



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
**Region 1**  
**5 Post Office Square, Suite 100**  
**Boston, MA 02109-3912**

September 30, 2020

Mr. Tom O'Donovan, Director  
Water Division  
NH Department of Environmental Services  
29 Hazen Drive; P.O. Box 95  
Concord, NH 03302-0095

Dear Mr. O'Donovan,

Thank you for the final submission by the NH Department of Environmental Services (NHDES) of the Final Total Maximum Daily Load (TMDL) for Phosphorus for Locke Lake, Barnstead, NH. This TMDL submission addresses one impaired waterbody (with seven beach segments) in one HUC 10 watershed for impairment of the Aquatic Life Designated Use due to total phosphorus (TP), chlorophyll *a*, and pH; and impairment of the Primary Contact Recreation Designated Use due to cyanobacteria hepatotoxic microcystins.

The U.S. Environmental Protection Agency (EPA) hereby approves New Hampshire's Final Total Maximum Daily Load (TMDL) for Phosphorus for Locke Lake, Barnstead, NH submitted on September 28, 2020. This phosphorus TMDL is supported by the 24 Lake Phosphorus TMDLs which were approved by EPA on May 12, 2011. The 24 Lake Phosphorus TMDLs provide the modeling approach and template for additional lake phosphorus TMDLs in New Hampshire. EPA has determined that this TMDL meets the requirements of § 303(d) of the Clean Water Act (CWA) and of EPA's implementing regulations (40 CFR part 130). Attached is a copy of our approval documentation.

We commend your staff's efforts and involvement with our office to develop and finalize this TMDL. We believe the information, maps, data and references provided in this document and appendices combined with the 2011 Lake Phosphorus TMDL Documents will educate, motivate and assist stakeholders in tackling phosphorus impairments at the local level. My staff and I look forward to continued cooperation with the NHDES in exercising our shared responsibility of implementing the requirements under Section 303(d) of the CWA. Should you have any questions, please do not hesitate to call Toby Stover at (617) 918-1604.

Sincerely,

/s/

Ken Moraff, Director  
Water Division

cc (electronic)

Ted Diers, NH DES  
Gregg Comstock, NH DES  
Peg Foss, NH DES  
Dan Arsenault, EPA  
Steve Winnett, EPA

## **EPA NEW ENGLAND'S TMDL REVIEW**

**TMDL:** Final Total Maximum Daily Load for Phosphorus for Locke Lake, Barnstead, NH

**STATUS:** Final

**IMPAIRMENT/POLLUTANT:** Locke Lake is not meeting criteria for chlorophyll a (chl a), total phosphorus (TP) and pH which is causing impairment of the Aquatic Life Designated Use; and cyanobacteria hepatotoxic microcystins which is causing impairment of the Primary Contact Recreation Designated Use. The lake impairments are attributed to excess phosphorus which is causing excess algal growth and cyanobacteria blooms.

Locke Lake has eight segments on the State of New Hampshire's 2018 List of New Hampshire Water Bodies Not Meeting Water Quality Standards (Section 303(d) of the Federal Clean Water Act):

### **Waterbody Name and Waterbody Segment ID number**

Webster Stream-Locke Lake: NHIMP700060402-02 (main body of the lake)  
Locke Lake: NHIMP700060402-02-01 (Georgetown Beach #6)  
Locke Lake: NHIMP700060402-02-02 (North Barnstead Road Beach)  
Locke Lake: NHIMP700060402-02-03 (N Shore RD Beach)  
Locke Lake: NHIMP700060402-02-04 (Point Beach)  
Locke Lake: NHIMP700060402-02-05 (Colony Beach)  
Locke Lake: NHIMP700060402-02-06 (Varney Beach)  
Locke Lake: NHIMP700060402-02-07 (Winchester Drive Beach)

