

## Technical Memorandum

### *Significant Phosphorus Point Sources in the Rock Creek 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 Rock Creek 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 Rock Creek TMDL Contributions (See Executive Summary of the main report for further description of all watershed TMDL contributions and allocations). 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 Rock Creek 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 Rock Creek 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 municipal 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 is one minor municipal facility and 18 minor industrial facilities permitted to discharge phosphorus in the Rock Creek watershed.

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 flow, whichever is less, and expected maximum phosphorus concentrations of 3 mg/l. The 18 industrial facilities discharging process water in the Rock Creek 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 or professional judgment. These WLAs were adopted for the Rock Creek Phosphorus TMDL.

## FINAL

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 Rock Creek watershed. An aggregate WLA is given for all minor municipal and industrial process water 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 34 NPDES Phase I and Phase II stormwater permits identified throughout the Rock Creek watershed, plus one “General Permit to Construct.” These include both individual Phase I and general Phase 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 the Montgomery County Phase I county MS4 permit and the SHA Phase I MS4 permit. An aggregate WLA has been calculated for the general municipal Phase II NPDES stormwater permits, including the town of Rockville. Other NPDES regulated stormwater permits include state and federal regulated developed land, all industrial facilities permitted for stormwater discharges, and general construction permits.

The computational framework chosen for the Rock Creek 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 Rock Creek 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 Montgomery County Phase I jurisdictional MS4, the SHA MS4, the Phase II jurisdictional MS4s, and “Other NPDES regulated stormwater,” which includes stormwater from federal state, and industrial facilities, mining and extractive operations, and land under construction. 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 Montgomery County Phase I MS4 permit requires the

## FINAL

jurisdiction 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 the Montgomery County Phase I MS4 permit) 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 Rock Creek 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 Rock Creek watershed. (See Sections 4.5 - 4.6 of the main report for further details).

Recent EPA regulations also require confined animal feeding operations (CAFOs) to have a NPDES permit. There are no CAFOs, however, in the Rock Creek watershed.

**FINAL**

**Table 1: Rock Creek Phosphorus TMDL Allocations for Process Water Point Sources**

NPDES Permit Number	Process Water Point Source	WLA TYPE		Baseline Load (lbs/yr)	TMDL Load (lbs/yr)
MD0020931	NIH ANIMAL CENTER	Municipal			
MD0025496	NATIONAL INSTITUTES OF HEALTH				
MD0062723	WMATA - MARINELLI ROAD				
MD0069035	W.M.A.T.A.- RED LINE P.S.				
MD0069825	LAUREL SAND & GRAVEL – SOUTHLAWN READY MIX				
MDG492212	LAFARGE - ROCKVILLE CONCRETE PLANT				
MDG492709	ROCKVILLE FUEL FEED COMPANY				
MDG499750	CLARK CONSTRUCTION GROUP – TUCKERMAN PLANT				
MDG499847	MONTGOMERY CONCRETE OPERATIONS LLC	Industrial	Aggregate	3,815	1,709
MDG766207	BAR-T RANCH SUMMER CAMP				
MDG766248	GARRETT PARK SWIMMING POOL ASSOC.				
MDG766448	FAIRWAYS CONDOS				
MDG766473	MILL CREEK TOWNE POOL				
MDG766474	BEL PRE RECREATION ASSOC.				
MDG766476	NORTH CHEVY SWIMMING POOL ASSOC.				
MDG766632	MONTGOMERY CENTURY CONDOMINIUM				
MDG766898	CONNECTICUT BELAIR CLUB, INC.				
MDG915049	SHELL STATION				
MDG918482	WHITE FLINT CROSSING				

