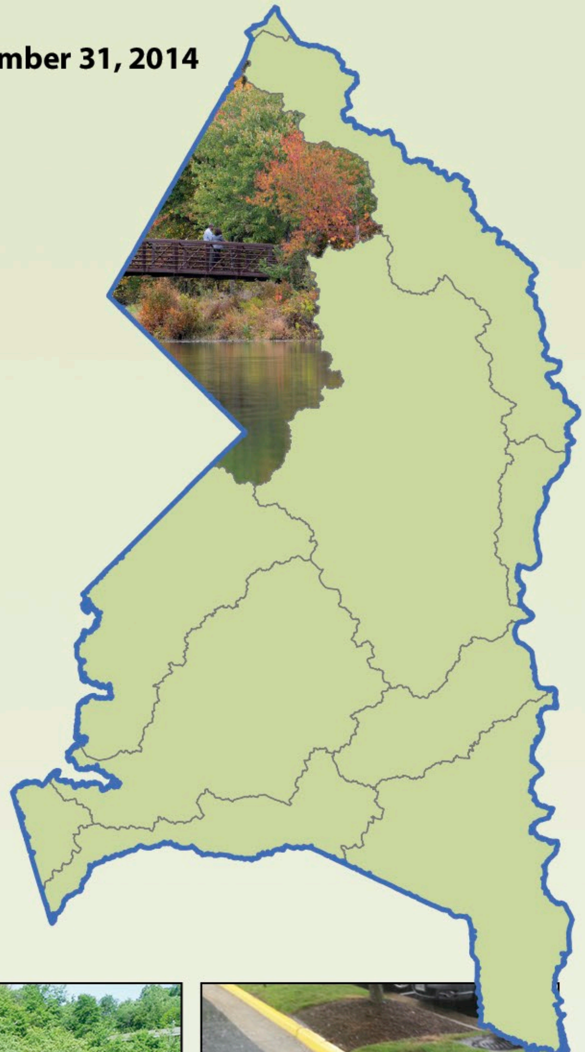
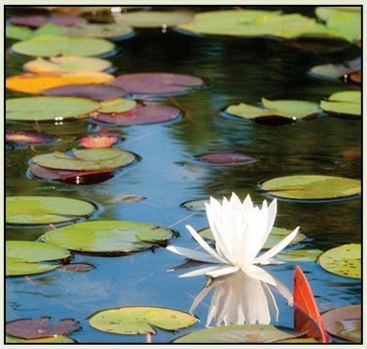
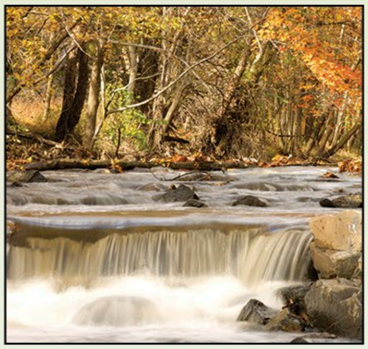
RUSHERN L. BAKER, III
COUNTY EXECUTIVE

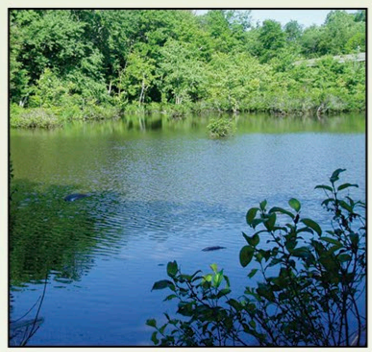
Prince George's County
DEPARTMENT OF THE
ENVIRONMENT

December 31, 2014



Watershed Existing Condition Report for the Anacostia River Watershed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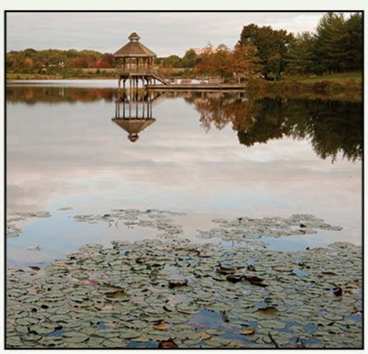


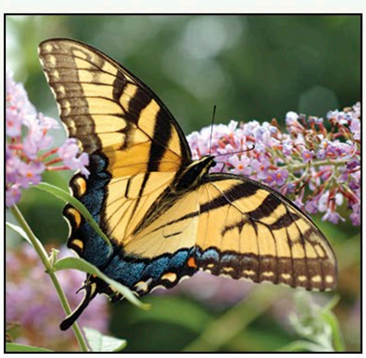
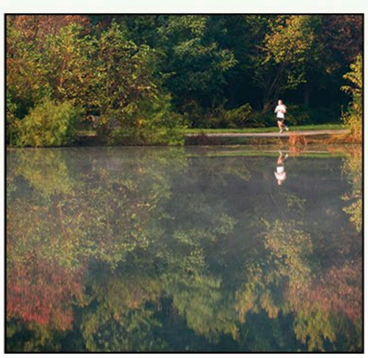

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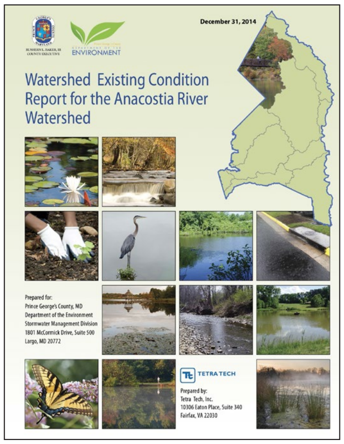

Watershed Existing Condition Report for the Anacostia River Watershed

December 31, 2014

Prepared for:
Prince George's County, Maryland
Department of the Environment
Stormwater Management Division

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ACRONYMS AND ABBREVIATIONS

ANC	acid neutralizing capacity
B-IBI	Benthic Index of Biotic Integrity
BMP	best management practice
BOD	biochemical oxygen demand
BSID	Biological Stress Identification
cfs	cubic feet per second
COMAR	Code of Maryland Regulations
DA	drainage area
DMR	discharge monitoring report
DO	dissolved oxygen
EPA	Environmental Protection Agency
ft/sec	feet per second
GIS	geographic information system
LAs	Load Allocations
LID	Low Impact Development
MDE	Maryland Department of the Environment
MDP	Maryland Department of Planning
mg/L	milligrams per liter
mL	milliliter
MOS	margin of safety
MPN	most probable number
MS4	Municipal Separate Storm Sewer System
NADP	National Atmospheric Deposition Program
NEB	Northeast Branch
NPDES	National Pollutant Discharge Elimination System
NWB	Northwest Branch
PCB	polychlorinated biphenyl
SR3	Sewer Repair, Replacement and Rehabilitation
SSO	sanitary sewer overflow
STATSGO	State Soil Geographic Database
STORET	STOrage and RETrieval
TMDL	Total Maximum Daily Load
TSS	total suspended solids
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency

USGS	U.S. Geological Survey
WIP	Watershed Implementation Plan
WLAs	wasteload allocations
WSSC	Washington Suburban Sanity Commission
WWTP	wastewater treatment plant

1 INTRODUCTION

On January 2, 2014, the Maryland Department of the Environment (MDE) issued Prince George's County (the County) a new municipal separate storm sewer system (MS4) permit. An MS4 is a series of stormwater sewers owned by a municipal entity (e.g., the County) that discharges the conveyed stormwater runoff into a water body (e.g., Northeast Branch [NEB]).

The County's new MS4 permit requires that the County develop local restoration plans to address each U.S. Environmental Protection Agency (EPA)-approved total maximum daily load (TMDL) with stormwater wasteload allocations (WLAs).

As a result of the County's new MS4 permit, restoration plans are being developed for all water bodies in the County that are subject to TMDL WLAs associated with the MS4 system. The County's MS4 system has been assigned WLAs in 10 separate TMDLs addressing pollutants in 5 water body systems:

- Anacostia River
- Mattawoman Creek
- Upper Patuxent River (including Rocky Gorge Reservoir)
- Potomac River
- Piscataway Creek

This report is an initial step in the restoration plan development process for the portions of the Anacostia River watershed that are within the County. It characterizes the watershed, includes a compilation and inventory of available information, provides a review of existing reports and data, and presents some additional data and spatial analyses. Unless otherwise noted, when the report references the "Anacostia River watershed," it refers to only the portion within the County.

1.1 Purpose of Report and Restoration Planning

Section 303(d) of the Clean Water Act and EPA's Water Quality Planning and Management Regulations (codified at Title 40 of the *Code of Federal Regulations* Part 130) require states to develop TMDLs for impaired water bodies. A TMDL identifies the maximum amount of pollutant load that the water body can receive and still meet water quality criteria. TMDLs provide the scientific basis for a state to establish water quality-based controls to reduce pollution from both point and nonpoint sources to restore and maintain the quality of the state's water resources (USEPA 1991).

Figure 1-1 shows a generalized TMDL schematic. The bar on the left represents the current pollutant load (sometimes called the baseline) that exists in a water body before a TMDL is developed. The elevated load causes the water body to exceed water quality criteria. The bar on the right represents the amount that the pollutant load will need to be reduced for the water body to meet water quality criteria. Another way to convey the required load reduction is by identifying the *percent reduction* needed.

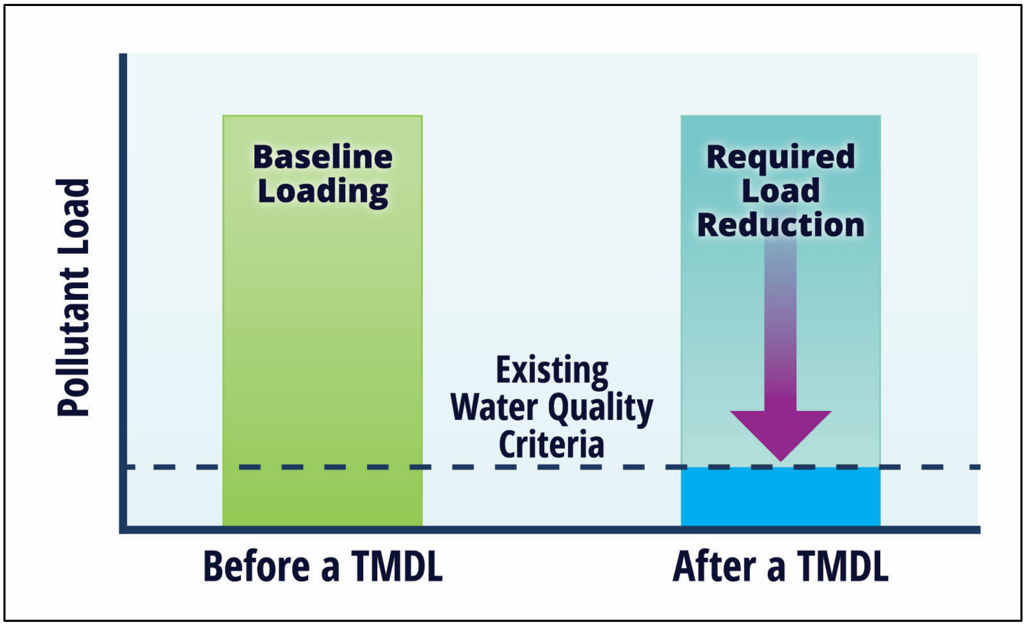


Figure 1-1. Schematic for typical pollution diet (TMDL).

A TMDL for a given pollutant and water body is composed of the sum of individual WLAs for point sources and load allocations (LAs) for nonpoint sources and natural background levels. In addition, the TMDL must include an implicit or explicit margin of safety (MOS) to account for the uncertainty in the relationship between pollutant loads and the quality of the receiving water body. The TMDL components are illustrated using the following equation:

$$TMDL = \Sigma\ WLAs + \Sigma\ LAs + MOS$$

A WLA is the portion of the overall pollution diet that is assigned to permitted dischargers, such as the County's MS4 stormwater system. The County's new MS4 permit requires that the County develop local restoration plans to address each EPA-approved TMDL with stormwater WLAs.

A restoration plan is a strategy for managing the natural resources within a geographically defined watershed. For the County's Department of the Environment, this means managing urban stormwater (i.e., water from rain storms) to restore and protect the County's water bodies. Stormwater management is most effective when viewed in the watershed context—watersheds are land areas and their network of creeks that convey stormwater runoff to a common body of water. Successful stormwater management consists of both structural practices (e.g., vegetated roadway swale) and public outreach (e.g., pet waste campaigns and education) at both the public and private levels. The restoration plan development process will address changes to the County's priorities to comply with water quality regulations, to improve the health of the streams in the County, and to create value for neighborhoods in the County's watersheds.

The overall goals of restoration planning are to:

- Protect, restore, and enhance habitat in the watershed.
- Restore watershed functions, including hydrology, water quality, and habitat, using a balanced approach that minimizes negative impacts.
- Support compliance with regional, state, and federal regulatory requirements.
- Increase awareness and stewardship within the watershed, including encouraging policymakers to develop policies that support a healthy watershed.

The first stage in completing these goals is to develop restoration plans. These plans typically:

- Identify causes and sources of pollution.
- Estimate pollutant load reductions.
- Describe management options and identify critical areas.
- Estimate technical and financial assistance needed.
- Develop an education component.
- Develop a project schedule.
- Describe interim, measurable milestones.
- Identify indicators to measure progress.
- Develop a monitoring component.

This report begins the process by collecting data needed for restoration planning and characterization of the watersheds. This will help identify potential sources and causes of the pollution.

1.2 Impaired Water Bodies and TMDLs

MDE has included the Anacostia River and its tributaries on its Section 303(d) list of impaired streams because of the following pollutants (listing year in parentheses):

- Nutrients (1996)
- Sediment (1996)
- Fecal coliform bacteria (2002 non-tidal waters and 2004 tidal waters)
- Impacts to biological communities (2002 non-tidal waters)
- Toxics (polychlorinated biphenyls [PCBs] 2002)
- PCBs in fish tissue in tidal waters (2006)
- Trash and debris (2008)

MDE developed TMDLs to address impairments caused by the violation of water quality standards for fecal coliform bacteria (*Enterococcus*), PCBs, biochemical oxygen demand (BOD), total nitrogen, total phosphorus, sediment, and trash. In addition, EPA recently (2010) developed an overall TMDL for the Chesapeake Bay watershed for nitrogen, phosphorus, and sediment. The

County has developed a Watershed Implementation Plan (WIP) in response to the Chesapeake Bay TMDL (PGC DER 2012). Table 1-1 presents the TMDLs and percent reduction WLAs for the Anacostia River watershed.

Table 1-1. TMDLs and Percent Reduction WLAs

Water Body	Pollutant	Percent Reduction WLA
Anacostia River	Nutrients (nitrogen, phosphorus)	TN: 81% TP: 81.2%
	Biochemical oxygen demand	BOD: 58%
	Fecal coliform bacteria (enterococci)	NEB/NWB: 80.3% Tidal: 99.3%
	Sediment, total suspended solids	85%
	PCBs	NEB: 98.64% NWB: 98.1%
	Trash	100%
Chesapeake Bay	Nitrogen, Phosphorus, and Sediment	TN: Varies by water body (10%-26%) TP: Varies by water body (32%-41%) TSS: Varies by water body (29%-31%)

Note: PCB=polychlorinated biphenyls; BOD=biological oxygen demand; TN=total nitrogen; TP=total phosphorus; TSS=total suspended solids; NEB=northeast branch; NWB=northwest branch

This report covers MDE TMDLs for nutrients, sediment, bacteria, BOD and PCBs. Appendix A contains fact sheets on these TMDLs. The fact sheets include information on the TMDLs' technical approaches, allocations, and other information.

1.2.1 Water Quality Standards

Water quality standards consist of designated uses, criteria to protect those uses, and antidegradation policies to protect waters from pollution. States assign designated uses based on their goals and expectations for water bodies. Each water body is assigned a designated use that should be attainable. Water quality criteria consist of narrative statements or numeric values designed to protect the designated uses. Water quality criteria describe the physical, chemical, and biological conditions necessary to support each designated use and might not be the same for all uses.

Portions of the Anacostia River have the following designated uses (*Code of Maryland Regulations* [COMAR] 26.08.02.08 O):

- Use Class I: Water Contact Recreation, and Protection of Nontidal Warmwater Aquatic Life
- Use Class II: Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting
- Use Class III: Non-tidal Cold Water
- Use Class IV: Recreational Trout Waters

Maryland's General Water Quality Criteria states that "the waters of this State may not be polluted by…any material, including floating debris, oil, grease, scum, sludge and other floating materials attributable to sewage, industrial waste, or other waste in amounts sufficient to be unsightly; produce taste or odor; change the existing color to produce objectionable color for aesthetic purposes; create a nuisance; or interfere directly or indirectly with designated uses" [COMAR 26.08.02.03B(2)]. Specific water quality criteria also apply for the specific pollutants addressed in the TMDLs for the Anacostia River watershed and are discussed below.

Bacteria Water Quality Criterion

Table 1-2 presents the Maryland water quality standards for bacteria used for all areas.

Table 1-2. Maryland bacteria water quality criteria

Indicator	Steady State Geometric Mean Indicator Density
Freshwater	
E. coli	126 MPN/100 mL
Enterococci[a]	33 MPN/100 mL
Marine Water	
Enterococci	35 MPN/100 mL

Notes:
MPN=most probable number; mL=milliliters.
[a] Used in the Anacostia River TMDL analysis.

Nitrogen/Phosphorus Water Quality Criterion

Maryland does not have numeric criteria for nitrogen or phosphorus, so other parameters, such as dissolved oxygen (DO) are used in the TMDL process. Table 1-3 summarizes the Maryland DO criteria applicable to the nutrients and BOD TMDL.

Table 1-3. Maryland dissolved oxygen water quality criteria

Designated Use	Period Applicable	DO Criteria
MD Use I-P	Year-round	≥ 5 mg/L (instantaneous)
MD Use II: Migratory Fish Spawning and Nursery Subcategory	2/1–5/31	≥ 5.0 mg/L (instantaneous) ≥ 6.0 mg/L (7-day average)
MD Use II: Open Water Fish and Shellfish Subcategory	6/1–1/31	≥ 3.2 mg/L (instantaneous) ≥ 4.0 mg/L (7-day average) ≥ 5.5 mg/L (30-day average applicable all year) ≥ 4.3 mg/L (instantaneous for water temperature > 29 °C for protection of Shortnose Sturgeon)
MD Use III	Year-round	≥ 5 mg/L (instantaneous) ≥ 6 mg/L (1-day average)
MD Use IV	Year-round	≥ 5 mg/L (instantaneous)

Note: DO = dissolved oxygen; mg/L= milligrams per liter.

PCB Water Quality Criteria

Water quality criteria for toxic substances are found in COMAR 26.08.02.03-2 (*Numerical Criteria for Toxic Substances in Surface Waters*). The PCB human health criterion for consumption of organism and drinking water is 0.00064 micrograms per liter (µg/L), while the aquatic life criterion for freshwater is 0.014 µg/L, and for salt water is 0.03 µg/L. The Maryland impairment threshold for PCBs in fish tissue is 88 parts per billion (ICPRB 2007).

Sediment Water Quality Criterion

Non-tidal portions of the watershed are subject to Maryland's General Water Quality Criteria, for the protection of aquatic life. For tidal portions, it is based on average Secchi disk depth equal to or greater than 0.4 meters for April 1 through October 31 of each year. Secchi depth is a measure of the clarity of water. The criterion is meant to protect submerged aquatic vegetation in the tidal portions of the watershed.

1.2.2 Problem Identification and Basis for Listing

Documentation for TMDLs includes discussion of the issues driving TMDL development, such as a description of the problem conditions that prompted a 303(d) listing as well as any monitoring data that were used to document and support the listing. This section provides a summary of the various problems identified in the Anacostia River watershed and the data supporting the impairment decisions. Tidal impairments and listings are discussed first, followed by non-tidal impairments.

Tidal portions of the Anacostia River have been listed for sediment and nutrients, PCBs in fish tissue, and fecal coliform bacteria. For tidal portions of the Anacostia River, the Chesapeake Bay Program provides the framework against which constituents such as nutrients, sediment, DO, and chlorophyll *a* concentration are measured to determine the health of the Chesapeake Bay and its tributaries. Long-term monitoring data collected in the Anacostia River showed violations of minimum DO concentrations, clarity standards, and chlorophyll *a* concentrations. Long-term Secchi depth growing season medians for the most upstream segments, representing water clarity conditions from the confluence of the Northeast and Northwest branches (NEB and NWB, respectively) in Maryland to the New York Avenue Bridge at approximately the Maryland-DC line, were at or above 0.4 meters, the Maryland criterion. Median Secchi depths were less than the District of Columbia's (the District) 0.8-meter depth criteria in the middle portions of the tidal Anacostia, which is the most stringent downstream criteria driving reductions from Maryland portions of the watershed. The tidal PCB listing was driven by ambient water column and fish tissue data collected from 2002 to 2007 showing that the existing PCB water quality criteria were not protective of fish tissue concentrations in the tidal Potomac and Anacostia rivers. For the TMDL, target water column concentration targets were calculated to be protective of fish tissue concentrations.

Non-tidal portions of the Anacostia River are impaired because of nutrients, sediment, impacts to biological communities, PCBs, and fecal coliform bacteria. The 1993–1995 Maryland Water Quality Inventory provided the original narrative basis for the nutrients and BOD listings, indicating that erosion, sediment, and high levels of bacteria were the primary causes of impaired water quality in the non-tidal portions of the watershed. Data collected more recently for the

TMDL analyses indicated that, related to the nutrients and BOD listings in non-tidal portions of the watershed, DO and chlorophyll *a* concentrations were not problematic. As a result, reductions in nutrients and BOD in non-tidal portions are driven by levels required to meet standards in the tidal portions of the Anacostia River. Data related to sediment in the non-tidal streams of the Anacostia River watershed included biological monitoring data and measurements of suspended solids in water samples. Biological indices categorize the condition of benthic communities in most sites in the non-tidal Anacostia as Poor to Very Poor and fish communities as Poor to Very Good. The PCB impairment in the NEB and NWB occurred because of exceedence of human health criteria for water column PCBs. It has been estimated that PCBs contaminate 4 percent of the river bottom of the Anacostia River mainstem (MWCOG 2010).

Finally, for both tidal and non-tidal waters of the Anacostia River, fecal bacteria listings were based on a comparison of the criterion value (33 most probable number [MPN] *Enterococcus*) with calculated annual and seasonal steady state geometric means for different flow strata. The *steady state condition* is defined as "unbiased sampling targeting average flow conditions and/or equally sampling or providing for unbiased sampling of high and low flows." (MDE 2006). It is determined through monitoring design or statistical analysis. In the case of this TMDL, the monitoring was routine (i.e., it did not stratify monitoring such that samples collected were proportional to the duration of time the watershed experiences low, mid-, and high flows). The assessment process involved separating monitoring data into flow categories to calculate the steady state geometric mean with respect to flow regimes. Data were then compared to criteria and the impairment assessment was made.

1.2.3 TMDL Identified Sources

Nutrients and BOD are attributed to stormwater runoff, erosion and in-stream scour, subsurface drainages, point source discharges, and sanitary sewer overflows. Sources that contribute bacteria in the watershed include wildlife and domestic animals via nonpoint loading from land surfaces, and humans via septic systems, sanitary sewer overflows (SSOs), and municipal wastewater treatment plants. Sources of sediment in the Anacostia River include agriculture, sand and gravel mining, and construction activities. Stream channel erosion is considered to be the most significant source of sediment. Tidal resuspension of bed sediments is also a factor in the tidal portions. Approximately 85 percent of sediment entering the tidal Anacostia from the non-tidal portions stays there, remaining suspended before settling to the bed. Tidal action impedes settling and continually promotes resuspension of sediments. Model scenarios predict that with no incoming sediment loads from non-tidal portions, sediment concentrations in the tidal Anacostia would approximate 5 milligrams per liter (mg/L) because of tidal resuspension alone (MDE and DDOE 2007). Sources of PCBs in the watershed are generally from legacy-polluted sites, and are contributed by runoff from those sites as well as stormwater. Legacy pollution happens when previously contained PCB laden sediments are exposed or displaced and washed into surface waters during rainfall events. Additional sources of PCBs to the watershed might be from illegal or improper dumping, and improper disposal of PCB containing products.

1.2.4 Previous Studies

In 2011 the County developed a Countywide WIP in response to the 2010 Chesapeake Bay Nutrient and Sediment TMDL. The WIP was finalized in 2012 and laid out a plan for best management practice (BMP) implementation and other restoration activities through 2017 and 2025. In addition to urban stormwater runoff, the WIP covered agricultural practices and upgrades to wastewater systems (i.e., municipal wastewater treatment plants and on-site wastewater systems). Although the plan is Countywide, aspects from it will be used to develop the restoration plan for the Anacostia River watershed. The County's final WIP can be viewed at www.mde.state.md.us/programs/Water/TMDL/TMDLImplementation/Documents/FINAL_PhaseII_Report_Docs/Final_County_WIP_Narratives/PG_WIPII_2012.pdf.[1]

In 2005 the Maryland Department of Natural Resources produced a series of reports on the Anacostia River watershed. These reports include (1) *Report on Nutrient Synoptic Surveys in the Anacostia River Watershed, Prince George's County, Maryland, April, 2004 as part of a Watershed Restoration Action Strategy*; (2) *Anacostia River Stream Corridor Survey*; and (3) *Characterization of the Anacostia River Watershed in Prince George's County*. The first report looked at data collected during 2004 in the watershed at multiple stations. The report found that nutrients did not appear to be a significant problem at that time; however, there were issues with low DO concentrations. The second report assessed the conditions of the stream channels by looking at several factors such as inadequate stream buffers, channel alterations, trash dumping, exposed pipes and pipe outfalls, and erosion. The last report was an earlier watershed characterization that covers several similar topics to this report.

A series of reports in 2009 and 2010 was developed for and by the Anacostia Watershed Restoration Partnership for 15 major subwatersheds in the Anacostia River watershed in Montgomery County, Prince George's County, and the District. Each subwatershed has a subwatershed action plan, baseline condition report, and project inventory. The subwatershed action plans and project inventory reports looked at the existing impervious areas and BMPs, and then evaluated and suggested potential (public and private) projects in each subwatershed. Table 1-4 presents a summary of selected proposed activities from the subwatershed action plans. Certain restoration activities, such as trash removal, fish passages, and land acquisition, were removed from the list. The plans call for more than $1 billion in restoration activities for treating 6,500 acres of impervious land and 11,500 acres of total land area. The Anacostia Watershed Restoration Partnership estimated that implementing the plans' activities would achieve the following reductions: 81,800 pounds per year (lb/year) of nitrogen, 9,300 lb/year of phosphorus, 2,300 tons/year total suspended solids (TSS), and 2.9 million billion counts/year of bacteria. The most implemented practice was bioretention systems.

[1] Accessed June 6, 2014.

Table 1-4. Summary of selected proposed restoration activities in the Anacostia Watershed Restoration Partnership's subwatershed action plans.

Restoration Practice	Number of Practices	Number on Private Land	Percent on Private Land
Bioretention	1,501	612	41%
Bioswale	202	62	31%
Downspout disconnection	516	105	20%
Dry pond	58	19	33%
Education and outreach	14	1	7%
Extended detention pond	2	1	50%
Filter	647	275	43%
Fish passage	82	15	18%
Green roof	480	86	18%
Infiltration practices	7	2	29%
Inlet grates	66	7	11%
Invasive species removal	42	3	7%
Land acquisition	115	100	87%
Manhole maintenance	2	0	0%
Meadow	3	3	100%
Parkland acquisition	24	17	71%
Permeable pavement	244	25	10%
Pipe modification	7	2	29%
Pipe removal	2	0	0%
Pipe storage	207	69	33%
Pond modification	2	1	50%

Restoration Practice	Number of Practices	Number on Private Land	Percent on Private Land
Rain barrel	201	16	8%
Rain garden	383	60	16%
Reforestation	18	0	0%
Riparian buffer	29	8	28%
Sand filter	3	1	33%
Sheet flow	1	0	0%
Signs	8	0	0%
Storm filter	1	1	100%
Stream habitat	4	0	0%
Stream restoration	168	44	26%
Street sweeping	79	0	0%
Support structure	1	1	100%
Trash	194	20	10%
Trash train	2	0	0%
Underground storage	1	1	100%
Vernal pools	13	1	8%
Wet pond	112	36	32%
Wetland	88	30	34%
Wetland creation	2	0	0%
Wetland restoration	37	9	24%

2 WATERSHED DESCRIPTION

The Anacostia River watershed lies across the northwestern portions of the County, as well as portions of Montgomery County and the District (Figure 2-1). In Maryland, it includes the municipalities of Berwyn Heights, Bladensburg, Brentwood, Capital Heights, Cheverly, College Park, Colmar Manor, Cottage City, Edmonston, Fairmount Heights, Glenarden, Greenbelt, Hyattsville, Landover Hills, Mount Rainier, New Carrollton, North Brentwood, Riverdale Park, Seat Pleasant, and University Park. The watershed also contains a large area of federal land (Beltsville Agricultural Research Center and Greenbelt Park) and state-owned land (University of Maryland).

The mainstem of the Anacostia River is 8.4 miles long, beginning at the confluence of the NWB and the NEB and ending at the Potomac River in the District. The Anacostia River watershed spans both Maryland and the District. The non-tidal reaches are predominantly in Prince George's and Montgomery counties in Maryland. The lower, tidal portions are mostly in the District; however, a portion of the tidal mainstem extends into the County. The watershed is 173 square miles, 145 of which are in Maryland. In Maryland, the Anacostia River is classified as a *Wild and Scenic River*. The major drainages in the County include NEB, NWB, Lower Beaverdam Creek, Watts Branch, and the tidal drainage.

The watershed has been inhabited for more than 4,000 years, but European colonization began in the 1700s. Historically a predominately forested watershed, agriculture dominated through the late 1800s, after which time urbanization began to replace agricultural land uses. The County portion of the watershed has a broad mix of land uses, ranging from undeveloped forestland and agriculture to high-density development. The population of the Anacostia River watershed is more than 800,000 persons. Figure 2-2 presents the population density (2010 U.S. Census population per square mile of the census tract). The western portions of the watershed are the most densely populated with more than 24,000 people per square mile.

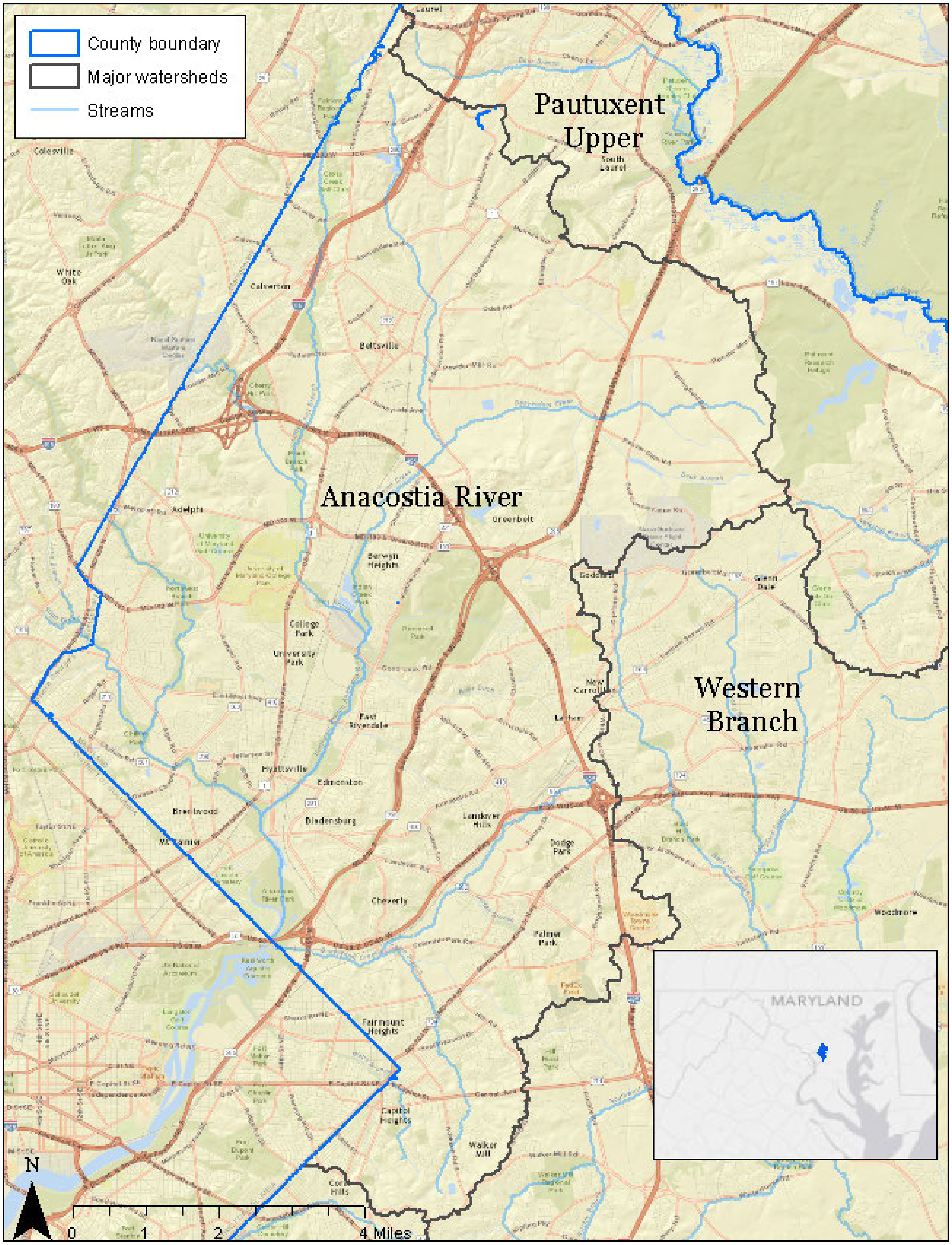
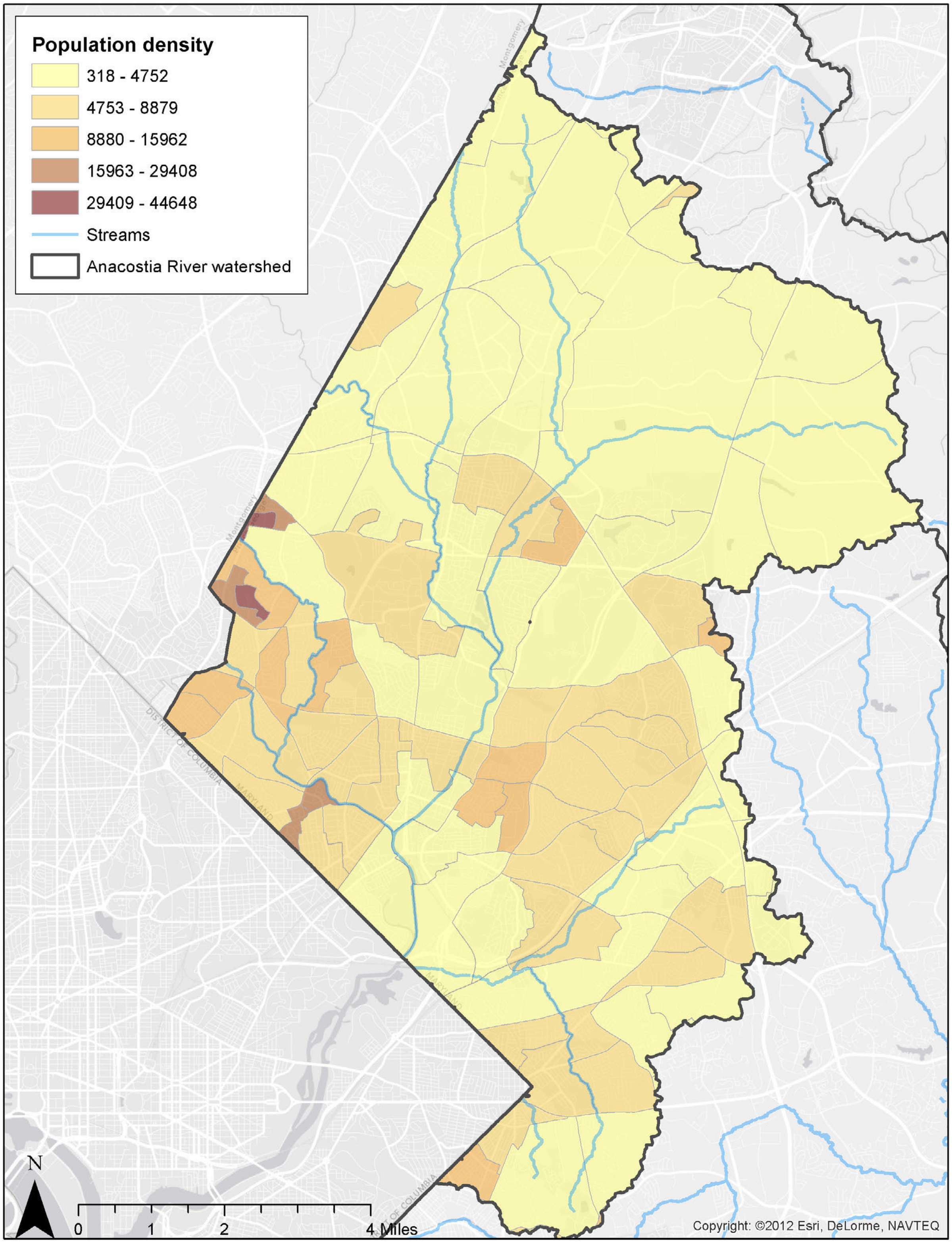


Figure 2-1. Location of the Anacostia River watershed.



Source: Population data is from 2010 US Census

Figure 2-2. Population density (people per square mile) in the Anacostia River watershed.

2.1 Physical and Natural Features

2.1.1 Hydrology

The Anacostia River watershed is made up of 15 subwatersheds: NWB, Sligo Creek, Paint Branch, Little Paint Branch, Indian Creek, Upper Beaverdam Creek, Still Creek, Brier Ditch, NEB, Lower Beaverdam Creek, Watts Branch, Fort Dupont Tributary, Pope Branch, Hickey Run, and the tidal river. With the exception of Hickey Run, Fort Dupont Tributary, and Pope Branch, all of the subwatersheds have a portion in the County. The majority of the land in the watershed is drained by MS4 outfalls. In the Maryland portion of the watershed, 9,500 acres drain directly to the Anacostia River and tributaries, and the remaining 82,600 acres are drained via MS4 outfalls. The County has 44,000 acres of MS4 drainage (MDE and DDOE 2010). The tributary system of the Anacostia River is described as *flashy*, meaning there is a quick rise in stream level because of rainfall (MWCOG 2010).

2.1.2 Climate/Precipitation

The Anacostia River watershed is in a temperate area. The National Weather Service Forecast Office (2014b) reports a 30-year average annual precipitation of 39.74 inches. No strong seasonal variation in precipitation exists. On average, winter is the driest with 8.48 inches, and summer is the wettest with 10.44 inches (National Weather Service Forecast Office 2014a).The average annual temperature is 58.2 degrees Fahrenheit. The January normal low is 28.6 °F and the July normal high is 88.4 °F.

Evapotranspiration accounts for water that evaporates from the land surface (including water bodies) or is lost through plant transpiration. Evapotranspiration varies throughout the year because of climate, but is greatest in the summer. Potential evapotranspiration (Table 2-1) is the environmental demand for evapotranspiration.

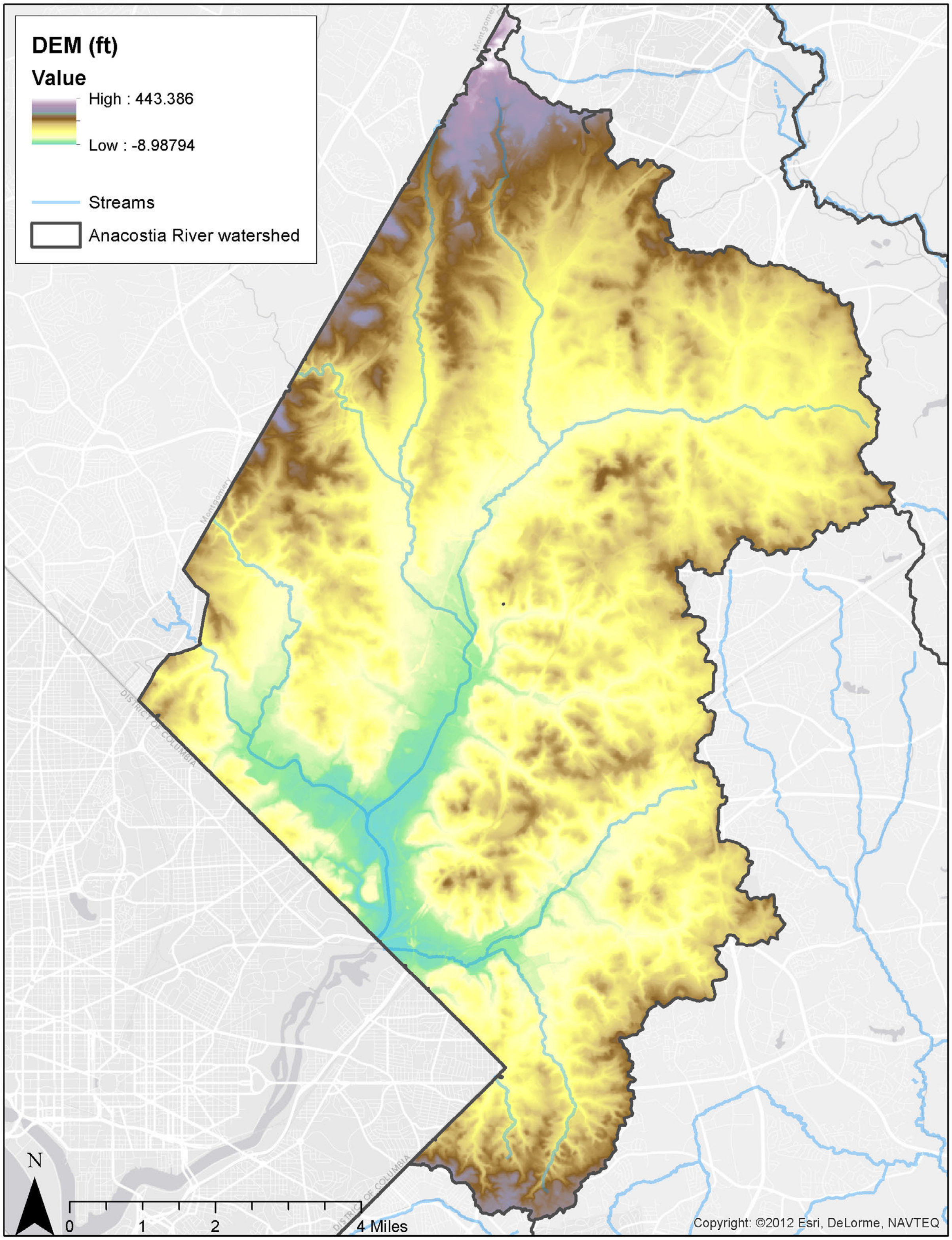
Table 2-1. Average monthly (1975–2004) potential evapotranspiration (inches)

January	February	March	April	May	June
0.60	0.86	1.69	2.74	3.86	4.30
July	**August**	**September**	**October**	**November**	**December**
4.59	4.01	2.85	1.88	0.98	0.62

Source: NRCC 2014

2.1.3 Topography/Elevation

According to the Maryland Geological Survey, the Fall Line between the Atlantic Coastal Plain and the Piedmont approximates the boundary between Prince George's and Montgomery counties. The majority of the County portion of the watershed is in the coastal plain, which is underlain by unconsolidated sediments, including gravel, sand, silt, and clay (MGS 2014). The coastal plain is characterized by gentle slopes, meandering streams, and lower relief. The watershed is relatively flat with elevations typically only between sea level and 200 feet. The highest elevations in the watershed are in the northern portion, with the lowest portions following the mainstems of NEB, NWB, and Beaverdam Creek (Figure 2-3).



