



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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July 30, 2012

Betsey Wingfield, Chief
Bureau of Water Protection and Land Reuse
Connecticut Department of Energy & Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

Dear Ms. Wingfield:

Thank you for the final submission of **A Total Maximum Daily Load Analysis for the Titicus River Sub-Regional Basin** for indicator bacteria (*Escherichia coli*). The Titicus River was included on Connecticut's 2010 303(d) List as priority waters for TMDL development. This TMDL analysis the Titicus River segment was submitted to EPA for approval.

The U.S. Environmental Protection Agency (EPA) hereby approves Connecticut's TMDL submission. The TMDL package was submitted to EPA via Email on May 29, 2012. No public comments were received by CTDEEP during the public participation process. EPA has determined that this TMDL meets the requirements of Section 303(d) of the Clean Water Act (CWA) and EPA's implementing regulations (40 CFR Part 130). Attached is a copy of our approval documentation.

This TMDL analysis is based upon Connecticut's methodology entitled, *Development of Total Daily Maximum Loads (TMDLs) for Indicator Bacteria in Contact Recreation Areas Using the Cumulative Frequency Distribution Function Method (November 8, 2005)*. The technical support document for this method is detailed in Appendix D of the TMDL analysis. This approach for TMDL development does not alter CT's standing policy of assessing use support in accordance with *Connecticut Consolidated Assessment and Listing Methodology (CT-CALM)*.

My staff and I look forward to continued cooperation with the CT DEEP in exercising our shared responsibility of implementing the requirements under Section 303(d) of the CWA.

If you have any questions regarding this approval, please contact Steve Silva at (617) 918-1561 or have your staff contact Mary Garren at (617) 918-1322. Thank you very much.

Sincerely,

/s/

Stephen S. Perkins, Director
Office of Ecosystem Protection

attachment

cc with attachment:
Rob Hust, CT DEEP
Traci Iott, CTDEEP
Steve Silva, EPA
Mary Garren, EPA

EPA NEW ENGLAND'S TMDL REVIEW

TMDL: A Total Maximum Daily Load Analysis for Recreational Uses of the Titicus River Sub-Regional Basin

CT Waterbody Segments on the State of Connecticut 2010 List of Connecticut Water Bodies Not Meeting Water Quality Standards (Section 303(d) of the Federal Clean Water Act):

Waterbody Names and Waterbody Segment ID numbers

Titicus River Sub-Regional Basin (Ridgefield): CT8104-00_01

STATUS: Final

IMPAIRMENT/POLLUTANT: Impairment of recreational uses due to indicator bacteria. The Total Daily Maximum Load (TMDL) is proposed for indicator bacteria - *Escherichia coli*.

BACKGROUND:

The Connecticut Department of Energy and Environmental Protection (CT DEEP) submitted to EPA New England the final TMDL Analysis for Recreational Uses of the Titicus River Sub-Regional Basin for review and approval. EPA New England concurs with the content of TMDL analysis.

The following review explains how the TMDL submission meets the statutory and regulatory requirements of TMDLs in accordance with Section 303(d) of the Clean Water Act, and 40 CFR Part 130.

REVIEWER: Mary Garren (617-918-1322) garren.mary@epa.gov

REVIEW ELEMENTS OF TMDLs

Section 303(d) of the Clean Water Act (CWA) and EPA's implementing regulations at 40 C.F.R. § 130 describe the statutory and regulatory requirements for approvable TMDLs. The following information is generally necessary for EPA to determine if a submitted TMDL fulfills the legal requirements for approval under Section 303(d) and EPA regulations, and should be included in the submittal package. Use of the verb "must" below denotes information that is required to be submitted because it relates to elements of the TMDL required by the CWA and by regulation.

1. Description of Waterbody, Pollutant of Concern, Pollutant Sources and Priority Ranking

The TMDL analytical document must identify the waterbody as it appears on the State/Tribe's 303(d) list, the pollutant of concern and the priority ranking of the waterbody. The TMDL submittal must include a description of the point and nonpoint sources of the pollutant of

concern, including the magnitude and location of the sources. Where it is possible to separate natural background from nonpoint sources, a description of the natural background must be provided, including the magnitude and location of the source(s). Such information is necessary for EPA's review of the load and wasteload allocations that are required by regulation. The TMDL submittal should also contain a description of any important assumptions made in developing the TMDL, such as: (1) the assumed distribution of land use in the watershed; (2) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources; (3) present and future growth trends, if taken into consideration in preparing the TMDL; and, (4) explanation and analytical basis for expressing the TMDL through surrogate measures, if applicable. Surrogate measures are parameters such as percent fines and turbidity for sediment impairments, or chlorophyll a and phosphorus loadings for excess algae.

