



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
**REGION III**  
**1650 Arch Street**  
**Philadelphia, Pennsylvania 19103-2029**  
6/11/2008

Richard Eskin, Ph.D.  
Director, Technical and Regulatory Services Administration  
Maryland Department of the Environment  
1800 Washington Blvd., Suite 540  
Baltimore, MD 21230-1718

Dear Dr. Eskin:

The U.S. Environmental Protection Agency (EPA) is pleased to approve Total Maximum Daily Loads (TMDLs) of Fecal Coliform for the restricted shellfish harvesting area of the Chester River in the Lower Chester River Basin, Southeast Creek Basin, and Middle Chester River Basin, received by EPA for review and approval from the Maryland Department of the Environment (MDE), originally on September 24, 2007. To clarify some of the listing and industrial point source issues, MDE submitted a revised TMDL report to EPA on April 25, 2008. The TMDL was established and submitted in accordance with Sections 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 Chester 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. An additional listing of biological impact was added in the 2002 Section 303(d) List. The TMDLs described in this document were developed to address localized water quality impairments identified within the watershed, specifically excessive bacteria concentrations in the three restricted shellfish areas of the Lower Chester River Basin, Southeast Creek Basin, and Middle Chester River Basin. The other impairments in this watershed will be addressed by MDE in separate TMDL documents.

The TMDL analysis identifies the current loading, relates the current loading to the applicable water quality standard, and identifies the necessary reductions for a total maximum daily load that will achieve the applicable water quality standard. It also identifies individual wasteload and load allocations 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) be designed to attain and maintain the applicable water quality standards; (2) include a total allowable loading and as appropriate, wasteload allocations for point sources and load allocations 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); and (7) be subject to public participation. In addition, these TMDLs considered reasonable assurance that the TMDL allocations assigned to the nonpoint sources can be reasonably met. The enclosure to this letter describes how the fecal coliform TMDLs for the

Lower Chester River Basin, Southeast Creek Basin, and Middle Chester River Basin satisfies each of these requirements.

As you know, all new or revised National Pollutant Discharge Elimination System permits must be consistent with the TMDL wasteload allocations 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 Ms. Mary Kuo at (215) 814-5721 or Mr. Kuo-Liang Lai at (215) 814-5473.

Sincerely,

Signed

Jon M. Capacasa, Director  
Water Protection Division

Enclosure

cc: Nauth Panday, MDE-TARSA  
Melissa Chatham, MDE-TARSA



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## **Decision Rationale**

# **Total Maximum Daily Loads of Fecal Coliform for the Restricted Shellfish Harvesting Area of the Chester River in the Lower Chester River Basin, Southeast Creek Basin, and Middle Chester River Basin, Kent and Queen Anne's Counties, Maryland**

**Signed**

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**Jon M. Capacasa, Director  
Water Protection Division**

**Date: 6/11/2008**

## **Decision Rationale**

### **Total Maximum Daily Loads of Fecal Coliform for the Restricted Shellfish Harvesting area of the Chester River in the Lower Chester River Basin Southeast Creek Basin and Middle Chester River Basin Kent and Queen Anne's Counties, Maryland**

#### **I. Introduction**

The Clean Water Act (CWA) requires a Total Maximum Daily Load (TMDL) to be developed for those waterbodies 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 (MOS), that may be discharged to a water quality limited waterbody.

This document sets forth the U.S. Environmental Protection Agency's (EPA) rationale for approving the TMDLs for fecal coliform in the Chester River located in portions of three-8-digit basins: Lower Chester River (Basin No. 02130505), Southeast Creek (Basin No. 02130508), and Middle Chester River (Basin No. 02130509); hereafter referred to as the Chester River restricted shellfish harvesting area. The TMDLs were established to address impairments of water quality, caused by bacteria (i.e., evidenced by fecal coliform), as identified in Maryland's 1996 CWA Section 303(d) List for water quality limited segments (for details see the Maryland Department of the Environment's (MDE) TMDL report). MDE submitted the report, "Total Maximum Daily Loads of Fecal Coliform for the Restricted Shellfish Harvesting Area of the Chester River in the Lower Chester River Basin, Southeast Creek Basin, and Middle Chester River Basin in Kent and Queen Anne's Counties, Maryland," dated September 24, 2007, to EPA for final review on October 3, 2007.

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

1. The TMDL is designed to implement applicable water quality standards.
2. The TMDL includes a total allowable load as well as individual wasteload allocations (WLAs) and load allocations (LAs).
3. The TMDL considers the impacts of background pollutant contributions.
4. The TMDL considers critical environmental conditions.
5. The TMDL considers seasonal environmental variations.
6. The TMDL includes a MOS.
7. The TMDL has been subject to public participation.

In addition, these TMDLs considered reasonable assurance that the TMDL allocations assigned to nonpoint sources can be reasonably met.

