



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MASSACHUSETTS 02109-3912

July 20, 2022

Martin Suuberg, Commissioner
Department of Environmental Protection
One Winter Street
Boston, MA 02108

Re: Approval of the Monponsett Ponds System TMDLs for Total Phosphorous

Dear Commissioner Suuberg:

Thank you for your Department's submittal of the TMDL analyses for the Monponsett Ponds system on June 30, 2022. We appreciate your efforts and involvement with our office to finalize these TMDLs. The U.S. Environmental Protection Agency (EPA) has reviewed the document entitled "Final West and East Monponsett Pond System Total Maximum Daily Loads For Total Phosphorus" (CN – 446.2), and it is my pleasure to approve the Total Phosphorous TMDLs. EPA has determined, as set forth in the enclosed review document, that this TMDL meets the requirements of Section 303(d) of the Clean Water Act (CWA) and EPA's implementing regulations at 40 Code of Federal Regulations (CFR) Part 130.

MassDEP's efforts will help restore water quality and prevent further degradation of these, and adjacent, waterbody segments. My staff and I look forward to continued cooperation with the Massachusetts DEP in exercising our shared responsibility of implementing the requirements under Section 303(d) of the CWA. If you have any questions regarding this approval, please contact me at (617) 918-1502 or have your staff contact Ivy Mlsna of my staff at (617) 918-1311.

Sincerely,

/s/

Kenneth Moraff, Director
Water Division

Enclosure

cc:
Richard Carey, MassDEP
Matt Reardon, MassDEP
Jackie LeClair, EPA
Ivy Mlsna, EPA

EPA NEW ENGLAND'S TMDL REVIEW

DATE: July 20, 2022

TMDL: West and East Monponsett Pond System Total Maximum Daily Loads for Total Phosphorus

STATUS: Final

IMPAIRMENT/POLLUTANT: 4 Total Phosphorous TMDLs

East Monponsett Pond (MA62218) is listed as impaired for Chlorophyll-a and Harmful Algal Blooms

West Monponsett (MA62119) is listed as impaired for Chlorophyll-a, Harmful Algal Blooms, Total Phosphorus and Transparency/Clarity.

Stetson Pond (MA62182) is listed as impaired for Dissolved Oxygen, Harmful Algal Blooms, and Total Phosphorus

White Oak Reservoir (MA62157) is listed as impaired for Nutrient/Eutrophication Biological Indicators.

BACKGROUND: EPA Region 1 received the *West and East Monponsett Pond System Total Maximum Daily Loads for Total Phosphorus* (Control Number: CN 446.2) from the Massachusetts Department of Environmental Protection (MassDEP) with a transmittal letter dated June 30, 2022. In addition to the Final Phosphorous TMDL itself, the submittal included, either directly or in reference, the following documents:

- Public Meeting Information and Response to Comments (page 57 and Appendix F)
- Applicable Massachusetts Surface Water Quality Standards (WQS) (pages 8-11)
- AECOM Lake Loading Response Model (LLRM) Lake Loading Response Model Users Guide and Quality Assurance Project Plan
- Final Massachusetts Integrated List of Waters for the Clean Water Act 2018/2020 Reporting Cycle <https://www.mass.gov/doc/final-massachusetts-integrated-list-of-waters-for-the-clean-water-act-20182020-reporting-cycle/download>
- Guidelines for Total Maximum Daily Loads of Phosphorus from Commercial Cranberry Bog Discharges in Massachusetts. (Appendix D)

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.

REVIEWERS: Ivy Mlsna (617-918-1311) e-mail: mlsna.ivy@epa.gov

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

An interconnected set of four waterbodies - West and East Monponsett Pond, Stetson Pond and White Oak Reservoir - in the towns of Hanson, Halifax, and Pembroke, are listed as impaired (Category 5), on the "Massachusetts 2018/2020 Integrated List of Waters" for nutrient-related impairments. All four waterbodies covered in this TMDL are classified as Class A waterbodies as well as having been designated Public Water Supply and Outstanding Resource Waters (ORWs). The natural surface water flow pattern is from Stetson Pond south via Stetson Brook to East Monponsett Pond and then west through a culvert under Route 58 to West Monponsett Pond. In the northwest part of the watershed, White Oak Brook flows into White Oak Reservoir, then continues south to West Monponsett Pond. Stump Brook is the outlet on the west side of West Monponsett Pond.

