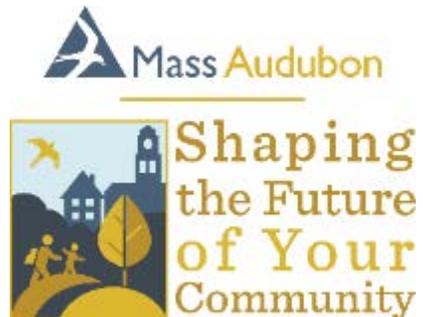


Climate Messaging and Adaptation

December 1, 2018

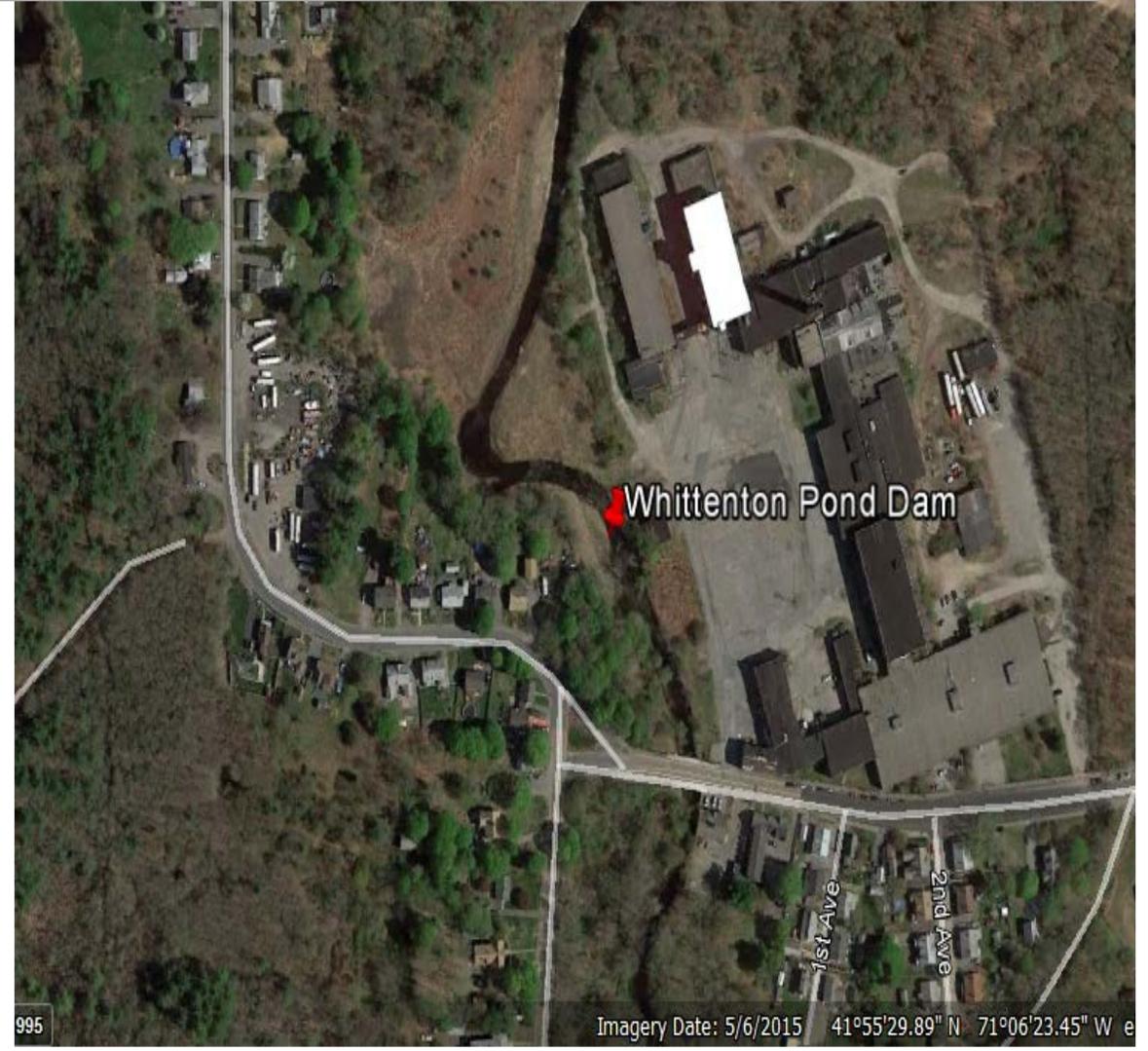
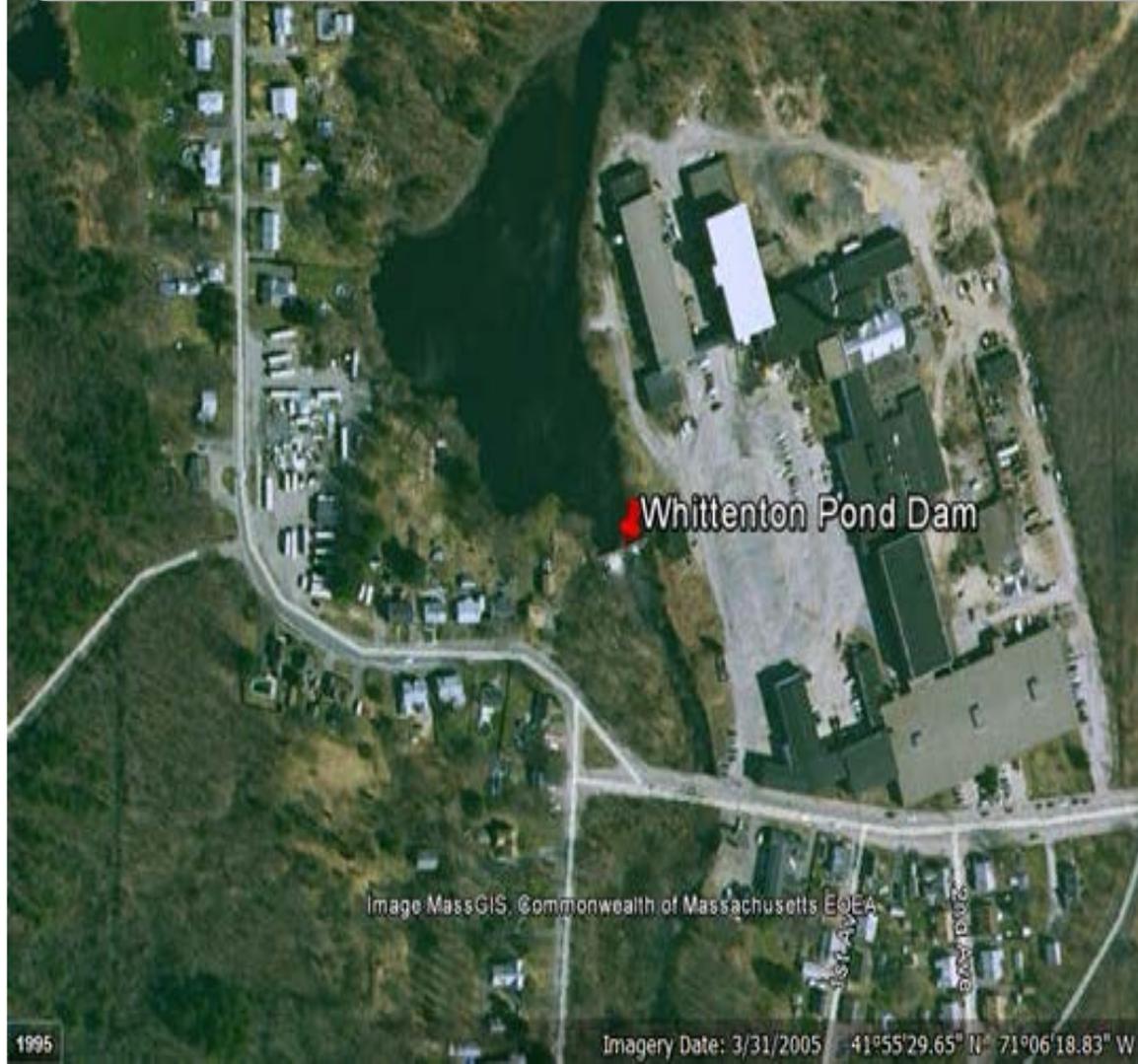


