UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029
12/3/2009

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

Dear Dr. Eskin:

The U.S. Environmental Protection Agency (EPA), Region III, is pleased to approve *Total Maximum Daily Loads (TMDLs) of Fecal Bacteria for the Lower Monocacy Watershed in Carroll, Frederick, and Montgomery Counties, Maryland*. The TMDL report was submitted via the Maryland Department of the Environment's (MDE) letter dated September 27, 2007, and was received by EPA for review and approval on October 3, 2007. Also, MDE made revisions to the TMDL report and sent a final revised version electronically on September 19, 2009. The TMDL was established and submitted in accordance with Section 303(d)(1)(c) and (2) of the Clean Water Act to address impairments of water quality as identified in Maryland's Section 303(d) List. The Lower Monocacy Watershed (MD02140302) was included on Maryland's Section 303(d) List as impaired by fecal bacteria (2002), nutrients (1996), sediments (1996), and impacts to biological communities (2002, 2004, and 2006). This TMDL addresses the fecal bacteria impairment only.

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 instream 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 bacteria TMDLs for the Lower Monocacy Watershed satisfy each of these requirements.

As you know, all new or revised National Pollutant Discharge Elimination System permits must be consistent with the TMDL wasteload allocation 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 María García, at 215-814-3199.

Sincerely,

John Armstead for

Jon M. Capacasa, Director
Water Protection Division

Enclosure

cc: Nauth Panday, MDE-TARSA
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 Bacteria in the Lower Monocacy Watershed
Carroll, Frederick and Montgomery Counties
Maryland

John Armstead for

_____

Jon M. Capacasa, Director
Water Protection Division

Date: 12/3/2009

Decision Rationale
Total Maximum Daily Loads
of Fecal Bacteria for the Lower Monocacy River Basin
Carroll, Frederick, and Montgomery Counties, Maryland

I. Introduction

The Clean Water Act (CWA) requires a Total Maximum Daily Load (TMDL) 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 waterbody without exceeding water quality standards.

This document sets forth the U.S. Environmental Protection Agency's (EPA) rationale for approving the TMDL for fecal bacteria in the Lower Monocacy River Basin. The TMDL was established to address impairments of water quality, caused by fecal bacteria, as identified in Maryland's 2002 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 Bacteria for the Lower Monocacy River Basin in Carroll, Frederick, and Montgomery Counties, Maryland*, dated September 2007, to EPA for final review on September 27, 2007. Also, MDE made revisions to the TMDL report and sent a final revised version electronically on September 19, 2009. The TMDL in this report addresses the fecal bacteria impairment in the Lower Monocacy River Watershed as identified on Maryland's Section 303(d) List. The basin identification for the Lower Monocacy River Watershed is MD02140302.

EPA's rationale is based on the TMDL Report and information contained in the computer files provided to EPA by MDE. EPA's review determined that the TMDLs meet 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 TMDL specifically allocates the allowable fecal bacteria loading to the Lower Monocacy River Watershed. There are 20 (and one under construction) permitted point sources of fecal bacteria which are included in the WLA. The fact that the TMDL does 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 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 annual average TMDLs and Maximum Daily Load for fecal bacteria are presented in Tables 1 and 2, respectively. Individual annual and daily WLAs for permitted point sources are provided in Table 3. The TMDLs include an upstream load from the Upper Monocacy River watershed. A separate fecal bacteria TMDL has been developed for the Upper Monocacy River and that TMDL is accounted in the Lower Monocacy River TMDL as an upstream load allocation. Individual annual and daily WLAs for permitted point sources are provided in Table 3.

Table 1. Lower Monocacy River Annual Average TMDL

Lower Monocacy River Fecal Bacteria TMDL (Billion MPN *E. coli*/year)										
TMDL	**=**	**LA**			**+**	**WLA_{UM}**			**+**	**MOS**
		LA_{UM}[1]	**+**	**LA_{LM}**		**Stormwater WLA_{LM}**	**+**	**WWTP WLA_{LM}**		
		1,353,850	+	426,161		196,041		57,327		
2,033,379	=	1,780,011			+	253,368			+	Incorporated

[1] This upstream load allocation is equivalent to the Upper Monocacy River TMDL.

