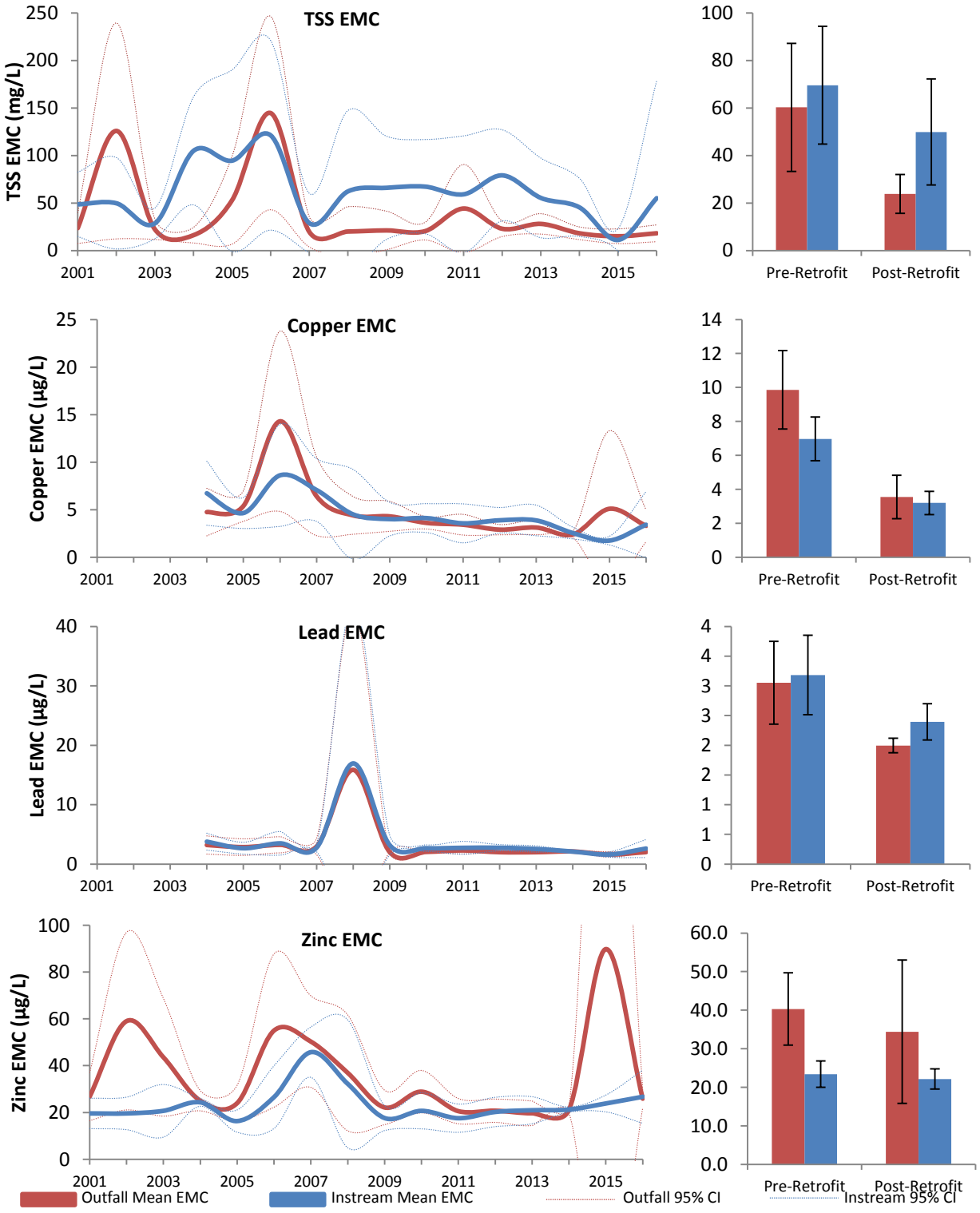


Figure 20: EMC Values from 2001 – 2016 for TSS, Copper, Lead, and Zinc

Annual Pollutant Loads

A discharge hydrograph was created for this reporting period for each monitoring station. Baseflow separation revealed that storm flow was evident above 700 gpm discharge at the instream station. Estimations for baseflow, storm flow, and total annual loading based on EMC values and discharge data are located in **Table 22**.

Expectedly, greater analyte loads were observed at the instream station. The contribution of analyte loading at the outfall station to total loading (instream station) increases during storm flow. Similar to previous observations evident in **Figure 19**, outfall contribution of Nitrates/Nitrites were low overall. All other analytes had estimated outfall contributions during storm flow of 5 percent to 26 percent, lower than the previous year. Results for baseflow were mixed with BOD, TKN, Phosphorus, TSS, and the metals increasing and BOD and NO^3/NO^2 decreasing outfall contribution relative to storm flow.

Table 22
Annual Pollutant Loads for the 2016 Reporting Year

Annual Pollutant Loading (lbs/Year)										
Loc.	Type	BOD	TKN	NO^3/NO^2	Phosphorus	TSS	Copper	Lead	Zinc	TPH
Instream	Base	4,972	622	7,707	25	3,729	2.5	2.5	25	6,215
	Storm	6,039	3,559	3,296	411	307,119	10.7	5.9	50	5,475
	Total	11,011	4,181	11,003	436	310,848	13.2	8.4	75	11,690
Outfall	Base	1,140	228	94	17	4,276	0.6	0.6	8	1,426
	Storm	1,579	227	156	20	6,683	1.1	0.6	8	1,320
	Total	2,719	455	250	37	10,959	1.7	1.2	16	2,746

Seasonal Pollutant Loads

Seasonal discharge for each monitoring station is provided in **Figure 21** for reference**.** The instream station unsurprisingly displayed greater discharges for each season; therefore, it is not unexpected to have greater loadings. Seasonal loadings based on the EMC values and seasonal discharges from **Figure 21** are located in **Table 23**.

Several analytes had the greatest loadings in the winter season. This is not surprising considering the winter season had the greatest total discharge of the reporting period. Total suspended solids were highest during the spring season for both stations with a majority of total TSS at the instream station and a large portion at the outfall station. A total of 95 percent of the TSS loading occurred in spring at the instream station, and 37 percent of total outfall loading occurred during spring. As usual, spring was also the season with greatest loading of Phosphorus and TKN at the instream station, with 85 percent and 55 percent of total loading, respectively. Nitrate/Nitrite loading, however, was greatest in the winter, with 44 percent of the

total load occurring during that season. The outfall station consistently correlates to values estimated for the instream station.

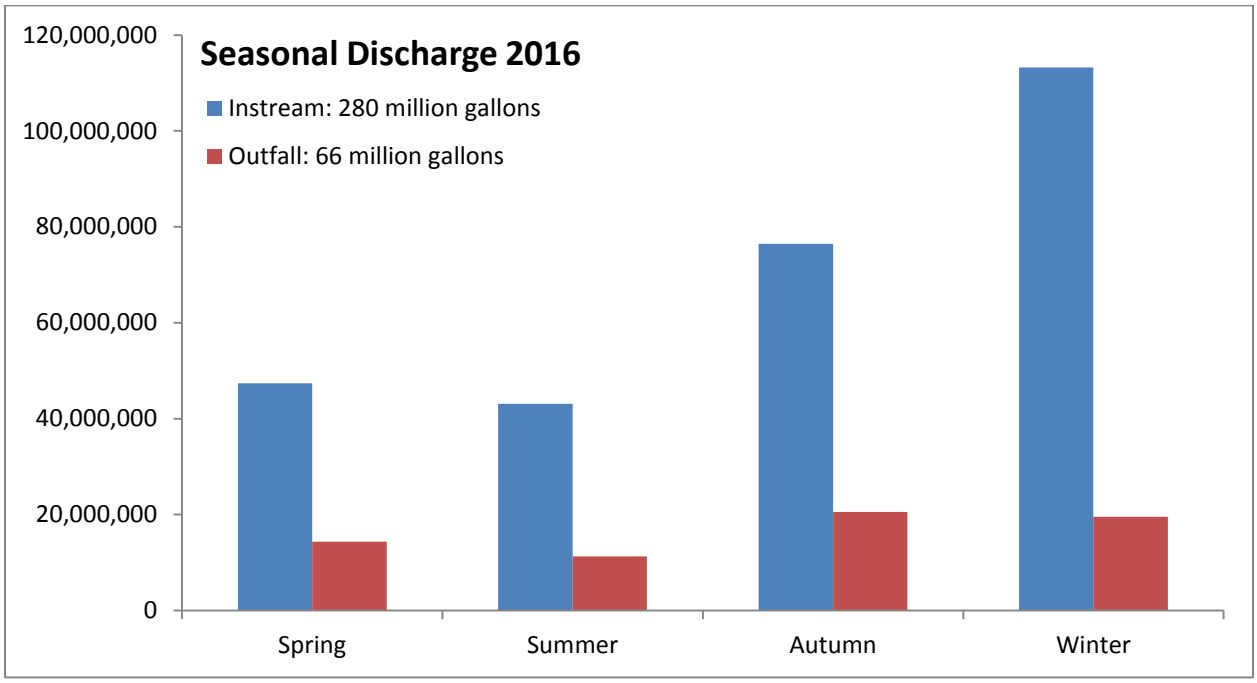


Figure 21: Seasonal Discharge for the 2016 Reporting Year

Table 23
Seasonal Pollutant Loads for the 2016 Reporting Year

Seasonal Pollutant Loading (lbs)										
Loc.	**Season**	**BOD**	**TKN**	**NO^3/NO^2**	**Phosphorus**	**TSS**	**Copper**	**Lead**	**Zinc**	**TPH**
Instream	Spring	2,578	1,203	1,666	148	111,087	3.9	2.1	18.0	1,978
	Summer	1,439	180	2,230	11	3,957	0.7	0.7	7.2	1,798
	Autumn	12,552	319	3,573	6	638	1.3	1.3	12.8	3,190
	Winter	3,779	472	5,952	10	1,889	1.9	1.9	26.6	4,723
	Total	20,348	2,174	13,421	175	117,571	7.8	6.0	64.6	11,689
Outfall	Spring	708	80	67	8	3,095	0.5	0.3	3.1	600
	Summer	472	123	13	8	1,983	0.2	0.2	1.9	472
	Autumn	714	153	41	10	1,544	0.5	0.3	4.3	858
	Winter	652	130	132	8	1,793	0.5	0.3	4.7	815
	Total	2,546	486	253	34	8,415	1.7	1.1	14.0	2,745

Biological

A complete list of species found at each site and the frequency of their occurrence can be found on the CD in Appendix B. MBSS scoring criteria for the genus level benthic macro-invertebrate Index of Biotic Integrity (IBI) for the Eastern Piedmont region of Maryland is shown in **Table 15**. An IBI score was calculated for each station by dividing the total score by the 6 metrics used for this index, thus deriving an average IBI score. Corresponding narrative ratings were also determined for each station in accordance with MBSS Standards. The narrative rating guidelines can be found in **Table 16.**

The biological health of the outfall and instream monitoring stations are summarized by **Tables 24 and 25**, respectively. The stations for the 2016 reporting year displayed poor and very poor health ratings. The outfall station had an IBI score of 1.33 while the instream station had an IBI score of 2.33.

Table 24
Outfall Station IBI Score for the 2016 Reporting Year

Metric	Result	Score
Number of Taxa	15	3
Number of EPT	1	1
Number Ephemeroptera	1	1
% Intolerant Urban	4	1
% Chironomidae	78	1
% Clingers	25	1
	Total Score	**8**
	IBI Score	**1.33**
	Narrative Rating	**Very Poor**

Table 25
Instream Station IBI Score for the 2016 Reporting Year

Metric	Result	Score
Number of Taxa	20	3
Number of EPT	2	1
Number Ephemeroptera	2	3
% Intolerant Urban	9	1
% Chironomidae	61	3
% Clingers	44	3
	Total Score	**14**
	IBI Score	**2.33**
	Narrative Rating	**Poor**

Figure 22 presents these scores annually from 2001 through 2016. The trends of both stations appear to be correlative throughout this time period. On average, the score for the instream station remains 0.8 greater than that of the outfall station. The average score for the outfall station is 2.2, which is rated as poor biological health according to MBSS guidelines. The average score for the instream station is 3, which is on the boundary between poor and fair biological health according to MBSS guidelines. Despite having similar number of taxa and individuals, the instream reach had more Ephemeroptera and clingers present with fewer chironomids resulting in a higher IBI score. Number of EPT and percent intolerant were the only scoring parameters that were the same for both reaches. The outfall station appears to still be relatively intolerable for most sensitive species, as only 4 percent of the individuals recovered were considered sensitive with a large percentage of tolerant species present.

