



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029
5/13/2003

Richard Eskin, Acting Director
Technical & Regulatory Services Administration
Maryland Department of the Environment
1800 Washington Boulevard, Suite 540
Baltimore, Maryland 21230-1718

Dear Dr. Eskin:

The Environmental Protection Agency (EPA) Region III, is pleased to approve the report "Total Maximum Daily Loads [TMDLs] of Phosphorus and Sediments for Lake Linganore, Frederick County, MD" submitted to the U.S. Environmental Protection Agency (USEPA) by the Maryland Department of the Environment (MDE) by letter dated December 30, 2002. The TMDLs were established and submitted in accordance with Section 303(d)(1)(c) and (2) of the Clean Water Act. The TMDLs were established to address impairments of water quality as identified in Maryland's 1996 Section 303(d) list. Maryland identifies the impairments for this water quality-limited waterbody based on nutrients and suspended sediments.

In accordance with Federal regulations found at 40 CFR 130.7, a TMDL must: 1) be designed to meet water quality standards; 2) include, as appropriate, both wasteload allocations (WLAs) from point sources and load allocations from non-point sources; 3) consider the impacts of background pollutant contributions; 4) take critical stream conditions into account (the conditions when water quality is most likely to be violated); 5) consider seasonal variations; 6) include a margin of safety which accounts for any uncertainties in the relationship between pollutant loads and in-stream water quality; 7) include reasonable assurance that the TMDL can be met; and 8) be subject to public participation. The enclosure to this letter describes how the Lake Linganore TMDL and supporting documentation satisfies each of these requirements. The supporting documentation provided with the TMDL report, specifically, the Technical Memorandum, provides one allocation scenario including allocations for the point source and non-point sources. USEPA relied upon this information in reviewing and approving the TMDL submittal and in preparing USEPA's Decision Rationale.

Following the approval of this TMDL, MDE shall incorporate it into the state's Water Quality Management Plan pursuant to 40 CFR 130.7(d)(2). Also, any new or revised National Pollution Discharge Elimination System (NPDES) permits with applicable effluent limits must be consistent with the TMDL's WLA pursuant to 40 CFR 122.44(d)(1)(vii)(B)(2). If an NPDES permit is issued with an effluent limitation that does not reflect the wasteload allocation contained in the approved TMDL and Technical Memorandum, it is expected that Maryland will document this change in the permit Fact Sheet, as discussed in USEPA's enclosed Decision Rationale.

If you have any questions or concerns, please call me or have your staff contact Mr. Thomas Henry, TMDL Program Manager, at (215) 814-5752.

Sincerely,

/S/

Jon M. Capacasa, Acting Director
Water Protection Division

Enclosure

cc: Dr. James George, MDE

Decision Rationale

Total Maximum Daily Loads for Phosphorus and Sediments for Lake Linganore, Frederick County, Maryland

I. Introduction

The Clean Water Act (CWA) requires a Total Maximum Daily Load (TMDL) to be developed for those water bodies identified as impaired by the state where technology-based and other controls will not provide for attainment of water quality standards. A TMDL is a determination of the amount of a pollutant from point, nonpoint, and natural background sources, including a margin of safety, that may be discharged to a water quality-limited water body.

This document sets forth the United States Environmental Protection Agency's (USEPA's) rationale for approving the TMDLs for phosphorus and sediments in the Lake Linganore watershed. The TMDLs were established to address impairments of water quality, caused by nutrients and sediments, as initially identified (i.e., under the Lower Monocacy River watershed) in Maryland's 1996 Section 303(d) list for water quality-limited segments. The Maryland Department of the Environment (MDE) submitted the report, "Total Maximum Daily Loads of Phosphorus and Sediments for Lake Linganore, Frederick County, MD", dated December 2002, to USEPA for final review on December 30, 2002. These TMDLs address one segment, Lake Linganore, on Maryland's Section 303(d) list.

USEPA's rationale is based on the TMDL Report, information contained in the Appendix to the report, and the Technical Memorandum. USEPA's review determined that the TMDL meets the following eight regulatory requirements pursuant to 40 CFR Part 130.

