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

Hamid Karimi, PhD., Deputy Director
Natural Resources Administration
DC Department of the Environment
Water Quality Divsion
51 N Street, NE
Washington, D.C. 20002

JUL 25 2014

Dear Dr. Karimi:

The U.S. Environmental Protection Agency (EPA) Region III is pleased to inform you that we are approving the *E. coli* Total Maximum Daily Loads (TMDLs) revision for the Anacostia River and tributaries. The revision submitted by the District of Columbia Department of the Environment (DDOE) on April 24, 2014 includes a new *E. coli Allocations and Daily Loads for the Anacostia River and Tributaries* (Appendix C) , *Calculations* (Appendix D) and Response to Comments documents, along with supporting documentation incorporating the earlier submission of the original 2003 TMDL by reference.

The 2014 TMDL revision was established in accordance with Sections 303(d)(1)(c) and (2) of the Clean Water Act (CWA) to address impairments of water quality to the non-tidal and tidal segments of the Anacostia River as well as the tributaries as identified on the District's 1998 CWA Section 303(d) list of impaired waters. These segments were listed for bacteria impairments, and TMDLs were written for fecal coliform, which was the basis of the Water Quality Standard (WQS) at the time of the listing and TMDL development.

Anacostia Riverkeepers, Friends of the Earth, and Potomac Riverkeepers filed a complaint, Case No.: 1:09-cv-00098-JDB (*Anacostia Riverkeepers*) on January 15, 2009 challenging multiple TMDLs established for District waters, including the original 2003 TMDL. In connection with that matter, the existing 2003 TMDL was deemed deficient because it was established before the D.C. Circuit's decision in *Friends of the Earth vs. the Environmental Protection Agency, 446 F.3d 140, 144* (D.C. Cir. 2006) and did not include daily loads consistent with that decision. EPA represented to the court that, with respect to the fecal coliform TMDLs, including the original 2003 TMDL, any action taken to address the absence of a daily load expression should also address the District's revised bacteria water quality standard from fecal coliform to *E. coli.* Accordingly, the court vacated the 2003 TMDL but stayed vacatur until December 31, 2014.

These TMDL revisions, being approved today, provide allocations as *E. coli,* the parameter on which the current standard is based. In addition, daily loading expressions for the new *E. coli* allocations are also provided. The assumptions and modeling underlying the original 2003 TMDL

was not challenged in *Anacostia Riverkeeper* and therefore were not revised in connection with this effort. EPA believes that the revisions we are approving today adequately respond to the plaintiffs' complaint, and therefore, will not require vacatur of the original TMDLs by the court.

The 2003 TMDL as revised by Appendices C and D and its supporting documentation submitted to EPA on April 24, 2014, now supersedes the 2003 TMDL. A copy of EPA's Decision Rationale for approval of these TMDL revisions is enclosed.

If you have any questions or comments concerning this letter, please do not hesitate to contact me, or have your staff contact Ms. Helene Drago, TMDL Program Manager, at (215) 814-5796.

Sincerely,

Jon M. Capacasa, Director
Water Protection Division

Enclosure

cc: C. Burrell, DDOE
G. Onyullo, DDOE

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

Decision Rationale
2014 E. coli Bacteria Allocations and Daily Loads for the Anacostia River and Tributaries, TMDL Revision, District of Columbia

Jon M. Capacasa, Director
Water Protection Division

Date: 7/25/14

Decision Rationale
2014 E. coli Bacteria Allocations and Daily Loads for the Anacostia River and Tributaries, TMDL Revision, District of Columbia

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 introduced into a water quality limited waterbody.

This document sets forth the rationale for the U.S. Environmental Protection Agency's (EPA) approval of a revised TMDL (2014 revised TMDL) incorporating revisions to the 2003 *Final Total Maximum Daily Load for Fecal Coliform Bacteria in Upper Anacostia River, Lower Anacostia River, Watts Branch, Fort Dupont Creek, Fort Chaplin Tributary, Fort Davis Tributary, Fort Stanton Tributary, Hickey Run, Nash Run, Popes Branch, Texas Avenue Tributary*, (hereafter referred to 2003 TMDLs). The revision submitted by the District of Columbia Department of the Environment (DDOE) on April 24, 2014 includes a new *E. coli Allocations and Daily Loads for the Anacostia River and Tributaries* (Appendix C), *Calculations* (Appendix D) and Response to Comments documents, along with supporting documentation.