Source: DEM is from Prince George's County

Figure 2-3. Elevation in the Anacostia River watershed.

2.1.4 Soils

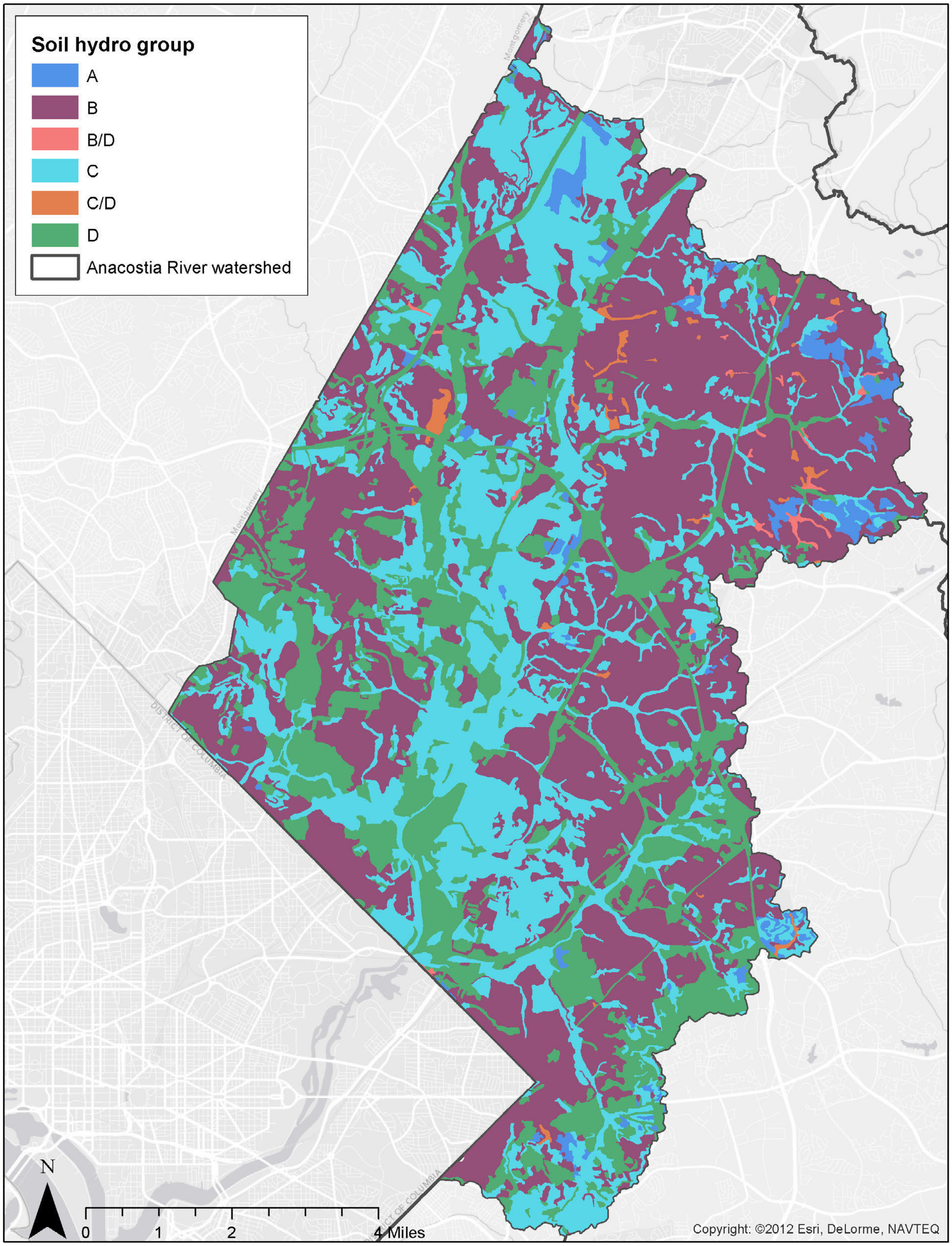
The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service has defined four hydrologic soil groups, providing a means for grouping soils by similar infiltration and runoff characteristics during periods of prolonged wetting. Poorly drained clay soils (Group D) have the lowest infiltration rates, resulting in the highest amount of runoff, while well-drained sandy soils (Group A) have high infiltration rates, with little runoff.

Figure 2-4 presents the USDA hydrologic soil group data. For some areas, the USDA data were null; therefore, the information was filled in with State Soil Geographic Database (STATSGO) data. The majority of the watershed is underlain by hydrologic group B and C soils. Hydrologic soil group A is the least represented in the watershed.

Soils in the watershed are frequently also classified as “urban land complex” or “udorthent” soils. These are soils that have been altered by disturbance because of land development activities. Soils affected by urbanization can have a higher density because of compaction during construction activities, and might be more poorly drained. Note that natural pervious land covers on Group B soils have very little runoff compared to that from disturbed soils.

Soils of the NWB tributary are predominantly in the Manor-Glenelg-Chester soil series, which are Piedmont soils. These soils are fine-loamy, mixed mesic Typic Hapludults and are very deep and well-drained (Maryland Soil Conservation Service 1995).

NEB tributary soils are mostly in the Sunnyside-Christiana-Muirkirk soil series, which is a Coastal Plain soil. The Sunnyside soils are mostly red, deep, and well-drained. The Christiana-Muirkirk soils are also red and deep, but are less permeable than the Sunnyside soils (Maryland Soil Conservation Service 1967). Below the confluence of the NEB and NWB, the soils are primarily in the Sunnyside-Christiana-Muirkirk soil series and the Beltsville-Croom-Sassafras soil series (STATSGO). The Beltsville-Croom-Sassafras series is gently sloping to steep and dominantly gravelly (Maryland Soil Conservation Service 1967).



Source: 2002 Soils are from USDA NRCS

Figure 2-4. Hydrologic soil groups in the Anacostia River watershed.

2.2 Land Use and Land Cover

Land use, land cover, and impervious area are some of the most important factors that influence the amount of pollution entering the County's water bodies. Pollutants, like excess nitrogen or bacteria, vary on the basis of different land uses (e.g., commercial, agriculture, and parks). Increased impervious area increases the amount of runoff a rain event produces, thus transporting more pollutants to a water body in a shorter period of time.

2.2.1 Land Use Distribution

Land use information for the watershed is available from the previous watershed reports, TMDL reports, and previous restoration planning efforts, in addition to the Maryland Department of Planning (MDP) 2010 land use update (MDP 2010). Data from previous reports and the 2010 MDP are presented below for comparison and to illustrate how land use has changed in the watershed. However, only the MDP land use data are available as geographic information system (GIS) data, so these data are what will be used in the restoration plan. Land uses are made of many different land covers, such as roads, roofs, turf, and tree canopy. The proportion of land covers in each land use control the hydrologic and pollutant loading response of such uses.

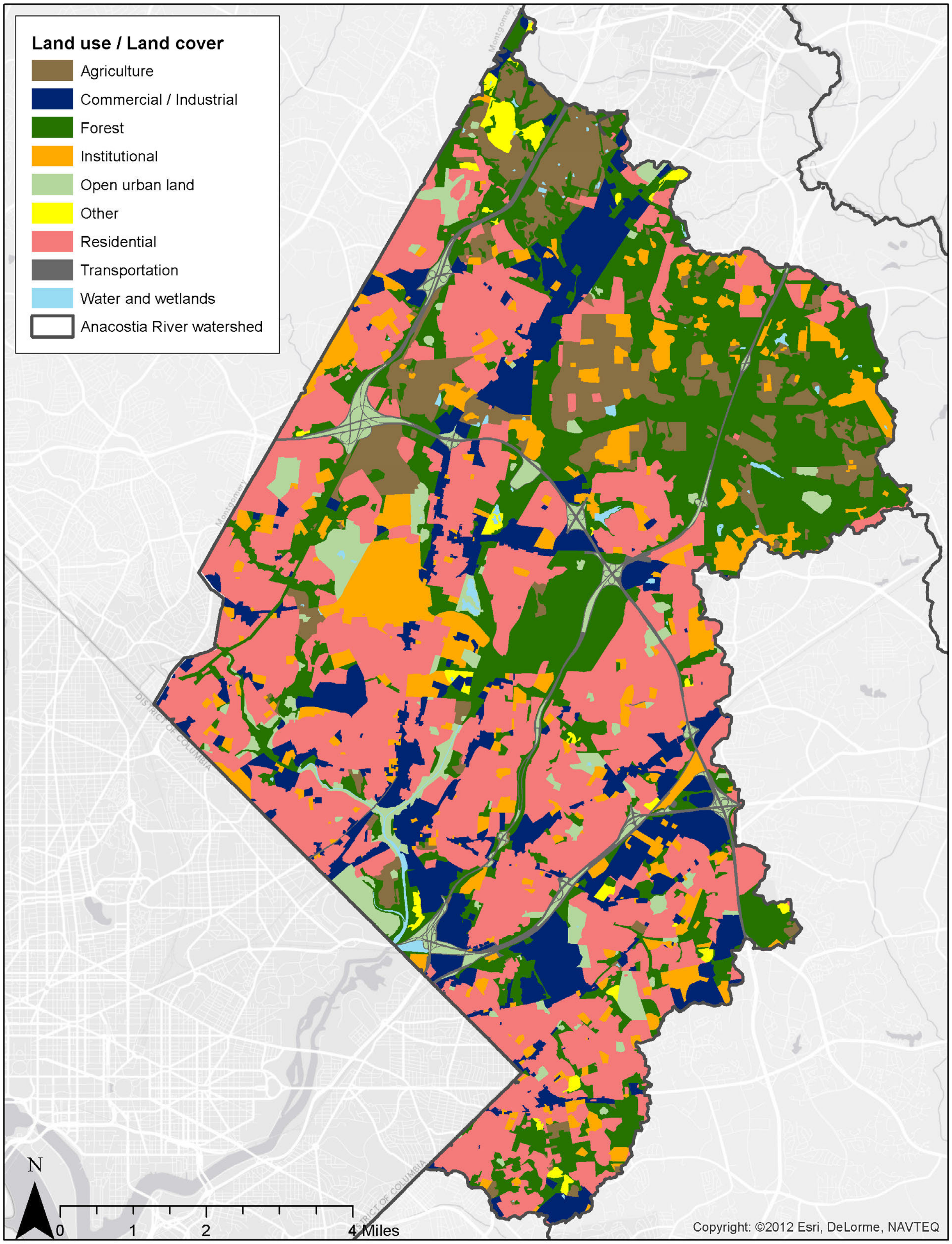
Land use analysis for the Anacostia River sediment TMDLs used older MDP GIS land uses, which were then aggregated into more general categories by subwatershed (MDE and DDOE 2007). The analysis included low-density, medium-density, and high-density residential, commercial and industrial land in the urban land use category (Table 2-2), which dominates 76 percent of the watershed. Agricultural land includes cropland and pasture.

Table 2-2. Anacostia River watershed 2002 MDP land use

Water Body	Urban (%)	Agricultural (%)	Forest (%)
Northwest Branch	80.9%	3.3%	15.8%
Northeast Branch	61.2%	8.1%	30.7%
Lower Beaverdam Creek	78.7%	0.9%	20.4%
Watts Branch	86.0%	1.3%	12.7%
Tidal Portions	99.1%	0.0%	0.9%

Source: MDE and DDOE 2007.
Note: This table includes the Montgomery County and District of Columbia portions of the watershed.

Figure 2-5 shows the 2010 MDP land use for the watershed. The large area of institutional land in the central part of the County is the University of Maryland at College Park. The large forest and agriculture area to the northeast is the Beltsville Agricultural Research Center. Table 2-3 summarizes the areas. The percentages in Table 2-2 and Table 2-3 are not directly comparable, because Table 2-2 includes portions of the watershed in Montgomery County and the District.



Source: MDP 2010

Figure 2-5. Land use in the Anacostia River watershed.

Table 2-3. Anacostia River watershed 2010 MDP land use in Prince George's County

Land Use	Acres	Percent of Total	Percent of Land Use Grouping
Agriculture	**4,520**	**8.33%**	**100.0%**
Agricultural building	0	0.00%	0.0%
Cropland	3,135	5.78%	69.4%
Feeding operations		0.00%	0.0%
Large lot subdivision (agriculture)	48	0.09%	1.1%
Orchards/vineyards/horticulture		0.00%	0.0%
Pasture	1,307	2.41%	28.9%
Row and garden crops	29	0.05%	0.6%
Forest	**13,721**	**25.30%**	**100.0%**
Brush	388	0.72%	2.8%
Deciduous forest	6,301	11.62%	45.9%
Evergreen forest	886	1.63%	6.5%
Large lot subdivision (forest)	88	0.16%	0.6%
Mixed forest	6,057	11.17%	44.1%
Other	**559**	**1.03%**	**100.0%**
Bare ground	350	0.64%	62.6%
Beaches		0.00%	0.0%
Extractive	209	0.39%	37.4%
Urban	**35,139**	**64.79%**	**100.0%**
Commercial	3,143	5.80%	8.9%
High-density residential	5,696	10.50%	16.2%
Industrial	3,315	6.11%	9.4%
Institutional	4,904	9.04%	14.0%
Low-density residential	1,173	2.16%	3.3%
Medium-density residential	13,151	24.25%	37.4%
Open urban land	2,588	4.77%	7.4%
Transportation	1,170	2.16%	3.3%
Water and wetlands	**296**	**0.55%**	**100.0%**
Water	267	0.49%	90.2%
Wetlands	29	0.05%	9.8%

Source: MDP 2010.

The urban area in the watershed is largely residential land (37 percent), with the majority being low-density residential (24 percent). There are also significant areas of forested land (25 percent), institutional land (such as schools, government buildings, churches) (9 percent), and commercial/industrial land (12 percent). Knowing this information will help during later stages in restoration planning, because it will influence the types of water quality control practices—commonly known as BMPs—and where they can be installed. For instance, certain

BMPs are preferred in medium-density residential areas, while others are preferred in industrial areas.

2.2.2 Percent Imperviousness

According to Prince George's County Code, *impervious area* means an area that is covered with solid material or is compacted to the point where water cannot infiltrate into underlying soils (e.g., parking lots, roads, houses, patios, swimming pools, compacted gravel areas, and so forth) and where natural hydrologic patterns are altered.

Impervious areas are important in urban hydrology, in that the increased paved areas (e.g., parking lots, rooftops, and roads) decrease the amount of water infiltrating the soils to become ground water and increase the amount of water flowing to the stream channels in the watershed. This increased flow not only brings additional nutrients and other pollutants, but also increases the velocity of the streams, which causes erosion and increased sediment making the water muddy during periods of elevated flow, such as during rain events.

Impervious area is made up of several types including buildings (e.g., roofs), parking lots, driveways, and roads. Each type has different characteristics and contribute to increased runoff and pollutant loadings in different ways. For instance driveways have a higher nutrient loading potential to waterways than roofs, due to factors such as grass clippings and potential fertilizer (accidentally spread on the drive way). Sidewalks will have a higher bacteria loading than driveways due to the amount of dogs that are walked along sidewalks. Besides the different types of impervious area, there are two subgroups of impervious land: connected and disconnected. On connected impervious land, rainwater runoff flows directly from the impervious surface to stormwater sewers, which in turn flow directly to streams. In disconnected impervious cover areas, rainwater runoff flows over grass, meadows, or forest areas before being intercepted by stormwater sewers, which then flow to streams. Directly connected impervious cover is substantially more detrimental to stream health and quality than disconnected land cover because the highly efficient conveyance system (stormwater pipes) associated with directly connected impervious cover increases both flow and pollutant transport to nearby streams.

Similar to the land use data, information on impervious area is available from the previous reports, in addition to 2009 County-specific information. Data from previous reports and the 2009 County data are presented below for comparison and to illustrate how impervious area has changed in the watershed. Only the 2009 County impervious data are available as GIS data; therefore, these data will be used in the restoration plan.

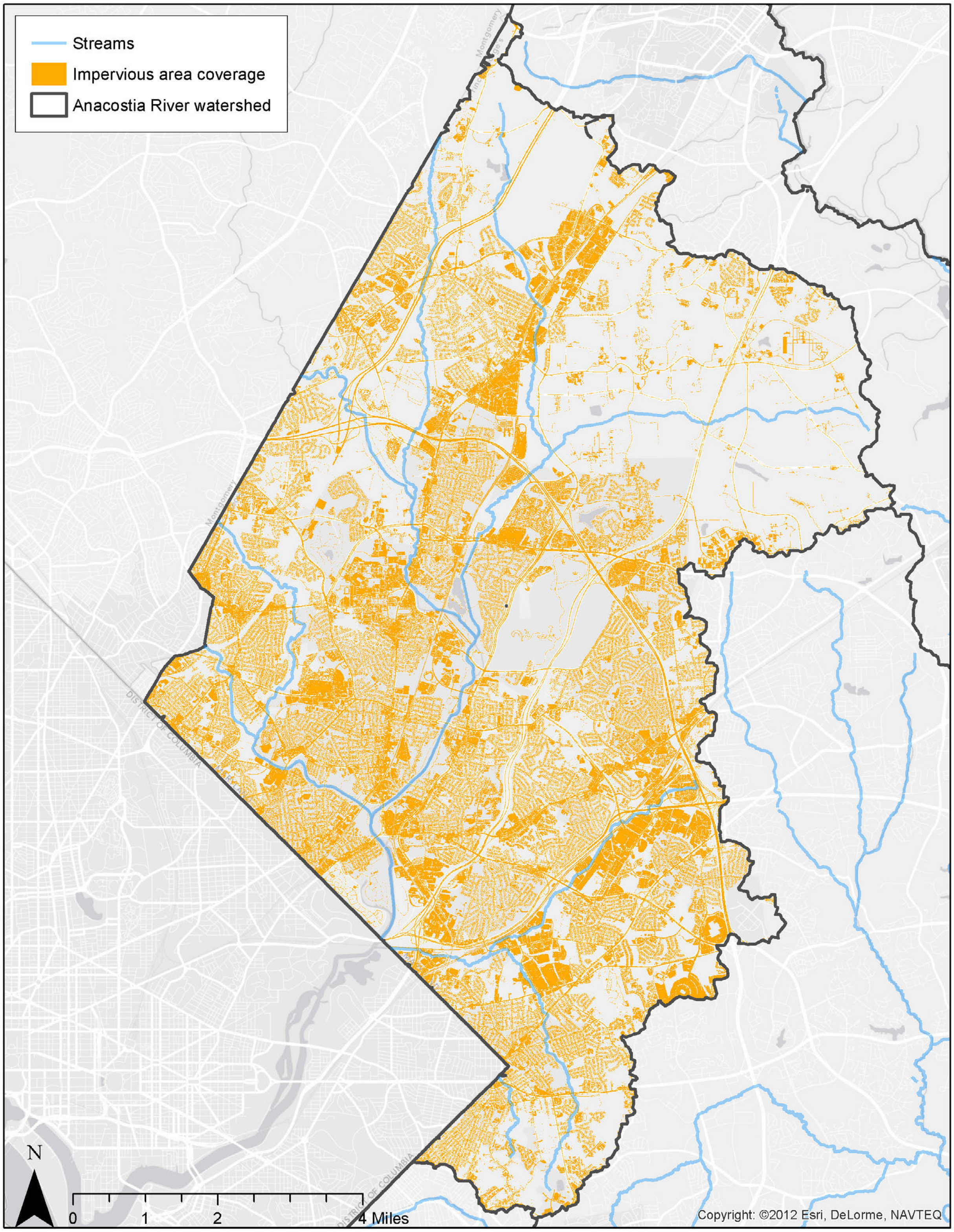
Table 2-4 presents impervious area information for the County's portion of the watershed. Currently, there are no estimates of connected impervious area in the 2009 County GIS data for comparison to previous data. This information will be estimated at a later phase of the restoration process. The majority of the impervious area in the watershed is buildings (28 percent of impervious area), roads (27 percent of the impervious area), and parking lots (25 percent of the impervious area).

Table 2-4. Anacostia River watershed impervious area in Prince George's County

Impervious Type	Area (acres)	Percent of Impervious Area	Percent of Total Watershed Area
Aviation	10.0	0.07%	0.02%
Bridges	57.5	0.37%	0.11%
Buildings	4,247.3	27.52%	7.83%
Driveways	962.2	6.23%	1.77%
Gravel surfaces	268.2	1.74%	0.49%
Other	108.6	0.70%	0.20%
Other concrete surfaces	409.4	2.65%	0.75%
Parking lots	3,833.0	24.83%	7.07%
Patios	193.9	1.26%	0.36%
Pools	22.0	0.14%	0.04%
Railroads	8.1	0.05%	0.02%
Roads and highways	4,174.1	27.04%	7.70%
Track and athletic	66.9	0.43%	0.12%
Walkways	1,074.0	6.96%	1.98%
Total	15,435.3	100.00%	28.46%

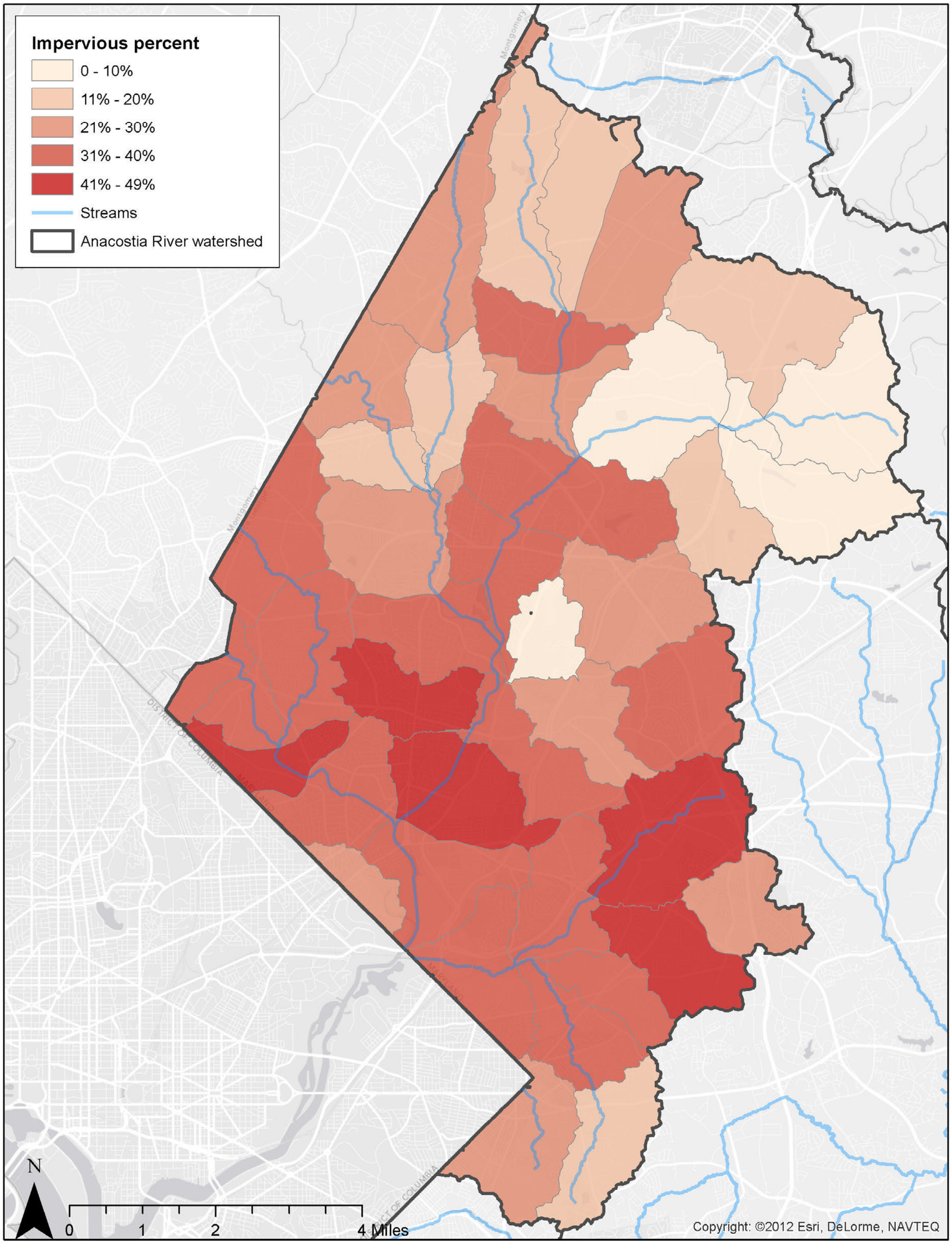
Source: M-NCPPC 2014.

Figure 2-6 presents the 2009 County impervious area GIS information for the watershed, while Figure 2-7 shows the corresponding percentage impervious area calculated for each subwatershed, which is being used in the restoration planning process. As the figures illustrate, impervious areas are most concentrated in the southwestern portion of the watershed, which corresponds to the location of most of the urban areas. As with land use, the impervious areas are important to know for restoration planning.



Source: 2009 impervious area from M-NCPPC 2014.

Figure 2-6. Impervious areas in the Anacostia River watershed.



Source: 2009 impervious area from M-NCPPC 2014.

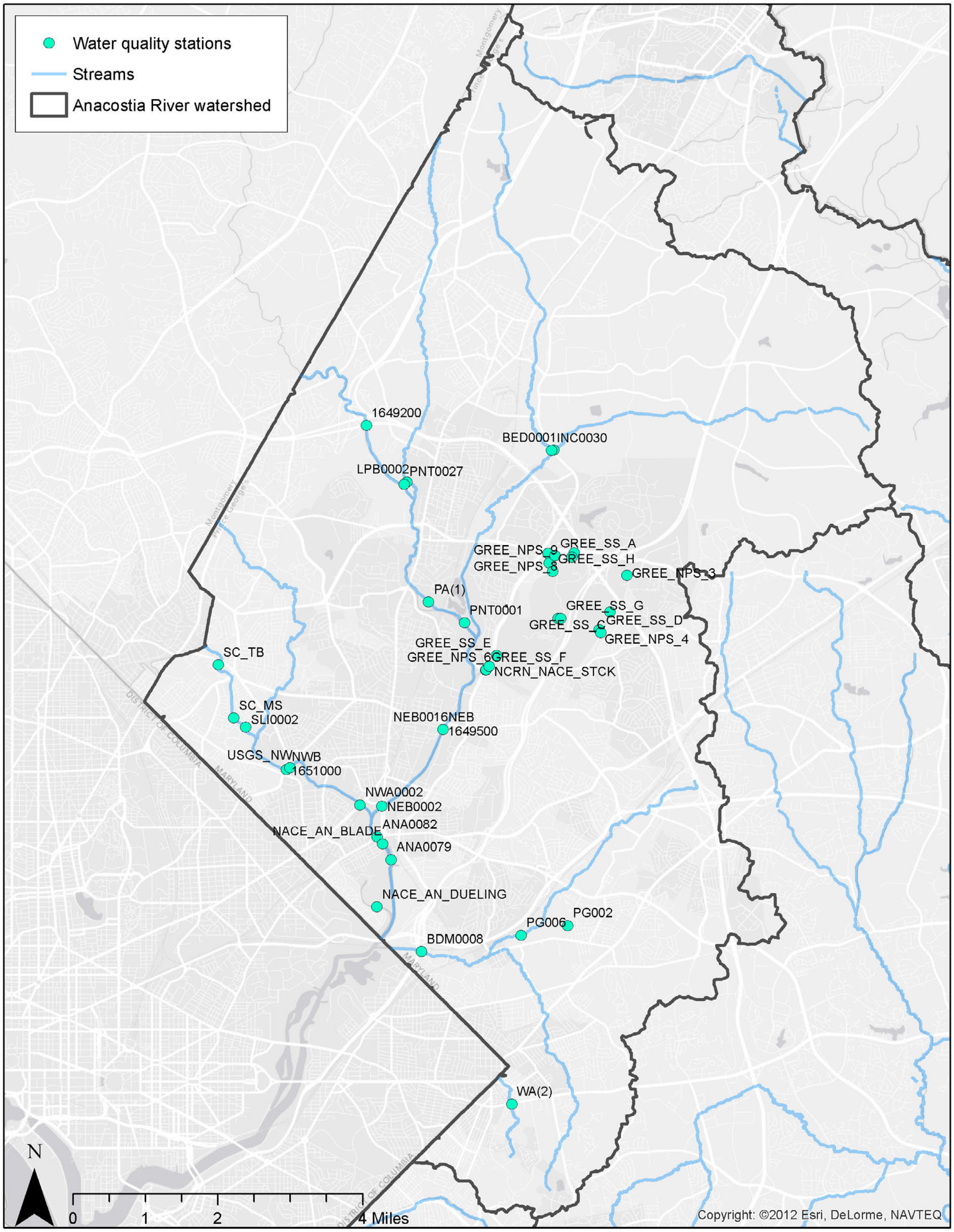
Figure 2-7. Percent impervious areas in the Anacostia River watershed.

3 Water Quality and Flow Conditions

Water quality and flow information are important parts of TMDL development and restoration planning. The water quality data helps illustrate the health of a water body. Flow data is important because it shows how water moves through the watershed. Historical flow data can also show the increase of urban stormwater runoff entering into water bodies, where, prior to development, the water infiltrated into the soils. Figure 3-1 shows the locations of water quality and flow monitoring stations in the Anacostia River watershed.

Water quality and flow data are available from several different sources. The TMDL reports provide the water quality information used in their development. These reports were the sole source of PCB water quality data. Data were also obtained from the *Water Quality Portal* (www.waterqualitydata.us/). This source is sponsored by EPA, the U.S. Geological Survey (USGS), and the National Water Quality Monitoring Council and collects data from more than 400 federal, state, local, and tribal agencies. EPA's STORET (STOrage and RETrieval) Data Warehouse was also searched for additional information. MDE was contacted and provided supplemental recent data that were not found in the *Water Quality Portal* or STORET. The final data source was the County's MS4 long-term monitoring program.

The County implements its biological monitoring program to provide credible data and valid, defensible results to address questions related to the status and trends of stream and watershed ecological condition. Biological monitoring data are used to provide problem identification; documentation of the relationships among stressor sources, stressors, and response indicators; and evaluation of environmental management activities, including restoration.



Source: USGS and EPA Water Quality Portal

Figure 3-1. Flow and water quality monitoring stations in the Anacostia River watershed.

3.1 Water Quality Data

3.1.1 Fecal Bacteria

Pathogens are microscopic organisms known to cause disease or sickness in humans. Pathogen-induced diseases are easily transmitted to humans through contact with contaminated surface waters, often through recreational contact or ingestion. Fecal bacteria (e.g., fecal coliforms, *E. coli*, fecal streptococci, and enterococci) are microscopic single-celled organisms found in the wastes of warm-blooded animals. Excessive amounts of fecal bacteria in surface waters have been shown to indicate an increased risk of pathogen-induced illness to humans, causing gastrointestinal, respiratory, eye, ear, nose, throat, and skin diseases (USEPA 1986). In water quality analysis, fecal bacteria are used to indicate the potential for pathogen-contaminated waters. Two in particular, *E. coli* and enterococci, have shown a strong correlation with swimming-associated gastroenteritis; thus, EPA recommends their use in water quality criteria for protecting against pathogen-induced illness in association with primary contact recreational activities.

Table 3-1 presents data summaries for stations within the watershed. Because of the large amount of data available, it includes only stations with more than 10 samples over multiple years after 2000. Appendix B provides complete data summaries. The highest bacteria levels were reported at the two USGS stations, which are on the NEB and NWB just upstream of their confluence to form the mainstem of the Anacostia River.

Figure 3-2 presents enterococci data over time for the five stations with the most data, while Figure 3-3 presents the *E. coli* data. In recent years, the two stations for which the most monitoring data exist are USGS1649500 and USGS1651000 on the NEB and NWB, respectively. The next three stations with the largest number of observations include BED0001 on Beaverdam Creek, INC0030 on Indian Creek, and NEB0002 on the NEB just above the confluence with the NWB. These three stations have monitoring data for enterococci. Maximum values observed at each of the five stations for which data are plotted in Figure 3-2 and Figure 3-3 are well above single sample thresholds for bacteria and do not show any definite trends over time, except for BED0001 on Beaverdam Creek, which appears to decrease over the course of 2003.

Table 3-1. Summary of available bacteria data in the Anacostia River watershed

Station ID	Station Name/ Description	Parameter	Date		Number of Records	Value (count/100mL)		
			Min.	Max.		Min.	Mean	Max.
USGS1649500	Northeast Branch Anacostia River at Riverdale, MD	*E. coli*	12/11/03	04/08/14	241	21	9,777	120,000
USGS1651000	Northwest Branch Anacostia River Near Hyattsville, MD	*E. coli*	10/29/03	06/09/10	104	3	13,123	290,000
BED0001	Beaverdam Creek	Enterococci	10/07/02	10/20/03	26	20	896	8,660
INC0030	Indian Creek	Enterococci	10/07/02	10/20/03	25	10	763	7,700
NEB0002	Northeast Branch	Enterococci	10/07/02	08/09/05	42	9	575	8,160
NEB0016	Northeast Branch Anacostia River	Enterococci	08/18/04	08/09/05	16	10	1,724	24,190

Station ID	Station Name/ Description	Parameter	Date		Number of Records	Value (count/100mL)		
			Min.	Max.		Min.	Mean	Max.
NWA0002	Northwest Branch	Enterococci	10/07/02	08/09/05	42	2	676	9,800
PNT0001	Paint Branch	Enterococci	10/07/02	10/20/03	25	10	327	4,350
USGS1649500	Northeast Branch Anacostia River at Riverdale, MD	Enterococci	12/11/03	11/16/05	29	20	12,649	240,000
USGS1651000	Northwest Branth Anacostia River Near Hyattsville, MD	Enterococci	10/29/03	11/16/05	30	8	35,894	920,000
PG002	Stormwater outfall at Flaggstaff Street	Fecal Coliform	10/16/01	02/28/07	38	17	7,050	37,997
PG006	Beaverdam Creek at Beaver Road	Fecal Coliform	10/30/01	07/02/07	40	17	7,760	137,606

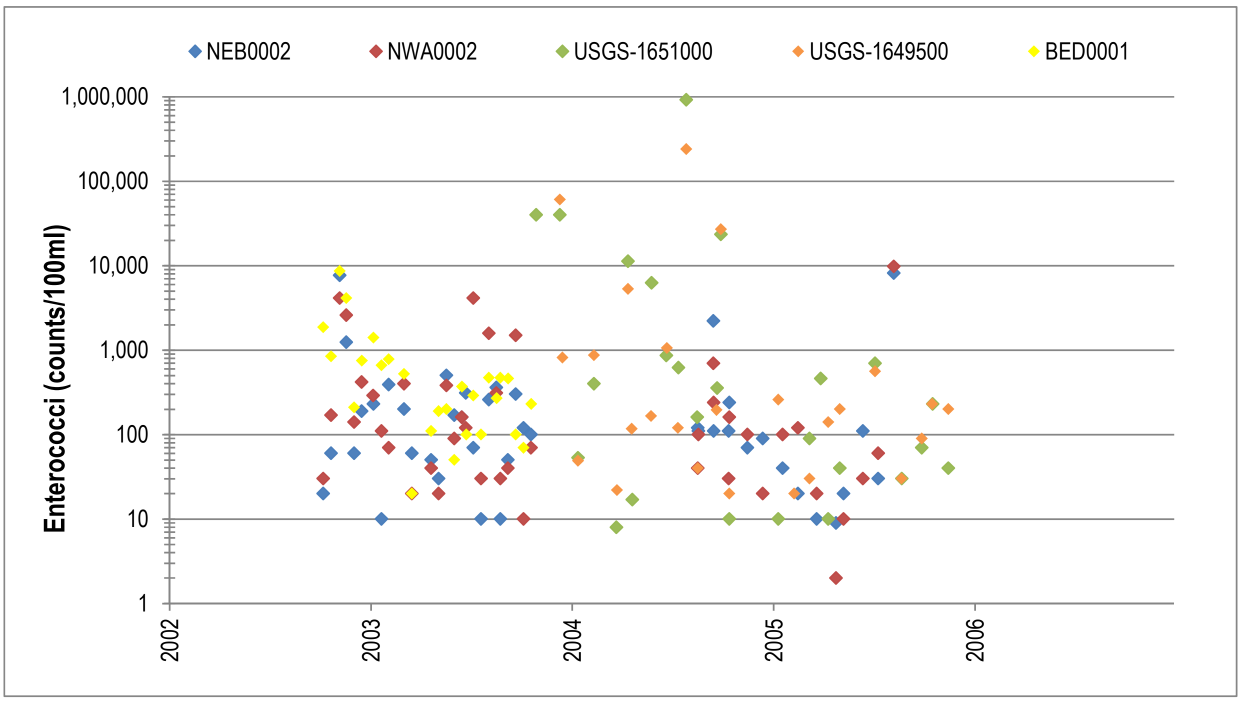


Figure 3-2. Plot of enterococci over time in the Anacostia River watershed.

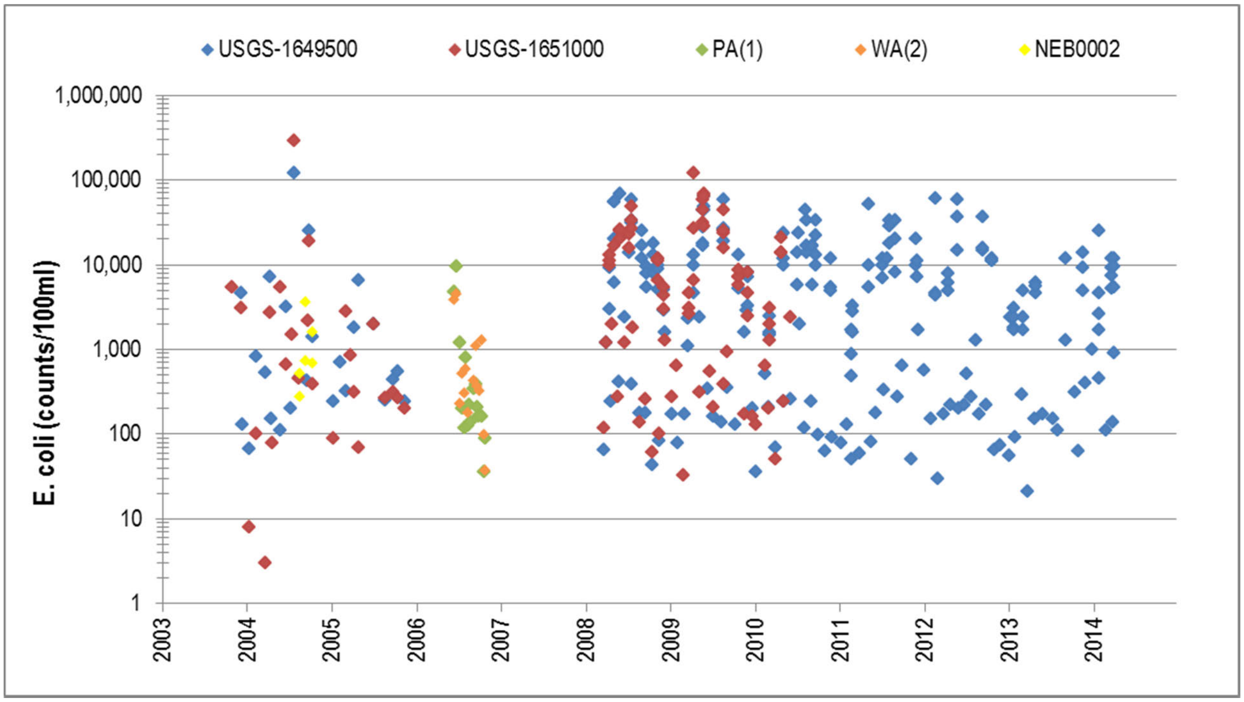


Figure 3-3. Plot of *E. coli* over time in the Anacostia River watershed.

3.1.2 DO and BOD

DO and BOD are parameters of concern commonly associated with nutrient impairments and eutrophication-impacted water bodies.

Aquatic organisms require adequate concentrations of DO for survival. DO levels are typically cyclical because they are influenced by temperature and photosynthesis, with levels often falling at night in impaired water bodies. Maryland has numeric criteria for DO that specify minimum concentrations.

BOD is used as an indicator of organic pollution in a water body. It is determined by measuring the DO used by microorganisms during the decomposition of organic matter over a period of time (typically 5 days) at a temperature of 20 degrees Celsius. It is often associated with the discharge streams of wastewater treatment plants but can be attributed to stormwater runoff, agriculture feed lots, and septic systems as well as more natural sources such as leaves and woody debris and dead plants and animals. Maryland does not have numeric criteria for BOD; however, water quality modeling can be used to estimate appropriate BOD levels for streams given available information for flows and source loads. Unpolluted surface waters typically have BOD values of 2 mg/L or less.

Table 3-2 presents data summaries for stations within the watershed. Because of the large amount of data available, it includes only stations with more than 10 samples after 2000. Appendix B provides complete data summaries. The stations that show the best DO concentrations are in the headwaters and tributaries to the NEB, which is the least urbanized portion of the watershed. The highest BOD levels were in the Beaverdam Creek tributary and mainstem of the Anacostia River.

Figure 3-4 presents BOD data and Figure 3-5 presents DO data over time for the five stations with the most data. In the early 2000s PG002 and PG006 on Beaverdam Creek exhibited relatively high observed BOD maximums; those levels have since come down considerably. ANA0082, which is just below the confluence of the NEB and NWB, has the longest span of data and has the next-highest maximum and average observed BOD values, which might be trending upward very slightly. DO observations at the five stations range from a minimum of about 3 mg/L to a high of more than 16 mg/L. NACE_AN_BLADE and ANA0082 both show a decreasing trend in DO over time and are near each other in the Anacostia River.

