

Comment Response Document
Regarding the Total Maximum Daily Loads of Nitrogen, Phosphorus and Biochemical Oxygen Demand for Breton Bay, St. Mary's County, MD

The Maryland Department of the Environment (MDE) has conducted a public review of the proposed Total Maximum Daily Loads (TMDLs) of nitrogen, phosphorus and biochemical oxygen demand (BOD) for Breton Bay. The public comment period was open from March 23, 2005 through April 21, 2005. MDE received one set of written comments.

Below is a list of commentors, their affiliation, the date comments were submitted, and the numbered references to the comments submitted. In the pages that follow, comments are summarized and listed with MDE's response.

List of Commentors

Author	Affiliation	Date	Comment Number
Jennifer Murphy, Esq. Robert Albanese, Intern	Mid-Atlantic Environmental Law Center/ Widener University School of Law Clinic	April 21, 2005	1 through 7

Comments and Responses

1. The commentors state that the first paragraph of the TMDLs Executive Summary incorrectly lists biological oxygen demand ("BOD") as a nutrient. The commentor suggests revising the statement to define BOD appropriately.

Response: *Thanks. The phrase in question has been changed to "Breton Bay is impaired by nutrients (nitrogen, phosphorus) and BOD, causing occasional algal blooms and low dissolved oxygen".*

2. The commentors state that it is not clear from the text of the TMDL if the growing season allocations for nitrogen, phosphorus and BOD are included in the average annual flow allocations for nitrogen, phosphorus and BOD. The commentors suggest that the text of the TMDL should explicitly state if the growing season allocations are included in the average annual flow allocations or if the growing season allocations are in addition to the average annual flow allocations for nitrogen, phosphorus and BOD.

Response: *The average annual TMDLs apply to the entire year; however, during the May 1st – October 31st period (the algae growing season period) more stringent nutrient loadings limits apply. These additional limits ensure protection of water quality during the period when the waterbody is more sensitive to nutrients.*

The allocations for nutrients and BOD during the growing season are included in the annual allocations. Based on EPA's guidelines, when the TMDL nutrient limits are incorporated into NPDES discharge permits, the permittee is required to report both the monthly and

annual nutrient loads on a monthly basis to MDE all year round. The annual load will be checked by MDE to ensure that the nutrient load discharged is in compliance with the TMDL. This procedure, which includes EPA's permit review approval and a public participation process, has been routinely implemented in the issuance of MDE discharge permits since the completion of our first TMDL. MDE thanks the commentor for the suggestion, however, it is not necessary to change the text in the TMDL because the guidelines are already in place.

3. The commentors reference the United States Protection Agency (EPA) guidance document entitled, "Protocol for Developing Nutrient TMDLs" stating that it might be appropriate to measure the nutrient, nitrogen or phosphorus level and to measure an indicator such as chlorophyll *a* that relates to the designated use of the waterbody. The commentors state that the TMDL only addresses the use of indicators to monitor the nutrient levels for nitrogen and phosphorus. In addition, the commentors state that the data used by MDE to establish the nutrient TMDLs only consisted of chlorophyll *a* and dissolved oxygen (DO) data. The commentors further state that the development of the TMDLs and monitoring of the TMDL endpoint for nitrogen and phosphorus would be better determined through the use of chlorophyll *a* and DO indicators plus the direct measurement of nitrogen and phosphorus as suggested by EPA in the earlier reference. In addition, the commentors state that because the endpoint for nitrogen and phosphorus can be measured through direct measurement of nitrogen and phosphorus the failure to include such a requirement make the TMDL inadequate to protect water quality.

Response: *On page 4-1 of EPA's "Protocols for Developing Nutrient TMDLs", the EPA lists chlorophyll *a* as a suitable indicator for a nutrient TMDL. On pages 2-10 and 2-11, EPA also use the Port Tobacco River TMDL (prepared by MDE and approved by EPA in 1998) as an example to demonstrate how to use the indicators to set the end point of model run. In that TMDL, MDE had used chlorophyll *a* as well as D.O. as the TMDL indicators. In addition, after three years of research and deliberations with all the Region III States, the EPA Chesapeake Bay Program has also recommended WQ criteria for D.O., chlorophyll *a*, and clarity to protect aquatic life in the Bay instead of direct measurement of nutrients.*

4. The commentor states that the implicit margin of safety (MOS) that the EPA (sic) relied on was based on two conservative assumptions: the average monthly flow from the Leonardtown Wastewater Treatment Plant (WWTP) and a peak chlorophyll *a* concentration of 50 micrograms/liter ($\mu\text{g/l}$). The commentors further state that the use of the average monthly flow from the Leonardtown WWTP cannot constitute an implicit MOS. The commentors continue that the use of the difference between the WWTP's current discharge loadings and the permitted allowable loadings is not an implicit MOS. The commentors continue that the TMDL in no way restricts the WWTP from using its permitted flow. The commentors also state that the use of a peak chlorophyll *a* concentration of 50 mg/l (sic) cannot constitute an implicit MOS. The commentors continue that the MDE is attempting to use their goal concentration of 50 $\mu\text{g/l}$ for chlorophyll *a* as an implicit MOS for the development of the TMDL concluding that the goal concentration of 50 $\mu\text{g/l}$ for chlorophyll *a* should not be used as a conservative estimate for an implicit MOS because the goal concentration for the TMDL and the concentration for the implicit MOS are the same value.

