December 1, 2010

Alicia Good, Assistant Director of Water Resources
Rhode Island Department of Environmental Management
Office of Water Resources
235 Promenade Street
Providence, RI 02908

SUBJECT: **Approval of Pawcatuck River and Little Narragansett Bay Waters TMDL**

Dear Ms. Good:

Thank you for your submission of Rhode Island's Total Maximum Daily Loads (TMDLs) for the five water bodies of the *Pawcatuck River and Little Narragansett Bay Waters*, Westerly, Rhode Island, for fecal coliform and enterococci bacteria. Four of these water bodies were included on the State's 2008 303(d) list and were prioritized for TMDL development. One water body was found to be impaired during the TMDL study. The purpose of these TMDLs for Rhode Island waters is to address bacteria-related impairments to shellfish consumption and contact recreation use from point and nonpoint source pollution.

The U.S. Environmental Protection Agency (EPA) hereby approves Rhode Island's TMDLs for the Pawcatuck River and Little Narragansett Bay Waters, received by EPA on September 24, 2010. EPA has determined that this TMDL meets the requirements of §303(d) of the Clean Water Act (CWA), and of 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 RI DEM in exercising our shared responsibility of implementing the requirements under Section 303(d) of the CWA.

If you have any questions, please contact Stephen Silva (617-918-1561) or Steven Winnett (617-918-1687) of my staff.

Sincerely,

/s/

Stephen S. Perkins, Director
Office of Ecosystem Protection

cc Angelo Liberti, RI DEM
Elizabeth Scott, RI DEM
Heidi Travers, RI DEM
Stephen Silva, EPA
Steven Winnett, EPA

EPA NEW ENGLAND'S TMDL REVIEW

TMDL: Pawcatuck River and Little Narragansett Bay Waters

Mastuxet Brook	RI0008039R-11
Pawcatuck River	RI0008038E-01A
Pawcatuck River	RI0008038E-01B
Little Narragansett Bay	RI0008038E-02A
Little Narragansett Bay	RI0008038E-02B

Location: Town of Westerly, Rhode Island (RI).

STATUS: Final

IMPAIRMENT/POLLUTANT: These five water body segments are not meeting criteria for fecal coliform bacteria concentrations. The river and bay segments are not supporting the designated use of shellfishing for direct human consumption. Mastuxet Brook is also not meeting criteria for enterococci bacteria concentrations and is not supporting designated use of recreation. The Pawcatuck River segments A and B are designated class SB1and SB, respectively, and Little Narragansett Bay segments A and B are designated class SA and SA{b}, respectively. A year-around TMDL submission is presented for fecal coliform and enterococci bacteria.

BACKGROUND: The Rhode Island Department of Environmental Management (DEM) submitted to EPA New England the final Total Maximum Daily Load Analysis for ***Pawcatuck River and Little Narragansett Bay Waters*** (the "TMDL," "submission," or "Report") with a transmittal letter dated September 24, 2010. EPA commented on an earlier draft of the TMDL sent by DEM on June 4 and responded with comments and emails dated June 16. DEM provided responses to EPA's comments on June 25. EPA and DEM discussed TMDL issues in phone calls later in June and in October 2010. EPA sent additional comments to DEM on September 27, with responses from DEM on September 28, October 29, and November 19. The submission included:

- Final TMDL report for pathogens in the Pawcatuck River and Little Narragansett Bay Waters;
- Implementation plan for achieving TMDL reductions, Chapter 5, pp. 40-57;
- References set out in Chapter 8, pp. 60-63;
- Sampling station location and data, Appendices A-B and E-F (pp. 64-69,76-78);
- Stormwater discharge location and data, Appendices C-D, pp. 70-75;
- Bacteria source investigations, Appendix G, pp. 79-83;
- DEM response to comments, Appendix H, pp. 84-88; and
- Little Narragansett Bay Seasonality Analysis, separate submission, October 29, 2010.

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.

REVIEWERS: Steven Winnett (617-918-1687) E-mail: winnett.steven@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 Water Body, Pollutant of Concern, Pollutant Sources and Priority Ranking

The TMDL analytical document must identify the water body as it appears on the State/Tribe's 303(d) list, the pollutant of concern and the priority ranking of the water body. 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.