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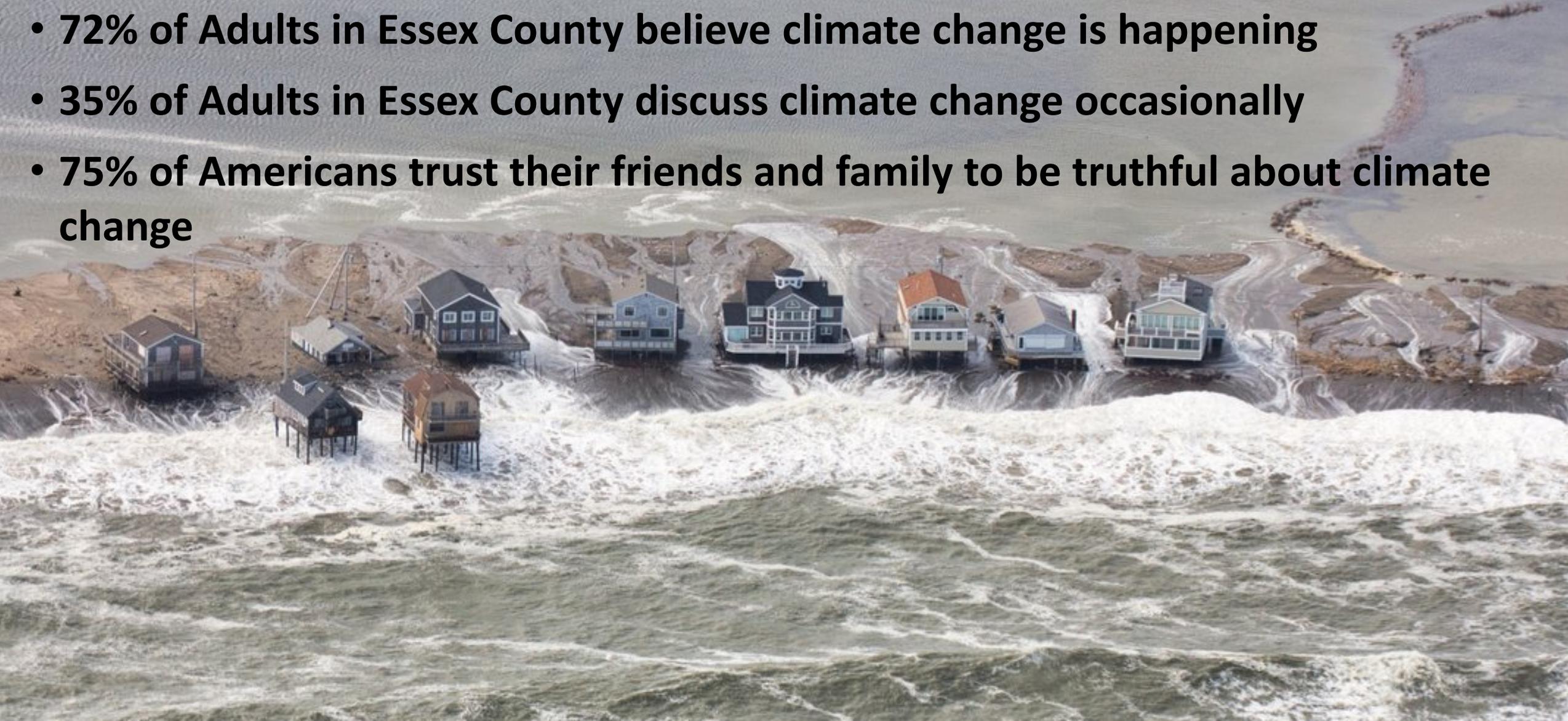


Resilience: The capacity to recover quickly; ability to spring back into shape
Adaptation: A change that makes a thing or place better suited for its environment



Communicating Climate Change – Why?!

- **72% of Adults in Essex County believe climate change is happening**
- **35% of Adults in Essex County discuss climate change occasionally**
- **75% of Americans trust their friends and family to be truthful about climate change**





Communicating Climate Change – How?!

Know your audience

What do you want them to do or change?



There is an enormous range of perceptions around climate change.

A Trusted Messenger can be key to reaching a range of people in your audience



Boston Globe – Plum Island

A scenic landscape featuring a body of water in the foreground with a small boat carrying two people. The background consists of a dense forest with trees in various shades of autumn, including oranges, yellows, and greens. The sky is clear and blue. The entire scene is framed within a rounded rectangular overlay.

Finding Common Ground on Climate Change

Common Values:

- ***Protect*** our natural resources for *future generations* and *public health*.
- ***Responsibly manage*** our natural and fiscal resources.
- ***Sense of place*** encourages people to invest locally and overcome challenges.

Preparing for climate change through natural resource management satisfies each of those values.

Recommended Resources: Yale Project on Climate Communication, Frameworks Institute, Center for Research on Environmental Decisions – Columbia University

Photo: Wicked Local Great Marsh Ipswich Chronicle



A Global Problem with Local Solutions



Local land use decisions drastically alter the severity of climate change impacts.

Focus on local climate change impacts and responses, rather than on causes. Drought in the Canoe River, MA September 2016



Do not rely on facts to carry the day!



Avoid technical jargon



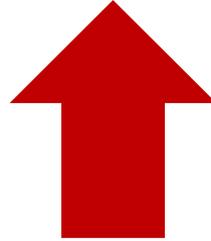


Climate change can lead to new opportunities.



