Technical Memorandum_____

Significant Nutrient Point Sources and Nonpoint Sources in the Transquaking River Watershed

EPA requires that Total Maximum Daily Load (TMDL) allocations account for all significant sources. This technical memorandum identifies, in detail, the significant surface water discharges of nutrients, and significant nonpoint sources and their distribution between different land uses. The two nutrients, total nitrogen (TN) and total phosphorus (TP) are addressed by the TMDLs for the Transquaking River. Modeling input information is provided for simulating all potentially significant point sources as discrete discharges. Details are provided for allocating nonpoint source loads for nutrients to different landuse categories. These are conceptual values that are within the TMDL thresholds. They represent viable individual allocations to each point source. 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.

TMDLs are being established in the Transquaking River watershed for both low-flow and average annual conditions. Tables 1A and Table 1B provide point source modeling information for low-flow and average annual TMDLs for TN and TP respectively. This is supplemented by Table 1C, which provides additional information attributed to each point source for the low-flow and average annual TMDL calculations.

Table 1A
Loads Attributed to Significant Point Sources for
Low-Flow and Average Annual Nitrogen TMDLs[a]

Source Name	**Permit Number**	**TN Load** *lbs/month*	**Flow** *mgd*	**Concentration** *mg/l*
Darling International, Inc	MD0003247	1,231	0.246	20

Table 1B
Loads Attributed to Significant Point Sources for
Low-Flow and Average Annual Phosphorus TMDLs[a]

Source Name	**Permit Number**	**TP Load** *lbs/month*	**Flow** *mgd*	**Concentration** *mg/l*
Darling International, Inc	MD0003247	123	0.246	2

[a] These loadings correspond to model scenarios 3 & 4 in the Draft TMDL *Total Maximum Daily Loads of Nitrogen and Phosphorus for the Transquaking River Dorchester County, Maryland*, November 1999.

Table 1C
Additional Assumptions for Low Flow and Average Annual TMDLs[a]

		Darling International Inc.
CBOD	*kg/d*	3.3
DO	*kg/d*	6.2
NH_3	*kg/d*	0.098
ON	*kg/d*	593.72
NO23	*kg/d*	376.54
PO_4	*kg/d*	2.564
OP	*kg/d*	2.698
Flow	*m^3/s*	0.0108
Total Nitrogen	*kg/d*	970.358
Total Phosphorus	*kg/d*	5.262

a. These conditions correspond to model scenarios 3 & 4 in the Draft TMDL *Total Maximum Daily Loads of Nitrogen and Phosphorus for the Transquaking River Dorchester, Maryland*, November 1999.
b. 1 kg = 2.2 lb

The loadings, concentrations, and flows represented in the tables above are for illustrative purposes only. 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 populations projections, infrastructure needs as defined in County Comprehensive Water and Sewer Plans, and appropriate concentrations and loadings needed to address impairments of the water quality limited segments identified by this TMDL and the applicable 303(d) list. The total of load reductions from all sources will, however, remain the same as the subtotals and grand totals reflected on the charts. Point source loadings, flows, and concentrations placed in permits will be based upon the information listed above as well as that provided during the permit adjudication process.

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. 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[1], which was a continuous simulation model. The Chesapeake Bay Program nutrient loading rates represent loads delivered to the stream, for the year 2000 assuming Best Management Practice (BMP) implementation at levels consistent with current Tributary Strategy progress, and account for atmospheric deposition, loads from septic tanks, and loads coming from urban development, agriculture, and forestland. These average annual loads served as the starting point from which reductions were simulated to meet water quality standards. Table 2A and Table 2B provide one possible scenario for the distribution of average annual nitrogen and phosphorus nonpoint source loads between different land use categories.

Table 2A
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	50.3%	206426
Forest and Other Herbaceous	43.7%	179356
Urban	1.8%	7466
Atmospheric Deposition[2]	4.3%	17481
Total	100	410,729

Table 2B
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	73.2%	21445
Forest and Other Herbaceous	22.1%	6487
Urban	1.2%	341
Atmospheric Deposition[2]	3.5%	1025
Total	100	29,298

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.

[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.

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