2/27/01

EPA NEW ENGLAND'S TMDL REVIEW

TMDL: **Sebasticook Lake**, Penobscot and Somerset counties, Maine
(ME ID# 325 2264 located in Newport, ME)
1998 303(d) list: "Blooms; monitoring, improving; <2003" TMDL development.

STATUS: Final

IMPAIRMENT/POLLUTANT: Algae blooms due to excessive nutrient loading. The TMDL is proposed for total phosphorus (TP).

BACKGROUND: The Maine Department of Environmental Protection (ME DEP) submitted to EPA-New England the final Sebasticook Lake TMDL for total phosphorus (TP) with a transmittal letter dated February 8, 2001 (received by EPA on February 14, 2001). All of EPA's October 18, 2000 comments (on the September 29, 2000 draft TMDL) were taken into account in the final submission.

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 40 CFR Part 130.

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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 Sebasticook Lake TMDL describes the waterbody and the cause of impairment as identified in the 1998 303(d) list. The document describes the pollutant of concern, total phosphorus, and identifies the location (by tributary subwatershed) and magnitude of phosphorus sources from atmospheric deposition and from fifteen subcategories of land use within the watershed which include: agriculture, residential, roadways, and non-cultural uses (forests, wetlands, etc.). (See Table 2 page 12 TMDL report.) Information on population and growth characteristics is also provided.

ME DEP also explained that it was not possible to separate natural background from nonpoint sources. In this case, not separating natural background is reasonable because of the limited and general nature of the information available (land use categories) related to potential phosphorus sources to Sebasticook Lake. Without more detailed site-specific information on nonpoint source loading, it would be very difficult to separate natural background from the total nonpoint source load, and attempting to do so would add little value to the analysis.

ME DEP provides an explanation and analytical basis for expressing the TMDL for nuisance algae blooms through surrogate measures using Secchi disk transparency (SDT), phosphorus loadings, and chlorophyl a. (See also section 2 below which documents ME's statutory description of "trophic status based on measures of the chlorophyll a content, Secchi disk transparency, total phosphorus content and other appropriate criteria" as stated in Maine's water

Assessment: EPA New England concludes that the ME DEP has done an admirable job of characterizing Sebasticook Lake's sources of impairment.

EPA notes that one pollutant source not factored into the TMDL is an EPA superfund site located upstream of Sebasticook Lake. The clean-up of this site involves re-routing a segment of the East Branch Sebasticook River in Corinna, as well as removal of contaminated sediments within the river; some siltation resulting in phosphorus transport could result. EPA views the Corinna clean-up as a temporary and short-term potential pollutant source to Sebasticook Lake, and agrees with ME DEP that omitting the site from the TMDL is appropriate. The in-stream clean-up work requires a DEP permit (MEPA) and is subject to requirements for erosion and sedimentation control, standards for coffer dams, etc. Ed Hathaway, EPA project officer, reports that some excavation took place this construction season, some will occur next construction season, and the picture is uncertain after that; monitoring is in place, erosion control and stabilization are in place, and it is unlikely that any hazardous substances would be released downstream because the river sections are actually being de-watered as they're excavated (personal communication,10/18/00).

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

The TMDL submittal must include a description of the applicable State/Tribe water quality standard, including the designated use(s) of the waterbody, the applicable numeric or narrative water quality criterion, and the antidegradation policy. Such information is necessary for EPA's review of the load and wasteload allocations which are required by regulation. A numeric water quality target for the TMDL (a quantitative value used to

measure whether or not the applicable water quality standard is attained) must be identified. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, usually site specific, must be developed from a narrative criterion and a description of the process used to derive the target must be included in the submittal.

The Sebasticook Lake TMDL describes the applicable narrative water quality standards (see pp 18-19 TMDL report). The report defines applicable narrative criteria (p.18), designated uses, and antidegradation policy (p.19).

ME DEP identifies a numeric water quality target for the TMDL of 15 ppb total phosphorus which ME DEP predicts will result in the attainment of water quality standards. The numeric target was selected using best professional judgement based on available water quality data corresponding to non-bloom conditions, using measures of both Secchi disk transparency (<2.0 meters) and chlorophyll-a (<8.0 ppb) levels in lightly colored water (p. 19).