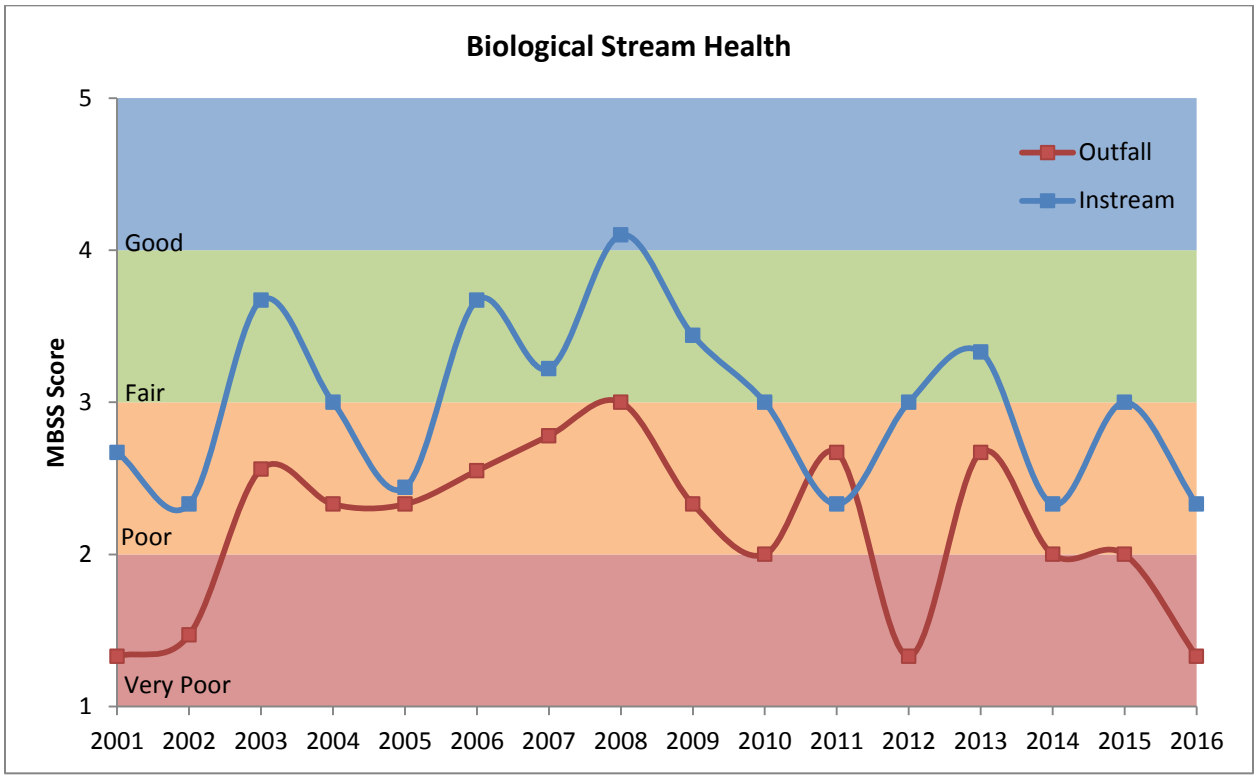


Figure 22: Macro-Invertebrate IBI Analysis 2001 – 2016

Table 26
Spring 2016 Habitat Assessment Results

Parameter	Outfall	Category	In-stream	Category
Instream Habitat	6	marginal	11	sub-optimal
Epifaunal Substrate	5	poor	11	sub-optimal
Velocity/Depth Diversity	10	marginal	13	sub-optimal
Pool/Glide/Eddy Quality	10	marginal	12	sub-optimal
Riffle/Run Quality	9	marginal	11	sub-optimal
Embeddedness	4	poor	8	marginal
Shading	4	poor	12	sub-optimal
Trash Rating	12	sub-optimal	15	sub-optimal
Total Score (max. of 160)	**60**		**93**	
Score (percent)	**38%**		**58%**	

The biological habitat assessment results for each station are summarized in **Table 26**. The scores are of a maximum 160 points based on 8 parameters as shown in **Table 17**. Overall, the quality of biological habitat at the instream station remains higher than the outfall station with overall habitat scores of 93 and 60, respectively. From 1998 through 2016 (excluding 2001), as shown in **Figure 23**, the stations have average habitat scores of 92 for the instream station and 69 for the outfall station. This was a fairly typical year for both stations, with the instream scoring 1 point higher and the outfall scoring 9 points below average. The weakest parameters for both stations are riffle/run quality, embeddedness, and shading. The outfall station also showed a loss of some stable habitat, as it scored lower than the previous years.

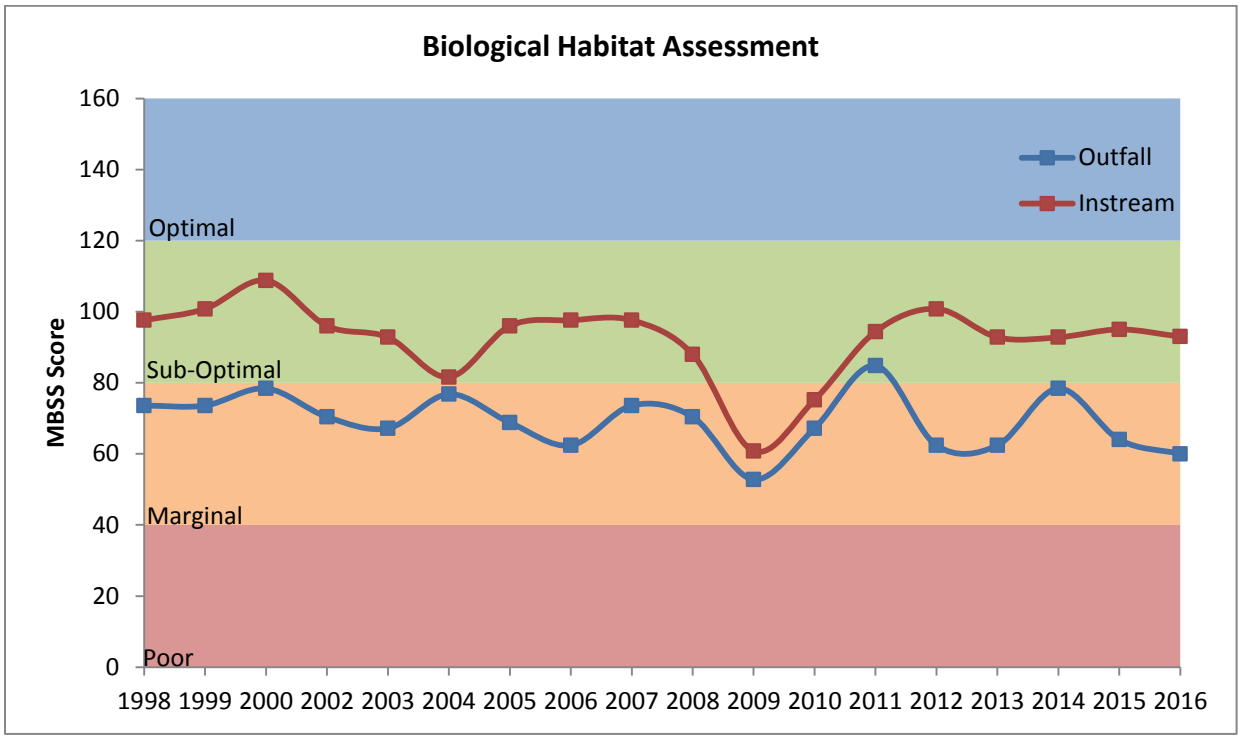


Figure 23: Comparison of NPDES Station Habitat 1998 – 2016 (Excluding 2001)

It should be noted that the habitat assessment is wholly subjective. Slight changes may be a result of inconsistencies in assessor(s) scoring methodology. To show a general relationship between the habitat and biological scores, these have been plotted for the outfall and instream stations in **Figures 24 and 25**, respectively. These are plotted on each assessment's overall scoring range. Though not unexpected, it is evident that the lower the quality of habitat in this case, the lower the biological quality found in said habitat. Both stations appear to have a 1 to 2 year period of latency between habitat and biological changes. The certainty of any evident relationship is low given the high degree of bias and chance that is probable in these assessments.

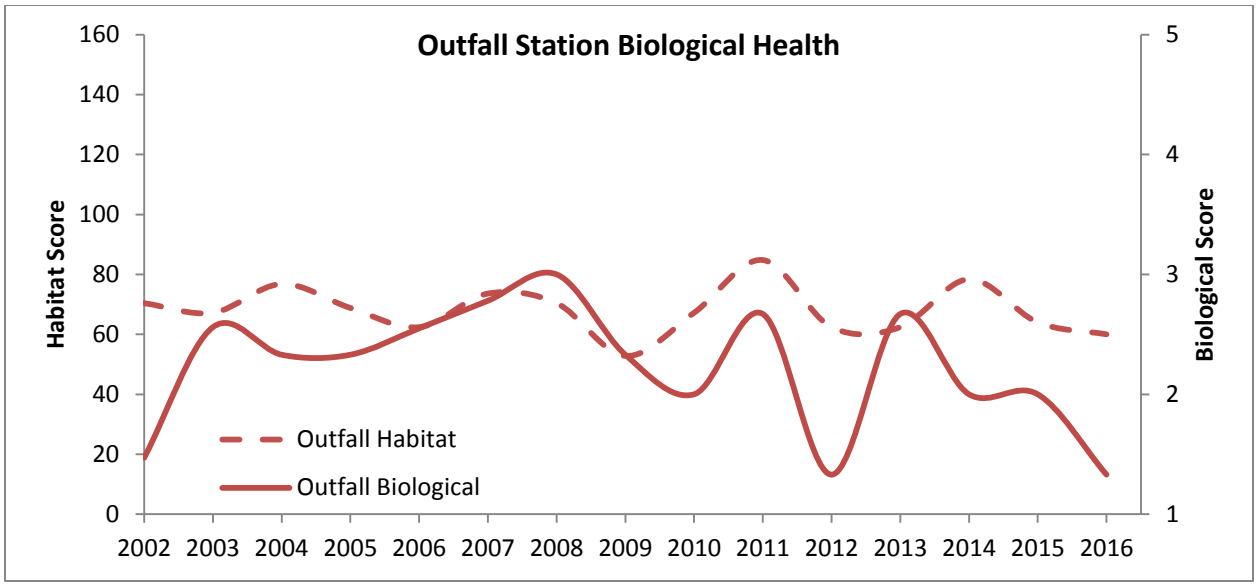


Figure 24: Comparison of Outfall Station Habitat and Biological IBI Scores 2002 – 2016

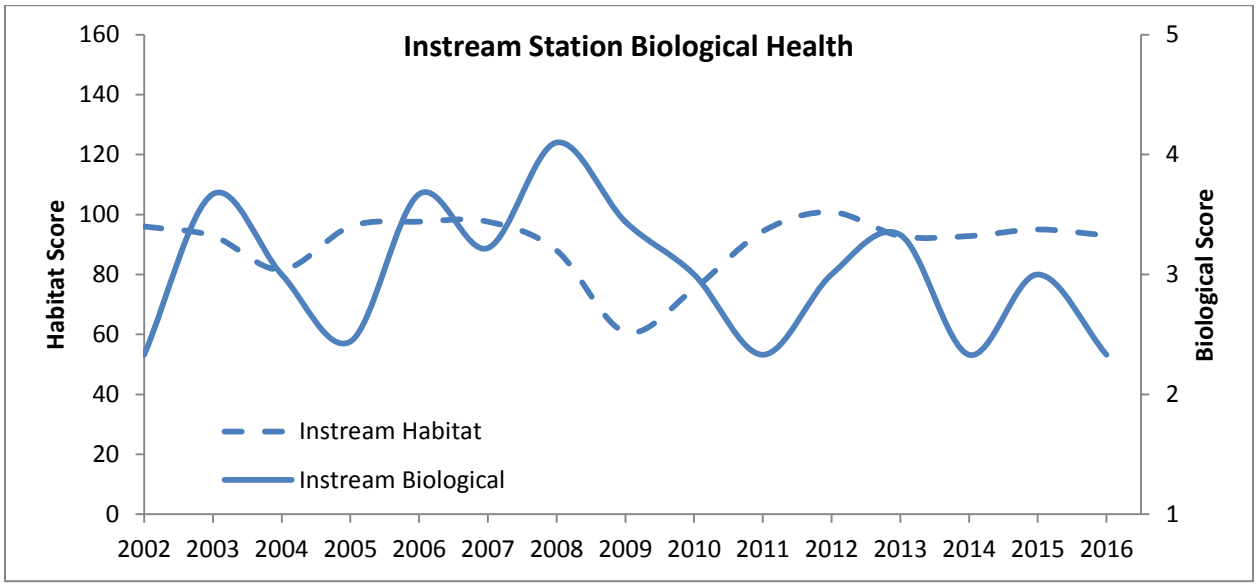


Figure 25: Comparison of Instream Station Habitat and Biological IBI Scores 2002 – 2016

G. Program Funding

1. Operational Expenses

During the 2015 legislative session, the General Assembly adopted Senate Bill 863. This legislation repealed the mandatory requirement for the NPDES Phase I MS4 jurisdictions to adopt a fee as the funding mechanism for their stormwater program. All affected jurisdictions must still maintain a local watershed protection and restoration fund. The legislation, which became Chapter 124 of the Maryland Annotated Code, allows Phase I jurisdictions that established a fee before July 1, 2013, to repeal or reduce those fees before July 1, 2016. However, each jurisdiction must demonstrate sufficient funding for its stormwater program. This requirement has always been in place via Part IV G. of the permit. The following provides a summary of the Watershed Protection and Restoration Fund established by Carroll County related to operating expenses.

Watershed Protection and Restoration Fund

The Watershed Protection and Restoration Special Revenue Fund was established in FY 2015 to ensure adequate funding for operating expenses related to the County's National Pollutant Discharge Elimination System (NPDES) Permit and Watershed Restoration efforts. Property Tax revenue equal to the projected operating expenses for this purpose will be dedicated to the fund on an annual basis.

Sources of Funding	FY 15 Actual	FY 16 Actual	FY 17 Budget	Increase (Decrease)
Dedicated Property Tax	$990,535	$1,067,097	$2,160,120	$1,093,023
Total Sources of Funding	**$990,535**	**$1,067,097**	**$2,160,120**	**$1,093,023**
Uses of Funding				
Personnel	$896,814	$942,097	$1,021,310	$79,213
Operating	$93,721	$125,000	$165,300	$40,300
Capital			$973,510	$973,510
Total Uses of Funding	**$990,535**	**$1,067,097**	**$2,160,120**	**$1,093,023**

Figure 26: Watershed Protection and Restoration Fund

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

(1) **Director, Department of Land and Resource Management** – The following general tasks are performed by the Director of Land and Resource Management requiring approximately **50%** of the position's time:

- Administration of the permit;
- Report writing and compilation responsibility;
- Monitoring of project progress; and
- Any other necessary activity to ensure compliance.

Total estimated expenditure ***~$59,293***

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

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

Total estimated expenditure ***~ $84,072***

(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 permit compliance. The position is responsible for the following tasks:

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

Total estimated expenditure ***~ $78,640***

(4) **Administrative Office Associate II** – The following general tasks are performed by the Administrative Office Associate II, requiring approximately **40%** of the position's time:

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

Total estimated expenditure ~ ***$22,261***

(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 ~ ***$2,354***

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

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

Total estimated expenditure ~ ***$3,629***

(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:

- Illicit discharge inspections;
- Coordination of regular site inspections;
- Stormwater management facility maintenance inspections; and
- Stormwater management facility maintenance and other related enforcement action.

Total estimated expenditure ~ ***$26,970***

(8) **Environmental Inspectors (4 total)** – The following general tasks are performed by the Environmental Inspectors related to NPDES MS4 compliance. They require approximately **25%** of one inspector's time:

- Stormwater management facility maintenance inspections;
- Regular illicit discharge inspections; and
- Field investigations.

Total estimated expenditure (for all four inspectors) ~ ***$60,954***

(9) **Stormwater Management Program Engineer** – The following general tasks are performed by the Stormwater Management Program Engineer related to NPDES MS4 compliance. They require approximately **40%** of the position's time:

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

Total estimated expenditure ~ ***$52,367***

(10) **Stormwater Management Review Assistant** – The following are general tasks performed by the Stormwater Management Review Assistant related to NPDES MS4 compliance. They require approximately **60%** of the position's time:

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

Total estimated expenditure ~ ***$57,138***

(11) **Watershed Management Specialist** – The following are general tasks performed by the Watershed Management Specialist related to NPDES MS4 compliance. The tasks require approximately **80%** of the position's time:

- Biological and physical data collection, interpretation, and reporting;
- Technical assistance;
- Public outreach;
- Watershed management planning and coordination for restoration activities; and
- Work with state and federal agencies on permitting issue.