Table 2. Lower Monocacy River Maximum Daily Load

Lower Monocacy River Fecal Bacteria TMDL (Billion MPN *E. coli*/day)										
TMDL	**=**	**LA**			**+**	**WLA_{UM}**			**+**	**MOS**
		LA_{UM}[1]	**+**	**LA_{LM}**		**Stormwater WLA**	**+**	**WWTP WLA**		
		105,797	+	8,471		5,088		488		
119,845	=	114,268			+	5,576			+	Incorporated

[1] This upstream load allocation is equivalent to the Upper Monocacy River TMDL.

Table 3. Wasteload Allocations for Permitted Point Sources in the Lower Monocacy River Watershed

Facility	NPDES ID Number	TMDL Long Term Annual Average Load (Billion MPN *E. Coli*/year)	Maximum Daily Load (Billion MPN *E. Coli*/day)
Reichs Ford Sanitary Landfill	MD0061093	78	0.67
Woodsboro WWTP	MD0058661	174	1.48
Kemptown School WWTP	MD0056481	9	0.07
Monrovia WWTP	MD0059609	348	2.97
New Life Foursquare Church/School WWTP	MD0057100	9	0.07
Concord Trailer Park WWTP	MD0023060	26	0.22
Libertytown WWTP	MD0060577	87	0.74
Hyattstown WWTP	MD0067768	35	0.30
New Market WWTP	MD0020729	418	3.56
Cracked Claw WWTP	MD0024244	52	0.45
Mill Bottom WWTP	MD0065439	174	1.48
Springview Mobile Home Park WWTP	MD0022870	12	0.10
Pleasant Branch WWTP	MD0065269	174	1.48
Dan-Dee Motel & Country Inn WWTP	MD0023710	21	0.18
Frederick City WWTP	MD0021610	13,927	118.67
Fort Detrick WWTP	MD0020877	3,482	29.67
Ballenger Creek WWTP	MD0021822	10,446	89.00
Future McKinney Creek WWTP*	--	27,855	237.34
NPDES Stormwater Permits	N/A	196,041	5,088
Carroll	MD0068331		
Frederick	MD0068357		
Montgomery	MD0068349		

* The effluent from the McKinney WWTP will be combined with the Ballenger Creek WWTP and discharged through the existing Ballenger Creek outfall.

The TMDL is a written plan and analysis established to ensure that a waterbody will attain and maintain water quality standards. The TMDL is a scientifically based strategy that considers current and foreseeable conditions, the best available data, and accounts for uncertainty with the inclusion of a MOS value. The option is always available to refine the TMDL for

resubmittal 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 Lower Monocacy River Watershed is located in Carroll, Frederick, and Montgomery Counties in Maryland. The total drainage area of the Lower Monocacy River is 314.2 square miles. The Lower Monocacy River flows southward through Frederick, eventually emptying into the Middle Potomac River near the town of Dickerson. There are several major tributaries comprising the Lower Monocacy River watershed: Israel, Carroll, Linganore, Bush, Bennett, and Ballenger Creeks. These branches are free-flowing (nontidal) streams, and flow directly into the Lower Monocacy River.

The Lower Monocacy watershed is primarily rural with the exception of Frederick, and the smaller communities of Mount Airy, Walkersville, and Woodsboro, which account for the majority of commercial and residential land use. The watershed can be characterized primarily as cropland (38.7%) and forest (29.4%). The total population in the Lower Monocacy River watershed is estimated to be 136,079 people. The human population and the number of households were estimated based on a weighted average from the 2000 U.S. Census Block and Maryland Department of Planning Land Use 2002 Cover. Section 2.0 of MDE's TMDL Report provides additional information about the Lower Monocacy River watershed, including land use and population.

The Lower Monocacy River Watershed (MD--02140302) was included on Maryland's Section 303(d) List as impaired by fecal coliform (2002), nutrients (1996), sediments (1996), and impacts to biological communities (2002, 2004, and 2006). Lake Linganore, an impoundment within the Lower Monocacy River basin, was listed for nutrients and sediments in 1996. Phosphorus and sediment TMDLs for Lake Linganore were approved by EPA on March 13, 2003, to address the nutrient and sediment listings. This TMDL addresses the fecal bacteria impairment only.

