

May 20, 2004

Harry T Stewart, P.E., Director
New Hampshire Department of Environmental Services
Water Division
29 Hazen Drive, Box 95
Concord, New Hampshire 03302-0095

SUBJECT: Approval of Eight Hampton/Seabrook Harbor TMDLs

Dear Mr. Stewart:

It is my pleasure to approve eight Total Maximum Daily Loads (TMDLs) for the remaining waterbody segments within and tributary to Hampton/ Seabrook Harbor known to have shellfish harvesting use impairments due to bacteria contamination. All of these waters are included on New Hampshire's 2002 303(d) list.

EPA has determined, as set forth in the enclosed review document, that the bacteria TMDLs for the Hampton/ Seabrook Harbor watershed meet the requirements of Section 303(d) of the Clean Water Act, and EPA's implementing regulations (40 CFR part 130).

I want to congratulate you and your staff for the excellent work in developing these TMDLs.

Sincerely,

Linda Murphy, Director
Office of Ecosystem Protection

Enclosure: EPA TMDL Review Document

cc: Paul Currier, NH DES
Gregg Comstock, NH DES
Phil Trowbridge, NHDES
Carl DeLoi, EPA
Alison Simcox, EPA

EPA NEW ENGLAND'S TMDL REVIEW

May 19, 2004

TMDLs: Hampton/Seabrook Harbor, New Hampshire - Eight Assessment Units

Blackwater River (NHEST600031004-08-01 & NHEST600031004-08-02)
Mill Creek (NHEST600031004-07)
Hunts Island Creek (NHEST600031004-06)
Browns River (NHEST600031004-05)
Hampton Falls River (NHEST600031003-01)
Hampton River 2 (NHEST600031004-04-02)
Hampton/ Seabrook Harbor 2 (NHEST600031004-09-02)

STATUS: Final

IMPAIRMENT/POLLUTANT: Fecal Coliform Bacteria - Shellfish use is not fully supported in the eight Assessment Units (AU) units.

REVIEWER: Mark Voorhees

BACKGROUND: The New Hampshire Department of Environmental Services (NHDES) submitted to EPA New England the Total Maximum Daily Load (TMDL) Study for Bacteria in Hampton/Seabrook Harbor. The study addresses ten impaired waterbody segments, hereafter referred to as assessment units (AUs), within and tributary to Hampton/Seabrook Harbor. The complete TMDL package submitted to EPA for review and approval consists of three documents:

- 1) Final Report - *Total Maximum Daily Load (TMDL) Study for Bacteria in Hampton/Seabrook Harbor*, dated August 2003;
- 2) Appendix E: *Responses to EPA Comments on the Hampton/Seabrook Harbor Bacteria TMDL*, dated September 25, 2003; and
- 3) Appendix F: *TMDL Calculations for Hampton/Seabrook Harbor Tributaries*, dated May 10, 2004.

On September 29, 2003, EPA approved TMDLs for two of the ten impaired segments, NHEST600031004-09-01 and NHEST600031004-04-03. At that time, additional information was needed by EPA to complete the review of the TMDLs for the remaining eight segments. Under a cover letter dated May 10, 2004, NHDES provided the additional information needed by EPA to complete its review of the eight remaining impaired segments. The supplemental information was provided as an addendum, Appendix F, to the August 2003 TMDL report.

Appendix F together with the earlier submissions, the August 2003 report and Appendix E,

comprise the complete TMDL submittal for the Hampton/Seabrook Harbor and its tributaries. This review document summarizes EPA's review of the TMDLs for the eight impaired segments identified above. This review document supplements the finding outlined in the TMDL review document prepared by Alison Simcox of EPA for the two TMDLs approved by EPA on September 29, 2003.

The following is a summary of EPA's review which explains how the TMDL submissions for Hampton/Seabrook Harbor and its impaired tributaries meet the statutory and regulatory requirements of TMDLs in accordance with Section 303(d) and 40 CFR Part 130.

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 TMDL Report describes the environs of Hampton/Seabrook Harbor and identifies all assessment units (AUs) within the Hampton/ Seabrook Harbor system. Table 1 of the report (page 3) identifies the ten AUs that are listed on NH's 2002 303(d) list because of bacteria pollution. The report identifies shellfishing as the impaired use in each AU.

