March 23, 1999

Alicia M. Good, P.E., Assistant 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 submittal of the Stafford Pond Total Maximum Daily Load (TMDL) for total phosphorus. This water is included on Rhode Island's 1998 303(d) list and was targeted for TMDL development during 1998-2000. The TMDL was developed to address the occurrence of nuisance algal blooms and low levels of dissolved oxygen which are a result of excessive nutrient loading.
The U.S. Environmental Protection Agency (EPA) hereby approves Rhode Island's Stafford Pond TMDL, received by EPA on December 23, 1998. EPA has determined that the Stafford Pond TMDL meets the requirements of §303(d) of the Clean Water Act (CWA), and of EPA's implementing regulations (40 CFR Part 130).

We are very pleased with the quality of the Stafford Pond TMDL. Your staff has done an excellent job of preparing a comprehensive and informative TMDL report. The submittal includes all the required elements of a TMDL, including:

- loading capacity,
- load allocations
- seasonal variation
- waste load allocations,
- margin of safety
- public participation process.

Consistent with EPA policies, the TMDL also includes an implementation plan which addresses the primary sources contributing to the impairment. In addition, RI has provided reasonable assurances that the necessary controls will be implemented in a timely manner.

My staff and I look forward to continued cooperation with the RIDEM in exercising our shared responsibility of implementing the requirements under 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,

Linda M. Murphy, Director
Office of Ecosystem Protection

Enclosure

cc: Wayne Jenkins RIDEM

Ron Manfredonia, EPA
Ann Williams, EPA
Mark Voorhees, EPA
Bob Mendoza, EPA
Al Basile, EPA

EPA - NEW ENGLAND'S REVIEW of RHODE ISLAND'S
STAFFORD POND TMDL

BACKGROUND: The Rhode Island Department of Environmental Management submitted to EPA-New England the *Total Maximum Daily Load for Total Phosphorus, dated December 1998*. The TMDL was submitted under a cover letter dated December 23, 1998 requesting review and approval by EPA - New England. Following is a summary of EPA's review which explains how the TMDL submission satisfies the statutory and regulatory requirements of TMDLs in accordance with Section 303(d) and 40 CFR Part 130. In addition to reviewing the TMDL document, EPA-New England also reviewed the August 1997 report by ENSR, *Limnological Investigation of Stafford Pond, Tiverton, Rhode Island* which provides the technical basis for the TMDL.

IMPAIRMENT/POLLUTANT: Nuisance algal blooms and low levels of dissolved oxygen due to excessive nutrient loading. The TMDL is proposed for total phosphorus.

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STATUTORY AND REGULATORY REQUIREMENTS OF TMDLs

Section 303(d) of the Clean Water Act and EPA's implementing regulations at 40 C.F.R. Part 130 describe the statutory and regulatory requirements of TMDLs. These requirements, which must be described in TMDLs both submitted by States and established by EPA, are described below.

1. Loading Capacity

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). As described in EPA guidance, a TMDL describes the loading capacity of water for a particular pollutant.

The loading capacity was set at 411 kg/yr of total phosphorus in order to reduce average chlorophyll a concentrations to ≤10 ug/L (page 29). The loading capacity is also intended to meet the State's Water Quality Criteria for average in-lake total phosphorus (0.025 mg/L) and instantaneous dissolved oxygen (5.0 mg/L) - page 22. The State of Rhode Island anticipates that controlling phosphorus loading from anthropogenic sources will also result in attainment of the dissolved oxygen criteria by reducing the amount of organic material that would otherwise be available for decomposition. The loading capacity was determined using several empirical models which calculate allowable annual loadings based upon desired in-lake concentrations. It is important to note, that the RIDEM will support long-term monitoring of the pond and its tributaries to evaluate the effectiveness of this TMDL in restoring water quality in Stafford Pond.

As indicated, the Stafford Pond TMDL is expressed in terms of allowable annual loadings of total phosphorus rather than daily loadings. As specified in 40 CFR 130.2(i), TMDLs may be expressed in terms of either mass per unit time, toxicity or other appropriate measure. Setting an annual load

as opposed to a daily load is appropriate for many lakes including Stafford Pond, especially where pollutant loading is solely from nonpoint sources. Further justification for setting an annual load is the fact that Stafford Pond has a detention time greater than one year (1.5 years).