This TMDL analysis has been prepared for the Titicus River Sub-Regional Basin (page 2, main document). The sub-regional basin extends from New York state border (in large marsh along north side of North Salem Road (Route 116)), US to headwaters (at unnamed marsh, US of Old West Mountain Road crossing), Ridgefield. The portion of the sub-regional basin that is within the State of Connecticut's boundaries and for which this TMDL is written is Titicus River-01 segment. Titicus River-01 is located in the Town of Ridgefield, Connecticut. The segment includes several ponds and marshes. The Titicus River is protected for recreational uses such as kayaking, wading, water skiing, fishing, boating, aesthetic enjoyment and others. Titicus River-01 is identified as impaired for their recreational uses due to the presence of *E. coli* on the State of Connecticut 2010 List of Connecticut Water Bodies Not Meeting Water Quality Standards (2010 List).

The Titicus River-01 was categorized by CTDEEP as high priority for TMDL development. The river was identified as priority "H" meaning it was targeted for TMDL development within 3 years if warranted (page 3, main document). There are no municipal waste water treatment plants in the sub-regional basin (page 4, main document). Five individual permits have been issued to facilities in the Titicus River Sub-Regional Basin. The permits are for two underground storage tanks, one underground injection, one aquatic permit for pesticide application, and one stormwater construction general permit. The Town of Ridgefield is an urban community covered under the Municipal Separate Storm Sewer System (MS4) and is subject to the NPDES Phase II Stormwater General Permit (Figure 2, Appendix A). Industrial and commercial stormwater dischargers are covered under the MS4 permit.

Potential sources of bacteria are identified for the sub-regional basin (Table 2, main document). Sources of indicator bacteria in this case are unknown and/or identified as urban runoff. Point and nonpoint sources (NPS) are contributing to the impairment of the river. Nonpoint sources include unspecified urban stormwater, failed septic systems, and unknown sources. Point sources include regulated stormwater runoff, illicit connections/hook-ups to storm sewers, animal waste, and other unknown sources. The underground injection permit is issued to the Scotland Elementary School and is the only one of the five individual permits that may involve discharges of bacteria. The underground injection permit requires the Town of Ridgefield to monitor quarterly for fecal coliform. The discharge location was dry in 2009 and fecal coliform was not present in samples in 2010 (page 4, main document).

Appendix B of the TMDL document provides detailed identifying information for the waterbody. The designated use that is being impaired is identified as recreation in this waterbody. No designated swimming or non-designated swimming areas are located in the water. The waterbody must meet the standard for recreational use that does not include full body contact with the water, e.g. boating, fishing (page 5, main document). Surface water classification for the waterbody segment is Class AA (Table 5, main document).

The assessment methodology for recreation is presented on pages 22 and 23 of the 2010 State of Connecticut Integrated Water Quality Report (Integrated Report), July 2011. Chapter one of the Integrated Report explains Connecticut's Consolidated Assessment and Listing Methodology (CALM). Applicable indicator bacteria criteria for the waterbody segment are presented in Table 4 of the TMDL Analysis. A more detailed explanation of the relevant water quality criteria can be found in Appendix D (pages 28-31) of the CTDEEP's document entitled, Development of Total Maximum Daily Loads (TMDLs) for Indicator Bacteria in Contact Recreation Areas using the Cumulative Function Distribution Method, November 8, 2005 (the method document). The critical season for the TMDL is the recreational season, May 1st to September 30th. The waterbody is not impaired during the cold months when enteric bacteria die off due to the lower temperatures and potential human exposure is greatly reduced (page 29, the method document). Surface water classifications for each of impacted waters are listed as they were defined by WQS. Connecticut's WQS contain an anti-degradation policy (Appendix E of the WQS). Present and future growth in the watershed is therefore required to comply with all applicable WQS including this policy (page 12, main document).

Appendix B also list additional information on the waterbody, including the linear mileage of the waterbody and the square mileage of the individual sub-drainage basin. Land use categories are presented for the watershed. The watershed is broken down into appropriate land use categories, i.e. forested, urban/developed, water/wetland, and agriculture. Located within the northern portion of the sub-watershed are a large horse farm, a large golf course, and many large homes. Four schools with large areas of impervious cover and ball fields are also located in the sub-watershed (pages 4-5, main document). Six *E. coli* samples taken in the watershed during 2001-2010 showed bacteria levels ranging from 135 to >2,419 colonies/100 milliliters. See Section 2 below for an explanation of how these levels compare to water quality criteria.

Assessment:

EPA New England concludes that the TMDL document meets the requirements for describing the water body segment, pollutant of concern, identifying and characterizing sources of impairment, and the water's priority ranking.

