Technical Memorandum

Point Sources of Sediment in the Non-Tidal Patuxent River Middle 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 Middle watershed. Detailed allocations are provided for those point sources included within the Patuxent River Middle 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 Middle 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 industrial permits, individual municipal permits, individual and general municipal separate storm sewer system (MS4) permits, general mining permits, general industrial stormwater permits, and the general permit for stormwater discharges from construction sites in the Patuxent River Middle 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 are two industrial and four municipal wastewater facilities within the Patuxent River Middle watershed that have TSS limits in their permits. 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). Facilities that discharge directly into the tidal Patuxent River mainstem are not included in this analysis.

The stormwater category includes all NPDES regulated stormwater discharges, both general and individual. In the Patuxent River Middle watershed, these include the Anne Arundel and Prince George's County Phase I jurisdictional MS4 permits, the Phase I State Highway Administration (SHA) MS4 permit, and other general Phase II stormwater permits. 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 using the nonpoint source 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 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. 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.

The watershed model chosen for the non-tidal Patuxent River Middle 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 2010b). 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 applied to 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 2009). 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).

Table 1 identifies the individual wastewater facilities that contribute to the watershed sediment load and provides the aggregate baseline load and allocation assigned to these facilities. Table 2 identifies all of the applicable NPDES stormwater permits in the Patuxent River Middle watershed. Table 3 provides the distribution of the NPDES Regulated Stormwater WLA in the Patuxent River Middle watershed amongst the permits identified in Table 2.

Table 1: Patuxent River Middle Sediment TMDL Wastewater Point Source WLAs

Facility Name	NPDES #	Permit Type	Baseline Load (ton/yr)	WLA (ton/yr)	Reduction (%)	MDL (ton/day)
Brandywine Flyash Site	MD0054836	Industrial	3	3	0	0.02
Harwood Landfill, Inc.	MD0066087	Industrial	7	7	0	0.04
Boones MHP	MD0050903	Municipal	1	1	0	0.008
Tracey's Elementary School	MD0069582	Municipal	0.2	0.2	0	0.002
Lyons Creek Mobile Home Park WWTP	MD0053511	Municipal	1	1	0	0.009
NVA Properties, LLC	MD0052680	Municipal	0.5	0.5	0	0.004

Table 2: Patuxent River Middle 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
MD0068276	State Highway Administration	SHA Phase I MS4
MDG498042	Brandywine Ent/cross Trails Operation/	Other NPDES Regulated Stormwater
MDG490170	Lee Pit # 1	Other NPDES Regulated Stormwater
MDG499725	Reliable Contracting - Asphalt Plant	Other NPDES Regulated Stormwater
MDG493000	Rockhill Sand and Gravel Corp / Gudelsky Materials	Other NPDES Regulated Stormwater
MDR003258	Brandywine Flyash Site	Other NPDES Regulated Stormwater
MDR001841	City of Laurel DPW Maintenance Facility	Other NPDES Regulated Stormwater
MDR001750	Insurance Auto Auctions, Inc.	
MDRC	MDE General Permit to Construct	Other NPDES Regulated Stormwater

Table 3: Patuxent River Middle 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	MD0068306	162	71	56	0.2
Prince George's County Phase I MS4	MD0068284	158	69	56	0.2
SHA Phase I MS4	MD0068276	51	22	56	0.06
"Other NPDES Regulated Stormwater"	N/A	290	189	35	0.54
Total		**661**	**351**	**47**	**1**

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.

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