



# 5<sup>TH</sup> ANNUAL CAPE COASTAL CONFERENCE

## THE RESILIENT CAPE COD PROJECT

Heather McElroy, Cape Cod Commission



CAPE COD  
COMMISSION



**THE RESILIENT CAPE COD PROJECT**

**Cape Coastal Conference  
December 5, 2017**

# Project Overview

- Three-year, \$780,000 NOAA Coastal Resiliency grant awarded to the Cape Cod Commission and partners
- Investigate environmental and socio-economic effects of local and regional coastal resiliency strategies
- Town of Barnstable pilot program

## GRANT PARTNERS



## SUPPORTING AGENCIES





# HOW CAN CAPE COD PREPARE?

What are the threats?

How are we vulnerable?

What do we value?

What are possible actions?



# Resilience Planning on Cape Cod

## RESILIENCE PLANNING GOALS

**Identify** vulnerable assets  
**Engage** and inform stakeholders  
**Develop** tools  
**Share** responsibility for action

## WHAT ARE THE THREATS?

Extreme weather  
Erosion  
Sea Level Rise  
Flooding

# Resilient Cape Cod | Engagement



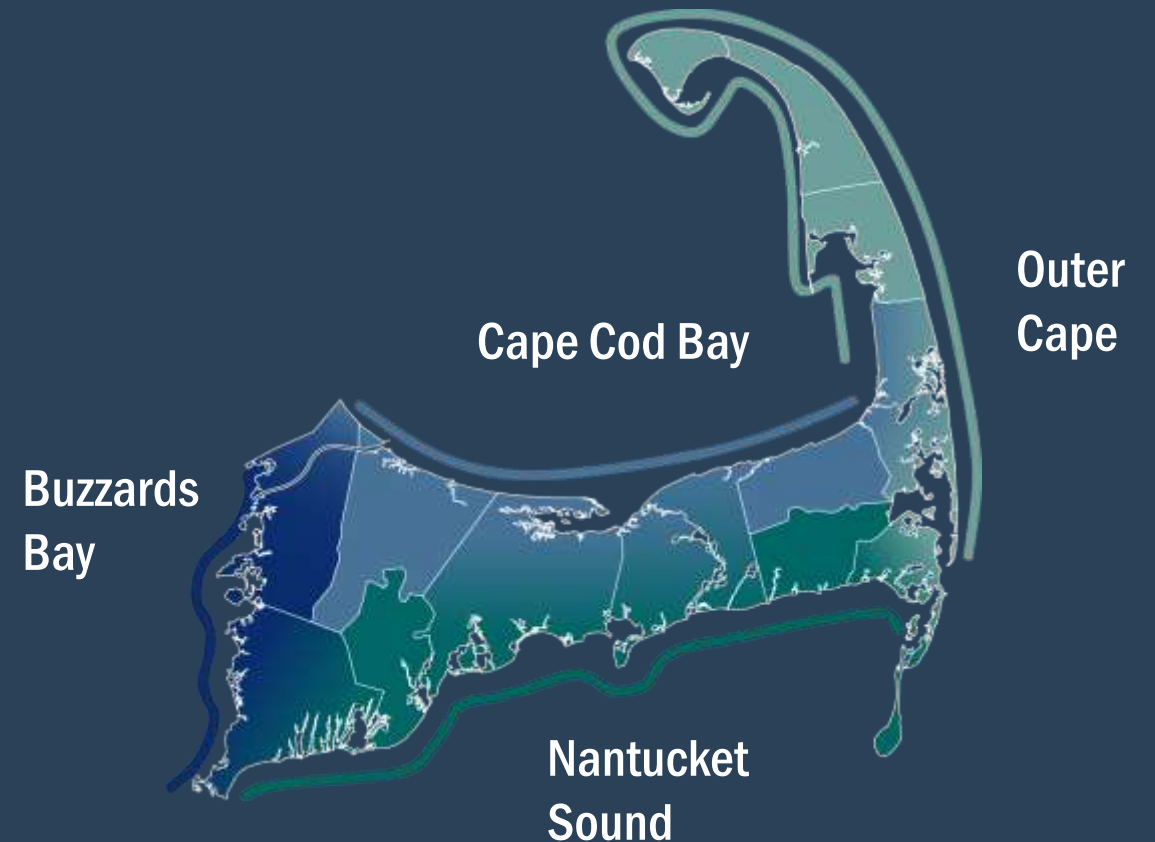
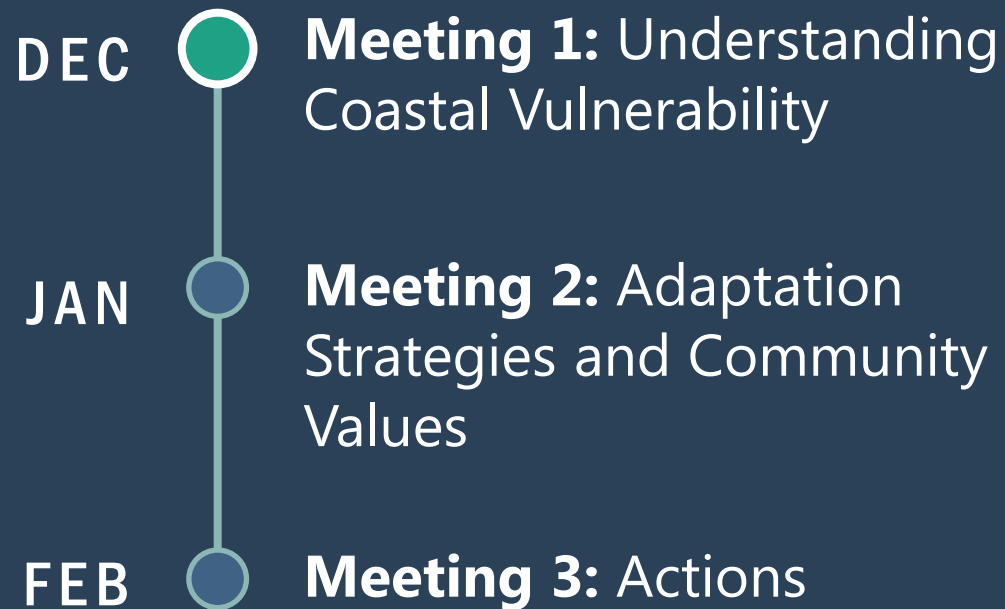
## **SUBREGIONAL STAKEHOLDERS**