## II. Summary

The TMDLs specifically allocate fecal coliform loadings to sources in three separate load allocations to each of the three restricted shellfish harvesting areas in the Chester River Basin: Lower Chester River Basin, Southeast Creek Basin, and Middle Chester River Basin, Mill Creek, and the Chester River Mainstem. There are five permitted point sources and one industrial point source facility in the watershed. The total permitted fecal coliform load from these point sources is approximately  $1.233 \times 10^{10}$  counts per day, and will be included in the wasteload allocation for the Chester River Mainstem (see Table 2 below). The TMDLs for each area were expressed as a median TMDL and a 90<sup>th</sup> percentile TMDL, which is consistent with the format of Maryland’s bacteriological criteria, which assign numeric threshold criteria for fecal coliform based on the median and 90<sup>th</sup> percentile. However, since the 90<sup>th</sup> percentile criterion is more stringent in this case, the allocations to point (WLA) and nonpoint sources (LA) for the TMDLs are based on the Fecal Coliform 90<sup>th</sup> Percentile Criterion indicated in Table 1.

**Table 1. Fecal Coliform 90<sup>th</sup> Percentile TMDLs Summary**

Area	Rate	TMDL	Wasteload Allocation (WLA)	Load Allocation (LA)	Margin of Safety (MOS)
Chester River Mainstem	Counts/day	$3.75 \times 10^{13}$	$1.233 \times 10^{10}$	$3.75 \times 10^{13}$	Implicit

**Table 2. Permitted Fecal Coliform Wasteload Allocations**

Facility Name	NPDES Permit No.	Design Flow (MGD)	Permitted FC Concentration in MPN/100 ml	Permitted FC Loads in MPN/Day	
				Median	90 <sup>th</sup> Percentile
Chestertown WWTP	MD0020010	0.9	14 (median)	4.77+08	1.55E+09
Kennedyville WWTP	MD0052671	0.06	126 (monthly log mean for <i>E. coli</i> )	4.44E+08	1.44E+09
Eastern Pre-Release Unit WWTP	MD0023876	0.02	200 (monthly log mean)	1.51E+08	4.92E+08
Church Hill WWTP	MD0050016	0.08	14 (median)	4.24E+07	1.38E+08
Worton-Butleron WWTP	MD0060585	0.15	200 (monthly log mean)	1.14E+09	3.69E+09
Chestertown Food, Inc.	MD0012232	0.204	200	1.54E+09	5.02E+09

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” 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 resubmittal to EPA for approval.

### **III. Background**

Lower Chester River Basin (Basin No. 02130505), Southeast Creek Basin (Basin No. 02130508), and Middle Chester River Basin (Basin No. 02130509) are restricted shellfish areas in the Chester River mainstem. The Chester River has a length of approximately 44.5 km, with a width of 5.4 km at its mouth, where it flows into the Chesapeake Bay. Additional information about restricted shellfish areas in the Chester River Basin is included in Section 2.1 of the TMDL Report. Figures 2.1.1 through 2.1.2 of the TMDL report show the location of the Chester River Basin, sub-basins, and land uses in the watershed.

These three basins in the Chester River were originally listed in Maryland's 1996 CWA Section 303(d) List for water quality limited segments as being impaired by bacteria, nutrients, and sediments (listing details see the TMDL report). This document, upon EPA approval, establishes a TMDL for fecal coliform to address all three listings for Lower Chester River Basin, Southeast Creek Basin, and Middle Chester River Basin in the Chester River Mainstem. The listings for other impairments within these Chester River Basins will be addressed at a future date.

The monitoring and analysis for these bacteria TMDLs was 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 Chester River area 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 the 90<sup>th</sup> percentile concentration exceeds 49 MPN per 100 milliliters (for a three 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 affected by point source discharges, the 90<sup>th</sup>

percentile of water samples does not exceed an MPN of 49 per 100 milliliters (for a three tube decimal dilution test). The National Shellfish Sanitation Program (NSSP), oversight by the U.S. Food and Drug Administration (FDA), continues to use the fecal coliform as the indicator organism to assess shellfish harvesting waters to protect human health due to the potential shellfish consumptions. The restricted shellfish areas of the Chester River were classified as such because they do not meet shellfish water quality standards for an approved classification. The Chester 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 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 in order to attain the bacteriological water quality criteria and support the Use II designation. Refer to Table 1 above for a summary of allowable loads.

For this TMDL analysis, Maryland used fecal coliform data from three shellfish monitoring stations in the Chester River Basin (but only one is located inside the restricted harvesting area). Observations and data from the period 2000 to 2005 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 three-dimensional, hydrodynamic, and eutrophication model (HEM-3D) in order to simulate the transport processes in the Chester River. The transport of fecal coliform is most influenced by the tide and the amount of freshwater discharge into the shellfish harvesting areas. Appendix A of the TMDL report provides a thorough description of the HEM-3D model and calculations.

