

Technical Memorandum

Point 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 point sources of sediment in the Maryland 8-Digit (MD 8-Digit) Patuxent River Lower watershed. Detailed allocations are provided for those point sources included within the Patuxent River Lower Wastewater Wasteload Allocation (WLA) and National Pollutant Discharge Elimination System (NPDES) Stormwater WLA. The State reserves the right to allocate the TMDLs among different sources in any manner that is reasonably calculated to protect aquatic life 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. WLAs have been calculated for NPDES regulated individual municipal permits, general mineral mining permits, individual and general municipal separate storm sewer system (MS4) permits, the general permit for stormwater discharges from industrial activities, and the general permit for stormwater discharges from construction sites in the Patuxent River Lower watershed. The permits can be grouped into two categories, wastewater and stormwater.

The wastewater category includes those loads generated by continuous discharge sources whose permits have total suspended solids (TSS) limits (i.e., contributors to the watershed sediment load). Wastewater permits that do not meet these conditions are considered *de minimis* in terms of the total watershed sediment load. There is one municipal wastewater facility and one general mineral mining facility within the Patuxent River Lower watershed that contain TSS limits in their permit. The WLA for the wastewater permits is calculated based on their TSS limit and corresponding flow information (see Sections 2.2.2 and 4.6 of the main report for further details).

The stormwater category includes all NPDES regulated stormwater discharges, both general and individual. In the Patuxent River Lower watershed, these include the Anne Arundel, Charles, and Prince George's County Phase I jurisdictional MS4 permits, the Phase I State Highway Administration (SHA) MS4 permit, general Phase II stormwater permits, and general mineral mining permits (with no TSS limits). These stormwater permits are regulated based on Best Management Practices (BMPs) and do not include TSS limits. In the absence of TSS limits, the baseline loads for these NPDES regulated stormwater discharges are calculated based on the loads from the urban land use within the watershed. The associated WLAs are calculated by applying reductions to the urban land use loads. These calculations are described in more detail below.

Individual WLAs have been calculated for the Anne Arundel, Charles, and Prince George's County Phase I jurisdictional MS4 permits and the SHA Phase I MS4 permit. Aggregate WLAs have been calculated for the general Phase II NPDES stormwater permits and general mineral

FINAL

mining permits that do not include TSS limits. NPDES regulated Phase II stormwater permits include non-jurisdictional general MS4s, all industrial facilities permitted for stormwater discharges, and general construction permits. This aggregate WLA is referred to as the “Other NPDES regulated stormwater” WLA.

In this TMDL analysis, sediment loads are estimated using a watershed model. The watershed model chosen for the non-tidal Patuxent River Lower Sediment TMDL was the Chesapeake Bay Program Phase 5.3.2 (CBP P5.3.2) watershed model 2009 Progress Scenario *edge-of-stream* (EOS) sediment loads. Within this TMDL, the NPDES regulated stormwater baseline sediment loads are represented by the urban land-use EOS loads associated with the NPDES stormwater permits within the watershed. Urban land-use EOS loads are calculated within the CBP P5.3.2 watershed model as a product of the land use area, land use target *edge-of-field* (EOF) loading rate, and loss from the EOF to the main channel (i.e., sediment delivery factor). BMP data and reduction efficiencies are then subsequently applied to calculate the final EOS loads (USEPA 2010). Further details regarding general nonpoint source sediment load calculations can be found in Section 2.2.1 of the main report.

In order to calculate the NPDES stormwater WLA, MDE further refined the CBP P5.3.2 urban land-use. For any given watershed, the refined CBP P5.3.2 land-use contains the specific level of detail needed to determine individual WLAs for Phase I jurisdictional MS4s, the State Highway Administration (SHA) Phase I MS4, and Phase II jurisdictional MS4s, and an aggregate WLA for “Other NPDES Regulated Stormwater” entities. The methods used by MDE to refine the CBP P5.3.2 urban land-use are described within MDE’s documentation, *CBP P5.3.2 Land-Use and MDE Urban Source Sector Delineation - Development Methodology* (MDE 2011).