The Surface Water Use Designations for the Lower Monocacy River, upstream of US Route 40, and its tributary Israel Creek is Use IV-P: *Recreational Trout Waters and Public Water Supply*. Downstream of Route US Route 40, the Lower Monocacy River is designated as use I-P: *Water Contact Recreation, Protection of Aquatic Life and Public water Supply*. Additional tributaries Carroll Creek, Rocky Fountain Run, Little Bennett Creek, Furnace Branch, Ballenger Creek, and Bear Branch are designated as Use III-P: *Nontidal Cold Water and Public Water Supply.* See Code of Maryland Regulations (COMAR) 26.08.02.08P. The Lower Monocacy River watershed was listed on Maryland's Section 303(d) List as impaired by fecal bacteria in 2002 due to elevated fecal coliform concentrations detected as high as 11,200 MPN/100 ml.

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 fecal bacteria TMDL

submitted by MDE is designed to allow for the attainment of the Lower Monocacy River watershed's designated uses, and to ensure that there will be no fecal bacteria impacts affecting the attainment of these uses. Refer to Tables 1 and 2 above for a summary of allowable loads.

For this TMDL analysis, the Lower Monocacy River watershed has been divided into nine subwatersheds, within which include the tributaries Carroll Creek, Israel Creek, Bush Creek, Ballenger Creek, Bennett Creek, and Linganore Creek (divided into two subwatersheds). The pollutant loads established in the TMDL are for these nine subwatersheds. To establish baseline and allowable pollutant loads for this TMDL, a flow duration curve approach was employed, using bacteria monitoring data from MDE and flow strata estimated from United States Geological Survey (USGS) daily flow monitoring data. The sources of fecal bacteria were estimated at nine representative stations in the Lower Monocacy River watershed where samples were collected for one year. Multiple antibiotic resistance analysis (ARA) source tracking was used to determine the relative proportion of domestic (pets and human associated animals), human (human waste), livestock (agriculture-related animals), and wildlife (mammals and waterfowl) source categories. Appendix C of the TMDL report includes the Bacteria Source Tracking Report titled *Identifying Sources of Fecal Pollution in Lower Monocacy River, Maryland* prepared by the Salisbury University, Department of Biological Sciences and Environmental Health Services.

The allowable load was determined by first estimating a baseline load from current monitoring data. The baseline load was estimated using a long-term geometric mean and weighting factors from the flow duration curve. The TMDL for fecal bacteria was established after considering three different hydrological conditions: high flow and low flow annual conditions; and an average seasonal condition (the period between May 1 and September 30, when water contact recreation is more prevalent). The allowable load was reported in units of Most Probable Number (MPN)/year and represents a long-term load estimated over a variety of hydrological conditions.

Two scenarios were developed, with the first assessing if attainment of current water quality standards could be achieved by applying maximum practicable reductions (MPRs), and the second applying higher reductions than MPRs. Scenario solutions were based on an optimization method where the objective was to minimize the overall risk to human health, assuming that the risk varies over the four bacteria source categories. In eight of the nine subwatersheds, it was estimated that water quality standards could not be attained with MPRs; therefore, for these subwatersheds higher maximum reductions were applied.

The fecal bacteria long-term annual average TMDL for the Lower Monocacy River watershed, including the Upper Monocacy River upstream load allocation (LA_{UM}) is 2,033,379 billion MPN *E. coli*/year. A separate TMDL has been developed for the Upper Monocacy River watershed and since the Upper Monocacy flows into the Lower Monocacy, the Upper Monocacy River TMDL (LA_{UM}= 1,353,850 billion MPN *E. coli*/year) is accounted for herein as an upstream LA. The TMDL for the Lower Monocacy River MD 8-digit is 679,529 billion MNP *E. coli*/year, and represents a reduction of 88.3 percent from the baseline load of 5,783,325 billion MPN *E. coli*/year. TMDLs within Maryland are distributed between a load allocation (LA_{LM}) for nonpoint sources, and wasteload allocations (WLA_{LM}) for point sources. Point

sources include National Pollutant Discharge Elimination System (NPDES) wastewater treatment plants (WWTPs) and NPDES regulated stormwater discharges, including county and Municipal Separate Storm Sewer Systems (MS4s). The TMDL allocations in Maryland are distributed as follows: LA_{LM} (426,161 billion MPN *E. coli*/year), Stormwater WLA_{LM} (196,041 billion MPN *E. coli*/year), and the $WWTP_{LM}$ (57,327 billion MPN *E. coli*/year).

