

EPA NEW ENGLAND'S TMDL REVIEW

DATE: July 31, 2019

TMDL: Tisbury Great Pond/Black Point Pond Estuarine System TMDL for Total Nitrogen

STATUS: Final

IMPAIRMENT/POLLUTANT: 1 Total Nitrogen TMDL, 3 protective Total Nitrogen TMDLs
(See Attachment 1)

BACKGROUND: EPA Region 1 received the *Tisbury Great Pond Black Point Pond Estuarine System Total Maximum Daily Loads for Total Nitrogen* (Control Number: CN 398.1) from the Massachusetts Department of Environmental Protection (MassDEP) with a transmittal letter dated July 22, 2019. In addition to the Final Nitrogen TMDL itself, the submittal included, either directly or in reference, the following documents:

- Public Meeting Information and Response to Comments, page 34 and Appendix E
- Applicable Massachusetts Surface Water Quality Standards (WQS), Appendix A
- Massachusetts Estuaries Project, Linked Watershed-Embayment Approach to Determine Critical Nitrogen Loading Threshold for the Tisbury Great Pond/Black Point Pond Embayment System, Towns of Chilmark and West Tisbury, Massachusetts, May 2013.
<https://www.mass.gov/files/documents/2016/08/ok/mep-tisbury-isle.pdf>
- Massachusetts Year 2014 Integrated List of Waters: Final Listing of the Condition of Massachusetts' Waters Pursuant to Sections 305(b), 314 and 303(d) of the Clean Water Act (CN 450.1), December 2015.
<http://www.mass.gov/eea/docs/dep/water/resources/07v5/14list2.pdf>
- Massachusetts Estuaries Project Embayment Restoration and Guidance for Implementation Strategies, MassDEP 2003. <http://www.mass.gov/eea/docs/dep/water/resources/a-thru-m/mepmain.pdf>

The following review explains how the TMDL submission meets the statutory and regulatory requirements of TMDLs in accordance with § 303(d) of the Clean Water Act and EPA's implementing regulations in 40 CFR Part 130.

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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.

A. Description of Waterbody, Priority Ranking, and Background Information

The Tisbury Great Pond/Black Point Pond estuarine system is one of the largest estuaries on Martha's Vineyard and its watershed is shared by the towns of Chilmark and West Tisbury. The system is comprised of three major functional units; the main basin, a lagoon formed by the barrier beach, the shallow and narrow tributary coves, and Black Point Pond, a shallow pond surrounded by wetlands. The estuarine system is a complex coastal open-water embayment as evidenced by its size and structure. The estuary is maintained by the periodic breaching of the Tisbury Great Pond barrier beach, coordinated by the Riparian Owners of Tisbury Great Pond Association with a single temporary inlet. Its ponds and coves delineate a number of sub-basins: Town Cove, including the tributaries Mill Brook and Tiasquam River; Tiah Cove; Short Cove; Muddy Cove; Pear Tree Cove; Deep Bottom Cove; Thumb Cove; Tississa Pond; and Black Point Pond. The upper reaches of the great pond appear to be the most nitrogen sensitive, however, the N loads emanating from the upper portion eventually have an impact on the lower reaches, and therefore the system has to be managed as a whole. (Page 2, TMDL document)

The TMDL document presents a sound overview of the estuary system and the companion Massachusetts Estuaries Project final report (May 2013) presents a thorough description of the Tisbury Great Pond/Black Point Pond estuarine system. The Massachusetts Estuary Project (MEP) divided the Tisbury Great Pond/Black Point Pond estuary system into 4 distinct areas for analysis: Tisbury Great Pond (analyzed as 4 sub-embayments), Black Point Pond, Mill Brook, and the Tiasquam River. Just the Tisbury Great Pond segment was found to be impaired for nutrients, low dissolved oxygen levels, elevated chlorophyll *a* levels, degraded eelgrass and benthic fauna habit in the MEP Technical Report; the other segments were not found to be impaired for nutrients but require a TMDL since all of these segments are hydraulically linked. Tisbury Great Pond/Black Point Pond will be listed as impaired for

nutrients in a future Massachusetts Integrated List of Waters. Additionally, Tisbury Great Pond/Black Point Pond has been previously listed as impaired for bacteria by MassDEP.