In order to achieve the estimated sediment load reductions required from urban land, which are necessary to meet the TMDL, current Phase I MS4 permits require the jurisdictions to retrofit 20% of existing impervious area where there is failing, minimal, or no stormwater management (estimated to be areas developed prior to 1985). That is, the jurisdiction needs to install/institute stormwater management practices to treat runoff from these existing impervious areas (MDE 2014). Extending these permitting requirements to all urban stormwater sources (i.e., not solely those sources regulated via Phase I MS4 permits) would require that all impervious areas developed prior to 1985 be retrofit at this pace. Additionally, MDE estimates that future stormwater retrofits will have, on average, a 65% TSS reduction efficiency (Claytor and Schueler 1997; Baldwin, Weammert, and Simpson 2007; Baish and Caliri 2009). By default, these retrofits will also provide treatment of any adjacent urban pervious runoff within the applicable drainage area (see Sections 4.5 and 4.6 of the main report for further details).

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

FINAL

and one for when the General Permit for Small MS4s is finalized and a portion of Calvert and Saint Mary’s Counties’ urban land use is regulated. In each section, the first table identifies the individual wastewater facilities that contribute to the watershed sediment load and provides the baseline load and allocation assigned to these facilities. The second table identifies all of the applicable NPDES stormwater permits in the Patuxent River Lower watershed. The third table provides the distribution of the NPDES Regulated Stormwater WLA in the Patuxent River Lower watershed amongst the permits identified in the second table.

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

Table 1-1: Patuxent River Lower Sediment TMDL Wastewater Point Source WLAs

Facility Name	NPDES #	Permit Type	Baseline Load (ton/yr)	WLA (ton/yr)	Reduction (%)	MDL (ton/day)
Northern High School WWTP	MD0052167	Municipal	1	1	0	0.0085
Chaney Enterprises – Prince Frederick	MDG499872	Mining	1	1	0	0.0002

Table 1-2: Patuxent River Lower Watershed NPDES Stormwater Permits

NPDES Permit #	Facility Name	NPDES Regulated Stormwater WLA Sector
MD0068306	Anne Arundel County	County Phase I MS4
MD0068284	Prince George’s County	County Phase I MS4
MD0068365	Charles County	County Phase I MS4
MD0068276	State Highway Administration	SHA Phase I MS4
MDG491702	Baystar Precast Corporation	Other NPDES Regulated Stormwater
MDG498010	Chaney Enterprises - Vincent Jenkins Tract	Other NPDES Regulated Stormwater
MDG490171	Ford/Rooney Pit-Percontee	Other NPDES Regulated Stormwater
MDG499856	Howlin Concrete, Inc. - Owings Batch Plant	Other NPDES Regulated Stormwater
MDG491091	Mechanicsville Aggregate & Ready Mix Concrete Plant	Other NPDES Regulated Stormwater
MDRC ²	MDE General Permit to Construct	Other NPDES Regulated Stormwater

Note: ¹ For the industrial stormwater permits, the permit number listed is the MDE permit application number.

² Permit does not have an NPDES number.

Table 1-3: Patuxent River Lower Sediment TMDL Allocations for NPDES Regulated Stormwater WLAs

NPDES Regulated Stormwater Sector	NPDES #	Baseline Load (ton/yr)	WLA (ton/yr)	Reduction (%)	MDL (ton/day)
Anne Arundel County Phase I MS4	MD0068292	14	5.5	61	0.02
Prince George's County Phase I MS4	MD0068284	126	49	61	0.2
Charles County Phase I MS4	MD0068365	86	33.5	61	0.1
SHA Phase I MS4	MD0068276	24	10	58	0.04
"Other NPDES Regulated Stormwater"	N/A	1,105	960	13	3.6
Total		1,355	1,058	22	4