II. Background

EPA received DDOE's original submission of the 2003 TMDLs on May 27, 2003 (2003 TMDL). Based on the submission, EPA approved the 2003 TMDLs on August 28, 2003, and amended its approval on October 16, 2003.

Anacostia Riverkeeper, Friends of the Earth, and Potomac Riverkeepers filed a complaint (Case No.: 1:09-cv-00098-JDB) on January 15, 2009 challenging multiple TMDLs established for District waters, including the 2003 TMDLs. In connection with that matter, the plaintiffs asserted, and EPA conceded, that the existing 2003 TMDLs were deficient because they were established before the D.C. Circuit's decision in *Friends of the Earth vs. the Environmental Protection Agency, 446 F.3d 140, 144* (D.C. Cir. 2006) and did not include daily loads consistent with that decision. EPA represented to the court in *Anacostia Riverkeeper* that, with respect to the fecal coliform TMDLs, including the 2003 TMDLs, any action taken to address the absence of a daily load expression should also address the District's revised bacteria water quality standard from fecal coliform to *E. coli*. EPA advised the court that this would entail development of a translator from fecal coliform to *E. coli*. EPA also advised the court that it estimated that such action would take between three and five years. Accordingly, the court vacated the 2003 TMDL but stayed vacatur until December 31, 2014.

The District has submitted to EPA for our approval the 2014 revised TMDLs which incorporate a new water quality standard (WQS) for *E. coli* that the District promulgated in

October 2005 after the approval of the original 2003 TMDLs. The assumptions and modeling underlying the original 2003 TMDLs were not challenged in *Anacostia Riverkeeper* and therefore were not revised in connection with this effort. The allocations in the original 2003 TMDLs were translated to *E. coli,* the parameter on which the existing standard is based. The translation was performed using a translator equation developed from analysis of paired fecal coliform/*E. coli* sampling data collected from waters in the District, Maryland and Virginia. In addition, daily loading expressions for the new *E. coli* allocations are also provided.

On April 24, 2014, DDOE, submitted to EPA the Appendix C, D, and Response to Comments documents, along with supporting documentation, incorporating their earlier submission of the 2003 TMDLs by reference.

The 2003 TMDLs as revised by Appendices C and D and supporting documentation now supersedes the 2003 TMDL. Except where otherwise noted, EPA's Decision Rationale for the 2003 TMDLs is incorporated by reference.

III. TMDL Analysis

A. TMDL Revision Description

The June 2003 TMDLs provided loads for the MPN of colonies of fecal coliform for various sources and identified the necessary percentage reduction required for each source in order to meet the TMDL. Sources specified include: upstream sources (representing the in-stream and watershed loads delivered at the District's boundaries); direct stormwater runoff (LAT), separate stormwater sewers (SW), combined sewer overflows (CSOs), and tributary loads. The 2014 revised TMDLs translate the original annual fecal coliform loads into equivalent annual *E. coli* loads. See "Translation Methodology" in the May 2014 Appendix C for the methodologies used to calculate the revised *E. coli* allocation for each source. For calculations and information supporting the translations, please see Appendix D of the 2014 revised TMDLs. The waterbodies addressed by this revision are the same ones that received allocations under the original 2003 TMDLs: the Anacostia River mainstem and the Anacostia River tributaries of Fort Chaplin, Fort Davis, Fort Dupont, Fort Stanton, Hickey Run, Nash Run, Popes Branch, Texas Ave Tributary, and Watts Branch. The TMDL annual and daily loads are in section III.B.4. of this Decision Rationale below.

B. *The 2014 revised TMDLs are designed to achieve applicable water quality standards*

1. Applicable Designated Uses

Water Quality Standards (WQS) consist of three components: designated uses; narrative and/or numerical water quality criteria necessary to support those uses; and an anti-degradation policy.

The District has classified the Anacostia for current and designated uses including:

- Class A: "Primary Contact Recreation";
- Class B: "Secondary Contact Recreation and aesthetic enjoyment";
- Class C: "Protection & Propagation of fish, shellfish and wildlife";
- Class D: "Protection of human health related to consumption of fish and shellfish"; and
- Class E: "Navigation."

[Title 21 of the District of Columbia Municipal Regulations (DCMR) §1101.1].