Assessment: EPA New England concludes that ME DEP has properly presented its water quality standards and has made a reasonable interpretation of the narrative water quality criteria in the standards when setting a numeric water quality target.

The 15 ppb target concentration was selected based on review of statewide water quality data for lightly colored lakes in Maine, lake-specific data for Sebasticook Lake, and on water quality goals of ME DEP. EPA New England is satisfied that this review was thorough and, based on our review, EPA concurs that the available data support the conclusion that an in-lake concentration of 15 ug/l will attain Maine's water quality standards.

3. Loading Capacity - Linking Water Quality and Pollutant Sources

As described in EPA guidance, a TMDL identifies the loading capacity of a waterbody for a particular pollutant. EPA regulations define loading capacity as the greatest amount of loading that a water can receive without violating water quality standards (40 C.F.R. § 130.2(f)). The loadings are required to be expressed as either mass-per-time, toxicity or other appropriate measure (40 C.F.R. § 130.2(i)). The TMDL submittal must identify the waterbody's loading capacity for the applicable pollutant and describe the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources. In most instances, this method will be a water quality model. Supporting documentation for the TMDL analysis must also be contained in the submittal, including the basis for assumptions, strengths and weaknesses in the analytical process, results from water quality modeling, etc. Such information is necessary for EPA's review of the load and wasteload allocations which are required by regulation.

In many circumstances, a critical condition must be described and related to physical conditions in the waterbody as part of the analysis of loading capacity (40 C.F.R. § 130.7(c)(1)). The critical condition can be thought of as the "worst case" scenario of environmental conditions in the waterbody in which the loading expressed in the TMDL for the pollutant of concern will continue to meet water quality standards. Critical conditions are the combination of environmental factors (e.g., flow, temperature, etc.) that results in attaining and maintaining the water quality criterion and has an acceptably low frequency of occurrence. Critical conditions are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards.

The loading capacity for Sebasticook Lake is set at 4,514 kg TP/yr (see p.19 TMDL report). The loading capacity is set to protect water quality and support uses during critical conditions which

occur during the summer season when environmental conditions (e.g., higher temperatures, increased light intensity, etc.) are most favorable for aquatic plant growth. Attainment of water quality standards will rely on reducing phosphorus loading from the watershed and on using annual lake drawdowns to address internal phosphorus recycling (see pages 22-25 TMDL report).

ME DEP links water quality to phosphorus loading by: (1) picking a target in-lake phosphorus level, based on historic state-wide and in-lake water quality data (page 19 of the report), (2) using an empirical phosphorus retention model, calibrated to in-lake phosphorus concentration data, to determine the pollutant loading corresponding to the desired water quality in the lake (see page 20 TMDL report), (3) comparing the loading target to existing phosphorus loadings estimated by applying phosphorus export coefficients to land area with specified land uses (see Table 2 on page 8 of the report). These analytical methods are widely recognized as appropriate for lake TMDL development.

Sebasticook Lake TMDL includes documentation supporting the technical approach, and discussion of strengths and weaknesses in the analytical method used (see pp. 21-22 TMDL report).

Assessment: EPA New England concludes that the loading capacity has been appropriately set at a level necessary to attain and maintain applicable water quality standards. The TMDL is based on a reasonable and widely accepted approach for establishing the relationship between pollutant loading and water quality in lakes.

EPA New England also concurs with expressing the TMDL as an annual loading based on the reasons provided by ME DEP (long average hydraulic residence time (9 months); see page 20 TMDL report).

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.

To achieve the in-lake level of 15 ppb TP, ME DEP calculated that the total load of phosphorus contribution must be limited to 4,514 kg/yr. The TMDL allocates all of this loading capacity as a gross allotment to existing and future nonpoint sources and to natural background. ME DEP's calculation of the current "low end" external loading of 5,513 kg TP/yr equates to a modeled TP concentration of 19 ppb (5,717 kg). To meet the target of 15 ppb, this external loading must be

reduced by about 1,000 kg (page 18 of report). (A 17% reduction of current loadings must be achieved.) Additional reductions for existing sources would be necessary to offset any future sources. The TMDL submission provides an extensive and detailed discussion of various steps that could be taken to implement these reductions (see Section 6 below, "Implementation

Assessment: EPA New England concludes that the load allocation is adequately specified in the TMDL at a level necessary to attain and maintain water quality standards. The degree of load reductions necessary to achieve the in-lake phosphorus levels is based in part on an estimate of current loadings. EPA believes that ME DEP has made reasonable judgements about current loads, since the estimated values correlate well with modeled predictions and monitoring data.

