Baltimore County National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System Permit 2024 Annual Report

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Department of Environmental Protection and Sustainability
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Baltimore County Executive John A. Olszewski Jr. and the County Council

Annual Report of Baltimore County's
National Pollutant Discharge Elimination System (NPDES)
Municipal Separate Storm Sewer System (MS4) Permit
2024

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Executive Summary

As per "Narrative Files" in section 4 of "National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4), Geodatabase Design and User's Guide" (MDE 2017 p 74):

"In addition to the specific narrative reports that have been indicated throughout this User's Guide, MDE requires that an executive summary that covers each major permit section be submitted as part of each jurisdiction's MS4 annual report submittal."

Baltimore County understands "major permit section" to refer to items in permit Part IV. Standard Permit Conditions.

A. Permit Administration

The County has designated an NPDES Management Committee, composed of representatives from agencies involved in NPDES activities, that meets on a periodic basis for updates and coordination. During fiscal year 2023, the Watershed Management and Monitoring section was reorganized into two sections. The goal of this reorganization is to create one team focused on monitoring (Watershed Monitoring section), and a separate team focused on watershed planning and outreach (Watershed Management section). This greater specialization will result in more efficient organization and operations, while also elevating the importance of both sets of functions within the Department of Environmental Protection and Sustainability.

B. Legal Authority

The County continues to maintain adequate legal authority in all areas related to implementation of its NPDES permit. There were no regulatory changes over the last year.

C. Source Identification

The 2024 annual report utilizes the MDE MS4 geodatabase format for all annual data reporting requirements based on the September 2023 supplemental updates.

D. Management Programs

1. *Stormwater Management*

As of July 1, 2024, there are 4,988 built facilities. 32,717 acres of land are treated by one or more of these facilities. The County completed 1,732 stormwater facility inspections during FY24.

2. *Erosion and Sediment Control*

   In FY23 there was a decrease in number of grading permits issued (199) and acres disturbed (628) compared to FY23 (200 permits and 700 acres), and an increase in new building permits (1,684, up from 1,001). A total of 9,525+ sediment control inspections were conducted with 1,009 enforcement actions (743 correction notices and 266 stop work orders). MDE approved Baltimore County's application for renewal of delegation of authority on February 6, 2024. This authority is effective through June 30, 2026.

3. *IDDE*

   The County screened 193 storm drain outfalls in calendar year 2023. Of the outfalls that were screened 72 were found to be above water quality thresholds. The County investigated 211 complaints. Of the 211 complaint investigations 178 were closed and 33 are still under investigation.

   The County also conducts hotspot surveys of commercial/industrial sites. A total of 140 sites were surveyed during FY 2024. Of the 140 sites, 23% (32 sites) were confirmed hotspots.

   The County continues to implement a proactive IDDE program. Additionally, pollution reductions from individual illicit discharge eliminations are available within the Chesapeake Bay Watershed Model. The County has implemented a system for tracking and reporting these pollution reductions, and is using the IDDE program to make progress on TMDL waste load allocations and the MS4 impervious surface restoration requirement.

4. *Trash and Litter*

   Baltimore County's expansive litter reduction efforts include instream monitoring, litter removal programs, and anti-litter outreach and education programs. Baltimore County continued to implement the trash and litter reduction strategy and the trash TMDL implementation plan in FY24. During this cycle, the County's efforts captured and removed 480,791 pounds of trash countywide through a multitude of strategies. Of this total, 133,888 pounds were prevented from entering the Baltimore Harbor.

   In FY24, The County enhanced its multi-year effort to conduct education and outreach programs by developing new and ongoing pilot programs and advancing foundational anti-litter initiatives such as Clean Green 15 and Litter Blitz. The FY24 Litter Blitz promotion garnered three times the participation from FY23, which resulted in over a threefold increase in pounds of litter collected. Newer efforts such as the County cigarette butt anti-litter campaign gained some traction in FY24. EPS used lessons learned from the pilot in Towson and took preliminary steps to connect with other chambers of commerce throughout the County to offer to install cigarette butt receptacles in additional commercial districts. EPS also collaborated with the Baltimore County Department of Public Works and Transportation on installing roadside signs to promote public awareness of the locations of the Jones Falls and Gwynns falls watersheds. Lastly, a new anti-litter digital marketing campaign was developed by the County around the story of "Litter-zilla", a litter monster spin-off inspired by the infamous Godzilla. This anti-litter advertisement was delivered to Baltimore County residents on major social media platforms such as YouTube, Snapchat and others.

5. *Property Management and Maintenance*

County-operated industrial sites are regulated by the General Stormwater Discharge Permit for Industrial Activity (20-SW). There were 19 permits in effect in FY24 for general government operations, plus 13 Baltimore County Public School sites and the three campuses of the Community College of Baltimore County. Stormwater Pollution Prevention Plans (SWPPP) are maintained for all of the county's industrial sites. Sites are inspected via Quarterly Visual Monitoring, Routine Facility Inspections, and Comprehensive Annual Inspections.

Chemical application of fertilizer, pesticide/herbicide, and deicer is reported for all county property; efforts are being made to reduce the amount of chemicals applied.

During FY24 the County removed 1,168 tons of debris through the street sweeping program and 29.46 tons of debris through the storm drain cleaning program.

The County acknowledges its new permit requirements to develop Good Housekeeping Plans for eligible county-owned sites and to develop a Salt Management Plan for winter deicer use. These plans are complete and included as appendices to this report.

6. *Public Education*

The County has continued to enhance and expand its education and outreach efforts across multiple media, including multiple county webpages, programs, and campaigns. Baltimore County has recorded a significant increase in direct personal engagement over the past years, due largely to greater engagement of the County's on-call outreach contract. Continued focus on enhancing social media reach, chiefly through the "Clean Green Baltimore County" Facebook page, has also been recorded. Baltimore County's MS4 permit requires a minimum of 150 education and outreach efforts to be achieved each year. In FY24 Baltimore County and its contributing partners have recorded 323 education and outreach efforts.

E. Stormwater Restoration

Replacing Annual Practices From the Previous Permit

Baltimore County completed the obligation to install BMPs providing 471 acres of impervious credit to replace annual practices that were used to meet our prior permit requirements.

Progress Toward the Current Permit

The final impervious accounting guidance for the next MS4 permit was released by MDE on November 5, 2021. Applying this final guidance, the County completed 2,493 acres of impervious surface restoration during the period between the expiration of the previous permit and the end of FY24 via perennial BMPs. After applying 471 of these acres to replace annual practices from the previous permit, 2,022 acres will apply towards the County's current MS4 permit requirement to restore 2,696 impervious acres.

Year 2 BMPs and Annual Benchmarks

Baltimore County completed BMPs equivalent to 270 impervious acres in year 3 of the permit. This brings the total EIA restored to 2,022 for the current permit. After accounting for annual practices the EIA is 2,060 acres, 76% of the restoration required by the permit. This exceeds the year 3 benchmark of 60% by 16%.

Next Year's BMPs

Baltimore County anticipates implementing BMPs equivalent to 701 impervious acres in fiscal year 2025.

F. Countywide TMDL Stormwater Implementation Plan

1. *Addressing MDE Comments on Submitted TMDL Implementation Plans*

Baltimore County responded to MDE comments on implementation plans for phosphorus and sediment in Liberty Reservoir watershed on Nov. 4, 2022.

2. *Implementation Plans for New TMDLs*

Baltimore County will continue to submit TMDL Implementation Plans for new TMDLs established as required by the NPDES Permit. The Baltimore Harbor Non-Tidal Sediment TMDL implementation plan was submitted on January 27, 2023 and approved by MDE on Sept. 20, 2023.

3. *TMDL Compliance*

Baltimore County continues to calculate its progress toward meeting applicable WLAs included in EPA approved TMDLs through its reporting, chiefly in Sections 6, 9, and the Countywide TMDL Summary Report (Appendix A) of this annual report. Our watershed monitoring program assists with tracking progress toward biological, bacterial, and chemical endpoints, while tracking the credited pollutant load reductions provides documentation on progress toward meeting assigned WLAs and assists with long range planning for implementation to better reach water quality endpoints of many types.

Progress toward addressing phosphorus WLAs has been challenging: 1 out of 5 watersheds have attained the WLA (Baltimore Harbor), 1 is at 75% (Back River), and 3 are 60% or less (Liberty, Prettyboy and Loch Raven Reservoirs). Both nitrogen WLAs have also been a challenge: Back River and Baltimore Harbor are at less than 50% of the target. Sediment WLAs have seen positive gains: 1 of 8 have attained the WLA (Jones Falls), 1 is set to baseline conditions (Loch Raven), and 6 are at 50% or less (Back River, Lower Gunpowder, Patapsco, Gwynns Falls, Baltimore Harbor and Liberty Reservoir). Progress on the trash WLA is on target (Baltimore Harbor). Implementation targets are based on deadlines set within each TMDL implementation plan. For most nutrient and sediment WLAs the self-imposed deadline had been 2025 (with the exception of Liberty Reservoir being 2030). The updates to the Watershed Model from Phase 5 to Phase 6 have pushed the WLA targets out of reach for these deadlines and have necessitated updates to estimated years of completion for a majority of the TMDLs. Details were provided in the addendum to the FY22 report titled "Baltimore County EPS Countywide TMDL Stormwater Implementation Plan 2022". Other WLAs (i.e. PCBs, bacteria, trash, etc., which have different methods of crediting implementation progress) have been given a 2035 deadline.

In the 2024 Integrated Report the 6 sulfate impairments for Baltimore County were moved from Category 5 to Category 2 due to an updated conservative sulfate screening threshold that was based on toxicity studies.

4. Public Participation

Baltimore County publishes all draft restoration plans on the County webpage for public review and comment. The public comment periods for these watershed assessments and restoration plans are at least 30 days, and a comment response document is produced and attached to each plan to publicly acknowledge and address received comments. Baltimore County is currently assessing other methods of driving public participation in its watershed assessment and restoration processes.

G. Assessment of Controls

In calendar year 2023, Baltimore County met the requirements for the watershed restoration and stormwater management assessment utilizing the Scotts Level Branch biological and physical habitat monitoring. In addition, the County has continued the following programs to assess the conditions of Baltimore County waters and locate areas in need of restoration, which aid the progress in meeting TMDL reduction targets:

- Bacteria monitoring program
  - 27 fixed sites countywide were monitored each month for the bacteria trend monitoring program generating 472 samples in CY2023
- Trash monitoring program
  - 24 fixed sites were monitored for trash accumulation in the Gwynns Falls and Jones Falls watershed in CY2023
- Chemical monitoring program
  - 40 fixed sites countywide were monitored each month for the chemical trend monitoring program generating 528 samples in CY2023
  - 12 Scotts Level Branch storm events were collected with 12 storm events at the instream monitoring location and 11 storm events at the outfall location. 12 rounds of baseflow monitoring were collected for a total of 225 samples.
- Biological monitoring programs
  - 50 randomly selected sites were sampled for the stream random point program
  - 39 additional randomly selected sites were sampled for the sediment TMDL biological monitoring program
  - 25 randomly selected sites were sampled for the tidal water random point program
  - 7 fixed sites were monitored for the reference site monitoring program
  - 19 fixed sites were monitored for the sentinel site monitoring program
- Geomorphological monitoring program
  - 14 fixed cross sections were measured in the Scotts Level watershed
- Restoration effectiveness monitoring program
  - 10 fixed biological monitoring sites were monitored in the Scotts Level watershed
  - 4 fixed biological monitoring sites were monitored in the Red Run watershed
- Special studies monitoring program
  - 7 tidal segments were monitored for the Submerged Aquatic Vegetation Monitoring Program

H. Program Funding

The EPS funding for capital and operating budgets for FY2024 are $29,287,504 and $8,570,816, respectively. The County designated additional funds in FY2024 for MS4 capital projects: $10 million from Metropolitan District utility bonds. The County's total expenditures on impervious surface restoration during FY2024 were $30,093,878.

The County's annual Watershed Protection and Restoration Program Annual Report (WPRP) is submitted with this NPDES MS4 annual report. The report details the funding structure, deposits into the fund, and expenditures from the fund for FY 2024. Funds deposited into the County's watershed protection and restoration fund in FY 2024 were sourced from general funds, metropolitan district funds, general obligation bonds, and state aid (grants).

The County's biennial Financial Assurance Plan is submitted with this NPDES MS4 annual report. The report focuses on demonstrating that the County has sufficient funding resources to meet the Impervious Surface Restoration requirement of the MS4 Permit, and shows that the County has sufficient funding in the current fiscal year and subsequent fiscal year budgets to meet its estimated cost as per Md. Code Ann. Environment § 4-202.1(j)(2).

1.0 Permit Requirements

PART IV. STANDARD PERMIT CONDITIONS

A. **Permit Administration**

Baltimore County shall designate an individual to act as a liaison with the Maryland Department of the Environment (Department) for the implementation of this permit. The County shall provide the coordinator's name, title, address, phone number, and email address. Additionally, the County shall submit in its annual reports to the Department an organizational chart detailing personnel and groups responsible for major NPDES program tasks in this permit. The Department shall be notified in annual reports of any changes in personnel or organization relative to NPDES program tasks.

B. **Legal Authority**

Baltimore County shall maintain adequate legal authority to meet this permit's requirements in accordance with NPDES regulations at 40 CFR §122.26 throughout the term of this permit. In the event that any provision of its legal authority is found to be invalid, the County shall notify the Department in writing within 30 days and make the necessary changes to maintain adequate legal authority within one year of notification. All changes shall be included in the County's annual report.

1.1 Permit Administration

The designated individual to act as a liaison with Maryland Department of the Environment is:

Robert Hirsch
Manager, Watershed Management Section
Baltimore County Department of Environmental Protection and Sustainability
111 West Chesapeake Avenue, Room 305
Towson, MD 21204
410-887-3217
rhirsch@baltimorecountymd.gov

The major NPDES program tasks are listed in Table 1-1, along with the Baltimore County Departments and associated bureaus or sections responsible for implementation. The County has designated an NPDES Management Committee, composed of representatives from agencies involved in NPDES activities, that meets on a periodic basis for updates and coordination.

Early in fiscal year 2023, the Watershed Management and Monitoring section was reorganized into two sections. The goal of this reorganization is to create one team focused on monitoring (Water Quality Monitoring section), and a separate team focused on watershed planning and outreach (Watershed Management section). This greater specialization will result in more efficient organization and operations, while also elevating the importance of both sets of functions within the Department of Environmental Protection and Sustainability. The new

Watershed Management and Water Quality Monitoring sections report to the DEPS deputy director.

There were no other major organizational changes over the last year.

Table 1-1: Major NPDES Program Tasks and Responsible Baltimore County Agencies

NPDES Program Task	Department - Section
Program Administration	EPS – Watershed Management and Monitoring Sections
Legal Authority	EPS – Administration Office of Law
Source Identification	EPS – Watershed Management and Monitoring Sections OIT – Geographic Information Systems
Stormwater Management – Review Stormwater Management – Inspections Stormwater Facility Maintenance	EPS – Stormwater Management EPS – Watershed Restoration
Erosion and Sediment Control	PAI – Building and Inspection
Illicit Discharge Detection and Elimination	EPS – Water Quality Monitoring Section Health Department – Environmental Health
County Property Management and Maintenance	DPWT – Highways Bureau DPWT – Utilities Bureau Office of Budget and Finance –Property Management, Vehicle Operations and Maintenance Community College of Baltimore County Baltimore County Public Schools
Road Maintenance	DPWT – Highways Bureau – Street Sweeping DPWT – Utilities Bureau – Storm Drain Cleaning
Public Education	EPS – All Sections
Watershed Assessment and Planning	EPS – Watershed Management and Monitoring Sections
Watershed Restoration	EPS – Watershed Restoration EPS – Forest Management EPS – Groundwater Management DPWT – Storm Drains Design
Assessment of Controls	EPS – Water Quality Monitoring Section
Program Funding	EPS – Finance and Administration EPS – Watershed Restoration
Total Maximum Daily Loads	EPS – Watershed Management and Monitoring Sections
Annual Report	EPS – Watershed Management and Monitoring Sections
Reapplication for NPDES Permit	EPS – Watershed Management and Monitoring Sections

EPS = Department of Environmental Protection and Sustainability
DPW = Department of Public Works
OIT = Office of Information Technology
PAI = Permits, Approvals and Inspections

1.2 Legal Authority

The County continues to maintain adequate legal authority in all areas related to implementation of its NPDES permit. There were no regulatory changes over the last year.

2.0 Permit Requirements

PART IV. STANDARD PERMIT CONDITIONS

C. **<u>Source Identification</u>**

Sources of pollutants in stormwater runoff jurisdiction-wide shall be identified by Baltimore County and linked to specific water quality impacts on a watershed basis. A georeferenced database shall be submitted annually in accordance with Maryland Department of the Environment, National Pollutant Discharge Elimination System, Municipal Separate Storm Sewer System, Geodatabase Design and User's Guide (Version 1.2, May 2017), (hereafter MS4 Geodatabase) or as noted below that includes information on the following:

1. <u>Storm drain system</u>: all infrastructure, major outfalls, inlets, and associated drainage areas delineated (to be submitted as a supplemental geodatabase);
2. <u>Industrial/Commercial sources</u>: industrial and commercial land uses and sites that the County has determined have the potential to contribute significant pollutants (to be submitted as a supplemental geodatabase);
3. <u>Urban best management practices (BMPs)</u>: stormwater management facility data for new and redevelopment, including outfall locations and delineated drainage areas;
4. <u>Impervious surfaces</u>: public and private land cover delineated, controlled and uncontrolled impervious areas based on, at a minimum, Maryland's hierarchical eight-digit sub-basins;
5. <u>Monitoring locations</u>: locations established by Baltimore County for chemical, biological, and physical monitoring of watershed restoration efforts and the 2000 Maryland Stormwater Design Manual, unless participating in the pooled monitoring program, as described in PART IV.G; and
6. <u>Water quality improvement projects</u>: Restoration projects implemented in accordance with PART IV.E.3 including stormwater BMPs, programmatic initiatives, and alternative control practices in accordance with the Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated Guidance for National Pollutant Discharge Elimination System Stormwater Permits (2021), (hereafter 2021 Accounting Guidance), including projects proposed, under construction, and completed with associated drainage areas delineated.

PART V. PROGRAM REVIEW AND ANNUAL PROGRESS REPORTING

A. **Annual Reporting**

2. All annual reporting specified in PARTs IV.C, D, E, F, and G, or required anywhere within this permit shall be made using the MS4 Geodatabase. A corresponding User's Guide provides guidance for data requirements and entry into the MS4 Geodatabase.

This section describes the Geographic Information System (GIS) data layers and the databases submitted with the Annual Report. The GIS data layers are described in Section 2.1. Section 2.2 describes the databases that have been created for the NPDES – MS4 report, along with data sources and limitations.

2.1 Source Identification – Geographic Information System Data

Table 2-1 summarizes the relationship between the source identification topics, report sub-sections, and the GIS data. Baltimore County has fully implemented MDE's MS4 geodatabase version 1.2 dated September 2023 for the 2024 NPDES Annual Report submittal

Table 2-1: Source Identification Topic, Section Discussion, and GIS data

Source Identification Topic	Section Discussion	GIS Data
Storm Drain System Mapping	2.1.1	MDE_NPDES_BaltimoreCounty_2024_V1_2.gdb
Industrial/Commercial Sources	2.1.2	BUSINESS2024.gdb
Urban Best Management Practices	2.1.3	MDE_NPDES_BaltimoreCounty_2024_V1_2.gdb
Impervious Surfaces	2.1.4	MDE_NPDES_BaltimoreCounty_2024_V1_2.gdb
Monitoring Locations	2.1.5	MDE_NPDES_Baltimore_County_2024_V1_2.gdb …FeatureClasses\MonitoringSite …FeatureClasses\MonitoringDrainageArea …ChemicalMonitoring …BiologicalMonitoring MonitoringLocations.gdb: …Bacteria_Trend …ChemicalTrend … Geomorph …Tidal …TrashStreamFixed …MonitoringPointDrainageAreas
Water quality improvement projects: Septic, street sweeping, and inlet cleaning	2.1.6	MDE_NPDES_Baltimore_County_2024_V1_2.gdb
Water quality improvement projects: everything else	2.1.7	MDE_NPDES_Baltimore_County_2024_V1_2.gdb

2.1.1 Storm Drain System

Storm drain system mapping is included in the MDE NPDES MS4 geodatabase, located in the 2024_NPDES_Required_Database folder. Inside the URDL, the stormdrain system features were captured by a consultant digitizing construction drawings. Outside the URDL, the stormdrain system features were captured using GPS followed by editing in the office. The depiction of the storm drain system in this geodatabase remains incomplete. Notable omissions include outfalls for some systems, many parts of storm drain systems in older subdivisions, most state and private storm drain systems, and drainage area polygons for minor outfalls.

2.1.2 Industrial/Commercial Sources

A database of businesses located in Baltimore County attributed with North American Industry Classification System (NAICS) codes is obtained once a year from Data Axel, containing 72,083 records. Place of business addresses were geocoded, creating a GIS data layer. The file geodatabase with the NIACS feature class, and a code sheet are located under Data 2024/2024 GIS Datalayers/IndustrialCommercialSources.

Baltimore County is evaluating this data source for its suitability for identifying potential pollution sources. The county has found 23% of the addresses do not have NIACS codes or business descriptions. The county is evaluating address accuracy and closed businesses which was a concern in previous years trying to utilize this type of data.

2.1.3 Urban Best Management Practices

Urban best management practices are included in the MDE NPDES MS4 geodatabase, located in the 2024_NPDES_Required_Database folder.

The BMPDrainageArea feature class has some locational errors. Most of these errors are historical, as until 2000 the County required engineers to submit drawings based on the Baltimore County Metropolitan District coordinate system. Conversion to Maryland State Plane resulted in shifting of drainage areas. County staff correct drainage areas found to have shifted when staff time resources allow and when necessary to support stormwater facility conversions.

2.1.4 Impervious Surfaces

Impervious surface information is included in the MDE NPDES MS4 geodatabase, located in the 2024_NPDES_Required_Database folder. The MDE NPDES MS4 geodatabase does not require or accept geospatial map data for impervious surfaces, so none are submitted.

2.1.5 Monitoring Locations

Monitoring sites, monitoring site drainage areas, and monitoring results for CY 2023 biological monitoring and Scotts Level chemical monitoring are presented in the MDE NPDES MS4 geodatabase.

Monitoring locations and drainage areas for other Baltimore County monitoring programs are presented in the six feature classes within the MonitoringLocations file geodatabase (BacteriaTrend, ChemicalTrend, Geomorph, Tidal biological, and TrashStreamFixed.) The files are located under Data 2024/2024 GIS Datalayers.

2.1.6 Water Quality Improvement Projects

All water quality improvement projects are included in the MDE NPDES MS4 geodatabase, located in the 2024_NPDES_Required_Database folder. The project types included in this geodatabase are stream restoration, outfall stabilization, shoreline enhancement, impervious surface removal, reforestation, septic BMPs, street sweeping, inlet cleaning, and individual IDDE.

2.2 Databases

The MDE NPDES MS4 geodatabase, and additional databases that have been created to meet NPDES MS4 Permit requirements, can be found in the Data 2024 directory. Table 2-2 in this section identifies the file folders and locations of the mentioned GIS data layers and databases, along with additional databases that have been created to meet NPDES MS4 Permit requirements.

Table 2-2: File Locations of Data Layers and Databases

Databases			
Storm drain system mapping	Y	MDE_NPDES_Baltimore_County_2024_V1_2.gdb	-
Industrial and Commercial Facilities	Y	2024 GIS Datalayers/Industrial Commercial Sources/BUSINESS2024.gdb	-
Urban BMP locations	Y	MDE_NPDES_Baltimore_County_2024_V1_2.gdb	-
Impervious Surfaces	N	MDE_NPDES_Baltimore_County_2024_V1_2.gdb	-
Water quality improvement projects	Y	MDE_NPDES_Baltimore_County_2024_V1_2.gdb	-
Chemical monitoring results	Y	MDE_NPDES_Baltimore_County_2024_V1_2.gdb	-
Biological & habitat monitoring	Y	MDE_NPDES_Baltimore_County_2024_V1_2.gdb	-
Additional monitoring sites	Y	2024GIS Datalayers/Monitoring Locations	BacteriaTrend ChemicalTrend Geomorphic
Pollutant load reductions	N	MDE_NPDES_Baltimore_County_2024_V1_2.gdb	-
IDDE activities	Y	MDE_NPDES_Baltimore_County_2024_V1_2.gdb	-
Responsible personnel certification	N	N/A	N/A
Grading Permits	Y	MDE_NPDES_Baltimore_County_2024_V1_2.gdb	-
Fiscal Analysis	N	MDE_NPDES_Baltimore_County_2024_V1_2.gdb	-

2.2.1 Chemical Monitoring Results

Scotts Level Branch storm event and baseflow monitoring data and corresponding monitoring sites can be found in the 2024 MDE NPDES MS4 geodatabase. Countywide trend monitoring databases can be found in the 2024 Chemical Data file folder, and corresponding monitoring sites are found in the 2024 GIS Datalayers/Monitoring Locations folder. Also included is the file containing the Scotts Level Branch in-stream gage data and the calculated pollutant concentrations and loads at 5-minute intervals. The final database contains the calculated EMCs for each storm at the Scotts Level Branch in-stream monitoring site.

2.2.2 Pollutant Load Reductions

Pollutant load reductions from actions, projects, and BMPs reported in Sections 3, 5, 6, 7 and 10 of this report and in the MDE NPDES MS4 geodatabase are tallied per 8-digit watershed in the CountywideStormwaterWatershedAssessment and LocalStormwaterWatershedAssessment tables in the MDE NPDES MS4 geodatabase. These tables contain pollutant load targets and estimated pollutant loads for the baseline year, start of permit term (FY2021), and current year (FY2024) for each Total Maximum Daily Load (TMDL) Waste Load Allocation (WLA) assigned to Baltimore County's MS4.

2.2.3 Biological, Habitat, Geomorphic, and Bacteria Monitoring

The MDE NPDES MS4 geodatabase contains the annual biological monitoring results and corresponding monitoring sites.

Two Excel spreadsheet files in the Data 2024 folder under the 2024 Geomorphic Data sub folder contain the geomorphological data. Corresponding monitoring site locations are provided in 2024 GIS Datalayers/Monitoring Locations. The Excel files are:

- Scotts Level 2024.xls – This file contains data from the 16 cross section in Scotts Level Branch, including the overlay charts from previous years, and the calculations of cut/fill volumes
- 2023 Scotts Level Geo Pollutant Load Calcs.xls – Contains monitoring site characteristics and pollutant load calculations derived from the cut/fill volumes from Scotts Level 2023.xls.

Bacteria monitoring at trend sites is a vital part of the County's strategy for complying with bacteria TMDLs. Data collected at trend sites in 2023 are stored in "2023_Bacteria_Data.csv " Corresponding monitoring site locations are provided in 2024 GIS Datalayers/Monitoring Locations.

2.2.4 Illicit Discharge Detection and Elimination Activities

Illicit Discharge Detection and Elimination (IDDE) information is included in the MDE NPDES MS4 geodatabase, located in the 2024_NPDES_Required_Database folder. Since the inception of the program only major outfalls were screened, however we initiated the screening of minor outfalls in CY 2012 and now report screening results for both major and minor outfalls.

2.2.5 Responsable Personnel Certification Information

A database of Responsible Personnel Certification is now maintained by MDE and cannot be queried by Baltimore County staff. This data is therefore no longer reported by Baltimore County.

2.2.6 Grading Permit Information

Grading permit information is presented in the MDE NPDES MS4 geodatabase. This includes all grading permits from July 1, 2023 through June 30, 20244.

2.2.7 Fiscal Analyses

Fiscal analysis information is included in the MDE NPDES MS4 geodatabase, located in the 2024 GIS Datalayers folder. Additional fiscal information is contained in the County's Watershed Protection and Restoration Program annual report, found in the Misc. Attachments 2024 folder.

2.3 NPDES MS4 Geodatabase Migration

MDE issued the latest MS4 database, version 2.0 in September 2024. However, due to concerns of the MS4 permittees regarding rapid migration into this new format, MDE is allowing permittees to deliver the GIS data in the MS4 database, version 1.2 issued in September 2023. The County will submit the MS4 database in the V1.2 September 2023 format.

3.0 Permit Requirements

PART IV. STANDARD PERMIT CONDITIONS

D. **Management Programs**

1. Stormwater Management

An acceptable stormwater management program shall be maintained in accordance with Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. Activities to be undertaken by the County shall include, but not be limited to:

a. Implementing the stormwater management design policies, principles, methods, and practices found in the latest version of the *2000 Maryland Stormwater Design Manual*. This includes:

i. Comply with the Stormwater Management Act of 2007 (Act) by implementing environmental site design (ESD) to the MEP for new and redevelopment projects;

ii. Tracking the progress toward satisfying the requirements of the Act and identifying and reporting annually the problems and modifications necessary to implement ESD to the MEP; and

iii. Reporting annually the modifications that have been or need to be made to all ordinances, regulations, and new development plan review and approval process to comply with the requirements of the Act.

b. Maintaining programmatic and implementation information including, but not limited to:

i. Number of Concept, Site Development, and Final plans received. Plans that are re-submitted as a result of a revision or in response to comments should not be considered separate projects;

ii. Number of redevelopment projects received;

iii. Number of stormwater exemptions issued; and

iv. Number and type of waivers received and issued, including those for quantity control, quality control, or both. Multiple requests for waivers may be received for a single project and each should be counted separately, whether part of the same project or plan. The total number of waivers requested and granted for qualitative and quantitative control shall be documented.

Stormwater program data shall be recorded on MDE's annual report database and submitted as required in PART V of this permit.

c. Maintaining construction inspection information according to COMAR 26.17.02 for all ESD treatment practices and structural stormwater management facilities including the number of inspections conducted and violation notices issued by Baltimore County.

d. Conducting preventative maintenance inspections, according to COMAR 26.17.02, of all ESD treatment systems and structural stormwater management facilities at least on a triennial basis. Documentation identifying the ESD systems and structural stormwater management facilities inspected, the number of maintenance inspections, follow-up inspection, the enforcement actions used to ensure compliance, the maintenance inspection schedules, and any other relevant information shall be submitted in the County's annual reports.

3.1 Introduction

The Stormwater Management Program addresses the impacts on stormwater quantity and quality resulting from new development and redevelopment after the construction phase is complete. These impacts are mainly associated with the increase in impervious area due to the installation of roadways and buildings. Baltimore County has been delegated authority by the State of Maryland to enforce stormwater management regulations. The Stormwater Management Program is located within the EPS – Stormwater Management Section. EPS currently implements the requirements of the 2000 Maryland Stormwater Design Manual, revised in 2009, for new and redevelopment activities. The Stormwater Management Act of 2007 was incorporated into the County's regulations in May 2010. The delegation of this program is periodically reviewed by the Maryland Department of the Environment (MDE) and has consistently passed the review requirements.

The Stormwater Management Program contains several components, including:

- review of stormwater management facilities plans,
- as-built inspections,
- triennial inspections, and
- maintenance of public stormwater management facilities.

All inspections of public and private facilities and maintenance of public facilities are conducted by the Stormwater Management Section.

3.2 Plan, Exemption, and Waiver Reviews

During fiscal year 2024 the following new plan reviews were conducted:

- Concept Plans – 137
- Site Development Plans – 27
- Final Plans – 337

This does not include multiple reviews for the same development project, only new projects. In FY 2024, there were 5 exemptions granted.

3.3 Inspections

Table 3-1 presents the SWM facility inspections conducted by EPS during the reporting period of July 1, 2023 through June 30, 2024.

Table 3-1: SWM Inspections from July 1, 2023 through June 30, 2024

	As-built	One year	Three year	Totals
Public Stormwater Facilities	49	20	495	564
Private Stormwater Facilities	130	90	948	1,168
Totals	179	110	1,443	1,732

A total of 179 as-built inspections were completed for the reporting period. A total of 110 one year inspections were completed. Approval of the one year maintenance inspection initiates the three-year maintenance inspection cycle. A total of 495 three-year inspections were completed for public facilities and 948 three-year inspections were completed for private facilities for a total of 1,443 three year inspections conducted. The inspection program's goal is to inspect all built facilities every three years. A total of 1,732 inspections were completed for all built facilities. There are 1,623 public facilities built with and without as-builts so the County's goal is to inspect 541 public facilities: there are 3,609 private facilities built with and without approved as-builts so the goal is to inspect 1,203 private facilities.

3.4 Stormwater Management Facility Maintenance

The Baltimore County Department of Environmental Protection and Sustainability has an operations crew in the Stormwater Management Section, responsible for inspection and maintenance of public facilities. Their staff consists of one supervisor, one crew chief, and four maintenance field crew members. Additionally, there are two contracted inspectors and two contracted maintenance field crew members. The crews are divided geographically into eastern and western districts. The County also utilizes on call contractors for major facility repairs as well as water quality conversions to publicly owned facilities.

A database has been developed to track all routine maintenance and responses to complaints. Table 3-2 summarizes the number of maintenance visits due to complaints versus routine maintenance. There were 478 routine maintenance assessments and 61 complaint driven site assessments during the reporting period for a total of 539 maintenance visits.

Table 3-2: Stormwater Facility Maintenance Visits by Type FY 2024

# of Routine Maintenance Visits	# of Complaint Maintenance Visits
478	61

3.5 Approved Stormwater Management Facility Analysis

The database of approved stormwater management facilities indicates that a total of 5,678 facilities have been approved through June 30, 2023. Of the 5,678 approved facilities, 4,764 have been built and have approved as-builts (1,578 public and 3,186 private).

The 5,678 approved facilities will, if built, serve 43,929 acres of land. Private facilities represent 68% of all approved facilities and 46% of the drainage area served by stormwater management facilities.

3.6 Constructed Stormwater Management Facility Data Analysis

An analysis of the databases related to stormwater management facilities indicated that a total of 4,988 facilities have been built to date (with and without approved as-builts). Of these 4,988 built facilities, 4,971 have their drainage area delineated and have a combined drainage area of 39,683 acres, and 32,717 acres of land are treated by at least one of these SWM facilities. The difference is due to treatment trains for some of the facilities, where the facility drainage areas are nested. Table 3-3 shows the total approved and built facilities (including conversions and retrofits) by watershed and includes facilities with and without approved as-builts.

Table 3-3: Total Facilities Built by Ownership through Fiscal Year 2024

Facility Type	Responsible Party	Number of Facilities	Drainage Area (Acres)
Detention Ponds, Underground Storage, Oil and Grit Separators	Private	353	3,597
	Public	215	6,247
Extended Detention Ponds	Private	660	5,113
	Public	521	7,052
Wet Ponds and Wetlands	Private	150	4,188
	Public	272	6,025
Infiltration Practices	Private	334	732
	Public	128	790
Sand Filters, Bioretention, Filter Strips, Swales	Private	521	1,530
	Public	370	2,538
Environmental Site Design	Private	889	645
	Public	158	193
Total	**Private**	2,907	15,805
	Public	1,664	22,845
	Total	4,571	38,650

Note: Drainage areas are rounded to the nearest acre.

3.6.1 As-built Analysis

It is possible for a facility to be active, that is functioning and passing regular inspections, but not have an approved as-built. This scenario occurs in several situations. For example, sometimes a developer builds a facility but never submits an as-built drawing.

These facilities without approved as-builts still provide important stormwater management as intended. Baltimore County will continue to abide by the 3 year inspection mandate

When an inspection happens for a facility with no approved as-built, the inspector attempts to contact the pond owner to ask for an as-built.

In order to address the missing as-builts, the County proposes several methods, depending on whether the facility is privately or publicly owned. For private facilities, the County will determine if there are any monies being withheld from the developer. If so, developers could be incentivized to submit an as-built in order to get their security deposit back.

For public facilities, however, there is typically no security deposit required, so there is often no financial incentive to prepare and submit an as-built, or to pass an as-built inspection. EPS is working with other agencies in the County to determine a plan to address missing as-builts. Additionally, we are now aware that sometimes providing an as-built plan was not part of the contract and therefore was not completed. In April 2016, EPS held meetings with Baltimore County Public Schools, Department of Public Works, and Property Management to develop a plan for finding or creating as-built style documentation for existing stormwater management facilities that lack documentation of as-built inspections.

EPS requested each agency to review a list of facilities in their department which are lacking as-builts. Most County agencies have responded to the EPS request and have committed to work on the review, and to help with the search for as-built documentation. DPW is now requiring as-builts to be done in their contracts along with a 2-year warranty (maintenance period).

presents the progress made by sector that do not have an as-built with their corresponding drainage area prior to (FY18) and post post-hoc as-built effort (FY19 and FY20).

Table 3-4: Progress of SWM Facilities with Missing As-builts

	Public Stormwater Facilities		Private Stormwater Facilities	
	Count	Drainage Area (acres)	Count	Drainage Area (acres)
As of June 30, 2018	90	885	152	1,167
As of June 30, 2019	99	861	141	1,102
As of June 30, 2020	92	773	138	1,104
As of June 30, 2021	92	773	138	1,104
As of June 30, 2022	92	773	130	1,009
As of June 30, 2023	86	651	137	1,132
As of June 30, 2024	86	651	138	1,148

3.7 Pollutant Loads

The drainage areas of 4,571 built facilities in the county that have been delineated and digitized into the County GIS covering 38,650 acres. MDE and the EPA Chesapeake Bay Program currently endorse two methods for calculating stormwater management facility load reductions: the "BMP Removal Rate Adjustor Curve" method (Schueler & Lane, 2015a; Maryland Department of the Environment, 2014) and, for facilities that do not qualify for the curve method, the "Approved CBP BMP Efficiency Rates" method (Schueler & Lane, 2015a, p. 12 & 40).

These methods, which are documented in detail in SOP RT-010: Tracking, Verification, and Pollutant Load Calculations: Stormwater Management Facilities (Baltimore County EPS, 2015), were used for the 4,749 facilities that are currently active with drainage areas digitized. The results of the analysis are displayed in Table 3-5 (Total Nitrogen), Table 3-6 (Total Phosphorus), and Table 3-7 (Total Suspended Solids) respectively.

Facilities designed and constructed for water quantity management or limited water quality management (e.g. extended detention) represent an opportunity for water quality improvement through conversion to water quality facilities that is explored through the Small Watershed Action Plan planning process and by EPS watershed restoration section staff. Conversions are typically cost effective only for facilities with greater than ten acres of drainage. However, to meet the pollutant reduction requirements facilities with acreage less than 10 acres are also considered. Assessments of existing County owned stormwater management facilities for conversion possibilities are summarized in Small Watershed Action Plans (see Section 10).

Table 3-5: Total Nitrogen Removal by SWM Facility Type and Watershed (pounds)

Watershed	Total pounds of N to SWM	Pounds of Removal by Facility Type						Total Removed	
		DP	EDP	WP	INF.	FIL.	ESD	Pounds	%
Upper Western Shore Watersheds									
Deer Creek	24.87		4.82				0.26	5.08	20.44
Prettyboy Reservoir	1365.57		99.92	0.05		84.16	432.92	617.05	45.19
Loch Raven Reservoir	99645.27	801.49	5836.98	4199.75	3544.42	4439.88	1958.76	20781.29	20.86
Lower Gunpowder Falls	37027.20	595.61	2203.28	1790.12	515.68	669.35	794.19	6568.24	17.74
Little Gunpowder Falls	3764.61	0.86	192.27	169.24	320.51	365.64	96.69	1145.20	30.42
Bird River	43112.54	366.03	1742.69	3823.31	924.11	1533.51	605.86	8995.52	20.87
Gunpowder River	3435.95	13.74	39.02	810.88	50.23	83.55	31.03	1028.45	29.93
Middle River	8926.42	42.13	221.23	1542.33	123.30	236.24	110.56	2275.78	25.49
Sub Totals	**197,302**	**1,820**	**10,340**	**12,336**	**5,478**	**7,412**	**4,030**	**41,417**	**21.0**
Patapsco/Back River Watersheds									
Liberty Reservoir	5111.52	1.43	484.74	149.38	188.86	432.60	320.94	1577.95	30.87
Patapsco River	47226.90	652.25	2532.12	1835.43	1065.60	1989.62	657.13	8732.15	18.49
Gwynns Falls	109437.97	941.77	7813.87	5730.14	1414.74	2844.20	938.45	19683.17	17.99
Jones Falls	60611.76	595.28	3542.75	4829.63	1268.01	1771.79	745.82	12753.28	21.04
Back River	28473.96	215.16	1386.95	2372.00	131.03	1035.60	427.79	5568.53	19.56
Baltimore Harbor	10428.65	68.47	263.10	1539.72	68.10	111.04	164.35	2214.78	21.24
Sub Totals	**261290.76**	**2474.36**	**16023.54**	**16456.31**	**4136.33**	**8184.85**	**3254.47**	**50529.86**	**19.34**
County Totals	**458593.18**	**4294.21**	**26363.75**	**28792.00**	**9614.58**	**15597.19**	**7284.74**	**91946.47**	**20.05**

Table 3-6: Total Phosphorus Removal by SWM Facility Type and Watershed (pounds)

Watershed	Total pounds of P to SWM	Pounds of Removal by Facility Type						Total Removed	
		DP	EDP	WP	INF.	FIL.	ESD	Pounds	%
Upper Western Shore Watersheds									
Deer Creek	1.03		0.19				0.02	0.22	21.17
Prettyboy Reservoir	103.79		10.61	0.01		12.36	22.14	45.11	43.46
Loch Raven Reservoir	6485.41	104.92	373.13	465.71	257.99	456.19	128.18	1786.12	27.54
Lower Gunpowder	3209.88	94.04	199.28	283.14	51.78	94.32	77.47	800.03	24.92
Little Gunpowder	414.02	0.17	20.92	31.28	42.00	61.81	11.74	167.90	40.55
Bird River	5818.49	100.11	233.65	814.69	135.33	317.72	99.37	1700.87	29.23
Gunpowder River	528.34	4.44	5.84	197.40	10.81	18.48	5.26	242.24	45.85
Middle River	1561.43	14.23	39.63	436.69	24.20	60.90	20.97	596.62	38.21
Sub Totals	**18122.38**	**317.91**	**883.24**	**2228.91**	**522.12**	**1021.78**	**365.15**	**5339.12**	**29.46**
Patapsco/Back River Watersheds									
Liberty Reservoir	467.52	0.25	47.44	15.45	20.94	54.70	33.87	172.66	36.93
Patapsco River	4602.57	127.37	243.09	298.98	118.75	300.17	70.81	1159.17	25.19
Gwynns Falls	9859.04	170.69	696.49	993.39	128.89	376.06	96.05	2461.57	24.97
Jones Falls	3836.14	73.86	221.63	511.77	89.40	169.66	55.30	1121.63	29.24
Back River	4878.24	73.83	235.72	653.37	22.15	255.40	85.00	1325.47	27.17
Baltimore Harbor	1280.64	18.91	32.08	288.51	9.52	19.60	28.75	397.38	31.03
Sub Totals	**24924.16**	**464.91**	**1476.47**	**2761.48**	**389.64**	**1175.59**	**369.79**	**6637.87**	**26.63**
County Total	**43046.54**	**782.82**	**2359.71**	**4990.39**	**911.76**	**2197.36**	**734.93**	**11976.99**	**27.82**

Table 3-7: Total Suspended Solids Removal by SWM Facility Type and Watershed (pounds)

Watershed	Total TSS To SWM	Pounds of Removal by Facility Type						Total Removed	
		DP	EDP	WP	INF.	FIL.	ESD	Pounds	%
Upper Western Shore Watersheds									
Deer Creek	5210		2930				141	3071	59
Prettyboy Reservoir	391813		115971	35		57118	96473	269596	69
Loch Raven Reservoir	27920002	449581	4906279	2299082	1352576	2157057	571887	11736462	42
Lower Gunpowder Falls	11155156	331172	2113838	959742	208328	403459	269645	4286184	38
Little Gunpowder Falls	1239160	960	191516	118356	138115	229913	33726	712585	58
Bird River	14509155	240050	1901108	2392975	391944	921238	219421	6066736	42
Gunpowder River	867548	6024	32863	395883	11253	49940	9393	505356	58
Middle River	3891802	33216	286933	1365308	72970	210455	57599	2026480	52
Sub Totals	**59979846**	**1061003**	**9551436**	**7531381**	**2175185**	**4029180**	**1258285**	**25606470**	**43**
Patapsco/Back River Watersheds									
Liberty Reservoir	1266	517116	78414	77868	216614	122970	115201	1128184	89144
Patapsco River	402916	2376357	1018581	416575	1130255	238315	196653	5376736	1334
Gwynns Falls	431918	5651619	2548808	335552	1163341	270587	256334	10226240	2368
Jones Falls	267327	2513259	2100163	340860	739572	224166	204552	6122572	2290
Back River	145802	1464758	1545702	47335	615190	184473	148496	4005953	2748
Baltimore Harbor	34404	198159	791743	21128	33839	45521	36154	1126545	3274
Sub Totals	**1283634**	**12721268**	**8083410**	**1239317**	**3898812**	**1086033**	**957390**	**27986230**	**2180**
County Total	**61263480**	**13782271**	**17634847**	**8770698**	**6073997**	**5115213**	**2215674**	**53592701**	**87**

3.8 BMP Data Maintenance

Baltimore County continues to improve the quality of its SWM data. In particular, water quality volume (Q), BMP type, and drainage areas were closely reviewed and revised as needed.

3.9 Summary

Baltimore County operates a comprehensive stormwater management program. EPS has always taken a firm stand on requiring water quality treatment even when quantity management was not required. EPS continues to require all projects to explore and implement methods for water quality treatment. EPS uses the option to accept a fee-in-lieu payment if an exhaustive search has resulted in no practicable opportunity for on-site treatment.

The stormwater management facility maintenance program within EPS has continued to inspect both publicly and privately owned facilities and maintain public facilities. The staff has compiled an extensive database of inspections and maintenance operations for the publicly and privately owned stormwater facilities. These inspections, and the resulting actions, are improving the overall pollutant reduction efficiency of all stormwater facilities.

Constructed stormwater management facilities serve ~20.75% of the total urban land (32,386 of 156,099 acres) in Baltimore County. For the areas served by these facilities a significant amount of pollutants are removed annually.

4.0 Permit Requirements

PART IV. STANDARD PERMIT CONDITIONS

D. Management Programs

2. Erosion and Sediment Control
An acceptable erosion and sediment control program shall continue to be maintained and implemented in accordance with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland. Activities to be undertaken by Baltimore County shall include, but not be limited to:

a. Implementing program improvements identified in any MDE evaluation of the County's erosion and sediment control enforcement authority;

b. Ensuring that construction site operators have received training regarding erosion and sediment control compliance and hold a valid Responsible Personnel Certification as required by the Department; and

c. Reporting quarterly, information regarding earth disturbances exceeding one acre or more. Quarters shall be based on calendar year and submittals shall be made within 30 days following each quarter. The information submitted shall cover permitting activity for the preceding three months.

4.1 Introduction

The Erosion and Sediment Control Program is being implemented by the Department of Permits, Approvals and Inspections (PAI), Building Inspections Division and has been since February 2012 when the program was transferred from EPS's Inspection and Enforcement Section. This program is reviewed by the Maryland Department of the Environment (MDE) on a biennial basis. On January 9, 2012 MDE formally adopted new erosion and sediment control regulations. Additionally, the 1994 Maryland Standards and Specifications Manual for Soil Erosion and Sediment Control has been revised. The 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control document received final approval and was published on January 27, 2012. The new regulations and standards will enhance erosion and sediment control practices, improve water quality of construction site runoff, and help in the Chesapeake Bay restoration efforts. In late March 2012 a letter from the Baltimore County Soil Conservation District was sent to consultants serving Baltimore County regarding the formal adoption of the new erosion and sediment control regulations and the grandfathering conditions consistent with the MDE regulations. Baltimore County adopted this manual in a manner consistent with MDE regulations on November 19, 2012 (Council Bill Number 72-12). The Erosion and Sediment Control Program contains several components:

- review of building and grading permit applications
- field inspection and enforcement of grading and sediment control regulations
- citizen complaint investigation

Baltimore County has been given the authority to enforce sediment control regulations by the State of Maryland. The main function of the Erosion and Sediment Control Program is to reduce pollutant loads from new development and redevelopment during the construction phase. This goal is achieved using sediment control best management practices (BMPs) as specified in the sediment and erosion control plan for each development site. A grading permit is required for any construction activity disturbing an area greater than 5,000 square feet and/or over 100 cubic yards of material disturbed. The Standard Plan for Sediment and Erosion Control is used for residential construction activity disturbing less than 30,000 sq. ft. and for all other construction activity disturbing less than 20,000 sq. ft.

4.2 Program Analysis – Plans Review

Currently, Sediment and Erosion Control Plans are reviewed for adequacy by the Baltimore County Soil Conservation District while EPS's Stormwater Engineering and Management Section coordinates the approval process. The Sediment and Erosion Control Plans are also reviewed by EPS's Environmental Impact Review Section to ensure that there is no encroachment into the forest buffer or forest conservation areas that are protected by County regulations.

Each Sediment and Erosion Control Plan is required to have an associated Grading Plan indicating the final topographic contours of the development site. The Grading Plan is reviewed by EPS, Development Plans Review (PAI) and the Baltimore County Soil Conservation District.

4.3 Program Analysis – Inspection and Enforcement

The Inspection and Enforcement Program maintains records of issued grading permits, conducts routine inspections of active construction sites, and issues correction notices, violation notices, and stop work orders to enforce compliance of sediment and erosion control and grading plans. Prior to the issuance of grading permits, a pre-construction meeting is held at the site. This meeting is attended, at a minimum, by the County inspector and the construction site foreman. The foreman must be certified through the "responsible personnel in erosion and sediment control" training program now held by MDE which is mentioned in section 4.4. The meeting covers the sequence of operations for the installation of controls and grading involved with the overall site development. This meeting is intended to forestall any future problems.

4.3.1 Grading and Building Permits Issued

Grading permits and building permits are reviewed by PAI and EPS. Grading Permits are required for any disturbance over 5,000 square feet or for grade changes in existing neighborhoods. A grading permit is also required for any grading activities in a watercourse, floodplain, wetland area, buffers (stream and within 100 feet of tidal water), habitat protection areas or forest buffer areas, including forest conservation areas. Baltimore County building permits are required for any new construction, additions, or alterations. Building permits are reviewed to ensure that the final drainage patterns will not impact adjacent properties and that the onsite drainage will direct stormwater away from building structures to stormwater management facilities. These permits are also reviewed to ensure that they are in compliance with other environmental regulations, such as, Chesapeake Bay Critical Area, Forest Buffer and Forest Conservation requirements.

During FY24, one hundred ninety nine (199) grading permits were issued. This represents the slightest decrease in the number of grading permits from FY23 (200). The number of acres disturbed decreased from 700 acres in FY23 to 628 acres in FY24. The number of grading permits approved and the acreage of disturbance are displayed by watershed in Table 4-1 and Figure 4-1.

Table 4-1: Number of Grading Permits and Acreage of Disturbance by Watershed for FY24

Watershed	Number of Permits	Acres of Disturbance
Upper Western Shore		
Deer Creek	0	0
Prettyboy Reservoir	2	0.3
Loch Raven Reservoir	31	79.8
Lower Gunpowder Falls	17	45.6
Little Gunpowder Falls	7	1.7
Bird River	16	77.1
Gunpowder River	5	1.0
Middle River	9	5.6
Upper Western Shore Total	**87**	**211.1**
Patapsco/Back River		
Liberty Reservoir	3	11.9
Patapsco River	21	92.7
Gwynns Falls	21	63.0
Jones Falls	27	14.3
Back River	19	50.1
Baltimore Harbor	21	184.8
Patapsco/Back River Total	**112**	**416.8**
County Total	**199**	**627.9**

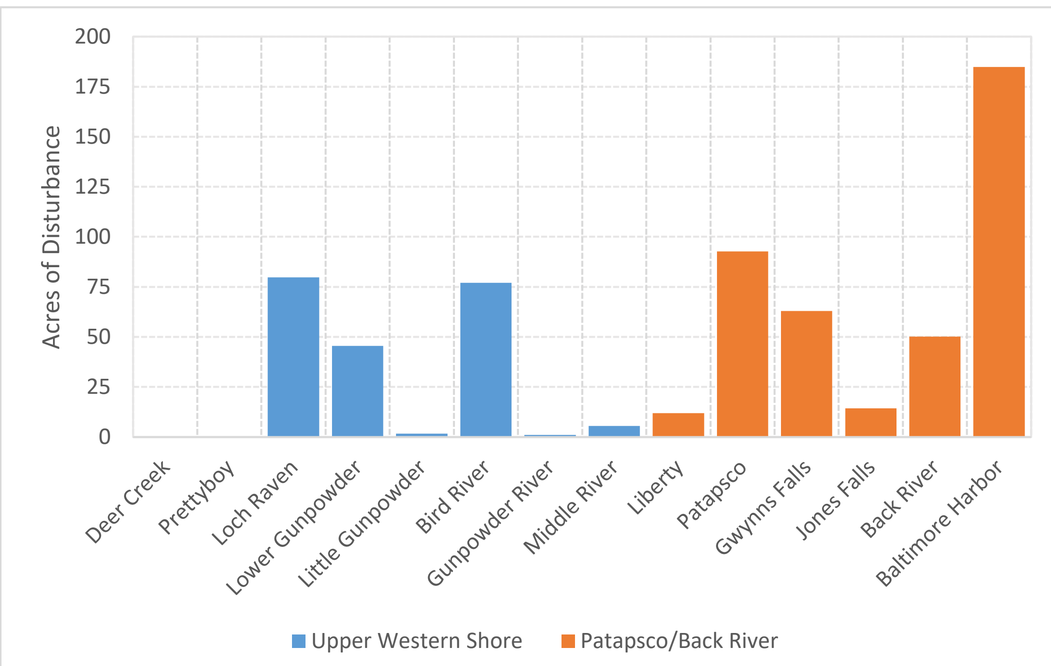


Figure 4-1: Acres of disturbance through approved grading permits by watershed for FY24

During FY24, 1,684 permits were released for new buildings. This represents a significant increase from the previous year of 1,001 permits. The distribution of building permits by watershed is displayed in Table 4-2 and Figure 4-2.

Table 4-2: Number of Building Permits by Watershed for FY24

Watershed	Number of Permits
Upper Western Shore	
Deer Creek	3
Prettyboy Reservoir	11
Loch Raven Reservoir	189
Lower Gunpowder Falls	98
Little Gunpowder Falls	17
Bird River	331
Gunpowder River	54
Middle River	209
Upper Western Shore Total	**912**
Patapsco/Back River	
Liberty Reservoir	21
Patapsco River	251
Gwynns Falls	182
Jones Falls	96
Back River	119
Baltimore Harbor	103
Patapsco/Back River Totals	**772**
County Totals	**1,684**

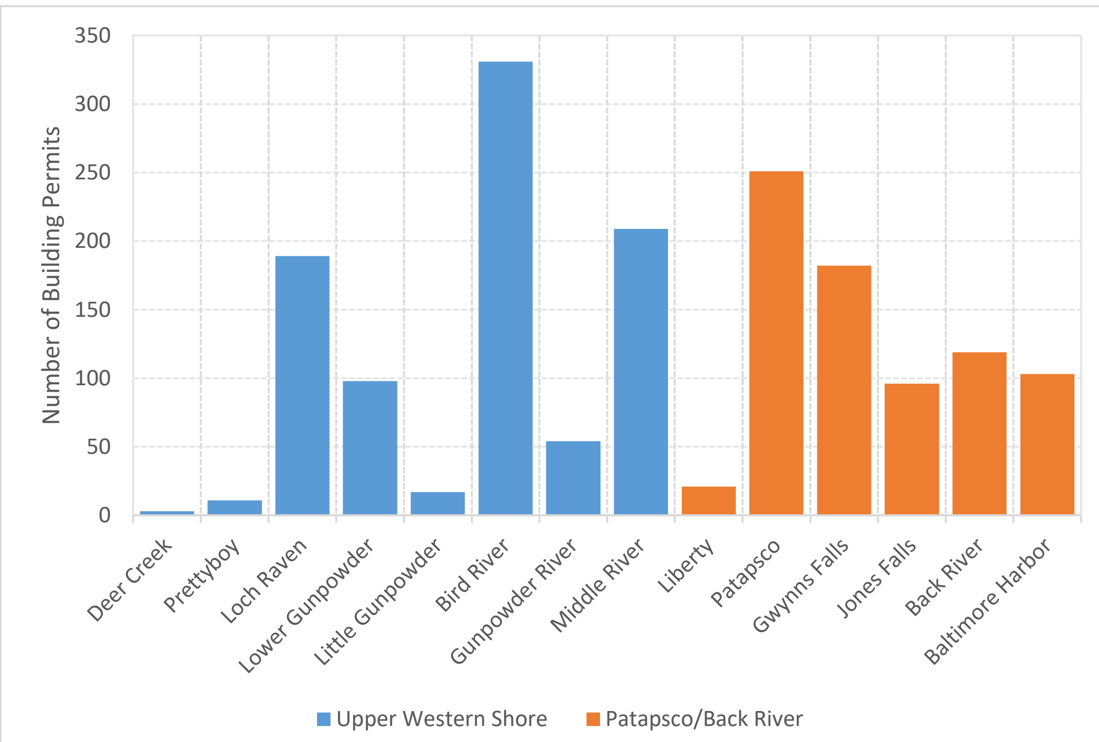


Figure 4-2: Number of building permits issued by watershed in FY24

Displayed in Table 4-3 and Figure 4-3 are the trends in building and grading permits, as well as acres of disturbance for a twenty-year period. The data used for the building permits is now extracted from the data layer called “Landuse Permits”. Residential permits include single family and multi-family dwellings. The Other Building permits column includes all other building permits.

Table 4-3: Number of Grading and Building Permits by Year

Year	Grading Permits	Acres of Disturbance	Residential Building Permits	Other Building Permits	Total Building Permits
1999	364	1,115*	2,480	107	2,587
2000	256	1,081	2,148	143	2,291
2001	232	1,209	1,636	105	1,741
2002	216	1,093	1,548	105	1,653
2003	258	916	1,339	39	1,378
2004	249	905	1,159	103	1,262
2005	217	1,083	1,231	113	1,344
2006	230	1,147	1,349	101	1,450
2007	212	698	983	121	1,104
2008	217	670	743	105	848
2009	185	430	491	201	692
2010	188	447	500	376	876
2011 – FY12	319	647	831	803	1,634
FY13	112	339	679	474	1,153
FY14	150	523	794	330	1,124
FY15	162	434	903	686	1,589
FY16	170	844	857	369	1,226
FY17	211	790	786	470	1,256
FY18	178	682	1,144	937	2,081
FY19	207	1,138	1,081	651	1,732
FY20	150	617	842	464	1,306
FY21	145	849	715	257	972
FY22	166	755	1,049	179	1,228
FY23	200	700	852	149	1,001
FY24	199	628	1,477	207	1,684

*Excludes single permit for 6,060 acres of disturbance associated with 1999 Colonial Pipeline maintenance project.

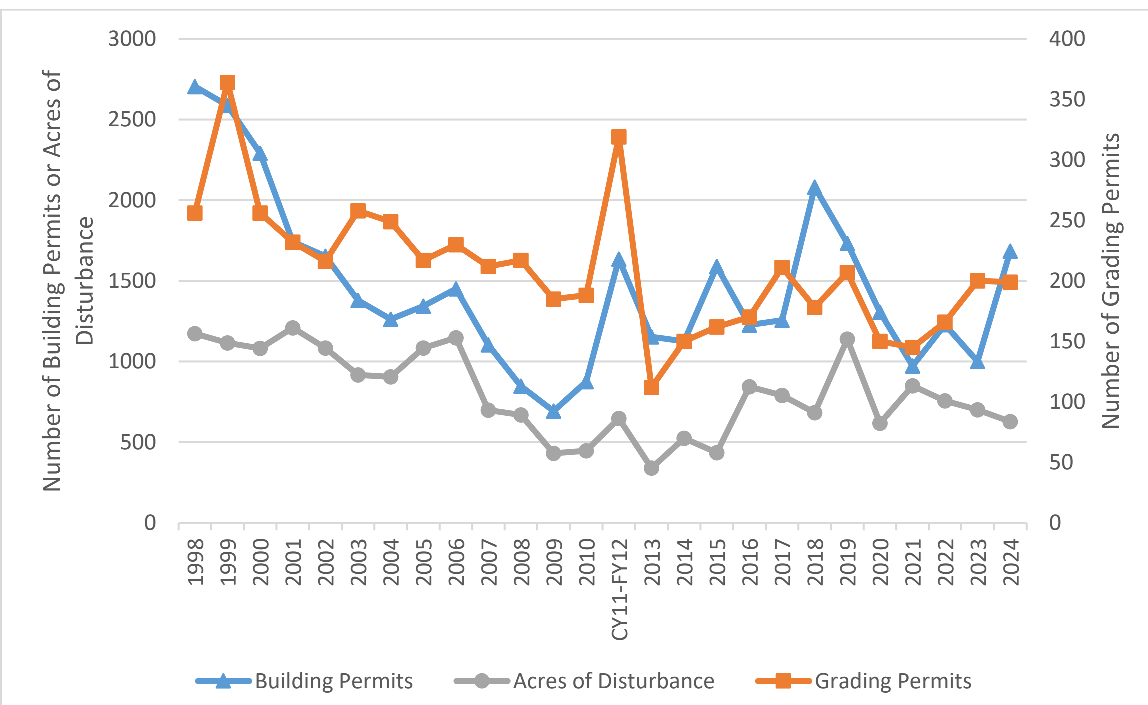


Figure 4-3: Approved Grading and Building Permits for the Period 1998 – FY2024

Construction activities in Baltimore County had been decreasing in number through 2009. Since then, numbers have generally been trending upward. Development has been purposefully directed towards existing urban areas within the County's Urban Rural Demarcation Line (URDL). These areas are also classified as the County's priority funding area and currently provide infrastructure and services such as: sewer, water, schools and an existing transportation network.

4.3.2 Inspections, Complaints and Enforcement

After construction begins, an inspector inspects the site an average of once every two weeks during the active constructive phase. Table 4-4 displays the number of inspections by type for FY12 through FY24. The data are broken down into two categories, inspections and enforcement actions.

In FY24, a total of 1,009 enforcement actions were logged (Table 4-4, last column), and over 9,525 inspections were logged (Table 4-4, 8th column). The Complaint Inspections column includes follow up inspections, which are not logged, hence the "+".

Table 4-4: Erosion & Sediment Control (ESC) Inspection and Enforcement Data Thru FY24

	Inspections							Enforcement		
Year	**Prelim.**	**Pre Constr.**	**S.C. Inspt.**	**Re-Inspections**	**Final Inspt.**	**Complaint Inspects.**	**Total Inspt.**	**Correct. Notice**	**Stop Work Order**	**Total Enforcement**
FY12	1,623	155	6,868	*	139	265	**9,050**	616	113	**729**
FY13	1,633	118	4,386	*	16	2	**6,155**	321	59	**380**
FY14	1,667	128	3,808	*	18	9	**5,630**	315	61	**376**
FY15	1,592	110	3,613	117	12	13	**5,457**	1,118	103	**1,221**
FY16	1,769	100	3,790	61	9	157+	**5,886+**	943	115	**1,058**
FY17	1,888	151	4,038	47	8	156+	**6,288+**	843	92	**935**
FY18	1,873	133	3,679	50	6	157+	**5,898+**	1,048	88	**1,136**
FY19	1,848	140	3,115	26	22	234+	**5,385+**	705	67	**772**
FY20	1,350	109	2,499	13	23	134+	**4,128+**	566	76	**642**
FY21	2,102	94	2,521	29	67	200+	**5,013+**	292	34	**326**
FY22	2,150	125	1,873	1,564	1,044	186+	**5,378+**	860	269	**1,129**
FY23	2,633	183	3,665	2,965	1,469	100+	**8,050+**	828	275	**1,103**
FY24	3,785	211	3,755	2,809	1,567	207+	**9,525+**	743	266	**1,009**

*not tracked

As of November 2021, Baltimore County began using a tracking system called Cityworks for tracking permitting. This new tracking system has facilitated better tracking of ESC re-inspections and final inspections, however now all re-inspections are also tallied as a sediment control inspection. To avoid double counting total inspections, re-inspections are no longer counted toward the total inspections tally.

Sediment controls are only seventy to ninety percent effective when they are properly installed and maintained. Therefore, a successful sediment control inspection and enforcement program is essential for achieving maximum effectiveness. Note that in FY24 207 complaints were filed and at least one inspection was conducted for each complaint. Complaints average 2-3 inspections per complaint.

Starting in FY17, Baltimore County Department of Permits, Approvals and Inspection (PAI) instituted a new program authorizing the use of third-party sediment and erosion control inspectors. These inspectors are in addition to those employed by Baltimore County PAI and must complete training, meet certain qualifications and have an application approved by PAI. The program policy can be accessed here. Additional information and requirements can be accessed here.

4.4 Program Analysis - Training Program

Starting in FY16, Responsible Personnel Certification training sessions are being held online by MDE. This data will no longer be reported in this document.

4.5 MDE Delegation

MDE approved Baltimore County's application for renewal of delegation of authority on February 6, 2024. This authority is effective through June 30, 2026.

5.0 Permit Requirements

PART IV. STANDARD PERMIT CONDITIONS

D. Management Programs

3. Illicit Discharge Detection and Elimination

The County shall implement an inspection and enforcement program to ensure that all discharges into, through, or from the MS4 that are not composed entirely of stormwater are either issued a permit by the Department or eliminated. Activities shall include, but not be limited to:

a. Reviewing all County outfalls to prioritize field screening efforts in areas with the greatest potential for polluted discharges. The County must submit the process developed to prioritize outfall screenings to the Department for approval with the first-year annual report;

b. Submitting a plan and schedule for field screening the prioritized outfalls for the Department's approval with the first-year annual report. The plan and schedule shall include the annual screening of at least 150 outfalls. Each outfall having a dry weather discharge shall be sampled at the time of screening using a chemical test kit. An alternative program may be submitted by the County for the Department's approval that methodically identifies, investigates, and eliminates illegal discharges into, through, or from the County's MS4;

c. Conducting annual visual surveys of commercial and industrial areas as identified in PART IV.C.2 above for discovering, documenting, and eliminating pollutant sources. Areas surveyed and the results of the surveys shall be reported annually;

d. Maintaining written standard operating procedures for outfall screenings, illicit discharge investigations, annual visual surveys of commercial and industrial areas, responding to illicit discharge complaints, and enforcement implementation;

e. Maintaining an ordinance, or other regulatory means, that prohibits illicit discharges into the storm sewer system;

f. Maintaining a program to address and respond to illegal discharges, dumping and spills; and

g. Using appropriate enforcement procedures for investigating and eliminating illicit discharges, illegal dumping, and spills. When a suspected illicit discharge discovered within the County's jurisdiction is either originating from or discharging to an adjacent MS4, the County must coordinate with that MS4 to resolve the investigation. Significant discharges shall be reported to the Department for enforcement and/or permitting.

5.1 Introduction

Although the separate storm sewers in Baltimore County are intended to handle only stormwater runoff and groundwater drainage, non-storm water from commercial and industrial facilities, leaks from the sanitary sewage system, and other non-stormwater sources may contribute pollutants that ultimately reach surface waters via the storm drain system. These sources of discharge not composed entirely of storm and/or ground water, which are not authorized by an NPDES permit, are termed *illicit connections*. The Baltimore County Illicit Connection Management Program was created in partial fulfillment of the requirements of the Baltimore County National Pollutant Discharge Elimination System (NPDES) - Municipal Stormwater Discharge Permit (MD0068314). The NPDES - Municipal Stormwater Discharge permit program is federally mandated with local administration by the Maryland Department of the Environment. The requirements for the illicit connection program are detailed in 40 CFR 122.26(d)(2)(iv)(B)(1 through 7).

This year's reporting period is from January 1, 2023 to December 31, 2023. The following section will cover Program Status (5.2), Outfall Screening Plan (5.3), Analysis of Outfall Screenings (5.4), Enforcement (5.5), Illicit Connections Investigations and Corrections (5.6), Commercial/Industrial Pollution Surveys (5.7), Outreach (5.8), Illicit Discharge Elimination Program Credit (5.9) and Summary (5.10).

5.2 Program Status

During January 2023 through December 2023, the Watershed Monitoring Section of EPS staff conducted 193 outfall screenings in which 72 were above water quality thresholds (Table 5-4). If an outfall is above the water quality threshold an investigation may be begun immediately or a return visit may be scheduled. Our outfall screening goal according to our permit conditions is 150.

WMM staff investigated 211 complaints, which includes reports from citizens, other agencies, outfall screenings and issues found while conducting other fieldwork. As revealed in the analysis in the following section, routine outfall screenings for detection of illicit connections appear to compliment citizen complaints of problems they observe. The routine outfall screenings catch the chronic problems that may be missed by the public, such as chlorine leaks from the municipal water supply.

Aside from the benefits of greater public involvement and the resolution of complaints, citizens provide surveillance at a level beyond that of the monitoring staff. A majority of the time citizens call while they are actually observing a problem and often can provide immediate local information that increases the chance of eliminating illicit connections. Some of the citizen complaints are a result of the Stream Watch program. This program allows citizens to adopt a stream, which includes tracking the health of the stream and reporting problems or potential projects they observe.

5.3 Outfall Screening Plan

In Baltimore County, there are 10,749 total outfalls. The Department of Public Works has developed an updated storm drain GIS layer of outfalls and that data has been incorporated into the IDDE program. There are two types of outfalls: major and minor. Major outfalls are ≥36" and minor outfalls are <36". There are 1,407 major and 9,342 minor outfalls in our database. As one of our new permit requirements, we reviewed all County outfalls to prioritize field screening efforts in areas with the greatest potential for polluted discharges. The plan was submitted in 2023 and approved by MDE in 2023. Risk factors shown in Table 5-1 were used to calculate an illicit discharge potential (IDP) score for each subwatershed. This analysis resulted in the development of five Subwatershed Priority Levels— Extreme (1), High (2), Medium (3), Low (4), and Very Low (5), that represent the subwatersheds' relative risk for illicit discharges (Figure 5-1).

Table 5-1: Risk factors included in subwatershed analysis

Risk Factor	Description
Percent Impervious	Percent of impervious cover
Population Density	Estimated population per acre
Land Use	Total land use area by Outfall Priority Level
Hotspot Density	Count and density of Hotspots
Sanitary Sewer Overflows (SSOs)	Count and density of SSOs
Storm Sewer Development Age	Average number of years since a major structure was built on parcels, weighted by stormdrain drainage density
Infrastructure Access Point (IAP) Density	The count and density of IAPs (manholes, cleanouts, junction boxes, and diversion chambers)
Total Maximum Daily Loads (TMDLs)	Geospatial TMDL data available for Chlordane, E. coli, Mercury, Nitrogen, PCBs, Phosphorus, and Sediment/TSS
Septic System Density	Count and density of septic system components (septic tanks, cesspools, and seepage pits)
Sanitary Sewer Infrastructure Age	Average age of sanitary sewer infrastructure weighted by the sanitary sewer drainage density per infrastructure age

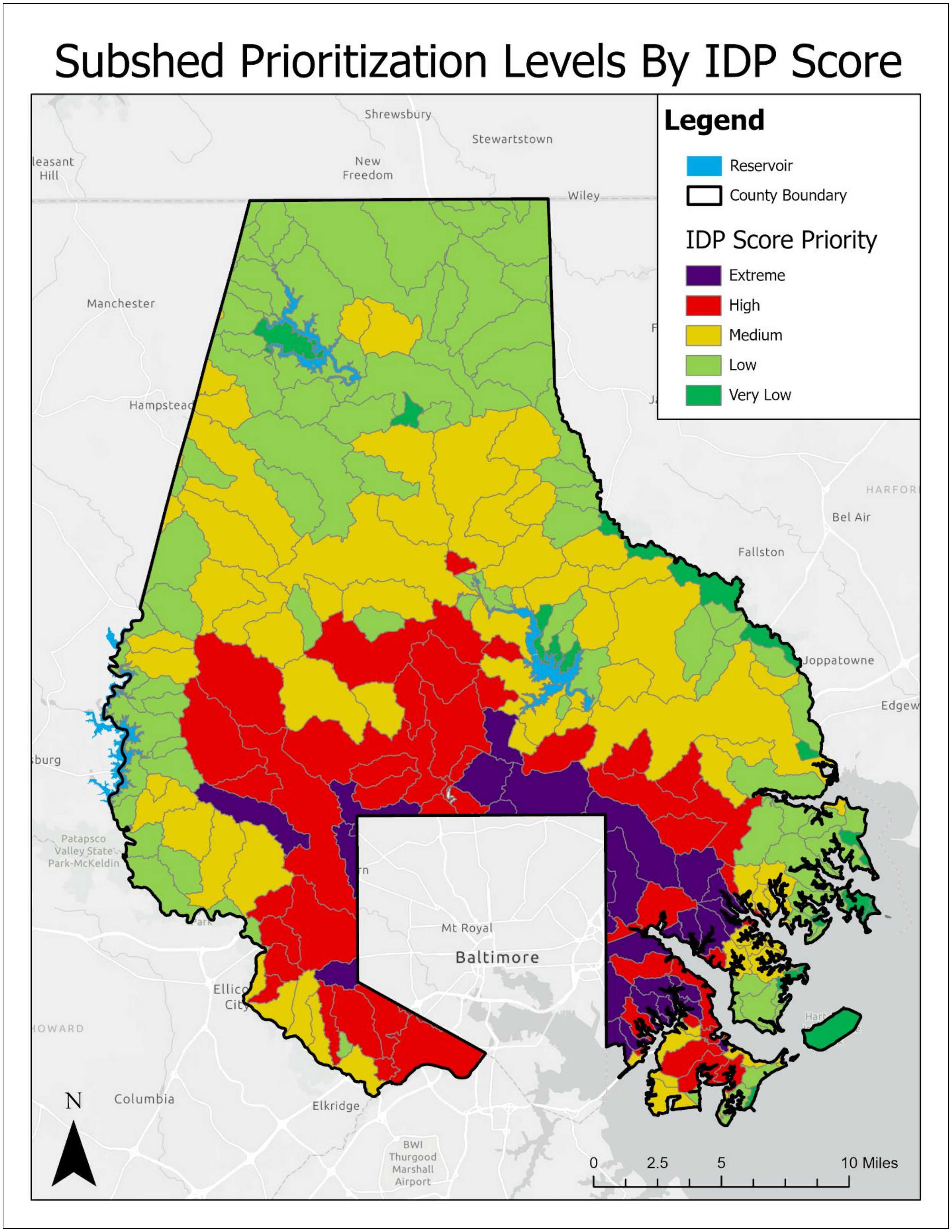


Figure 5-1: Subshed Prioritization Levels by IDP Score

Baltimore County will screen subwatersheds in the extreme risk category and work through to the lower risk levels (Table 5-2). When a subwatershed is visited, all outfalls will be screened once. These include both outfalls that have never been visited and outfalls within that subwatershed that may have a lower individual outfall priority assigned based on previous screening data. Individual outfalls are also given a priority level. Previously screened outfalls retained their priority; unscreened outfalls were assigned the subshed priority. Over time priorities may be changed with the intention that all outfalls are moving into lower priorities after problems are resolved or after a number of screenings conditions are shown to be stable. Individual outfall priorities follow the same scheme as the subwatersheds: Extreme (1), High (2), Medium (3), Low (4), and Very Low (5).

Table 5-2 Subwatershed ranked by prioritization level

Subwatershed Name (*subsheds in italics have no outfalls)*	**Average Illicit Discharge Potential (IDP) Score**	**Subwatershed Prioritization Level**
Chinquapin Run	0.61	Extreme
Colgate Creek	0.58	Extreme
Bear Creek-F	0.54	Extreme
Moores Run-A	0.54	Extreme
Back River-H	0.53	Extreme
Bear Creek-G	0.53	Extreme
Deep Creek	0.53	Extreme
Herring Run-B	0.52	Extreme
Chink Creek	0.5	Extreme
Duck Creek	0.5	Extreme
Lynch Cove	0.5	Extreme
Middle River-A	0.5	Extreme
Peach Orchard Cove	0.5	Extreme
Charlesmont Cove	0.49	Extreme
Maiden Choice Run-B	0.49	Extreme
Oakleigh Cove	0.49	Extreme
Powder Mill Run	0.49	Extreme
Towson Run	0.49	Extreme
Lynch Pt Cove	0.48	Extreme
Moores Run-B	0.48	Extreme
Long Quarter Branch	0.46	Extreme
Redhouse Run	0.46	Extreme
Stemmers Run	0.46	Extreme
Western Run-Jones Falls	0.46	Extreme
Baltimore Harbor	0.45	Extreme
Scotts Level	0.45	Extreme
Back River-I	0.44	Extreme
Briens Run	0.44	Extreme
Darkhead Creek-B	0.44	Extreme
Tabasco Cove	0.44	Extreme
Hopkins Creek	0.43	Extreme
Back River-B	0.42	High

Subwatershed Name (*subsheds in italics have no outfalls)*	Average Illicit Discharge Potential (IDP) Score	Subwatershed Prioritization Level
Clements Cove	0.42	High
Herbert Run (E. Br)	0.42	High
Roland Run	0.42	High
Bread & Cheese	0.41	High
Bullneck Creek	0.41	High
Cowpens Run	0.41	High
Dead Run	0.41	High
Gwynns Falls-A	0.41	High
Whitemarsh Run (N.Fork)	0.41	High
Gwynns Falls-C	0.4	High
Spring Branch	0.4	High
Greenhill Cove-A	0.39	High
Maiden Choice Run-A	0.39	High
Miller Branch	0.39	High
Cedar Branch	0.38	High
Lake Roland Reservoir	0.38	High
Northeast Creek	0.38	High
Back River-G	0.37	High
Goodwin Run	0.37	High
Gwynns Falls-B	0.37	High
Horsehead Branch	0.37	High
Jones Creek	0.37	High
Lower Jones Falls	0.37	High
Moores Branch	0.37	High
Stony Run	0.37	High
Whitemarsh Run	0.37	High
Patapsco River-A5	0.36	High
Herbert Run	0.35	High
Herring Run-A	0.35	High
Minebank Run	0.35	High
Beaver Dam Run	0.34	High
Greenhill Cove-B	0.34	High
Herbert Run (W. Br)	0.34	High
Humphreys Creek	0.34	High
Middle River-D	0.34	High
Middle River-E	0.34	High
Red Run	0.34	High
Ruxton Run	0.34	High
Whitemarsh Run (S.Fo)	0.34	High

Subwatershed Name (*subsheds in italics have no outfalls)*	Average Illicit Discharge Potential (IDP) Score	Subwatershed Prioritization Level
Bear Creek-A	0.33	High
Bull Branch	0.33	High
Deep Run-Jones Falls	0.33	High
Jennifer Branch	0.33	High
Slaughterhouse Branch	0.33	High
Back River-A	0.32	High
Jones Falls	0.32	High
Quail Creek	0.32	High
Cooper Branch	0.31	High
Dogwood Run	0.31	High
Merryman's Branch	0.31	High
Northpoint Creek	0.31	High
Schoolhouse Cove	0.31	High
Bean Run	0.31	Medium
Country Club Cove	0.3	Medium
Jones Falls (North Branch)	0.3	Medium
Muddy Gut	0.3	Medium
Ben's Run	0.29	Medium
Hampton Branch	0.29	Medium
Hogpen Creek	0.29	Medium
Sawmill Branch	0.29	Medium
Chesapeake Bay-B	0.28	Medium
Honeygo Run	0.28	Medium
Mardella Run	0.28	Medium
Swan Point Inlet-B	0.28	Medium
Councilman's Run	0.27	Medium
Darkhead Creek-A	0.27	Medium
Dipping Pond Run	0.27	Medium
Frog Mortar Creek	0.27	Medium
Loch Raven Reservoir-K	0.27	Medium
Patapsco River-A1	0.27	Medium
Patapsco River-A4	0.27	Medium
Santee Branch	0.27	Medium
Back River-F	0.26	Medium
Bear Creek-B	0.26	Medium
Delaware Run	0.26	Medium
Dulaney Valley Branch	0.26	Medium
Loch Raven Reservoir-H	0.26	Medium
Lower Gunpowder Falls	0.26	Medium

Subwatershed Name (*subsheds in italics have no outfalls)*	**Average Illicit Discharge Potential (IDP) Score**	**Subwatershed Prioritization Level**
Stansbury Creek	0.26	Medium
Sweet Air	0.26	Medium
Thistle Run	0.26	Medium
Bird River-A	0.25	Medium
Cowen Run	0.25	Medium
Franklinville Channel	0.25	Medium
Greene Branch	0.25	Medium
Indian Run-Prettyboy	0.25	Medium
Loch Raven Reservoir-B	0.25	Medium
Loch Raven Reservoir-C	0.25	Medium
Loch Raven Reservoir-D	0.25	Medium
Lower Loch Raven	0.25	Medium
Oregon Run	0.25	Medium
Overshot Run	0.25	Medium
Bear Creek-D	0.24	Medium
Brice Run	0.24	Medium
Deep Run-Liberty	0.24	Medium
Gunpowder Falls	0.24	Medium
Middle River-F	0.24	Medium
Murphy Run	0.24	Medium
Old Road Bay-B	0.24	Medium
Owl Branch	0.24	Medium
Piney Run	0.24	Medium
Powells Run	0.24	Medium
Sue Creek-B	0.24	Medium
Bear Creek-C	0.23	Medium
Carroll Branch	0.23	Medium
Charles Run	0.23	Medium
Deadman's Run	0.23	Medium
Frog Hollow	0.23	Medium
Keyser Run	0.23	Medium
Middle River-B	0.23	Medium
Norman Creek	0.23	Medium
Peggy's Run	0.23	Medium
Piney Creek	0.23	Medium
Sawmill Branch 2	0.23	Medium
Sue Creek-A	0.23	Medium
Western Run-Loch Raven-A	0.23	Medium
Board Run	0.22	Medium

Subwatershed Name ***(subsheds in italics have no outfalls)***	**Average Illicit Discharge Potential (IDP) Score**	**Subwatershed Prioritization Level**
Falls Run	0.22	Medium
Loch Raven Reservoir-J	0.22	Medium
Long Green Creek	0.22	Medium
McGill Run	0.22	Medium
My Ladys Manor Branch	0.22	Medium
Norris Run	0.22	Medium
Patapsco River-D	0.22	Medium
Slade Run	0.22	Medium
Aspen Run	0.22	Low
Back River-E	0.22	Low
Bird River-C	0.22	Low
Blackrock Run	0.22	Low
Loch Raven Reservoir-I	0.22	Low
Patapsco River-C	0.22	Low
Seneca Creek	0.22	Low
Silver Run	0.22	Low
Waterspout Run	0.22	Low
Western Run-Loch Raven-B	0.22	Low
Beetree Run	0.21	Low
Buffalo Creek	0.21	Low
Compass Run	0.21	Low
Harford	0.21	Low
Headwaters	0.21	Low
Indian Run-Loch Raven	0.21	Low
Liberty Reservoir-B	0.21	Low
Little Deer Creek	0.21	Low
Little Falls	0.21	Low
Little Piney Run	0.21	Low
Old Road Bay-A	0.21	Low
Parker Branch	0.21	Low
Plumtree Branch	0.21	Low
Royston Run	0.21	Low
Second Mine Branch	0.21	Low
Walker Run	0.21	Low
Baisman Run	0.2	Low
Bear Creek-E	0.2	Low
Bird River-D	0.2	Low
Cooks Branch	0.2	Low
Georges Run	0.2	Low

Subwatershed Name (*subsheds in italics have no outfalls)*	Average Illicit Discharge Potential (IDP) Score	Subwatershed Prioritization Level
Grave Run	0.2	Low
Harris Mill	0.2	Low
Nelson Branch	0.2	Low
Panther Branch	0.2	Low
Rushbrook	0.2	Low
Shallow Creek	0.2	Low
Third Mine Branch	0.2	Low
Timber Run	0.2	Low
Windlass Run	0.2	Low
Black Marsh	0.19	Low
Deer Creek-B	0.19	Low
Glen Falls Run	0.19	Low
Granite Branch	0.19	Low
Hawk Cove-B	0.19	Low
Locust Run	0.19	Low
Longs Creek	0.19	Low
Muddy Creek	0.19	Low
Poplar Run	0.19	Low
Prettyboy Branch	0.19	Low
Railroad Creek	0.19	Low
Belair	0.18	Low
Bush Cabin	0.18	Low
Deer Creek-A	0.18	Low
First Mine Branch	0.18	Low
Fitzhugh Run	0.18	Low
Fourth Mine Branch	0.18	Low
Galloway Creek	0.18	Low
Haystack Branch	0.18	Low
Hess	0.18	Low
Liberty Reservoir-C	0.18	Low
Patapsco River-A6	0.18	Low
Cliffs Branch	0.17	Low
Dick Branch	0.17	Low
Gunpowder Falls (Above Prett;6	0.17	Low
Gunpowder River-C	0.17	Low
Jenkins Run	0.17	Low
Patapsco River-B	0.17	Low
Prettyboy Direct Drainage-B	0.17	Low
Saltpeter Creek-B	0.17	Low

Subwatershed Name (*subsheds in italics have no outfalls)*	Average Illicit Discharge Potential (IDP) Score	Subwatershed Prioritization Level
Bird River-B	0.16	Low
Gunpowder Falls (Below Pretty;7	0.16	Low
Liberty Reservoir-F	0.16	Low
Patapsco River (N.Br)	0.16	Low
Patapsco River-E	0.16	Low
Sweathouse Run	0.16	Low
Chesapeake Bay-C	0.15	Low
Chesapeake Bay-F	0.15	Low
Chimney Branch	0.15	Low
Ebaughs Creek	0.15	Low
Liberty Reservoir-A	0.15	Low
Loch Raven Reservoir-A	0.15	Low
Lower Little Gunpowder Falls	0.15	Low
Prettyboy Direct Drainage-A	0.15	Low
Soapstone Branch	0.15	Low
Browns Creek	0.14	Low
Dundee Creek	0.14	Low
Liberty Reservoir-E	0.14	Low
Loch Raven Reservoir-G	0.14	Low
Prettyboy Direct Drainage-C	0.14	Low
Middle River-C	0.13	Low
Gooseharbor Inlet	0.13	Very Low
Jerusalem	0.13	Very Low
Long Green Pike	0.13	Very Low
Mingo Branch	0.13	Very Low
Hawk Cove-A	0.12	Very Low
Loch Raven Reservoir-E	0.12	Very Low
Patapsco River-F	0.12	Very Low
Prettyboy Direct Drainage-D	0.12	Very Low
Loch Raven Reservoir-F	0.11	Very Low
Chesapeake Bay-D	0.09	Very Low
Chesapeake Bay-E	0.09	Very Low
Gunpowder Falls State Park	0.08	Very Low
Slough Creek	0.08	Very Low
Cunninghill Cove	0.07	Very Low
Jarrettsville	0.06	Very Low
Swan Point Inlet-A	0.05	Very Low
Hawthorne Cove	0.02	Very Low
Chesapeake Bay-A	0.01	Very Low

Subwatershed Name (*subsheds in italics have no outfalls)*	Average Illicit Discharge Potential (IDP) Score	Subwatershed Prioritization Level
Gunpowder River-A	0.01	Very Low
Gunpowder River-B	0.01	Very Low
Hart-Miller Island	0.01	Very Low

5.4 Analysis of Outfall Screenings

A routine outfall screening consists of:

(1) A quantitative analysis of the effluent. This includes measuring the effluent flow rate, temperature and pH, and field-testing with the LaMotte NPDES test kit (parts per million tests for copper, chlorine, ammonia, boron and phenol).

(2) A visual inspection of the effluent, the outfall structure and the receiving channel, noting such conditions as water color, odor, vegetative condition, sedimentation, erosion, structural damage, etc.

If the problem is severe enough to warrant immediate correction, then an investigation begins immediately. Some sites are determined to have problems severe enough to warrant immediate investigation and/or corrective action after only one screening. Table 5-3 lists the number of outfalls by watershed and by the priority classification described above.

Table 5-3 Outfalls by Watershed Priority Classification

Watershed	Priority 1/Extreme	Priority 2/High	Priority 3/Medium	Priority 4/Low	Priority 5/Very Low	Total
Upper Western Shore						
Deer Creek	0	0	4	111	0	115
Prettyboy Reservoir	0	0	42	181	4	227
Loch Raven Reservoir	31	425	1,045	686	0	2,187
Lower Gunpowder	1	202	813	74	0	1,090
Gunpowder River	1	4	12	113	4	134
Little Gunpowder Falls	0	2	121	165	20	308
Bird River	0	530	161	278	0	969
Middle River	85	56	249	64	19	473
Total	**118**	**1,219**	**2,447**	**1,672**	**47**	**5,503**
Patapsco-Back River						
Liberty Reservoir			46	133		179
Patapsco River	44	439	416	92		991
Gwynns Falls	170	1,083	202	120		1,575
Jones Falls	130	514	160	35		839
Back River	345	319	277	124	5	1,070
Baltimore Harbor	185	306	51	49	1	592
Total	**874**	**2,661**	**1,152**	**553**	**6**	**5,246**
Grand Total	**992**	**3,880**	**3,599**	**2,225**	**53**	**10,749**

The locations of the prioritized outfalls are shown in

Figure 5-2 through Figure 5-6. As can be noted from the figure, the majority of the outfalls occur within the Urban-Rural Demarcation Line. There is no consistent pattern of outfall location in relation to the prioritization category. The percentages of outfall priorities are shown in Figure 5-7 and Figure 5-8.

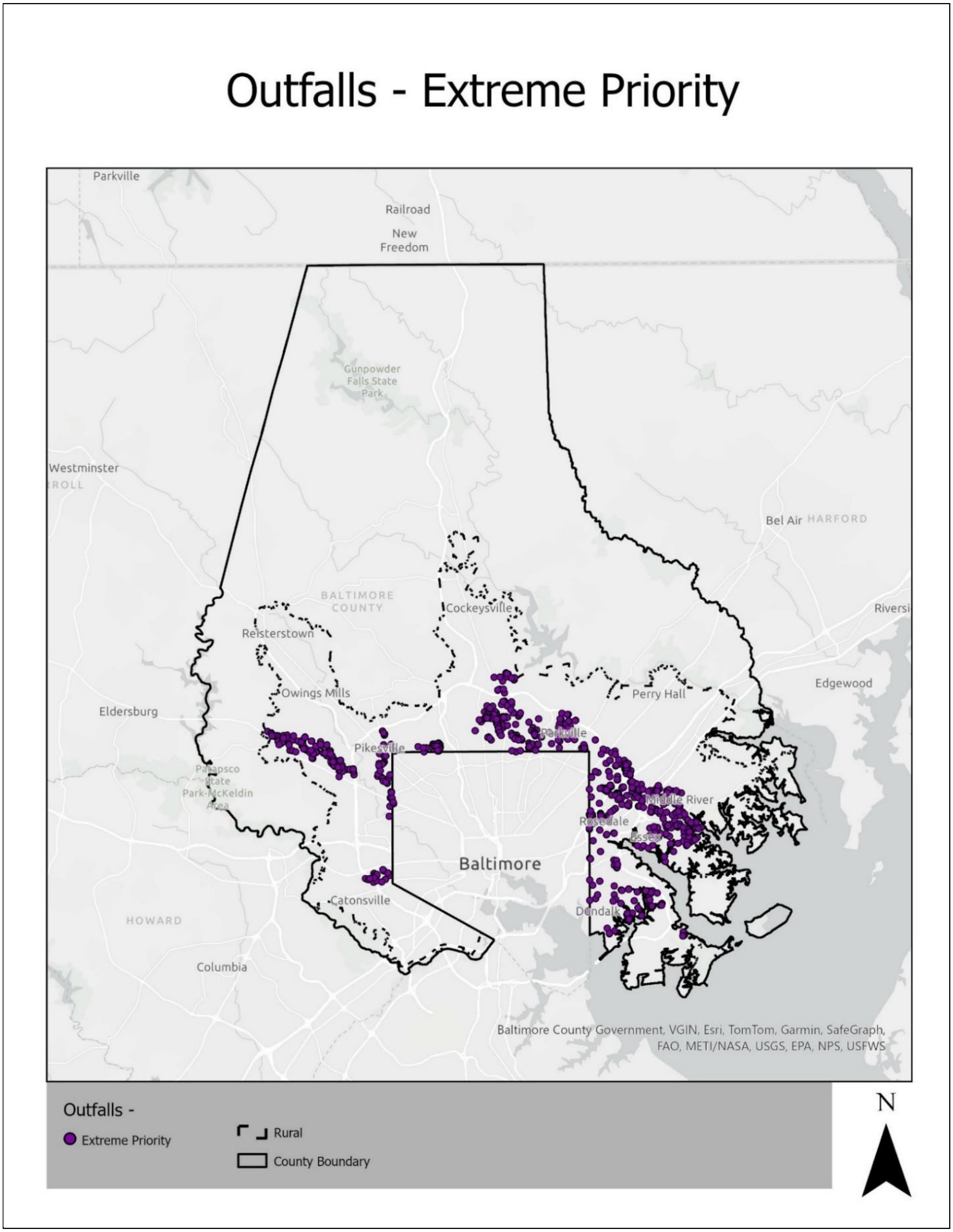


Figure 5-2 Outfall Prioritization Map- Extreme

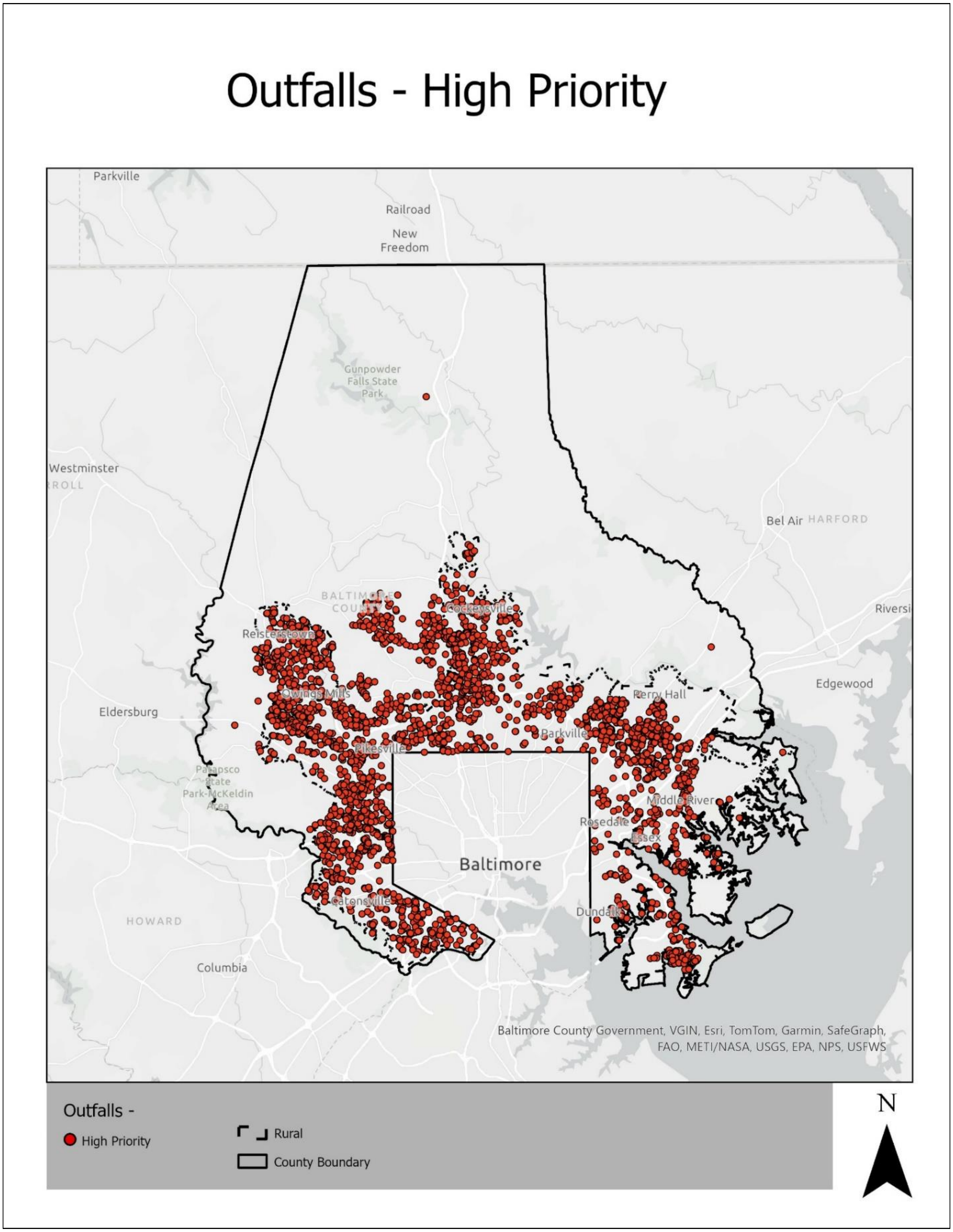


Figure 5-3 Outfall Prioritization Map- High

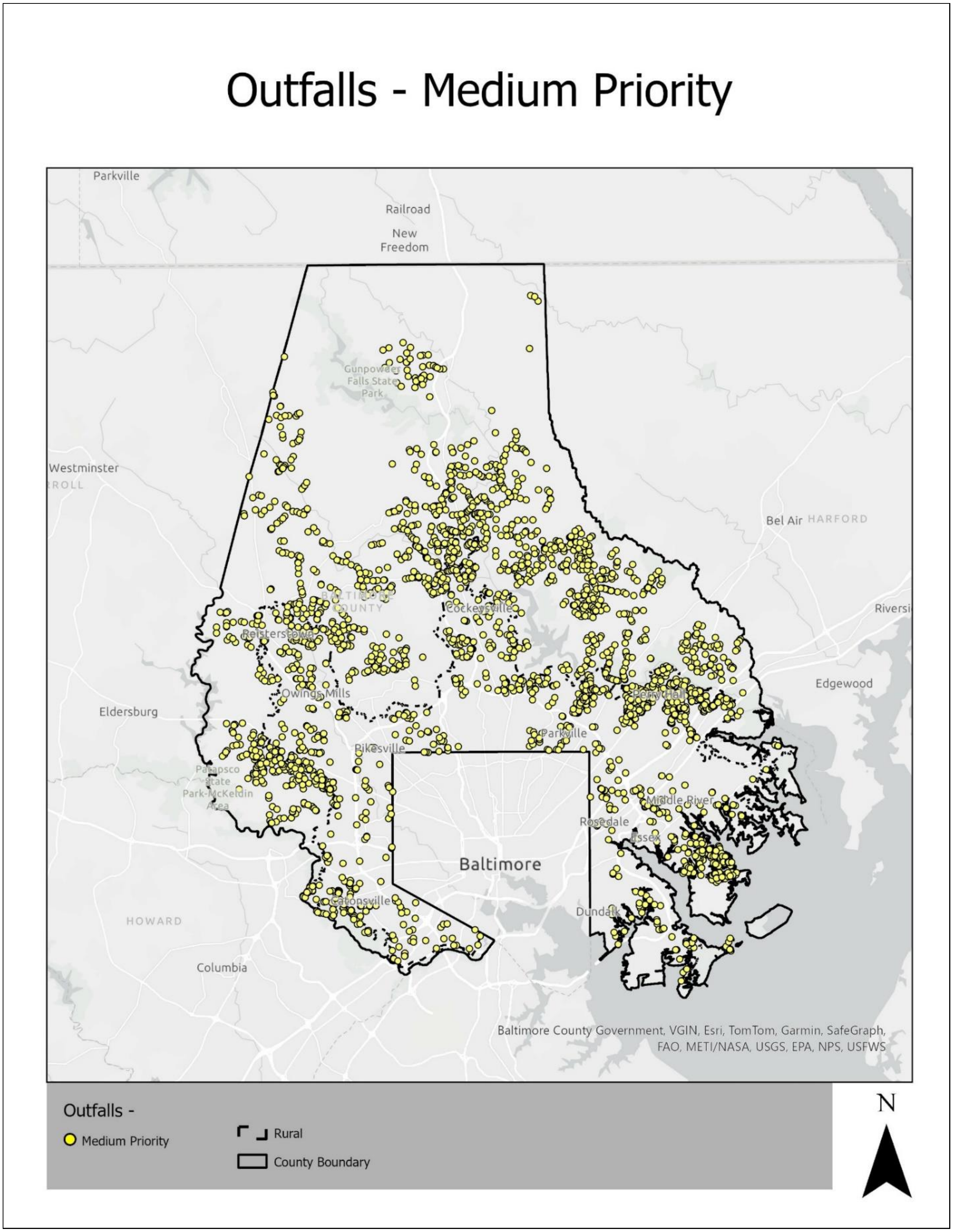


Figure 5-4 Outfall Prioritization Map- Medium

Outfalls - Low Priority

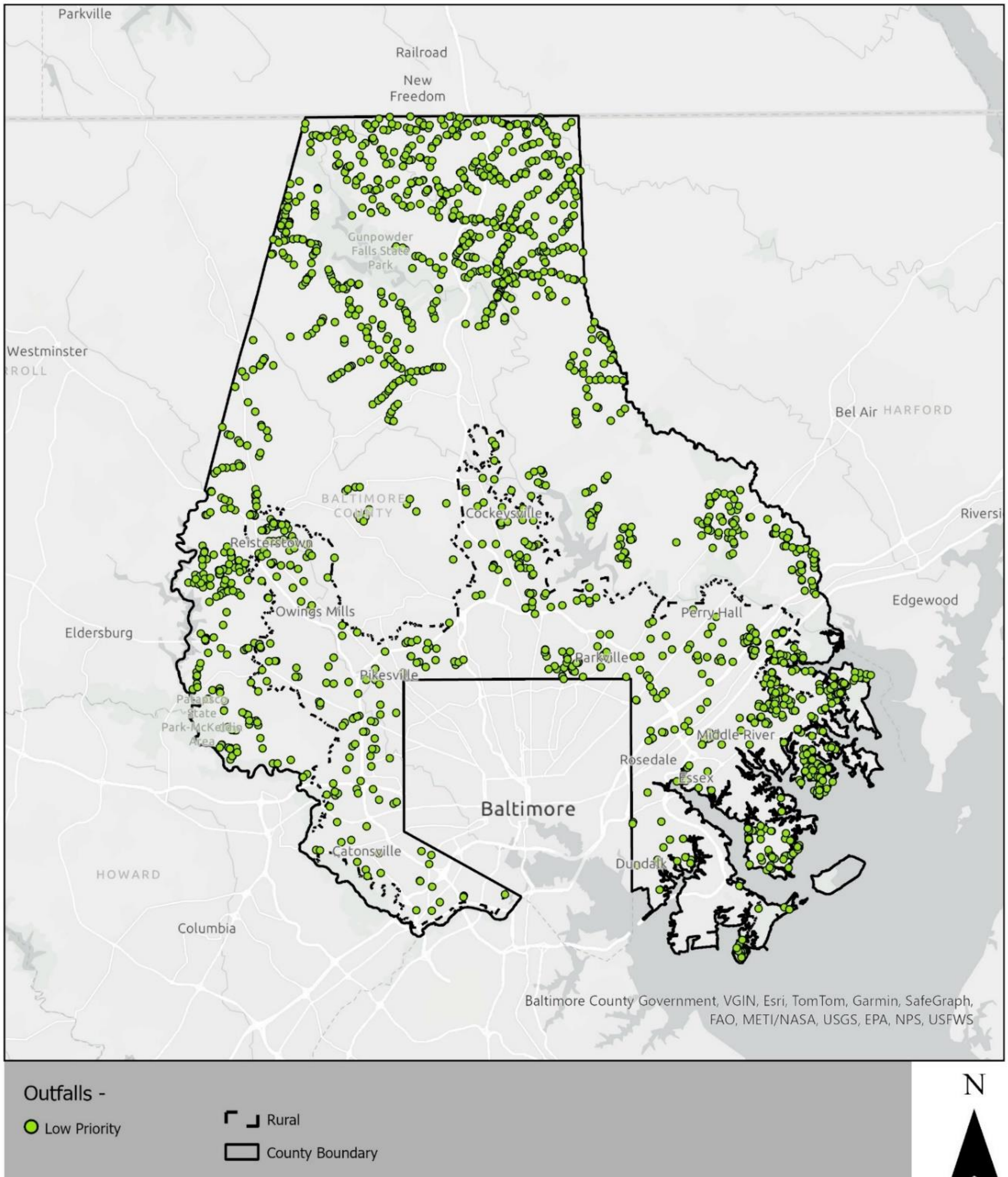


Figure 5-5 Outfall Prioritization Map- Low

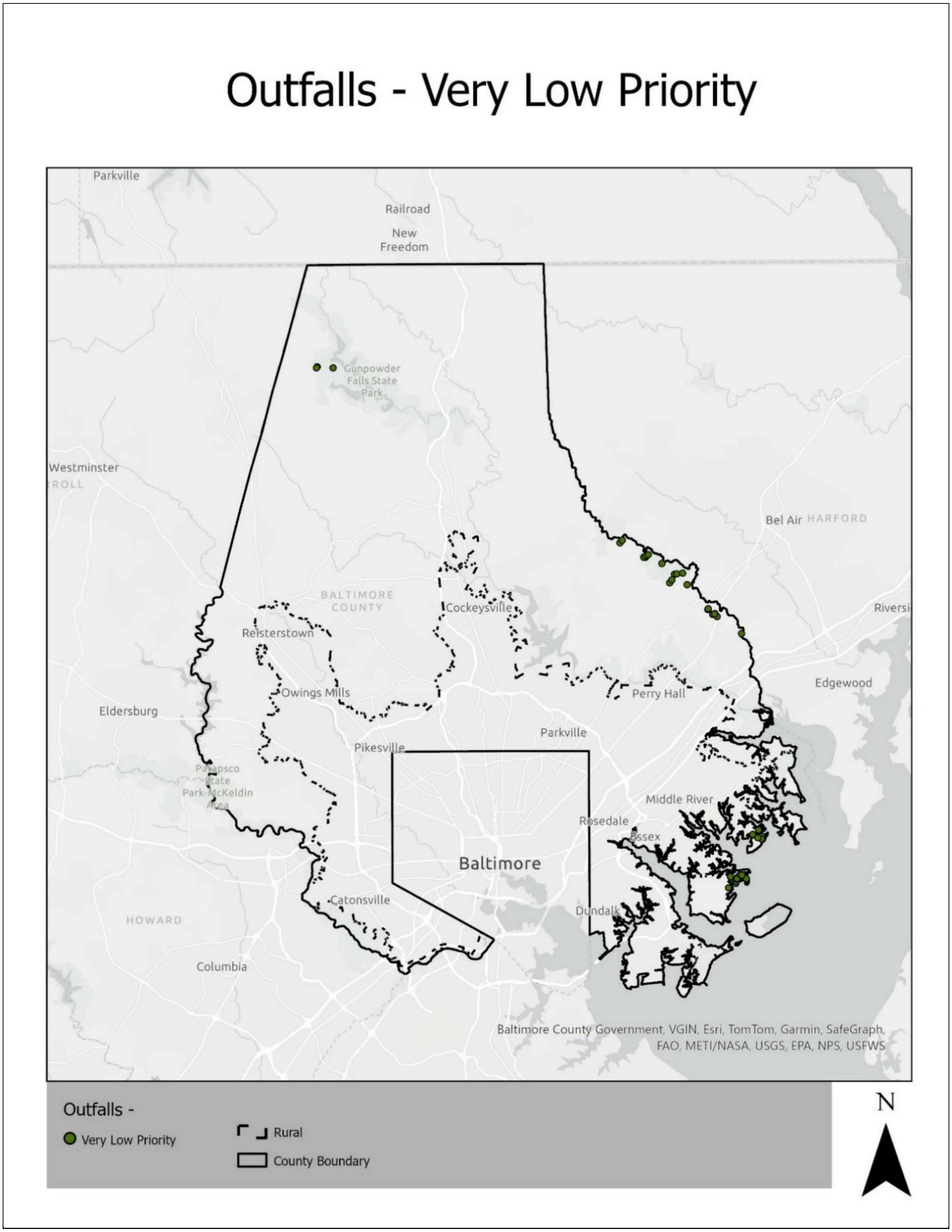


Figure 5-6 Outfall Prioritization Map- Very Low

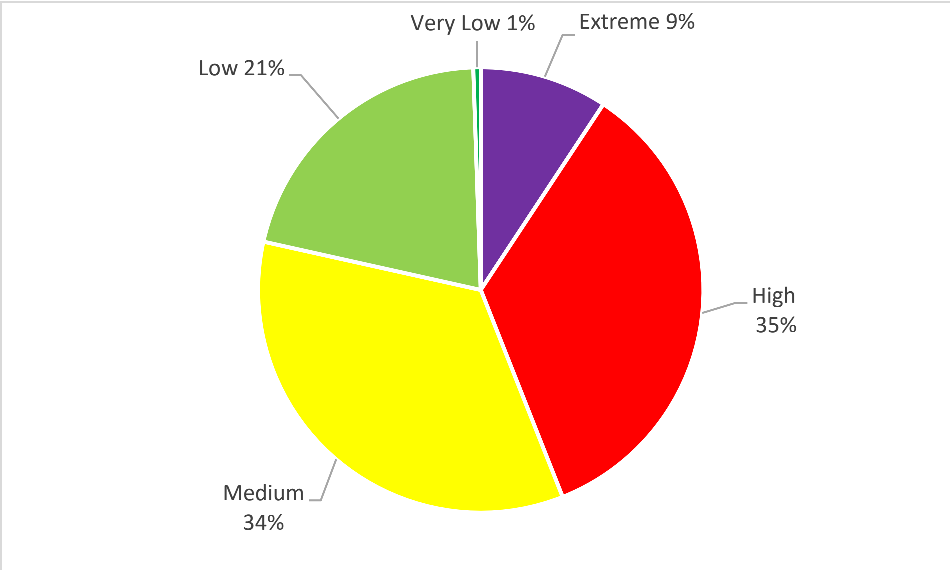


Figure 5-7: Minor Outfall Screening Priority Distribution

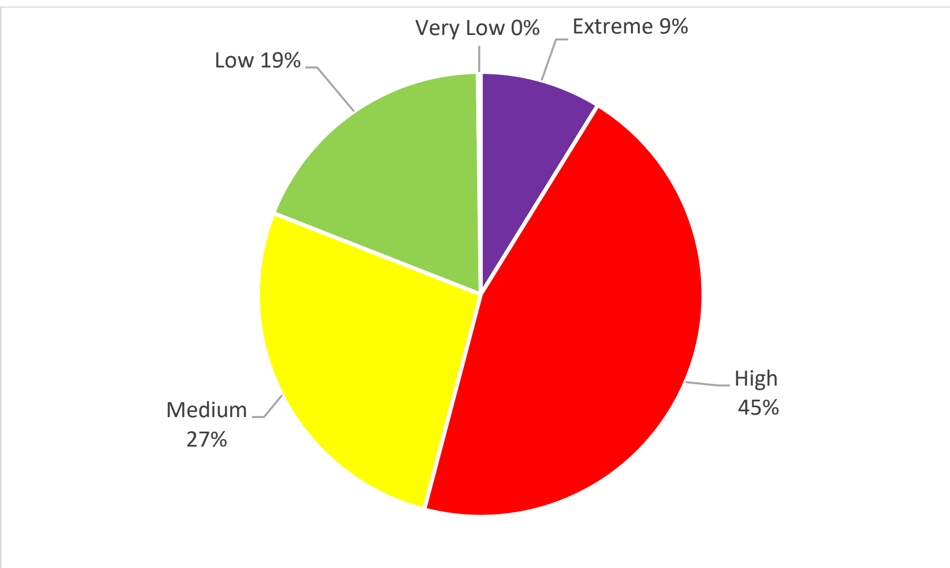


Figure 5-8 Major Outfall Screening Priority Distribution

Of the 193 outfalls screened during January 2023 to December 2023, 91 were major outfalls and 103 were minor outfalls. They were selected from the database based on the following criteria:

- Outfall prioritization plan
- Citizens who contacted to express concern about stream water quality
- Referrals as a result of field work by this office (not related to the illicit program), other Baltimore County agencies or Sections of EPS, or State agencies;

Figure 5-9 and Figure 5-10 show the quantitative problems and Figure 5-11 and Figure 5-12 show the qualitative problems found. As indicated in Figure 5-9 and Figure 5-10 by the bar labeled "*none detected*", 88 out of the 193 routine outfall screenings had no detectable quantitative problems. Phenol, chlorine, copper, ammonia and boron are considered as indicators if they are above 0.17 mg/L, 0.4 mg/L, 0.21mg/L and 0.3 mg/L, 0.35 mg/L respectively. Phenol was detected at 104 outfalls and chlorine was detected at nine. Copper was detected at five outfalls and ammonia was detected at four. Boron was detected at two outfalls. Baltimore County screens boron instead of detergents, boron will be reported in the detergent field in the geodatabase give to MDE. Temperature is considered a potential problem if it exceeds 75 degrees F (23.9 degrees C), which occurred in eight outfalls. pH is a problem if it is under 6.0 or above 9.0, and all outfalls were within that range.

