



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029
5/7/2009

Richard Eskin, Ph.D., Director
Technical and Regulatory Services 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) for fecal bacteria in the Conococheague Creek Watershed in Washington County, Maryland. The TMDL report was submitted via the Maryland Department of the Environment's (MDE) letter dated June 16, 2008, and was received by EPA for review and approval on June 23, 2008. Also, based on EPA's comments, MDE sent a final revised TMDL report via electronic mail on April 7, 2009. The TMDL was established and submitted in accordance with Sections 303(d)(1)(c) and (2) of the Clean Water Act to address impairments of water quality as identified in Maryland's Section 303(d) List. The Conococheague Creek Watershed (MD-02140504) was included on Maryland's Section 303(d) List as impaired by fecal bacteria (2002), high pH (2002), and sediments (1996). 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 Conococheague Creek 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,

/S/

Jon M. Capacasa, Director
Water Protection Division

Enclosure

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



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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1650 Arch Street
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Decision Rationale
Total Maximum Daily Load
Fecal Bacteria in Conococheague Creek Basin
Washington County, Maryland

/S/

Jon M. Capacasa, Director
Water Protection Division

Date: 5/7/2009

Decision Rationale
Total Maximum Daily Load
Fecal Bacteria in Conococheague Creek Basin
Washington County, 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 Conococheague Creek Basin. The TMDL was established to address impairments of water quality, caused by fecal bacteria, as identified in Maryland's 1996 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 Conococheague Creek Basin in Washington County, Maryland*, dated May 2008, to EPA for final review on June 16, 2008. The TMDL in this report addresses the fecal bacteria impairment in the Conococheague Creek Watershed as identified on Maryland's Section 303(d) List. The basin identification for the Conococheague Creek Watershed is MD-02140504.

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 Conococheague Creek Watershed. There are two 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 (MDL) 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 generated outside (Pennsylvania) of the assessment area (MD 8-digit Conococheague Creek Basin). Individual annual and daily WLAs for permitted point sources are provided in Table 3.

Table 1. Conococheague Creek Annual Average TMDL
Conococheague Creek Fecal Bacteria TMDL (Billion MPN *E. coli*/year)

TMDL	=	LA			+	WLA			+	MOS
		LAPA *	+	LA _{CON}		SW WLA _{CON}	+	WWTP WLA _{CON}		
1,013,386	=	907,512	+	81,626	+	17,106	+	7,142	+	Inc.

*Upstream Load from Pennsylvania. Although the upstream load is reported here as a single value, it could include point and nonpoint sources.

MD TMDL contribution (LA_{CON} + SW WLA_{CON} + WWTP WLA_{CON} = 105,874 Billion MPN *E. coli*/year)

Table 2. Conococheague Creek Maximum Daily Load
Conococheague Creek Fecal Bacteria MDL (Billion MPN *E. coli*/day)

MDL	=	LA			+	WLA			+	MOS
		LAPA *	+	LA _{CON}		SW WLA _{CON}	+	WWTP WLA _{CON}		
29,699	=	26,266	+	2,722	+	650	+	61	+	Inc.

*Upstream Load from Pennsylvania

MD Daily Load contribution = 3,433 Billion MPN *E. coli*/day

Table 3. Wasteload Allocations for Permitted Point Sources in the Conococheague Creek Watershed

Facility	NPDES ID Number	TMDL Long Term Annual Average Load (Billion MPN <i>E. coli</i>/year)	Maximum Daily Load (Billion MPN <i>E. coli</i>/day)
Broadfording Bible Brethren Church WWTP	MD0051373	4	0.04
Conococheague WWTP	MD0063509	7,138	61
Washington County MS4*	MDR055500	17,106	650

*Washington County is included in the NPDES General Permit for discharges from Small Municipal Separate Storm Sewer System (MS4) General NPDES Permit No. MDR055500. This General Permit also covers two other governments located in Washington County, the Cities of Hagerstown and Smithburg, both with a population greater than 1,000, but less than 100,000.

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 Conococheague Creek Watershed is located in both Maryland and Pennsylvania with a drainage area of 568 square miles (363,567 acres). The majority (363,567 acres or 88.4%) of the watershed is in PA (in Franklin, Adams, Cumberland, and Perry Counties) with a portion in Washington County, MD (42,200 acres or 11.6%). The headwaters of Conococheague Creek originate approximately 13 miles east of Chambersburg, PA. Passing through Chambersburg it continues flowing southwest through PA and into MD, and finally empties into the Potomac River near the town of Williamsport. The tributaries of Conococheague Creek in Maryland include Semple Run, Meadow Brook, Rush Run, Toms Run, and Rockdale Run. Maryland's portion of the watershed is primarily cropland (47.7%), with significant urban (24.6%) and forest land (20%), as well. The PA portion is largely forest (49.2%) and cropland (35.1%). The total population in the Conococheague Creek watershed is estimated to be 108,702 people. The human population and the number of households were estimated based on a weighted average from the 2000 Census Geographic Information Systems (GIS) Block Groups, the 2002 Maximum Design Pressure (MDP) Land Use Land Cover, and the Regional Earth Science Applications Center (RESAC) for PA. Section 2.0 of MDE's TMDL Report provides additional information about the Conococheague Creek watershed, including land use and population.

