

Massachusetts Department of Transportation
Semi Annual Submittal under MassDOT's Impaired Water Program

Attachment 5: Less than 9% Impervious Cover Assessments

MA51-12 West River including West River Pond (MA51177)

Impaired Waters Assessment for West River (MA51-12) Including Former Segment West River Pond (MA51177): <9% Impervious Cover in Contributing Watershed

Impaired Water Bodies

Name: West River (MA51-12)

Location: Uxbridge, Northbridge, and Upton

Water Body ID: MA51-01

Impairments

West River (MA51-12) is listed under Category 5, "Waters requiring a TMDL", on MassDEP's final *Massachusetts Year 2012 Integrated List of Waters* (MassDEP, 2013). According to this list, West River is impaired for the following:

- aquatic plants (macrophytes)
- cadmium
- chloride
- copper
- lead
- (non-native aquatic plants*)
- nutrient/eutrophication biological indicators
- low pH

According to MassDEP's final *Massachusetts Year 2012 Integrated List of Waters*, West River Pond (MA51177) is now considered run-of-the-river with West River (MA51-12).

Relevant Water Quality Standards

Water Body Classification: Class B / Warm Water Fishery

Applicable State Regulations:

- *314 CMR 4.05 (5) (c) Nutrients.* Unless naturally occurring, all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses and shall not exceed the site specific criteria developed in a TMDL or as otherwise established by the Department pursuant to 314 CMR 4.00. Any existing point source discharge containing nutrients in concentrations that would cause or contribute to cultural eutrophication, including the excessive growth of aquatic plants or algae, in any surface water shall be provided with the most appropriate treatment as determined by the Department, including, where necessary, highest and best practical treatment (HBPT) for POTWs and BAT for non POTWs, to remove such nutrients to ensure protection of existing and designated uses. Human activities that result in the nonpoint source discharge of nutrients to any surface water may be required to be provided with cost effective and reasonable best management practices for nonpoint source control.

- **314 CMR 4.05 (5)(e) Toxic Pollutants.** All surface waters shall be free from pollutants in concentrations or combinations that are toxic to humans, aquatic life or wildlife. For pollutants not otherwise listed in 314 CMR 4.00, the National Recommended Water Quality Criteria: 2002, EPA 822R-02-047, November 2002 published by EPA pursuant to Section 304(a) of the Federal Water Pollution Control Act, are the allowable receiving water concentrations for the affected waters, unless the Department either establishes a site specific criterion or determines that naturally occurring background concentrations are higher. Where the Department determines that naturally occurring background concentrations are higher, those concentrations shall be the allowable receiving water concentrations. The Department shall use the water quality criteria for the protection of aquatic life expressed in terms of the dissolved fraction of metals when EPA's 304(a) recommended criteria provide for use of the dissolved fraction. The EPA recommended criteria based on total recoverable metals shall be converted to dissolved metals using EPA's published conversion factors. Permit limits will be written in terms of total recoverable metals. Translation from dissolved metals criteria to total recoverable metals permit limits will be based on EPA's conversion factors or other methods approved by the Department. The Department may establish site specific criteria for toxic pollutants based on site specific considerations.
- **314 CMR 4.05 (3)(b) 1 Dissolved Oxygen.** Shall not be less than 6.0 mg/l in cold water fisheries and not less than 5.0 mg/l in warm water fisheries. Where natural background conditions are lower, DO shall not be less than natural background conditions. Natural seasonal and daily variations that are necessary to protect existing and designated uses shall be maintained.
- **314 CMR 4.05 (3)(b) 2 Temperature.**
 - o a. Shall not exceed 68°F (20°C) based on the mean of the daily maximum temperature over a seven day period in cold water fisheries, unless naturally occurring. Where a reproducing cold water aquatic community exists at a naturally occurring higher temperature, the temperature necessary to protect the community shall not be exceeded and the natural daily and seasonal temperature fluctuations necessary to protect the community shall be maintained. Temperature shall not exceed 83°F (28.3°C) in warm water fisheries. The rise in temperature due to a discharge shall not exceed 3°F (1.7°C) in rivers and streams designated as cold water fisheries nor 5°F (2.8°C) in rivers and streams designated as warm water fisheries (based on the minimum expected flow for the month); in lakes and ponds the rise shall not exceed 3°F (1.7°C) in the epilimnion (based on the monthly average of maximum daily temperature);
 - o b. natural seasonal and daily variations that are necessary to protect existing and designated uses shall be maintained. There shall be no changes from natural background conditions that would impair any use assigned to this Class, including those conditions necessary to protect normal species diversity, successful migration, reproductive functions or growth of aquatic organisms;
- **314 CMR 4.05 (3)(b) 3 pH.** Shall be in the range of 6.5 through 8.3 standard units but not more than 0.5 units outside of the natural background range. There shall be no change from natural background conditions that would impair any use assigned to this Class.

Site Description

These water bodies are located in the towns of Uxbridge, Northbridge, and Upton. They potentially receive direct discharge from MassDOT urban roadways.