Total estimated expenditure ~ ***$66,529***

(12) **Watershed Restoration Engineer** – The following are general tasks performed by the Watershed Restoration Engineer related to NPDES MS4 compliance. These tasks require approximately **80%** of the position's time:

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

Total estimated expenditure ~ ***$97,339***

(13) **Water Resource Supervisor** – The following are general tasks performed by the Water Resource Supervisor related to NPDES MS4 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 ~ ***$48,716***

(14) **Water Resource Technician** – The following are general tasks performed by the Water Resource Technician related to NPDES MS4 compliance. These tasks require approximately **80%** of the position's time:

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

Total estimated expenditure ~ ***$56,925***

(15) **Water Resource Specialist** (2 total) – The following are general tasks performed by the Water Resource Specialist to NPDES MS4 compliance. These tasks require approximately **80%** of each 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 (for 2 Water Resource Specialists) ~ ***$116,948***

(16) **Floodplain Management Specialist** – The following are general tasks performed by the Floodplain Management Specialist related to NPDES MS4 compliance. These tasks require approximately **60%** 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 ~ ***$45,974***

(17) **Forest Conservation Specialist** – The following are general tasks performed by the Forest Conservation Specialist related to NPDES MS4 compliance. These tasks require approximately **10%** of the position's time:

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

Total estimated expenditure ***~ $8,640***

(18) **Watershed Grants Analyst** – The following are general tasks performed by the Watershed Grants Analyst related to NPDES MS4 compliance. These tasks require approximately **100%** of the position's time:

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

Total estimated expenditure ***~ $53,348***

Other post-employment benefits (OPEB)	***$31,092.20***
The total estimated salary expenditure for personnel in the 2015/2016 permit year	***$973,189.20***

Supplies and Contract Services

Nitrate testing kits, thermometer, swing sampler and pole, easel and materials for public education, hip boots, and biological monitoring chemicals for sampling	***$2,977.89***
Expenses for physical and biological monitoring analysis, and monitoring equipment for the 2015/2016 permit year	***$11,422.02***
NPDES training webinar and training video	***$101.84***
Total expenditures for supplies and contract services in the Operating Budget for 2015/2016 permit year	***$14,501.75***

Stormwater Pond Maintenance

The annual maintenance cost for County stormwater management facilities was necessary to meet NPDES MS4 compliance.

Contractor Cost for 2015/2016	***$106,383.97***
Equipment (gas, other)	***$4,113.28***
Total maintenance cost for stormwater management facilities in permit year 2015/2016	***$110,497.25***
TOTAL OPERATING EXPENDITURES FOR 2015/2016 PERMIT YEAR	***$1,098,188.20***

2. Capital Expenses

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

Watershed Assessment and Improvement (NPDES) project appropriation for 2015/2016 permit year	***$4,916,000.00***
Environmental Compliance appropriation for FY 2015 – 2016	***$75,000.00***
Stormwater Facility Renovations FY 2015 – 2016	***$72,649.00***

Cumulative capital expenditures for the program since 2005 can be found in **Table 27**. **Table 28, Table 29,** and **Table 30** provide the approved FY 2017-2022 CIP estimates for program funds. It is important to note that funding beyond FY 2017 is subject to future budget review and approval processes. Therefore, no guarantee is made to future appropriations beyond FY 2017.

Table 27 Total NPDES MS4 Capital Expenditures Carroll County, Maryland July 15, 2005 through June 30, 2016	
Permit Year	**Capital Expenditure**
7/15/05 to 6/30/06	$36,040.19
7/1/06 to 6/30/07	$53,593.00
7/1/07 to 6/30/08	$1,978,829.14
7/1/08 to 5/30/09	$816,823.30
7/1/09 to 5/30/10	$1,744,986.91
7/1/10 to 6/30/11	$672,479.04
7/1/10 to 6/30/11	$23,269.00
7/1/11 to 6/30/12	$1,635,671.32
7/1/12 to 6/30/13	$1,012,067.26
7/1/13 to 6/30/14	$2,147,337.51
7/1/14 to 6/30/15	$2,964,442.44
7/1/15 to 6/30/16	$2,297,193.78
Total permit expenditures, to date	***$15,382,732.89***
Grants received	***$2,734,404.15***
Actual County expenditures	***$12,648,328.74***

Approved Community Investment Plan 2017 – 2022

Table 28
Watershed Assessment and Improvement (NPDES)

	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	Prior Allocation	Balance to Complete	Total Project Cost
Engineering/Design		105,000	70,000	80,000	130,000	130,000			**515,000**
Land Acquisition									**0**
Site Work									**0**
Construction	5,189,408	4,340,770	3,335,000	2,180,000	2,880,000	2,880,000			**20,805,178**
Equipment/Furnishings									**0**
Other									**0**
EXPENDITURES									
TOTAL	**5,189,408**	**4,445,770**	**3,405,000**	**2,260,000**	**3,010,000**	**3,010,000**	**0**	**0**	**21,320,178**

Table 29
Environmental Compliance

	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	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**

Table 30
Stormwater Facility Renovations

	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	Prior Allocation	Balance to Complete	Total Project Cost
Engineering/Design	63,000	63,000	63,000	63,000	63,000	63,000			**378,000**
Land Acquisition									**0**
Site Work									**0**
Construction	268,500	268,500	268,500	268,500	268,500	268,500			**1,611,000**
Equipment/Furnishings									**0**
Other									**0**
EXPENDITURES									
TOTAL	**331,500**	**331,500**	**331,500**	**331,500**	**331,500**	**331,500**	**0**	**0**	**1,989,000**

The Board of County Commissioners approved a capital program in spring 2016 to address the renovation of existing stormwater management facilities. The program funding is designed to support long-term improvements to existing stormwater management facilities which are beyond routine maintenance but are not undertaken as part of the County's retrofit program. The program will evaluate and repair 5 to 10 facilities per year over a 30-year period. The funding is used for pipe replacement, erosion repairs, filter media replacement, and other items which will extend the useful life of a facility and to maintain compliance. The program began July 1, 2015, with the following expenditures during the permit year: $207,351.00.

Table 31 provides a project list associated with the approved capital budget for the Stormwater Facility Renovation Program for Fiscal Years 2017 to 2022.

Table 31
Stormwater Management Facility Renovation Program 2017-2022

Year	Project Name	MDE8NAME
Project Completed		
2016	Carroll Highlands	Liberty Reservoir
2016	Grand Valley Farms Section 2	Double Pipe Creek
2016	Oklahoma Phase 1 Pond #2	Liberty Reservoir
2016	Washington Square	Liberty Reservoir
2016	Poole Meadows	Liberty Reservoir
Projects Under Construction		
2016	Jenna Estates Section 2 Phase 1 Pond #1	S Branch Patapsco
2017	Oklahoma- Sweetwater	Liberty Reservoir
2017	Grand View Resub. Of Lot 38	S Branch Patapsco
2017	Carrollyn Manor Section 6	Double Pipe Creek
2017	Obrecht Estates	S Branch Patapsco

Projects Planned		
2017	Eldersburg Estates Section 1	S Branch Patapsco
2017	Sun Valley Waterloo	S Branch Patapsco
2018	Matthew Meadows Sec. 2	Liberty Reservoir
2018	Carroll County Commerce Center	Liberty Reservoir
2018	Carroll Woods Est. Sec. 7	Double Pipe Creek
2018	Carmae Acres	S Branch Patapsco
2018	Woodsyde Estates Surf. Sand	S Branch Patapsco
2019	Melstone Valley	S Branch Patapsco
2019	Kalten Acres Section 1	Double Pipe Creek
2019	Wilmont Manor	Liberty Reservoir
2019	St. Georges Gate Section 2	Liberty Reservoir
2020	Exception Center	Double Pipe Creek
2020	Sherlock Holmes Section 3B	Liberty Reservoir
2020	Stafford Estates Section 1	Liberty Reservoir
2020	Piney Ridge Village 7	S Branch Patapsco
2020	Larash Manor	Liberty Reservoir
2021	Aspen Run- Winterberry	Liberty Reservoir
2021	C.C. Health Department	Double Pipe Creek
2021	North Carroll Library	Prettyboy Reservoir
2021	North Carroll Library	Prettyboy Reservoir
2022	Northern Landfill	Liberty Reservoir
2022	Hunters Crossing #2	S Branch Patapsco
2022	Ronsdale Road	Liberty Reservoir
2022	Hoods Mill Landfill Closure	S Branch Patapsco
2022	Stone Manor Pond 1	Liberty Reservoir
2022	Stone Manor Pond 2	Liberty Reservoir
2022	Carrollyn Manor Section 7	Double Pipe Creek
2022	Squires	Liberty Reservoir

Part IV. Special Programmatic Conditions

Carroll County actively participates in the Chesapeake Bay TMDL efforts. In addition to attending regional workshops held by MDE, staff also participates in webinars offered by the EPA and MDE regarding the Bay TMDL and Maryland's WIP processes. The WRCC continues to serve as the County's local WIP team, and participates in discussions and development of WIP efforts. The WRCC continues to provide progress updates on the 2-year milestones. County staff completed work with MDE staff to update the historical BMP inventory and provide GIS data needed for land use data to update the CBP model for the 2017 Midpoint Assessment. Staff continue to participate in review of the land use/land cover data under development by CBP and other agencies.

A brief discussion of clarification is provided related to this permit and "toward meeting the Chesapeake Bay TMDL by 2025." The permittees continue to work toward compliance with the 20 percent restoration requirement as it relates to compliance with the Chesapeake Bay TMDL. It should be noted that there is still no agreement with Maryland's Phase II WIP, State-derived, Carroll County-specific nutrient load numbers. The numbers were calculated based on the Maryland Assessment and Scenario Tool (MAST) model, which, to date, has not clearly identified input parameters nor output values which are transparent or appear technically sound. Therefore, we will continue to support and work toward the clearly definable 20 percent restoration strategy, with any other TMDL endpoint requirements pending sound, quantitative, reasonable science.

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. Staff members participate with several groups that address these issues.

County staff participate as members of the Baltimore Metropolitan Council's Reservoir Technical Group, which meets regularly to discuss issues of common concern regarding protection of the watersheds. Staff also has a very close working relationship with the local Soil Conservation District Board (District). 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.

Staff has participated in or attended meetings of numerous efforts and work groups regarding various other initiatives, including, but not limited to, updates to stormwater management regulations, water reuse regulation development and update, growth offsets and trading policy and regulations, legislative proposals, discussions related to implementation of permit requirements, and various other initiatives. Participation in regional and statewide management and protection issues will continue to be a priority for Carroll County.

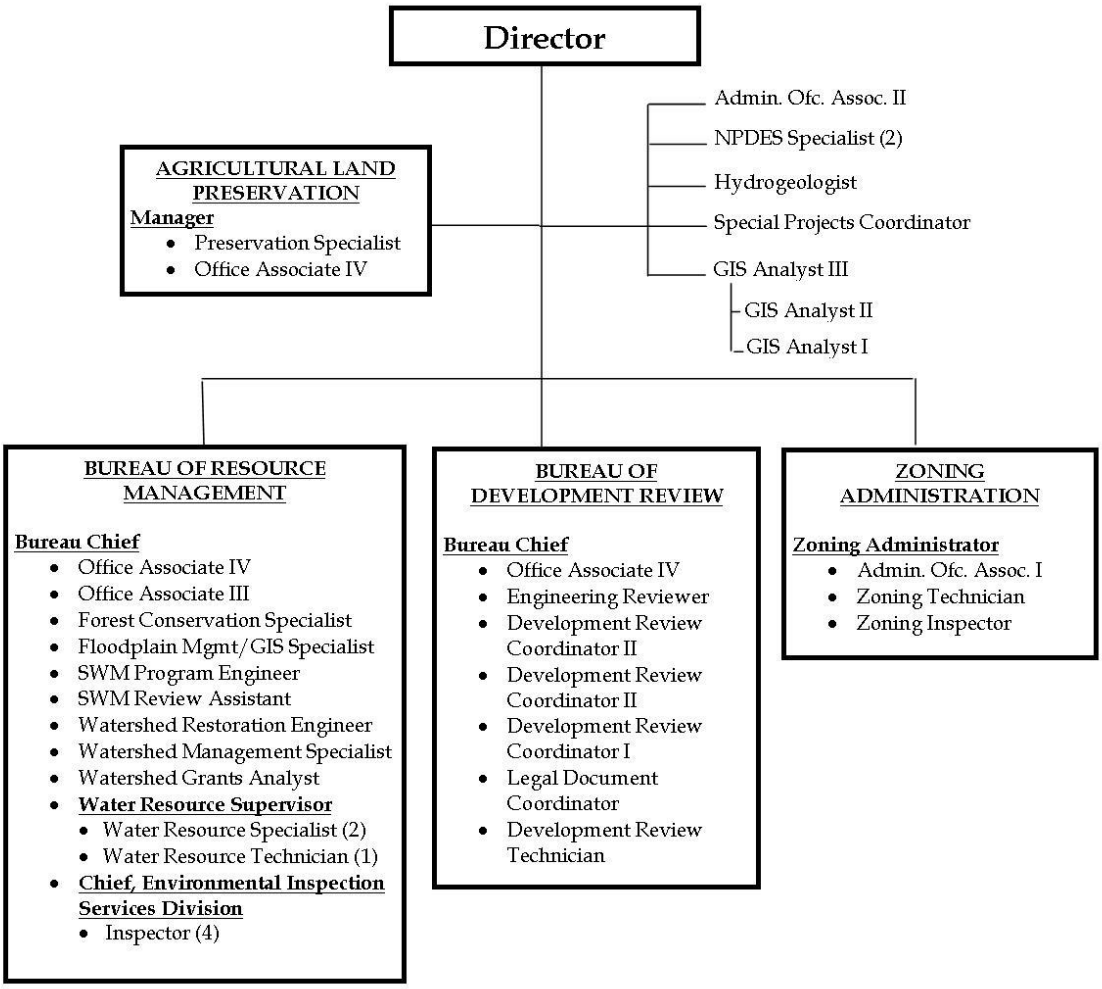
The County and municipalities adopted a comprehensive Water Resources Element (WRE) in April 2010, after a very thorough study of water supply, wastewater, and water quality issues in Carroll County and extensive coordination and collaboration with MDE staff. The WRE provides long-term direction to the County and municipalities regarding public water supply needs and issues and limitations related to wastewater treatment.