There was a total of 226 quantitative problems, Table 5-4 Summary of 2023 Outfall Screenings with a Quantitative Issue lists the 105 outfalls that had those problems. This table also indicates if an investigation was started or not (these investigations are also included in the overall complaint table). Seventy-six percent of the major and 66% of the minor outfalls had a quantitative problem.

When an outfall has a quantitative problem detected, meaning the parameter was above the allowable threshold, it is automatically changed to a higher priority and investigated. The qualitative problems are more subjective and depend on the particular problem and severity.

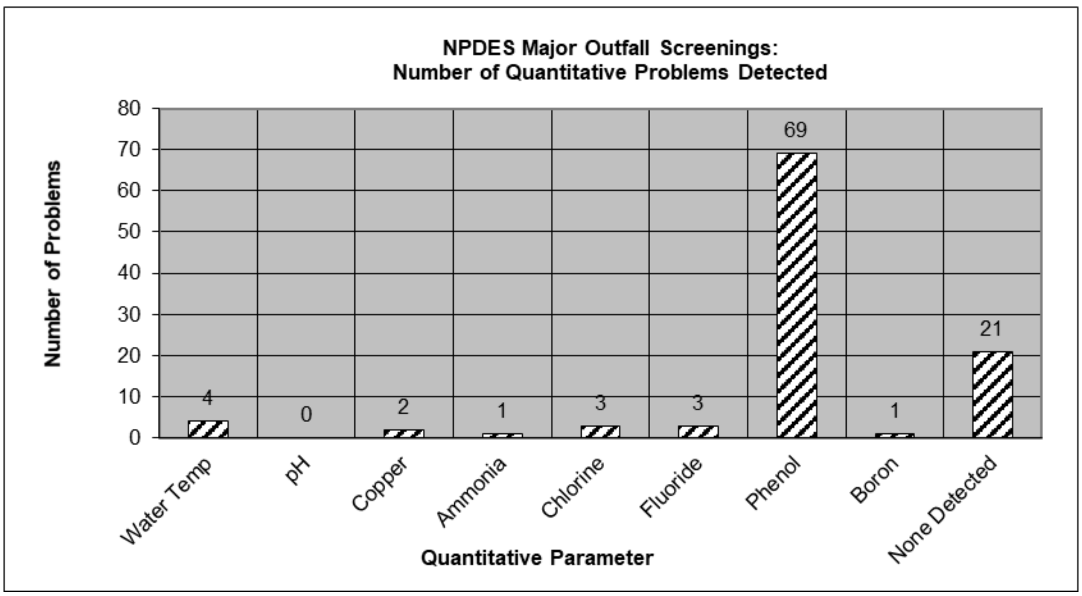


Figure 5-9 Major Outfalls Number of quantitative problems detected

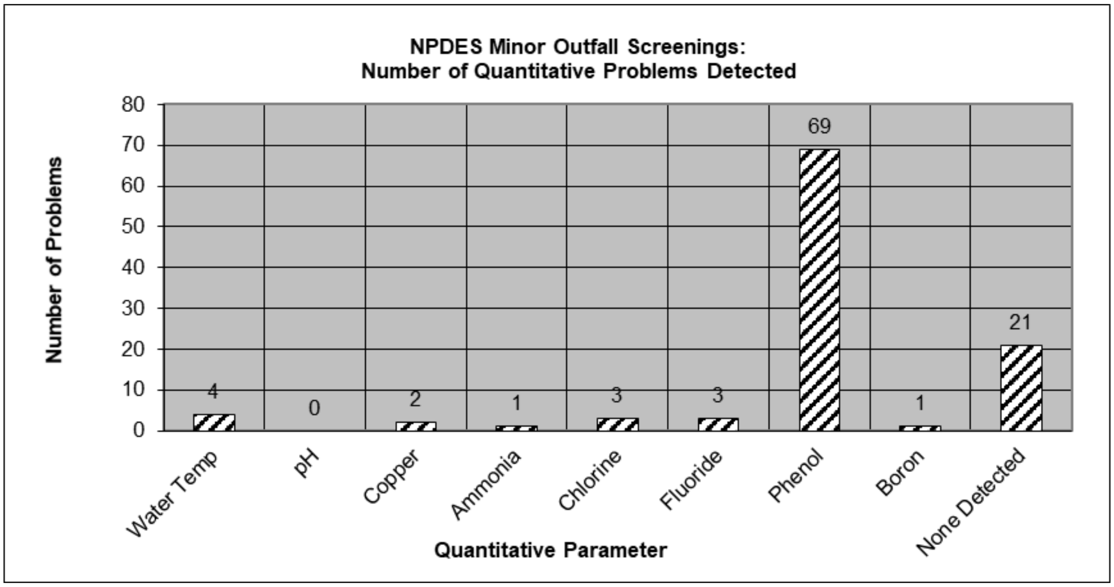


Figure 5-10 Minor Outfalls Number of quantitative problems detected

Table 5-4 Summary of 2023 Outfall Screenings with a Quantitative Issue

Outfall	Source	Status
31	Drinking Water Transmission Loss	Eliminated
32	Commercial and Mobile Vehicle Washing	In Process of Correction
37	Unknown	Source Under Investigation
38	Unknown	Source Under Investigation
39	Unknown	Source Under Investigation
40	Unknown	Follow-up investigation found no issue
49	Unknown	Source Under Investigation
60	Unknown	Follow-up investigation found no issue
61	Unknown	Source Under Investigation
72	Unknown	Source Under Investigation
73	Unknown	Source Under Investigation
75	Unknown	Source Under Investigation
123	Unknown	Source Under Investigation
129	Unknown	Source Under Investigation
140	Unknown	Source Under Investigation
168	Unknown	Source Under Investigation
174	Unknown	Source Under Investigation
181	Unknown	Source Under Investigation
214	Unknown	Source Under Investigation
235	Unknown	Source Under Investigation
240	Unknown	Source Under Investigation
243	Unknown	Source Under Investigation
295	Commercial and Mobile Vehicle Washing	Eliminated

Outfall	Source	Status
301	Unknown	Source Under Investigation
315	Drinking Water Transmission Loss	In Process of Correction
378	Unknown	Source Under Investigation
379	Unknown	Source Under Investigation
448	Unknown	Source Under Investigation
452	Unknown	Source Under Investigation
493	Unknown	Source Under Investigation
570	Unknown	Source Under Investigation
673	Unknown	Source Under Investigation
674	Unknown	Source Under Investigation
710	Unknown	Source Under Investigation
718	Unknown	Source Under Investigation
720	Unknown	Source Under Investigation
805	Unknown	Source Under Investigation
807	Unknown	Source Under Investigation
810	Unknown	Source Under Investigation
831	Unknown	Source Under Investigation
1607	Unknown	Source Under Investigation
1608	Unknown	Source Under Investigation
1612	Unknown	Source Under Investigation
so-103-bh	Unknown	Source Under Investigation
So-11808-gw	Unknown	Eliminated
so-1527-lr	Unknown	Source Under Investigation
so-1534-lr	Unknown	Source Under Investigation
so-1550-lr	Unknown	Source Under Investigation
so-1648-gw	Drinking Water Transmission Loss	In Process of Correction
so-1713-lr	Unknown	Source Under Investigation
So-1763-lr	Unknown	Source Under Investigation
so-1815-lr	Drinking Water Transmission Loss	In Process of Correction
so-1815-lr	Drinking Water Transmission Loss	In Process of Correction
so-193-mr	Commercial and Mobile Vehicle Washing	Source Under Investigation
so-2121-lr	Unknown	Source Under Investigation
So-244-br	Sanitary Direct Connection	In Process of Correction
so-277-bh	Unknown	Source Under Investigation
so-284-gw	Drinking Water Transmission Loss	In Process of Correction
so-294-br	Unknown	Source Under Investigation
so-3114-bh	Unknown	Source Under Investigation
so-3115-bh	Unknown	Source Under Investigation
so-322-br	Unknown	Source Under Investigation
So-3245-gw	Unknown	Source Under Investigation
so-39-bh	Unknown	Source Under Investigation

Outfall	Source	Status
so-40-bh	Unknown	Source Under Investigation
so-4147-bh	Unknown	Source Under Investigation
So-4225-br	Unknown	Source Under Investigation
so-4349-bh	Unknown	Source Under Investigation
so-5576-bh	Unknown	Source Under Investigation
so-769-br	Unknown	Source Under Investigation
so-7-br	Unknown	Source Under Investigation
so-892-br	Unknown	Source Under Investigation

Figure 5-11 and Figure 5-12 illustrate incidences of problems observed during *qualitative* assessments such as; visual evidence of sewage, oil, and structural problems. Qualitative and "visual problems" which were those most frequently encountered included observations regarding color, odor, clarity, and receiving water characteristics and sediment deposition immediately at and below each outfall. Trash, erosion, and sediment deposition were observed at 124, 23, and 98 outfalls, respectively. Oil was observed at one outfall and sewage was not observed at any. Structural issues were observed at 59 and odor at nine. Of the total 193 outfalls screened, there were a total of 314 qualitatively assessed problems, however, 24 had no problems. Many of the outfalls screened had more than one problem. Eighty-five percent of the major and 90% of the minor outfalls had a qualitative problem.

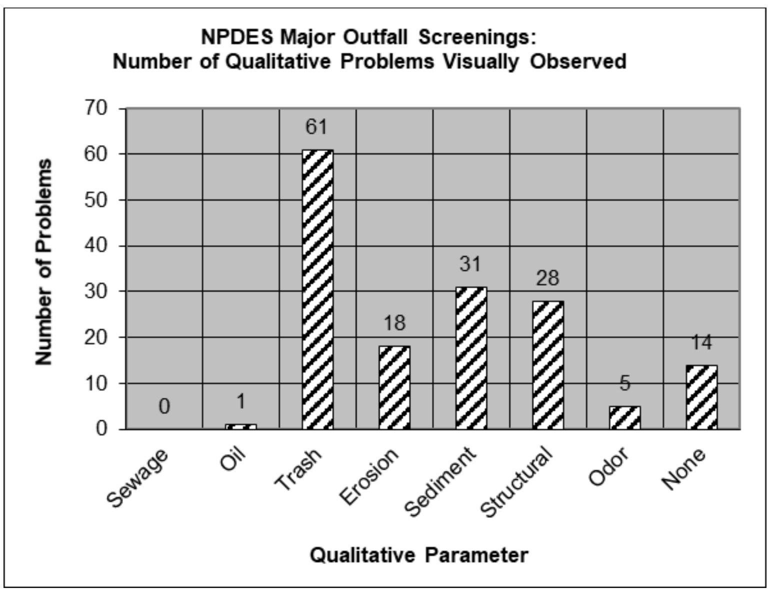


Figure 5-11 Major Outfalls Number of qualitative problems visually observed

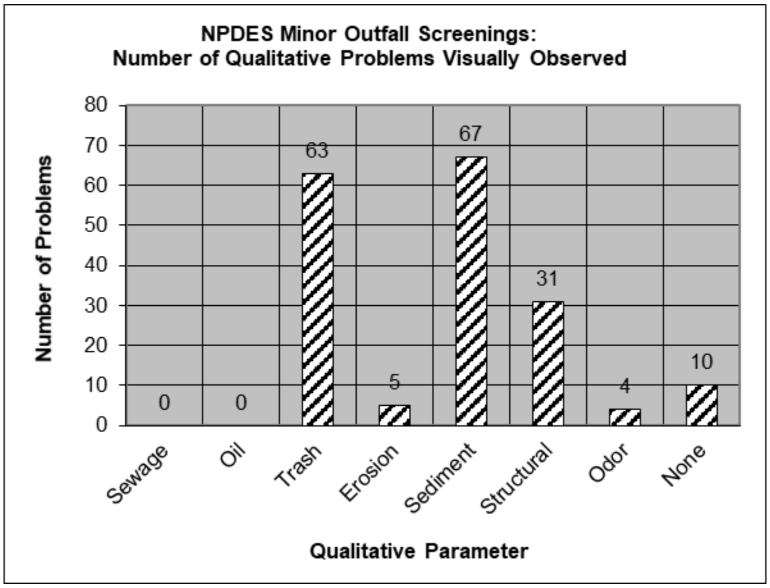


Figure 5-12 Minor Outfalls Number of qualitative problems visually observed

As described above, routine outfall screenings include a quantitative and qualitative assessment. Based on these two procedures, a total of 540 problems were encountered during the 193 routine outfall screenings during this reporting period. Many of the outfalls had more than one problem. Observations regarding the receiving channel within the immediate vicinity of the outfall were also included.

During the reporting period, outfall screening was distributed among nine watersheds as follows: Baltimore Harbor (34), Back River (75), Bird River (1), Gwynns Falls (25), Jones Falls (5), Loch Raven (33), Patapsco (11), Middle River (2), and Lower Gunpowder Falls (7).

5.5 Enforcement

The Illicit Connection Program was developed by identifying existing programs that address the requirements of the illicit connection program and incorporating those programs and their procedures by reference into the overall illicit connection program. These existing programs include:

- **Baltimore Metropolitan Water District** has responsibility for correction of problems in the water distribution system. Baltimore City administers this portion of the Baltimore Metropolitan Water District program. Only those problems associated with the water distribution system will be routed to the City via their complaint procedure.
- **Maryland Department of the Environment (MDE)** has responsibility for the permitting of industrial discharges under the NPDES Industrial Permit program and the NPDES Industrial Stormwater Permit program. Any discharges that are industrial in nature and for which the source has been identified will be routed to MDE.
- **Department of Public Works - Bureau of Utilities** has responsibility for maintenance of the County sanitary sewer system and the below ground portion of the County storm water sewer system. Any sanitary sewer problems encountered will be referred to this Bureau. This program also has the equipment, training and expertise to conduct below ground investigations to locate illicit connections.

- **Department of Public Works - Bureau of Highways** has responsibility for maintenance of the above ground portions of the storm water sewer system. All outfall structural problems will be routed to this Bureau for correction. The determination of corrective action will be on a priority basis within the limits of the County's capital improvement budget.
- **Department of Environmental Protection and Sustainability - Groundwater Management Section** has the authority to order correction of failing septic systems and the expertise to facilitate the correction of these systems if they require innovative technology for permanent correction. Any septic system failing to the storm water sewer system will be referred to this section.
- **Department of Health Environmental Services Section** - Baltimore County Health inspectors investigate some complaints that are now categorized as potential illicit connections. These complaints include septic systems, leaky refuse and grease containers, the dumping of used motor oil, leaky engines, and industrial maintenance activities among others. Because these investigations are only a small percentage of the thousands of complaints received each year by the regional programs, it was difficult to separate complaints with a potential illicit connection from the rest of the caseload. These thousands of complaints were analyzed and broken down into the categories seen in Figure 5-13. After looking at the data from 2005-2009, it was determined that the breakdown into categories is approximately the same each year and we can assume these numbers will continue to be the same in the future. This is the approximate breakdown of cases based on past data.

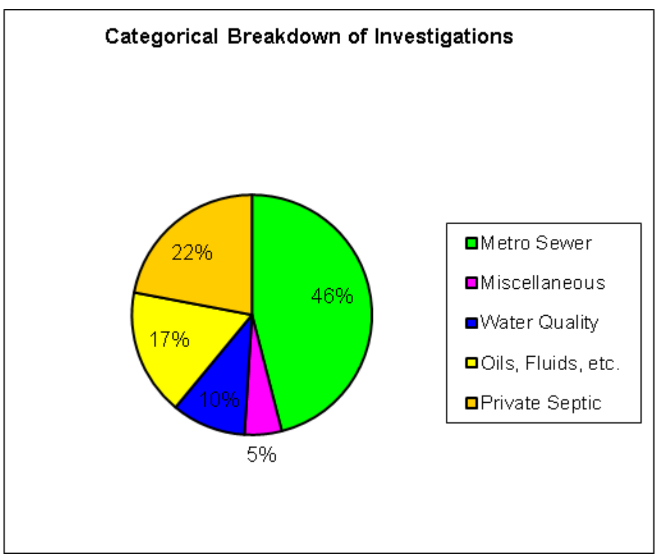


Figure 5-13 Involvement of the Regional Programs in the Investigation of Illcit Connections

The Watershed Monitoring Section of Environmental Protection and Sustainability will provide overall coordination, record keeping and tracking of the Illicit Connection Program. The section will perform the outfall screening and initial field investigations if an illicit connection is detected as a result of the screening. The section is also responsible for directing the removal of illicit connections that do not fall under the responsibility of an existing program.

5.6 Illicit Connections Investigations and Corrections

During the reporting period, the Watershed Monitoring Section handled 211 investigations, of which 122 were citizen complaints. The citizen complaints include participants in the Stream Watch Program through various watershed associations. Fifty citizen complaints were received through our report pollution web form, although it is important to note citizens are still emailing as well. The remainder of the investigations listed as complaints in Table 5-7 came from WMM, other sections of EPS or other agencies. Table 5-5 lists on-going and case closed complaints by cases referred to other agencies and handled by Environmental Protection and Sustainability. Table 5-6 lists a summary of complaint status from previous years. Complaints that are still open will be investigated until resolution.

Table 5-5 Summary of Complaint Status 2023

	On-going	Case Closed	Total
Referred to other agencies	25	84	**109**
Handled by EPS	8	94	**102**
Total	**33**	**178**	**211**

Table 5-6 Summary of Complaint Status Previous Years

	On-going	Case Closed	Total
2014	4	111	**115**
2015	2	206	**208**
2016	3	211	**214**
2017	12	291	**303**
2018	7	255	**262**
2019	3	255	**258**
2020	4	271	**275**
2021	6	275	**281**
2022	3	197	**227**

Table 5-7 Complaints Processed for Calendar Year 2023

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2023-01-001	1/5/2023	Complaint	Upland	Restaurant discharging water to sidewalk.	Keeping an eye on the pipe, first visit showed no flow but curb was damp. Referred grease to EHS.	**On-going**	6 E. Pennsylvania Avenue, 27 D6
2023-01-002	1/18/2023	Complaint	Stream	Milky colored stream.	City repaired water leak.	**Case Closed**	5548 Southwestern Blvd., 42 A8
2023-01-003	1/20/2023	Complaint	Upland	Uncovered salt pile in parking lot.	MDE found salt pile had already been removed.	**Case Closed**	5101 East Drive, 42 A7
2023-01-004	1/24/2023	Complaint	Stream	Muddy stream.	Baltimore City repaired two water breaks in area.	**Case Closed**	Rolling Road, 25 A13

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2023-01-005	1/11/2023	Complaint	Stream	Oil spill on parking lot.	MDE said property owner is responsible for clean-up.	**Case Closed**	1630 Reisterstown Road, 25 E10
2023-01-006	1/16/2023	Complaint	Stream	Sewage odor in stream.	Visited area, stream clear and no odor.	**Case Closed**	800 Sussex Road, 27 E9
2023-01-007	1/27/2023	Complaint	Upland	Pipe discharging water to storm drain.	Plumbing and Sediment Control found no violation.	**Case Closed**	3024 Woodside Avenue, 28 D10
2023-01-008	1/17/2023	Complaint	Upland	Trash bags not in cans being ripped open.	PAI found no violation, pictures showed clean trash can areas.	**Case Closed**	5705 Selford Road, 41 H9
2023-01-009	1/23/2023	Complaint	Upland	Trees being cleared.	EIR has approved a forest harvest plan.	**Case Closed**	Harris Mill Road, 3 H1
2023-01-010	1/28/2023	Complaint	Upland	Sewage overflow.	Utilities found no problem on county line. Will visit site and see if issue still occurring.	**On-going**	16 Akin Circle, 38 F3
2023-01-011	1/29/2023	Complaint	Stream	Mattress dumped in stream.	Highways removed mattress.	**Case Closed**	Tenbury Road, 27 C4
2023-01-012	1/31/2023	Complaint	Stream	Wetland being filled in.	EIR found no issue.	**Case Closed**	19425 Ensor Road, 4 A12
2023-01-013	1/21/2023	Complaint	Stream	Muddy water in creek.	Visited site and sediment had cleared.	**Case Closed**	202 Wagners Lane, 37 A10
2023-01-014	1/14/2023	Complaint	Upland	Disc golfers clearing vegetation.	Visited site and determined it's on BCPS and Rec and Parks property, not an issue.	**Case Closed**	9200 Old Harford Road, 28 D5
2023-01-015	1/11/2023	Complaint	Upland	Trash and chopped up tree in forest.	Visited site and found moderate litter, will put on list for volunteer clean up.	**Case Closed**	8729 Liberty Road, 24 G13
2023-02-001	2/5/2023	Complaint	Upland	Trash around dumpster.	PAI found no violation.	**Case Closed**	23 W. Aylesbury Road, 18 K13
2023-02-002	2/6/2023	Complaint	Stream	Muddy stream.	Baltimore City repaired water break.	**Case Closed**	Shetland Hills, 27 C2

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2023-02-003	2/7/2023	Complaint	Upland	Trash around dumpster.	PAI issued correction notice.	**Case Closed**	6433 Frederick Road, 41 G3
2023-02-004	2/8/2023	Complaint	Upland	Sediment issues with landscaping and excavation work.	Sediment Control never responded, will visit site.	**On-going**	1426 E. Joppa Road, 27 J7
2023-02-005	2/8/2023	Complaint	Upland	Trash dropped on road during collection.	Solid Waste visited site and found no litter, will let trash hauler know of complaint.	**Case Closed**	53 Rocky Brook Court, 32 K9
2023-02-006	2/9/2023	Complaint	Stream	Stream erosion and flooding.	WR put site on potential project list.	**Case Closed**	8324 Thornton Road, 26 G3
2023-02-007	2/10/2023	Complaint	Upland	Trash around dumpster.	PAI issued correction notice.	**Case Closed**	8302 Liberty Road, 32 K1
2023-02-008	2/15/2023	Complaint	Upland	Litter at bus stop.	DPW placed trash can, SHA cleaned litter.	**Case Closed**	8014 Philadelphia Road, 36 G7
2023-02-009	2/21/2023	Complaint	Upland	Uncovered salt pile in parking lot.	Revisited site and pile has been removed.	**Case Closed**	8640 Pulaski Highway, 37 A5
2023-02-010	2/25/2023	Complaint	Stream	Company cut trees down and placed them in woods.	Highways does not removed fallen or cut up trees from wooded areas.	**Case Closed**	1313 Hickory Springs Circle, 33 A12
2023-02-011	2/28/2023	Complaint	Upland	Unwanted newspapers littering neighborhood.	Requested unsubscribe from Sunplus, revisited site and requested more unsubscribes, which Sunplus confirmed would be canceled.	**Case Closed**	102 Cedarmere Road, 16 D13
2023-02-012	2/27/2023	Complaint	Upland	Trucks leaking fluids on parking lot.	Visited site and found no issues.	**Case Closed**	8001 Belair Road, 28 H11

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2023-02-013	2/20/2023	Complaint	Upland	Trash dumping.	Visited site and found light litter, will keep on list for volunteer clean up.	**Case Closed**	2 Delafield Court, 28 E4
2023-02-014	2/25/2023	Complaint	Upland	Grease on top of manhole.	EHS issued violation and had site make corrections.	**Case Closed**	1504 Reisterstown Road, 25 F10
2023-02-015	2/27/2023	Complaint	Stream	Litter along stream banks.	Visited site, moderate trash. Will put on list for volunteer clean up.	**Case Closed**	Coyle Road, 24 D7
2023-02-016	2/2/2023	Complaint	Upland	Pool built too close to water.	EIR had unpermitted pool removed from property.	**Case Closed**	2607 Boulevard Place, 45 H11
2023-02-017	2/21/2023	Complaint	Upland	Back yard erosion due to invasives.	Minor erosion present, will put on potential project list for invasive removal.	**Case Closed**	4307 Spring Avenue, 42 C10
2023-02-018	2/16/2023	Complaint	Stream	Stream erosion and outfall blocked.	Highways cleared outfall, WR has an upcoming project to address erosion.	**Case Closed**	Outfall so-4159, 27 G11
2023-02-019	2/22/2023	Complaint	Stream	Stream is off color and vegetation is dying.	Visited site and stream had cleared, tests showed no issues.	**Case Closed**	12104 Bonita Avenue, 16 G9
2023-03-001	3/1/2023	Complaint	Stream	Muddy stream.	Baltimore City repaired leak.	**Case Closed**	Shetland Hills, 27 C2
2023-03-002	3/6/2023	Outfall	Stream	Untagged vehicle on street, outfall had high phenols.	Police reported car had already been removed. Will investigate phenols.	**On-going**	Outfall so-3114, 44 E2
2023-03-003	3/28/2023	SWAP	Hotspot	Trash on property.	PAI issued correction notice.	**Case Closed**	1751 E. Joppa Road, 27 K7
2023-03-004	3/28/2023	SWAP	Hotspot	Trash next to dumpster.	PAI issued correction notice.	**Case Closed**	1745 E. Joppa Road, 27 K7

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2023-03-005	3/30/2023	SWAP	Hotspot	Litter around property.	PAI issued correction notice.	**Case Closed**	222 North Point Blvd., 36 F12
2023-03-006	3/2/2023	Complaint	Upland	Cutting trees without permit.	EIR working with owner on correction.	**Case Closed**	11700 Ivy Mill Road, 15 D11
2023-03-007	3/5/2023	Complaint	Upland	Wastewater discharge connected to storm drain.	GWM had property owner make corrections.	**Case Closed**	5615A Cullum Avenue, 29 K7
2023-03-008	3/8/2023	Complaint	Stream	Muddy stream.	Baltimore City repaired water break.	**Case Closed**	Old Court Road, 24 K12
2023-03-009	3/8/2023	Complaint	Upland	Construction with no sediment controls.	Sediment Control issued correction notice.	**Case Closed**	21628 Parker Road, 2 J1
2023-03-010	3/11/2023	Complaint	Upland	Excessive dog waste in yard.	PAI found no violation.	**Case Closed**	1618 Howard Avenue, 37 G9
2023-03-011	3/12/2023	Complaint	Stream	Stream bank erosion.	WR visited site and no project will be undertaken at this time.	**Case Closed**	10619 Topsfield Drive, 19 A5
2023-03-012	3/12/2023	Complaint	Stream	Abandoned homeless camp items near stream.	Visited site and could not locate items.	**Case Closed**	Baltimore Avenue, 42 E9
2023-03-013	3/20/2023	Complaint	Upland	Drinking water entering storm drain.	Plumbing issued correction notice.	**Case Closed**	720 Maiden Choice Lane, 41 J4
2023-03-014	3/24/2023	Complaint	Upland	Junk pile in backyard.	PAI issued correction notice.	**Case Closed**	6 Ensenada Court, 24 J9
2023-03-015	3/27/2023	Complaint	Upland	Trash and grease dumping.	PAI found no violation, EHS found no evidence of dumping, but spoke to business about proper grease disposal.	**Case Closed**	55 W. Aylesbury Road, 18 K12
2023-03-016	3/24/2023	Complaint	Upland	Truck washing concrete	Contacted NCCDB for update.	**On-going**	9 W. Aylesbury Road, 18 K13

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
				equipment off into stream.			
2023-03-017	3/14/2023	Outfall	Stream	Oil sheen at outfall.	Junk vehicle no longer present. Follow-up visit found no oil sheen. Will continue to investigate ammonia, e. coli.	**On-going**	Outfall 718, 44 E4
2023-03-018	3/25/2023	Complaint	Upland	Vehicle leaking oil.	Mailed literature to educate.	**Case Closed**	526 Franklin Avenue, 37 C9
2023-03-019	3/28/2023	Complaint	Stream	Litter in water.	PAI had management company remove trash, issued correction notice for units that weren't secure.	**Case Closed**	121 Anjeu Reuss Court, 44 J9
2023-03-020	3/8/2023	Complaint	Upland	Wash water discharging from sump pipe.	Made site visit and sampled puddle, will try to catch pipe discharging.	**On-going**	2120 Sunnythorn Road, 37 J8
2023-03-021	3/14/2023	Complaint	Stream	Dumping next to a stream.	Visited site and found only minor trash.	**Case Closed**	2830 Lieb Road, 4 G2
2023-03-022	3/22/2023	Complaint	Upland	Dumping of bleach, grease in stream behind shopping center.	Referred uncovered salt pile to MDE, grease bin to EHS. Emailed both for update.	**On-going**	594 Cranbrook Road, 19 A6
2023-03-023	3/17/2023	Outfall	Stream	Outfall 75% full of sediment.	Highways cleared outfall.	**Case Closed**	Outfall so-7831, 4 G13
2023-03-024	3/17/2023	Outfall	Stream	Outfall damage, end of pipe crushed.	Highways repaired outfall.	**Case Closed**	Outfall so-7835, 4 C13
2023-03-025	3/23/2023	Complaint	Stream	Oil spill in creek.	No oil present, added litter to potential clean up list.	**Case Closed**	7800 Dunmanway, 44 H6
2023-04-001	4/6/2023	Complaint	Stream	Tarp in stream, sediment piles.	Visited site and tarp is no longer present.	**Case Closed**	6092 Falls Road, 26 G11

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2023-04-002	4/7/2023	Complaint	Upland	Oil spill on parking lot.	Fire Department cleaned.	**Case Closed**	903 Taylor Avenue, 27 G9
2023-04-003	4/20/2023	Complaint	Stream	Trash in stream, stagnant, overgrown buffer.	Referred to Property Management and recommended against mowing, they will remove litter and dumping.	**Case Closed**	Bexhill Road, 33 C4
2023-04-004	4/26/2023	Complaint	Upland	Water leaking out of meter cover.	City found no leak, only rain water.	**Case Closed**	5625 Baltimore National Pike, 33 F13
2023-04-005	4/26/2023	Complaint	Upland	Car wash discharge going to storm drain.	MDE had business make corrections.	**Case Closed**	5505 Johnnycake Road, 33 F13
2023-04-006	4/28/2023	Complaint	Upland	Car leaking oil onto street.	Doorhangered to educate, Police had car removed, diaper no longer in storm drain.	**Case Closed**	6011 Burnt Oak Road, 33 C12
2023-04-007	4/24/2023	Complaint	Upland	While trying to locate outfall found buried inlet.	Highways said inlet is private.	**Case Closed**	6843 German Hill Road, 44 E2
2023-04-008	4/5/2023	Complaint	Upland	Leaking fire hydrant.	City repaired leak.	**Case Closed**	Roundridge Road, 18 K11
2023-04-009	4/19/2023	Complaint	Upland	Water bubbling out of street.	Baltimore City repaired leak.	**Case Closed**	2700 Taylor Avenue, 28 B11
2023-04-010	4/13/2023	Complaint	Upland	Trash in yard from improper storage.	PAI issued citation.	**Case Closed**	134 Bourbon Court, 29 A6
2023-04-011	4/1/2023	Complaint	Upland	Junk dumped in alley.	Visited site and found dumping had already been removed.	**Case Closed**	21 Haley Road, 37 G9
2023-04-012	4/12/2023	Complaint	Upland	Mowing wetland buffer.	EIR did not consider this an issue based on scale and lack of easement.	**Case Closed**	7206 Greenbank Road, 39 A2
2023-04-013	4/17/2023	Complaint	Stream	Stream erosion.	WR has a project planned at this site for next FY, will try to expedite.	**Case Closed**	3907 Tila Road, 29 A6

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2023-04-014	4/4/2023	Complaint	Stream	Pipe discharging foul, orange water.	Smell was coming from dumpsters, water test showed no issue.	**Case Closed**	5101 East Drive, 42 A7
2023-04-015	4/10/2023	Complaint	Upland	Yard waste dumped in woods.	Doorhangered to educate.	**Case Closed**	9221 Seven Courts Drive, 29 A5
2023-04-016	5/19/2023	Complaint	Upland	Washing cars in parking lot.	Spoke to owner, they did apply for permit but follow up visits showed they are not washing.	**Case Closed**	1706 Eastern Boulevard, 37 F7
2023-04-017	4/28/2023	Complaint	Upland	Trees dying.	Visited site and oaks likely dying because area is being inundated with storm water flow. Other trees healthy.	**Case Closed**	601 Nicodemus Road, 16 A11
2023-05-001	5/11/2023	Outfall	Stream	Street inlets clogged, sewage smell in yard at night.	DPW investigated sewer smell and found no issue, street sweeping completed, inlets cleared.	**Case Closed**	Outfall 1609, 42 A5
2023-05-002	5/9/2023	Complaint	Upland	Car washing in parking lot.	MDE advised them to apply for 20-SW, discharge is entering groundwater not storm drain.	**On-going**	4007 Annapolis Road, 42 H9
2023-05-003	5/9/2023	Complaint	Upland	Water bubbling out of street.	City repaired leak.	**Case Closed**	McDowell Lane, 42 G10
2023-05-004	5/17/2023	SWAP	Hotspot	Junk vehicles.	PAI found no violation.	**Case Closed**	19609 Old York Road, 4 H11
2023-05-005	5/17/2023	SWAP	Hotspot	Pile of tires.	Referred to MDE LMA.	**On-going**	19529 Old York Road, 4 H11
2023-05-006	5/16/2023	Outfall	Stream	Sediment and debris built up in gutter, high phenols.	Highways swept street; phenols now low. Follow-up sample found low e. coli.	**Case Closed**	Outfall 493, 44 E6

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2023-05-007	5/18/2023	Complaint	Upland	Roadside litter.	SHA removed litter.	**Case Closed**	Perring Parkway, 27 J11
2023-05-008	5/11/2023	Complaint	Upland	Sediment leaving construction site.	Sediment Control had site make corrections.	**Case Closed**	4622 Wilkens Avenue, 41 K4
2023-05-009	5/22/2023	Complaint	Upland	Trash dumping in forest buffer, animal shelters.	PAI issued correction notice. Animal control said this is a managed TRN colony.	**Case Closed**	3601 Washington Boulevard, 42 D8
2023-05-010	5/30/2023	Complaint	Stream	Fish kill.	Investigated stream and found no issues, whatever caused fish kill no longer occurring. MDE found swim club at fault, working with them on correcting issue.	**Case Closed**	Essex Farm Road, 26 H4
2023-05-011	5/2/2023	Complaint	Upland	Litter from car crashes.	DPWT swept street.	**Case Closed**	Cromwell Bridge Road, 28 E2
2023-05-012	5/15/2023	Complaint	Upland	Dumping grease onto grass.	EHS addressed the issue with business.	**Case Closed**	8428 Willow Oak Road, 27K8
2023-05-013	5/31/2023	Complaint	Upland	Water bubbling out of street.	City repaired leak.	**Case Closed**	Burke Avenue, 27 D7
2023-05-014	5/9/2023	Complaint	Stream	Water coming out of valve and flowing to storm drain.	Visited site had been repaired.	**Case Closed**	2800 Illinois Avenue, 42 H10
2023-05-015	5/18/2023	Outfall	Stream	Outfall had high phenols, ammonia, fluoride, e. coli, sewage odor.	Sanitary CCTV found no issues, will visit site and rescreen.	**On-going**	Outfall so-4225, 44 H1

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2023-05-016	5/25/2023	Complaint	Upland	Litter along highway ramp.	SHA removed litter.	**Case Closed**	Liberty Road, 33 C2
2023-05-017	5/21/2023	Complaint	Upland	Illegal dumping in field.	Visited site and trash had already been removed.	**Case Closed**	3335 Washington Avenue, 33 B3
2023-05-018	5/16/2023	Outfall	Stream	High phenol, ammonia and copper.	Contacted Highways for update and MDE. Will visit site as well since this was the 2nd request for update.	**On-going**	Outfall so-4147, 44 F4
2023-05-019	5/18/2023	Complaint	Upland	Dumping trash in woods.	Put on potential volunteer clean up list.	**Case Closed**	1420 Spring Avenue, 36 G6
2023-05-020	5/25/2023	Complaint	Upland	Trash dumping.	PAI issued correction notice. Highways removed roadside litter.	**Case Closed**	34 Tameron Place, 36 J4
2023-05-021	5/23/2023	Complaint	Stream	Oil in stream.	Visited stream and found no issue, some iron bacteria probably mistaken for oil.	**Case Closed**	Snyder Lane, 29 D6
2023-06-001	6/6/2023	Complaint	Stream	Sludge below dam.	Visited site, no issues found.	**Case Closed**	1000 Lakeside Drive, 26 H10
2023-06-002	6/6/2023	SWAP	Hotspot	Tires piled behind building.	Referred to PAI 2nd time.	**On-going**	6204 Baltimore National Pike, 41 B1
2023-06-003	6/5/2023	SWAP	Hotspot	Litter and dumping at loading dock.	PAI never investigated, will see if still an issue.	**On-going**	8200 Perry Hall Boulevard, 29 D11
2023-06-004	6/6/2023	SWAP	Hotspot	Litter at rear of parking lot.	Gave to PAI 2nd time.	**On-going**	9633 Reisterstown Road, 25 A5
2023-06-005	6/6/2023	SWAP	Hotspot	Litter at rear of parking lot by dumpsters.	Referred to EHS.	**On-going**	9635 Reisterstown Road, 25 A5

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2023-06-006	6/6/2023	SWAP	Hotspot	Litter and yard waste at rear of parking lot by dumpster.	PAI issued correction notice.	**Case Closed**	9639 Reisterstown Road, 25 A5
2023-06-007	6/6/2023	SWAP	Hotspot	Litter around dumpster and parking lot.	PAI found no violation.	**Case Closed**	6400 Frederick Road, 41 G3
2023-06-008	6/6/2023	SWAP	Hotspot	Litter, dumping, junk vehicles inside and fenced in storage yard.	PAI found no violation.	**Case Closed**	6352 Frederick Road, 41 G3
2023-06-009	6/6/2023	SWAP	Hotspot	Litter in parking lot.	PAI issued correction notice.	**Case Closed**	921 Reisterstown Road, 25 G11
2023-06-010	6/27/2023	Complaint	Upland	Construction berm left in storm drain.	Utilities removed filter sock.	**Case Closed**	216 Maple Avenue, 44 E5
2023-06-011	6/8/2023	SWAP	Hotspot	Grease bin issues.	EHS had business make corrections.	**Case Closed**	16952 York Road, 7 E11
2023-06-012	6/5/2023	Complaint	Upland	Paint poured into alley.	Doorhangered to educate.	**Case Closed**	444 Trappe Road, 44 J3
2023-06-013	6/29/2023	Complaint	Upland	Leaking water meter.	City repaired leak.	**Case Closed**	Hamilton Avenue, 36 F7
2023-06-014	6/16/2023	Complaint	Upland	Car dealer washing in parking lot.	They will no longer wash cars.	**Case Closed**	50 Eastern Blvd., 37 A10
2023-06-015	6/15/2023	Complaint	Upland	Trees being cut down.	EIR did not consider this an issue.	**Case Closed**	200 Slitting Mill Place, 32 K11
2023-06-016	6/21/2023	Complaint	Upland	Gasoline odor, oil runoff during rain.	Emailed MDE for update 2nd time.	**On-going**	2723 North Point Boulevard, 45 A2
2023-06-017	6/30/2023	Complaint	Stream	Stream damaged by storm.	WR has advised homeowner multiple times in the past. Upcoming floodplain project downstream may alleviate some of the problem.	**Case Closed**	11313 Glen Arm Road, 20 E13

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2023-06-018	6/20/2023	Complaint	Upland	Trash not kept in cans, junk vehicles.	No junk vehicles present, PAI issued correction notice for trash can litter.	**Case Closed**	4408 Norfen Road, 42 H10
2023-06-019	6/30/2023	Complaint	Upland	Roadside dumping.	Highways removed debris.	**Case Closed**	Bird River Grove Road, 29 K10
2023-06-020	6/20/2023	Complaint	Upland	Trash dumping.	Visited site and trash had already been removed.	**Case Closed**	1410 Bellona Avenue, 26 K3
2023-06-021	6/27/2023	Complaint	Upland	Overflowing dumpsters.	Dumpster was fine, but found grease storage issues. Emailed EHS for update.	**On-going**	6433 Frederick Road, 41 G3
2023-06-022	6/29/2023	Complaint	Upland	Dumping along tree line.	No evidence of dumping, PAI found no violation for junk vehicles.	**Case Closed**	1030 Leslie Avenue, 41 B1
2023-06-023	6/20/2023	Complaint	Upland	Dumped fish.	No fish or other dumping present.	**Case Closed**	7704 Belair Road, 28 F12
2023-06-024	6/13/2023	Complaint	Stream	Stream blocked by trash, algae, growth.	Visited site and found stream clear. Doorhangered for yard waste education.	**Case Closed**	Aiken Avenue, 28 B10
2023-06-025	6/22/2023	Complaint	Stream	Water leaks at two outfalls.	City found no leak, will revisit site.	**On-going**	Outfall 222, 33 A8
2023-07-001	7/17/2023	Complaint	Upland	Storm drain smells like something dead inside.	Utilities found storm drain not to be the issue, did not locate source of smell.	**Case Closed**	310 Dixie Drive, 27 B7
2023-07-002	7/7/2023	Complaint	Stream	Stream blocked with trash and debris.	Highways removed trash, otherwise stream running freely.	**Case Closed**	1401 East Homberg Avenue, 37 F9
2023-07-003	7/27/2023	Outfall	Stream	Inlet smells of gasoline/petroleum, missing inlet grate.	MDE closed case, residual petroleum not an issue, will revisit site and see if inlet grate still missing.	**On-going**	Outfall 039, 45 A2

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2023-07-004	7/5/2023	Complaint	Upland	Pool drained to street, salt pile in backyard.	Doorhangered to educate. City repaired leak.	**Case Closed**	204 Janet Court, 16 B8
2023-07-005	7/7/2023	Outfall	Stream	Outfall screen found sewage odor, high ammonia, phenol.	Utilities found no issue, will continue to investigate.	**On-going**	Outfall so-5576, 45 A3
2023-07-006	7/12/2023	Complaint	Upland	Mulch trails and piles of wood in forest buffer easement.	EIR found no issue. Mitigation planting and signs have been completed.	**Case Closed**	14323 Thornton Mill Road, 12 F11
2023-07-007	7/25/2023	Complaint	Upland	Rv discharging sewage to storm drain.	EHS addressed the issue with owner.	**Case Closed**	7833 Main Falls Circle, 32 J11
2023-07-008	7/30/2023	Complaint	Stream	Stream erosion.	Visited site and found minor erosion.	**Case Closed**	623 Stevenson Lane, 27 D9
2023-07-009	7/20/2023	Complaint	Stream	Stream erosion.	WR visited site and offered advice to homeowner.	**Case Closed**	23 Buchanan Road, 26 J9
2023-07-010	7/18/2023	Complaint	Upland	Overgrown stream.	Downed limbs are not in an area the county will remove. Put on potential project list for yard waste education.	**Case Closed**	3702 Downey Dale Drive, 24 J12
2023-07-011	7/16/2023	Complaint	Upland	Mud on road from residential construction.	PAI issued correction notice and stop work order.	**Case Closed**	1214 Wiseburg Road, 7 J4
2023-07-012	7/3/2023	Complaint	Upland	Oil dumped in storm drain.	Visited site and found no evidence in storm drains.	**Case Closed**	1630 Searles Road.
2023-07-013	7/13/2023	Outfall	Stream	High phenol and boron at outfall.	Follow-up screen found low boron, storm drain investigation found phenols to be natural.	**Case Closed**	Outfall 1612, 44 K3
2023-07-014	7/27/2023	Outfall	Stream	Outfall had high water temperature and phenols.	PAI issued correction notice, will investigate phenols and water temperature.	**On-going**	Outfall 038, 44 J3
2023-07-015	7/7/2023	Outfall	Stream	Outfall had high phenols and damage.	Will investigate, damage not sent to SDD yet.	**On-going**	Outfall 049, 45 A3
2023-07-016	7/7/2023	Outfall	Stream	Homeowner said water spurts out of lawn during storm events.	Utilities tv'ed line and found no issue.	**Case Closed**	Outfall so-108, 45 B5

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2023-07-017	7/28/2023	Complaint	Upland	Spill at business going into wetland.	MDE had business make corrections regarding salt storage.	**Case Closed**	8243 Rosebank Avenue, 45 C1
2023-07-018	7/27/2023	Complaint	Upland	Trash dumping.	Highways removed debris.	**Case Closed**	Purnell Drive, 33 H7
2023-07-019	7/24/2023	Complaint	Upland	Sewage leak in yard.	Visited site and puddle no longer present.	**Case Closed**	52 Handworth Way, 28 H8
2023-08-001	8/10/2023	Complaint	Upland	Dumped TV.	Added comment to BaltCoGo for update.	**On-going**	1112 Foxwood Lane, 37 F11
2023-08-002	8/18/2023	Complaint	Upland	Trash at bus stop.	Never heard back from MTA, visited site and found only minor litter and 3 trash cans looked fine.	**Case Closed**	Reisterstown Road, 16 C11
2023-08-003	8/21/2023	Complaint	Upland	Mattress dumped in alley.	Highways removed dumping.	**Case Closed**	664 Middlesex Road, 37 E6
2023-08-004	8/24/2023	Complaint	Upland	Homeless person throwing trash and clothing into storm drain.	Made Prologue aware of issue. Referred to dumping on property to PAI, Utilities found no issue at inlet.	**On-going**	1300 Old Eastern Avenue, 37 E9
2023-08-005	8/26/2023	Complaint	Upland	Junk vehicle on street.	Police addressed vehicle.	**Case Closed**	9762 Deltom Court, 28 J6
2023-08-009	8/28/2023	Complaint	Upland	Roadside dumping.	Highways removed items.	**Case Closed**	Cantwell Road, 32 J9
2023-08-010	8/14/2023	Outfall	Stream	Outfall 75% submerged.	Highways cleared pipe.	**Case Closed**	Outfall so-259, 37 F11
2023-08-011	8/3/2023	Complaint	Stream	Illicit discharge in stream.	Visited site and stream had cleared, no issue at outfall.	**Case Closed**	122 Greenmeadow Drive, 19 B12
2023-08-012	8/9/2023	Complaint	Stream	Stream blocked with trees and debris.	Highways removed debris.	**Case Closed**	Echo Court, 27 G3
2023-08-013	8/1/2023	Complaint	Stream	Discolored stream.	Visited site and stream had cleared, odor no longer present.	**Case Closed**	504 Charles Street, 27 A6

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2023-08-014	8/7/2023	Complaint	Stream	Stream blocked by debris.	Stream flowing freely, but did observe dumping in buffer, put on list for volunteer cleanup. Doorhangered for yard waste.	**Case Closed**	7007 Glen Spring Road, 33 B8
2023-08-015	8/2/2023	Complaint	Upland	Dumped tires.	Highways removed dumping.	**Case Closed**	Foerster Road, 42 G10
2023-08-016	8/29/2023	Complaint	Upland	Muddy water leaking onto sidewalk from vacant house.	Visited site and issue no longer occurring.	**Case Closed**	34 Maple Drive, 41 G3
2023-08-017	8/17/2023	Complaint	Upland	Runoff from construction site.	Visited site and found no issues.	**Case Closed**	McCormick Road, 18 G1
2023-08-018	8/10/2023	Complaint	Upland	Vehicles leaking fluids onto street.	Doorhangered to educate.	**Case Closed**	Holburn Road, 44 H5
2023-08-019	8/30/2023	Complaint	Stream	Pipe with suspicious discharge.	Test results indicate discharge is groundwater.	**Case Closed**	7904 Springway Road, 26 G5
2023-08-020	8/29/2023	Complaint	Upland	Litter thrown from a vehicle.	Visited area and found minor litter, not an issue.	**Case Closed**	Rossville Boulevard, 37 B4
2023-08-021	8/28/2023	Complaint	Upland	Algae growing below curb pipe.	Tested discharge and found to be groundwater.	**Case Closed**	4 Bardia Court, 37 D1
2023-08-022	8/21/2023	Complaint	Stream	Rock dam in stream.	Visited site, rocks present across stream not sure if natural of manmade but not causing an issue.	**Case Closed**	Roldrew Avenue, 26 G5
2023-08-023	8/14/2023	Outfall	Stream	High phenol, fluoride and copper at outfall.	Sanitary CCTV found no issues, will visit site and rescreen.	**On-going**	Outfall so-7, 37 F12
2023-08-024	8/25/2023	Outfall	Stream	High phenols and temperature at outfall.	High temperature probably due to high air temperature, follow-up storm drain investigation found phenols to be	**Case Closed**	Outfall so-255, 37 F10

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
					natural and no temperature issue.		
2023-09-001	9/3/2023	Complaint	Stream	Roadside dumping.	Highways said items were on private property, someone else removed them.	**Case Closed**	Bonita Avenue, 16 H7
2023-09-002	9/8/2023	Complaint	Upland	Trash bags and litter on roadside.	Highways removed debris.	**Case Closed**	Milford Mill Road, 33C1
2023-09-003	9/5/2023	Complaint	Stream	Stream smells like vinegar.	Visited stream, no odor or discoloration.	**Case Closed**	Edgevale Road, 27 F6
2023-09-004	9/7/2023	Complaint	Upland	Sudsy puddle in gutter.	Plumbing issued correction notice.	**Case Closed**	7804 Shepherd Avenue, 28 A10
2023-09-005	9/8/2023	Complaint	Upland	Water bubbling out of street.	Baltimore City said leak repaired, will visit site and confirm.	**On-going**	Security Boulevard, 33 D9
2023-09-006	9/7/2023	Complaint	Upland	Excessive litter on roadside.	SHA removed litter.	**Case Closed**	Washington Boulevard, 41 J13
2023-09-007	9/22/2023	Complaint	Upland	Litter along roadway.	Highways removed litter.	**Case Closed**	Lord Baltimore Drive, 33 C2
2023-09-008	9/22/2023	Complaint	Upland	Junk vehicles at property.	Police did not find vehicle present. PAI issued citation.	**Case Closed**	3249 Green Knoll Road, 32 G1
2023-09-009	9/25/2023	Complaint	Upland	Erosion caused by cleared residential construction site.	Sediment Control had them repair silt fence and stone entrance.	**Case Closed**	8944 Millers Island Blvd., 46 C11
2023-09-010	9/22/2023	Complaint	Stream	Tree and trash under bridge blocking flow.	Visited site and found no issue.	**Case Closed**	Buckingham Road, 33 D2
2023-09-011	9/29/2023	Complaint	Upland	Boat and trailer dumped on roadside.	Visited site and found no issue.	**Case Closed**	Bon Oak Court, 16 D8
2023-10-001	10/17/2023	Complaint	Upland	Roadside litter from busted garbage bags fallen off vehicle.	Highways cleaned trash.	**Case Closed**	3228 E. Joppa Road, 28 G7

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2023-10-002	10/3/2023	Complaint	Upland	Yard full of trash.	PAI had contractor correct violations.	**Case Closed**	7014 Belclare Road, 44 G7
2023-10-003	10/11/2023	Complaint	Upland	Overflowing trashcans.	PAI issued correction notice.	**Case Closed**	1017 Grovehill Road, 41 J9
2023-10-004	10/13/2023	Complaint	Upland	Carpet cleaning truck discharging to storm drain.	Educated business on proper disposal.	**Case Closed**	8425 Kings Ridge Road, 28 B9
2023-10-005	10/18/2023	Complaint	Upland	Sunplus papers littering street.	Contacted Sunplus to discontinue delivery.	**Case Closed**	6836 Duluth Avenue, 44 E2
2023-10-006	10/25/2023	Complaint	Upland	Excessive dog waste in yard.	PAI issued correction notice.	**Case Closed**	859 Jaydee Avenue, 44 H2
2023-10-007	10/25/2023	Complaint	Stream	Fallen trees blocking stream.	Trees on private property, EIR will advise homeowner on what they are allowed to do.	**Case Closed**	1869 Greenspring Valley Road, 25 H3
2023-10-008	10/4/2023	Complaint	Stream	Overflow at pumping station.	Caller was told to call DPWT Utilities Emergency response. A repair was made the day before at the pumping station, no report found of an overflow.	**Case Closed**	8508 Lynch Road, 45 B6
2023-10-009	10/3/2023	Complaint	Stream	Stream needs to be cleaned up.	Visited site and some light litter present, no action needed.	**Case Closed**	Hawksbury Road, 25 A10
2023-10-010	10/12/2023	Complaint	Upland	Inlet grate knocked off.	SWM had business fix inlet.	**Case Closed**	8227 Liberty Road, 32 K1
2023-10-011	10/15/2023	Complaint	Upland	Car throwing litter.	Visited intersection and found minor litter, not an issue.	**Case Closed**	Ingleside Avenue, 33 E13
2023-11-001	11/7/2023	Complaint	Stream	Muddy water in stream.	Baltimore City repaired leak.	**Case Closed**	Geipe Road, 41 A1
2023-11-002	11/13/2023	Complaint	Upland	Water leaking out of meter cover.	Baltimore City repaired leak.	**Case Closed**	Charles Street, 26 K8
2023-11-003	11/27/2023	Complaint	Upland	Water leak.	City repaired leak.	**Case Closed**	9306 Harford Road, 28 E8

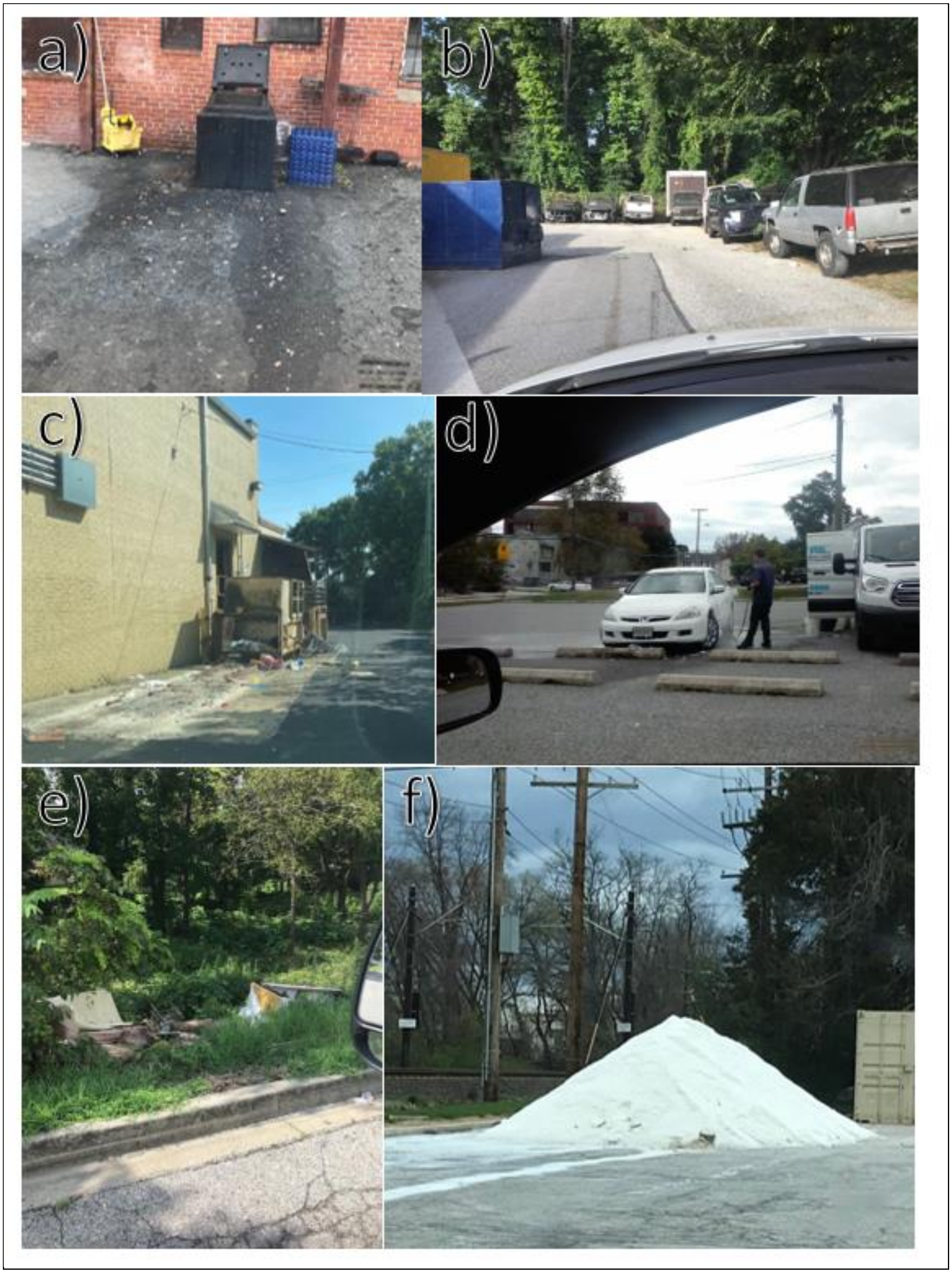
CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2023-11-004	11/15/2023	Outfall	Stream	Outfall buried and sewage discharge from alley.	Plumbing had sewage issue corrected. Storm drain investigation found phenols to be natural. Outfall is still testing high for e. coli, take MST test.	**On-going**	Outfall so-244, 37 F9
2023-11-005	11/16/2023	Complaint	Upland	Water leak.	City repaired leak.	**Case Closed**	622 Marianne Lane, 40G2
2023-11-006	11/15/2023	Outfall	Stream	Junk vehicle on street.	Vehicle was removed.	**Case Closed**	Outfall so-261, 37 F10
2023-11-007	11/20/2023	Outfall	Stream	Outfall 100% filled with sediment.	SHA cleared outfall.	**Case Closed**	Outfall so-4498, 37 E8
2023-11-008	11/7/2023	Complaint	Stream	Excessive trash at restoration project.	Revisited shopping center and after PAI found no violation and very little litter present., Solid Waste picked up litter at sports field.	**Case Closed**	6223 Baltimore National Pike, 41 B2
2023-11-009	11/7/2023	Complaint	Upland	Roadside litter.	Highways removed litter.	**Case Closed**	Tulip Avenue, 42 G8
2023-11-010	11/15/2023	Complaint	Stream	Creek filled with sediment.	Baltimore City repaired leak.	**Case Closed**	406 Bowleys Quarters Road, 38 D5
2023-11-011	11/20/2023	Outfall	Stream	Outfall buried and could not locate.	Highways cleared outfall, PAI issued citation for litter.	**Case Closed**	Outfall so-8703-br, 37 G10
2023-11-012	11/27/2023	Complaint	Upland	Outfall buried and could not locate.	Contacted company about proper disposal, referred large item dumping to PAI May 2024	**On-going**	5840 Baltimore National Pike, 33 D13
2023-11-013	11/29/2023	Complaint	Upland	Car washing in parking lot.	Sent violation letter. Revisited site and no evidence of car washing.	**Case Closed**	1645 Merritt Boulevard, 44 J3
2023-11-014	11/30/2023	Complaint	Upland	Dumping in alley.	PAI found no violation.	**Case Closed**	2445 Fairway, 44 F4

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2023-11-015	11/9/2023	Outfall	Stream	High phenols at outfall.	Spoke to construction crew dewatering muddy water to gutter. Follow up visit found issue had been corrected and phenols were low.	**Case Closed**	Outfall 235, 33 D1
2023-11-016	11/20/2023	Complaint	Upland	Old deck dumped on street corner.	Visited site and items had been removed.	**Case Closed**	Schaeffer Road, 46 B2
2023-11-017	11/8/2023	Complaint	Upland	Vehicle leaking oil.	Doorhangered to educate.	**Case Closed**	114 Spectator Lane, 25 A6
2023-11-018	11/20/2023	Outfall	Stream	High phenols at outfall.	Requested Utilities CCTV, PAI issued correction notice for litter. Referred litter to PAI.	**On-going**	Outfall 805, 37 F9
2023-11-019	11/20/2023	Outfall	Stream	High phenols and fluoride at outfall.	Follow-up screen found low fluoride; storm drain investigation found phenols to be natural.	**Case Closed**	Outfall 060, 37 F9
2023-11-020	11/9/2023	Outfall	Stream	Outfall filled with debris.	Referred to Highways. Added comment to BaltCoGo for update. Never heard back, will visit site.	**On-going**	Outfall so-7082, 32 J3
2023-11-021	11/15/2023	Outfall	Stream	High phenols at outfall.	Rescreen had high phenols and E. coli. Sent MST sample for analysis.	**On-going**	Outfall 061, 37 F9
2023-11-022	11/17/2023	Complaint	Upland	Illegal dumping on roadside.	Referred litter to Highways.	**On-going**	Tulip Avenue, 42 H8
2023-12-001	12/19/2023	Complaint	Upland	Car dealer washing in parking lot.	Car dealer will make sure all vehicles are washed inside bay.	**Case Closed**	10207 Philadelphia Road, 29 G12
2023-12-002	12/3/2023	Complaint	Stream	Dumping in stream buffer.	Added to potential project list for volunteer clean-up.	**Case Closed**	1609 Trebor Court, 26 K2

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2023-12-003	12/18/2023	Complaint	Upland	Car dealers washing cars into storm drain.	No staff to wash cars, so not occurring right now. They will apply for permit if they plan on starting again.	**Case Closed**	41 Eastern Boulevard, 37 A10
2023-12-004	12/21/2023	Complaint	Stream	Outfall high flow, smells like chlorine.	Follow-up screen found water leak had been repaired, phenols natural.	**Case Closed**	Outfall 297, 32 K12
2023-12-005	12/6/2023	Complaint	Stream	Muddy stream.	Baltimore City repaired water leak.	**Case Closed**	3824 Offutt Road, 24 E10

5.7 Commercial/ Industrial Pollution Surveys (Hotspots)

Commercial and industrial pollution surveys have been conducted for years as part of the SWAP process, referred to as Hotspot Site Investigations (HSIs). A ramped-up hotspot program was initiated in the 2015 fiscal year. Hotspots will continue to be done by consultants as part of the SWAP process, but additional hotspots will be done by WMM staff in areas with completed SWAPs. During the 2024 fiscal year, a total of 140 sites were assessed in this way (Table 5-8). Figure 5-15 to Figure 5-29 show maps of hotspots in each SWAP area. Figure 5-14 shows common poor housekeeping practices that would trigger corrective actions.



a. improper grease storage, b. junk vehicles, c. litter, d. car washing, e. large item dumping, f. improper salt storage

Figure 5-14 Poor housekeeping issues found during hot spot inspections

Table 5-8 Hotspot Investigations Conducted from July 1, 2023 through June 30, 2024

SWAP Area	Total # HSIs Assessed	# Confirmed Hotspots	# Not a Hotspot	% Confirmed Hotspots
Lower Patapsco (A)	7	4	3	57%
Middle Gwynns Falls (C)	2	1	1	50%
Baltimore Harbor (D)	2	0	2	0%
Tidal Back River (E)	25	3	22	12%
Middle River (F)	25	4	21	16%
Upper Jones Falls (G)	4	4	0	100%
Lower Jones Falls (H)	1	0	1	0%
Beaverdam Run, Baisman Run, and Oregon Branch (I)	3	2	1	67%
Bird River (K)	1	0	1	0%
Upper Back River (L)	3	3	0	100%
Northeastern Jones Falls (M)	25	0	25	0%
Deer Creek (U)	3	3	0	100%
Upper Gwynns Falls (V)	25	5	20	20%
Loch Raven West (W)	13	2	11	15%
Loch Raven North (X)	1	1	0	100%
TOTAL	**140**	**32**	**108**	**23%**

5.7.1 Confirmed Hotspots

Confirmed hotspots are written up as complaints and tracked until resolution. Some of these hotspot complaints have also been included above in Table 5-5 Summary of Complaint Status 2023, which are all the complaints the IDDE program investigated in calendar year 2023.

Consultants and staff doing SWAP fieldwork have been instructed to immediately report suspected illicit connections found. Hotspots were found both in hot spot assessments and while doing other fieldwork related to the SWAP. Complaints are also occasionally received at community meetings. Participants wishing to report environmental problems are asked to fill out cards describing the location and nature of the issue. Any illicit connections identified are investigated. Table 5-9 lists all of these types of SWAP complaints handled during the 2023 fiscal year.

Table 5-9 SWAP Complaints Processed from July 1, 2023 through June 30, 2024

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2024-03-014	3/28/2024	SWAP	Hotspot	Litter behind business.	PAI found no violation.	**Case Closed**	11720 Reisterstown Road, 16 C11
2024-03-015	3/28/2024	SWAP	Hotspot	Construction debris and bags of trash.	PAI found no violation.	**Case Closed**	11903 Reisterstown Road, 16 C11
2024-03-016	3/28/2024	SWAP	Hotspot	Litter and dumping at vacant store.	Referred to PAI.	**On-going**	11906 Reisterstown Road, 16 C11

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
2024-03-017	3/28/2024	SWAP	Hotspot	Grease and salt storage issue.	Referred to EHS.	**On-going**	4854 Butler Road, 16 B6
2024-04-014	4/5/2024	SWAP	Hotspot	Litter around lot and dumpsters.	PAI found no violation.	**Case Closed**	11623 Reisterstown Road, 16 D12
2024-04-015	4/5/2024	SWAP	Hotspot	Inoperable vehicles and junk on property.	PAI issued correction notice.	**Case Closed**	2808 Hammonds Ferry, 42 E9
2024-04-016	4/5/2024	SWAP	Hotspot	Chemical jugs junk stored outside.	PAI found no violation.	**Case Closed**	2619 Hammonds Ferry Road, 42 E8
2024-04-017	4/5/2024	SWAP	Hotspot	Junk and trash bags not stored in dumpster.	PAI found no violation.	**Case Closed**	1300 Linden Avenue, 42 A7
2024-04-018	4/5/2024	SWAP	Hotspot	Litter and dumping in parking lot.	PAI found no violation.	**Case Closed**	6400 Frederick Road, 41 G3
2024-05-006	5/17/2024	SWAP	Hotspot	Trash and junk behind building.	PAI issued correction notice.	**Case Closed**	1123 North Point Road, 44 J1
2024-05-007	5/27/2024	SWAP	Hotspot	Junk vehicles.	PAI issued correction notice.	**Case Closed**	2800 North Point Blvd., 45 A2
2024-05-009	5/17/2024	SWAP	Hotspot	Litter along fence and large item dumping.	PAI issued correction notice.	**Case Closed**	222 North Point Boulevard, 26 F12
2024-06-001	6/3/2024	SWAP	Hotspot	Grease dumpster dripping and pooled on ground.	Referred to EHS.	**On-going**	1030 Old Eastern Avenue, 37 E9
2024-06-005	6/3/2024	SWAP	Hotspot	Untagged/junk vehicles.	PAI issued correction notice.	**Case Closed**	1627 Eastern Boulevard, 37 F7
2024-06-006	6/3/2024	SWAP	Hotspot	Junk vehicle.	Owner filed Police report after receiving PAI correction notice, visited	**Case Closed**	1814 Turkey Point Road, 38 A12

CASE	DATE	SOURCE	TYPE	COMPLAINT	ACTION TAKEN	STATUS	LOCATION
					site and confirmed truck has been removed.		
2024-06-007	6/3/2024	SWAP	Hotspot	Chemical jugs near inlet.	MDE is having business make corrections throughout site and apply for permit.	**Case Closed**	201 Earls Road, 38 E2
2024-06-016	6/17/2024	SWAP	Hotspot	Junk vehicles and food trailer.	PAI issued correction notice.	**Case Closed**	11950 Falls Road, 18 A10
2024-06-015	6/17/2024	SWAP	Hotspot	Spilled grease and litter around dumpster.	Referred to EHS.	**On-going**	1201 Shawan Road, 18 B2
2024-06-017	6/12/2024	SWAP	Hotspot	Junk vehicles, staining, vehicle washing.	Referred to PAI, sent violation letter for car washing.	**On-going**	12340 Owings Mills Boulevard, 16 D8
2024-06-036	6/17/2024	SWAP	Hotspot	Grease bin issues.	Referred to EHS.	**On-going**	16952 York Road, 7 E11
2024-06-031	6/12/2024	SWAP	Hotspot	Litter and yard waste at rear of parking lot by dumpster.	PAI found no violation.	**Case Closed**	9639 Reisterstown Road, 25 A5
2024-06-032	6/21/2024	SWAP	Hotspot	Trash next to dumpster.	PAI issued correction notice.	**Case Closed**	1745 E. Joppa Road, 27 K7
2024-06-033	6/21/2024	SWAP	Hotspot	Trash on property.	PAI issued correction notice.	**Case Closed**	1751 E. Joppa Road, 27 K7

5.7.2 Hotspot Site Investigations Program Summary

EPS staff continues to refine the program to make more efficient use of field time. By identifying the categories of commercial and industrial sites that tend to have issues, more pollution problems may be addressed. A Standard Operating Procedure (SOP) for Hotspot Site Investigations was developed in 2017.

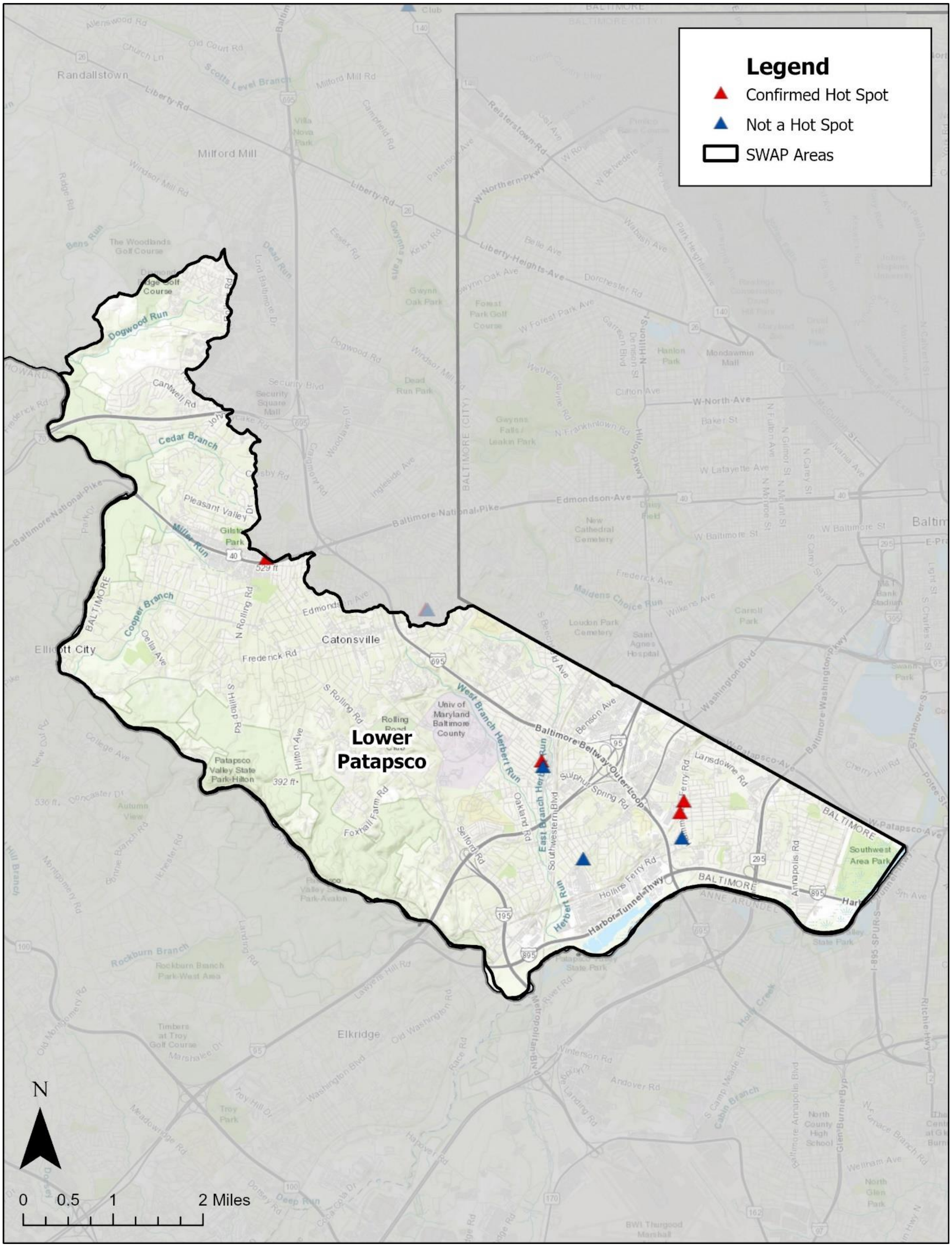


Figure 5-15 HSI Locations in Lower Patapsco (A)

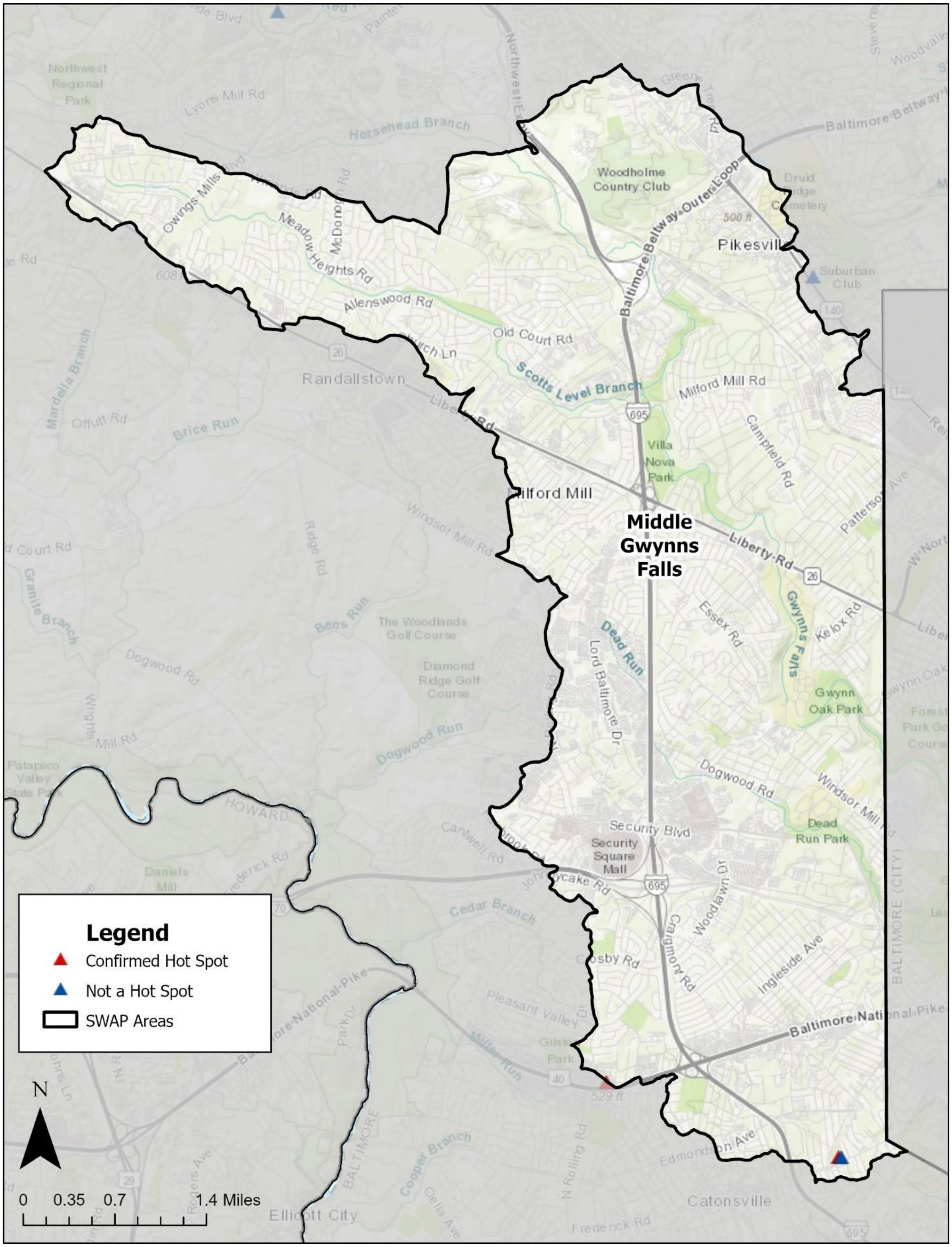


Figure 5-16 HSI Locations in Middle Gwynns Falls (C)

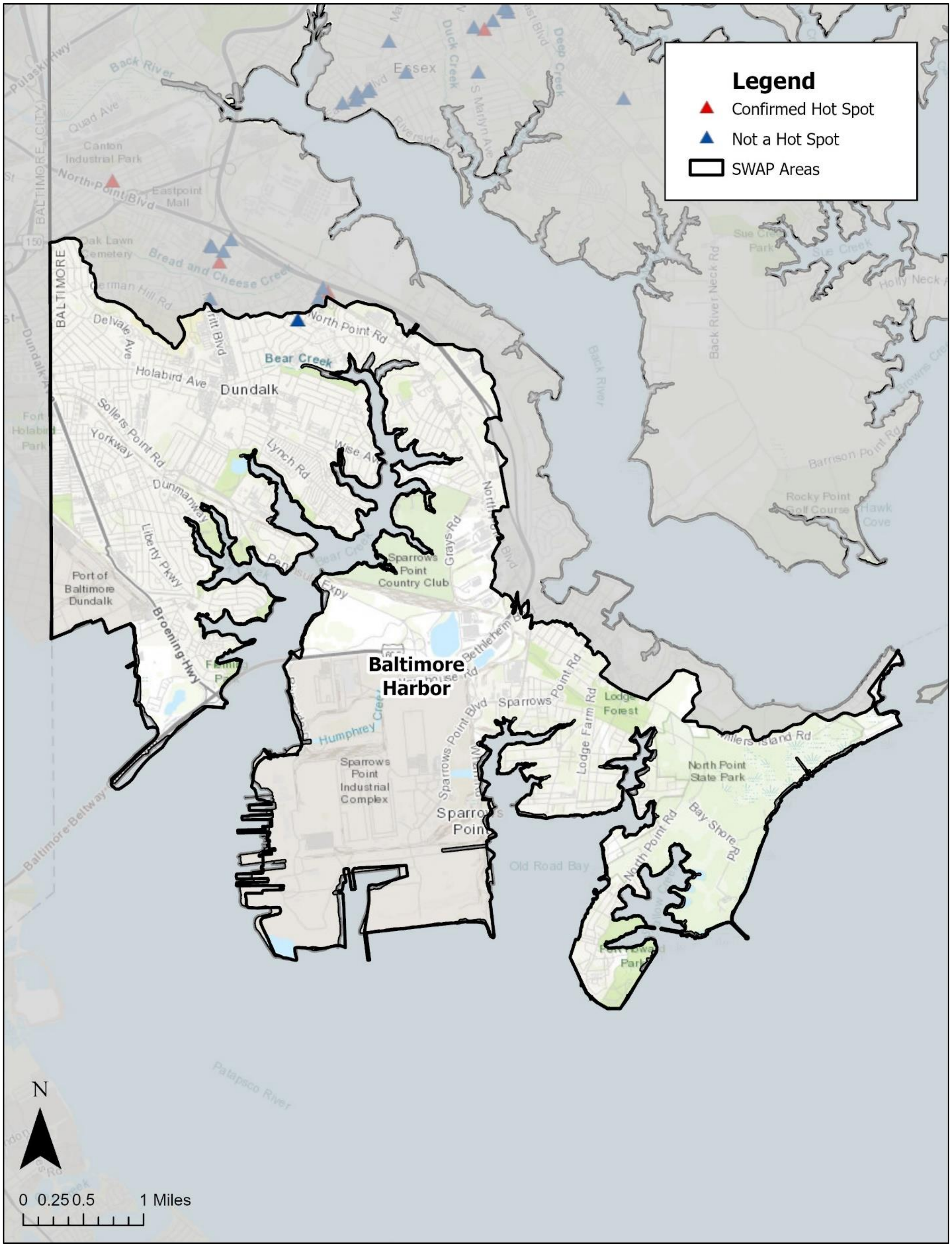


Figure 5-17 HSI Locations in Baltimore Harbor (D)

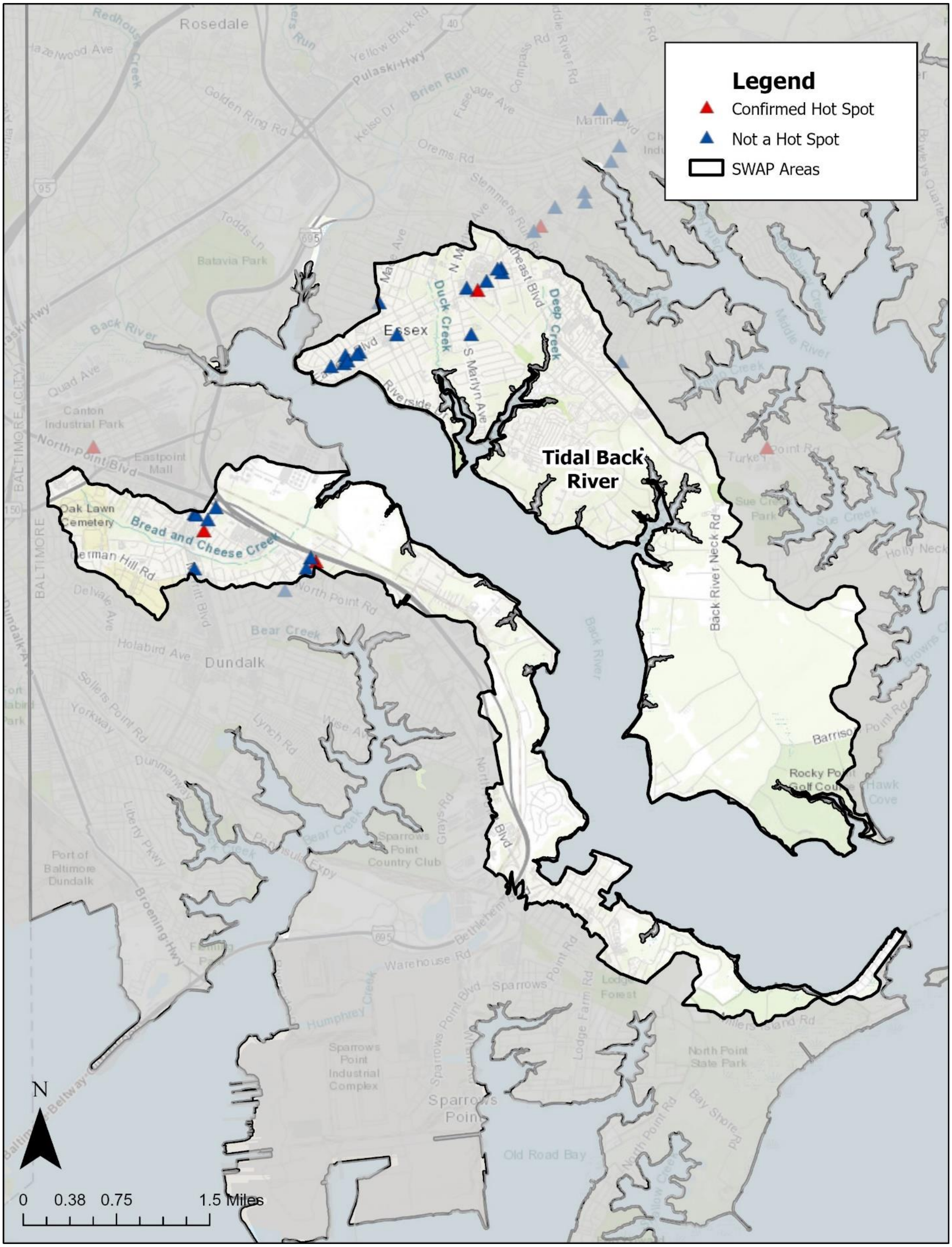


Figure 5-18 HSI Locations in Tidal Back River (E)

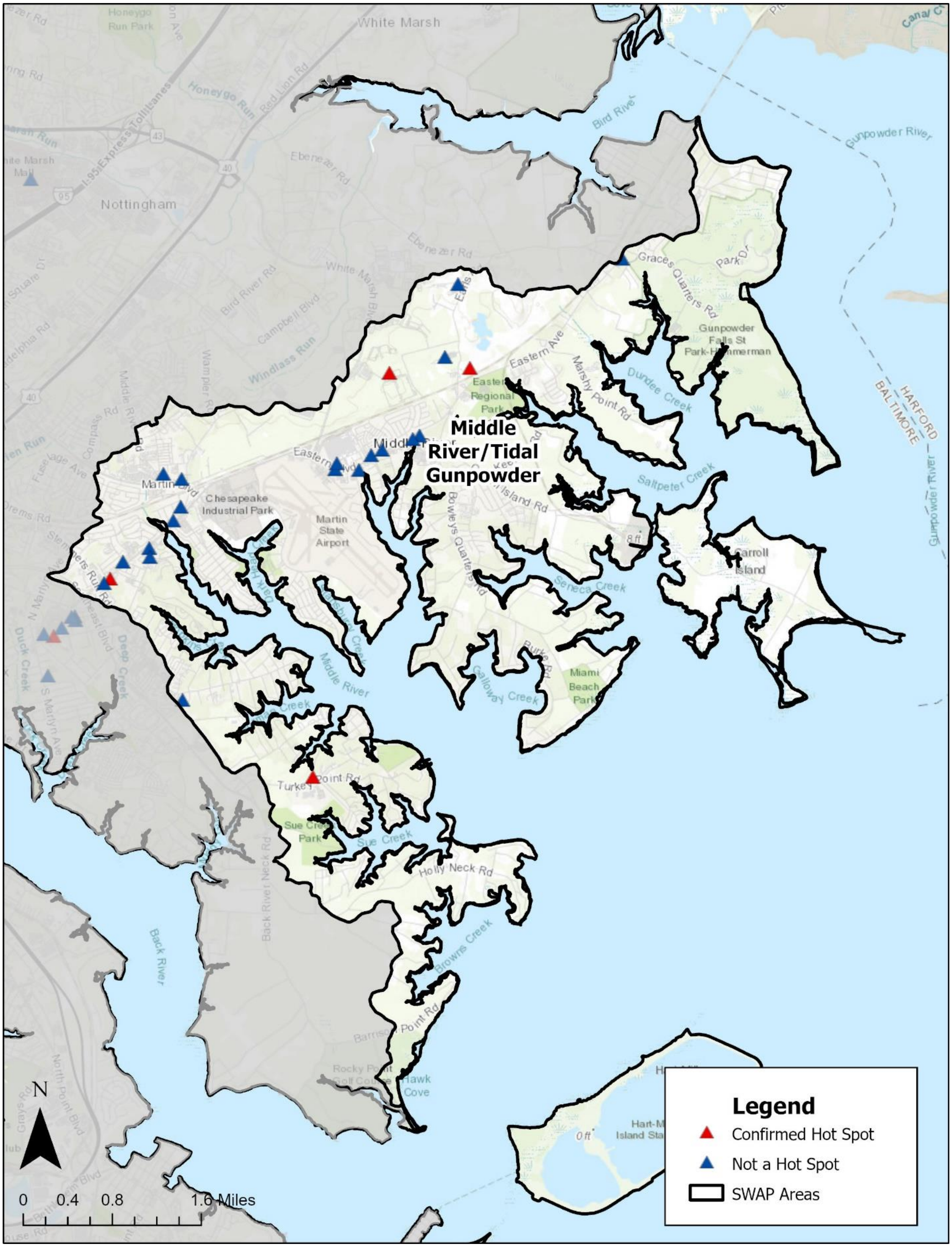


Figure 5-19 HSI Locations in Middle River (F)

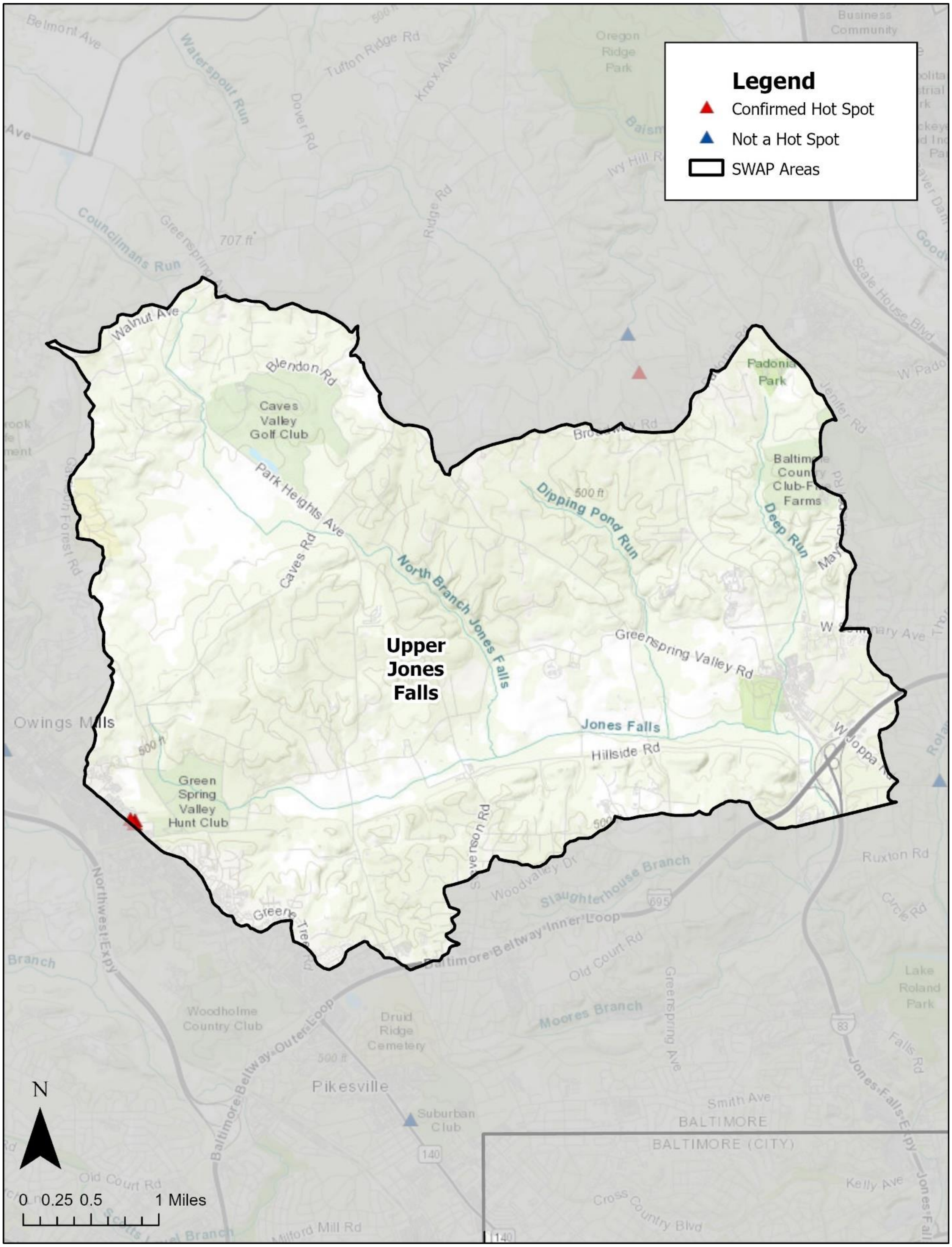


Figure 5-20 HSI Locations in Upper Jones Falls (G)

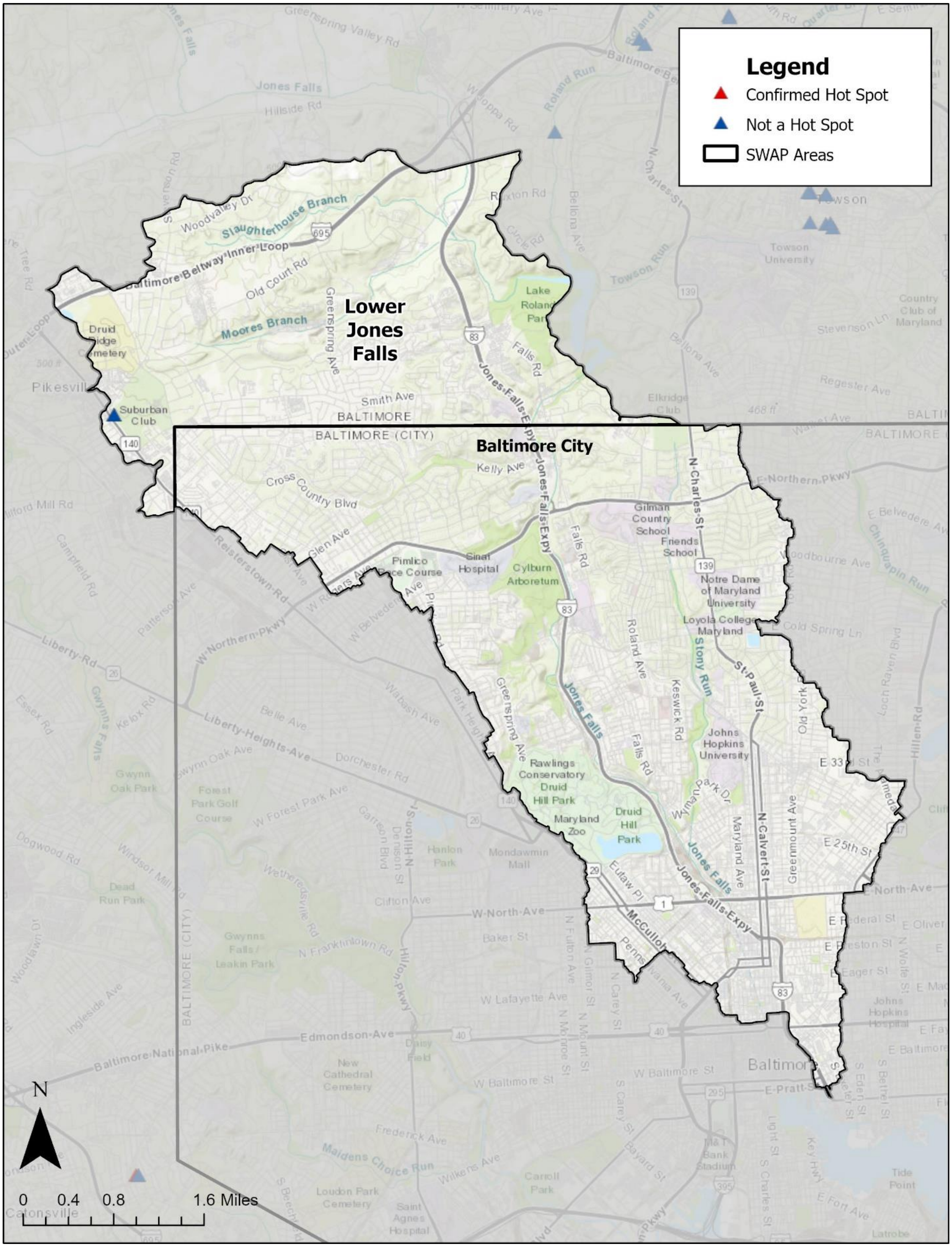


Figure 5-21 HSI Locations in Lower Jones Falls (H)

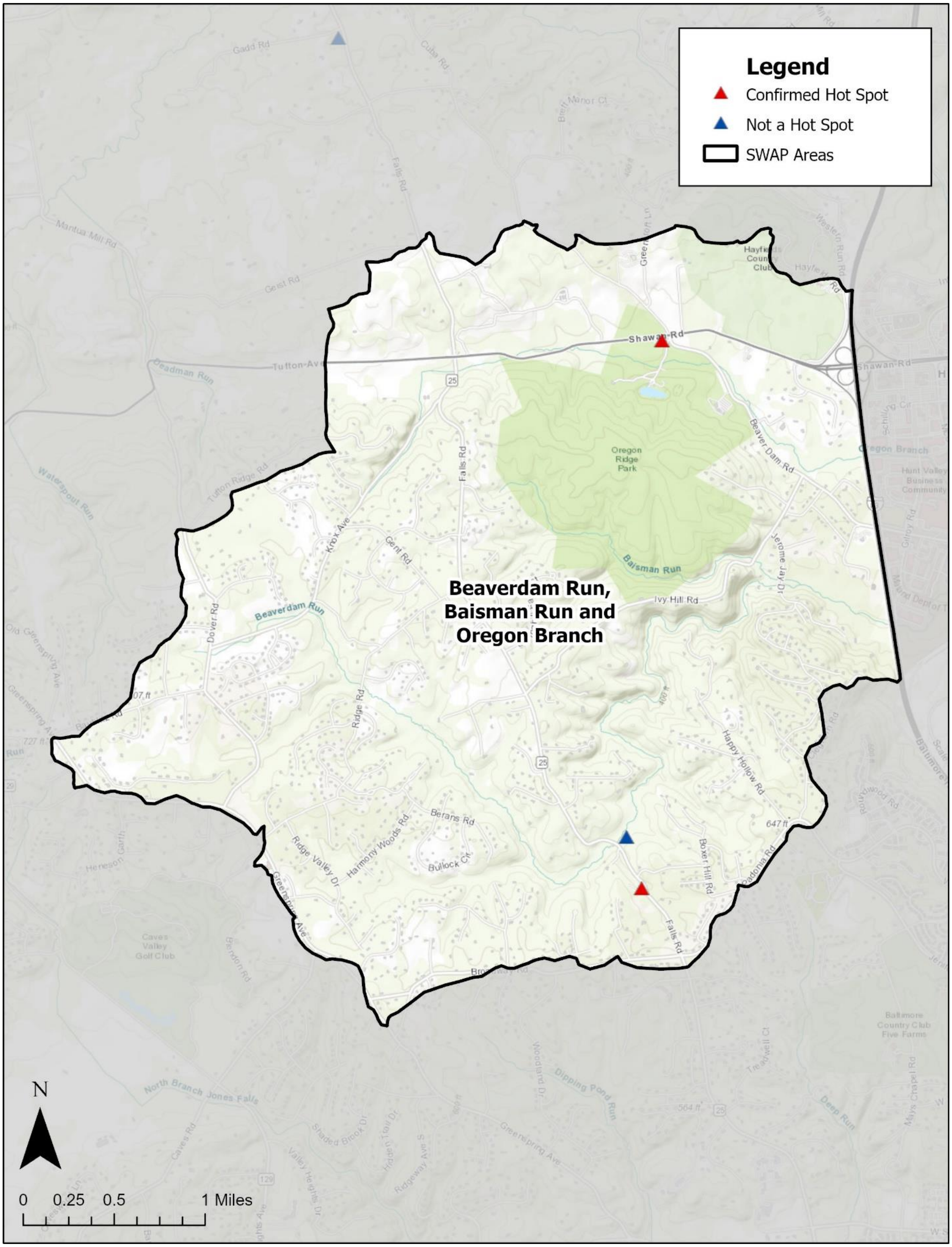


Figure 5-22 HSI Locations in Beaverdam Run, Baisman Run, and Oregon Branch (I)

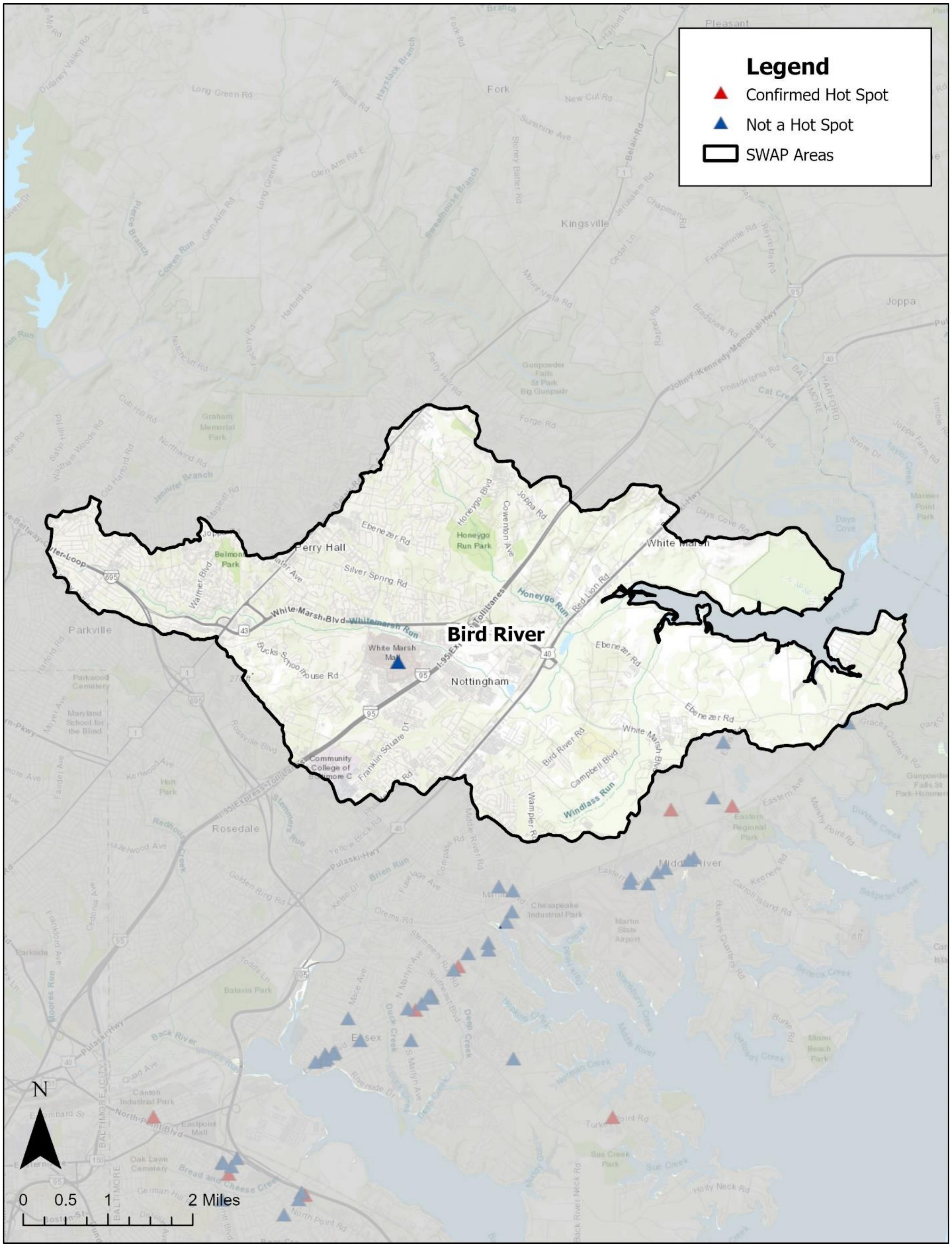


Figure 5-23 HSI Locations in Bird River (K)

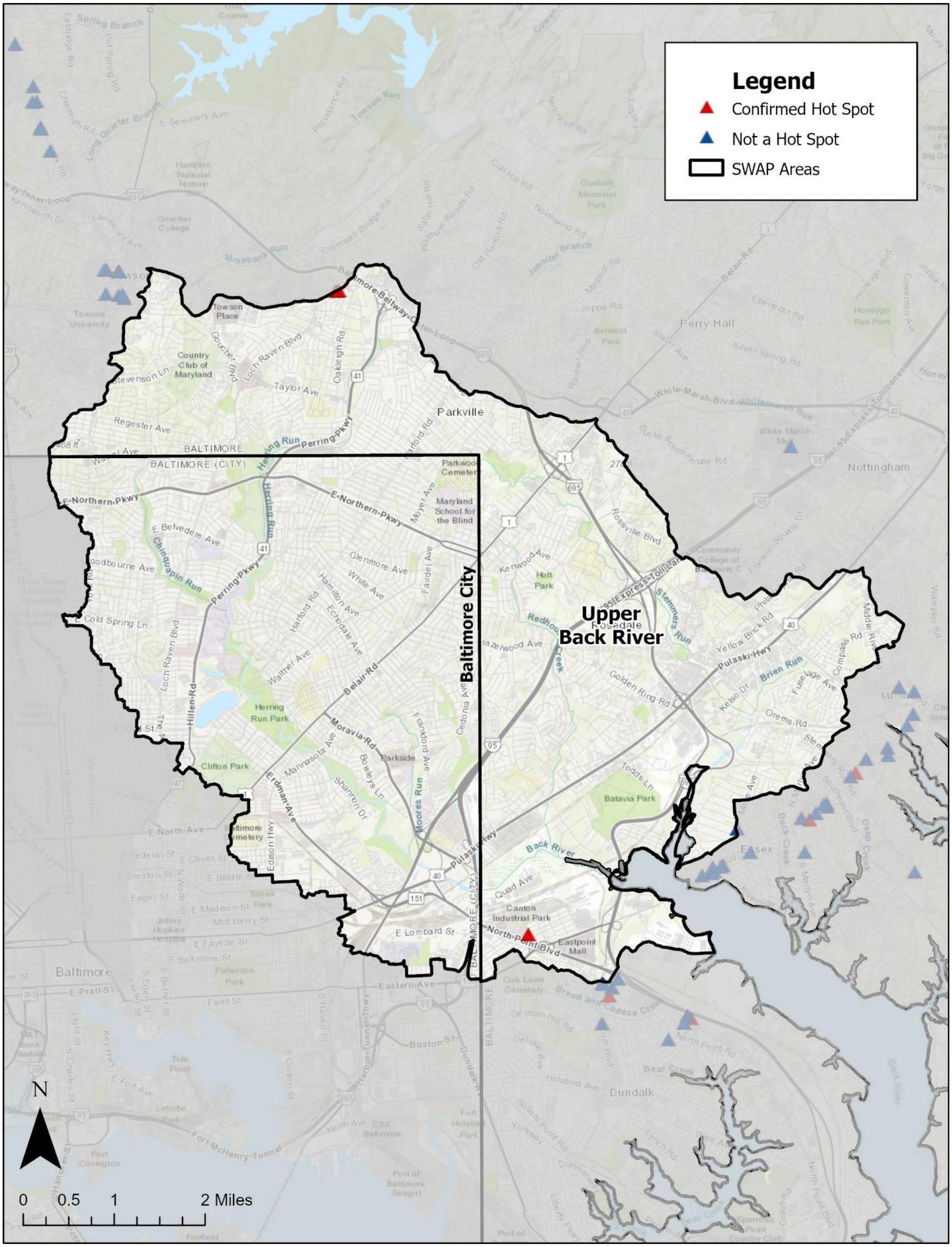


Figure 5-24 HSI Locations in Upper Back River (L)

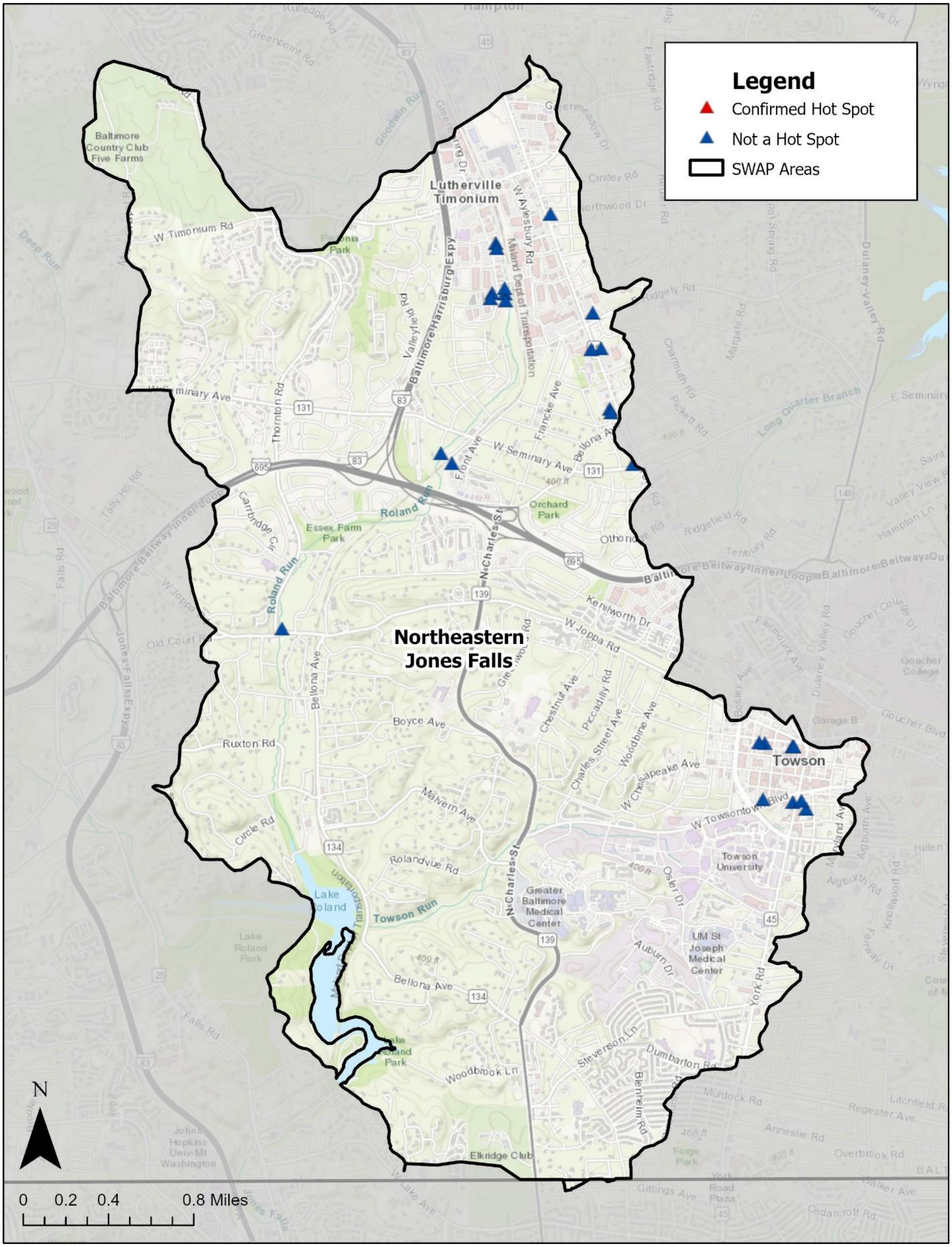


Figure 5-25 HSI Locations in Northeastern Jones Falls (M)

