

Flooding your Community with Solutions, Not Stormwater



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Agenda

Stefanie Covino

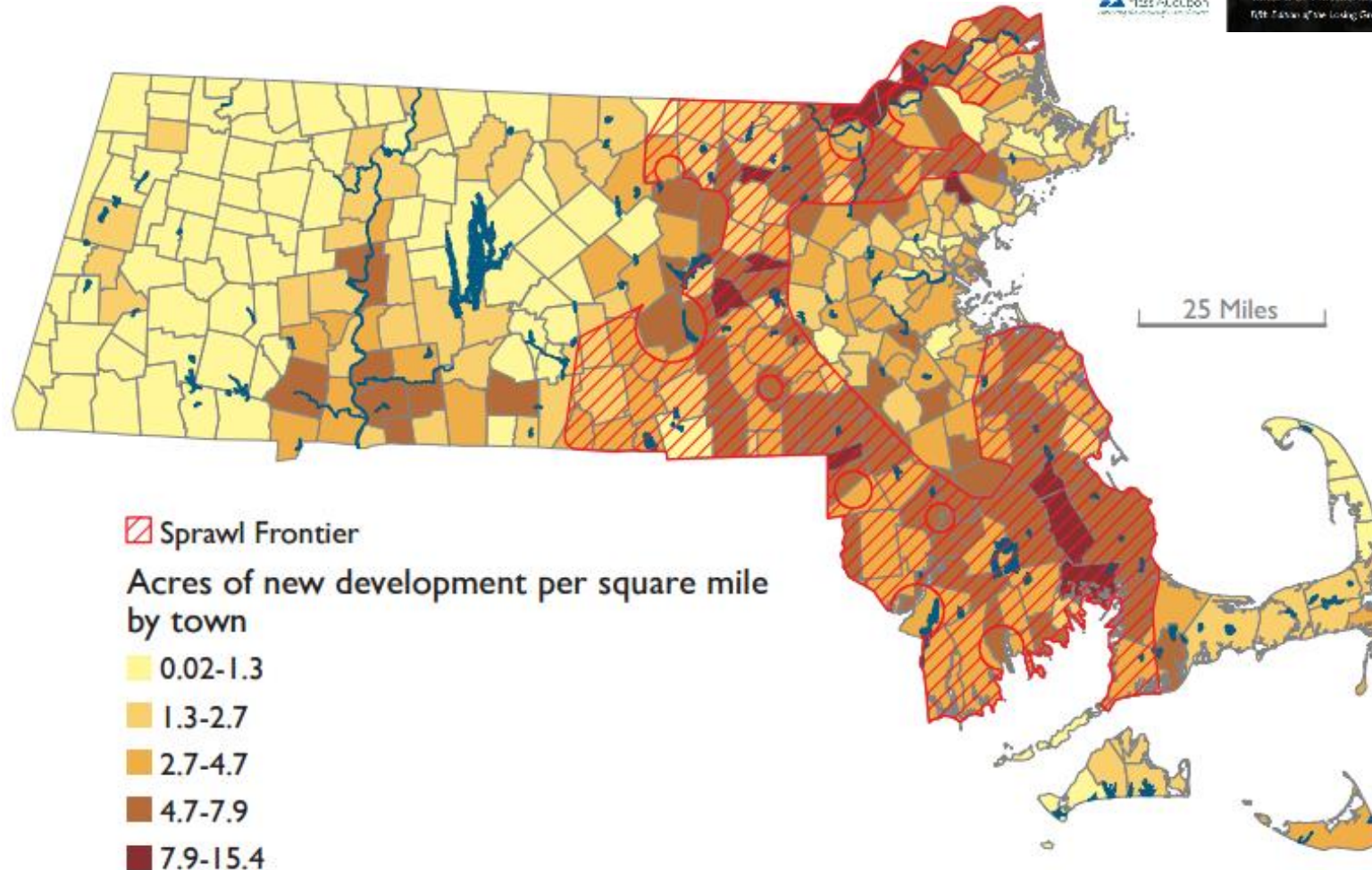
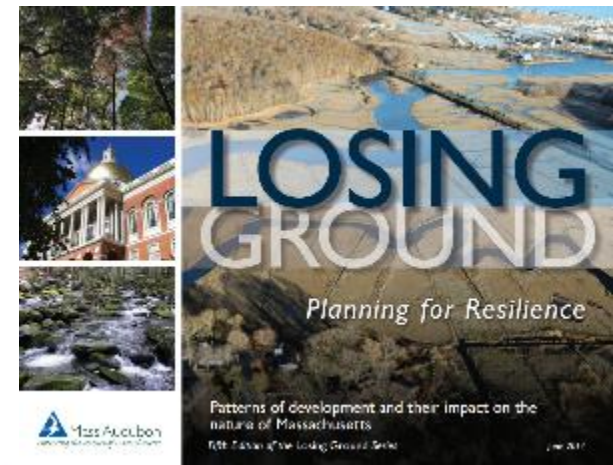
- The big picture in MA
- Climate change & development
- Nature based solutions at every scale
- Co-benefits and cost effectiveness
- Climate planning – MVP
- Tools and resources