Appendix A

Organizational Chart:
Department of Land and Resource Management

Appendix A

Department of Land & Resource Management



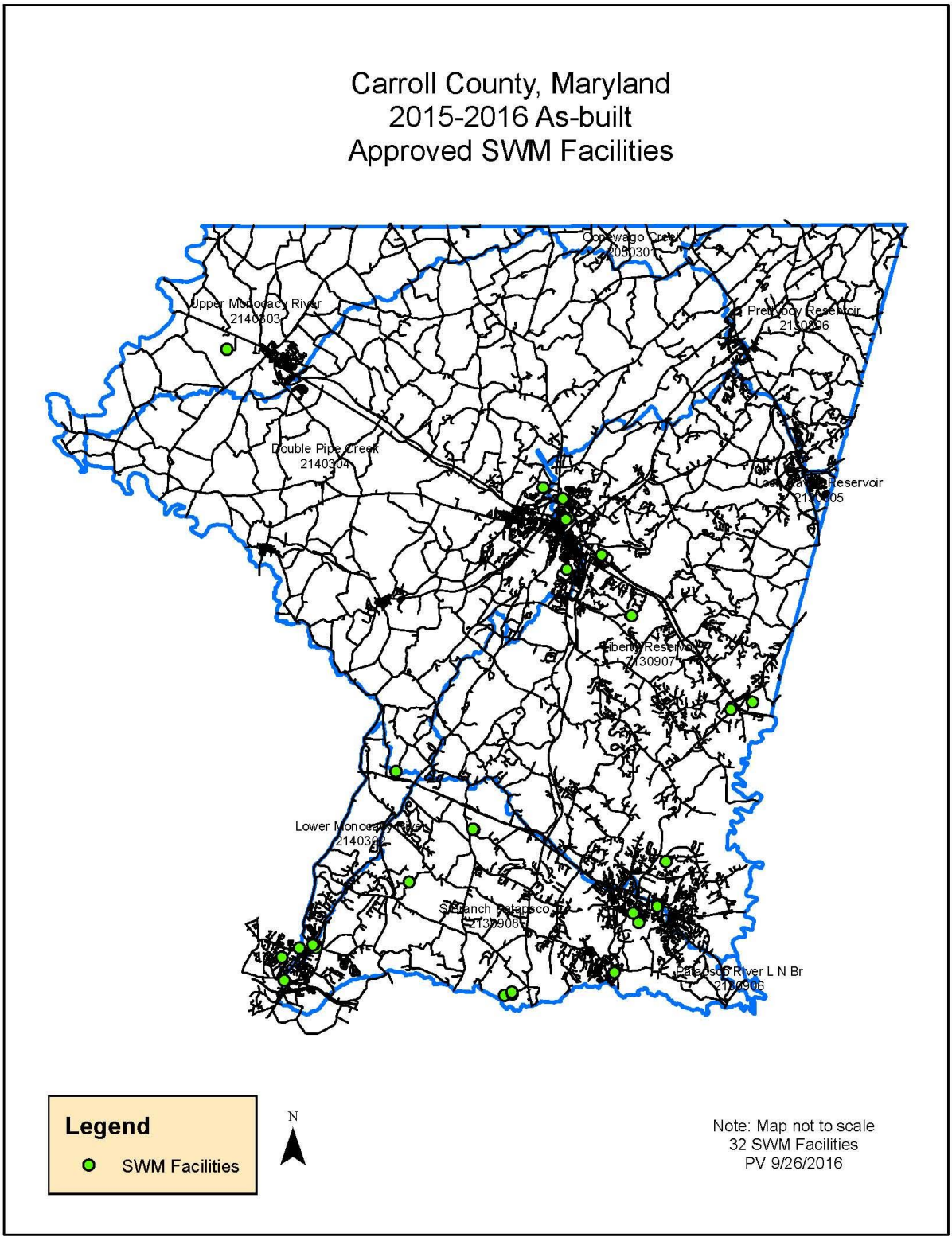
Appendix B

County NPDES MS4 Database CD

(Available Upon Request)

Carroll County, Maryland, 2015-2016 As-built Approved SWM Facilities Map

Appendix B

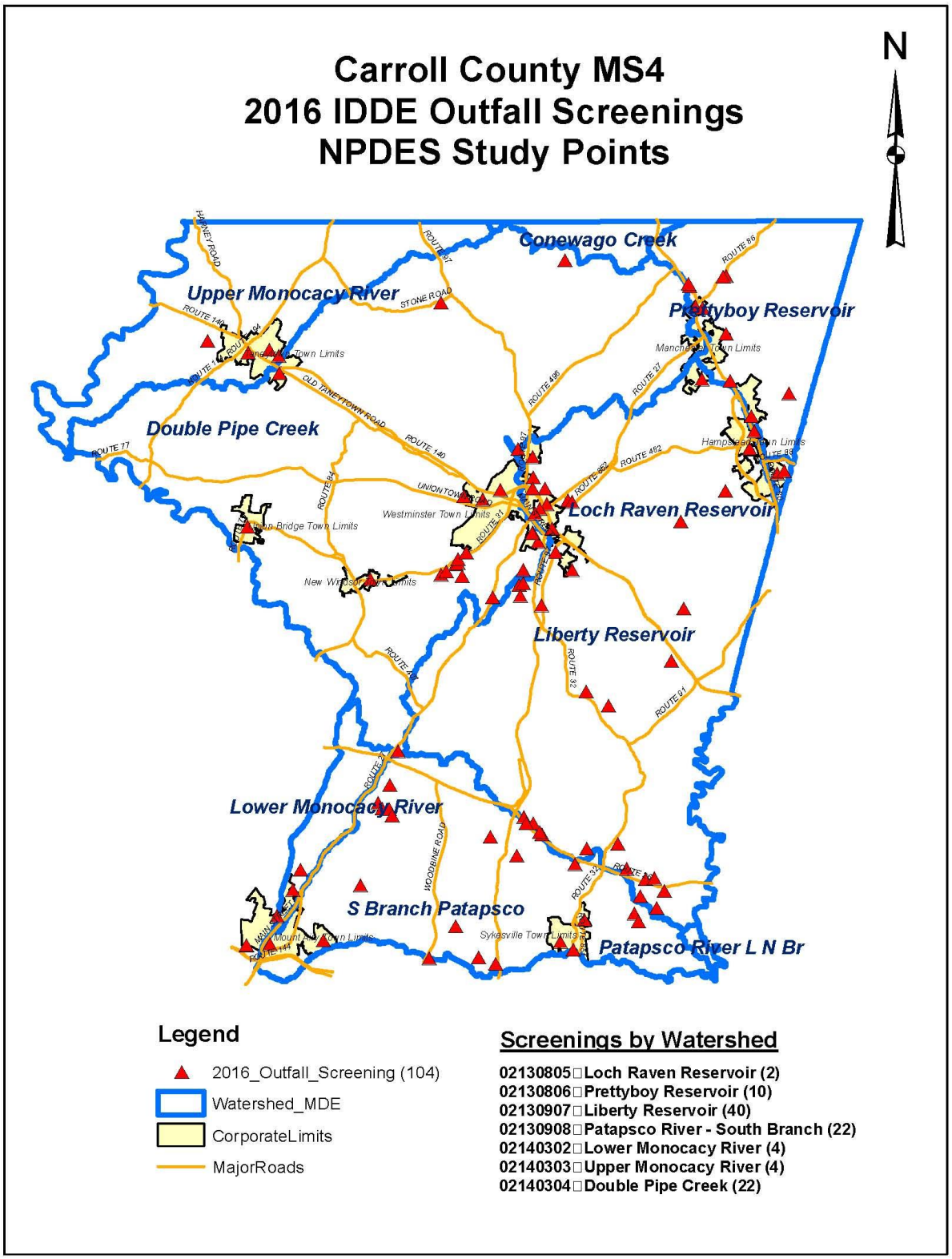

Carroll County, Maryland
2015-2016 As-built
Approved SWM Facilities
Upper Monocacy River
2140303
Double Pipe Creek
2140304
Lower Monocacy River
2140305
Liberty Reservoir
2130907
Patapsco River L N Br
2130906
Legend
SWM Facilities
N
Note: Map not to scale
32 SWM Facilities
PV 9/26/2016

Appendix C

Illicit Discharge Detection and Elimination (IDDE)

- Carroll County MS4 2016 IDDE Outfall Screenings (Map)
- 2016 Illicit Discharge Summary, Illicit Discharge Complaints Processed from July 1, 2015 - June 30, 2016
- 2016 IDDE Commercial/Industrial Survey Locations Map
- 2016 Visual Survey Summary
- Stormwater Pollution Prevention for Businesses
- Stormwater Pollution Prevention for Restaurants & Food Service Industry
- Stormwater Pollution Prevention for Auto-Related Industry
- Carroll Clean Water Partnership Stormwater Self-Inspection Checklist

Appendix C


Carroll County MS4
2016 IDDE Outfall Screenings
NPDES Study Points
N
Conewago Creek
Upper Monocacy River
Prettyboy Reservoir
Double Pipe Creek
Loch Raven Reservoir
Liberty Reservoir
Lower Monocacy River
S Branch Patapsco
Patapsco River L N Br
Legend
2016_Outfall_Screening (104)
Watershed_MDE
CorporateLimits
MajorRoads
Screenings by Watershed
02130805 Loch Raven Reservoir (2)
02130806 Prettyboy Reservoir (10)
02130907 Liberty Reservoir (40)
02130908 Patapsco River - South Branch (22)
02140302 Lower Monocacy River (4)
02140303 Upper Monocacy River (4)
02140304 Double Pipe Creek (22)

Appendix C

IDDE Program

2016 Illicit Discharge Summary

Illicit Discharge Complaints Processed from July 1, 2015 – June 30, 2016

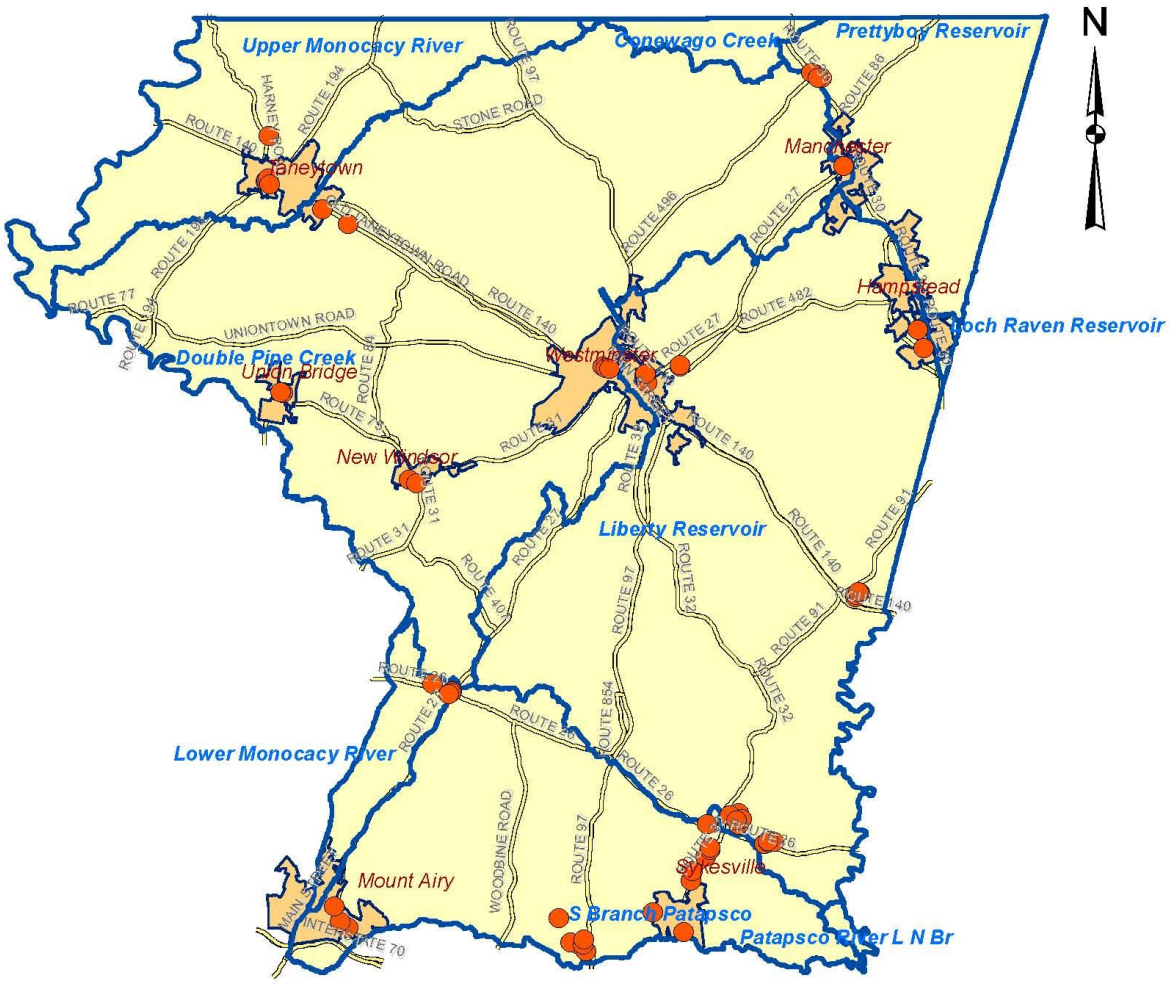
Case No.	Complaint/ Date	Action Taken	Status	Jurisdiction/ Location
PD-15-0008	CC Department of Environmental Health reported they were notified of fats/oils/grease and food waste on pavement near storm drain inlet behind commercial strip center w/3 restaurants. 07/13/2015	CC Department of Environmental Health and CC EISD staff investigated 7/13/2015. Materials confirmed on pavement with some on storm grate and in curb basin. No discharge observed at outfall. CC Health Department spoke with each restaurant and property management company requiring professional contractor cleanup and proper waste disposal per sanitary regulations of pavement and storm drain system per EISD. Re-inspected 7/17/2015. All areas cleaned. Follow-up inspection of storm drain system and outfall inspected by EISD on 8/4/2015 – storm drain system clean.	Illicit Disposal **Case Closed: 08/05/2015**	County 577 Johnsville Rd Sykesville, MD
PD-15-0009	County Staff 2015 IDDE Dry Weather Screening Reported 7/29/2015	Dry weather screening of major outfall #MA033. Obvious physical indicators at non-flowing outfall found strong rancid odor and light tan film at plunge pool. Tracked up storm drain system. Investigation confirmed multiple illicit discharge sources from nearby shopping center. Fat/oil/grease from a leaking trash compactor at a grocery store and poor good housekeeping measures behind a restaurant (grease bin, etc.) from nearby shopping center. Enforcement coordination with local municipality. Promptly addressed by conducting on-site meeting with property management company and 2 commercial business representatives. Regulatory compliance regulations, remediation measures, and educational BMP information reviewed with all parties. Documented in an enforcement letter to property management company. Voluntary compliance and remediation achieved. Portion of storm drain blocked off, jetted, and cleaned. Pavement areas bermed up and cleaned. Poor good housekeeping activities eliminated. Follow-up inspection of outfall plunge pool clean and odor free.	Illicit Discharge Eliminated **Case Closed: 9/02/2015**	Town of Mount Airy S/E Corner of Twin Arch Road and Ridge Road
PD-15-0010	Municipal Staff reported complaints received of tow truck company leaking fuel leaving shopping center gas station. 8/27/2015	EISD staff checked roadway multiple times with no observations of gas or auto fluid leaks leading to towing vendor location. Municipality contacted 3/17/2016, and reported no local complaints since August 2015. Roadway will continue to be monitored by EISD staff when performing site visits in area.	Illicit Discharge Inconclusive **Case Closed: 3/17/2016**	Town of Mount Airy 518 E. Ridgeville Blvd Mount Airy, MD