### **BACKGROUND:**

On May 12, 2011 EPA approved 24 TMDLs for New Hampshire lakes that were impaired due to excess phosphorus. The following year three more TMDLs for phosphorus impaired lakes in NH were approved by EPA which followed the same framework and used the same model to estimate phosphorus loadings and reductions needed as the original 24 TMDLs. In subsequent years, NH Department of Environmental Service (NHDES) has submitted lake phosphorus TMDLs which follow the previously adopted format and modeling approach. On September 28, 2020 NHDES submitted to EPA New England a document titled "Final Total Maximum Daily Load for Phosphorus for Locke Lake, Barnstead, NH" for eight segments that are listed on the 2016 303(d) list. This most recent submission for Locke Lake also follows the same framework and model as the previously approved TMDLs. This document provides TMDL implementation information to stakeholders as well as the framework for future TMDLs. In accordance with EPA regulations [40 CFR 130.7 (c) (ii)], NHDES conducted a public comment period from August 26, 2020 to September 23, 2020 and notified interested parties and stakeholders. Along

with the main TMDL document the submission consisted of the following documents submitted electronically:

- Letter of Transmission
- TMDL Report Appendix A: Methodology for Determining Target Criteria
- TMDL Report Appendix B: LLRM Methodology Documentation
- TMDL Report Appendix C: Land Use Categories, Export Coefficients and Additional Calculations
- Appendix D: 2018 VLAP Report for Locke Lake

The following review explains how the TMDL submission meets the statutory and regulatory requirements of TMDLs in accordance with Section 303(d) of the Clean Water Act, and [40 CFR Part 130].

**Reviewer:** Toby Stover (617-918-1604) [stover.toby@epa.gov](mailto:stover.toby@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 that 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.*

This TMDL is for eight segments (main lake and seven beach segments) of Locke Lake in Barnstead, NH. The main characteristics of Locke Lake are described in the TMDL Document in Section 2.1. The Merrimack River HUC 10 watershed delineation, Locke Lake Watershed Drainage Area map, pond bathymetry and land use categories are visually depicted in Figure 2-1, Figure 2-2, Figure 2-3, and Figure 3-1 of the TMDL document. These New Hampshire waterbody segments are listed on the 2018 List of New Hampshire Waterbodies Not Meeting

Water Quality Standards as impaired for Aquatic Life Use due to exceedances of the state water quality standards for nutrients (phosphorus), chlorophyll a, and pH; and impairment of the Primary Contact Recreation Use due to cyanobacteria hepatotoxic microcystins (TMDL Document Section 2.1, Table 2-2). These conditions can cause dissolved oxygen to reach levels that are harmful to fish, invertebrates, and shellfish and can also cause blooms of hepatotoxic cyanobacteria microcystins which are potentially harmful to humans, pets, and wildlife that come into contact with the toxins either through physical contact, inhalation, or ingestion. Under Section 303(d) of the Clean Water Act, states are required to compile a list of impaired waterbodies in their biennial water quality report to Congress and to develop TMDLs for these waters so that they will achieve water quality standards.

The probable cause of the exceedances of the criteria is excessive phosphorus loads from several different nonpoint sources. These sources include atmospheric deposition, surface water base flow, stormwater runoff, internal phosphorus recycling, waterfowl, and direct groundwater seepage (including septic systems within 125 feet of the pond, TMDL Document Section 3.0).

The Priority Ranking for the impaired segment has been labeled “high” by NHDES (TMDL Document Section 2.5). Priority ranking is based on when the segment was listed as impaired and the resources available on an annual basis (See NHDES’ Consolidated Assessment and Listing Methodology (CALM) document) to develop TMDLs for impaired waterbodies.

***Assessment:***

EPA New England concludes that the TMDL document meets the requirements for describing the waterbody segments, pollutants of concern, identifying and characterizing sources of impairment and priority ranking. This TMDL is supported by previously approved lake phosphorus TMDLs which were approved in 2011 and 2012. The site-specific information provided in this submission, in conjunction with the documentation on the ENSR-LLRM model (TMDL Document Section 3.0 and Appendix B) used to set the phosphorus target, satisfies the requirements for TMDL submission.

