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

8/9/2011

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) is pleased to approve the Total Maximum Daily Loads (TMDL) for fecal bacteria in the Patuxent River Upper Basin. The TMDL Report, *Total Maximum Daily Loads of Fecal Bacteria for the Patuxent River Upper Basin in Anne Arundel and Prince George's Counties, Maryland*, was submitted by the Maryland Department of the Environment's letter dated September 28, 2010. 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 Patuxent River Upper Watershed (MD-02131104) was included on Maryland's Section 303(d) List as impaired by fecal bacteria (2008), nutrients (listed in 1996, revised in 2008 to phosphorus), sediments (1996), and impacts to biological communities (listed 2002, 2004 and 2006). Cash Lake, an impoundment in the Patuxent River Upper watershed, was listed in 2004 for methylmercury in fish tissue. The listing for phosphorus was addressed with a Water Quality Analysis in 2007. A TMDL for Cash Lake was submitted to EPA in September 2010 and subsequently approved on March 18, 2011. 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, the TMDL considered reasonable assurance that the TMDL allocations assigned to the nonpoint sources can be reasonably met. The enclosure to this letter describes how the bacteria TMDL for the Patuxent River Upper Basin satisfies each of these requirements.

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

Sincerely,

Jon M. Capacasa, Director
Water Protection Division

Enclosure

cc: Lee Curry, 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 for the Patuxent River Upper Basin
Anne Arundel and Prince George's Counties
Maryland

/S/

Jon M. Capacasa, Director
Water Protection Division

Date: August 9, 2011

Decision Rationale
Total Maximum Daily Loads of
Fecal Bacteria for the Patuxent River Upper Basin
Anne Arundel and Prince George's 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 Patuxent River Upper Basin. The TMDL was established to address impairments of water quality, caused by fecal bacteria, as identified in Maryland's 2008 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 Patuxent River Upper Basin in Anne Arundel and Prince George's Counties, Maryland,* dated September 2010, to EPA for final review on September 28, 2010. The basin identification for the Patuxent River Upper Watershed is MD-02131104.

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 Patuxent River Upper Watershed. There are two (2) 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. The TMDLs include a load allocation (LA_{US}) to account for contributions from areas upstream of the listed portion (including the unlisted upstream portion of the Patuxent River Upper watershed and the Maryland 8-digit watersheds of Little Patuxent River, Middle Patuxent River, Rocky Gorge Dam, and Brighton Dam). This LA_{US} is necessary in order to meet water quality standards in the listed portion of the Maryland 8-digit Patuxent River Upper watershed (LP).

Table 1. Patuxent River Upper Watershed Annual Average TMDL

Patuxent River Upper Fecal Bacteria TMDL (Billion MPN *E. coli*/year)										
TMDL	=	**LA**			+	**WLA**			+	**MOS**
		LA_{US}[1]	+	LA^{2}_{LP}		SW WLA^{2}_{LP}	+	WWTP WLA^{2}_{LP}		
		5,621,888	+	320,742		91,116		0		
6,033,746	=	5,942,630			+	91,116			+	Incorporated

[1]This account for contributions from areas upstream of the listed portion (including the unlisted upstream portion of the Patuxent River Upper watershed and the Maryland 8-digit watersheds of Little Patuxent River, Middle Patuxent River, Rocky Gorge Dam, and Brighton Dam).
[2]Total TMDL contribution from the Listed Portion of MD 8-digit Patuxent River Upper Watershed is 411,858.

Table 2. Patuxent River Upper Watershed Maximum Daily Load

Patuxent River Upper Fecal Bacteria MDL (Billion MPN *E. coli*/day)										
TMDL	=	**LA**			+	**WLA**			+	**MOS**
		LA_{US}[1]	+	LA_{LP}		SW WLA^{2}_{LP}	+	WWTP WLA^{2}_{LP}		
		61,567	+	3,744		1,042		0		
66,353	=	65,311			+	1,042			+	Incorporated

[1]This account for contributions from areas upstream of the listed portion (including the unlisted upstream portion of the Patuxent River Upper Basin watershed and the Maryland 8-digit watersheds of Little Patuxent River, Middle Patuxent River, Rocky Gorge Dam, and Brighton Dam).
[2]Total TMDL contribution from the Listed Portion of Maryland 8-digit Patuxent River Upper Basin Watershed is 4,786.