PD-15-0011	County Staff 2015 IDDE Dry Weather Screening Reported 8/31/2015	Dry weather screening of major outfall #C0886. Chemical screening indicated slightly elevated level of chlorine. Investigation found contractor's sprinkler flow for watering newly installed sod at active high residential density townhouse construction area partially flowing onto pavement and running into storm drain inlet inflow into pond. Activity immediately adjusted onto lawn. EISD staff notified construction company regarding BMP and will monitor through regular site inspections.	Illicit Discharge Eliminated **Case Closed: 8/31/2015**	County Cassandra Dr Eldersburg, MD
PD-15-0012	Citizen complaint regarding residential contractor spilling heating fuel oil from fuel oil tank. 11/24/2015	EISD staff inspected site from property frontage. Contractor not at site and unable to locate or contact. Incident reported and contractor information turned over to MDE Oil Control Program on 11/24/15. EISD staff found site stabilized on 3/17/2016.	Illicit Discharge Inconclusive. Turned over to MDE. **Case Closed: 3/17/2016**	County 1603 Brangles Ct Marriottsville, MD
PD-15-0013	County Staff 2015 IDDE Dry Weather Screening Reported 06/12/2015	Dry weather screening of major outfall #C0630 found small amount of suds from instream stormwater outfall. Field chemical test showed slight elevation of phenols. Lab sample taken – no illicit discharge.	Non Illicit Discharge **Case Closed: 1/20/2016**	County 5308 Klees Mill Rd Sykesville, MD
PD-15-0014	Municipal Staff reported oil/grease from restaurant grease recycle bin leaking onto public sidewalk and roadway. 12/09/2015	City issued Notice of Violation letter. Site cleaned up using dry clean up measures immediately. Restaurant's recycle bin contractor replaced leaking bin. Site was pressure washed with inlet protection in place. Wastewater captured and properly disposed of. MS4 pollution prevention education provided to owner.	Illicit Discharge Eliminated Case Closed **Case Closed: 4/29/16**	City of Westminster 43 Rear East Main Westminster, MD
PD-15-0015	County Staff reported an apparent sewage backup slowly leaking onto municipal sidewalk. 11/20/2015	Contacted Municipal DPW – Utilities Department. Nearby storm drain inlet protected from discharge by municipal staff. Private line clog repaired and site clean-up by property owner under municipal supervision.	Potential Illicit Discharge Eliminated **Case Closed: 1/26/2016**	City of Westminster 379 S. Center St Westminster, MD
PD-15-0016	Municipal staff reported commercial business washing trucks beside storm drain inlet. 12/16/15	Municipal staff spoke to employees and stopped activity. County EISD and NPDES compliance staff followed up with business owner on MS4 stormwater pollution prevention education.	Illicit Discharge Eliminated **Case Closed: 12/17/15**	County 113 John St Westminster, MD
PD-16-0001	Municipal staff reported kitchen waste discharge from new waste pipe discharge at SHA inlet.	EISD and Municipal staff investigated. Town issued Notice of Violation letter to property owner. Waste pipe eliminated by owner.	Illicit Discharge Eliminated **Case Closed: 3/7/2016**	Town of Hampstead 1809 Hanover Pike, Hampstead, MD

PD-16-0002	Citizen complaint regarding private residence mulched area with hand-made hazardous sign placement "Poison, Keep Dogs Off." 1/13/2016	County staff contacted owner who indicated they used an over-the-counter weed control product on their mulched landscape bed per label instructions, which instructed the user to put up the sign for a certain period of time. No product or runoff from the mulched area was observed on the lawn, on nearby sidewalk, street area, in the inlets or outfall discharge area. Nor were any sick or dead animals, rodents, birds, reptiles, or insects observed.	Non-Illicit Discharge **Case Closed: 1/26/2016**	County 221 Morningstar Way Westminster, MD
PD-16-0003	Citizen complaint regarding water discharging from house onto roadway. 02/22/2016	County staff investigated and found a small amount of a clear discharge along the road edge. A foundation sump pump discharge pipe is located at the front of the house right at the road's edge. Determined to be exempt from MS4 regulations.	Non-Illicit Discharge **Case Closed: 3/17/2016**	County 2509 Marston Rd New Windsor, MD
PD-16-0004	Citizen complaint regarding fundraiser car washing conducted at restaurant that flows toward storm drain system. 5/26/2016	County staff met with restaurant manager explaining MS4 permit and local code regulations. Provided "*MDE's Facts About Car Washing Fundraisers"* publication requiring the restaurant to have fundraising groups follow the low-impact car wash fundraiser BMP guidelines. Followed up with restaurant manager for implementation.	Compliant **Case Closed: 6/17/2016**	County 6 Baltimore Blvd Westminster, MD
PD-16-0005	Citizen complaint regarding fundraiser car washing conducted at restaurant that flows toward storm drain system. 5/26/2016	County staff met with restaurant manager explaining MS4 permit and local code regulations. Provided "*MDE's Facts About Car Washing Fundraisers"* publication requiring the restaurant to have fundraising groups follow the low-impact car wash fundraiser BMP guidelines. Followed up with restaurant manager for implementation.	Compliant **Case Closed: 6/17/2016**	County 144 Englar Rd Westminster, MD
PD-16-0006	County Staff 2015 IDDE Dry Weather Screening Reported 06/15/2015	Dry weather screening at outfall # C0885 discovered a water line break entering the storm drain system in an older residential subdivision. County DPW Bureau of Utilities investigated and promptly repaired the leak.	Illicit Discharge Eliminated **Case Closed 6/28/2016**	County 6915 Carroll Highlands Sykesville, MD
PD-16-0007	Citizen complaint reporting a small amount of granular fertilizer spillage along a grassed shoulder of a rural County road. 6/26/2016	County staff investigated and spoke with complainant who noted a commercial-like ag fertilizer equipment vehicle pulled along the edge of the road during a rain downpour apparently leaving a small deposit of granular fertilizer that began browning up the grass. One to 2 gallons of dry fertilizer material was removed by shovel. The vehicle had no markings as reported. Five attempts to locate the commercial ag fertilizer applicator were unsuccessful. All five were made aware of MS4 permit and local code regulations. The material was determined to be a nitrogen-based fertilizer commonly used for top dressing field corn. Follow-up observations were made of the area.	Illicit Discharge/ Accidental Spill **Case Closed 7/18/2016**	County Fringer Road Taneytown, MD
	Total:	***16 Complaints***		

Appendix C

Carroll County MS4
2016 IDDE Commercial/Industrial Survey Locations



Legend

- **2016 IDDE Commercial/Industrial Survey (62)**
  - (5) Upper Monocacy River
  - (10) Double Pipe Creek
  - (4) Lower Monocacy River
  - (5) Prettyboy Reservoir
  - (21) Liberty Reservoir
  - (17) South Branch Patapsco River

Appendix C

IDDE Program

2016 Commercial Industrial Visual Survey Summary

Visual Survey Areas Requiring Follow-up Actions

Processed from July 1, 2015 – June 30, 2016.

This table presents the 5 of 62 Commercial/Industrial Visual Surveys requiring follow-up action during the permit year.

Unique ID#	Visual Survey # Date	Land Use	Activity/ Location/ Watershed	Potential Significant Pollutant Source	Follow-Up Action/Status
0705032644	VS-16-0056 3/1/16	C	Restaurant Retail Shopping Center, Eldersburg, MD Liberty Watershed	Equipment washing near storm drain inlet	Area Cleaned Up/MS4 Education/Restaurant BMP Good Housekeeping Practices. File closed
0705063272	VS-16-0019 3/9/16	C	Commercial Business, Sykesville, MD South Branch Patapsco River Watershed	Materials Loading/Unloading near storm drain inlet	MS4 Education w/Business Owner. Business Owner contacting MDE regarding 12SW permit. Good Housekeeping practices employed. File open - In Progress
0707035586	VS-16-0030 3/15/16	C	Restaurant Retail Shopping Center, Westminster, MD Liberty Watershed	Waste management near storm drain inlet	Area Cleaned Up/MS4 Education/Restaurant BMP Good Housekeeping. File closed
0714024603	VS-16-0048 3/1/16	I	Wood products manufacturer, Woodbine, South Branch Patapsco River Watershed	Site erosion, sediment leaving site entering roadside ditch	Environmental Inspection Services Division met w/owner. MS4 Education, Corrective measures taken to stabilize site under EISD supervision. EISD inspection and approved. File closed.
0714044434	VS-16-0050 3/1/16	C	Building contractor office and storage yard, Woodbine, MD South Branch Patapsco River Watershed	Storage yard disturbance area near storm drain inlet	EISD follow-up inspection insured storm drain inlet protection in place and swm facility/outfall clean.

Stormwater Pollution Prevention for Businesses

Dear Owner/Manager:

You and your staff play an important role in keeping pollution out of the storm drain system and out of local streams. This stormwater protection guide is provided to help you comply with environmental storm drain system requirements within your local municipality and the County. It is illegal for unauthorized wastes or wash waters from your business to enter the **storm drain system**. You may have to pay for clean-up costs, fines, or encounter more stringent measures as a result of an incident through local, state, and federal regulations. The County's knowledgeable staff makes it easy for businesses to understand the water pollution regulations that affect them. If you have questions, you may contact your local municipality or the County agency contact on the back of this brochure.

Carroll County Department of Land & Resource Management

What is Stormwater Pollution?

The term stormwater is used to describe water from rain or snow. Stormwater that does not soak into the ground becomes surface runoff from roof tops, parking lots, streets, yards, and other impervious surfaces. This runoff flows into surface waterways or is channeled through storm drains.

Improper disposal of materials, such as fuel, oil, washwater, solvents, and other fluids, that come into contact with stormwater runoff can cause pollutants to enter the storm drain system and break down in the local waters. These pollutants may increase heavy metals and toxic chemicals, affect aquatic life, and impact water quality.

Most storm drains flow directly into streams without any treatment. Newer storm drain systems may flow into a stormwater management facility and discharge to streams or infiltrate into the groundwater with potential contaminants.

Stormwater Requirements

The federal Clean Water Act, passed in 1972, authorizes the regulation of point sources of pollutants that discharge to Waters of the U.S. Point sources are associated with discrete conveyances, such as pipes or man-made ditches. Wastewater and stormwater are considered point sources. It is unlawful to discharge any pollutant from a point source into surface waters, unless a permit is obtained.

The U.S. Environmental Protection Agency (EPA) administers the National Pollutant Discharge Elimination System (NPDES) program, through which permits are required for point sources if they discharge directly to surface waters. This program is administered by the State in Maryland. Individual homes connected to a municipal system, using a septic system, or without surface discharge do not need an NPDES permit.

In Carroll County, Chapter 53, Environmental Management of Storm Sewer Systems, of the Carroll County Code of Public Local Laws provides the County with the legal authority to prohibit illicit discharges, as required by PART IV of Carroll County's NPDES Municipal Separate Storm Sewer System (MS4) permit.

Common Pollutants

Some business activities present a greater opportunity for pollutants to find their way into stormwater runoff.

Sample Business Activities	Common Pollutants					
	Bacteria	Erosion & Debris	Excess Nutrients	Heavy Metals	Oil & Grease	Toxic Chemicals
Engine Maintenance & Repair		✓		✓	✓	✓
Food Service & Production	✓	✓	✓		✓	✓
Gas Stations		✓		✓	✓	✓
Washing Vehicles, Equipment, etc.	✓	✓			✓	✓
Waste Handling	✓	✓	✓	✓	✓	✓
Landscaping		✓	✓	✓		✓
Parking Lots, Sidewalks, Paved Areas	✓	✓	✓		✓	

Source: *Clean Water Partners: Make it your business to reduce water pollution and flooding*. Partnership for the Delaware Estuary, Inc., http://www.delawareestuary.org/, September 8, 2015.

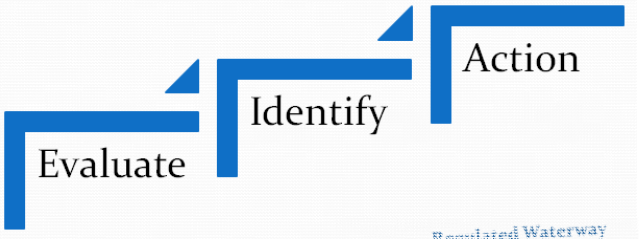
Storm Drain vs. Sanitary Sewer?

Gaithersburgmd.gov, 10/9/15

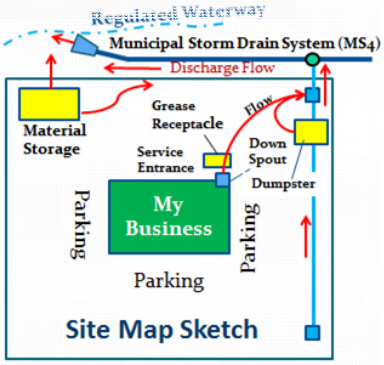
Unlike the sanitary sewer system, the storm drain system is NOT connected to the wastewater treatment plant. The sanitary sewer system takes wastewater from your business (toilets, sinks, dishwashers, and properly connected mop/clean up sinks) and sends it to a treatment plant that removes contaminants before it is released.

