

Attachment 2:

Less than 9% Impervious Cover Assessments

Impaired Waters Assessment for Impaired Waters with <9% Impervious Cover in Contributing Watershed

Impaired Water Bodies

The list of impaired water bodies covered by this assessment is included in Table 1.

Impairments

Impairments included under this assessment methodology include those typically associated with storm water runoff from impervious cover. Impairments for specific water bodies are listed in Table 1 for each water body as listed on MassDEP's *Massachusetts Year 2010 Integrated List of Waters* (MassDEP, 2011).

Relevant Water Quality Standards

This assessment covers a wide range of impairments related to a variety of water quality standards. Relevant Water Quality Standards can be found on MassDEP's website:

<http://www.mass.gov/dep/service/regulations/314cmr04.pdf>

Site Description

This assessment applies to the water bodies listed in Table 1. These water bodies are located across the state and have various impairments that could potentially be related to storm water. They potentially receive direct discharge from MassDOT urban roadways.

Assessment under BMP 7U

A Total Maximum Daily Load (TMDL) has not been developed for the impairments for the water bodies listed in Table 1. 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 storm water 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 storm water impacts on the impaired water and evaluates the impervious cover reduction required to ensure that storm water 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 storm water 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.

Figure 1 illustrates the flow chart steps from the MassDOT’s Application of IC Method document that are addressed by this assessment. 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 (Step 2).

The subwatershed to the impaired water body was delineated using the USGS Data Series 451. When USGS Data Series did not delineate the subwatershed of the water body under review, the GIS shapefiles were modified based on USGS topography to add specificity. Impervious cover data was available as part of the USGS data layers Data Series 451 and MassGIS’s impervious surfaces data layer. For the water bodies listed in Table 1, MassDOT calculated that each subwatershed had less than 9% impervious cover. Therefore, as described in the MassDOT IC Method storm water is not a likely cause of the impairments to these water bodies.

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 storm water 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 storm water from its property.

References

CWP, Center for Watershed Protection. 2003. Impact of Impervious Cover on Aquatic Systems. Watershed Protection Research Monograph No. 1. Ellicott, 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). (2011). Massachusetts Year 2010 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/dep/water/resources/10list6.pdf>

Massachusetts Department of Transportation (MassDOT). (2011). Description of MassDOT's Application of Impervious Cover Method in BMP 7U (MassDOT Application of IC Method).

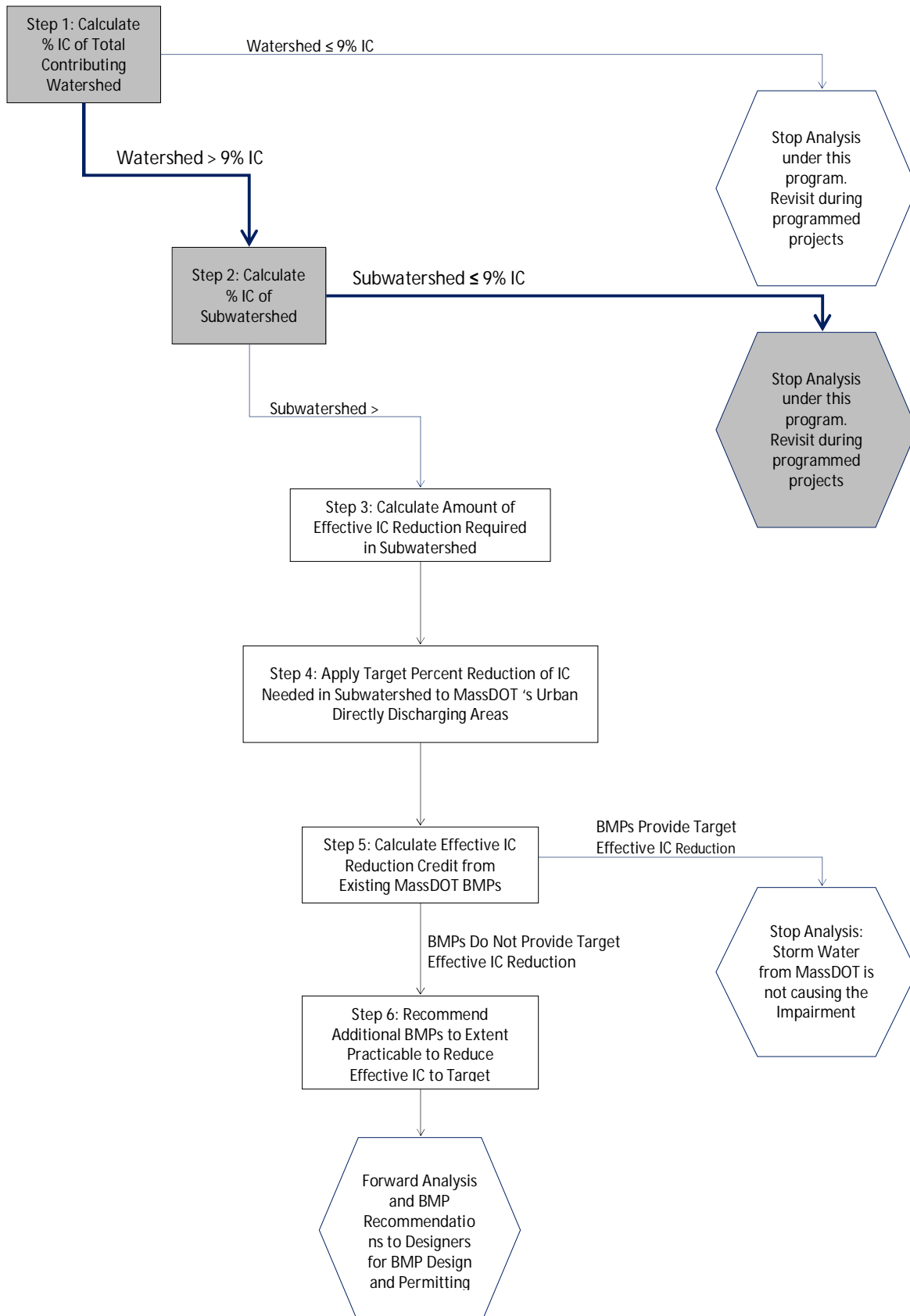
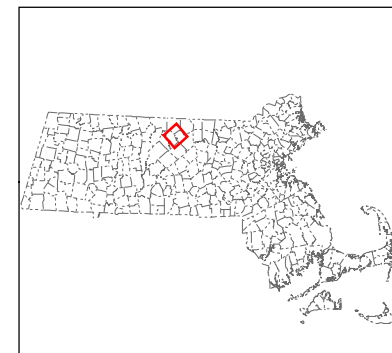
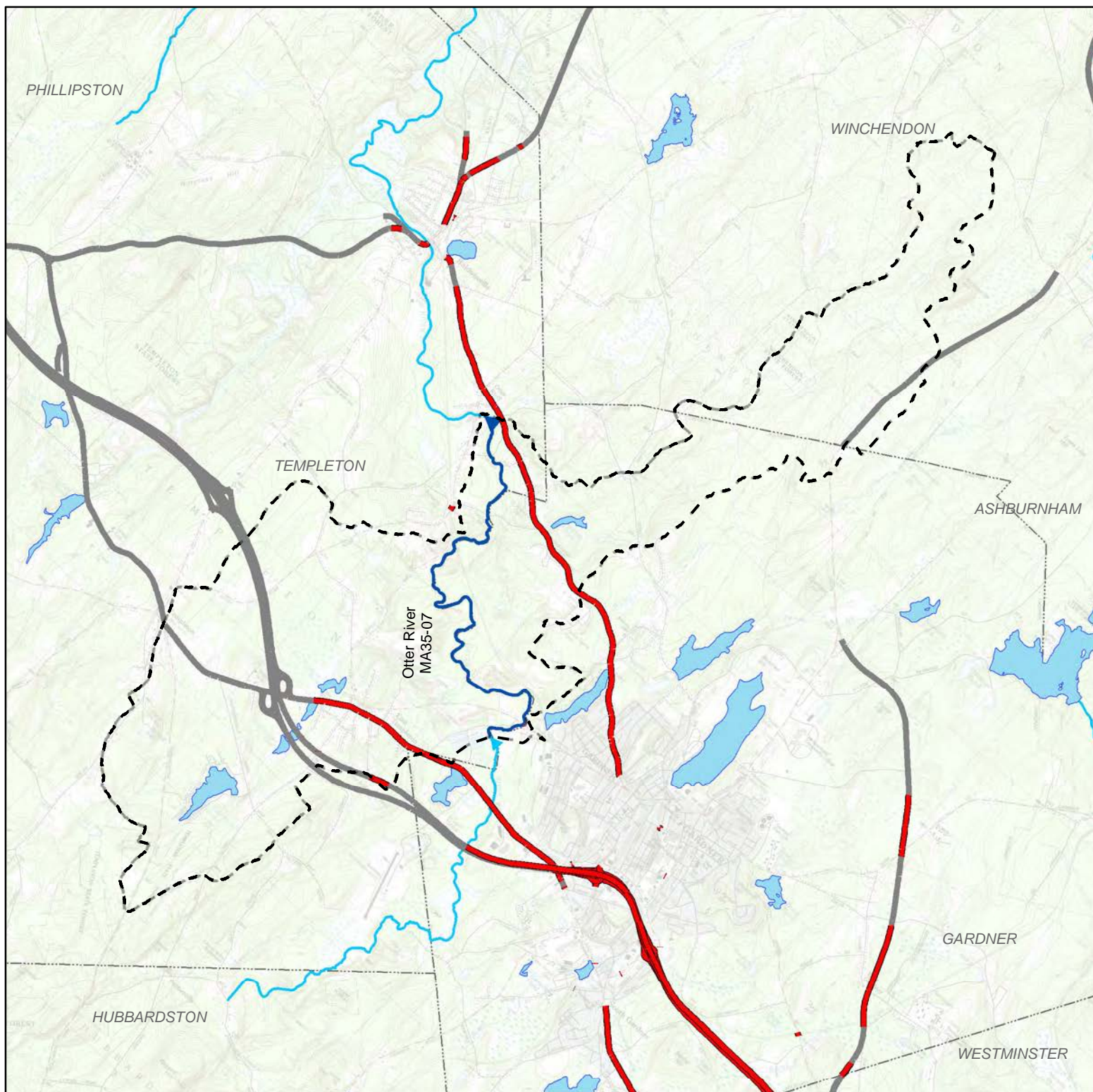
Figure 1 MassDOT's Application of the IC Method