Table 3. Wasteload Allocations for Permitted Point Sources in the Patuxent River Upper Watershed

Facility	**NPDES ID Number**	**TMDL Long Term Annual Average Load (Billion MPN *E. Coli*/year)**	**Maximum Daily Load (Billion MPN *E. Coli*/day)**
NPDES Regulated Stormwater	--	91,116	1,042
Anne Arundel County	MD0068306		
Prince George's County	MD0068284		

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 listed portion of the Maryland 8-digit Patuxent River Upper watershed begins at the confluence with Little Patuxent River and ends at the crossing of Queen Anne Bridge Road. The watershed is located in the Patuxent River region of the Chesapeake Bay watershed within Maryland. The watershed covers portions of Anne Arundel and Prince George's Counties. It also includes portions of the towns of Bowie, Davidsonville and Mitchellville. The listed watershed area covers 28.7 square miles (18,362 acres), with an additional 342.1 square miles (218,951 acres) draining from upstream areas.

Based on the 2002 Maryland Department of Planning land use/land cover data, the Patuxent River Upper watershed can be characterized as primarily forest and urban land with significant agricultural use. Within the listed watershed, urban land is predominant in the eastern portion, with agricultural land in the west and forest mainly along the Patuxent River. The total population in the listed portion of the Patuxent River Upper watershed is estimated to be 20,587.

The Patuxent River Upper Watershed (MD-02131104) was included on Maryland's Section 303(d) List as impaired by fecal bacteria (2008); nutrients (listed in 1996, revised in 2008 to phosphorus); sediments (1996); and impacts to biological communities (listed 2002, 2004 and 2006). Cash Lake, an impoundment in the Patuxent River Upper watershed, was listed in 2004 for methylmercury in fish tissue. The listing for phosphorus was addressed with a Water Quality Analysis in 2007. A TMDL for Cash Lake was submitted to EPA in September 2010 and approved on March 18, 2011. This TMDL addresses the fecal bacteria impairment only.

The waters of the Maryland 8-digit Patuxent River Upper watershed have been designated as Use I: *Water Contact Recreation, and Protection of Nontidal Warmwater Aquatic Life*. The Patuxent River Upper watershed was listed on Maryland's Section 303(d) List as impaired by fecal bacteria in 2008. This impairment listing is limited to the portion of the Patuxent River Upper watershed from Queen Anne Bridge Road to the confluence with Little Patuxent River.

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 Patuxent River Upper 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 Patuxent River Upper watershed has been divided into three subwatersheds and the pollutant loads established are for these three 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 three representative stations in the Patuxent River Upper 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 Shellfish and Nontidal Waters in Maryland Watersheds* prepared by the Salisbury University, Department of Biological Sciences.

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 entering the listed portion of the Patuxent River Upper watershed is established after considering two different hydrological conditions: an average annual condition, and an average seasonal dry weather 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 across the four bacteria source categories. In all three subwatersheds, it was estimated that water quality standards could be attained with MPRs; therefore, it was estimated that water quality standards could be attained within MPRs.

The fecal bacteria long-term annual average TMDL for the Patuxent River Upper watershed is 6,033,746 billion MPN *E. coli*/year and it represents a reduction of 49.9 percent of the baseline load (12,040,565 billion MPN *E. coli*/year). This TMDL includes an upstream load (LA_{US} = 5,621,888) necessary to meet water quality standards in the listed portion of the MD 8-digit Patuxent River Upper watershed. The TMDL contribution from the listed portion of the Maryland 8-digit Patuxent River Upper watershed (411,858 billion MPN *E. coli*/year) includes a load allocation LA_{LP} (320,742 billion MPN *E. coli*/year), and a wasteload allocation, WLA_{LP} (91,116 billion MPN E. *coli*/year). The TMDL contribution from the listed portion of the Maryland 8-digit Patuxent River Upper watershed (411,858 billion MPN *E. coli*/year) represents a reduction of approximately 47.2 percent from the baseline load contribution (779,491 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 Patuxent River Upper watershed. EPA, therefore, approves this fecal bacteria TMDL for the Patuxent River Upper 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 waters of the Maryland 8-digit Patuxent River Upper watershed have been designated as Use I: *Water Contact Recreation, and Protection of Nontidal Warmwater Aquatic Life*. The Patuxent River Upper watershed was listed on Maryland's Section 303(d) List as impaired by fecal bacteria in 2008. This impairment listing is limited to the portion of the Patuxent River Upper watershed from Queen Anne Bridge Road to the confluence with Little Patuxent River. The indicator organism used in the Patuxent River Upper 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.