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.

Sebasticook Lake is a Class GPA water in Maine. According to Maine statute, "There may be no new direct discharge of pollutants into Class GPA waters." [38 MRSA 465-A (1) (c)] Although there is one existing point source discharge to the East Branch of the Sebasticook River, upstream of the Lake, the Corinna STP discharge is scheduled to implement land treatment by the year 2003. For these reasons, "the waste load allocation for all existing and future point sources is set at 0 (zero) kg/yr of total phosphorus." (Page 28 TMDL report). ME DEP reports that "Funding has been secured for this new land treatment system and it is very likely that the discharge removal will occur as scheduled."(page 28)

Assessment: Given the facts that (1) an enforceable compliance schedule is in place, and (2) treatment funding is secured, EPA New England concurs that the WLA component of the TMDL is appropriately set equal to zero based on ME DEP's determination that there will be no point source discharges to the Sebasticook Lake or its tributaries in the near future (2003).

6. Margin of Safety (MOS)

The statute and regulations require that a TMDL include a margin of safety to account for any lack of knowledge

concerning the relationship between load and wasteload allocations and water quality (CWA § 303(d)(1)(C), 40 C.F.R. § 130.7(c)(1)). EPA guidance explains that the MOS may be implicit, i.e., incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified.

The Sebasticook Lake TMDL includes an implicit MOS through the relatively conservative selection of the numeric water quality target of 15 ppb (see p.28-29 TMDL report). Based on ME DEP's analysis of a state-wide limnological database for Maine, ME DEP believes that a target of 15 ug/l is a fairly conservative goal because "nuisance algae blooms (plankton growth of algae which causes Secchi disk transparency to be less than 2 meters) are more likely to occur at 17 ppb or above", particularly in a colored lake. The difference between the in-lake target of 15 ppb and 16 ppb represents a 6.3% (301 kg TP/yr) implicit margin of safety." (See page 29 TMDL report.)

This MOS is based on a summary of statewide Maine lakes water quality data for colored or >26 SPU lakes, and by ME DEP's review of Sebasticook Lake historical records (see page 9 TMDL report). "Notably, the only year on record during which Sebasticook Lake attained water quality standards was in 1997 when minimum Secchi disk transparencies measured 2.1 meters in late August, and late spring total phosphorus concentrations were 16 ppb.
Assessment: EPA New England concludes that adequate MOS (roughly 6%) is provided for the following reasons: (1) EPA believes a significant implicit MOS is provided in the selection of an in-lake TP concentration of 15 ppb bases on a state-wide data based for naturally colored lakes, and (2) the adequacy of this MOS is supported by in-lake data.

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 Sebasticook Lake considered seasonal variations because the allowable annual load was developed to be protective of the most sensitive time of year - during the summer, when conditions most favor the growth of algae and aquatic macrophytes (page 29 of the report).

Assessment: EPA New England concludes that seasonal variation has been adequately accounted for in the TMDL because the TMDL was developed to be protective of the most environmentally sensitive period, the summer season. In addition, phosphorus controls are expected to be in place through the year so that these controls will reduce pollution whenever sources are active.

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 Sebasticook Lake TMDL describes the considerable history of volunteer monitoring (24 years), and describes the continued cooperative (volunteer and ME DEP) long-term water quality monitoring plan during open water months (April - Oct). Additional monitoring parameters measured in the deep hole basin on a monthly basis are scheduled to begin in the year 2000 season. The data will be used to track seasonal and inter-annual variation and long term trends in water quality in the Lake.(See pages 29-30 TMDL report.)

Assessment: EPA New England concludes that the ongoing monitoring by Tom Hannula and VLMP in cooperation with ME DEP is sufficient to evaluate the adequacy of the TMDL.

