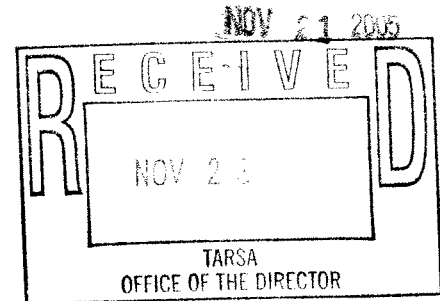




UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION III  
1650 Arch Street  
Philadelphia, Pennsylvania 19103-2029

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 Total Maximum Daily Load (TMDL) for Breton Bay submitted by the Maryland Department of the Environment (MDE) on September 29, 2005 to EPA for review and approval. 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. Breton Bay was identified on the State of Maryland's Section 303(d) lists as having nutrient, sediment, bacteria and biological impairments. The TMDL described in this document was developed to address localized water quality impairments identified within the watershed, specifically excessive bacteria concentrations in a restricted shellfish area of Breton Bay. The remaining impairments in this watershed will be addressed by MDE in separate TMDL document(s).

EPA's approval of the Breton Bay TMDL is based on EPA's understanding that MDE will complete a Bacterial Source Tracking (BST) study in the 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.

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 TMDL for Breton Bay satisfies 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,



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 Loads of Fecal Coliform for Restricted Shellfish Harvesting Area in Cherry Cove Creek of the Breton Bay Basin in St. Mary's County, Maryland

*Signed*

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

**Date: 11/21/2005**

## Decision Rationale

### Total Maximum Daily Loads of Fecal Coliform For the Restricted Shellfish Harvesting Area in Cherry Cove Creek Of the Breton Bay Basin in St. Mary's 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 TMDL for fecal coliform in the Breton Bay Basin. The TMDL was established to address impairments of water quality, caused by bacteria (i.e., evidenced by fecal coliform), as identified in Maryland's 1996 Section 303(d) list for water quality-limited segments. On September 29, 2005, the Maryland Department of the Environment (MDE) submitted the report, "Total Maximum Daily Loads of Fecal Coliform for the Restricted Shellfish Harvesting Area in Cherry Cove Creek of the Breton Bay Basin in St. Mary's County Maryland" dated September 2005. The basin identification for Breton Bay is 02-14-01-04.

EPA's rationale is based on the information contained in the TMDL Report, information contained in the Appendix to the report, and MDE's responses to EPA's comments. EPA's review determined that the TMDL meets the following eight 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 waste load allocations (WLAs) and load allocations (LAs).
3. The TMDL considers the impacts of background pollutant contributions.
4. The TMDL considers the critical environmental conditions.
5. The TMDL considers seasonal environmental variations.
6. The TMDL includes a MOS.
7. There is reasonable assurance that the TMDL can be met.
8. The TMDL has been subject to public participation.

#### II. Summary

The TMDL specifically allocates fecal coliform loadings to sources in the restricted shellfish harvesting area of the Breton Bay Basin. There were no National Pollutant Discharge Elimination System (NPDES) permitted facilities of bacteria in this watershed and therefore no WLA was provided in the TMDL. The fact that EPA is approving this TMDL does not mean that EPA has determined whether some of the sources discussed in the TMDL, under appropriate conditions,

TMDL Report addresses the fecal coliform impairment specific to Breton Bay.

The monitoring and analysis for this TMDL was 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 Breton Bay 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 the 90<sup>th</sup> percentile of water sample results exceeds 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 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 Breton Bay Basin was classified as such because it did not meet the shellfish water quality standards for an approved classification. Breton Bay 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 median and 90<sup>th</sup> percentile values of the most recent three-year data set for Breton Bay are shown in Table 2.3.1 of Maryland's TMDL Report.

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 TMDL submitted by MDE is 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 two shellfish monitoring stations in the Breton Bay Basin, specifically Cherry Cove Creek. Observations and data from the period of 2002-2004 were used. Maryland selected a three-year period of data for TMDL development that contains the 30-sample minimum 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 Basin. The transport of fecal coliform is most influenced by the tide and the amount of freshwater discharge into the shellfish harvesting areas.

1) *The TMDL is 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 Breton Bay 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) the 90<sup>th</sup> percentile of water sample results shall not 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 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).

Maryland developed the bacteria TMDL for Breton Bay 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 TMDL therefore used these applicable numerical criteria as endpoints. The TMDL was calculated and expressed as median and 90<sup>th</sup> percentile TMDL in order to meet the associated numerical criteria. EPA believes that this is a reasonable and appropriate water quality goal.

2) *The TMDL includes 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 milliliters. The TMDL 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, and LAs for nonpoint sources, and natural background concentrations. The TMDL for fecal coliform for Breton Bay is 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. Pursuant to 40 CFR § 130.6 and § 130.7(d)(2), the TMDL 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.

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 the TMDL, if an NPDES permit is issued for a point source that discharges one or more of the pollutants of concern in the Breton Bay Basin, any deviation from the WLA 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 analysis 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 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 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. 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 TMDL is consistent with the regulations and requirements of 40 CFR Section 130. Pursuant to 40 CFR § 130.6 and § 130.7(d)(2), the TMDL and the supporting documentation, including MDE's responses to comments, should be incorporated into Maryland's current water quality management plan.