The Pawcatuck River and Little Narragansett Bay estuary are located in the southwest corner of Rhode Island, adjoining the town of Westerly, Rhode Island, and bordering the State of Connecticut across these water bodies to the west. The Report describes the pollutants of concern, fecal coliform and enterococci bacteria, an indicator of pathogen-caused impairment of the designated uses for shellfish consumption and contact recreation (TMDL pp. 8-9). It lists four of the water bodies as they appear on the State's 2008 303(d) list and explains that these waters are scheduled for TMDL development in 2010 (TMDL p.8). Mastuxet Brook is currently unlisted. The document also describes the TMDL study area, its land uses, and a brief history of the watershed and its impairments (TMDL pp. 6-7 and 13-18).

Bacteria impairments in these water bodies arise from both dry and wet weather events, year round. The most important sources are stormwater discharges, but also include farms, vessel discharges, animal waste (waterfowl and pets), illegal sanitary connections to stormwater systems and leaking pipes, and broken onsite systems (pp. 23-33). There are also contributions from the State of Connecticut. In addition, there are two permitted municipal waste treatment facilities, one in each state.

The submission includes an in-depth discussion of monitoring activities, the data that indicate the sources and what methods were used to acquire them (TMDL pp. 19-27, and appendices).

Assessment: DEM has adequately identified the water bodies, the pollutants of concern, and the magnitude and location of the sources of pollution.

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 water body, 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 designations of the five water body segments are detailed above (also, TMDL p. 8). The numeric water quality targets are set for all waters at the appropriate numeric water quality standard for fecal coliform and enterococci bacteria. DEM explains that they are applying the SB criteria to Class B Mastuxet Brook segment as it discharges into a Class SB water, thus ensuring the criterion will be met at the border of the segment with the more stringent Class SB standard.

Similar conditions exist across the state border with Connecticut. Although Rhode Island's geometric means for Classes SA, SA{b}, SB, and SB1 are equivalent to or more stringent than Connecticut's, its Class SB and SB1 90^{th} percentile criteria are less protective. Rhode Island therefore applied a more stringent 90^{th} percentile value to its two SB and SB1 waters that is equivalent to Connecticut's so that the TMDLs are protective across the state boundary (p. 12).

Assessment: EPA New England concludes that DEM has properly presented its water quality standards and designated uses when setting a numeric water quality target. It has also presented its rationale for the deviations from that designation and classification system.

3. Loading Capacity - Linking Water Quality and Pollutant Sources

As described in EPA guidance, a TMDL identifies the loading capacity of a water body 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 water body'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 water body 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 water body 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.

DEM sets the numeric water quality targets at the applicable water quality criteria or standard for each of the segments in the TMDL study area, depending on each water segment's classification, as outlined in the TMDL report. DEM has also set more stringent criteria for three segments as discussed above.

DEM describes the rationale for the methods used to establish the cause-and-effect relationship between the numeric targets (WQS) and the identified pollutant sources (TMDL pp. 34-36). DEM sets a reduction goal for each impaired water body segment (as a whole) by comparing current fecal coliform and enterococci bacteria concentrations to the applicable water quality target, then calculating the percent reduction required to reach that target (TMDL, Tables 4.2-4.4, p. 37). The water quality standards for fecal coliform specify geometric means and 90^{th} percentile criteria. DEM uses the higher percent reduction to set each segment's necessary percent reduction. For enterococci bacteria, the water quality standards specify only geometric means. DEM explains the process for calculating the reduction goals (TMDL p. 36) and provides a discussion of critical conditions and seasonal variability (TMDL p. 34).

DEM has said that it considers the pollutant concentrations and percent reduction targets in these TMDLs to apply daily. The allowable daily load is essentially the criteria concentration times the daily flow in the receiving water.

Assessment*:* EPA New England concludes that the loading capacities, having been set equal to the WQSs, have been appropriately set at levels necessary to attain and maintain applicable water quality standards. The TMDL is based on a reasonable approach for establishing the relationship between pollutant loading and water quality in the bays and estuaries.

EPA New England also concurs with expressing the bacteria TMDLs as concentrations in lieu of mass-per time because these units are the same as the state water quality standards. In addition, concentration is mathematically related to per time loading (concentration multiplied by flow volume per time results in mass per time), so that the daily load is the daily concentration times the flow volume per time.

