December 28, 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 Belleville Ponds and Belleville Upper Pond Inlet TMDLs**

Dear Ms. Good:

Thank you for your submission of Rhode Island's Total Maximum Daily Load (TMDL) for the Belleville Ponds and Belleville Upper Pond Inlet, for phosphorus. These water bodies are included on the State's 2010 303(d) list and were prioritized for TMDL development. The purpose of these two TMDLs for Rhode Island waters are to address nutrient-related impairments of recreation and aquatic life use due to nutrients from point and nonpoint source pollution.

The U.S. Environmental Protection Agency (EPA) hereby approves Rhode Island's TMDLs for the Belleville Ponds and Belleville Upper Pond Inlet, received by EPA on September 16, 2010. EPA has determined that these TMDLs meet 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,

Stephen S. Perkins, Director
Office of Ecosystem Protection

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

EPA NEW ENGLAND'S TMDL REVIEW

TMDL: **Belleville Ponds and Belleville Upper Pond Inlet**

Belleville Ponds	RI0007027L-02
Belleville Upper Pond Inlet	RI0007027R-02

Location: North Kingstown, Rhode Island.

STATUS: Final

IMPAIRMENT/POLLUTANT: These two water body segments are not meeting criteria for phosphorus and are not supporting the designated uses of Aquatic Life and Recreation Use. A year-around TMDL submission is presented for total phosphorus.

BACKGROUND: The Rhode Island Department of Environmental Management (DEM) submitted to EPA New England the final Total Maximum Daily Load Analysis for *Belleville Ponds and Belleville Upper Pond Inlet* (the "TMDL," "submission," or "Report") with a transmittal letter dated September 16, 2010. DEM sent EPA a draft report in July, 2010, and EPA responded with comments on July 30. DEM addressed EPA's comments in the final TMDL document, transmitted to EPA in September 2010. EPA and DEM discussed further comments on December 2 and in a phone call on December 21.

The submission included:

- Final TMDL report for phosphorus in the Belleville Pond system;
- Implementation plan for achieving TMDL reductions, Chapter 6, pp. 33-43;
- References, pp. 45-47;
- Hatchery outfall phosphorus concentrations, Appendix A, pp. 48-50;
- Belleville Pond outfalls, Appendix C, pp. 52-58; and
- Response to Comments, Appendix D, pp. 59-63.

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 chlorophyl a and phosphorus loadings for excess algae.

Belleville Ponds and Upper Pond Inlet are located in North Kingstown, RI, in the Annaquatucket River watershed. The Report describes the pollutant of concern, total phosphorus. The Report lists the water bodies as they appear on the State's 2010 303(d) list (TMDL pp.1-2), and explains that they are a high priority for TMDL development (TMDL p.3). The document also describes the TMDL study area and its land uses (TMDL pp. 4-7).

The submission includes a discussion of the point and nonpoint sources that contribute to the water quality impairments, as well as a discussion of the water monitoring and data that indicate the condition of the water body (TMDL pp. 8-23). The major sources of pollution to the watershed include effluent from a trout hatchery, urban runoff from stormwater outfalls, internal loading and cycling from sediments, wetlands, and aquatic vegetation, and possibly waterfowl and wildlife.

Assessment: RI DEM has adequately identified the water body, the pollutant 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.

Belleville Ponds and Upper Pond Inlet are impaired by phosphorus (TMDL, page 1). RI DEM's goals for the TMDL are to:

- Reduce total phosphorus levels in the ponds to an average level of 0.025 mg/l;

- Reduce total phosphorus levels in the Belleville Upper Pond Inlet such that they do not cause an exceedance of the 0.025 mg/l at the point that the tributary enters Belleville Ponds;
- Reduce nuisance densities of both native and non-native aquatic plants in Belleville Ponds; and
- Reduce algal abundance in Belleville Ponds to levels consistent with designated uses by reducing the frequency and duration of chlorophyll-a levels exceeding 0.009 mg/l.

The numeric water quality target is set at the appropriate numeric water quality standard for phosphorus for ponds, and the state has set a similar conservative target for the inlet stream (TMDL p. 24). The water bodies are classified in Class B (TMDL, page 1). Rhode Island has both a numeric and narrative standard for phosphorus in ponds, which includes that average total phosphorus shall not exceed 0.025 mg/l (25.0 ug/l), and allows for lower levels as determined by the Director of RI DEM as necessary to prevent cultural eutrophication (TMDL pp. 4-5).

