

**Comment Response Document
Regarding the Phosphorus and Sediment TMDLs for Adkins Pond
Wicomico County, MD**

Introduction

The Maryland Department of the Environment (MDE) has conducted a public review of the proposed Total Maximum Daily Loads (TMDLs) for phosphorus and sediment loadings in Adkins Pond. The public comment period was open from September 28, 2001 to October 29, 2001. 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
James R. Trader	Salisbury, MD citizen	October 19, 2001	1 through 8
James Stuhltrager & Taryn B. Kindred	Mid-Atlantic Environmental Law Center on behalf of the Maryland Chapter of the Sierra Club, the American Littoral Society, and the American Canoe Association	October 29, 2001	9 through 15

Comments and Responses

1. The commentor stated that the proposal to allow a design loading to preserve 62% of the pond volume over the next 61 years will, in effect, sacrifice the pond volume. The commentor supported this statement, citing the highly erodible soils in the watershed, the high sediment loading that has reduced the pond volume by 61% since 1940, the lack of effective State or county erosion and sediment control plans or programs, and the absence of proposals to dredge or restore the pond to its original volume.

Response: It is the nature of impoundments to fill in with sediment over time. However, it is our experience based on reservoir studies that most of this infilling occurred prior to the 1980's. Subsequent programs and requirements for agricultural soil and water conservations, sediment and erosion controls, and stormwater management greatly slowed the rate of infilling. MDE believes that the proposed volumetric preservation is reasonable for an impoundment draining an agricultural area on the Coastal Plain. Best Management Practices (BMPs) and other control strategies designed to reduce phosphorus loading will also address the sedimentation issue. Dredging is a complex issue, requiring detailed financial and technical analyses, as well as cooperation among the State, local governments and other stakeholders. These details are beyond the scope of this TMDL. However, the State will

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actively facilitate implementation of the TMDL once it is approved by the U.S. Environmental Protection Agency (EPA).

2. The commentor questioned whether any field investigations or sampling have been conducted upstream of the watershed to identify sediment problems and/or sources of phosphorus that must be corrected.

Response: MDE Field Office personnel have conducted a field investigation visited the area. Their observations and analyses suggest that nonpoint source loading accounts for the phosphorus and sediment impairment of the impoundment.

3. The commentor questioned the feasibility of reducing the total annual phosphorus loading of 9,381 lbs/yr by 75% to the allowed loading of 2,505 lbs/yr, specifically questioning whether the use of buffer strips along drainage areas could achieve the estimated 70% to 90% reduction in sediment loads cited in the TMDL document.

Response: The nutrient and sediment reductions in the proposed TMDL are challenging but not impossible. These are long-term goals that will be addressed in an iterative manner. Additionally, there are numerous State and federal programs that offer technical and financial assistance for implementation of these control strategies. (Also see response to Comment 8 in regard to implementation plans).

4. The commentor requested information regarding the number of farms in the watershed with Nutrient Management Plans either in place or under development. The commentor additionally questioned whether such plans include a provision for sediment control.

Response: The Department of Environment will ascertain whether or not information is available from the Maryland Department of Agriculture on the status of the Nutrient Management Plans, and will respond directly to the commentor. It should be noted, however, that the estimated TMDL is independent of the status of Nutrient Management Plan development. That is, the impoundment's assimilative capacity of nutrients is a function of the physical characteristics of the impoundment, which is independent of the nutrient sources. See response to Comment 11 regarding the background sources of nutrients.

In regard to the second question, Nutrient Management Plans do not make explicit provisions for sediment controls. Rather, they focus on issues regarding fertilizer application and animal waste management. Soil Conservation and Water Quality Plans (SCWQPs) are the agricultural planning tools by which soil erosion is addressed.

5. The commentor questioned how MDE will assure dissolved oxygen (DO) concentrations will not drop below 5.0 mg/l at any time in the pond water area.

