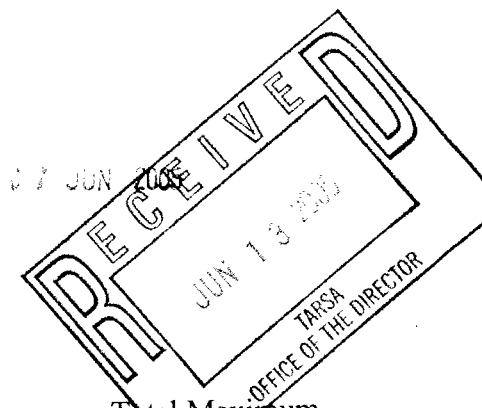




UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Dr. Richard Eskin, Director
Technical and Regulatory Services Administration
Maryland Department of the Environment
1800 Washington Boulevard, Suite 540
Baltimore, Maryland 21230

Dear *Rich* Dr. Eskin:



The U. S. Environmental Protection Agency (EPA) is pleased to approve Total Maximum Daily Loads (TMDLs) for the Choptank Watershed, received by EPA for review and approval from the Maryland Department of the Environment (MDE) on September 29, 2004. MDE submitted its Comment Response Document to EPA on or about October 14, 2004. MDE submitted a response to EPA's additional comments on December 22, 2004. The TMDL was established and submitted in accordance with Section 303(d)(1)(c) and (2) of the Clean Water Act to address impairments of water quality as identified in Maryland's Section 303(d) list. The Lower Choptank River was identified on the State of Maryland's 1996 Section 303(d) list for water quality-limited segments as being impaired by nutrients, sediments and bacteria. Additional listings of biological impacts were added for non-tidal and tidal portions in the 2002 and 2004 Section 303(d) lists. The TMDLs described in this document were developed to address localized water quality impairments identified within the watershed, specifically excessive bacteria concentrations in the four restricted shellfish areas of the Lower Choptank River Basin. Water quality data demonstrated that two of the six originally listed shellfish restricted areas were now attaining criteria and a TMDL was therefore not warranted. The other impairments in this watershed will be addressed by MDE in separate TMDL document(s).

EPA's approval of the Lower Choptank River TMDL is based on EPA's understanding that MDE will complete a Bacterial Source Tracking (BST) study in this watershed and MDE will evaluate the BST data when it becomes available, in order to verify the nonpoint source loading estimates contained in the TMDL report.

The TMDL analysis identifies the current loading, relates the current loading to the applicable water quality standard, and identifies the necessary reductions for a TMDL that will achieve the applicable water quality standard. It also identifies individual wasteload allocations (WLAs) and load allocations (LAs) to the maximum extent supported by the available data.

In accordance with Federal regulations at 40 CFR §130.7, a TMDL must comply with the following requirements: (1) designed to attain and maintain the applicable water quality standards, (2) include a total allowable loading and as appropriate, WLAs for point sources and LAs for nonpoint 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 uncertainties in the relationship between pollutant loads and in-stream water quality), (7) consider reasonable assurance that the TMDL can be met, and (8) be subject to public participation. The enclosure to this letter describes how the fecal coliform TMDLs for the Lower Choptank River Basin satisfy each of these requirements.

Following the approval of this TMDL, Maryland shall incorporate the TMDL into the Water Quality Management Plan pursuant to 40 CFR § 130.7(d)(2). As you know, all new or revised National Pollutant Discharge Elimination System permits must be consistent with the TMDL WLA pursuant to 40 CFR § 122.44(d)(1)(vii)(B). Please submit all such permits to EPA for review as per EPA's letter dated October 1, 1998.

If you have any questions or comments concerning this letter, please do not hesitate to contact Mr. Thomas Henry at (215) 814-5752.

