

Technical Memorandum

Point Sources of Sediment in the Non-Tidal West River 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 West River watershed (MD 8-Digit 02131004). Detailed allocations are provided for those point sources included within the West River 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.

Point sources can be grouped into two categories, wastewater and stormwater. There are no wastewater permits in the non-tidal West River watershed that contribute to the watershed sediment load. Sediment loads from the Mayo Water Reclamation Facility and Smithsonian Environmental Research Center in the West River basin are not included in this analysis because they discharge into the tidal portion of the watershed, which is not included in this TMDL. Sediment loads from these facilities were addressed in the 2010 Chesapeake Bay TMDL for sediment in the Rhode River Mesohaline (RHDMH) segment.

The stormwater category includes all NPDES regulated stormwater discharges. WLAs have been calculated for individual municipal separate storm sewer systems (MS4) permits, the general permit for stormwater discharges from industrial activities, and the general permit for stormwater discharges from construction sites. In the West River watershed, these include the Anne Arundel County Phase I jurisdictional MS4 permit, the Phase I State Highway Administration (SHA) MS4 permit, and other general NPDES 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 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 County Phase I jurisdictional MS4 permit and the SHA Phase I MS4 permit. Aggregate WLAs have been calculated for other general NPDES stormwater permits. Other NPDES regulated stormwater permits include 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 order to use a reference watershed approach for this TMDL, sediment loads are estimated using a watershed model. The watershed model chosen for the non-tidal West River 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

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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 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).

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). These retrofits will assist with the effort to achieve the estimated sediment load reductions applied to urban land. 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 all of the applicable NPDES stormwater permits in the West River watershed. Table 2 provides the distribution of the NPDES Regulated Stormwater WLA in the West River watershed amongst the permits identified in Table 2.

Table 1: West River Watershed NPDES Stormwater Permits

NPDES Permit #	Facility Name	NPDES Regulated Stormwater WLA Sector
MD0068306	Anne Arundel County	County Phase I MS4
MD0068276	State Highway Administration	SHA Phase I MS4
MDR002167	Smith Brothers, Inc	Other NPDES Regulated Stormwater
MDRC ¹	MDE General Permit to Construct	Other NPDES Regulated Stormwater

Note: ¹N/A: Permit does not have a NPDES number.

Table 2: West River 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	MD0068306	288	226	22	1.1
SHA Phase I MS4	MD0068276	25	19	24	0.1
Other NPDES Regulated Stormwater	N/A	63	57	10	0.3
Total		376	302	20	1.5

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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.
- 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.
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- 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
<http://ches.communitymodeling.org/models/CBPhase5/documentation.php#p5modeldoc>