- 1) The TMDLs are designed to implement applicable water quality standards.
- 2) The TMDLs include a total allowable load as well as individual waste load allocations and load allocations.
- 3) The TMDLs consider the impacts of background pollutant contributions.
- 4) The TMDLs consider the critical environmental conditions.
- 5) The TMDLs consider seasonal environmental variations.
- 6) The TMDLs include a margin of safety.
- 7) There is reasonable assurance that the TMDLs can be met.
- 8) The TMDLs have been subject to public participation.

The Technical Memorandum, *Significant Phosphorus and Sediments Nonpoint and Point Sources in Lake Linganore Watershed* submitted by MDE, specifically allocates phosphorus and sediments to each of three separate land use categories under nonpoint sources (direct atmospheric deposition of phosphorus to the water surface is obviously not considered a "land use" source), as well as to the one point source in the watershed (Libertytown wastewater treatment plant (WWTP)). Each land use or source is allocated some percentage of the total load originating from nonpoint sources. Current nonpoint source load estimates were based on the Chesapeake Bay Phase 4.3 Watershed Model loading coefficients from Segment 210, which considers atmospheric deposition to the land surface, loads from septic tanks, and loads from urban development, agriculture, and land covered by forest or other herbaceous growth. Likewise, the load allocations to each land use also consider these elements, thereby accounting for both natural and human-induced sources. Each land use load allocation represents average annual allowable loads of phosphorus. The one point source in the watershed, Libertytown WWTP, contributes a very small amount of phosphorus and sediments as compared to nonpoint sources, and is therefore allocated a nominal portion of the total load. Table 1 summarizes the TMDLs for Lake Linganore as determined by MDE.

Table 1 - Phosphorus and Sediment TMDLs Summary

Parameter	Rate	TMDL	Wasteload Allocation (WLA)	Load Allocation (LA)	Margin Of Safety (MOS)
Phosphorus	lbs/yr	5288	609	4150	529
	lb/day ¹	14.5	1.7	11.4	1.4
Sediment	tons/yr	7073	707	6346	Implicit
	lb/day ²	19.4	1.9	17.4	Implicit

^{1,2} Although the expression of the TMDL as an annual mass loading rate is acceptable, for consistency, EPA has derived daily mass loadings by dividing the annual loadings by 365.

The TMDLs are written plans and analyses established to ensure that a waterbody will attain and maintain water quality standards. The TMDLs are scientifically-based strategies which consider current and foreseeable conditions, the best available data, and account for uncertainty with the inclusion of a “margin of safety” (MOS) value. Conditions, available data, and the understanding of the natural processes can change more than what was anticipated by the MOS. The option is always available to refine the TMDLs for re-submittal to USEPA for approval.

Summary

Lake Linganore is an impoundment on Linganore Creek, a tributary of the Monocacy River (Lower Monocacy River watershed, 02-14-03-02). The impoundment is owned by the Lake Linganore Association and was created in 1972 for the purposes of water supply and recreation. Inflow to the lake is primarily via Bens Branch and Linganore Creek. Discharge from the lake is to Linganore Creek, which flows to the Monocacy River. The Lake Linganore watershed land use is primarily agricultural. The Libertytown Wastewater Treatment Plant (WWTP) is the only point source in the watershed. The WWTP has a capacity of 50,000 gallons per day (GPD) and treats an average flow of 30,000 GPD. However, the contribution of the WWTP to the overall phosphorus and sediment loadings to Lake Linganore are negligible compared to nonpoint sources. Additional information about Lake Linganore and the watershed is included in Section 2.1 of the TMDL Report. Figures 1 through 3 of the TMDL report show the location of Lake Linganore and land uses in the watershed.

Lake Linganore was originally listed (via the Lower Monocacy River) in Maryland’s 1996 Section 303(d) list for water quality-limited segments (WQLS) as being impaired by nutrients and sediments.¹ For the purpose of this TMDL analysis, Maryland monitored Lake Linganore in 2002 for the following parameters: total phosphorus, soluble orthophosphorus, nitrate and nitrite nitrogen, total Kjeldahl nitrogen, total nitrogen, and chlorophyll-*a*, as well as physical parameters: dissolved oxygen (DO), depth, water temperature, pH, and conductivity. Chlorophyll-*a*, a type of photosynthetic pigment, is commonly used as measure of algal biomass in natural waters.

