Information Session – Draft Maximum Extent Practicable Guidance for Replacement Stream Crossings

MassDEP and
UMass – Amherst

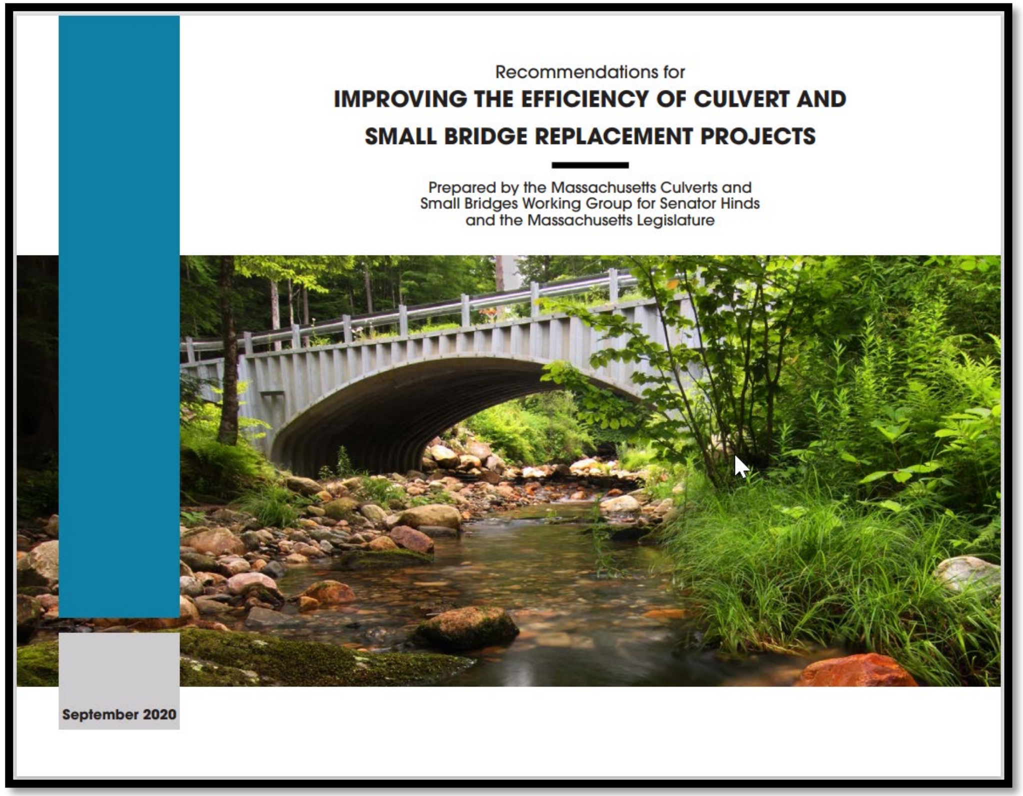
February 19, 2025

Information Session Agenda

- Guidance Development Timeline (MassDEP)
- Regulations (MassDEP)
- Problem Statement (UMass- Amherst)
- Stream Crossing Standards Review (UMass-Amherst)
- MEP Guidance Overview (UMass-Amherst)

Work Group Recommends the Development of Regulatory Presumptions

- *Improving the Efficiency of Culvert and Small Bridge Replacement Projects* identified the problems and recommended solutions
- Recommended next steps (7 in total) included adopting regulatory presumptions and/or providing condensed review for projects achieving certain standards to identify the most appropriate replacement crossing structure size