Key Observed Climate Changes in MA

Temperature:

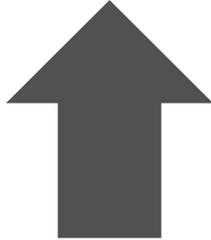


2.9°F

Since 1895

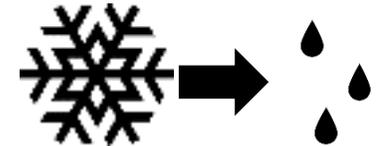


Growing Season:



11 Days

Since 1950



Sea Level Rise:

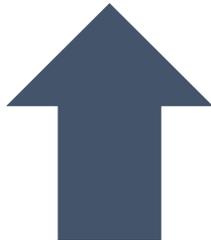


11 inches

Since 1922

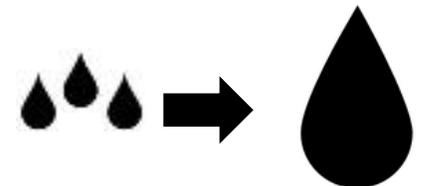


Strong Storms:



55%

Since 1958



Addressing Misconceptions



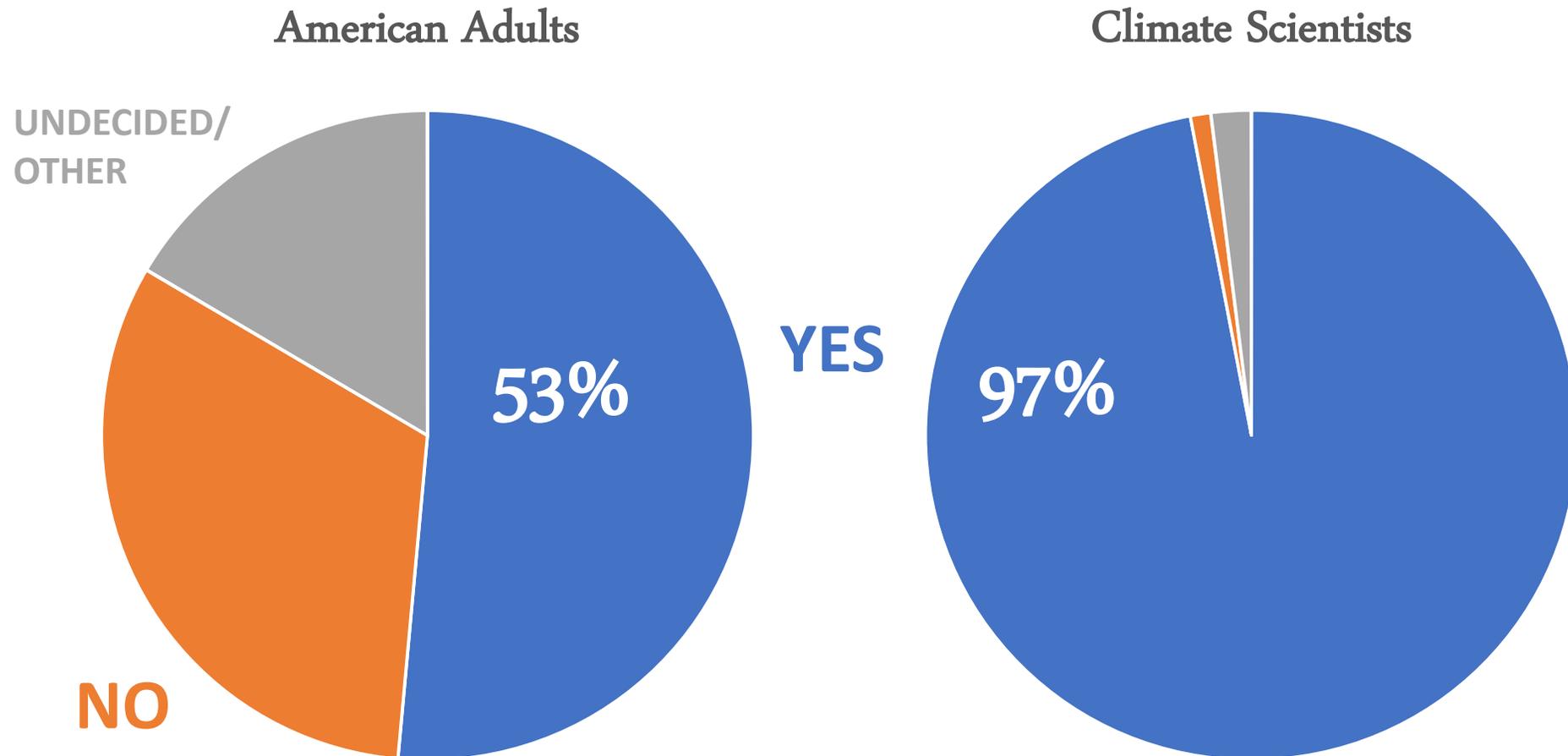
Many leaders often feel uncomfortable discussing climate change.

“Inoculate” them to common skepticism, alarmism and inaccuracies.

It improves their comfort and depth of knowledge.

