Tools and Processes for Integrating Conservation Planning and Climate Resilience

2019 RCP Network Gathering

Moderator: E. Heidi Ricci, Mass Audubon

Speakers: Sara Burns, The Nature Conservancy

Eric Walberg, Manomet

Bill Napolitano, SRPEDD

Agenda

Welcome, introductions

Community Resilience Building – Sara Burns, TNC

Taunton Green Infrastructure Network – Eric Walberg, Manomet

Comprehensive planning using the tools – Bill Napolitano, SRPEDD

Q&A, discussion

Wrap up and additional resources

Resilient Taunton Watershed Network (RTWN)

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SRPEDD

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Soaring Solutions. Grounded Science.

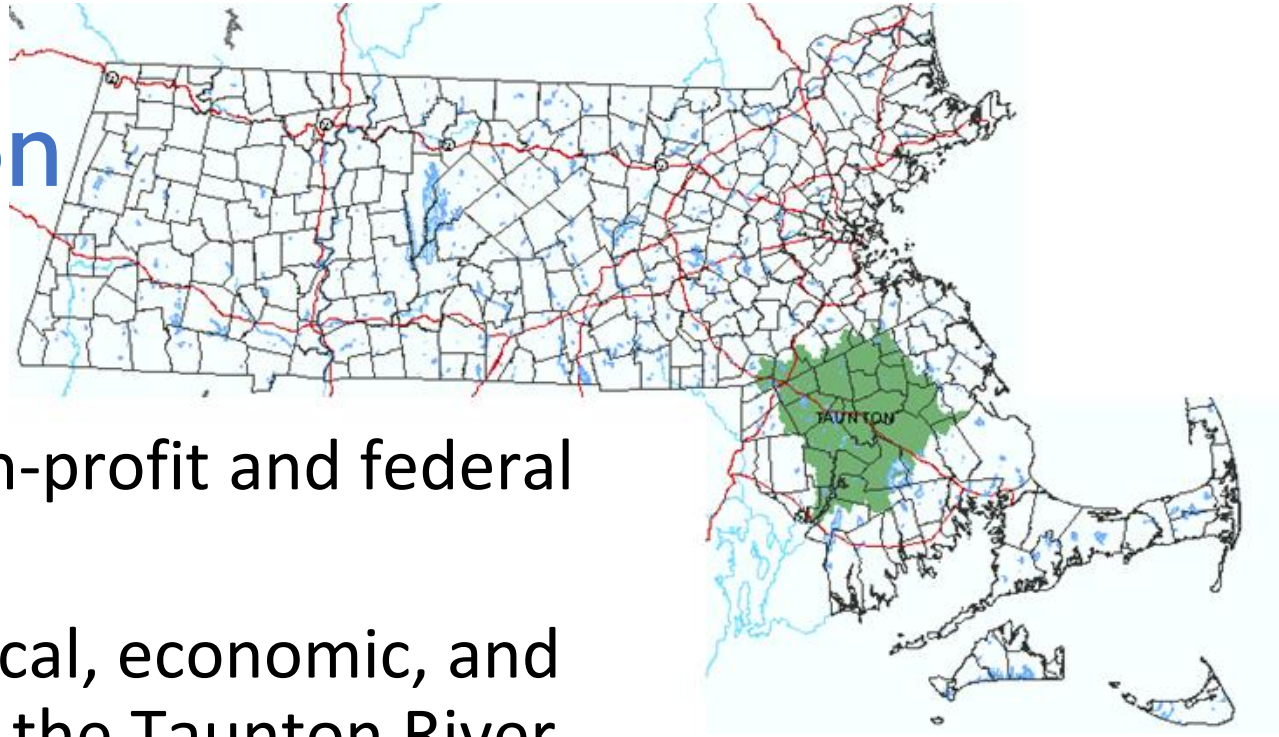
50 YEARS

The Nature Conservancy

Mass Audubon

Shaping the Future of Your Community

The Taunton Watershed



20 state, local, non-profit and federal partners.

Promoting ecological, economic, and social resiliency of the Taunton River Watershed.

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Planning Ahead for a Changing Environment

RTWN engages with local officials and residents in a variety of ways to encourage holistic planning that involves multiple municipal departments to add resilience to the list of a project's desired outcomes.

Resilience Roundtables

Municipal Training Programs

Assistance with Regulatory Requirements

Prioritizing Culvert Replacement

Assist in pursuing funding opportunities for watershed localities

Community Resilience Building in the Taunton River Watershed

Sara Burns

Water Resource Scientist

The Nature Conservancy

The Nature Conservancy

Municipal Vulnerability Preparedness (MVP)



State and local partnership to build resiliency to climate change

1. Engage Community
2. Identify CC impacts and hazards
3. Complete assessment of vulnerabilities & strengths
4. Develop and prioritize actions
5. Take Action

MVP: State and local partnership to build resiliency to climate change

Planning Grants & Certification

- Planning for climate impacts and changes in natural hazards
- Planning workshop and report consider strengths and vulnerabilities:
  - Society
  - Environment
  - Infrastructure

Action Grants - Implementation

- Implementation of MVP Plans
- Nature Based Solutions prioritized

Engage Community → Identify CC impacts and hazards → Complete vulnerability assessment → Develop and prioritize actions → Take Action

Nature-Based Solutions

Nature-Based Solutions *use* natural systems, *mimic* natural processes, or *work in tandem with* traditional approaches to address natural hazards like flooding, erosion, drought, and heat islands.

Green Infrastructure

Engineered Solutions

Overview of the Process (Steps & Tasks)

Part 1: Today

Part 2: May 3

DURING WORKSHOP

A Prepare for the Workshop
1. Establish a core team with goals.
2. Engage stakeholders.
3. Prepare materials for workshop.
4. Decide on participant arrangements.

B Characterize Hazards
1. Identify past, current, and future impacts.
2. Determine the highest-priority hazards.

C Identify Community Vulnerabilities and Strengths
1. Identify infrastructural vulnerabilities and strengths.
2. Identify societal vulnerabilities and strengths.
3. Identify environmental vulnerabilities and strengths.

D Identify and Prioritize Community Actions
1. Identify and prioritize infrastructural actions.
2. Identify and prioritize societal actions.
3. Identify and prioritize environmental actions.

E Determine the Overall Priority Actions
1. Identify highest-priority actions.
2. Further define urgency and timing.

F Put It All Together
1. Generate final workshop products.

G Move Forward
1. Continue community outreach and engagement.
2. Secure additional data and information.
3. Inform existing planning and project activities.

Community Components

Infrastructural

Societal

Environmental

Why Community Resilience Building?

- Collaborative, stakeholder-driven process (you're the experts!)
- Informs long-term local planning efforts
- Positions Rochester for funding opportunities

Natural Hazards: weather and other natural impacts that can cause damage

Riverine and Stormwater Flooding

Drought

Severe Storms

Extreme Temperatures

How Does Climate Change Work?

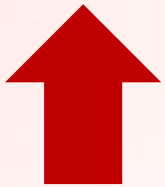
Like a heat-trapping blanket!

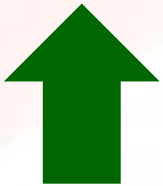
- The atmosphere is like a blanket that surrounds the earth.

- When we burn fossil fuels like coal and oil for energy, we add more carbon dioxide to the atmosphere, which is like making the blanket thicker.

- The blanket has become too thick. It's trapping in too much heat, and the planet is warming rapidly.

Climate changes already observed in Massachusetts

Temperature:  **2.9°F** Since 1895

Growing Season:  **11 Days** Since 1950

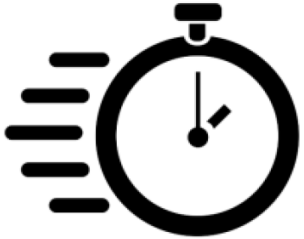
Sea Level Rise:  **11 inches** Since 1922

Strong Storms:  **55% >precip** Since 1958

Source: Climate Science Special Report, 2017; NOAA NCEI nClimDiv; NOAA Ocean Service

An anecdotal rule of thumb for anticipating changes in extreme precipitation…

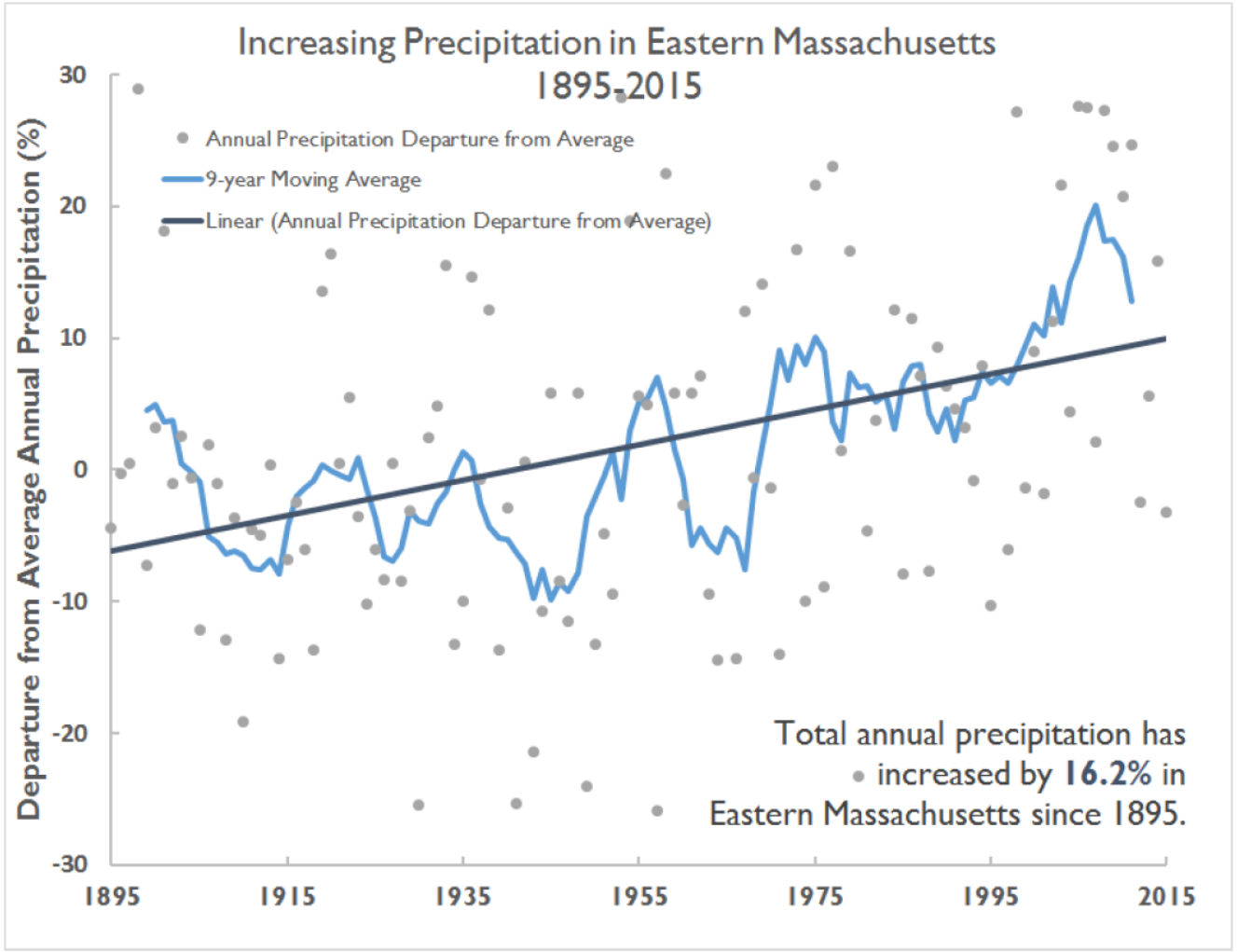
Models often project a return period shorter by a factor of 2 to 4.



Often:

100-year storm → 25-year storm → 10-year storm

But projections vary place-to-place.


Increasing Precipitation in Eastern Massachusetts
1895-2015
Annual Precipitation Departure from Average
9-year Moving Average
Linear (Annual Precipitation Departure from Average)
Departure from Average Annual Precipitation (%)
30
20
10
0
-10
-20
-30
1895
1915
1935
1955
1975
1995
2015
Total annual precipitation has increased by 16.2% in Eastern Massachusetts since 1895.

Precipitation Impacts: Seasonal Changes and Water Supply

Changing Seasonal Precipitation:

Warmer springs and more precipitation increase the potential for mixed precipitation and variable spring weather.

