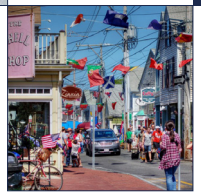
Town of Provincetown, MA

Community Resiliency Building Workshop Summary of Findings

June 2019



WOODARD &CURRAN

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1. OVERVIEW

Along with other Cape Cod communities, the Town of Provincetown, Massachusetts is vulnerable to a wide range of natural hazards, some of which will be exacerbated by climate change, sea level rise and associated storm surge. The community has been proactively discussing and planning for these impacts and changes. Due to Provincetown's location, a peninsula at the end of Cape Cod, storm events have caused damage, even as recently as the winter of 2018. Coastal flooding, inland flooding, power outages, coastal erosion, residential and commercial property damage and damage to Town property and buildings were unfortunate outcomes.

Provincetown has specifically been managing impacts and damage in recent years associated with the following:

- Commercial Street/Downtown Area Flooding,
- Town Hall Flooding,
- Coastal Erosion at Herring Cove and along the Provincetown Harbor Waterfront,
- Emergency Services Located in Floodplain Areas, and
- Property Damage to Residential Homes and Commercial Businesses Due to Flooding and Severe Storms.

As Provincetown continues to move forward with mitigation, adaptation and resiliency focused goals and actions, seeking out supplemental funding sources remains a key focus. In 2018, the community applied for and received a Municipal Vulnerability Preparedness (MVP) Planning Grant from the Massachusetts Executive Office of Energy and Environmental Affairs. This was the second round of MVP planning grants to be awarded with the purpose of supporting communities who want to plan for climate change resiliency and implement priority projects. Provincetown began the planning process in the fall of 2018 and held its Community Resiliency Building (CRB) workshop in March 2019.

Upon completion of the planning process, Provincetown will become a certified MVP community and eligible to apply for Municipal Vulnerability Preparedness Action Grants. This Summary of Findings captures Provincetown's process and efforts to reach this designation and will propel the community forward to continue its resiliency planning, projects and community engagement.

1.1 Municipal Vulnerability Preparedness Process

Provincetown received grant funding to conduct the Community Resiliency Building Workshop as well as one specific engagement session targeted toward part-time or seasonal residents and one specific engagement session targeted toward residents who live in or are associated with the designated Environmental Justice area of the community. To start the process, a kick-off meeting was held with a Core Team of participants.

1.2 Community Resiliency Building Workshop Core Team

Provincetown's Community Resiliency Building Workshop was led by a local Core Team which included the following individuals and Town departments:

- Timothy Famulare, Environmental Planner & Conservation Agent | Lead Project Manager for MVP/CRB
- Rex McKinsey, Harbormaster
- David Gardner, Assistant Town Manager/Acting Town Manager
- Erin Ellis, Project Administrator
- Bob Capurso, Town Engineer
- Lezli Rowell, Health Agent

- Greg Hennick, Lieutenant/Police Department
- Anne Howard, Building Commissioner
- Chris Hottle, Director/Council on Aging
- Jeff Ribeiro, Town Planner

Other key individuals who participated during the process of planning the workshop included:

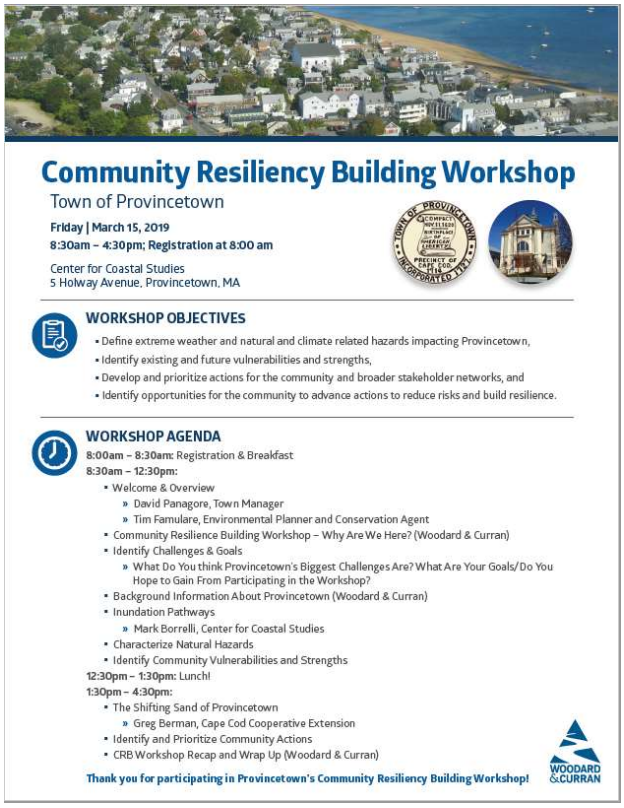
- David Panagore, Former Town Manager
- Lauren McKean, Cape Cod National Seashore
- Richard Waldo, DPW Director
- Eric Sussman, Emergency Manager

Provincetown contracted with Woodard & Curran to support and help implement the Community Resiliency Building process required as a part of the MVP program. The Core Team held an initial project kick off meeting on December 13, 2018 to discuss the overall MVP planning process and start planning for the upcoming CRB workshop.

1.2.1 Community Resiliency Building Workshop

Provincetown held its Community Resiliency Building (CRB) workshop on March 15, 2019, at the Center for Coastal Studies located at 5 Holway Avenue. The Core Team and Woodard & Curran worked together to develop an agenda that was both informative, engaging and aligned with the objectives of the workshop which were to:

- Define extreme weather and natural and climate related hazards impacting Provincetown,
- Identify existing and future vulnerabilities and strengths,
- Develop and prioritize actions for the community and broader stakeholder networks, and
- Identify opportunities for the community to advance actions to reduce risks and build resilience.



The Core Team, led by Tim Famulare and under the direction of former Town Manager, David Panagore, conducted outreach to town boards and committees through presentations, emails, phone calls and meetings to gather their support and participation in the upcoming CRB workshop. The outreach was successful and there were 55 participants for the eight-hour workshop. Other partners for the CRB workshop included the Center for Coastal Studies and the Cape Cod Cooperative Extension.

The CRB workshop also focused on learning information from attendees through a personal reflection format that asked what they felt the community's biggest challenges are regarding resiliency. The agenda built upon this exercise by educating participants with the goal of increasing local awareness of risks facing the community from natural and

climate-related hazards. Identifying vulnerabilities and strengths in Provincetown from an infrastructure, societal and environmental perspective served as the foundation for the end of day discussions about action steps.

1.2.2 Listening Session

Provincetown engaged stakeholders at a Listening Session which was held on April 11, 2019 at Town Hall. The Listening Session included a summary of the Community Resiliency Building workshop process and findings. Key discussion points from the Listening Session include:

- Mitigating flooding in Provincetown and increasing awareness to homeowners and businesses about potential issues.
- Natural infrastructure flood and storm mitigation techniques such as beach nourishment and dune enhancement.
- Managing natural hazard situations for both the year-round population and during the busy summer months when thousands of additional residents and visitors are in town.
- Desire of stakeholders to increase awareness of and use of green infrastructure techniques, including planting and managing trees.

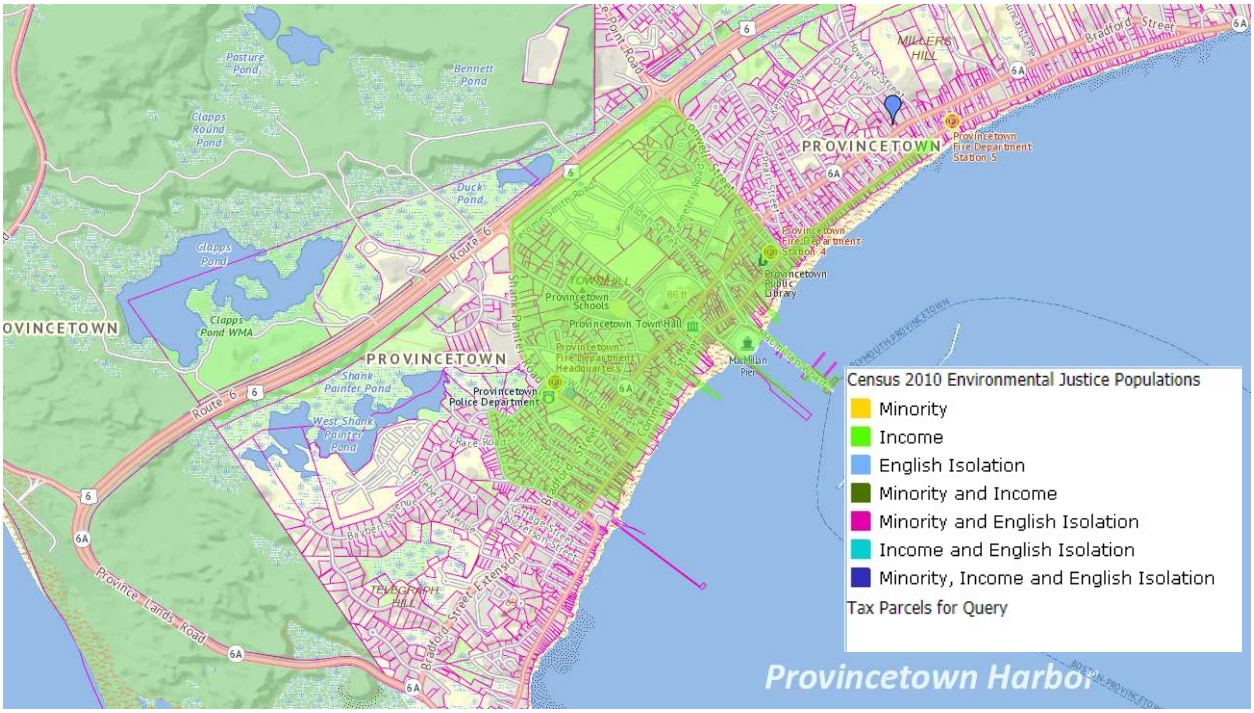
1.2.3 Part-Time or Seasonal Resident Engagement

On May 17, 2019, Provincetown held an engagement session about the Municipal Vulnerability Preparedness planning process specifically for part-time or seasonal residents at The Commons, located at 46 Bradford Street. Attendees at this engagement session focused on learning and understanding background information about the project and community, learning about the Community Resiliency Building Workshop and then sharing their thoughts and ideas on how Provincetown can focus on adaptation strategies to increase resiliency.

1.2.4 Environmental Justice Area Engagement

Provincetown held an additional resident engagement session on June 5, 2019 at the Veterans Memorial Community Center that focused on the designated Environmental Justice (EJ) area (based on income) in the community (see **Figure 1**). EJ is a concept that refers to the fair distribution of environmental benefits and burdens in a community. According to 2010 Census data, approximately 499 people live in the census tract associated with the EJ area. Provincetown's EJ area was designated because of the 499 people living in this area, 57% are considered to be of low or moderate income or suffer from income isolation. The overall EJ concept refers to the fair distribution of environmental benefits and burdens.

Figure 1: Provincetown Environmental Justice Population (Income Based)



To inform residents and businesses about the event, an informational flyer was distributed to the backpacks of every Provincetown public school student and to the family of each daycare participant in town - a total of 145 flyers. Flyers for the event were also posted at the locations noted in **Table 1**. These locations were mostly located within the EJ area and those that are not were selected because they are places likely to be visited by residents who live in the EJ area. Flyers were also distributed to various community and public housing partners.

Table 1: Resident Engagement Informational Flyer Locations

Area	Location
Commercial Street (East to West)	St. Mary's Episcopal Church Ice House Apartments Angel Foods Grocery Store Angel's Landing Retail and Residences Public Library Wired Puppy Coffee Shop Land's End Hardware Town Rest Rooms at MacMillan Public Landing Town Hall - Community Development Unitarian Universalist Church Seamen's Bank USPS
Bradford Street (West to East)	Mussel Beach Gym

Area	Location
	AIDS Support Group Farland Provisions Grocery Store & Deli East End Market Place Grocery Store & Deli
Shankpainter Road	Provincetown Gym Laundromat Stop and Shop Province Landing Affordable Housing Herring Cove Animal Hospital Methodist Church
Harry Kemp Way	Outer Cape Health Community Health Center Maushope – Provincetown Housing Authority
Conwell Street	Community Housing Resources Helping Our Women – Nonprofit Organization Ace Hardware
Other	Seashore Point Senior Housing Provincetown High School Council on Aging/Recreation St. Peter's Catholic Church
Town of Truro, MA	Salty Market Grocery Store & Deli Savory and Sweet Escape Deli & Coffee Shop

Attendees at this engagement session focused on learning and understanding background information about the project and community, learning about the Community Resiliency Building Workshop and then sharing their thoughts and ideas on how Provincetown can focus on adaptation strategies to increase resiliency.

1.3 Other Recent Planning Efforts

Continuing to leverage the work that has already been done in Provincetown to actively address climate change and natural hazard impacts is critically important to Town staff. Recent planning efforts were highlighted during the workshop and subsequent resident engagement sessions by informing participants of the following plans and projects that have been completed:

- FEMA approved Hazard Mitigation Plan (2016)
- Increasing Coastal Resiliency and Reducing Infrastructure Vulnerability by Mapping Inundation Pathways (2016)
- Coastal Zone Management Grant for Ryder Street Beach Dune Enhancement which was supported at the Spring 2018 Town Meeting with a $200,000 CIP line item for beach nourishment projects. Currently this project is in the design and permitting stage. If approved and constructed, it will provide a barrier for flood events that have previously entered the Gosnold Street inundation pathway to contribute to flooding along Commercial Street.
- Community dialogue sessions in 2018 to discuss recent flooding events and flood insurance options and requirements
- Regularly seeking out other grant funding opportunities to advance needed resiliency projects such as the Ryder Street Outfall
- Installed a tide gauge to closely monitor daily tide levels
- Municipal Vulnerability Preparedness Planning Grant (2018)
- Town purchased a waterfront lot in 2018 that is currently used as commercial parking. There will be improvements made to the property.

- Current purchase and sale agreement for a wooded lot off Bradford Street that abuts the Old Colony Nature Trail
- Health Director is introducing a revolving fund for residents to create rain gardens which will result in using rain water for residential homes and help keep water off Commercial Street.
- Beach Nourishment at Court Street (winter 2019)
- Town hired an Emergency Manager as of Spring 2019

Many of the recommendations and next steps highlighted in some of these planning documents have been carried forward during the Municipal Vulnerability Preparedness and Community Resiliency Building process for Provincetown.

Photos: Provincetown Community Resiliency Building Workshop, March 2019

2. SUMMARY OF FINDINGS

Provincetown's Summary of Findings is based on the outcomes of the March 15, 2019 CRB Workshop. The purpose of the summary is to document the workshop and leverage the information to move forward with adaptation and mitigation projects that are aligned with overall resiliency goals.

One of the first agenda items for the workshop was to listen to attendees about their thoughts on community challenges. Participants were asked to think about and write down on a note card answers to the questions below. Participants provided feedback for these questions which is summarized below in **Table 2**.

1) **What are Provincetown's biggest challenges? (infrastructure, societal, environment)**
2) **What are your goals for the day and what do you hope to gain from your participation in the workshop?**

Table 2: CRB Workshop Participant Reflection Summary

What are Provincetown's biggest challenges?	
• Flooding • Sea level rise • Preserving coastline • Maintaining business community and property values • Sewer system vulnerability • Sand management • Erosion • Management of development pressures and fragile natural environment • Geographic vulnerability • Redundant water (and groundwater contamination)	• Isolation • Evacuation (Route 6) • Inadequate drainage • Prioritizing needs • Resources (staff, financial) to address needs • Preservation of town character • Building consensus • Long term economic position • Storm mitigation • Zoning bylaws need updating
What are your goals for the day and what do you hope to gain from your participation in the workshop?	
• Hear others' concerns and learn • Think about solutions • Contribute to defining protective measures for the community • Proactive planning and build connections • Understand community options for improved resiliency and the path forward • Community concerns about vulnerable areas • Prevent future structural damage • Identify talking points to share with others and engage	• Improved understanding of community challenges • Identify practical solutions that will work • Focus on nature based solutions • Start small and lead to larger results • Learn - what can I do? • Build community • Be educated • Witness the process • Leave the workshop feeling positive • Start to develop a long term plan

2.1 Top Natural Hazards

Participants at the CRB workshop were divided into five tables for the day. Following the agenda, they were first asked to identify what the top four natural hazards are that Provincetown faces. Prior to this discussion, two presentations were given which included background information about the community relevant to the discussion and a presentation from Mark Borrelli, Center for Coastal Studies, regarding the inundation pathway work that he and his colleagues had conducted recently in the community.

The *"Increasing Coastal Resiliency and Reducing Infrastructure Vulnerability by Mapping Inundation Pathways"* project was funded by the Massachusetts Office of Coastal Zone Management. The goal of the project was to identify the most critical facilities and infrastructure, conduct a detailed risk assessment, identify vulnerabilities and help prioritize mitigation projects and adaptation strategies for Provincetown. One useful aspect of the project was the documented flood elevations associated with coastal inundation – otherwise referred to as inundation pathways.

During the background information presentation, the Inundation Pathways study was highlighted along with the recently completed Provincetown Hazard Mitigation Plan (HMP). To further leverage existing work the town has already done, participants learned that the following natural hazards were identified as impacting the community during the HMP process:

- Coastal Erosion
- Fire
- Flood
- Hurricane/Tropical Storms
- Landslide
- Nor'easters
- High Winds
- Thunderstorms
- Extreme Temperatures (heat, cold)
- Drought
- Culvert Failure
- Severe Winter Weather
- Sea Level Rise
- Climate Change

Based on the background information presented and what was learned about the HMP, the natural hazards identified by the CRB workshop participants that they were most concerned about include:

- **Flooding**
- **Sea Level Rise**
- **Severe Storms/Wind**
- **Coastal Erosion**
- **Drought**
- **Fire**
- **Extreme Heat/Cold**

Flooding, sea level rise and severe storms/wind were identified on each of the five matrix boards. The other natural hazards were selected by some but not all of the tables.

2.2 Identified Vulnerable Areas in the Community

Due to its coastal location and the fact that it is a peninsula, Provincetown in general was identified as being vulnerable to the natural hazard events discussed by each table. The community is particularly vulnerable during any storm that comes from the east (northeast to southeast). Participants did specifically focus on the downtown area of the community which is densely developed and most vulnerable to storm events due to the number of residents, businesses and visitors which frequent this area. Specific locations mentioned by participants at the workshop for that should be considered for their vulnerability include:

Neighborhoods or Areas

- **Downtown/Commercial Street Area** – This area has seen flooding and damage from various storm events in the past from heavy precipitation and coastal flooding/storm surge.

- **Ryder Street/Gosnold Street** – This area has an identified inundation pathway. Currently, the town is using Massachusetts Coastal Zone Management grant funding to design and permit a dune enhancement project. If successful and the dune is constructed, it will serve to cut off this inundation pathway during future storm events and reduce the impacts of flooding to this section of Commercial Street.

- **Court Street at Shank Painter Road –** This area experiences flooding during heavy rain events due in part to runoff from Shank Painter Road.

- **Shank Painter Area Flooding –** A previous planning project identified a coastal storm inundation pathway that if overtopped at a specific elevation at Herring Cove, would flood the Shank Painter Road area. The police and fire stations are located along Shank Painter. This area is also known to have groundwater inundation issues.

- **MacMillan Pier** – Dredging work needs to be done to help protect this infrastructure and economic activity in the area. During any dredging project, beneficial reuse of the materials should be considered.

- **Central Sewer Vacuum System** – Located in the parking lot for MacMillan Pier, this key component of the Town's wastewater system is vulnerable to flooding and storm impacts.

- **Historic District** – Located in Provincetown's downtown area, there are 511 historic structures located in the floodplain.

- **Route 6A at Snail Road** – This was identified as an area that needs to be better protected due to the water transmission line in this location. Discussion included potentially installing an oyster reef to build up sand.

Ecosystems

- Herring Cove, Shank Painter Pond, Local Beaches and Dunes, Provincetown Waterfront and Harbor Area which would benefit from Beach Nourishment and Sediment Management

Transportation

- Route 6, Route 6A, Snail Road, Commercial Street, Provincelands Road, Howland Road, Conwell Road, Provincetown Harbor, Provincetown Airport, Isolation of the community should Route 6 and 6A become unusable

Infrastructure

- Route 6, Route 6A, Water Transmission Mains, Sewer Infrastructure & Septic Systems, Wastewater Treatment Plant, Pump Stations, Hatches Harbor Dike and the Airport, East End Outfalls near Kendall Lane, Ryder Street Outfall, Gosnold Street Outfall and other outfalls in the community, MacMillan Pier, Coastal Infrastructure, Culverts, Provincetown Airport, Municipal Services (Town Hall, Police, Fire, Emergency Shelters)

2.3 Challenges and Concerns Presented by Natural Hazards

Participants at the CRB workshop identified a number of challenges and concerns that have been and will continue to be presented to the town from natural hazard events, including impacts from climate change. Most recently in January 2018, a large storm event caused major flooding that resulted in three feet of water on parts of Commercial Street and Province Lands Road, loss of power, damage to more than 50 homes and businesses, flooding of Town Hall and flooding of the UU Meeting House (dated 1847) which had six inches of water on the first floor. Another Nor'Easter in

March 2018 also resulted in power outages and damage to waterfront homes and businesses as well as localized flooding.

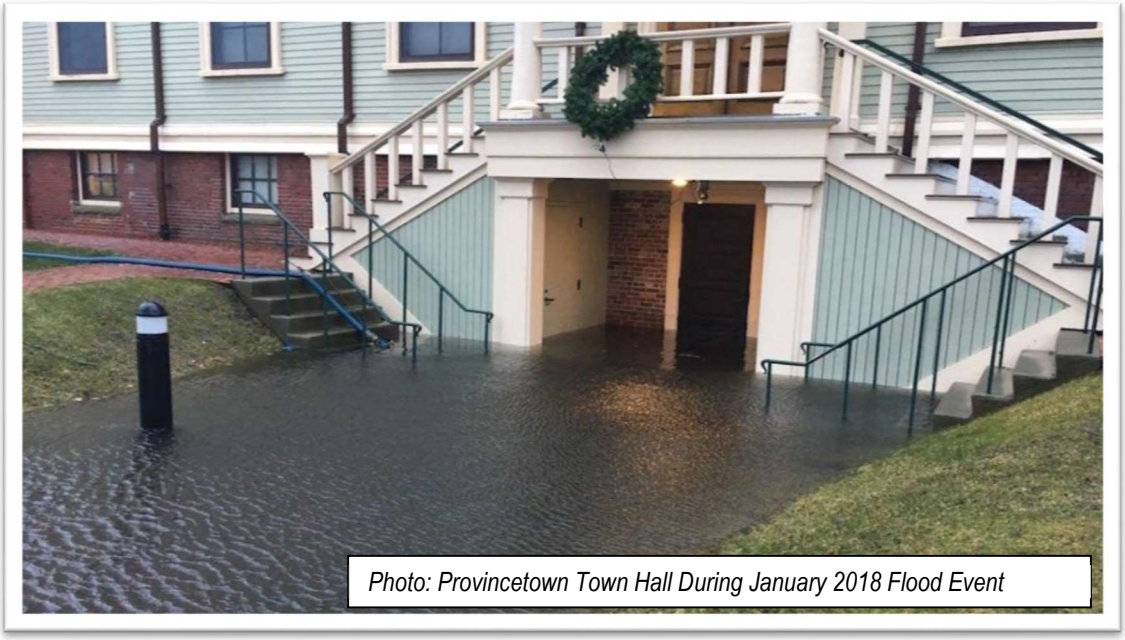


Photo: Provincetown Town Hall During January 2018 Flood Event

Provincetown has also recovered from other storm events including:

- Super Storm Sandy (2012) and Winter Storm Nemo (2013) – beach erosion, flooding, property damage, significant damage to MacMillan Pier
- Hurricane Earl (2010) and Irene (2011) – street flooding, loss of power
- Great Storm of 1978 and Halloween Storm (1991) – caused property damage
- Hurricane Bob (1991) – erosion from waves and wind, MacMillan Pier was submerged

These storm events, particularly the most recent one in 2018, have heightened awareness regarding the need to become a resilient community and address climate change more specifically. Being prepared for and recovering from natural hazard events in a variety of scenarios is critical for Provincetown – a community that sees an influx of residents and visitors between April to November.

Four recent local studies were leveraged during the CRB workshop process and a summary of the recommendations from each report was prepared as a handout. The purpose of this effort was to educate attendees about the work that has been completed to date and to understand previous recommendations that would also apply to the CRB process. The reports leveraged include:

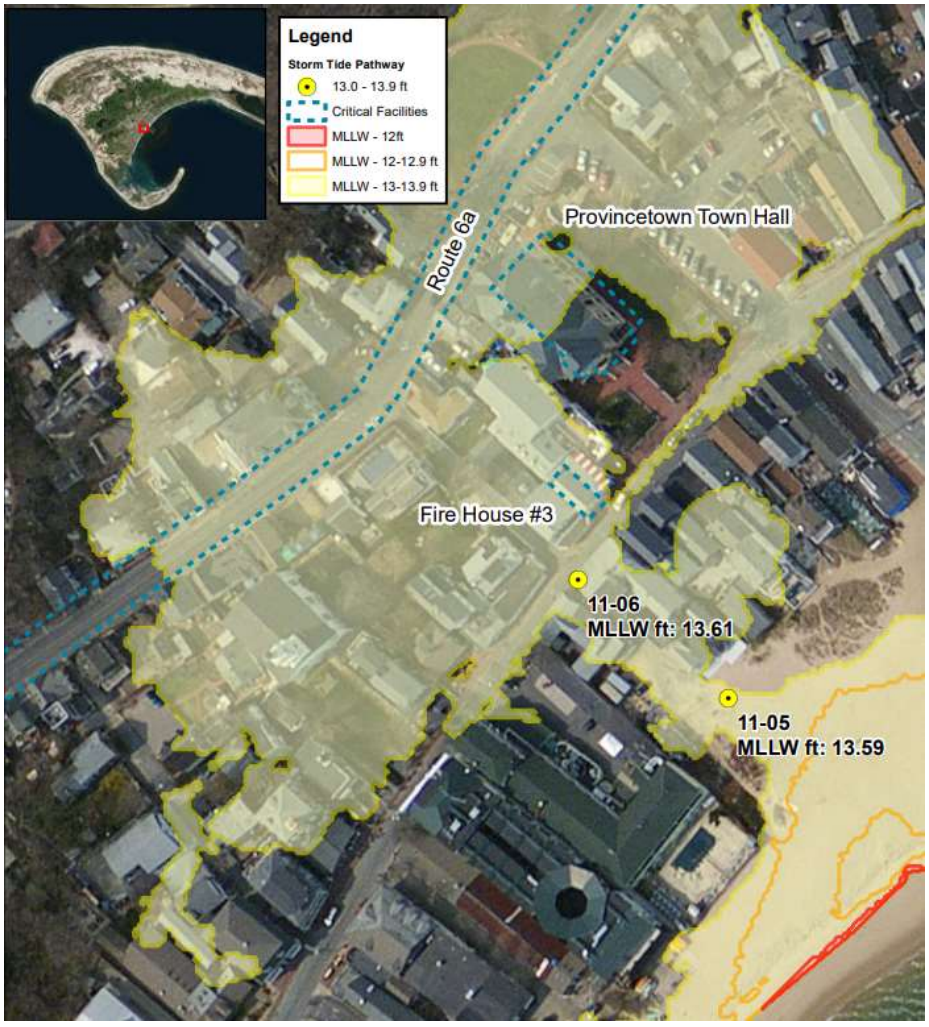
1. Provincetown Coastal Resiliency Assessment and Strategic Beach Stabilization Pilot Project (2015)
2. Increasing Coastal Resiliency and Reducing Infrastructure Vulnerability by Mapping Inundation Pathways (2016)
3. Provincetown Hazard Mitigation Plan (HMP) (2016)
4. Provincetown Harbor Management Plan (2018)

2.3.1 Downtown Area & Commercial Street

Provincetown's downtown area, which includes Commercial Street, has been at the forefront of resiliency related discussions and improvements. From 2012 to 2014, Provincetown installed porous pavement along 1.5 miles of Commercial Street, which has reduced stormwater runoff onto the beaches and into Provincetown Harbor. Stormwater is now filtered through the porous pavement resulting in improved water quality within Provincetown Harbor. Additionally, the Town cleans the pavement by vacuuming streets daily during the summer.

In 2016, Provincetown completed a study *(Increasing Coastal Resiliency and Reducing Infrastructure Vulnerability by Mapping Inundation Pathways)* focused on identifying and planning for areas of the community where there is critical infrastructure in place and that would be impacted by "inundation pathways." The work included a risk assessment and strategies to improve resilience of Provincetown's critical infrastructure. The downtown area near Commercial Street and Ryder Street includes critical infrastructure such as Town Hall, the Central Sewer Vacuum System, roadways and pump stations. Two storm tide pathways were identified to impact this area and Provincetown Town Hall and MacMillan Pier (where the Central Sewer Vacuum System is located) were identified as the second and third most at risk critical assets in the community (see **Figure 2**). The report recommended eliminating this inundation pathway if possible.

Figure 2: Downtown/Commercial Street Inundation Pathway

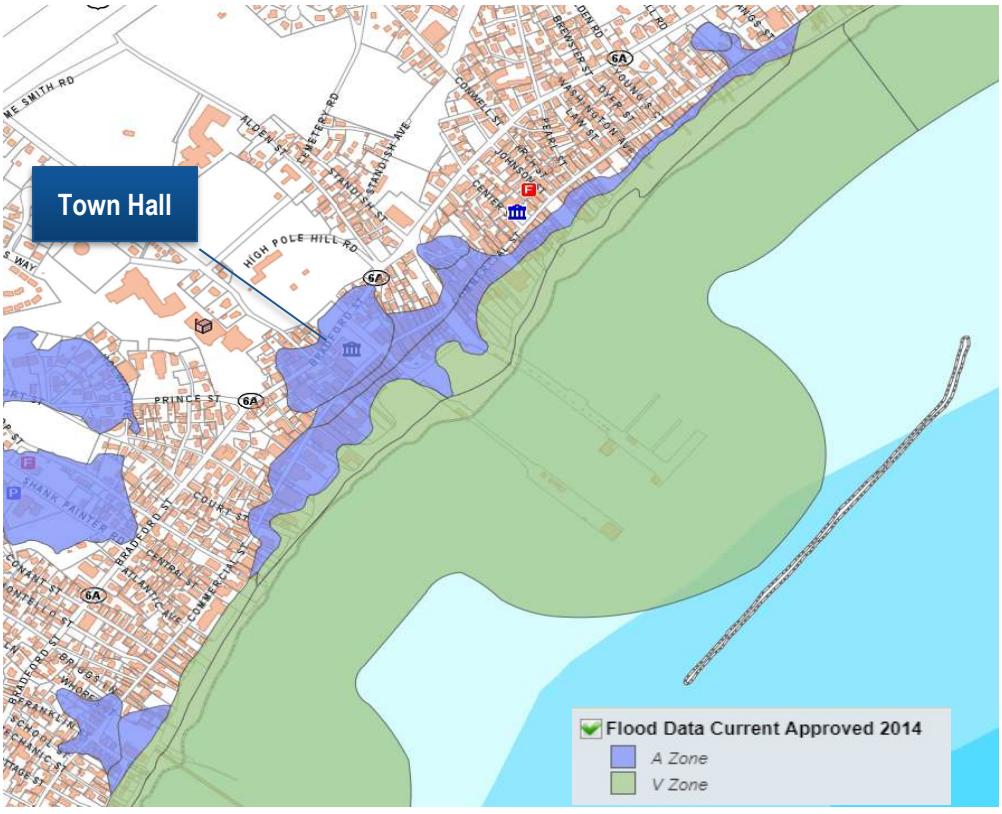


Since this report was completed, Provincetown has moved forward with a natural infrastructure solution to design and permit a dune on Ryder Street beach (including natural plantings) that would block storm surge from flooding this inundation pathway. In the Spring of 2019, dune design and permit documents were completed and submitted for necessary local, state and federal approval.

Town Hall is located in an identified FEMA Floodplain (AE Zone) and is vulnerable to coastal flooding, flooding associated with drainage issues and flooding exacerbated by high precipitation events (see **Figure 3**). The building is historic and serves as the central location for town government. In addition to conducting Town business, Provincetown also uses the building for entertainment events, celebration events (such as weddings) and meeting rental space which all contributes to the local economy. This building has been impacted by flooding events in the past and continues to be vulnerable to future hazards.

Provincetown has a highly valued second home market and most of these properties are in the densely developed downtown area. The majority of downtown is also a historic district and over 500 properties in this area are historic structures.

Figure 3: Provincetown, MA Downtown/Commercial Street Area in Floodplain



Other concerns and discussion topics that pertain to the Downtown or Commercial Street area (along with other areas in Town) include:

- The need for continued focus on natural infrastructure solutions and living shorelines,
- Identification of a long-term sand supply is needed,

- The need to educate year-round and seasonal residents about flooding, sea level rise, climate change and other issues the community faces – it is a constantly changing group of people,
- A long-term solution is needed to address the sand impacts on outfall pipes that need continuous cleaning and maintenance to clear the sand,
- Quantification of the economic value of Provincetown Harbor that will help highlight the impact it has on the community, region and State, and
- Increased precipitation, increased runoff, increased pollutants into the harbor result in water quality impacts and this needs to be understood, monitored and mitigated.

2.3.2 Emergency Management

Evacuation, shelter in place, community isolation during storm events, the ability to handle a large-scale emergency event during busy summer months and distance from major medical care were all discussed as challenges faced by Provincetown during the Community Resiliency Building Workshop. Provincetown does have a Local Emergency Preparedness Committee (LEPC) whose goal is to prepare response plans that address human or natural hazard threats to public health and safety. To date, this committee has helped prepare a Comprehensive Emergency Management Plan, a Continuity of Operations Plan and several other overarching emergency preparedness and response documents.

In 2019, Provincetown hired an Emergency Manager to support this committee and work with other departments. One of the main focus areas for the current Emergency Manager is to conduct community engagement and outreach activities to inform the public of Provincetown's emergency management planning and to clarify what the plans are for various emergency situations. The outreach includes messaging for short term guests and visitors as well as vulnerable populations.

The 2016 *Increasing Coastal Resiliency and Reducing Infrastructure Vulnerability by Mapping Inundation Pathways* study recognized the existing Police Station and Police Department as critical to the community in supporting public safety. Its current location (in a FEMA floodplain) on Shank Painter Road has made it the subject of numerous recent discussions and planning efforts – its location at a low elevation contributes to its flood risk. Provincetown is seeking to construct the facility in another location outside of the floodplain but the project has not been funded yet. This document also recognized the need to update the local Emergency Response Plan and take the opportunity to make sure lessons learned from recent events, such as the January 2018 floods, are included.

2.3.3 Utilities (Power, Water, Drainage, Wastewater)

Provincetown put a spotlight on critical infrastructure in 2016 with the completion of the *Increasing Coastal Resiliency and Reducing Infrastructure Vulnerability by Mapping Inundation Pathways* project. The goal of the project was to identify the most critical facilities and infrastructure, conduct a detailed risk assessment, identify vulnerabilities and identify and prioritize mitigation projects and adaptation strategies.

Utilities received the most support during the Community Resiliency Building workshop and this study should be leveraged for any future resiliency or adaptation work in the community that will include utilities and infrastructure or impact them in any manner. Moving forward, Provincetown should also consider the following principles for any project, plan or implementation step focused on utilities which are consistent with State guidelines outlines in the Massachusetts Climate Adaptation Report:

- Strengthening infrastructure resources to increase their capacity to manage and withstand climate change impacts.
- Focus on conservation, efficiency, reuse and redundancy for drinking water, drainage, stormwater management and the sewer system.
- Flood proofing structures during upgrades or routine maintenance.
- During infrastructure maintenance, replacement and rehabilitation, provide proper lead time so that an adaptation strategy can be included in the overall assessment of the critical facility where applicable.

Increasing Coastal Resiliency and Reducing Infrastructure Vulnerability by Mapping Inundation Pathways Report

Recommendations in this study associated with utilities include:

- Conduct a drainage study for the area around Town Hall and/or perform a groundwater study or modeling analysis.
- Conduct a drainage study for the area around Shank Painter and/or perform a groundwater study or modeling analysis.
- Develop a strategy to conduct ongoing CCTV work that will result in information that can be leveraged for Operations & Maintenance work of the drainage system. This needs to be done particularly in the East End area near Kendall Lane.
- Add redundant water transmission lines from Truro. Currently the water transmission lines run along Route 6A and Provincetown receives its water from Truro and the roadway these lines are underneath is inundated by sea water at times. Electric power comes in through Route 6A as well.
- Provincetown has 11 pump stations, some in high risk areas. Flooding and power outages at pump stations could result in interrupted sewer service or sanitary sewer overflows which could impact public health and the environment. Making pump station improvements such as elevating them or relocating equipment, developing standard operating procedures and ensuring generator capacity and availability are all key resiliency measures.

Other projects that were discussed during this process and specifically mentioned by the DPW Director include planning for an emergency water connection and water supply redundancy, reinforce Route 6A at Snail Road due to the water transmission line, accelerate all pump station resiliency projects, address the Central Sewer Vacuum System resiliency issues by installing a redundant effluent pipe or relocating it, preparing a Hydrologic & Hydraulic Study for Commercial Street, evaluate and improve the East End Storm Drains that are in poor condition and more formally prepare a DPW deployment Emergency Response Plan that focuses on flood control in priority areas.

2.3.4 Beaches & Natural Infrastructure Enhancement

Provincetown's beaches are one of the community's biggest assets and major contributors to the local economy and overall community culture. The beaches experience accretion and erosion of sand and sediment naturally and due to existing coastal infrastructure, such as seawalls, the breakwater, and wave attenuators. In Provincetown's Harbor area, beach migration and sedimentation is a known, ongoing problem.

The DPW currently conducts nourishment in some beach areas, particularly at town landings including Atlantic Street. A nourishment effort at Court Street receives sediment from accreting areas near MacMillan Wharf. The 2018 Provincetown Harbor Plan discussed how climate change will impact Provincetown's beaches and noted the following:

Provincetown Harbor Plan

This plan stated that beach nourishment, sediment management and an overall plan and strategy for managing natural infrastructure will be necessary. Locations in need of beach nourishment include:

- Court Street
- West End Boat Ramp

Known accumulation areas include:

- Ryder Street
- Gosnold Street

- Beaches will be "flooded" due to sea level rise which will cause them to naturally move inland, become smaller or disappear,
- Heightened storm activity will impact movement of sediment causing more frequent erosion and accretion. Should this occur, a secondary impact will be loss of habitat for wildlife, and
- There will be an increase in post storm debris from runoff, damaged property and wave impacts.

Overall beach stability and erosion patterns are a concern due to coastal erosion from storm events and how it will impact property, structures and public access and the siting of future dredge material disposal for beach nourishment and flood prevention. Three recent local studies should be leveraged to help advance beach nourishment and the potential for natural infrastructure adaptation measures.

1. **Provincetown Coastal Resiliency Assessment and Strategic Beach Stabilization Pilot Project (2015)** – This study measured sediment transport and determined a sediment budget for just the Harbor area. Priority areas known for sediment erosion issues that should be investigated further include:
    - **East End in the Snail Road Vicinity** – This is a challenging location due to wind and wave velocity. Critical infrastructure is located in this area including power, water, wastewater and it also serves as an alternative evacuation route.
    - **East End Near Kendall Lane** – This is an area that could be leveraged for introducing sediment back into the natural system which would serve as beach nourishment. Considerations include drainage and flooding problems in the area between Bradford and Commercial Streets – these are further complicated by high tides and storm events. There are also outfall pipes and drainage systems beneath private property and seawalls that need to be considered before any beach nourishment.
    - **West End Near Court Street** – This is an opportunity to relocate accumulated sand at Ryder Street beach to the Court Street area as beach nourishment. Removing the outfall pipe blockage at Ryder Street would further help protect Town Hall and other critical infrastructure. The Ryder Street Beach Dune Enhancement project is currently in the design and permitting phase. Beach nourishment would complement this ongoing work.
    - **West End Near Provincetown Inn** – This area is an accretion site for sand which can be problematic. Accumulated sand at the Provincetown Inn has eroded from the littoral sub-cell between the Coast Guard Pier and West End Boat ramp.

Additional beach nourishment conclusions focused on the following:

- The Harbor shoreline is gaining sand with accretion the greatest at the East End thereby decreasing at the West End. Eroding beaches may be observed due to coastal infrastructure or erosion control structures that block sand movement.
- There are sub-littoral cells in the West End centered on Court Street and the boat ramp.
- East End nourishment including consideration of stormwater drains and bulkheads.

This study should be leveraged for any future beach nourishment/sediment management work in the community.

2. **Increasing Coastal Resiliency and Reducing Infrastructure Vulnerability by Mapping Inundation Pathways (2016)** – This report was discussed in a previous section. It also addresses the importance of beach nourishment as an adaptive strategy to enhance natural storm damage protection and coastal resilience. The specific beach nourishment project noted in this report is associated with Ryder Street Beach. Since the completion of this report, the Town has been able to move forward with the design and permitting of a dune enhancement project on Ryder Street Beach to enhance natural storm damage protection and coastal resilience. The next step is funding actual construction of this dune once it is through the permitting phase.

3. **Provincetown Hazard Mitigation Plan (HMP) (2016)** – Prepared in accordance with FEMA guidelines, the HMP's focus is to reduce damages resulting from natural hazards by implementing sustained actions to reduce or eliminate long-term risk to human life and property from hazards. The HMP is also about building a successful, long-term outreach strategy to educate residents about natural hazards that could affect the Town, to prepare them in case a storm impacts the Town, and to create a resilient Provincetown that can recover after a storm event occurs.

Provincetown Hazard Mitigation Plan

The HMP discussed beach nourishment and recommended the following:

- Pursue beach nourishment opportunities near Snail Road.
- Monitor beach conditions and evaluate all vulnerable shoreline areas for possible future nourishment and beach stabilization projects.

2.4 Current Strengths and Assets

Provincetown is fortunate to have characteristics that provide an asset or strength during natural hazard events to the community such as the beaches, naturally occurring dunes and wetlands, the coastal infrastructure that exists and a strong emergency management team. During the CRB workshop, participants also identified the following strengths:

- Long Point Dike which is 6,150 feet long and extending southerly from Stevens Point across House Point Island Flats protects the harbor from offshore coastal hazards.
- Stone breakwater parallel to shore 835 feet from end of MacMillan Pier which is 2,500 feet long and at elevation 15.5 feet, also protects the harbor from coastal hazards.
- Provincetown Airport is a destination airport from Logan International in Boston. It provides commercial airline service to the Cape Cod region and is sited on 331 acres of land administered by the National Park Service. This airport could provide a lifeline if needed during an emergency. The airport also contributes millions of dollars to the local economy.
- Hatches Harbor Dike which was constructed across the Hatches Harbor salt marsh in 1930.

- Installation of a community battery at transfer station to improve reliability of the electrical infrastructure.
- Abundant natural shoreline areas that can be maintained and enhanced.
- Provincetown has valued Fire, Police and DPW departments who respond during emergency events.
- Beach nourishment, dune enhancement, sediment management, wetland restoration and open space protection and continuing to support these projects and find funding for future phases is important. For example, the Ryder Street Beach Dune Enhancement project is currently in the design and permitting phase, but will need funding for construction.
- Provincetown's existing water, wastewater and drainage infrastructure and the need to keep this updated, maintained and managed was recognized. Recent upgrades to Commercial Street were acknowledged and appreciated.
- Supportive social services such as the Senior Center, Library and designated Shelter are all valued resources.

Photo: Community Resiliency Building Workshop, March 2019

3. RECOMMENDATIONS TO IMPROVE PROVINCETOWN'S RESILIENCY

Attendees at the CRB worked with their individual tables to consider and discuss the natural hazards, vulnerabilities, strengths and potential actions to improve overall resiliency of Provincetown. Each group developed their own list of action items which was recorded on the matrix board. At the end of the CRB workshop, each group presented their findings on the top three key actions Provincetown should focus on based on their discussion. Each attendee was given six dots and asked to use those dots, or spend them, to identify of the top three actions identified by each group, which is the most critical or most important. **Table 3** is a summary of the top priorities identified at Provincetown's CRB workshop.

Table 3: Top Seven Recommendations to Improve Resiliency

Rank	Action	Notes
1	Utilities (Sewer, Water, Septic, Drainage) (received 78 dots)	Maintain, upgrade, hardening and reinforce existing utilities. This includes pump stations, the Central Sewer Vacuum System, adding redundant water lines, adding redundant power sources and focusing on renewable energy resources. Septic system elimination and expanding the sewer system was identified as critical for resiliency and harbor water quality. The discussion also included focusing on the drainage infrastructure to improve areas known for flooding including the busy downtown area of Provincetown. The Snail Road water main needs protection and there are major utilities along Freeman Street that need protection as well. Utilities need to be reinforced, upgraded or moved where they are vulnerable.
2	Beach Management & Nourishment and Coastal Infrastructure (received 47 dots)	Develop a comprehensive beach sediment and nourishment plan focused on shoreline management and sand management is critical. Beach management and nourishment should also consider other coastal protection measures and infrastructure that could help protect downtown Provincetown and the local economy, including consideration of oyster reefs. A town-wide approach to this challenge is needed and areas of need should be specifically identified.
3	Natural Infrastructure Solutions (received 44 dots)	Focus on natural infrastructure solutions throughout the community including improving groundwater conditions, using native trees and plants to support drainage and improve stabilization of soils and any future heat island impacts. These solutions could support or enhance other resilience/adaptation measures for improved stormwater management and flood control.
4	Emergency Management (received 36 dots)	The resulting actions surrounding emergency management focused on informing the community about the current comprehensive evacuation and emergency management plans in place, improving communication, updating emergency response equipment, community engagement

Rank	Action	Notes
		about existing plans to shelter in place and making sure that all residents (full and part time) and visitors including vulnerable populations such as elderly, foreign minority and workforce employees as well as businesses are included and accounted for with any planning efforts. The current Emergency Response Plan does need to be updated. Other existing studies and planning efforts will be leveraged by emergency management staff for emergency planning.
5	Individual Household Assessments (received 20 dots)	Work with homeowners to educate them about resiliency challenges in Provincetown and help them be more proactive including understanding where their utilities are, making sure they are signed up for the alert system, informing them about grant opportunities for upgrades, and connecting them with neighbors. Inform homeowners about how to make their homes more resilient through a public education process is also needed.
6	Food, Medicine, Healthcare (received 20 dots)	Develop a plan for both acute and chronic issues that could occur in Provincetown and impact access to food, medicine and healthcare. Consider developing solutions and being prepared for long term needs should the community be in a shelter in place or other long term emergency/unplanned for situation.
7	Shank Painter (received 13 dots)	Evaluate the Shank Painter inundation pathway which when activated will impact town services, homeowners, transportation routes and sensitive habitat areas. Identify potential solutions to address this inundation pathway. This could be a location studied for a temporary flood barrier to deploy under certain storm conditions.

When thinking about recommendations to improve resiliency, Town staff, workshop participants and attendees at the other resident engagement efforts stressed the importance of leveraging other recent planning studies that have been completed. Some of the previous recommendations that support the outcomes of the Community Resiliency Building Workshop include:

- Integrate the current Hazard Mitigation Plan and Critical Facility/Infrastructure Adaptation Study into the Capital Improvement Planning Process.
- During the Capital Improvement Planning process, consider the Inundation Pathways and allow that to influence any design, maintenance or upgrades.
- Review the current Hazard Mitigation Plan and Critical Facility/Infrastructure Adaptation Study and this report and determine if credit can be given to Provincetown (a participant in the NFIP Community Rating System) and improve the Town's CRS score of 9.0.

3.1 Results from Additional Resident Engagement

The two additional resident engagement efforts – one for part-time residents and one for the Environmental Justice population yielded similar concerns and opportunities that were identified during the CRB workshop process. Some specific feedback from these engagement sessions that aligns with the findings of the CRB workshop are highlighted below.

- Identify a consistent source of sand for beach nourishment and prepare a beach nourishment/sediment management plan.
- Ryder Street Outfall – design an infiltration basin so it doesn't discharge and/or move this outfall.
- Focus on local zoning and other bylaws and strengthen them with supportive adaptation strategies to increase the resiliency of the community.
- Identify and support renewable energy opportunities for the Town and individual residents and business owners.
- Raising roadways was discussed with the goal of eliminating inundation issues or providing certain areas of town from overtopping and flooding.
- Support for homeowners and businesses who have dealt with flooding issues in the past including an education campaign that will include things like elevating electrical systems and other utilities, etc.
- Identifying data that will be helpful in providing the community with necessary information that can be used to prioritize and develop adaptation strategies and actions to increase community resiliency. This includes researching groundwater conditions on Cape Cod and how they are being impacted by sea level rise, then identify what Natural Infrastructure techniques can be used to improve groundwater conditions.
- Require subsurface stormwater recharge be considered in development projects or during paving and repaving projects.
- Investigate locations for temporary flood barriers that can be deployed when the Town anticipates certain storm or flooding conditions. Develop a coordinated plan with DPW, Town Management and Emergency Management staff.
- Develop a Climate Adaptation Plan that includes a Greenhouse Gas emission evaluation and goals.
- Creation of a resiliency overlay zone where residents and businesses in the area would pay into a fund that would then be used to pay for resiliency measures and projects associated with the zone. Or, have a special assessment of beach owner properties and use this funding for needed infrastructure improvements that would add protection for them.
- Consider hiring a Coastal Resources Manager in Provincetown.

3.2 Community Resiliency Building Workshop Identified Priorities

The following priorities below are action items identified during the CRB workshop for the Town of Provincetown to consider for increased resiliency. These priorities should continue to be vetted and aligned with the recommendations in **Table 3**.

3.2.1 Highest Priority

- Maintain and manage outfall pipes in Provincetown and relocate or improve them where necessary – including Gosnold Street and Ryder Street.
- Increase the Town's ability and capacity to pump water – this may be through stormwater pump stations in key locations.
- Move forward with beach nourishment and sediment management projects including construction of the Ryder Street Dune Enhancement project currently in the design and permitting phase.
- Identify and implement green solutions to address power outages such as solar power and rechargeable batteries.
- Evaluate the need to elevate roadways in key locations to prevent critical infrastructure and/or developed areas from flood events and to prevent the road from flooding. Focus this evaluation on critical evacuation routes.
- Develop a formal evacuation plan and shelter in place plan and have it include year round and seasonal resident scenarios. Engage the Coast Guard in this effort and consider evacuation by water if necessary.
- Secure a mobile medical unit that can serve as a backup or pop up hospital type of asset.
- Improve existing cell and fiber optic service and make sure that any improvements consider flooding and sea level rise.

3.2.2 Moderate Priority

- Evaluate local regulations
- Design and install a redundant water transmission main which can provide a backup water supply.
- Consider desalination options – either a tank, system or plant.
- Upgrade sewer system to better withstand the impacts of sea level rise.
- Use technology to reduce water consumption and increase water conservation.
- Include in any shelter plans the consideration for a long-term shelter in place need that could result from a large scale flooding event.

3.2.3 Lower Priority

- Wind energy turbines

4. ACKNOWLEDGEMENTS

The Provincetown CRB Workshop was managed by the municipal Core Team, led by Tim Famulare, in partnership with Woodard & Curran. The Core Team guided the work throughout the project that also included insight and input from town staff, industry professionals, residents and business owners.

Special thanks to the Center for Coastal Studies and the Cape Cod Cooperative Extension for their participation and support during Provincetown's CRB Workshop.

4.1 CRB Workshop Project Team - Organization and Role

The entire Municipal Vulnerability Preparedness process for the Town of Provincetown was a collaborative, team effort that engaged over eighty people. Listed below is the project team who was closely involved with the process.

