

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 1
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Boston, MA 02109-3912

October 16, 2014

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 the *Additional Appendix to the Statewide TMDL for Bacteria Impaired Waters in the Pawcatuck Watershed*, dated September 24, 2014. This TMDL is an appendix to the 2012 Statewide Total Maximum Daily Load for Bacteria Impaired Waters. The appendix provides the TMDL analyses for six freshwater segments and four marine segments that are impaired for indicator bacteria. Three of the waterbody segments were included on Connecticut's 2012 303(d) list as priority waters for TMDL development.

The U.S. Environmental Protection Agency (EPA) hereby approves Connecticut's TMDL submission. The TMDL package was submitted to EPA for approval via electronic mail on September 24, 2014. Three sets of comments were received by CT DEEP during the public participation process, and the State's responses to them are included in the TMDL package. 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.

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 Mary Garren of my staff at (617) 918-1322.

Sincerely,

/s/

Ken Moraff, Director
Office of Ecosystem Protection

cc with attachment:
Denise Ruzicka, CT DEEP
Rob Hust, CT DEEP
Traci Iott, CT DEEP
Chris Sullivan, CT DEEP
Ralph Abele, EPA

EPA NEW ENGLAND'S TMDL REVIEW

DATE: October 16, 2014

TMDL: *Additional Appendix to the Statewide TMDL for Bacteria Impaired Waters in the Pawcatuck Watershed*

STATUS: Final

IMPAIRMENT/POLLUTANT: 11 Total Daily Maximum Loads (TMDLs) are established in terms of concentrations and daily loads for the indicator bacteria - E. coli, enterococci, and fecal coliform.

BACKGROUND: The Connecticut Department of Energy and Environmental Protection (CT DEEP) submitted a draft TMDL for ten bacteria impaired fresh and estuarine waters of the Pawcatuck River watershed to EPA New England on May 7, 2014. The six freshwater and four estuarine segments addressed in this approval are listed in Attachment 1 of this document. A public comment period was held by CT DEEP from May 8, 2014 to June 9, 2014. CT DEEP submitted to EPA New England the final *Additional Appendix to the Statewide TMDL for Bacteria Impaired Waters in the Pawcatuck Watershed* (“the Appendix”) with a transmittal letter dated September 24, 2014. In addition to the Appendix, the submittal included, either attached or by reference, the following documents:

- Notice of Public Comment, CT DEEP, May 6, 2014.
- TMDL submission letter, CT DEEP to EPA, September 24, 2014
- Pawcatuck River Watershed TMDL fact sheet, CT DEEP, undated
- Response to Public Comment Document, CT DEEP, September 18, 2014
- *A Statewide Total Maximum Daily Load Analysis for Bacteria Impaired Waters*, CT DEEP, Final, September 19, 2012 (hereafter referred to as the Statewide Bacteria TMDL)
- EPA New England’s TMDL Approval of Connecticut’s document: *A Statewide Total Maximum Daily Load Analysis for Bacteria Impaired Waters*, September 20, 2012
- State of Connecticut regulation of Connecticut Water Quality Standards, CT DEEP, October 10, 2013
- 2012 State of Connecticut Integrated Water Quality Report, CT DEEP, Final, December 19, 2012

The following review explains how the TMDL submission meets the statutory and regulatory requirements of TMDLs in accordance with § 303(d) of the Clean Water Act and EPA’s implementing regulations in 40 CFR Part 130.

REVIEWER: Mary Garren (617-918-1322), e-mail: 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.

Introduction

The Statewide Bacteria TMDL was approved by EPA in 2012. The Statewide Bacteria TMDL is the main TMDL document with the segment-specific information and the bacteria data included in its appendices. The TMDL was designed to support reduction of waterborne disease-causing organisms, known as bacteria or pathogens, to reduce public health risk. Waterborne pathogens enter surface waters from a variety of sources including sewage, the feces of warm-blooded wildlife such as barn-yard animals, pets, geese, gulls, illicit discharges of boat wastes, and agricultural applications of manure. These pathogens can pose a risk to human health due to gastrointestinal illness through exposure via ingestion and contact with recreational waters, ingestion of drinking water, and consumption of filter-feeding shellfish. Since the time the Statewide Bacteria TMDL was approved in 2012, CT DEEP has prepared TMDLs for the ten freshwater and estuarine waterbody segments of the Pawcatuck watershed included in the Appendix. The Appendix was developed by CT DEEP with the intention of adding these segments to the Statewide Bacteria TMDL. The Statewide Bacteria TMDL was constructed to allow for this.