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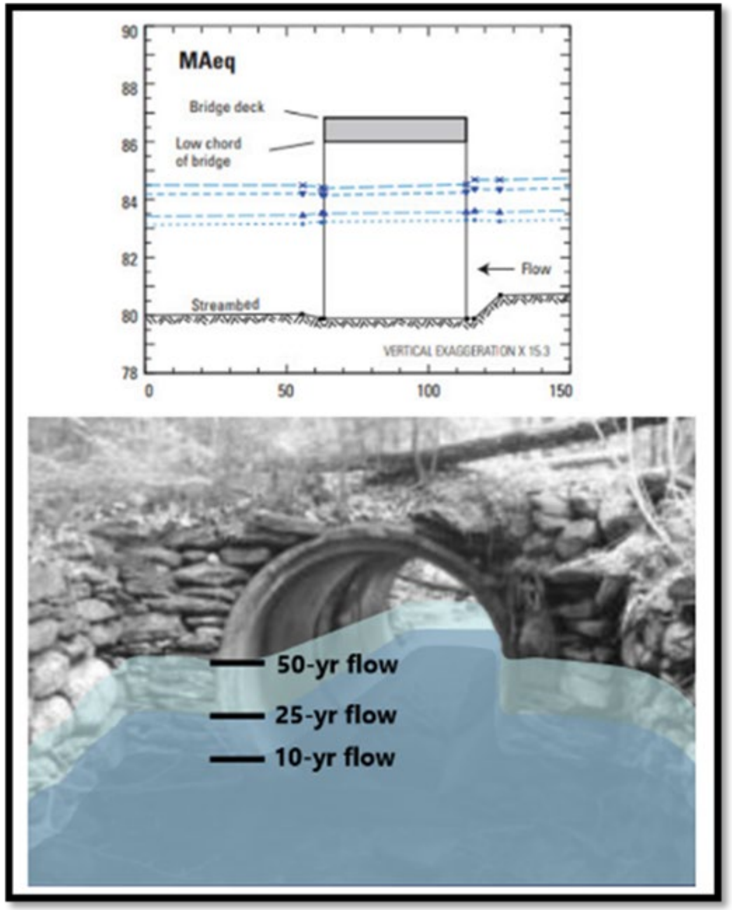
Development Schedule[1] of the Draft Guidance Document

- 2020 – Culverts and Small Bridges Work Group
- 2021 – Internal Policy Deliberation between MassDEP and EEA
- 2021 / 2022 – Advisory Meetings and Individual Meetings with MassDOT
- 2023 – MassDEP Region Review / Comment Reconciliation
- Summer 2024 – MassDER Review and Comment Reconciliation



[1]Concurrent with the Development of the Statewide Hydraulic Model as a Stream Crossing Planning Tool: https://www.usgs.gov/centers/new-england-water-science-center/science/a-statewide-hydraulic-modeling-tool-stream

Draft MEP Guidance and Stream Crossing Tool Presentations

- 2022 - Advisory Group and DOT-specific Meetings and Internal Briefings
- 2023 - 01 - 04 - New Hampshire Stream Crossing Steering Committee
- 2023 - 04 - 05 - EPA/USGS Science Day
- 2023 - 04 - 26 - National Association of Wetland Managers
- 2023 - 07-12 - Silver Jackets
- 2023 - 11 - 02 - MassFM
- 2023 - 12-14 - Water Resource Commission
- 2024 - 03-02 - MACC Conference
- 2024 - 03-17 - GSA (Geology Society of America) – Northeastern Section Meeting Presentation
- 2024 - 03 - 25 - AWRA Geospatial Water Technology Conference
- 2024 - 04 - 21 & 23 - NEAFWA Conference
- 2024 - 10 - 15 MACC Conference
- 2024 - 11 - 12 NEBAWWG / NAWM / NEIWPCC

Massachusetts Stream Crossing Regulations Summary

- New Stream Crossings - 310 CMR 10.54(4)(a)6 & 10.56(4)(a)(5)
  - *Massachusetts River and Stream Crossing Standards* developed by the River and Stream Continuity Partnership

- Replacement Stream Crossings - 310 CMR 10.53(8)(a)
  - Maximum Extent Practicable Standard requires evaluation of 12 metrics including engineering design constraints, stream stability, and cost.

310 CMR 10.53(8) – MEP for Replacement Stream Crossings

(8) Any person proposing the replacement of an existing stream crossing shall demonstrate to the Issuing Authority that the impacts of the crossing have been avoided where possible, and when not possible have been minimized and that mitigation measures have been provided to contribute to the protection of the interests identified in M.G.L. c. 131, § 40. An applicant will be presumed to have made this showing if the project is designed as follows:

(a) If the project includes replacement of an existing non-tidal crossing, the applicant demonstrates to the satisfaction of the Issuing Authority that the crossing complies with the Massachusetts Stream Crossing Standards to the maximum extent practicable.