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

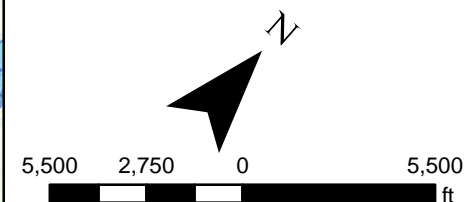
Waterbody ID	Waterbody Name	Impairments of Concern (2010)**	% IC in Subwatershed
MA35-07	Otter River	Turbidity, Nutrient/Eutrophication Biological Indicators, Fishes Bioassessments, Aquatic Macroinvertebrate Bioassessments	8.0%
MA36-11	Sevenmile River	NA	7.3%
MA36056	Eames Pond	Oxygen, Dissolved	6.9%
MA41-06	Cady Brook	(Low flow alterations*), Nutrient/Eutrophication Biological Indicators	8.8%
MA81-07	Nashua River	Phosphorus (Total), Aquatic Macroinvertebrate Bioassessments	8.6%
MA81-19	Squannacook River	NA	5.3%
MA91-08	Mill River	Aquatic Macroinvertebrate Bioassessments	7.6%
MA94-18	Bound Brook	(Fish-Passage Barrier*), Turbidity	5.9%
MA94-28	Aaron River	(Fish-Passage Barrier*), Excess Algal Growth, (Non-Native Aquatic Plants*)	5.0%
MA11019	Cheshire Reservoir, South Basin	(Non-Native Aquatic Plants*), Excess Algal Growth, (Eurasian Water Milfoil, Myriophyllum spicatum*)	3.6%
MA32021	Congamond Lakes	Oxygen, Dissolved, (Eurasian Water Milfoil, Myriophyllum spicatum*)	7.7%
MA72122	Uncas Pond	Oxygen, Dissolved, (Non-Native Aquatic Plants*)	7.0%
MA81098	Partridge Pond	Aquatic Plants (Macrophytes), Turbidity, (Non-Native Aquatic Plants*)	3.4%
MA93080	Upper Banjo Pond	Turbidity, Aquatic Plants (Macrophytes)	0.4%

