Ms. Alicia Good, Director
Office of Water Resources
Rhode Island Department of Environmental Management
235 Promenade Street
Providence, RI 02908-5767

Dear Ms. Good:

Thank you for your final submittal of a fecal coliform bacteria Total Maximum Daily Load (TMDL) for the Barrington River, dated August 2002. The U.S. Environmental Protection Agency (EPA) has determined that this TMDL meets the requirements of Section 303(d) of the federal Clean Water Act (CWA) and EPA's implementing regulations (40 CFR Part 130). With this letter, EPA hereby approves the Barrington River TMDL for fecal coliform bacteria. Enclosed are a copy of EPA's review documentation for this TMDL.

EPA considers the completion of this TMDL a positive first step that will enable the State to move forward with on-the-ground measures to improve water quality in the Barrington River. I am encouraged that the State intends to collect additional information in the future to evaluate the effectiveness of management actions and to determine whether water quality standards have been attained throughout the waterbody. As noted in the review documentation, EPA believes that additional information that reflects localized impacts will be necessary to make future attainment decisions.

My staff and I look forward to continuing to work with the RIDEM in our shared responsibility to implement the requirements of Section 303(d) of the CWA. Please feel free to contact me or my staff if you have any questions or comments on our review.

Sincerely,

dated and signed 9/30/02

Linda Murphy, Director
Office of Ecosystem Protection

Enclosure

cc: Elizabeth Scott
Angelo Liberti
Chris Turner

TMDL: Barrington River, Rhode Island (Fecal Coliform)
Final Submittal, August 2002

TMDL Authors: Heidi Travers (Rhode Island DEM)
Chris Turner (Rhode Island DEM)

Principal EPA Reviewer: David Turin (Office of Ecosystem Protection)

Date: September 25, 2002

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 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 chlorophyl *a* and phosphorus loadings for excess algae.

The Rhode Island Department of Environmental Management (DEM) has reasonably described the listed portion Barrington River that this TMDL addresses. With this final submittal, the TMDL has been expanded to include the entire SA segment of the Barrington River. In addition, DEM has identified this waterbody as a Group 1, or highest priority, ranking for TMDL development; identified fecal coliform as the pollutant of concern; and nonpoint pollution, including agricultural

runoff, wildlife and waterfowl, originating in five subwatersheds, as the primary sources of bacterial contamination. Natural background is included in the nonpoint source loading because of a lack of site-specific information.

This TMDL indicates that separate TMDLs are being prepared for the Runnins and Palmer rivers. The TMDL dictates that the Class SA criteria must be met in both of these rivers at the point that they enter the Barrington River. Two point sources (Blount Seafood and the Warren Wastewater Treatment Facility) that discharge in the Warren River, another of the subwatersheds, are also identified. The wasteload allocations for the Warren WWTF and Blount Seafood are set above the receiving water standard for bacteria. Approval of the WLAs in this TMDL should not be viewed as an approval or endorsement of permitted limits for either of these facilities.

For this TMDL, storm water sources are considered along with nonpoint source loadings. This approach is acceptable in this case because of the lack of pipe-specific data and the fact that these storm water discharges are not currently subject to RIPDES regulations.

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.

DEM has reasonably described the applicable water quality standards and numeric water quality criteria, the designated uses, and the antidegradation provisions.

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 condition*s 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.

The loading capacity in this TMDL is expressed in terms consistent with the State numeric bacteria criteria: a geometric mean density for fecal coliform bacteria of 12.6 bacteria/100 ml (14 fc / 100 ml minus an explicit 10 % margin of safety) and a 90th percentile value of no greater than 49 fc / 100 ml. As stated in 40 *C.F.R. §130.2(i), loadings are required to be expressed as either mass-per-time, toxicity or other appropriate measure. DEM appropriately justifies its decision to express the loading capacity for bacteria as a density.*

To link the pollutant loadings to a numeric target, a hydrodynamic model (WQMAP) was used to estimate the existing water quality conditions at the several shellfish monitoring locations within the waterbody and the reductions needed to meet both parts of the bacteria criteria. It was assumed that the required percent reductions in waterbody concentrations will be achieved through an equal percent reduction of all source loads. EPA believes that this is an acceptable approach for identifying the reductions needed at these locations.

The TMDL has identified the critical conditions as the period between July 1 and October 31, when the loading rates from the Runnins River, the largest contributor of fecal coliform, are at its highest. The targeted reductions in loading year around are based on the reductions necessary to meet the water quality targets during this critical condition.