Response: The TMDL is designed to maintain a DO concentration of at least 5.0 mg/l in the surface waters of the pond. The TMDL is designed to maintain a hypolimnetic DO concentration of not less than 10% saturation during periods of thermal stratification. This is

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in accordance with MDE's interim interpretation of the DO standard as it applies to stratified impoundments.

6. The commentor stated that the proposed TMDLs should strive to restore the pond to its original volume, in addition to the cited goal of attaining water quality standards.

Response: The TMDL is developed under the assumption that the pond will be restored to its original volume. See also the response to Comment 1 above.

7. The commentor noted that monthly water quality sampling initiated in October 2000 did not include bacteriological testing or analysis for pesticides, herbicides, or other chemicals.

Response: The impoundment is listed as being impaired by nutrients and sediments. The parameters cited by the commentor are not relevant to the TMDL analysis, and thus were not assessed by field operations staff assigned to support the TMDL analysis. A separate State monitoring strategy governs the long-term assessment of the substances referenced by the commentor.

8. The commentor expressed doubt regarding the ability of the TMDL analysis to prevent further deterioration and achieve water quality standards.

Response: The purpose of a TMDL analysis is limited to determining the maximum loading limit that meets existing water quality standards. Neither the Clean Water Act nor current U.S. Environmental Protection Agency regulations direct states to develop a detailed implementation plan as part of the TMDL development and approval process. Although formal implementation planning is currently beyond the scope of the TMDL development process, Maryland is committed to enforcing applicable laws and supporting voluntary initiatives necessary to implement this and other TMDLs. To this end Maryland has several well-established programs to draw upon as part of future implementation efforts. These include the State Water Quality Improvement Act of 1988, the federal Clean Water Action Plan framework, and the State's Chesapeake Bay Agreement Tributary Strategies for Nutrient Reduction. Additionally, Maryland has adopted procedures to assure that future evaluations are conducted for all TMDLs that are established.

9. The commentor stated that the proposed TMDL is not designed to achieve the appropriate water quality standards. The commentor additionally suggested that MDE set a more aggressive goal for trophic status and annual mean phosphorus concentration.

Response: The TMDL for Adkins Pond sets as a goal a reasonable trophic status for an impoundment in the Coastal Plain. EPA guidelines acknowledge significant variability in water quality as a function of geography, morphometry, lake origin and climate, as well as variations in user perceptions based on geography and land use. For these reasons, the EPA does not advocate the establishment of a single, national nutrient standard for lakes (U.S. EPA, 2000).

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A chlorophyll *a* concentration of 20 µg/l corresponds approximately to 60 on Carlson's Trophic Status Index, which is within the lower range of eutrophic conditions (Carlson 1977). This is compatible with Adkins Pond's designated use. It should also be noted that the TMDL document provides an estimate that a 75% reduction in the load will be needed to achieve this water quality goal. This substantial load reduction goal speaks to the reasonableness of the water quality goal.

10. The commentor stated that the proposed TMDL fails to establish daily loads; instead, the document establishes a maximum annual load.

Response: The U.S. EPA interprets the term "Total Maximum Daily Load" more broadly than the commentor, providing in its regulations (40 CFR 130.2(i)) that "TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure." Accordingly, no explicit time period is required. In this case, annual loads make more sense than daily loads. From a technical standpoint, nutrient and sediment loads are both highly variable. Most of the loads are generated during a small number of storm events. Thus, it is essentially infeasible to establish a meaningful daily load for nutrients and sediments. To do so, in view of the large daily variability, would require the daily loading caps to be very large to accommodate the large natural peak in loading events. More importantly, nutrients and sediments do not have an impact on the temporal scale of a day; rather, they act over long periods of time. In the case of nutrients, it does not matter if a large quantity goes in one day, and a small amount goes in the next; rather, it is the accumulation over a time scale of weeks that is significant. In the case of sedimentation, it is the long-term accumulation of sediments—and the resultant loss in lake volume—that is significant. For these reasons, the Department has elected to establish the sediment and phosphorus TMDLs on the timeframe that it has. Nevertheless, the TMDLs are expressed within the TMDL documentation both as annual loads and average daily loads, in order to assist the reader in understanding the magnitude of the loads involved.