**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 anti-degradation policy. Such information is necessary for EPA’s review of the load and wasteload allocations that 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.*

Water quality standards and classification for all surface waters have been established by the New Hampshire Legislature at RSA 485-A:8, I, II and V and in the New Hampshire surface water regulations (ENV-Wq1700). NH water quality standards for nutrients in Class B waters (Env-Wq 1703.14) state:

- Class B Waters shall contain no phosphorus in concentrations that would impair any existing or designated uses, unless naturally occurring.
- Existing discharges containing either phosphorus or nitrogen that encourage cultural eutrophication shall be treated to remove phosphorus or nitrogen to ensure attainment and maintenance of water quality standards.
- There shall be no new or increased discharges of phosphorus into lakes or ponds.
- There shall be no new or increased discharge(s) containing phosphorus or nitrogen to tributaries of lakes or ponds that would contribute to cultural eutrophication or weeds or algae in such lakes or ponds.

NH water quality standards for dissolved oxygen (Env-Wq 1703.07) state the following:

- Except as naturally occurs, or in waters identified in RSA 485-A:8, III, or subject to (c) below, Class B waters shall have a DO content of at least 75% of saturation, based on a daily mean, and an instantaneous minimum DO concentration of at least 5 mg/L.
- Unless naturally occurring or subject to (a) above, surface waters within the top 25 percent of depth of thermally unstratified lakes, ponds, impoundments and reservoirs or within the epilimnion shall contain a DO content of at least 75 percent saturation, based on a daily mean and an instantaneous minimum DO content of at least 5 mg/L. Unless naturally occurring, the DO content below those depths shall be consistent with that necessary to maintain and protect existing and designated uses.
- The NHDES policy for interim nutrient threshold for primary contact recreation (i.e. swimming) in NH lakes is 15 µg/L chl *a* (NHDES 2008a). NHDES has also developed thresholds for protection of aquatic life for chl *a* and TP based on trophic level (see Appendix A, Table A-2). Lakes were also listed as impaired for swimming if surface blooms (or “scums”) of cyanobacteria were present. For example, a lake was listed as impaired if scums were present only along a downwind shore.

Currently, NH does not have numeric phosphorus criteria adopted into water quality standards which means that numeric target(s) must be set for TMDLs and assessment purposes. A statewide target of 12 µg/L TP was developed for NH lakes in previously approved TMDLs based on: (1) An examination of the distribution of TP concentrations in impaired and unimpaired NH lakes; (2) The use of nutrient levels for commonly accepted trophic levels; and (3) The use of probabilistic equations to establish targets to reduce the risk of adverse conditions (Appendix A Section 1.4). All three of these methods reached the same conclusion that 12 µg/L

TP was a reasonable target for NH lakes. In cases where the modeled natural conditions exceed the 12 µg/L TP target, the higher modeled target value will be used. The phosphorus target selected for this TMDL was determined using the ENSR-LLRM model which determined that the appropriate phosphorus target for Locke Lake is 12.0 µg/L TP which is the predicted in-lake concentration under natural conditions (TMDL Document Section 2.6 and Appendix A Section 1.3.1).

***Assessment:***

EPA concludes that NHDES has properly presented and interpreted its narrative WQS for phosphorus to set the appropriate load reduction targets. NHDES is directly applying the numeric target from the ENSR-LLRM model to derive the TMDL target with the goal of reducing the phosphorus concentration to reflect natural conditions. This is a reasonable approach and is in line with NH water quality standards.

### **3. Loading Capacity - Linking Water Quality and Pollutant Sources**

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

This TMDL quantifies the loads that each source is contributing to Locke Lake and assigns load reductions in order to achieve the target concentration that will result in Locke Lake attaining water quality standards. The Locke Lake watershed was divided into two sub-watersheds (Halfmoon Lake Watershed and Locke Lake Watershed) and loads were assigned to each sub-watershed based on tributary inputs and topography (TMDL Document Section 3.0 and Figure 2-2). TP loads were estimated for each subwatershed based on runoff and land use export