Maryland conducted a nonpoint source assessment by Bacteria Source Tracking (BST) and/or reviewing several sources of population and land use data to estimate the contributions of fecal coliform 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 estimated 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. The transport of fecal coliform from land surface to shellfish harvesting areas is dictated by the hydrology, soil type, land use, and topography of the watershed. The Bacterial Source Tracking

is 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, required reductions in each category in order to achieve the TMDL load allocation. This method is described further below in Section IV.

#### **IV. Discussion of Regulatory Conditions**

EPA finds that MDE has provided sufficient information to meet all of the seven basic requirements for establishing fecal coliform TMDLs for the Chester River Basin. EPA, therefore, approves the TMDLs for fecal coliform in the Chester River. This approval is outlined below according to the seven 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 Chester 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 three 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 90<sup>th</sup> 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 Chester 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 90<sup>th</sup> 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 wasteload 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 90<sup>th</sup> percentile concentration of 49 MPN per 100 milliliters. Separate TMDLs were developed for each restricted shellfish area of the Chester 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 measures.

EPA regulations at 40 CFR §130.2(i) state that the total allowable load shall be the sum of individual wasteload allocations for point sources, and load allocations for nonpoint sources, and natural background concentrations. The TMDLs for fecal coliform for the Chester 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 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 Table 1 for a summary of allowable loads.

#### Wasteload Allocations

According to the TMDL report and Maryland's response to comments, the watershed that drains to Chester River contains seven permitted point sources in the watershed: five municipal treatment plants and two industrial point sources. However, one of the industrial permits is not regulated for fecal coliform discharge. The permitted fecal coliform load from these Wastewater Treatment Plant (WWTP) point sources is approximately  $1.233 \times 10^{10}$  counts per day and will be included in the wasteload allocation for the Chester River Mainstem (see Table 1 and Sections 2.4 and 4.7 in TMDL report).

#### Load Allocations

The TMDL summary in Table 1 contains the load allocations for the 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, 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 background 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. However, it is appropriate to assign reductions to wildlife sources where necessary to meet the TMDL goals.

As stated above, Maryland developed TMDLs for each restricted shellfish area consistent with the two numeric criteria for Use II waters that are based on median and 90<sup>th</sup> percentile data. However, larger percentage and overall mass reductions are required in the 90<sup>th</sup> percentile TMDL case based on the difference between the TMDL and the current load to each shellfish area. 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 90<sup>th</sup> percentile concentration of the current condition.

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 2.4.1 of the TMDL report provides a breakdown of the TMDL load allocation by nonpoint source category, for each restricted shellfish area.

#### Allocations Scenarios

EPA realizes that the above breakout of the total load and load allocation for fecal coliform among the major nonpoint sources for the 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 wasteload 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 a National Pollutant Discharge Elimination System (NPDES) permit for an individual point source, the effluent limitations must be consistent with the assumptions and requirements of any available wasteload allocation for the discharge prepared by the state and approved by EPA. EPA has authority to object to the issuance of an NPDES permit that is inconsistent with wasteload allocations established for that point source. To ensure consistency with these TMDLs, NPDES permits issued for a point source that discharges one or more of the pollutants of concern in the Chester River Watershed, 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 WLAs.

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 background sources such as wildlife.

*4) The TMDLs consider critical environmental conditions.*

EPA 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 the TMDLs are protective of human health, and the water quality of the waterbodies is protected during the times when they are most vulnerable.

Critical conditions are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards<sup>1</sup>. 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 90<sup>th</sup> percentile current load and allowable load. The 90<sup>th</sup> percentile concentration is that which one would expect to see exceeded no more than 10% of the time. For each shellfish area, the actual 90<sup>th</sup> percentile

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<sup>1</sup>EPA memorandum regarding EPA Actions to Support High Quality TMDLs from Robert H. Wayland III, Director, Office of Wetlands, Oceans, and Watersheds to the Regional Management Division Directors, August 9, 1999.

concentration from the most recent data set (i.e., July 2005) was used in these calculations, thereby incorporating the critical condition. Further, Maryland compared the 90<sup>th</sup> 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 90<sup>th</sup> percentile TMDL suggest a less frequent occurrence of high fecal coliform concentrations due to the variation of hydrological conditions.

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 dataset 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 include 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 90<sup>th</sup> percentile criterion (i.e., to account for fluctuations around the median).

The BST study was conducted by Maryland in conjunction with these TMDLs has generated 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 an 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 implicit MOS for these TMDLs. The decay rate is one of the most sensitive parameters of the HEM-3D model. A decay rate of 0.7 per day was used as a conservative estimate in the TMDL calculation; therefore, the MOS is implicitly included in this calculation.

7) *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 Chester River Basin. The public review and comment period was open from August 10, 2007 to September 10, 2007. No comment other than EPA was submitted to MDE after the close of the comment period. EPA sent some clarification comments to MDE on April 18, 2008, and MDE provided a revised TMDL report on April 25, 2008, to clarify the listing and industrial point sources allocation issues.

## **V. Discussion of Reasonable Assurance**

There is a 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 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. BMPs 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 are 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 the 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 also conducted the BST study that was 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.