**FINAL**

**Table 2a: NPDES Regulated Stormwater Permits in the Rock Creek Watershed**

NPDES Permit Number	Facility	NPDES Group
MD0068349	MONTGOMERY COUNTY MS4	County Phase I
MDR05550	CITY OF ROCKVILLE MS4	Municipal Phase II
MDR055501	MCCPC PARKS MS4 Phase II General Permit	Municipal Phase II
MD0068276	STATE HIGHWAY ADMINSTRATION MS4	SHA Phase I
	MDE GENERAL PERMIT TO CONSTRUCT	Other NPDES Reg SW
02SW0013	CITY OF ROCKVILLE MAINTENANCE YARD	Other NPDES Reg SW
02SW0262	MONTGOMERY COUNTY SOLID WASTE TRANSFER STATION	Other NPDES Reg SW
02SW0263	8309 TUJUNGA AVENUE CORPORATION - GUDE	Other NPDES Reg SW
02SW0277	MONTGOMERY COUNTY - GAITHERSBURG DEPOT	Other NPDES Reg SW
02SW0278	MONTGOMERY COUNTY - SILVER SPRING DEPOT	Other NPDES Reg SW
02SW0327	WMATA - SHADY GROVE METRORAIL YARD	Other NPDES Reg SW
02SW0334	M-NCPPC - SHADY GROVE MAINTENANCE YARD	Other NPDES Reg SW
02SW0335	M-NCPPC - MEADOWBROOK MAINTENANCE YARD	Other NPDES Reg SW
02SW0337	M-NCPPC ROCK CREEK REGIONAL PARK MAINTENANCE YARD	Other NPDES Reg SW
02SW0495	SP RECYCLING CORPORATION	Other NPDES Reg SW
02SW0523	MONTGOMERY COUNTY SCHOOLS - SHADY GROVE	Other NPDES Reg SW
02SW0668	MONTGOMERY SCRAP CORPORATION	Other NPDES Reg SW
02SW0905	ROCKVILLE GM USED AUTO PARTS	Other NPDES Reg SW
02SW1072	MCCORMICK PAINT WORKS COMPANY - ROCKVILLE	Other NPDES Reg SW
02SW1075	INTERSTATE BRANDS CORP. - ROCKVILLE	Other NPDES Reg SW
02SW1104	UNITED STATES POSTAL SERVICE - SUBURBAN VMF	Other NPDES Reg SW
02SW1118	ROB-DEE AUTO RECYCLERS, LLC	Other NPDES Reg SW
02SW1172	WILCOXON CONSTRUCTION, INC.	Other NPDES Reg SW
02SW1208	M-NCPPC - POPE FARM NURSERY	Other NPDES Reg SW
02SW1233	GEORGETOWN PAPER STOCK OF ROCKVILLE, INC.	Other NPDES Reg SW
02SW1233	U.S. ARMY - WALTER REED ARMY MEDICAL CENTER - FOREST GLEN ANNEX	Other NPDES Reg SW
02SW1237	MARYLAND CAST STONE, INC.	Other NPDES Reg SW
02SW1239	ROCKVILLE FUEL AND FEED COMPANY	Other NPDES Reg SW
02SW1245	SALVAGE SYSTEMS, INC.	Other NPDES Reg SW
02SW1323	SHA - KENSINGTON SHOP	Other NPDES Reg SW
02SW1348	TWO BROTHERS	Other NPDES Reg SW
02SW1382	BROOKVILLE AUTOMOTIVES, INC.	Other NPDES Reg SW
02SW1409	FEDERAL EXPRESS - ROCKVILLE	Other NPDES Reg SW
02SW1415	FRANCIS O. DAY COMPANY, INC. - SOUTHLAWN LN.	Other NPDES Reg SW
02SW1739	WSSC - LYTTONSVILLE GARAGE	Other NPDES Reg SW

**Table 2b: Rock Creek Watershed 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	1,349	903	33%
Montgomery County Phase I	MD0068306	12,503	8,089	35%
SHA Phase I MS4	MD0068276	1,142	773	32%
Other Regulated Stormwater		1,267	1,050	17%
<b>Total</b>		<b>16,261</b>	<b>10,815</b>	<b>33%</b>

## FINAL

## 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.
- 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.
- CFR (Code of Federal Regulations). 2011. *40 CFR 130.2(i)*.  
[http://edocket.access.gpo.gov/cfr\\_2011/julqtr/40cfr130.2.htm](http://edocket.access.gpo.gov/cfr_2011/julqtr/40cfr130.2.htm) (Accessed March, 2012).
- COMAR (Code of Maryland Regulations). 2012. *26.08*  
[http://www.dsd.state.md.us/comar/subtitle\\_chapters/26\\_Chapters.aspx#Subtitle08](http://www.dsd.state.md.us/comar/subtitle_chapters/26_Chapters.aspx#Subtitle08) (Accessed March, 2012).
- US EPA (U.S. Environmental Protection Agency). 2010a. *Chesapeake Bay Total Maximum Daily Load*. U.S. Environmental Protection Agency, Chesapeake Bay Program Office, Annapolis MD. December 2010.
- \_\_\_\_\_. 2010b. *Chesapeake Bay Phase 5.3 Community Watershed Model*. EPA 903S10002 - CBP/TRS-303-10. U.S. Environmental Protection Agency, Chesapeake Bay Program Office, Annapolis MD. December 2010. Also available at  
<http://ches.communitymodeling.org/models/CBPhase5/documentation.php#p5modeldoc>.
- MDE (Maryland Department of the Environment). 2009a. *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.
- \_\_\_\_\_. 2009b. General Discharge Permit for Animal Feeding Operations. Maryland Permit No. 09AF. NPDES Permit No. MDG01. Baltimore, MD: Maryland Department of the Environment.  
[http://www.mde.maryland.gov/programs/Land/SolidWaste/CAFOMAFO/Documents/www.mde.state.md.us/assets/document/waste/AFO\\_General\\_Permit.pdf](http://www.mde.maryland.gov/programs/Land/SolidWaste/CAFOMAFO/Documents/www.mde.state.md.us/assets/document/waste/AFO_General_Permit.pdf) (Accessed March, 2012).
- \_\_\_\_\_. 2010. *Maryland's Phase I Watershed Implementation Plan for the Chesapeake Bay Total Maximum Daily Load*. Baltimore, MD: Maryland Department of the Environment. Also Available at

**FINAL**

[http://www.mde.maryland.gov/programs/Water/TMDL/TMDLHome/Pages/Final\\_Bay\\_WIP\\_2010.aspx](http://www.mde.maryland.gov/programs/Water/TMDL/TMDLHome/Pages/Final_Bay_WIP_2010.aspx).

\_\_\_\_\_. 2012. Draft. *Maryland's Phase II Watershed Implementation Plan for the Chesapeake Bay Total Maximum Daily Load*. Baltimore, MD: Maryland Department of the Environment. Also Available at

[http://www.mde.state.md.us/programs/Water/TMDL/TMDLImplementation/Pages/DRAFT\\_PhaseII\\_WIPDocument\\_Main.aspx](http://www.mde.state.md.us/programs/Water/TMDL/TMDLImplementation/Pages/DRAFT_PhaseII_WIPDocument_Main.aspx).