

# Technical Memorandum

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## *Significant Nutrient Nonpoint Sources in the Fairlee Creek Watershed*

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EPA requires that TMDL allocations account for all significant sources. This technical memorandum identifies significant nonpoint sources and their distribution between different land use categories. The two nutrients, total nitrogen (TN) and total phosphorus (TP), are addressed by the TMDLs for the Fairlee Creek. Details are provided for identifying land use category contributions to nonpoint source loads. These are conceptual values that are within the TMDL thresholds for each nutrient. They represent viable individual allocations to each land use category. Maryland 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 Fairlee Creek watershed for both low flow and annual average conditions. The low flow nonpoint source loads are attributable to base flow contributions. The nonpoint source loads that were used in the water quality model account for both “natural” and human-induced components, and were based on in-stream monitoring data. For low flow conditions, insufficient data is available to distribute the nonpoint source load among different categories.

For annual average flow conditions, the 1991 nonpoint source loads were determined using land use loading coefficients. The land use information was based on 1990 Maryland Office of Planning 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 Model (U.S. EPA, 1991), which was a continuous simulation model. The Chesapeake Bay Program nutrient loading rates account for atmospheric deposition<sup>1</sup>, loads from septic tanks, and loads coming from urban development, agriculture, and forest land. The loading rates account for both “natural” and human-induced sources. The 1991 total nitrogen load coming from nonpoint sources is 88,526 lb/yr, and the total nonpoint source phosphorus load is 6,355 lb/yr.

The nonpoint source loads used in the average annual TMDLs are based on the loading coefficients from the Chesapeake Bay Model and estimated year 2000 land use. The loads were calculated using the same methodology as for the 1996 nonpoint source loads discussed above and in the Fairlee Creek TMDL documentation. Table 1 and Table 2 provide one possible scenario for the distribution of nitrogen and phosphorus nonpoint source loads between different land use categories. The tables are based on the nonpoint source loading distribution presented on pages 4 and 5 in the report *Total Maximum Daily Load of Nitrogen and Phosphorus for the Fairlee Creek*, which was available for public comment from December 3, 1998 to January 4,

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<sup>1</sup> Atmospheric deposition directly to the water’s surface was considered to be insignificant because the surface area of the water in the Fairlee Creek Basin accounts for only for a small amount of the total surface area of the watershed. Atmospheric deposition to the land surface is accounted for in the land use loading coefficients. Atmospheric deposition directly to the water’s surface was not taken into account.

1999, and has been revised based on public comment and submitted to EPA Region III for approval.

**Table 1**  
**Nonpoint Source Nitrogen Loads Attributed to Significant Land Uses for Average Annual TMDLs**

<b>Land Use Category</b>	<b><u>Nitrogen</u></b>	
	<b>Percent of Nonpoint Source Load</b>	<b>Nonpoint Source Load (<i>lb/yr</i>)</b>
<b>Agricultural</b>	90%	71,440
<b>Forest</b>	7%	5,440
<b>Urban</b>	3%	2,610
<b>Total</b>	100%	79,490

**Table 2**  
**Nonpoint Source Phosphorus Loads Attributed to Significant Land Uses for Average Annual TMDLs**

<b>Land Use Category</b>	<b><u>Phosphorus</u></b>	
	<b>Percent of Nonpoint Source Load</b>	<b>Nonpoint Source Load (<i>lb/yr</i>)</b>
<b>Agricultural</b>	95%	5,510
<b>Forest</b>	1%	70
<b>Urban</b>	3%	200
<b>Total</b>	100%	5,780

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