Table 3-2. Summary of available BOD and DO data in the Anacostia River watershed

Station ID	Station Name/Description	Parameter	Date		Number of Records	Value (mg/L)		
			Min.	Max.		Min.	Mean	Max.
ANA0082	Anacostia River	BOD	01/07/86	12/05/12	212	0.330	3.45	21.60
NEB0002	Northeast Branch	BOD	08/18/04	08/09/05	16	0.300	1.74	3.60
NEB0016	Northeast Branch Anacostia River	BOD	08/18/04	08/09/05	16	0.200	1.59	3.50
NWA0002	Northwest Branch	BOD	08/18/04	08/09/05	16	0.400	1.59	3.50
PG002	Stormwater outfall at Flaggstaff Street	BOD	10/16/01	02/28/07	48	2.00	12.68	96.90
PG006	Beaverdam Creek at Beaver Road	BOD	10/30/01	07/02/07	52	0.600	8.24	65.06
USGS1649500	Northeast Branch Anacostia River at Riverdale, MD	BOD	10/23/69	12/21/05	34	1.10	2.71	6.20
USGS1651000	Northwest Branch Anacostia River Near Hyattsville, MD	BOD	10/23/69	12/21/05	35	0.300	2.79	8.90
ANA0082	Anacostia River	DO	01/07/86	12/05/12	272	3.30	10.34	14.80
BED0001	Beaverdam Creek	DO	10/07/02	12/15/08	38	5.70	8.91	13.20
INC0030	Indian Creek	DO	10/07/02	12/15/08	38	6.30	9.26	13.10
NCRN_NACE_STCK	Still Creek	DO	03/06/06	09/27/12	72	2.27	8.36	13.75
NEB0002	Northeast Branch	DO	10/07/02	12/15/08	54	7.40	10.94	15.50
NEB0016	Northeast Branch Anacostia River	DO	08/18/04	08/09/05	16	7.40	10.51	14.30
NWA0002	Northwest Branch	DO	10/07/02	12/15/08	54	6.50	10.02	14.20
PNT0001	Paint Branch	DO	10/07/02	10/20/03	25	7.70	10.00	13.60
SC_MS	Mainstem	DO	03/05/05	10/23/10	122	4.72	8.55	13.48
SC_TB	Takoma Branch	DO	03/05/05	10/23/10	122	4.40	9.13	14.77
USGS_NW	USGS Northwest Branch	DO	10/15/05	06/26/10	90	4.80	9.45	14.60

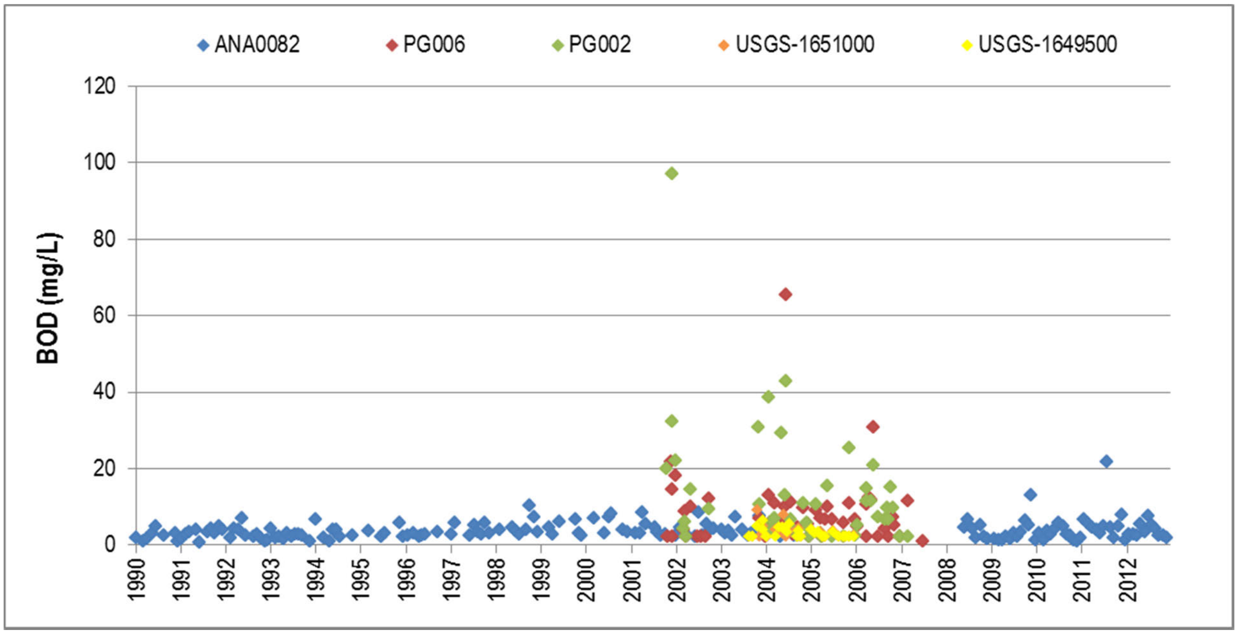


Figure 3-4. Plot of BOD over time in the Anacostia River watershed.

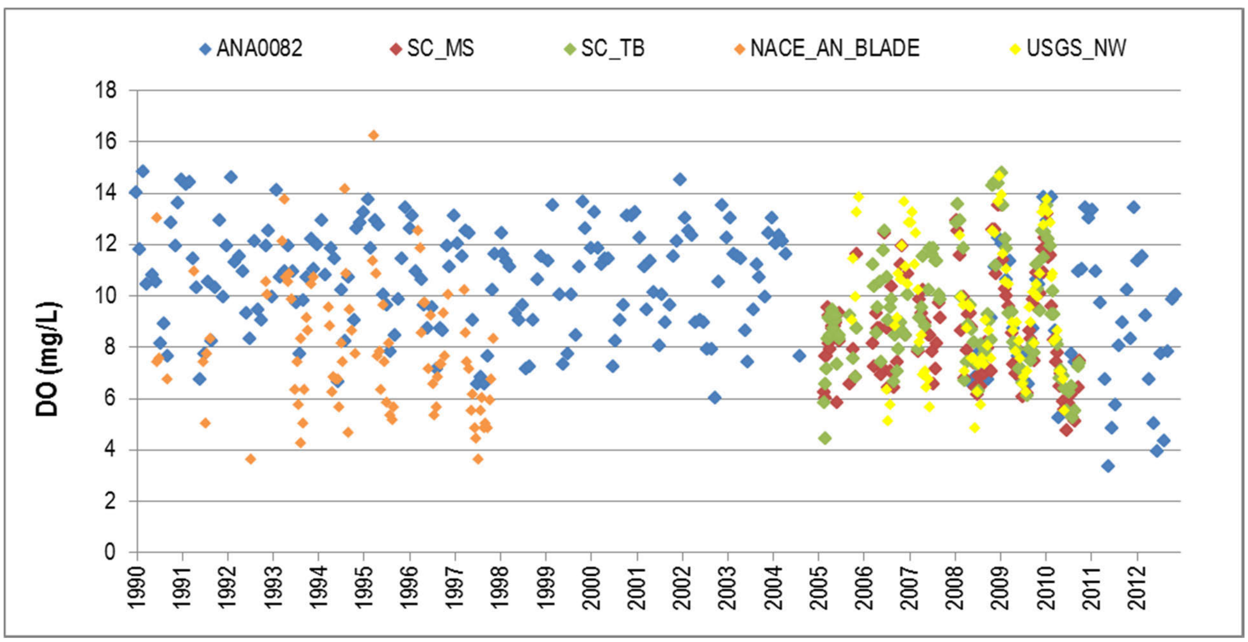


Figure 3-5. Plot of DO over time in the Anacostia River watershed.

3.1.3 Nitrogen

Nitrogen at levels higher than 10 mg/L can lead to a condition called methemoglobinemia in infants and at levels higher than 100 mg/L can lead to taste problems and physiological distress (Straub 1989). However, a more common effect of excess nitrogen and its constituent parameters is that it plays an important role in eutrophication of water bodies. *Eutrophication* is the over-enrichment of aquatic systems by excessive inputs of nutrients; it is associated with an

overabundance of aquatic plant growth including phytoplankton, periphyton, and macrophytes. Nitrogen acts as a fertilizer for aquatic plant communities, leading to explosive plant growth followed by die-off and depletion of DO levels as the dead plant matter decays. Maryland does not specify numeric standards for nitrogen species; however, many TMDLs identify as endpoints, levels of nitrogen associated with maintaining DO levels to support aquatic life.
Table 3-3 presents data summaries for stations within the watershed. Because of the large amount of data available, it includes only stations with more than 10 samples after 2000. Appendix B provides complete data summaries. The lowest average concentrations were found in the tributaries.

Table 3-3. Summary of available total nitrogen data in the Anacostia River watershed

Station ID	Station Name/Description	Date		Number of Records	Value (mg/L)		
		Min.	Max.		Min.	Mean	Max.
ANA0082	Anacostia River	01/07/86	08/18/04	204	0.410	1.68	7.25
BDM0008	Beaverdam Creek	01/28/08	12/15/08	12	0.357	1.13	3.29
BED0001	Beaverdam Creek	10/07/02	12/15/08	38	1.25	1.84	3.43
INC0030	Indian Creek	10/07/02	12/15/08	38	1.00	1.54	1.96
LPB0002	Little Paint Branch	01/28/08	12/15/08	12	0.834	1.23	1.82
NEB0002	Northeast Branch	10/07/02	12/15/08	52	0.512	1.30	1.93
NEB0016	Northeast Branch Anacostia River	08/18/04	08/09/05	15	1.15	1.36	1.81
NWA0002	Northwest Branch	10/07/02	12/15/08	53	0.741	1.55	2.59
PNT0001	Paint Branch	10/07/02	10/20/03	25	0.676	1.38	1.81
PNT0027	Paint Branch	01/28/08	12/15/08	12	0.725	1.18	1.73
SC_MS	Mainstem [Sligo Creek]	09/04/04	09/11/10	176	0.140	0.972	2.36
SLI0002	Sligo Creek	01/28/08	12/15/08	12	0.840	1.54	2.45
USGS1649500	Northeast Branch Anacostia River at Riverdale, MD	06/02/92	12/23/13	231	0.480	2.00	8.10
USGS1651000	Northwest Branch Anacostia River Near Hyattsville, MD	06/02/92	06/09/10	128	0.820	2.40	5.90

Figure 3-6 presents total nitrogen data over time for the five stations with the most data. As with other parameters, ANA0082, USGS1649500, and USGS1651000 reflect some of the longest monitoring records for nitrogen in the watershed (Figure 3-6). The figure also shows nitrogen data for SC_MS (Sligo Creek) and NWA0002 (NWB). Highest values have been recorded at the two USGS stations on the NEB and NWB.

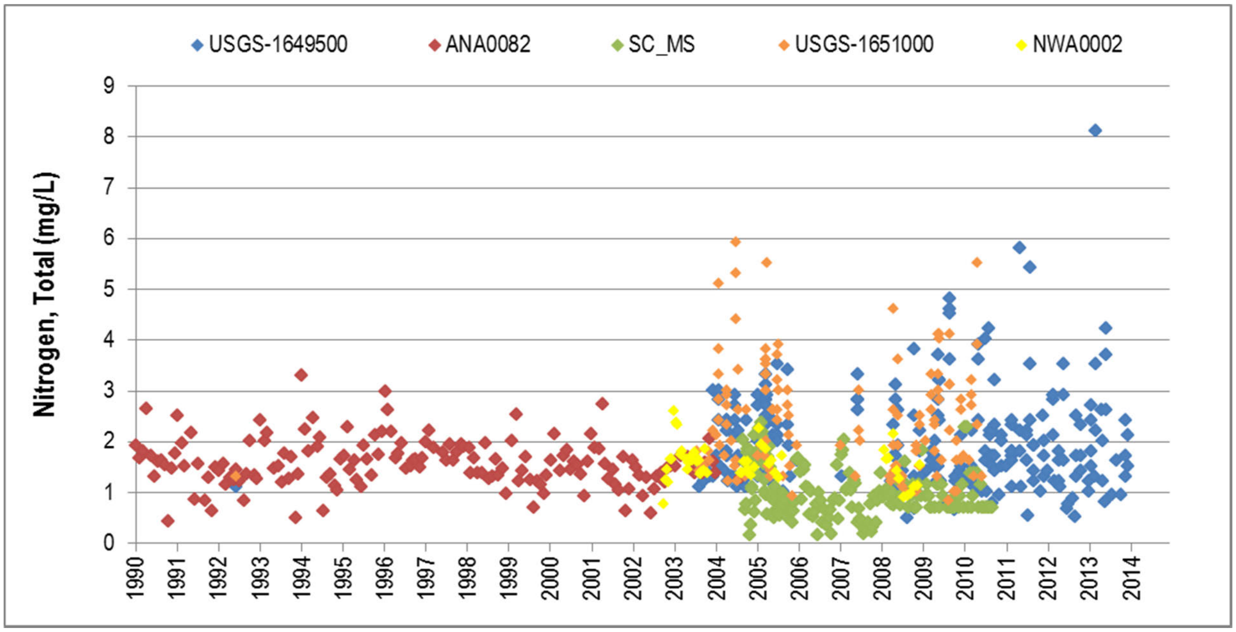


Figure 3-6. Plot of total nitrogen over time in the Anacostia River watershed.

3.1.4 Phosphorus

Like nitrogen, excessive loading of phosphorus into surface water bodies can lead to eutrophication by fueling aquatic plant growth. Phosphorus in fresh and marine waters exists in organic and inorganic forms. The most readily available form for plants is soluble inorganic phosphorus ($H_2PO_4^-$, HPO_4^{2-}, and PO_4^3), also commonly referred to as soluble reactive phosphorus. Phosphorus is also able to sorb to sediment particles and is carried into water bodies by upland and streambank erosional processes. Maryland does not have numeric criteria for phosphorus.

Table 3-4 presents data summaries for stations within the watershed. Because of the large amount of data available, it includes only stations with more than 10 samples after 2000. Appendix B provides complete data summaries. Figure 3-7 presents total phosphorus data over time for the five stations with the most data, USGS1649500, ANA0082, USGS1651000, SC_MS and PG006. Earlier data collected at ANA0082 are demonstrably lower than data collected in more recent years at both USGS sites and PG006 on Beaverdam Creek. ANA0082 is downstream of the confluence of the NEB and NWB, which the USGS stations are on. Data collected on Sligo Creek (SC_MS) are consistently much lower than the other stations. The stations on Beaverdam Creek had the highest phosphorus concentrations.

Table 3-4. Summary of available total phosphorus data in the Anacostia River watershed

Station ID	Station Name/Description	Date		Number of Records	Value (mg/L)		
		Min.	Max.		Min.	Mean	Max.
ANA0082	Anacostia River	01/07/86	02/11/04	202	0.0100	0.0617	0.700
BED0001	Beaverdam Creek	01/28/08	12/15/08	12	0.0941	0.305	0.897
INC0030	Indian Creek	01/28/08	12/15/08	12	0.0095	0.0500	0.320
LPB0002	Little Paint Branch	01/28/08	12/15/08	12	0.0087	0.0313	0.206
NEB0002	Northeast Branch	01/28/08	12/15/08	12	0.0157	0.0488	0.229
NWA0002	Northwest Branch	01/28/08	12/15/08	12	0.0158	0.0507	0.267
PG002	Stormwater outfall at Flaggstaff Street	10/16/01	02/28/07	51	0.050	0.581	11.37
PG006	Beaverdam Creek at Beaver Road	10/30/01	07/02/07	55	0.0170	0.295	1.95
PNT0027	Paint Branch	01/28/08	12/15/08	12	0.0060	0.0238	0.187
SC_MS	Mainstem	09/04/04	07/05/08	120	0.0000	0.0221	0.120
SLI0002	Sligo Creek	01/28/08	12/15/08	12	0.0138	0.0615	0.288
USGS1649500	Northeast Branch Anacostia River at Riverdale, MD	10/23/69	02/04/14	249	0.0100	0.240	1.08
USGS1651000	Northwest Br Anacostia River Near Hyattsville, MD	10/23/69	06/09/10	139	0.0030	0.286	0.930

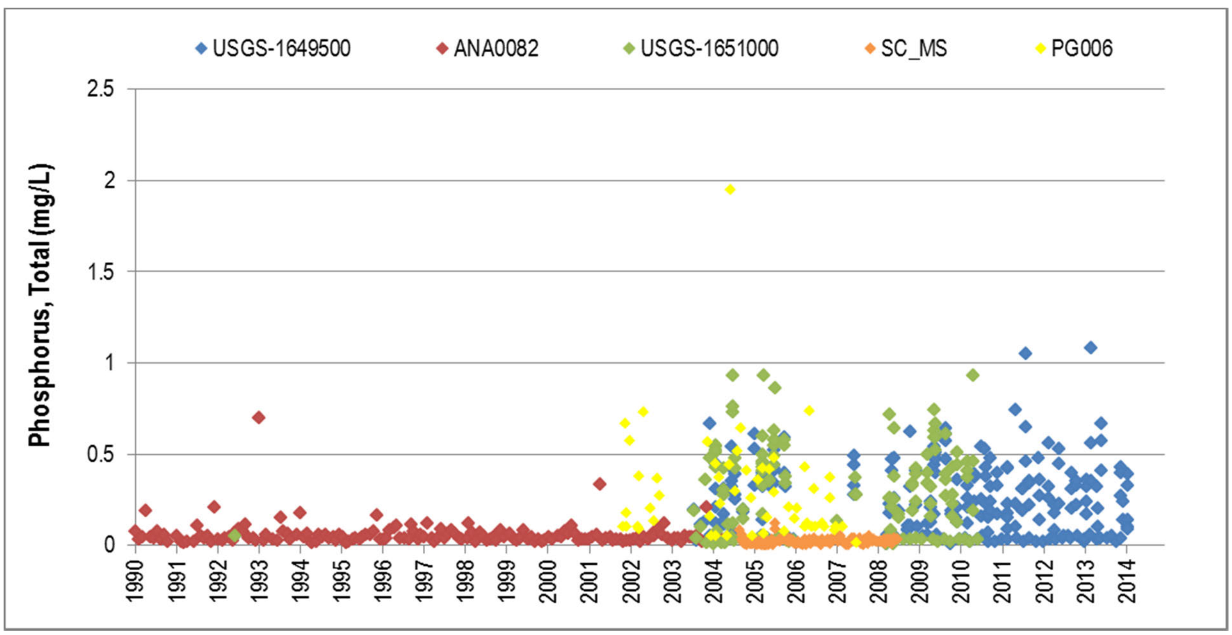


Figure 3-7. Plot of total phosphorus over time in the Anacostia River watershed.

3.1.5 Sediment

Sediment is a natural component of water bodies, but like nutrients, sediment in excess amounts can impair designated uses. Sediments deposited on stream beds and lake bottoms impair fish spawning ability and food sources and reduce habitat complexity and cover from prey. Very high levels of sediment can affect the ability of fish to find prey and can also clog gills. High levels of sediment impair water clarity and adversely affect aesthetics, among other things. In addition, because of the ability of phosphorus to sorb to sediment, it can serve as a source of phosphorus to water bodies. Sediment is a common cause of impairment for water bodies listed for biological impairments. Maryland does not have numeric sediment or total suspended solids (TSS) criteria.

Table 3-5 presents data summaries for stations within the watershed. Because of the large amount of data available, it includes only stations with more than 10 samples after 2000. Appendix B provides complete data summaries. Figure 3-8 presents TSS data over time for the five stations with the most data, ANA0082, USGS1649500, USGS1651000, PG006, and NWA0002. Concentrations at ANA0082 (Anacostia River) and USGS1649500 (NEB) tend to have higher concentrations in recent years over older concentrations. Generally, the USGS stations have the highest overall average concentrations.

Table 3-5. Summary of available TSS data in the Anacostia River watershed

Station ID	Station Name/Description	Date		Number of Records	Value (mg/L)		
		Min.	Max.		Min.	Mean	Max.
ANA0082	Anacostia River	02/03/86	12/05/12	266	1.00	18.90	486
BDM0008	Beaverdam Creek	01/28/08	12/15/08	12	2.40	16.11	124
BED0001	Beaverdam Creek	10/07/02	12/15/08	38	4.00	16.40	121
INC0030	Indian Creek	10/07/02	12/15/08	38	2.00	15.08	206
LPB0002	Little Paint Branch	01/28/08	12/15/08	12	2.40	12.22	114
NEB0002	Northeast Branch	10/07/02	12/15/08	53	2.40	11.94	222
NEB0016	Northeast Branch Anacostia River	08/18/04	08/09/05	15	2.40	7.25	48.7
NWA0002	Northwest Branch	10/07/02	12/15/08	53	2.40	12.30	215
PG002	Stormwater outfall at Flaggstaff Street	10/16/01	02/28/07	51	1.00	62.71	454
PG006	Beaverdam Creek at Beaver Road	10/30/01	07/02/07	55	1.00	1,023	39,344
PNT0001	Paint Branch	10/07/02	10/20/03	25	2.40	4.16	18.7
PNT0027	Paint Branch	01/28/08	12/15/08	12	2.40	16.96	176
SLI0002	Sligo Creek	01/28/08	12/15/08	12	2.40	27.01	198
USGS1649500	Northeast Branch Anacostia River at Riverdale, MD	10/23/69	02/04/14	243	0.500	181	1,930
USGS1651000	Northwest Branch Anacostia River Near Hyattsville, MD	10/23/69	06/28/07	199	0.00	189	1,340

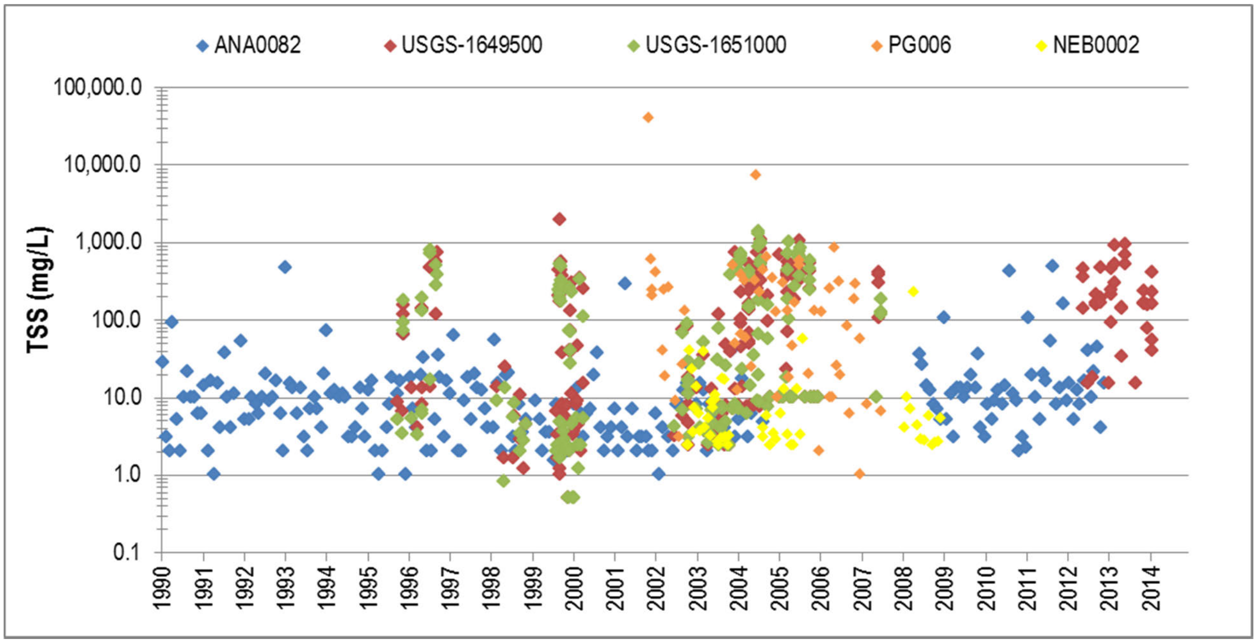


Figure 3-8. Plot of TSS over time in the Anacostia River watershed.

3.1.6 PCBs

PCBs are a class of man-made compounds widely used from the 1940s through the 1970s in manufacturing and industrial applications because of their exceptional fire-retardant and insulating properties. They were found to possess certain negative characteristics that led to a ban on their manufacture in the United States in 1979. They have been demonstrated to cause cancer and can negatively affect the immune, reproductive, nervous, and endocrine systems. Other qualities of PCBs make them particularly problematic environmentally. They are hydrophobic and tend to become concentrated in sediment and in fatty tissues of animals. They bioaccumulate and do not break down over time. Small organisms that ingest PCB-contaminated sediment or food are then eaten by larger organisms contributing to accumulation of PCBs in the tissues of the larger organisms. Consumption of PCB-contaminated fish is a primary pathway of PCB exposure in humans. Although PCBs are no longer manufactured, they continue to exist in the environment and might still be released from legacy pollution through fires or leaks from old PCB-containing equipment, accidental spills, burning of PCB-containing oils, leaks from hazardous waste sites, and so on.

Table 3-6 presents data summaries for stations within the watershed. Figure 3-9 presents PCB data over time. Levels of total PCBs, from data collected on the NWB and the NEB of the Anacostia River, appear stable over time. Average values are consistently higher on the NWB site; however, the highest observed value occurred at the NEB site.

Table 3-6. Summary of available total PCB data in the Anacostia River watershed

Station ID	Station Name/Description	Date		Number of Records	Value (ng/L)		
		Min.	Max.		Min.	Mean	Max.
NWB	Northwest Branch of the Anacostia River	04/13/04	10/07/05	34	0.238	4.30	12.51
NEB0016	Northeast Branch Anacostia River	04/13/04	10/07/05	35	0.10	3.35	15.67

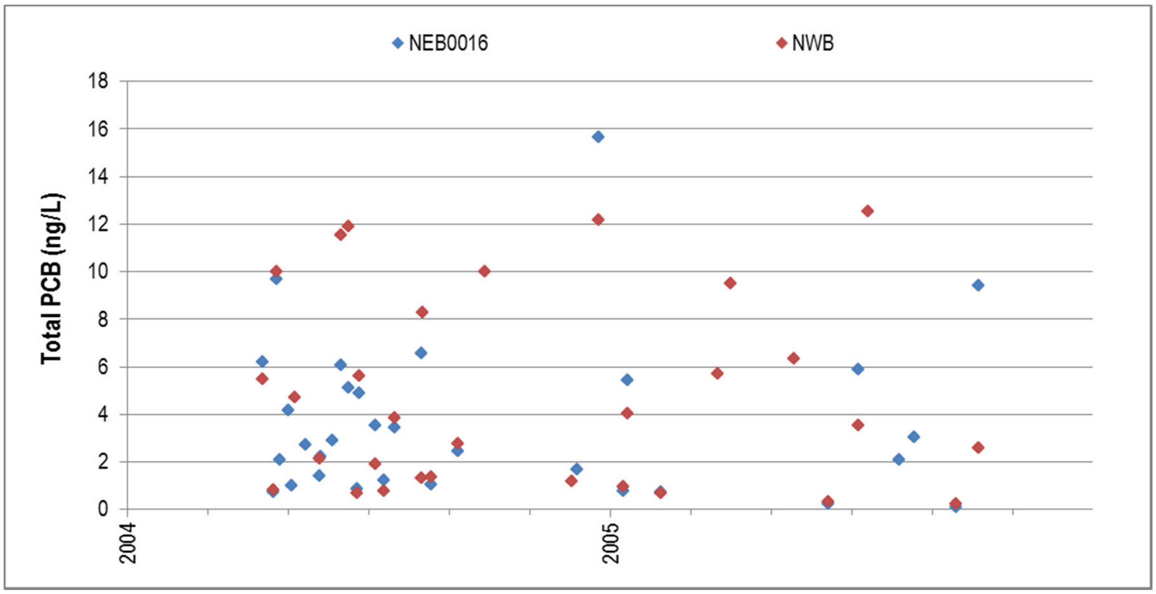
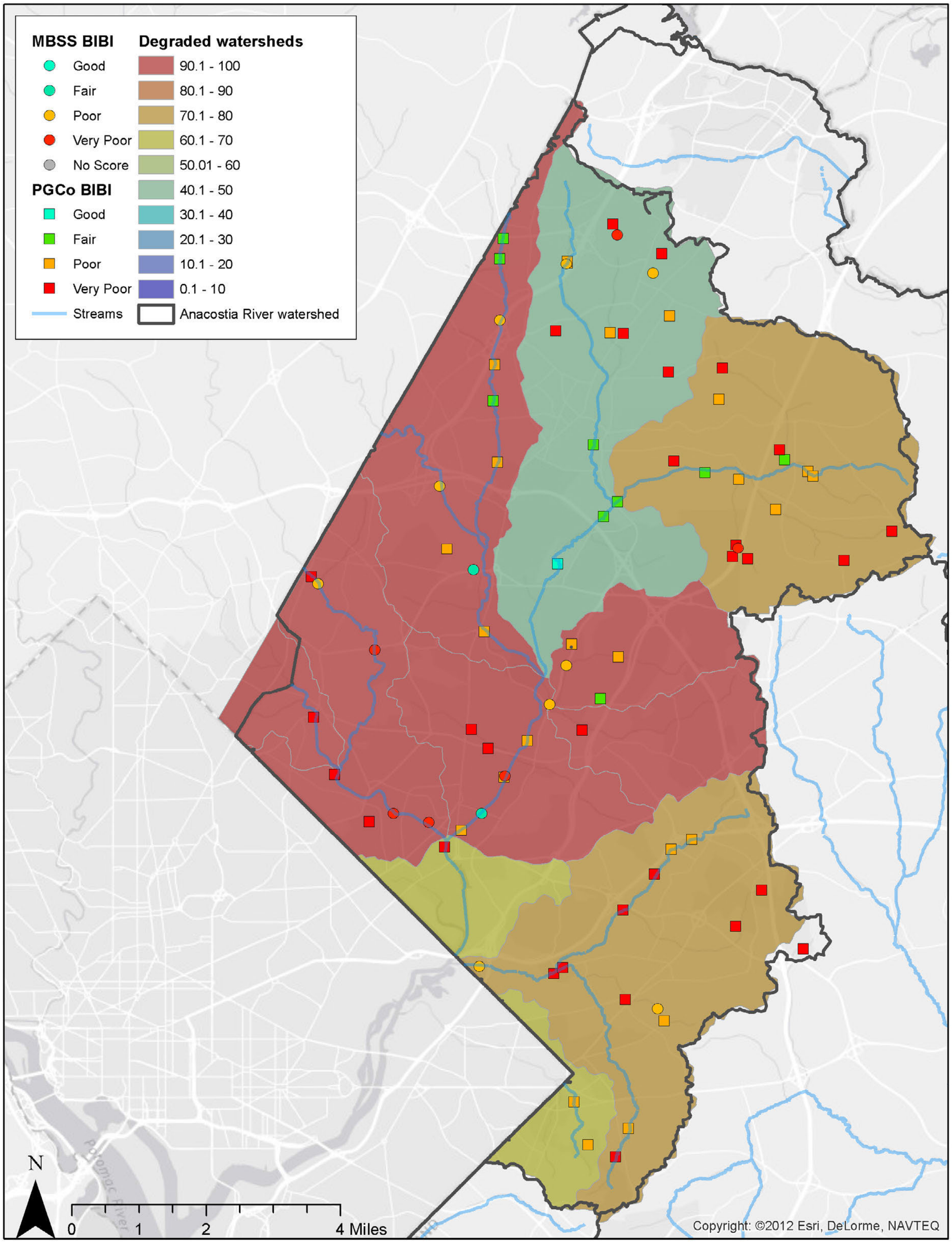


Figure 3-9. Plot of total PCBs over time in the Anacostia River watershed.

3.2 Biological Station Data

Since 1999 two rounds of a Countywide bioassessment study have been completed; the first round from 1999 to 2003 and the second round from 2010 to 2013. In 2013, the third and final year of Round 2, 10 subwatersheds or subwatershed groups were assessed, including 1 in the Anacostia River basin, 5 in the Patuxent River basin, and 4 in the Potomac River basin (Millard et al. 2013). Using the Maryland Department of Natural Resources Benthic Index of Biotic Integrity (B-IBI), approximately 50 percent of the sites assessed during Year 3 were rated biologically impaired (Poor or Very Poor B-IBI rating).

Figure 3-10 provides results of the second round of benthic invertebrate and B-IBI sampling in the Anacostia River watershed and illustrates that approximately 71 percent of sites are rated as biologically degraded having B-IBI ratings of Poor to Very Poor. No sites in the Anacostia River were rated Good. Degraded stream miles account for 78 percent of total stream miles in the Prince George's County section of the Anacostia River watershed. Although not statistically significant, the percent of degraded stream miles in the Anacostia River increased 9 percent from the Round 1 assessments to Round 2 assessments. The Round 2 assessment report suggests that while the County's overall efforts to manage and restore water quality have not resulted in improvements in the Anacostia River watershed, they might have resulted in enabling conditions to "hold their own" in the face of added development and continued degradational pressures (Millard et al. 2013).



Source: Biotic Integrity from MD DNR, degraded watersheds from Tetra Tech
MBSS = Maryland Biological Stream Survey.

Figure 3-10. Results of benthic invertebrate and B-IBI sampling in the Anacostia River watershed.

MDE performed a biological stress identification (BSID) study in the nearby Mattawoman Creek watershed published in March 2014 (MDE 2014). The parameters used in the BSID analysis were segregated into land use sources and stressors representing sediment, in-stream habitat, riparian habitat, and water chemistry conditions. Through the BSID analysis, MDE identified land use sources and water chemistry parameters significantly associated with degraded fish or benthic biological conditions (MDE 2012; USEPA 2013). Sediment conditions, riparian habitat conditions, and in-stream habitat conditions did not show significant association with Poor to Very Poor stream biological conditions (i.e., removal of stressors would result in improved biological community). Specifically, high chlorides, high conductivity, low field pH, and acid neutralizing capacity (ANC) below chronic level have been identified to show a high level of correlation with Poor to Very Poor stream biological conditions.

Many stressors identified in MDE (2014) are applicable to the Upper Patuxent River and Western Branch watersheds. One of the stressors is the application of road salts during winter seasons that can become a source of chlorides and high conductivity levels. On-site septic systems and stormwater discharges are also likely sources of elevated concentrations of chlorides, sulfates, and conductivity. Currently there are no specific numeric criteria in Maryland that quantify the impacts of these stressors on non-tidal stream systems. Low ANC below chronic level can be caused by repeated additions of acidic materials, like those found in atmospheric deposition (NADP 2012). The results of the National Atmospheric Deposition Program/National Trends Network (NADP 2012) indicate that Maryland is in or near the region of most acidic precipitation and receives some of the highest concentrations of sulfate and nitrate deposition in the United States (MD DNR 2010).

3.3 Flow Data

Flow in a water body is the result of several factors, with the most significant being rainfall and subsequent runoff; snow melt; ground water inflow into a water body; and release of water from upstream holding facilities such as reservoirs or stormwater detention systems. Flow can change over time as urbanization occurs. Urbanization results in increased impervious area (e.g., roof tops, parking lots, and roads). This area prevents water from infiltrating into the ground, resulting in more water flowing to streams during rainfall events, creating higher peak flows. These peak flows can bring higher levels of sediment and other pollutants into the water body.

Table 3-7 presents flow and related stream change information. Because of the large amount of data available, it includes only stations with more than 10 samples after 2000. Appendix B provides complete data summaries. Figure 3-11 presents flow data over time for the two USGS flow gages with a logarithmic scale. The logarithmic scale helps show data with a wide range of values, in this case from less than 2 cubic feet per second (cfs) to more than 4,000 cfs. Although there is a large gap in the data record, recent data appears to have larger peak flows than older data. This could be representative of larger amounts of impervious area in the watershed.

Table 3-7. Summary of available flow and stream data in the Anacostia River watershed

Station ID	Station Name/ Description	Parameter	Units	Date		Number of Records	Value		
				Min.	Max.		Min.	Mean	Max.
ANA0082	Anacostia River	Depth	feet	06/15/11	09/05/12	11	2.62	7.96	11.81
NCRN_NACE _STCK	Still Creek	Depth	feet	03/06/06	09/27/12	57	0.200	0.347	0.800
NCRN_NACE _STCK	Still Creek	Flow	cfs	03/06/06	09/27/12	54	0.252	1.83	9.11
NCRN_NACE _STCK	Still Creek	Stream velocity	ft/sec	03/06/06	09/27/12	54	0.060	0.326	1.11
NCRN_NACE _STCK	Still Creek	Stream width	feet	03/06/06	09/27/12	70	7.10	15.50	28.25
NWA0002	Northwest Branch	Flow	cfs	05/05/03	07/21/08	16	9.50	35.23	66.70
NWB	Northwest Branch	Flow	cfs	04/13/04	10/07/05	30	7.00	406	3,810
PNT0001	Paint Branch	Flow	cfs	10/07/02	10/20/03	25	6.30	40.43	98.70
USGS1649500	Northeast Branch Anacostia River at Riverdale, MD	Depth	feet	10/17/74	04/08/14	834	0.361	2.64	9.43
USGS1649500	Northeast Branch Anacostia River at Riverdale, MD	Flow	cfs	09/27/95	09/29/04	133	3.20	396	4,130
USGS1649500	Northeast Branch Anacostia River at Riverdale, MD	Flow, instantaneous	cfs	01/03/59	12/04/13	412	8.60	742	7,840
USGS1651000	Northwest Branch Anacostia River Near Hyattsville, MD	Depth	feet	12/22/75	06/09/10	448	0.870	2.46	66.00
USGS1651000	Northwest Branch Anacostia River Near Hyattsville, MD	Flow	cfs	09/27/95	09/29/04	132	1.50	251	1,880
USGS1651000	Northwest Branch Anacostia River Near Hyattsville, MD	Flow, instantaneous	cfs	01/03/60	06/09/10	260	2.70	536	9,290

Note: cfs = cubic feet per second; ft/sec = feet per second.

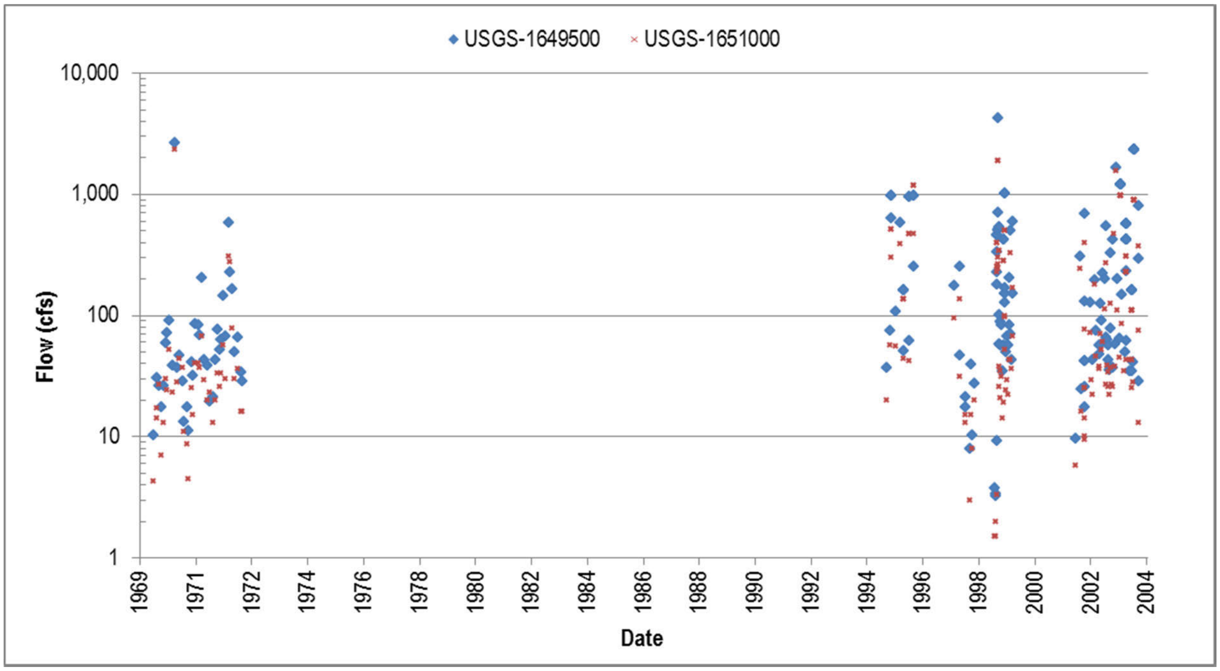


Figure 3-11. Plot of river flow over time.

4 Pollutant Source Assessments

Point sources are permitted through the National Pollutant Discharge Elimination System (NPDES) program. Nonpoint sources are diffuse sources that typically cannot be identified as entering a water body through a discrete conveyance at one location. Nonpoint sources can originate from land activities that contribute nutrients or TSS to surface water as a result of rainfall runoff. For the TMDLs in this report, all sources of pollutant loading not regulated by NPDES permits are considered nonpoint sources.

4.1 NPDES Permitted Facilities

Under Title 40 of the *Code of Federal Regulations* section 122.2, a *point source* is described as a discernible, confined, and discrete conveyance from which pollutants are or may be discharged to surface waters. The NPDES program, established under Clean Water Act sections 318, 402, and 405, requires permits for the discharge of pollutants from point sources, including urban stormwater systems, known as MS4s. The County is an MS4 permitted discharger.

4.1.1 MS4 (Phase I, Phase II, SHA, Federal)

Stormwater discharges are generated by runoff from urban land and impervious areas such as paved streets, parking lots, and rooftops during precipitation events. These discharges often contain high concentrations of pollutants that can eventually enter nearby water bodies.

Under the NPDES stormwater program, operators of large, medium, and regulated small MS4s must obtain authorization to discharge pollutants. The Stormwater Phase I Rule (55 *Federal Register* 47990, November 16, 1990) requires all operators of medium and large MS4s to obtain an NPDES permit and develop a stormwater management program. Medium and large MS4s are defined by the size of the population in the MS4 area, not including the population served by combined sewer systems. A medium MS4 has a population between 100,000 and 249,999. A large MS4 has a population of 250,000 or more. The Stormwater Phase II Rule (64 *Federal Register* 68722, December 8, 1999) applies to operators of regulated small MS4s with a population less than 100,000 not already covered by Phase I; however, the Phase II Rule is more flexible and allows greater variability of regulated entities than does the Phase I Rule. Regulated, small MS4s include those within boundaries of *urbanized areas* as defined by the U.S. Census Bureau and those designated by the NPDES permitting authority. The NPDES permitting authority may designate a small MS4 under any of the following circumstances: the MS4's discharges do or can negatively affect water quality; population exceeds 10,000; population density is at least 1,000 people per square mile; or contribution of pollutant loadings to a physically interconnected MS4 is evident.

The Phase II municipal Phase II MS4 entities in the Anacostia River watershed are:

- Berwyn Heights
- Bladensburg
- Brentwood
- Capitol Heights
- Cheverly
- College Park
- Colmar Manor
- Cottage City
- Fairmount Heights
- Glenarden
- Greenbelt
- Hyattsville

- Landover Hills
- Mount Rainier
- New Carrollton
- Riverdale Park
- Seat Pleasant
- University Park

In addition to municipalities, certain federal, state, and other entities are also required to obtain a Phase II MS4 permit. Table 4-1 presents these permitted entities within the Anacostia River watershed.