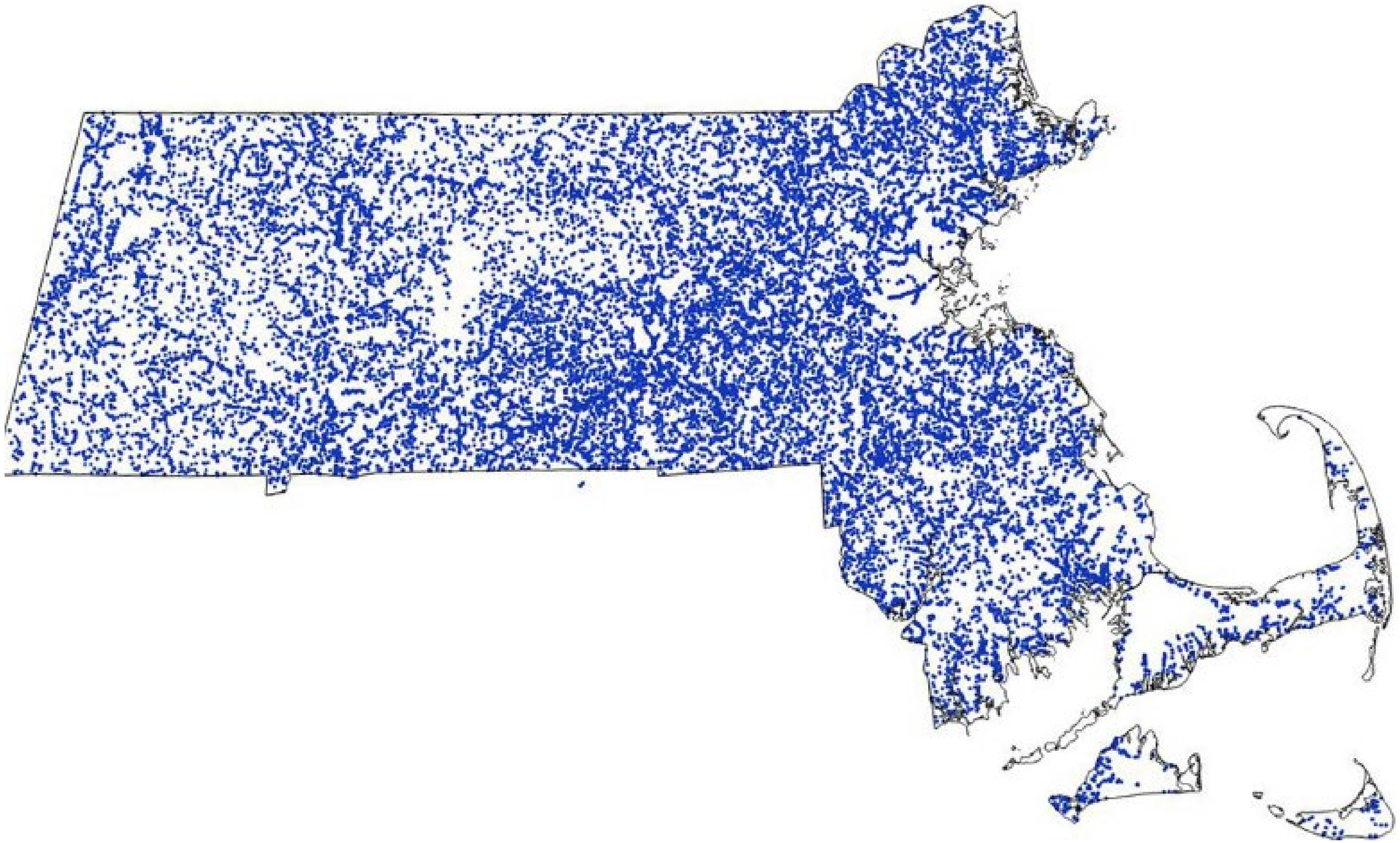
(b) If the project includes replacement of an existing tidal crossing that restricts tidal flow, the applicant demonstrates to the satisfaction of the Issuing Authority that tidal restriction will be eliminated to the maximum extent practicable.

