FINAL

Comment Response Document
Regarding the Total Maximum Daily Loads of Biochemical Oxygen Demand (BOD) and Total Phosphorus to an Unnamed Tributary and In-Stream Pond of La Trappe Creek to which the Trappe Wastewater Treatment Plant Discharges
Talbot County, Maryland

Introduction

The Maryland Department of the Environment (MDE) has conducted a public review of the proposed Total Maximum Daily Loads (TMDLs) of biochemical oxygen demand and total phosphorus to an unnamed tributary and in-stream pond of La Trappe Creek to which the Trappe Wastewater Treatment Plant discharges. The public comment period was open from November 27, 2002 to December 26, 2002. MDE received two sets 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
Ray Clarke, P.E.	Talbot County Department of Public Works	December 19, 2002	1 through 3
Patricia Gleason	U.S. Environmental Protection Agency	December 26, 2002	4 through 18

Comments and Responses

1. The commentor states a waste load allocation for nonpoint sources should be provided to the unnamed tributary and in-stream pond of La Trappe Creek.

   Response: In the phosphorus TMDL to protect the in-stream pond, there was an allocation given to the nonpoint sources because the chlorophyll *a* values reflect the average loading from point and nonpoint sources into the Pond over a period of time. The TMDLs for carbonaceous biochemical oxygen demand (CBOD) and nitrogenous biochemical oxygen demand (NBOD), however, are for low-flow conditions only. Observations in 1998 and in other years when the discharge site was visited indicate that there is flow upstream of the discharge point only during and immediately after precipitation events. Scenario 2, which represents average flow conditions for the period May 1 through September 30, includes nonpoint source loads. As can be seen in Figure 7 and in Table A10, there are no dissolved oxygen (DO) violations occurring, and no need to limit the nonpoint source loading. There is a need for a CBOD and NBOD TMDL only in the low-flow scenarios when no nonpoint source load occurs.

2. The commentor requests that some level of financial assistance be provided to local governments to comply with the TMDLs.

   Response: The Department is committed to following through on the implementation of TMDLs in coordination with the many stakeholders who will have a role. Because this topic is beyond the scope of the TMDL analysis for which comments are being solicited, we invite the commentor to engage us in further discussions on the matter outside of this comment process.

3. The commentor requests that a standard procedure be established by MDE for reporting water quality results to the County and the Town of Oxford in relation to the TMDLs.

   Response: The Department acknowledges the commentor's interest in obtaining water quality monitoring results in the future. The Department would be happy to discuss a specific procedure by which future monitoring results can be shared with the County and the Town of Oxford.

4. The commentor noted that the report text identifies 25 µg/l chlorophyll *a* as the endpoint, and as being in the lower range of eutrophy, while Appendix B states that the 25 µg/l represents what is probably the minimum chlorophyll a that can be achieved with the maximum level of technology at the wastewater treatment plant (WWTP) and maximum practical best management practices (BMPs). The commentor stated that the endpoint selection should be consistent throughout the document as based on water quality, not technical achievability. The commentor also requested rationale for the determination that managing the water body at this level is expected to meet water quality standards (e.g., was this the number used in the Minnesota study or is this based on MDE's experience with similar water bodies in Maryland?).

   Response: The previous reference in Appendix B to 25 µg/l as the maximum level of technology has been deleted in the October 28, 2002 version. The rationale for selecting 25 µg/l is given in Section 3.0 – Targeted Water Quality Goals. For similar ponds in Minnesota values of 30 – 90 µg/l TP have been used as goals. This corresponds to a chlorophyll *a* concentration of approximately 15 – 50 µg/l. The endpoint of 25 µg/l chlorophyll *a* is Maryland's interpretation of a narrative criterion as it applies to the special case of the impoundment on the UTLTC. The privately owned pond is on a small stream that would typically be dry in the summer were it not for the effluent from the treatment plant upstream. At 3.9 acres, the pond is smaller than 5 acres, deemed by Maryland to be the lower threshold size for defining significant impoundments for management purposes. The pond is not a major recreational attraction, and stakeholders living next to the pond would prefer to have the treatment discharge upstream to ensure year-round stream flow to the pond. (If treatment requirements become too costly, the treatment plant managers might be motivated to move the point of discharge to a location below the pond). The chlorophyll *a* endpoint of 25 µg/l is consistent with midrange of values used by Minnesota, and is the threshold used by the State of Virginia, also in EPA Region III. Given the special circumstances of this case, we judge the choice of 25 µg/l as an endpoint to be a reasonable application of Maryland's standards