The water quality impairments of Lake Linganore consist of a violation of Maryland’s numerical water quality criterion for DO (in the hypolimnion) and violations of the general narrative criteria applicable to the designated use of the water in Maryland’s regulations. Maryland does not currently have a water quality standard for nutrients or sediments. The Surface Water Use Designation for Lake Linganore is Use IV-P: *recreational trout water and public water supply*. Under the Code of Maryland Regulations (COMAR), “all waters of this State shall, wherever attainable, be protected for the basic uses of water contact recreation,

¹ The TMDL Report for Lake Linganore was intended to address only these impairments in the Lake Linganore watershed; Maryland will address the impairments in the other portions of the Lower Monocacy River at a later date.

fishing, protection of aquatic life and wildlife, and agricultural and industrial water supply.” The Use IV-P provides a use designation including cold or warm waters which have the potential for or are capable of holding or supporting adult trout for put-and-take fishing, and managed as a special fishery by periodic stocking and seasonal catching, as well as use as a public water supply. The excessive eutrophication that has been observed in Lake Linganore can produce nuisance levels of algae and interfere with the Lake’s designated uses. Eutrophication is caused by nutrient overenrichment. Using the 2002 data, MDE determined that the limiting nutrient in Lake Linganore is phosphorus (see Appendix A, page A-1, of the TMDL report) and therefore based the nutrient TMDL on the control of phosphorus loadings. Excessive sediment loads to Lake Linganore can result in a significantly shortened projected lifespan of the lake.

The Clean Water Act (CWA) Section 303(d) and its implementing regulations require that TMDLs be developed for waterbodies identified as impaired by the state where technology-based and other required controls do not provide for attainment of the water quality standards. The TMDLs submitted by MDE are designed to attain acceptable loadings of phosphorus and sediments into the pond in order to attain the narrative and DO water quality criteria and support the Use IV-P designation. Refer to Table 1 above for a summary of allowable loads.

Discussion of Regulatory Conditions

USEPA finds that MDE has provided sufficient information to meet all of the eight basic requirements for establishing phosphorus and sediment TMDLs for Lake Linganore. USEPA therefore approves the TMDLs for phosphorus and sediment in Lake Linganore. This approval is outlined below according to the eight regulatory requirements.

1) *The TMDLs are designed to implement applicable water quality standards*

Water Quality Standards consist of three components: designated and existing uses; narrative and/or numerical water quality criteria necessary to support those uses; and an anti-degradation statement. Maryland does not currently have numeric water quality criteria for nutrients (nitrogen or phosphorus) or sediments. Maryland does have a numerical criterion for DO. According to this criterion, for Use IV-P waters, the dissolved oxygen concentration may not be less than 5 mg/l at any time unless resulting from naturally occurring conditions. In lake environments, low concentrations of DO are expected in bottom waters even under optimal natural conditions. This concept is reflected in Maryland interpretation of the DO criterion for thermally stratified lakes, where the acceptable concentrations of DO in the bottom layer (hypolimnion) depend on the trophic status of the lake. Achievement of the 5 mg/l, however, is expected in well-mixed surface waters. Also, Maryland has a narrative standard that states that settleable waste substances may not interfere directly or indirectly with designated uses nor create a nuisance. The nutrient enrichment and excessive sedimentation in Lake Linganore have led to violations of these standards. The overall objective of the TMDLs is to reduce phosphorus and sediment loadings in order to meet all water quality standards (narrative and numerical) that support the Use IV-P designation.

The TMDLs propose that the violation of the water quality criterion for DO and the narrative standard for nuisance is caused by excessive growth of algae due to phosphorus enrichment. Because phosphorus binds to sediment, sedimentation rates are also related to phosphorus loadings. Reduction of phosphorus loadings associated with sediment will consequently result in a decrease in sedimentation rates and promote attainment of water quality objectives.