In its September 20, 2012 approval of the Statewide Bacteria TMDL, EPA specified a process by which CT DEEP could add more impaired waters to the TMDL. CT DEEP has submitted this Appendix to EPA for ten waterbody segments to be added for coverage under the Statewide Bacteria TMDL. The State has provided public notice for review of the Appendix, in addition to the public notice that was provided in 2012 on the Statewide Bacteria TMDL. The Appendix provides the level of detailed waterbody-specific information on the impaired waterbodies and their TMDLs as was required in the Statewide Bacteria TMDL. CT DEEP has submitted the Pawcatuck River and Estuary Appendix for EPA approval under the Statewide Bacteria TMDL.

The Appendix therefore presents information related to new segments being added under the Statewide Bacteria TMDL only; all other Sections of the Statewide Bacteria TMDL that were approved in 2012 are incorporated by reference and remain applicable to the Appendix.

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 which 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.*

A. Description of Waterbody and Background Information

The Pawcatuck River is a waterbody shared by the States of Connecticut and Rhode Island. The river begins in South Kingstown, Rhode Island, flows southwest, and then forms the boundary between the two states. The Pawcatuck watershed is located in the Connecticut municipalities of North Stonington and Stonington. The Appendix addresses a total of ten bacteria-impaired segments, six fresh water and four estuarine. The largest fresh water segment, Pawcatuck River-01, and all four of the Long Island Sound estuarine segments were listed as impaired on Connecticut's 2012 303(d) list. Five small tributary fresh water brooks were found to be impaired during the development of this TMDL. These five segments were therefore not listed on the 2012 303(d) List. They will be listed as impaired in 2014. The Appendix was submitted to EPA for approval under the Statewide Bacteria TMDL. The Pawcatuck River-01 is classified as inland surface water classification B while the five tributary brooks are classification A waters. Of the four estuarine segments, two of the segments are classified as coastal and marine surface water quality classification SA and two of the segments are classification SB. The Appendix lists the impaired water segments within the watershed and estuary, including each waterbody's name, location, assessment unit identifier, classification, and size. Details on the designated uses of the segments, including shellfish bed classifications, are presented. Site-specific maps and data are provided in the Appendix.

The Pawcatuck River and Estuary appendix to the Statewide Bacteria TMDL covers the six freshwater segments of Pawcatuck River-01, Lewis Brook, Lassell's Brook, Kelly Brook, Hyde Brook and Iron Brook. It also covers four estuarine segments of Long Island Sound. (See Attachment 1 to this document.)

B. Pollutant of Concern

All six of the freshwater segments are impaired for their recreational use due to the presence of indicator bacteria, *E. coli*. Three of the estuarine waterbody segments are impaired for their shellfishing use due to the presence of indicator bacteria, fecal coliform. In one estuarine segment the shellfishing use is impaired by fecal coliform, in addition to its recreational use being impaired by enterococci.

C. Pollutant Sources

Bacteria impairments in these waterbodies arise from both dry and wet weather events, year round. Potential point sources of bacterial pollution include: wastewater discharges from treatment facilities, NPDES-regulated stormwater runoff including stormwater discharges authorized by the State's MS4 permits, accidental and illicit discharges, combined sewer overflows, and discharges from boats. Potential non-point sources of bacterial pollution include stormwater not regulated under the NPDES program, septic systems, pet waste, wildlife wastes, agriculture, and recreational uses (swimmers). A detailed assessment of segment-specific sources of bacterial pollution are identified in the Appendix when these sources are known. (the Appendix, Potential Bacteria Sources).

D. Priority Ranking

Connecticut's 2012 303(d) list indicated priority dates for development of TMDLs for three of the ten waterbodies. LIS EB Inner – Pawcatuck River (01) Stonington was projected for TMDL

development during 2012. LIS-EB Shore – Wequetequock Cove – Stonington and LIS EB Midshore – Stonington were scheduled for TMDL development in 2013. CTDEEP chose to address those segments as well as the other related waterbody segments concurrently.