11. The commentor stated that the proposed TMDL does not fully consider all background contributions to Adkins Pond. The commentor suggested that Maryland conduct a study specifically focusing on nonpoint source contributions for the purpose of assessing their impact on Adkins Pond.

Response: The TMDL analysis methodology considers all sources, including background contributions. Specifically, the Vollenweider method determines the assimilative capacity (TMDL) for nutrients as a function of the physical characteristics of the impoundment. It sets a limit on nutrients irrespective of the specific source of the loads, including natural background loads.

The TMDL analysis is limited to determining the loading limit. The development of an implementation plan for achieving the loading goal established by the TMDL analysis is beyond the scope of this undertaking (See response to Comment 8). The suggestion to conduct a study of specific sources would be more appropriate in the context of identifying the most cost effective nonpoint source controls as part of an implementation planning effort.

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12. The commentor stated that the proposed TMDL does not properly allocate loadings from nonpoint sources.

Response: The calculated NPS allocation is implicitly the sum of the individual load allocations. The sub-allocation of the allowable NPS load to individual sources is a detailed implementation issue, which is beyond the scope of the TMDL. A technical memorandum, entitled “*Significant Phosphorus and Sediment Nonpoint Sources in the Adkins Pond Watershed*”, describes viable individual sediment load allocations to each land use category. The technical memorandum provides information that is intended to facilitate future stakeholder dialogue on implementation planning. Neither the Clean Water Act nor current EPA regulations requires states to develop a detailed implementation plan as part of the TMDL development and approval process. Maryland’s rationale for not including a detailed implementation plan within the TMDL documentation is to allow flexibility for those other government programs and stakeholders currently developing mechanisms to reduce nutrient and sediment loads to Adkins Pond and other waters of the State.

13. The commentor stated that the proposed TMDL does not adequately consider seasonal variations.

Response: The Clean Water Act, Section 303(d)(1)(C) states that the TMDL load “... shall be established at a level necessary to implement the applicable water quality standards with seasonal variations...”. This TMDL establishes a maximum load that meets water quality standards during all seasons of the year. Exceedances of the relevant water quality standards occur almost exclusively in the summer season, when increased water temperatures and solar radiation are most conducive to the growth of algae. This is also the period when dissolved oxygen saturation levels, inversely related to water temperature, are lowest. The water quality standard thresholds were established with this critical season in mind. However, the TMDL analysis does not focus solely on the summer season.

The TMDL analysis uses the Vollenweider Relationship. This empirical method relates long-term loading of phosphorus to trophic status (primarily chlorophyll levels). Another analysis makes use of the Vollenweider results as inputs to a computation of the expected dissolved oxygen values under critical conditions of maximum chlorophyll and water temperature. The Vollenweider Relationship considers long-term loading, which accounts for wet seasons (Winter/Spring) when loading rates are higher. It also accounts for the recycling of nutrients, introduced in the wet season, which has the potential to affect water quality during the warm, sunny season, typically associated with peak algal growth and low dissolved oxygen.

In summary, the analysis considers both the seasonal aspects of the water quality endpoint (standards), and the seasonal aspects of the loads and their resultant fate in the water body system. Thus, the analysis is comprehensive with regard to consideration of seasonal variations.

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14. The commentor stated that the proposed TMDL does not adequately consider critical conditions.

Response: See response to Comment 13 above.

15. The commentor stated that the proposed TMDL fails to address implementation.

Response: See response to Comment 8 above.

References

Carlson, R.E. 1977. A Trophic State Index for Ponds. *Limnology and Oceanography* 22:361-369.

Code of Federal Regulations, 40 CFR 130.2(i).

U.S. EPA, "Nutrient Criteria Technical Guidance Manual, Lakes and Reservoirs," Office of Water/Office of Science and Technology, Publication Number EPA-822-B00-001, April 2000.