EPA's regulations at 40 C.F.R. §130.7(c)(1) require that TMDLs identify water quality targets that are consistent with all applicable water quality standards. EPA New England has accepted the percent reduction approach for bacteria TMDLs in some water bodies under an assumption that the reductions needed to meet applicable water quality standards (WQS) at ambient stations are representative of the reductions needed to meet the applicable standards throughout the water body.

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.

Information to support the development of separate allocations for load and wasteload allocations for wet weather discharges does not exist. Consequently, the LA is included in the WLA (TMDL p. 36). Note that this approach does not affect the regulation of storm water that is subject to Phases I or II of EPA's storm water program.

Assessment: EPA New England concludes that it is unnecessary to include a specific load allocation as the information to support separate load and wasteload allocations does not exist. Consequently, the load allocation is included in the wasteload allocation, below.

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 submission contains wasteload allocations that are expressed as the percent reduction for fecal coliform and enterococci bacteria required to meet the water quality standards (TMDL, pp. 36-37). As mentioned in the LA review (above), because information to support the development of separate allocations for load and wasteload allocations doesn't exist, the LA is included in the WLA for each segment.

The WLA is expressed as the percent reduction required for the water bodies to meet the water quality criteria. Because the fecal coliform criteria contain both a geomean and 90th percentile component, DEM compared the current conditions for each of the water bodies to both components. The station data with the largest violation of the criteria were used to set the current conditions for each segment. The higher percent reductions resulting from the comparison of the bacteria data to the 90th percentile criteria (the component which required the larger reduction) were then used to set each segment's required reduction. For Mastuxet Brook's enterococci impairment, the largest departure from the geometric mean was used to set the required reduction, as the enterococci criteria include no 90 percentile component.

For the Class B Mastuxet Brook, which flows into a Class SB segment, its data were compared to the Class SB criteria to set the reduction, thus ensuring that water quality in the Class SB segments would be met.

Similarly, although Rhode Island's geometric means for Classes SA, SA{b}, SB, and SB1 are equivalent to or more stringent than Connecticut's, its Class SB 90th percentile criteria is less protective. Rhode Island therefore applied a more stringent 90th percentile value to its two SB and SB1 waters that is equivalent to Connecticut's so that the TMDLs are protective across the state boundary (p. 12).

Finally, two municipal waste treatment facilities discharge into the study area, one from each state. The Westerly facility, in Rhode Island, whose discharge permit is scheduled for renewal, will be permitted such that its effluent meets the water quality criteria for the segment at the point of discharge (p. 38). The concentration of the historic discharges from Connecticut's Pawcatuck WWTF is very low (p. 28), although the State of Rhode Island has no authority over its permit.

Assessment: EPA New England concludes that the WLAs for this submission are acceptable and reasonable, and have sufficiently addressed all sources of pollution in Rhode Island.

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 explicit MOS of 5% is included in the TMDL for bacteria loads (TMDL p. 34), which sets a percent reduction target for these water bodies 5% higher than is required in order to meet the State's numeric water quality standards for fecal coliform bacteria (TMDL Tables 4.2-4.4, p. 37).

Assessment: EPA New England concurs that an adequate MOS is provided by the explicit 5% MOS for bacteria.

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).

Although all data for this study were collected in the May to September period, historic data from earlier in the last 15 years show that summer bacteria concentrations are generally higher than those in the winter, with the exception of the Little Narragansett Bay wet weather conditions (p. 34). DEM believes that the TMDLs for these segments will be protective because critical conditions are adequately represented by the data. EPA believes that because the TMDL reductions for the Little Narragansett Bay segments are set with data that represents the critical historic conditions, and that attainment for the TMDL will be met when ambient samples meet the WQS criteria, the TMDL reductions will adequately address seasonal variation through the entire year.

Assessment: EPA New England concludes that seasonal variations have been adequately accounted for in the TMDLs because the TMDLs were developed to be protective year round.

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.