Recommended resource: skepticalscience.com

Say Climate Change is Happening and Caused by Humans



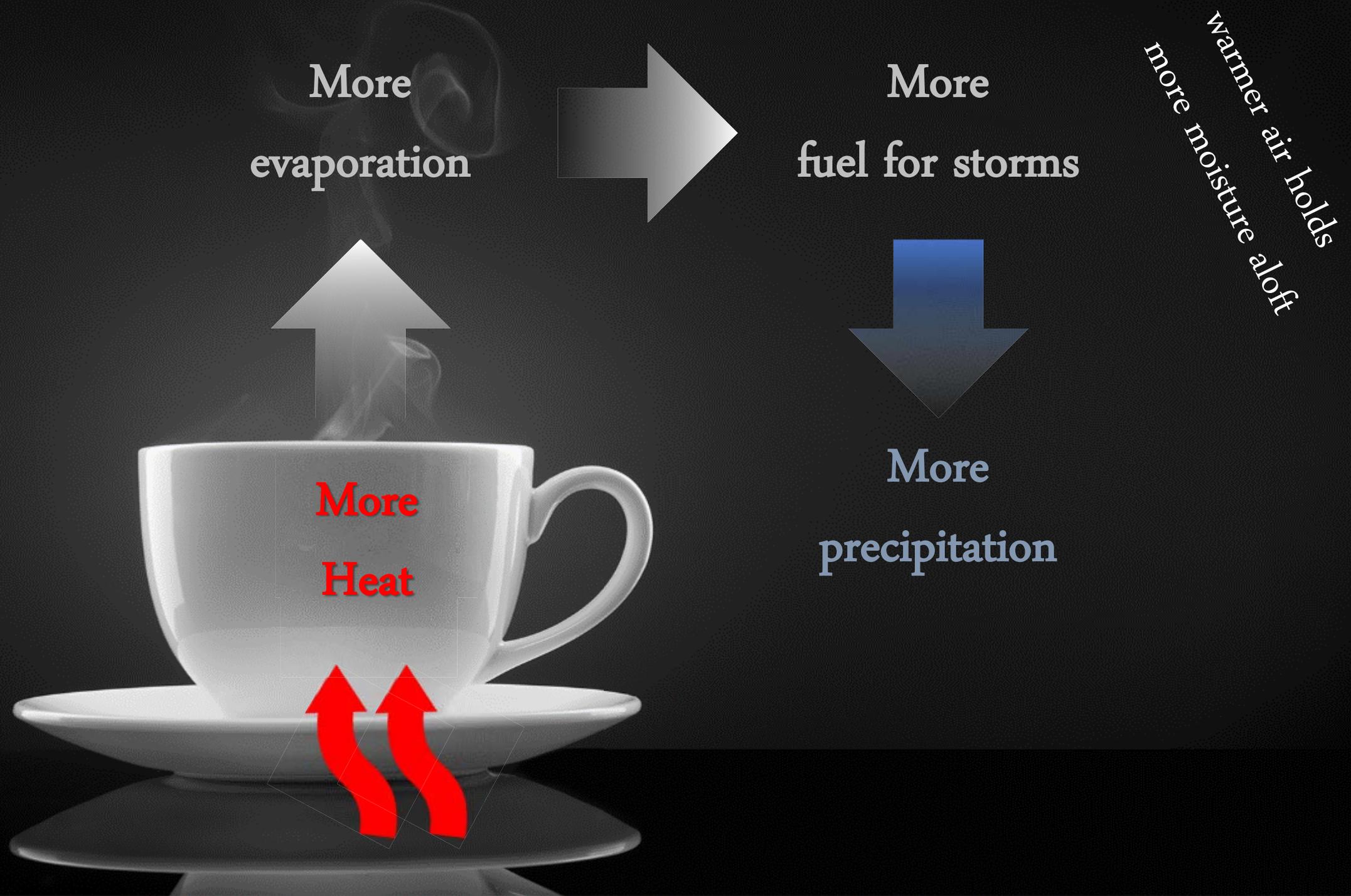
Sources: Yale Project on Climate Communication (2015) and Cook et al. (2013)



Why do rising temperatures also
bring more precipitation?



...consider your morning
coffee.





How Much 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

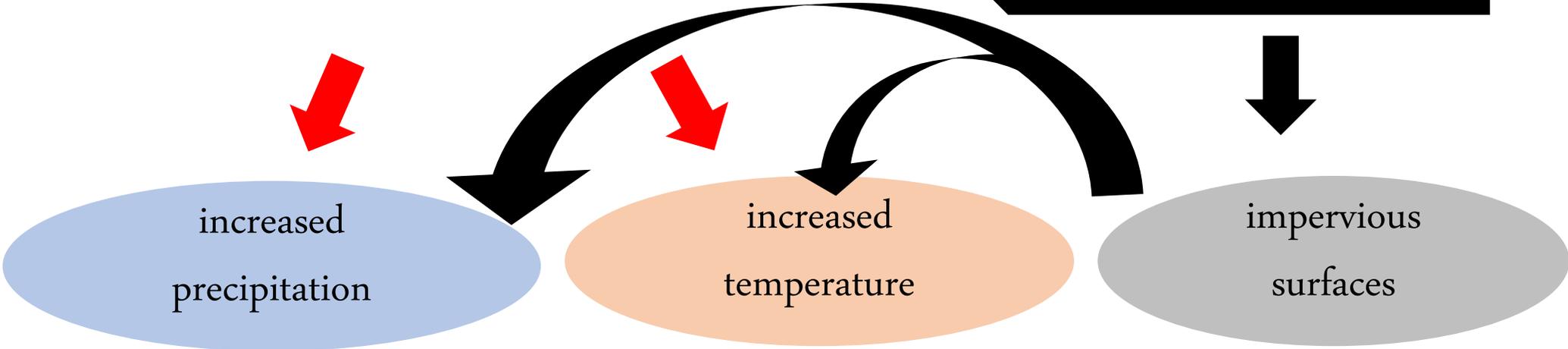
filled Prudential Towers





Climate change

Sprawling
Development



stormwater & WQ
issues

flooding & infrastructure
damage

heat-related illnesses

more cooling shelters



Impacts: dry rivers, flooding, algae blooms, beach closures



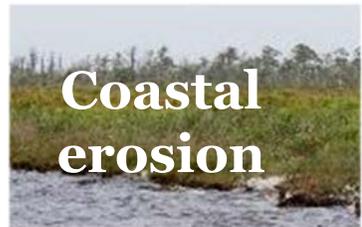
There are real solutions.

One of the best adaptation practices is preserving natural areas.





Hazards



Nature-based solutions

Open space preservation

Ecosystem restoration

Low Impact Development

Municipal benefits



Avoided Costs



Enhanced Safety



Environmental Services



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**.

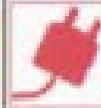
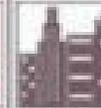
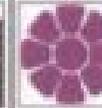
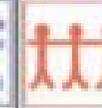


Green Infrastructure



Low Impact Development (LID)

Nature-Based Solutions Offer Multiple Benefits

Benefit	Reduces Stormwater Runoff				Increases Available Water Supply	Increases Groundwater Recharge	Reduces Salt Use	Reduces Energy Use	Improves Air Quality	Reduces Atmospheric CO ₂	Reduces Urban Heat Island	Improves Community Livability					Improves Habitat	Cultivates Public Education Opportunities
	Reduces Water Treatment Needs	Improves Water Quality	Reduces Grey Infrastructure Needs	Reduces Flooding								Improves Aesthetics	Increases Recreational Opportunity	Reduces Noise Pollution	Improves Community Cohesion	Urban Agriculture		
Practice																		
Tree Planting	●	●	●	●	○	◐	○	●	●	●	●	●	●	●	●	◐	●	●
Bioretention & Infiltration	●	●	●	●	◐	◐	○	○	●	●	●	●	●	◐	◐	○	●	●

● Yes ◐ Maybe ○ No

Nature based solutions at every scale

Rural, suburban, or urban

Conserve available open space
providing ecosystem services



Integrate concepts into new
development at neighborhood scales



Restore resilience in urban areas
at site specific scale



Avoided Costs

Land Protection as Water Protection

- Quabbin & Wachusett Reservoirs serve 2.5 million
- Over 20 years, Massachusetts Water Resources Authority spent \$130M to protect 22,000 acres of watershed lands
- Avoided ratepayer cost of \$250M on a filtration plant and \$4M/yr in operations



Avoided Costs



Preserve Services

Massachusetts Forests Mitigate Climate Change

- MA forests **sequester 14%** of the state's gross annual carbon emissions
- Average acre stores **85 tons carbon**
- Capacity **increases** over time as forests mature



**Environmental
Services**

Enhance Safety: Charles River Natural Valley Storage Area. US Army Corps of Engineers

- 8,095 Acres purchased or protected in the middle and upper Charles River watershed since 1977. Project Cost of \$8,300,000
- From 1977 through September 2016, the project has provided \$11,932,000 in flood protective services (not counting for inflation).
- Co-benefits include recreation and natural resource benefits



<https://www.usace.army.mil/Missions/Civil-Works/Flood-Risk-Management/Massachusetts/Charles-River-NVS/>

Enhanced Safety

Return on Investment Studies in MA: 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



Avoided Costs



Environmental Services



SOLUTIONS

6 Results

CASE STUDIES

0 Results

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



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...



