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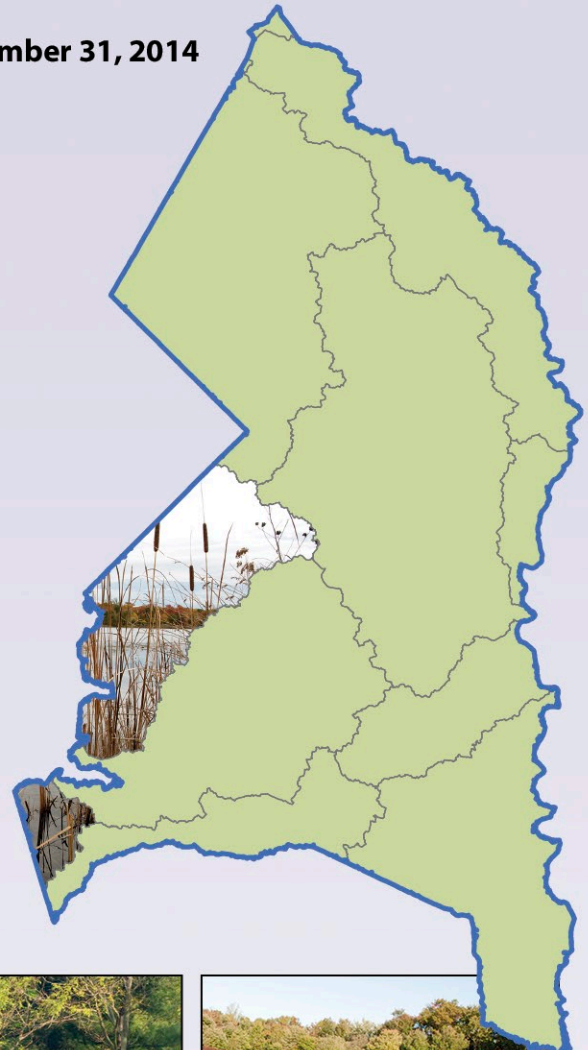
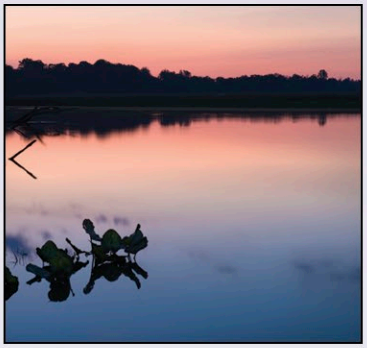
COUNTY EXECUTIVE

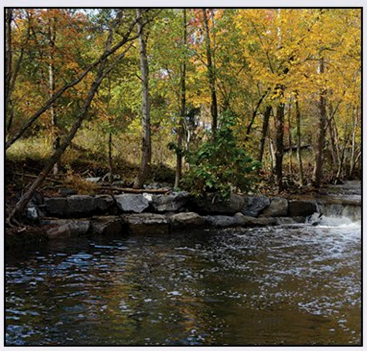
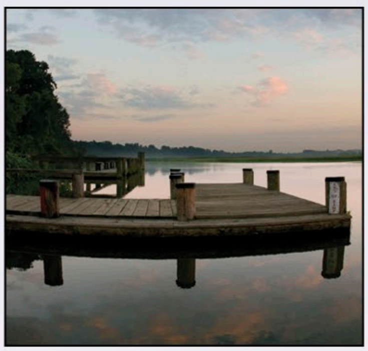
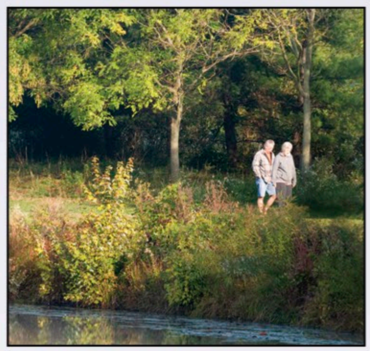
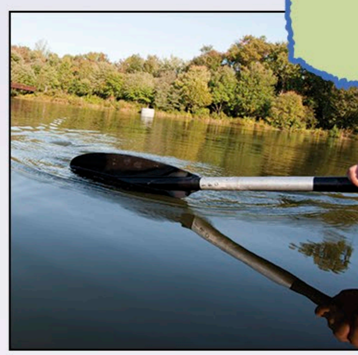
Prince George's County
DEPARTMENT OF THE
ENVIRONMENT

December 31, 2014



Watershed Existing Condition Report for the Potomac River Watershed



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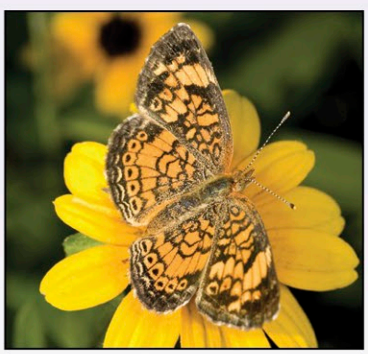


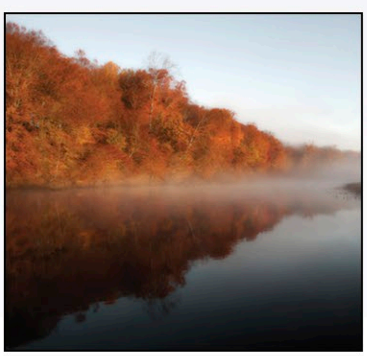
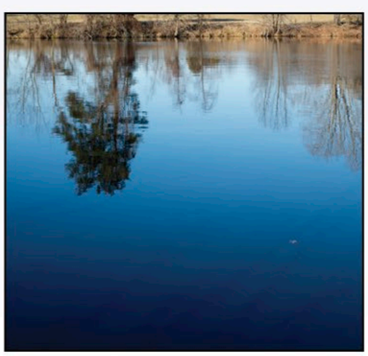

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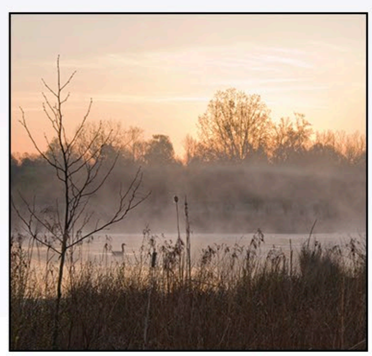

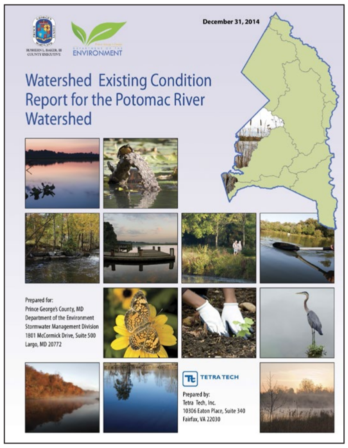

Watershed Existing Condition Report for the Potomac River Watershed

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

Prepared by:

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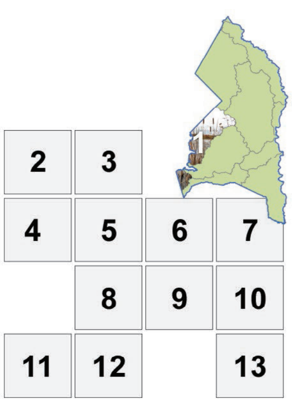

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Acronyms and Abbreviations

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
LA	load allocation
LID	low impact development
MDE	Maryland Department of the Environment
MDP	Maryland Department of Planning
mL	milliliter
mg/L	milligrams per liter
MOS	margin of safety
MPN	most probable number
MS4	Municipal Separate Storm Sewer System
NADP	National Atmospheric Deposition Program
ng/L	nanograms per liter
NPDES	National Pollutant Discharge Elimination System
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
µg/L	micrograms per liter
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey

WIP	Watershed Implementation Plan
WLA	wasteload allocation
WSSC	Washington Suburban Sanity Commission

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., Oxon Creek).

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 Potomac River drainage area 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 "Potomac River watershed," it refers to only the portion within the County, unless otherwise noted.

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.

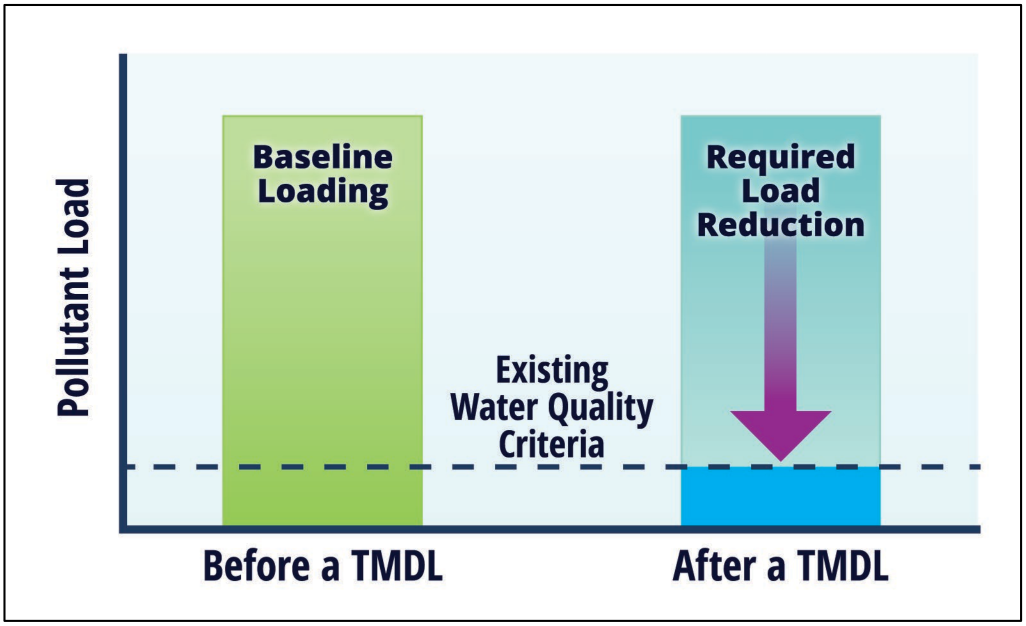


Figure 1-1. Schematic for typical pollution diet (TMDL).

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 Potomac River Upper Tidal (basin number 02140201), Middle Tidal (basin number 02140102) and Lower Tidal (basin number 02140101) basins on its Section 303(d) list of impaired streams because of the following pollutants (listing year in parentheses):

- Polychlorinated biphenyls (PCBs) in fish tissue in tidal waters (Upper, Middle, and Lower Tidal basins) (2006)
- Nutrients – (Upper, Middle, and Lower Tidal basins) (1996)
- Sediments – (Upper, Middle, and Lower Tidal basins) (1996)
- Toxics – (Upper, Middle, and Lower Tidal basins) (PCBs in fish tissue [2002])
- Bacteria – Lower Tidal (2004)
- Impacts to biological communities – (Lower, Middle, and Upper non-Tidal) (2004 and 2006)
- Metals – Upper Tidal (Copper [1996]) (Delisted on the basis of Water Quality Analysis [2006])

MDE's Lower, Middle, and Upper Tidal basins correspond to the following stretches of the Potomac:

- Potomac River Lower – Mouth of the Potomac to Smith Point, Charles County
- Potomac River Middle – Smith Point to Pomonkey Point, Charles County
- Potomac River Upper – Pomonkey Point to DC/MD Line at Wilson Bridge

Of the listings noted above, the Upper Tidal basin listings are relevant to the County, while the Middle Tidal and Lower Tidal basins are south of Prince George's County adjacent to Charles County. MDE has developed TMDLs to address impairments caused by the violation of water quality standards for fecal coliform bacteria and PCBs, and a water quality analysis was performed to address the metals listings. The percent reduction WLA for PCBs in the Potomac River tidal areas varies by water body from 5 percent to 99 percent. In addition, USEPA recently (2010) developed a TMDL for the Chesapeake Bay watershed for nitrogen, phosphorus, and sediment. The percent reduction WLAs for nitrogen, phosphorus, and sediment varies by water body ranging from 10 percent to 26 percent for total nitrogen; 32 percent to 41 percent for total phosphorus; and 29 percent to 31 percent for total suspended solids. The County has developed a Watershed Implementation Plan (WIP) in response to the Chesapeake Bay TMDL (PGC DER 2012).

Appendix A contains fact sheets on the MDE TMDLs that affect the watershed; they include information on the TMDLs' technical approaches and allocations, along with other summary 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.

The designated use (*Code of Maryland Regulations* [COMAR] 26.08.02.08 O) for the County's portion of the Potomac River watershed is: *Use Class II: Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting* for the mainstem of the Potomac an Rive and embayments. For tributaries in the County the designated use is *Use Class I: Water Contact Recreation, and Protection of Nontidal Warmwater Aquatic Life*.

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 applicable to pollutants addressed in the TMDLs for the Potomac River watershed are discussed below.

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 1-1 summarizes the Maryland DO criteria applicable to the nutrients TMDL.

Table 1-1. 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	02/01–05/31	≥ 5.0 mg/L (instantaneous) ≥ 6.0 mg/L (7-day average)
MD Use II: Open Water Fish and Shellfish Subcategory	06/01–01/31	≥ 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 water clarity. 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

The Potomac River Upper Tidal watershed listings for PCBs in fish tissue, nutrients, and sediment are relevant to the County. This section provides a summary of the problems identified in the Potomac River watershed and the data supporting the PCB impairment decisions. The nutrients and sediment listings are addressed by the Chesapeake Bay TMDL and are discussed in that report (USEPA 2010).

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.

1.2.3 TMDL Identified Sources

Sources of PCBs in the Potomac River Upper Tidal portions 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 Potomac River 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 in developing the restoration plan for the Potomac 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]

Numerous studies and reports have been completed that address the entire Potomac River watershed or subsections of the watershed. An example is the Maryland Tributary Strategy Middle Potomac River Basin Summary Report for 1985–2005, which includes the County's portion of the Potomac River drainage area. However, such reports do not address the County's drainage area specifically and are therefore not summarized as part of this effort.

[1] Accessed June 6, 2014.

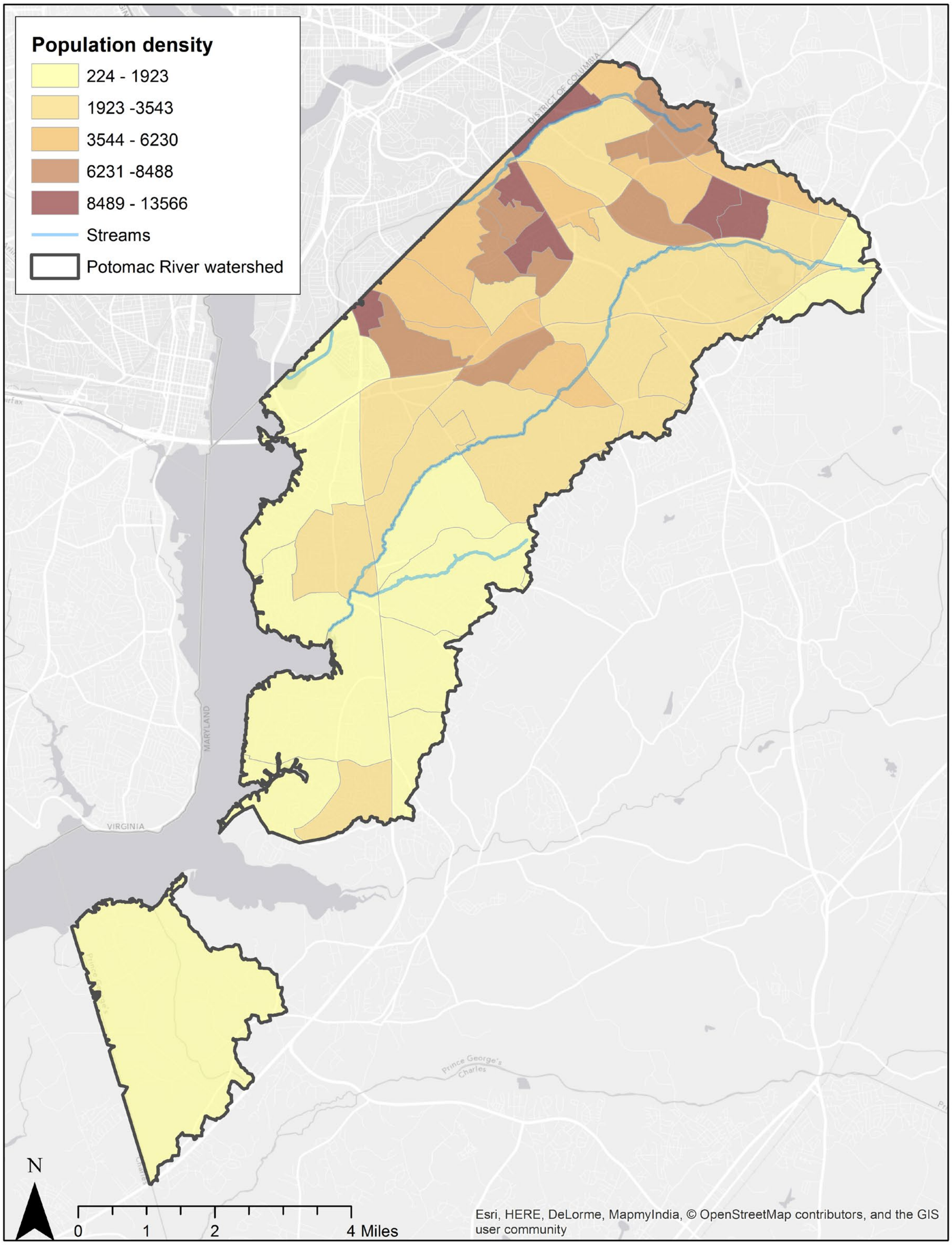
2 WATERSHED DESCRIPTION

The Potomac River basin stretches from West Virginia to the Chesapeake Bay, draining portions of West Virginia, Virginia, Maryland, Pennsylvania, and Washington D.C. that total an area of 14,670 square miles. The Upper Potomac River Basin is the largest and drains more than 2,000 square miles of land from all of Allegany and Washington counties and parts of Montgomery, Frederick, Carroll, and Garrett counties in Maryland. The Middle Potomac River basin drains about 610 square miles, including portions of Montgomery and Prince George's counties. It is in the Piedmont Plateau and Coastal Plain physiographic provinces. Finally, the Lower Potomac River basin drains 730 square miles and is entirely tidal, draining portions of Charles, St. Mary's, and Prince George's counties. 53.4 square miles of the Potomac River watershed are in the County in the Middle Potomac River basin, which is the most heavily populated of the Potomac River's three basins.

From its confluence with the Anacostia River, the Potomac River flows from north to south along the western border of southern Prince George's County (Figure 2-1). In the County, areas draining to the Potomac River extend from northeast to southwest, with Andrews Air Force Base at the northeastern-most corner and the Charles County line in the southwest. Intersecting the Potomac River drainage area in the County is Piscataway Creek. Communities within the County Potomac River drainage area include Suitland, Morningside, Temple Hills, and Forest Heights.

Figure 2-2 presents the population density (2010 U.S. Census population per square mile of the census tract). Northern areas of the drainage are more heavily populated than those toward the south.

Figure 2-1. Location of the Potomac River drainage area in Prince George's County.



Source: Population data is from 2010 US Census

Figure 2-2. Population density (people per square mile) in the Potomac River drainage area in Prince George's County.