IV. Discussion of Regulatory Conditions

EPA finds that MDE has provided sufficient information to meet all seven of the basic requirements for establishing a fecal bacteria TMDL for the Lower Monocacy River watershed. EPA, therefore, approves this fecal bacteria TMDL for the Lower Monocacy River watershed. 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 indicator organism used in the Lower Monocacy River watershed TMDL analysis was *E. coli* and the state water quality standard used in this study was 126 MPN/100 ml (COMAR 26.08.02.03-3 Water Quality Criteria Specific to Designated Uses; Table 1). EPA believes this is a reasonable and appropriate water quality goal. The Surface Water Use Designations for the Lower Monocacy River, upstream of US Route 40, and its tributary Israel Creek is Use IV-P: *Recreational Trout Waters and Public Water Supply*. Downstream of Route US Route 40, the Lower Monocacy River is designated as use I-P: *Water Contact Recreation, Protection of Aquatic Life and Public water Supply*. Additional tributaries Carroll Creek, Rocky Fountain Run, Little Bennett Creek, Furnace Branch, Ballenger Creek, and Bear Branch are designated as Use III-P: *Nontidal Cold Water and Public Water Supply*. See Code of Maryland Regulations (COMAR) 26.08.02.08P.

2) The TMDLs include a total allowable load as well as individual wasteload allocations and load allocations.

Total Allowable Load

As described above, the allowable load was determined by first estimating a baseline load from current monitoring data. The baseline load was estimated using a long-term geometric mean and weighting factors from the flow duration curve. The TMDL for fecal bacteria was established after considering three different hydrological conditions: high flow and low flow annual conditions; and an average seasonal condition (the period between May 1 and September 30, when water contact recreation is more prevalent). The allowable load was reported in units of MPN/year and represents a long-term load estimated over a variety of hydrological conditions. This load is considered the maximum allowable load the watershed can assimilate and still attain water quality standards. The fecal bacteria TMDL was developed for the Lower Monocacy River watershed based on this endpoint. The allowable load was reported in units of MPN/year for the average annual load and in MPN/day for the long term daily load.

Expressing TMDLs using these units is consistent with Federal regulations at 40 CFR §130.2(i), which states that *TMDLs can be expressed in terms of either mass per time, or other appropriate measure*. The average annual and long term daily fecal bacteria TMDLs are presented in Tables 1 and 2, respectively.

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 TMDL for fecal bacteria for the Lower Monocacy River watershed 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), this TMDL and the supporting documentation should be incorporated into Maryland's current water quality management plan.

Wasteload Allocations

As indicated in the TMDL report, there are 20 active (and one under construction) permitted point sources of fecal bacteria with NPDES permits regulating the discharge of fecal bacteria in the Lower Monocacy River watershed which are included in the WLA. These point sources include 17 active and one under construction WWTP NPDES permitted facilities. The effluent from the WWTP under construction will be combined with an existing one and discharged through that existing plant outfall. See Table 3 above for the WLAs for these facilities. Also, there are three NPDES Phase I or Phase II stormwater permits identified throughout the Maryland 8-digit Lower Monocacy River watershed. The NPDES regulated stormwater loads within the Maryland 8-digit Lower Monocacy watershed will be expressed as a single NPDES stormwater WLA. The total NPDES stormwater WLA is 196,041 billion MPN *E. coli*/year.