This presumption may be rebutted by credible evidence from a competent source that the impacts of the project have not been avoided, minimized or mitigated to the maximum extent practicable.

At a minimum, in evaluating the potential to comply with the standards to the maximum extent practicable the applicant shall consider site constraints in meeting the standard, undesirable effects of risk in meeting the standard and the environmental benefit of meeting the standard compared to the cost by evaluating the following:

- The potential for downstream flooding;
- Upstream and downstream habitat (in-stream habitat, wetlands);
- Potential for erosion and head-cutting;
- Stream stability;
- Habitat fragmentation caused by the crossing;
- The amount of stream mileage made accessible by the improvements;
- Storm flow conveyance;
- Engineering design constraints specific to the crossing;
- Hydrologic constraints specific to the crossing;
- Impacts to wetlands that would occur by improving the crossing;
- Potential to affect property and infrastructure; and
- Cost of replacement.

Thousands of culverts in MA, many undersized and need replacement over the next two decades



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Poorly Designed Culverts Disrupt Aquatic Organism Passage

Undersized culverts create high water velocities, scour, and outlet drops that impede the upstream movements of fish and other aquatic organisms.

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Wetlands Values:
8 Interests of the Act

Private & Public Water Supply

Groundwater Protection

Pollution Prevention

Flood Prevention

Prevention of Storm Damage

Land Containing Shellfish

Fisheries

Wildlife Habitat

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Addressing MA Wetlands Protection Act Interests for Crossing Replacements

Minimum Hydraulic Design Criteria

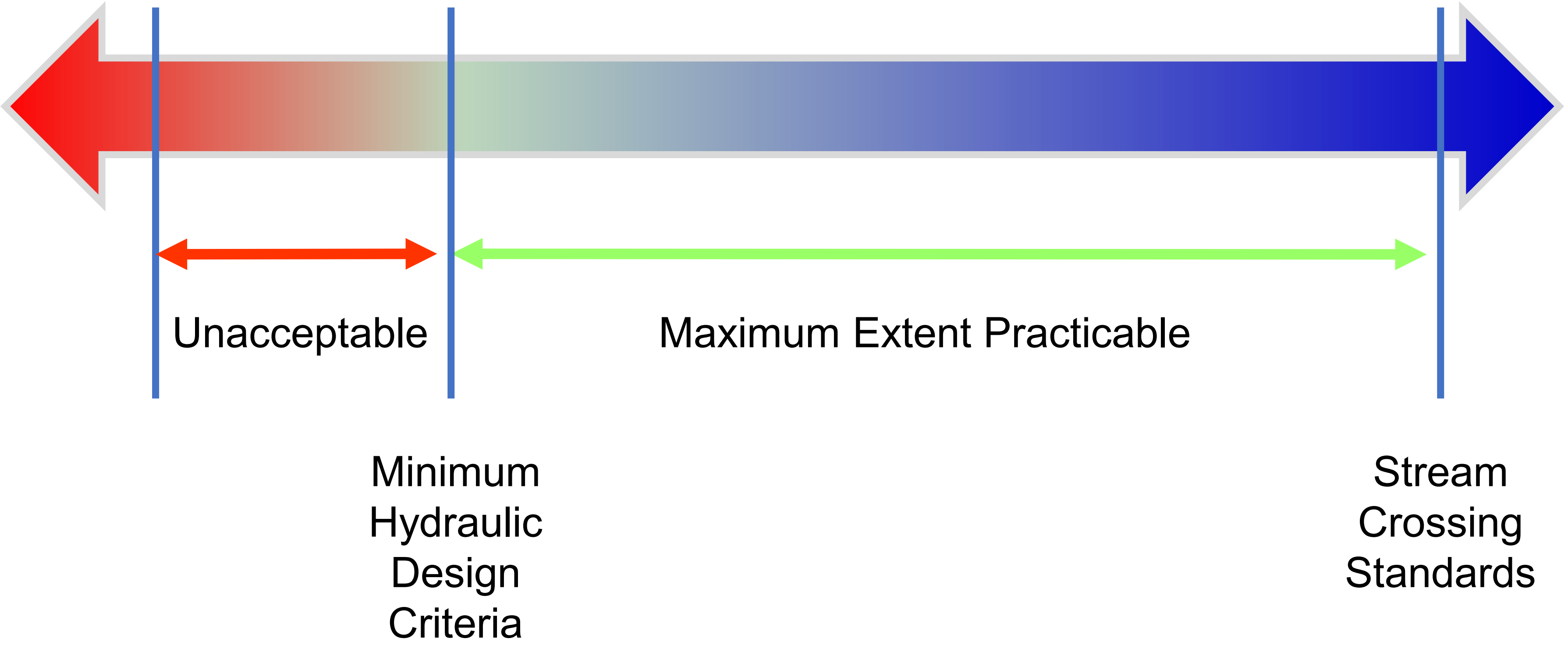
- Flood prevention
- Storm damage prevention

