# *Local Action for Coastal Climate Resilience*

**MA Land Conservation Conference**

**March 23, 2019**

# Presenters

**Tom O’Shea, Dir. for Coast & Natural Resources**

**Jen Ryan, Dir. of Policy**

**Rob Warren, Dir. of Conservation**

trustees

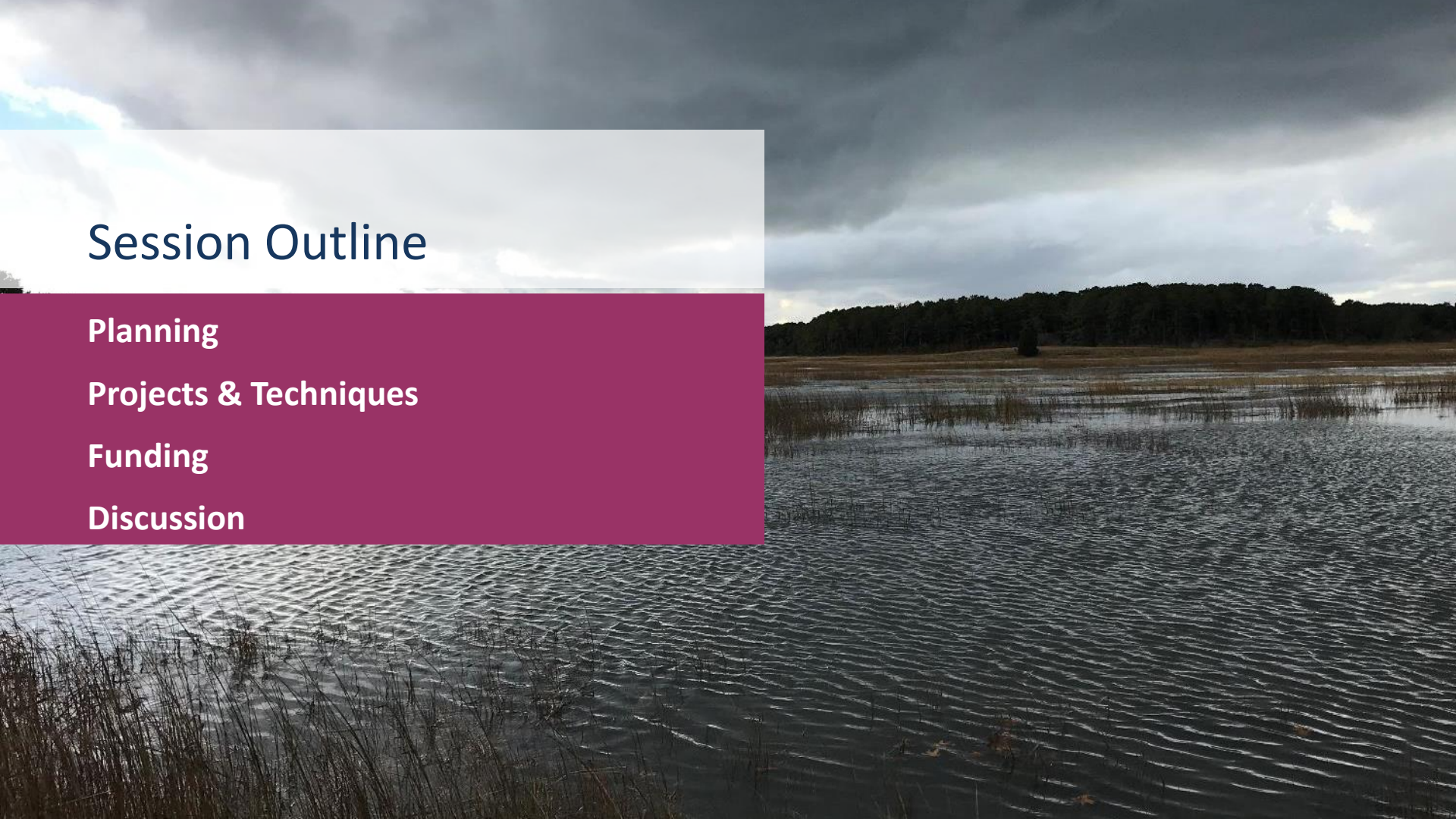
# Session Outline

**Planning**

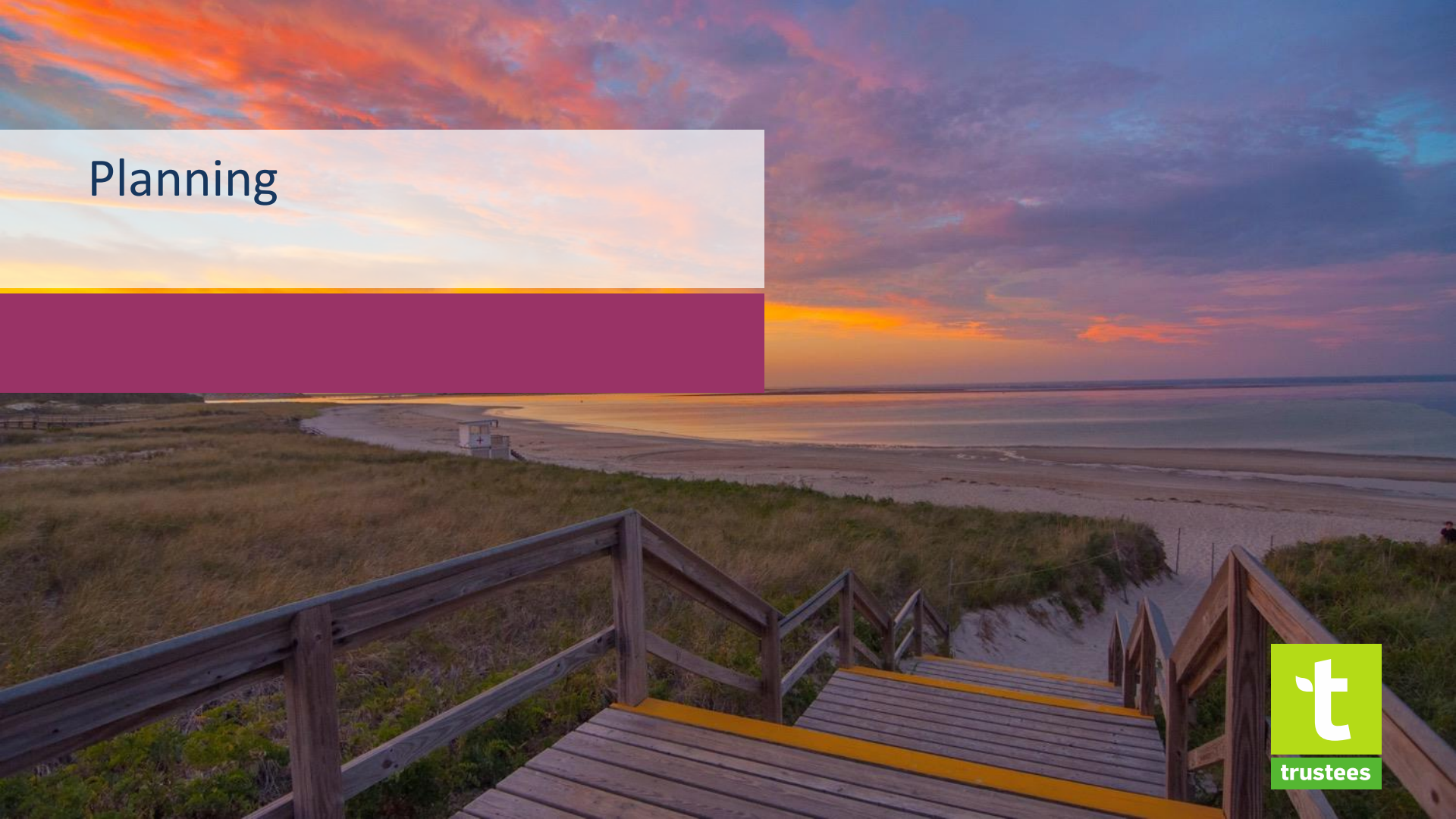
**Projects & Techniques**

**Funding**

**Discussion**



# Planning



# Coastal Change

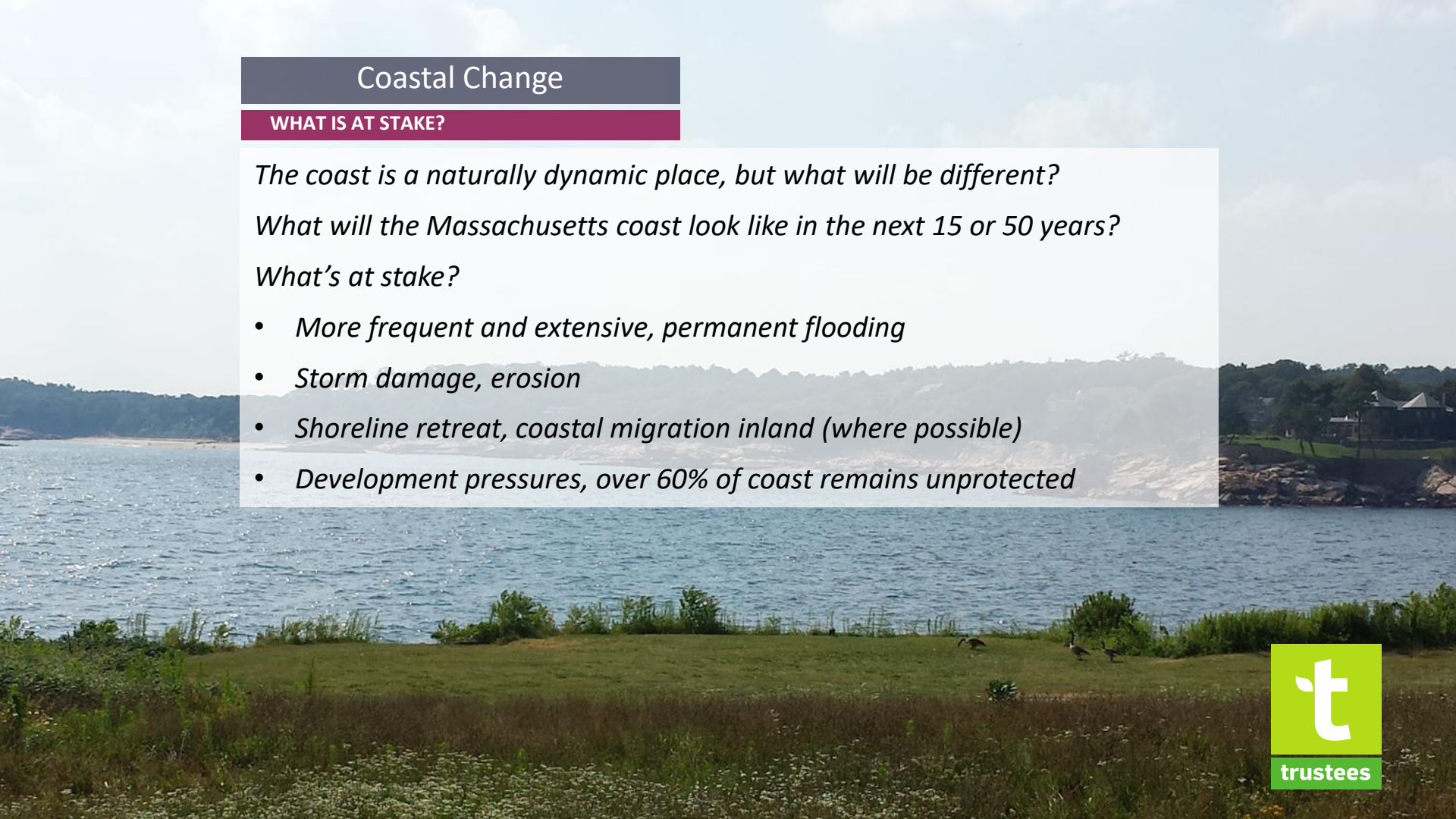