2.1 Physical and Natural Features

2.1.1 Hydrology

The largest tributary to the County is Henson Creek, which runs the length of the drainage area from the northeast border near Andrews Air Force Base to the Potomac River at Henson Creek Park. Hunters Mill Branch joins Henson Creek before the Potomac River. The headwaters of Oxon Run flow through the northern portion of the drainage area before it enters the District of Columbia. In the District, Oxon Run is largely underground until it crosses back into the County, and then it flows aboveground again until it enters the Potomac River.

2.1.2 Climate/Precipitation

The Potomac River drainage area within the County 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 and the Potomac River drainage areas in the County lie 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 300 feet. The highest elevations in the watershed are in the northern portion, with the lowest portions along the Potomac River (Figure 2-3).

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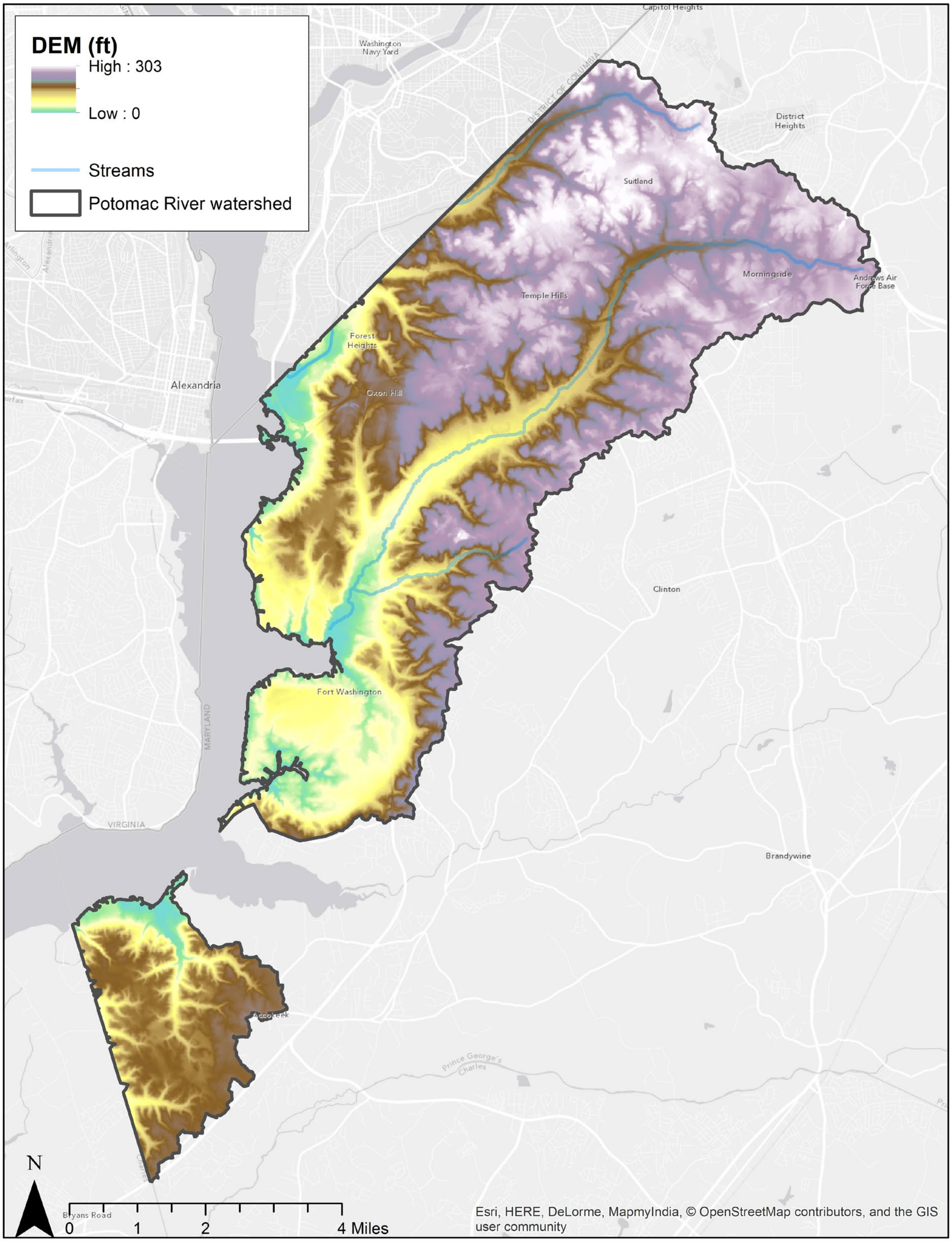


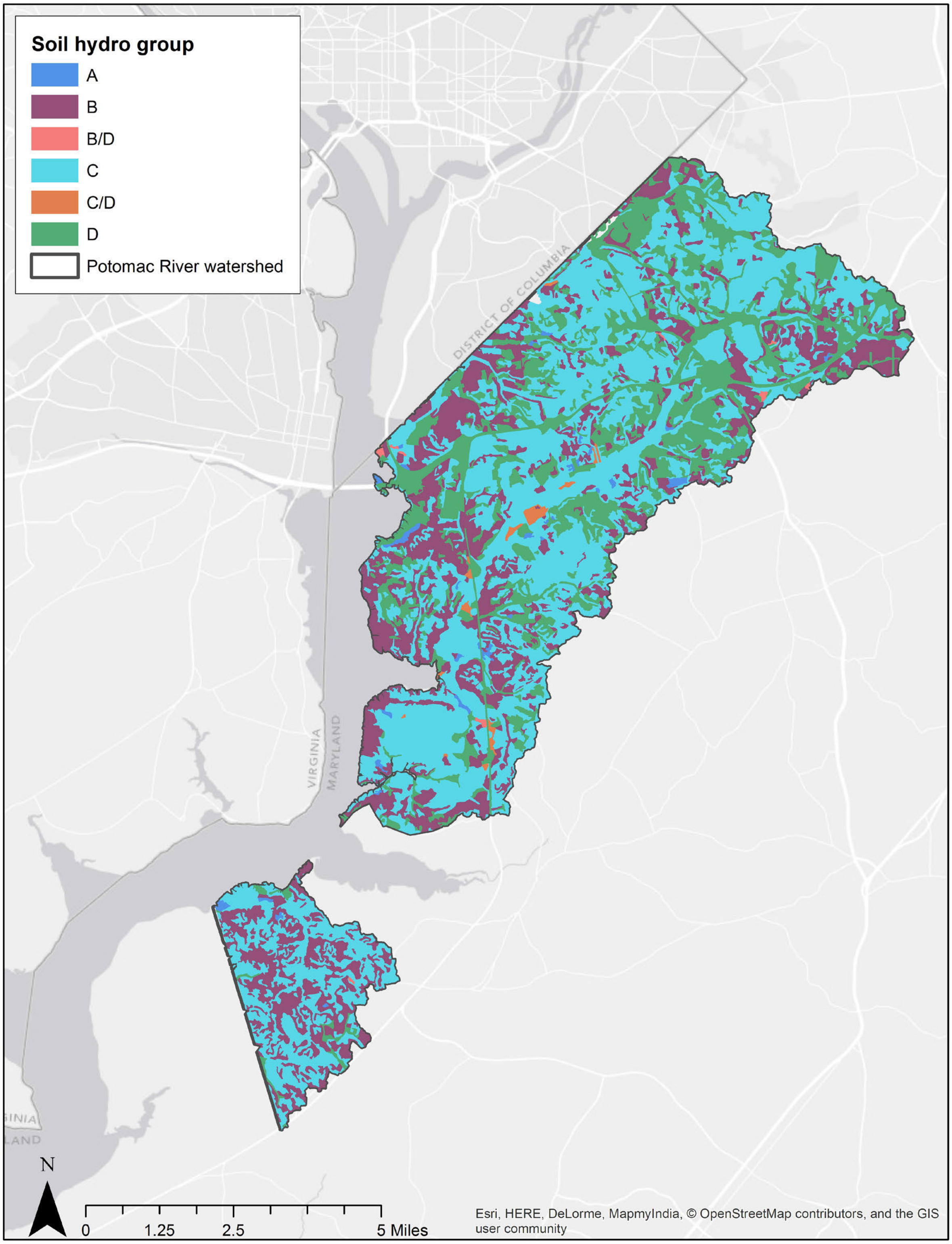
Source: DEM is from Prince George's County

Figure 2-3. Elevation in the Potomac River drainage area in Prince George's County.

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



Source: 2002 Soils are from USDA NRCS

Figure 2-4. Hydrologic soil groups in the Potomac River drainage area in Prince George's County.

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 Maryland Department of Planning (MDP) 2010 land use update (MDP 2010). 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.

The 2010 MDP land use data (Table 2-2) indicate that the Potomac River drainage area in the County is primarily (62 percent) urban followed by forest (31 percent). Agriculture is limited in this drainage area (3 percent). Water/wetlands and other land uses (e.g., bare ground or beaches) make up the remaining 3 percent. The urban area in the watershed is largely residential land (72 percent), almost half of which is medium-density residential (46.4 percent). There are also significant areas of forested land (31 percent), institutional land (such as schools, government buildings, and churches) (5 percent), and commercial/industrial land (5 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 other types are preferred in industrial areas.

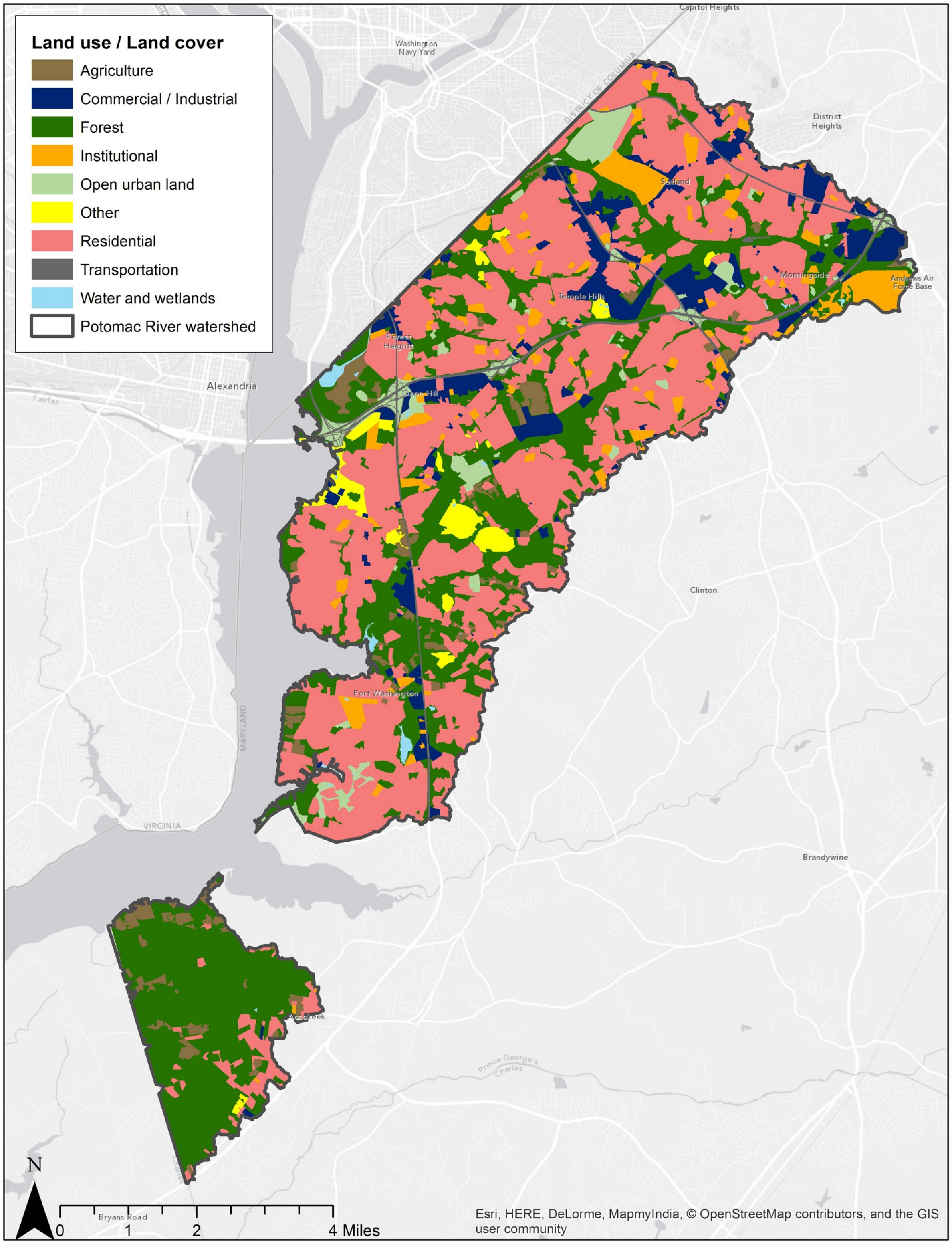
Table 2-2. Land use distribution in the County's Potomac River drainage area

Land Use	Land Use	Percent of Total	Percent of Land Use Grouping
Agriculture	**1,145.4**	**3.35%**	**100.0%**
Agricultural building	7.7	0.02%	0.7%
Cropland	493.7	1.44%	43.1%
Feeding operations		0.00%	0.0%
Large lot subdivision (agriculture)	75.6	0.22%	6.6%
Orchards/vineyards/horticulture	11.6	0.03%	1.0%
Pasture	556.7	1.63%	48.6%
Row and garden crops		0.00%	0.0%
Forest	**10,642.2**	**31.11%**	**100.0%**
Brush	86.1	0.25%	0.8%
Deciduous forest	8,022.3	23.45%	75.4%
Evergreen forest	87.9	0.26%	0.8%
Large lot subdivision (forest)	1,594.3	4.66%	15.0%
Mixed forest	851.4	2.49%	8.0%

Land Use	Land Use	Percent of Total	Percent of Land Use Grouping
Other	**728.3**	**2.13%**	**100.0%**
Bare ground	678.3	1.98%	93.1%
Beaches	50.0	0.15%	6.9%
Extractive	0.0	0.00%	0.0%
Urban	**21,351.2**	**62.42%**	**100.0%**
Commercial	1,890.3	5.53%	8.9%
High-density residential	2,785.9	8.14%	13.0%
Industrial	535.0	1.56%	2.5%
Institutional	1,743.6	5.10%	8.2%
Low-density residential	2,835.8	8.29%	13.3%
Medium-density residential	9,905.0	28.96%	46.4%
Open urban land	1,024.7	3.00%	4.8%
Transportation	630.9	1.84%	3.0%
Water and wetlands	**337.4**	**0.99%**	**100.0%**
Water	289.4	0.85%	85.8%
Wetlands	48.0	0.14%	14.2%

Source: MDP 2010.

Figure 2-5 shows the 2010 MDP land use for the area. The large area of institutional land in the northeast corner of the drainage area is Andrews Air Force Base. The large forested area in the southernmost portion of the drainage area is associated with Piscataway Park, which was created to preserve the historic views from Mt. Vernon across the river to Fort Washington.



Source: MDP 2010

Figure 2-5. Land use in the Potomac River drainage area in Prince George's County.

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.

Table 2-3 presents impervious area information for the County's portion of the watershed. The majority of the impervious area in the watershed consists of roads (29 percent of impervious area), buildings (27 percent of impervious area), and parking lots (21 percent of the impervious area).Currently, there are no estimates of connected impervious area in the 2009 County geographic information systems (GIS) data. The amount of connected impervious area will be estimated at a later phase of the restoration process.

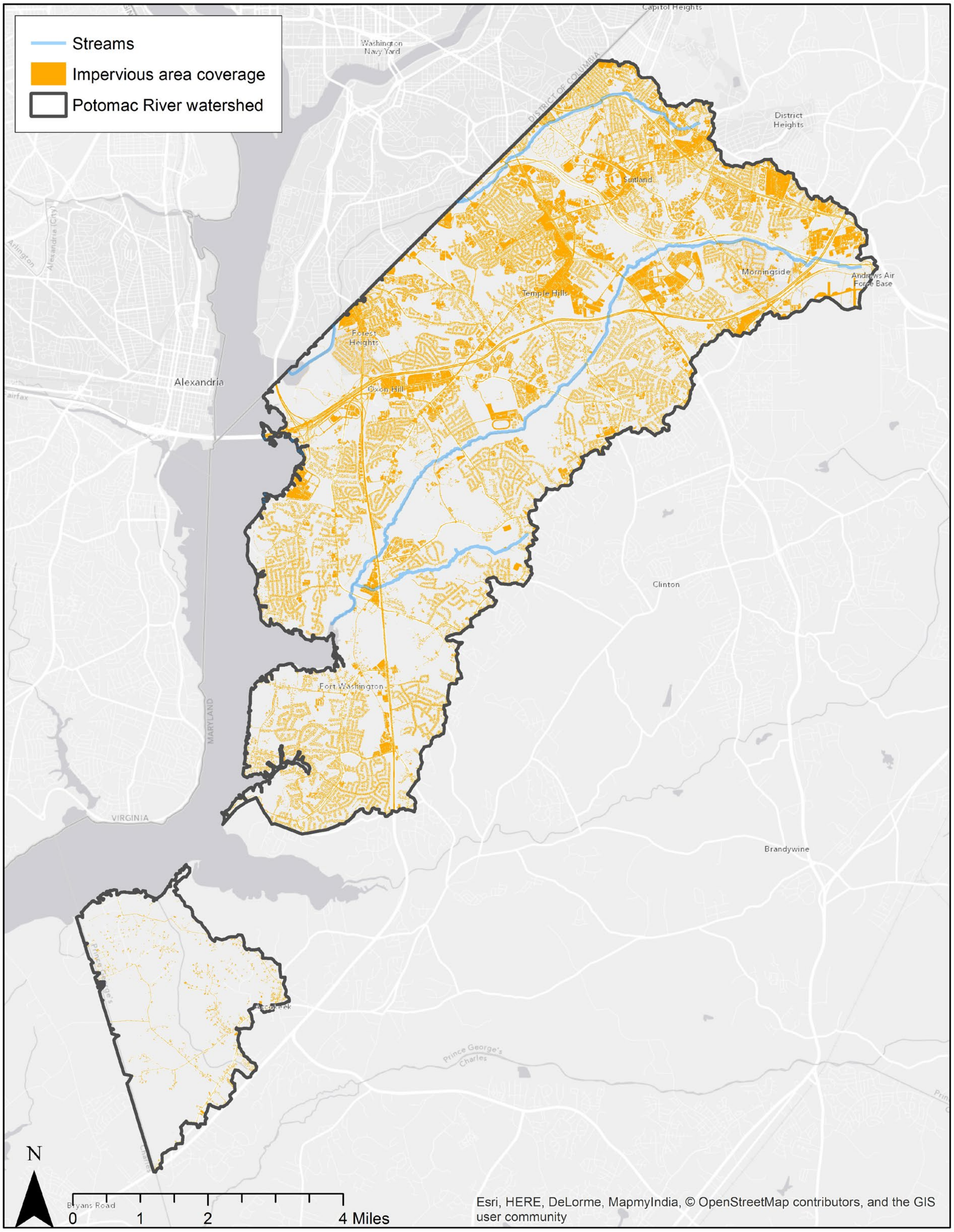
Table 2-3. Potomac River drainage impervious area in Prince George's County