2. Description of the Applicable Water Quality Standards and Numeric Water Quality Target

The TMDL submittal must include a description of the applicable State/Tribe water quality standard, including the designated use(s) of the waterbody, the applicable numeric or narrative water quality criterion, and the anti-degradation policy. Such information is necessary for

EPA's review of the load and wasteload allocations that are required by regulation. A numeric water quality target for the TMDL (a quantitative value used to measure whether or not the applicable water quality standard is attained) must be identified. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, usually site specific, must be developed from a narrative criterion and a description of the process used to derive the target must be included in the submittal.

Appendix D of the TMDL is entitled "Development of TMDLs for Indicator Bacteria in Contact Recreational Areas using the Cumulative Distribution Function Method." This Appendix details the entire methodology for this TMDL analysis. Water quality criteria supporting "all recreational uses" are applicable to the Titicus River. There are no designated or non-designated swimming areas in the segment. The geometric mean density of indicator bacteria must be less than 126 colonies/100 ml and the single sample maximum is limited to 576 colonies/100 ml to comply with CT's indicator bacteria criteria.

The cumulative distribution function method is an accepted method used by CTDEEP to develop TMDLs for indicator bacteria. CTDEEP worked with EPA during the development of this method. The method was also peer reviewed by many colleagues outside CTDEEP. The methodology has been applied to many waterbody segments and TMDL analyses in CT. Representative ambient water quality monitoring data taken on a minimum of 21 sampling dates between May 1st and September 31st is a requirement for use of this method. Representative sampling of indicator bacteria density and precipitation are required. Decisions regarding listing or delisting of a waterbody pursuant to Section 303(d) of the Clean Water Act will not be made based on this methodology. CTDEEP will continue to make an assessment as to whether a waterbody is supporting its designated use according to its most currently approved CALM (page 27, Appendix D). Connecticut's anti-degradation policy (Appendix E of the State's 2002 WQS) is referenced (page 12, main document) in the context that this and any future modification of the TMDL must be consistent with that policy.

This TMDL analysis uses a cumulative distribution function method to determine the reduction in the density of bacteria needed to allow the waterbody to meet its water quality criteria. Connecticut's WQS require levels of *E. coli* to be less than a geometric mean of 126 col/100 ml and single sample maximum that varies depending on the designated use of the waterbody. The Titicus River must comply with a single sample maximum of 576 colonies/100 ml which is protective of its designation as a waterbody appropriate for recreational use that does not include swimming (page 5 and Table 4, main document). The single sample maximum of 576 col/100 ml represents the 95th percentile upper confidence limit for statistical distribution of *E. coli* data with a geometric mean of 126 colonies/100 ml and a log standard deviation of 0.4. Appendix D (page 28-31) contains a detailed explanation of the water quality criteria and the cumulative frequency distribution curve. The cumulative frequency distribution curves that express the applicable water quality criteria are shown graphically in Figures 1a - 1c (Appendix D). Analytical data from the waterbody is then plotted on the same graph (Figures 2a - 2c, Appendix D) to form a second cumulative relative frequency curve. The graph shows the percent reduction in *E. coli* needed to move each data point from the sample data curve to the criteria curve. The cumulative frequency distribution curves show the estimated percent reduction needed for any given concentration of *E. coli* on any given day (Figure 2c, Appendix D). The TMDL is then the

arithmetic average of the percent reduction needed for each sampling data point to meet water quality criteria.

Assessment:

The use of the cumulative distribution function method, the description of the process in the TMDL document, and the companion method document to this TMDL document adequately demonstrate the basis for deriving the target indicator bacteria loads and demonstrating that the targets will achieve Water Quality Standards (WQS). EPA concludes that Connecticut has properly presented its numeric WQS and has made a reasonable and appropriate interpretation of its narrative water quality criteria for the designated uses of the Titicus River Sub-Regional Basin.

3. Loading Capacity - Linking Water Quality and Pollutant Sources

As described in EPA guidance, a TMDL identifies the loading capacity of a waterbody for a particular pollutant. EPA regulations define loading capacity as the greatest amount of loading that a water can receive without violating water quality standards (40 C.F.R. § 130.2(f) The loadings are required to be expressed as either mass-per-time, toxicity or other appropriate measure (40 C.F.R. § 130.2(i) The TMDL submittal must identify the waterbody's loading capacity for the applicable pollutant and describe the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources. In most instances, this method will be a water quality model. Supporting documentation for the TMDL analysis must also be contained in the submittal, including the basis for assumptions, strengths and weaknesses in the analytical process, results from water quality modeling, etc. Such information is necessary for EPA's review of the load and wasteload allocations that are required by regulation.