## WHAT IS AT STAKE?

*The coast is a naturally dynamic place, but what will be different?*

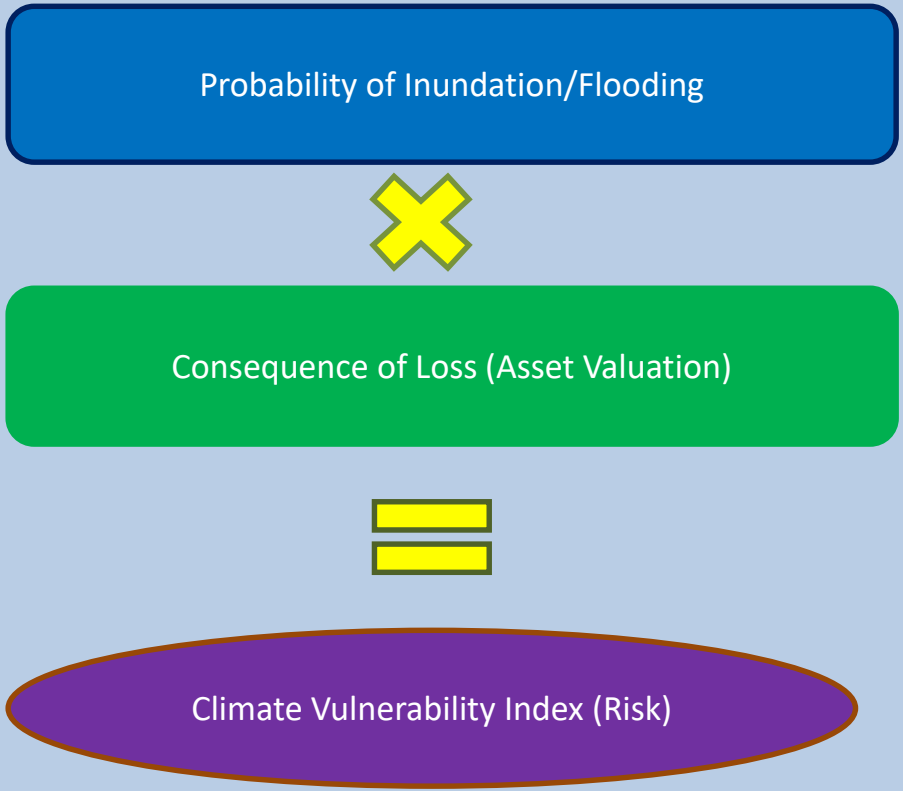
*What will the Massachusetts coast look like in the next 15 or 50 years?*

*What's at stake?*

- *More frequent and extensive, permanent flooding*
- *Storm damage, erosion*
- *Shoreline retreat, coastal migration inland (where possible)*
- *Development pressures, over 60% of coast remains unprotected*