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...



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...



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...

<http://nrcsolutions.org/>



Return on Investment Studies

Northeast US

Scientific Reports

- **Wetlands** saved \$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**



<https://www.nature.com/articles/s41598-017-09269-z>



Factors

Conventional

Better

Best

GOAL I: PROTECT NATURAL RESOURCES AND OPEN SPACE

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

Soils managed for revegetation	Not addressed	Limitations on removal from site, and/or requirements for stabilization and revegetation	Prohibit removal of topsoil from site. Require rototilling and other prep of soils compacted during construction
Limit clearing, lawn size, require retention or planting of native vegetation/naturalized areas	Not addressed or general qualitative statement not tied to other design standards	Encourage minimization of clearing/ grubbing	Require minimization of clearing/grubbing with specific standards
Require native vegetation and trees	Require or recommend invasive species	Not addressed, or mixture of required plantings of native and nonnative	Require at least 75% native plantings



The power of a bylaw: Westford

- Adopted a Conservation Subdivision bylaw in 1978
- Requires conservation and conventional plans

Benefits

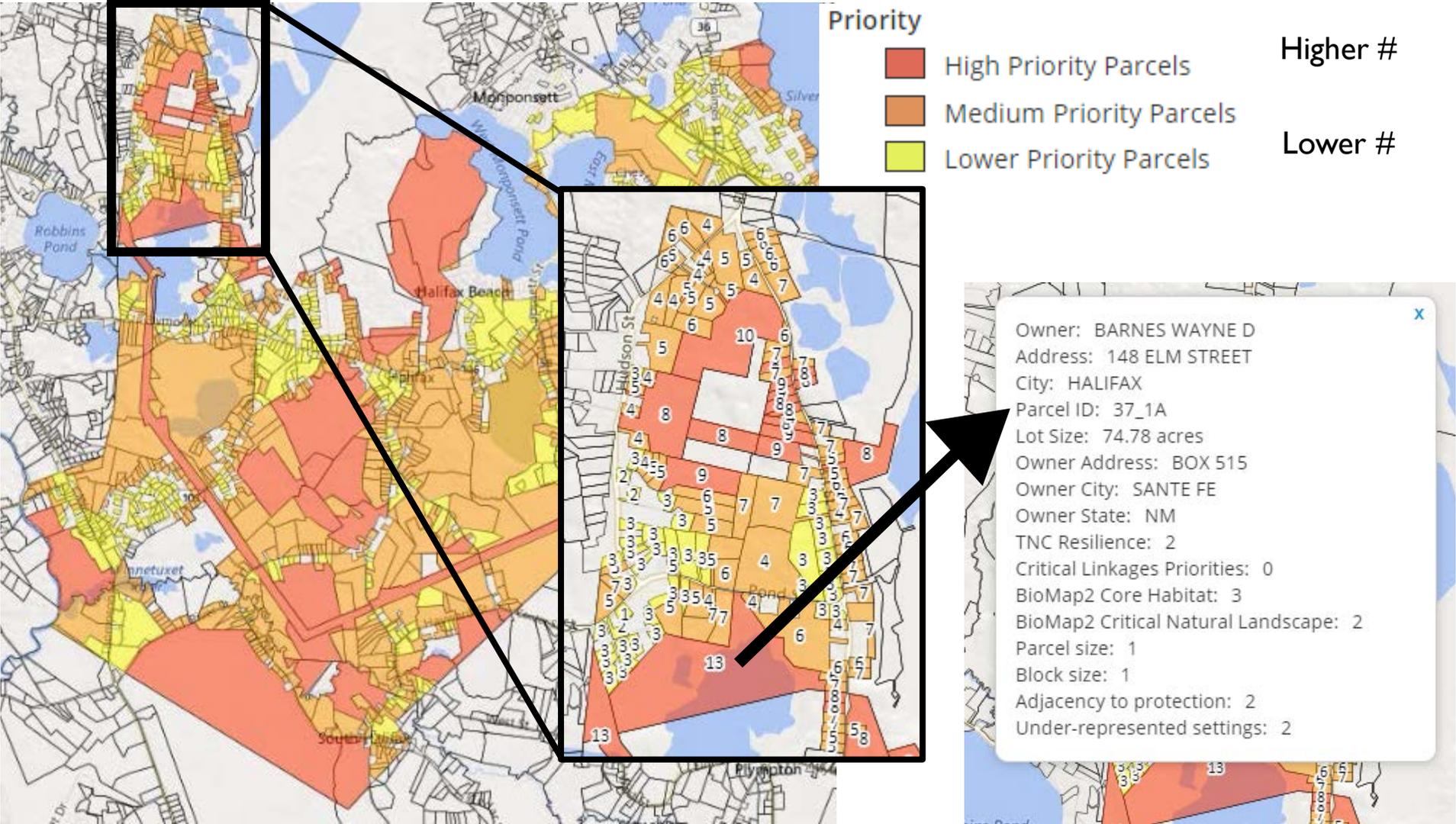
- 1,700 Acres of land Protected
- Preserved local habitat and water resources
- Created 13 miles of hiking trails & public recreation
- Town saved millions of dollars