Sincerely,



Jon M. Capacasa, Director
Water Protection Division

Enclosure

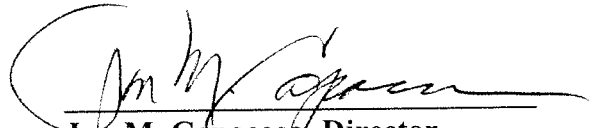
cc: Melissa Chatham, MDE-TARSA





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

**Decision Rationale
Total Maximum Daily Load
For Fecal Coliform for
Restricted Shellfish Harvesting Areas in the
Lower Choptank Basin
Talbot and Dorchester Counties, Maryland**


Jon M. Capacasa, Director
Water Protection Division

Date: 6/7/05



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Decision Rationale
Total Maximum Daily Loads of Fecal Coliform
for Restricted Shellfish Harvesting Areas
in the Lower Choptank Basin in Talbot and Dorchester Counties, Maryland

I. Introduction

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

This document sets forth the United States Environmental Protection Agency's (EPA's) rationale for approving the TMDLs for fecal coliform in the Choptank Basin. The TMDLs were established to address impairments of water quality, caused by bacteria (i.e., evidenced by fecal coliform), as initially identified in Maryland's 1996 Section 303(d) list for water quality-limited segments. The Maryland Department of the Environment (MDE) submitted the report, "Total Maximum Daily Loads of Fecal Coliform for Restricted Shellfish Harvesting Areas in the Lower Choptank Basin in Talbot and Dorchester Counties, MD," dated September 2004, to EPA for final review on September 29, 2004. MDE subsequently completed the Comment Response Document on October 14, 2004, for submittal to EPA. This TMDL addresses one segment, Lower Choptank, on Maryland's Section 303(d) list (basin ID 02-14-01-03).

EPA's rationale is based on the TMDL Report, information contained in the Appendix to the report, the Comment Response Document, and MDE's December 22, 2004 response to EPA's comments. USEPA's review determined that the TMDL meets the following eight regulatory requirements pursuant to 40 CFR Part 130.

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

II. Summary

The TMDLs specifically allocate fecal coliform loadings to nonpoint sources in four separate load allocations to each of the restricted shellfish harvesting areas in the Lower Choptank basin: San Domingo Creek, Tred Avon River, Tar Creek and Northeast Branch. There were two other segments, Jenkins and Cummings Creek, that were identified as impaired on Maryland's 303(d) List but recent sampling data shows that they are now in compliance with the bacteria criteria. There are no point sources in the watershed and, consequently, no allocations were made to point sources. The TMDLs for each area were expressed as a median TMDL and a 90th Percentile TMDL, which is consistent with the format of Maryland's bacteriological criteria, which assign numeric threshold criteria for fecal coliforms based on the median and 10 percent of sample data.

Table 1 - Fecal Coliform Median TMDLs Summary

Area	Rate	TMDL	Wasteload Allocation (WLA)	Load Allocation (LA)	Margin Of Safety (MOS)
San Domingo	Counts/day	5.36×10^{10}	0	5.36×10^{10}	Implicit
Tred Avon River	Counts/day	3.41×10^{11}	0	3.41×10^{11}	Implicit
Tar Creek	Counts/day	2.88×10^{10}	0	2.88×10^{10}	Implicit
Northeast Branch	Counts/day	5.96×10^{10}	0	5.96×10^{10}	Implicit

Table 2 - Fecal Coliform 90th Percentile TMDLs Summary

Area	Rate	TMDL	Wasteload Allocation (WLA)	Load Allocation (LA)	Margin of Safety (MOS)
San Domingo	Counts/day	1.88×10^{11}	0	1.88×10^{11}	Implicit
Tred Avon Creek	Counts/day	1.20×10^{12}	0	1.20×10^{12}	Implicit
Tar Creek	Counts/day	1.01×10^{11}	0	1.01×10^{11}	Implicit
Northeast Branch	Counts/day	2.09×10^{11}	0	2.09×10^{11}	Implicit

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

III. Background

The Lower Choptank River drains directly to the Chesapeake Bay. Five of the six listed segments, San Domingo Creek, Tred Avon River, Tar Creek, Northeast Branch and Cummings Creek, are located in Talbot County along the northeast shoreline of the Lower Choptank River. The six impaired segment, Jenkins Creek, is located in Dorchester County along the southern shoreline of the Lower Choptank River. The Lower Choptank River watershed is approximately 22 square kilometers. Additional information about restricted shellfish areas in the Lower Choptank River basin are included in Section 2.1 of the TMDL Report. Figures 2.1.1 through 2.1.7 of the TMDL report show the location of the Lower Choptank River basin, sub-basins, and land uses in the watershed.

The Lower Choptank River was originally listed in Maryland's 1996 Section 303(d) list for water quality-limited segments (WQLS) as being impaired by bacteria, nutrients, and sediments. In 2002, portions of the Lower Choptank River were placed on the Section 303(d) list for biological impairments and additional shellfish restricted areas were identified on the 2004 Section 303(d) List. These other impairments will be addressed at a future date.