Stream Crossing Standards

- Fisheries
- Wildlife habitat

Massachusetts Stream Crossing Standards (SCS)

Maximum Extent Practicable (MEP)



MassDOT
Hydraulic Design Flow Requirements

Highway Functional Classification	Hydraulic Design Flow
Interstate, or limited access highways	100-year
Rural principal arterial	50-year
Rural minor arterial	50-year
Rural collector, major	25-year
Rural collector, minor	10-year
Rural local road	10-year
Urban principal arterial	50-year
Urban minor arterial street	25-year
Urban collector street	10-year
Urban local street	10-year

MassDOT, 2013, LRFD Bridge Manual, Part I, Chapter 1, Table 1.3.4-1

Maximum Extent Practicable

Cost-Benefit Analysis

- How much additional cost is “practicable”
  - Relative to crossings built to hydraulic design criteria
  - Based on
    - Habitat quality
    - Connectivity restoration potential

- Still need to maximize aquatic organism passage when it is not physically possible to meet the Stream Crossing Standards. Examples:
  - Maximize crossing width
  - Rock or log weirs to backwater the outlet and/or reduce velocities
  - Roughened channel within the crossing structure to reduce velocities and ensure adequate water depth

Habitat Quality

- Biomap aquatic core
- Cold water fisheries resource
- Diadromous fish run (Mass F&W development)
- Area of Critical Environmental Concern (ACEC)
- Wild and scenic river

Highest Quality: two or more of the above categories apply

High Quality: one of the above categories apply

General Quality: All other stream and river segments

Connectivity Restoration Potential

Highest Restoration Potential: Top 5% of statewide Critical Linkages or top 10% of Coldwater Critical Linkages Effect scores for crossings on streams with a projected mean summer temperature ≤ 16C

Very High Restoration Potential: 5-10% of statewide Critical Linkages or top 10-20% of Coldwater Critical Linkages Effect scores for crossings on streams with a projected mean summer temperature ≤ 16C

High Restoration Potential: 10--20% of statewide Critical Linkages or top 20-30% of Coldwater Critical Linkages Effect scores for crossings on streams with a projected mean summer temperature ≤ 16C

Medium Restoration Potential: 20-25% of statewide Critical Linkages or top 30-40% of Coldwater Critical Linkages Effect scores for crossings on streams with a projected mean summer temperature ≤ 16C

Other: All other crossings (below top 25% for Critical Linkages; below top 40% for Coldwater Critical Linkages)

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Maximum Extent Practicable Cost Factors

Connectivity Restoration Potential	Highest Habitat Quality	High Habitat Quality	General Habitat Quality
Highest restoration potential	50% above baseline	30% above baseline	25% above baseline
Very high restoration potential	40% above baseline	25% above baseline	20% above baseline
High restoration potential	30% above baseline	20% above baseline	15% above baseline
Medium restoration potential	20% above baseline	15% above baseline	10% above baseline
Other	10% above baseline	10% above baseline	Baseline

Design elements to maximize aquatic organism passage when full compliance with the Crossing Standards is not practicable