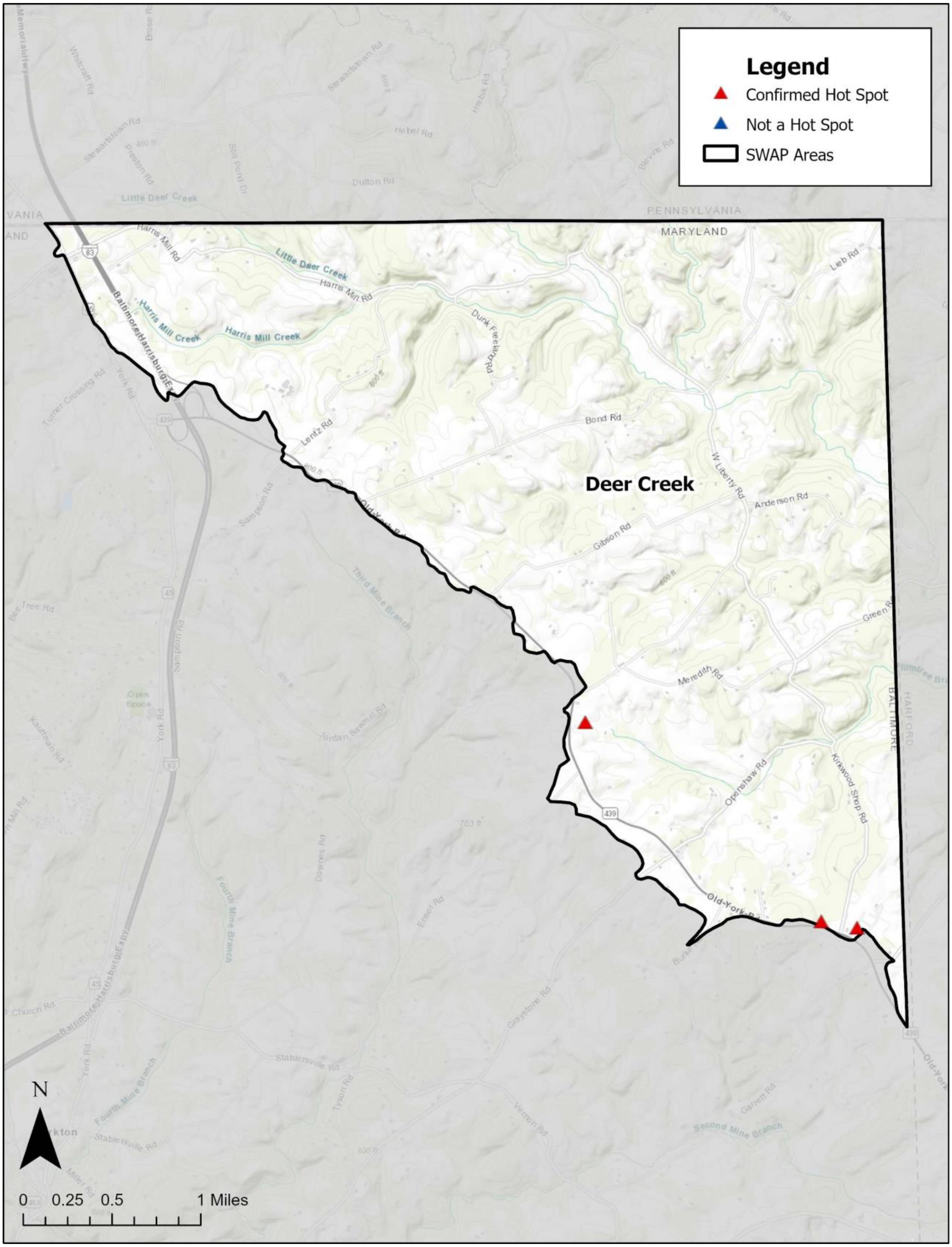


Figure 5-26 HSI Locations in Deer Creek (U)

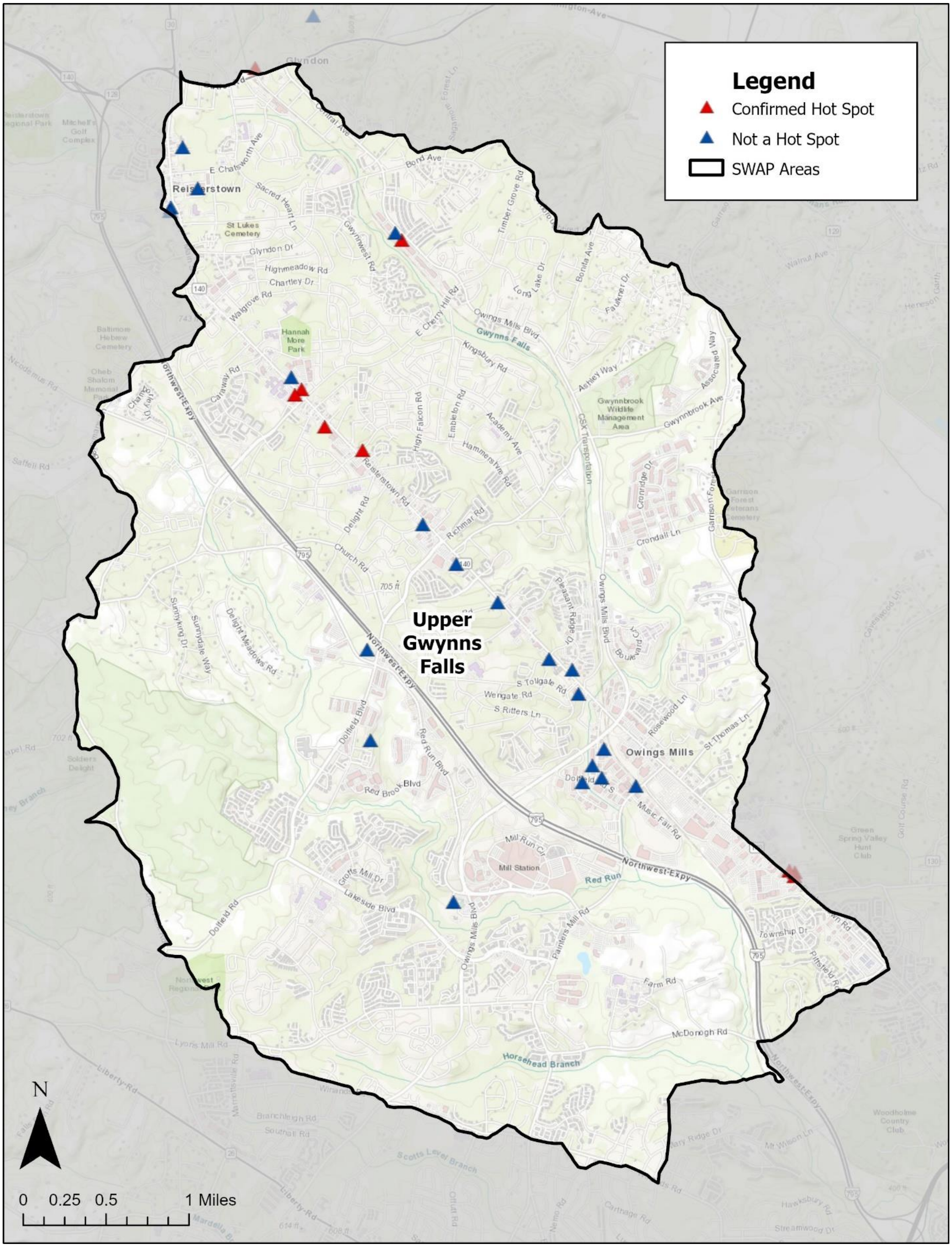


Figure 5-27 HSI Locations in Upper Gwynns Falls (V)

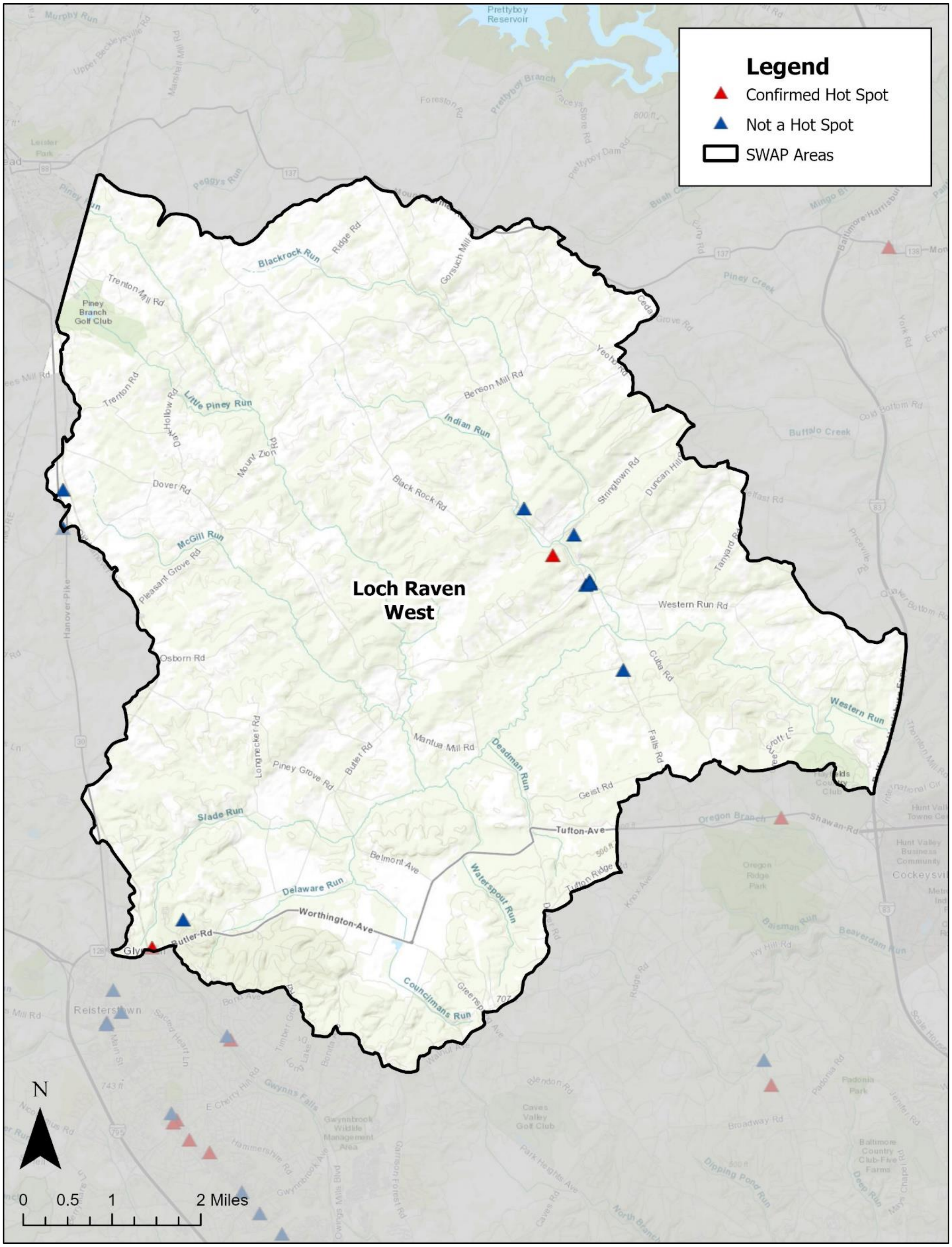


Figure 5-28 HSI Locations in Loch Raven West (W)

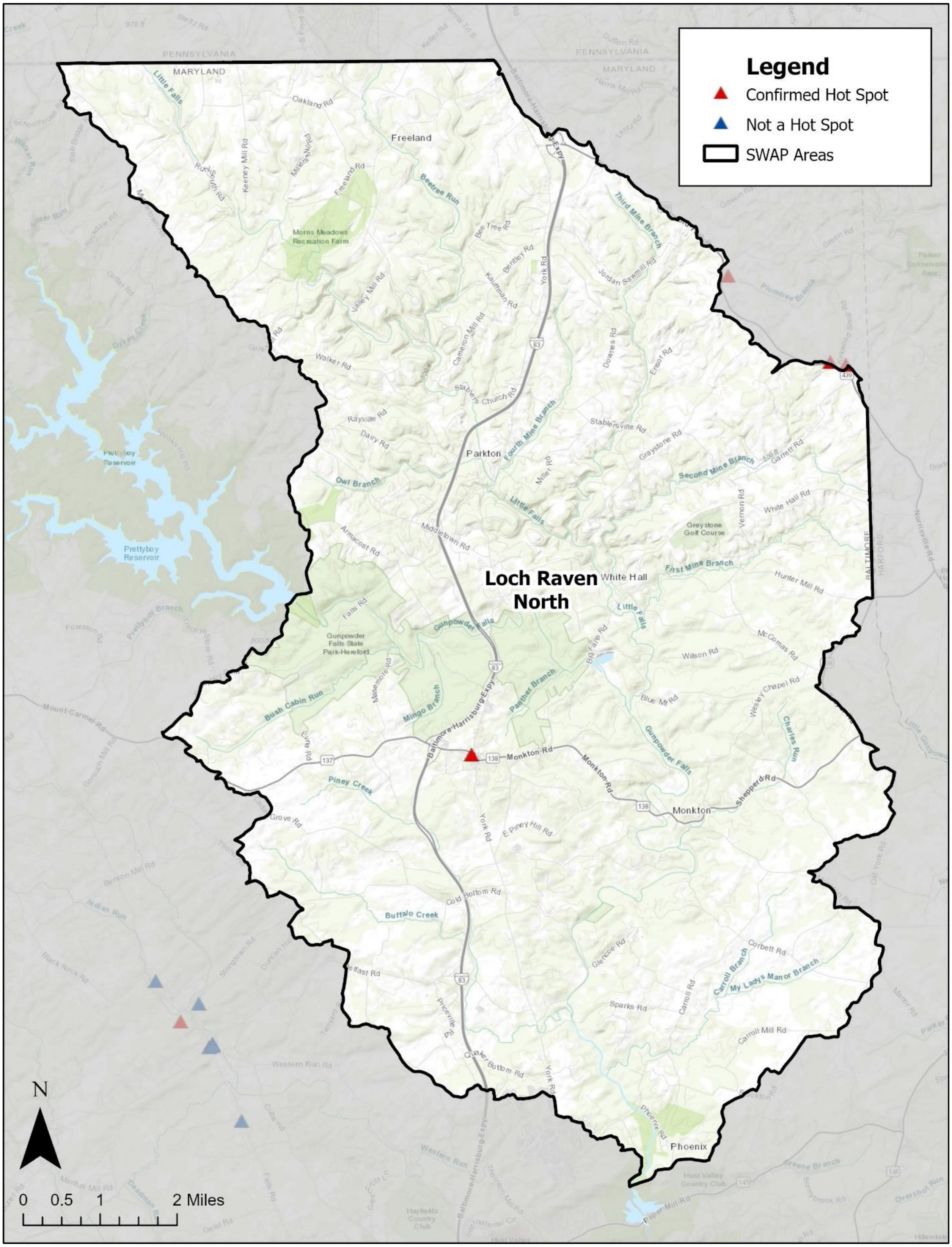


Figure 5-29 HSI Locations in Loch Raven North (X)

5.8 Outreach

Not all complaints investigated, even if an issue is found, result in an enforcement action. Some problems, such as litter, are not severe enough or cannot be attributed to one source. Or we may have a report of dumping into a storm drain, but no evidence is found when we visit the site. WMM has developed a door-hanger to be used in such instances. The door-hanger was based on one developed by MDE. Staff can check off the particular issue found from the list on the door-hanger. There is also educational information on the reverse side, letting them know storm drains are connected to streams and the proper disposal of materials.

A brochure on the illicit connection program has also been developed. It is distributed at events and stakeholder meetings to educate and advertise the program. A form is now available on our website to report pollution complaints. Previously complainants could send an email to watersheds@baltimorecountymd.gov, but sometimes information about the problem was missing. The web form will eliminate the problem of missing data and hopefully increase the number of complaints submitted by making the process easier.

5.9 Illicit Discharge Elimination – Individual Credits

Illicit discharges comprise a wide range of flow types with variable nutrient concentrations, flow and modes of entry into the storm drain system. An Expert Panel evaluated infrastructure-related nutrient discharges against 5 technical criteria and identified 8 discharges. The following eight discharge types were recommended for an annual nutrient reduction credit, based on empirical measurement or calculations of the unique nutrient concentration, flow rate and discharge duration over the year:

- Laundry Washwater
- Commercial Car Washing
- Floor Drains
- Miscellaneous High Nutrient Non-Sanitary Discharges
- Sanitary Direct Connections
- Sewage Pipe Exfiltration
- Drinking Water Transmission Loss
- Dry Weather Sanitary Sewer Overflows

Individual nutrient discharges submitted for credit in FY 2023 are listed in Table 5-11. The nitrogen and phosphorus calculation method are documented in the expert panel report (CSN and CWP 2014). For discharges submitted before December 23, 2018, the EIA calculation method follows the 2014 MDE Accounting Guidance document Appendix D (MDE, 2014). The EIA calculation method described in the 2021 MDE Accounting Guidance document (MDE, 2021) is used for discharges submitted after December 23, 2018.

The guiding principle was that elimination of a discovered nutrient discharge could only be considered an urban BMP, if they:

- Are detected and physically eliminated from 2005 or later.
- On-site sampling of the discharge that has been eliminated to define one or more of the following parameters -- nutrient concentration, flow rate and duration.
- Subsequent inspections and/or monitoring verify or otherwise confirm that discharge no longer exists.

Table 5-10 Individual Discharge Credit Taken for FY24

Individual Discharge Credit Taken for FY23	Watershed	Fiscal Year	Protocol	TN Reduction		TP Reduction	EIA (acres)
4806 Seton Drive_Overflowing sewer_C_14067	GW	2015	1	474.89		86.343	35.6534
7309 McClean Blvd._Cloudy grease discharge from outfall_L_14018	BR	2016	1	399.50		196.058	51.5330
OUT000316	PA	2017	1	648.58		121.638	49.3417
OUT000874	GW	2017	1	4837.16		115.171	229.7728
OUT002144	PA	2017	1	604.58		9.627	27.8865
Owings Mills Boulevard_Sewer overflow_V_17148	GW	2018	1	58.44		10.625	4.3875
2430 York Road_Next Car washing cars in lot_O_17123	LR	2018	1	6.56		0.729	0.4119
OUT000161	GW	2018	1	8.47		1.307	0.5953
Outfall 029_High phenols and foam_V_13107	GW	2018	1	68.45		-2.004	0.9625
7616 Canton Center Drive_Gray water and sewage smell in swm pond_L	BR	2018	1	0.01		0.001	0.0004
20756 Old York Road_Whitcraft bus washing in parking lot_X	DC	2018	1	3.61		0.402	0.2268
3300 Lord Baltimore Drive_Leaking fire hydrant_C	GW	2019	1	0.07		0.001	0.0033
7229 Golden Ring Road_water running in roadside ditch_L	BR	2019	1	3.30		0.097	0.1600
5629 Deer Park Road_Peter's Auto car washing_S	LI	2019	1	6.56		0.729	0.4119
7701 Charlesmont Road_Water meter leak_D	BH	2019	1	2.31		0.068	0.0528
OUT000222	PA	2019	1	0.01		0.002	0.0004
10515 Reisterstown Road_Enterprise washing in parking lot_V	GW	2019	1	4.05		0.450	0.1418
19200 Middletown Road_Curry Excavation grease dumpster issues_T	PR	2020	1	0.01		0.000	0.0001
8601 Loch Raven Boulevard_Water gushing from road_L	BR	2020	1	180.73		5.316	4.1266
OUT004907	BR	2020	1	10.68		0.314	0.2439
3100 Ryerson Circle_Water Leak_A	PA	2021	1	251.46		3.224	5.1180
8607 Lucerne Road_Water leak in stream_C_16191	GW	2021	1	924.89		13.850	19.1220
Gwynndale Avenue_BWB high bacteria readings_C	GW	2021	1	1.87		0.340	0.0854
4201 Wholesale Club Drive_BJs sewage leak_K	BI	2021	1	847.59		154.108	38.6622
6813 Quad Avenue_Leaking water valve_L	BR	2021	1	36.64		0.603	0.7656
7100 darlington drive_leaking fire hydrant_L	BR	2021	1	2.25		0.037	0.0469

Individual Discharge Credit Taken for FY23	Watershed	Fiscal Year	Protocol	TN Reduction		TP Reduction	EIA (acres)
7969 Saint Monica Drive_Sump pump discharging sewage_D	BH	2023	1	0.06		0.000	0.0011
101 Marine Oaks Drive_leaking fire hydrant_F	MR	2023	1	0.28		0.005	0.0058
10 W. Aylesbury Road_Leaking fire hydrant_M	JF	2023	1	12.87		0.225	0.2710
6 Carroll Island Road_Walgreens leaking sewer clean out_F	MR	2023	1	0.82		0.149	0.0373
708 Bloomingdale Avenue_Caliber Collision car wash discharge_A	PA	2023	1	0.03		0.003	0.0011
4132 Joppa Road_Festival at Perry Hall Water Leak_N_15036	GU	2023	1	229.32		9.450	5.6404
2814 Lightfoot Drive_Chalky then muddy stream_H	JF	2023	1	135.28		24.596	6.1705
Outfall 153_BWB outfall blitz high fluoride_M	JF	2023	1	1.67		0.005	0.0316
Roundridge Road_leaking fire hydrant_O	LR	2023	1	0.23		0.001	0.0044
3801 Rolling Way_Water quality issues_L	BR	2023	1	10.68		1.942	0.4871
Outfall so-1648_Sudsy grey water at outfall_C	GW	2023	1	699.90		11.985	14.6952
2700 Taylor Avenue_Water bubbling out of street_L	BR	2023	1	0.22		0.001	.0041
OUT000134	LR	2023	1	1774.37		20.593	29.6352
622 Marianne Lane_water leak_A	PA	2024	1	2.87		0.047	0.0600
9510 Coyle Road_Smell in woods_V	GW	2024	1	416.38		28.576	11.9481
OUT000615	PA	2024	1	1743.51		23.842	35.7082
Total	**-**	**-**	**-**	**14411.16**		**840.456**	**574.4138**

In the 2021 Accounting Guidance (MDE 2021), MDE chose to set a maximum EIA credit cap on individual discharge credits. The sum total EIA claimed at one point in time may not exceed the cap. Following MDE’s guidance and examples (MDE 2021 pp 23-26), Baltimore County calculated an EIA credit cap of 1,714.9 acres, as shown in Table 5-11.

Table 5-11 Maximum Total EIA Credit for the Elimination of Individual Discharges from Grey Discharges

Total turfpervious acres in Baltimore County MS4[1]	76,351.59		
	TN (lbs/acre/yr)	**TP (lbs/acre/yr)**	**TSS (lbs/acre/yr)**[2]
Statewide Turf Unit Load (pervious unit load)	13.43	2.10	3,552
Total Pervious Load (turf unit load multiplied by the total pervious acres in an MS4 jurisdiction)	1,025,401.8	160,338.3	271,200,834.2
Total Dry Weather Load (20% of the total pervious load)	205,080.4	32,067.7	54,240,166.8
Maximum Load Attributable to Grey Infrastructure (20% of the dry weather load)	**41,016.1**	**6,413.5**	**10,848,033.4**
	TN EIA	**TP EIA**	**TSS EIA**
Equivalent Impervious Acres (calculated using the aggregate impervious – true forest delta as explained in Section V.)	2,268.6	2,876.0	0
Maximum Total EIA Credit (acres)			**1,714.9**

Notes:

1. Source for pervious acres is CAST Phase 6 - 7.4.0 Summary Loads Report for the 2021 Progress Scenario, acres of non-federal pervious developed land in Baltimore County, MD
2. No TSS reduction is assigned to this BMP by the 2014 Grey Infrastructure Report.

5.10 Summary

The Outfall Prioritization Program has increased efficiency in detecting pollutants. A database is used to assign a priority rating for each outfall based on past screening data and the potential for having illicit connections. Outfalls are screened periodically based on their priority rating, which is assigned or appropriately changed when information is entered. The type and severity of pollution determines the outfall's position in the queue. The combination of citizen involvement, routine outfall screenings and the regional staff complaint investigations is working well to meet our continuing goal of preventing and eliminating illicit connections. Continuing effort will be made to educate and encourage citizens to report illicit discharges.

6.0 Permit Requirements

PART IV. STANDARD PERMIT CONDITIONS

F. **Countywide TMDL Stormwater Implementation Plan**

3. For all TMDLs and WLAs listed in Appendix A, the County shall annually document, in one Countywide Stormwater TMDL Implementation Plan, updated progress toward meeting these TMDL WLAs. This Countywide Stormwater TMDL Implementation Plan shall include:
    a. A summary of all completed BMPs, programmatic initiatives, alternative control practices, or other actions implemented for each TMDL stormwater WLA;
    b. An analysis and table summary of the net pollutant reductions achieved annually and cumulatively for each TMDL stormwater WLA;
    c. An updated list of proposed BMPs, programmatic initiatives, and alternative control practices, as necessary, to demonstrate adequate progress toward meeting the Department's approved benchmarks and final stormwater WLA implementation dates; and
    d. Updates on the County's efforts to reduce trash, floatables, and debris, and show progress toward achieving the annual trash reduction allocation required by the Baltimore Harbor trash TMDL. The updates shall describe the status of trash elimination efforts including resources (e.g., personnel and financial) expended and the effectiveness of all program components including:
        i. Quantifying annual trash reductions using the Department's TMDL analysis or an equivalent and comparable County trash reduction model;
        ii. The public education and outreach strategy to initiate or increase residential and commercial recycling rates, improve trash management, and reduce littering; and
        iii. An annual evaluation of the local trash reduction strategy including any modifications necessary to improve source reduction and proper disposal.

6.1 Introduction

The 2008 Integrated Report indicated that the mesohaline portion of the Patapsco River basin was listed for impairment of aquatic life by debris/floatables/trash. This listing only applies to the Middle Branch from the mouth (Ferry Bar Park to Harbor Hospital Center) extending westward and the Northwest Branch from the Hull Street Pier to Canton Waterfront Park, which includes the Inner Harbor at the base of Gwynns Falls and Jones Falls. In October 2010, Baltimore County initiated a monitoring program designed to collect data for development of a Total Maximum Daily Load (TMDL) for trash, which was completed in November 2011. Following this yearlong study, a long-term trend monitoring program was initiated in March 2012 with a fixed and random site study design. The draft TMDL report was made public on September 11, 2012. The public comment period ended on October 29, 2012. An informational briefing was held prior to the closing on September 21, 2012. Comments were addressed and the trash TMDL was submitted for approval to the EPA in August of 2014. In January 2015, the EPA approved the trash TMDL for the Inner Harbor.

Baltimore County developed a TMDL Implementation Plan for trash to outline how the County plans to meet the pollutant reduction requirements in the impaired waterbody. A draft of the plan was posted for public comment in November of 2015 and submitted to MDE for approval in December that year. MDE provided comments on the plan and Baltimore County responded to those comments before resubmitting the revised plan in July, 2016.

To target areas of high trash accumulation, an upland trash assessment monitoring plan was developed in 2015 to determine the sources of trash within the Gwynns Falls and Jones Falls. A pilot of the upland trash monitoring program was tested in 2015 and a full-scale assessment began in April of 2016. Baltimore County concluded upland trash monitoring assessments in 2022 with the possibility of returning in years to come.

A county-wide Trash and Litter Reduction Strategy has also been developed to address the trash issue throughout the county in response to a requirement in the county's 2013 MS4 permit. The Trash and Litter Reduction Strategy was submitted to MDE in 2014. This section will describe the progress of the Trash and Litter Reduction Strategy and include any monitoring data collected as part of strategy implementation and tracking. This section also includes progress and monitoring relating to the Trash TMDL Implementation Plan.

6.2 TMDL Compliance

This section describes the key assessment, outreach and progress tracking components of the Trash Reduction Strategy. The Trash and Litter Reduction Strategy outlines a Countywide program to reduce litter pollution and addresses a requirement in part IV.D.4 (see box above) of the current MS4 permit.

6.2.1 Trash and Litter Reduction Strategy

Baltimore County EPS is implementing a Trash and Litter Reduction Strategy. This plan includes actions to reduce trash and enhance public education to ensure that Baltimore County meets the compliance requirements of the TMDL.

The strategy addresses MS4 permit requirements as stated in Part IV.D.4 of the current permit. This strategy was developed by Baltimore County's Department of Environmental Protection & Sustainability (EPS) in close partnership with various county agencies, public stakeholders, local watershed associations, and with input from Trash Free Maryland. Suggestions from the public, via community input events held throughout the county, are the main driver of the actions within this plan. Suggestions for litter reduction actions, made by individual citizens, were compiled into a report in the initial phase of strategy development. Those suggestions were then evaluated for their feasibility and potential effectiveness. The Trash and Litter Reduction Strategy is the result of that evaluation.

6.2.2 Inventory and Evaluation of Operations and Outreach

Baltimore County EPS worked closely with Baltimore County Department of Public Works' (DPW) Bureau of Solid Waste Management, Baltimore County Department of Permits, Approvals, and Inspections (PAI), Baltimore County Police Department, Baltimore County Department of Planning, the County Executive's Office, Baltimore County Public Schools and the Department of Health and Human Services in an effort to identify opportunities for improving efficiency within programs pertaining to trash and recycling pickup, litter control, and public outreach.

On February 20, 2019, MDE approved a Ten-Year Solid Waste Management Plan covering the years 2019-2028. The goals of this plan are to promote waste prevention, increase recycling, increase resource recovery, and assess the feasibility of expanding the residential recycling program. The use of this plan will allow for identifying effective ways to improve waste management efforts.

A Baltimore County Solid Waste Work Group was formed in October 2020 to examine existing waste collection and disposal practices, and make recommendations for a more sustainable future. This group met for the first time on November 19, 2020 and included members of County agencies, non-profits, and citizen representatives. A final report was produced in June 2021 that represents an end-to-end review of the Recycling and Solid Waste System along with a set of recommendations, timelines, and estimated cost of implementation for improving the System over the next five (5) fiscal years. More information about the work group and the final report can be found at this website www.baltimorecountymd.gov/boards-commissions/executive/solid-waste-work-group .

Enforcement of trash regulations is conducted by PAI and by the Baltimore County Police Department. The Baltimore County Bureau of Solid Waste Management has a comprehensive education and outreach program to improve county recycling rates and reduce the amount of trash generated. The Bureau of Solid Waste also hosts a Community Cleanup Program which funds weekend dumpster rentals upon request. The Baltimore County Bureau of Highways runs several litter reduction programs including street sweeping of county roadways, an Adopt-A-Road volunteer program, roadside litter removal, and neighborhood dumpster cleanups. Collaboration with these departments helps promote effective litter control and trash reduction programs.

Existing programmatic and municipal trash reduction actions that have associated measurable load reductions have been inventoried in Section 9 of the Trash TMDL Implementation Plan. Those actions with calculable load reductions are street sweeping, storm drain cleaning, SWM facilities, the Team BCPS Clean Green 15 Litter Challenge, Community Cleanups, Project Clean Stream, BaltCo Litter Blitz, and enforcement programs. Calculated reductions are based on the best available data. This section will serve as the means for reporting any reduction calculation changes based on future data.

A gap analysis is also available in Section 9 of the Trash TMDL Implementation Plan, which shows the remaining reductions needed to meet the TMDL requirements for trash and the process of analysis used to select opportunities for program enhancements. The program enhancements are projected to achieve the remaining reductions. This section will also serve to report progress of program enhancements and the status of Phase I and II of the Trash TMDL Implementation Plan.

6.2.3 Public Education and Outreach

EPS conducts broad-ranging, research-based public education and outreach designed to reduce litter in the waterways by promoting source reduction and community litter removal in collaboration with schools, businesses, community associations and watershed association partners.

A more detailed review of activities and plans is available in Section 8 of this report. This is one of several education and outreach actions described in the Trash and Litter Reduction Strategy. Other potential actions outlined in the Trash and Litter Reduction Strategy include: promoting service-learning opportunities, school litter cleanup and awareness programs, anti-littering signage, and continued support of cleanups by watershed and community groups and faith-based institutions.

The effectiveness of the education and outreach programs can be evaluated annually through the NPDES report. Information will be compiled from all responsible agencies with education materials.

Baltimore County EPS will track the effectiveness of its Trash and Litter Reduction Strategy and Trash TMDL Implementation Plan as part of the initial phase of implementation. The Trash TMDL Implementation Plan requires that the need for the contingent structural phase be evaluated after 10 years. The Trash and Litter Reduction Strategy has a similar contingent structural phase, but at a Countywide level. This too will be addressed in this section of future NPDES reports. The data collected from the initial phase can also be used to better target actions to areas where they will be most beneficial.

6.2.3.1 Anti-Litter Advertising Campaign: Litter-Zilla

The County continues to promote our anti-litter advertising campaign developed in FY 2018, as a part of phase I of the Trash and the Litter Reduction Strategy and Trash TMDL Implementation Plan. The goal of the campaign is to change littering behavior and reduce trash entering our local waterways. In FY 2024, EPS built on the "Litter Doesn't Stop Where It Drops" and "Put litter in its place" campaigns by developing a new anti-litter advertisement initiative. Baltimore County EPS focused their anti-litter messaging towards the younger demographic in 2024 by creating an animated video advertisement centered around Litter-Zilla, a litter-composed adaptation of the fictional monster Godzilla. The 30-second video tells the story of a community that becomes so overrun with trash from poor litter and waste management habits that it accumulates into a Godzilla like monster that terrorizes the community. The townsfolk conquer Litter-Zilla by implementing good household litter practices and conducting community litter clean-ups which are all shown during the video.

This theme was picked as the most engaging from a variety of different anti-litter storylines by a focus group of teenagers from Baltimore County. Over the past year, the Litter-Zilla video was delivered to the public as an advertisement on social media and entertainment platforms such as Snapchat, YouTube, Sportify, Hulu, and mobile display ads on websites like ESPN and CNN. The ad was geographically targeted to people in Baltimore County between the ages of 13 to 24. EPS also posted a series of messages featuring Litter-Zilla on Facebook via the Clean Green Baltimore County page. EPS also delivered a non-digital approach by generating Litter-Zilla material that was used on bus shelters and buses with routes in areas of Baltimore County struggling with litter. The original anti-litter slogans focus on how litter can travel from where it is dropped to a place it does not belong. This new advertisement campaign builds on that and takes a new approach that elaborates on the idea that once litter accumulates where it does not belong it becomes a menace to communities and can be remedied by working together.

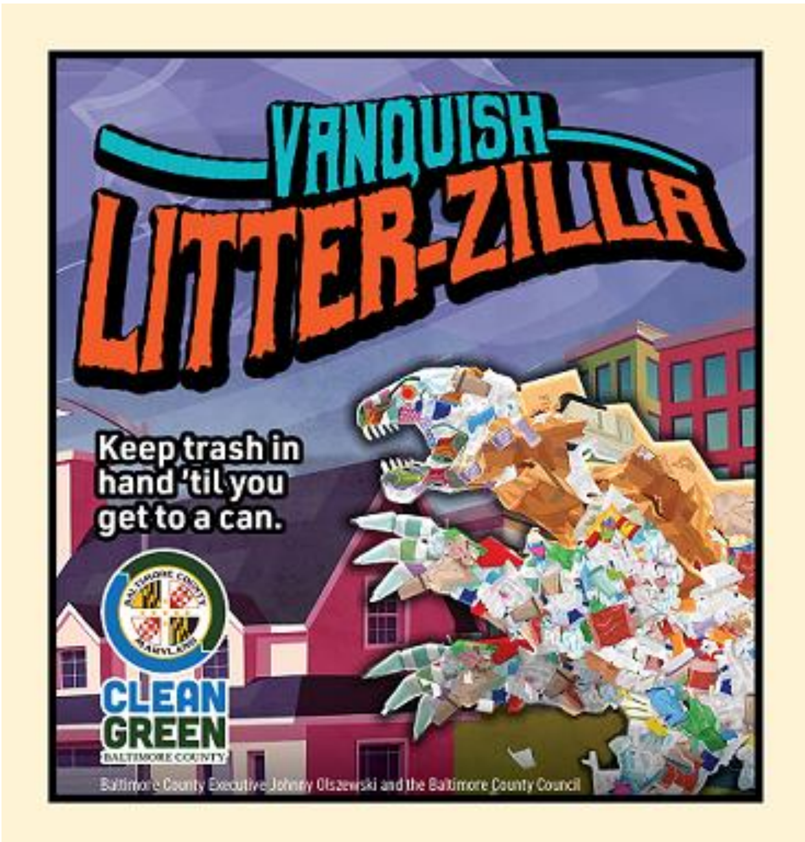


Figure 6-1: Litter-Zilla Anti-Litter Campaign Messaging

6.2.3.2 County Trash Can Signage

In FY 2020, EPS developed anti-litter signage to be placed on all County-owned pitch-in trash cans. The messaging shown below in Figure 6-2, was developed based on feedback from County residents. There are about 680 county cans that that are maintained by the Department of Public Works and Transportation (DPW&T). The installation of these signs was completed in FY 2024.

Figure 6-2: Anti-Litter Signage Developed for County Trash Cans

6.2.3.3 Watershed Signs

In FY 2024, EPS piloted the installation of watershed focused road signage in the Baltimore County portions of the Jones Falls and Gwynns Falls watersheds. This pilot is an anti-litter initiative that educates and reminds passersby that everyone lives, works, and recreates in a watershed, therefore everyone should do their part to keep it clean. Sixteen of these signs were installed across the two watersheds on major county roads and a few locations where the two watersheds border each other. EPS plans to install more of these signs in other watersheds throughout the County. A study will be conducted in FY 2025 to gauge if the signs have increased the public's awareness of watersheds in Baltimore County and if increased awareness has an impact on litter rates.

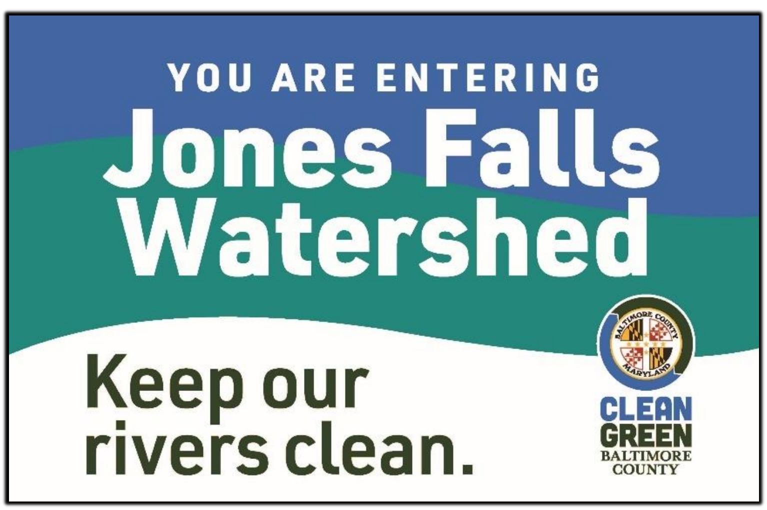


Figure 6-3: Jones Falls Watershed Sign

6.2.3.4 <u>Cigarette Butt Anti-Litter Pilot Campaign</u>

Cigarette butts are one of the most frequently littered items. If left on the ground, they can contaminate soil and groundwater, harm birds, marine life and other animals. Since the filters are made of cellulose acetate, a synthetic fiber, they remain in the environment permanently. In the summer of 2023, the county piloted a cigarette butt anti-litter program in Towson, in partnership with the Towson Chamber of Commerce. The campaign included the placement of outdoor receptacles, distribution of free pocket keychain ashtrays and graphic yard signs at select bar/restaurants and cigarette retailers, and pop-up displays featuring larger-than-life cigarette butt sculptures. In 2024, EPS focused on the distribution of pocket ashtrays by handing them out during public outreach events and at Baltimore County operated buildings. As a continuation of the Towson pilot, EPS also distributed 900 pocket ashtrays to 13 different retailers in Towson for them to distribute to customers. EPS intends to continue this successful outreach throughout the County in coordination with chambers of commerce, Main Street and Sustainable Communities groups and Department of Health staff who regularly interact with cigarette retailers.

6.2.3.4.1 <u>Litter Smart Business</u>

Baltimore County EPS is expanding the Litter Smart Business Program, which was piloted in the Pikesville area in 2019. The program involves working with commercial properties to provide educational materials on best waste management practices, and identifying poor waste management practices and potential solutions to prevent both intentional and unintentional littering. Businesses are invited to take the Litter Smart Business Pledge and become a Baltimore County Litter Smart Business. EPS staff and contractors conducted in-person outreach, with assistance from other County agencies, including the Department of Economic and Workforce Development, Department of Planning, and Code Enforcement. Participating businesses who sign the pledge are included in an online dashboard and are given a window decal and poster to show their commitment to their customers and staff. Business with dumpsters are offered a large graphic dumpster magnet with simple waste management tips. This approach is also applicable to high-density residential areas that are run by a property management group. EPS has also adapted the Litter Smart Business materials for faith-based organizations. In collaboration with Interfaith Partners for the Chesapeake, EPS has begun reaching out to faith-based institutions to become "Litter Smart Congregations." Additionally, EPS is working with Baltimore County chambers of commerce as another strategy for reaching businesses who could benefit from the Litter Smart Business program.

6.3 Monitoring

Following the TMDL development study, the trash monitoring program has developed into a long-term trend monitoring program for stream sites. Trash from both fixed and random sampling sites are collected on an annual basis to document trends and identify problem areas. A monitoring program for trash in the upland areas of the county has also been used. Upland trash monitoring sites include revisited confirmed hotspot sites as well as new random sites each year. Upland trash monitoring assessments concluded in 2022.

6.3.1 Fixed and Random Study (in-stream monitoring)

The twenty stream sites from the initial trash survey used by MDE in the development of the Trash TMDL were defined as fixed sites, and were randomly selected to be alternately sampled in groups of ten during odd and even years. Each year until 2019, twenty additional randomly selected sites (ten in Gwynns Falls, ten in Jones Falls) were added to the survey along with the ten fixed sites. However, in 2019, additional fixed sites were added to monitor land uses not previously covered by fixed sites in each watershed and the yearly random sampling were eliminated. Beginning in 2019, all fixed sites will be monitored on a yearly basis. Random sites had proven to not be significantly different from fixed site loading rates, and the trash collected in the stream could not be confirmed to have been recently deposited. Figure 6-4 below shows the locations of the fixed sites for 2023 throughout the Gwynns Falls and Jones Falls.

The monitoring protocol established by Baltimore County applies to both fixed and random sites. A 500 foot reach is measured at each site—for fixed points, this is a fixed length of stream established at the beginning of the monitoring program in 2010 and confirmed as needed. For random points, the randomly selected site is considered the midpoint of the reach. After the 500 foot reach is established, trash is collected from within the bankfull of the reach. This collected trash is sorted into five categories: aluminum cans, glass bottles, plastic bottles, floatables (food containers, Styrofoam, etc.), and small item dumping (shoes, toys, household items, etc.). Bulk item dumping (bicycles, shopping carts, appliances, etc.) are noted and a weight estimate is made based on available information. Each category is weighed and the recyclable categories (cans and bottles of both types) are counted. This collected data is reported below for each site monitored in 2023.

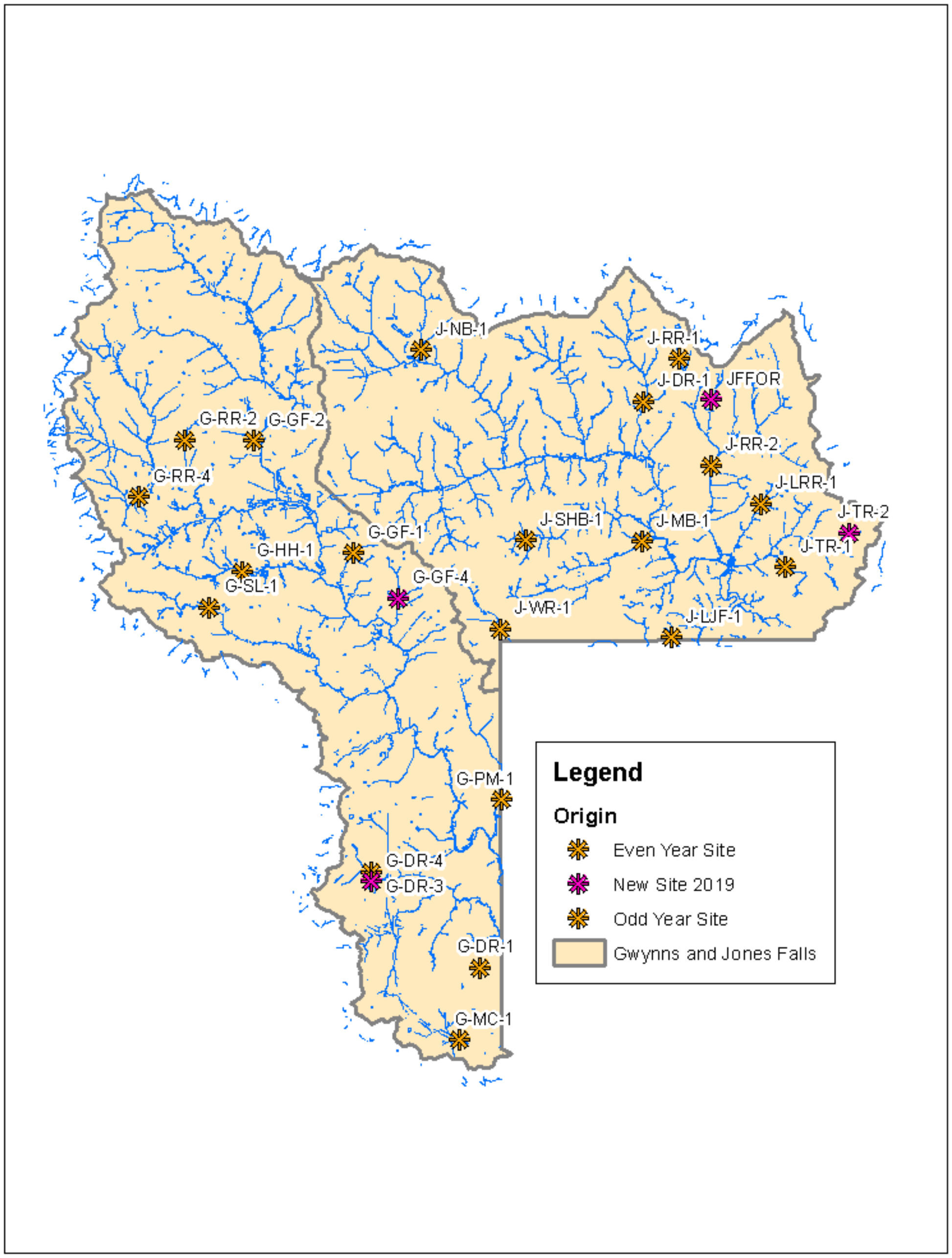


Figure 6-4: Map of 2023 Fixed Monitoring Locations

6.3.1.1 Results

The results from the 2023 fixed site survey are presented below, with any new sites in bold. The data is broken into total pounds of trash collected per site, count of bottles/cans per site, and the loading rates with and without dumping (lbs/acre) per site. Dumping increased from 2022 to 2023, accounting for approximately 35% of the total trash weight collected in 2023. There was a decrease in total pounds of floatables found within the fixed sites between 2022 and 2023, which was approximately 39% of the total trash weight in 2023. Table 6-1 displays the site-specific information, grouped by watershed.

Table 6-1: 2023 Fixed Site Information

Stream Site	Stream Name	Watershed	Major Designation Land Use	Drainage Area (acres)	Trash Total (lbs)	Trash (lbs/acre)	Trash w/o dumping (lbs/acre)
G-DR-1	Dead Run	Gwynns Falls	HDR	238.41	132.27	0.5548	0.5129
G-DR-3	Dead Run	Gwynns Falls	MDR	408.97	124.74	0.3050	0.3050
G-GF-1	Gwynns Falls	Gwynns Falls	LDR	83.74	4.08	0.0487	0.0487
G-PM-1	Powder Mill	Gwynns Falls	MDR	2435.80	126.17	0.0518	0.0436
G-SL-1	Scotts Level Br.	Gwynns Falls	MDR	738.66	13.95	0.0189	0.0189
G-GF-2	Gwynns Falls	Gwynns Falls	MDR	150.26	179.27	1.1931	0.5276
G-HH-1	Horsehead Branch	Gwynns Falls	MDR	508.47	3.47	0.0068	0.0068
G-MC-1	Maiden Choice Run	Gwynns Falls	MDR	414.40	312.86	0.7550	0.2230
G-RR-2	Red Run	Gwynns Falls	Forest	112.82	1.11	0.0098	0.0098
G-RR-4	Red Run	Gwynns Falls	Forest	522.83	0.78	0.0015	0.0015
G-DR-4	Dead Run	Gwynns Falls	Commercial	48.60	320.51	6.5947	5.5659
G-GF-4	Gwynns Falls	Gwynns Falls	Open Urban	300.87	24.39	0.0811	0.0811
J-NB-1	North Br.	Jones Falls	LDR	642.02	0.00	0.0000	0.0000
J-RR-2	Roland Run	Jones Falls	MDR	3009.80	17.34	0.0058	0.0058
J-SHB-1	Slaughterhouse Branch	Jones Falls	LDR	265.80	1.41	0.0053	0.0053
J-TR-1	Towson Run	Jones Falls	HDR	320.41	47.91	0.1495	0.0463
J-WR-1	Western Run	Jones Falls	OU	583.80	36.92	0.0632	0.0255
J-DR-1	Deep Run	Jones Falls	LDR	1149.03	1.51	0.0013	0.0013
J-LJF-1	Lower Jones Falls	Jones Falls	HDR	48.77	95.26	1.9532	0.7230
J-LRR-1	Ruxton Run	Jones Falls	Institutional	180.29	5.22	0.0290	0.0290
J-MB-1	Moores Branch	Jones Falls	LDR	1315.70	1.64	0.0012	0.0012
J-RR-1	Roland Run	Jones Falls	OU	221.48	0.02	0.0001	0.0001
JFFOR	Roland Run Trib	Jones Falls	Forest	80.27	10.01	0.1247	0.1247
J-TR-2	Towson Run	Jones Falls	Commercial	159.15	6.43	0.0404	0.0404

*-Note: The abbreviations used in the Land Use column are as follows: LDR – Low Density Residential, MDR –Medium Density Residential, HDR – High Density Residential, OU – Open Urban.

A two-tailed, paired t-test was also performed on data collected in 2023 against the 2022 data for all fixed sites. The results of this test indicate that, with a p-value of 0.108, loading rates were statistically similar from 2022 to 2023 with a mean loading rate of 0.499 lbs/acre for 2023 and a mean loading rate of 0.119 lbs/acre for 2022. The largest absolute difference in loading rates was found at site G-DR-4, in Dead Run, which exhibited a 396% increase in loading rate driven by an increase in floatables found at the site. It is worth noting that only 15% of the 6.59 lbs/acre loading rate is attributed to dumping, so 85% is coming from non-point sources. It is also worth noting that G-DR-4 has the smallest drainage area of all the sites.

Table 6-2: Comparison of Fixed Site Results 2022-2023 (#s/Acre)

Site	Loading Rate 2022	Loading Rate 2023	Difference 2022 to 2023
G-DR-1	0.3505	0.5548	0.2043
G-DR-3	0.2963	0.3050	0.0087
G-GF-1	0.0126	0.0487	0.0362
G-PM-1	0.0291	0.0518	0.0227
G-SL-1	0.0142	0.0189	0.0047
G-GF-2	0.2686	1.1931	0.9245
G-HH-1	0.0008	0.0068	0.0061
G-MC-1	0.1539	0.7550	0.6010
G-RR-2	0.0021	0.0098	0.0078
G-RR-4	0.0010	0.0015	0.0005
G-DR-4	1.3280	6.5947	5.2668
G-GF-4	0.0028	0.0811	0.0782
J-NB-1	0.0019	0.0000	-0.0019
J-RR-2	0.0044	0.0058	0.0014
J-SHB-1	0.0163	0.0053	-0.0110
J-TR-1	0.0163	0.1495	0.1333
J-WR-1	0.0249	0.0632	0.0383
J-DR-1	0.0026	0.0013	-0.0013
J-LJF-1	0.1715	1.9532	1.7817
J-LRR-1	0.0041	0.0290	0.0248
J-MB-1	0.0003	0.0012	0.0010
J-RR-1	0.0015	0.0001	-0.0014
JFFOR	0.0442	0.1247	0.0805
J-TR-2	0.1118	0.0404	-0.0714
Mean	**0.1191**	**0.4998**	**0.3806**

Table 6-3 and Table 6-4 below indicate the total pounds of trash per sorting category and total count of bottles and cans collected at the fixed sites. Every sorting category rose in weight and count with the exception of glass bottles count falling by two bottles, the total weight of glass (bottles and pieces) is accounted for in Table 6-1 through Table 6-3.

Table 6-3: Pounds of Trash Collected by Sorting Category, 2023

Sorting Category	Weight
Plastic Bottles	79.93
Glass Bottles	17.52
Aluminum Cans	27.95
Other - Floatables	573.52
Other - Small Items	252.76
Dumping	515.58
Total	**1,467.26**

Table 6-4: Count of Bottles and Cans Collected, 2023

Bottle Counts	Fixed
Plastic Bottles	651
Glass Bottles	5
Aluminum Cans	218

The results of the loading rate analysis for 2023 fixed sites are displayed in Figure 6-5 through Figure 6-8.

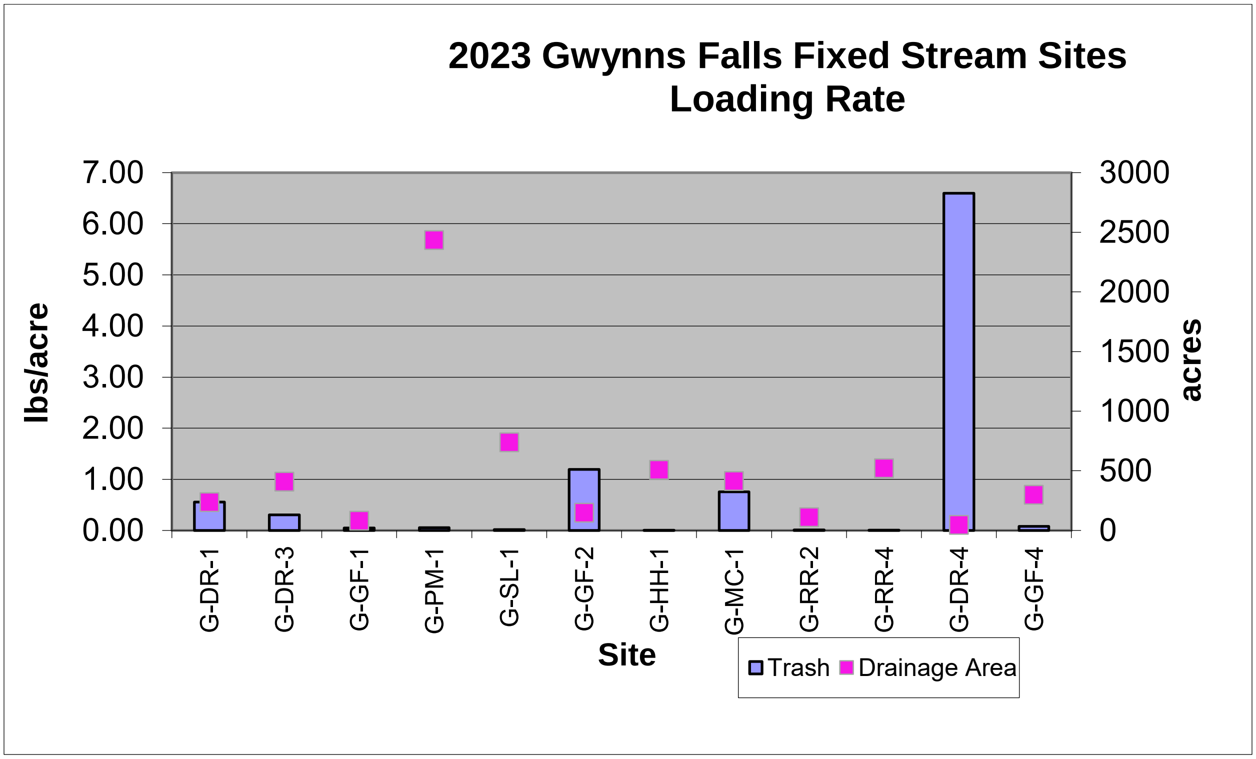


Figure 6-5: Gwynns Falls Fixed Stream Sites Loading Rates

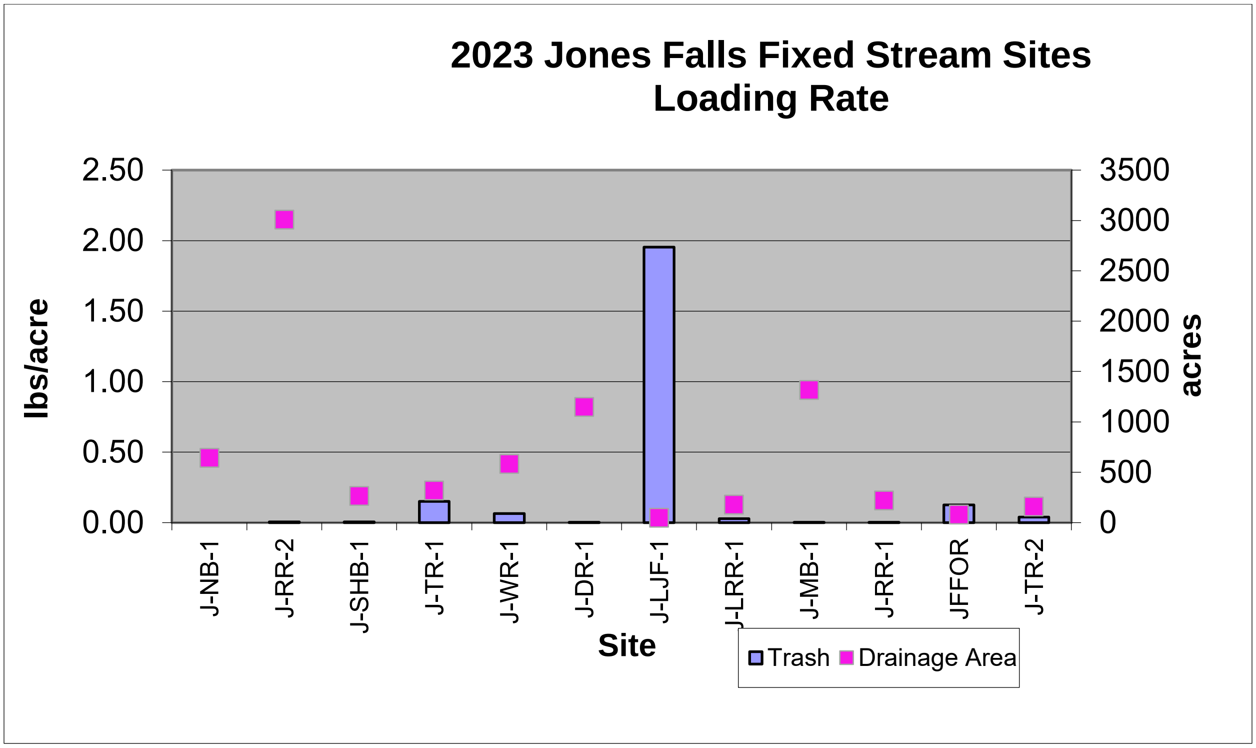


Figure 6-6: Jones Falls Fixed Stream Sites Loading Rates

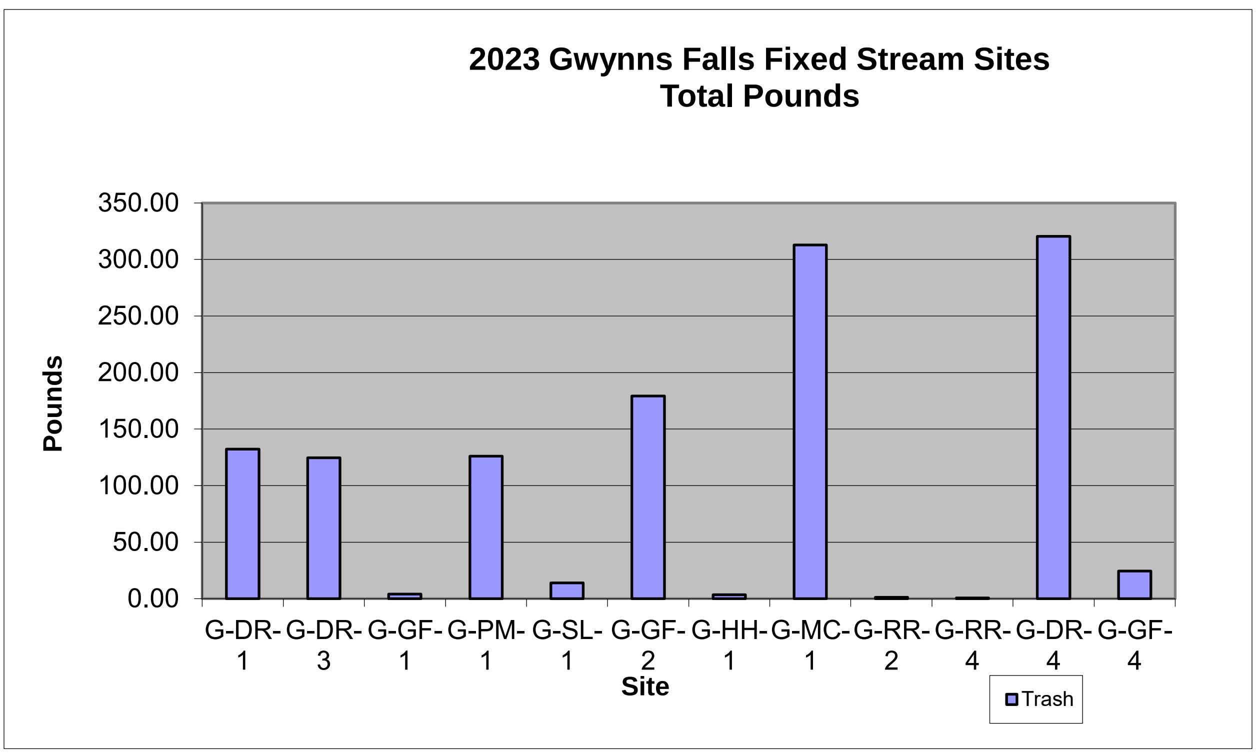


Figure 6-7: Gwynns Falls Fixed Stream Sites Total Pounds

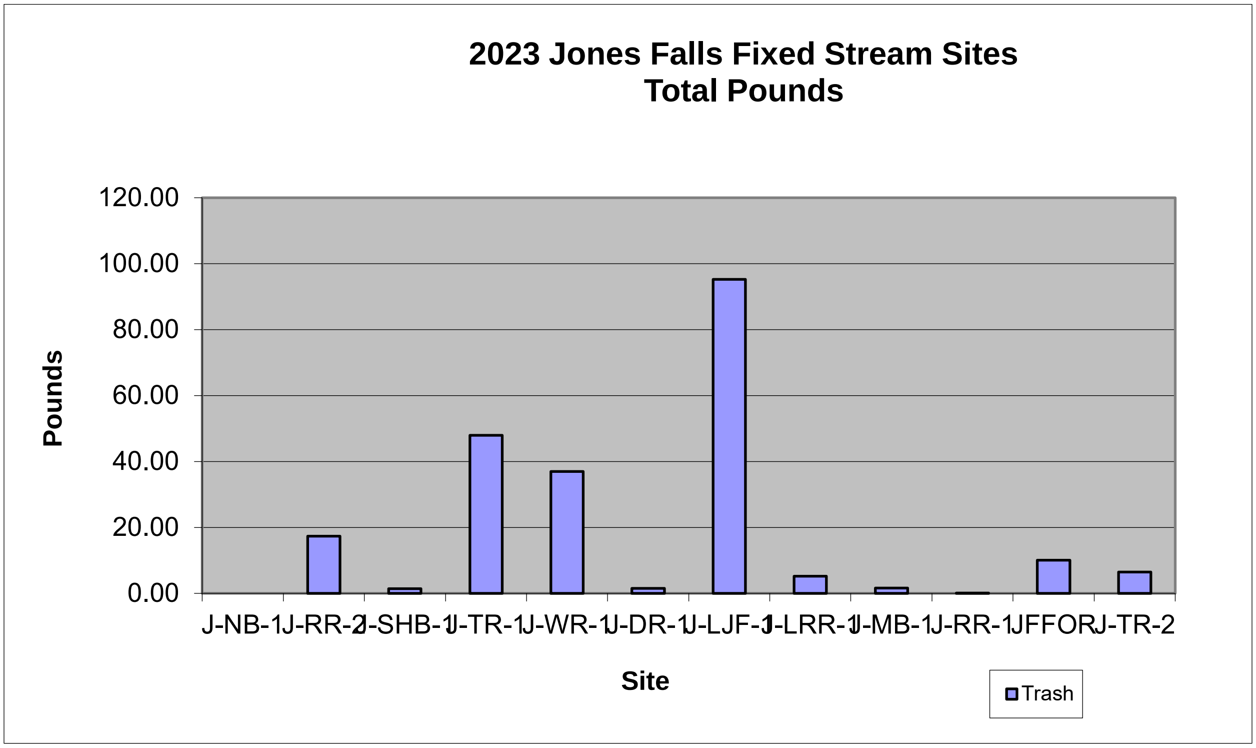


Figure 6-8: Jones Falls Fixed Stream Sites Total Pounds

6.3.2 Upland Trash Assessment

In order to assess the sources of trash throughout the study area, an upland assessment was developed. Upland trash monitoring was used as a tool to track the sources of trash in watersheds. Specifically, this program was used in the watersheds draining to the Middle Branch and Northwest Branch of the Patapsco River to address the trash TMDL. The results of this assessment are a valuable resource for targeting trash reduction actions in order to meet the TMDL requirements.

An initial pilot of this Upland Trash assessment took place in 2015 where 42 sites where surveyed. Baltimore County then implemented a full version of the program beginning in 2016 where 192 sites were surveyed. Geographic Information System mapping was used to randomly select commercial and industrial sites in the area of interest. Upon arrival at each site a visual inspection is made to assess trash at the street level which may enter nearby/connected watercourses. After the assessment, the site is assigned numerous “litter index” scores to help in ranking the types of sites/localities with the highest prevalence of trash. This is similar to the “windshield” surveys conducted for the Anacostia Watershed Trash Reduction Plan. This type of survey may be useful in targeting areas for education and for trash removal or street sweeping activities.

6.3.2.1 Upland Trash Assessments Fiscal Year 2022

To determine the effectiveness of our education and outreach litter reduction efforts, EPS started a new upland visual litter study in March 2020. For this study EPS selected Pikesville as the implementation area and Overlea as the control area. These areas were paired based on an analysis of past upland trash assessments, and recommendations from the County’s Department of Planning and Department of Economic and Workforce Development. Sites for this study were randomly selected using a stratified selection method. Assessments are completed using a modified version of the methodology used in previous upland assessments detailed in Section 6.3.2. This study differs from assessments done prior to 2019 in that the geographic area being sampled is much smaller, sites are closer together, and additional site types were eligible for selection. Site selection was expanded to also include roadways, institutional properties, and low density residential properties in addition to high density residential, commercial and industrial areas that were previously eligible. The study was planned to end in March 2021 but due to the COVID-19 pandemic our litter reduction efforts in Pikesville were delayed and the ending timeline for the study was adjusted to March 2022. The data from this study was analyzed in FY 2023 to determine if our efforts were effective in reducing the amount of litter on the ground. No statistically significant trends could be determined from the study. Table 6-5 shows the list Table 6-5 of sites selected by area and site type. Figure 6-9 and Figure 6-10 show the locations of the sites within study areas.

Table 6-5: Litter Study Sites by Type and Area

Site Type	Implementation Area - Pikesville	Control Area - Overlea
Commercial	10	5
Institutional	3	3
Attached Residential	2	2
Detached Residential	3	3
Roadway	10	7

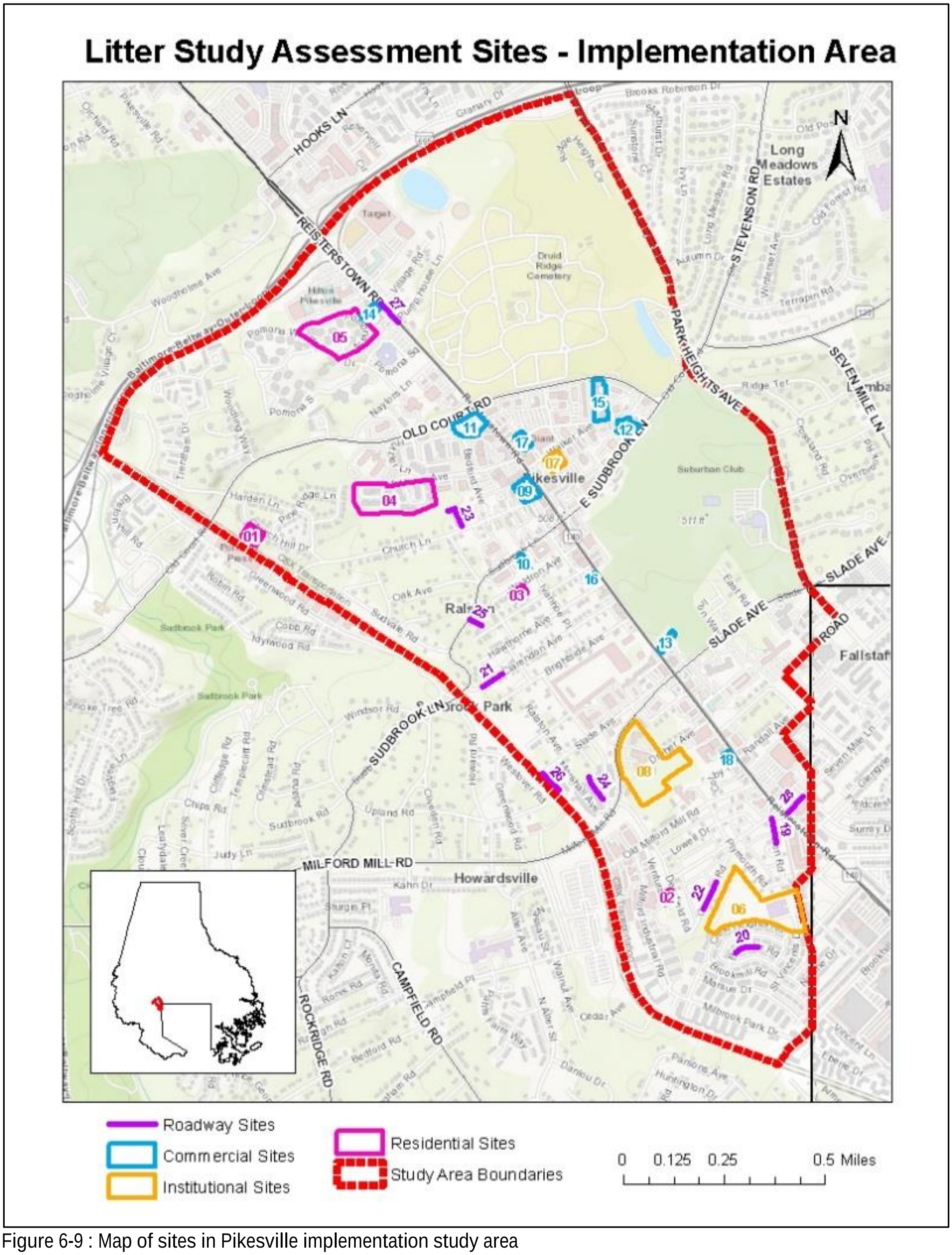


Figure 6-9 : Map of sites in Pikesville implementation study area

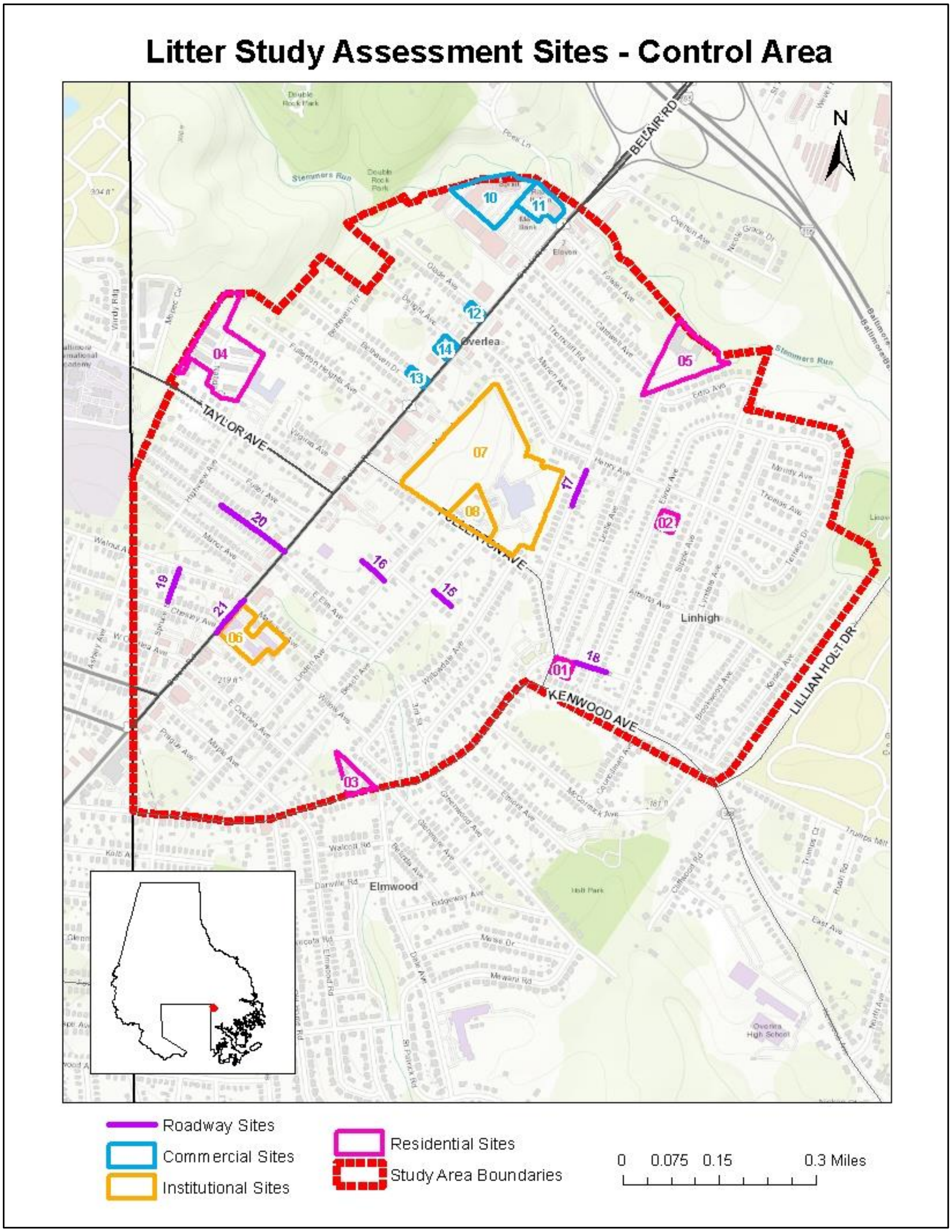


Figure 6-10: Map of sites in Overlea control study area

6.4 Watershed Trash Loading Calculations

While the Trash TMDL developed trash loading rates for the Gwynns Falls and the Jones Falls, there were no calculations for the trash loading rates for the rest of the watersheds in Baltimore County. In order to provide the trash loadings on a county-wide basis, EPS has used the information in the Baltimore Harbor Trash TMDL to develop trash loading rates for all 14 watersheds in Baltimore County. The trash TMDL is based on loading rates attributable to the differing land uses in the county (Table 6-6) These land use loading rates plus a 0.5% margin of safety were used to estimate the trash loads in each of the 14 major watersheds in Baltimore County (Table 6-7). Based on the Baltimore County data, it is estimated that 0.57 pounds of trash per acre are dumped each year, in addition to the land use derived trash load.

Table 6-6: Trash Loading Rates by Land Use

Land Use	Land Use Code	Trash Loading rate Lbs/acre/year
Low Density Residential	11, 191, 192	0.9
Medium Density Residential	12	2.45
High Density Residential	13	4.01
Commercial	14	7.91
Industrial	15	7.91
Extractive	17	7.91
Institutional	16	1.99
Open Urban	18	2.15
Roadways	80	2.06
Agriculture	21,22,23,241,242	2.15
Forest	41,42,43,44	0.02
Construction	73	7.91

Table 6-7: Baltimore County Watersheds - Annual Trash Loading Rates

Watershed	Acres	Pounds of Trash per Year
Deer Creek	7,152	14,084
Prettyboy Reservoir	25,551	38,761
Loch Raven Reservoir	139,568	266,591
Lower Gunpowder Falls	29,468	62,516
Little Gunpowder Falls	17,276	30,801
Bird River	16,408	50,460
Gunpowder River	5,859	11,669
Middle River	6,466	23,468
Liberty Reservoir	17,597	27,366
Patapsco River	33,579	82,411
Gwynns Falls	28,654	99,563
Jones Falls	25,933	64,051
Back River	23,115	84,816
Baltimore Harbor	11,406	57,236
Total	**388,032**	**913,793**

The trash load calculated for each watershed will be used as the target load for removal each year to reach a goal of zero trash in our waterways.

6.5 Load Removal in 2024

This section describes the trash reduction rates for ongoing litter removal programs in Baltimore County. It includes trash reductions from street sweeping, inlet cleaning, stormwater management ponds, the Clean Green 15 challenge, project clean stream, and other stream clean-up programs.

6.5.1 Street Sweeping/Inlet and Pipe Cleaning Trash Removal

As discussed in Section 7.2 removing the material from the storm drain system reduces street flooding (a potential safety hazard), reduces the amount of trash and sediment from entering streams, and aids in the detection of illicit connections.

A study of debris removed from inlets (Law, DiBlasi, & Ghosh, 2008) found that trash accounted for 8.9% of the weight of debris from inlets, while sediment and organic material made up 91.1% of the weight of debris. Baltimore County has created a standard operating procedure for protocols on how inlet and pipe cleaning is conducted and how pollutant load calculations are performed named PLRC_SOP_RT-022 that can be made available on request.

We apply this same study to street sweeping debris and multiply the total debris by 8.9% to determine the amount of trash removed through street sweeping. A standard operating procedure was also created for how street sweeping pollutant load calculations are performed named PLRC_SOP_RT-021.02. This document can also be made available on request.

Table 6-8 shows the amount of trash removed by watershed for street sweeping and inlet cleaning activities throughout the County.

Table 6-8: Trash Removed by Watershed through Street Sweeping and Storm Drain Cleaning in FY24

Watershed	Street Sweeping Trash Removed (pounds)	Storm Drain Cleaning Trash Removed (pounds)
Deer Creek	-	-
Prettyboy Reservoir	-	-
Loch Raven Reservoir	24,920	1,300.91
Lower Gunpowder Falls	11,412.45	251.26
Little Gunpowder Falls	1,442.12	-
Bird River	10,579.23	273.97
Gunpowder River	1,839.66	185.63
Middle River	5,117.10	66.58
UWS Totals	55,311	**2,078.35**
Liberty Reservoir	315.64	-
Patapsco River	3,372.71	962.73
Gwynns Falls	16,708.44	811.22
Jones Falls	13,964.98	935.59
Back River	44,476.79	286.11
Baltimore Harbor	73,760.23	170.40
P/Back River Totals	**152,599**	**3,166.05**
Annual County Totals	**207,909**	**5,244.40**

6.5.2 *Ongoing Litter Removal from Stormwater Management Facilities*

Starting in FY 2016, the County began keeping track of the amount of trash removed from stormwater facilities while doing maintenance. Logs of the number of bags of trash collected and any miscellaneous items (shopping carts, mattresses, tires, etc.) are tracked by the stormwater management facility number. Routine and complaint-driven maintenance is performed on stormwater management facilities and trash collection is part of that maintenance. This maintenance prevents trash from entering the stream system. The standard operating procedure document named PLRC_SOP_RT-010 details protocols on how stormwater facility trash removal is tracked in Baltimore County and is available on request. Table 6-9 shows the debris removed by watershed at stormwater management facilities throughout the county in FY 2024.

Table 6-9: Trash Removed from Stormwater Management Facilities FY24

Watershed	Trash removed (pounds)
Deer Creek	0
Prettyboy Reservoir	118.14
Loch Raven Reservoir	707.36
Lower Gunpowder Falls	198.69
Little Gunpowder Falls	10.74
Bird River	434.97
Gunpowder River	10.74
Middle River	214.8
UWS Totals	**1,695.44**
Liberty Reservoir	118.14
Patapsco River	1,716.24
Gwynns Falls	1,805.62
Jones Falls	161.1
Back River	472.56
Baltimore Harbor	42.96
P/Back River Totals	**4,316.62**
Annual County Totals	**6,012.06**

6.5.3 *Gwynns Falls Trash Wheel*

In FY2020 the County entered an agreement with the Waterfront Partnership of Baltimore (WPB) to provide funding for the operation of a new trash wheel. The new wheel collects trash and debris flowing out of the Gwynns Falls into Ridgley's Cove of the Middle Branch of the Patapsco River. Similar to other models of the trash wheel, this wheel operates using hydro power from the river current turning the attached water wheel, and solar power from the panels that are placed on top of the vessel. Nets in the water guide floating litter to the front of the trash wheel. Trash is then carried up into the vessel on a conveyor belt where it is deposited into a dumpster. Dumpsters have sensors on them and are changed out when they become full. The WPB has agreed to send quarterly reports of the debris removed by the wheel and the County will take pollutant reduction credit for the debris removed in proportion to our contribution to the cost of operation. The wheel started operating July 2021, and table below shows the County's portion of the wheel's reductions from FY23 and FY24 The equation below was used for these calculations.

$$\begin{aligned} &Annual\ Reduction = \\ &\qquad Wet\ Trash\ Weight\ Removed * Dry\ Weight\ Conversion\ (.7) * County\ Proportion\ (.5) \end{aligned}$$

Equation 6-1

Table 6-10: Gwynns Falls Trash Wheel Reductions

Year	Trash removed (pounds)
FY23	28,364
FY24	48,447

6.5.4 *Team BCPS Clean Green 15 Litter Challenge*

The Team BCPS Clean Green 15 Litter Challenge program, which began in 2014, is a Clean Green County initiative to encourage people to conduct short 15-minute trash cleanups around the county and to report the amount of litter they picked up. The following website has a description of Clean Green 15 and the reporting form for clean-ups https://www.baltimorecountymd.gov/departments/environment/clean-green/clean-green-15.

The purposes of the Clean Green 15 Team BCPS Litter Challenge are to prompt young people to internalize an anti-litter ethic; directly remove tons of litter from communities, preventing it from polluting waterways; and generate "buzz" and positive peer pressure about litter and its damaging effects. Baltimore County public schools compete to see whose "school community" can do the most Clean Green 15 litter cleanups and collect the most litter. "School community" means school-based groups as well as any civic or community group, business, scout troop, sports team, place of worship, youth group, environmental organization, family, individual, etc. who wants to do a cleanup and designate a school to receive credit. Participants conduct Clean Green 15-minute litter cleanups, and report their cleanups on the program web site, designating one BCPS school to receive credit. Winning schools are selected based on cleanup activity credited to their school as well as other anti-litter education and outreach efforts. From 2014 through May 2016, the Team BCPS Litter Challenge was seasonal. The program is now year-round and cleanups can be reported and designated to a BCPS school all year. Clean Green 15 celebrated it's 10-year anniversary during FY 2024.

Table 6-11 shows the Clean Green 15 trash reduction results by weight and by watershed for the cleanups taking place during FY 2023.

Table 6-11: Clean Green 15 Results FY24

Watershed	Trash removed (pounds)
Deer Creek	0
Prettyboy Reservoir	0
Loch Raven Reservoir	660.15
Lower Gunpowder Falls	2,193.21
Little Gunpowder Falls	5.2
Bird River	323.53
Gunpowder River	7.5
Middle River	0
UWS Totals	**3,189.59**
Liberty Reservoir	972.16
Patapsco River	3,005.52
Gwynns Falls	3,192.06
Jones Falls	622.61
Back River	7,234.15
Baltimore Harbor	3,947.76
P/Back River Totals	**18,974.26**
Annual County Totals	**22,163.85**

6.5.5 BaltCo Litter Blitz

BaltCo Litter Blitz is a Clean Green County initiative that encourages residents to either host or volunteer for a litter cleanup in Baltimore County during a designated period of time, typically in the spring. EPS piloted this initiative on a small scale in April 2019 by working with watershed partners to host volunteer cleanups in the month of April, and promoting them to residents on the county website and through social media channels.

In FY22 EPS partnered with DPWT Solid Waste and expanded the program. In April 2022 the County launched the BaltCo Litter Blitz hub site. Using this site groups can register their cleanup of any size, and sign up to receive free bags and gloves from the County. Residents also have the option to make their cleanups private or open to volunteers from the public. The hub site features several interactive tools including a way to locate cleanups happening near them and the closest supply pickup location. The hub site hosts a form for people to report the results of their cleanup, this form auto populates a data dashboard that summarizes the number of bags collected, volunteers engaged, and supplies distributed. With help from Baltimore County Recreation and Parks, Property Management and DPWT, BaltCo Litter Blitz took place again during FY 2024 from the beginning of April 2024 to the end of May 2024 and the results are shown in Table 6-12 below. EPS has decided to host the next Litter Blitz during the Fall of 2024 instead of the in the Spring of 2025 on the usual cycle. This decision was made based on the expressed interest from Baltimore County's watershed partners to do the event in the Fall.

Table 6-12: Balt Co Litter Blitz Results FY24

Watershed	Trash removed (pounds)
Deer Creek	0
Prettyboy Reservoir	0
Loch Raven Reservoir	3,374.21
Lower Gunpowder Falls	638.4
Little Gunpowder Falls	0
Bird River	0
Gunpowder River	220.7
Middle River	0
UWS Totals	**4,233.31**
Liberty Reservoir	0
Patapsco River	776.72
Gwynns Falls	2604.4
Jones Falls	1,808.16
Back River	3234.6
Baltimore Harbor	0
P/Back River Totals	**8,423.88**
Annual County Totals	**12,657.19**

6.5.6 Watershed Association Stream Cleanups, Project Clean Stream

Stream cleanups are conducted throughout the County each year by local watershed groups. Watershed associations participating in the county's Watershed Association Restoration, Planning, and Implementation Grant program report stream clean-ups to the County.

Project Clean Stream is a program of the Alliance for the Chesapeake Bay. The project has been in operation for about 15 years and encourages volunteers to come together and cleanup on a unified day of service. Even though the project is aimed at engaging volunteers for this single day event, they support cleanup projects throughout the spring. Many watershed associations in Baltimore County participate in this initiative and it accounts for a significant portion of the trash collected shown in Table 6-13. below combined with clean-ups the groups host throughout the year.

Table 6-13 shows the results of watershed group clean-up reporting from July 1, 2023 to June 30, 2024 by watershed. In the past, we reported this data by calendar year because our watershed association grant cycle followed the calendar year, but starting in 2017 we transitioned into a fiscal year grant cycle.

Table 6-13: FY24 Watershed Association and Project Clean Stream Clean-ups by Watershed

Watershed	Trash (pounds) removed
Deer Creek	0
Prettyboy Reservoir	0
Loch Raven Reservoir	2,715
Lower Gunpowder Falls	802
Little Gunpowder Falls	0
Bird River	750
Gunpowder River	40
Middle River	610
UWS Totals	**4,917**
Liberty Reservoir	0
Patapsco River	18,320
Gwynns Falls	4,775
Jones Falls	0
Back River	43,527
Baltimore Harbor	1,671
P/Back River Totals	**68,293**
Annual County Totals	**73,210**

7.0 Permit Requirements

PART IV. STANDARD PERMIT CONDITIONS

D. **Management Programs**

4. Property Management and Maintenance

a. Coverage under Maryland's NPDES General Permit for Discharges of Stormwater Associated with Industrial Activity (SW Industrial GP) is typically required at facilities where the following activities are performed: maintenance or storage of vehicles or equipment; storage of fertilizers, pesticides, landscaping materials, hazardous materials, or other materials that could pollute stormwater runoff. The County shall:

i. Ensure that a Notice of Intent (NOI) has been submitted to the Department for each County-owned industrial facility requiring coverage under the SW Industrial GP; and

ii. Submit with the annual report a list of County properties currently covered under the industrial stormwater permit.

b. The County shall develop, implement, and maintain a good housekeeping plan (GHP) for County-owned properties not required to be covered under Maryland's SW Industrial GP where the activities listed in PART IV.D.4.a are performed. The GHP shall be submitted to the Department by the County in its third year annual report and implemented thereafter. A standard GHP may be developed for all County owned property or separate GHPs may be developed for properties with similar use (e.g., recreation and parks properties, school properties). The GHP shall include, but not be limited to:

i. A description of property management activities;

ii. A map of the locations of properties covered by the GHP;

iii. A list of potential pollutants and their sources that result from facility activities;

iv. Written procedures designed to reduce the potential for stormwater pollution from property activities, including illicit discharges, dumping, and spills;

v. Written procedures for annually assessing County properties in order to prevent the discharge of pollutants, spills, and leaks into its municipal separate storm sewer system;

vi. Written procedures for performing stormwater conveyance system inspections for removing debris that may cause clogging, backups, and flooding; and

vii. Annual training for all appropriate County staff and contractors regarding best practices for preventing, reducing, and eliminating the discharge of pollutants during property activities.

c. The County shall continue to implement a program to reduce pollutants associated with the maintenance of County-owned properties including, but not limited to, local roads and parks. The maintenance program shall include the following activities where applicable:

i. Street sweeping in the amount identified in Appendix B and annually updated thereafter in accordance with PART IV.E.8;

ii. Inlet and conveyance system inspection and cleaning in the amount identified in Appendix B and annually updated thereafter in accordance with PART IV.E.8; and

iii. Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with vegetation management. This can include, but is not limited to:

- Developing and implementing an Integrated Pest Management Plan according to EPA guidelines;
- Custom fertilizer property management plans based on soil testing;
- Targeted application or “spot application” of pesticides;
- Alternative and organic fertilizers;
- Manual weed removal, mowing, and trimming;
- Annual training and applicator certification and licensing as required by Maryland Department of Agriculture to ensure accurate application of chemicals according to manufacturer's recommendations;
- Subcontracting to a certified pest control applicator licensed business for some or all of properties;

- Piloting biological pest control programs; and
- Establishing “no mow” areas.

d. The County shall reduce the use of winter weather deicing and anti-icing materials, without compromising public safety, by developing a County Salt Management Plan (SMP) to be submitted to the Department in its third year annual report and implemented thereafter. The SMP shall be based on the guidance provided on best road salt management practices described in the *Maryland Department of Transportation, State Highway Administration’s Maryland Statewide Salt Management Plan,* developed and updated annually as required by the Maryland Code, Transportation §8-602.1. The County’s SMP shall include, but not be limited to:

i. A plan for evaluation of new equipment and methods, and other strategies for continual program improvement;

ii. Training and outreach:
- Creating a local “Salt Academy” that annually provides County winter weather operator personnel and contractors with the latest training in deicer and anti-icer management, or the participation of County personnel and contractors in a “Salt Academy” administered by another MS4 permittee or State agency; and
- Developing and distributing best salt management practices outreach for educating residents within the County.

iii. Tracking and reporting:

- Starting with the fourth year annual report, during storm events where deicing or anti-icing materials are applied to County roads, track and record the amount of materials used and snowfall in inches per event, if applicable, and;
- Report the deicing or anti-icing application by event or date, and the monthly and annual pounds used per lane mile per inch of snow.

e. The County shall evaluate current litter control problems associated with discharges into, through, or from portions of its MS4 that are not already addressed under the TMDL implementation plan for trash (litter and floatables) (see Appendix A). Additionally, the County shall continue to remove from or prevent from entering its storm drain system 152.4 tons of litter and debris in the first year of permit issuance or as updated annually thereafter in accordance with PART IV.E.8.

f. The County shall report annually on the changes in its Property Management and Maintenance programs and the overall pollutant reductions resulting from implementation of the components of the programs listed in this section.

7.1 Introduction

Baltimore County has a number of county owned facilities that are required to have coverage under the NPDES General Permit for Stormwater Discharges Associated with Industrial Activities (Section 7.2).

The County has a Storm Drain Cleaning Program (Section 7.3) and a Street Sweeping Program (Section 7.4.2) to reduce the amount of pollution that reaches the stream systems, both of which are the responsibility of the Department of Public Works and Transportation (DPWT).

The County tracks its use of chemicals involved in vegetation maintenance (herbicides, pesticides, fertilizers) and deicing materials for winter weather conditions (Section 7.3). Household Hazardous Waste drop-off sites are open year-round (Section 7.5).

EPS periodically coordinates with other county agencies through the NPDES Management Committee (Section 7.6). Bacteria monitoring is conducted in association with sanitary sewer repairs. Progress of repairs as required by U.S. Environmental Protection Agency (EPA) and Maryland Department of Environment (MDE) in the 2005 Consent Decree and bacteria monitoring are summarized (Section 0).

7.2 General Permit for Stormwater Discharges Associated with Industrial Activity

The State of Maryland's current General Permit for Stormwater Discharges Associated with Industrial Activities went into effect on February 1, 2023 and is administered by Maryland Department of the Environment (MDE). It is also referred to as General Discharge Permit No.

20-SW, or simply "20-SW". All required documentation is either submitted to MDE or stored on site, as specified by the permit.

7.2.1 Regulated County Facilities - Status of NOIs and SWPPPs

County-owned industrial facilities requiring NPDES stormwater general permit coverage include general government sites such as highway shops, utility yards, vehicle/equipment maintenance, solid waste facilities, etc. Other public industrial sites, such as school bus lots and college campus maintenance facilities are also covered under this permit. These municipal industrial operations fall under various county agencies, including the Department of Public Works and Transportation, Property Management, Baltimore County Public Schools, and the Community College of Baltimore County.

7.2.1.1 Status of General Government Sites

The Baltimore County Department of Public Works and Transportation (DPWT) is responsible for ensuring that regulated general county government facilities comply with the requirements of the General Permit for Industrial Stormwater Discharge (20-SW). Table 7-1 shows the status of facility compliance by agency or bureau.

In FY 2024, there were a total of 19 permits in effect for general government industrial activities: DPWT/Highways (11), DPWT/Solid Waste (3), Office of Budget and Finance/Vehicle Operations and Maintenance (3), and Office of Budget and Finance /Property Management (2). Each industrial operator is responsible for maintaining their own permit and related requirements, such as conducting quarterly site inspections, with one of those being a comprehensive inspection. Quarterly Visual Monitoring occurs when stormwater conditions and protocols allow for the sampling. Certain sites are used for storage only and are unmanned; these sites are inspected annually. Comprehensive Annual Inspections and staff training are conducted by DPWT or its contractors for all general government facilities.

In accordance with the requirements of the 20-SW permit, Notices of Intent (NOIs) and Stormwater Pollution Prevention Plans (SWPPPs) have been prepared and submitted to MDE for all regulated general government sites. SWPPPs are revised as needed to reflect changes in operations and to incorporate comments from MDE inspections.

7.2.1.2 Status of Other County Agencies

This group includes public sites managed separately by Baltimore County Public Schools (13 sites) and the Community College of Baltimore County (3 campuses) and are included in Table 7-1. These sites must comply with the same inspection, monitoring and reporting requirements as general government sites. They are up to date with NOI and SWPPP requirements for all sites.

In FY24, CCBC updated its Spill Response procedures, revised its maps to reflect current conditions, and enhanced employee training modules.

Table 7-1: General SW Discharge Permit (20-SW) – FY 2024 Compliance Status of Baltimore County Industrial Sites

County Dept.	Bureau	Facility	Quarterly Inspections	Annual Inspections	SWPPP Training Date (# staff)
DPWT	Highways	Brady Avenue (Shop 1)	yes	yes	
DPWT	Highways	Clarks Lane (Shop 3)	yes	yes	
DPWT	Highways	Emala Ave (Shop 8)	yes	yes	
DPWT	Highways	Glen Arm (EOM)	yes	yes	
DPWT	Highways	Hydes Road (Shop 7-2)	yes	yes	6/11/24 (15)
DPWT	Highways	Longview (Shop 6)	yes	yes	

County Dept.	Bureau	Facility	Quarterly Inspections	Annual Inspections	SWPPP Training Date (# staff)
DPWT	Highways	Middletown Road (Shop 4-2)	yes	yes	
DPWT	Highways	Perry Road (Shop 7-1)	yes	yes	6/17/24 (15)
DPWT	Highways	Sparrows Point (Shop 9)	yes	yes	
DPWT	Highways	White Hall (Shop 4-3)	yes	yes	
DPWT	Highways	Windsor Mill (Shop 2)	yes	yes	
DPWT	Solid Waste	Eastern Sanitary Landfill	yes	yes	1/31/24 (6)
DPWT	Solid Waste	Central Acceptance Facility	no	no	6/11/24 (7)
DPWT	Solid Waste	Western Acceptance Facility	yes	yes	7/9/24 (2)
OBF	VOM	Randallstown (Liberty Road)	yes	yes	12/15/23 (1)
OBF	VOM	Essex (Mace Avenue)	yes	yes	
OBF	VOM	Gilroy	yes	yes	
OBF	PM	Double Rock Park	yes	yes	12/21/23 (3)
OBF	PM	Inwood	yes	yes	
BCPS	Transportation and Grounds	Arbutus Transportation and Grounds	yes	yes	Fall 2023 (14)
BCPS	Transportation and Grounds	Cockeysville Service Center	yes	yes	Fall 2023 (60)
BCPS	Transportation	Hopkins Creek Bus Lot	yes	yes	Fall 2023 (2)
BCPS	Transportation	Inwood Bus Lot	yes	yes	Fall 2023 (2)
BCPS	Transportation	Kenwood Truck and Bus Facility	yes	yes	Fall 2023 (16)
BCPS	Grounds	Larchmont Grounds	yes	yes	Fall 2023 (1)
BCPS	Grounds	Loch Raven Grounds	yes	yes	Fall 2023 (8)
BCPS	Transportation and Grounds	North Point Transportation Facility	yes	yes	Fall 2023 (20)
BCPS	Transportation	Parkton Bus Lot	yes	yes	Fall 2023 (2)
BCPS	Transportation	Providence Road Facility	yes	yes	Fall 2023 (3)
BCPS	Transportation	Rosedale Bus Lot	yes	yes	Fall 2023 (2)
BCPS	Transportation	Wabash Bus Lot	yes	yes	Fall 2023 (2)
BCPS	Transportation	Windsor Mill Bus Lot	yes	yes	Fall 2023 (3)
CCBC	Facilities	Catonsville Campus	yes	yes	10/10/23 (21)
CCBC	Facilities	Dundalk Campus	yes	yes	11/15/23 (9)
CCBC	Facilities	Essex Campus	yes	yes	11/17/23 (16)

BCPS = Baltimore County Public Schools
CCBC = Community College of Baltimore County
DPWT = Department of Public Works and Transportation
EOM = Equipment Operation and Maintenance
OBF = Office of Budget and Finance
PM = Property Management
VOM = Vehicle Operation and Maintenance

7.2.2 Employee Training

Training of on-site employees is an essential part of compliance with the 20-SW permit. All county industrial sites are required to conduct regular training and to keep a record of the training with their SWPPP at the site; documentation is also available electronically to county employees for general government sites.

7.2.2.1 Department of Public Works and Transportation (DPWT)

A virtual training presentation was created by Baltimore County contractor, Maryland Environmental Service (MES). After viewing the presentation, staff take a short quiz on the material. Upon completion, staff names and the sites where they work are recorded. Dates indicated are representative for the time period when training was being done. Certain sites held staff meetings where the training was given and completed a sign-in sheet that included additional personnel.

7.2.2.2 Baltimore County Public Schools (BCPS)

The BCPS Department of Facilities developed a Power Point presentation to train transportation, facilities, grounds, and logistics employees. A total of 1,403 BCPS employees completed SWPPP training between July and September 2023, including 1,044 bus drivers. All bus lot sites are provided with posters that serve as reminders for small steps that can have huge impacts on protecting waterways.

7.2.2.3 Community College of Baltimore County (CCBC)

CCBC trained 46 employees across its three main campuses in October and November 2023 using a commercial stormwater compliance training video.

7.3 Good Housekeeping Plan

In accordance with MS4 permit Part IV. D. 4. b., the county has developed a Good Housekeeping Plan (GHP). The plan, including a map of locations of properties covered by the GHP, is submitted to MDE with this annual report. See Appendix B.

7.4 Pollutant Reduction Due to County Maintenance Programs

7.4.1 Storm Drain Cleaning

The initial compilation of the Baltimore County DPWT storm drain geodatabase is complete. The geodatabase will be maintained with the results of field investigations, quality control, and compilation from recent storm drain drawings.

The Baltimore County storm drain system consists of approximately 1,657 active miles of storm drain pipes, channels, and swales, 57,606 inlets, 32,005 manholes, 20,688 in-network structures, and 8,869 outfalls. Approximately 30-40% of inlets in older neighborhood are not found in the geodatabase or the storm drain drawing plans. Substantial field work will be needed if the County were to capture the locations of all the inlets in older neighborhoods.

In order to keep the entire storm drain system clean of trash, debris, and sediment, the Department of Public Works and Transportation Bureau of Utilities maintains six Vactor 2100 Combination cleaning trucks and employs three crews of two men each on a daily basis to clean the storm drains and pipes. Removing the material from the storm drain system reduces street flooding, a potential safety hazard, reduces the amount of trash and sediment from entering streams, and aids in the detection of illicit connections. Please refer to PLRC_SOP_RT-022 for protocols on how inlet and pipe cleaning is conducted and how pollutant load calculations are performed in Baltimore County. A review of the calculations performed for storm drain pipe pumpouts was conducted as result of the issuance of a new permit, and it was determined that Baltimore County had been under-reporting the volume of material removed due to an overly conservative calculation. The pumpout volumes for pipes have been revised to the beginning of the new permit term (FY22).

7.4.1.1 Storm Drain Cleaning Data Analysis

The removal rates for 1993 through 2024 are presented in Table 7-2. Inlet data are reported as the average annual cubic feet of material removed per inlet, and pipe data are reported in cubic feet of material removed per linear foot of pipe. Figure 7-1 shows a yearly comparison of the number of inlets cleaned and the total volume of material removed. Figure 7-2 shows the mean volume of debris removed per inlet. Figure 7-3 shows a yearly comparison of the length of pipe cleaned and the amount of material removed, and Figure 7-4 shows the mean volume of debris removed per linear foot of pipe.

Table 7-2: Removal Rates of Inlet and Pipe Cleaning by Year

Year	Inlet Vol. Cu. Yd.	# Inlets	Vol. / Inlet Cu. Yd.	Pipe Vol. Cu. Yd.	Length in feet	Vol. / Ft. Cu. Yd.
1993	760	8,955	0.08	1,186	68,830	0.0172
1994	769	2,615	0.29	347	21,193	0.0164
1995	642	1,532	0.42	306	14,491	0.0211
1996	1,536	1,347	1.14	1,558	67,676	0.0230
1997	1,731	1,485	1.17	2,822	119,900	0.0235
1998	2,059	1,178	1.75	988	93,918	0.0105
1999	662	462	1.43	446	38,451	0.0116
2000	689	580	1.19	672	89,145	0.0075
2001	902	746	1.21	585	46,319	0.0126
2002	919	602	1.53	409	34,384	0.0118
2003	660	428	1.54	519	30,374	0.0171
2004	898	653	1.37	1,169	54,795	0.0213
2005	1,385	888	1.56	1,001	53,069	0.0189
2006	950	659	1.44	538	30,891	0.0174
2007	429	223	1.92	179	10,257	0.0175
2008	664	377	1.76	238	16,572	0.0144
2009	591	373	1.58	288	19,450	0.0148
2010	354	313	1.13	172	13,310	0.0129
2011	466	605	0.77	441	28,069	0.0157
FY 2012*	407	619	0.66	434	25,761	0.0168
FY 2013	221	286	0.77	229	14,342	0.0160
FY 2014	260	209	1.24	439	19,372	0.0226
FY 2015	407	854	0.48	645	42,615	0.0151
FY 2016	225	181	0.81	150	25,791	0.0058
FY 2017	280	810	0.35	228	24,170	0.0094
FY 2018	238	561	0.42	461	20,442	0.0226
FY 2019	271	777	0.35	737	32,660	0.0226
FY 2020	55.2	67	0.82	556	14,503	0.038
FY 2021	73	404	0.18	1,301	18,648	0.0698
FY 2022	71.1	137	0.52	642	10,239	0.0296
FY 2023	82	151	0.54	138	7,329	0.0188
FY 2024	34.7	86	.403	144.5	12,282	.0118
Totals	19,691	29,163	30.823	19,968.5	1,119,248	0.017841

* The analysis for 2012 was projected in terms of the 2012 fiscal year using data from January-June 2012, which was added to the ½ the value of the 2011 data.

