

Technical Memorandum

Nonpoint Sources of Sediment in the Non-Tidal Patuxent River Lower Watershed

The U.S. Environmental Protection Agency (USEPA) requires that Total Maximum Daily Load (TMDL) allocations account for all sources of each impairing pollutant (CFR 2012). This technical memorandum identifies the nonpoint sources of sediment in the Patuxent River Lower watershed. Detailed allocations are provided for those nonpoint sources included within the Patuxent River Lower Sediment TMDL Load Allocations (LAs). These are conceptual values that are designed to meet the TMDL thresholds. The State reserves the right to allocate the sediment TMDL among different sources in any manner that is reasonably calculated to protect the designated uses of the non-tidal Patuxent River Lower from sediment related impacts.

The Patuxent River Lower watershed sediment TMDL is presented in terms of an average annual load established to ensure the support of aquatic life. Since there are no specific numeric criteria in Maryland that quantify the impact of sediment on the aquatic life of non-tidal stream systems, a reference watershed approach will be used to establish the TMDL. In order to use a reference watershed approach for this TMDL, sediment loads are estimated using a watershed model. For this analysis, the Chesapeake Bay Program Phase 5.3.2 (CBP P5.3.2) watershed model was chosen. The nonpoint source sediment loads generated within the Patuxent River Lower watershed are calculated as edge-of-stream (EOS) loads and represent a long-term average loading rate. Individual land-use EOS baseline loads are calculated as a product of the land-use acreage and the average annual simulated sediment loading rates (tons/ac/yr) from the 2009 Progress Scenario (USEPA 2010). The 2009 Scenario represents 2009 land-use, loading rates, and best management practice (BMP) implementation simulated using precipitation and other meteorological inputs from the period 1991 - 2000 to represent variable hydrological conditions. The 1991 – 2000 simulation period was used to set the baseline loading rates in the 2010 Chesapeake Bay TMDLs. Further details of the nonpoint source sediment load calculations can be found in Sections 2.2, 4.2, and 4.3 of the main TMDL report.

Individual LAs for each nonpoint land-use sector were calculated using the allocation methodology in the MD Phase I WIP, which was designed to be equitable, effective, and consistent with water quality standards (MDE 2010). The allocations were calculated by applying equal reductions to the *reducible* loads of all predominant land use sectors. The *reducible* load is defined as the difference between the No Action (NA) scenario and the “Everything, Everyone, Everywhere” (E3) scenario. The NA scenario represents current land-uses without any sediment controls applied, while the E3 scenario represents an application of all possible BMPs and control technologies to current land-use. For more detailed information regarding the calculation of the LA, please see *Maryland’s Phase I Watershed Implementation Plan for the Chesapeake Bay Total Maximum Daily Load*.

In the Patuxent River Lower watershed, unregulated urban land and crop land were identified as the predominant nonpoint sources requiring reductions in the watershed. Other land uses that individually contributed less than 1% of the total sediment load were not reduced as they would

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produce no discernible reductions. Forest is not assigned reductions, as it represents the most natural condition in the watershed. Sediment loads from regulated lands in this watershed are permitted under the National Pollutant Discharge Elimination System (NPDES) and are considered a point source that must be included in the Waste Load Allocation (WLA) portion of a TMDL (USEPA 2002). Therefore, the reductions required from regulated urban land sediment loads are defined in the point source technical memorandum.

In December 2016, the Maryland Department of the Environment reached a tentative determination to issue a National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges from Small Municipal Separate Storm Sewer Systems (General Discharge Permit No. 13-IM-5500, General NPDES No. MDR055500). Urbanized areas of Calvert and Saint Mary’s Counties, as determined by the latest Decennial Census by the U.S. Census Bureau, will be included in the updated permit. Therefore, two analyses are presented in this tech memo—one where Calvert and Saint Mary’s Counties are entirely unregulated by an NPDES MS4 permit and one for when the General Permit for Small MS4s is finalized and a portion of Calvert and St Mary’s Counties’ urban land use is regulated. The table for each section, provides one possible scenario for the allocations of the nonpoint source sediment loads that will allow the TMDL for sediment to be met in the Patuxent River Lower watershed.

Section 1 – LAs Calculated Using Permit 03-IM-5500 for Small MS4s

Table 1-1: Patuxent River Lower Watershed Sediment TMDL Allocation by Nonpoint Source Category

General Land Use	Detailed Land-Use	Baseline Load (tons/yr)	TMDL (ton/yr)	Reduction (%)
	Forest	1,544	1,544	0
Forest	Harvested Forest	85	85	0
AFOs	Animal Feeding Operations	26	26	0
Pasture	Pasture	235	235	0
Nursery	Nursery	115	115	0
Crop	Crop	9,380	5,281	44
Unregulated urban	Unregulated urban	2,265	972	57
Total		13,650	8,258	40

¹The source categories represent aggregates of multiple sources (e.g., crop is an aggregate of conventional till, conservation till, and hay).

Section 2 – LAs Calculated Using Draft Permit 13-IM-5500 for Small MS4s

Table 2-1: Patuxent River Lower Watershed Sediment TMDL Allocation by Nonpoint Source Category

General Land Use¹	Detailed Land-Use¹	Baseline Load (tons/yr)	TMDL (ton/yr)	Reduction (%)
	Forest	1,544	1,544	0
Forest	Harvested Forest	85	85	0
AFOs	Animal Feeding Operations	26	26	0
Pasture	Pasture	235	235	0
Nursery	Nursery	115	115	0
Crop	Crop	9,380	5,281	44
Unregulated urban	Unregulated urban	1,800	773	57
Total²		13,186	8,060	39

¹The land use categories represent aggregates of multiple sources (e.g., crop is an aggregate of conventional till, conservation till, and hay).

²Individual values may not add to total load due to rounding.

REFERENCES

CFR (Code of Federal Regulations). 2012. *40 CFR 130.2(i)*.
http://edocket.access.gpo.gov/cfr_2011/julqtr/40cfr130.2.htm

MDE 2010 Reference

USEPA (U.S. Environmental Protection Agency). 2002. *Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs*. Washington, DC: U.S. Environmental Protection Agency.

_____. 2010. *Chesapeake Bay Phase 5.3 Phase 5.3 Community Watershed Model*. EPA 903S10002 - CBP/TRS-303-10. U.S. Environmental Protection Agency, Chesapeake Bay Program Office, Annapolis MD. December 2010. Also available at
<http://ches.communitymodeling.org/models/CBPhase5/documentation.php#p5modeldoc>.