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

APR 04 2002

Ms. Denise Ferguson Southard
Assistant Secretary
Maryland Department of the Environment
2500 Broening Highway
Baltimore, Maryland 21224

Dear Ms. Southard:

The U.S. Environmental Protection Agency (EPA), Region III, is pleased to approve the Clopper Lake Total Maximum Daily Load (TMDL), submitted to EPA by the Maryland Department of Environment (MDE) by letter dated December 27, 2001 and received on January 8, 2002. A revised TMDL was received on February 04, 2002. The TMDL was established and submitted in accordance with Sections 303(d)(1)(c) and (2) of the Clean Water Act. The TMDL was established to address impairment of water quality as identified in Maryland's 1998 Section 303(d) list. Maryland identifies the impairment for this water quality-limited waterbody based on low dissolved oxygen levels and nuisance levels of algae. Clopper Lake is located in Montgomery County.

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) have a reasonable assurance that the TMDL can be met; and 8) be subject to public participation. The enclosure to this letter describes how the Clopper Lake 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 with nonpoint source load allocations and a zero WLA for point sources. EPA relied upon this information in reviewing and approving the TMDL submittal and in preparing EPA's Decision Rationale. EPA expects for future TMDLs that the Technical Memorandum will be included in any public notice of the TMDLs.

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 Pollutant 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 WLA 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 EPA's Decision Rationale.

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

Sincerely,

Rebecca W. Hanmer

Rebecca W. Hanmer, Director
Water Protection Division

Enclosure

cc: Jim George, MDE
Robin Grove, MDE

Decision Rationale

Total Maximum Daily Loads for Phosphorus and Sediments to Clopper Lake, Montgomery County, Maryland

I. Introduction

The Clean Water Act (CWA) requires a Total Maximum Daily Load (TMDL) 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 (EPA) rationale for approving the TMDLs for phosphorus and sediment in the Clopper Lake watershed. Clopper Lake was identified as having low dissolved oxygen levels and nuisance algal blooms, in the *Maryland Lake Water Quality Assessment Report* (March 1998). Clopper Lake was listed on Maryland's 1998 Section 303(d) list as well. The Maryland Department of the Environment (MDE), submitted the *Total Maximum Daily Loads of Phosphorus and Sediment to, Montgomery County, MD*, dated December 2001, to EPA for final review on December 27, 2001. A revised TMDL was submitted on February 04, 2002. These TMDLs address one segment, Clopper Lake, on Maryland's 1998 Section 303(d) list

EPA's rationale is based on the TMDL Report, information contained in the Appendix to the report, and the Technical Memorandum. EPA's review determined that the TMDLs meet 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 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 Sediment Non-point Sources in the Clopper Lake Watershed* submitted by the MDE, specifically allocates phosphorus and sediment loads to the two land use/source categories (direct atmospheric deposition of phosphorus to the water surface is obviously not considered a "land use" source). 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 Model loading coefficients from segment 220 which consider natural background, loads from septic

tanks, as well as baseflow contributions. Likewise, the load allocations to each land use also consider natural background, septic tanks and baseflow. Loading rates for developed lands were obtained from Montgomery County. Each land use load allocation represents yearly allowable loads of phosphorus. There are no point sources in this watershed. Table 1 summarizes the TMDLs for Clopper Lake as determined by MDE.

Table 1 - Phosphorus and Sediment TMDLs Summary

Parameter	Rate	TMDL	WLA[2]	LA[3]	MOS[4]
Phosphorus	lbs/yr	555	0	500	55
	lbs/day[1]	1.5	0.0	1.4	0.2
Sediment	Tons/year	129	0	129	Implicit
	Tons/day[1]	0.4	0.0	0.4	Implicit

[1] The TMDL rate of pounds per day or tons per day is derived by dividing the pounds and tons per year values by 365, respectively.
[2] WLA = Waste Load Allocation
[3] LA = Load Allocation
[4] MOS = Margin of Safety

The TMDL is a written plan and analysis established to ensure that a waterbody will attain and maintain water quality standards. The TMDL is a scientifically-based strategy which considers current and foreseeable conditions, the best available data, and accounts for uncertainty with the inclusion of a "margin of safety" value. Conditions, available data, and the understanding of natural processes can change more than what was anticipated by the margin of safety. If the above occurs, the state holds the option to refine the TMDL for re-submittal to EPA for approval.

