Technical Memorandum_____

Significant Nutrient Nonpoint Sources in the Chicamacomico River Watershed

EPA requires that Total Maximum Daily Load (TMDL) allocations account for all significant sources of each impairing pollutant. This technical memorandum identifies, in detail, the significant nonpoint sources of nitrogen (TN) and phosphorus (TP) in the Chicamacomico River and their distribution between different land uses. Details are provided for allocating nonpoint source loads for nutrients to different land use categories. These are conceptual values that are within the TMDL thresholds. However, Maryland Department of the Environment (MDE) expressly reserves the right to allocate the TMDLs among different sources in any manner that is reasonably calculated to achieve water quality standards.

TMDLs are being established in the Chicamacomico River watershed for both low-flow and average annual conditions. The nonpoint source loads that were used in the model account for both "natural" and human-induced components. Low-flow nonpoint source loads were based on in-stream monitoring data. Insufficient data are available to distribute the low-flow nonpoint source load among different land use categories.

The average annual nonpoint source loads were determined using land use loading coefficients. The land use information was based on 1997 Maryland Office of Planning data, with crop acreages refined by 1997 Farm Service Agency data. The total nonpoint source load was calculated by summing all of the individual land use areas and multiplying by the corresponding land use loading coefficients. The loading coefficients were based on the results of the Chesapeake Bay Watershed Model[1], a continuous simulation model. The Bay Model loading rates are consistent with what would be expected in the year 2000 assuming continued Best Management Practice (BMP) implementation at a level consistent with current progress of Maryland's Tributary Strategies for Nutrient Reduction. These loads reflect both natural and human sources, including atmospheric deposition, loads coming from septic tanks, loads coming from urban development, agriculture, and forest land.

These average annual loads served as the starting point from which reductions were simulated to meet water quality standards. Table 1A and Table 1B provide one possible scenario for the distribution of average annual nitrogen and phosphorus nonpoint source loads between different land use categories.

[1] U.S. EPA Chesapeake Bay Program, "Chesapeake Bay Program: Watershed Model Application to Calculate Bay Nutrient Loadings: Final Findings and Recommendations," and Appendices, 1996.

Table 1A

Nonpoint Source Nitrogen Loads
Attributed to Significant Land Uses for Average Annual TMDLs

Land Use Category	Percent of Nonpoint Source Load	Nonpoint Source Load (lb/yr)
Mixed Agricultural	48.2%	95,258
Forest and Other Herbaceous	46.7%	92,111
Urban	1.0%	1,988
Atmospheric Deposition[2]	4.1%	8,143
Total	100	197,500

Table 1B

Nonpoint Source Phosphorus Loads
Attributed to Significant Land Uses for Average Annual TMDLs

Land Use Category	Percent of Nonpoint Source Load	Nonpoint Source Load (lb/yr)
Mixed Agricultural	71.3%	9,693
Forest and Other Herbaceous	24.5%	3,330
Urban	0.7%	87
Atmospheric Deposition[2]	3.5%	477
Total	100	13,587

It must be noted that these loads are based on broad-scaled estimates. Efforts are underway to update the Chesapeake Bay model, and MDE anticipates that better estimates of land use and loading rates will be available in the future.

[2] The atmospheric deposition load is attributable to deposition only to surface water, atmospheric deposition to land surfaces is included in the loads attributed to mixed agriculture, forest and other herbaceous, and urban land uses.