*Non-pollutant according to MA DEP 303d Year 2010 Integrated List of Waters

**Impairments listed on the MA DEP 303d Year 2010 Integrated list of Waters



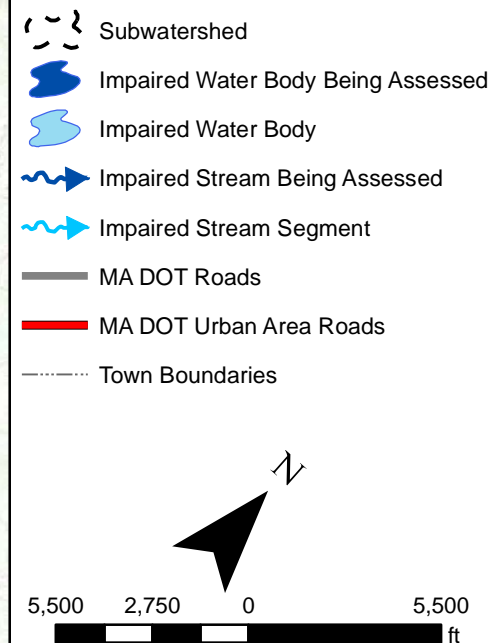
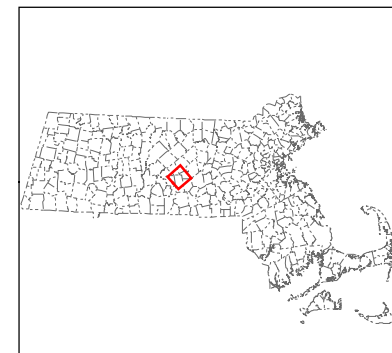
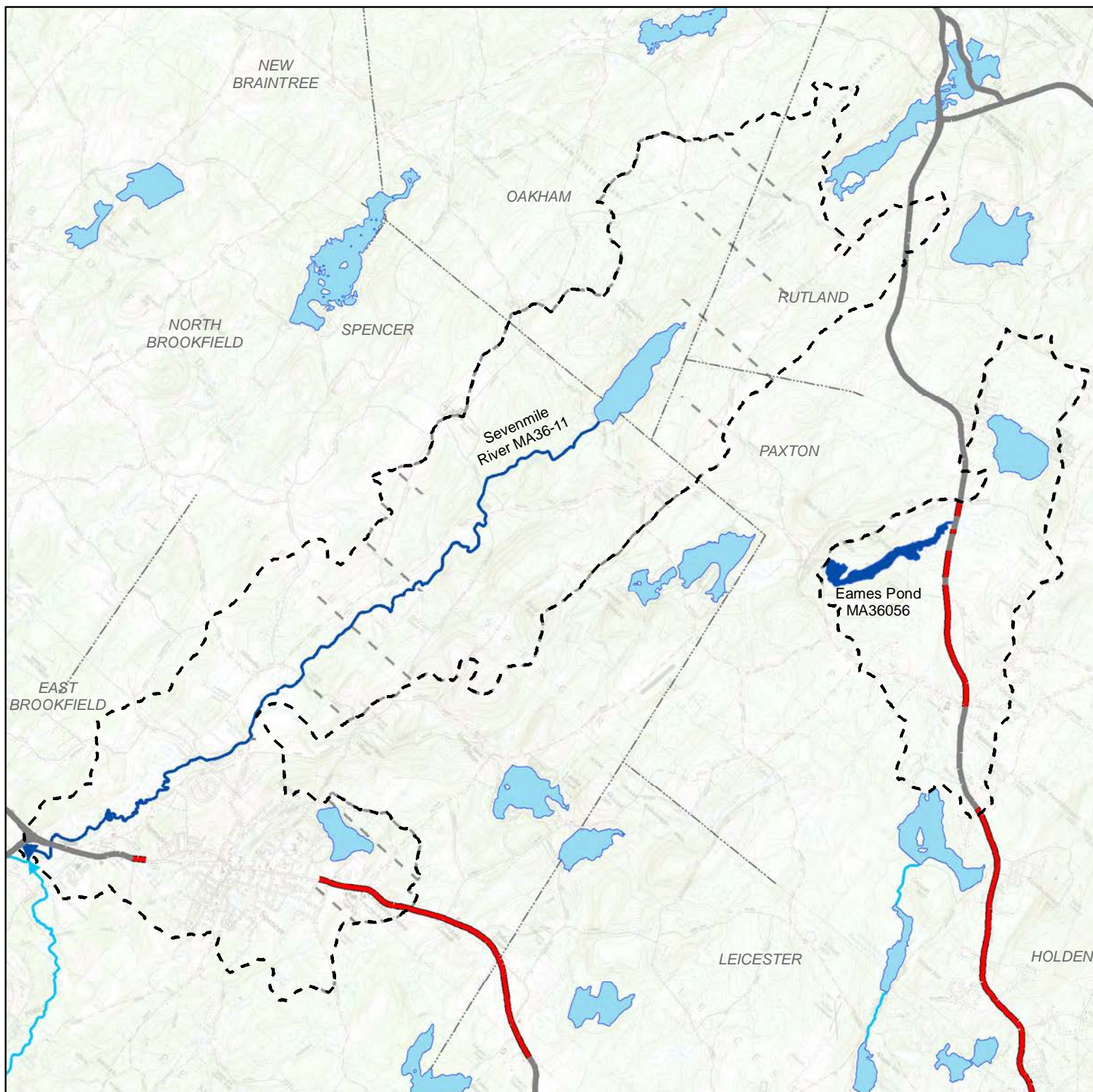
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- Impaired Water Body Being Assessed
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- Impaired Stream Being Assessed
- Impaired Stream Segment
- MA DOT Roads
- MA DOT Urban Area Roads
- Town Boundaries



MA35-07

Otter River

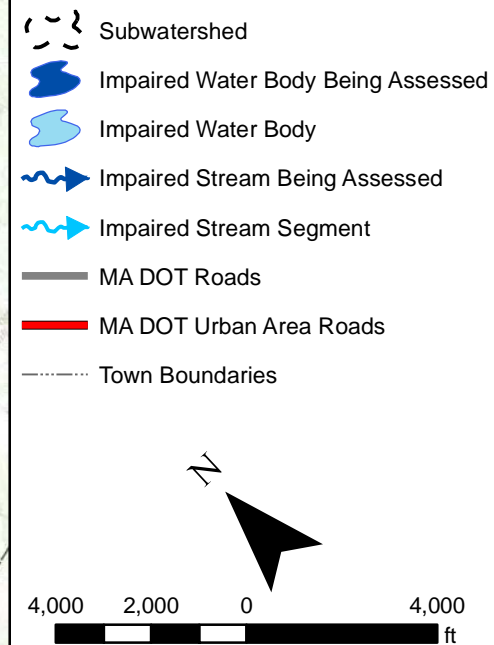
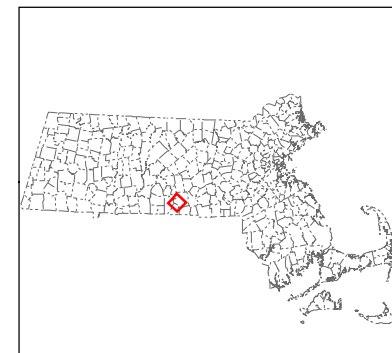
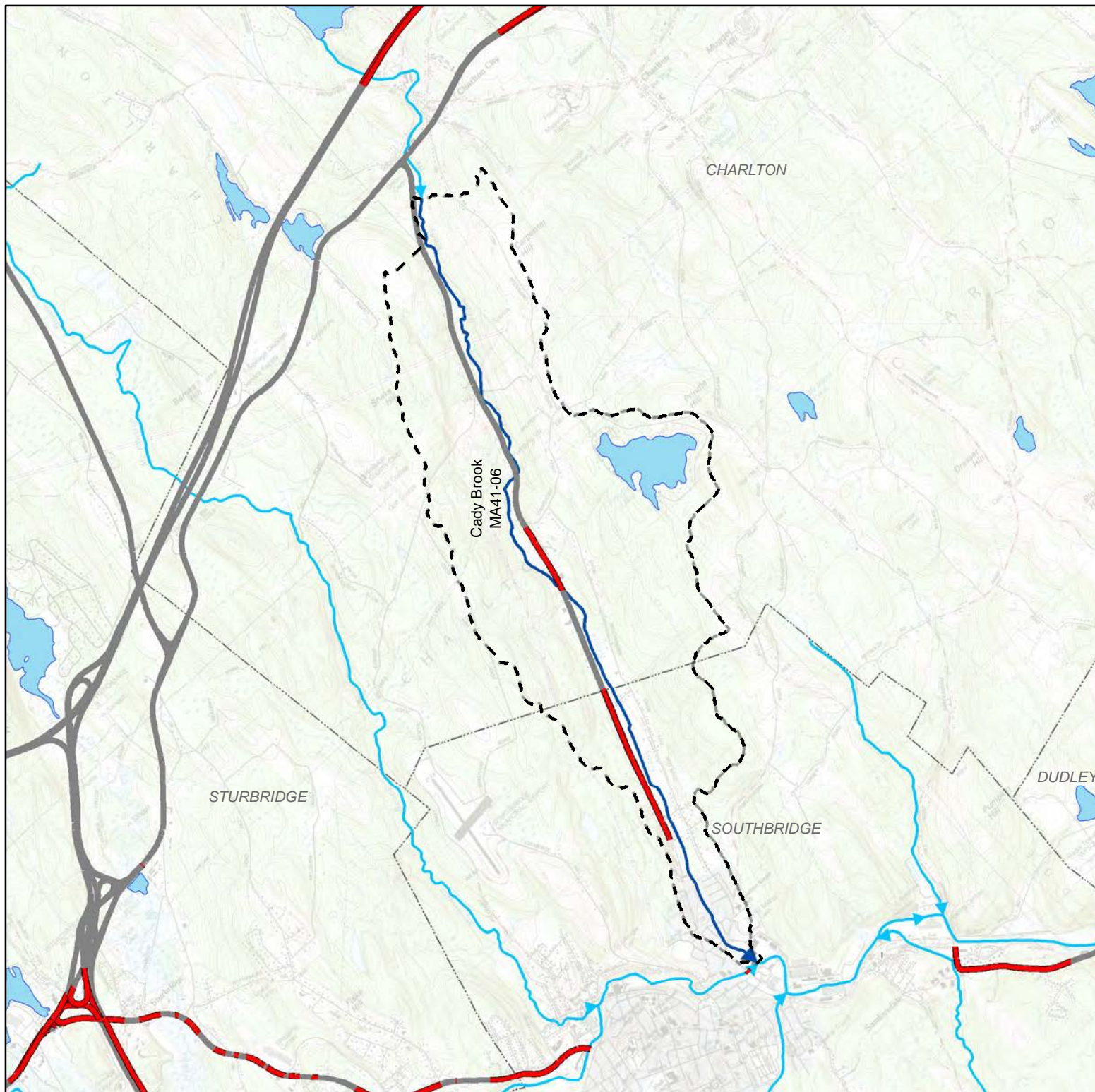
June 2012