Table 4-1. Phase II MS4 permitted federal, state, and other entities in Anacostia River watershed

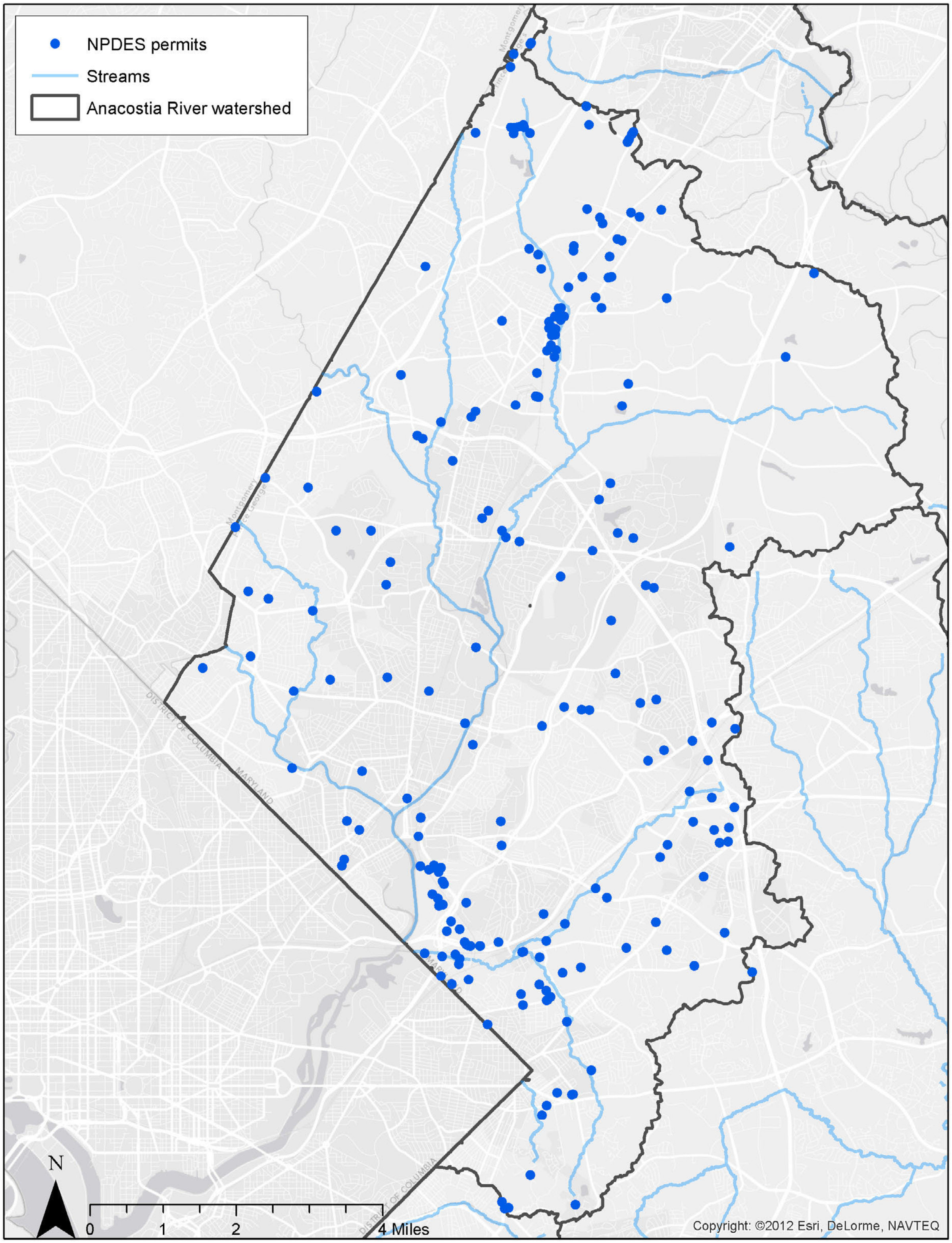
Agency	Installation/Facility
Maryland Army National Guard	Multiple Properties
U.S. Department of the Army	Adelphi Laboratory Center
Washington Suburban Sanitary Commission	Multiple Properties
United States Department of Agriculture APHIS-PPQ	National Plant Germplasm and Biotechnology Laboratory
University of Maryland	College Park Campus
Maryland Transit Administration	Multiple Properties
National Aeronautics and Space Administration	Goddard Space Flight Center
Maryland State Highway Administration	Multiple (outside Phase I Jurisdictions)
Washington Metropolitan Area Transit Authority	Multiple Metro Rail Stations
Maryland Transportation Authority	Multiple Properties
U.S. Department of the Army, Reserves	Multiple Properties
U.S. Department of Agriculture	Beltsville Agricultural Research Center
Maryland Department of Transportation Motor Vehicle Administration	Multiple Properties

4.1.2 Other NPDES Permitted Facilities

NPDES permit information was obtained from MDE's website and EPA's Integrated Compliance Information System. Figure 4-1 shows the locations of the permitted facilities that discharge to surface water in the watershed. Because of the number of facilities, Appendix C lists information on the facilities and their available information. Depending on permit conditions, a discharger is required to submit a discharge monitoring report (DMR) that reports pollutant concentration or loading data along with other information, such as flow or pH. The required information varies by discharger, and depends on the type of facility. Appendix C also includes summaries of available relevant permit limit (4 facilities) and DMR data (32 facilities).

The permit review revealed that there are 195 permitted facilities in the watershed. Of these, more than half are listed as discharging stormwater. Other facilities are permitted for discharging from construction sites, mining facilities, de-watering activities, refuse sites, and swimming pools. There were also 28 facilities that were found that were not permitted.

The County maintains stormwater pollution prevention plans (SWPPP) for its facilities. There currently are ten County facilities and nine other municipal facilities covered by the NPDES General Industrial permit and which require a SWPPP. The County currently conducts field verification of these facilities to assure that each SWPPP accurately reflects the environmental and industrial operations of the facility. If deficiencies in the SWPPP are noted, the County provides the required technical support to upgrade the plans. The County also monitors all SWPPP implementation activities through its database tracking system and provides MDE with an annual report documenting the status of each County-owned facility SWPPP.



Source: MDE and EPA ICIS database

Figure 4-1. Permitted discharges in the Anacostia River watershed.

4.1.3 Wastewater

Wastewater facilities may include those publicly owned treatment works providing wastewater treatment and disinfection for sanitary sewer systems, or industrial facilities providing treatment of process waters. In the Anacostia River watershed, two federal facilities are permitted to discharge treated sanitary wastewater in the watershed (Table 4-2). These facilities do not fall under the purview of the MS4 permit.

Table 4-2. Wastewater treatment plants in Anacostia River watershed

NPDES ID	Facility Name	Permit Type	Facility Type	Date Issued	Effective Date	Expiration Date
MD0020842	USDA East Side WWTP	NPDES Individual Permit	WWTP	02/16/10	03/01/10	02/28/15
MD0020851	USDA West Side WWTP	NPDES Individual Permit	WWTP	10/29/12	12/01/12	11/30/17

Note: WWTP = wastewater treatment plant; n/a=not available.

Sanitary sewers occasionally unintentionally discharge raw sewage to surface waters in events called SSOs. These events contribute nutrients, bacteria, and solids into local waterways. SSOs can be caused by sewer blockages, pipe breaks, defects, and power failures. The Maryland Reported Sewer Overflow Database contains bypasses, combined sewer overflows, and SSOs reported to MDE from January 2005 through the most recent update. Data on SSOs in the County were obtained from the database and are summarized in Table 4-3. Since 2005 an estimated 7.4 million gallons of sanitary overflows have been reported in the County. For that period, the average amount of annual overflow has been 828,064 gallons, with a minimum of 12,840 and a maximum of 5.2 million gallons, which occurred in 2006.

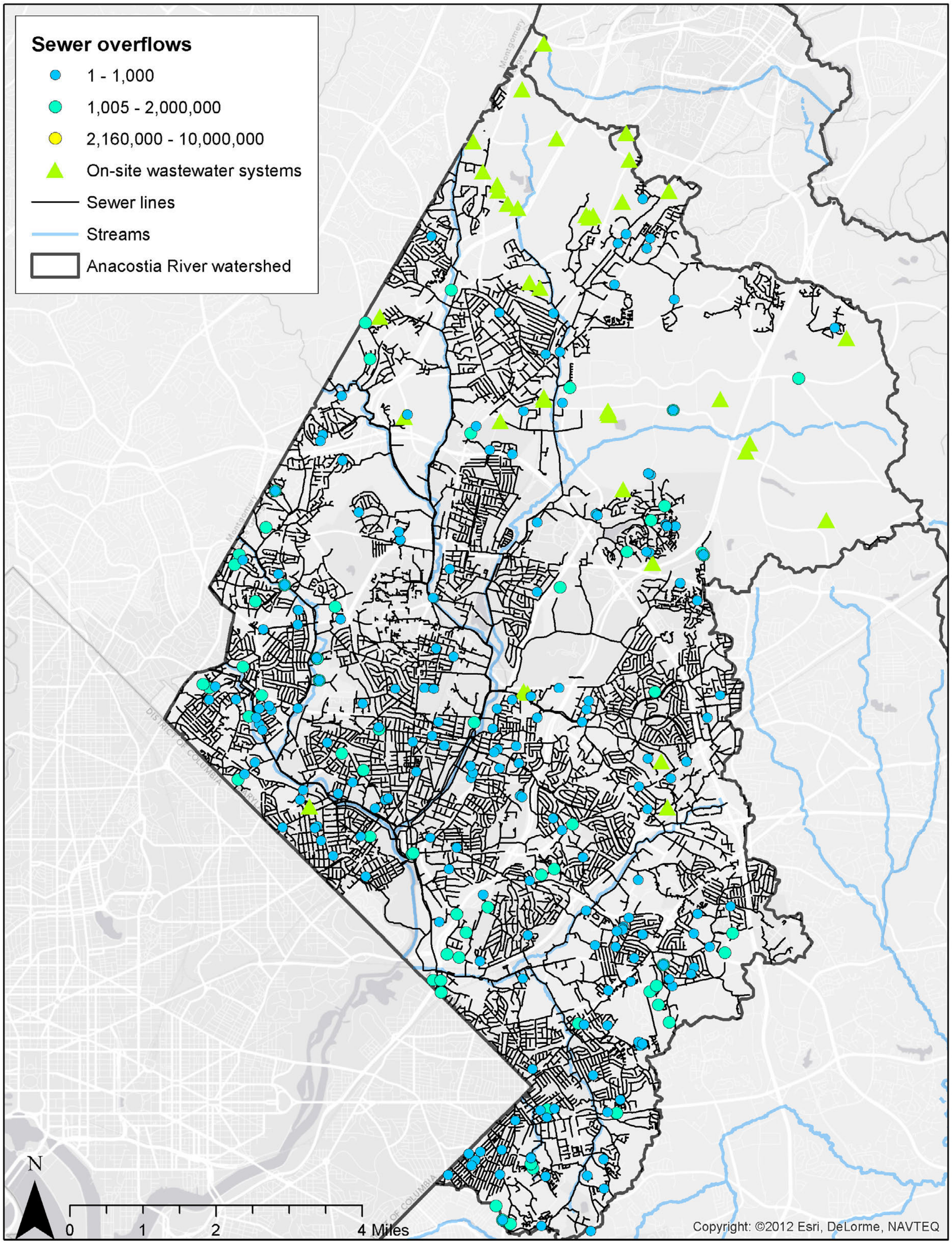
Figure 4-2 shows the locations of SSOs. The Washington Suburban Sanity Commission (WSSC) is currently addressing problems that cause SSOs through their Sewer Repair, Replacement and Rehabilitation (SR3) Program.

Table 4-3. Summary SSO overflow (gallons) in the Anacostia River watershed by year

Causes	2005	2006	2007	2008	2009	2010	2011	2012	2013
Blockage	21,660	547	5,766	620	16,313	184	669	329	14,242
Construction Activity							100		
Defective Equipment/ Workmanship	1,220					5,002			
Equipment Failure		1,950	41			100,000			
Equipment Ware		6,000		111,230		5,000			
Grease	35,299	57,945	5,347	13,571	7,026	21,423	2,618	5,142	8,108
High Flow/ Precipitation		2,000,000		1,458,880	1,000				
Mechanical Failure		100		11,100			41,620		
Other	30,500	2,160,232		25	28,261	761	152	147,665	

Causes	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Power Loss		999,000					0		
Roots		140	286	9,310	780	63	1,878	27	1,555
Roots/Grease						451	3,192	605	2,695
Stream Erosion				15,396					13,446
Third-Party Damage			65		92			5	
Unknown	1,000	50,000	1,335	562	1,925	791	2,415	2,659	15,252
Total	**89,679**	**5,275,914**	**12,840**	**1,620,694**	**55,397**	**133,675**	**52,644**	**156,432**	**55,298**

County data from 2011 indicate that there are 43 on-site wastewater systems within the watershed. Although these systems are typically not considered point sources, they are included in this section to provide a complete picture of sanitary wastewater in the watershed. These types of systems can contribute nitrogen loadings to nearby water bodies through their normal operation. Failing on-site systems can increase nitrogen, phosphorus, and bacteria levels. No information is currently available as to the age, maintenance, or level of treatment of the systems. Figure 4-2 shows the locations of on-site wastewater systems.



Source: Storm sewer pipes are from DoE and overflows from MDE, June 2014,

Figure 4-2. Sanitary sewer lines, overflow sites, and on-site wastewater systems in the Anacostia River watershed.

4.2 Nonpoint and Other Sources

Nonpoint sources can originate from rainfall runoff (in non-urban areas) and landscape-dependent characteristics and processes that contribute sediment, organic matter, and nutrient loads to surface waters. Nonpoint sources include diffuse sources that cannot be identified as entering the water body at a specific location. Because the County is considered a Phase I MS4, for TMDL purposes, all urban areas within the County are considered to be point sources and allocated loads are considered under the WLA component. Mechanisms under which urban or MS4 loads are generated are the same as other rainfall-driven nonpoint sources. Potential sources vary greatly and include agriculture-related activities, atmospheric deposition, on-site treatment systems, streambank erosion, wildlife, and unknown sources.

Atmospheric deposition occurs by two main methods: wet and dry. Wet deposition occurs through rain, fog, and snow. Dry deposition occurs from gases and particles. Particles and gases from dry deposition can be washed into streams from trees, roofs, and other surfaces by precipitation after it is deposited. Winds blow the particles and gases contributing to atmospheric deposition over far distances, including political boundaries, such as state boundaries.

Streams and rivers can be vulnerable to nutrient inputs from wildlife. Wild animals with direct access to streams include deer, raccoons, other small mammals, and avian species. This access to streams contributes bacteria and nitrogen to water bodies.

Development in the watershed has altered the landscape from presettlement conditions, which included grassland and forest, to post-settlement conditions, which include cropland, pasture, and urban/suburban areas. This conversion has led to increased runoff and flow into streams versus presettlement conditions, as well as streambank erosion and straightening of meandering streams. The increased erosion not only increases sediment loading to water bodies but also increases loadings of nutrients and other pollutants (e.g., PCBs) that are adsorbed to the particles.

4.3 Existing BMPs

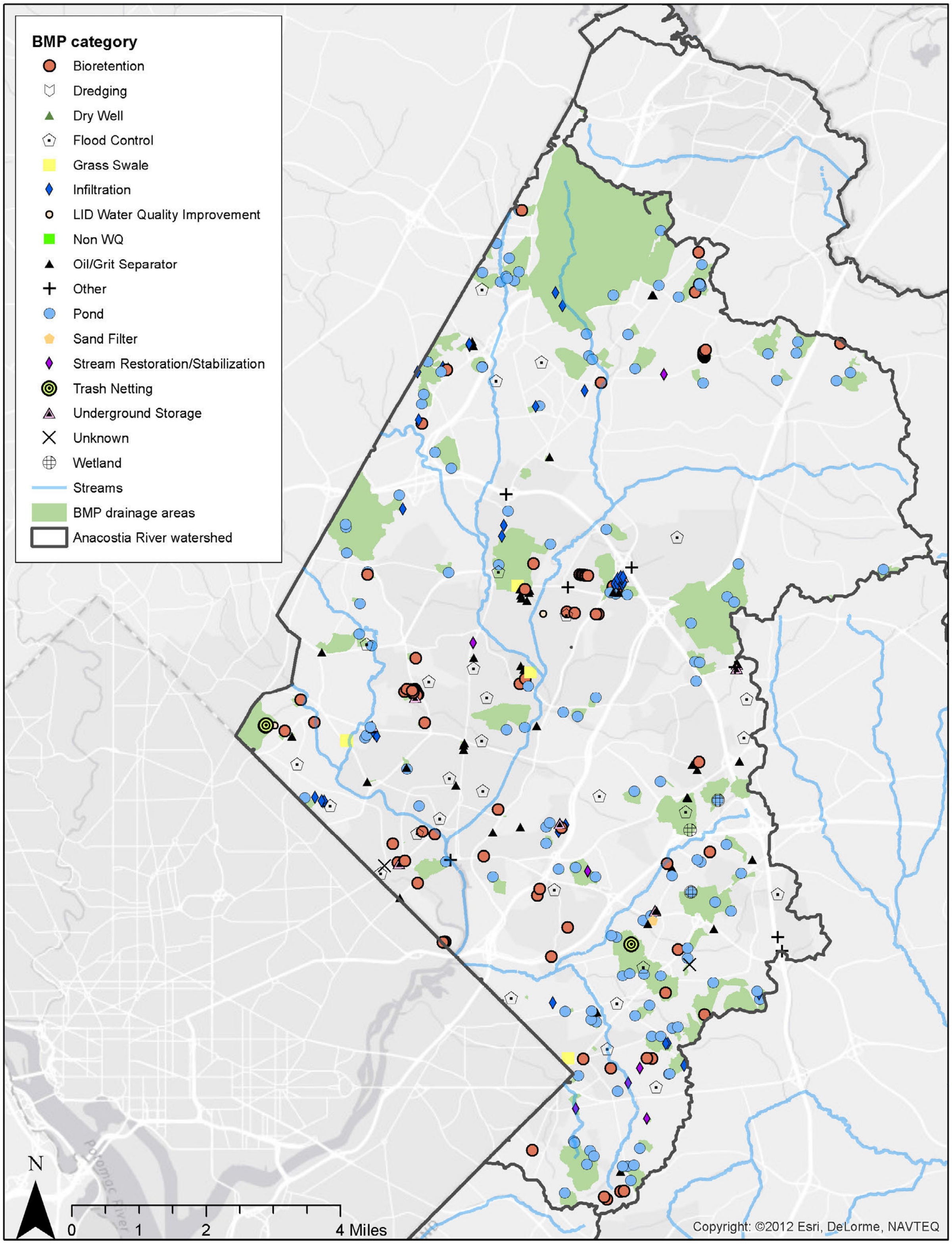
BMPs are measures used to control and reduce sources of pollution. They can be structural or nonstructural and are used to address both urban and agricultural sources of pollution. Structural practices include practices that are constructed and installed such as detention ponds, porous pavement, or bioretention systems. Nonstructural BMPs include institutional, educational or pollution prevention practices that when implemented work to reduce pollutant loadings. Examples of nonstructural BMPs include implementation of strategic disconnection of impervious areas in a municipality, street sweeping, homeowner and landowner education campaigns, and nutrient management. Different types of BMPs remove pollutants at different levels of efficiency. Ponds tend to have lower efficiencies (but can treat larger areas), while bioretention systems and infiltration practices tend to have higher efficiencies (but can only treat smaller areas).

The County has implemented both structural and nonstructural BMPs in furtherance of a variety of programmatic goals and responsibilities including permit compliance, TMDL WLAs, flood mitigation, and others. Table 4-4 presents the list of known public and private structural BMPs in the County's portion of the Anacostia River watershed. Figure 4-3 presents the locations of the BMPs in the watershed. The County also engages in street sweeping, public outreach to promote environmental awareness, green initiatives, and community involvement in protecting natural resources. Past public outreach activities include educational brochures on stormwater pollution awareness, outreach in schools, *Can the Grease* program to decrease the amount of SSOs, and recycling programs.

Table 4-4. List of BMP types in the Anacostia River watershed

BMP Type	Total	Total w/DA	Total Acres Treated	Avg. Acres Treated
Bioretention	86	51	181.25	3.55
Flood Control	29	1	1.69	1.69
Grass Swale	5	3	2.52	0.84
Infiltration	39	31	62.07	2.00
Oil/Grit Separator	44	28	77.08	2.75
Other	9	1	0.61	0.61
Pond	133	122	6,159.99	50.49
Sand Filter	1	1	0.49	0.49
Stream Restoration/Stabilization	7	6	64.19	10.70
Trash Netting	3	1	337.27	337.27
Underground Storage	8	4	6.77	1.69
Unknown	2	1	6.30	6.30
Wetland	3	3	403.25	134.42
Total	371	253	7,303.47	28.87

Note: DA=drainage area



Source: BMPs and storm sewer pipes are from DoE, June 2014

Figure 4-3. BMPs and associated drainage areas in the Anacostia River watershed.

4.4 Existing Condition Analysis

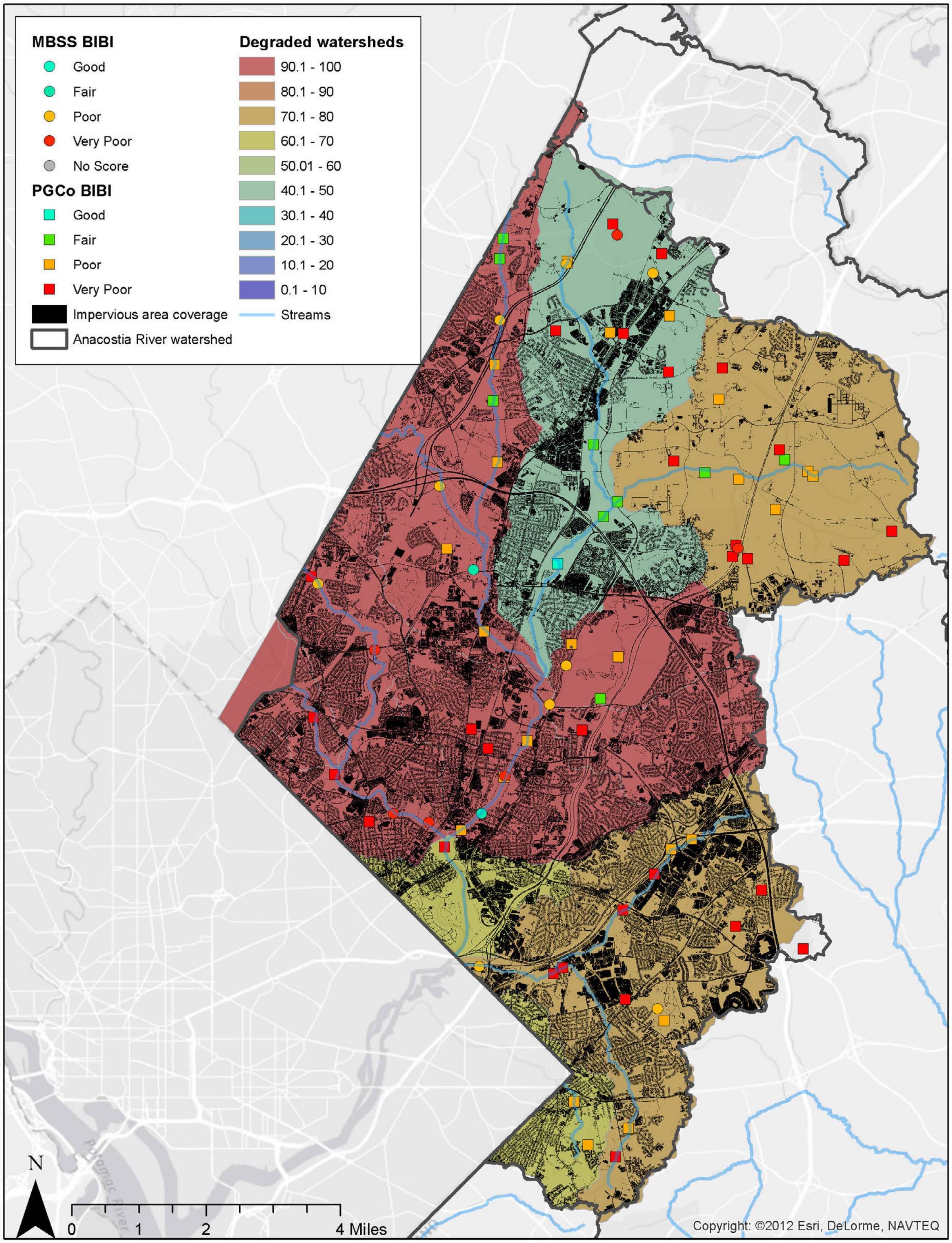
Water quality and the health of biological communities are affected by watershed characteristics such as land use and percentage of impervious cover. Multiple studies have shown that as impervious cover increases, peak runoff volumes and velocities increase, along with streambank erosion (Arnold and Gibbons 1996; Schueler 1994). The purpose of this section is to examine how landscape and physical characteristics in the County might influence conditions in other portions of the County. Available data were reviewed to examine relationships between biological index scores and impervious cover and BMP locations. In addition, BMP locations are examined in relation to current land uses and impervious areas.

- Figure 4-4 compares biological scores to impervious areas.
- Figure 4-5 compares biological scores to BMP locations.
- Figure 4-6 compares BMP locations to the current storm drain network.
- Figure 4-7 compares BMP locations to impervious areas.
- Table 4-5 looks at BMPs, their drainage areas, and what land use(s) they treat.

Overall the watershed has biological integrity values of Poor, Very Poor, and a few Fair and Good. The monitoring locations with Poor and Very Poor scores tend to be in the impervious areas. The monitoring locations with scores of Fair are in the headwaters of the NEB that flows through the Beltsville Agricultural Research Center, which is low in impervious area. The other Good and Fair scores are in areas surrounded by areas that have more pervious surfaces, such as turf or forested patches.

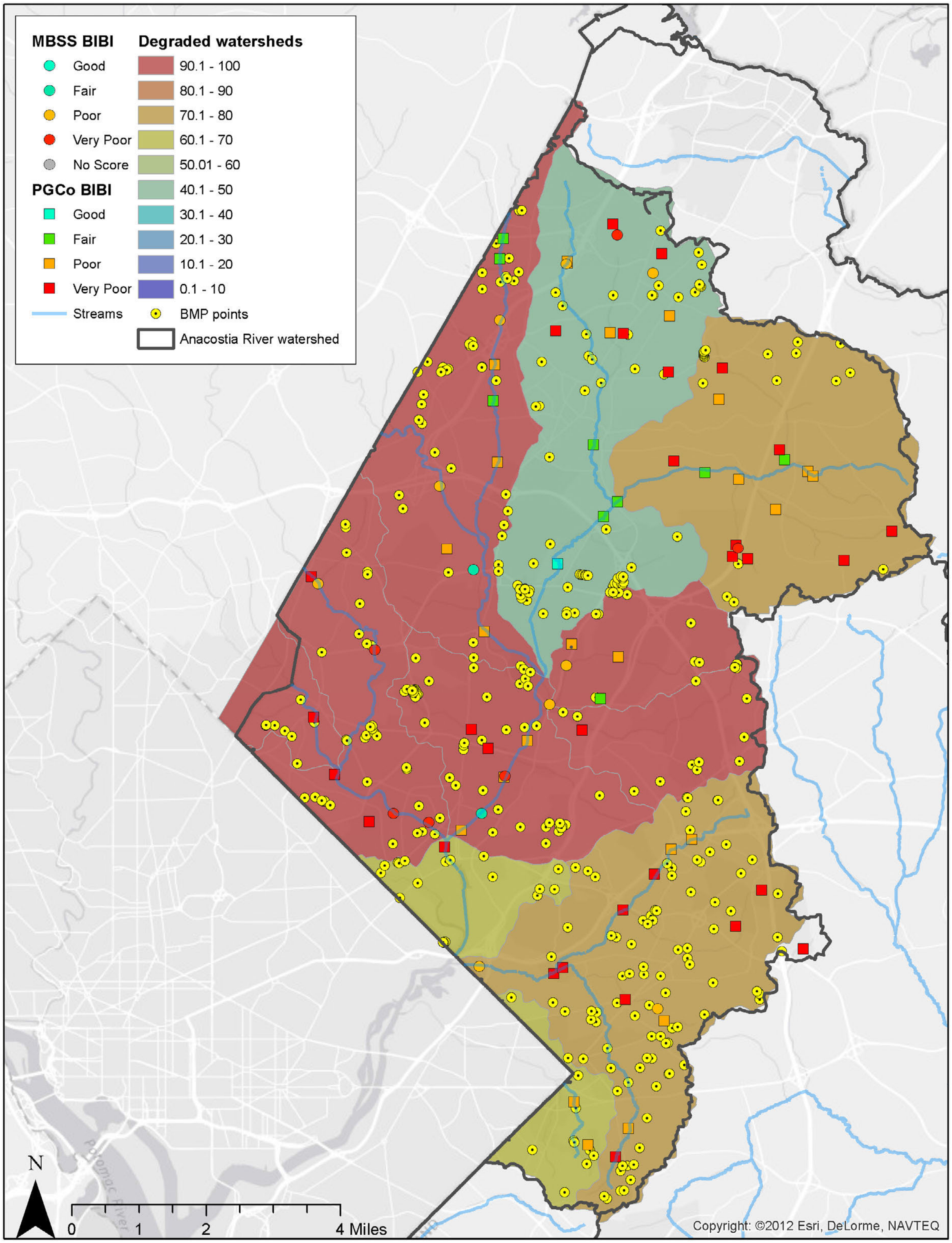
Figure 4-6 and Figure 4-7 show that there are impervious areas that have storm sewers that are not treated by BMPs, for example, in the central portion of the watershed. These areas might be candidate locations for BMP placement during the restoration plan development.

Table 4-5 is a compilation of BMP types in the Anacostia River watershed and the land uses they drain. Stormwater ponds are the most implemented BMP. They usually treat residential and non-urban areas. Bioretention systems are the second most implemented practices. They tend to treat smaller areas, but with greater pollutant removal efficiency. Oil and grit separators and infiltration practices are tied for the third most implemented BMPs, with the separators treating more total area and impervious area; however, separators have lower removal efficiencies than infiltration practices.



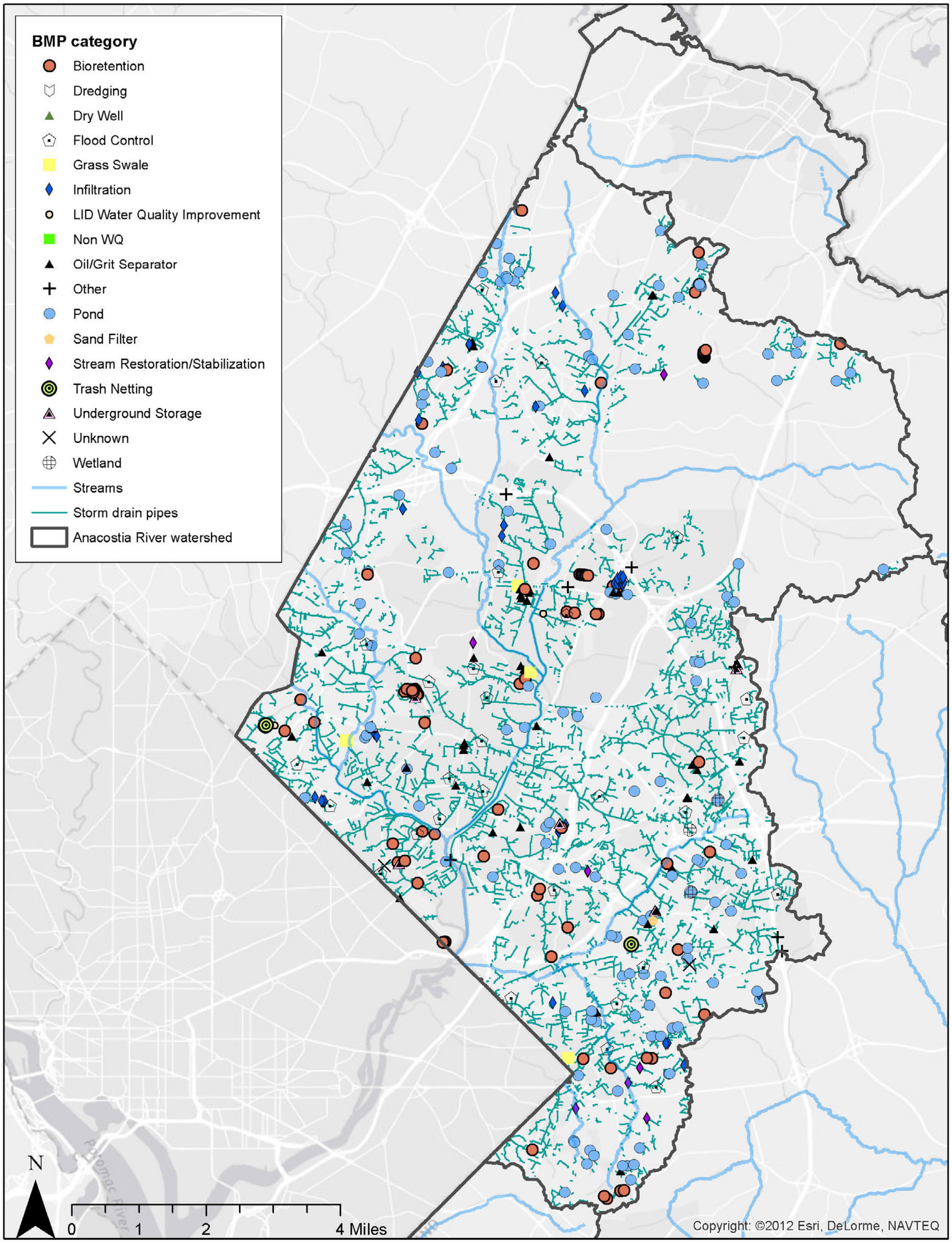
Source: Biotic Integrity from MD DNR, degraded watersheds from Tetra Tech, 2009 impervious area from M-NCPPC 2014

Figure 4-4. Comparison of biological conditions and impervious areas in the Anacostia River watershed.



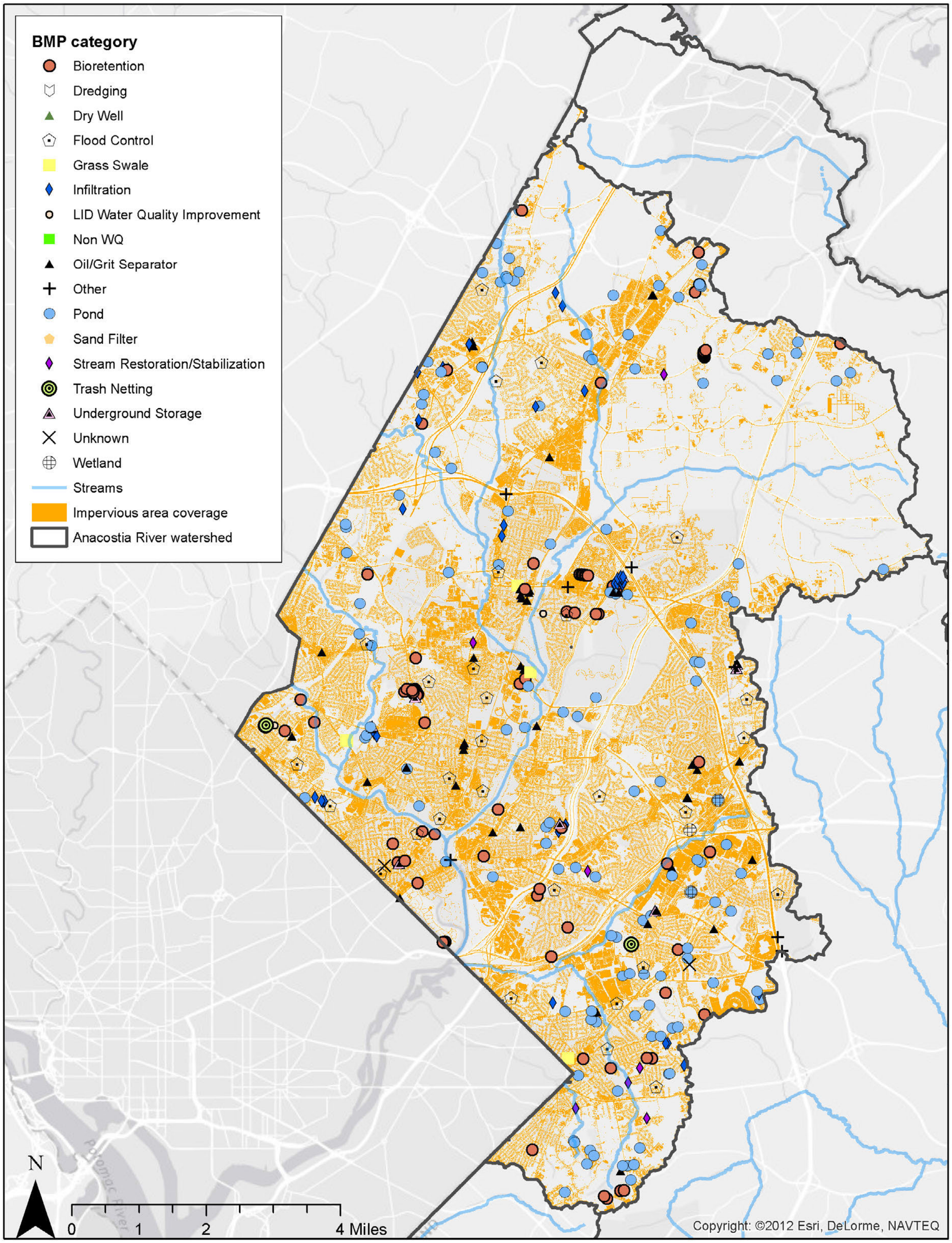
Source: BMPs are from DoE, June 2014, Biotic Integrity from MD DNR, degraded watersheds from Tetra Tech

Figure 4-5. Comparison of biological conditions and BMP locations in the Anacostia River watershed.



Source: BMPs and storm sewer pipes are from DoE, June 2014

Figure 4-6. Comparison of BMP locations and storm drain network in the Anacostia River watershed.



Source: 2009 impervious area from M-NCPPC 2014, BMPs are from DoE, June 2014

Figure 4-7. Comparison of BMP locations and impervious areas in the Anacostia River watershed.

Table 4-5. Summary of known BMP drainage areas, land uses, and impervious areas

BMP Type	Statistic	Com-mercial	Indus-trial	Institut-ional	Non-urban	Open urban	Resi-dential	Trans-portation
Bioretention	Count	11	9	15	8	1	24	1
	DA (acres)	10.33	9.89	57.95	9.22	0.04	92.51	0.05
	Imp DA (acres)	8.28	5.11	32.26	1.82	0.00	35.70	0.00
Grass Swale	Count	1	0	2	1	0	2	0
	DA (acres)	1.31	0.00	0.91	0.15	0.00	0.15	0.00
	Imp DA (acres)	0.67	0.00	0.57	0.13	0.00	0.10	0.00
Infiltration	Count	16	0	8	1	1	11	0
	DA (acres)	50.05	0.00	23.90	0.63	5.36	92.83	0.00
	Imp DA (acres)	35.42	0.00	15.66	0.04	1.84	37.48	0.00
Oil/Grit Separator	Count	14	4	9	1	1	7	1
	DA (acres)	74.28	21.02	49.36	15.39	3.41	123.45	8.63
	Imp DA (acres)	53.50	14.51	28.44	0.24	2.98	56.21	0.00
Other	Count	3	0	2	0	0	2	1
	DA (acres)	4.06	0.00	2.51	0.00	0.00	0.65	0.16
	Imp DA (acres)	3.36	0.00	1.47	0.00	0.00	0.54	0.00
Pond	Count	35	23	45	65	27	96	9
	DA (acres)	1,696.07	2,137.72	1,716.89	12,729.88	1,483.38	10,975.77	634.73
	Imp DA (acres)	1,109.95	926.19	590.81	401.49	169.94	3,714.35	0.00
Sand Filter	Count	1	0	0	0	0	0	0
	DA (acres)	0.49	0.00	0.00	0.00	0.00	0.00	0.00
	Imp DA (acres)	0.36	0.00	0.00	0.00	0.00	0.00	0.00
Stream Restoration/ Stabilization	Count	3	0	2	4	0	6	0
	DA (acres)	40.63	0.00	1.60	9.94	0.00	79.29	0.00
	Imp DA (acres)	15.01	0.00	0.23	0.89	0.00	22.33	0.00
Unknown	Count	0	0	0	0	0	1	0
	DA (acres)	0.00	0.00	0.00	0.00	0.00	11.64	0.00
	Imp DA (acres)	0.00	0.00	0.00	0.00	0.00	4.82	0
Wetland	Count	3	1	3	4	2	3	2
	DA (acres)	134.73	79.13	42.75	120.47	70.11	354.43	3.73
	Imp DA (acres)	86.06	49.49	17.80	9.08	14.98	145.57	0.00

Note: This table only includes information for BMPs with geospatial drainage area (DA) information.

4.5 Stressor Loading Analysis

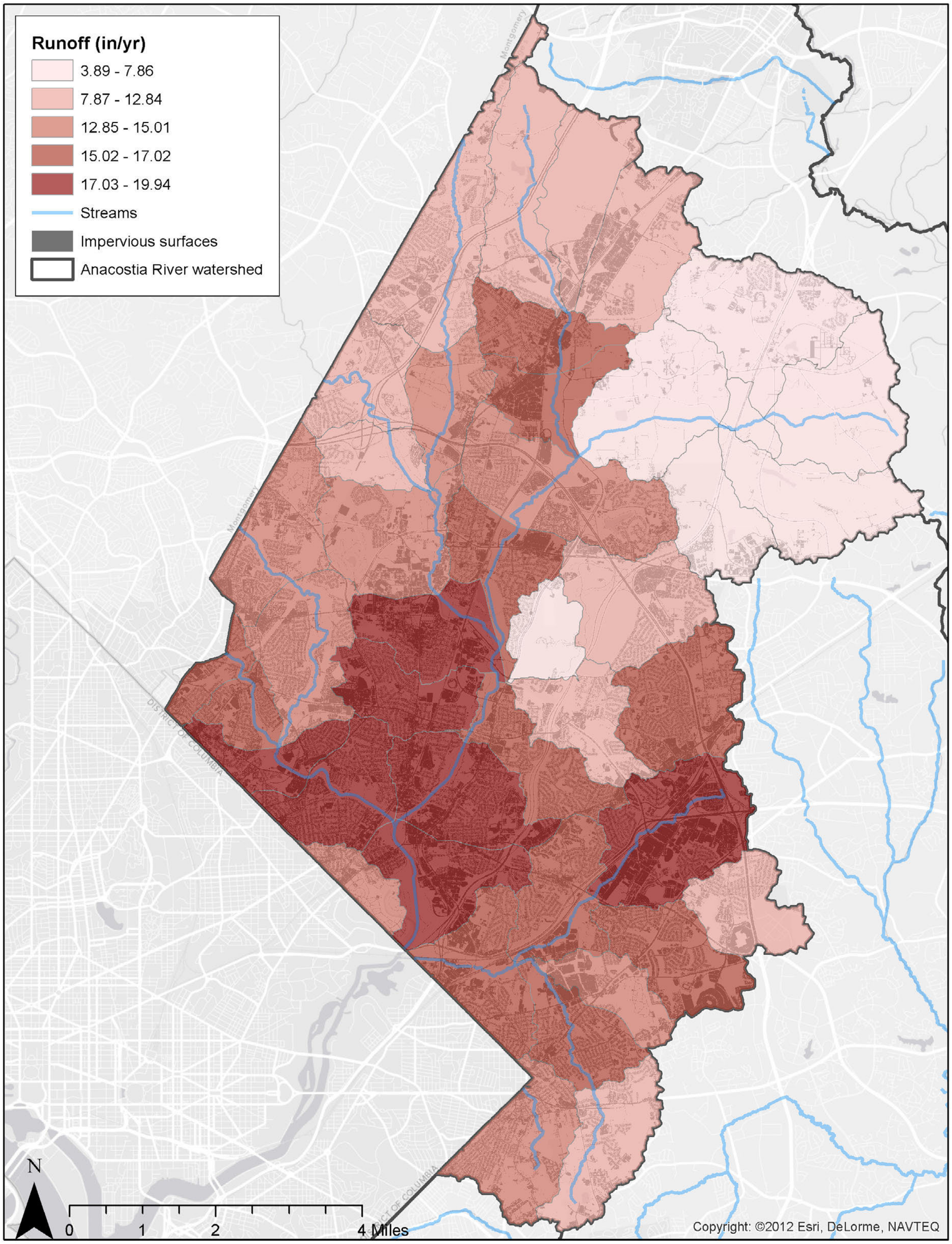
As described above, water quality and the health of biological communities are affected by watershed characteristics such as land use and percentage of impervious cover. On the basis of land cover characteristics, there is substantial literature on annual median concentrations for connected impervious, disconnected impervious, and pervious areas. Multiplied by annual runoff volumes from each of these land covers, this develops the projected runoff loads of the various stressors. These stressors are total nitrogen, total phosphorus, TSS, BOD, and fecal coliforms. The first four parameters are measured in pounds per acre per year, while the latter is measured by billion MPN per acre per year.

The purpose of this section is to examine how these landscape and physical characteristics in the watershed might influence conditions in their local watershed. Given their individual characteristics, this analysis highlights subwatersheds (smaller portions of the watershed) where runoff and pollutant loads are elevated. The most elevated subwatersheds are candidates for increased restoration activities to help restore watershed functions. The least elevated watersheds are candidates for preservation measures. The following figures relate how impervious surfaces are closely correlated to the extent of stressor loading.