- Engage participants across the region based on their connection to the waters that surround the Cape.
- Present information and solicit feedback that will inform the process



# Resilient Cape Cod | Engagement

## SUBREGIONAL STAKEHOLDERS



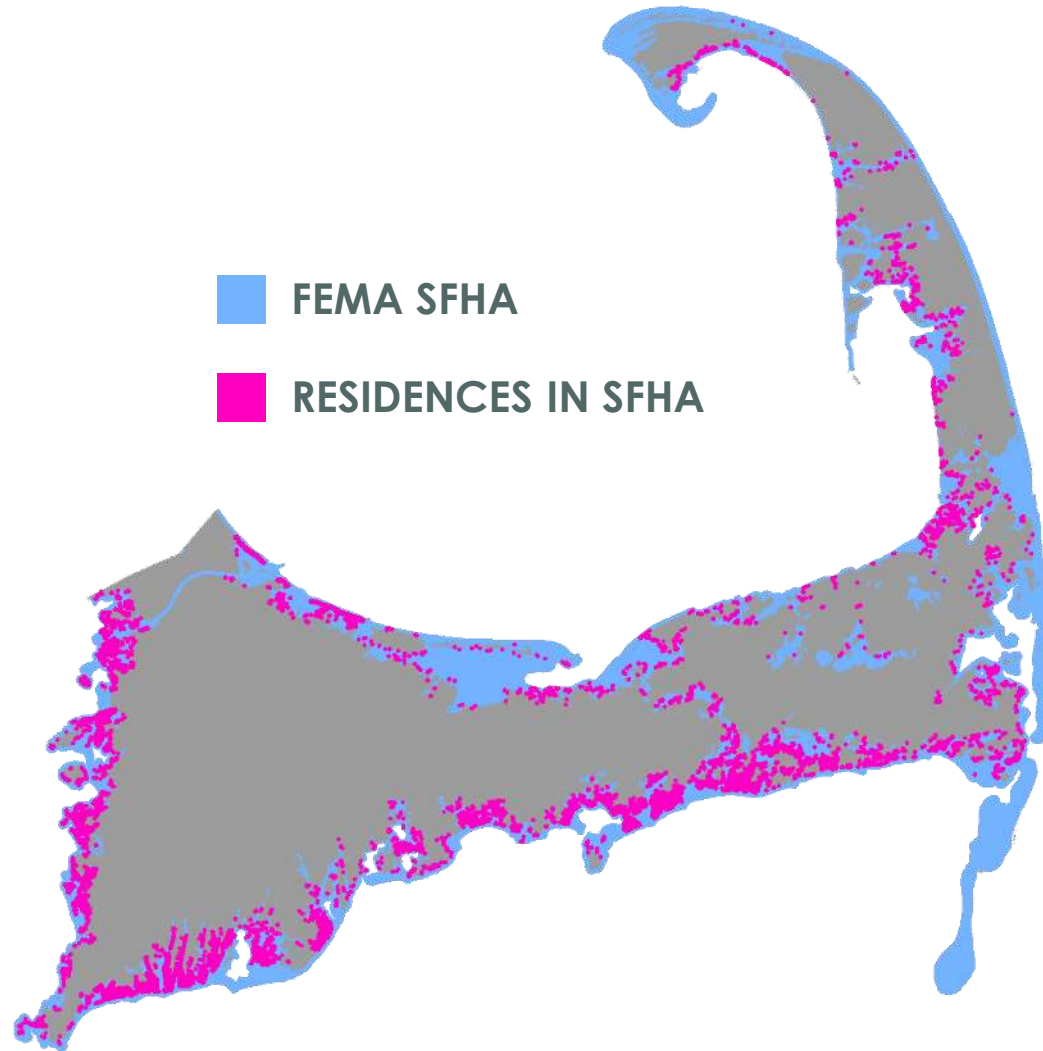
A photograph of a two-story house with grey shingle siding and white trim, built on a sandy dune. The house has a gabled roof, a brick chimney, and several multi-paned windows. A wooden deck with a railing is visible on the side. The house is situated on a steep, sandy slope with some dry grass. In the background, a sandy beach and the ocean are visible under a blue sky with scattered clouds.