MA36-11 and MA36056

**Sevenmile River
and Eames Pond**

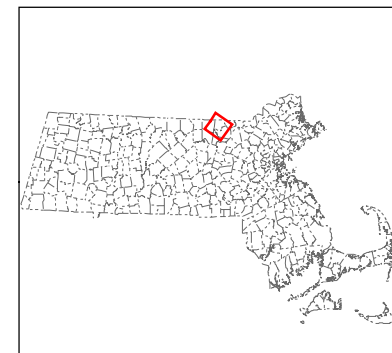
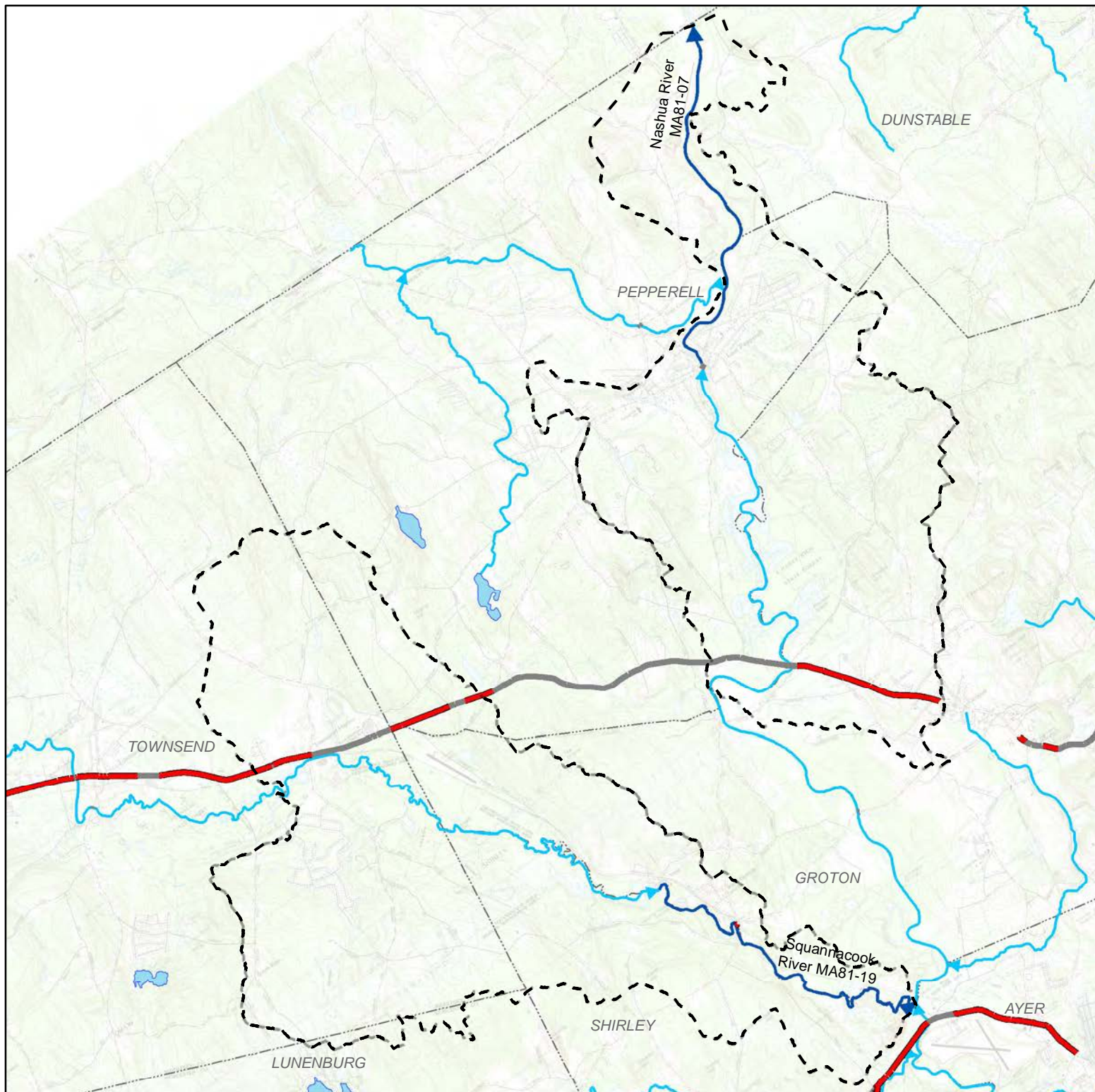
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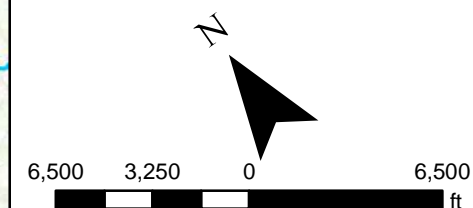
MA41-06

Cady Brook

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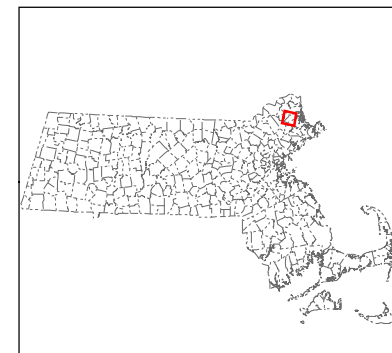
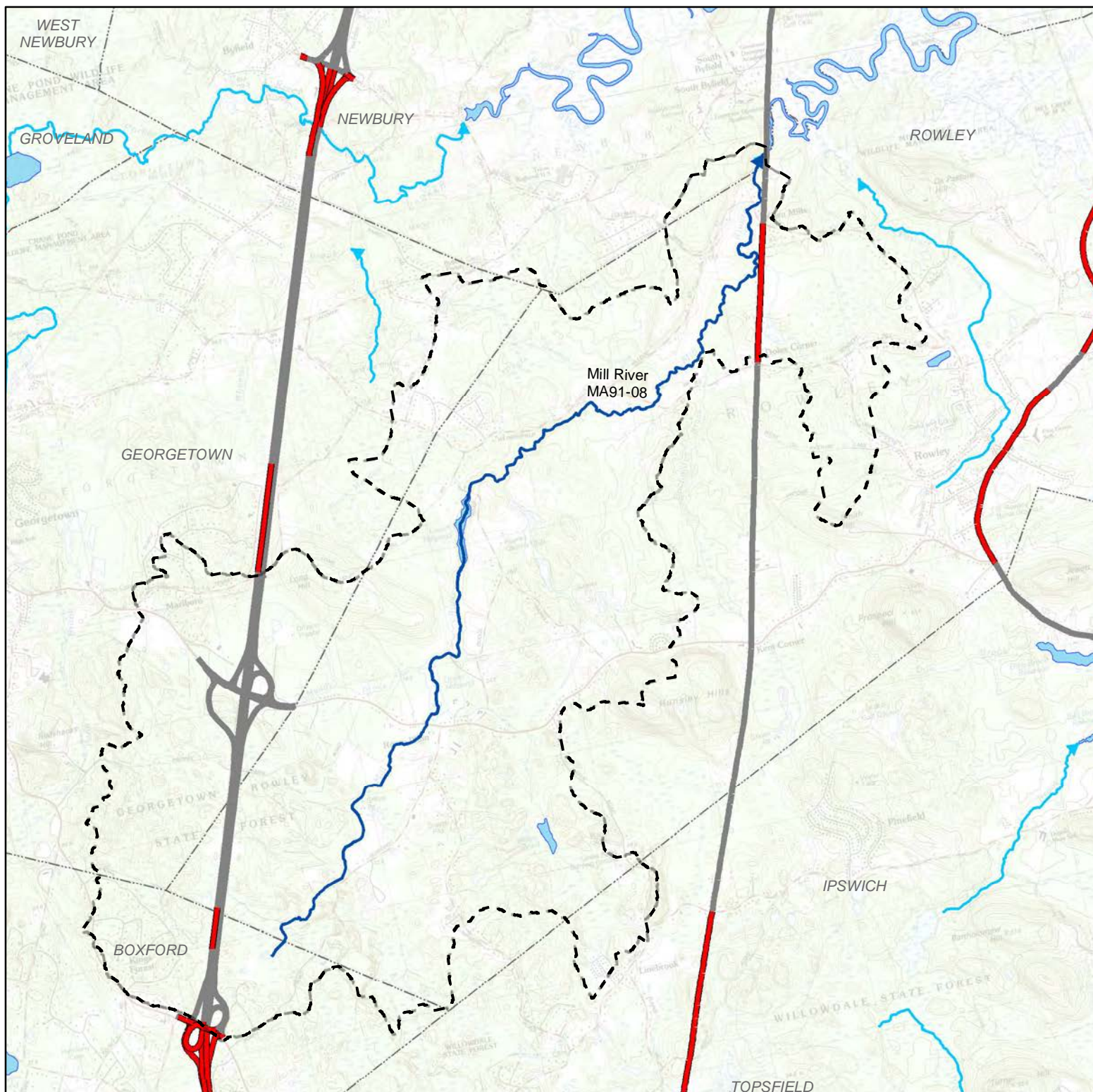
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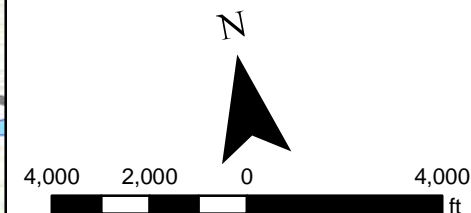
MA81-19 and MA81-07