Impervious Type	Area (acres)	Percent of Impervious Area	Percent of Total Watershed Area
Aviation	35.5	0.45%	0.10%
Bridges	29.1	0.37%	0.08%
Buildings	2,185.3	27.85%	6.39%
Driveways	724.8	9.24%	2.12%
Gravel surfaces	64.4	0.82%	0.19%
Other	38.4	0.49%	0.11%
Other concrete surfaces	104.9	1.34%	0.31%

Impervious Type	Area (acres)	Percent of Impervious Area	Percent of Total Watershed Area
Parking lots	1,709.3	21.79%	5.00%
Patios	128.6	1.64%	0.38%
Pools	21.7	0.28%	0.06%
Railroads	0.0	0.00%	0.00%
Roads and highways	2,291.9	29.21%	6.70%
Track and athletic	35.6	0.45%	0.10%
Walkways	475.9	6.07%	1.39%
Total	7,845.4	100.00%	22.94%

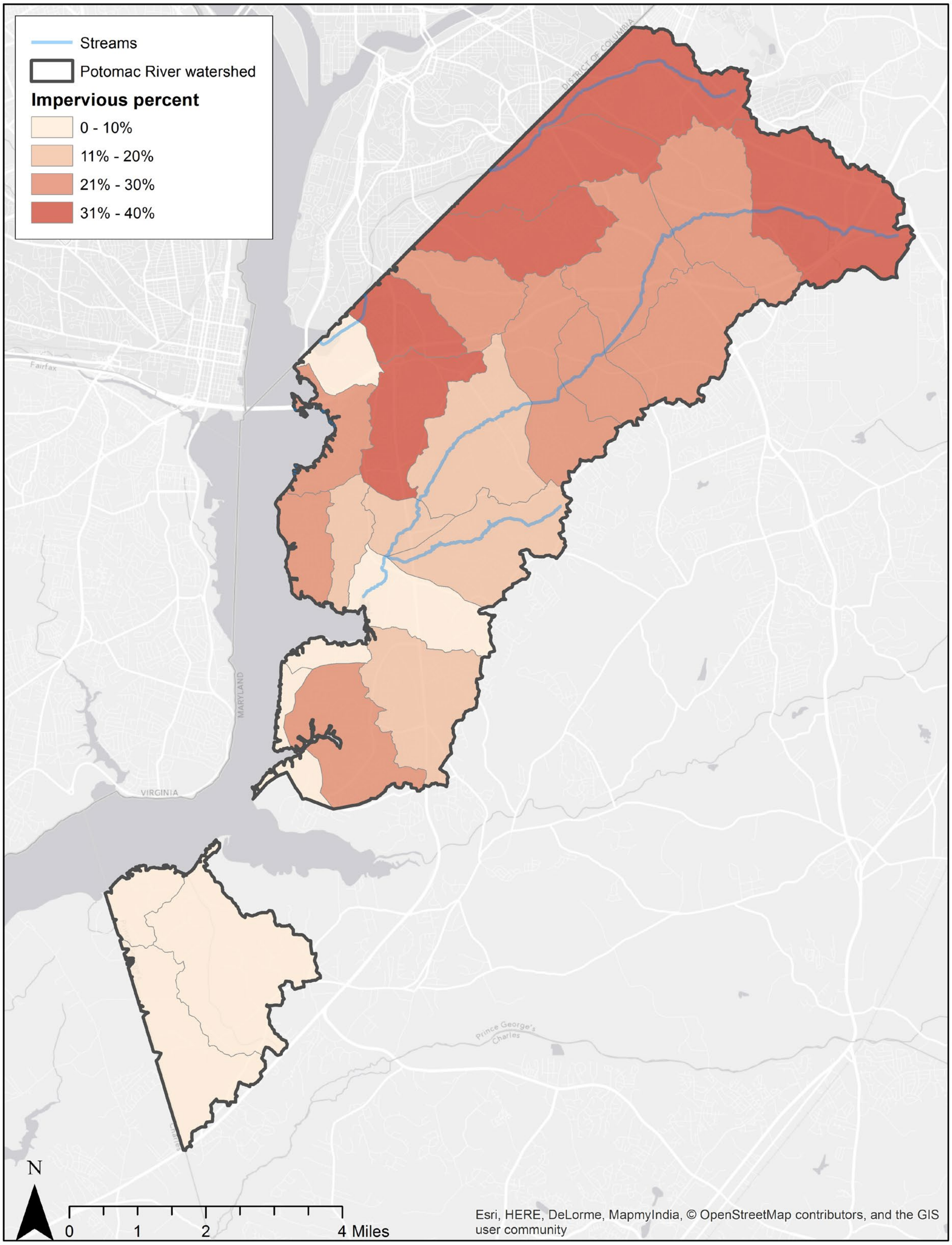
Source: M-NCPPC 2014.

Figure 2-6presents the 2009 County impervious area GIS information for the watershed, while Figure 2-7 shows the corresponding percentage impervious area calculated for each subwatershed being used in the restoration planning process. As the figures illustrate, impervious areas are most concentrated in the northern and central portions of the drainage area. 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 Potomac River drainage area in Prince George's County.



Source: 2009 impervious area from M-NCPPC 2014

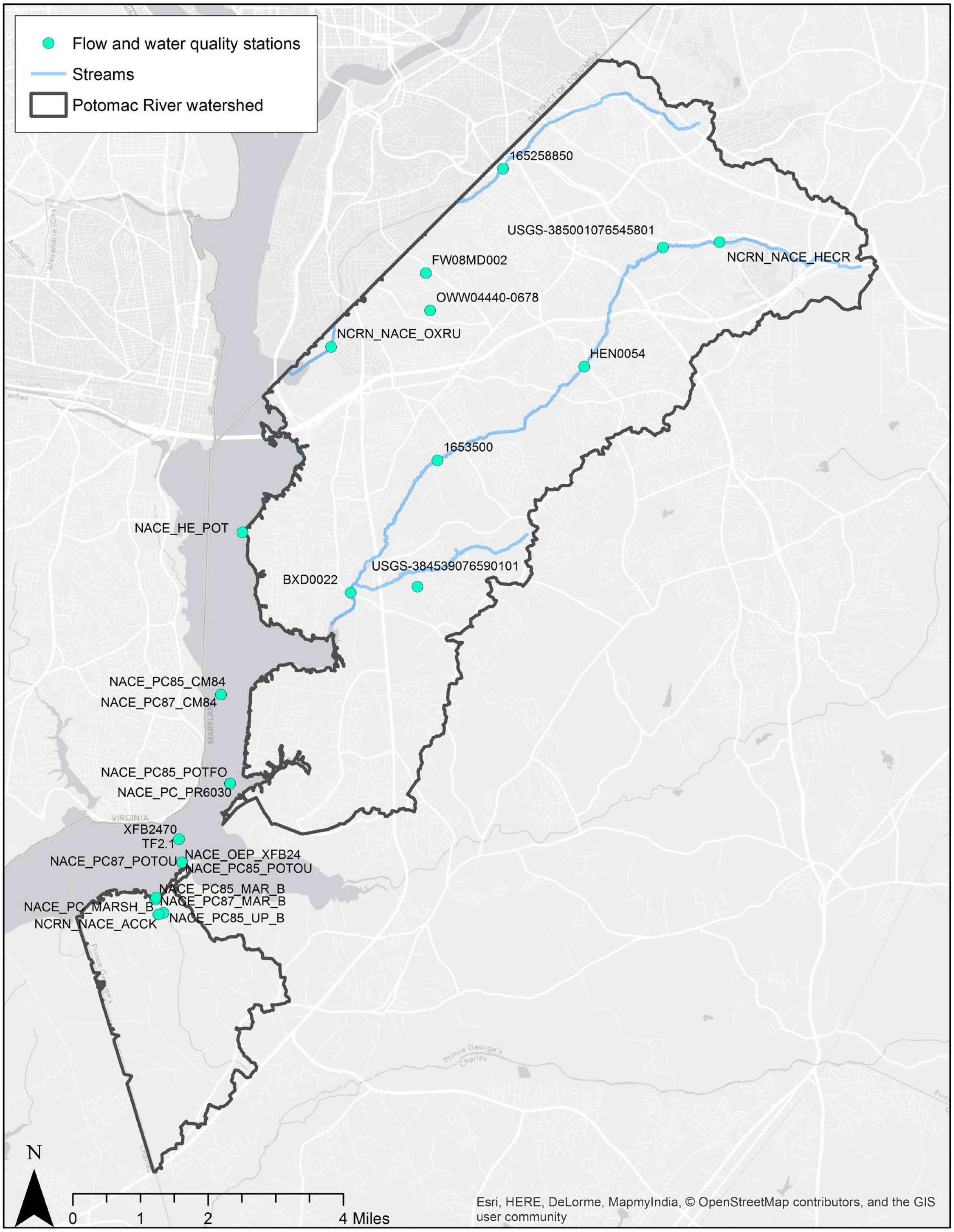
Figure 2-7. Percent impervious areas in the Potomac River watershed of Prince George's County.

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, before development, the water infiltrated into the soils. Figure 3-1 shows the locations of flow and water quality monitoring stations in the Potomac River drainage area.

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 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 Potomac River drainage area in Prince George's County.

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 a data summary for the one station within the Potomac River drainage area with fecal bacteria data. Although the one data point is above the water quality criteria threshold for enterococci, a single data point is not sufficient for water quality or trend analysis.

Table 3-1. Summary of available enterococci data in the Potomac River drainage area

Station ID	Station Name/Description	Date		Number of records	Value (Counts/100mL)		
		Minimum	Maximum		Minimum	Mean	Maximum
FW08MD002	Tributary to Barnaby Run	07/21/08	07/21/08	1	3,346	3,346	3,346

Note: mL = milliliter.

3.1.2 Nitrogen

Nitrogen at levels higher than 10 milligrams per liter (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 3-2 presents the data summary for stations within the watershed where total nitrogen data are available. The most recent date for which any stations have data is 2000 (three stations). Station TF2.1 in the mainstem Potomac River has 704 records, however, representing a long-term record. Mean total nitrogen values range from 0.4 mg/L at USGS384539076590101 to 2.8 mg at TF2.1.

Although there are no records after April 2000, average values recorded at station TF2.1 appear to show a downward trend (Figure 3-2). Data for the other two stations with multiple records (DBX0022 and HEN0054) are inconclusive for trend analysis; they are on tributaries and not on the mainstem and do show lower average total nitrogen values.

Table 3-2. Summary of available total nitrogen data in the Potomac River drainage area

Station ID	Station Name/Description	Date		Number of records	Value (mg/L)		
		Minimum	Maximum		Minimum	Mean	Maximum
BXD0022	Broad Creek	01/06/09	12/01/09	12	0.264	0.811	1.26
FW08MD002	Tributary to Barnaby Run	07/21/08	07/21/08	1	0.847	0.847	0.847
HEN0054	Henson Creek	01/06/09	11/02/09	11	0.731	1.09	1.95
OWW04440-0678	Barnaby Run	10/11/04	10/11/04	1	1.05	1.05	1.05
TF2.1	TF2.1	01/06/86	04/24/00	704	0.977	2.80	5.30
USGS165258850	Oxon Run near Washington, DC	09/20/94	09/20/94	1	0.700	0.700	0.700
USGS384318077020300	Potomac River at Hatton Point	07/23/80	09/15/80	18	1.80	2.43	4.00
USGS384539076590101	Hunters Mill Branch Tributary near Friendly, MD	04/05/00	04/05/00	1	0.400	0.400	0.400
USGS384605077015800	Potomac River at Rosier Bluff	07/23/80	08/09/83	22	1.50	2.40	3.50
USGS385001076545801	Unnamed Trib To Henson Creek at Suitland, MD	05/11/00	05/11/00	1	1.60	1.60	1.60

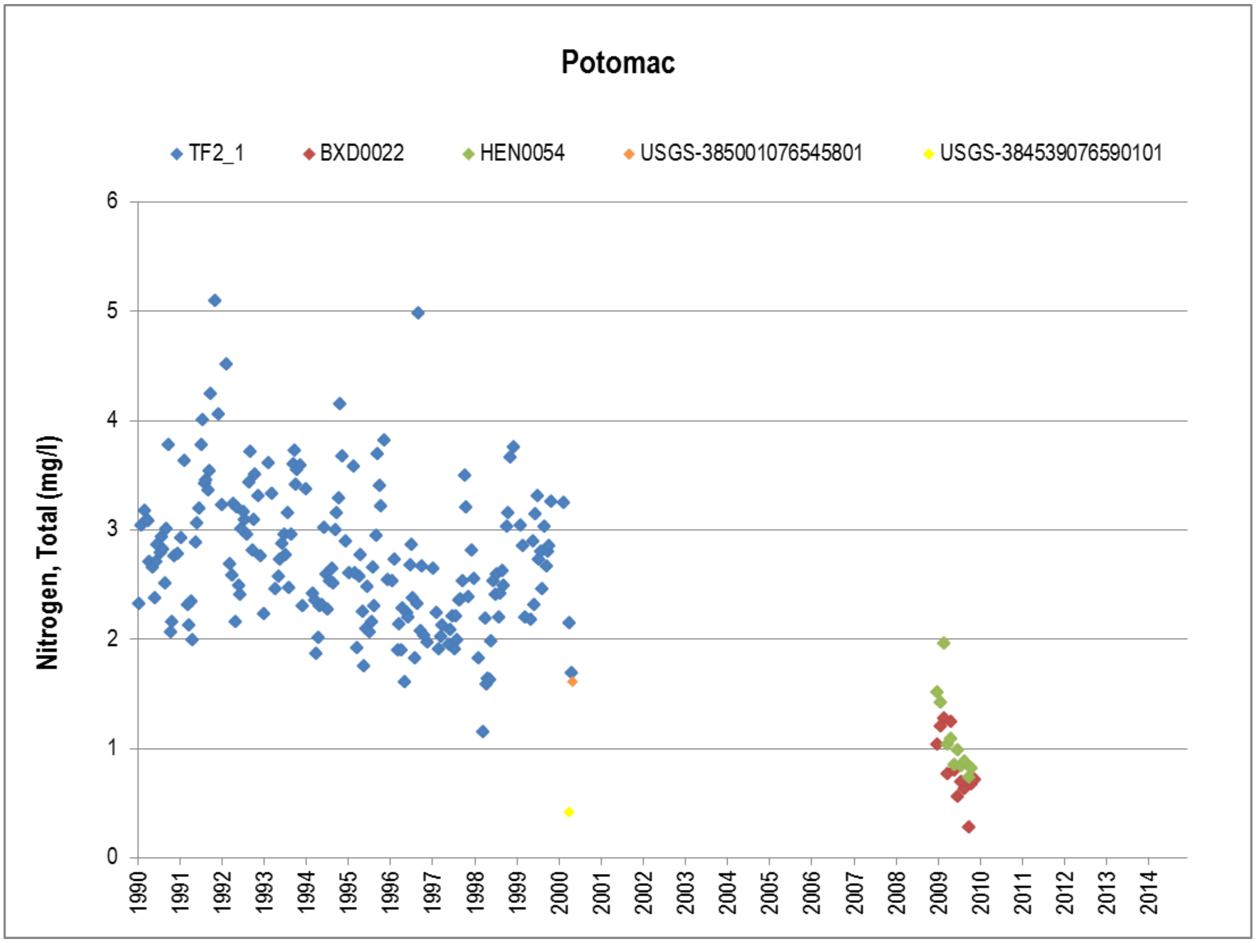


Figure 3-2. Plot of total nitrogen over time in the Potomac River drainage area.

3.1.3 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 3-3 presents the summary of total phosphorus data collected at locations in the Potomac River drainage area. As with nitrogen, there is a lack of recent total phosphorus data for streams in the Potomac River drainage area. Two tributary stations (BXD0022 and HEN0054) have approximately monthly data collected during 2009. Station TF2.1 has the longest period of record (736 data points) collected from 1986 to 2000. Average total phosphorus values in the drainage range from 0.0185 mg/L at FW08MD002 to 0.127 mg/L at USGS384605077015800. Figure 3-3 shows no discernible decrease in phosphorus concentrations over time for the stations with the most data.

Table 3-3. Summary of available total phosphorus data in the Potomac River drainage area

Station ID	Station Name/Description	Date		Number of records	Value (mg/L)		
		Minimum	Maximum		Minimum	Mean	Maximum
BXD0022	Broad Creek	01/06/09	12/01/09	12	0.0103	0.0353	0.136
FW08MD002	Tributary to Barnaby Run	07/21/08	07/21/08	1	0.0185	0.0185	0.0185
HEN0054	Henson Creek	01/06/09	11/02/09	11	0.0464	0.0647	0.0837
OWW04440-0678	Barnaby Run	10/11/04	10/11/04	1	0.0190	0.0190	0.0190
TF2.1	TF2.1	01/06/86	04/24/00	736	0.0100	0.105	2.10
USGS165258850	Oxon Run near Washington, DC	09/20/94	09/20/94	1	0.0300	0.0300	0.0300
USGS384318077020300	Potomac River at Hatton Point	07/23/80	09/15/80	18	0.0630	0.110	0.148
USGS384539076590101	Hunters Mill Branch Tributary near Friendly, MD	04/05/00	04/05/00	1	0.0290	0.0290	0.0290
USGS384605077015800	Potomac River at Rosier Bluff	07/23/80	08/09/83	22	0.0680	0.127	0.210
USGS385001076545801	Unnamed Trib To Henson Creek at Suitland, MD	05/11/00	05/11/00	1	0.0390	0.0390	0.0390

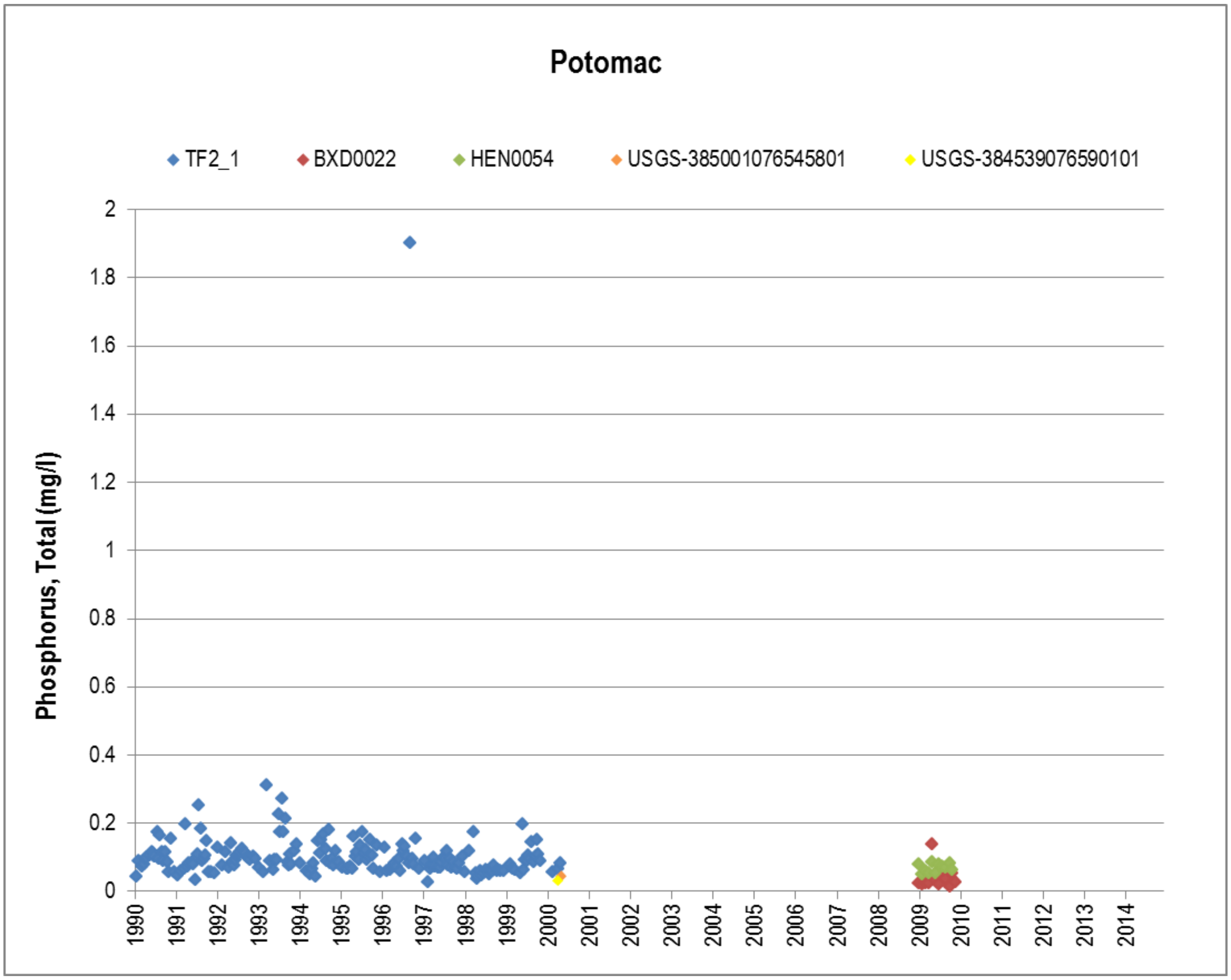


Figure 3-3. Plot of total phosphorus over time in the Potomac River drainage area.

