

Technical Memorandum

Significant Phosphorus Point Sources in the Upper Monocacy River 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 2011). This technical memorandum identifies the significant point sources of phosphorus in the Upper Monocacy River watershed. Detailed allocations are provided for those point sources included within the National Pollutant Discharge Elimination System (NPDES) Process Water Waste Load Allocation (WLA) and Regulated Stormwater WLA of the Upper Monocacy River TMDL Contributions (See Executive Summary of the main report for further description of all watershed TMDL contributions and allocations). The WLA also includes an allocation to concentrated animal feeding operations (CAFOs), but the WLA for CAFOs is not presented here in more specific detail than in the main report. The State reserves the right to allocate the TMDLs among different sources in any manner that is reasonably calculated to protect aquatic life from nutrient related impacts.

The Upper Monocacy River Watershed Phosphorus TMDLs are presented in terms of an average annual load established to be protective of aquatic health. WLAs have been calculated for NPDES regulated individual industrial, individual municipal, individual municipal separate storm sewer systems (MS4s), general industrial stormwater, and general MS4 permits in the Upper Monocacy River watershed. The permits can be grouped into two categories, process water and stormwater.

The NPDES process water category includes those loads generated by the following continuous discharge sources: (1) major publically-owned wastewater treatment plants (WWTPs) (facilities with flow of 0.5 MGD or more) that are slated for Enhanced Nutrient Removal (ENR); (2) minor municipal WWTP (facilities discharging less than 0.5 MGD) and industrial facilities whose permits have total phosphorus (TP) limits; (3) minor municipal WWTPs with no phosphorus permit limits; and (4) industrial facilities which, based on the process involved, are expected to discharge nutrients. There are seven industrial and ten municipal facilities permitted to discharge phosphorus in the Upper Monocacy River watershed. Three of the WWTPs are major facilities slated for ENR: Emmitsburg WWTP (MD002057); Taneytown WWTP (MD0020672); and Thurmont WWTP (MD0021121).

The WLAs for process water sources are based on the WLAs assigned to each facility under the Chesapeake Bay TMDL (EPA, 2010) and Maryland's Phase I and Phase II Watershed Implementation Plans (WIPs) (MDE 2010 and 2012, respectively). These WLAs are designed to meet the Phase II 2025 final implementation goal for the Bay TMDL. The WLAs are loading caps which are designed to accommodate future growth after full implementation of the Bay TMDL in 2025. The WLAs for major and minor municipal facilities with nutrient permit limits are calculated based on their phosphorus limits and design flow. The WLAs for the remainder of the minor municipal facilities are calculated based on their design flow or their projected 2020

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flow, whichever is less, and expected maximum phosphorus concentrations of 3 mg/l. Seven industrial facilities discharging process water in the Upper Monocacy River watershed have the capacity to discharge TP in their process water. Under the Chesapeake Bay TMDL, industrial facilities capable of discharging phosphorus in their process water were given WLAs based on the results of monitoring required by their permits and professional judgment. These WLAs were adopted for the Upper Monocacy River Phosphorus TMDL.

Table 1 provides one possible scenario for the distribution of the average annual phosphorus point source loads attributed to the process water point sources in the Upper Monocacy River watershed. Individual WLAs are given for major facilities and an aggregate WLA is given for all minor process water facilities in the watershed including both municipal and industrial facilities. See Sections 2.2.2 and 4.6 of the main report for further details.

The stormwater category includes all NPDES regulated stormwater discharges. There are seventeen NPDES Phase I and Phase II stormwater permits identified throughout the Upper Monocacy River watershed. These include both general Phase I and II stormwater permits. These stormwater permits are regulated based on Best Management Practices (BMPs) and do not include nutrient limits. In the absence of nutrient limits, the baseline loads for these NPDES regulated stormwater discharges are calculated using phosphorus loading rates and acreages from developed land-uses within the watershed. These calculations are described in more detail below.

Individual WLAs have been calculated for each of the Phase I county MS4 permits and the SHA Phase I MS4 permit. An aggregate WLA has been calculated for the general municipal Phase II NPDES stormwater permits for the cities of Thurmont and Emmitsburg. Other NPDES permits include stormwater from federal, state, mining and extractive operations, and land under construction, which are aggregated into one WLA and are referred to as the “Other NPDES regulated stormwater” WLA.

The computational framework chosen for the Upper Monocacy River watershed TMDL was the Chesapeake Bay Program Phase 5.3.2 (CBP P5.3.2) Watershed Model. Within this TMDL, the NPDES regulated stormwater baseline phosphorus loads generated within the Upper Monocacy River watershed are calculated from edge-of-stream (EOS) loads within the watershed and represent a long-term average loading rate. EOS loads are calculated as a product of the developed land-use acreage and the average annual simulated phosphorus loading rates (lbs/ac/yr) from the 2009 Progress Scenario (US EPA 2010b). The 2009 Scenario represents current land-use, loading rates, and BMP implementation, simulated using precipitation and other meteorological inputs from the period 1991-2000 to represent variable hydrological conditions. The 1991-2000 simulation period represents the baseline loading rates in the TMDL for Chesapeake Bay segments. Further details of the phosphorus load calculations from developed land can be found in Section 2.2.1 of the main report.

To determine the different NPDES stormwater WLAs, MDE has further refined the CBP P5.3.2 developed land-use. The refined CBP P5.3.2 land-use contains the specific level of detail needed to determine individual and aggregate WLAs for the Frederick County Phase I jurisdictional

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MS4, the Carroll County Phase I jurisdictional MS4, the SHA MS4, the Phase II jurisdictional MS4s, and “Other NPDES regulated stormwater”. The methods used by MDE to refine CBP P5.3.2 developed land-use are described within CBP P5.3.2 Land Use and MDE Urban Source Sector Delineation - Development Methodology (MDE 2009a).