Summer Water Availability:

Even as annual total precipitation increases, summers may become drier.

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.com

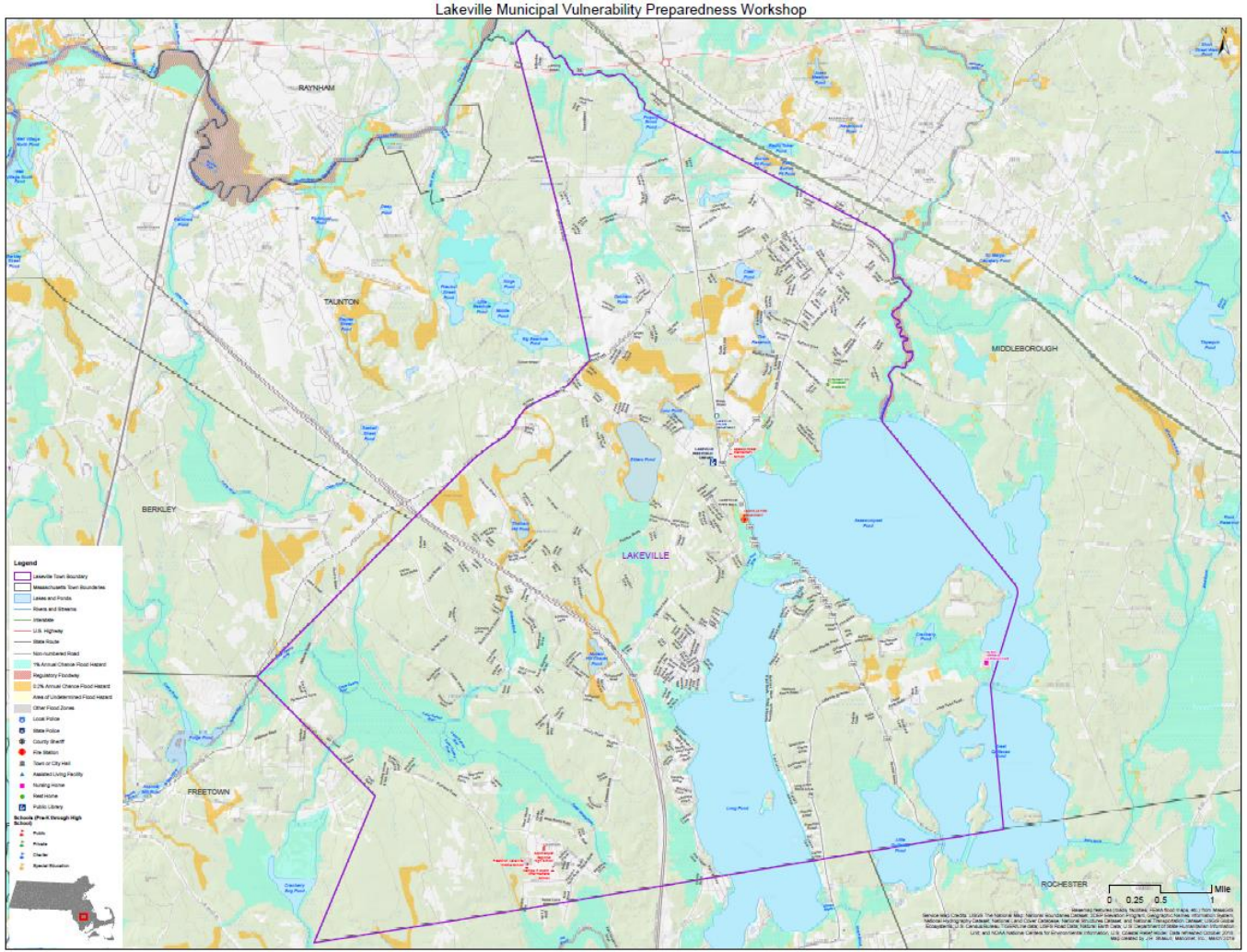
H-**M**-**L** priority for action over the **S**hort or **L**ong term (and **O**ngoing)
V = Vulnerability **S** = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S					Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Societal									
Environmental									

Lakeville
Flood Map

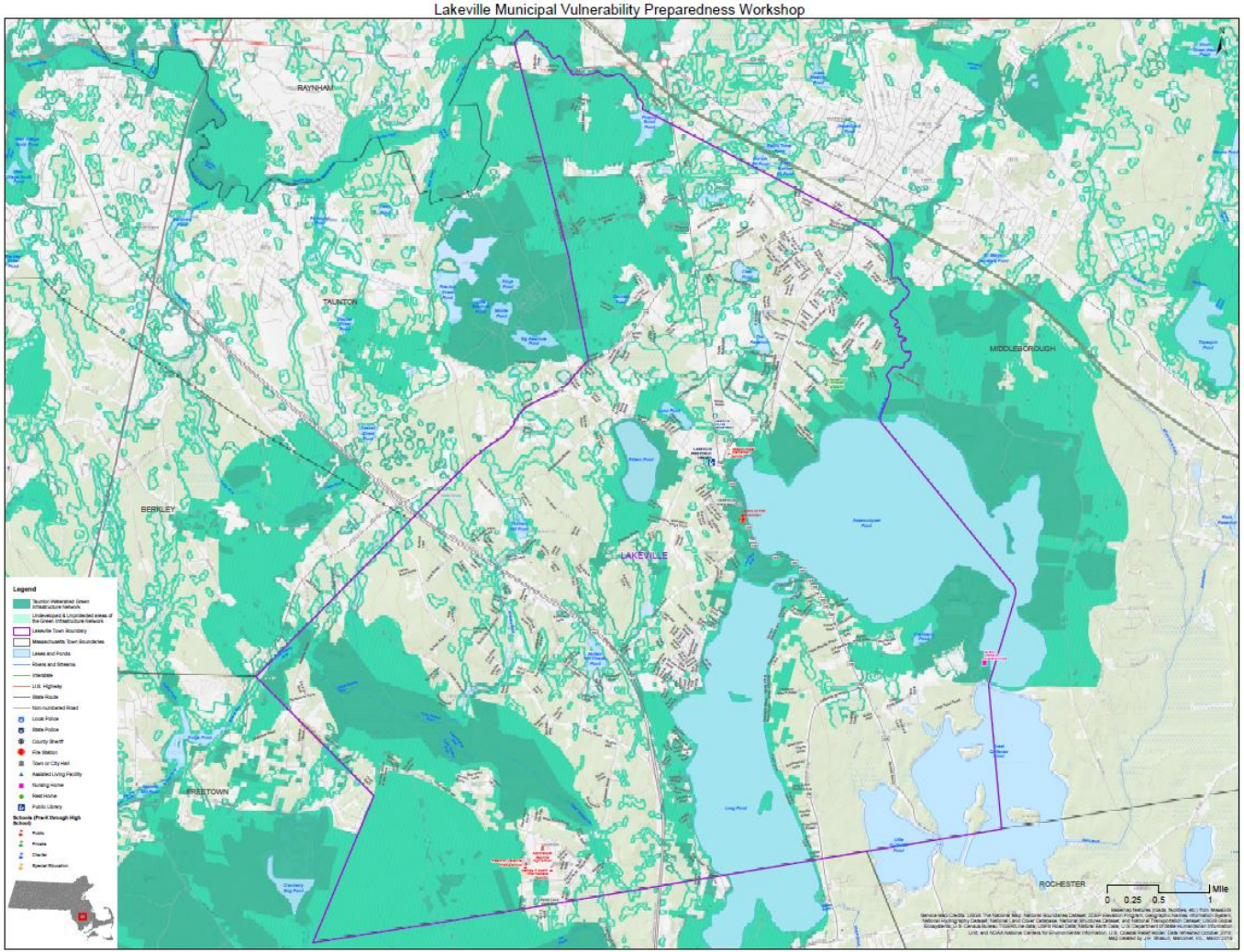
The expected 3.14 inch increase in annual precipitation by 2050 will widen the "1% chance flood hazard areas" (turquoise) and will introduce flooding in low-lying areas. This will exacerbate flooding in Lakeville.



Lakeville

GI Map

Protecting "undeveloped unprotected land" (dark green) ensures that the land remains undeveloped. Undeveloped land allows precipitation to infiltrate into the ground. This would mitigate flooding in Lakeville.



Year One MVP Plan Summaries

- Top Hazards (Year 1): Severe Storms, Inland Flooding, Heat, Wind
- Top Actions (Year 1): Emergency Management, Power Infrastructure, Stormwater Management, Regulations, Drinking Water

Community Resilience Building – Beyond MA

- Rhode Island – Municipal Resilience Building Program
  - Warren and Barrington
  - South Kingstown
  - Portsmouth
  - Westerly

- Connecticut – Sustainable CT Program

Delineating a Green Infrastructure Network in the Taunton River Watershed

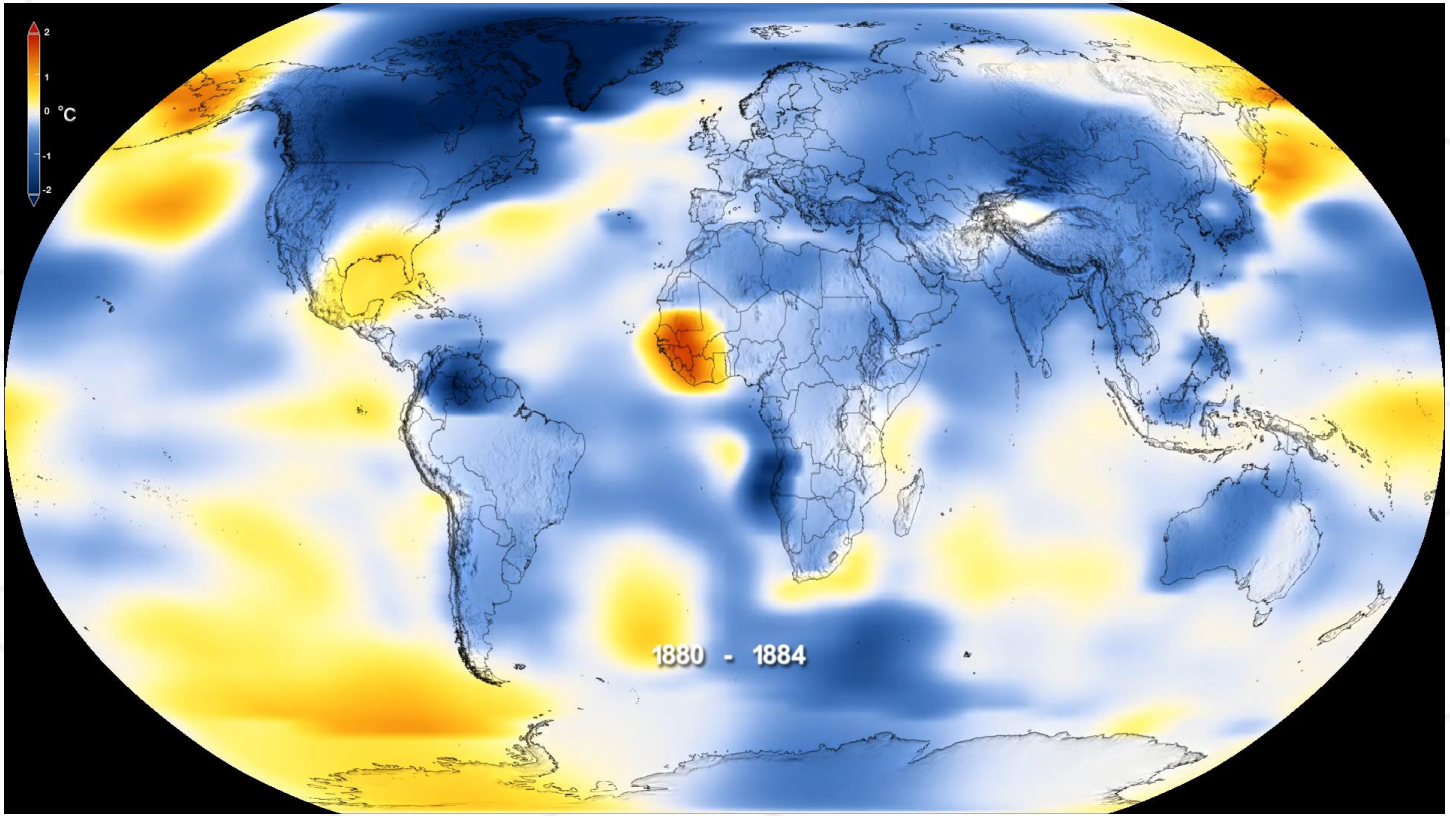
Eric Walberg, AICP

Senior Program Leader,
Climate Services

Manomet Climate Services Program

A natural systems-based approach to climate change adaptation and mitigation

Global Temperature Anomalies



Animation of Global Surface Temperature Anomalies from 1880-2018. Source: NASA/GSFC Scientific Visualization Studio

What is Green Infrastructure?