Ambient bacteria monitoring data are presented for the harbor and its tributaries which indicate the magnitude of the bacteria criteria exceedences. The monitoring results show that bacteria related impairments in Hampton/Seabrook Harbor and its tributaries occur during wet-weather related conditions because of the dominance of wet weather sources (i.e. storm water runoff). Dry weather data indicate that the harbor is in attainment with the fecal coliform criteria for shellfishing.

The TMDL report adequately describes the point and nonpoint sources of bacteria that are present within the Hampton/Seabrook Harbor watershed. For each impaired AU, known and suspected sources of bacteria are identified in Table 1 and discussed in Section 4 - *Source Characterization* (see pages 23 to 42). Also, estimates of bacteria loadings from the various sources are provided on Table 20, page 40. NHDES used ambient data, water quality modeling, hydrologic modeling and source monitoring to develop estimates of the loadings. Also, NHDES used microbial source tracking (ribotyping) to distinguish natural from human sources of bacteria in storm water.

EPA concludes that the TMDL document adequately characterizes Hampton/Seabrook Harbor, the nature of the shellfish use impairment and its cause. NHDES relied on best available information including extensive ambient and source monitoring data collected during both dry and wet weather conditions, hydrologic modeling and water quality modeling. EPA believes the approach used by NHDES effectively documents the extent and magnitudes of the impairments due to bacteria contamination, as well as the types of sources that are present in the Hampton/Seabrook Harbor watershed.

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 TMDL report presents the applicable New Hampshire Water Quality Standards on pages 10-13 which include fecal coliform criteria to protect the shellfishing use in all AUs. The fecal coliform criteria are used as the numeric water quality target for the TMDLs. EPA concludes that NHDES has properly presented the applicable 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.

Table 1 of Appendix F identifies the bacteria loading capacity for each of the eight impaired AUs. NHDES chose to express the loading capacity for these TMDLs in terms of concentrations set equal to the NH's adopted fecal coliform criteria at the most representative monitoring station in each AU. EPA concurs with NHDES's approach of expressing the loading capacity of the eight AUs as concentrations equal to the criteria for the following reasons:

- 1) The loading capacity for the eight AUs expressed in terms of concentrations set equal to the State adopted criteria is consistent with the approach used in this TMDL to estimate the reductions (i.e., allocations) in bacteria loading that are needed to attain applicable criteria in each AU. For these TMDLs the reductions or allocations are determined by comparing ambient levels of bacteria from the appropriate monitoring locations to the applicable criteria. Without a detailed water quality model that can reasonably represent the hydrodynamics of each AU, which is not available for the tributary streams, it is difficult to accurately estimate allowable bacteria loads using ambient data alone.
- 2) A loading capacity for bacteria expressed in terms of concentrations set equal to the State adopted criteria provides a very clear and understandable expression of water

quality goals to the public and to groups that conduct water quality monitoring in the harbor and its tributaries.

3) A loading capacity for bacteria expressed in terms of loadings (e.g., numbers of organisms per day) would be difficult for the public to interpret and understand because the “allowable” loading number would be very large (i.e., billions of organisms per day). Additionally, the number would vary according to flow rate since the loading capacity is dependent on stream flow rates which are constantly changing.

4) A loading capacity expressed as a number of organisms per day would not ensure compliance with water quality standards throughout the day since it is conceivable that a large number of bacteria could be discharged during a brief period (e.g., few hours) resulting in temporary exceedences of the criteria but meeting the daily load.

EPA reviewed the locations of the monitoring stations used to set the loading capacities for each AU to determine how representative the bacteria data are of water quality throughout the AU. EPA has concluded that bacteria data from the stations used to set the loading capacity and to estimate the needed reductions in bacteria loading are adequately representative of water quality in the eight AUs. Water quality sampling in the tributaries is conducted during low tide when dilution from ocean water is minimal. The tributary channels are very small such that during a low tide-wet weather event (critical conditions for this TMDL), flows in the tributary streams are likely to be well mixed consisting of mostly runoff, the primary source of bacteria to the streams. As a result, EPA believes that the sampling at the tributary monitoring stations reasonably represents critical worst case conditions because of in-stream mixing and the relatively short travel time that occurs when wet-weather flow moves from the tributary streams to the harbor.