DC's Section 303(d) List divides the Anacostia River within the District's borders into two segments. The lower Anacostia is identified as that portion of the river extending from the mouth of the river to the John Philip Sousa Bridge on Pennsylvania Avenue and the upper Anacostia from the bridge to the Maryland border. The upper and lower segments of the Anacostia were listed on DC's 1998 Section 303(d) List as impaired by biochemical oxygen demand (BOD), bacteria, organics, metals, TSS, and oil and grease. DC has already developed TMDLs addressing these impairments in the Anacostia.[1] A Maryland and District of Columbia TMDL for nutrients/BOD was approved in 2008. A Maryland and District of Columbia TMDL for trash was approved in 2010. A TSS TMDL was established for the tidal Anacostia in Maryland and the District of Columbia in 2012.

2. Water Quality Criteria Applicable to the Designated Uses

The WQS that were adopted by DC at the time of the original 2003 TMDL, Class A and Class B waters were required to achieve the WQS for bacteria as measured by fecal coliform as the indicator organism. When the original 2003 fecal coliform bacteria TMDL was developed for the Anacostia River and its tributaries, the standard for Class A waters was a maximum 30-day geometric mean of 200 MPN. The geometric mean is based on a minimum of no fewer than five samples within the 30-day period. The standard for Class B waters was a 30-day geometric mean of 1,000 MPN. However because all the waterbodies were designated as Class A waters, which were subject to the more restrictive bacteria standard, the 30-day geometric mean of 200 MPN for Class A designation was used as the applicable water quality standard to be achieved in all the waterbodies in the original 2003 TMDL.

Effective January 1, 2008, the District bacteriological WQS changed from fecal coliform to *E. coli*. The current Class A water quality criterion for bacteria is a geometric mean of 126 MPN. The geometric mean is based on a minimum of five samples within a 30-day period and is specified for all purposes, including attainment determinations, and permits. The District's water quality criterion also includes a value of 410 MPN for a single sample value. The water quality criterion expressly states that this single sample value is used only in assessing water quality trends. Class B and Class C waters do not have an *E. coli* standard. Currently, all waters subject to this TMDL, including the Anacostia mainstem and all tributaries, are designated as indicated in Table 1. (DCMR, WQS, 21-1101.2):

1 DC is in the process of revising a number of TMDLs consistent with the court's order in *Anacostia Riverkeeper v. Jackson*, 713 F.Supp.2d 50 (D.D.C. 2010).

Table 1. Classification of the District's waters

Surface waters of the District	Use classes	
	Current use	Designated use
Potomac River	B, C, D, E	A, B, C, D, E
Potomac River tributaries (except as listed below)	B, C, D	A, B, C, D
Battery Kemble Creek	B, C, D	A, B, C, D
C & O Canal	B, C, D, E	A, B, C, D, E
Rock Creek	B, C, D, E	A, B, C, D, E
Rock Creek tributaries	B, C, D, E	A, B, C, D, E
Tidal Basin	B, C, D, E	A, B, C, D, E
Washington Ship Channel	B, C, D, E	A, B, C, D, E
Oxon Run	B, C, D	A, B, C, D
Anacostia River	B, C, D, E	A, B, C, D, E
Anacostia River tributaries (except as listed below)	B, C, D	A, B, C, D
Hickey Run	B, C, D	A, B, C, D
Watts Branch	B, C, D	A, B, C, D
Wetlands	C, D	C, D

Source: DCMR 1101.2

3. The TMDL revisions are designed to achieve all applicable numeric criteria

To support the TMDL revision, EPA and DDOE developed a District-specific translator using the statistical relationship between paired fecal coliform and *E. coli* data collected in the District's waters (LimnoTech 2011 and 2012).[2] The data used to develop the DC translator was composed of paired fecal coliform and E. coli instream monitoring measurements for DC and adjacent waters collected by three agencies: DDOE, the Virginia Department of Environmental Quality (VDEQ), and the Maryland Department of the Environment (MDE). The translator is representative of ambient and stormwater bacteria concentrations and was used to convert the original fecal coliform TMDL allocations into *E. coli* values for the following sources: upstream, direct and tributary stormwater runoff, and other tributary sources. CSO data was excluded from the dataset and was not used in the development of the translator because the. coli allocations for CSO's were not calculated using the translator. Because there was *E. coli* data available for the CSO's from development of the D.C. Water and Sewer Authority's Combined Sewer System Long Term Control Plan (LTCP), DDOE elected to use the LTCP as the basis for developing *E. coli* allocations for this source because it was the best available data. See below for a description of how CSO allocations were calculated.

