UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 1
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BOSTON, MA 02109-3912

May 10, 2010

Andrew Fisk
Maine Department of Environmental Protection
#17 State House Station
Augusta, Maine 04333-0017

SUBJECT: **Notification of Approval of Prestile Stream & Christina Reservoir TMDLs**

Dear Mr. Fisk:

Thank you for Maine's submittal of the Total Maximum Daily Load (TMDL) Report on total phosphorus, total nitrogen, and sediment TMDLs for Prestile Stream, and a total phosphorus TMDL for Christina Reservoir. This Class A stream and Class GPA lake are included on Maine's 2008 303(d) list. The purposes of the TMDL are to address aquatic life and dissolved oxygen impairment in Prestile Stream, and primary contact recreation use impairment in Christina Reservoir, both due to excessive nutrient and sediment loading from nonpoint source pollution.

The U.S. Environmental Protection Agency (EPA) hereby approves Maine's April 15, 2010 Prestile Stream and Christina Reservoir TMDLs. EPA has determined that this TMDL report 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 are very pleased with the quality of your TMDL submittal. Your staff have done an excellent job of site investigation and use of the regionally-calibrated modeling tool (AVGWLF), resulting in a comprehensive and informative TMDL report for this NPS-impaired stream and reservoir in Aroostook County. My staff and I look forward to continued cooperation with the ME DEP in exercising our shared responsibility of implementing the requirements under Section 303(d) of the CWA.

Sincerely,

/s/

Stephen S. Perkins, Director
Office of Ecosystem Protection

cc (electronic):
David Courtemanch, ME DEP
Melissa Evers, ME DEP

05/10/10

EPA NEW ENGLAND'S TMDL REVIEW

TMDL: **Prestile Stream**, Aroostook County, Maine
HUC: ME 0101000501, ME ID# 149R01 located in Fort Fairfield, Presque Isle, and Westfield, ME.
2008 303(d) listings: benthic macroinvertebrates, nutrients, dissolved oxygen;
TMDL development: 2008.
Christina Reservoir, Aroostook County, Maine
HUC: ME 0101000501, ME ID# 9525 located in Fort Fairfield, ME.
2008 303(d) listings: Primary Contact Recreation (total phosphorus).
TMDL development: 2008.

STATUS: Final

IMPAIRMENT/POLLUTANT: **Prestile Stream**: Aquatic life use impairment measured by aquatic life criteria for Class A stream (benthic macroinvertebrate bioassessments), nutrient enrichment, and low dissolved oxygen; potential sources include eutrophic lake source, and agricultural runoff. TMDLs are calculated for **phosphorus**, **nitrogen**, and **sediment**.

Christina Reservoir: Primary contact recreation impairment of Class GPA (lakes & ponds) trophic status criteria resulting from frequent algal blooms and excessive nutrient loads from nonpoint source pollution. TMDL is calculated for **phosphorus**; nitrogen, and sediment reductions are also provided for information.

BACKGROUND: The Maine Department of Environmental Protection (ME DEP) submitted to EPA New England the final *Total Maximum Daily Load (TMDL) Report, Prestile Stream (& Christina Reservoir), Aroostook County, Maine* electronically with a transmittal letter dated April 2, 2010, and a revised final report on April 15, 2010. All of EPA's September 4, 2008 comments (on the August 8, 2008 draft TMDL) were taken into account in the final submission.

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: Jennie Bridge (617-918-1685) e-mail: bridge.jennie@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.

Christina Reservoir is a 309-acre manmade impoundment located in the Town of Fort Fairfield, in Aroostook County, ME, and is the largest of sixteen small lakes and ponds (including 5 impoundments) in the Prestile watershed. The Lake Christina Dam was built in 1966 to provide supply water to a potato processing plant. The reservoir is Class GPA (Maine lakes & ponds), and the outlet on the south end of the reservoir allows constant overflow to Prestile Stream. Christina Reservoir is listed as impaired for primary contract recreation as a result of high nutrient loads and frequent algal blooms (pages 4 and 9 TMDL report). Water clarity standards are not met (page 13 TMDL report).