Rail Trail in Westford

Mapping local priorities

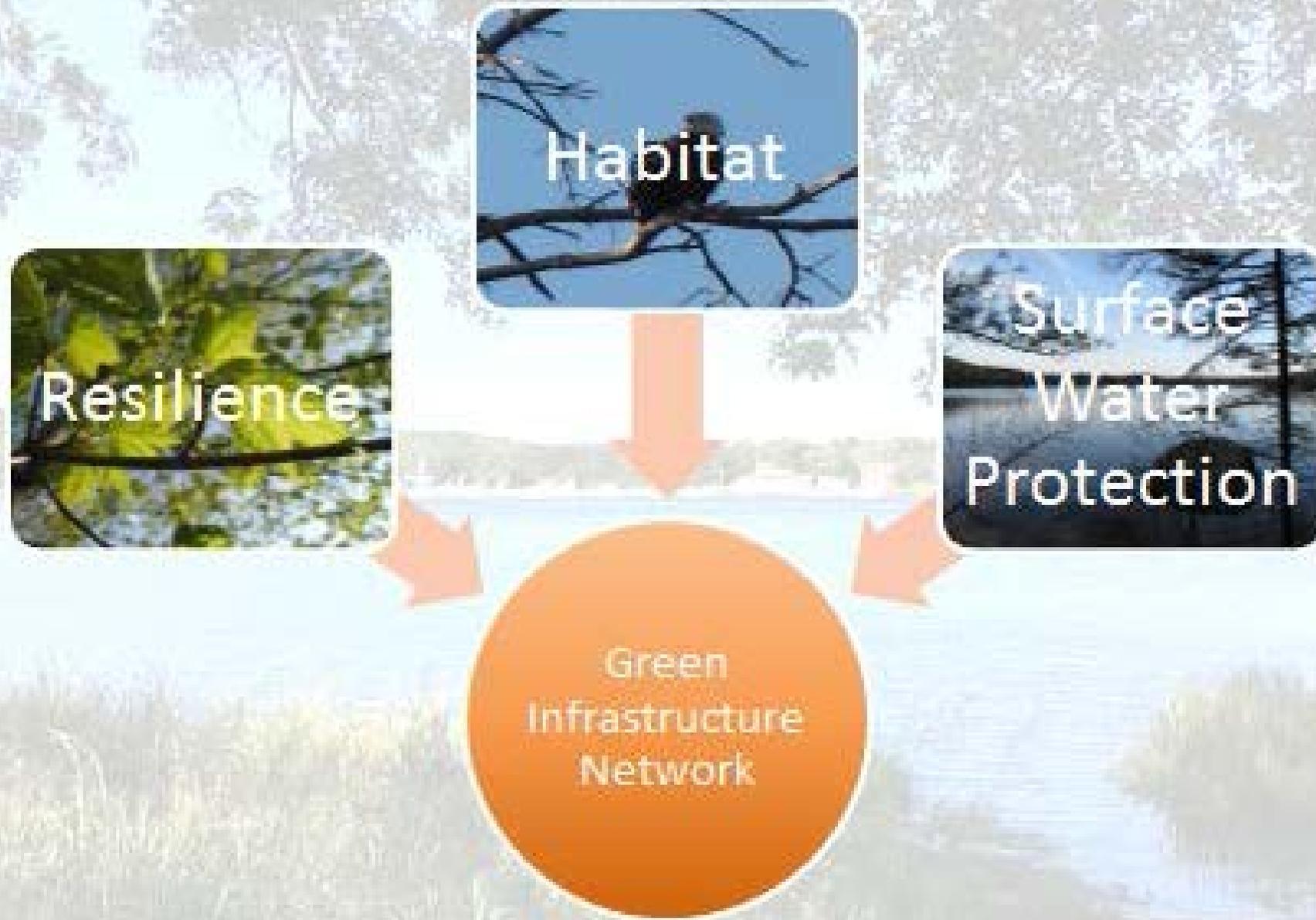
massaudubon.org/mappr



Linking Local and Regional Green Infrastructure

- Benefits of linkage:
 - Contribute to watershed-scale approach to addressing water balance, water quality and flooding concerns
 - Maximize the utility of local conservation planning
 - Control costs
 - Ecological integrity
 - Quality of life

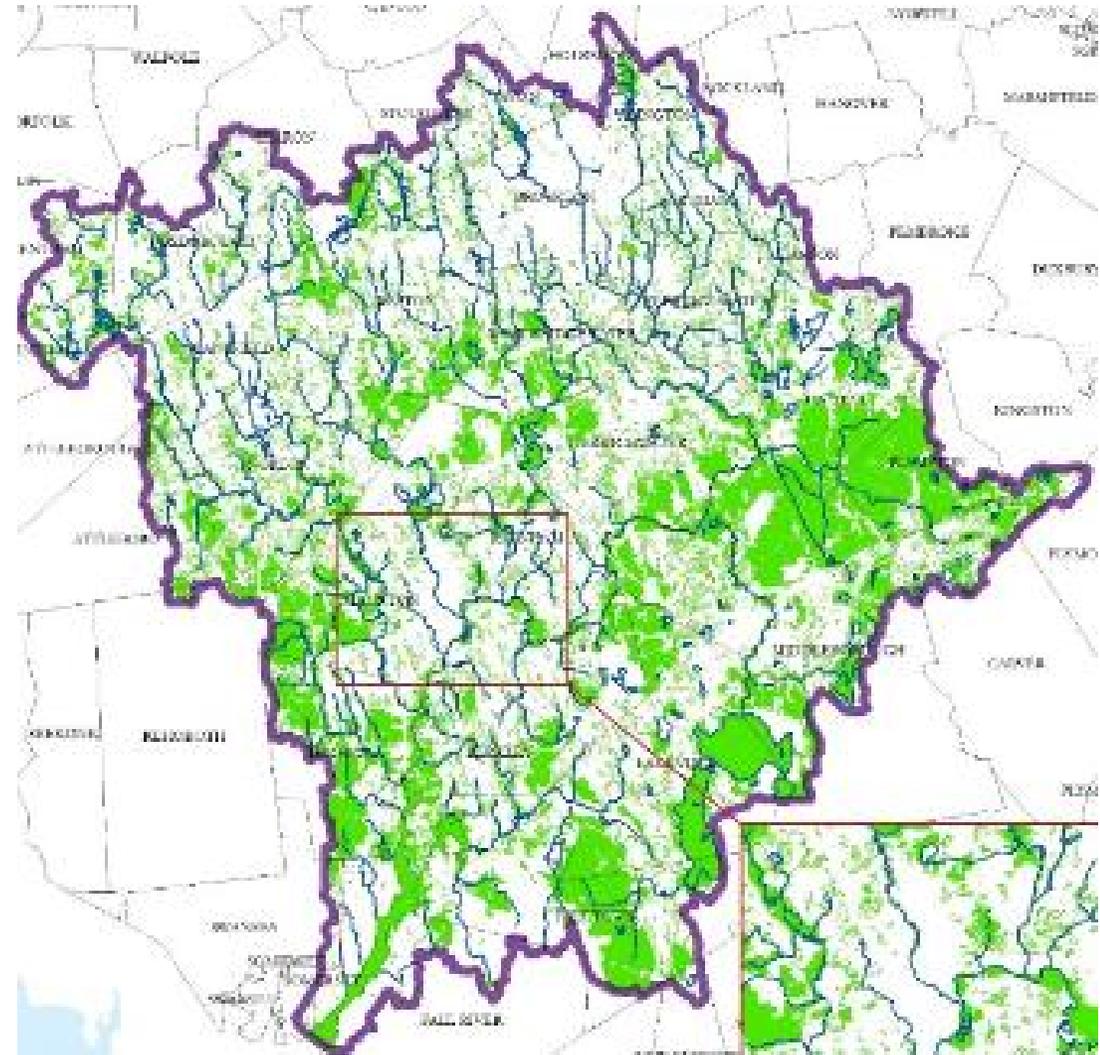




Linking Local and Regional

<http://www.srpedd.org/rtnw>

- Mechanisms for linkage:
 - Comprehensive/Master Plans,
 - Cluster subdivision requirements,
 - Open space districts,
 - Transfer of development rights,
 - Water resource protection overlay districts,
 - Floodplain management,
 - Wetland protection districts and bylaws
 - Open space plans.