Green Infrastructure: A network of waterways, wetlands, woodlands, wildlife habitats, and other natural areas that support native species, maintain natural ecological processes, sustain air and water resources and contribute to health and quality of life.

(McDonald, Benedict and O'Conner, 2005).

Context

Legend

Taunton Watershed Boundary

Streams

Town Boundaries

Land Use/Land Cover

Open (Ag; Bare; Non-forest vegetation)

Commercial/Industrial/High Dens Res

Low Density Residential

Forest (incl. Forested Wetland)

Wetland

Water

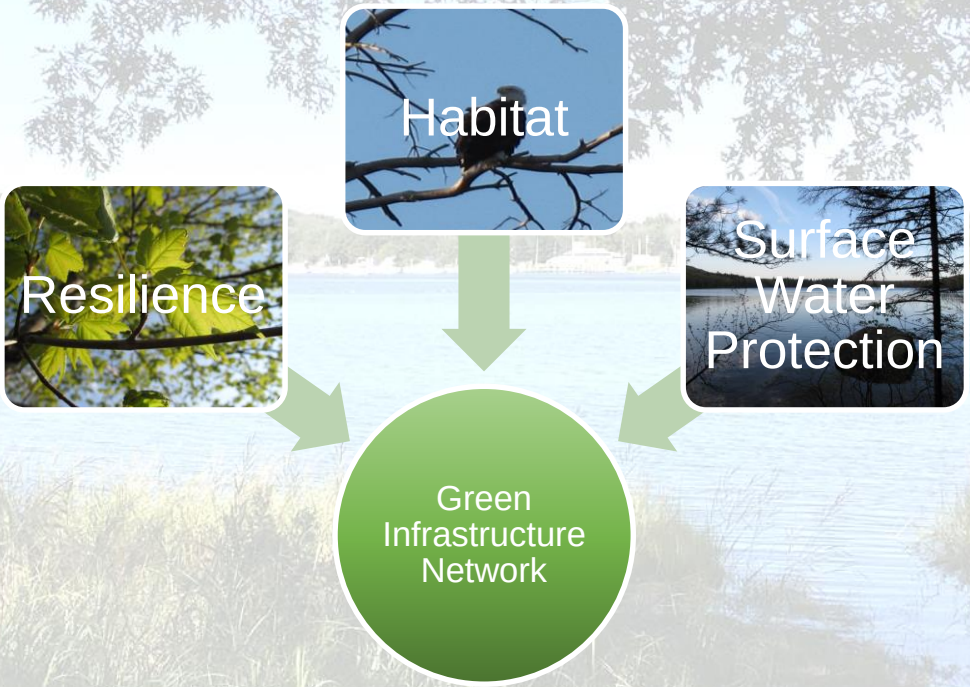
Cranberry Bog

Major Routes, by Administrative Type

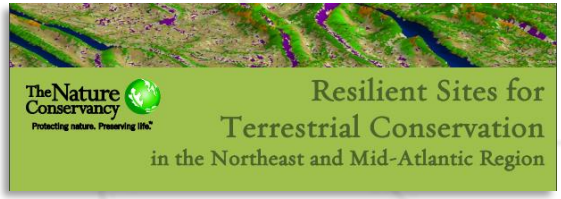
Interstate

U.S. Highway

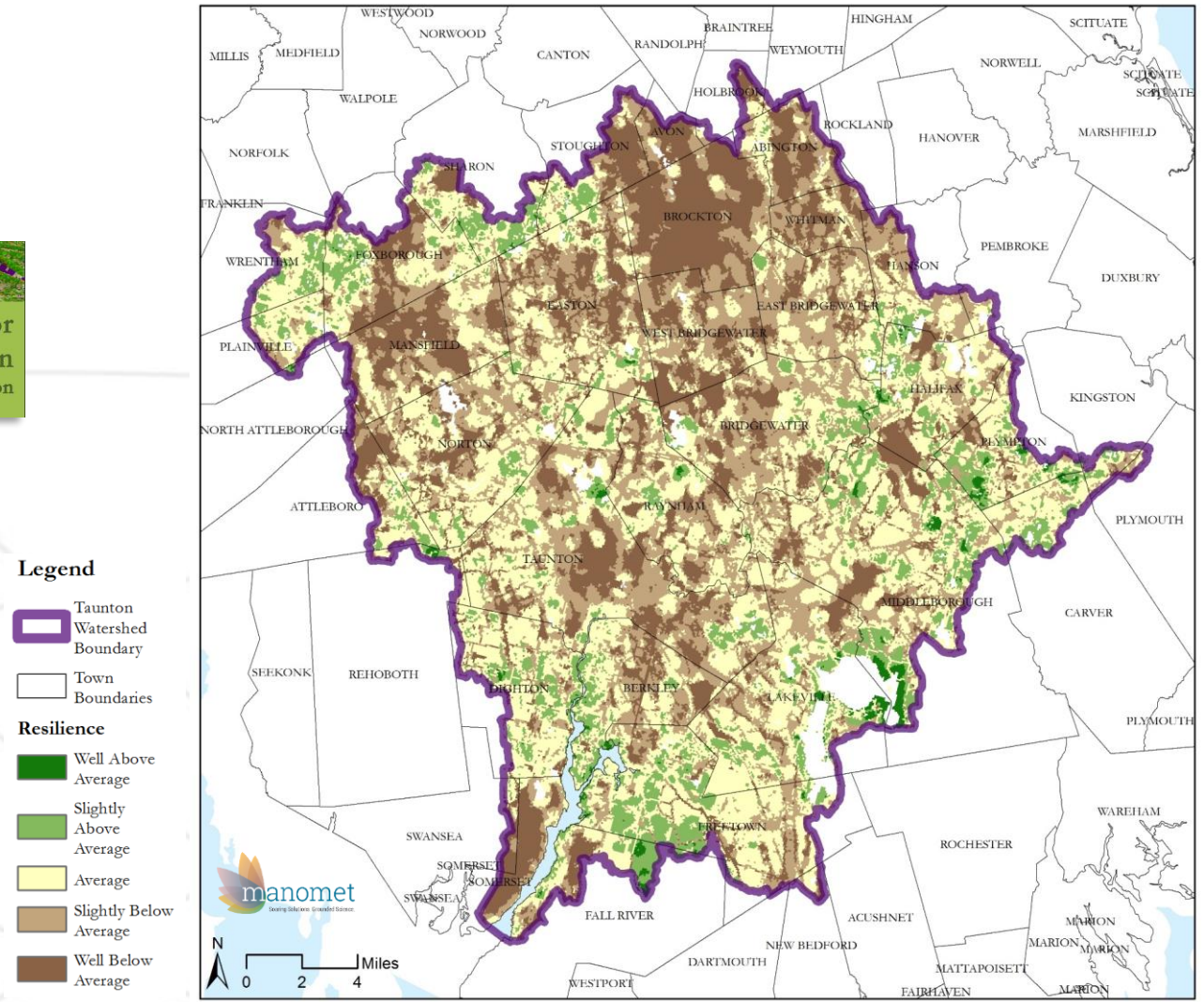
State Route


Habitat
Resilience
Surface Water Protection
Green Infrastructure Network

Resilient Landscapes

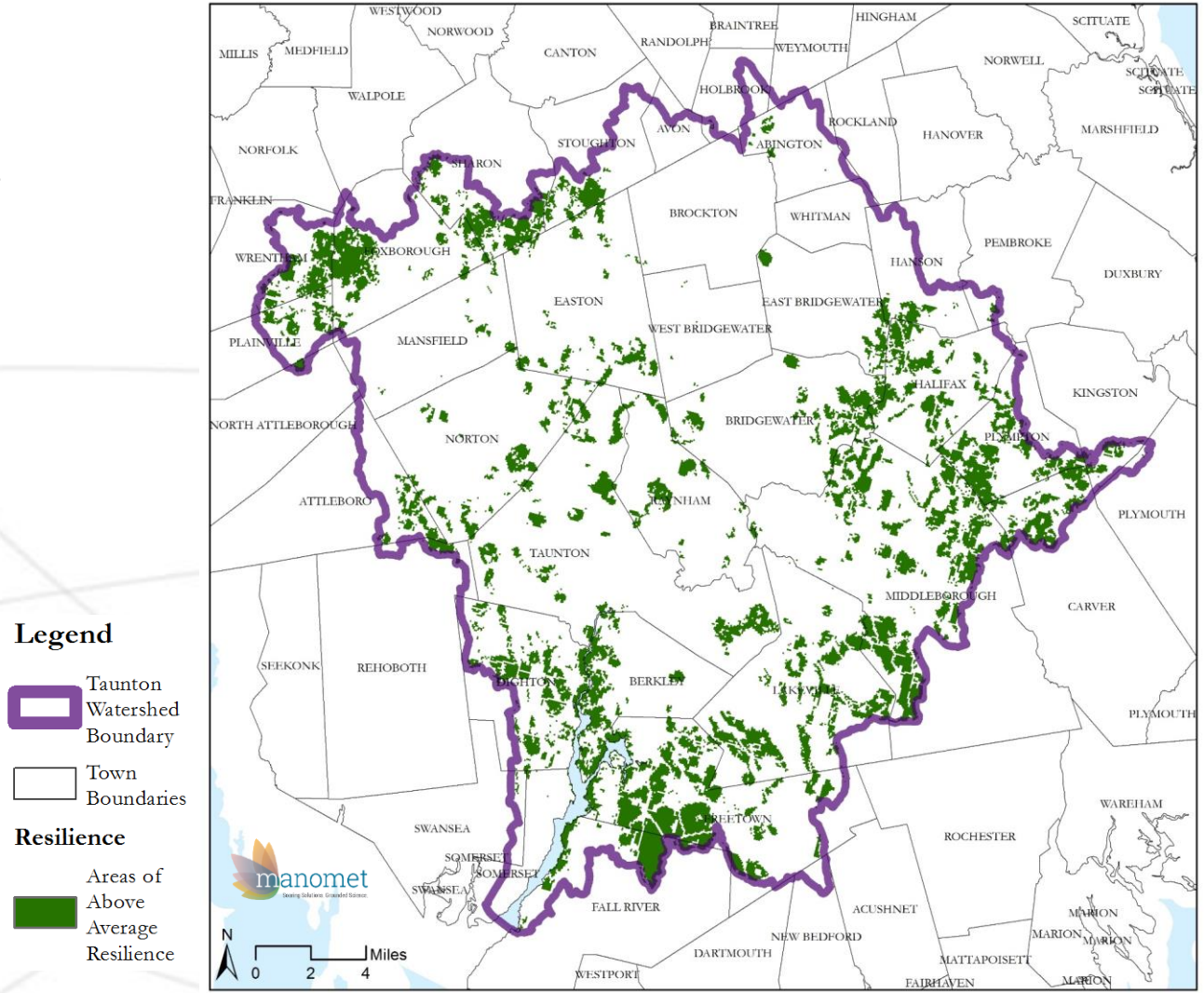


Complex topography
+
Connected natural cover
+
High quality biodiversity features



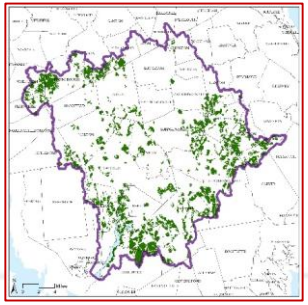
Resilient Landscapes

Areas of Above Average Resilience



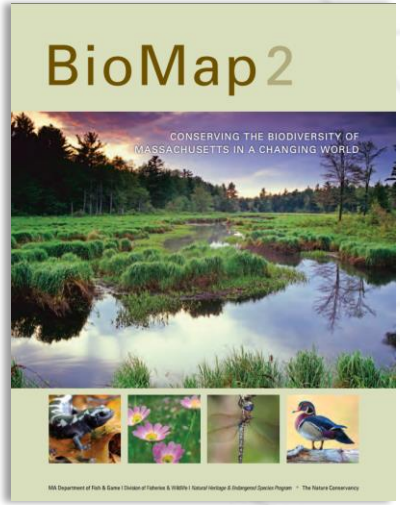
Green Infrastructure Network Components…