Town of Provincetown, MA
Timothy Famulare, Environmental Planner & Conservation Agent | Lead Project Manager for MVP/CRB
Rex McKinsey, Harbor Master | Support
Erin Ellis, Project Manager | Support
David Gardner, Assistant Town Manager/Acting Town Manager | Support

Woodard & Curran
Mary McCrann, AICP | Lead Facilitator
Mary House | Project Support

Center for Coastal Studies
Mark Borrelli | CRB Presenter
Provided Location for CRB Workshop

Cape Cod Cooperative Extension
Greg Berman, | CRB Presenter

APPENDIX A: EVENT ANNOUNCEMENTS, AGENDAS & SUPPORTING DOCUMENTATION

COMMITMENT & INTEGRITY
DRIVE RESULTS

40 Shattuck Road | Suite 110
Andover, Massachusetts 01810
www.woodardcurran.com

T 866.702.6371
T 978.557.8150
F 978.557.7948

AGENDA

MEETING DATE: December 13, 2018

MEETING TIME: 9:00am – 11:00am

LOCATION: Provincetown Town Hall, Judge Welsh room

SUBJECT: **Town of Provincetown, MA – Municipal Vulnerability Preparedness Program Kick-Off Meeting & Preparation for Community Resiliency Building Workshop**

Invited Attendees

Name	Organization	Telephone/email
Tim Famulare, Environmental Planner & Conservation Agent	Town of Provincetown	tfamulare@provincetown-ma.gov
David Panagore, Town Manager	Town of Provincetown	dpanagore@provincetown-ma.gov
David Gardner, Assistant Town Manager	Town of Provincetown	dgardner@provincetown-ma.gov
Rich Waldo, DPW Director	Town of Provincetown	rwaldo@provincetown-ma.gov
Rex McKinsey, Harbormaster	Town of Provincetown	rmckinsey@provincetown-ma.gov
Morgan Clark, Health Director	Town of Provincetown	mclark@provincetown-ma.gov
Jeffrey Ribeiro, Planner	Town of Provincetown	jribeiro@provincetown-ma.gov
Michael Trovato, Fire Department	Town of Provincetown	mtrovato@provincetown-ma.gov
Jim Golden, Chief of Police	Town of Provincetown	jgolden@provincetown-ma.gov
Chris Hottle	Council on Aging	chottle@provincetown-ma.gov
Mary House	Woodard & Curran	mhouse@woodardcurran.com

Agenda

1. Thank You & Introductions
2. Identify Goals of Core Team – What Does Project Success Look Like to You? - All
3. Background of Provincetown's Participation in the Municipal Vulnerability Preparedness Program (Current Issues in Town, Why This Program?) – Tim Famulare
4. Overview of the Municipal Vulnerability Preparedness Program & Community Resilience Building Workshop – Mary House
5. Community Resilience Building Workshop & Planning for the Event – Tim Famulare & Mary House
6. Discussion of Action Items/Next Steps

Meeting Objectives

Preparation for Community Resiliency Building Workshop

Goals of the Workshop are to:

- Define extreme weather and natural and climate related hazards impacting Provincetown,
- Identify existing and future vulnerabilities and strengths,
- Develop and prioritize actions for the community and broader stakeholder networks, and
- Identify opportunities for the community to advance actions to reduce risks and build resilience.

Need to Identify the Following:

- Workshop Goals – why does the community need to discuss current and future impacts of natural hazards?
- Workshop Date
- Workshop Location
- Workshop Timeframe (either one 8 hour session or two 4 hour sessions)
- Workshop Food (need to provide breakfast, lunch, maybe snack)
- Outreach Campaign to Secure Maximum Number of Attendees & Engage Stakeholders
    - Identify list of potential attendees/stakeholders and how best to reach out/invite them to workshop?
    - How to register attendees and designate a person to keep track
- Prepare Workshop Materials

Resilient Provincetown

Municipal Vulnerability Preparedness Workshop

When: Friday, March 15, 2019 (Registration: 8:00am - 8:30am) Time: 8:30am – 4:30pm

Where: Center for Coastal Studies, 5 Holway Avenue, Provincetown, MA

The Town of Provincetown received funding from the Executive Office of Energy and Environmental Affairs to complete a Community Resilience Building Workshop. The Town has been impacted in the past by severe weather events and like other Massachusetts communities, now finds itself facing more unpredictable weather which brings challenges and opportunities. We are working on a Municipal Vulnerability Preparedness project that will involve an 8 hour workshop which must include input from community members. **We would love for you to participate!!!**

We will provide breakfast and lunch to those who participate. If you are interested, please contact Tim Famulare at tfamulare@provincetown-ma.gov or 508-487-7000 ext. 554 by March 11th to pre-register or receive more information about the workshop. **Space is limited so please sign up today!**

Please contact Tim Famulare if you have any questions at tfamulare@provincetown-ma.gov or 508-487-7000 ext. 554

WOODARD &CURRAN

Town Topics Forum went deep but kept it light

By K.C. Myers
Banner Staff

PROVINCETOWN — The Town Topics Forum, now in its third year, attracted more than 100 people on Saturday to discuss the new police station price, the Harbor Hill year-round market-rate rental project, coastal resiliency in Provincetown and the role of social media in community discourse.

The meeting began with summaries of and background on each topic. Then people broke into four groups to focus on a particular issue. After 25 minutes, they moved to another topic. Each attendee was able to sit in on two groups before the meeting ended.

There was coffee, juice, pastries and civil yet deep conversation among a mixed crowd of town hall regulars, second-home owners and those who were curious to find out more about the community.

The role of social media in general and the town manager's Facebook page, Town Talk, in particular drew a small but passionate crowd during the first session. Most in the group were over 40, with one exception of a man in his 20s.

The benefits and detriments of social media are well known, said Mette Kreutzmann of the Mass. Office of Public Collaboration, which has a grant to produce a report and recommendations for the town on the role of social media.

On the upside, many more ideas can be shared online, she said. Productive discussions go forward on carefully managed pages that are scrubbed of the insults, falsehoods and rumors that define the downside of social media. Town Talk, the municipally sponsored page, is monitored to keep town business, weather and announcements on the screen while personal attacks get removed. The problem, however, is that people don't like to be restricted. Thus Provincetown has several Facebook pages that allow much unedited and inflammatory discourse.

As Rik Ahlberg of the bicycle committee said, there are about 2,600 members of Town Talk, but Provincetown Community Space has over 12,000.

"Do I take advantage of that or shy away from it so I'm not exposed," he asked.

Lots of online rants and misinformation fester without an interactive response from an authoritative source, said one woman. (Some participants asked not to be quoted by name.) Typing a question or rumor on the screen is like screaming at the TV and people don't feel heard, she said.

Ahlberg said he dreams of a way for people to comment live-yet-remotely during meetings in town hall. The young man in the group said that both Twitter and Facebook offer live streaming options so that people can type comments that could be projected onto a screen during town hall meetings.

There are also alternatives to Facebook on which large community projects can be presented without the need to click on a link to a 100-page document, a criticism of Town Talk.

Ahlberg mentioned coUrbanize, a web-based service advertising itself as an "online communication platform for developers and planners." For a fee that depends on the size of the project (the monthly fee can be as low as $500), it offers interactive discussions and lots of graphics on major projects, according to Sara Matasci of coUrbanize.

Newspapers, one woman said, are still a reliable source of information. The young man agreed. "You remember something you read [not on] your phone much better," he said.

Kreutzmann's team will soon conduct a survey to gather more opinions and ideas on social media. They will hold "dialogue sessions" for about a week in April with night and weekend hours. Then her group will issue a report in June.

Coastal resiliency

Town officials are developing a plan to raise the height of the beach between Ryder and Gosnold streets, said Tim Famulare, the town's environmental planner and conservation agent.

A preliminary design will be reviewed in March in a public meeting. A final design will be done in April and permit applications will be sent out in June, according to the forum brochure.

The low-lying pathways off the Ryder Street downtown beach proved in the January 2018 storm to be vulnerable to flooding, exactly as scientists had predicted in 2016. The Ryder Street Beach Dune Enhancement Project is the short-term solution. It will include creating a "protective dune system with native plantings to help anchor the dunes on a 300-foot stretch of Ryder Street Beach," according to the brochure.

Another response to the increased intensity of storms resulting from climate change is battery back-up for the Outer Cape. Eversource will install two lithium-ion batteries to be used in the case of a power outage. The batteries, which will be placed at the Provincetown Transfer Station, will add 10 hours of backup power to Provincetown, Truro and part of Wellfleet in the winter and three hours of power in the summer. Eversource will provide the batteries and Provincetown will provide the 1.4 acres of land at the transfer station for the batteries. The lease must be approved at town meeting.

Long-term solutions to sea level rise are unknown. Select board member Lise King said she is asking every department head how climate change factors into their planning.

Sediment transfer, that is the movement of sand, is benefiting Beach Point in North Truro, where migrating sand from Truro and Wellfleet lands, said Harbormaster-Pier Manager Rex McKinsey. But other areas, such as the beach in front of the Boatslip, are eroding.

"We are built out to the water's edge; we cannot retreat," McKinsey said.

Conservation commission member Dennis Minsky said, "Our only retreat is vertical, not horizontal, and raising a home is a large sum of money for many."

There are no obvious answers. But the town will hold an all-day workshop on March 15 from 8:30 a.m. to 4:30 p.m. to discuss the topic. People can sign up by emailing tfamulare@provincetown-ma.gov. Lunch will be provided.

Another workshop will be held in May. Town officials will also be reaching out to Provincetown's "environmental justice population," which includes low-income residents and others who are affected by climate change but may not get information as easily, Famulare said.

For more information about the police station, see the Banner's Jan. 31 page 1 article.

Update on Harbor Hill Project

- In 2017 the Year Round Market Rental Trust purchased the Harbor Hill timeshare complex. A lengthy court process followed to clear 1,300 deeds held by the former timeshare owners.
- In the fall of 2018 renovation work for the 28-unit complex was put out to bid; but no acceptable bids were received. The town did, however, hire the Community Development Partnership to manage the property.
- 27 applications from potential renters have been received.
- The town has started work on Building Five, since it needs only minor renovations.
- Construction bids for the rest of the project are due this month.
- Financials: The project is costing more than expected. Expenses not covered by revenue for 2019 are projected at $237,021. When the project was discussed at town meeting in 2017, it was supposed to be subsidized at $159,470. (Expenses are up due to a higher-than-projected management fee.
- Expected rental timeline: 6 units will be rented by April 2019; 12 units will be rented by June 2019; Full occupancy by fall 2019

Source: Town Topics Forum brochure

Nathan Balk King organizes delegation for Model UN

PROVINCETOWN — A local teenager is organizing a delegation of Native American youth from around the country to attend the National High School Model United Nations Conference (NHSMUN) at the United Nations in New York City.

Nathan Balk King, 17, of Provincetown, is bringing together native youth for the National High School Model United Nations which runs from March 6 to 11 in New York City. He has received the support and endorsement of the International Model United Nations Association, which has reserved 20 seats for the indigenous students. This year, they will be simulating the UN Permanent Forum on Indigenous Issues for the first time.

Nathan Balk King.

King has set up a website where the public may make donations to help support the delegation: MUNindigenous.com. The Provincetown Community Compact's Think-ubator is serving as the 501(c)(3) fiscal sponsor.

The International Model United Nations Association, a longstanding partner of the UN, provides students with a forum to hone skills in diplomacy, negotiation, critical thinking, compromise, public speaking, writing, and research.

Nathan Balk King was born in Rapid City, South Dakota and is a member of the Rosebud Sioux Tribe. He has been living part time in Provincetown his whole life, and moved to the East Coast in 2009 with his mother, Lise Balk King. Nathan is a senior at Sturgis Charter Public School in Hyannis.—KCM

Sitting pretty

The Clamnation and the Kimberly Ann at Wellfleet Harbor. [PHOTO VINCENT GUADAZNO]

Town Talk; Provincetown

Public group

About

Discussion

Announcements

Members

Events

Videos

Photos

Files

Moderate Group

Search this group

Shortcuts

- Provincetown Com… 20+
- Town Talk; Provincetown
- Provincetown and O… 7
- Our Night Out Wilmin… 5
- Tin Pan Artist Jam
- Provincetown in the 180…
- Provincetown: Hous… 11
- Wellfleet Communit… 20+

Announcements

See All (9

Tim Famulare shared a post.
Moderator · 19 hrs

Come spend a day planning how Provincetown should prepare for climate change! Breakfast and lunch will be provided. As part of the Town's climate change resiliency planning process, "Resilient Provincetown," the Town is hosting a COMMUNITY WORKSHOP on FRIDAY, MARCH15th, 8:30 a.m.-4:30 p.m. (Registration 8:00-8:30)

Community participation is critical, and all are welcome to attend. It will be held at the CENTER FOR COASTAL STUDIES at 5 Holway Ave. Free parking is available in the Grace Hall parking lot.

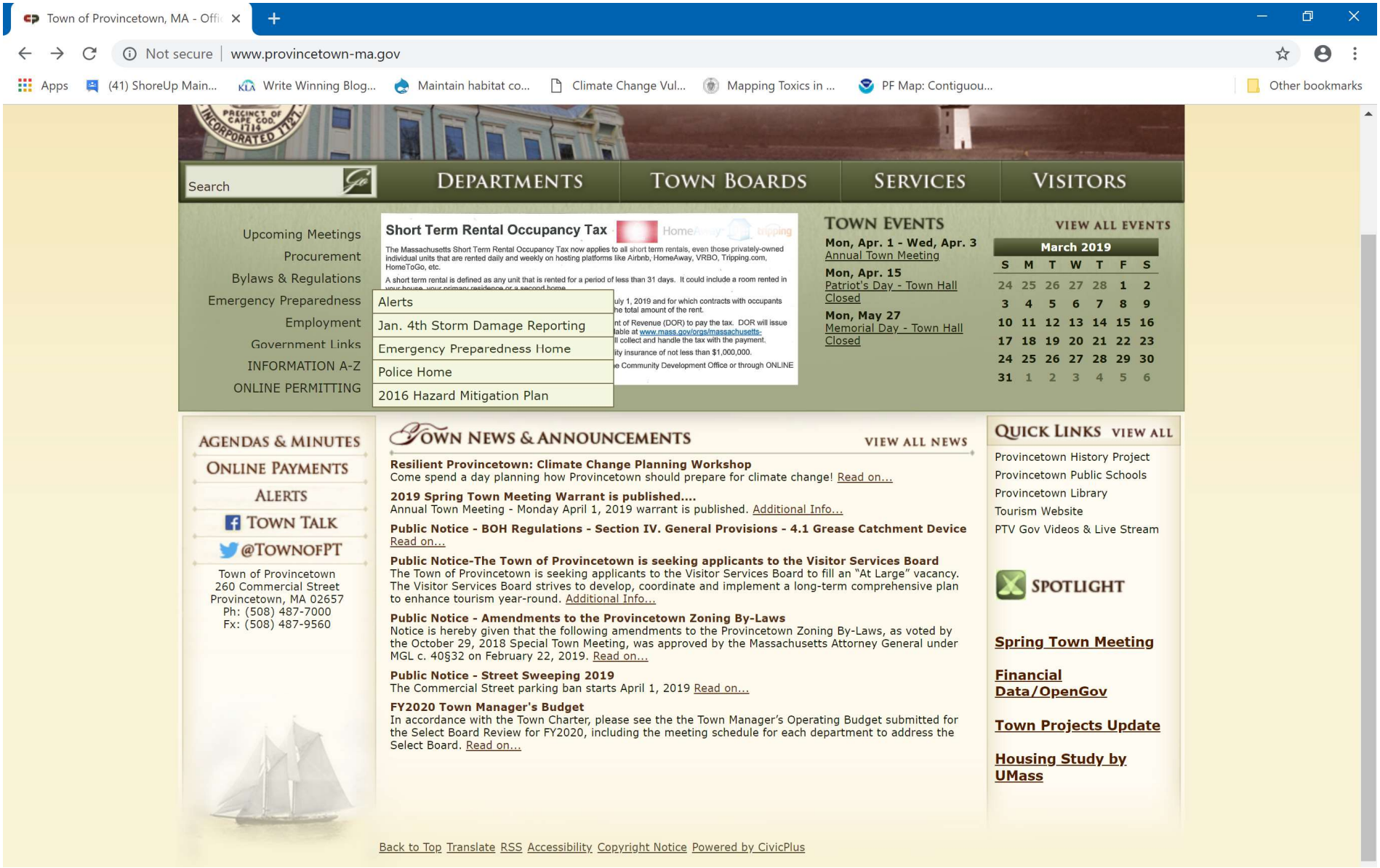
RSVPs are greatly appreciated so that we can get a head count for food. You can RSVP on this event posting, or you can contact me by phone: (508) 487-7000 x554 or email: tfamulare@provincetown-ma.gov.

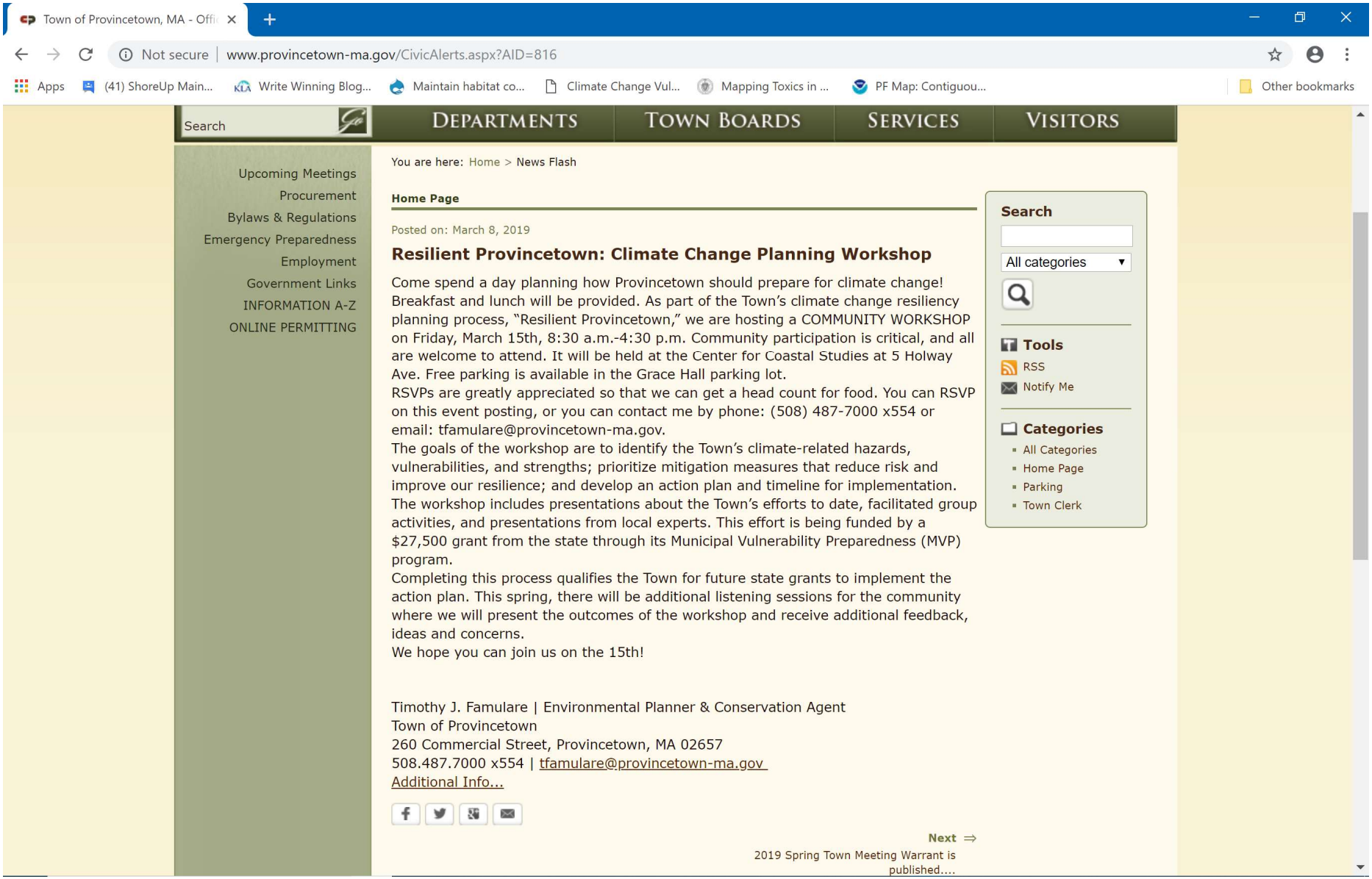
FRI, MAR 15 AT 8 AM

Climate Change Planning Workshop - March 15, 8:00am to 4:30pm

9 Going · 36 Interested

★ Interested


Town of Provincetown, MA - Offi
Not secure | www.provincetown-ma.gov
Apps
(41) ShoreUp Main...
Write Winning Blog...
Maintain habitat co...
Climate Change Vul...
Mapping Toxics in ...
PF Map: Contiguou...
Other bookmarks
PRECINCT OF CAPE COD 1714 INCORPORATED 1727
Search
DEPARTMENTS
TOWN BOARDS
SERVICES
VISITORS
Upcoming Meetings
Procurement
Bylaws & Regulations
Emergency Preparedness
Employment
Government Links
INFORMATION A-Z
ONLINE PERMITTING
Short Term Rental Occupancy Tax
The Massachusetts Short Term Rental Occupancy Tax now applies to all short term rentals, even those privately-owned individual units that are rented daily and weekly on hosting platforms like Airbnb, HomeAway, VRBO, Tripping.com, HomeToGo, etc.
A short term rental is defined as any unit that is rented for a period of less than 31 days. It could include a room rented in
Alerts
Jan. 4th Storm Damage Reporting
Emergency Preparedness Home
Police Home
2016 Hazard Mitigation Plan
TOWN EVENTS
VIEW ALL EVENTS
Mon, Apr. 1 - Wed, Apr. 3
Annual Town Meeting
Mon, Apr. 15
Patriot's Day - Town Hall Closed
Mon, May 27
Memorial Day - Town Hall Closed
March 2019
S M T W T F S
24 25 26 27 28 1 2
3 4 5 6 7 8 9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31 1 2 3 4 5 6
AGENDAS & MINUTES
ONLINE PAYMENTS
ALERTS
TOWN TALK
@TOWNOFPT
Town of Provincetown
260 Commercial Street
Provincetown, MA 02657
Ph: (508) 487-7000
Fx: (508) 487-9560
TOWN NEWS & ANNOUNCEMENTS
VIEW ALL NEWS
Resilient Provincetown: Climate Change Planning Workshop
Come spend a day planning how Provincetown should prepare for climate change! Read on...
2019 Spring Town Meeting Warrant is published....
Annual Town Meeting - Monday April 1, 2019 warrant is published. Additional Info...
Public Notice - BOH Regulations - Section IV. General Provisions - 4.1 Grease Catchment Device
Read on...
Public Notice-The Town of Provincetown is seeking applicants to the Visitor Services Board
The Town of Provincetown is seeking applicants to the Visitor Services Board to fill an "At Large" vacancy. The Visitor Services Board strives to develop, coordinate and implement a long-term comprehensive plan to enhance tourism year-round. Additional Info...
Public Notice - Amendments to the Provincetown Zoning By-Laws
Notice is hereby given that the following amendments to the Provincetown Zoning By-Laws, as voted by the October 29, 2018 Special Town Meeting, was approved by the Massachusetts Attorney General under MGL c. 40§32 on February 22, 2019. Read on...
Public Notice - Street Sweeping 2019
The Commercial Street parking ban starts April 1, 2019 Read on...
FY2020 Town Manager's Budget
In accordance with the Town Charter, please see the the Town Manager's Operating Budget submitted for the Select Board Review for FY2020, including the meeting schedule for each department to address the Select Board. Read on...
QUICK LINKS VIEW ALL
Provincetown History Project
Provincetown Public Schools
Provincetown Library
Tourism Website
PTV Gov Videos & Live Stream
SPOTLIGHT
Spring Town Meeting
Financial Data/OpenGov
Town Projects Update
Housing Study by UMass
Back to Top Translate RSS Accessibility Copyright Notice Powered by CivicPlus


Town of Provincetown, MA - Offi
Not secure | www.provincetown-ma.gov/CivicAlerts.aspx?AID=816
Apps
(41) ShoreUp Main...
Write Winning Blog...
Maintain habitat co...
Climate Change Vul...
Mapping Toxics in ...
PF Map: Contiguou...
Other bookmarks
Search
DEPARTMENTS
TOWN BOARDS
SERVICES
VISITORS
Upcoming Meetings
Procurement
Bylaws & Regulations
Emergency Preparedness
Employment
Government Links
INFORMATION A-Z
ONLINE PERMITTING
You are here: Home > News Flash
Home Page
Posted on: March 8, 2019
Resilient Provincetown: Climate Change Planning Workshop
Come spend a day planning how Provincetown should prepare for climate change! Breakfast and lunch will be provided. As part of the Town's climate change resiliency planning process, "Resilient Provincetown," we are hosting a COMMUNITY WORKSHOP on Friday, March 15th, 8:30 a.m.-4:30 p.m. Community participation is critical, and all are welcome to attend. It will be held at the Center for Coastal Studies at 5 Holway Ave. Free parking is available in the Grace Hall parking lot.
RSVPs are greatly appreciated so that we can get a head count for food. You can RSVP on this event posting, or you can contact me by phone: (508) 487-7000 x554 or email: tfamulare@provincetown-ma.gov.
The goals of the workshop are to identify the Town's climate-related hazards, vulnerabilities, and strengths; prioritize mitigation measures that reduce risk and improve our resilience; and develop an action plan and timeline for implementation. The workshop includes presentations about the Town's efforts to date, facilitated group activities, and presentations from local experts. This effort is being funded by a $27,500 grant from the state through its Municipal Vulnerability Preparedness (MVP) program.
Completing this process qualifies the Town for future state grants to implement the action plan. This spring, there will be additional listening sessions for the community where we will present the outcomes of the workshop and receive additional feedback, ideas and concerns.
We hope you can join us on the 15th!
Timothy J. Famulare | Environmental Planner & Conservation Agent
Town of Provincetown
260 Commercial Street, Provincetown, MA 02657
508.487.7000 x554 | tfamulare@provincetown-ma.gov
Additional Info...
Next ⇒
2019 Spring Town Meeting Warrant is published....
Search
All categories
Tools
RSS
Notify Me
Categories
All Categories
Home Page
Parking
Town Clerk

Posted on: April 5, 2019

Municipal Vulnerability Preparedness

The Town will host a public information session on
Thursday, April 11, 2019
4:30 pm-6:00 pm
Town Hall Auditorium
to discuss the outcomes of the March 15th Climate Change Resilience Planning Workshop.

Additional Info...

Next ⇒
Civil Discourse Summary Report and Dialogue Series April 24th-30th

Other News in Home Page

Civil Discourse Summary Report and Dialogue Series April 24th-30th
Posted on: April 3, 2019

Thank you, Good Night!
Posted on: April 1, 2019

AFFORDABLE HOME OWNERSHIP OPPORTUNITY
Posted on: March 28, 2019

Community Housing Opportunity
Posted on: March 28, 2019

Setting the Stage for a Sustainable Economy in Provincetown
Posted on: March 28, 2019

Towns asked to target uses of rental tax revenue

By K.C. Myers
Banner Staff

PROVINCETOWN — With at least a million dollars expected to pour into the Outer Cape towns' coffers when the short-term rental tax is collected for the first time this summer, a coalition of Cape organizations is asking that 50 percent of the new revenue be set aside for housing, wastewater, transportation, broadband and tourism marketing.

Housing and wastewater, in particular, have been obvious needs for years. Money has been the perennial barrier in efforts to protect both water and affordable housing stock, said Stefanie Coxe, a consultant with the new Future Cape Cod coalition.

The coalition is composed of the Association for the Preservation of Cape Cod (APCC), the Cape Cod & Islands Association of Realtors, the Housing Assistance Corporation and the Cape Cod Chamber of Commerce. The members have written a model bylaw and are urging towns to put a version of it on their town meeting warrants this spring.

The short-term rental tax, passed by the legislature last year, is expected to double motel-hotel excise tax revenue Capewide, said Andrew Gottlieb, executive director of the APCC. Directing this "once-in-a-generation revenue infusion" is an opportunity to tackle these chronically underfunded infrastructure needs, said Alisa Galazzi, chief executive officer of the Housing Assistance Corporation.

Wellfleet and Provincetown officials estimate that their towns will get as much as $1 million each in additional revenue when homes rented short-term are taxed the same as hotels and motels. Truro officials have not hazarded a guess on its potential new revenue, said Town Manager Rae Ann Palmer.

The authors of the model bylaw targeted five infrastructure areas because all are important to the Cape's future. But, Gottlieb said, there is nothing wrong with town officials tweaking it to fit their priorities.

Provincetown, for example, already has a sewer system so investing more in housing could make sense.

Transportation needs include improving bike and walking paths and investing in public transportation. Upgrading broadband service would enable it to reach pockets of the Outer Cape that are still dead zones. And marketing Cape Cod was placed on the list because the short-term rental tax itself is "reliant on tourism," Gottlieb said. "The competition for tourist dollars is pretty intense."

The model bylaw idea was unveiled last week, and has not received immediate buy-in from towns. The Truro Select Board will not put it on the warrant in the spring.

The board "decided to take no action until after the summer season and we have a sense of what the revenue is," Palmer said. "We did discuss creating a stabilization fund in the future. We have not discussed the model bylaw as yet."

Wellfleet Town Administrator Dan Hoort said he suspects the Wellfleet Select Board will discuss the request on March 12..

"My personal opinion, which I have expressed to our select board, is that the town of Wellfleet will decide how best to allocate the additional revenues," Hoort wrote by email. "There is no hurry to do this. Any funds received from the new tax will end up in free cash at the end of fiscal year 2020 and town meeting voters will decide how these funds are spent at the 2020 annual town meeting."

Asked to pick the most important of the five targeted areas, Gottlieb and Coxe picked two: wastewater and housing.

"Housing and wastewater needs go hand in hand," Coxe said.

The density required to make developments affordable is not possible without a way to handle the water and the waste safely, Gottlieb said.

"You can serve both by unlocking the key to additional density to give you the affordability that you need," Gottlieb said.

A free workshop for home owners on the short-term rental tax will take place from 10 to 11:30 a.m. on Wednesday, March 20 at the Eastham Public Library, 190 Samoset Road.

New bike lane plan for Shank Painter gets OK

By K.C. Myers
Banner Staff

PROVINCETOWN — The select board has approved the addition of bikes lanes on both sides of Shank Painter Road as part of a $9.4 million state-funded project to improve traffic flow along that street.

The Feb. 25 vote, during another continuation of the road design hearing, was significant because it gave a green light to the most critical part of the plan — five-foot-wide bike lanes on either side of the street, said Rik Ahlberg, chair of the town's bicycle committee.

The next hearing will be on April 22, to vote on whether to install a roundabout at the intersection of Route 6 and Shank Painter Road, and whether to put the portion of Route 6 between Shank Painter Road and Herring Cove on a "road diet" by closing the southern lanes to cars.

The project is proceeding with "baby steps," said Select Board Chair Cheryl Andrews. Engineers had hoped the first 25 percent of the project design would be done in January. Construction is slated for 2023.

But the plan has been controversial. Citizens did not like the pitch they saw in November, which called for a two-way bike lane on one side of Shank Painter Road. It would be separated from the roadway by a sidewalk. People criticized two-way lanes side by side. The new design has one lane on each side of the road, with bikes moving in the same direction as vehicular traffic.

Placing a pedestrian walkway between bike and vehicle traffic also got panned in the first plan. Now the pedestrian lanes will be on the far sides of the bike lanes.

Finally, this design keeps the width of the car part of the road at 34 feet, wide enough to allow a fire truck to pass when cars pull over. This had been a big concern for Fire Chief Mike Trovato, who did not attend last week's hearing.

Resident Jay Gurewitsch thanked the engineers for "keeping pedestrians on the outside, not in between cars and bikes."

Ahlberg said, "We love this project. It is fantastic."

"Congratulations, gentlemen, you've beaten this issue to death," Andrews joked to the engineers after the board approved that portion of the design unanimously.

Then the engineers moved on to the roundabout, and there the protests began.

James Fitzgerald, the director of transportation for the designers, Environmental Partners, presented statistics showing more accidents occurred at the Shank Painter and Route 6 intersection than at the Conwell Street and Route 6 intersection.

Reports over a five-year period showed 11 crashes at Conwell versus 13 crashes at Shank Painter.

Some people "thought it was worse at Conwell, but that's not the case," Fitzgerald said.

Yet even after they heard these numbers, skeptical residents disputed the source of the data. Town Manager David Panagore later confirmed the accident reports came directly from the local police and the state Dept. of Transportation.

The roundabout design didn't impress Deb Trovato, who said, "I'm a firm believer in if it's not broken don't fix it. And I don't believe those accident numbers."

"This is complexity we don't need," said Duane Steele, a member of the finance committee. "Keep it simple, keep it straight, keep Provincetown the way it is. And I don't want to see something grotesque like that."

The hearing continues on April 22.

Year-Rounders' Festival is Saturday

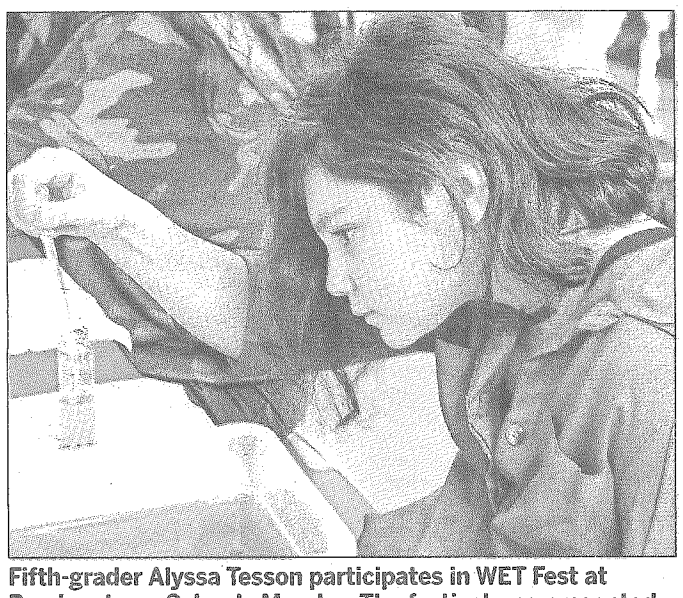
PROVINCETOWN — The 34th Provincetown and Outer Cape Year-Rounders' Festival begins Saturday, March 9, at 11 a.m. with artisans and exhibits displayed at town hall.

The festival offers a silent auction all day, and a raffle drawing at 8 p.m. Other special features include a pet parade with prizes at 2 p.m., and a buffet dinner with restaurant donations from 5 to 7 p.m.

Singers, musicians, bands, dancers and other performers will take the stage from 6 to 10 p.m.

For more information, or to sign up to volunteer, go to the year-rounders' festival Facebook page, www.facebook.com/groups/ProvincetownYearRounders, or contact Penny Sutter at 860-917-9393.

Wet test



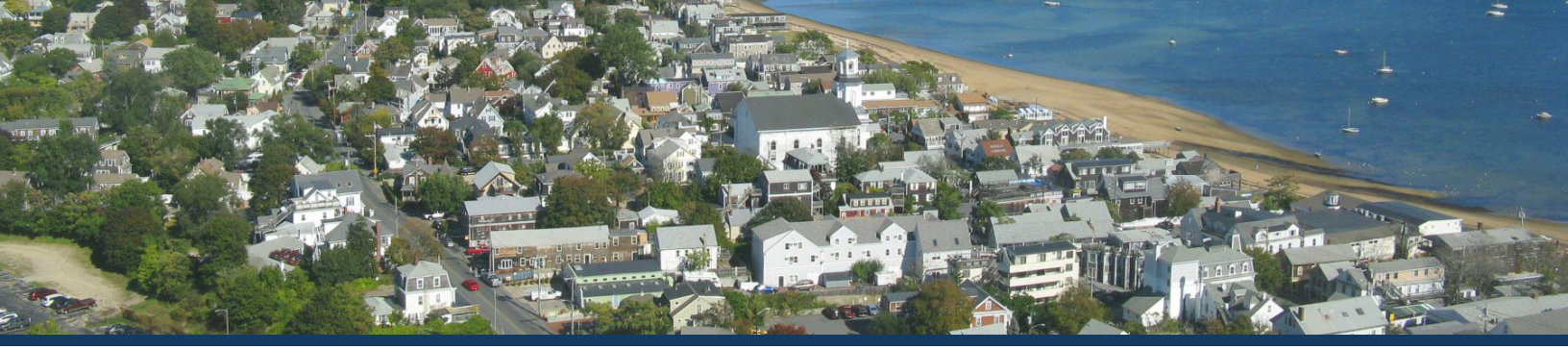
Fifth-grader Alyssa Tesson participates in WET Fest at Provincetown Schools Monday. The festival was presented by AmeriCorps and the Cape Cod Cooperative Extension. Students learned about the fundamentals of water and Cape Cod's sole source aquifer. [PHOTO VINCENT GUADAZNO]

Coastal resiliency all day workshop

PROVINCETOWN — A Community Resilience Building Workshop will be held Friday, March 15, starting with registration at 8 a.m. and running until 4:30 p.m. at the Provincetown Center for Coastal Studies, 5 Holway Avenue.

In the face of more unpredictable weather, town officials are working on a "municipal vulnerability preparedness project" that will involve this eight-hour workshop. As part of the requirements of a state grant to help with coastal resiliency planning, the town is required to get public input during this workshop. The town will provide breakfast and lunch.

If you are interested, contact Tim Famulare, the town's environmental planner and conservation agent: tfamulare@provincetown-ma.gov or 508-487-7000 ext. 554 by March 11, to preregister or to receive more information about the workshop. Space is limited.



Community Resiliency Building Workshop

Town of Provincetown

Friday | March 15, 2019
8:30am – 4:30pm; Registration at 8:00 am

Center for Coastal Studies
5 Holway Avenue, Provincetown, MA

WORKSHOP OBJECTIVES

- Define extreme weather and natural and climate related hazards impacting Provincetown,
- Identify existing and future vulnerabilities and strengths,
- Develop and prioritize actions for the community and broader stakeholder networks, and
- Identify opportunities for the community to advance actions to reduce risks and build resilience.

WORKSHOP AGENDA

8:00am – 8:30am: Registration & Breakfast

8:30am – 12:30pm:

- Welcome & Overview
  - » David Panagore, Town Manager
  - » Tim Famulare, Environmental Planner and Conservation Agent
- Community Resilience Building Workshop – Why Are We Here? (Woodard & Curran)
- Identify Challenges & Goals
  - » What Do You think Provincetown's Biggest Challenges Are? What Are Your Goals/Do You Hope to Gain From Participating in the Workshop?
- Background Information About Provincetown (Woodard & Curran)
- Inundation Pathways
  - » Mark Borrelli, Center for Coastal Studies
- Characterize Natural Hazards
- Identify Community Vulnerabilities and Strengths

12:30pm – 1:30pm: Lunch!

1:30pm – 4:30pm:

- The Shifting Sand of Provincetown
  - » Greg Berman, Cape Cod Cooperative Extension
- Identify and Prioritize Community Actions
- CRB Workshop Recap and Wrap Up (Woodard & Curran)

Thank you for participating in Provincetown's Community Resiliency Building Workshop!

WOODARD &CURRAN

WOODARD &CURRAN

MUNICIPAL VULNERABILITY PREPAREDNESS
COMMUNTIY RESILIENCY BUILDING WORKSHOP
TOWN OF PROVINCETOWN, MA
MARCH 15, 2019 | 8:00AM
SIGN IN SHEET

	Name	Email
1.	Dennis Minsky	DMinsky4@comcast.net
2.	Sherry Dranch	kuduinc@gmail.com
3.	KAOLIN DAVIS	kaolin.davis@gmail.com
4.	MARTHA PINTO	mjpinto@umich.edu
5.	ELISE COZZI	ezthpik@SBCGLOBAL.NET
6.	William Lord	lordwwl@gmail.com
7.	George Tagaris	gnt_77@hotmail.com
8.	Dave Abramson	dave_abramson@hotmail.com
9.	Susan Avellar	sfavellar@hotmail
10.	Lezli Rowell	LRowell@provincetown-ma.gov
11.	Gordon Peabody	gordonpeabody@gmail.com
12.	GREG HENNICK	GHENNICK@PROVINCETOWN-MA.GOV
13.	Chris Brooke	gabriels3232@icloud.com
14.	CHRIS HOTTLE	chottle@provincetown-ma.gov
15.	Rex McKinsey	Rmckinsey@provincetown-ma.gov
16.	Owen Nichols	nichols@coastalstudies.org
17.	Linda Fiorella	lfiorella@provincetown-ma.gov
18.	ERIC SUSSMAN	ebsussman@gmail.com
19.	BOB NEE	BOBATPTOWN@GMAIL.COM
20.	BOB CAPURSO	RCAPURSO@PROVINCETOWN-MA.GOV
	LAUREN MCLEAN	CCNS
	JORDAN FLEMING	AMERICORPS

MUNICIPAL VULNERABILITY PREPAREDNESS
COMMUNTIY RESILIENCY BUILDING WORKSHOP
TOWN OF PROVINCETOWN, MA
MARCH 15, 2019 | 8:00AM
SIGN IN SHEET

	Name	Email
1.	Rik Ahlberg	rikahlberg@mac.com
2.	Penny Sutter	psutter mail-7@yahoo.com
3.	Tim Famulare	tfamulare@provincetown-ma.gov
4.	JAMIE STANISCIA	JAMIESTANISCIA@ICLOUD.COM
5.	Roger Castellani	rogercast@AOL
6.	ALAN RUSCOE	deSmondo2@earthlink.net
7.	THOMAS BAGLEY	thomb@comcast.net
8.	DAVID GARDNER	dgardner@provincetown-ma.gov
9.	Denise Vieira	Ivieira@ " "
10.	TRACY KACHTICK-ANDERS	Vincents Earart@gmail.com
11.	Kalliope Chute	Kalliope@barnstablecounty.org
12.	Rich Waldo	RWALDOE PROVINCETOWN-MA.GOV
13.	Erin Ellis	eellis@provincetown-ma.gov
14.	Tom Skinner	tom@dunelandtours.com
15.	Laura Ludwig	~~[illegible]~~
16.	Rik Kapur aka Wave	ugowave@gmail.com
17.		
18.		
19.		
20.		

MUNICIPAL VULNERABILITY PREPAREDNESS
COMMUNTIY RESILIENCY BUILDING WORKSHOP
TOWN OF PROVINCETOWN, MA

MARCH 15, 2019 | 8:00AM

SIGN IN SHEET

	Name	Email
1.	ANNE HOWARD	ahoward@provincetown-ma.gov
2.	Sandy Chaet	sbc.chaet@gmail.com
3.	KEITH HUNT	KHO2118@gmail.com
4.	Ronnie McEwan	bmceewan@nyc.rr.com
5.	Michael Perry	perrymassage@mac.com
6.	Robert Gaetani	
7.	Donald Yasi	donaldyasi@hotmail
8.	Jordan Fleming	jordan.fleming@barnstablecounty.org
9.	Lauren McKean	lauren_mckeanengs.gov
10.	JAY CARLOTTI	JAY@ARKADIAPTOWN.com
11.		
12.		
13.		
14.		
15.		
16.		
17.		
18.		
19.		
20.		

MUNICIPAL VULNERABILITY PREPAREDNESS
COMMUNTIY RESILIENCY BUILDING WORKSHOP
TOWN OF PROVINCETOWN, MA
MARCH 15, 2019 | 8:00AM
SIGN IN SHEET

	Name	Email
1.	Rachel St. Germain	rachel@helpingourwomen.org
2.	Robin Evans	rge_1ks@verizon.net
3.	Sally Deane	sallydeane924@gmail.com
4.	Mary McCrann	mmccrann@woodardcurran.com
5.	Jeff Ribeiro	jribeiro@provincetown-ma.gov
6.	Alfred Tonghetti	aptamighetti@yahoo.com
7.	Elizabeth C CABRAL	ECGROUNDHOG@Gmail.com
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		
17.		
18.		
19.		
20.		

Provincetown, MA
Community Resiliency Building Workshop
Recent Implementation Considerations

From the Provincetown Hazard Mitigation Plan, Infrastructure Vulnerability Assessment and Harbor Management Plan

Provincetown is focused on Resiliency – the purpose of this summary is to inform attendees participating in the CRB workshop about implementation steps that have been considered and noted during other recent planning projects in the community.

PROVINCETOWN HAZARD MITIGATION PLAN (2016) | ACTION ITEMS

- Utilize materials developed by the County's multifaceted educational program and develop town-specific materials as needed to raise public awareness of and support for mitigation and to reduce the duplication of efforts across Cape Cod.
- Develop an educational program on designated evacuation routes and shelter locations.
- Review and revise the Town's Floodplain District Zoning Bylaw to ensure it incorporates up to date floodplain science, policy, and legislation as well as cumulative substantial damage or improvement requirements.
- Conduct an assessment of local infrastructure that is subject to damage from flooding or storm surge or that is likely to cause damage to surrounding areas should it fail or flood.
- Develop, prioritize and seek funding for a list of needed infrastructure improvement projects.
- Conduct a survey and assessment of waterfront bulkheads to identify those at risk.
- Continue the Town's participation on the Barnstable County Regional Emergency Planning Committee (BCREPC).
- Monitor beach conditions and evaluate all vulnerable shoreline areas for possible future nourishment and beach stabilization projects.
- Evaluate and take steps necessary to ensure the reliable provision of electricity to Provincetown.
- Identifying and prioritizing areas where safety and reliability would be improved by under-grounding electric transmission lines.
- Establish mutual aid agreements with neighboring communities to address administering the NFIP following a major storm event.
- Work with willing landowners to acquire properties subject to repetitive losses due to shoreline erosion, flooding, or other storm damage.
- Conduct a thorough evaluation of the Town's most at-risk locations identified in the Vulnerability Analysis, and evaluate the potential mitigation techniques for protecting each location to the maximum extent possible.
- Inventory existing equipment and develop and prioritize an equipment needs list.
- Work with the radio station as the Town's public information service to identify their needs to secure the building against high wind, flood and other natural disasters.
- Install new storm sewers where needed. The Town Public Works Department has developed a plan for additional storm sewers around the harbor, extending out toward the wetlands in the interior of the Town, and including most of the low-lying areas in Town which have been built upon or around.
- Utilities that service critical structures require flood proofing and elevating to secure them against storm surge and flooding.
- Conduct major beach nourishment projects and additional measures such as a wave attenuator, beach nourishment, the rebuilding of bulkheads, buying out vulnerable properties.
- Improve Provincetown's Class in the Community Rating System to an 8.
- Designate evacuation pick up points.

- Preplan a rapid assessment of post storm damages.
- Create a floorplan that shows where essential department records are located.
- Identify a list of items and responsible parties for essential records, cultural items and artwork. Raise awareness of how these items will be preserved after a storm event.
- Develop steps needed to mitigate damage to records in advance of a storm.
- Develop a plan for what to do with Critical Town records in the event of a disaster.
- Continue to gather accurate data on the location, history, extent and impact of natural hazards in Provincetown.
- Gather data on the seasonal and tourist populations in Provincetown. It is difficult to determine Provincetown's seasonal population and it is important to have an accurate estimate of the number of people visiting to ensure they are safe and prepared in the event of a hazard event.
- Replace the current generator at the Police Department.
- Maintain generator to ensure back up power at the shelter.
- Improve radio communication at the shelter.
- Floodproof critical facilities or other buildings that house computers and servers and/or relocate the equipment out of the floodplain.
- Conduct an assessment of local infrastructure and critical facilities subject to damage from flooding or storm surge that is likely to cause damage. Develop, prioritize and seek funding for a list of needed infrastructure improvement projects.
- Increase number of subscribers to CODE RED.
- Continue to use technology and the internet to connect with the community about disaster planning and response.
- Track and verify repetitive loss properties to see if they have been mitigated. If so, work with FEMA to remove them from the repetitive loss list. If they are damaged, ensure they are brought up to code. Educate them about how to improve their flood insurance costs by making improvements.
- Protect repetitive loss properties through minor localized flood protection projects.
- Annually contact owners of repetitive loss properties and inform them of financial assistance available for structural mitigation such as elevation and acquisition.
- Relocate Provincetown Police Department out of floodplain.
- Distribute educational brochures about storm surge, urban flooding, Community Rating System and National Flood Insurance Program.
- Consider a study to assess the true flood risk for town property which might include a reassessment of Base Flood Elevation and/or Letter of Map Amendments.
- Incorporate beach grass plantings as mitigation for proposed coastal projects.
- Inventory current stormwater systems for age, material and condition.
- Continue beach management efforts for Provincetown Harbor and Cape Cod Bay.
- Use soft armoring to protect vulnerable coastal areas of Provincetown Harbor.
- Coordinate with the Army Corps of Engineers about the breakwater in Provincetown Harbor. Investigate opening the west end of the breakwater or extending it to protect Provincetown Harbor from flooding.
- Pursue beach nourishment opportunities near Snail Road.
- Monitor beach conditions and evaluate all vulnerable shoreline areas for possible future nourishment and beach stabilization projects.
- Educate the public about litter and debris in stormwater systems.

INFRASTRUCUTRE VULNERABILITY ASSESSMENT (2016) | ACTION ITEMS

- Strengthen infrastructure resources, where possible, for future climate change impacts through principles of conservation, efficiency and reuse (i.e. drinking water conservation, stormwater management and flood-proofing structures during upgrades or routine maintenance). Ensuring there is capacity to manage and withstand climate change impacts will be critical to minimizing infrastructure damage and failure.
- Consider land use, design, site selection and building standard modifications to include climate change impacts.
- Focus on protecting and enhancing natural systems like wetlands, coastal features and areas that serve as flood storage capacity and provide protection and resilience to infrastructure.
- When considering infrastructure maintenance, replacement and rehabilitation, provide proper lead time so that an adaptation strategy can be included in the overall assessment of the critical facility. The amount of time to repair, improve, permit, or move a facility will vary greatly depending on what it is, so planning early is key.
- Continued maintenance of existing infrastructure to minimize damage from natural hazard events.
- Formulate risk-based methods to evaluate service life of infrastructure assets against adverse climate change.
- Include climate change impacts with standard maintenance and inspection procedures and increase the frequency of routine inspections of coastal zone and inland drainage structures.
- Initiative comprehensive community asset damage inventories after major storm events.
- The Provincetown Airport should consider how it can use and implement new technology for navigation aids and airfield lighting systems to function better during a natural hazard event.
- Focus on natural systems to help absorb or redirect inflow from stormwater collection systems into natural systems or those that use LID technology. Keeping stormwater flow contained helps to increase capacity for other systems (wastewater, water) and groundwater recharge.
- Expand water conservation and reuse of drinking water and reduce wastewater discharge and stormwater runoff.
- Educate the community and relevant staff on the vulnerabilities of its assets or individual facility to climate change impacts, where appropriate.
- Use the permitting process to recommend new construction and renovation projects consider potential climate change impacts, where appropriate. Requiring protection of basements and first floor levels or enhancing site work to include natural systems for surface runoff could improve their ability to withstand a natural hazard event.
- Consider climate change impacts and develop design guidelines for new construction and renovation projects.
- Center of Provincetown's Downtown | central downtown near Commercial Street at Ryder Street presents a significant risk to the community for flooding hazards during major storm events. It was recommended that the Town eliminate the storm tide pathway that impacts this area. Suggestions to consider for eliminating this pathway include:
    - Developing a plan to sand bag the storm tide pathway during storm threats,
    - Insert a flood gate at a key location,
    - Using natural feature enhancements, such as plantings or beach restoration, provide more of a natural buffer, and
    - Construct a structural berm (or temporary berm that could be put in place) to block the storm tide pathway.
- Flooding and outages could result in interrupted sewer services or sanitary sewer overflows, both of which have significant public health and environmental impacts. Four of the Town's wastewater pump stations are located in areas identified to be inundated at different elevations. Some solutions include:
    - Adding risers to wet well hatches to prevent flood waters from entering,
    - Relocating sensitive electronic equipment (control panels, generators) to higher elevations,
    - Building protections such as hurricane proof doors, and
    - Wet well hatches and any sensitive electrical equipment raised above a high risk elevation.
    - Provide emergency power to avoid SSOs at the pump stations. Town should develop a standard operating procedure for providing emergency power to the pump stations using the portable generators and add it to the Emergency Response Plan.
- Provincetown Airport provides an important economic and transportation service to the community. The Town previously installed a dike to protect the airport from flooding, inundation pathways show the dike may not provide

enough protection and could easily be overcome. This area needs to be studied for improvements and a solution to this issue.