Assessment under BMP 7U

A Total Maximum Daily Load (TMDL) has not been developed for West River (MA51-12) or West River Pond (MA51177). Therefore, MassDOT assessed these impairments using the approach described in BMP 7U of MassDOT's Storm Water Management Plan. As described in BMP 7U's Description of MassDOT's Application of Impervious Cover Method (MassDOT Application of IC Method, MassDOT 2011), impervious cover (IC) provides a measure of the potential impact of stormwater on many impairments.

MassDOT's Application of the Impervious Cover Method

MassDOT's IC Method applies many aspects of USEPA Region I's Impervious Cover Method described in USEPA's *Stormwater TMDL Implementation Support Manual* (ENSR, 2006) to MassDOT's Impaired Waters Assessment Program. The MassDOT IC method assesses potential stormwater impacts on the impaired water and evaluates the impervious cover reduction required to ensure that stormwater is not the cause of the impairments. Consistent with findings of USEPA and others, when the impervious cover for a watershed exceeds 10% a decline in stream quality occurs and that severe impairment can be expected when the IC exceeds 25%. Alternatively, the Center for Watershed Protection states that the influence of IC on the receiving waters when the watershed is in the range of 1-10 percent impervious "is relatively weak compared to other potential watershed factors". Therefore USEPA chose a 9% target (1 point less than 10%) as the value at which stormwater impairments are no longer a significant source of pollutants (CWP, 2003). MassDOT also chose to use the 9% impervious cover target for its IC Method analysis. Additional information regarding this method is provided in MassDOT's Application of IC Method document (MassDOT, 2011).

To be conservative, MassDOT did not rule out water bodies based on the IC value of the total watershed and instead based Table 1 on those water bodies where the local watershed contributing to the impaired segment (referred to as the subwatershed in this analysis) is equal to or less than the 9% target.

The subwatershed to the impaired water body was delineated using the USGS Data Series 451. Impervious cover data was available as part of the USGS data layers Data Series 451 and MassGIS's impervious surfaces data layer. MassDOT calculated the subwatershed to West River (MA51-12) is less than 9% impervious cover as shown in Table 1. Therefore, as described in the MassDOT IC Method stormwater is not a likely cause of the impairments to this water body.