MassDEP has determined that all nutrient impaired segments in the Commonwealth are a high priority. See the Massachusetts 2014 Integrated List of Waters at: <http://www.mass.gov/eea/docs/dep/water/resources/07v5/14list2.pdf>

B. Pollutant of Concern

In the Tisbury Great Pond/Black Point Pond Estuarine System, the pollutant of concern is the nutrient nitrogen. Additional impairments include excess nutrients, dissolved oxygen level, chlorophyll *a*, benthic fauna, and eelgrass.

C. Pollutant Sources

The TMDL document identifies that the predominate sources of controllable N affecting this system originate from agriculture and septic systems. Additional controllable sources include fertilizers, the runoff from impervious surfaces, and landfills. Other sources, not locally controllable, include atmospheric nitrogen deposition to the estuary and natural surfaces (page 12 of the TMDL document).

Assessment: EPA Region 1 concludes that the TMDL document meets the requirements for describing the TMDL waterbody segments, pollutants of concern, identifying and characterizing sources of impairment, and priority ranking.

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 Tisbury Great Pond/Black Point Pond estuarine system water quality classification is SA (all surface waters subject to the rise and fall of the tide). The two freshwater waterbodies covered as part of a protective TMDL are considered Class B. Water quality standards of particular interest to the issues of cultural eutrophication are dissolved oxygen, nutrients, aesthetics, and excess plant biomass and nuisance vegetation. (page 12 of the TMDL document). As stated on page 13 of the TMDL document and in EPA guidance, individual estuarine and coastal marine waters tend to have unique characteristics and therefore, site-specific analyses of the individual water body are typically required. For example, the loading of nitrogen that a specific water body can handle without becoming impaired varies. Factors that influence the effect of nitrogen include: flow velocity, tidal hydraulics, dissolved oxygen, and sediment adsorption and desorption of nitrogen.

The Massachusetts Estuaries Project analytical method is the Linked Watershed-Embayment Management Model (Linked Model), discussed on pages 13-21 of the TMDL document. It links watershed inputs with embayment circulation and nitrogen characteristics, and:

- requires site-specific measurements within each watershed and embayment;

- uses realistic “best-estimates” of nitrogen loads from each specific type of land-use;
- spatially distributes the watershed nitrogen loading to the embayment;
- accounts for nitrogen attenuation during transport to the embayment;
- includes a 2D or 3D embayment circulation model depending on embayment structure;
- accounts for basin structure, tidal variations, and dispersion within the embayment;
- includes nitrogen regenerated within the embayment;
- is validated by both independent hydrodynamic, nitrogen concentration, and ecological data; and
- is calibrated and validated with field data prior to generation of “what if” scenarios.

Four sentinel stations were identified in the embayment system at locations at which restoration will necessarily result in high quality habitat throughout the system and attainment of water quality standards (page 16-17 of the TMDL document). For the Tisbury Great Pond/Black Point Pond system, high quality habitat is defined as possibly supportive of eelgrass as well as diverse benthic animal communities. The sentinel stations TGP-7, TGP-6, TGP-5, and TGP-4 were placed within the main basin and tributary coves (page 19 of the TMDL document). These sites were selected such that their restoration would necessarily bring the entire, highly variable, system to acceptable habitat quality levels.

Per the TMDL document, the determination of the critical nitrogen threshold for maintaining high quality habitat within the Tisbury Great Pond/Black Point Pond estuarine system is based on the nutrient and oxygen levels, temporal trends in eelgrass distribution, and benthic community indicators. Habitat issues in the Tisbury Great Pond/Black Point Pond estuarine system are primarily related to the lack of a permanent estuary outlet which has resulted in loss of eelgrass and stressed benthic infauna habitat. Eelgrass has not generally existed in Tisbury Great Pond throughout the past several decades. There is evidence of historical distribution as shown in a 1951 photo interpretation and supported by reports from local residents. At present eelgrass cannot be supported given the measured levels of nitrogen enrichment and resulting high chlorophyll-*a* and low dissolved oxygen. Based on this, habitat restoration in this nutrient enriched system should focus on improving eelgrass habitat within the lower main basin, as well as restoration of infaunal habitat quality, pond-wide.

