

Technical Memorandum

Significant Sediment Point Sources in the Patapsco River Lower North Branch Watershed

The U.S. Environmental Protection Agency (EPA) requires that Total Maximum Daily Load (TMDL) allocations account for all significant sources of each impairing pollutant (CFR 2008). This technical memorandum identifies the significant point sources of sediment in the Patapsco River Lower North Branch watershed. Detailed allocations are provided for those point sources included within the Process Water Waste Load Allocation (WLA) and National Pollutant Discharge Elimination System (NPDES) Regulated Stormwater WLA of the Patapsco River Lower North Branch TMDL Contribution (See Executive Summary of the main report for further description of the watershed TMDL Contribution). These are conceptual values that are designed to meet the TMDL thresholds. 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 Patapsco River Lower North Branch Watershed Sediment TMDL is presented in terms of an average annual load established to ensure that there will be no sediment impacts affecting aquatic health. The watershed was evaluated using two TMDL segments (See Sections 2.3, 2.4, and 4.2 – 4.6 of the main report for further details) with consideration of additional upstream loads from the South Branch Patapsco River (See Sections 2.1 and 2.2.3 of the main report for further details).

WLAs have been calculated for NPDES regulated individual industrial, individual municipal, individual municipal separate storm sewer systems (MS4s), general mineral mining, general industrial stormwater, and general MS4 permits in the Patapsco River Lower North Branch watershed. The permits can be grouped into two categories, process water and stormwater.

The process water category includes those loads generated by continuous discharge sources whose permits have Total Suspended Solids (TSS) limits. There are 12 process water permits in the Patapsco River Lower North Branch watershed. These include four individual industrial, two individual municipal, and six general mineral mining permits. The WLAs for these 12 process water permits are calculated based on their TSS limits (average monthly or weekly concentration values) and corresponding flow information (See Sections 2.2.2, 4.6, and Appendix B of the main report for further details). The process water permits are further divided into minor and major facilities, based on whether their design flow is greater or less than 1.0 Millions of Gallons per Day (MGD). The minor facilities are calculated as an aggregate WLA. All of the process water permits in the watershed are considered to be minor facilities. Therefore, only an aggregate allocation is provided.

The stormwater category includes all NPDES regulated stormwater discharges. There are 58 NPDES Phase I and Phase II stormwater permits identified throughout the Patapsco River Lower North Branch watershed. These include the Baltimore City Phase I jurisdictional MS4, the

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Baltimore County Phase I jurisdictional MS4, the Howard County Phase I jurisdictional MS4, the Carroll County Phase I jurisdictional MS4, the Anne Arundel county Phase I MS4, the Phase I State Highway Administration (SHA) MS4 permit, and other general Phase I and 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. These calculations are described in more detail below.

Individual WLAs have been calculated for the Baltimore City Phase I jurisdictional MS4, the Baltimore County Phase I jurisdictional MS4, the Howard County Phase I jurisdictional MS4, the Carroll County Phase I jurisdictional MS4, the Anne Arundel county Phase I MS4, and the SHA Phase I MS4 permit. An aggregate WLA has been calculated for the other general Phase I and II NPDES stormwater permits. Other NPDES regulated Phase I and Phase II stormwater permits include 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 computational framework chosen for the Patapsco River Lower North Branch watershed TMDL was the Chesapeake Bay Program Phase 5 (CBP P5) watershed model. Within this TMDL, the NPDES regulated stormwater baseline sediment loads are represented by the urban land use nonpoint source loads. These loads are calculated as the sum of the urban land use *edge-of-stream* (EOS) loads and represent a long-term average loading rate. Urban land use EOS loads are calculated as a product of the land use area, land use target loading rate, and loss from the *edge-of-field* (EOF) to the main channel (US EPA 2008). Further details regarding general nonpoint source sediment load calculations can be found in Section 2.2.1 of the main report.

TMDL allocations are developed for TMDL Segments 1 and 2 and the South Branch Patapsco River watershed independently. No reductions are applied to the upstream South Branch Patapsco River watershed, since it was concluded that sediment loads from the watershed do not have a negative impact on the aquatic health of the Patapsco River Lower North Branch mainstem. Additionally, since the current *forest normalized sediment load* for TMDL segment 1 is below the reference watershed *sediment loading threshold*, no reductions in sediment loads are needed within the segment (See Sections 4.2 - 4.6 of the main report for further details). Thus, in order to attain the TMDL loading cap, reductions are solely applied within TMDL segment 2 to the urban sediment sources (i.e., regulated stormwater), since urban land was identified as the most extensive predominant controllable sediment source in the segment.

Relative to the estimated sediment load reductions applied to urban land, which are necessary to achieve the TMDL, MDE currently requires that Phase I MS4s retrofit 10% of their existing impervious area where there is failing, minimal, or no stormwater management (estimated to be areas developed prior to 1985) within a permit cycle (five years) (i.e., Phase I MS4s need to install/institute stormwater management practices to treat runoff from these existing impervious areas) (MDE 2009b). Theoretically, 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,

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MDE estimates that future stormwater retrofits will have, on average, a 65% TSS reduction efficiency (Claytor and Schueler 1997; Baldwin et al. 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 order to determine the individual and aggregate WLAs to the Baltimore City Phase I jurisdictional MS4, the Baltimore County Phase I jurisdictional MS4, the Howard County Phase I jurisdictional MS4, the Carroll County Phase I jurisdictional MS4, the Anne Arundel county Phase I MS4, the SHA Phase I MS4 permit, and “Other NPDES regulated stormwater”, Maryland Department of Planning (MDP) urban land use was applied to further refine the CBP P5 urban land use. This methodology associates MDP urban land use classifications with the different types of NPDES regulated stormwater Phase I and II permits (MDE 2009).