Table 1. Impaired Waters Addressed by IC Method with <9% IC in Watershed

MA51-12	West River	8.1%
MA51177	West River Pond**	8.1%

**West River Pond is considered run-of-the-river with West River

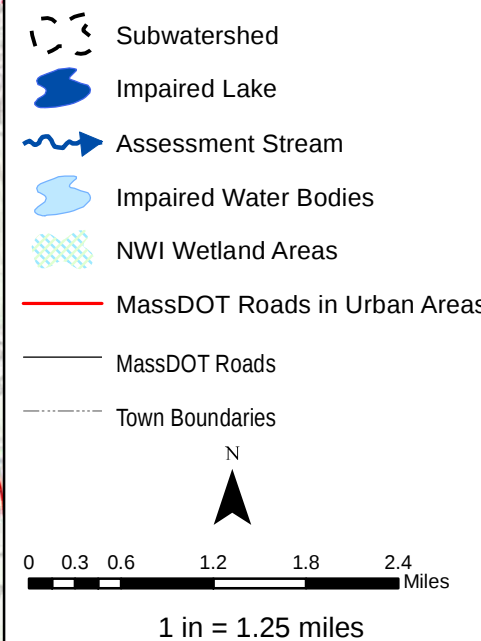
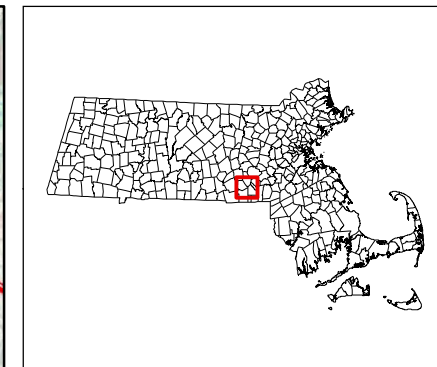
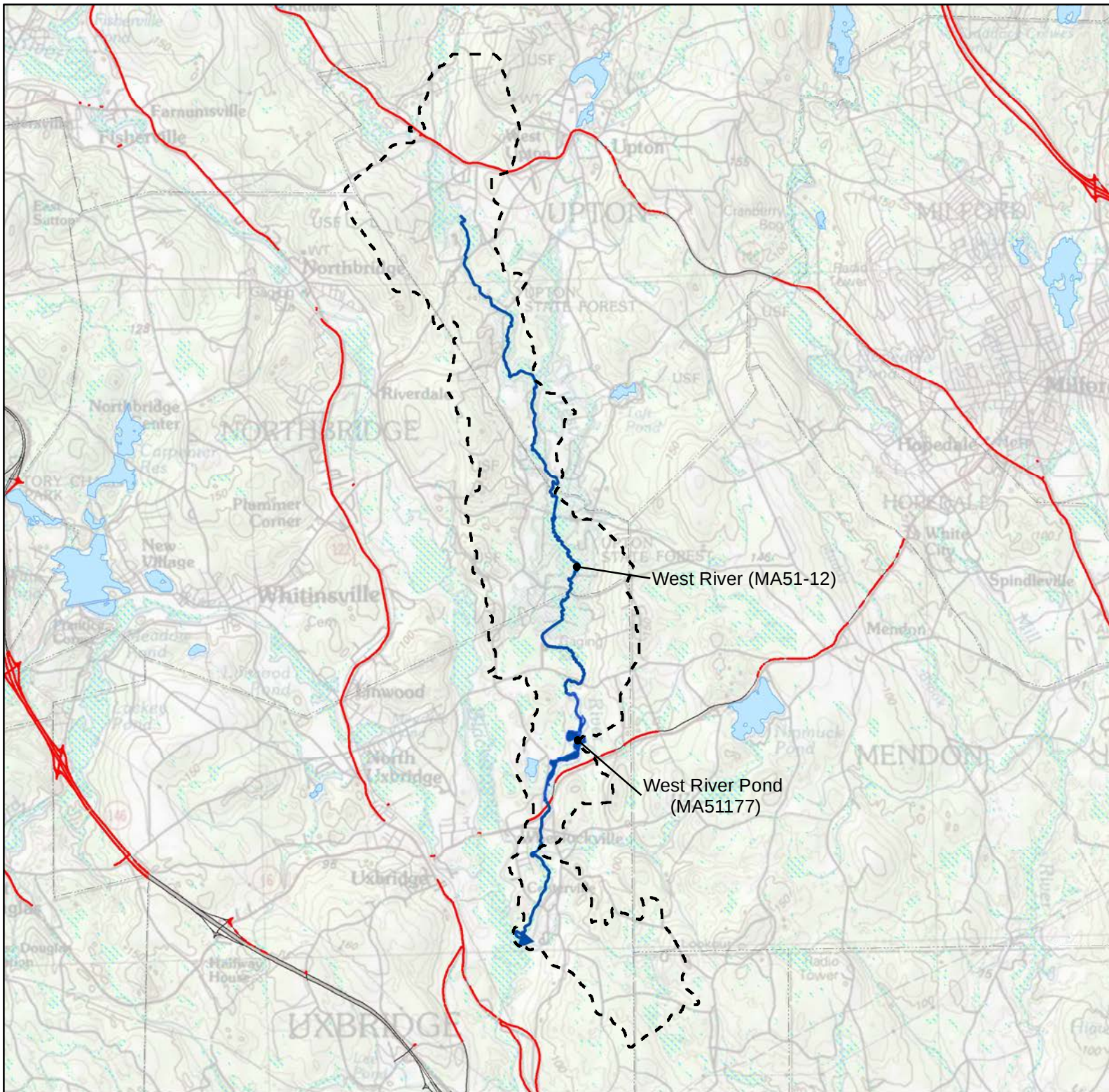
Conclusions

MassDOT has concluded, using the IC Method, that there is no required reduction in impervious area for the water bodies listed in Table 1 because the percent of impervious cover within the subwatershed is equal to or less than the 9% maximum IC target. This indicates that stormwater from this watershed is not likely the cause of the impairments. Therefore, further assessment of these water bodies is not warranted under the Impaired Waters Program.

MassDOT will continue to identify opportunities to implement additional structural BMPs to address pollutant loading when road work is conducted under MassDOT's Programmed Projects Initiative portion of the Impaired Waters Program. Work on programmed projects, which often include broader scale road layout changes, may provide additional opportunities for construction of new treatment BMPs. This is consistent with an iterative adaptive management approach to address impairments. Furthermore, MassDOT will continue to implement the measures outlined in its Storm Water Management Plan (SWMP) to minimize the impacts of stormwater from its property.

References

- Center for Watershed Protection (CWP). 2003. Impact of Impervious Cover on Aquatic Systems. Watershed Protection Research Monograph No. 1. Ellicott City, MD.
- ENSR. (2006). Stormwater TMDL Implementation Support Manual for US Environmental Protection Agency Region 1. ENSR International & USEPA Region 1, Boston, MA. Project No.: 10598-001-500. Retrieved from:
<http://www.epa.gov/region1/eco/tmdl/pdfs/Stormwater-TMDL-Implementation-Support-Manual.pdf>
- Massachusetts Department of Environmental Protection (MassDEP). (2013). Massachusetts Year 2012 Integrated List of Waters - Final Listing of the Condition of Massachusetts' Waters Pursuant to Sections 305(b), 314 and 303(d) of the Clean Water Act. Retrieved from:
<http://www.mass.gov/eea/docs/dep/water/resources/07v5/12list2.pdf>
- Massachusetts Department of Transportation (MassDOT). (2011). Description of MassDOT's Application of Impervious Cover Method in BMP 7U (MassDOT Application of IC Method).



West River (MA51-12) and West River Pond (MA51177) Subwatershed

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