# Coastal Vulnerability Assessments




trustees

# How do you model probability of flooding/inundation?

Coastal

- Sea level rise
- Storm driven inundation

Inland

- Precipitation
- Storms leading to river flooding and erosion

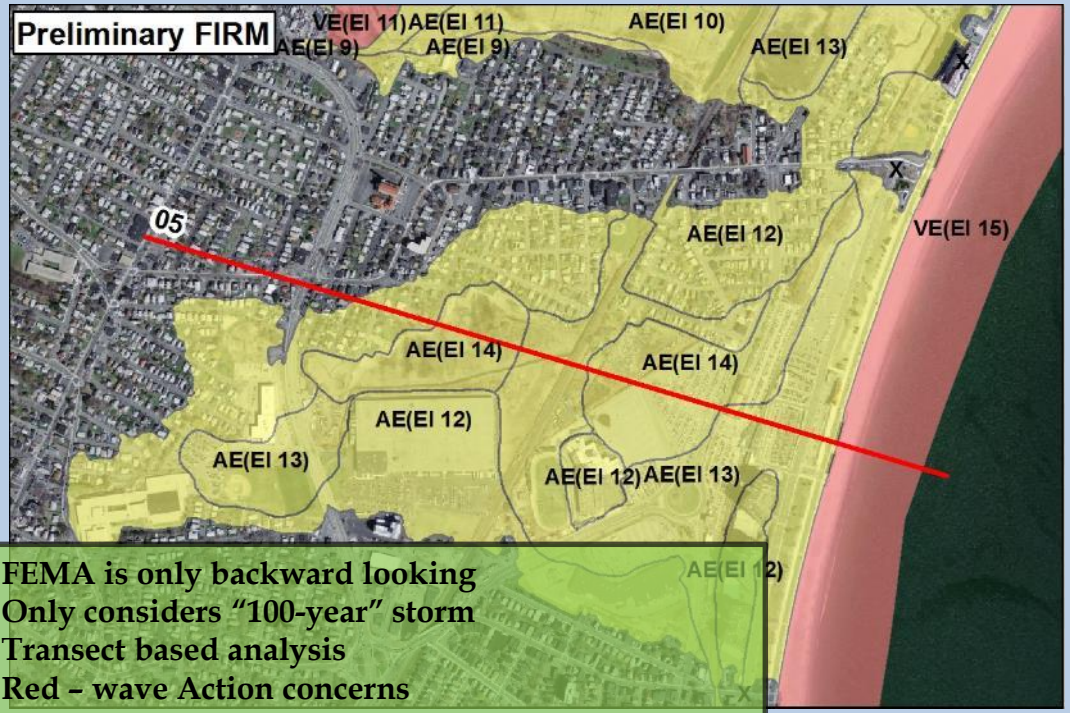
# How do you model probability of flooding/inundation?

Coastal

EXAMPLE Tools

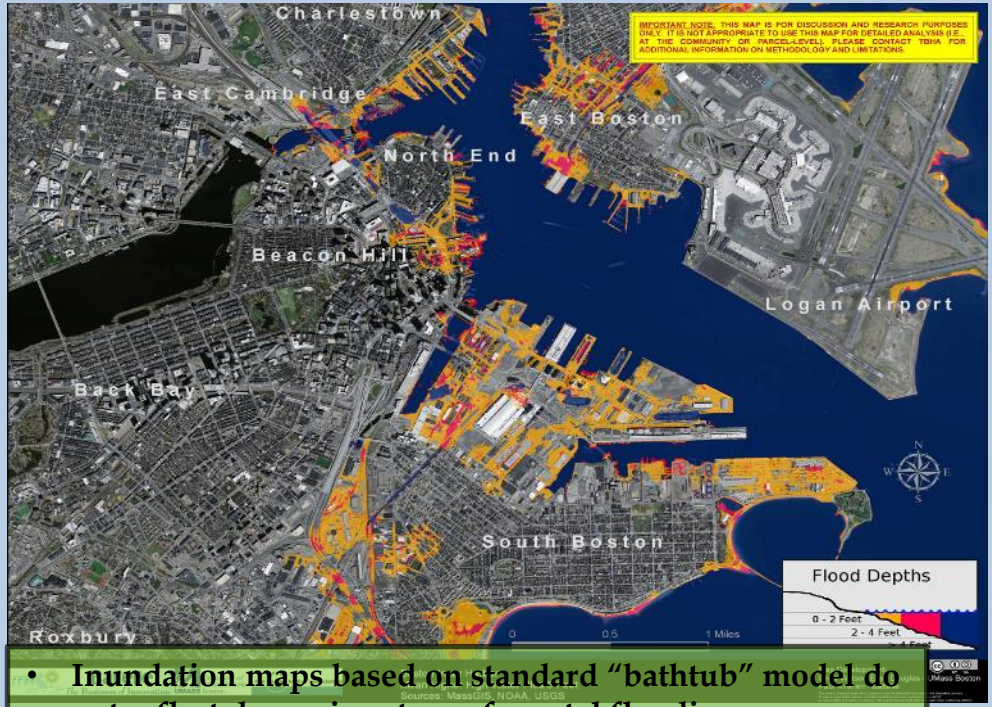
- ❑ FEMA Flood Insurance Rate Maps
- ❑ NOAA Sea Level Rise Viewer
  https://coast.noaa.gov/digitalcoast/tools/slr.html
- ❑ Sea Level Affecting Marshes Model (SLAMM)
  https://coast.noaa.gov/digitalcoast/tools/slamm.html
- ❑ Probabilistic Hydrodynamic Models

# FEMA Models




- FEMA is only backward looking
- Only considers "100-year" storm
- Transect based analysis
- Red – wave Action concerns
- Yellow – vulnerable to flooding from 100-yr storm

