



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

January 29, 2001

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 carbonaceous biochemical oxygen demand (CBOD) and nitrogenous biochemical oxygen demand (NBOD) for Little Youghiogheny River" which was submitted by the Maryland Department of Environment (MDE) for final agency review on December 14, 2000. Pursuant to 40 CFR Section 130.7(d), EPA is approving the Little Youghiogheny River 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 Load of Carbonaceous Biochemical Oxygen Demand (CBOD) and Nitrogenous Biochemical Oxygen Demand (NBOD) for the Little Youghiogheny River Garrett County, Maryland

I. Introduction

This document sets forth the U.S. Environmental Protection Agency (EPA) rationale for approving the Total Maximum Daily Loads (TMDLs) of carbonaceous biochemical oxygen demand (CBOD) and nitrogenous biochemical oxygen demand (NBOD) for Little Youghiogheny River, as submitted by the Maryland Department of the Environment (MDE) for final Agency review on December 14, 2000. The EPA's rationale is based on the TMDLs, the Technical Memorandum, and other information provided in the submittal document to determine if the TMDLs meets the following eight regulatory conditions pursuant to 40 CFR Section 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 (MOS).
- 7) The TMDLs have been subject to public participation.
- 8) There is reasonable assurance that the TMDLs can be met.

The Technical Memorandum, *Significant BOD Point and Nonpoint Sources in the Little Youghiogheny River Watershed*, submitted by the Maryland Department of the Environment (MDE), specifically allocates CBOD and NBOD loads to two point sources, the Trout Run Waste Water Treatment Plant (WWTP) and the Deer Park Spring Water Company. The current CBOD and NBOD loads were based on the two point sources' monthly maximum National Pollutant Discharge Elimination System (NPDES) permit limits. The nonpoint source current loads were based on summer stream surveys from 1994 and 1997. MDE has determined that low flow is the critical condition. Table 1 shows a summary of the TMDLs as determined by MDE.

Table 1, Summary of CBOD and NBOD TMDLs¹

Flow Regime (Period)	Parameter	TMDL	WLA ²	LA ³	MOS ⁴
Low-flow (June 1 - Oct. 31)	CBOD (lbs/month)	423	102	294	27
	NBOD (lbs/month)	413	95	318	0

¹ The load allocations for low-flow represent flows developed using a United States Geological Survey regression analysis and also on data collection in 1994 and 1997 in the Little Youghiogheny

² WLA = Waste Load Allocation

³ LA = Load Allocation

⁴ MOS = Margin of Safety

II. Summary

The Little Youghiogheny River is a tributary of the Youghiogheny River, located in Garrett County, Maryland. The Youghiogheny River flows northward into Pennsylvania, joining the Monongahela and Allegheny Rivers to form the Ohio River. The mainstem of the river is about 11 miles long. The watershed of the Little Youghiogheny River covers about 26,214 acres. The predominant land uses in the watershed, based on 1997 Maryland Office of Planning land cover data, are mixed agriculture (comprising 11,129 acres or 43 percent of the total area), forested (11,027 acres or 42 percent), and urban (3,837 acres or 15 percent). The upper portion of the Little Youghiogheny River traverses both agricultural and forest lands. The lower portion traverses the watershed's urban areas of Loch Lynn Heights, Mountain Lake Park, and Oakland.

The Little Youghiogheny River watershed lies in the Allegheny Plateau. Geological strata in the watershed include shale and sandstone of the Devonian age Chemung and Hampshire formations¹. Soils in the watershed are primarily Calvin-Gilpin association, which consists of gently sloping to steep, moderately deep, well-drained soils; in association with red to gray shale and sandstone².

The hydrology of the Little Youghiogheny differs from typical Appalachian streams, due to relatively little elevation change along its river channel. The sluggish, meandering river is more depositional than erosional³. During a low-flow stream survey of the Little Youghiogheny River from the Trout Run WWTP to the confluence with the Youghiogheny River, velocities averaged 0.13 feet per second, and depths averaged about 1 to 1.5 feet.

The Little Youghiogheny River was identified on Maryland's 1996 303(d) list of water quality limited segments (WQLS) because of nutrients. Maryland listed the Little Youghiogheny based on the information available at that time. The actual impairment, however, in the Little Youghiogheny River is due to the occurrence of occasional low dissolved oxygen (DO) levels. While the cause of these DO violations was initially suspected to be nutrients, subsequent investigation determined that biochemical oxygen demand (BOD) is the dominant cause of the low DO concentrations. Therefore, the TMDLs for the Little Youghiogheny River addressed the dominant impairment substance, BOD. BOD reflects the amount of oxygen consumed through two processes: CBOD and NBOD. The water quality goal of the TMDLs is to establish allowable CBOD and NBOD inputs to ensure the DO standard is maintained. MDE anticipates that these CBOD and NBOD TMDLs will completely address the original 303(d) listing for nutrients.

