



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION III  
1650 Arch Street  
Philadelphia, Pennsylvania 19103-2029  
8/2/2006

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

Dear Dr. Eskin:

The U.S. Environmental Protection Agency (EPA) is pleased to approve the Total Maximum Daily Loads (TMDLs) for fecal coliform for the Restricted Shellfish Harvesting Area in Laws Thorofare and Upper Thorofare in the Tangier Sound Basin, Somerset County, Maryland. The TMDL Report was submitted by the Maryland Department of the Environment (MDE) on May 19, 2006 to EPA for review and approval. These TMDLs were 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 Tangier Sound Basin (02-13-02-06) was first identified on Maryland's 1996 Section 303(d) list as impaired by nutrients and sediments, with listings of fecal coliform impairments and evidence of biological impacts in the tidal portions added in 2004. Maryland's 2004 Section 303(d) list refined the fecal coliform impairment with the identification of a specific restricted shellfish harvesting area: Laws Thorofare and Upper Thorofare. The nutrient, sediment and biological impairments in the watershed will be addressed by MDE at a future date. The TMDLs described in this document were developed to address localized water quality impairments identified within the watersheds, specifically excessive bacteria concentrations in the restricted shellfish area of the Tangier Sound Basin.

EPA's approval of the Tangier Sound Basin TMDLs is based on EPA's understanding that MDE will complete a bacterial source tracking (BST) study in this watershed. 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 analyses identify the current loadings, relate the current loadings to the applicable water quality standard, and identify the necessary reductions for TMDLs that will achieve the applicable water quality standard.

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 (WLAs) 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), (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 Tangier Sound Basin satisfy each of these requirements.

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,

*Signed*

Jon M. Capacasa, Director  
Water Protection Division

Enclosure

cc: Melissa Chatham, MDE-TARSA





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**Decision Rationale**  
**Total Maximum Daily Loads of Fecal Coliform**  
**for the Restricted Shellfish Harvesting Area**  
**in Laws Thorofare and Upper Thorofare of the**  
**Tangier Sound Basin in Somerset County, Maryland**

*Signed*

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

**Date: 8/2/2006**



**Decision Rationale**  
**Total Maximum Daily Loads of Fecal Coliform for the Restricted Shellfish Harvesting Area in Laws Thorofare and Upper Thorofare of the Tangier Sound Basin in Somerset County, 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 (MOS) that may be discharged to a water quality-limited water body.

This document sets forth the U.S. Environmental Protection Agency's (EPA) rationale for approving the TMDLs for fecal coliform in the Tangier Sound Basin. The TMDLs were established to address impairments of water quality, caused by bacteria (i.e., evidenced by fecal coliform), as identified in Maryland's 2004 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 the Restricted Shellfish Harvesting Area in the Laws Thorofare and Upper Thorofare of the Tangier Sound Basin in Somerset County, Maryland* on May 19, 2006. The TMDLs in this report address one individual sub-basin of the Tangier Sound Basin as identified on Maryland's Section 303(d) lists. The basin identification for the Tangier Sound Basin is 02-13-02-06.

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

1. The TMDLs are designed to implement applicable water quality standards.
2. The TMDLs include a total allowable load as well as individual waste load allocations (WLA) and load allocations (LA).
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 MOS.
7. There is reasonable assurance that the TMDLs can be met.
8. The TMDLs have been subject to public participation.

**II. Summary**

TMDLs specifically allocate the allowable fecal coliform loading to the restricted shellfish harvesting area of the Laws Thorofare and Upper Thorofare within the Tangier Sound Basin. Based on MDE point source permitting information, there are no point source facility discharge permits regulating the release of fecal coliform directly into the restricted shellfish harvesting area. The fact that the TMDLs do not assign WLAs to any other sources in the watershed should not be construed as a determination by either EPA or MDE that there are no additional sources in the watershed that

are subject to the National Pollutant Discharge Elimination System (NPDES) program. In addition, the fact that EPA is approving these TMDLs does not mean that EPA has determined whether some of the sources discussed in the TMDLs, under appropriate conditions, might be subject to the NPDES program. TMDLs for each area were expressed as a median and a 90<sup>th</sup> percentile load, which is consistent with the format of Maryland’s bacteriological criteria, which assign numeric threshold criteria for fecal coliform based on the median and 10 percent of sample data.