The state has only narrative standards for rivers and streams, but DEM has assigned a numeric target of 0.025 mg/l to the Upper Pond Inlet (the main tributary to the Ponds) so that it meets the criteria for the pond at the point it enters the ponds. This is a conservative approach since EPA's 1986 Quality Criteria for Water (Gold Book) recommends 0.050 mg/l phosphorus for streams which discharge into ponds, and its 2000 Ambient Water Quality Criteria Recommendations for Rivers and Streams in Nutrient Ecoregion XIV (into which RI falls) suggests 0.031 mg/l phosphorus.

***Assessment**:* EPA New England concludes that RI DEM has properly presented its water quality standard when setting a numeric water quality target.

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 set the numeric water quality target at the applicable water quality criteria as outlined in the TMDL report (TMDL pp. 24-25).

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. Current yearly phosphorus loads (in kg/yr) to the ponds were established using the Reckhow model (TMDL pp. 25-27). DEM also used that AVGWLF model to characterize nonpoint source nutrient sources to the pond and to check the results of the Reckhow model. The allowable loading was then back-calculated from the model using the numeric water quality target (0.025 mg/l) and a 10% margin of safety was subtracted to determine the target load. The required load reduction was calculated from the current load and the TMDL (target load), and the percent loading reduction was also calculated.

The current loading rate for the trout hatchery was calculated using data on effluent flows and concentrations. The hatchery constitutes approximately 51% of the phosphorus load to the pond. At 7Q10 flow, the hatchery effluent constitutes the entire flow of the tributary stream, so DEM set the permitted effluent concentration of the hatchery at the stream's target concentration (0.025 mg/l) to be protective of the stream and ponds year round. The target load for the hatchery was calculated using the target concentration (0.025 mg/l) and the maximum design flow (2.5 MGD). At maximum flows, the hatchery will deliver the largest load of phosphorus to the ponds, and lower loads at lower flows will be more protective. The TMDL target for the stream is expressed as a concentration, and the load is the concentration times the flow.

The hatchery's current and target loads were subtracted from the current and target loads for the ponds to derive the portion of those loads attributable to other pollution sources. NPDES-regulated stormwater and nonpoint source loads were determined based on the percentage of impervious and non-impervious cover, respectively, observed in the contributing watershed.

The daily load is the annual load divided by 365.

Assessment*:* EPA New England concludes that the loading capacities, having been calculated using water quality models well-known to EPA, and using observed concentration data and water quality targets consistent with numeric water quality criteria, 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.

4. Load Allocation (LA)

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 submission contains a load allocation (LA) that is expressed as a target load in kg/year required to meet the applicable water quality criteria (TMDL Tables 5.5 and 5.7, pp. 30-32). Because there are little data to determine how much of the non-hatchery runoff is from regulated vs. unregulated sources, DEM has chosen to allocate unregulated stormwater and other nonpoint source runoff to the load allocation based on the percent of the contributing watershed that is pervious surface. The load reduction called for by the LA constitutes 19% of the total load reduction required by the TMDL. The remainder of the non-hatchery flow is considered to be regulated stormwater and allocated to the WLA (see below).

Assessment*:* EPA New England concludes that load allocation is adequately specified in the TMDL.

5. Wasteload Allocation (WLA)

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 a waste load allocation (WLA) that is expressed as a target load and corresponding load reduction required to meet the applicable water quality criteria. The major source of polluted effluent is a trout hatchery, whose WLA is specified in the TMDL. The hatchery load target has been set at a level which will attain the stream's target phosphorus concentration and the pond's target load at all stream and hatchery flows. Attaining the stream's target concentration will ensure that the pond's TMDL is attained. The hatchery's target load constitutes 77% of the load reduction required by the TMDL.

The remainder of the WLA is NPDES-regulated stormwater. Because of the difficulties of determining the relative amount of regulated and unregulated stormwater runoff from developed areas, DEM has allocated non-hatchery flows to the WLA based on the percent of impervious cover observed in the contributing watershed. The load reduction assigned to regulated stormwater is 3.7% of the total reduction required by the TMDL. The remainder of the non-hatchery effluent flow is allocated to LA (see above).

