


# Land Use Futures – Options and Effects on Water Resources

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 Mass Audubon

 Shaping  
the Future  
of Your  
Community

# Shaping The Future of Your Community Program

Created in 2009 to implement Losing Ground recommendations

Assists communities chart a more **sustainable future** through customized community workshops and direct assistance



## Shaping the Future of Your Community

# Overview

- **Land and Water – Future in a Changing Climate**
  - Valuing natural lands for resiliency and ecosystem services
- **Applying Future Scenarios – Informing and motivating action**
  - Sprawl
  - Imperviousness and water
  - Resilient Lands
- **Regional Partnership Applications**
  - Narragansett Bay Watershed
  - Resilient Taunton Watershed Network
- **Related tools for local conservation**



1. *HOW MIGHT OUR LANDSCAPE CHANGE OVER THE NEXT 50 YEARS?*
2. *WHAT ARE THE POSSIBLE CONSEQUENCES FOR ECOSYSTEMS AND PEOPLE?*
3. *WHAT ACTIONS COULD HELP SUSTAIN IMPORTANT ECOSYSTEM FUNCTIONS AND SERVICES IN THE FACE OF CHANGE?*



Connected Communities

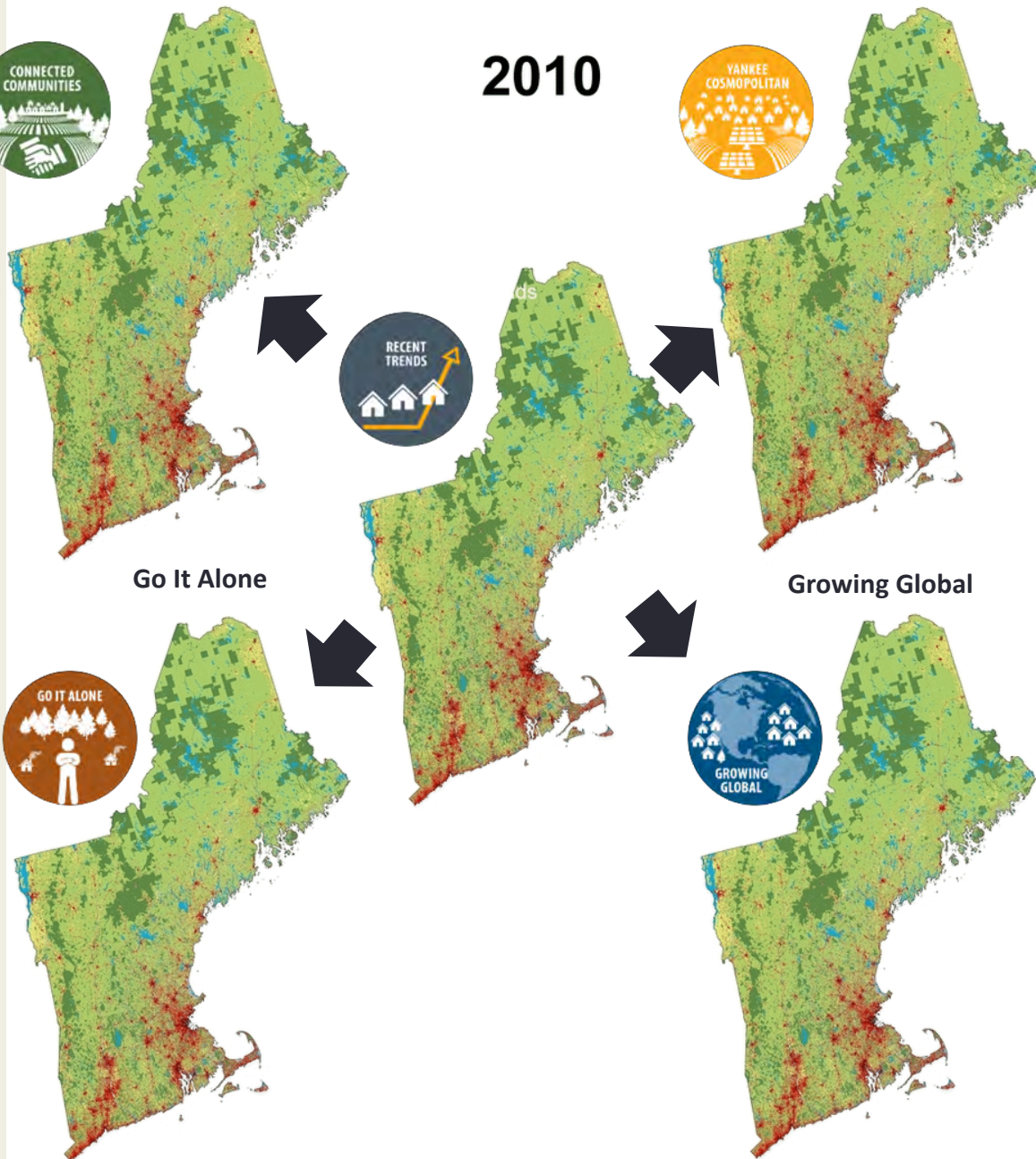
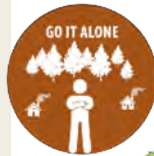
Yankee Cosmopolitan