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

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

4) *The TMDL considers critical environmental conditions.*

EPA regulations at 40 CFR § 130.7(c)(1) require TMDLs to account for critical conditions

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 the TMDL. 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 TMDL can be met.*

EPA requires that there be a reasonable assurance that the TMDL can be implemented. WLAs will be implemented through the NPDES permit process. According to 40 CFR § 122.44(d)(1)(vii)(B), the effluent limitations for an NPDES permit must be consistent with the assumptions and requirements of any available WLA for the discharge prepared by the state and approved by EPA. Furthermore, EPA has 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 can not 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 TMDL for the Breton Bay Basin. The public review and comment period was open from





**From:** <Beck.Mary@epamail.epa.gov>  
**To:** <tmdlcoordinator@mde.state.md.us>  
**Date:** 12/12/2006 12:00:06 PM  
**Subject:** Errata

I'm not sure I've responded to you regarding all of the errata memos you have sent. The web documents for the following contain appropriate errata.

Potomac River Upper Tidal WQA for Copper  
Evitts and Wills Creek Watersheds for pH  
Zekiah Swamp WQA for Copper, Lead, and Zinc  
✓ Brenton Bay TMDL for Shellfish and Fecal Coliform  
Wills Creek WQA for Cyanide  
Lower North Branch Potomac WQA for Cadmium  
Little Seneca Lake WQA for Eutrophication

No errata is necessary for Town Creek WQA for Eutrophication because the appropriate DO criterion was cited in the approval letter although the water's use designations were not.





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

## Decision Rationale

# Total Maximum Daily Loads of Fecal Coliform for Restricted Shellfish Harvesting Area in Cherry Cove Creek of the Breton Bay Basin in St. Mary's County, Maryland



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

Date: 11/21/05

## **Decision Rationale**

### **Total Maximum Daily Loads of Fecal Coliform For the Restricted Shellfish Harvesting Area in Cherry Cove Creek Of the Breton Bay Basin in St. Mary's 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 TMDL for fecal coliform in the Breton Bay Basin. The TMDL was established to address impairments of water quality, caused by bacteria (i.e., evidenced by fecal coliform), as identified in Maryland's 1996 Section 303(d) list for water quality-limited segments. On September 29, 2005, the Maryland Department of the Environment (MDE) submitted the report, "Total Maximum Daily Loads of Fecal Coliform for the Restricted Shellfish Harvesting Area in Cherry Cove Creek of the Breton Bay Basin in St. Mary's County Maryland" dated September 2005. The basin identification for Breton Bay is 02-14-01-04.

EPA's rationale is based on the information contained in the TMDL Report, information contained in the Appendix to the report, and MDE's responses to EPA's comments. EPA's review determined that the TMDL meets the following eight 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 waste load allocations (WLAs) and load allocations (LAs).
3. The TMDL considers the impacts of background pollutant contributions.
4. The TMDL considers the critical environmental conditions.
5. The TMDL considers seasonal environmental variations.
6. The TMDL includes a MOS.
7. There is reasonable assurance that the TMDL can be met.
8. The TMDL has been subject to public participation.

#### **II. Summary**

The TMDL specifically allocates fecal coliform loadings to sources in the restricted shellfish harvesting area of the Breton Bay Basin. There were no National Pollutant Discharge Elimination System (NPDES) permitted facilities of bacteria in this watershed and therefore no WLA was provided in the TMDL. The fact that EPA is approving this TMDL does not mean that EPA has determined whether some of the sources discussed in the TMDL, under appropriate conditions,

might be subject to the NPDES program. The TMDL for Breton Bay was 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 coliforms based on the median and 10 percent of sample data.

**Table 1 – Fecal Coliform Median TMDL Summary**

Area	Rate	TMDL	Wasteload Allocation (WLA)	Load Allocation (LA)	Margin of Safety (MOS)
Breton Bay	Counts/day	1.38 x10 <sup>10</sup>	0	1.38 x10 <sup>10</sup>	Implicit

**Table 2 – Fecal Coliform 90<sup>th</sup> Percentile TMDL Summary**

Area	Rate	TMDL	Wasteload Allocation (WLA)	Load Allocation (LA)	Margin of Safety (MOS)
Breton Bay	Counts / day	4.83 x10 <sup>10</sup>	0	4.83 x 10 <sup>10</sup>	Implicit

A TMDL is a written plan and analysis 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. 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 EPA for approval.

### III. Background

Breton Bay is located on Maryland's western shore of the Chesapeake Bay and drains to the Potomac River which feeds into the Chesapeake Bay. The Breton Bay TMDL Report addresses a single impaired basin: Cherry Cove Creek. Section 2.0 of Maryland's TMDL Report provides additional information about Breton Bay, including land use data.