Response: TMDLs are required to include a MOS to account for uncertainties in a manner that is conservative toward protecting the environment. There are no strict guidelines or methodologies provided by the EPA for selecting a MOS, except to suggest that a MOS may be an explicit value held aside or conservative assumptions built into the analysis. The margin of safety proposed in this TMDL analysis is based on other TMDLs approved by EPA and was adopted in consideration of built-in conservative assumptions of the analysis. The MOS for the TMDL was selected with the understanding that the analysis and the MOS may be revised in the future as better information comes available.

5. The commentors state that the explicit margin MOS for the nutrients that the MDE relied upon for both nitrogen and phosphorus was based solely on 5% of the agricultural nonpoint sources loading for the average annual flow allocations, and on 5% of the urban stormwater, agriculture, forest and air deposition for the growing season calculations. The commentors state that in order to account for the uncertainty of the modeling process for the average annual flow conditions and the growing season conditions, the explicit MOS should be based on 5% of the total urban stormwater, agriculture, forest, air deposition, and point sources for nitrogen and phosphorus.

Response: Please refer to response 4.

6. The commentors state that the explicit MOS for the BOD that MDE relied on for the TMDL is 5% of the loading from nonpoint sources. The commentors continue with given the uncertainty that the MDE acknowledged in the BOD nonpoint sources loading estimates and explicit MOS of 5% does not afford enough protection to Breton Bay. The commentors suggested that the MDE quantify the accuracy of their BOD nonpoint source loading estimates so that an appropriate explicit MOS that takes into account the accuracy of the nonpoint source loading estimates can be used in place of the 5% value that MDE is currently using.

Response: The estimation for current BOD loads from nonpoint sources was based on stream sampling data and local flow condition, which is an actual portrait for current condition. The estimated current loads were then analyzed through water quality model to determine the required reduction to keep the DO in the water body above the water quality standard. The 5% MOS is explicit with the maximum loads recommend by the model, thus the protection of water quality has been ensured.

7. The commentors state that MDE needs to verify the MOS allocations in the TMDL documentation or express how the 5% MOS was calculated because the commentors attempted to verify the calculations and could not.

Response: The MOS for both annual nitrogen and phosphorus is determined as follows: After the overall load reduction percentage determined by the water quality model, the recommended loads for all non-WWTP sources were allocated through the land use distribution followed by adjustments based on reduction attainability. For instance there will be no nutrient reductions for forest and the best reduction for air deposition is 20% on total nitrogen (no phosphorus reduction). Among the adjusted reduced load, 5% of the load

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from the agriculture was allocated as the MOS. The final load allocations were then determined after the subtraction of MOS (please refer to attached tables for detail).

Total Nitrogen (Annual)

	Current Load	Adj. Red. Load	Final Load	Red %
<i>urban</i>	77550	50160	50160	35.3
<i>agri</i>	140560	94266	89553	36.3
<i>forest</i>	25470	25470	25470	0.0
<i>air dep</i>	6099	4879	4879	20.0
MOS[#]			4713	
<i>total</i>	249679	174775	174775	30.0

Unit: lbs/yr

Total Phosphorus (Annual)

	Current Load	Re. Load	Adj. Load	Red%
<i>urban</i>	5016	3398	3398	32.3
<i>agri</i>	9951	6852	6510	34.6
<i>forest</i>	398	398	398	0.0
<i>air dep</i>	357	357	357	0.0
MOS[#]			343	
<i>total</i>	15722	11005	11005	30.0

Unit: lbs/yr

For BOD allocations, the MOS was calculated as 5% of the overall NPS allocation, since the loads were determined through actual stream data and are not separable (see below for calculation detail).

BOD (Growing Season)

5 % of the overall NPS allocation =

$$\frac{84 \text{ lbs/growing season}}{(1,548 \text{ lbs/yr} + 84 \text{ lbs/growing season})} \approx 5\%$$

*Because the MOS has to come from an allocation you must add it back to the NPS allocation, in order to calculate the 5%. Multiplying the NPS allocation after the subtraction of the MOS would be incorrect (i.e., 1,548 lbs/growing season *0.05 = 77.4 lbs/growing season).*

BOD (Annual)

5 % of the overall NPS allocation =

$$\frac{10,164 \text{ lbs/year}}{(202,520 \text{ lbs/yr} + 10,649 \text{ lbs/year})} \approx 5\%$$

*Again, because the MOS has to come from an allocation you must add it back to the NPS allocation, in order to calculate the 5%. Multiplying the NPS allocation after the subtraction of the MOS would be incorrect (i.e., 202,520 lbs/year *0.05 = 10,126 lbs/year).*