5. The commentor recognized the use of 7Q10 (zero flow, in this instance) as the critical flow condition for the unnamed tributary of La Trappe Creek model. The commentor noted that the low-flow model scenarios use 0.144 MGD and 0.2 MGD flows for the WWTP; however, the 1998 data, which shows DO violations at monitoring station TRP 3, indicate that the WWTP was discharging between 0.043 and 0.055 MGD. The commentor requested a discussion of this discharge condition with respect to the critical flow condition model scenarios, and whether the TMDL will be protective in this case.

   Response: The model is calibrated to match the observed low DO readings measured at TRP3 in 1998, when the plant flows were only 0.043 –0.055 MGD. This is one reason that we believe the model is correct. In the case of intermittent streams, there is often no background flow available for dilution; therefore, similar effluent limitations are needed for both low flow such as occurred in 1998, as well as for the higher design flows. (In fact, because of the lower stream velocities and reaeration, lower DO values can be expected to occur with the lower flow). The low flows, however, reflect the previous lagoon operation, in which, because of evaporation, flows in the warm, dry summer periods are typically well below the average plant flow. Now that the lagoons have been abandoned, the summertime flows in the current plant should closely reflect the average plant flow of 130,000-140,000 gpd.

6. The commentor stated that, although the impairing substances were determined to be phosphorus for the In-Stream Pond and BOD in the stream, the secondary impacts of the implementation of the TMDL for one water body on DO levels in the other water body should be discussed.

   Response: Any measures taken to meet stricter point or nonpoint source allocations for either BOD and phosphorus should have a positive impact on both waterbodies. More specifically, reduction of the CBOD and NBOD required to meet the TMDL for the stream will also reduce the CBOD and NBOD loading going into the Pond. Although there was no observed oxygen problem in the Pond, this reduction in the load of oxygen-demanding material will make any future violations even more unlikely. Similarly, the requirement of the plant effluent to meet an extremely strict 0.3 mg/l TP limit necessitates the addition of chemical precipitation and filters in the treatment process of the WWTP. This should result in a reduction of the CBOD in the plant effluent to levels even below those needed to meet the CBOD TMDL, and, subsequently, further improve the stream DO.

7. The commentor requested an explanation regarding MDE's decision to establish TMDLs as monthly loads considering that the WWTP permit utilizes daily limits.

   Response: As required under the Section 122.45(d)(2), the WWTP permit utilizes monthly average loads for CBOD, NBOD, and TP, not daily limits (which are used only for acutely toxic substances).

8. The commentor requested that a brief discussion of how critical conditions are accounted for in the Pond analysis be added to Section 4.2.4.

Response: As mentioned in the first paragraph of Section 4.2.4, lake TMDL analyses for phosphorus are normally developed on a yearly basis to account for dry weather loading rates which generally occur during the warmer months when algae production is most prevalent, and wet weather loading rates when most of the nonpoint source phosphorus load is deposited. The updated Vollenweider-OECD Normalized P-loading/Chlorophyll Response Relationship specifically uses long-term loading estimates to avoid adopting a single transient loading pulse, which would yield erroneous results.

9. The commentor suggested that the remainder of La Trappe Creek be discussed in the Introduction with respect to impairments.

   Response: We mentioned in the Introduction that this TMDL is designed to eliminate a specific localized impairment in the unnamed tributary of LaTrappe Creek only. We then stated "the fecal coliforms, suspended sediment, and nutrient impairments within other portions of the Lower Choptank River watershed will be addressed at a later date." We feel that this clearly includes the remainder of LaTrappe Creek, and no further explanation is required.