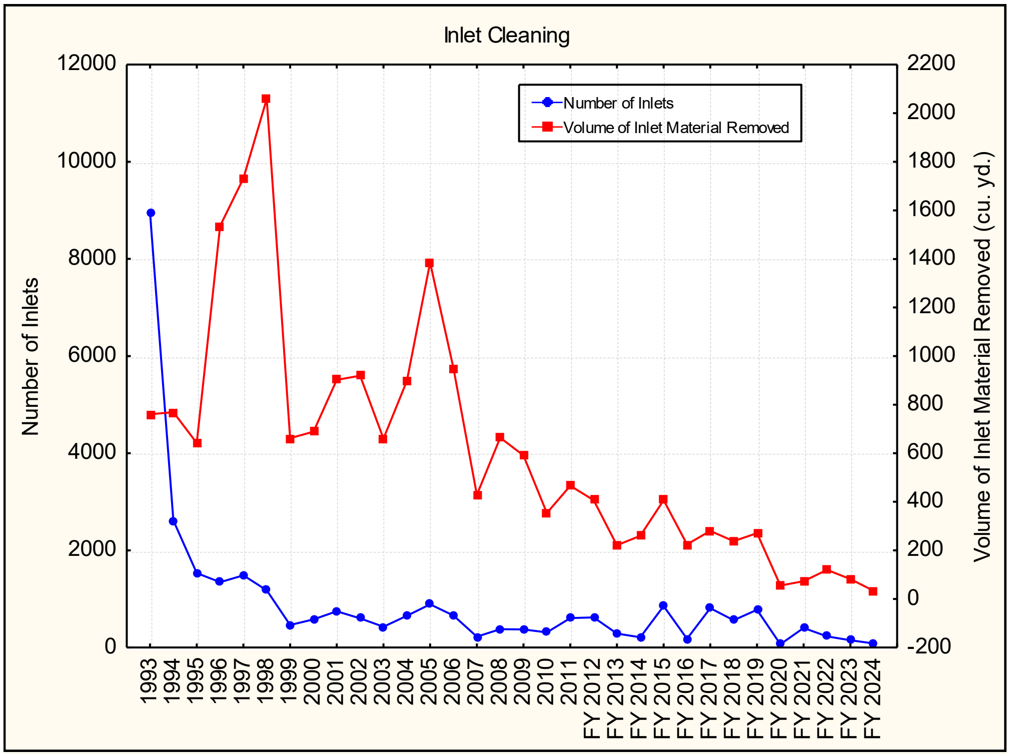


Figure 7-1: Inlets Cleaned and Volume of Material Removed per Year

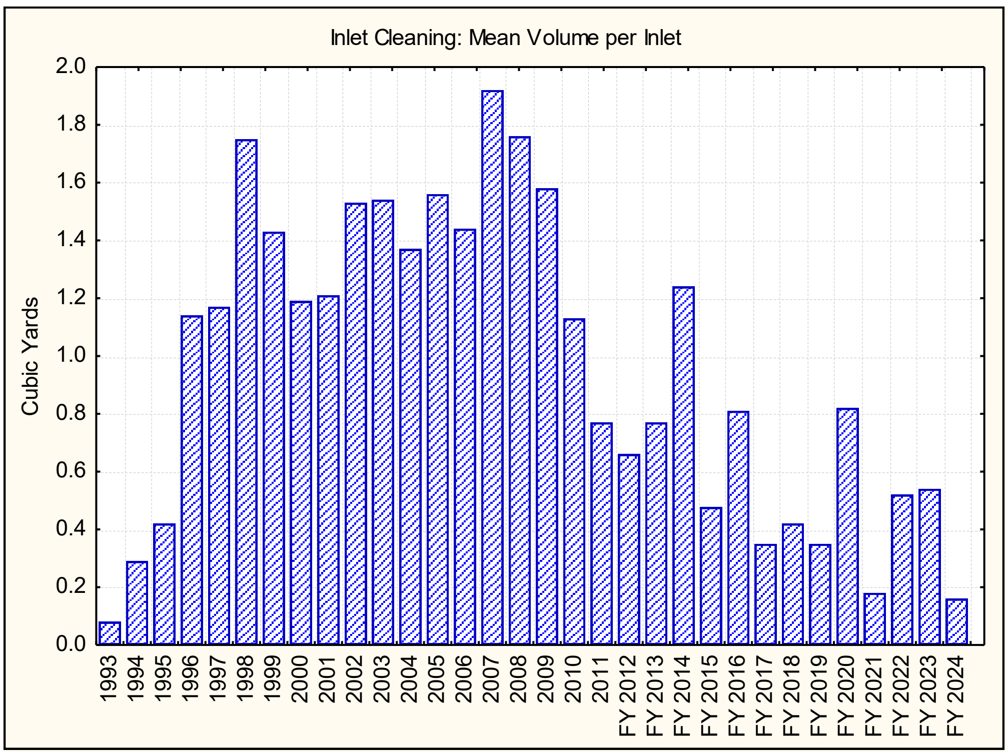


Figure 7-2: Annual Inlet Debris Removal Rates

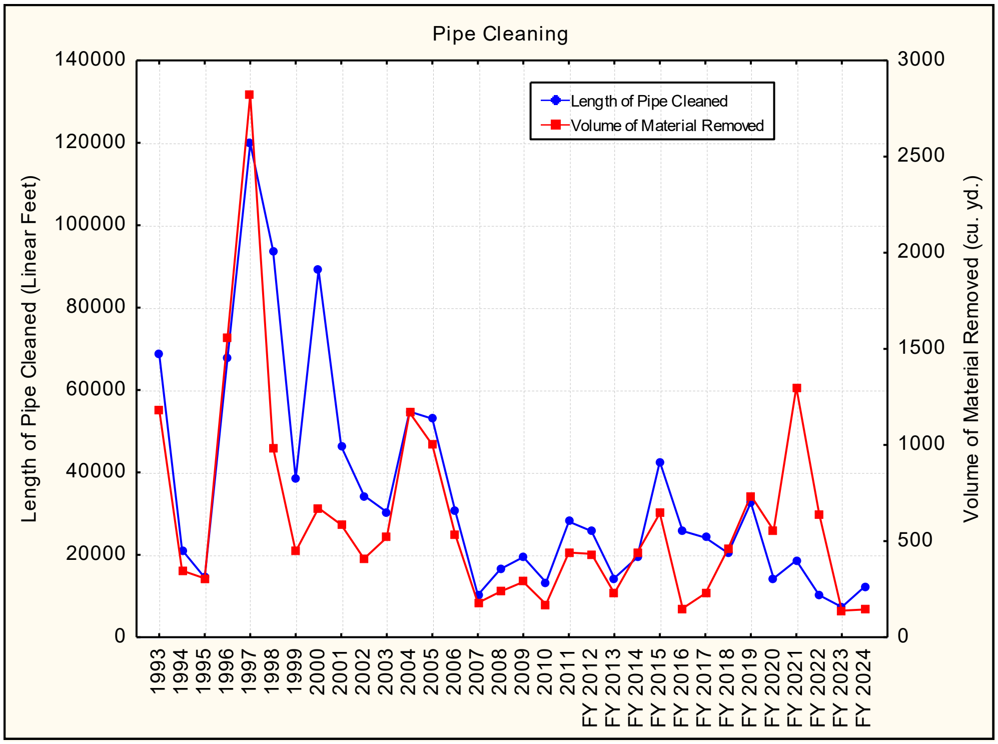


Figure 7-3: Length of Pipe Cleaned and Volume of Material Removed per Year

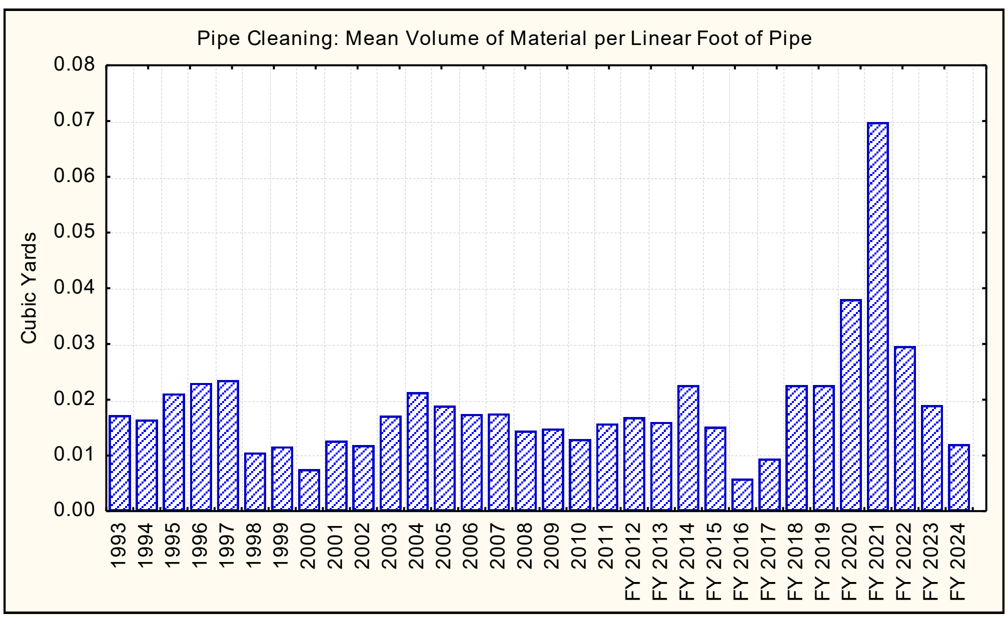


Figure 7-4: Annual Pipe Debris Removal Rates

In the early years of the program (1993-1995), all inlets within the county were cleaned, some with little or no accumulation of material. This resulted in low volumes of material removed per inlet cleaned. This method was changed after 1995. The current storm drain cleaning program is driven by comments or complaints received via phone and web requests from residents. There are also emergency based cleanings due to pipes or inlets being clogged.

For the period from 1993 through 1998, the average number of inlets cleaned was ~2,850 per year in contrast to ~627 per year in the 1999-2006, ~418 in the 2007-2012 time periods, and ~525 during 2013-2019 (see Figure 7-1). While the total amount of material removed from the inlets was initially low, between 1996 and 2010 the average removal of material per inlet was 1.45 cu. yd. Between 2011 and 2024 the average was 0.58 cu yd. removed per inlet (see Figure -2).

The volume of material removed from pipes has steadily declined from an average of ~1,200 cubic yards between 1993 and 1998, ~667 cu. yd. between 1999 and 2006, and down to ~357 cu. yd. between 2007 and 2018 (see Figure 7-4). The average volume of material removed from pipes cleaned in these time periods has also declined. The volume removed per linear foot has varied, but 2024 showed an increase of linear feet of pipe and total volume cleaned than the previous years.

It should also be noted that drought conditions from 1999 through 2002 might have resulted in less material being washed into the storm drain system. That material was likely removed by street sweeping. Conversely, the increase in removal rates in the 2003 to 2005 period was probably due to above average levels of precipitation. In general, it's typically smaller diameter pipes that become clogged and need cleaning whereas larger pipes receive more volume of water and are able to flush the debris more easily.

7.4.1.2 Storm Drain Cleaning Data by Watershed

The Storm Drain Cleaning data for the 2024 fiscal year, showing the total number of inlets and lengths of pipe cleaned for each of Baltimore County's fourteen (14) major watersheds, are displayed in Table 7-3.

Table 7-3: FY 2024 Material Removed in Cubic Yards by Watershed

Watershed	Inlets Cleaned	Inlet Volume Cleaned (Cu. yd.)	Length of Pipe Cleaned (Ft.)	Pipe Volume Cleaned (Cu. yd.)	Total Volume (Cu. yd.)
Upper Western Shore					
Deer Creek	0	0	0	0	0
Prettyboy Reservoir	0	0	0	0	0
Loch Raven Reservoir	16	12.83	2,494	31.194	44.0
Lower Gunpowder Falls	7	5.08	250	3.42	8.5
Little Gunpowder Falls	0	0	0	0	0.0
Bird River	0	0	655	9.27	9.3
Gunpowder River	0	0	214	6.28	6.3
Middle River	1	0.00036	331	2.254	2.3
Upper Western Shore Totals	**24**	**17.914**	**3,944**	**52.424**	**70.34**
Patapsco/Back River					
Liberty Reservoir	0	0	60	0.43	0.43
Patapsco River	7	3.22	1,101	29.36	32.58
Gwynns Falls	10	4.31	1,607	23.14	27.45
Jones Falls	14	4.50	4,32	27.17	31.66
Back River	5	0.99	742	8.70	9.68
Baltimore Harbor	25	2.46	507	3.31	5.77
Patapsco/Back River Totals	**61**	**15.47**	**8,338.00**	**92.11**	**107.58**
County Totals	**85.00**	**33.39**	**12,282.00**	**144.53**	**177.92**

Approximately 60% of the material removed from the storm drain system was removed from the heavily urbanized Patapsco/Back River Basin, with the Patapsco River, Gwynns Falls, and Jones Falls having the highest amounts removed.

The amount of each pollutant removed and urban impervious area treated from each major watershed in the county during FY 2024 is shown in Table 7-4. Impervious Urban Area Treated was calculated by classifying the tons of material as either organic or inorganic based on proportions observed by Neely et al in 2018, then applying the Equivalent Impervious Area credit for each proportion, assigned by MDE (2021). Please refer to PLRC_SOP_RT-022 for protocols on how inlet and pipe cleaning is conducted and how pollutant load calculations are performed in Baltimore County.

Table 7-4: FY 2024 Storm Drain Cleaning Program Pollutant Removal (Pounds) and Impervious Urban Acres Treated

Watershed	Debris (Cu. yd.)	Debris, non-trash (Tons)	TN Pounds	TP Pounds	TSS Pounds	EIUA[1]
Upper Western Shore						
Deer Creek	0.00	0.00	0.00	0.00	0.00	0.000
Prettyboy Reservoir	0.00	0.00	0.00	0.00	0.00	0.000
Loch Raven Reservoir	44.03	6.66	25.25	3.83	4,976.09	1.235
Lower Gunpowder River	8.50	1.29	4.88	0.74	961.10	0.239
Little Gunpowder Falls	0.00	0.00	0.00	0.00	0.00	0.000
Bird River	9.27	1.40	5.32	0.81	1,047.96	0.260
Gunpowder River	6.28	0.95	3.60	0.55	710.06	0.176
Middle River	2.25	0.34	1.29	0.20	254.67	0.063
UWS Totals	**70.34**	**10.64**	**40.34**	**6.12**	**7,949.89**	**1.97**
Patapsco/Back River						
Liberty Reservoir	0.43	0.07	0.25	0.04	48.70	0.012
Patapsco River	32.58	4.93	18.68	2.83	3,682.51	0.914
Gwynns Falls	27.45	4.15	15.74	2.39	3,102.98	0.770
Jones Falls	31.66	4.79	18.16	2.75	3,578.71	0.888
Back River	9.68	1.46	5.55	0.84	1,094.39	0.272
Baltimore Harbor	5.77	0.87	3.31	0.50	651.79	0.162
Patapsco/Back River Totals	**107.58**	**16.27**	**61.69**	**9.36**	**12,159.08**	**3.02**
County Totals	**177.92**	**26.91**	**102.03**	**15.48**	**20,108.97**	**4.99**

1. EIUA = Equivalent Impervious Urban Acres

7.4.1.3 Program Summary – Storm Drain Cleaning

Since the storm drain cleaning program began in 1993, ~39,659.5 cubic yards of material have been removed from the Baltimore County storm drain system (Table 7-2). At 331 pounds per cubic yard, that amounts to approximately 13 million pounds. Without intervention, this material would have eventually entered our waterways.

7.4.2 Street Sweeping Overview

Removing materials such as trash, sediment, and debris, from public streets also results in a reduction of the pollutant load (toxins and nutrients) that could have entered waterways. Baltimore County removes these materials by utilizing mechanical street sweepers managed by the Bureau of Highways. Please refer to PLRC_SOP_RT-021.02 for protocols on how street sweeping is conducted and how pollutant load calculations are performed in Baltimore County.

Table 7-5: Annual Street Sweeping Summary

Year	Miles Swept	Tons Debris Collected (wet)
1991	7,566	3,792
1992	6,663	3,161
1993	6,300	3,108
1994	8,532	7,473
1995	5,333	2,990
1996	8,605	2,990
1997	14,785	3,177
1998	24,863	2,792
1999	24,968	2,880
2000	21,949	2,491
2001	12,147	1,395
2002	7,800	2,364
2003	8,640	2,592
2004	6,617	1,985
2005	6,126	1,838
2006	6,306	1,892
2007	5,133	1,540
2008	4,110	1,233
2009	3,972	1,192
2010	3,937	1,181
2011	3,107	932
2012*	3,638	1,091
FY 2013	2,569	771
FY 2014	N/A	2,166
FY 2015	N/A	1,854.4
FY 2016	N/A	1,420.5
FY 2017	N/A	1,206.6
FY 2018	N/A	1,454.2
FY 2019	N/A	1,673.8
FY 2020	N/A	1,289.3
FY 2021	N/A	816.30
FY 2022	N/A	572.24
FY 2023	N/A	861.2
FY 2024	N/A	1,168

* The analysis for 2012 was projected in terms of the 2012 fiscal year using data from January-June 2012, which was added to the ½ the value of the 2011 data.

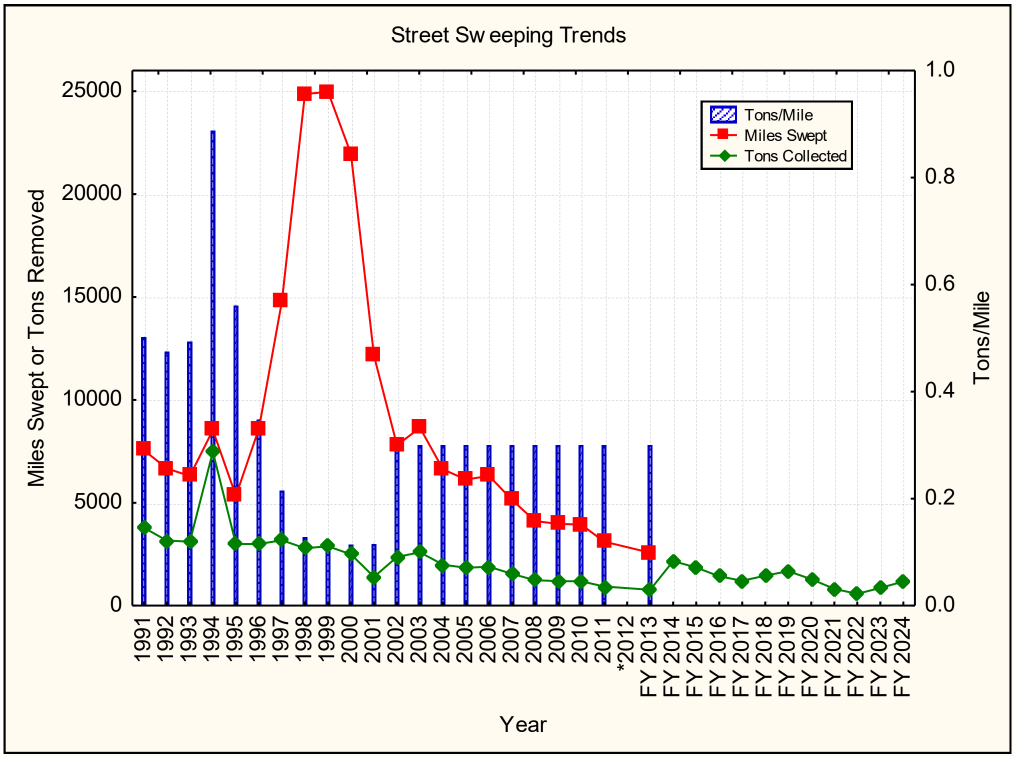


Figure 7-5: Miles of Street Swept, Tons of Material Removed, and Tons/Mile Swept

7.4.2.1 Street Sweeping by Watershed

Street sweeping data is reported as tons collected per highway shop. There are 11 highway shops in Baltimore County. Street sweeping is conducted only on roads with curb and gutters. Some alleys, county parking lots, and open roadways (without curb and gutter) are swept when requested. State Routes such as S.R. 45 (York Road) are not handled by the county; State Highway Administration is responsible those roads. Please refer to PLRC_SOP_RT-022 for protocols on how street sweeping is conducted and how pollutant load calculations are performed in Baltimore County. Table 7-6 shows the amount of each pollutant removed and urban impervious area treated from each major watershed in the county during the 2024 fiscal year.

Table 7-6: FY 2024 Street Sweeping Program Pollutant Removal (Pounds) and Impervious Urban Acres Treated

Watershed	(wet) Debris (Tons)	Debris, non-trash (tons)	TSS Pounds	TN Pounds	TP Pounds	EIUA[1]
Deer Creek	0.0	0.0	--*	--*	--*	--*
Prettyboy Reservoir	0.0	0.0	--*	--*	--*	--*
Loch Raven Reservoir	140.0	127.5	--*	--*	--*	--*
Lower Gunpowder Falls	64.1	58.4	--*	--*	--*	--*
Little Gunpowder Falls	8.1	7.4	--*	--*	--*	--*
Bird River	59.4	54.1	--*	--*	--*	--*
Gunpowder River	10.3	9.4	--*	--*	--*	--*
Middle River	28.7	26.2	--*	--*	--*	--*
UWS Totals	310.7	283.1	--*	--*	--*	--*
Liberty Reservoir	1.8	1.6	--*	--*	--*	--*
Patapsco River	18.9	17.3	--*	--*	--*	--*
Gwynns Falls	93.9	85.5	--*	--*	--*	--*
Jones Falls	78.5	71.5	--*	--*	--*	--*
Back River	249.9	227.6	--*	--*	--*	--*
Baltimore Harbor	414.4	377.5	--*	--*	--*	--*
P/Back River Totals	857.3	781.0	--*	--*	--*	--*
Annual County Totals	1,168.0	1,064.1	--*	--*	--*	--*

[1]EIUA = Equivalent Impervious Urban Acre
* - Based on Accounting Guidance provided by MDE in Nov 2021, Baltimore County's street sweeping program provides no nutrient reductions nor EIUA.

7.4.2.2 Program Summary - Street Sweeping

From 1991 through June of 2024, the Street Sweeping program removed 69,343 tons of debris from Baltimore County streets (Table 7-5). Without this program, this debris would have entered waterways.

Both the Storm Drain Cleaning and Street Sweeping programs make a contribution to the County's overall goal of reducing sediment and other pollutants, including toxics and nutrients that enter the waters of the State. The tonnage collected by the street sweepers and storm drain cleaning trucks is not just pollutant-laden sediment, but includes significant amounts of paper, plastic, glass, wood, aluminum cans, and metal objects. During rainy weather the lighter, more floatable debris is washed into the storm drains, which is then removed by the Storm Drain Cleaning program instead of by the street sweepers.

7.4.3 Litter and Debris Removed from or Prevented from Entering Storm Drain System

Baltimore County removed from or prevented from entering its storm drain system a total of 906.244 tons of litter and debris in FY24 (Table 7-7), exceeding the requirement of 152.4 tons for the first year of the permit. Litter and debris was removed from the storm drain system by cleaning of catch basins (inlets) and storm drain pipes. Litter and debris was prevented from entering the storm drain system by street sweeping; litter was also prevented from entering the storm drain system by upland litter cleanups. See Section 6 for detail on cleanups.

Table 7-7: FY 2024 Litter and Debris Removed from and Prevented from Entering Storm Drain System (Pounds)

Action	Storm Drain System Litter and Debris (pounds)		
	Removed from System	Prevented from Entering System	Total
Storm Drain Cleaning	58,920		58,920
Street Sweeping		2,336,060	2,336,060
Litter Cleanups: Clean Green 15		12,828	12,828
Litter Cleanups: Balt Co Litter Blitz		4,108	4,108
Total Pounds	58,920	1,739,336	1,812,487
Total Tons	**29.46**	**869.668**	**906.244**

7.4.4 Fertilizer, Pesticide, and Deicing Statistics

Members of the Baltimore County NPDES Management Committee have submitted statistics for usage of fertilizers, pesticides and deicing materials. Quantities of fertilizer, pesticide/herbicide, and deicer are originally reported in pounds, tons, gallons, and ounces, but have all been converted to pounds for this report. Fluid measure is assumed to have a density of 7.0 pounds per gallon. The statistics for FY 2024 (July 1, 2023 – June 30, 2024) by individual agencies are presented in Table 7-8. The amounts used by the entire county annually since 1999 are presented in Table 7-9, along with number of winter storms and snowfall in inches. The number of winter storms includes forecasted storms where roads were treated in advance, whether or not snow or ice occurred.

Table 7-8: FY 2024 County Agency Fertilizer, Pesticide/Herbicide and Deicing Materials Use (Pounds)

Golf Courses	Fertilizer	Pesticide/Herbicide	Deicing
Diamond Ridge	8,816	4,009	75
Fox Hollow	4,944	4,431	100
Greystone	30,775	7,845	750
Rocky Point	25,864	11,316	100
Woodlands	6,633	4,186	75
Golf Course Total	77,032	31,787	1,100
Agency	**Fertilizer**	**Pesticide/Herbicide**	**Deicing**
Catonsville Community College	100	4	70,850
Essex Community College	171	15	31,200
Dundalk Community College	0	8	26,850
County Public Schools	3,274	90	95,450
DPWT - Bureau of Utilities	0	7	4,225
DPWT - Bureau of Highways[1]	0	641	33,183,924
DPWT – Bureau of Solid Waste	0	0	52,580
Environmental Protection and Sustainability	0	490	0
Property Management (includes athletic fields)	76,600	2,325	27,263
Non-Golf Course Total	80,145	3,580	33,492,342
Total County Pounds	**153,632**	**35,367**	**33,493,442**

[1]Bureau of Highways data includes deicer applied by truck at Public Schools and Property Management sites, and pesticide applied by DPWT's forestry practices.

[2]Property Management maintains athletic fields and Recreation and Parks sites.

7.4.4.1 Fertilizer

Baltimore County applies fertilizer on athletic fields, golf courses, and as needed at landfills and institutions.

A number of factors have contributed to the highs and lows of fertilizer application, such as the number of county golf courses in operation (either five or six depending on the year), management of athletic fields, and whether agency data was reliably reported. In FY 2024, 153,632pounds were applied by county agencies.

The average amount of fertilizer used in FY 2024 by a county golf course was 15,406 pounds, with a total of 77,032 pounds applied for golfing overall, a comparable amount to recent years. Following several years of over 100,000 pounds of fertilizer applied to improve the condition of the county athletic fields each year, there was a 30,000 pound decrease in FY 24.

Efforts to reduce fertilizer application:

- Property Management's maintenance shops follow the Nutrient Management Guidelines for Athletic Fields from University of Maryland, Department of Plant Science and Landscape Architecture. Fertilizer is applied at the prescribed rate of 0.9 pounds of nitrogen per 1000 square feet. In FY24, a 32-0-7 fertilizer was used, which has a higher nitrogen content (32% nitrogen versus 22% used in 2022); it has lower potential for nutrient leaching, denitrification, and runoff because it contains a dual coated polymer on the urea nitrogen.
- Factors influencing Property Management's fertilizer application include extreme heat, heavy rainfall, ground conditions on athletic fields, Rec and Park programming, and mechanical practices like aeration and overseeding.
- Baltimore County golf courses test soil to inform their turf management and only use phosphorus if there is a soil deficiency. They have shifted to foliar absorbed fertilizers in the summer to reduce nitrogen leaching and runoff, and lowered fertilizer inputs for all rough. Granular fertilizer applications to rough are limited to only high traffic areas.
- The Woodlands and Diamond Ridge Golf Courses treat irrigation water to help mineralize soil nitrogen, reducing need for nitrogen application.
- Rocky Point Golf Course has increased biostimulant program to increase plant health, lessening the need for fertilizer.
- Fox Hollow Golf Course does not pick up clippings, except on greens, which adds nitrogen back to the soil.
- In 2021, Fox Hollow Golf Course joined "Monarchs in the Rough", a program which promotes the use of pollinator-friendly wildflowers and native milkweed to enhance the habitat for Monarchs and other pollinators. More native plants are being incorporated into flower beds and milkweed seeds are finding new places to sprout and thrive.
- The Community College of Baltimore County (CCBC) performs soil tests and only sparingly uses slow-release fertilizer; aerates and cuts grass at greater heights to promote turf health; utilizes microbial and mycorrhizae treatments while watering to increase nutrient uptake in plants; implemented an integrated pest and fertilizer management program to reduce use of pesticides and fertilizers, and proper storage, application, and disposal. They restrict fertilizer applications to portions of fields, mulch leaves and grass clippings, and utilize perennial plantings.

- Environmental Protection and Sustainability (EPS) – Typically, does not apply any fertilizer to tree plantings or restoration plantings.
- Baltimore County Public Schools uses fertilizer on high use athletic fields as necessary, otherwise relying on aeration and seeding to enhance grass health.

7.4.4.2 Pesticides/Herbicides

The chemicals that make up the category known as "pesticides" include herbicides, insecticides, and fungicides. As a group, golf courses are the largest users of pesticides. There is not a distinct trend in pesticide use. Over the years, pesticide use by county agencies has ranged from 21,000 to 46,600 pounds. Of that total amount, golf courses have reported collectively using from 19,000 to 36,000 pounds. Since 1999, non-golf course use of pesticide ranges from 1,730 to 7,415 pounds per year, with the exception of a sharp increase to over 10,000 pounds in 2016. The spike of 2016 resulted from an increase in use by Property Management to rehab athletic fields. In 2024, a total of 35,367 pounds of pesticide were applied with golf course use at 31,787 pounds and non-golf course use at 3,580 pounds; this amounts to a decrease of about 5,000 pounds from 2023.

Efforts to reduce pesticide application:

- Property Management only treats athletic fields, and spot sprays on perimeters of parks for weeds; as of 2020, glyphosate is no longer used. Pesticide treatments are reduced in extreme heat.
- Department of Public Works and Transportation – The Bureau of Highways controls invasive plants and noxious weeds by mechanical mowing during the growing season in all possible instances to reduce reliance on herbicides.
- Baltimore County golf courses have 17 certified or trained and registered employees for the application of fertilizers and pesticides; they operate calibrated equipment that is checked to verify output prior to use; have lowered pesticide use for all rough; pesticides with longer residual activity will continue to be incorporated into spray programs to increase application intervals; further increased biostimulant program to increase plant health and reduce amount of pesticide use; post-emergent herbicide applications for weed control are applied as a spot spray; and pursue new technologies that introduce lower usage rates of pesticide. Integrated Pest Management is practiced regularly to highlight scouting and for targeted application to minimize need for pesticide use.
- County golf courses make a point to introduce at least one fungicide annually with a lower label rate than traditional fungicides and only use fungicide during extreme weather conditions as a curative spot spray application. Chemical classes and modes of action of all pesticides are rotated with the same class never being applied in consecutive applications to any one playing surface; constant rotation allows the golf courses to avoid pesticide resistance and lessen the need for repeat application.
- CCBC ensures that employees applying pesticides are supervised by individuals licensed by the Maryland Department of Agriculture; expanding use of native plants in garden beds to suppress weeds; pulls more weeds and repairs broken concrete in an effort to reduce pesticide use; pesticide is only used on a case by case basis and is not used for insects; soap rinses and organic pesticides are used when appropriate; CCBC's Integrated Pest Management program includes weather factors, modified practices, and additional training.

- EPS developed an Integrated Pest Management Plan for its restoration sites to reduce herbicide usage. Since native plants grow more slowly and germinate later than most exotic invasive species, it is important to treat early and quickly to allow native plants to become established and outcompete the invasive species. EPS uses Early Detection and Rapid Response to survey and treat invasive plants, trees, and shrubs. Sites are surveyed in late winter to determine effort needed in the coming growing season. A higher concentration of herbicide is used to ensure a complete kill; it is expected that more aggressive treatments will lead to less herbicide needed as invasive plants die off and the seed bank is depleted; contractors use dye to ensure coverage of pesticide, without over use, and use mechanical methods as an alternative to pesticide treatment.
- Baltimore County Public Schools uses mechanical means, such as string trimmers and weeding, as much as possible to control weed growth and reduce pesticide use.

7.4.4.3 Deicing

Deicing materials (road salts) are used by the DPWT Bureau of Highways to clear 2,705 miles of roads, or 6,762 lane miles during snow and ice storm events. In FY 2024, the Bureau of Highways applied 33,183,924 pounds of road salt, which includes salt used to produce a brine mixture; 42,800 gallons of brine was applied. Overall, the county applied a total of 33,493,442 pounds of deicer, 99% of which was used by Highways. Efforts will continue to be made to reduce the amount of deicing materials used through research, testing, equipment calibration, employee training, and effective decision making.

The amount of deicing materials used depends not only on accumulation of snow, but also the number of winter weather events. Icy road conditions are not tracked at this time.

Efforts to reduce deicer usage by the Department of Public Works and Transportation - Bureau of Highways:

- As required in the third year of Baltimore County's current MS4 Permit term, a Salt Management Plan is submitted to MDE with this annual report. The purpose of the Plan is to reduce the use of salt without compromising public safety. It includes details on evaluation of new equipment, methods and strategies for improvement, training for county winter weather operator personnel and contractors, outreach to residents on salt usage, and additional reporting metrics in future years. See Appendix C.
- DPWT has outfitted all snow removal equipment outside of the County's Urban-Rural Demarcation Line (URDL) with independent salting controls. Just over a quarter of the entire fleet has been replaced and all new vehicle replacements are being equipped with this technology. DPWT conducts annual staff reviews of the County's Snow Management Plan, which includes best practices of salt usage. This information is also now shared with our contractual snow vendors.
- In an attempt to reduce the total amount of salt applied, a trial run of brine (23% rock salt) was used as pre-treatment on a few heavily traveled roads in the Reisterstown and Cockeysville areas.
- County crews receive extensive training and begin each snow season with a review of salt application procedures and best-practices. One aspect of the training is a "Snow College" which is held yearly for all personnel involved with snow operations.

- Crews use manually adjusted salt spreaders and spinners to restrict salting, except in the "North County" area, where computerized salt spreading technology is used. These computerized spreading systems will be mandated on each new piece of snow removal equipment starting with a quarter of the fleet by 2021. Salt spreader calibrations are checked yearly. Spreading volumes are maintained between 500 and 600 pounds of salt for each lane mile (for every inch of snow).
- Efficiencies have been made in salt storage. The County's full supply (91,000 tons located at 17 sites) is stored under cover, on impervious surfaces and surrounded by berms (or straw bales) to deter or prevent leaching.
- Snow removal operations and related information are reported on the county website on the "[Baltimore County Stormfighter](https://www.baltimorecountymd.gov/Agencies/publicworks/StormFighter/index.html)" page, which is activated only during storm events. https://www.baltimorecountymd.gov/Agencies/publicworks/StormFighter/index.html

Efforts to reduce deicer usage by other County agencies:

- Property Management applies deicer only as needed for safety.
- Department of Public Works and Transportation – Bureau of Solid Waste applies deicer as conservatively as possible at the landfill and resident drop sites; Bureau of Utilities purchased a walk-behind snow blower for its Fullerton site.
- CCBC reduces their use of deicer by closing certain parking lots to concentrate parking in select treated areas only.
- Baltimore County Public Schools only uses deicer on sidewalks where icy conditions are a safety issue; they use shovels and use lower settings on deicer spreaders.
- Deicer is used by Golf Courses only as needed.

Table 7-9 shows the annual usage of fertilizer, pesticides and deicing material from 1999 through 2024. As of 2016, EPS obtains winter storm data from DPWT Highways. Snowfall is measured at the Highways shops. There is a complex relationship of snowfall and amount of deicer used due to size/frequency of storms, freezing rain events, and the effect of freeze and thaw on localized road treatment. Due to its location along the boundary of the Piedmont Plateau and Coastal Plain geographic provinces, the county experiences considerable weather variability.

Prior to 2016, snowfall data was obtained from NOAA's online preliminary monthly weather (summary) data archive for BWI Airport. The number of winter weather events is attributable to the events with measurable snowfall ("heavy snow" and "snow" categories); the number of winter storms does not include "freezing rain" events, although road salt may be applied for these storms as well. (Note: there is a considerable difference in data between the data sources, but the Highways data reflects actual conditions, averaged across the county. Conditions at BWI are often different than Baltimore County, hence the change.) Figure 7-6 shows data for Fertilizer and Pesticide Trends and Figure 7-7 shows the data for Deicer and Snowfall. The analysis for 2012 only reflects data collected between January and June 2012; this data was intentionally not included in the graph, as it does not represent an entire growing season. Since 2013, data is reported by the fiscal year (July 1 – June 30).

Table 7-9: Annual Fertilizer, Pesticide/Herbicide and Deicing Materials Used By County Agencies (in Pounds)

Year	Fertilizer	Pesticide/ Herbicide	Deicing Mat.	Snowfall (in.)	Number of Winter Weather Events
1999	275,400	34,320	83,978,000	12.4	8
2000	213,114	21,028	94,467,750	27.2	7
2001	221,609	21,509	48,566,400	7.4	5
2002	200,060	21,229	100,437,859	12.0	7
2003	191,726	22,137	205,164,341	58.0	8
2004	227,309	34,762	147,537,040	8.7	5
2005	133,881	20,899	185,118,740	24.5	7
2006	166,870	29,607	23,888,950	13.1	1
2007	131,191	26,362	156,690,026	14.4	11
2008	113,435	32,059	65,456,420	4.3	15
2009	170,175	35,279	151,208,045	28.6	9
2010	181,573	38,587	162,724,620	58.1	7
2011	158,866	29,778	133,892,760	13.2	7
2012[1]	90,546	14,878	23,162,196	1.8	3
2013 FY	170,644	37,244	65,614,500	8.0	3
2014 FY	198,889	56,325	251,133,425	39.0	20
2015 FY	264,889	36,920	205,325,015	28.7	20
2016 FY[2]	248,227	46,641	89,838,190	38.5	7
2017 FY	265,115	30,185	59,366,300	12.0	7
2018 FY	178,695	26,749	167,405,138	14.3	14
2019 FY	204,807	36,121	141,904,712	17.9	9
2020 FY	189,175	32,525	17,062,530	4.5	4
2021 FY	215,589	33,454	170,669,481	17.3	8
2022 FY	188,566	39,488	63,678,883	11.0	10
2023 FY	195,632	40,508.4	1,987,590	0	4
2024 FY	153,632	35,367	33,493,442	9.8	5

[1]2012 data is for January – June only

[2]As of FY 2016, weather data obtained from Baltimore County DPWT - Highways

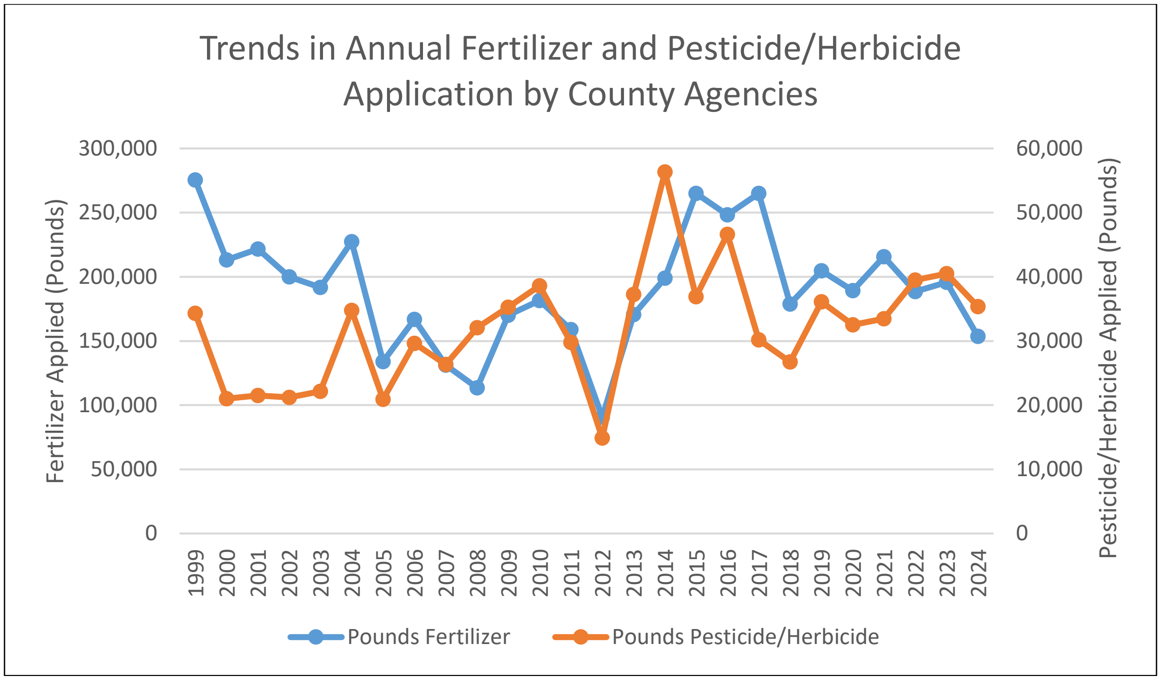


Figure 7-6: Trends in Annual Fertilizer and Pesticide/Herbicide Used by County Agencies

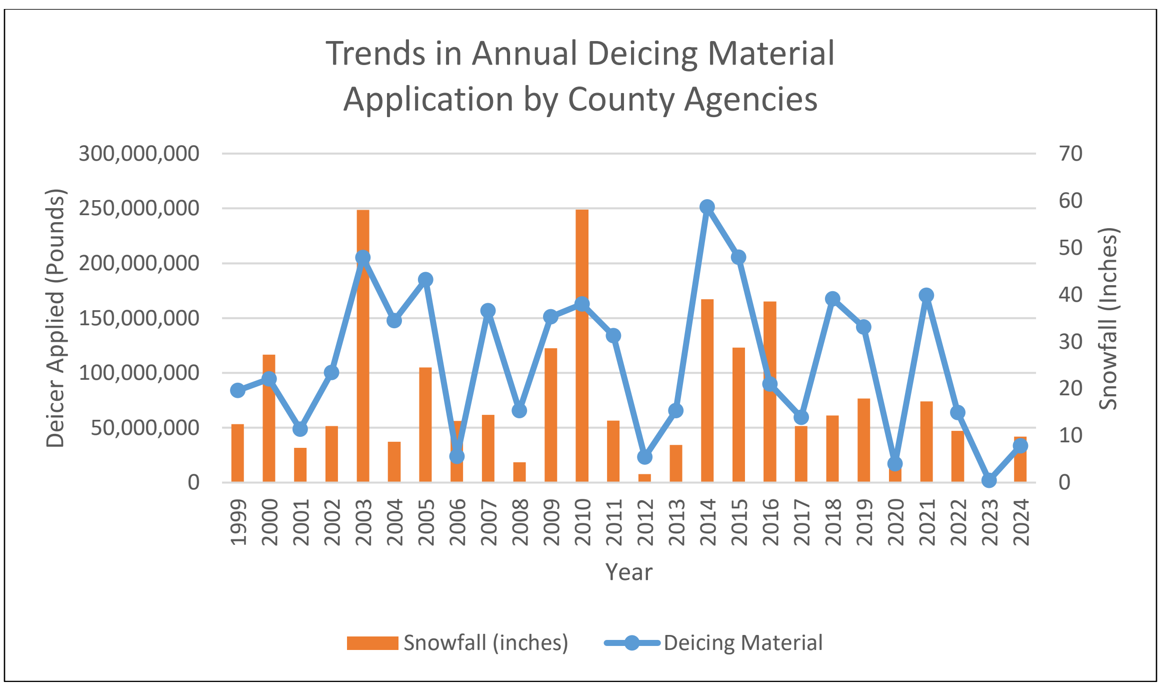


Figure 7-7: Trends in Annual Deicing Material Used by County Agencies

7.5 Household Hazardous Waste

There is a year-round household hazardous waste drop-off center located at the Central Acceptance Facility in Cockeysville. It is open to the public from 8 am to 4 pm, Monday to Saturday. Baltimore County residents can drop off all household hazardous waste materials (paints, automotive fluids, solvents, pesticides and herbicides, swimming pool chemicals, corrosive materials, rechargeable batteries, fluorescent light bulbs, mercury thermometers and thermostats, etc.) for recycling or proper disposal.

The Eastern Sanitary Landfill and Western Acceptance Facility in Halethorpe serve as satellite facilities accepting motor oil, anti-freeze, rechargeable batteries, fluorescent light bulbs, mercury thermometers and thermostats. The acceptance facilities, landfill, and household hazardous waste collection areas are operated by the Department of Public Works and Transportation, Bureau of Solid Waste.

A connection potentially exists between the collection of household hazardous waste materials and Total Maximum Daily Loads for mercury, PCBs, and chlordane, however there is no way to quantify the amount of material that would have entered waterways, had it not been taken to a collection site for proper disposal.

7.6 NPDES Management Committee

This committee is composed of representatives from several county agencies with responsibility for property management and maintenance of county facilities. The committee meets periodically to discuss issues related to NPDES-MS4 compliance.

In May 2023, several Baltimore County agencies joined a shared contract with other MS4 entities in Maryland to collaboratively address the Good Housekeeping Plan requirement, as introduced in the current MS4 permit cycle. The contract has resulted in the development of an Applicability Certification process to determine which facilities need plans, and a Good Housekeeping Plan template for facilities regulated by this permit, also mentioned in section 7.3. Sanitary Sewer Repair Tracking

In Baltimore County, the population that lives inside the metropolitan district is primarily supported by the sanitary sewer system. The county has been making repairs to the sewer system, and these are expected to reduce bacteria entering our waterways. This section outlines the sanitary sewer repairs and our method of tracking these repairs. Bacteria TMDLs are in effect for Back River (Herring Run only), Gwynns Falls, Jones Falls, Liberty Reservoir, Loch Raven Reservoir, Lower North Branch of Patapsco River, and Prettyboy Reservoir.

7.6.1 Data Sources and Methodology

Bacteria monitoring locations were used as reference points to summarize the records of sewer repairs. Drainage areas for these locations were digitized in GIS using ArcHydro and manual delineation using topography and county and city digital elevation model (DEM) data. Figure 7-8 below shows the locations of the bacteria monitoring points used to summarize the data in this section. Monitoring locations that have drainage areas entirely outside the metropolitan district (public sewer service area) are not included in this section as well as areas that do not have any sewer repair data.

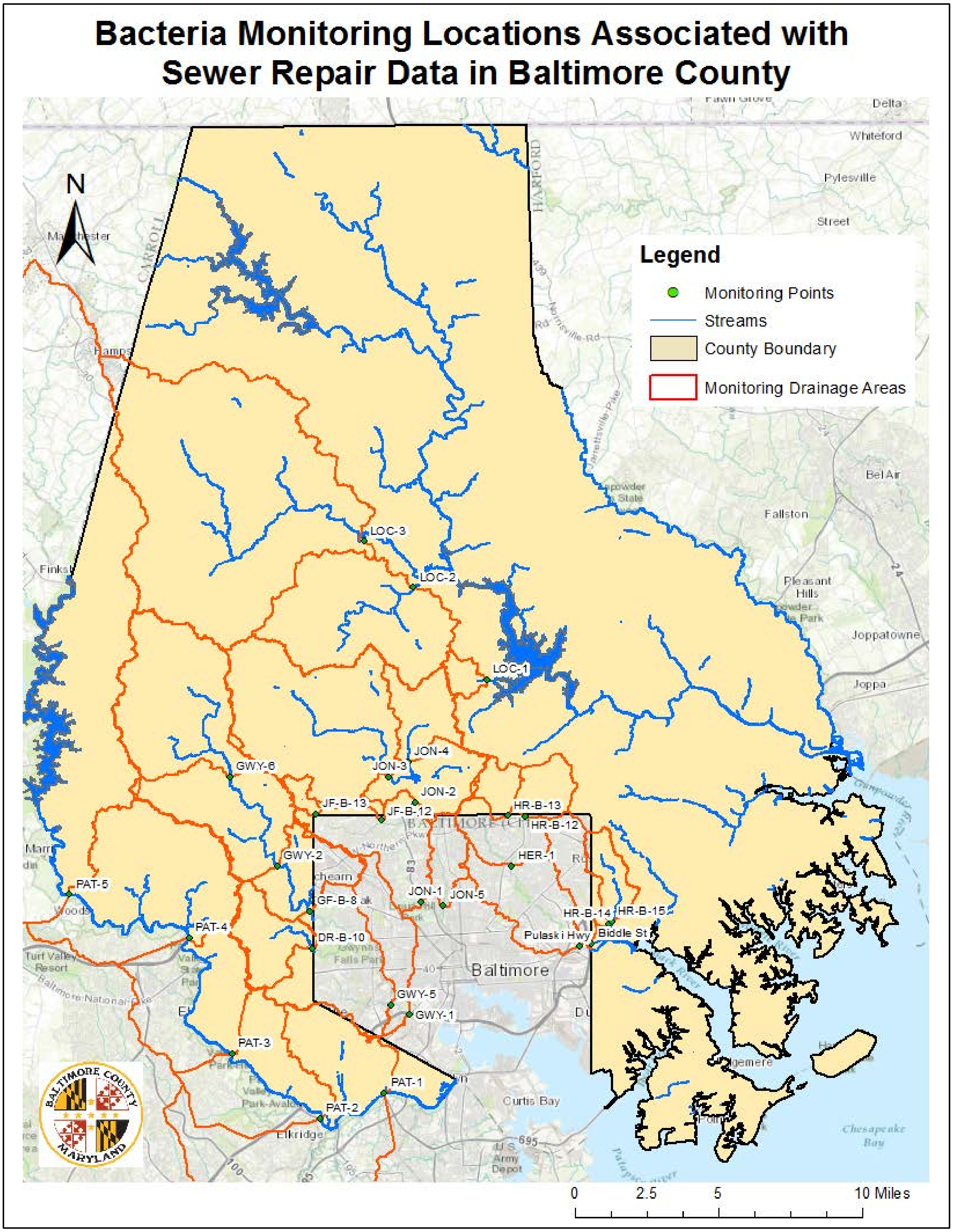


Figure 7-8: Baltimore County Bacteria Monitoring Locations with Sewer Repair Data

The consent decree mandated in 2005 by the EPA and MDE requires the County to complete repairs to sanitary sewer overflow structures (SSOs) and pump station structures. Using data compiled from the Department of Public Works and Transportation and consent decree appendices we summarized the progress of these repairs. We completed an overlay analysis of the SSO repairs to each of our bacteria monitoring drainage areas to get the count and status of repairs. SSOs were either substantially completed with the overflow pipe plugged (completed) or substantially complete with the overflow pipe open (to be completed). Pumping stations labeled as substantially complete were tallied for the complete 'pump station repairs' column of the tables below. There were no incomplete pump station repairs in the consent decree appendices.

The development and implementation of Sewer Replacement, Repair and Rehabilitation (SRRR) plans is also required as a part of the consent decree. SRRR plan information was taken from the consent decree monthly report from June 2015 and assigned to the corresponding sewershed in order to associate each SRRR plan with an area in the county, creating a SRRR plan feature class. Using the bacteria monitoring drainage areas and sewer SRRR plan feature class, an implementation date for each drainage area was recorded and is shown in the tables below. Multiple sewersheds can fall within a monitoring drainage area, and therefore multiple SRRR plans with varying implementation dates can be associated with the same drainage area. The 'SRRR Plan Imp. Date' is the last implementation date of the SRRR plans that fall within that drainage area.

The Cityworks enterprise database is a compilation of sewer line and manhole repairs specified by the SRRR plans including: repair type, status of repair, and repair location. This data was used to derive the total number of sewer line and manhole repairs completed and proposed (to be completed) within the drainage areas of each of the county's bacteria monitoring locations. The types of sewer repairs tallied for the 'sewer pipe repair' column in the tables below include the following: grout, grout lateral, pipe replacement, open cut point repair, segmental liners, t-liner, upsize 6" to 8" PVC, lining, and pipe bursting. 'Manhole repairs' include: frame seal, cementitious lining, chimney seal, rebuild bench and channel, replace, reset frame and cover and replace frame and cover. These repairs were intersected to drainage areas using overlay analysis in GIS. From this analysis we were able to get a count of manhole and sewer line repairs in each bacteria monitoring drainage area shown in Table 7-10 through Table 7-19 below.

7.6.2 Summary of Sewer Repairs Associated with Bacteria Monitoring

The status of sanitary sewer system repairs and plans is presented in this section, organized by watershed.

7.6.2.1 Lower North Branch Patapsco Watershed

The Lower North Branch Patapsco watershed has five sampling locations for the bacteria monitoring program. The drainage areas for these monitoring points are all nested meaning they fall within each other and there is an overlap in repairs for each area. PAT-1 has the largest drainage area and includes the area of PAT-5 through PAT-2 and areas downstream of PAT-2. Repairs in PAT-1 include all repairs in PAT-2 through PAT-5, repairs in PAT-2 include all repairs in PAT-3 through PAT-5, and so on. As shown in Table 7-10 and Table 7-11, all the overflow pipes required by the consent decree have been repaired and all SRRR plans have been implemented by September 6, 2018.

Table 7-10: Lower North Branch Patapsco River – Completed Sanitary Sewer Repairs

Monitoring Stations					Overflow Pipe Plugged	Pumping Station Repairs	Manhole Repairs	Sewer Pipe Repaired (length, ft)	SRRR Plan Imp. Date
Downstream	Nested 1	Nested 2	Nested 3	Nested 4					
PAT-1					36	7	10	3,354.65	9/6/2017
	PAT-2				11	6	8	1,894.69	9/6/2017
		PAT-3			8	2	6	1,111.64	9/6/2017
			PAT-4		6	2	2	67	9/6/2017
				PAT-5	0	0	0	54.51	9/6/2018

Table 7-11: Lower North Branch Patapsco River – To Be Completed Sanitary Sewer Repairs

Monitoring Stations					Overflow Pipe Plugged	Pumping Station Repairs	Manhole Repairs
Downstream	Nested 1	Nested 2	Nested 3	Nested 4			
PAT-1					0	0	94
	PAT-2				0	0	579
		PAT-3			0	0	365
			PAT-4		0	0	196
				PAT-5	0	0	0

7.6.2.2 Jones Falls Watershed

The Jones Falls watershed has five bacteria monitoring locations that fall within the county boundaries. Monitoring site JON-1 has the largest drainage area which encompasses the drainage areas for JON-2, JON-3 and JON-4. The drainage areas for JF-B-12 and JF-B-13 do not overlap with the other Jones Falls monitoring drainage areas. Table 7-12 and Table 7-13 show that one overflow pipe detailed in the consent decree still needs to be plugged and all pumping station repairs have been completed, but there are many manhole repairs that still need to be completed in the Jones Falls.

Table 7-12: Jones Falls – Completed Sanitary Sewer Repairs

Monitoring Stations			Overflow Pipe Plugged	Pumping Station Repairs	Manhole Repairs	Sewer Pipe Repaired (length, ft)	SRRR Plan Imp. Date
Downstream	Nested 1	Nested 2					
JON-1			14	2	15	1,730.2	9/6/2018
	JON-2		12	2	14	1,730.2	9/6/2018
		JON-3	0	2	6	632.48	9/6/2019
		JON-4	3	0	4	483.07	4/18/2024
	JF-B-12		0	0	0	0	9/6/2019
	JF-B-13		0	0	2	0	9/6/2019

Table 7-13: Jones Falls – To Be Completed Sanitary Sewer Repairs

Monitoring Stations			Overflow Pipe Plugged	Pumping Station Repairs	Manhole Repairs
Downstream	Nested 1	Nested 2			
JON-1			1	0	65
	JON-2		0	0	322
		JON-3	0	0	282
		JON-4	0	0	141
	JF-B-12		0	0	0
	JF-B-13		0	0	5

7.6.2.3 Gwynns Falls Watershed

There are four bacteria monitoring locations in the Gwynns Falls watershed in the county. Two additional locations for Gwynns Falls (GWY-1 and GWY-2) lie in the city potion of the watershed but are included in this section because their drainage areas extend into the county. The most downstream and largest drainage area is GWY-1 with all other drainage areas nested within it. Seven overflow pipes still need to be plugged and 161 manhole repairs are needed for the GWY-5 drainage area as shown in Table 7-14 and Table 7-15.

Table 7-14: Gwynns Falls –Completed Sanitary Sewer Repairs

Monitoring Stations				Overflow Pipe Plugged	Pumping Station Repairs	Manhole Repairs	Sewer Pipe Repaired (length, ft)	SRRR Plan Imp. Date
Downstream	Nested 1	Nested 2	Nested 3					
GWY-1				77	2	30	7,424.29	9/6/2017
	GWY-5			77	2	30	8,194.57	9/6/2017
		DR-B-10		3	0	3	2,102.04	9/6/2017
		GF-B-8		55	2	25	4,881.27	9/6/2017
			GWY-2	28	2	25	3,516.07	9/6/2019
			GWY-6	13	2	17	1,679.58	9/6/2018

Table 7-15: Gwynns Falls –To Be Completed Sanitary Sewer Repairs

Monitoring Stations				Overflow Pipe Plugged	Pumping Station Repairs	Manhole Repairs
Downstream	Nested 1	Nested 2	Nested 3			
GWY-1				7	0	65
	GWY-5			7	0	54
		DR-B-10		0	0	19
		GF-B-8		4	0	42
			GWY-2	0	0	145
			GWY-6	0	0	134

7.6.2.4 Loch Raven Reservoir Watershed

In the Loch Raven Reservoir watershed the county has seven bacteria monitoring locations. Four of these (LOC 1- 4) include area that is served by the sewer system and are included in the table below, the other 3 (LOC 5-7) are served by septic systems and are not included. The drainage areas for these four areas that are served by the sewer system are not nested. As shown in Table 7-16 and Table 7-17 Loch Raven does not have any repairs to be completed.

Table 7-16: Loch Raven Reservoir –Completed Sanitary Sewer Repairs

Monitoring Stations				Overflow Pipe Plugged	Pumping Station Repairs	Manhole Repairs	Sewer Pipe Repaired (length, ft)	SRRR Plan Imp. Date
Downstream	Nested 1	Nested 2	Nested 3					
LOC-1				0	0	1	1,116.84	4/18/2024
LOC-2				2	1	8	0	4/18/2024
LOC-3				0	0	0	0	9/6/2018
LOC-4				0	0	0	0	*

* The SRRR plan for this area is still being developed and an implementation date has not been set yet.

Table 7-17: Loch Raven Reservoir – To Be Completed Sanitary Sewer Repairs

Monitoring Stations				Overflow Pipe Plugged	Pumping Station Repairs	Manhole Repairs
Downstream	Nested 1	Nested 2	Nested 3			
LOC-1				0	0	0
LOC-2				0	0	0
LOC-3				0	0	0
LOC-4				0	0	0

7.6.2.5 Back River Watershed

The Back River watershed has seven bacteria monitoring locations. The HER-1 monitoring location is downstream of HRB-12 & HRB-13 and is nested within the Pulaski Hwy monitoring drainage area that is the farthest downstream. HR-B-14, HR-B-15, and the Biddle Street monitoring locations are not nested within any other monitoring drainage areas. Table 7-18 and Table 7-19 below show that no pump station repairs need to be completed and two overflow pipes still need to be plugged in Back River.

Table 7-18: Back River –Completed Sanitary Sewer Repairs

Monitoring Stations			Overflow Pipe Plugged	Pumping Station Repairs	Manhole Repairs	Sewer Pipe Repaired, (length, ft)	SRRR Plan Imp. Date
Downstream	Nested 1	Nested 2					
Pulaski Hwy			27	0	1	375.64	9/6/2024
	HER-1		27	0	1	375.64	9/6/2024
		HR-B-12	17	0	0	375.64	9/6/2024
		HR-B-13	7	0	0	0	4/18/2026
HR-B-14			0	0	2	0	4/18/2024
HR-B-15			7	0	1	1,268.61	9/6/2024
Biddle St			3	0	2	125.02	9/6/2024

* The SRRR plan for this area is still being developed and an implementation date has not been set yet.

Table 7-19: Back River –To Be Completed Sanitary Sewer Repairs

Monitoring Stations			Overflow Pipe Plugged	Pumping Station Repairs	Manhole Repairs
Downstream	Nested 1	Nested 2			
Pulaski Hwy			2	0	16
	HER- 1		2	0	23
		HR-B-12	2	0	189
		HR-B-13	0	0	87
HR-B-14			0	0	0
HR-B-15			0	0	94
Biddle St			0	0	4

8.0 Permit Requirements

PART IV. STANDARD PERMIT CONDITIONS

D. **Management Programs**

5. Public Education

The County shall continue to implement a public education and outreach program to reduce stormwater pollution and flooding. Education and outreach efforts may be integrated with other aspects of the County's activities. These efforts are to be documented and summarized in each annual report, with details on resources (e.g., personnel and financial) expended and method of delivery for education and outreach. The County shall implement a public outreach and education campaign that includes, but is not limited to:

a. Maintaining a website with locally relevant stormwater management information and promoting its existence and use;

b. Maintaining a compliance hotline or similar mechanism for public reporting of water quality complaints, including suspected illicit discharges, illegal dumping, spills, and flooding problems;

c. Providing information to inform the general public about the benefits of:

i. Increasing water conservation;

ii. Residential and community stormwater management implementation and facility maintenance;

iii. Proper erosion and sediment control practices;

iv. Removing debris from storm drain inlets to prevent flooding;

v. Increasing proper disposal of household hazardous waste;

vi. Improving lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice control and snow removal);

vii. Proper residential car care and washing;

viii. Litter reduction;

ix. Reducing, reusing, and recycling solid waste; and

x. Proper pet waste management.

The County shall conduct a minimum of 150 outreach efforts per year. These efforts may include distributing printed materials such as brochures or newsletters; electronic materials such as website pages; mass media such as newspaper articles or public service announcements (radio or television); and conducting targeted workshops on stormwater management for the public.

8.1 Introduction

Baltimore County continues to view environmental education and outreach as a high priority, particularly in an effort to reduce stormwater pollution and flooding, addressing the Municipal Separate Storm Sewer System (MS4) permit requirements.

This 2024 Annual Report section covers the fiscal year of July 1, 2023 to June 30, 2024 for reporting. Within this section, Baltimore County's Department of Environmental Protection and Sustainability (DEPS) will report on:

a. Monitoring of a public complaint/reporting system via email and webform submissions (Section 8.2).

b. Development and distribution of outreach products to provide educational value to the public. Distribution includes maintenance and promotion of webpages housing educational resources on pollution reduction, stewardship, and stormwater management (Section 8.3).

c. A general accounting for organizational effort applied in the promotion of these topics, including staff and financial resources committed to these priorities (Section 8.4).

8.2 Public Complaint and Reporting System

Recognizing that resident reports of environmental problems are a great complement to regular monitoring programs, DEPS maintains an online form.

(https://www.baltimorecountymd.gov/departments/environment/watersheds/report-pollution) to "Report an Environmental Concern." Concerns of particular interest, such as of illegal waste water connections to and/or dumping into the storm drain system, can be reported here along with photos of the particular concern. In addition to the webform, a phone number (410-887-5683) and a general email address (watersheds@baltimorecountymd.gov) are provided as an alternative method of submission. Non-emergencies are generally investigated by DEPS staff within 2 business days. These reports and the outcomes of their investigations continue to be tracked in Section 5 of the County's Annual Report which also includes a full description of the related Illicit Discharge Detection & Elimination program.

The reporting page explains the difference between an emergency and a concern (non-emergency), giving phone numbers for those agencies that provide a 24-hour service line. Certain events, such as chemical spills, can pose a public health threat as well as an environmental risk; these events are considered an emergency situation and are handled by MDE's Emergency Response Division.

8.2.1 Reports

In FY24, the following number of complaints were logged: 49 using the web form, 15 through the Watersheds email, and 5 by outside agencies (i.e. county interagency, state, and federal [not including reports from local watershed association partners]).

In FY 24, the County received 156 midge activity reports, 125 of them being 'intolerable' activity reports, through our Environmental Reporter site, which allows residents and visitors to report midge activity, tree plantings, and rain barrel installations in their community ((Baltimore County Environmental Reporter (arcgis.com)).

8.3 Development and Distribution of Outreach Products, and Webpage Maintenance and Promotion

Many county departments and agencies continue efforts to inform the public and student population about various aspects of environmental education and practices, community activities and individual resident activities. While there are clear priorities outlined by the MS4 permit – many of which are addressed by this subsection – Baltimore County's efforts in this field extend to other areas of communicating important aspects of environmental wellbeing.

8.3.1 MS4 Permit Priorities

Baltimore County's MS4 permit prioritizes certain topics for increasing public awareness and the benefits of several facets of a broader environmental conversation. Several of the topics prioritized by the MS4 permit have resources made available on the Clean Green Sustainable Baltimore County webpage, found at https://www.baltimorecountymd.gov/departments/environment/clean-green/. Here are the topics prioritized by the MS4 permit, along with examples of how Baltimore County has made efforts to enhance the public awareness of them:

i. Increasing water conservation

- The Baltimore County Public Works and Transportation (DPWT) – Bureau of Utilities offers tips on their web pages regarding water issues. The DPWT – Bureau of Utilities also provides a link to the MDE webpage on water conservation

  (https://www.baltimorecountymd.gov/departments/public-works/utilities/water-issues ; https://mde.maryland.gov/programs/water/waterconservation/Pages/index.aspx).

ii. Residential and community stormwater management implementation and facility maintenance

- General information about rain garden projects led by the County is hosted on the County Watershed Restoration website (see the Stormwater Conversion and Retrofit Projects accordion tab). The County works closely with several local watershed associations to implement conservation landscaping projects. Information about the benefits of implementing and maintaining community and county stormwater management facilities and the maintenance and inspection process is hosted on the County Stormwater Management website. (Watershed Restoration - Baltimore County (baltimorecountymd.gov) ; Watershed Association Grants - Baltimore County (baltimorecountymd.gov) ; Stormwater Management - Baltimore County (baltimorecountymd.gov)).

- Rain Barrel sales have been hosted online since FY21. Information about these sales gets posted on the county website, mailed to all County residents, and emailed to a network of subscribers which includes the DPWT – Bureau of Solid Waste Management's monthly newsletter *The Resource*. (Compost Bin and Rain Barrel Truckload Sale | Baltimore County Government (baltimorecountymd.gov) ; Bureau of Solid Waste Management (campaign-archive.com)).

- The DEPS webpage *Clean Green Sustainable Baltimore County* provides a link to the University of Maryland Extension publication *Slow it Down and Soak it In: Disconnecting and Redirecting Your Downspouts*. This publication details the process and benefits of downspout disconnection. (https://www.baltimorecountymd.gov/departments/environment/clean-green/; https://extension.umd.edu/resource/slow-it-down-and-soak-it-disconnecting-and-redirecting-your-downspouts).

iii. Proper erosion and sediment control practices

- The DEPS webpage, *Clean Green Sustainable Baltimore County,* provides a link to the Maryland Department of Agriculture – Education and Homeowner Tips brochure titled "Backyard Actions for a Cleaner Chesapeake Bay" (see the From Your Backyard to the Bay accordion tab). This publication includes tips on controlling soil erosion, among several other topics. Multiple County-developed brochures, such as the Riparian Buffer brochure, are currently not available online, but provide important and applicable information for land use practices to reduce sediment run-off and erosion. (Clean Green Sustainable Baltimore County - Baltimore County (baltimorecountymd.gov); https://mda.maryland.gov/resource_conservation/documents/backyard.pdf).

iv. Removing debris from storm drain inlets to prevent flooding

- The DEPS webpage *Clean Green Sustainable Baltimore County* (see From Your Backyard to the Bay accordion tab) provides advice to keep debris and yard waste from clogging storm drain inlets. It also provides a link to the DPWT Bureau of Highways webpage to report clogged storm drains if they do occur. (https://www.baltimorecountymd.gov/departments/environment/clean-green/; https://www.baltimorecountymd.gov/departments/public-works/highways/).

v. Increasing proper disposal of household hazardous waste

- The DPWT – Bureau of Solid Waste Management offers tips on their web pages regarding management of household hazardous waste. The available resources increase public understanding of the types, negative effects, safety tips for handling, and methods of proper disposal of household hazardous wastes accepted for disposal at permanent county-operated facilities.

  (Accepted Materials Directory | Baltimore County Government (baltimorecountymd.gov)).

vi. Improving lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice control and snow removal)

- The DEPS webpage *Clean Green Sustainable Baltimore County* provides a link to the Maryland Department of Agriculture – Education and Homeowner Tips brochure titled "Backyard Actions for a Cleaner Chesapeake Bay." This publication includes tips on responsible fertilizing and pest control, among several other topics.

  (https://mda.maryland.gov/resource_conservation/documents/backyard.pdf)

vii. Proper residential car care and washing

- The DEPS webpage *Clean Green Sustainable Baltimore County* provides a link to the MDE webpage focused on Water Conservation (see the Water and Stormwater accordion tab, and click on the Conserve Water link, then click on the Car Washing link). That page provides fact sheets and advice on several topics including household car washing tips.

  (Clean Green Sustainable Baltimore County | Baltimore County Government (baltimorecountymd.gov); http://mde.maryland.gov/programs/Water/waterconservation/Pages/carwashing.aspx)

viii. Litter reduction

- Two Baltimore County watersheds have streams that contribute to an impairment of Baltimore Harbor by excess trash and litter. Baltimore County has developed and piloted multiple pathways of achieving public behavior change in proper disposal of solid waste, including cigarette butt anti-litter campaign, Countywide 'pitch in' cans with graphic anti-litter signage, Adopt-A-Road, LitterSmart Business, Litter Blitz and Clean Green 15 programs. The focus of related programs includes trash set out for residential and commercial collection, recycling, and both intentional and unintentional litter. Updates on these programs will be shared in detail in Section 6 of this report, and progress toward meeting the Total Maximum Daily Load assigned for trash-impaired waterways in Baltimore County is additionally accounted for in the Countywide TMDL Implementation Plan Section Appendix A of this report. (https://baltcolitterblitz-bc-gis.hub.arcgis.com/ ; https://bceps-bc-gis.hub.arcgis.com/pages/clean-green-15)

ix. Reducing, reusing, and recycling solid waste

- DPWT – Bureau of Solid Waste Management has several resources available to promote better stream waste management. Subscribers to the DPWT – Bureau of Solid Waste Management's monthly newsletter, *The Resource*, receive regular tips that help residents improve efficiency in the management of waste in and near streams. Since FY22, County residents are permitted to compost certain food scraps with their regular backyard compost methods. DPWT webpages include a plethora of additional links, resources, opportunities, fact sheets, and an entertaining video to help communicate the importance of proper waste disposal and recycling.

  (Recycling and Waste Prevention | Baltimore County Government (baltimorecountymd.gov) ; Compost Organic Materials at Home | Baltimore County Government (baltimorecountymd.gov); Bureau of Solid Waste Management (campaign-archive.com)).

x. Proper pet waste management

- Several Baltimore County watersheds have streams that are impaired by excess fecal bacteria from multiple sources, including from improper disposal of domestic pet waste. In order to achieve reductions in bacteria contamination in our streams, Baltimore County has developed and piloted multiple pathways of achieving public behavior change by highlighting the benefits of proper pet waste disposal to pet owners and caregivers, including the installation of numerous pet waste stations and in-person outreach events. In FY24, 1,546 pet waste bags and dispensers and 316 pet waste yard signs were distributed to the public, and 596 people made the pet waste pledge. This is a collaborative outreach program with Baltimore County Animal Services and local veterinarian clinics. Progress toward meeting the Total Maximum Daily Loads assigned for bacteria-impaired waterways in Baltimore County is accounted for in the Countywide TMDL Implementation Plan Section Appendix A of this report.

8.3.2 Additional Education and Outreach Communications and Media

As a supplement to the MS4 permit required and recommended discussion topics, Baltimore County continues to seek new and effective styles of communication to advance environmental literacy, and provide enhanced value for residents.

8.3.2.1 Door hanger distribution

Baltimore County staff use door hangers to inform residents of improper disposal of pollutants at their residence and in their neighborhood (see Section 5 of this report for details on those programs). These door hangers also include information for residents that substances put into the storm drain system flow into the nearby stream and then to the Chesapeake Bay. The formatting of the door hanger also provides a list of potential common pollutants of concern that should stay out of the storm drain system.

8.3.2.2 Social media

Fiscal Year 2024 saw the continuation of social media programming for Baltimore County's environmental messaging. The Clean Green Baltimore County Facebook page was made public in February of 2017, curating content that engages followers and encourages post interaction by providing residents and businesses with relevant content on county initiatives, services and resources that support sustainable living." Visit us at https://www.facebook.com/CleanGreenBaltCo/

See Table 8-1 for an overview of the accomplishments of the Clean Green Baltimore County Facebook page during this reporting year.

Table 8-1: Clean Green Baltimore County Facebook Page Performance July 2023 - June 2024

Measurement	
New Fans/Followers	252
Posts	164
Post Engagement Rate	4.04%
Impressions Achieved	136,957

8.3.2.3 Short video productions

The YouTube social media platform has been primarily used by Baltimore County to host content. Below is a listing of short videos produced by Baltimore County with the aim of providing an engaging look into various aspects of county operations that focus on the environment.

- Released in FY19:
    - All About Stream Restoration
        - https://youtu.be/c48GtdMgHvg
    - Scotts Level Branch Stream Restoration Projects
        - https://youtu.be/ix42pr9t3ts
    - Stream Restoration, What to Expect During Construction
        - https://youtu.be/Rpby6-mmPRk
    - Tangled Up! [keeping "tanglers" out of the recycling stream]
        - https://youtu.be/EDipC5oJG_A
    - Watershed Moments - Keepers of the Stream [benthic macroinvertebrate sampling featuring County Executive Johnny Olszewski]
        - https://youtu.be/a4jz6BK9rbo
- Released in FY20:
    - Watershed Moments - Pollution Detectives [illicit discharge detection and elimination featuring County Executive Johnny Olszewski]
        - https://youtu.be/ZeVcdkwiLZk
    - Watershed Moments - The Pond Down the Road [stormwater management facilities]
        - https://youtu.be/W7JgpIBgs5g

8.3.2.4 Pollinators Handbook and Film Screening

In response to declines in pollinator populations over recent decades, DEPS publishes a locally-specific guide designed to help residents and businesses protect these critical species by creating and preserving habitat on their properties for pollinator species. DEPS distributes between 4,000 and 5,000 booklets per year through public facilities like libraries, nature and recreation centers and private garden centers.

To help promote the release of the pollinators guide, DEPS hosted a theater screening of the award-winning documentary, "The Pollinators," which highlights bees and the important role they play in sustaining the global food web. (howtoattractpollinators2023.pdf (baltimorecountymd.gov)).

8.3.2.5 Event Giveaways and Additional Materials

DEPS has developed several giveaway items to help spread messaging and build branding around our environmentally related campaigns. A selection of those materials follows:

- Reusable water bottles
- Reusable tote bags
- Reusable trash bags for use in cars
- Pocket ash trays
- Dog waste bag dispensers
- Dog waste yard signs
- Wildflower and Milkweed seed packets
- Series of pamphlets and guides for myriad topics
- Stickers

8.4 Accounting for Outreach Efforts

Baltimore County's MS4 permit requires a minimum of 150 outreach efforts per year to be catalogued in each reporting year. This subsection will account for various achievements of effort of public education and outreach at Baltimore County.

8.4.1 Sources of Credit

In order to account for efforts towards education and outreach goals, Baltimore County has begun to aggregate contributions in this field from multiple contributors. The accounting of effort from each contributor may not fully encompass the entirety of that organization's actual outreach work on environmental topics. Baltimore County provides financial support to several eligible non-government organizations, through its grant program, in exchange for their continued support of county watershed and environmental restoration and outreach goals (see Section 8.4.4.3). As they are at least partially funded by Baltimore County, the grant-related education and outreach achievements reported to Baltimore County by these groups are included in this report. Contributions from the following outreach providers are counted as providing credit toward the MS4 permit goal.

- Baltimore County DEPS
    - Including On-Call Education and Outreach Communications Consultant
- Baltimore County DPWT
    - Bureau of Solid Waste Management
    - Bureau of Utilities
- Baltimore County Office of Information Technology
    - Web Services
- Watershed Association Restoration Planning and Implementation Grant recipient organizations
    - Back River Restoration Committee
    - Blue Water Baltimore
    - Gunpowder Valley Conservancy
    - Interfaith Partners for the Chesapeake
    - Patapsco Heritage Greenway

8.4.2 Categorization of Effort

Since 1994, Baltimore County has carried its message via thousands of environmental presentations, outreach events, and media outlet campaigns. As modes and occasions for public interaction evolve, the county adapts its messaging to utilize new opportunities. Presently DEPS divides most of the county's outreach efforts between two categories: live event outreach and mass-reach/social media communications. The lists below provide a non-exhaustive inventory of various subcategories of trackable efforts. Conducting any of these events or communication activities, with an educational component and/or resident/community participation, may be accounted for as a single education/outreach "effort."

8.4.2.1 Live Event Outreach

Examples of currently recognized live event outreach activities:

- Workshop
- Tabling/Festival/Expo/Market booth
- Webinar
- Presentation
- Tree Plantings/Giveaways/Maintenance
- Strom Drain Stenciling
- Cleanups
- Community Science Monitoring Programs
- Door to Door Outreach

8.4.2.2 Mass-Reach and Social Media Communications

Examples of currently recognized Mass-Reach Communications activities:

- Maintenance of Webpage
- Maintenance of Social Media Account
- Press Releases/Blog Posts
- Publication of Article in a Periodical
- Distribution of Literature in Public (includes doorhangers)
- TV/Radio/Billboard/Online Advertisement
- Mass/Direct Mailing
- Newsletter Publication
- News Media Appearance
- Report Publication

8.4.2.3 Uncategorized Communications

Currently uncategorized activities, which are not counted as outreach efforts (such as the Name Our Streams contest), are being assessed on a continuous basis for possible inclusion in the above listings.

8.4.3 Effort Achieved During Reporting Period

Various organizations contribute toward the MS4 Permit's requirement to achieve a minimum count of outreach efforts. Table 8-2 aggregates the categories of effort and the volume achieved for each contributing organization. Baltimore County has also begun to track impressions achieved by outreach efforts, when that information is available, and that data will be available upon request.

Table 8-2: Organizations Contributing to Baltimore County Education and Outreach Efforts; Categories and Volume of Effort; Efforts During this Reporting Year

Contributing Organization		
Baltimore County	Distribution of Literature in Public, Maintenance of Social Media Account, Newsletter Publication, Presentations, Press Releases/Blog Posts, Tabling/ Festival/ Expo/ Market booths	94
Back River Restoration Committee (BRRC)	Community Science Monitoring Programs, Tabling/ Festival/ Expo/ Market booths, Maintenance of Social Media Account, News Media Appearances, Presentations, Stream Cleanups, Workshops	34
Blue Water Baltimore (BWB)	Community Science Monitoring Programs, Tabling/ Festival/ Expo/ Market booths, Stream Cleanups, Tree Plantings/ Giveaways/ Maintenance, Webinars, Workshops	17
Gunpowder Valley Conservancy (GVC)	Presentations, Cleanups, Tabling/ Festival/ Expo/ Market booth, Tree Plantings/Giveaways/Maintenance, Workshops	111
Interfaith Partners for the Chesapeake (IPC)	Cleanups, Tabling/ Festival/ Expo/ Market booths, Presentations, Webinars, Workshops	35
Patapsco Heritage Greenway (PHG)	Community Science Monitoring Programs, Cleanups, Maintenance of a Social Media Account, Mass/Direct Mailing, Newsletter Publication, Presentations, Workshops	32

8.4.4 Resource Expenditure

With multiple contributors of effort in the education and outreach field, Baltimore County has multiple cost categories associated with relevant achievements. Current financial resources are committed through a contracted Education and Outreach communications consulting firm, and through a grant program to provide support for eligible, local, environmental, not-for-profit organizations. Both programs are administered by Baltimore County DEPS.

8.4.4.1 Baltimore County Staff

Baltimore County DEPS staff support education and outreach initiatives by providing presentations, educational talks to students, tabling support at events, and similar assistance. Within this group of staff, some roles are more deeply involved with development and distribution of education and outreach materials as a result of pollution reduction strategies on certain topics (trash and litter, and bacteria from pet waste), which require human behavior change to achieve water quality goals. The following positions regularly dedicate a portion of their work time in support of education and outreach for pollution reduction:

- Natural Resource Specialist (2)
- Natural Resource Supervisor (1)
- Senior Advisor for Communications and Community Engagement (1)

Baltimore County DPWT Bureau of Solid Waste Management and Director's Office additionally have dedicated staff to support education and outreach on matters of Reducing, Reusing, Recycling, Waste Collection, and other related topics. The following staff positions regularly dedicate a portion of their work time in support of education and outreach tasks:

- Public Information Specialist (2)
- Marketing and Contracts Specialist (1)
- Director's Office – Communications Manager (1)

8.4.4.2 On-call Education and Outreach Communications Consulting Firm

Since FY17 Baltimore County DEPS has retained the services of a communications consulting firm. One of the primary goals of the contract is to help build our public education and outreach presence, utilizing targeted marketing and other methods. The primary work focus of our consultant has been assisting to develop public behavior change campaigns to reduce trash/litter, and bacteria from pets in our local waterways. Additional support from our consulting firm has been creation of social media posts, coordinating/attending events, and developing/acquiring outreach materials and aides.

Total of monthly invoices paid or expected to be paid for work during:

- FY23 $218,058.29
- FY24 $273,392.77

These costs include one consultant staff member working full-time as an Education and Outreach Coordinator, as well as support staff and sub-consultants who provide part-time support, administration, and material acquisition or media buy costs.

8.4.4.3 Watershed Association Restoration Planning and Implementation Grant Program

Local watershed associations, partially funded by county grants, partner with DEPS to implement education and outreach programs, including pollution reduction initiatives outlined by the county's Small Watershed Action Plans, and Total Maximum Daily Load Implementation Plans. Educational components are meant to build awareness about issues of pollution and extend the reach of our message of stewardship into the local communities through the voice of trusted, local, non-government experts. Each quarter, grant recipients submit a report to DEPS that includes activities, dates, and number of participants/impressions for educational activities. Given the nature of the reporting and invoicing system used by this program, it is not feasible to provide an estimate of how much of these funds were devoted to education and outreach activities specifically, although most of the work conducted by these organizations does contain educational elements involving public participants.

Total of quarterly invoices paid or expected to be paid for work during:

- FY23 $346,255.00
- FY24 $294, 418.00

Costs in FY24 included efforts from 31 staff across five organizations.

9.0 Permit Requirements

PART IV. STANDARD PERMIT CONDITIONS

F. Assessment of Controls

Baltimore County and 10 other municipalities in Maryland have been conducting discharge characterization monitoring since the early 1990's. From this expansive monitoring, a statewide database has been developed that includes hundreds of storms across numerous land uses. Analyses of this dataset and other research performed nationally effectively characterize stormwater runoff in Maryland for NPDES municipal stormwater purposes. To build on the existing information and to better track progress toward meeting TMDLs, better data are needed on ESD performance and BMP efficiencies and effectiveness.

Assessment of controls is critical for determining the effectiveness of the NPDES stormwater management program and progress toward improving water quality. The County shall use chemical, biological, and physical monitoring to document work toward meeting applicable WLAs developed under EPA approved TMDLs. Additionally, the County shall continue physical stream monitoring in the Windlass Run to assess the implementation of latest version of the *2000 Maryland Stormwater Design Manual*. Specific monitoring requirements are described below.

1. Watershed Restoration Assessment

   Baltimore County shall monitor the Scotts Level Branch, or, select and submit for MDE's approval a new watershed restoration project for monitoring. Monitoring activities shall occur where the cumulative effects of watershed restoration activities can be assessed. One outfall and associated in-stream station, or other locations based on a study design approved by MDE, shall be monitored. The criteria for chemical, biological, physical monitoring are as follows:

   a. Chemical Monitoring

      i. Twelve (12) storm events shall be monitored per year at each monitoring location with at least two occurring per quarter. Quarters shall be based on the calendar year. If extended dry weather periods occur, baseflow samples shall be taken at least once per month at the monitoring stations if flow is observed;

ii. Discrete samples of stormwater flow shall be collected at the monitoring stations using automated or manual sampling methods. Measurements of pH and water temperature shall be taken;

iii. At least three (3) samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to methods listed under 40 CFR Part 136 and event mean concentrations (EMC) shall be calculated for:

- Biochemical Oxygen Demand (BOD_5) or Total Organic Carbon (TOC)
- Total Nitrogen (TN)
- Nitrate plus Nitrite
- Total Suspended Solids (TSS)
- E. coli or Enterococcus
- Chloride
- Total Phosphorus (TP)
- Orthophosphate
- Total Ammonia

iv. Continuous flow measurements shall be recorded at the in-stream monitoring station or other practical locations based on an approved study design. Data collected shall be used to estimate annual and seasonal pollutant loads and reductions, and for the calibration of watershed assessment models.

b. <u>Biological Monitoring</u>

i. Benthic macroinvertebrate samples shall be gathered each Spring between the outfall and the in-stream stations or other practical locations based on MDE approved study design; and

ii. The County shall use EPA Rapid Bioassessment Protocols (RBP), Maryland Biological Stream Survey (MBSS), or other similar method approved by MDE.

c. Physical Monitoring

i. A geomorphologic stream assessment shall be conducted between the outfall and the in-stream monitoring locations or in a reasonable area based on the approved study design. This assessment shall include an annual comparison of permanently monumented stream channel cross-sections and the stream profile.

ii. A stream habitat assessment shall be conducted using techniques defined by the EPA's RBP, MBSS, or other similar method approved by MDE; and

iii. A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.

d. Annual Data Submittal: The County shall describe in detail its monitoring activities for the previous year and include the following:

i. EMCs submitted on MDE's long-term monitoring database as specified in PART IV below;

ii. Chemical, biological, and physical monitoring results and a combined analysis for the approved monitoring locations; and

iii. Any requests and accompanying justifications for proposed modification to the monitoring program.

2. Stormwater Management Assessment

The County shall continue monitoring Windlass Run for determining the effectiveness of stormwater management practices for stream channel protection. Physical stream monitoring protocols shall include:

a. An annual stream profile and survey of permanently monumented cross-sections in the Windlass Run to evaluate channel stability in conjunction with surrounding and on-going commercial development;

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

c. A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.

9.1 Introduction

Baltimore County is required to maintain a long-term monitoring location in an approved watershed to determine the effectiveness of stormwater management practices for stream channel protection. Additionally, chemical, biological, and physical monitoring is required to assess the cumulative effects of watershed restoration activities. The permit requires the County to conduct a systematic assessment of water quality for each watershed. These watershed assessments are to include detailed water quality analyses, identifying water quality improvement opportunities, and developing and implementing restoration plans to control stormwater discharges.

Assessment of controls is critical to determine the effectiveness of the NPDES stormwater management program. Therefore, chemical, biological, and physical monitoring is required to document progress toward improving water quality and meeting applicable stormwater WLAs developed under EPA approved TMDLs. This report will present the research design and monitoring data for Scotts Level Branch (9.2), Windlass Run (9.3), and Countywide monitoring locations (9.4). This report covers monitoring conducted during calendar year 2023.

9.2 Scotts Level Branch Long-Term Monitoring

Scotts Level Branch is located in the Gwynns Falls watershed in the Patapsco/Back River Basin. Gwynns Falls has a TMDL for sediment that requires a 36.5% reduction. On December 29, 2010, the U.S. Environmental Protection Agency established the Chesapeake Bay TMDL. The Chesapeake Bay TMDL requires 29% nitrogen and 45.1% phosphorus load reductions. The Gwynns Falls TMDL for bacteria has identified a ~98% reduction for human and domestic pet sources.

The Baltimore County NPDES Municipal Stormwater Discharge Permit requires monitoring of restoration effectiveness. For the first two rounds of the 5-year permit, the Spring Branch subwatershed had been monitored to determine the effectiveness of the stream restoration in promoting stream stability, reduction in pollutant loads, and improvement in the benthic macroinvertebrate community. Using the experience gained in monitoring Spring Branch, a more effective monitoring program has been designed for the Scotts Level Branch subwatershed, as detailed below.

While the Spring Branch study monitored the effectiveness of one large restoration project, the Scotts Level Branch monitoring is designed on the basis that a number of restoration projects will be implemented within the subwatershed over a period of time. The ability to detect effects of individual restoration projects will be dependent on the size of the restoration project in relation to the total subwatershed size. Therefore, each restoration project will be monitored for project effectiveness, dependent on staff availability. The cumulative effects of restoration will be measured at the long-term in-stream monitoring site. In order to assess restoration progress in the Scotts Level Branch subwatershed, a before-after design concept will be used.

Stream restoration work on Scotts Level Branch began in the fall of 2013 with the start of the McDonogh Road project. Construction of this reach was completed in the spring of 2014, which included 1,900 linear feet of stream channel, 2 acres of forested wetland, and 4 acres of floodplain wetlands, with a total of 7 acres of buffer plantings. New restoration projects have been completed in subsequent years, with additional restoration planned for future years.

9.2.1 Monitoring Design

9.2.1.1 Flow Monitoring

Scotts Level Branch has a gage installed and operated by the US Geological Survey (SL-01) (Figure 9-1). USGS provides the rating curve and annual data for the gage. A 36" outfall near the headwater of Scotts Level Branch is being monitored for discharge and chemistry (SL-09). A weir was installed to permit continuous flow monitoring with a water level sensor installed and operated by Baltimore County. This outfall has a drainage area of 15.0 acres with ~35% impervious cover. The land use is ~88% medium residential and therefore representative of the major land use in each of the subwatersheds.

The flow monitoring will be used in conjunction with the chemical monitoring (described below) to determine pollutant loads and in relation to the geomorphological monitoring. Over time the flow data will be assessed for any changes in relation to restoration work that is conducted in the subwatersheds.

9.2.1.2 Chemical Monitoring

The chemical monitoring includes both storm event and baseflow monitoring components. The standard list of chemicals detailed in the permit requirements are analyzed. Figure 9-1 displays the location of the chemical monitoring sites in Scotts Level Branch by type.

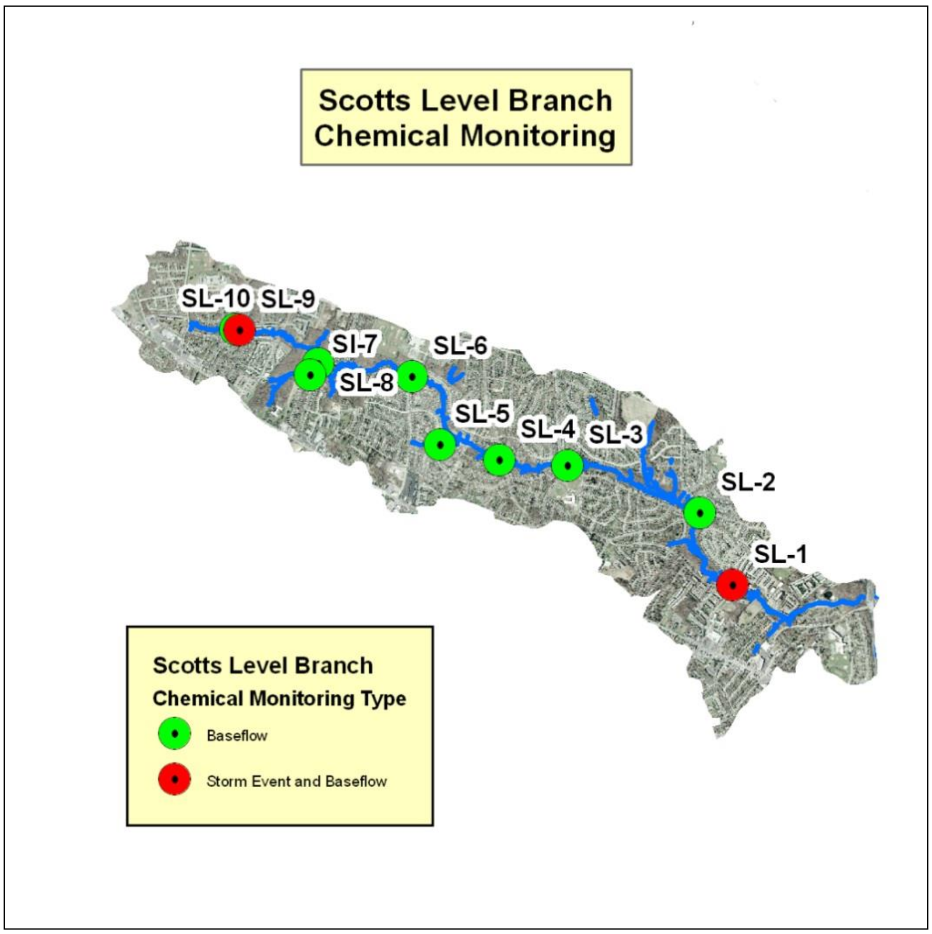


Figure 9-1: Scotts Level Branch Chemical Monitoring Locations

9.2.1.3 Storm Event Monitoring

Storm event monitoring occurs at the USGS gage site and at the outfall. The two Scotts Level Branch storm event monitoring sites (SL-01 in-stream, and SL-09 outfall) are monitored for up to 12 storms each calendar year seeking to acquire samples for the entire hydrograph. The data are analyzed using regression analysis to determine the relationship between discharge and pollutant concentration. These relationships are then used in conjunction with the flow data collected from the USGS operated gage and the water level sensor operated by EPS. The results and subsequent analysis following restoration is used to determine annual loads and any load reductions due to restoration activities.

The pollutant load data collected from the Scotts Level Branch outfall is used to estimate the wash load (the load derived from the land surface). The pollutant load estimate derived from the Scotts Level Branch in-stream site will estimate the watershed load, which includes both the wash load and the load derived from stream bank erosion. The geomorphological analysis (see below) attempts to determine the stream channel erosion component via changes in the channel cross-section and analysis of the pollutant concentration of the stream bank and bed. Thus, the wash load (derived from the outfall data) plus the stream erosion load (derived from the geomorphological data) should equal the watershed load (derived from the in-stream monitoring data). These data should provide an estimate of the relative proportions of pollutants derived from the land surface and the stream corridor. This will have important implications for restoration efforts in urban settings. If, as the literature suggests, a large component of the sediment and total phosphorus load is derived from the stream channel, then in order to meet sediment and phosphorus load reduction requirements for TMDLs and the Chesapeake Bay Program additional effort will need to be focused on stream restoration.

Additional storm event monitoring will be associated with the restoration activities to determine the effectiveness of the restoration in reducing pollutant loads. These will also use a before-after design with installation of the monitoring equipment and collection of data occurring as far in advance of the restoration site as possible to collect the before data.

9.2.1.4 Baseflow Monitoring

Scotts Level Branch baseflow monitoring occurs at the outfall (SL-09), two tributary locations, and six mainstem locations for a total of 10 baseflow monitoring sites (Figure 9-1). The baseflow sites in Scotts Level Branch are monitored quarterly during baseflow conditions (preceded by a minimum of 72 hours dry weather).

Analysis of baseflow pollutants is especially important in relation to nitrogen. Research work conducted by the County, indicates that ~50% of the nitrogen load occurs during dry weather. The baseflow sampling will be used in conjunction with the storm event sampling to partition the annual discharge and pollutant load between baseflow (dry weather) conditions and storm event conditions.

9.2.1.5 Geomorphic Monitoring

The geomorphic monitoring is intended to provide an estimate of stream erosion and deposition rates and an estimate of the pollutant load derived from stream channel erosion. In addition, it is intended to provide an estimate of the effects of restoration on stream stability on both a project basis and over the entire subwatershed.

In order to assure unbiased selection of cross-section locations, Scotts Level Branch was divided into 20 equal length stream segments (Figure 9-2). Within each segment a point was randomly selected, using a GIS subroutine, for location of permanent cross-sections. These cross-sections are monitored annually, usually in the fall or winter seasons with the results overlaid to provide an assessment of the amount of channel change. Two longitudinal profile reaches were selected in Scotts Level Branch for annual assessment.

In the summer of 2016 stream bank and bed core samples were collected in Scotts Level in the vicinity of nineteen permanent cross sections for laboratory analysis of bulk density, particle size distribution, total nitrogen, and total phosphorus. These were one-time sample collections; however additional samples should be collected to provide an analysis of annual variability. Based on the annual and long-term change, and the results of the core samples, the estimated annual sediment, total nitrogen, and total phosphorus loads will be calculated for comparison with the chemical monitoring results derived from the in-stream monitoring site.

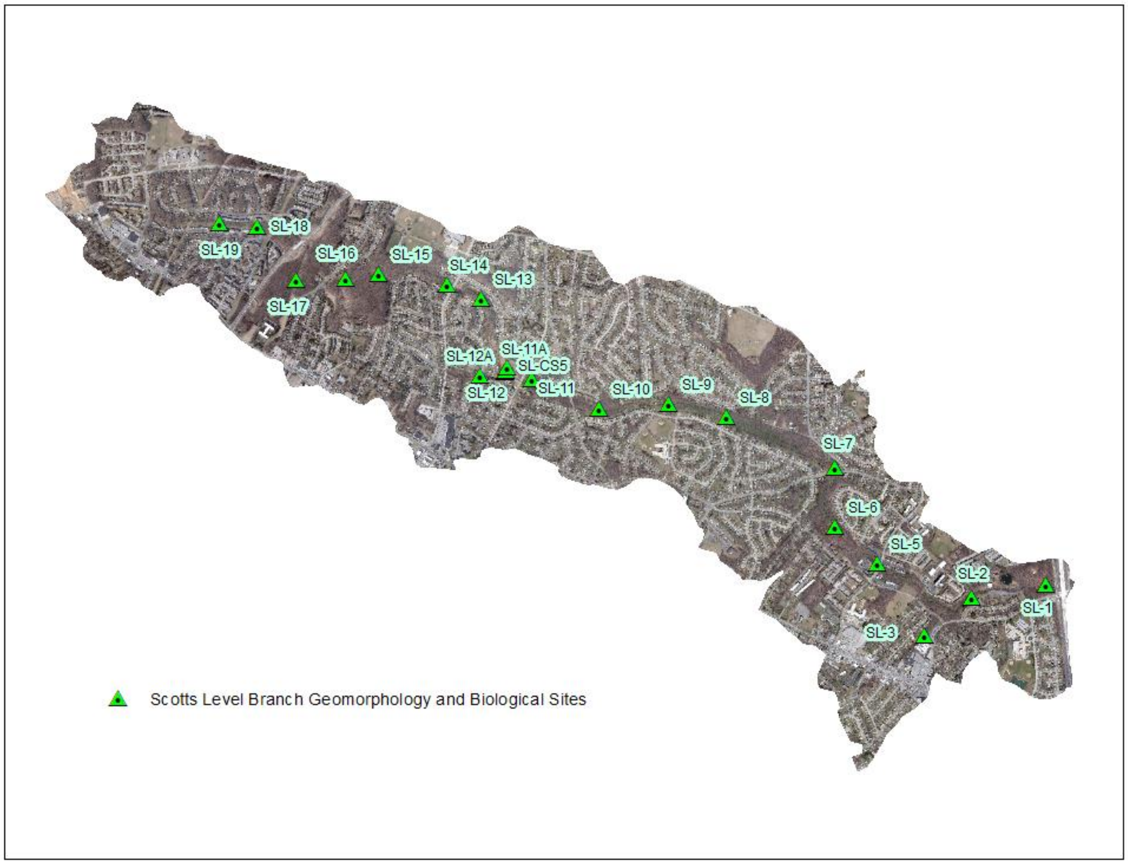


Figure 9-2: Scotts Level Branch Geomorphic and Biological Monitoring Site Locations

9.2.1.6 Biological Monitoring

Benthic macroinvertebrate sampling is conducted annually at ten fixed stations on Scotts Level Branch. Fish surveys are conducted annually at an evenly distributed subset of the ten sites across the Scotts Level Branch watershed. Monitoring is conducted every five years at two fixed stations on Powder Mill Run.

Maryland Biological Stream Survey (MBSS) methods are followed and all sampling is completed during the appropriate index periods (March-April for macroinvertebrates, June-September for fish). Macroinvertebrates are identified to the Genus taxonomic level, or the lowest practical identification level. At the time of sample collection, the appropriate MBSS stream physical habitat assessment is conducted. The biological monitoring data are integrated with the cross sectional and habitat data to produce an overall assessment of conditions in the subwatershed.

9.2.2 Scotts Level Branch Long-Term Site Monitoring Results

9.2.2.1 Chemical Monitoring Results

The data analysis for chemical monitoring includes three components: storm event monitoring, baseflow monitoring, and the calculation of pollutant loads.

9.2.2.2 Storm Event Monitoring Results

The chemical results from the storm event monitoring at the Scotts Level Branch in-stream (SL-01) and outfall (SL-09) monitoring sites were analyzed in conjunction with the discharge data. Twelve storms were monitored for the instream site (SL-01) and eleven were monitored at the outfall site (SL-09). Baseflow conditions were monitored ten times during 2023. Chemical results from these storms along with the calculated EMCs can be found in the NCT database. Fewer storms were captured at the outfall site due to equipment issues. Both the chemical and the discharge data were $\log_{10}$ transformed before regression analysis and data for the regression equations was censored by removing data that was below the detection limit for any constituent. The regression equations were used to calculate the chemical concentrations for each 5-minute interval for recorded discharge. Regression equations were determined for Total Suspended Solids, TKN, Nitrate/Nitrite, Total Nitrogen, and Total Phosphorus. The regression for Total Suspended Solids at SL-01 is a polynomial regression including turbidity data. The results are displayed in Table 9-1 and Table 9-2 and an example regression graph is shown in Appendix 9-1.

Table 9-1: SL-01 Regression Equations Relationship Between Discharge (CFS) and Pollutant Concentrations

Parameter	Regression Equation
Total Suspended Solids	1.452*(TURB)^2+0.00327*(TURB)+0.155*(CFS)
Total Kjeldahl Nitrogen	-0.422+0.202*(log cfs)
Nitrate/Nitrite	-0.074-0.185*(log cfs)
Total Nitrogen	0.0975+0.024*(log cfs)
Total Phosphorus	-1.124+0.175*(log cfs)

Table 9-2: SL-09 Regression Equations Relationship Between Discharge (CFS) and Pollutant Concentrations

Parameter	
Total Suspended Solids	1.409+0.222*(log cfs)
Total Kjeldahl Nitrogen	0.011+0.018*(log cfs)
Nitrate/Nitrite	-0.428-0.175*(log cfs)
Total Nitrogen	0.229-0.092*(log cfs)
Total Phosphorus	-0.850-0.018*(log cfs)

For SL-01, Total Suspended Solids exhibited a strong positive correlation with Turbidity and discharge. TKN, and Total Phosphorus exhibited moderately positive relationships with discharge, while the Nitrate/Nitrite relationship with discharge was moderately negative. Total Nitrogen's (TKN plus Nitrate/Nitrite Nitrogen) relationship to discharge was weakly positive.

For SL-09, Total Suspended Solids and Total Kjeldahl Nitrogen exhibited a weak positive correlation to discharge. Total Nitrogen and Total Phosphorus exhibited a weak negative correlation and Nitrate/Nitrite a moderately weak negative correlation.

9.2.2.2.1 Baseflow Monitoring Results

Scotts Level Branch baseflow monitoring occurred at the outfall (SL-09) and instream (SL-01) storm monitoring locations as well as two tributary locations and six mainstem locations for a total of 10 baseflow monitoring sites (Figure 9-1). The baseflow sites in Scotts Level Branch were monitored quarterly during baseflow conditions (preceded by a minimum of 72 hours dry weather) until 2018. In October 2018 the sampling regime at these baseflow sites was changed to monthly, both to satisfy the requirement that baseflows be sampled quarterly and to better resolve the causes of inconsistencies between the Chesapeake Bay Program (CBP) model and the observed monitoring data noted later within this section. These samples were sent to a subcontracting laboratory. Analysis of baseflow pollutants is important in understanding the contribution of dry weather baseflow to the total pollutant load being transported out of Scott's Level Branch. The baseflow sampling was used in conjunction with the storm event sampling to partition the annual discharge and pollutant load between baseflow (dry weather) conditions and storm event conditions.

Pollutant loads were examined for each of the baseflow sites. The results obtained were standardized to both daily pollutant load for drainage area and a daily load per acre and are shown in Table 9-3 for the sampling in 2023. Pollutant loads were calculated for the outfall site, SL-09, using flow data derived from the in-situ probe.

Table 9-3: Baseflow Pollutant Loads Observed in 2023 for Scotts Level Branch Sites

Site	Drainage Area (Acres)	TKN Conc. (mg/L)	TKN Daily Load (lbs.)	TKN Daily Load (lbs./acre)	Nitrite/Nitrate Conc. (mg/L)	Nitrite/Nitrate Daily Load (lbs.)	Nitrite/Nitrate Daily Load (lbs./acre)
SL01	2,186	0.271	1.231	0.0006	0.907	4.770	0.0022
SL02	1,908	0.319	1.619	0.0008	0.824	3.989	0.0021
SL03	1,434	0.423	1.276	0.0009	0.967	3.633	0.0025
SL04	1,167	0.342	0.930	0.0008	1.037	3.754	0.0032
SL05	202	0.300	0.077	0.0004	2.475	1.051	0.0052
SL06	742	0.484	0.534	0.0007	1.091	1.279	0.0017
SL07	62	0.200	0.034	0.0005	1.486	0.330	0.0053
SL08	451	0.339	0.059	0.0001	0.431	0.187	0.0004
SL09	15	0.362	0.105	0.0070	3.425	0.783	0.0522
SL10	265	0.182	0.083	0.0003	1.116	0.406	0.0015

Site	Drainage Area (Acres)	TN Conc. (mg/L)	TN Daily Load (lbs.)	TN Daily Load (lbs./acre)	TP Conc. (mg/L)	TP Daily Load (lbs.)	TP Daily Load (lbs./acre)
SL01	2,186	1.178	6.001	0.0027	0.031	0.109	0.00005
SL02	1,908	1.143	5.608	0.0029	0.032	0.130	0.00007
SL03	1,434	1.390	4.908	0.0034	0.023	0.071	0.00005
SL04	1,167	1.378	4.684	0.0040	0.037	0.094	0.00008
SL05	202	2.775	1.128	0.0056	0.030	0.013	0.00006
SL06	742	1.575	1.813	0.0024	0.021	0.022	0.00003
SL07	62	1.686	0.363	0.0059	0.020	0.003	0.00005
SL08	451	0.770	0.246	0.0005	0.023	0.005	0.00001
SL09	15	3.787	0.888	0.0592	0.076	0.019	0.00127
SL10	265	1.299	0.489	0.0018	0.031	0.009	0.00003

9.2.2.2.2 Pollutant Load Calculations

Data from the USGS gage at Rolling Rd. (SL-01) has been recorded at 5-minute intervals since June 5, 2013. The current level probe installed at the Outfall has been in operation since May 2021. The pollutant loads calculated for SL-01 and SL-09 are presented in Table 9-4 and Table 9-5. The regression equations shown in Table 9-1 and Table 9-2, relating pollutant concentration to discharge, were used to determine the pollutant concentration for each 5-minute interval. From this data the load was calculated for each 5-minute interval using Equation 9-1:

$$P_L = (P_C * 0.000008345) * (CFS * 448.8 * I), \text{ where} \qquad \text{Equation 9-1}$$

P_L = Pollutant Load,
P_C = Pollutant Concentration,
.000008345 = Conversion factor to convert mg/L to pounds per gallon,
CFS = Cubic feet per second,
448.8 = Conversion factor to convert cubic feet per second to gallons per minute
I = number of minutes in the interval (5 or 15).

The results obtained by the above formula were standardized to both an annual pollutant load for the drainage area and an annual pollutant load per acre for the instream site (Table 9-4) and outfall (Table 9-5).

Table 9-4: Pollutant Load Characteristics for USGS Gaged In-Stream Site (SL-01) Calendar Year 2023

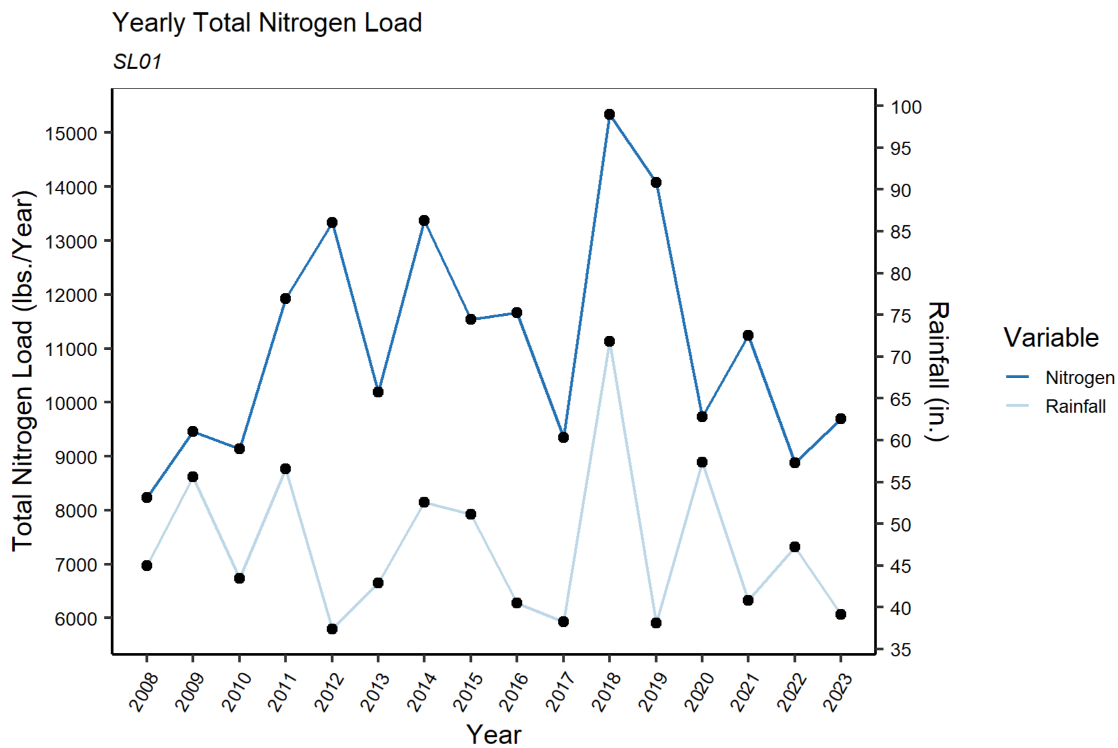
Parameter	Quarter	Total lbs.	Total %	Standardized by Average Rainfall lbs.	Standardized by Average Rainfall lbs./Acre	Stormflow lbs.	Stormflow %	Baseflow lbs.	Baseflow %
TSS	1st	109,132	11.3%	125,471	57.40	104,528	10.8%	4,604	0.5%
	2nd	119,324	12.4%	137,189	62.76	117,863	12.2%	1,461	0.2%
	3rd	383,210	39.7%	440,584	201.55	381,803	39.5%	1,407	0.1%
	4th	354,233	36.7%	407,268	186.31	352,228	36.5%	2,005	0.2%
	Total	965,898	100.0%	1,110,511	508.01	956,422	99.0%	9,477	1.0%
TP	1st	175	17.6%	201	0.09	128	12.8%	48	4.8%
	2nd	139	13.9%	160	0.07	118	11.8%	21	2.1%
	3rd	338	33.9%	389	0.18	327	32.8%	11	1.1%
	4th	344	34.5%	396	0.18	318	31.9%	26	2.6%
	Total	997	100.0%	1,146	0.52	891	89.4%	105	10.5%
TN	1st	2,065	21.3%	2,374	1.09	1,327	13.7%	738	7.6%
	2nd	1,509	15.6%	1,735	0.79	1,146	11.8%	363	3.7%
	3rd	3,065	31.6%	3,524	1.61	2,874	29.6%	191	2.0%
	4th	3,061	31.6%	3,519	1.61	2,626	27.1%	435	4.5%
	Total	9,700	100.0%	11,152	5.10	7,973	82.2%	1,727	17.8%
NO_2/NO_3	1st	946	26.1%	1,088	0.50	496	13.7%	450	12.4%
	2nd	653	18.0%	751	0.34	396	10.9%	258	7.1%
	3rd	1,002	27.7%	1,152	0.53	855	23.6%	147	4.1%
	4th	1,022	28.2%	1,175	0.54	726	20.0%	296	8.2%
	Total	3,623	100.0%	4,165	1.91	2,472	68.2%	1,150	31.7%
TKN	1st	946	17.0%	1,088	0.50	702	12.6%	243	4.4%
	2nd	765	13.7%	880	0.40	660	11.8%	106	1.9%
	3rd	1,908	34.2%	2,194	1.00	1,855	33.3%	52	0.9%
	4th	1,960	35.1%	2,253	1.03	1,828	32.8%	132	2.4%
	Total	5,578	100.0%	6,413	2.93	5,045	90.4%	533	9.6%

Table 9-5: Pollutant Load Characteristics for Outfall Site (SL-09) for 2023

Parameter	Quarter	Total lbs.	Total %	Standardized by Average Rainfall lbs.	Standardized by Average Rainfall lbs./Acre	Stormflow lbs.	Stormflow %	Baseflow lbs.	Baseflow %
TSS	1st	654	11.7%	751.9	48.70	299	5.3%	355	6.3%
	2nd	782	14.0%	899.1	58.23	432	7.7%	350	6.2%
	3rd	2,016	36.0%	2,317.8	150.12	1,736	31.0%	277	4.9%
	4th	2,150	38.4%	2,471.9	160.10	1,582	28.2%	567	10.1%
	Total	5,601	100.0%	6,439.6	417.07	4,050	72.3%	1,549	27.7%
TP	1st	5	16.1%	5.7	0.37	1	3.3%	4	13.0%
	2nd	5	16.1%	5.7	0.37	2	6.5%	4	13.0%
	3rd	9	29.0%	10.3	0.67	6	19.5%	3	9.8%
	4th	11	35.5%	12.6	0.82	6	19.5%	5	16.3%
	Total	31	100.0%	35.6	2.31	15	48.8%	16	52.1%
TN	1st	73	18.6%	83.9	5.44	17	4.3%	56	14.3%
	2nd	74	18.9%	85.1	5.51	21	5.4%	54	13.8%
	3rd	106	27.0%	121.9	7.89	59	15.1%	46	11.7%
	4th	139	35.5%	159.8	10.35	68	17.3%	71	18.1%
	Total	392	100.0%	450.7	29.19	165	42.1%	226	57.7%
NO_2/NO_3	1st	19	19.8%	21.8	1.41	4	4.2%	16	16.7%
	2nd	19	19.8%	21.8	1.41	4	4.2%	15	15.7%
	3rd	25	26.0%	28.7	1.86	11	11.5%	13	13.6%
	4th	33	34.4%	37.9	2.46	14	14.6%	19	19.9%
	Total	96	100.0%	110.4	7.15	33	34.5%	63	65.9%
TKN	1st	34	16.3%	39.1	2.53	10	4.8%	24	11.5%
	2nd	36	17.3%	41.4	2.68	13	6.2%	23	11.1%
	3rd	62	29.8%	71.3	4.62	42	20.2%	19	9.1%
	4th	77	37.0%	88.5	5.73	45	21.6%	32	15.4%
	Total	208	100.0%	239.1	15.49	111	53.3%	97	46.6%

There are distinct seasonal differences in the delivery of nutrient and total suspended solids pollutant loads at each site. At both sites, the second half of the year was observed to have significantly higher pollutant loading for all measured pollutants.