3.1.4 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 3-4 presents the summary of TSS data collected at stations in the Potomac River drainage area. TSS data are limited. The most recent and longest record is associated with station TF2.1. Other stations with more than 20 observations do not have recent data. As with nutrient sampling, stations BXD0022 and HEN0054 were sampled monthly for a year in 2009. Average TSS values for these three stations range from 7.17 mg/L at HEN0054 to 35.22 mg/L at TF2.1. Maximums range from 26.50 mg/L at HEN0054 to 1,620 mg/L at TF2.1. Figure 3-4 shows TSS data plotted over time for the five stations with the most data in the Potomac River drainage area. Note that only TF2.1 is on the mainstem Potomac River.

Table 3-4. Summary of available TSS data in the Potomac River drainage area

Station ID	Station Name/Description	Date		Number of records	Value (mg/L)		
		Minimum	Maximum		Minimum	Mean	Maximum
BXD0022	Broad Creek	01/06/09	12/01/09	12	2.40	11.73	70.70
FW08MD002	Tributary to Barnaby Run	07/21/08	07/21/08	1	1.80	1.80	1.80
HEN0054	Henson Creek	01/06/09	12/01/09	12	2.20	7.17	26.50
NACE_OEP_XFB24	Potomac River 1/4 Mile West of Mockley Point	01/06/86	12/08/86	50	5.00	28.57	110
NACE_PC_CM84	Potomac River at Channel Marker 84	05/06/84	09/17/84	3	7.00	13.00	25.00
NACE_PC_MAR_B	Marsh 1/2 Mile East of Bryan Point	10/02/79	09/17/84	55	2.00	16.53	90.00
NACE_PC_MARSH_B	Marsh 1/2 Mile East of Bryan Point	10/26/76	08/16/77	42	1.00	13.17	41.00
NACE_PC_PC6020	Piscataway Creek at Potomac River Confluence	11/03/76	08/16/77	8	1.00	16.63	23.00
NACE_PC_POTOU	Potomac River 1/4 Mile West of Mockley Point	04/27/83	06/19/84	5	8.00	29.60	61.00
NACE_PC_PR6030	Potomac River 1/4 Mile Southwest of Hatton Point	11/03/76	08/16/77	24	13.00	35.04	166
NACE_PC85_POTFO	Potomac River 1/4 Mile Southwest of Hatton Point	10/02/79	09/17/84	7	8.00	30.43	91.00
NACE_PC85_UP_B	Upland Creek Where It Drains Into Marsh_B	10/02/79	09/17/84	7	4.00	19.43	71.00
OWW04440-0678	Barnaby Run	10/11/04	10/11/04	1	0.400	0.400	0.400
TF2.1	TF2.1	01/06/86	12/12/12	1,218	2.00	35.22	1,620

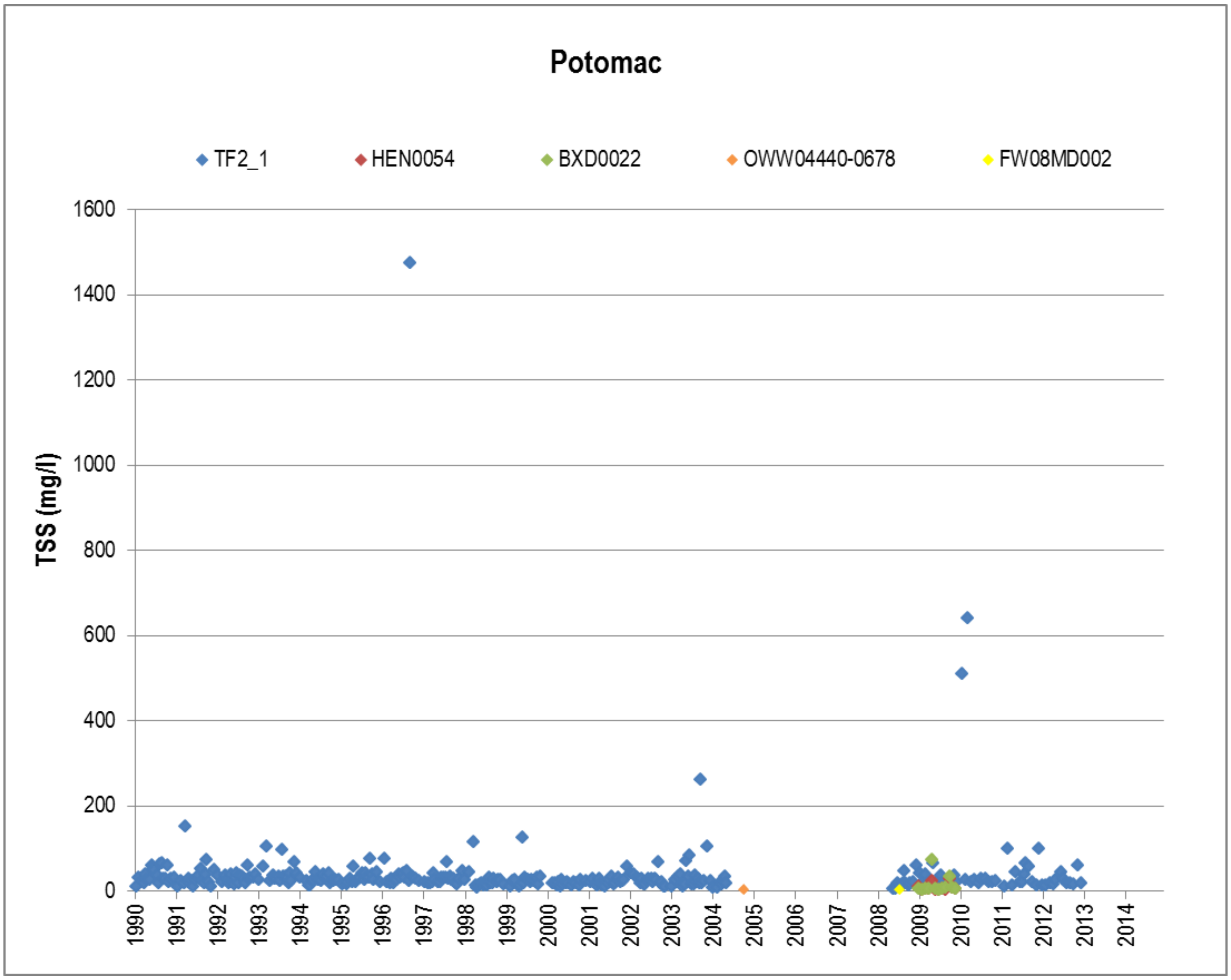


Figure 3-4. Plot of TSS over time in the Potomac River drainage area.

3.1.5 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 3-5 summarizes the PCB data for stations in the Potomac River. The data reflect the results of one sampling event at station NACE_HE_POT in August 2008 in which seven PCB congeners were analyzed.

Table 3-5. Summary of available PCB data in the Potomac River drainage area

Station ID	Station Name/ Description	Parameter	Date		Number of records	Value (ng/L)		
			Minimum	Maximum		Minimum	Mean	Maximum
NACE_HE_POT	Potomac River West of Rosier Bluff	Aroclor 1016	08/05/88	08/05/88	1	0.100	0.100	0.100
		Aroclor 1221	08/05/88	08/05/88	1	0.100	0.100	0.100
		Aroclor 1232	08/05/88	08/05/88	1	0.100	0.100	0.100
		Aroclor 1242	08/05/88	08/05/88	1	0.100	0.100	0.100
		Aroclor 1248	08/05/88	08/05/88	1	0.100	0.100	0.100
		Aroclor 1254	08/05/88	08/05/88	1	0.200	0.200	0.200
		Aroclor 1260	08/05/88	08/05/88	1	0.200	0.200	0.200

Note: ng/L = nanograms per liter.

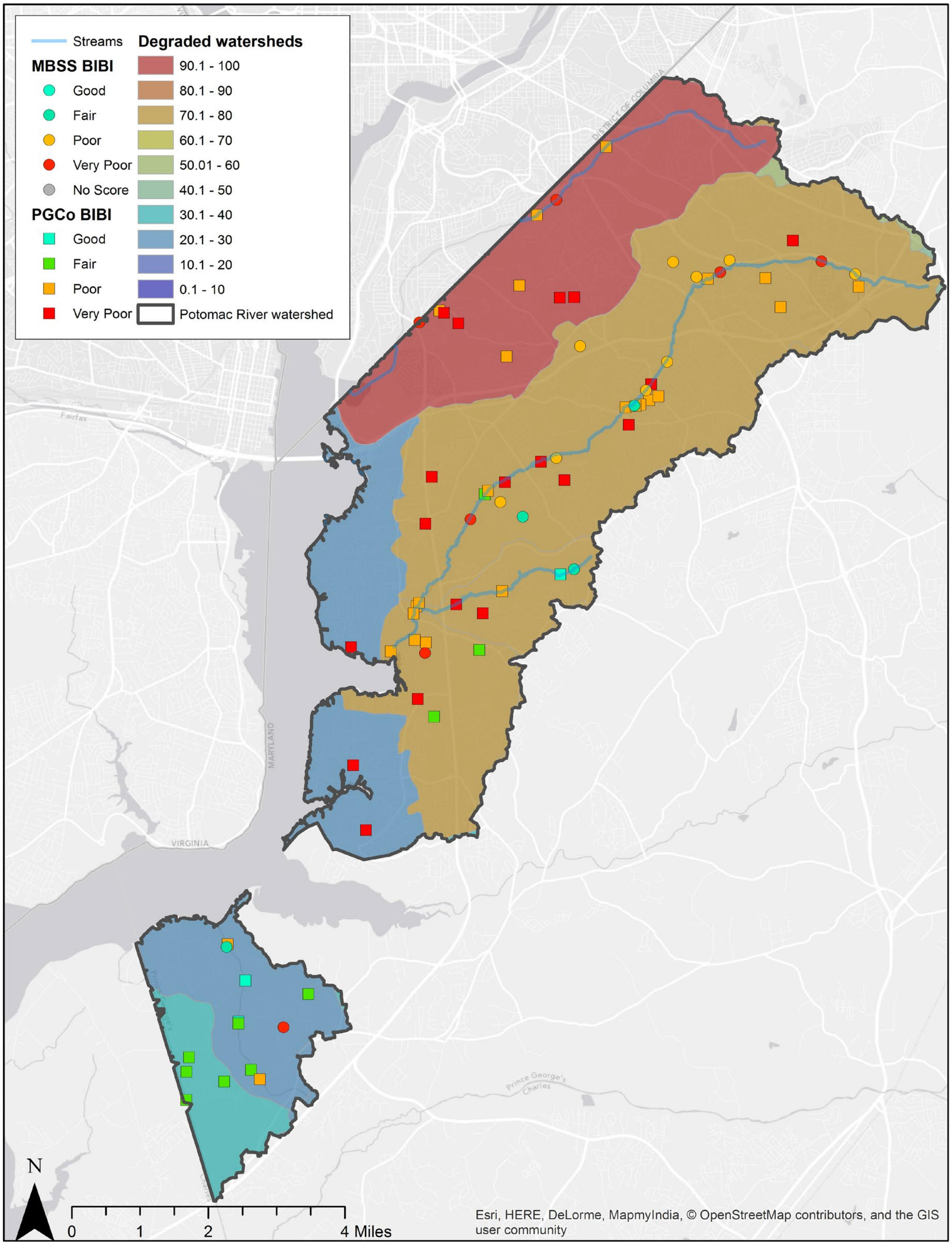
3.2 Biological Station Data

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 3-5 provides results of the second round of benthic invertebrate and B-IBI sampling in the Potomac River drainage area and illustrates that approximately 54 percent of sites are rated as biologically degraded, having B-IBI ratings of Poor to Very Poor. Six sites in the Potomac River drainage area were rated Good; 10 sites were rated Fair. These are primarily located in the southern portion of the Potomac River drainage. Degraded stream miles account for 48 percent of total stream miles in the Potomac River basin. Although not statistically significant, the percent of degraded stream miles in the Potomac River increased 1 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 Potomac River drainage area, 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).

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).



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

Figure 3-5. Results of benthic invertebrate and B-IBI sampling in the Potomac River drainage area in Prince George's County.

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 3-6 presents flow and related stream change information. Figure 3-6 presents flow at the stations with the most data on Accoceek Creek tributary, Henson Creek, and Oxon Run. Because of the limited data, trends were not able to be determined.

Table 3-6. Summary of available flow and stream data in the Potomac River drainage area

Station ID	Station Name/ Description	Parameter	Units	Date		Number of records	Value		
				Min	Max		Min	Mean	Max
BXD0022	Broad Creek	Flow	cfs	01/06/09	02/02/09	2	12.42	15.09	17.76
HEN0054	Henson Creek	Flow	cfs	01/06/09	02/02/09	2	5.05	9.65	14.25
NCRN_NACE_ACCK	Accoceek Creek tributary	Depth	feet	11/29/05	03/13/12	35	0.000	0.214	0.581
NCRN_NACE_ACCK	Accoceek Creek tributary	Flow	cfs	01/31/06	03/13/12	29	0.000	0.242	1.02
NCRN_NACE_ACCK	Accoceek Creek tributary	Stream Velocity	ft/sec	11/29/05	03/13/12	33	0.000	0.320	0.851
NCRN_NACE_ACCK	Accoceek Creek tributary	Stream width	feet	01/31/06	09/27/12	62	0.000	2.45	8.62
NCRN_NACE_HECR	Henson Creek	Depth	feet	03/06/06	09/27/12	57	0.100	0.453	1.40
NCRN_NACE_HECR	Henson Creek	Flow	cfs	03/06/06	09/27/12	53	0.506	3.20	18.55
NCRN_NACE_HECR	Henson Creek	Stream Velocity	ft/sec	03/06/06	09/27/12	54	0.032	0.473	1.93
NCRN_NACE_HECR	Henson Creek	Stream width	feet	03/06/06	09/27/12	69	0.250	16.97	23.42
NCRN_NACE_OXRU	Oxon Run	Depth	feet	11/29/05	09/27/12	53	0.230	0.559	1.55
NCRN_NACE_OXRU	Oxon Run	Flow	cfs	06/14/06	09/27/12	45	1.50	9.42	34.65
NCRN_NACE_OXRU	Oxon Run	Stream Velocity	ft/sec	11/29/05	09/27/12	50	0.000	0.727	2.39
NCRN_NACE_OXRU	Oxon Run	Stream width	feet	01/31/06	09/27/12	68	0.000	32.41	109
TF2.1	TF2.1	Depth	feet	02/08/99	12/12/12	169	34.78	62.46	68.90
USGS165258850	Oxon Run near Washington, DC	Flow, instantaneous	cfs	09/20/94	09/20/94	1	0.410	0.410	0.410
USGS1653500	Henson Creek at Oxon Hill, MD	Depth	feet	10/15/74	09/16/78	56	0.295	0.716	1.51
USGS1653500	Henson Creek at Oxon Hill, MD	Flow, instantaneous	cfs	10/15/74	09/16/78	28	0.380	17.31	85.00
USGS384539076590101	Hunters Mill Branch Tributary near Friendly, MD	Flow, instantaneous	cfs	04/05/00	04/05/00	1	0.200	0.200	0.200
USGS385001076545801	Unnamed Trib To Henson Creek at Suitland, MD	Flow, instantaneous	cfs	05/11/00	05/11/00	1	0.670	0.670	0.670
XFB2470	XFB2470	Depth	feet	01/06/86	12/14/98	247	42.32	62.10	71.52

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

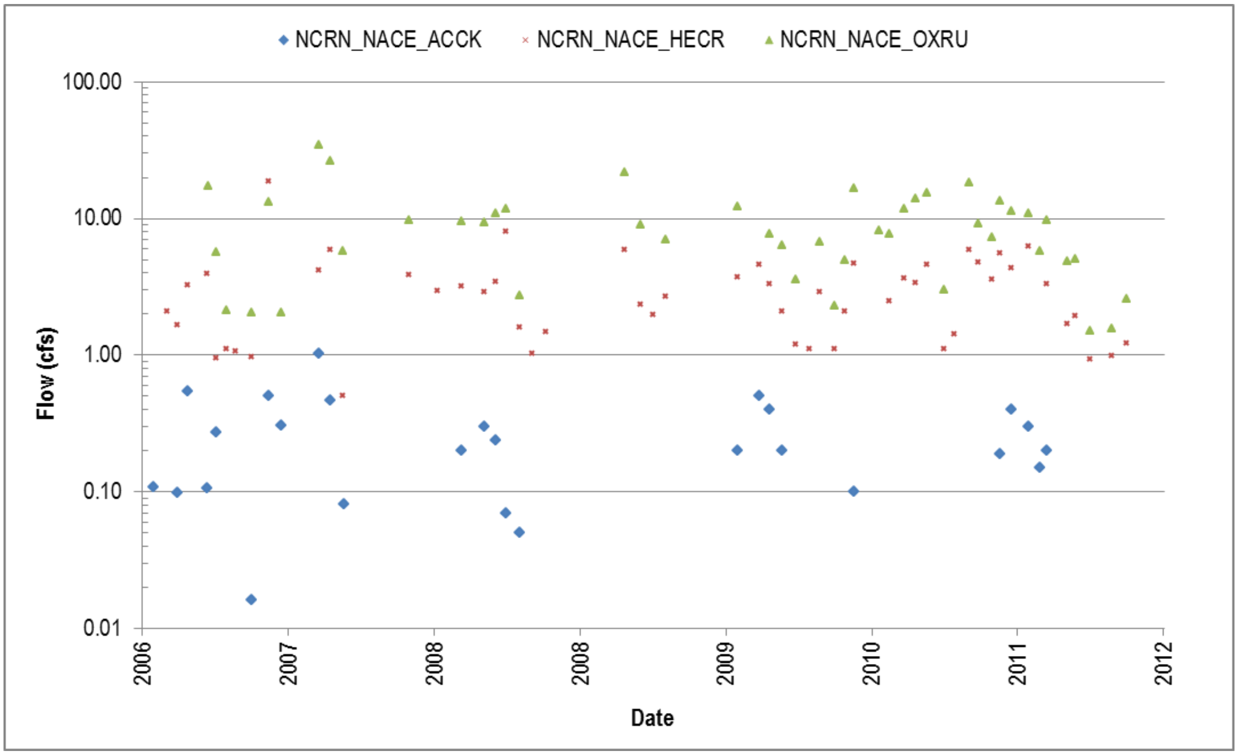


Figure 3-6. Flow over time on Accoceek Creek tributary, Henson Creek and Oxon Run.