10. The commentor requested that rationale for the use of the Beaver Dam gage as representative of the UTLTC be provided.

    Response: The Beaver Dam gage represents the best basis from which to estimate flow in the UTLTC, due to drainage size, proximity, and occurrence in the same larger watershed (Choptank) as the UTLTC.

11. The commentor requested that reference for the use of 1.5 g/m2/d for sediment oxygen demand be provided in Section 4.1.1.

    Response: The 1.5 gm/m^2-day SOD is taken from the EPA's "Rates, Constants, and Kinetics Formulations in Surface Water Quality Modeling", Table 3-25 – Average Values of Oxygen Uptake Rates of River Bottoms. This value was then used in the model calibration to confirm its validity.

12. The commentor questioned whether the WWTP technologies (e.g. BNR) implemented since 1998 or planned for the future might affect the nutrient limitation analysis in Appendix B, and if a phosphorus limitation would still result. The commentor further questioned whether future water quality monitoring will include this analysis to determine that phosphorus is still the limiting nutrient.

    Response: Inclusion of BNR would change Table B2 as follows- Trappe WWTP, TN = 4900 lbs/year, total TN load = 6930 lbs/year, N:P ratio = 20:1, which is still strongly phosphorus limited. When the stream and Pond are resampled to confirm that the TMDL has eliminated the impairment, analyses for TN and TP will be included to confirm that the system is phosphorus limited. The commentor noted the following calculation errors in Appendix B:

a. In the total annual unit runoff calculations, 15920 m^2 (the pond surface area) is multiplied by 1.07 m/yr (annual precipitation rate) to obtain 38,982 instead of 17,034.

b. Using MDE's numbers, the normalized P loading for the "pond analysis without the point source load" should be 245 mg P/m3 instead of 324; "with the current point source load" should be 1,027 mg P/m3 instead of 1,297.

Response:

a. The total has been corrected to 17,034.

b. The values have been corrected to 257 and 1,057 mg P/m^3, respectively.

13. The commentor noted that the lake volume cited on page B-5 (under "Hydraulic Residence Time") should be 9,711 and the discharge rate value should be included where it is referenced.

Response: These corrections have been made.

14. The commentor asked how the nonpoint source concentrations of CBOD (6.9 mg/l) and NBOD (4.1 mg/l) were assumed in Scenario 2 of the UTLTC model?

Response: As stated on page A-13, the nonpoint source CBOD and NBOD were estimated using water quality data from nearby streams. This is standard procedure when no data is available for the specific stream that is being modeled.

15. The commentor noted that the UTLTC model uses NBOD as calculated from TKN although the WWTP data provides total nitrogen, and requested a clarification regarding how these relationships were determined.

Response: The NBOD values listed for TRP1 represent the observed plant effluent values because there was no upstream flow and the samples were collected at the plant outfall.

16. The commentor stated that the second sentence discussing temperature in Section 4.2.6 belongs with the UTLTC discussion in Section 4.1.6. The commentor also requested a brief explanation regarding why using the high summer temperature provides a margin of safety (i.e., is conservative).

Response: We agree that the sentence reading "In calculating minimum DO levels, MDE assumes a 90^{th} % highest observed summertime water temperature of 25.4^{o} C." should be moved to Section 4.1.6. This assumption that both the 7Q10 flow (which occurs <1% of the time) and 90th % highest temperature occur simultaneously is even more conservative. In fact, the highest temperatures tend to occur in July or August, while the lowest flows tend to occur in September or October. Also, when the temperature is higher, the saturation value for DO is lower, and, therefore, there is less assimilative capacity available in the stream for DO.

17. In Table A2, the DO value of 3.4 mg/l should be 3.5 mg/l based on the data provided elsewhere in the report.

    Response: The DO value in Table A2 has been corrected to 3.5 mg/l.