coefficients and then attenuated to match the in-lake monitoring data. The ENSR-LLRM model was used to determine the annual loading rates of phosphorus into the lake. Lake response to the loading (the resulting phosphorus concentration) was calculated using the average of five models, including Kirchner-Dillon (1975), Vollenweider (1975), Reckhow (1977), Larsen-Mercier (1976), Jones-Bachman (1976), and Nurnberg (1998) (TMDL Document Section 3.5). The lake response results were then used as inputs into a different set of models: Carlson (1977), Dillon and Rigler (1974), Jones and Bachman (1976), Oglesby and Schaffner (1978), Vollenweider (1982), and Jones, Rast, and Lee (1979) to predict mean annual chl a and secchi disk transparency (TMDL document Table 3-5). Algal bloom frequency (TMDL document Table 3-5) was also predicted using equations from Walker (1984, 2000). The limitations associated with the loading estimates are explained in Section 3.3 of the TMDL document and are attributable to variations in weather, spatial analysis variability, data availability and the assumptions that had to be made about loadings from, atmospheric deposition, internal loading, septic systems, waterfowl and land use export coefficients.

**Assessment:** EPA New England concludes that the loading capacity which was calculated using a set of recognized water quality models using observed phosphorus concentration data from impaired and unimpaired NH water bodies, has been appropriately set at a level necessary to attain and maintain applicable water quality standards. This approach is consistent with narrative water quality criteria and observed conditions. The resulting TMDL is based on a reasonable approach for establishing the relationship between pollutant loading and water quality.

#### 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 Load Allocation (LA) relates to existing and future nonpoint sources, natural background, and stormwater runoff not subject to permitting under the National Pollutant Discharge Elimination System (NPDES) requirements for Municipal Separate Storm Sewer Systems (MS4). The nonpoint sources of phosphorus discharging to Locke Lake include diffuse stormwater, surface water base flow (including groundwater in seepage), septic systems, internal recycling, waterfowl, and atmospheric deposition (TMDL document, section 5.1). The LA for nonpoint sources of phosphorus in this lake watershed is 249.9 kg/yr TP (total watershed load



that will meet water quality standards). The contributing watersheds to Locke Lake do not include any MS4 communities, therefore the loading from stormwater is considered nonpoint pollution and the allocation for stormwater is included in the Load Allocation.

***Assessment:***

EPA New England concludes that NHDES has identified and allocated appropriate TP loads to nonpoint sources of pollution within the watershed and assigned reasonable reductions to the identified sources.

**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 Waste Load Allocation (WLA) accounts for all sources within the watershed that are attributed to point sources of TP pollution. The WLA for point sources of phosphorus in this lake watershed is 0 kg/yr TP, which is the amount of TP that the Locke Lake watershed can assimilate while still meeting water quality standards. The contributing watersheds to Locke Lake are not within the MS4 designated area that would classify the stormwater loads as point sources. Consequently, the watershed loads (including stormwater) are captured entirely within the Load Allocation as nonpoint source pollution.

***Assessment:*** EPA concludes that the WLA has been reasonably set to zero as the contributing watersheds are not within the MS4 community designation and there are no permitted point-sources discharging to the lake. EPA New England concludes that it is acceptable and reasonable for all sources of TP to be included in the LA due to the fact that the entire watershed is not regulated under the MS4 permit.

## 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 water quality target for this TMDL was developed using the LLRM model to predict pre-development conditions for both phosphorus and chlorophyll a. The resulting target concentration derived from the model is 12.2 µg/L TP, which is slightly higher than the 12 µg/L TP target that NHDES has set for mesotrophic lakes based on observed summer values. NHDES rounded the modeled value down to match the 12 µg/L TP target that NHDES uses for mesotrophic lakes. The 12 µg/L TP target contains an implicit Margin of Safety of 20% which accounts for the difference between fully mixed annual TP conditions used in the LLRM model and the summer sampling period values that are collected under conditions where phosphorus in the water column is being taken up by algae, macrophytes and phytoplankton. In order to reach the Target Load, total phosphorus will need to be reduced by 54% in the watershed from the sources allocated in the Load Allocation.

### ***Assessment:***

EPA New England concurs that an adequate margin of safety is provided by the implicit MOS of 20% to account for model uncertainty used in the phosphorus target setting procedures.