- Figure 4-8 presents the variation in runoff amount throughout the watershed.
- Figure 4-9 presents the variation in total nitrogen loading rates throughout the watershed.
- Figure 4-10 presents the variation in total phosphorus loading rates throughout the watershed.
- Figure 4-11 presents the variation in TSS loading rates throughout the watershed.
- Figure 4-12 presents the variation in BOD loading rates throughout the watershed.
- Figure 4-13 presents the variation in fecal coliform loading rates throughout the watershed.

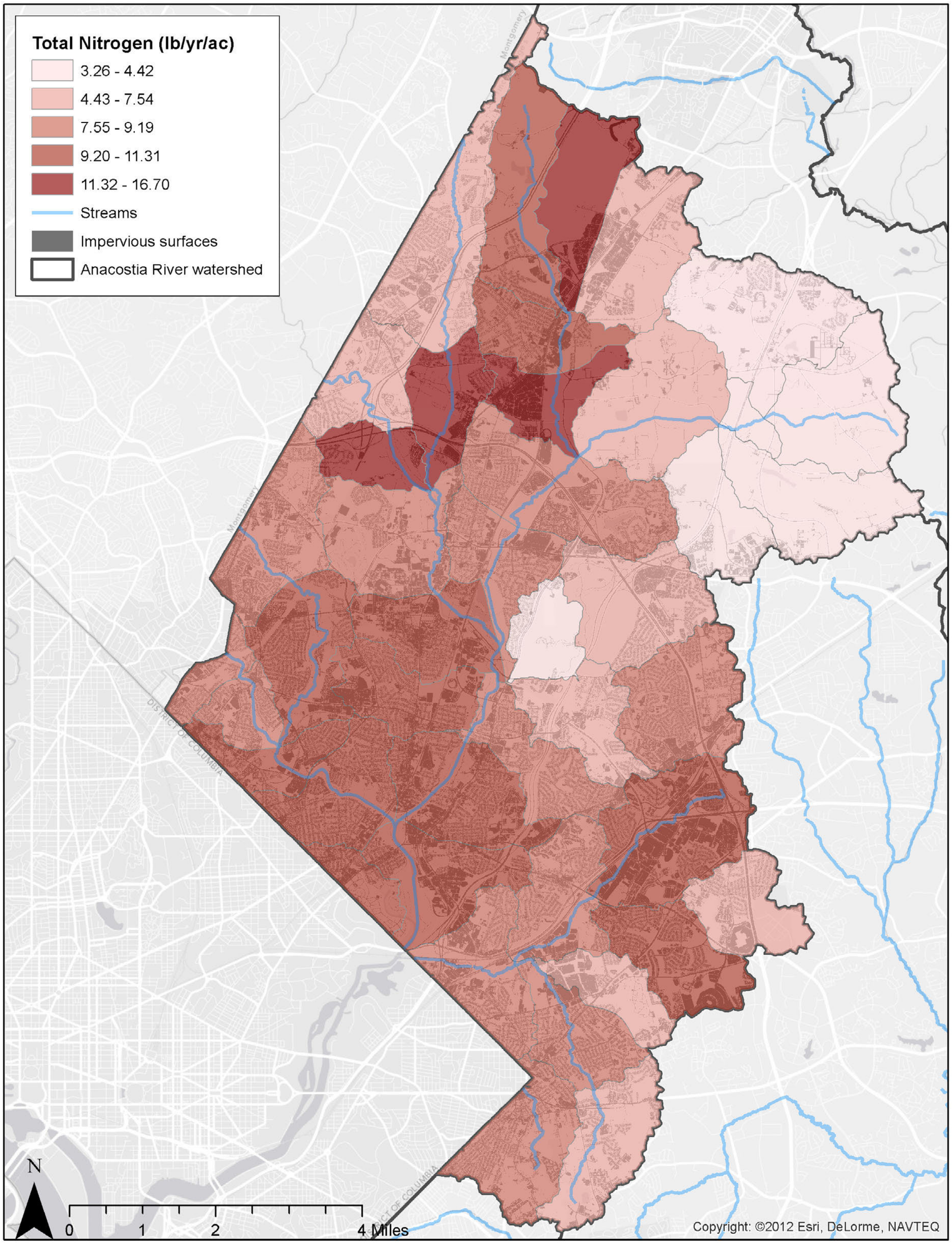
Figure 4-8 illustrates how runoff is affected by impervious cover. The areas with the most runoff are the areas of higher impervious area in the lower portion of the watershed. The areas with the least runoff are the Beltsville Agricultural Research Center and Greenbelt Park.

Loading rates for total phosphorus, BOD, and fecal coliform bacteria tend to mirror the areas with the highest runoff and impervious area. Total nitrogen loading rates are high in the northern reaches of the Northeastern Branch.



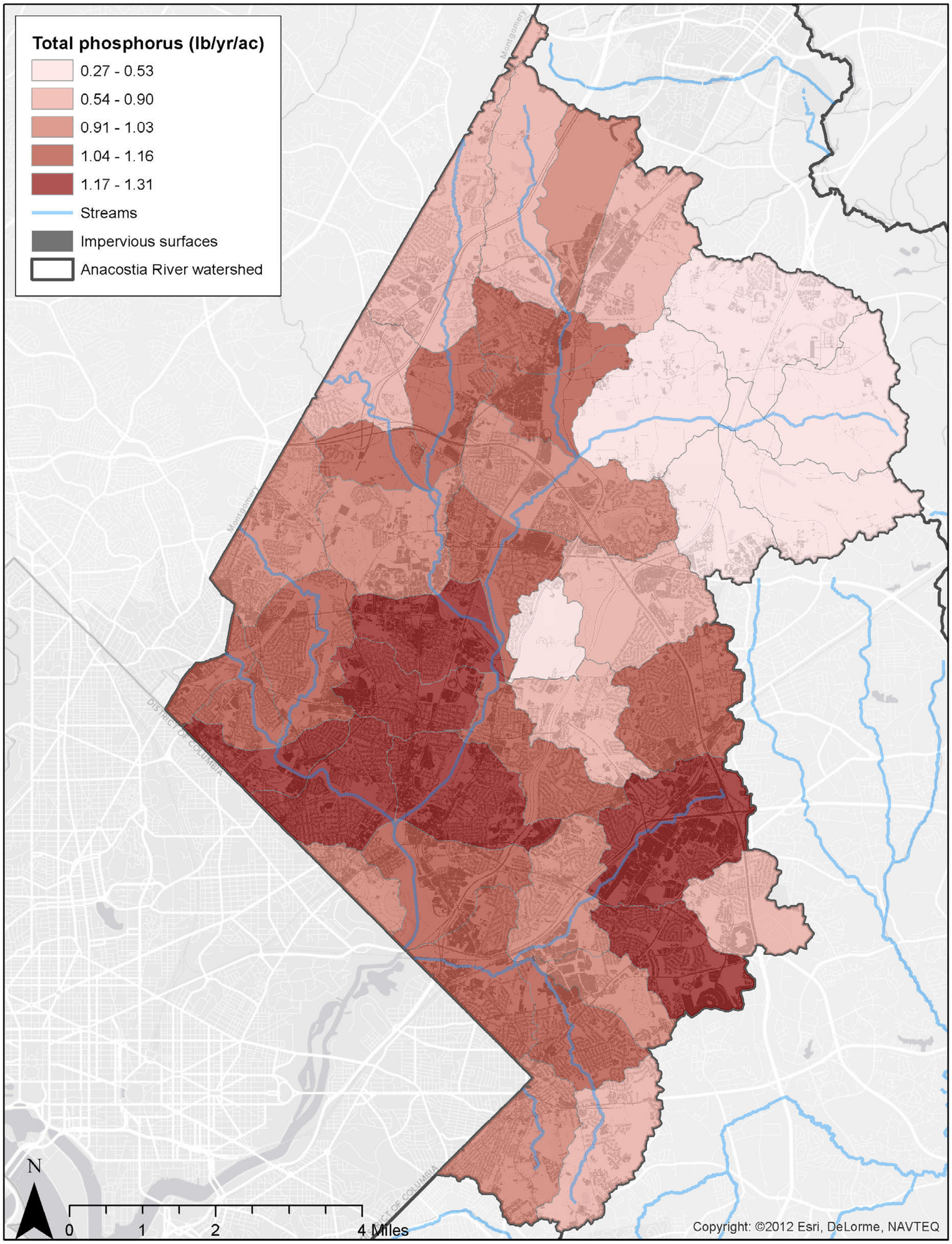
Source: 2009 impervious area from M-NCPPC 2014.

Figure 4-8. Comparison of runoff amount and impervious areas in the Anacostia River watershed.



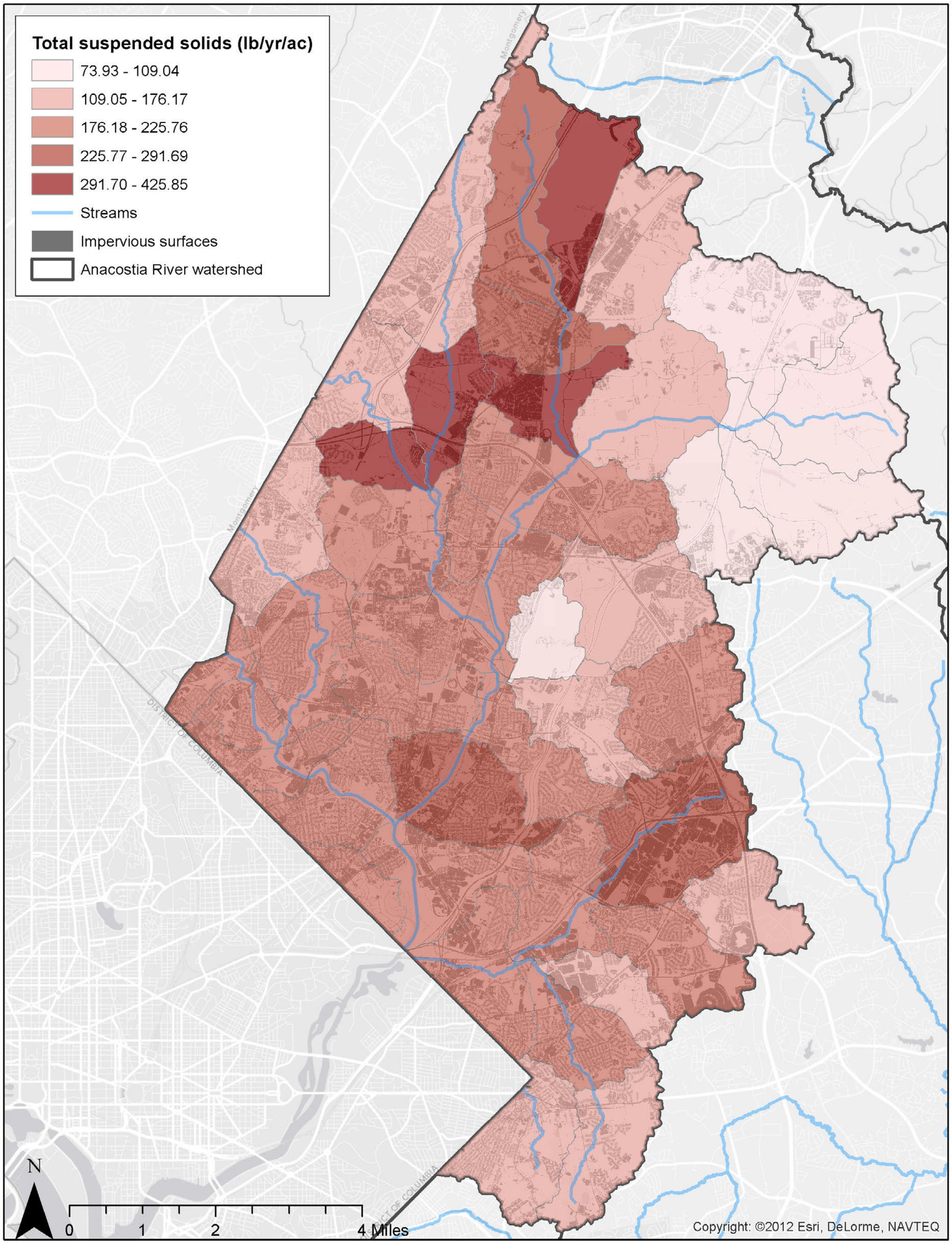
Source: 2009 impervious area from M-NCPPC 2014.

Figure 4-9. Comparison of total nitrogen loading rates and impervious areas in the Anacostia River watershed.



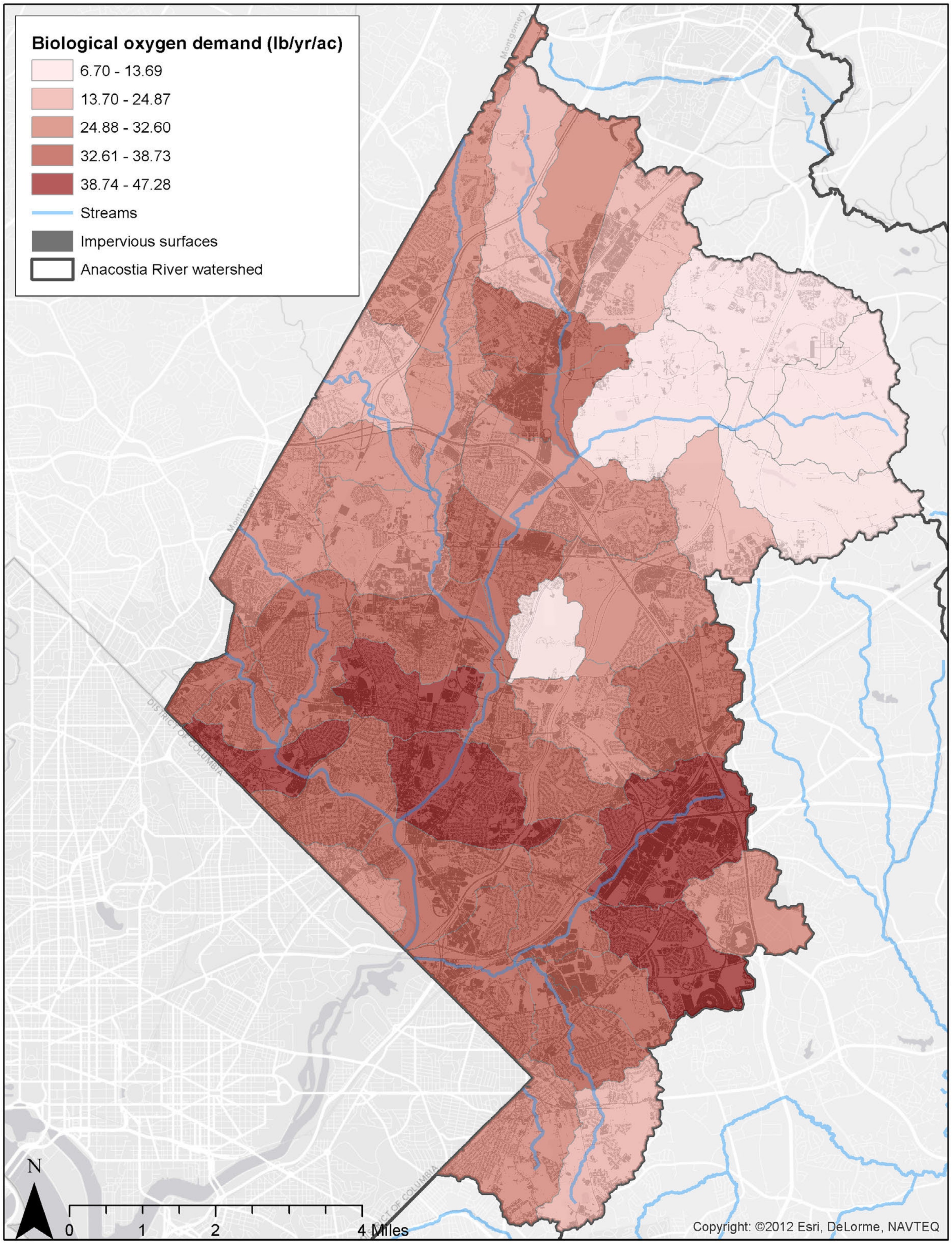
Source: 2009 impervious area from M-NCPPC 2014.

Figure 4-10. Comparison of total phosphorus loading rates and impervious areas in the Anacostia River watershed.



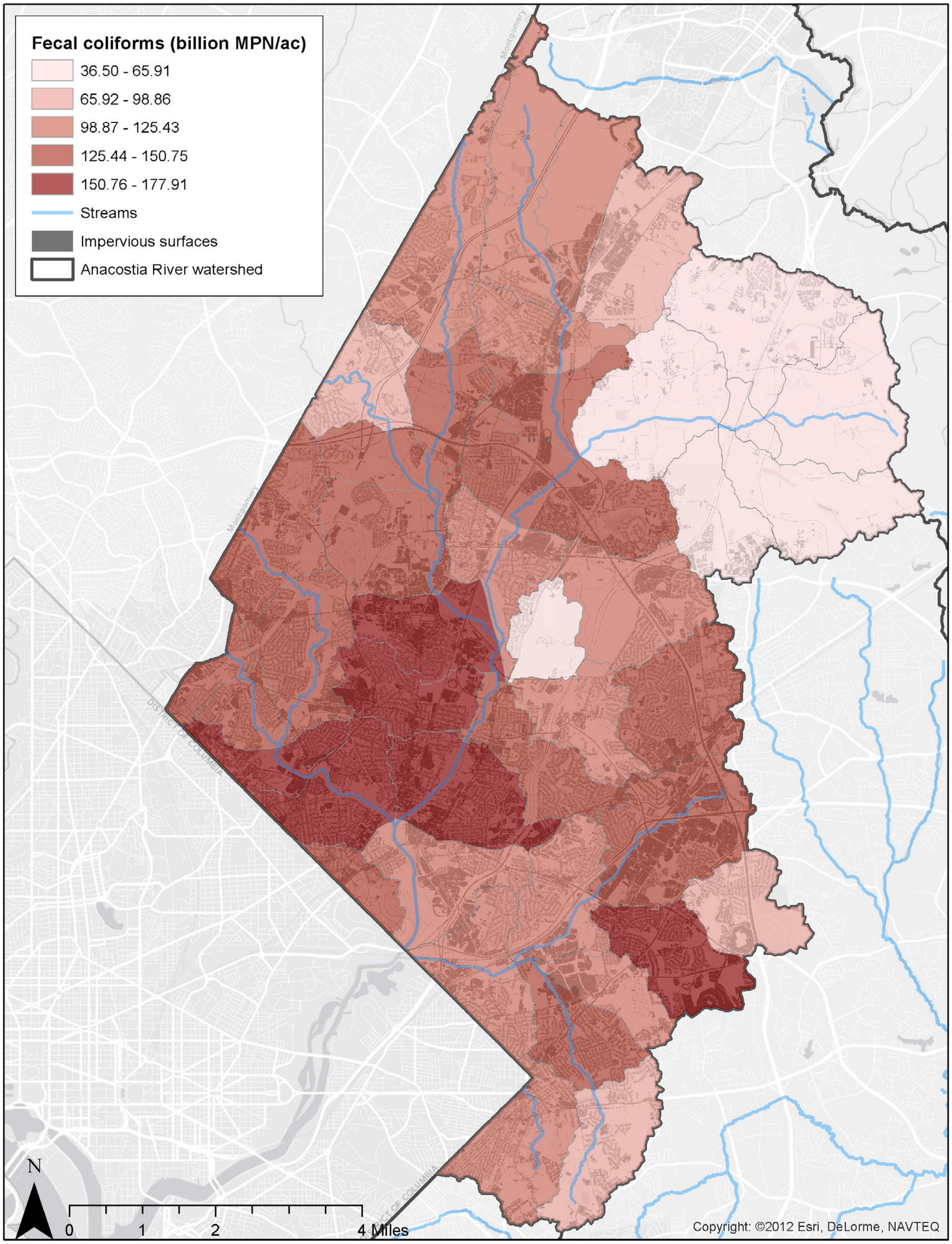
Source: 2009 impervious area from M-NCPPC 2014.

Figure 4-11. Comparison of total suspended sediments loading rates and impervious areas in the Anacostia River watershed.



Source: 2009 impervious area from M-NCPPC 2014.

Figure 4-12. Comparison of BOD loading rates and impervious areas in the Anacostia River watershed.



Source: 2009 impervious area from M-NCPPC 2014.

Figure 4-13. Comparison of fecal coliform loading rates and impervious areas in the Anacostia River watershed.

5 NEXT STEPS

As previously discussed, the County is in the beginning phases of developing restoration plans for the EPA-approved TMDLs in the County. This is a multistep process and this report represents the initial phase of the plan development process by collecting the necessary data and beginning to process the information. Additional phases will be completed through the remainder of 2014, culminating in final plans submitted to MDE by January 2, 2015. Future phases include analyses to (1) look at the amount of pollutant loads that need to be reduced; (2) estimate reductions from the current and past County restoration activities; (3) determine the current load reduction gap; and (4) estimate the remaining amount of restoration activities that are still required to meet TMDL goals. The restoration plans will be developed once these analyses are complete.

Restoration plans typically:

- Identify causes and sources of pollution.
- Estimate pollutant load reductions.
- Describe management options and identify critical areas.
- Estimate technical and financial assistance needed.
- Develop an education component.
- Develop a project schedule.
- Describe interim, measurable milestones.
- Identify indicators to measure progress.
- Develop a monitoring component.

The restoration plans will be developed over the summer and early fall and expected to be available for public comment in November. For more information concerning the restoration plans or the public meeting, please visit the County's Department of the Environment website at www.princegeorgescountymd.gov/sites/stormwatermanagement or contact Lilantha Tennekoon at 301-883-6198 or ltennekoon@co.pg.md.us.

Once finalized, the restoration plans will lead to additional BMP implementation, public outreach, and opportunities for the public to help in the watershed restoration process. The County is already conducting many of the activities that will be described in the plans, but the rate of implementation activities will increase. BMPs will be installed through the County's Public-Private Partnership Program, capital improvement projects, and grants. Additional BMPs are expected to be implemented from Rain Check Rebates and the Alternative Compliance program through the County's recently implemented Clean Water Act Fee. There will also be an increase in pollutant-focused public outreach initiatives. The public will also be encouraged to take small steps that will add up to be part of the restoration solution.

The restoration plan will explore different ways the County can monitor, track, and report restoration progress towards meeting the TMDL reduction goals. There are several different options for monitoring and tracking progress. The County expects to use a combination of monitoring activities. The County will report annual progress as part of its NPDES MS4 permit reporting requirements. In addition, the restoration plans describe adaptive approaches that will reevaluate current strategies on the basis of the progress that has occurred and possibly suggest new implementation strategies.

The County's NPDES MS4 permit also requires the County to develop detailed watershed assessments for each County watershed by January 2019. These assessments will be larger studies that will build off the initial watershed characterization reports and restoration plans. The assessments will include the current water quality conditions, identification and ranking of water quality problems, prioritized water quality improvement projects, and load reduction benchmarks for meeting applicable TMDL reduction goals.

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APPENDIX A: TMDL FACTSHEETS

Anacostia River Fecal Coliform Bacteria TMDL

Anacostia River Nutrients and BOD TMDL

Anacostia River Sediment TMDL

Anacostia River Trash TMDL

Chesapeake Bay Watershed Nutrient and Sediment TMDL

Northeast and Northwest Branch Non-Tidal Anacostia River PCB TMDL

Tidal Potomac and Anacostia PCB TMDL

Anacostia River Nutrients and BOD TMDL

Source Document:	MDE and DDOE (Maryland Department of the Environment and District Department of the Environment). 2008. Total Maximum Daily Loads of Nutrients/Biochemical Oxygen Demand for the Anacostia River Basin, Montgomery and Prince George's Counties, Maryland and The District of Columbia. Document Version April 25, 2008.
Water Body Type:	Tidal and non-tidal portions of Anacostia River watershed
Pollutant:	Biochemical oxygen demand (BOD), total nitrogen (TN), and total phosphorus (TP)
Designated Uses:	Use I-P – Water Contact Recreation, Protection of Aquatic Life and Public Drinking Supply; Use II – Tidal Waters: Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting; Use III – Natural Trout Waters; and Use IV – Recreational Trout Waters
Size of Watershed:	173 square miles (84 percent in Maryland)
Water Quality Standards:	**Dissolved oxygen (DO)**: See Table 21 of report **Chlorophyll *a***: July 1–September 30 average concentration ≤ 25 µg/L **Secchi depth:** Growing season (April 1–October 30) 3-year median Secchi depth not less than 0.8 meters
Analytical Approach:	Tidal Anacostia Model/Water Analysis Simulation Program (TAM/WASP) with other methods used for various sources and tributaries
Date Approved:	Approved June 5, 2008

Introduction

The Total Maximum Daily Load (TMDL) analysis for the Anacostia River watershed (Figure 1) addresses the BOD, TN, and TP loads on an annual average basis.

This fact sheet provides summary data related to the TMDL and includes specific information related to allocations made for Prince George's County, Maryland, regulated stormwater sources.

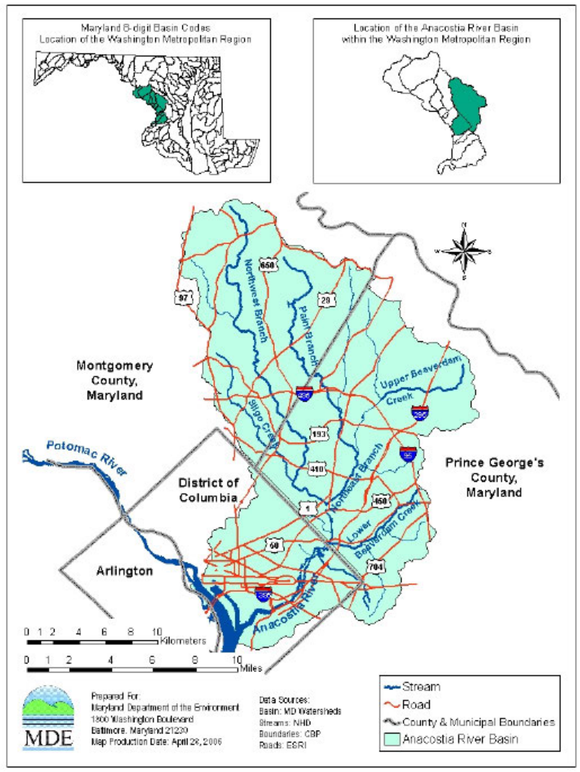

Figure 1. Location of Anacostia River watershed

Source: MDE and DDOE 2007.

Problem Identification and Basis for Listing

Water quality impacts from nutrients and BOD tend to occur in the tidal Anacostia. The Chesapeake Bay Program provides the framework against which constituents such as nutrients, sediment, DO, and chlorophyll *a* concentration are measured to determine the health of the Chesapeake Bay and its tributaries. Monitoring data showed violations of minimum DO concentrations, clarity standards, and chlorophyll *a* concentrations. For non-tidal waters, the 1993–1995

Maryland Water Quality Inventory provided the original narrative basis for the listing, indicating that erosion, sediment, and high levels of bacteria were the primary causes of impaired water quality in the non-tidal portions of the watershed. Whereas high levels of nutrients, chlorophyll *a*, and turbidity were said to characterize the tidal portion of the river at station ANA0082. Data collected more recently to the TMDL analysis indicated that in non-tidal portions of the watershed, DO and chlorophyll *a* concentrations were not problematic. As a result, reductions in nutrients and BOD were driven by levels required to meet standards in the tidal portions of the Anacostia River.

Applicable Data

The models were calibrated for 1995–2003, the most recent period for which observed data was available for developing the sediment TMDLs. DDOE restarted sampling for chlorophyll *a* in 1999.

Sources

Nutrients and BOD are attributed to stormwater runoff, subsurface drainage, erosion and in-stream scour, industrial and municipal point sources, and combined sewer overflows.

Technical Approach

The TMDL for the tidal Anacostia River watershed was developed using the TAM/WASP modeling application to simulate hydrodynamics, with additional modules to simulate sediment transport and sediment oxygen demand. Loadings from the tributary watersheds of the Northeast Branch (NEB), Northwest Branch (NWB), Lower Beaverdam Creek (LBC), and Watts Branch were determined from a combination of U.S. Geological Survey's ESTIMATOR and Hydrological Simulation Program—FORTRAN (HSPF) models. More specifically, upstream loads from NEB and NWB were determined by ESTIMATOR; four loads from LBC and Watts Branch were determined by HSFP models; and five loads from smaller tributaries and direct drainage are based on simulated Watts Branch flows and average event mean concentrations from the jurisdictions' water quality monitoring for their municipal separate storm sewer system (MS4) permits.

For storm sewers drainage and direct drainage areas to the tidal Anacostia River in Maryland and the District, flows were estimated based on the Watts Branch HSPF model. Loads were determined using model flows and Anacostia River watershed average event mean concentrations of stormwater monitoring data collected under the MS4 program.

Daily nutrient and BOD loads from the HSPF (and other) models were used to drive eutrophication, DO dynamics, and light extinction in WASP.

Allocations

The baseline scenario represents actual loads over the period from 1995–1997. The TMDL scenario represents the maximum nutrients and BOD loads such that standards are met. The Point Sources Technical Memorandum (MDE and DDOE 2008) developed in conjunction with the TMDL provides the annual allocations for TP, TN, and BOD for County sources (see table below).

Table 1. Annual allocations to Prince George's County point sources

Point Source	Permit Number	BOD (lbs/year)	TN (lbs/year)	TP (lbs/year)
Non-tidal				
MS4 – NWB	MD0068284	55,234	9,065	1,388
SW-NWB		9,784	1,193	204
MS4 – NEB	MD0068284	226,639	25,116	3,461
SW-NEB		101,158	10,311	893
MS4 – LBC	MD0068284	109,434	11,598	1,485
Other MD SW-LBC		18,946	1,625	140
MS4–Watts Branch	MD0068284	12,765	1,490	199
Other MD SW-Watts		1,147	97	8
Tidal				
Prince George's County MS4 – Tidal	MD0068284	62,613	4,173	433
Other Maryland SW-Tidal		13,963	1,172	88

Source: MDE and DDOE 2007.
Note: SW = stormwater.

No baseline loads are given for MS4 sources. Summary tables of the TMDLs begin on page 42 of the TMDL report. For Maryland, only load allocation and wasteload allocation are presented. (No source-specific breakdown is provided.)

The final average annual BOD TMDL for all Maryland and District non-tidal and tidal waters of the Anacostia River is 1,491,715 lbs/year. The loading cap constitutes a 61 percent overall reduction of BOD from the baseline loads determined for the TMDL analysis period, 1995–1997.

The final average annual nitrogen TMDL for all Maryland and District non-tidal and tidal waters of the Anacostia River is 196,788 lbs/year. The loading cap constitutes a 79 percent overall reduction of nitrogen from the baseline loads determined for the TMDL analysis period, 1995–1997.

The final average annual phosphorus TMDL for all Maryland and District non-tidal and tidal waters of the Anacostia River is 20,757 lbs/year. The loading cap constitutes an 80 percent overall reduction of phosphorus from the baseline loads determined for the TMDL analysis period, 1995–1997.

References

MDE and DDOE (Maryland Department of the Environment and District Department of the Environment). 2008. Technical Memorandum: Significant Biochemical Oxygen Demand, Nitrogen, and Phosphorus Point Sources in the Anacostia River Watershed.

Mandel, R., S. Kim, A. Nagel, J. Palmer, C. Schultz, and K. Brubaker. 2008. The TAM/WASP Modeling Framework for Development of Nutrient and BOD TMDLs in the Tidal Anacostia River.

Anacostia River Fecal Coliform Bacteria TMDL

Source Document:	MDE (Maryland Department of the Environment). 2006. Total Maximum Daily Loads of Fecal Bacteria for the Anacostia River Basin in Montgomery and Prince George's Counties, Maryland FINAL. Document Version November 3, 2008.
Water Body Type:	Tidal and non-tidal stream reaches of the Anacostia River in Maryland
Pollutant:	Fecal coliform bacteria
Designated Uses:	Water Contact Recreation, Protection of Aquatic Life, Public Drinking Water Supply, Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting, Recreational Trout Waters, Natural Trout Waters, Northeast Branch (NEB) (Upper Beaverdam Creek – High Quality)
Size of Watershed:	127 square miles (combined watersheds)
Water Quality Standards:	Freshwater: *E. coli*: 126 MPN / 100 mL Enterococci: 33 MPN / 100 mL Marine Water: Enterococci: 35 MPN / 100 mL
Indicators:	*Enterococcus* used for the Total Maximum Daily Load (TMDL)
Analytical Approach:	Flow duration curve with bacterial source tracking used to determine proportional contributions from sources.
Date Approved:	Approved March 2007

Introduction

This TMDL was developed to address the fecal coliform impairment in the tidal and non-tidal portions of the Anacostia River watershed (Figure 1) in Maryland and is designed to achieve attainment of the primary water contact recreation use. This fact sheet provides summary data related to the TMDL and includes specific information related to allocations made for Prince George's County, Maryland, regulated stormwater sources.

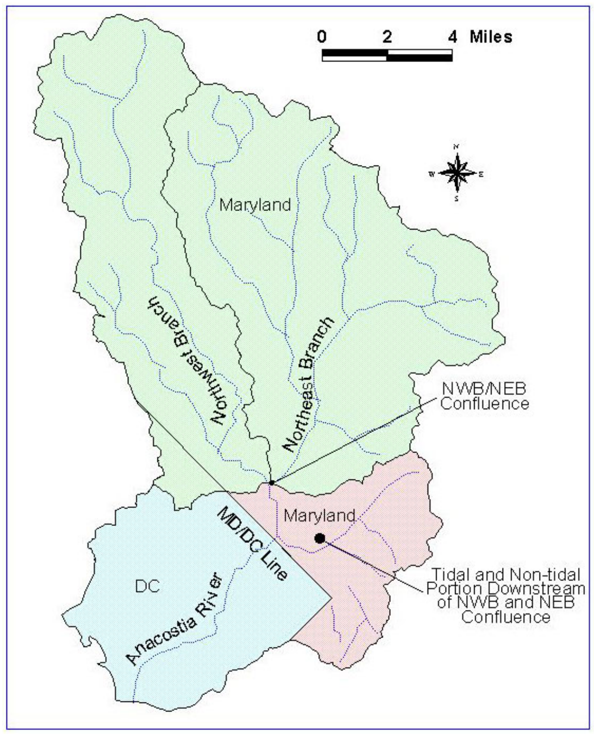

Figure 1. Anacostia River watershed
Source: MDE 2006.

Problem Identification and Basis for Listing

The listing was based on a comparison of the criterion value (33 MPN *Enterococcus*) with calculated annual and seasonal steady state geometric means for different flow strata. The steady state condition is defined as "unbiased sampling targeting average flow conditions and/or equally sampling or providing for unbiased sampling of high and low flows" and is determined through monitoring design or statistical analysis (MDE 2006). In the case of this TMDL, the monitoring was routine (i.e., it did not stratify monitoring such that samples collected were proportional to the duration of time the watershed experiences low, mid, and high flows). The assessment process involved separating monitoring data into flow categories to calculate the steady state geometric mean with respect to flow regimes. Data were then compared to criteria and the impairment assessment was made.

Applicable Data

TMDL analysis was performed using historical data from the 5-year period preceding the TMDL. A specific data solicitation was made in 2003 to support the TMDL development.

Sources

Typical sources that contribute bacteria in the watershed including wildlife and domestic animals via nonpoint loading from land surfaces, and humans via septic systems, sanitary sewer overflows and municipal wastewater treatment plants, as well as livestock.

There is no separate accounting for federal lands in this TMDL.

Technical Approach

The baseline loadings and allowable loads were determined using a load duration curve with flow from U.S. Geological Survey daily flow monitoring data and bacteria monitoring data (six stations with one year of data). A multiple antibiotic resistance analysis methodology was used to determine the relative proportion of source categories: domestic (pets and human associated animals); human (human waste); livestock (agricultural related animals); and wildlife (mammals and waterfowl).

The allowable load within the non-tidal watershed upstream of the confluence is determined by first estimating a baseline load from current monitoring data. This baseline load is estimated using a long-term geometric mean and weighting factors from the flow duration curve. The TMDL for fecal bacteria entering the non-tidal Anacostia River upstream of the confluence is established after considering six different hydrological conditions:

- High-flow and low-flow annual conditions
- High-flow and low-flow seasonal conditions (the period between May 1 and September 30 when water contact recreation is more prevalent)
- 30-day high-flow
- 30-day low-flow conditions to be protective of DC waters designated uses (The District of Columbia's TMDL used a 30-day moving geometric mean.)

The TMDL for the Anacostia River area downstream of the confluence was estimated by subtracting the upstream non-tidal area allowable load from the total allowable load derived from the District's TMDL.

Allocations

As described under the technical approach description, analysis for the TMDL was performed separately for two regions in the watershed: The region upstream of the confluence of the NEB and Northwest Branch (NWB) and the region downstream of the confluence.

Practicable Reduction Targets

The analysis includes a step by which maximum practicable reduction (MPR) targets were first identified and scenarios representing MPR situations were evaluated to see if standards were met. None of the watersheds upstream of the NWB and NEB meet water quality standards based on MPRs in the practicable reduction target scenario. Therefore, the allocations represent scenarios with reductions higher than MPR.

Upstream Region

For the upstream region, allocations were made for the subbasins draining to each of six water quality monitoring stations in the unit of billion MPN/day and source distributions identified based on the bacteria source tracking results and analysis of flow strata.

Downstream Region

Allocations for the area below the confluence of the NEB and NWB were made by calculating the difference between the allocation assigned to Maryland in the District's Anacostia River bacteria TMDL and the allocated load at the confluence of the NEB and NWB as calculated for the upstream portion.

Baseline Loads and Reductions

The TMDL report provides a baseline, TMDL, and percent reduction at the six monitoring stations for the TOTAL load for the upstream region (Table 1).

Table 1. Upstream region enterococci TMDL

Station	Baseline	TMDL	% Reduction
	(billion MPN/day)		
BED0001	473	42	91
INC0030	163	20	88
PNT0001	545	68	87
NEB0002sub	259	53	79
NWA0135	478	57	88
NWA0002sub	318	70	78
Total	2,236	310	86

Source: MDE 2006.

Only TMDL loads are presented for the downstream region (Table 2).

Table 2. Downstream region enterococci TMDL

Region	TMDL	LA	WLA-PS	WLA-MS4
	(billion MPN/day)			
Downstream	47	16	0	31

Source: MDE 2006.
Note: LA = load allocation; WLA = wasteload allocation; PS = point source; MS4 = municipal separate storm sewer system.

MS4 Allocations

The TMDL provides a single municipal separate storm sewer system (MS4) load allocation to each county. The MS4 allocation for the County is listed in Table 3.

Table 3. Prince George's County MS4 enterococci allocations

Station	County MS4 Load (billion MPN/day)
Upstream Region	
BED0001	9
INC0030	9
PNT0001	15
NEB0002sub	34
NWA0002sub	17
Downstream Region	
Area between confluence and DC line	31

Source: MDE 2006.

Bacteria Source Tracking Source Contributions

Bacteria source tracking results identified the relative proportion for which contributing sources are responsible in the upstream portion and in the downstream portion (Table 4).

Table 4. Bacteria source tracking results

Station	Pets	Human	Livestock	Wildlife
	Percent			
Upstream Region				
BED0001	45	15	9	32
INC0030	30	23	13	33
PNT0001	29	23	7	41
NEB0002sub	24	9	28	38
NWA0002sub	31	17	8	44
Downstream Region				
Entire area	21.1	22.2	0.3	56.5

Source: MDE 2006.

Loading Rate Analysis

To develop the TMDL for the downstream region, a loading rate analysis was also performed which resulted in an estimated loading rate for both regions of 3.7 billion MPN fecal coliform/acre/year. Conversion to *Enterococcus* produces a loading rate of 47.2 billion enterococcus MPN/day.

References

MDE (Maryland Department of the Environment). 2006. Total Maximum Daily Loads of Fecal Bacteria for the Anacostia River Basin in Montgomery and Prince George's Counties, Maryland FINAL.

Anacostia River Sediment TMDL

Source Document: MDE and DDOE (Maryland Department of the Environment and District Department of the Environment). 2007. Total Maximum Daily Loads of Sediment/Total Suspended Solids for the Anacostia River Basin, Montgomery and Prince George's Counties, Maryland and The District of Columbia. Document Version June 14, 2007.

Water Body Type: Tidal and non-tidal portions of Maryland's and the District of Columbia's Anacostia River basin

Pollutant: Sediment and total suspended solids (TSS)

Designated Uses: Use I-P – Water Contact Recreation, Protection of Aquatic Life and Public Drinking Supply; Use II – Tidal Waters: Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting; Use III – Natural Trout Waters; and Use IV – Recreational Trout Waters

Size of Watershed: 173 square miles (84 percent in Maryland)

Water Quality Standards: Growing season (April 1–October 30) 3-year median Secchi depth not less than 0.4 meters

Analytical Approach: Tidal Anacostia Model/Water Analysis Simulation Program (TAM/WASP) with other methods used for various sources and tributaries

Date Approved: Approved July 24, 2007

Introduction

The Total Maximum Daily Load (TMDL) addresses water clarity problems and associated impacts to aquatic life in the Anacostia River watershed (Figure 1) caused by high sediment and TSS concentrations.

This fact sheet provides summary data related to the TMDL and includes specific information related to allocations made for Prince George's County, Maryland, regulated stormwater sources.

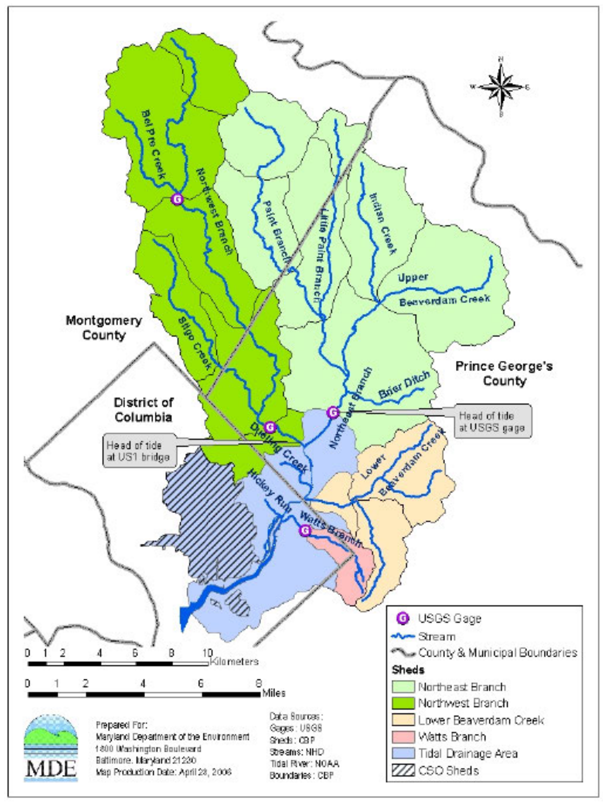

Figure 1. Anacostia River watershed
Source: MDE and DDOE 2007.

Problem Identification and Basis for Listing

Impairments were identified in both the non-tidal and tidal portions of the Anacostia River. Long-term Secchi depth growing season medians for the most upstream segments, representing water clarity conditions from the confluence of the Northeast and Northwest Branches (NEB and NWB, respectively) in Maryland to the New York Avenue Bridge at approximately the Maryland-DC line, were at or above 0.4 meters, the Maryland criterion. For tidal portions, long-term data showed median Secchi depths were less than the District's 0.8-meter depth criteria in the middle portions of the tidal Anacostia.

Data related to sediment in the non-tidal streams of the Anacostia River watershed included biological monitoring data and measurements of suspended solids in water samples. Biological indices categorize the condition of benthic communities in most sites in the Anacostia River as poor to very poor and fish communities as poor to very good.

Analysis determined that the District's clarity criterion for tidal waters required the most stringent sediment reductions; therefore, that standard is the one driving all allocations in the TMDL.