Potential sources of pollutants for Christina Reservoir include excessive nutrients from tributaries draining sites historically used for land application of potato processing sludge as well as sanitary sludge (page 6 TMDL report). The previous industrial discharge from a potato processing plant is no longer spray-irrigated in the Christina reservoir watershed; the effluent is now treated and discharged by permit to the Aroostook River (page 7 TMDL report). Due to concerns that the historic high-nutrient spray has saturated watershed soils as well as the sediment within the reservoir, both external and internal nutrient loads from Christina Reservoir are considered as sources to Prestile Stream (page 12 TMDL). (The average annual internal load appears to be dropping slightly since the cessation of aerial spraying of processing waste in the Christina Reservoir watershed in 2000 (page 13).) Migratory waterfowl are also a potential source of nutrients. Atmospheric deposition accounts for <2% of the total direct watershed load of phosphorus (20 kg/yr) (page 10).

Prestile Stream originates at the outlet of Christina Reservoir in the Town of Fort Fairfield, in

Aroostook County, ME, and flows through the Towns of Presque Isle and Westfield, then southeasterly through Mars Hill to the Maine-New Brunswick border where it joins the main stem of the St. John River approximately 14 miles from the U.S. Border. The impaired segment of Prestile Stream is a 15.78 mile stretch of Class A water from the Christina Reservoir Dam in Fort Fairfield to the Mars Hill Dam in Mars Hill, ME. This segment of the stream is impaired due to violations of aquatic life criteria (benthic-macroinvertebrate bioassessments), nutrient/eutrophication (biological indicators), and dissolved oxygen criteria (pp 6&8 TMDL). This TMDL report acknowledges but does not address the fact that Prestile Stream has a fish advisory and is also 303(d)-listed for legacy pollution from DDT (which remains persistent in the watershed decades after being applied). The unimpaired segment of Prestile Stream, located below Mars Hill Dam to the confluence with the St. John River, is a Class B stream.

Potential sources for Prestile Stream include nonpoint source pollution caused by soil erosion from agriculture and forestry practices, and recreational activities such as ATV trails. Historical agricultural and industrial actions negatively affected dissolved oxygen in the stream, and resulted in fish kills in the 1950's. Another significant source of pollutants to the stream are excessive nutrients from the highly eutrophic Christina Reservoir (which has acted as a nutrient sink for decades) (page 7 TMDL report).

ME DEP also identifies the magnitude and location of nonpoint sources in terms of land use distribution in the Prestile Stream watershed, including the land area of Christina Reservoir. Land uses are dominated by agricultural land (40% in row crops) and forest land (35%), with sparse residential development along major highways. Potatoes are the most prominent crop in the region. In Christina Reservoir alone, agriculture accounts for 56% of the subwatershed land use (row crops (39%), hay/pasture (17%), with a significant portion of wetlands (22%) (page 10 TMDL report).

The document describes the primary pollutants of concern for both lake (**total phosphorus**) and stream (**total phosphorus, total nitrogen, and sediment**). For watershed modeling purposes, all three pollutants are used as primary contributors to and surrogates for the DO impairment, aquatic life impairment, and nutrient enrichment of Prestile Stream, and for the primary contact recreation impairment in Christina Reservoir. Maine DEP explains that phosphorus and nitrogen are the limiting nutrients for algal growth, and contribute to hyper-abundant populations of stream macroinvertebrates, both of which are major contributors to dissolved oxygen impairment; sediment-laden runoff transports these adsorbed nutrients into both waterbodies. Sediment also is a significant contributor to, and provides a reasonable surrogate for aquatic habitat degradation in this TMDL. In summary, phosphorus, nitrogen, and sediment are all pollutants of concern in Prestile Stream; total phosphorus is the major limiting nutrient for water column algae and eutrophication in Christina Reservoir.

ME DEP provides an explanation and analytical basis for assessing the TMDL for aquatic life impairment through the use of surrogate pollutants described above, a watershed model (GWLF) to simulate nonpoint source pollutant loading, and a reference stream approach to develop numeric endpoints. (See also section 2 below, which documents ME's water quality standards.)

To further characterize loading characteristics to Prestile Stream, the watershed was divided into nine subwatersheds for modeling purposes (pages 15-16). This approach allows comparisons of estimated sediment and nutrient loadings between individual drainages that contribute to Prestile Stream, including loadings specifically from the Christina Reservoir subwatershed.

Assessment: EPA New England concludes that the ME DEP has done an admirable job of describing the TMDL waterbody segment, pollutants of concern, and identifying and characterizing sources of impairment.

2. Description of the Applicable Water Quality Standards and Numeric Water Quality Target

The TMDL submittal must include a description of the applicable State/Tribe water quality standard, including the designated use(s) of the waterbody, the applicable numeric or narrative water quality criterion, and the antidegradation policy. Such information is necessary for EPA's review of the load and wasteload allocations which are required by regulation. A numeric water quality target for the TMDL (a quantitative value used to measure whether or not the applicable water quality standard is attained) must be identified. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, usually site specific, must be developed from a narrative criterion and a description of the process used to derive the target must be included in the submittal.

The Prestile Stream & Christina Reservoir TMDL report describes the applicable water quality standards, designated uses (including habitat for fish and aquatic life; primary recreation), and antidegradation policy standards (see page 18 TMDL report).

Christina Reservoir, Class GPA (Great Pond Class A), is subject to the water quality standards for great ponds and natural lakes and ponds less than 10 acres. The relevant water use is recreation in and on the water. The water quality standards relate to the lake's trophic state (measured by chlorophyll a content, Secchi disk transparency (SDT), total phosphorus content, and other appropriate criteria), and waters must be free of culturally induced algal blooms that impair their use and enjoyment. [38 MRSA §465-A (1).] Christina Reservoir is a colored lake (average color 46 SPUs), and does not meet water quality standards with low late summer SDT readings (<2.0) and high chlorophyll-a levers (21 ppb).

Prestile Stream has been classified as a Class A water since 1994. Relevant water quality standards include those to protect aquatic life use (narrative for benthics and nutrient/eutrophication, and numeric for benthics), and dissolved oxygen (numeric); habitat must be characterized as natural. [38 MRSA 465 (2).] Prestile Stream also shows consistent non-attainment of Maine's Class A criterion for dissolved oxygen (DO of 7 ppm), and all sites sampled exhibit a 2 ppm or greater swing in DO from daily maximum to minimum, which indicates excessive nutrient enrichment and algal growth (p. 12).

As mentioned above, Maine DEP uses three pollutants of concern (phosphorus, nitrogen, and sediments) as surrogate measures of nonpoint source impacts resulting in violation of the State's criteria for Class GPA lakes and for Class A streams. Since Maine does not have numeric water

quality standards for the surrogate pollutants, numeric targets for phosphorus, nitrogen, and sediments are established by comparing the Christina Reservoir subwatershed, and the encompassing Prestile watershed to two attainment watersheds, Moose Brook and B Stream, in the same geographical region. Both attainment streams are designated Class B streams, but are documented to attain Class A standards for aquatic life and dissolved oxygen (see Table 5, page 19 TMDL report). A comparative attainment approach requires identical modeling procedures be applied to all watersheds in the analysis, which is documented in Appendix A (pages 35-53 TMDL report).

Assessment: EPA New England concludes that ME DEP has properly presented its water quality standards and has made a reasonable interpretation of the narrative water quality criteria in the standards when setting the numeric water quality targets by using unimpaired or reference watersheds. EPA has reviewed the modeling report in appendix 1 and believes that ME DEP's selection of reference watersheds is based on reasonable and appropriate technical criteria.

3. Loading Capacity - Linking Water Quality and Pollutant Sources

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

In many circumstances, a critical condition must be described and related to physical conditions in the waterbody as part of the analysis of loading capacity (40 C.F.R. § 130.7(c)(1)). The critical condition can be thought of as the "worst case" scenario of environmental conditions in the waterbody in which the loading expressed in the TMDL for the pollutant of concern will continue to meet water quality standards. Critical conditions are the combination of environmental factors (e.g., flow, temperature, etc.) that results in attaining and maintaining the water quality criterion and has an acceptably low frequency of occurrence. Critical conditions are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards.

The loading capacities for nutrients and sediment applicable to the impaired segment of Prestile Stream, and to Christina Reservoir, are set at numeric target levels using the two reference streams. The following targets for each pollutant represents an average of the unit area loads for the two reference streams because the loading results were so similar for both watersheds: **total phosphorus** (0.21 kg/ha/year), **total nitrogen** (4.80 kg/ha/year) and **sediment** (0.02 ton/ha/year). The loading capacities are expressed as annual unit area loads rather than daily loads in order to "normalize the spatial and temporal variation associated with instream nonpoint source pollutant concentrations." (See Table 5, page 17, and page 18 TMDL report.)

These loading capacities for Prestile Stream are set to protect water quality and support uses

during critical conditions, which are defined as environmental conditions that induce a stress response in aquatic life. These stressful conditions may occur throughout the year, at various flows, and depend on the biological requirements of the life stage of resident aquatic organisms. Complexities of critical conditions in flowing water impaired by NPS runoff are a major consideration in expressing the TMDL in terms of **annual loads**. The TMDL loads are also expressed in terms of daily maximum loads (see Table 7a, 1st footnote, page 21 TMDL report). The same loading capacities described above are also applied to Christina Reservoir subwatershed (see Table 7b, page 21 TMDL).

The Generalized Watershed Loading Function (GWLF) model was used to estimate pollutant loadings of phosphorus, nitrogen, and sediment associated with each of the two unimpaired reference streams, with the impaired portion of Prestile Stream, and with Christina Reservoir. For each pollutant of concern, the differences between the reference watershed average and Prestile Stream, and the difference between the reference watershed average and Christina Reservoir, are the pollutant load reductions needed to achieve water quality criteria for all nonpoint source pollutants of concern (pages 20-21 TMDL report). Similar comparisons are also presented for each of the other eight subwatersheds to determine geographical areas of highest pollutant loadings (Appendix A, page 53, TMDL report).

The GWLF model is an established midrange modeling tool that uses hydrology, land cover, soils, topography, weather, pollutant discharges, and other critical environmental characteristics to model sediment and nutrient (TN and TP) transport within a watershed and to compute flow and pollutant loads. In this case, GWLF was used as the core watershed simulation model, and Northeast AVGWLF was used to model the watershed land uses at a screening level of model evaluation for planning level estimates rather than exact prediction of loads entering streams. (Northeast AVGWLF is the GWLF model with an ArcView geographic information systems (GIS) interface; see appendix 1, page 32-43 TMDL report.)

All model simulations were conducted over a 15-year period (1990-2004) in order to capture sufficient hydrologic and weather conditions to account for typical variations in nutrient loading conditions. These simulations include those for the attainment watersheds of B Stream and Moose Brook, and the impaired watersheds of Prestile Stream as a whole, Christina Reservoir subwatershed (as well as the 8 other Prestile subwatersheds). ME DEP explains the assumptions, strength and weaknesses of the analytical process involving the GWLF model and comparative reference stream approach to evaluating loading capacities (pages 21-22, 35-53 TMDL report). These analytical methods are widely recognized as appropriate for NPS-impaired stream TMDL assessment.

Assessment: Since nonpoint source runoff occurs throughout the year, with different environmental effects, at both low and high flows, critical conditions for aquatic life protection are not limited to particular flow conditions or time of year. EPA concludes that critical conditions are adequately accounted for because the TMDL reduction targets directly address the effect of nonpoint source runoff in the impaired watersheds, and thus the range of impacts under varying critical conditions at different flows. EPA New England concludes that the loading capacities have been appropriately set at levels necessary to attain and maintain applicable water

quality standards. The TMDLs are based on a reasonable and widely accepted approach for establishing the relationship between pollutant loading and water quality in nonpoint source-impaired watersheds.

TMDL Time Increment / Daily Loading

EPA's November 15, 2006 guidance entitled "Establishing TMDL 'Daily' Loads in Light of the Decision by the U.S. Court of Appeals for the D.C. Circuit in Friends of the Earth, Inc. v. EPA, et al., No.05-5015, (April 25, 2006) and Implications for NPDES Permits," recommends that TMDL submittals express allocations in terms of daily time increments. In this case, the TMDLs' pollutant targets are expressed in terms of a daily increment, as well as in terms of an annual load. EPA New England concurs with expressing the TMDLs as annual loads based on the reasons provided by ME DEP (critical conditions occurring at various flows and pollutant loads throughout the year).

4. Load Allocations (LAs)

EPA regulations require that a TMDL include LAs, which identify the portion of the loading capacity allocated to existing and future nonpoint sources and to natural background (40 C.F.R. § 130.2(g)). Load allocations may range from reasonably accurate estimates to gross allotments (40 C.F.R. § 130.2(g)). Where it is possible to separate natural background from nonpoint sources, load allocations should be described separately for background and for nonpoint sources.

If the TMDL concludes that there are no nonpoint sources and/or natural background, or the TMDL recommends a zero load allocation, the LA must be expressed as zero. If the TMDL recommends a zero LA after considering all pollutant sources, there must be a discussion of the reasoning behind this decision, since a zero LA implies an allocation only to point sources will result in attainment of the applicable water quality standard, and all nonpoint and background sources will be removed.

ME DEP allocates all of each of the loading capacities for Prestile Stream and for Christina Reservoir as the "load allocation", a single categorical (gross) allotment, to existing and future nonpoint sources and to natural background: **phosphorus** (0.21 lb/acre/year), **nitrogen** (4.8 lb/acre/year) and **sediment** (0.02 ton/acre/year) (see Table 9 page 24, and page 25 TMDL report). Calculation of necessary reductions are also provided: Prestile Stream: 50% TP, 51% TN, 69% sediment; Christina Reservoir: 57% TP, 59% TN, 50% sediment (see Tables 7a and 7b, page 21 TMDL report). ME DEP explains that it was not possible to separate natural background from non-point pollution sources in these watersheds because of the limited and general nature of the available information.

Although Aroostook County has declining population trends, expansion of agricultural and development activities have the potential to increase runoff and associated pollutants. To ensure that the TMDL targets are attained, future agriculture or development activities will need to meet the TMDL targets. (See page 24 TMDL report for discussion of future NPS loadings.)

Assessment: EPA New England concludes that the load allocations for total phosphorus, total nitrogen, and sediment are adequately specified in the TMDL report at levels necessary to attain and maintain water quality standards. The degrees of load reductions necessary to achieve the

in-stream or in-lake phosphorus levels, and the in-stream nitrogen and sediment levels are based on estimates of current loadings, and the need to address future loadings is discussed.

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.

ME DEP sets the waste load allocations for total phosphorus, total nitrogen, and sediment at **0 (zero)** for all the pollutants of concern in the runoff, and explains that no portion of the Prestile Stream watershed (including the Christina Reservoir subwatershed) is designated as an urban area, and would not be subject to coverage under Maine's general permit for municipal separate stormwater sewer systems (MS4s) (page 25 TMDL report). Stormwater associated with construction site activities affecting over one acre would be subject to the MEPDES stormwater permit program, although those activities are expected to be short term and infrequent.

Assessment: EPA New England concurs that the WLA component of the TMDLs is appropriately set equal to zero based on ME DEP's determination that there are no existing point sources discharges to either impaired waterbody, including regulated stormwater, subject to NPDES permit requirements in the watershed.

6. Margin of Safety

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 Prestile Stream and Christina Reservoir TMDLs include an implicit margin of safety (MOS) based on a conservative selection of numeric water quality targets, which were based on reference streams that attain Class A water quality standards for aquatic life criteria and

dissolved oxygen. There are also several conservative assumptions associated with the AVGWLF model, which provide a MOS to account for uncertainty and ensure that water quality standards will be attained in Prestile Stream and Christina Reservoir (pages 25-26 TMDL report). For example, the modeling process for Prestile Stream did not account for existing riparian buffers, existing agricultural BMPs, instream nutrient-attenuating and sediment-settling processes, all of which reduce the pollutant load that moves through the system. The modeling process for Christina Reservoir subwatershed did not account for historic high-nutrient point-source pollutant discharges in the watershed, and the extent of existing BMPs in the watershed.

Assessment: EPA New England concludes that adequate MOS is provided. EPA believes a significant implicit MOS is provided in the modeling used to establish the numeric water quality targets, and the adequacy of this MOS is supported by in-stream and in-lake data.

7. Seasonal Variation

The statute and regulations require that a TMDL be established with consideration of seasonal variations. The method chosen for including seasonal variations in the TMDL must be described (CWA § 303(d)(1)(C), 40 C.F.R. § 130.7(c)(1)).

Seasonal variation for Prestile Stream is considered in the allowable annual loads of nutrients and sediment, which protect macroinvertebrates and other aquatic life under the influence of seasonal fluctuations in environmental conditions such as flow, rainfall, and runoff. (Page 26, TMDL report.) ME DEP explains the various seasonal fluctuations in flow which influence the concentrations of nutrients and sediment, and how the TMDLs are protective of all seasons. ME DEP also explains that the phosphorus TMDL for Christina Reservoir was developed to be protective of the most sensitive time of year – during the summer, when conditions most favor the growth of algae and aquatic macrophytes. With an average flushing rate of 5.1 flushes/year, the annual average phosphorus loading is most critical to the water quality (page 26 TMDL report.

Assessment: EPA New England concludes that seasonal variation has been adequately accounted for in the TMDL because the TMDL was developed to be protective year round for both impaired waterbodies. Seasonal fluctuations in flow, and varying contributions of nutrients and sediment from snow and rainfall runoff are taken into account. In addition, nutrient and sediment controls are expected to be in place through the year so that these controls will reduce pollution whenever sources are active.

8. Monitoring Plan for TMDLs Developed Under the Phased Approach

EPA's 1991 document, Guidance for Water Quality-Based Decisions: The TMDL Process (EPA 440/4-91-001), recommends a monitoring plan when a TMDL is developed under the phased approach. The guidance recommends that a TMDL developed under the phased approach also should provide assurances that nonpoint source controls will achieve expected load reductions. The phased approach is appropriate when a TMDL involves both point and nonpoint sources and the point source is given a less stringent wasteload allocation based on an assumption that nonpoint source load reductions will occur. EPA's guidance provides that a TMDL developed under the phased

approach should include a monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of water quality standards.

ME DEP explains that future, more detailed assessments of individual sites will be needed to develop site-specific best management practices (BMPs), and suggests that modeling results in Appendix 1 be used as a starting point for conducting subwatershed surveys, beginning with the subwatersheds with the greatest input peer unit load. ME DEP also recommends stream monitoring be conducted as part of pre- and post BMP-application assessments. As restoration plans proceed, ME DEP will check on progress towards attainment of Maine's Class A water quality standards with both aqueous samples and biological monitoring evaluations (page 26, TMDL report). Future biological monitoring will be conducted according to the Department's rotating basin sampling schedule. Continued monitoring of Christina Reservoir will be conducted between the months of May to October, through the continued efforts of the ME DEP.

Assessment: EPA New England concludes that the anticipated monitoring in cooperation with and by ME DEP is sufficient to evaluate the adequacy of the TMDL.

9. Implementation Plans

On August 8, 1997, Bob Perciasepe (EPA Assistant Administrator for the Office of Water) issued a memorandum, "New Policies for Establishing and Implementing Total Maximum Daily Loads (TMDLs)," that directs Regions to work in partnership with States/Tribes to achieve nonpoint source load allocations established for 303(d)-listed waters impaired solely or primarily by nonpoint sources. To this end, the memorandum asks that Regions assist States/Tribes in developing implementation plans that include reasonable assurances that the nonpoint source load allocations established in TMDLs for waters impaired solely or primarily by nonpoint sources will in fact be achieved. The memorandum also includes a discussion of renewed focus on the public participation process and recognition of other relevant watershed management processes used in the TMDL process. Although implementation plans are not approved by EPA, they help establish the basis for EPA's approval of TMDLs.

The nutrient and sediment load reductions listed in the TMDL allocations Tables 7a and b are intended to provide a guide for restoration plans and engineered solutions that will lower the content of nutrient and sediment in the runoff reaching the stream and reservoir (page 27-29 TMDL report). ME DEP explains that improving dissolved oxygen regimes and restoring sustainable and functional aquatic communities require more than just planning and assessment. In general, ME DEP recommends a higher level of local stewardship (creation of an organized watershed group), instream restoration, and attention to small chronic problems, as well as a comprehensive watershed approach to look at all potential nutrient and sediment sources including the impact of agricultural land, impervious surfaces (roads and roofs) and commercial development. ME DEP also provides a list of specific assessment and implementation recommendations.

Assessment: Addressed, though not required.

10. Reasonable Assurances

EPA guidance calls for reasonable assurances when TMDLs are developed for waters impaired by both point and

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

In a water impaired solely by nonpoint sources, reasonable assurances that load reductions will be achieved are not required in order for a TMDL to be approvable. However, for such nonpoint source-only waters, States/Tribes are strongly encouraged to provide reasonable assurances regarding achievement of load allocations in the implementation plans described in section 9, above. As described in the August 8, 1997 Perciasepe memorandum, such reasonable assurances should be included in State/Tribe implementation plans and "may be non-regulatory, regulatory, or incentive-based, consistent with applicable laws and programs."

ME DEP addresses reasonable assurances first by emphasizing that more active local watershed participation is an important component in improving water quality. The load reductions provide a guide for restoration plans and engineered solutions that will lower the content of nutrients and sediments in the runoff reaching the stream. The 2005 watershed management plan for Prestile Steam lists a number of recommendations for improving water quality that can be used to guide future watershed efforts (pages 28-29 TMDL report).

Assessment: Addressed, though not required, since this TMDL does not establish less stringent WLAs in reliance on greater load reductions from nonpoint sources.

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 Prestile Stream and Christina Reservoir TMDL report is described on pages 29-30 of the TMDL report. Copies of a preliminary draft TMDL were provided to watershed stakeholders including: state agency staff from ME DEP (CRMO – Augusta, and NMRO – Presque Isle), ME DIF&W, Central Aroostook Soil & Water Conservation District, USDA/NRCS, Houlton Band of Maliseet Indians, Maine Potato Board, municipal officials in Mars Hill and Presque Isle, and several private citizens (listed on page 30 TMDL report). Public meetings on the TMDLs were held in Houlton on May, 2008, and in Presque Isle on August 11, 2008. The public review report was posted on the ME DEP Internet Web site and a notice was placed in local newspapers, and in the Bangor Daily news on August 16th and 23rd, 2008. The public review period lasted from August 8 – September 5, 2008. No written comments outside of ME DEP and EPA were received; ME DEP responded to comments received from the Northern Maine Regional Office of DEP (see Appendix D, pages

64-70 TMDL report).

Assessment: EPA New England concludes that ME DEP has done a sufficient job of involving the public during the development of the TMDL, has provided adequate opportunities for the public to comment on the TMDL, and has fully addressed comments received from EPA.

12. Transmittal 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: ME DEP's letter of April 2, 2010 and e-mail of April 15, 2010 (forwarding the final revised report) indicate that the TMDL is being formally submitted for EPA approval.

MAC HD:Users:jeb:Documents:2010:EPA:TMDLs:Prestile & Christina:PrestileStr&ChristinaRes_Final.doc

Data for Entry in EPA's National TMDL Tracking System and Regional Web Page							
TMDL Water Body Names *	**Dudley Brook & Christina Reservoir (2 segments)**						
Number of TMDLs*	4						
Type of Pollutant(s) *	Nutrients and sediment						
Number of listed causes (from 303(d) list)	11						
Any Information/prevention TMDLs (Y/N)	N						
Lead State	Maine (ME)						
TMDL Status	Final						
Individual TMDLs listed below (one line per segment-pollutant combination)							
TMDL Segment name	TMDL Segment ID #	TMDL Pollutant ID# & name	TMDL Impairment Cause(s)	Pollutant Endpoint	Unlisted ?	MEPDES Point Source & ID#	Segment still listed for other? (Y/N)
Prestile Stream (above dam in Mars Hill)	ME 0101000501_149R01	515 (Total Phosphorus)	773 Benthic Macroinvertebrate bioassessments 743 Nutrient/Eutrophication biological indicators 225 Dissolved Oxygen	0.21 (kg/ha/yr) phosphorus			Y (Cat 5D: DDT)
Prestile Stream (above dam in Mars Hill)	ME 0101000501_149R01	511 (Total Nitrogen)	773 Benthic Macroinvertebrate bioassessments 743 Nutrient/Eutrophication biological indicators 225 Dissolved Oxygen	4.8 (kg/ha/yr) nitrogen			Y (Cat 5D: DDT)
Prestile Stream (above dam in Mars Hill)	ME 0101000501_149R01	457 (Sediment)	773 Benthic Macroinvertebrate bioassessments 743 Nutrient/Eutrophication biological indicators 225 Dissolved Oxygen	0.02 (ton/ha/yr) sediment			Y (Cat 5D: DDT)
Christina Reservoir	ME 0101000501_9525	515 (Total Phosphorus)	515 Total Phosphorus 747 Secchi disk	0.21 (kg/ha/yr)			N

			transparency	phosphorus			
TMDL Water Pollution Type		Nonpoint Source					
Cycle (list date)		2008					
Establishment Date (approval)*		May 10, 2010					
EPA Developed		No					
Towns affected*		Fort Fairfield, Easton, Presque Isle, Westfield, Mars Hill, Bridgewater					

* = These data fields used in webpage entries