2010



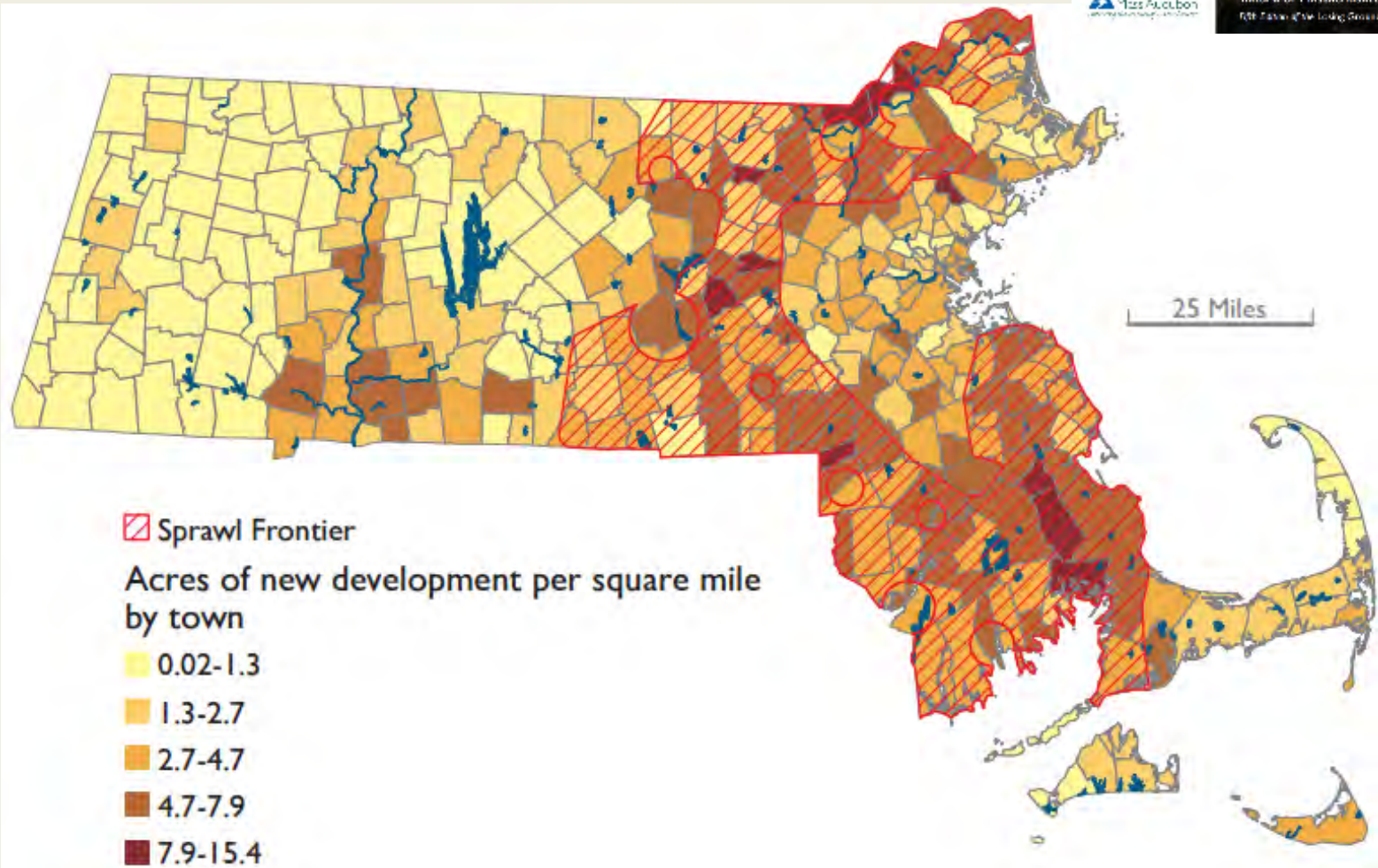
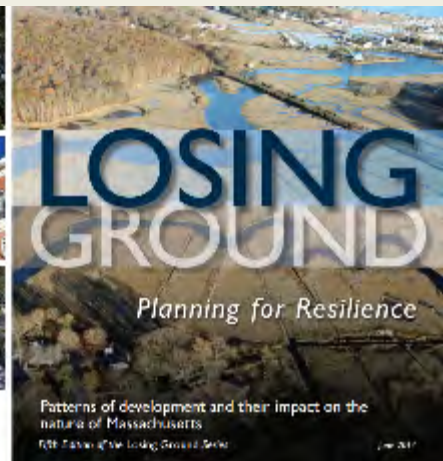
Go It Alone

Growing Global

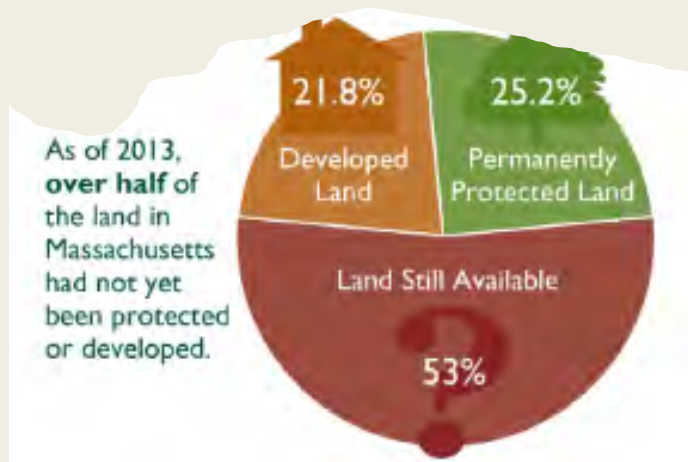


# What's the problem?

Development is sprawling



# Losing Ground



## Planning for the Future



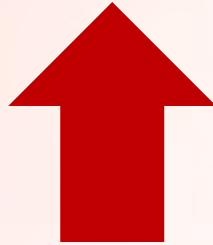
of the remaining unprotected land is of **high conservation value**.  
(BioMap 2)

As development pressures increase, we can plan our land use for both a **strong economy** and a **safe, healthy environment**.



# Our climate is already changing

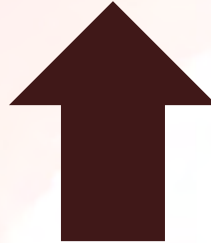
**Temperature:**



**2.9°F**

Since 1895

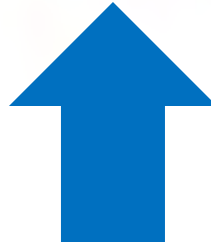
**Growing Season:**



**11 Days**

Since 1950

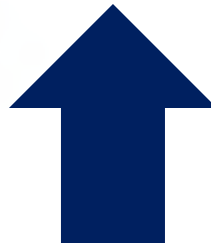
**Sea Level Rise:**



**11 inches**

Since 1922

**Strong Storms:**



**55%**

Since 1958



**Climate change**

**Sprawling  
Development**

increased  
precipitation

increased  
temperature

impervious  
surfaces

stormwater &  
WQ issues

flooding &  
infrastructure  
damage

heat-related  
illnesses

fish and  
aquatic life  
impacts



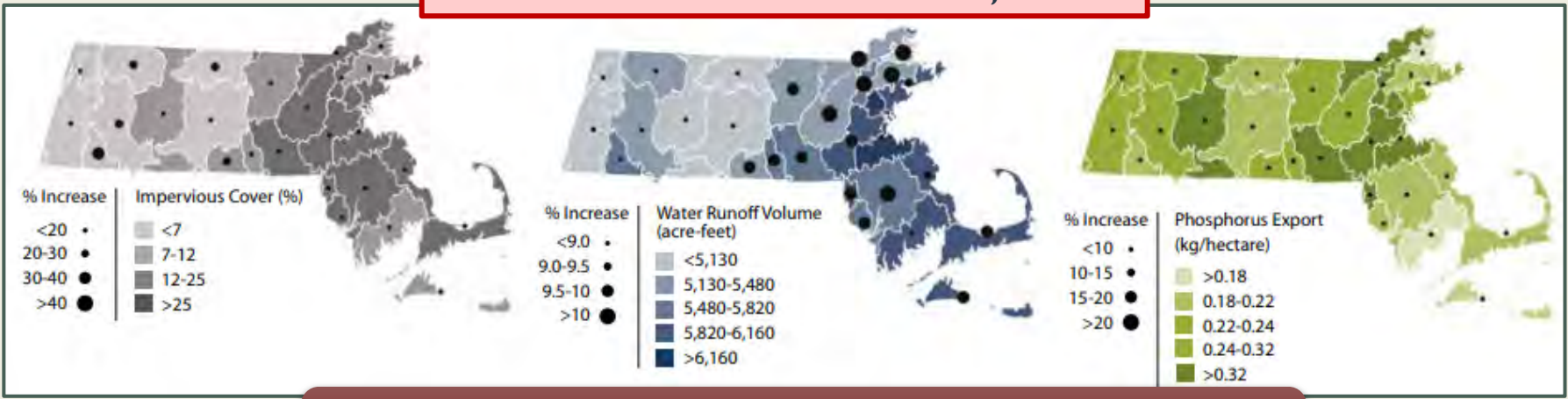
# Natural lands for Resiliency and Values