# Static Sea Level Rise

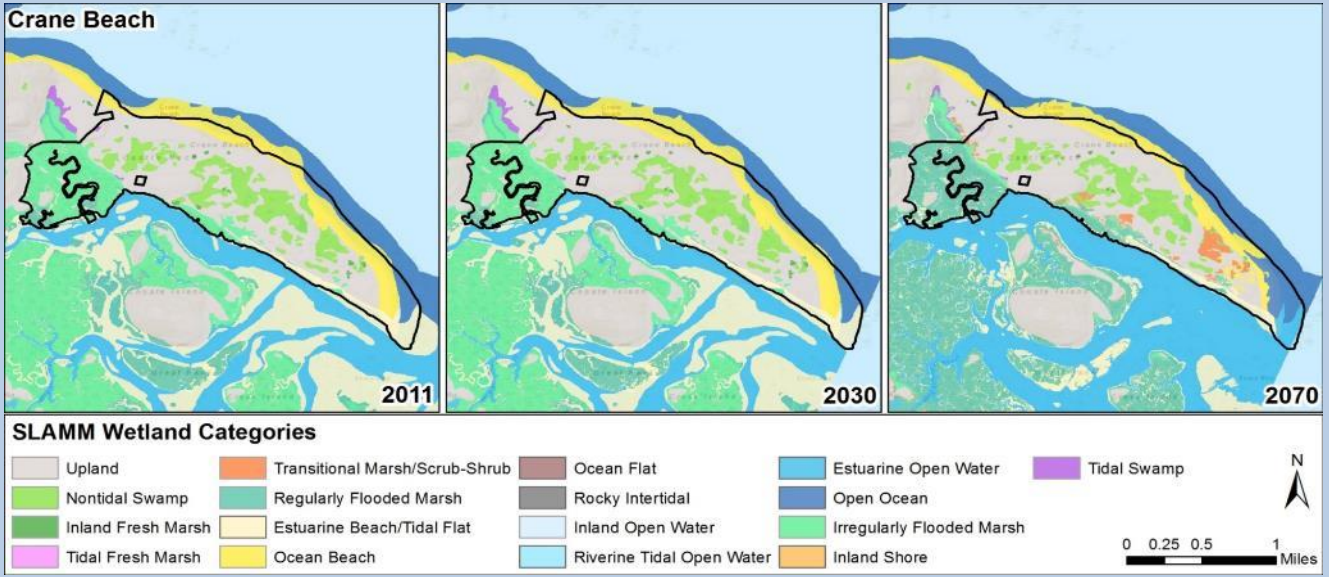



- **Inundation maps based on standard "bathtub" model do not reflect dynamic nature of coastal flooding**
- **Does not account for joint flooding conditions**
- **Does not include effects of infrastructure (e.g., dams)**
- **Does not account for tides**

# Storm Surge – CZM Online Viewer

https://mass-eoeea.maps.arcgis.com/apps/MapSeries/index.html?appid=6f2797652f8f48eaa09759ea6b2c4a953

# SLAMM Modeling




trustees

# Inundation Modeling: Data Sources

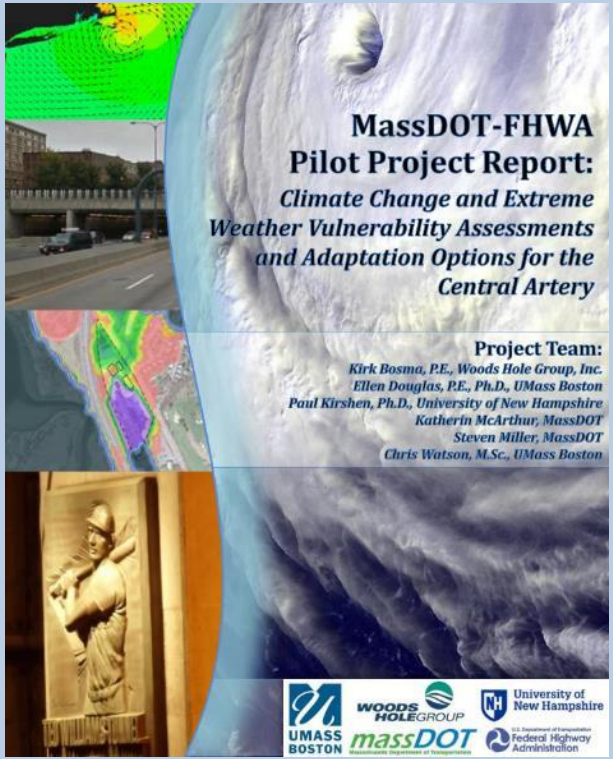
- Utilize existing information (if appropriate)
  - FEMA flood zones
  - Existing model results (where available)
  - Sea level rise rates
  - MCZM shoreline change rates
  - USGS National Assessment of Coastal Vulnerability to SLR
  - NOAA and others basic bathtub model

- Modeling habitat change
  - Sea Level Affecting Marshes Model (SLAMM) results (CZM – Woods Hole Group)

- Focused probabilistic inundation mapping
  - MassDOT model results (Woods Hole Group)
  - North Atlantic Coast Comprehensive Study (USACE)

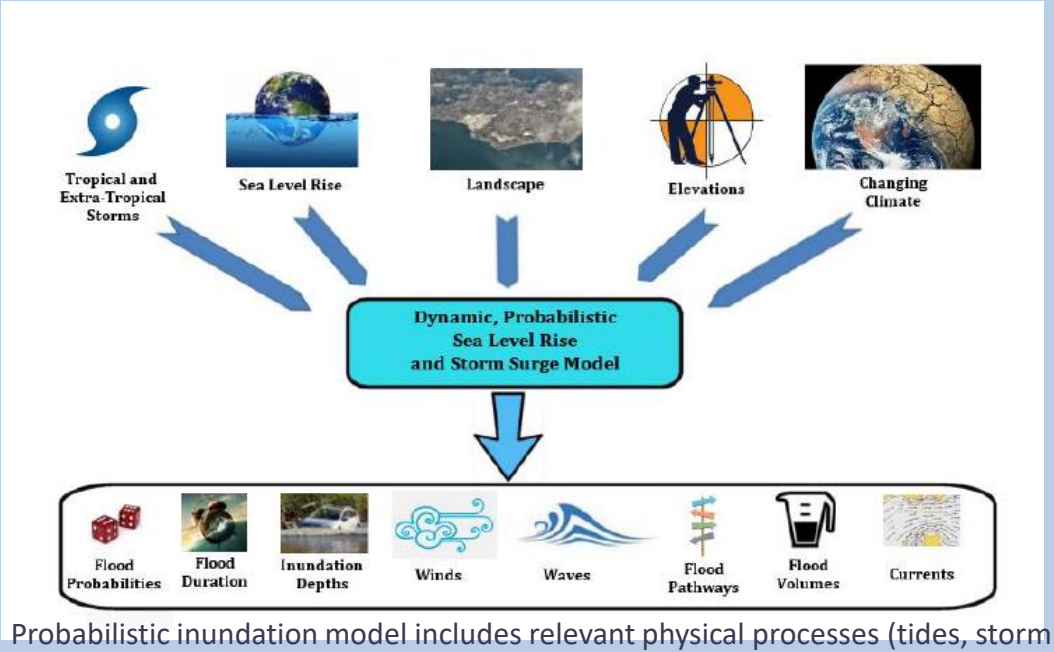
# Probabilistic Dynamic Models

1. What is the probability of flooding?
2. What is vulnerable and what is the priority?
3. What interventions are available and what is the plan?