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 Potomac River watershed are:

- District Heights
- Forest Heights
- Morningside

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 other entities within the Potomac River watershed drainage area.

Table 4-1. Phase II MS4 permitted federal, state, and other entities in the Potomac River watershed drainage area

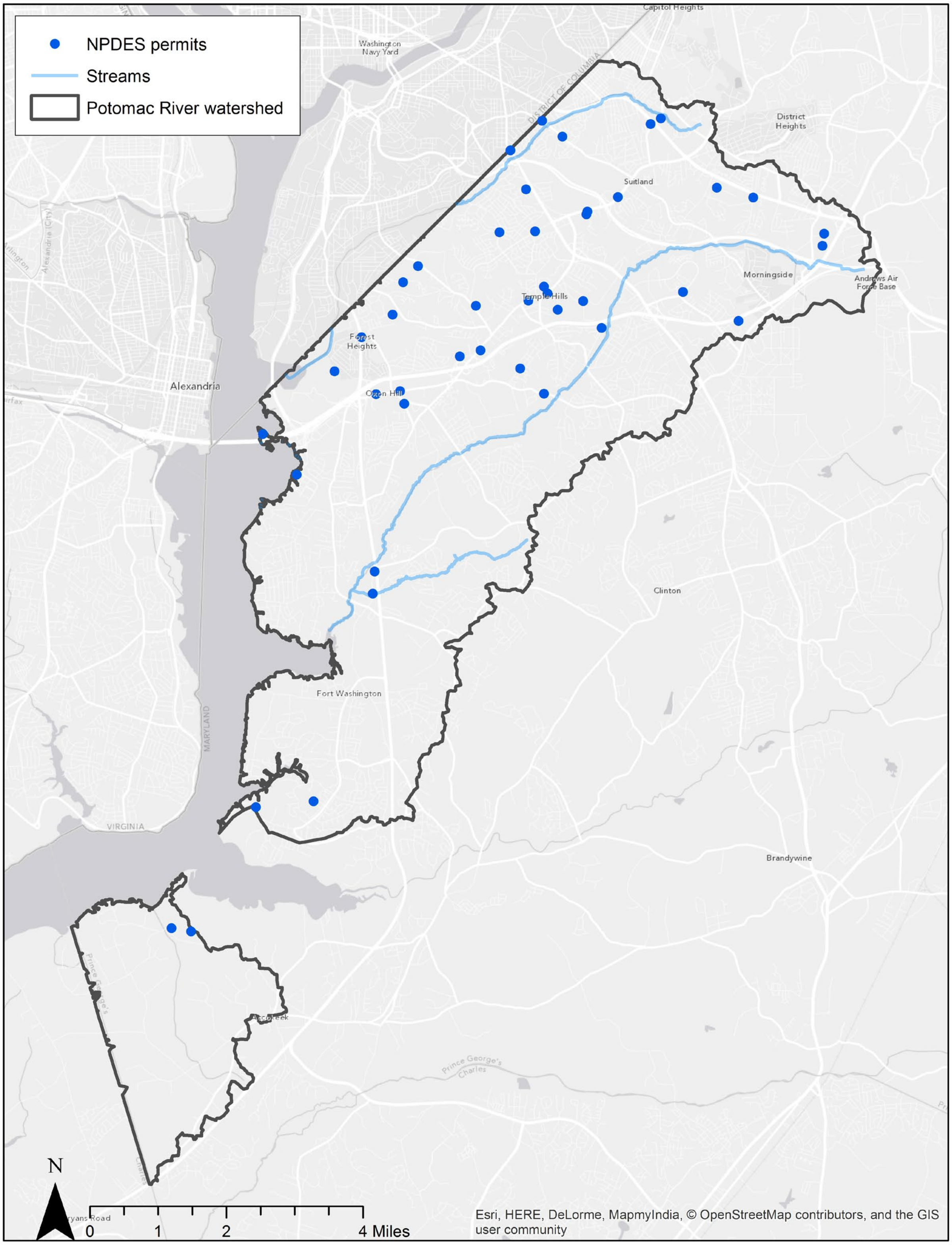
Agency	Installation/Facility
U.S. Department of the Air Force	Andrews Air Force Base
Washington Suburban Sanitary Commission	Multiple Properties
Maryland Air National Guard	Multiple Properties
Maryland State Highway Administration	Multiple (outside Phase I Jurisdictions)
Washington Metropolitan Area Transit Authority	Multiple Metro Rail Stations

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, information on the facilities and their available information is listed in Appendix B. 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 B also includes summaries of available relevant permit limits (one facility) and DMR data (eight facilities).

The permit review revealed that there are 45 permitted facilities in the watershed. Of these, 11 are listed as stormwater facilities, and 28 are listed as swimming pools. The facility types of the remaining permits include refuse systems (one facility), gas service station (one facility), membership organization (one facility), state facility (I–95 / I–495 / MD–210 Interchange / Woodrow Wilson Bridge). There were also two 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 Potomac River drainage area in Prince George's County.

4.1.3 Wastewater

Wastewater facilities might include those publicly owned treatment works providing wastewater treatment and disinfection for sanitary sewer systems or industrial facilities providing treatment of process waters. There are no wastewater treatment plants in the Potomac River drainage area.

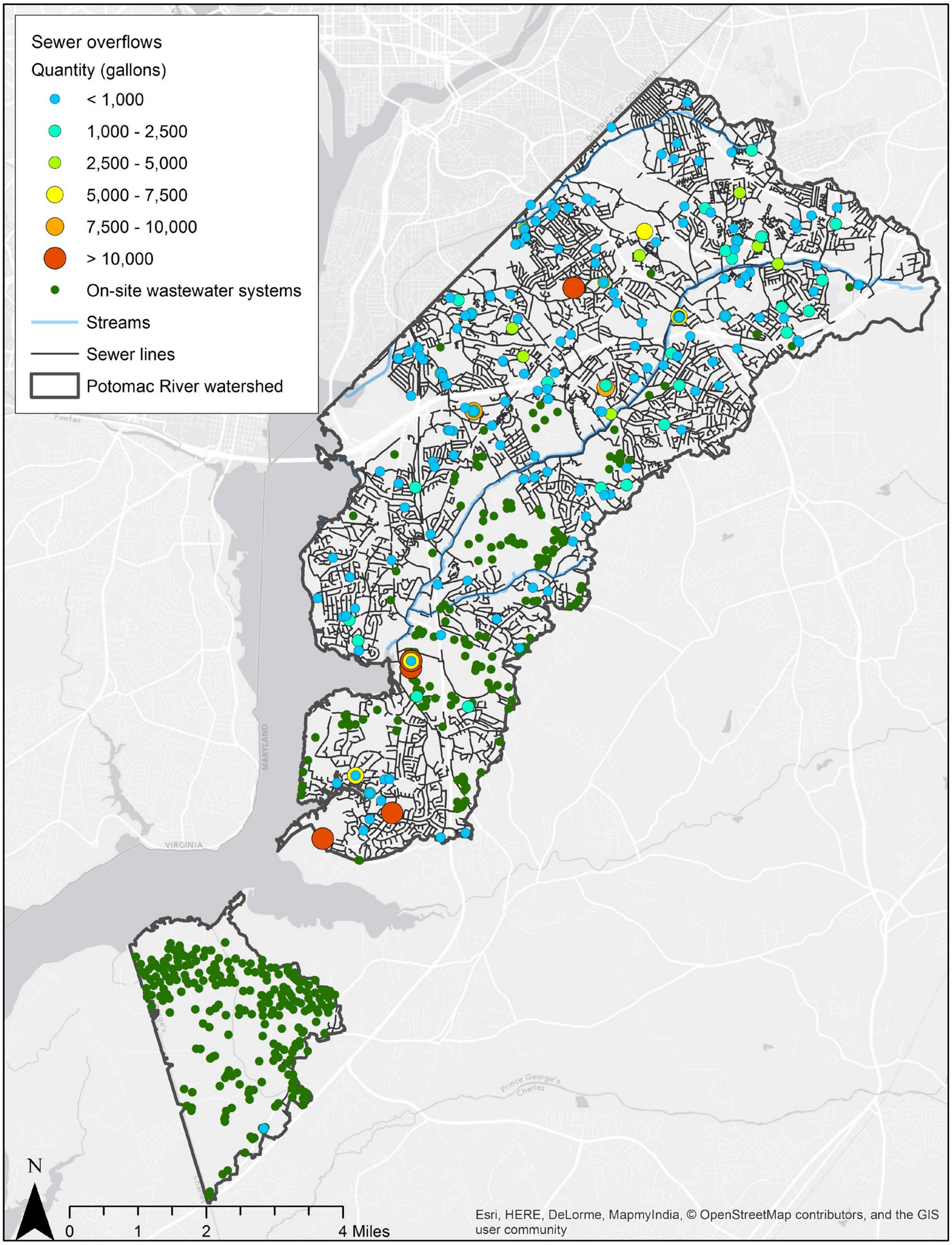
Sanitary sewers occasionally unintentionally discharge raw sewage to surface waters in events called sanitary sewer overflows (SSOs). These events contribute nutrients, bacteria, and solids into local waterways. SSOs can be caused by sewer blockages, pipe breaks, defects, and power failures. The Maryland 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 4-2. Since 2005 an estimated 50.9 million gallons of sanitary overflows have been reported in the County from within the Potomac River drainage area. For that period, the average amount of annual overflow has been 5.6 million gallons, with a minimum of 114,328 gallons and a maximum of 26.5 million gallons, which occurred in 2008.

Figure 4-2 shows the locations of SSOs and depicts the size of the average discharge. Four have average discharge volumes greater than 10,000 gallons/year. The Washington Suburban Sanity Commission is currently addressing problems that cause SSOs through their Sewer Repair, Replacement and Rehabilitation (SR3) Program.

Table 4-2. Summary SSO overflow (gallons) in the Potomac River watershed by year

Causes	2005	2006	2007	2008	2009	2010	2011	2012	2013
Blockage	3,320	2,026	548	3,265	270	1,854	678	4,680	110
Construction Activity	3,600								
Defective Equipment/ Workmanship	600	1,269		1,964	1,315	30	35	14	20
Equipment Failure	120	1,120	19,721		1,000				
Grease	22,924	15,488	9,345	3,026	7,841	4,800	5,704	2,997	1,860
High Flow/ Precipitation	838,000	1,706,923	1,108,000	4,710,045	358,513	201,831	5,997,000	90,000	3,900,000
Other	597,015	7,855		189			2,168	670	
Power Loss	3,000,000	6,482,000		21,822,340					
Roots		3	240	6	40	5	3	931	1
Roots/Grease				58		15			6,991
Stream Erosion						5,891		13,968	5,207
Third Party Damage			540		51			691	4,459
Unknown			3,850	720	407	2,600	1,350	377	993
Total	**4,465,579**	**8,216,684**	**1,142,244**	**26,541,613**	**369,437**	**217,026**	**6,006,938**	**114,328**	**3,919,641**

County data from 2011 indicate that there are 444 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 Potomac River drainage area in Prince George's County.

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 pre-settlement conditions, which included grassland and forest, to post-settlement conditions, which include cropland, pasture, and urban and suburban areas. This conversion has led to increased runoff and flow into streams versus pre-settlement 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

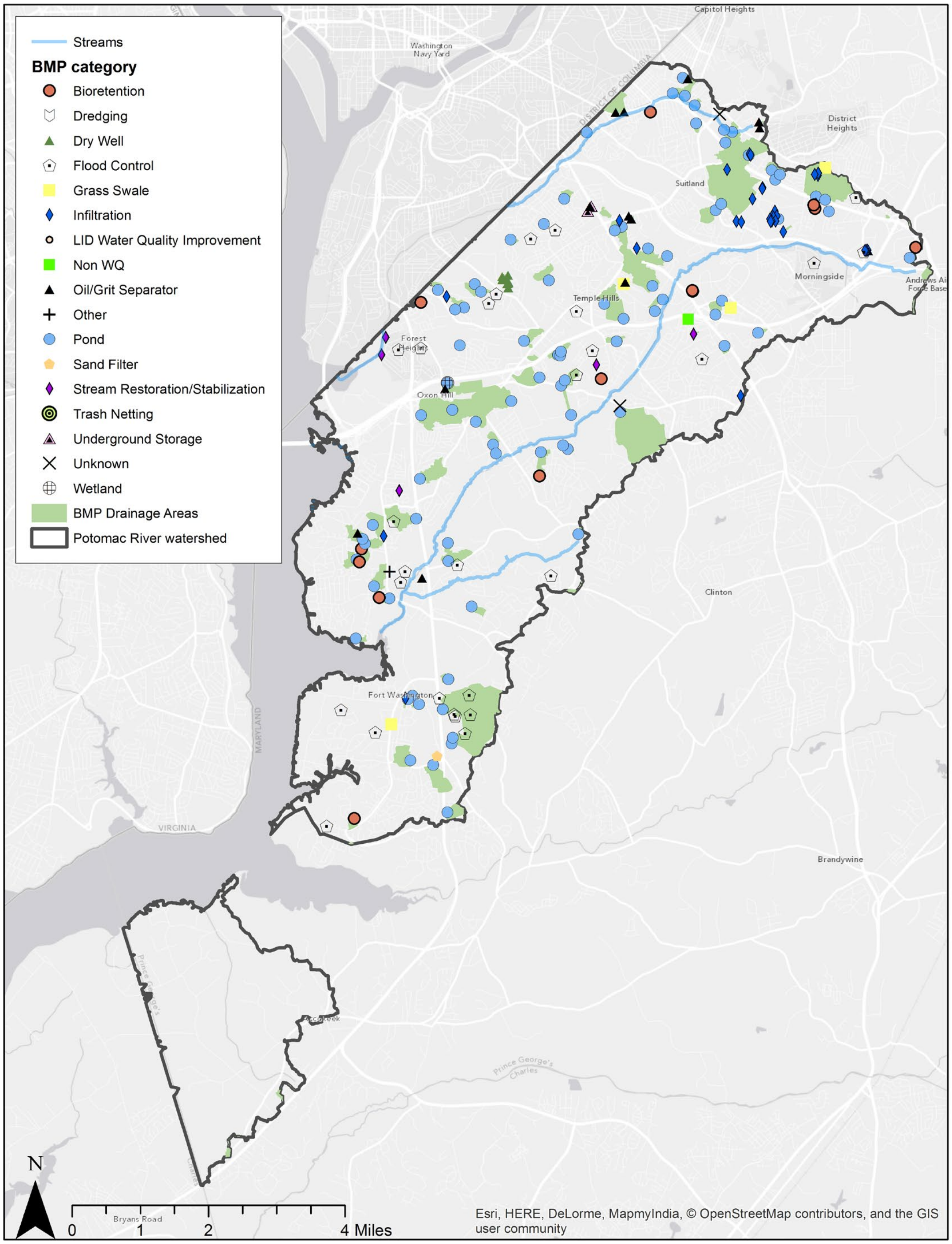
BMPs are measures used to control and reduce sources of pollution. They can be structural or nonstructural and are used to address both urban and agricultural sources of pollution. Structural practices include practices that are constructed and installed such as detention ponds, porous pavement, or bioretention 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 4-3 presents the list of known public and private structural BMPs in the County's portion of the Potomac River watershed; they are shown spatially in Figure 4-3. 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 4-3. List of BMP types in the Potomac River watershed

BMP Type	Total	Total w/DA	Total Acres Treated	Avg. Acres Treated
Bioretention	14	10	37.55	3.75
Dry Well	10	10	9.20	0.92
Grass Swale	4	2	3.04	1.52
Infiltration	33	13	36.07	2.77
Oil/Grit Separator	14	11	17.38	1.58
Pond	87	79	2,597.74	32.88
Stream Restoration/Stabilization	5	2	2.14	1.07
Underground Storage	2	1	0.05	0.05
Unknown	2	1	0.51	0.51
Wetland	1	1	55.80	55.80
Total	202	130	2,759.48	21.23

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 Potomac River drainage area in Prince George's County.

4.4 Existing Condition Analysis

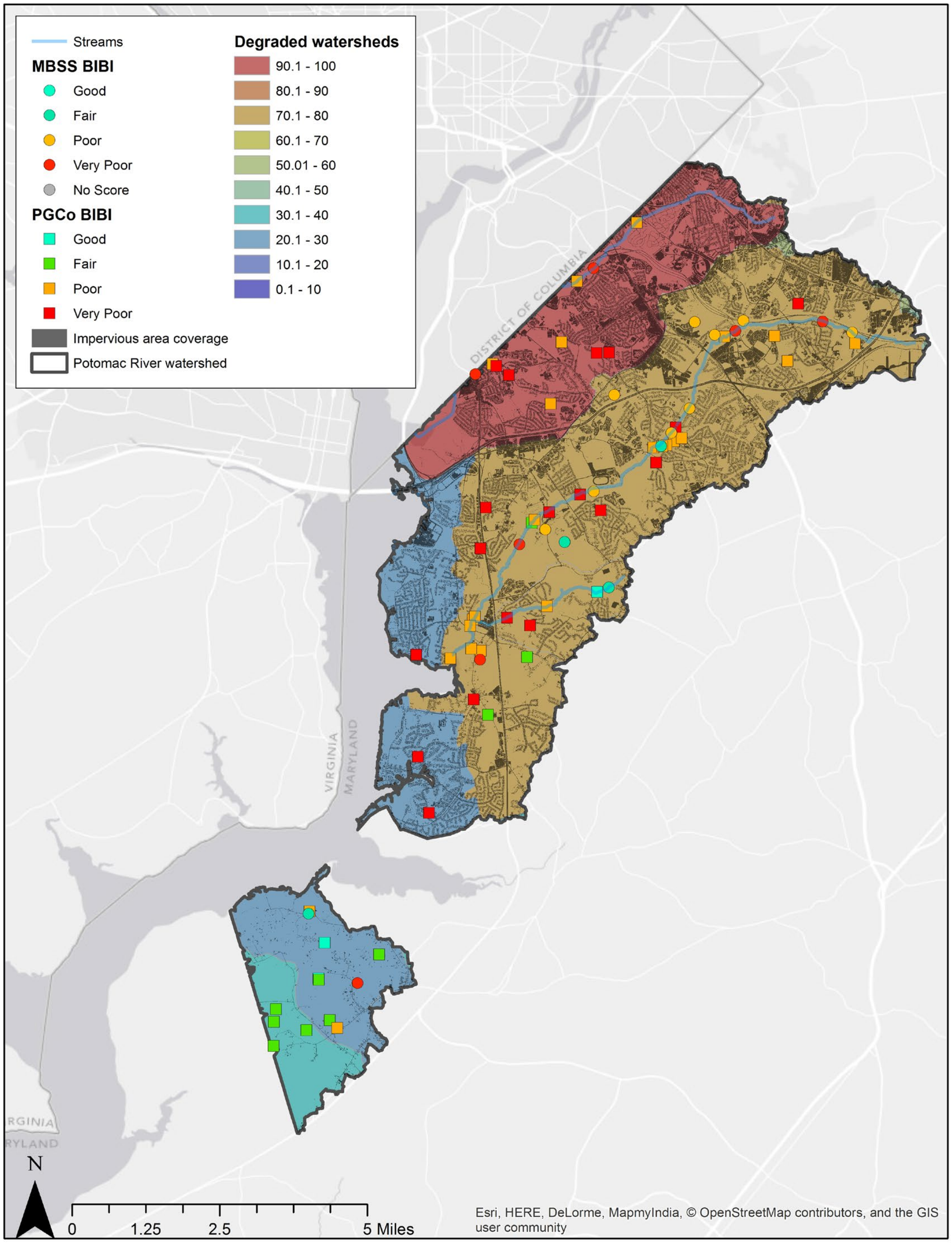
Water quality and the health of biological communities are affected by watershed characteristics such as land use and percentage of impervious cover. Multiple studies have shown that as impervious cover increases, peak runoff volumes and velocities increase, along with streambank erosion (Arnold and 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. BMP locations are also 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 4-4 looks at BMPs, their drainage areas, and what land use(s) they treat.