Applicable Data

Water quality data related to suspended solids and water clarity in the tidal portion of the Anacostia River were available from routine monitoring programs conducted by agencies in Maryland the District, and from several special studies. Available parameters generally included TSS, chlorophyll a, and Secchi depth. Specific studies from which data were used are detailed in the TMDL report.

Various agencies also collected suspended solids data (TSS) or suspended solids concentrations that were used in the impairment assessment and subsequent modeling. Those data sets are described in Appendix A of the TMDL report.

Sources

Historically, activities contributing significant loads include agriculture, sand and gravel mining, and construction activities. Currently, stream channel erosion is considered to be the most significant source of sediment. Tidal resuspension of bed sediments is also a factor in the tidal portions.

Approximately 85 percent of sediment entering the tidal Anacostia from the non-tidal portions stays there, remaining suspended before settling to the bed. Tidal action impedes settling and continually promotes resuspension of sediments. Model scenarios predict that with no incoming sediment loads from non-tidal portions, sediment concentrations in tidal Anacostia would approximate 5 mg/L due to tidal resuspension alone.

Technical Approach

The TMDL allocations were developed using a modeling framework that consisted of a coupled watershed/hydrodynamic water quality model.

Hydrological Simulation Program—FORTRAN (HPSF) and the U.S. Geological Survey's (USGS') ESTIMATOR model were used to provide nonpoint source inputs to the receiving water model. A reference watershed approach was used to determine the sediment loads required to meet water quality standards in Maryland's non-tidal waters.

The TAM/WASP model was used to calculate water clarity conditions to determine attainment of water quality standards in the tidal Anacostia.

Estimation of Watershed Inputs

A combination of modeling tools were used to develop load estimates from the watershed for the TMDL development effort.

ESTIMATOR

For the NEB and NWB watersheds, input loads for TAM/WASP were developed using the USGS' multiple regression model, ESTIMATOR. Appendix A provides further details. ESTIMATOR was used to compute time series of daily, monthly, and annual sediment loads for both tributaries. Daily time series were used as input to TAM/WASP. The monthly load time series were used to calibrate the HSPF watershed model (Phase 3) for the non-tidal Anacostia.

HSPF

HSPF was used to simulate hydrologic and erosion processes in the non-tidal drainage areas of the major tributaries (NEB, NWB, Lower Beaverdam Creek [LBC], and Watts Branch). Calibrated against ESTIMATOR loads for 1995–2004, HSPF provided daily flow and sediment loads for LBC and Watts Branch. (ESTIMATOR provides daily flow and sediment loads for NEB and NWB.) HSPF results also provided sediment loads by source (agriculture, forest, urban, streambank erosion).

A reference watershed analysis was conducted with HSPF to evaluate loads needed to satisfy Maryland's non-tidal aquatic life criteria (using unimpaired watersheds of Upper Beaverdam Creek and Upper Paint Creek). Reductions necessary to meet Maryland's non-tidal criteria were found to be less than those needed to meet the District's tidal water clarity criteria.

Other analyses were conducted that could potentially be useful or informative to the TMDL implementation effort. A flow duration/quantile regression analysis was performed to estimate the current-day sediment loads due to altered hydrology. Results suggest that up to 90 percent of the watershed's impervious surfaces would need to be disconnected to return to 1939 hydrologic conditions (Appendix B).

Allocations

The TMDL specifies annual and 7-month growing season allocations for agricultural and forest land uses and streambank erosion; for municipal and industrial facilities, municipal separate storm sewer systems (MS4s), and other regulated stormwater; and for District combined sewer overflows (CSOs) (Tables 1–4). The margin of safety for the Anacostia River sediment TMDL is implicit. An additional technical memorandum provided with the TMDL provides a breakdown between the Maryland MS4 loads by watershed and other regulated stormwater loads.

Baseline loading for the MS4s is not provided in the TMDL report or accompanying appendices; therefore, it is not possible to calculate required percentage reductions specific to the MS4 portion of loads. Overall, the loading caps constitute an 85 percent reduction of sediment and TSS from the baseline loads determined for the TMDL analysis period, 1995–1997. For additional context, the following tables present the baseline annual and seasonal loads and the annual and seasonal load allocations for the entire watershed.

Table 1. MS4 loads by watershed (Prince George's County)

Maryland Point Source Name	Permit Number	TMDL - Annual (tons/year)	TMDL - GS (tons/growing season)
Prince George's County MS4 – NWB	MD0068284	1,090.50	574.70
Other Prince George's County SW-NWB		147.90	77.90
Prince George's County MS4 – NEB	MD0068284	2,449.40	988.50
Other Prince George's County: SW-NEB		678.10	273.70
Prince George's County MS4 – LBC	MD0068284	421.00	263.90
Other Maryland SW-LBC		57.80	36.20
Prince George's County: MS4–Watts Branch	MD0068284	25.80	15.30
Other Maryland: SW-Watts		2.10	1.20
Total Maryland Non-tidal—point sources		6,355.80	3,005.80
Prince George's County MS4 – Tidal	MD0068284	77.30	55.60
Other Maryland SW-Tidal		9.00	6.40
Total Maryland—point sources		6,442.10	3,067.80

Source: MDE and DDOE 2007.
Note: GS = growing season; SW = stormwater.

Table 2. Annual baseline loading by source, entire watershed

Source	Area (acres)	Annual Load (tons)	% Annual Load	Annual Yield (tons/ acre)
Agriculture	4,971	1,290	3%	0.24
Forest	21,942	357	1%	0.02
Urban	77,017	9,331	20%	0.12
Construction	198	624	1%	3.15
Stream Channel	--	34,250	73%	0.31
Point Sources	--	2	0.2%	--
CSOs	6,945	1052	2%	--
Total	111,073	46,906	100%	0.42

Source: MDE and DDOE 2007.

Table 3. Seasonal baseline loading by source, entire watershed

Source	Area (acres)	GS Load (tons)	% GS Load
Agriculture	4,971	150	1%
Forest	21,942	16	0.1%
Urban	77,017	6,483	30%
Construction	198	364	2%
Stream Channel	--	14,565	65%
Point Sources	--	1	0.2%
CSOs	6,945	733	1%
Total	111,073	22,312	100%

Source: MDE and DDOE 2007.

Table 4. Annual allocations, entire watershed

Sediment/ TSS TMDLs	Annual (tons/year)				
	MD WLA	MD LA	DC WLA	DC LA	TMDL
Non-tidal					
NWB	2,254	23	27	0	2,304
NEB	3,595	218	--	--	3,814
LBC	479	5	1	0	484
Watts Branch	28	1	24	0	53
Non-tidal Total	6,356	247	51	0	6,655
Tidal					
Tidal Total	86	0	306	51	443
Total	6,442	247	357	51	7,097

Source: MDE and DDOE 2007.
Note: WLA = wasteload allocation; LA = load allocation.

Table 5. Seasonal allocations, entire watershed

Sediment/ TSS TMDLS	Growing season (Apr 1 – Oct 31) (tons/year)				
	MD WLA	MD LA	DC WLA	DC LA	TMDL
Non-tidal					
NWB	1,216	3	21	0	1,240
NEB	1,473	22			1,495
LBC	300	0	0	0	301
Watts Branch	17	0	16	0	32
NT Total	3,006	25	37	0	3.068
Tidal					
Tidal Total	62	0	231	36	328
Total	**3,068**	**25**	**267**	**36**	**3,396**

Source: MDE and DDOE 2007.

References

MDE and DDOE (Maryland Department of the Environment and District Department of the Environment). 2008. Technical Memorandum: Significant Biochemical Oxygen Demand, Nitrogen, and Phosphorus Point Sources in the Anacostia River Watershed.

Mandel, R., S. Kim, A. Nagel, J. Palmer, C. Schultz, and K. Brubaker. 2008. The TAM/WASP Modeling Framework for Development of Nutrient and BOD TMDLs in the Tidal Anacostia River.

Anacostia River Trash TMDL

Source Document: MDE and DDOE (Maryland Department of the Environment and District Department of the Environment). 2010. Total Maximum Daily Loads of Trash for the Anacostia River Watershed, Montgomery and Prince George's Counties, Maryland and The District of Columbia. August 2010.

Water Body Type: Tidal and non-tidal portions of Maryland's and the District of Columbia's Anacostia River basin

Pollutant: Trash

Designated Uses: Use I – Water Contact Recreation and Protection of Nontidal Warmwater Aquatic Life; Use I-P – Water Contact Recreation, Protection of Aquatic Life and Public Drinking Supply; Use II – Tidal Waters: Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting; Use III – Nontidal Coldwater; and Use IV – Recreational Trout Waters

Size of Watershed: 173 square miles (84 percent in Maryland)

Water Quality Standards: Waters of this [s]tate may not be polluted by:

(1) Substances attributable to sewage, industrial waste, or other waste that will settle to form sludge deposits that: (a) Are unsightly, putrescent, or odorus, and create a nuisance or (b) Interfere directly or indirectly with designated uses;

(2) Any material, including floating debris, oil, grease, scum, sludge, and other floating materials attributable to sewage, industrial waste, or other waste in amounts sufficient to: (a) be unsightly; (b) produce taste or odor; (c) change the existing color to produce objectionable color for aesthetic purposes; (d) create a nuisance; or (e) interfere directly or indirectly with designated uses.

Analytical Approach: Land use loading rates were derived from monitoring data from storm drains and combined sewer overflows (CSOs), and in-stream sampling data. Loading rates were applied across the jurisdictions.

Date Approved: Approved September 21, 2010

Introduction

The Total Maximum Daily Load (TMDL) addresses excessive trash in the Anacostia River watershed (Figure 1).

This fact sheet provides summary data related to the TMDL and includes specific information related to allocations made for Prince George's County, Maryland, for both regulated and nonregulated stormwater sources.

Problem Identification and Basis for Listing

Impairments were identified in both the non-tidal and tidal portions of the Anacostia River. Previous studies have documented that trash in the Anacostia River is a significant environmental issue. Both deliberate dumping areas and trash found along streams from more gradual accumulation were documented (MDNR 2005).

Data related to trash in the streams of the Anacostia River watershed included transects for quarterly counting, characterization, and documentation of trash within the District. On average, the Anacostia River was found to have 58 pieces of trash per 100 feet of river length (AWS 2008).

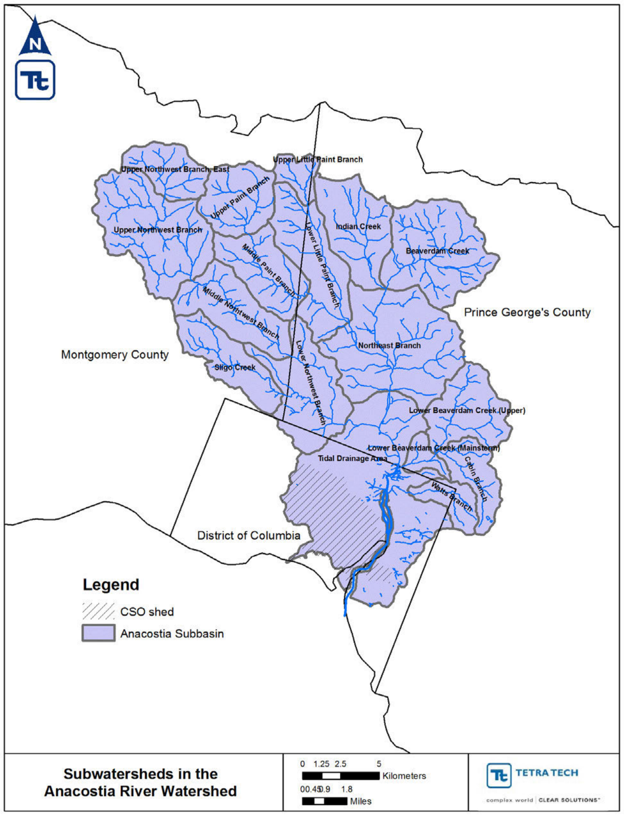

Figure 1. Anacostia River watershed
Source: MDE and DDOE 2010.

Applicable Data

Trash monitoring data collected throughout the watershed were available from monitoring programs conducted by agencies in Maryland and the District. In Maryland, storm drain outfalls were monitored by installing trash fencing and trash nets at the outfalls. Monitoring sites were selected to collect trash data from specific land uses – low-density, medium-density, and high-density residential; commercial land use; and industrial land use. The trash traps and nets were monitored approximately every month for just under one year. Trash items in the traps and nets were separated from organic material and the trash items were cataloged and weighed. In Maryland, in-stream monitoring was also conducted at 30 sites throughout Montgomery and Prince George's counties. The sites were at existing watershed monitoring stations. Transects were established along the stream at each of the corresponding monitoring stations. Trash items were counted and recorded by type.

Sources

Sources of trash were considered to be litter conveyed through the stormwater and CSO system (point sources), and larger objects that were accidentally or intentionally dumped along or in the streams in the watershed (nonpoint sources).

Technical Approach

The TMDL allocations were developed using loading rates calculated based on monitoring data. The loading rates were translated into baseline loads across the watershed. The allocations were assumed to be 100 percent removal of the baseline load of trash. Results of the in-stream monitoring were used to determine the nonpoint source baseline load and stormwater outfall monitoring results were used to establish the point source baseline load.

The point source loading rate was based on the weight of the trash collected from the storm drain outfall traps and nets. The trash weights were normalized to pounds of trash per acre, based on the contributing drainage area for the storm drain. The sampling events were then normalized based on rainfall associated with the trash collection period to yield pound/acre/inch of rain. Loading rates for each land use were based on the loading rate for the corresponding outfall site with the same land use.

Nonpoint source loading rates were based on the in-stream monitoring data. Only trash items considered too large to move through the sewer system were counted as part of the nonpoint source load. The count per type of material was averaged across all the stream sampling events to develop an average count per year for each type of trash per 500 feet (the length of the sampling segment). These loading rate counts were extrapolated to all stream miles in each county. The counts were then converted to standardized weights, using the trash weights documented in AWS 2008. This yielded the annual nonpoint source load for each county.

Allocations

The TMDL specifies annual and daily allocations for nonpoint sources and for municipal and industrial facilities, municipal separate storm sewer systems (MS4s), and other regulated stormwater; and for District CSOs (Table 1). There is an explicit 5 percent margin of safety for the Anacostia River trash TMDL.

Because there are no numeric water quality criteria for trash, the TMDL target is the removal of 100 percent of the baseline trash loading, plus removal of the amount that is equal to the margin of safety. In-stream trash monitoring was used to establish the nonpoint source baseline load and stormwater outfall monitoring was used to establish the point source baseline load. Table 2 summarizes the total TMDL allocations for all jurisdictions.

Table 1. Wasteload allocations by watershed (Prince George's County), including margin of safety.

Maryland Point Source Name	Permit Number	TMDL - Annual (lbs/year reduced)
Prince George's County MS4 – Northwest Branch	MD0068284	37,145
Prince George's County Phase II MS4s Northwest Branch	MDR055500	5,130
Prince George's County MS4 – Northeast Branch	MD0068284	32,750
Prince George's County Phase II MS4s Northeast Branch	MDR055500	59,831
Prince George's County MS4 – Lower Beaverdam Creek	MD0068284	24,609
Prince George's County Phase II MS4s Lower Beaverdam Creek	MDR055500	16,171
Prince George's County MS4 – Beaverdam Creek	MD0068284	6,304
Prince George's County Phase II MS4s Beaverdam Creek	MDR055500	2,029
Prince George's County MS4 – Cabin Branch	MD0068284	15,016
Prince George's County Phase II MS4s Cabin Branch	MDR055500	3,213
Prince George's County MS4 – Indian Creek	MD0068284	18,759
Prince George's County Phase II MS4s Indian Creek	MDR055500	110
Prince George's County MS4 – Paint Branch	MD0068284	1,134
Prince George's County MS4 – Little Paint Branch	MD0068284	26,838
Prince George's County Phase II MS4s Little Paint Branch	MDR055500	3,026
Prince George's County: MS4– Watts Branch	MD0068284	4,703
Prince George's County Phase II MS4s – Watts	MDR055500	4,237
Prince George's County MS4 – Tidal	MD0068284	11,902
Prince George's County Phase II MS4 – Tidal	MDR055500	25,510
Maryland State Highway Administration	MD0068276	14,134
Federal Facilities	MDR055501	6,185
Prince George's County – aggregated other permits		11,023
Total Prince George's County — point sources		**329,759**

Source: MDE and DDOE 2010.

Table 2. Annual allocations, entire watershed

Trash TMDLs	Annual (lbs/year to be removed)			
	WLA	LA	MOS	TMDL
Prince George's County	314,055	347,958	33,101	695,114
Montgomery County	243,256	65,945	15,460	324,660
District of Columbia - Upper	150,154	18,343	8,425	176,922
District of Columbia - Lower	60,955	1,705	3,133	65,794
Total	**768,420**	**433,951**	**60,119**	**1,262,490**

Source: MDE and DDOE 2010.

Notes: WLA = wasteload allocation; LA = load allocation.

References

AWS (Anacostia Watershed Society). 2008. Anacostia Watershed Trash Reduction Plan.

MDE and DDOE (Maryland Department of the Environment and District Department of the Environment). 2010. Total Maximum Daily Loads of Trash for the Anacostia River Watershed, Montgomery and Prince George's Counties, Maryland and the District of Columbia.

MDNR (Maryland Department of Natural Resources). 2005. Anacostia River Stream Corridor Survey.

Chesapeake Bay Watershed Nutrient and Sediment TMDL

Source Document:	U.S. Environmental Protection Agency, Region 3, Water Protection Division and Region 3, Chesapeake Bay Program Office and Region 2 Division of Environmental Planning and Protection. 2008. Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment. December 29, 2010.
Water Body Type:	Chesapeake Bay tidal and non-tidal watershed and contributing subwatersheds.
Pollutant:	Total nitrogen (TN), total phosphorus (TP) and total suspended solids (TSS)
Designated Uses:	Migratory fish spawning and nursery, open water fish and shellfish, and shallow water Bay grasses.
Size of Watershed:	64,000 square miles
Water Quality Standards:	**Dissolved oxygen (DO)**: See Table 3-4 of report. **Chlorophyll *a***: Concentrations of chlorophyll *a* in free-floating microscopic aquatic plants (algae) shall not exceed levels that result in ecologically undesirable consequences—such as reduced water clarity, low DO, food supply imbalances, proliferation of species deemed potentially harmful to aquatic life or humans or aesthetically objectionable conditions—or otherwise render tidal waters unsuitable for designated uses **Secchi depth:** See Table 3-5 of report.
Analytical Approach:	Chesapeake Bay Airshed Model (wet deposition regression, and Community Multiscale Air Quality Model); SPARROW; Phase 5.3 Chesapeake Bay Watershed Model (HSPF)
Date Approved:	Approved December 29, 2010

Introduction

The Total Maximum Daily Load (TMDL) analysis for the Chesapeake Bay watershed (Figure 1) addresses TN, TP, and sediment loads on an annual average basis. Reductions in these pollutants will address DO, chlorophyll *a*, and clarity impairments in the Chesapeake Bay.

This fact sheet provides summary data related to the TMDL and includes specific information related to allocations made for Prince George's County, Maryland.

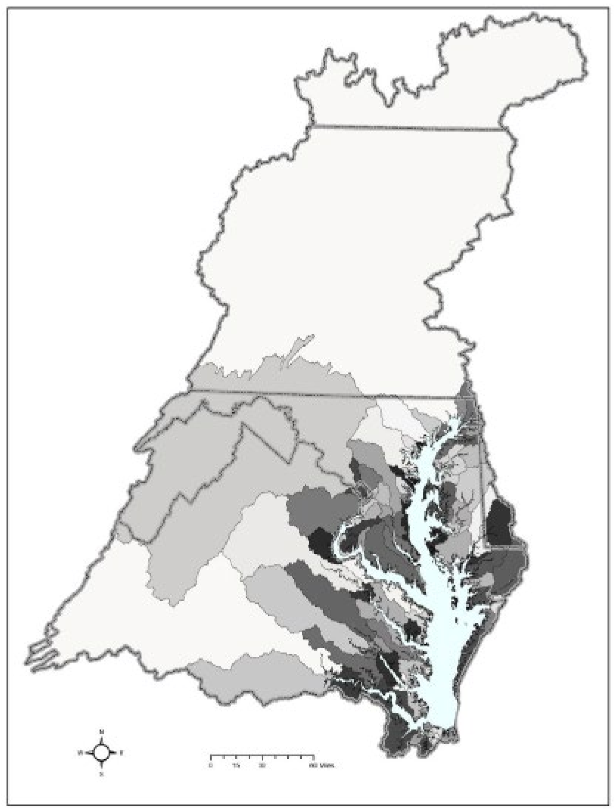

Figure 1. Overall Chesapeake Bay watershed and segment subwatersheds.
Source: USEPA 2010.

Problem Identification and Basis for Listing

Water quality impacts from excessive nutrients and sediment throughout the Chesapeake Bay watershed cause excessive algal growth, low DO, and reduced water clarity in the Chesapeake Bay. Suspended sediment reduces light availability, impacting underwater Bay grass communities. In addition, sediment can transport other pollutants, such as bacterial and phosphorus. Most of the Chesapeake Bay tidal segments were listed as impaired or threatened water that requires a TMDL. Factors for their listing included low DO, insufficient submerged aquatic vegetation, excess chlorophyll *a*, biological/nutrient indicators, TN, TP, TSS, biological oxygen demand, and pH. Many of the impaired segments are addressed by either consent decree or memoranda of understanding with the states.

Applicable Data

The Chesapeake Bay tidal monitoring program was established in 1984 to collect water quality data monthly at more than 150 stations throughout the 92 Chesapeake Bay tidal segments in Delaware, the District of Columbia, Maryland, and Virginia. Twenty-six parameters are monitored, and various other data are also collected, including shallow water monitoring benthic infaunal communities, Bay grass surveys, phytoplankton and zooplankton monitoring, and fisheries population monitoring. The monitoring is designed to support the bay states' 303(d) listing decision-making. In addition to tidal monitoring, there is a network of streamflow gauges and water quality sampling sites throughout the Chesapeake Bay watershed. These data were used to calibrate and verify the Phase 5.3 Chesapeake Bay Watershed Model.

Sources

Point sources of nutrients and sediment include municipal wastewater facilities, industrial wastewater facilities, combined sewer overflow systems, sanitary sewer overflow systems, National Pollution Discharge Elimination System (NPDES) permitted stormwater, and Concentrated Animal Feeding Operations. Nonpoint sources of nutrients and sediment include agricultural runoff, atmospheric deposition, on-site treatment system (septics), stormwater runoff, runoff from forested areas, streambank and tidal shoreline erosion, and wildlife and natural background.

Technical Approach

The two primary models used in the development of the TMDL were the Phase 5.3 Chesapeake Bay Watershed Model and the Chesapeake Bay Water Quality and Sediment Transport Model. The models are designed to simulate the 10-year hydrologic period from 1991 through 2000. The Watershed Model is responsible for simulating the loading and transport of nutrients and sediment from pollutant sources in the watershed and can provide loading estimates for management scenarios. The Water Quality Model simulates estuarine hydrodynamics, water quality, sediment transport, and living resources in the Chesapeake Bay. The model predicts water quality that results from management scenarios, and ensures that the allocated loads developed in the TMDL will meet water quality standards.

The Phase 5.3 Chesapeake Bay Watershed Model was calibrated for 1985–2005, using streamflow and water quality data from this time period. The segment outlets were intentionally designed to be in proximity to in-stream flow gauges and water quality monitoring stations. The model considers inputs from manure, fertilizers, atmospheric deposition, land use-based nonpoint sources, septic systems, regulated stormwater runoff, and wastewater treatment and discharge facilities.

The Chesapeake Bay Water Quality Model is based on a three-dimensional hydrologic transport model (CH3D) with a eutrophication model (CE-QUAL-ICM) to allow prediction of water quality in the Chesapeake Bay, based on the changes in the loading from the watershed. The hydrodynamic model was calibrated for 1991–2000. The Water Quality Model receives loads from nonpoint sources entering the tidal system at tributary fall lines from each of the Chesapeake Bay segments, based on inputs from the Watershed Model, and directly as runoff below the fall lines. Point sources are also incorporated based on their location in the tidal waters. The model incorporates atmospheric deposition of nutrients directly on the Chesapeake Bay tidal surface waters. Shoreline erosional loads are also included.

Allocations

The baseline scenario represents modeled loads for 2009. Wasteload and load allocations were made at the Chesapeake Bay segment level. Several of the bay segments are partially within Prince George's County. The Maryland Department of the Environment then allocated to the county level. The TMDL scenario represents the maximum nutrients and sediment loads to meet water quality standards. Reductions to each of the sectors is based on a limit of technology upgrades to wastewater treatment plants, no reductions to forest lands, and equal percent reductions from the nonpoint source sectors (MDE 2012). These factors are also modified by credit for existing nutrient and sediment reduction practices that are already in place and consideration for geographic proximity and relative impacts of the local load on Chesapeake Bay water quality. See Table 1 for TMDL allocations and reductions from baseline. Overall, there is a 9.32 percent reduction from baseline to the TMDL TN target, and a 3.61 percent reduction from baseline to the TMDL TP target. Table 2 provides annual allocations to urban loading sources for the County. County-level sediment allocations were not provided.

Table 1. Baseline and annual allocations to Prince George's County (delivered loads)

Sector	TN		
	2009 Load (lbs/year)	TMDL (lbs/year)	% Reduction
Agriculture	198,439	150,520	24.15%
Urban	832,131	628,709	24.45%
Septic	93,098	62,562	32.80%
Forest	200,386	198,993	0.70%
Point sources	1,670,919	1,674,936	-0.24%b
Total	2,994,973	2,715,720	9.32%
Sector	**TP**		
	2009 Load (lbs/year)	**TMDL (lbs/year)**	**% Reduction**
Agriculture	37,275	31,017	16.79%
Urban	106,306	68,923	35.17%
Septic	--[a]	--	--
Forest	6,850	6,744	1.55%
Point sources	61,786	97,880	-58.42%[b]
Total	212,217	204,564	3.61%

Source: DER 2012.
Notes:
[a] Septics are not considered a source of phosphorus in the Chesapeake Bay Model.
[b] Negative reductions account for growth in wastewater treatment plants.

Table 2. Annual allocations to urban loading sources in Prince George's County and percent reductions from 2009

Sector	TN (lbs/year)	% Reduction	TP (lbs/year)	% Reduction
County Phase I/II MS4	360,740	22.56%	29,394	38.58%
Municipal Phase II MS4	101,202	20.21%	8,796	34.65%
Bowie	36,746	18.26%	3,136	30.70%
Other Municipal	64,456	21.28%	5,660	36.65%
Nonregulated	18,807	24.86%	1,122	44.54%
Construction	83,805	37.22%	22,253	30.14%
SHA Phase I/II MS4	41,414	21.18%	3,880	36.02%
State Phase II MS4	10,168	21.57%	877	37.58%
Regulated Industrial	5,027	21.89%	502	36.38%
Extractive	7,546	16.16%	2,099	26.45%
Total	**628,709**	**24.45%**	**68,923**	**35.17%**

Source: DER 2012.

References

MDE (Maryland Department of the Environment). 2012. Maryland's Phase II Watershed Implementation Plan for the Chesapeake Bay TMDL. Developed by the University of Maryland, Maryland Department of Planning, Maryland Department of Agriculture, Maryland Department of the Environment and Maryland Department of Natural Resources.

Prince George's County Maryland, Department of Environmental Resources (DER). 2012. Revised Draft, Prince George's County, Maryland – Phase II Watershed Implementation Plan, For Inclusion in the Maryland Final Phase II Watershed Implementation Plan.

Northeast and Northwest Branch Non-Tidal Anacostia River PCB TMDL

Source Document: MDE (Maryland Department of the Environment). 2011. Total Maximum Daily Loads of Polychlorinated Biphenyls in the Northeast and Northwest Branches of the Nontidal Anacostia River, Montgomery and Prince George's Counties, Maryland. Document Version September 30, 2011.

Water Body Type: Non-tidal stream reaches of the Northeast (NEB)and Northwest (NWB) Branches of the Anacostia River

Pollutant: Polychlorinated biphenyls (PCBs)

Designated Uses: Use I - Water Contact Recreation, Protection of Warm Water Aquatic Life.

NWB: Use IV-Trout Waters

NEB (Upper Beaverdam Creek) – High Quality

Size of Watershed: 127 square miles (combined watersheds)

Water Quality Standards: Human Health – 0.64 ng/L Total PCB

Fish tissue threshold 39 ng/g

Indicators: Total PCBs

Analytical Approach: Back calculation from downstream allocations on the basis of proportional contributions from landuses and clam study data

Date Approved: September 2011

Introduction

This Total Maximum Daily Load (TMDL) was developed to address the 2002 listing of the NEB and NWB of the Anacostia River (Figure 1) for impairment due to PCBs. The majority of both the NEB and NWB are non-tidal. In 2006 a PCB TMDL was approved for the tidal portions of the Anacostia River, which included allocations for both the NEB and NWB tributaries. Analysis for this TMDL applied the tributary allocations identified in the Tidal TMDL for both branches and further identified allocations to source categories.

This fact sheet provides summary data related to the TMDL and includes specific information related to allocations made for Prince George's County, Maryland, regulated stormwater sources.

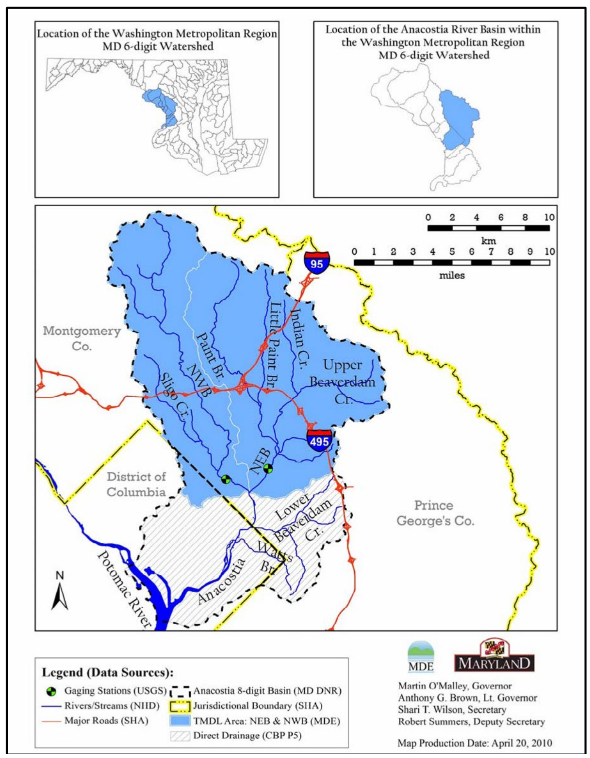

Figure 1. Anacostia River watershed.

Source: MDE 2011.

Problem Identification and Basis for Listing

Water column data collected between 2004 and 2005 demonstrated that the human health criterion (0.64 ng/L) was exceeded in both the NEB and NWB

(Table 1). Appendix A of the report provides detailed information regarding the PCB data collected to confirm the impairment and support the TMDL development.

Table 2. Average tPCB levels from monitoring data

Tributary	Average tPCB (ng/L)
NEB	3.35
NWB	4.30

Source: MDE 2011.
Note: tPCB = total PCB.

Applicable Data

Historical water quality data was used to characterize the impairment and support modeling in the TMDL and in Appendices A and E. The TMDL development effort used water column concentration data, targeted sampling of wastewater treatment plant (WWTP) discharges, and a bivalve (clams) exposure study to contrast long-term conditions with ambient sampling.

Sources

The Tidal Potomac and Anacostia PCB TMDL provided baseline and allocated loads for both the NEB and NWB (Table 2).

Table 3. Tidal Potomac and Anacostia PCB TMDL allocations assigned to the NEB and NWB tributaries

Tributary	Baseline (g/yr)	Allocation (g/yr)	MOS (g/yr)
NEB	429	8.14	0.43
NWB	298	5.66	0.30

Source: MDE 2011.
Note: MOS = margin of safety.

The NEB and NWB Tributary TMDL further subdivides the allocations given in the Tidal TMDL among the following sources:

- WWTP
- Contaminated sites
  - 15 in NEB drainage
- Regulated stormwater
  - Small, medium, and large municipal separate storm sewer systems (MS4s)
  - Industrial stormwater discharges
  - Construction sites
- Nonregulated stormwater
- District of Columbia upstream watershed

State and federal properties were not explicitly considered in the TMDL; however, if they are permitted to discharge stormwater they may appear in Appendix C. Their loads are inherently considered in the regulated stormwater load.

Technical Approach

This TMDL used the allocations provided in the Tidal Potomac and Anacostia TMDL for both tributaries and was based on an understanding of existing WWTP loads[1] and contaminated site loads[2], back-calculated loads for regulated stormwater, nonregulated stormwater, and District upstream load.

The three calculated loads were determined using proportional contributions from each of these source categories in the NEB and NWB tributary drainage basins on the basis of a total PCB (tPCB) clam exposure study, the land cover area making up each source category, and a runoff coefficient for each land cover category. Formulas for these calculations are detailed in the TMDL report.

Areas regulated by the Maryland National Pollutant Discharge Elimination System (NPDES) stormwater permits were represented in this analysis by the following 2006 land cover classifications:

- Developed open space
- Low-intensity urban
- Medium-intensity urban
- High-intensity urban

Allocations

The NEB and NWB PCB TMDL allocations are presented by county for each tributary; however, the regulated stormwater allocation refers to all known NPDES stormwater dischargers within the County's portions of the NEB and NWB drainage basin (identified in Appendix C).

Table 3 shows the Regulated Stormwater Baseline Load and the Regulated Stormwater TMDL allocations for the County. For implementation of the County's MS4 allocations, additional analysis will be needed to calculate the County's portion of the regulated stormwater allocation. If it is possible to identify the areas covered by construction and industrial stormwater permits, then by subtracting those from the remaining stormwater land cover areas and applying the formula for stormwater loads and

[1] Extrapolated from similar facilities' data and adjusted based on targeted sampling results.
[2] Calculated edge-of-field loads, then converted to edge-of-stream loads using the same RUSLE2-based methods as Maryland's non-tidal sediment TMDLs.

runoff, the County's MS4 load could be identified. Required information includes the runoff coefficient for the stormwater land cover, the clam concentration for relevant subwatersheds, and the area of the County's MS4 stormwater lands. Tetra Tech has not identified whether and where the clam concentration data are presented in the TMDL; however, Figure 7 on page 16 shows the location of clam deployment sites and subbasins are color coded according to average clam tPCB concentration.

Table 4. NEB and NWB PCB TMDL – Prince George's County MS4 baseline and TMDL allocated loads

Regulated Stormwater Loads	Baseline (g/yr)	TMDL (g/yr)	% Reduction
NEB	277.12	3.77	98.64
NWB	93.0	1.77	98.10

Source: MDE 2011.

Reference

MDE (Maryland Department of the Environment). 2011. Total Maximum Daily Loads of Polychlorinated Biphenyls in the Northeast and Northwest Branches of the Nontidal Anacostia River, Montgomery and Prince George's Counties, Maryland.

Tidal Potomac and Anacostia PCB TMDL

Source Document:	Haywood, H. C., and C. Buchanan. 2007. Total maximum daily loads of polychlorinated biphenyls (PCBs) for tidal portions of the Potomac and Anacostia rivers in the District of Columbia, Maryland, and Virginia. Interstate Commission on the Potomac River Basin. ICPRB Report 07-7. Rockville, MD.
Water Body Type:	Tidal stream reaches of the Potomac River and Anacostia River
Pollutant:	Polychlorinated biphenyls (PCBs)
Designated Uses:	Fish consumption
Size of Water Body:	117 miles
Size of Watershed:	2,537 square miles
Water Quality Standards:	Water quality criteria and fish tissue standards
Indicators:	Total PCBs
Analytical Approach:	A linked hydrodynamic and PCB transport and fate model (PotPCB) was built and calibrated to existing data

Introduction

The U.S. Environmental Protection Agency (EPA) approved the PCB Total Maximum Daily Load (TMDL) for the tidal portions of the Potomac and Anacostia rivers in 2007 (Figure 1). This fact sheet provides summary data related to the TMDL and includes specific information related to allocations made for Prince George's County, Maryland, regulated stormwater sources.

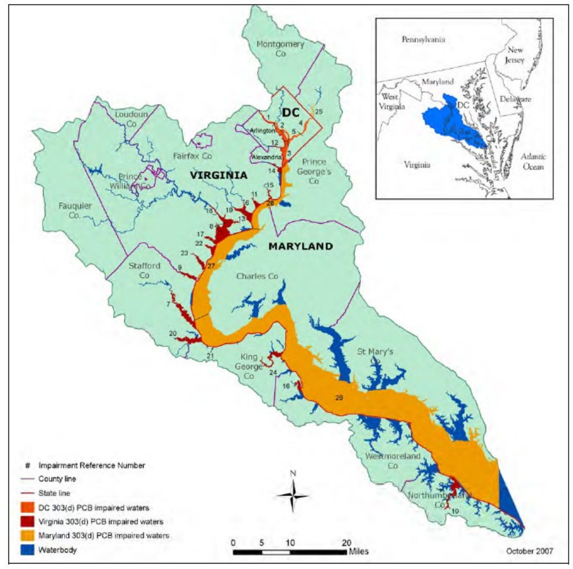

Figure 1. PCB Potomac River and Anacostia River watersheds
Source: Haywood and Buchanan 2007.

Problem Identification and Basis for Listing

Primarily, segments in all three jurisdictions were listed on the basis of fish tissue data. Ambient water column and fish tissue data collected from 2002 to 2007 showed that the existing PCB water quality criteria were not protective of fish tissue concentrations in the tidal Potomac and Anacostia rivers. For the TMDL, target water column concentrations were calculated, using EPA-recommended methods, to be protective of fish tissue concentrations.

County-specific listed segments include:

- Tidal Anacostia – segment 25
- Potomac River Upper – segment 28

Applicable Data

Historical water quality data used to characterize the impairment and support modeling are discussed on page 8 of the TMDL and in Appendix A. Because of advances in laboratory analysis techniques, much of the data analyzed before 2000 had limited value for the TMDL, which focused on data collected since 1999. The master data set (1999–2007) was used to characterize tributary input loads and ambient PCB levels in the estuary. The data set has 270 water samples, 250 sediment samples, and 350 fish tissue samples.

Sources

Major source categories modeled are as follows:

- Non-tidal Potomac at Chain Bridge
- Lower Basin Tributaries – that portion of the Potomac River watershed that contributes to the tidal waters, and excludes the watershed above Chain Bridge. The tributaries are the 17 streams in the lower basin defined in the Chesapeake Bay Watershed Model (WM5) as tributaries.
- Direct Drainage – that part of the lower basin watershed that is not in a WM5-defined tributary. Direct drainage areas are located adjacent to the Potomac and Anacostia rivers.
- Wastewater Treatment Plant (WWTP)
- Combined Sewer Overflow (CSO)
- Atmospheric Deposition – directly deposited on water surface
- Contaminated Sites – those sites that have been identified as contaminated by PCBs, some of which have been remediated.
- Margin of safety – 5 percent to all sources except WWTP.

State and federal properties were not explicitly considered in the TMDL.

Appendix A of the TMDL document details how external loads were calculated.

Technical Approach

The Potomac PCB (PotPCB) model developed for this TMDL by LimnoTech is a coupled, hydrodynamic, salinity, sorbent dynamics, and PCB mass balance model for the tidal portions of the Potomac and Anacostia rivers. The PotPCB model provides daily PCB water column and sediment concentrations in each of 257 segments. The median daily concentration in the final year, or the maximum 30-day average for the District of Columbia (see below), represents the predicted water column and sediment concentrations for a loading scenario.

Baseline Scenario in the POTPCB model is run with 2005 flows and 2005 loads from all sources. The 2005 hydrologic year also is used for the TMDL Scenario, except for WWTPs and for the District CSO system.

Development of External Source Loads

To characterize external sources, output from the Chesapeake Bay Watershed Model (WM5) was used to estimate daily flows and the associated loads from 17 lower basin tributaries and from direct drainage areas. While the overall load for each tributary is accounted for in this study, specific sources within watersheds are not characterized.

Daily PCB loading data were not available to use in the PotPCB model. PCB loads for tributaries and direct drainages were developed on the basis of monitoring data in which the relationship between total suspended solids (TSS) and PCBs was determined. Using the WM5 model predictions of flow and TSS along with the monitoring-derived relationship between TSS and PCB, daily PBC concentrations were developed for modeling.

Modeled Landuse Loading Rates

To calculate municipal separate storm sewer system (MS4)-specific allocation totals, understanding the modeled land use loading rates for urban land uses would be helpful. However, the TMDL document does not provide loading rate information at urban land use levels. The most specific loading rate information is provided in Appendix A, which gives the PCB^{+3} and total PCB loading rates in grams/yr for the direct drainages, which are the only drainage basins in the modeling that pertain to MS4 areas. Loading rates in Table 1 are taken from Appendix A.

Table 2. PCB Model loading rates

Source Category	PCB^{+3} (g / yr)	Total PCB (g / yr)
Direct Drainages	4,976	5,409

Source: Haywood and Buchanan 2007.

Allocations

Allocations were made at the impaired segment level. Table 2 is excerpted from Table 12 of the TMDL document, which provides direct drainage loads by watershed code.

Table 2. Prince George's County TMDL direct drainage loads by watershed

Impair-ment ref #	Water-shed code	Baseline (g/yr)		TMDL (g/yr)		Percent reduction
		tPCB MS4	tPCB NPS LA	tPCB MS4 WLA	tPCB NPS LA	
3, 4, 5, 25	4810	2,980	54.3	1.94	0.0353	99.9%
3	4960	92.6	11.2	0.88	0.107	99.0%
28	4961	96	24.7	0.912	0.235	99.0%
3, 28	4980	28.4	13.5	8.72	4.15	69.3%
28	5060	6.95	5.24	6.6	4.97	5.0%
28	5061	1.16	1.94	1.1	1.84	5.0%
28	5290	0.451	2.49	0.348	1.92	22.9%
27	5390	0.0678	0.615	0.0644	0.584	5.0%
	Total	3,210	114	20.6	13.8	99.0%

Source: Haywood and Buchanan 2007.

Note: tPCB = total PCB; LA = load allocation; WLA = wasteload allocation.

The TMDL document also presents allocations for Maryland segments by state 8-digit hydrologic unit code. A geographic information system exercise will be needed to determine what portion of the allocated load is applicable to the County by identifying what portions of the County's MS4s are within the direct drain watersheds of the Chesapeake Bay Watershed Model (WM5). (See the Watershed Codes above in Table 2.)

Loads for the regulated National Pollutant Discharge Elimination System (NPDES) stormwater system were expressed as a single stormwater wasteload allocation (WLA) for each impaired water body. The stormwater WLAs are calculated for and apply to the direct drainage areas covered by a NPDES stormwater permit. For these areas, the stormwater WLA was derived by multiplying the direct drainage PCB load for the TMDL scenario in each WM5 "riverseg-landseg" area (the smallest watershed area defined in WM5) by its percent of developed land.

Additional tables in the report provide allocations for various portions of the TMDL equation and for various geographic scales. The TMDL document lists the MS4s in Maryland. Allocations are not specified at this level.