In addition to the WLA value, a Maximum Daily Load (MDL) is also presented in this document for the aggregation of minor process water facilities and individual, as well as aggregate, NPDES stormwater sources. The calculation of the MDL is explained in Appendix C of *Total Maximum Daily Load of Sediment in the Patuxent River Upper Watershed, Baltimore City and Baltimore, Howard, Carroll and Anne Arundel Counties, Maryland*.

Tables 1 and 3 provide one possible scenario for the distribution of the average annual point source loads attributed to the process water and NPDES regulated stormwater point sources, respectively, in the Patapsco River Lower North Branch watershed. Additionally, Table 4 provides one possible scenario for the distribution of the annual point source loads attributed to the NPDES regulated stormwater point sources in TMDL Segment 2 only, as TMDL Segment 1 and the South Branch Patapsco River watershed received an informational allocation equivalent to their baseline loads (See Sections 4.2 - 4.6 of the main report for further details).

Table 1: Patapsco River Lower North Branch TMDL Allocations for Process Water Point Sources

Process Water Point Source	Baseline Load (ton/year)	WLA (ton/year)	MDL (ton/day)	Reduction (%)
Minor Facilities ¹	11.5	11.5	0.8	0.0

Note: ¹ Minor facilities are those with less than 1.0 MGD design flow. These facilities are not given individual allocations. Rather, an aggregate allocation is provided for all of the minor facilities.

Table 2: Facilities included in Minor Process Water Point Source WLA

Process Water Point Source	NPDES Permit Number
HERNWOOD LANDFILL - NORTHERN SITE	MD0063924
KOP-FLEX, INC.	MD0069094
SHA - HANOVER COMPLEX	MD0069469
MACHADO CONSTRUCTION COMPANY, INC.	MD0054585
MES - HOLIDAY MOBILE ESTATES WWTP	MD0053082
MES - WOODSTOCK JOB CORPS WASTEWATER	MD0023906
LAFARGE - MARRIOTTSVILLE QUARRY	MDG490220
JONES QUARRIES	MDG499703
THE BELLE GROVE CORPORATION	MDG499741
THE BELLE GROVE CORPORATION - THOMAS AVENUE	MDG499743
ROCKVILLE FUEL & FEED COMPANY - PLANT 5	MDG499770
VINCI PIT #1	MDG499881

Table 3: Patapsco River Lower North Branch TMDL Allocations for NPDES Regulated Stormwater Point Sources

NPDES Regulated Stormwater Point Source	NPDES Permit Number	Baseline Load (ton/year)	WLA (ton/year)	MDL (ton/day)	Reduction (%)
Anne Arundel County Phase I MS4	MD0068306	1,915.1	1,490.0	58.1	22.2
Baltimore County Phase I MS4	MD0068314	4,746.5	3,942.1	153.7	16.9
Baltimore City Phase I MS4	MD0068292	610.2	456.9	17.8	25.1
Howard County Phase I MS4	MD0068322	2,926.7	2,634.3	102.7	10.0
Carroll County Phase I MS4	MD0068331	5.2	5.2	0.2	0.0
SHA Phase I MS4	MD0068276	1,559.3	1,278.6	49.9	18.0
“Other NPDES Regulated Stormwater”	N/A	3,773.9	3,245.8	126.6	14.0
Total		15,536.8	13,052.9	509.1	16.0

Table 4: Patapsco River Lower North Branch TMDL Segment 2 Allocations for NPDES Regulated Stormwater Point Sources

NPDES Regulated Stormwater Point Source	NPDES Permit Number	Baseline Load (ton/year)	WLA (ton/year)	MDL (ton/day)	Reduction (%)
Anne Arundel County Phase I MS4	MD0068306	1,915.1	1,490.0	58.1	22.2
Baltimore County Phase I MS4	MD0068314	3,784.9	2,980.5	116.2	21.2
Baltimore City Phase I MS4	MD0068292	610.2	456.9	17.8	25.1
Howard County Phase I MS4	MD0068322	2,420.5	2,128.2	83.0	12.1
SHA Phase I MS4	MD0068276	1,475.7	1,194.9	46.6	19.0
“Other NPDES Regulated Stormwater”	N/A	3,426.0	2,898.0	113.0	15.4
Total		13,632.4	11,148.5	434.8	18.2

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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.
- 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.
- CFR (Code of Federal Regulations). 2008. *40 CFR 130.2(i)*.
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- MDE (Maryland Department of the Environment). 2009. *Memorandum: Maryland's Approach for Calculating Nutrient and Sediment Stormwater Wasteload Allocations in Local Nontidal Total Maximum Daily Loads and the Chesapeake Bay Total Maximum Daily Load*. Baltimore, MD: Maryland Department of the Environment.