II. Summary

Clopper Lake is an impoundment on Long Draught Branch and is located in Montgomery County, Maryland. Clopper Lake drains to Great Seneca Creek. The Clopper Lake watershed lies in the Seneca Creek watershed (12-13-01-06). The impoundment (Clopper Lake) was built in the 1970s and is owned by the Maryland Department of Natural Resources.

The Clopper Lake watershed is in the Piedmont physiographic province. The soils immediately surrounding the lake are the Glenig-Gaila-Occoquan association (Soil Conservation Service, 1994). These soils are characterized as being well drained and composed of a fine-loamy, mixed mesic Ochreptic Hapudults to mesic Typic Hapudults. Soils from the Urban-Land-Wheaton-Glenelg associations make-up the soils of the outer watershed (Soil Survey of Montgomery, Maryland, USDA, 1988).

Inflow to the pond is primarily from two tributaries. The tributaries are Long Draught Branch and an unnamed tributary. As mentioned earlier, the pond discharges to Great Seneca

Creek, which flows into Seneca Creek. The drainage area to Clopper Lake was estimated at 2.86 square miles. Table 2 documents the physical characteristics of Clopper Lake.

Table 2 - Physical Characteristics of Clopper Lake

Characteristic		Present (2001)
Surface Area		90 acres
Average Pond Depth		17.7 feet
Drainage Area to Pond		2.86 square miles
Volume of Pond		1,592 acre-feet

Developed and forested land comprise 94% of the watershed. Water and agricultural lands make up the remaining 6% of the watershed. Developed lands make-up 77% of the watershed or 1,409 acres. Forested lands make-up 17% of the watershed or approximately 311 acres. Agricultural lands make up less than 1% of the watershed. There are no point sources located in Clopper Lake.

Clopper Lake was identified as having low dissolved oxygen (DO) levels and nuisance levels of algae in the *Maryland Lake Water Quality Assessment Report* (March 1998), and was, therefore, added to Maryland's 1998 Section 303(d) list of water quality limited segments. Clopper Lake was monitored by MDE in June and August 1991 (MDE, 1995), October, November and December 2000, and from January through July 2001. Water quality samples were taken from monitoring stations within the watershed during each of the previously mentioned months. The samples were analyzed for total phosphorus, soluble orthophosphorus, total Kjeldahl nitrogen, total organic solvents, and chlorophyll *a*. Physical measurements of depth, water temperature, pH, conductivity, and DO were recorded in the field.

The water quality impairment of Clopper Lake consists of violations of the applicable numeric water quality criteria for DO and violations of the general narrative criteria applicable to the water. Clopper Lake is designated a Use I water, *Water Contact Recreation and Protection of Aquatic Life*. Under the Code of Maryland Regulations (COMAR), this designation states that "all waters of this state shall be protected for the basic uses of water contact recreation, fish, other aquatic life, wildlife and water supply." The pollutants causing the water quality criteria violations in Clopper Lake are nutrients and sediment. The pond suffers from excessive eutrophication that interferes with the designated use of the pond. Eutrophication can be defined as the process of accelerated aging of a surface waterbody caused by excess nutrients and sediments being brought into the lake (Fetter, 1988).

Clopper Lake was not attaining the DO standard in the hypolimnion due to nutrient loadings. It was determined that phosphorous was the limiting nutrient and thus needed to be controlled. The hypolimnion can be defined as the area of the lake which occurs below the thermocline, the region in a thermally stratified body of water which separates the warmer

oxygen-rich surface layers (epilimnion) from the cold oxygen-poor deepwater environment. During periods of thermal stratification in a lake, the relationship between trophic status and the saturation potential for oxygen determine the DO concentration below the epilimnion. MDE has developed an interim interpretation on the DO criteria for thermally stratified lakes. According to this interpretation, the DO concentration of the hypolimnion is expected to be 10% of the concentration in the epilimnion in a meso-eutrophic system. The TMDL is expected to cause the DO concentrations of the hypolimnion to increase from a minimum of 0.1 mg/L (current conditions) to 0.5 mg/L.