- Carbon sequestration
- Clean Water
- Flood prevention
- Habitat
- Tourism
- Recreation
- Health
- Property Values
- Quality of Life

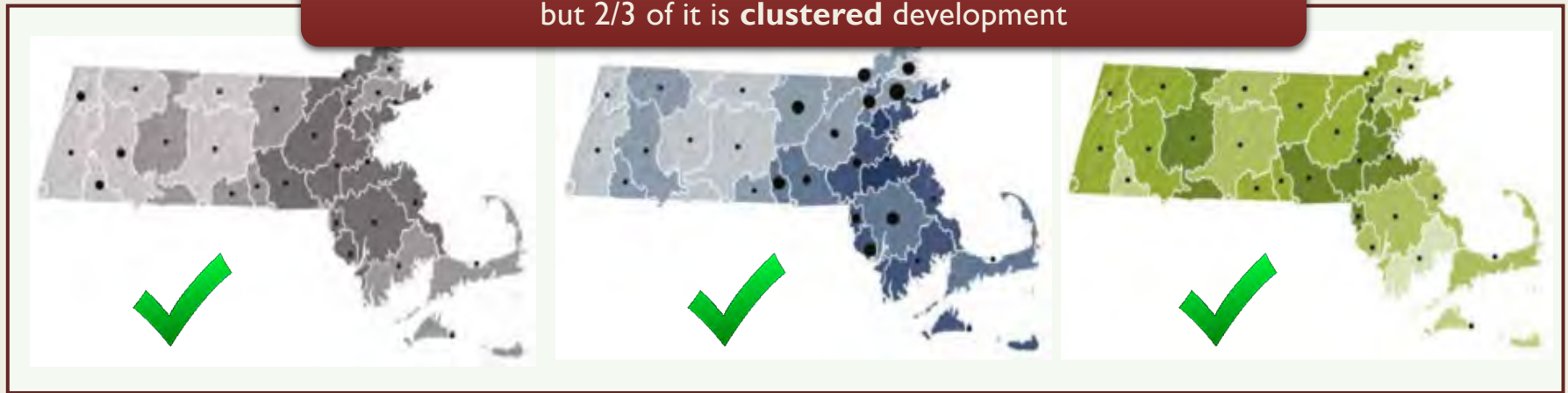


# The Value of Green: Imperviousness, Runoff, Nutrients

If we continue to follow recent trends, in 2060:



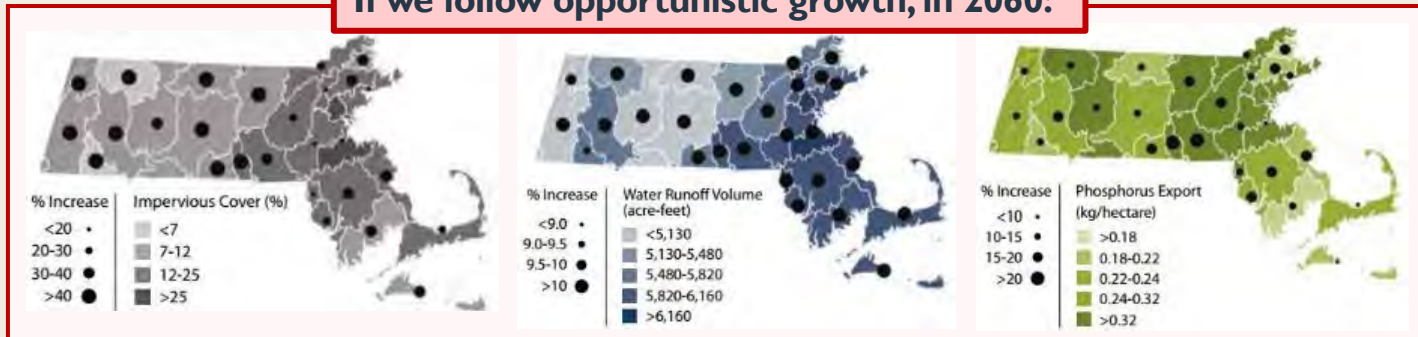
These allow for nearly the **same amount of development**, but 2/3 of it is **clustered** development



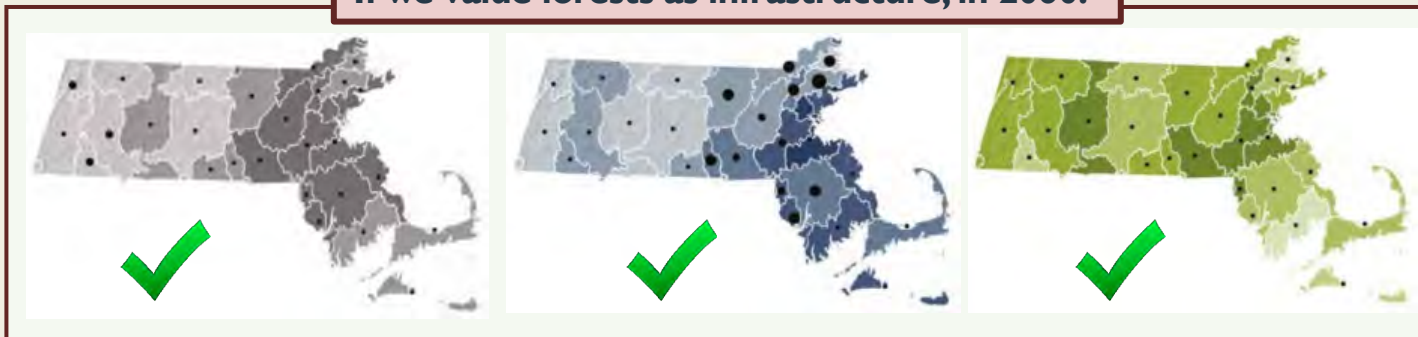


# The Value of Green: Imperviousness, Runoff, Nutrients

If we follow opportunistic growth, in 2060:



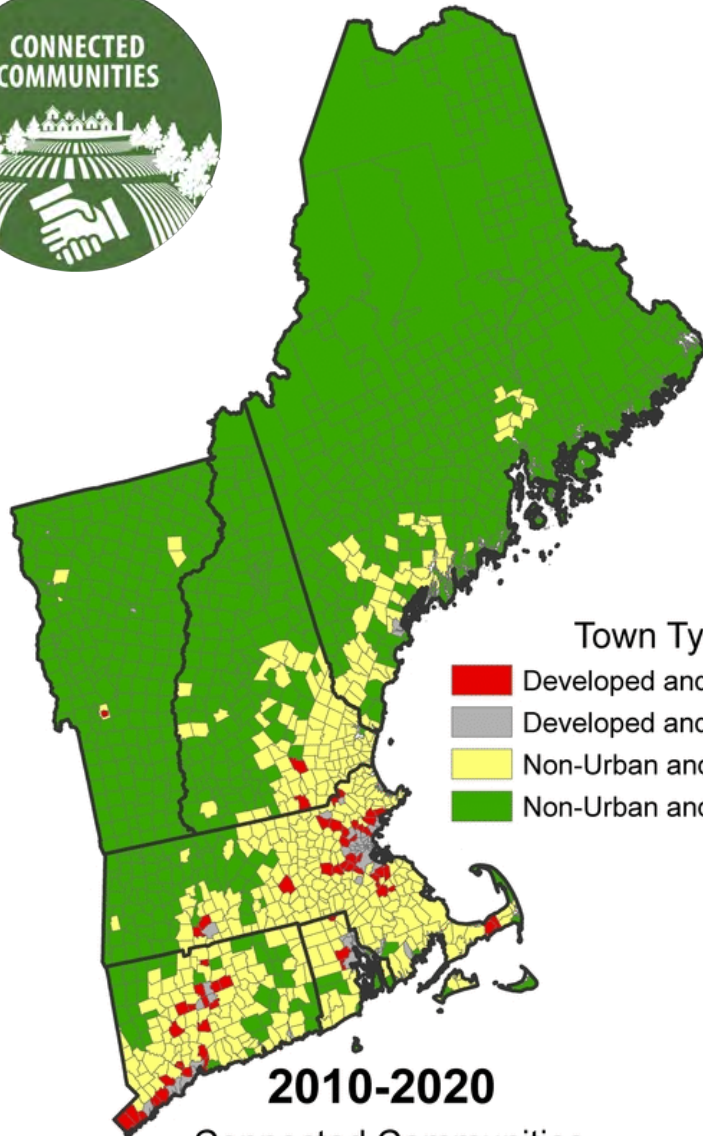
If we value forests as infrastructure, in 2060:







# Sprawl

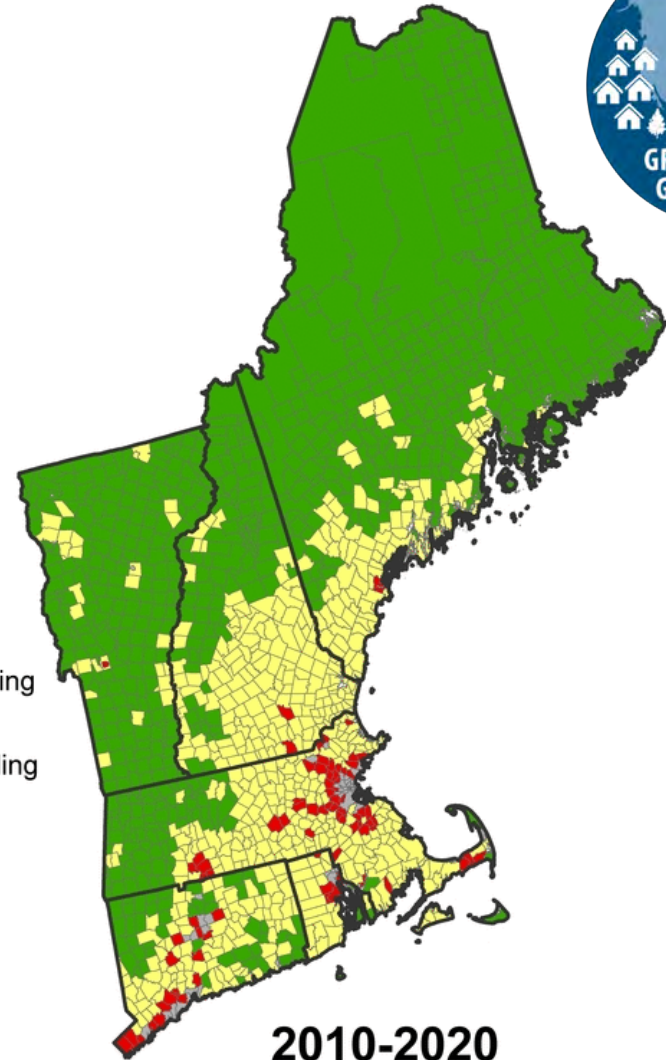


2010-2020

Connected Communities

## Town Type

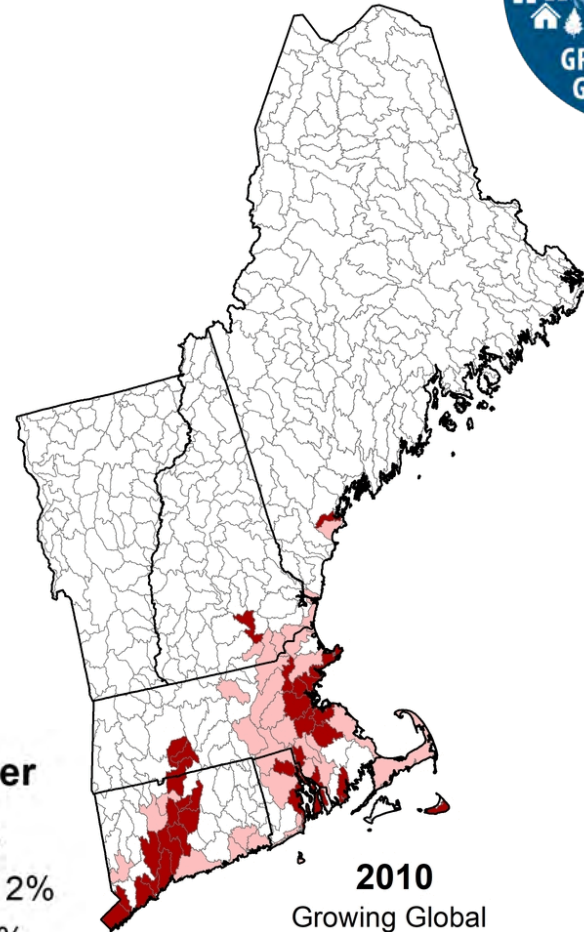
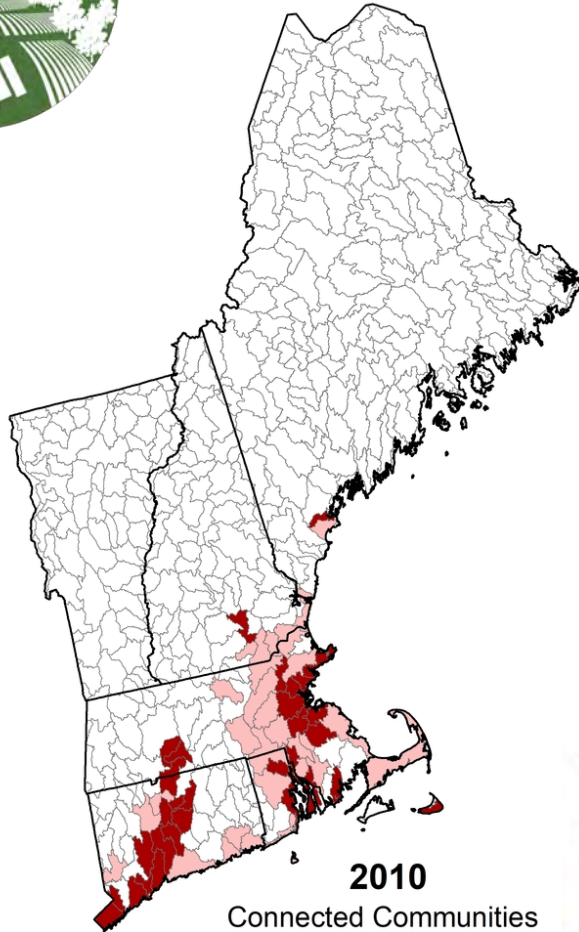
- Developed and Sprawling
- Developed and not Sprawling
- Non-Urban and Sprawling
- Non-Urban and not Sprawling



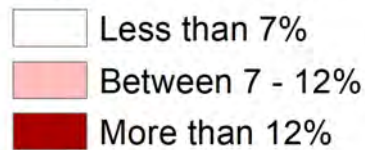
2010-2020

Growing Global

# Impervious Surfaces



## Impervious Cover





# Integrating Ecosystem Services Values in the Narragansett Bay Watershed



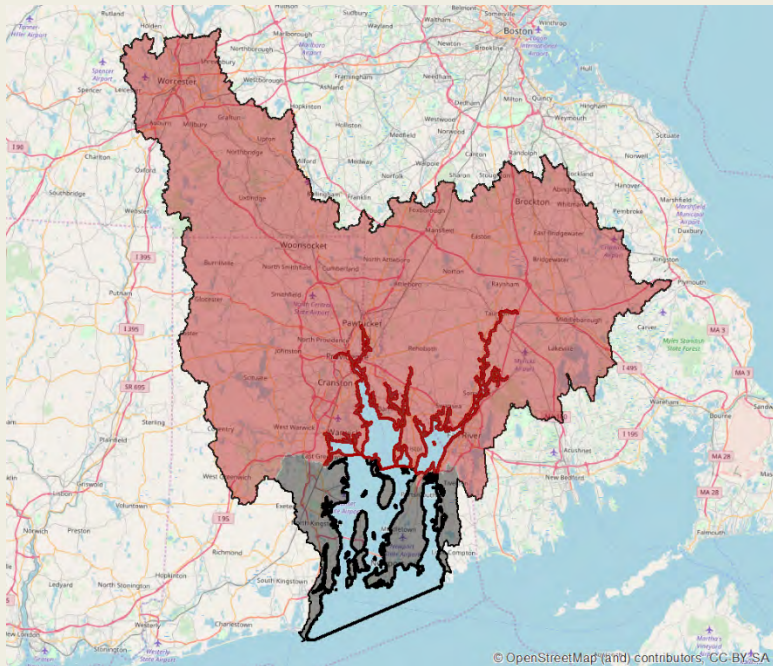
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THE  
UNIVERSITY  
OF RHODE ISLAND  
GRADUATE SCHOOL  
OF OCEANOGRAPHY



THE  
UNIVERSITY  
OF RHODE ISLAND  
COLLEGE OF  
THE ENVIRONMENT  
AND LIFE SCIENCES

natural  
capital  
PROJECT

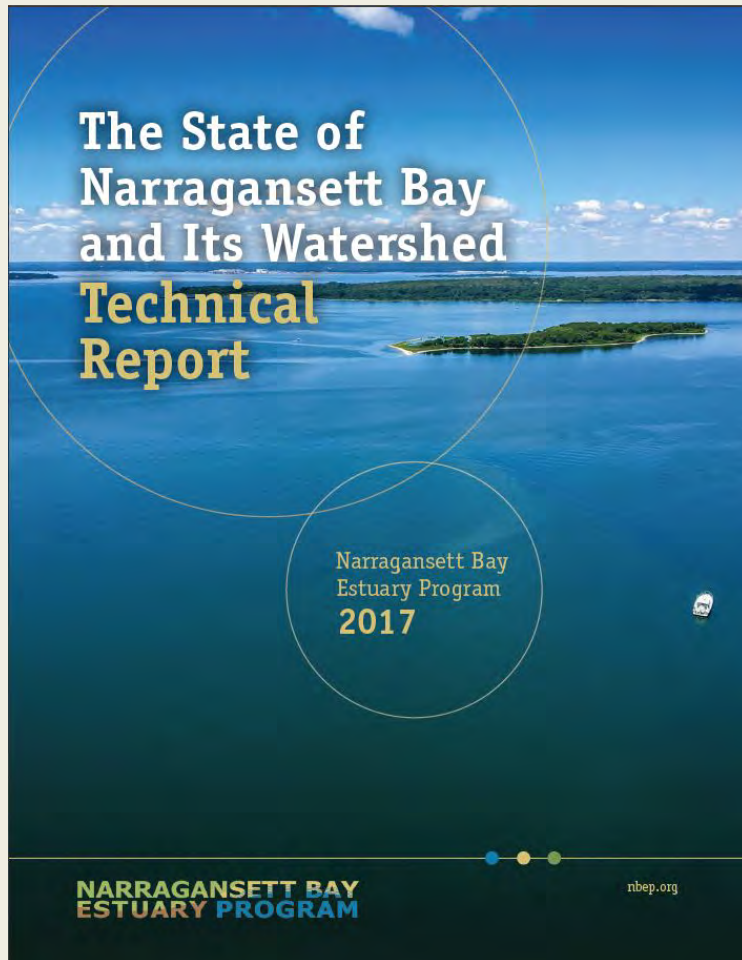


This project was funded under Assistance Agreement No. SE - 00A00252 awarded by the U.S. Environmental Protection Agency (EPA).