The Potomac River drainage area has Round 2 biological integrity values that range from Poor to Good. The monitoring locations with Poor and Very Poor scores tend to be in the impervious areas. The monitoring locations with scores of Good are in the southern portion of the drainage area near Piscataway Park, which is surrounded by open areas that have more pervious surfaces, such as turf or forested patches.

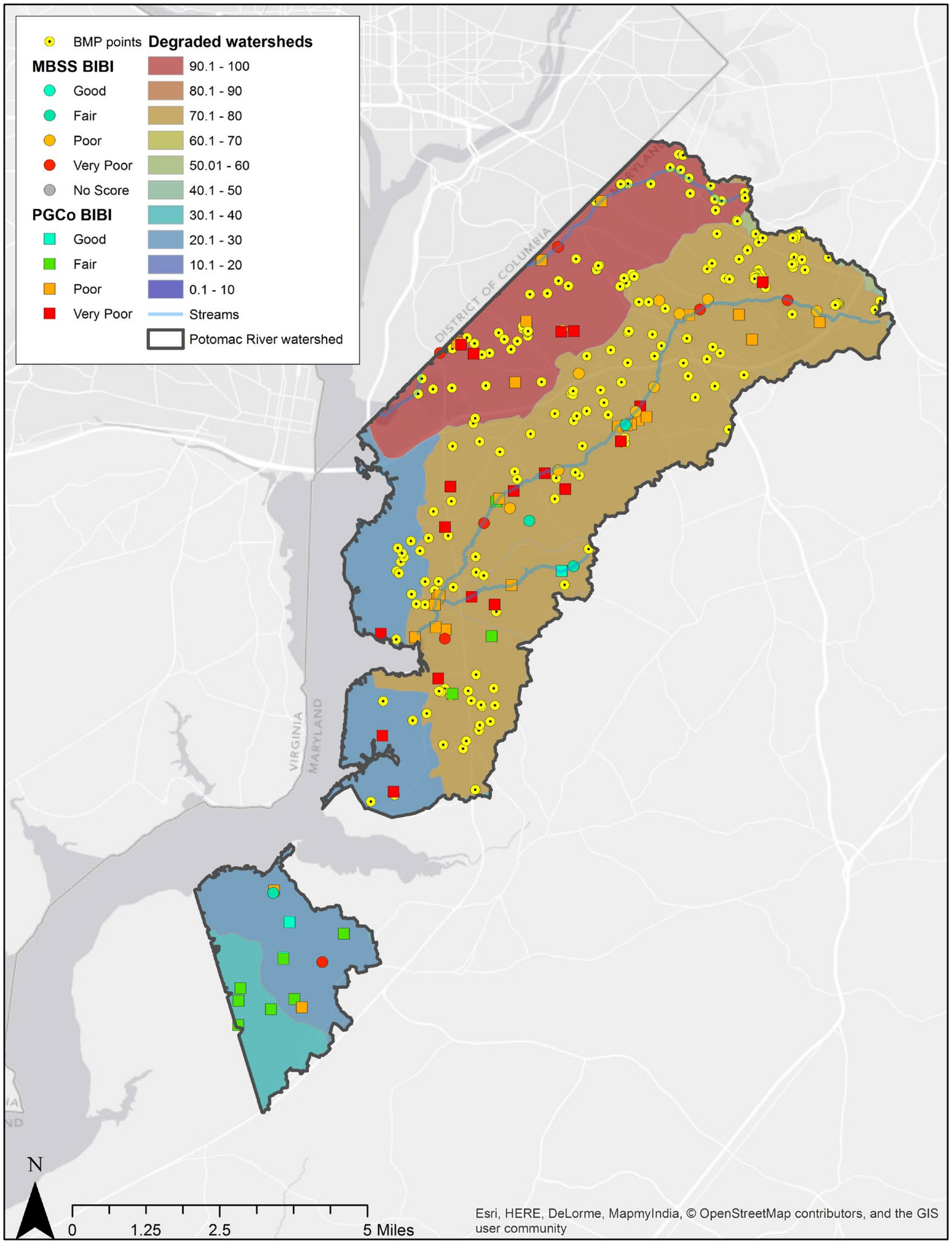
Figure 4-6 and Figure 4-7 show that there are impervious areas that have storm sewers that are not treated by BMPs. These areas might be candidate locations for BMP placement during the restoration plan development. The southern portion of the drainage area does not have any BMPs; however, this area is highly pervious and not expected to be contributing as much polluted runoff as in the north portion, which has more impervious area.

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



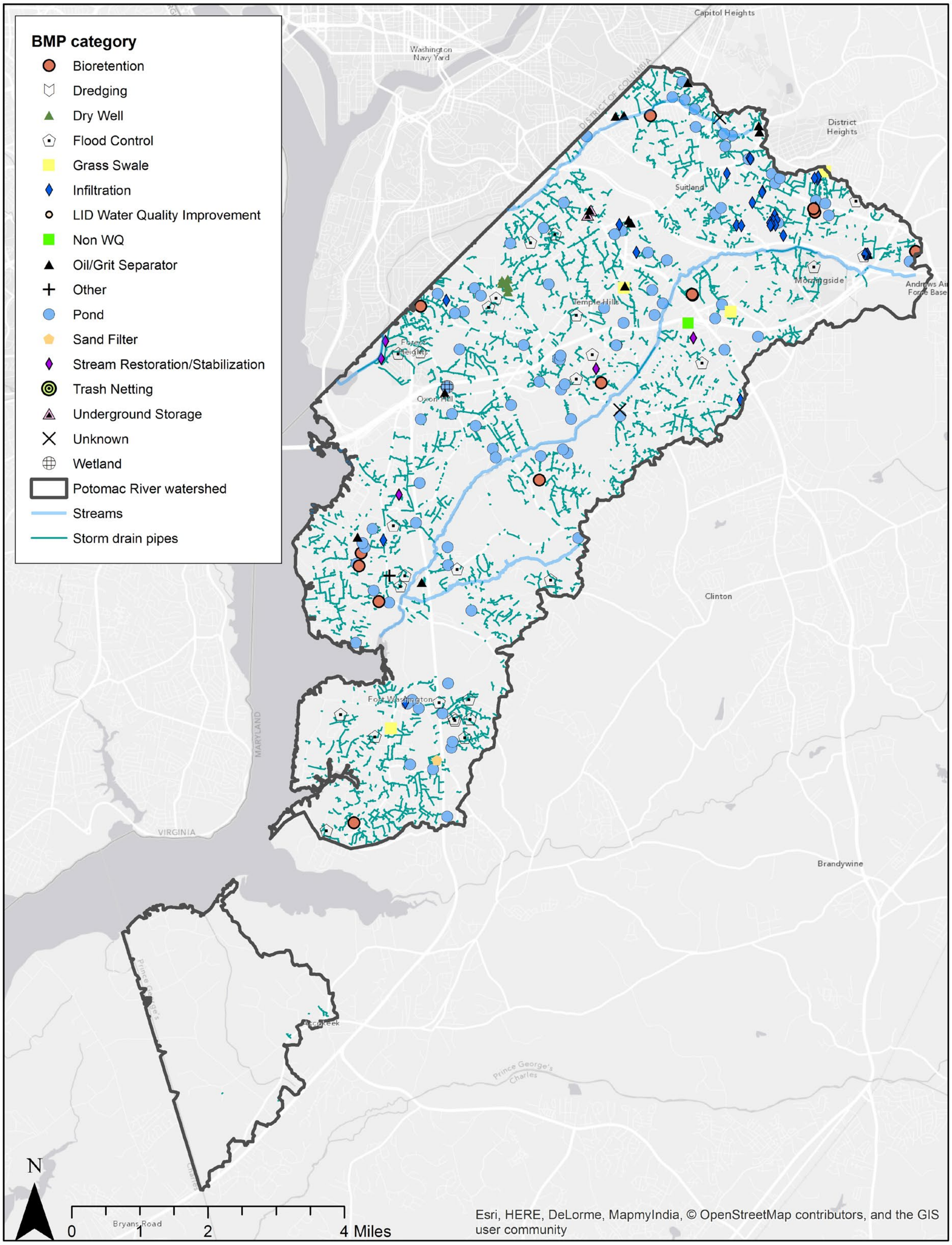
Source: Biotic Integrity from MD DNR, degraded watersheds from Tetra Tech, 2009 impervious area from M-NCPPC 2014

Figure 4-4. Comparison of biological conditions and impervious areas in the Potomac River drainage area in Prince George's County.



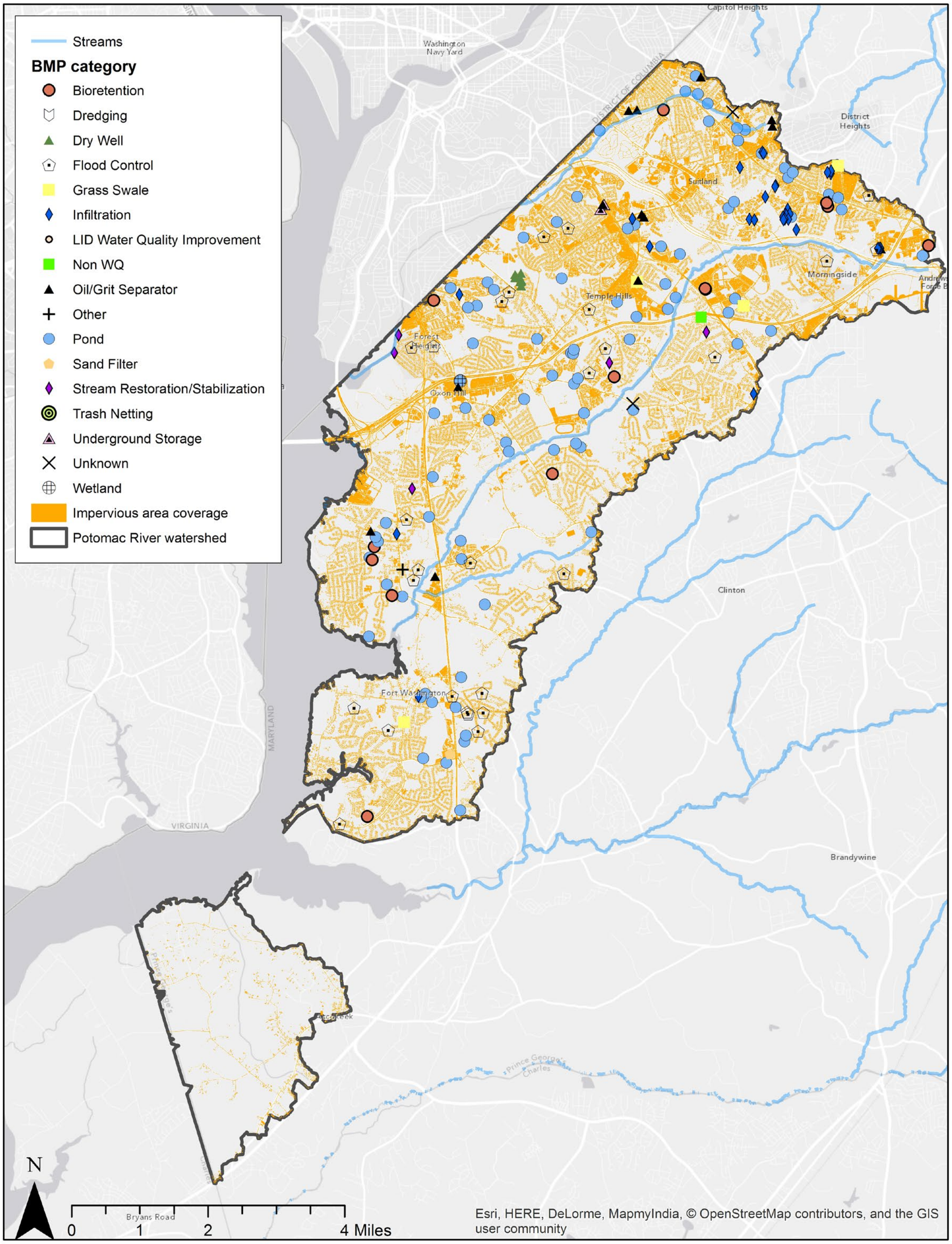
Source: BMPs are from DoE, June 2014, Biotic Integrity from MD DNR, degraded watersheds from Tetra Tech

Figure 4-5. Comparison of biological conditions and BMP locations in the Potomac River drainage area in Prince George's County.



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

Figure 4-6. Comparison of BMP locations and storm drain network in the Potomac River drainage area in Prince George's County.



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 Potomac River drainage area in Prince George's County.

Table 4-4. Summary of known BMP drainage areas, land uses, and impervious areas in the Potomac River drainage area

BMP Type	Statistic	Com-mercial	Indus-trial	Institut-ional	Non-urban	Open urban	Resi-dential	Trans-portation
Bioretention	Count	3	1	2	2	0	5	1
	DA (acres)	0.87	0.37	1.71	2.46	0.00	31.78	0.11
	Imp DA (acres)	0.62	0.32	0.93	0.19	0.00	7.36	0
Dry Well	Count	0	0	0	0	0	10	0
	DA (acres)	0.00	0.00	0.00	0.00	0.00	9.20	0.00
	Imp DA (acres)	0.00	0.00	0.00	0.00	0.00	3.42	0
Grass Swale	Count	2	1	0	0	0	2	0
	DA (acres)	2.44	0.06	0.00	0.00	0.00	0.55	0.00
	Imp DA (acres)	1.95	0.06	0.00	0.00	0.00	0.14	0
Infiltration	Count	2	0	1	2	0	13	0
	DA (acres)	4.94	0.00	45.33	4.90	0.00	53.00	0.00
	Imp DA (acres)	4.16	0.00	18.83	0.18	0.00	24.24	0
Oil/Grit Separator	Count	4	2	4	1	0	5	2
	DA (acres)	8.92	3.06	18.32	0.02	0.00	35.48	3.74
	Imp DA (acres)	6.60	2.75	11.29	0.00	0.00	8.15	0
Other	Count	1	0	0	0	0	0	0
	DA (acres)	0.05	0.00	0.00	0.00	0.00	0.00	0.00
	Imp DA (acres)	0.01	0.00	0.00	0.00	0.00	0.00	0
Pond	Count	26	7	23	32	4	70	7
	DA (acres)	1,386.89	215.26	768.29	1,665.81	315.85	8,416.91	94.70
	Imp DA (acres)	961.95	107.87	325.08	78.85	5.56	2,719.89	0
Stream Restoration/ Stabilization	Count	0	0	0	1	0	2	0
	DA (acres)	0.00	0.00	0.00	0.06	0.00	3.60	0.00
	Imp DA (acres)	0.00	0.00	0.00	0.01	0.00	1.14	0
Unknown	Count	1	0	0	0	0	1	0
	DA (acres)	0.03	0.00	0.00	0.00	0.00	0.99	0.00
	Imp DA (acres)	0.03	0.00	0.00	0.00	0.00	0.15	0
Wetland	Count	1	1	1	0	0	1	0
	DA (acres)	76.63	18.90	2.63	0.00	0.00	13.44	0.00
	Imp DA (acres)	66.17	12.53	1.59	0.00	0.00	7.60	0

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

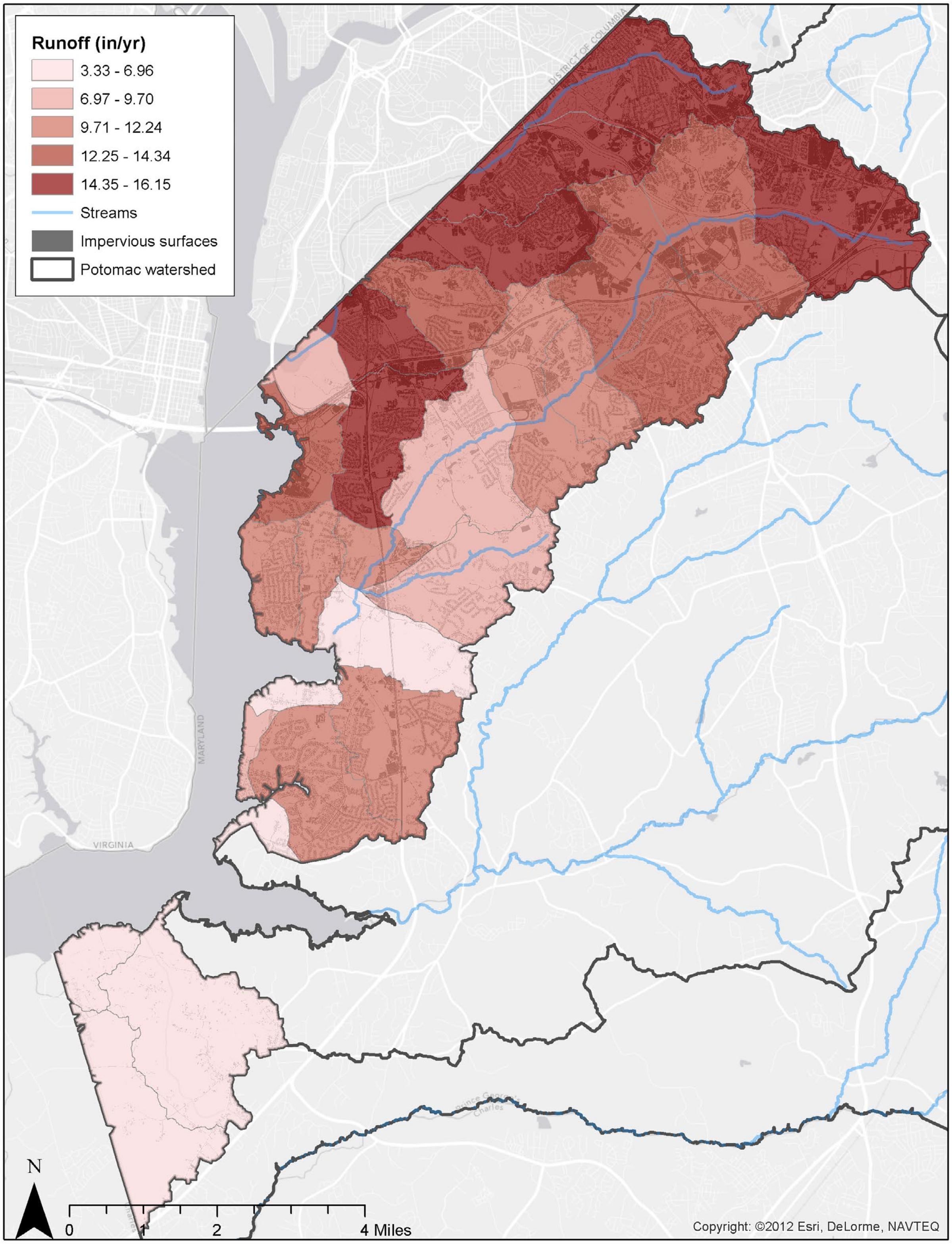
4.5 Stressor Loading Analysis

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, biochemical oxygen demand (BOD), and fecal coliforms. The first four parameters are measured in pounds per acre per year, while the latter is measured by billion counts (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) with elevated runoff and pollutant loads. 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.