Section 2 – WLAs Calculated Using Draft Permit 13-IM-5500 for Small MS4s**Table 2-1: Patuxent River Lower Sediment TMDL Wastewater Point Source WLAs**

Facility Name	NPDES #	Permit Type	Baseline Load (ton/yr)	WLA (ton/yr)	Reduction (%)	MDL (ton/day)
Northern High School WWTP	MD0052167	Municipal	1	1	0	0.0085
Chaney Enterprises – Prince Frederick	MDG499872	Mining	1	1	0	0.0002

Table 2-2: Patuxent River Lower Watershed NPDES Stormwater Permits

NPDES Permit #	Facility Name	NPDES Regulated Stormwater WLA Sector
MD0068306	Anne Arundel County	County Phase I MS4
MD0068284	Prince George's County	County Phase I MS4
MD0068365	Charles County	County Phase I MS4
MD0068276	State Highway Administration	SHA Phase I MS4
MDR055500	Calvert County	General Phase II MS4
MDR055500	Saint Mary's County	General Phase II MS4
MDG491702	Baystar Precast Corporation	Other NPDES Regulated Stormwater
MDG498010	Chaney Enterprises - Vincent Jenkins Tract	Other NPDES Regulated Stormwater
MDG490171	Ford/Rooney Pit-Percontee	Other NPDES Regulated Stormwater
MDG499856	Howlin Concrete, Inc. - Owings Batch Plant	Other NPDES Regulated Stormwater
MDG491091	Mechanicsville Aggregate & Ready Mix Concrete Plant	Other NPDES Regulated Stormwater
MDRC ²	MDE General Permit to Construct	Other NPDES Regulated Stormwater

Note: ¹ For the industrial stormwater permits, the permit number listed is the MDE permit application number.

² Permit does not have an NPDES number.

FINAL

Table 2-3: Patuxent River Lower Sediment TMDL Allocations for NPDES Regulated Stormwater WLAs

NPDES Regulated Stormwater Sector	NPDES #	Baseline Load (ton/yr)	WLA (ton/year)	Reduction (%)	MDL (ton/day)
Anne Arundel County Phase I MS4	MD0068292	14	5.5	61	0.02
Prince George's County Phase I MS4	MD0068284	126	49	61	0.2
Charles County Phase I MS4	MD0068365	86	33.5	61	0.1
SHA Phase I MS4	MD0068276	24	10	58	0.04
Calvert County Phase II MS4	MDR055500	252	108	58	0.4
Saint Mary's County Phase II MS4	MDR055500	212	90	58	0.4
"Other NPDES Regulated Stormwater"	N/A	1,105	960	13	3.6
Total		1,819	1,256	31	5

REFERENCES

Baish, A. S., and M. J. Caliri. 2009. *Overall Average Stormwater Effluent Removal Efficiencies for TN, TP, and TSS in Maryland from 1984-2002*. Baltimore, MD: Johns Hopkins University.

Baldwin, A. H., S. E. Weammert, and T. W. Simpson. 2007. *Pollutant Load Reductions from 1985-2002*. College Park, MD: Mid Atlantic Water Program.

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

Claytor, R., and T. R. Schueler. 1997. *Technical Support Document for the State of Maryland Stormwater Design Manual Project*. Baltimore, MD: Maryland Department of the Environment.

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.

_____. 2014. *Maryland's NPDES Municipal Stormwater Permits – Phase I*.
http://www.mde.state.md.us/programs/water/StormwaterManagementProgram/Pages/stormgen_permit.aspx

USEPA (U.S. Environmental Protection Agency). 2010. *Chesapeake Bay Phase 5.3 Community Watershed Model*. Annapolis, MD: U.S. Environmental Protection Agency, Chesapeake Bay Program Office. Also available at:
https://www.chesapeakebay.net/what/programs/modeling/phase_5.3_watershed_model