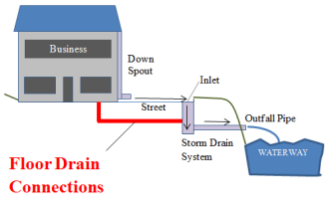
Inspecting Your Work Site

Businesses can take three simple steps to prevent pollutants from entering local waterways.



1. ***Evaluate current activities that could expose pollutants to precipitation or stormwater runoff***. Use a sketch map of your site to identify where the water goes. Assess indoor site characteristics in addition to outdoor.





2. ***Identify potential pollutants that could be exposed to precipitation or stormwater runoff and their sources***. Businesses that participate in the sample activities in the Common Pollutants table would particularly benefit from the following good housekeeping measures.
3. ***Take action*** to implement good housekeeping best management practices at your business. Use the self-inspection checklist, "Completing Your Stormwater Pollution Prevention Self-Inspection Checklist and Action Plan," to note where actions can be taken to make improvements that will prevent stormwater pollution. Contact the County for a courtesy site visit to review your self-inspection checklist and/or action plan with you. Feel free to call with questions. Consider becoming a Clean Water Partner to demonstrate and be recognized for your commitment.

CARROLL CLEAN WATER PARTNERSHIP

COMPLETING YOUR STORMWATER POLLUTION PREVENTION SELF-INSPECTION CHECKLIST AND ACTION PLAN

Assessment and action planning requires respondents to assess their current activities and identify any specific actions needed to prevent pollution and improve water quality stewardship.

To create your own Stormwater Pollution Prevention Action Plan, please fill out the following checklist. If you have any questions, please contact the Carroll County NPDES Compliance Specialist at (410) 386-2220 or gedwards@ccg.carr.org.

If you would like to take the additional step to become a Clean Water Partner, please review the process at the end of this assessment. You will be asked to provide a copy of the completed Stormwater Pollution Prevention Self-Checklist and Action Plan and verify when the action steps have been implemented.

Business Information

Business Name: _____

Type of Business: _____ No. of Employees: _____

Address: _____

_____ Zip: _____

Contact Person: _____

Title: _____ Phone: _____

Prepared by: _____ Date: ____/____/____

E-mail: _____ Fax: _____

Business Activities That Can Affect Water Quality

- Storing materials
- Preventing and cleaning up spills
- Maintaining Equipment and Vehicles
- Disposing of Fats, Oils, and Grease (FOG)
- Maintaining buildings paved areas
- Maintaining landscapes
- Managing wastes

A **best management practice (BMP)** is a technique, measure or structural control that is used for a given set of conditions to manage the quantity and improve the quality of stormwater runoff in the most cost-effective manner.

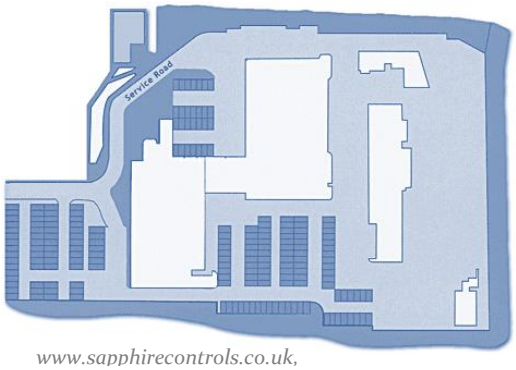
Good housekeeping BMPs are common sense measures that help businesses manage site activities and operations by preventing materials and wastes from being exposed to stormwater and thereby preventing stormwater runoff pollution.

Good Housekeeping Best Management Practices (BMPs)

Employ these Good Housekeeping BMPs to help prevent stormwater runoff pollution into nearby storm drain systems and waterways.

Know Your Work Site

- Update site sketch plans to reflect current plumbing connections, drains, and pipes.
- Identify specific activities with potential to cause spills or leak pollutants, such as grease, oils, fuel, etc. Designate specific areas for these activities where spills could be more easily contained and cleaned up.



www.sapphirecontrols.co.uk,

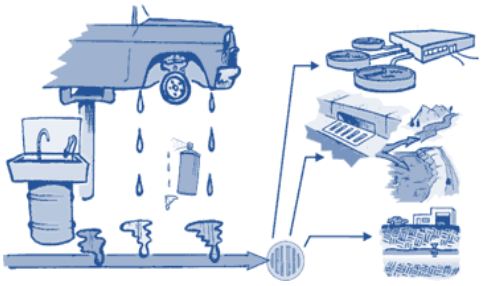
Keep Your Work Site Clean

- Keep spill clean-up kits readily accessible to all work areas.
- Sweep or vacuum the floor daily.
- Sweep sidewalks and parking lots periodically to remove debris. Dispose of debris in the garbage.

- Sweep outside around front and back doors to control litter and debris, cigarette butts, and packaging waste from customers and deliveries.

Prevent Spills & Leaks

- Check equipment, wipe up spills, and repair leaks on a daily basis.
- Ensure waste containers are in good condition and secured against wind and leakage.
- Monitor parked vehicles for leaks and place pans under leaks to collect fluids for proper disposal or recycling.



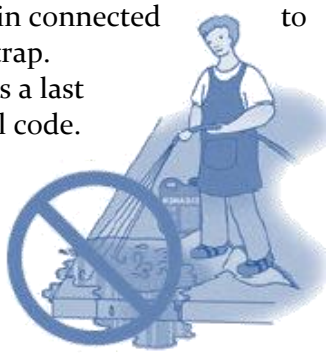
www.epa.illinois.gov, 11/4/15

Use Proper Clean Up Measures

- Use dry methods for spill cleanup (sweeping, cat litter, or absorbent). Use as little water as possible. Don't hose down spills outside.
- Use drain mats to cover drains in the event of a spill.
- Promptly dispose of collected fluids into secondary containment, using hazardous waste drum when required.

Control Outdoor Washing Activities

- Pour wash water into a janitorial or mop sink. Don't pour it outside or into the storm drain.
- Wash all equipment indoors with wastewater directed to floor drains or sinks.
- Clean floor mats, filters, and garbage cans in a mop sink, wash rack, or floor drain connected to the sewer through a grease trap.
- Wash items outdoors only as a last resort and according to local code.
- Wastewater from outdoor activities **must be contained**, recaptured, and disposed of into the sanitary sewer system. (ex. high pressure washing, etc.).



www.ewashtenaw.org, 9/21/15

- Wash vehicles in designated areas. Never discharge wash water into the street, gutter, or storm drain.
- Use oil separators, and dispose of other soapy water into sanitary sewer (both as required or allowed by law).
- Use a spray nozzle or bucket when possible to conserve water and minimize wastewater. Use a commercial car wash facility if site is not equipped properly for vehicle washing.

Control Litter, Store Trash Properly, & Recycle

- Provide employees and customers with an adequate number of receptacles for trash. Keep lids on trash/recycling cans, bins, and other outdoor containers.
- Collect trash and litter before it can be washed into the storm drain system.
- Place non-hazardous waste (trash, food, packaging, etc.) in sealed bags prior to disposal. Minimize liquids.
- Regularly inspect dumpsters for leaks and for loose trash. Cover dumpsters. Replace leaking dumpsters.
- Do not dispose of any materials in storm drain.

Reduce Waste and Recycle

- Minimize the number of solvents used to make recycling easier and to reduce hazardous waste management costs.
- Recycle and reuse solvents and other fluids where applicable and when possible.
- Carefully calculate paint and thinner needs before using.

Use Safer Alternatives

- Use non-hazardous cleaners when possible.
- Replace chlorinated organic solvents with non-chlorinated ones like kerosene or mineral spirits.

Protect Outdoor Work and Storage Areas

http://stormwater.pca.state.mn.us,1 1/4/15

- Store materials, such as grease, paints, detergents, metals, and raw materials in appropriate, labeled containers.
- Ensure all outdoor storage containers have lids and that they are kept closed.
- Store materials and waste off the ground and under roof so they will not be exposed to precipitation. If not under a roof, cover securely with an impervious material.
- If work must be done outdoors, prevent runoff from reaching storm drain inlets by berming and/or covering work areas.
- Move indoor activities that could cause pollution. If not possible, move away from drainage paths outside.

Use plants and landscaping to help control runoff pollution

Off a commercial parking lot at the 7Sigma Corporation in Minneapolis. http://www.watersheddistrict.org,11/4/15

- Plant native vegetation in sloped areas to help slow runoff and filter pollutants.
- Install rain gardens to collect and treat stormwater.
- Install rain barrels at down spouts to help collect rainwater from rooftops and prevent or minimize runoff.

Eliminate Illicit Drain Connections

- Plumb indoor drains according to local sanitary code. Do not discharge plumbing and drains to gutters or streams.

Label /Stencil and Inspect Storm Drain Inlets

- Label storm inlets at your site to alert employees that no fluids should be discharged to these drains.
- Regularly remove trash and debris from storm drain inlets to prevent accumulated pollutants from washing into them.

www.ewashtenaw.org, 9/21/15

Train and Educate Employees and Customers

- Ensure employees understand the effect their daily activities could have on water quality, as they are more likely to respond to training.
- Include stormwater pollution prevention / water quality training in employee orientations, reviews, and staff meetings.
- Assign an employee to be responsible for effective implementation of BMPs.
- Read and review this guide, sign, and date a training log.
- Consider offering incentives to employees who practice good housekeeping.
- Use signage to help direct customers to use good housekeeping measures at your business site.

www.cliparthut.com, 11/4/15

Conduct Routine Inspections

- Perform routine inspections to help ensure your work site complies with stormwater requirements.
- Make sure all pipes inside your business are properly connected to the sanitary sewer system.
- Review your current practices and look for areas where you can improve. Use the Stormwater Pollution Prevention Self-Inspection Checklist and Action Plan to assist with this process.
- Record any changes you make to document corrections and improvements.

For more information, help, or guidance regarding your business, contact:

Carroll County Department of Land & Resource Management
Phone: 410-386-2210

OR your municipality:

Hampstead	410-374-2761
Manchester	410-239-3200
Mount Airy	410-795-6012
New Windsor	410-635-6575
Sykesville	410-795-8959
Taneytown	410-751-1100
Union Bridge	410-775-2711
Westminster	410-848-9000

To report a concern about pollutants or possible illegal dumping into the storm drain system, contact:
Carroll County Resource Management Bureau, Environmental Inspection Services Division
Phone: 410-386-2210

For general information about stormwater pollution prevention, visit the "Protecting Carroll County Waters" webpage at:
http://ccgovernment.carr.org/ccg/plan/npdes/

Stormwater Pollution Prevention

Restaurants & Food Service Industry

Dear Owner/Manager:

You and your staff play an important role in keeping pollution out of the storm drain system and out of local streams. This stormwater protection guide is provided to help you comply with environmental storm drain system requirements within your local municipality and the county. It is illegal for unauthorized wastes or wash waters from your business to enter the **storm drain system**. You may have to pay for clean-up costs, fines, or encounter more stringent measures as a result of an incident through local, state, and federal regulations. The County's approachable and knowledgeable staff makes it easy for businesses to understand the water pollution regulations that affect them. If you have questions, you may contact your local municipality or the County agency contact on the back of this brochure.

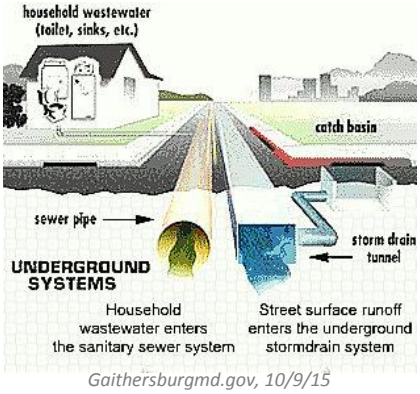
What is Stormwater Pollution?

The term stormwater is used to describe water from rain or snow. Stormwater that does not soak into the ground becomes surface runoff from roof tops, parking lots, streets, yards, and other impervious surfaces. This runoff flows into surface waterways or is channeled through storm drains.

Storm Drain vs. Sanitary Sewer?

Most storm drains flow directly into streams without any treatment. Newer storm drain systems may flow into a stormwater management facility and discharge to streams or infiltrate into the groundwater with potential contaminants.

Unlike the sanitary sewer system, the storm drain system is NOT connected to the wastewater treatment plant. The sanitary sewer system takes wastewater from your restaurant (toilets, sinks, dishwashers, and property connected mop/clean up sinks) and sends it to a treatment plant that removes contaminants before it is released.



Gaithersburgmd.gov, 10/9/15

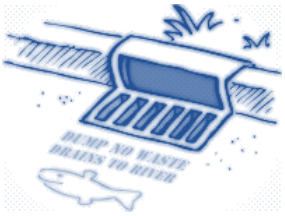
Good Housekeeping Best Management Practices (BMPs)

Employ these Good Housekeeping BMPs to help prevent stormwater runoff pollution into nearby storm drain systems and waterways.


www.adllawaz.com/equipment-financing/ 10/9/15

Manage Kitchen Grease Properly

- Keep grease storage containers clean and wiped off. Inspect regularly. Keep under roof if feasible.
- Prevent grease from dripping or overflowing when transferring and emptying containers.
- Ensure container lids should fit securely and are closed.



www.ewashtenaw.org, 9/21/15

- Regularly service grease containers by a licensed hauler and supervise activity.
- Never dump grease down a storm drain.

Trash/Recycling Storage and Handling

- Place non-hazardous waste (trash, food, packaging, etc.) in sealed bags prior to disposal. Minimize liquids.
- Keep lids on trash/recycling cans, bins, and other outdoor containers.
- Regularly inspect dumpsters for leaks and for loose trash. Replace leaking dumpsters.
- Do not dispose of any materials in storm drain.

Control Outdoor Washing Activities

- Pour wash water into a janitorial or mop sink. Don't pour it outside or into the storm drain.

http://www.adllawaz.com/equipment-financing/, 10/9/15

- Wash all equipment indoors with wastewater directed to floor drains or sinks.
- Clean floor mats, filters, and garbage cans in a mop sink, wash rack, or floor drain connected to the sewer through a grease trap.
- Wash items outdoors only as a last resort and according to local code. Wastewater from outdoor activities **MUST BE CONTAINED**, recaptured, and disposed of into the sanitary sewer system. (ex. high pressure washing, etc.)

Sweep Sidewalks and Parking Lots

- Sweep outside around front and back doors to control litter and debris, cigarette butts, and packaging waste from customers and deliveries.

Eliminate Illicit Drain Connections

- Plumb indoor drains according to local sanitary code. Do not discharge plumbing and drains to gutters or streams.