## 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 TMDL addresses seasonal variation because the required reduction in phosphorus was calculated for the conditions during the critical, summer season, when occurrence of nuisance algal blooms, low dissolved oxygen, and high chlorophyll a concentrations are most likely to occur. The conservative assumptions that were made regarding summer epilimnetic data and applying it on a mean annual basis in setting the TMDL phosphorus target provides assurance that water quality standards will be met during the summer critical period. Therefore, the TMDL allocation protects designated uses during the entire year (TMDL Section 4.4 and 4.5).

### ***Assessment:***

EPA concludes that the TMDL is protective of water quality under all conditions during 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.*

NHDES proposes to continue to monitor Locke Lake in conjunction with the Volunteer Lake Assessment Program (VLAP). VLAP monitors have been collecting data from Locke Lake since 2002. NHDES suggests that the VLAP monitors continue the monitoring program and consult with NHDES on any changes to the monitoring plan in the future. The State discusses their monitoring recommendations and plans in the TMDL report (TMDL Document Section 8.0).

### ***Assessment:***

EPA concludes that the continued monitoring by NHDES and VLAP volunteers is sufficient to evaluate the adequacy of the TMDL and attainment of Water Quality Standards, although not a required element for TMDL approval. EPA is taking no action on the monitoring plan.

## 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.*

An implementation plan is provided in the submission (TMDL Section 7.0) that summarizes the major identified sources of pollution, identifies the necessary reductions from each, and gives general and specific recommendations for abating them. The plan discusses several types of best

management practices and low impact development (LID) techniques to reduce runoff from stormwater, residential areas, and lawns (TMDL Section 7.0 and Table 7.1). It also discusses the opportunities that may be provided by the Clean Water Act Section 319 program for nonpoint source pollution abatement.

***Assessment:***

NHDES has addressed the implementation plan, although it is not required for TMDL approval. EPA is taking no action on the implementation plan.

## 10. Reasonable Assurances

*EPA guidance calls for reasonable assurances when TMDLs are developed for waters impaired by both point and nonpoint sources. In a water impaired by both point and nonpoint sources, where a point source is given a less stringent wasteload allocation based on an assumption that nonpoint source load reductions will occur, reasonable assurance that the nonpoint source reductions will happen must be explained in order for the TMDL to be approvable. This information is necessary for EPA to determine that the load and wasteload allocations will achieve water quality standards.*

*In a waterbody 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 assurance is not required for this TMDL because point sources are not given a less stringent WLA based on the assumption of future nonpoint source load reductions. There are no point sources in this watershed and therefore all phosphorus load reductions must be achieved through the LA for nonpoint sources. Although not required, the TMDL cites several additional elements of reasonable assurance:

- The enforcement of RSA 485-A:12, which requires those responsible for sources of pollution that lower water quality below the minimum requirements of the classification to abate such pollution;
- NHDES will work with watershed stakeholders to identify specific phosphorus sources within the watershed;
- Requests for Clean Water Act Section 319 funds (nonpoint source pollution program) to implement specific best management practices (BMPs) will receive high priority;
- Support for Lakes Management and Protection Plans through RSA 483-A:7; and
- For lakes included in the NHDES VLAP, support from NHDES staff on phosphorus reduction opportunities and help securing CWA Section 319 grants where eligible.

***Assessment:***

NHDES has addressed reasonable assurance, although it is not required for this TMDL approval. EPA 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 draft TMDL report was released for public comment on August 26, 2020, and written comments were accepted until September 23, 2020. The draft report was posted to the NHDES website and mail and/or email notice was provided to the Town of Barnstead, NH. NHDES did not receive any comments on the draft report during the public comment period. NHDES TMDL and Groundwater Protection staff held a conference call with the Pennichuck East Utility (local water supply utility) as part of its public outreach for the TMDL. The purpose was to inform the utility on the details of the TMDL and the TP reductions that are required in order to meet water quality standards as well as inform the utility how the TMDL process is conducted and implemented. NHDES also plans on holding another conference call with the Locke Lake Colony Association and other stakeholders in the future to explain the details and implementation of the TMDL. Only one substantive change to the draft report was made before submitting it as the final report:

- The narrative in Section 5.1 was modified to explain that since stormwater loads from the watershed are not regulated under the US EPA Municipal Separate Storm Sewer System (MS4) permitting program, the Waste Load Allocation (WLA) portion of the TMDL was set to zero and the load from all sources, including the watershed, is included in the Load Allocation (LA) of the TMDL.

