UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029
9/23/2009

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 Cherry Creek Sub-basin in the Youghiogheny River Basin in Garrett County, Maryland*. The TMDL report was submitted via the Maryland Department of the Environment's (MDE) letter dated July 30, 2009, and was received by EPA for review and approval on August 10, 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. MDE identified Cherry Creek (MD 050202010002), and its tributaries on Maryland's Section 303(d) List, as impaired by fecal bacteria (2008) and impacts to biological communities (2002). 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 Cherry Creek Watershed 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, at 215-814-3199.

Sincerely,

Tai-Ming Chang for

Jon M. Capacasa, Director
Water Protection Division

Enclosure

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

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Decision Rationale
Total Maximum Daily Loads of
Fecal Bacteria for the Cherry Creek Sub-basin in the Youghiogheny River Basin
Garrett County, Maryland

Tai-Ming Chang for

Jon M. Capacasa, Director
Water Protection Division

Date: 9/23/2009

Decision Rationale
Total Maximum Daily Loads of Fecal Bacteria for the
Cherry Creek Sub-basin in the Youghiogheny Basin
Garrett 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 Cherry Creek sub-basin in the Youghiogheny River 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 Cherry Creek sub-basin in the Youghiogheny River Basin in Garrett County, Maryland,* dated July 2009, to EPA for final review on July 30, 2009. The TMDL in this report addresses the fecal bacteria impairment in the Cherry Creek Watershed as identified on Maryland's Section 303(d) List. The basin identification for the Cherry Creek Watershed is MD-050202010002.

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 Cherry Creek Watershed. There are no permitted point sources of fecal bacteria in the Cherry Creek watershed. Therefore, the entire TMDL has been assigned to the LA. 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. The annual average TMDLs and Maximum Daily Load for fecal bacteria are presented in Tables 1 and 2, respectively.

Table 1. Cherry Creek Annual Average TMDL

Cherry Creek Fecal Bacteria TMDL (Billion MPN *E. coli*/year)								
TMDL	=	**LA**	+	**WLA**			+	**MOS**
51,125	=	51,125	+	**SW WLA**	+	**WWTP WLA**	+	Incorporated
				0	+	0		

Table 2. Cherry Creek Maximum Daily Load

Cherry Creek Fecal Bacteria TMDL (Billion MPN *E. coli*/day)								
TMDL	=	**LA**	+	**WLA**			+	**MOS**
695	=	695	+	**SW WLA**	+	**WWTP WLA**	+	Incorporated
				0	+	0		

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 Cherry Creek Watershed is located in the Youghiogheny River region of Maryland and is part of the MD 8-digit Youghiogheny River watershed. The watershed encompasses 10,685 acres in Garrett County. The headwaters of Cherry Creek, which is one of the major tributaries of the Youghiogheny River, begin in southern Garrett County, flowing north into the Youghiogheny River, downstream of Underwood Road. The watershed includes the town of Gortner. Tributaries to Cherry Creek include Fox Run, Clark Run, Douglass Run, Ambrose Run, and Frozen Camp Run.

The Cherry Creek watershed can be characterized primarily by agriculture (54.9%) and forest (37.5%). There is minimal residential land. The total population is estimated to be 613

people. The human population and the number of households were estimated based on a weighted average from the Census block groups and the 2007 MDP Property View, a geographic information system dataset that provides a holistic assessment of all the taxable properties within the State. Section 2.0 of MDE's TMDL Report provides additional information about the Cherry Creek watershed, including land use and population.

The MDE has identified the Cherry Creek watershed and its tributaries on Maryland's Section 303(d) List as impaired by fecal bacteria (listed in 2008) and impacts to biological communities (listed in 2002). This TMDL addresses the fecal bacteria impairment only. The Cherry Creek watershed was listed on Maryland's 303(d) List as impaired by fecal bacteria in 2008 due to elevated fecal coliform concentrations detected at a MDE monitoring station. The *E. coli* counts for the monitoring station ranged between 109 and 6,867 MPN/100 ml.

The Maryland Surface Water Use Designation in the Code of Maryland Regulations (COMAR) for the waters of the 12-digit Cherry Creek is Use III-P: *Nontidal Cold Water and Public Water Supply*. All other stream segments of the watershed have been designated as Use I: *Water Contact Recreation, and Protection of Nontidal Warmwater Aquatic Life*. See COMAR 26.08.02.08S(4) and 26.08.02.07F(5).

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 Cherry 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 pollutant loads are for the Cherry Creek. 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 one representative station in the Cherry 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 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 over the four bacteria source categories. In this watershed, it was estimated that water quality standards could not be attained with MPRs, therefore, higher maximum reductions were applied.

The fecal bacteria long-term annual average TMDL for the Cherry Creek watershed is 51,125 billion MPN *E. coli*/year. This represents a reduction of 90.6 percent from the baseline load of 541,106 billion MPN *E. coli*/year. No point sources exist in this watershed; therefore, the entire TMDL was allocated to the LA for nonpoint sources.

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 Cherry Creek watershed. EPA therefore approves this fecal bacteria TMDL for the Cherry 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 designation for the waters of the 12-digit Cherry Creek is Use III-P: *Nontidal Cold Water and Public Water Supply*. All other stream segments of the watershed have been designated as Use I: *Water Contact Recreation, and Protection of Nontidal Warmwater Aquatic Life*. See COMAR 26.08.02.08S(4) and 26.08.02.07F(5). The indicator organism used in the Cherry 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 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. 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 Cherry Creek 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 Cherry 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 no permitted point sources of fecal bacteria in the Cherry Creek watershed. 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.

Load Allocations

The TMDL summary in Table 1 contains the LA for the Cherry 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 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 livestock loads are all assigned to the LA. Since there are no Multiple Stormwater Sewer Systems or other NPDES-regulated stormwater systems, bacteria loads from domestic animal, human and wildlife sources are entirely assigned to the LA.

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 an average annual condition and an average seasonal dry weather condition. 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* MPN/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 Cherry Creek watershed. The public review and comment period was open from May 28, 2009, through June 26, 2009. MDE received no comments during the public comment period.

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.