**Table 1 – Fecal Coliform Median TMDLs Summary for the Tangier Sound Basin**

Area	Rate	TMDL	Wasteload Allocation (WLA)	Load Allocation (LA)	Margin of Safety (MOS)
Tangier Sound Basin Segments					
Laws Thorofare and Upper Thorofare	counts/day	3.43 x10 <sup>11</sup>	0	3.43 x10 <sup>11</sup>	Implicit

**Table 2 – Fecal Coliform 90<sup>th</sup> Percentile TMDLs Summary for the Tangier Sound Basin**

Area	Rate	TMDL	Wasteload Allocation (WLA)	Load Allocation (LA)	Margin of Safety (MOS)
Tangier Sound Basin Segments					
Laws Thorofare and Upper Thorofare	counts/day	1.20 x10 <sup>12</sup>	0	1.20 x10 <sup>12</sup>	Implicit

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

### **III. Background**

The Tangier Sound Basin is located on Maryland’s eastern shore of the Chesapeake Bay in Somerset County. A single shellfish harvesting area in the Tangier Sound Basin is addressed by this TMDL Report: Laws Thorofare and Upper Thorofare. Laws Thorofare is bordered to the southeast by the Manokin River and is connected to the Upper Thorofare by two meandering passages along its northwest side. These passages have minimum widths of only 50 meters (m) and 10m. The Upper Thorofare is bordered along its west side to the northern portion of Tangier Sound. Both Laws, Thorofare and Upper Thorofare, have a length of approximately three kilometers (km), but

Laws Thorofare has a width of approximately two km while Upper Thorofare has a width of approximately one km. This restricted shellfish harvesting area has a drainage area of 2,413.3 acres (9.8 km<sup>2</sup>). The Laws Thorofare and Upper Thorofare are dominated by rural land uses with 75% of the area being wetlands. Section 2.0 of MDE's TMDL Report provides additional information about the Tangier Sound Basin and its listed sub-basins, including land use information.

The Tangier Sound Basin (02-13-02-06) was first identified on Maryland's 1996 Section 303(d) list submitted to EPA by MDE as impaired by nutrients and sediments, with listings of fecal coliform impairments and evidence of biological impacts in the tidal portions added in 2004. The 2004 Section 303(d) list refined the fecal coliform impairment with the identification of a specific restricted shellfish harvesting area. The Laws Thorofare and Upper Thorofare are classified as a restricted shellfish harvesting area because water quality data has documented bacteria concentrations exceeding Maryland's water quality standards for fecal coliform. As a result of this restricted classification, this area is closed to shellfish harvesting. Maryland's TMDL Report addresses the fecal coliform impairment specific to this sub-basin. The nutrient, sediment, and biological impairments in the watershed will be addressed by MDE at a future date.

The monitoring and analysis for these bacteria TMDLs were performed using fecal coliform data. Fecal coliform is a bacterium that 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 this sub-basin of the Tangier Sound Basin is Use II: *Shellfish Harvesting Waters* (Code of Maryland Regulations, COMAR, 26.08.02.08L). 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 (mL) or if more than 10 percent of samples taken exceed 49 MPN per 100 mL (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 three-year period to incorporate inter-annual variability does not exceed 14 MPN per 100 mL, 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 mL (for a three-tube decimal dilution test). The restricted shellfish area of the Tangier Sound Basin was classified as such because it does not meet shellfish water quality standards for an approved classification. The Tangier Sound Basin was placed on Maryland's Section 303(d) list because the shellfish area within this system, which is

currently classified as restricted, violates Maryland's protective bacteriological criteria for Use II Waters. The most recent five-year dataset documenting the median and 90<sup>th</sup> percentile concentrations for this area is shown in Table 2.3.1 of MDE's TMDL Report. The water quality impairment was assessed as not meeting the 90<sup>th</sup> percentile at two monitoring stations, and not meeting either the geometric median or the 90<sup>th</sup> percentile at one monitoring station.

CWA Section 303(d) and its implementing regulations require that TMDLs be developed for waterbodies identified as impaired by the state where technology-based and other required controls do not provide for attainment of water quality standards. The TMDLs submitted by MDE are designed to attain 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 five shellfish monitoring stations in the Tangier Sound Basin. Observations and data from the period spanning June 2000 through June 2005 were used. Maryland selected a five-year period for TMDL development because it covers a longer time span than the 30-sample minimum requirement and is consistent with MDE's shellfish program sanitary survey schedule. TMDL analysis utilized a tidal prism model in order to account for the tidal influences in the Tangier Sound Basin. The transport of fecal coliform is most influenced by the tide and the amount of freshwater discharge into the shellfish harvesting area. The steady state tidal prism method assumes that freshwater input, tidal range, and the first-order decay rate of fecal coliform are all constant. 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 both 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), embayment volume, fecal coliform concentration and water quality criterion. These values are used to derive the TMDLs (i.e., using the water quality criterion) and the current load (i.e., using the current median concentration). The differences between these loads are used to compute the percentage load reductions that are required to meet the TMDLs. Section 4.2 and Appendix A of the TMDL Report provides 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 coliform by the following categories: wildlife, human, pets, and livestock. Any contributions from boat discharges, resuspensions 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 clean 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 C of the TMDL Report.

The results of the nonpoint source assessment allowed Maryland to calculate the percent contribution for each of the four major types of nonpoint sources. This method is further described in Section IV of this Decision Rationale. 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 LAs in the TMDLs.