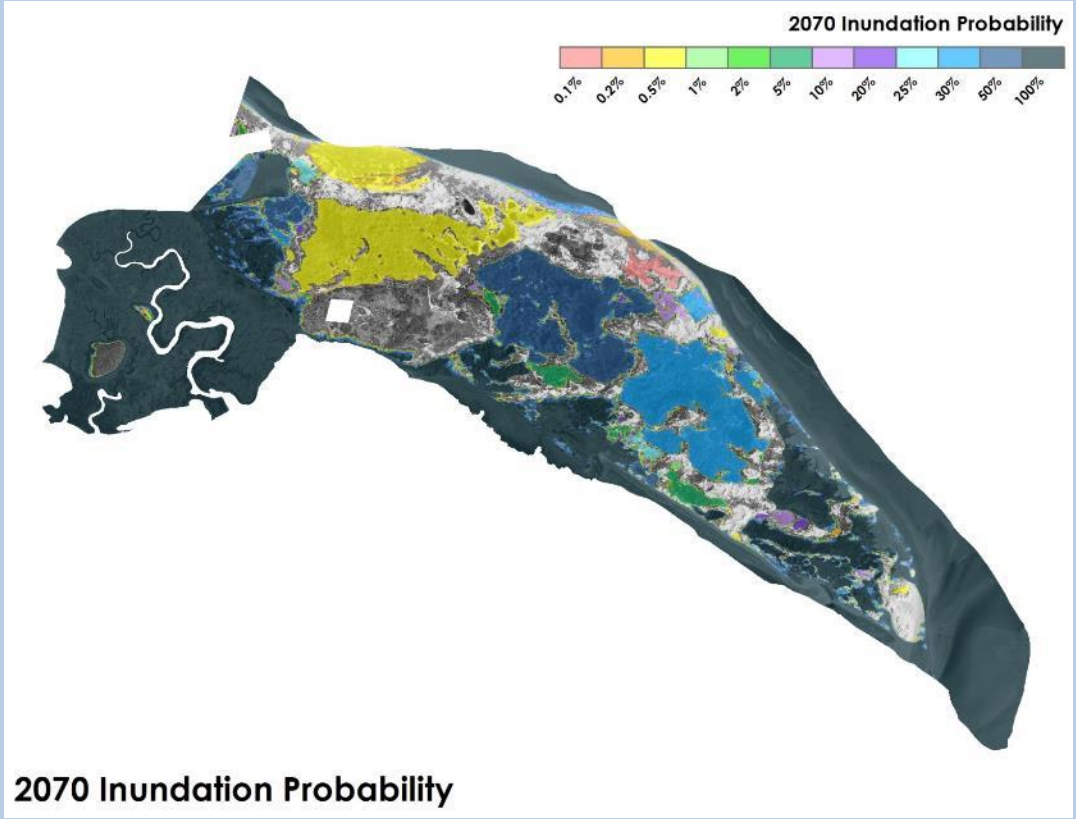

https://www.massdot.state.ma.us/Portals/8/docs/environmental/SustainabilityEMS/Pilot_Project_Report_MassDOT_FHWA.pdf

# Probabilistic Dynamic Models




- Probabilistic inundation model includes relevant physical processes (tides, storm surge, wind, waves, wave setup, river discharge, sea level rise, future climate scenarios)

# Probabilistic Inundation Modeling: Outputs



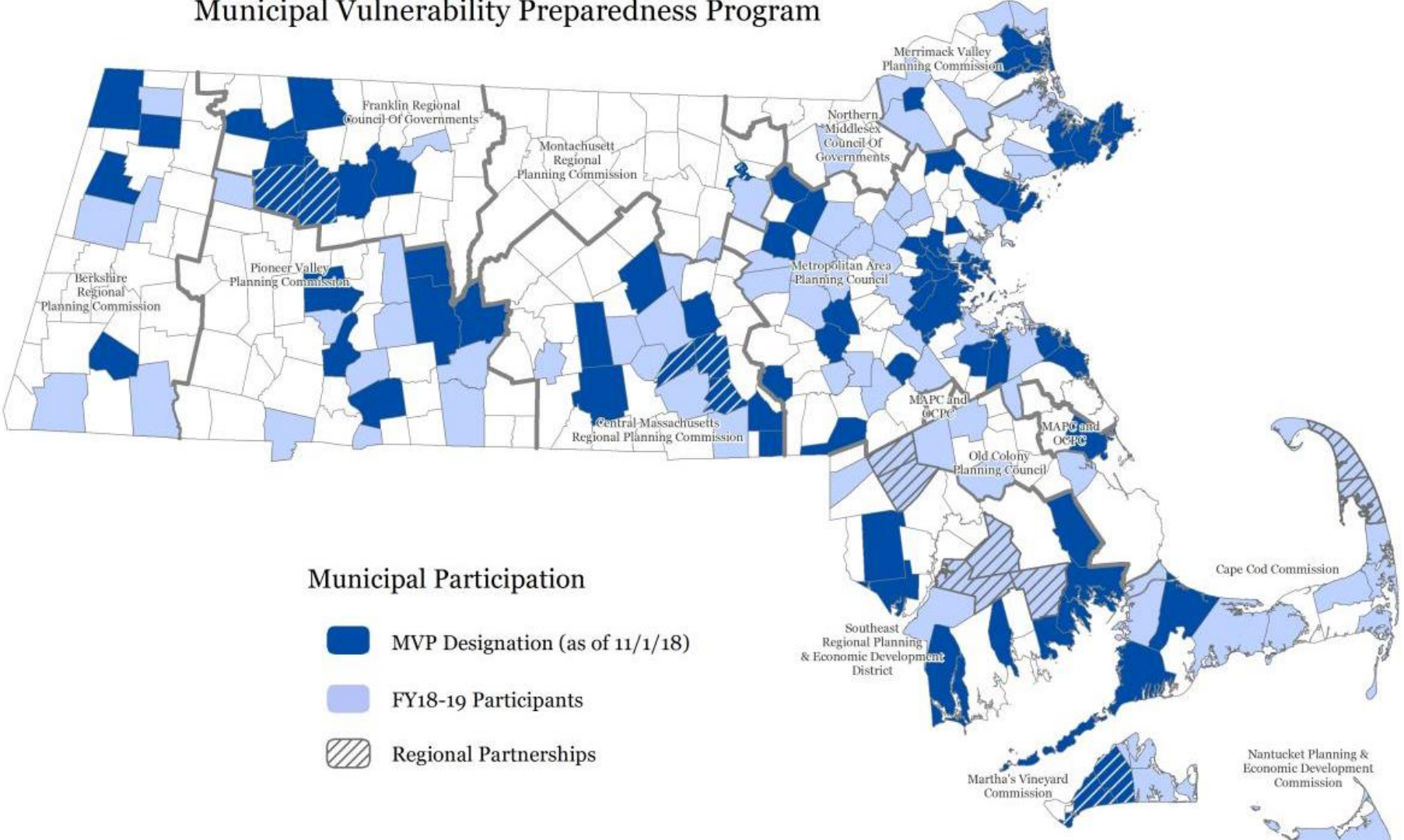
# Municipal Vulnerability Preparedness (MVP) Program



***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

# Municipal Vulnerability Preparedness Program



- Implement key priorities identified through the MVP Planning Grants.
- Proposals may include a range of climate change adaptation actions to increase resiliency within the community including:
  - advanced vulnerability assessments,
  - education and outreach,
  - changes to local policies, plans or management strategies,
  - redesigns and retrofits, or
  - nature-based solutions for storm damage protection, water infiltration management & to reduce vulnerability to extreme heat
  - ecological restoration and habitat management
- 25% local match of total project cost

## MVP Action Grants

**MA EOEEA**

# Coastal Wetlands Assessment

NORMAL PAGE SUBHEAD, LOCATION, ETC.

OBJECTIVE: Assess the potential conservation value of coastal wetlands throughout the MA coast, including limited input on wetland migration potential.