Silver Lake (Pembroke, Kingston, and Plymouth MA) is the surface water supply for the City of Brockton. There is an underground pipe which allows water to be diverted from East Monponsett to Silver Lake. The City of Brockton was authorized through an emergency legislative action in 1964 to withdraw water from Silver Lake. Diversions to Silver Lake are through a pipe laid by Brockton and permitted under Ch. 91 by MassDEP. During diversions (mainly in October through May) water flows regularly in the reverse direction, flowing backward from West Monponsett to East Monponsett, potentially drawing the cyanobacteria and nutrients into Silver Lake. Action is being taken to address the cyanobacterial blooms observed in West and East Monponsett Ponds and the upstream waterbodies that are tributary to those ponds.

The major sources of phosphorus to the system are cranberry bogs, runoff from developed areas, internal release from sediments, and natural wetlands. Ignoring sediment sources, the largest controllable watershed sources of phosphorous are cranberry bog inputs and runoff associated with residential development. In the case of West Monponsett Pond, internal loading or recycling of

phosphorus from lake sediments is a major source of phosphorus during the summer growing season. Implementation is already underway to address the cranberry bog inputs. It is recommended to first reduce external loads to the extent possible before addressing the internal loads, but due to health concerns regarding the potentially toxic cyanobacterial blooms in West Monponsett, the Town of Halifax funded treatments with a light dose of aluminum in 2013, 2015, and 2016. With 319 funding, the Town of Halifax applied aluminum doses in 2017, 2018 and 2019. Light aluminum doses were applied in small amounts over the summer months to avoid potential impacts to the rare state listed freshwater mussels in the pond. The sediment source of phosphorus is presumably due to historic inputs of phosphorus, largely from anthropogenic sources.

MassDEP has determined that all nutrient impaired segments in the Commonwealth are a high priority. See Massachusetts Integrated List of Waters for the Clean Water Act 2018/2020 Reporting Cycle: <https://www.mass.gov/doc/final-massachusetts-integrated-list-of-waters-for-the-clean-water-act-20182020-reporting-cycle/download>

B. Pollutant of Concern

In the West and East Monponsett Pond System, the pollutant of concern is the nutrient phosphorous. Additional impairments include dissolved oxygen, harmful algal blooms, chlorophyll-a, transparency/clarity, and nutrient/eutrophication biological indicators.

C. Pollutant Sources

The TMDL document identifies the major sources of phosphorus to the lakes as cranberry bogs, runoff from developed areas, internal release from sediments, and natural wetlands. Ignoring sediment sources, the largest controllable watershed sources of phosphorous are cranberry bog inputs and runoff associated with residential development. Within the TMDL system, with the exception of White Oak Reservoir, internal loading or recycling of phosphorus from lake sediments is a major source of phosphorus during the summer growing season. The origin of this large amount of sediment phosphorus is due to historically high anthropogenic phosphorus inputs that have transferred and settled to the sediments over many years.

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 waterbodies in the TMDL study area are all classified as Class A in the Massachusetts Surface Water Quality Standards (SWQS). Class A waterbodies are designated as a source of public water supply as well as “designated as excellent habitat for fish, other aquatic life and wildlife, including for

their reproduction, migration, growth and other critical functions, and or primary and secondary contact recreation, even if not allowed”. Massachusetts’ narrative criteria for nutrients states: “Unless naturally occurring, all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses and shall not exceed the site-specific criteria developed in a TMDL or as otherwise established by the Department pursuant to 314 CMR 4.00.”

To assess waterbodies, Massachusetts uses their Consolidated Assessment and Listing Methodology (CALM) as part of 305b and 303d listing for Clean Water Act purposes. This document has guidance threshold values which allow for the determination of whether a waterbody is supporting its designated uses. Lacking a numeric nutrient criterion, a numeric target total phosphorus concentration must be chosen which should meet CALM guidance thresholds for lakes and allow for the meeting of designated uses, therefore meeting SWQS. The target total phosphorus concentration must be chosen to be low enough for all designated uses to be attained. In the case of nutrients, the uses include primary and secondary contact recreation, aquatic life and aesthetics. Based on MassDEP’s CALM document these lakes should generally meet the 1.2-meter Secchi disk transparency, 5 mg/l dissolved oxygen concentration, the maximum monthly chlorophyll a concentration should not exceed 16 ppb, have less than 25% non-rooted macrophytes and be free from frequent cyanobacteria blooms (>70,000 cells/mL) to be considered free of nutrient impairment (unless the exceedance is a natural condition).