This is not a phased TMDL. The document includes a description of the ongoing monitoring that will take place to monitor changes in the water quality of the impaired segments. The State discusses its plans for monitoring as and after the TMDL is implemented (TMDL p. 59). The DEM specifically recommends sampling the area twice a year, and provides reasonable plan for doing so. It also discusses other groups' monitoring that will likely take place.

Assessment: EPA concludes that the anticipated monitoring by DEM and other groups is sufficient to evaluate the adequacy of progress toward attainment of WQS, although 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.

A detailed implementation plan is provided in the submission (TMDL pp. 40-57). DEM describes an implementation program which includes the management of stormwater from municipal and industrial activities, eliminating illicit discharges from sanitary systems, reducing wastewater from marine vessels and leaking sewers and septic systems, and minimizing contamination from domestic and farm animals, and waterfowl and wildlife.

In the plan, DEM details the Stormwater Phase II requirements that are part of its implementation plan, including required amendments to municipal stormwater management program plans (SWMPPs), the six minimum measures, site-specific structural BMP requirements, and MS4-specific requirements. DEM also identifies holders of RIPDES Multi-Sector General Permits (MSGPs) whose stormwater discharges will have to be in compliance with the approved TMDLs (p. 49).

In addition, DEM provides recommendations about stormwater control on the Connecticut side of the border.

Assessment: Addressed, though not required.

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 body 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."

Reasonable assurance is not required because point sources are not given less stringent wasteload allocations based on the assumption of future nonpoint source load reductions. In addition, DEM addresses reasonable assurances that stormwater runoff reductions will occur by providing information about past and current surveys, and past work in the watershed which point to a long term commitment to improving water quality (TMDL p. 39).

Assessment: Addressed, though not required.

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.

DEM held a public meeting on August 19, 2010 to present the draft TMDL to stakeholders and the public. DEM provided a comment period from mid-August 2010 to September 17, 2010. Notice of the public meeting and the comment period were sent by email and postal mail to key stakeholders in the affected communities, and through public notices posted in prominent public places. The draft TMDL was posted on DEM's website. DEM also met with the town of Westerly and CT DEP in July 2010 after sending them copies of the draft TMDL a month earlier.

DEM has provided EPA with copies of all submitted comments and the Department's responses as an attachment to the final TMDL submission.

Assessment: EPA New England has reviewed all comments and DEM's responses to comments. EPA concludes that DEM involved the public during the development of the TMDL for the *Pawcatuck River and Little Narragansett Bay Waters,* has provided adequate opportunities for the public to comment on the TMDL, and has provided reasonable responses to the comments received.

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 water body, the pollutant(s) of concern, and the priority ranking of the water body.

Comment: A letter with appropriate information was included with the final submission.

APPENDIX

(Tables reprinted from the submitted TMDL by permission of RI DEM)

Table 4.2 Pawcatuck River and Little Narragansett Bay Fecal Coliform TMDL Reductions[1]

Station	Segment ID Location	Class	No. Samples	Geometric Mean		90th Percentile		Percent Reduction[2]
				Target	Observed	Target	Observed	
PR4	**RI0008038E-01A Pawcatuck River**	**SB1**	13	50	**638**	300[3]	**4156**	**94.9** (99.9)
12-1			16		**219**		**780**	
12-17			17		**222**		**956**	
17A			7		**743**		**5420**	
12-2			14		**545**		**3670**	
17B			7		**903**		**5840***	
19.6			10		**948**		**5240**	
12-3			17		**421**		**2800**	
12-4	**RI0008038E-01B Pawcatuck River**	**SB**	16	50	**238**	300[3]	**1950**	**95.3** (100)
12-5			15		**183**		**1160**	
12-6			15		**252**		**2040**	
12-7[2]		**SB[4]**	15	14	**110**	49	**1032***	
12-8	**RI0008038E-02A Little Narragansett Bay**	**SA**	12	14	**66**	49	**240***	**79.6** (84.6)
12-9			11		**24**		**240***	
12-10			14		**23**		**93**	
12-11			11		7		39	
12-14	**RI0008038E-02B Watch Hill Cove**	**SA{b}**	11	14	9	49	43	**87.6** (92.6)
12-15			14		**17**		**196**	
12-16			14		**43**		**394***	

[1] Results denoted with a * show that data for that station was used to set the reduction for the segment.
[2] The actual percent reduction is shown in bold. The value in parentheses includes an explicit 5% margin of safety.
[3] The 90th Percentile Target for Class SB/SB1 waters is set to the FDA MPN three-tube variability criterion for the restricted classification of waters to be protective of Connecticut waters.
[4] This station is located on the Class SA line and needs to meet Class SA standards.