Maryland uses chlorophyll-*a* (chl-*a*), a measure of algal biomass, as the water quality

endpoint for the phosphorus TMDL. The chl-*a* endpoint selected for Lake Linganore, 10 ug/l, corresponds to a score of about 53 on the TSI and is at the boundary of eutrophy and mesotrophy, which Maryland has determined is an appropriate trophic state at which to manage this impoundment. Management of Lake Linganore at this trophic state is expected to avoid nuisance algal blooms and excessive aquatic macrophyte growth. EPA believes that this is a reasonable and appropriate water quality goal.

There are two accepted empirical methods that are used to relate total phosphorus to trophic status: the Vollenweider Relationship and Carlson's Trophic State Index (TSI). R.A. Vollenweider developed the relationship by assessing a large number of lakes.² He established a linear relationship between the log of phosphorus loading and the log of the ratio of the lake's mean depth to hydraulic residence time. Carlson's TSI is a frequently used, biomass-related index. The TSI considers Secchi depth, chlorophyll-*a*, and total phosphorus, with each providing an independent measure of trophic state. Index values range from 0 (ultraoligotrophic) to 100 (hypereutrophic). The following classifications can be used to interpret the TSI:

1)	TSI < 35	Most oligotrophic lakes
2)	35 < TSI < 55	Mesotrophic lakes
3)	TSI > 55	Eutrophic lakes
4)	TSI > 70	Hypereutrophic lakes

The chl-*a* endpoint of 10 ug/l selected by Maryland would correspond to a TSI of approximately 53, which is at the boundary of mesotrophy and eutrophy. EPA believes that Maryland selected an appropriate chl-*a* concentration to use as the water quality endpoint for Lake Linganore, since maintaining water quality at or below this level should avoid nuisance algal blooms and excessive aquatic macrophyte growth.

To the extent that phosphorus binds to sediments, measures taken to reduce phosphorus loadings will result in concomitant reductions of sediment loads. The reductions are not necessarily 1:1, and Maryland's rationale for predicting sediment load reductions is described more fully in Appendix A TMDL report. MDE believes that these reductions of sediment and phosphorus loads will be sufficient to prevent violations of the State's narrative water quality criteria.

- 2) *The TMDLs include a total allowable load as well as individual waste load allocations and load allocations.*

Total Allowable Load

As described above, MDE used an endpoint of a maximum chl-*a* concentration of 10 ug/l, since a predictable relationship exists between the concentration of chl-*a*, phosphorus loading, and excessive sedimentation.

MDE determined that the limiting nutrient is phosphorus. Thus, a TMDL for nitrogen is not necessary. Separate TMDLs were calculated for phosphorus and sediments. The allocations are presented as annual loads. Expressing TMDLs as annual loads is consistent with Federal regulations at 40 CFR 130.2(i), which state that TMDLs can be expressed in terms of either mass

²Vollenweider, R.A. "Scientific Fundamentals of the Eutrophication of Lakes and Flowing Waters, with Particular Reference to Nitrogen and Phosphorus as Factors in Eutrophication." Technical Report to OECD, Paris, France, 1968.

per time, toxicity, or other appropriate measure.

USEPA regulations at 40 CFR 130.2(i) state that the total allowable load shall be the sum of individual waste load allocations for point sources, and load allocations for nonpoint sources, and natural background concentrations. The TMDLs for phosphorus and sediment for Lake Linganore are consistent with 40 CFR 130.2(i) because the total loads provided by MDE equal the sum of the individual wasteload allocations for point sources and the land-based load allocations for nonpoint sources set forth in the Technical Memorandum provided with the TMDL document. Pursuant to 40 CFR 130.6 and 130.7(d)(2), these TMDLs and the Technical Memorandum and supporting documentation should be incorporated into Maryland's current water quality management plan. See Table 1 for a summary of allowable loads.

Waste Load Allocations

The watershed that drains to Lake Linganore contains one point source, the Libertytown WWTP. Libertytown WWTP received a wasteload allocation of 609 lb/year for phosphorus and 707 tons/year for sediments. Although the Libertytown WWTP contributes a very small amount to the overall sediment loading to Lake Linganore as compared to the nonpoint source contribution, MDE properly assigned a nominal allocation of 1% (707 tons/yr) of the total sediment TMDL to this point source. This does not imply, however, that MDE will revise Libertytown WWTP's NPDES discharge permit to allow additional solids discharges at this amount. MDE's permitting decisions will consider the impact of discharge to the local portion of Linganore Creek as well as to Lake Linganore.