Collaboration with Umass Dept of Environmental Conservation


Coastal Wetlands Assessment

# 1. Identify Conservation Units

- Entire MA Coast
- Wetland complexes & adjoining upland buffers
- Core selection (DSL)
- Scored across the coast


Coastal Wetlands Assessment

# 2. Assess Value for Conservation

- Protected/Unprotected
- Index of Ecological Integrity
- Accessibility
- Proximity to matrix of conserved lands

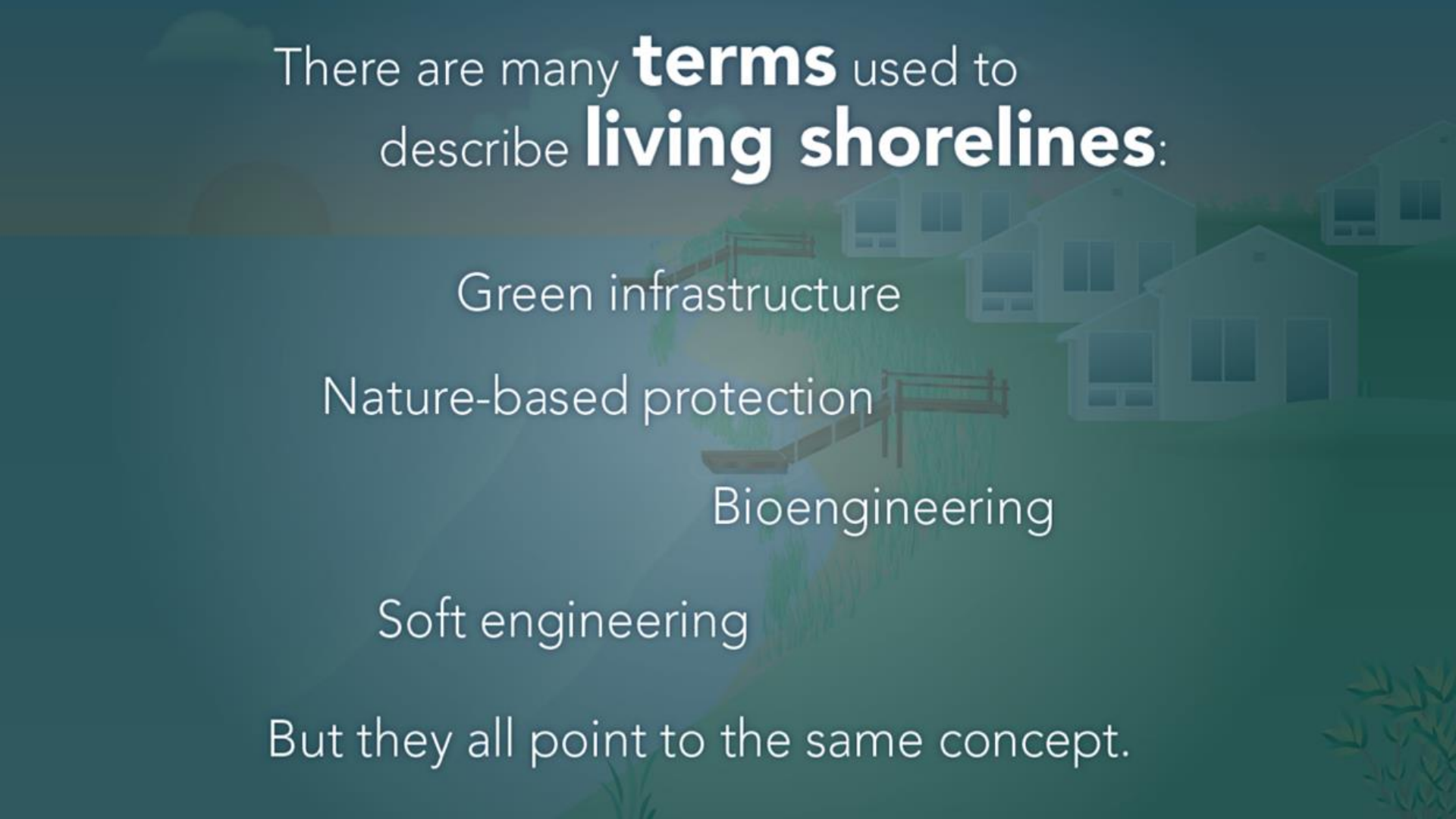

Coastal Wetlands Assessment

3. Potential for Inland Expansion
    - Identify Tidal Restrictions
    - Assess Actual VS Potential wetland above the restriction


Coastal Wetlands Assessment

# Projects & Techniques

trustees


There are many **terms** used to describe **living shorelines**:
Green infrastructure
Nature-based protection
Bioengineering
Soft engineering
But they all point to the same concept.

**NOAA - Natural and Structural Measures for Shoreline Stabilization**
https://coast.noaa.gov/digitalcoast/training/living-shorelines.html

**MA CZM StormSmart Fact Sheets** – easy primer on coastal resiliency techniques:
https://www.mass.gov/service-details/stormsmart-properties

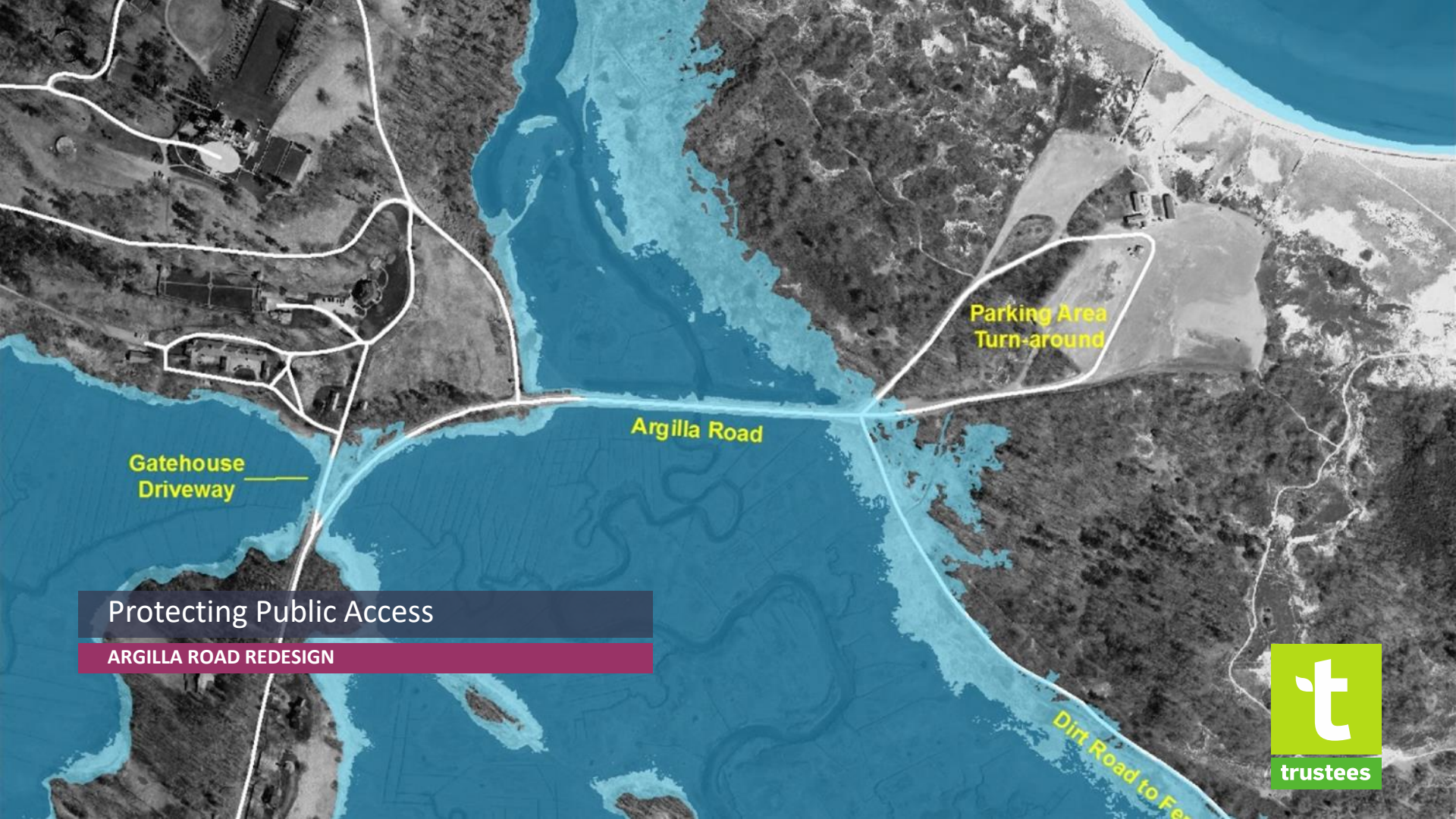
**TNC and Woods Hole Group – Living Shorelines in New England: State of the Practice**
https://www.conservationgateway.org/ConservationPractices/Marine/Pages/new-england-living-shorelines.aspx