- Reducing velocity and ensuring adequate water depths
- Construction of low-flow channels
- Stabilizing the streambed and grade control structures
- Use of log and rock weirs and cross vanes
- Preventing erosion and scour
- Upsizing substrate material
- Protecting upstream wetlands

MassDEP culvert and bridge upgrade assessment tool

About this site

About the MEP guidance

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Data sources & contact

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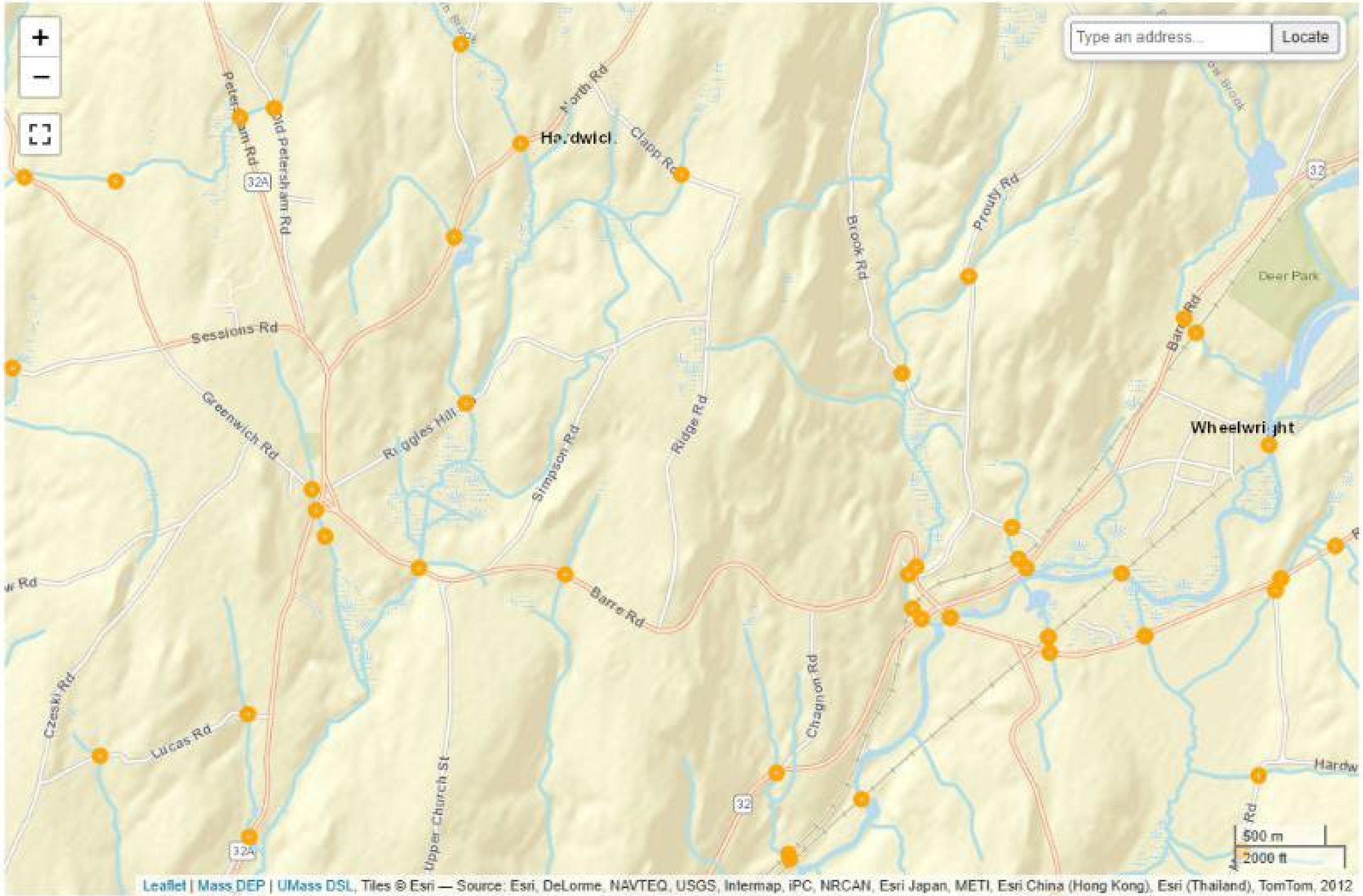

