

## Technical Memorandum

### *Significant Sediment Point Sources in the Jones Falls Watershed*

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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 Jones Falls 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 Jones Falls Watershed Sediment TMDL. 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 Jones Falls 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.

WLAs have been calculated for NPDES regulated individual municipal, individual municipal separate storm sewer systems (MS4s), general mineral mining, general industrial stormwater, and general MS4 permits in the Jones Falls 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 two process water permits in the Jones Falls watershed. These include 1 individual municipal and 1 general mineral mining permit. The WLAs for these 2 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. Both 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 21 NPDES Phase I and Phase II stormwater permits identified throughout the Jones Falls watershed. These include the Baltimore City Phase I jurisdictional MS4 permit, the Baltimore County Phase I jurisdictional MS4 permit, 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 the entirety of the reductions required to meet the TMDL to the urban land use. These calculations are described in more detail below.

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Individual WLAs have been calculated for both of the Baltimore City Phase I jurisdictional MS4 permit, the Baltimore County Phase I jurisdictional MS4 permit, 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 Jones Falls 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.

In order to attain the TMDL loading cap, reductions are applied to solely the urban sediment sources within the watershed (i.e., regulated stormwater), since urban land was identified as the most extensive predominant controllable sediment source.

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 the Baltimore City Phase I jurisdictional MS4 permit, the Baltimore County Phase I jurisdictional MS4 permit, the SHA MS4, 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 Jones Falls Watershed, Baltimore City and Baltimore County, Maryland*.

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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 Jones Falls watershed.

**Table 1: Jones Falls TMDL Allocations for Process Water Point Sources**

<b>Process Water Point Source</b>	<b>Baseline Load (ton/year)</b>	<b>WLA (ton/year)</b>	<b>MDL (ton/day)</b>	<b>Reduction (%)</b>
Minor Facilities <sup>1</sup>	2.4	2.4	0.02	0.0

**Note:** <sup>1</sup> 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**

<b>Process Water Point Source</b>	<b>NPDES Permit Number</b>
STEVENSON UNIVERSITY WWTP	MD0066001
ARUNDEL CORPORATION - GREENSPRING QUARRY	MDG490976

**Table 3: Jones Falls TMDL Allocations for NPDES Regulated Stormwater Point Sources**

<b>NPDES Regulated Stormwater Point Source</b>	<b>NPDES Permit Number</b>	<b>Baseline Load (ton/year)</b>	<b>WLA (ton/year)</b>	<b>MDL (ton/day)</b>	<b>Reduction (%)</b>
Baltimore County Phase I MS4	MD0068314	1,961.3	1,532.3	61.3	21.9
Baltimore City Phase I MS4	MD0068292	4,733.3	3,489.2	139.6	26.3
SHA Phase I MS4	MD0068276	209.1	163.7	6.5	21.7
“Other NPDES Regulated Stormwater”	N/A	1,176.8	899.7	36.0	23.6
<b>Total</b>		<b>8,080.5</b>	<b>6,084.9</b>	<b>243.4</b>	<b>24.7</b>

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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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- 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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- 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.