Figure 9-3 shows the history of annual pollutant loads for Total Nitrogen and Total Phosphorus at the SL-01 gage. Total Suspended Solids is not included in this figure due to a change in modeling for 2023 which renders a year over year comparison invalid. Moving forward, previous years Total Suspended Solids loads will be recalculated using the new model. This data is adjusted for average annual rainfall. In 2023, the total annual rainfall was 39.14 inches, compared to the average annual rainfall of 45 inches.



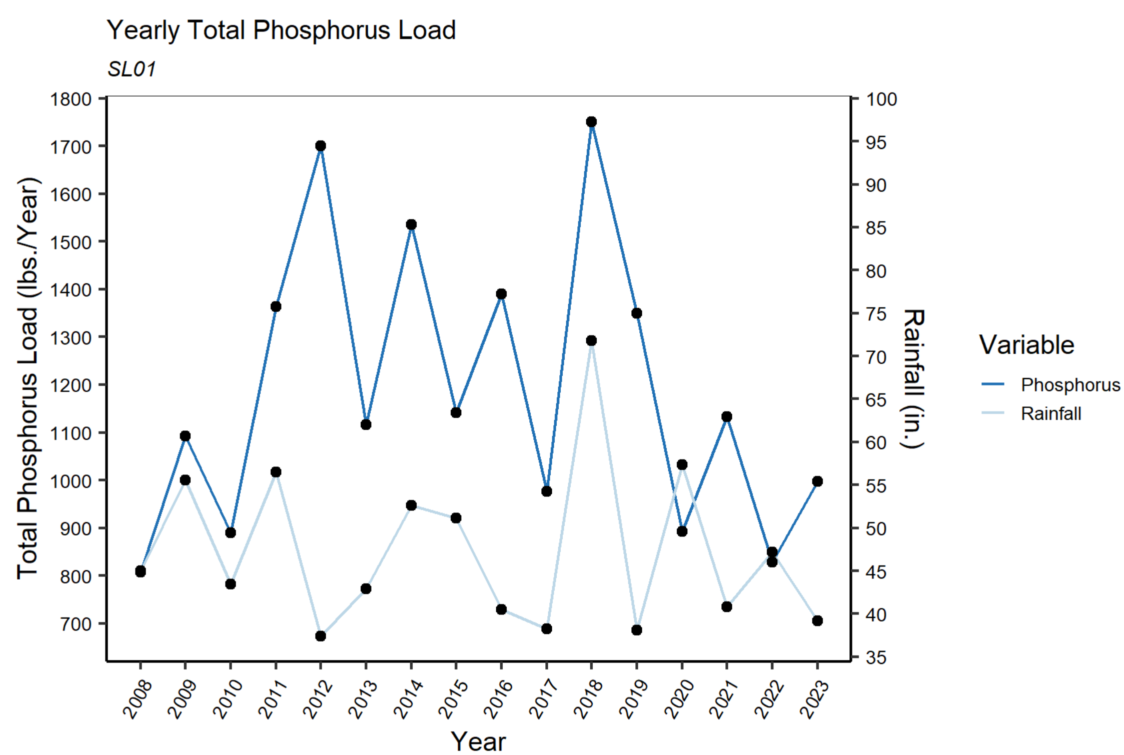


Figure 9-3: Scotts Level Branch pollutant loads at SL-01 gage from 2008-2023 (adjusted for average annual rainfall)

9.2.2.3 Geomorphic Monitoring Results

Streambank Soil Sampling: Nineteen sets of Scotts Level stream bank and bed core samples were collected in 2016 in the vicinity of the permanent cross sections for laboratory analysis of bulk density, particle size distribution, total nitrogen, and total phosphorus and other constituents. The data from each cross section will allow either positive or negative loading estimates to be made for the cross sections. These estimates, if extended to represent their respective stream segments, may provide information helpful in understanding the sediment and chemical flux of the stream system. Based on the annual and long-term change, and the results of the core samples, the estimated annual sediment, total nitrogen, and total phosphorus loads will be calculated for comparison with the chemical monitoring results derived from the in-stream monitoring site.

9.2.2.3.1 Scotts Level Branch Geomorphic Monitoring Results

The morphology of 14 cross sections was examined in winter of 2023/2024 to show changes that occurred over the past year, as well as the changes over the period of 2006 through 2023. Figure 9-4 shows an overlay of CX #6 for 2022 and 2023. Table 9-6 presents the amount of aggradation (deposition/fill) or degradation (erosional/cut) within the active channel, and Table 9-7 (listed from upstream to downstream) summarizes Table 9-6. Data in Table 9-6 was annualized by multiplying the cut/fill value by 365 over the number of days between measurements to standardize the aggradation and degradation estimates. The data files and plots are included on the CD accompanying this report. SL-3, SL-4, SL-10, SL-11, and SL-12 cross sections were not sampled in 2023/2024. The pins for SL-12 were removed during stream restoration construction. The contractor, EA Engineering Science, will take future cross sectional data within the restoration site. SL-4 is lacking property owner permission, so this cross section was not sampled. SL-6 was the only cross-sectional reach of the 16 that showed minor adjustments (annualized net cut/fill < ± 1.0 ft^3) in channel morphology in 2023. All other cross sectional reaches showed greater than ± 1.0 cubic feet of change. SL-5 exhibited the largest net alteration to the stream channel with an annualized net aggradation of 5.83 ft^3.

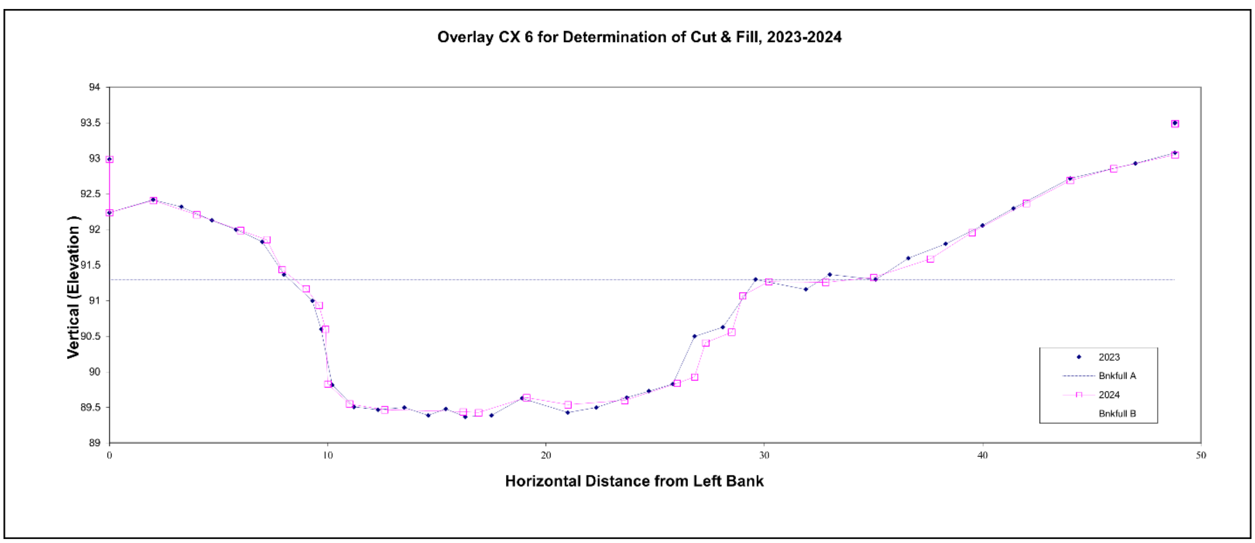


Figure 9-4: Scotts Level Branch Geomorphic Cross Section 6 overlay showing minimal changes in channel morphology between the 2022 and 2023 surveys.

Impervious land cover influences the majority of the Scotts Level Branch hydrology. The sediment transport within the stream channel is likely the result of the stream widening and scouring its disconnected flood plain. Sediment from the upper stations is being transported into the downstream reaches as evidenced by cut and fill values, and likely depositing in the Gwynns Falls mainstem and beyond. This baseline data will be useful in evaluating the stream restoration project at McDonogh Road. The project stabilized the stream channel and reconnected the stream to the floodplain. Significant deposition is likely to occur in restoration reaches during post-restoration years.

Table 9-6: Scotts Level Branch Cross Sections - Annualized Cut and Fill Amounts

SL20: Change (cu ft)	**Period: 2023-2024**	**Period: 2006-2024**		**SL10: Change (cu ft)**	**Period: 2023-2024**	**Period: 2006-2024**
Total Cut	*	*		Total Cut	*	*
Total Fill	*	*		Total Fill	*	*
Total Change	*	*		Total Change	*	*
Net Change	*	*		Net Change	*	*
SL19: Change (cu ft)	**Period: 2023-2024**	**Period: 2006-2024**		**SL9: Change (cu ft)**	**Period: 2023-2024**	**Period: 2006-2024**
Total Cut	-1.46	-0.33		Total Cut	-1.97	-0.44
Total Fill	3.79	1.04		Total Fill	3.63	0.34
Total Change	5.25	1.37		Total Change	5.61	0.78
Net Change	2.33	0.70		Net Change	1.66	-0.09
SL18: Change (cu ft)^	**Period: 2023-2024**	**Period: 2006-2024**		**SL8: Change (cu ft)**	**Period: 2023-2024**	**Period: 2006-2024**
Total Cut	-2.69	-0.43		Total Cut	-4.08	-0.04
Total Fill	1.40	0.56		Total Fill	2.66	0.49
Total Change	4.08	1.00		Total Change	6.74	0.53
Net Change	-1.29	0.13		Net Change	-1.43	0.45
SL17: Change (cu ft)	**Period: 2023-2024**	**Period: 2012-2024**		**SL7: Change (cu ft)**	**Period: 2023-2024**	**Period: 2012-2024**
Total Cut	-4.42	-0.36		Total Cut	-2.46	-0.33
Total Fill	1.07	0.43		Total Fill	1.33	0.59
Total Change	5.50	0.79		Total Change	3.79	0.92
Net Change	-3.35	0.06		Net Change	-1.13	0.25
SL16: Change (cu ft)	**Period: 2023-2024**	**Period: 2006-2024**		**SL6: Change (cu ft)**	**Period: 2023-2024**	**Period: 2006-2024**
Total Cut	-4.60	-0.30		Total Cut	-1.51	-0.26
Total Fill	0.93	0.42		Total Fill	1.58	0.02
Total Change	5.53	0.72		Total Change	3.09	0.29
Net Change	-3.67	0.12		Net Change	0.07	-0.24
SL15: Change (cu ft)	**Period: 2023-2024**	**Period: 2006-2024**		**SL5: Change (cu ft)**	**Period: 2023-2024**	**Period: 2012-2024**
Total Cut	-4.85	-0.19		Total Cut	-0.73	-1.16
Total Fill	1.19	0.04		Total Fill	6.56	0.28
Total Change	6.04	0.24		Total Change	7.29	1.44
Net Change	-3.65	-0.15		Net Change	5.83	-0.88

SL14: Change (cu ft)	Period: 2023-2024	Period: 2006-2024	SL3: Change (cu ft)	Period: 2023-2024	Period: 2006-2024
Total Cut	-1.39	-1.03	Total Cut	*	*
Total Fill	2.67	0.63	Total Fill	*	*
Total Change	4.06	1.66	Total Change	*	*
Net Change	1.27	-0.39	Net Change	*	*
SL13: Change (cu ft)	**Period: 2023-2024**	**Period: 2006-2024**	**SL2: Change (cu ft)**	**Period: 2023-2024**	**Period: 2006-2024**
Total Cut	-5.67	-0.99	Total Cut	-4.46	-0.38
Total Fill	2.41	0.40	Total Fill	8.26	0.59
Total Change	8.07	1.40	Total Change	12.72	0.97
Net Change	-3.26	-0.59	Net Change	3.80	0.21
SL11: Change (cu ft)	**Period: 2023-2024**	**Period: 2006-2024**	**SL1: Change (cu ft)**	**Period: 2023-2024**	**Period: 2006-2024**
Total Cut	*	*	Total Cut	-4.90	-0.63
Total Fill	*	*	Total Fill	6.83	1.23
Total Change	*	*	Total Change	11.72	1.86
Net Change	*	*	Net Change	1.93	0.59

^ SL-18 pin lost in 2013, replaced in 2018. *SL-20 was included in a stream restoration in 2019. CX data will be presented as it is collected and analyzed by the restoration consultant in future reports.

Table 9-7: Scotts Level Branch Stream Channel Changes Over Time

SL #	CX 2023-2024	CX 2006-2024
20	*	*
19	a	a
18	d	a
17	d	a^
16	d	a
15	d	d
14	a	d
13	d	d
11	*	*
10	*	*
9	a	d
8	d	a
7	d	a^
6	a	d
5	a	d^
3	*	*
2	a	a
1	a	a

Symbols: a: aggradation (deposition), d: degradation (erosion)
^ SL-17, SL-7, and SL-5 historically compared from 2012-2022 due to resetting of pin
*SL-20, SL-11, SL-10, and SL-3 not sampled in 2024.

9.2.2.4 Biological Monitoring Results

Benthic macroinvertebrate and fish sampling were conducted following MBSS protocols within the index periods of March 1st and April 30th (macroinvertebrates) and June 1st and September 30th (fish) in 2023. Scotts Level Branch was sampled for benthic macroinvertebrates at SL-1, SL-6, SL-9, SL-11, SL-11a, SL-12, SL-12a, SL-13, SL-14, and SL-18. Fish were sampled in Scotts Level Branch at SL-1, SL-9, and SL-18. Benthic Index of Biotic Integrity (BIBI), Fish Index of Biotic Integrity (FIBI), and Physical Habitat Index (PHI) scores were calculated using criteria from Southerland et al (2005).

The following sites sampled for benthic macroinvertebrates will be discussed in the McDonogh Road restoration section: SL-11, SL-11a, SL-12, SL-12a, and SL-13. The remaining IBI and PHI score are shown in Figure 9-5 and Figure 9-6. Compared to last year, BIBI, FIBI and PHI scores fluctuated only slightly, remaining mostly in the same categories as the prior year.

The benthic and fish communities of Scotts Level Branch reflect the effects of environmental stressors. Both communities are low in diversity and primarily composed of pollution tolerant organisms and habitat generalists. The instream and epifaunal habitats are degraded and provide poor cover for both fish and macroinvertebrates. As reported in previous Baltimore County NPDES reports, BIBI scores have ranked "Poor" or "Very Poor" annually since the study began in 2005. FIBI scores for SL-1 and SL-9 both ranked in the "Fair" category this year. The biological community in Scotts Level Branch does not seem to respond to annual variation in precipitation and water temperature consistent with healthy streams.

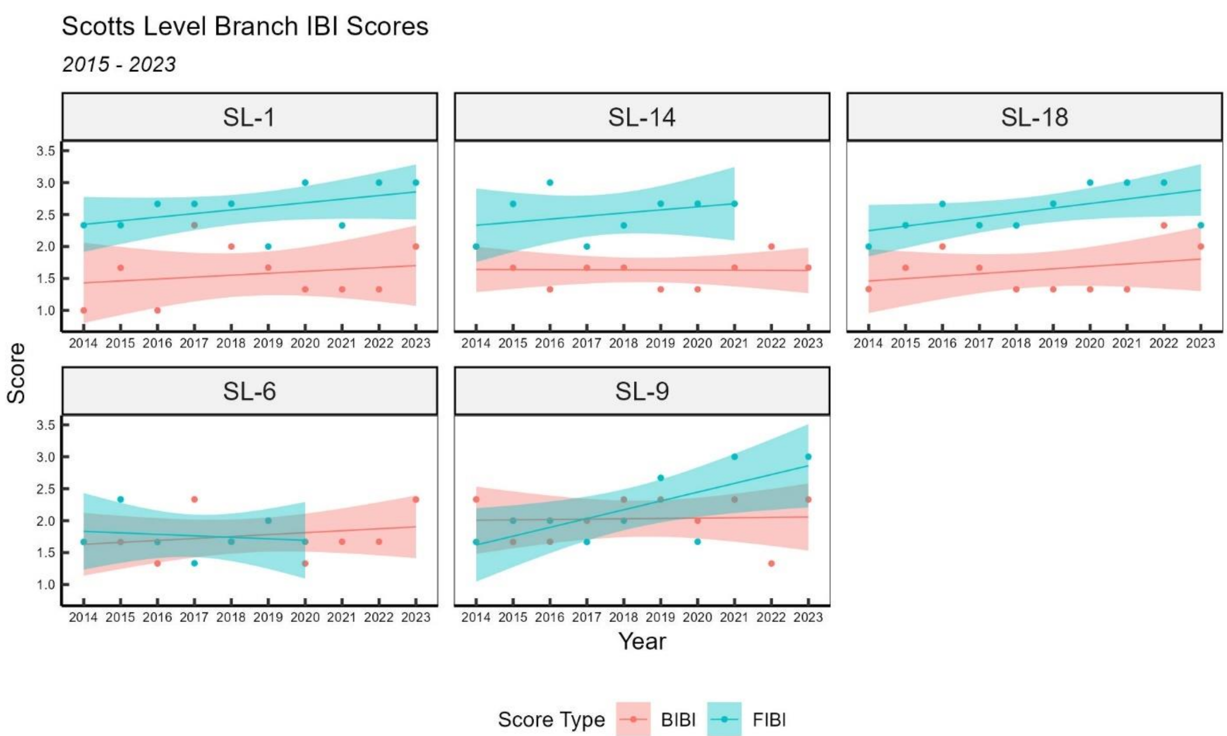


Figure 9-5: Scotts Level Branch BIBI and FIBI Scores, 2014 - 2023. IBI Scores of 1-1.99=Very Poor, 2-2.99=Poor, 3-3.99=Fair, and 4-5.00=Good.

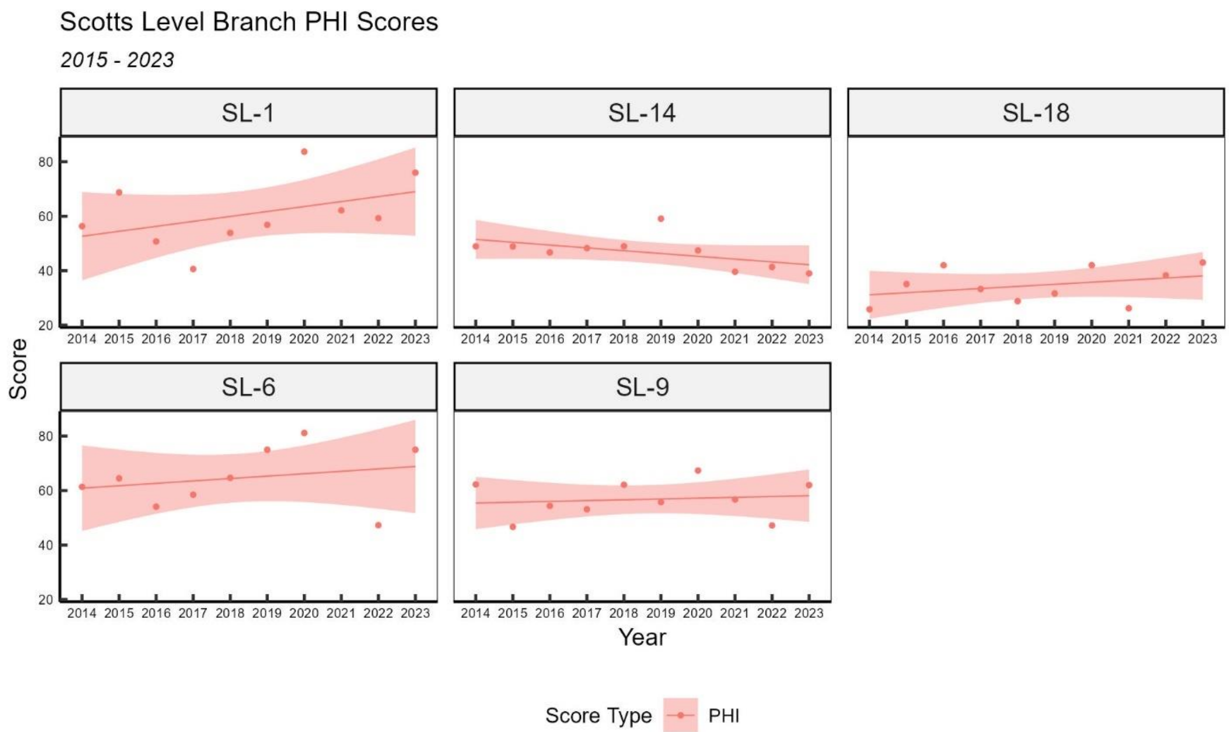


Figure 9-6: Scotts Levels Branch PHI scores from 2014 - 2023.

9.2.2.5 Scotts Level Branch Pollutant Load Calculations

Integrating geomorphology, stream bank soil chemistry, and water chemistry data, allows examination of pollutant loads for various components of the Scotts Level Branch watershed. The three components of the field model are in-stream water quality loads measured at SL-01, stream bank soil loads measured at the geomorphology cross-sections, and watershed wash-off loads measured at outfall SL-09. The model expectation is that in-stream water quality estimates are equal to the sum of stream bank and watershed wash-off estimates.

9.2.2.5.1 Stream Erosion Loads

The calculations for the stream erosion loads are based on the stream channel changes measured by the annual cross-sections and the mean concentration of TKN, NO_3, and TP determined by stream bank and bed chemical analysis from 2016. The net change at a particular cross-section was applied to a stream length based on the midpoints between cross-sections to determine the cubic feet of change for the stream reach. The load for each reach was then calculated based on the average bulk density of stream bank and bed samples, the chemical concentrations of nitrogen species, and total phosphorus. The numbers used in this analysis were:

- Mean Bulk Density = 86.86 lbs/ft^3
- Mean TKN Concentration = 0.0005495 lbs/lb sediment
- Mean NO_3 Concentration = 0.0000026 lbs/lb sediment
- Mean TP Concentration = 0.0001454 lbs/lb sediment

The following formulas were applied to determine the stream channel erosion loads for sediment, TKN, TP, NO_3, and TN:

Sediment Load = Net Change Cross-section (ft^2) x reach length (ft) x Bulk Density (lbs/ft^3) Equation 9-2

Total TKN Load = Sediment Load (lbs) x Mean TKN Concentration Equation 9-3

Total NO_3 Load = Sediment Load (lbs) x Mean NO_3 Concentration Equation 9-4

Total TP Load = Sediment Load (lbs) x Mean TP Concentration Equation 9-5

Total TN Load = Total TKN Load + Total NO_3 Load Equation 9-6

Table 9-8 shows load calculations derived from the geomorphology measurements for the calendar year 2023.

Table 9-8: 2023 Pollutant Load Estimates and Calculations for Stream Bank Soil Sediment and Nutrients

Site	Stream Length (ft)	Distance Between Sites	Adjusted Stream Length[1]	Net Cut/Fill at Site (cu ft)[2]	Cut/Fill Adjusted for Stream Length (cu ft)[3]	Sediment Weight (lbs)[4]	TKN (lbs)[5]	TP (lbs)[6]	NO_3 (lbs)[7]	TN (lbs)[8]
20	885	* [9]	1,643	0	0	0	0	0	0	0
19	2,402	1,517	1,351	2.33	3,147.83	273,420.51	150.24	39.76	0.71	150.96
18	3,587	1,185	3,434	-1.29	-4,429.92	-384,783.24	-211.44	-55.95	-1.00	-212.44
17	2,782	* [10]	3,662	-3.35	-12,267.70	-1,065,572.42	-585.53	-154.93	-2.77	-588.30
16	12,932	5,683	3,918	-3.67	-14,379.43	-1,248,997.03	-686.32	-181.60	-3.25	-689.57
15	15,085	2,153	2,269	-3.65	-8,281.85	-719,361.49	-395.29	-104.60	-1.87	-397.16
14	17,470	2,385	1,738	1.27	2,206.63	191,667.45	105.32	27.87	0.50	105.82
13	18,560	1,090	3,070	-3.26	-10,006.57	-869,170.67	-477.61	-126.38	-2.26	-479.87
12	1,575	* [10]	1,601	0	0.00	0.00	0.00	0.00	0.00	0.00
11	25,210	5,049	3,764	0	0.00	0.00	0.00	0.00	0.00	0.00
10	27,688	2,478	2,400	0	0.00	0.00	0.00	0.00	0.00	0.00
9	30,010	2,322	2,562	1.66	4,252.92	369,408.63	202.99	53.71	0.96	203.95
8	32,812	2,802	6,845	-1.43	-9,787.64	-850,153.98	-467.16	-123.61	-2.21	-469.37
7	43,699	10,887	6,922	-1.13	-7,821.30	-679,357.68	-373.31	-98.78	-1.77	-375.07
6	46,655	2,956	2,612	0.07	182.84	15,881.48	8.73	2.31	0.04	8.77
5	48,923	2,268	1,318	5.83	7,683.94	667,427.03	366.75	97.04	1.74	368.49
Total Load (lbs)	--	--	--	--	--	-4,299,591.41		-625.16		-2373.80
Total Load, Normalized for Rainfall (lbs)	--	--	--	--	--	-4,943,321.76		-718.76		-2,729.21

1 Stream length upstream of cross-section plus one-half the distance between cross-sections
2 As calculated from geomorphic cross-section measurements
3 Geomorphic cut/fill multiplied by adjusted stream length
4 Cut/fill adjusted for stream length multiplied by 86.86 lb/cu ft (mean bulk density of Scotts Level soils)
5 Weight of sediment in lbs multiplied by 0.0005495 (mean soil TKN in lb/lb sediment)
6 Weight of sediment in lbs multiplied by 0.0001454 (mean soil TP in lb/lb sediment)
7 Weight of sediment in lbs multiplied by 0.0000026 (mean soil NO_3 in lb/lb sediment)
8 TKN (lbs) plus NO_3 (lbs)
9 Upstream limit of study. "Distance between sites" does not apply.
10 Tributary. "Distance between sites" does not apply.

9.2.2.5.2 Watershed Load

The land surface pollutant load was calculated using water chemistry data and discharge measurements from the outfall (SL-09). A flow-rating curve developed by the United States Geological Survey aided in calculating watershed wash-off loads at the SL-09 outfall. The calculated per acre loading rates from the outfall SL-09 were used to calculate the watershed load. The load was determined by placing the watershed acreage (watershed determined by drainage area to SL-01) into four categories:

- Acreage of urban land draining untreated to outfalls,
- Acreage of urban land draining to stormwater management facilities and receiving some treatment,
- Acreage of urban land that did not flow to a storm drain system (considered sheet flow to buffer), and
- Acreage in forest cover based on MDP 2007 land use and CBP Watershed Model 6 loading from forest.

Using the pollutant loading information provided in Table 9-9 on the standardized per acre loading rates (standardization based on average annual rainfall), the watershed per acre loads for Total Nitrogen, Total Phosphorus, and Total Suspended Solids were calculated. The respective loading rates were:

- 29.19 lbs/acre Total Nitrogen
- 2.31 lbs/acre Total Phosphorus
- 417.1 lbs/acre Total Suspended Solids

The acreages, nutrient loads, and sediment load by landscape category are shown in Table 9-9.

Table 9-9: Calculated Watershed Loads Delivered Based on SL-09 Monitoring Data

Landscape Category	Acres	TN Load	TP Load	Sediment Load
Untreated Outfalls	1,510.9	44,103	3,490	630,151
Stormwater Management	249.4	1,791	287	18,518
Sheet Flow to Buffer	127.1	184	19	820
Forest Cover	298.3	829	12	24,511
Total	**2,185.7**	**46,907**	**3,808**	**674,000**

The bulk of the nutrient and sediment loads from the watershed are delivered untreated directly to the stream through storm drain outfalls, and a smaller portion of the drainage receives some treatment from stormwater management facilities.

The calculated watershed loads (Table 9-9) were combined with estimated stream erosion loads (Table 9-8) to provide an estimate of the total load delivered to the in-stream monitoring site SL-01. The estimated total load was compared to the calculated (based on discharge and pollutant concentration) load from the monitoring data at SL-01. The differences between the two loads were then calculated on both a pound and percentage basis. All loads are standardized to an average precipitation year. The results are displayed in Table 9-10.

Table 9-10: 2023 Watershed Pollutant Load Estimates Compared to Water Quality Monitoring at SL-01

Component			
Geomorphology Pollutant Load (lbs/yr)	2,729	719	4,943,322
Land Surface Pollutant Load (lbs/yr)	46,907	3,808	674,000
Total Estimated Watershed Load to SL-01	**49,636**	**4,527**	**5,617,322**
In-stream Water Quality Pollutant Load (lbs/yr) SL-01 – Measured	11,152	1,146	1,110,511
Difference Between Estimated Load and Measured	38,484	3,381	4,506,811
Percent Underestimate by In-stream Monitoring	**78%**	**75%**	**80%**

The in-stream monitoring site SL-01 measured pollutant loads were 75% - 80% less than the calculated loads based on the geomorphological and the outfall monitoring, site SL-09.

Several explanations may account for why the in-stream monitoring, and stream erosion estimates and land surface (based on outfall SL-09 monitoring) pollutant loads are out of balance. Suggestions for future avenues of investigation are provided in order of priority to the program:

- The County funded a sediment loading study on Scotts Level Branch, which was started in 2015. USGS has been monitoring continuous turbidity levels with concurrent grab samples to develop a rating curve that will give us a better estimate of the sediment load. This data will be included in the next report.
- The ISCO sampler at the in-stream site may not be collecting the entire sediment load. Therefore, the bank- and bedloads may be undersampled. We will do a comparison study between the ISCO sampler and manual grab samples to determine the validity of this statement. The estimates may not be accurate due to inadequate data. The estimates should become more refined as more data are collected annually. This is a long term monitoring project for pollutant load estimates and with additional water chemistry data we should get closer to a better estimate of the in-stream pollutant load.
- The outfall is not representative of each outfall in the watershed. This outfall has groundwater input whereas many of the other outfalls are dry. There are 18 major outfalls and 80 minor outfalls upstream from SL-01. More information is needed to determine the contribution of load coming from the untreated outfalls. Additional outfalls have been selected for comparative sampling to determine if the data is adequate.
- Data from 2021 for the outfall is incomplete due to equipment failure. This may have created bias in the untreated outfall pollutant load estimates.
- Geomorphology estimates are based on once-annual cross-sectional measurements. Although the loads are annualized, they are point-in-time estimates and may not accurately characterize the amount of material being moved through the channel in each study reach over the entire year. In future, more frequent cross-sectional measurements should be made to determine what, if any, effect this has on sediment and nutrient loads originating from the Scotts Level Branch stream banks.
- Randomly selected cross-sections may not accurately reflect nutrient and sediment fluxes within the Scotts Level Branch watershed. Targeted riffle cross-sections should be considered, in areas where stream bank and floodplain indicators suggest frequent shaping of the active channel by storm events.
- The field-collected data may underestimate the in-stream pollutant loads, or the land surface pollutant loads may be overestimated. There may be a component of the in-stream load that our current monitoring is missing. For example, we may not be getting enough peak flow water quality data or we may be missing bed load, or large organic matter. The land surface loads may be overestimated because the SL-09 outfall is not representative of all outfalls in the watershed, as explained above.
- Scotts Level Branch benthic and fish communities are impaired, as shown in past EPS NPDES reports. Nutrient uptake by stream organisms is probably less than in a healthy, functional stream. However, it is likely that some ecosystem function such as, denitrification, floodplain deposition and in-stream biological uptake is maintained and may account for some of the difference between the in-stream measured loads and the estimated loads.

9.2.2.5.3 Comparison of Scotts Level Pollutant Loads with the Chesapeake Bay Watershed Model Computed Loads

To aid in understanding the field-collected data, pollutant loads were calculated using a Chesapeake Bay model which incorporates loading rates for urban pervious, urban impervious, crop, pasture, and forested land use. The model also considers load reductions due to stormwater management measures. Table 9-11 shows the loading rates and acreages for each land use and the results of the computations for nitrogen, phosphorus, and sediment. These results are compared to the estimated watershed load for Scotts Level Branch. As can be seen from Table 9-11, the Phase 6 CBP Watershed Model underestimates the nitrogen, sediment and phosphorus loads in comparison to the data collected in Scotts Level Branch (Table 9-10). It should be noted that the in-stream measurements at SL-01 are closer to the CBP Watershed Model numbers than the estimated loads calculated for Scotts Level Branch.

Table 9-11: Land Use and CBP Watershed Model 6 Loading Rates for SL-01 Drainage Area and Calculated Loads

Land Use	Acres	Loading Rate N (lbs/ac/yr)	N Load (lbs/yr)	Loading Rate P (lbs/ac/yr)	P Load (lbs/yr)	Loading Rate TSS (lbs/ac/yr)	Sed Load (lbs/yr)
Urban Pervious	1,360.5	10.74	14,612	1.28	1,741	1,361.38	1,852,157
Urban Impervious	526.0	17.91	9,421	1.38	726	5,079.73	2,671,938
Crop	0.56	41.98	24	1.07	0.6	4,046.71	2,266
Pasture	0.37	16.62	6	1.51	1	3,886.15	1,438
Forest	298.3	1.63	486	0.07	20.88	215.25	64,209
CBP Total Load	**2,185.7**		**24,548**		**2,489**		**4,592,009**
In-stream SL-01 Measured Load			**11,152**		**1,146**		**1,110,511**
Scotts Level Estimated Load			**49,636**		**4,527**		**5,617,322**

9.2.2.5.4 *Summary*

This analysis has begun to show patterns of nutrient and sediment loading to Scotts Level Branch. Continued water quality and stream bank soil sampling, along with estimates of loads from the outfall, should provide more refined estimates of the relative contribution of each of these components to the pollutant loads within the watershed, as well as estimates of export from the watershed. These data will allow EPS to more accurately determine the contribution of the various flow components to overall pollutant load estimates, and will form the basis for more accurate determination of benefits from future stream restoration.

9.2.3 McDonogh Road Stream Restoration

Stream restoration and riparian enhancement began in December 2013 in Scotts Level Branch, upstream of McDonogh Road. To investigate potential gains in water quality resulting from the restoration, EPS will complete pre- and post-restoration monitoring. Pre-restoration monitoring data has been collected since 2005 and post-restoration monitoring data began in the fall of 2014 when construction was complete. This includes flow monitoring, chemical monitoring, geomorphological monitoring, and biological monitoring as described below. For each monitoring component, there are stations upstream, within, and downstream of the restoration reach.

Figure 9-7: Scotts Level Branch McDonogh Road Restoration Water Chemistry Monitoring Locations

Figure 9-7 shows the location of the three water chemistry monitoring sites for the McDonogh Road restoration project. All three sites are outside the restoration project, with SL-05 being the Allenswood tributary site above the restoration along with SL-12 (Meadow Heights) and SL-13 (McDonogh) being the main stem site below restoration.

Geomorphology is monitored at sites both outside of and within the project reach, as described below. As some cross-sections were removed during construction, post-restoration monuments were replaced within the restoration near the old pre-restoration monuments.

Benthic macroinvertebrates and fish are monitored at five stations in and around the McDonough Rd restoration. Changes in biological stream condition, fish species composition, and biomass will be determined using Maryland Biological Stream Survey (MBSS) protocol.

9.2.3.1 <u>McDonogh Road Geomorphic Monitoring Results</u>

Pre-Restoration monitoring consisted of three existing cross-sections (SL-11, SL-12, and SL-13) in Scotts Level Branch near McDonogh Road and one added cross-section (CS 5). Note: chemical and geomorphology monitoring sites with the same numbers may be at different locations. Longitudinal profiles (20 bankfull widths long) and pebble counts were also completed in each of these four reaches. CS-5 and SL-12 were within the restoration, SL-11 is downstream of the restoration, and SL-13 is upstream of the restoration.

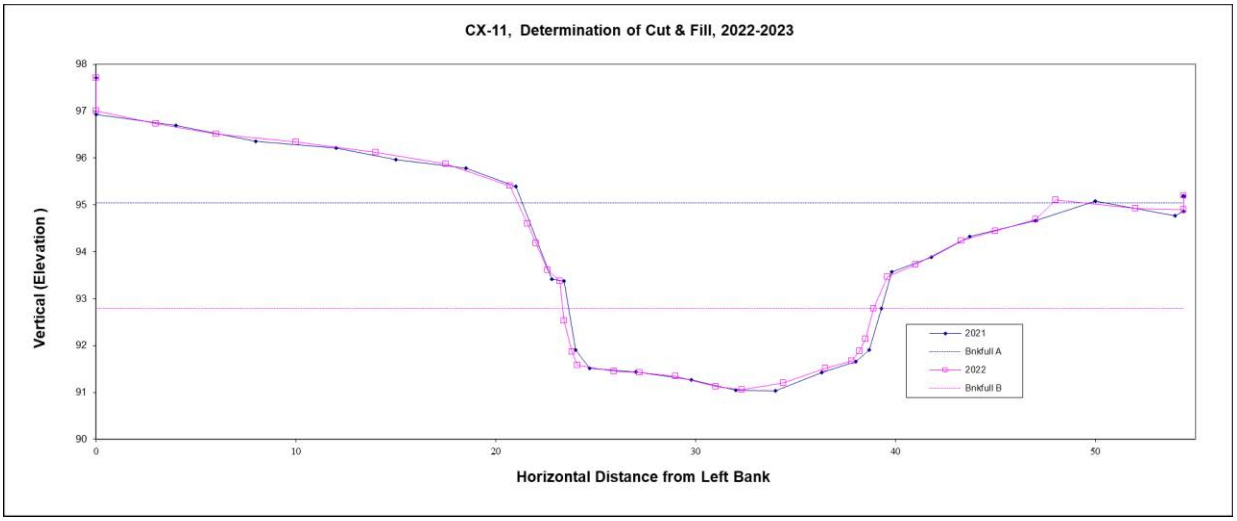


Figure 9-8: McDonogh Road 2022 and 2023 cross-section overlays.

As shown in Figure 9-8, cross sectional data was collected to add to post-restoration data in the winters of 2022/2023 at the remaining sites. The data collected each year represents the previous year's addition or subtraction of sediment from the cross section, i.e. 2023 data represents 2022. The 2022-2023 cross-section overlays continue to show that each reach is typical of urbanized streams: incised and widened channels, and perched floodplains. SL-13 morphology changed only slightly over the past year, with no net change in cross-sectional area. SL-11 experienced moderate deposition over both the channel and adjacent floodplain, changing by 1.3 cubic feet over the past year. For multiple previous years, this finding showed a trend of greater change *below* vs. above the restoration, as it had been in years prior.

Table 9-12: Mean cut/fill values for McDonogh Road restoration geomorphological monitoring stations pre and post restoration construction (note: significant difference calculated with fewer than recommended number of values).

Station	Status	Mean Geomorphological Results				Number of Years Observed	Net Change Sign. Diff. <0.05
		Total Cut	Total Fill	Total Change	Net Change		
SL-11 (downstream)	Pre	-2.25	1.43	3.68	-0.83	3	NO
	Post	-3.63	4.25	4.67	3.84	8	
SL-12 (in restoration)	Pre	-2.85	5.58	8.43	2.72	2	Not applicable- removed during restoration
	Post	N/A	N/A	N/A	N/A	0	
SL-13 (upstream)	Pre	-3.98	2.70	6.68	-1.28	3	NO
	Post	-3.47	3.59	5.43	1.75	8	

Consultant EA Engineering is responsible for monitoring geomorphic sites within the restoration after construction. Figure 9-9 is a map of the consultant's restoration monitoring sites, and Table 9-13 shows annualized cut and fill totals so far. The expectation that sediment should move post-construction and fill in areas further downstream is once again illustrated by the total change numbers for this segment, with XS-4 showing the highest fill volume. Baltimore County will continue to monitor sites that are upstream and downstream of the restoration and provide further analysis of consultant data as it is received.

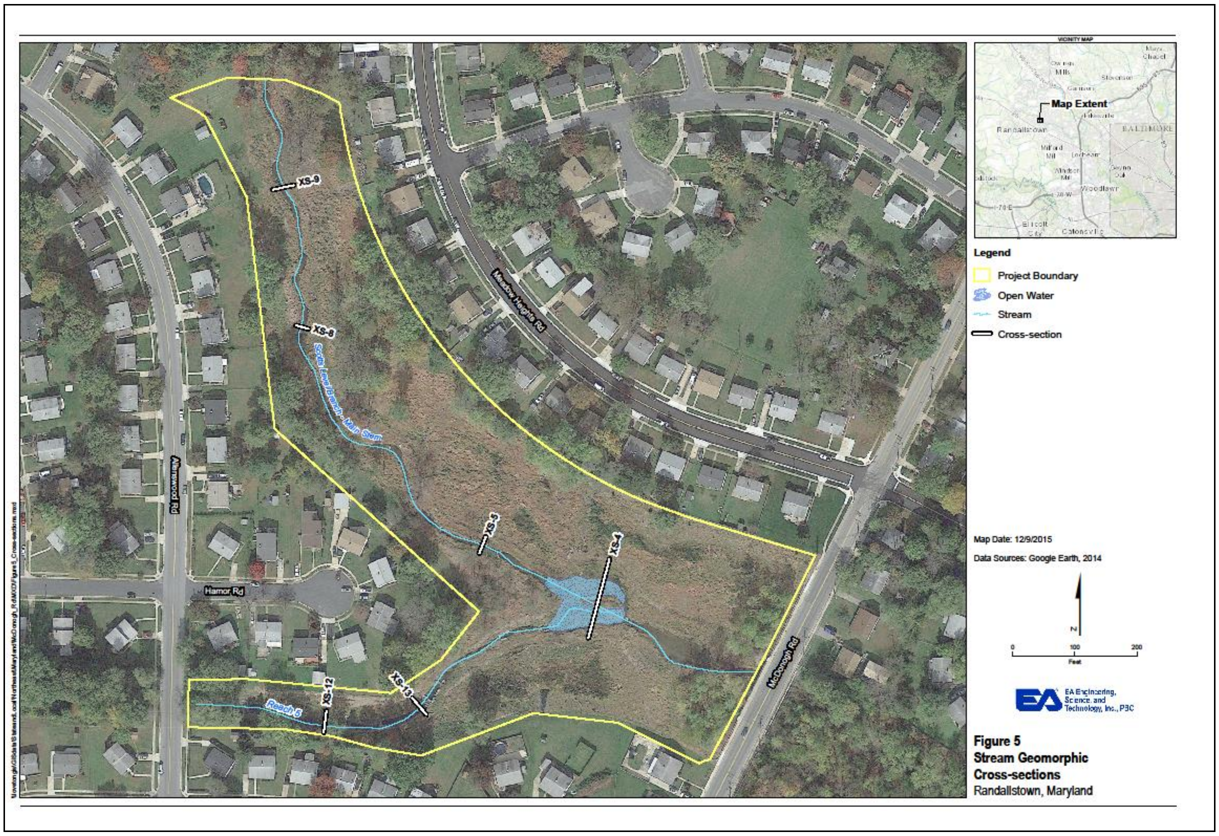


Figure 9-9: McDonogh Rd In-Restoration Monitoring Locations

Table 9-13: McDonogh Rd Restoration – Consultant Annualized Cut and Fill Amounts

XS-4: Change (cu ft)	Period: 2015-2019	XS-9: Change (cu ft)	Period: 2015-2019
Total Cut	-3.1	Total Cut	0.0
Total Fill	8.8	Total Fill	3.3
Total Change	11.9	Total Change	3.3
Net Change	5.6	Net Change	3.3
XS-5: Change (cu ft)	**Period: 2015-2019**	**XS-12: Change (cu ft)**	**Period: 2015-2019**
Total Cut	-0.7	Total Cut	-0.4
Total Fill	0.6	Total Fill	0.5
Total Change	1.3	Total Change	0.9
Net Change	-0.1	Net Change	0.2
XS-8: Change (cu ft)	**Period: 2015-2019**	**XS-13: Change (cu ft)**	**Period: 2015-2019**
Total Cut	-1.4	Total Cut	-1.3
Total Fill	0.6	Total Fill	1.5
Total Change	2.0	Total Change	2.8
Net Change	-0.7	Net Change	0.3

9.2.3.2 McDonogh Road Biological Monitoring Results

Five stations were established in 2011 to monitor pre-restoration biological condition: SL-11 (downstream of restoration), SL-11a (on main stem within restoration), SL-12 (tributary upstream of confluence to main stem, within restoration), SL-12a (tributary, upstream of restoration and SL-12), and SL-13 (Scotts Level Branch, upstream of restoration). Scotts Level Branch was sampled for benthos at SL-11a, SL-12, SL-12a, and SL-13 in 2023. SL-11 was not sampled due to current restoration efforts. Variations in MBSS field sampling and laboratory processing have each been shown to affect BIBI scores up to 1.00 point. As this variation is considered acceptable for both field and lab MBSS certifications, statistically significant findings may be the result of BIBI score variation and not the effects of stream restoration.

Figure 9-10 shows BIBI and FIBI values for pre-restoration (2011-2013) and post restoration (2014-2023). Figure 9-11 shows PHI scores for the same time periods. All stations had biological communities that are characteristic of urban streams. BIBI scores continued to rank in the Poor category at all sites (Table 9-14). No significant change in FIBI scores have been observed at any of the five stations monitored since 2011. As restoration construction in the watershed is ongoing, it is possible that continued monitoring may result in significant trends in data at these sites. Variations in MBSS field sampling and laboratory processing have each been shown to affect BIBI scores up to 1.00 point. As this variation is considered acceptable for both field and lab MBSS certifications, statistically significant findings may be the result of BIBI score variation and not the effects of stream restoration.

Figure 9-10: BIBI and FIBI values for McDonogh Road restoration biological monitoring station. Note: Fish sampling was not conducted for 2023 and Benthic sampling was not conducted at SL-11.

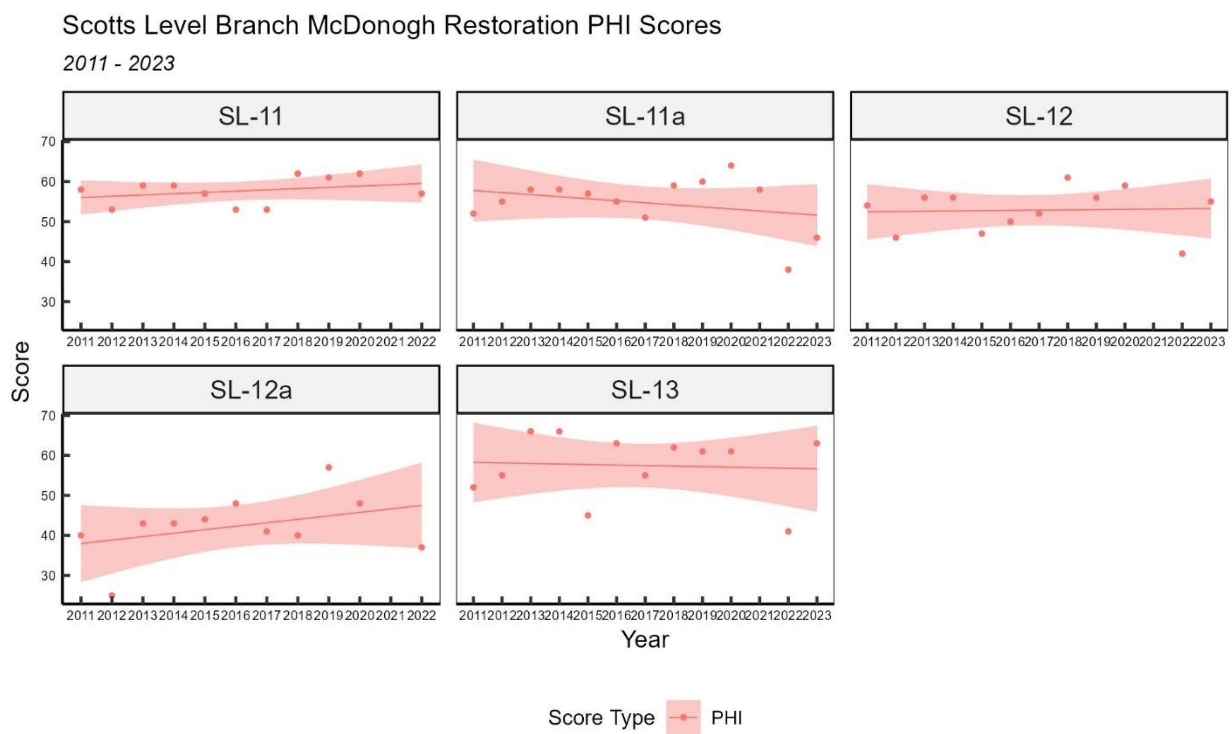


Figure 9-11: PHI values for McDonogh Road restoration biological monitoring stations

Table 9-14: Mean BIBI, FIBI and PHI values for McDonogh Road restoration biological monitoring stations. Statistically significant changes to BIBI scores are highlighted (T-test, $p<0.05$, note: BIBI significant difference calculated with <10 observations pre-restoration)

Station	Status	Means BIBI	Means FIBI	Means PHI	Years Observed	BIBI T-Test
SL-11	Post	1.81	2.33	58.00	9	0.004
SL-11	Pre	1.11	1.78	56.67	3	0.004
SL-11a	Post	1.80	2.46	54.60	10	0.004
SL-11a	Pre	1.11	1.78	55.00	3	0.004
SL-12	Post	1.93	2.09	53.11	10	0.002
SL-12	Pre	1.11	1.67	52.00	3	0.002
SL-12a	Post	1.70	1.44	44.75	9	0.490
SL-12a	Pre	1.44	1.22	36.00	3	0.490
SL-13	Post	1.93	1.86	57.44	10	0.330
SL-13	Pre	1.56	1.56	57.67	3	0.330

9.3 Windlass Run Monitoring Final Report – Stormwater Management Assessment

Monitoring in the Windlass Run watershed occurred between 2002 and 2018, and included stream geomorphology and biology. The Baltimore County NPDES Municipal Stormwater Discharge Permit only required the stream stability geomorphic monitoring. A summary of findings was presented in the 2018 report.

9.4 Countywide Monitoring

9.4.1 Chemical Monitoring Program

9.4.1.1 <u>Introduction</u>

Baltimore County EPS manages a trend chemical monitoring program in order to assess long term trends in the water chemistry of the county's streams. This program focusses on trends in both chemical concentrations and chemical loads. The information will be used to better target restoration activities, to provide data for the calibration of pollutant load models, and to provide local data to assess the results of the Chesapeake Bay Program modeling efforts and TMDL modeling. The data will be used to assess water quality improvements that are the result of restoration efforts. It will also be used to determine progress in meeting the pollutant load reductions required by the Chesapeake Bay restoration efforts and as determined by the development of local watershed Total Maximum Daily Loads (TMDLs). These programs will partially fulfill the restoration effectiveness monitoring required under NPDES Permit section F.1 and H above.

9.4.1.2 <u>Monitoring Protocol</u>

9.4.1.2.1 Site Selection

The Trend Monitoring Program was initiated in January 2011 with forty-one sites selected throughout Baltimore County (Figure 9-12). Where possible, chosen sites correspond to the location of USGS gaged stations to provide continuous discharge records of 5- or 15-minute intervals. In watersheds where USGS gaged stations were unavailable, chosen sites are measured manually for discharge.

9.4.1.2.2 Field Procedures

Trend sites are broken into 4 groups that determine when they are sampled. Each trend group is sampled on the Tuesday or Thursday of the same week of each month, regardless of weather conditions (fixed site/fixed interval design). This sampling results in 12 samples per site per year.

1 liter of stream water is collected in laboratory cleaned sample bottles for later lab analysis. Temperature, pH, Dissolved Oxygen, Specific Conductivity, and Turbidity are measured in-situ at the time of sampling, and at streams with no USGS gaging station the instantaneous discharge of the stream is measured manually with a SonTek Flowtracker.

9.4.1.2.3 Sample Analysis

Water samples are taken to the Baltimore County DPW Water Chemistry Laboratory for analysis. The samples are analyzed for TSS, TKN, Nitrate/Nitrite, Total Phosphorus, Ortho-phosphorus, Cadmium, Copper, Lead, Zinc, Chlorides, Sodium, Hardness, Magnesium and Calcium.

9.4.1.2.4 Data Analysis

Continuous discharge measurements from USGS gages are used in conjunction with pollutant concentrations determined by lab analysis to calculated pollutant loads for each site. For sites with no USGS gage, manually recorded discharge measurements are correlated with discharge measurements at gaged sites to determine the gage with the highest correlation coefficient for each site. Using the continuous discharge measurements of the most highly correlated USGS gage for each site, a discharge record is modeled via linear regression. Linear regression analysis is used to model the relationship between pollutant concentration and stream discharge, and the create a pollutant concentration record from the continuous discharge record. Laboratory analyses that indicate a sample was below. The modeled pollutant concentrations are used to calculate pollutant load using Equation 9-7:

$P_L = (P_C*.000008345) * (CFS*448.8*I)$, where Equation 9-7

P_L = Pollutant Load,
P_C = Pollutant Concentration,
.000008345 = Conversion factor to convert mg/L to pounds per gallon,
CFS = Cubic feet per second,
448.8 = Conversion factor to convert cubic feet per second to gallons per minute
I = number of minutes in the interval (typically 5 or 15).

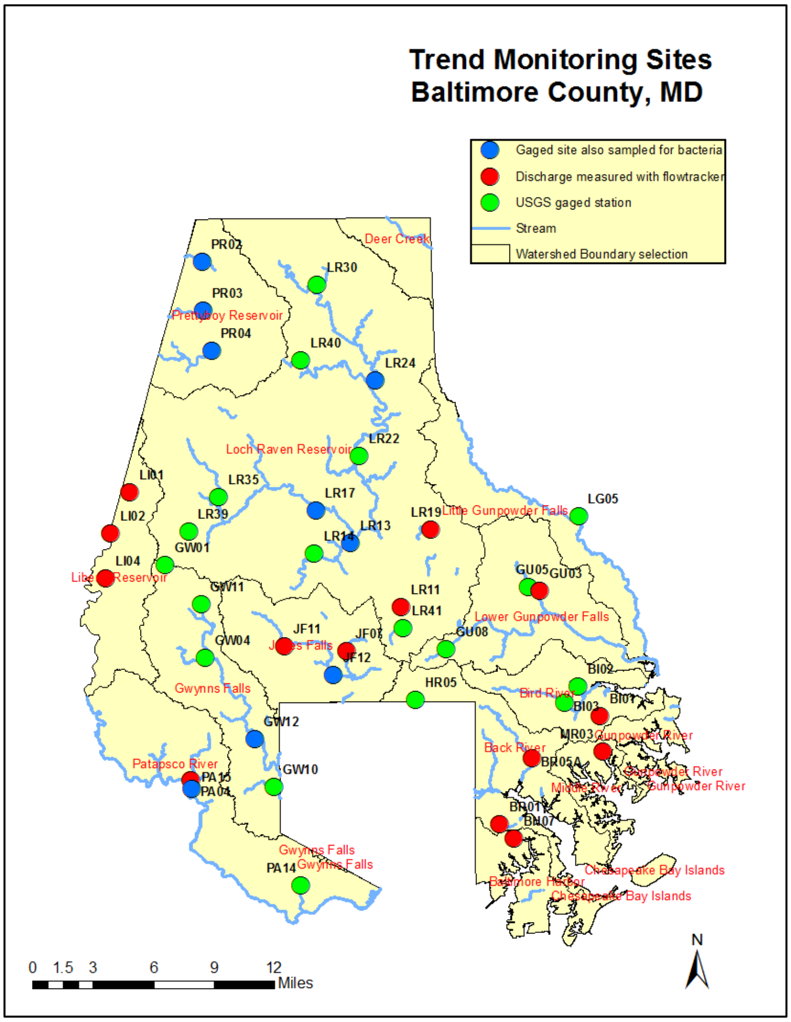


Figure 9-12: Trend Monitoring Sites

9.4.1.3 Chemical Trend Monitoring Program Results

9.4.1.3.1 Pollutant Load Modelling

Table 9-15 presents the total 2023 pollutant loads calculated for each site, adjusted to pounds per acre of drainage area. The highest suspended solids and total phosphorus loading rates were observed in the Gwynns Falls, Bird River, and Back River watersheds. LI02 (Liberty Reservoir watershed) had the highest loading rate for Total Phosphorus, while LR19 (Loch Raven Reservoir watershed) had the highest Nitrate + Nitrite and Total Nitrogen loading rates. For chloride and sodium, GW10 (Gwynns Falls watershed) had the highest loading rate.

Figure 9-13 and Figure 9-14 show total nitrogen and total phosphorus mean concentrations for the sub-watershed upstream of each trend site. As can be seen from Figure 9-13, the highest concentrations of total nitrogen are found outside the URDL. In the rural areas these increased total nitrogen concentrations may be the result of agricultural activities, septic system inputs, or a combination of both. In the urban areas the high concentrations are most likely from fertilizer, pet waste and point sources entering the streams through outfalls. The majority of Total Phosphorus is delivered during storm events, associated with sediment.

A more general analysis of watershed level loading rate trends over time is also useful. A baseline site—LR14—for nutrient trends in Baltimore County was chosen based on forest canopy cover. LR14 is located on Baisman Run at the USGS gage, and its drainage area is approximately 76% forested. This baseline site is used as a comparison to the annual loading rates of individual sites in watersheds where only one chemical site exists, and to the average loading rates of a watershed where multiple sites exist. Loading rates for 2011 and 2012 were not included due to the variability of loading rate data during those years, and all loading rates are standardized based on rain amounts, using the method described in Section 9.2.2. This is shown in Figure 9-15 through Figure 9-17.

Table 9-15: Pollutant Load Analysis in Pounds per Acre of Drainage Area, 2023

Site	Drainage Area (ac)	Total Suspended Solids	Total Phosphorus	Total Nitrogen	Nitrite/Nitrate	Chloride	Sodium
Prettyboy Reservoir							
PR02	17,528.14	24.62	0.29	7.91	7.16	47.13	18.88
PR03	4,971.14	19.29	0.35	8.20	7.59	53.25	21.83
PR04	9,995.36	56.39	0.27	11.75	10.49	91.19	34.66
Liberty Reservoir							
LI01	1,488.66	13.73	0.48	12.56	11.57	85.69	26.13
LI02	2,058.54	20.71	0.73	5.73	4.60	144.25	45.94
LI04	1,639.56	17.32	0.45	5.70	4.71	176.83	48.93
Loch Raven Reservoir							
LR11	948.84	10.37	0.43	6.39	5.51	289.30	94.70
LR13	13,371.76	171.56	0.59	9.59	7.20	432.49	179.03
LR14	956.27	5.42	0.37	4.99	3.48	84.63	32.59
LR17	38,460.65	65.86	0.32	7.65	6.56	71.73	28.66
LR19	1,117.44	10.88	0.23	8.62	7.85	155.18	59.16
LR22	102,240.4	15.85	0.38	7.24	6.18	92.44	34.26
LR24	34,391.45	22.32	0.44	9.32	8.40	95.06	37.30
LR30	6,185.80	16.48	0.30	8.66	8.21	105.82	41.04
LR35	7,873.46	100.12	0.57	10.57	9.31	86.54	38.01
LR39	1,371.54	25.75	0.33	3.25	2.51	33.92	13.34
LR40	52,143.54	8.47	0.39	5.73	4.62	68.73	28.19
LR41	1,287.27	40.63	0.36	5.43	3.22	419.96	248.67
Little Gunpowder							
LG05	23,225.29	26.64	0.43	10.26	8.92	80.33	30.42
Lower Gunpowder							
GU03	1,828.29	18.11	0.47	12.34	11.28	80.38	28.75
GU05	6,002.65	30.80	0.66	12.25	9.87	79.45	29.92
GU08	1,456.12	54.19	0.37	5.28	4.48	421.59	379.86
Gwynns Falls							
GW01	194.46	12.95	0.18	2.93	1.71	162.42	78.92
GW04	4,731.00	33.74	1.58	4.60	3.09	357.12	128.74
GW10	3,507.70	19.31	0.67	6.22	2.66	595.00	220.23
GW11	2,998.00	275.40	0.57	5.76	4.04	225.31	73.48
GW12	11,735.89	243.14	0.71	10.31	6.74	638.97	361.36
Jones Falls							
JF07	3,111.86	22.98	0.54	8.16	5.93	484.73	249.08
JF11	7,986.54	41.71	0.47	9.84	7.91	216.17	76.45
JF12	16,181.91	44.10	0.37	5.43	4.36	219.37	110.57
Bird River							
BI01	1,004.18	216.78	1.01	6.91	1.27	413.01	187.15
BI02	1,510.73	172.46	0.75	4.66	2.17	271.49	141.00
BI03	4,885.67	250.48	1.26	11.44	4.00	580.63	283.22
Back River							
BR01	403.15	37.28	0.88	12.62	9.44	513.15	276.35
BR05	3,566.61	276.79	0.87	13.08	6.62	1,045.14	446.47
HR05	1,356.27	130.85	0.31	9.02	6.81	397.46	290.32
Patapsco River							
PA04	4,529.46	7.65	0.33	4.53	3.39	273.01	157.60
PA14	1,402.65	50.49	0.77	8.46	4.84	340.59	176.68
PA15	182,430.6	10.86	0.15	2.57	2.13	44.00	19.09
Baltimore Harbor							
BH07	311.04	3.54	0.09	1.71	1.37	97.81	50.29

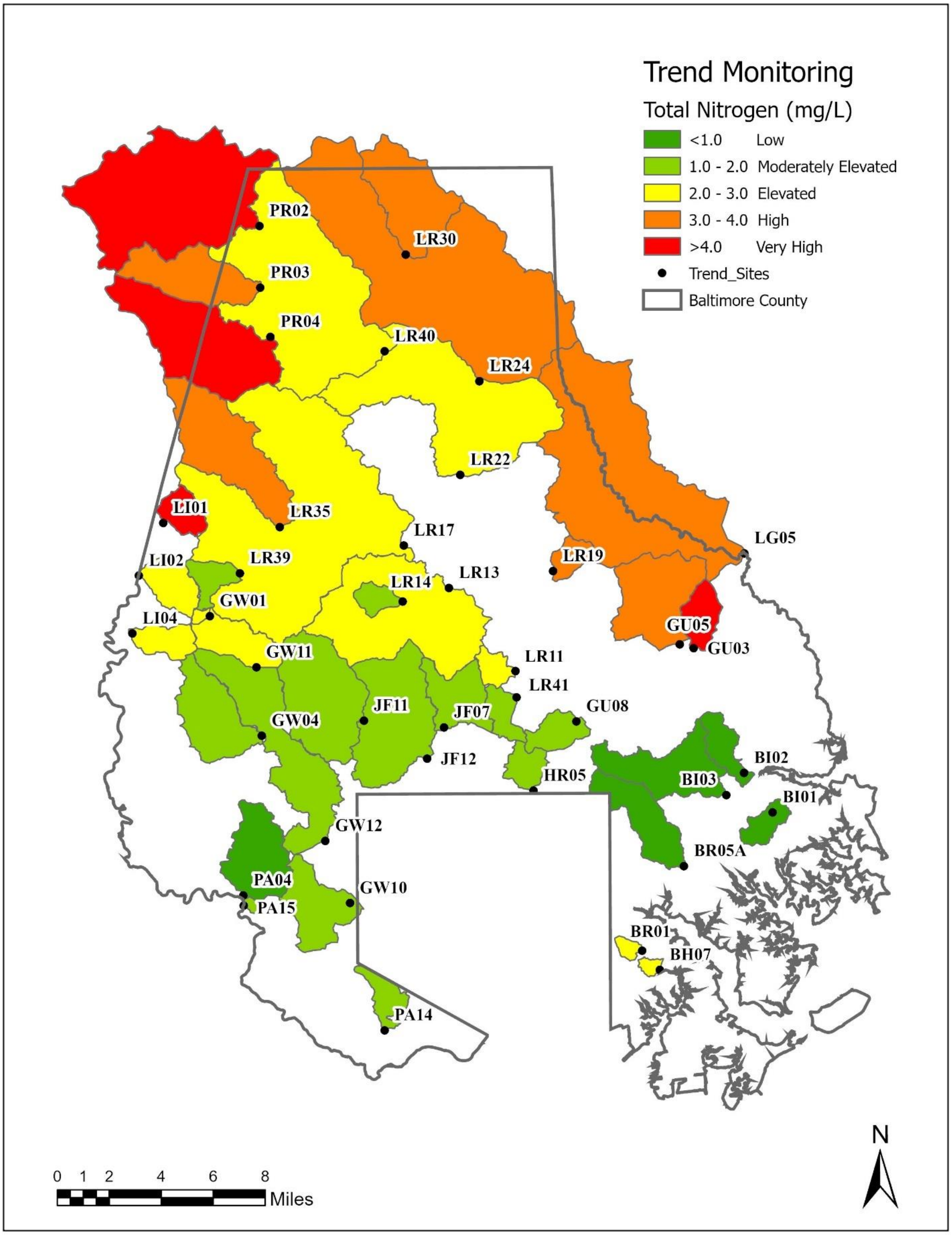


Figure 9-13: Trend Total Nitrogen Mean Concentrations for Monitoring Year 2023

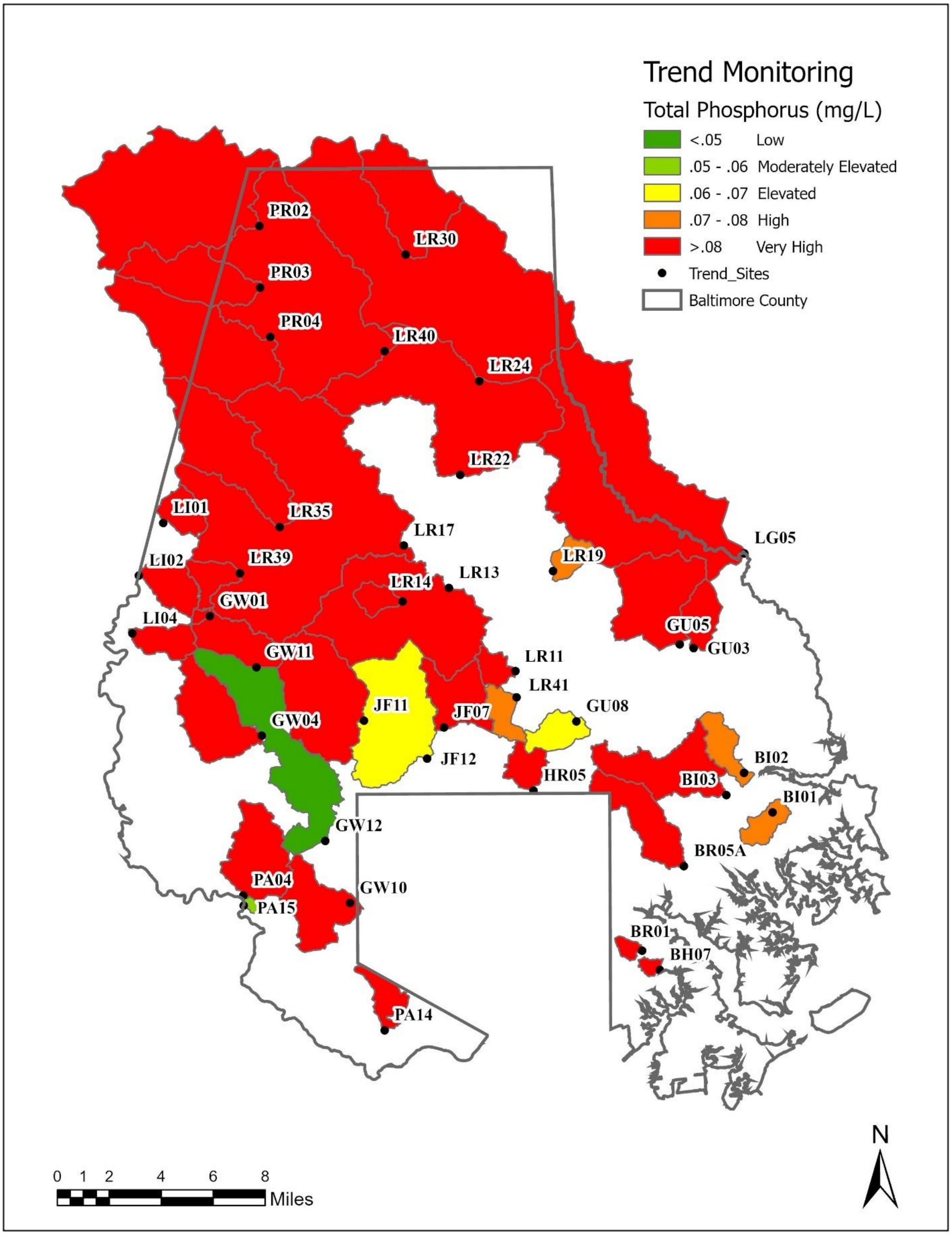


Figure 9-14: Trend Total Phosphorus Mean Concentrations for Monitoring Year 2023

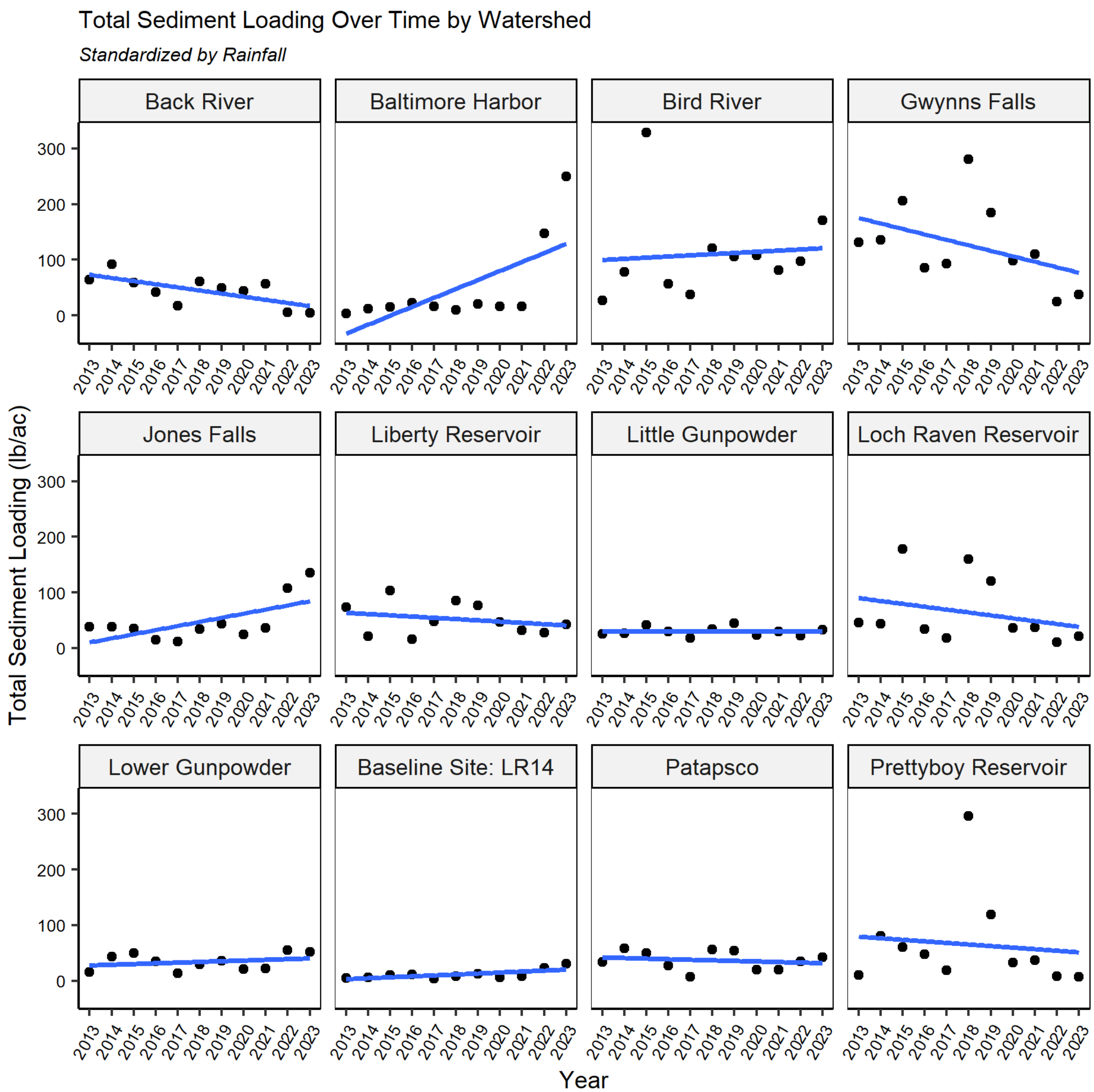


Figure 9-15: Sediment Loading Trends in Baltimore County Watersheds

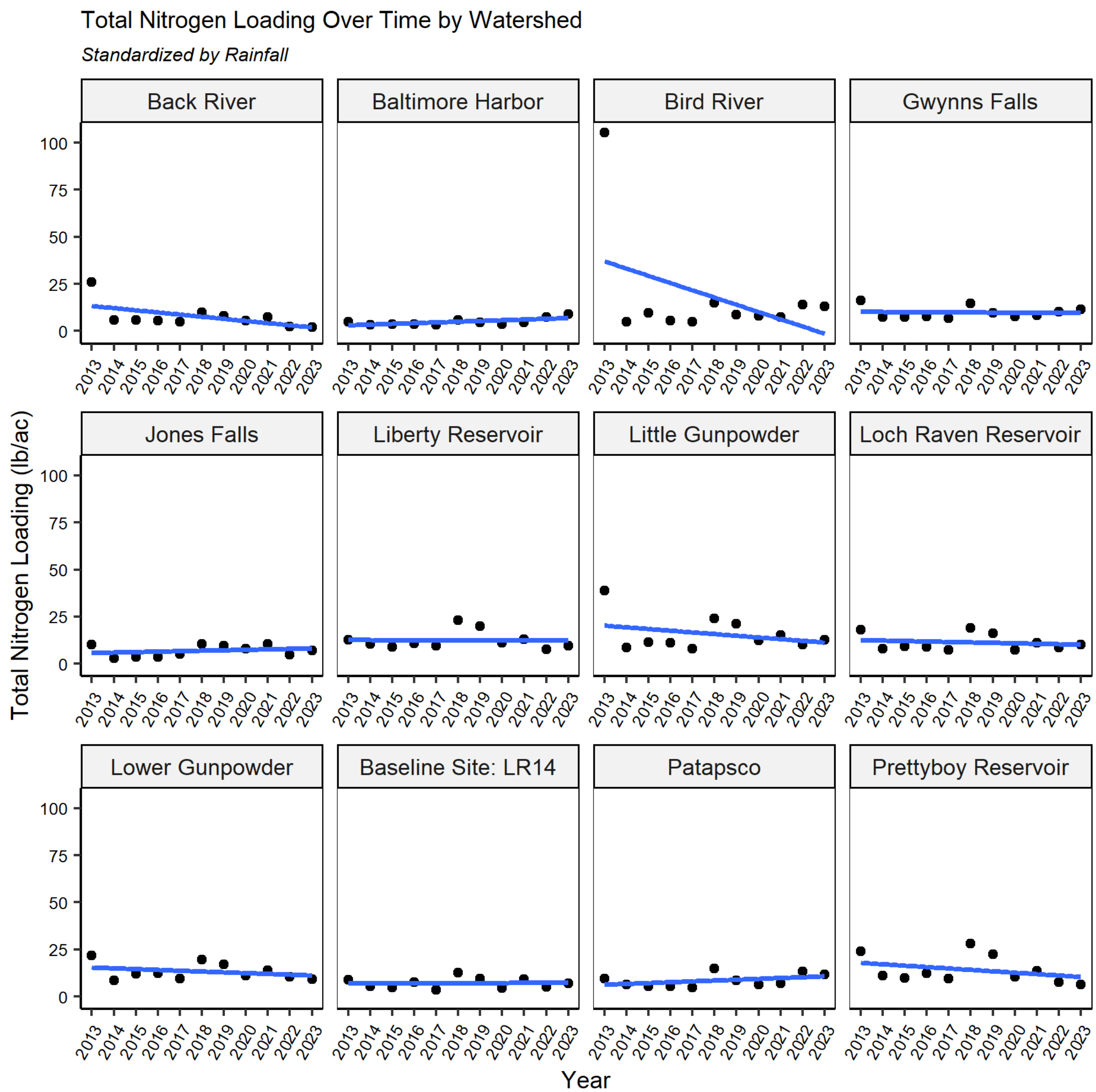


Figure 9-16: Total Nitrogen Loading Trends in Baltimore County Watersheds

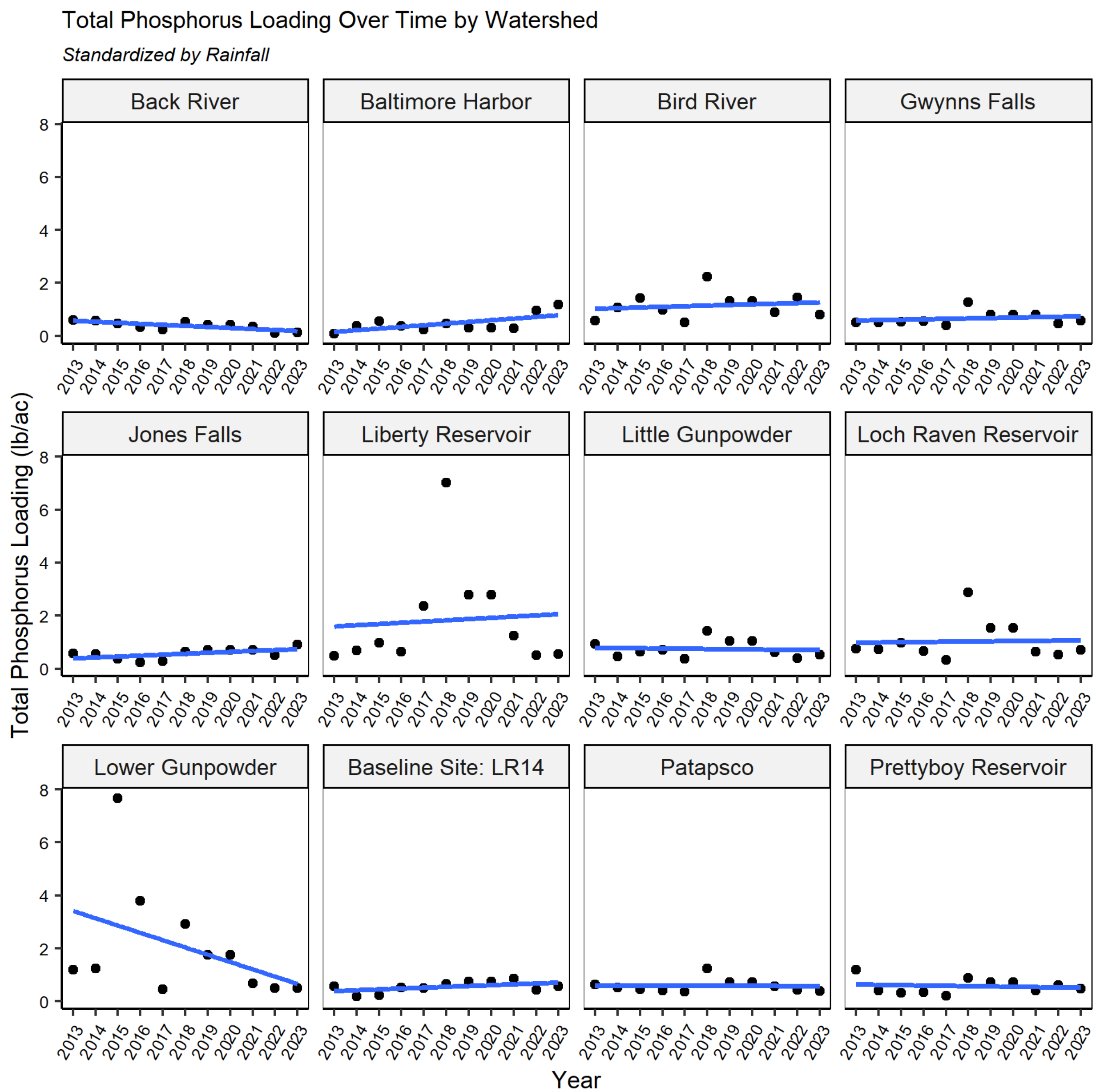


Figure 9-17: Total Phosphorus Loading Trends in Baltimore County Watersheds

9.4.2 Bacteria TMDL Monitoring

9.4.2.1 Introduction

Baltimore County EPS has coordinated with Baltimore City Surface Water Management Division, and Carroll County Department of Land Use, Planning, and Development to monitor trend over time levels of bacteria at 32 monitoring locations within 1 sub-watershed and 6 major watersheds. This program was developed in response to the development of bacteria TMDLs in Herring Run, Gwynns Falls, Loch Raven, Prettyboy, Jones Falls, Liberty Reservoir, and Patapsco watersheds. Bacteria monitoring began in June 2010, with 20 sites in Baltimore

County, 7 sites in Baltimore City and 5 sites in Carroll County. These were the sites used by Maryland Department of the Environment in the development of the bacteria TMDL. In 2015, 8 new sites were added to the monitoring program, and as of 2020, the sites in Carroll County and Baltimore City are no longer being monitored. All active monitoring sites are shown in Figure 9-18.

In 2014, TMDL Implementation Plans were developed by Baltimore County for the 7 bacteria TMDLs issued for waters in the county. Enhanced bacteria monitoring, which started in 2015, is detailed in the bacteria TMDL Implementation Plans. The Bacteria Trend monitoring, as detailed in this report, has been expanded to add additional monitoring locations where streams cross the city/county line and for sub-watersheds included in the bacteria TMDL for which there were no corresponding monitoring stations (Redhouse Run). Two additional bacteria monitoring programs were initiated; the Bacteria Sub-watershed Prioritization Program and the Reach Source Tracking Program. These programs are designed to narrow the focus to the sub-watersheds exhibiting bacteria contamination and locating the bacteria sources, respectively.

In order to more effectively target Baltimore County's efforts in reducing bacterial loads, a sub-watershed prioritization program was instituted beginning in May 2015. This program was intended to assess the bacterial loads associated with streams and tributaries draining to each of the watersheds impaired by fecal bacteria. The program monitored sub-watershed bacterial loads for two seasonal sampling periods, May-September 2015 and May-September 2016. Using the results from a particular stream or tributary that is consistently exceeding bacterial standards, monitoring staff can focus efforts to detect and eliminate the source of the bacterial load. A small pilot study was performed in 2017, based on data from the sub-watershed prioritization program. Beginning at the site on the north branch of Beaver Dam Run, a systematic sampling upstream was performed at each branch of the stream. Unfortunately, the results did not conclusively indicate a point source for the E. coli values previously observed at this site. This observation, combined with the ongoing efforts by the Department of Public Works to replace and repair sewer lines upstream of many of the sub-watersheds marked for further investigation, the decision was made to delay further upstream tracking in these sub-watersheds until the planned repairs are completed. The sub-watershed prioritization program may be revisited after the planned repairs are completed.

In 2015, eight new trend sites were added to more directly assess how the portions of impacted watersheds in Baltimore County contributed to the total bacterial load observed at the bottom of the watershed located in Baltimore City. Two trend sites were added to the Gwynns Falls watershed, two to the Jones Falls, and four to the Herring Run portion of the Back River watershed. Table 9-16 lists the locations and descriptions of the new trend sites added in 2015. Additionally, seasonal monitoring of trend sites was enhanced in 2015 by sampling the 40 sites twice per month in order to develop a more accurate assessment of seasonal, low flow trends.

At the end of the sampling year of 2017, it was decided that sampling would be suspended at LOC-7 and PAT-5 sites in 2018. LOC-7 had been below the 126 MPN E. Coli limit under all flow regimes since 2011, and PAT-5 had not exceeded the annual low flow limit at all, and only exceeded the seasonal low flow mean once, in 2012. The Liberty Reservoir sites were also suspended in 2017 because Baltimore County does not have a TMDL for these bacteria sites as they all reside in Carroll County and the majority of the Liberty Reservoir drainage is in Carroll County.

Table 9-16: New Bacteria Trend Sites added in 2015

Station Code	Sub-watershed	Monitoring Type	Latitude	Longitude
DR-B-10	Dead Run	New Trend	39.304	-76.712
GF-B-8	Gwynns Falls – mainstem	New Trend	39.322	-76.712
JF-B-12	Western Run – East Branch	New Trend	39.373	-76.668
JF-B-13	Western Run – West Branch	New Trend	39.372	-76.708
HR-B-12	East Branch – Herring Run	New Trend	39.369	-76.574
HR-B-13	West Branch – Herring Run	New Trend	39.371	-76.583
HR-B-14	Unnamed Trib to Redhouse Run	New Trend	39.316	-76.518
HR-B-15	Redhouse Run	New Trend	39.317	-76.518

9.4.2.1.1 Watershed Descriptions

9.4.2.1.1.1 Prettyboy Reservoir

Prettyboy Reservoir is an 8-digit watershed (02-13-08-06) that covers a total area of 80 square miles. Forty-eight percent of the land area of the watershed is located in Baltimore County, 43% is in Carroll County, and 9% is in York County, Pennsylvania. The reservoir itself is 1,516 acres in size and is entirely located in Baltimore County. Land use in the Prettyboy Reservoir watershed (excluding York County) is composed of approximately 38% forest and wetland, 50% agriculture, and 13% urban.

Table 9-17 shows the latitude/longitude locations of the current bacteria monitoring stations within the Prettyboy Reservoir watershed, all located within Baltimore County.

Table 9-17: Prettyboy Reservoir Watershed Bacteria Monitoring Station Locations

MDE Station Code	County Code	Watershed	Latitude	Longitude
PRE-1	GOB0042	Georges Run	39.626	-76.773
PRE-2	GRG0013	Grave Run	39.655	-76.779
PRE-3	GUN0476	Gunpowder Falls	39.689	-76.781

PRE-1 (GOB0042): This site is located on Georges Run close to where it discharges into the reservoir. It receives drainage from both Carroll County and Baltimore County, with the majority of the drainage in Carroll County. Maryland Department of the Environment (MDE) baseline sampling in 2003 and 2004 at this site produced a geometric mean of 287 MPN/100ml for dry weather seasonal samples. The TMDL requires a 59.0% reduction of bacteria loading at this site to meet bacteria water quality standards.

PRE-2 (GRG0013): This monitoring site is located on Grave Run in Baltimore County, but with the majority of drainage area in Carroll County. The baseline data collected by MDE for this site resulted in a seasonal dry weather geometric mean of 134 MPN/100ml. The TMDL requires a 9.5% reduction of bacteria loading at this site to meet bacteria water quality standards.

PRE-3 (GUN0476): This site is located on the mainstem of Gunpowder Falls above the Prettyboy Reservoir. The baseline data collected by MDE for this site resulted in a seasonal dry weather geometric mean of 751 MPN/100ml for this site. The TMDL requires an 85.3% reduction in bacteria loading at this site to meet bacteria water quality standards.

9.4.2.1.1.2 Loch Raven Reservoir

Loch Raven Reservoir is an 8-digit watershed (02-13-08-05) that covers a total land area of 303 square miles. The Loch Raven Reservoir watershed is located mostly in Baltimore County with small portions in Carroll and Harford counties in Maryland and York County, Pennsylvania. The

Loch Raven watershed receives drainage from the Prettyboy Reservoir, which encompasses 80 square miles of the 303 square miles of Loch Raven drainage. Land use in the Loch Raven Reservoir watershed (entire) is composed of approximately 36.6% forest, 37.9% agriculture, 24.0% urban, and 1.5% water. Table 9-18 shows the latitude/longitude locations of the six current bacteria monitoring stations within the Loch Raven watershed.

Table 9-18: Loch Raven Reservoir Watershed Bacteria Monitoring Station Locations

MDE Station Code	County Code	Watershed/ Subshed	Latitude	Longitude	Location
SBH0002	LOC-1	Spring Branch	39.440	-76.597	County
BEV0005	LOC-2	Beaverdam Run	39.487	-76.645	County
WGP0050	LOC-3	Western Run	39.511	-76.677	County
GUN0233	LOC-4	Gunpowder Falls	39.519	-76.620	County
GUN0284	LOC-5	Gunpowder Falls	39.568	-76.611	County
LIT0002	LOC-6	Little Falls	39.602	-76.622	County

LOC-1 (SBH0002): This site is the located in Baltimore County in the Spring Branch sub watershed. This sub watershed drainage area is entirely within Baltimore County and represents an urban drainage area. Maryland Department of the Environment (MDE) baseline sampling in 2003 and 2004 at this site produced a geometric mean of 1,080 MPN/100ml for dry weather seasonal samples. The TMDL requires an 89.8% reduction in bacteria loading at this site to meet bacteria water quality standards.

LOC-2 (BEV0005): This monitoring site is located on Beaverdam Run at the USGS gage where York Road crosses the stream. MDE baseline sampling for this site produced a seasonal dry weather geometric mean of 611 MPN/100ml. The TMDL requires an 80.2% reduction in bacteria loading at this site to meet bacteria water quality standards.

LOC-3 (WPG0050): This site is located on Western Run sub watershed in Baltimore County at the USGS gage on the stream. The majority of the drainage area is in Baltimore County, with a small portion (~580 acres) from the town of Hampstead in Carroll County. This sub watershed is predominantly agricultural. MDE baseline sampling for this site produced a seasonal dry weather geometric mean of 491 MPN/100ml. The TMDL requires a 73.9% reduction in bacteria loading at this site to meet bacteria water quality standards.

LOC-4 (GUN0233): This site is located in Baltimore County on the mainstem of Gunpowder Falls at the Glencoe USGS gage site. The majority of the drainage is in Baltimore County, with some headwater drainage area in York County, Pennsylvania (~2,700 acres) and a small amount of drainage from Harford County, Maryland (~818 acres). The site also receives discharge from the upstream Prettyboy dam. MDE baseline sampling for this site resulted in a seasonal dry weather geometric mean of 224 MPN/100ml. The TMDL requires an 82.1% reduction in bacteria loading at this site to meet bacteria water quality standards.

LOC-5 (GUN284): This site is located on the mainstem of Gunpowder Falls below the confluence with Little Falls. The majority of the drainage is in Baltimore County, with some headwater drainage area is in York County, Pennsylvania (~2,700 acres). The site also receives discharge from the upstream Prettyboy dam. MDE baseline sampling for this site resulted in a seasonal dry weather geometric mean of 168 MPN/100ml. The TMDL requires an 88.0% reduction in bacteria loading at this site to meet bacteria water quality standards.

LOC-6 (LIT0002): This site is located on the mainstem of Little Falls. The majority of the drainage is in Baltimore County with some headwater drainage in York County, Pennsylvania

(~2,700 acres). MDE baseline sampling for this site resulted in a seasonal dry weather geometric mean of 139 MPN/100ml. The TMDL requires a 12.7% reduction in bacteria loading at this site to meet bacteria water quality standards.

9.4.2.1.1.3 Lower North Branch of the Patapsco River

The Patapsco River Lower North Branch (Patapsco LNB) is an 8-digit watershed that covers a total land area of 118 square miles. It comprises the downstream non-tidal portions of the Patapsco River. Patapsco LNB is located within portions of Baltimore, Howard, Carroll, and Anne Arundel counties. Table 9-19 shows the latitude/longitude locations of the four current bacteria monitoring stations within the Lower North Branch of the Patapsco River.

Table 9-19: Patapsco River Watershed Bacteria Monitoring Station Locations

MDE Station Code	County Code	Watershed	Latitude	Longitude
PAT0148	PAT-1	LNB Patapsco River	39.231	-76.665
PAT0176	PAT-2	LNB Patapsco River	39.218	-76.707
PAT0222	PAT-3	LNB Patapsco River	39.251	-76.764
PAT0285	PAT-4	LNB Patapsco River	39.310	-76.792

PAT-1 (PAT148): This site is the located on the mainstem of the Lower North Branch of the Patapsco River and is the lowest monitoring point on the mainstem. It receives drainage from Carroll, Baltimore, Howard, and Anne Arundel counties. The MDE baseline sampling for this site resulted in a seasonal dry weather geometric mean of 231 MPN/100ml based on monitoring conducted between 10/2/2002 and 10/21/2003. The TMDL requires a 56.1% reduction of bacteria at this site.

PAT-2 (PAT0176): This monitoring site is located on the mainstem of the Lower North Branch of the Patapsco River above the confluence of the highly urbanized Herbert Run sub watershed in Baltimore County and Deep Run in Howard County. The MDE baseline sampling for this site resulted in a seasonal dry weather geometric mean of 117 MPN/100ml. The TMDL indicated no reductions necessary for meeting bacteria water quality standards in the drainage area to this site.

PAT-3 (PAT0222): This site is located on the mainstem of the Lower North Branch of the Patapsco River where it is crossed by Ilchester Road. The MDE baseline sampling resulted in a seasonal low flow geometric mean of 119 MPN/100ml. The TMDL indicated no reductions necessary for meeting bacteria water quality standards at this site.

PAT-4 (PAT0285): This site is located where Old Frederick Road crosses the mainstem of the Lower North Branch of the Patapsco River. It is downstream of the confluence of a number of urbanized sub watersheds (Miller Run, Cedar Branch). The MDE baseline sampling resulted in a seasonal dry weather geometric mean of 93 MPN/100ml for this site. The TMDL indicated no reductions necessary for meeting bacteria water quality standards at this site.

9.4.2.1.1.4 Gwynns Falls

The Gwynns Falls is an 8-digit (02-13-09-05) watershed that covers a total land area of 41,710 acres. The watershed originates in Baltimore County and flows through Baltimore City to the tidal waters of the Middle Branch of Baltimore Harbor. The Baltimore County portion of the watershed comprises 28,399 acres or 68% of the land area of the watershed. Table 9-20 shows the latitude/longitude locations of the five current bacteria monitoring stations within the Gwynns Falls watershed.

Table 9-20: Gwynns Falls Watershed Bacteria Monitoring Station Locations

MDE Station Code	County Code	Watershed	Latitude	Longitude	Location
GWN0115	GWY-2	Gwynns Falls	39.346	-76.734	County
GWN0160	GWY-6	Gwynns Falls	39.392	-76.765	County
	DR-B-10	Gwynns Falls	39.304	-76.712	County
	GF-B-8	Gwynns Falls	39.322	-76.712	County
	SL-B-3	Gwynns Falls	39.374	-76.791	County

GWY-2 (GWN0115): This monitoring site is located on the mainstem of Gwynns Falls in Baltimore County, above the confluence of both Dead Run and Powdermill Run. The entire drainage area is in Baltimore County. The MDE baseline sampling for this site resulted in a seasonal dry weather geometric mean of 373 MPN/100ml. The TMDL requires a reduction of 67.2% reduction necessary for meeting bacteria water quality standards in the drainage area to this site.

GWY-6 (GWN0160): This site is located in Baltimore County on the mainstem of Gwynns Falls where McDonogh Road crosses the stream. It is upstream of the confluence of Scotts Level Branch. The MDE baseline sampling indicated a seasonal dry weather concentration of 743 MPN/100ml for this site. The TMDL requires a 93.2% reduction to meet bacteria water quality standards at this site.

DR-B-10: This site is located in Baltimore County on Dead Run on the city/county line. This site was added to the trend program beginning in 2015 to obtain a clearer picture of the bacterial loads present in the two major branches of the Gwynns Falls which flow into Baltimore City from the County.

GF-B-8: This site is located in Baltimore County on the Gwynns Falls mainstem downstream of site GWY-2, and just before the city/county border. This site was also added to the trend program beginning in 2015.

SL-B-3: This site is located in Baltimore County on Scotts Level Branch at its crossing on McDonogh Rd. This site was added in 2017 to increase Baltimore County's ability to assess bacterial loads to Gwynns Falls.

9.4.2.1.1.5 Jones Falls

The Jones Falls is an 8-digit (02-13-09-04) watershed that covers a total land area of 34,122 acres. The watershed originates in Baltimore County and flows through Baltimore City to the tidal waters of the Northwest Branch (Inner Harbor) of Baltimore Harbor. The Baltimore County portion of the watershed comprises 25,399 acres or 76% of the land area of the watershed. Table 9-21 shows the latitude/longitude locations of the five current bacteria monitoring stations within the Jones Falls watershed.

Table 9-21: Jones Falls watershed Bacteria Monitoring Station Locations

MDE Station Code	County Code	Watershed/ Subshed	Latitude	Longitude	Location
JON0082	JON-2	Jones Falls	39.378	-76.644	County
JON0184	JON-3	Jones Falls	39.391	-76.661	County
UQQ005	JON-4	Roland Run	39.399	-76.649	County
	JF-B-12	Western Run – East	39.373	-76.668	City
	JF-B-13	Western Run – West	39.372	-76.708	County

JON-2 (JON0082): This monitoring site is located on the mainstem of Jones Falls in Baltimore County, below the Lake Roland dam. The entire drainage area is in Baltimore County. The MDE baseline sampling for this site resulted in a seasonal dry weather geometric mean of 139 MPN/100ml. The TMDL requires a reduction of 95.3% to meet bacteria water quality standards in the drainage area to this site.

JON-3 (JON0184): This is located on the mainstem of Jones Falls in Baltimore County upstream of Lake Roland at the Sorrento Run USGS gage. The entire drainage area is in Baltimore County. The MDE baseline sampling for this site resulted in a seasonal dry weather geometric mean of 501 MPN/100ml. The TMDL requires 92.4% reduction to meet bacteria water quality standards at this site.

JON-4 (UQQ005): This site is located in Baltimore County on Roland Run upstream from Lake Roland. The entire drainage is in Baltimore County and represents an urban sub watershed. The MDE baseline sampling for this site resulted in a seasonal dry weather geometric mean of 872 MPN/100ml. The TMDL requires a 92.1% reduction to meet bacteria water quality standards at this site.

JF-B-12: This site is located in Baltimore City on an eastern tributary of Western Run. Most of the drainage area is in Baltimore County and is within an urban watershed. This site was added to the trend program beginning in 2015 to obtain a clearer picture of the bacterial loads present in two branches of Western Run, which then flows into the Jones Falls mainstem.

JF-B-13: This site is located in Baltimore County on the westernmost end of Western Run. Most of its drainage area is located within Baltimore County and is within an urban watershed. This site was also added to the trend program in 2015 to better assess conditions in Western Run. While this site is considered urban, it has a larger variety of land uses present, including a cemetery and golf course (both classified as open urban land use).

9.4.2.1.1.6 Herring Run

Herring Run is a watershed that covers a total land area of 19,198.80 acres, 7,569 acres of which are located within Baltimore County. The Herring Run watershed begins in the East-central portion of Baltimore County, with portions of the watershed flowing through the City of Baltimore, before discharging into Back River to the East of the Baltimore City line. Table 9-22 shows the latitude/longitude locations of the four current bacteria monitoring stations within the Herring Run watershed. Of these four sites, two are in the headwaters of Herring Run and are intended to look at the concentration of bacteria at the city/county line for the two headwater branches. The other two sites are located in Redhouse Run, which was included in the Herring Run Bacteria TMDL.

Table 9-22: Herring Run watershed Bacteria Monitoring Station Locations

Station Code	County Code	Stream	Watershed	Latitude	Longitude	County
	HR-B-12	Herring Run – East	Back River	39.368927	-76.573717	Balt. City
	HR-B-13	Herring Run – West	Back River	39.370618	-76.58334	Balt. City
	HR-B-14	UNT to Redhouse Run	Back River	39.31609	-76.518137	Balt. County
	HR-B-15	Redhouse Run	Back River	39.317338	-76.515859	Balt. County

HR-B-12: This site is located just inside of Baltimore City on the east branch of Herring Run and was added in 2015 to assess inputs by Baltimore County into the Herring Run watershed.

The drainage is mostly within Baltimore County, with only 7.5% of the total area within Baltimore City.

HR-B-13: This site is located just inside of Baltimore City on the west branch of Herring Run and was added in 2015 to assess inputs by Baltimore County into Herring Run watershed. The drainage area is located within Baltimore City and Baltimore County, with only 3.5% located within Baltimore City.

HR-B-14: This site is located in Baltimore County on a small tributary to Redhouse Run. All of the drainage area is within Baltimore County and has the smallest drainage area of the sites added to Herring Run.

HR-B-15: This site is located in Baltimore County on the mainstem of Redhouse Run. Most of the drainage area is in Baltimore County and is within an urban watershed.

Figure 9-18: Map of Active Bacteria TMDL Monitoring Stations

9.4.2.2 Monitoring Protocol

9.4.2.2.1 Field Procedures

All bacteria trend sites within Baltimore County are sampled monthly. Sampling occurs on the first Thursday of every month, regardless of weather conditions. Additional seasonal samples are collected on the third Thursday of each month, May through September, to increase the frequency of sampling during low flow conditions when the majority of recreational water contact is expected.

Samples are collected in sterile 120 ml sample bottles containing sodium thiosulfate which acts as a dechlorinating agent to treat any residual free chlorine in the water. Samples are then stored on ice for transport prior to analysis.

9.4.2.2.2 Sample Analysis

All samples are analyzed in-house using IDEXX procedures and equipment. Samples are incubated for 18-22 hours in Quanti-Tray 2000 vessels with Colilert-18. At the end of the incubation period samples are read and results are given in MPN/100ml (Most Probable Number), a statistically determined estimate of organisms present per 100 ml of sample water.

The detection limits of the Colilert-18 method range from 1 MPN/100mL to 2419.6 MPN/100mL. Dilutions are done on samples that are taken during or after heavy rains, or at sites with chronically high levels of bacteria, so that the sample reading is within the limit of detection for the analysis.

9.4.2.2.3 Data Analysis

A high/low flow determination is made for each bacteria sample. A flow rate cutoff was determined for each site following the methodology described in the Bacteria TMDL documentation. Each site has also been assigned a USGS streamflow gage based upon geographic proximity. The recorded discharge at the data and time of the sampling is compared to the predetermined cutoff, if the recorded discharge is above the cutoff the sample is considered "High Flow". Discharge equal to the cutoff or below are considered "Low Flow".

All data is separated by monitoring site, flow condition (High/Low), and by time period collected. Seasonal data is only collected during the May to September time period, and annual data represents all data collected throughout the calendar year. Data is then statistically analyzed to determine the geometric mean for all categories and for single sample exceedance rates of water quality standards. Single sample exceedance standards are based on frequency of full body contact, ranging from infrequent (576 MPN) to frequent (235 MPN). This data provides a means to assess acute human health risks due to short term exposure. A Mann-Kendall trend analysis is performed on the geometric mean data and the single sample exceedance data to determine any statistically significant trends. The running annual and seasonal low flow geometric means for the full sampling record are compared to the baseline MDE geometric mean for each site using a One-Sample t-test. Statistical significance is determined by *p-value* < 0.05.

9.4.2.3 Bacteria Trend Monitoring Program Results

9.4.2.3.1 Prettyboy Reservoir

9.4.2.3.1.1 Geometric Means

Sampling in 2023 produced annual low-flow geometric mean *E. coli* values below the long-term target mean of 126 MPN/100ml at all 3 sampling locations. PRE-2 and PRE-3 also had seasonal low-flow geometric mean values below 126 MPN/100ml, while the seasonal low-flow geometric mean at PRE-1 was slightly above target. The annual and seasonal low-flow geometric mean values for 2023 were significantly lower than the running geometric means for PRE-1 and PRE-3 (One-Sample t-test, $p\text{-}value < 0.05$), though there is not a statistically significant downward trend over the last 5 years of sampling or over the full sampling record (Mann-Kendall $p\text{-}value < 0.05$). The running seasonal low-flow geometric mean for the full sampling record is not significantly different from the MDE baseline at PRE-1 or PRE-2 but is significantly lower at PRE-3 (208 MPN/100ml vs. 751 MPN/100ml, One-Sample t-test, $p\text{-}value < 0.05$). The most recent five years of low-flow geometric means data is summarized in Table 9-23 and the full record of low-flow geometric means data is shown in Figure 9-19. Geometric means meeting the water quality standard (126 MPN) are denoted with bolded and italicized text in Table 9-23.

9.4.2.3.1.2 Single Sample Exceedance Rates

Due to dry weather conditions during the seasonal sampling period, no high flow samples were collected in 2023 at any of the three sampling locations. Low flow single sample exceedance rates were down at PRE-1 and PRE-3 compared to the previous year, with no samples exceeding single sample standards at PRE-3 for 2023. PRE-2 exhibited higher single sample exceedance rates for the more stringent frequent bodily contact standards but had no samples exceeding the 576 MPN/100ml standard. The most recent five years of seasonal (May through September) single sample exceedance data are summarized in Table 9-24.

9.4.2.3.1.3 Summary

Results from 2023 were very positive, with low geometric mean values as well as low single sample exceedance rates in the Prettyboy Reservoir watershed. While dry weather throughout the seasonal sampling period in 2023 was a likely contributor to these results, mean values and single sample exceedance rates have declined over the past several years. Current data indicates that these sites are approaching the long-term water quality standards for *E. coli*.

9.4.2.3.1.4 Tables and Figures

Table 9-23: Prettyboy Reservoir Watershed 5-year Annual and Seasonal E. coli Geometric Means

Annual Data (MPN/100 mL)											
		2019		2020		2021		2022		2023	
Site	**Flow**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**
PRE-1	All	151	17	201	16	200	16	280	17	***123***	17
	High	***64***	7	136	4	299	4	878	3		
	Low	275	10	229	12	174	12	219	14	***123***	17
PRE-2	All	***62***	17	***73***	16	***125***	16	168	17	***76***	17
	High	***29***	7	***35***	4	234	4	608	3		
	Low	***105***	10	***93***	12	***101***	12	127	14	***76***	17
PRE-3	All	***91***	17	127	16	175	16	204	17	***79***	17
	High	***52***	7	183	4	367	4	789	3		
	Low	134	10	***112***	12	137	12	153	14	***79***	17
Seasonal Data (May 1st to September 30th) (MPN/100 mL)											
		2019		2020		2021		2022		2023	
Site	**Flow**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**
PRE-1	All	243	10	368	10	486	9	366	10	148	10
	High	***93***	3	235	3	1,253	2	1,540	2		
	Low	365	7	445	7	371	7	256	8	148	10
PRE-2	All	***86***	10	***116***	10	211	9	228	10	***99***	10
	High	***43***	3	***42***	3	439	2	1,591	2		
	Low	***115***	7	179	7	171	7	140	8	***99***	10
PRE-3	All	149	10	197	10	287	9	376	10	***101***	10
	High	***108***	3	218	3	1,646	2	2,420	2		
	Low	171	7	189	7	174	7	236	8	***101***	10

Table 9-24: Frequency of Exceedance of Single Sample Water Quality Standards

		N		Percent Single Sample Exceedance (MPN)							
				235		298		410		576	
Site	**Year**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**
PRE-1	2023		10	N/A	20%	N/A	20%	N/A	20%	N/A	0%
	2022	2	8	100%	88%	100%	38%	100%	25%	100%	0%
	2021	2	7	100%	71%	100%	57%	100%	29%	100%	29%
	2020	3	7	67%	86%	67%	43%	67%	43%	0%	29%
	2019	3	7	0%	57%	0%	43%	0%	43%	0%	14%
PRE-2	2023		10	N/A	30%	N/A	20%	N/A	10%	N/A	0%
	2022	2	8	100%	12%	100%	12%	100%	12%	100%	12%
	2021	2	7	50%	14%	50%	14%	50%	14%	50%	14%
	2020	3	7	0%	29%	0%	29%	0%	14%	0%	14%
	2019	3	7	0%	29%	0%	29%	0%	14%	0%	0%
PRE-3	2023		10	N/A	0%	N/A	0%	N/A	0%	N/A	0%
	2022	2	8	100%	62%	100%	38%	100%	12%	100%	0%
	2021	2	7	100%	14%	100%	14%	100%	14%	100%	14%
	2020	3	7	67%	29%	67%	14%	67%	14%	0%	14%
	2019	3	7	0%	43%	0%	0%	0%	0%	0%	0%

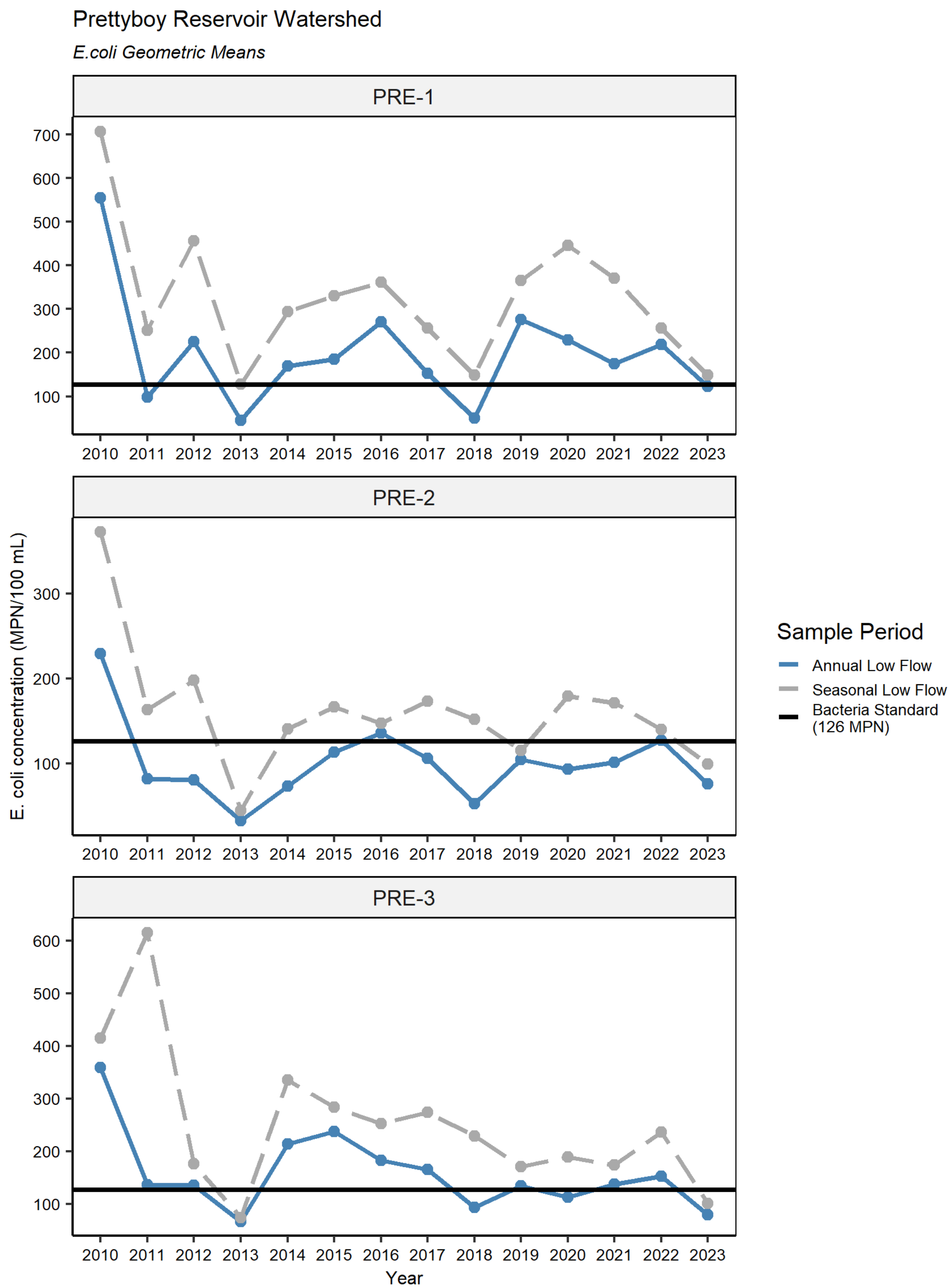


Figure 9-19: Annual and Seasonal Low Flow E. coli Geometric Mean Concentrations for all Prettyboy Reservoir Watershed Monitoring Locations 2010 – 2023

9.4.2.3.2 Loch Raven Reservoir

9.4.2.3.2.1 Geometric Means

Annual and seasonal low flow geometric means varied significantly across the Loch Raven Reservoir watershed in 2023. Both annual and seasonal low-flow geometric mean values at LOC-1, LOC-2, and LOC-6 exceeded the 126 MPN/100ml long term target, while annual low-flow geometric mean values at LOC-3, LOC-4, and LOC-5 were below the 126 MPN/100ml target, and the seasonal low-flow geometric mean value at LOC-4 was also below the 126 MPN/100ml target. At LOC-3 the seasonal low-flow geometric mean was slightly higher than the target at 128 MPN/100ml. LOC-3 and LOC-4 had annual and seasonal low-flow geometric mean values for 2023 that were significantly lower than the running geometric means at those sites (One-Sample *t-test*, *p-value* < *0.*05), though none of the Loch Raven Reservoir sampling locations exhibit a statistically significant trend over the previous 5 years of sampling or over the full sampling record (Mann-Kendall, *p-value <0.05*). Despite the lack of significant trend over time in the data the running seasonal low-flow geometric mean values for the full sampling record are significantly lower than the MDE baseline geometric means at LOC-1, LOC-2, LOC-3, and LOC-6, though they are not significantly lower at LOC-4, and LOC-5 (One-Sample t-test, *p-value* < 0.05). This data is summarized in Table 9-25 and Figure 9-20 and Figure 9-21. Geometric means meeting the water quality standard (126 MPN) are denoted with bolded and italicized text in Table 9-25.