Assessment: EPA concludes that the trout hatchery's WLA has been appropriately set to attain WQS in both the Upper Pond Inlet (tributary stream) and in the ponds. In the absence of specific information to determine the relative contributions of regulated and unregulated sources of stormwater runoff to the water body, EPA has allowed states to use the percent of impervious and pervious cover to allocate these loads, respectively. DEM has used this approach and EPA New England concludes that the WLA for this submission is acceptable and reasonable.

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 10% is included in the TMDL for phosphorus loads to the Ponds, and DEM has also set a conservative water quality phosphorus target for the Upper Pond Inlet, which is more stringent than that recommended by EPA for streams in the region.

Assessment: EPA New England concurs that an adequate MOS is provided by the explicit 10% MOS for phosphorus, and a more stringent water quality target used for the tributary stream.

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).

This TMDL addresses seasonal variation because the required reduction in phosphorus was calculated for the conditions during the critical, growing season, May to October, when occurrence of nuisance algal blooms, low dissolved oxygen, and macrophyte growth are greatest. Therefore, the TMDL allocation protects designated uses during the entire year (TMDL p. 24).

Assessment: EPA New England concludes that seasonal variations have been adequately accounted for as the TMDL was developed to be protective during the critical period for phosphorus, and will therefore be more than adequately protective during the other seasons.

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.

The TMDL proposes continuing monitoring to ensure that water quality improvement activities are adjusted as monitoring indicates changes in the water quality of the pond. The State briefly discusses their monitoring plans in the TMDL report (TMDL p. 44).

Assessment: Addressed, though not required.

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. 33-43) which specifically addresses the major identified sources of pollution and gives specific recommendations for abating them, including the permit requirements for the trout hatchery, the largest single source of phosphorus loadings to Belleville Ponds, and suggested actions to attain it. The plan contains specific recommendations with regard to the six minimum measures that comprise the Stormwater Phase II permit program, and discusses several types of specific corrective actions, including measures to reduce stormwater runoff, reduction of internal phosphorus loadings, septic system maintenance, and control of waterfowl.

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 this case, the WLA constitutes approximately 80% of the required load reductions, nearly all of which is taken up by the individual permit for a trout hatchery.

Assessment: 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 summarizes its public participation in the TMDL report (TMDL p. 44). DEM presented the draft TMDL to the public at a meeting on July 29, 2010. The meeting was well publicized in the press and letters were sent to key stakeholders well in advance. Copies of the TMDL were made available to the public two weeks before the meeting. The meeting began the 30-day comment period. The agency received comment letters from EPA and the town of North Kingstown. The TMDL submission includes copies of the submitted comments and the Department's responses in an appendix to the final TMDL submission.

Assessment: EPA New England has reviewed all comments and the agencies' responses to comments. EPA concludes that DEM involved the public during the development of the *Belleville Ponds and Belleville Upper Pond Inlet TMDL*, 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.

Data for entry in EPA's National TMDL Tracking System							
TMDL (Water body) Name *	**Belleville Ponds & Upper Pond Inlet (2 segments)**						
Number of TMDLs*	2						
Type of TMDLs (Pollutant)*	Nutrients						
Number of listed causes (from 303(d) list)	2						
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 something else?
Belleville Ponds	RI0007027L-02	515 (Total Phosphorus)	Phosphorus (29)	0.025 mg/l phosphorus		RIPDES individual MS4 stormwater permit RIR040028, RIDOT permit RIR040036, and RIPDES facility permit # R10110035	
Belleville Upper Pond Inlet	RI0007027R-02	515 (Total Phosphorus)	Phosphorus (29)	0.025 mg/l phosphorus		RIPDES individual MS4 stormwater permit RIR040028, RIDOT permit RIR040036, and RIPDES facility permit # R10110035	Bacteria
TMDL Type	Point & Nonpoint Source						
Cycle (list date)	2010						
Establishment Date (approval)*	Dec 28, 2010						
EPA Developed	No						
Towns affected*	North Kingstown, RI						