Assessment: EPA New England concludes that the Appendix meets the requirements for describing the TMDL waterbody segments, pollutant of concern, and priority ranking, and identifying and characterizing sources of impairment.

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 antidegradation policy. Such information is necessary for EPA's review of the load and wasteload allocations which 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.

The Appendix defines the appropriate water quality criteria for protecting the designated shellfishing and recreational uses that apply to these waters, and for implementing the antidegradation policy. The water quality criteria for E. coli, enterococci, and/or fecal coliform that are applicable to an individual waterbody segment are found in the segment specific table in the Appendix. Additional details regarding applicable water quality criteria are found in Section 3 of the Statewide Bacteria TMDL.

Water quality classification and water quality standards of all surface waters of the State of Connecticut have been established pursuant to Connecticut General Statutes Section 22a-426. According to Connecticut's water classification program, surface waters are categorized in one of three freshwater classes (AA, A, or B), or one of two saltwater classes (SA and SB). The classification assigned to a waterbody segment is defined by the designated use of the water. The applicable ambient water quality criteria for bacteria are established to support the designated and existing uses of the water.

The freshwaters in this Appendix are categorized as Class A or B. These fresh waterbody segments do not have beaches designated as bathing areas by the State. They are waters that support non-designated swimming, tubing, water skiing, or other recreational uses where full body contact is likely. E. coli is the indicator organism used to protect recreational uses in fresh water and is the same for Class A and B waters. The geometric mean established as the water quality criterion for E. coli, is 126 colonies/100mL. The single sample maximum for waters not designated by the State for bathing is 410 colonies/100mL.

Marine waters in this Appendix are classified as either Class SA or SB. Class SA waters are designated for shellfish harvesting for direct human consumption, among other uses. Class SB waters are designated for commercial shellfish harvesting, among other uses. Fecal coliform is the indicator organism for shellfish growing and harvesting areas (tidal waters) following the standards developed under the National Shellfishing Sanitation Program (NSSP) by the United States Food and Drug Administration. Fecal coliform is the indicator organism used by the State

to assess water quality in marine shellfishing waters. The geometric mean established as the water quality criterion for fecal coliform, is set at 14 colonies/100mL with 90% of samples less than 31 colonies/100 mL in Class SA waters. In Class SB waters the geometric mean for fecal coliform is 88 colonies/100 mL with 90% of the samples less than 260 colonies/100 mL.

One of the SB marine segments, in addition to not meeting its shellfishing use, is also impaired for recreation. Enterococcus is the indicator organism used for protecting recreational use in marine waters. This marine waterbody segment is not designated by the State for swimming. Non-designated swimming and other recreational uses are protected. The geometric mean established as the water quality criterion for enterococci, is set at 35 colonies/100mL. The single sample maximum for Class SB waters not designated by the State for swimming is 500 colonies/100mL.

Connecticut's water quality criteria for bacteria are used as the numeric water quality targets in the bacteria TMDLs (Statewide Bacteria TMDL, Section 3). The numeric targets vary depending on the specific waterbody's use of shellfish consumption and/or recreation, and the waterbody classification. The ten waterbody segments in this Appendix are either Class A, B, SA, or SB. The water quality criteria for Class A, B, SA, or SB waters, as appropriate, are consequently the numeric water quality targets for the waterbodies.

Assessment: EPA concludes that CT DEEP has properly described and interpreted the applicable water quality standards to set the numeric water quality targets. CT DEEP is directly applying the numeric bacteria criteria in its water quality standards as the numeric water quality targets.

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 which 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 results in attaining and maintaining the water quality criterion and has 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.