The TMDLs were developed using a mathematical water quality model, INPRG, for free-flowing

¹ Maryland Geological Survey, Geological Map of Maryland. Cleaves, Edwards, and Glaser. Under Supervision of Weaver. 1968.

² U.S. Department of Agriculture, Soil Conservation Service. Soil Survey of Garrett County Maryland. August, 1974.

³ Maryland Department of the Environment, Hydrologic Transport in the Little Youghiogheny River, Under Low-Flow Conditions, As Determined Using Fluorimetric Procedures. Holt and Tate, Fall 1997.

streams. INPRG is a steady state mathematical model, developed within MDE, to assess the impact of point and nonpoint source load discharges of material that exert an oxygen demand in free-flowing streams. The model prepares input data and runs a free-flowing stream model based on the Streeter Phelp's equation. The INPRG model predicts receiving stream CBOD, NBOD, and DO concentrations for selected stream input conditions.

The model was used to determine allowable CBOD and NBOD loadings that would maintain the DO standard in the receiving stream. The model was also used to investigate seasonal variations in stream conditions and to establish margins of safety that are environmentally conservative. Load allocations were determined for distributing allowable loads between point and nonpoint sources.

The modeling spatial domain extends from the confluence of the Little Youghiogheny River and the Youghiogheny River, approximately 7.6 miles upstream along the mainstem of the Little Youghiogheny River, to the discharge from the Deer Park Spring Water Company. The model's spatial domain does not include the entire length of the Little Youghiogheny River; rather, it focuses on the area where the localized DO impairment occurs.

To project the water quality response of the system, the model was applied to seven different scenarios under selected stream flow conditions. By modeling several stream flow conditions, the scenarios simulate seasonality, a necessary element of the TMDL development process.

The available data and predictive modeling indicated no problems with DO concentrations during higher flows. Problems with DO are expected to occur only at low flow conditions. Therefore, Maryland did not perform an average annual flow TMDL analysis. The TMDLs were calculated only for 7Q10 conditions. The 7Q10 flow refers to the seven-day consecutive lowest flow expected to occur every 10 years. Because 7Q10 conditions are only likely to occur during summer months, the TMDLs only apply from June 1 to October 31. MDE determined TMDLs for critical low-flow conditions only (see Table 1).

The allocation of CBOD and NBOD for nonpoint sources was based on observed field values and the implementation of nutrient management plans that will achieve a commensurate reduction in CBOD and NBOD loads. The point source allocation was based on the future maximum NPDES permit limits at the Trout Run WWTP and the Deer Park Spring Water Company.

MDE modeled the Little Youghiogheny River for average summer conditions. The data and model showed no impairment problems and therefore no TMDLs were developed for average flow.

III. Discussion of Regulatory Conditions

EPA finds that Maryland has provided sufficient information to meet all of the eight basic requirements for establishing CBOD and NBOD TMDLs for the Little Youghiogheny River. EPA therefore approves the TMDLs, the TMDL Technical Memorandum, and supporting documentation for CBOD and NBOD in the Little Youghiogheny River. EPA approval is outlined according to the following regulatory requirements.

- 1) *The TMDL is designed to implement the applicable water quality standards.*

The Little Youghiogheny River is designated as a Use III-P, natural trout water according to the Code of Maryland Regulations 26.08.02. The DO standard for a Use III-P water is a minimum daily average of 6.0 mg/L and 5.0 mg/L at any time. MDE has indicated that DO concentrations were 0.1 milligram per liter (mg/L) below the numeric criteria of 5 mg/L minimum at any time in September 1991 and were 0.1 mg/L below the 6 mg/L minimum daily average numeric criteria as recently as July 1997.

These minor and infrequent DO violations would not by themselves be a cause of concern. MDE is concerned with the release rate from one of its point sources, Trout Run WWTP. The allowable rate of wastewater release from the Trout Run WWTP is dependent upon the flow rate of the Little Youghiogheny River above the wastewater treatment plan. Therefore, MDE believes if this release rate is not carefully controlled, DO violations will increase in frequency and severity.

Though both nutrients and BOD contribute to the impairment, MDE's analysis demonstrated that the impairment is principally due to BOD in the stream. Therefore, MDE describes the development of TMDLs for CBOD and NBOD in the Little Youghiogheny River. MDE anticipates that these TMDLs will completely address the impairment and ensure that DO standards are met.

Based on the above discussion, EPA finds that the TMDLs established for CBOD and NBOD will ensure that the designated use and water quality criteria for the Little Youghiogheny River are met and maintained.