In many circumstances, a critical condition must be described and related to physical conditions in the waterbody as part of the analysis of loading capacity (40 C.F.R. § 130.7(c)(1)). The critical condition can be thought of as the "worst case" scenario of environmental conditions in the waterbody in which the loading expressed in the TMDL for the pollutant of concern will continue to meet water quality standards. Critical conditions are the combination of environmental factors (e.g., flow, temperature, etc.) that result in attaining and maintaining the water quality criterion and have an acceptably low frequency of occurrence. 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.

The loading capacity for the waterbody, or TMDL, is calculated using the cumulative frequency distribution function method detailed in Appendix D of the document. The TMDL for each waterbody segment is the average percent reduction of indicator bacteria needed to meet the applicable Water Quality Criteria. A TMDL is the sum of the Waste Load Allocation (WLA), Load Allocation (LA) plus a Margin of Safety (MOS) for a particular waterbody segment. The indicator bacteria used in freshwater is *E. coli*. The numeric water quality targets are therefore

the average percent reductions needed in *E. coli* to meet Water Quality Standards. The TMDL, calculated in Appendix B and presented in Table 5 of the main document, is:

TMDL - Average percent reduction in *E. coli* needed at each specified monitoring site

<u>Waterbody</u>	<u>Segment ID Number</u>	<u>TMDL - Avg. % Reduction needed in indicator bacteria</u>	<u>Monitoring Site Number</u>
Titicus River	CT8104-00_01	61%	926

Appendix B (main document) provides detailed information on the waterbody. Waterbody specific information, sampling data, calculations of the TMDL, cumulative distribution frequency curves, and a summary of the TMDL are included in the appendix. The Town of Ridgefield contains a designated urbanized area where Connecticut’s stormwater general permit (MS4 permit) is applicable (page 2, main document). The portion of the Titicus River Sub-Regional Basin that is located in the State of Connecticut is largely in the urban area covered by the MS4 permit (Figure 2, Appendix A).

CTDEEP’s cumulative distribution function method for TMDL development calls for certain minimum data requirements (page 35-36, Appendix D). All TMDLs should be based upon ambient water quality monitoring data obtained on at least 21 sampling dates within the last five recreational seasons (tabular data table in Appendix B, main document).

Monitoring site 926 (CT8104-00_01) is located along the lower stretch of the Titicus River in Connecticut. The river continues on into the State of New York beyond the jurisdiction of Connecticut. The TMDL for this location calls for a 61% average percent reduction needed in indicator bacteria (*E. coli*). CTDEEP is monitoring at a sampling station located where the river flows downstream to the New York border.

Potential sources of indicator bacteria are identified for the waterbody segment (Table 2, main document). Unspecified urban stormwater runoff, failed septic systems, and unknown sources contribute to nonpoint source load in the water body. Regulated stormwater runoff, illicit stormwater pipe connections, animal waste, and unknown sources are contributors of bacteria to point source stormwater runoff. A sustainable natural habitat for wildlife is the State’s management goal. Other than controlling “nuisance” populations of wildlife, e.g. Canada geese clusters, no reduction would be expected for wildlife contributions to *E. coli* loads (page 34, Appendix D). Domestic pet waste management is an ongoing strategy in all communities. The goal for nonpoint sources such as pet waste and unknown sources is their elimination. Regulated baseflow from individually permitted wastewater treatment plants, regulated stormwater discharges subject to the Phase II Stormwater General Permit, sanitary/combined sewer overflows, illicit and unknown discharges are potential contributing point sources. Insufficiently treated wastewater from permitted treatment plants, illicit discharges, and sanitary/combined sewer overflows are allocated 100% reduction in indicator bacteria since the goal is their elimination. Reduction of *E. coli* discharged from regulated urban runoff/storm sewers is identified as a necessary step to reduce point source loading of *E. coli*.

Critical conditions in the watershed are identified in the seasonal analysis section of the TMDL (pages 6-7, main document and the table on page 34, Appendix D). Summer is the critical season for increased bacterial densities in water bodies. Warm weather conditions in water and sediment improve the survival of bacteria. Resident and migratory wildlife are more prevalent and active during the summer increasing the bacterial load. The summer season is when the designated recreational uses of waters are most critical. For waters impaired by bacteria, if the TMDL and designated uses can be achieved during the worst-case summer season, then the designated uses of the water will be met during the remainder of the year. CTDEEP clearly states that, “The percent reduction TMDL for the Titicus River Regional Basin is applicable each and every day until recreational use goals are attained” (page 2, main document).

Assessment:

The TMDL document explains and EPA concurs with the approach for applying the cumulative distribution function method to specific surface water bodies for the purpose of developing target indicator bacteria loading rates and in identifying sources of needed *E. coli* load reduction. EPA believes that this approach is reasonable because the factors influencing and controlling indicator bacteria impairment were well justified.