Connecticut's bacteria TMDLs consist of two formats for the loading capacity of allowable levels of bacteria: (1) concentrations of bacteria, expressed as bacteria counts/100 ml of water, and (2) loads of bacteria, expressed as billions of bacteria/day (Statewide Bacteria TMDL, Section 5.1, Appendix 1). CT DEEP considers both formats to be daily targets because they

apply on any given day whenever the water quality standards are in effect in order to assure achievement of bacteria water quality criteria. Both formats express targets designed to attain the designated use of shellfishing and/or recreation, and to meet the associated criteria in Connecticut's water quality standards. CT DEEP considers the concentration-based targets to be most useful for guiding implementation of bacteria controls because those targets are easy to understand, and achievement of those targets is more readily assessed by groups with limited resources (see Tables 11-13 and 15-25 of the Appendix).

Connecticut's water quality criteria for bacteria apply year round at all times. By setting the water quality targets equal to the numeric bacteria criteria; the TMDLs are applicable at all times and are therefore protective of water quality under all conditions and seasons. These TMDLs set a goal of meeting bacteria water quality criteria at the point of discharge for all sources in order to meet water quality standards throughout each waterbody. Achievement of those water quality goals will be assessed by ambient water quality monitoring.

CT DEEP has calculated the percent reduction based on the difference between measured ambient bacteria data and the applicable water quality criteria for bacteria, which are also the TMDL target concentrations (Statewide Bacteria TMDL, Section 8.1.2 and Tables 16-26 of the Appendix). In each impaired segment, the sampling station with the highest geometric mean and/or 90% less than/single sample maximum statistical value in relation to the applicable criterion was used to calculate a percent reduction for bacteria for each segment. The percent reduction goals provide useful information to guide implementation of the TMDL.

Assessment: TMDLs can be expressed in various ways, including in terms of toxicity, which is a characteristic of one or more pollutants, or by some "other appropriate measure" (40 C.F.R. §130.2(i)). The loading capacities expressed in the Appendix are set at levels which assure WQS will be met (criteria at point of discharge). The loading capacity is based on the water quality criteria for each waterbody. If all sources of pathogens are at or below the water quality criteria, then it follows that the receiving water will meet water quality standards. Attainment of the concentration-based loading capacity will achieve water quality criteria for both dry and wet weather and for all storm events whenever they occur (i.e., on any given day). Loading capacity targets are listed for each impaired waterbody in the Appendix for the watershed and estuary in which it is located, as are the estimated percent reductions needed to reach the water quality target for each waterbody segment.

EPA's November 15, 2006 guidance entitled "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," recommends that TMDL submittals express allocations in terms of daily time increments. CT DEEP expresses loading capacity targets on a daily basis. The total daily maximum loads of bacteria, expressed as billions of bacteria/day, are calculated using the daily replacement volume of an estuarine segment or the flow rate for riverine segment multiplied by the water quality criteria. In addition the water quality targets apply on any given day whenever the water quality standards are in effect.

In summary, the targets (both concentration and load-based) are directly linked to Connecticut's water quality standards' bacteria criteria to achieve the designated uses of the waterbodies. In addition, EPA concludes that the loading capacity targets address critical conditions and are consistent with EPA guidance on the daily time increment.

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) relates to existing and future nonpoint sources, natural background, and stormwater runoff not subject to NPDES permitting. LAs are set based on the criteria established by Connecticut's water quality standards, or are set at zero for prohibited discharges (Statewide Bacteria TMDL, Section 5.2.1, Tables 5-1, 5-2 and 5-3, as well as Tables 12-14 of the Appendix). The LAs for stormwater (non-MS4), wildlife direct discharge, human or domestic animal direct discharge are set equal to the applicable water quality criteria. Prohibited discharges are given an allocation of zero. LAs, consistent with the applicable numeric water quality criteria, are set based upon the A, B, SA or SB classification of the waterbody segment.

Assessment: As discussed in Section 5 of the Statewide Bacteria TMDL, CT DEEP used the applicable numeric water quality criteria directly related to the use-impairment which the TMDL is designed to address. CT DEEP set conservative LA targets based on meeting criteria at the location of the discharge. EPA concludes that the LAs for bacteria are adequately specified in the TMDLs at levels necessary to attain and maintain water quality standards.

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.