The Lake Loading Response Model (LLRM) suite of lake models was used for this TMDL. The LLRM is a spreadsheet-based model which uses an annual steady state suite of models to estimate nutrient loadings. The LLRM model uses inputs for estimated nutrient loadings from landuse, septic systems, waterfowl, internal loading, areal deposition and point sources. The model was calibrated and used to estimate current loading to the ponds in the TMDL study area. These estimated nutrient loadings along with pond morphometric and physical characteristics were then used to predict in-pond nutrient concentrations using a suite of well accepted lake models for phosphorus predictions. The successful calibration of the model was based on relatively high nutrient export rates from specific landuses that discharge directly to surface waters (cranberry bogs, stormwater and natural forested wetlands), combined with estimates of export from septic systems and internal sediment recycling of phosphorus. These estimates for each waterbody were simultaneously adjusted with the LLRM suite of lake models until they approximated the observed in-lake surface concentrations in each lake.

The total phosphorus concentration expected to attain the biological thresholds of the CALM listed above may vary between types of lakes. Generally, all uses for typical warm water lake fisheries (including swimming, boating and aesthetics) can be met at the USEPA “Gold Book” recommendation of 0.025 mg/l (25 ppb). Previous MassDEP sampling in lakes in Massachusetts suggests a target of 23 ppb total phosphorus for clear (not tea colored) lakes that are dominated by groundwater seepage and 48 ppb total phosphorus for clear impoundments is appropriate. However, in colored lakes with high concentrations of dissolved carbon, as indicated by true color measurements exceeding 57 PCU, the natural total phosphorus is expected to be higher than in otherwise similar clear water lakes. Using model results, previous studies, professional knowledge, and a weight of evidence approach the ponds’ target concentrations were selected as follows:

Table 1: Total Phosphorous reductions required to meet TMDL targets

Waterbody	Current TP ppb used in model	Current TP Load kg/yr	Target TP ppb	TMDL Load kg/yr	TMDL Load kg/day	Percent TP Reduction
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Stetson Pond	15	69	13	48	0.13	31%
East Monponsett	34	345	18	182	0.50	47%
White Oak Reservoir	50	76	23	35	0.10	54%
West Monponsett	68	676	18	186	0.51	73%

MassDEP uses an adaptive management approach to observe implementation results over time and allow for adjustments. If water quality targets are met and yet guidance threshold values and other habitat indicators continue to indicate impaired water quality, total phosphorus water quality targets may be revised and TMDLs adjusted accordingly. MassDEP will propose modifications to the TMDL analysis only if a review of the new information or data indicates that such a modification is warranted and is consistent with the anti-degradation provisions in the Massachusetts Water Quality Standards. Modification of the TMDL will only be made following an opportunity for public participation and be subject to the review and approval of the EPA.

Assessment: The use of the Lake Loading Response Model, the description of the weight-of-evidence target-selection process in the TMDL document, and the companion studies to this TMDL document adequately demonstrates the basis for deriving the target phosphorous loads and 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 West and East Monponsett Ponds, Stetson Pond and White Oak Reservoir 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.

The LLRM was used to estimate each pond’s target load for total phosphorus based on the target concentrations in the water column described above. This model was chosen as it provides a reasonable estimation of nutrient loads and requires less time, effort and expertise than more complex models (SWAT, BASINS, HSPF). The total phosphorus load was adjusted for each pond until its predicted total phosphorus concentration matched the target phosphorus concentration. The estimated allowable total phosphorus load was 48 kg/yr, 182 kg/yr, 35 kg/yr and 186 kg/yr for

Stetson Pond, East Monponsett Pond, White Oak Reservoir and West Monponsett Pond, respectively. The effects of yearly total phosphorus loading have their most severe effects in the summer; this effect is captured by the LLRM model which was calibrated to average summer in-pond TP concentrations (“critical condition”). Meeting the threshold loads for each pond will result in reduced algal blooms. All the ponds had a predicted probability of chlorophyll a >16 ppb less than 10% of time at the recommendation phosphorous targets. See Appendix E for full explanation of model inputs and assumptions.

Assessment: The TMDL document explains, and EPA concurs with, the approach for applying the LLRM to specific ponds for the purpose of developing target phosphorus loading rates and identifying sources of needed phosphorous 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.