4. Load Allocations (LAs)

EPA regulations require that a TMDL include LAs, which identify the portion of the loading capacity allocated to existing and future nonpoint sources and to natural background (40 C.F.R. § 130.2(g)). Load allocations may range from reasonably accurate estimates to gross allotments (40 C.F.R. § 130.2(g)). Where it is possible to separate natural background from nonpoint sources, load allocations should be described separately for background and for nonpoint sources.

If the TMDL concludes that there are no nonpoint sources and/or natural background, or the TMDL recommends a zero load allocation, the LA must be expressed as zero. If the TMDL recommends a zero LA after considering all pollutant sources, there must be a discussion of the reasoning behind this decision, since a zero LA implies an allocation only to point sources will result in attainment of the applicable water quality standard, and all nonpoint and background sources will be removed.

The Load Allocation (LA) for the Titicus River Sub-Regional Basin is summarized in Table 5 (main document) and calculated in Appendix B. Using the cumulative distribution function method, the percent reduction needed to achieve indicator bacteria criteria from unregulated nonpoint source discharges is assigned to the LA (pages 33-34, Appendix D). CTDEEP uses dry weather data to reflect these unregulated nonpoint source discharges. “Dry” data is collected at any time when precipitation is less than 0.1” per 24 hours, 0.25” per 48 hours, or 2.0” per 96 hours (page 38, Appendix D). The TMDL identifies failed septic systems, unspecified urban stormwater and unknown sources as largely contributing to the LA for the Titicus River Sub-Regional Basin (Table 2, main document). The LA is based on the average bacteria loading

reduction needed in unregulated nonpoint sources to comply with the criteria. The Load Allocation (Table 5, main document and Appendix B) is:

<u>Waterbody</u>	<u>Segment ID Number</u>	<u>Dry Weather</u>	
		<u>Load Allocation</u>	<u># of Dry Samples</u>
Titicus River	CT8104-00_01	<u>Avg. % Reduction</u> 54% at site 926	21

Assessment:

EPA concludes that the TMDL document sufficiently addresses the calculation of the load allocations.

5. Wasteload Allocations (WLAs)

EPA regulations require that a TMDL include WLAs, which identify the portion of the loading capacity allocated to existing and future point sources (40 C.F.R. § 130.2(h)). If no point sources are present or if the TMDL recommends a zero WLA for point sources, the WLA must be expressed as zero. If the TMDL recommends a zero WLA after considering all pollutant sources, there must be a discussion of the reasoning behind this decision, since a zero WLA implies an allocation only to nonpoint sources and background will result in attainment of the applicable water quality standard, and all point sources will be removed.

In preparing the wasteload allocations, it is not necessary that each individual point source be assigned a portion of the allocation of pollutant loading capacity. When the source is a minor discharger of the pollutant of concern or if the source is contained within an aggregated general permit, an aggregated WLA can be assigned to the group of facilities. But it is necessary to allocate the loading capacity among individual point sources as necessary to meet the water quality standard.

The TMDL submittal should also discuss whether a point source is given a less stringent wasteload allocation based on an assumption that nonpoint source load reductions will occur. In such cases, the State/Tribe will need to demonstrate reasonable assurance that the nonpoint source reductions will occur within a reasonable time.

Waste Load Allocations (WLAs) for the water body is summarized in Table 5 (main document) and calculated in Appendix B. Using the cumulative distribution function method, the percent reduction needed to achieve Water Quality Criteria from regulated point source discharges is assigned to the WLA (pages 33-34, Appendix D). CTDEEP uses wet weather data to reflect these regulated point source discharges. “Wet” data is collected when precipitation is greater than 0.1” per 24 hours, 0.25” per 48 hours, or 2.0” per 96 hours (page 38, Appendix D). The WLA is based on the average bacteria loading reduction needed in regulated point source loadings to comply with the criteria. The TMDL identifies regulated stormwater runoff, illicit connections to storm sewers, animal waste and unknown sources as largely contributing to the

WLA for the Titicus Sub-Regional Basin (Table 2, main document).