[massaudubon.org/naturesvalue](https://massaudubon.org/naturesvalue)

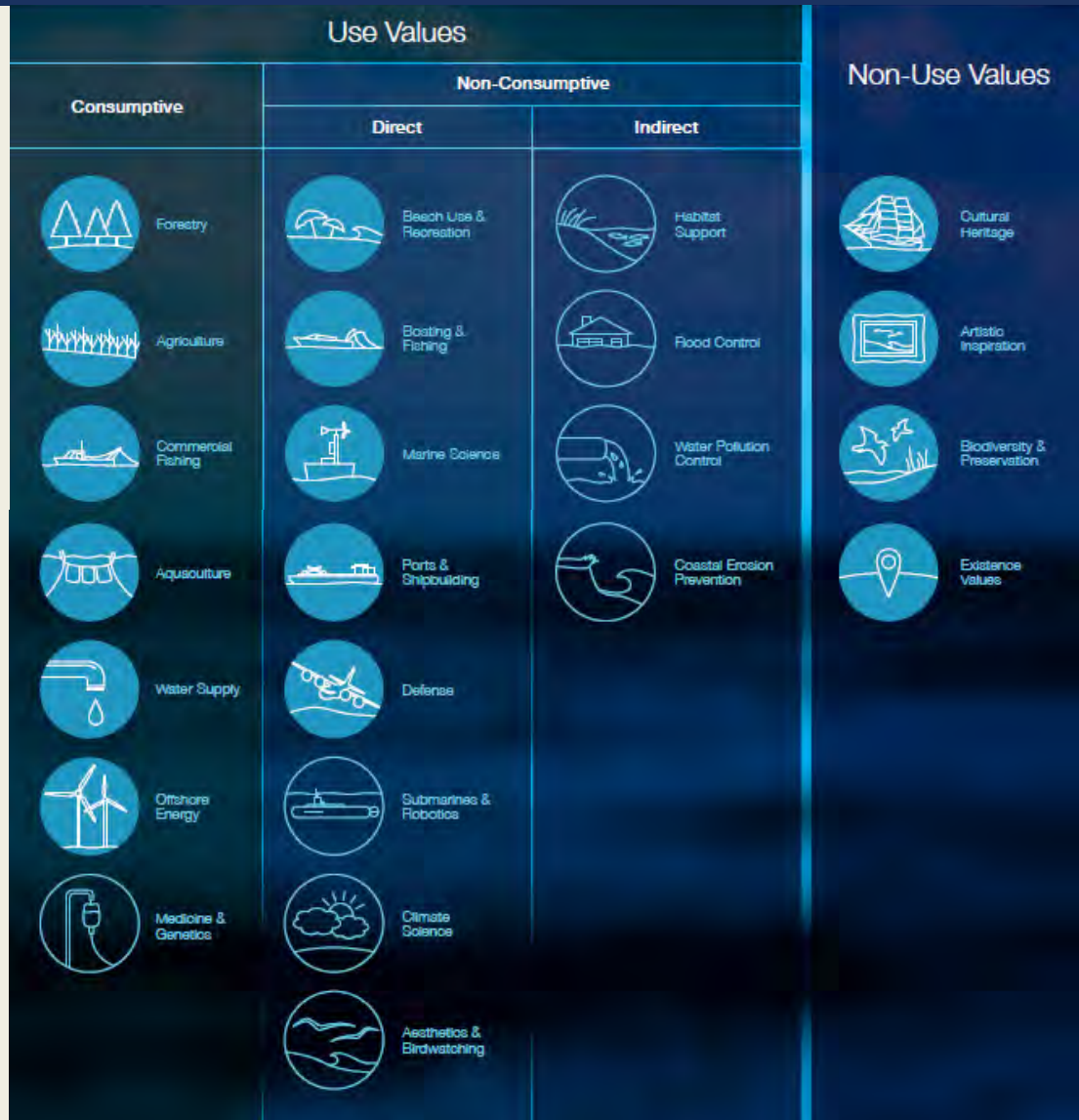


# Status and Trends in the Narragansett Bay Watershed – And Possible Futures



# AN ECONOMIC EVALUATION OF THE NARRAGANSETT BAY WATERSHED

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UNIVERSITY OF RHODE ISLAND (euchida@uri.edu)



The Narragansett Bay Watershed Economy project was conceived by the Coastal Institute under the leadership of Dr. Emi Uchida. Funding was provided by the Coastal Institute at the University of Rhode Island. Additional project support was provided by the URI Graduate School of Oceanography, the URI Coastal Resources Center, Mass Audubon, the Natural Capital Project at Stanford University, and the EPA award.

# Harvard Forest Scenarios

NARRAGANSETT BAY

2010

2060

- High Density Development
- Low Density Development
- Unprotected Forest
- Conserved Forest
- Agriculture
- Other
- Water

Source: Harvard Forest



2060 scenarios	Urban	Forest	Ag
Connected Communities	34%	46%	8%
Growing Global	57%	22%	9%
Go It Alone	39%	42%	7%
Recent Trends	41%	40%	7%
Yankee Cosmopolitan	50%	32%	6%
Current (2010)	31%	50%	7%

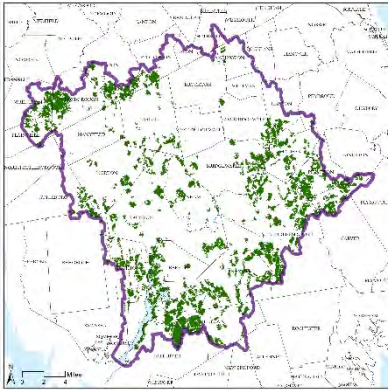


The RTWN was formed in 2014 and is an award-winning collaboration of 19 organizations and agencies who care about the future health and resilience of the Taunton River Watershed and believe that nature-based solutions have economic, social, and ecological benefits.