**How are we Vulnerable?**



# COASTAL HOMES AT RISK

## ESTIMATED ECONOMIC LOSS



13,000 SINGLE FAMILY  
HOMES IN SPECIAL FLOOD  
HAZARD AREAS (SFHA)

PROPERTY VALUE:  
\$9,000,000,000

A photograph of a coastal scene. On the left, a white boat with a red stripe is partially visible. In the center, a person wearing a bright yellow raincoat is walking away from the camera on a wet, muddy path. To the right, there is a small, dark-colored building with white trim, a gabled roof, and a small porch. The building appears to be a guardhouse or a small office. The background shows a hilly area with some houses and trees under a cloudy sky. The overall scene suggests a coastal or maritime environment, possibly after a storm or during a rainy day.

# Storymap: Impacts and Mitigation Efforts



# Resilient Cape Cod - Coastal Impacts



Where are we vulnerable to the impacts of storm events, flooding, sea level rise, and erosion?

Sea Level Rise Viewer





## COASTAL RESILIENCY CASE STUDIES

# Paine's Creek Beach Storm Damage

**THE PROBLEM:** paved parking lot and rock revetment destroyed twice by winter storms

### CLIMATE CHANGE HAZARDS:

- Sea Level Rise
- Flooding
- Erosion

### COMMUNITY RESPONSE:

- Retreat
- Managed Relocation
- Restoration

**LOCATION:** Brewster, MA  
**SUB-REGION:** Cape Cod Bay





# DECISION SUPPORT TOOL

# RESILIENCY DECISION SUPPORT TOOL

## WHY ARE WE CREATING ONE?





# RESILIENCY DECISION SUPPORT TOOL

## THE PATH FORWARD

STEP 1: Identify the vulnerabilities.

STEP 2: Investigate options.

STEP 3: Evaluate risks & costs.

STEP 4: Make informed decisions

# RESILIENCY DECISION SUPPORT TOOL

## VULNERABILITY RIBBON



- Distance of structures from shoreline
- Coastal erosion rates
- Presence/absence of coastal resources
- Structures/roads in hazard areas
- Sediment transport

# RESILIENCY DECISION SUPPORT TOOL

## ECOSYSTEM SERVICES



- Flood Control
- Storm Damage Prevention
- Protection of Wildlife Habitat
- Protection of Marine Fisheries
- Recreational access



# Resilient Cape Cod | Socio-Economic Analysis



Economic modeling  
to estimate use  
values



Research to fill in  
knowledge gaps  
where primary  
studies for the Cape  
don't exist



Estimate how the  
community values  
coastal resources



Add baseline  
information to eco-  
system services  
valuation

# RESILIENCY DECISION SUPPORT TOOL

## ADAPTATION STRATEGIES

- 45+ Strategies
- 15 data points:
  - Description
  - Hazard type
  - Advantages/disadvantages
  - Siting requirements
  - Ecosystem services
- Linked to database for tool

Adaptation Measures	Description	Adaptation Category			Adaptation Type	Climate Change Hazard		
		Protect	Accommodate	Retreat	CES or Non-CES	Erosion	Storm Surge	Sea level rise
Dune Stabilization - Coir Envelopes	"Envelopes" are constructed of coir (coconut fiber) fabric and are filled with local sand. The envelopes are placed in terraces along the beach, are typically covered with sand, and may also be planted with native vegetation to hold sand together and absorb water.	Y	N	N	non-CES	Y	Y	N
Sand Bypass System	Where a jetty or groin has interrupted the flow of sediment along the beach, sand may be moved hydraulically or mechanically from the accreting updrift side of an inlet to the eroding down-drift side.	Y	N	N	non-CES	Y	N	N
Living Shoreline: Vegetation Only	Shoreline stabilization techniques along estuarine coasts, bays, sheltered coastlines, and tributaries. A living shoreline has a footprint that is made up mostly of native material. It incorporates vegetation or other living, natural "soft" elements alone or in combination with some other type of harder shoreline structure (e.g. oyster reefs or rock sills) for added stability.  Using vegetation alone is one approach. Roots hold soil in place to reduce erosion. Provides a buffer to upland areas and breaks	Y	Y	N	non-CES	Y	Y	Y

