

Comment Response Document for the Phosphorus TMDL for Marshyhope Creek Dorchester and Caroline Counties, Maryland

Introduction

The Maryland Department of the Environment (MDE) has conducted a public review of the proposed Total Maximum Daily Load (TMDL) for Phosphorus in Marshyhope Creek. The public comment period was open from October 25, 2000 through November 27, 2000. MDE received 2 sets of written comments.

Below is a list of commenters, their affiliation, and the date they submitted comments. In the pages that follow, comments are summarized in conjunction with MDE's responses.

List of Commenters

Author	Affiliation	Date
James Stuhltrager, and Susan Mack	Widener University Environmental and Natural Resources Law Clinic, on behalf of the Sierra Club and the American Littoral Society; Earthjustice Legal Foundation on behalf of the Chesapeake Bay Foundation	11/27/00
Brandon P. Wright	Resident of Federalsburg, MD	11/22/00

Comments and Responses

1. One commentator questions the monthly limits proposed in the TMDL documentation, saying that failure to propose a *daily* load is inconsistent with the Clean Water Act.

Response: The Code of Federal Regulations (40 CFR 130.2(i)) states that "TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure." No explicit time period is required. The Environmental Protection Agency (EPA) acknowledges this in the recent preamble to their proposed TMDL regulations published in the Federal Register, August 23, 1999 (Volume 64, Number 162)] page 46031. Nevertheless, in order to assist the reader in understanding the magnitude of the loads involved the TMDL value is also shown as an average daily load.

2. One commentor questions the increase in phosphorus loads from point sources specifically questioning how the water quality can improve in such a case.

Response: First, MDE needs to clarify a typographical error that was made regarding the reported total low flow phosphorus load in 1998 on page A4. The correct load should read 1.3 kg/day not 1.3 lbs/day, which reflects approximately 86 lbs/month of phosphorus, not 40 lbs/month as indicated by the commentor.

The total phosphorus load from the three point sources does increase from the 1998 load to the point source waste load allocation stated in the TMDL. However, one must also note that the total flows are increasing from approximately 0.3 mgd in 1998 to 2.3 mgd in the TMDL, while the average phosphorus concentrations are decreasing from an approximate average of 1.14 mg/l to 0.72 mg/l. The reason the water quality is projected to improve is because the concentration of phosphorus is decreasing and there is no place in the waterbody system where the concentrations of these substances build up. The situation is most easily envisioned as a slightly larger river of improved water quality.

3. One commentor questions the inclusion of stream sediment deposited during higher flow periods and its effect on low flow stream water quality.

Response: Although the time-variable deposition of sediments due to changes in stream flow was not simulated explicitly, the steady-state application of the model used for this TMDL analysis did account for bottom sediment chemistry. The roles of bottom sediments, including the effects of prior sedimentation, were addressed in two ways in this TMDL analysis. First, baseline bottom chemistry was estimated on the basis of research literature and knowledge of the characteristics of the subject waterbody, which accounted for previously deposited sediments. Second, an estimation was made of the change in bottom chemistry that occurs as a result of changes in nitrogen and phosphorus concentrations, which affect the concentration of chlorophyll *a* and organic nitrogen and phosphorus and therefore the amount of organic matter settling to the bottom sediments.

To put the Department's choice of using a steady-state model into the proper context, sediment transport and fate processes are rarely simulated for eutrophication problems even when time-variable simulations are conducted. First, the ability to accurately simulate those processes, though improving, is limited. Second, many researchers think that the simulation of those processes for assessing eutrophication does not necessarily improve the analysis results. As an alternative, the simulation of an active sediment layer, which models the evolving sediment chemistry, but not the stream bed sediment movement, is generally the next level of sophistication beyond what was done in the present analysis. This later analytical approach is typically applied in situations where organic matter and nutrients in the bottom sediments accumulate over a long period, and one is interested in assessing the long-term recovery of the system. However, even to conduct this refined analytical approach, which would not simulate stream bed sediment transport, sediment properties must be

measured using non-routine methods that would entail significant costs and delay of this and other TMDLs.

Given the questionable benefits of explicitly simulating the stream bed sediment transport in this case, and EPA's approval of this methodology for similar TMDL analyses, the Department elected to conduct the analysis as it did.

4. One commentor questions whether the TMDL can achieve water quality standards because there is no adequate explanation of how the low flow nonpoint source reductions will be achieved. The commentor is concerned it may not be feasible to achieve required reductions, and that only surface runoff loads are being addressed.

Response: The allocations expressed in a TMDL are intended to serve as an outline of viable means for implementing the TMDL. MDE's rationale for not including a detailed implementation plan, which would address how the reductions would be achieved, within the TMDL documentation is to allow for a separate, thorough process, involving the appropriate stakeholders. MDE considers implementation issues during the TMDL development process, and establishes allocations at a level of detail that meet the intent of the law and meet the expectations of stakeholders to be involved in the future process of conceiving detailed TMDL implementation plans. Thus, rather than risk the appearance of imposing a detailed implementation plan from the top down, during the relatively short time-frame available for conducting the TMDL analysis, the Department's current approach preserves the many future options for implementing the TMDL goals.