Spill Prevention/Dry Cleanup Measures

- Use dry methods for spill cleanup (sweeping, cat litter, or absorbent). Don't hose down spills outside.

Train and Educate Employees

- Ensure employees understand the effect their daily activities could have on water quality, as they are more likely to respond to training.
- Include stormwater pollution prevention / water quality training in employee orientations, reviews, and staff meetings.

Conduct Routine Inspections

- Perform routine inspections to help ensure your work site complies with stormwater requirements.
- Make sure all pipes inside your business are properly connected to the sanitary sewer system.
- Review your current practices and look for areas where you can improve. Use the *Stormwater Pollution Prevention Self-Inspection Checklist and Action Plan* to assist with this process.
- Record any changes you make to document corrections and improvements.

CARROLL CLEAN WATER PARTNERSHIP

COMPLETING YOUR STORMWATER POLLUTION PREVENTION SELF-INSPECTION CHECKLIST AND ACTION PLAN

Assessment and action planning requires respondents to assess their current activities and identify any specific actions needed to prevent pollution and improve water quality stewardship.

To create your own Stormwater Pollution Prevention Action Plan, please fill out the following checklist. If you have any questions, please contact the Carroll County NPDES Compliance Specialist at (410) 386-2220 or gedwards@ccg.carr.org.

If you would like to take the additional step to become a Clean Water Partner, please review the process at the end of this assessment. You will be asked to provide a copy of the completed Stormwater Pollution Prevention Self-Checklist and Action Plan and verify when the action steps have been implemented.

Business Information

Business Name: _____

Type of Business: _____ No. of Employees: _____

Address: _____

_____ Zip: _____

Contact Person: _____

Title: _____ Phone: _____

Prepared by: _____ Date: ____/____/____

E-mail: _____ Fax: _____

Business Activities That Can Affect Water Quality

- Storing materials
- Preventing and cleaning up spills
- Maintaining Equipment and Vehicles
- Disposing of Fats, Oils, and Grease (FOG)
- Maintaining buildings paved areas
- Maintaining landscapes
- Managing wastes

For more information, help, or guidance regarding your business, contact:

Carroll County Department of Land & Resource Management
Phone: 410-386-2210

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Westminster	410-848-9000

To report a concern about pollutants or possible illegal dumping into the storm drain system, contact: Carroll County Resource Management Bureau, Environmental Inspection Services Division
Phone: 410-386-2210

For general information about stormwater pollution prevention, visit the "Protecting Carroll County Waters" webpage at:
http://ccgovernment.carr.org/ccg/plan/npdes/

Stormwater Pollution Prevention

Auto-Related Industry

Dear Owner/Manager:

You and your staff play an important role in keeping pollution out of the storm drain system and out of local streams. This stormwater protection guide is provided to help you comply with environmental storm drain system requirements within your local municipality and the county. It is illegal for unauthorized wastes or wash waters from your business to enter the **storm drain system**. You may have to pay for clean-up costs, fines, or encounter more stringent measures as a result of an incident through local, state, and federal regulations. The County's knowledgeable staff make it easy for businesses to understand the water pollution regulations that affect them. If you have questions, you may contact your local municipality or the County agency contact on the back of this brochure.

What is Stormwater Pollution?

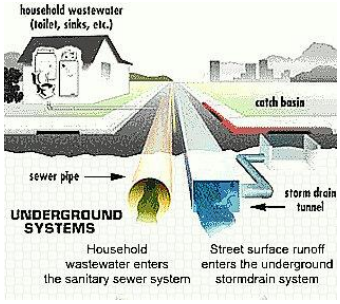
The term stormwater is used to describe water from rain or snow. Stormwater that does not soak into the ground becomes surface runoff from roof tops, parking lots, streets, yards, and other impervious surfaces. This runoff flows into surface waterways or is channeled through storm drains.

www.ewashtenaw.org, 9/21/15

Improper disposal of auto-related materials, such as fuel, oil, washwater, solvents, and other auto fluids, that come into contact with stormwater runoff can cause pollutants to enter the storm drain system and breakdown in the local waters. These pollutants may increase heavy metals and toxic chemicals, affect aquatic life, and impact water quality.

Storm Drain vs. Sanitary Sewer?

Most storm drains flow directly into streams without any treatment. Newer storm drain systems may flow into a stormwater management facility and discharge to streams or infiltrate into the groundwater with potential contaminants.



Gaithersburgmd.gov, 10/9/15

Unlike the sanitary sewer system, the storm drain system is NOT connected to the wastewater treatment plant. The sanitary sewer system takes wastewater from your restaurant (toilets, sinks, dishwashers, and property connected mop/clean up sinks) and sends it to a treatment plant that removes contaminants before it is released.

Good Housekeeping Best Management Practices (BMPs)

Employ these Good Housekeeping BMPs to help prevent stormwater runoff pollution into nearby storm drain systems and waterways.

Know Your Work Site and Keep It Clean

- Update site sketch plans to reflect current plumbing connections, drains, and pipes.
- Identify specific activities with potential to cause spills or leak pollutants, such as grease, oils, fuel, etc. Designate specific areas for these activities where spills could be more easily contained and cleaned up.
- Keep spill clean-up kits readily accessible to all work areas.
- Sweep or vacuum the floor daily.

Prevent Spills & Leaks

- Check equipment, wipe up spills, and repair leaks on a daily basis.
- Ensure waste containers are in good condition and secured against wind and leakage.
- Contain cracked batteries to prevent hazardous spills.

- Designate an area to drain vehicle fluids away from storm drains.
- Empty drip pans into labeled, sealed containers.
- Monitor parked vehicles for leaks and place pans under leaks to collect fluids for proper disposal or recycling.

Use Proper Clean Up Measures

- Use dry methods for spill cleanup (sweeping, cat litter, or absorbent). Use as little water as possible. Don't hose down spills outside.
- Use drain mats to cover drains in the event of a spill.
- Promptly dispose of collected fluids into secondary containment, using hazardous waste drum when required.

Control Outdoor Washing Activities

- Wash vehicles in designated areas. Never discharge wash water into the street, gutter, or storm drain.
- Use oil separators, and dispose of other soapy water into sanitary sewer (both as required or allowed by law).
- Use a spray nozzle or bucket when possible to conserve water and minimize wastewater. Use a commercial car wash facility if site is not equipped properly for vehicle washing.

Reduce Waste and Recycle

- Minimize the number of solvents used to make recycling easier and to reduce hazardous waste management costs.
- Recycle and reuse solvents and other fluids where applicable and when possible.
- Carefully calculate paint and thinner needs before using.

Use Safer Alternatives

- Use non-hazardous cleaners when possible.
- Replace chlorinated organic solvents with non-chlorinated ones like kerosene or mineral spirits.

Protect Outdoor Work and Storage Areas

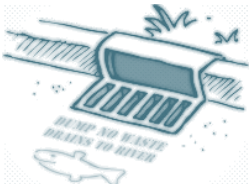
- Store materials and waste off the ground and under roof so they will not be exposed to precipitation. If not under roof, cover with an impervious material.
- If work must be done outdoors, prevent runoff from reaching storm drain inlets by berming and/or covering work areas.

Clean Engines and Parts Properly

- Use steam cleaning and pressure washing or water-based solutions instead of cleaning parts with solvent.
- Clean parts in a self-contained unit, solvent sink, or parts washer to prevent solvents and grease from entering a storm drain.

Label and Inspect Storm Drain Inlets

- Label storm inlets at your site to alert employees that no fluids should be discharged to these drains.



- Regularly remove trash and debris from storm drain inlets to prevent ac cumulated pollutants from washing into them.

Train and Educate Employees

- Ensure employees understand the effect their daily activities could have on water quality, as they are more likely to respond to training.
- Include stormwater pollution prevention / water quality training in employee orientations, reviews, and staff meetings.
- Read and review this guide, sign, and date a training log.

Conduct Routine Inspections

- Perform routine inspections to help ensure your work site complies with stormwater requirements.
- Make sure all pipes inside your business are properly connected to the sanitary sewer system.
- Review your current practices and look for areas where you can improve. Use the *Stormwater Pollution Prevention Self-Inspection Checklist and Action Plan* to assist with this process.
- Record any changes you make to document corrections and improvements.


CARROLL CLEAN WATER PARTNERSHIP

COMPLETING YOUR STORMWATER POLLUTION PREVENTION SELF-INSPECTION CHECKLIST AND ACTION PLAN

Business Information

Business Activities That Can Affect Water Quality

For more information, help, or guidance regarding your business, contact:

Carroll County Department of Land & Resource Management
Phone: 410-386-2210

OR your municipality:

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To report a concern about pollutants or possible illegal dumping into the storm drain system, contact: Carroll County Resource Management Bureau, Environmental Inspection Services Division
Phone: 410-386-2210

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http://ccgovernment.carr.org/ccg/plan/npdes/

CARROLL CLEAN WATER PARTNERSHIP

COMPLETING YOUR STORMWATER POLLUTION PREVENTION SELF-INSPECTION CHECKLIST AND ACTION PLAN

Assessment and action planning requires respondents to assess their current activities and identify any specific actions needed to prevent pollution and improve water quality stewardship.

To create your own Stormwater Pollution Prevention Action Plan, please fill out the following checklist. If you have any questions, please contact the Carroll County NPDES Compliance Specialist at (410) 386-2220 or gedwards@ccg.carr.org.

If you would like to take the optional step to become a Clean Water Partner, please review the process at the end of this assessment. You will be asked to provide a copy of the completed Stormwater Pollution Prevention Self-Checklist and Action Plan and verify when the action steps have been implemented.

Business Information

Business Name: _____

Type of Business: _____ No. of Employees: _____

Address: _____

_____ Zip: _____

Contact Person: _____

Title: _____ Phone: _____

Prepared by: _____ Date: _____/____/____

E-mail: _____ Fax: _____

Business Activities That Can Affect Water Quality

- Storing materials
- Preventing and cleaning up spills
- Maintaining Equipment and Vehicles
- Disposing of Fats, Oils, and Grease (FOG)
- Maintaining buildings paved areas
- Maintaining landscapes
- Managing wastes

IMPORTANT!

Directions for Completing this Checklist

1. For each question, check the appropriate answer box in the Assessment column (Always, Needs Improvement, or Not Applicable).
2. Next, check the corresponding box in the Action Plan column (Plan to Continue or Plan to Improve).
3. For every activity, indicate:
   - **Who** is, or will be responsible. It is best to answer with a job positon, i.e. facility manager.
   - **Schedule** or proposed date by which the activity will be completed.
   - **Action(s)**. Please provide additional details regarding the implementation of a proposed activity, or explain what is already being done.

(See example below)

The self-inspection assessment is not complete until this information is provided for each question.

For questions or assistance on the self-inspection checklist and action plan, contact:

Glenn Edwards
Carroll Clean Water Partnership
c/o Department of Land & Resource Management
225 North Center Street, Suite 204
Westminster, Maryland 21157
Phone: 410-386-2220
Fax: 410-386-2924
E-mail: gedwards@ccg.carr.org

Sample Checklist Question:

1. Steps are taken to minimize the amount of potentially polluting materials and wastes kept in storage.

ASSESSMENT / **ACTION PLAN**

❑ Not applicable
❑ Always ..... ❑ Plan to continue
☑ Needs Improvement ..... ☑ Plan to improve

Responsible job or staff position(s): Safety Manager

Schedule: Materials will be in place by 12/01

Action(s): Spill kits, absorbent pads, and spill response plans will be placed near all areas that have the potential for spills.

Storing Materials

ASSESSMENT **ACTION PLAN**

1. **Storage containers, including drums, waste dumpsters, and/or trash compactors, are free from cracks/leaks and have lids/covers that are kept closed.**

❑ Not applicable
❑ Always .....❑ Plan to continue
❑ Needs Improvement .....❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

ASSESSMENT **ACTION PLAN**

2. **Storage areas are enclosed or covered from the rain.**

❑ Not applicable
❑ Always .....❑ Plan to continue
❑ Needs Improvement .....❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

Preventing and Cleaning Up Spills

ASSESSMENT **ACTION PLAN**

3. **Steps are taken to prevent and contain spills (i.e., trays are placed under open containers and the spouts of liquid storage containers).**

❑ Not applicable
❑ Always .....❑ Plan to continue
❑ Needs Improvement .....❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

ASSESSMENT **ACTION PLAN**

4. **Clean-up materials are readily available and appropriate to the types and quantities of materials that could spill using dry clean-up methods (sweeping, damp mopping, absorbents, etc.).**

❑ Not applicable
❑ Always .....❑ Plan to continue
❑ Needs Improvement .....❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

ASSESSMENT **ACTION PLAN**

5. **Spill materials are prevented from entering the storm drain system.**

❑ Not applicable
❑ Always ……❑ Plan to continue
❑ Needs Improvement ……❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

ASSESSMENT **ACTION PLAN**

6. **Employees are trained in spill response.**

❑ Not applicable
❑ Always ……❑ Plan to continue
❑ Needs Improvement ……❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

Maintaining Equipment and Vehicles

ASSESSMENT **ACTION PLAN**

7. **Vehicles and equipment are regularly inspected for leaks; any leaks that are found are contained and cleaned up.**

❑ Not applicable
❑ Always ……❑ Plan to continue
❑ Needs Improvement ……❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

ASSESSMENT **ACTION PLAN**

8. **Vehicle repair and maintenance areas are covered or out of the rain.**

❑ Not applicable
❑ Always ……❑ Plan to continue
❑ Needs Improvement ……❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

ASSESSMENT **ACTION PLAN**

9. **Vehicle and equipment washing and other maintenance activities are performed *only* in designated areas that drain to the sanitary sewer or an enclosed holding tank.**

❑ Not applicable
❑ Always ……❑ Plan to continue
❑ Needs Improvement ……❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

Disposal of Fats, Oils, and Grease (FOG)

ASSESSMENT **ACTION PLAN**

10. **Equipment-cleaning wastewater is properly directed to a sanitary sewer.**

❑ Not applicable
❑ Always ……❑ Plan to continue
❑ Needs Improvement ……❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

ASSESSMENT **ACTION PLAN**

11. **Fats, oils, and grease are not dumped into storm drain inlets.**

❑ Not applicable
❑ Always ……❑ Plan to continue
❑ Needs Improvement ……❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

ASSESSMENT **ACTION PLAN**

12. **Steps are taken to prevent FOG spills. A clean-up procedure is available and implemented in the event a FOG spill should occur.**

❑ Not applicable
❑ Always ……❑ Plan to continue
❑ Needs Improvement ……❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