Section 303(d) of the CWA 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 water quality standards. The TMDLs submitted by MDE are designed to attain acceptable loadings of phosphorus and sediment for the pond. Furthermore, these TMDLs are designed to restore the designated uses of Clopper Lake and attain the narrative water quality criteria that are currently not being met. See Table 1 for a summary of the allowable loads.

III. Discussion of Regulatory Conditions

EPA finds that MDE has provided sufficient information to meet all of the eight basic requirements for establishing phosphorus and sediment TMDLs for Clopper Lake. EPA therefore approves the TMDLs for phosphorus and sediment for Clopper Lake. 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 has a numerical criterion for DO. According to the criterion, DO concentrations may not be less than 5.0 milligrams per liter (mg/L) unless resulting from naturally occurring conditions. In lake environments, low concentrations of DO are expected in bottom waters even under optimal natural conditions. However, achievement of the 5.0 mg/L criterion is expected in well-mixed surface waters. The TMDL for phosphorous is aimed at addressing DO violations within the hypolimnion since the DO standard is being attained in the epilimnion.

Also, a narrative criterion states that excessive sedimentation shall not interfere with the Use I designation. The current sediment load was quantified as being below the assimilative capacity of the lake. Therefore, the TMDL does not call for any reductions in sediment loadings. In the past, development has caused an increase in sedimentation, and thus, created a sedimentation problem. Since the construction phase in the watershed is largely complete, sedimentation is no longer viewed as a problem. The violation of both criteria (the numeric DO and narrative Use I Designation) in Clopper Lake indicates

nutrient enrichment in the pond. The overall objective of the TMDLs is to reduce phosphorus and sediment loads in order to meet all water quality criteria that support the Use I designation.

The TMDL proposes that the violation of the water quality criterion for DO is caused by excessive growth of plants and algae. This excessive growth is linked to the trophic status of the pond, which is controlled by phosphorus loading. Phosphorous and nitrogen concentrations were analyzed to determine which was the limiting nutrient. It was determined that phosphorous was the limiting nutrient and therefore reductions were applied towards its loading. Because phosphorus binds to sediment, sedimentation rates are expected to be reduced as well. However, the sediment reductions were not quantified because the current loadings are below the assimilative capacity of the lake.

Chlorophyll *a* (Chl-a), a measure of algal biomass, is used as the endpoint. The chlorophyll *a* endpoint selected for Clopper Lake – 20 ug/l, or approximately 60 on the Carlson's Trophic State Index (TSI) – is in the lower range of eutrophy, which is an appropriate trophic state at which to manage this impoundment since moderate degrees of eutrophication are compatible with the sustenance and enhancement of Clopper Lake's fishery. Other states have adjusted their trophic-state expectation for lakes or impoundments with differing uses. Minnesota, for example, uses an ecoregion-based approach. Heiskary (2000) reports that individuals utilizing lakes for recreational purposes (water contact, fishing) demanded relatively clear, less enriched lakes in the Northern Lakes and Forest (NLF) and North Central Hardwood Forest (NCHF) ecoregions. In the Western Corn Belt Plains and Northern Glaciated Plains ecoregions, users accepted relatively greater enrichment and less clarity. Under Minnesota's classification system, lakes in the NLF and NCHF ecoregions are considered to fully meet use support with TSIs of about 53 and 57, respectively. Lakes in the other two ecoregions, both of which are largely agricultural, are considered to fully support use with TSIs of about 60 (Heiskary, 2000). Clopper Lake lies in the Piedmont ecoregion; which is categorized as having a rolling to moderately hilly topography with varying soils. There are few natural lakes occurring in this region (none in Maryland).