9. Implementation Plans

On August 8, 1997, Bob Perciasepe (EPA Assistant Administrator for the Office of Water) issued a memorandum, "New Policies for Establishing and Implementing Total Maximum Daily Loads (TMDLs)," that directs Regions to work in partnership with States/Tribes to achieve nonpoint source load allocations established for 303(d)-listed waters impaired solely or primarily by nonpoint sources. To this end, the memorandum asks that Regions assist States/Tribes in developing implementation plans that include reasonable assurances that the nonpoint source load allocations established in TMDLs for waters impaired solely or primarily by nonpoint sources will in fact be achieved. The memorandum also includes a discussion of renewed focus on the public participation process and recognition of other relevant watershed management processes used in the TMDL process. Although implementation plans are not approved by EPA, they help establish the basis for EPA's approval of TMDLs.

The Sebasticook Lake implementation plan is described in pages 30-34 of the TMDL report, with and update on priority remediation sites provided in appendix A, *MACD and Town of Newport Sebasticook Lake Watershed Survey*. Specific recommendations for BMPs are outlined for several sources of phosphorus pollution, including agriculture, residential sites, and roadways.

Comment: Addressed, though not required. EPA New England thinks that ME DEP has done an admirable job in developing and targeting BMPs to achieve the TMDL.

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."

ME DEP addresses reasonable assurances by (1) providing information on past and current EQIP and Clean Water Act §319 funded work in the watershed (see page 4 TMDL report), (2) stating that a combination of BMPs will provide a significant reduction in phosphorus loading to the Lake to help achieve water quality standards (pages 33-34 TMDL report), and (3) explaining the priority ranking of Sebasticook Lake in the context of Maine's state-wide EPA-approved NPS control program. ME DEP also points out a "unique and unprecedented agreement" signed in March 1992 by all eight towns within the Sebasticook Lake watershed which provides for mutual notification of any town development projects with a potential for phosphorus contributions, of any magnitude (although review comments indicate that the agreement may not have been put into practice).

***Comment**:* Addressed, though not required. EPA New England concurs that the historic and current technical support and assistance from NRCS and SWCDs to agricultural interests in the Sebasticook Lake watershed, local participation in a current 319 BMP implementation program to control soil erosion from residential and municipal sources, and ME DEP's strong NPS strategy all provide reasonable assurance that load allocations will be achieved. We also note that the Maine Volunteer Lake Monitoring Program, in cooperation with ME DEP, has a commitment to conduct regular, open water lake monitoring to assess the adequacy of the TMDL and, if necessary, the TMDL will be revised. This provides EPA with additional assurance that water quality standards will ultimately be met in Sebasticook Lake.

11. Public Participation

EPA policy is that there must be full and meaningful public participation in the TMDL development process. Each State/Tribe must, therefore, provide for public participation consistent with its own continuing planning process and public participation requirements (40 C.F.R. § 130.7(c)(1)(ii)). In guidance, EPA has explained that final TMDLs submitted to EPA for review and approval must describe the State/Tribe's public participation process, including a summary of significant comments and the State/Tribe's responses to those comments. When EPA establishes a TMDL, EPA regulations require EPA to publish a notice seeking public comment (40 C.F.R. § 130.7(d)(2)).

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

The public participation process for Sebasticook Lake TMDL is described on pages 34-36 of the report. ME DEP issued public notice of the TMDL availability on December 9/10, 2000 via local newspapers, and on ME DEP's Internet web site. ME DEP also organized and participated in several local education/outreach meetings with lakeshore residents in 1999 and 2000 and distributed information briefs (see Appendix B). An extension on the comment period was extended to accommodate respondents from agricultural interests. ME DEP provided a public review summary, along with all public comments and ME DEP's response to comments in appendix E of the TMDL report.

Assessment: EPA New England concludes that ME DEP has done an adequate job of involving the public during the development of the TMDL, provided adequate opportunities for the public to comment on the TMDL, and provided reasonable responses to the public comments. EPA further believes that ME DEP did an exceptionally fine job responding to comments on an

individual basis, and provided an especially commendable response to concerns that agricultural interests were not adequately involved in the TMDL development initially, both by incorporating information on more appropriate loading rates, and with a commitment to working more closely in the future with local Soil and Water Conservation District (SWCS) offices.

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