The Conococheague Creek Watershed (MD-02140504) was included on Maryland's Section 303(d) List as impaired by fecal bacteria (2002), high pH (2002), and sediments (1996).

This TMDL addresses the fecal bacteria impairment only.

The Surface Water Use Designations for the Conococheague Creek and its tributaries is Use IV-P: *Recreational Trout Waters and Public Water Supply* (Code of Maryland Regulations, (COMAR), 26.08.02.08Q). The Conococheague Creek watershed was listed on Maryland's Section 303(d) List as impaired by fecal bacteria due to elevated fecal coliform concentrations detected at a Department of Natural Resources (DNR) Core monitoring station, which showed a geometric mean of 216 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 Conococheague Creek 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 Conococheague Creek watershed has been divided into nine subwatersheds and the pollutant loads established in the TMDL are for those nine subwatersheds. To establish baseline and allowable pollutant loads for this TMDL, a flow duration curve approach was employed, using bacteria data from MDE and flow strata estimated from United States Geological Survey (USGS) daily flow monitoring. The sources of fecal bacteria were estimated at nine representative stations in the Conococheague Creek 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 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 four different hydrological conditions: high flow and low flow annual conditions; and high flow and low flow seasonal conditions (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 all nine subwatersheds, it was estimated that water quality standards could not be attained with MPRs, thus higher maximum reductions were applied.

The fecal bacteria long-term annual average TMDL for the Conococheague Creek watershed is 1,013,386 billion MPN *E. coli*/year, which includes a load allocation for subwatersheds located in Pennsylvania (L_{APA}). The L_{APA} (907,512 billion MPN *E. coli*/year) represents a reduction of approximately 77 percent from the PA baseline load (3,966,535 billion MPN *E. coli*/year). The Maryland TMDL contribution (105,874 billion MPN *E. coli*/year) represents a reduction of approximately 87 percent from the baseline load (845,806 billion MPN *E. coli*/year). Maryland's TMDL contribution represents the sum of individual TMDLs for the nine subwatersheds or portions thereof within MD, and is distributed between a load allocation (L_{ACON}) for nonpoint sources and wasteload allocations (W_{LACON}) for point sources. Point sources include NPDES wastewater treatment plants (WWTPs) and NPDES regulated stormwater (SW) discharges, including County and Municipal Separate Storm Sewer Systems (MS4s).

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 Conococheague Creek watershed. EPA, therefore, approves this fecal bacteria TMDL for the Conococheague Creek 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 Designated Uses for the Conococheague Creek watershed include Use IV-P: *Recreational Trout Waters and Public Water Supply* (COMAR 26.08.02.08Q). Maryland's water quality criteria for bacteria are based on water column limits for either *E. coli* or *enterococci*. The indicator organism used in the Conococheague Creek 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 was established after considering four different hydrological conditions: high flow and low flow annual conditions, and high flow and low flow seasonal conditions (the period between May 1 and September 30, when water contact recreation is more prevalent). 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 Conococheague 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 Conococheague Creek 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 three permitted point sources in this watershed. These point sources include two active municipal NPDES WWTP facilities which, combined, treat approximately 2.9 million gallons per day, and an MS4 General NPDES permit. There are no industrial facilities in the Conococheague Creek watershed with NPDES permits regulating the discharge of fecal bacteria. See Table 3 above for the WLAs for these three facilities.

Load Allocations

The TMDL summary in Table 1 contains the LA for the Conococheague Creek 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, 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, the upstream load (L_{APA}) was reported as a single value, but it could include point and nonpoint sources. Also, the livestock loads are all assigned to the L_{ACON}. Since the entire Conococheague Creek watershed is covered by an NPDES MS4 permit, bacteria loads from domestic animal sources are assigned to the SW-WL_{ACON} in all nine subwatersheds of Conococheague Creek. However, wildlife sources were distributed between the L_{ACON} and the SW-WL_{ACON} on a ratio of the amount of pervious area in non-urban land to 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 Conococheague 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 embrace 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 standards¹. 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 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 five 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 Conococheague watershed. A public notice of intent to establish 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.

Conococheague Creek fecal bacteria TMDL, announcing the opening and closing dates of the formal 30-day public comment period, was published in the Washington County Herald-Mail. The public review and comment period was open from April 17, 2008 through May 16, 2008. MDE received one comment and they satisfactorily responded to the comment.

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.