8/12/04

EPA NEW ENGLAND'S TMDL REVIEW

TMDL: **Sabattus Pond,** Androscoggin County, Maine
HUC: ME 0104000210; ME ID# 3796 located in Sabattus, Wales, and Greene.
2002 303(d) list: primary contact impairment; 2004-5 TMDL development.

STATUS: Final

IMPAIRMENT/POLLUTANT: Primary contact; algae blooms due to excessive nutrient loading from nonpoint source pollution. The TMDL is proposed for total phosphorus (TP).

BACKGROUND: The Maine Department of Environmental Protection (ME DEP) submitted to EPA New England the final Sabattus Pond TMDL for total phosphorus (TP) with a transmittal letter dated July 16, 2004, received electronically by EPA on July 19, 2004. All of EPA's June 7, 2004 comments (on the May 28, 2004 draft TMDL) were taken into account in the final submission.

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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 chlorophyll a and phosphorus loadings for excess algae.

The Sabattus Pond TMDL describes the waterbody and the cause of impairment is identified in the 2002 303(d) list (see pages 9-10 TMDL report). The document describes the pollutant of

concern, total phosphorus, and identifies the location (by tributary subwatershed) and magnitude of phosphorus sources from atmospheric deposition (7%) and from 27 subcategories of land use within the direct watershed which include: agricultural and forested land, shoreline development, non-shoreline development, and non-developed land (see Table 4 page 30, TMDL report). Also included is information on 303(d) status and water quality of tributaries (pages 9 and 20, TMDL report). Information on population and growth characteristics is provided (page 10 TMDL report). Internal sediment recycling is evaluated (page 33 TMDL report). Water level (outlet dam) management is also addressed (page11, TMDL report).

ME DEP explained that it was not possible to separate natural background from nonpoint sources (page 28 TMDL report). 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. Without more detailed site-specific information on nonpoint source loading, it would be very difficult to separate natural background form 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 chlorophyll a. (See also section 2 below which documents ME's water quality standards.)

Assessments: EPA New England concludes that the ME DEP has done an adequate job of characterizing sources of impairment.

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.

Sabattus Pond TMDL describes the applicable narrative water quality standards (see page 28-29 TMDL report). The report defines applicable narrative criteria, designated uses, and antidegradation policy.

ME DEP identifies a numeric water quality target for the TMDL of **15 ppb** total phosphorus (TP) (1,155 kg TP/yr) which ME DEP predicts will result in the attainment of water quality standards. The numeric target was selected using best professional judgment based on available water quality data (average epilimnion grab/core samples), as reflected in measures of both Secchi disk transparency (>2.0 meters) and chlorophyll-a (<8.0 ppb) levels in non-colored water (pages 28-29 TMDL report). DEP considers "this water quality target is also stringent enough

to protect downstream uses and provide for the attainment and maintenance of Sabattus River (listed for dissolved oxygen and nutrient loading), provided other sources of impairment to the river are also addressed (municipal point source and agricultural non-point source)." (page 29 TMDL report)

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 the 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 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 Sabattus Pond is set at **1,155 kg TP/yr** (page 32 TMDL report), based on a target goal of 15 ppb. The loading capacity is set to protect existing and future 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 (pages 32 and 34 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 29 TMDL 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 pages 33-34 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 4 page 30 TMDL report).

These analytical methods are widely recognized as appropriate for lake TMDL development.

ME DEP explains that selected phosphorus loading coefficients in Table 4 (primarily for roads and residential land use) "were reduced (from total P values) to account for the estimated bioavailability of the soil runoff sources according to available literature" (page 30 TMDL report).

ME DEP explains the justification for expressing the loading capacity as an annual load, as opposed to a daily load, lies in the lake basins low flushing rate (1.52 flushes per year) (pages 32 and 35, 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 TDML 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 reason provided by ME DEP (relatively long average hydraulic residence time).

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.

ME DEP allocates **962 kg TP/yr** of the loading capacity of 1,155 kg TP/yr for Sabattus Pond as the "load allocation". This consists of a gross allotment to existing and future nonpoint sources and to natural background (page 34 TMDL report). Calculation of estimated load reductions are provided (page 20 TMDL report).