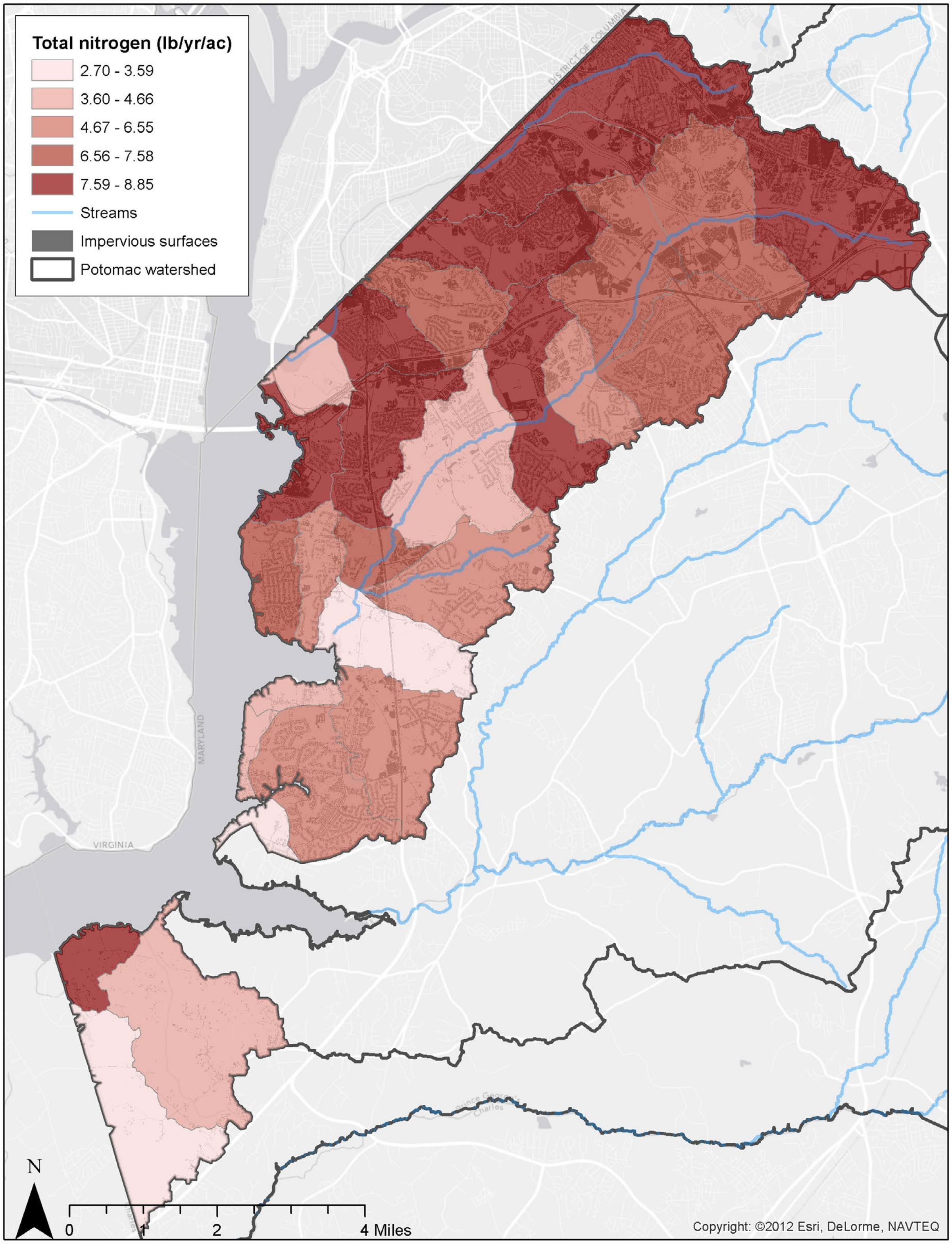
- Figure 4-8 presents the variation in runoff amount throughout the watershed.
- Figure 4-9 presents the variation in total nitrogen loading rates throughout the watershed.
- Figure 4-10 presents the variation in total phosphorus loading rates throughout the watershed.
- Figure 4-11 presents the variation 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 the extent of impervious cover in the northern reaches of the drainage area. Subsequent figures illustrate how increased impervious areas lead to larger nutrient, sediment, BOD, and bacteria loads.



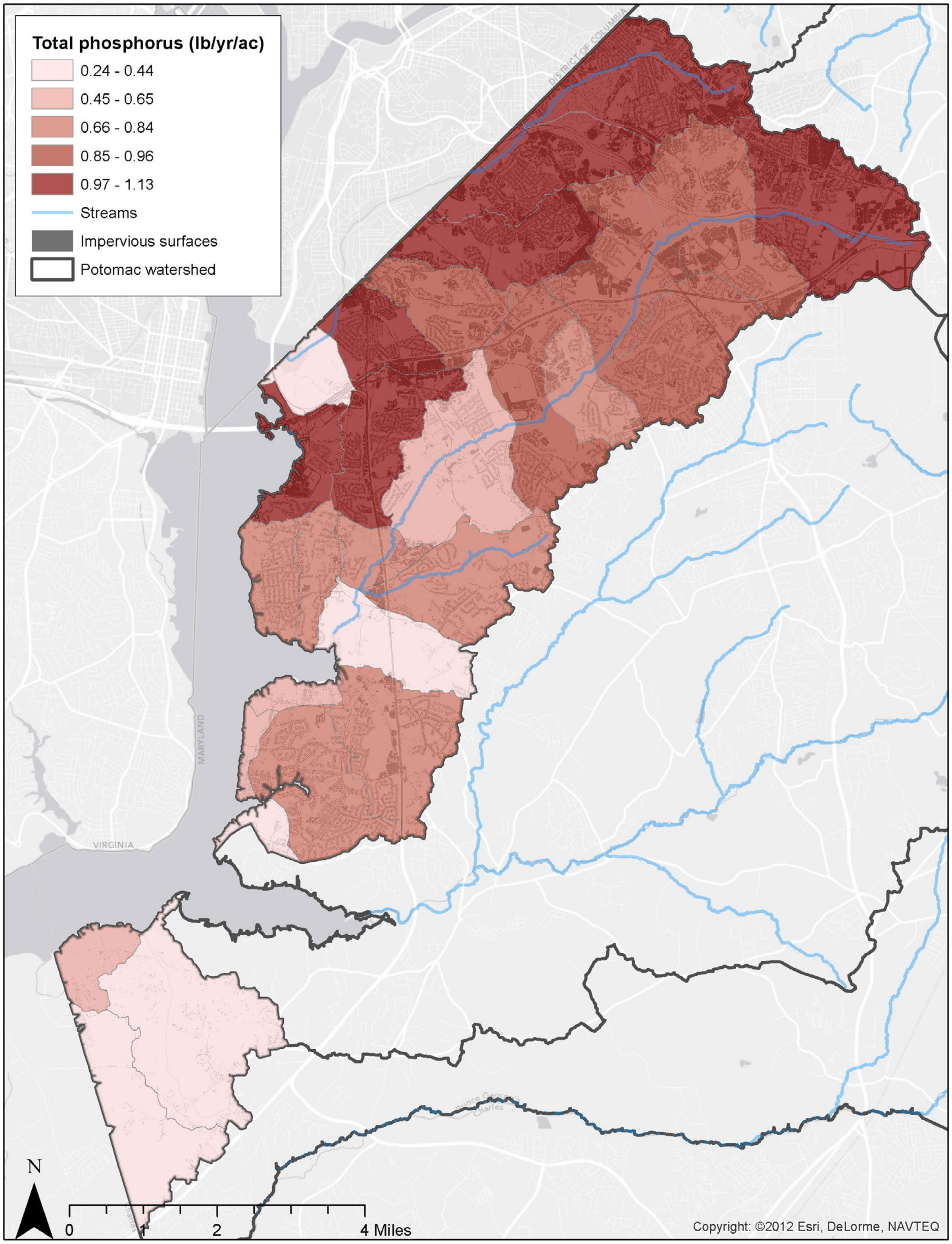
Source: 2009 impervious area from M-NCPPC 2014.

Figure 4-8. Comparison of runoff amount and impervious areas in the Piscataway Creek watershed.



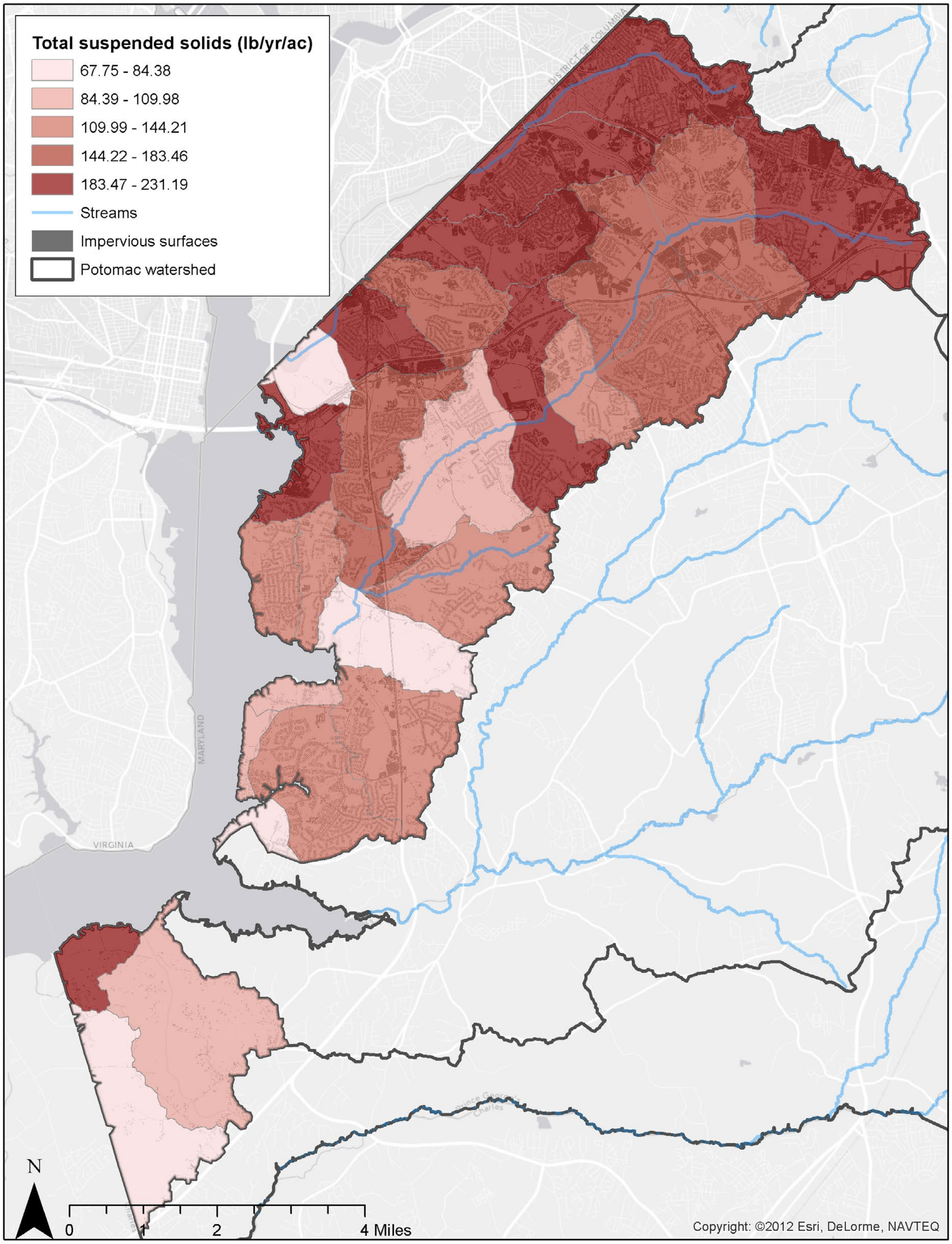
Source: 2009 impervious area from M-NCPPC 2014.

Figure 4-9. Comparison of total nitrogen loading rates and impervious areas in the Potomac River drainage basin.



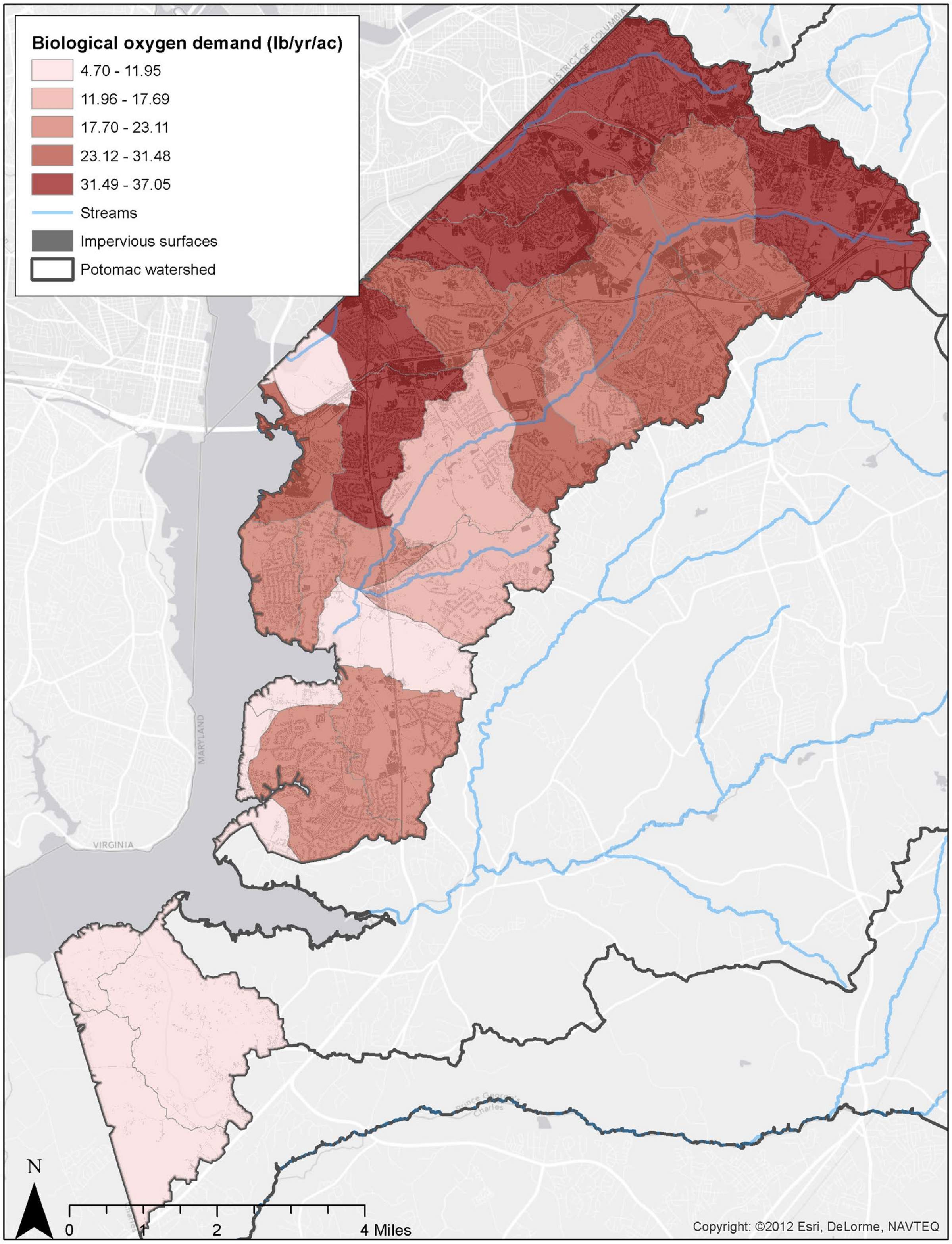
Source: 2009 impervious area from M-NCPPC 2014.

Figure 4-10. Comparison of total phosphorus loading rates and impervious areas in the Potomac River drainage basin.