# RESILIENCY DECISION SUPPORT TOOL

## TOOL DEVELOPMENT

### Adaptation Strategies:

- Revetment
- Wave attenuator
- Living shoreline
- Coir logs with plantings
- Beach nourishment
- Zoning changes
- Retreat





# Resilient Cape Cod | Engagement

---



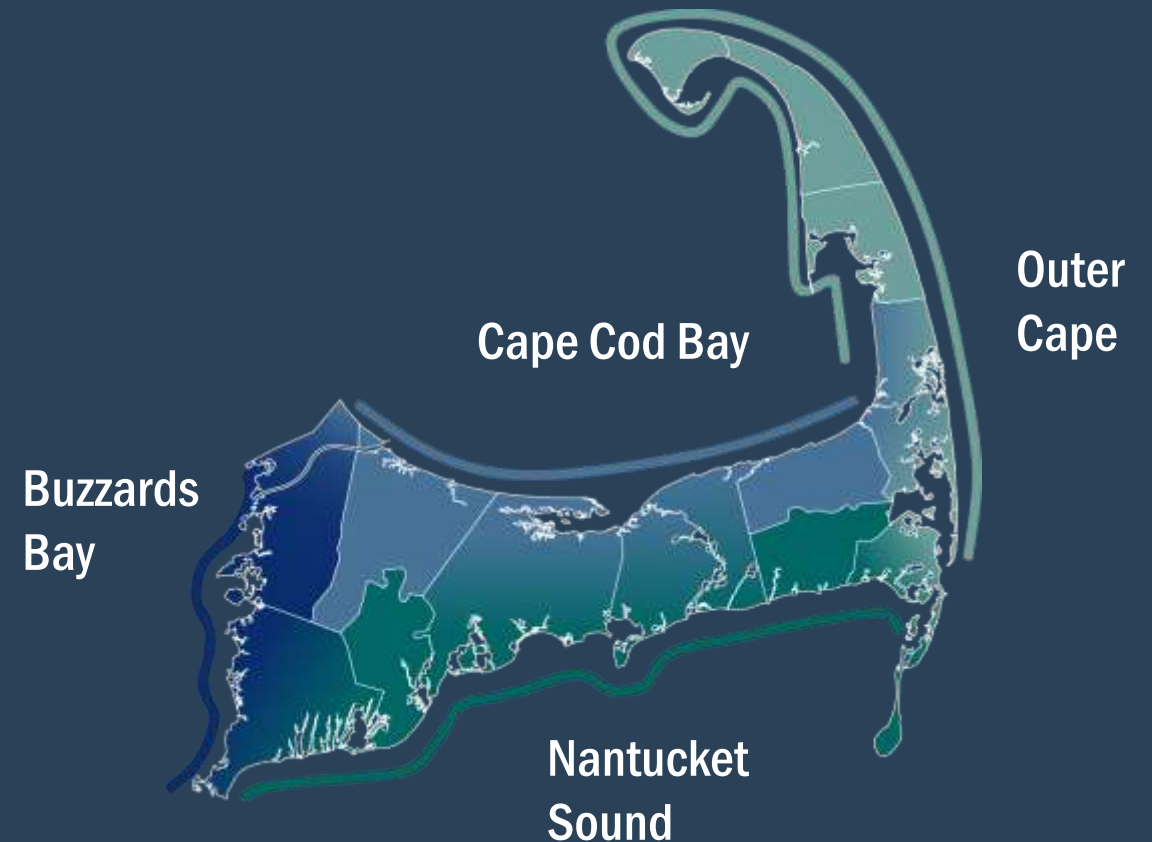
## **TOOL BETA TESTER GROUP**

- Will provide feedback on the decision support tool as it is developed
- Help shape ultimate functionality

# Resilient Cape Cod | Summary

## NEXT STEPS:

- Stakeholder engagement: Workshops
- Discuss threats and vulnerabilities
- Identify what we care about: values
- Make tool to illustrate tradeoffs between solutions and values
- Pilot project in Barnstable





# THANK YOU

## THE RESILIENT CAPE COD PROJECT



WAQUOIT BAY  
NATIONAL  
ESTUARINE  
RESEARCH  
RESERVE



**APCC**  
Association to  
Preserve Cape Cod