**Squannacook River
and Nashua River**

June 2012



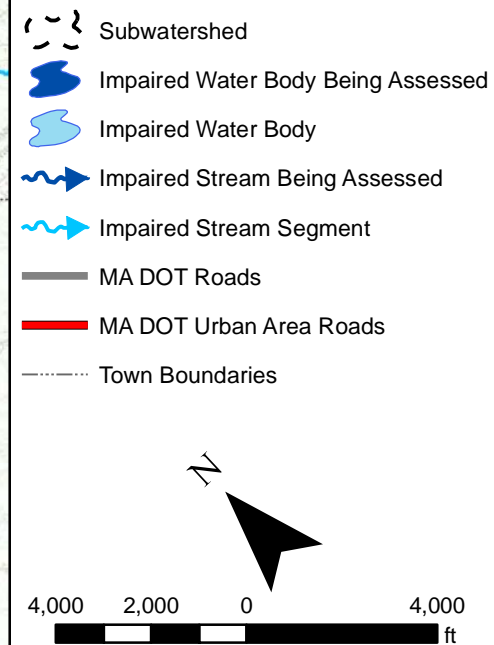
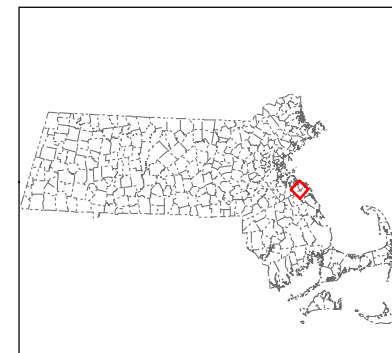
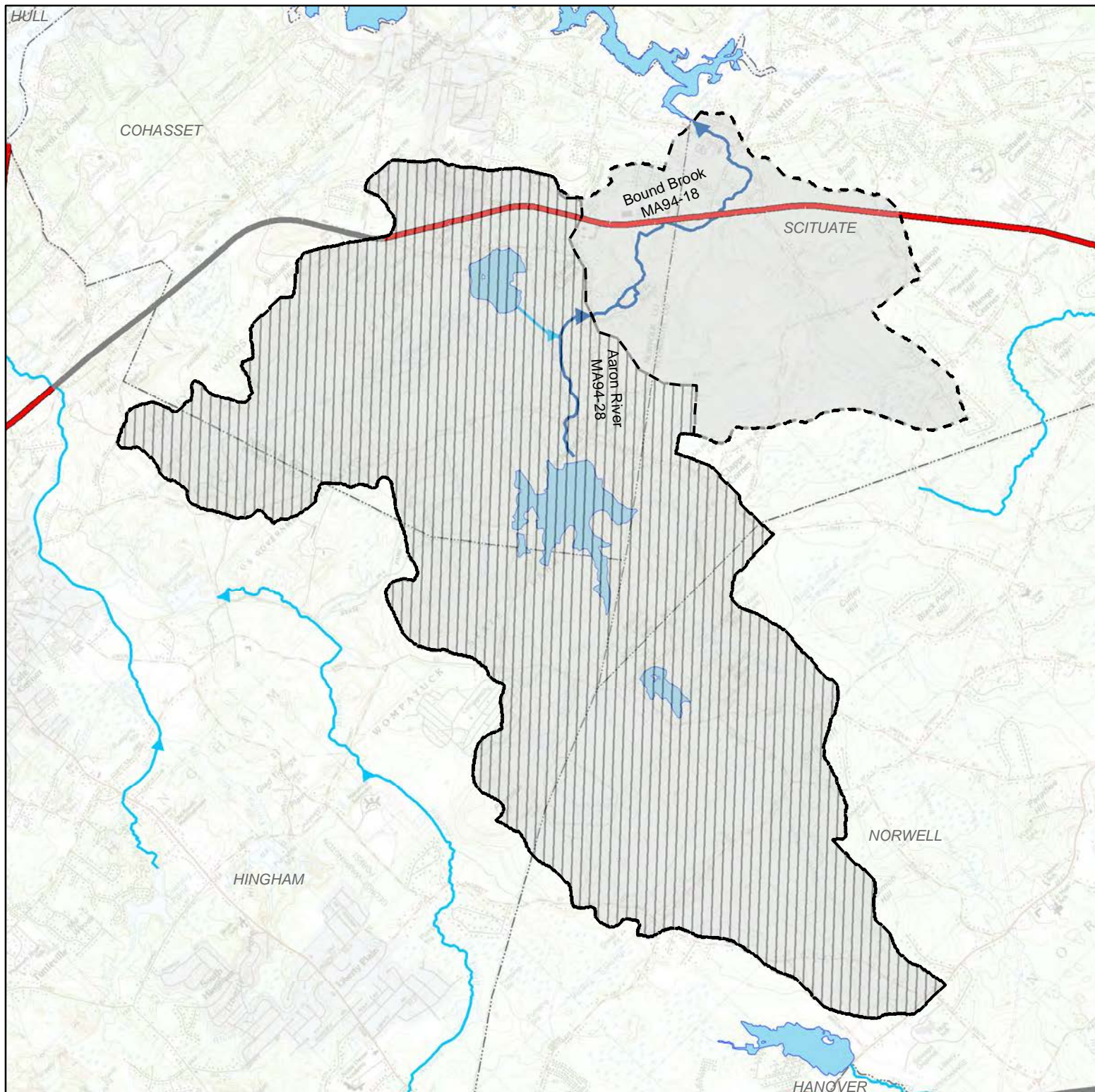
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MA91-08