The waste load allocations (WLAs) relate to existing and future point sources. WLAs are allocated based on the criteria established by Connecticut's water quality standards, or are set at zero for prohibited discharges (Statewide Bacteria TMDL, Section 5.2.1, Tables 5-1, 5-2, and 5-3, as well as Tables 12-14 of the Appendix). WLAs, consistent with the applicable numeric water quality criteria, are set based upon the classification of the waterbody segment. Class A

waters have WLAs only for permitted MS4 discharges. Class B have WLAs for permitted MS4 discharges, and also for non-stormwater NPDES discharges and combined sewer overflows. The WLAs for non-stormwater NPDES in SB waters, combined sewer overflows in SA or SB waters, and stormwater (MS4) in SA or SB waters are set equal to the applicable water quality criteria. Prohibited discharges are given an allocation of zero in all waters. The WLAs for each impaired waterbody are listed in the Appendix for the estuary in which it is located, as are the estimated percent reductions needed to reach the water quality concentration target for each waterbody. WLAs, consistent with the applicable numeric water quality criteria, are set based upon the A, B, SA or SB classification of the waterbody segment.

CT DEEP established concentration-based WLAs by applying the numeric criteria directly to each discharge, or zero for prohibited discharges. Aggregate mass WLAs were established for the stormwater sources because it is impossible to determine with any precision or certainty the actual and projected loadings for individual discharges or groups of discharges. EPA's November 22, 2002 TMDL guidance suggests that it is acceptable in such cases to allocate stormwater by gross allotments

Assessment:

As discussed in Section 5 of the Statewide Bacteria TMDL, CT DEEP used the applicable numeric water quality criteria directly related to the use-impairment which the TMDL is designed to address. CT DEEP set conservative WLA targets based on meeting criteria at the point of source discharge. Waste load allocations, consistent with the applicable numeric water quality criteria established by Connecticut's water quality standards, are set based upon the A, B, SA or SB classification of the waterbody segment. EPA concludes that the WLAs for bacteria are adequately specified in the TMDLs at levels necessary to attain and maintain water quality standards.

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.

The TMDLs expressed in terms of daily loads include an explicit 5% MOS which is applied to the appropriate water quality criteria before calculating the allowable daily LAs and WLAs for bacteria (Statewide Bacteria TMDL, Section 5.2., Appendix 1). The mass-per-unit-time bacteria TMDLs are expressed in terms of billions of bacteria per day as a function of flow (for freshwater streams) or daily water outflow volume (for estuarine and marine waters). This 5% MOS is incorporated into the TMDLs in order to account for any uncertainty involved in measurements or estimations of waterbody flow or volume exchange used in the daily load calculations.

When the loading capacity for the waterbody is set equal to the water quality standard, an implicit margin of safety is inherent based on conservative assumptions incorporated into the

TMDL analysis (Statewide Bacteria TMDL, Section 5.2). The water quality targets are established at the same levels as the water quality standards for each waterbody, and include the goal of meeting bacteria water quality criteria at the point of discharge for all sources. Consequently, they do not rely on in-stream processes, such as bacteria die-off, dilution, and settling, which are known to reduce in-stream bacteria concentrations. Given this very conservative target-setting, there is a high level of confidence that the TMDLs established are consistent with water quality standards, and the entire loading capacity can be allocated among sources. The underlying assumption in establishing a concentration TMDL for bacteria is that if all sources are equal to or below the water quality standards, then the concentration of bacteria in the receiving water will attain standards.

Assessment: EPA concludes that the TMDLs expressed as daily loads incorporate an explicit MOS. The loading set-aside is therefore established as 5%. EPA also concludes that the approach used in developing the concentration-based TMDLs provides for an adequate implicit MOS. Setting the concentration targets at the water quality criteria, with the goal of meeting those criteria at the point of discharge with no allowance for bacteria die-off and settling, provides an implicit margin of safety.

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)).

CT DEEP considered seasonal variations when developing the TMDLs. Because the loading capacities are set equal to the bacteria criteria, and the criteria are applicable at all times of year, the TMDLs are also applicable at all times of year and protective during all conditions (Statewide Bacteria TMDL, Section 5.3).

Assessment: The bacteria TMDLs apply over the entire time that the bacteria criteria apply, which is year round in Connecticut. The TMDL targets will reduce bacteria concentrations to water quality criteria levels in all seasons. EPA concludes that the TMDLs have adequately addressed seasonal variability.