Laurie Connors

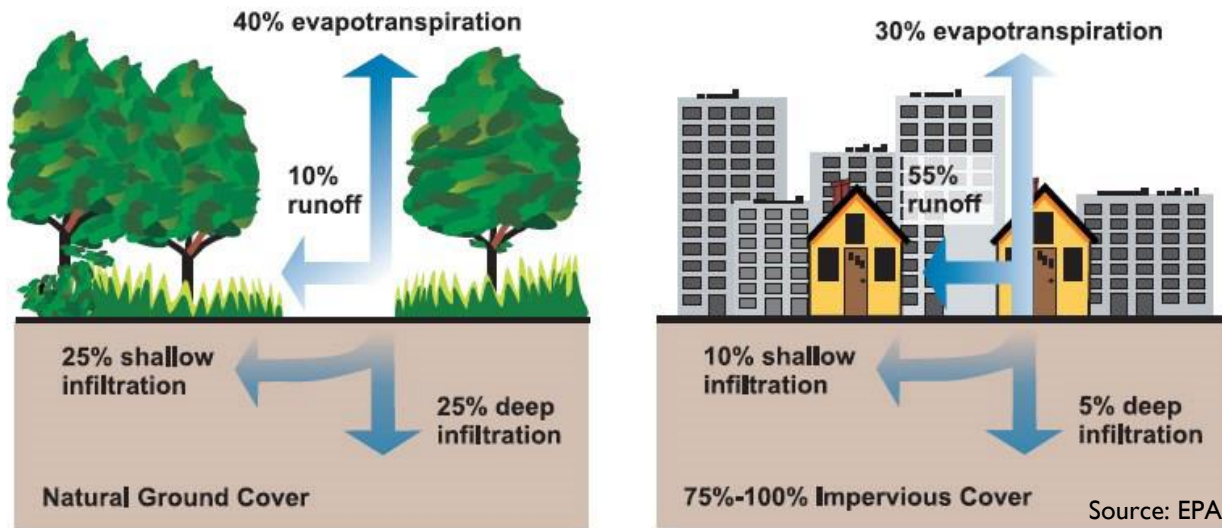
- LID project example
- Existing site conditions
- Proposed improvements
- Benefits
- Funding sources
- Next steps

What's the problem?

Development is sprawling



What's the problem?



Impervious
surface



Runoff



Large lawns



Fertilizer





flooding

IMPACTS



dry rivers



algae blooms

More Precipitation

**Total annual precipitation
has increased by:**

15%

***1.2 trillion more gallons of
water or equivalent snow falling on
Massachusetts each year.***

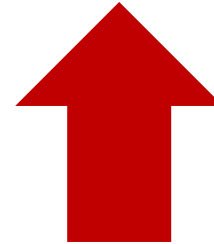
~9,700 filled Prudential Towers



Key **Observed** Climate Changes in MA

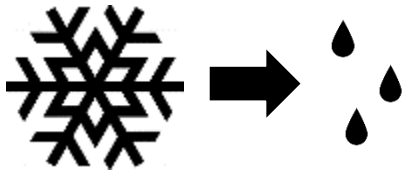


Temperature:



2.9°F

Since 1895



Growing Season:

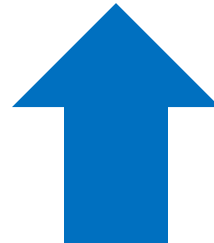


11 Days

Since 1950

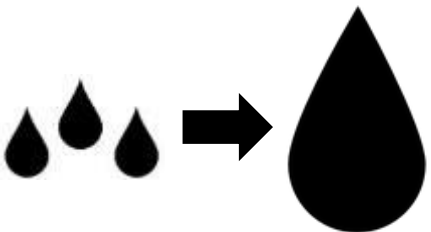


Sea Level Rise:

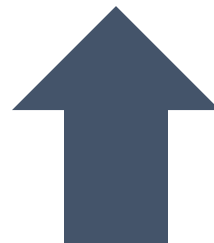


11 inches

Since 1922



Strong Storms:

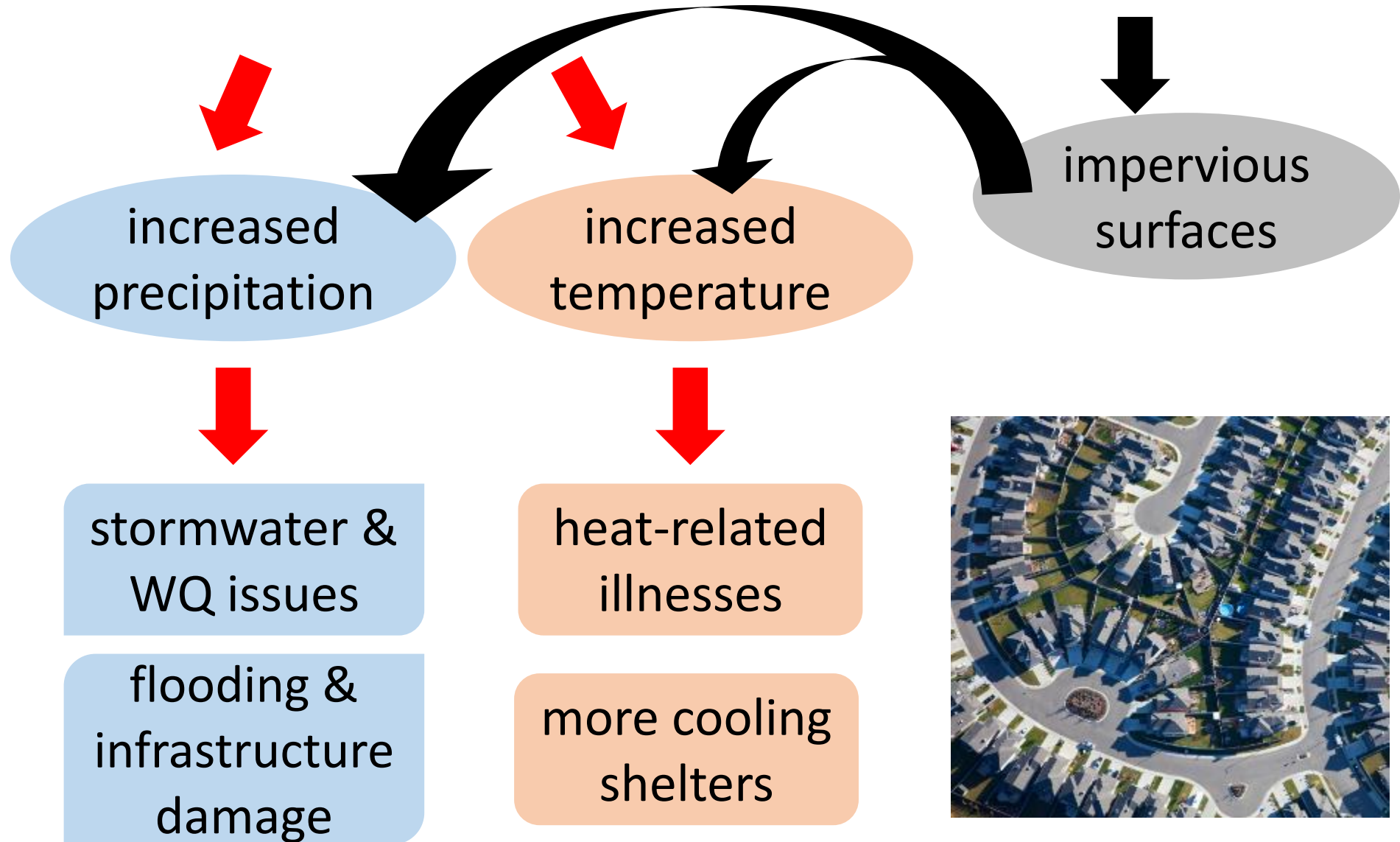


55%

Since 1958

Climate change

**Sprawling
Development**



There are real solutions.

One of the best adaptation practices is **preserving natural areas.**



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**.*

Incorporating nature-based solutions in local planning and built projects can help communities reduce their exposure to these impacts, resulting in reduced costs, economic enhancement, and **safer, more resilient communities**.