In order to achieve the estimated phosphorus load reductions applied to urban land, which are necessary to meet the TMDL, current Carroll County and Frederick County 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 2009a). Extending these permitting requirements to all urban stormwater sources (*i.e.*, not solely those sources regulated via individual County 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 35% TP 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 2a provides a detailed list of all NPDES regulated stormwater discharges within the Upper Monocacy River watershed. Table 2b provides one possible scenario for the distribution of the average annual phosphorus point source loads attributed to NPDES regulated stormwater point sources in the Upper Monocacy River watershed. (See Sections 4.5 - 4.6 of the main report for further details).

In January 2009, Maryland implemented new regulations governing CAFOs (COMAR 26.08.01, 26.08.03, and 26.08.04), which were approved by the EPA in January, 2010. Under these regulations, CAFOs are required to fulfill the conditions of a general permit. These conditions include instituting a Comprehensive Nutrient Management Plan (CNMP) which meets the Nine Minimum Standards to Protect Water Quality (MDE 2009b). The general permit also prohibits the discharge of pollutants, including nutrients, from CAFO production areas except as a result of an event greater than the 25-year, 24-hour storm. Based on the TMDL methodology approach of applying an equal percent reduction to all controllable loads, the Upper Monocacy River Phosphorus TMDL does not require a reduction in phosphorus loads from CAFOs. (Table 3 provides the baseline load and WLA for CAFOs.)

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Table 1: Upper Monocacy River Phosphorus TMDL Allocations for Process Water Point Sources

NPDES Permit #	Facility	WLA TYPE		Flow (MGD)	Baseline Load (lb/yr)	WLA (lb/yr)
MD0020257	EMMITSBURG WWTP	Municipal	Individual	0.75	2,977	685
MD0020672	TANEYTOWN WWTP			1.1	3,697	1,005
MD0021121	THURMONT WWTP			1.0	845	914
MD0022683	CRESTVIEW ESTATES WWTP		Aggregate	N/A	2,912	1,802
MD0022900	LEWISTOWN SCHOOL WWTP					
MD0023230	MOUNT SAINT MARY'S UNIVERSITY					
MD0023922	VICTOR CULLEN CENTER WWTP					
MD0025089	WHITE ROCK WWTP					
MD0025119	FOXVILLE US NAVAL SUPPORT WWTP					
MD0058050	SHAMROCK RESTAURANT					
MD0050245	SHUFF'S MEAT MARKET, INC.	Industrial				
MD0052345	REDLAND BRICK, INC.					
MD2637K00	HUNTING CREEK FISHERIES					
MDG344550	WALSH FUEL					
MDG766135	KNOTT ATHLETIC COMPLEX					
MDG766215	OLE MINK FARM REC. RESORT					
MDG912397	SHEETZ STORE # 132					
Total					10,430	4,406

Note: Individual allocations may not add to total load due to rounding.

Table 2a: NPDES Regulated Stormwater Permits in the Upper Monocacy River Watershed

NPDES Permit #	Facility	NPDES Group
MDR055500	TOWN OF THURMONT MS4	Municipal Phase-II
MDR055500	TOWN OF EMMITSBURG MS4	Municipal Phase-II
MD0068276	FREDERICK COUNTY HIGHWAYS - THURMONT	County Phase-I
MD0068331	CARROLL COUNTY MS4	County Phase-I
MD0068357	FREDERICK COUNTY MS4	County Phase-I
MD0068276	STATE HIGHWAY ADMINISTRATION MS4	SHA Phase I
	MDE GENERAL PERMIT TO CONSTRUCT	Other NPDES Reg SW
02SW0062	FLOWSERVE CORPORATION	Other NPDES Reg SW
02SW0458	EVAPCO, INC.	Other NPDES Reg SW
02SW1743	TANEYTOWN WWTP	Other NPDES Reg SW
02SW1812	CHAZ'S USED AUTO PARTS & TOWING, INC.	Other NPDES Reg SW
02SW0443	MOORE BUSINESS COMMUNICATION SERVICES	Other NPDES Reg SW
02SW0991	HOME RUN, INC.	Other NPDES Reg SW
02SW1188	FEDERAL STONE INDUSTRIES, INC.	Other NPDES Reg SW
02SW1882	THURMONT WWTP	Other NPDES Reg SW
02SW1229	ROCKVILLE FUEL & FEED COMPANY - MONTGOMERY VAULT	Other NPDES Reg SW
02SW1344	SHA - THURMONT SHOP	Other NPDES Reg SW

Table 2b: Upper Monocacy River Phosphorus TMDL Allocations for NPDES Regulated Stormwater Point Sources

NPDES Regulated Stormwater Point Source	NPDES Permit Number	Baseline Load (lbs/yr)	TMDL (lbs/year)	Reduction (%)
Municipal Phase II MS4	MDR055500	10,174	9,878	3%
Carroll County Phase I MS4	MD0068331	1,427	1,353	5%
Frederick County Phase I MS4	MD0068357	7,425	7,131	4%
SHA Phase I MS4	MD0068276	2,469	2,404	3%
“Other NPDES Regulated Stormwater”		3,018	2,976	1%
Total		24,513	23,741	3%

Note: Individual allocations may not add to total load due to rounding.

Table 3: Upper Monocacy River Phosphorus TMDL Allocations for NPDES Regulated Concentrated Animal Feeding Operations

NPDES Regulated Animal Feeding Operations	Baseline Load (lbs/yr)	TMDL (lbs/year)	Reduction (%)
	379	379	0%

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