R1: Summary of Maine's Barberry Creek TMDL for Biological Impairments Using Impervious Cover as Surrogate

Impairment/Pollutant/Sources: Barberry Creek is listed as impaired for non-attainment of Maine's Class C aquatic life standards. Maine Department of Environmental Protection (ME DEP) 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. The major source of stormwater are from the City of South Portland (regulated by MEPDES stormwater general permit), and overland runoff from a highly urbanized drainage area. 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. ME DEP also addressed pollutant-specific loads through the use of Pb and Zn as surrogate measures of the array of metals in stormwater runoff, in order to establish another link between water quality and pollutants in stormwater.

Water Quality Target: *Aquatic Life Criteria:* Barberry Creek is impaired for aquatic life use designation for Class C waters. 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. *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.

Loading Capacity: 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. 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. Based on site-specific data, ME DEP also used lead (Pb) and zinc (Zn) as surrogates for an array of metals usually found in stormwater runoff. The loading capacities for Pb and Zn are presented as daily loads. These targets provide ambient water quality criteria-based daily pollutant loads to complement the % IC targets.

Load and Wasteload Allocation/Margin of Safety: For Barberry Creek, the TMDL loading capacity of 12% IC was reduced by 2% IC in order to provide a margin of safety, 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 It was not feasible to separate the loading contributions from nonpoint sources, background, regulated and unregulated stormwater. 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. 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 loadings 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.

Implementation/Monitoring Plan: Implementation of remedial measures will occur under an adaptive management approach in which certain measures are implemented, their outcome evaluated, and future measures selected so as to achieve maximum benefit based on new insights gained. The TMDL outlines the options available for BMPs aimed at stream restoration techniques, and disconnection and conversion of impervious surfaces. Maine DEP will evaluate the progress towards attainment of Maine's water quality standards by monitoring the macroinvertebrate community in Barberry Creek under the Biomonitoring Unit's existing rotating basin sampling schedule. At the same time, water chemistry samples during stormflow conditions will be collected to detect in-stream sediment trends and determine whether acute criteria of the Main Statewide Water Quality Criteria for certain toxic contaminants are exceeded.

TMDL document can be found on ME DEP's website at:
http://www.maine.gov/dep/blwq/docmonitoring/impairedwaters/TMDL/2007/barberry_ck_rep.pdf
EPA region 1 contact is Jennie Bridge, bridge.jenny@epa.gov
EPA region 1 Approval Notification Document for the TMDL can be found at:
http://www.epa.gov/region01/eco/tmdl/assets/pdfs/me/barberrycreek.pdf