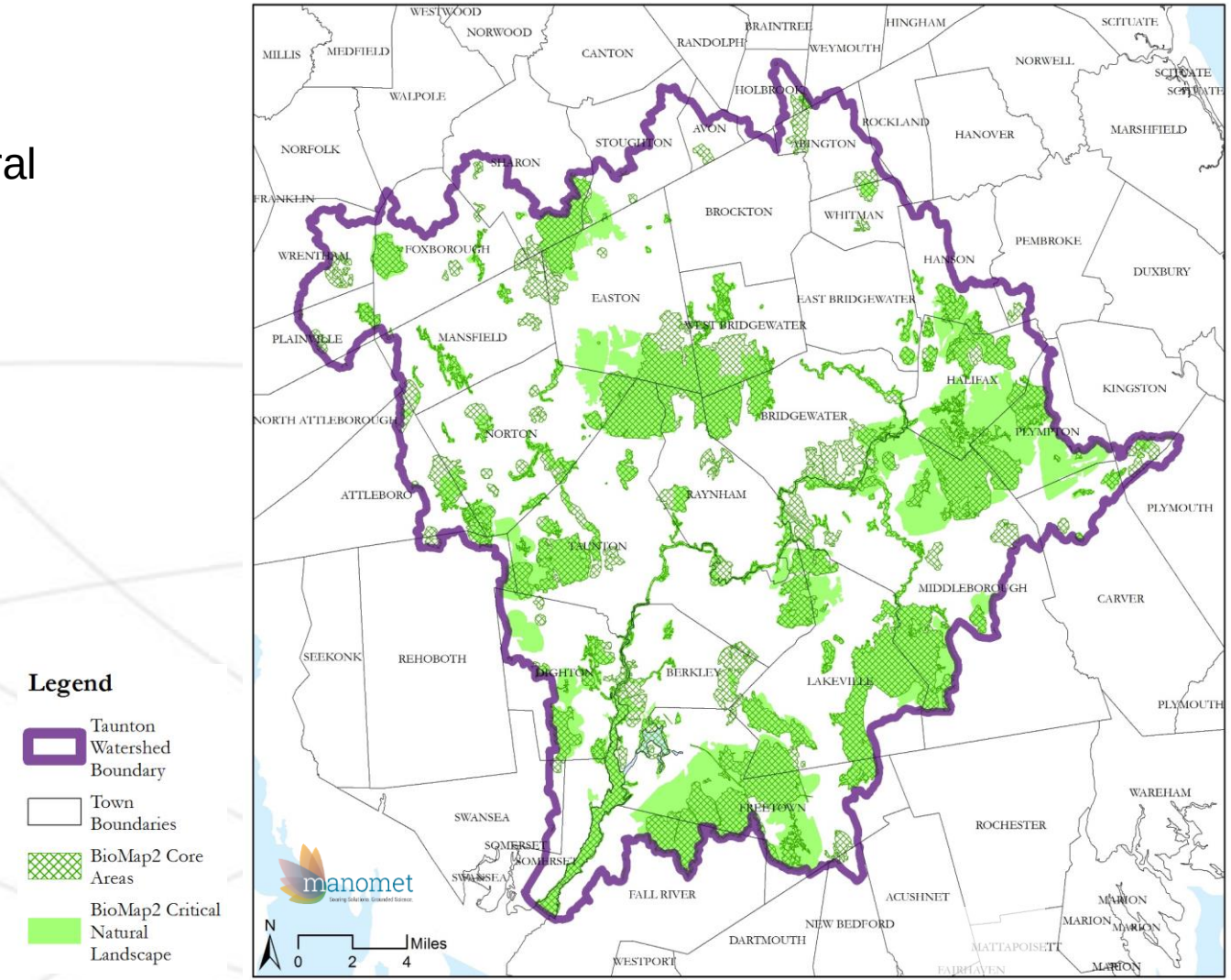
Areas of Above Average Resilience



BioMap2:

Core & Critical Natural Landscape





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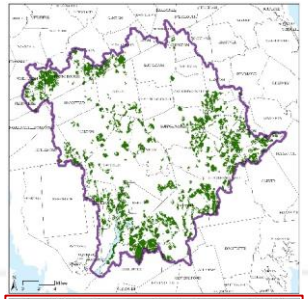

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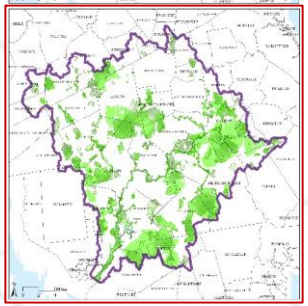
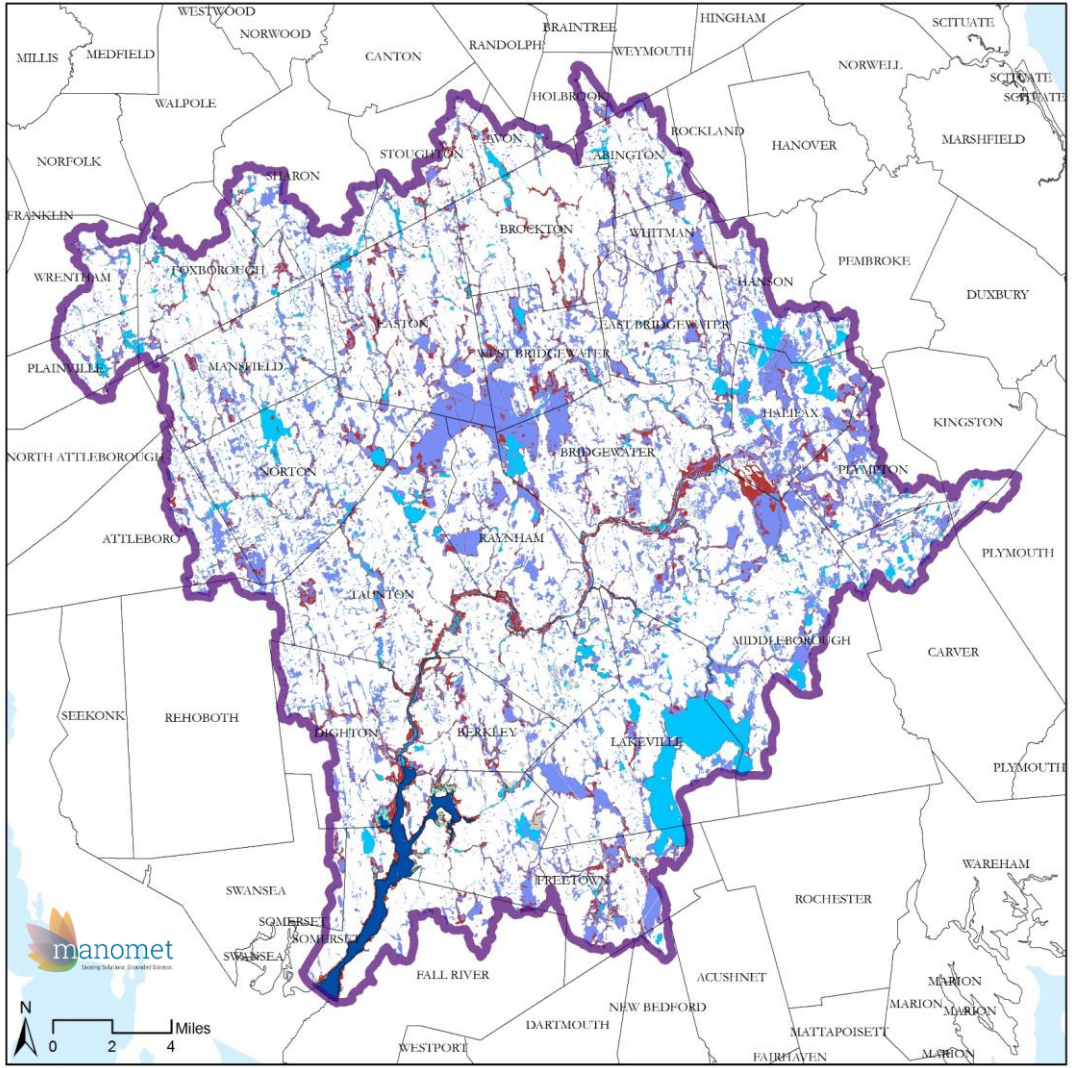
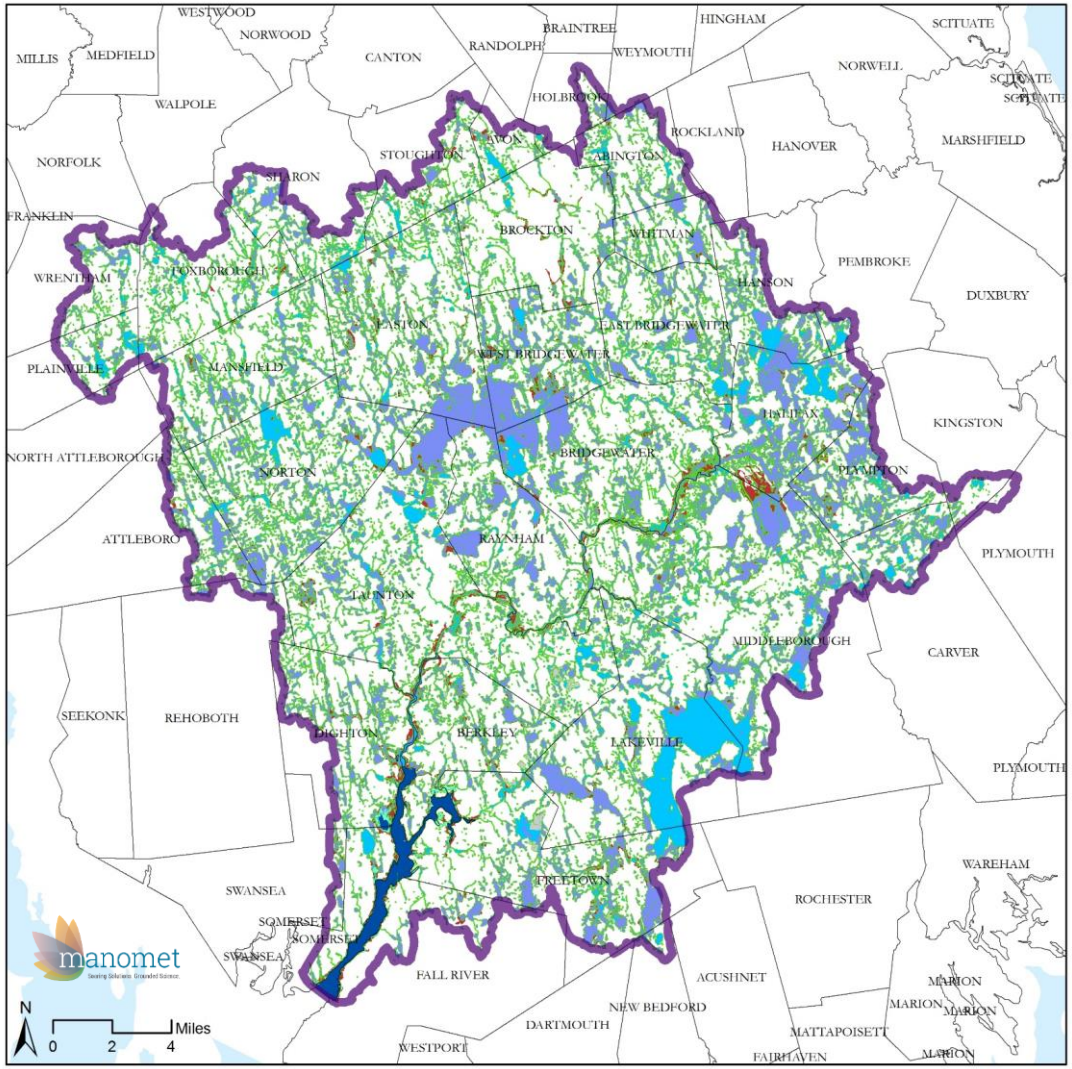


Surface Water, Wetlands, & Flood Areas



Riparian/ Flood Zone Buffers



Green Infrastructure Network Components…

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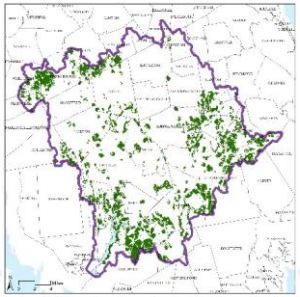

