

## Technical Memorandum

### ***Significant Phosphorus Nonpoint 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 2010). This technical memorandum identifies the significant nonpoint sources of phosphorus in the Upper Monocacy River watershed. Detailed allocations are provided for those nonpoint sources included within the Load Allocation (LA) portion of the Upper Monocacy River 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 Upper Monocacy River Watershed Phosphorus TMDL is presented in terms of an average annual load established to ensure that there will be no nutrient impacts affecting aquatic health. The computational framework chosen for the Upper Monocacy River watershed TMDL was the Chesapeake Bay Program Phase 5.3 (CBP P5.3) Watershed Model. The nonpoint source nutrient loads generated within the Upper Monocacy River 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 area and the average annual simulated phosphorus yields (lbs/ac/yr), 1991-2000, from the 2009 Scenario (US EPA 2010). The 2009 Scenario represents current land use, loading rates, and BMP implementation simulated for the period 1985-2005 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 Upper Monocacy River watershed, crop, pasture, unregulated animal feeding operations, and nurseries were identified as the predominant nonpoint source controllable 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 and is not considered for reduction within the scope of this TMDL analysis. 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 Upper Monocacy River watershed. The source categories in Table 1 represent aggregates of multiple sources (e.g., crop source is an aggregate of high till, low till, hay, animal feeding operations, and nursery sources).

**Table 1: Upper Monocacy River Phosphorus TMDL Allocation by Nonpoint Source Category**

<b>General Category</b>	<b>Nonpoint Source Category</b>	<b>Baseline Load (lbs/yr)</b>	<b>TMDL (lbs/yr)</b>	<b>Reduction (%)</b>
Forest	Forest	10,983	10,983	0%
	Harvested Forest	452	452	0%
AFOs	AFOs	7,225	7,225	0%
Pasture	Pasture	20,055	19,891	1%
Crop	Crop	94,801	91,173	4%
Nursery	Nursery	19,460	19,211	1%
Septic	Septic	0	0	0%
Atmospheric Deposition	Non-tidal Atmospheric Deposition	737	737	0%
<b>Total</b>		<b>153,714</b>	<b>149,673</b>	<b>3%</b>

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

## REFERENCES

CFR (Code of Federal Regulations). 2010. *40 CFR 130.2(i)*.

[http://edocket.access.gpo.gov/cfr\\_2009/julqtr/40cfr130.2.htm](http://edocket.access.gpo.gov/cfr_2009/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>.