

## Technical Memorandum

### *Significant Phosphorus Nonpoint Sources in the Antietam Creek Watershed*

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The US 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 nonpoint sources of phosphorus in the Antietam Creek watershed. Detailed allocations are provided for those nonpoint sources included within the Load Allocation (LA) portion of the Antietam Creek TMDL. The State reserves the right to allocate the phosphorus TMDLs among different sources in any manner that is reasonably calculated to protect aquatic life from nutrient related impacts.

The Antietam Creek Watershed Phosphorus TMDL is presented in terms of an average annual load established to be protective of aquatic health. The computational framework chosen for the Antietam Creek watershed TMDL was the Chesapeake Bay Program Phase 5.3.2 (CBP P5.3.2) Watershed Model. The nonpoint source nutrient loads generated within the Antietam Creek watershed are calculated as the sum of corresponding land-use edge-of-stream (EOS) loads within the watershed and represent a long-term average loading rate. Individual land-use EOS loads are calculated as a product of the land-use acreage and the average annual simulated phosphorus loading rates (lbs/ac/yr) from the 2009 Progress Scenario (US EPA 2010). 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 nonpoint source nutrient load calculations can be found in Section 2.2.1 of the main report.

In the Antietam Creek watershed, crop, pasture, animal feeding operations, and nurseries were identified as the predominant controllable nonpoint sources. Forest is the primary non-controllable source, as it represents the most natural condition in the watershed. Direct atmospheric deposition on water is a minor source which to a large extent originates outside the watershed. Atmospheric deposition will be reduced by existing state and federal programs and will not be addressed in this TMDL. Stormwater loads from developed land are regulated under the National Pollutant Discharge Elimination System (NPDES) and are considered a point source that must be included in the Waste Load Allocation (WLA) portion of a TMDL (US EPA 2002). Therefore, the reductions required from developed land phosphorus loads are defined in the point source technical memorandum.

Table 1 provides one possible scenario for the distribution of the annual phosphorus nonpoint source loads between different land-use categories in the Antietam Creek watershed. The source categories in Table 1 represent aggregates of multiple sources (e.g., crop source is an aggregate of high till, low till, and hay sources).

**Table 1: Antietam Creek Phosphorus TMDL Allocation by Nonpoint Source Category**

General Category	Nonpoint Source Category	Baseline Load (lbs/yr)	TMDL (lbs/yr)	Reduction (%)
Forest	Forest	4,298	4,298	0%
	Harvested Forest	167	167	0%
AFOs	Animal Feeding Operations	9,469	7,840	17%
Pasture	Pasture	10,999	9,882	10%
Crop	Crop	43,537	43,537	0%
Nursery	Nursery	1,593	1,475	7%
Septic	Septic	0	0	0%
Atmospheric Deposition	Non-tidal Atmospheric Deposition <sup>1</sup>	398	398	0%
<b>Total</b>		<b>70,461</b>	<b>67,598</b>	<b>4%</b>

<sup>1</sup> No reduction – based on 2025 federal atmospheric deposition strategies.

**REFERENCES**

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).

US EPA (U.S. Environmental Protection Agency). 2002. *Establishing Total Maximum Daily Load (TMDL) Wasteload Allocations (WLAs) for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs*. Washington, DC: U.S. Environmental Protection Agency.

\_\_\_\_\_. 2010. *Chesapeake Bay Phase 5.3 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>.