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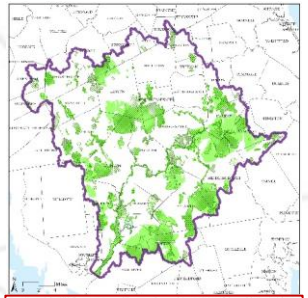
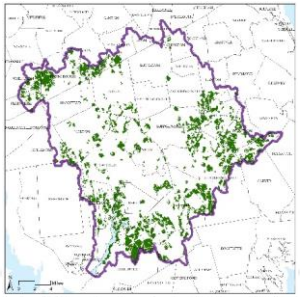


Areas within 100ft of Surface Waters, Wetlands, and Flood Zones; Areas </= 4m elevation (vulnerable to sea level rise)

Green Infrastructure Network Components…

Areas of Above Average Resilience



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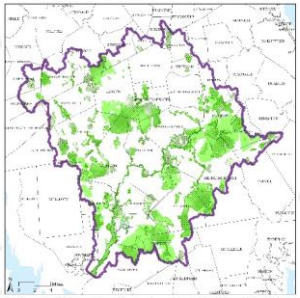

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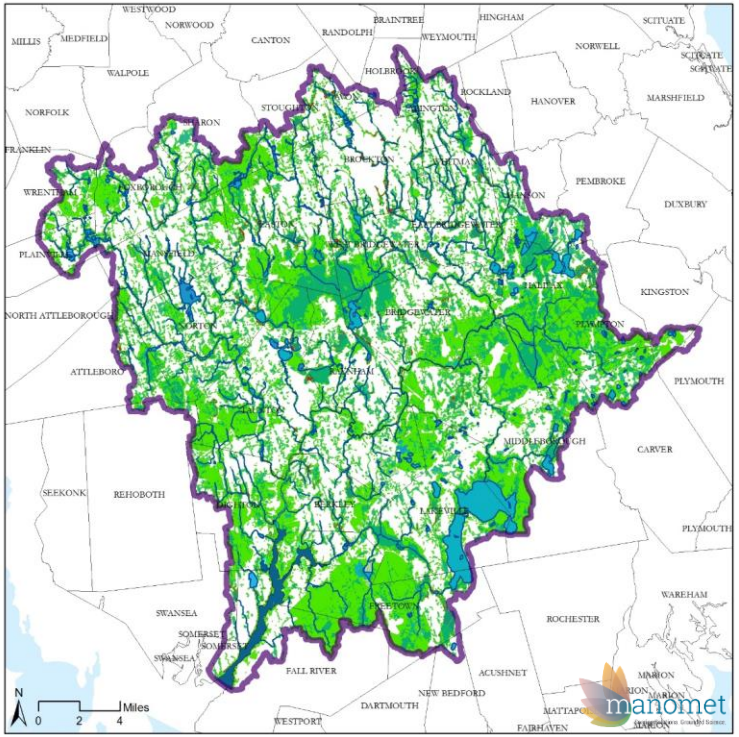


Legend

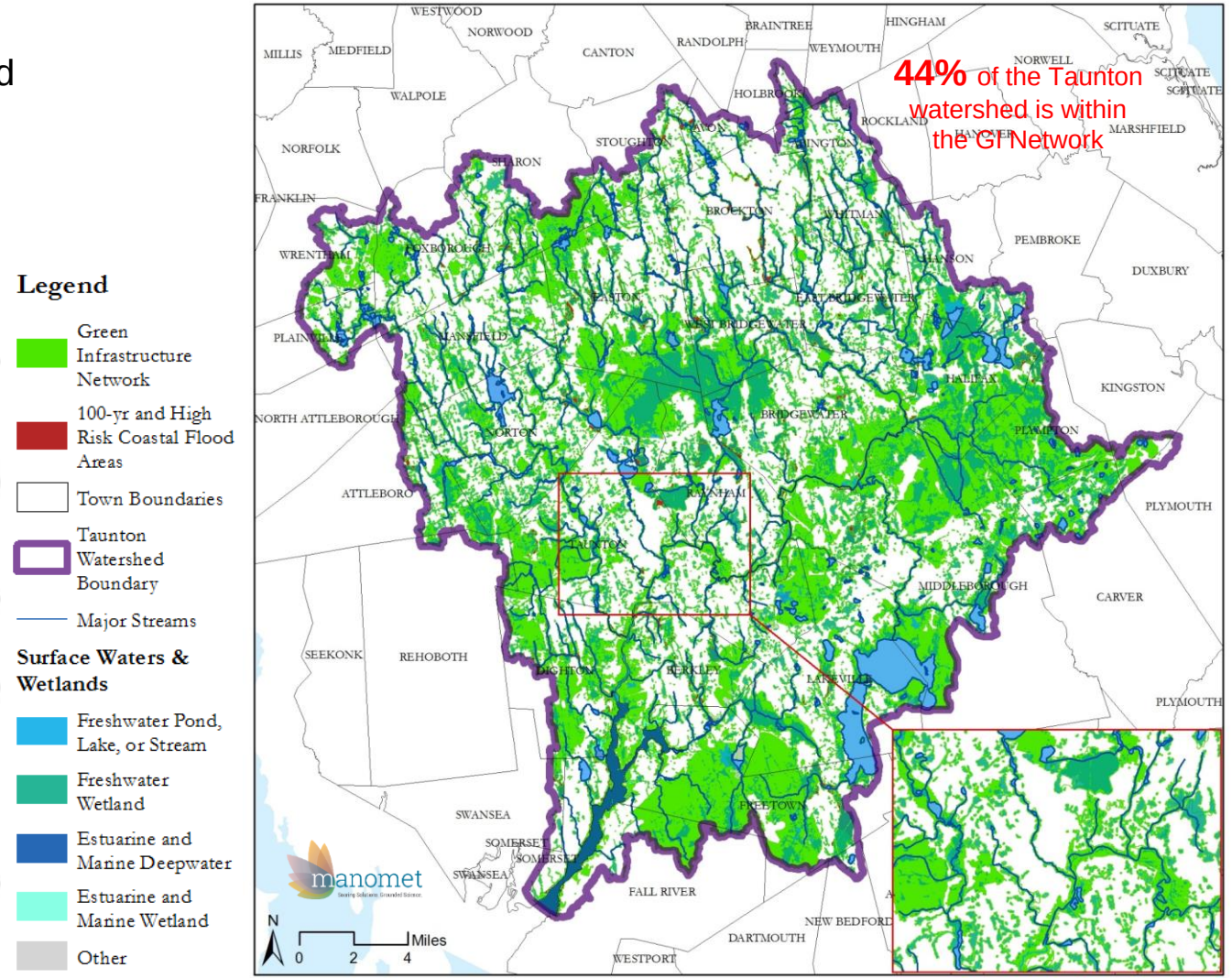
- Green Infrastructure Network
- 100-yr and High Risk Coastal Flood Areas
- Town Boundaries
- Taunton Watershed Boundary
- Major Streams

Surface Waters & Wetlands

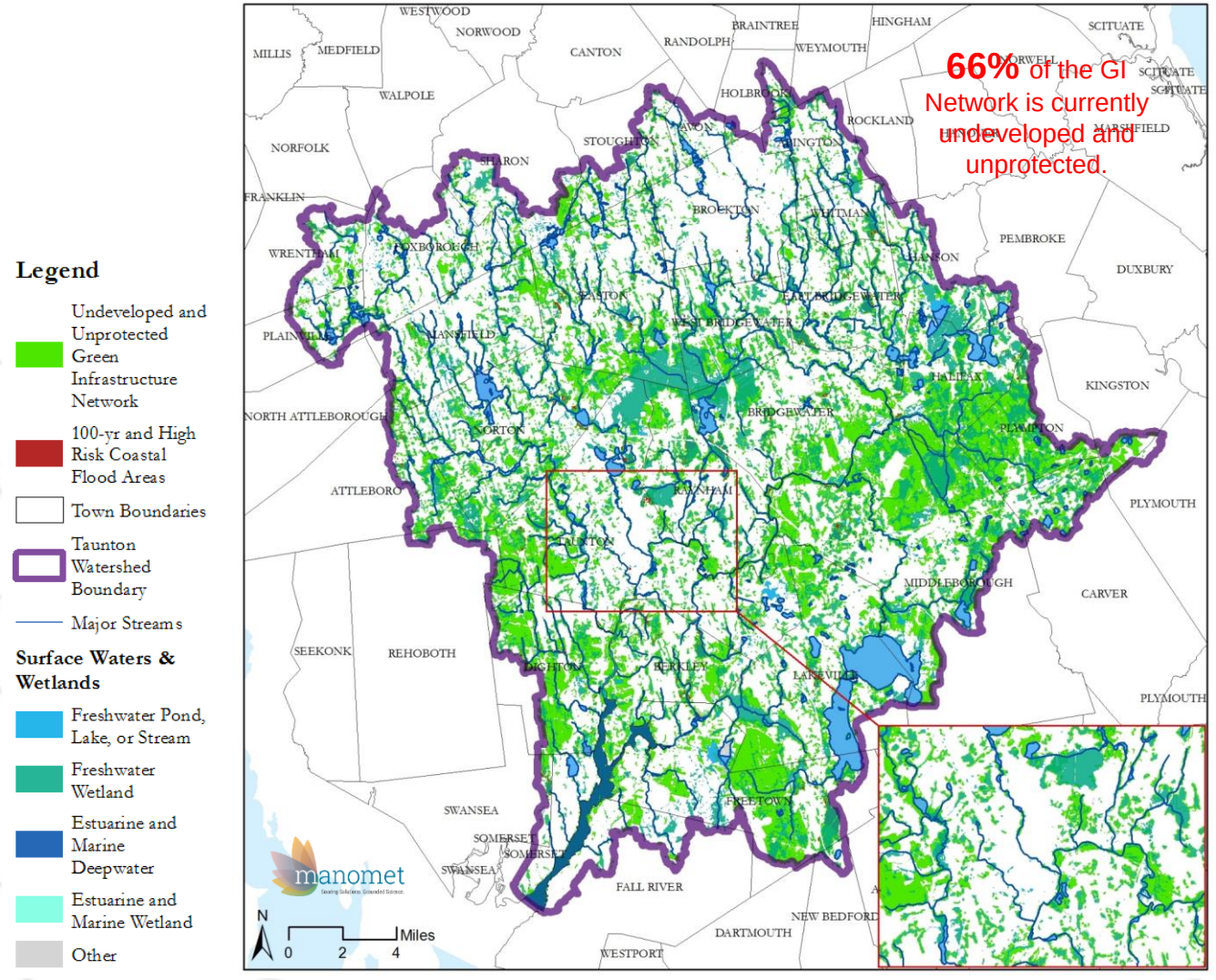
- Freshwater Pond, Lake, or Stream
- Freshwater Wetland
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Other

