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

February 13, 2001

Mr. Robert Hoyt
Assistant Secretary
Maryland Department of the Environment
2500 Broening Highway
Baltimore, Maryland 21224

Dear Mr. Hoyt:

The Environmental Protection Agency (EPA) Region III, has reviewed the report "Total Maximum Daily Loads (TMDLs) of of Phosphorus and Sediments to Johnson Pond, in the Upper Wicomico Watershed, Wicomico County, Maryland" which was submitted by the Maryland Department of Environment (MDE) for final agency review on January 3, 2001. Pursuant to 40 CFR Section 130.7(d), EPA is approving the Johnson Pond TMDLs.

The definition of Load Allocation (LA) at 40 CFR Section 130.2(g) states, in part, that "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." Further, a wasteload allocation (WLA), according to 40 CFR Section 130.2(h), is "The portion of a receiving water's loading capacity that is allocated to one of its existing or future points sources of pollution." In addition, a TMDL is defined at 40 CFR Section 130.2(i) as "The sum of the individual WLAs for point sources and LAs for nonpoint sources and natural background."

The supporting documentation provided with the TMDL report, specifically, the Technical Memorandum provides one allocation scenario with individual point and nonpoint source allocation. 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.

EPA has determined that the TMDL and technical report are consistent with the regulation and requirements of 40 CFR Section 130 (see enclosed Decision Rationale). Pursuant to 40 CFR Sections 130.6 and 130.7(d)(2), the TMDLs and the supporting documentation, including the Technical Memorandum, should be incorporated into Maryland's current water quality management plan.

EPA has authority to object to issuance of a National Pollutant Discharge Elimination System (NPDES) permit that is inconsistent with WLAs established for that point source. If an NPDES permit is issued with an effluent limitation that does not reflect the WLA contained in the approved TMDLS 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 contact me at (215) 814-1111 or contact Thomas Henry at (215) 814-5752.

Sincerely,

/s/

Rebecca W. Hanmer, Director
Water Protection Division

Enclosure

Decision Rationale

Total Maximum Daily Loads of Phosphorus and Sediments to Johnson Pond, in the Upper Wicomico Watershed Wicomico County, Maryland

I. Introduction

This document sets forth the U.S. Environmental Protection Agency's (EPA) decision rationale for approving the Total Maximum Daily Loads (TMDL) for phosphorus and sediment in Johnson Pond submitted by the Maryland Department of the Environment (MDE) on January 3, 2001. The rationale is based on information provided in the TMDL document and is intended to assess whether TMDLs meet the following eight regulatory requirements:

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) The TMDLs have been subject to public participation.
8) There is reasonable assurance that the TMDLs can be met.

The Technical Memorandum, *Significant Phosphorus and Sediment Point and Non-point Sources in the Johnson Pond Watershed* submitted by the MDE, specifically allocates sediment to each of three separate 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 Model Phase IV loading coefficients from segment 160 which considers 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. Each land use load allocation represents yearly allowable loads of phosphorus. MDE also allocates phosphorus to the Delmar Wastewater Treatment Plant (WWTP) and the Purdue, Inc. WWTP. Table 1 summarizes the TMDLs for Johnson Pond Creek as determined by MDE.

Table 1 - Phosphorus and Sediment TMDLs Summary

Parameter	Rate	TMDL	WLA[2]	LA[3]	MOS[4]
Phosphorus	lbs/yr	5,093	1,135	3,449	509
	lbs/day[1]	14.0	3.1	9.4	1.4
Sediment	tons/year	2,008	34	1,974	Implicit
	tons/day[1]	5.5	0.1	5.4	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

II. Summary

Johnson Pond is a fairly large impoundment located at the outlet of the Upper Wicomico River in Wicomico County, Maryland. The Wicomico River is a tributary of Monie Bay, which lies in the Lower Eastern Shore Tributary Strategy Basin. Monie Bay drains to Chesapeake Bay via Tangier Sound. The impoundment, which is owned by the City of Salisbury, originally served as a mill pond but was significantly expanded to its present dimensions following construction of a concrete dam in 1933. The dam at Johnson Pond is the designated dividing line between tidal and nontidal waters in the Wicomico River.

Three major tributaries contribute most of the inflow to the ponds. Little Burnt Branch, Connelly Mill Branch, and Leonard's Pond Run merge to form the northernmost tributary, and Middle Neck Branch and Peggy Branch merge to form the easternmost tributary. Brewington Branch enters the northeast arm of the pond between the other two main tributaries. Under base flow conditions, the tributaries are generally shallow (1 to 3 feet) at their point of discharge to the pond. The pond discharges to the Wicomico River, which flows southwest to Chesapeake Bay.

The surface area of Johnson Pond is 136 acres, and it has a drainage area of 24,993 acres. The pond lies in the Atlantic Coastal Plain physiographic province. The soils immediately surrounding the pond are easily erodible. The soils range from level to steep excessively drained to somewhat poorly drained sands and are characterized by loamy sands in upland areas. The soils of the outer watershed area are typically level to gently sloping, moderately well-drained and well-drained upland soils with a subsoil of friable or firm, sandy clay loam. The depth of the pond averages 7.0 feet and reaches a maximum of 20.3 feet. Because a large volume of the lake has been lost to sedimentation, the TMDLs have been developed under the assumption that the pond will be dredged to restore it to its approximate 1933 dimensions.