EPA concludes that loading capacities expressed in Appendix F are set at levels that would result in attainment with water quality standards since they are set directly equal to the fecal coliform criteria in the water quality standards. EPA believes that the approach used by NHDES to express the loading capacities as concentrations is reasonable and consistent with 40 C.F.R. 130.2(i) which allows for TMDLs to be expressed as either mass per time, toxicity, or other appropriate measure.

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.

NHDES set the load allocation (LA) equal to zero for each AU (Table 1, Appendix F). Although nonpoint sources are present, NHDES included the portion of the allowable load that originates from nonpoint sources as part of the wasteload allocations (WLA). NHDES chose to lump all sources into the WLA because of the dominance of regulated storm water contributing to the impairment and because they believed there was insufficient information to meaningfully separate regulated and non-regulated sources (including nonpoint sources) of bacteria. EPA concurs with NHDES determination that insufficient information exists to provide reasonable estimates of nonpoint sources which would be necessary to specify allowable LAs. Furthermore, EPA believes it is reasonable to include existing nonpoint sources as part of the lumped WLA since regulated point source storm water discharges exist in the AU watersheds which must be accounted for as a WLA.

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.

Table 1 in Appendix F identifies the WLAs for each of the eight AUs. The WLAs are expressed as concentrations equal to 80% of the geometric mean criteria (20% reserved for margin of safety (MOS)). Also, the WLA's are expressed as percent reduction of bacteria loading needed in each AU based on attaining applicable fecal coliform criteria. The WLAs address the total loading to each AU which includes regulated storm water, unregulated storm

water and nonpoint sources. NHDES chose to lump all sources into a single WLA for each AU because there is insufficient information to develop allocations for separate sources and because storm water runoff represents the dominant source that is causing impairments. EPA concludes that the WLAs are adequately specified at levels necessary to attain and maintain water quality standards.

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.

NHDES provided both an explicit and implicit MOS for the TMDLs. Appendix F describes an explicit MOS of 20% used for the tributary streams and an implicit MOS that is provided by using a conservative approach to calculate the percent reduction of bacteria loading (WLAs) needed for each AU. NHDES used wet weather data to calculate geometric means and determine the bacteria load reductions needed to attain water quality standards. Since wet weather bacteria concentrations are consistently much higher than dry weather concentrations, a geometric mean calculated from wet weather data only would be higher than a geometric mean calculated using both dry and wet weather data. As a result, the percent reductions calculated for the AUs to attain the geometric mean criterion are conservative since the National Shellfish Sanitation Program protocols used by NHDES to assess the waters would include both dry and wet weather data in the geometric mean calculation.

EPA concludes the NHDES has provided adequate MOS in the eight TMDLs such that the loading capacities and WLAs specified will likely result in attainment of water quality standards.

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))

NHDES defines critical conditions as occurring during wet weather conditions. Ambient bacteria data indicate that water quality standards are attained during dry weather conditions. As discussed above the TMDLs were specifically developed for wet weather conditions using data that were collected during storm events when dilution from tidal inflow was minimal. EPA concludes that the TMDLs address seasonal variation because they were calculated for worst case conditions and would be protective of other times throughout the year when environmental

conditions are more favorable for water quality with respect to bacteria (i.e., dry weather and during high tide).

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 documents describe a monitoring plan for Hampton/ Seabrook Harbor that consists of both ambient and source monitoring. As presented the plan appears to be sufficient to identify bacteria sources requiring control, as well as performing future water quality assessments.

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 TMDL documents describes an implementation plan.

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."

The WLA in the TMDL will be implemented through several pollution-control requirements, including the federal Stormwater Ph II permit and state requirements to eliminate illicit sewer connections. Other measures that may be taken are listed in the description of Implementation Plans for this TMDL. NHDES expects many of these measures and BMPs to be implemented on a voluntary basis. In some cases, NHDES has enforcement authority to ensure that implementation occurs.

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 Hampton/Seabrook Harbor TMDL report was made available for public comment between June 1 and August 1, 2003 on the NHDES website. DES did not receive any public comments on the report. EPA New England concludes that NHDES has done an adequate job of involving the public during the development of the TMDL report for Hampton/Seabrook Harbor, and has provided adequate opportunity for public comment.

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