Taunton Watershed

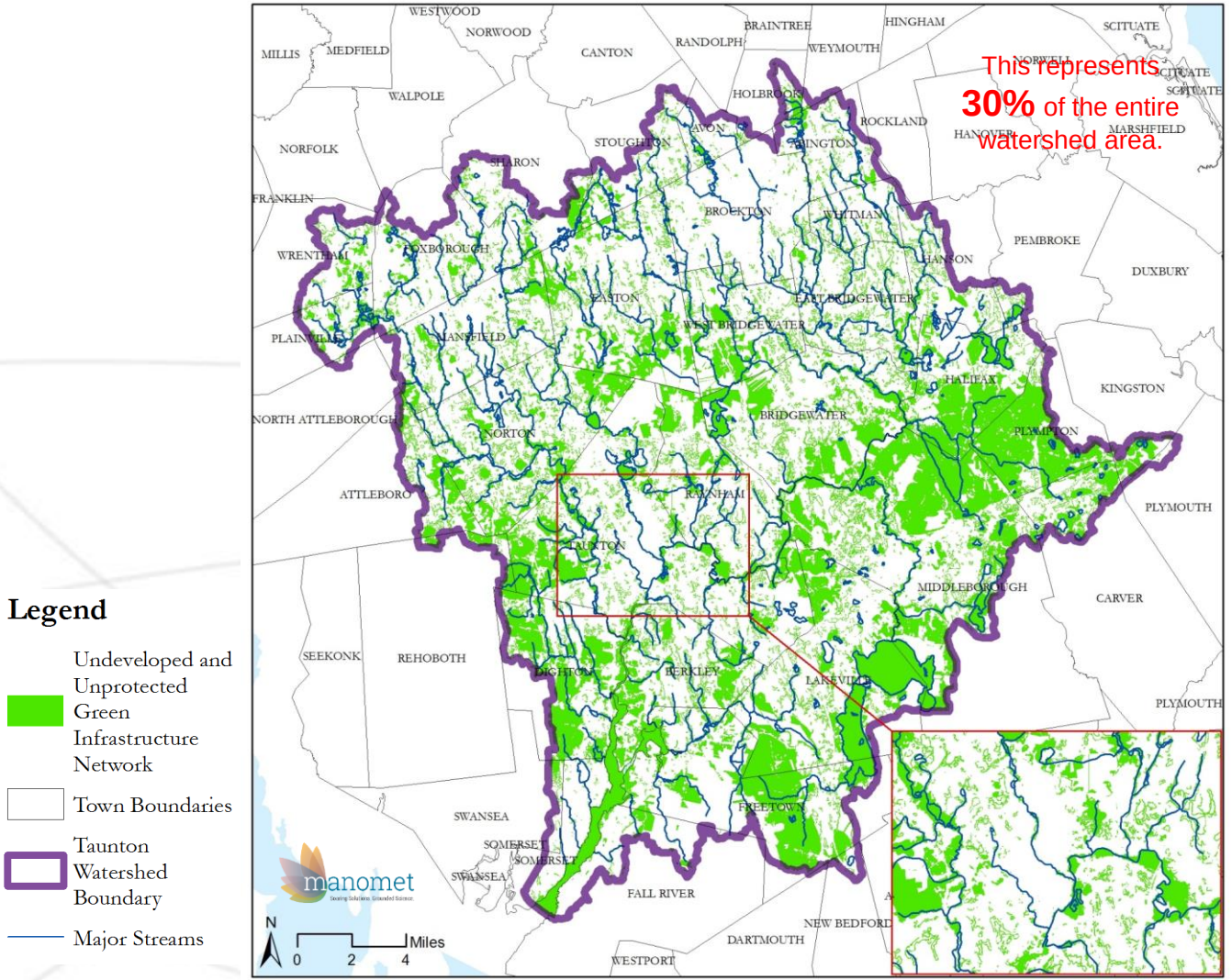
Green Infrastructure Network



Taunton Watershed **Undeveloped & Unprotected Green Infrastructure Network**



Taunton Watershed
Undeveloped & Unprotected Green Infrastructure Network



Application Beyond Massachusetts

Resilient Landscapes analysis available for all of northeast U.S.

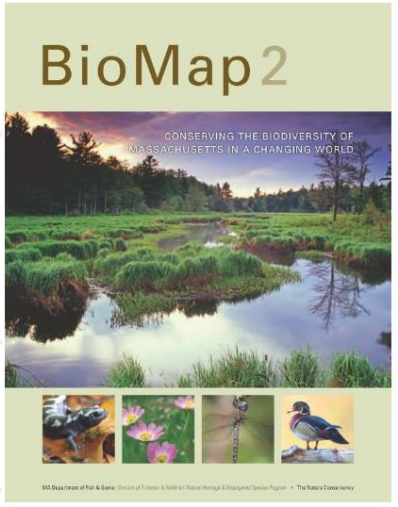
https://www.conservationgateway.org/conservationbygeography/northamerica/unitedstates/edc/reportsdata/terrestrial/resilience/pages/default.aspx

Application Beyond Massachusetts

Elements of BioMap2 likely available in most states

State Wildlife Action Plans a good first resource

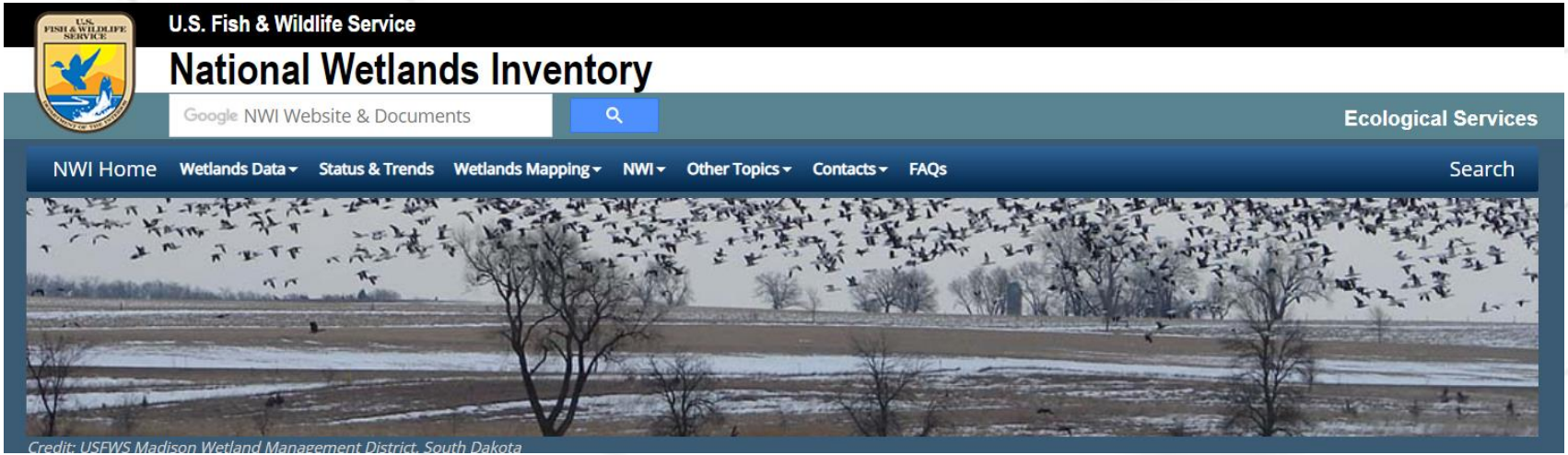
https://www.mass.gov/service-details/biomap2-conserving-the-biodiversity-of-massachusetts-in-a-changing-world



Application Beyond Massachusetts

National Wetlands Inventory good first step in developing buffers for high order streams, ponds and wetlands

https://www.fws.gov/wetlands/



Thank You

Using Green Infrastructure Mapping in Regional MVP Planning

State and local partnership to build resiliency to climate change

Bill Napolitano
Environmental Program Director
Southeast Regional Planning and Economic Development District

Resilient Taunton Watershed Network (RTWN)

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The Nature Conservancy
nature.org

Mass Audubon
Shaping the Future of Your Community

MVP approach is a fluid process that:

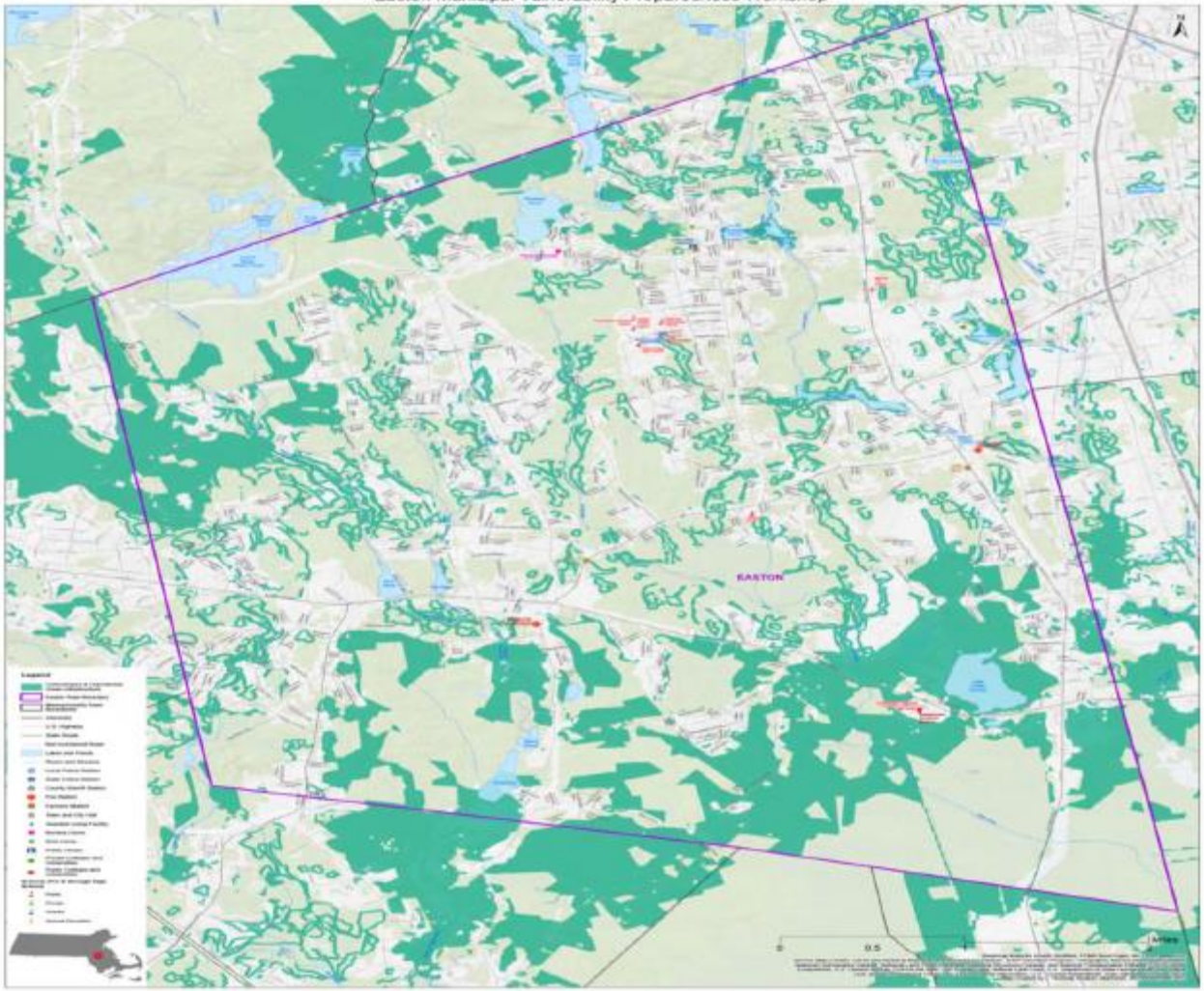
- Is locally led and collaborative
- Accessible
- Utilizes partnerships
- Mainstreams climate change
- Informs local planning efforts and promotes local innovation
- Positions municipalities for funding opportunities in a coordinated statewide effort

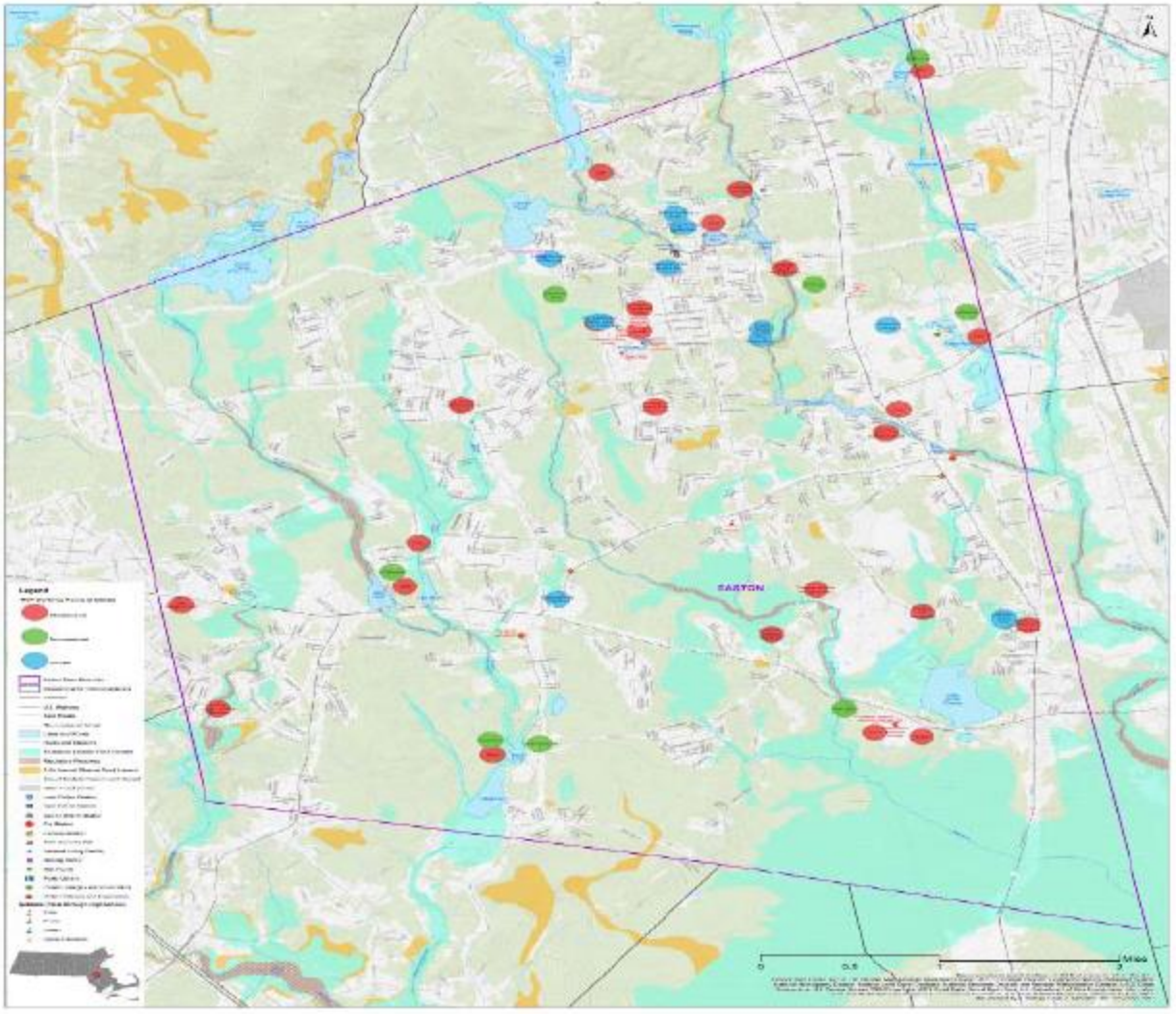

We need to find new ways to work together … MVP can help us get there!
Trish Garrigan, EPA