- Shank Painter Road – groundwater analysis to gather data to better understand flood risk in this area.
- Capital Improvement and Maintenance Planning – use the infrastructure vulnerability analysis to inform future capital improvement and maintenance planning efforts. For example, focus stormwater pipe improvements, inspections and cleanings on areas of the town that impact critical assets and are shown to be at higher risk for flooding.
- Determine if this study could be used to help improve the Community Rating System rating for Provincetown.
- Add redundant water main lines from Truro.
- Add vegetative buffer near the DPW location to limit snow drifting.
- Conduct drainage study for the area around Town Hall and/or perform a groundwater study analysis.
- Conduct a study to identify an Operations and Maintenance strategy for CCTV work.
- Remove and relocate the Ryder Street outfall and return the area back to its natural state.
- Install a generator at the library.
- Establish a formal beach management plan.

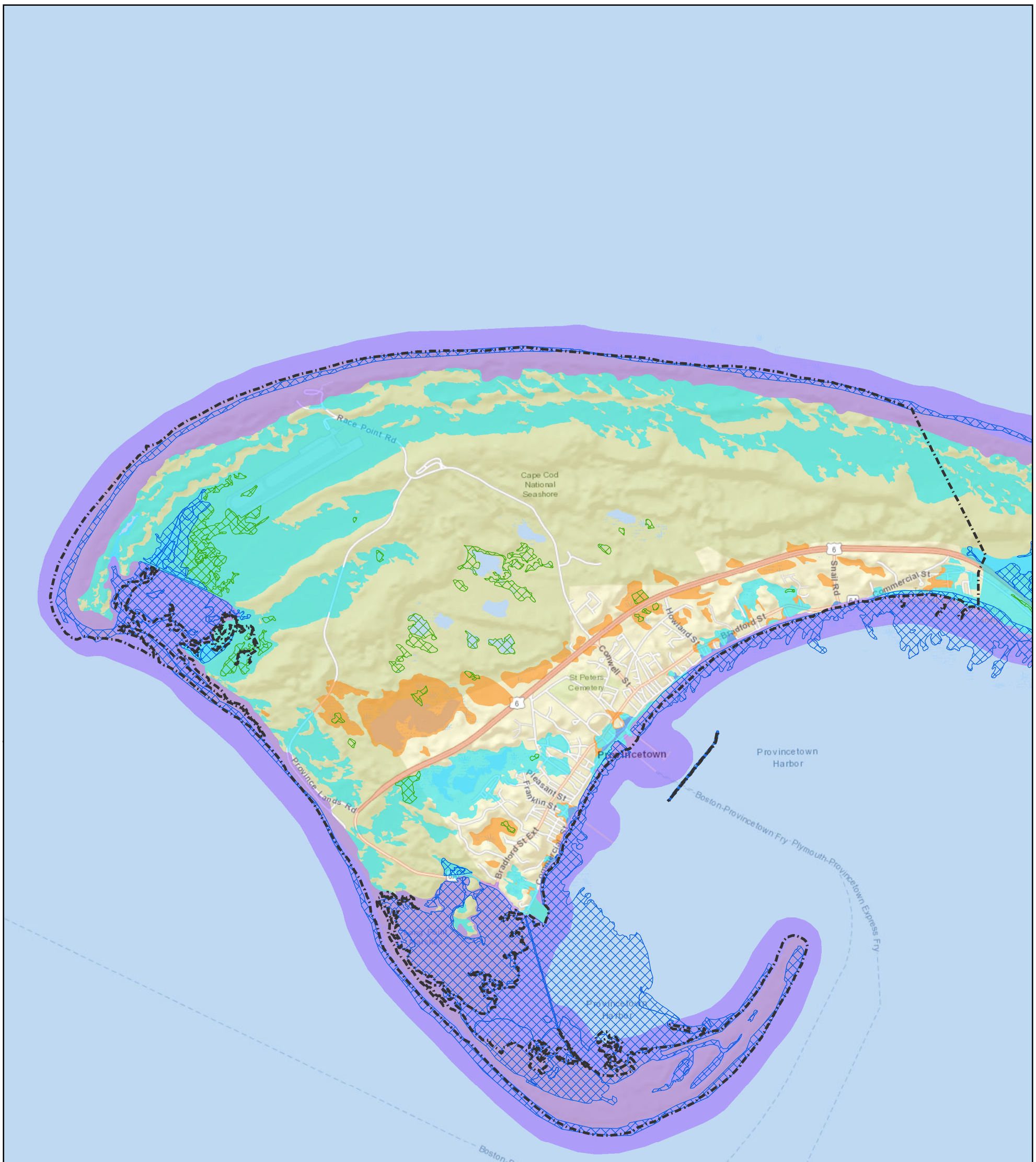
HARBOR MANAGEMENT PLAN

- **Expand the Town's sewer system and determine the feasibility of expanding the wastewater treatment facility.** The Town should determine which waterfront properties are not connected to the Town's sewer system, and prioritize connecting those properties when funding is obtained. More specifically, the Town should first investigate properties on the water-side of Commercial Street and determine which need to be connected. Additionally, as the Town's sewer system is almost at capacity, a new wastewater treatment facility is needed to accommodate the new connections, including those on the water-side. The Town should investigate the feasibility of developing this new wastewater treatment facility.
- **Identify the locations of cesspools, septic systems, and grease traps that could be vulnerable to damage and, thus, contaminate the Harbor, and develop strategies to minimize potential impacts.** The water-side of Commercial Street, in particular, has a number of properties with cesspools, septic systems, and grease traps that are vulnerable to damage (from storms) and need to be addressed.
- **Continue to identify sources of any remaining stormwater runoff pollution and address these sources.** Additionally, consider the potential impacts of climate change and enhanced storm intensity on stormwater runoff.
- **Reduce the flow of debris from the storm sewer outfalls through the installation of subsurface systems that can collect pollution from the storm sewer outfalls.**
- **Continue the program that ensures that all storm drains are labeled to prevent dumping activities.** This is especially important for storm drains that are replaced, as the language may get removed from the location. Additionally, language around the storm drain should note that the drain is connected to the Harbor/ocean.
- Continue and enhance marine debris prevention and removal efforts in Provincetown.
- Ensure all appropriate town landings, beaches, and public seating areas have trash barrels, recycling bins, cigarette litter receptacles, dog poop bags, and signage stating that cigarette smoking is prohibited on beaches.
- Continue and expand upon current strategies to reduce pet waste pollution.
- Provide homeowners and landscapers with information on organic fertilizers, environmentally-suitable fertilizer application rates, natural or indigenous plantings, and other landscaping practices that would help protect water quality.
- Support the water testing program for the Harbor, which includes monitoring storm drain and street runoff.
- Develop strategies to keep the sand from clogging the outfall pipes, better maintain the pipes where sediment is backing-up, and utilize the removed sand as nourishment material.
- Continue monitoring water quality closely for different types of pollution.
- Continue to maintain, publicize, and enforce the current pump-out program.
- Expand the pump-out system to accommodate the larger commercial vessels operating on tight time schedules.

- Expand the Town's sewer system to accommodate current un-met needs and additional vessels.
- Using the research conducted as part of this project, build and maintain a database of all Chapter 91 licenses access conditions as well as other public access to the Harbor, obtained through other means such as easements.
- Ensure that efforts to minimize inundation flooding maintain public access, where possible.
- Create a series of pocket parks along the Harbor.
- Understand local interest in expanding aquaculture in Provincetown Harbor.
- Determine the harbor's capacity for additional aquaculture activities and identify opportunities to locate aquaculture leases in a manner that avoids conflicts with other Harbor uses and maximizes co-location with compatible uses of the Harbor.
- Develop a manual describing permits and plans needed for those interested in obtaining an aquaculture lease in Provincetown Harbor.
- Explore opportunities to increase shoreside infrastructure for aquaculture activities.
- Develop a schedule for existing priority nourishment projects and identify non-priority projects and timelines for those as well.
- Conduct public meetings to solicit input to determine which areas should receive nourishment after the previously identified priority projects are complete.
- Based on science-based research and public input, develop a plan for long-term beach nourishment, taking into account any cyclical nourishment needs and dredging projects, as well as anticipated impacts from sea level rise.
- Continue to monitor beach conditions and evaluate all vulnerable shoreline areas for possible future nourishment and beach stabilization projects.
- Take steps to ensure that funding for beach nourishment is a standard budget item.
- Work with regional partners to address research needs, planning, permitting, and funding for future beach nourishment projects.
- Establish a regular dredge maintenance program (including long-term and short- term priorities) for areas outside of the Federal Channel in Provincetown Harbor.
- Conduct studies to determine bathymetric changes in the Harbor (i.e., changes in under water topography) and their causes
- Provide advice to the Select Board on a regular basis on what areas in the Harbor need to be dredged.
- Remove all hazards (e.g., wrecks, moorings, groins) from navigable waterways that could create safety concerns.
- Inventory all groins along the shoreline to identify those that pose navigational hazards but cannot be removed. Mark those that require marking, taking into consideration those which may become submerged with rising sea levels.

MUNICIPAL VULNERABILITY PREPAREDNESS
LISTENING SESSION
TOWN OF PROVINCETOWN, MA
APRIL 11, 2019 | 4:30 PM
SIGN IN SHEET

	Name	Email
1.	Mary McCrann	mmccrann@woodardcurran.com
2.	Bill Lord	lordwwl@gmail.com
3.	Susan Avellar	savellar@hotmail.com
4.	Sherry Branch	kudwinc@gmail.com
5.	Linda Fiorella	lfiorella@provincetown-ma.gov
6.	DAVID GARDNER	dgardner@provincetownma.gov
7.	ALAN RUSCOE	togetcast@aol.com
8.	ROGER CASTELLANI	desmondo2@earthlink.net
9.	BRIAN FITZPATRICK	fuzzzy@gmail.com
10.	SUSAN TROYAN	susantroyan@gmail.com
11.	Lezli Rowell	LRowell@provincetown-ma.gov
12.	JAY GARGUTSIS	JAG@ARCADAPTIVE.com
13.	REX McKINSEY	RMcKinsey@provincetown-ma.gov
14.	ANNE HOWARD	ahoward@provincetown-ma.gov
15.	KEITH Hunt	Kth02118@gmail.com
16.	Paul Benson	paulmbenson@gmail.com
17.	Rebecca Vanderpool	rvanderpool@provincetown-ma.gov
18.		
19.	Tim Famulare	tfamulare@provincetown-ma.gov
20.	Jan Greenwood	jgreenwood@woodardcurran.com



Provincetown, MA

FEMA Floodplains

Legend

- Provincetown Boundary
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland

FEMA National Flood Hazard

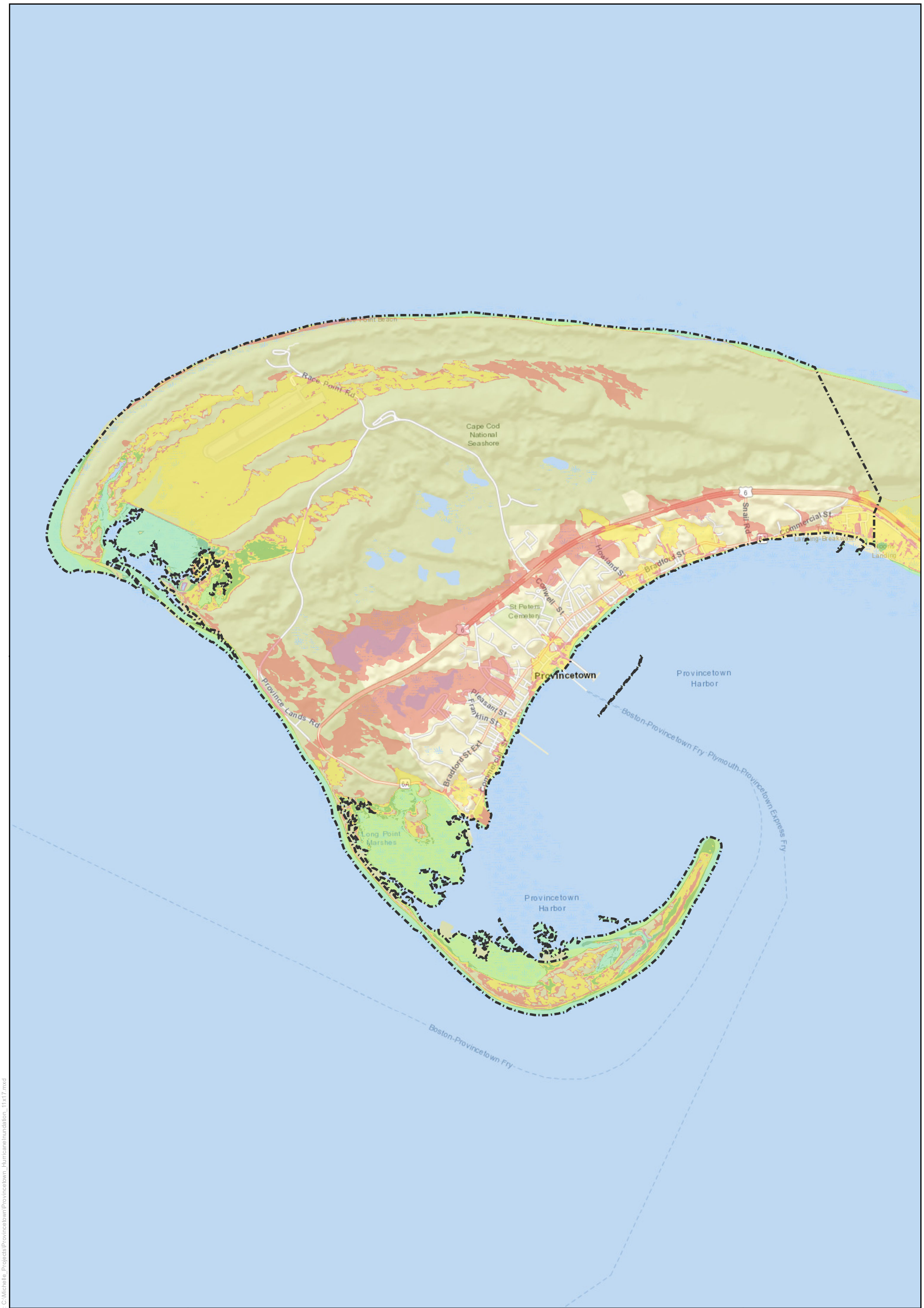
- A: 1% Annual Chance of Flooding, no BFE
- AE: 1% Annual Chance of Flooding, with BFE
- AE: Regulatory Floodway
- AH: 1% Annual Chance of 1-3ft Ponding, with BFE
- AO: 1% Annual Chance of 1-3ft Sheet Flow Flooding, with Depth
- VE: High Risk Coastal Area
- D: Possible But Undetermined Hazard
- X: 0.2% Annual Chance of Flooding
- X: Reduced Flood Risk due to Levee
- Area Not Included
- Area with no DFIRM - Paper FIRMs in Effect

N

0 0.15 0.3 0.6 Miles

WOODARD &CURRAN

Project #: 0231672
Map Created: March 2019



Provincetown, MA

Hurricane Inundation Zones

Legend

Worst-case Hurricane Surge Inundation Zones

Hurricane Category

- Category 1
- Category 2
- Category 3
- Category 4

Provincetown Boundary

N

0 0.15 0.3 0.6 Miles

WOODARD &CURRAN

Project #: 0231672
Map Created: March 2019

Figure Exported: 3/9/2019 By: mroberts Using: C:\Michelle_Projects\Provincetown\Provincetown_HurricaneInundation_11x17.mxd

APPENDIX B: COMMUNITY RESILIENCY BUILDING PRESENTATIONS


Good Morning &
Welcome!
Provincetown Community Resiliency Building Workshop
March 15, 2019

1


Provincetown, MA
Community Resiliency Building Workshop
March 15, 2019
WOODARD &CURRAN

2

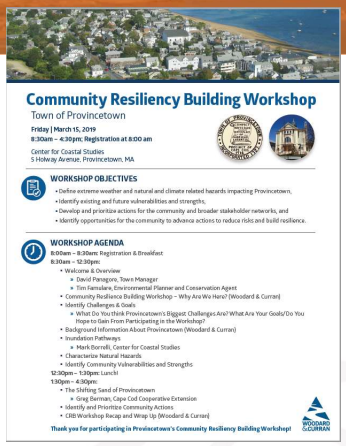
Community Resiliency Building Workshop

3

Community Resiliency Building Workshop

4

Agenda


Community Resiliency Building Workshop
Town of Provincetown
Friday | March 15, 2019
8:30am – 4:30pm; Registration at 8:00 am
Center for Coastal Studies
5 Holway Avenue, Provincetown, MA

WORKSHOP OBJECTIVES
- Define extreme weather and natural and climate related hazards impacting Provincetown,
- Identify existing and future vulnerabilities and strengths,
- Develop and prioritize actions for the community and broader stakeholder networks, and
- Identify opportunities for the community to advance actions to reduce risks and build resilience.

WORKSHOP AGENDA
8:00am – 8:30am: Registration & Breakfast
8:30am – 12:30pm:
- Welcome & Overview
  - David Panagore, Town Manager
  - Tim Famulare, Environmental Planner and Conservation Agent
- Community Resilience Building Workshop – Why Are We Here? (Woodard & Curran)
- Identify Challenges & Goals
  - What Do You think Provincetown's Biggest Challenges Are? What Are Your Goals/Do You Hope to Gain From Participating in the Workshop?
- Background Information About Provincetown (Woodard & Curran)
- Inundation Pathways
  - Mark Borrelli, Center for Coastal Studies
- Characterize Natural Hazards
- Identify Community Vulnerabilities and Strengths

12:30pm – 1:30pm: Lunch!
1:30pm – 4:30pm:
- The Shifting Sand of Provincetown
  - Greg Berman, Cape Cod Cooperative Extension
- Identify and Prioritize Community Actions
- CRB Workshop Recap and Wrap Up (Woodard & Curran)

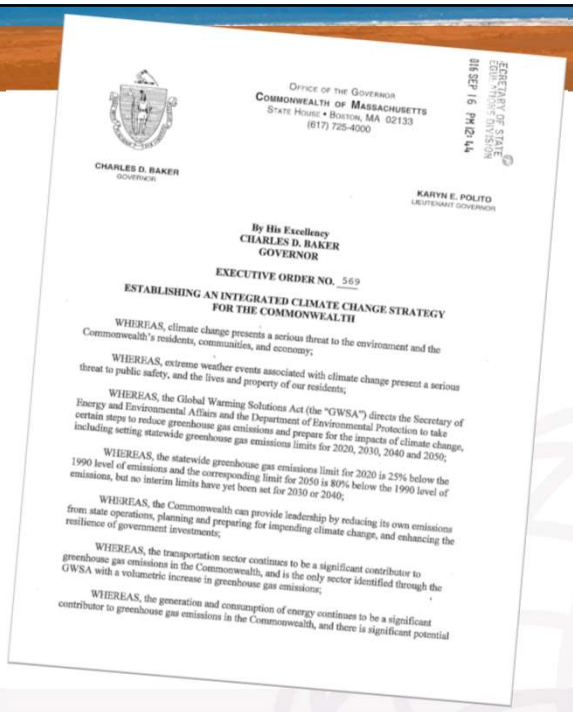
Thank you for participating in Provincetown's Community Resiliency Building Workshop!

- 8:00 – 8:30 | Registration
- 8:30 – 12:30
  - Welcome & Overview
  - CRB Workshop Why Are We Here?
  - Identify Challenges & Goals
  - Background Information About Provincetown
  - Inundation Pathways, Mark Borrelli, **Center for Coastal Studies**
  - Characterize Natural Hazards
  - Identify Community Vulnerabilities & Strengths
- **12:30 – 1:30 | LUNCH!**
- 1:30 – 4:30
  - The Shifting Sand of Provincetown, Greg Berman, **Cape Cod Cooperative Ext.**
  - Identify & Prioritize Community Actions
  - CRB Workshop Recap & Wrap Up

5

Executive Order 569

- In September 2016, Governor Charlie Baker signed Executive Order 569, instructing state government to **provide assistance to cities and towns to complete climate change vulnerability assessments and resiliency planning**


OFFICE OF THE GOVERNOR
COMMONWEALTH OF MASSACHUSETTS
STATE HOUSE • BOSTON, MA 02133
(617) 725-4000

CHARLES D. BAKER
GOVERNOR

KARYN E. POLITO
LIEUTENANT GOVERNOR

By His Excellency
CHARLES D. BAKER
GOVERNOR

EXECUTIVE ORDER NO. 569

ESTABLISHING AN INTEGRATED CLIMATE CHANGE STRATEGY FOR THE COMMONWEALTH

WHEREAS, climate change presents a serious threat to the environment and the Commonwealth's residents, communities, and economy;

WHEREAS, extreme weather events associated with climate change present a serious threat to public safety, and the lives and property of our residents;

WHEREAS, the Global Warming Solutions Act (the "GWSA") directs the Secretary of Energy and Environmental Affairs and the Department of Environmental Protection to take certain steps to reduce greenhouse gas emissions and prepare for the impacts of climate change, including setting statewide greenhouse gas emissions limits for 2020, 2030, 2040 and 2050;

WHEREAS, the statewide greenhouse gas emissions limit for 2020 is 25% below the 1990 level of emissions and the corresponding limit for 2050 is 80% below the 1990 level of emissions, but no interim limits have yet been set for 2030 or 2040;

WHEREAS, the Commonwealth can provide leadership by reducing its own emissions from state operations, planning and preparing for impending climate change, and enhancing the resilience of government investments;

WHEREAS, the transportation sector continues to be a significant contributor to greenhouse gas emissions in the Commonwealth, and is the only sector identified through the GWSA with a volumetric increase in greenhouse gas emissions;

WHEREAS, the generation and consumption of energy continues to be a significant contributor to greenhouse gas emissions in the Commonwealth, and there is significant potential

6

August 2018

- Governor Baker signed legislation directing $2.4 billion to Climate Change Adaptation, Environmental Protection and Community Investments
- $$ allocated capital for investments in safeguarding residents, municipalities and businesses from the impacts of climate change, protecting environmental resources, and improving recreational opportunities
- The $$ enables critical environmental investments at the state and local levels and will put into law essential components of Governor Baker's Executive Order 569

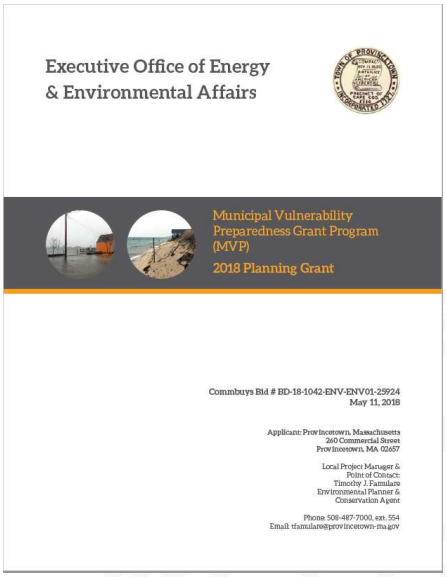
Photo: Mass.gov Press Release, August 2018

7

8

Municipal Vulnerability Preparedness (MVP) Grant Program

- The MVP grant program provides support for cities and towns in Massachusetts to begin or continue the process of planning for resiliency
- The state awards communities with funding to complete vulnerability assessments and develop action-oriented resiliency plans
- Provincetown submitted a grant application to participate in the MVP Planning process



9

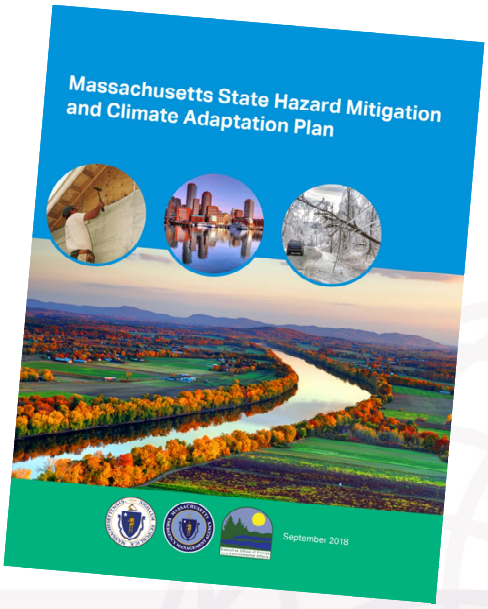
Municipal Vulnerability Preparedness (MVP) Grant Program

- The program helps communities achieve the following objectives:
  - Define extreme weather and natural and climate related hazards
  - Identify existing and future vulnerabilities and strengths
  - Develop and prioritize actions for the community
  - Identify opportunities to take action to reduce risk and build resilience

10

Municipal Vulnerability Preparedness (MVP) Grant Program

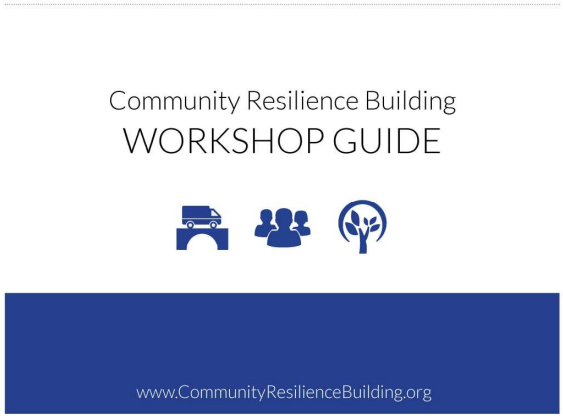
- MVP Principles
  - **Community-led process** that employs local knowledge and requires local buy-in and support
  - **Accessible** to everyone
  - **Utilizes partnerships** and leverages existing efforts
  - **Mainstreams** climate change
  - **See communities** as local innovators
  - **Frames** coordinated statewide efforts



11

Community Resiliency Building Workshop

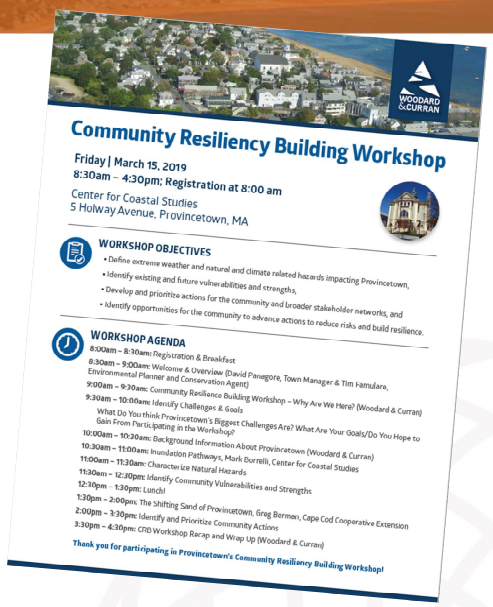
- As part of the MVP program, participating communities MUST complete a Community Resiliency Building Workshop!
- A second discussion will be held in the spring for seasonal and environmental justice populations
- Upon completion of the workshop, a summary report will be submitted to EEA
- Provincetown will continue to use this Summary of Findings to reinforce future planning and action item implementation



12

We will work together to….

- Understand connections between ongoing community issues, climate change, natural hazards and local planning and actions
- Understand how climate change will exacerbate or lead to new community issues, hazards and challenges
- Identify infrastructural, societal, environmental vulnerabilities and strengths that help Provincetown become more resilient
- Explore nature-based solutions to build resiliency
- Develop and prioritize actions that delineate next steps for the community
- Identify how Provincetown can advance actions to reduce risks and impacts of climate change and increase local and regional resilience



Community Resiliency Building Workshop

Friday | March 15, 2019
8:30am – 4:30pm; Registration at 8:00 am

Center for Coastal Studies
5 Holway Avenue, Provincetown, MA

WORKSHOP OBJECTIVES

- Define extreme weather and natural and climate related hazards impacting Provincetown,
- Identify existing and future vulnerabilities and strengths,
- Develop and prioritize actions for the community and broader stakeholder networks, and
- Identify opportunities for the community to advance actions to reduce risks and build resilience.

WORKSHOP AGENDA

8:00am – 8:30am: Registration & Breakfast
8:30am – 9:00am: Welcome & Overview (David Panagore, Town Manager & Tim Famulare, Environmental Planner and Conservation Agent)
9:00am – 9:30am: Community Resilience Building Workshop – Why Are We Here? (Woodard & Curran)
9:30am – 10:00am: Identify Challenges & Goals
What Do You think Provincetown's Biggest Challenges Are? What Are Your Goals/Do You Hope to Gain From Participating in the Workshop?
10:00am – 10:30am: Background Information About Provincetown (Woodard & Curran)
10:30am – 11:00am: Inundation Pathways, Mark Borrelli, Center for Coastal Studies
11:00am – 11:30am: Characterize Natural Hazards
11:30am – 12:30pm: Identify Community Vulnerabilities and Strengths
12:30pm – 1:30pm: Lunch!
1:30pm – 2:00pm: The Shifting Sand of Provincetown, Greg Berman, Cape Cod Cooperative Extension
2:00pm – 3:30pm: Identify and Prioritize Community Actions
3:30pm – 4:30pm: CRB Workshop Recap and Wrap Up (Woodard & Curran)

Thank you for participating in Provincetown's Community Resiliency Building Workshop!

13

Community Resiliency Building Workshop

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S					Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Societal									
Environmental									

14

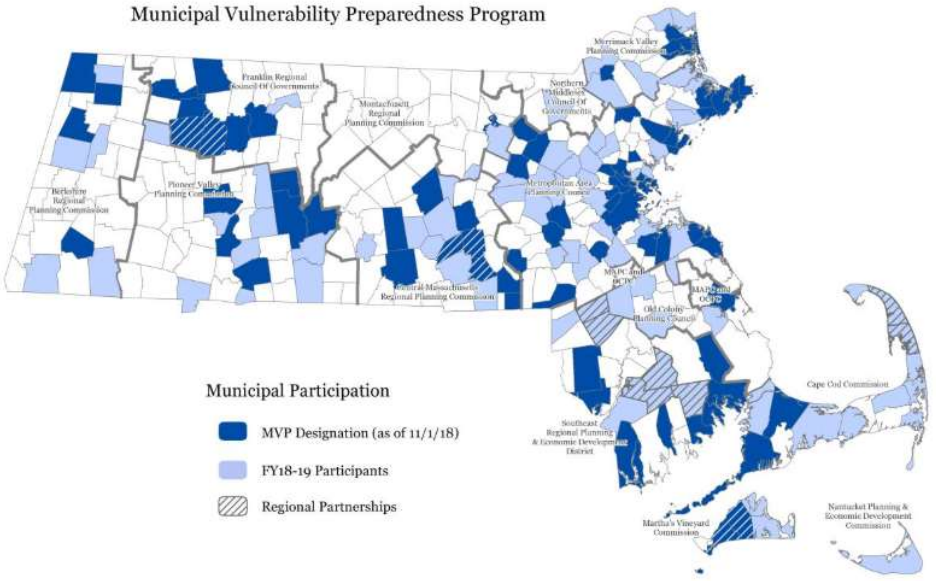
Municipal Vulnerability Preparedness (MVP) Grant Program

- Communities who complete the MVP program become certified as an MVP community and are eligible for potential follow-up grant funding and other opportunities
- Examples of other MA communities who have had projects funded!

Community	Project	Amount
Weymouth	Fort Point Road Coastal Infrastructure Resilience Project	$129,557
Medford	Open Space Plan Update	$60,000
Winthrop	Ingleside Park Feasibility Study and Permitting	$156,750
Manchester By The Sea	Sawmill Brook Central Pond Restoration Design	$88,180
Newburyport	Wastewater Treatment Plant Climate Resilience	$122,695
Salem	Salem Sanitary Sewer Trunk Line Relocation Assessment	$345,000

15

What Other Communities Are in the MVP Program?



16

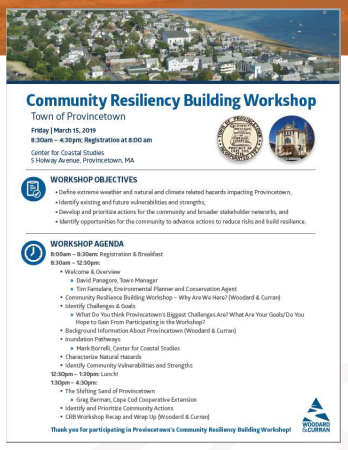
Two Questions for You!

The goal of the workshop is to listen and learn from attendees regarding your thoughts and ideas for meeting the CRB workshop objectives!

- **What are Provincetown's biggest challenges?**
  - Think infrastructure, societal, environment
- **What are your goals for the day and what do you hope to gain from your participation in the workshop today?**

17

Agenda



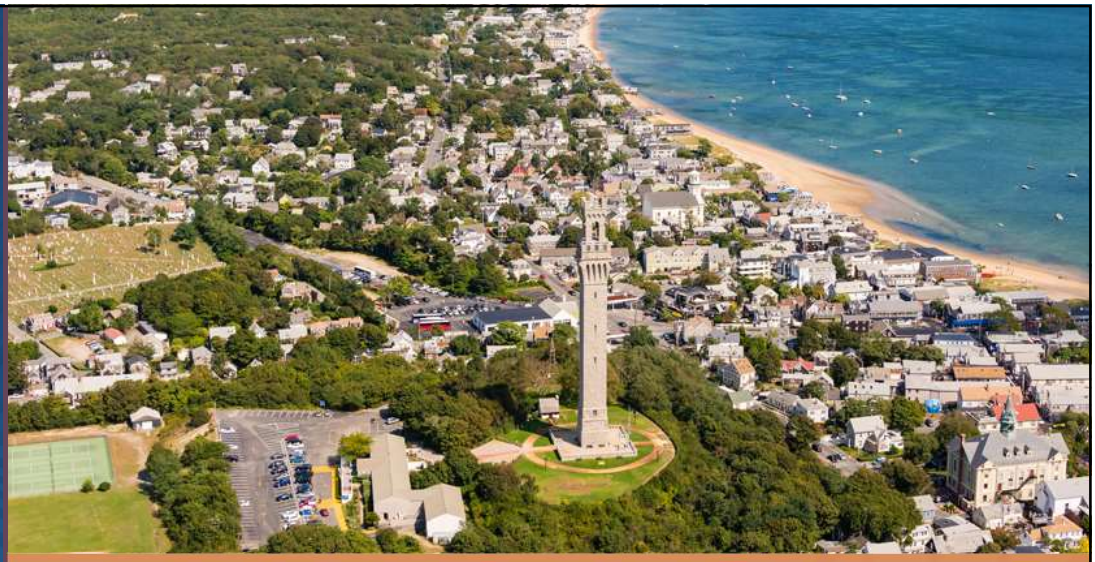
- **8:00 – 8:30 | Registration**
- **8:30 – 12:30**
  - **Welcome & Overview**
  - **CRB Workshop Why Are We Here?**
  - **Identify Challenges & Goals**
  - **Background Information About Provincetown**
  - Inundation Pathways, Mark Borrelli, **Center for Coastal Studies**
  - Characterize Natural Hazards
  - Identify Community Vulnerabilities & Strengths
- **12:30 – 1:30 | LUNCH!**
- 1:30 – 4:30
  - The Shifting Sand of Provincetown, Greg Berman, **Cape Cod Cooperative Ext.**
  - Identify & Prioritize Community Actions
  - CRB Workshop Recap & Wrap Up

18

Provincetown, MA
Community Resiliency Building Workshop

March 15, 2019

19



Provincetown, MA
Community Resiliency Building Workshop

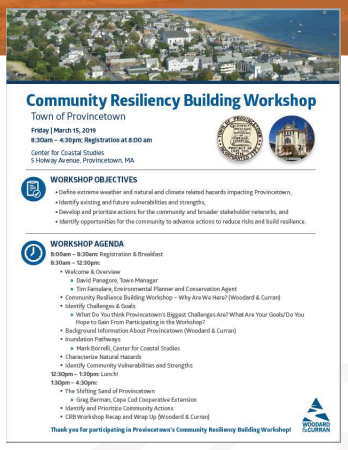
March 15, 2019

WOODARD &CURRAN

1

Agenda

- **8:00 – 8:30 | Registration**
- **8:30 – 12:30**
  - **Welcome & Overview**
  - **CRB Workshop Why Are We Here?**
  - **Identify Challenges & Goals**
  - **Background Information About Provincetown**
  - Inundation Pathways, Mark Borrelli, **Center for Coastal Studies**
  - Characterize Natural Hazards
  - Identify Community Vulnerabilities & Strengths
- **12:30 – 1:30 | LUNCH!**
- 1:30 – 4:30
  - The Shifting Sand of Provincetown, Greg Berman, **Cape Cod Cooperative Ext.**
  - Identify & Prioritize Community Actions
  - CRB Workshop Recap & Wrap Up



Community Resiliency Building Workshop

Town of Provincetown

Friday | March 15, 2019

8:30am – 4:30pm; Registration at 8:00 am

Center for Coastal Studies

5 Holway Avenue, Provincetown, MA

WORKSHOP OBJECTIVES

- Define extreme weather and natural and climate related hazards impacting Provincetown,
- Identify existing and future vulnerabilities and strengths,
- Develop and prioritize actions for the community and broader stakeholder networks, and
- Identify opportunities for the community to advance actions to reduce risks and build resilience.

WORKSHOP AGENDA

8:00am – 8:30am: Registration & Breakfast

8:30am – 12:30pm:

- Welcome & Overview
  - David Panagore, Town Manager
  - Tim Famolare, Environmental Planner and Conservation Agent
- Community Resilience Building Workshop – Why Are We Here? (Woodard & Curran)
- Identify Challenges & Goals
  - What Do You think Provincetown's Biggest Challenges Are? What Are Your Goals/Do You Hope to Gain From Participating in the Workshop?
- Background Information About Provincetown (Woodard & Curran)
- Inundation Pathways
  - Mark Borrelli, Center for Coastal Studies
- Characterize Natural Hazards
- Identify Community Vulnerabilities and Strengths

12:30pm – 1:30pm: Lunch!

1:30pm – 4:30pm:

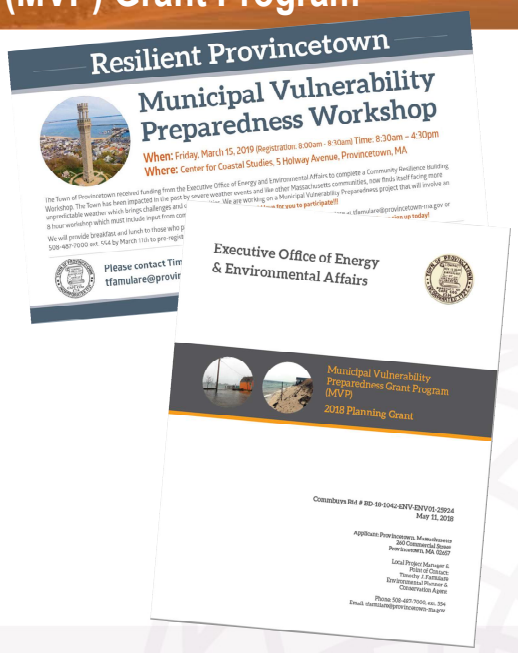
- The Shifting Sand of Provincetown
  - Greg Berman, Cape Cod Cooperative Extension
- Identify and Prioritize Community Actions
- CRB Workshop Recap and Wrap Up (Woodard & Curran)

Thank you for participating in Provincetown's Community Resiliency Building Workshop!

2

Municipal Vulnerability Preparedness (MVP) Grant Program

- The program helps communities achieve the following objectives:
  - Define extreme weather and natural and climate related hazards
  - Identify existing and future vulnerabilities and strengths
  - Develop and prioritize actions for the community
  - Identify opportunities to take action to reduce risk and build resilience



3

resilience

noun

1. *the capacity to recover quickly from difficulties; toughness*

4

adapt

verb

1. *make (something) suitable for a new use or purpose; modify.*
2. *become adjusted to new conditions.*

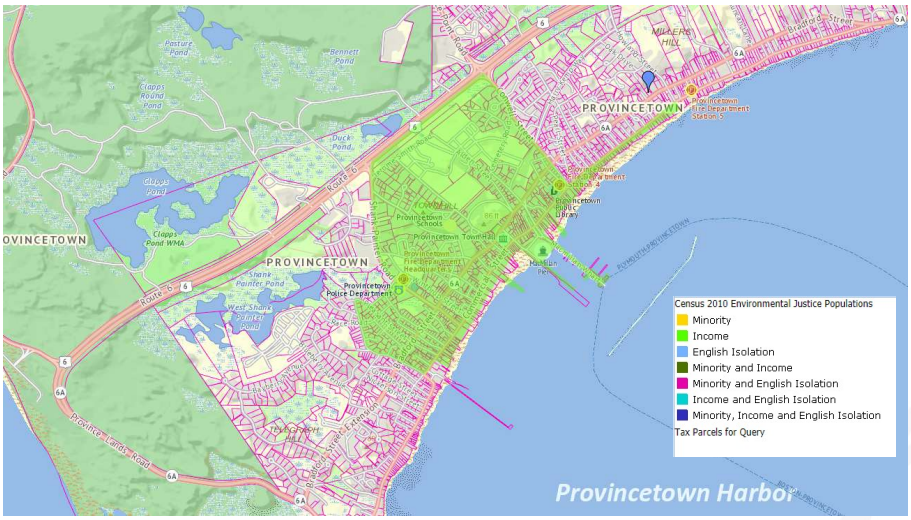
5

Background Information

- Year round population of 2,959 (as of 2017)
- Seasonal population swells to 60,000
- Located on a peninsula
- 17.5 square miles
- 21.3 miles of coastline
- Provincetown Harbor – deep water port, commercial fishing
- Provincetown is almost completely surrounded by the ocean and has only one way in and out of town for vehicles, Route 6. The entire coastline of the community is in a designated flood zone as well as some inland areas.
- Major asset to the community – the waterfront and water access!
- The flood zone areas and projected impacts of sea level rise and storm surge will directly affect Provincetown's busy commercial and densely developed residential areas.

6

Environmental Justice Population - Income

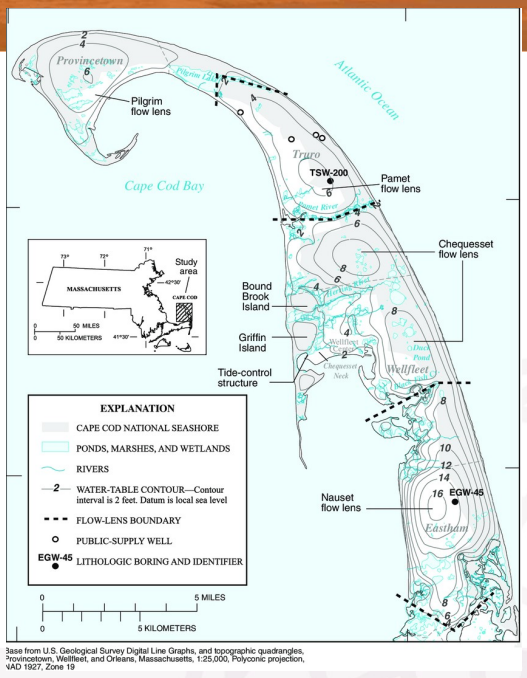


Income isolation – 57% of population is considered to be low/moderate income

7

Transportation, Water & Sewer

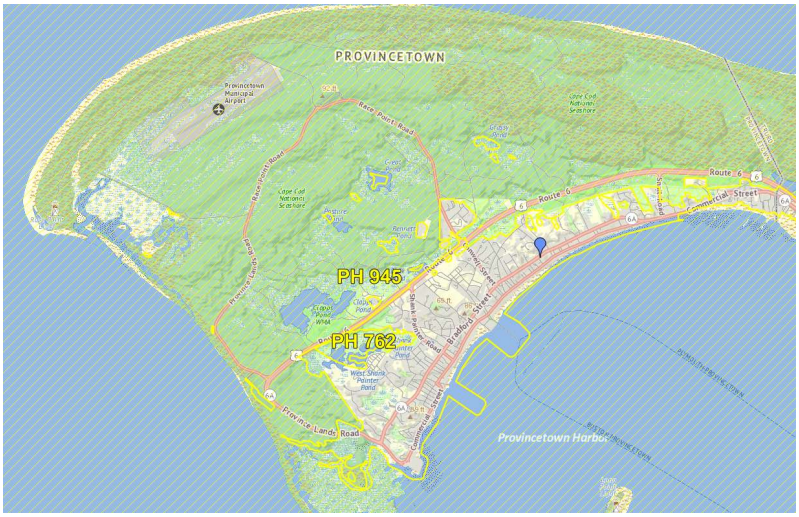
- Primary roadway is Route 6 and 6A, limited public transportation
- Water transmission mains provide water from Truro
  - Water supply sources – 3 wellfields (Pamet Lens of Cape Cod Aquifer)
- Local wastewater treatment plant serves about 50% of community, remainder of community on septic



Base from U.S. Geological Survey Digital Line Graphs, and topographic quadrangles, Provincetown, Wellfleet, and Orleans, Massachusetts, 1:25,000, Polyconic projection, NAD 1927, Zone 19

8

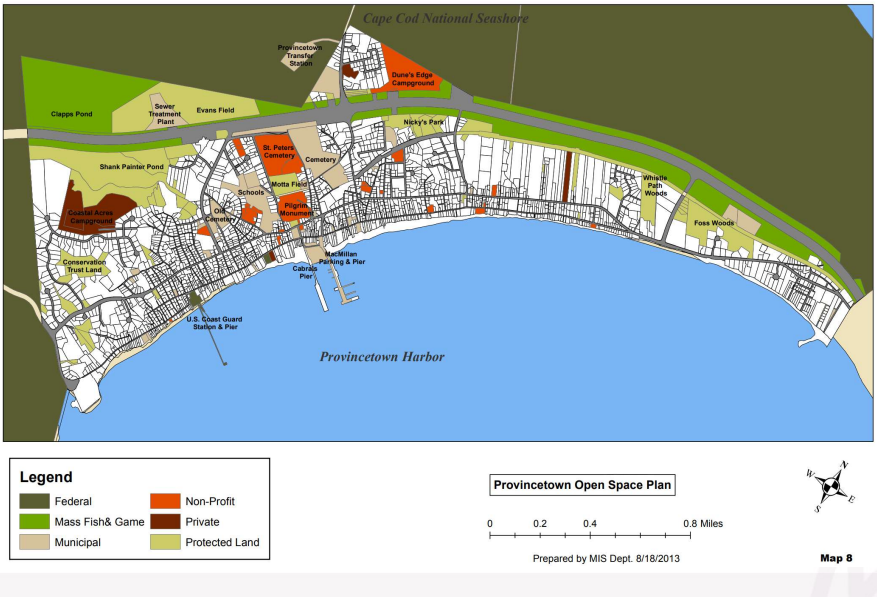
Environmental Features



- Major priority habitat area
- Most wetlands in town are coastal
- Home to Cape Cod National Seashore (75% of land in Town is within this area)
- 20+ acre quaking bog on Shank Painter Pond is the largest known quaking bog on a barrier beach system in the world

9

Environmental Features



- Provincetown owns 99 acres of open space
- 333 acres of salt marsh (most in National Seashore)
- 10 ponds in town

10

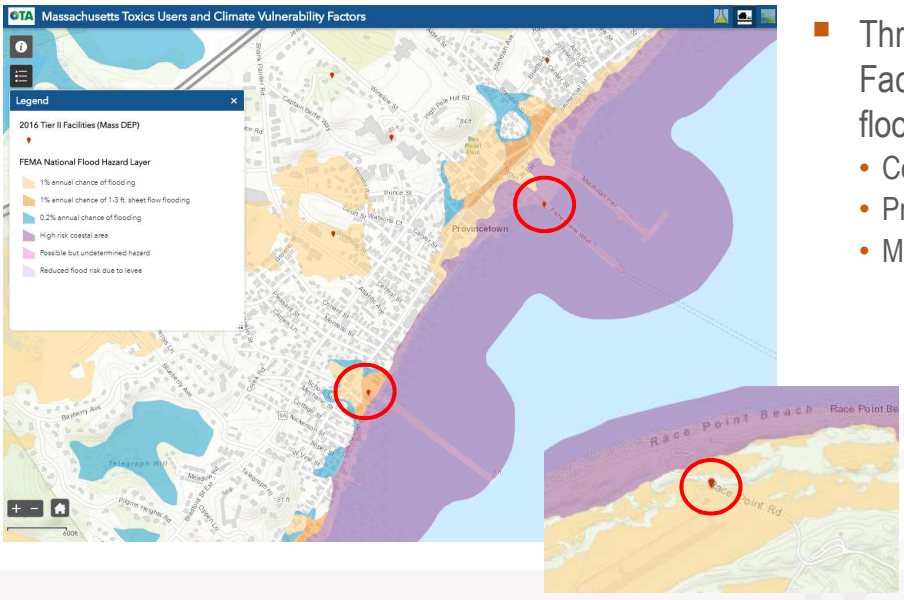
Environmental Features

- 10 ponds in town – not significant for recreation, they are the primary sites for rare plant and animal species and are protected as sensitive habitat

Table 4.2 **Pond Name**	**Surface Acreage**	**Max. Depth (ft.)**	**Shore Length (miles) Activities**	**Public Access***
Clapps Pond	40	4	1.8. Fishing, hunting	off Rt. 6
Shank Painter Pond	15	3	1.2	none
Great Pond	10	<3	0.7. Nature study,	CCNS
Grassy Pond	6	<3	0.4	CCNS
Pasture Pond	6	<3	0.5	CCNS
West Shank Painter Pond	5	<3	?	none
Bennett Pond	5	<3	0.4	CCNS
Duck Pond	4	<3	?	Route 6
Clapps Round Pond	3	<3	0.1	CCNS
Jimmys Pond	2	<3	?	PCT

11

Environmental Features



- Three DEP Tier II Facilities located in the floodplain
  - Coast Guard Facility
  - Provincetown Marina
  - Municipal Airport

12

Coastal Infrastructure

- Long Point Dike
  - 6,150 feet long
  - Extends southerly from Stevens Point across House Point Island Flats
  - Completed in 1914
  - Protect harbor from offshore coastal hazards
- Stone breakwater parallel to shore 835 feet from end of MacMillan Wharf
  - 2,500 feet long, elevation of 15.5 feet
  - Completed in 1972
  - Protect harbor coastal hazards

13

Provincetown Airport

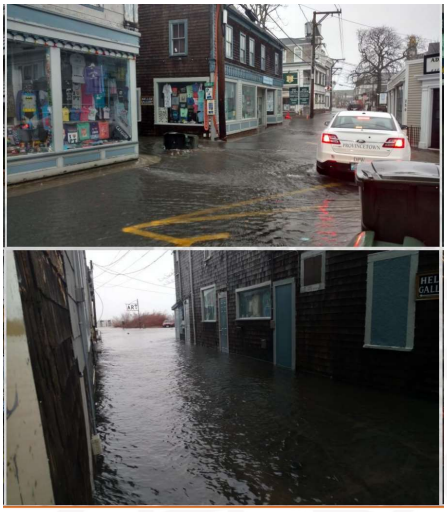
- A destination airport from Logan International in Boston
- Provides commercial airline service to the Cape Cod region
- Sited on 331 acres of land administered by the National Park Service
- Hatches Harbor dike constructed in 1930 across the Hatches Harbor salt marsh
  - Culverts constructed in the 1990s to bring salt water into upper Hatches Harbor Race Run to help restore marsh to its natural condition

Photo 5. View of Hatches Harbor dike facing northeast. Photo credit Jacobs.