The four waterbodies were modeled with a consistent set of export coefficients and current (2009 or 2015) TP loads were estimated. Target TP concentrations were developed and a new set of TMDL loads were established to meet those targets. The reductions in loads required to reach the targets ranged from 31 to 73% as shown in Table 1 above. Large reductions in internal loadings will be required to meet the target thresholds for this TMDL (Table 2).

Table 2: Percent internal load reductions required to meet internal load TMDL allocation

Waterbody	TMDL Load Allocation (kg TP/yr)	Internal Load Allocation (kg/yr)	Percent Internal Load Reduction
Stetson Pond	28.48	0.69	90%
East Monponsett	105.38	15	50%
White Oak Reservoir	13.59	0	0%
West Monponsett	115.45	14.68	95%

Additional reductions are required from other non-point sources, predominantly from cranberry bog agriculture (landuse source “high intensity agriculture”). See Tables 5-8 of the TMDL document for specific breakdowns of source reductions for each waterbody segment.

Table 3: Nonpoint source load reductions required to meet TMDL targets

Waterbody	TMDL Load Allocation (kg TP/yr)	TMDL Wasteload Allocation (kg TP/yr)	Total Maximum Yearly Load (kg TP/yr)	TMDL (kg TP/day)	Percent Load Reduction
Stetson Pond	28.48	19.24	48	0.13	23%
East Monponsett	105.38	76.58	182	0.50	50%
White Oak Reservoir	13.59	21.63	35	0.10	64%
West Monponsett	115.45	70.36	186	0.51	79%

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 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. Except for Peterson Swamp and the wetlands northwest of West Monponsett Pond, the TMDL study area is considered an urbanized area and are included in the jointly issued EPA- MassDEP NPDES General Permits for Stormwater Discharges from MS4s. Substantial reduction in TP loads from stormwater will be required for Stetson Pond, East Monponsett, White Oak Reservoir, and West Monponsett Pond watersheds to meet this TMDL. The reductions in TP in stormwater required under this TMDL will be included in the next amendment of the MS4 General Permit (expected issue date 2023). Municipalities discharging stormwater to waters with a TP TMDL are required to prepare a Lake Phosphorus Control Plan (LPCP) as required in Appendix F, A: II (pg. 18-26) of the permit.

Stormwater loadings was estimated using an analysis which included MassGIS landuse classifications, analysis of directly connected impervious areas and hydrologic soil group classifications, as well as individual TP export loading rates by landuse for directly connected impervious area and for pervious

areas as provided by Table 1-2 in Appendix F of the 2016 Massachusetts MS4 permit. For each watershed the impervious area was intersected with the MassGIS landuse classification and directly connected impervious area percentages and loadings were calculated using *EPA's Methodology to Calculate Baseline Estimates of Impervious Area (IA) and Directly Connected Impervious Area (DCIA) for Massachusetts Communities*. Except for Stetson Pond all stormwater loads were less than the calculated TMDL watershed load. For Stetson Pond this discrepancy is likely explained by the fact that the agricultural areas in this watershed are largely abandoned cranberry bogs and not active operations. A crosswalk between the modeled watershed loading landuse groupings and EPA MA MS4 landuse groupings for each MassGIS landuse code was then constructed to allow the determination of stormwater loads for each modeled watershed loading landuse grouping. On occasion the calculated total stormwater load was greater than the modeled watershed load for a given modeled watershed landuse grouping, therefore for the purposes of the stormwater wasteload allocation (WLA) in the TMDL, the entirety of the modeled watershed load was assigned to the wasteload allocation for stormwater.

Table 4: Wasteload reductions required to meet TMDL targets

Waterbody	TMDL Load Allocation (kg TP/yr)	TMDL Wasteload Allocation (kg TP/yr)	Total Maximum Yearly Load (kg TP/yr)	TMDL (kg TP/day)	Percent Wasteload Reduction
Stetson Pond	28.48	19.24	48	0.13	40%
East Monponsett	105.38	76.58	182	0.50	44%
White Oak Reservoir	13.59	21.63	35	0.10	44%
West Monponsett	115.45	70.36	186	0.51	43%

For complete details on the estimation of current stormwater loads and the procedure to allocate a wasteload allocation see Appendix E 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

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.

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 MOS for these TMDLs is implicit. An implicit MOS is not specifically quantified but consists of statements of the conservative assumptions used in the analysis. MassDEP used conservative assumptions to develop numeric model applications that account for the MOS.