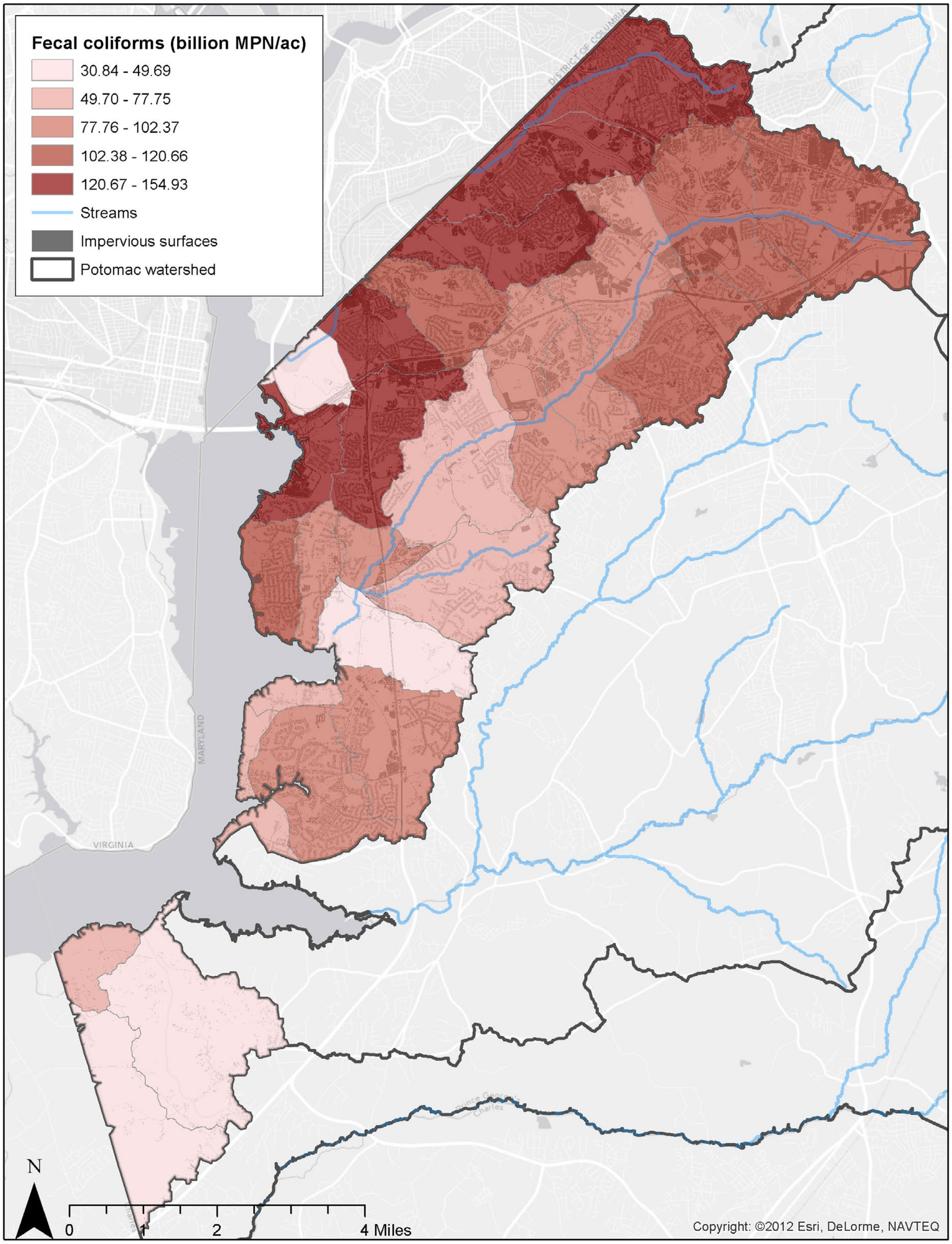
Source: 2009 impervious area from M-NCPPC 2014.

Figure 4-11. Comparison of total suspended sediments loading rates and impervious areas in the Potomac River drainage basin.



Source: 2009 impervious area from M-NCPPC 2014.

Figure 4-12. Comparison of BOD loading rates and impervious areas in the Potomac River drainage basin.



Source: 2009 impervious area from M-NCPPC 2014.

Figure 4-13. Comparison of fecal coliform loading rates and impervious areas in the Potomac River drainage basin.

5 Next Steps

As previously discussed, the County is in the beginning phases of developing restoration plans for 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 are 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 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.

6 References

Arnold, C., and J. Gibbons. 1996. Impervious surface coverage: the emergence of a key environmental indicator. *J. Am. Planning Assoc*. 62(2): 243–258.

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.

ICPRB (Interstate Commission on the Potomac River Basin). 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.* Prepared for District of Columbia Department of the Environment, Maryland Department of the Environment, and Virginia Department of Environmental Quality, by ICPRB, Rockville, MD.

MD DNR (Maryland Department of Natural Resources). 2010. *Maryland Biological Stream Survey Rivers and Streams Why is Atmospheric Deposition a Concern in Maryland.* Annapolis, MD. Accessed June 25, 2014. http://www.dnr.state.md.us/streams/atmosphericDeposition.asp.

MDE (Maryland Department of the Enviornment). 2012. *Final Integrated Report of Surface Water Quality in Maryland*. Maryland Department of the Environment, Baltimore, MD. Accessed June 25, 2014. http://www.mde.state.md.us/programs/Water/TMDL/Integrated303dReports/Pages/2012_IR.aspx.

MDE (Maryland Department of the Environment). 2014. *Watershed Report for Biological Impairment of the Mattawoman Creek Watershed in Charles and Prince George's Counties, Maryland - Biological Stressor Identification Analysis, Results and Interpretation*. Submitted to the U.S. Environmental Protection Agency, Region 3.

MDP (Maryland Department of Planning). 2010. Land Use/Land Cover. Accessed May 29, 2014. http://www.mdp.state.md.us/OurWork/landuse.shtml.

MGS (Maryland Geological Survey). 2014. Maryland Geology. Accessed May 29, 2014. http://www.mgs.md.gov/geology/index.html.

Millard, C. J., C. L. Wharton, and J.B. Stribling. 2013. *Biological Assessment and Monitoring of Streams and Watersheds in Prince George's County*. Round 2, Year 3. Prepared for Prince George's County Government, Environmental Services Group, Department of Environmental Resources, Largo, MD, and Maryland-National Capital Park and Planning Commission, Countywide Planning Division, Prince George's County Planning Department, Upper Marlboro, MD, by Tetra Tech, Inc., Center for Ecological Sciences, Owings Mills, MD.

M-NCPPC (Maryland-National Capital Park and Planning Commission). 2014. *PGAtlas*. Accessed June 18, 2014. http://www.pgatlas.com/#/Welcome.

NADP (National Atmospheric Deposition Program [NRSP-3]). 2012. NADP Program Office, Illinois State Water Survey, 2204 Griffith Dr., Champaign, IL 61820. Accessed June 25, 2014. http://nadp.sws.uiuc.edu/.

National Weather Service Forecast Office. 2014a. Reagan National Average Monthly Precipitation. Accessed May 7, 2014. http://www.erh.noaa.gov/lwx/climate/dca/dcaprecip.txt.

National Weather Service Forecast Office. 2014b. Washington National Airport Normals, Means and Extremes. Accessed May 7, 2014. http://www.erh.noaa.gov/lwx/climate/dca/NME.htm.

NRCC (Northeast Regional Climate Center). 2014. Monthly average PET (potential evapotranspiration) estimates. Accessed August 27, 2014. http://www.nrcc.cornell.edu/PET.pdf.

PGC DER (Prince George's County Department of Environmental Resources). 2012. *Prince George's County, Maryland—Phase II Watershed Implementation Plan*. Accessed June 17, 2014. http://www.mde.state.md.us/programs/Water/TMDL/TMDLImplementation/Documents/FINAL_PhaseII_Report_Docs/Final_County_WIP_Narratives/PG_WIPII_2012.pdf.

Schuler, T. 1994. *Watershed Protection Techniques.* Vol. 1, The Importance of Imperviousness. The Center for Watershed Protection, Ellicott City, MD.

Straub, C.P. 1989. *Practical Handbook of Environmental Control*. CRC Press, Inc., Boca Raton, FL.

USEPA (U.S. Environmental Protection Agency). 1986. *Ambient Water Quality Criteria for Bacteria—1986*. EPA A440/5-84-002. U.S. Environmental Protection Agency, Washington, DC.

USEPA (U.S. Environmental Protection Agency). 1991. *Guidance for Water Quality-Based Decisions: The TMDL Process*. EPA 440/-4-91-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

USEPA (U.S. Environmental Protection Agency). 2010. *Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment*. U.S. Environmental Protection Agency, Region 3, Philadelphia, PA; U.S. Environmental Protection Agency, Region 3, Chesapeake Bay Program Office, Annapolis, MD; and U.S. Environmental Protection Agency, Region 2, New York, NY. Accessed June 18, 2014. http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/tmdlexec.html.

USEPA (U.S. Environmental Protection Agency). 2013. *National Recommended Water Quality Criteria.* EPA 822-R-02-047. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Health and Ecological Criteria Division, Washington, DC. Accessed June 25, 2014. http://www.epa.gov/waterscience/criteria/wqctable/nrwqc-2006.pdf.

APPENDIX A: TMDL FACTSHEETS

Chesapeake Bay Watershed Nutrient and Sediment TMDL

Tidal Potomac and Anacostia PCB TMDL

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.

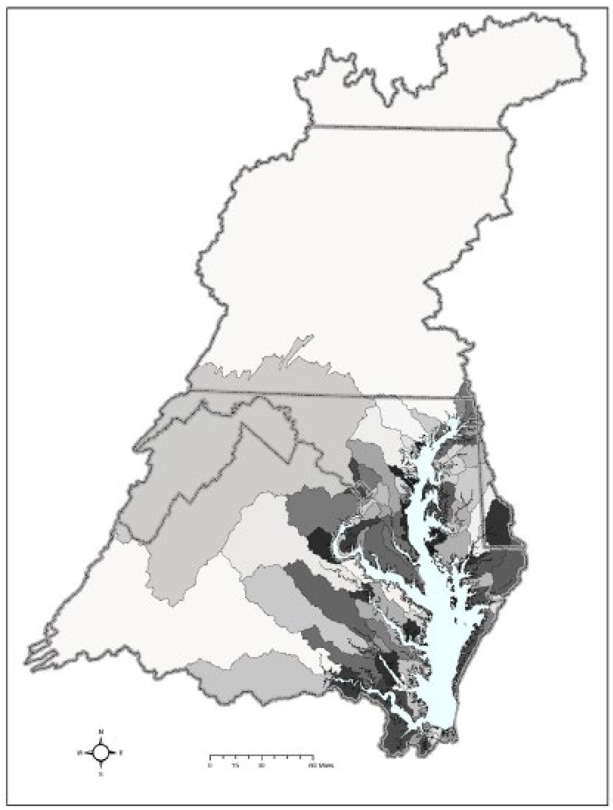


Figure 1. Overall Chesapeake Bay watershed and segment subwatersheds.
Source: USEPA 2010.

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.

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.

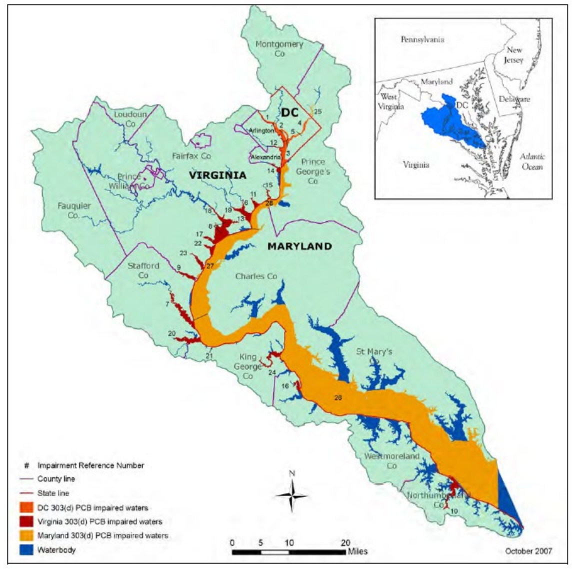


Figure 1. PCB Potomac River and Anacostia River watersheds
Source: Haywood and Buchanan 2007.

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: NPDES PERMITTED DISCHARGERS

Table B-1. Active NPDES permits in the Potomac River drainage area in Prince George's County

NPDES ID	Facility Name	Permit Type	Facility Type	Date Issued	Effective Date	Expiration Date
MD0069876	National Harbor Development	NPDES Individual Permit	Sanitary Services	08/15/07	08/15/07	08/14/12
MD02S0059	I-95 / I-495 / MD-210 Interchange / Woodrow Wilson Bridge	NPDES Individual Permit	State Facility	05/18/09	05/18/09	05/17/14
MD3515Q05	Hard Bargain Farm	General Permit	Membership Organizations	10/18/13	11/01/13	10/31/18
MDG499777	Woodrow Wilson Bridge Project	General Permit	Not reported	03/18/05	03/18/05	10/16/05
MDG766164	Jesse B. Mason Specialty School	General Permit	Swimming Pool	04/07/08	04/07/08	05/13/12
MDG766327	Surrey Square Apartments	General Permit	Swimming Pool	09/26/02	09/26/02	12/27/06
MDG766361	Sussex Square	General Permit	Swimming Pool	09/26/02	09/26/02	12/27/06
MDG766362	Hickory Hill	General Permit	Swimming Pool	09/26/02	09/26/02	12/27/06
MDG766363	Arbor View Apartments	General Permit	Swimming Pool	09/25/02	09/25/02	12/27/06
MDG766366	Chevet Manor	General Permit	Swimming Pool	01/10/08	01/10/08	05/13/12
MDG766387	Cambridge Commons	General Permit	Swimming Pool	08/05/02	08/05/02	12/27/06
MDG766390	Princeton Estates	General Permit	Swimming Pool	04/01/13	04/01/13	09/30/17
MDG766450	Allentowne Apartments	General Permit	Apartment Building Operators/Swimming Pool	10/21/02	10/21/02	12/27/06
MDG766452	The Prestridge	General Permit	Swimming Pool	10/21/02	10/21/02	12/27/06
MDG766469	Temple Hills Swim Club	General Permit	Swimming Pool	03/29/13	03/29/13	09/30/17
MDG766491	Southview	General Permit	Apartment Building Operators/Swimming Pool	10/11/02	10/11/02	12/27/06
MDG766492	Marlborough House	General Permit	Swimming Pool	10/11/02	10/11/02	12/27/06
MDG766493	Oxon Hill Village	General Permit	Swimming Pool	10/11/02	10/11/02	12/27/06
MDG766544	Bradford Place Apartments	General Permit	Swimming Pool	12/04/02	12/04/02	12/27/06
MDG766574	Moyaone Community Swimming Pool	General Permit	Swimming Pool	03/27/08	04/01/08	05/13/12
MDG766592	Whitehall Square Apartments	General Permit	Apartment Building Operators/Swimming Pool	03/20/13	03/20/13	09/30/17
MDG766593	Chestnut Hill Apartments	General Permit	Swimming Pool	03/20/13	03/20/13	09/30/17
MDG766595	Gateway Square Apartments	General Permit	Swimming Pool	03/25/13	03/25/13	09/30/17
MDG766598	Riverside Plaza Apartments	General Permit	Swimming Pool	03/25/13	03/25/13	09/30/17
MDG766645	Portabello Apartments	General Permit	Apartment Building Operators/Swimming Pool	03/27/03	03/27/03	12/27/06

NPDES ID	Facility Name	Permit Type	Facility Type	Date Issued	Effective Date	Expiration Date
MDG766646	Fox Hills North	General Permit	Swimming Pool	03/27/03	03/27/03	12/27/06
MDG766802	Park Inn	General Permit	Hotels And Motels/Swimming Pool	12/09/03	12/09/03	12/27/06
MDG766875	Heather Hills Apartments	General Permit	Swimming Pool	05/11/04	05/11/04	12/27/06
MDG766876	Tantallon Country Club	General Permit	Swimming Pool	06/23/04	06/23/04	12/27/06
MDG767006	MNCPPC - North Barnaby Pool	General Permit	Swimming Pool	04/07/08	04/07/08	05/13/12
MDG767112	Oakcrest Towers	General Permit	Swimming Pool	n/a	n/a	n/a
MDG767117	Top of the Hill Apartments	General Permit	Swimming Pool	03/25/13	03/25/13	09/30/17
MDG913158	Shell Station - Smo # 441	General Permit	Gasoline Service Stations	03/19/09	03/24/09	12/11/12
MDG917986	St. Barnabas Shell	General Permit	Refuse Systems	01/13/00	01/13/00	04/22/02
MDR000618	Waste Management of Maryland - Greater Washington	General Permit	Stormwater Discharge	03/11/03	03/11/03	11/30/07
MDR000839	Save More Used Parts, Inc	General Permit	Stormwater Discharge	03/21/03	03/21/03	11/30/07
MDR000959	Security Storage Company of Washington – Forestville	General Permit	Stormwater Discharge	03/10/03	03/10/03	11/30/07
MDR001112	Chucks Used Auto Parts, Inc	General Permit	Stormwater Discharge	01/29/03	01/29/03	11/30/07
MDR001642	Federal Census Bureau Building Construction	General Permit	Stormwater Discharge	07/06/04	07/06/04	11/30/07
MDR001694	Pitt Ohio Express	General Permit	Stormwater Discharge	01/29/03	01/29/03	11/30/07
MDR001703	Central Steel Supply, Inc.	General Permit	Stormwater Discharge	03/10/03	03/10/03	11/30/07
MDR001709	WMATA Branch Ave Rail Yard	General Permit	Stormwater Discharge	03/21/03	03/21/03	11/30/07
MDR001720	Barnabas Road Associates, LLC	General Permit	Stormwater Discharge	04/24/03	04/24/03	11/30/07
MDR002138	Town of Forest Heights	General Permit	Stormwater Discharge	11/30/07	11/30/07	11/30/07
MDR002151	US Fort Washington Park Maryland	General Permit	Stormwater Discharge	11/30/07	11/30/07	11/30/07
MDU000162	WMATA Branch Ave Rail Yard	Unpermitted Facility	Not reported	--	--	--
MDU011741	WMATA Branch Ave Rail Yard	Unpermitted Facility	Not reported	--	--	--

Table B-2. Available permit limits for NPDES permits in the Potomac River drainage area in Prince George's County

NPDES ID	Outfall	Parameter	Minimum	Maximum	Unit	Statistical Base
MD3515Q05	001	Fecal Coliform	200	200	MPN/100mL	Daily Maximum

Note: MPN/100mL= most probable number (MPN) per 100 milliliters.

Table B-3. Summary of available discharge information for NPDES permits in the Potomac River drainage area in Prince George's County

NPDES ID	Outfall	Parameter	Minimum	Average	Maximum	Unit	Statistical Base
MD3515Q05	001	Fecal Coliform	1.00	1.00	1.00	MPN/100mL	Daily Maximum
MD3515Q05	001	Flow	200.0	200.0	200.0	gpd	Daily Maximum
MDG766362	001	Flow	70.00	70.00	70.00	gpd	Daily Maximum
MDG766362	002	Flow	200.0	200.0	200.0	gpd	Daily Maximum
MDG766362	002	Flow	185.0	185.0	185.0	gpd	Quarterly Average
MDG766390	001	Flow	275.0	275.0	275.0	gpd	Daily Maximum
MDG766390	001	Flow	257.0	257.0	257.0	gpd	Quarterly Average
MDG766592	001	Flow	250.0	250.0	250.0	gpd	Daily Maximum
MDG766592	001	Flow	230.0	230.0	230.0	gpd	Quarterly Average
MDG766592	002	Flow	90.00	90.00	90.00	gpd	Daily Maximum
MDG766593	001	Flow	230.0	465.0	700.0	gpd	Daily Maximum
MDG766593	001	Flow	230.0	230.0	230.0	gpd	Monthly Average
MDG766593	001	Flow	220.0	220.0	220.0	gpd	Quarterly Average
MDG766593	002	Flow	70.00	70.00	70.00	gpd	Daily Maximum
MDG766595	001	Flow	220.0	410.0	600.0	gpd	Daily Maximum
MDG766595	001	Flow	200.0	200.0	200.0	gpd	Monthly Average
MDG766595	001	Flow	210.0	210.0	210.0	gpd	Quarterly Average
MDG766595	002	Flow	70.00	70.00	70.00	gpd	Daily Maximum
MDG913158	001	Flow	25.00	25.00	25.00	gpd	Daily Maximum
MDG913158	001	Flow	25.00	25.00	25.00	gpd	Quarterly Average
MDG917986	001	Flow	413	3,709	8,549	gpd	Daily Maximum
MDG917986	001	Flow	184	2,662	19,876	gpd	Quarterly Average
MD0063801	002	Flow	0.011	0.011	0.011	Mgpd	Daily Maximum

Note: MPN/100mL= most probable number (MPN) per 100 milliliters; gpd = gallons per day; Mgpd = million gallons per day.