The monitoring and analysis for these bacteria TMDLs were performed using fecal coliform data. Fecal coliform is a bacterium which can be found within the intestinal tract of all warm blooded animals. Fecal coliform in itself is generally not a pathogenic organism. However, fecal coliform indicates the presence of fecal wastes and the potential for the existence of other pathogenic bacteria. The higher concentrations of fecal coliform indicate the elevated likelihood of the presence of pathogenic organisms in shellfish that are harvested from polluted waters and subsequently consumed. Maryland's current water quality standards provide bacteriological criteria for Shellfish Harvesting (i.e., Use II) waters based on numeric criteria for fecal coliform.

The Surface Water Use Designation for the Lowe Choptank River is Use II: *Shellfish Harvesting Waters* (Code of Maryland Regulations, COMAR, 26.08.02.08M). Maryland's water quality standards provide bacteriological criteria for Use II waters, stating that a public health hazard will be presumed if the most probable number (MPN) of fecal coliform organisms exceeds a median concentration of 14 MPN per 100 milliliters or if more than 10 percent of samples taken exceed 49 MPN per 100 milliliters (for a 3-tube decimal dilution test).

Maryland's current standards provide a classification system for Use II shellfish waters. Use II waters may be classified as approved, conditionally approved, restricted, or prohibited. Maryland's listing methodology for shellfish waters provides that approved and conditionally approved shellfish waters are not placed on the Section 303(d) list of water quality limited segments. Shellfish waters may be classified as "approved" if the median fecal coliform MPN of at least 30 water samples taken over a 3-year period to incorporate inter-annual variability does not exceed 14 per 100 milliliters, and, in areas not affected by point source discharges, the 90th percentile of water samples does not exceed an MPN of 49 per 100 milliliters (for a three-tube decimal dilution test). The restricted shellfish areas of the Lower Choptank River were classified as such because they do not meet shellfish water quality standards for an approved classification. The Lower Choptank River was placed on Maryland's Section 303(d) list because the shellfish areas within this system, which are currently classified as restricted, violate Maryland's protective bacteriological criteria for Use II Waters.

The Clean Water Act (CWA) Section 303(d) and its implementing regulations require that TMDLs be developed for waterbodies identified as impaired by the state where technology-based and other required controls do not provide for attainment of the water quality standards. The TMDLs submitted by MDE are designed to attain acceptable loadings of fecal coliform and in order to attain the bacteriological water quality criteria and support the Use II designation. Refer to Tables 1 and 2 above for a summary of allowable loads.

For this TMDL analysis, Maryland used fecal coliform data from eight shellfish monitoring stations in the Lower Choptank River basin. Observations and data from the period of 1999-2003 were used. Maryland selected a five-year period for TMDL development because it covers a longer time span than the 30-sample requirement and is consistent with MDE's shellfish program sanitary survey schedule. The TMDL analysis utilizes a tidal prism model in order to account for the tidal influences in the Lower Choptank River basin. The transport of fecal coliform is most influenced by the tide and the amount of freshwater discharge into the shellfish harvesting areas. The steady state tidal prism method assumes that freshwater input, tidal range, and the first-order decay rate of fecal coliform are all constant. Further, the model assumes that a single volume can represent a waterbody, and that the fecal coliform is well mixed in the system. The steady state mass inputs include: upstream loading of fecal coliform, loading from the local

area within the tidal cycle, and fecal coliform associated with ocean water that does not exit the embayment on the previous ebb tide. Mass outputs include: fecal coliform associated with embayment water that does not enter the system on the previous flood tide, and fecal coliform lost through decay or removal. The given or known parameters are: tidal period, fecal coliform decay rate, tidal range, freshwater discharge flow rate, ocean tidal exchange ratio (estimated from salinity data), volume of embayment, fecal coliform concentration and water quality criterion. These values are used to derive the TMDL (i.e., using the water quality criterion) and the current load (i.e., using the current median concentration). The differences between these loads is used to compute the percentage load reductions that are required to meet the TMDL. Section 4.2 and Appendix A of the TMDL report provide a thorough description of the tidal prism model and calculations.