Best Practices and Techniques

COASTAL RESILIENCY

trustees

| Applicant | Project Title |
|---|---|
| Sandwich | Climate Change Vulnerability Assessment/Adaptation Planning for the Town of Sandwich |
| Boston | Climate Ready Zoning and Design Guidelines |
| Winthrop | Ingleside Park Feasibility Study and Permitting |
| Essex | Feasibility Study for an Essex Bay Living Shoreline |
| Essex, Ipswich, Newbury | Documenting Effects of a Large-Scale, Natural Sediment Event on Salt Marsh Resiliency in the Great Marsh Estuary: [Assessing Applicability for Potential Salt Marsh Management Strategies in Massachusetts] |
| Manchester-by-the-Sea | Sawmill Brook Central Pond Restoration Design |
| Newbury | Assessing storm energy reduction by the vegetated salt marsh platform in Newbury, MA: a background to enhancing natural protection by the living shoreline |
| Salem | Salem Sanitary Sewer Trunk Line Relocation Assessment |
| New Bedford | Comprehensive Climate Adaptation and Resilience Action Plan and Interactive Community Dashboard |
| Scituate | Comprehensive Wastewater Treatment Resilience Feasibility Study |
| Swansea | Public Water Supply Infrastructure Vulnerability Assessment |
| Wareham (B) | Climate Change Flood Vulnerability Assessment/Adaptation Planning |
| Weymouth | Fort Point Road Coastal Infrastructure Resilience Project |




# Protecting Public Access

## ARGILLA ROAD REDESIGN

trustees

# Salt Marsh Restoration

## KEEPING PACE WITH SEA-LEVEL RISE

trustees

# Beach and Dune Restoration

## BEACH PROFILING / WAVE-SEDIMENT STUDIES

trustees

Projects & Techniques

**NEW PROJECTS & PARTNERS**

***Protecting urban wetlands***

***Coalition to Save the Mugar Wetlands***

**https://arlingtonlandtrust.org/**

**https://saveourwetlands.wordpress.com/**

**Increased Flooding from Climate Change**

**Provide Vision & Technical Expertise**

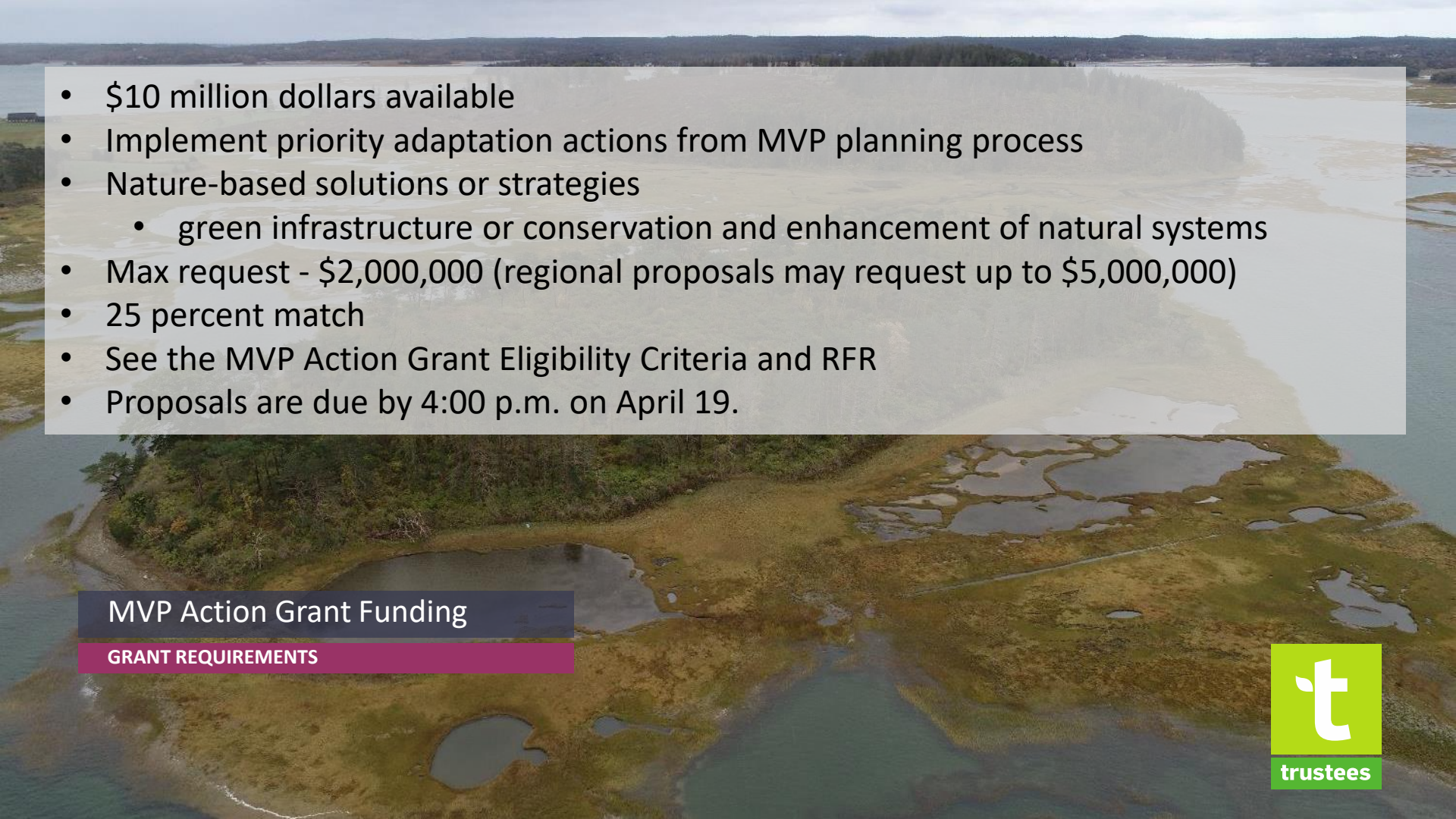
**Get Out and Go Where You Haven't Gone Before**

- **Church Events**
- **Social Clubs**
- **Housing Discussions**
- **Climate Events**
- **Grocery Stores**