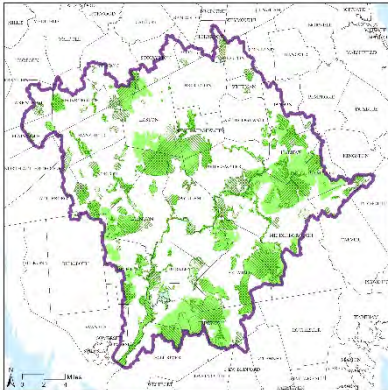


# Green Infrastructure Network Components...

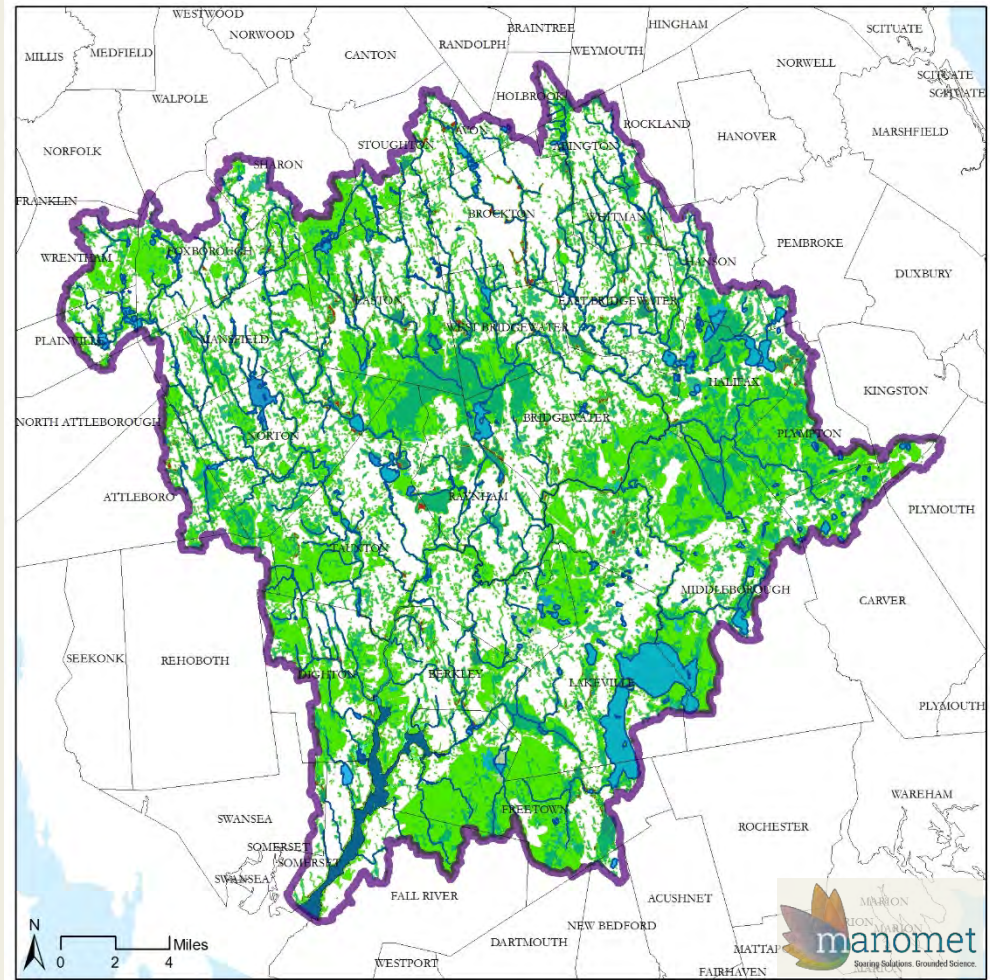
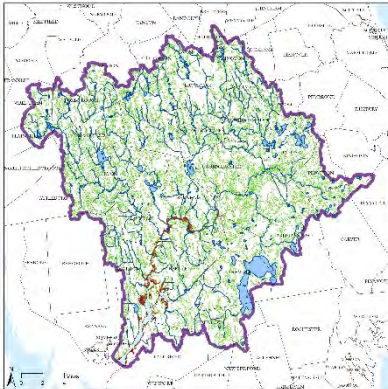
Areas of Above Average Resilience













BioMap2 Core & Critical Natural Landscape



Areas within 100ft of Surface Waters, Wetlands, and Flood Zones; Areas  $\leq$  4m elevation (vulnerable to sea level rise)

