Technical Memorandum

Significant Sediment Point Sources in the Non-Tidal Lower Gunpowder Falls 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 2012a). This technical memorandum identifies the significant point sources of sediment in the Maryland 8-Digit (MD 8-Digit) Lower Gunpowder Falls watershed. Detailed allocations are provided for those point sources included within the Lower Gunpowder Falls Process Water 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 Lower Gunpowder Falls 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, general MS4 permits, and the general permit for stormwater discharges from construction sites in the Lower Gunpowder 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 (i.e., contributors to the watershed sediment load). Other permits that do not meet these conditions are considered *de minimis* in terms of the total watershed sediment load. There are four municipal Wastewater Treatment Plants (WWTPs) within the Lower Gunpowder Falls watershed that contribute to the overall sediment load. There are no individual industrial process water permits.

The WLAs for these process water permits are calculated based on their TSS limits and corresponding flow information (See Sections 2.2.2 and 4.6 of the main report for further details). Municipal process water permits can be further divided into minor and major facilities, based on whether their design flow is greater or less than 0.5 Millions of Gallons per Day (MGD).

The stormwater category includes all NPDES regulated stormwater discharges, both general and individual. In the Lower Gunpowder Falls watershed, these include 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 reductions to the urban land use. These calculations are described in more detail below.

Individual WLAs have been calculated for the Baltimore County Phase I jurisdictional MS4 permit and the SHA Phase I MS4 permit. Aggregate WLAs have been calculated for 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.

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 Lower Gunpowder Falls 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 (US EPA 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 and aggregate WLAs for county Phase I jurisdictional MS4s, the State Highway Administration (SHA) Phase I MS4, Phase II jurisdictional MS4s, and "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 10% of existing impervious area where there is failing, minimal, or no stormwater management (estimated to be areas developed prior to 1985) every permit cycle (five years) (*i.e.*, 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 *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).

Table 1 identifies the individual process water facilities that contribute to the watershed sediment load and provides the aggregate baseline load and allocation assigned to these facilities. Table 2 identifies all of the applicable NPDES stormwater permits in the Lower Gunpowder Falls watershed. Table 3 provides the distribution of the NPDES Regulated Stormwater WLA in the Lower Gunpowder Falls watershed amongst the permits identified in Table 2.

Table 1: Lower Gunpowder Falls Sediment TMDL Process Water Point Source WLAs

Facility Name	NPDES #	Permit Type	WLA Type	Baseline Load (ton/yr)	WLA (ton/yr)	Reduction (%)
Glen Arm WWTP & WTP	MD0067903	WMA2	Aggregate	8	8	0
Glen Meadows Retirement Community	MD0022951	WMA2	Aggregate			
United Container Acquisition Building Business Trust WWTP	MD0024635	WMA2	Aggregate			
Richlyn Manor WWTP	MD0022713	WMA2	Aggregate			

Table 2: Lower Gunpowder Falls Watershed NPDES Stormwater Permits

NPDES Permit #[1]	Facility Name	NPDES Regulated Stormwater WLA Sector
MD0068314	Baltimore County	County Phase I MS4
MDR068276	State Highway Administration	SHA Phase I MS4
MDR001971	Baltimore County Bureau of Highways Shop 7-2	Other NPDES Regulated Stormwater
MDR002052	Baltimore County Public Schools – Providence Road Bus Lot	Other NPDES Regulated Stormwater
N/A	MDE GENERAL PERMIT TO CONSTRUCT	Other NPDES Regulated Stormwater

Note: [1]N/A: Permit does not have an NPDES number. For the industrial stormwater permits, the permit number listed is the MDE permit application number.

Table 3: Lower Gunpowder Falls Sediment TMDL Allocations for NPDES Regulated Stormwater WLAs

NPDES Regulated Stormwater Sector	NPDES #	Baseline Load (lbs/yr)	WLA (lbs/year)	Reduction (%)
Baltimore County Phase I MS4	MD0068314	3,095	1,009	67
SHA Phase I MS4	MDR055501	163	53	67
"Other NPDES Regulated Stormwater"	N/A	1,061	794	30
Total		**4,319**	**1,858**	**57**

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). 2012a. *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.

_____. 2009. *Maryland's NPDES Municipal Stormwater Permits – Phase I*. http://www.mde.state.md.us/Programs/WaterPrograms/SedimentandStormwater/storm_gen_permit.asp (Accessed December, 2009).

US EPA (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