Mill River

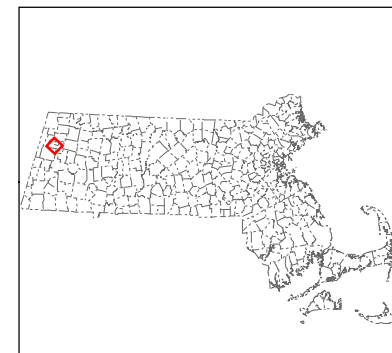
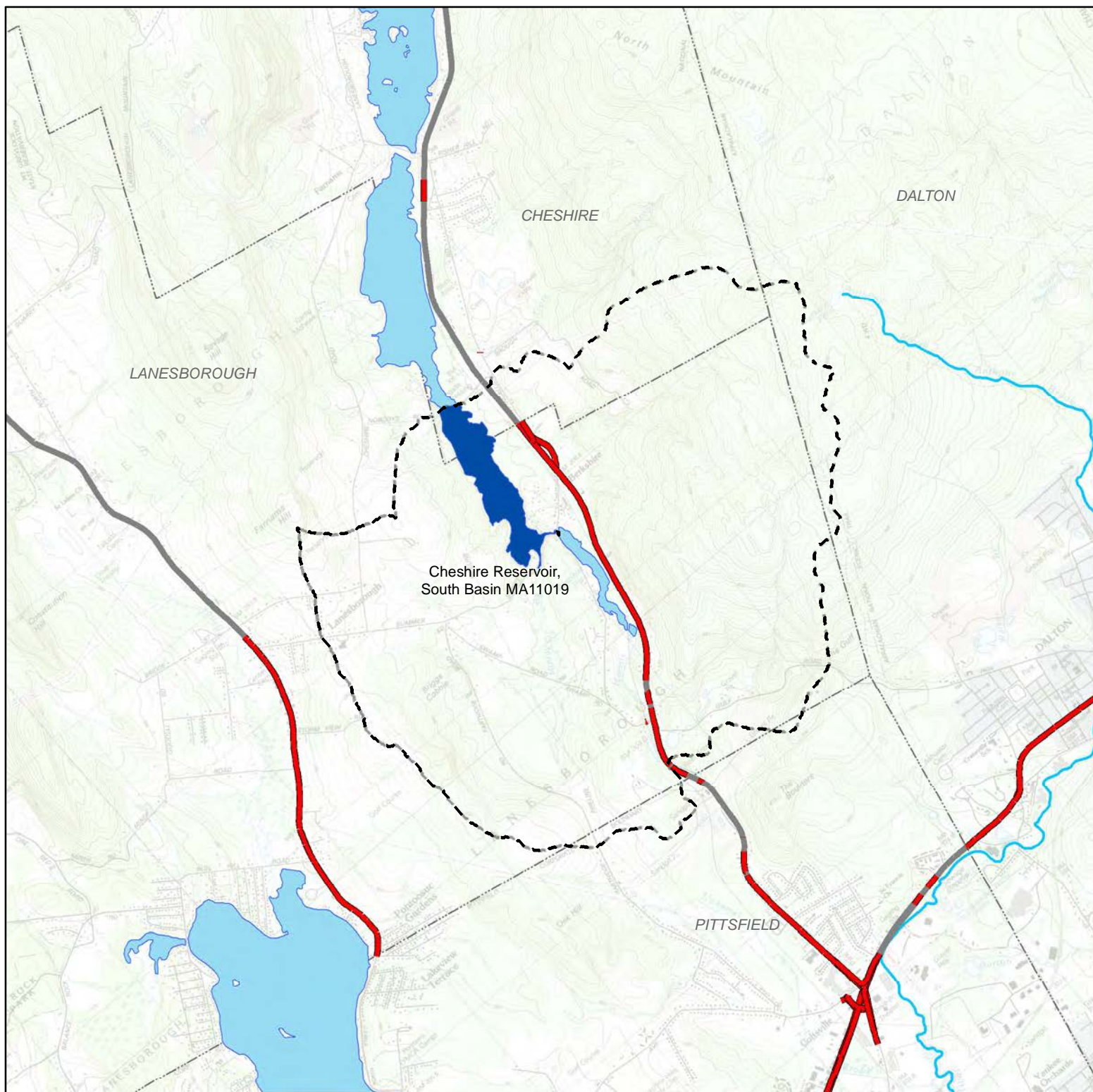
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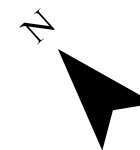
MA94-28 and MA94-18

**Aaron River and
Bound Brook**

June 2012



- Subwatershed
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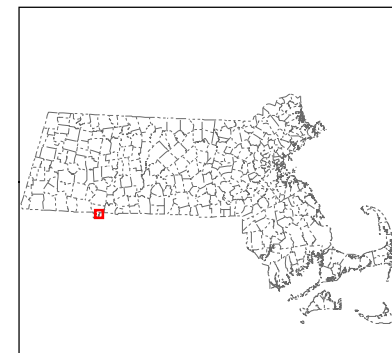
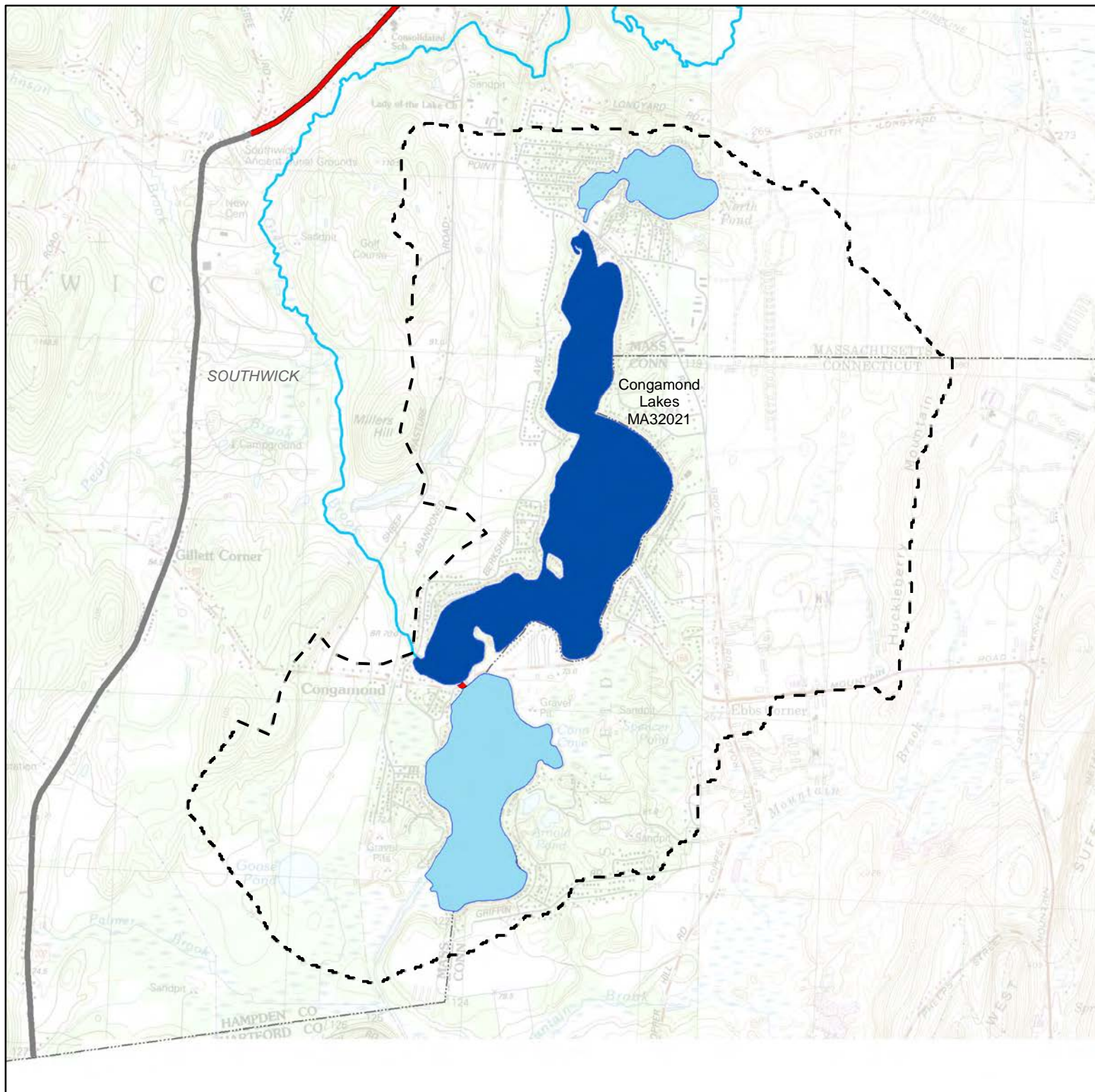