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

EPA finds that MDE has provided sufficient information to meet all of the eight basic requirements for establishing fecal coliform TMDLs for the restricted shellfish area within the Tangier Sound Basin. EPA therefore approves these TMDLs for fecal coliform in the Tangier Sound Basin. 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 this area of the Tangier Sound Basin 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 mL; and (2) no more than 10 percent of samples taken may exceed 49 MPN per 100 mL (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 three-year period to incorporate inter-annual variability does not exceed 14 per 100 mL, 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 mL (for a three-tube decimal dilution test). Recent monitoring data (2000-2005) document that the Laws Thorofare and Upper Thorofare did not attain the geometric median or the 90<sup>th</sup> percentile criteria, as shown in Table 2.3.1 of MDE's TMDL Report.

Maryland developed the bacteria TMDLs for the Tangier Sound Basin 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. 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 waste load allocations and load allocations.*

#### Total Allowable Load

As described above, MDE used as endpoints a median concentration of 14 MPN per 100 mL and a 90<sup>th</sup> percentile concentration of 49 MPN per 100 mL. Separate TMDLs were developed for the restricted shellfish area of the Tangier Sound Basin 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 WLAs for point sources, LAs for nonpoint sources, and natural background concentrations. The TMDLs for fecal coliform for the Tangier Sound Basin are consistent with 40 CFR § 130.2(i) because the total loads provided by MDE equal the sum of the individual WLAs for point sources and the land-based LAs for nonpoint sources. See Tables 1 and 2 for a summary of allowable loads.

#### Waste Load Allocations

According to the TMDL Report, there are no point sources permitted to discharge bacteria directly into the Laws Thorofare and Upper Thorofare restricted shellfish harvesting area within the Tangier Sound Basin. Therefore, the TMDLs will be allocated entirely to the LA.

#### Load Allocations

The TMDL summary in Tables 1 and 2 contain the LAs 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. As stated above, Maryland developed two types of fecal coliform 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. The greater reduction required when comparing the median and the 90<sup>th</sup> percentile results was used for the source allocation. Tables 4.4.1 and 4.4.2 in MDE's TMDL Report show the geometric median and 90<sup>th</sup> percentile results, respectively. In this case, the 90<sup>th</sup> percentile requires the greater reduction for the area. For example, no reductions are required in order to meet the median TMDL for Laws Thorofare and Upper Thorofare. In order to meet the 90<sup>th</sup> percentile TMDL, a reduction of approximately 50 percent or  $1.20 \times 10^{12}$  counts/day is required to attain the allowable load of  $1.20 \times 10^{12}$  counts/day. Therefore, although a larger load can be assimilated to meet the 90<sup>th</sup> percentile, it is more restrictive because the reductions are more stringent and will insure compliance with both criteria. 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), LAs are best estimates of the loading, which may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the loading. Wherever possible, natural and nonpoint source 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. Tables in Section 2.4 of the TMDL Report provide a breakdown of the existing bacteria load from the four nonpoint source categories (livestock, pets, wildlife and humans). A similar breakdown was not developed for the allocations, which instead were developed with a gross LA. This was done because the implementation will target anthropogenic sources and monitor the basins to determine if the TMDLs can be achieved through controls on pets, livestock and humans. Also, BST has not yet been completed within the basins to confirm the percent contribution from each of the four nonpoint source categories.

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, if an NPDES permit is issued for a point source that discharges one or more of the pollutants of concern in the Tangier Sound Basin, any deviation from the WLAs 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 the TMDL; 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 analyses as well as any local and state agency with jurisdiction over land uses for which LA 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 TMDLs 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 (BMP) or other nonpoint source pollution controls make more stringent LAs practicable, then WLAs 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 the 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 the TMDL; and 3) the trading results in enforceable controls for each source.

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).

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.*

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 1) the TMDLs are protective of human health, and 2) the water quality of the waterbodies is protected during the times when they are most vulnerable.

Critical conditions are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards<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 percent of the time. For each shellfish area, the actual 90<sup>th</sup> 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 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 in the median TMDL suggest that, on average, water column concentrations are very high with limited variation. Greater reductions in the 90<sup>th</sup> percentile TMDL suggest a less frequent occurrence of high fecal coliform concentrations due to the variation of hydrologic 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

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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.

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. Therefore, the monitoring design and the statistical analysis used to evaluate water quality attainment 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., 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 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. 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.

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. WLAs will be implemented through the NPDES permit process. According to 40 CFR § 122.44(d)(1)(vii)(B), the effluent limitations for a 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 WLAs established for that point source.

Nonpoint source controls to achieve LAs 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 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 BST 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 TMDLs have been subject to public participation.*

MDE provided an opportunity for public review of and comment on the fecal coliform TMDLs for the restricted shellfish harvesting area within the Tangier Sound Basin. The public review and comment period was open from March 15, 2006 through April 13, 2006 for the Tangier Sound Basin TMDLs. MDE received two sets of comments during the public comment period which were addressed in MDE's Comment Response Document.

Copies of the reports were sent to the U.S. Fish and Wildlife Service and National Marine Fisheries Service 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.