Table 4.3 Mastuxet Brook Fecal Coliform TMDL Reductions[1]

Station	Segment ID Location	Class	No. Samples	Geometric Mean		90th Percentile		Percent Reduction[3]
				Target	Observed	Target	Observed	
LPK02	**RI0008039R-11 Mastuxet Brook and Tributaries**	**B**	3	200	48	400	105	**97.6** (100)
MAS1			6		**1772**		**16995***	
MAS2[2]		**B[2]**	6	50	**262**		**3893**	
MAS3		**B**	3	200	29		93	

[1] Results denoted with a * show that data for that station was used to set the reduction for the segment.
[2] This station is located near the Class SB line and needs to meet Class SB standards.
[3] The actual percent reduction is shown in bold. The value in parentheses includes an explicit 5% margin of safety.

The required enterococci reductions Mastuxet Brook are presented in Table 4.4 below. The reductions are calculated from observed concentrations at RIDEM Ambient Monitoring Program stations.

Table 4.4 Mastuxet Brook Enterococci TMDL Reductions[1]

Station	Segment ID Location	Class	No. Samples	Geometric Mean		Percent Reduction[2]
				Target	Observed	
LPK02	**RI0008039R-11**	**B**	5	54	**76**	**72.1**
MAS1	**Mastuxet Brook**		5		**194***	(77.1)

[1] Results denoted with a * show that data for that station was used to set the reduction for the segment.
[2] The actual percent reduction is shown in bold. The value in parentheses includes an explicit 5% margin of safety.

Data for entry in EPA's National TMDL Tracking System							
TMDL Name	**Pawcatuck River and Little Narragansett Bay Waters (5 segments)**						
Number of TMDLs*	6						
Type of TMDLs*	Bacteria						
Number of listed causes (from 303(d) list)	4						
Lead State	Rhode Island (RI)						
TMDL Status	Final						
Individual TMDLs listed below							
TMDL Segment name	TMDL Segment ID #	TMDL Pollutant ID# & name	TMDL Impairment Cause(s)	Pollutant endpoint	Unlisted?	RIPDES Point Source & ID#	Listed for anything else?
Mastuxet Brook	RI0008039R-11	259 (Fecal coliform bacteria)	Pathogens (41)	SB: 50 fc /100 ml; 400 fc /100 ml	yes	RIPDES General Stormwater permit RIR040000 & Multi-Sector Gen. permit RIR500000	
		605 (Enterococci bacteria)	Pathogens (41)	SB: 35 colonies/100 ml, geomean			
Pawcatuck River	RI0008038E-01A	259 (Fecal coliform bacteria)	Pathogens (41)	SB1: 50 fc /100 ml; 400 fc /100 ml		**RI0100064**; RIPDES General Stormwater permit RIR040000 & Multi-Sector Gen. permit RIR500000	
Pawcatuck River	RI0008038E-01B	259 (Fecal coliform bacteria)	Pathogens (41)	SB: 50 fc /100 ml; 400 fc /100 ml		RIPDES General Stormwater permit RIR040000 & Multi-Sector Gen. permit RIR500000	
Little Narragansett Bay	RI0008038E-02A	259 (Fecal coliform bacteria)	Pathogens (41)	SA: 14 fc /100 ml; 49 fc /100 ml		RIPDES General Stormwater permit RIR040000 & Multi-Sector Gen. permit RIR500000	Nitrogen, DO
Little Narragansett Bay	RI0008038E-02B	259 (Fecal coliform bacteria)	Pathogens (41)	SA{b}: 14 fc /100 ml; 49 fc /100 ml		RIPDES General Stormwater permit RIR040000 & Multi-Sector Gen. permit RIR500000	Nitrogen, DO

TMDL Type	Point & Nonpoint Sources
Establishment Date (approval)*	December 1, 2010
EPA Developed	No
Towns affected*	Westerly, Rhode Island