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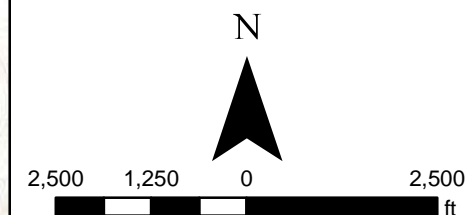
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**Cheshire Reservoir
(South Basin)**

June 2012



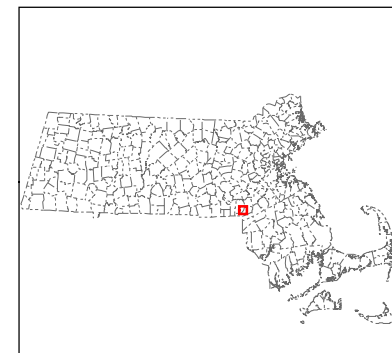
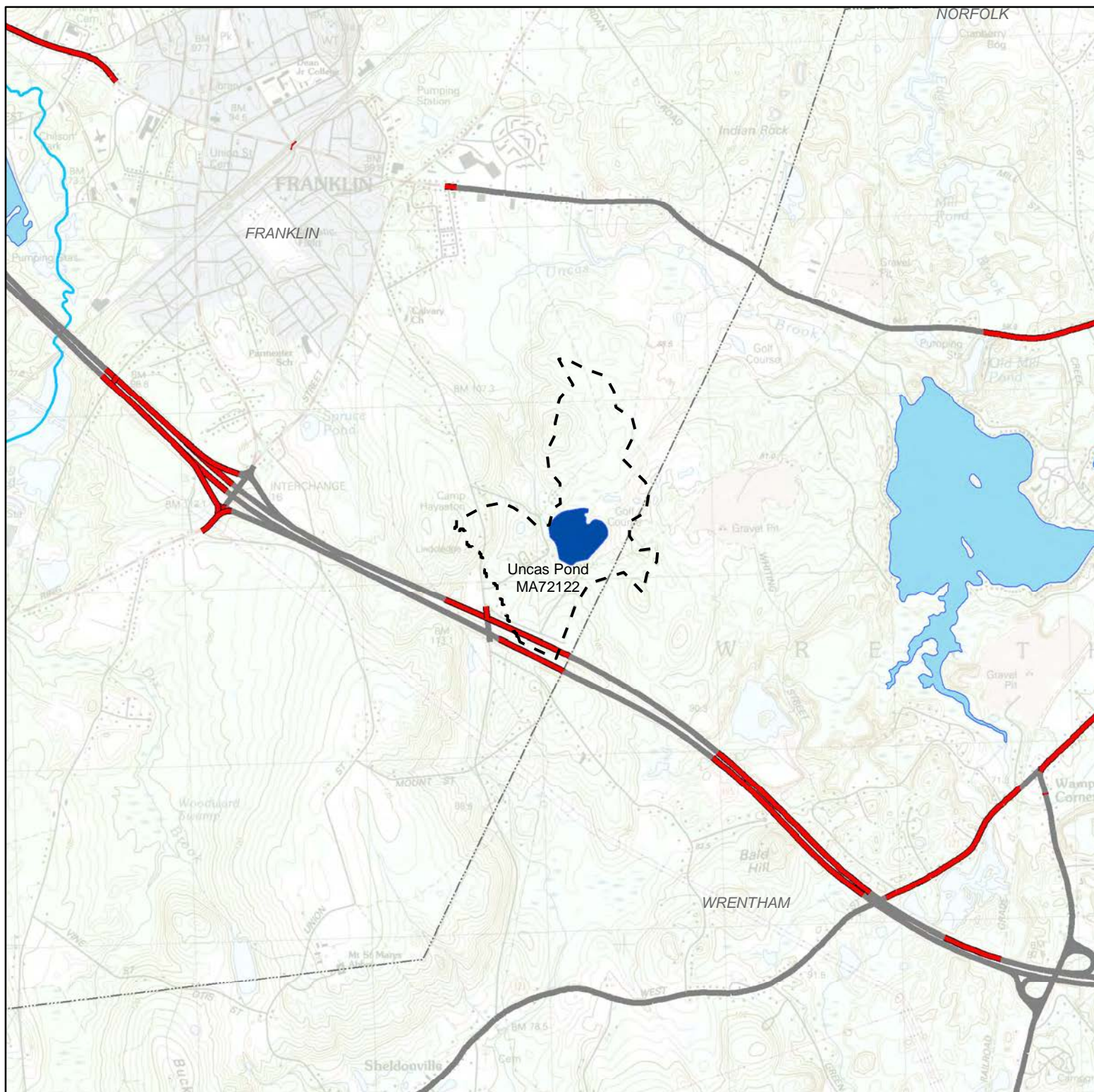
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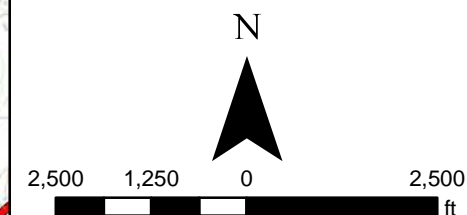
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Congamond Lakes