**& talk about climate change and land conservation**

trustees

# Funding

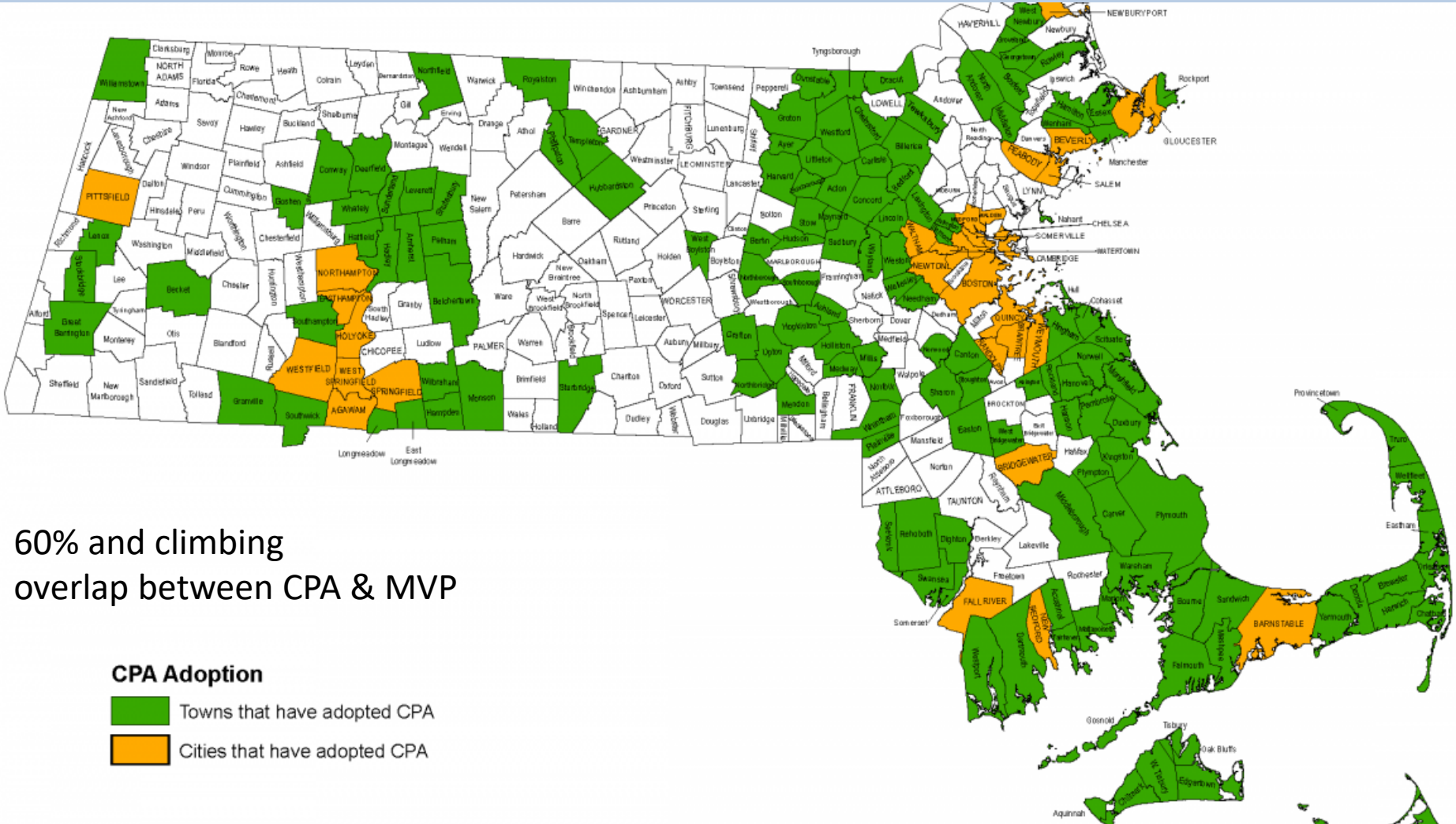


- $10 million dollars available
- Implement priority adaptation actions from MVP planning process
- Nature-based solutions or strategies
  - green infrastructure or conservation and enhancement of natural systems
- Max request - $2,000,000 (regional proposals may request up to $5,000,000)
- 25 percent match
- See the MVP Action Grant Eligibility Criteria and RFR
- Proposals are due by 4:00 p.m. on April 19.

## MVP Action Grant Funding

**GRANT REQUIREMENTS**

trustees




60% and climbing
overlap between CPA & MVP

## Chart 1
## COMMUNITY PRESERVATION FUND ALLOWABLE SPENDING PURPOSES (G.L. c. 44B, § 5)

| | OPEN SPACE | HISTORIC RESOURCES | RECREATIONAL LAND | COMMUNITY HOUSING |
|---|---|---|---|---|
| **DEFINITIONS**<br>(G.L. c. 44B, § 2) | Land to protect existing and future well fields, aquifers and recharge areas, watershed land, agricultural land, grasslands, fields, forest land, fresh and salt water marshes and other wetlands, ocean, river, stream, lake and pond frontage, beaches, dunes and other coastal lands, lands to protect scenic vistas, land for wildlife or nature preserve and land for recreational use | Building, structure, vessel, real property, document or artifact listed on the state register of historic places or determined by the local historic preservation commission to be significant in the history, archeology, architecture or culture of the city or town | Land for active or passive recreational use including, but not limited to, the use of land for community gardens, trails, and noncommercial youth and adult sports, and the use of land as a park, playground or athletic field<br>Does not include horse or dog racing or the use of land for a stadium, gymnasium or similar structure. | Housing for low and moderate income individuals and families, including low or moderate income seniors<br>Moderate income is less than 100%, and low income is less than 80%, of US HUD Area Wide Median Income |
| **ACQUISITION**<br>Obtain property interest by gift, purchase, devise, grant, rental, rental purchase, lease or otherwise. Only includes eminent domain taking as provided by G.L. c. 44B | Yes | Yes | Yes | Yes |
| **CREATION**<br>To bring into being or cause to exist. *Seideman v. City of Newton*, 452 Mass. 472 (2008) | Yes | | Yes | Yes |
| **PRESERVATION**<br>Protect personal or real property from injury, harm or destruction | Yes | Yes | Yes | Yes |
| **SUPPORT**<br>Provide grants, loans, rental assistance, security deposits, interest-rate write downs or other forms of assistance directly to individuals and families who are eligible for community housing, or to entity that owns, operates or manages such housing, for the purpose of making housing affordable | | | | Yes, includes funding for community's affordable housing trust |
| **REHABILITATION AND RESTORATION**<br>Make capital improvements, or extraordinary repairs to make assets functional for intended use, including improvements to comply with federal, state or local building or access codes or federal standards for rehabilitation of historic properties | Yes if acquired or created with CP funds | Yes | Yes | Yes if acquired or created with CP funds |

**OPEN SPACE**

CPA funds may be spent on the acquisition, creation, and preservation of open space, and for the rehabilitation or restoration of any open space that has been acquired or created using CPA funds.

**HISTORIC PRESERVATION**

CPA funds may be spent on the acquisition, preservation, rehabilitation and restoration of historic resources.

trustees

Community Preservation Coalition

*Preserving our past. Building our future.*

https://www.communitypreservation.org/databank/projectsdatabase

| | | | |
|---|---|---|---|
| Oak Bluffs | Coastal Climate Change Plan | A study to assess the risks and impact of climate change on the Oak Bluffs shoreline, and to offer adaptation strategies. | 4/8/2014 |

trustees

# THREE+ THINGS YOU CAN DO TO TAKE ACTION

Tell your legislator you:

1. support the CPA (House Bill 2463, Rep. Ferrante & Sen. Creem)
2. support new funding for climate change adaptation
3. and that conservation and climate change go hand in hand

And if your town hasn't done a MVP, make that happen and bring land conservation to the table.

trustees

# *Discussion*