Determination of a target threshold nitrogen concentration that would restore eelgrass at the sentinel location was based on comparison to other local embayments of similar depths and structure under the MEP studies. The nitrogen threshold target for eelgrass restoration in Tisbury Great Pond is similar to those selected by the MEP for nearby systems like the Bournes Pond Estuary, where eelgrass has historically been confined to the lower estuarine basin. Fringing eelgrass persists in Bournes Pond at 0.45 mg N/L. The MEP study determined through modeling that achieving a time averaged N concentration of 0.46 mg/L within the main basin of Tisbury Great Pond near sentinel station TGP-7 will result in restoration of eelgrass habitat along the shallow margins of the main basin. The target sentinel station concentration of 0.46 mg/L is higher than typically observed in other estuaries for eelgrass restoration (0.3 to 0.35 mg/L) given the bathymetry of the main basin and limited area in which eelgrass was previously assumed to occur. A secondary target of 0.48 mg/L was established within the tributary coves for infaunal habitat restoration near sentinel stations of TGP-4, TGP-5, and TGP-6. (See Figure 5, page 18 of TMDL document for sentinel station locations). See Sections VII and VIII of the MEP report for a complete discussion of the threshold nitrogen concentration.

Target threshold N concentrations in this study were developed to restore or maintain SA waters or high habitat quality. To restore a modest level of eelgrass habitat (consistent with the uncertainties in

the historic distribution record) the target time-averaged TN concentrations in the main basin of Tisbury Great Pond, at sentinel station TGP-7, is 0.46 mg/L TN. This nitrogen level is predicted to be supportive of sparse eelgrass in the shallow margins of the main basin. This concentration is consistent with other estuaries with eelgrass restricted to shallow water areas. To achieve the restoration of benthic habitat in the Tisbury Great Pond/Black Point Pond estuarine system the average TN level is set at 0.48 mg/L at stations TGP-4, TGP-5 and TGP-6. These distributed locations for the target threshold stations are due to the variability within each tributary cove and the non-tidal nature of this system. Black Point Pond differs from Tisbury Great Pond and its tributary coves. It functions as a shallow pond surrounded by wetlands and is connected to the main pond through Crab Creek, a small restricted connection to the main basin. As a wetland influenced salt pond, it supports relatively high-quality benthic animal habitat. There is no evidence Black Point Pond ever supported eelgrass habitat. Setting the TN level at 0.46 mg/L at TGP-7 will be protective of Black Point Pond and its high-quality benthic habitat.

Should the target concentration be met at the sentinel stations without eelgrass habitat restoration in the shallow margins of the main basin of Tisbury Great Pond, as well as improvement in numbers and diversity of benthic macroinvertebrates in the tributary coves, other management activities would have to be identified and considered to reach goals outlined in this TMDL (page 33 of the TMDL document). MassDEP's commitment to monitor the receiving water response is, in EPA's view, a reasonable measure designed to manage the inherent uncertainty around selecting an instream target against a backdrop of considerable scientific and technical uncertainty. While there is sufficient basis in the administrative record at the time of approval to conclude that the selected target will be protective, EPA will coordinate with the MassDEP to review any additional monitoring data or other information that may become available concerning eelgrass populations in the receiving waters, consistent with MassDEP's commitment to evaluate the adequacy of the target. EPA may determine at some point in the future whether a revision of this TMDL may be necessary in order to achieve water quality that fully supports the aquatic life designated use. These revisions may require additional monitoring, modeling and revised nitrogen targets at the sentinel stations.