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 level is based in part on an estimate of current loadings.

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 WLA for regulated stormwater for Sabattus Pond is 193 kg TP/yr (page 35 TMDL report). Sabattus, ME, one of the three towns in the watershed, has regulated urbanized areas that are subject to ME DEP's NPDES phase II stormwater program; the southern tip of Sabattus Pond watershed falls within the regulated "urbanized area". All the regulated stormwater area in the non-shoreline development category is presented as "Urban Stormwater – Town of Sabattus". Using the assumption that all urban runoff is occurring from the regulated areas (needing a WLA), the WLA is calculated as the sum of selected high density and urban development land use sub-categories (Table 4, page 30, and page 35 TMDL report).

Assessment: EPA New England concurs that the WLA component of the TMDL is appropriately set based on ME DEP's assumptions from their analysis of current land use area and calculations of the contribution of regulated stormwater in the watershed.

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 Sabattus Pond TMDL includes an implicit margin of safety (MOS) through the relatively conservative selection of the numeric water quality target of 15 ppb as well as the selection of relatively conservative phosphorus export loading coefficients for cultural pollution sources (page 35 TMDL report). Based on both historical records and ME DEP's analysis of a state-wide limnological database for non-colored or <26 SPU lakes, 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 18 ppb or above. The difference between the in-lake target of 15 ppb and 17 ppb represents a 12% implicit margin of safety for Sabattus Pond. ME DEP also mentions an additional unquantified margin of safety for attainment of state water quality goals is provided by the inherently conservative methods used to estimate future growth (page 32 TMDL report).

Assessment: EPA New England concludes that adequate MOS (roughly 12%) 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 based on a state-wide data base for non-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)).

Sabattus Pond TMDL 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 35 TMDL report). The TMDL is protective of all seasons, given lake's flushing rate of 1.52 flushes/year, and the fact that BMPs implemented (implemented and proposed) have been designed to address TP loading during all seasons.

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 Sabattus Pond TMDL describes the history of cooperative monitoring (since 1977) by ME DEP, and volunteers (VLMP). Long-term water quality monitoring will be conducted bi-weekly, from May through September through continued efforts of ME VLMP in cooperation with ME DEP. ME DEP anticipates sufficient data will be acquired to adequately track seasonal and inter-annual variation and long term trends in water quality in the lake (see page 24 TMDL report).

Assessment: EPA New England concludes that the ongoing monitoring by the Maine Volunteer Lakes Monitoring Program (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 Sabattus Pond phosphorus control action plan is described in pages 20-25 of the TMDL report, with recommendations for future work on pages 22-24. Specific recommendations for seven action items are followed by other recommendations to address the following sources of pollution: individual action of landowners and shoreline pollution, roads, agriculture and forestry, and dam operation. The TMDL report also includes a summary of recent and current NPS/BMP projects in the watershed (some funded through CWA §314 lakes, and §319 nonpoint source program).

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 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 that NPS reductions will occur by providing information on current surveys and work in the watershed which point to a long term local commitment to improving water quality in Sabattus Pond (pages 21 and 25 TMDL report). The report documents a collaborative approach to water quality restoration over the past decade. The Androscoggin Valley Soil and Water Conservation District (AVSWCD), along with lake stakeholders, have worked diligently since the early to mid-90's to address NPS pollution in the watershed. The watershed towns continue to support and cooperate with the AVSWCD and the Sabattus Pond Watershed Partnership to foster NPS awareness and implement NPS-BMPs..

Assessment: Addressed, though not required.

11. Public Participation

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

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

The public participation process for Sabattus Pond TMDL is described preliminarily on pages 35-36 of the report. ME DEP issued public notice of the TMDL availability on May 28, 2004 via local newspapers, and on ME DEP's Internet web site, following a preliminary review by 14 interested individuals representing the stakeholder group of interested agencies and organizations (April 21 - May 24, 2004). Comments received from five preliminary reviewers were considered in the public review draft. MACD staff participated in several local meetings with town officials and lakeshore residents from 2002 – 2003. The TMDL public comment period deadline is June 25, 2004.

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.

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