Nature based solutions keeps water where you need it most

In 2016, the City of Worcester's reservoirs went dry and spent >\$1M to purchase MWRA water.

This **takes money from our local budget** for infrastructure repairs, monitoring, education, and more.



make
sure
water that *falls*
in our
communities
stays in our
communities

What does sustainable development really look like? **Actions at every scale**

Conserve the natural green infrastructure already providing free ecosystem services

Integrate LID and green infrastructure design into development

Restore the resiliency of urban landscapes through LID in redevelopment



Conserve

Conserve the natural green infrastructure already providing free ecosystem services

Integrate LID and green infrastructure designs into current development projects

Restore the resiliency of urban landscapes through LID in redevelopment



Integrate

Conserve the natural green infrastructure already providing free ecosystem services

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Restore

Conserve the natural green infrastructure already providing free ecosystem services

Integrate LID and green infrastructure designs into current development projects

Restore the resiliency of local landscapes through LID in redevelopment



Climate Hazards



Riverine flooding



Coastal flooding



Coastal erosion



Stormwater
flooding



Heat island effects

Nature-based solutions

Conserve natural areas

Restore ecosystems

Integrate Low Impact Development

Municipal benefits



Avoided Costs



Enhanced Safety



Environmental Services

Return on Investment Studies in MA



Avoided Costs



Environmental Services

Trust for Public Land

- Outdoor recreation generates:
 - \$10 billion in consumer spending
 - \$739 million in state and local tax revenue
 - 90,000 jobs
 - \$3.5 billion in annual wages and salaries
- Agriculture, forestry, commercial fishing, and related activities generate:
 - \$13 billion in output
 - 147,000 MA Jobs
- **Conservation Projects Return \$4 : \$1 spent**



Return on Investment Studies in MA

Div. Ecological Restoration



DER aquatic restoration projects produce an average employment demand of **12.5 jobs** and **\$1.75 Million** in total economic output from each \$1 Million spent, contributing to a growing “restoration economy” in Massachusetts



Environmental Services



Enhanced Safety



Avoided Costs



Return on Investment Studies in Northeast US

Scientific Reports

- In Hurricane Sandy, wetlands reduced \$625,000,000 in direct flooding damages in New Jersey
- In New England, wetlands reduce storm damage by approximately 16%



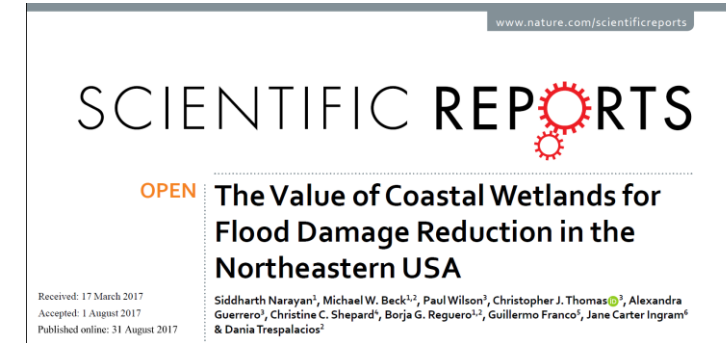
Environmental
Services



Enhanced
Safety



Avoided Costs





Municipal Vulnerability Preparedness (MVP)



State and local partnership grant to build resiliency to climate change

1. Engage
Community

2. Identify CC
impacts and
hazards

3. Assess
vulnerabilities
& strengths

4. Develop and
prioritize
actions

5. Take Action

www.mass.gov/municipal-vulnerability-preparedness-program

MVP Example: identified intersection that floods?



Bioretention bump outs & street trees can help to...

- capture & filter excess water – alleviate pressure on MS4
- improved pedestrian safety – better visibility, shorter walkway
- enhance aesthetics to encourage visitors & walking

without altering existing parking or bus stops

5 Things **Planners** Can Do

1. **Become** an MVP community & participate in the core team
2. **Talk** to your neighbors, fellow board members, and community members about climate change and nature based solutions
3. **Advocate** to adopt the Community Preservation Act or support CPA projects
4. **Adjust** local bylaws & regulations that support climate smart nature based solutions
5. **Vote** in local, state, and federal elections to promote candidates that support climate smart solutions and funding

Resources for Nature-Based Solutions

Guidance/Case Studies

- [Naturally Resilient Communities](#) successful project case studies from across the country to help communities learn and identify nature-based solutions
- [EPA's Soak Up the Rain](#) stormwater outreach tools, how-to guides and resources
- [EPA's RAINE](#) database of vulnerability, resilience and adaptation reports, plans and webpages at the state, regional and community level.
- [Climate Action Tool](#) explore adaptation strategies and actions to help maintain healthy, resilient wildlife communities in the face of climate change.

