

TMDL for Sediment in the Non-Tidal Piscataway Creek

Source Document: MDE (Maryland Department of the Environment). 2019. *Total Maximum Daily Loads of Sediment in the Piscataway Creek Watershed, Prince George's County, MD.* Draft, Document Version July 2019.

Water Body Type: Non-tidal segments of Piscataway Creek

Pollutant: Sediment

Designated Uses: I - Aquatic Life and Wildlife

Size of Watershed: Piscataway Creek – 43,510 acres (68 sq. miles)

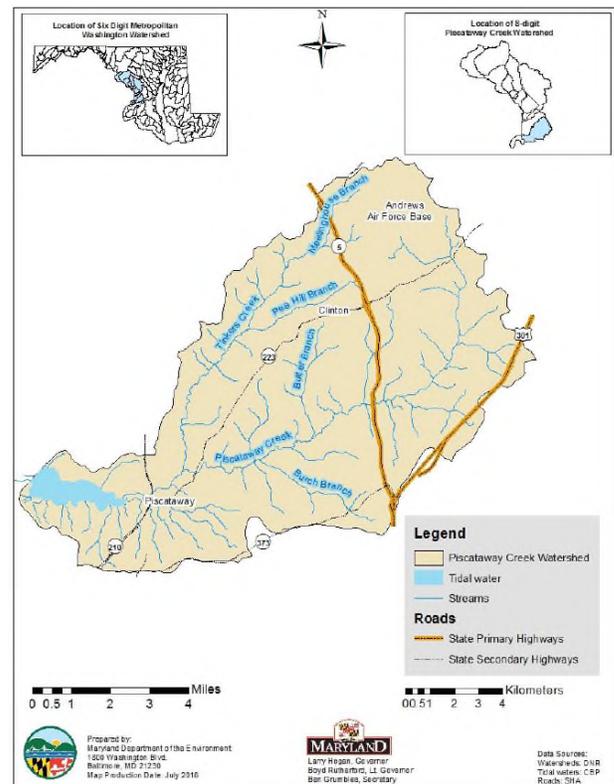
Water Quality Standards: Non-numeric; aquatic life assessed using Maryland's biocriteria protocol, which evaluates both the amount and diversity of the benthic and fish community using the Index of Biotic Integrity (IBI)

Analytical Approach: Used the Chesapeake Bay Watershed Model (Phase 5.3.2) in a reference watershed analysis to calculate land use-specific loading rates and losses from edge of field to the main channel. Tabular aggregation to Maryland's 8-digit watersheds.

Date Approved: Draft

for the non-tidal Piscataway Creek watershed (Figure 1), and more specifically, at a level to support aquatic life.

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



Source: MDE 2019.

Figure 1. Piscataway Creek watershed

Introduction

The Total Maximum Daily Load (TMDL) addresses the 2016 sediment impairment. In May 2018, MDE conducted a data solicitation of sediment to support the TMDL and all readily available data were considered for this TMDL. The TMDL's objective was to ensure that watershed sediment loads support the Use I designation

Problem Identification and Basis for Listing

Biological community impairments were identified, prompting placement of the Piscataway Creek watershed on Maryland's 303(d) list in 2016. A biological stressor identification analysis (BSID) was conducted in 2015 and identified sediment, along with inorganic chemical parameters (e.g., chlorides) as stressors on the aquatic life. Chlorides were also placed on the 303(d) list in 2016. The current TMDL does not address chlorides.

Applicable Data

For listing, the biological stressor identification analysis (BSID) was based primarily on the MBSS. The MBSS is a statewide probability-based sampling survey for assessing the biological conditions of wadeable, non-tidal streams. For purposes of developing the TMDL, the data set has the following benefits: (1) in-stream biological data are paired with chemical, physical, and land use data variables that could be identified as possible stressors; and (2) it uses a probabilistic statewide monitoring design. The impairment listing made use of all 22 stations with physical and biological monitoring data in the Piscataway Creek watershed in the MBSS program (all rounds).

The BSID analysis (stressor identification) made use of the biological and physical monitoring data collected under the Round Two and Round Three MBSS. The BSID analysis combines the individual stressors (physical and chemical variables) into three generalized parameter groups to assess how the resulting impacts of these stressors can alter the biological community and structure. The three generalized parameter groups include sediment, habitat, and water chemistry.

Sources

Nonpoint sources addressed by the TMDL include unregulated stormwater runoff from agricultural land and forested land uses. Point sources include regulated stormwater (including construction) for federal, state, county, and private facilities. Table 2 presents the baseline loads for sources determined by the modeling approach used to develop the TMDL.