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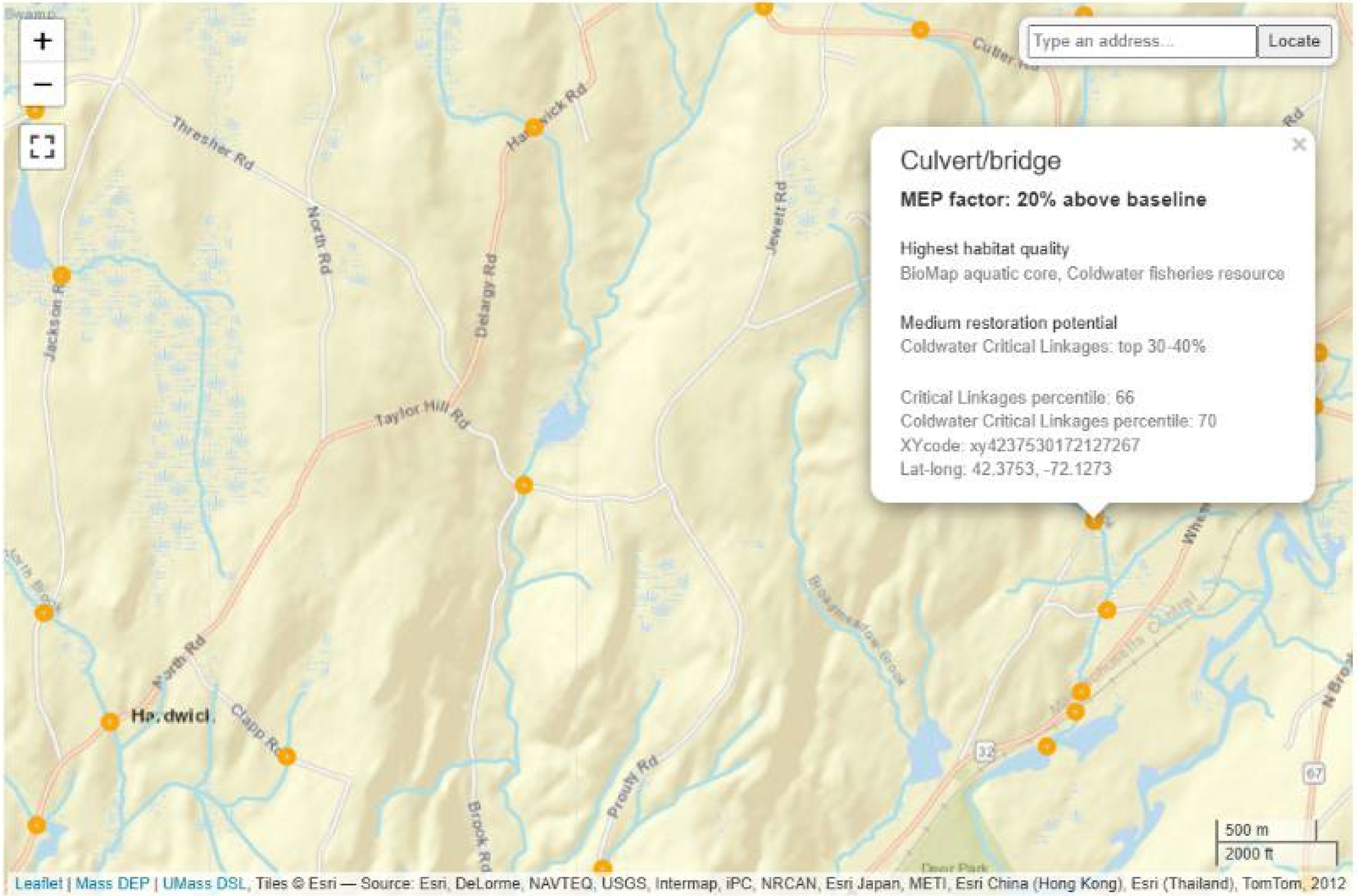