Using the District-specific translator, a fecal coliform value of 200 MPN (the original District standard for bacteria) is associated with an *E. coli* value of approximately 104 MPN,

2 Documentation related to development of the translator is in LimnoTech's 2011 Memorandum, *Final Memo Summarizing DC Bacteria Data and Recommending a DC Bacteria Translator (Task 2)* and Limno Tech's 2012 Memorandum, *Update on Development of DC Bacteria Translators.*

which is below the 126 MPN *E. coli* criteria. It is important to consider that under the original modeling analysis, reductions to sources of fecal bacteria were made until the waterbodies met the fecal coliform geometric mean standard of 200 MPN at all times. Therefore, for sources where allocations were calculated using the translator, fecal coliform loads translated to *E. coli* loads will result in loads designed to achieve an *E. coli* value of a geometric mean of 104 MPN, a more protective value than the District's numeric criterion of 126 MPN.

4. The TMDL revisions are designed to achieve applicable designated uses

The original June 2003 TMDLs used a series of computer simulations to determine the level of annual load reductions needed to meet WQS. The WQS were considered to be met if no model segment in the District had a fecal coliform maximum 30-day geometric mean exceeding the 200 MPN Class A standards. Using the translator, the fecal coliform loads were translated into equivalent E. coli loads. The bacteria translator provides a calculation of the equivalent *E. coli* load, meaning that the TMDL revisions are designed to assure that the equivalent *E. coli* endpoint (104 MPN) will be met for upstream, direct and tributary stormwater runoff, and other tributary sources.

The *E. Coli* loads for CSO's were not calculated using the translator but were developed using the LTCP based event meant concentration (EMC) for *E. coli*, which was established from data gathered during the development of DC Water and Sewer Authority 's Combined Sewer System Long Term Control Plan (DC WASA 2002). An EMC is defined as the total mass of pollutants discharged divided by the total flow volume for a storm event. In order to provide a consistent framework for evaluating the effects of CSOs, a single EMC for fecal coliform and *E. coli* was used for all untreated CSOs. Each EMC was calculated by dividing the total number of organisms by the total volume of CSO at all sampled storms for all sites to generate an overall system EMC. The LTCP-based EMC for *E. coli* (686,429 MPN / 100 mL) and the predicted flow volume under full implementation of the LTCP were used to calculate the revised CSO *E. coli* allocation. As indicated in EPA's 2003 Decision Rationale for the original TMDL, computer simulation models of the District's combined sewer and storm water system were constructed by DC Water as part of the LTCP. The TAM/WASP model was then used to assess the impact of CSOs on water quality in the Anacostia River and to demonstrate that the LTCP adequately protects water quality standards when fully implemented. Based on this demonstration, EPA agrees that the CSO allocations in this TMDL revision, calculated using the EMC from the LTCP, will also meet WQS.

Below are the Wasteload Allocations (WLA):

Average Annual and Daily *E. coli* WLAs

Source	Allocated load (MPN)	Maximum Daily Load (MPN)	Average Daily Load (MPN)
CSO (NPDES Permit No. DC0021119)	1.41E+15	1.67E+15	5.30E+14
Direct Storm Runoff [a]	8.1E+12	4.33E+11	6.71E+10
Tributary Storm Water [a]	2.3E+14	1.50E+13	6.56E+11

[a] Sources associated with the District's MS4 permit (Permit No. DC0000221)

The following *E. coli* wasteload allocation is made for the Anacostia tributaries:

Tributaries to the Anacostia River *E. coli* Average Annual and Daily Wasteload Allocations

Tributary Name	Allocated Load (MPN)	Maximum Daily Load (MPN)	Average Daily Load (MPN)
Fort Stanton	1.08E+06	9.17E+03	2.95E+03
Fort Davis	8.17E+05	6.96E+03	2.24E+03
Fort Dupont	2.34E+06	1.99E+04	6.41E+03
Fort Chaplin	1.32E+06	1.13E+04	3.62E+03
Hickey Run	6.31E+06	5.37E+04	1.73E+04
Nash Run (ALL)[a]	2.23E+06	1.90E+04	6.11E+03
Popes Br	1.67E+06	1.42E+04	4.57E+03
Texas Ave Trib	1.36E+06	1.16E+04	3.72E+03
Watts Br (ALL) [a]	1.20E+07	1.02E+05	3.28E+04

[a] Original TMDL report provided allocations for the entire tributary; not by jurisdiction.