Regional Projects Addendum to the Mansfield - Norton - Easton MVP Plans

June 2019

Easton Municipal Vulnerability Preparedness Workshop

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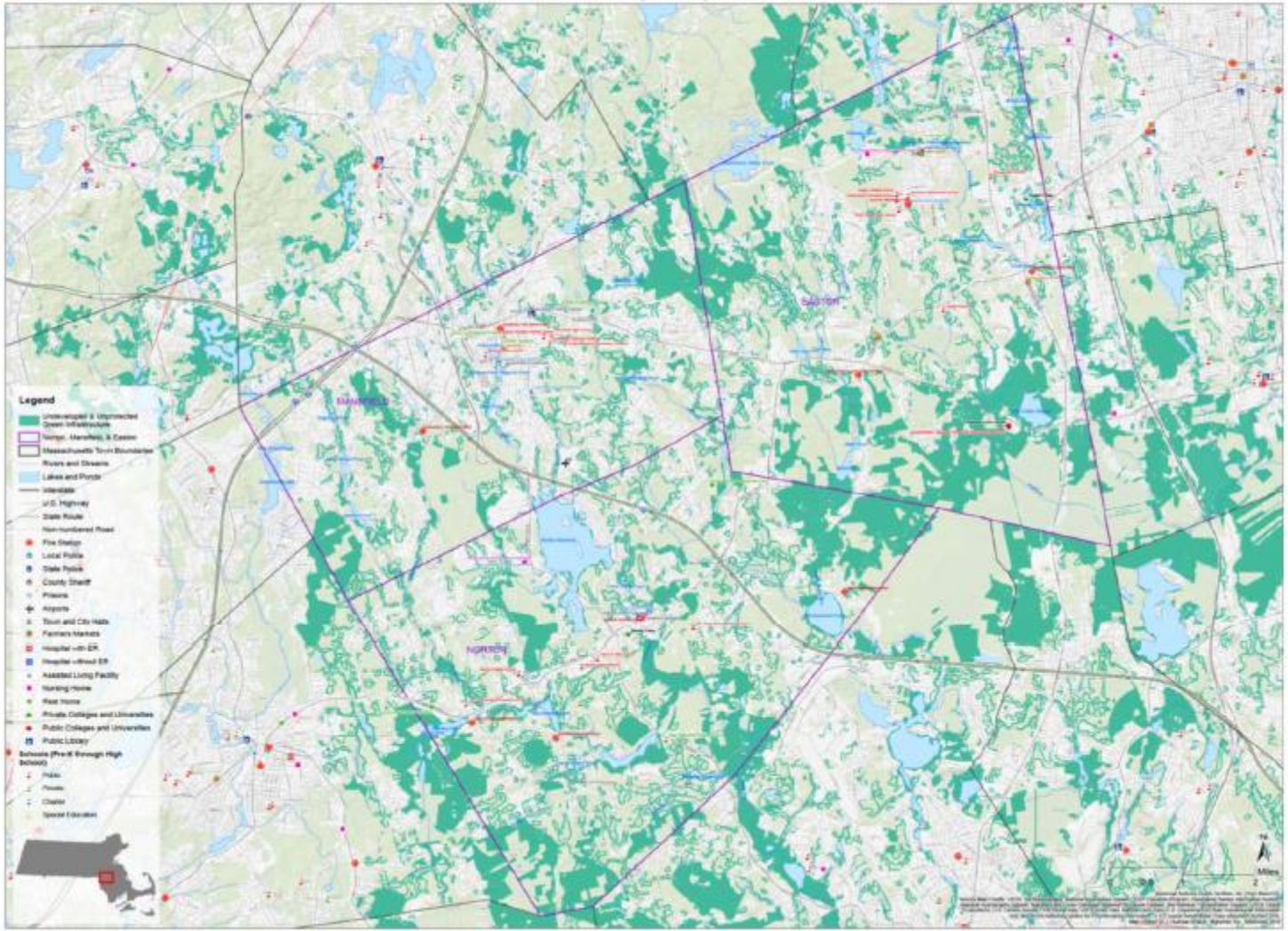
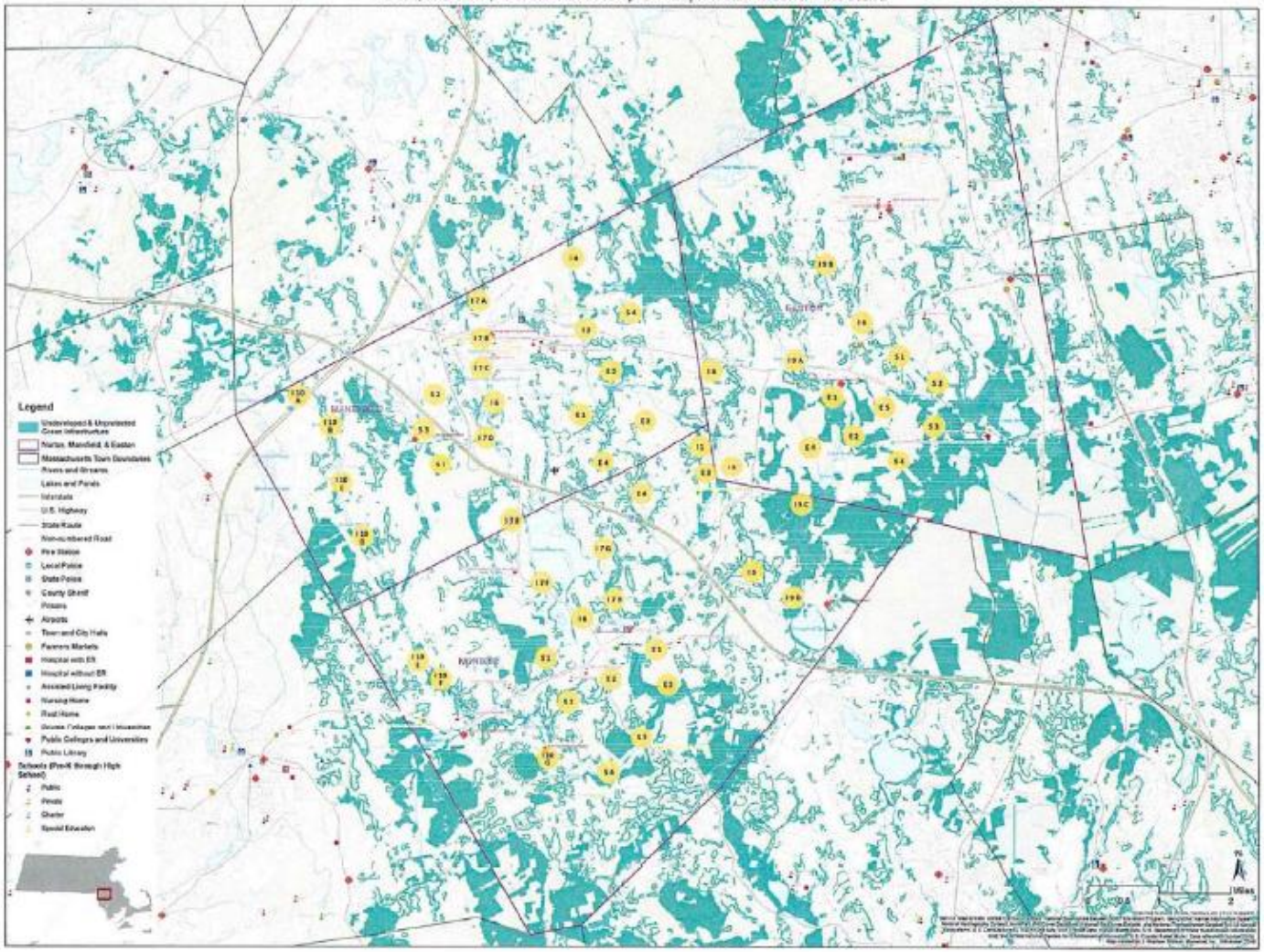
Norton, Mansfield, & Easton: Undeveloped & Unprotected Green Infrastructure



Norton, Mansfield, & Easton: Undeveloped & Unprotected Green Infrastructure



NORTON/MANSFIELD/EASTON REGIONAL VULNERABILITY CONCERNS

NFRASTRUCTURAL

I-1 Infrastructure along the Canoe River (all 3 towns) – dams, roads, bridges, GI/forests

I-2 Rolling Pine Package Treatment (Easton) – impacts on the Canoe River

I-3 East St. culvert (Mansfield) – impact on the Canoe River; replace/repair, forestry management

I-4 Assess all culverts and surroundings (Mansfield) – impacts on the rivers

I-5 Leonard St. culvert (Norton) – impact on the river

I-6 Assess the integrity of town roadway infrastructure and the GI surrounding it (all 3 towns)

I-7 Repeat the process in I-6 along all shared river and stream corridors, including:

- Rumford River (Hathaway Patterson area) – Mansfield
- Johnson St. culvert – Mansfield
- Fulton Pond Dam/West St. – Mansfield
- Willow St. culvert – Mansfield
- Route 140 South Main St. – Mansfield
- Route 140 – Norton
- Norton Reservoir Dam – Norton
- Cross St. Dam – Norton

I-8 Columbia Gas – Easton

I-9 Mulberry Meadow Brook area, Norton/Easton

I-10 Wading River area, Norton/Mansfield

- West St. – culvert (Mansfield)
- Williams St. – culvert (Mansfield)
- Balcom St. – culvert (Mansfield)
- Otis St. – culvert (Norton)
- Walker St. – culverts (2) (Norton)
- Camp Edith Reed – culvert (Norton)
- Barrowsville Pond – dam (Norton)

ENVIRONMENTAL

E-1 Work to retain/enhance the recharge capacity of the Canoe River Sole Source Aquifer (all 3 towns)

E-2 Work to improve forestry management practices town-wide/watershed-wide (all 3 towns)

E-3 Work to preserve/enhance the Canoe River Greenbelt (all 3 towns)

E-4 Work to improve groundwater quality employing nature-based solutions as appropriate (all 3 towns)

E-5 Monitor and remove invasive species (all 3 towns)

SOCIETAL

S-1 Develop greater regional capacity/facilities to serve the area during/post climate disruption related event (all 3 towns), including:

- Facility improvements (assessment needed)
- Back-up communication and communication capabilities (assessment needed)
- Adequate transportation services (assessment needed)
- Capacity to shelter pets and livestock

S-2 Promote the use of Low Impact Development (LID) practices in our shared region

S-3 Develop/Update Hazard Mitigation Plans (all 3 towns) as needed, and develop a regional element for these plans as well (similar to the MVP plan/process)

S-4 Promote awareness of vector borne diseases (tick and mosquito related) as well as tree related pests and diseases (all 3 towns)

