

Technical Memorandum

Point Sources of Sediment in the Non-Tidal Other West Chesapeake 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) Other West Chesapeake watershed. Detailed allocations are provided for those point sources included within the Other West Chesapeake 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 Other West Chesapeake 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, individual and general 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 Other West Chesapeake 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 within the Other West Chesapeake watershed that contributes to the overall sediment load. The WLA for 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 individual and general. Currently in the Other West Chesapeake 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 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.

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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 the other general NPDES stormwater permits. Other NPDES regulated 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 Other West Chesapeake 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 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).

In December 2016, the Maryland Department of the Environment, Water Management Administration (MDE\WMA) 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 County, as determined by the latest Decennial

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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 County is entirely unregulated by an NPDES MS4 permit and one for when the General Permit for Small MS4s is finalized and a portion of Calvert County’s 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 Other West Chesapeake watershed. The third table provides the distribution of the NPDES Regulated Stormwater WLA in the Other West Chesapeake watershed amongst the permits identified in the second table.

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

Table 1-1: Other West Chesapeake Sediment TMDL Wastewater Point Source WLAs

Facility Name	NPDES #	Permit Type	Baseline Load (ton/yr)	WLA (ton/yr)	Reduction (%)	MDL (ton/day)
U.S. Naval Research Lab. - Chesapeake Bay Detachment	MD0020168	Municipal	1	1	0	0.0085

Table 1-2: Other West Chesapeake 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
MDR001180 ¹	Anne Arundel County Roads - Friendship	Other NPDES Regulated Stormwater
MDR001335 ¹	SHA - Prince Frederick Maintenance Facility	Other NPDES Regulated Stormwater
MDR000146 ¹	U.S. Naval Research Lab. - Chesapeake Bay Detachment	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: Other West Chesapeake 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	MD0068306	290	196	33	1.2
SHA Phase I MS4	MD0068276	30	20	33	0.1
“Other NPDES Regulated Stormwater”	N/A	455	204	55	1.2
Total		775	420	46	2.5

Section 2 – WLAs Calculated Using Proposed Permit 13-IM-5500 for Small MS4s**Table 2-1: Other West Chesapeake Sediment TMDL Wastewater Point Source WLAs**

Facility Name	NPDES #		Baseline Load (ton/yr)	WLA (ton/yr)	Reduction (%)	MDL (ton/day)
U.S. Naval Research Lab. - Chesapeake Bay Detachment	MD0020168	Municipal	1	1	0	0.0085

Table 2-2: Other West Chesapeake 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
MDR055500	Calvert County	General Phase II MS4
MDR001180 ¹	Anne Arundel County Roads - Friendship	Other NPDES Regulated Stormwater
MDR001335 ¹	SHA - Prince Frederick Maintenance Facility	Other NPDES Regulated Stormwater
MDR000146 ¹	U.S. Naval Research Lab. - Chesapeake Bay Detachment	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 2-3: Other West Chesapeake 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	290	196	32	1.2
SHA Phase I MS4	MD0068276	30	20	33	0.1
Calvert County Phase II MS4	MDR055500	139	98	29	0.4
“Other NPDES Regulated Stormwater”	N/A	455	204	55	1.2
Total		914	518	43	2.9

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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.
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- 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.
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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>