13. **All relevant fixtures like wall and flush-mounted sinks, automatic dishwashers, and floor drains are connected to a grease trap or interceptor leading to the sanitary sewer.**

ASSESSMENT **ACTION PLAN**

❑ Not applicable
❑ Always ……❑ Plan to continue
❑ Needs Improvement ……❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

14. **A watertight outdoor receptacle of adequate size is provided to dispose of FOG waste.**

ASSESSMENT **ACTION PLAN**

❑ Not applicable
❑ Always ……❑ Plan to continue
❑ Needs Improvement ……❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

Maintaining Buildings and Paved Areas

15. **The ground around dumpsters, stockpiles, and other outdoor storage areas is regularly cleaned.**

ASSESSMENT **ACTION PLAN**

❑ Not applicable
❑ Always ……❑ Plan to continue
❑ Needs Improvement ……❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

16. **Parking areas or access roads are free of signs of excessive oil and/or motor fluids, leaks, stains, litter, and sediments.**

ASSESSMENT **ACTION PLAN**

❑ Not applicable
❑ Always ……❑ Plan to continue
❑ Needs Improvement ……❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

ASSESSMENT **ACTION PLAN**

17. **Paved surfaces are regularly cleaned using dry methods.**

❑ Not applicable
❑ Always ……❑ Plan to continue
❑ Needs Improvement ……❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

ASSESSMENT **ACTION PLAN**

18. **Wastewater from pressure washing is kept out of the stormwater management system. Wastewater is collected and disposed of properly.**

❑ Not applicable
❑ Always ……❑ Plan to continue
❑ Needs Improvement ……❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

ASSESSMENT **ACTION PLAN**

19. **Runoff from rooftops is managed to protect water quality.**

❑ Not applicable
❑ Always ……❑ Plan to continue
❑ Needs Improvement ……❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

ASSESSMENT **ACTION PLAN**

20. **Storm drain inlets are checked on a regular schedule.**

❑ Not applicable
❑ Always ……❑ Plan to continue
❑ Needs Improvement ……❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

ASSESSMENT **ACTION PLAN**

21. **Contractors are required to implement practices consistent with this plan.**

❑ Not applicable
❑ Always .....❑ Plan to continue
❑ Needs Improvement .....❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

Maintaining Landscapes

ASSESSMENT **ACTION PLAN**

22. **Grass clippings and fertilizers are left on the lawn, not on pavement or inlets.**

❑ Not applicable
❑ Always .....❑ Plan to continue
❑ Needs Improvement .....❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

Managing Wastes

ASSESSMENT **ACTION PLAN**

23. **Steps are taken to ensure that water materials or wastewater are *not* dumped onto the ground or into storm drains.**

❑ Not applicable
❑ Always .....❑ Plan to continue
❑ Needs Improvement .....❑ Plan to improve

Responsible job or staff position(s): _____

Schedule: _____

Action(s): _____

_____

_____

CARROLL CLEAN WATER PARTNERSHIP

BECOMING A CLEAN WATER PARTNER *(optional)*

The purpose of the Carroll Clean Water Partnership (CCWP) is for sponsors to foster a business-friendly environment for local businesses to identify and address potential pollutants and good housekeeping measures, and, as a result, gain community recognition for Partners for their contribution to achieving clean water. The program aims to assist Partners with voluntary activities related to stormwater pollution prevention. The CCWP program will be a cooperative effort of the Carroll County Land & Resource Management (DLRM) Stormwater Program Staff, Carroll County Environmental Advisory Council (EAC), and the Carroll County Water Resource Coordination Council (WRCC).

Process to Become Partner:

1. ***Request information***. Program staff will be available to meet onsite to provide program overview.
2. ***Perform self-assessment/inspection***. To create your own Stormwater Pollution Prevention Action Plan, please fill out the self-inspection checklist. The action items included on the assessment will become your "action plan."

   Program staff will be available at any point during the self-assessment process for a courtesy visit to assist with the checklist to inventory good housekeeping measures and recommend best management practices appropriate for the site or to review the checklist and action plan at your facility when it is complete. Please contact the Carroll County NPDES Compliance Specialist at (410) 386-2220 or gedwards@ccg.carr.org.
3. ***Review Stormwater Pollution Prevention Self-Inspection Checklist and Action Plan with Program staff.*** Program staff will review your Stormwater Pollution Prevention Self-Inspection Checklist and Action Plan for completeness.
4. ***Sign Stormwater Pollution Prevention Self-Inspection Checklist and Action Plan***. The business owner/manager will sign this form to demonstrate the self-inspection checklist and action plan have been completed.
5. ***Commit to implement Stormwater Pollution Prevention Action Plan***. Participation in the program is voluntary. However, signing (below) indicates the Partner's commitment to implement the Action Plan and maintain good housekeeping practices following the signature date.
6. ***Verify with Program staff when the action steps have been implemented***.

Benefits:

- Partners will receive a framed Certificate of Partnership.
- Partners will be listed on the CCWP webpage.
- Partners are eligible for nomination for the EAC's Environmental Awareness Awards, but at a minimum, will be named at the Awards ceremony.
- Partners receive additional recognition and publicity through the CCWP website, public outreach efforts, and materials indicating sponsorships and partnerships associated with the program, which will increase name recognition and public awareness for the business.
- Partners may be able to network with other Partners who may share similar issues, good housekeeping practices, and best management practices.

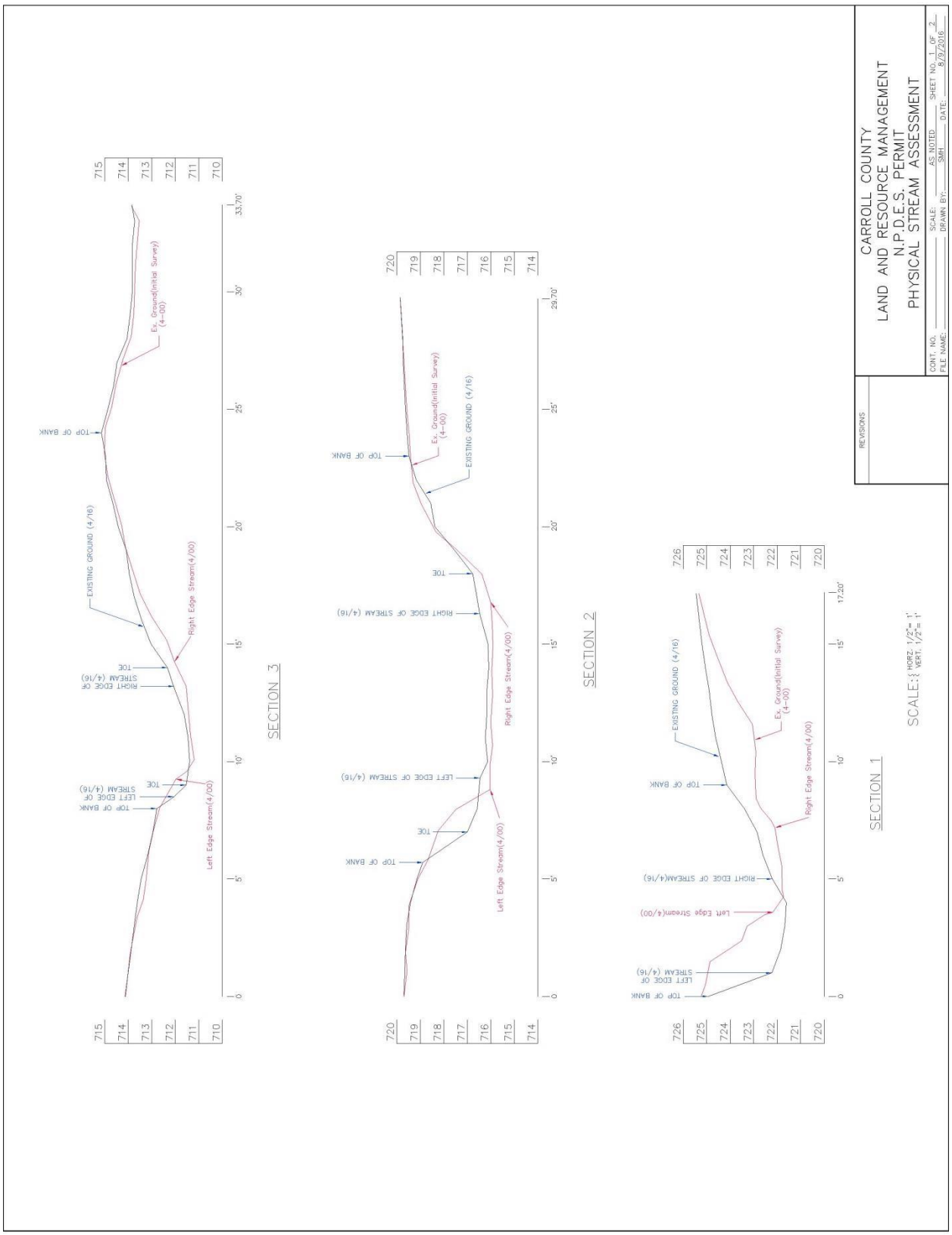
By signing below, the responsible party commits on behalf of this business to implement the Stormwater Pollution Prevention Self-Inspection Checklist and Action Plan.

_____	_____	_____
Business Name	*Date*	*Signature of Responsible Party*

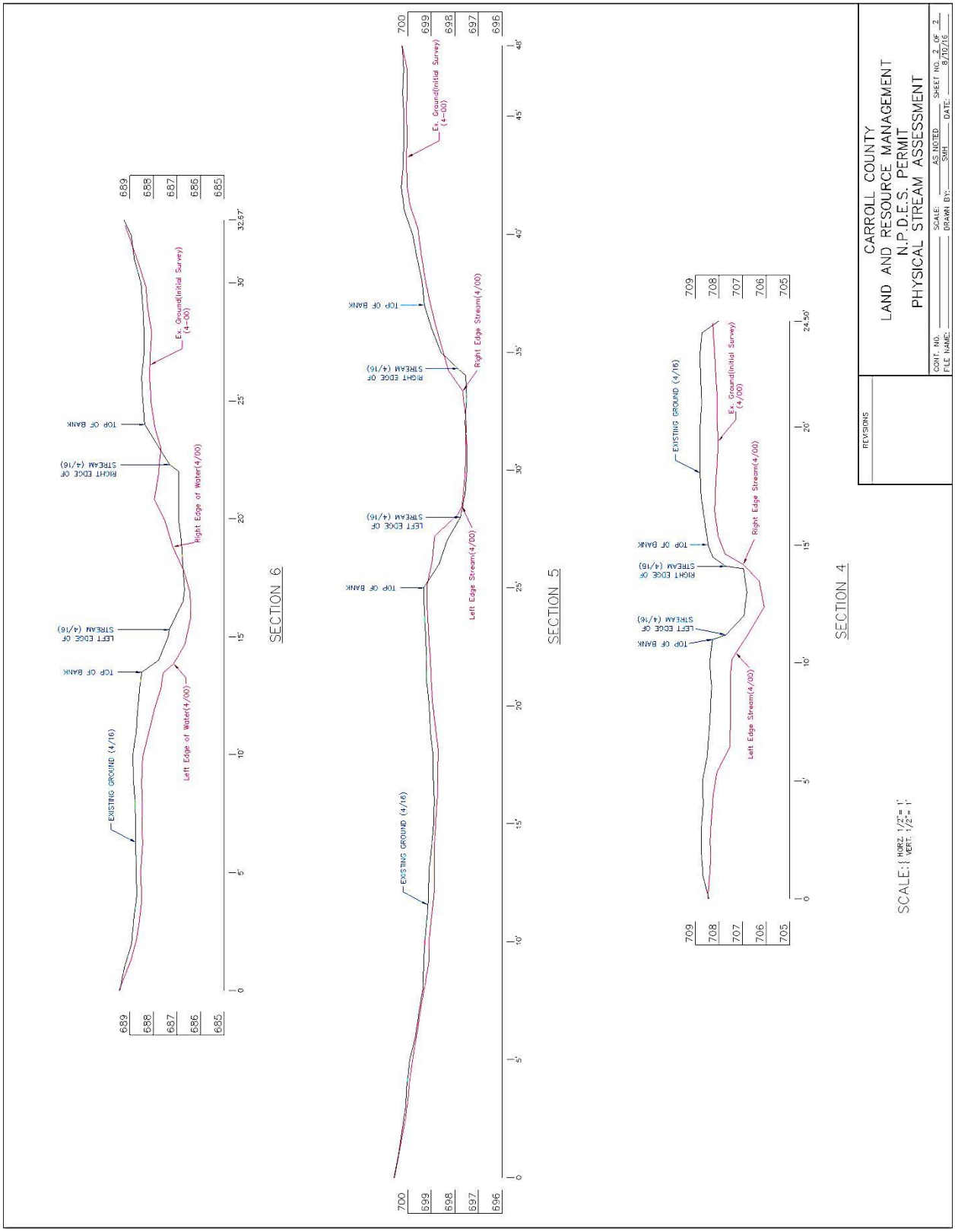
Appendix D

Monumented Cross Sections

- Physical Stream Assessment, Sections 1-6 (graphs)


CARROLL COUNTY
LAND AND RESOURCE MANAGEMENT
N.P.D.E.S. PERMIT
PHYSICAL STREAM ASSESSMENT
REVISIONS
CONT. NO.
FILE NAME:
SCALE: AS NOTED
DRAWN BY: SMH
SHEET NO. 1 OF 2
DATE: 8/9/2016
SECTION 1
SECTION 2
SECTION 3
SCALE: HORZ. 1/2" = 1'
VERT. 1/2" = 1'
Ex. Ground(Initial Survey) (4-00)
EXISTING GROUND (4/16)
Right Edge Stream(4/00)
Left Edge Stream(4/00)
TOP OF BANK
TOE
RIGHT EDGE OF STREAM (4/16)
LEFT EDGE OF STREAM (4/16)

Appendix D


CARROLL COUNTY
LAND AND RESOURCE MANAGEMENT
N.P.D.E.S. PERMIT
PHYSICAL STREAM ASSESSMENT
REVISIONS
SECTION 6
SECTION 5
SECTION 4
Ex. Ground(Initial Survey) (4-00)
Right Edge of Water(4/00)
Left Edge of Water(4/00)
Right Edge Stream(4/00)
Left Edge Stream(4/00)
EXISTING GROUND (4/16)
TOP OF BANK
RIGHT EDGE OF STREAM (4/16)
LEFT EDGE OF STREAM (4/16)
SCALE: HORZ. 1/2"= 1'
VERT. 1/2"= 1'

Appendix D