Breton Bay was identified on the 1996 § 303(d) list submitted to EPA by the MDE as impaired by nutrients, sediments and fecal coliform with listings of biological impairments in the non-tidal portions added in 2002. The 2004 § 303(d) list identified Cherry Cove Creek as the location of the bacteria impairment. A TMDL for nutrients was developed by MDE and approved by EPA in 2005; the suspended sediment and biological impairments within the Breton Bay Basin will be addressed at a future date. Breton Bay is classified as a restricted shellfish harvesting area because the bacteria concentrations exceeded 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 Breton Bay.

The monitoring and analysis for this TMDL was 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 Breton Bay 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 the 90<sup>th</sup> percentile of water sample results exceeds 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 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 Breton Bay Basin was classified as such because it did not meet the shellfish water quality standards for an approved classification. Breton Bay 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 median and 90<sup>th</sup> percentile values of the most recent three-year data set for Breton Bay are shown in Table 2.3.1 of Maryland's TMDL Report.

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 TMDL submitted by MDE is 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 two shellfish monitoring stations in the Breton Bay Basin, specifically Cherry Cove Creek. Observations and data from the period of 2002-2004 were used. Maryland selected a three-year period of data for TMDL development that contains the 30-sample minimum 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 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. 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), embayment volume, 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 are 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 percent contribution for each of the four major types of nonpoint sources. This method is described further below in Section IV. Maryland is conducting a one-year bacteria source tracking (BST) study for the shellfish harvesting area in order to verify the categorized nonpoint source estimates and LAs in the TMDL.

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

EPA finds that MDE has provided sufficient information to meet all of the eight basic

requirements for establishing a fecal coliform TMDL for Breton Bay. This approval is outlined below according to the eight regulatory requirements.

1) *The TMDL is 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 Breton Bay 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) the 90<sup>th</sup> percentile of water sample results shall not 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 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).

Maryland developed the bacteria TMDL for Breton Bay 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 TMDL therefore used these applicable numerical criteria as endpoints. The TMDL was calculated and expressed as median and 90<sup>th</sup> percentile TMDL in order to meet the associated numerical criteria. EPA believes that this is a reasonable and appropriate water quality goal.

2) *The TMDL includes 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 milliliters. The TMDL 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, and LAs for nonpoint sources, and natural background concentrations. The TMDL for fecal coliform for Breton Bay is 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. Pursuant to 40 CFR § 130.6 and § 130.7(d)(2), the TMDL 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, there are no NPDES permitted facilities in the watershed. In Maryland's TMDL Report, Maryland assigned a WLA of "N/A" (i.e., not applicable) for these areas. EPA clarifies that these WLAs are actually zero, because a measurable value must be assigned to the WLA even if no point sources exist.

#### 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 the 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 TMDL for the median case is more restrictive than the 90<sup>th</sup> percentile TMDL in terms of mass loading rate. However, a larger percentage and overall mass reduction is required in the 90<sup>th</sup> percentile TMDL case based on the difference between the TMDL and the current load to the shellfish area (see Tables 4.4.1 and 4.4.2 of the TMDL Report). For example, in order to meet the median TMDL for Breton Bay, a 91 percent or  $1.32 \times 10^{11}$  reduction in the current loading was required. In order to meet the 90<sup>th</sup> percentile TMDL, a reduction of 95 percent or  $1.10 \times 10^{12}$  counts/day would be required. Note that the percent 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 TMDL allocation, which instead was developed with a gross LA. This was done because the implementation will target anthropogenic sources and monitor the basins to determine if the TMDL can be achieved through controls on pets, livestock and humans. Also, bacterial source tracking 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 the TMDL, if an NPDES permit is issued for a point source that discharges one or more of the pollutants of concern in the Breton Bay Basin, any deviation from the WLA 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 analysis 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 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 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. 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 TMDL is consistent with the regulations and requirements of 40 CFR Section 130. Pursuant to 40 CFR § 130.6 and § 130.7(d)(2), the TMDL and the supporting documentation, including MDE's responses to comments, should be incorporated into Maryland's current water quality management plan.

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

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

4) *The TMDL considers 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. The actual 90<sup>th</sup> percentile concentration from the most recent data set 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 hydrological conditions.

5) *The TMDL considers 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 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 90<sup>th</sup> percentile criterion (i.e., to account for fluctuations around the median).

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

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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.

6) *The TMDL includes 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 the TMDL. 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 TMDL can be met.*

EPA requires that there be a reasonable assurance that the TMDL can be implemented. WLAs will be implemented through the NPDES permit process. According to 40 CFR § 122.44(d)(1)(vii)(B), the effluent limitations for an NPDES permit must be consistent with the assumptions and requirements of any available WLA for the discharge prepared by the state and approved by EPA. Furthermore, EPA has 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 can not 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 TMDL for the Breton Bay Basin. The public review and comment period was open from July 8, 2005 to August 17, 2005. Written comments were submitted from the Potomac River Association, St. Mary's County and two residents. EPA sent comments to MDE on this TMDL on October 5, 2005 regarding the water quality criteria.

A copy of the report was sent to both 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 the TMDL does not adversely affect any listed endangered and threatened species and their critical habitats.