A number of strengths and weaknesses of the overall analysis are discussed. Strengths include recognition of the extensive knowledge of land use, conservative estimations of critical conditions, the relatively large amount of available data for model calibration and verification, and wet weather reductions that are based on a storm where rainfall exceeded 81% of storms in the area. Weaknesses include the fact that only one wet weather event was available, wet weather sources to the Barrington and Warren rivers were not sampled because of lack of resources, loads from small streams could not be quantified because of tidal influences and the difficulty accessing them at low tide, and the coarse resolution of the water quality model in the upper reaches of the river.

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.

For this TMDL, storm water sources are considered along with nonpoint source loadings. This approach is acceptable in this case because of the lack of pipe-specific data and the fact that these storm water discharges are not currently subject to RIPDES regulations. The required fecal coliform reductions for the Barrington River were calculated using a water quality model, calibrated and validated with RIDEM sampling at in-stream stations. Reductions needed to meet the criteria are presented as the percent reduction required to go from existing conditions to the water quality standard at each monitoring location. Load allocations and wasteload allocations are combined to present an overall reduction goal for each station that is applicable to the composite of all sources contributing to the water quality impairment.

EPA considers this LA to be a first step that will enable the State to move forward with on-the-ground measures to improve water quality. Additional information should be collected in the future to evaluate the effectiveness of management actions and the attainment of water quality standards throughout the waterbody. EPA believes that additional information that reflects localized water quality conditions will be necessary to make future attainment decisions.

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 TMDL identifies two point sources that have the potential to impact the Barrington River: Blount Seafood and the Warren Wastewater Treatment Facility. Both facilities discharge to the Warren River, which lies downstream of the Barrington River. As this is a tidal system, these sources potentially impact the Barrington River under flood tide conditions. RIDEM has concluded that loadings from these sources have very little effect on water quality in the Barrington River and wasteload allocations for both facilities are consistent with the current permit limits.

Approval of the WLAs for these sources is based solely on their limited impact to the Barrington River and should not be interpreted as an approval or endorsement of permitted limits for Blount Seafood and the Warren Wastewater Treatment Facility; both facilities have permit limits that are set above the applicable receiving water quality criterion.

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.

DEM appropriately incorporates both explicit and implicit margins of safety. These include: 1) a 10% explicit MOS applied to the geometric mean target in the Barrington River; 2) targeted reductions for the entire year were based on the critical period, July to October, when bacteria densities are at their highest levels; and, 3) modeled values were used to calculate the required reductions that are higher than actual observed values.

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 addresses seasonal variability by establishing targeted pollutant reductions based on the defined critical conditions: the water quality predicted during the period between July 1 and October 31, when loading rates from the Runnins River, the largest contributor of fecal coliform,

are at its highest.

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), recommends a monitoring plan when a TMDL is developed under the phased approach. The guidance recommends that a TMDL developed under the phased approach also should provide assurances that nonpoint source controls will achieve expected load reductions. The phased approach is appropriate when a TMDL involves both point and nonpoint sources and the point source is given a less stringent wasteload allocation based on an assumption that nonpoint source load reductions will occur. EPA's guidance provides that a TMDL developed under the phased approach should include a monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of water quality standards.

A detailed monitoring plan was not provided. Future monitoring, including recruitment of volunteers from the Pokanoket Watershed Alliance for monitoring at specific locations in the Runnins and Barrington rivers, and at existing monitoring stations under the shellfish program is discussed. The TMDL also indicates that as BMPs are effective in reducing bacteria densities at the current monitoring stations, additional monitoring at historic shellfish stations further upstream in the Barrington River may be necessary.

In addition, EPA believes that additional water quality data may be needed for segments of the Barrington River potentially impacted by storm water discharges after the implementation of phase two storm water controls regulations to demonstrate compliance with criteria throughout the waterbody.

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.

An implementation plan is provided in the TMDL report.

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."

No point sources in this TMDL are given less stringent WLAs based on an assumption that nonpoint source load reductions will occur. Therefore, reasonable assurance is not a necessary element of the TMDL approval.

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 TMDL documents a significant level of public participation in the development of the TMDL, including the involvement of Runnins River Steering Committee, established in 1993 and comprised of members of the local municipalities, state agencies, EPA and the Pokanoket Watershed Alliance, a local volunteer monitoring group, whose data is used to validate some of the projections of the WQ model used to develop the reduction targets. In addition, DEM held public meetings in July 1999, June 2000 and July 2002. There were formal opportunities to comment on draft TMDLs in June/July 2000, and again in July/August 2002 following revisions made in response to EPA comments. The TMDL includes a summary of significant comments and the State response.

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.

A submittal letter with appropriate information was included with final submittal.

13. Other Comments: