UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
ONE CONGRESS STREET SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

June 21, 2007

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

SUBJECT: **Notification of Approval of Barberry Creek TMDL**

Dear Mr. Fisk:

Thank you for Maine's submittal of the Barberry Creek Total Maximum Daily Loads (TMDLs) for percent impervious cover (% IC) in the watershed, which serves as a surrogate for the mix of pollutants in stormwater, and for lead (Pb) and zinc (Zn) which serve as surrogates for the array of metals in stormwater. This Class C waterbody is included on Maine's 2004 303(d) list and was prioritized for TMDL development. The purpose of the TMDL is to address impaired aquatic life use from a mix of regulated and unregulated urban stormwater.

The U.S. Environmental Protection Agency (EPA) hereby approves Maine's February 22, 2007, Barberry Creek TMDL received by EPA electronically. 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 are very pleased with the quality of Maine's TMDL submittal, and especially with the initiative taken by Melissa Evers to use the impervious cover approach for TMDL development to address aquatic life water quality impairment. Her leadership in applying this new approach to several small streams in Maine, and sharing her results with the other New England states has not only helped to move our regional TMDL program forward, but has also promoted increased coordination with nonpoint source and stormwater programs, as well. 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,

Stephen S. Perkins, Director
Office of Ecosystem Protection

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

06/21/07

EPA NEW ENGLAND'S TMDL REVIEW

TMDL: **Barberry Creek**, Cumberland County, Maine
HUC: ME 0106000105; ME ID# 610R09 located in South Portland, ME
2004 303(d) list: aquatic life use impairment; 2006 TMDL development.

STATUS: Final

IMPAIRMENT/POLLUTANT: Aquatic life use impairment measured by Class C aquatic life criteria (macroinvertebrates); primary sources are a mix of regulated and unregulated urban stormwater. TMDLs are established (1) in terms of percent impervious cover (% IC, serving as a surrogate for the mix of pollutants in stormwater), and (2) in terms of daily loads for lead (Pb) and zinc (Zn) (both serving as surrogates for the array of metals in stormwater).

BACKGROUND: The Maine Department of Environmental Protection (ME DEP) submitted a draft TMDL on July 14, 2005. An initial public comment period was held from November 18 to December 19, 2005, extended to January 9, 2006. A revised TMDL was sent out for additional public comment from July 25 to August 8, 2006, extended to August 18, 2006. ME DEP submitted to EPA Region 1 the final *Barberry Creek TMDL* with a transmittal letter dated February 22, 2007. All of EPA's comments on the preliminary and public review drafts were taken into account in the final submission. In addition to the TMDL itself, the submittal included, either directly or by reference, the following documents:

- *Public Comments and MDEP Response to Comments*, Appendix A, TMDL report.
- *ME DEP Draft Percent Impervious Cover TMDL Guidance for Attainment of Tiered Aquatic Life Uses*, Appendix E, TMDL report.
- ME DEP *Stormwater Best Management Practices Manual*, January 2006. http://www.maine.gov/dep/blwq/docstand/stormwater/stormwaterbmps/index.htm
- ME DEP Rule, Chapter 579, *Classification Attainment Evaluation Using Biological Criteria for Rivers and Streams*. May 2003.
- *ME DEP 2004 Integrated Water Quality Monitoring and Assessment Report*, Document Number DEPLW0665.
- A number of other references cited on pages 30-31 and Appendix D, TMDL report.

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.

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

Barberry Creek in South Portland, ME is currently included on Maine's 2004 §303(d) list for non-attainment of Class C aquatic life standards (based on biological monitoring of benthic macroinvertebrates). The TMDL describes the waterbody (urbanized, industrialized), the causes of impairment (aquatic life criteria) to the entire stream (1.3 miles), and potential sources (urban stormwater runoff), as identified in Maine's 2004 303(d) list. The entire watershed (1.2 sq. mi.) is located within a NPDES Phase II Stormwater urbanized area and the entire watershed has been affected by human activities.

Barberry Creek's priority ranking for TMDL development was raised when the stream was included in an EPA-funded special project on urban NPS pollution and stressor identification analysis (page 12 TMDL report). Although the stream was listed for impairment of aquatic life criteria (specific cause unknown), the special project provided an unusually extensive data collection which identified and evaluated potential stressors of concern (pages 9-11 TMDL report).

B. Pollutant of Concern

ME DEP's stressor identification process yielded the conclusion that biological impairments

were due primarily to a combination of pollutant and non-pollutant aquatic life stressors (such as impaired stream habitat and low baseflow) related to stormwater runoff from developed areas. Extensive stream assessment data also indicated toxic contaminants and increased sedimentation as pollutants which were potential factors contributing to impairment, but no specific pollutant could be identified as the primary cause of biological impairment.

Given the importance of stormwater runoff to the Barberry Creek TMDL, ME DEP has used the total **extent of impervious cover (%IC)** in the watershed as a **surrogate** for the complex mixture of pollutant and non-pollutant aquatic life stressors which are attributable to stormwater runoff from developed areas (page 22 TMDL report; see section 3 below on linking water quality and pollutant sources). A number of urban stressors (e.g., toxic contaminants, impaired stream habitat, increased sedimentation, and low baseflow) and their sources can be addressed simultaneously by reducing % IC or its effects, and DEP refers to a list of remediation options in the "Implementation Plan" section of the TMDL report.

ME DEP provides an explanation and analytical basis for assessing the TMDL for aquatic life impairment through the use of surrogate measures (pages 25-26 TMDL report). (See also section 2 below which explains ME's water quality standards, and section 3 below which explains the use of percent impervious cover as a surrogate for the mix of pollutants in stormwater.) ME DEP also provides an explanation and analytical basis for assessing the pollutant-specific TMDLs through the use of Pb and Zn as surrogate measures of the array of metals in stormwater runoff (pages 25 and 47-48 TMDL report). (See also section 2 below which explains ME's water quality standards, and section 3 below which explains the use of Pb and Zn as surrogates for an array of metals usually found in stormwater runoff.)

C. Pollutant Sources

The major sources are stormwater from the City of South Portland (regulated by MEPDES stormwater general permit), and overland runoff from a highly urbanized drainage area (e.g., unconfined runoff from roads and development). Of overall minor significance to Barberry Creek were one commercial source of stormwater which is treated (Hannaford Brothers Co.), and one CSO in the lower part of the watershed (South Portland, below the biological monitoring stations, and scheduled for removal (page 11 TMDL report)). Two other potential sources, a railroad yard and a capped landfill, were investigated by ME DEP (page 31 TMDL report: PETE/MDEP 2005). ME DEP determined these two sites to be insignificant sources of pollutants for Barberry Creek based on the low levels of pollutants found in runoff from these sites which are located at the farthest point in the watershed from the main stream channel, and the relatively clean stream baseflow (except for naturally occurring levels of Aluminum).

ME DEP also identifies the magnitude and location of point sources and nonpoint sources (in terms of land use distribution in the watershed). Analysis shows that development dominates the watershed (71%), followed by wetlands (16%), forests and grasslands (12%), and other (1%) (pages 15 and 23 TMDL report).

Assessment: EPA Region 1 concludes that the TMDL document meets the requirements for describing the TMDL waterbody segment, 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 TMDL report defines the appropriate water quality criteria for aquatic life protection, designated uses (including habitat for fish and aquatic life), and antidegradation policy (pages 7-8 TMDL report). Water quality classification and water quality standards of all surface waters of the State of Maine have been established by the Maine Legislature at Title 38 MRSA 464-468. According to Maine's water classification program, Barberry Creek is classified as Class C. In order for a waterbody to attain its classification, all applicable surface water quality standards must be met (page 7 TMDL report).

A. Water Quality Target - Aquatic Life Criteria

The impact of excessive stormwater runoff into Barberry Creek has resulted in a violation of the ME water quality standards (WQS), specifically the designated use as habitat for fish and other aquatic life. The Barberry Creek % IC TMDL is tied to achieving Maine's water quality criteria for Class C aquatic life use. Maine's narrative criteria require Class C waters:

> *"…to support all species of fish indigenous to the receiving water and maintain the structure and function of the resident biological community…Discharges to Class C waters may cause some changes to aquatic life, provided that the receiving waters shall be of sufficient quality to support all species of fish indigenous to the receiving waters and maintain the structure and function of the resident biological community."* [MRSA Title 38 §465, 4]

These narrative criteria have provided the regulatory basis for Maine's numeric tiered aquatic life criteria since 1992. Numeric biocriteria designed to protect aquatic life use were adopted by Maine in 2004 [DEP Rule, Chapter 579], submitted to EPA as a water quality standard revision, and approved by EPA on January 25, 2005 (as required by §303(c) of the Clean Water Act, 33 U.S.C. §1313(c)). The biocriteria for Class C waters in Maine's water quality standards were used as the TMDL target to address Barberry Creek's non-attainment of aquatic life uses.

Maine's biocriteria were developed through the use of macroinvertebrate sampling and associated community structure modeling. The biocriteria provide a quantitative methodology for interpreting Maine's narrative biological criteria and aquatic life uses for rivers and streams, and for making decisions about classification attainment. A waterbody is determined to be in

attainment in accordance with Chapter 579.4. Maine's biocriteria are based on 20 years of data from (currently) 768 river and stream and 126 wetland sampling locations, and over 1300 individual sampling events. Required sampling methods are referenced in Chapter 579.2 and included in the document entitled, *Methods for Biological Sampling and Analysis of Maine's Rivers and Streams* (DEP LW0387-B2002).

Macroinvertebrate data collected from Barberry Creek were sampled and evaluated in accordance with the procedures in Chapter 579 referenced above. The Class C metrics from Maine's statistical model are used as the ultimate numeric water quality compliance measure or TMDL end point for Barberry Creek (page 8 TMDL report).

B. Water Quality Target – Ambient Toxics Criteria

The Barberry Creek surrogate pollutant-specific TMDLs for Pb and Zn are tied to achieving Maine's state water quality criteria (SWQC) for the appropriate criteria, chronic concentration ("CCC"), at 20 mg/l hardness. The chronic criteria for both Pb and Zn are more stringent than the acute criteria (or "CMC", criteria, maximum concentration) (pages 9-10 TMDL report).

Assessment: EPA Region 1 concludes that ME DEP has properly presented its water quality standards, and has made a reasonable and appropriate application of its water quality standards to protect the designated uses of Barberry Creek. This conclusion is based on the following factors.

Aquatic Life Criteria

Barberry Creek is impaired for aquatic life use designation. The Department's determination of impairment was based on instream biological data collected according to required quality assurance protocols, and the modeling and assessment protocols for the implementation of Maine's water quality standards for assessment of aquatic life use. The approved biocriteria are the target or end point for the Barberry Creek TMDL, creating a direct connection between Maine's water quality standards and the TMDL target. The approved biocriteria are based on a long-term, extensive database and a peer reviewed model, used and interpreted by highly qualified and experienced staff biologists.

Ambient Toxics Criteria

The use of the pollutant-specific TMDLs for Pb and Zn as surrogates for metals in stormwater consists of direct applications of Maine's chronic water quality criteria as a function of stream flow. (See discussion in the next section on the choice and acceptability of these particular metals as surrogates.) Ambient water quality criteria for the two most common metals found in stormwater [(1)] were used. Maine's criteria were adopted by Maine [DEP Rule Chapter 584] and approved by EPA on July 7, 2006.

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.

A. TMDL for Percent Impervious Cover (% IC)

ME DEP used the extent of impervious cover (% IC) in the watershed as a surrogate for the complex mixture of pollutant and non-pollutant aquatic life stressors which the stressor identification analysis indicates are the cause of non-attainment of water quality standards. ME DEP explains the use of the impervious cover method to establish the link between water quality (attainment of aquatic life and other criteria) and the mix of pollutants in stormwater runoff. DEP explains that "a number of urban stressors and their sources can be addressed simultaneously (e.g., toxic load from runoff and road sand; habitat impairment due to storm flows including erosion and wash-out of aquatic life, and sedimentation problems from road sand and exposed soil; low flows related to high imperviousness) (page 21 TMDL report). The report provides an extensive discussion and list of recommendations for TMDL implementation (pages 16-20 TMDL report).

The impervious cover model (ICM) for illustrating the connection between land development and water quality was developed by the Center for Watershed Protection (CWP, March 2003[1]). The research monograph, *Impacts of Impervious Cover on Aquatic Systems*, establishes the linkage between the level of IC in the watershed (causal variable), and water quality as measured by aquatic life criteria (response variable). [(1, page 2)] CWP's IC model is based on estimates of total % IC. Use of the ICM for TMDL development was suggested and piloted by ENSR in EPA Region 1 in 2004-5[2], and involves. :

- Watershed delineation;
- Mapping or estimation of total impervious cover;
- Establishment of % IC target for unimpaired conditions (based on state, regional, and national information);
- Comparison of estimated % IC to the % IC target for un-impaired conditions;
- Calculation of % IC reduction from current conditions needed to attain water quality.

ME DEP explains the assumptions, strength and weaknesses of the analytical process which is appropriate for TMDL assessment of small (high order, 1-3), stormwater-impaired streams (page 26 TMDL report).

ME developed a support document for using this method in Maine, entitled *Percent Impervious Cover TMDL Guidance for Attainment of Tiered Aquatic Life Uses*. [3] (See also pages 21 and Appendix E of TMDL report.) This guidance identifies ranges of % IC target values for TMDLs, WLAs, and margin of safety for Maine's different stream classifications in order to assure attainment of Maine's tiered aquatic life uses. The % IC target values "represent the level of impervious cover that generally coexists with a biological community that meets aquatic life criteria as defined by statutory class." [3] IC values reflecting different levels of protection are based on an analysis of DEP water quality standard attainment data from Maine's biomonitoring program. Maine used data from 43 macroinvertebrate samples collected between 1994 and 2004, from 32 watersheds of first to third order in size that were influenced by differing amounts of % IC upstream of the sampled location. In setting watershed-specific targets, ME DEP staff are directed to use best professional judgment based on knowledge of site-specific conditions and aquatic life goals for the waterbody.

Establishment of TMDL Percent Impervious Cover (%IC) Target

In a pollutant-specific TMDL, a stream's loading capacity is the greatest amount of pollutant loading the water can receive without violating water quality standards. In this TMDL, because the "pollutant of concern" is represented by the surrogate measure of impervious cover, the loading capacity is the greatest amount of impervious cover the Barberry Creek watershed can support without violating the stream's aquatic life criteria.

The loading capacity or TMDL target for Barberry Creek, a class C stream, is set at **12% IC** (page 21, TMDL report). This waterbody-specific target is within the TMDL target range for Maine's Class C-protected streams (10-15% IC). [(3, Table 1)] The 12% IC TMDL reflects local conditions and factors in the Barberry Creek watershed which both lessen (e.g., presence of riparian buffers) or increase (e.g., presence of impermeable soils) the volume of stormwater runoff. The % IC target applies at all times (instantaneous, daily, monthly, seasonal, annual) and will therefore achieve reductions in stormwater runoff volume in all storm events whenever they occur (e.g., on any given day) throughout the year. (See Discussion of TMDL time increment, page 9 below.)

B. TMDLs for Specific Pollutants – Pb and Zn

The State of Maine prefers to express the Barberry Creek aquatic life use protection TMDLs in terms of % IC. Expressions of these TMDLs in terms of pounds per day of Pb and Zn (the most commonly detected metals in stormwater) are provided for those who are interested in that particular format. Although this mass per unit time expression is more indicative of a typical pollutant-specific TMDL, Maine believes it is not the most useful measure for TMDLs intended to address stormwater-related impairments because of the complexity of tracking stormwater pollutant flows and loads.

ME DEP used lead (Pb) and zinc (Zn) as surrogates for an array of metals usually found in stormwater runoff, in order to establish another link between water quality and pollutants in stormwater. ME DEP explains the method used to establish the cause and effect relationship between the numeric targets (set at SWQC) and pollutants in stormwater runoff for a range of streamflow volumes characteristic of Barberry Creek. The loading capacities for Pb and Zn are

presented as daily loads (pages 25 and 47-48, TMDL report). These targets provide ambient water quality criteria-based daily pollutant loads to complement the % IC targets.

C. Critical conditions

The % IC, Pb, and Zn loading capacities for Barberry Creek are set to protect water quality for the full range of flows expected in Barberry Creek, and thus support uses during *critical conditions*. Since stormwater 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. Benefits realized from IC reductions will occur in all seasons because stormwater controls to be implemented to meet the IC targets will reduce adverse impacts (pollutant loading and damaging flows) for the full spectrum of storms throughout the year.

Assessment: EPA Region 1 concludes that Maine selected reasonable surrogates for the complex mixture of pollutant and non-pollutant stressors causing water quality impairment, and that all the targets for % IC, Pb, and Zn, have all been appropriately set at levels necessary to attain and maintain applicable water quality standards in Maine. The loading capacities are based on reasonable approaches for establishing the relationship between pollutant loading in stormwater runoff and water quality in stormwater-impaired streams. Furthermore, the TMDLs are based on analyses of site-specific monitoring data. EPA also concludes that Maine adequately documented the assumptions and strengths and weaknesses in the analytical approaches used to support the establishment of the loading capacities for % IC, Pb, and Zn, and properly accounted for critical conditions for all the TMDLs established. The bases for these conclusions are explained below.

Maine's use of surrogates is reasonable and appropriate

While TMDLs are intended to address impairments resulting from pollutants, there is nothing in EPA's regulations that forbids expression of a TMDL in terms of a surrogate for pollutant-related impairments. EPA's regulations state that TMDLs can be expressed in several ways, including terms of toxicity, which is a characteristic of one or more pollutants, or by some "other appropriate measure" 40 CFR §130.2(i). EPA's regulations also state that TMDLs may be established using a biomonitoring approach as an alternative to the pollutant-by-pollutant approach 40 CFR §130.7(c)(1). The use of a surrogate impervious cover target in place of a numeric pollutant target is appropriate in this case because the impervious cover target serves as an indicator for conditions under which the water quality criteria for aquatic life can be attained. Appendix E of the TMDL submission provides a reasonable basis for linking % IC to attainment of aquatic life criteria and uses. The use of pollutant-specific metals targets for Pb and Zn as surrogates for the suite of metals found in stormwater is appropriate in this case for reasons discussed below.

TMDL for Percent Impervious Cover (% IC)

EPA Region 1 concludes that the use of impervious cover as a surrogate for loading capacity is reasonable and appropriate. EPA Region 1 concurs with expressing the TMDL surrogate for stormwater pollutants and impacts as a % IC TMDL, based on the reasons provided by ME DEP. Compelling evidence exists for the linkage between total watershed IC and increased stormwater

runoff volume and peak discharge [1, page 37] and lower baseflows. IC increases the volume of stormwater runoff and therefore, the total pollutant load [1, page 91].

The scientific record documenting the impact of watershed urbanization on surface water quality and the integrity and diversity of aquatic communities is quite strong. Research from the mid-1990's pointed to the emergence of impervious surface coverage as a key environmental indicator [5, pages 243-258]. Scientific literature summarized in 2003 generally shows that aquatic insect and freshwater fish diversity declines at fairly low levels of impervious cover (10-15% IC), and urban land use of 33% [1, page 116]. In general, the data summaries from CWP document that stream habitat diminishes at about 10% watershed IC, and becomes severely degraded beyond 25% watershed IC[1, page 54]. Earlier research has shown that the variety of fish species drops as well [4, pages 28-31].

A more regionally specific scientific record documenting the linkage between % IC and the integrity and diversity of aquatic communities in New England is also strong, and growing. Recent study results from USGS in the New Hampshire seacoast region confirm that the percent impervious surface in a watershed can be used as an indicator of stream quality: the biological condition score was negatively correlated with the percent impervious surface [7]. In southern New England, a study of benthic monitoring sites sampled by CTDEP from 1996 to 2001 (and more recently, a group of sites selected based on a probabilistic sampling design) demonstrated a threshold effect in Connecticut small streams: as the % IC increases to approximately 12%, no applicable streams met Connecticut's aquatic life criteria [8].

Regionally, IC target-setting in both CT and ME are based on analyses of their respective state-specific biological monitoring data. Maine's analysis supports an IC target range of 10-15% for Maine Class C streams expected to attain tiered aquatic life uses [3, Table 1, page 1]. (As explained in Appendix E of the TMDL report, Maine also established different, more stringent ranges for Class A streams (<6% IC), and for Class B streams (7-10% IC).)

As discussed above (page 7), the 12% IC TMDL target specifically for Barberry Creek is further based on site-specific conditions and factors in the Barberry Creek watershed which both lessen or increase the volume of stormwater runoff. This watershed-specific TMDL of 12% IC represents a much more localized refinement for a Maine Class C stream than provided by the CWP model's broader range of 10%-25% IC as an indication of some water quality impairment (based on data from a much broader geographic and climatic range).

Maine's use of Impervious Cover Model is reasonable and appropriate

The CWP states that the IC model with a 10% IC threshold applies to small streams (1st – 3rd order) in the East Coast and Midwest [1, page 116]. Earlier research from the CWP shows the influence of impervious cover on watersheds to be *very strong* at the catchment level (0.05 to 0.50 sq. mi.), *strong* at the subwatershed level (1 to10 sq. mi.), and *moderate* at the watershed level (10-100 sq. mi.) [6 page 135]. This makes sense because in smaller watersheds, the IC is more likely to be located in proximity of the monitoring location, whereas high IC clusters in a large watershed may be located far upstream of the monitoring site, and may have no effect on the macroinvertebrates at the monitoring location. With a watershed size of 1.2 square miles (786

acres), Barberry Creek watershed in Maine falls within the category of strongly influenced by impervious cover.

EPA concludes that Maine adequately documented the assumptions and strengths and weaknesses in the modeling approach used to support the establishment of the % IC loading capacity, and explained why the model is appropriate for Barberry Creek (page 26 TMDL report). The IC model is appropriate for use in Maine for several reasons. First, the State is located in the East Coast range of applicability identified by the CWP. Second, Barberry Creek is a small stream (1^{st} – 3^{rd} order) whose watershed size falls within an appropriate range of watershed area for evaluating the influence of impervious cover on water quality. Furthermore, there are no known significant non-stormwater sources in the Barberry Creek watershed (page 26 TMDL report). For the reasons explained above, EPA believes the % IC surrogate approach is suitable for a small stream system such as Barberry Creek, where the impairment is for aquatic life, and where stormwater, with its associated pollutants and other stressors, is the cause of the impairment. Additionally, use of an impervious cover TMDL target offers an implementation advantage because IC relates directly to both the source of impairment and to BMP measures needed to restore water quality.

TMDLs for Specific Pollutants – Pb and Zn

EPA Region 1 concludes that the use of lead (Pb) and zinc (Zn) as surrogates for the array of metals usually found in stormwater runoff is reasonable and appropriate because the extensive data show that those two metals are most consistently present in stormwater. The Center for Watershed Protection compiled data from several sources on event mean concentrations (EMCs) and detection frequency for metals in urban stormwater. (1, pages 71-72 and Table 30) Analyses of the urban stormwater showed that "certain metals, such as zinc, lead, copper, cadmium, and chromium are consistently present at concentrations that may be of concern." Data also indicate that the EMCs for those metals vary regionally due to climate (with drier regions often having higher risk of exceeding trace metal concentration standards). Of these metals consistently present in stormwater, lead and zinc are the two metals most frequently detected in stormwater events, and at the highest concentrations (e.g., the mean EMC for lead ranged from 67.5 – 175 ug/l between two studies, and the mean for zinc ranged from 162-176 ug/l). (1, Table 30) For these reasons, using lead and zinc as surrogates for the array of metals usually found in stormwater runoff is reasonable.

Critical Conditions

The critical conditions for Barberry Creek are associated with storm events from developed areas which, in addition to potential immediate damage to aquatic biota, produce cumulative impacts to the biota over time. These urban/suburban storm events dramatically change watershed hydrology by affecting the quantity and quality of runoff. Urban development results in increases in stormwater runoff peaks and volumes (9), and increased frequency of runoff from smaller storms. As the amount of impervious cover in watersheds increases, greater quantities of stormwater runoff wreak havoc with the physical structure and stability of streams and the habitat for aquatic life, while increased runoff of pollutants creates water quality problems, and less base flow is available to aquatic life in streams during low flow periods. (10, page 1-1)

These higher peak volumes scour macroinvertebrates along with other stream bed materials. Lower base flows reduce the amount and extent of wetted aquatic habitat, and increase aquatic temperatures and stress on aquatic life. More frequent post-development runoff from smaller storms (that used to infiltrate or soak into pervious ground and surfaces) subject aquatic life to more frequent exposure to pollutants, and increased destabilization of stream morphology and aquatic habitat.

EPA concludes that critical conditions are adequately accounted for because the target for % IC directly addresses the effect of % IC on stormwater runoff in the watershed, and thus the range of the stormwater impacts under varying critical conditions at different flows. The critical conditions are also adequately accounted for by the loading capacity targets for the surrogate metals (Pb and Zn) because the presentation of the maximum acceptable loads (of these commonly detected metals) as a function of flow accounts for the dynamic nature of stormwater run-off volume and resulting streamflows.

TMDL Time Increment

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 TMDL's % IC targets are not explicitly expressed in terms of a daily increment. However, they are, in effect, daily targets because they will achieve reductions in stormwater runoff volume in all storm events whenever they occur (e.g., on any given day) throughout the year. (14, page 9) The pollutant-specific daily loads for the surrogate metals, lead and zinc, are expressed in terms of allowable daily load (lbs/day) for each pollutant.

EPA Region 1 also concurs with expressing the pollutant-specific TMDLs for Pb and Zn as daily loads versus streamflow volume, based on the reasons provided by ME DEP (critical conditions occurring at various flows and pollutant loads throughout the year). Maine's water quality standards require ME DEP to compute the assimilative capacity of a river or stream using "the 7-day low flow which can be expected to occur with a frequency of once in 10 years" to assure that water quality standards are met at this flow and at greater flows. ME DEP "may use a different flow rate only for those toxic substances regulated under section 420" [38 MRSA §464 (4) D]. Both Pb and Zn are toxic substances with federal water quality criteria required under §304(a) of the Clean Water Act, and are therefore regulated under §420 [38 MRSA §420], so the ME DEP is allowed to use a different flow rate. To use a flow rate other than 7Q10, ME DEP must find that the flow rate is consistent with the risk being addressed. The metals TMDLs for Barberry Creek are provided for all flows, including 7Q10 (dry weather stream flow conditions) and higher because stormwater is the source of pollutants rather than the more continuous discharges from industrial or municipal treatment facilities. Use of the full range of flows under which impacts from stormwater occur is therefore consistent with the water quality standards because aquatic life has less frequent exposure to metals from periodic stormwater discharges, and when exposure to pollutants in stormwater occurs, it will usually happen at streamflows above 7Q10.

This approach of setting the TMDL target for stormwater discharges at the in-stream pollutant

concentration as a function of stream flow is also consistent with Maine's water quality standards because the narrative standards state that "Except as naturally occurs, surface waters must be free of pollutants in concentration which impart toxicity and cause those waters to be unsuitable for the existing and designated uses of the water body." [Chapter 584 §2.] The ambient water quality criteria are established by Chapter 584 to implement the narrative criteria, and the "Aquatic life criteria are intended to assure that toxic pollutants are not present in concentrations or amounts that would cause acute and or chronic adverse impacts on organisms in, on or using the surface waters." [Chapter 584 §1.] Using the pollutant-specific ambient water quality criteria to calculate the appropriate TMDL target assures that water quality standards will be met at all times throughout the waterbody.

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.

For Barberry Creek, the TMDL loading capacity of 12% IC was reduced by 2% IC in order to provide a margin of safety (discussed below), resulting in an overall allocation target of 10% IC. The TMDL applies the 10% IC target to all stormwater drainage areas and affects all sources subject to load allocations (LA) and wasteload allocations (WLA) in the watershed (WLA=LA=10%IC). The LA relates to existing and future nonpoint sources, natural background, and stormwater runoff not subject to NPDES permitting. (See WLA discussion below.)

The 10% allocation target is based on achieving an impervious cover goal across the whole watershed. ME DEP states that it was not feasible to separate the loading contributions from nonpoint sources, background, regulated and unregulated stormwater (page 26 TMDL report), and explains that parsing out loads to each source is not possible because of the large number of diffuse stormwater point and nonpoint sources, differences in natural geologic conditions, and the wide variability in storm flows. (See WLA section below, page 14, for discussion of future sources.)

The TMDL loading capacities for the surrogate stormwater metals, Pb and Zn, were reduced by 5% in order to provide a margin of safety (discussed below), resulting in an overall allocation target of 95% of the total loading capacity. As with the %IC TMDL, the metals TMDLs apply to all stormwater drainage areas and affect all sources subject to load allocations (LA) and wasteload allocations (WLA) in the watershed. For the metals TMDLs, the LA is included in the WLA, and the WLA is equal to 95% of the loading capacity, as discussed below. As with the %IC TMDL, the 95% allocation targets are based on achieving ambient water quality criteria

across the whole watershed, under all streamflow conditions.

Assessment: Both the impervious cover and metals targets apply irrespective of the type of stormwater (nonpoint source or point source) that is generated from any given parcel of land. Since stormwater discharges are highly variable in frequency and duration, and because insufficient data are available for each parcel in the watershed, it is not feasible to establish specific % IC or metals allocations for each area that generates stormwater, nor is it feasible to draw a clear distinction among stormwater from nonpoint sources, stormwater from non-NPDES-regulated point sources, and stormwater from NPDES-regulated point sources (which require a wasteload allocation – see next section). EPA agrees that it is reasonable to address the combined loading contributions for % IC and for metals, respectively, into one allocation for each surrogate because separating the loading contributions is infeasible and because the control measures necessary to abate point and nonpoint sources of stormwater are not affected by this practice. EPA Region 1 concludes that the load allocations for % IC, Pb, and Zn are adequately specified in the TMDL at levels necessary to attain and maintain water quality standards.

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 set the Barberry Creek wasteload allocations (WLA) for MEPDES-regulated stormwater discharges at two levels, one for CSO discharges, and one for non-CSO stormwater discharges (page 27 TMDL report).

CSO Discharges

The first level is a WLA for CSOs set at **0.** The single CSO discharge in the watershed (City of South Portland) was given an allocation of zero because the CSO is scheduled for elimination under South Portland's MEPDES wastewater discharge permit.

Non-CSO Stormwater Discharges

The second level is a WLA set at **10% IC** for other stormwater discharges in the contributing watershed**.** As mentioned above, the TMDL establishes the non-CSO WLA at the same 10% IC

that was established for the LA, as a gross allotment or watershed allocation, because it was not possible to establish WLAs for individual parcels or stormwater sources. The relatively insignificant amounts of stormwater runoff from the landfill, rail yard, and Hannaford site are addressed by MEPDES MS4 general permit for any stormwater runoff entering the MS4 collection system (e.g., runoff from the former city landfill), or by MEPDES multi-sector general permit (e.g., runoff from the rail yard), or by Maine state regulation as applicable (e.g. Maine site location permit which requires stormwater treatment issued to the Hannaford warehouse facility).

DEP notes that the necessary reduction in % IC discussed in the TMDL reflects reduction from current conditions. Future development activities have the potential to increase effective impervious cover and resulting stormwater runoff and associated pollutants. To ensure that the TMDL targets are attained, future development either will need to be constructed and operated in such a way that there is no net increase in stormwater runoff, or additional reduction in effective IC will need to occur at existing sites that contribute stormwater runoff (page 45, Appendix A, TMDL report).

DEP recommends that the % IC WLA target be used to guide TMDL implementation because stormwater impacts can be reduced most effectively by reducing the volume of stormwater discharge and the effect of impervious cover in the contributing watershed (as well as using stream restoration techniques). DEP also explains that ultimate compliance with the TMDL and all of Maine's WQS will be determined by measuring instream water quality.

Assessment:

CSO Discharges

EPA agrees that establishment of a zero WLA for the CSO is reasonable. The CSO is still scheduled for removal and continues to have a zero WLA, however, the schedule has been delayed due to the need to redesign and rebid a related CSO abatement project for the Pleasantdale neighborhood. In the meantime, work completed to date in the Pleasantdale project has freed up additional interceptor capacity, so the weirs have been raised for CSO #006 to Barberry Creek, resulting in less frequent and lower volume discharges. DEP has requested re-evaluation of the project and submission of an updated schedule for CSO elimination (personal communication with John True, ME DEP CSO Coordinator, February 9, 2007). South Portland is making good progress, and the proposed abatement plan for the CSO 006 in the Barberry Creek area will be available in the City's updated Long Term Control Plan (LTCP) by the end of 2007 (personal communication with John True, ME DEP CSO Coordinator, May 9, 2007).

Non-CSO Stormwater Discharges

WLAs are required for NPDES regulated point sources of pollutants. In this case, WLAs would be needed for areas from which there are NPDES (or, in Maine, MEPDES) regulated stormwater discharges. EPA's TMDL guidance suggests that it is acceptable, in cases where data are unavailable, to allocate stormwater by gross allotments. See EPA's November 22, 2002 guidance entitled *Establishing Total Maximum Daily load (TMDL) Wasteload Allocations (WLAs).* Given the data limitations mentioned above, it is acceptable to group all NPDES eligible stormwater discharges into a common wasteload allocation target for % IC, and common

wasteload allocation targets for Pb and Zn. In addition, given the difficulty of separating out % IC and levels of metals associated with different stormwater sources (point and nonpoint, regulated and nonregulated) in this case, it is acceptable to include all sources in the one aggregate allocation for each TMDL (WLA=LA=10% IC, or WLA = 95% of PB or Zn loading capacity (and includes the LA)). Future construction projects in the watershed may be subject to the Maine stormwater permitting program and will require control of stormwater on site or potential further IC reduction by existing sources, and Maine's ambient water quality criteria must be met.

EPA Region 1 concurs that the WLA components of the TMDLs are appropriately set to assure attainment of water quality standards.

6. Margin of Safety (MOS)

The statute and regulations require that a TMDL include a margin of safety to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality (CWA § 303(d)(1)(C), 40 C.F.R. § 130.7(c)(1)). EPA guidance explains that the MOS may be implicit, i.e., incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e., expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified.

The Barberry Creek TMDLs provide two explicit margins of safety (MOS) (page 27, TMDL report), one for % IC, and one for the metals Pb and Zn.

The TMDL for percent impervious cover provides an explicit MOS of 2% IC in the contributing watershed, which is reserved from the total loading capacity of 12%. This adjustment of 2% IC is the level specified for Class C waters in Maine's guidance for setting % IC TMDL targets.[3] This 2% IC represents a 17% MOS when compared to the total loading capacity of 12% IC [MOS = (2 ÷ 12) x 100 = 16.66].

The metal TMDLs for Pb and Zn include an explicit 5% MOS which is applied to the appropriate SWQC before calculating the allowable daily wasteload allocations for Pb and Zn.

Assessment: EPA Region 1 has evaluated the margins of safety and believes that the two explicit MOS are each adequate. The MOS for %IC results in the WLA being set at the most conservative end of the suggested % IC target rang for Class C streams. ME DEP also points out that there is the mitigating presence of a riparian buffer along a substantial portion of the Creek, which adds an implicit MOS. In support of, but not part of the MOS, EPA also notes ME DEP's commitment to future monitoring, adaptive management, and a willingness to adjust the TMDL, as necessary, (based on measurement of actual physical, chemical and biological responses of the river to future pollutant loading).

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)).

ME DEP considered seasonal variations in conditions when developing the TMDL because stormwater volume and pollutant loads vary throughout the year, and because impairment to aquatic life and habitat in stormwater-impaired streams occurs at both low and high flows, with different environmental impacts (page 28, TMDL report). The TMDL was established to protect during critical conditions throughout the year. The IC target will result in reductions in the effects of IC which will improve water quality for all flows and seasonal conditions. The daily loads for Pb and Zn are expressed as a function of flow to assure SWQC are attained for all flows and seasonal conditions. In addition, specific BMPs implemented will be designed to address loadings during all seasons.

Assessment: EPA Region 1 concludes that seasonal variation has been adequately accounted for in the TMDL because the TMDL was developed to be protective year round. Seasonal fluctuations in flow, and varying contributions of pollutants from snow and rainfall runoff are taken into account. There is no need to apply different targets on a seasonal basis because the stormwater controls to be implemented to meet the IC targets will reduce adverse impacts (pollutant loading and damaging flows) for the full spectrum of storms 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.

Barberry Creek is not a phased TMDL, but the document includes a description of a monitoring plan designed to measure attainment of water quality standards. ME DEP explains that progress towards attainment of water quality standards will be evaluated by monitoring the macroinvertebrate community according to an existing rotating basin sampling schedule (next due in 2009 for this watershed) (page 20 TMDL report). Ambient water chemistry will be sampled during stormflow conditions to determine whether Maine's criteria for toxic contaminants are exceeded.

Assessment: EPA Region 1 concludes that the anticipated monitoring by and in cooperation with ME DEP is sufficient to evaluate the adequacy of the TMDL and attainment of water quality standards.

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.

ME DEP provides both specific and general implementation recommendations in the TMDL report (pages 16-20 TMDL report). Specific recommendations relate to the City of South Portland's MEPDES permit for wastewater and CSO controls. More general abatement measures are listed under different categories of best management practices (BMPs) to address stormwater, including disconnection and conversion of impervious surfaces, stream restoration techniques, as well as a list of BMPs for mitigating impacts of impervious cover in Appendix C (page 49 TMDL report). The DEP recommends using an adaptive management approach toward lessening stormwater impacts and improving water quality (page 16 TMDL report).

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

The Barberry Creek watershed is an urban MS4 area. Most stormwater sources are regulated under the MEPDES Program. As described in Sections 4 and 5, a single allocation of 10% IC, and a daily mass of pollutant as a function of stream flow are established for all sources. No point sources have been given less stringent limits assuming nonpoint source reductions, therefore, reasonable assurance is not required.

Nevertheless, ME DEP addresses reasonable assurances that point and nonpoint source reductions will occur in the following ways: by providing information on the City of South Portland's past efforts toward CSO elimination (page 12 above) to illustrate the City's past cooperation in addressing environmental issues related to wet weather; by providing extensive references to the more detailed information available on necessary remedial measures (pages 16-20 and Appendices C-D TMDL report); by encouraging coordination among specifically identified concerned parties on the development of a more specific implementation plan; and by suggesting

stakeholders involve the Cumberland County Soil and Water Conservation District and/or the DEP in their planning efforts (page 17 TMDL report).

Furthermore, in the public comments on the TMDL, CLF supported DEP's use of the IC method as "an effective tool to guide the restoration effort" (page 35 Appendix A, TMDL report). In response to other comments from CLF, ME DEP committed to "take steps necessary to ensure that water quality standards are met in Barberry Creek, including the use of enforcement tools" (page 45 Appendix A TMDL report).

Assessment: Although not required, reasonable assurance is addressed in the TMDL report and in public comments and ME DEP's response to comments. Based on the commitment of the ME DEP and its watershed partners to work together to abate adverse stormwater impacts, backed up by ME DEP's regulatory authority, EPA concludes that adequate reasonable assurance has been provided.

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 Barberry Creek TMDL is described as a phased process (pages 28-29 TMDL report). As part of "phase one", a preliminary review draft was distributed to six watershed stakeholder organizations. Then, paper and electronic copies of the public review draft report were made available on July 15, 2005, and posted on ME DEP's Internet web site. Notices of availability were also place in the Portland Press Herald on July 17 and 24, 2005. The initial (or "phase 1") public comment deadline was August 15, 2005.

A second public comment period was provided by ME DEP in order to allow for noticed public review of the ME DEP's draft guidance on setting IC TMDL targets, as well as review of changes made in the report. The second public review draft was posted on the web for public comment from July 25 to August 8, 2006, extended to August 18, 2006.

ME DEP fully addressed comments received during both phases of public comment in Appendix A of the TMDL report. A response letter dated February 21, 2007, addressing comments received from Conservation Law Foundation of Maine, was included in Appendix A (pages 41-46 TMDL report).

Assessment: EPA Region 1 concludes that ME DEP has done an adequate 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 provided reasonable responses to the public comments.

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: ME DEP's letter of February 22, 2007 states that the TMDL is being formally submitted for EPA approval.

References:

1. Center for Watershed Protection, 2003. Watershed Protection Research Monograph No.1, *Impacts of Impervious Cover on Aquatic Systems*, March 2003.

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4. Schueler, T.R., *Site Planning for Urban Stream Protection*, Metropolitan Washington Council of Government, December 1995.

5. Arnold, C.L. and C.J. Gibbons, *Impervious Surface Coverage: The Emergence of a Key Environmental Indicator*, *Journal of the American Planning Association*, vol. 62, no. 2, Spring 1996, pages 243-258.

6. Center for Watershed Protection, 1998. *Basic Concepts in Watershed Planning*, Chapter 1 from *The Rapid Watershed Planning Handbook*, October 1998, Table 1, page 135.

7. Deacon, J.R., S.A. Soule, and T.E. Smith, 2005. *Effects of Urbanization on Stream Quality at Selected Sites in the Seacoast Region in New Hampshire, 2001-03*, U.S. Geological Survey Scientific Investigations Report 2005-5103, November 15, 2005, Abstract online at http://pubs.usgs.gov/sir/2005/5103/

8. CT DEP, 2006. *Percent Impervious Cover as a Surrogate Target for TMDL Analyses in Connecticut*, December 14, 2006 draft.

9. Leopold, L.B. 1968. *Hydrology for urban land planning – a guidebook on the hydrologic effects of urban land use*. Geological Survey Circular 554. US Dep. of the Interior. Washington, DC, pp. 1-18.

10. ENSR, 2006. *Stormwater TMDL Implementation Support Manual*, ENSR Corporation March 2006. http://www.epa.gov/region1/eco/tmdl/assets/pdfs/Stormwater-TMDL-Implementation-Support-Manual.pdf

11. Roy, A.H. et al, 2005. *Investigating hydrologic alteration as a mechanism of fish assemblage shifts in urbanizing streams.* J.N. Am. Benthol. Soc., 2005, 24(3):656-678.

12. ME DEP, 2006. *Maine Stormwater Best Management Practices Manual*, Maine Department of Environmental Protection, No. DEPLW0738, January 2006. http://www.maine.gov/dep/blwq/docstand/stormwater/stormwaterbmps/index.htm

13. ME DEP Rule, Chapter 579, *Classification Attainment Evaluation Using biological Criteria for Rivers and Streams*. May 2003.

14. CT DEP, 2007. *A Total Maximum Daily Load Analysis for Eagleville Brook, Mansfield, CT.* February 8, 2007

Data for entry in EPA's National TMDL Tracking System						
TMDL Name	**Barberry Creek (1 segment)**					
Number of TMDLs*	3					
Type of TMDLs*	Stormwater					
Lead State	Maine (ME)					
TMDL Status	Final					
Individual TMDLs listed below						
TMDL Segment name	TMDL Segment ID #	TMDL Pollutant ID# & name	TMDL Impairment Cause(s)	Pollutant endpoint	Unlisted ?	MEPDES Point Source & ID#
Barberry Creek	ME0106000105_610R09	705 (Pollutants in urban stormwater	Aquatic life criteria	ME narrative and numeric aquatic life criteria for Class C streams (% IC is surrogate for pollutants in stormwater)		City of South Portland WWTP - ME0100633 MEPDES MS4 General Permits effective June 3, 2003
Barberry Creek	ME0106000105_610R09	18 (Lead (Pb))	Aquatic life criteria	0.41 ug/l Lead (PB)		City of South Portland WWTP - ME0100633 MEPDES MS4 General Permits effective June 3, 2003
Barberry Creek	ME0106000105_610R09	21 (Zinc (Zn))	Aquatic life criteria	27.1 ug/l Zinc (Zn)		City of South Portland WWTP - ME0100633 MEPDES MS4 General Permits effective June 3, 2003
TMDL Type	Point & Nonpoint Source (Stormwater)					
Cycle (list date)	2004					
Establishment Date (approval)*	June 21, 2007					
EPA Developed	No					
Towns affected*	South Portland, ME					