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

Total Allowable Loads

The critical season for DO problems in the Little Youghiogheny River has been identified by Maryland as the summer months. During these months, flow in the channel is reduced resulting in slower moving, warmer water which has less dilution potential and is susceptible to algal blooms and low DO concentrations. In order to maintain the DO levels, Maryland has established individual TMDLs for CBOD and NBOD June 1 through October 31. Maryland presented this as monthly loads to be consistent with the monthly concentration limits that are required by NPDES permits. Expressing the TMDLs as monthly 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. See Table 1 for a summary of the allowable loads.

EPA regulations [40 CFR 130.2(i)] define TMDL as the sum of individual WLA for point sources and LA for nonpoint sources and natural background. TMDLs for CBOD and NBOD for the Little Youghiogheny River are consistent with Section 130.2(i) because the total loads provided by Maryland equal the sum of the individual WLAs for point sources and the land-based LAs for nonpoint sources, as set forth below and in the Technical

Memorandum provided with the TMDL. Pursuant to 40 CFR 130.6 and 130.7(d)(2), the TMDLs, Technical Memorandum, and supporting documentation should be incorporated into Maryland's current water quality management plan.

Waste Load Allocations

EPA regulations require that an approvable TMDL include individual WLAs for each point source. Maryland's TMDL report for the Little Youghiogheny River did not include an individual waste load allocation for each of the two point sources (Trout Run WWTP - NPDES permit # MD0051497 and Deer Park Spring Water - NPDES permit # MD0060844) of CBOD and NBOD. The Technical Memorandum, however, did provide WLA scenarios, which are presented in Table 2.

Table 2 - Summary of low-flow WLAs for CBOD and NBOD

Facility	NPDES permit #	Parameter	Current permit Loading ¹ (lbs/month)	WLA (lbs/month)	Reduction needed (%)
Trout Run WWTP ²	MD0051497	CBOD	230	35	85
		NBOD	350	54	85
Deer Park Spring Water ³	MD0060844	CBOD	405	68	83
		NBOD	1,040	41	96

¹ The current point source loadings assume current monthly maximum NPDES permit limits. For Trout Run WWTP, the current loading was based on a flow of 20,3500 gpd, a BOD₅ concentration of 30 mg/L (converts to CBOD) and a TKN concentration of 15 mg/L (converts to NBOD). For Deer Park Spring Water, the current loading was based on flow of 36,000 mgd, a BOD₅ concentration of 30 mg/L. (convert to CBOD), and a TKN concentration of 25 mg/L (converts to NBOD).

² WLA loading based on a design flow of 3,100 gpd, a BOD₅ concentration of 30 mg/L, and a TKN concentration of 15 mg/L.

³ WLA based on a design flow of 36,000 gpd, a BOD₅ concentration of 5 mg/L., and a TKN concentration of 1 mg/L.

The point source loads used to represent the expected current conditions assumed maximum NPDES permit limits. The existing Trout Run WWTP treatment process and wastewater discharge method affected the WLA. The Trout Run WWTP is a lagoon treatment system with hydrographic controlled wastewater release. Effluent flows are restricted during the summer period and are dependent on stream flow conditions above the WWTP. A wastewater release rate relationship for Trout Run WWTP was developed in 1983, which became a discharge permit condition. The current TMDLs use data collected in 1997 and developed a new hydrographic release relationship. This revised release relationship can be seen by the change in flow from the "current" conditions to the flow used to develop the WLA for Trout Run WWTP.

The WLAs of the TMDL represent point source loads which will provide compliance with the water quality standards mentioned in Section 1 above. The low-flow monthly WLA values are most applicable from June 1 to October 31. The low-flow TMDL analyses were accomplished using nonpoint source loads which are based on 1994 and 1997 field survey

data from the Little Youghiogheny River.

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 maximum 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 limits may need to be revised in order to reflect findings from the TMDL process.

Load Allocations

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. A breakdown by land use cannot be determined for nonpoint source loads during low flow. These nonpoint source loads which were based on observed concentrations account for “natural” and human-induced components. Table 3 presents the gross LA for low flow. These allocations are based on the period between June 1 and October 31 only, when critical flow periods (7Q10 flows) are most likely to occur.

Table 3 - Summary of low-flow LAs for CBOD and NBOD

Parameter	“Existing” ¹ Nonpoint Source Load (lbs/month)	LA (lbs/month)	Reduction needed (%)
CBOD	498	294	41
NBOD	509	317	38

¹ Based on 1994 and 1997 observed field data. Reflects what is considered as current conditions.

Allocations Scenarios

EPA realizes that the above breakouts of the total loads for CBOD and NBOD 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 TMDL 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 Little Youghiogheny 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 TMDL 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), this TMDL and the supporting documentation, including the Technical Memorandum, should be incorporated into Maryland's current water quality management plan.