14

Severe Weather

- Vulnerable to any storm from the east (northeast to southeast)
- Hurricane Bob 1991 – erosion from waves and wind
- Great Storm of 1978 and Halloween Storm 1991 – caused property damage
- Hurricane Earl 2010 and Irene 2011 – street flooding, loss of power
- Super Storm Sandy 2012 and Winter Storm Nemo 2013 – beach erosion, flooding, property damage, significant damage to MacMillan Pier
- January 2018 Storm – power outage, flooding, property damage

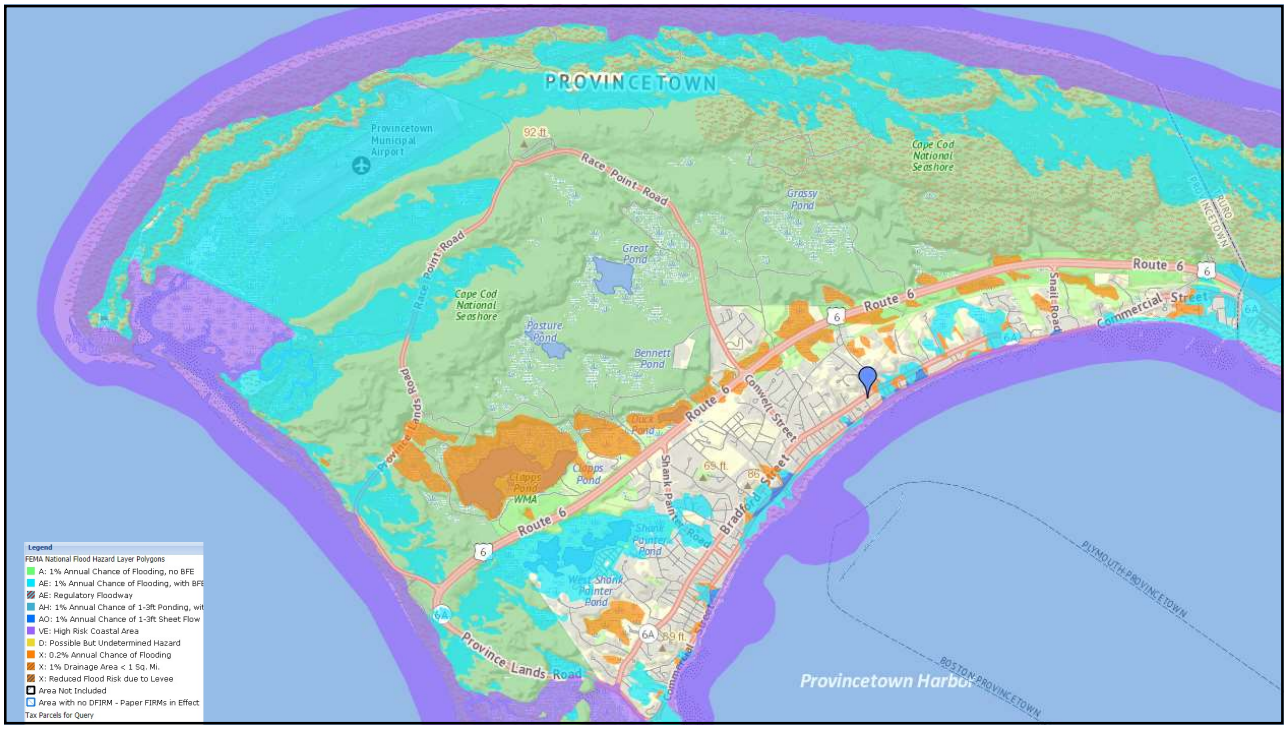


15

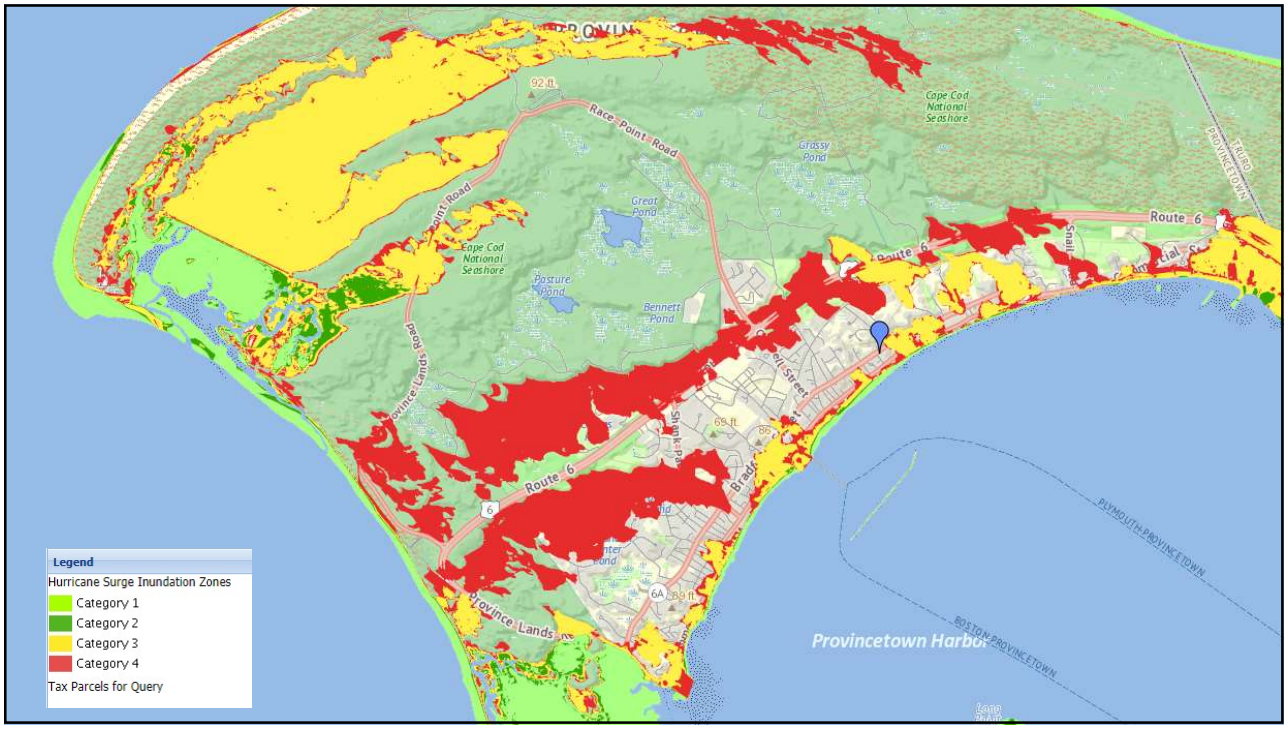
January 2018 Storm Event

- January 2018 flooding event – many had not seen anything like this in Town
  - Provincetown Fire reported 3 feet of water on parts of Commercial Street and Province Lands Road
  - Loss of power
  - Damage to more than 50 homes and businesses
  - UU Meeting House (1847) had 6 inches of water on the first floor

16

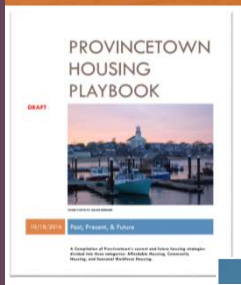

PROVINCETOWN
Provincetown Municipal Airport
92 ft
Race Point Road
Cape Cod National Seashore
Grassy Pond
Great Pond
Route 6
Commercial Street
Snail Road
Bennett Pond
Duck Pond
Conwell Street
Province Lands Road
Clapps Pond
WMA
Shank Painter Road
Bradford Street
West Shank Painter Pond
65 ft
PLYMOUTH PROVINCETOWN
BOSTON PROVINCETOWN
Provincetown Harbor
Legend
FEMA National Flood Hazard Layer Polygons
A: 1% Annual Chance of Flooding, no BFE
AE: 1% Annual Chance of Flooding, with BFE
AE: Regulatory Floodway
AH: 1% Annual Chance of 1-3ft Ponding, wit
AO: 1% Annual Chance of 1-3ft Sheet Flow
VE: High Risk Coastal Area
D: Possible But Undetermined Hazard
X: 0.2% Annual Chance of Flooding
X: 1% Drainage Area < 1 Sq. Mi.
X: Reduced Flood Risk due to Levee
Area Not Included
Area with no DFIRM - Paper FIRMs in Effect
Tax Parcels for Query

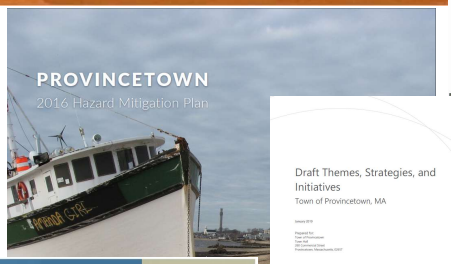
17

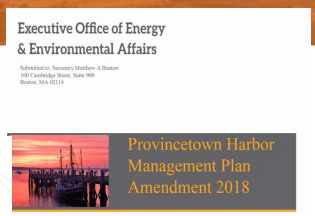

92 ft
Race Point Road
Cape Cod National Seashore
Grassy Pond
Great Pond
Route 6
Commercial Street
Province Lands Road
Bradford Street
65 ft
PLYMOUTH PROVINCETOWN
BOSTON PROVINCETOWN
Provincetown Harbor
Legend
Hurricane Surge Inundation Zones
Category 1
Category 2
Category 3
Category 4
Tax Parcels for Query

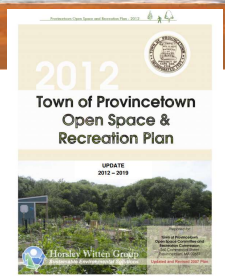
18

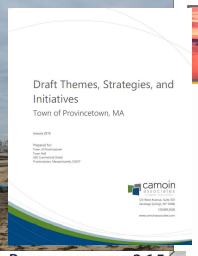
Recent Planning Efforts

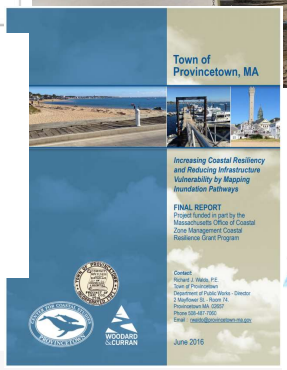












Shank Painter Road
Corridor Study
Provincetown
September 2012

CAPE COD COMMISSION

19

Natural Hazards Impacting Provincetown

- Coastal Erosion
- Fire
- Flood
- Hurricane/Tropical Storms
- Landslide
- Nor'easters
- High Winds
- Thunderstorms
- Extreme Temperatures (heat, cold)
- Drought
- Culvert Failure
- Severe Winter Weather
- Sea Level Rise
- Climate Change

20

Parcels & Buildings Vulnerable to Flooding – V Zone

Parcels and Buildings Vulnerable to Flooding

Flooding (V Zone)

Type of Structure	Number of Parcels			Value of Buildings		
	# in town	# in Hazard area	% in Hazard Area	$ in town	$ in Hazard area	% in Hazard Area
Agriculture	1	0	0%	$41,100	$0	0%
Banks	2	0	0%	$2,102,300	$0	0%
Entertainment and Recreation	7	1	14%	$1,602,200	$162,100	10%
General Services	134	18	13%	$74,779,900	$14,020,000	19%
Heavy Industrial	3	0	0%	$443,100	$0	0%
Medical Office/Clinic	47	11	23%	$97,309,900	$44,545,500	46%
Multi-family Dwelling	808	94	12%	$868,840,700	$193,841,700	22%
Non-Profit/Municipal Offices	127	21	17%	$61,477,600	$1,928,000	3%
Parking (Commercial)	10	2	20%	$0	$0	0%
Personal/Repair Services	3	1	33%	$378,400	$67,100	18%
Retail Trade	47	10	21%	$24,001,100	$4,516,800	19%
Single Family Dwelling	915	96	10%	$271,541,800	$37,522,800	14%
Temporary Lodging	45	14	31%	$46,061,100	$23,687,500	51%
Theaters	1	0	0%	$1,267,200	$0	0%
Vacant	192	16	8%	$9,083,900	$8,100,100	89%
Wholesale Trade	10	0	0%	$3,075,700	$0	0%
COLUMN TOTALS:	2352	284		$1,462,006,000	$328,391,600	

Table 4.4 | The proportion of buildings and value of buildings located in a V zone.
Table generated using 2012 Provincetown Assessing Data

21

Parcels & Buildings Vulnerable to Flooding – A Zone

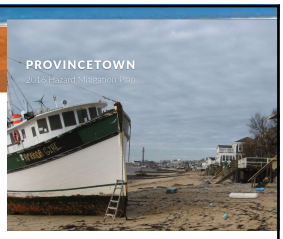
Flooding (A Zone)

Type of Use	Number of Parcels			Value of Buildings		
	# in town	# in Hazard area	% in Hazard Area	$ in town	$ in Hazard area	% in Hazard Area
Agriculture	1	1	100%	$41,100	$41,100	100%
Banks	2	1	50%	$2,102,300	$1,581,200	75%
Entertainment and Recreation	7	5	71%	$1,602,200	$1,602,200	100%
General Services	134	55	41%	$74,779,900	$31,115,100	42%
Heavy Industrial	3	0	0%	$443,100	$0	0%
Medical Office/Clinic	47	17	36%	$97,309,900	$48,941,700	50%
Multi-family Dwelling	808	194	24%	$868,840,700	$290,491,100	33%
Non-Profit/Municipal Offices	127	59	46%	$61,477,600	$31,361,800	51%
Parking (Commercial)	10	4	40%	$0	$0	0%
Personal/Repair Services	3	1	33%	$378,400	$67,100	18%
Retail Trade	47	26	55%	$24,001,100	$14,783,700	62%
Single Family Dwelling	915	231	25%	$271,541,800	$66,452,700	24%
Temporary Lodging	45	22	49%	$46,061,100	$27,321,300	59%
Theaters	1	1	100%	$1,267,200	$1,267,200	100%
Vacant	192	45	23%	$9,083,900	$8,100,100	89%
Wholesale Trade	10	6	60%	$3,075,700	$988,500	32%
COLUMN TOTALS:	2352	668		$1,462,006,000	$524,114,800	

Table 4.5| The proportion of buildings and value of buildings located in an A zone.
Table generated using 2012 Provincetown Assessing Data

22

Hazard Mitigation Plan – Actions



- Public education materials
- Zoning, regulatory, policy changes
- Detailed infrastructure vulnerability and risk assessments and improvement projects
- Monitor beach conditions, evaluate for stabilization/restoration
- Investigate underground electric transmission lines
- Improve NFIP CRS rating
- Collaboration with neighboring communities
- Communication, generator needs, shelter evaluation
- Additional storm sewers, improved drainage, flood proofing
- Major beach nourishment

23

Infrastructure Vulnerability Assessment

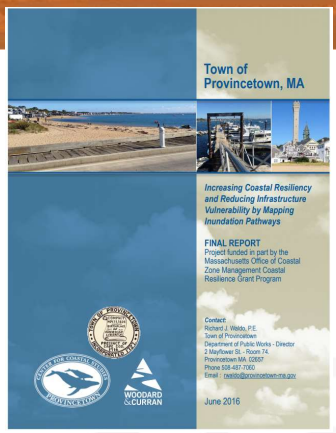
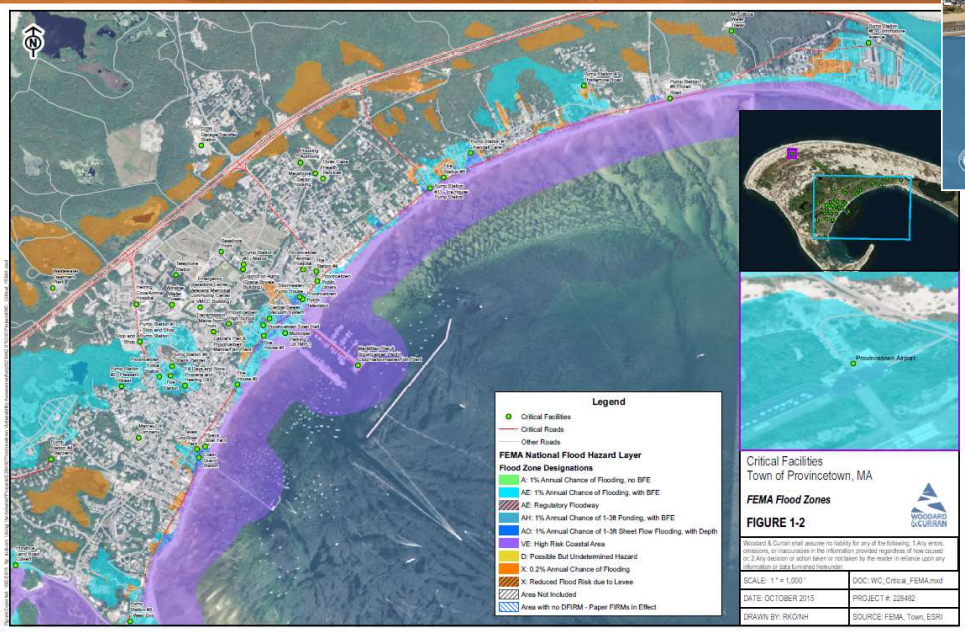


Table 1-2: Site Visit Observations/Themes

Topic	Details
Severe Weather	Due to the geography of Provincetown and its location at the tip of Cape Cod with water on three sides, the community is at risk due to natural hazard events. Impacts can be severe due to high winds and wind exposure, flooding and blowing sand. All south blowing storms are of the greatest concern.
Sand Management	Moving, removing, replacing and managing sand is a big effort for the Department of Public Works and is a unique challenge to Provincetown.
Power/Electric Service	There are power issues in general in Provincetown. The main feed to the community is from the Town of Truro (Truro).
Emergency Shelter	Provincetown has a shelter, but most likely in a serious emergency event, it would not be able to evacuate, resulting in a shelter in place situation. Other communities in the area, like Truro, may also use the shelter.
Flooding	Flooding occurs in Provincetown due to natural hazard events, but also due to drainage issues.
Transmission Mains from Truro – Critical	All water delivered to Provincetown comes from Truro. Water transmission mains, under 6A near Shore Road, could be impacted and if something happens to that roadway or the pipes underneath, Provincetown loses access to water. The water tower would only buy a minimal amount of time. A Category 2 or 3 storm could impact Shore Road.

24

Infrastructure Vulnerability Assessment



25

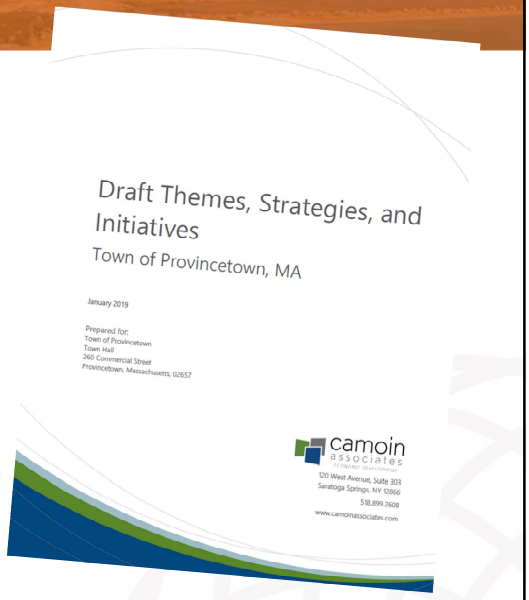
Infrastructure Vulnerability Assessment

- Critical facilities
  - Town Hall
  - Pump Stations
  - Coast Guard Station
  - VMCC Building
  - Fire Station
  - DPW Garage
  - Central Vac
  - MacMillan Pier
  - Water Transmission
  - Culverts
  - Route 6
- Recommendations focused:
  - Protecting natural systems/infrastructure
  - Include resilience in infrastructure maintenance
  - Address pump station vulnerability
  - Focus stormwater pipe improvements, inspections, and cleanings on areas of town that affect critical assets and are shown to be at high risk for flooding, etc.

26

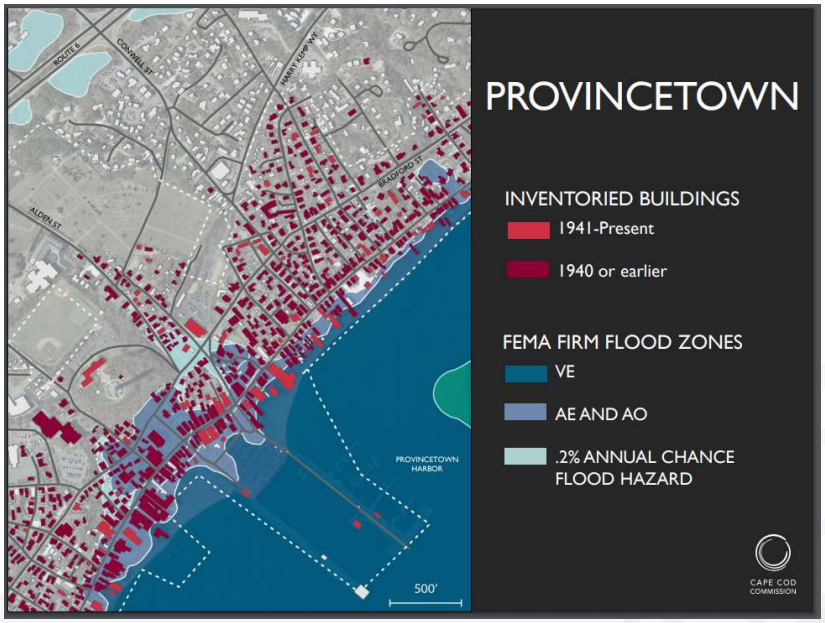
The Blue Economy

- "Economic activities that relate to oceans, seas and coasts…"
- Opportunities include fisheries and aquaculture, recreation, education and research
- Suggests creating a specific waterfront development master plan to dovetail with Local Comprehensive Plan
- Acknowledges the question of how climate change will impact the opportunities and investments

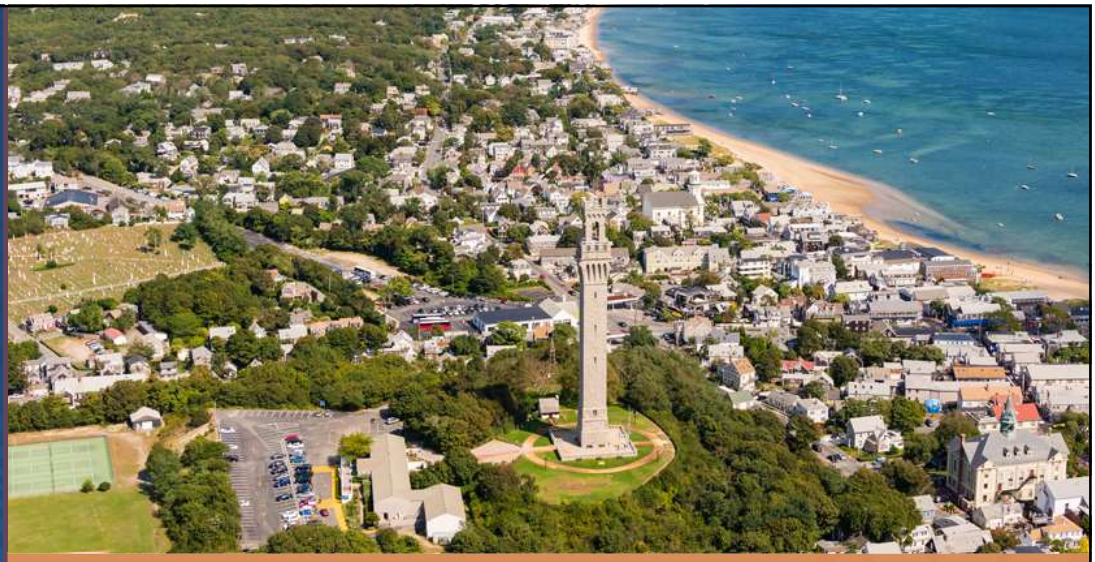


27

Historic District & Historic Buildings



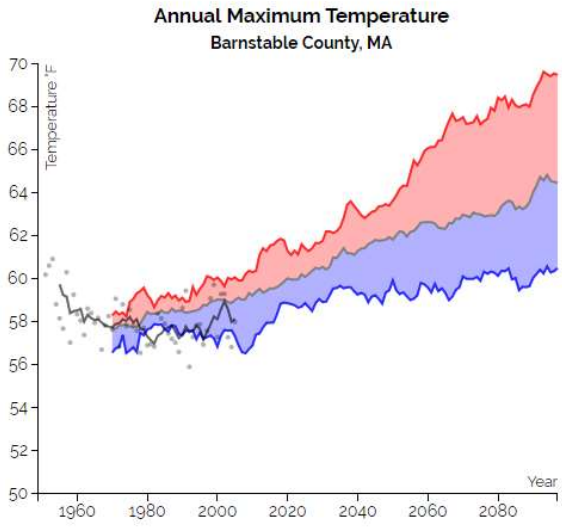
28



What About the Future?

29

Annual Maximum Temperature



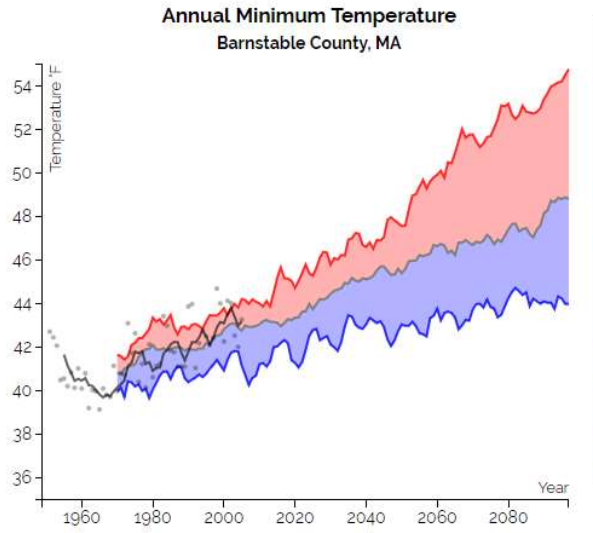
Observed	°F
5-yr Mean	
Modeled °F	
Max	
Median	
Min	
Changes from 1971-2000 for:	
2020 - 2049	3.40°F
2040 - 2069	4.55°F
2060 - 2089	5.30°F
2080 - 2097	5.95°F

resilient MA

NECSC Northeast Climate Science Center

30

Annual Minimum Temperature



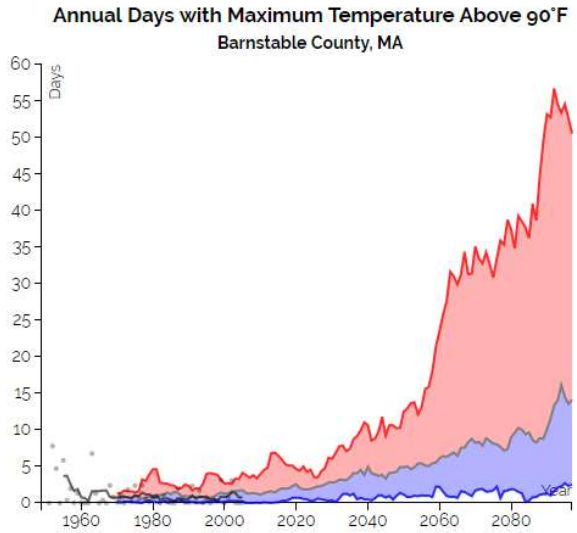
Observed	°F
5-yr Mean	
Modeled °F	
Max	
Median	
Min	
Changes from 1971-2000 for:	
2020 - 2049	2.96°F
2040 - 2069	4.11°F
2060 - 2089	4.93°F
2080 - 2097	5.69°F

resilient MA

NECSC Northeast Climate Science Center

31

Annual Days With Maximum Temperature Above 90



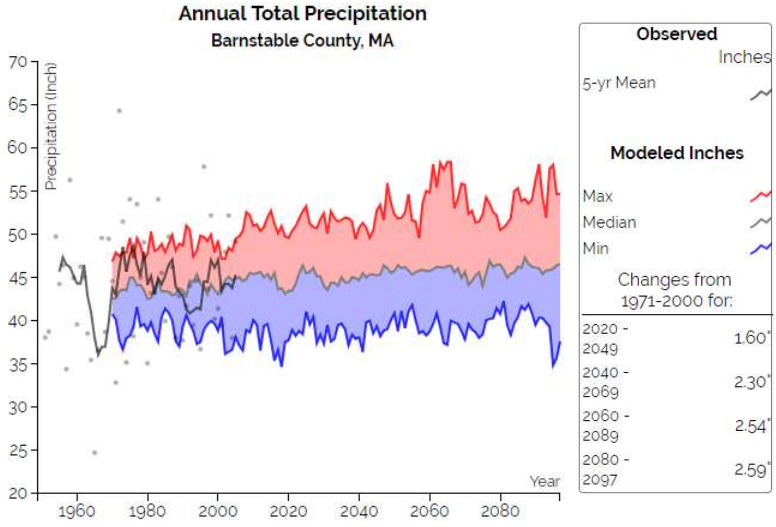
Observed	days
5-yr Mean	
Modeled days	
Max	
Median	
Min	
Changes from 1971-2000 for:	
2020 - 2049	2.86 days
2040 - 2069	4.70 days
2060 - 2089	7.85 days
2080 - 2097	9.68 days

resilient MA

NECSC Northeast Climate Science Center

32

Annual Total Precipitation

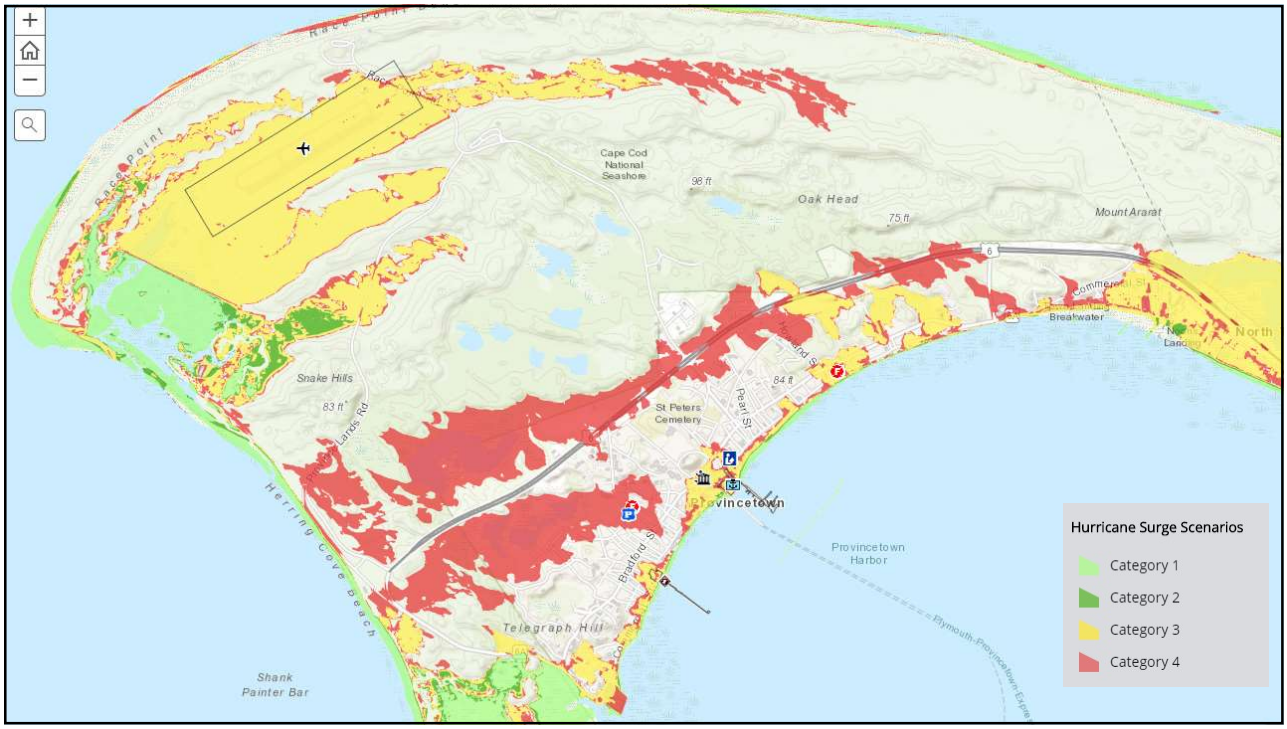


resilient MA

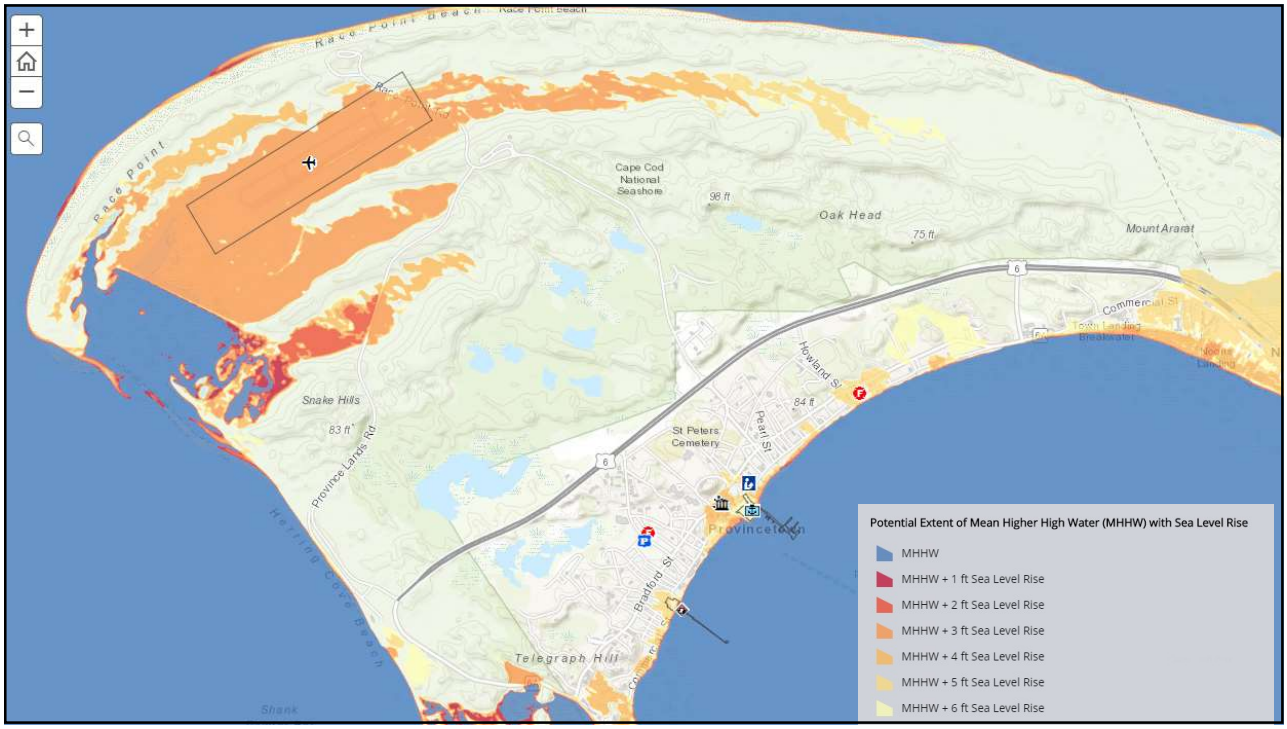
NECSC Northeast Climate Science Center

33

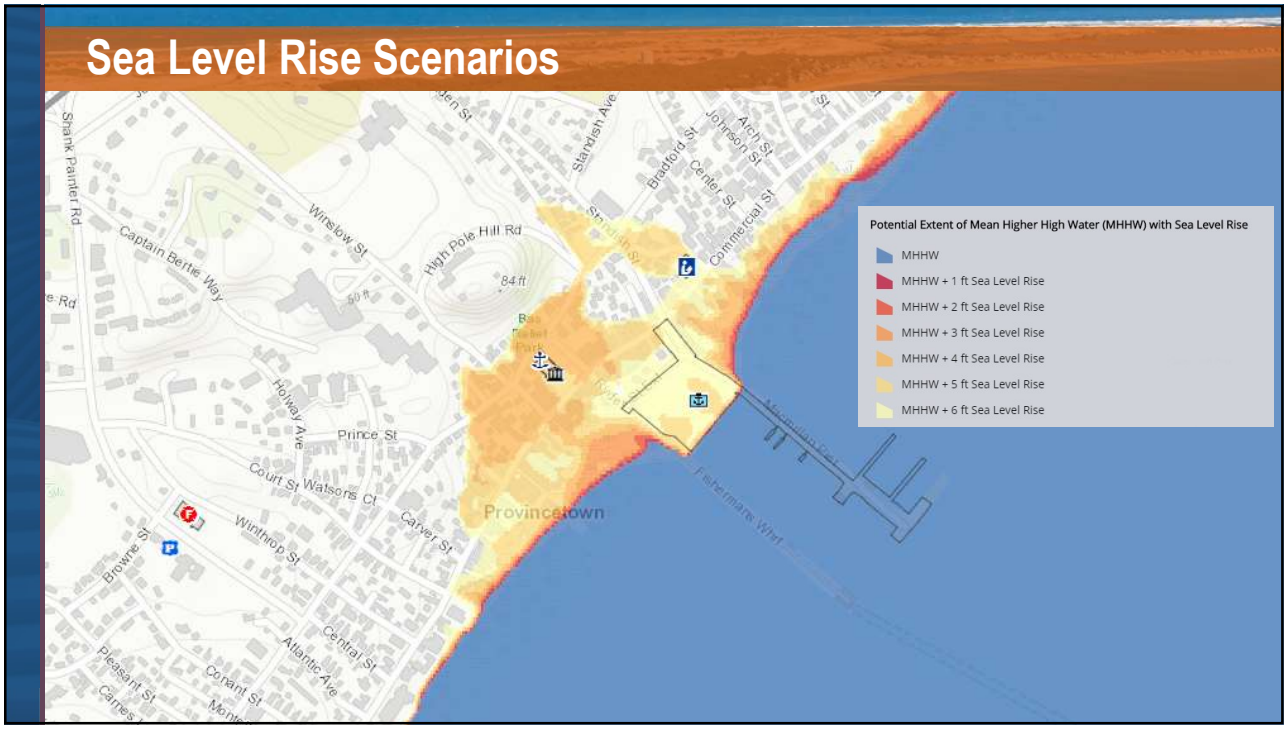
34


Race Point
Cape Cod National Seashore
98 ft
Oak Head
75 ft
Mount Ararat
Commercial St
Breakwater
North Landing
Snake Hills
83 ft
Province Lands Rd
St Peters Cemetery
84 ft
Pearl St
Howland St
Provincetown
Herring Cove Beach
Bradford St
Provincetown Harbor
Plymouth-Provincetown Ferry
Telegraph Hill
Shank Painter Bar
Hurricane Surge Scenarios
Category 1
Category 2
Category 3
Category 4

35


Race Point
Cape Cod National Seashore
98 ft
Oak Head
75 ft
Mount Ararat
Commercial St
Breakwater
Snake Hills
83 ft
Province Lands Rd
St Peters Cemetery
84 ft
Pearl St
Howland St
Provincetown
Herring Cove Beach
Bradford St
Telegraph Hill
Potential Extent of Mean Higher High Water (MHHW) with Sea Level Rise
MHHW
MHHW + 1 ft Sea Level Rise
MHHW + 2 ft Sea Level Rise
MHHW + 3 ft Sea Level Rise
MHHW + 4 ft Sea Level Rise
MHHW + 5 ft Sea Level Rise
MHHW + 6 ft Sea Level Rise

36


Sea Level Rise Scenarios
Potential Extent of Mean Higher High Water (MHHW) with Sea Level Rise
MHHW
MHHW + 1 ft Sea Level Rise
MHHW + 2 ft Sea Level Rise
MHHW + 3 ft Sea Level Rise
MHHW + 4 ft Sea Level Rise
MHHW + 5 ft Sea Level Rise
MHHW + 6 ft Sea Level Rise
Provincetown
Prince St
Court St
Watsons Ct
Winthrop St
Carver St
Commercial St
Bradford St
Center St
Johnson St
Arch St
Stanley St
Stardish Ave
High Pole Hill Rd
Winslow St
Captain Bertie Way
Shank Painter Rd
Holway Ave
Browne St
Central St
Atlantic Ave
Conant St
Pleasant St
Fishermans Wharf
84 ft
50 ft

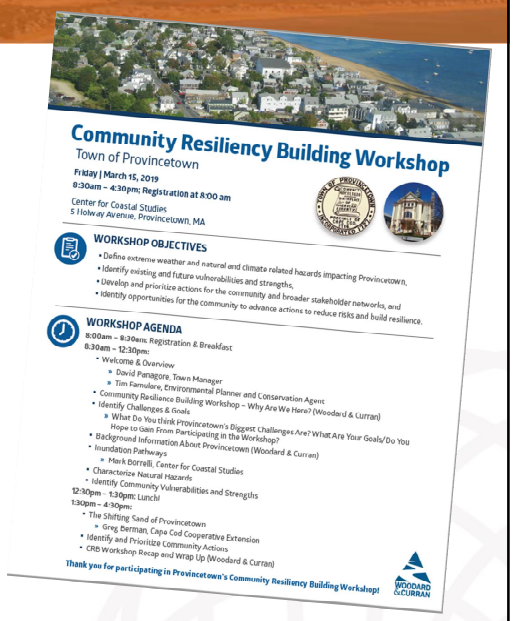
37


What Can We Do?
WOODARD &CURRAN

38

Today, we will work together to….

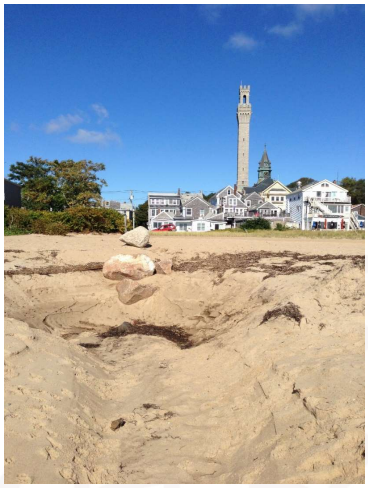
- Understand connections between ongoing community issues, climate change, natural hazards and local planning and actions
- Understand how climate change will exacerbate or lead to new community issues, hazards and challenges
- Identify infrastructural, societal, environmental vulnerabilities and strengths that help Provincetown become more resilient
- Explore nature-based solutions to build resiliency
- Develop and prioritize actions that delineate next steps for the community
- Identify how Provincetown can advance actions to reduce risks and impacts of climate change and increase local and regional resilience


Community Resiliency Building Workshop
Town of Provincetown
Friday | March 15, 2019
8:30am – 4:30pm; Registration at 8:00 am
Center for Coastal Studies
5 Holway Avenue, Provincetown, MA
WORKSHOP OBJECTIVES
• Define extreme weather and natural and climate related hazards impacting Provincetown,
• Identify existing and future vulnerabilities and strengths,
• Develop and prioritize actions for the community and broader stakeholder networks, and
• Identify opportunities for the community to advance actions to reduce risks and build resilience.
WORKSHOP AGENDA
8:00am – 8:30am: Registration & Breakfast
8:30am – 12:30pm:
• Welcome & Overview
» David Panagore, Town Manager
» Tim Famolare, Environmental Planner and Conservation Agent
• Community Resilience Building Workshop – Why Are We Here? (Woodard & Curran)
• Identify Challenges & Goals
» What Do You think Provincetown's Biggest Challenges Are? What Are Your Goals/Do You Hope to Gain From Participating in the Workshop?
• Background Information About Provincetown (Woodard & Curran)
• Inundation Pathways
» Mark Borrelli, Center for Coastal Studies
• Characterize Natural Hazards
• Identify Community Vulnerabilities and Strengths
12:30pm – 1:30pm: Lunch
1:30pm – 4:30pm:
• The Shifting Sand of Provincetown
» Greg Berman, Cape Cod Cooperative Extension
• Identify and Prioritize Community Actions
• CRB Workshop Recap and Wrap Up (Woodard & Curran)
Thank you for participating in Provincetown's Community Resiliency Building Workshop!
WOODARD & CURRAN

39

Recent Efforts

- Provincetown has been actively working on addressing climate change impacts through the following projects and planning activities:
  - FEMA Approved Hazard Mitigation Plan (2016)
  - Increasing Coastal Resiliency and Reducing Infrastructure Vulnerability by Mapping Inundation Pathways (2016)
  - Coastal Zone Management Grant for Ryder Street Beach Dune Enhancement – supported at Spring 2018 Town Meeting with a $200,000 CIP line item for beach nourishment projects
  - Held community dialogue session in 2018 to discuss recent flooding events and flood insurance options and requirements
  - Seeking out other grant funding opportunities to advance needed resiliency projects such as the Ryder Street Outfall
  - Installed a tide gauge to closely monitor daily tide levels
  - Municipal Vulnerability Preparedness Planning Grant



40

Recent Efforts

- Town just purchased a waterfront lot currently used as commercial parking. There will be improvements made to the property
- Current purchase and sale agreement for a wooded lot off Bradford Street that abuts the Old Colony Nature Trail
- Health Director is introducing a revolving fund for residents to create rain gardens… using rain water for your home and to keep water off Commercial Street
- Beach Nourishment at Court Street (winter 2019)
- Town is hiring a part-time Emergency Management Director

41

Environmental Planner & Conservation Agent

- Ryder Street Beach Dune Enhancement
  - More dune enhancement, monitoring and maintain
- Leverage Hazard Mitigation Plan & Infrastructure Vulnerability Assessment & Harbor Plan
- Community battery at transfer station to improve reliability of electrical infrastructure
- Enhance natural shoreline areas
- Shank Painter Pond Floodplain - how much flooding is coastal and how much is precipitation/groundwater?

42

Harbormaster

- Continued focus on natural infrastructure solutions
  - Long term sand supply is needed
- Need to educate year round and seasonal residents about all of these issues – a constantly changing group of people
- Quantify economic value of the harbor with Cape Cod Commission
- Increased precipitation, increased runoff, increased pollutants into the harbor resulting in water quality impacts
- Infrastructure impacts from storms and flooding like sewer lines and pump out facilities could impact water quality
- Dredging MacMillan Wharf

Potential Mitigation Measures

- Living Shorelines
- Natural infrastructure solutions need sand – identify/permit a ready source of sand and have it available to help create solutions
- Deal with stormwater draining from outfall pipes at high tide
- Sand impacts to outfall pipes – need a long term solution

43

DPW Director

- Coastal flooding an issue but also drainage system and low lying areas being impacted by high groundwater table
- 6A inundation could disrupt the water supply line – run a redundant pipe up Route 6?
- Enhance natural shoreline areas
- Central Vac – concern over inundation

Potential Mitigation Measures

- Emergency water connection needed and water supply redundancy
- Reinforce 6A at Snail Road – oyster reef to build up sand
- Accelerate pump station resiliency projects
- Address Central Vac - redundant effluent pipe? Relocate?
- Enhance natural shoreline areas
- Outfall pipes need to be improved
- Hydrologic & Hydraulic study for Commercial Street, Ryder Street outfall to identify solution
- East End storm drains are in disrepair – need to evaluate condition and improve
- Emergency response plan for DPW deployment – priority areas and flood control

44

Town Planner

- Housing & Economic Development are big challenges and opportunities
- Historic Character of the community is beloved and critical to Provincetown (511 historic homes in floodplain)
- Shank Painter – commercial corridor, Town facilities, municipal properties for housing, groundwater issues
- Fishing, the arts, tourism
- Highly valued second home market
- Need to protect Commercial Street
- Natural infrastructure solutions/dunes

Potential Mitigation Measures

- Incorporate climate change into LCP
- Budget for climate change initiatives and projects
- Need to determine a long term, community wide solution
- Quantify long term value of Provincetown to justify large scale, long term solutions
- Shank Painter – develop solution for this area
- Historic District – develop plan and solutions for this area

45

Department of Health

- Focus on winter storm sheltering
  - Current shelter has access challenges during winter storms
- Emergency access, egress and evacuation are concerns
- Vulnerable populations (long term care facility, older residents)
- Communications – frequently experience problems that results in using police dispatch to communicate needs to the County/Coordinating Agency
- Provincetown is making efforts to move away from septic systems to protect groundwater

Potential Mitigation Measures

- Cooling Center
- Designate Library as Warming Center (needs a generator)
- Additional Emergency Management Planning and Exercises
- Shelter in need of a new generator (currently money allocated for this)

46

Council on Aging

- Barnstable County has the oldest population in the country
- Over 70% of the population is 45 or older compared to 43% of Massachusetts as a whole
- Power outages a concern
- Shelter capacity during peak season
- Ability to adequately staff the shelter during a storm event
- Evacuation routes

Outreach Measures

- Are you, your friends, your neighbors signed up for the Town Alert system – emergency messages issued by Town Manager?
- Storm reassurance program – calls from COA prior to an event
- Special Assistance Form – maintained by Police Department for those who may need help during an emergency

47

Conserve, Integrate, Restore

- **Conserve** the natural green infrastructure already providing free ecosystem services
- **Integrate** Low Impact Development and green infrastructure design into development
- **Restore** the resiliency of landscapes through LID

48

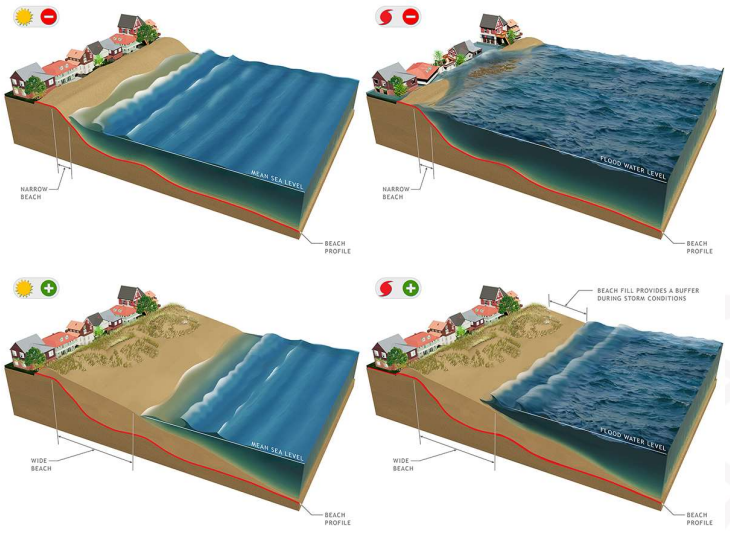
Nature Based Solutions

- 96% of the total US population lives in counties where federally-declared, weather-related disasters have occurred since 2010
- One of the best adaptation practices is preserving natural areas
- Nature-based solutions provide multiple benefits, and a higher return on investment with flood risk reduction strategies

49

Nature Based Solutions

- Restore or protect wetland areas to reduce impact of flooding
- Restore and manage saltmarshes, wetland, beaches and oyster reefs that form a natural buffer between sea and land which reduces wave intensity and prevents erosion



50

Living Shorelines

- Concept is cost–effective and quickly gaining popularity.
- Broad term that includes range of shoreline stabilization techniques with a footprint that is made up mostly of native material, and incorporates vegetation or other living elements alone or in combination with some type of harder shoreline structure for stability (oyster reef).
- Maintain continuity of the natural land-water relationship and reduce erosion while providing habitat value and enhancing coastal resilience.