MVP Is a Unique Opportunity



- Gets nature to the table
- Environment as strength and vulnerability
- Connects actions to contextual knowledge
- Regional example – share single source aquifer, consider:
 - Flooding
 - water quality
 - drought

Community
Components



Infrastructural

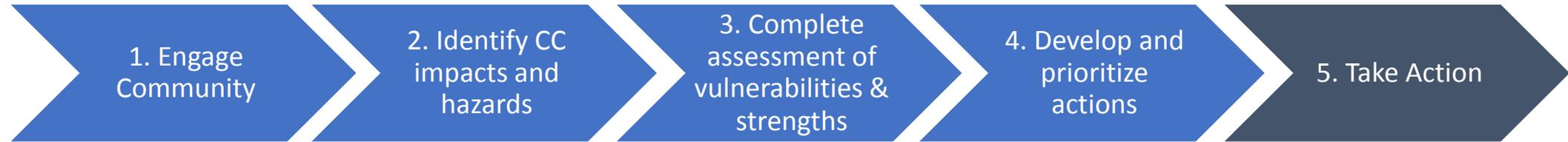


Societal



Environmental

Community Resilience Building Process

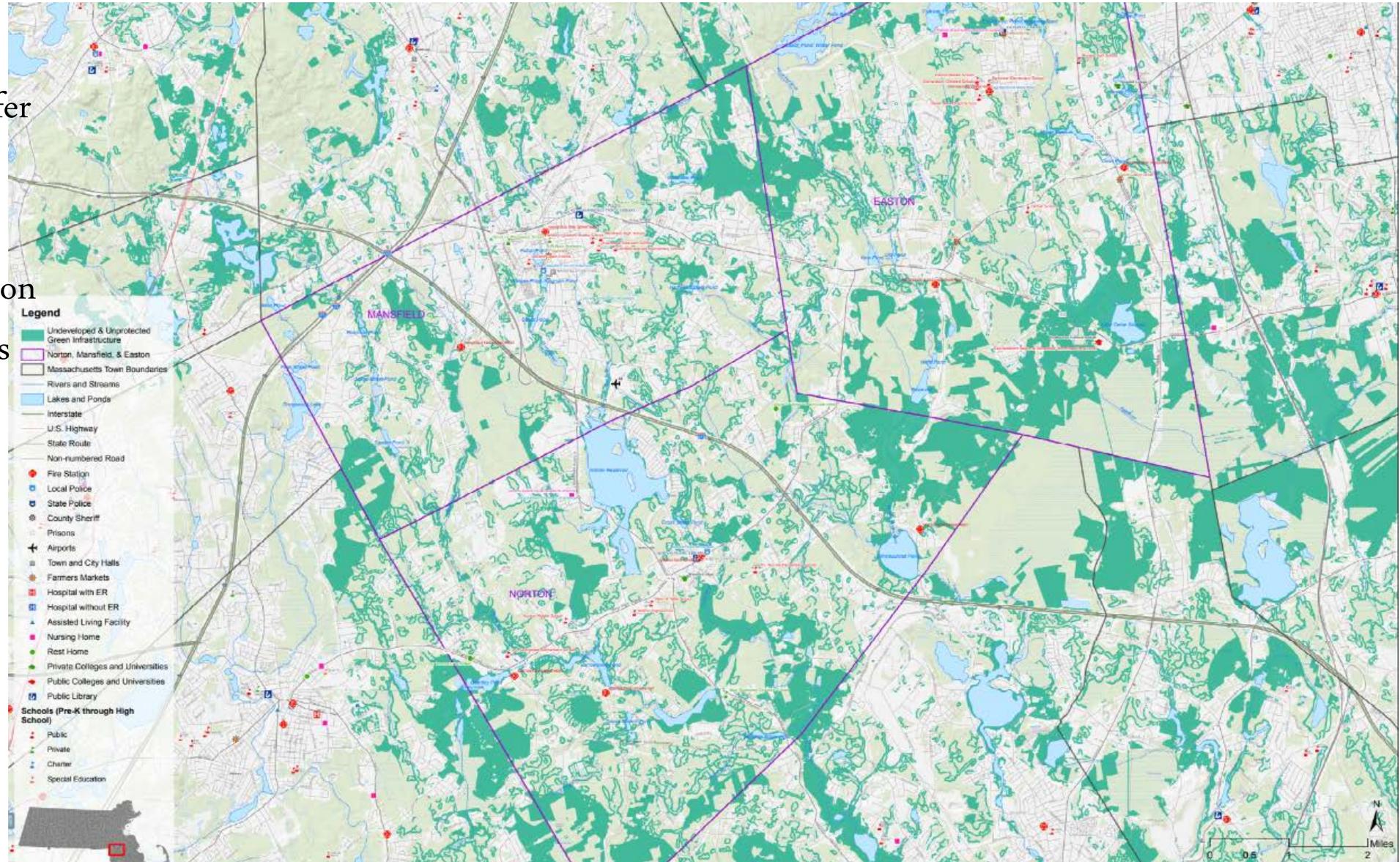


- Stakeholder-led, facilitator partners
- Venue to highlight local expertise
- All input memorialized → ongoing “living report”
- Builds consensus in identifying
 - Strengths
 - Vulnerability
 - Actions
 - Priorities



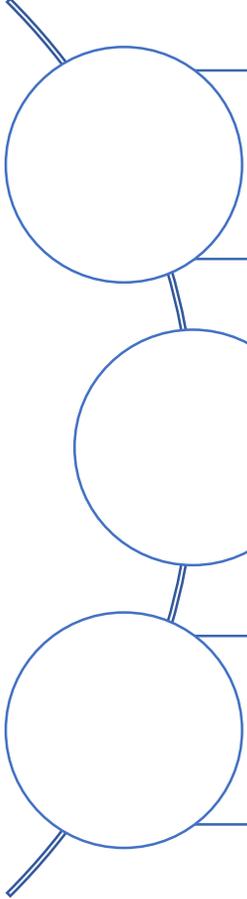
Regional Planning for Shared Resources

- Example: Sole source aquifer serves 5 towns
- Comprehensive identification of assets and vulnerabilities
- Your actions impact your neighbors – so team up!