### ***Assessment:***

EPA concludes that NHDES has appropriately involved the public during the development of the TMDL and has provided adequate opportunities for the public to comment on the TMDL.

## 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.*

The letter of submission accompanying the *Total Maximum Daily Load for Phosphorus for Locke Lake, Barnstead, NH* is dated September 28, 2020. NHDES clearly states that the Final TMDL document has been submitted to EPA for approval in accordance with Section 303(d) of the Clean Water Act. The submittal letter along with the appendices and public notice provide all of the required documentation necessary for approval of the Locke Lake TMDL.

***Assessment:***

NHDES's letter of September 28, 2020 states that the TMDL is being formally submitted for EPA review and approval.

**Data for entry in EPA's National TMDL Tracking System**

<b>TMDL Name *</b>				Final Total Maximum Daily Load for Phosphorus for Locke Lake, Barnstead, NH					
Number of TMDLs*				8					
Type of TMDLs*				Nutrients (phosphorus)					
Number of listed causes/parameters (from 303(d) list)				32					
Lead State				NH					
TMDL Status				Final					
<b>Individual TMDLs listed below</b>									
Action ID#	Segment name	Segment ID #	TMDL, Protection Plan, OR Alternative*	Pollutant name	Impairment PARAMETERS/Cause(s)name	Pollutant endpoint	? Unlisted	NH DES Point Source & ID#	Listed for anything else?
R1_NH_2020_1	Webster Stream-Locke Lake	NHIMP700060402-02	TMDL	Total Phosphorus	Chlorophyll a Total Phosphorus pH Cyanobacteria	12 ug/L phosphorus	N	N/A	
R1_NH_2020_1	Locke Lake: (Georgetown Beach #6)	NHIMP700060402-02-01	TMDL	Total Phosphorus	Chlorophyll a Total Phosphorus pH Cyanobacteria	12 ug/L phosphorus	N	N/A <sup>N</sup>	N
R1_NH_2020_1	Locke Lake: (North Barnstead Road Beach)	NHIMP700060402-02-02	TMDL	Total Phosphorus	Chlorophyll a Total Phosphorus pH Cyanobacteria	12 ug/L phosphorus	N	N/A	N
R1_NH_2020_1	Locke Lake: (N Shore RD Beach)	NHIMP700060402-02-03	TMDL	Total Phosphorus	Chlorophyll a Total Phosphorus pH Cyanobacteria	12 ug/L phosphorus	N	N/A	N
R1_NH_2020_1	Locke Lake: (Point Beach)	NHIMP700060402-02-04	TMDL	Total Phosphorus	Chlorophyll a Total Phosphorus pH Cyanobacteria	12 ug/L phosphorus	N	N/A	N
R1_NH_2020_1	Locke Lake: (Colony Beach)	NHIMP700060402-02-05	TMDL	Total Phosphorus	Chlorophyll a Total Phosphorus pH Cyanobacteria	12 ug/L phosphorus	N	N/A	N

R1_NH_2020_1	Locke Lake: (Varney Beach)	NHIMP700060402-02-06	TMDL	Total Phosphorus	Chlorophyll a Total Phosphorus pH Cyanobacteria	12 ug/L phosphorus	N	N/A	N
R1_NH_2020_1	Locke Lake: (Winchester Drive Beach)	NHIMP700060402-02-07	TMDL	Total Phosphorus	Chlorophyll a Total Phosphorus pH Cyanobacteria	12 ug/L phosphorus	N	N/A	N
TMDL Type			Nonpoint Sources						
Establishment Date (approval)*			Sep 30, 2020						
Completion (final submission) Date			9/28/2020						
Public Notice Date			8/26/2020 - 9/23/2020						
EPA Developed			No						
Towns affected* (in alphabetical order)			Barnstead						

\*Abbreviations:

TMDL = TMDL

Protection Plan = PP

Alternative Restoration Approach = Alt