51

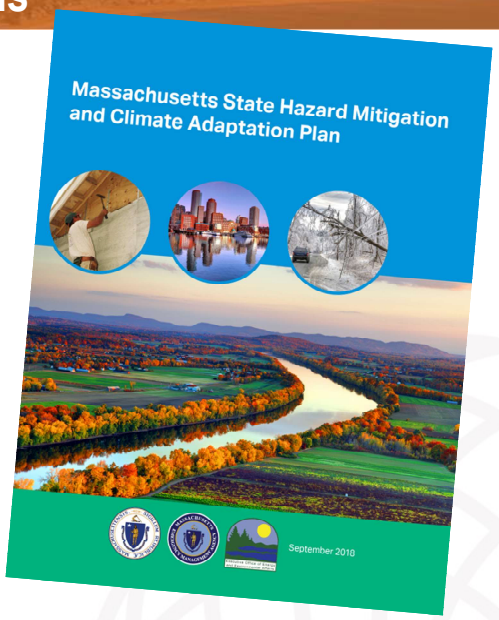
Green Infrastructure & Low Impact Development

- **Green Infrastructure**
  - Incorporates natural features such as floodplains, forests, wetlands, and buffer areas
  - Refers to a designed landscape that puts natural systems to work like soil and vegetation and mimics those natural processes
- **Low Impact Development**
  - Category of green infrastructure that works with nature to manage stormwater and decrease the impact of development on surface and groundwater

52

Nature Based Solutions – State Focus

- State hazard mitigation and climate adaptation strategy focuses on nature based solutions
- For implementation of certain State grant or State administered grant programs – emphasis is or may be placed on projects that outline a nature based solution



53

MVP Action Grant

- Projects that **build resilience**, are **proactive** and clearly demonstrate efforts to redesign, re-evaluate, or reconsider and **incorporate new climate change** data.
- Projects are encouraged to utilize **nature-based strategies** to address climate change impacts.
- **Many of these projects might also be funded through existing grant programs (**Dams and Seawalls, CZM Coastal Resiliency, DER's Culvert Replacements, MEMA)

54

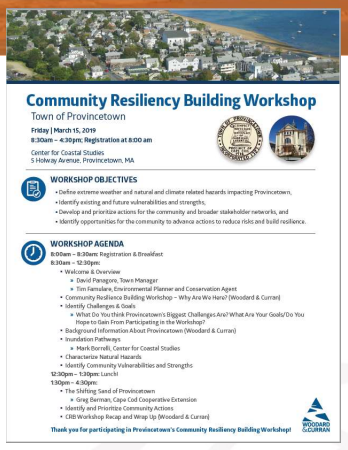
But What Can I Do?

- Be an MVP community – participate, tell your neighbors, friends and colleagues about it!
- Talk to neighbors, friends, local board members and others in the community about Climate Change
- Make your vote count!
- Incorporate Climate Change and nature based solutions into all of your local and regional plans – including the LCP

55

Agenda

- **8:00 – 8:30 | Registration**
- **8:30 – 12:30**
  - **Welcome & Overview**
  - **CRB Workshop Why Are We Here?**
  - **Identify Challenges & Goals**
  - **Background Information About Provincetown**
  - **Inundation Pathways, Mark Borrelli, Center for Coastal Studies**
  - Characterize Natural Hazards
  - Identify Community Vulnerabilities & Strengths
- **12:30 – 1:30 | LUNCH!**
- 1:30 – 4:30
  - The Shifting Sand of Provincetown, Greg Berman, **Cape Cod Cooperative Ext.**
  - Identify & Prioritize Community Actions
  - CRB Workshop Recap & Wrap Up


Community Resiliency Building Workshop
Town of Provincetown
Friday | March 15, 2019
8:30am – 4:30pm; Registration at 8:00 am
Center for Coastal Studies
5 Holway Avenue, Provincetown, MA
WORKSHOP OBJECTIVES
WORKSHOP AGENDA
Thank you for participating in Provincetown's Community Resiliency Building Workshop!

56

Provincetown, MA
Community Resiliency Building Workshop

March 15, 2019

57

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.com

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S					Priority H - M - L	Time Short Long Ongoing
Infrastructural									
Societal									
Environmental									

58

Individual Homeowners – Adaptive Measures

Elevation – Raising your home so that the lowest floor or lowest horizontal member is at or above the regulated flood level. You can accomplish this in several ways. (Chapter 5)

Relocation – Moving your home to higher ground where it will reduce the exposure to flooding. (Chapter 6)

Demolition – Tearing down your damaged home and either rebuilding on the same property or buying or building a home elsewhere. (Chapter 6)

Wet Floodproofing – Making portions of your home resistant to flood damage and allowing water to enter during flooding. (Chapter 7)

Dry Floodproofing – Sealing your home to prevent floodwaters from entering. (Chapter 7)

Barrier Systems – Building a floodwall or levee around your home to restrain floodwaters. (Chapter 8)

Source: FEMA, "An Overview of Retrofitting Methods", https://www.fema.gov/media-library-data/1404149230242-8f5a97a5d9aa426b83e3fef354e8ffa8/FEMA_P312_Chap_3.pdf

59

Considerations for Provincetown

- **Non-Structural**
  - Acquisition & Relocation
  - Building Retrofits
  - Enhanced Floodwarning & Evacuation Planning
  - Land Use Management, Zoning
  - Flood Insurance
- **Structural**
  - Floodwalls
  - Deployable Floodwalls
  - Levees
  - Seawalls
  - Revetments
  - Bulk Heads
  - Storm Surge Barriers
- **Nature Based**
  - Beach Restoration
  - Breakwaters
  - Drainage Improvements
  - Living Shorelines
  - Reefs
  - Submerged Aquatic Vegetation
  - Wetlands

60

Sea Level Rise Impacts on Groundwater Systems

- Water quality reduction
- Infrastructure failure
- Ecosystem changes
- Intrusion of saltwater into groundwater systems can impact coastal ecosystems such as marshes by changing the elevation of the freshwater-saltwater interaction
- Potential adverse effect of sea level rise on the depth to the freshwater-saltwater interaction near public groundwater supply wells
- Public-supply can potentially be impacted by saltwater intrusion, and limit the amount of potable water available from the well

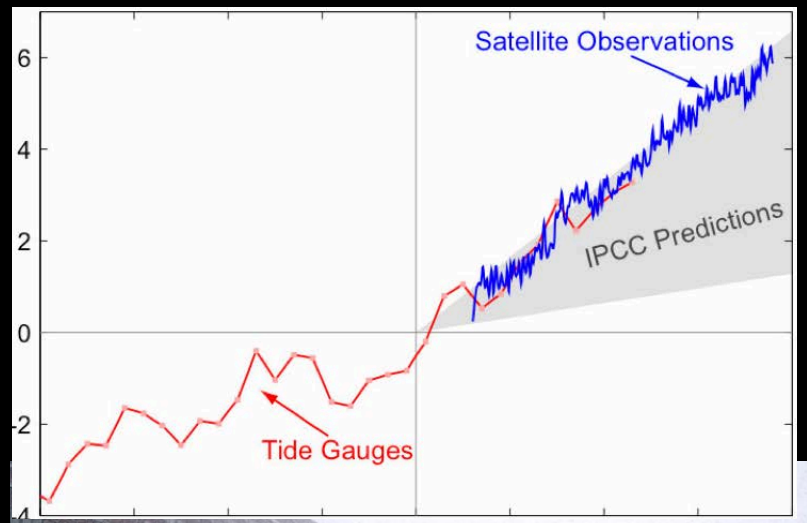
Potential Mitigation Measures

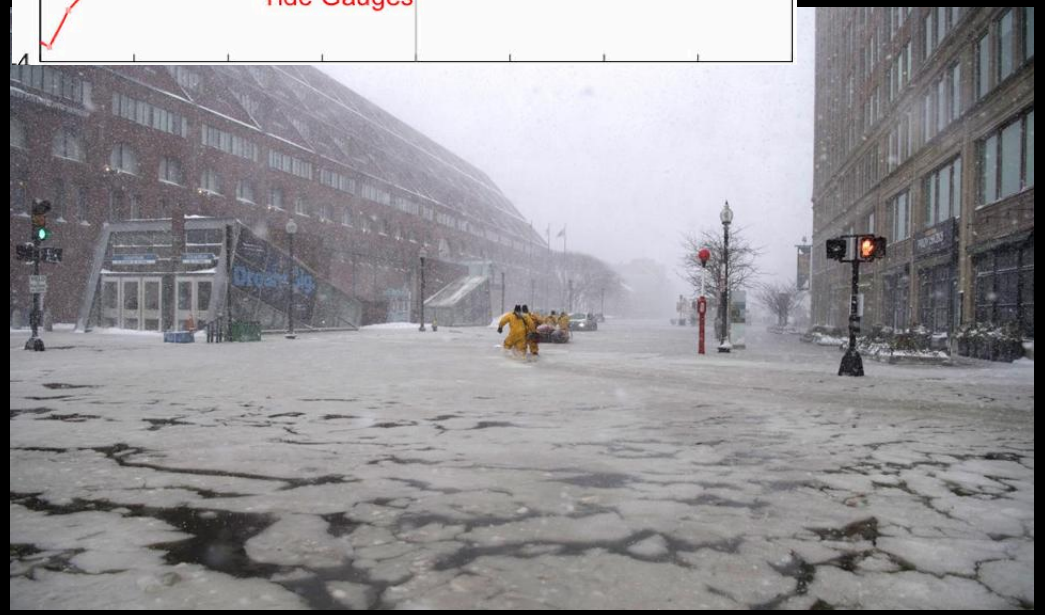
- Plan for impacts on water quality
- Management of stormwater, wastewater and infrastructure
- Protecting and restoring natural surface drainage systems (streams, ponds)
- Coordination and communication with Town of Truro

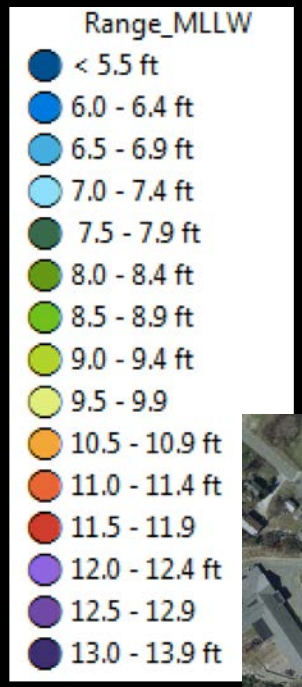
61

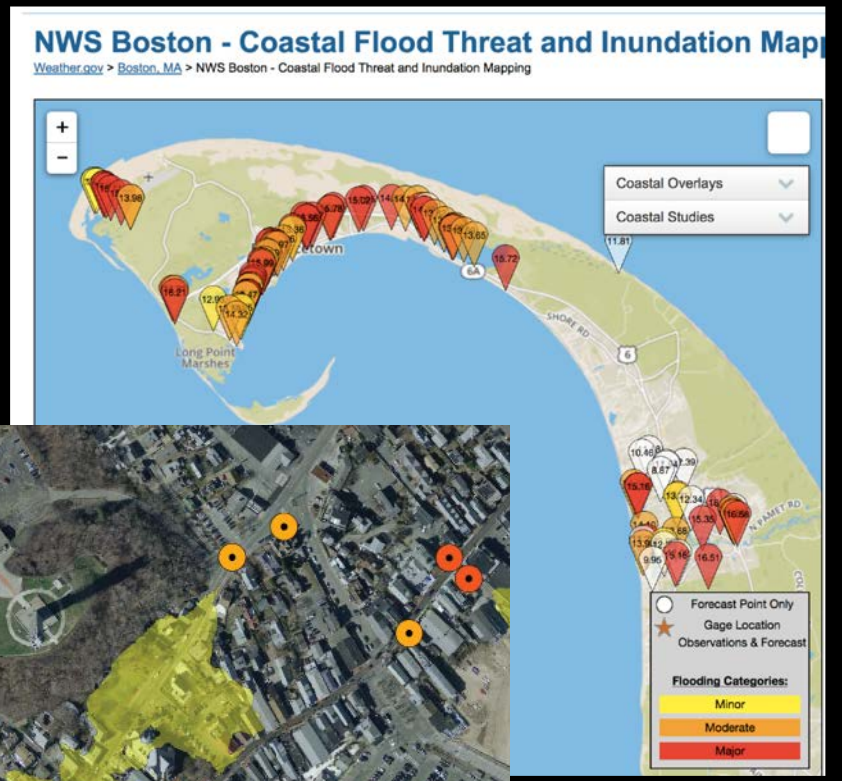
Community Resiliency Building Workshop: Provincetown, MA

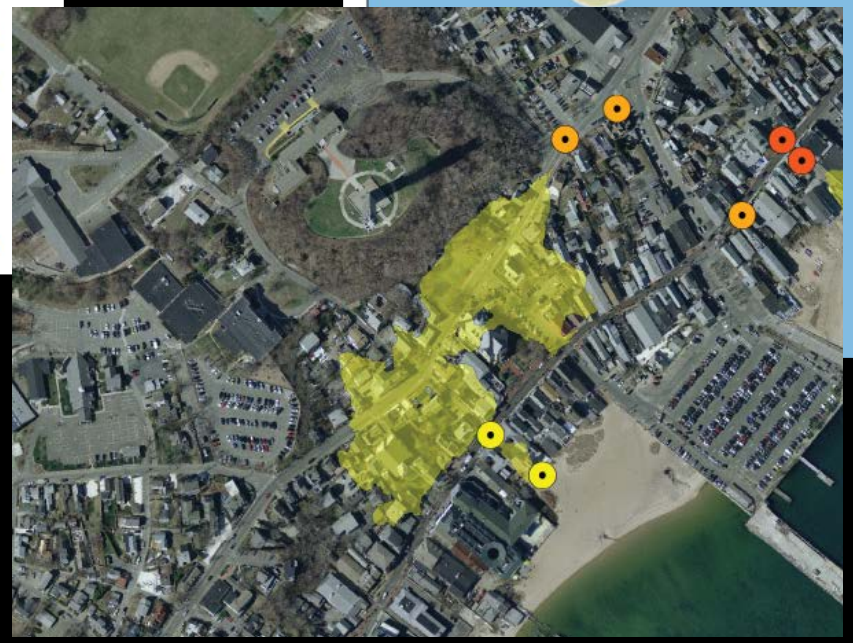
Storms, Sea Level Rise and Mapping Inundation Pathways











Center for Coastal Studies
Marine Geology

CAPE Lab
The Coastal Processes and Ecosystems Laboratory

The University of Massachusetts, Boston
School for the Environment

Talk Outline

- Tidal Flooding: '*Nuisance Flooding*' '*Sunny Day Flooding*'
- Storms
- Sea Level Rise
- Mapping Storm Tide Pathways

Nov 3, 2015

"King Tide" Brings Record Sea Level Rise to Boston's Waterfront

http://www.climatesignals.org

October 24, 2016

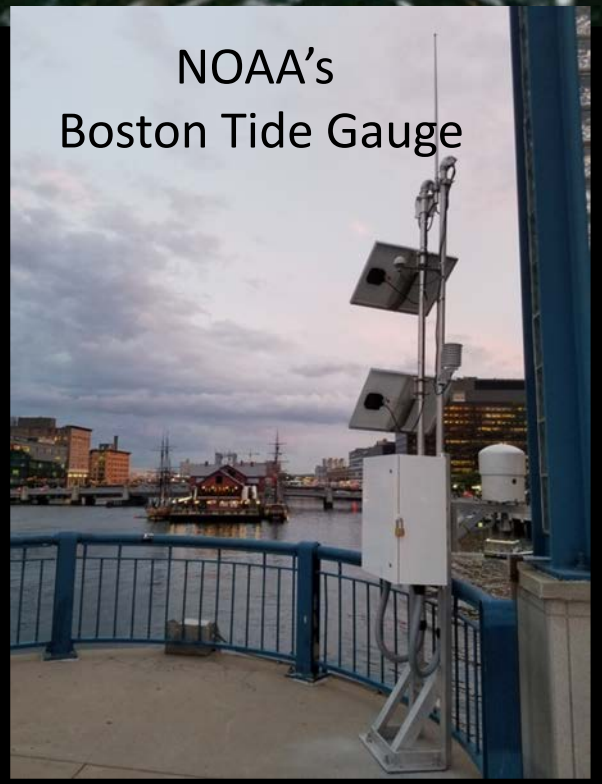
King Tide's Gift: Gentle Awakenings to a Rapidly Changing World

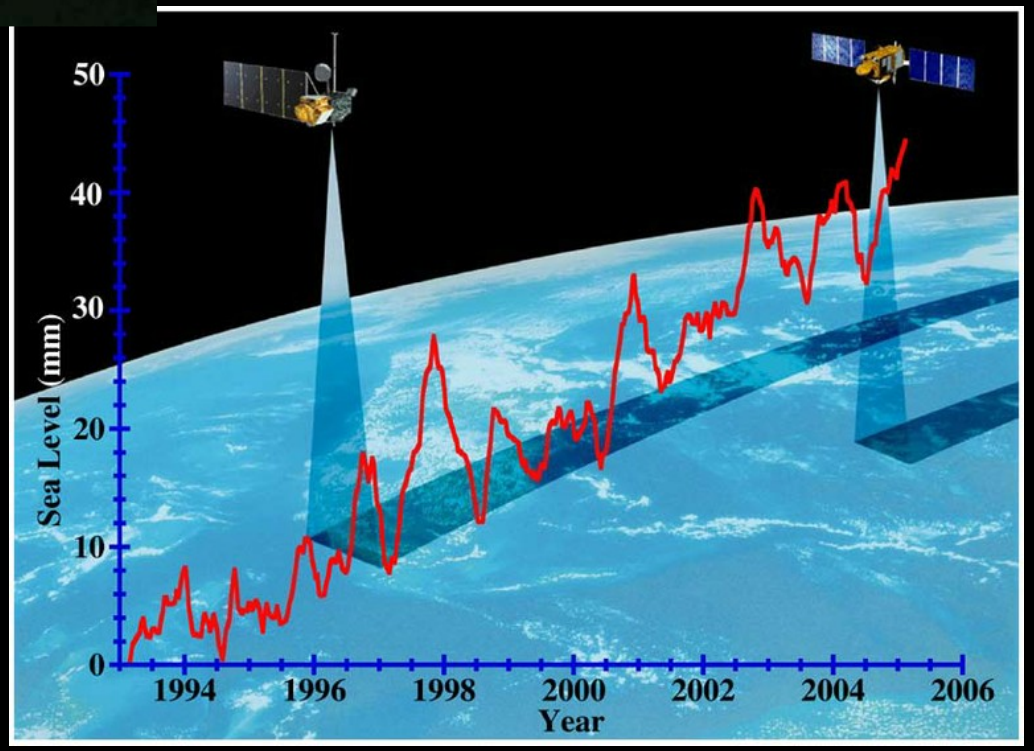
Union of Concerned Scientists

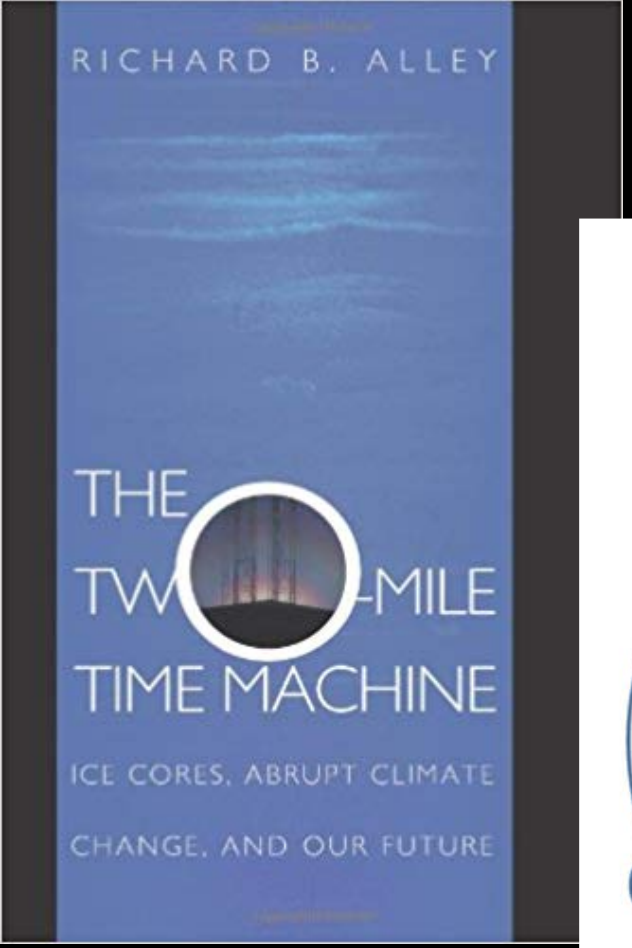
Dec 05 2017
Perigean tide flooding the Chart House patio on Long Wharf in Boston, WBZ, Boston

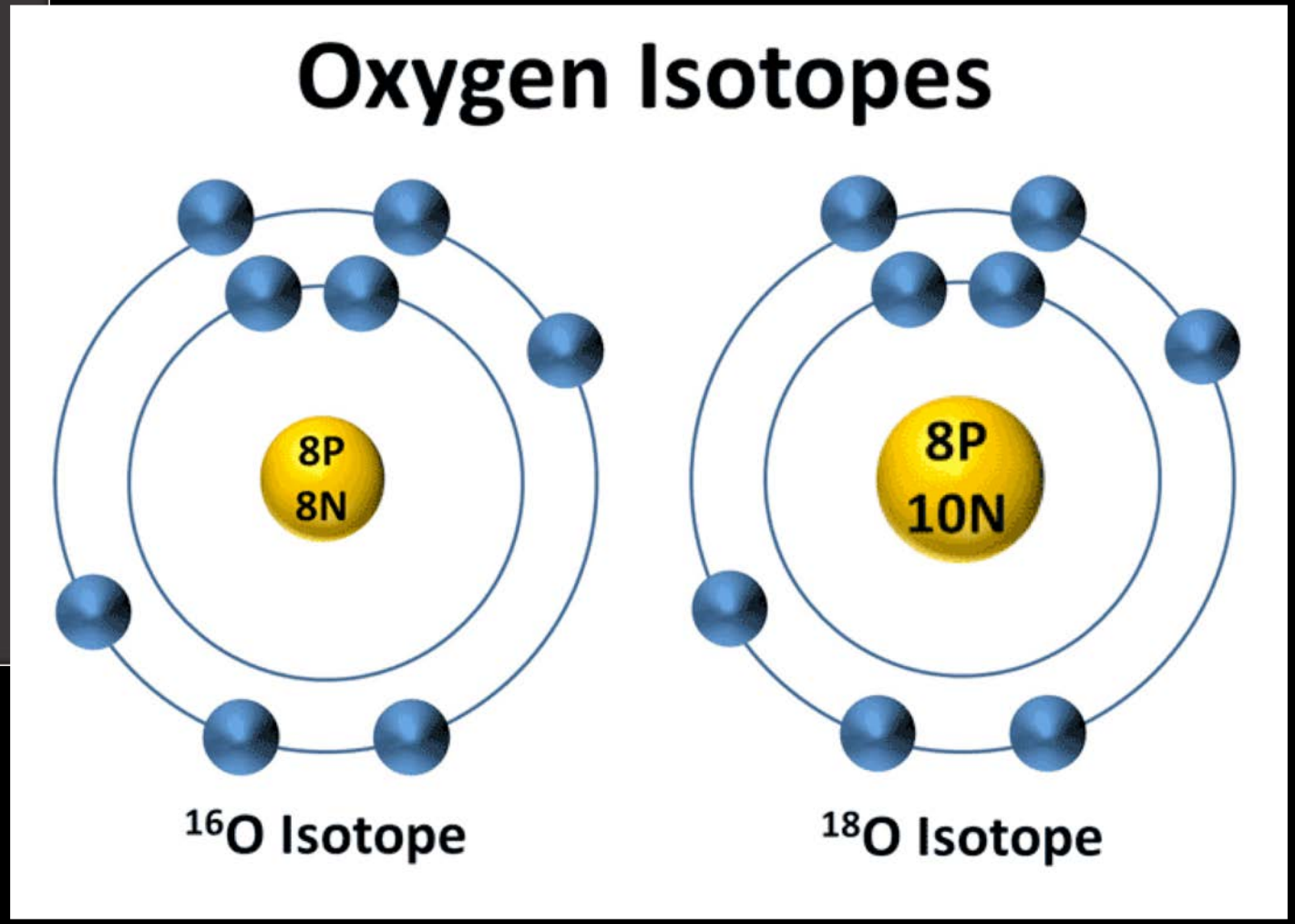
Sea Level Rise

Direct vs. Proxy measurements

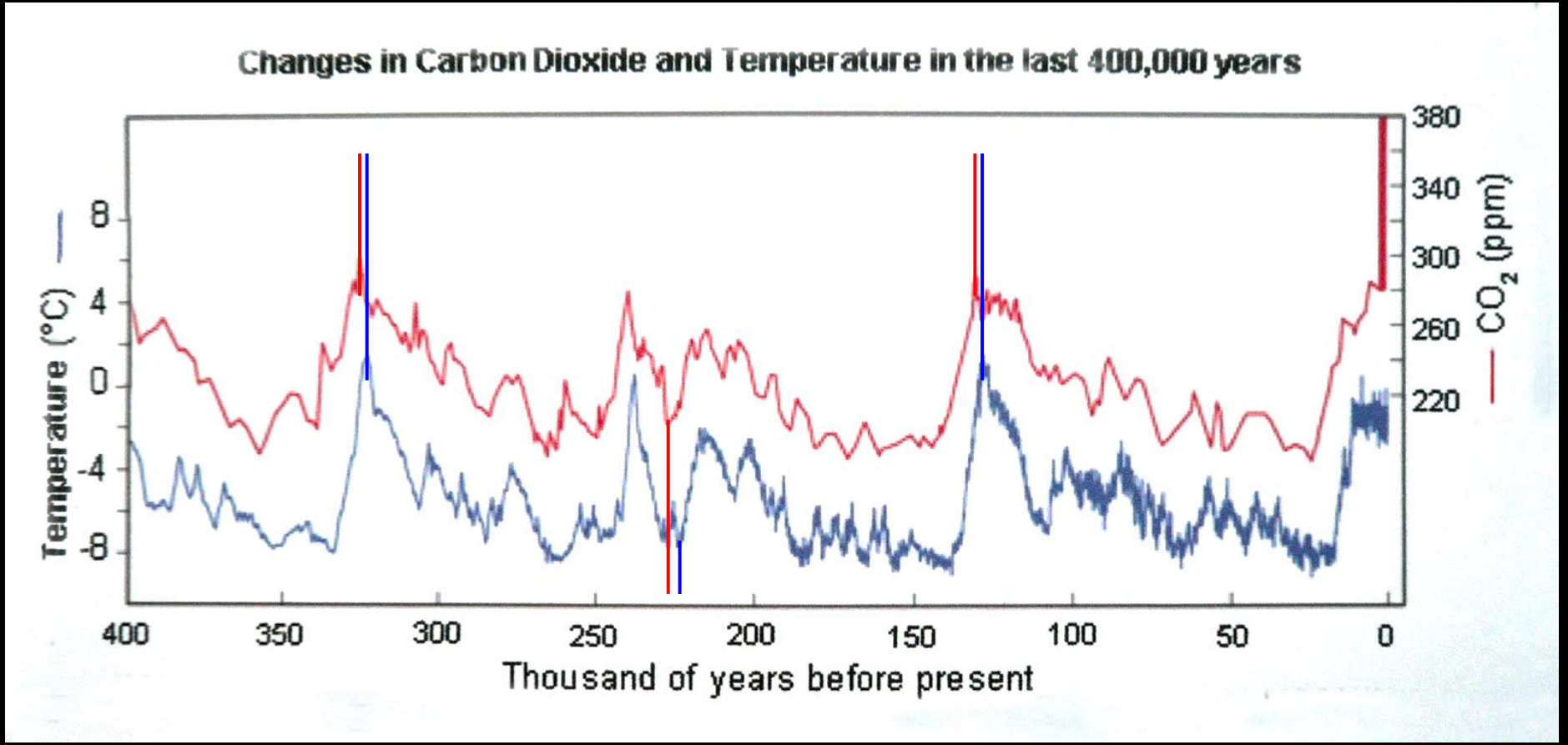


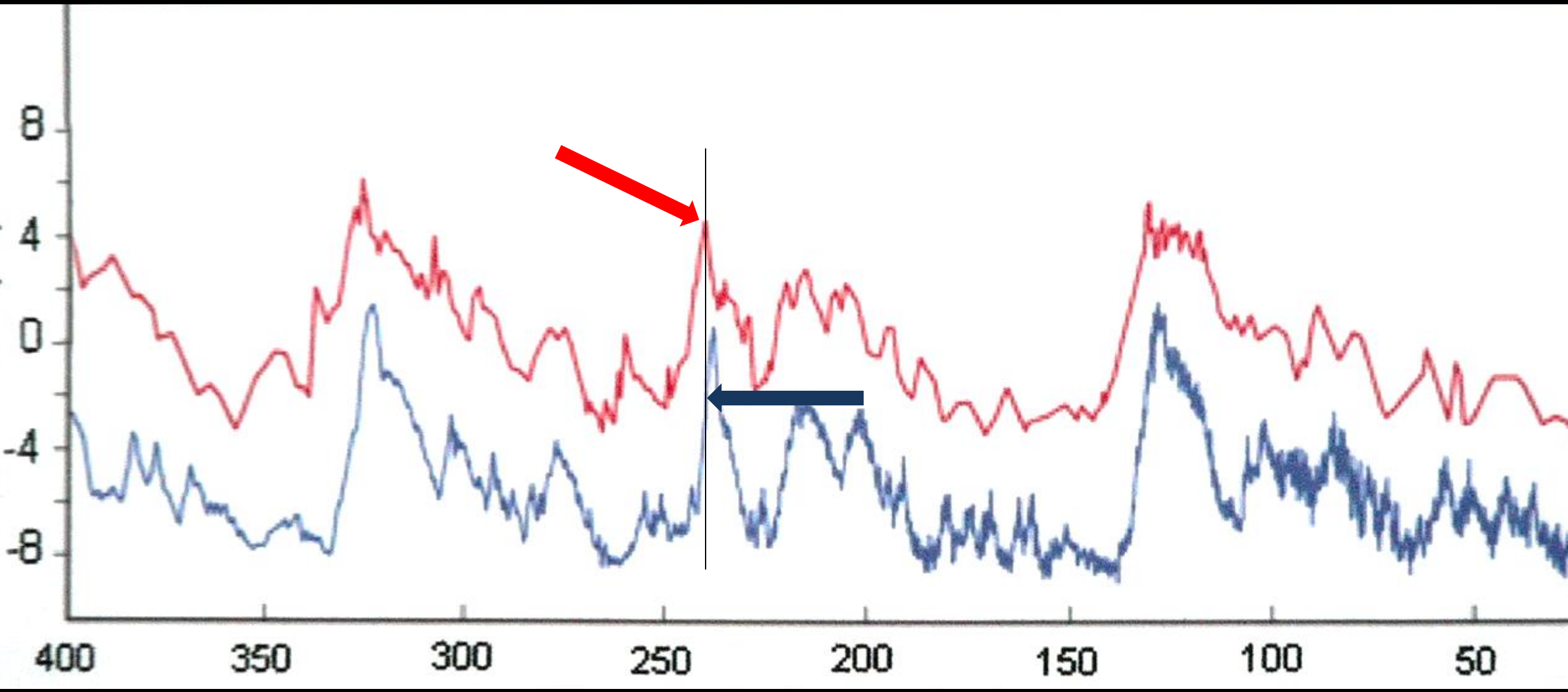


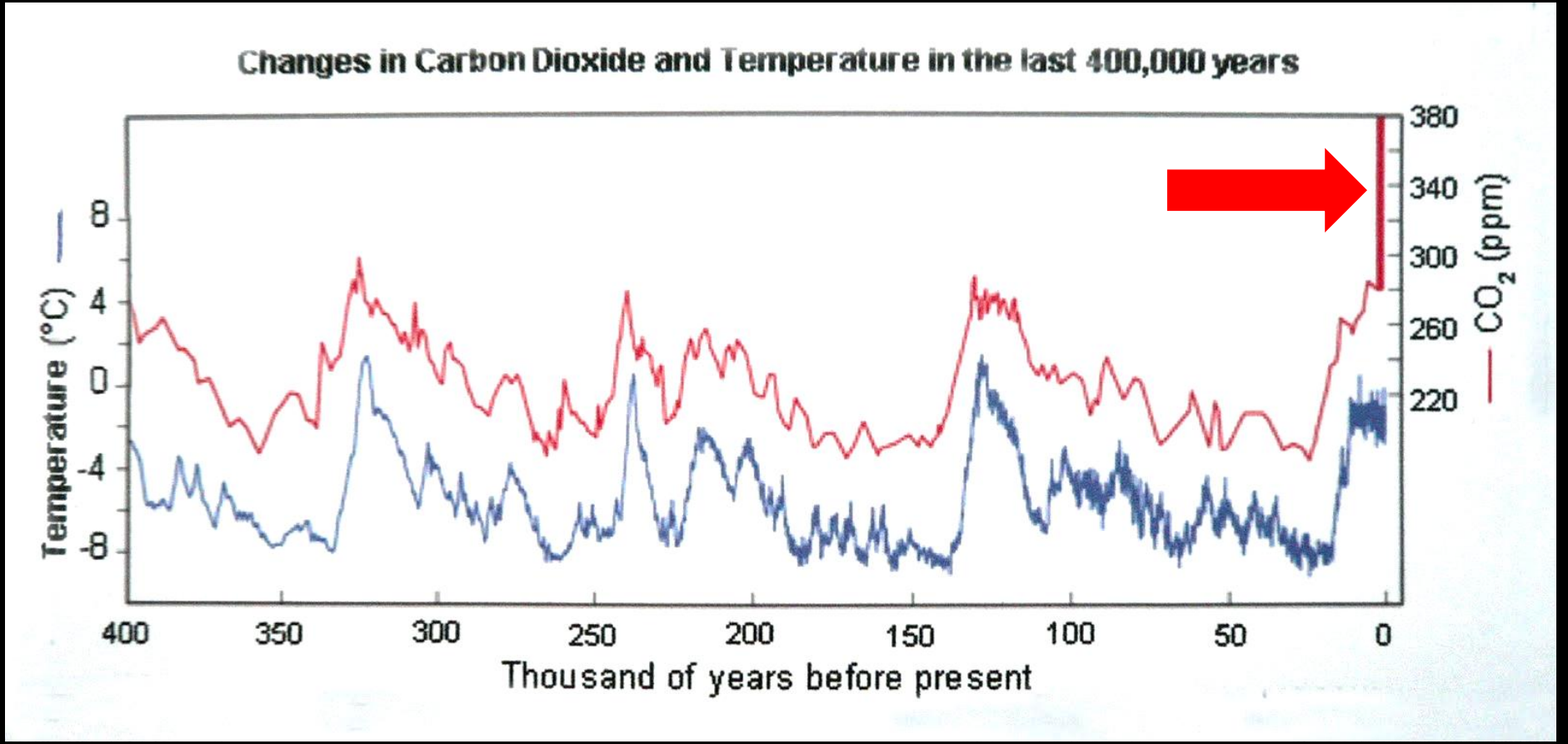

RICHARD B. ALLEY
THE TWO-MILE TIME MACHINE
ICE CORES, ABRUPT CLIMATE CHANGE, AND OUR FUTURE

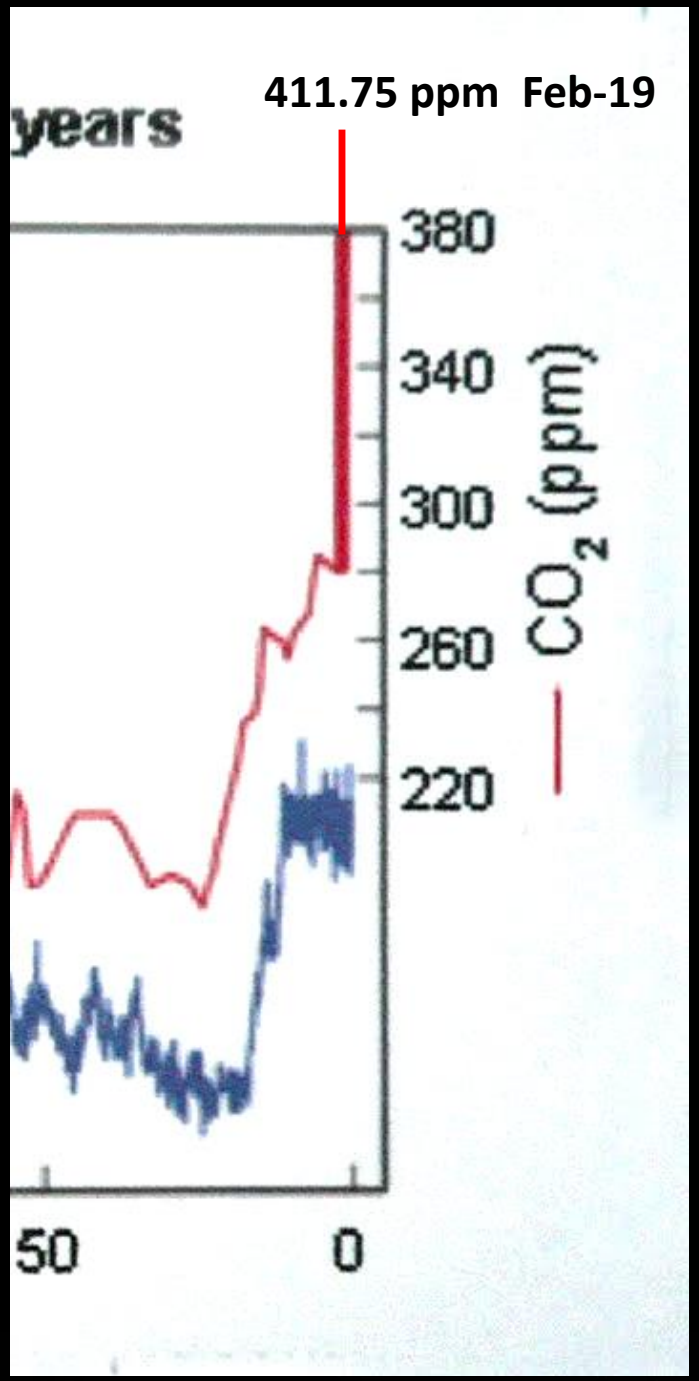

Oxygen Isotopes
8P
8N
16O Isotope
8P
10N
18O Isotope

CO_2 and Global Temperatures



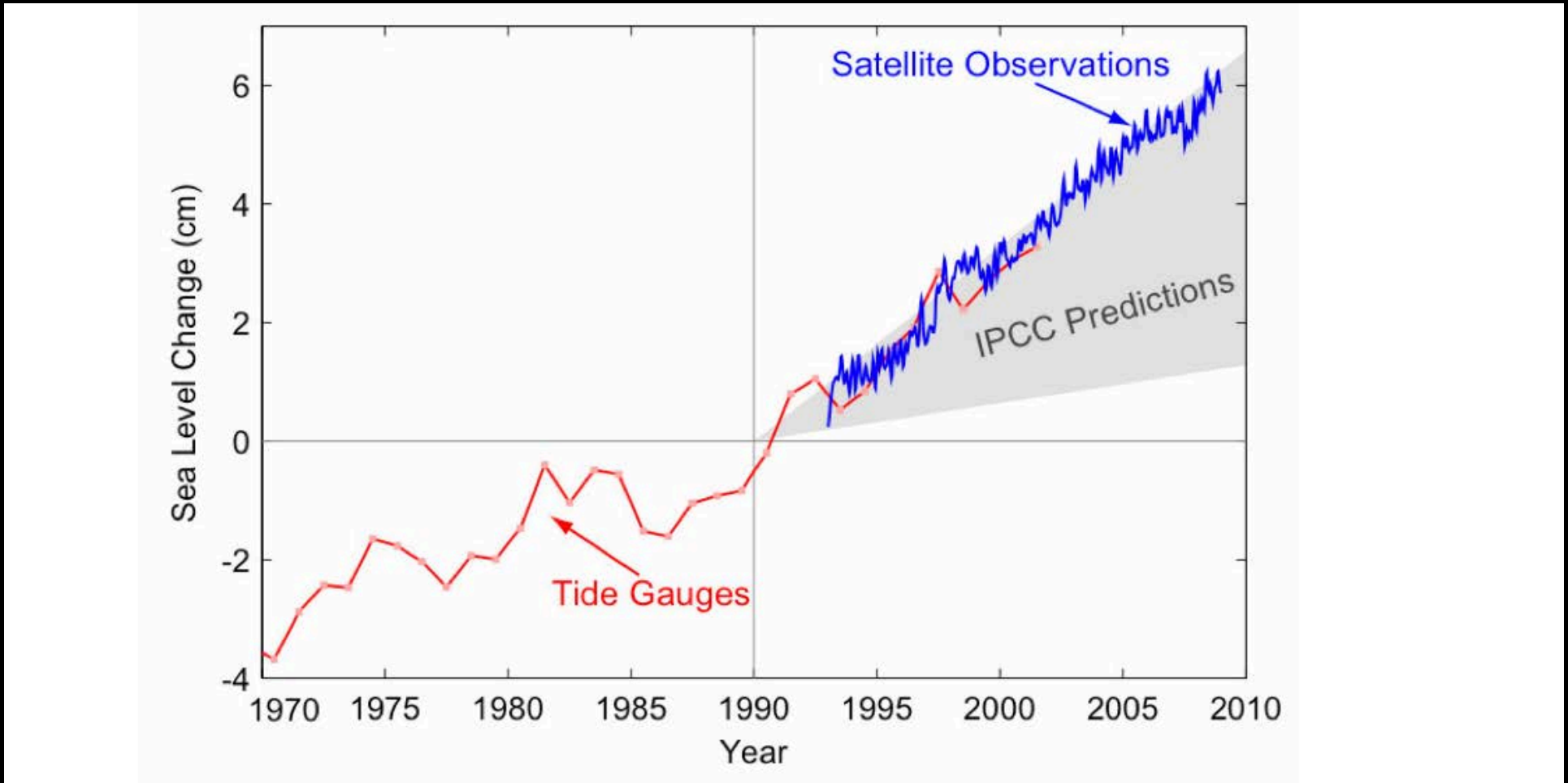

8
4
0
-4
-8
400
350
300
250
200
150
100
50

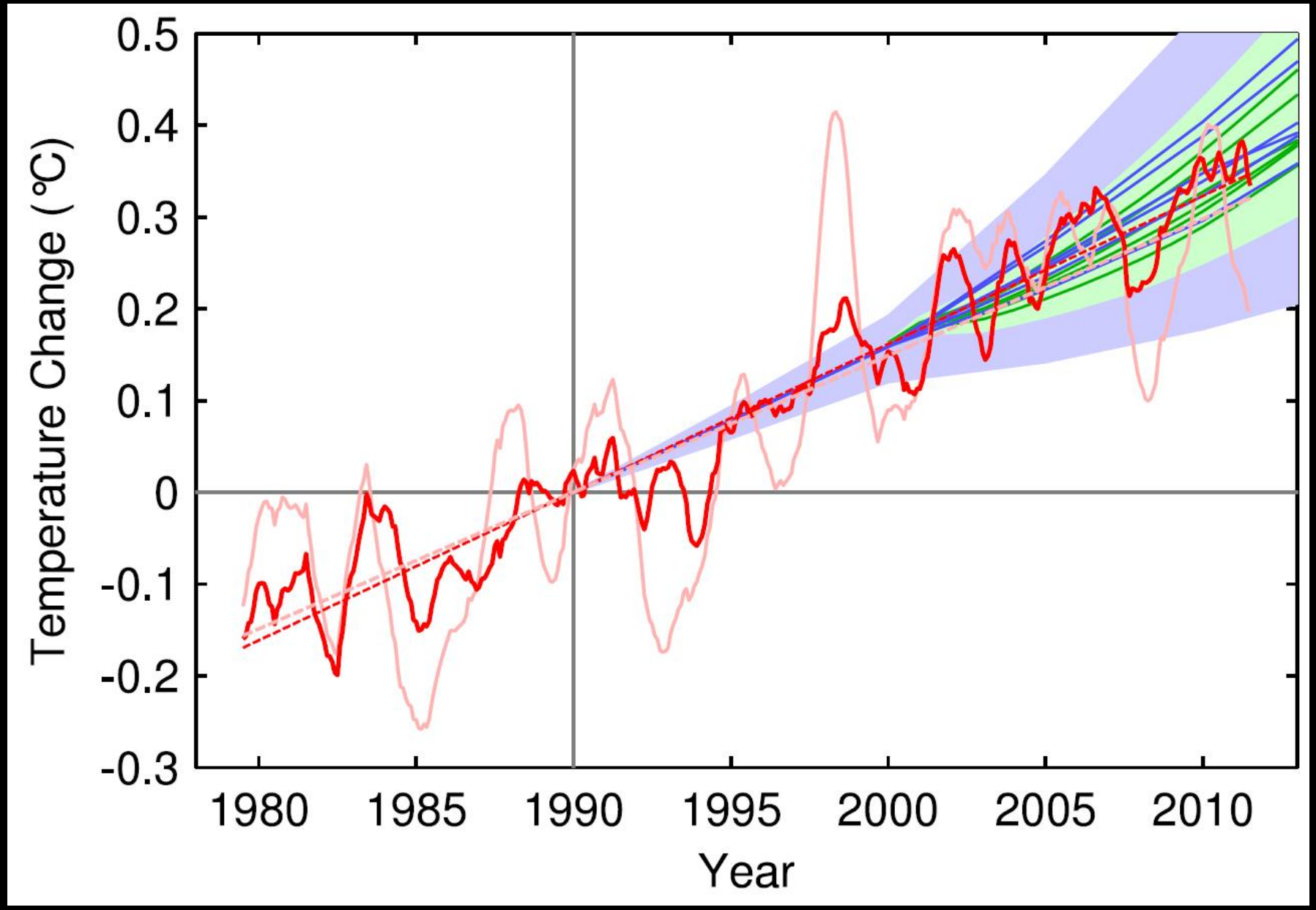

Changes in Carbon Dioxide and Temperature in the last 400,000 years
Temperature (°C)
8
4
0
-4
-8
380
340
300
260
220
CO_2 (ppm)
400
350
300
250
200
150
100
50
0
Thousand of years before present



NOAA Earth System Research Laboratory

‘They can’t predict the weather next week what do they know about the climate in 20 years’

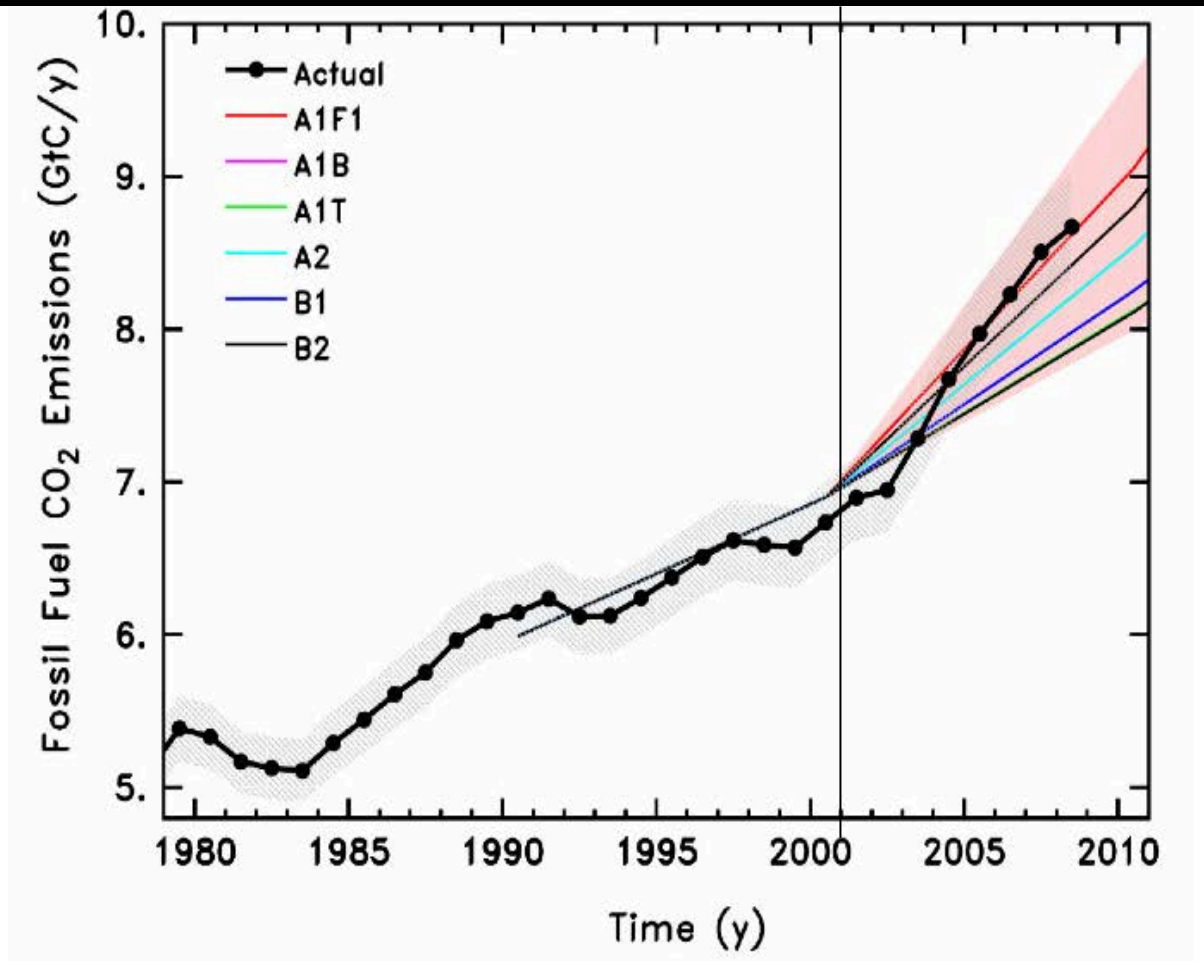


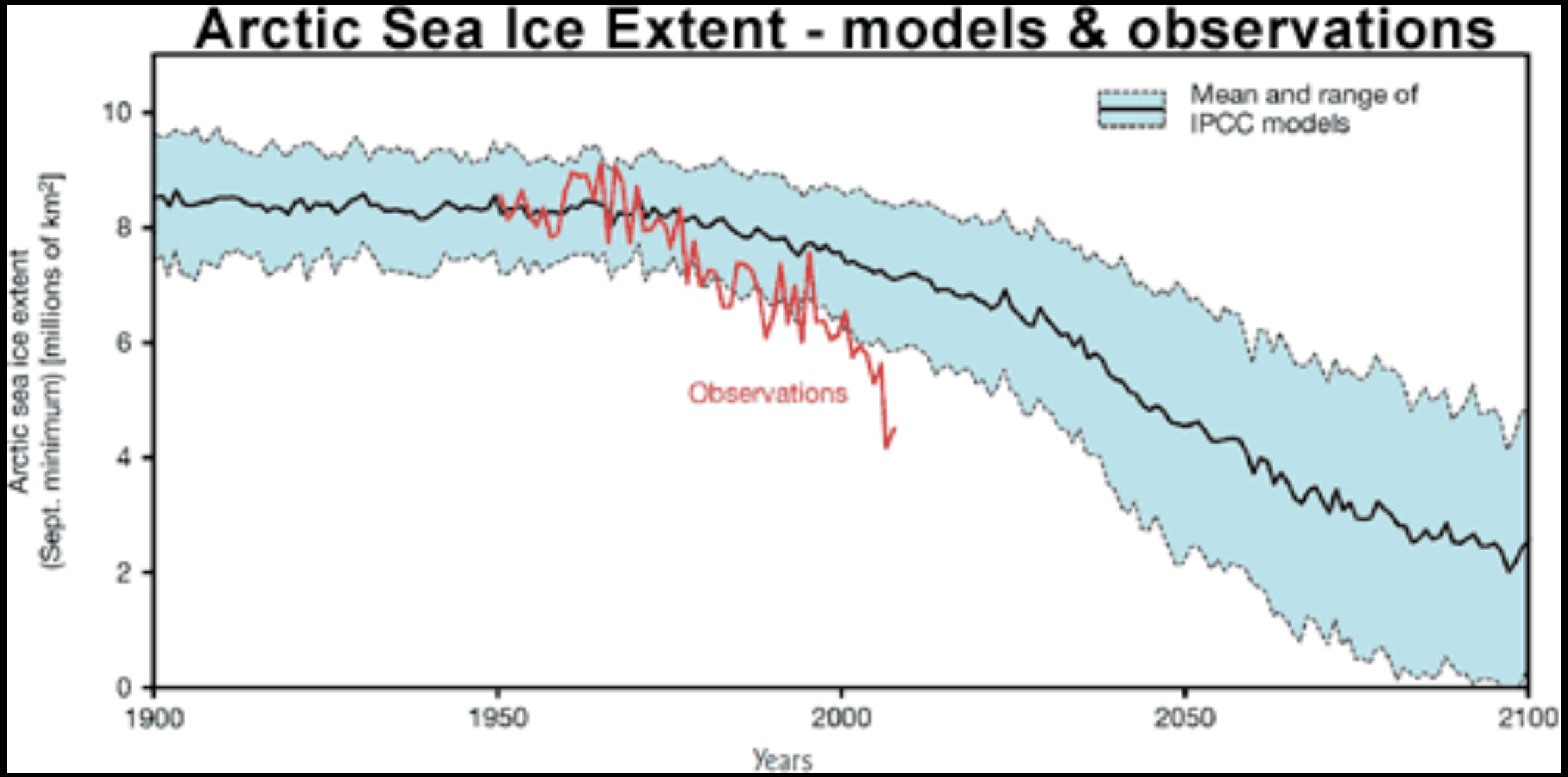


Center for Coastal Studies
Marine Geology

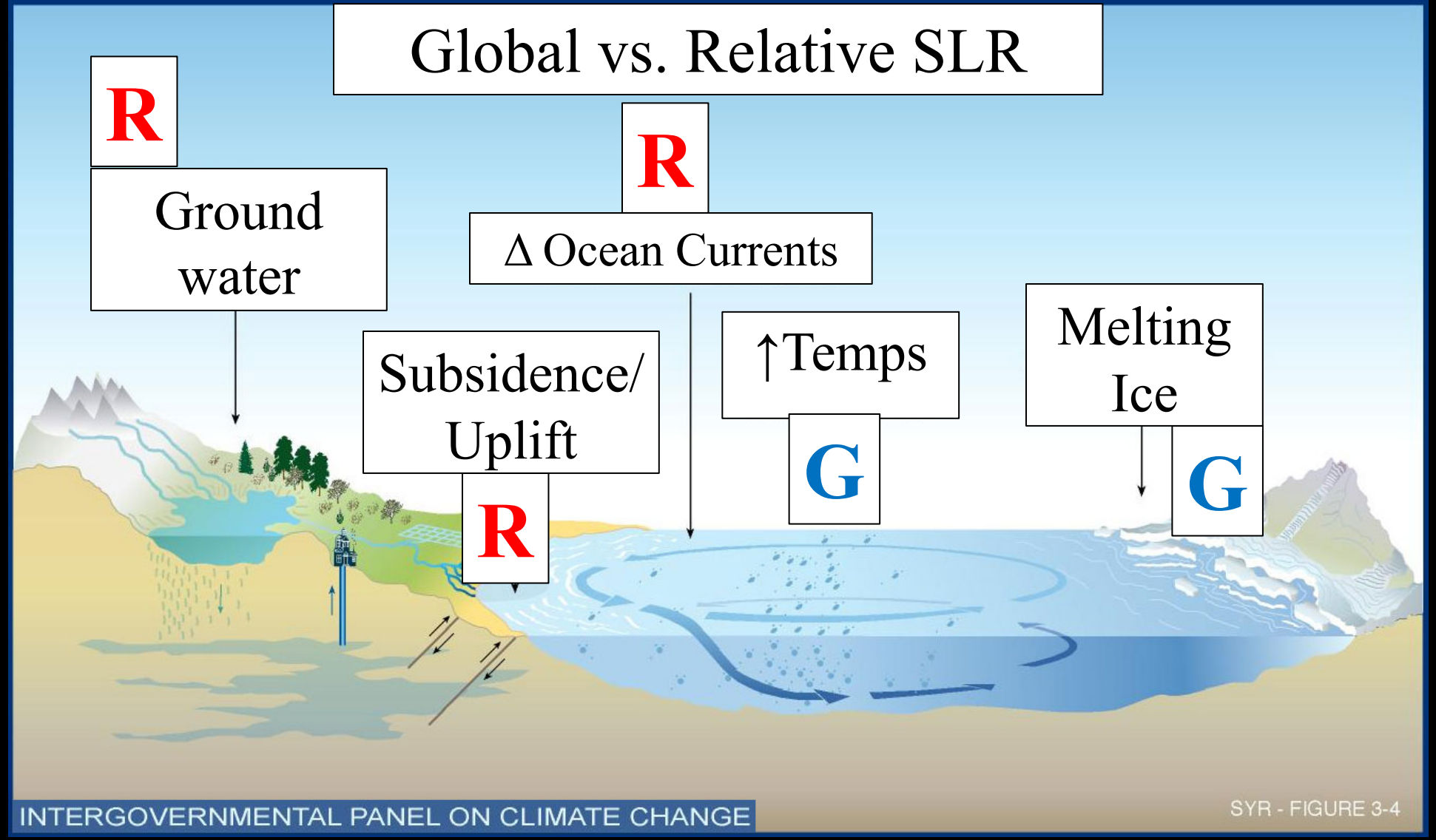
CAPE Lab
The Coastal Processes and Ecosystems Laboratory