Table 2. Baseline sediment loads

Source	Baseline Sediment Load (ton/yr)
Forest	366
Harvesting Forest	28
Animal Feeding Operations	4
Pasture	87
Crop	1,090
Nursery	57
Regulated Urban (MS4)	1,419
Regulated Urban (Construction)	1,319
Regulated Urban (Extractive)	44
Industrial Point Sources	0
Municipal Point Sources	4
Total Baseline	4,418

Source: MDE 2019.

Most of the sediment load is from regulated urban land (63 percent) and crop land (25 percent). The next largest sediment sources are forest (8 percent).

Technical Approach

The TMDL was developed using a modeling approach to identify a sediment loading threshold consistent with support of aquatic life. Average annual edge-of-stream (EOS) loading rates were identified for seven reference (unimpaired) watersheds using the Chesapeake Bay Program's Phase 5.3.2 watershed model.

Because the Piscataway Creek watershed lies almost entirely within the Coastal Plain region, reference watersheds that were identified as supporting aquatic life were selected from the same region (non-tidal Coastal Plain). The reference watershed loads were all normalized by a constant background condition, the all-forested watershed condition. The normalized load represents how many times greater the current watershed sediment load is than the all-forested sediment load. The forest-normalized sediment load for this TMDL is calculated as the current watershed sediment load divided by the all-forested sediment load.

Seven reference watersheds were selected and the forest-normalized sediment loads were calculated using CBP P5.3.2 2009 Progress Scenario EOS. The median value of the reference watershed forest-normalized sediment loads (3.9) was calculated and established as the sediment loading threshold for the TMDL. Section 4.2 of the draft TMDL provides an overview of the methodology.

The forest-normalized sediment load for the Piscataway Creek watershed (estimated as 5.4) was calculated using CBP P5.3.2 2009 Progress Scenario land use because it is used as the baseline year in the Chesapeake Bay TMDL. A comparison of the Piscataway Creek watershed forest-normalized sediment load to the forest-normalized reference sediment load (also referred to as the sediment loading threshold) demonstrates that the watershed exceeds the sediment loading threshold, indicating that it is receiving loads that are above the maximum allowable load that it can sustain and still meet water quality standards.

Allocations

The future conditions of maximum allowable sediment loads that will be at a level to support aquatic life (TMDL scenario) is calculated as the product of the sediment loading threshold (from reference watersheds) and the Piscataway Creek all-forested sediment load. Table 2 provides the watershed baseline, TMDL loads, and percent reduction.

Table 3. Baseline and TMDL loads and percent reduction

Baseline Load (ton/yr)	TMDL (ton/yr)	Percent reduction
4,418	3,220	27%

Source: MDE 2018

Cropland, nursery and pasture were identified as the predominant nonpoint sources in the watershed and require reductions. Other nonpoint sources contributed less than 1 percent of the total sediment load and do not require load reductions.

The wasteload allocation (WLA) is allocated between wastewater and stormwater. Wastewater permits with specific TSS limits and flow information are assigned WLAs at their permit limits.

Table 3 provides the baseline and wasteload allocation (WLA) for the regulated stormwater sediment load. In the accompanying technical memorandum related to significant point sources in the Piscataway Creek watershed, a specific WLA is specified for the Prince George’s County Phase I municipal separate storm sewer system (MS4) and other NPDES stormwater permissess (Table 4). To determine these further breakdowns of the WLA by MS4, the Maryland Department of Planning (MDP) urban land use was applied to further refine the CBP P5.3.2 urban land use. The methodology to refine urban land by permittee is described separately (MDE 2011).

Table 4. MS4 sediment baseline load, WLA, and percent reduction

Baseline Load (ton/yr)	WLA (ton/yr)	Percent reduction
2,782	1,870	33%

Source: MDE 2018.

Table 5. Specific WLAs for MS4s

Permittee	Baseline Load (ton/yr)	WLA (ton/yr)	Percent reduction
Prince George’s County Phase I MS4	1,085	535	51
SHA Phase I MS4	74	36	51
State and Federal Phase II MS4s	253	124	51
Other NPDES Regulated Stormwater	1,370	1,175	14
Total	2,782	1,870	33

Source: MDE 2018.

Reference

MDE (Maryland Department of the Environment). 2011. CBP P5.3.2 Land-Use and MDE Urban Source Sector Delineation – Development Methodology. Baltimore, MD. Maryland Department of the Environment.

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