Load Allocations

Maryland provided adequate land use and loading data in the TMDL report, but did not distributed the total load allocation to specific land use categories in the TMDL report. Maryland included a gross load allocation for the TMDL. These gross load allocations were presented in Table 1. Nonpoint source loading rates represent a cumulative impact from all sources, including naturally occurring and human-induced sources.

According to Federal regulations at 40 CFR 130.2(g), load allocations are best estimates of the loading, which may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the loading. Wherever possible, natural and nonpoint source loadings should be distinguished. MDE uses the Chesapeake Bay Program Watershed Model Phase 4.3 loading coefficients (from segment 210) which are land use specific and include natural background contributions, atmospheric deposition to land surface, and baseflow contributions.

As noted above, Maryland did not provide a breakdown of the load allocation in the TMDL report; however, such a breakdown (based on average annual flow) was provided in the Technical Memorandum. The TMDLs are based on phosphorus loading from the land uses within the watershed, the information for which is based on 2000 Maryland Department of Planning land use data. According to the Technical Memorandum, the specific load allocations for the TMDLs are presented in Tables 2 and 3.

Table 2 – Summary of Load Allocations for Phosphorus

Source Category	% Land Use	Acreage	Baseline Load (lb/yr)	% Nonpoint Source Load	Target Load (lb/yr)	% Reduction
Agriculture	56	29,068.1	42,180.6	83	3,577.5	91.5
Developed	16	8,305.2	8,352.1	16	547.8	93.4
Forest and Herbaceous Cover	28	14,534.0	373.3	<1	24.9	93.3
TOTAL	100%	51,907.3	50,906.	100%	4,150.2	91.8

Table 3 – Summary of Load Allocations for Sediments

Source Category	% Land Use	Acreage	Baseline Load (tons/yr)	% Nonpoint Source Load	Target Load (tons/yr)	% Reduction
Agriculture	56	29,068.1	10,099	87	5,660.6	43.9
Developed	16	8,305.2	1,200.5	10	533.1	55.6
Forest and Herbaceous Cover	28	14,534.0	354.3	3	152.3	57.0
TOTAL	100%	51,907.3	11,653.8	100	6,346	45.5

Allocations Scenarios

USEPA realizes that the above breakouts of the total loads for phosphorus and sediments to the point source and nonpoint sources is one allocation scenario. As implementation of the established TMDLs proceeds, Maryland may find that other combinations of allocations are more feasible and/or cost effective. However, any subsequent changes in the TMDLs must conform to gross waste load and load allocations and must ensure that the biological, chemical, and physical integrity of the waterbody is preserved.

Federal regulations at 40 CFR 122.44(d)(1)(vii)(B) require that, for an NPDES permit for an individual point source, the effluent limitations must be consistent with the assumptions and requirements of any available wasteload allocation for the discharge prepared by the state and approved by USEPA. USEPA has authority to object to the issuance of an NPDES permit that is inconsistent with wasteload allocations established for that point source. To ensure consistency with these TMDLs, if an NPDES permit is issued for a point source that discharges one or more of the pollutants of concern in the Lake Linganore watershed, any deviation from the wasteload allocations set forth in the Technical Memorandum, TMDL Report, and described herein for a point source must be documented in the permit Fact Sheet and made available for public review along with the proposed draft permit and the Notice of Tentative Decision. The documentation should: 1) demonstrate that the loading change is consistent with the goals of the TMDL and will implement the applicable water quality standards, 2) demonstrate that the changes embrace the assumptions and methodology of these TMDLs and Technical Memorandum, and, 3) describe that portion of the total allowable loading determined in the State's approved TMDL report that remains for any other point sources (and future growth where included in the original TMDL) not yet issued a permit under the TMDL. It is also expected that Maryland will provide this Fact Sheet for review and comment to each point source included in the TMDL analysis as well as

any local and State agency with jurisdiction over land uses for which load allocation changes may be impacted. It is also expected that MDE will require periodic monitoring of the point source(s) for phosphorus and total suspended solids, through the NPDES permit process, in order to monitor and determine compliance with the TMDL wasteload allocations.