Assessment: The use of the Linked Model, the description of the process in the TMDL document, and the companion Technical Report to this TMDL document adequately demonstrate the basis for deriving the target nitrogen loads and demonstrating that the targets will achieve water quality standards. EPA Region 1 concludes that MassDEP has properly presented its numeric water quality targets and has made a reasonable and appropriate interpretation of its narrative water quality criteria for the designated uses of the Tisbury Great Pond/Black Point Pond Estuarine System. In addition, MassDEP's adaptive management approach to the TMDL allows for revision if the target concentration is reached but habitat indicators are not met.

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.

As stated in the TMDL document, the Linked Model is a robust and fairly complicated model that determines an embayment’s nitrogen sensitivity, nitrogen threshold watershed loading levels and response to changes in the loading rate. A key feature of the approach involves the selection of sentinel locations that have the poorest water quality in the embayment system. If these degraded areas come into compliance with the TMDL, other areas will also achieve water quality standards for nitrogen in the system. This approach captures the critical targets needed to address the impaired segments.

The percent reductions of existing nitrogen loads necessary to meet the target threshold watershed loads range from 0% to 36.8% with an overall required reduction of 19.1% for Tisbury Great Pond/Black Point Pond estuarine system as a whole (Table 6 below, page 21 of the TMDL document). As described in the TMDL document, these loads represent one scenario using the Linked Model that could achieve the target threshold N concentration at the sentinel station. An alternative scenario to meet the target threshold N concentration can also be evaluated as part of the MEP process, at the town’s request.

TABLE 6. Present Watershed Nitrogen Loading Rates, Calculated Loading Rates that are Necessary to Achieve Target Threshold Nitrogen Concentrations, and the Percent Reductions of the Existing Loads Necessary to Achieve the Target Threshold Loadings*

Sub-embayment	Present Total Watershed Load¹ (kg/day)	Target Threshold Watershed Load² (kg/day)	% Watershed Load Reductions Needed to Achieve Target
Deep Bottom Cove	2.80	2.80	0.0%
Tiah Cove	2.25	2.25	0.0%
Pear Tree Cove	3.84	3.84	0.0%
Tisbury GP main basin	22.10	16.97	23.2%
Black Point Pond	0.80	0.80	0.0%
Town Cove – Mill Brook	8.64	7.03	18.6%

Town Cove – Tiasquam River	5.56	3.51	36.8%
System Total	43.98	37.20	19.1%

¹ Composed of natural background, septic, fertilizer, agriculture, landfill and runoff loadings.

²Target threshold watershed load is the N load from the watershed (including natural background) needed to meet the target threshold N concentration identified in Table 4 on page 16 of the TMDL document.

* From Tables ES-2 and VIII-3 in the MEP Technical Report with corrected % reductions

The TMDL for each embayment considers all sources of N and is therefore the sum of the calculated target threshold watershed load, atmospheric deposition load, and benthic flux load from sediment sources (Table 7 below, page 28 of the TMDL document). The TMDLs for the Tisbury Great Pond/Black Point Pond estuarine system range from 3.03 kg N/day to 33.7 kg N/day. The TMDL for the system as a whole is 64.12 kg N/day.

Table 7: The Total Maximum Daily Loads (TMDL) for the Swan Pond River Estuarine System

Sub-embayment	Target Threshold Watershed Load ¹ (kg N/day)	Atmospheric Deposition (kg N/day)	Nitrogen Load from Sediments ² (kg N/day)	TMDL ³ (kg N/day)
Deep Bottom Cove	2.8	1.51	0.55	4.86
Tiah Cove	2.25	0.78	0	3.03
Pear Tree Cove	3.84	0.26	0.01	4.1
Tisbury Great Pond – main basin	16.97	7.83	8.9	33.7
Black Point Pond	0.8	0.94	6.17	7.9
Mill Brook	7.03	-	-	7.03
Tiasquam River	3.51	-	-	3.51
System Total	37.2	11.3	15.63	64.12

¹ Target threshold watershed load (including natural background) is the load from the watershed needed to meet the embayment target threshold nitrogen concentration identified in Table 4 of the TMDL Document.

