Comment Response Document for the Nitrogen and Phosphorus TMDL for Bohemia River Cecil County, MD

Introduction

The Maryland Department of the Environment (MDE) has conducted a public review of the proposed Total Maximum Daily Loads (TMDLs) for Nitrogen and Phosphorus in the Bohemia River. The public comment period was open from October 25, 2000 through November 27, 2000. MDE received 1 set of written comments.

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

List of Commentors

Author	Affiliation	DATE
James Stuhltrager, Susan D. 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

Comments and Responses

1. One commentor questions the accuracy of the model calibration plots near the mouth of the river, and the need for a model validation against a second set of data.

   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 second comprehensive set of low flow data was not available for validation 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.

2. One commentor questions the exclusion of the Cecilton Wasterwater Treatment Plant (WWTP) in the model analysis, while the associated load makes up approximately 40% of the TMDL. They also note that the draft TMDL fails to provide a comparison of recent WWTP discharges and future discharges.

Response: The Cecilton WWTP discharge was included in the model as a direct load to the mainstem of the Bohemia River. This may not have been clear in the Appendix because the flows and loads from the Cecilton Plant were combined with the nonpoint source flows and loads from the Black Duck Creek Watershed and appeared as only one set of flows and concentrations entering segment 5. Tables A9 and A11 were added to the Appendix to clearly indicate the contributions of the Cecilton WWTP separate from the nonpoint source load. With these revisions, the summer 1999 WWTP discharge can be seen in the above tables associated with the calibration of the model.

The future discharge used in the reference draft TMDL can been seen in the technical memorandum entitled "Significant Nutrient Point Sources in the Bohemia River Watershed."

3. One commentor 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.

4. Several commentors indicate that there are large uncertainties in the analysis. One commentor argues that the uncertainty would suggest the TMDL 5% margin of safety (MOS) seems too small. The commentor asks that the Department clarify how these values were calculated.

   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 explict 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.

5. One commentor questions whether the TMDL can achieve water quality standards because there is no adequate explanation on how the low-flow non-point 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, it was envisioned by the people who crafted the federal Clean Water Act that the TMDL analysis would serve to provide feed back information to the process of refining the water quality standards. That is, it was envisioned that 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 Bohemia River, 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.

6. 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' approval of this methodology for similar TMDL analyses, the Department elected to conduct the analysis as it did.

7. 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.

8. One commentor remarks that the presentation of critical information is not easily accessible to the reader. It was unclear to the commentor whether the 31% reduction in nonpoint source loads was to the total nonpoint source load or the controllable nonpoint source load, and what the overall reduction was. They requested the reduction be divided into nonpoint source categories. The commentor also requested a comparison of current and future nonpoint source loads.

   Response: The 31% reduction is to controllable nonpoint source loads as stated in the description of scenario 2. The overall nonpoint source load reduction is 23%. In reference to the distribution of reductions to specific nonpoint source categories, see comments #5 and #7.

   The 1999 low flow nonpoint source loads can be calculated from Tables A8 – A10 in Appendix A. The future nonpoint source low flow loads are presented in the TMDL main document in Table 2.