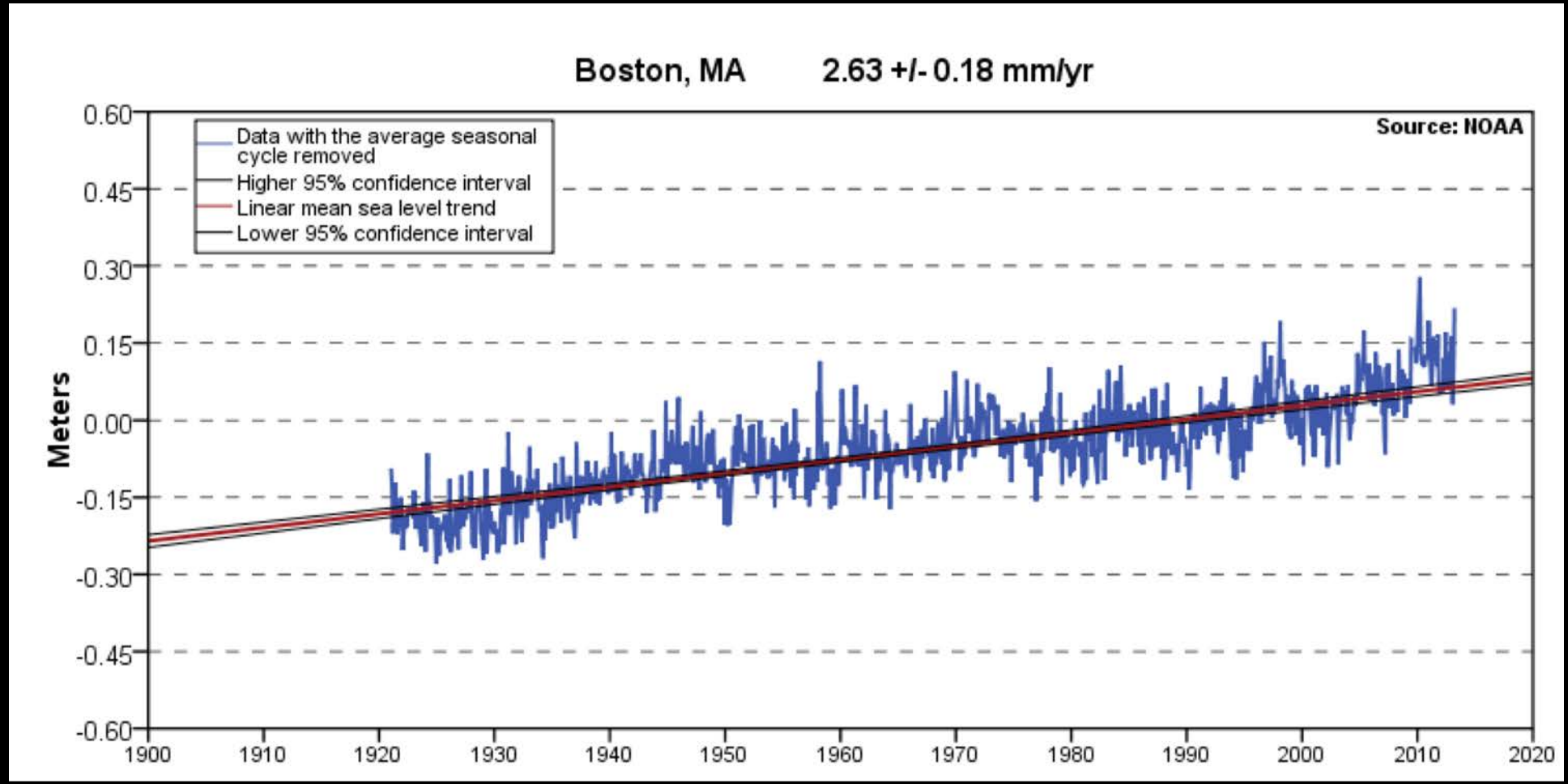
The University of Massachusetts, Boston
School for the Environment

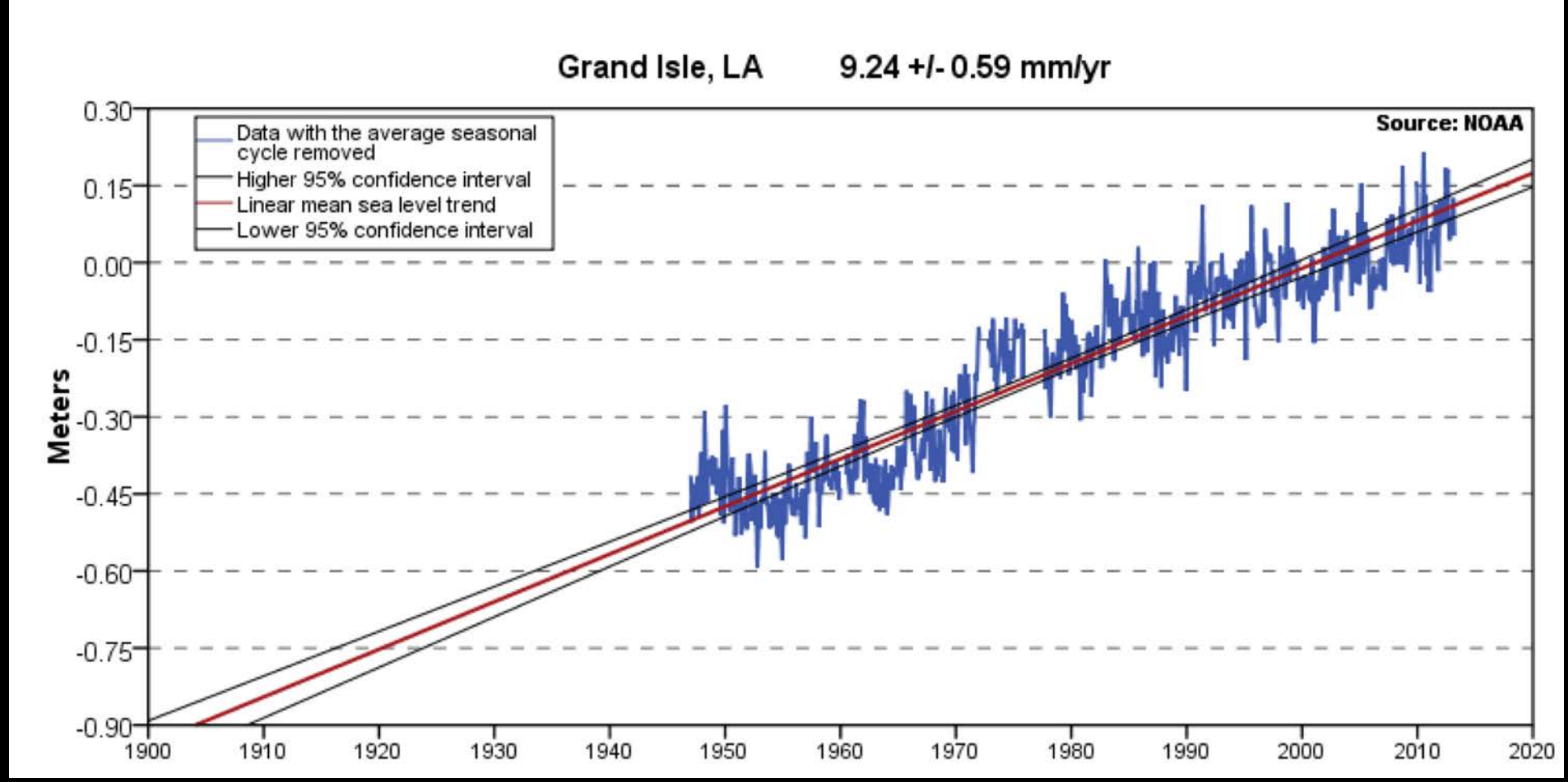

Actual
A1F1
A1B
A1T
A2
B1
B2
Fossil Fuel CO_2 Emissions (GtC/y)
10.
9.
8.
7.
6.
5.
1980
1985
1990
1995
2000
2005
2010
Time (y)

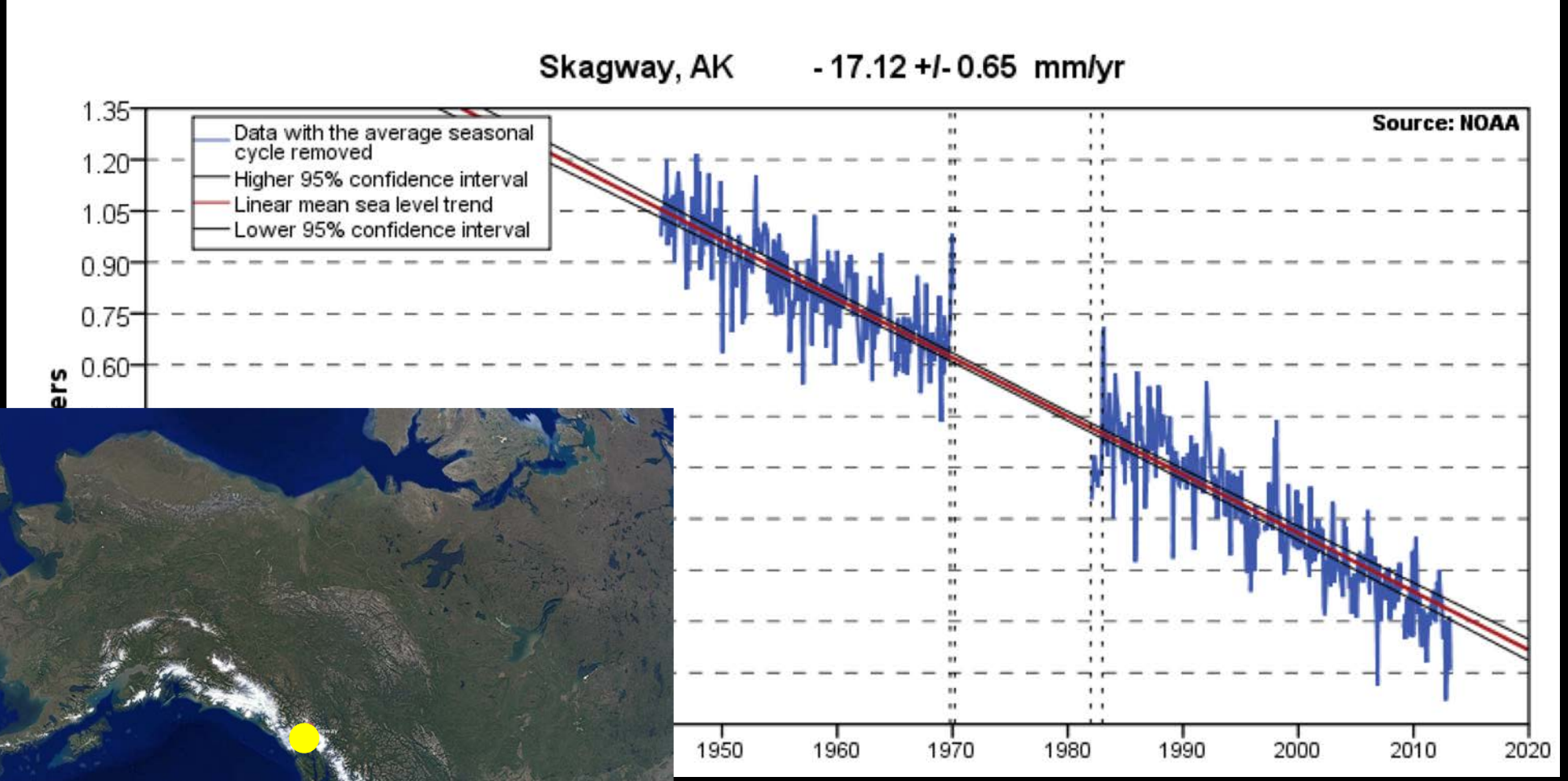

Arctic Sea Ice Extent - models & observations
Mean and range of IPCC models
Observations
Arctic sea ice extent (Sept. minimum) [millions of km²]
10
8
6
4
2
0
1900
1950
2000
2050
2100
Years

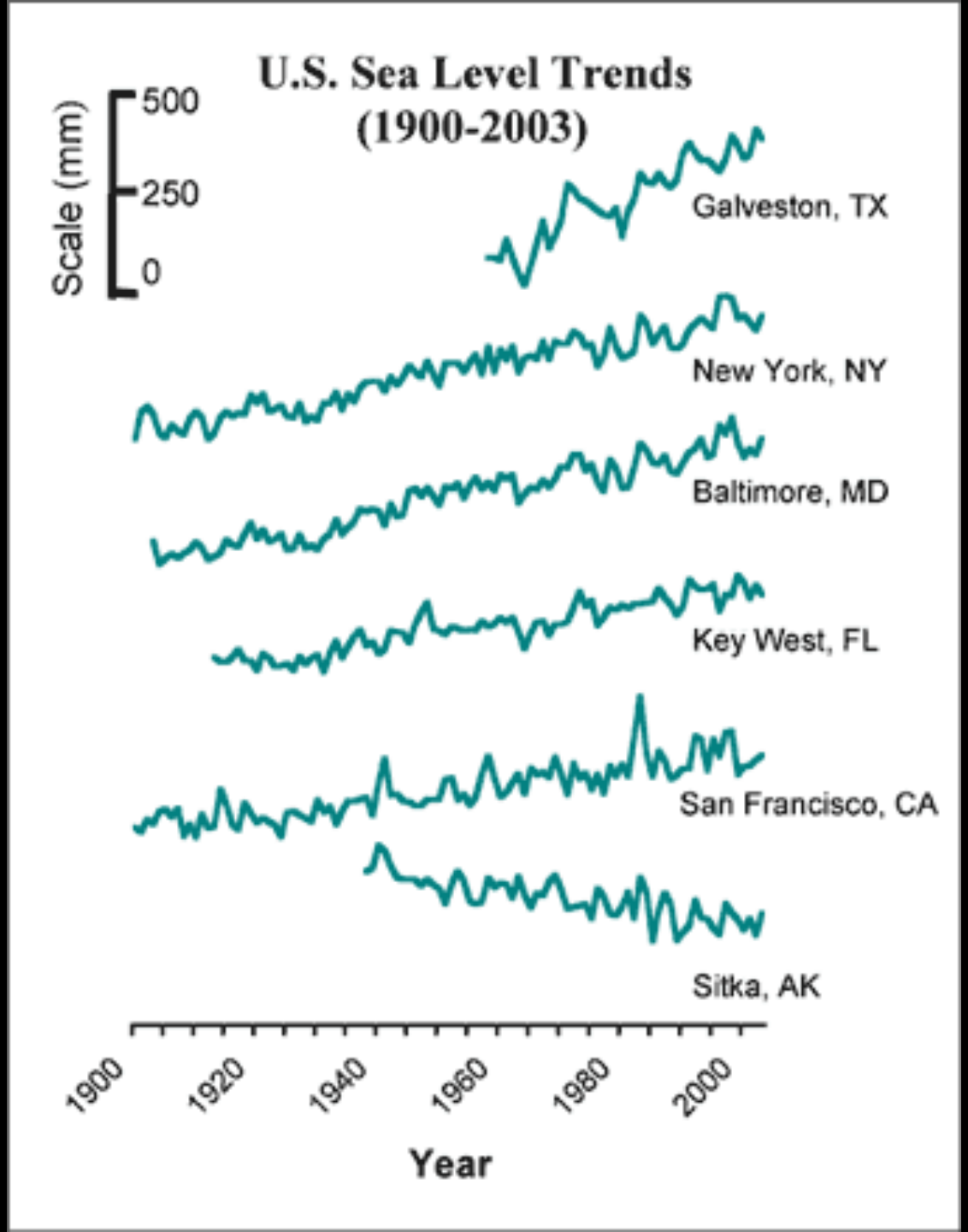
Global vs. Relative SLR




Boston, MA 2.63 +/- 0.18 mm/yr
Source: NOAA
Data with the average seasonal cycle removed
Higher 95% confidence interval
Linear mean sea level trend
Lower 95% confidence interval
Meters
0.60
0.45
0.30
0.15
0.00
-0.15
-0.30
-0.45
-0.60
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
2020


Grand Isle, LA
9.24 +/- 0.59 mm/yr
Source: NOAA
Data with the average seasonal cycle removed
Higher 95% confidence interval
Linear mean sea level trend
Lower 95% confidence interval
Meters
0.30
0.15
0.00
-0.15
-0.30
-0.45
-0.60
-0.75
-0.90
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
2020


Skagway, AK - 17.12 +/- 0.65 mm/yr
Source: NOAA
Data with the average seasonal cycle removed
Higher 95% confidence interval
Linear mean sea level trend
Lower 95% confidence interval
1.35
1.20
1.05
0.90
0.75
0.60
1950
1960
1970
1980
1990
2000
2010
2020


U.S. Sea Level Trends
(1900-2003)
Scale (mm)
500
250
0
Galveston, TX
New York, NY
Baltimore, MD
Key West, FL
San Francisco, CA
Sitka, AK
1900
1920
1940
1960
1980
2000
Year

NATURE | NEWS

US northeast coast is hotspot for rising sea levels

Report comes after North Carolina senate proposes bill to ban predictions of increase in rates of sea-level rise.

Leigh Phillips

Regional sea-level scenarios: Helping US Northeast plan for faster-than-global rise

Global sea level could rise by as much as 8 feet by 2100 in a worst-case scenario

Date: January 19, 2017

Source: Rutgers University

Quick Quiz

A _____ft rise in MSL would enable a 10-year storm to flood areas that today are only flooded by a 100-year storm.

a) 1

b) 1.5

c) 2

d) 2.5

e) 3

A 100-year storm…
A 100-year return frequency event
1% return frequency event

Return Frequency	10-yr	100 - yr	Δ 10 v 100	500 - yr	Δ 100 v 500
Elevation (ft)	8.6	9.5	~1.0	10.20	0.70

Center for International Earth Science Information Network
EARTH INSTITUTE | COLUMBIA UNIVERSITY

Orton, P., et al., Boston Coastal Flooding Analysis and Mapping

Center for Coastal Studies
Marine Geology

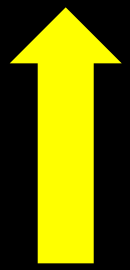
CAPE Lab
The Coastal Processes and Ecosystems Laboratory

The University of Massachusetts, Boston
School for the Environment

Back to back nor’easter storms slam Massachusetts

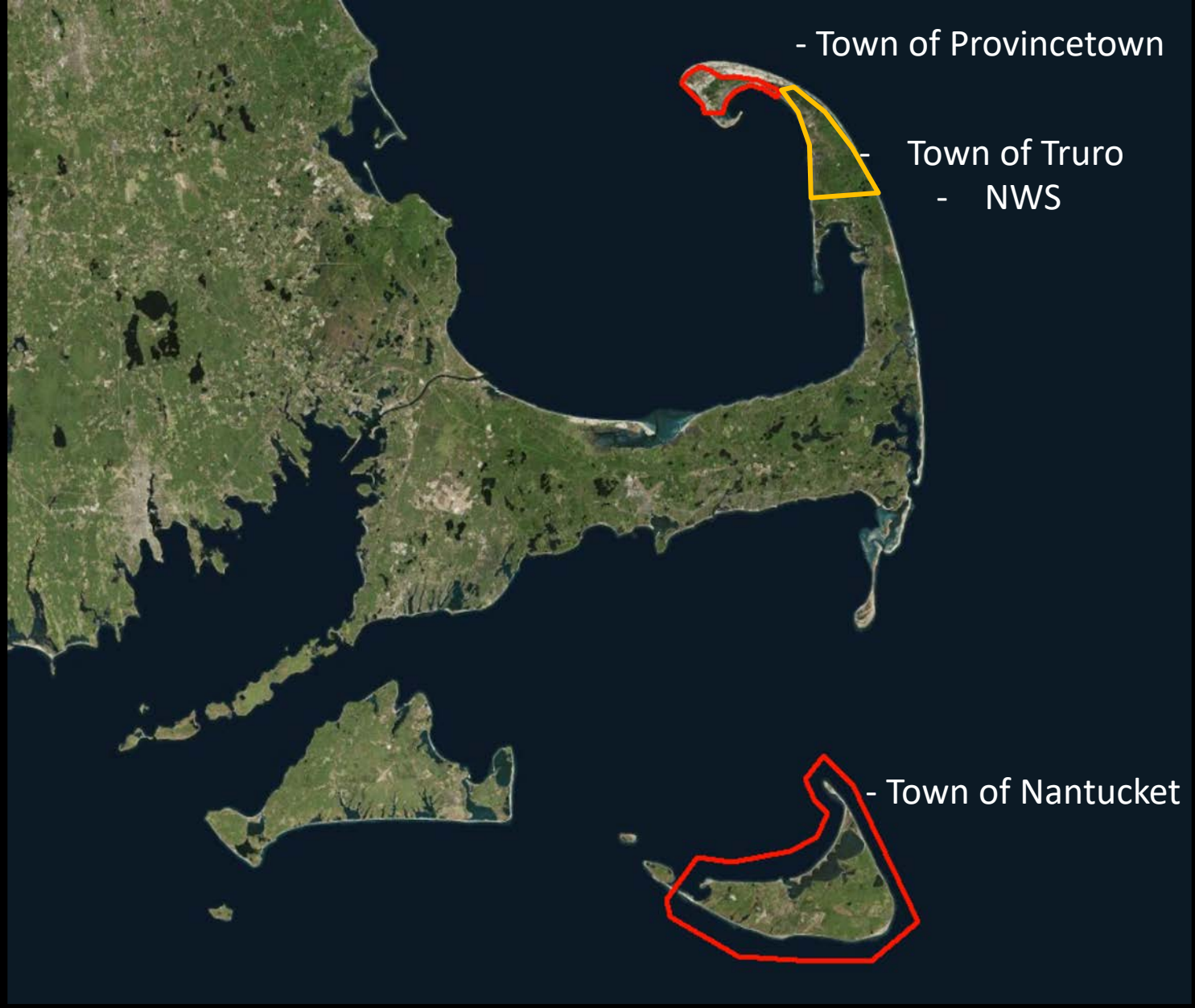
March 08, 2018, Boston Globe

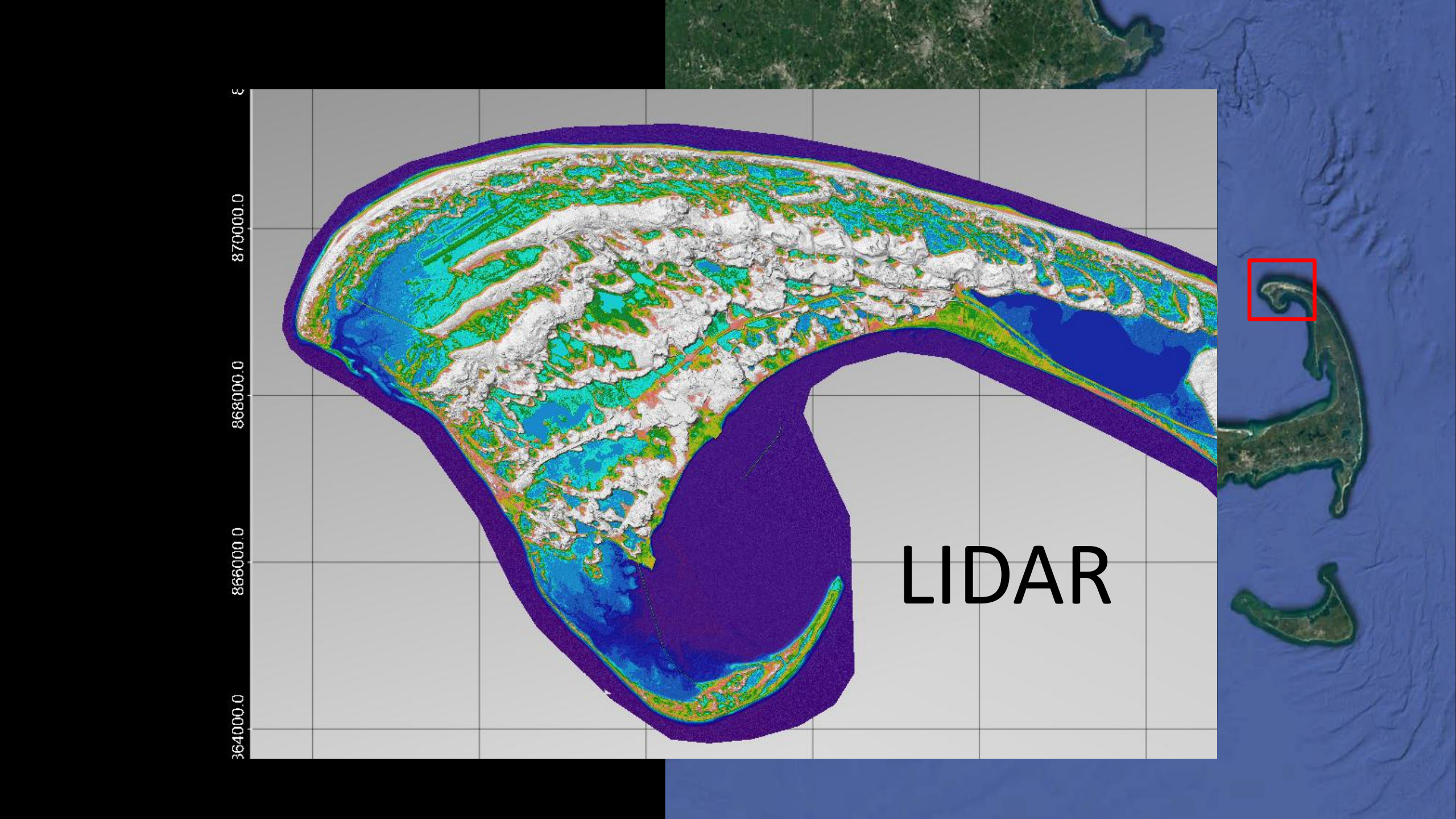
Mapping Storm-Tide (Inundation) Pathways



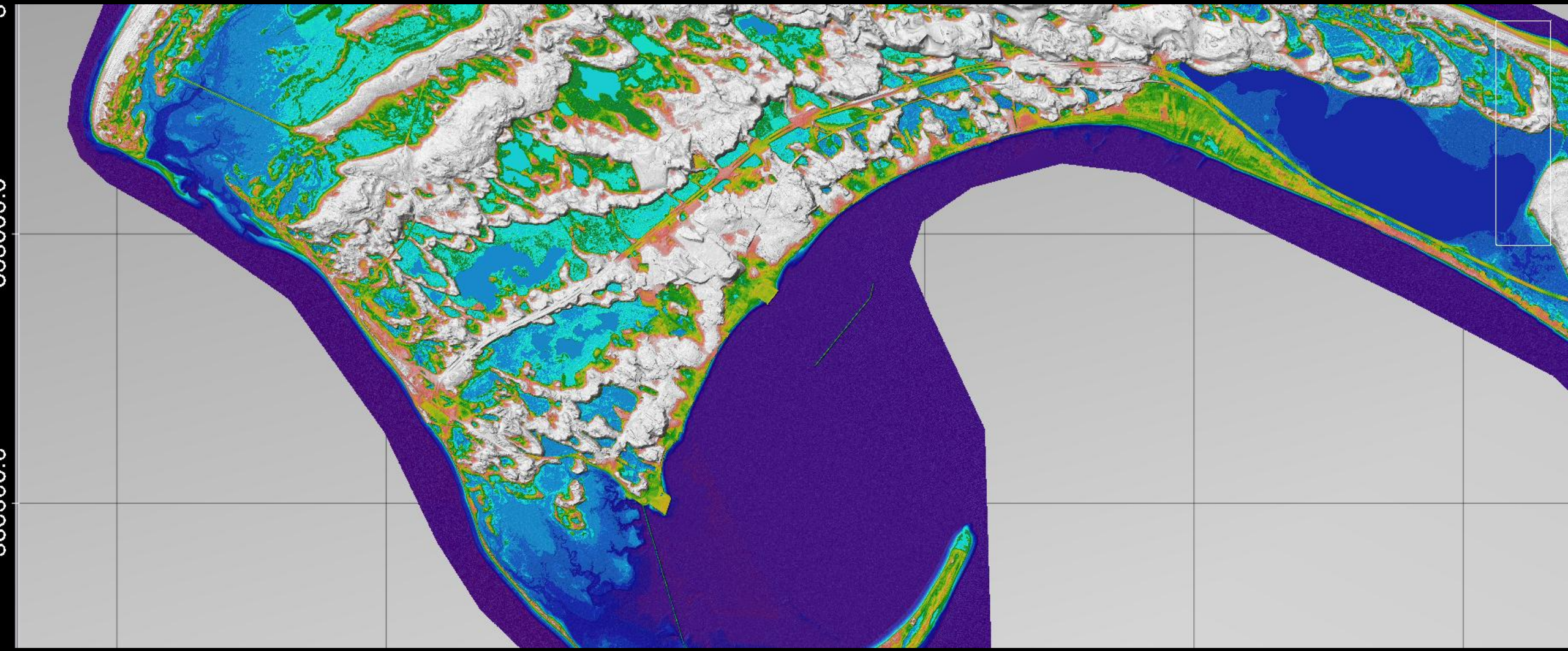
MAPPING & MODELING

1. Useful AND usable to local entities/managers
2. Address current and future concerns
3. Little, to no, computing resources
4. Increase resiliency and autonomy

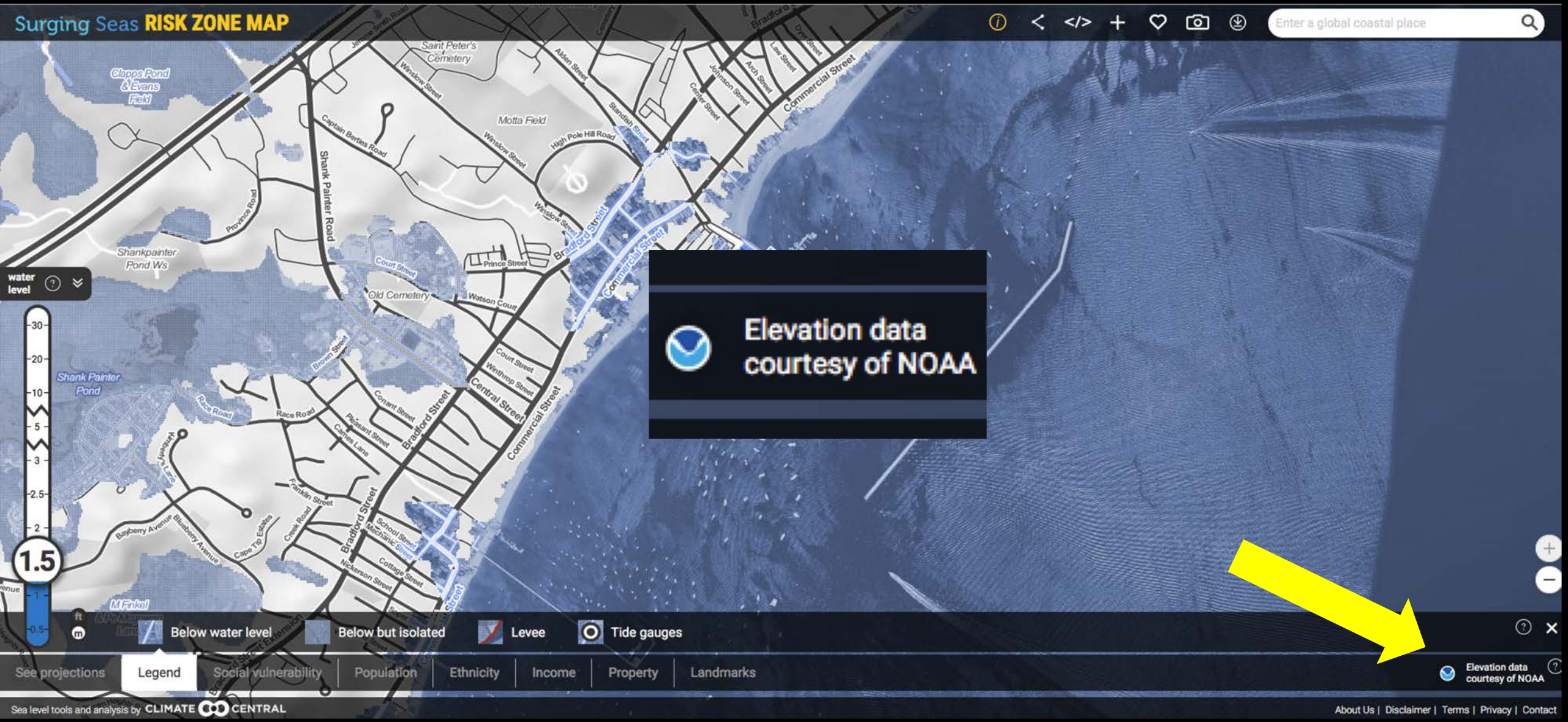

- Town of Provincetown
- Town of Truro
- NWS
- Town of Nantucket

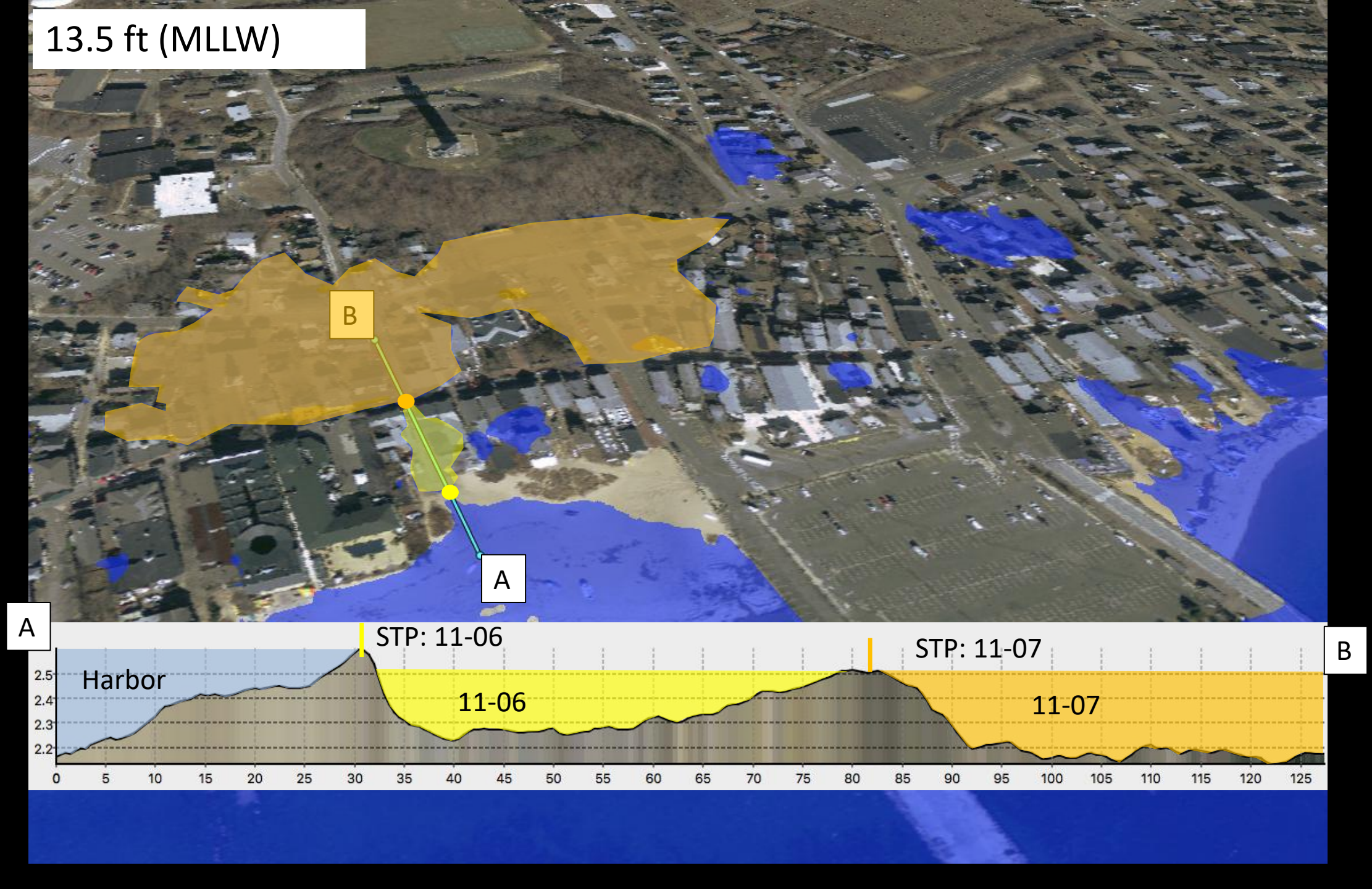

870000.0
868000.0
866000.0
364000.0
LIDAR

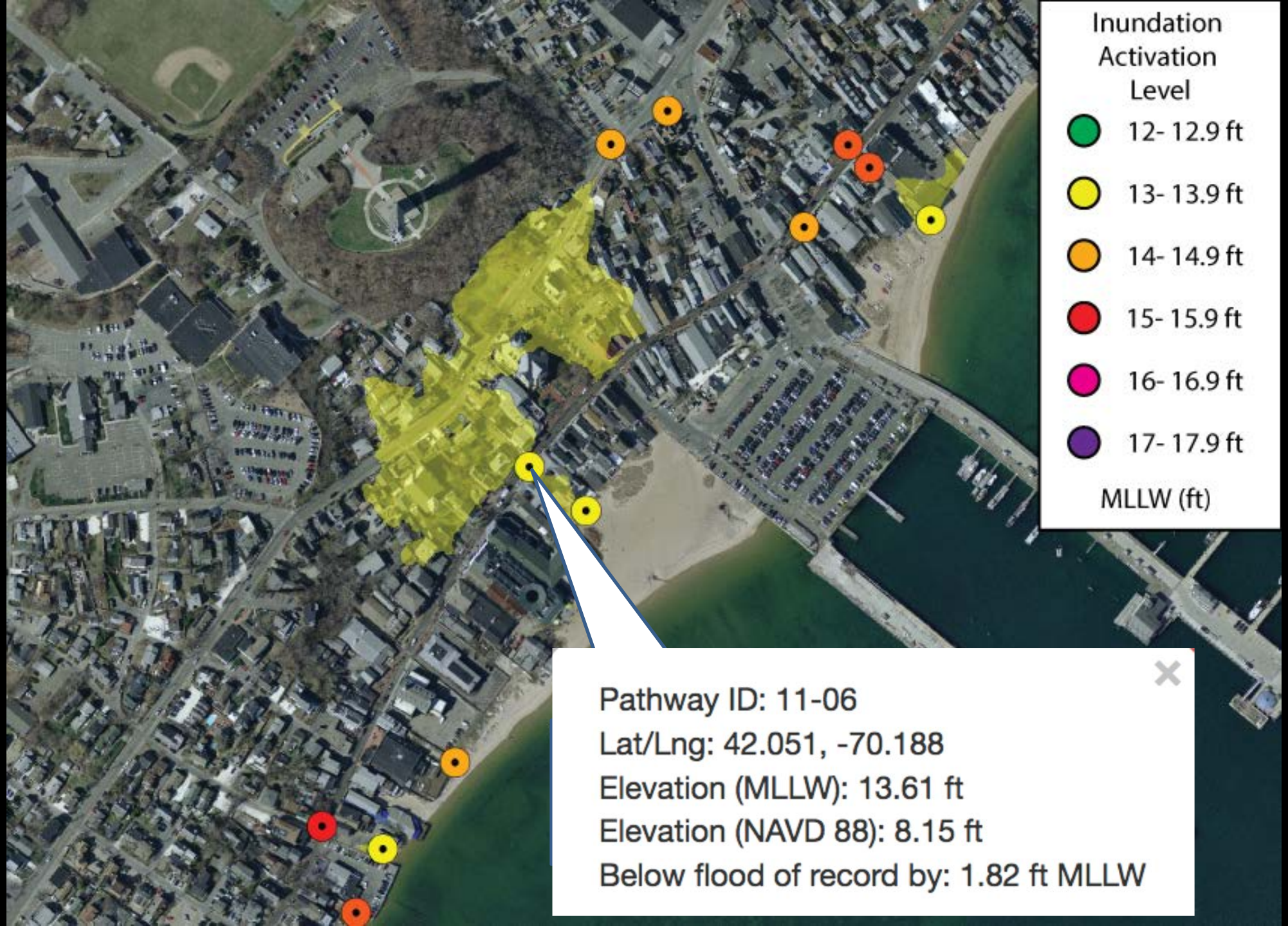
Downtown Provincetown



Surging Seas (http://sealevel.climatecentral.org/)



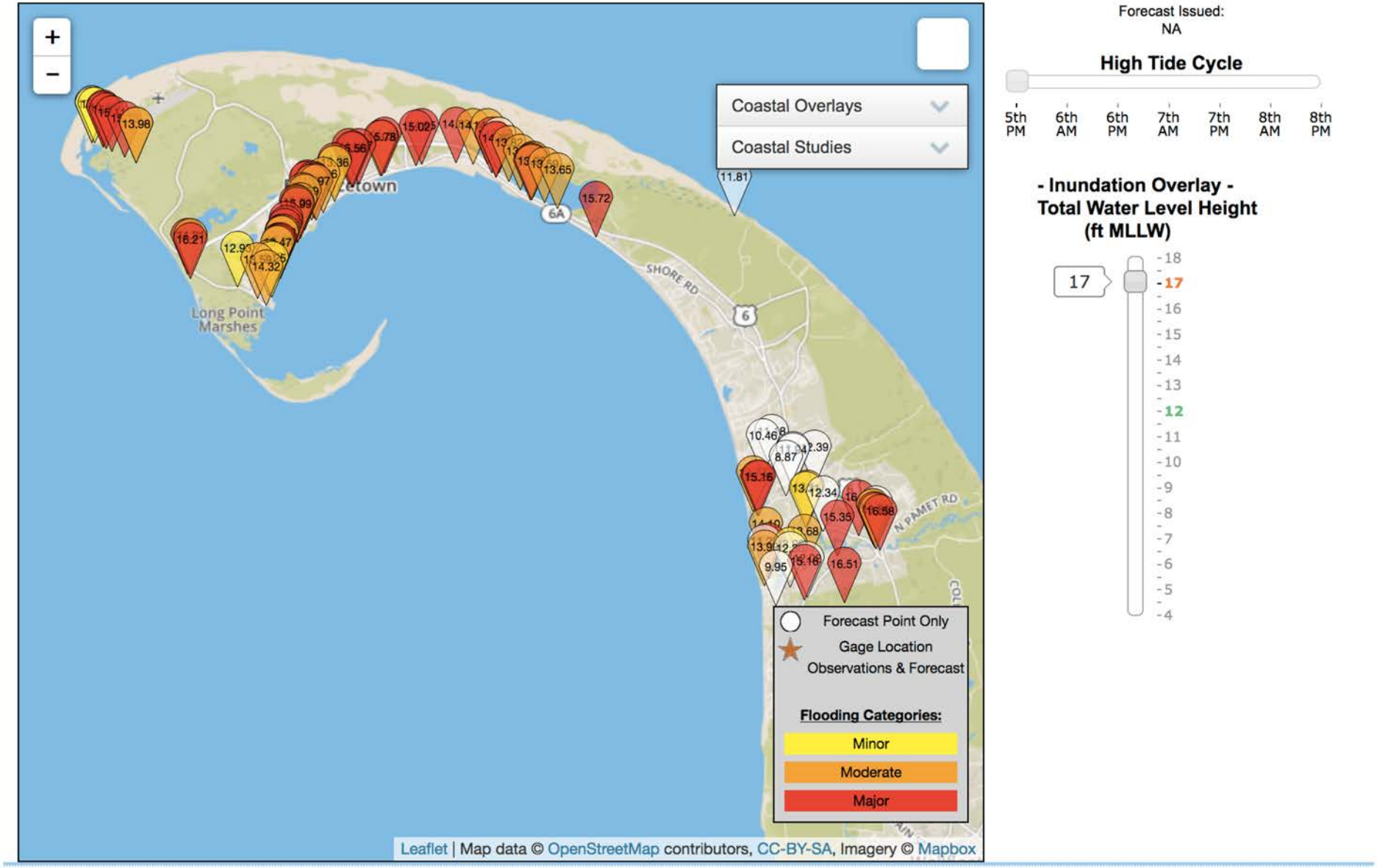

13.5 ft (MLLW)
B
A
A
STP: 11-06
STP: 11-07
B
Harbor
11-06
11-07
2.5
2.4
2.3
2.2
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
105
110
115
120
125


Inundation Activation Level
12- 12.9 ft
13- 13.9 ft
14- 14.9 ft
15- 15.9 ft
16- 16.9 ft
17- 17.9 ft
MLLW (ft)
Pathway ID: 11-06
Lat/Lng: 42.051, -70.188
Elevation (MLLW): 13.61 ft
Elevation (NAVD 88): 8.15 ft
Below flood of record by: 1.82 ft MLLW

NWS Boston - Coastal Flood Threat and Inundation Mapping

Weather.gov > Boston, MA > NWS Boston - Coastal Flood Threat and Inundation Mapping