MDE considers the issue of whether or not it is feasible to achieve the TMDL goals when developing TMDL allocations. MDE is obligated to establish TMDLs, even for extreme cases in which it is not feasible to achieve the stated goals. In such cases, the TMDL analysis serves to provide feed back information to the process of refining the water quality standards. That is, the detailed TMDL analysis might determine that a particular water quality goal is infeasible, thereby providing guidance for refining the water quality standards. In the Marshyhope Creek, it appears to be feasible to meet standards; however, it is likely to take many years for the effects of nonpoint source controls to be reflected in changes to the base-flow (groundwater) concentrations related to the low-flow TMDL.

5. One commentor questions the specific allocations of low flow nonpoint source loads, and remarks that MDE has provided allocations to nonpoint source categories in past TMDLs.

Response: MDE considers sub-allocations of nonpoint source loads to individual sources to be a detailed implementation issue, which is beyond the scope of this TMDL, as discussed above. The technical memoranda provided for previous TMDLs only included viable individual allocations to each land use category for average annual loads. The reference TMDL is for low flow only, and thus no allocations were included.

6. One commentor questions the accuracy of the model calibration plots and suggests the need for a model validation. The commentor also questions the data and the nonpoint source load assumptions used for the calibration of the model.

Response: The calibration plots for the mainstem of the river are reasonably accurate, and support results that are consistent with regulatory decision-making methods used elsewhere in Maryland. All available data was used for the calibration of the model. A high flow calibration of the model was also performed, and where applicable, the same model parameters and kinetic coefficients were used with only light, temperature, and flow values being changed. A second comprehensive set of low flow data was not available for validation of the model.

The assumptions made regarding the estimation of nonpoint source loads are very reasonable. Average data from two water quality monitoring stations, one in the upper watershed and one in the lower, was used to estimate the all of the nonpoint source boundary conditions (excepting three watersheds where actual data was available). This is more reasonable than using just the upper station as the commentor suggests due to the variation in land use among the 39 subwatersheds in the basin. The boundary conditions that MDE used are more representative of the whole watershed.

7. One commentor indicates that there are large uncertainties in the analysis. The commentor questions the rationale for selecting 1.7% as the margin of safety (MOS) and also asks that the Department clarify how these values were calculated.

Response: MDE should clarify that the MOS is calculated as a percentage of the load allocation or nonpoint source load, not the TMDL. The MOS for the Marshyhope Creek TMDL is 5% based on the load allocation.

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 the 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 MOS, may be revised in the future as better information becomes available.

8. One commentor remarks that the presentation of critical information is not easily accessible to the reader. The commentor requests that the TMDL document clearly show percent reductions for point and nonpoint source loads. Also, it was unclear to the commentor whether the 40% reduction

in nonpoint source loads was to the total nonpoint source load or the controllable nonpoint source load. The commentor also questions if the Department will base permits on the Department's water quality standard of 100 µg/l for chlorophyll *a* concentration or the Department's "goal" of 50 µg/l.

Response: The 1998 low flow point source loads used for the calibration of the model can be calculated from Table A5 in Appendix A. The baseline and TMDL low flow point source loads are presented in Table A12 of the Appendix and Table 1A of the Technical Memorandum respectively. The final point and nonpoint source loads are stated in the TMDL document and with these pieces of information, the reader can easily calculate the percent reductions.

The 40% reduction is to controllable nonpoint source loads as stated in the description of scenario 2.

Regarding the water quality standards for permit purposes, the chlorophyll *a* water quality endpoint expressed in the proposed TMDL is consistent with NPDES permitting practices. Hence, no "change" in general permit goals will be necessary. The point source implementation of this proposed TMDL will be consistent with the specific chlorophyll *a* goal.

9. One commentor voices concerns regarding the placement of the public notice in the newspaper.

Response: MDE is required to publish the TMDL public comment notice in the public notice section of the newspaper. MDE also sends out a copy of the public notice to a list of interested parties that results from the TMDL development process. The public notice is also published on MDE's web site (www.mde.state.md.us).

10. One commentor requests a public hearing into the TMDL so that members of the community may have questions answered that are not answered in the draft.

Response: MDE is willing to schedule a meeting outside the formal comment period to discuss the TMDL with the commentor. However, because MDE received no other requests for a hearing and because MDE has responded to commentor's concerns in the final TMDL, we believe a hearing is not warranted. The commentor's main concern was the location of water quality monitoring stations, which are shown in Figure 1 of the TMDL Main Document and in Figure A7 of the Appendix.