The land use distribution in the watershed is approximately 41 percent agricultural, 42 percent forested, and 17 percent developed. Two significant point source discharges of nutrients are considered in the Johnson Pond TMDL analysis: the Delmar and Perdue Farms, Inc.,

wastewater treatment plants (WWTP).

Water quality sampling was conducted at Johnson Pond in 1990 through 1993 by Coastal Environmental Services, Inc. (CES) for the City of Salisbury. CES collected water samples from the pond and the tributaries of Middle Neck Branch and Naylor Mill Branch. Sample analyses were conducted for nitrate (Nitrate-N), total phosphorus (Total-P), total suspended solids (TSS), and chlorophyll *a* (Chl-a). Monitoring of Johnson Pond and its tributaries was also conducted by MDE's field office in 1998. MDE collected water samples as well. Sample analytes included dissolved oxygen (DO), Total-P, total nitrogen (Total-N), Nitrate-N, nitrite, and ammonia.

The pond was identified on Maryland's 1996 list of water quality limited segments (WQLS). The water quality impairment of Johnson Pond involves a violation of the numerical water quality for DO and violations of general narrative criteria applicable to the designated use of the water in the state's regulations. The Surface Water Use Designation for Johnson Pond in the Maryland water quality standards is Use I - 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 constituents causing the water quality criteria violations in Johnson Pond are phosphorus and sediment. The pond suffers from excessive sedimentation, algal blooms, excessive plant growth, and foul odors that interfere with direct contact with and recreational use of the pond.

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 water quality standards. The TMDLs submitted by MDE are designed to attain acceptable loadings of phosphorus into the pond and allowable sediment concentrations. Furthermore, these TMDLs are designed to restore the designated uses of Johnson Pond and attain 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 Johnson Pond. EPA therefore approves the TMDLs for phosphorus and sediment in Johnson Pond. This approval is outlined below according to the eight regulatory requirements.

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

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.

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 they result 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. Also, a narrative criterion states that excessive sedimentation shall not interfere with the Use I designation. The violation of both criteria in Johnson Pond indicates nutrient enrichment in the pond.

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. Because phosphorus binds to sediment, sedimentation rates are also associated with phosphorus loading. Reduction of phosphorus loading will result in a decrease in sedimentation rates as well as adherence to the water quality criterion.

Chlorophyll-a (Chl-a), a measure of algal biomass, is used as the endpoint. Raschke[1] reports that a mean growing season Chl-a concentration of less than 25 micrograms per liter (µg/L) is recommended to maintain a minimal aesthetic environment for viewing pleasure, safe swimming, and good fishing and boating. Hendricks, Maceina, and Reeves[2] analyzed black bass (*Micropterus* spp.) tournament catch data for 27 Alabama reservoirs over a 5-year period from 1986 to 1991. Among many parameters, concentrations of Chl-a were positively correlated with both the average weight of the bass caught and the frequency of "memorable size" (≥ 2.27-kilogram [kg]) catches. Johnson Pond is used as a recreational warm-water (bass) fishery. Moderate degrees of eutrophication are compatible with sustenance and enhancement of such warm-water fisheries. An appropriate management goal, therefore, is to enhance or maintain support of the Johnson Pond fishery. An endpoint for maintaining the productive fishery while avoiding nuisance algal blooms is a maximum permissible Chl-a level of 20 µg/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 Trophic State Index (TSI). R.A. Vollenweider developed the relationship by assessing a large number of lakes[3]. 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, Chl-a, and total

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[1] Raschke, R.L. 1994. Phytoplankton Bloom Frequencies in a Population of Small Southeastern Impoundments. Lake and Reservoir Management 8(2): 205-210.

[2] Hendricks, H.S., M.J. Maceina, and W.C. Reeves. 1995. Abiotic and Biotic Factors Related to Black Bass Fishing Quality in Alabama. Lake and Reservoir Management 11(1):47-56.

[3] 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.

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 µg/L corresponds to a TSI of 60.

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 µg/L, and a relationship exists between the level of Chl-a concentration, the phosphorus loading, and excessive sedimentation.

Separate TMDLs have been calculated for both phosphorus 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 waste load allocations (WLA) for point sources, and load allocations (LA) for nonpoint sources, and natural background concentrations. The TMDLs for phosphorus and sediment for Johnson Pond are consistent with 40 CFR 130.2 (i) because the total loads provided by MDE equal the sum of the individual WLAs for point sources and the land-based LAs 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 Johnson Pond contains two permitted surface water discharges. The loading estimates are based on the total annual load calculated using monitoring data rather than a model. The WLAs calculated are presented in Table 2. Though it appears that the TMDL is increasing the point source loads, this is not the case. The current loadings were based on monitoring reports rather than permit limits. This was done in order to more accurately characterize "existing" conditions. WLAs can be made

up to permit limits. In these TMDLs, WLAs were made at average effluent concentration and design flow.