In addition, USEPA regulations and program guidance provides for effluent trading. Federal regulations at 40 CFR 130.2(i) state: “if Best Management Practices (BMPs) or other nonpoint source pollution controls make more stringent load allocations practicable, then wasteload allocations may be made less stringent. Thus, the TMDL process provides for nonpoint source control tradeoffs.” The state may trade between point sources and nonpoint sources identified in this TMDL as long as three general conditions are met: 1) the total allowable load to the waterbody is not exceeded; 2) the trading of loads from one source to another continues to properly implement the applicable water quality standards and embraces the assumptions and methodology of these TMDLs and Technical Memorandum; and, 3) the trading results in enforceable controls for each source. Final control plans and loads should be identified in a publicly available planning document, such as the state’s water quality management plan (see 40 CFR 130.6 and 130.7(d)(2)). These final plans must be consistent with the goals of the approved TMDLs.

Based on the foregoing, USEPA has determined that the TMDLs and the Technical Memorandum are consistent with the regulations and requirements of 40 CFR Section 130. Pursuant to 40 CFR 130.6 and 130.7(d)(2), these TMDLs and the supporting documentation, including the Technical Memorandum, should be incorporated into Maryland’s current water quality management plan.

3) *The TMDLs consider the impacts of background pollutant contributions.*

Lake Linganore’s background environment is known to have been impaired by deposition of sediment over time. The contributions of background pollutants have been incorporated in the TMDLs through the baseline developed by MDE’s 2002 monitoring data.

In terms of the TMDL analysis, the Chesapeake Bay Watershed Model Phase 4.3 loading coefficients (for segment 210) were used which effectively consider natural background, loads from septic tanks, and baseflow contributions. The loading rates account for both natural and human-induced sources.

4) *The TMDLs consider critical environmental conditions.*

USEPA regulations at 40 CFR 130.7(c)(1) require TMDLs to account for critical conditions for stream flow, loading, and water quality parameters. The intent of the regulations is to ensure that 1) the TMDLs are protective of human health, and 2) the water quality of the waterbodies is protected during the times when they are most vulnerable.

Critical conditions are defined as those that violate applicable water quality criteria – in this case, criteria for chl-a and DO concentrations. The TMDLs address the critical values for these parameters, which are 10 ug/l for chl-a and 5 mg/l DO in the epilimnion and 10% DO saturation in the hypolimnion (all minimum criteria). Appendix A describes MDE’s interpretation of its water quality criterion for DO in thermally stratified lakes such as Lake Linganore. MDE analyzed the effects on DO concentration in the critical summertime conditions (18-25° C water temperatures) when lakes thermally stratify and sub-epilimnetic waters become hypoxic, the extent to which depends on the trophic status of the lake.

For sediments, although maximum sediment loading rates occur during wet weather events, the water quality impacts of sedimentation do not have a single critical period.

5) *The TMDLs consider seasonal environmental variations.*

Seasonal variations involve changes in flow as a result of hydrologic and climatological patterns. In the continental United States, seasonally high flow normally occurs during the colder period of winter and in early spring due to snowmelt and spring rain, while seasonally low flow typically occurs during the warmer summer and early fall drought periods.³

The TMDLs appropriate consider seasonal variations by estimating loading rates over the entire year. This approach captures the dry weather loading rates, which generally occur during the warmer months when algae production is most prevalent. This approach also captures the wet-weather loading rates, which contribute significant sediment-bound sources of phosphorus. The method used (the Vollenweider Relationship) specifically employs long-term loading estimates to avoid adopting a single transient loading pulse, which would yield erroneous results.

As described in Section 4 above, the TMDL considers the effects of the seasonal phenomenon of thermal stratification in lakes and the subsequent reductions of DO saturation levels in sub-epilimnetic waters.