The margin of safety is set by establishing targets for East and West Monponsett Pond that are below a nominal target of 23 ppb TP. Previous lake sampling has shown this target generally meets all CALM thresholds. These two ponds are colored, influenced by both surface water and groundwater, and upstream wetlands. These characteristics make the ponds atypical of lakes fed by clear groundwater seepage. The 18 ppb TP target for these lakes has also been set conservatively given that both East and West Monponsett Ponds are classified as Class A waters (public water supply). Similarly, the target concentrations for Stetson Pond (13 ppb) and White Oak Reservoir (23 ppb) were also conservatively set. Stetson Pond received a target concentration below its current in-pond concentration to both protect its water quality as well as the water quality of downstream water resources. The White Oak Reservoir target concentration was set well below a nominal target of 48 ppb. Previous sampling of similar clear water impoundments has shown this target generally meets CALM thresholds for this waterbody type. This level is expected to reduce duckweed coverage, which is causing the impairment, and should also help restore the principal downstream waterbody, West Monponsett Pond.

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).

TMDL captures seasonal variations in water quality with its calibration to summertime in-pond TP concentrations as noted above. Seasonal variations are also accounted for by using the average of several years of rainfall to estimate runoff flows (pg 47 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.

Cyanobacteria levels will continue to be monitored by MassDEP and the Massachusetts Department of Public Health. Future lake surveys by MassDEP, should include Secchi disk transparency, nutrient analyses, temperature and dissolved oxygen profiles and aquatic vegetation maps of distribution and density. Monitoring of total phosphorus concentrations and transparency by local volunteer groups is encouraged when possible.

Assessment: EPA concludes that the anticipated ambient water quality monitoring program 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.

Implementation of the TMDL will focus on the largest sources, including the sediment recycling of phosphorus during the summer and the cranberry bog BMPs. Additional implementation will include upgrading Title 5 septic systems as required by regulations (310 CMR 15.00) or by sewerage areas as development increases. There are no reasonable BMPs available to significantly reduce atmospheric precipitation and dryfall inputs.

In the case of the Monponsett Ponds, Stetson Pond and White Oak Reservoir, much of the above implementation has been underway since 2009. The major bog owners have already reduced the fertilizer rates by 60-70% and West Monponsett Pond exhibited a 23% reduction in TP concentrations coincident with those fertilizer reductions.

The implementation plan for the total phosphorous TMDL for the Monponsett Ponds system is described on pages 47-54 of the TMDL document. MassDEP has provided the following implementation plan recommendations:

- **Internal loading** of summer sediment phosphorus release in West Monponsett Pond can be treated with a buffered alum and sodium aluminate treatment, iron treatment combined with aeration, or by dredging the sediments after the major surface discharges are controlled. Aluminum treatment generally has been most cost effective. East Monponsett Pond may also require an aluminum treatment of sediment phosphorus sources if further implementation of watershed control fails to stop cyanobacterial blooms in the pond. If treatment is required, a lighter dose than that used for West Monponsett Pond is likely to be enough. The same is true for Stetson Pond.

- **Cranberry Bogs** discharge must be limited to 0.5 kg/ha/yr. This level of phosphorus export can be achieved by limiting water discharge rates to 3.5 acre-feet per acre of bog with average total phosphorus concentrations of 50 ppb (the acceptable concentration of inputs to lakes from EPA, 1986 “Gold Book”). A recent review of phosphorus export versus phosphorus fertilizer use suggests that exports can be dramatically reduced with reductions in phosphorus fertilizer application while maintaining crop yields. This is accomplished by switching from low ratios of N:P:K to higher N fertilizers with proportionately less P. Irrigation water should be recycled from water stored in the bog ditches or in storage ponds to the greatest extent possible. Harvest water should also be recycled from section to section rather than flooding the entire bog complex at one time. After cranberry harvest the water should be retained in the bog complex for at least 1 to 3 days to allow particulate matter to settle out, but always less than 10 days to avoid excess release from sediments. Water should be discharged slow enough to minimize turbulence and erosion within the bogs. When possible, the discharge should be directed away from sensitive surface waters, particularly in the growing season. It is recommended that the small Winebrook bog currently discharging to West Monponsett Pond be further treated or diverted away from the pond. Winter floods should be withdrawn beneath newly formed ice within 10 days to avoid anoxic injury to plants and anoxic release of phosphorus from the flooded soils.
- **Flow management** is required by Administrative Consent Order (ACO) that the City of Brockton take action to reduce the likelihood of water going from the West to East Monponsett Pond during diversion by altering their diversion transfer rate. The ACO requires a minimum flow of 900,000 gallons/day to leave West Monponsett Pond both during diversion periods and beginning June 1, 2017 to be released at all times unless as stipulated in the consent order.
- **Septic** load control is recommended, although not currently required to meet the TMDL. The densely populated area along the shores of the West and East Monponsett Ponds is a potential area for sewerage and this would eliminate the septic system phosphorus loads to the lake from those homes.
- **Stormwater** load reductions of 50-60% will be required for Stetson Pond, East Monponsett, White Oak Reservoir, and West Monponsett Pond watersheds to meet this TMDL. EPA NPDES MS4 permits require six minimum control measures including public education, public participation, illicit discharge detection and elimination, construction site runoff control, post construction runoff control, and good housekeeping at municipal operations. The latter ‘good housekeeping’ control should include BMPs and a schedule of activities to control pollution. The permits also require the development of a stormwater management plan that must include mapping outfalls to receiving waters. Details on Massachusetts stormwater program are available at: <https://www.mass.gov/info-details/stormwater>.