Clopper Lake is used as a recreational warm-water fishery. Moderate degrees of eutrophication are compatible with the sustenance and enhancement of such warm-water fisheries. An appropriate management goal, therefore, is to enhance or maintain support of the Clopper Lake fishery. An endpoint for maintaining the productive fishery while avoiding nuisance algal blooms is a maximum permissible Chl-a level of 20 ug/L. This endpoint is in the lower range of eutrophy, and is, therefore, an appropriate trophic state at which to manage the pond.

The constituents discussed above are related by means of two accepted empirical methods known as the Vollenweider Relationship and Carlson's TSI. R.A. Vollenweider

developed the relationship by assessing a large number of lakes[1]. 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 (the time it would take for the system to flush itself). Carlson's TSI is a frequently used, biomass-related index. The TSI considers Secchi depth, Chl-a and total phosphorus, with each providing an independent measure of trophic state. Index values range from 0 (ultraoligotrophic) to 100 (hypereutrophic). The following classification 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 20 ug/L corresponds to a TSI of 60. Equation A was used to convert a TSI score of 60 into a phosphorous load in grams per square meter per year.

Equation A

$$TSI(TP) = 4.15 + 14.42 \ln[TP]$$
$$60 = 4.15 + 14.42[TP]$$
$$[TP] = 48 ug / l$$
$$(48 ug / l * depth * 10^3) \div (retention * 10^6) = Xg / m^2 / year$$

Since phosphorus binds to sediments, reducing the phosphorus loads should result in lower sediment loads as well.

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

Total Allowable Load

As mentioned above, the endpoint used is a maximum Chl-a of 20 ug/L, since a relationship exists between the level of Chl-a concentration and phosphorus loading.

MDE determined that the limiting nutrient is phosphorus. Therefore, a TMDL for nitrogen was not necessary. Separate TMDLs have been calculated for both phosphorus

[1] Vollenweider, 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.

and sediment. The allocations are presented as yearly loads. Expressing TMDLs as yearly loads is consistent with Federal regulations at 40 CFR 130.2(i), which state that TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure.

EPA regulations [40 CFR 130.2.(i)] state that the total allowable load shall be the sum of individual wasteload allocations for point sources, load allocations for nonpoint sources, and natural background concentrations. The TMDLs for phosphorus and sediment for Clopper Lake 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 the allowable loads.

Waste Load Allocations

The watershed that drains to Clopper Lake contains no permitted surface water discharges. Therefore, the wasteload allocation was set to zero.

Load Allocations

Maryland provided adequate land use and loading data in the TMDL report, but did not distribute the total load allocation to specific land use categories in the TMDL report. Maryland included a gross load allocation for the TMDLs. 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. The loading estimates for phosphorus and sediments are based on the total annual load calculated using Chesapeake Bay and Montgomery County loading data.

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 loads should be distinguished. MDE uses the Chesapeake Bay Phase Model 4.3 loading coefficients which are land use specific and include natural background contributions, atmospheric deposition (to land and/or water), and baseflow contributions.

As noted above, Maryland did not provide a breakdown of the load allocation in the TMDL report. The TMDLs are based on phosphorus loading from the two land uses/sources within the watershed. According to the Technical Memorandum, the specific load allocations for the TMDLs during average flow are presented in Tables 3 and 4.

Table 3 - Summary of Load Allocations for Phosphorus (average flow)

Land Use Category	% Land Use	Watershed Area (acres)	% Nonpoint source current load	Nonpoint source current load (lbs/yr)	% nonpoint source TMDL load	Nonpoint source TMDL load (lbs/yr)	% reduction needed
Developed	77	1,409	99.0	906	99.0	495	45.4
Forest/other Herbaceous	17	311	1.0	9	1.0	5	44.4
Total	94	1,720	100	915	100	500	-----

Table 4 - Summary of Load Allocations for Sediments (average flow)

Land Use Category	% Land Use	Watershed Area (acres)	% Nonpoint source current load	Nonpoint source current load (Tons/yr)	% nonpoint source TMDL load	Nonpoint source TMDL load (Tons/yr)	% reduction needed
Developed	77	1,409	91.0	117	91.0	117	0.0
Forest/other Herbaceous	17	311	9.0	12	9.0	12	0.0
Total	94	1,720	100	129	100	129	0.0

Allocations Scenarios

EPA realizes that the above breakouts of the total loads for phosphorus and sediments to the point sources and nonpoint sources is one allocation scenario. As implementation of the established TMDLs proceed, Maryland may find that other combinations of nonpoint source 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. Please note that the TMDL does not call for any reductions in sediment loading.