3) *The TMDL considers the impacts of background pollutant contributions.*

For the low-flow TMDL analysis, Maryland used field data from January 1990 to October 1998; these dates would adequately consider pollutant contributions from baseflow. Baseflow is considered to be most influential during low-flow periods. Other nonpoint source contributions, such as atmospheric deposition and loads from septic systems, are also influential during low-flow periods.

No violations of DO standards (5.0 mg/L at any time and 6.0 mg/L minimum daily average) have been recorded during high flow periods. The TMDL documentation shows that impairment is not a concern during high flow periods, but rather during low flow months (June 1 to October 31), which is the applicable period for these TMDLs.

4) *The TMDLs consider critical environmental conditions.*

EPA regulations at 40 CFR 130.7(c)(1) require that TMDLs consider critical conditions for streamflow, loading, and water quality parameters. The intent of this requirement is to ensure that the water quality of the Little Youghiogheny River is protected when it is most vulnerable.

Critical conditions are important because they describe factors that can combine to result in a violation of water quality standards. As such, critical conditions will help identify actions needed to meet water quality standards.² Critical conditions represent the combination of environmental factors (such as flow, temperature, and other parameters) that results in attaining and maintaining the water quality criterion. In specifying critical conditions in the water body, an attempt is made to develop and analyze a reasonable “worst-case” scenario condition. For example, stream analysis often uses a low-flow (7Q10) design condition as critical because at low flow the water body is least able to assimilate pollutants without exhibiting adverse impacts.

Based on data collected between January 1990 and October 1998, Maryland has determined that DO concentrations were 0.1 mg/L below the numeric criteria of 5 mg/L minimum at any time in September 1991 and were 0.1 mg/L below the 6 mg/L minimum daily average numeric criteria as recently as July 1997. The modeling scenarios used to determine CBOD and NBOD TMDLs were based on critical low flow conditions (7Q10 flow). The observed data suggest that these conditions exhibit the highest likelihood of DO violations.

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 during the colder period of winter and in early spring from snowmelt and spring rain. Seasonal low flow typically occurs during the warmer summer and early fall drought periods³. The INPRG water quality model and TMDL analysis effectively consider seasonal environmental variations.

6) *The TMDLs include a margin of safety.*

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 Water Management Division Directors, August 9, 1999.

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

This requirement is intended to add a level of safety to the modeling process to account for any uncertainty. The MOS may be implicit and built into the modeling process, or it may be explicit and taken as a percentage of the WLA, LA, or TMDL.

The TMDLs for the Little Youghiogheny River employs both of these approaches. Implicit MOS are built into the design conditions for the WLA and the LA computations through the use of conservative assumptions. The following conservative assumptions were used: (1) The use of critical conditions of the 7Q10 flow was used to determine the final TMDL load allocations, which constitutes a worst-case scenario; (2) The TMDLs were modeled using the maximum NPDES monthly permit limits for effluent concentrations from the Trout Run WWTP and future NPDES monthly permit limits for Deer Park Spring Water Company. These monthly limits are likewise conservative because they represent an upper limit that WWTPs strive not to exceed.

In terms of the TMDL analysis for CBOD, MDE states that it explicitly allocates 27 lbs/month of the loading capacity and reserves this for the MOS. There was no explicit MOS for NBOD as an implicit MOS was utilized as discussed above.

7) *The TMDLs have been subject to public participation.*

TMDLs for CBOD and NBOD in the Little Youghiogheny River were open for public comment from November 7, 2000 through December 8, 2000. No written comments were received by MDE.

EPA submitted a copy of these TMDLs to the United States Fish and Wildlife Service (USFWS) on November 13, 2000 and to the United States National Marine Fisheries Service (USNMFS) on November 13, 2000. The EPA did not receive a response from the USFWS or USNMFS on the proposed TMDLs.

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

EPA requires that there be a reasonable assurance that the TMDL 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.

MDE believes that agricultural ditching, direct loading from animals, and deposition of nutrient-laden sediment from high-flow events are potential nonpoint sources that negatively impact water quality during critical low-flow periods. MDE believes that nonpoint source control mechanisms are necessary to improve water quality during low-

flow periods. MDE states that controlling these nonpoint sources will ensure that water quality standards during low-flow periods will be achieved.

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.

IV. Additional Information

The following table presents the TMDL in pounds per day.

Flow Regime (Period)	Parameter	TMDL	WLA ¹	LA ²	MOS ³
Low-flow (June 1 - Oct. 31)	CBOD (lbs/day) ⁴	13.8	3.3	9.6	0.9
	NBOD (lbs/day) ⁴	13.5	3.1	10.4	0

¹ WLA = Waste Load Allocation

² LA = Load Allocation

³ MOS = Margin of Safety

⁴ 30.5 days per month was used to convert lbs/month to lbs/day