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.”

Reasonable assurances that the TMDL will be implemented include both enforcement of current laws and regulations, availability of financial incentives, and the various local, state and federal program for pollution control. Active cooperation of the cranberry growers and the Cape Cod Cranberry Growers Association, homeowners, the towns of Halifax, Hanson and Pembroke, City of Brockton, EPA, NRCS and the UMass Cranberry Station is required for this TMDL to be effective in returning the lake to an unimpaired status.

Assessment: Although not required for this TMDL approval, because MassDEP did not increase WLAs based on expected LA reductions, MassDEP has nevertheless described a number of programs that provide reasonable assurance that WQS will be met. EPA New England is taking no action on reasonable assurance.

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 Monponsett Ponds System TMDL is described on page 57 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 December 15, 2016 at the Halifax Town Hall in Halifax, MA. 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 F of the TMDL document. MassDEP fully addressed all comments received in Appendix F 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 June 30, 2022, MassDEP submitted the West and East Monponsett Pond System Total Maximum Daily Loads for Total Phosphorus (Control #446.2) and associated documents for EPA approval. The documents contained all of the elements necessary to approve the TMDL

Data for entry in EPA's National TMDL Tracking System									
TMDL Name *			Final West and East Monponsett Pond System Total Maximum Daily Loads For Total Phosphorus						
Number of TMDLs*			4 TMDLs						
Type of TMDLs*			Nutrients (Phosphorus)						
Number of listed causes/parameters (from 303(d) list)			25 impairments for 12 different causes						
Lead State			Massachusetts (MA)						
TMDL Status			Final						
Individual TMDLs listed below									
TMDL ID#	TMDL Segment name	TMDL Segment ID #	TMDL Pollutant ID# & name	TMDL Impairment PARAMETERS/Cause(s), ID# and name	Pollutant endpoint	Unlisted ?	MA DEP Point Source & ID#	Listed for anything else?	
R1-MA-2022-01	East Monponsett Pond	MA62218	Total Phosphorus	Chlorophyll-a, Harmful Algal Blooms, Curly Leaf Pondweed, Eurasian Water Milfoil, Myriophyllum Spicatum, Fanwort, Non-Native Aquatic Plants	0.50 kg TP/day	N		Mercury in Fish Tissue	
R1-MA-2022-01	West Monponsett Pond	MA62119	Total Phosphorus	Chlorophyll-a, Harmful Algal Blooms, Phosphorus (Total), Transparency/Clarity, Eurasian Water Milfoil, Myriophyllum Spicatum, Fanwort	0.51 kg TP/day	N			
R1-MA-2022-01	White Oak Reservoir	MA62157	Total Phosphorus	Nutrient/Eutrophication Biological Indicators, Phosphorus (Total), Fanwort	0.10 kg TP/day	N			
R1-MA-2022-01	Stetson Pond	MA62182	Total Phosphorus	Harmful Algal Blooms, Oxygen, Dissolved, Phosphorus (Total), Curly-Leaf Pondweed, Eurasian Water Milfoil, Myriophyllum Spicatum, Fanwort, Water Chestnut	0.13 kg TP/day	N			
TMDL Type: restoration			Nonpoint Sources: yes						

Establishment Date (approval)*	July 20, 2022
Completion (final submission) Date	June 30, 2022
Public Notice Date	December 15, 2016
EPA Developed	No
Towns affected* (in alphabetical order)	Halifax, Hanson, Pembroke