9.4.2.3.2.2 Single Sample Exceedance Rates

All active Loch Raven monitoring stations show variability in single sample exceedance rates. LOC-1 and LOC-2 show the highest single sample exceedance rates, with LOC-4 and LOC-5 exhibiting the lowest single sample exceedance rates. All six of the active monitoring sites did show overall improvement in 2023 over 2022, with LOC-5 having no samples exceeding the 410 MPN/100ml and 576 MPN/100ml standards. The most recent 5 years of seasonal single sample exceedance data are summarized in Table 9-26.Summary

Sampling results from 2023 appear to show some measure of improvement at LOC-3 and LOC-4, with lower geometric mean values and lower exceedance rates at these sites. Current data indicates that LOC-3, LOC-4, and LOC-5 are approaching water quality standards, but more improvement is necessary at LOC-1, LOC-2, and LOC-6 in order to meet water quality standards.

9.4.2.3.2.3 Tables and Figures

Table 9-25: Loch Raven Reservoir Watershed Annual and Seasonal E. coli Results

Annual Data (MPN/100 mL)											
		2019		2020		2021		2022		2023	
Site	Flow	MPN	N	MPN	N	MPN	N	MPN	N	MPN	N
LOC-1	All	546	17	560	16	633	16	639	17	369	17
	High	631	8	1,508	4	563	7	1,693	4		
	Low	480	9	402	12	694	9	474	13	369	17
LOC-2	All	194	17	328	17	292	16	571	17	195	17
	High	***113***	8	1,004	5	293	7	1,512	4		
	Low	312	9	206	12	292	9	423	13	195	17
LOC-3	All	187	17	197	15	194	16	294	17	***117***	17
	High	149	11	231	7	408	6	1,224	3		
	Low	283	6	171	8	***124***	10	216	14	***117***	17
LOC-4	All	152	17	184	17	260	16	199	17	***79***	17
	High	***118***	11	252	6	731	4	373	4	225	1
	Low	243	6	155	11	184	12	164	13	***74***	16
LOC-5	All	***103***	17	153	17	159	16	143	17	***93***	17
	High	***98***	11	185	5	441	4	270	4	***74***	1
	Low	***114***	6	141	12	***113***	12	***117***	13	***95***	16
LOC-6	All	202	17	235	17	225	16	253	17	157	17
	High	170	7	205	4	619	4	587	3		
	Low	228	10	245	13	161	12	211	14	157	17
Seasonal Data (May 1st to September 30th) (MPN/100 mL)											
		2019		**2020**		**2021**		**2022**		**2023**	
Site	**Flow**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**
LOC-1	All	559	10	763	10	942	9	904	10	730	10
	High	854	3	2,420	3	833	3	2,420	2		
	Low	466	7	465	7	1,001	6	706	8	730	10
LOC-2	All	279	10	495	10	413	9	708	10	351	10
	High	202	3	1,254	3	686	3	2,420	2		
	Low	320	7	332	7	320	6	521	8	351	10
LOC-3	All	417	10	308	9	358	9	416	10	128	10
	High	377	6	296	5	967	4	1,939	2		
	Low	486	4	324	4	162	5	283	8	128	10
LOC-4	All	313	10	184	10	418	9	236	10	***111***	10
	High	264	7	142	3	2,420	2	341	3	225	1
	Low	469	3	205	7	253	7	201	7	***103***	9
LOC-5	All	155	10	208	10	273	9	208	10	144	10
	High	162	7	272	2	1,646	2	303	3	***74***	1
	Low	139	3	195	8	163	7	178	7	155	9
LOC-6	All	264	10	371	10	399	9	339	10	241	10
	High	173	3	311	2	2,048	2	743	2		
	Low	317	7	388	8	250	7	279	8	241	10

Table 9-26: Frequency of Exceedance of Single Sample Water Quality Standards

Site	Year	N High	N Low	235 High	235 Low	298 High	298 Low	410 High	410 Low	576 High	576 Low
				Percent Single Sample Exceedance (MPN)							
LOC-1	2023		10	N/A	90%	N/A	90%	N/A	80%	N/A	60%
	2022	2	8	100%	100%	100%	100%	100%	75%	100%	50%
	2021	3	6	100%	100%	100%	100%	100%	83%	33%	83%
	2020	3	7	100%	86%	100%	71%	100%	71%	100%	43%
	2019	3	7	100%	86%	100%	71%	100%	57%	100%	29%
LOC-2	2023		10	N/A	60%	N/A	60%	N/A	20%	N/A	20%
	2022	2	8	100%	100%	100%	75%	100%	50%	100%	38%
	2021	3	6	100%	67%	100%	67%	33%	33%	33%	17%
	2020	3	7	100%	57%	100%	43%	100%	29%	67%	29%
	2019	3	7	33%	71%	33%	57%	0%	43%	0%	14%
LOC-3	2023		10	N/A	20%	N/A	10%	N/A	0%	N/A	0%
	2022	2	8	100%	62%	100%	38%	100%	25%	100%	12%
	2021	4	5	75%	20%	75%	0%	75%	0%	75%	0%
	2020	5	4	40%	75%	40%	75%	40%	0%	40%	0%
	2019	6	4	67%	100%	50%	75%	50%	50%	33%	50%
LOC-4	2023	1	9	0%	11%	0%	11%	0%	11%	0%	0%
	2022	3	7	33%	43%	33%	43%	33%	0%	33%	0%
	2021	2	7	100%	71%	100%	43%	100%	0%	100%	0%
	2020	3	7	33%	29%	33%	14%	33%	14%	33%	14%
	2019	7	3	14%	100%	14%	100%	14%	67%	14%	33%
LOC-5	2023	1	9	0%	33%	0%	11%	0%	0%	0%	0%
	2022	3	7	33%	14%	33%	14%	33%	14%	33%	0%
	2021	2	7	100%	43%	100%	29%	100%	14%	100%	0%
	2020	2	8	50%	38%	50%	25%	50%	12%	50%	12%
	2019	7	3	14%	0%	14%	0%	14%	0%	14%	0%
LOC-6	2023		10	N/A	30%	N/A	30%	N/A	20%	N/A	20%
	2022	2	8	50%	62%	50%	50%	50%	25%	50%	12%
	2021	2	7	100%	43%	100%	29%	100%	29%	100%	0%
	2020	2	8	50%	75%	50%	50%	50%	25%	50%	25%
	2019	3	7	33%	57%	0%	29%	0%	29%	0%	14%

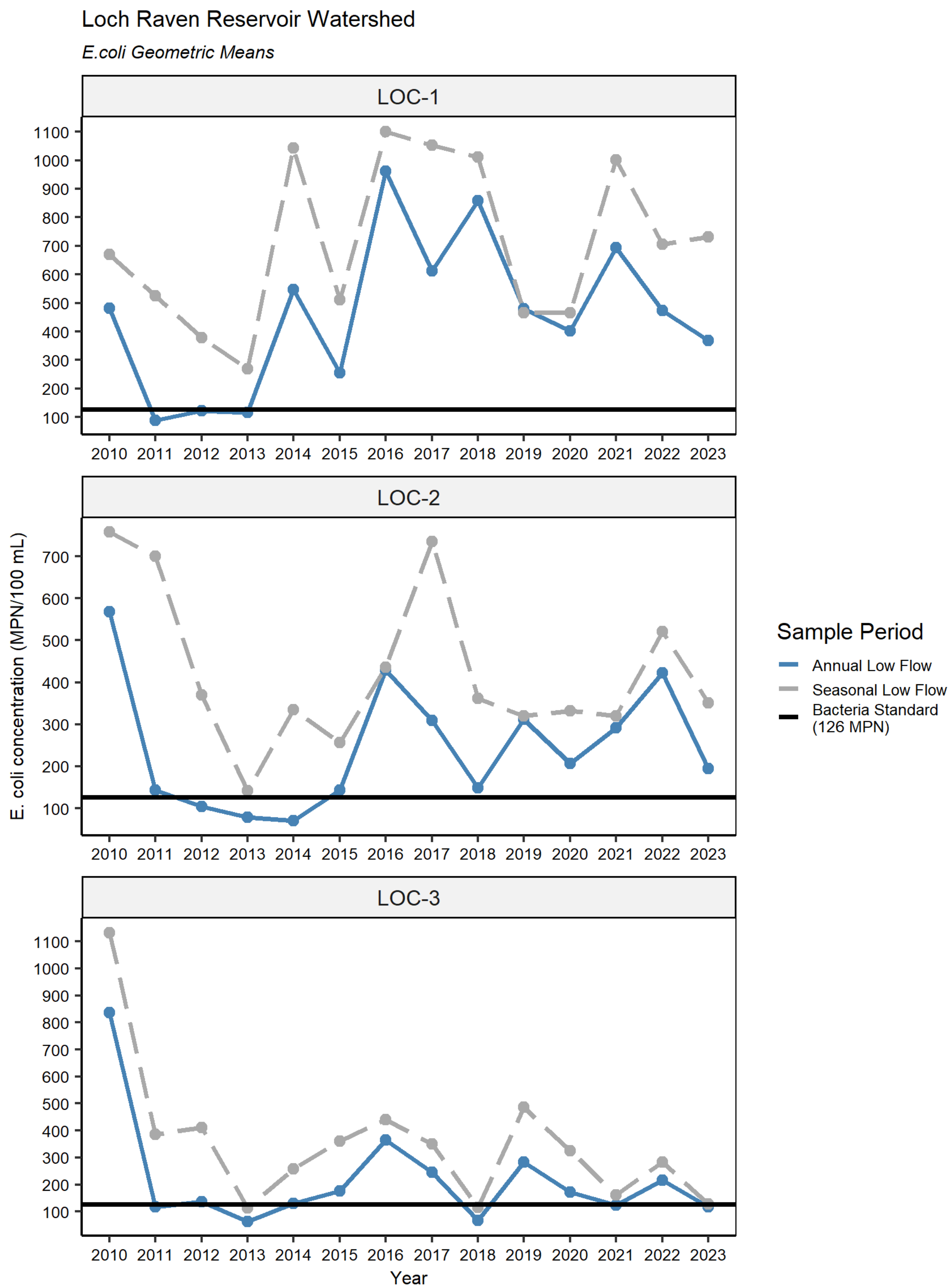


Figure 9-20: Annual and Seasonal Low Flow E. coli Geometric Mean Concentrations for Loch Raven Reservoir Watershed Monitoring Locations LOC-1, LOC-2, and LOC-3 2010 – 2023

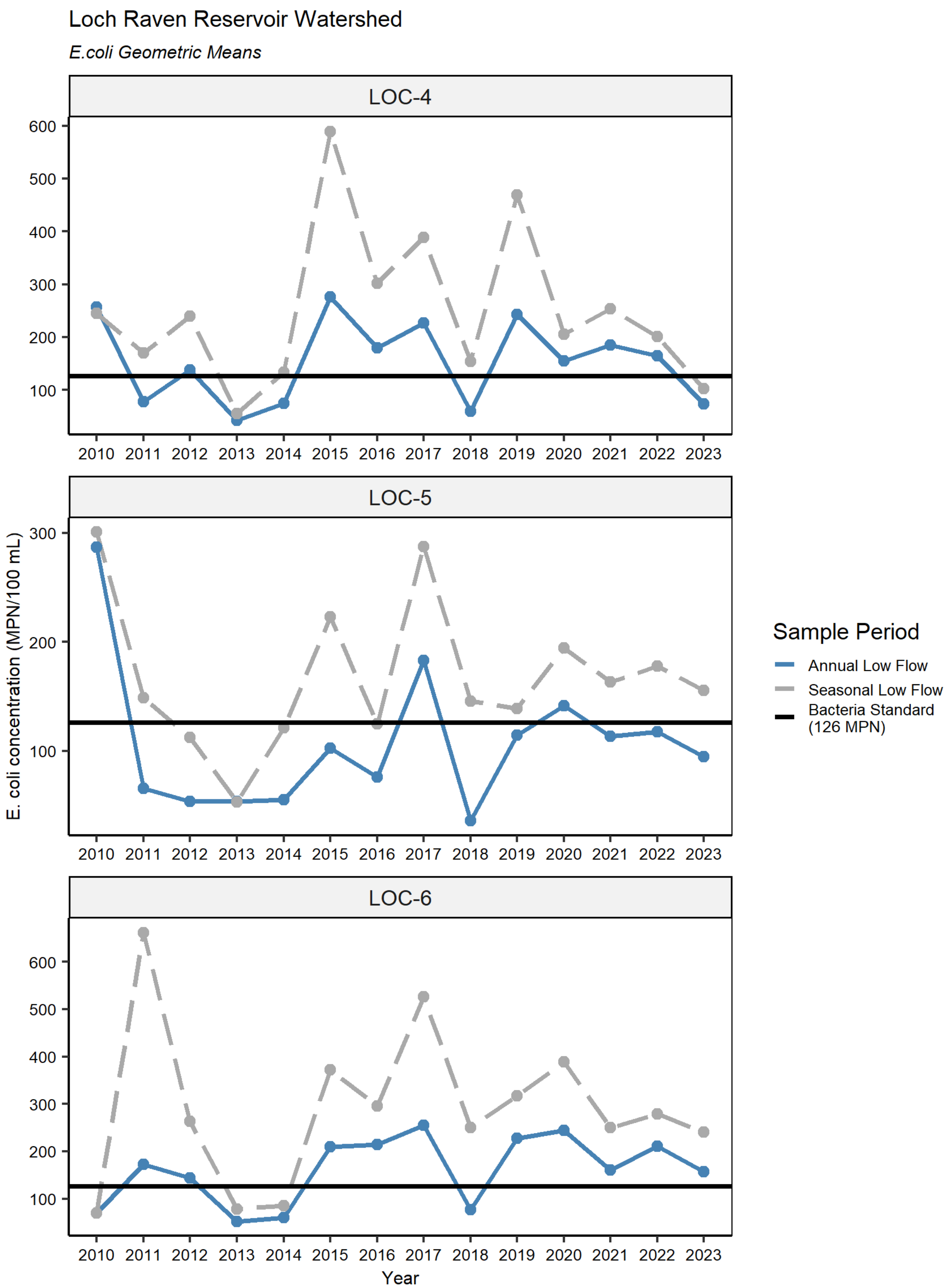


Figure 9-21: Annual and Seasonal Low Flow E. coli Geometric Mean Concentrations for Loch Raven Reservoir Watershed Monitoring Locations LOC-4, LOC-5, and LOC-6 2010 – 2023

9.4.2.3.3 Lower North Branch of the Patapsco River

9.4.2.3.3.1 Geometric Means

Sampling in 2023 resulted in annual and seasonal geometric means that were well below the long-term target of 126 MPN/100ml at PAT-2, PAT-3, and PAT-4. Annual and seasonal geometric means at PAT-1 were slightly above the long-term target for low flow conditions but were below for high flow conditions. All four current Patapsco River monitoring locations produced seasonal low-flow geometric mean values that were significantly lower than the running geometric mean values, and PAT-1 and PAT-2 also had annual low-flow geometric mean values that were significantly lower than the running geometric mean values (One-Sample *t*-test, *p-value* < *0.*05). Despite this, none of the Patapsco River monitoring locations exhibit a statistically significant trend over the past five years of sampling or over the full sampling record (Mann-Kendall, *p-value* < 0.05), though PAT-2, PAT-3, and PAT-4 have regularly had annual and seasonal low-flow geometric means near or below the long-term 126 MPN/100ml target. PAT-4 has only exceeded this target one year, in 2015. The running geometric mean at PAT-1 is significantly higher than the MDE baseline geometric mean (314 MPN/100 ml vs. 231 MPN/100 ml, One-Sample t-test, *p-value* = 0.03). This likely results from high observed geometric means from 2020 through 2022. The geometric mean observed in 2023 is more in line with those observed prior to 2020 and is below the MDE baseline. This data is summarized in Table 9-27 and Figure 9-21 and Figure 9-22. Geometric means meeting the water quality standard (126 MPN) are denoted with bolded and italicized text in Table 9-27.

9.4.2.3.3.2 Single Sample Exceedance Rates

Single sample exceedance rates for the sampling period in 2023 were low for all Patapsco River monitoring locations. PAT-2 and PAT-4 had no samples exceed and bodily contact water standards, and PAT-1 and PAT-3 only had a single low-flow sample exceed the 235 MPN/100ml, 298 MPN/100ml, and 410 MPN/100ml standards. PAT-1 and PAT-3 had no high flow samples exceed any bodily contact standards. These results were an improvement for all of the sites. The most recent five years of single sample exceedance data is summarized in Table 9-28.

9.4.2.3.3.3 Summary

Sampling in 2023 produced positive results across the board at the Patapsco River watershed monitoring locations. All four sites had lower geometric mean values and only two total samples exceeded bodily contact water standards. PAT-2, PAT-3, and PAT-4 have consistently met water quality standards and PAT-1 has shown improvement over the past year.

9.4.2.3.3.4 Tables and Figures

Table 9-27: Lower North Branch of the Patapsco River Annual and Seasonal E. coli Results

Annual Data (MPN/100 mL)											
		2019		2020		2021		2022		2023	
Site	**Flow**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**
PAT-1	All	***109***	17	648	17	295	16	466	17	144	17
	High	***72***	10	474	9	364	6	2,420	1	***78***	1
	Low	195	7	922	8	260	10	421	16	150	16
PAT-2	All	***41***	17	152	17	***106***	16	133	17	***55***	17
	High	***29***	10	***92***	9	137	6	1,414	1	***58***	1
	Low	***67***	7	266	8	***90***	10	***115***	16	***55***	16
PAT-3	All	***41***	17	375	17	145	16	177	16	***63***	17
	High	***39***	10	262	9	189	6	1,046	1	***74***	1
	Low	***44***	7	560	8	***123***	10	158	15	***62***	16
PAT-4	All	***45***	17	***41***	16	***69***	16	***47***	17	***51***	17
	High	***36***	10	***39***	8	***81***	6	162	2	***51***	1
	Low	***63***	7	***44***	8	***63***	10	***40***	15	***51***	16
Seasonal Data (May 1st to September 30th) (MPN/100 mL)											
		2019		**2020**		**2021**		**2022**		**2023**	
Site	**Flow**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**
PAT-1	All	154	10	826	10	473	9	565	10	147	10
	High	133	5	666	5	1,047	3			***78***	1
	Low	178	5	1,025	5	318	6	565	10	157	9
PAT-2	All	***71***	10	***125***	10	154	9	146	10	***58***	10
	High	***77***	5	***83***	5	446	3			***58***	1
	Low	***65***	5	186	5	***90***	6	146	10	***58***	9
PAT-3	All	***57***	10	210	10	197	9	188	9	***70***	10
	High	***76***	5	143	5	424	3			***74***	1
	Low	***42***	5	308	5	135	6	188	9	***70***	9
PAT-4	All	***77***	10	***62***	10	***109***	9	***52***	10	***44***	10
	High	***70***	5	***109***	5	222	3	***36***	1	***51***	1
	Low	***84***	5	***36***	5	***76***	6	***54***	9	***43***	9

Table 9-28: Frequency of Exceedance of Single Sample Water Quality Standards

		N		Percent Single Sample Exceedance (MPN)							
				235		298		410		576	
Site	Year	High	Low	High	Low	High	Low	High	Low	High	Low
PAT-1	2023	1	9	0%	11%	0%	11%	0%	11%	0%	11%
	2022		10	N/A	80%	N/A	70%	N/A	70%	N/A	60%
	2021	3	6	100%	67%	100%	50%	100%	33%	67%	17%
	2020	5	5	80%	100%	60%	100%	60%	100%	60%	80%
	2019	5	5	20%	40%	20%	40%	20%	20%	20%	20%
PAT-2	2023	1	9	0%	0%	0%	0%	0%	0%	0%	0%
	2022		10	N/A	10%	N/A	10%	N/A	10%	N/A	10%
	2021	3	6	67%	0%	33%	0%	33%	0%	33%	0%
	2020	5	5	20%	20%	0%	20%	0%	20%	0%	20%
	2019	5	5	20%	20%	0%	0%	0%	0%	0%	0%
PAT-3	2023	1	9	0%	11%	0%	11%	0%	11%	0%	0%
	2022		9	N/A	44%	N/A	44%	N/A	22%	N/A	11%
	2021	3	6	33%	0%	33%	0%	33%	0%	33%	0%
	2020	5	5	60%	60%	40%	60%	20%	60%	0%	40%
	2019	5	5	20%	0%	0%	0%	0%	0%	0%	0%
PAT-4	2023	1	9	0%	0%	0%	0%	0%	0%	0%	0%
	2022	1	9	0%	11%	0%	0%	0%	0%	0%	0%
	2021	3	6	33%	0%	33%	0%	33%	0%	33%	0%
	2020	5	5	20%	0%	20%	0%	20%	0%	20%	0%
	2019	5	5	0%	20%	0%	20%	0%	20%	0%	0%

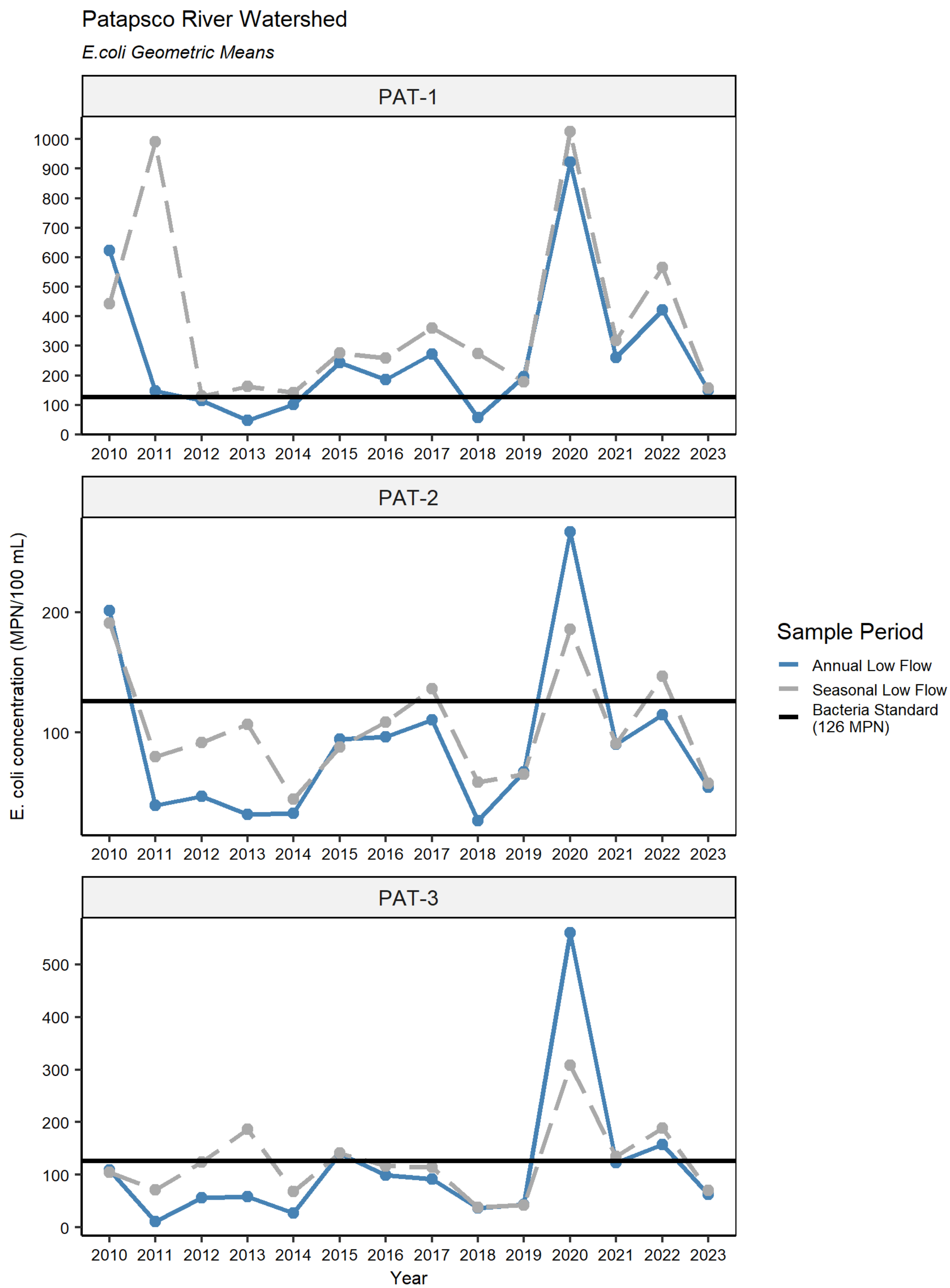


Figure 9-22: Annual and Seasonal Low Flow E. coli Geometric Mean Concentrations for Patapsco River Watershed Monitoring Locations PAT-1, PAT-2, and PAT-3 2010 - 2023

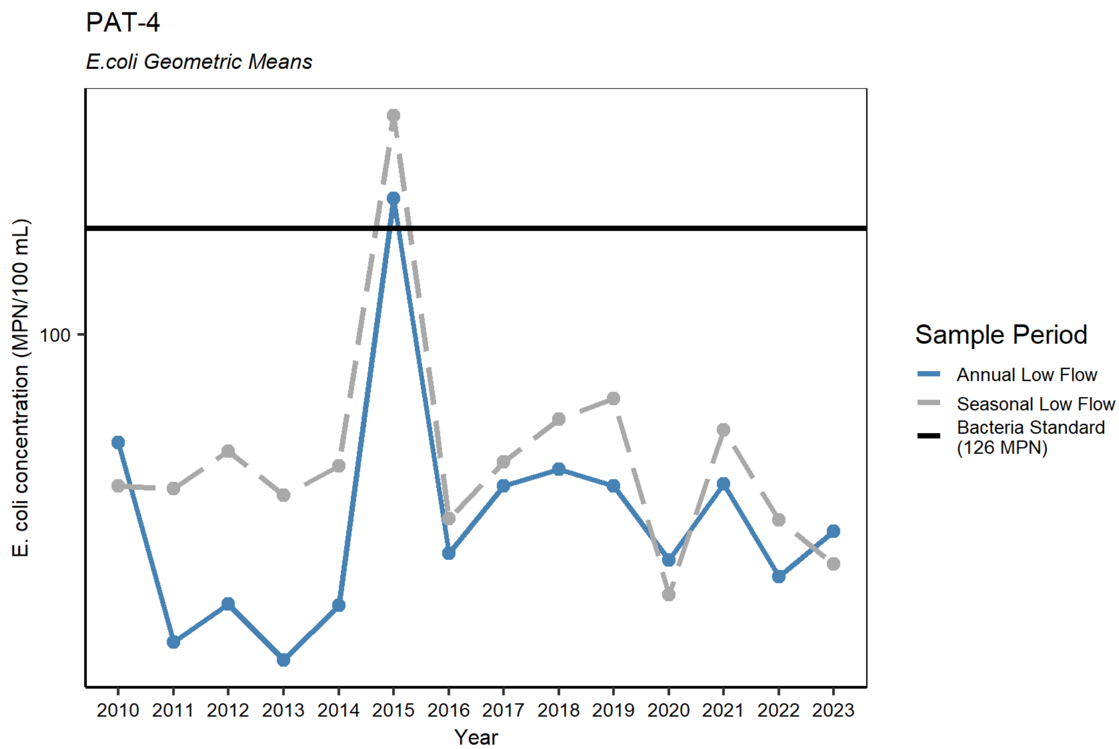


Figure 9-23: Annual and Seasonal Low Flow E. coli Geometric Mean Concentrations for Patapsco River Watershed Monitoring Location PAT-4 2010 – 2023

9.4.2.3.4 *Gwynns Falls*

9.4.2.3.4.1 Geometric Means

Sampling in 2023 produced annual and seasonal low-flow geometric mean values that were above the long-term target of 126 MPN/100ml at all current Gwynns Falls monitoring locations. GWY-2 and GF-B-8 had seasonal low-flow geometric means that were significantly below the running geometric mean, and DR-B-10 and GF-B-8 also had annual low-flow geometric means for 2023 that were below the running geometric mean (One-Sample *t-test*, *p-value* < 0.05). None of the Gwynns Falls monitoring locations exhibit and statistically significant trend over time in geometric mean values for the full monitoring record, but GF-B-8 does exhibit a significant downward trend over the past five years of sampling (Mann-Kendall, *p-value* < 0.05). Of the current monitoring locations only GWY-2 and GWY-6 were monitored by MDE to obtain baseline data, and both of these sites have seasonal low flow geometric mean values that are significantly below the MDE baseline (One-Sample *t-test*, *p-value* < 0.05). The most recent five years of geometric means data is summarized in Table 9-28 and the full record of low-flow geometric means data is shown in Figure 9-23 and Figure 9-24. Geometric means below the water quality standard (126 MPN/100ml) are displayed in bolded and italicized text in Table 9-28.

9.4.2.3.4.2 Single Sample Exceedance Rates

Single sample exceedance rates varied across the Gwynns Falls monitoring locations. GWY-6 was the only site to show a noticeable reduction in single sample exceedance rates, and this site had no samples exceed the 576 MPN/100ml infrequent bodily contact standard during low-flow conditions. All other sites continue to show moderate rates of samples exceeding the bodily contact standards.

9.4.2.3.4.3 Summary

2023 did not produce widespread improvements in the Gwynns Falls watershed, though the significant downward trend observed at GF-B-8 over the past five years is encouraging. While GWY-6 still requires improvement to meet water quality standards it is closer to meeting those standards than the other monitoring locations in this watershed. Overall, significant improvement is still needed at all sites.

9.4.2.3.4.4 Tables and Figures

Table 9-29: Gwynns Falls E. coli Annual and Seasonal Results

Annual Data (MPN/100 mL)											
		2019		**2020**		**2021**		**2022**		**2023**	
Site	**Flow**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**
DR-B-10	All	222	17	521	17	524	16	404	17	184	17
	High	188	5	1,385	3	1,065	3	1,627	4		
	Low	237	12	423	14	445	13	263	13	184	17
GF-B-8	All	954	17	1,058	17	970	16	456	17	305	17
	High	558	5	2,023	3	2,266	3	1,544	4		
	Low	1,193	12	921	14	798	13	313	13	305	17
GWY-2	All	276	9	273	14	274	16	317	17	154	17
	High	301	2	1,119	2	1,213	4	1,618	4		
	Low	269	7	216	12	167	12	192	13	154	17
GWY-6	All	142	17	251	16	234	16	310	15	164	17
	High	***50***	5	1,254	3	597	3	611	3		
	Low	218	12	173	13	189	13	262	12	164	17
SL-B-3	All	153	17	291	17	611	16	361	17	235	17
	High	214	5	869	5	717	3	1,852	4		
	Low	133	12	184	12	588	13	218	13	235	17
Seasonal Data (May 1st to September 30th) (MPN/100 mL)											
		2019		**2020**		**2021**		**2022**		**2023**	
Site	**Flow**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**
DR-B-10	All	273	10	602	10	768	9	432	10	276	10
	High	1,300	1	1,048	2	2,420	1	2,420	2		
	Low	230	9	524	8	665	8	281	8	276	10
GF-B-8	All	1,288	10	1,209	10	924	9	380	10	284	10
	High	2,420	1	1,850	2	2,420	1	1,646	2		
	Low	1,201	9	1,087	8	820	8	263	8	284	10
GWY-2	All	219	5	446	9	382	9	373	10	225	10
	High			1,119	2	2,420	2	2,420	2		
	Low	219	5	343	7	225	7	234	8	225	10
GWY-6	All	217	10	333	10	341	9	313	9	202	10
	High	131	1	1,254	3	2,420	1	2,420	1		
	Low	229	9	188	7	267	8	243	8	202	10
SL-B-3	All	***109***	10	309	10	617	9	353	10	276	10
	High	326	1	655	3	727	1	2,048	2		
	Low	***97***	9	224	7	604	8	227	8	276	10

Table 9-30: Frequency of Exceedance of Single Sample Water Quality Standards

		N		Percent Single Sample Exceedance (MPN)							
				235		298		410		576	
Site	Year	High	Low	High	Low	High	Low	High	Low	High	Low
DR-B-10	2023		10	N/A	60%	N/A	50%	N/A	30%	N/A	20%
	2022	2	8	100%	50%	100%	38%	100%	25%	100%	12%
	2021	1	8	100%	100%	100%	62%	100%	50%	100%	50%
	2020	2	8	100%	62%	100%	62%	100%	50%	100%	38%
	2019	1	9	100%	33%	100%	33%	100%	22%	100%	11%
GF-B-8	2023		10	N/A	50%	N/A	30%	N/A	30%	N/A	20%
	2022	2	8	100%	50%	100%	38%	100%	38%	100%	0%
	2021	1	8	100%	75%	100%	75%	100%	75%	100%	75%
	2020	2	8	100%	100%	100%	100%	100%	88%	100%	88%
	2019	1	9	100%	100%	100%	100%	100%	100%	100%	89%
GWY-2	2023		10	N/A	60%	N/A	40%	N/A	10%	N/A	10%
	2022	2	8	100%	50%	100%	38%	100%	12%	100%	12%
	2021	2	7	100%	43%	100%	43%	100%	29%	100%	14%
	2020	2	7	100%	57%	100%	57%	100%	43%	50%	29%
	2019		5	N/A	20%	N/A	20%	N/A	20%	N/A	20%
GWY-6	2023		10	N/A	50%	N/A	30%	N/A	10%	N/A	0%
	2022	1	8	100%	50%	100%	50%	100%	25%	100%	12%
	2021	1	8	100%	62%	100%	25%	100%	12%	100%	12%
	2020	3	7	100%	43%	100%	29%	100%	29%	67%	29%
	2019	1	9	0%	44%	0%	33%	0%	33%	0%	11%
SL-B-3	2023		10	N/A	50%	N/A	50%	N/A	30%	N/A	30%
	2022	2	8	100%	50%	100%	38%	100%	38%	100%	25%
	2021	1	8	100%	88%	100%	75%	100%	62%	100%	50%
	2020	3	7	100%	57%	67%	43%	67%	14%	67%	14%
	2019	1	9	100%	22%	100%	11%	0%	0%	0%	0%

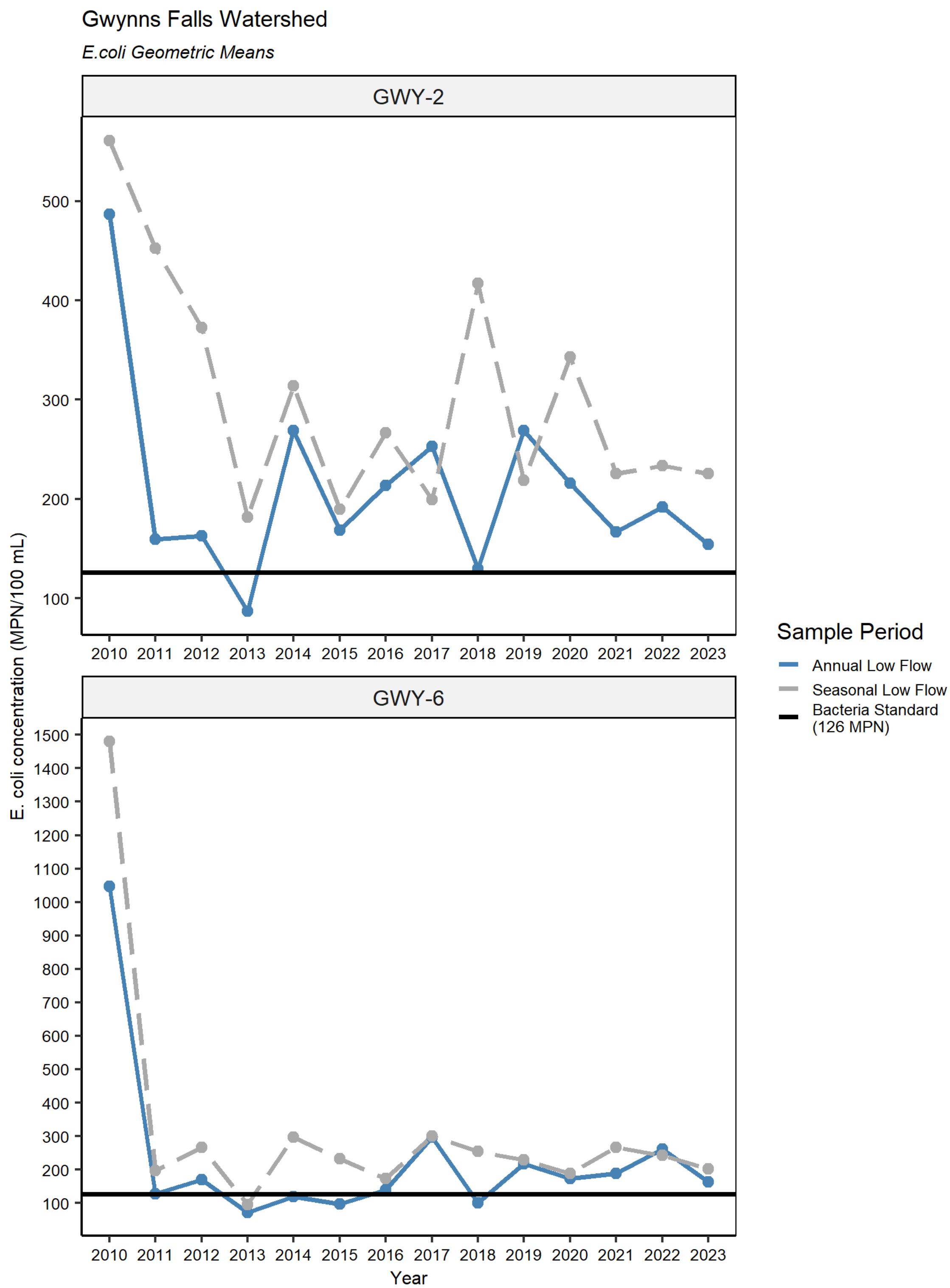


Figure 9-24: Annual and Seasonal Low Flow E. coli Geometric Mean Concentrations for Gwynns Falls Watershed Monitoring Locations GWY-2, and GWY-6 2010 – 2023

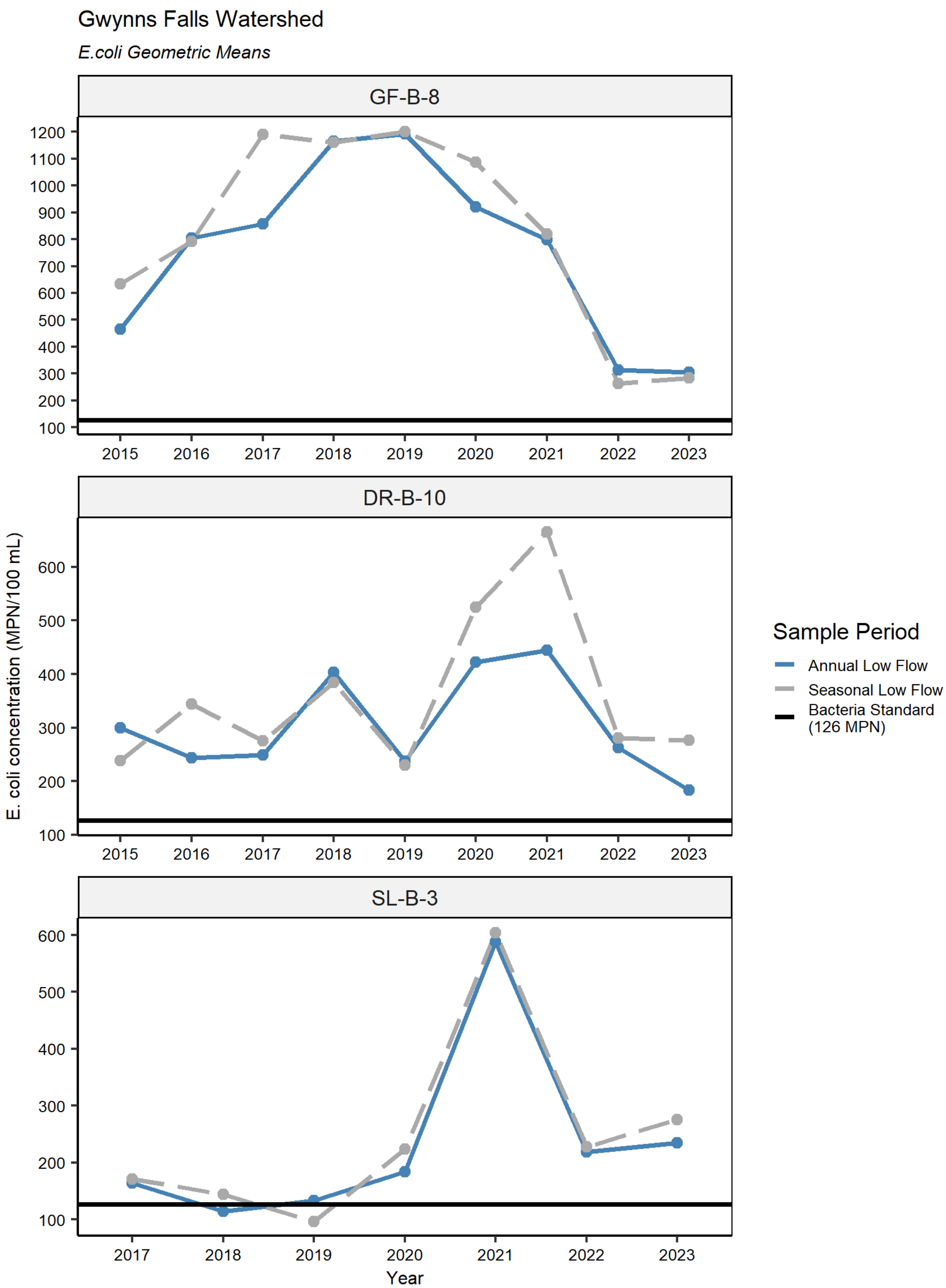


Figure 9-25: Annual and Seasonal Low Flow E. coli Geometric Mean Concentrations for Gwynns Falls Watershed Monitoring Locations GF-B-8, DR-B-10, and SL-B-3 2015 – 2023

9.4.2.3.5 Jones Falls

9.4.2.3.5.1 Geometric Means

Sampling in 2023 resulted in annual low-flow geometric means that were below the long-term target of 126 MPN/100ml at JON-2 and JF-B-12 as well as annual low-flow geometric means that were below the target at JON-2. JON-3, JON-4, and JF-B-13 all had low-flow geometric means that were above the long-term target. The annual low-flow geometric mean for 2023 was significantly below the running geometric mean at JF-B-12, and the seasonal low-flow geometric mean was significantly below the running geometric means at JON-3 and JON-4 (One-Sample *t-test*, *p-value* < 0.05). None of the Jones Falls monitoring locations exhibit a statistically significant trend over time over the past five years or over the full monitoring record (Mann-Kendall, *p-value* > 0.05). Of the five current monitoring locations in the Jones Falls watershed, only JON-2, JON-3, and JON-4 were monitored by MDE to obtain baseline data. All three of these sites have running seasonal low-flow geometric mean values that are significantly below the MDE baseline data (One-Sample *t-test*, *p-value* < 0.05). The most recent five years of geometric means data are summarized in Table 9-31 and the full record of low-flow geometric means data is shown in Figure 9-25 and Figure 9-26. Geometric means below the water quality standard (126 MPN/100ml) are displayed in bolded and italicized text in Table 9-31.

9.4.2.3.5.2 Single Sample Exceedance Rates

All five monitoring locations exhibited moderate to high seasonal low-flow single sample exceedance rates during the 2023 sampling period. As a result of dry weather, no seasonal high flow samples were collected. JON-3 and JON-4 showed a decline in exceedance rates when compared to the previous year, but JON-2, JF-B-12, and JF-B-13 showed general increases in the exceedance rates.

9.4.2.3.5.3 Summary

The 2023 monitoring data does show some positive signs for the Jones Falls monitoring locations. All five of the sites did show year over year declines in the annual low flow geometric mean values. The year over year decline in single sample exceedance rates at JON-3 and JON-4 is also encouraging. Of the five sites, JON-2 and JF-B-12 appear to be the closest to meeting water quality standards. JON-2 consistently exhibits annual and seasonal low-flow geometric mean values below 126 MPN/100ml and JF-B-12 has often been below this target as well. Improvement is needed in the geometric means at the other three sites, and all five sites need improvement in single sample exceedance rates to consistently meet water quality standards.

9.4.2.3.5.4 Tables and Figures

Table 9-31: Jones Falls E. coli Results on an Annual and Seasonal Basis

Annual Data (MPN/100 mL)											
		2019		2020		2021		2022		2023	
Site	**Flow**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**
JF-B-12	All	***75***	17	190	16	228	16	204	17	***93***	17
	High	***51***	7	266	2	636	3	1,093	4		
	Low	***100***	10	181	14	180	13	***122***	13	***93***	17
JF-B-13	All	192	17	208	17	344	16	196	17	213	17
	High	***105***	7	169	2	467	3	154	4		
	Low	294	10	214	15	320	13	211	13	213	17
JON-2	All	***46***	9	***95***	14	***86***	16	***94***	17	***51***	17
	High	***39***	4	162	1	169	3	199	4		
	Low	***52***	5	***91***	13	***74***	13	***75***	13	***51***	17
JON-3	All	175	9	236	14	254	16	339	17	194	17
	High	***104***	4	130	1	423	3	799	3		
	Low	265	5	248	13	225	13	282	14	194	17
JON-4	All	176	8	517	14	371	16	363	17	174	17
	High	***87***	4	285	1	322	3	***100***	3		
	Low	355	4	541	13	383	13	479	14	174	17
Seasonal Data (May 1st to September 30th) (MPN/100 mL)											
		2019		2020		2021		2022		2023	
Site	**Flow**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**
JF-B-12	All	***73***	10	285	10	296	9	171	10	141	10
	High	***22***	3	***122***	1	2,420	1	968	2		
	Low	***121***	7	313	9	228	8	***111***	8	141	10
JF-B-13	All	336	10	322	10	713	9	302	10	594	10
	High	329	3	***74***	1	2,420	1	635	2		
	Low	338	7	379	9	612	8	251	8	594	10
JON-2	All	***24***	5	***89***	9	***117***	9	***95***	10	***81***	10
	High	***24***	2	162	1	461	1	669	2		
	Low	***23***	3	***83***	8	***98***	8	***58***	8	***81***	10
JON-3	All	238	5	427	9	562	9	536	10	266	10
	High	151	2	130	1	2,420	1	2,420	1		
	Low	322	3	495	8	468	8	453	9	266	10
JON-4	All	344	4	818	9	941	9	907	10	282	10
	High	236	2	285	1	1,986	1	2,420	1		
	Low	501	2	933	8	858	8	814	9	282	10

Table 9-32: Frequency of Exceedance of Single Sample Water Quality Standards

Site	Year	N High	N Low	235 High	235 Low	298 High	298 Low	410 High	410 Low	576 High	576 Low
JF-B-12	2023		10	N/A	30%	N/A	20%	N/A	20%	N/A	10%
	2022	2	8	100%	12%	100%	0%	50%	0%	50%	0%
	2021	1	8	100%	50%	100%	38%	100%	25%	100%	25%
	2020	1	9	0%	67%	0%	56%	0%	44%	0%	44%
	2019	3	7	0%	14%	0%	14%	0%	14%	0%	14%
JF-B-13	2023		10	N/A	60%	N/A	60%	N/A	50%	N/A	50%
	2022	2	8	100%	38%	50%	38%	50%	38%	50%	25%
	2021	1	8	100%	75%	100%	75%	100%	62%	100%	62%
	2020	1	9	0%	78%	0%	67%	0%	56%	0%	33%
	2019	3	7	33%	86%	33%	57%	33%	29%	33%	29%
JON-2	2023		10	N/A	30%	N/A	20%	N/A	20%	N/A	10%
	2022	2	8	50%	25%	50%	25%	50%	25%	50%	25%
	2021	1	8	100%	38%	100%	38%	100%	38%	0%	38%
	2020	1	8	0%	25%	0%	25%	0%	25%	0%	12%
	2019	2	3	0%	0%	0%	0%	0%	0%	0%	0%
JON-3	2023		10	N/A	60%	N/A	40%	N/A	30%	N/A	20%
	2022	1	9	100%	78%	100%	78%	100%	67%	100%	56%
	2021	1	8	100%	88%	100%	62%	100%	38%	100%	38%
	2020	1	8	0%	75%	0%	62%	0%	62%	0%	50%
	2019	2	3	50%	67%	50%	33%	0%	33%	0%	33%
JON-4	2023		10	N/A	60%	N/A	30%	N/A	30%	N/A	10%
	2022	1	9	100%	100%	100%	100%	100%	89%	100%	89%
	2021	1	8	100%	100%	100%	88%	100%	75%	100%	62%
	2020	1	8	100%	100%	0%	100%	0%	88%	0%	75%
	2019	2	2	50%	100%	50%	100%	50%	50%	50%	50%

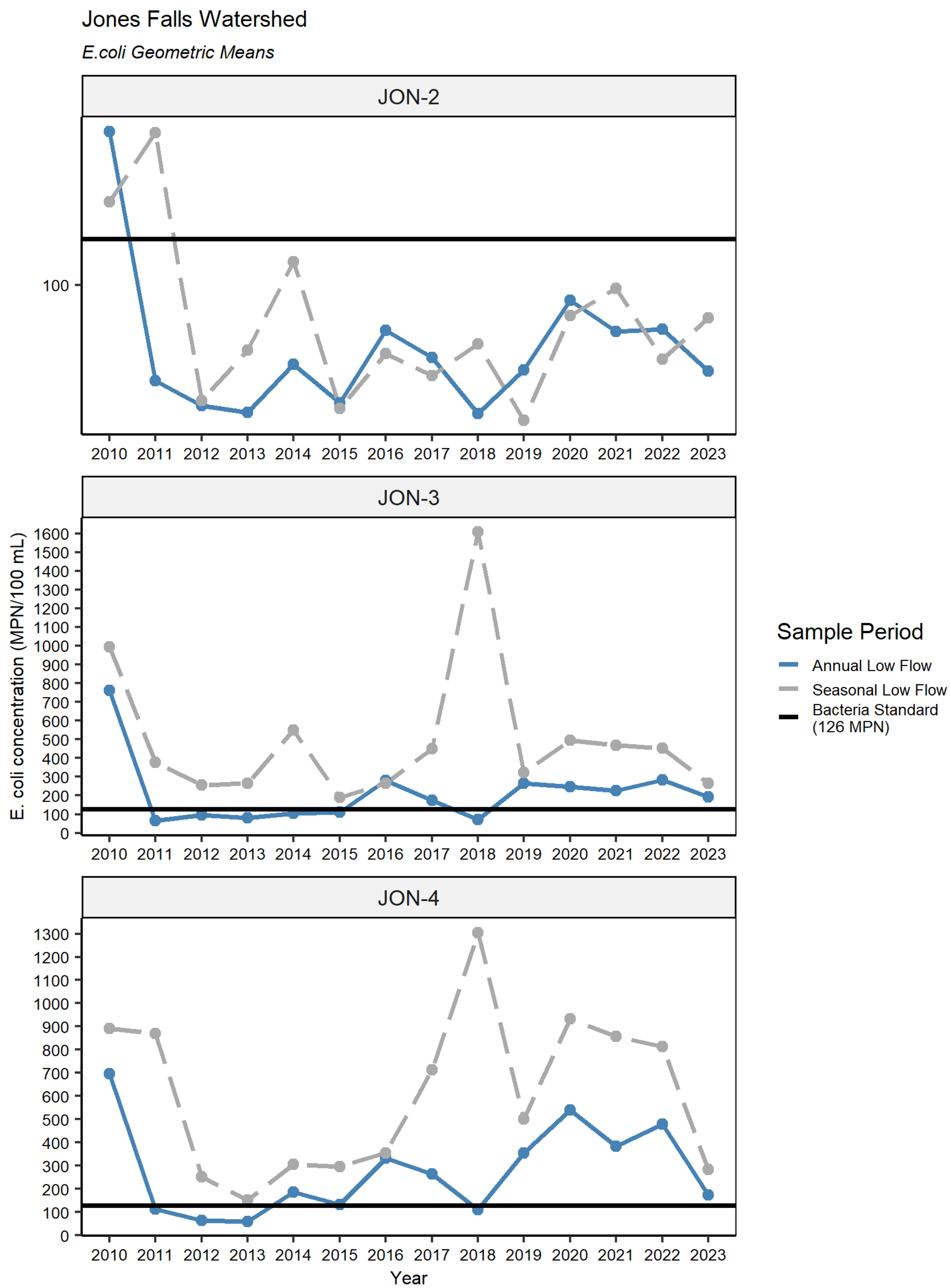


Figure 9-26: Annual and Seasonal Low Flow E. coli Geometric Mean Concentrations for Jones Falls Watershed Monitoring Locations JON-2, JON-3, and JON-4 2010 – 2023

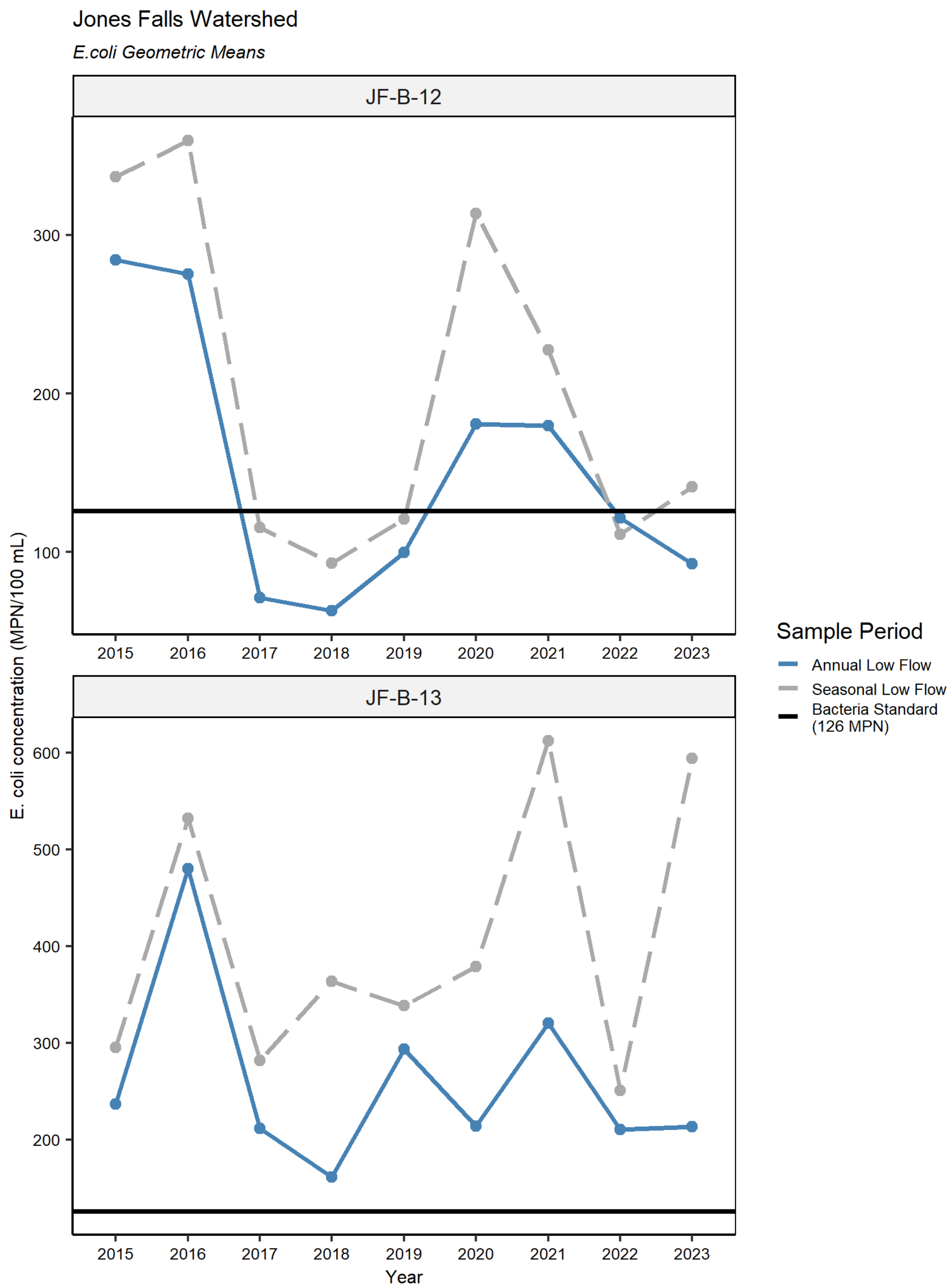


Figure 9-27: Annual and Seasonal Low Flow E. coli Geometric Mean Concentrations for Jones Falls Watershed Monitoring Locations JF-B-12 and JF-B-13 2015 – 2023

9.4.2.3.6 Herring Run

9.4.2.3.6.1 Geometric Means

Sampling in 2023 resulted in annual and seasonal low-flow geometric means that were well above the long-term target of 126 MPN/100ml at all sampling locations. The annual and seasonal low-flow geometric means were both significantly higher than the running geometric means at HR-B-12 an HR-B-13 (One-Sample *t-test*, *p-value < 0.05*). None of the current Herring Run monitoring locations exhibit and statistically significant trend over time for either the past five years or over the full monitoring record. None of the current monitoring locations were sampled by MDE to produce baseline data. The most recent five years of geometric means data are summarized in Table 9-34 and the full record of low-flow geometric mean data is shown in Figure 9-35. Geometric means below the water quality standard (126 MPN/100ml) are displayed in bolded and italicized text in Table 9-34.

9.4.2.3.6.2 Single Sample Exceedance Rates

All four sampling locations exhibited high seasonal single sample exceedance rates during the 2023 sampling period. All four locations also exhibited higher single sample exceedance rates in 2023 than in previous years.

9.4.2.3.6.3 Summary

The 2023 monitoring data indicate a continuing increase in bacteria concentrations in the Herring Run watershed. None of the monitoring locations in this watershed are currently on track to meet water quality standards, though HR-B-15 does show an overall improvement from the start of sampling in 2015 to the current sampling year.

9.4.2.3.6.4 Tables and Figures

Table 9-33: Herring Run Annual Geometric Mean by Weather

Annual Data (MPN/100 mL)											
		2019		2020		2021		2022		2023	
Site	**Flow**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**
HR-B-12	All	629	14	578	16	445	17	576	17	856	17
	High	779	5	1,713	3	866	1	488	1	2,420	1
	Low	559	9	450	13	427	16	582	16	802	16
HR-B-13	All	692	15	318	16	377	17	265	17	580	17
	High	406	6	609	3	727	1	166	1	2,420	1
	Low	986	9	274	13	362	16	273	16	531	16
HR-B-14	All	151	15	326	16	210	17	269	17	206	13
	High	***64***	6	925	3	345	1	345	1	2,420	1
	Low	270	9	257	13	204	16	265	16	167	12
HR-B-15	All	795	15	693	16	455	17	834	17	760	17
	High	502	6	1,371	4	387	1	517	1	2,420	1
	Low	1,080	9	552	12	460	16	860	16	707	16
Seasonal Data (May 1st to September 30th) (MPN/100 mL)											
		2019		2020		2021		2022		2023	
Site	**Flow**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**	**MPN**	**N**
HR-B-12	All	656	8	445	9	377	10	807	10	1,265	10
	High	762	2					488	1	2,420	1
	Low	624	6	445	9	377	10	854	9	1,177	9
HR-B-13	All	886	9	439	9	658	10	624	10	1,116	10
	High	672	2					166	1	2,420	1
	Low	959	7	439	9	658	10	723	9	1,024	9
HR-B-14	All	431	9	475	9	566	10	783	10	701	8
	High	653	2					345	1	2,420	1
	Low	383	7	475	9	566	10	857	9	587	7
HR-B-15	All	1,416	9	762	9	640	10	1,048	10	1,132	10
	High	1,850	2					517	1	2,420	1
	Low	1,311	7	762	9	640	10	1,134	9	1,040	9

Table 9-34: Frequency of Exceedance of Single Sample Water Quality Standards

Site	Year	N High	N Low	Percent Single Sample Exceedance (MPN) 235 High	235 Low	298 High	298 Low	410 High	410 Low	576 High	576 Low
HR-B-12	2023	1	9	100%	89%	100%	89%	100%	89%	100%	89%
	2022	1	9	100%	78%	100%	67%	100%	67%	0%	67%
	2021		10	N/A	70%	N/A	40%	N/A	30%	N/A	30%
	2020		9	N/A	67%	N/A	67%	N/A	56%	N/A	56%
	2019	2	6	100%	67%	100%	67%	100%	67%	50%	67%
HR-B-13	2023	1	9	100%	100%	100%	100%	100%	89%	100%	78%
	2022	1	9	0%	89%	0%	89%	0%	78%	0%	56%
	2021		10	N/A	80%	N/A	70%	N/A	50%	N/A	40%
	2020		9	N/A	67%	N/A	67%	N/A	67%	N/A	44%
	2019	2	7	100%	71%	100%	71%	100%	71%	50%	71%
HR-B-14	2023	1	7	100%	86%	100%	57%	100%	57%	100%	57%
	2022	1	9	100%	89%	100%	89%	0%	89%	0%	56%
	2021		10	N/A	80%	N/A	70%	N/A	70%	N/A	60%
	2020		9	N/A	89%	N/A	78%	N/A	33%	N/A	22%
	2019	2	7	100%	71%	100%	57%	100%	43%	50%	43%
HR-B-15	2023	1	9	100%	100%	100%	100%	100%	89%	100%	78%
	2022	1	9	100%	100%	100%	89%	100%	89%	0%	67%
	2021		10	N/A	70%	N/A	70%	N/A	70%	N/A	60%
	2020		9	N/A	89%	N/A	89%	N/A	78%	N/A	67%
	2019	2	7	100%	100%	100%	100%	100%	86%	100%	71%

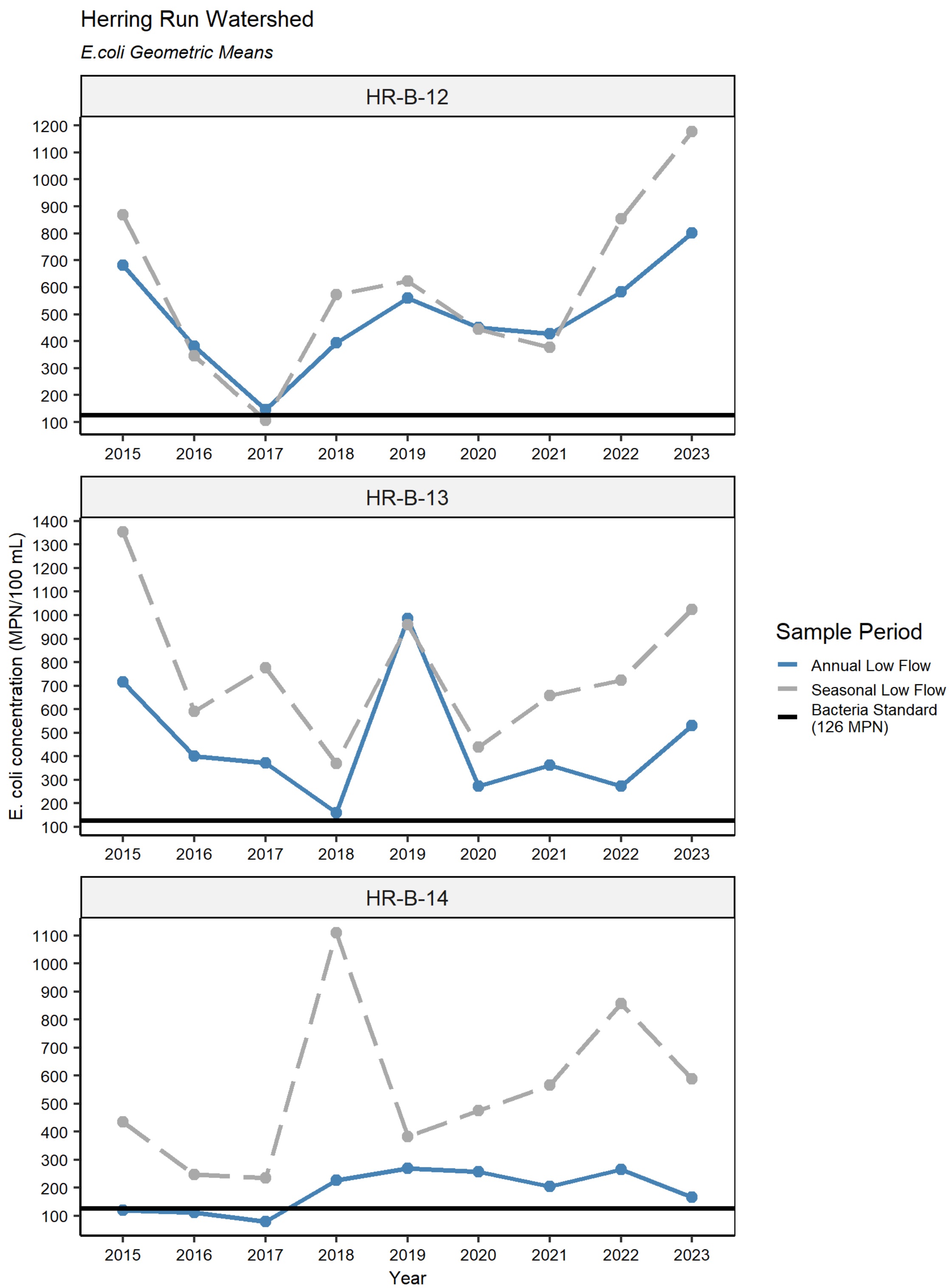


Figure 9-26: Annual and Seasonal Low Flow E. coli Geometric Mean Concentrations for Herring Run Watershed Monitoring Locations HR-B-12, HR-B-13, and HR-B-14 2015 – 2023

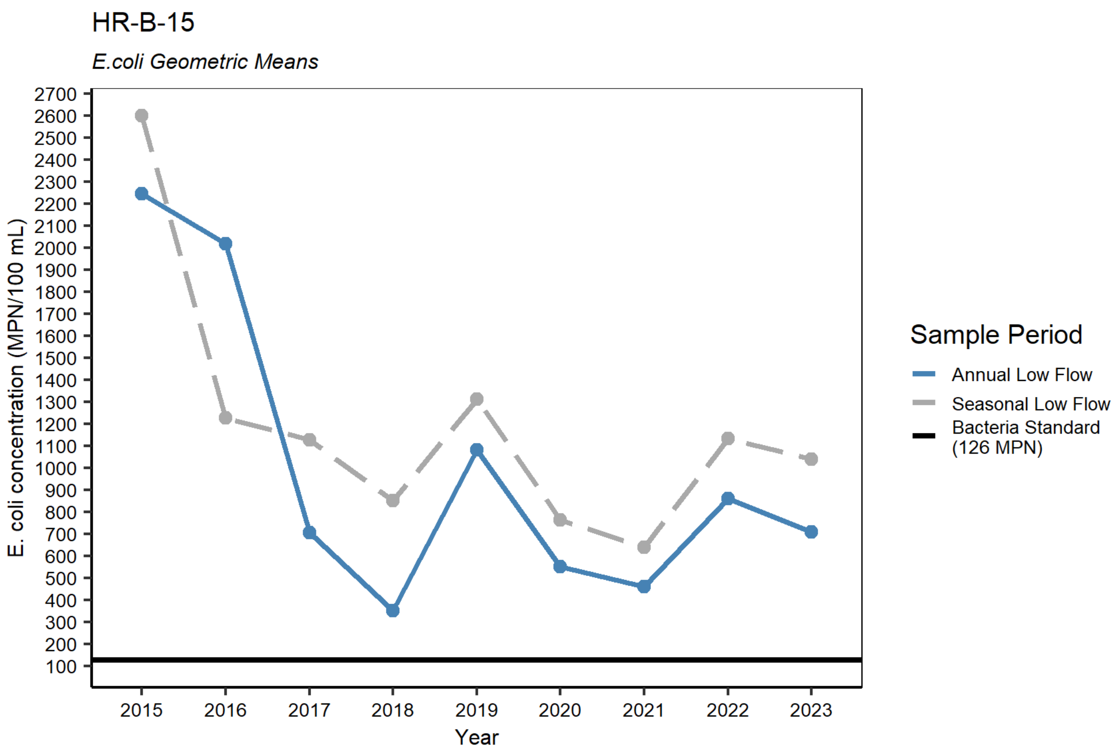


Figure 9-27: Annual and Seasonal low flow E. coli Geometric Mean Concentrations for Herring Run Monitoring Location HR-B-15 2015 – 2023

9.4.3 Biological Monitoring

In addition to the biological monitoring required at Scotts Level Branch under Baltimore County's NPDES permit, the County has five additional biological monitoring programs. These programs use the biological community to assess the ecological health of the streams within the County both freshwater and tidal (Probabilistic Monitoring Program), assess the effectiveness of stream restoration projects (CIP Monitoring Program), provide data on the best streams in Baltimore County to serve as bench marks for other stream assessments (Reference Site Monitoring Program), represent environmental variation over a range of watershed land uses (Sentinel Site Monitoring Program), and assess Submerged Aquatic Vegetation (Submerged Aquatic Vegetation (SAV) Monitoring Program). The first four programs use assessments based on the benthic macroinvertebrate community and, in some cases, the fish assemblage. It is widely accepted that the biological community of streams is sensitive to anthropogenic perturbations. By monitoring the biological community, the County can assess the amount of change due to anthropogenic activities and the benefit of stream restoration to stream organisms. The SAV Monitoring Program provides an assessment of the coverage of SAV and progress made in meeting the current water quality standards for water clarity and SAV coverage in Baltimore County tidal waters.

9.4.3.1 Probabilistic Monitoring

Since 2003, Baltimore County has followed Maryland Biological Stream Survey (MBSS) probabilistic monitoring methods. Probabilistic monitoring (random selection of monitoring stations) allows statistically valid conclusions to be drawn regarding stream condition. This approach provides greater resolution of County stream condition because there are more stations in County streams and the data are directly comparable to data generated by MBSS.

The County contracts a consultant to perform a portion of the probabilistic monitoring. In past years a different basin was sampled each year, with the Patapsco/Back River Basin (Liberty Reservoir, Patapsco River, Gwynns Falls, Jones Falls, and Back River) monitored in odd years and the Gunpowder River Basin and Deer Creek watersheds (Deer Creek, Prettyboy Reservoir, Loch Raven Reservoir, Lower Gunpowder, Little Gunpowder, and Bird River) monitored in the even years. Beginning with the 2023 sampling, Baltimore County will conduct monitoring using a non-rotational sampling design suggested by MDE. Three watersheds are not assessed using the Biological Probabilistic Monitoring Program (Baltimore Harbor, Middle River, and Gunpowder River) due to the limited miles of non-tidal streams in the watersheds.

Fifty sites are randomly selected, and macroinvertebrates are sampled during the spring index period, March 1st to April 30th, using the MBSS protocols. These samples are sub-sampled to at least 100 organisms, identified to Genus or the lowest possible taxonomic level, and a Benthic Index of Biotic Integrity (BIBI) is calculated. In 2006, a subset of previously sampled random sites located towards the base of major subwatersheds were selected to serve as sentinel sites. Eighteen sentinel sites were originally selected in the Patapsco/Back River basin, and 13 sentinel sites were selected in the Gunpowder/Deer Creek basin. Eleven of the original sentinel sites in the Patapsco/Back River and 8 in the Gunpowder/Deer Creek watersheds are currently monitored. Sentinel sites have been dropped in subsequent years as a result of permission loss and other factors. These 21 sentinel sites are used to monitor biological condition over a range of watershed and stream conditions.

Baltimore County has two physiographic provinces, the Eastern Piedmont and Coastal Plain, each of which have their own BIBI stratum and component metrics. Component metrics of BIBI strata and expected stressor response are displayed in Table 9-35 and Table 9-36.

Table 9-35: BIBI Eastern Piedmont Metrics

BIBI Metric	Metric Measure	Expected Response
Number of Taxa	Species Richness	Decrease
Number of EPT	Species Richness	Decrease
Number of Ephemeroptera	Species Richness	Decrease
Percent Intolerant to Urban	Tolerance/Intolerance	Decrease
Percent Chironomidae	Taxonomic Composition	Increase
Percent Clingers	Habit	Decrease

Table 9-36: BIBI Coastal Plain Metrics

BIBI Metric	Metric Measure	Expected Response
Number of Taxa	Species Richness	Decrease
Number of EPT	Species Richness	Decrease
Number of Ephemeroptera	Species Richness	Decrease
Percent Intolerant to Urban	Tolerance/Intolerance	Decrease
Percent Ephemeroptera	Taxonomic Composition	Decrease
Number of Scrapers	Habit	Decrease
Percent Climber	Habit	Decrease

The BIBI scores for each site from the 2023 probabilistic monitoring are listed in the NPDES MS4 Geodatabase. Figure 9-28 shows the results by watershed, as the percentage of sites within each BIBI range, for the entire nineteen-year probabilistic data set.

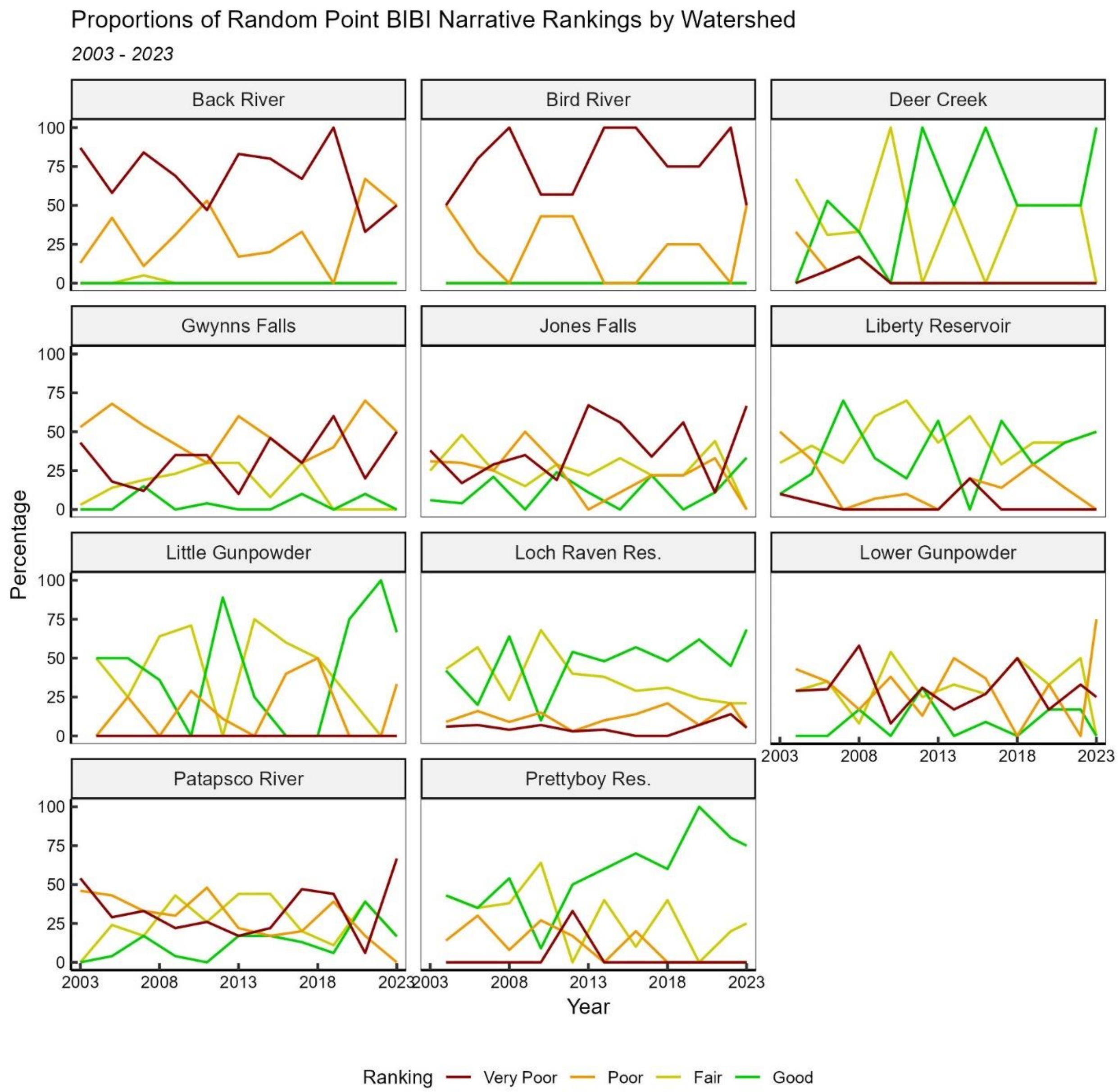


Figure 9-28: Percentages of sites scoring in each of the four Narrative Rank categories from 2003 – 2023.

Figure 9-29 and Figure 9-30 show the annual mean linear trend over time of BIBI scores for each watershed between 2003 and 2023. BIBI scores increased between 2019 and 2021 in each of the Patapsco/Back River 8-digit watersheds, though scores decreased from 2021 to 2023 in three of five watersheds. The Liberty Reservoir watershed has had the highest average BIBI score in the Patapsco/Back River basin since Baltimore County began its random point biological monitoring program in 2003 except for 2021, where the Patapsco watershed had a higher average BIBI score. In the Gunpowder/Deer Creek watersheds between 2022 and 2023, BIBI scores increased in the Bird River, Deer Creek, and Loch Raven Reservoir watersheds. BIBI scores decreased in the Lower Gunpowder, Little Gunpowder, and Prettyboy Reservoir watersheds. In both the Patapsco and Gunpowder basins, the watersheds with the poorest biological condition coincide with the most populated and urbanized areas within Baltimore County.

The procedure developed by Maryland Department of the Environment and Maryland Department of Natural Resources to determine biological impairment of fresh water streams was used to decide the watershed condition for all nineteen sampling years. The procedure is detailed in the following document:

http://mde.maryland.gov/programs/Water/TMDL/Integrated303dReports/Documents/Assessment_Methodologies/Biological_Listing_Methodology-non-tidalwadeablestreams_2014_Final%20(New%20links).pdf

The method assesses watersheds at the Maryland 8-digit scale, and uses 90% confidence limits around the proportion of degraded stream miles to determine whether the proportion of degraded stream miles is significantly different from reference conditions. Watersheds are listed as "Attaining," "Impaired," or "Inconclusive." The results of the biological listing method are presented in Table 9-37. Figure 9-31 displays site and watershed condition for sites sampled in 2020 and 2023. The sites, with color-coded condition, are overlain on their respective 8-digit watersheds.

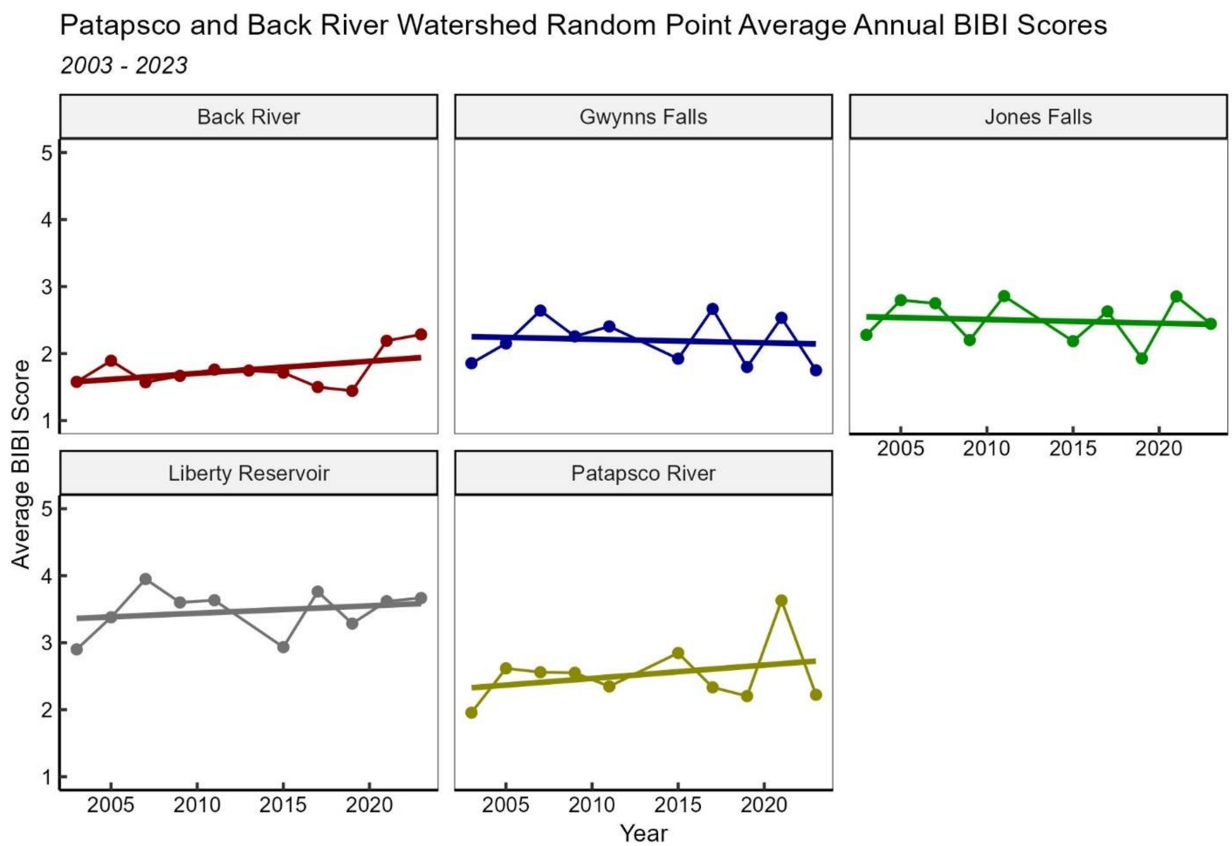


Figure 9-29: Annual mean and linear trend of BIBI scores for Patapsco/Back River watersheds between 2003 and 2023. Scores of 1-1.99=Very Poor, 2-2.99=Poor, 3-3.99=Fair, and 4-5=Good.

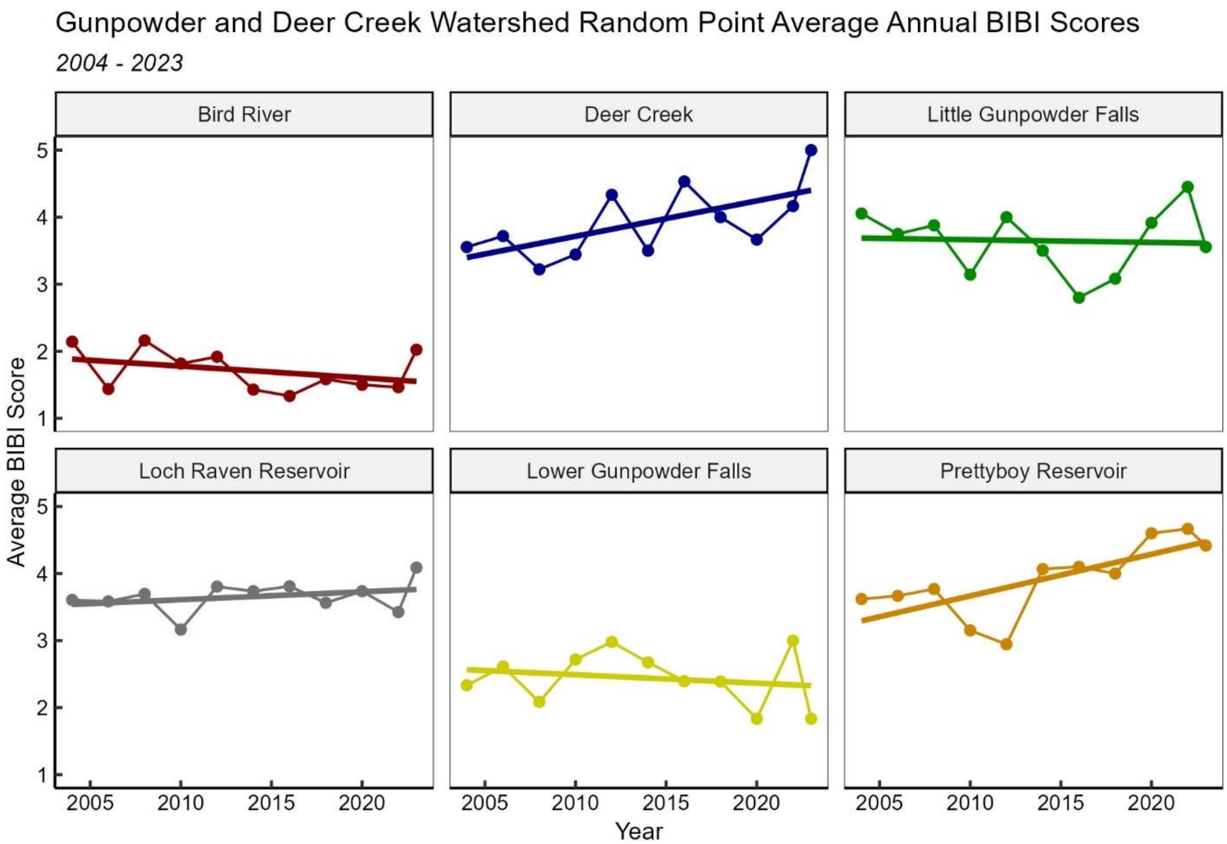


Figure 9-30: Annual mean and linear trend of BIBI scores of Gunpowder Falls/Deer Creek watersheds between 2004 and 2023.

Table 9-37: Watershed Biological Condition Using Percent Stream Mile Method (2008-2023 Only)

Watershed Sampled	Sites		Stream Miles	Category
	Total (2008-2023)	Degraded (2008-2023)	Percent with Possible Degradation	
Back River	62	62	100%	Impaired
Bird River	42	42	100%	Impaired
Deer Creek	33	4	12%	Attaining
Gwynns Falls	106	83	78%	Impaired
Jones Falls	89	57	64%	Impaired
Liberty Reservoir	60	8	13%	Attaining
Little Gunpowder Falls	51	8	16%	Attaining
Loch Raven Reservoir	313	51	16%	Attaining
Lower Gunpowder Falls	80	47	59%	Impaired
Patapsco River	147	82	56%	Impaired
Prettyboy Reservoir	64	9	14%	Attaining

Based on the percent stream mile criteria over the sampling period of the past sixteen years, 2008-2023, Deer Creek, Liberty Reservoir, Little Gunpowder, Loch Raven Reservoir, and Prettyboy Reservoir met biological criteria. All remaining watersheds were considered impaired at varying levels of severity. Considering only the past two years, Figure 9-31 indicates sites and sub-watersheds that are close to the population centers of Baltimore County are the most impaired.

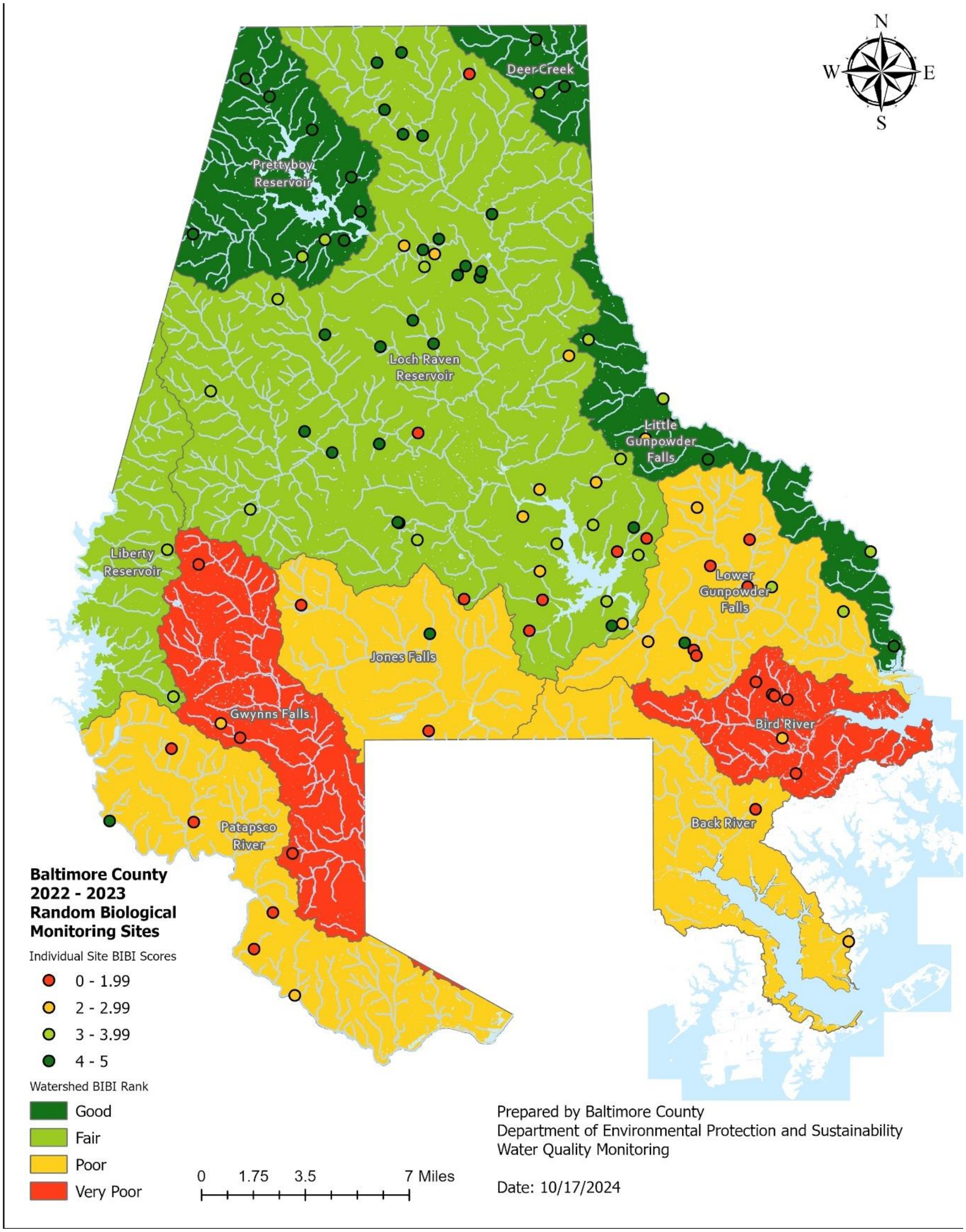


Figure 9-31: Probabilistic Biological Monitoring results for 2022 and 2023. Sample points are superimposed on named Baltimore County 8-Digit subwatersheds. Scores of 1-1.99=Very Poor, 2-2.99=Poor, 3-3.99=Fair, and 4-5=Good.

Two year rolling averages were calculated using the probabilistic data for the entire period of record. This smoothing technique clarifies underlying patterns in data. The results are shown in Figure 9-32 and Figure 9-33. The Back River watershed is well below the overall average, while

Liberty is above it. For all watersheds, the rolling averages suggest relative stability in biological condition over this short period of record.

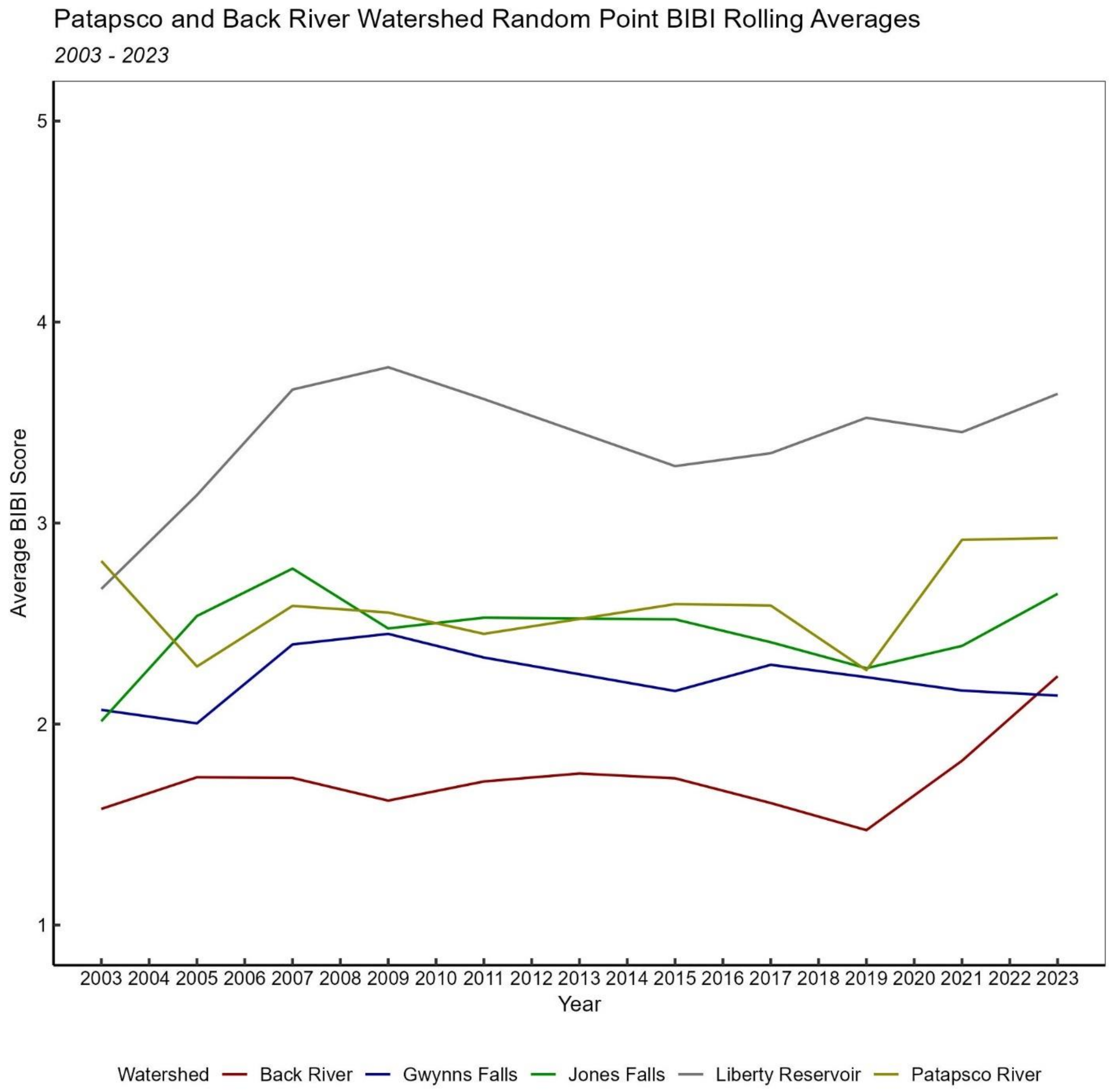


Figure 9-32: BIBI rolling averages for Patapsco/Back River probabilistic monitoring sites between 2003 and 2023. Scores of 1-1.99=Very Poor, 2-2.99=Poor, 3-3.99=Fair, and 4-5=Good.

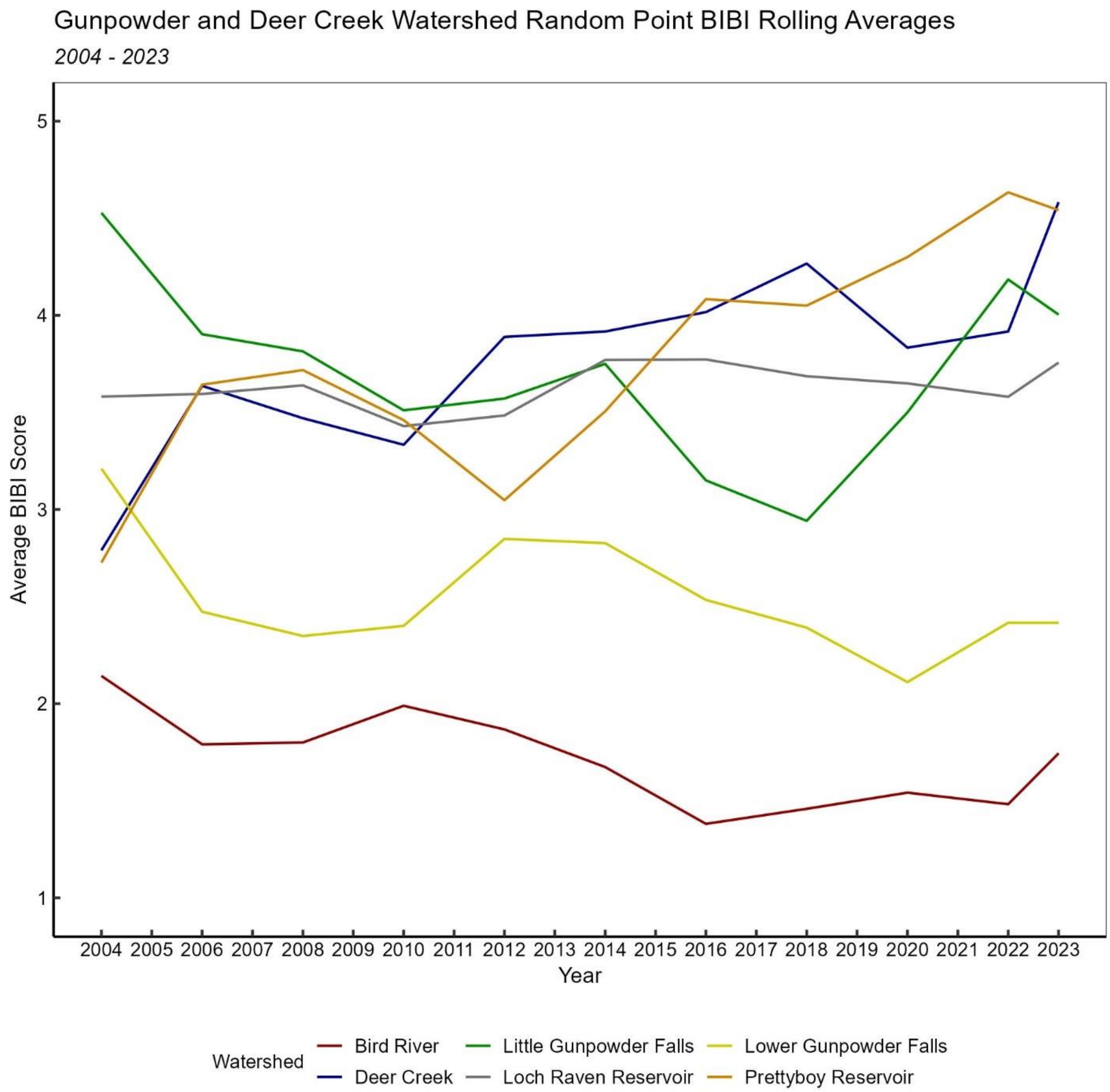


Figure 9-33: BIBI rolling averages for Gunpowder/Deer Creek probabilistic monitoring sites between 2004 and 2023.

There are currently 11 sentinel sites monitored in the Patapsco/Back River drainage and 8 sentinel sites in the Gunpowder River/Deer Creek drainage. The sentinel sites represent environmental variation over a range of watershed land use. Sentinel sites were sampled in 2003 and 2004, and 2006-2023. Figure 9-34 shows the BIBI scores for sentinel sites, by watershed, between 2003 and 2023.

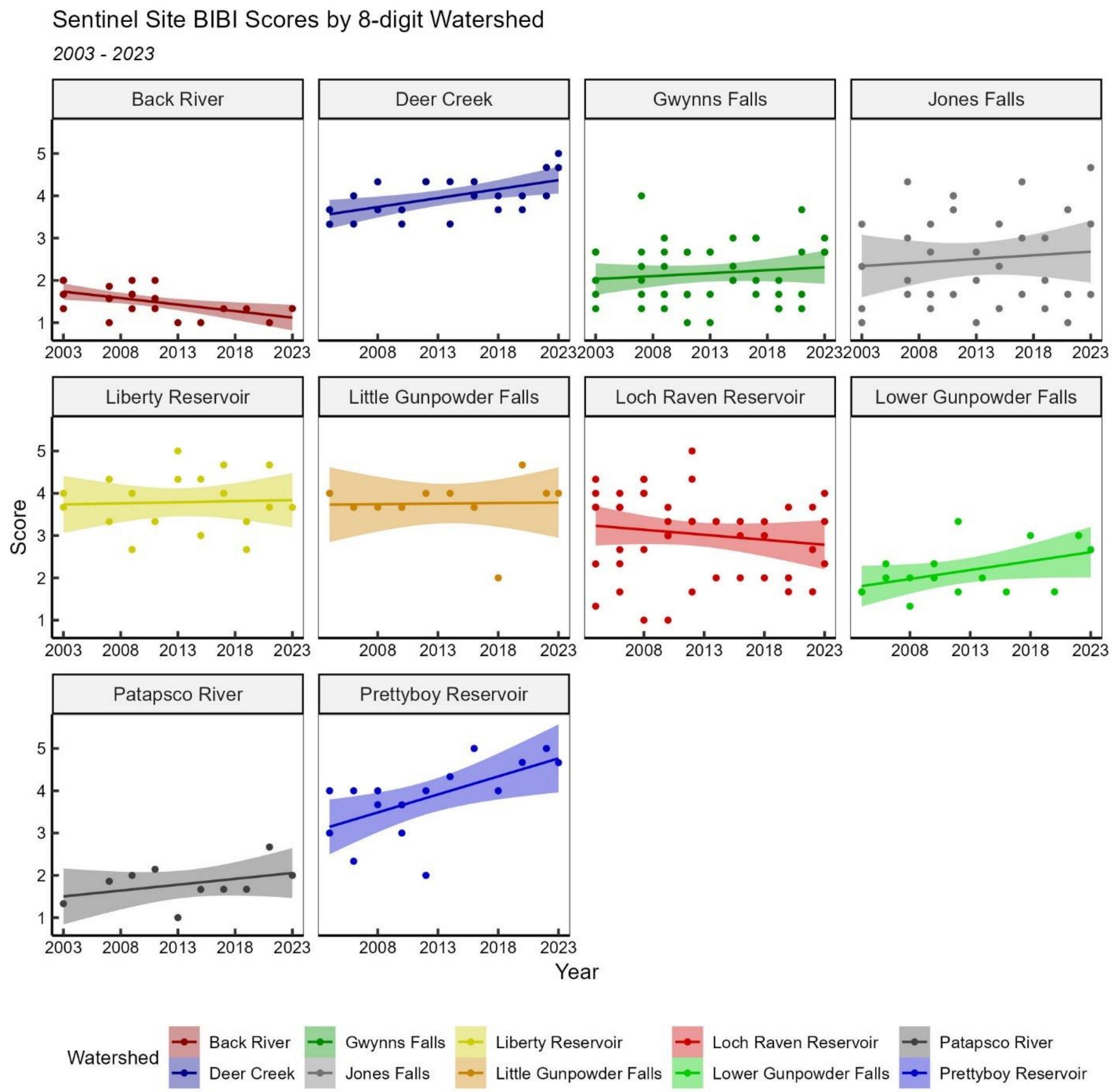


Figure 9-34: BIBI scores by 8-Digit Watershed for Sentinel Sites between 2003 and 2023.
Scores of 1-1.99=Very Poor, 2-2.99=Poor, 3-3.99=Fair, and 4-5=Good.

9.4.3.2 Reference Site Monitoring

Baltimore County is currently conducting monitoring at seven (7) reference sites. An initial suite of twenty-one (21) sites were selected using GIS in 2001. Reference sites were selected within Baltimore County based on land cover (>50% forested, < 20% urban), water chemistry, and physical habitat parameters. The initial 21 site network was reduced over the last 20 years as a result of private property access issues and to reduce duplicative sampling effort with other government agencies (MDNR). Baisman Run (REF-001) was dropped because it overlapped with an existing MBSS Sentinel Site, but data is included in figures below for the period of record. Permission for Charles Run (REF-015) was reinstated in 2022 but has a significant data gap due to lack of access. Latitudes, longitudes, and stream names of the current reference site network are displayed in Table 9-38.

Table 9-38: Reference Site Locations

Station	Stream Name and Location	Lat	Long
REF-004	Poplar Run upstream of Gunpowder Road	39.661848	-76.781047
REF-009B	Springhouse Run downstream of Gunpowder Rd	39.676285	-76.771473
REF-012	Panther Branch upstream of Gunpowder Falls	39.606599	-76.642492
REF-013	Mingo Branch upstream of Gunpowder Falls	39.605859	-76.673612
REF-015	Charles Run upstream Gerting Rd	39.589755	-76.586323
REF-017	Sunnyking Run near Sunnyking Drive	39.416937	-76.824300
REF-019	Fourth Mine Branch upstream of Stablers Church Road	39.66585	-76.63911

The seven reference sites are sampled annually for benthic macroinvertebrates during the spring index period using MBSS sampling protocols. In an effort to reduce stress on naturally reproducing trout populations and reference fish assemblages, fish sampling is only conducted every three years. Fish sampling and physical habitat assessments were completed during the summer index period unless otherwise stated and completed according to MBSS protocols.

All reference site BIBI scores were in the Fair to Good range in 2023 (Figure 9-35). The interannual variations in benthic populations and corresponding BIBI scores are likely the result of climactic cycles (precipitation and temperature). These streams differ in their response to environmental conditions due to the unique characteristics of each stream (underlying geology and land use). The expectation is that aquatic organisms will be negatively impacted during periods of extreme climatic conditions. Effects of extremely wet (2018) or dry periods (2007 – 2008) may not be reflected in BIBI or PHI scores until subsequent years. Drought reduces habitat availability due to decreased water levels and generally increases water temperature. Water temperature is critical in cold-water streams, where many of the organisms are adapted for cooler temperatures. For example, the reference streams clearly responded to the drought conditions of 2007, as shown by a major drop in BIBI scores in all but one site in the following year.

Land use also influences the response of the reference streams. Panther Branch (REF-012) and Mingo Branch (REF-013) are the most urban of the reference streams. Panther Branch originates at Interstate 83, York Road, and Monkton Road. Mingo Branch's headwaters drain Interstate 83 and Mount Carmel Road. These streams are subject to high storm flows and stormwater pollutants, which cause physical damage to stream banks and riparian zones and degrade instream habitat. This may, in part, explain the wider annual fluctuations in biological condition in these streams. Fourth Mine Branch (REF-019) is the most agricultural of the reference streams and is subject to high sediment and nutrient loads during storms; this may be shown in the widely fluctuating annual BIBI values. Sunnyking Run (REF-017) is unique among the reference streams and most other Baltimore County streams in that it is underlain by serpentine rock. Serpentine is naturally high in metals, low in nutrients, erosive, and lower in organic material than other systems. This geology and associated hydrology could make it more difficult for benthic populations to recover after extreme climactic events. Fourth Mine Branch (REF-109) and Sunnyking Run (REF-017) have generally exhibited the widest fluctuations in BIBI scores, especially during periods of drought.