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 entering the listed portion of the Patuxent River Upper watershed is established after considering two different hydrological conditions: an average annual condition and an average seasonal dry weather condition (the period between May 1 and September 30, when water contact recreation is more prevalent). The allowable load represents a long-term load estimated over a variety of hydrological conditions and is considered the maximum allowable load that the watershed can assimilate and still attain water quality standards. The fecal bacteria TMDL was developed for the Patuxent River Upper 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 maximum 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 maximum 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 Patuxent River Upper 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.

Load Allocations

The TMDL summary in Table 1 contains the LA for the Patuxent River Upper 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. The LA for the Patuxent River Upper watershed (5,942,630 billion MPN *E. coli*/year) includes a load allocation to account for contributions from areas upstream (LA_{US}= 5,621,888) of the listed portion. The load allocation for the listed portion of the MD 8-digit Patuxent River Upper watershed (LA_{LP}) is 320,742 billion MPN *E. coli*/year. 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 4.7.1 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 4.8.2 of the TMDL Report. In this analysis, all four bacteria source categories could potentially

contribute to nonpoint source loads. The upstream load (LA_{US}) was reported as a single value, but it could include point and nonpoint sources. For human sources, the nonpoint source contribution is estimated by subtracting any WWTP loads from the TMDL human load, and is then assigned to the LA_{LP}. Livestock loads are all assigned to the LA_{LP}. Since the entire Patuxent River Upper watershed is covered by NPDES Municipal Stormwater Separate Sewer System (MS4) permits, bacteria loads from domestic animal and wildlife sources are distributed between the SW-WLA_{LP} and LA_{LP}.

Wasteload Allocations

As indicated in the TMDL report, there are two (2) permitted point sources of fecal bacteria with NPDES permits in the Patuxent River Upper watershed which are included in the WLA. Both permits are Phase I MS4s: Anne Arundel and Prince George's Counties. The stormwater WLA (SW-WLA) is presented as one combined load for the entire land area of each jurisdiction in each subwatershed. In addition to the MS4s, the SW-WLA includes any other Phase I and Phase II NPDES regulated stormwater entities in the watershed, including the Maryland State Highway Administration Phase I MS4, Phase II State and Federal MS4s, and industrial stormwater permittees. In the future, when more detailed data and information become available, it is anticipated that the SW-WLA may be disaggregated into more specific allocations by permit type. The total NPDES stormwater WLA is 1,042 billion MPN *E. coli*/year.

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. 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. 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 the annual and dry weather seasonal conditions. The critical condition requirement is met by determining the maximum reduction per bacteria source that satisfies both conditions and meets the water quality standard, thereby minimizing the risk to water contact recreation.

5) The TMDLs consider seasonal environmental variations.

Seasonality was assessed as the time period when water contact recreation is expected, specifically dry weather days from 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 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 Patuxent River Upper watershed. The public review and comment period was open from August 17, 2010 through September 15, 2010. MDE received no written comments.

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.

[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.

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.

The fecal bacteria load reductions required to meet water quality criteria may be achieved by implementing effluent limitations and cost-effective, reasonable Best Management Practices (BMPs) to nonpoint sources. MDE proposed to implement the required reductions 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. The iterative implementation of BMPs in the watershed has several benefits: tracking of water quality improvements following BMP implementation through follow-up stream monitoring; providing a mechanism for developing public support through periodic updates on BMP implementation; and helping to ensure that the most cost-effective practices are implemented first.

Other options include the low interest loans, available to property owners with failing septic systems through the Linked Deposit Program for assistance in correction of such systems through replacement or connection to public sewer systems; the Maryland's Bay Restoration Fund, which provides funding to upgrade onsite sewage disposal systems; Maryland's Agricultural Cost Share Program, which provides grants to farmers to help protect natural resources; and the Environmental Quality and Incentives Program, which focuses on implementing conservation practices and BMPs on land involved with livestock and production. In addition, stormwater BMPs and programs implemented as required by MS4 permits shall be consistent with available WLAs developed under the TMDL. Where fecal bacteria are transported through an MS4 conveyance system, stormwater BMPs implemented to control urban runoff should help in reducing fecal bacteria loads in the Patuxent River Upper watershed.

Reduction of wildlife was not necessary in the TMDL analysis. However, Maryland stated that after developing and implementing, to the maximum extent possible, a reduction goal based on the anthropogenic sources identified in the TMDL, Maryland anticipates that implementation to reduce the controllable nonpoint sources may also reduce some wildlife inputs to the waters.