MVP Action Grant



To implement priority climate adaptation actions identified by MVP Communities

Preference for nature-based solutions

82 Communities funded for \$5 million in year one

We Need You At the Table!

- *You* are the local open space experts
- Opportunity to share knowledge of OS benefits
- Use this program to advance your mission and promote climate resilience in your community!

EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS

Matthew A. Beaton, Secretary

Grant Announcement

Commbuys Bid # BD-18-1042-ENV-ENV01-25921

Request for Responses (RFR) ENV 18 POL 03

Dated: April 13, 2018

MUNICIPAL VULNERABILITY PREPAREDNESS GRANT PROGRAM (MVP)

IMMEDIATE NEEDS ROUND FY 18

MVP ACTION GRANT

1. Grant Opportunity Summary

A. PROPOSALS SOUGHT FOR: Financial and technical assistance for municipalities who have received designation from the Executive Office of Energy and Environmental Affairs (EEA) as a Climate Change Municipal Vulnerability Preparedness (MVP) Community ("MVP Community") to implement priority adaptation actions identified through the MVP planning process, or similar climate change vulnerability assessment and action planning that has led to MVP designation.

B. OVERVIEW AND GOALS: The Municipal Vulnerability Preparedness Grant Program supports Executive Order 569, "Establishing an Integrated Climate Change Strategy for the Commonwealth," by providing direct funding and technical support to cities and towns to complete and implement community-driven climate change vulnerability assessments and

of climate-related

Grants, which
a "MVP
which seek to
ants.

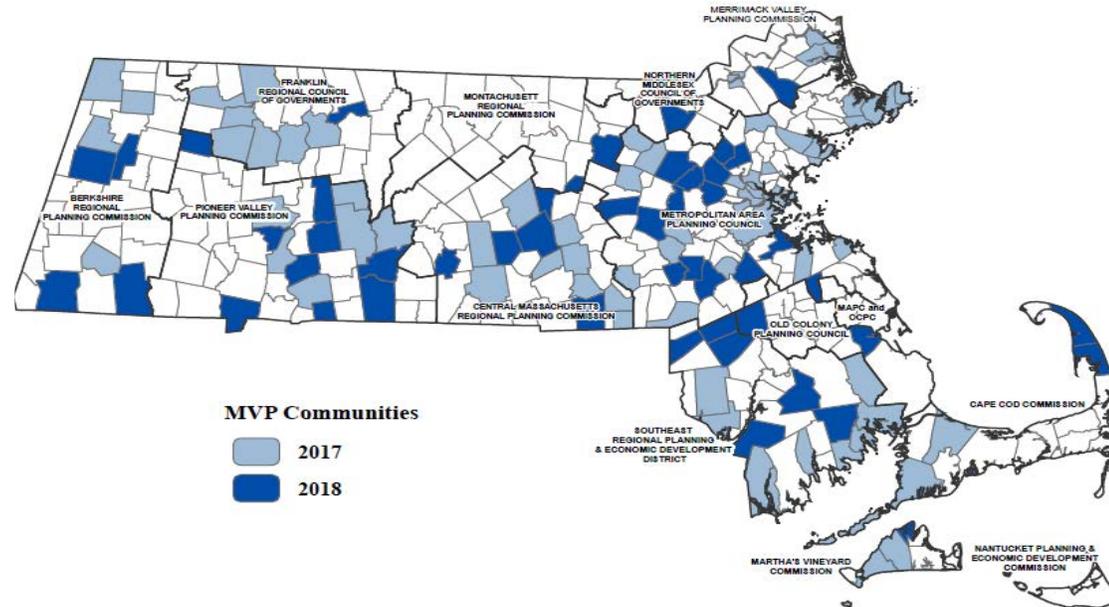
ns identified by
ne weather, sea

(See further detail
ons or strategies
systems to improve

“Projects that propose **nature-based solutions** or strategies that rely on green infrastructure or conservation and enhancement of natural systems to improve community resilience will **receive higher scores.**”

Get Involved! It's All For You and Your Community

Your Town Already Certified?	Your Town Currently in Planning Process?	Your Town Not Involved?
Pay attention to updates – go to meetings	Ask about providing information to the core team	Encourage them to apply!!!
<ul style="list-style-type: none"> Influence Action Grant Applications 	Share information in planning workshops	<ul style="list-style-type: none"> More rounds of planning and action grants pending
<ul style="list-style-type: none"> Influence plan as action items are achieved 		



5 Things You Can Do As Land Trust

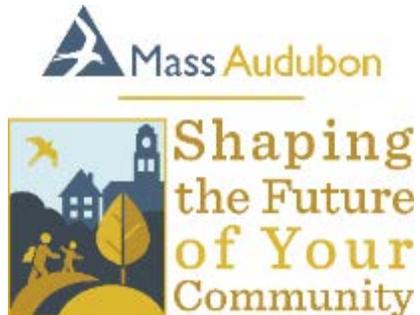
1. Encourage your community to become an MVP community & participate in the core team
2. Talk to your neighbors, local board members, and community members about climate change and nature based solutions
3. Advocate to adopt the Community Preservation Act or support CPA projects
4. Preserve land! And educate others why it's a great climate adaptation tool
5. Vote in local, state, and federal elections to promote candidates that support climate smart solutions and funding





Thank you!

Questions!



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amaiorano@massaudubon.org

Sara Burns
Sara.burns@tnc.org



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.

Ensuring Success Webinars

MVP Tool Box

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](#)

Ten things local homeowners & citizens can do

1. Divert your downspouts
2. Plant a rain garden
3. Replace impervious surfaces
4. Adopt a drain – and encourage others to
5. Don't wash your car in the driveway



6. Pick up pet waste
7. Reduce fertilizer and pesticide use
8. Replace lawn with native plants
9. Reduce lawn watering and mowing
10. Pick up leaf litter (compost/dispose of properly)

Tips for Communicating Climate



1. Lead with politically neutral messages
2. Find trusted spokespeople to deliver your messages
3. Focus on local climate change impacts and responses, rather than on causes
4. Avoid technical jargon
5. Select Photos that bring your message to life

<http://climatechange.lta.org/recommendations-for-communicating/>

Common Pitfalls to Avoid When Communicating Climate

1. Believing facts will carry the day
2. People need to know and care about everything you do
3. Communicating the same way with every audience
4. Not knowing or being clear about what you want people to do differently
5. Assuming the problem is finding the “right” words
6. Forgetting that climate change is personal for audiences

[Source:https://static1.squarespace.com/static/59cbe1e04c326dc7d7bfa01c/t/5a2deda1419202de2eb7dd07/1512959396180/MassECAN+CCCommunications+workshop_reduced.pdf](https://static1.squarespace.com/static/59cbe1e04c326dc7d7bfa01c/t/5a2deda1419202de2eb7dd07/1512959396180/MassECAN+CCCommunications+workshop_reduced.pdf)