APPENDIX B: WATER QUALITY SUMMARIES

Table B-1. Summary of available bacteria data in the Anacostia River watershed

Station ID	Station Name/Description	Parameter	Date		Number of Records	Value (Count/100mL)		
			Min.	Max.		Min.	Mean	Max.
PA(1)	Paint Branch	*E. coli*	06/20/06	10/31/06	16	36	1,168	9,700
USGS-1649500	Northeast Branch Anacostia River at Riverdale, MD	*E. coli*	12/11/03	04/08/14	241	21	9,777	120,000
USGS-1651000	Northwest Br Anacostia River Nr Hyattsville, MD	*E. coli*	10/29/03	06/09/10	104	3	13,123	290,000
WA(2)	Watts Branch	*E. coli*	06/20/06	10/31/06	14	37	990	4,500
BED0001	Beaverdam Creek	Enterococci	10/07/02	10/20/03	26	20	896	8,660
INC0030	Indian Creek	Enterococci	10/07/02	10/20/03	25	10	763	7,700
NEB0002	Northeast Branch	Enterococci	10/07/02	08/09/05	42	9	575	8,160
NEB0016	NE Branch Anacostia River	Enterococci	08/18/04	08/09/05	16	10	1,724	24,190
NWA0002	Northwest Branch	Enterococci	10/07/02	08/09/05	42	2	676	9,800
NWA0135	Northwest Branch Anacostia	Enterococci	10/07/02	10/20/03	26	10	1,467	19,860
PNT0001	Paint Branch	Enterococci	10/07/02	10/20/03	25	10	327	4,350
USGS-1649500	Northeast Branch Anacostia River at Riverdale, MD	Enterococci	12/11/03	11/16/05	29	20	12,649	240,000
USGS-1651000	Northwest Br Anacostia River Nr Hyattsville, MD	Enterococci	10/29/03	11/16/05	30	8	35,894	920,000
GREE_NPS_1	North Branch Still Creek East of Park Entrance	Fecal Coliform	06/15/81	12/15/83	49	0	203	2,400
GREE_NPS_2	North Branch Still Creek Next To Propane Tank	Fecal Coliform	06/15/81	04/02/84	55	0	295	3,800
GREE_NPS_3	Tributary of Still Creek at Goddard Village	Fecal Coliform	06/15/81	03/05/84	50	0	540	5,700
GREE_NPS_4	Still Creek On West Side of Nashville Road	Fecal Coliform	06/15/81	03/05/84	49	1	696	6,000
GREE_NPS_5	Still Creek On West Side of Kepner Road	Fecal Coliform	06/15/81	02/07/84	50	0	555	4,800
GREE_NPS_6	Still Creek at Goodluck Road And	Fecal	06/15/81	03/05/84	52	0	507	5,000

Station ID	Station Name/Description	Parameter	Date		Number of Records	Value (Count/100mL)		
			Min.	Max.		Min.	Mean	Max.
	Kenilworth Ave.	Coliform						
GREE_NPS_7	Still Creek at West Side of Park Central Road	Fecal Coliform	06/15/81	03/05/84	51	0	557	5,500
GREE_NPS_8	North Branch Still Creek West of Park Entrance	Fecal Coliform	10/19/81	01/09/84	24	0	129	1,100
GREE_NPS_9	North Branch Still Creek West of Park Central Rd	Fecal Coliform	02/16/82	04/02/84	40	0	127	650
PA(1)	Paint Branch	Fecal Coliform	06/13/06	10/31/06	17	100	2,211	11,000
PG002	Stormwater outfall at Flaggstaff Street	Fecal Coliform	10/16/01	02/28/07	38	17	7,050	37,997
PG006	Beaverdam Creek at Beaver Road	Fecal Coliform	10/30/01	07/02/07	40	17	7,760	137,606
USGS-1649500	Northeast Branch Anacostia River at Riverdale, MD	Fecal Coliform	07/16/69	01/21/74	49	18	2,152	13,000
USGS-1651000	Northwest Br Anacostia River Nr Hyattsville, MD	Fecal Coliform	07/16/69	06/02/92	48	27	7,231	170,000
WA(2)	Watts Branch	Fecal Coliform	06/06/06	10/31/06	16	20	1,062	3,900

Table B-2. Summary of available BOD and DO data in the Anacostia River watershed

Station ID	Station Name/Description	Parameter	Date		Number of Records	Value (mg/L)		
			Min.	Max.		Min.	Mean	Max.
ANA0082	Anacostia River	BOD	01/07/86	12/05/12	212	0.330	3.45	21.60
NEB0002	Northeast Branch	BOD	08/18/04	08/09/05	16	0.300	1.74	3.60
NEB0016	NE Branch Anacostia River	BOD	08/18/04	08/09/05	16	0.200	1.59	3.50
NWA0002	Northwest Branch	BOD	08/18/04	08/09/05	16	0.400	1.59	3.50
PG002	Stormwater outfall at Flaggstaff Street	BOD	10/16/01	02/28/07	48	2.00	12.68	96.90
PG006	Beaverdam Creek at Beaver Road	BOD	10/30/01	07/02/07	52	0.600	8.24	65.06
USGS-1649500	Northeast Branch Anacostia River at Riverdale, MD	BOD	10/23/69	12/21/05	34	1.10	2.71	6.20
USGS-1651000	Northwest Br Anacostia River Nr	BOD	10/23/69	12/21/05	35	0.30	2.79	8.90

Station ID	Station Name/Description	Parameter	Date		Number of Records	Value (mg/L)		
			Min.	Max.		Min.	Mean	Max.
	Hyattsville, MD							
ANA0082	Anacostia River	DO	01/07/86	12/05/12	272	3.30	10.34	14.80
BDM0008	Beaverdam Creek	DO	01/28/08	12/15/08	12	5.20	9.27	13.60
BED0001	Beaverdam Creek	DO	10/07/02	12/15/08	38	5.70	8.91	13.20
GREE_NPS_1	North Branch Still Creek East of Park Entrance	DO	06/12/81	04/30/84	64	7.50	10.20	14.20
GREE_NPS_2	North Branch Still Creek Next To Propane Tank	DO	06/15/81	04/30/84	60	7.50	10.73	15.20
GREE_NPS_3	Tributary of Still Creek at Goddard Village	DO	06/15/81	04/30/84	66	8.00	10.76	14.70
GREE_NPS_4	Still Creek On West Side of Nashville Road	DO	06/15/81	04/30/84	53	6.00	10.38	15.00
GREE_NPS_5	Still Creek On West Side of Kepner Road	DO	06/12/81	04/30/84	65	8.00	10.49	14.60
GREE_NPS_6	Still Creek at Goodluck Road And Kenilworth Ave.	DO	06/12/81	04/30/84	66	7.60	10.64	15.00
GREE_NPS_7	Still Creek at West Side of Park Central Road	DO	06/12/81	04/30/84	67	8.00	10.82	15.00
GREE_NPS_8	North Branch Still Creek West of Park Entrance	DO	01/04/82	04/30/84	50	6.00	11.08	14.20
GREE_NPS_9	North Branch Still Creek West of Park Central Rd	DO	01/04/82	04/30/84	57	8.60	10.88	14.20
INC0030	Indian Creek	DO	10/07/02	12/15/08	38	6.30	9.26	13.10
LPB0002	Little Paint Branch	DO	01/28/08	12/15/08	12	7.90	10.06	14.30
NACE_AN_BLADE	Anacostia River South of Bladensburg Road Bridge	DO	06/26/90	11/20/97	90	3.60	7.94	16.20
NACE_AN_DUELING	Dueling Creek Upstream of the Anacostia River	DO	09/04/90	11/20/97	60	1.50	6.08	14.90
NCRN_NACE_STCK	Still Creek	DO	03/06/06	09/27/12	72	2.27	8.36	13.75
NEB0002	Northeast Branch	DO	10/07/02	12/15/08	54	7.40	10.94	15.50
NEB0016	NE Branch Anacostia River	DO	08/18/04	08/09/05	16	7.40	10.51	14.30
NWA0002	Northwest Branch	DO	10/07/02	12/15/08	54	6.50	10.02	14.20
PNT0001	Paint Branch	DO	10/07/02	10/20/03	25	7.70	10.00	13.60

Station ID	Station Name/Description	Parameter	Date		Number of Records	Value (mg/L)		
			Min.	Max.		Min.	Mean	Max.
PNT0027	Paint Branch	DO	01/28/08	12/15/08	12	6.80	10.03	14.30
SC_MS	Main Stem	DO	03/05/05	10/23/10	122	4.72	8.55	13.48
SC_TB	Takoma Branch	DO	03/05/05	10/23/10	122	4.40	9.13	14.77
SLI0002	Sligo Creek	DO	01/28/08	12/15/08	12	6.00	9.53	12.90
USGS_NW	USGS NW Branch	DO	10/15/05	06/26/10	90	4.80	9.45	14.60

Table B-3. Summary of available total nitrogen data in the Anacostia River watershed

Station ID	Station Name/Description	Date		Number of Records	Value (mg/L)		
		Min.	Max.		Min.	Mean	Max.
ANA0082	Anacostia River	01/07/86	08/18/04	204	0.410	1.68	7.25
BDM0008	Beaverdam Creek	01/28/08	12/15/08	12	0.357	1.13	3.29
BED0001	Beaverdam Creek	10/07/02	12/15/08	38	1.25	1.84	3.43
INC0030	Indian Creek	10/07/02	12/15/08	38	1.00	1.54	1.96
LPB0002	Little Paint Branch	01/28/08	12/15/08	12	0.834	1.23	1.82
NEB0002	Northeast Branch	10/07/02	12/15/08	52	0.512	1.30	1.93
NEB0016	NE Branch Anacostia River	08/18/04	08/09/05	15	1.15	1.36	1.81
NWA0002	Northwest Branch	10/07/02	12/15/08	53	0.741	1.55	2.59
PNT0001	Paint Branch	10/07/02	10/20/03	25	0.676	1.38	1.81
PNT0027	Paint Branch	01/28/08	12/15/08	12	0.725	1.18	1.73
SC_MS	Main Stem	09/04/04	09/11/10	176	0.140	0.972	2.36
SLI0002	Sligo Creek	01/28/08	12/15/08	12	0.840	1.54	2.45
USGS-1649500	Northeast Branch Anacostia River at Riverdale, MD	06/02/92	12/23/13	231	0.480	2.00	8.10
USGS-1651000	Northwest Br Anacostia River Nr Hyattsville, MD	06/02/92	06/09/10	128	0.820	2.40	5.90

Table B-4. Summary of available total phosphorus data in the Anacostia River watershed

Station ID	Station Name/Description	Date		Number of Records	Value (mg/L)		
		Min.	Max.		Min.	Mean	Max.
ANA0082	Anacostia River	01/07/86	02/11/04	202	0.0100	0.0617	0.700
BED0001	Beaverdam Creek	01/28/08	12/15/08	12	0.0941	0.305	0.897
INC0030	Indian Creek	01/28/08	12/15/08	12	0.0095	0.0500	0.320
LPB0002	Little Paint Branch	01/28/08	12/15/08	12	0.0087	0.0313	0.206
NEB0002	Northeast Branch	01/28/08	12/15/08	12	0.0157	0.0488	0.229
NWA0002	Northwest Branch	01/28/08	12/15/08	12	0.0158	0.0507	0.267

Station ID	Station Name/Description	Date		Number of Records	Value (mg/L)		
		Min.	Max.		Min.	Mean	Max.
PG002	Stormwater outfall at Flaggstaff Street	10/16/01	02/28/07	51	0.050	0.581	11.37
PG006	Beaverdam Creek at Beaver Road	10/30/01	07/02/07	55	0.0170	0.295	1.95
PNT0027	Paint Branch	01/28/08	12/15/08	12	0.0060	0.0238	0.187
SC_MS	Main Stem	09/04/04	07/05/08	120	0.0000	0.0221	0.120
SLI0002	Sligo Creek	01/28/08	12/15/08	12	0.0138	0.0615	0.288
USGS-1649500	Northeast Branch Anacostia River at Riverdale, MD	10/23/69	02/04/14	249	0.0100	0.240	1.08
USGS-1651000	Northwest Br Anacostia River Nr Hyattsville, MD	10/23/69	06/09/10	139	0.0030	0.286	0.930

Table B-5. Summary of available TSS data in the Anacostia River watershed

Station ID	Station Name/Description	Date		Number of Records	Value		
		Min.	Max.		Min.	Mean	Max.
ANA0082	Anacostia River	02/03/86	12/05/12	266	1.00	18.90	486
BDM0008	Beaverdam Creek	01/28/08	12/15/08	12	2.40	16.11	124
BED0001	Beaverdam Creek	10/07/02	12/15/08	38	4.00	16.40	121
GREE_NPS_1	North Branch Still Creek East of Park Entrance	06/12/81	04/30/84	62	0.100	48.93	798.1
GREE_NPS_2	North Branch Still Creek Next To Propane Tank	06/12/81	04/30/84	69	0.400	30.32	749.7
GREE_NPS_3	Tributary of Still Creek at Goddard Village	06/15/81	04/30/84	76	0.200	39.63	440.3
GREE_NPS_4	Still Creek On West Side of Nashville Road	06/22/81	04/30/84	71	0.500	18.45	348.4
GREE_NPS_5	Still Creek On West Side of Kepner Road	06/12/81	04/30/84	76	1.00	45.17	1,306
GREE_NPS_6	Still Creek at Goodluck Road And Kenilworth Ave.	06/12/81	04/30/84	70	0.200	77.38	2,210
GREE_NPS_7	Still Creek at West Side of Park Central Road	06/22/81	04/30/84	70	0.200	40.09	1254
GREE_NPS_8	North Branch Still Creek West of Park Entrance	10/19/81	04/30/84	59	2.30	153	1,650
GREE_NPS_9	North Branch Still Creek West of Park Central Rd	02/01/82	04/30/84	37	0.200	15.32	166.6
INC0030	Indian Creek	10/07/02	12/15/08	38	2.00	15.08	206
LPB0002	Little Paint Branch	01/28/08	12/15/08	12	2.40	12.22	114
NEB0002	Northeast Branch	10/07/02	12/15/08	53	2.40	11.94	222
NEB0016	NE Branch Anacostia River	08/18/04	08/09/05	15	2.40	7.25	48.70
NWA0002	Northwest Branch	10/07/02	12/15/08	53	2.40	12.30	215
PG002	Stormwater outfall at Flaggstaff Street	10/16/01	02/28/07	51	1.00	62.71	454
PG006	Beaverdam Creek at Beaver Road	10/30/01	07/02/07	55	1.00	1,023	39,344

Station ID	Station Name/Description	Date		Number of Records	Value		
		Min.	Max.		Min.	Mean	Max.
PNT0001	Paint Branch	10/07/02	10/20/03	25	2.40	4.16	18.70
PNT0027	Paint Branch	01/28/08	12/15/08	12	2.40	16.96	176
SLI0002	Sligo Creek	01/28/08	12/15/08	12	2.40	27.01	198
USGS-1649500	Northeast Branch Anacostia River at Riverdale, MD	10/23/69	02/04/14	243	0.500	181	1,930
USGS-1651000	Northwest Br Anacostia River Nr Hyattsville, MD	10/23/69	06/28/07	199	0.00	189	1,340

Table B-6. Summary of available PCB data in the Anacostia River watershed

Station ID	Station Name/Description	Parameter	Date		Number of Records	Value		
			Min.	Max.		Min.	Mean	Max.
NEB0016	NE Branch Anacostia River	Total PCB	04/13/04	10/07/05	35	0.10	3.35	15.67
NWB	Northwest Branch (NWB) of the Anacostia River	Total PCB	04/13/04	10/07/05	34	0.238	4.30	12.51

APPENDIX C: NPDES PERMITTED DISCHARGERS

Table C-1. Active NPDES permits in the Anacostia River watershed in Prince George's County

NPDES ID	Facility Name	Permit Type	Facility Type	Date Issued	Effective Date	Expiration Date
MD0003425	Rockwood Pigments NA Inc	NPDES Individual Permit	Stormwater Discharge	n/a	n/a	n/a
MD0020842	USDA East-Side WWTP	NPDES Individual Permit	WWTP	02/16/10	03/01/10	02/28/15
MD0020851	USDA West Side WWTP	NPDES Individual Permit	WWTP	10/29/12	12/01/12	11/30/17
MD0062421	WMATA - Southern Avenue Bus Division	NPDES Individual Permit	Stormwater Discharge	03/10/09	04/01/09	03/31/14
MD0063801	University of Maryland - College Park	NPDES Individual Permit	Cooling Water	09/20/12	11/01/12	10/31/17
MD0064521	WMATA - Landover Bus Division	NPDES Individual Permit	Stormwater Discharge	02/24/09	03/01/09	02/28/14
MD0065871	National Archives & Records Administration	NPDES Individual Permit	Cooling Water	11/10/09	12/01/09	11/30/14
MD0067482	NASA Goddard Space Flight Center	NPDES Individual Permit	Cooling Water	05/10/12	06/01/12	05/31/17
MD0069795	Bardon,Inc. DBA Aggregate Industries	NPDES Individual Permit	Ready-Mixed Concrete	05/04/07	06/01/07	05/03/12
MD0069965	Bardon, Inc - Odell Road, Ready-Mix	NPDES Individual Permit	Ready-Mixed Concrete	03/10/08	04/01/08	03/09/13
MD0070084	the Gardens Ice House	NPDES Individual Permit	Cooling Water	08/21/08	09/01/08	08/31/13
MD0070688	WSSC - Andalusia Lane	NPDES Individual Permit	Dewatering Nonconstruction	07/28/09	10/20/09	10/19/14
MD0071145	IC3 Constructors	NPDES Individual Permit	Dewatering Nonconstruction	09/01/10	09/01/10	08/31/15
MD08S0047	Rehabilitation of US ROUTE 1 from MD 410 to Alban Street	NPDES Individual Permit	Highway and Street Construction	07/29/09	07/29/09	07/28/14
MD09I0132	Bear Branch Stream and Watershed Restoration Project	NPDES Individual Permit	Not Reported	06/17/09	06/17/09	06/16/14
MD09I0133	Doswell E. Brooks Elementary School	NPDES Individual Permit	Federal & Fed.-Sponsored Credit	06/17/09	06/17/09	06/16/14
MD09I0261	Beaverdam Creek Site 104 Water Quality Improvement Project	NPDES Individual Permit	Not Reported	10/07/09	10/07/09	10/06/14

NPDES ID	Facility Name	Permit Type	Facility Type	Date Issued	Effective Date	Expiration Date
MD09S0381	Us 50/I495/I95 Interchange Invasivespecies Rmvl, Reforstn & Lndsp	NPDES Individual Permit	Not reported	07/21/09	07/21/09	07/20/14
MDG490219	Laurel Sand & Gravel, INC.	General Permit	Construction Sand And Gravel	01/20/98	01/20/98	01/31/98
MDG490772	Aggregate Industries - Bladensburg Aggregate	General Permit	Mineral Mine	n/a	n/a	n/a
MDG492331	Muirkirk Pit	General Permit	Mineral Mine	02/14/01	02/14/01	10/16/05
MDG493577	Aggregate Industries - Bladensburg Ready-Mix Concrete & Hot Mix Asphalt Plant	General Permit	Ready-Mixed Concrete	08/21/12	08/21/12	04/30/15
MDG493602	Beltsville Ready-Mix Concrete (RMC)	General Permit	Mineral Mine	05/20/13	05/20/13	04/30/15
MDG498039	Laurel Asphalt Crushing Plant	General Permit	Mineral Mine	n/a	n/a	n/a
MDG498040	Laurel Concrete Crushing Plant	General Permit	Mineral Mine	12/01/11	12/01/11	04/30/15
MDG498070	CNC Supply Ready-Mix Concrete Plant	General Permit	Mineral Mine	09/09/13	09/09/13	04/30/15
MDG498072	Sheriff Road Asphalt	General Permit	Mineral Mine	n/a	n/a	n/a
MDG499755	Aggregate Industries	General Permit	Mineral Mine	12/01/11	12/01/11	04/30/15
MDG499769	Rockville Fuel & Feed Co., Inc.	General Permit	Mineral Mine	12/01/11	12/01/11	04/30/15
MDG499849	Aggregate Industries@Sheriff Road Facility	General Permit	Mineral Mine	n/a	n/a	n/a
MDG499867	Chaney Enterprises - Seat Pleasant	General Permit	Mineral Mine	05/01/10	01/01/11	04/30/15
MDG679429	U S Department of Agriculture	General Permit	Noncommercial Research Organizations	01/15/02	01/15/02	08/27/05
MDG766025	Pointer Ridge Swim/Racquet Clb	General Permit	Marinas/Swimming Pool	04/26/02	04/26/02	12/28/06
MDG766137	Courtyard at Marriott-Landover	General Permit	Amusement And Recreation/Swimming Pool	05/13/02	05/13/02	12/27/06
MDG766155	Charlestowne North Apartments	General Permit	Swimming Pool	06/14/02	06/14/02	12/27/06
MDG766233	Greenway Village Apartments	General Permit	Swimming Pool	08/05/02	08/05/02	12/27/06
MDG766308	Knights of Columbus Pool	General Permit	Swimming Pool	08/05/02	08/05/02	12/27/06

NPDES ID	Facility Name	Permit Type	Facility Type	Date Issued	Effective Date	Expiration Date
MDG766326	University Square Apartments	General Permit	Swimming Pool	09/26/02	09/26/02	12/27/06
MDG766367	Riverdale Towers	General Permit	Swimming Pool	09/26/02	09/26/02	12/27/06
MDG766369	Holiday Inn - Greenbelt	General Permit	Swimming Pool	09/25/02	09/25/02	12/27/06
MDG766372	Whitfield Towne Apartments	General Permit	Swimming Pool	08/21/02	08/21/02	12/27/06
MDG766388	Villas at Langley	General Permit	Apartment Building Operators/Swimming Pool	08/05/02	08/05/02	12/27/06
MDG766391	Oakton Apartments	General Permit	Swimming Pool	08/05/02	08/05/02	12/27/06
MDG766431	MNCPPC - Hamilton Pool	General Permit	Swimming Pool	03/17/08	04/01/08	05/13/12
MDG766432	MNCPPC - Lane Manor Splash Pool	General Permit	Swimming Pool	03/07/13	03/07/13	09/30/17
MDG766439	Riverdale Towne Apartments	General Permit	Swimming Pool	10/11/02	10/11/02	12/27/06
MDG766454	Glen Willow Apartments	General Permit	Swimming Pool	09/27/02	09/27/02	12/27/06
MDG766457	Finian's Court Apartments	General Permit	Swimming Pool	09/27/02	09/27/02	12/27/06
MDG766470	Wynfield Park	General Permit	Swimming Pool	10/10/02	10/10/02	12/27/06
MDG766485	Gateway Gardens	General Permit	Apartment Building Operators/Swimming Pool	10/11/02	10/11/02	12/27/06
MDG766490	Chestnut Ridge	General Permit	Swimming Pool	10/11/02	10/11/02	12/27/06
MDG766524	Seven Springs Village Apts.	General Permit	Swimming Pool	10/25/02	10/25/02	12/27/06
MDG766526	Ferwood Gardens	General Permit	Swimming Pool	10/25/02	10/25/02	12/27/06
MDG766570	Adelphi Pool	General Permit	Physical Fitness Facilities/Swimming Pool	12/30/02	12/30/02	12/27/06
MDG766594	Columbia Park	General Permit	Swimming Pool	03/20/13	03/20/13	09/30/17
MDG766596	Heritage Square	General Permit	Swimming Pool	03/25/13	03/25/13	09/30/17
MDG766597	Kenilworth Towers East	General Permit	Swimming Pool	03/25/13	03/25/13	09/30/17
MDG766599	Lansdowne Village	General Permit	Swimming Pool	03/25/13	03/25/13	09/30/17
MDG766643	Belcrest Plaza	General Permit	Swimming Pool	03/27/03	03/27/03	12/27/06
MDG766644	Fox Club Apartments	General Permit	Apartment Building Operators/Swimming Pool	03/27/03	03/27/03	12/27/06
MDG766709	MNCPPC - Ellen E. Linson Swimming Pool	General Permit	Swimming Pool	03/07/13	03/07/13	09/30/17
MDG766743	Maple Ridge Apartments	General Permit	Apartment Building Operators/Swimming Pool	06/23/03	06/23/03	12/27/06
MDG766759	Lakeside North	General Permit	Apartment Building	06/23/03	06/23/03	12/27/06

NPDES ID	Facility Name	Permit Type	Facility Type	Date Issued	Effective Date	Expiration Date
			Operators/Swimming Pool			
MDG766797	Villages @ Montpelier	General Permit	Apartment Building Operators/Swimming Pool	10/01/03	10/01/03	12/27/06
MDG766811	Parkview Gardens Apartments	General Permit	Apartment Building Operators/Swimming Pool	12/09/03	12/09/03	12/27/06
MDG766822	Suburban Aquatic Club, Inc.	General Permit	Physical Fitness Facilities/Swimming Pool	03/23/04	03/23/04	12/27/06
MDG766849	Hillside Heights Apartments	General Permit	Apartment Building Operators/Swimming Pool	12/08/10	12/08/10	05/13/12
MDG766871	Woods of Marlton	General Permit	Apartment Building Operators/Swimming Pool	05/10/04	05/10/04	12/27/06
MDG766884	New Carrollton Recreation Club, Inc.	General Permit	Physical Fitness Facilities/Swimming Pool	01/31/13	01/31/13	09/30/17
MDG766925	Towers of Westchester Park	General Permit	Apartment Building Operators/Swimming Pool	08/16/04	08/16/04	12/27/06
MDG766927	the Lighthouse at Twin Lakes	General Permit	Swimming Pool	03/29/13	03/29/13	09/30/17
MDG766931	Marylander Condominiums	General Permit	Swimming Pool	08/13/04	08/13/04	12/27/06
MDG766932	Lexington Court	General Permit	Apartment Building Operators/Swimming Pool	08/13/04	08/13/04	12/27/06
MDG766945	Hampton Inn College Park	General Permit	Swimming Pool	01/11/08	01/11/08	05/13/12
MDG767005	MNCPPC - J. Franklin Bourne Swimming Pool	General Permit	Swimming Pool	03/14/13	03/14/13	09/30/17
MDG767015	College Park Woods Swimming Club	General Permit	Physical Fitness Facilities/Swimming Pool	03/27/08	04/01/08	05/13/12
MDG767098	Prince George's Sports & Learning Complex	General Permit	Swimming Pool	02/06/13	02/06/13	09/30/17
MDG767099	Theresa Banks Memorial Aquatic Center	General Permit	Swimming Pool	02/06/13	02/06/13	09/30/17
MDG767106	Carrollon Manor	General Permit	Swimming Pool	03/25/13	03/25/13	09/30/17
MDG767108	Forest Park	General Permit	Swimming Pool	02/27/13	02/27/13	09/30/17
MDG767114	Takoma Landing	General Permit	Swimming Pool	n/a	n/a	n/a
MDG767140	Best Western Capitol Beltway	General Permit	Swimming Pool	03/29/13	03/29/13	09/30/17
MDG767144	Post Park	General Permit	Swimming Pool	03/29/13	03/29/13	09/30/17
MDG767149	Howard Johnson's - Cheverly	General Permit	Swimming Pool	n/a	n/a	n/a
MDG767172	Longwood Homeowners Association	General Permit	Swimming Pool	n/a	n/a	n/a

NPDES ID	Facility Name	Permit Type	Facility Type	Date Issued	Effective Date	Expiration Date
MDG767192	Eppley Recreation Center	General Permit	Swimming Pool	n/a	n/a	n/a
MDG911179	Crown Service Station	General Permit	Not reported	04/25/06	04/25/06	05/24/07
MDG912119	Texaco Station - Peh Shell # 804	General Permit	Gasoline Service Stations	06/20/11	07/01/11	12/11/12
MDG912853	Capital Heights Citgo	General Permit	Gasoline Service Stations	02/08/11	02/08/11	12/11/12
MDG913117	Greenbelt Extrafuel	General Permit	Gasoline Service Stations	12/17/08	01/01/09	12/31/12
MDG916865	City of Seat Pleasant	General Permit	Not Reported	09/18/98	09/18/98	03/31/02
MDG916997	Landover Sunoco	General Permit	Gasoline Service Stations	03/01/07	03/01/07	05/24/07
MDG918486	Q-Card No. 403	General Permit	Refuse Systems	06/17/13	06/17/13	06/17/13
MDG918514	Former Chevron # 122208	General Permit	Refuse Systems	01/31/08	01/31/08	12/12/12
MDR00	Intercounty Connector (ICC) Eastern Operations Facility	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR000007	Stone Industrial Precision Products	General Permit	Stormwater Discharge	03/13/03	03/13/03	11/30/07
MDR000008	Airgas East, Inc.	General Permit	Stormwater Discharge	03/31/03	03/31/03	11/30/07
MDR000010	U.S. Army - Adelphi Laboratory Center	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR000149	Sheriff Road Processing Facility & Transfer Station	General Permit	Stormwater Discharge	04/24/03	04/24/03	11/30/07
MDR000197	Town of Cheverly	General Permit	Stormwater Discharge	05/16/03	05/16/03	11/30/07
MDR000316	Eaton Corporation	General Permit	Stormwater Discharge	01/27/03	01/27/03	11/30/07
MDR000328	WMATA - New Carrollton Yard	General Permit	Stormwater Discharge	02/13/03	02/13/03	11/30/07
MDR000466	Sherwin-Williams #3850	General Permit	Stormwater Discharge	03/31/03	03/31/03	11/30/07
MDR000481	Smithfield Packing Company - Landover	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR000560	ABF Freight Systems, Inc	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR000584	Washington Woodworking Company LLC	General Permit	Stormwater Discharge	03/11/03	03/11/03	11/30/07
MDR000621	Laurel Sand and Gravel, Inc	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR000648	Prince George's Scrap, Inc.	General Permit	Stormwater Discharge	05/29/03	05/29/03	11/30/07
MDR000654	Joseph Smith & Sons, Inc	General Permit	Stormwater Discharge	05/29/03	05/29/03	11/30/07

NPDES ID	Facility Name	Permit Type	Facility Type	Date Issued	Effective Date	Expiration Date
MDR000740	United Parcel Service - Landover	General Permit	Stormwater Discharge	02/25/03	02/25/03	11/30/07
MDR000772	Aggregate Industries - Bladensburg Aggregate	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR000858	United Parcel Service - Landover #2	General Permit	Stormwater Discharge	02/25/03	02/25/03	11/30/07
MDR000871	Security Storage Co. of Washington - Landover	General Permit	Stormwater Discharge	03/10/03	03/10/03	11/30/07
MDR000874	Security Storage Co. of Washington - Hyattsville	General Permit	Stormwater Discharge	03/10/03	03/10/03	11/30/07
MDR001052	Federal Express Corporation	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR001065	UPS Freight	General Permit	Stormwater Discharge	04/29/03	04/29/03	11/30/07
MDR001076	Interstate Brands Corp. - Beaver Heights	General Permit	Stormwater Discharge	03/21/03	03/21/03	11/30/07
MDR001077	Interstate Brands Corp. - Beltsville	General Permit	Stormwater Discharge	03/21/03	03/21/03	11/30/07
MDR001083	Gold Line, Inc	General Permit	Stormwater Discharge	01/24/03	01/24/03	11/30/07
MDR001093	WB, LLC	General Permit	Stormwater Discharge	11/30/07	11/30/07	11/30/07
MDR001103	Us Postal Service - Riverdale VMF	General Permit	Stormwater Discharge	10/22/03	10/22/03	11/30/07
MDR001136	All Star Used Auto Parts, Inc	General Permit	Stormwater Discharge	05/19/03	05/19/03	11/30/07
MDR001158	Greyhound Lines, Inc #320012	General Permit	Stormwater Discharge	01/27/03	01/27/03	11/30/07
MDR001242	WMATA - Greenbelt Rail Yard	General Permit	Stormwater Discharge	05/28/03	05/28/03	11/30/07
MDR001276	Nazario Construction Company, Inc.	General Permit	Stormwater Discharge	02/13/03	02/13/03	11/30/07
MDR001277	Nazcon Ready Mix Plant - Maryland Avenue	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR001299	Jiffy John Company, Inc.	General Permit	Stormwater Discharge	01/27/03	01/27/03	11/30/07
MDR001326	SHA - Metro Shop	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR001357	Metro Re-Uz-It Company, Inc.	General Permit	Stormwater Discharge	05/14/03	05/14/03	11/30/07
MDR001365	World Recycling Company	General Permit	Stormwater Discharge	05/23/03	05/23/03	11/30/07

NPDES ID	Facility Name	Permit Type	Facility Type	Date Issued	Effective Date	Expiration Date
MDR001366	Kenilworth Foreign Car Parts	General Permit	Stormwater Discharge	06/19/03	06/19/03	11/30/07
MDR001376	Thomas Tours, Inc.	General Permit-Stormwater	No Exposure Certification	n/a	n/a	n/a
MDR001380	Griffith Energy Services, Inc. - Cheverly	General Permit	Stormwater Discharge	07/01/03	07/01/03	11/30/07
MDR001393	Try It Again, Inc.	General Permit	Stormwater Discharge	01/14/04	01/14/04	11/30/07
MDR001429	Joseph Smith & Sons, Inc.	General Permit	Stormwater Discharge	03/31/03	03/31/03	11/30/07
MDR001464	Beltway Used Auto Parts LLC	General Permit	Stormwater Discharge	04/24/03	04/24/03	11/30/07
MDR001561	Beltsville Ready-Mix Concrete (RMC)	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR001621	Earl Center Lumber Company	General Permit	Stormwater Discharge	07/01/03	07/01/03	11/30/07
MDR001659	Baxter Maryland Vaccines - Bldg. 1	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR001660	Baxter Maryland Vaccines - Bldg. 2	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR001661	Baxter Hyland Immuno	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR001662	Aggregate Industries	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR001679	J & M Auto, Inc.	General Permit	Stormwater Discharge	05/14/03	05/14/03	11/30/07
MDR001721	Beltsville Auto Recyclers Inc	General Permit	Stormwater Discharge	04/29/03	04/29/03	11/30/07
MDR001724	East-West Motors	General Permit	Stormwater Discharge	04/24/03	04/24/03	11/30/07
MDR001725	Aggregate & Dirt Solutions	General Permit	Stormwater Discharge	04/24/03	04/24/03	11/30/07
MDR001735	WSSC - Anacostia Equipment Shop	General Permit	Stormwater Discharge	04/29/03	04/29/03	11/30/07
MDR001736	WSSC - Anacostia Garage	General Permit	Stormwater Discharge	04/29/03	04/29/03	11/30/07
MDR001741	Atel Bus & Truck Service Center	General Permit	Stormwater Discharge	04/29/03	04/29/03	11/30/07
MDR001745	D C Materials	General Permit	Stormwater Discharge	05/28/03	05/28/03	11/30/07
MDR001747	Stromberg Sheet Metal Works	General Permit-Stormwater	No Exposure Certification	n/a	n/a	n/a
MDR001750	Insurance Auto Auctions, Inc.	General Permit	Stormwater Discharge	05/29/03	05/29/03	11/30/07
MDR001754	the Recycling Center	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR001763	Strittmatter Land,	General Permit	Stormwater Discharge	06/19/03	06/19/03	11/30/07

NPDES ID	Facility Name	Permit Type	Facility Type	Date Issued	Effective Date	Expiration Date
	LLC					
MDR001779	Atman Corporation	General Permit	Stormwater Discharge	08/27/03	08/27/03	11/30/07
MDR001813	Akropolis Marble & Granite	General Permit-Stormwater	No Exposure Certification	n/a	n/a	n/a
MDR001822	Mallinckrodt	General Permit-Stormwater	No Exposure Certification	n/a	n/a	n/a
MDR001829	Halle Enterprises, Inc.	General Permit	Stormwater Discharge	03/09/04	03/09/04	11/30/07
MDR001839	First Transit	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR001856	Bates Trucking Company	General Permit	Stormwater Discharge	06/15/04	06/15/04	11/30/07
MDR001860	Turbo Haul, Inc.	General Permit	Stormwater Discharge	07/06/04	07/06/04	11/30/07
MDR001864	Rolling Frito-Lay Sales - Beltsville DC	General Permit	Stormwater Discharge	09/28/04	09/28/04	11/30/07
MDR001897	Pepsi Bottling Group, LLC	General Permit	Stormwater Discharge	04/13/05	04/13/05	11/30/07
MDR001901	Reddy Ice Group #427 - Landover	General Permit-Stormwater	No Exposure Certification	n/a	n/a	n/a
MDR001931	Pepsi Cola Bottlers Ofo Wash Dc	General Permit	Stormwater Discharge	09/27/05	09/27/05	11/30/07
MDR001936	Yellow Transportation, Inc. - Landover	General Permit	Stormwater Discharge	11/10/05	11/10/05	11/30/07
MDR001983	WMATA - Chillum Road Storage Facility	General Permit-Stormwater	No Exposure Certification	n/a	n/a	n/a
MDR002002	Rodgers Brothers Service, Inc.	General Permit	Stormwater Discharge	11/17/06	11/17/06	11/30/07
MDR002022	Marva Maid Landover, LLC	General Permit	Stormwater Discharge	05/09/07	05/09/07	11/30/07
MDR002066	White Cap Construction Supply HDWC0208	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR002086	ATK Space Systems	General Permit-Stormwater	No Exposure Certification	n/a	n/a	n/a
MDR002087	ATK Space - Beltsville/Herzel	General Permit-Stormwater	No Exposure Certification	n/a	n/a	n/a
MDR002092	Maier, Ernst, Inc.	General Permit	Stormwater Discharge	11/30/07	11/30/07	11/30/07
MDR002125	Grant County Mulch - Laurel	General Permit	Stormwater Discharge	11/30/07	11/30/07	11/30/07
MDR002128	Greenbelt Park & Balto Wash Pkwy	General Permit	Stormwater Discharge	11/30/07	11/30/07	11/30/07
MDR002139	Brentwood Maintenance	General Permit	Stormwater Discharge	11/30/07	11/30/07	11/30/07

NPDES ID	Facility Name	Permit Type	Facility Type	Date Issued	Effective Date	Expiration Date
MDR002143	City of Seat Pleasant Ms4	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR002144	New Carrollton Public Works	General Permit	Stormwater Discharge	11/30/07	11/30/07	11/30/07
MDR002145	City of Greenbelt DPW	General Permit	Stormwater Discharge	11/30/07	11/30/07	11/30/07
MDR002146	Town of Riverdale Park DPW	General Permit	Stormwater Discharge	11/30/07	11/30/07	11/30/07
MDR002147	City of Mount Rainer	General Permit	Stormwater Discharge	11/30/07	11/30/07	11/30/07
MDR002148	City of College Park DPW	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR002150	City of Hyattsville	General Permit	Stormwater Discharge	11/30/07	11/30/07	11/30/07
MDR002153	Dico Inc - Movaco Industrial Park	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR002155	EP Henry	General Permit	Stormwater Discharge	11/30/07	11/30/07	11/30/07
MDR002168	FEDEX Ground	General Permit	Stormwater Discharge	11/30/07	11/30/07	11/30/07
MDR002233	ATK Space Systems, Inc	General Permit-Stormwater	No Exposure Certification	n/a	n/a	n/a
MDR002243	US Secret Service - James T Rowley Training Center	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR002246	QTG CDSD - Landover	General Permit	Stormwater Discharge	11/30/07	11/30/07	11/30/07
MDR002318	Greenlight Biofuels	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR002330	Greyhound Lines, Inc #320012	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR002339	WMATA Maintenance Yard	General Permit-Stormwater	Stormwater Discharge	n/a	n/a	n/a
MDR002352	Lawrence Street Solid Waste Acceptance Facility	General Permit	Refuse Systems/Stormwater Discharge	05/22/13	05/22/13	05/22/13
MDR002362	Vector Fleet Management	General Permit	Stormwater Discharge	08/05/13	08/05/13	08/05/13
MDU000014	Prince George Scrap, Inc.	Unpermitted Facility	Scrap And Waste Materials	--	--	--
MDU000016	Ac Tours	Unpermitted Facility	Local Passenger Transportation	--	--	--
MDU000017	Bfi-Prince George County	Unpermitted Facility	Local Trucking, Without Storage	--	--	--
MDU000019	Gold Line/Gray Line	Unpermitted Facility	Local Passenger Transportation	--	--	--
MDU000021	World Recycling	Unpermitted Facility	Scrap And Waste Materials	--	--	--
MDU000057	D.C. Materials	Unpermitted Facility	Scrap And Waste Materials	--	--	--

NPDES ID	Facility Name	Permit Type	Facility Type	Date Issued	Effective Date	Expiration Date
MDU000058	East West Motors, Inc.	Unpermitted Facility	Motor Vehicle Parts, Used	--	--	--
MDU000061	Metro Re-Uz-It Co., Inc.	Unpermitted Facility	Scrap And Waste Materials	--	--	--
MDU000064	the Recycling Center	Unpermitted Facility	Scrap And Waste Materials	--	--	--
MDU000071	Insurance Auto Auctions	Unpermitted Facility	Automobiles And Other Motor Vehicles	--	--	--
MDU000075	Joseph Smith and Sons Recyclin	Unpermitted Facility	Scrap And Waste Materials	--	--	--
MDU000076	Arriva Coach	Unpermitted Facility	Bus Charter Service, Except Local	--	--	--
MDU000077	B & E Millwork - Cabinetry	Unpermitted Facility	Furniture Stores	--	--	--
MDU000078	Capital Liminates	Unpermitted Facility	Wood Kitchen Cabinets	--	--	--
MDU000080	Halle Companies, the	Unpermitted Facility	Heavy Construction	--	--	--
MDU000087	Aa Ladder & Scaffolding	Unpermitted Facility	Automotive Repair Shops	--	--	--
MDU000090	Consilidated Waste Industries	Unpermitted Facility	Scrap And Waste Materials	--	--	--
MDU000092	Cammock Bus Services	Unpermitted Facility	Local Passenger Transportation	--	--	--
MDU000094	C. Dawes and Sons, Inc.	Unpermitted Facility	Scrap And Waste Materials	--	--	--
MDU000096	Atlantic Transportation Equipm	Unpermitted Facility	Bus Terminal And Service Facilities	--	--	--
MDU000097	Beltsville Auto Recyclers	Unpermitted Facility	Motor Vehicle Parts, Used	--	--	--
MDU000098	All Star Used Auto Parts, Inc.	Unpermitted Facility	Motor Vehicle Parts, Used	--	--	--
MDU000100	Beltsville Refuse Service	Unpermitted Facility	Local Trucking, Without Storage	--	--	--
MDU000102	Precision Plastics, Inc.	Unpermitted Facility	Plastics Products	--	--	--
MDU000103	Aggregate Industries	Unpermitted Facility	Construction Sand And Gravel	--	--	--
MDU000127	Aggregate Industries	Unpermitted Facility	Ready-Mixed Concrete	--	--	--
MDU000131	Ammendale Road	Unpermitted Facility	Not Reported	--	--	--
MDU000132	Summit at College Park	Unpermitted Facility	Not Reported	--	--	--

Note: WWTP = wastewater treatment plant; NPDES = National Pollutant Discharge Elimination System; n/a = not applicable.