Table 2 - Summary of WLAs for Phosphorus and Sediment

Facility	NPDES[1] permit #	Parameter	Rate	Current Loading[2]	WLA	Reduction needed
Delmar WWTP[3]	MD0020532	Phosphorus	lbs/year	703	989	-----
		Sediment	tons/year	27	27	-----
Perdue, Inc. WWTP[4]	MD0000060	Phosphorus	lbs/year	47	146	-----
		Sediment	tons/year	7.3	6.6	-----

[1] NPDES = National Pollutant Discharge Elimination System

[2] The current phosphorus loadings are based on 1998 DMRs. For Delmar an average effluent concentration of 0.42 mg/L and a flow of 0.55 mgd was used for the current phosphorus load. For Delmar's current sediment load, a concentration of 30 mg/L and a flow of 0.650 mgd were used. For Perdue, an average effluent concentration of 0.1 mg/L and a flow of 0.160 mgd was used for the current phosphorus loading. For Perdue's current sediment load, a concentration of 30 mg/L and a flow of 0.160 mgd were used.

[3] Though Delmar's NPDES permit limit is 1.0 mg/L for total phosphorus, the phosphorus WLA for Delmar was based on a concentration of 0.5 mg/L and a flow of 0.650 mgd. The sediment WLA was based on a concentration of 30 mg/L and a flow of 0.650 mgd.

[4N] Though Purdue's NPDES permit limit is 0.5 mg/L for total phosphorus, the WLA for Purdue was based on a concentration of 035 mg/L and a flow of 0.160 mgd. The sediment WLA was based on a concentration of 30 mg/L and a flow of 0.160 mgd.

It is necessary to distinguish between current permitted loading, the WLA determined through the TMDL process, and actual loading. Current permitted loading refers to the allowable loading as designated by NPDES permit for each facility prior to the TMDL process. The WLA represents the allowable point source pollutant load necessary to achieve water quality standards as determined by the TMDL process. The actual loading represents the amount of pollutant loading that a facility is discharging. This load must not exceed the permitted load specified in the NPDES permit. However, it is very likely that actual loading is less than both the current permitted load and wasteload allocation such that pollutant loadings from particular facilities may not be impacted by the TMDL process. Conversely, permit limits may need to be adjusted to reflect the wasteload allocation determined in the TMDL process. Thus, while a facility may not be required to take action to reduce pollutant loadings, the NPDES permit may need to be revised in order to reflect findings from the TMDL process.

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 LA for the low-flow and average-flow TMDLs. These gross LAs were presented in Table 1. Nonpoint source loading rates represent a cumulative

impact from all sources, including naturally occurring and human-induced sources. Atmospheric sources of phosphorus and sediment associated with wind erosion are considered to be insignificant for Johnson Pond because the ratio of the watershed to the surface area of the pond is large. The loading estimates for phosphorus are based on the total annual load calculated using monitored data rather than a model.

According to federal regulations at 40 CFR 130.2(g), LAs 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 Program model Phase IV loading coefficients (Year 2000 scenario) 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 LA in the TMDL report; however, such a breakdown for average annual flow was provided in the Technical Memorandum. The TMDLs are based on sediment loading from the 4 land uses/sources within the watershed. According to the Technical Memorandum, the specific load allocations for the TMDLs during average flow are presented in Table 3.

Table 3 - Summary of Load Allocations for Sediment (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
Mixed Agriculture	41	10,197	85.8	2,244	85.8	1,806	20
Forest/other Herbaceous	42	10,547	2.8	74	2.8	59	20
Urban	17	4,249	11.4	297	11.4	239	20
Total	100	24,993	100	2,615	100	2,104	-----

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 point and 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.

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 WLA 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 WLAs established for that point source. To ensure consistency with these TMDLs, as NPDES permits are issued for the point sources that discharge the pollutants of concern to Lower Wicomico River, any deviation from the WLAs set forth in the Technical Memorandum 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 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 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.

Johnson Pond'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 from CES's 1990 through 1993 and MDE's 1998 sampling data.

In terms of the high-flow TMDL analysis, Chesapeake Bay Model Phase IV loading coefficients (Year 2000 scenario) 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 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 Chl-a and DO, which are 20 µg/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.*

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. 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. The load allocated to the MOS is computed as 10 percent of the total allowable load, thereby applying an additional 10 percent reduction in phosphorus.

MDE has also incorporated conservative assumptions that effectively constitute an additional, implicit MOS. In calculating minimum DO concentrations, MDE assumed a water temperature of 30°C; the highest temperature observed during monitoring was 29°C.

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 sediment.

7) *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 Johnson Pond. The public review and comment period extended from October 18, 2000 to November 18, 2000. Four sets of written comments were received by MDE. These comments and responses are provided with the TMDL document.

EPA submitted a copy of these TMDLs to the United States Fish and Wildlife Service (USFWS) on October 16, 2000. The EPA did not receive a response from the USFWS on the proposed TMDLs.

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

EPA requires that there be a reasonable assurance that the TMDLs can be implemented. WLAs 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 WLA 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 WLAs established for that point source.

Nonpoint source controls to achieve LAs 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, 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.