EPA-New England concludes that the loading capacity has been appropriately set at a level necessary to attain applicable water quality standards.

2. 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(g).

There are no significant point sources in the Stafford Pond watershed. The TMDL equation includes an allocation of 0 kg/yr of total phosphorus for the WLA (page 30).

EPA-New England concludes that the WLA component of the TMDL is appropriately set equal to zero because there are no significant point sources present in the watershed.

3. Load Allocations (LAs)

EPA regulations require that a TMDL include LAs, which identify the portion of the loading capacity allocated to existing or future nonpoint sources and to natural background. 40 C.F.R. § 130.2(h). Load allocations may range from reasonably accurate estimates to gross allotments. 40 C.F.R. § 130.2(g).

The load allocation for all existing and future (pg.34) nonpoint sources is set at 390 kg/yr total phosphorus (page 30). More detailed and specific allocations are discussed in the implementation plan which targets the three primary sources (e.g., Aruda Farm) for reductions.

EPA-New England concludes that load allocations are adequately specified in the TMDL.

4. 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 effluent limitations 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.

An explicit MOS of 5% (21 kg/yr) has been set aside as unallocated for the Stafford Pond TMDL. The 5% MOS is believed to be sufficient because the uncertainties in estimating current and permissible loadings were minimized by an intensive monitoring effort that addressed loading from surface water storm-flow, surface water base-flow, groundwater, atmospheric precipitation, internal recycling, and waterfowl. The RIDEM believes an implicit MOS is also provided in the water

quality standard for phosphorus which they believe is fairly conservative. This belief is supported by the technical analysis conducted by ENSR in which it was estimated that an in-lake total phosphorus concentration of 0.028 mg/l would attain the aesthetic (due to algal blooms) component of the water quality standards. Furthermore, future monitoring activities are planned to evaluate the adequacy of the TMDL in attaining water quality standards.

EPA-New England concludes that adequate MOS is provided for in the TMDL.

5. Seasonal Variation

The statute and regulations require that a TMDL be established with seasonal variations. CWA 303(d)(1)(C), 40 C.F.R. § 130.7(c)(1).

As discussed previously, the Stafford Pond TMDL is appropriately expressed in terms of allowable annual loadings of phosphorus which inherently accounts for seasonal variations. The RIDEM believes that the annual load is protective for all seasons. Finally, it is important to note that long-term water quality monitoring will be conducted to verify the effectiveness of the TMDL.

EPA-New England concludes that seasonal variations have been adequately accounted for in the TMDL.

INFORMATION GENERALLY NECESSARY FOR EPA TO DETERMINE THE STATUTORY AND REGULATORY ADEQUACY OF TMDLS

Consistent with existing policy, the following information, although not statutory or regulatory requirements of TMDLs, will generally be necessary for EPA to determine if a submitted TMDL fulfills the legal requirements for approval under Section 303(d) and EPA regulations.

1. Submittal Letter

Each final TMDL submitted to EPA should be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under § 303(d) of the Clean Water Act for EPA review and approval. The submittal letter should reference the waterbody as it is identified on the State's section 303(d) list, including the pollutant of concern and the priority ranking of the waterbody. This clearly establishes the State's intent to submit, and EPA's duty to review, the TMDL under the statute.

A December 23, 1998 cover letter accompanied the TMDL requesting EPA's review and approval. The TMDL documentation clearly identifies the TMDL as having been developed for a waterbody on the 303(d) list.

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

Target

The TMDL submittal or EPA-established TMDL should include a description of the applicable State water quality standard, including the designated use(s) of the waterbody, the applicable numeric or narrative water quality criterion, and the antidegradation policy. A numeric water quality target for the TMDL (a quantitative value used to measure whether or not the applicable water quality standard is attained) should be identified. If the TMDL is based on a target other than a numeric water quality criterion, a description of the process used to derive the target should be included in the submittal.

Applicable water quality criteria (page 2-3) and designated uses (page 2) are clearly described. The numeric water quality targets are defined as instantaneous dissolved oxygen of 5.0 mg/L, average total phosphorus of 0.025 mg/L, and average chlorophyll a of ≤10 ug/L (page 23).

3. Description of Pollutant Sources

The TMDL submittal or EPA-established TMDL should include a description of the point, nonpoint, and natural background sources of the pollutant of concern, including the magnitude and location of the sources.