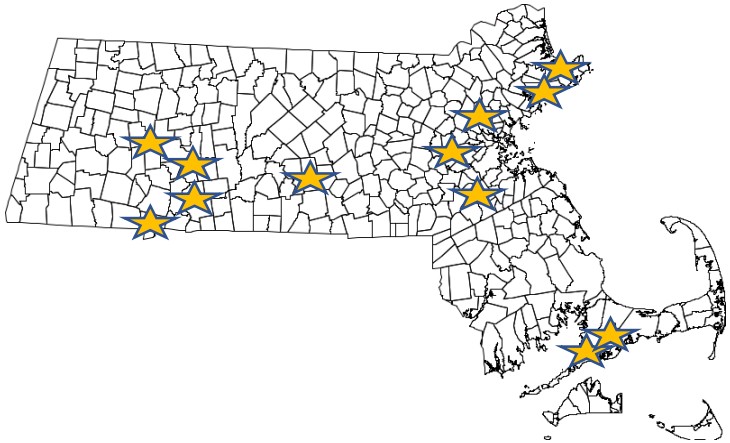
S-5 Improved management of ATV and unauthorized motor vehicles and their impact to soils in critical resource areas

Benefits:

- Contribute to watershed-scale approach to addressing water balance, water quality, natural resource stewardship and flooding concerns
- Maximize the utility of local conservation planning

How to link:

- Comprehensive/Master Plans
- Open space residential development provisions
- Forestry Management Plans
- Transfer of Development Rights
- Water Resource Protection overlay districts and Plans
- Floodplain management
- Wetland protection districts and bylaws
- Open Space Plans



Example Nature Based Solutions for Resilience

- Living Shoreline Feasibility
- Cranberry Bog restoration
- Watershed Land Protection
- Salt Marsh Restoration
- Brook Stabilization
- Tree Planting for Heat Island and reduced runoff
- Design with Nature for Flood
- Nature Based Road Stream Crossing
- Floodplain Restoration
- Green Infrastructure
- Forestry for Emergency Management and Environmental Conditions

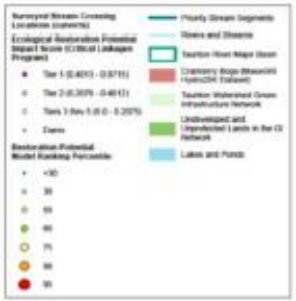
https://www.mass.gov/files/documents/2018/10/19/2017-2018-planning-grant-report-essex.pdf
https://static1.squarespace.com/static/59cbe1e04c326dc7d7bfa01c/t/5beb329e40ec9a5063154e4e/1542140578345/ECAN+MVP+2+Essex.pdf

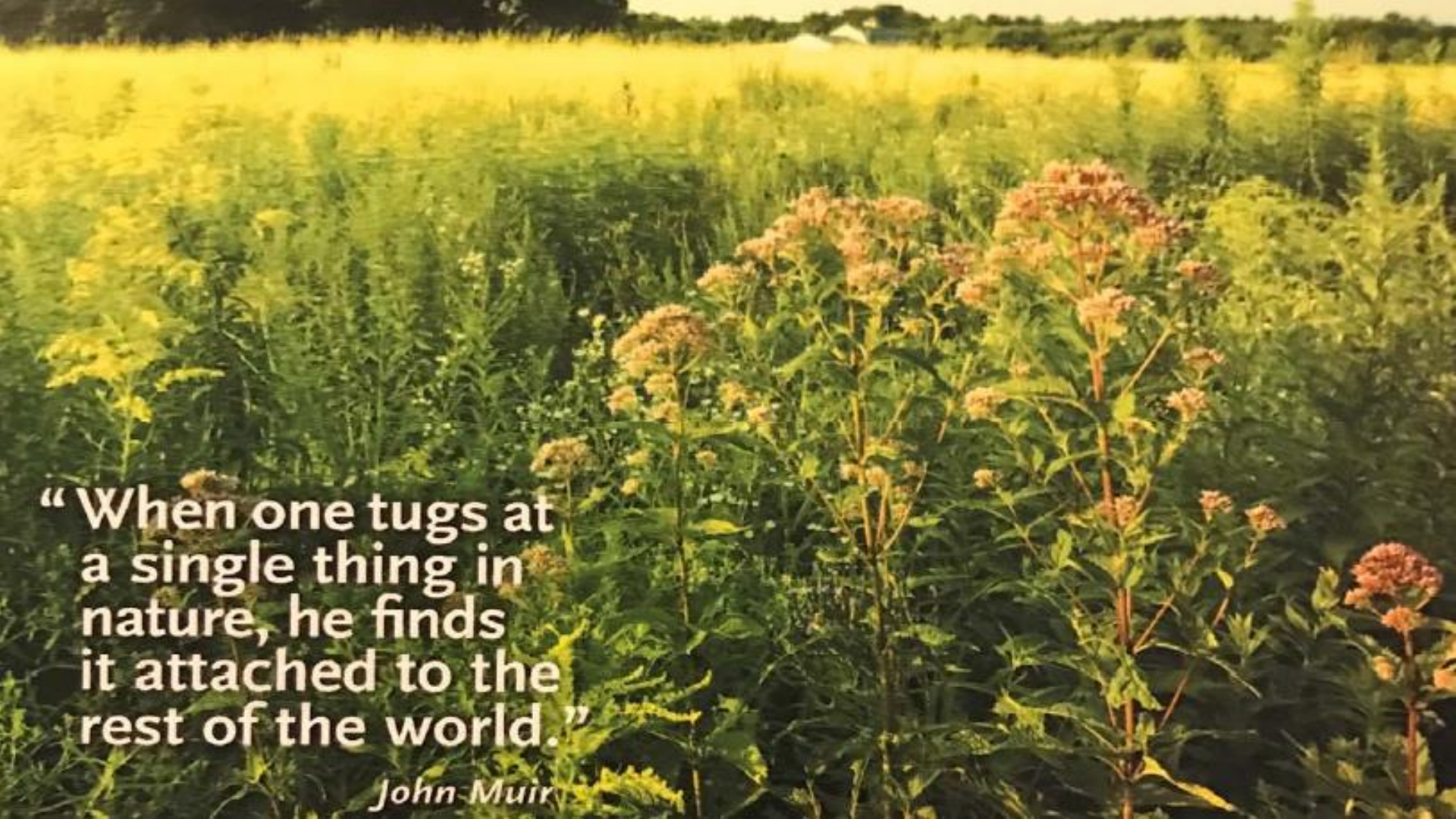
Restoration Priorities in the Taunton River Watershed

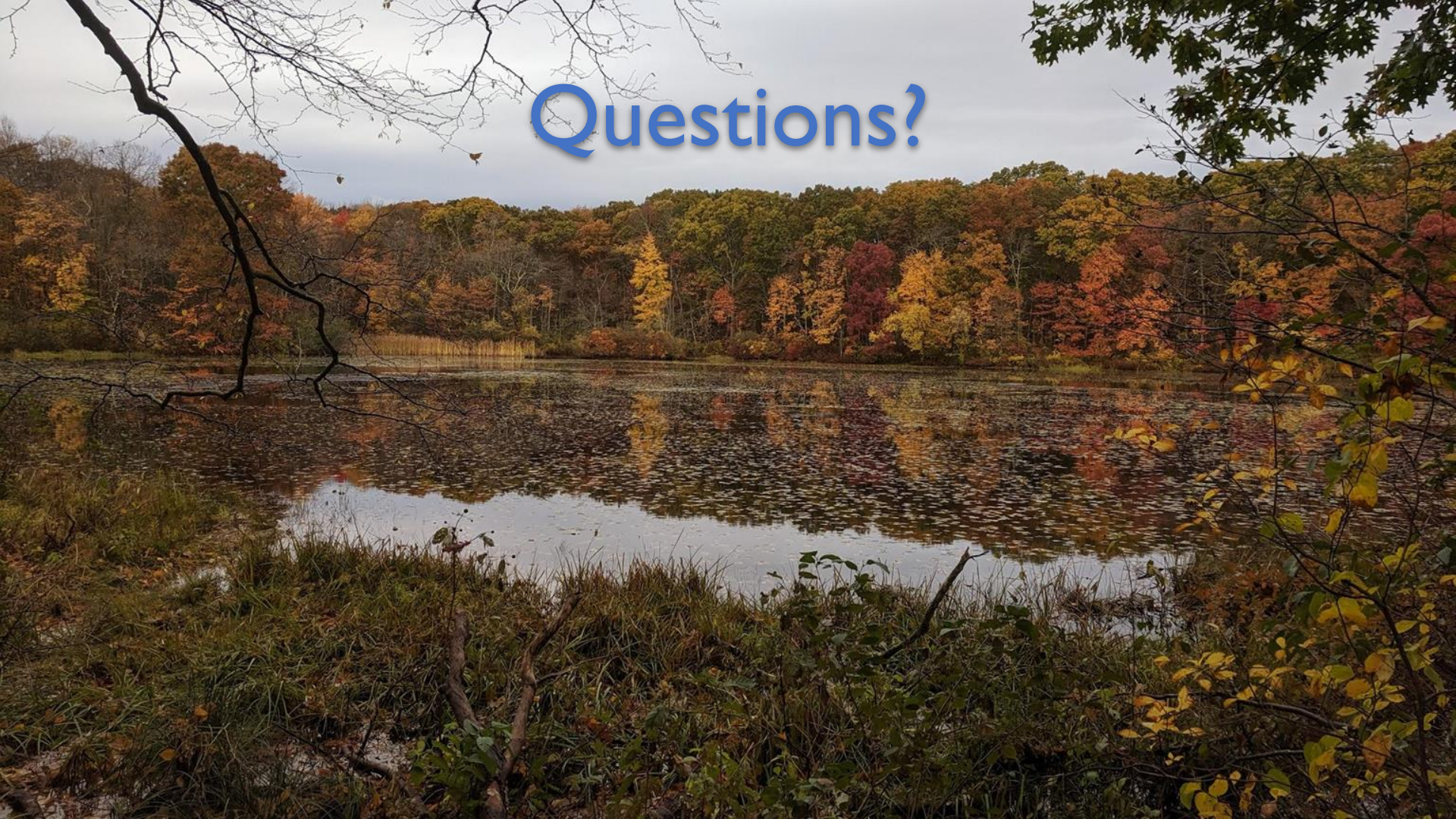
GOAL: To reconnect and restore the best riverine habitat in the Taunton River watershed.

PRIORITIES:

- Reconnect and restore spawning and migration habitat for diadromous species including alewife and blueback herring, smelt, and eel.
- Expand, restore, reconnect habitat for threatened or rare species (the bridleshiner in particular).
- Reconnect major tributaries to the mainstem.
- Focus on restoring rare habitat types, including head-of-tide, bridleshiner, and cold-water.
- Connect large wetland complexes with the rest of the watershed.




“When one tugs at a single thing in nature, he finds it attached to the rest of the world.”
John Muir


Questions?

Optional Discussion

- Are other RCP's using land protection as a resilience building strategy?
- Who has participated in MVP?
- How has participation in the MVP program helped your communities?
- MVP-like programs outside Massachusetts?

Additional Resources

- Naturally Resilient Communities: nrcsolutions.org
- EPA's Soak Up the Rain campaign: https://www.epa.gov/soakuptherain
- MA EEA Smart Growth Toolkit: https://www.mass.gov/smart-growth-smart-energy-toolkit-information-and-resources
- Mass Wildlife climate adaptation resources: https://www.mass.gov/service-details/masswildlife-and-climate-adaption
- EPA's Resilience and Adaptation in New England (RAINE): https://www.epa.gov/raine
- Mapping and Prioritizing Parcels for Resilience (MAPPR) Tool: massaudubon.org/mappr
- Low Impact Development Fact Sheets: massaudubon.org/lidfactsheets
- EPA's Opti-Tool: https://www.epa.gov/tmdl/opti-tool-epa-region-1s-stormwater-management-optimization-tool
- Green Infrastructure Cost-Benefit Resources: https://www.epa.gov/green-infrastructure/green-infrastructure-cost-benefit-resources
- LID Bylaw Review Tool: massaudubon.org/lidcost
- MVP Program: https://www.mass.gov/municipal-vulnerability-preparedness-mvp-program

Potential Funding Sources

- Complete Streets and Chapter 90 Funds
- DER Culvert Replacement Grant Program and Priority Projects assistance (dam removal/river restoration)
- EEA Planning Grants, DLTA (through your RPAs), MVP (Planning and Action Grants), DCS, MDAR, Dam and Seawall Repair Program
- Mass Environmental Trust (MET)
- DEP Sections 604 (b) and 319 Grants Programs
- NRCS, NOAA, EPA, NEP, RDA programs
- Public – Private Partnership, Foundation Grants
- MA CZM Coastal Pollution Remediation Grants (CPR) and Coastal Resiliency Grants
- MEMA Pre-distaster Hazard Mitigation Grants