8. Monitoring Plan

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.

The TMDLs are not phased TMDLs. CT DEEP does, however, include recommendations for monitoring by permittees as part of their permit obligations to conduct sampling data designed to measure attainment of water quality standards (Statewide Bacteria TMDL, Section 5.6 and the

Appendix, current management activities and recommended next steps). It is recommended that towns conduct wet-weather sampling at stormwater outfalls. There are also recommendations for other agencies and groups who may be interested in conduction monitoring in the state.

The Connecticut Department of Agriculture/Bureau of Aquaculture (CT DA/BA) is responsible for monitoring shellfish in Connecticut. All shellfish growing areas are classified by CT DA/BA in accordance with the Interstate Shellfish Sanitation Conference (ISSC) National Shellfish Sanitation Program Model Ordinance (NSSP-MO) and CT General Statutes Chapter 491, §26-192e. These classifications are based on fecal coliform bacteria standards as provided in the NSSP-MO (Interstate Shellfish Sanitation Conference, 2007). Connecticut DA/BA monitors shellfish beds for compliance with shellfish bacteria standards.

CT DEEP will continue to monitor the water quality of fresh water and estuarine segments of the Pawcatuck River through its probabilistic monitoring program. CT DEEP also conducts some targeted monitoring and sampling trips.

Assessment: EPA concludes that the anticipated monitoring by and in cooperation with CT DEEP is sufficient to evaluate the adequacy of the TMDL and attainment of water quality standards, although this is not a required element of EPA's TMDL approval process.

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.

The Statewide Bacteria TMDL and the Appendix provide implementation guidance and identifies existing informational resources on BMPs to address the various sources of bacteria (Statewide Bacteria TMDL, Section 6 and Appendix, recommended next steps). It also includes an overall description of the implementation process, and information about the stormwater management program. Maps, waterbody-specific data summary tables, and other information specific to each watershed are presented in the Appendix to inform stakeholders on the location of known impairments in their watershed and estuary. Data were used to calculate percent reductions needed to meet the concentration-based targets, and to present wet weather and dry weather bacteria counts (where sufficient precipitation information was available). This wet/dry data analysis provides valuable indications of the sources of bacteria in order to guide implementation efforts to fix the problem.

Assessment: Although implementation plans are not a required element for TMDL approval, CT DEEP has included implementation guidance and identified many resources to aid implementation. 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 water 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 TMDL targets for point sources in these TMDLs are not less stringent based on any assumed nonpoint source reductions, so documentation of reasonable assurance in the TMDLs is not a requirement. Nonetheless, CT DEEP explains that a combination of regulatory and non-regulatory program support in Connecticut will provide reasonable assurances that both point and non-point allocations will be achieved, including regulatory enforcement, technical assistance, availability of financial incentives, and state, and federal programs for pollution control (Statewide Bacteria TMDL, Section 5.7).

Assessment: Although not required, because CT DEEP did not increase WLAs based on expected LA reductions, CT DEEP has nevertheless described a number of programs that provide reasonable assurance that WQS 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.

The public participation process for the *Additional Appendix to the Statewide TMDL for Bacteria Impaired Waters in the Pawcatuck Watershed* is described in the Response to Comments. A public notice, dated May 6, 2014, was released announcing the Appendix for public review. The notice was posted on the CT DEEP website and was placed in several newspapers on May 8, 2014. Emails were sent to a list of interested agencies, towns, and stakeholders. CT DEEP held a joint public meeting with RI DEM on TMDLs for the Pawcatuck River at the Westerly (Rhode Island) Public Library on May 14, 2014. Comments were received by CT DEEP from May 8, 2014 to June 9, 2014. Copies of the comment letters received and the CT DEEP responses to those comments were submitted along with the final Appendix.

Assessment: EPA concludes that CT DEEP has provided sufficient opportunities for the public to comment on the TMDL, and has provided reasonable responses to the public comments.

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.

Assessment: On September 24, 2014, CT DEEP submitted the *Additional Appendix to the Statewide TMDL for Bacteria Impaired Waters in the Pawcatuck Watershed* for EPA approval. The submission package contains all the elements necessary to approve the TMDL.