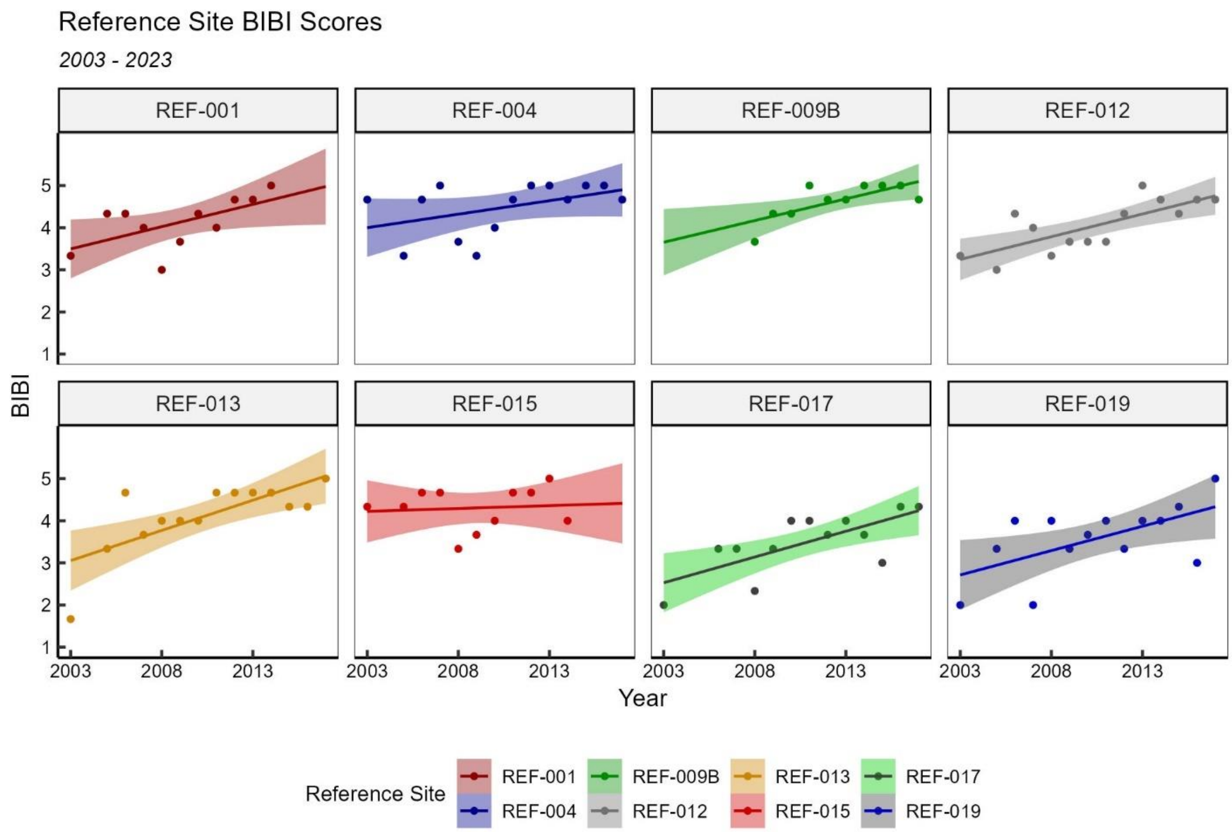


Figure 9-35: Benthic IBI values for Reference Sites, 2003-2023. Scores of 1-1.99=Very Poor, 2-2.99=Poor, 3-3.99=Fair, and 4-5=Good

Stream physical habitat index (PHI) values have not varied as widely as BIBI values (Figure 9-36). Most PHI values have remained in the minimally or partially degraded categories. Fourth Mine Branch (REF-019) has consistently had lower PHI scores, scoring in the degraded category since 2015. Permission for this site was lost following 2022 sampling, so this site has been relocated to the next parcel upstream.

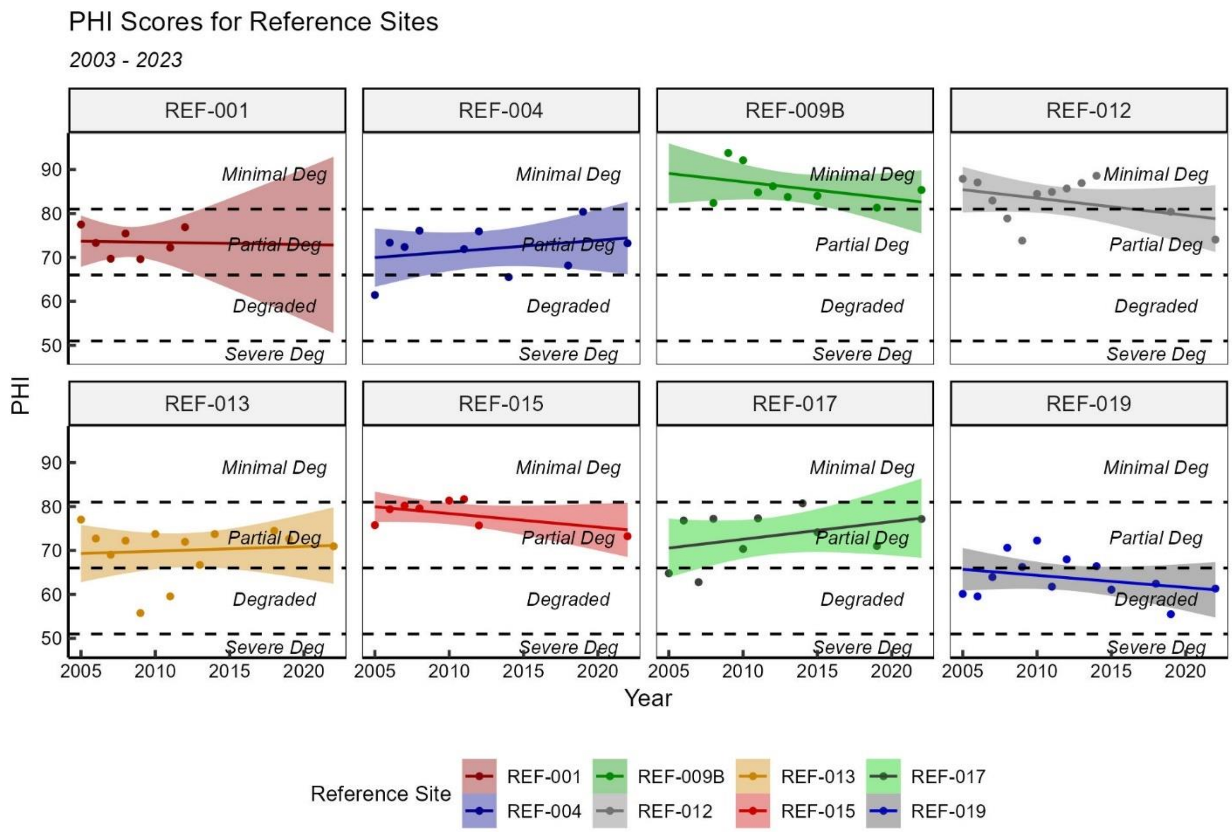


Figure 9-36: Physical Habitat Index values for Reference Sites, 2005-2023

9.4.3.3 Sediment TMDL Benthic Monitoring

Baltimore County added a new benthic monitoring program in 2015 for watersheds where biological communities were impaired by excess sedimentation and a sediment TMDL was implemented. This additional biological monitoring will provide sufficient data to determine progress in meeting the biological community standards on an 8-digit watershed basis. Currently, the Patapsco River, Gwynns Falls, Jones Falls, Lower Gunpowder River and Back River watersheds are sampled on a rotational three-year cycle. BIBI score mean, median, range, and interquartile range are shown by subwatershed over time in Figure 9-37 and Figure 9-38. Utilizing the process described in Section 9.4.3.1 Probabilistic Monitoring, randomly selected points will be sampled according to MBSS procedures, as below:

- 2015: 53 samples were collected from the Lower North Branch of the Patapsco/Back River (Figure 9-39).
- 2016: 48 samples were collected from the Gwynns Falls (Figure 9-40).
- 2017: 25 samples were collected from the Jones Falls (Figure 9-41).
- 2018: 42 samples were collected from the Patapsco watershed (Figure 9-42).
- 2019: 28 samples were collected from the Gwynns Falls and 16 from Back River (Figure 9-43).
- 2020: 30 samples were collected from the Lower Gunpowder Falls and 25 from Jones Falls (Figure 9-44)
- 2021: 42 samples were collected from the Patapsco watershed (Figure 9-45).
- 2022: 28 samples were collected from the Gwynns Falls and 16 from Back River (Figure 9-46)
- 2023: 22 samples were collected from the Lower Gunpowder Falls and 17 from Jones Falls (Figure 9-47)

This data will continue to provide the County with assessment of the sediment impairment of the biological community and where to focus future restoration efforts. Location details and results are shown in the NPDES MS4 Geodatabase.

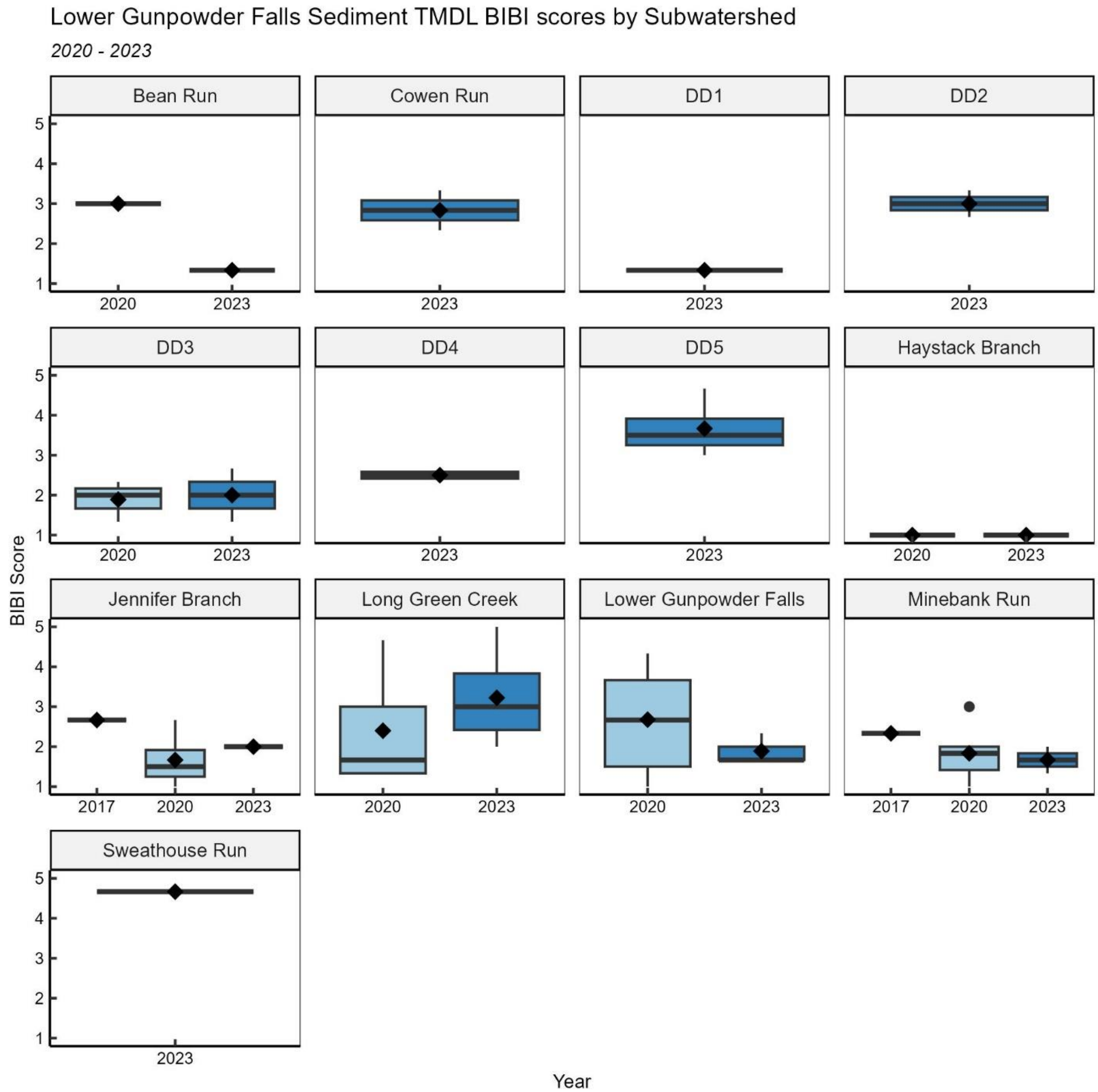


Figure 9-37: Sediment TMDL sampling BIBI results by subwatershed in Lower Gunpowder Falls; 2017 – 2023.

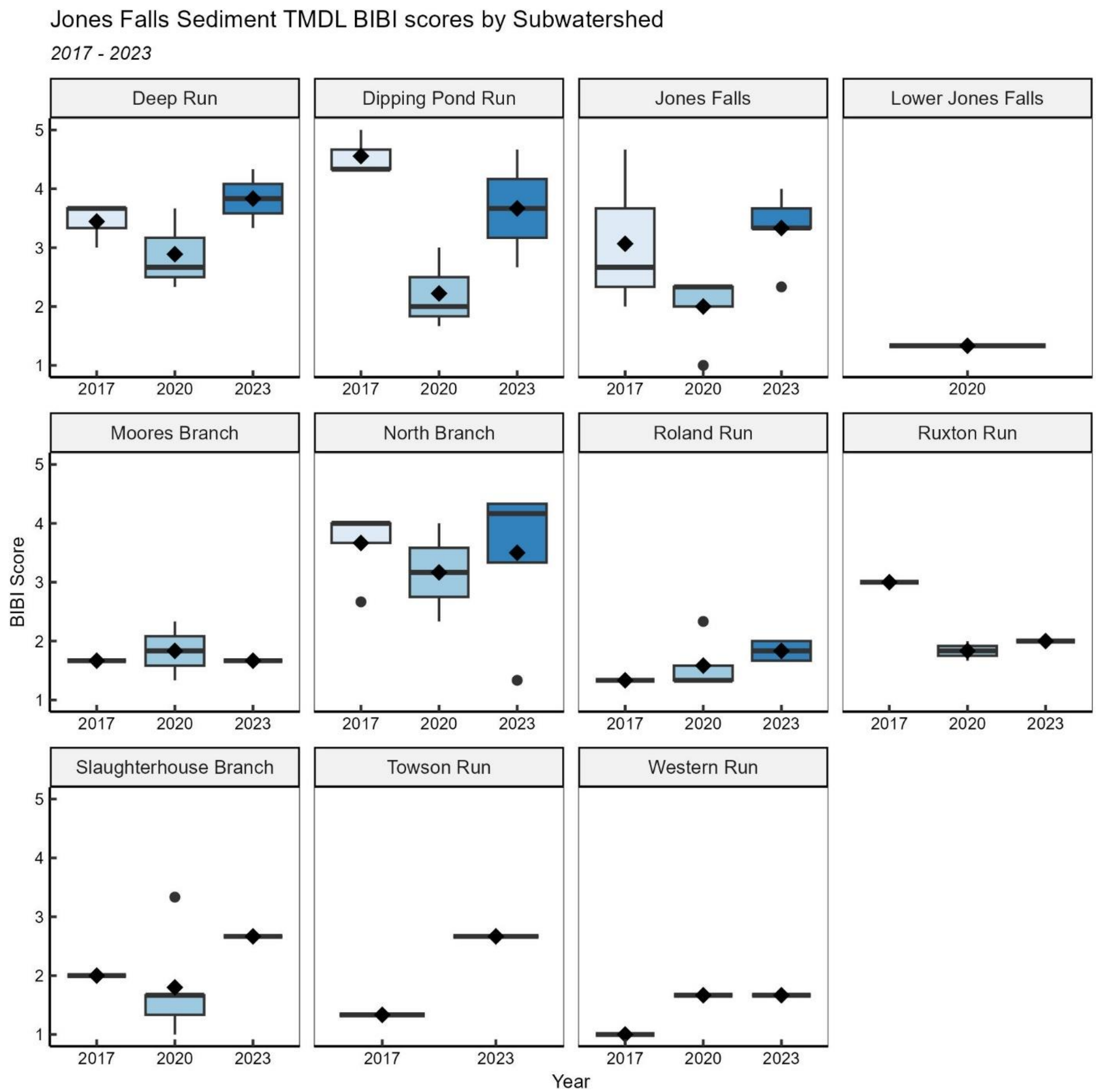


Figure 9-38: Sediment TMDL sampling BIBI results by subwatershed in Jones Falls; 2017 – 2023.

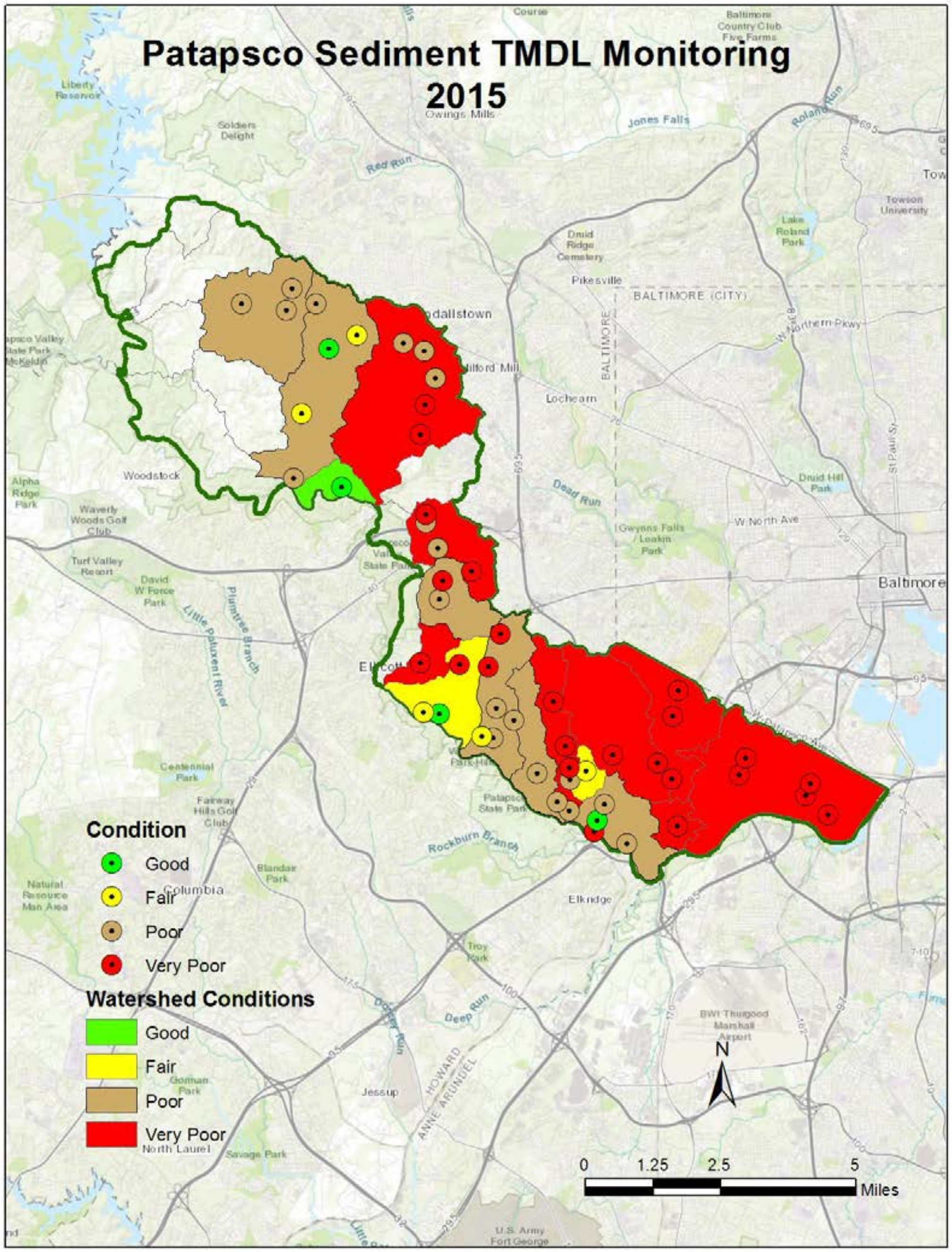


Figure 9-39: 2015 Sediment TMDL Monitoring Point Locations and BIBI Scores

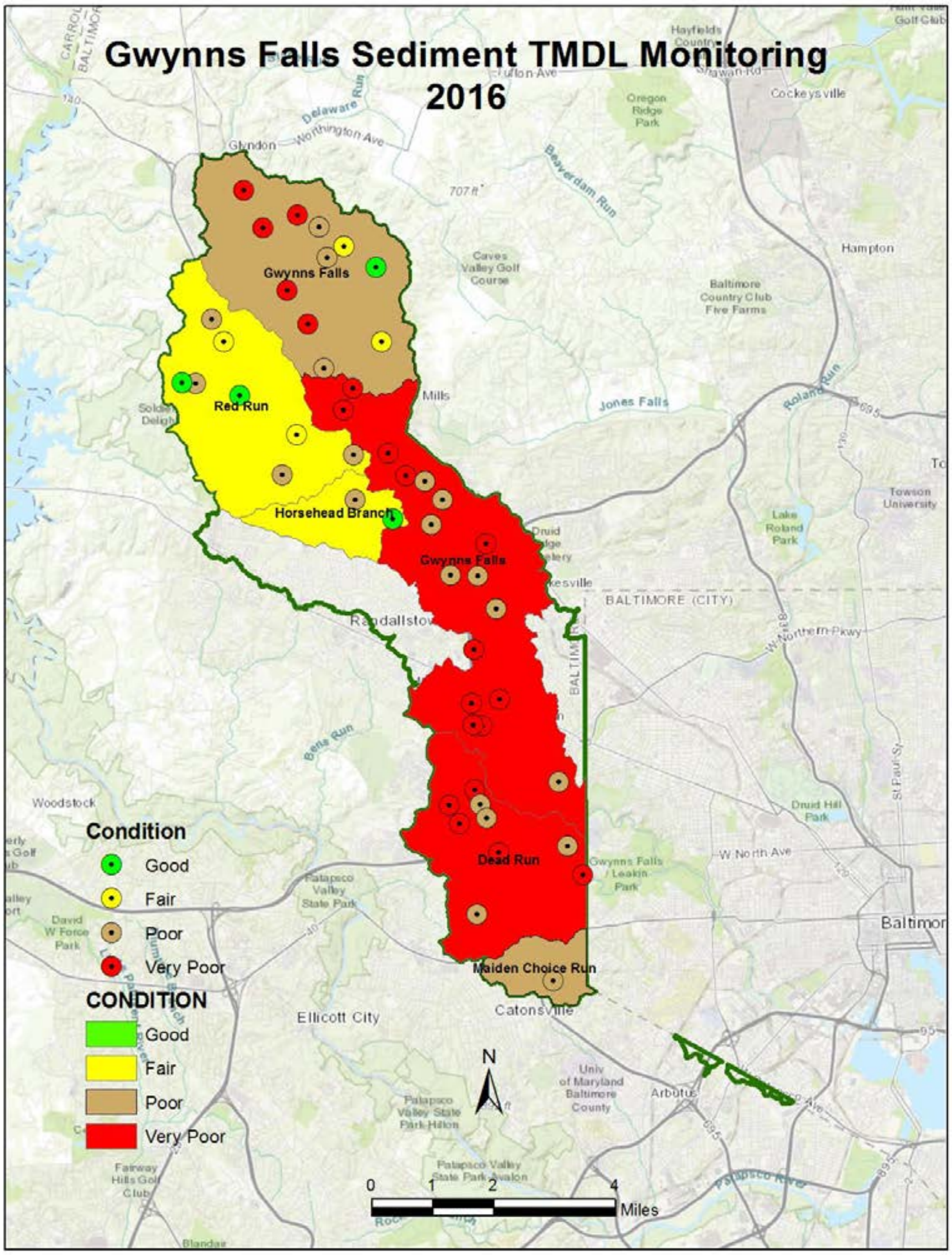


Figure 9-40: 2016 Sediment TMDL Monitoring Point Locations and BIBI Scores

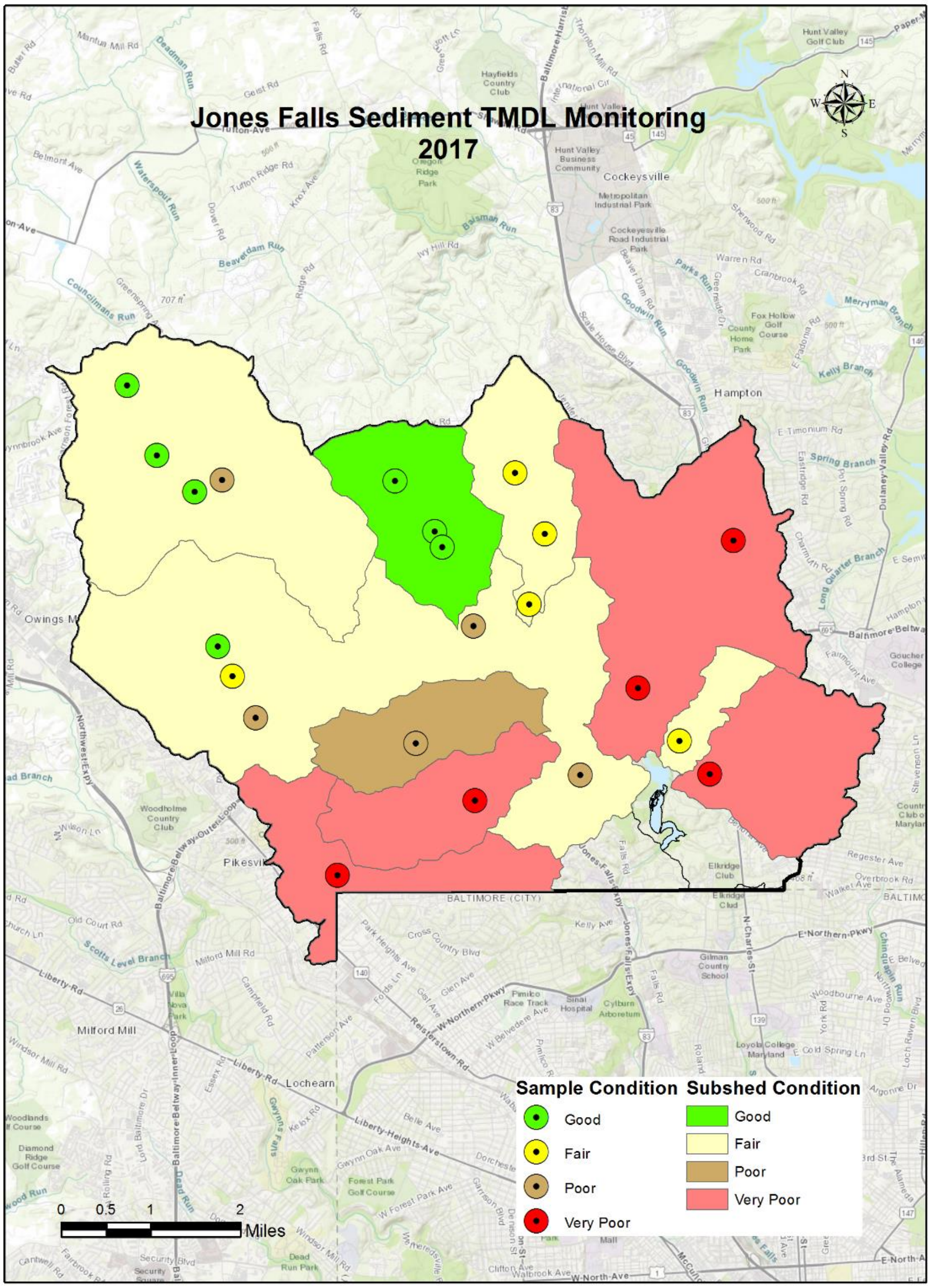


Figure 9-41: 2017 Sediment TMDL Monitoring Point Locations and BIBI Scores

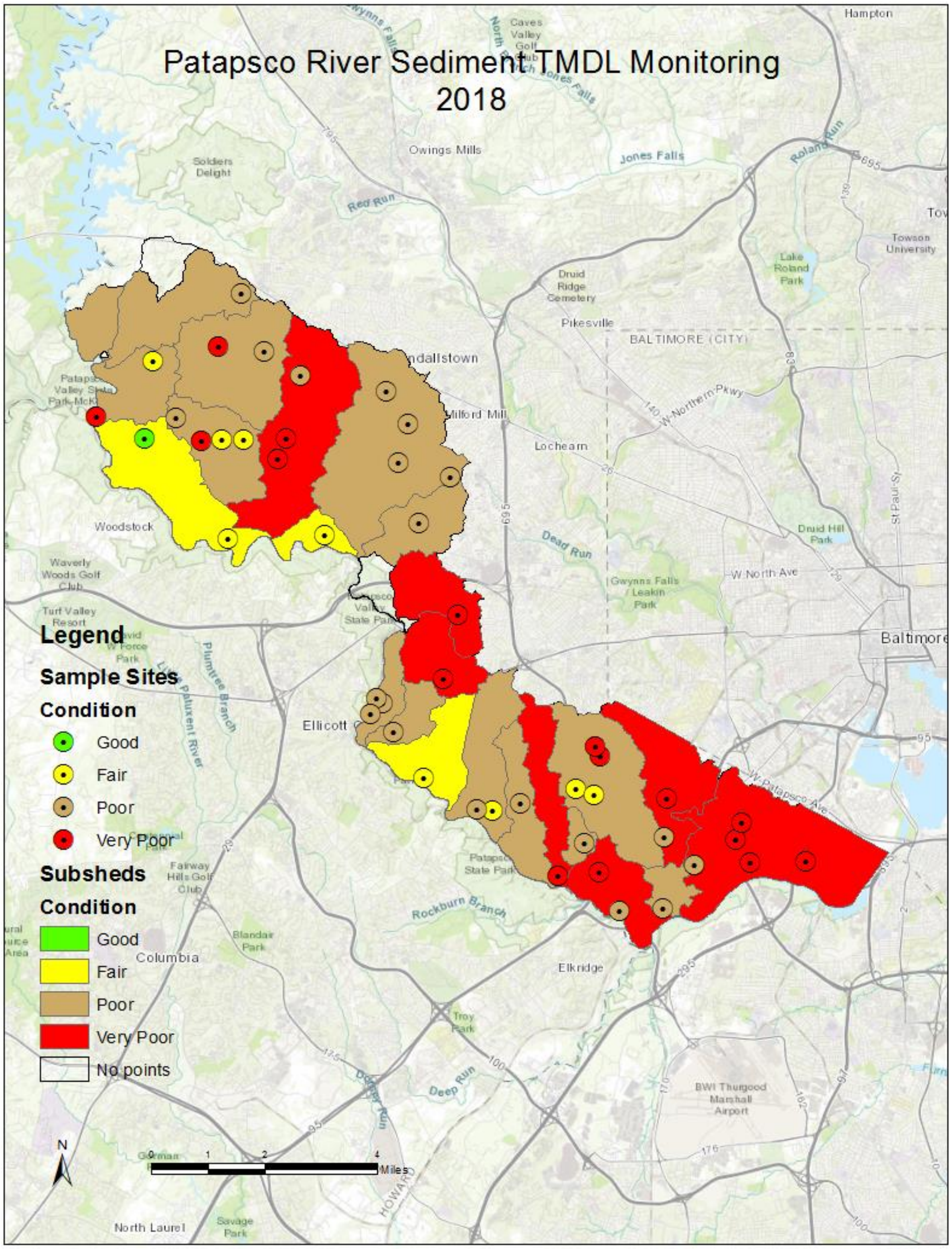


Figure 9-42: 2018 Sediment TMDL Monitoring Point Locations and BIBI Scores

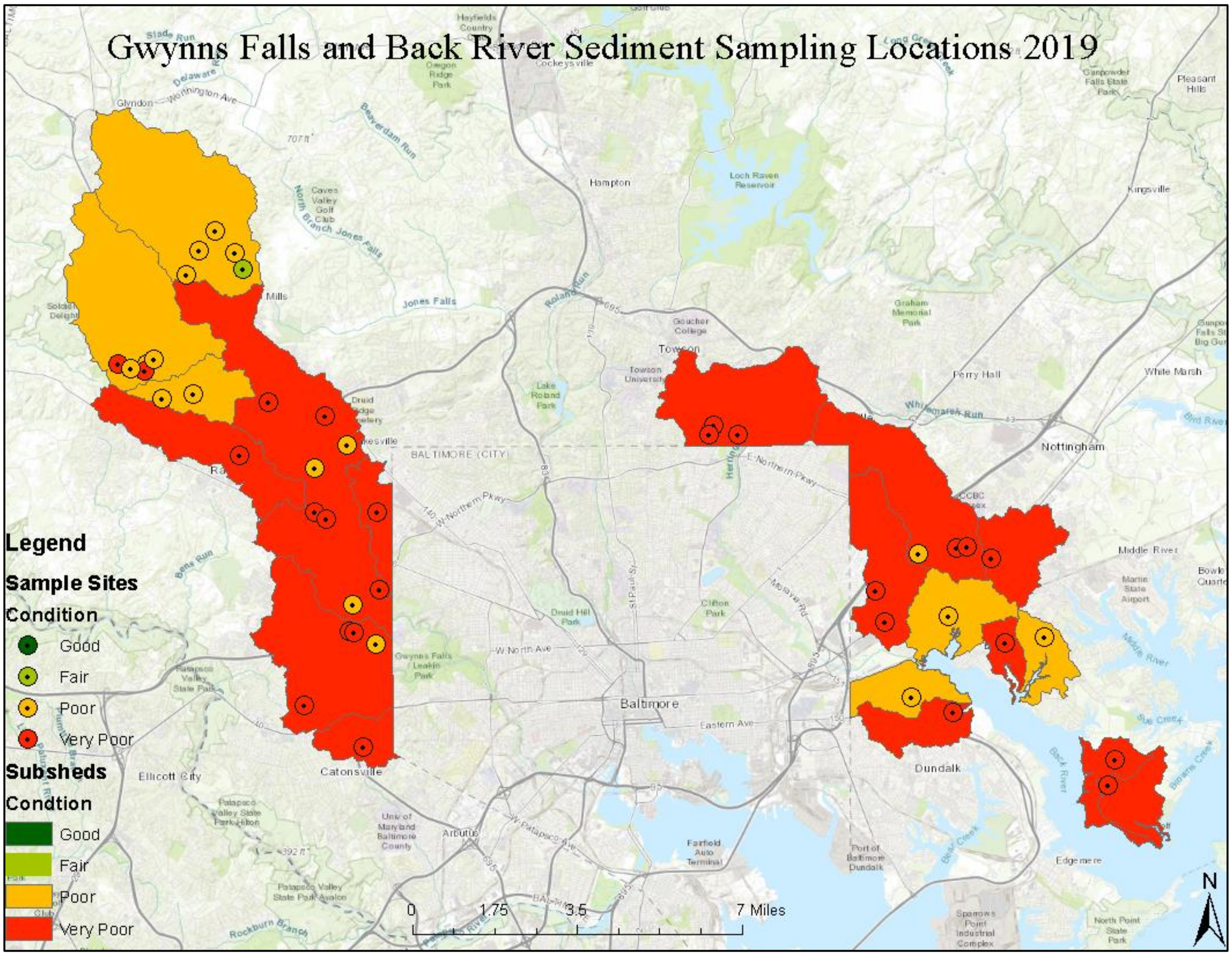


Figure 9-43: 2019 Sediment TMDL Monitoring Point Locations and BIBI Scores

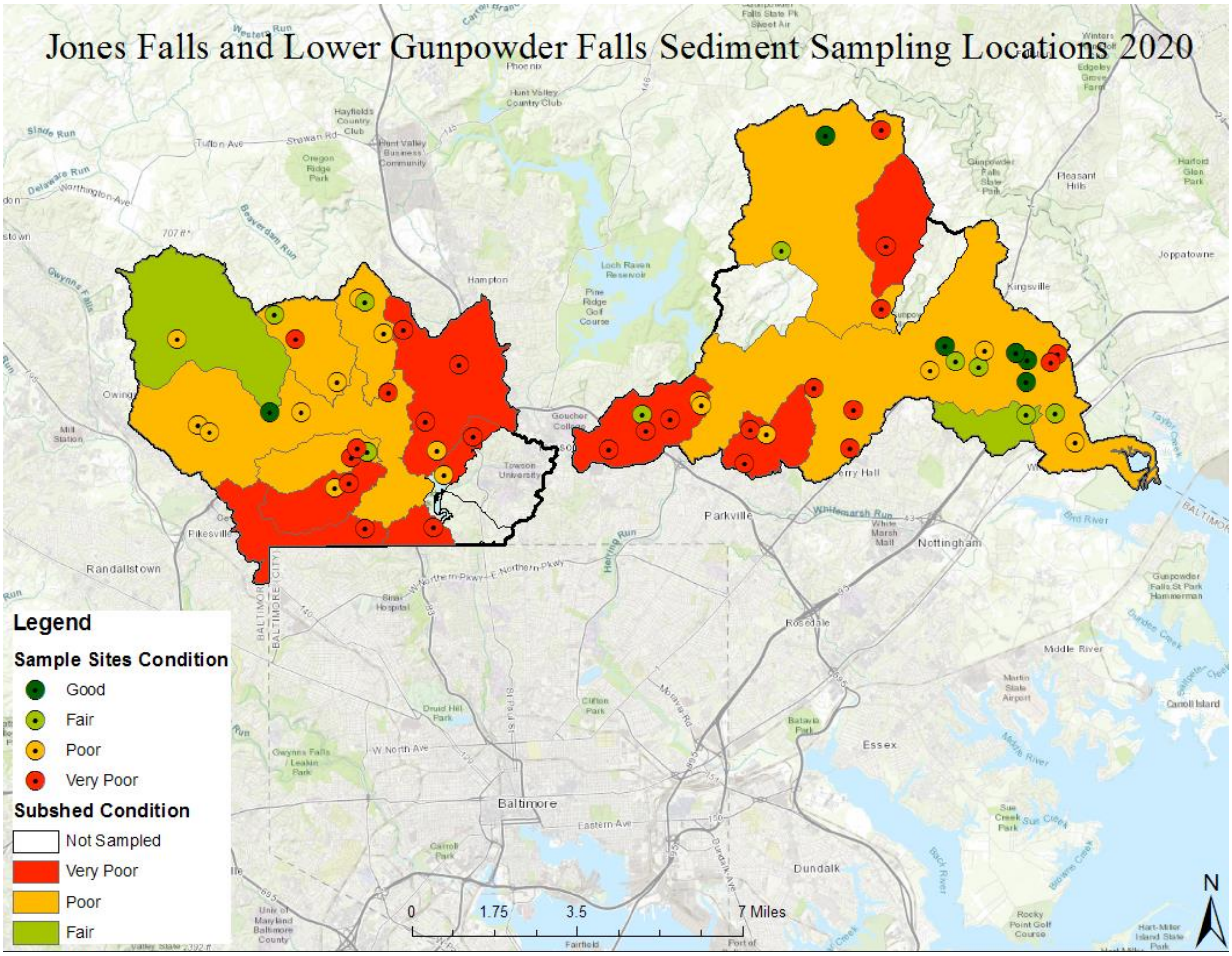


Figure 9-44: 2020 Sediment TMDL Monitoring Point Locations and BIBI scores

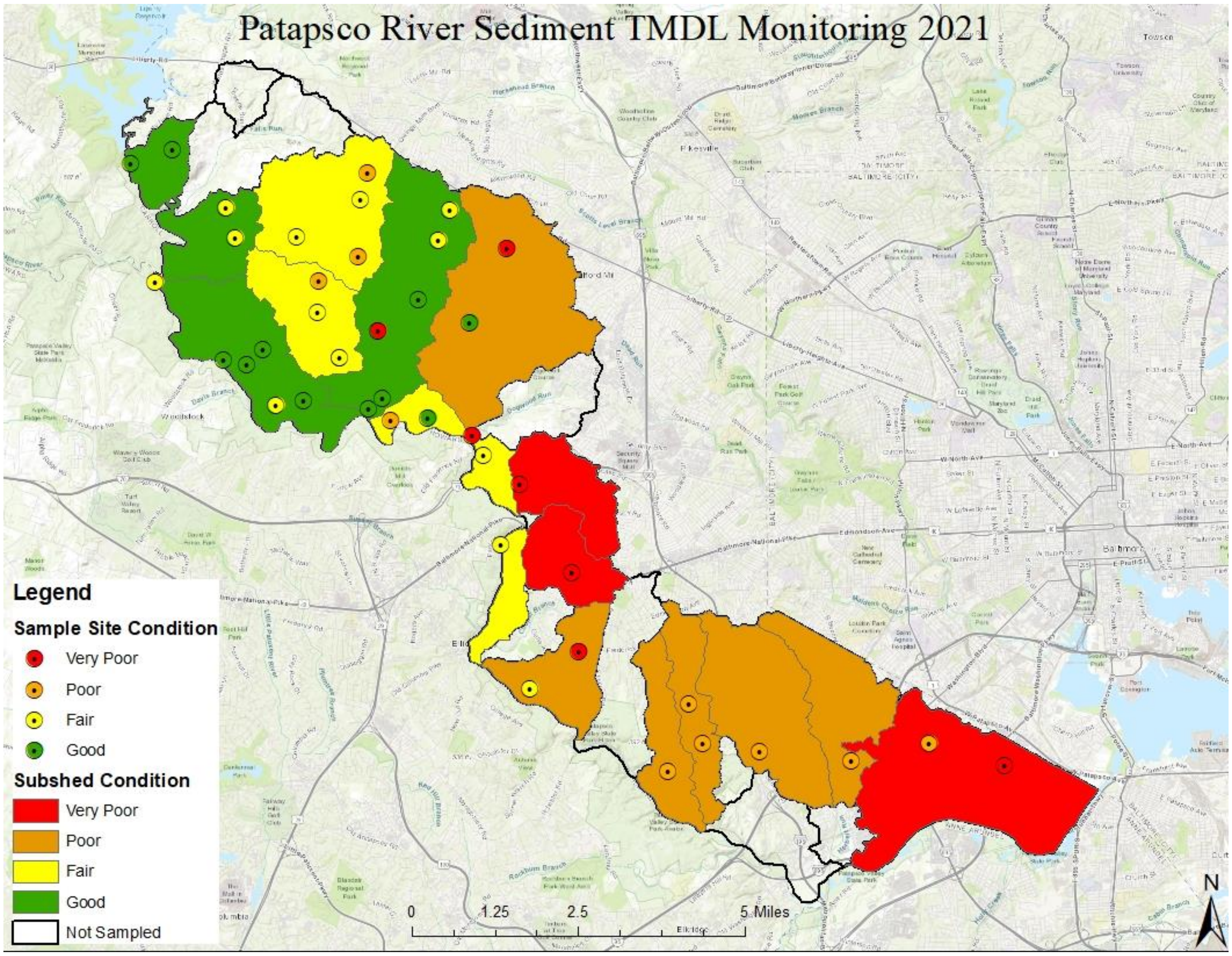


Figure 9-45: 2021 Sediment TMDL Monitoring Point Locations and BIBI scores

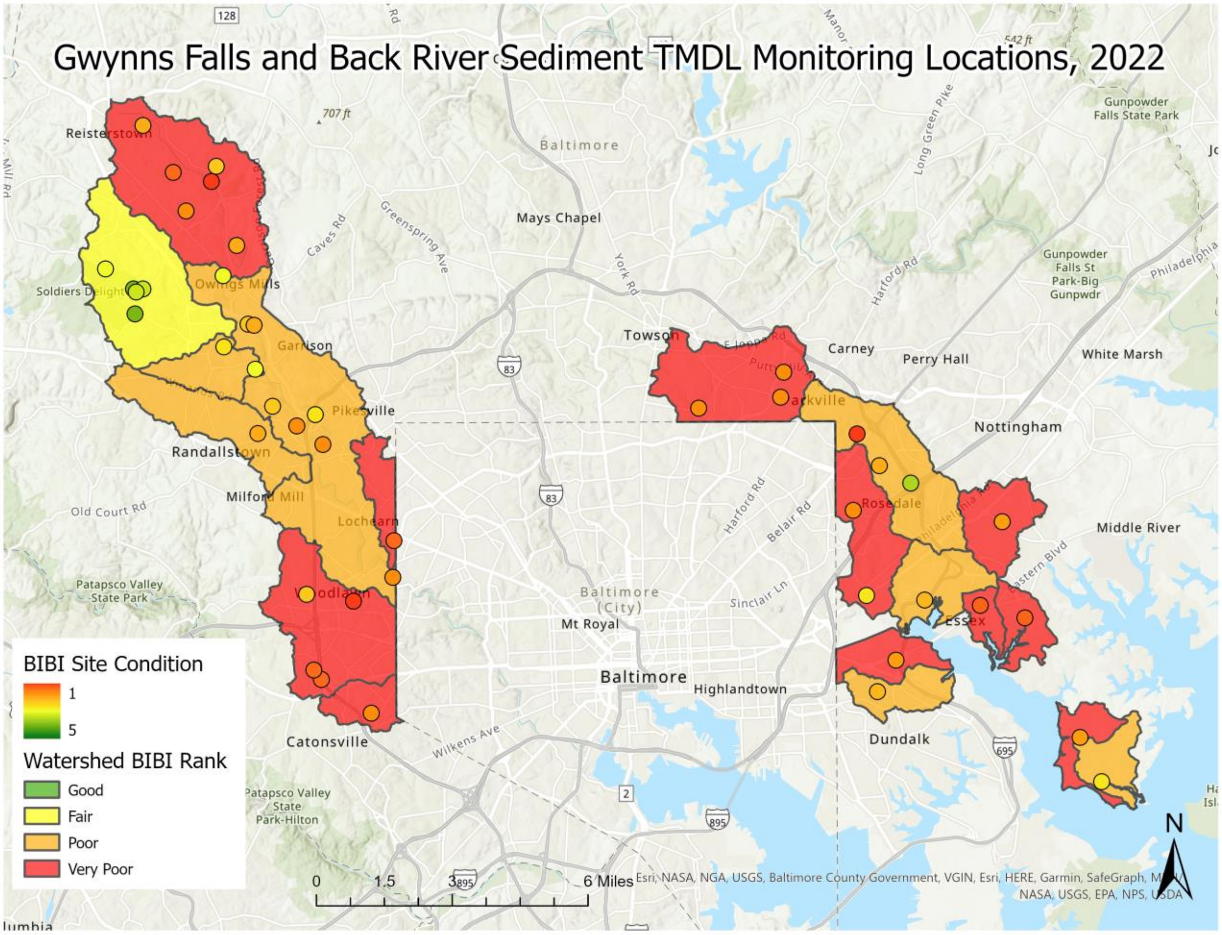


Figure 9-46: 2022 Sediment TMDL Monitoring Point Locations, BIBI Scores, and Subwatershed Ranks in Gwynns Falls and Back River 8-digit watersheds.

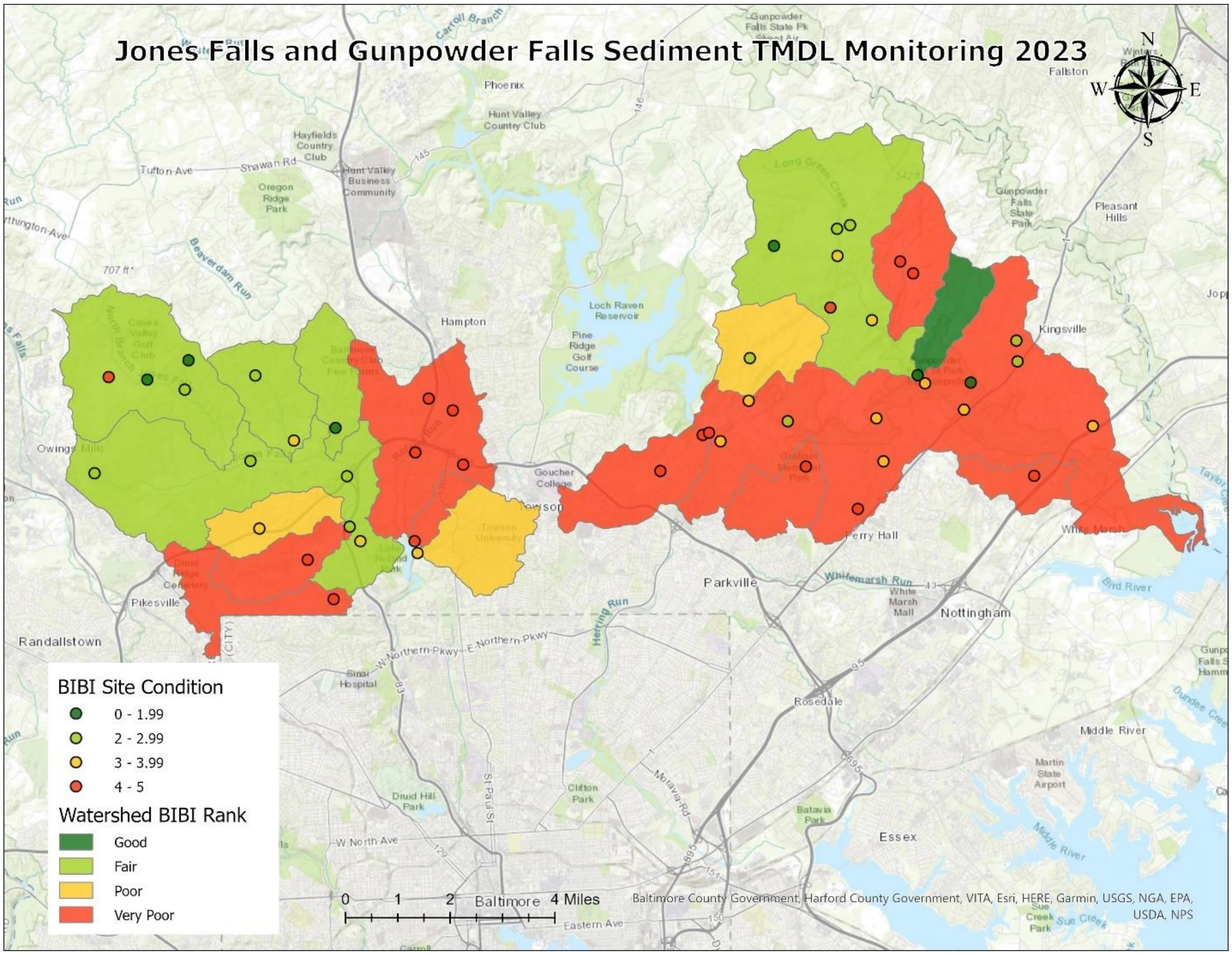


Figure 9-47: 2023 Sediment TMDL Monitoring Point Locations, BIBI Scores, and Subwatershed Ranks in Jones Falls and Lower Gunpowder Falls 8-digit watersheds.

9.4.3.4 Tidal Benthic Monitoring

In 2013, Baltimore County added Tidal Benthic Random Sampling to its Countywide monitoring program. The tidal sampling occurs annually, alternating between the Patapsco/Back River and Gunpowder River watersheds coincident with the non-tidal probabilistic monitoring program. The 25 tidal benthic sites were sampled September 12th – 27th 2023 following methods established by the Maryland Department of Natural Resources' (DNR) Chesapeake Bay Long-Term Benthic Monitoring and Assessment Program. The four tidal subestuary systems sampled in the Patapsco/Back River watershed for 2023, were Back River, Bear Creek, Old Road Bay, and Shallow Creek. All samples were taken from unvegetated soft substrates (sand or mud) using a Modified-Young Grab with a sampling area of 0.044 m^2 to a depth of 10 cm.

Along with the macroinvertebrate data, the bottom water quality and sediment characteristics were sampled. Baltimore County required the consultant to calculate the percent silt/clay, percent total organic carbon (TOC), and percent nitrogen in conjunction with the 25 tidal benthic samples. All the specimens were identified to the lowest practical taxonomic category as required by the Maryland DNR Chesapeake Bay Long Term Benthic Program (LTB).

The Chesapeake Bay Benthic Index of Biological Integrity (B-IBI) is calculated by scoring each of several attributes of benthic community structure and function (abundance, biomass, Shannon diversity, etc.). These component metric scores are averaged, to form the actual index score (Table 9-39). Samples with index values of 3.0 or more are considered to have good benthic condition, indicative of good habitat quality. The B-IBI was designed to account for varying salinities and substrates which affect benthic community structure. There are five salinity classes, however only Tidal Freshwater (0-0.5 ppt), Oligohaline (>0.5-5.0 ppt), and Low Mesohaline (>5.0–12.0 ppt) are applicable for Baltimore County tidal waters.

Table 9-39: Metrics used for Tidal IBI Calculations

Metrics Used in BIBI Calculations	Tidal Freshwater	Oligohaline	Low Mesohaline
Percent abundance of deep-deposit feeders	X		
Tolerance Score	X	X	
Percent Abundance of Pollution-Sensitve Taxa		X	
Percent Abundance of Carnivores & Omnivores		X	
Tanydodini to Chironomidae per abundance ratio		X	
Total Species Biomass			X
Shannon-Weiner Diversity Index			X
Percent biomass of tollution-sensitive taxa			X
Total Specied Abundance	X	X	X
Percent Abundance of Pollution Indicative Taxa	X	X	X
Total Metrics in Score	4	6	5

The results from the 2023 tidal benthic samples can be seen in Table 9-40. In 2023, 44% of the samples met the restoration goal (BIBI score > 3.0), 24% were in marginal condition, 8% were in degraded condition, and 24% of the samples were in severely degraded condition (BIBI score < 2.0). Bear Creek, Old Road Bay, and Shallow Creek did not have any samples that met restoration goals. The ten-year comparison for the Patapsco/Back River waterbodies showed relative stability of BIBI scores across years, though three of the four watersheds sampled in 2023 had lower average BIBI scores than those from 2021 sampling. Figure 9-48 shows all sites sampled in 2021 and 2023 as well as their BIBI scores. Figure 9-49 shows average IBI scores and summary statistics for each tidal segment over time. Only Back River met restoration goals in 2023 sampling.

Table 9-40: 2023 Tidal Water Quality and BIBI Results

Sample	Salinity (psu)	DO (mg/L)	Salinity Class	Tidal BIBI Score	Condition
TID-23-BAC-011	3.94	9.52	OH	3.666667	Meets Restoration Goal
TID-23-BAC-012	4.14	7.72	OH	3.666667	Meets Restoration Goal
TID-23-BAC-013	3.74	8.99	OH	3.500000	Meets Restoration Goal
TID-23-BAC-014	4.27	8.19	OH	3.333333	Meets Restoration Goal
TID-23-BAC-015	4.02	9.03	OH	3.000000	Meets Restoration Goal
TID-23-BAC-016	5.10	6.49	LM	2.333333	Degraded
TID-23-BAC-017	3.42	8.74	OH	2.500000	Marginal
TID-23-BAC-018	4.15	8.45	OH	3.000000	Meets Restoration Goal
TID-23-BAC-019	5.21	7.13	LM	3.333333	Meets Restoration Goal
TID-23-BAC-020	3.89	5.20	OH	3.333333	Meets Restoration Goal
TID-23-BAC-021	5.24	5.25	LM	3.000000	Meets Restoration Goal
TID-23-BAC-022	3.92	7.70	OH	2.666667	Marginal
TID-23-BAC-023	2.75	5.27	OH	2.500000	Marginal
TID-23-BAC-024	2.19	7.47	OH	3.333333	Meets Restoration Goal
TID-23-BAC-025	4.87	5.41	OH	2.666667	Marginal
TID-23-BAC-027	3.48	8.95	OH	3.333333	Meets Restoration Goal
TID-23-BRC-043	8.88	1.86	LM	1.333333	Severely Degraded
TID-23-BRC-044	8.92	2.46	LM	1.333333	Severely Degraded
TID-23-BRC-045	9.64	0.82	LM	1.333333	Severely Degraded
TID-23-BRC-046	8.65	3.86	LM	1.333333	Severely Degraded
TID-23-ORB-001	7.11	4.64	LM	2.666667	Marginal
TID-23-ORB-002	7.19	7.49	LM	2.666667	Marginal
TID-23-ORB-003	6.58	3.81	LM	2.333333	Degraded
TID-23-SHC-008	5.40	4.04	LM	2.000000	Severely Degraded
TID-23-SHC-009	6.02	3.69	LM	2.000000	Severely Degraded

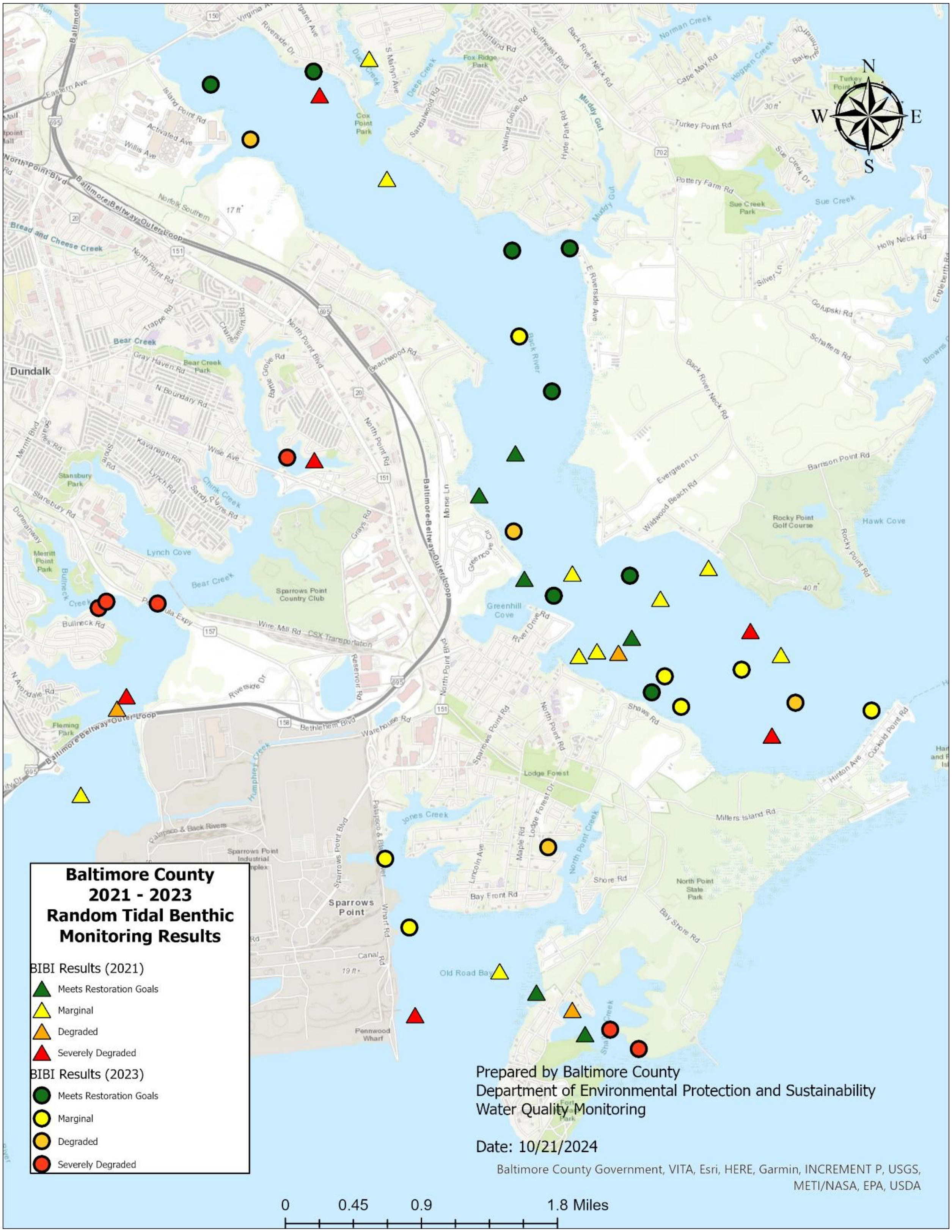


Figure 9-48: Map of tidal benthic sample results between 2021 and 2023

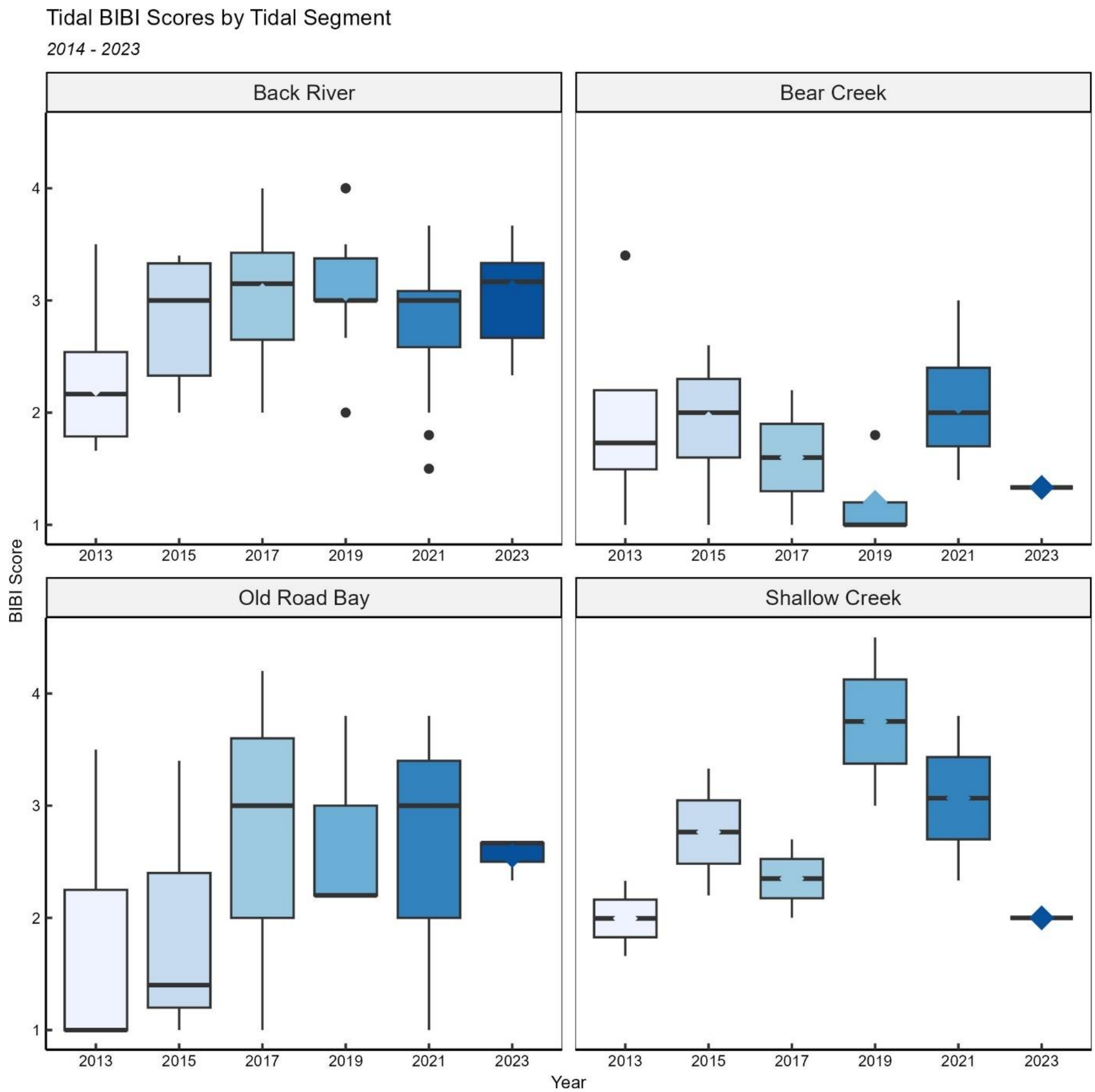


Figure 9-49: Tidal B-IBI scores by Tidal Segment and year since 2014

9.4.4 Submerged Aquatic Vegetation Monitoring Program

Baltimore County has conducted Submerged Aquatic Vegetation monitoring since 1989 on certain waterways. With the advent of water quality standards for submerged aquatic vegetation, reporting on the monitoring results commenced in the 2006 NPDES Annual Report. The standards are based on water quality segments that are derived from the Chesapeake Bay Program model. There are a total of seven segments in Baltimore County tidal waters. Three of the segments (MIDOH, GUNOH1, and BACOH) are entirely within Baltimore County tidal waters. Four other segments have tidal waters that extend to other jurisdictions. Two of these segments (CB2OH and CB3MH) are Chesapeake Bay mainstem segments and extend to the eastern shore of Maryland. The Chesapeake Bay Program draft document *Ambient Water*

Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and Its Tidal Tributaries 2006 Addendum provides guidance on assessing the attainment of the SAV acreage criteria. The document states "the shallow-water bay grass designated use is considered in attainment if there are sufficient acres of SAV observed within the segment or there are enough acres of shallow-water habitat meeting the applicable water clarity criteria to support restoration of the desired acres of SAV for that segment." The recommended procedure is to use the single best year SAV acreage based on the most recent three-year period of available data. The criteria may also be met by attaining water clarity acres for the most recent three-year period of available data. The water clarity depth varies by tidal segment (see Table 9-41). Water clarity data is currently not collected in Baltimore County, so only the SAV acreage will be used.

The 2009 Triennial Review of Water Quality Standards proposed several changes that affect the SAV criteria. First, the tidal segment BACOH, which covers tidal Back River, has had a change in the target SAV acreage goal from 0 to 340 acres. Secondly, credit for meeting water clarity standards in areas with no SAV have changed from an acre by acre basis to 2.5 acres per acre basis. In other words, using Back River as an example, if no SAV were present in Back River, water clarity standards would have to be met for 850 acres (340 acres SAV goal X 2.5).

Baltimore County monitors SAV distributions in the spring and summer of each year in accordance with the US Fish and Wildlife Service methodologies. There are currently 29 waterways in the County that are monitored. In order to assess the total acres of yearly coverage for the creeks surveyed, the data for the spring and summer were analyzed for overlap in SAV distribution between the two seasons. The total SAV coverage for each year is calculated by following Equation 9-8:

$$\text{Total SAVacres} = (\text{Spring SAVacres} - \text{Overlapacres}) + (\text{Summeracres SAV} - \text{Overlapacres}) + \text{Overlapacres}$$

Equation 9-8

To estimate the progress in meeting the SAV goal for each tidal segment the Total SAV_{acres} are divided by the SAV goal for that segment. Only two of the seven segments are totally within Baltimore County jurisdiction and therefore can be assessed for SAV criteria attainment. However, these two segments are not entirely surveyed for SAV coverage and so, like the other five segments this analysis will only provide a conservative estimate of SAV criteria attainment. Table 9-41 presents the SAV water quality standard for each segment and the results of the last three years of SAV monitoring. The blue highlighted water quality segments lie entirely within Baltimore County. The green highlighted cells are the highest percent attainment for each water quality segment based on the last three years of data.

Table 9-41: SAV Standards and Baltimore County SAV Monitoring Results (2021-2023)

Water Quality Segment	SAV Goal (Acres)	Water Clarity Depth (m)	2021		2022		2023	
			Acres	% of Goal	Acres	% of Goal	Acres	% of Goal
MIDOH	**879**	**2**	864.79	98.38	1453.3	165.34	1147.48	130.1
GUNOH1	**1,860**	**0.5**	813.44	43.73	823.76	44.28	720.36	38.7
GUNOH2	**572**	**2**	884	154.54	884.54	154.63	881.49	154.1
BACOH	**340**	**0.5**	47.86	14.08	68.98	20.28	19.3	5.7
PATMH	**389**	**1**	250.39	64.37	257.88	66.29	235.06	60.4
CB2OH	**705**	**0.5**	45.63	6.47	228.61	32.43	200.67	28.4
CB3MH	**1,370**	**0.5**	166.02	12.12	167.75	12.24	166.48	12.2
Total SAV Acres	**6,115**		**3,072.13**		**3,884.82**		**3,370.84**	

** No monitoring conducted by Baltimore County in this segment.

Overall the 2023 monitoring year shows improvements of coverage of SAV at all monitoring segments. The Middle River segment (MIDOH) continues to have one of the highest amount of SAV coverage, and has been consistently meeting or very close to the SAV goal of 879 acres of coverage. Overall, all segments showed a stable coverage of SAV, with Back River showing a decrease in 2023.

Since not all of the county tidal waters are monitored through this program, the numbers represent a conservative estimate of progress in meeting the SAV goals. The Gunpowder segment (GUNOH1) is not monitored by Baltimore County.

Figure 9-50 displays the trends in SAV coverage over 22 years of monitoring. The figure displays the percent of the area surveyed that was covered by SAV. As can be seen from the figure there is a generally increasing trend in the percent of the area surveyed that is covered by SAV from a low in 1999 of 4.1% to a high of 63% in 2022. While there is a certain degree of variability, possibly related to climatic events (record wet year in 2003 with reduced % coverage), the overall trend is improved coverage.

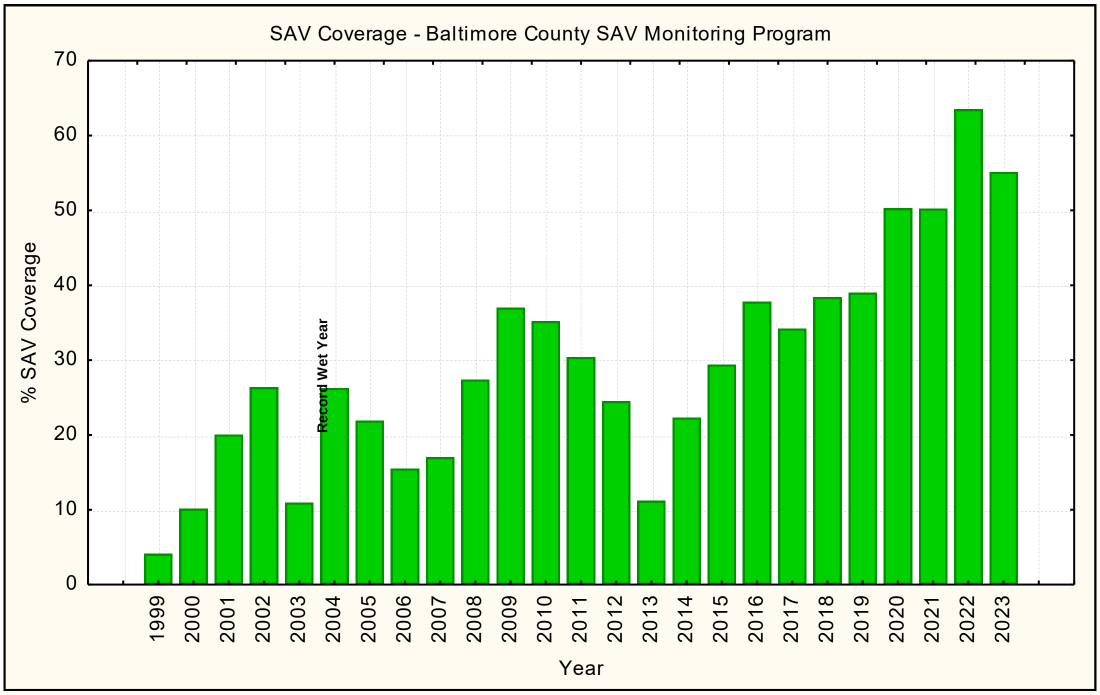
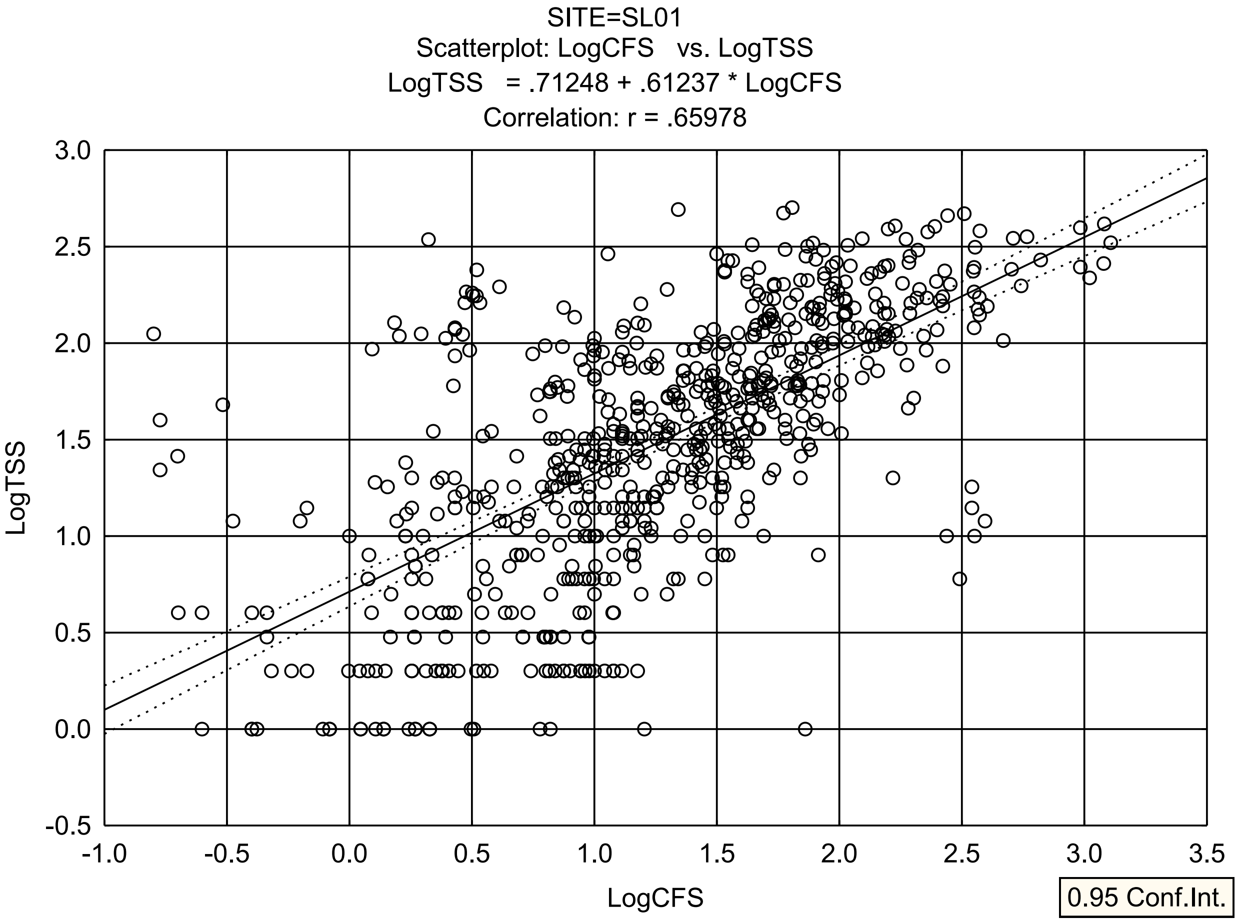


Figure 9-50: Baltimore County SAV Monitoring Program – Trends in % Coverage

Appendix 9-1: Trend Monitoring Sites by Watershed

Liberty Reservoir – 3 Sites			
Site ID	**Subwatershed**	**Site ID**	**Subwatershed**
LI-01	Cliffs Branch	LI-04	Norris Run
LI-02	Glen Falls Run		
Patapsco River – 5 Sites			
PA-04	Ben's Run	PA-15	Patapsco River Direct Drainage
PA-14	Herbert Run- East Branch		
Gwynns Falls – 5 Sites			
GW-01	Gwynns Falls – Glyndon	GW-11	USGS gage at Gwynnbrook Road
GW-04	Red Run	GW-12	Gwynns Falls Direct Drainage
GW-10	Dead Run – Mainstem		
Jones Falls – 3 Sites			
JF-07	Roland Run	JF-12	Lake Roland Reservoir
JF-11	Jones Falls		
Back River – 3 Sites			
HR-05	Herring Run	BR-05A	Stemmers Run
BR-01	Bread and Cheese Creek		
Middle River – 1 Site			
MR-03	Frog Mortar Creek		
Prettyboy Reservoir – 3 Sites			
PR02	Gunpowder Falls above Prettyboy	PR04	George's Run
PR03	Grave Run		
Loch Raven Reservoir – 13 Sites			
LR-11	Spring Branch	LR-24	Little Falls
LR-13	Beaver Dam Run – York Road	LR-27	Third Mine Branch
LR-14	Baisman Run	LR-30	Beetree Run
LR-17	Western Run	LR-35	Piney Run
LR-19	Overshot Run	LR-39	Slade Run
LR-22	Gunpowder Falls - Glencoe	LR-40	Gunpowder Falls
LR-23	Charles Run		
Lower Gunpowder Falls – 3 Sites			
GU-03	Haystack Branch	GU-08	Minebank Run
GU-05	Long Green Creek – Hartley Mill		
Little Gunpowder Falls – 1 Site			
LG-05	Little Gunpowder Falls		
Bird River – 3 Sites			
BI-01	Windlass Run	BI-03	Whitemarsh Run - Headwaters
BI-02	Honeygo Run		
Baltimore Harbor – 1 Site			
BH-07	Bear Creek		



Appendix 9-1: Example Regression Analysis Graph
SL-01 Total Suspended Solids Data and Regressions for 2005-2020

10.0 Permit Requirement

PART IV. **STANDARD PERMIT CONDITIONS**

E. **Stormwater Restoration**

In compliance with §402(p)(3)(B)(iii) of the CWA, MS4 permits must require stormwater controls to reduce the discharge of pollutants to the MEP and such other provisions as the Department determines appropriate for the control of such pollutants. Additionally, by regulation at 40 CFR §122.44, BMPs and programs implemented pursuant to this permit must be consistent with applicable stormwater WLAs developed under EPA established or approved TMDLs (see list of EPA established or approved TMDLs attached and incorporated as Appendix A). The impervious acre restoration requirements and associated pollutant reductions described below for Baltimore County are consistent with Maryland's Phase III Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL and 2025 nutrient load targets, and for local TMDL implementation targets described by the County in its TMDL Watershed Implementation Plans.

1. Annual alternative control practices used by Baltimore County to meet its prior MS4 permit's impervious acre restoration requirement shall be:
   a. Continued annually at the same level of implementation (e.g., street lane miles swept, septic systems pumped) under this permit;
   b. Replaced with 471 impervious acres using stormwater management BMPs, programmatic initiatives, or alternative control practices in accordance with the 2021 Accounting Guidance; or
   c. A combination of a and b above.
2. The impervious acre requirements described below are in addition to the requirements listed in PART IV.E.1 of this permit.
3. By November 4, 2026, Baltimore County shall commence and complete the restoration of 2,696 impervious acres that have not been treated to the MEP by implementing stormwater BMPs, programmatic initiatives, or alternative control practices in accordance with the 2021 Accounting Guidance.

4. By November 4, 2022, Baltimore County shall complete the stormwater BMPs, programmatic initiatives, or alternative control practices listed in the Year 1 BMP Portfolio provided in Appendix B. Baltimore County may replace individual practices listed in Appendix B with others that meet the requirements of the 2021 Accounting Guidance as long as the total restoration at the end of year one meets the implementation benchmark schedule in Table 1.

   "Benchmark" as used in this permit is a quantifiable goal or target to be used to assess progress toward the impervious acre restoration requirement or WLAs, such as a numeric goal for stormwater control measure implementation. If a benchmark is not met, the County should take appropriate corrective action to improve progress toward meeting permit objectives. Benchmarks are intended as an adaptive management aid and generally are not considered to be enforceable.

5. Baltimore County may acquire Nutrient Credits for Total Nitrogen (TN), Total Phosphorus (TP), and Total Suspended Solids (TSS) in accordance with COMAR 26.08.11 to meet its impervious acre restoration requirement in PART IV.E.3 of this permit. For acquiring Nutrient Credits in place of impervious acre restoration, an equivalent impervious acre shall be based on reducing 18.08 pounds of TN, 2.23 pounds of TP, and 8,046 pounds of TSS. The maximum allowable credits obtained from trades with wastewater treatment plants shall not exceed 490 equivalent impervious acres restored.

6. Any Nutrient Credits acquired by Baltimore County for meeting the restoration requirements of this permit shall be maintained and verified in accordance with COMAR 26.08.11 and reported to the Department in annual reports unless they are replaced at a one to one acre ratio by local stormwater management BMPs, programmatic initiatives, or alternative control practices in accordance with the 2021 Accounting Guidance.

7. Baltimore County shall use the annual restoration benchmark schedule provided in Table 1 below to achieve its impervious acre implementation requirement by the end of the permit term.

Annual Restoration Benchmark Schedule, Table 1

Metric	Year 1	Year 2	Year 3	Year 4	Year 5
Cumulative Percent Impervious Acre Restoration Completed	20%	40%	60%	75%	100%

8. In each year's annual report, Baltimore County shall:

   a. Submit to the Department a list of BMPs, programmatic initiatives, and alternative control practices to be completed in the following year to work toward meeting its impervious acre restoration benchmark:

      i. The list of BMPs, programmatic initiatives, or alternative control practices shall be submitted in the Year 1 BMP Portfolio format provided in Appendix B; and
      ii. Baltimore County may replace individual practices listed in its annual BMP Portfolio as long as the total implementation rate at the end of each year meets the annual restoration benchmark schedule in Table 1.

   b. Evaluate progress toward meeting its annual restoration benchmark according to the schedule in Table 1 and adjust the benchmark appropriately based upon:

      i. Actual BMP implementation rates; and
      ii. Anticipated implementation rates and annual restoration benchmark schedule needed in the remaining years of this permit for meeting the final impervious acre restoration requirement by November 4, 2026.

10.1 Introduction

This section of Baltimore County's 2024 NPDES Report covers stormwater restoration (10.2), and restoration project types (10.3).

Section 10.2 details the impervious cover restoration credited through BMPs since the expiration of the previous permit on December 22, 2018 and BMPs projected for the following year.

Section 10.3 describes restoration project types.

10.2 Stormwater Restoration

10.2.1 Addressing Prior Permit Annual Obligations

Baltimore County will be using new BMP projects to replace the 471 acres of impervious credit achieved through annual alternative control practices in our prior MS4 permit. Table 10-1 below shows the projects used to complete this requirement.

Table 10-1: Capital Projects Completed to Replace Annual Obligations

BMP Type	# of BMPs	Impervious Acres Treated	Acres Planted/ Feet Restored/ Acres Drainage Area
12/23/18 - FY19			
RFP	2	3.1	2.1
UTC	11	15.7	1.7
STRE	3	221.2	9,095.0
WSHW	6	30.7	82.0
DGI	1	0.1	N/A
FY20			
OUT	1	35.5	361.0
RFP	2	10.7	7.1
SHST	1	34.2	1,510.0
STRE	2	56.8	5,005.0
UTC	9	21.2	0.1
WSHW	17	41.7	223.3
Total	**55**	**471.0**	

10.2.2 BMPs Completed Under The Current Permit

Appendix B of Baltimore County's 2021 NPDES Permit lists BMPs to be completed in year 1 of the permit (by November 4, 2022). As stated in the permit, individual practices listed in Appendix B may be replaced with others as long as the year one benchmark, 748 acres, is achieved. Year 1 encompassed the period from the expiration of the previous permit, December 22, 2018 through June 30, 2022. Restoration during this period totaled 1,387 equivalent impervious acres, exceeding the year 1 benchmark.

Table 10-2 below shows the benchmark schedule for completing the impervious restoration requirement for the current permit which is 2,696 acres. For the purposes of the benchmark schedule, annual practices (septic pumping and inlet cleaning) are accounted for by adding the known values for years 1-3 and the projected values for years 4-5 then dividing that sum by 5 for a 5 year average. For this year's report that 5 year average is 61.8. This value divided by 5 is 12.4 and this value is included with each year's progress total shown in Table 10-2.

Table 10-2 Annual Restoration Benchmark Schedule

Metric	Year 1[1]	Year 2 (FY 2023)	Year 3 (FY 2024)	Year 4	Year 5
MDE Benchmark Schedule (%)	20%	40%	60%	70%	100%
Baltimore County Progress (%)	52%	66%	76%	103%[2]	129%[2]
Baltimore County Progress (EIA)	1,400	1,778	2,060	2,773[2]	3,481[2]

[1]Year 1 = Dec 22, 2018 – June 30, 2022
[2]Projected

Included with the submission of this report is the attachment *Baltimore County BMPs Years 1-3.xlsx* which lists all BMPs completed in each year of the current permit to date.

10.2.3 BMPs projected for FY25

A condition of the 2021 NPDES Permit is to submit in the annual report a list of initiatives to be completed in the following year that will work toward meeting the impervious acre restoration benchmarks. Table 10-3 below shows BMPs projected for fiscal year 2025.

Table 10-3 Year 4 (FY25) BMPs Projected

BMP NAME	BMP TYPE	NUMBER of BMPs	IMPERVIOUS ACRES TREATED	LENGTH RESTORED (feet)/ LANE MILES (miles)/ MASS LOADING (lbs)
Proposed Restoration for Year 4 of the Reissued Permit (FY25)				
Stream Restoration	STRE	4	507.3	15,419 ft
Shoreline Management	SHST	1	118.7	2.967 ft
Reforestation - Fall	FPU	1	33.3	N/A
Urban Tree Canopy - Fall	UTC	1	2.9	N/A
Equity Trees - Fall	UTC	1	1.0	N/A
Reforestation - Spring	FPU	1	28.9	N/A
Urban Tree Canopy - Spring	UTC	1	2.4	N/A
Pond Conversions	WSHW	5	6.5	N/A
Total		**20**	**701.0**	

10.3 Restoration Project Types

There are several types of restoration programs and projects completed by EPS, local watershed associations with funding assistance from EPS, and other Baltimore County agencies that result in quantifiable pollution reduction. These types of projects are listed in Sections 10.3.1 - 10.3.7 below.

10.3.1 Stream, Shoreline and Outfall Projects

The Baltimore County EPS Watershed Restoration Section (WR) administers the Watershed Restoration Program which is responsible for oversight of the design and construction of capital projects that include stream restoration, shoreline management and outfall stabilization. Baltimore County Department of Public Works (DPW) occasionally completes these types of projects as well.

10.3.1.1 Stream Restoration Project Maintenance

Recently completed stream projects subject to required permit monitoring typically include post-storm evaluation. This monitoring is usually contracted with the design consultant, whose scope of work will include post storm evaluations for 2-3 years after installation. The results are included within the annual monitoring reports. Severe problems are reported to the County immediately. Following the completion of the permit monitoring, routine inspections continue on a 3-5 year cycle and are performed by EPS staff.

EPS staff also perform supplemental monitoring including post-storm evaluations. Staff prioritize new and/or problematic sites as inspection time allows. Conditions are documented with photos and/or mapping as appropriate.

Change of condition following large storm events is very common in natural and restored streams. Noted problem areas will often self-heal with the succession of smaller storm events over time. More significant changes will be evaluated to determine if maintenance or intervention is required, and may require additional design, permitting and construction activity. Maintenance of this magnitude requires an extended period of time to implement.

Other routine maintenance is implemented as needed and may include invasive species control, planting and/or bioengineering methods performed in-house or with use of an on-call contractor.

10.3.2 Reforestation and Urban Tree Planting

Trees planted as part of restoration efforts and not as mitigation for development/funded by mitigation (fee-in-lieu) monies, are tracked here. Baltimore County EPS Forest Management (FM) and local watershed groups do the bulk of these plantings.

10.3.3 Stormwater Projects

10.3.3.1 Restoration Stormwater Projects

Restoration type stormwater projects are completed by EPS, DPWT and local watershed groups. As with restoration tree plantings, these stormwater management (SWM) projects must not be associated with any type of mitigation to be considered restoration. Rain barrels and rain gardens installed by local watershed associations are included here.

10.3.3.2 New Development Regulation Stormwater Management

As stated in Section 3, EPS currently implements the requirements of the 2000 Maryland Stormwater Design Manual, revised in 2009, for new and redevelopment activities. The Stormwater Management Act of 2007 was incorporated into the County's regulations in May 2010.

10.3.3.3 Redevelopment Regulation Stormwater Management

Baltimore County has identified redevelopment/revitalization as one of the restoration actions to meet the Chesapeake Bay TMDL and local nutrient and sediment TMDLS. Redevelopment has also been identified as an action for meeting the impervious surface treatment requirements of the NPDES – MS4 permit.

Redevelopment is defined as a pre-development site with impervious cover >40% as per the stormwater management regulations. Redevelopment projects are already accounted for in the Chesapeake Bay Watershed Model as urban land, and therefore included in the load reduction allocation for Baltimore County.

10.3.4 Impervious Removal

The County tracks impervious surface removal as part of meeting our restoration goals.

10.3.5 Groundwater Management

10.3.5.1 Denitrifying System Upgrades

The typical septic system does not remove nitrogen, therefore, about 24.32 pounds of nitrogen per year is delivered to the groundwater. An upgraded, nitrogen-removing septic system cuts a system's nitrogen load in half using Best Available Technology (BAT). BATs may be installed using money through the Bay Restoration Fund (BRF) Onsite Sewer Disposal System (OSDS) grant program.

10.3.5.2 Septic System Pump Outs

A septic pump out is the act of removing waste by a licensed septic hauler from a septic system contained within the Chesapeake Bay watershed that is currently in use for any affected property.

10.3.5.3 OSDS Connections to the Sanitary Sewer System

Connection to the sanitary sewer system and abandonment of OSDS systems (AKA septic hook-ups) reduce nitrogen discharges from the OSDS source sector.

In accordance with Bay Restoration Fund (BRF), money is collected annually from septic system users to reduce pollution from the OSDS sector. State law also allows BRF money to be used to pay for properties on septic systems to be connected to public sewer. Baltimore County regulations require that failing systems located within the Chesapeake Bay Critical Area (CBCA, i.e., property within 1,000 feet of mean high tide) be upgraded with Best Available Technology (BAT) units or connected to public sewer. These improvements may be paid for by private property owners, or by grants from the BRF to property owners. Other septic systems, including failing systems outside of the CBCA may also be eligible for BRF funding. The EPS Groundwater Management section administers the BRF grant program in Baltimore County. The EPS grant review includes assessing the availability of public sewer. If the subject property has access to public sewer, a grant will only be approved for a sewer connection.

10.3.6 Street Sweeping and Storm Drain Cleaning

Please see Section 7 for information on Baltimore County's Street Sweeping and Storm Drain Cleaning program.

10.3.7 Illicit Connection Program

Please see Section 5 for information on Baltimore County's Illicit Connection Program

10.3.8 Urban Nutrient Management and Fertilizer Act (new 2022)

2020 CAST outputs for the *Nutrient Management Maryland Commercial Applicators (CA)* and *Nutrient Management Maryland Do It Yourself (DIY)* BMPs were showing very large acreages. To bring these acreages in line with MDE Phase 6 land use data, the ratio between these CAST BMP acres and CAST land use data was determined for watersheds with TN or TP TMDLs. This ratio is shown in the two far right columns in Table 10-4. These percentages were then applied to the respective acreages in the MDE Phase 6 data to determine the acres of credit for UNM, shown in two far right columns of Table 10-5. Efficiencies from MDEs TIPP Tool were then applied to these acreages to calculate the reductions shown in the Section tables. For TN the efficiency is 9% for CA and 4.5% for DIY. For TP the efficiency is 4.13%, as per MDE this represents the statewide turf per acre load change from pre and post Fertilizer Act. Table 10-4 and Table 10-5 have been updated for this 2024 report to reflect the most up to date CAST outputs.

Table 10-4 2024 Cast Outputs

Watershed	Turf Acres Total	Canopy Over Turf Acres	Turf UNM BMP Acres	Canopy Over Turf UNM BMP Acres	% Turf	% Canopy Over Turf
Back River (CA)	5,500.6	3,0003.5	1,892.6	1,069.2	34.4%	35.6%
Back River (DIY)	5,500.6	3,003.5	3,061.0	1,729.3	55.6%	57.6%
Baltimore Harbor (CA)	2,808.6	815.0	989.0	290.7	35.2%	35.7%
Baltimore Harbor (DIY)	2,808.6	815.0	1,599.5	470.1	57.0%	57.7%
Gwynns Falls (CA)	6,503.3	4,853.5	2,267.3	1,724.5	34.9%	35.5%
Gwynns Falls (DIY)	6,503.3	4,853.5	3,667.0	2,789.1	56.4%	57.5%
Jones Falls (CA)	5,454.3	4,607.7	1,922.2	1,639.1	35.2%	35.6%
Jones Falls (DIY)	5,454.3	4,607.7	3,108.8	2,650.9	57.0%	57.5%
Liberty Reservoir (CA)	2,704.1	546.3	940.7	192.4	34.8%	35.2%
Liberty Reservoir (DIY)	2,704.1	546.3	1,521.4	311.1	56.3%	56.9%
Loch Raven Reservoir (CA)	19,100.0	5,954.7	6,855.8	2,151.3	35.9%	36.1%
Loch Raven Reservoir (DIY)	19,100.0	5,954.7	11,088.2	3,479.4	58.1%	58.4%
Patapsco River (CA)	6,591.6	3,532.2	2,293.6	1,245.6	34.8%	35.3%
Patapsco River (DIY)	6,591.6	3,532.2	3,709.6	2,014.6	56.3%	57.0%
Prettyboy Reservoir (CA)	2,737.5	339.7	994.4	123.7	36.3%	36.4%
Prettyboy Reservoir (DIY)	2,737.5	339.7	1608.3	200.1	58.8%	58.9%

Table 10-5 MDE Land Use Data for UNM

Watershed	MDE Turf Acres (2013)	MDE Canopy Over Turf Acres (2013)	% of Turf Credited in CAST	% of Canopy Over Turf Credited in CAST	MDE Turf Acres to Credit	MDE Canopy Over Turf Acres to Credit
Back River (CA)	3,873.6	1,367.6	34.4%	35.6%	1,332.8	486.8
Back River (DIY)	3,873.6	1,367.6	55.6%	57.6%	2,155.6	787.4
Baltimore Harbor (CA)	1,604.0	341.7	35.2%	35.7%	564.8	121.9
Baltimore Harbor (DIY)	1,604.0	341.7	57.0%	57.7%	913.5	197.1
Gwynns Falls (CA)	4,799.8	2,255.1	34.9%	35.5%	1,673.4	801.3
Gwynns Falls (DIY)	4,799.8	2,255.1	56.4%	57.5%	2,706.5	1,295.9
Jones Falls (CA)	2,829.2	1,363.2	35.2%	35.6%	997.1	484.9
Jones Falls (DIY)	2,829.2	1,363.2	57.0%	57.5%	1,612.6	784.3
Liberty Reservoir (CA)	934.2	62.8	34.8%	35.2%	325.0	22.1
Liberty Reservoir (DIY)	934.2	62.8	56.3%	56.9%	525.6	35.8
Loch Raven Reservoir (CA)	7,676.1	1,215.0	35.9%	36.1%	2,755.3	439.0
Loch Raven Reservoir (DIY)	7,676.1	1,215.0	58.1%	58.4%	4,456.2	709.9
Patapsco River (CA)	3,734.3	1,177.0	34.8%	35.3%	1,299.4	415.1
Patapsco River (DIY)	3,734.3	1,177.0	56.3%	57.0%	2,101.6	671.3
Prettyboy Reservoir (CA)	914.5	26.5	36.3%	36.4%	332.2	9.6
Prettyboy Reservoir (DIY)	914.5	26.5	58.8%	58.9%	537.3	15.6

11.0 Permit Requirements

PART IV. STANDARD PERMIT CONDITIONS

H. <u>Program Funding</u>

1. Annually, a fiscal analysis of the capital, staffing, operation, and maintenance expenditures necessary to comply with all conditions of this permit shall be submitted by Baltimore County as required in PART V below.
2. Adequate program funding to comply with all conditions of this permit shall be maintained. Lack of funding does not constitute a justification for noncompliance with the terms of this permit.

PART V. PROGRAM REVIEW AND ANNUAL PROGRESS REPORTING

A. <u>Annual Reporting</u>

1. Annual progress reports, required under 40 CFR §122.42(c), will facilitate the long-term assessment of Baltimore County's NPDES stormwater program. The County shall submit annual reports on or before December 31st and post these reports on the County's website. All information, data, and analyses shall be based on the State's fiscal year and include:
   c. Expenditures for the reporting period and the proposed budget for the upcoming year;

11.1 SB863 – Financial Assurance Plan

The County's fifth biennial Financial Assurance Plan (FAP) was completed in October 2024 with County Council approval on December 16, 2024. The FAP is submitted with this NPDES MS4 annual report.

The County's fourth biennial Financial Assurance Plan (FAP) was completed in October 2022 with County Council approval on December 19, 2022, and was submitted to Maryland Department of the Environment (MDE) with the 2022 NPDES MS4 annual report. MDE's review of this report found that Baltimore County has met the requirements of SB863 (2015 Regular Session of the Maryland General Assembly). A July 20, 2023 letter from MDE detailing their findings is posted on the MDE website at: https://mde.maryland.gov/programs/water/StormwaterManagementProgram/Documents/FAP-WPRP/2022_Reviews/BA_FAP_Review_7-20-2023.pdf

The FAP focuses on demonstrating that the County has sufficient funding resources to meet the Impervious Surface Restoration requirement of the MS4 Permit, and shows that the County has sufficient funding in the current fiscal year and subsequent fiscal year budgets to meet its estimated cost as per Md. Code Ann. Environment § 4-202.1(j)(2).

11.2 SB863 – Watershed Protection and Restoration Program Annual Report

State law requires an annual report on Baltimore County’s watershed protection fund (Md. Code Ann. Environment §4-202.1.) The report details the funding structure, deposits into the fund, and expenditures from the fund. The report for fiscal year 2024 is due and is submitted with this NPDES MS4 annual report. Baltimore County's stormwater remediation fee was repealed on July 1, 2017. Funds deposited into the County's watershed protection and restoration fund in FY 2024 were sourced from general funds, metropolitan district funds, general obligation bonds, and state aid (grants).

11.3 Fiscal Year 2024 Budget Detail

The fiscal year 2024 adopted budget is available on-line and consists of the following components:

FY24 Adopted Operating and Capital Budget:
https://resources.baltimorecountymd.gov/Documents/Budget/24budget/fy2024adoptedfinal.pdf

FY24 Adopted Operating Budget Supporting Detail:
https://resources.baltimorecountymd.gov/Documents/Budget/24budget/2024adoptedoperatingbudgetsupportingfinal.pdf

FY24 Adopted Operating Budget Personnel Detail:
https://resources.baltimorecountymd.gov/Documents/Budget/24budget/2024adoptedoperatingbudgetpersonnelfinal.pdf

FY24 Adopted Capital Budget Supporting Detail:
https://resources.baltimorecountymd.gov/Documents/Budget/24budget/2024adoptedcapitalbudgetfinal.pdf

American Rescue Plan funding reports:
https://arp-bc-gis.hub.arcgis.com/pages/reporting

The operating budget of the Department of Environmental Protection and Sustainability for FY24 totals $8,570,816. Table 11-1 presents detail of the FY22 – FY24 operating budgets. The majority of the operational funds (92.7%) is directed to personnel costs.

Table 11-1: Summary of EPS Operating Budget for Fiscal Year 2023

Description	Actual 2022	Appropriated 2023	Budget 2024
Contracts & Services	$47,439	$91,250	$203,250
Equipment, Bldg, Improvements	$258,047	$205,800	$205,800
Grants/Subsidies/Contributions	$180,427	$180,427	$180,427
Other Charges	$1,767	$0	$0
Personnel	$6,079,007	$7,277,495	$7,941,689
Rents & Utilities	$8,750	$21,400	$9,400
Supplies & Materials	$36,485	$27,000	$28,250
Travel	$2,087	$2,020	$2,000
Total Expenditures	**$6,614,009**	**$7,805,392**	**$8,570,816**
Original General Fund Appropriation	$6,447,251	$6,980,700	$7,519,451
General Fund Approp Transfer/Supplement	$0	$0	$0
Adjusted General Fund Appropriation	$6,447,251	$6,980,700	$7,519,451
Special Fund Authorization - Fund 200	$734,952	$0	$0
Special Fund Authorization - Fund 220	$0	$766,692	$993,365
Special Fund Authorization - Fund 215	$0	$58,000	$58,000
Total Expenditure Authorization	$7,182,203	$7,805,392	$8,570,816
Less: Unexpended Balance	($568,194)	$0	$0
Expenditure Totals	**$6,614,009**	**$7,805,392**	**$8,570,816**
Authorized Positions	79	85	87
Full Time Equivalents – Total	83.32	81.86	83.35

Table 11-2 provides a summary of the Department of Environmental Protection and Sustainability (EPS) Waterway Improvement Program capital budget as approved by the County Council for fiscal year 2024. The prior authorizations and fiscal year 2024 information are provided here. The capital budget for future years is provided in the Financial Assurance Plan (see section 0). The total capital budget for FY2024 was $29,287,504, bringing the total funds authorized since the fund was established in 1996 to $232,714,860. In addition to the capital funds detailed here, EPS has access to up to $10 million per year in capital funds from Metropolitan District utility bonds, for projects that take place in the reservoir watersheds or have a significant sanitary sewer protection component. Baltimore County has also designated $8.1 million from its American Rescue Plan Act (ARPA) State and Local Fiscal Recovery Funds (SLFRF) allotment for two stormwater infrastructure projects that will provide water pollution reductions in support of MS4 permit requirements.

Table 11-2: Summary of EPS Capital Budget – FY2024 and Prior Authorizations

Title	Prior Authorizations	FY 2024	Total Through 2024
Watershed Restoration	$8,522,146	$375,000	$8,897,146
Lower Gunpowder Watershed	$5,186,011	$0	$5,186,011
Patapsco River Watershed	$384,582	$0	$384,582
Gwynns Falls Watershed	$7,969,864	$0	$7,969,864
Jones Falls Watershed	$4,464,014	$0	$4,464,014
Environmental Management	$8,622,067	$0	$8,622,067
Stormwater - Restoration and Retrofit	$96,477,448	$24,605,000	$121,082,448
Stormwater – Planning & Monitoring	$8,024,416	$2,032,504	$10,056,920
Stormwater – Sustainability	$10,032,300	$2,275,000	$12,307,300
Community Conservation	$3,744,508	$0	$3,744,508
Totals	**$153,427,356**	**$29,287,504**	$182,714,860

Baltimore County's water quality and impervious surface restoration efforts extend beyond EPS. The revenue and costs documented in the FAP include funds used by the Department of Public

Works for operational programs (street sweeping, storm drain cleaning), capital funds from Metropolitan District utility bonds used for water quality restoration, ARPA grants for water quality restoration, and capital funds used to retrofit County owned sites subject to the General Industrial Stormwater Discharge Permit. Table 11-3 summarizes the actual FY 2024 and projected 2025 costs for impervious surface restoration, split into operating/paygo funds and capital/debt/grant funds. Total expenditures on impervious surface restoration during FY2024 were $30,093,878.

Table 11-3: Summary of Impervious Surface Restoration Budget

Fund Type	FY 2024 Projected Cost	FY 2025 Projected Cost
Operating (Paygo)	$1,083,416	$1,131,308
Capital (Paygo, Debt and Grants)	$29,010,462	$51,648,705
Total	$30,093,878	$52,780,013

A.1 Permit Requirement

F. **Countywide TMDL Stormwater Implementation Plan**

1. Where Baltimore County has submitted an implementation plan for a TMDL identified in Appendix A and that plan has yet to be approved, the County shall, within one year of the effective date of this permit, address all outstanding comments needed for the Department's approval of the plan.
2. Within one year of EPA's approval or establishment of a new TMDL, Baltimore County shall submit an implementation plan to the Department for approval. The TMDL implementation plan shall be based on the Department's TMDL analyses, or equivalent and comparable Baltimore County water quality analyses, that includes:
   a. A list of stormwater BMPs, programmatic initiatives, or alternative control practices that will be implemented to reduce pollutants for the TMDL;
   b. A description of the County's analyses and methods, and how they are comparable with the Department's TMDL analyses; and
   c. Final implementation dates and benchmarks for meeting the TMDL's applicable stormwater WLA. Once approved by the Department, any new TMDL implementation plan shall be incorporated in the Countywide TMDL Stormwater Implementation Plan and subject to the annual progress report requirements under PART IV.F.3 of this permit.
   d. Allow a minimum 30-day comment period before finalizing TMDL stormwater implementation plans; and
   e. Document in final TMDL stormwater implementation plans how the County provided public outreach and adequately addressed all relevant comments.
3. For all TMDLs and WLAs listed in Appendix A, the County shall annually document, in one Countywide Stormwater TMDL Implementation Plan, updated progress toward meeting these TMDL WLAs. This Countywide Stormwater TMDL Implementation Plan shall include:
   a. A summary of all completed BMPs, programmatic initiatives, alternative control practices, or other actions implemented for each TMDL stormwater WLA;
   b. An analysis and table summary of the net pollutant reductions achieved annually and cumulatively for each TMDL stormwater WLA;
   c. An updated list of proposed BMPs, programmatic initiatives, and alternative control practices, as necessary, to demonstrate adequate progress toward meeting the Department's approved benchmarks and final stormwater WLA implementation dates; and

d. Updates on the County's efforts to reduce trash, floatables, and debris, and show progress toward achieving the annual trash reduction allocation required by the Baltimore Harbor trash TMDL. The updates shall describe the status of trash elimination efforts including resources (e.g., personnel and financial) expended and the effectiveness of all program components including:

    i. Quantifying annual trash reductions using the Department's TMDL analysis or an equivalent and comparable County trash reduction model;
    ii. The public education and outreach strategy to initiate or increase residential and commercial recycling rates, improve trash management, and reduce littering; and
    iii. An annual evaluation of the local trash reduction strategy including any modifications necessary to improve source reduction and proper disposal.

A.2 Countywide Stormwater TMDL Implementation Plan

A provision of Baltimore County's NPDES - MS4 permit issued on November 5, 2021 is a requirement to develop a Countywide Stormwater TMDL Implementation Plan or summary report which will document updated progress toward meeting TMDL wasteload allocations (WLAs). This summary report represents Baltimore County's progress on achieving applicable wasteload allocations and ultimately attaining water quality criteria and waterbody designated uses.

Carried over from the previous permit is the requirement to develop a TMDL Implementation Plan within one year for each newly approved or established EPA approved local TMDL.

A.2.1 TMDL Development

Federal regulations require that every state designate appropriate uses of water, and in doing so they "…must take into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation" (Designation of Uses, 40 CFR 131.10, 2015). These regulations also explain that "water quality standards" consist of the above-mentioned designated use of a waterway in conjunction with the water quality required for that designated use to be realized (Definitions, 40 CFR 131.3(i), 2015). In essence, states are required to inventory the waterways within their jurisdiction and categorize them by what their primary uses are.

States then provide an assessment of water quality on all of those inventoried waterways as required by Section 305(b) of the Federal Clean Water Act by preparing a report. The report (termed "305(b) report"), produced every two years, must include an evaluation of whether the state's waters and water quality are supportive of their designated uses. Because water quality standards are a combination of the designated use and the water quality needed to support that use, it means that if the designated use is not supported then the waterway is not meeting water quality standards. When a waterway is not meeting water quality standards, it is said to be "impaired" by whatever pollutant is keeping it from supporting its designated use. Section 303(d) of the Federal Clean Water Act mandates that those impaired waterways are specifically called out in their own list (termed “303(d) list”) for further assessment and remediation planning. This list is a subset of the waters evaluated by the 305(b) report. In Maryland the “305(b) report” and the “303(d) list” are published together, every two years, in a document known as the Maryland Integrated Report on Surface Water Quality (MDE, 2024).

The Integrated Report divides waterways and their affecting pollutants into several categories. The most relevant categories are:

- **Category 2**: Waterways that are meeting some water quality standards, but perhaps not others.
- **Category 4**: Waterways that are impaired by specific pollutants for which a TMDL has already been issued or for which a TMDL may not be required.
- **Category 5**: Waterways that are impaired by specific pollutants and require a TMDL or other abatement initiative.

In a majority of cases, the waters that find themselves on the 303(d) list (Category 5 within the Integrated Report) receive a TMDL which represents the calculated maximum load or amount of a specific pollutant that a waterway can receive while still supporting its designated uses and meeting water quality standards. Currently in Baltimore County, there are TMDLs for nitrogen, phosphorus, sediment, bacteria, trash, PCBs, and chlordane. Some pollutants are impairing county waterways and do not yet have TMDLs issued for them. For each assessed waterway in Baltimore County, Table A-1 displays pollutants determined to not be contributing to impairments (Category 2), and pollutants determined as contributing to impairments (Category 4 and 5), along with a listing of those impairing pollutants that have a current TMDL issued by the State.

Table A-1: Pollutants by Maryland Integrated Report Category in each Watershed (as of 2024).