Mapping/Planning

- [Mapping and Prioritizing Parcels for Resilience \(MAPPR\)](#) ID priority parcels for protection and climate change resilience
- [Living Shorelines in New England: State of the Practice](#) and [Profile Pages for Solutions](#) are case studies, siting criteria, and regulatory challenges for coastal resilience in New England.
- [Low Impact Development Fact Sheets](#) cover valuing green infrastructure, conservation design, development techniques, regulations, urban waters, and cost calculations.

Cost/Benefit

- [EPA's Green Infrastructure cost/cost-benefit/tools](#) Database of tools for comparing solution costs
- [Massachusetts Division of Ecological Restoration's](#) economic benefits of aquatic restoration based on MA case studies

Bylaws/Ordinances

- [EEA's Smart Growth Toolkit](#) access to information on planning, zoning, subdivision, site design, and building construction techniques
- [Guide for Supporting LID in Local Land Use Regulations](#) provides a framework for communities to review their zoning, rules, and regulations for a number of factors.

Naturally Resilient Communities

nrcsolutions.org

HELP ME CHOOSE

Hazard Types

- ☐ Coastal Erosion
- ☐ Tidal Flooding
- ☐ Coastal Flooding
- ☐ Riverine Erosion
- ☐ Riverine Flooding
- ☐ Stormwater Flooding

Region

- ☐ Coastal West
- ☐ Great Lakes
- ☐ Gulf of Mexico
- ☐ Mid-Atlantic
- ☐ Midwest
- ☒ Northeast
- ☐ Pacific Northwest
- ☐ Rocky Mountain West
- ☐ Southeast
- ☐ Southwest

Community Type

- ☐ Rural
- ☒ Suburban
- ☐ Urban

Scale


- ☐ Community
- ☒ Neighborhood
- ☐ Site

Cost

- ☐ \$
- ☒ \$\$
- ☐ \$\$\$
- ☐ \$\$\$\$

SOLUTIONS
6 Results


CASE STUDIES
0 Results



Open Space Preservation through Land Acquisition

Coastal Erosion Riverine Flooding Riverine Erosion Coastal Flooding Stormwater Flooding Tidal Flooding


This strategy focuses on the public acquisition of undeveloped land to lessen...



Urban Trees + Forests

Coastal Erosion Riverine Flooding Riverine Erosion Coastal Flooding Stormwater Flooding Tidal Flooding


Urban forestry is the planned installation and management of trees within an...



Horizontal Levees

Coastal Erosion Riverine Flooding Riverine Erosion Coastal Flooding Stormwater Flooding Tidal Flooding


A horizontal levee consists of a hardened structure (levee) setback from the...



Green Streets

Coastal Erosion Riverine Flooding Riverine Erosion Coastal Flooding Stormwater Flooding Tidal Flooding


Green streets incorporate depressed planted areas, typically located between the roadway pavement...



Floodwater Detention and Retention Basins

Coastal Erosion Riverine Flooding Riverine Erosion Coastal Flooding Stormwater Flooding Tidal Flooding


A detention basin is an area that has been designed and designated...



Daylighting Rivers and Streams

Coastal Erosion Riverine Flooding Riverine Erosion Coastal Flooding Stormwater Flooding Tidal Flooding

Daylighting rivers or streams is the process of removing obstructions (such as...



LID Fact Sheets



massaudubon.org/lidfactsheets

Supporting LID in bylaws & regulations

massaudubon.org/lidcost or [download here](#)

[illegible]

Ensuring Success Webinars

MVP Tool Box

www.mass.gov/municipal-vulnerability-preparedness-program

- Working with MVP Service Providers: [View recording](#)
- Advancing Social Equity in Climate Adaptation Planning: [View recording](#)
- Alternatives for engaging your community: [View presentation slides](#)
- The importance of listening: [View recording](#)
- Bylaw Review –Encouraging Nature Based Solutions: [View recording](#)
- Nature Based Solutions: [View recording](#)
- Characterizing coastal flood hazards and increasing resilience: [View recording](#)

Thank you!



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