² Projected sediment N loadings obtained by reducing the present benthic flux loading rates (Table 5 of the TMDL) proportional to proposed watershed load reductions and factoring in the existing and projected future concentrations of PON. (Negative fluxes set to zero.)

³ Sum of target threshold watershed load, sediment load and atmospheric deposition load.

Assessment: The TMDL document explains and EPA concurs with the approach for applying the Linked Model to specific embayments for the purpose of developing target nitrogen loading rates and identifying sources of needed nitrogen load reduction. EPA believes that this approach is reasonable because the factors influencing and controlling nutrient impairment were well justified, as demonstrated by the foregoing and the TMDL’s administrative record.

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.

Using the Linked Model, MassDEP has identified the portion of the loading capacity allocated to existing and future non-point sources necessary to meet water quality standards. Within the Tisbury Great Pond/Black Point Pond estuary system, the majority of locally-controllable non-point source loadings are from agriculture and on-site subsurface wastewater disposal systems (septic systems) at 44% and 40%, respectively. Other sources calculated for controllable loads include fertilizers (8%), runoff from impervious surfaces (7%) and the landfill (1%). The MEP study determined that sediments contributed approximately 9.6 kg/day-N to the Tisbury Great Pond main basin. Atmospheric nitrogen deposition to the estuary and watershed surface area was found to be significant (21% of the overall load). Sediment flux and atmospheric deposition are not considered controllable sources of N.

MassDEP describes the load allocations for natural background sources (see page 22 of the TMDL document).

Assessment: EPA concludes that the TMDL document sufficiently addresses the calculation of the load allocations, as demonstrated by the foregoing and by the TMDL's administrative record.

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 Commonwealth assigned to the WLA those point sources (1) that “discharge” pollutants to waters of the United States within the meaning of the Act and (2) that are subject to the NPDES permitting program (existing and future); it allocated sources that did not meet these two criteria to the LA. This approach is reasonable and is consistent with the Act and implementing regulations. EPA interprets 40 CFR § 130.2(h) to require that allocations for NPDES-regulated discharges of stormwater be included in the waste load component of the TMDL.

There are no NPDES regulated point source discharges in the Tisbury Great Pond/Black Point Pond estuarine system. No part of the towns of West Tisbury and Chilmark are designated as an urbanized area by EPA and thus the towns are not required to obtain coverage under the NPDES Phase II General Permit for Storm-water Discharges from Small Municipal Separate Storm Sewer Systems (MS4s) that took effect March 31, 2017. Subsequently, in the Tisbury Great Pond/Black Point Pond estuarine system watershed there are no Phase II NPDES permitted stormwater discharges.

Since the majority of the nitrogen loading comes from septic systems and agriculture, and to a lesser extent fertilizer, the landfill and storm-water runoff that infiltrates into the groundwater, the allocation of nitrogen for any storm-water pipes that discharge directly to any of the embayments is insignificant as compared to the overall groundwater load. In estimating the nitrogen loadings from impervious sources, MassDEP considered that most stormwater runoff from impervious surfaces in the watershed is not discharged directly into surface waters, but, rather, percolates into the ground. The geology on Cape Cod and the Islands consists primarily of glacial outwash sands and gravels, and water moves rapidly through this type of soil profile. A systematic survey of stormwater conveyances on the Islands has never been undertaken. Nevertheless, most catch basins on the Islands are known to MassDEP to have been designed as leaching catch basins in light of the permeable overburden. The Linked Model accounts for storm water loadings and groundwater loading in one aggregate allocation as a non-point source. However, MassDEP also considered that some stormwater may be discharged directly to surface waters through outfalls. In the absence of specific data or other information to accurately quantify stormwater discharged directly to surface waters, MassDEP assumed that all impervious surfaces within 200 feet of the shoreline, as calculated from MassGIS data layers, would discharge directly to surface waters, whether or not it in fact did so. Although the 200-foot approach provided a gross estimate, MassDEP considered it a reasonable and conservative approach given the lack of pertinent data and information about stormwater collection systems on Martha’s Vineyard. The calculated waste load allocation due to runoff from impervious surfaces within 200 feet of the estuary is 0.21 kg/day, or 0.36%, of the total unattenuated watershed load. (Refer to Appendix C of the TMDL document for details.)