Boston, MA
Weather Forecast Office



Forecast Issued:
NA

High Tide Cycle

5th PM | 6th AM | 6th PM | 7th AM | 7th PM | 8th AM | 8th PM

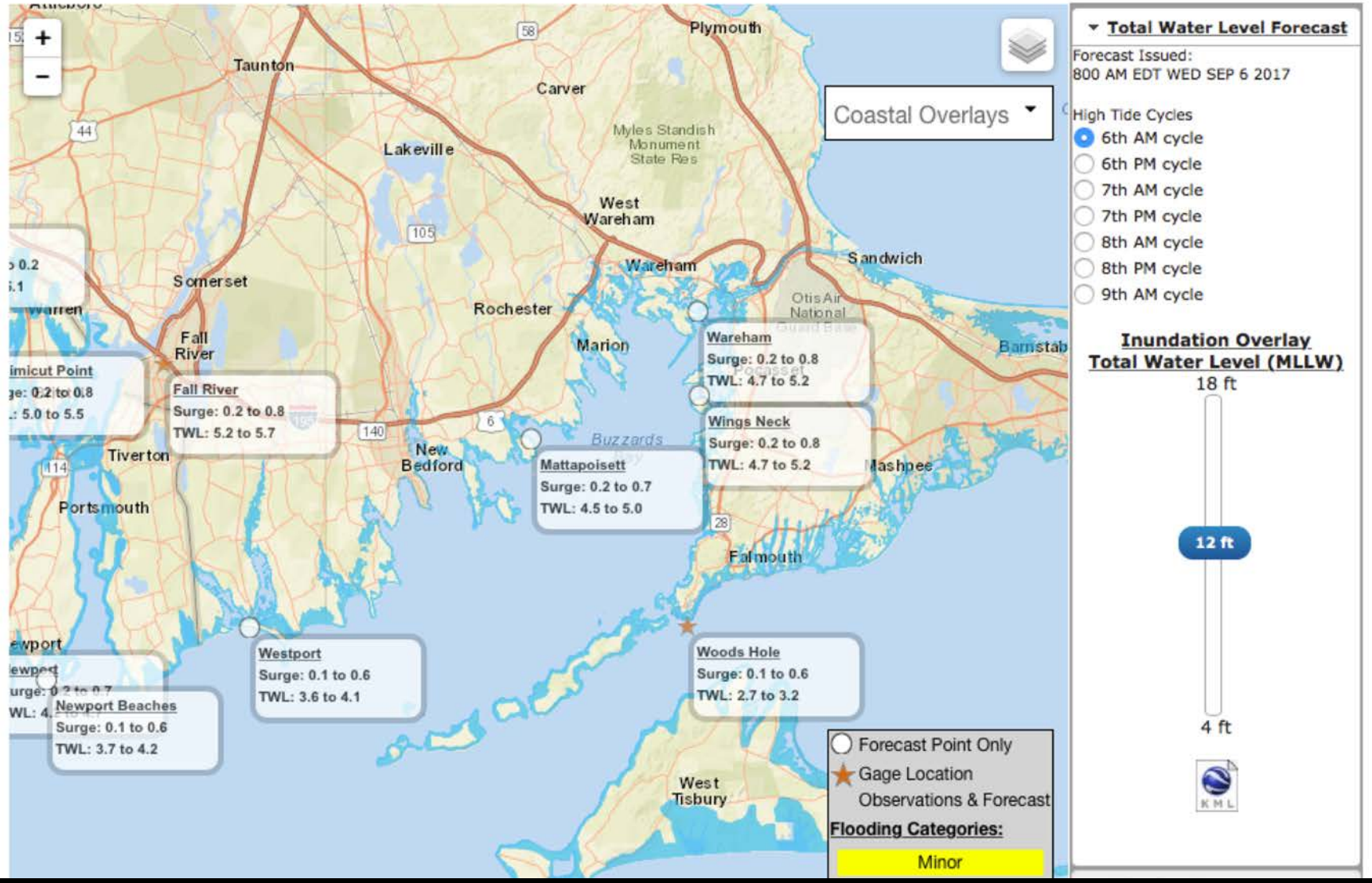
- Inundation Overlay -
Total Water Level Height (ft MLLW)

17

18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4

NWS Boston - Coastal Flood Threat and Inundation Mapping

Boston, MA
Weather Forecast Office



Total Water Level Forecast

Forecast Issued:
800 AM EDT WED SEP 6 2017

High Tide Cycles

- (•) 6th AM cycle
- ( ) 6th PM cycle
- ( ) 7th AM cycle
- ( ) 7th PM cycle
- ( ) 8th AM cycle
- ( ) 8th PM cycle
- ( ) 9th AM cycle

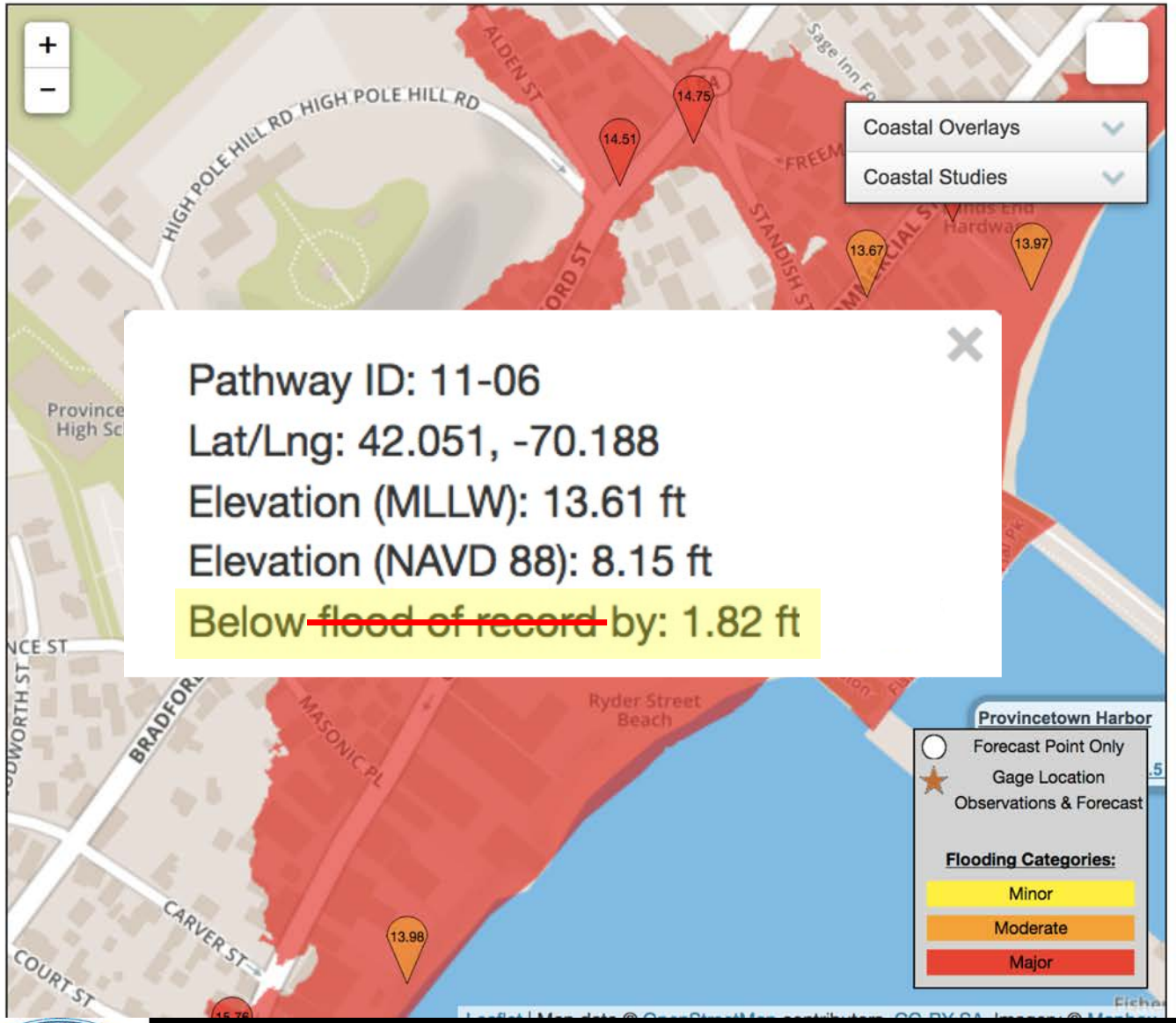
Inundation Overlay
Total Water Level (MLLW)

18 ft
12 ft
4 ft

NWS Boston - Coastal Flood Threat and Inundation Mapping

Weather.gov > Boston, MA > NWS Boston - Coastal Flood Threat and Inundation Mapping

Boston, MA
Weather Forecast Office



Forecast Issued:
NA

High Tide Cycle

5th PM | 6th AM | 6th PM | 7th AM | 7th PM | 8th AM | 8th PM

- Inundation Overlay -
Total Water Level Height
(ft MLLW)

16

-18 -17 -16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4

Storm of Record

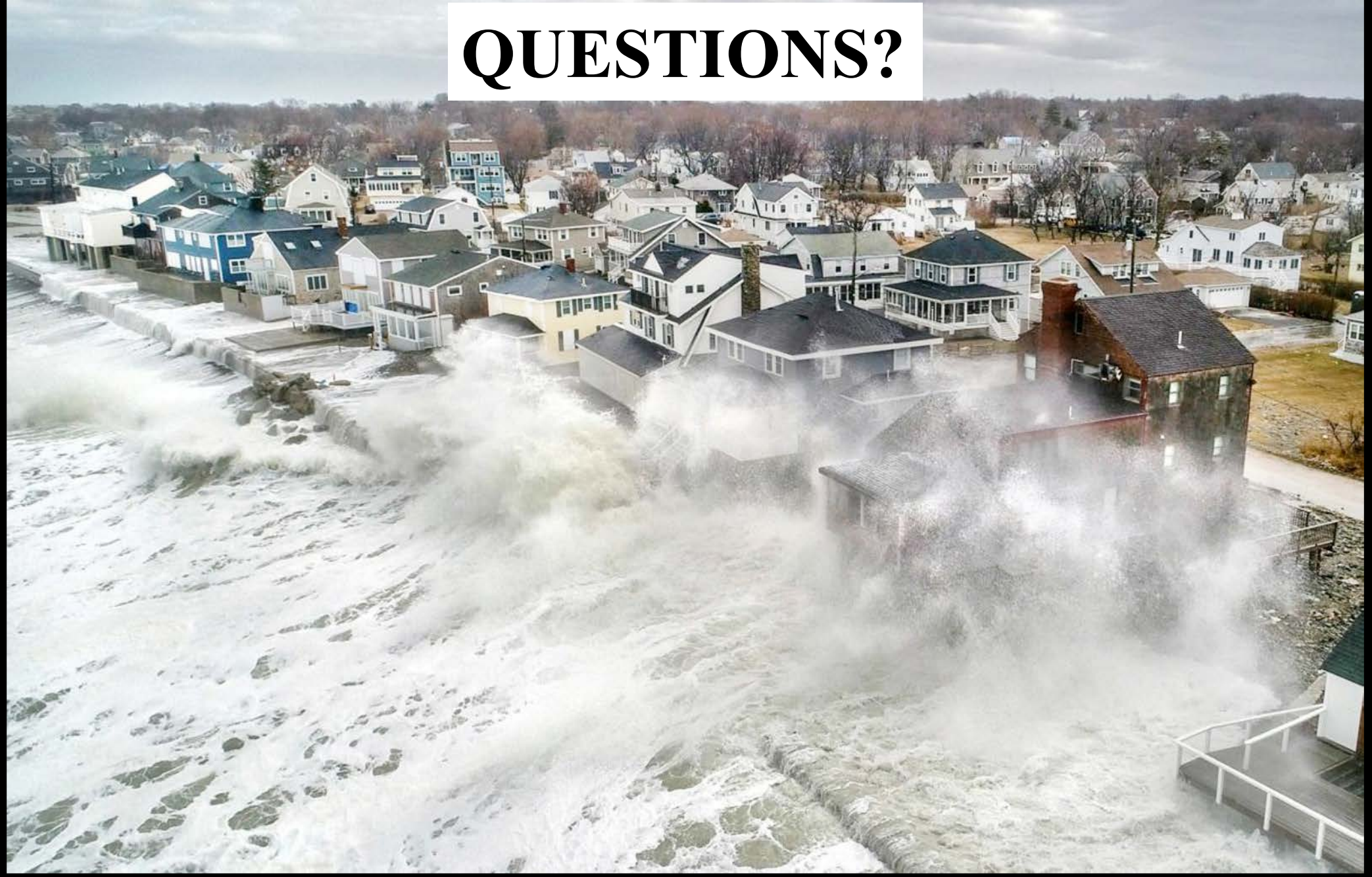
Provincetown

11 Feb 78 15.1 ft

04 Jan 18 15.6 ft

~ +0.5 ft

QUESTIONS?



Provincetown, MA

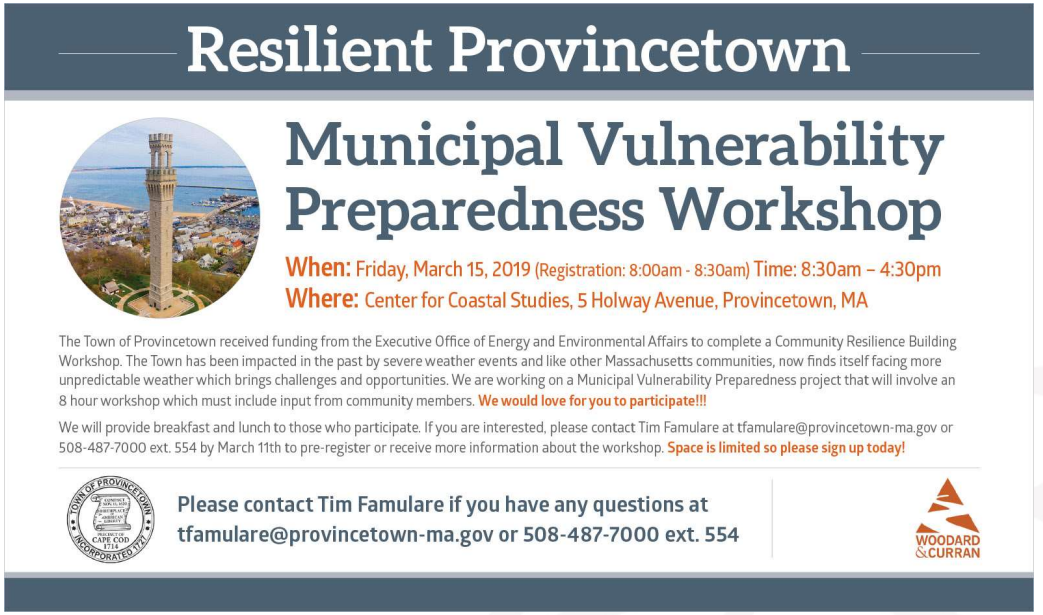
Community Resiliency Building | Listening Session

April 11, 2019

Agenda

- Overview of Community Resiliency Building Workshop
- Question & Answer

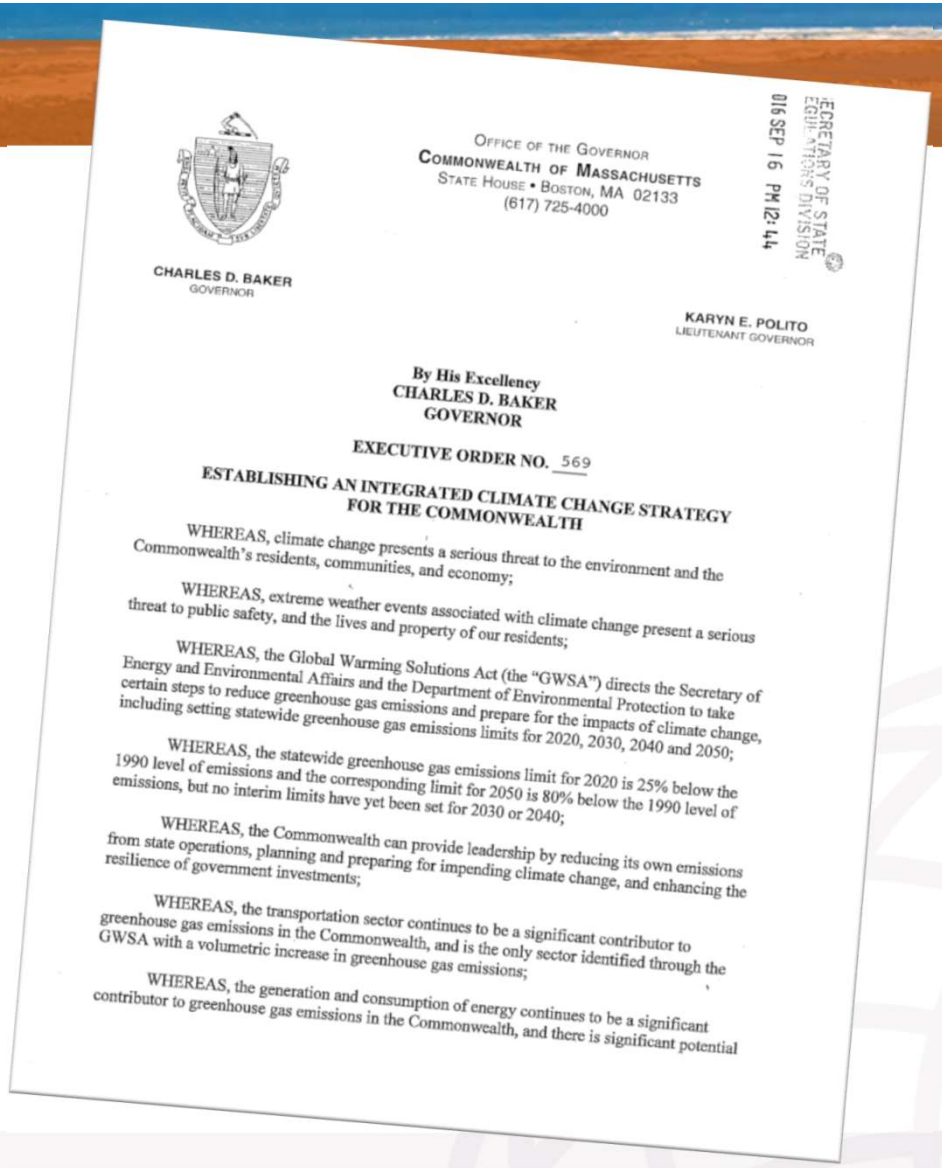
Note: *Please utilize the notecards available to share any concerns or ideas that you have and would like to make sure are documented as a part of this process. Thank you!*



Background Information

Executive Order 569

- In September 2016, Governor Charlie Baker signed Executive Order 569, instructing state government to **provide assistance to cities and towns to complete climate change vulnerability assessments and resiliency planning**



CHARLES D. BAKER
GOVERNOR

OFFICE OF THE GOVERNOR
COMMONWEALTH OF MASSACHUSETTS
STATE HOUSE • BOSTON, MA 02133
(617) 725-4000

2016 SEP 16 PM 12:14
SECRETARY OF STATE
REGULATIONS DIVISION

KARYN E. POLITO
LIEUTENANT GOVERNOR

By His Excellency
CHARLES D. BAKER
GOVERNOR

EXECUTIVE ORDER NO. 569

ESTABLISHING AN INTEGRATED CLIMATE CHANGE STRATEGY FOR THE COMMONWEALTH

WHEREAS, climate change presents a serious threat to the environment and the Commonwealth's residents, communities, and economy;

WHEREAS, extreme weather events associated with climate change present a serious threat to public safety, and the lives and property of our residents;

WHEREAS, the Global Warming Solutions Act (the "GWSA") directs the Secretary of Energy and Environmental Affairs and the Department of Environmental Protection to take certain steps to reduce greenhouse gas emissions and prepare for the impacts of climate change, including setting statewide greenhouse gas emissions limits for 2020, 2030, 2040 and 2050;

WHEREAS, the statewide greenhouse gas emissions limit for 2020 is 25% below the 1990 level of emissions and the corresponding limit for 2050 is 80% below the 1990 level of emissions, but no interim limits have yet been set for 2030 or 2040;

WHEREAS, the Commonwealth can provide leadership by reducing its own emissions from state operations, planning and preparing for impending climate change, and enhancing the resilience of government investments;

WHEREAS, the transportation sector continues to be a significant contributor to greenhouse gas emissions in the Commonwealth, and is the only sector identified through the GWSA with a volumetric increase in greenhouse gas emissions;

WHEREAS, the generation and consumption of energy continues to be a significant contributor to greenhouse gas emissions in the Commonwealth, and there is significant potential

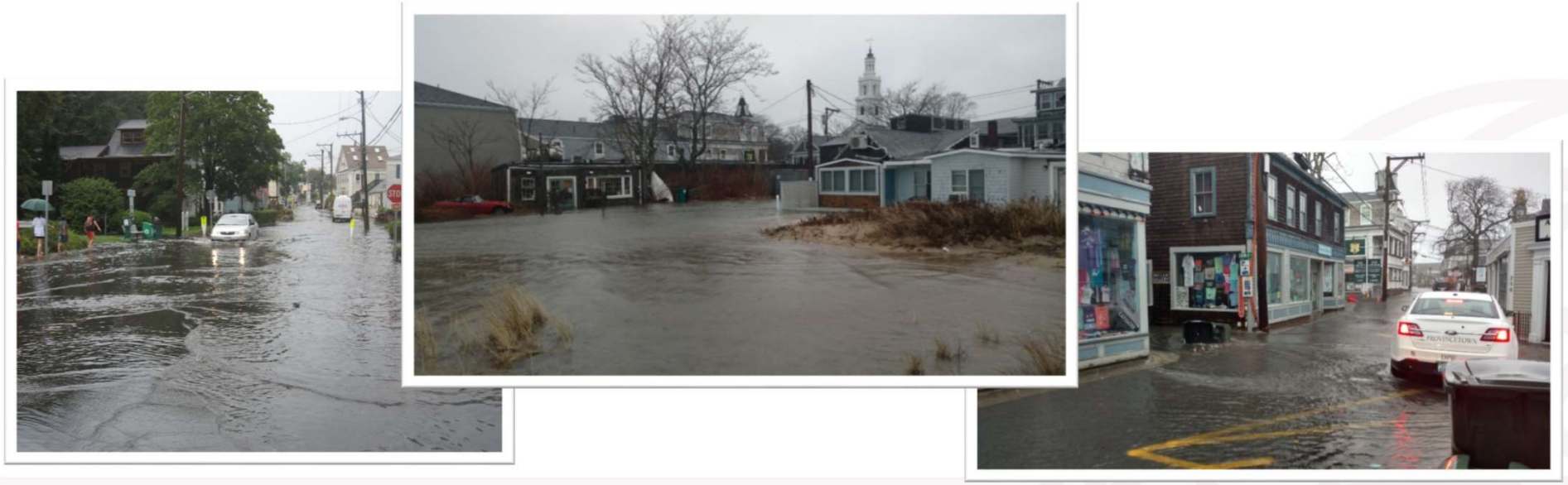
August 2018

- Governor Baker signed legislation directing $2.4 billion to Climate Change Adaptation, Environmental Protection and Community Investments
- $$ allocated capital for investments in safeguarding residents, municipalities and businesses from the impacts of climate change, protecting environmental resources, and improving recreational opportunities
- The $$ enables critical environmental investments at the state and local levels and will put into law essential components of Governor Baker's Executive Order 569

Photo: Mass.gov Press Release, August 2018

Municipal Vulnerability Preparedness (MVP) Grant Program

- The MVP grant program provides support for cities and towns in Massachusetts to begin or continue the process of planning for resiliency
- The state awards communities with funding to complete vulnerability assessments and develop action-oriented resiliency plans

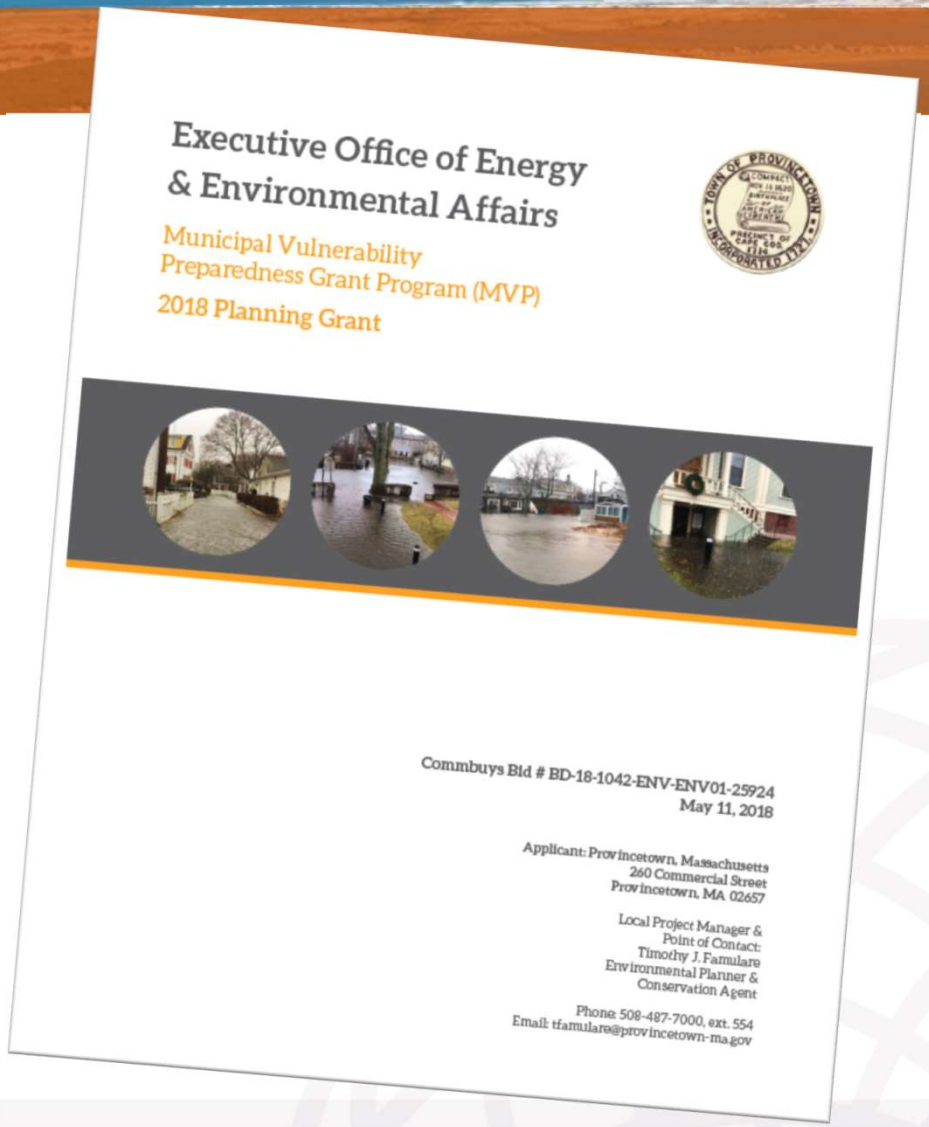


Municipal Vulnerability Preparedness (MVP) Grant Program

- The program helps communities achieve the following objectives:
  - Define extreme weather and natural and climate related hazards
  - Identify existing and future vulnerabilities and strengths
  - Develop and prioritize actions for the community
  - Identify opportunities to take action to reduce risk and build resilience

MVP Planning Grant Program

- Provincetown proactively applied for the 2017 round
- Awarded $27,500 grant
- Partnered with MVP Technical Services provider Woodard & Curran
- Resulted in the Community Resiliency Building Workshop, Listening Session, Environmental Justice Area Listening Session, Workshop for Seasonal Residents & Summary of Findings



Executive Office of Energy & Environmental Affairs

Municipal Vulnerability Preparedness Grant Program (MVP)

2018 Planning Grant

Commbuys Bid # BD-18-1042-ENV-ENV01-25924
May 11, 2018

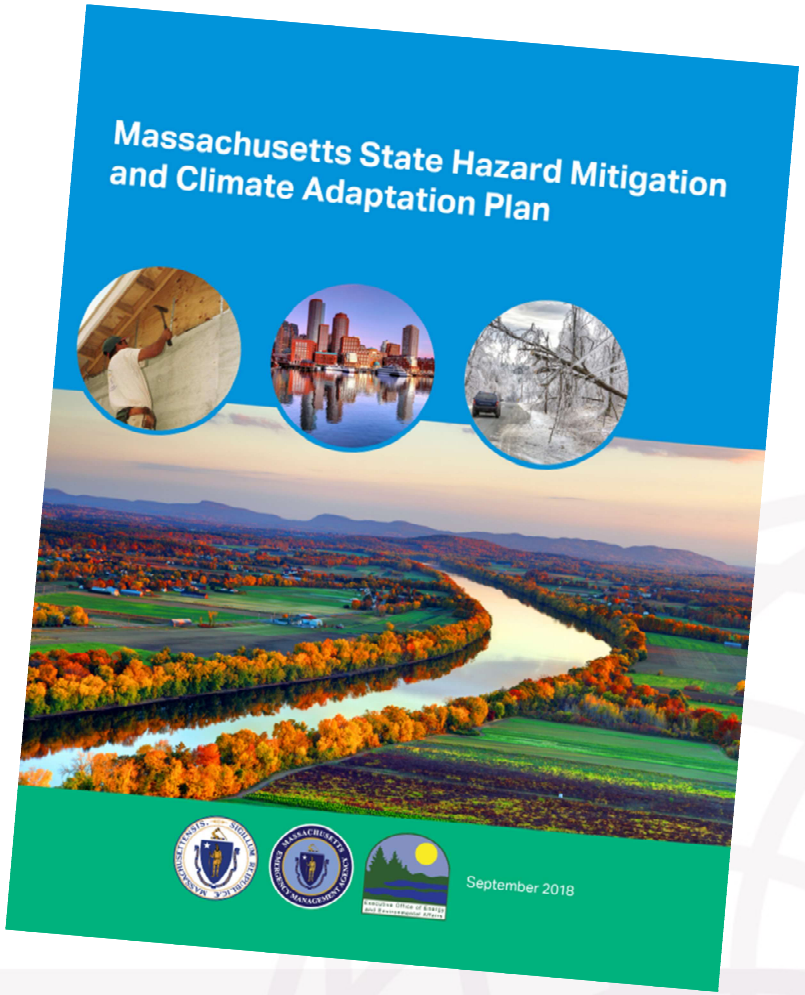
Applicant: Provincetown, Massachusetts
260 Commercial Street
Provincetown, MA 02657

Local Project Manager & Point of Contact:
Timothy J. Famulare
Environmental Planner & Conservation Agent

Phone: 508-487-7000, ext. 554
Email: tfamulare@provincetown-ma.gov

Municipal Vulnerability Preparedness (MVP) Grant Program

- MVP Principles
  - **Community-led process** that employs local knowledge and requires local buy-in and support
  - **Accessible** to everyone
  - **Utilizes partnerships** and leverages existing efforts
  - **Mainstreams** climate change
  - **See communities** as local innovators
  - **Frames** coordinated statewide efforts

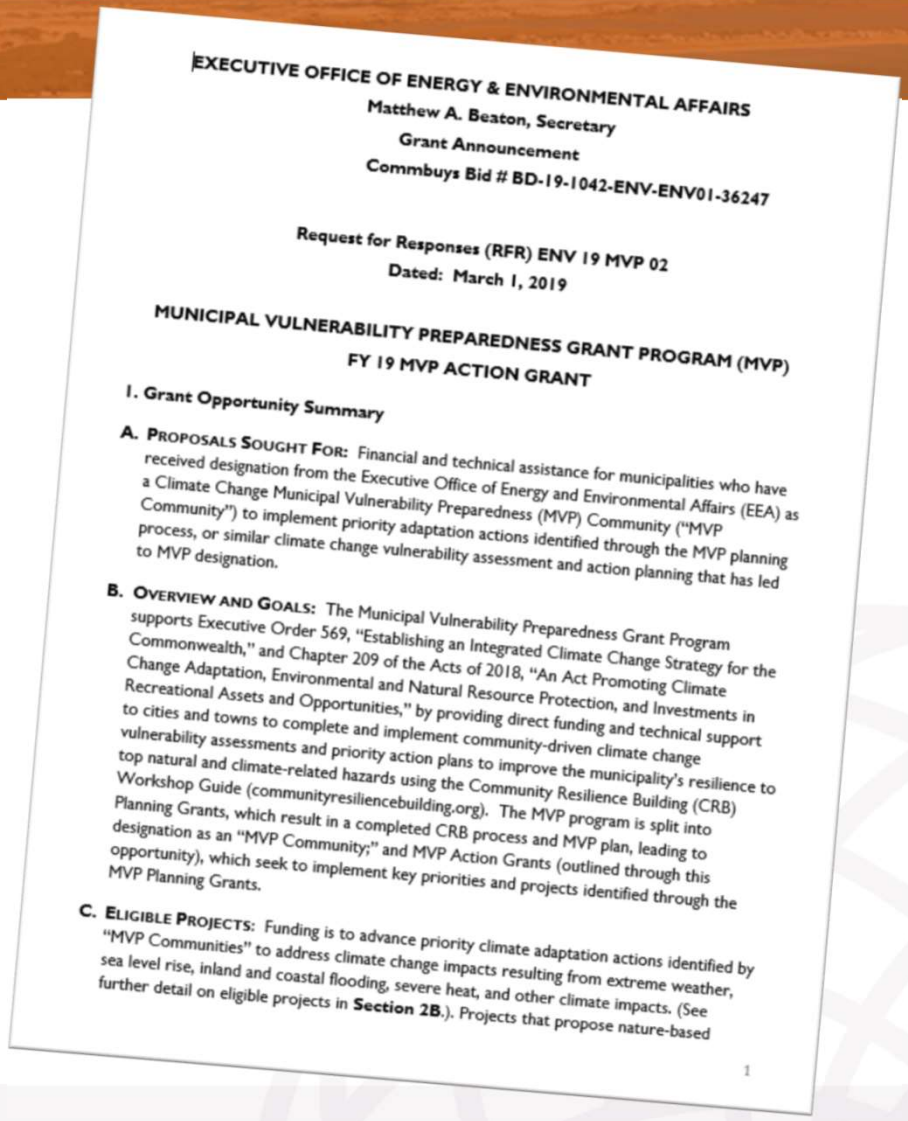


Municipal Vulnerability Preparedness (MVP) Grant Program

- Communities who complete the MVP program become certified as an MVP community and are eligible for potential follow-up grant funding and other opportunities.

MVP Action Grant Program

- Current MVP Action Grant Program open!
- Applications are Due April 19, 2019 – may be a second round for current planning communities where applications are due in June
- Provincetown would be eligible for June because of MVP Planning participation
- Can apply for up to $2,000,000
- Projects that propose nature-based solutions or green infrastructure will receive higher scores
- Eligible projects: detailed vulnerability and risk assessment, public education and communication, local bylaws, redesign and retrofit, nature based storm damage protection, nature based infrastructure, eco restoration



EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
Matthew A. Beaton, Secretary
Grant Announcement
Commbuys Bid # BD-19-1042-ENV-ENV01-36247

Request for Responses (RFR) ENV 19 MVP 02
Dated: March 1, 2019

MUNICIPAL VULNERABILITY PREPAREDNESS GRANT PROGRAM (MVP)
FY 19 MVP ACTION GRANT

1. Grant Opportunity Summary

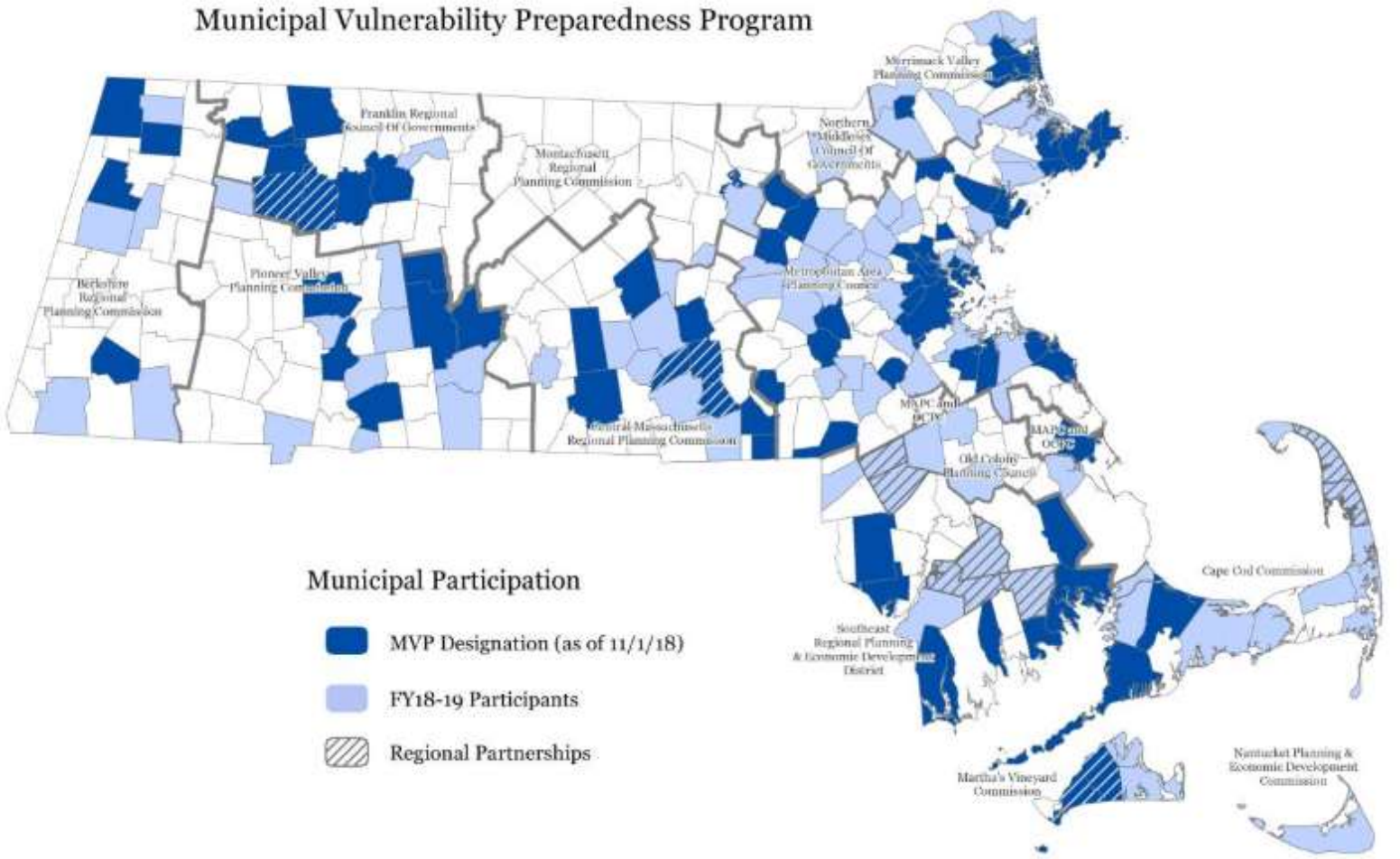
A. PROPOSALS SOUGHT FOR: Financial and technical assistance for municipalities who have received designation from the Executive Office of Energy and Environmental Affairs (EEA) as a Climate Change Municipal Vulnerability Preparedness (MVP) Community ("MVP Community") to implement priority adaptation 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," and Chapter 209 of the Acts of 2018, "An Act Promoting Climate Change Adaptation, Environmental and Natural Resource Protection, and Investments in Recreational Assets and Opportunities," by providing direct funding and technical support to cities and towns to complete and implement community-driven climate change vulnerability assessments and priority action plans to improve the municipality's resilience to top natural and climate-related hazards using the Community Resilience Building (CRB) Workshop Guide (communityresiliencebuilding.org). The MVP program is split into Planning Grants, which result in a completed CRB process and MVP plan, leading to designation as an "MVP Community;" and MVP Action Grants (outlined through this opportunity), which seek to implement key priorities and projects identified through the MVP Planning Grants.

C. ELIGIBLE PROJECTS: Funding is to advance priority climate adaptation actions identified by "MVP Communities" to address climate change impacts resulting from extreme weather, sea level rise, inland and coastal flooding, severe heat, and other climate impacts. (See further detail on eligible projects in **Section 2B**.). Projects that propose nature-based

1

What Other Communities Are in the MVP Program?



Community Resiliency Building Workshop

Community Resiliency Building Workshop

Community Resiliency Building Workshop

- CRB workshop held on March 15, 2019
- Welcome & Overview
- Each Individual Identified Challenges & Goals
- Background Information About Provincetown
- “Inundation Pathways” – Mark Borrelli
- Characterized/Identified Natural Hazards
- Identified Community Vulnerabilities & Strengths
- “The Shifting Sand of Provincetown” - Greg Berman
- Identified & Prioritized Community Actions
- CRB Workshop Recap & Wrap Up

Community Resiliency Building Workshop - Matrix

Community Resilience Building Risk Matrix — www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

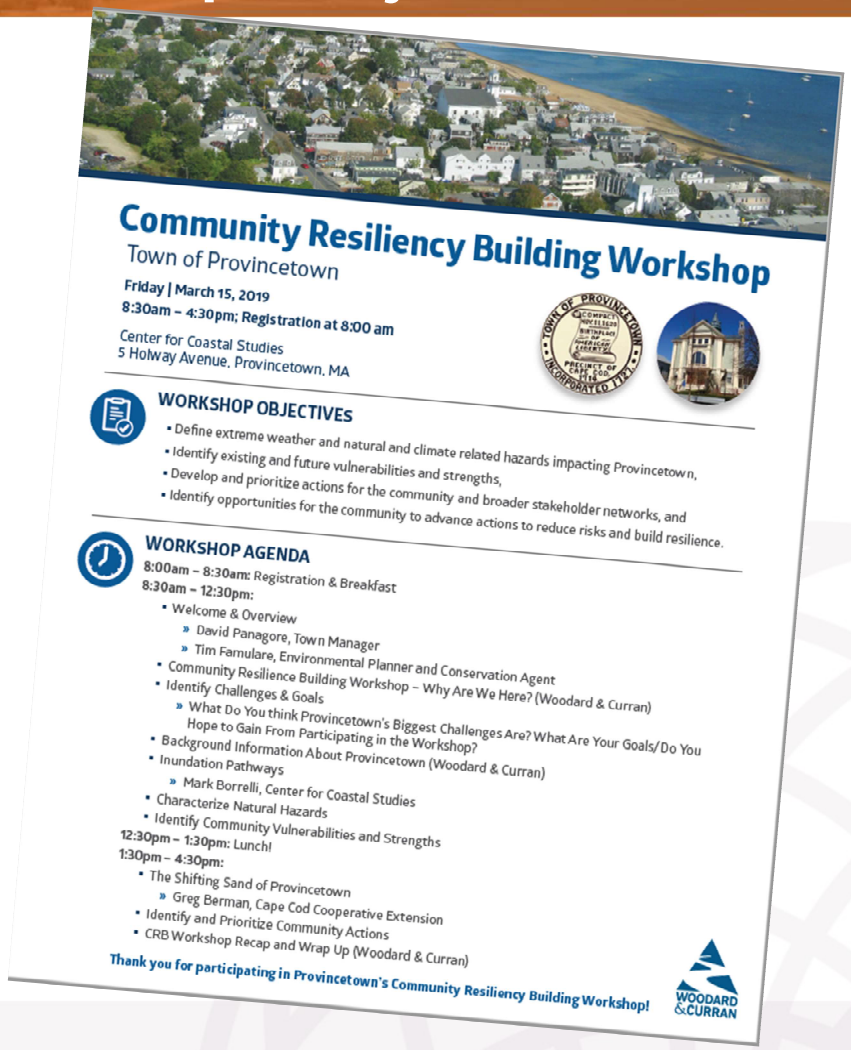
Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	1 Sea level Rise	2 Flooding	3 Severe Storms - Winds	4 Droughts Freshwater	Priority H-M-L	Time Short Long Ongoing
Infrastructural Dikes, Culverts, Bulkheads, outfall pipes & pumps	Town-Wide	Town & Private	V	increase pumps	increase pumps	increase pumps	N/A	H	SLO
Loss of Power	Town-Wide	Public Utility/ Private	V	look @ & implement green solutions →	→	→	→	H	SLO
Roadways	Town-wide	State Town Private	V	elevate roadways	evacuation (seasonal) plan →	→	N/A	H	S
Sewer - Septic	Town-wide	Town Private	V	upgrade to sewer	→	→	use of tech. to reduce H2O use	M	O
Water (Freshwater)	Town wide	Town Private	V	Back up system/ tank	→	→	Desalination tank/system/plant	M	L
Coast Guard	Commercial St.	Fed	S	create evac plan engage	→	→	→		O
Transportation (Emergency)	Town-Wide	All	V	evacuation plan/	→ & more sm. boats & buses & ambulances	→ & roll call program	Check in/roll call on those who can't get water	H	SLO
Societal									
Food - Medicine - Healthcare	Town-Wide	Public & Private	V		mobile medical →		→ Back up	H	SO
Freshwater Shortage & Backup	Town-Wide	Town & Private	V	Back-up system tank →	→		→ conservation & restrictions	M	O
Sheltering	VMCC	Town	V	N/A	expansion for long term solutions →		N/A	M	O
Communications	Town-Wide	All	S & V	Fix & improve existing cell & fiber optic →	→		→	H	SL
House lifting	Flood Zones Coastal	Private & Public	V	Streamline permitting	→	→	N/A	M	O
First Responders	Town-wide	Town, Fed, State, local	S & V	housing/tax incentive to live here to help →	→	→	N/A	H	O
Environmental									
Fires	Town-Wide	All	V	N/A	Upgrade shut off means $		← Fire prevention/ → Code compliance	H	O
Hazardous Materials	Town-Wide	All	V	identify locations & relocate →	→	→		H	O
Disposal of Storm Debris	Town-Wide	Town & Private	V		designated locations inspection protocols, trucking means			M	O
Sewer & Water	Town-Wide	Town & Private	V	Back-up system & upgrade sewer →	→	→		M	O
Wildlife	Seashore & Town-Wide	Public & Private	VS					M	O
Emergency Staging Area(s)	Various Throughout Town	Public & Private	S		identify locations/ private & public options →	→		M	O

Community Resiliency Building Workshop

Community Resiliency Building Workshop - Objectives

- The CRB was designed to help communities achieve the following objectives:
  - Define extreme weather and natural and climate related hazards
  - Identify existing and future vulnerabilities and strengths
  - Develop and prioritize actions for the community
  - Identify opportunities to take action to reduce risk and build resilience



Community Resiliency Building Workshop

Town of Provincetown

Friday | March 15, 2019
8:30am – 4:30pm; Registration at 8:00 am

Center for Coastal Studies
5 Holway Avenue, Provincetown, MA

WORKSHOP OBJECTIVES

- Define extreme weather and natural and climate related hazards impacting Provincetown,
- Identify existing and future vulnerabilities and strengths,
- Develop and prioritize actions for the community and broader stakeholder networks, and
- Identify opportunities for the community to advance actions to reduce risks and build resilience.

WORKSHOP AGENDA

8:00am – 8:30am: Registration & Breakfast
8:30am – 12:30pm:
- Welcome & Overview
  - » David Panagore, Town Manager
  - » Tim Famulare, Environmental Planner and Conservation Agent
- Community Resilience Building Workshop – Why Are We Here? (Woodard & Curran)
- Identify Challenges & Goals
  - » What Do You think Provincetown's Biggest Challenges Are? What Are Your Goals/Do You Hope to Gain From Participating in the Workshop?
- Background Information About Provincetown (Woodard & Curran)
- Inundation Pathways
  - » Mark Borrelli, Center for Coastal Studies
- Characterize Natural Hazards
- Identify Community Vulnerabilities and Strengths

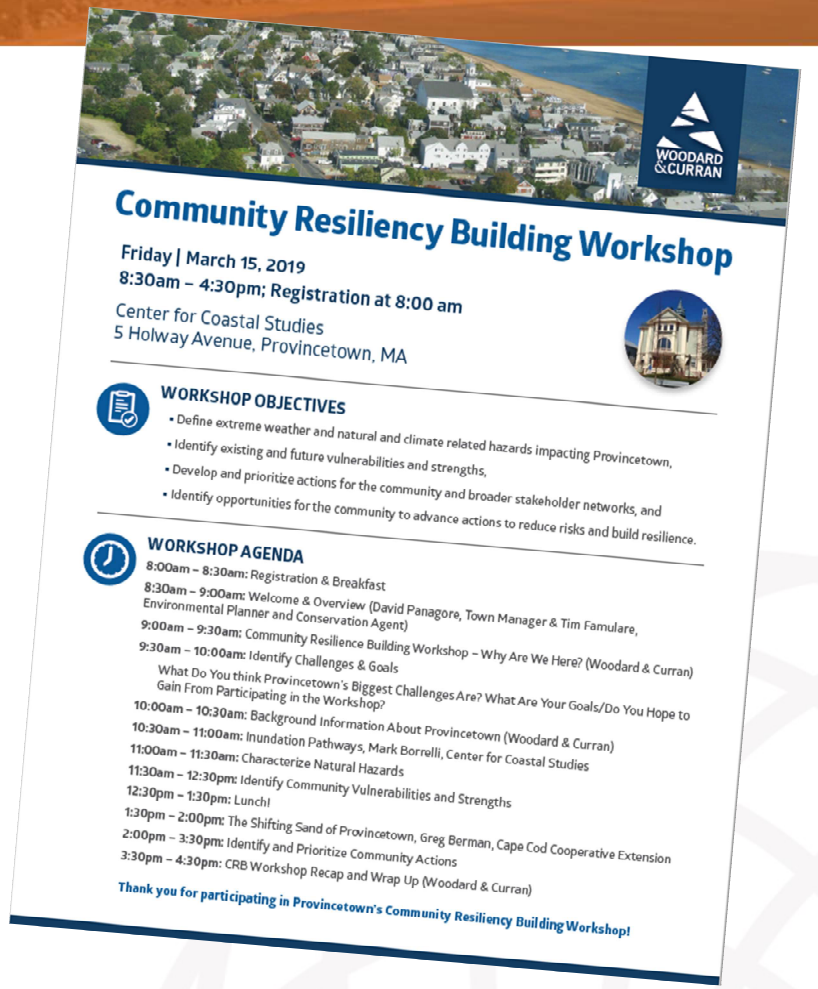
12:30pm – 1:30pm: Lunch!
1:30pm – 4:30pm:
- The Shifting Sand of Provincetown
  - » Greg Berman, Cape Cod Cooperative Extension
- Identify and Prioritize Community Actions
- CRB Workshop Recap and Wrap Up (Woodard & Curran)

Thank you for participating in Provincetown's Community Resiliency Building Workshop!

WOODARD & CURRAN

We worked together to….

- Understand connections between ongoing community issues, climate change, natural hazards and local planning and actions
- Understand how climate change will exacerbate or lead to new community issues, hazards and challenges
- Identify infrastructural, societal, environmental vulnerabilities and strengths that help Provincetown become more resilient
- Explore nature-based solutions to build resiliency
- Develop and prioritize actions that delineate next steps for the community
- Identify how Provincetown can advance actions to reduce risks and impacts of climate change and increase local and regional resilience



WOODARD & CURRAN

Community Resiliency Building Workshop

Friday | March 15, 2019
8:30am – 4:30pm; Registration at 8:00 am

Center for Coastal Studies
5 Holway Avenue, Provincetown, MA

WORKSHOP OBJECTIVES

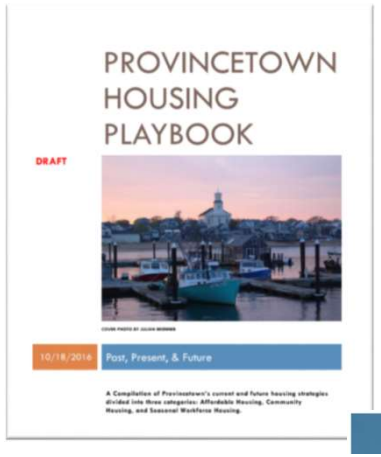
- Define extreme weather and natural and climate related hazards impacting Provincetown,
- Identify existing and future vulnerabilities and strengths,
- Develop and prioritize actions for the community and broader stakeholder networks, and
- Identify opportunities for the community to advance actions to reduce risks and build resilience.