Watershed	Waterway	Pollutants Not Contributing to Impairment (Category 2)	Pollutants Contributing to Impairment (Category 4 and 5)	Current TMDLs Issued by MDE, Approved by EPA
Back River	Back River Non-Tidal Streams	•Sulfate (2024)	•Bacteria (Herring Run only) •Chlorides •Habitat alterations •Lack of riparian buffer •Sediment	•Bacteria (Herring Run only) •Sediment
Back River Oligohaline (BACOH)[a]	Chesapeake Bay Segment	•Heptachlor Epoxide •Mercury •Zinc	•PCBs •Sediment •Nutrients •Chlordane •PFOS	•Chlordane •PCBs •Nutrients (Bay TMDL + Local TMDL) •Sediment (Bay TMDL)
Baltimore Harbor	Baltimore Harbor Non-Tidal Streams	•Sulfate (2024)	•Chlorides •Habitat alterations •Lack of riparian buffer •Sediment	•Sediment
	Baltimore Harbor Tidal Embayment		•Chlordane •PCBs	•Chlordane •PCBs
	Baltimore Harbor Impoundments	•PCBs (Stansbury Pond-2024)[b]		
Patapsco River Mesohaline (PATMH)[a]	Chesapeake Bay Segment	•Chromium (Bear Creek) •Copper (Bethlehem Steel Outfall 014. 021) •Nickel (Bethlehem Steel Outfall 001, 014, 021)	•Copper (Bethlehem Steel Outfall 001) •Cyanide (Bethlehem Steel Outfall 001, 014, 021) •Nutrients •PCBs •Sediment •Trash •Unknown cause of impairment •Zinc	•Nutrients (Bay TMDL + Local TMDL) •PCBs •Sediment (Bay TMDL) •Trash
	Lower Patapsco River Mainstem Tidal		•PFOS	
Bird River	Bird River Non-Tidal Stream		•Unknown cause of impairment	
	Bird River Tidal Embayment		•PCBs	•PCBs
Deer Creek			-Temperature	
Tidal Gunpowder River		•Mercury (ex. Seneca Creek)	•PCBs (Seneca Creek) •PCBs (Tidal Gunpowder ex. Seneca Creek) •PFOS	•PCBs (Tidal Gunpowder ex. Seneca Creek)
Gunpowder River Oligohaline (GUNOH)[a]	Chesapeake Bay Segment	•Sediment (MD-GUNOH2-SWSAV, delisted 2024)	•Nutrients •Sediment (MD-GUNOH1-SWSAV)	•Nutrients (Bay TMDL) •Sediment (Bay TMDL, MD-GUNOH1-SWSAV)

Watershed	Waterway	Pollutants Not Contributing to Impairment (Category 2)	Pollutants Contributing to Impairment (Category 4 and 5)	Current TMDLs Issued by MDE, Approved by EPA
Gwynns Falls		•Phosphorus	•Bacteria •Chlorides •Habitat alterations •PCBs •Sediment •Temperature •PFOS	•Bacteria •Sediment
Jones Falls		•Chlordane (Lake Roland) •Copper •Lead •Mercury (Lake Roland) •Phosphorus •Zinc •Sulfates (delisted 2024)	•Bacteria •Chlorides •PCBs (Lake Roland) •PCBs (Mainstem above Lake Roland) •Sediment •Temperature •PFOS	•Bacteria •PCBs (Lake Roland) •Sediment
Liberty Reservoir	Liberty Reservoir Streams		•Bacteria •Chlorides •Temperature	•Bacteria
	Liberty Reservoir Impoundment	•Chromium-total •Lead •Mercury •PCBs	•Phosphorus •Sediment	•Phosphorus •Sediment
Little Gunpowder Falls		•Arsenic •Cadmium •Chromium-III •Copper •Lead •Mercury •Nickel •Nutrients (phosphorus) •Selenium •Zinc	•Temperature	-
Loch Raven Reservoir	Loch Raven Reservoir Streams	•E. coli (portion of river mainstem delisted, other tributaries still impaired) •Sulfates (delisted 2024)	•Bacteria •Chlorides •Lack of riparian buffer •Temperature	•Bacteria
	Loch Raven Reservoir Impoundment	•Arsenic •Cadmium •Chromium-total •Copper •Lead •Mercury (new in 2022) •Nickel •Selenium	•Phosphorus •Sediment	•Phosphorus •Sediment
Lower Gunpowder Falls		•Arsenic •Cadmium •Chromium-VI •Copper •Lead •Mercury •Nickel •Nutrients (phosphorus) •Selenium	•Chlorides •Habitat alterations •Sediment •pH, High •Temperature	•Sediment

Watershed	Waterway	Pollutants Not Contributing to Impairment (Category 2)	Pollutants Contributing to Impairment (Category 4 and 5)	Current TMDLs Issued by MDE, Approved by EPA
		•Temperature (Long Green Creek; last assessed 2014) •Zinc •Sulfates (delisted 2024)		
Middle River + Browns Cove		•Cadmium •Copper (originally listed in error) •Lead •Mercury •Nickel (originally listed in error)	•PCBs •PFOS	-
Middle River Oligohaline (MIDOH)[a]	Chesapeake Bay Segment		•Nutrients	•Nutrients (Bay TMDL)
Patapsco River Lower North Branch		•Arsenic •Bacteria (portions of middle reaches) •Cadmium •Chromium-total •Copper •Lead •Mercury •Nickel •PCBs •Phosphorus •Selenium •Zinc •Sulfates (delisted 2024)	•Bacteria •Chlorides •Habitat alterations •Sediment •PFOS •Temperature	•Bacteria •Sediment
Prettyboy Reservoir	Prettyboy Reservoir Streams	•PCBs •Temperature (multiple tribs)	•Bacteria •Temperature •PFOS	•Bacteria
	Prettyboy Reservoir Impoundment	•Arsenic •Cadmium •Chromium-VI •Copper •Lead •Mercury (new in 2022) •Nickel •PCBs •Selenium •Zinc	•Phosphorus	•Phosphorus
Northern Chesapeake Bay Oligohaline (CB2OH)[a]	Chesapeake Bay Segment	•Sediment (MD-CB@OH-SWSAV delisted) •Unknown cause of impairment	•Nutrients	•Nutrients (Bay TMDL)
Upper Chesapeake Bay Mesohaline (CB3MH)[a]	Chesapeake Bay Segment		•Nutrients •Sediment •Unknown cause of impairment	•Nutrients (Bay TMDL) •Sediment (Bay TMDL

a. Baltimore County is responsible for portions of six Chesapeake Bay Segments: Gunpowder Oligohaline (GUNOH), Northern Chesapeake Bay Oligohaline (CB2OH), Middle River Oligohaline (MIDOH), Back River Oligohaline (BACOH), Patapsco Mesohaline (PATMH), and Upper Chesapeake Bay Mesohaline (CB3MH) – “oligohaline” refers to low salinity waters, while “mesohaline” refers to moderate salinity waters.

b. Stansbury pond was moved from Cat 5 to Cat 2 for PCBs due to the contaminated species (White Perch) being determined to not naturally reproduce in the pond. Their presence was due to overflows of the cove.

Each current and future local TMDL will have a TMDL Implementation Plan developed by Baltimore County. The Chesapeake Bay TMDL is currently addressed through the Maryland Phase III Watershed Implementation Plan. For more detailed views of the TDMLs, see the Maryland TMDL Data Center webpage.

MDE utilizes several assessment methodologies for determining impairments. These methodologies are linked on the MDE webpage here. This page houses assessment methods for bacteria, biological impairments, dissolved oxygen and chlorophyll a, pH, sediment, temperature, and toxic pollutants. Specifically for aquatic biological community impairments in streams, the assessment methodology involves the Maryland Biological Stressor Identification (BSID) process linked here.

A.2.2 Categories of Local TMDLs

The categories of local TMDLs are discussed below.

A.2.2.1 Nutrient TMDLs:

There are seven local nutrient TMDLs for Baltimore County waters, two for nitrogen and five for phosphorus. The three drinking water reservoirs (Prettyboy, Loch Raven, and Liberty) located in Baltimore County have TMDLs and Implementation Plans completed for phosphorus. Each reservoir exceeds the water quality standards for epilimnion chlorophyll *a* and hypolimnion dissolved oxygen. The two standards are linked through algal production, which in turn is related to the amount of phosphorus delivered to the impaired waterway. Changes in nitrogen have been found through modeling to not have an effect on the amount of algal production within the reservoirs. This follows the general ecological principle that algal productivity in fresh water is phosphorus limited and not nitrogen limited. An increase in algal biomass can cause problems in the final drinking water product. High amounts of algae can cause taste issues with the drinking water and the algal organic matter can react with the chlorination to produce trihalomethanes in the finished water. When the algal biomass dies it drifts through the thermocline to the hypolimnion where bacteria break down the organic matter and in the process reduce the oxygen in the hypolimnion (for further information see here or here). This in turn impacts the biological community's ability to survive. Table A-2 summarizes the nutrient and sediment reduction requirements for Baltimore County's local TMDLs.

A.2.2.2 Sediment TMDLs:

There are eight local sediment TMDLs for Baltimore County waters. Two are related to drinking water reservoirs and six are related to stream biological community impacts. Sediment TMDLs come from a variety of impacts. Sediment TMDLs for reservoirs are typically based on maintaining the capacity of the drinking water supply ,while sediment TMDLs for streams are based on impacts to the aquatic community. Table A-2 summarizes the nutrient and sediment reduction requirements for Baltimore County's local TMDLs. Specific progress toward meeting required reductions is reported by watershed in Section A.2.3.http://www.csu.edu.au/__data/assets/pdf_file/0011/749936/Harrison_Evan_139.pdf

Table A-2: Local TMDL Reduction Requirements for Nutrient and Sediment TMDLs

Watershed	Nitrogen (N)		Phosphorus (P)		Sediment (TSS)	
	Total lbs*	% from baseline	Total lbs*	% from baseline	Total lbs*	% from baseline
Prettyboy	NA	NA	516	15%	NA	NA
Loch Raven	NA	NA	3,095	15%	514,939	0%
Liberty	NA	NA	1,227	49%	3,237,556	38%
LNB Patapsco River	NA		NA		6,123,379	21.2%
Gwynns Falls	NA		NA		13,542,224	36.4%
Jones Falls	NA		NA		4,802,771	21.9%
Baltimore Harbor (N & P incl DF)	61,851	15%	3,973	15%	NA	58%
Back River (N & P incl DF)	14,152	15%	2,156	15%	21,651,187	75%
Lower Gunpowder Falls	NA	NA	NA	NA	15,004,877	67.4%
Baltimore Harbor Direct Drainage	NA	NA	NA	NA	2,678,892	58%

DF = Delivery Factor, *target load reduction as of FY13 land use and BMPs update

The Baltimore Harbor nutrient TMDL has an overall requirement of 15% reductions for nitrogen and phosphorus from urban stormwater sources. To achieve these reductions, the restoration actions are spread over four 8-digit watersheds: LNB Patapsco, Gwynns Falls, Jones Falls & Baltimore Harbor. Since three of these watersheds have reductions associated with sediment impacts to the aquatic community and since most restoration actions that reduce sediment also reduce nitrogen and phosphorus, Baltimore County used the sediment TMDL Implementation Plans to determine how much nitrogen and phosphorus would be reduced and adjusted from that projection if additional reductions were needed.

Implementation actions to achieve these local TMDL pollutant reductions are directly applicable to meeting the Chesapeake Bay TMDL after accounting for delivery factors (DFs), with the exception of Liberty Reservoir. Restoration actions with the Liberty Reservoir do not count toward meeting the Bay TMDL as the Chesapeake Bay Watershed Model indicates zero delivery of pollutants from within Liberty watershed to the bay due to the effects of Liberty Reservoir.

The TMDL Implementation Plans accounted for the changes in the amount of urban load due to development and the amount of restoration actions since the development of each TMDL up to FY13 which is the most recent land use data available. Loads were adjusted based on the Chesapeake Bay Program loading rates to determine new load reductions needed as of FY13. The 'Total lbs' columns in Table A-2 reflect this update. Restoration actions and other reductions that have occurred since that date can be credited toward meeting the reductions needed. This process is described in detail in Section 5 of the county's TMDL Implementation Plans.

A.2.2.3 <u>Bacteria TMDLs:</u>

The seven bacteria TMDLs developed to date have all focused on bacteria impairments in streams, with no impairments indicated for the drinking water reservoirs, and none currently in tidal water segments. High levels of bacteria are an indicator of potential human health impacts for people using the waters for recreational purposes. The bacteria TMDLs present some unique challenges, due mainly to the input of wildlife and the current state of knowledge on bacteria dynamics in streams and effectiveness of various treatment options. Meeting the Consent Decree to eliminate Sanitary Sewer Overflows (SSOs) is expected to provide a majority of the reduction to bacteria counts in affected areas served by the sanitary sewer system. Among other pushes for bacteria reductions include an active program to address failing septic systems and efforts to implement a pet waste education and outreach program. The County has existing programs to address rats and deer, which will address some of the wildlife sources. The livestock sources are the responsibility of the agricultural sector over which Baltimore County has no control.

The initial focus of each Bacteria TMDL Implementation Plan is to provide monitoring for better resolution of subwatersheds with high bacteria counts, to continue monitoring at the Bacteria Trend Monitoring sites, to continue to implement the requirements of the sanitary sewer Consent Decree, and to develop education and outreach for pet waste bacteria sources. The bacteria monitoring is detailed in Section 9.4.2. The County has completed the first two years of the subwatershed bacteria prioritization monitoring. The results of the both years of subwatershed prioritization monitoring are presented in Section 9.4.2.2.

The progress in meeting the sanitary sewer Consent Decree in relation to the bacteria monitoring is detailed in Section 7.6. Baltimore County is currently working on pet waste outreach and education; results and discussion of this effort will be detailed in Section 8 of future annual reports.

The trends in the bacteria concentrations for all of the Bacteria TMDL watersheds are presented in relation to sanitary sewer repairs if applicable in Section A.2.3. The concentrations presented are the geometric means for the seasonal (May 1st – September 30th) dry weather flow. This data was selected for presentation as it represents the most likely condition under which human recreational contact will occur. Most people will not enter the streams during the colder months nor during times of high water flow as occurs during and immediately after storm events. Section 9 presents the monitoring data for each site under all flow conditions.

A.2.2.4 Toxics-Organics TMDLs

This class of pollutants includes all of those with a hydrocarbon based molecular structure and includes a variety of pesticides, polychlorinated biphenyls (PCBs), and a variety of petroleum products and their derivatives. There are two in this class that currently have TMDLs, the pesticide chlordane, and PCBs; both of which have been banned for use for several decades. The listings are typically based on presence in fish tissue which can be a human health risk from exposure through fish consumption. Baltimore County has six such TMDLs. Two are for Chlordane in Back River and Baltimore Harbor, (Lake Roland had one for chlordane, but was delisted from impairment status in 2012). Four are for PCBs in Back River, Baltimore Harbor, Tidal Gunpowder (including Bird River), and Lake Roland.

The TMDL Implementation Plans for Chlordane indicate working with MDE to develop a coordinated fish tissue and bioaccumulation monitoring plan. Baltimore County met with MDE in 2015 to discuss the value of a fish tissue monitoring plan and a bioaccumulation monitoring plan. Baltimore County is still exploring the value of this type of monitoring for Chlordane. The fish tissue monitoring will determine when the endpoint is reached, while the bioaccumulation studies would help target subwatersheds for additional source tracking of chlordane. Chlordane usage has been banned since 1987, so the source tracking/monitoring would be primarily looking for historic contamination sites.

Similar to chlordane, PCBs are a banned substance and no longer being produced for use, however, unlike chlordane the use of existing PCBs may still be occurring through old electrical transformers, PCBs in hydraulic fluid, and in old building materials. PCBs continue to be deposited from the air, which may currently be a major source of PCBs. However, it has been suggested that the lighter PCB homologs (lower numbers of chlorines attached), which have a higher propensity to volatize and be transported via air, (Baker and Eisenreich 1990 as cited in ATSDR, 2000, pg 491) are also more likely to pass through organisms without significant bioaccumulation (McFarland and Clarke 1989 as cited in ATSDR, 2000, pg 493), and thus might not be significant contributors to the water resource impairment. As with chlordane, Baltimore County is exploring fish tissue, water column, and sediment monitoring to locate potential ongoing sources and target remediation efforts. Based on the literature and the findings from MDE, the use of bioaccumulation monitoring (utilizing cages of freshwater clams) may not give consistent results and needs to be further evaluated prior to developing a monitoring program related to that chemical pathway. Baltimore County developed a framework for a PCB monitoring program to include aqueous trend monitoring, source tracking, storm drain cleanout, SWM pond clean out, fish tissue, and tidal sediment media. The County initiated a pilot first round of this monitoring in calendar year 2018 focusing on the Back River watershed. Calendar year 2019 saw a pilot fish tissue collection and analysis. Assessments of scalability of monitoring, and publication of new guidance by MDE in August 2022, have resulted in development of an updated framework to monitor for PCBs. The framework lays out a plan to submerge small sheets of low density polyethylene in waterways for several weeks so that the sheets approach equilibrium with the chemical concentration of PCBs found in the water. The sheets are then analyzed to determine that concentration and guide further investigation of potential upstream sources.

The Hazardous Waste Collection Program collects PCB oil and ballast from antiquated fluorescent light fixtures. Ballasts are recycled, and oil sent to be is incinerated at a permitted facility.

Baltimore County has explored in situ remediation options that appear to have utility in remediation of sediments, which may be a major repository of PCBs from historic contamination. The PCBs in sediment have not been assigned a load reduction in the TMDLs, but remediation of sediment may be an effective restoration mechanism in addition to finding and treating PCBs in the watershed. Baltimore County intends that continued monitoring will inform decisions on these matters.

A.2.2.5 Toxics-Metals

This category had one Water Quality Assessment and two TMDLs developed for mercury in reservoirs. The Water Quality Assessment was issued for Liberty Reservoir in 2014, while the TMDLs issued were for Loch Raven and Prettyboy Reservoirs. For water quality, the pollutant has been linked to mercury (Hg) accumulation in fish tissue related to human health concerns from consumption. The Healthy Air Act passed by the State of Maryland in 2007 placed stricter standards on mercury air emissions, which have significantly reduced mercury deposition to the reservoir surfaces and to the watershed (MDE, 2011; MDE, n.d.). The results of previous fish tissue monitoring indicated that the levels of mercury were below the action level, and further data appears to have confirmed this. Liberty Reservoir was officially delisted in the 2018 Integrated Report (MDE, 2019), and both Loch Raven and Prettyboy Reservoirs have been delisted as of the 2022 Integrated Report (MDE, 2022). The remaining various types of metals have not been determined to be impairing waterways.

A.2.2.6 Temperature:

While no TMDLs have been developed, temperature impairments in streams have been noted in various Baltimore County waterways. The County has collected data and partnered with consultants to research possible causes of high temperature within select watersheds. Baltimore County will collaborate with MDE on reviewing any draft TMDLs for temperature.

A.2.2.7 Other Impairing Substances:

This is a catchall category that includes trash, and ions such as chlorides and sulfates. One TMDL has been developed for trash (affecting both the Jones and Gwynns Falls watersheds), while the ions - chloride and sulfate - have been identified as impairing the stream biological community in a number of watersheds. No TMDLs for these two ion pollutants have been developed and in the 2024 Integrated Report the 6 sulfate impairments were moved from Category 5 to Category 2 due to an updated conservative sulfate screening threshold that was based on toxicity studies.

An additional category of impairment has been identified as impairing the stream communities in a number of watersheds. This category is physical impairments, such as stream channel alteration and inadequate riparian buffers. TMDLs will not be developed for these types of impairments, as they are not pollutants.

Table A-3 below lists the local TMDLs that have been developed by MDE and approved by EPA for Baltimore County waterways. The table also provides the date of which the most recently revised Implementation Plan for each TMDL was last submitted to MDE. At the time of this report's submittal to MDE, implementation plans for stormwater WLAs approved by EPA have been submitted as required by the County's NPDES MS4 permit.

Table A-3: Local TMDLs Approved for Baltimore County Waterways

Watershed	Pollutant	TMDL Effective Date	Implementation Plan Submitted	Last Revision Submitted	Implementation Plan Approved by MDE	Implementation Target
Back River	Chlordane	Dec. 17, 1999	Dec. 23, 2014	Dec. 23, 2016	Apr. 25, 2018	2035
Back River	Nitrogen & Phosphorus	Jun. 29, 2005	Dec. 23, 2014	Dec. 23, 2016	Apr. 25, 2018	TN: 2056 TP: 2025
Back River	PCBs	Oct. 1, 2012	Dec. 23, 2014	Aug. 29, 2024	Apr. 25, 2018	2035
Back River (NT)	Sediment	March 5, 2018	Feb. 26, 2019	Feb. 26, 2019	Oct. 8, 2019	2048
Back River (Herring Run)	Bacteria / E.coli	Dec. 4, 2007	Dec. 23, 2014	Dec. 23, 2016	Apr. 25, 2018	2035
Baltimore Harbor	Chlordane	Mar. 23, 2001	Dec. 23, 2014	Dec. 23, 2016	Apr. 25, 2018	2035
Baltimore Harbor	Nitrogen & Phosphorus	Dec. 17, 2007	Dec. 23, 2014	Dec. 23, 2016	Apr. 25, 2018	TN: 2056 TP: 2024
Baltimore Harbor	PCBs	Oct. 1, 2012	Dec. 23, 2014	Aug. 29, 2024	Apr. 25, 2018	2035
Baltimore Harbor (NT)	Sediment	Jan. 27, 2022	Jan. 27, 2023	Jan. 27, 2023	Sept. 20, 2023	2052
Bird & Gunpowder River	PCBs	Oct. 3, 2016	Oct. 30, 2017	Aug. 29, 2024	Mar. 17, 2020	2035
Gwynns Falls & Jones Falls	Trash	Jan. 5, 2015	Dec. 23, 2015	Dec. 23, 2015	Jan. 14, 2020	(Phase I) 2025
Gwynns Falls	Sediment	Mar. 10, 2010	Dec. 23, 2014	Dec. 23, 2016	Apr. 25, 2018	2057
Gwynns Falls	Bacteria / E.coli	Dec. 4, 2007	Dec. 23, 2014	Dec. 23, 2016	Apr. 25, 2018	2035
Jones Falls	Sediment	Sept. 29, 2011	Dec. 23, 2014	Dec. 23, 2016	Apr. 25, 2018	2025
Jones Falls	Bacteria / E.coli	Feb. 21, 2008	Dec. 23, 2014	Dec. 23, 2016	Apr. 25, 2018	2035
Jones Falls (Lake Roland)	Chlordane	Mar. 23, 2001	n/a	n/a	n/a	n/a (de-listed: 2012)
Jones Falls (Lake Roland)	PCBs	Jun. 30, 2014	Dec. 23, 2014	Aug. 29, 2024	Apr. 25, 2018	2035
Liberty Reservoir	Bacteria / E.coli	Dec. 3, 2009	Dec. 23, 2014	Dec. 23, 2016	Apr. 25, 2018	2035
Liberty Reservoir	Phosphorus	May 7, 2014	May 4, 2015	Nov. 4, 2022	July 14, 2023	2048
Liberty Reservoir	Sediment	May 7, 2014	May 4, 2015	Nov. 4, 2022	July 14, 2023	2057
Loch Raven Reservoir	Bacteria / E.coli	Dec. 3, 2009	Dec. 23, 2014	Dec. 23, 2016	Apr. 25, 2018	2035
Loch Raven Reservoir	Phosphorus	Mar. 27, 2007	Dec. 23, 2014	Dec. 23, 2016	Apr. 25, 2018	2056
Loch Raven Reservoir	Sediment	Mar. 27, 2007	Dec. 23, 2014	Dec. 23, 2016	Apr. 25, 2018	2056
Loch Raven Reservoir	Mercury	Aug. 16, 2004	Dec. 23, 2014	Dec. 23, 2016	Apr. 25, 2018	n/a (de-listed: 2022)
Lower Gunpowder Falls	Sediment	May 4, 2017	May 4, 2018	May 4, 2018	Oct. 8, 2019	2057

Watershed	Pollutant	TMDL Effective Date	Implementation Plan Submitted	Last Revision Submitted	Implementation Plan Approved by MDE	Implementation Target
Patapsco River Lower N. Branch	Bacteria / E.coli	Dec. 3, 2009	Dec. 23, 2014	Dec. 23, 2016	Apr. 25, 2018	2035
Patapsco River Lower N. Branch (NT)	Sediment	Sept. 30, 2011	Dec. 23, 2014	Dec. 23, 2016	Apr. 25, 2018	2057
Prettyboy Reservoir	Bacteria / E.coli	Oct. 8, 2009	Dec. 23, 2014	Dec. 23, 2016	Apr. 25, 2018	2035
Prettyboy Reservoir	Mercury	Aug. 16, 2004	Dec. 23, 2014	Dec. 23, 2016	Apr. 25, 2018	n/a (de-listed: 2022)
Prettyboy Reservoir	Phosphorus	Mar. 27, 2007	Dec. 23, 2014	Dec. 23, 2016	Apr. 25, 2018	2057

*Anticipated
(NT): non-tidal

A.2.3 Baltimore County TMDL Modeling Methods

Nutrient and sediment TMDL WLAs were adjusted to use MDE's TMDL Implementation Progress and Planning (TIPP) tool modeling system, as specified in MDE's Nutrient and Sediment TMDL implementation plan guidance. Pollution loads from MS4 land uses present in the TMDL baseline year, modified by appropriate delivery factors, were combined with pollution reductions from BMPs present in the baseline year. Land use loading rate and delivery factors are from the TIPP tool. Land use acreages are from MDE 2013 land cover data, backcast to baseline year via translation from NLCD land use fused with concurrent Baltimore County planimetric impervious GIS data, with temporal interpolation when necessary. The resultant baseline MS4 pollution load was multiplied by the percent reduction necessary to meet the SW-WLA as calculated in MDE's TMDL documents. Land use pollution load changes between the baseline year and 2013 were added, as were pollution reductions from BMPs installed through FY2022, producing the pollution reduction required at the beginning of FY2023. Pollution reduction projections were generated for different categories of BMPs. For WIP (Baltimore County EPS capital restoration) projects, the pollution reductions expected for specific restoration actions out to FY2026 were estimated using the TIPP tool, MDE guidance, and Chesapeake Bay Program documents. Specific WIP actions are not available beyond FY2026. For VOP (voluntary/opportunistic projects), pollution reductions from the past were used to project future pollution reductions, typically using averages, because specific VOP actions cannot be known for future years. In FY2027 and beyond, the specific projects to be installed using the WIP capital budget are unknown. Instead, a "generic WIP" pollution reduction was projected for each TMDL in FY2027 and beyond. First, the expected pollution removal cost efficiency (dollars per lb of pollution reduction) of all WIP BMPs installed or planned for FY2022-FY2026 was calculated for each pollutant and waterbody relevant to each watershed. For each year after FY2026, the total WIP budget was divided among watersheds in proportion to the projected cost to meet the SW-WLA at the beginning of that year, and generic WIP pollution reductions were projected by multiplying the cost efficiency of each watershed by the budget assigned to each watershed in that year. Due to the large quantity of data and calculations required, and limitations in the MDE TIPP tool excel file, calculation of baseline through present pollution loads and reductions were performed using python scripts and the ESRI arcpy package for GIS analysis.

A.2.4 Local TMDL Restoration Progress

Reported below is progress toward meeting Baltimore County’s Local TMDLs. EPS, through a variety of programs listed in Section 10.3 of this NPDES Report, is responsible for the bulk of the restoration activity within the County. Local watershed associations and Baltimore County DPWT also contribute to restoration activity.

Table A-4 summarizes Baltimore County’s progress toward meeting local nutrient and sediment TMDLs using the Phase 6 watershed model. More detail is provided on these and other local TMDLs below in Sections A.2.4.1 through A.2.4.16. Baltimore County is interested in working with MDE to update the tidal Nitrogen TMDL documents in Baltimore Harbor and Back River. These TMDLs are each over 15 years old and do not reflect the decreased nutrient discharges from the upgraded Patapsco and Back River wastewater treatment plants. Baltimore County will revise its local TMDL Implementation Plans to reflect the updates to the Phase 6 Model and MDE TMDL implementation planning guidance. These plans will include new restoration opportunities and set a new schedule for meeting the WLAs.

Table A-4: Summary of Current Progress Toward Local Nutrient and Sediment TMDLs

Watershed	Pollutant	% of Target
Prettyboy	TP	28%
Loch Raven	TP	57%
Loch Raven	TSS	NA*
Lower Gunpowder	TSS	25%
Liberty	TP	9%
Liberty	TSS	6%
Patapsco (NT)	TSS	50%
Baltimore Harbor (DF)	TN	49%
Baltimore Harbor (DF)	TP	108%
Gwynns Falls	TSS	43%
Jones Falls	TSS	116%
Back River (DF)	TN	29%
Back River (DF)	TP	75%
Back River (NT)	TSS	12%
Baltimore Harbor DD	TSS	4%

* The Loch Raven TSS WLA was set to equal baseline conditions with the assumption that the reductions to meet the WLA for TP will also result in a reduction in TSS

Table A-5 shows the metrics used to track TMDL progress.

Table A-5: TMDL Progress Metrics

Pollutant	Progress Metric	Progress Tracking Method
Total Nitrogen	Lbs/yr reductions	Modeling
Total Phosphorus	Lbs/yr reductions	Modeling
Total Suspended Solids	Lbs/yr reductions	Modeling
Bacteria	Most Probable Number (MPN)/100 ml sample	Direct Sampling
Trash	Lbs/yr reductions	Direct Sampling + Modeling
PCBs	Fish Tissue Concentration (ng/g)	Direct Sampling
Chlordane	Fish Tissue Concentration (mg/kg)	Direct Sampling

A.2.4.1 Deer Creek Watershed

There are no local TMDLs established for the Deer Creek watershed.

A.2.4.2 Prettyboy Reservoir Watershed

Table A-6 and Table A-7 show progress toward the local TMDLs in the Prettyboy Reservoir watershed.

Table A-6: Prettyboy Bacteria Impairment

EPS Station ID	MDE Station ID	Seasonal (5/1-9/30) Low Flow Geometric Mean (MPN/100 ml)				% Change Relative to MDE Geometric Mean	
		MDE	2025 Target*	2010-2022	2023	2010-2022	2023
PRE-1	GOB0042	287	170	289	148	0.7	-48.3
PRE-2	GRG0013	134	126	146	99	9.0	-26.0
PRE-3	GUN0476	751	372	208	101	-72.3	-86.6

*Note the final 2035 target is 126 MPN/100 ml for all sites

Table A-7: Prettyboy Phosphorus Impairment (lbs/yr)

Initial Target Load Reduction 1997 (baseline year)	Target Load Reduction as of FY13 (land use and BMPs update)	Target Load Reduction as of 11.5.21 (beginning of current permit)	FY14-FY24 Reductions	FY24 Annual Reductions	UNM & Fert Act	Total Reductions FY14-Current	% of FY13 Target
379.7	515.7	438.4	98.1	0.0	47.3	145.4	28.2%

The Prettyboy phosphorus TMDL is projected to be met by 2057.

A.2.4.3 Loch Raven Reservoir Watershed

Table A-8 through Table A-10 show progress toward meeting the local TMDLs in the Loch Raven Reservoir watershed.

Table A-8: Loch Raven Bacteria Impairment

EPS Station ID	MDE Station ID	Seasonal (5/1-9/30) Low Flow Geometric Mean (MPN/100 ml)				% Change Relative to MDE Geometric Mean	
		MDE	2025 Target*	2010-2023	2023	2013-2023	2023
LOC-1	SBH0002	1,080	603	689	730	-36.2	-32.4
LOC-2	BEV0005	611	369	395	351	-35.3	-42.5
LOC-3	WGP0050	491	309	285	128	-42.0	-74.0
LOC-4	GUN0233	224	175	228	103	1.7	-54.2
LOC-5	GUN0284	168	147	167	155	-0.5	-7.5
LOC-6	LIT0002	139	133	287	241	106.4	73.3
LOC-7	GUN0387	18	126	8	--[t]	-55.2	--[t]

*Note the final 2035 target is 126 MPN/100 ml for all sites
t Data collected through CY2017

Table A-9: Loch Raven Phosphorus Impairment (lbs/yr)

Initial Target Load Reduction 1997 (baseline year)	Target Load Reduction as of FY13 (land use and BMPs update)	Target Load Reduction as of 11.5.21 (beginning of current permit)	FY14-FY24 Reductions	FY24 Annual Reductions	UNM & Fert Act	Total Reductions FY14-Current	% of FY13 Target
3,037.7	3,095.3	2,127.3	1,377.5	2.7	384.3	1,764.5	57.0%

The Loch Raven phosphorus TMDL is projected to be met by 2056.

Table A-10: Loch Raven Sediment Impairment[1] (lbs/yr)

Initial Target Load Reduction 1997 (baseline year)	Target Load Reduction as of FY13 (land use and BMPs update)	Target Load Reduction as of 11.5.21 (beginning of current permit)	FY14-FY24 Reductions	FY24 Annual Reductions	Total Reductions FY14-Current	% of FY13 Target
0	514,939	0	4,325,226	3,541	4,328,767	NA[1]

[1]The Loch Raven TSS WLA was set to equal baseline conditions with the assumption that the reductions to meet the WLA for TP will also result in a reduction in TSS.

A.2.4.4 Lower Gunpowder Watershed

Table A-11 shows progress toward meeting the local TMDL in the Lower Gunpowder watershed.

Table A-11: Lower Gunpowder Sediment Impairment (lbs/yr)

Initial Target Load Reduction 2009 (baseline year)	**Target Load Reduction as of FY13** (land use and BMPs update)	**Target Load Reduction as of 11.5.21** (beginning of current permit)	**FY14-FY24 Reductions**	**FY24 Annual Reductions**	**Total Reductions FY14-Current**	**% of FY13 Target**
16,784,356	15,004,877	12,511,971	3,776,669	328	3,776,997	25.2%

The Lower Gunpowder sediment TMDL is projected to be met by 2057.

A.2.4.5 Little Gunpowder Falls Watershed

There are no local TMDLs established for the Little Gunpowder Falls watershed.

A.2.4.6 Bird River Watershed

Impairment: PCBs

Baltimore County has been developing and piloting a monitoring program to identify potential areas where upland sources of legacy PCBs may be contributing the toxins to impaired waterways. While it is expected that there is transport of legacy PCBs occurring, it is not expected that any major new sources of this class of chemicals (banned in 1979 (EPA, 2019)) will be found. Additional data regarding source tracking will be needed to advise future remediative action.

A.2.4.7 Gunpowder River Watershed

Impairment: PCBs

For Baltimore County, the dominant source of PCB contribution to the tidal Gunpowder River is through the Bird River (MDE, 2016). Baltimore County has been developing and piloting a monitoring program to identify potential areas where upland sources of legacy PCBs may be contributing the toxins to impaired waterways. While it is expected that there is transport of legacy PCBs occurring, it is not expected that any major new sources of this class of chemicals (banned in 1979 (EPA, 2019)) will be found. Additional data regarding source tracking will be needed to advise future remediative action.

A.2.4.8 Middle River Watershed

There are no local TMDLs established for the Middle River watershed.

A.2.4.9 Liberty Reservoir Watershed

Impairment: Bacteria

The bacteria impairment in the Liberty Reservoir watershed is based on five sampling sites located in Carroll County. The Liberty Reservoir TMDL document does not assign any wasteload allocations to Baltimore County.

Table A-12 and Table A-13 show progress toward meeting the Local Phosphorus and Sediment TMDLs in the Liberty Reservoir watershed.

Table A-12: Liberty Reservoir Phosphorus Impairment (lbs/yr)

Initial Target Load Reduction 2009 (baseline year)	**Target Load Reduction as of FY13** (land use and BMPs update)	**Target Load Reduction as of 11.5.21** (beginning of current permit)	**FY14-FY24 Reductions**	**FY24 Annual Reductions**	**UNM & Fert Act**	**Total Reductions FY14-Current**	**% of FY13 Target**
1,168.9	1,227.4	1,182	70.7	0.0	44.7	115.4	9.4%

The Liberty phosphorus TMDL is projected to be met by 2048.

Table A-13: Liberty Reservoir Sediment Impairment (lbs/yr)

Initial Target Load Reduction 2009 (baseline year)	**Target Load Reduction as of FY13** (land use and BMPs update)	**Target Load Reduction as of FY21** (beginning of current permit)	**FY14-FY24 Reductions**	**FY24 Annual Reductions**	**Total Reductions FY14-Current**	**% of FY13 Target**
3,155,994	3,237,556	3,137,154	190,455	0.0	190,455	5.9%

The Liberty sediment TMDL is projected to be met by 2057.

A.2.4.10 Lower North Branch Patapsco River Watershed

Table A-14 and Table A-15 show the progress toward meeting the local TMDLs in the Lower North Branch Patapsco watershed.

Table A-14: LNB Patapsco Bacteria Impairment

EPS Station ID	**MDE Station ID**	**Seasonal (5/1-9/30) Low Flow Geometric Mean (MPN/100 ml)**				**% Change Relative to MDE Geometric Mean**	
		MDE	**2025 Target***	**2010-2023**	**2023**	**2010-2023**	**2023**
PAT-1	PAT0148	231	178	314	157	36.1	-31.9
PAT-2	PAT0176	117	126	99	58	-15.7	-50.6
PAT-3	PAT0222	119	126	113	70	-4.8	-41.2
PAT-4	PAT0285	93	126	65	43	-30.2	-53.4
PAT-5	PAT0347	134	126	80	--[t]	-40.2	--[t]

*Note the final 2035 target is 126 MPN/100 ml for all sites
t Data collected through CY2017

Table A-15: LNB Patapsco Non-Tidal Sediment Impairment (lbs/yr)

Initial Target Load Reduction 2004 (baseline year)	**Target Load Reduction as of FY13** (land use and BMPs update)	**Target Load Reduction as of 11.5.21** (beginning of current permit)	**FY14-FY24 Reductions**	**FY24 Annual Reductions**	**Total Reductions FY14-Current**	**% of FY13 Target**
5,936,880	6,123,379	3,893,489	3,054,827	1,344	3,056,171	49.9%

The Patapsco non-tidal sediment TMDL is projected to be met by 2057.

A.2.4.11 Baltimore Harbor Drainage

The impairments designated for the Baltimore Harbor drainage area apply to four Baltimore County 8-Digit watersheds: Lower North Branch Patapsco, Gwynns Falls, Jones Falls, and Baltimore Harbor Direct Drainage (DD). **A delivery factor is applied to nitrogen and phosphorus target loads for each respective watershed from the original TMDL Implementation Plan and to the reductions, as the Baltimore Harbor Drainage nutrient impairment is for tidal waters.**

Table A-16 shows the progress toward meeting the local nitrogen and phosphorus TMDLs in the Baltimore Harbor watershed.

Table A-16: Baltimore Harbor Nitrogen and Phosphorus Impairments (lbs/yr, includes SDF)

Initial Target Load Reduction 1997 (baseline year)	**Target Load Reduction as of FY13** (land use and BMPs update)	**Target Load Reduction as of 11.5.21** (beginning of current permit)	**FY14-FY24 Reductions**	**FY24 Annual Reductions**	**UNM & Fert Act**	**Total Reductions FY14-Current**	**% of FY13 Target**
Nitrogen							
52,994	61,851	43,592	22,956	488	6,905.6	30,350	49%
Phosphorus							
4,342	3,973	915	3,769	39.6	482.6	4,291	108%

The Baltimore Harbor nitrogen TMDL is projected to be met by 2056. The phosphorus TMDL has been met.

Impairment: Chlordane

The Baltimore Harbor chlordane TMDL states that "since there are no discernible continuing sources of chlordane to the Harbor, continued fish monitoring and the expected gradual declines in tissue burdens below the 0.3mg/kg level will strongly suggest that water column concentrations fall below the 0.00059µg/L water quality standard adopted for the Harbor TMDL" (MDE, 2001a). Baltimore County will continue to assess available data regarding concentrations of chlordane (banned in 1988 (ATSDR, 1994)) in aquatic communities to determine if further action may be necessary. The 2018 Integrated Report of Surface Water Quality states that "Recently collected data on chlordane levels in fish tissue generally show levels to be below the fish tissue threshold. However more data is needed to confirm delisting." (MDE, 2019).

Impairment: PCBs

Baltimore County has been developing and piloting a monitoring program to identify potential areas where upland sources of legacy PCBs may be contributing the toxins to impaired waterways. While it is expected that there is transport of legacy PCBs occurring, it is not expected that any major new sources of this class of chemicals (banned in 1979 (EPA, 2019)) will be found. Additional data regarding source tracking will be needed to advise future remediative action.

A.2.4.12 Gwynns Falls Watershed

Table A-17 and Table A-18 show the progress toward meeting the local TMDLs in the Gwynns Falls watershed.

Table A-17: Gwynns Falls Bacteria Impairment

EPS Station ID	MDE Station ID	Seasonal (5/1-9/30) Low Flow Geometric Mean (MPN/100 ml)				% Change Relative to MDE Geometric Mean	
		MDE	2025 Target*	2010-2023	2023	2010-2023	2023
GWY-1	GWN0015	35,290	City	1302	n/a	-96.3	n/a
GWY-2	GWN0115	636	381	269	225	-57.6	-64.6
GWY-5	GWN0026	373	City	443	n/a	18.8	n/a
GWY-6	GWN0160	743	435	242	202	-67.4	-79.2
GF-B-8		373	249	705[a]	284	88.9[a]	-24.0
DR-B-10		373	249	332[a]	276	-10.9[a]	-26.0
SL-B-3		636	381	216[b]	276	-66.1 [b]	-56.7

*Note the final 2035 target is 126 MPN/100 ml for all sites
a Data collection began CY2015
b Data collection began CY2017

Table A-18: Gwynns Falls Sediment Impairment (lbs/yr)

Initial Target Load Reduction 2004 (baseline year)	Target Load Reduction as of FY13 (land use and BMPs update)	Target Load Reduction as of 11.5.21 (beginning of current permit)	FY14-FY24 Reductions	FY24 Annual Reductions	Total Reductions FY14-Current	% of FY13 Target
15,370,403	13,542,224	9,519,644	5,717,818	74,307	5,792,125	42.8%

The Gwynns Falls sediment TMDL is projected to be met by 2057.

A.2.4.13 Jones Falls Watershed

Table A-19 and Table A-20 show the progress toward meeting the local TMDLs in the Jones Falls watershed.

Table A-19: Jones Falls Bacteria Impairment

EPS Station ID	MDE Station ID	Seasonal (5/1-9/30) Geometric Mean (MPN/100 ml)				% Change Relative to MDE Geometric Mean	
		MDE	2025 Target*	2010-2023	2023	2013-2023	2023
JON-1	JON0039	372	City	464	n/a	24.6	n/a
JON-2	JON0082	139	133	70	81	-49.5	-41.4
JON-3	JON0184	501	314	397	266	-20.7	-46.9
JON-4	UQQ0005	872	499	523	282	-40.1	-67.6
JON-5	SRU0005	2,394	City	266	n/a	-88.9	n/a
JF-B-12		372	250	184[a]	141	-50.5 [a]	-62.0
JF-B-13		372	250	393[a]	594	5.6 [a]	-59.8

*Note the final 2035 target is 126 MPN/100 ml for all sites
a Data collection began CY2015

Table A-20: Jones Falls Sediment Impairment (lbs/yr)

Initial Target Load Reduction 2002 (baseline year)	Target Load Reduction as of FY13 (land use and BMPs update)	Target Load Reduction as of 11.5.21 (beginning of current permit)	FY14-FY24 Reductions	FY24 Annual Reductions	Total Reductions FY14-Current	% of FY13 Target
7,578,550	4,802,771	0	5,556,116	2,821	5,558,937	115.7

The Jones Falls sediment TMDL has been met.

Impairment: PCBs (Lake Roland)

Baltimore County has been developing and piloting a monitoring program to identify potential areas where upland sources of legacy PCBs may be contributing the toxins to impaired waterways. While it is expected that there is transport of legacy PCBs occurring, it is not expected that any major new sources of this class of chemicals (banned in 1979 (EPA, 2019)) will be found. Additional data regarding source tracking will be needed to advise future remediative action.

Impairment: Chlordane (Lake Roland)

The Lake Roland chlordane TMDL states that "because chlordane was banned nearly 15 years ago, the best readily available information shows that chlordane loadings from sources other than existing bottom sediments is negligible. Consequently, the bottom sediments are expected to be the dominant present-day source of chlordane in Lake Roland water and fish tissue" (MDE, 2001b). Baltimore County will continue to assess available data regarding concentrations of chlordane (banned in 1988 (ATSDR, 1994)) in aquatic communities to determine if further action may be necessary. MDE delisted Lake Roland for chlordane in 2012, noting very low levels in fish tissue (MDE, 2012).

A.2.4.14 Gwynns Falls & Jones Falls Watersheds

Impairment: Trash

Baltimore County is working toward the 2026 milestone of 80% of the reduction requirement set forth in Table 9-12 of the Trash TMDL Implementation Plan (EPS, 2016), with a final goal of 100% by 2036. Table A-21 shows the progress made in FY24 towards this goal.

Table A-21: Gwynns Falls and Jones Falls Trash Impairment

Watershed	Target Load Reduction	FY24 Reductions	% of Target
Jones Falls	48,773	28,356	58%
Gwynns Falls	81,621	105,532	129%
Totals	**130,394**	**133,888**	**103%**

Please refer to Section A.2.5 below for more information on this trash TMDL.

A.2.4.15 Back River Watershed

Table A-22 through Table A-24 show the progress toward meeting the local TMDLs in the Back River watershed.

Table A-22: Back River (Herring Run) Bacteria Impairment

EPS Station ID	MDE/BCDPW Station ID	Seasonal (5/1-9/30) Geometric Mean (MPN/100 ml)				% Change Relative to MDE Geometric Mean	
		MDE	2025 Target*	2010-2023	2023	2013-2023	2023
HER-1	HER0065	591	City	204	n/a	-65.6	n/a
Biddle	Biddle & 62nd	1,920	City	408	n/a	-78.8	n/a
Pulaski	Pulaski HWY	616	City	368	n/a	-40.3	n/a
HR-B-12		616	371	492[a]	1177	-20.2[a]	91.1
HR-B-13		616	371	703[a]	1024	14.2[a]	66.3
HR-B-14		616	371	482[a]	587	-21.8[a]	-4.7
HR-B-15		616	371	1068[a]	1040	73.4[a]	68.8

*Note the final 2035 target is 126 MPN/100 ml for all sites
a. Data collection began CY2015

Table A-23: Back River Nitrogen and Phosphorus Impairments (lbs/yr, tidal-includes SDF)

Initial Target Load Reduction 1997 (baseline year)	Target Load Reduction as of FY13 (land use and BMPs update)	Target Load Reduction as of 11.5.21 (beginning of current permit)	FY14-FY24 Reductions	FY24 Annual Reductions	UNM & Fert Act	Total Reductions FY14-Current	% of FY13 Target
Nitrogen							
12,648	14,152	11,875	2,642	71.2	1,447	4,160	29.4%
Phosphorus							
2,956	2,156	1,032	1,303	14.9	297	1,615	74.9%

The Back River nitrogen TMDL is projected to be met by 2056, phosphorus in 2026.

Table A-24: Back River Non-Tidal Sediment Impairment (lbs/yr)

Initial Target Load Reduction 2009 (baseline year)	Target Load Reduction as of FY13 (land use and BMPs update)	Target Load Reduction as of 11.5.21 (beginning of current permit)	FY14-FY24 Reductions	FY24 Annual Reductions	Total Reductions FY14-Current	% of FY13 Target
22,276,986	21,651,187	19,096,975	2,662,886	0	2,662,886	12.3%

The Back River non-tidal sediment TMDL is projected to be met by 2048.

Impairment: Chlordane

The Back River chlordane TMDL states:

> Because chlordane was banned nearly 15 years ago, chlordane loadings other than those from existing bottom sediments are expected to be negligible. Consequently, the bottom sediments are assumed to be the dominant current day source of chlordane in Back River water and fish tissue" and additionally states that "current sediment levels (1.12 ng/g dry weight) are well below the calculated [sediment quality benchmark (SQB)]. This represents indirect evidence that sediment concentrations of chlordane have declined below levels that would result in elevated fish tissue levels. (MDE, 1999)

The 2018 Integrated Report of Surface Water Quality stated that "Recently collected data on brown bullheads and white perch shows chlordane levels below the fish tissue threshold. However, the department prefers to collect data on catfish prior to delisting this segment for chlordane" (MDE, 2019). Baltimore County will continue to assess available data regarding concentrations of chlordane (banned in 1988 (ATSDR, 1994)) in aquatic communities to determine if further action may be necessary.

Impairment: PCBs

Baltimore County has been developing and piloting a monitoring program to identify potential areas where upland sources of legacy PCBs may be contributing the toxins to impaired waterways. While it is expected that there is transport of legacy PCBs occurring, it is not expected that any major new sources of this class of chemicals (banned in 1979 (EPA, 2019)) will be found. Additional data regarding source tracking will be needed to advise future remediative action.

A.2.4.16 <u>Baltimore Harbor Direct Drainage</u>

Table A-25 shows the progress towards meeting the local non-tidal sediment TMDL in the Baltimore Harbor Direct Drainage watershed.

Table A-25: Baltimore Harbor Direct Drainage Non-Tidal Sediment Impairment[1]

Initial Target Load Reduction 2009 (baseline year)	**Target Load Reduction as of FY13** (land use and BMPs update)	**Target Load Reduction as of 11.5.21** (beginning of current permit)	**FY14-FY23 Reductions**	**FY23 Annual Reductions**	**Total Reductions FY14-Current**	**% of FY13 Target**
2,677,418	2,616,305	2,539,188	101,141	0	101,141	3.9%

[1]Updates to Baltimore County's BMP master Project List resulted in changes to reductions for this TMDL geography. Targets and reductions shown above in Table A-25 therefore will not match the targets and reductions outlined in the TMDL Implementation Plan completed in January 2023.

The Baltimore Harbor Direct Drainage non-tidal sediment TMDL is projected to be met by 2058.

A.2.5 Trash TMDL

This section describes the key assessment, outreach and progress tracking components of the Trash TMDL Implementation Plan and the Trash Reduction Strategy. The Trash and Litter Reduction Strategy outlines a Countywide program to reduce litter pollution and addresses a requirement in part IV.D.4 (see box above) of the current MS4 permit. The Trash TMDL Implementation Plan addresses the requirement to develop a plan to meet TMDL reductions in Baltimore County within one year of approval of the TMDL.

A.2.5.1 Trash TMDL Implementation Plan

A Trash TMDL Implementation Plan was developed to outline the County's strategy for compliance with the Trash and Debris TMDL reduction requirements by 2036.

The implementation plan is a two-phase plan. Much like the Countywide Trash and Litter Reduction Strategy, the first phase of the plan is to focus on education and outreach, incentives and enforcement actions to meet the reduction requirements. These are the actions that will stop the trash pollution at its source. An evaluation of phase I success will be performed after 10 years (2025). At that time, the County will determine if the contingent phase II is necessary or if the reductions can be reached with phase I actions.

Phase II is the implementation of trash trapping devices. These devices trap trash after it has already been littered in the environment. This phase will be more costly than phase I of the plan. It is contingent only on a determination that the TMDL requirements cannot be met with Phase I alone.

A.2.5.2 Summary of Outreach and Other Trash Reduction Strategies

Table A-26 summarizes The County's outreach strategies and other initiatives aimed at trash reduction. Further details on these efforts are included in Section 6 of the County's NPDES report.

Table A-26: Summary of Trash Source Reduction and Removal Programs

Program	Summary/Goals	Status
Source Reduction Programs		
Anti-Litter Advertising Campaign	The goal of the campaign is to change littering behavior and reduce trash entering our local waterways. Strategies include a messaging campaign and trash can signage.	Campaign Developed in FY2018
Cigarette Butt Anti-Litter Pilot Campaign	Placement of outdoor receptacles, distribution of free pocket keychain ashtrays and graphic yard signs at select bar/restaurants and cigarette retailers, and pop-up displays featuring larger-than-life cigarette butt sculptures.	Campaign being piloted in FY 2023.
Ten Year Solid Waste Management Plan (link)	The goals of this plan are to promote waste prevention, increase recycling, increase resource recovery, and assess the feasibility of expanding the residential recycling program.	Plan finalized in 2018 for 2019 to 2028 timeframe.
Solid Waste Work Group (link)	The goals of this work group are to examine existing waste collection and disposal practices, and make recommendations for a more sustainable future.	Group Formed in 2020
Advertising Campaign Evaluation/Observation	Trash monitoring study in areas of focused outreach.	Monitoring in pilot program area complete.
Litter Smart Business Program (link)	Real-world tactics for effective waste management, as well as encouraging litter removal and prevention for commercial operations and other establishments.	Program created piloted in 2019. County-wide implementation began in Winter 2023.
Trash Removal Programs		
Team BCPS Clean Green 15 Litter Challenge	Team BCPS Clean Green 15 Litter Challenge initiative to encourage citizens to do short 15-minute trash cleanups around the county and to report the amount of litter that they picked up.	Program formed in 2014.
Litter Blitz	Clean Green County initiative that encourages residents to either host or volunteer for a litter cleanup in Baltimore County during the spring.	Program formed in 2019.
Watershed Associations Cleanups	Stream cleanups are conducted throughout the county each year by local watershed groups.	Ongoing.
Street Sweeping	Mechanical street sweepers managed by the Bureau of Highways remove materials such as trash, sediment, and debris, from public streets.	Began in 1991, ongoing.
Storm Drain Cleaning	DPWT maintains six Vactor 2100 Combination cleaning trucks and employs three crews of two men	Began in 1993, ongoing.

Program	Summary/Goals	Status
	each on a daily basis to clean the storm drains and pipes.	
Gwynns Falls Trash Wheel	Collects trash and debris flowing out of the Gwynns Falls into Ridgley's Cove in the Middle Branch of the Patapsco River.	Began operation in July 2021, ongoing.
In-Stream Trash Monitoring	Long term trend monitoring program for county streams.	Program began in 2010, ongoing.
SWM Facilities	Certain SWM facilities trap trash. Modeled trash reductions are calculated each year based on drainage areas to facilities.	Ongoing.

A.2.5.3 Progress Toward the Trash TMDL

Table A-27 below shows the amount of trash removed per existing program for the Jones Falls and Gwynns Falls watersheds.

In order to calculate the County's progress towards the trash TMDL for stormwater management facilities, the drainage areas of qualifying facilities were determined and summarized. For example, because of their concave nature, wet ponds and detention ponds inherently collect trash whereas green roofs and dry wells do not have the capability to collect trash. Any overlap between drainage areas (e.g. nested practices or treatment trains) were accounted for. Baltimore County conservatively assumes that treatment trains of SWM BMPs do not increase the trash removal compared to single SWM BMPs. The trash load was determined by multiplying the trash loading rate by the acres of drainage area of each land use in each watershed. Then a 95% removal efficiency was applied to determine the amount of trash reduction, as described in Section 8 of the Trash TMDL Implementation Plan. This procedure was applied to all qualifying facilities in the Gwynns Falls and Jones Falls watersheds and not just the facilities described in Section 6.5.2 of this report because although not all ponds were inspected/maintained, they still have the ability to collect trash. Please refer to PLRC_SOP_RT-010 for protocols on how stormwater facility pollutant load calculations are performed in Baltimore County.

All other programs in Table A-27 are recorded and reported as pounds removed. Most programs are measured on a fiscal year basis; however, the in-stream monitoring programs are measured on a calendar year basis.

Table A-27: Trash TMDL Implementation Actions and Trash Reductions for Existing Programs 2024

Action	Calculation	Calculated Reduction Jones Falls WLA (pounds)	Calculated Reduction Gwynns Falls WLA (pounds)
Street Sweeping	FY24 Pounds removed	13,965	16,708
Storm Drain Cleaning	FY24 Pounds removed	936	811
SWM Facilities	∑ (Drainage Acres by land use * loading rate for land use) * 95% efficiency	10,800	27,751
Clean Green 15	FY24 lbs removed	623	3,192
Litter Blitz	FY24 lbs removed	1,808	2,604
Watershed Associations	FY24 lbs removed	0	4,775
In-Stream Trash Monitoring	CY23 lbs removed	224	1,244
Gwynns Falls Trash Wheel	FY24 lbs removed	-	48,447
Total Pounds Removed, 2024		**28,356**	**105,532**
TMDL Goal Pounds Removed Per Year		**48,773**	**81,621**
Percent of TMDL Goal Met, 2024		**58%**	**129%**

Baltimore County is working to develop methods to measure the impact of our growing anti-litter outreach efforts. Due to the complexity of measuring human behavior change and its impact on the littering rate we are unable to capture any reductions associated with these efforts at this time.

A.2.6 Chesapeake Bay TMDL

Baltimore County is currently operating under the Phase III Watershed Implementation Plan (WIP). The Phase III WIP differs from the Phase II in that the focus is currently intended to be on implementing local jurisdiction's new MS4 Permits.

The County's current MS4 Permit, issued November 5, 2021, contains impervious surface restoration requirements that implement the Phase III WIP, that Baltimore County continues to work towards with diligence. Section 10.2 of this report details impervious surface restoration efforts under this new permit.

The Chesapeake Bay TMDL was developed in December 2010 and refined in July 2011. The CB TMDL is based on a series of interlinked models. The Watershed Model provides the pollutant loading input into the Chesapeake Bay from the various land uses, septic systems, and point sources. The agricultural sources of pollutant loads will not be addressed by Baltimore County, nor will actions taken by the State of Maryland or the federal government.

Table A-28 and Table A-29 show progress toward wasteload allocation (WLA) % reductions from Appendix A of the permit applied to baseline loads recalculated by Baltimore County. The baseline loads were recalculated to follow recent MDE guidance including the TIPP tool.

Table A-28 Chesapeake Bay Nitrogen TMDL Progress

Location		Baseline Load w/BMPs (2009)	WLA Reduction % / lbs	Reductions FY10-FY24 (no annuals)
BACOH	Back River Oligohaline	86,026	34% / 29,249	3,974
CB1TF	Northern Chesapeake Bay Tidal Fresh	8,385	32% / 2,683	289
CB2OH	Northern Chesapeake Bay Oligohaline	2,240	39% / 874	165
CB3MH	Upper Chesapeake Bay Mesohaline	566	39% / 221	0
GUNOH	Gunpowder River Oligohaline	253,161	26% / 65,822	19,004
MIDOH	Middle River Oligohaline	35,488	29% / 10,292	1,367
PATMH	Patapsco River Mesohaline	365,432	29% / 105,975	28,540

Table A-29 Chesapeake Bay Phosphorus TMDL Progress

Location		Baseline Load w/BMPs (2009)	WLA Reduction % / lbs	Reductions FY10-FY24 (no annuals)
BACOH	Back River Oligohaline	19,134	48% / 9,184	1,975
CB1TF	Northern Chesapeake Bay Tidal Fresh	622	51% / 317	20
CB2OH	Northern Chesapeake Bay Oligohaline	430	50% / 215	150
CB3MH	Upper Chesapeake Bay Mesohaline	67	50% / 34	0.0
GUNOH	Gunpowder River Oligohaline	18,232	42% / 7,658	3,248
MIDOH	Middle River Oligohaline	5,328	49% / 2,611	178
PATMH	Patapsco River Mesohaline	28,922	46% / 14,172	4,315

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GOOD HOUSEKEEPING PLAN

Submitted to MDE
December 2024

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List of Acronyms

AST	-	Aboveground Storage Tank
BMP	-	Best Management Practice
CFR	-	Code of Federal Regulations
GHP	-	Good Housekeeping Plan
MDE	-	Maryland Department of the Environment
MS4	-	Municipal Separate Storm Sewer System
NPDES	-	National Pollutant Discharge Elimination System
SPCC	-	Spill Prevention, Control, and Countermeasure Plan

1.0 BACKGROUND & INTRODUCTION

Polluted stormwater runoff has the potential to enter the County's storm sewer systems (referred to as a municipal separate storm sewer system or MS4), and then discharge, untreated, into local water bodies. To address this potential stormwater pollution, the County is required to obtain a NPDES permit from the Maryland Department of the Environment (MDE). The NPDES Permit requires the County to take actions to prevent stormwater pollution, maintain storm sewer systems, monitor stormwater discharges, and develop and implement comprehensive management programs to minimize the discharge of pollutants from the storm sewer system.

To comply with Part IV.D.4.b of the County's Phase I MS4 Permit, the County must develop, implement, and maintain a Good Housekeeping Plan (GHP) for certain County-owned properties not required to be covered under Maryland's General Permit for Discharges from Stormwater Associated with Industrial Activities *(General Permit 12-SWA / 20-SW).*

To support this effort, a *"Good Housekeeping Plan Applicability Certification"* has been developed to evaluate and document if a specific County-owned facility is subject to the GHP requirements. The *"GHP Applicability Certification"* includes the following ten (10) potential stormwater polluting activities. If any of the covered activities are performed at the facility, then that facility is required to implement a site-specific GHP. The GHP will include each of the potential stormwater polluting activities identified in the *"GHP Applicability Certification"* and corresponding pollution prevention procedures.

- Waste Management
- Vehicle and Equipment Storage
- Vehicle/Equipment Refueling
- Vehicle Maintenance
- Vehicle/Equipment Washing
- Material Storage
- Aboveground Storage Tanks
- Resident Drop-Off Center
- Stockpiles
- Deicing Materials

1.1 Objectives

The GHP was developed to outline suitable practices, procedures, and protocols, or Best Management Practices ("BMPs") for reducing and/or preventing stormwater pollution associated with operations at covered County-owned properties. The intent of the pollution prevention procedures included in the GHP is to limit the release of materials with the potential to impact stormwater, this includes reducing or eliminating (to the extent practical):

- The occurrence of spills and leaks;
- The accidental dumping or release of materials;
- The accumulation of waste, trash, debris, unused parts/equipment, etc.;
- The exposure of hazardous materials to precipitation/run-off;
- Stormwater run-off contamination by improperly stored materials; and/or
- Illicit discharges to the storm drain system.

1.2 Potential Stormwater Pollutants

Table 1-1 on the following page provides a list of common potential pollutants that may result from the GHP-regulated activities identified above. Understanding the sources of these pollutants can help in achieving the goals and objectives of the GHP program.

TABLE 1-1 POTENTIAL STORMWATER POLLUTANTS AND THEIR SOURCES

		Waste Management	Vehicle/Equipment Storage	Vehicle/Equipment Refueling	Vehicle Maintenance	Vehicle/Equipment Washing	Material Storage	Aboveground Storage Tanks	Resident Drop-Off Center	Stockpiles	Deicing Materials
Sediment	Land disturbance; erosion; paved surfaces; material stockpiles; waste storage; salt/abrasive application	X				X	X		X	X	X
Metals	Vehicle brake and tire wear; vehicle/equipment exhaust; batteries; galvanized metal; paint and wood preservatives; fuels, pesticides, and cleaners; vehicle fueling, maintenance, and washing; industrial waste	X	X	X	X	X	X	X	X		
Chlorides	De-Icing chemicals										X
Nutrients (nitrogen and Phosphorus)	Fertilizers; malfunctioning septic systems; sewer overflows; animal/pet waste; vehicle washing; decaying grass and leaves; leaking trash containers; atmospheric deposition	X				X	X		X		

1.3 Locations of Facilities - Good Housekeeping Plan Web Application

Specific County-owned facilities are evaluated using the GHP Applicability Certification form. Data on these facilities can be accessed through the *BALTIMORE COUNTY GOOD HOUSEKEEPING PLAN* web application, which indicates locations of facilities requiring a GHP and corresponding pollutant prevention procedures in effect.

2.0 RESPONSIBILITIES

2.1 GHP Implementation

A separate GHP is required for each covered facility. The Plan identifies a Responsible Person (by name or title) who is accountable for the administration and implementation of the GHP and has the authority to commit the necessary resources to implement this Plan.

The Responsible Person shall ensure that facility personnel involved in any GHP-covered activities identified in this Plan, are provided with access to, and are familiar with, the contents of this Plan.

2.2 Plan Review and Modification

The *"GHP Applicability Certification"* completed for each facility must be reviewed and updated once every permit term, or within one (1) year of substantial changes to a facility's operations that could reasonably contribute to stormwater pollution. Any newly constructed/acquired facility must be assessed within one (1) year of initiating operations at the facility. The facility's GHP must be amended and reissued to the facility within one (1) year of any changes to the facility's *"GHP Applicability Certification"*.

When warranted, the BMP Fact Sheets provided in Section 3.0 may need to be updated or revised. At the same time, additional BMP Facts Sheets may be added. The need for such updates or modifications will be at the discretion of the County's GHP Program Administrator.

2.3 Inspections

The County's MS4 permit requires each facility covered by a GHP to have the following:

1. Written procedures for annually assessing County properties to prevent the discharge of pollutants, spills, and leaks into the County's storm sewer system; and

2. Written procedure for performing stormwater conveyance system inspections and for removing debris that may cause clogging, backups, and flooding.

To meet these requirements, each facility that is covered by a GHP will be required to complete routine site inspections and stormwater conveyance system inspections as detailed below. Facility management will be responsible for ensuring the necessary inspections are completed within the required timeframes, that corrective actions (if needed) are performed, and that records of inspections and completed corrective actions are maintained for at least five (5) years.

2.3.1 GHP Site Inspections

The GHP Site Inspection will be performed to ensure that each GHP-covered facility is being properly maintained and that there are no visible signs of pollutants entering the stormwater system. GHP facilities shall utilize the *"GHP Site Inspection Checklist"*, provided in ***Appendix A*** to complete the required inspection. At a minimum, each facility is to be inspected every five (5) years.

2.3.2 *Conveyance System Inspections*

Stormwater conveyance systems are generally comprised of curbs and gutters, catch basins, inlet structures, swales, channels, piping, culverts, detention ponds, outfalls, or other structures that are used to collect, contain, and convey stormwater runoff.

The unimpeded movement of stormwater through conveyance systems is critical in avoiding backups and flooding, which can impede facility operations and damage property. Routine inspections and preventative care of stormwater conveyance systems can ensure these systems function as intended and prevent the need for costly and time-consuming repairs and retrofits.

Each GHP-covered facility is required to conduct routine stormwater conveyance system inspections to ensure the free flow of stormwater within the conveyance systems. GHP-covered facilities shall utilize the *"GHP Stormwater Conveyance System Inspection Checklist"*, provided in ***Appendix B*** to complete the required inspections. At a minimum, facility conveyance system inspections are to be conducted every five (5) years.

2.4 Training

As part of the GHP requirements within the County's Phase I NPDES permit, annual training must be provided to all appropriate staff and contractors. Such training shall be provided to any individuals responsible for implementing the GHP, performing the required inspections, or involved in any of the GHP-covered activities identified in this Plan. The required training shall focus on the duties and responsibilities assigned to site personnel in implementing the GHP and the best management practices (BMPs) prescribed in this Plan for preventing, reducing, and eliminating the discharge of pollutants during facility activities.

The County's MS4/GHP Program Coordinator will be responsible for developing the required training and disseminating it to GHP-covered facilities. Each GHP-covered facility will be responsible for identifying staff/contractors who must attend annual training, ensuring identified staff complete the required training, and maintaining records that document training dates and attendees. Training records and other documentation shall be maintained in ***Appendix D*** of this Plan.

Baltimore County will purchase a commercially-available training video, such as "Rain Check" published by Excal Visual. Employees who work on the GHP-covered sites will view the training video annually. A record of participation will be kept.

3.0 BEST MANAGEMENT PRACTICES (BMPs)

This section contains a BMP Fact Sheet for each of the ten (10) GHP-regulated activities. The County's operations are not limited to the BMPs contained within this document; nor is the County required to implement all of the pollution prevention measures identified within each BMP Fact Sheet. The County should select and implement those measures that are applicable and have the greatest potential for reducing stormwater pollution.

The BMP Fact Sheets contained within this document offer recommended protocols for a particular activity. These pollution prevention measures are considered non-structural BMPs with a focus on source control of potential pollutants.

3.1 Applicability of BMP Fact Sheets

The *"GHP Applicability Certification"* completed for this facility has identified the activities conducted at this facility that require coverage under this Plan. Each of the BMP Fact Sheets shall be marked as to whether they are applicable or not applicable to this facility. The Applicable/Not Applicable indicator on each BMP Fact Sheet can be revised in response to changes in operations at the facility.

3.2 BMP Fact Sheets

BMP Fact Sheets can be found on the following pages. For the sake of consistency, the general outline of a BMP Fact Sheet will be as follows:

- Identification of GHP-covered activity.
- Applicability of the BMP Fact Sheet to the facility.
- A general description of the concern the activity poses to stormwater.
- Recommended pollution prevention measures for reducing/eliminating stormwater pollution.
- Additional sources of information, if applicable.

BMP Fact Sheet

WASTE MANAGEMENT

GH-01

Not Applicable ☐ Applicable ☐

CONCERN

Improperly managed waste can allow trash and debris to be washed into storm drains which poses a concern to water quality, marine life, and public health. It also has the potential to create obstructions in the drainage system, which can lead to backups and flooding. Additionally, improper storage and handling of waste materials can allow pollutants including oils and greases, toxic and chemical compounds (including nutrients), bacteria, metals, and other potentially hazardous wastes to enter waterways.

POLLUTION PREVENTION MEASURES

General *(applicable to all waste management activities)*

1) Provide suitable containers, preferably with working covers, to collect waste materials.
2) Ensure that appropriate waste containers are available in areas where waste is generated.
3) Provide a cover over waste storage areas, if feasible.
4) Avoid positioning waste receptacles near storm drains, water bodies, or areas of concentrated runoff.
5) Ensure that lids to waste containers *(if present)* are kept closed to prevent the intrusion of precipitation and prevent trash from blowing out of the receptacle.
6) For waste receptacles, which do not have lids and could leak, containers should be inspected regularly and controls (e.g., containment, spill response, etc.) shall be enacted whenever leaks or dry-weather discharges are observed.
7) Routinely inspect waste containers, roll-offs, compactors, and other waste receptacles for the presence of excessive waste accumulation and overflowing containers.
8) Ensure that wastes accumulating on the ground are placed in a suitable waste container.
9) Ensure that wastes are removed from the facility regularly by a licensed and contracted vendor.
10) Repair or replace damaged waste container lids.

Trash Compactors

1) Routinely inspect trash compactors for malfunctioning equipment or leaking hydraulic oil and provide the appropriate spill response if leaking equipment is encountered.
2) Regularly inspect compactors for leaking fluids and implement appropriate controls such as spill response/cleanup, collection or diversion of released fluids, providing secondary containment, etc. whenever leaks or dry-weather discharges are observed.

Scrap Metal Collection Containers

1) Avoid placing oily or grease-covered items in uncovered scrap metal recycling collection containers. If needed, wrap oily/greasy items in plastic garbage bags before placing them in the collection container.

Hazardous/Universal Wastes

1) Ensure that hazardous waste and universal wastes (e.g., batteries, bulbs, etc.) are collected and stored indoors or within covered collection containers.
2) Verify that hazardous/universal waste collection containers are in good condition, not leaking, and compatible with the wastes being stored.

WASTE MANAGEMENT

Street Sweeping / Vactor Truck Material Storage

1) Do not site storage areas near storm drains, open water bodies, or areas of concentrated runoff.
2) Install sediment control devices (e.g. silt fence, silt socks, hay bales, etc.) around the staging area. Inspect these controls regularly and replace them as needed.
3) Cover the materials staging area, if feasible.
4) Provide oil-absorbent booms if necessary to control oily discharge. Inspect and replace booms regularly.
5) The staging area should be checked periodically for evidence of sediment migrating outside of the staging area. Material that has migrated out of the staging area should be promptly swept and returned to the staging area or disposed of.

Waste Cooking Oil/Grease

1) Maintain storage containers indoors or within a covered location, if feasible.
2) Storage containers shall be secured to prevent infiltration of precipitation and accidental/intentional spills or releases.
3) Carefully transfer waste oil/grease to the appropriate collection container to avoid spills.
4) Maintain suitable spill response equipment near collection containers. Immediately clean up any spilled oil/grease. Keep the exterior of the collection container clean and free of spilled oil/grease.
5) Provide secondary containment for collection containers, if feasible.

VEHICLE AND EQUIPMENT STORAGE

Not Applicable ☐ Applicable ☐

CONCERN

Vehicles and equipment may be stored onsite to support various County operations (e.g., construction, maintenance, snow removal, roadside assistance, mass transit, mowing, etc.). Examples of County owned and operated vehicles and equipment stored onsite at any given time include but are not limited to, the following: cars, trucks, buses, emergency response vehicles, garbage trucks, heavy equipment (backhoes, frontend loaders, etc.), forklifts, towable generators, portable light stands, and roadside equipment. Vehicle and equipment storage is considered a pollutant source due to the potential for incidental releases of petroleum products, lubricants, and various automotive fluids.

POLLUTION PREVENTION MEASURES

1) When possible/practical, store vehicles and equipment inside or under cover to prevent exposure to precipitation.
2) If vehicles or equipment must be stored outside, store vehicles/equipment in designated areas away from areas of concentrated runoff, storm drains, and other stormwater conveyances.
3) Vehicles and equipment shall be staged on impervious (asphalt or concrete) surfaces;
4) Keep truck beds clean and ensure potential stormwater pollutants are stored in closed containers, covered, or otherwise protected from stormwater exposure.
5) Conduct routine visual inspections of vehicles and equipment for the presence of leaks and respond accordingly.
6) Leaking vehicles/equipment should be moved inside or under cover. At a minimum, drip pans or absorbent pads shall be used to contain the leak until the vehicle/equipment can be relocated and the leak addressed.
7) Drain all fluids from wrecked or heavily damaged vehicles and equipment before storage.
8) Have an adequate supply of appropriate spill response equipment readily available and clean up all spills and leaks immediately utilizing dry cleaning techniques (e.g. absorbents and brooms).
9) Train staff in spill response so that incidents are addressed in a timely fashion.
10) Do not wash down areas where leaks have collected on ground surfaces; use dry cleaning methods such as granular absorbents and brooms.

VEHICLE AND EQUIPMENT REFUELING

Not Applicable ☐ Applicable ☐

CONCERN

Refueling activities associated with County vehicles and equipment can result in a discharge of fuel (gasoline and diesel fuel), which has the potential to enter the storm drain system and/or a nearby waterway. Such releases can introduce hydrocarbons, metals, and other toxic chemicals to stormwater runoff.

POLLUTION PREVENTION MEASURES

General Procedures *(applicable to all refueling activities)*

1) Routinely *(at least daily)* inspect the fuel dispensing area for any spills or leaks.
2) Routinely inspect fuel dispensing equipment looking for leaking or damaged equipment. Damaged or malfunctioning equipment shall be taken out of service until it has been repaired.
3) Fuels will only be dispensed into authorized vehicles, equipment, and approved containers.
4) Vehicle operators must remain outside of their vehicles and in attendance of fuel dispensers at all times while dispensing fuel.
5) Third-party contractors must be trained in proper refueling procedures and pollution prevention.
6) Do not utilize a foreign object to keep the dispenser nozzle in the open position. If present, a "hold-open" latch on the nozzle may be used.
7) Do not "top off" a vehicle's fuel tank once the dispenser nozzle's automatic shut-off has been activated. Topping off tanks may result in spills. Post signs in fueling areas warning vehicle operators against "topping off" of vehicle fuel tanks.
8) After refueling has stopped, allow several seconds to pass before removing the nozzle and returning it to the dispenser. This will prevent incidental dripping from the nozzle.
9) Employees refueling vehicles shall note the location of the "Emergency Fuel Shut Off" switch, to be used to stop the flow of fuel to the dispensers in the event of a release or emergency.
10) Have an adequate supply of appropriate spill response equipment readily available and clean up all spills immediately utilizing dry cleaning techniques (e.g. absorbents and brooms).
11) Immediately clean up and dispose of used absorbent material.
12) Do not wash down fueling areas; use dry cleaning methods such as granular absorbents and brooms.
13) Conduct refueling activities over impervious (e.g. concrete) surfaces. Place drip pans or absorbent pads under the nozzle if fueling occurs over a permeable surface such as grass or soil.
14) Install oil control devices in storm drains that may receive contaminated runoff from fueling areas.
15) Cover fueling areas with a canopy or roof to prevent direct contact with rainfall. Direct run-on away from fueling areas and collect fueling area run-off in a dead-end sump or oil-water separator.

Mobile Equipment Refueling

1) Refuel equipment on an impervious surface, downgradient of, and at the farthest practical distance from any storm drain, stormwater conveyance, stormwater management feature, or waterway.
2) Utilize secondary containment when refueling equipment (when practical).
3) Ensure mobile refuelers are parked in designated locations and away from areas of concentrated run-off, storm drains, and other stormwater conveyances.
4) Ensure that procedures are in place and that staff is properly trained in spill response/cleanup so that leaks and spills are addressed appropriately and promptly.

VEHICLE MAINTENANCE

BMP Fact Sheet
GH-04

Not Applicable ☐ Applicable ☐

CONCERN

Vehicle and equipment maintenance can impact the water quality of nearby waterways by exposing stormwater to various pollutants including petroleum hydrocarbons, solvents, antifreeze/coolants, used oil, lubricating oil, grease, brake fluid, metals, and various chemicals. Additionally, vehicles that are wrecked or awaiting repair can be a source of pollution if leaking fluids are not properly controlled.

POLLUTION PREVENTION MEASURES

1) Conduct vehicle and equipment maintenance activities indoors.
2) Make sure incoming vehicles and equipment are inspected for leaking fluids and oil.
3) Move leaking vehicles or equipment indoors or under cover as soon as possible. At a minimum, a drip pan or absorbent pads shall be utilized to contain the leak until the vehicle/equipment can be relocated and the leak addressed.
4) Avoid performing maintenance on vehicles in close proximity to exterior doorways, which may allow released fluids to migrate outdoors.
5) Have an adequate supply of appropriate spill response equipment readily available and clean up all spills and leaks immediately utilizing dry cleaning techniques (e.g. absorbents and brooms).
6) Keep maintenance areas neat and well organized. Remove dirt, debris, and used absorbent regularly.
7) Inspect maintenance areas as well as maintenance equipment on a routine basis.
8) Store vehicles, parts, and generated wastes indoors or off the ground and under cover whenever possible. When practical, provide secondary containment.
9) Promptly transfer used fluids to the proper waste container; do not leave full drip pans or other open containers around the shop. Empty and clean drip pans and containers regularly.
10) Waste liquids shall not be poured into floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections. Liquid wastes are to be collected in properly labeled containers and disposed of by a licensed waste hauler or other appropriate method.
11) Store leaking batteries in a sealed container and provide secondary containment, if feasible.
12) Clean all parts indoors utilizing a self-contained parts washer.
13) Do not hose down indoor service areas to storm drains or areas where it can seep into groundwater.
14) Maintain floor drains in good working order and inspect for proper function on a routine basis. Consider plugging floor drains that discharge to the storm sewer.
15) Ensure oil/water separators (if present) are maintained in proper working order and are checked on a routine basis for the presence of oil.
16) If maintenance work must be performed outdoors, adhere to the following requirements:
    - Conduct maintenance activities over an impervious surface, away from stormwater inlets.
    - Cover outdoor maintenance areas and direct stormwater run-on away from the area.
    - Use drip pans or drop cloths underneath the equipment to catch leaks and drips.
    - Have an adequate supply of appropriate spill response equipment readily available.
    - Clean all spills immediately using dry cleaning techniques (e.g. absorbents and brooms).
    - Avoid performing maintenance activities during precipitation events.
    - Limit temporary outdoor maintenance activities to a single shift/day if additional time is needed to cover the work area at the end of each day/shift.

VEHICLE AND EQUIPMENT WASHING

Not Applicable ☐ Applicable ☐

CONCERN

Vehicle and equipment washing can generate washwater that contains oil, grease, organic compounds, surfactants, phosphates, metals, and suspended solids. If vehicles/equipment are washed outdoors on impervious surfaces, dirty washwater can contaminate stormwater that ends up in waterways. Washing equipment over pervious surfaces can allow washwater to seep into the ground contaminating groundwater.

POLLUTION PREVENTION MEASURES

1) Vehicle and equipment washing should only be conducted in designated indoor wash bays that capture and recycle washwater to the extent practical.
2) Wastewater from the washing facility should be discharged to the sanitary sewer system under the authorization of a wastewater discharge permit issued by the local municipal authority.
3) The floor of indoor vehicle wash bays should be completely bermed or sloped to collect wash water and prevent migration outdoors.
4) No other activities (e.g., fluid changes, repairs, material storage) shall be performed in wash areas.
5) Keep the wash bay neat and well organized. Sweep or pick up all trash and debris daily or as needed.
6) Solid materials accumulated on vehicles or in vehicle beds (e.g. salt, soil, grass, etc.) shall be knocked off or otherwise removed from the vehicle (while inside the wash bay) prior to washing. Solid materials shall be collected and disposed of properly.
7) For vehicles too large to completely fit in the wash bays, only the portion of the vehicle physically located in the confines of the wash bay shall be cleaned. The vehicle shall then be rotated to allow for the remaining portion of the vehicle to be washed.
8) Use nozzles that automatically turn off water when not in use and consider high-pressure, low-volume sprays.
9) Avoid detergents as much as possible. If detergents are necessary, use a biodegradable, phosphate-free detergent.
10) If discharging to an oil-water separator, use a non-emulsifying detergent.
11) Inspect floor drain systems, holding tanks, and conveyances associated with designated wash areas regularly. Maintain oil/water separators and/or process flowthrough separators on a routine basis.
12) Use commercial car washes when vehicle or equipment washing cannot be performed onsite without causing impacts to stormwater.
13) If washing must occur onsite and outdoors, use a designated impervious area that is marked with posted signs indicating proper washing procedures. This area must be bermed to contain the wash water and graded to direct the wash water to the sanitary sewer, an oil-water separator, a holding tank, a dead-end sump, or other containment area. Captured water shall be disposed of properly.
14) Avoid steam cleaning and engine/undercarriage washing which can produce high pollutant concentrations. If steam cleaning or engine washing is necessary, perform such cleanings within isolated indoor areas, and ensure wash water is treated and discharged to the sanitary sewer (if permitted to do so) or captured for off-site disposal.
15) Train staff in proper washing techniques and how to confine washing to designated wash areas.
16) Consider alternatives to washing such as using air to blow grass and debris from small equipment, wet-wiping equipment with rags, etc.

MATERIAL STORAGE

Not Applicable ☐ Applicable ☐

CONCERN

The storage of petroleum products, chemicals, paints, cleaners, pesticides, fertilizers, bags of erodible materials like sand, cement, and soil, and other potential pollutants can negatively impact surface waters through the accidental releases or leaching of materials into stormwater. Unprotected outdoor storage areas can generate a wide range of stormwater pollutants, such as sediment, nutrients, toxic materials, and petroleum products.

POLLUTION PREVENTION MEASURES

1) Whenever possible, store containers (e.g. drums, bins, bags, cans, and totes) indoors or under cover to limit exposure to stormwater.
2) Designate specific areas for material delivery and storage that are away from heavy traffic areas, storm drains, stormwater conveyances, and areas of concentrated run-off.
3) Designated outdoor storage areas should be paved or consist of an impervious surface.
4) Provide secondary containment for materials whenever possible or required per regulation.
5) Store materials on pallets to prevent stormwater run-on from coming into contact with materials, prevent container corrosion, and allow for better leak detection. Pallets must be in good condition and promptly replaced once damaged or deteriorated.
6) Stack containers according to the manufacturer's recommendations to avoid damage.
7) Immediately replace damaged, corroded, or leaking containers.
8) Ensure all storage containers are clearly labeled with their contents.
9) Keep containers tightly sealed after use.
10) Maintain an accurate inventory of hazardous substances and limit on-site storage to that which is necessary to support facility operations.
11) Keep storage areas neat and well organized; remove debris and unneeded material promptly.
12) If empty drums are stored outdoors, ensure that all openings are equipped with caps to prevent water intrusion and that the drum/storage area is labeled "Empty Drums".
13) Have an adequate supply of appropriate spill response equipment readily available and clean up all spills and releases immediately utilizing dry cleaning techniques (e.g. sweeping/absorbents).
14) Clean up all migrating dry materials upon discovery and address the source of the release.
15) Provide perimeter controls (e.g., berms, rock check dams, etc.) for erodible stockpiles of materials such as mulch, sand, and gravel to prevent migration into the stormwater system.
16) Routinely inspect material storage areas for leaks, material migration, and damaged or corroded containers. Ensure that secondary containment and other perimeter controls are in satisfactory condition.
17) Additional visual inspections of outdoor storage areas should be conducted after significant rainfall events (i.e., greater than 0.5 inches).

ABOVEGROUND STORAGE TANKS

Not Applicable ☐ Applicable ☐

CONCERN

Aboveground storage tanks (ASTs) may be used to store fuels, automotive fluids, chemicals, or deicing fluids. Leaks from tanks, piping, or other equipment and releases during fluid transfers can all impact stormwater quality. It is critical to maintain ASTs in good working condition to prevent spills and/or releases from occurring. Improperly managed storage tanks can cause significant environmental impacts.

POLLUTION PREVENTION MEASURES

General *(applicable to all storage tanks)*

1) ASTs should be installed and maintained in accordance with COMAR 26.10 and applicable fire codes.
2) ASTs should be provided with secondary containment, whenever feasible or required by regulation.
3) Secondary containment areas shall be maintained clean and dry; drain valves must be kept closed; accumulated liquid shall only be discharged if there are no visible signs of impacts, and in accordance with applicable regulations.
4) Inspect ASTs monthly to identify any leaking or malfunctioning equipment and ensure tanks are functioning as designed.
5) ASTs shall be equipped with a form of liquid-level detection (i.e. sight gauge, electronic monitoring).
6) ASTs shall be equipped with overfill prevention (i.e. overfill alarm and/or overfill prevention valve).
7) Tanks and piping should be protected from vehicle impact via barriers, bollards, guard rails, etc.
8) Install ASTs on solid foundations over impervious surfaces, and away from areas of concentrated run-off, storm drains, and other stormwater conveyances.
9) Properly label all storage tanks (e.g., contents, capacity, etc.).
10) Keep remote fills and fill port spill buckets clean and dry.
11) Keep fill ports, gates, and tank areas secured when not in use to prevent fuel theft and tampering.
12) Have an adequate supply of appropriate spill response equipment readily available and clean up all spills and leaks immediately utilizing dry cleaning techniques (e.g. absorbents and brooms).
13) Facilities that maintain 1,320 gallons or more of aboveground oil products shall prepare and implement a Spill Prevention, Control, and Countermeasure (SPCC) Plan, per 40 CFR 112.
14) Facilities that maintain 1,000 gallons or more of used oil or 10,000 gallons or more of virgin oil in ASTs shall obtain an Individual Oil Operations Permit from the MDE, per COMAR 26.10.01.09.
15) Owners/Operators of facilities that maintain more than 2,500 gallons of oil in ASTs are required to register each AST with MDE, per COMAR 26.10.01.10.

Bulk Fluid Transfers (Deliveries)

1) All bulk fluid transfer operations shall be performed under the direct supervision of knowledgeable County personnel. At no time shall the delivery vehicle or delivery vehicle operator be unsupervised.
2) The product level within the tank must be measured and available capacity verified before delivery.
3) Deliveries shall be made via fill ports equipped with catch basins to capture drips and spills.
4) Ensure an adequate supply of appropriate spill response equipment is readily available.
5) Post signs in delivery area displaying proper delivery procedures and emergency contact information.

Used Oil Tanks

1) County personnel must verify the level of product in used oil tanks prior to filling.
2) Used oil tanks should only be filled via designated fill ports. Pumping used oil into the tank via a closed piping system is preferred to manually pouring used oil into the tank.

Brine Tanks

1) If multiple tanks are located onsite, the tanks should be plumbed to ensure that the complete failure of one tank will not drain all the tanks in the system (tanks must be isolated).
2) Minimize seeping and leaking at fittings by properly supporting piping and fittings, using flexible connectors or hoses to reduce stress, and installing corrosion-resistant fittings.
3) Consider placing hoses in non-permeable trenches or using drip-less nozzles to reduce repeated small spills.

RESIDENT DROP-OFF CENTER

GH-08

Not Applicable ☐ Applicable ☐

CONCERN

Resident Drop-Off Centers are publicly accessible facilities where residents can drop off used automotive fluids (i.e. oil or antifreeze), municipal waste, recyclable, and/or organic waste, typically free of charge. Improper transfer or management of the waste materials can allow a number of pollutants including oils and greases, toxic and chemical compounds, nutrients, metals, and other wastes to enter waterways.

POLLUTION PREVENTION MEASURES

General *(applicable to all materials collected)*

1) Clearly identify waste materials accepted by the facility, and clearly mark designated collection areas.
2) Waste material should be inspected by a County representative, prior to disposal.
3) Avoid positioning waste receptacles near storm drains, water bodies, or areas of concentrated runoff.
4) When practical, receiving areas should be covered.
5) Do not allow containers to overflow or waste materials to accumulate on the ground.

Automotive Fluid Collection

1) Used oil, antifreeze, and automotive fluid receiving areas should be on impervious surfaces, covered, and provided with secondary containment, which shall be maintained clean and dry.
2) Provide lidded waste receptacles in the receiving area for the public to dispose of empty containers. Waste receptacles shall be emptied routinely and waste disposed of properly.
3) Collection areas shall be inspected daily and all trash and spilled liquids appropriately cleaned up.
4) The available capacity of waste liquid collection containers shall be routinely verified and waste removals scheduled, as needed.
5) Install appropriate controls to prohibit the overfilling of waste fluid collection containers.
6) Place appropriate spill response equipment in close proximity to drop-off areas.
7) If aboveground tanks are used to collect waste fluids, refer to BMP Fact Sheet GHP-07 (Aboveground Storage Tanks) for additional recommendations.

Organic Debris Collection

1) Routinely transfer collected organic debris/waste to a composting or disposal facility.
2) Do not permit composting of organic waste except at properly designed and permitted facilities.
3) Enact controls to prevent leaves and other windblown debris from entering stormwater inlets.

Municipal Waste / Recyclables Collection

1) Refer to BMP Fact Sheet GHP-01 (Waste Management) for additional recommendations.

STOCKPILES

Not Applicable ☐ Applicable ☐

CONCERN

The County may stockpile various erodible materials, the type of material can vary depending on the needs of the County. Stockpiled material may include soil, sand, millings, slag, cinders, sawdust, landscaping bark, compost, etc. Exposed stockpiles can easily erode due to wind or precipitation and contribute suspended solids to stormwater runoff.

POLLUTION PREVENTION MEASURES

1) Maintain stockpiles of erodible materials within roofed storage buildings or covered storage bins, if feasible. If not, stockpile material on an impervious surface and cover the stockpile.
2) Temporary stockpiles should be placed on an impermeable membrane (tarp) for quick clean-up.
3) Locate stockpiles away from drain inlets, catch basins, swales, areas of concentrated stormwater flow, water bodies, and environmentally sensitive areas.
4) Divert stormwater flows away from/around the stockpiles using a diversion device (e.g., temporary swale, berm, sandbags, or diversion fence).
5) Cover temporary stockpiles of erodible materials with a tarp that has been adequately secured. The covers must be in place at all times when the stockpile is not in active use.
6) When accessing a portion of the stockpile, only remove a section of the cover to minimize exposure to the elements.
7) Use barriers to isolate stockpiled materials from high-traffic areas to prevent tracking of materials.
8) Sweep (do not wash or hose down) in front of material stockpile storage areas at regular intervals, following loading and unloading activities, and during times of heavy use.
9) If material is observed migrating from the stockpile, clean up all migrated material upon discovery and provide additional controls to reduce migration from the stockpile. If such measures are ineffective implement controls to capture pollutants before they migrate off-site (e.g. silt fencing, inlet filters, filter socks, at-grade inlet protection, etc.).
10) Minimize material stockpile inventory based on historical inventory/usage records and public safety operational needs.
11) Cold mix asphalt shall be stored on and covered with plastic sheeting or comparable material.
12) Routinely inspect outdoor material stockpiles to verify existing controls are functioning properly and for signs of erosion or material transport.

Not Applicable ☐ Applicable ☐

CONCERN

When salt and other de-icing materials are stored outside and uncovered, they have a much higher risk of being eroded and transported offsite by stormwater. Improper de-icing material and sand storage may result in stormwater runoff containing elevated concentrations of sodium chloride and dissolved solids. Sodium chloride (e.g., road salt) is an effective deicer but can be highly corrosive to stormwater facilities. Smaller waterways are at a higher risk to increases in salinity, which can threaten aquatic species. Additionally, runoff containing sodium chloride has the potential to reach drinking water sources where small traces can adversely impact public health.

POLLUTION PREVENTION MEASURES

1) Bagged de-icing chemicals must be stored indoors. If stored outdoors bags must be kept on pallets (off the ground) and covered at all times. Bags must be intact without holes or openings.
2) Bulk de-icing materials shall be stored under cover and on an impervious surface.
3) Bulk salt storage areas/buildings shall not be overfilled so that salt spills out beyond the entrance of the storage area/building.
4) Bulk salt storage areas/buildings shall be maintained in a structurally sound condition and in a way that prevents the release of salt and the infiltration of stormwater. Deicing materials should not touch the sides of metal storage containers.
5) Barriers such as berms, gates, knee walls, tarps, and/or straw bales shall be placed at the entrances of bulk salt storage areas/buildings to prohibit the migration of salt and prevent contact with precipitation/stormwater runoff.
6) Routinely inspect storage areas for migrating materials or deterioration of containment structures. Sweep up all migrating materials upon discovery and repair the source of the migrating pollutant.
7) Loading areas should be constructed of impervious material and covered or enclosed, to the extent practical, to reduce potential contact with stormwater.
8) Minimize the distance de-icing materials are transported during loading/unloading activities.
9) Prevent and/or minimize the spillage of salt and de-icing materials during loading/unloading activities, immediately clean spilled or tracked materials.
10) Sweeping of storage and loading/unloading areas shall be conducted immediately following loading/unloading activities.
11) Do not store de-icing materials (bulk or bagged) over or immediately adjacent to drains or waterways.
12) Control site drainage by diverting stormwater run-on away from storage/loading areas using appropriate measures (e.g., curbing, berms, etc.).
13) Slope storage/loading areas to direct salt-contaminated runoff to an appropriate collection area, and in a manner that prevents the runoff from reaching adjacent soil or surface waters.
14) Excess salt shall be removed from salt handling equipment (trucks, spreaders, etc.) following use/prior to storage. All cleaning shall occur on an impervious surface, which is sloped or curbed to contain any washwater and direct it to a collection area for recycling or proper disposal.

Appendix A

GHP Site Inspection Checklist

GOOD HOUSEKEEPING PLAN (GHP)
SITE INSPECTION CHECKLIST

Facility Name:	______________________	**Inspection Date:**	______________________
Inspector Name:	______________________	**Inspector Signature:**	______________________

- The intent of this inspection is to ensure that the site is being properly maintained and that there are no visible signs of pollutants entering the stormwater system.
- **A shaded status box designates an item in a non-compliant status. Please provide an explanation for all non-compliant items and subsequently document all corrective actions performed.**
- Retain the completed checklists for five (5) years.

Item	Status			CORRECTIVE ACTIONS/COMMENTS *Items which cannot be corrected immediately must be reported to the GHP/NPDES Program Manager*
	Yes	No	N/A	
1. Are exterior areas of the facility free of accumulated trash, debris, and unneeded materials?				
2. Are stormwater drains and inlets free from debris, sediment, and evidence of spills/releases?				
3. Is the facility free from signs of erosion?				
4. Are paved surfaces free of accumulated sediment?				
5. Is spill response equipment available in maintenance areas, fueling areas, hazardous material storage areas, and/or other required areas?				
6. Are spill kits and absorbent materials clearly labeled and accessible (i.e. items are not piled on top of or in front of spill kits)?				
7. Are spill kits secured from being stolen or misused?				
8. Is there a labeled container present for the disposal of used spill cleanup material?				

GOOD HOUSEKEEPING PLAN (GHP)
SITE INSPECTION CHECKLIST

9. Does spill response equipment (i.e. spill kits, absorbent materials) need to be replenished?

10. Are areas around solid waste containers/roll-offs/compactors free of excessive trash accumulation or overflowing containers?
11. Are areas around solid waste containers/roll-offs/compactors free of visible evidence (i.e. leaks, staining) of ongoing stormwater pollution?
12. Are scrap metal containers in good order and free from evidence of leaking oil/grease?
13. For dumpsters, roll-offs, and other waste receptacles, where leaks are observed, have appropriate controls (e.g. containment, spill response, etc.) been enacted?
14. Are the lids (if present) to solid waste containers closed?
15. Is street sweeping/vactor waste being managed appropriately (i.e. no evidence of material migration)?
16. Is waste cooking grease managed appropriately (i.e. no evidence of spilled material or excessive staining)?

17. Are stored vehicles/equipment free from leaks?
18. If leaks are present, are they being managed appropriately (drip pan or other methods in place to capture released liquids)?
19. Are storage areas free of visible evidence of chronic leaks/spills (i.e. significant staining)?

20. Are the areas around refueling areas free from evidence of spills or leaks?

GOOD HOUSEKEEPING PLAN (GHP)
SITE INSPECTION CHECKLIST

21. Are refueling areas free of used absorbent material that has not been swept/cleaned up?
22. Do fuel dispensers and hoses appear to be in good working order and well-maintained?

23. Is there any indication that vehicle maintenance activities are being conducted outdoors?
24. Is there any indication that vehicle maintenance activities are contributing to stormwater pollution?

25. If performed on-site, does all vehicle/equipment washing occur indoors?
26. Is wash water collected and disposed of properly?
27. Is there any indication that vehicle/equipment wash water is being released to stormwater conveyances or pervious areas?

28. Are all outdoor storage areas free from visible signs of leaks or spilled material?
29. Are material storage containers in good condition?
30. Are drums, totes, and other containers (that are <u>not</u> empty) stored off the ground and covered, or stored indoors?
31. Are liquid-containing drums/totes located outdoors provided with secondary containment?
32. Are containers that are located outdoors equipped with closed lids except when material transfers are occurring?

GOOD HOUSEKEEPING PLAN (GHP)
SITE INSPECTION CHECKLIST

33. Are materials, which could impact stormwater, stored away from heavy traffic areas, or protected from vehicle collisions?
34. Are chemical storage containers properly labeled?
35. If empty drums are stored outside, are all openings equipped with caps to prevent water intrusion?

36. Are all storage tanks, and surrounding areas free from visible signs of leaks or spilled material?
37. Do storage tanks appear to be in good working order (e.g. free of obvious signs of damage or malfunctioning equipment)?
38. Are remote fills associated with tanks free of liquid and debris?

39. Are waste collection areas clearly identified?
40. Are used oil/antifreeze collection tanks, containment structures, and surrounding areas free from visible signs of leaks or spilled material?
41. Do used oil/antifreeze collection tanks appear to be in good working order (e.g. free of obvious signs of damage or malfunctioning equipment)?
42. Are empty used oil/antifreeze containers being collected and disposed of in the trash?
43. Are areas around waste/recyclables containers free of excessive trash accumulation or overflowing containers?
44. Are areas around waste/recyclables containers free of visible evidence (i.e. leaks, staining) of ongoing stormwater pollution?

GOOD HOUSEKEEPING PLAN (GHP)
SITE INSPECTION CHECKLIST

45. Are organic debris collection areas free of visible evidence of ongoing stormwater pollution (e.g. leaves and debris in stormwater conveyances)?		
46. Are material piles, including salt, soil, sand, and millings isolated (i.e. covered, bermed, etc.) to prevent stormwater run-on and run-off?		
47. Are areas surrounding material piles (e.g. salt, soil, sand, millings, etc.) free of tracked or migrated material?		
48. Are all deicing materials stored indoors or undercover?		
49. Are salt storage structures in good condition (e.g. no evidence of material escaping or stormwater infiltration)?		
50. Is the salt loading area clean?		
51. If deicing materials are tarped, is the tarp secure and covering the entire pile?		
52. Are bags of salt stored indoors, or off the ground and covered?		

GOOD HOUSEKEEPING PLAN (GHP)
SITE INSPECTION CHECKLIST

ADDITIONAL COMMENTS:

Appendix B

GHP Stormwater Conveyance System Inspection Checklist

GOOD HOUSEKEEPING PLAN (GHP)
STORMWATER CONVEYANCE SYSTEM INSPECTION CHECKLIST

Facility Name:	____________________	**Inspection Date:**	____________________
Inspector Name:	____________________	**Inspector Signature:**	____________________

- The intent of this inspection is to ensure the free flow of stormwater within on-site conveyance systems and prevent damage/flooding.
- **If maintenance is needed, please provide an explanation, and document all corrective actions performed.**
- **Inspections shall include visually accessible infrastructure only; at no time shall inspection personnel enter a confined space.**
- Retain the completed checklists for five (5) years.

Item	**Item Checked** (Y/N/NA)	**Maintenance Needed** (Y/N)	**CORRECTIVE ACTIONS/COMMENTS** *Items which cannot be corrected immediately must be reported to the GHP/NPDES Program Manager*
1. Look for debris and sediment blocking catch basin grates. If found, remove.			
2. Look for damage or cracks to the frame, grate, basin walls or bottom. If found, schedule repairs or replacement.			
3. Look for sediment and debris in the catch basin sump. If sediment fills 60% of the sump or comes within 6” of a pipe it should be scheduled for cleaning.			
4. If any type of filtering device is present, verify that the filter is not clogged, torn, or damaged; clean if clogged, replace if damaged.			
PIPES / CULVERTS			
5. Look for evidence of clogged piping (e.g. visual obstructions, standing water within manholes/inlets structures, etc.). If found, remove or schedule cleaning.			
6. Verify vegetation growth, if present, does not impede water flow. If it does, mow, cut back, or remove.			

GOOD HOUSEKEEPING PLAN (GHP)
STORMWATER CONVEYANCE SYSTEM INSPECTION CHECKLIST

7. Inspect for damaged piping, inlets, outlets, headwalls, wingwalls, or excessive erosion. If found, make or schedule repairs.			
DITCHES / TRAPEZOIDAL SWALES			
8. Check for erosion, slumping, or undercutting. If found, make or schedule repairs.			
9. Look for trash and sediment accumulation. Remove all trash and remove sediment if it will impede water flow or clog downstream structures.			
10. Verify vegetation growth does not impede water flow. If it does, mow, cut back, or remove. Remove any trees or shrubs growing within the ditch.			
11. Check the integrity of check dams, filter socks, or other flow dissipation/filtering devices within the ditch or swale. Perform or schedule service if they are clogged, damaged, or deteriorated.			
12. Check inlets and outlets for debris accumulation, damage, or erosion. If found, make or schedule repairs.			

ADDITIONAL COMMENTS:

Appendix C

General Spill Response Procedures

Spill Response and Notification Procedures

A. Discovery of a Spill

1. Upon discovery of a spill, facility personnel should immediately assess the situation and determine if the spill is considered a “Minor” or “Major” spill. For a spill to be considered “Minor” all the following conditions must be satisfied:

    - The type of material spilled is known;
    - The spill is confined to the immediate work area;
    - The spill has not reached storm drains, sanitary sewer systems, open water, or surrounding soils;
    - The spill can be safely managed;
    - The employee can contain and clean up the spill with the PPE that is normally used in the work area;
    - The spill does not pose a serious threat of fire or an explosion; and
    - The spill does not pose conditions that are immediately dangerous to life or health.

2. If all the above conditions are met, the spill is considered “Minor”. Refer to ***Section B*** of this document for appropriate response actions.

3. If all the above conditions are not met, then the spill is considered “Major”. Refer to ***Section C*** of this document for appropriate response actions.

4. If a spill involves flammable liquids, ignitable vapors may be present - precautions must be taken to prevent ignition. Do not turn on or off equipment since sparks may be generated. Additionally, avoid the movement of equipment that could create static electricity. Larger spills of flammable liquids could pose a fire threat and would be considered a “Major” spill. Refer to ***Section C*** for appropriate actions.

B. Response to a “Minor” Spill

1. Identify the source of the spill and the direction in which the spill is heading.

2. Attempt to stop the spill at the source. Where applicable, the source of the spill shall be taken out of service until repairs can be made. If the spill is related to a fuel dispensing system, activate the Emergency Shut-Off (ESO) switch to prevent additional fuel disbursements.

3. If material is released outside a containment area, it is crucial that the material be contained as quickly as possible. Following proper safety procedures, use absorbent materials or diking to contain the spill. Prevent the spill from reaching storm drains, sanitary sewers, or open water. If a spill is flowing toward a drain, install temporary diking around the drain, block off the drain with a drain cover, or place absorbent material around the drain to prevent a discharge.

4. Once the spill has been stopped and contained, estimate the quantity of the spill. Consult applicable Safety Data Sheet (SDS) for material compatibility and environmental precautions. Note and follow recommendations regarding special precautions, spill response equipment, methods, or precautions. All cleanup work shall be conducted in accordance with existing safety

protocols and SDS recommendations. Contact the facility Superintendent/Supervisor, or designee, for assistance if needed.

5. Recover or clean up the spilled material as much as possible. Material that cannot be reused must be discarded in accordance with state and federal regulations. Liquids absorbed by porous materials (e.g., wood, gravel, significant quantities of absorbent material, etc.) shall be placed into US DOT-approved 30-gallon or 55-gallon steel drums. Following cleanup, the container shall be secured and appropriately labeled to identify the contents and the date of the spill/cleanup. Containers shall be stored indoors and provided with secondary containment until transported off-site for disposal.

6. For spills that do not involve flammable liquids or other potential hazardous wastes, small quantities of used absorbent materials may be double bagged and disposed of along with municipal trash as long as all liquids have been absorbed (no free liquid may be present).

7. If the spilled material is a flammable liquid, corrosive liquid (pH ≤ 2 or ≥ 12.5), or other potential hazardous waste, all recovered product, impacted material, and used absorbent must be placed into a US DOT-approved containers/drums. Following cleanup, the container(s) shall be secured and appropriately labeled to identify the contents and the date of the spill/cleanup. Containers shall be stored indoors and provided with secondary containment until transported off-site for disposal. The facility Superintendent/ Supervisor, or designee shall be notified that a potential hazardous waste was released and that a waste characterization may be needed to facilitate proper disposal.

8. Surfaces that are contaminated by the spill shall be cleaned utilizing dry absorbent material. Tools and equipment that have been used in the cleanup must be decontaminated immediately after use. Decontamination water (if used) must be minimized, containerized, and disposed of properly.

9. If waste requires disposal, notify the facility Superintendent/Supervisor, or designee who will arrange for the proper characterization and disposal of any waste material. Representative sampling and analysis may be necessary to properly characterize the waste. The waste must be transported and disposed of in compliance with all applicable laws and regulations. Waste manifests, trip tickets, or bills of lading (if required) for waste disposal shall be kept on file.

10. Facility personnel shall restock/replace spill response equipment and absorbent materials used during the clean-up efforts.

11. The facility Superintendent/Supervisor, designee, or other appropriate County personnel shall be notified of the spill in accordance with ***Section D*** of this document.

C. Response to "Major" Spill

A "Major" spill is any discharge that does not meet the definition of a "Minor" spill. Any employee or contractor observing, being involved with, or recognizing a potential or actual spill of oil or other hazardous material, other than a "Minor" spill is responsible for performing the following actions:

1. If there is no danger to human health, attempt to stop and contain the spill at the source. If the spilled material is unknown, if PPE other than that which is typically used in your work area, is

necessary to approach the spill area, or if assistance is required to stop the spill, do not attempt to contain the spill. If the spill is related to a fuel dispensing system, activate the Emergency Shut-Off (ESO) switch.

2. Most County employees lack the appropriate training to respond to "Major" spills. If the spill is of an unknown substance, is of a quantity that cannot be safely managed, or poses other risks beyond the training level of the employee, the employee should not attempt to contain or clean up the spill.

3. Evacuate individuals from the area and keep personnel away from the impacted area.

4. Immediately notify the facility Superintendent/Supervisor, or designee of the incident. The notified individual will determine the need for further evacuations and contact emergency response personnel (911), as necessary. *If a situation represents an immediate and grave danger to personnel, the public, structures, or other infrastructure, the individual discovering the incident may call 911 directly without first notifying facility management.*

5. The facility Superintendent/Supervisor or designee will determine if assistance from emergency response contractors is required to clean up the incident and will coordinate such spill response efforts with spill response contractors and other County agencies and first responders.

6. Facility personnel will provide assistance to emergency responders, as appropriate.

D. Reporting a Spill (Internal Notifications)

1. Once a spill is contained and cleanup operations have been initiated, the individual discovering the spill shall notify the appropriate County representatives and provide the following information:

   a) Identify the location, date, and time of the incident;
   b) Identify the type of material spilled or discharged;
   c) Estimate the quantity spilled and the rate of the spill;
   d) Identify the cause of the spill or discharge;
   e) Identify impacted media or infrastructure (soil, storm drains, open water bodies, etc.);
   f) Determine the extent of injuries involved; and
   g) Provide response measures implemented by the facility personnel.

E. Reporting a Spill (Regulatory Notifications)

State of Maryland Reporting Requirements (COMAR 26.10.01.05)

1. Upon discovery of a spill, the Responsible Person shall notify the MDE Emergency Response Division **within two (2) hours** by calling 866-633-4686. The caller shall be prepared to provide the following information:

   a) The time and date of the spill;
   b) The location and cause of the spill;
   c) The mode of transportation or type of facility involved;
   d) Type and quantity of oil spilled;

e) Details regarding any assistance required;
f) The name, address, and telephone number of the person making the report; and
g) Any other pertinent information requested by the Department.

2. MDE will provide further guidance on additional responsibilities.

3. Within **ten (10) working days** of the completed removal and clean-up activities, the Responsible Person shall prepare a report using either County letterhead detailing the incident. The report shall contain the following:

   a) Date, time, and place of the spill;
   b) The amount and type of oil or hazardous substance spilled;
   c) A complete description of circumstances that contributed to the spill;
   d) A complete description of the containment and removal operations performed, including disposal sites to which oil refuse was transported;
   e) Procedures, methods, and precautions instituted to prevent the recurrence of an oil spill from the facility involved;
   f) Any other information considered necessary or required by the MDE for a complete description of the incident; and
   g) A certification that the information provided is true and correct to the knowledge of the person signing the report.

4. The completed report shall be submitted to mdeerd.mema@maryland.gov or faxed to 410-537-3932.

5. A digital copy of the completed report and any accompanying documentation shall be retained

Federal Reporting Requirements - National Response Center (40 CFR 110)

1. If any of the following criteria are met the Responsible Person shall notify the National Response Center (NRC) **within two (2) hours** of the spill discovery by calling 800-424-8802 or 202-426-2675.

   ❖ The spill has caused a film, sheen, or discoloration of the surface water or shorelines;

   ❖ The material spilled will violate applicable water quality standards (surface water or groundwater); or

   ❖ The spill has caused a sludge or emulsion to be deposited beneath the surface of the water or on the shoreline.

2. At a minimum, the following information shall be provided to the NRC:

   a) Name, organization, and telephone number of reporting party;
   b) Name and address of the responsible party;
   c) Date, time, and location of the incident;
   d) Source and cause of the discharge;
   e) Type of material(s) discharged;
   f) Quantity of materials discharged;

g) Danger or threat posed by discharge;
h) Number and types of injuries (if any);
i) Weather conditions at the incident location; and
j) Other information to help emergency personnel respond to the incident.

3. If unable to report to the NRC, reports can be made to the EPA Regional Office at 800-438-2474 or the U.S. Coast Guard (USCG) at 202-372-1001. The NRC, EPA, or USCG will provide further guidance.

4. A digital record of the NRC notification and any accompanying documentation shall be retained on-site.

Federal Reporting Requirements - EPA Regional Administrator (40 CFR 112.4)

1. If the facility where the spill occurred is regulated under 40 CFR 112 and is required to have a Spill Prevention, Control, and Countermeasures (SPCC) Plan, the Responsible Person shall report the spill to the EPA Region III Administrator when any of the following criteria are met:

   - More than 1,000 gallons of oil is discharged to navigable waters or adjoining shorelines in a single incident; or
   - More than 42 gallons of oil is discharged to navigable waters or adjoining shorelines in each of two incidents occurring within any twelve-month period.

2. The report shall be made in writing **within 60 days** of the spill and shall contain:

   a) Name and location of the facility;
   b) Owner/operator name;
   c) Maximum storage/handling capacity of the facility and normal daily throughput;
   d) Corrective actions and countermeasures taken;
   e) Adequate description of the facility including maps, and flow diagrams;
   f) Cause of the discharge to navigable waters, including a failure analysis;
   g) Additional preventative measures taken or planned to minimize discharge reoccurrence; and
   h) Other information required by the EPA Regional III Administrator.

3. The report shall be submitted to the EPA Regional Administrator at the following address:

EPA Regional Administrator
US EPA Region 3
1650 Arch Street (3RA00)
Philadelphia, PA 19103-2029

4. A copy of the report shall be retained in the facility SPCC Plan.

Appendix D

Training Records

GOOD HOUSEKEEPING PLAN (GHP)
TRAINING ATTENDANCE LOG

FACILITY NAME: ______________________________

DATE	NAME *(PRINT)*	SIGNATURE

By signing I affirm that I have completed the required annual training; and I am aware of and understand my responsibilities under this Plan.