In the absence of site-specific information on direct discharge sources, EPA believes the approach set out in the TMDL for the WLAs is reasonable. The specific WLAs are set forth in Appendix C and on pages 22-23 of the TMDL document.

Assessment: EPA concludes that the TMDL document sufficiently addresses the calculation of the

waste load allocations, as demonstrated by the foregoing and by the TMDL's administrative record.¹

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.

MassDEP employs an implicit MOS in these TMDLs, described in the TMDL document on pages 25-27. There are several factors that contribute to the margin of safety inherent in the approach used to develop this TMDL including:

- 1) **Use of conservative data in the Linked Model as follows:**
 - Nitrogen concentrations in the watershed that were used in the model are conservative because the model assumes 100% of the groundwater discharge load enters the embayment, and stream flow entering the embayment was directly measured to determine attenuation;
 - Agreement between the modeled and observed values has been approximately 95%;
 - Water column nitrogen validation dataset is conservative. High or low measurements are marked as outliers;
 - Reductions in benthic regeneration of nitrogen are most likely underestimates based on a reduced deposition of PON, due to lower primary production rates under the reduced N loading in these systems; and
- 2) **Conservative sentinel station/target threshold nitrogen concentrations.** The target nitrogen concentration was chosen based on sites that had stable eelgrass or benthic animal (infaunal) communities, and not those just starting to show impairment, which would have slightly higher N concentration. Meeting the target threshold N concentrations at the sentinel stations will result in reductions of N concentrations in the rest of the system; and
- 3) **Conservative approach.** The target loads were based on tidally averaged N concentrations

¹ The categorization of the pollutant sources on Cape Cod (*i.e.*, whether a particular source, or category of sources, is required as a matter of law to be placed within the WLA or LA) has been the subject of recent litigation. On August 24, 2010, CLF filed a complaint in the United States District Court for the District of Massachusetts, captioned *Conservation Law Foundation et al. v. United States Environmental Protection Agency, et al.*, Action No. 1:10-cv-11455, challenging EPA's approval of thirteen (13) Total Maximum Daily Load determinations submitted to EPA by the Commonwealth of Massachusetts under section 303(d), 33 U.S.C. § 1313(d), of the Clean Water Act, 33 U.S.C. §§ 1251-1387, as arbitrary and capricious, an abuse of discretion, and in violation of the Administrative Procedure Act, 5 U.S.C. § 706(2). EPA's positions on categorization, margin of safety, seasonal variation and other matters raised in the litigation, including climate change, have been described in the Agency's filings in that case; have been specifically considered and relied upon by EPA for the purpose of these TMDL approvals; and accordingly, have been incorporated into the TMDL's administrative record. Additionally, EPA has considered MassDEP's correspondence of April 3, 2015 regarding these issues, and EPA's analysis thereof has also been included in the administrative record.

on the outgoing tide, which is the worst case condition because that is when the N concentrations are the highest. The N concentrations will be lower on the flood tides and therefore this approach is conservative.

Assessment: EPA concludes that the approach used in developing the TMDL provides for an adequate implicit MOS, as demonstrated by the foregoing and by the TMDL's administrative record.

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 TMDLs for the water body segments identified in the document are based on achieving the nitrogen loads during the most critical time period, i.e., the summer growing season. Since the other seasons are less sensitive to nitrogen loading, the TMDLs are protective of all seasons throughout the year. Seasonal variation is addressed on page 27 of the TMDL document.

Assessment: Since the other seasons are less sensitive to nitrogen loading, EPA concludes that the TMDL is protective of all seasons throughout the year.