All potential sources of phosphorus are thoroughly described including surface water base-flow, surface water storm-flow, groundwater, atmospheric precipitation, internal recycling, and waterfowl (page 26). Additionally, the Stafford Pond watershed was divided into 6 sub-basins to further itemize present loading contributions.

4. Linking Water Quality and Pollutant Sources

The TMDL submittal or EPA-established TMDL should describe the rationale for the analytical method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources. Supporting documentation for the analysis should also be included, including the basis for assumptions, strengths and weaknesses in the analytical process, results from water quality modeling, etc.

An intensive sampling program and predictive modeling were used to determine necessary load reductions to achieve water quality goals. Such an approach is common practice in lake management and does result in a reasonable estimate.

5. 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), calls for a monitoring plan when a TMDL is developed under the phased approach. The guidance provides that a TMDL developed under the phased approach also needs to provide assurances that nonpoint source control measures will achieve expected load reductions. The phased approach is appropriate when a TMDL involves both point and nonpoint sources and the

point source WLA is based on a LA for which nonpoint source controls need to be implemented. Therefore, EPA's guidance provides that a TMDL developed under the phased approach is to 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.

RIDEM will continue to support long term monitoring of the tributaries and pond (pg. 34) to evaluate the efficacy of the controls and the adequacy of the TMDL.

6. Implementation Plans

In August 8, 1997, Bob Perciasepe issued a memorandum, "New Policies for Establishing and Implementing Total Maximum Daily Loads (TMDLs)," that directs Regions to work in partnership with States 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 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; a public participation process; and recognition of other relevant watershed management processes. Although implementation plans are not approved by EPA, they may help establish the basis for EPA's approval of TMDLs.

The implementation plan includes reasonable assurances that the non-point source load allocations will be achieved (page 32). Three key areas in which progress is underway in the Stafford Pond watershed include agricultural BMP's, storm water BMP's, and public outreach. According to modeling and study results, the non-point source load reduction should be on the order of 239 kg/yr to meet water quality goals. The present implementation plan results in a shortfall of 44 kg/yr. RIDEM, in partnership with local stakeholders is continuing to look for further opportunities in the watershed for reducing phosphorus loads to the pond. RIDEM is working closely with NRCS to facilitate further reductions where possible. For example, a dairy farm in the watershed (the principal source of phosphorus loading) has agreed to implement a restoration plan for a critical wetland area. Restoration of this wetland could further reduce phosphorus loading through increased detention/settling and biological uptake. Additionally, the town of Tiverton has approved a local ordinance requiring home owners in the watershed to upgrade their septic systems by 2005. Based upon the fact that a substantial number of older and possibly faulty systems will be replaced, a net reduction in phosphorus loading to the pond is expected. Finally, due to uncertainties in estimating load reductions from the public outreach program, this component was not quantified but is expected to result in a net load reduction.

7. Reasonable Assurances

EPA guidance calls for reasonable assurances when TMDLs are developed for waters impaired by both point and nonpoint sources and for waters impaired solely by 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 is required in order for the TMDL to be approvable.

In a water impaired by solely by nonpoint sources, however, reasonable assurances are not required in order for a TMDL to be approvable. For such nonpoint source-only waters, States are encouraged to provide reasonable assurances regarding achievement of load allocations in the implementation plans described in section 7, above. As described in the August 8, 1997 Perciasepe memorandum, such reasonable assurances should be included in State implementation plans and "may be non-regulatory, regulatory, or incentive-based, consistent with applicable laws and programs."

A discussion of the implementation plan and reasonable assurances are included in the TMDL document (page 32). Using the Nongovernmental Water Pollution Control Facilities Fund and Section 319 Funds, RIDEM is providing the necessary funds to implement controls on the three primary sources. In addition, RIDEM has provided funding to Eastern Rhode Island Conservation District to develop a public outreach program designed to educate Stafford Pond watershed residents on ways of protecting the watershed and reducing NPS pollution.

8. Public Participation

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

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

A comprehensive public participation process has been established in the Stafford Pond Watershed. This process consists of three components. The first is that RIDEM established a steering committee of stakeholders during TMDL development, the second is the public comment period, and the third is the public outreach program funded by RIDEM and carried out by the Eastern Rhode Island Conservation District.

EPA-New England concludes that RIDEM has done an excellent job of involving the public during the development of the TMDL and has provided adequate opportunities for the public to comment on the TMDL.