Federal regulations at 40 CFR 122.44(d)(1)(vii)(B) require that, for a National Pollutant Discharge Elimination System (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 EPA. EPA 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, as NPDES permits are issued for point sources that discharge the pollutants of concern to Clopper Lake, any deviation from the wasteload allocations set forth in the Technical Memorandum, TMDL report, and described herein for the particular 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 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.

In addition, EPA regulations and program guidance provide for effluent trading. Federal regulations at 40 CFR 130.2 (I) states: "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 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, EPA 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.

In terms of the TMDL analysis, the Chesapeake Bay Phase 4.3 Model loading coefficients were used which effectively consider natural background, loads from septic tanks, as well as baseflow contributions.

4) The TMDLs consider critical environmental conditions.

EPA regulations in 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 important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards[2]. The TMDLs address the critical values for Chl-a and DO, which are 20 ug/L and 5.0 mg/L, respectively. The TSI ranking of 60 can also be used as a critical value.

5) *The TMDLs consider seasonal environmental variations.*

Seasonal variations involve changes in streamflow as a result of hydrologic and climatological patterns. In the continental United States, seasonally high flow normally occurs in early spring from a combination of snowmelt and spring rain, while seasonally low flow typically occurs during the warmer summer and early fall drought periods[3].

The TMDLs appropriately 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.

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 EPA guidance, the MOS can be achieved through two approaches. The first approach is to reserve a portion of the loading capacity as a separate term. The second 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. The load allocated to the MOS is computed as ten percent of the total allowable load. MDE has also incorporated conservative assumptions that effectively constitute an additional, implicit MOS.

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[2]EPA memorandum regarding EPA Actions to Support High Quality TMDLs from Robert H. Wayland III, Director, Office of Wetlands, Oceans, and Watersheds to the Regional Management Division Directors, August 9, 1999.

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

In establishing an MOS for sediments, MDE has adopted an implicit approach by selecting a conservative endpoint. Although no reductions in sediment loading are called for in the TMDL, some reductions are expected as a result of phosphorous controls.

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

EPA 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 EPA. Furthermore, EPA has authority to object to issuance of an NPDES permit that is inconsistent with wasteload allocations established for that point source.

Nonpoint source controls to achieve load allocations can be implemented through a number of existing programs, including EPA's Clean Water Action Plan and Maryland's Water Quality Improvement Act of 1998, and the state's Chesapeake Bay Agreement's Tributaries Strategies for Nutrient Reduction.

Nonpoint source nutrient reductions will depend heavily on implementation of agricultural best management practices (BMP). The TMDL document lists the following as BMPs: a Soil Conservation and Water Quality Plan, treatment of highly erodible land, conservation tillage, and Nutrient Management Plans. The sediment TMDL will also rely on a number of BMPs, both structural and nonstructural, which can be implemented to significantly reduce sediment loads.

In addition, there will be follow-up monitoring within five years as part of Maryland's Watershed Cycling Strategy. This follow-up monitoring will allow Maryland and EPA 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 Clopper Lake. The public review and comment period extended from November 16, 2001 to December 17, 2001. Two sets of written comments were received by MDE. These comments and responses were provided with the TMDL document.

On October 4, 2001, 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 February 8, 2002, regarding our proposed action on Maryland TMDLs. On February 27, 2002, EPA received concurrence from the U.S. Fish and Wildlife Services and

on March 1, 2002 EPA received concurrence from the National Marine Fisheries Service that our action is not likely to adversely affect endangered species and their critical habitat.