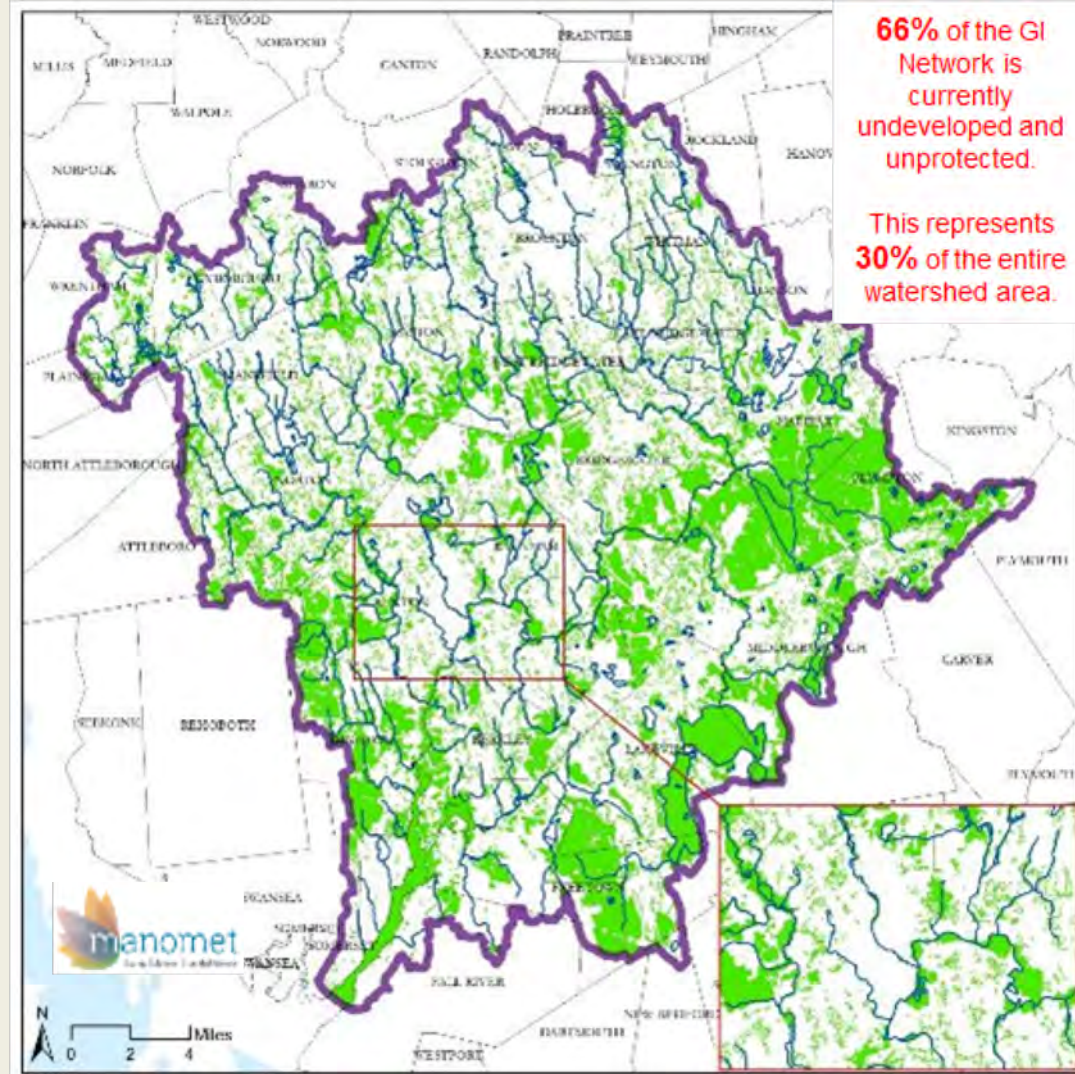


## Legend

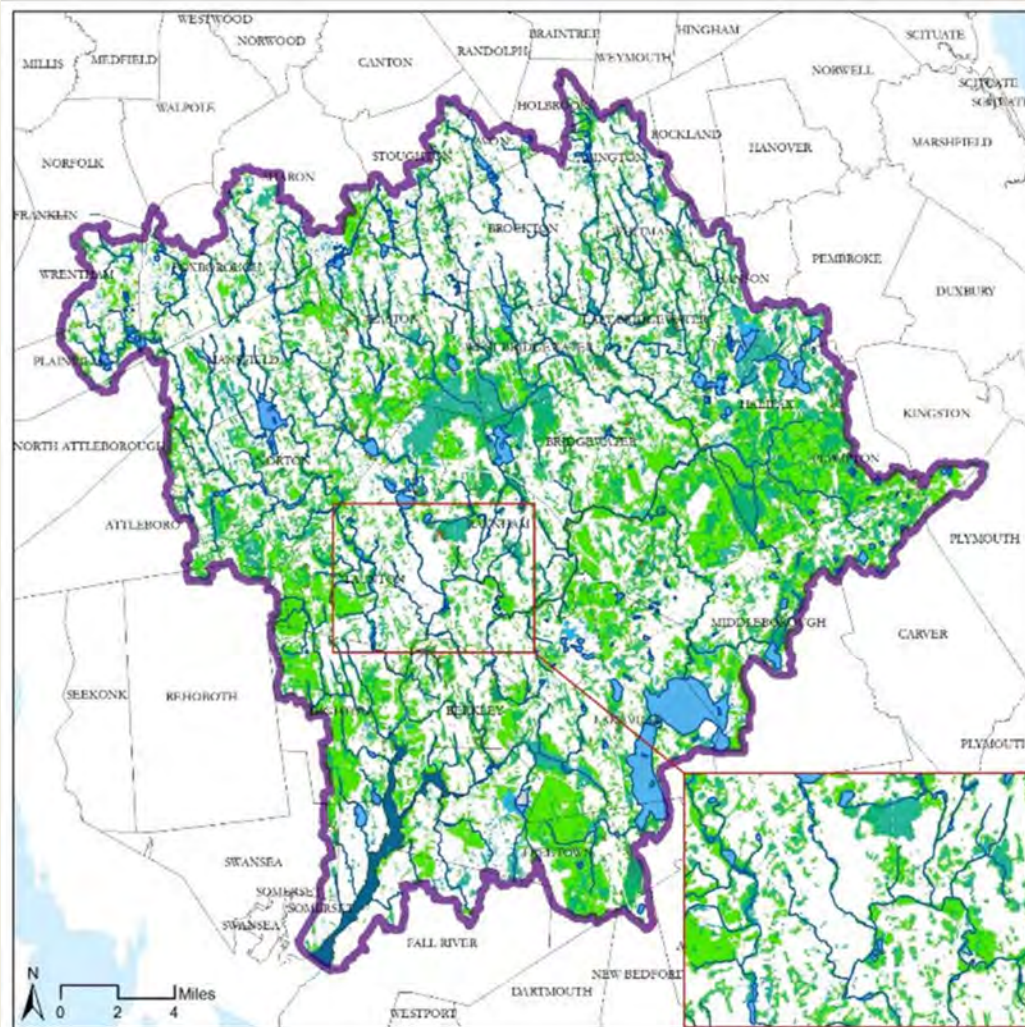
	Green Infrastructure Network		Town Boundaries	<b>Surface Waters &amp; Wetlands</b>		Estuarine and Marine Deepwater	
	100-yr and High Risk Coastal Flood Areas		Taunton Watershed Boundary		Freshwater Pond, Lake, or Stream		Estuarine and Marine Wetland
			Major Streams		Freshwater Wetland		Other



# Taunton Watershed Green Infrastructure Map



# What would happen to the Taunton Watershed Green Infrastructure lands under future scenarios?





## OUR CONSERVATION WORK

Wildlife Research & Conservation

Land Conservation

Ecological Management

Education & Community Outreach

Climate Change

Advocacy

Advocacy News & Events

Priority Legislation

Protecting Land & Wildlife

Ocean Management

Climate Change

### Version 2.0 just released - Mapping and Prioritizing Parcels for Resilience Project



Mass Audubon, in partnership with The Nature Conservancy and LandVest, developed [Mapping and Prioritizing Parcels for Resilience \(MAPPR\)](#) to allow Massachusetts conservationists to rapidly identify specific parcels that, if protected, could contribute the most to achieving land protection goals.

Resources

[MAPPR Tool 2.0](#)

[Resources](#)



# What is Low Impact Development?

“ LID is an approach to land development (or re-development) that **works with nature to manage stormwater** as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that **treat stormwater as a resource** rather than a waste product. ”



Source: Whole Buildings Design Guide, wbdg.com

# Review bylaws and regulations to encourage nature-based solutions

Factors	Conventional	Better	Best	Community's Zoning	Community's Subdivision Rules & Regulations	Community's Site Plan Review	Community's Stormwater/LID Bylaw/Regulations
<b>GOAL 1: PROTECT NATURAL RESOURCES AND OPEN SPACE</b>							
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	(Not applicable)			
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 invasives	Not addressed, or mixture of required plantings of native and nonnative	Require at least 75% native plantings				
<b>GOAL 2: PROMOTE EFFICIENT, COMPACT DEVELOPMENT PATTERNS AND INFILL</b>							
Lot size	Required minimum lot sizes	OSRD/NRPZ preferred. Special permit with incentives to utilize	Flexible with OSRD/NRPZ by right, preferred option				



# 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



# Thank you!

E. Heidi Ricci

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[www.massaudubon.org/shapingthefuture](http://www.massaudubon.org/shapingthefuture)