6) *The TMDL includes a margin of safety*

The requirement for a margin of safety (MOS) is intended to add a level of conservatism to the modeling process in order to account for uncertainty. Based on USEPA guidance, the MOS can be achieved through two approaches. One approach is to reserve a portion of the loading capacity as a separate term, and the other approach is to incorporate the MOS as part of the design conditions. MDE has adopted an explicit MOS for phosphorus in accordance with the first approach, whereby the load allocated to the MOS was computed as 10 percent of the total allowable load.

In establishing an MOS for sediments, MDE has adopted an implicit approach by incorporating conservative assumptions. Because phosphorus binds to sediment, sediment will be controlled as a result of controlling phosphorus. The estimate of sediment reduction is based on the load allocation for phosphorus rather than the entire phosphorus TMDL, including the MOS. Thus, the explicit 10 percent MOS for phosphorus will result in an implicit MOS for sediments. Also, MDE conservatively assumed a sediment to phosphorus ratio of 0.5:1 rather than 0.7:1 in calculated projected reductions of sediments based on phosphorus reduction measures.

7) *There is reasonable assurance that the TMDLs can be met.*

USEPA requires that there be a reasonable assurance that the TMDLs can be implemented. Wasteload allocations will be implemented through the NPDES permit process. According to 40 CFR 122.44(d)(1)(vii)(B), the effluent limitations for an NPDES permit must be consistent with the assumptions and requirements of any available wasteload allocation for the discharge prepared by the state and approved by USEPA. Furthermore, USEPA has the

³ USEPA, 1997. Technical Guidance Manual for Developing Total Maximum Daily Loads, Book 2, Part 1, Section 2.3.3 USEPA 823-B-97-002.

authority to object to issuance of an NPDES permit that is inconsistent with wasteload allocations established for that point source. As mentioned earlier, USEPA expects that MDE will require periodic monitoring for phosphorus and TSS in Libertytown WWTP (and for any other point source) in order to compare discharge rates for these pollutants with the loading estimates and wasteload allocation established in the TMDL report.

Nonpoint source controls to achieve load allocations can be implemented through a number of existing programs, including the Clean Water Action Plan, Maryland's Water Quality Improvement Act of 1998, and the Chesapeake Bay Agreement's Tributary Strategies for Nutrient Reduction. Also, the recommendations contained in an August 1989 "Watershed Plan – Environmental Assessment for Linganore Creek" prepared by the U.S. Department of Agriculture Soil Conservation Service provide additional information with which to implement this TMDL.

The TMDL provides a challenging goal of over 90% reduction in phosphorus, as well as 45% reduction in sediment loadings to Lake Linganore. Nonpoint source nutrient and sediment reductions will depend heavily on implementation of agricultural best management practices (BMPs). Both non- and structural BMPs can be used to implement sediment loading reductions. The TMDL document lists the following potential BMPs as examples: maintaining vegetated buffer strips along stream channels and conservation tillage. Also, nutrient management plans that provide for management of fertilizer application and animal waste are an important component of the TMDL nutrient control strategy.

In addition, there will be followup monitoring within five years as part of Maryland's Watershed Cycling Strategy. Maryland also has adopted procedures to ensure that future evaluations are conducted for all established TMDLs. This followup monitoring will allow Maryland and USEPA to determine whether these TMDLs have been implemented successfully.

8) *The TMDL has been subject to public participation.*

MDE provided an opportunity for public review of and comment on the phosphorus and sediment TMDLs for Lake Linganore. The public review and comment period was open from November 22, 2002 to December 21, 2002. MDE received one set of comments, from the City of Frederick.

On March 26, 2002, EPA initiated informal consultation with the U.S. Fish and Wildlife Service and National Marine Fisheries Service (NMFS) pursuant to Section 7(c) of the Endangered Species Act, regarding certain federal agency actions by EPA Region III regarding Maryland TMDLs. The Region forwarded a Biological Evaluation to the Services on May 3, 2002 and October 21, 2002 regarding our proposed action on Maryland TMDLs. On December 21, 2002, EPA received concurrence from the U.S. Fish and Wildlife Services and on April 16, 2002, EPA received concurrence from the National Marine Fisheries Service that our action in approving this TMDL is not likely to adversely affect endangered species and their critical habitat.