Load Allocations

The TMDL summary in Table 1 contains the LA for the Lower Monocacy River Watershed. 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. As described above in Section III, Maryland conducted a source assessment in order to estimate the contributions from domestic animals (pets and human associated animals), human (human waste), livestock (agriculture-related animals), and wildlife (mammals and waterfowl) to the overall nonpoint source loadings. Table 4.6.1 of the TMDL Report provides a breakdown of the existing average annual fecal bacteria from these four source categories. A similar breakdown was developed for the allocations, which are shown in Table 4.7.2 of the TMDL Report. In this analysis, all four bacteria source categories could potentially contribute to nonpoint source loads. The upstream load (LA_{UM}) was reported as a single value, but it could include point and nonpoint sources. For human sources, if the watershed has no MS4s or other NPDES-regulated stormwater entities, the nonpoint source contribution is estimated by subtracting any WWTP and CSO loads from the TMDL human load, and is then assigned to the LA_{LM}. In watersheds, covered by NPDES-regulated stormwater permits, any such nonpoint sources of human bacteria (beyond the reach of

the sanitary sewer systems) are assigned to the SW WLA_{LM}. The livestock loads are all assigned to the LA_{LM}. Since the entire Lower Monocacy River watershed is covered by NPDES MS4 permits, bacteria loads from domestic animal sources are assigned to the SW-WLA_{LM} in all nine subwatersheds of Lower Monocacy River. However, wildlife sources were distributed between the LA_{LM} and the SW-WLA_{LM} based on a ratio of the amount of pervious area in non-urban pervious area in urban land.

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. There is no express or implied statutory requirement that effluent limitations in NPDES permits necessarily be expressed in daily terms. The CWA definition of "effluent limitation" is quite broad (effluent limitation is "any restriction…on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources…)." See CWA 502(11). Unlike the CWA's definition of TMDL, the CWA definition of "effluent limitation" does not contain a "daily" temporal restriction. NPDES permit regulations do not require that effluent limits in permits be expressed as maximum daily limits or even as numeric limitations in all circumstances, and such discretion exists regardless of the time increment chosen to express the TMDL. For further guidance, refer to Benjamin H. Grumbles memo (November 15, 2006) titled *Establishing TMDL Daily Loads in Light of the Decision by the U.S. Court of Appeals for the D.C. Circuit in Friends of the Earth, Inc. v. EPA, et al., No. 05-5015* (April 25, 2006) and implications for NPDES Permits. 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 this TMDL, if an NPDES permit is issued for a point source that discharges one or more of the pollutants of concern in the Lower Monocacy watershed, 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 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 bacteria, through the NPDES permit process, in order to monitor and determine compliance with the TMDL's 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 Part 130.

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

The TMDLs consider the impact of background pollutants by considering the bacterial loads 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[1]. 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. For this TMDL, the critical condition was determined by assessing annual and seasonal hydrological conditions for high flow and low flow periods. The critical condition requirement is met by determining the maximum reduction per bacteria source that satisfies all hydrological conditions and meets the water quality standard, thereby minimizing the risk to water contact recreation.

5) The TMDLs consider seasonal environmental variations.

Seasonality was determined using various hydrological conditions and it was assessed as the time period when water contact recreation was expected, specifically May 1 through September 30.

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 adopted an explicit MOS for this TMDL. The MOS was determined by estimating the

[1] 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.

loading capacity of the stream based on a reduced (more stringent) water quality criterion concentration. The *E. coli* water quality criterion concentration was reduced by 5 percent, from 126 *E. coli* MN/100 ml to 119.7 *E. coli* MPN/100 ml.

7) The TMDLs have been subject to public participation.

MDE provided an opportunity for public review and comment on the fecal bacteria TMDL for the Lower Monocacy River watershed. The public review and comment period was open from August 3, 2007 through September 4, 2007. All the comments received were satisfactorily addressed by MDE.

A letter was sent to the U.S. Fish and Wildlife Service pursuant to Section 7(c) of the Endangered Species Act, requesting the Service's concurrence with EPA's findings that approval of this TMDL does not adversely affect any listed endangered and threatened species, and their critical habitats.

V. Discussion of Reasonable Assurance

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 WLAs established for that point source.

MDE proposed a staged approach to implementation beginning with the MPR scenario, with regularly scheduled follow-up monitoring to assess the effectiveness of the implementation plan. MDE intends for the required reductions to be implemented in an iterative process that first addresses those sources with the largest impact on water quality and human health risk, with consideration given to ease of implementation and cost.