Maryland conducted a nonpoint source assessment by reviewing several sources of population and land use data to estimate the contributions of fecal coliforms by the following categories: wildlife, human, pets, and livestock. Any contributions from boat discharges, resuspension from sediments, and regrowth of fecal coliform were neglected due to insufficient data. The contributions from each of these four sources were derived by multiplying the population densities by fecal coliform production rates. For the wildlife contribution, the population density estimates for each major wildlife animal type was multiplied by the associated acreage or stream mile for that animal, and multiplied again by the estimated fecal coliform production rate for each animal type. For human contributions, Maryland used census coverage and estimated daily discharges of wastewater per person, fecal coliform concentration of the wastewater, and septic system failure rate to calculate the human loading for areas having no or partial public sewer system. Pet contributions were calculated using survey-based estimates of dogs walked per household, percentage cleaned up, and estimated fecal coliform production rate per dog. Livestock contributions were derived from livestock census data and estimated fecal coliform production rates and manure washoff rates. Detailed explanations of the nonpoint source assessment and estimated parameters for each category are described in Appendix B of the TMDL report.

The results of the nonpoint assessment allowed Maryland to calculate the percentage contribution of each of the four major types of nonpoint sources, and to further calculate and assign required reductions in each category in order to achieve the TMDL load allocation. This method is described further below in Section IV. Also, Maryland is conducting a one-year bacteria source tracking (BST) study for each shellfish harvesting area in order to verify the categorized nonpoint source estimates and load allocations in the TMDL when the laboratory data become available.

IV. Discussion of Regulatory Conditions

USEPA finds that MDE has provided sufficient information to meet all of the eight basic requirements for establishing fecal coliform TMDLs for the Lower Choptank River basin. USEPA therefore approves the TMDLs for fecal coliform in the Lower Choptank River. 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.

The Surface Water Use Designation for the Lower Choptank River is Use II: *Shellfish Harvesting Waters* (Code of Maryland Regulations, COMAR, 26.08.02.08M). Use II waters may be classified as approved, conditionally approved, restricted, or prohibited. Maryland's listing methodology for shellfish waters provides that approved and conditionally approved shellfish waters are not placed on the Section 303(d) list of water quality limited segments. For Use II waters, Maryland's water quality standards provide bacteriological criteria of (1) fecal coliform organisms not to exceed a median concentration of 14 MPN per 100 milliliters; and (2) no more than 10 percent of samples taken may exceed 49 MPN per 100 milliliters (for a 3-tube decimal dilution test). Shellfish waters may be classified as "approved" if the median fecal coliform MPN of at least 30 water samples taken over a 3-year period to incorporate inter-annual variability does not exceed 14 per 100 milliliters, and, in areas not affected by point source discharges, the 90th percentile of water samples does not exceed an MPN of 49 per 100 milliliters (for a three-tube decimal dilution test).

Maryland developed the bacteria TMDLs for the Lower Choptank River in terms of fecal coliform because Maryland's current water quality standards contain specific numerical criteria for bacteria in Use II waters that are based on the concentration of fecal coliform, as described above. The TMDLs therefore use these applicable numerical criteria as an endpoint. The TMDLs were calculated and expressed as median TMDLs and 90th percentile TMDLs in order to meet the associated numerical criteria. EPA believes that this is a reasonable and appropriate water quality goal.

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

Total Allowable Load

As described above, MDE used as endpoints a median concentration of 14 MPN per 100 milliliters and a 90th percentile concentration of 49 MPN per 100 milliliters. Separate TMDLs were developed for each restricted shellfish area of Lower Choptank River based on these two endpoints. The TMDLs and allocations are presented as mass loading rates of counts per day. Expressing TMDLs as daily mass loading rates 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 at 40 CFR 130.2(i) state that the total allowable load shall be the sum of individual waste load allocations for point sources, and load allocations for nonpoint sources, and natural background concentrations. The TMDLs for fecal coliform for the Lower Choptank River 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 (which are zero, in this case, since

no point sources exist) and the land-based load allocations for nonpoint sources. Pursuant to 40 CFR 130.6 and 130.7(d)(2), these TMDLs and the supporting documentation should be incorporated into Maryland's current water quality management plan. See Tables 1 and 2 for a summary of allowable loads.

Waste Load Allocations

According to the TMDL report and Maryland's response to comments, the watershed that drains to the Lower Choptank River contains no permittable point sources, and Maryland therefore assigned a wasteload allocation of zero to each of the four restricted shellfish areas (San Domingo Creek, Tred Avon River, Tar Creek and Northeast Branch) in the basin.