The following *E. coli* load allocations (LA) are made for the non-CSO and non-MS4 stormwater sources:

Mainstem Anacostia River *E. coli* Average Annual and Daily Load Allocations

Source	Allocated load (MPN)	Maximum Daily Load (MPN)	Average Daily Load (MPN)
Upstream	1.8E+14	7.38E+12	4.91E+11

C. The TMDL revisions include a total allowable load as well as individual wasteload allocations and load allocations.

EPA finds that the 2014 revised TMDLs meet the requirements to include total loads as well as individual wasteload allocations and load allocations. EPA's rationale in its 2003 Approval Rationale is incorporated by reference. In addition, the 2014 revised TMDLs include

daily loading expressions for the new *E. coli* allocations. This has been done to comply with the U.S. Environmental Protection Agency (EPA) obligations under the 2006 court case, *Friends of the Earth vs. the Environmental Protection Agency, 446 F.3d 140, 144* (D.C. Cir. 2006) which requires establishment of a daily loading expression in TMDLs in addition to any annual or seasonal loading expressions previously established in the TMDL. In November 2006, EPA issued the memorandum *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*, which recommends that all TMDLs and associated load allocations and wasteload allocations include a daily time increment in conjunction with other appropriate temporal expressions that might be necessary to implement the relevant WQS. In compliance with that recommendation, the 2014 revised TMDLs present corresponding daily load expressions for the long-term load allocations. The calculation methodologies were described in Appendix C, and the daily loads were developed in a manner consistent with the following assumptions in EPA's 2007 *Draft Options for Expressions of Daily Loads in TMDLs.* The approach used to calculate daily loads in these revised TMDLs identifies a representative maximum daily or average daily load for the annual TMDL for each source identified in the original report. The approach does not presume that the maximum daily load provided could be discharged every day and still meet the in-stream WQS. While expressions of daily loading values are useful in illustrating the variability in loading that can occur under a TMDL scenario, the annual load must also be met to comply with the TMDL.

D. Background, Critical Conditions, Seasonal Variations and Reasonable Assurance.

This aspect of the e original 2003 TMDLs and EPA's Approval are unchanged and incorporated by reference.

E. The TMDL revisions include an additional Margin of Safety.

For the purposes of this TMDL revision, the original implicit MOS from the 2003 TMDL is retained, however, the explicit MOS for the tributaries has changed. For the sources that had allocations developed using the translator, including the tributaries, a fecal coliform value of 200 MPN (the endpoint of the original District standard for bacteria) is associated with an *E. coli* value of approximately 104 MPN, which is below the current WQS of 126 MPN *E. coli.* It is important to consider that under the original modeling analysis, reductions to sources of fecal bacteria were made until the waterbodies met the fecal coliform geometric mean standard of 200 MPN at all times. Therefore, fecal coliform loads translated to *E. coli* loads in this TMDL revision will result in loads that are more protective than the current WQS. EPA considers this a revised explicit MOS from the original TMDLs.

F. *The TMDLs have been subject to public participation.*

EPA finds that DDOE provided an appropriate opportunity for public review and comment on the Draft *Appendix C: E. coli Allocations and Daily Loads for the Anacostia River and Tributaries and Appendix D: Calculations* documents. A 30-day public comment period was originally held from February 8, 2013 to March 10, 2013, and then extended until

March 25, 2013, based on a stakeholder request for extension of the public comment period. Copies of the appendices were available for public review at the Martin Luther King, Jr. Library located in Washington, D.C. and were also posted online at the DDOE and EPA Region III websites.

A public meeting was held on March 4, 2013, at the Metropolitan Washington Council of Governments offices located in Washington D.C. to discuss the Draft TMDL Revisions for all interested parties.

A response to comments document was submitted to EPA as part of the TMDL submittal. Comments were received D.C. Water and Earthjustice (on behalf of Anacostia Riverkeeper and Potomac Riverkeeper). EPA considered those comments; and the District's response to them, in its evaluation of the TMDL submission.

EPA believes that the 2014 revised TMDLs, including the *E. coli Allocations and Daily Loads for the Anacostia River and Tributaries* (Appendix C) and *Calculations* (Appendix D), meet the requirement to provide adequate opportunity for public participation.