June 2012



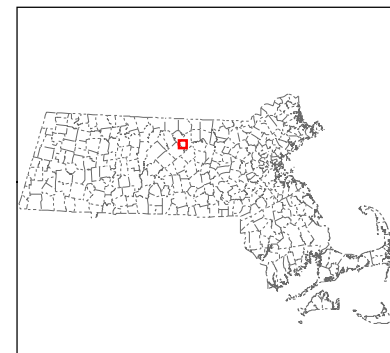
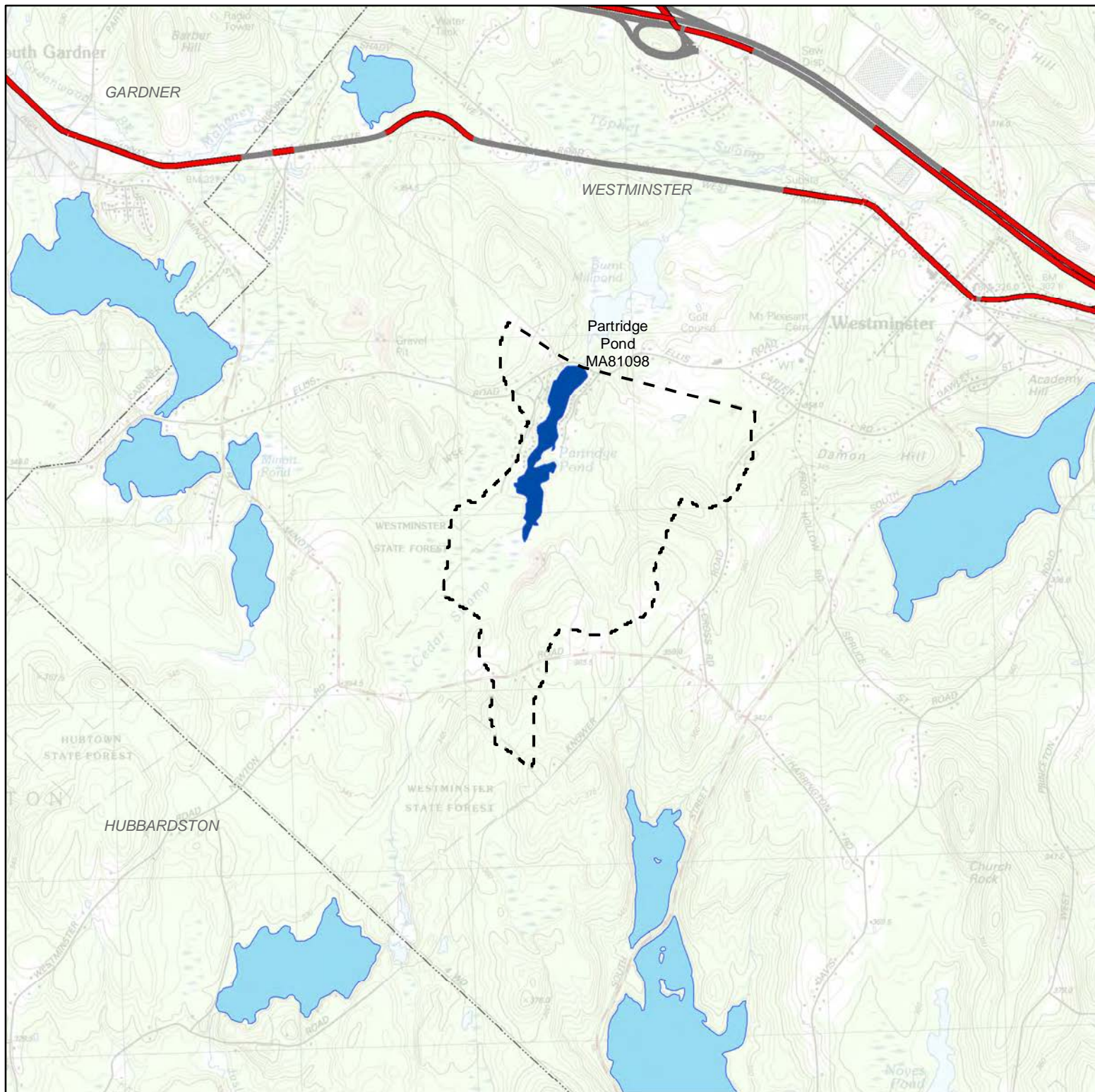
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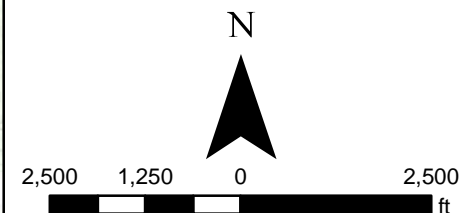
MA72122

Uncas Pond

June 2012



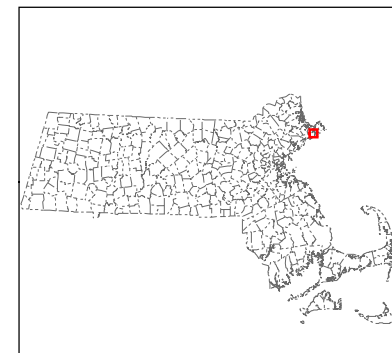
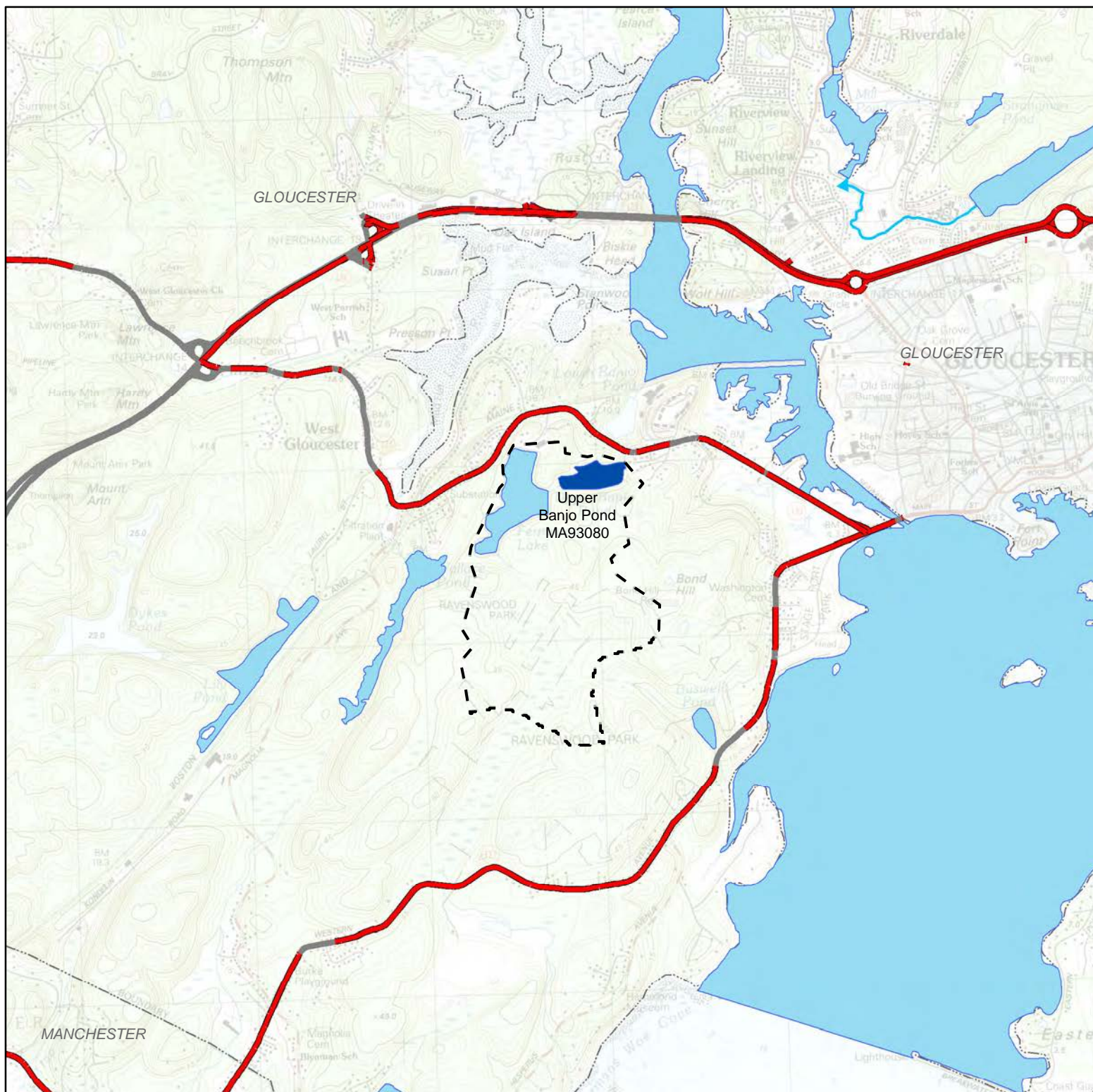
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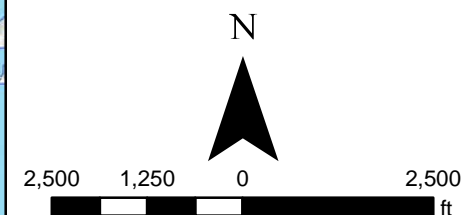
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Partridge Pond

June 2012



- Subwatershed
- Impaired Water Body Being Assessed
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MA93080

Upper Banjo Pond

June 2012