Load Allocations

The TMDL summary in Tables 1 and 2 contain the load allocations for each restricted shellfish area. As described above in Section III, Maryland conducted a nonpoint source assessment in order to estimate the contributions of wildlife, humans, pets, and livestock to the overall nonpoint source loadings. Maryland considers humans, pets and livestock to be controllable sources and therefore assigned reductions to these categories to determine if the TMDL load allocation could be achieved. If the TMDL could not be achieved as in the case of Northeast Branch, then reductions were assigned to the wildlife category. Although wildlife is considered to be a natural source of fecal coliform loadings and the TMDL does not promote changing a natural condition by the reduction of wildlife, Maryland and EPA believe that implementation of certain measures to reduce controllable sources may also serve to reduce wildlife inputs. Therefore, it is appropriate to assign reductions to wildlife sources where necessary to meet the TMDL goals. Table 4.6.1 presents the results of Maryland's calculated reductions to each nonpoint source category.

As stated above, Maryland developed two TMDLs for each restricted shellfish area consistent with the two numeric criteria for Use II waters that are based on median and 90th percentile data. For each shellfish area, the TMDL (which, in this case, is equal to the load allocation) for the median case is more restrictive than the 90th percentile TMDL in terms of mass loading rate. However, larger percentage and overall mass reductions are required in the 90th percentile TMDL case based on the difference between the TMDL and the current load to each shellfish area. For example, in order to meet the median TMDL for Tar Creek, a reduction by 0 percent or approximately 0 counts/day would be required as that criteria is being attained. In order to meet the 90th percentile TMDL, a reduction by 35 percent or 5.4×10^{10} counts/day would be required. Note that the percentage reductions are not strictly comparable between the two TMDLs because the baseline, or current, loads are different: the loads were calculated using the corresponding median concentration or 90th percentile concentration of the current condition. In assigning the load allocations to the four major nonpoint source categories (wildlife, human, pets, livestock), Maryland compared the median and 90th percentile TMDL results and used the allowable loads requiring the greater reduction as the basis for these load allocations.

According to Federal regulations at 40 CFR 130.2(g), load allocations are best estimates of the loading, which may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the loading.

Wherever possible, natural and nonpoint source loadings should be distinguished. MDE has used several sources of census, population, and land use coverage data in order to estimate and account for the major types of nonpoint, natural and background sources. Table 4.6.1 provides a breakdown of the TMDL load allocation by nonpoint source category, for each restricted shellfish area.

Allocations Scenarios

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

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

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, 3) the trading results in enforceable controls for each source. Final control plans and loads should be identified in a publicly available planning document, such as the state's water quality management plan (see 40 CFR 130.6 and 130.7(d)(2)). These final plans must be consistent with the goals of the approved TMDLs.

Based on the foregoing, EPA has determined that the TMDLs 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 MDE's responses to comments, should be incorporated into Maryland's current water quality management plan.

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

The TMDLs consider the impact of background pollutants by considering the bacterial load from natural sources such as wildlife.

- 4) *The TMDLs consider critical environmental conditions.*

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

Critical conditions are 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 standards¹. Critical conditions are a combination of environmental factors (e.g., flow, temperature, etc.), which have an acceptably low frequency of occurrence. In specifying critical conditions in the waterbody, an attempt is made to use a reasonable "worst-case" scenario condition. MDE modeled the 90th percentile current load and allowable load. The 90th percentile concentration is that which one would expect to see exceeded no more than 10% of the time. For each shellfish area, the actual 90th percentile concentration from the most recent data set (i.e., five years) was used in these calculations, thereby incorporating the critical condition. Further, Maryland compared the 90th percentile and median TMDLs to determine which value represented the critical condition and to determine the basis for the critical condition. Greater reductions that are driven by the median TMDL suggest that, on average, water column concentrations are very high with limited variation. Greater reductions that are driven by the 90th percentile TMDL suggest a less frequent occurrence of high fecal coliform concentrations due to the variation of hydrological conditions.

Also, based on Statewide shellfish monitoring data, fecal coliform concentrations are higher in the headwaters. Since multiple monitoring stations exist in two of the restricted shellfish areas Tred Avon River and Northeast Branch, the station(s) closest to the headwaters for these areas were used to represent the restricted shellfish harvesting area concentrations of fecal coliform; the downstream stations were used to represent boundary conditions.