There are regulated point sources present in the basin. There is one municipal point source discharge to the Titicus River (Table 3, main document). The Town of Ridgefield municipal point source discharge is regulated under the Municipal Stormwater General Permit. There is no municipal wastewater treatment plant in the sub-watershed. There are four other permitted discharges in the sub-regional basin (Table 3, main document). There is an aquatics permit for pesticide application issued for Mamasasco Lake. The Harrison Property is covered under the Stormwater Construction General Permit. Francis Cleaners Inc. has been issued an underground storage tank permit. Two permits have been issued to the Scotland Elementary School. The first permit is for an underground storage tank. The second permit is for underground injection. The Underground Injection (UI) Permit requires quarterly fecal coliform monitoring. This is due to the fact that the underground injection is considered a potential source of bacteria, although the discharge location was dry in 2009 and did not detect bacteria in 2010. The Waste Load Allocation (Table 5, main document and Appendix B) is:

<u>Waterbody</u>	<u>Segment ID Number</u>	<u>Wet Weather</u>	<u># of Wet Samples</u>
		<u>Waste Load Allocation</u> <u>Avg. % Reduction</u>	
Titicus River	CT8104-00_01	71% at site 926	15

Assessment:

EPA concludes that the TMDL document sufficiently addresses the calculation of the waste load allocations.

6. Margin of Safety (MOS)

The statute and regulations require that a TMDL include a margin of safety to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality (CWA § 303(d)(1)(C), 40 C.F.R. § 130.7(c)(1)). EPA guidance explains that the MOS may be implicit, i.e., incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified.

An implicit Margin of Safety (MOS) is relied upon in the TMDL document (page 6 and Table 5, main document). EPA’s indicator bacteria criteria, adopted by CT and used in this TMDL analysis, were developed from data taken at high use bathing beaches with identified human fecal contamination. The Titicus River does not include official swimming areas, so swimming is not expected or encouraged by the State. The water quality criterion of a single sample maximum of 576 colonies/100 ml is applicable to those waters without swimming beaches. Reliance upon data from EPA’s targeted impaired swimming beaches to assess the data from CT waters is a conservative comparison. Potential sources of contamination of the water body

(pages 3-5, main document and TMDL summary in Appendix B) are primarily not from human fecal matter, but from stormwater runoff.

The analytical methodology (pages 36-38, Appendix D) offers additional factors contributing to a MOS that are inherent to the cumulative distribution function method. Sample results from waters with lower levels of bacteria as compared to the bacteria criteria are assigned a percent reduction equal to zero. A negative value would suggest that the water could assimilate additional bacteria and still meet the criteria. Assigning a zero percent reduction is more conservative. Another factor is that compliance with CT's MS4 Permit requires elimination of high loading sources (illegal connections, dry weather storm sewer overflows, etc) (Appendix C). This permit, separate from the TMDL, will greatly reduce bacteria loading to the water body. Best Management Practices (BMPs), whether implemented for wet or dry weather sources, will also add to the MOS. BMPs designed to target a particular weather condition will most often contribute to load reductions during all conditions.

Assessment:

EPA concludes that the implicit margin of safety for the TMDL is acceptable.

7. Seasonal Variation

The statute and regulations require that a TMDL be established with consideration of seasonal variations. The method chosen for including seasonal variations in the TMDL must be described (CWA § 303(d)(1)(C), 40 C.F.R. § 130.7(c)(1)).

The TMDL relies upon samples obtained during the summer recreational season which runs from May 1 to September 30 (page 35, Appendix D). Bacteria densities are highest during warm months (page 7, main document). Summer months with warm temperatures provide an optimal environment for survival of bacteria colonies. Resident and migratory wildlife are more abundant during the summer. Data taken during the recreational season therefore represents “worst-case” conditions. Restoring designated uses during the summer will ensure that uses are met for the remainder of the year. Restricting data to samples taken during the warm months is therefore conservative and an acceptable approach to considering seasonal variation.

Assessment:

Since the other seasons are less sensitive to loading of indicator bacteria, EPA concludes that the TMDL is protective of all seasons throughout the year.

8. Monitoring Plan for TMDLs Developed Under the Phased Approach

EPA's 1991 document, Guidance for Water Quality-Based Decisions: The TMDL Process (EPA 440/4-91-001), and EPA's 2006 guidance, Clarification Regarding “Phased” Total Maximum Daily Loads, recommend a monitoring plan when a TMDL is developed using the phased

approach. The guidance indicates that a State may use the phased approach for situations where TMDLs need to be developed despite significant data uncertainty and where the State expects that the loading capacity and allocation scheme will be revised in the near future. EPA's guidance provides that a TMDL developed under the phased approach should include, in addition to the other TMDL elements, a monitoring plan that describes the additional data to be collected and a scheduled timeframe for revision of the TMDL.

Because this TMDL is not a “phased” TMDL, a monitoring plan is not required in order to assure that data is available for updating the TMDL in the near future. Nevertheless, in order to assess the progress in obtaining the TMDL water quality goals, CTDEEP has recommended that the municipalities establish a water quality monitoring program consistent with the Comprehensive Wastewater Management Planning process and implementation of the TMDL. The State outlines a comprehensive water quality monitoring program necessary to identify sources, track improvement and document attainment of water quality criteria (pages 9-11, main document).

