Technical Memorandum

Significant Sediment Point Sources in the Bynum Run 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 2009). This technical memorandum identifies the significant point sources of sediment in the Bynum Run 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 Bynum Run Watershed Sediment TMDL. These allocations are designed to meet the TMDL threshold. The State reserves the right to allocate the TMDLs among different sources in any manner that protects aquatic life from sediment related impacts.

The Bynum Run 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 separate storm sewer systems (MS4s), general mineral mining, general industrial stormwater, and general MS4 permits in the Bynum Run 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 is one process water permit in the Bynum Run watershed. It is a general mineral mining discharge. The WLA for this process water permit is calculated based on its TSS limit (average monthly or weekly concentration value) and corresponding flow information (See Sections 2.2.2, 4.6, and Appendix B of the main report for further details).

The stormwater category includes all NPDES regulated stormwater discharges. There are seven NPDES Phase I and Phase II stormwater permits identified throughout the Bynum Run watershed. These include the Harford County Phase I jurisdictional MS4 permit, the Phase I State Highway Administration (SHA) MS4 permit, a general Phase II jurisdictional 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 Harford County Phase I jurisdictional MS4 permit and the SHA Phase I MS4 permit. Aggregate WLAs have been calculated for: 1) the Phase II jurisdictional MS4; and 2) the other general Phase I and II NPDES stormwater permits. Other NPDES regulated Phase I and 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 computational framework chosen for the Bynum Run watershed TMDL was the Chesapeake Bay Program Phase 5.2 (CBP P5.2) 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 e*dge-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 2009). Further details regarding general nonpoint source sediment load calculations can be found in Section 2.2.1 of the main report.

In order to attain the TMDL loading cap, reductions were only applied to the urban sediment sources, since urban land was identified as the only predominant controllable sediment source at 76.7% of the total watershed sediment load (see Table 4 of the main report). Additionally, all urban land in the Bynum Run watershed is considered to represent regulated stormwater sources (i.e., all urban stormwater is regulated via a permit),

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, 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 Harford County Phase I jurisdictional MS4, SHA MS4, Phase II jusrisdictional MS4s, and "Other NPDES regulated stormwater", Maryland Department of Planning (MDP) urban land use was applied to further refine the CBP P5.2 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 2009a).

In addition to the WLA value, a Maximum Daily Load (MDL) is also presented in this technical memorandum for the single process water facility 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 Bynum Run Watershed, Harford County,Maryland.*

Tables 1 and 2 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 Bynum Run watershed. The reductions required to meet this TMDL would entail that at a 65% TSS reduction efficiency, approximately 52% of the urban area (impervious and pervious) within the watershed that was developed prior to 1985 would need to be retrofit.

Table 1: Bynum Run TMDL Allocations for Process Water Point Source

Process Water Point Source	NPDES Permit Number	Baseline Load (ton/year)	WLA (ton/year)	MDL (ton/day)	Reduction (%)
LAFARGE - CHURCHVILLE QUARRY	MDG490896	41.0	41.0	0.25	0.0

Table 2: Bynum Run 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 (%)
Harford County Phase I MS4	MD0068268	2,852.1	2,291.3	93.9	19.7%
Phase II jurisdictional MS4	MDR055500	630.1	504.2	20.7	20.0%
SHA Phase I MS4	MD0068276	231.8	187.0	7.7	19.3%
"Other NPDES Regulated Stormwater"[1]	N/A	471.6	436.6	17.9	7.4%
Total		**4,185.7**	**3,419.2**	**140.2**	140.2

Note: 1. The "Other NPDES Regulated Stormwater" Baseline Load and WLA include sediment loadings from Urban Barren land use, which represents the permitted construction site baseline sediment load and WLA within the watershed. No reductions were applied to Urban Barren land use because such controls would produce no discernable water quality benefit, when the remaining point and nonpoint sources within the watershed comprise 97.0% of the total sediment load. Thus, the required reduction percentage for the "Other NPDES Regulated Stormwater" stormwater source category is slightly lower than the other stormwater source categories.

REFERENCES

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