¹EPA 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.

5) *The TMDLs consider seasonal environmental variations.*

Seasonal variations involve changes in flow as a result of hydrologic and climatological patterns. Generally, water column data for fecal coliform may sometimes exhibit seasonal trends. For example, bacteria levels tend to be lower during the colder months in some areas, but this is not always the case. In order to account for seasonal variation and inter-annual variability, Maryland's shellfish monitoring program collects samples on a monthly basis and a minimum data set of 30 samples over three years (in this case, five years) is used. The monitoring design and the statistical analysis used to evaluate water quality attainment therefore implicitly includes the effect of seasonality. Further, Maryland's water quality standard itself reflects the need to account for seasonal variation in assigning both a median (i.e., average condition) criterion and 90th percentile criterion (i.e., to account for fluctuations around the median)

The BST study to be conducted by Maryland in conjunction with these TMDLs may generate additional information as to the seasonality of loadings by the types of nonpoint sources investigated in the study.

6) *The TMDLs include a margin of safety*

The requirement for a margin of safety (MOS) is intended to add a level of conservatism to the modeling process in order to account for uncertainty. Based on USEPA guidance, the MOS can be achieved through two approaches. One approach is to reserve a portion of the loading capacity as a separate term, and the other approach is to incorporate the MOS as part of the design conditions. MDE has adopted an implicit MOS for these TMDLs. In the tidal prism model, an implicit MOS was incorporated to account for the uncertainty of certain model parameters. For example, the decay rate was determined to be the most sensitive parameter and was therefore set at the conservative end of its known range (i.e., 0.7 per day) for the TMDL calculation. Also in areas where multiple monitoring stations exist, monitoring data from the stations closest to the headwaters, which typically exhibit higher concentrations, were used to represent the concentration within the corresponding shellfish area in the TMDL calculation.

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 USEPA. Furthermore, USEPA has the 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 will be implemented in an iterative process that places priority on those sources having the largest impact on water quality, with consideration given to ease of implementation and cost. Best management practices can be implemented through a number of existing programs and funding sources, including: Maryland's Agricultural Cost Share Program, Environmental Quality and Incentives Program, State Water

Quality Revolving Loan Fund, and Stormwater Pollution Cost Share Program. Also, low interest loans available through MDE to address failing septic systems. Also, sources of fecal coliform stemming from boats and marinas can be addressed through the Clean Marina Program, no discharge zone program, and grant funds available through Maryland Department of Natural Resources to install a pumpout station. Under existing Maryland law, certain new and existing marinas are required to have a pumpout station.

Pursuant to the National Shellfish Sanitation Program, Maryland will continue to monitor shellfish waters and classify harvesting areas. In addition to water quality monitoring and shoreline surveys, MDE will be conducting a bacteria source tracking study that will be used to confirm the source estimates presented in the TMDL report.

As mentioned above, Maryland and EPA acknowledge that while the TMDL does not promote changing natural background conditions due to wildlife, it is possible that implementation measures taken to reduce nonpoint controllable sources will also reduce wildlife loadings. In areas where wildlife is the dominant source of fecal coliform inputs to the shellfish waters and where water quality standards cannot be attained following TMDL implementation for controllable sources, then MDE would consider conducting either a risk-based water quality assessment or a Use Attainability Analysis to recognize these natural conditions.

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

MDE provided an opportunity for public review of and comment on the fecal coliform TMDLs for the Lower Choptank River basin. The public review and comment period was open from August 19, 2004 to September 17, 2004. Comments were submitted by three commentors: Circle-C Oyster Ranchers Association, Mid-Atlantic Environmental Law Center and The Talbot River Protection Association. EPA Region III provided comments to MDE after the close of the comment period and following receipt of the Draft Final TMDL report.

On November 9, 2004, EPA initiated informal consultation with the U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) pursuant to Section 7(c) of the Endangered Species Act, requesting the Services' concurrence with EPA's findings that approval of these TMDLs does not adversely affect any listed endangered and threatened species and their critical habitats. The NMFS provided concurrence with EPA's determination in its letter to EPA dated December 14, 2004. EPA is awaiting a response from FWS, and in anticipation of receiving concurrence from FWS, EPA has prepared a Section 7(d) memo to this effect and is proceeding with its approval pending FWS' concurrence.