The TMDL presents recommendations as to how the community can implement successful water quality monitoring programs. Analytical parameters and methods required by the MS4 Permit are discussed in the TMDL (pages 10-11, main document). Stormwater monitoring has been a requirement for MS4 communities since 2004 (page 9, main document). The required monitoring is scheduled to take place during stormwater runoff events. Municipalities have the option, however, to request that CTDEEP approve an alternate sampling plan of equivalent or greater scope. A fixed station ambient water quality monitoring program is recommended by CTDEEP to most effectively assess BMP implementation. CTDEEP commits to investigating funding sources for local communities and to providing technical assistance (page 9, main document).

The cumulative distribution function method is not a tool that will be used to assess use attainment status of the water as it relates to listing or delisting of a waterbody on the 303(d) List (page 27, Appendix D). Monitoring data, the CT CALM, and CT Water Quality Standards will guide the assessment of designated use attainment.

Assessment:

EPA New England concludes that the anticipated monitoring by and in cooperation with CTDEEP is sufficient to evaluate the adequacy of the TMDL and attainment of Water Quality Standards, although not a required element for TMDL approval.

9. Implementation Plans

On August 8, 1997, Bob Perciasepe (EPA Assistant Administrator for the Office of Water) issued a memorandum, “New Policies for Establishing and Implementing Total Maximum Daily Loads (TMDLs),” that directs Regions to work in partnership with States/Tribes to achieve nonpoint source load allocations established for 303(d)-listed waters impaired solely or primarily by nonpoint sources. To this end, the memorandum asks that Regions assist States/Tribes in

developing implementation plans that include reasonable assurances that the nonpoint source load allocations established in TMDLs for waters impaired solely or primarily by nonpoint sources will in fact be achieved. The memorandum also includes a discussion of renewed focus on the public participation process and recognition of other relevant watershed management processes used in the TMDL process. Although implementation plans are not approved by EPA, they help establish the basis for EPA's approval of TMDLs.

CTDEEP presents a plan as to how the TMDL for the Titicus River Sub-Regional Basin will be effectively implemented (pages 7-9, main document and Appendix C). Effective nonpoint source watershed management and NPDES stormwater management plans are highlighted as the primary mechanisms by which nonpoint and point sources of *E. coli* will be reduced. CTDEEP's watershed management program will provide technical and educational assistance for nonpoint source management, as well as help investigate funding sources for local communities. Stormwater Management Plans required by Connecticut's NPDES MS4 Permit will address minimum control measures and BMPs appropriate to regulated stormwater management. Municipalities are required by Section 6 (K) of the MS4 permit to amend their Stormwater Management Plans within four months of this EPA approval to implement the TMDL (page 8, main document). References to specific EPA and CTDEEP guidance on BMP implementation are suggested to assist the municipalities.

Assessment:

CT DEEP has addressed the implementation plan, although it is not required. EPA is taking no action on the implementation plan.

10. Reasonable Assurances

EPA guidance calls for reasonable assurances when TMDLs are developed for waters impaired by both point and nonpoint sources. In a water impaired by both point and nonpoint sources, where a point source is given a less stringent wasteload allocation based on an assumption that nonpoint source load reductions will occur, reasonable assurance that the nonpoint source reductions will happen must be explained in order for the TMDL to be approvable. This information is necessary for EPA to determine that the load and wasteload allocations will achieve water quality standards.

In a waterbody impaired solely by nonpoint sources, reasonable assurances that load reductions will be achieved are not required in order for a TMDL to be approvable. However, for such nonpoint source-only waters, States/Tribes are strongly encouraged to provide reasonable assurances regarding achievement of load allocations in the implementation plans described in section 9, above. As described in the August 8, 1997 Perciasepe memorandum, such reasonable assurances should be included in State/Tribe implementation plans and "may be non-regulatory, regulatory, or incentive-based, consistent with applicable laws and programs."