Attachment 1: Waterbody Segments
in the Pawcatuck Watershed

Segment Name	also known as	305b #	Town	Indicator Bacteria
Pawcatuck River-01		(CT-1000-00_01)	North Stonington and Stonington	E. coli
Unnamed Brook 1	Lewis Brook	(CT-1000-01_01)	North Stonington	E. coli
Unnamed Brook 2	Lassell's Brook	(CT-1000-03_01)	Stonington	E. coli
Unnamed Brook 3	Kelly Brook	(CT-1000-04_01)	Stonington	E. coli
Unnamed Brook 4	Hyde Brook	(CT-1000-05_01)	Stonington	E. coli
Unnamed Brook 5	Iron Brook	(CT-1000-00_trib_01)	Stonington	E. coli
LIS EB Inner - Pawcatuck River (01), Stonington		(CT-E1_001-SB)	Stonington	enterococci and fecal coliform
LIS EB Inner - Pawcatuck River (02), Stonington		(CT-E1_002_SB)	Stonington	fecal coliform
LIS EB Shore – Wequetequock Cove, Stonington		(CT-E2_001)	Stonington	fecal coliform
LIS EB Midshore – Stonington		(CT-E3_001)	Stonington	fecal coliform

Data for entry in EPA's National TMDL Tracking System							
TMDL Name	Pawcatuck River Watershed Bateria TMDL						
Number of TMDLs*	11						
Type of TMDLs*	Indicator Bacteria						
Number of listed causes (from 303(d) list)	4						
Lead State	Connecticut (CT)						
TMDL Status	Final						
Individual TMDLs listed below							
TMDL Segment name	TMDL Segment ID #	TMDL Pollutant ID# & name	TMDL Impairment Cause(s) ⁺	Pollutant endpoint	Unlisted?	CTDEEP Point Source & ID#	Listed for anything else?
Pawcatuck River-01	CT-1000-00_01		E. coli	GM 126 col./100 ml SSM 410 col./100 ml	No	GSM000056 GS1000342 GS1002235 GSN002113 GSC000151	No
Unnamed Brook 1	CT-1000-01_01	(471) E. coli		GM 126 col./100 ml SSM 410 col./100 ml	Yes	GSM000056	
Unnamed Brook 2	CT-1000-03_01	(471) E. coli		GM 126 col./100 ml SSM 410 col./100 ml	Yes	GSM000056	
Unnamed Brook 3	CT-1000-04_01	(471) E. coli		GM 126 col./100 ml SSM 410 col./100 ml	Yes	GSM000056	
Unnamed Brook 4	CT-1000-05_01	(471) E. coli		GM 126 col./100 ml SSM 410 col./100 ml	Yes	GSM000056	
Unnamed Brook 5	CT-1000-00_trib_01	(471) E. coli		GM 126 col./100 ml SSM 410 col./100 ml	Yes	GSM000056	
LIS EB Inner - Pawcatuck River (01), Stonington	CT-E1_001-SB	(466) enterococci	Fecal coliform	GM 35 col./100 ml SSM 500 col./100 ml	No	GSM000056 GS1002288 GS1001756 GS1001078 GS1000715 GS1002418 GS1000342	Dissolved oxygen, DO saturation, Nutrient/Eutrophication biological indicators
		(500) fecal coliform	Fecal coliform	GM 14 col./100 ml SSM 31 col./100 ml			

LIS EB Inner - Pawcatuck River (02), Stonington	CT-E1_002_SB	(500) fecal coliform		Fecal coliform GM 14 col./100 ml SSM 31 col./100 ml	Yes	GSM000056	
LIS EB Shore – Wequetequock Cove, Stonington	CT-E2_001	(500) fecal coliform	Fecal coliform	Fecal coliform GM 14 col./100 ml SSM 31 col./100 ml	No		No
LIS EB Midshore – Stonington	CT-E3_001	(500) fecal coliform	Fecal coliform	Fecal coliform GM 14 col./100 ml SSM 31 col./100 ml	No		No
TMDL Type		Point and Non-Point					
Establishment Date (approval)*		October 16, 2014					
EPA Developed		No					
Towns affected*		Stonington and North Stonington, CT					