8. Monitoring Plan

EPA's 1991 document, Guidance for Water Quality-Based Decisions: The TMDL Process (EPA 440/4-91-001), and EPA's 2006 guidance, Clarification Regarding "Phased" Total Maximum Daily Loads, recommend a monitoring plan when a TMDL is developed using the phased approach. The guidance indicates that a State may use the phased approach for situations where TMDLs need to be developed despite significant data uncertainty and where the State expects that the loading capacity and allocation scheme will be revised in the near future. EPA's guidance provides that a TMDL developed under the phased approach should include, in addition to the other TMDL elements, a monitoring plan that describes the additional data to be collected, and a scheduled timeframe for revision of the TMDL.

The TMDL document presents two forms of monitoring that would be useful to determine progress towards achieving compliance with the TMDL (page 33 of the TMDL document). MassDEP's position is that TMDL implementation will be conducted through an iterative process where adjustments may be needed in the future. The two forms of monitoring include 1) tracking implementation progress as approved in the CWMP and 2) monitoring water quality and habitat conditions in the estuaries, including but not limited to, the sentinel stations identified in the MEP Technical Report. Relative to water quality MassDEP believes that an ambient monitoring program much reduced from the data collection activities needed to properly assess conditions and to populate the model, will be important to determine actual compliance with water quality standards. Although more specific details need to be developed on a case-by-case basis, MassDEP believes that about half the current effort (using the same data collection procedures) would be sufficient to monitor compliance over time and to observe trends in water quality changes. In addition, the benthic habitat and infaunal communities would require periodic monitoring on a frequency of about every 3-5 years. Finally, in addition to the above, existing monitoring conducted by MassDEP for eelgrass should continue into the future to observe any changes that may occur to eelgrass populations as a result of restoration efforts.

Assessment: EPA concludes that the anticipated ambient water quality monitoring program approved in the CWMP by MassDEP is sufficient to evaluate the adequacy of the TMDL and attainment of water quality standards, although is not a required element of EPA's TMDL approval process.

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 implementation plan for the total nitrogen TMDL for the Tisbury Great Pond/Black Point Pond system is described on pages 29-33 of the TMDL document. MassDEP has provided the following implementation plan recommendations:

- **Agricultural** loads contribute the largest controllable N load (44%) to this system therefore it is recommended that the watershed communities also implement agricultural BMPs throughout the watershed with a goal of reducing N contribution from agricultural sources by 10% watershed-wide.
- **Septic system** loads from private residences is the second largest contributor to the controllable N load (40%), therefore as part of the Comprehensive Water Resources Management Plan (CWRMP) the town should assess the most cost-effective options for achieving the target N watershed loads, including but not limited to, sewerage and treatment for N control of sewage and septage at either centralized or de-centralized locations and denitrifying systems for all private residences.
- **Breaching the barrier beach.** Current management of Tisbury Great Pond involves excavation of a trench through the barrier beach roughly every 3 months to allow tidal exchange with the Atlantic Ocean. Records kept between 1993 and 2011 indicate the breach is typically opened three times each year with an average cumulative total of 144 days open per year. The average duration of all openings in the record was 42 days. Additionally, the MEP recommends adding a seventeen day plus (17 day +) late summer breach for Tisbury Great Pond to further reduce the buildup in nitrogen levels at a critical habitat stressor time.

EPA concludes that the approach taken by MassDEP is reasonable because of the resources available to the towns to address nitrogen such as the CWMP, additional Linked Model runs at nominal expense, assessment of cost-effective options for reducing loadings from individual on-site subsurface wastewater disposal systems, as well as reductions in stormwater runoff and/or fertilizer use within the watershed through the establishment of local by-laws and/or the implementation of stormwater Best Management Practices.

Assessment: MassDEP has addressed the implementation plan. Although EPA is not approving the implementation plan, EPA has concluded that it outlines a reasonable approach to implementation, as demonstrated by the foregoing and by the TMDL's administrative record.

