

Technical Memorandum

Significant Phosphorus Point Sources in the Sassafras River Watershed

EPA requires that Total Maximum Daily Load (TMDL) allocations account for all significant sources of the impairing pollutant. The TMDL analysis for the Sassafras River addresses total phosphorus (TP) loads during low-flow conditions (May, 1 – October, 31) and average annual conditions. This technical memorandum identifies, in detail, the significant surface water discharges of TP used as modeling input when computing the TMDL.

It should be noted that various other point source allocations are feasible within the bounds of the TMDL. Actual effluent limits and related permit conditions will be established at the time of permit issuance or renewal and will be based upon conditions present at that time, as reflected in population projections, infrastructure needs, and appropriate concentrations and loadings needed to assure the maintenance of water quality standards. The 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.

Table 1 provides the point source phosphorus effluent inputs used in the water quality model to determine the maximum phosphorus load that the Sassafras River can accept during low-flow and annual average flow conditions. Figures A42-A49 for low flow and A50-A57 for average annual flow in Appendix A corresponds to the loads shown in this table. The water quality model requires additional information about other substances associated with point source effluents. Supplemental information for these other substances, as well as phosphorus, is shown in Table 2.

Table 1
Phosphorus Loads Attributed to Significant Point Sources Used to Compute the
Low-Flow (May – October) and the Average Annual Flow TMDL^a

Point Source Name	Permit Number	TP Load			Flow		Concentration <i>mg/l</i>
		<i>kg/day</i>	<i>lb/month</i>	<i>lb/yr</i>	<i>gpd</i>	<i>m³/s</i>	
Betterton	MD0020575	6.05	406	4,876	200,000	0.0088	8
Galena	MD0020605	2.42	162	1,948	80,000	0.0035	8
TOTAL	N/A	8.47	568	6,824	280,000	0.0123	N/A

^a These loadings correspond to the third and fourth model scenarios in the Draft report entitled “Total Maximum Daily Load of Phosphorus for Sassafras River, Cecil and Kent Counties, Maryland”, October 2001.

Table 2
Additional Point Source Loading Assumptions for Low Flow and
Annual Average Flow TMDLs

Parameter	Betterton	Galena
kg/day^b		
CBOD	6.7	8.7
NH₃	10.2	0.14
ON	2.2	0.15
NO₂₋₃	1.16	7.67
PO₄	5.05	1.88
OP	1.0	0.54
Minimum Effluent DO	5.0 mg/l	5.0 mg/l
Total Nitrogen	13.5 kg/day (18 mg/l)	8 kg/day (26 mg/l)
Total Phosphorus	6.05 kg/day (8 mg/l)	2.42 kg/day (8 mg/l)
Flow	0.0088 m ³ /s (200,000 gpd)	0.0035 m ³ /s (80,000 gpd)

NOTE: This table is supplied for those who wish to assess the WASP modeling. Thus, metric units are reported to facilitate such comparison. English units are used in the other, less technical tables to be consistent with reporting traditionally used to communicate with stakeholders in Maryland.

b. 1 kg = 2.2 lb Note that dissolved oxygen (DO) is expressed in milligrams per liter.