Table C-2. Available permit limits for NPDES permits in the Anacostia River watershed in Prince George's County

NPDES ID	Outfall	Parameter	Minimum	Maximum	Unit	Statistical Base
MD0020842	002	Ammonia	10	14	mg/L	Maximum Daily Average
MD0020842	002	Ammonia	1.6	2.7	mg/L	Maximum Monthly Average
MD0020842	002	Ammonia	52	72	lb/d	Maximum Daily Average
MD0020842	002	Ammonia	8.3	14	lb/d	Maximum Monthly Average
MD0020842	001	BOD	30	30	mg/L	30-Day Average
MD0020842	001	BOD	45	45	mg/L	7-Day Average
MD0020842	001	BOD	17	17	mg/L	Monthly Average
MD0020842	001	BOD	26	26	mg/L	Weekly Average
MD0020842	001	BOD	160	160	lb/d	30-Day Average
MD0020842	001	BOD	230	230	lb/d	7-Day Average
MD0020842	001	BOD	130	130	lb/d	7-Day Geometric
MD0020842	001	BOD	88	88	lb/d	Monthly Loading
MD0020842	002	BOD	17	30	mg/L	30-Day Average
MD0020842	002	BOD	26	45	mg/L	7-Day Average
MD0020842	002	BOD	17	30	mg/L	Maximum Monthly Average
MD0020842	002	BOD	26	45	mg/L	Maximum Weekly Average
MD0020842	002	BOD	88	160	lb/d	30-Day Average
MD0020842	002	BOD	130	230	lb/d	7-Day Average
MD0020842	002	BOD	88	160	lb/d	Maximum Monthly Average
MD0020842	002	BOD	130	230	lb/d	Maximum Weekly Average
MD0020842	002	BOD	36,957	44,348	lb/yr	Cumulative Total
MD0020842	002	*E. coli*	126	126	MPN/100mL	Maximum Monthly Geometric Mean
MD0020842	001	Fecal Coliform	200	200	MPN/100mL	Logarithmic Mean
MD0020842	002	Fecal Coliform	200	200	MPN/100mL	Logrithmic Monthly Median
MD0020842	001	Flow	0.62	0.62	Mgpd	Average (Data Migration)
MD0020842	002	Flow	0.62	0.62	Mgpd	Annual Average
MD0020842	001	TKN	3	3	mg/L	30-Day Average
MD0020842	001	TKN	4.5	4.5	mg/L	7-Day Average
MD0020842	001	TKN	16	16	lb/d	30-Day Average
MD0020842	001	TKN	23	23	lb/d	7-Day Average
MD0020842	002	TKN	3	3	mg/L	30-Day Average
MD0020842	002	TKN	4.5	4.5	mg/L	7-Day Average
MD0020842	002	TKN	16	16	lb/d	30-Day Average
MD0020842	002	TKN	23	23	lb/d	7-Day Average
MD0020842	002	Total Nitrogen	6,294	7,553	lb/yr	Cumulative Total
MD0020842	002	Total Phosphorus	2	2	mg/L	Maximum Monthly Average

NPDES ID	Outfall	Parameter	Minimum	Maximum	Unit	Statistical Base
MD0020842	002	Total Phosphorus	3	3	mg/L	Maximum Weekly Average
MD0020842	002	Total Phosphorus	10	10	lb/d	Maximum Monthly Average
MD0020842	002	Total Phosphorus	16	16	lb/d	Maximum Weekly Average
MD0020842	002	Total Phosphorus	471	566	lb/yr	Cumulative Total
MD0020851	002	Ammonia	3.6	3.6	mg/L	Maximum Monthly Average
MD0020851	002	Ammonia	3.6	3.6	mg/L	Monthly Average
MD0020851	002	Ammonia	6	6	lb/d	Maximum Monthly Average
MD0020851	002	Ammonia	6	6	lb/d	Monthly Loading
MD0020851	001	BOD	20	30	mg/L	Monthly Average
MD0020851	001	BOD	30	45	mg/L	Weekly Average
MD0020851	001	BOD	78	117	lb/d	Monthly Loading
MD0020851	001	BOD	117	175	lb/d	Weekly Average
MD0020851	002	BOD	20	30	mg/L	Maximum Monthly Average
MD0020851	002	BOD	30	45	mg/L	Maximum Weekly Average
MD0020851	002	BOD	20	30	mg/L	Monthly Average
MD0020851	002	BOD	30	45	mg/L	Weekly Average
MD0020851	002	BOD	33	50	lb/d	Maximum Monthly Average
MD0020851	002	BOD	50	75	lb/d	Maximum Weekly Average
MD0020851	002	BOD	78	117	lb/d	Monthly Loading
MD0020851	002	BOD	117	175	lb/d	Weekly Average
MD0020851	002	BOD	14,705	14,705	lb/yr	Cumulative Total
MD0020851	002	*E. coli*	126	126	MPN/100mL	Maximum Monthly Geometric Mean
MD0020851	001	Fecal Coliform	200	200	MPN/100mL	Logrithmic Monthly Median
MD0020851	002	Fecal Coliform	200	200	MPN/100mL	Monthly Median
MD0020851	001	Flow	0.467	0.467	Mgpd	Average
MD0020851	002	Flow	0.467	0.467	gpd	Average
MD0020851	001	TKN	8.5	8.5	mg/L	Monthly Average
MD0020851	001	TKN	13	13	mg/L	Weekly Average
MD0020851	001	TKN	33	33	lb/d	Monthly Loading
MD0020851	001	TKN	51	51	lb/d	Weekly Average
MD0020851	002	TKN	8.5	8.5	mg/L	Monthly Average
MD0020851	002	TKN	13	13	mg/L	Weekly Average
MD0020851	002	TKN	33	33	lb/d	Monthly Loading
MD0020851	002	TKN	51	51	lb/d	Weekly Average
MD0063801	004	Ammonia	1.5	1.5	mg/L	Daily Maximum

NPDES ID	Outfall	Parameter	Minimum	Maximum	Unit	Statistical Base
MD0063801	005	Ammonia	1.5	1.5	mg/L	Daily Maximum
MD0063801	016	Ammonia	1.5	1.5	mg/L	Daily Maximum
MD0067482	002	BOD	45	45	mg/L	Daily Maximum
MD0067482	002	BOD	30	30	mg/L	Monthly Average
MD0067482	002	BOD	30	30	mg/L	Quarterly Average
MD0067482	003	BOD	45	45	mg/L	Daily Maximum
MD0067482	003	BOD	30	30	mg/L	Monthly Average

Note: mg/L= milligrams per liter; lb/d = pounds per day; lb/yr = pounds per year; MPN/100mL= most probable number (MPN) per 100 milliliters; gpd = gallons per day; Mgpd = million gallons per day; Mgpm = million gallons per month; MgpQ = million gallons per quarter; lb/m = pounds per month; lb/Q = pounds per quarter; pg/L= picograms per liter; MPN/100mL= number per 100 milliliters; MgpY = million gallons per year.

Table C-3. Summary of available discharge information for NPDES permits in the Anacostia River watershed in Prince George's County

NPDES ID	Outfall	Parameter	Minimum	Average	Maximum	Unit	Statistical Base
MD0003425	003	Flow	0.0065	0.012	0.0274	Mgpd	Daily Maximum
MD0003425	003	Flow	0.0065	0.012	0.0274	Mgpd	Monthly Average
MD0003425	004	Flow	0.00200	0.00391	0.00870	Mgpd	Daily Maximum
MD0003425	004	Flow	0.00200	0.00391	0.00870	Mgpd	Monthly Average
MD0020842	002	Ammonia	0.01	0.627	6.2	mg/L	30-Day Average
MD0020842	002	Ammonia	0.1	0.382	3.7	mg/L	Maximum Daily Average
MD0020842	002	Ammonia	0	0.449	7.6	mg/L	Maximum Monthly Average
MD0020842	002	Ammonia	0.05	1.01	8.70	lb/d	30-Day Average
MD0020842	002	Ammonia	0.1	0.780	6.4	lb/d	Maximum Daily Average
MD0020842	002	Ammonia	0.1	0.923	13.2	lb/d	Maximum Monthly Average
MD0020842	001	BOD	1.70	1.70	1.70	mg/L	30-Day Average
MD0020842	001	BOD	2.50	2.50	2.50	mg/L	7-Day Average
MD0020842	001	BOD	1.30	1.30	1.30	mg/L	Monthly Average
MD0020842	001	BOD	1.70	1.70	1.70	mg/L	Weekly Average
MD0020842	001	BOD	2.30	2.30	2.30	lb/d	30-Day Average
MD0020842	001	BOD	3.70	3.70	3.70	lb/d	7-Day Average
MD0020842	001	BOD	2.90	2.90	2.90	lb/d	7-Day Geometric
MD0020842	001	BOD	2.30	2.30	2.30	lb/d	Monthly Loading
MD0020842	002	BOD	1.00	2.90	14.00	mg/L	30-Day Average
MD0020842	002	BOD	1.00	4.49	37.00	mg/L	7-Day Average
MD0020842	002	BOD	2.00	2.72	12.20	mg/L	Maximum Monthly Average

NPDES ID	Outfall	Parameter	Minimum	Average	Maximum	Unit	Statistical Base
MD0020842	002	BOD	2.00	4.28	53.00	mg/L	Maximum Weekly Average
MD0020842	002	BOD	1.40	4.48	18.00	lb/d	30-Day Average
MD0020842	002	BOD	1.50	6.96	27.00	lb/d	7-Day Average
MD0020842	002	BOD	2.40	5.70	21.30	lb/d	Maximum Monthly Average
MD0020842	002	BOD	2.90	7.63	27.00	lb/d	Maximum Weekly Average
MD0020842	002	BOD	61	1,735	4,832	lb/yr	Cumulative Total
MD0020842	001	DO	7.50	7.67	8.00	mg/L	Minimum
MD0020842	002	DO	6.20	8.39	11.40	mg/L	Instantaneous Minimum
MD0020842	002	DO	5.00	8.30	11.80	mg/L	Minimum
MD0020842	002	*E. coli*	0.00	2.25	50.00	MPN/100mL	Maximum Monthly Geometric Mean
MD0020842	002	Fecal Coliform	0.00	2.40	11.00	MPN/100mL	Logrithmic Monthly Median
MD0020842	002	Flow	0.0709	0.176	0.3697	Mgpd	Annual Average
MD0020842	002	Flow	0.1511	0.412	0.767	Mgpd	Daily Maximum
MD0020842	002	Flow	0.1364	0.246	0.6095	Mgpd	Monthly Average
MD0020842	002	Nitrite + Nitrate	0.20	4.08	13.70	mg/L	30-Day Average
MD0020842	002	Nitrite + Nitrate	0.30	4.64	18.80	mg/L	Monthly Average
MD0020842	002	Nitrite + Nitrate	0.30	5.61	27.40	lb/d	30-Day Average
MD0020842	002	Nitrite + Nitrate	0.40	9.88	56.40	lb/d	Monthly Average
MD0020842	002	Org Nitrogen	0.50	1.16	6.50	mg/L	30-Day Average
MD0020842	002	Org Nitrogen	1.00	1.45	8.10	mg/L	Monthly Average
MD0020842	002	Org Nitrogen	0.60	1.77	20.00	lb/d	30-Day Average
MD0020842	002	Org Nitrogen	1.10	2.94	11.90	lb/d	Monthly Average
MD0020842	002	OrthoPhosphate	0.10	2.03	7.40	mg/L	30-Day Average
MD0020842	002	OrthoPhosphate	0.10	1.49	4.80	mg/L	Monthly Average
MD0020842	002	OrthoPhosphate	0.20	2.84	14.20	lb/d	30-Day Average
MD0020842	002	OrthoPhosphate	0.10	2.91	8.40	lb/d	Monthly Average
MD0020842	002	TKN	0.50	1.08	2.00	mg/L	30-Day Average
MD0020842	002	TKN	0.50	1.61	4.90	mg/L	7-Day Average
MD0020842	002	TKN	0.70	1.53	3.00	lb/d	30-Day Average
MD0020842	002	TKN	0.80	2.36	6.00	lb/d	7-Day Average
MD0020842	002	Total Nitrogen	1.00	5.53	18.80	mg/L	Monthly Average
MD0020842	002	Total Nitrogen	1.20	11.75	56.40	lb/d	Monthly Average
MD0020842	002	Total Nitrogen	225	1,864	4,325	lb/yr	Cumulative Total
MD0020842	002	Total	0.10	2.16	6.20	mg/L	30-Day Average

NPDES ID	Outfall	Parameter	Minimum	Average	Maximum	Unit	Statistical Base
		Phosphorus					
MD0020842	002	Total Phosphorus	0.20	1.93	3.80	mg/L	Maximum Monthly Average
MD0020842	002	Total Phosphorus	0.20	2.23	4.20	mg/L	Maximum Weekly Average
MD0020842	002	Total Phosphorus	0.20	3.06	15.60	lb/d	30-Day Average
MD0020842	002	Total Phosphorus	0.30	3.53	6.50	lb/d	Maximum Monthly Average
MD0020842	002	Total Phosphorus	0.40	3.99	8.40	lb/d	Maximum Weekly Average
MD0020842	002	Total Phosphorus	84.0	558.3	1,100	lb/yr	Cumulative Total
MD0020851	002	Ammonia	0.1	0.100	0.1	mg/L	Maximum Monthly Average
MD0020851	002	Ammonia	0.1	0.164	1	mg/L	Monthly Average
MD0020851	002	Ammonia	0.1	0.200	0.6	lb/d	Maximum Monthly Average
MD0020851	002	Ammonia	0.01	0.173	0.8	lb/d	Monthly Average
MD0020851	002	Ammonia	0.04	0.161	0.7	lb/d	Monthly Loading
MD0020851	002	BOD	1.10	2.94	59.20	mg/L	Maximum Monthly Average
MD0020851	002	BOD	1.60	5.68	228.00	mg/L	Maximum Weekly Average
MD0020851	002	BOD	2.00	2.27	2.80	mg/L	Monthly Average
MD0020851	002	BOD	1.90	2.66	4.30	mg/L	Weekly Average
MD0020851	002	BOD	0.60	1.86	27.60	lb/d	Maximum Monthly Average
MD0020851	002	BOD	0.80	3.59	105.90	lb/d	Maximum Weekly Average
MD0020851	002	BOD	1.00	1.36	1.80	lb/d	Monthly Loading
MD0020851	002	BOD	1.20	2.02	3.90	lb/d	Weekly Average
MD0020851	002	BOD	42.0	225.1	488.0	lb/yr	Cumulative Total
MD0020851	002	*E. coli*	0.00	20.64	398.00	MPN/100mL	Maximum Monthly Geometric Mean
MD0020851	002	Fecal Coliform	2.00	3.80	5.00	MPN/100mL	Monthly Median
MD0020851	002	Flow	0.05	1.28	91.00	gpd	Average
MD0020851	002	Flow	0.096	0.172	0.2448	Mgpd	Daily Maximum
MD0020851	002	Flow	0.0759	0.260	2.1848	Mgpd	Monthly Average
MD0020851	002	Flow	2.10	2.81	3.93	Mgpm	Monthly Total
MD0020851	002	Nitrite + Nitrate	3.70	6.97	11.30	mg/L	Monthly Average

NPDES ID	Outfall	Parameter	Minimum	Average	Maximum	Unit	Statistical Base
MD0020851	002	Org Nitrogen	1.00	1.05	2.70	mg/L	Monthly Average
MD0020851	002	OrthoPhosphate	0.3	0.631	1	mg/L	Monthly Average
MD0020851	002	OrthoPhosphate	0.09	0.665	1	mg/L	Monthly Average
MD0020851	002	PCBs	0.47	0.470	0.47	pg/L	Maximum
MD0020851	002	TKN	1.00	1.30	1.90	mg/L	Monthly Average
MD0020851	002	TKN	0.80	1.56	3.60	mg/L	Weekly Average
MD0020851	002	TKN	0.5	0.680	1	lb/d	Monthly Loading
MD0020851	002	TKN	0.6	0.960	1.8	lb/d	Weekly Average
MD0020851	002	Total Nitrogen	1.00	6.55	12.10	mg/L	Monthly Average
MD0020851	002	Total Nitrogen	0.60	3.12	6.30	lb/d	Monthly Average
MD0020851	002	Total Nitrogen	22.00	98.00	185.00	lb/m	Monthly Total
MD0020851	002	Total Nitrogen	33.0	589.7	1,603	lb/yr	Cumulative Total
MD0020851	002	Total Phosphorus	0.2	0.768	1.3	mg/L	Monthly Average
MD0020851	002	Total Phosphorus	0.2	0.738	4	lb/d	Monthly Average
MD0020851	002	Total Phosphorus	7.00	13.61	23.00	lb/m	Monthly Total
MD0020851	002	Total Phosphorus	11.00	84.00	266.00	lb/yr	Cumulative Total
MD0062421	001	Flow	50,400	142,892	288,000	gpd	Daily Maximum
MD0062421	001	Flow	32,400	114,942	288,000	gpd	Monthly Average
MD0062421	002	Flow	14,400	64,000	108,000	gpd	Daily Maximum
MD0062421	002	Flow	14,400	76,249	188,000	gpd	Monthly Average
MD0063801	004	Ammonia	0.03	0.581	1.7	mg/L	Daily Maximum
MD0063801	005	Ammonia	0.05	0.493	1	mg/L	Daily Maximum
MD0063801	016	Ammonia	0.379	0.561	1.1	mg/L	Daily Maximum
MD0063801	001	Flow	40.0	783.9	1,440	gpd	Daily Maximum
MD0063801	001	Flow	40.0	694.5	1,440	gpd	Monthly Average
MD0063801	001	Flow	0.00100	0.00100	0.00100	Mgpd	Daily Maximum
MD0063801	001	Flow	0.00100	0.00154	0.00288	Mgpd	Quarterly Average
MD0063801	002	Flow	1,864	4,808	8,064	gpd	Daily Maximum
MD0063801	002	Flow	1,698	4,648	8,064	gpd	Monthly Average
MD0063801	002	Flow	0.011	0.011	0.011	Mgpd	Daily Maximum
MD0063801	002	Flow	0.011	0.011	0.01152	Mgpd	Quarterly Average
MD0063801	003	Flow	36,000	48,435	134,136	gpd	Daily Maximum
MD0063801	003	Flow	24,000	45,980	113,969	gpd	Monthly Average
MD0063801	003	Flow	0.011	0.011	0.011	Mgpd	Daily Maximum

NPDES ID	Outfall	Parameter	Minimum	Average	Maximum	Unit	Statistical Base
MD0063801	003	Flow	0.011	0.011	0.011	Mgpd	Quarterly Average
MD0063801	004	Flow	13,856	46,044	171,714	gpd	Daily Maximum
MD0063801	004	Flow	11,845	45,529	159,563	gpd	Monthly Average
MD0063801	004	Flow	0.108	0.108	0.108	Mgpd	Daily Maximum
MD0063801	004	Flow	0.108	0.108	0.108	Mgpd	Quarterly Average
MD0063801	005	Flow	10,785	76,540	720,000	gpd	Daily Maximum
MD0063801	005	Flow	9,945	78,435	720,000	gpd	Monthly Average
MD0063801	005	Flow	0.0288	0.029	0.0288	Mgpd	Daily Maximum
MD0063801	005	Flow	0.0288	0.029	0.0288	Mgpd	Quarterly Average
MD0063801	007	Flow	21,600	26,967	37,701	gpd	Daily Maximum
MD0063801	007	Flow	21,600	26,520	37,701	gpd	Monthly Average
MD0063801	007	Flow	0.01000	0.01000	0.01000	Mgpd	Daily Maximum
MD0063801	007	Flow	0.01000	0.01000	0.01000	Mgpd	Quarterly Average
MD0063801	010	Flow	20	3,312	22,700	gpd	Daily Maximum
MD0063801	010	Flow	20	2,314	16,934	gpd	Monthly Average
MD0063801	010	Flow	0.00060	0.00128	0.00600	Mgpd	Daily Maximum
MD0063801	010	Flow	0.00060	0.00115	0.00600	Mgpd	Quarterly Average
MD0063801	012	Flow	3,878	19,766	136,328	gpd	Daily Maximum
MD0063801	012	Flow	3,778	17,773	136,328	gpd	Monthly Average
MD0063801	012	Flow	0.01152	0.012	0.01152	Mgpd	Daily Maximum
MD0063801	012	Flow	0.01152	0.012	0.01152	Mgpd	Quarterly Average
MD0063801	014	Flow	3,180	9,119	20,218	gpd	Daily Maximum
MD0063801	014	Flow	1,811	8,093	20,200	gpd	Monthly Average
MD0063801	014	Flow	0.00240	0.00240	0.00240	Mgpd	Daily Maximum
MD0063801	014	Flow	0.00240	0.00368	0.00720	Mgpd	Quarterly Average
MD0063801	016	Flow	14,100	25,742	53,578	gpd	Daily Maximum
MD0063801	016	Flow	14,100	26,150	53,578	gpd	Monthly Average
MD0063801	016	Flow	0.036	0.036	0.036	Mgpd	Daily Maximum
MD0063801	016	Flow	0.036	0.036	0.036	Mgpd	Quarterly Average
MD0063801	018	Flow	6.6	246.5	1,440	gpd	Daily Maximum
MD0063801	018	Flow	6.6	216.1	1,440	gpd	Monthly Average
MD0063801	019	Flow	5,474	16,792	28,977	gpd	Daily Maximum
MD0063801	019	Flow	4,163	15,868	28,977	gpd	Monthly Average
MD0063801	002	Nitrite + Nitrate	0.25	1.95	3.20	mg/L	Daily Maximum
MD0063801	002	Nitrite + Nitrate	0.25	1.64	2.90	mg/L	Monthly Average
MD0063801	003	Nitrite + Nitrate	0.10	1.36	1.90	mg/L	Daily Maximum
MD0063801	003	Nitrite + Nitrate	0.10	1.15	1.70	mg/L	Monthly Average

NPDES ID	Outfall	Parameter	Minimum	Average	Maximum	Unit	Statistical Base
MD0063801	004	Nitrite + Nitrate	0.11	1.16	1.70	mg/L	Daily Maximum
MD0063801	004	Nitrite + Nitrate	0.11	0.954	1.5	mg/L	Monthly Average
MD0063801	005	Nitrite + Nitrate	2.60	3.28	4.00	mg/L	Daily Maximum
MD0063801	005	Nitrite + Nitrate	2.40	2.82	3.16	mg/L	Monthly Average
MD0063801	007	Nitrite + Nitrate	3.50	4.50	5.70	mg/L	Daily Maximum
MD0063801	007	Nitrite + Nitrate	3.20	3.82	4.80	mg/L	Monthly Average
MD0063801	010	Nitrite + Nitrate	2.20	2.67	3.00	mg/L	Daily Maximum
MD0063801	010	Nitrite + Nitrate	1.22	2.14	3.00	mg/L	Monthly Average
MD0063801	012	Nitrite + Nitrate	1.30	1.88	2.70	mg/L	Daily Maximum
MD0063801	012	Nitrite + Nitrate	1.20	1.63	2.30	mg/L	Monthly Average
MD0063801	014	Nitrite + Nitrate	1.40	2.00	2.40	mg/L	Daily Maximum
MD0063801	014	Nitrite + Nitrate	1.30	1.50	1.90	mg/L	Monthly Average
MD0063801	016	Nitrite + Nitrate	1.70	2.43	4.20	mg/L	Daily Maximum
MD0063801	016	Nitrite + Nitrate	1.40	1.93	2.90	mg/L	Monthly Average
MD0063801	019	Nitrite + Nitrate	0.98	1.47	2.30	mg/L	Daily Maximum
MD0063801	019	Nitrite + Nitrate	0.70	1.04	1.50	mg/L	Monthly Average
MD0063801	002	TKN	1.40	1.92	2.50	mg/L	Daily Maximum
MD0063801	002	TKN	1.30	1.46	1.70	mg/L	Monthly Average
MD0063801	003	TKN	1.00	2.18	3.40	mg/L	Daily Maximum
MD0063801	003	TKN	1.00	1.54	2.20	mg/L	Monthly Average
MD0063801	004	TKN	1.70	3.08	5.00	mg/L	Daily Maximum
MD0063801	004	TKN	1.30	2.08	2.80	mg/L	Monthly Average
MD0063801	005	TKN	1.40	2.53	3.10	mg/L	Daily Maximum
MD0063801	005	TKN	1.10	1.78	2.40	mg/L	Monthly Average
MD0063801	007	TKN	1.10	1.33	1.40	mg/L	Daily Maximum
MD0063801	007	TKN	1.00	1.11	1.20	mg/L	Monthly Average
MD0063801	010	TKN	1.00	1.90	2.50	mg/L	Daily Maximum
MD0063801	010	TKN	1.00	1.77	2.50	mg/L	Monthly Average
MD0063801	012	TKN	2.80	3.70	5.00	mg/L	Daily Maximum
MD0063801	012	TKN	1.60	2.18	3.20	mg/L	Monthly Average
MD0063801	014	TKN	2.00	2.38	2.70	mg/L	Daily Maximum
MD0063801	014	TKN	1.40	1.66	1.90	mg/L	Monthly Average
MD0063801	016	TKN	1.70	4.20	7.80	mg/L	Daily Maximum
MD0063801	016	TKN	1.20	2.38	3.70	mg/L	Monthly Average
MD0063801	019	TKN	2.80	3.00	3.60	mg/L	Daily Maximum
MD0063801	019	TKN	1.73	2.06	2.70	mg/L	Monthly Average
MD0063801	002	Total Nitrogen	1.60	3.72	5.00	mg/L	Daily Maximum

NPDES ID	Outfall	Parameter	Minimum	Average	Maximum	Unit	Statistical Base
MD0063801	002	Total Nitrogen	1.60	2.89	3.90	mg/L	Monthly Average
MD0063801	002	Total Nitrogen	0.06	0.345	1.18	lb/d	Daily Maximum
MD0063801	002	Total Nitrogen	0.04	0.143	0.43	lb/d	Monthly Average
MD0063801	003	Total Nitrogen	1.00	3.28	5.00	mg/L	Daily Maximum
MD0063801	003	Total Nitrogen	1.00	2.46	3.70	mg/L	Monthly Average
MD0063801	003	Total Nitrogen	1.20	2.81	4.22	lb/d	Daily Maximum
MD0063801	003	Total Nitrogen	1.10	1.71	2.30	lb/d	Monthly Average
MD0063801	004	Total Nitrogen	2.70	3.98	6.00	mg/L	Daily Maximum
MD0063801	004	Total Nitrogen	2.00	2.86	4.20	mg/L	Monthly Average
MD0063801	004	Total Nitrogen	0.05	2.10	7.80	lb/d	Daily Maximum
MD0063801	004	Total Nitrogen	0.02	1.49	5.60	lb/d	Monthly Average
MD0063801	005	Total Nitrogen	4.10	5.38	6.40	mg/L	Daily Maximum
MD0063801	005	Total Nitrogen	3.10	4.30	5.50	mg/L	Monthly Average
MD0063801	005	Total Nitrogen	0.3	0.503	0.81	lb/d	Daily Maximum
MD0063801	005	Total Nitrogen	0.2	0.375	0.6	lb/d	Monthly Average
MD0063801	007	Total Nitrogen	4.40	5.28	6.90	mg/L	Daily Maximum
MD0063801	007	Total Nitrogen	4.10	4.56	5.50	mg/L	Monthly Average
MD0063801	007	Total Nitrogen	1.37	1.62	2.10	lb/d	Daily Maximum
MD0063801	007	Total Nitrogen	1.20	1.37	1.70	lb/d	Monthly Average
MD0063801	010	Total Nitrogen	2.20	4.30	5.60	mg/L	Daily Maximum
MD0063801	010	Total Nitrogen	2.20	3.63	5.60	mg/L	Monthly Average
MD0063801	010	Total Nitrogen	0.001	0.101	0.3	lb/d	Daily Maximum
MD0063801	010	Total Nitrogen	0.001	0.101	0.3	lb/d	Monthly Average
MD0063801	012	Total Nitrogen	4.30	5.53	7.70	mg/L	Daily Maximum
MD0063801	012	Total Nitrogen	2.36	3.57	5.50	mg/L	Monthly Average
MD0063801	012	Total Nitrogen	0.1	0.458	1.24	lb/d	Daily Maximum
MD0063801	012	Total Nitrogen	0.07	0.225	0.47	lb/d	Monthly Average
MD0063801	014	Total Nitrogen	3.50	3.95	4.30	mg/L	Daily Maximum
MD0063801	014	Total Nitrogen	2.50	3.03	3.40	mg/L	Monthly Average
MD0063801	014	Total Nitrogen	0.1	0.500	0.8	lb/d	Daily Maximum
MD0063801	014	Total Nitrogen	0.05	0.290	0.41	lb/d	Monthly Average
MD0063801	016	Total Nitrogen	3.40	5.75	9.40	mg/L	Daily Maximum
MD0063801	016	Total Nitrogen	2.50	3.67	5.10	mg/L	Monthly Average
MD0063801	016	Total Nitrogen	0.7	0.950	1.3	lb/d	Daily Maximum
MD0063801	016	Total Nitrogen	0.4	0.575	0.7	lb/d	Monthly Average
MD0063801	019	Total Nitrogen	3.70	4.20	5.10	mg/L	Daily Maximum
MD0063801	019	Total Nitrogen	2.26	3.07	3.80	mg/L	Monthly Average

NPDES ID	Outfall	Parameter	Minimum	Average	Maximum	Unit	Statistical Base
MD0063801	019	Total Nitrogen	0.1	0.238	0.44	lb/d	Daily Maximum
MD0063801	019	Total Nitrogen	0.07	0.178	0.35	lb/d	Monthly Average
MD0063801	002	Total Phosphorus	0.04	0.096	0.19	mg/L	Daily Maximum
MD0063801	002	Total Phosphorus	0.04	0.082	0.13	mg/L	Monthly Average
MD0063801	002	Total Phosphorus	0.0007	0.024	0.09	lb/d	Daily Maximum
MD0063801	002	Total Phosphorus	0.00060	0.00888	0.03200	lb/d	Monthly Average
MD0063801	003	Total Phosphorus	0.06	0.109	0.17	mg/L	Daily Maximum
MD0063801	003	Total Phosphorus	0.05	0.087	0.13	mg/L	Monthly Average
MD0063801	003	Total Phosphorus	0.028	0.067	0.1	lb/d	Daily Maximum
MD0063801	003	Total Phosphorus	0.024	0.046	0.07	lb/d	Monthly Average
MD0063801	004	Total Phosphorus	0.1	0.152	0.29	mg/L	Daily Maximum
MD0063801	004	Total Phosphorus	0.05	0.101	0.15	mg/L	Monthly Average
MD0063801	004	Total Phosphorus	0.007	0.074	0.2	lb/d	Daily Maximum
MD0063801	004	Total Phosphorus	0.004	0.054	0.17	lb/d	Monthly Average
MD0063801	005	Total Phosphorus	0.70	1.18	2.00	mg/L	Daily Maximum
MD0063801	005	Total Phosphorus	0.4	0.770	1	mg/L	Monthly Average
MD0063801	005	Total Phosphorus	0.06	0.135	0.3	lb/d	Daily Maximum
MD0063801	005	Total Phosphorus	0.03	0.078	0.15	lb/d	Monthly Average
MD0063801	007	Total Phosphorus	0.03	0.092	0.26	mg/L	Daily Maximum
MD0063801	007	Total Phosphorus	0.02	0.060	0.17	mg/L	Monthly Average
MD0063801	007	Total Phosphorus	0.01	0.028	0.08	lb/d	Daily Maximum
MD0063801	007	Total Phosphorus	0.006	0.018	0.05	lb/d	Monthly Average
MD0063801	010	Total Phosphorus	0.01	0.025	0.04	mg/L	Daily Maximum
MD0063801	010	Total	0.01	0.017	0.023	mg/L	Monthly Average

NPDES ID	Outfall	Parameter	Minimum	Average	Maximum	Unit	Statistical Base
		Phosphorus					
MD0063801	010	Total Phosphorus	0.000003	0.033	0.1	lb/d	Daily Maximum
MD0063801	010	Total Phosphorus	0.000003	0.033	0.1	lb/d	Monthly Average
MD0063801	012	Total Phosphorus	0.1	0.165	0.24	mg/L	Daily Maximum
MD0063801	012	Total Phosphorus	0.01	0.060	0.09	mg/L	Monthly Average
MD0063801	012	Total Phosphorus	0.003	0.071	0.27	lb/d	Daily Maximum
MD0063801	012	Total Phosphorus	0.001	0.024	0.09	lb/d	Monthly Average
MD0063801	014	Total Phosphorus	0.07	0.138	0.21	mg/L	Daily Maximum
MD0063801	014	Total Phosphorus	0.05	0.095	0.14	mg/L	Monthly Average
MD0063801	014	Total Phosphorus	0.002	0.028	0.08	lb/d	Daily Maximum
MD0063801	014	Total Phosphorus	0.00100	0.00950	0.02300	lb/d	Monthly Average
MD0063801	016	Total Phosphorus	0.87	0.968	1.1	mg/L	Daily Maximum
MD0063801	016	Total Phosphorus	0.5	0.680	0.9	mg/L	Monthly Average
MD0063801	016	Total Phosphorus	0.1	0.165	0.2	lb/d	Daily Maximum
MD0063801	016	Total Phosphorus	0.06	0.113	0.15	lb/d	Monthly Average
MD0063801	019	Total Phosphorus	0.058	0.215	0.4	mg/L	Daily Maximum
MD0063801	019	Total Phosphorus	0.04	0.102	0.2	mg/L	Monthly Average
MD0063801	019	Total Phosphorus	0.003	0.018	0.03	lb/d	Daily Maximum
MD0063801	019	Total Phosphorus	0.00200	0.00875	0.02000	lb/d	Monthly Average
MD0064521	001	Flow	4,320	161,548	720,000	gpd	Daily Maximum
MD0064521	001	Flow	4,320	77,719	391,200	gpd	Monthly Average
MD0065871	001	Flow	0	3,754,365	24,000,000	gpd	Daily Maximum
MD0065871	001	Flow	0	1,889,074	11,800,000	gpd	Monthly Average
MD0065871	001	Total Nitrogen	0.00	8.71	18.40	mg/L	Daily Maximum
MD0065871	001	Total Nitrogen	0.00	7.28	11.07	mg/L	Monthly Average
MD0065871	001	Total	0.00	8.39	15.00	mg/L	Daily Maximum

NPDES ID	Outfall	Parameter	Minimum	Average	Maximum	Unit	Statistical Base
		Phosphorus					
MD0065871	001	Total Phosphorus	0.00	6.74	13.00	mg/L	Monthly Average
MD0067482	002	Ammonia	1.00	1.24	2.10	mg/L	Daily Maximum
MD0067482	003	Ammonia	1.00	5.28	17.00	mg/L	Daily Maximum
MD0067482	002	BOD	2.00	15.93	140.00	mg/L	Daily Maximum
MD0067482	002	BOD	1.40	5.77	18.00	mg/L	Monthly Average
MD0067482	002	BOD	0.90	10.19	75.00	mg/L	Quarterly Average
MD0067482	003	BOD	1.00	4.15	7.00	mg/L	Daily Maximum
MD0067482	003	BOD	0.90	2.23	3.80	mg/L	Monthly Average
MD0067482	001	Flow	639,427	715,171	814,067	gpd	Daily Maximum
MD0067482	001	Flow	633,250	705,544	802,289	gpd	Quarterly Average
MD0067482	001	Flow	1,132	18,313	47,208	gpd	Daily Maximum
MD0067482	001	Flow	1,045	14,429	32,936	gpd	Monthly Average
MD0067482	001	Flow	57.22	64.46	74.64	MgpQ	Quarterly Total
MD0067482	002	Flow	118	24,367	81,897	gpd	Daily Maximum
MD0067482	002	Flow	118	12,765	45,614	gpd	Monthly Average
MD0067482	003	Flow	1,551	18,906	56,561	gpd	Daily Maximum
MD0067482	003	Flow	567	10,387	34,367	gpd	Monthly Average
MD0067482	004	Flow	111,370	122,485	142,845	gpd	Daily Maximum
MD0067482	004	Flow	106,757	119,636	138,486	gpd	Quarterly Average
MD0067482	004	Flow	0	3,073	16,549	gpd	Daily Maximum
MD0067482	004	Flow	0	2,114	9,134	gpd	Monthly Average
MD0067482	004	Flow	9.61	10.91	12.74	MgpQ	Quarterly Total
MD0067482	001	Nitrite + Nitrate	0.078	0.307	0.66	mg/L	Quarterly Average
MD0067482	004	Nitrite + Nitrate	0.093	0.136	0.31	mg/L	Quarterly Average
MD0067482	001	TKN	0.80	1.78	3.20	mg/L	Quarterly Average
MD0067482	004	TKN	0.6	0.900	1.6	mg/L	Quarterly Average
MD0067482	001	Total Nitrogen	1.00	2.06	3.39	mg/L	Quarterly Average
MD0067482	001	Total Nitrogen	490	1,117	2,078	lb/Q	Quarterly Average
MD0067482	001	Total Nitrogen	3,723	4,025	4,327	lb/yr	Annual Total
MD0067482	004	Total Nitrogen	0.60	0.99	1.73	mg/L	Quarterly Average
MD0067482	004	Total Nitrogen	50.13	90.92	169.00	lb/Q	Quarterly Average
MD0067482	004	Total Nitrogen	274.4	274.4	274.4	lb/yr	Annual Maximum
MD0067482	004	Total Nitrogen	274.4	281.7	289.0	lb/yr	Annual Total
MD0067482	001	Total Phosphorus	0.12	0.363	0.72	mg/L	Quarterly Average

NPDES ID	Outfall	Parameter	Minimum	Average	Maximum	Unit	Statistical Base
MD0067482	001	Total Phosphorus	67.7	200.5	448.5	lb/Q	Quarterly Average
MD0067482	001	Total Phosphorus	655.0	763.9	872.7	lb/yr	Annual Total
MD0067482	004	Total Phosphorus	0.05	0.211	0.58	mg/L	Quarterly Average
MD0067482	004	Total Phosphorus	2.66	19.01	56.40	lb/Q	Quarterly Average
MD0067482	004	Total Phosphorus	84.20	84.20	84.20	lb/yr	Annual Maximum
MD0067482	004	Total Phosphorus	38.00	61.10	84.20	lb/yr	Annual Total
MD0069795	001	Flow	150	4,493	36,000	gpd	Daily Maximum
MD0069795	001	Flow	150	3,240	12,840	gpd	Monthly Average
MD0069965	001	Flow	12	4,611	28,800	gpd	Daily Maximum
MD0069965	001	Flow	12	3,814	28,800	gpd	Monthly Average
MD0070688	001	Flow	9,700	71,069	107,589	gpd	Daily Maximum
MD0070688	001	Flow	291,000	2,140,429	3,227,667	gpd	Monthly Average
MDG492331	001	Flow	500.0	500.0	500.0	gpd	Daily Maximum
MDG492331	001	Flow	500.0	500.0	500.0	gpd	Quarterly Average
MDG493577	001	Flow	3,000	4,000	5,000	gpd	Daily Maximum
MDG493577	001	Flow	3,000	4,000	5,000	gpd	Monthly Average
MDG493602	001	Flow	1,200	1,320	1,440	gpd	Daily Maximum
MDG493602	001	Flow	1,200	1,320	1,440	gpd	Monthly Average
MDG499755	001	Flow	720	36,203	150,000	gpd	Daily Maximum
MDG499755	001	Flow	20,000	45,040	115,200	gpd	Monthly Average
MDG499755	001	Flow	8	15,153	48,960	gpd	Quarterly Average
MDG499755	002	Flow	9,000	21,150	43,200	gpd	Daily Maximum
MDG499755	002	Flow	14,400	14,400	14,400	gpd	Monthly Average
MDG499755	002	Flow	9,000	22,150	43,200	gpd	Quarterly Average
MDG499867	001	Flow	960	2,711	7,200	gpd	Daily Maximum
MDG499867	001	Flow	1,684	1,684	1,684	gpd	Monthly Average
MDG499867	001	Flow	960	3,053	7,200	gpd	Quarterly Average
MDG766025	001	Flow	900.0	975.0	1,050	gpd	Daily Maximum
MDG766025	002	Flow	600.0	637.5	675.0	gpd	Daily Maximum
MDG766432	001	Flow	500.0	525.0	600.0	gpd	Daily Maximum
MDG766432	001	Flow	440.0	470.0	550.0	gpd	Monthly Average
MDG766432	002	Flow	60.00	60.00	60.00	gpd	Daily Maximum
MDG766432	002	Flow	49.00	49.00	49.00	gpd	Monthly Average

NPDES ID	Outfall	Parameter	Minimum	Average	Maximum	Unit	Statistical Base
MDG766594	001	Flow	300.0	300.0	300.0	gpd	Daily Maximum
MDG766594	001	Flow	100.0	100.0	100.0	gpd	Monthly Average
MDG766594	002	Flow	70.00	70.00	70.00	gpd	Daily Maximum
MDG766596	001	Flow	160.0	290.0	420.0	gpd	Daily Maximum
MDG766596	001	Flow	160.0	160.0	160.0	gpd	Monthly Average
MDG766596	001	Flow	160.0	160.0	160.0	gpd	Quarterly Average
MDG766596	002	Flow	70.00	70.00	70.00	gpd	Daily Maximum
MDG766597	001	Flow	150.0	262.5	375.0	gpd	Daily Maximum
MDG766597	001	Flow	125.0	125.0	125.0	gpd	Monthly Average
MDG766597	001	Flow	150.0	150.0	150.0	gpd	Quarterly Average
MDG766597	002	Flow	70.00	70.00	70.00	gpd	Daily Maximum
MDG766599	001	Flow	480.0	990.0	1,500	gpd	Daily Maximum
MDG766599	001	Flow	495.0	495.0	495.0	gpd	Monthly Average
MDG766599	001	Flow	480.0	480.0	480.0	gpd	Quarterly Average
MDG766599	002	Flow	70.00	70.00	70.00	gpd	Daily Maximum
MDG766709	001	Flow	30.0	560.0	750.0	gpd	Daily Maximum
MDG766709	001	Flow	25.0	516.3	680.0	gpd	Monthly Average
MDG766709	002	Flow	25.0	437.5	850.0	gpd	Daily Maximum
MDG766709	002	Flow	670.0	670.0	670.0	gpd	Monthly Average
MDG766811	001	Flow	625.0	625.0	625.0	gpd	Daily Maximum
MDG766811	001	Flow	625.0	625.0	625.0	gpd	Monthly Average
MDG766811	002	Flow	100,000	100,000	100,000	gpd	Daily Maximum
MDG766884	001	Flow	820	24,419	400,000	gpd	Daily Maximum
MDG766884	001	Flow	875	24,502	400,000	gpd	Monthly Average
MDG766884	002	Flow	400,000	400,000	400,000	gpd	Daily Maximum
MDG767005	001	Flow	640	58,415	347,000	gpd	Daily Maximum
MDG767005	001	Flow	640.0	669.8	715.0	gpd	Monthly Average
MDG767005	002	Flow	60.0	123.3	250.0	gpd	Daily Maximum
MDG767005	002	Flow	45.00	47.50	50.00	gpd	Monthly Average
MDG767098	001	Flow	500.0	500.0	500.0	gpd	Daily Maximum
MDG767098	001	Flow	450.0	450.0	450.0	gpd	Quarterly Average
MDG767099	001	Flow	310.0	316.7	320.0	gpd	Daily Maximum
MDG767099	001	Flow	310.0	316.7	320.0	gpd	Quarterly Average
MDG911179	001	Flow	43,200	43,200	43,200	gpd	Daily Maximum
MDG911179	001	Flow	3,000	3,000	3,000	gpd	Quarterly Average
MDG912853	001	Flow	9,445	9,445	9,445	gpd	Daily Maximum
MDG912853	001	Flow	232.0	232.0	232.0	gpd	Quarterly Average

NPDES ID	Outfall	Parameter	Minimum	Average	Maximum	Unit	Statistical Base
MDG916997	001	Flow	30.00	30.00	30.00	gpd	Daily Maximum
MDG916997	001	Flow	30.00	30.00	30.00	gpd	Quarterly Average
MDG918514	001	Flow	0	13,124	54,862	gpd	Daily Maximum
MDG918514	001	Flow	0	10,271	32,484	gpd	Quarterly Average

Note: mg/L= milligrams per liter; lb/d = pounds per day; lb/yr = pounds per year; MPN/100mL= most probable number (MPN) per 100 milliliters; gpd = gallons per day; Mgpd = million gallons per day; Mgpm = million gallons per month; MgpQ = million gallons per quarter; lb/m = pounds per month; lb/Q = pounds per quarter; pg/L= picograms per liter; MPN/100mL= number per 100 milliliters; MgpY = million gallons per year.