The State of Connecticut has statutory and regulatory authority to require implementation of this TMDL. Connecticut's MS4 Permit provides assurance that reductions in *E. coli* loading will

occur in urban point sources of stormwater through continued implementation of the NPDES Program. These point sources are reflected in the TMDL analysis within the WLA. The MS4 permit for regulated stormwater discharges requires that communities identify minimum control measures in a Stormwater Management Plan that is submitted to CTDEEP. Six minimum control measures that must be addressed by the community are listed (page 8, main document). All minimum control measures were to be implemented by January 8, 2009. The MS4 permit is a legally enforceable mechanism by which CTDEEP can mandate, if necessary, that communities reduce stormwater point source discharges of bacteria (page 11, main document). CTDEEP also has the authority to designate municipal discharges outside the urbanized area as regulated by the MS4 permit (page 8, main document)

Nonpoint source loading from unregulated sources are partitioned into the LA for the TMDL (page 34, Appendix D). The TMDL document states that CTDEEP's watershed coordinator will provide assistance to local municipalities and stakeholders as part of the CTDEEP's nonpoint source program. CTDEEP also must approve CWA 319 Watershed-Based Plans. BMPs that address nonpoint sources are highlighted for consideration within local watershed management plans (pages 8 and 9, main document). Some suggested BMPs for the Titicus River Sub-Regional Basin are discussed in Appendix B.

Assessment:

Reasonable assurance is not necessary for this TMDL to be approvable, since the point sources are not given less stringent wasteload allocations based on projected nonpoint source load reductions. CTDEEP has provided reasonable assurance that Water Quality Standards will be met.

11. Public Participation

EPA policy is that there must be full and meaningful public participation in the TMDL development process. Each State/Tribe must, therefore, provide for public participation consistent with its own continuing planning process and public participation requirements (40 C.F.R. § 130.7(c)(1)(ii)). In guidance, EPA has explained that final TMDLs submitted to EPA for review and approval must describe the State/Tribe's public participation process, including a summary of significant comments and the State/Tribe's responses to those comments. When EPA establishes a TMDL, EPA regulations require EPA to publish a notice seeking public comment (40 C.F.R. § 130.7(d)(2)).

Inadequate public participation could be a basis for disapproving a TMDL; however, where EPA determines that a State/Tribe has not provided adequate public participation, EPA may defer its approval action until adequate public participation has been provided for either by the State/Tribe or by EPA.

Interested parties and communities were notified of the public comment period by a published *Notice of Intent to Adopt A Total Daily Maximum Load Analysis for Recreational Uses of the Titicus River Sub-Regional Basin*. The notice of intent was posted on the Department's website

on August 6, 2011 through September 5, 2011. It also was published in the Danbury News Times on August 6, 2011. The notice was mailed to municipalities, businesses, and non-governmental organizations in the area, as well as interested parties on CTDEEP's mailing list. No comments were submitted prior to the end of the public comment period. Copies of the public notice and mailing list were submitted to EPA along with the TMDL.

Assessment:

EPA concludes that CTDEEP has involved the public during the development of the TMDL and has provided adequate opportunities for the public to comment on the TMDL.

12. Submittal Letter

A submittal letter should be included with the TMDL analytical document, and should specify whether the TMDL is being submitted for a technical review or is a final submittal. Each final TMDL submitted to EPA must be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under Section 303(d) of the Clean Water Act for EPA review and approval. This clearly establishes the State/Tribe's intent to submit, and EPA's duty to review, the TMDL under the statute. The submittal letter, whether for technical review or final submittal, should contain such information as the name and location of the waterbody, the pollutant(s) of concern, and the priority ranking of the waterbody.

The final TMDL for Recreational Uses of the Titicus River Sub-Regional Basin was submitted to EPA by CTDEEP for approval via Email. The Final TMDL document was submitted to EPA for approval in accordance with Section 303(d) of the Clean Water Act. The TMDL submittal included a fact sheet, the public notice requesting comments, and the mailing list. The submittal package provides all the required identifying information for the Titicus River Sub-Regional Basin.

Assessment:

CTDEEP's email submission officially transmitted the TMDL for EPA review and approval.

Data for Entry in EPA's National TMDL Tracking System and Regional Web Page							
TMDL Water Body Name *		Titicus River Sub-Regional Basin					
Number of TMDLs*		1					
Type of Pollutant(s) *		bacteria					
Number of listed causes (from 303(d) list)		1					
Any <u>Information/prevention</u> TMDLs (Y/N)		N					
Lead State		Connecticut					
TMDL Status		Final					
Individual TMDLs listed in attached list (one line per segment-pollutant combination)							
TMDL Segment name	TMDL Segment ID #	TMDL Pollutant ID# & name	TMDL Impairment Cause(s)	Pollutant Endpoint (sampling location number) - % reduction needed in <i>E. coli</i>	Unliste?	NPDES Point Source & ID#	Segment still listed for something else? (Y/N)
Titicus River-01	CT8104-00_01	E. coli (227)	Indicator bacteria	61% (at Site 926)	No	GSM000041 Municipal stormwater general permit	No
TMDL Water Pollution Type		Point and Nonpoint Source					
Cycle (list date)		2010					
Establishment Date (approval)*		July 30 , 2012					
EPA Developed		No					
Towns affected*		Ridgefield					

* = These data fields used in webpage entries