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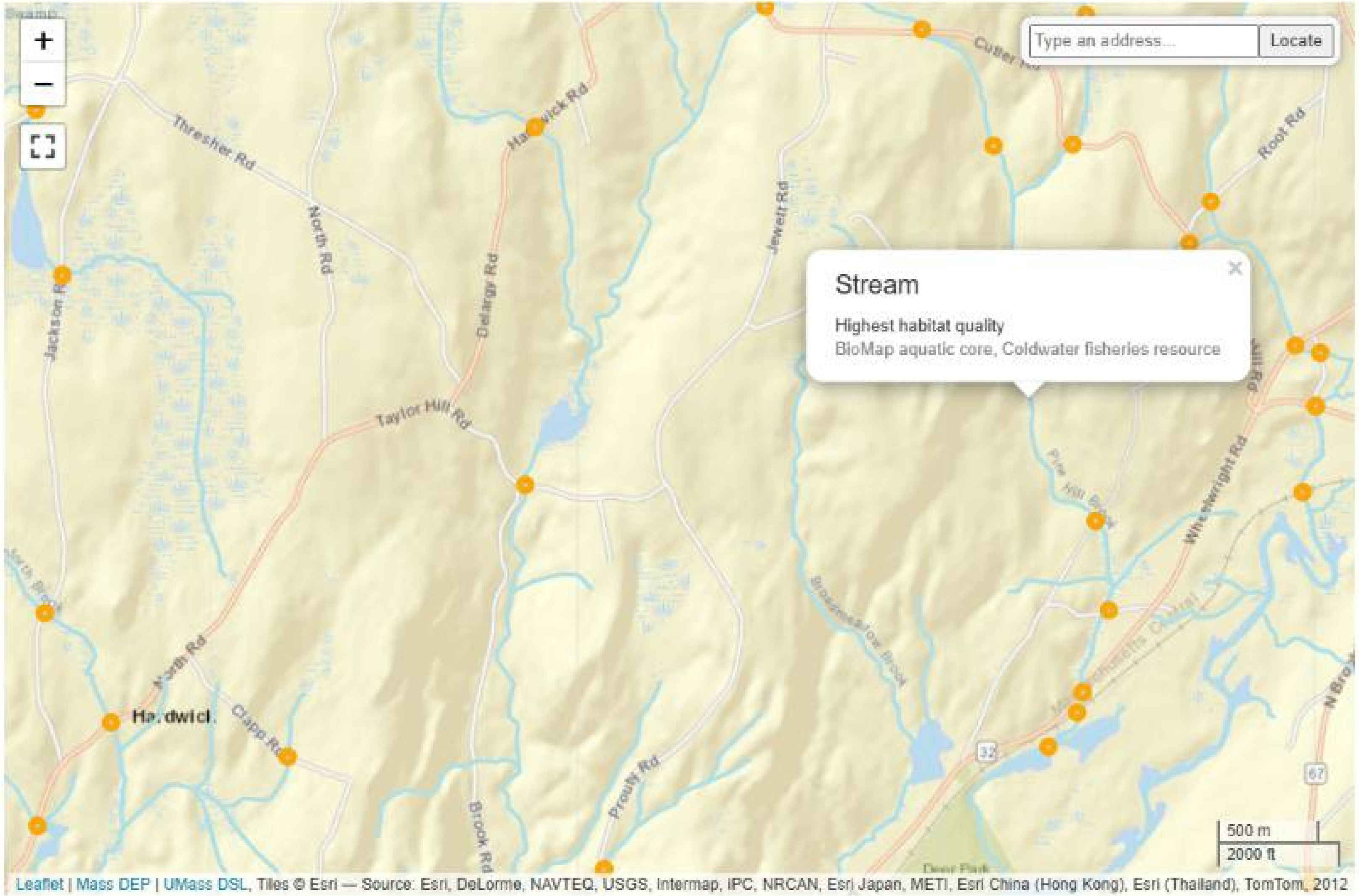

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