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 TMDL targets for point sources in this TMDL are not less stringent based on any assumed nonpoint source reductions, so documentation of reasonable assurance in the TMDL is not a requirement. However, MassDEP addresses the concept of reasonable assurance insofar as it relates to overall TMDL implementation on page 34 of the Final TMDL. The towns expect to use the information in this TMDL to generate support from their citizens to take the necessary steps to remedy existing problems related to nitrogen loading on-site subsurface wastewater disposal systems, stormwater runoff (including lawn fertilizers), and to prevent any future degradation of these valuable resources. Enforcement of local, state, and federal programs for pollution control contributes to the level of reasonable assurance. There are also financial incentives to encourage the town to follow through with its plans and prevent further degradation to water quality.

Assessment: Because MassDEP did not increase WLAs based on expected LA reductions, reasonable assurance is not required. However, EPA acknowledges MassDEP’s reasonable assurance discussion for the record.

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 the Tisbury Great Pond/Black Point Pond River Estuarine System TMDL is described on page 34 of the TMDL document. MassDEP publicly announced the draft TMDL and copies were distributed to key stakeholders. A public meeting to present the results of and answer questions on this TMDL was held on January 23, 2018 at the West Tisbury Public Library for all interested parties. Comments received at the public meeting and received in writing within the 30-day comment period were considered by MassDEP. The attendance list, public comments from the meeting, written comments received by MassDEP, and the MassDEP responses are included in Appendix E of the TMDL document. MassDEP fully addressed all comments received in Appendix E of the TMDL document.

Assessment: EPA concludes that MassDEP has done a sufficient job of involving the public in the development of the TMDL, provided adequate opportunities for the public to comment and has addressed the comments received as set forth in the response to comment section of the TMDL document.

12. Submittal Letter

A submittal letter should be included with the TMDL analytical document, and should specify whether the TMDL is being submitted for a technical review or is a final submittal. Each final TMDL submitted to EPA must be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under Section 303(d) of the Clean Water Act for EPA review and approval. This clearly establishes the State/Tribe's intent to submit, and EPA's duty to review, the TMDL under the statute. The submittal letter, whether for technical review or final submittal, should contain such information as the name and location of the waterbody, the pollutant(s) of concern, and the priority ranking of the waterbody.

Assessment: On July 22, 2019, MassDEP submitted the Final Tisbury Great Pond and Black Point Pond Estuarine System TMDL For Total Nitrogen (Control #398.1) and associated documents for EPA approval. The documents contained all of the elements necessary to approve the TMDL

Attachment 1: Tisbury Great Pond/Black Point Pond Estuarine System Total Nitrogen TMDLs (Appendix D of TMDL document)

Sub-embayment	Waterbody Segment ID	Impairment	Type of TMDL	TMDL (kg N/day)
Deep Bottom Cove ¹				4.86
Tiah Cove				3.03
Pear Tree Cove				4.10
Tisbury Great Pond-main basin				33.70
Tisbury Great Pond^{2, 3}	MA97-18	Nutrients, Dissolved Oxygen, Chlorophyll a, Benthic Fauna, Eelgrass.	Restoration	45.69
Black Point Pond	MA97-33	Not found to be impaired for nutrients during MEP but TMDL needed since waterbodies are hydraulically linked.	Protective⁴	7.90
Mill Brook⁵	MA97-24	Not found to be impaired for nutrients during MEP but TMDL needed since waterbodies are hydraulically linked.	Protective⁴	7.03
Tiasquam River⁵	MA97-25	Not found to be impaired for nutrients by MEP but TMDL needed since waterbodies are hydraulically linked.	Protective⁴	3.51
Total for System :				64.13

¹ MEP study included Thumb Cove as part of Deep Bottom Cove.

² The total load for Tisbury Great Pond includes the load for Deep Bottom Cove, Tiah Cove, Pear Tree Cove, and Tisbury Great Pond main basin.

³ This segment will be evaluated for nutrient impairment in a future Massachusetts Integrated List of Waters.

⁴ Not impaired for nutrients, but TMDL needed since embayments are linked. (Pollution Prevention TMDL)

⁵ Freshwater segments.