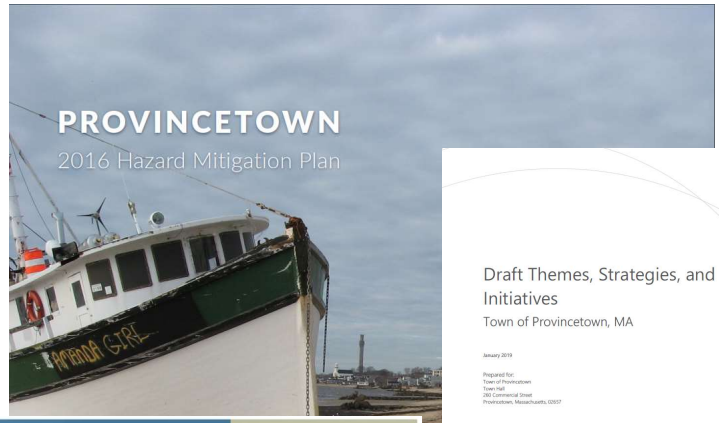
WORKSHOP AGENDA

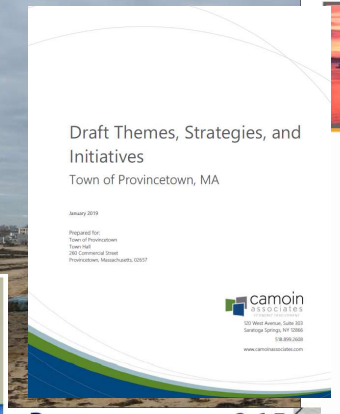
8:00am – 8:30am: Registration & Breakfast
8:30am – 9:00am: Welcome & Overview (David Panagore, Town Manager & Tim Famulare, Environmental Planner and Conservation Agent)
9:00am – 9:30am: Community Resilience Building Workshop – Why Are We Here? (Woodard & Curran)
9:30am – 10:00am: Identify Challenges & Goals
What Do You think Provincetown's Biggest Challenges Are? What Are Your Goals/Do You Hope to Gain From Participating in the Workshop?
10:00am – 10:30am: Background Information About Provincetown (Woodard & Curran)
10:30am – 11:00am: Inundation Pathways, Mark Borrelli, Center for Coastal Studies
11:00am – 11:30am: Characterize Natural Hazards
11:30am – 12:30pm: Identify Community Vulnerabilities and Strengths
12:30pm – 1:30pm: Lunch!
1:30pm – 2:00pm: The Shifting Sand of Provincetown, Greg Berman, Cape Cod Cooperative Extension
2:00pm – 3:30pm: Identify and Prioritize Community Actions
3:30pm – 4:30pm: CRB Workshop Recap and Wrap Up (Woodard & Curran)

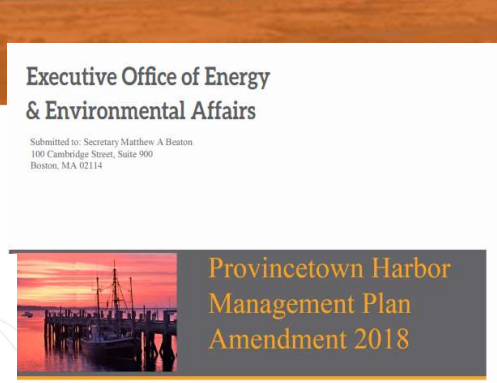
Thank you for participating in Provincetown's Community Resiliency Building Workshop!

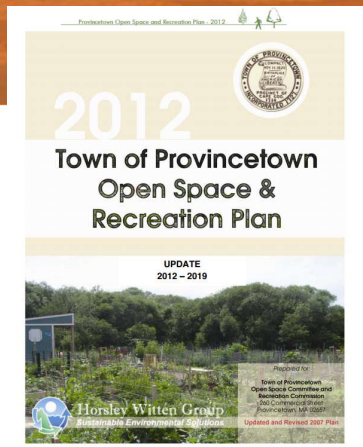
Recent Planning Efforts

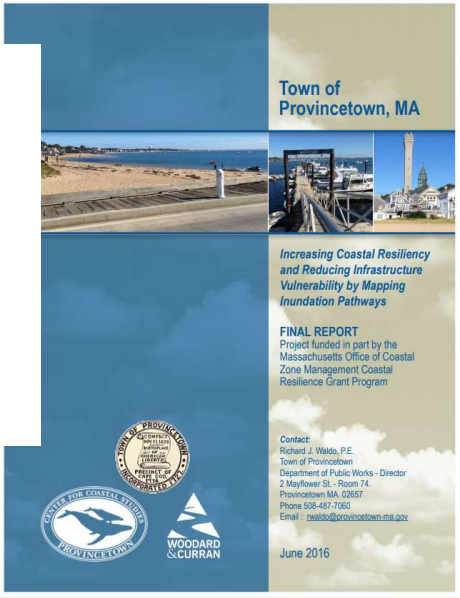


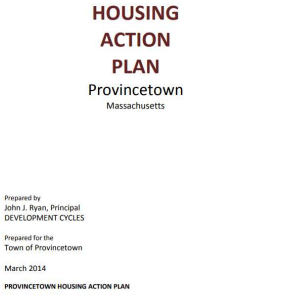












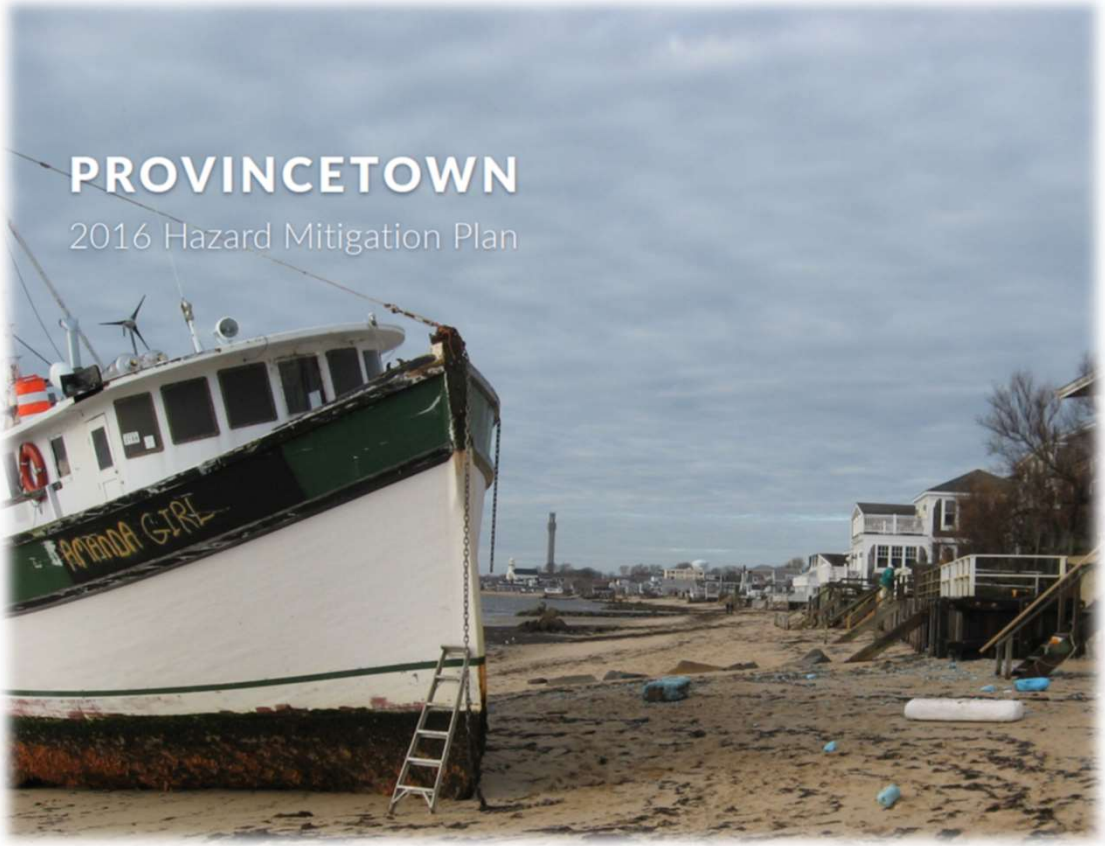
Shank Painter Road
Corridor Study
Provincetown

September 2012

CAPE COD COMMISSION

Natural Hazards Impacting Provincetown

- Coastal Erosion
- Fire
- Flood
- Hurricane/Tropical Storms
- Landslide
- Nor'easters
- High Winds
- Thunderstorms
- Extreme Temperatures (heat, cold)
- Drought
- Culvert Failure
- Severe Winter Weather
- Sea Level Rise
- Climate Change



CRB Workshop – What We Heard From YOU!

- Challenges
  - Flooding
  - Sea level rise
  - Preserving coastline
  - Maintaining business community and property values
  - Sewer system vulnerability
  - Sand management
  - Erosion
  - Management development pressures and fragile natural environment
  - Geographic vulnerability
  - Redundant water (and groundwater contamination)

- Challenges
  - Isolation
  - Evacuation (Route 6)
  - Inadequate drainage
  - Prioritizing needs
  - Resources (staff, financial) to address needs
  - Preservation town character
  - Building consensus
  - Long term economic position
  - Storm mitigation
  - Zoning bylaws need updating

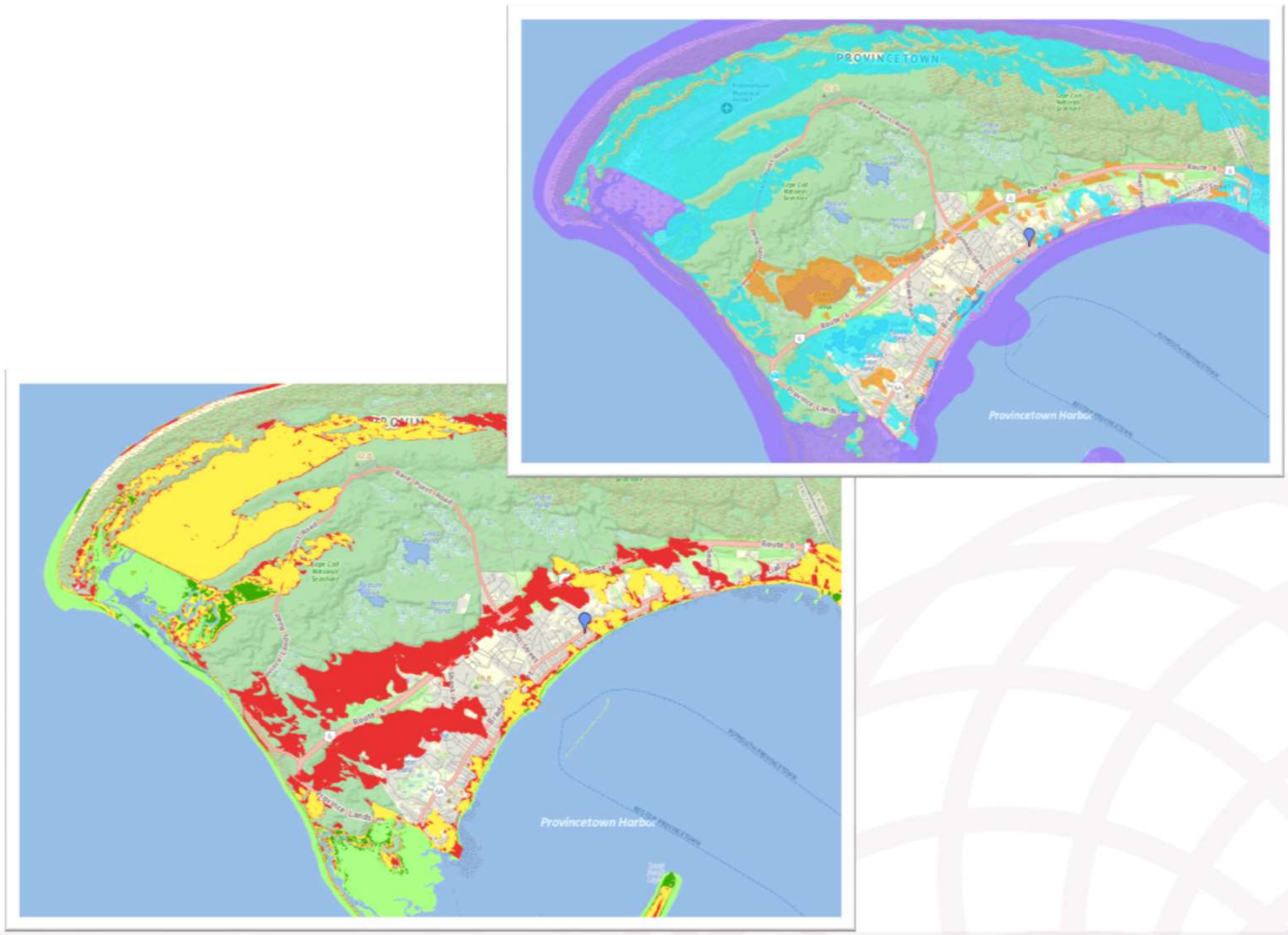
CRB Workshop – What We Heard From YOU!

- Goals
  - Hear others concerns and learn
  - Think about solutions
  - Contribute to defining protective measures for the community
  - Proactive planning and build connections
  - Understand community options for improved resiliency and the path forward
  - Community concerns about vulnerable areas
  - Prevent future structural damage
  - Identify talking points to share with others and engage

- Goals
  - Improved understanding of community challenges
  - Identify practical solutions that will work
  - Focus on nature based solutions
  - Start small and lead to larger results
  - Learn - what can I do?
  - Build community
  - Be educated
  - Witness the process
  - Leave the workshop feeling positive
  - Start to develop a long term plan

Community Resiliency Building Workshop - Outcomes

- Top Natural Hazards Identified By Participants
  - **Flooding**
  - **Sea Level Rise**
  - **Severe Storms/Wind**
  - Coastal Erosion
  - Drought
  - Fire
  - Extreme Heat/Cold

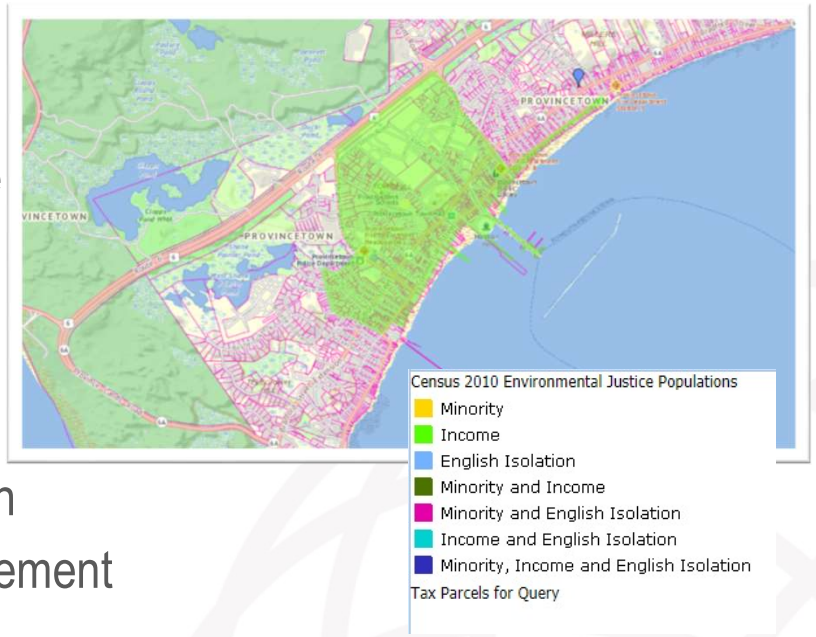


CRB Workshop – Infrastructure Vulnerabilities

- Utilities
  - Sewer System
  - Water System
  - Power Supply
- Roadways
- Sewer System
- Coast Guard Station
- Transportation Routes
- Municipal Structures
- Access to Shelters
- MacMillan Pier
- Airport
- Residential Structures
- Emergency Services
- Waterfront Structures
- Communication

CRB Workshop – Societal Vulnerabilities

- Food
- Medicine
- Health Care
- Freshwater Shortage & Backup
- Shelters
- Communications
- Elevating Homes
- Availability of First Responders
- Economic Impacts to Homes and Businesses
- Summer Evacuations/Tourism
- Environmental and Health Concerns Including Chemical Hazards
- Pet Evacuation
- Environmental Justice Populations
- Religious Groups
- Other Vulnerable Populations
- Regional Collaboration
- Education and Engagement
- Isolation



CRB Workshop – Environmental Vulnerabilities

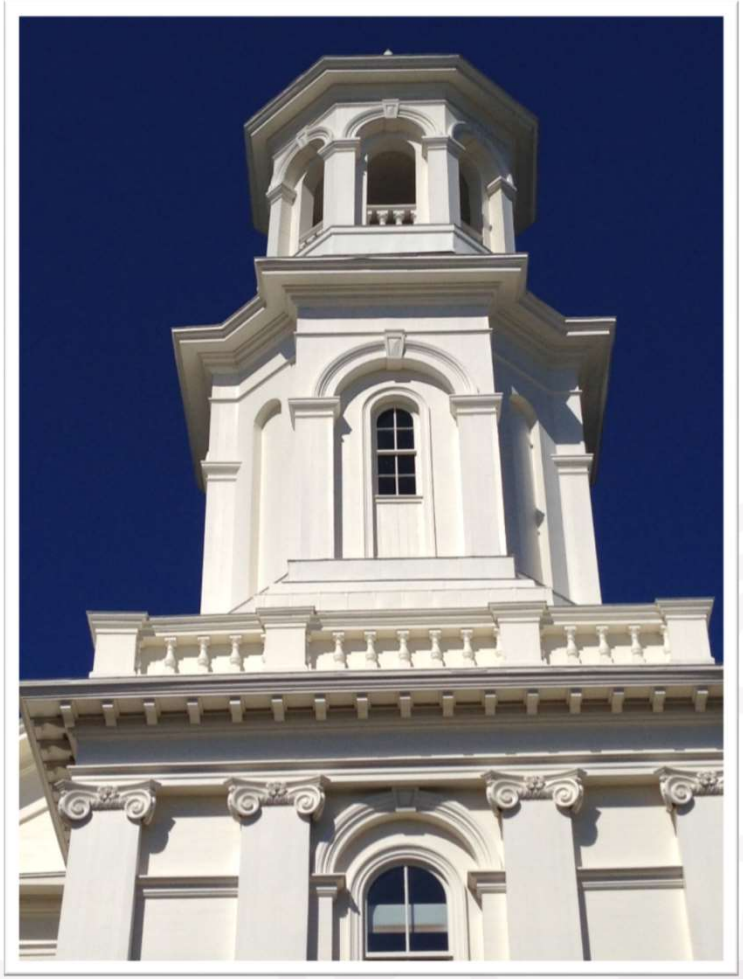
- Fire
- Hazardous Materials & Chemical Releases
- Disposal Storm Debris
- Sewer & Water
- Wildlife
- Emergency Staging Areas
- Erosion
- Loss of Vegetation, Trees
- Salt Water Corrosion
- Harbor Pollution
- Beach Closures
- Ground Water Quality
- Dune Systems
- Harbor Water Quality
- Wind Impacts
- Coastal Management
- Soil Retention/Stability
- Contamination

CRB Workshop – Infrastructure Strengths

- Public Sewer
- Public Water
- Communication from DPW
- Police, Fire, Rescue
- Existing Developed Property Contributing to Tax Base
- Roads | Evacuation Routes
- Municipal Structures | Town Hall
- Access to Shelter
- MacMillan Pier and Airport (supply line access if needed)
- Coast Guard

CRB Workshop – Societal Strengths

- Communication
- First Responders
- Access to Healthcare
- Economic Impact of Homes and Businesses
- Faith Groups
- Emergency Management
- Regional Collaboration
- Education & Engagement
- Community
- Tourism Population



CRB Workshop – Environmental Strengths

- Wildlife
- Emergency Staging Areas
- Existing Natural Areas (Trees, Vegetation)
- Coastal Wetlands
- Dune Systems
- Wind as a Renewable Resource
- Coastal Protection
- Beaches
- Sand Transport
- National Seashore & Open Space

Community Resiliency Building Workshop - Outcomes

- Top 3 Recommendations to Improve Resiliency
  - Used Dot Exercise to refine the top priorities

Rank	Action	
1	Utilities (Sewer, Water, Septic, Drainage) (received 78 dots)	Maintain, upgrade, hardening and reinforcing existing utilities.
2	Beach Management & Nourishment and Coastal Infrastructure (received 47 dots)	Developing a comprehensive beach sediment and nourishment plan focused on shoreline management and sand management is critical.
3	Natural Infrastructure Solutions (received 44 dots)	Focusing on natural infrastructure solutions throughout the community including improving groundwater conditions, using native trees and plants to support drainage and improve stabilization of soils and any future heat island impacts.

Community Resiliency Building Workshop - Outcomes

- Other Recommendations to Improve Resiliency
  - Used Dot Exercise to refine the top priorities

Rank	Action	
4	Emergency Management (received 36 dots)	Develop a comprehensive evacuation and emergency management plan.
5	Individual Household Assessments (received 20 dots)	Working with homeowners to educate them about resiliency challenges in Provincetown
6	Food, Medicine, Healthcare (received 20 dots)	Develop a plan for both acute and chronic issues that could occur in Provincetown and impact access to food, medicine and healthcare.
7	Shank Painter (received 13 dots)	Evaluate the Shank Painter inundation pathway.

Community Resiliency Building Workshop – Q & A

- What questions do you have?
- What comments do you have?
- Can we clarify something for you?
- What else do you want to make sure we capture through this CRB process?
- Do you have feedback or a question you would like to submit via notecard?

Next Steps

- Conduct workshop with Environmental Justice area residents
- Conduct workshop with seasonal residents
- Finalize CRB report and submit to EEA
- Upon review of CRB report by EEA, become a Certified MVP Community
- Seek out and apply for funding opportunities through grant programs for MVP communities (next opportunity June 2019!)
- Seek out and continue to apply for funding opportunities through other grant programs – CZM, PDM, FMA
- Prepare annual progress reports on MVP Implementation progress
- Continue to communicate with and engage Provincetown community in resiliency discussions and decisions

Thank You!

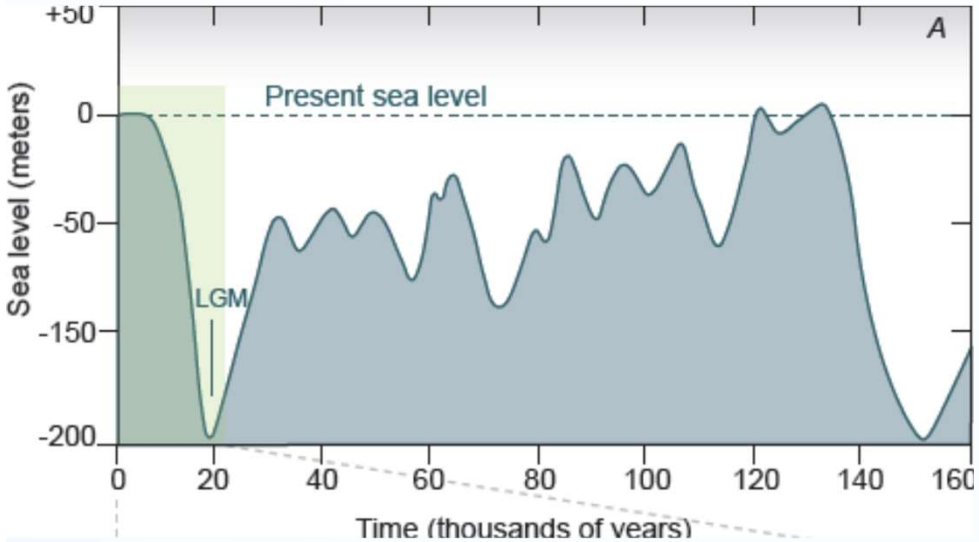
The Shifting Sand of Provincetown

Greg Berman

(Woods Hole Sea Grant & Cape Cod Cooperative Extension)

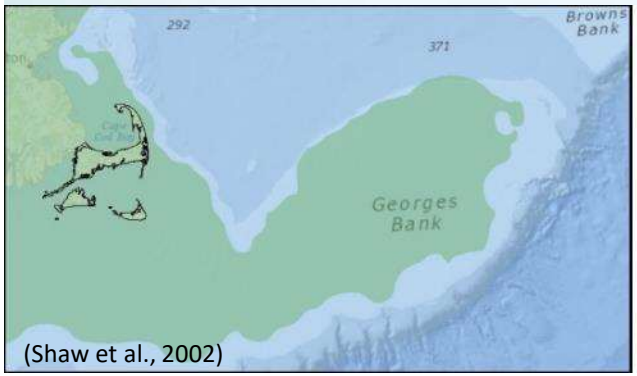
March 15, 2019

Glacial History



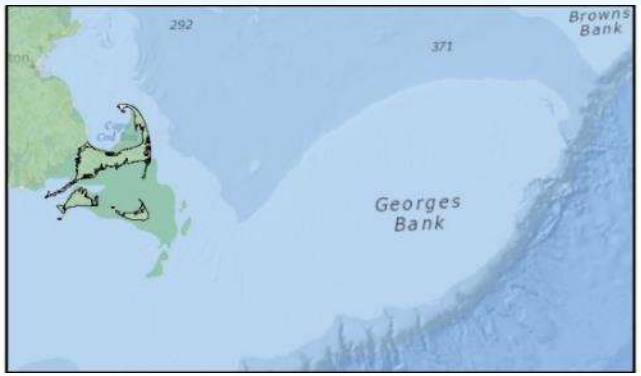
25,000 yr ago
400’ below SL, ~1 mile thick
By ~ 15,000 ice was gone.

11,000 years ago

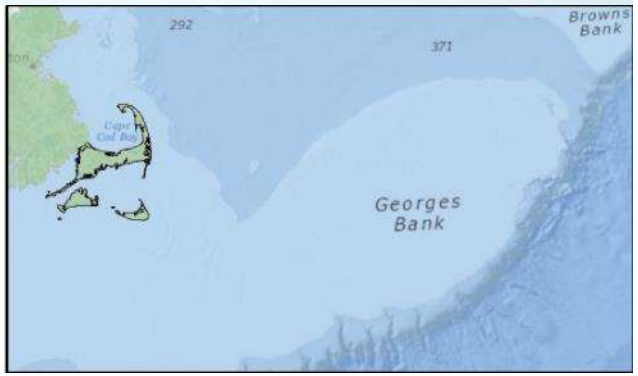


(Shaw et al., 2002)

6,000 years ago

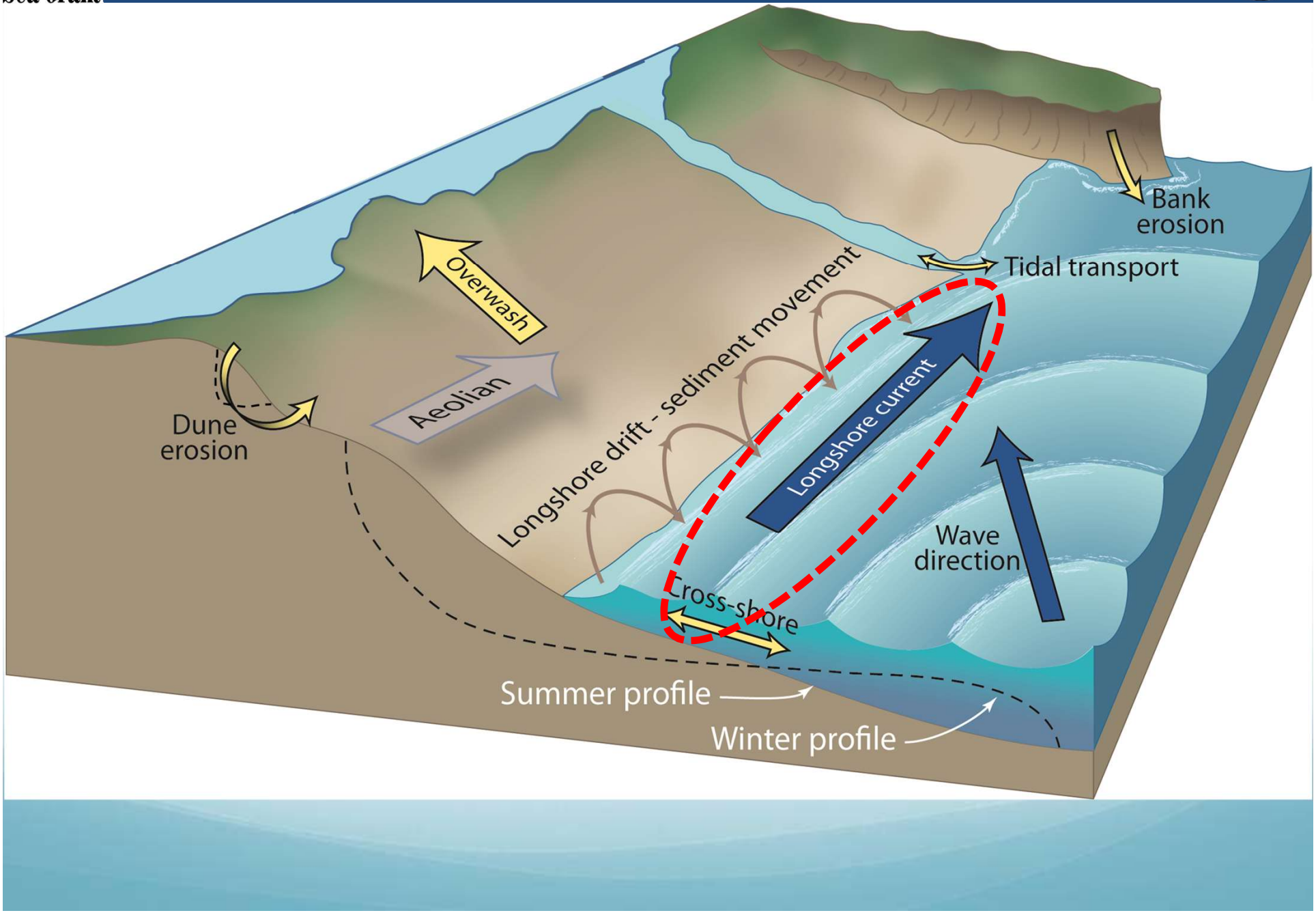


Present Day

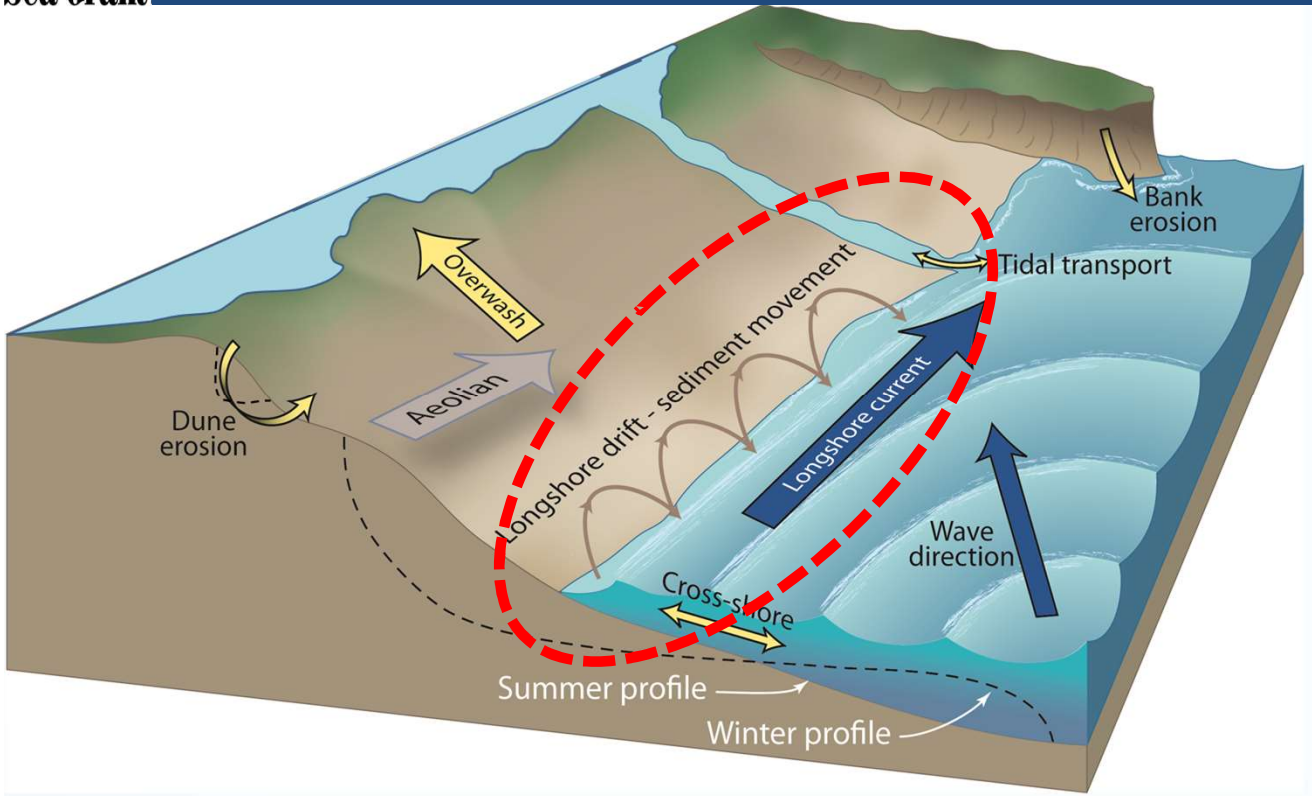


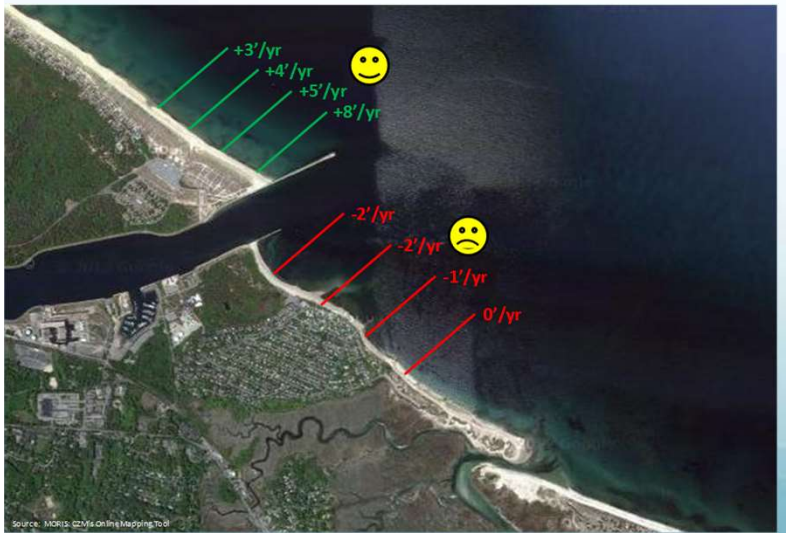
Arm of Cape Cod being reshaped over time ...

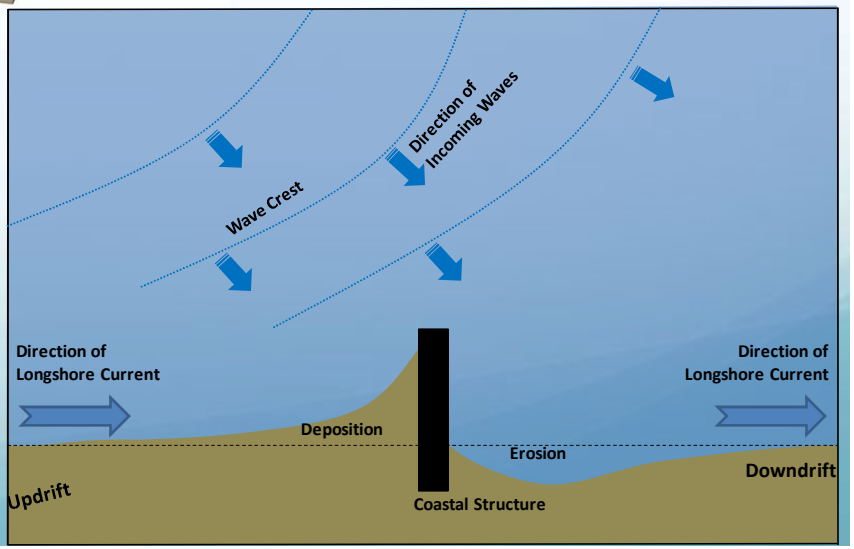
General Coastal Processes



Longshore Sediment Transport

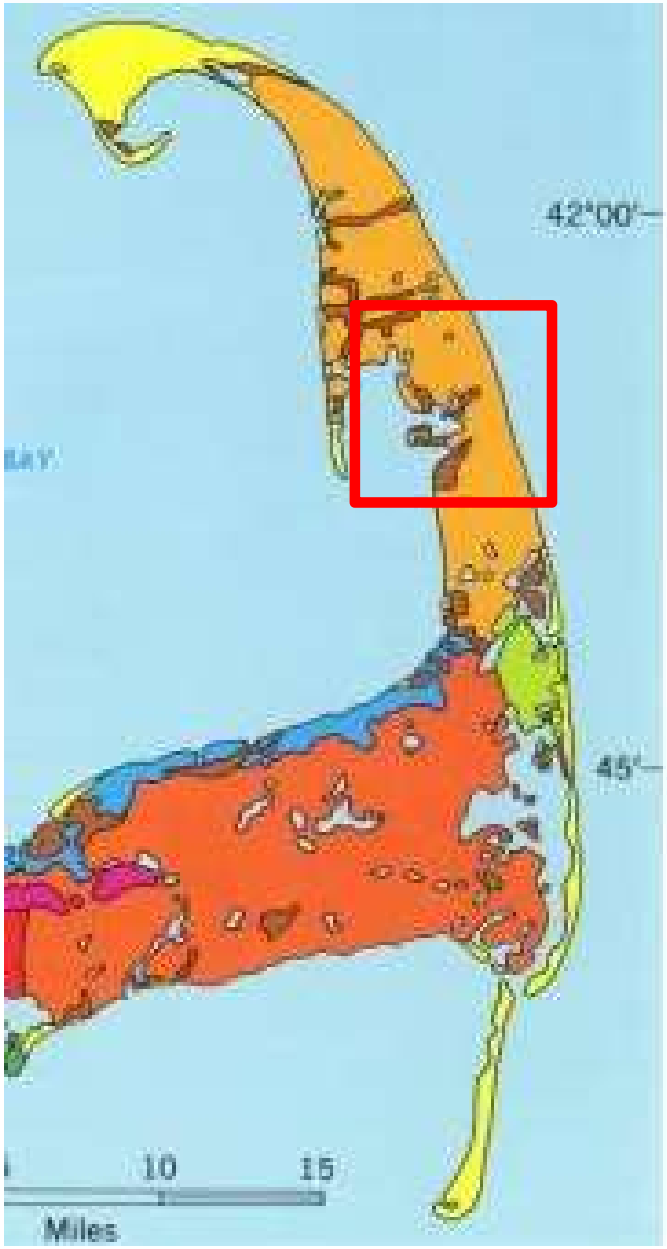


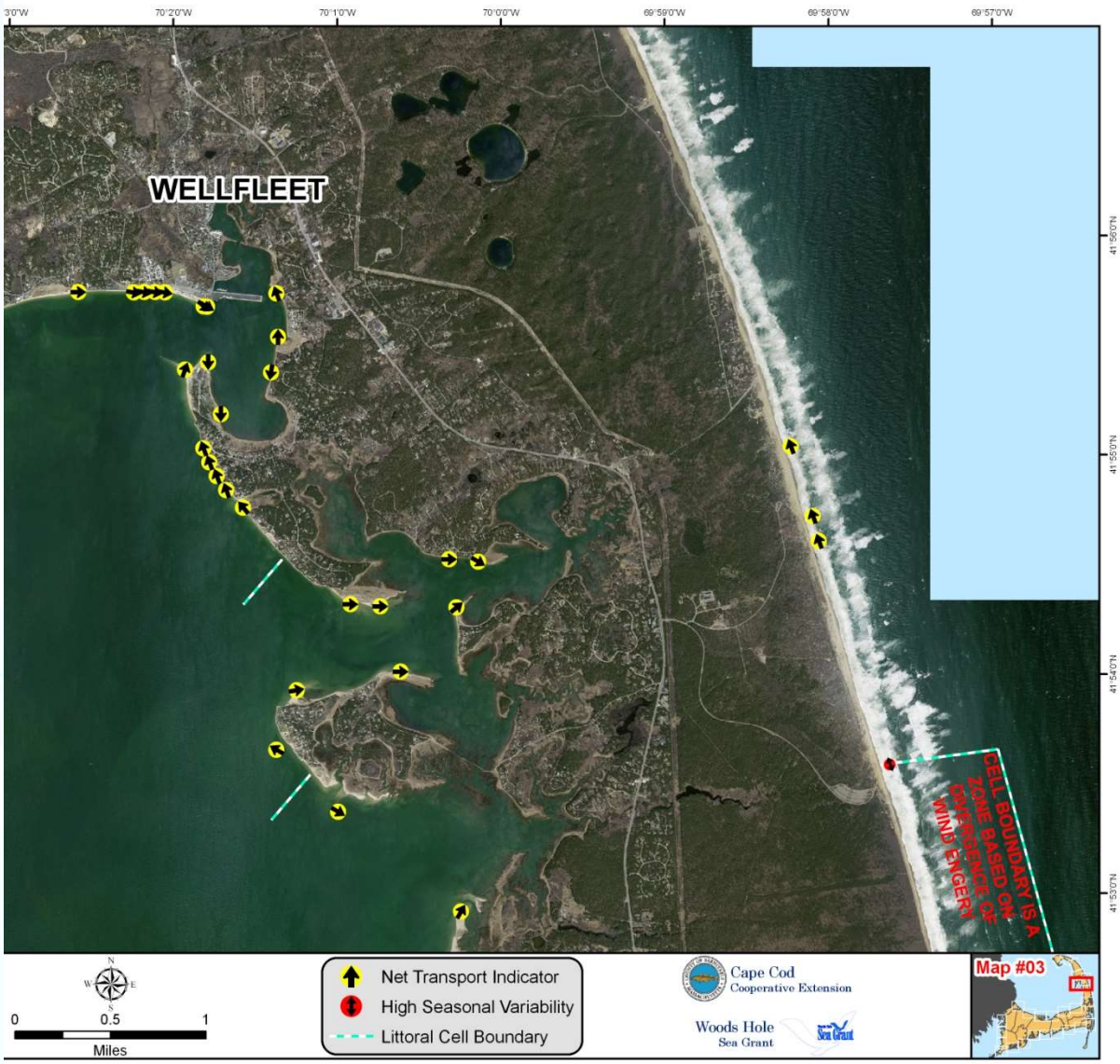




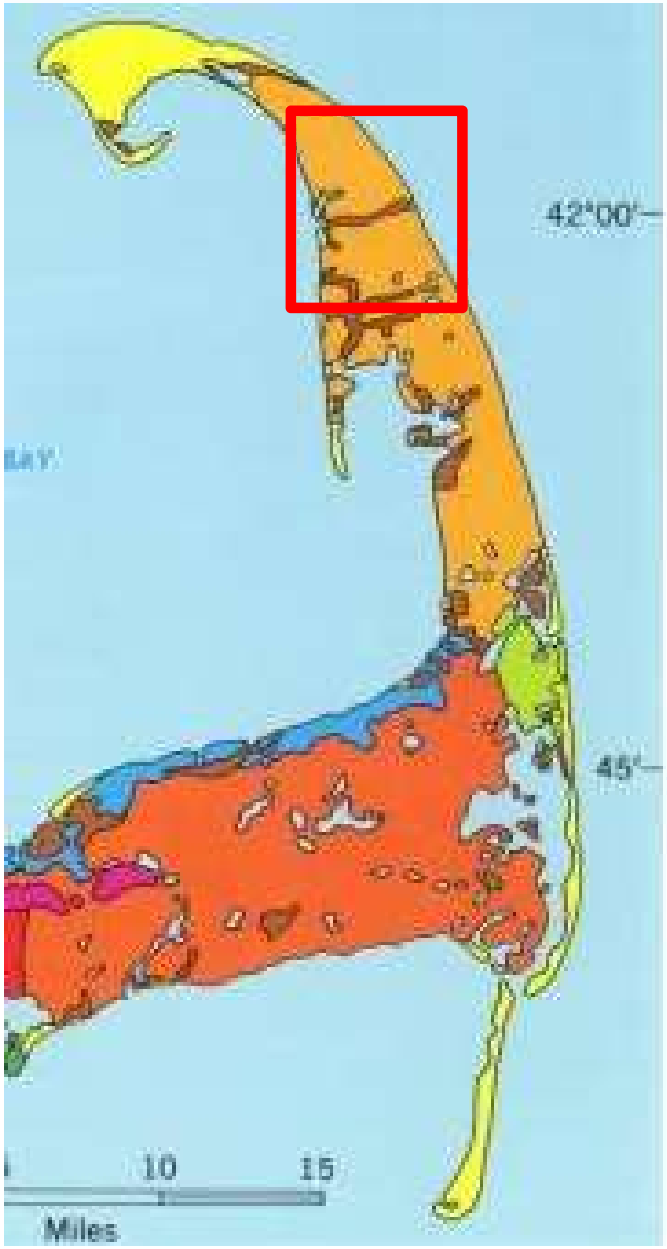
Longshore Sediment Transport

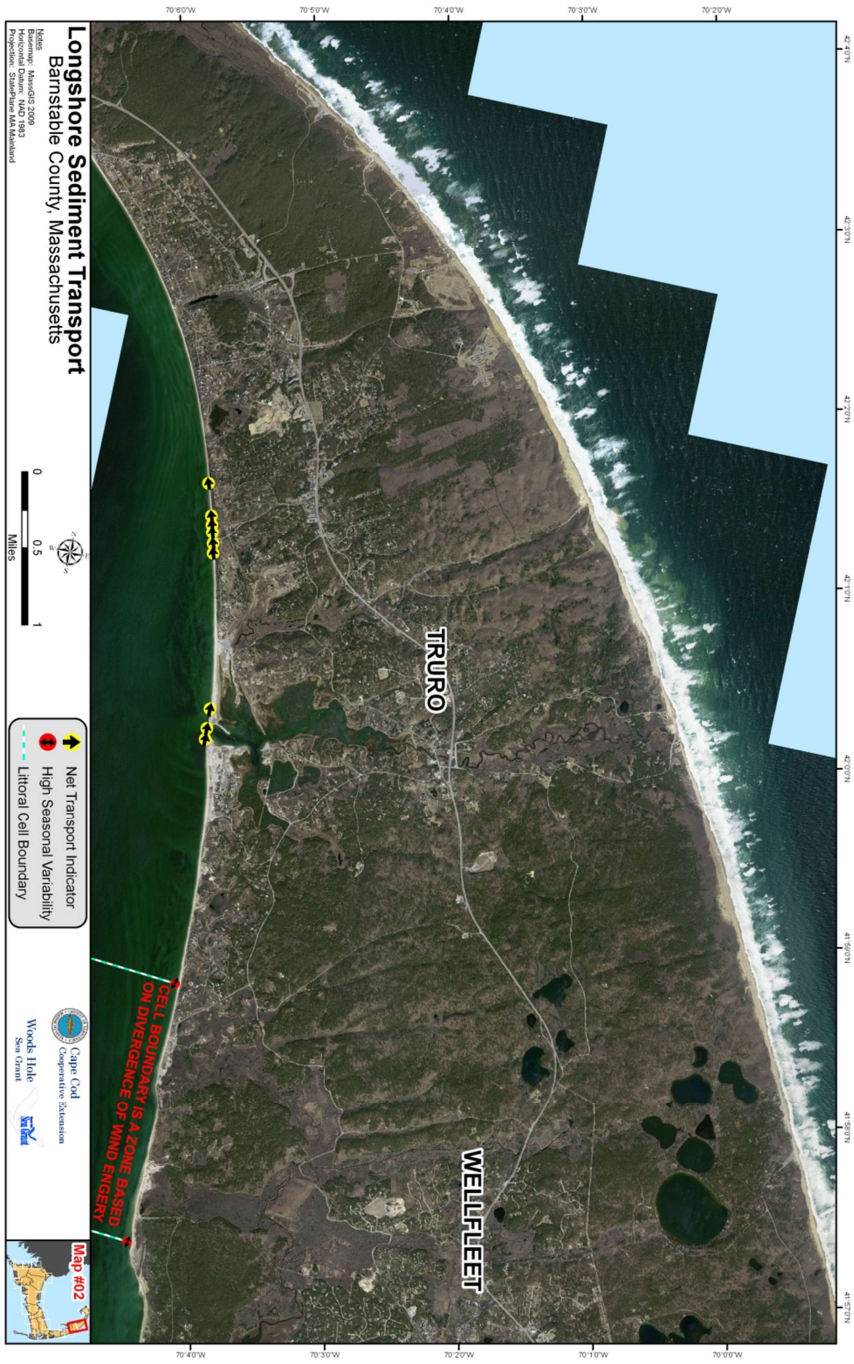
Longshore Sediment Transport



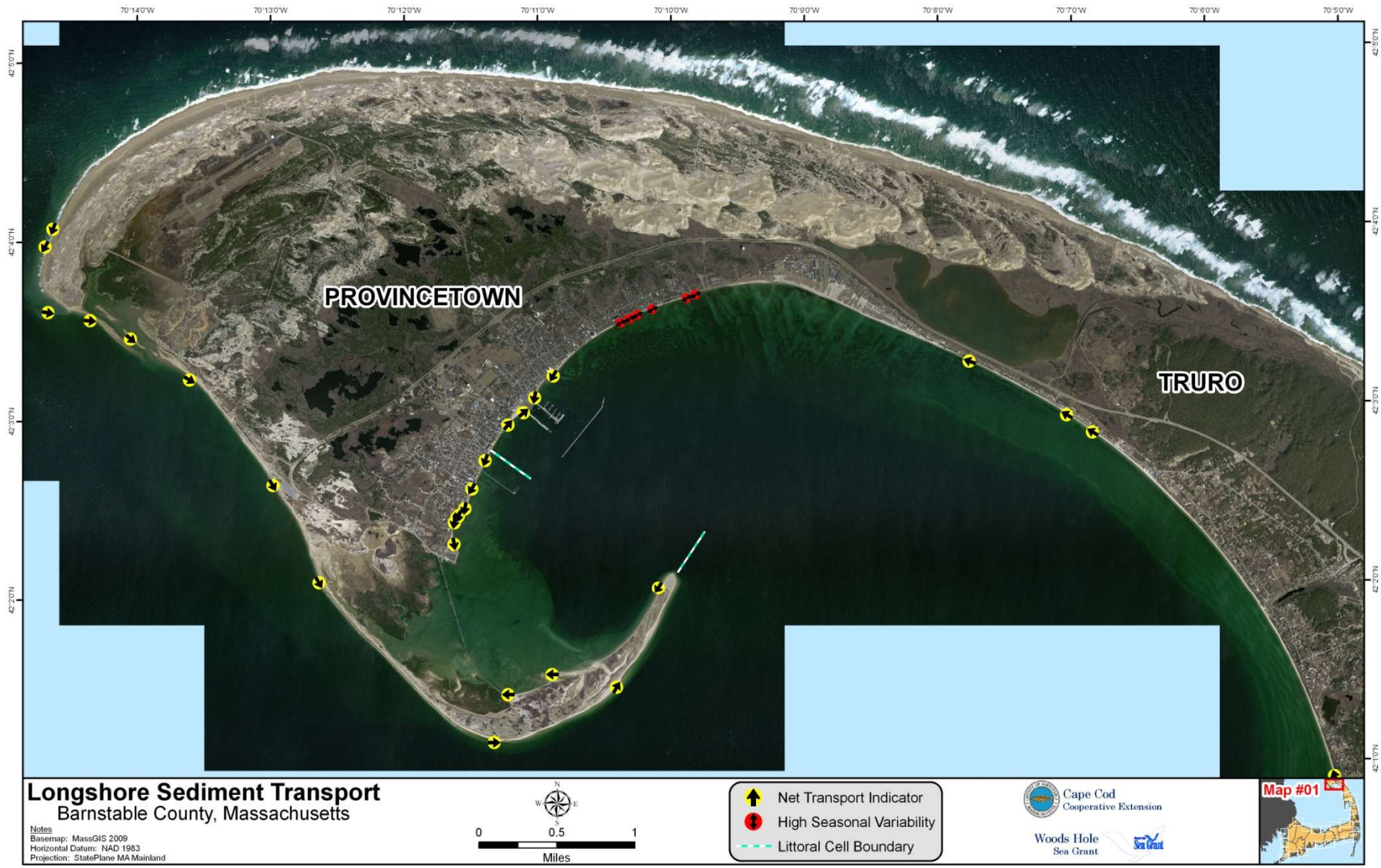


Longshore Sediment Transport





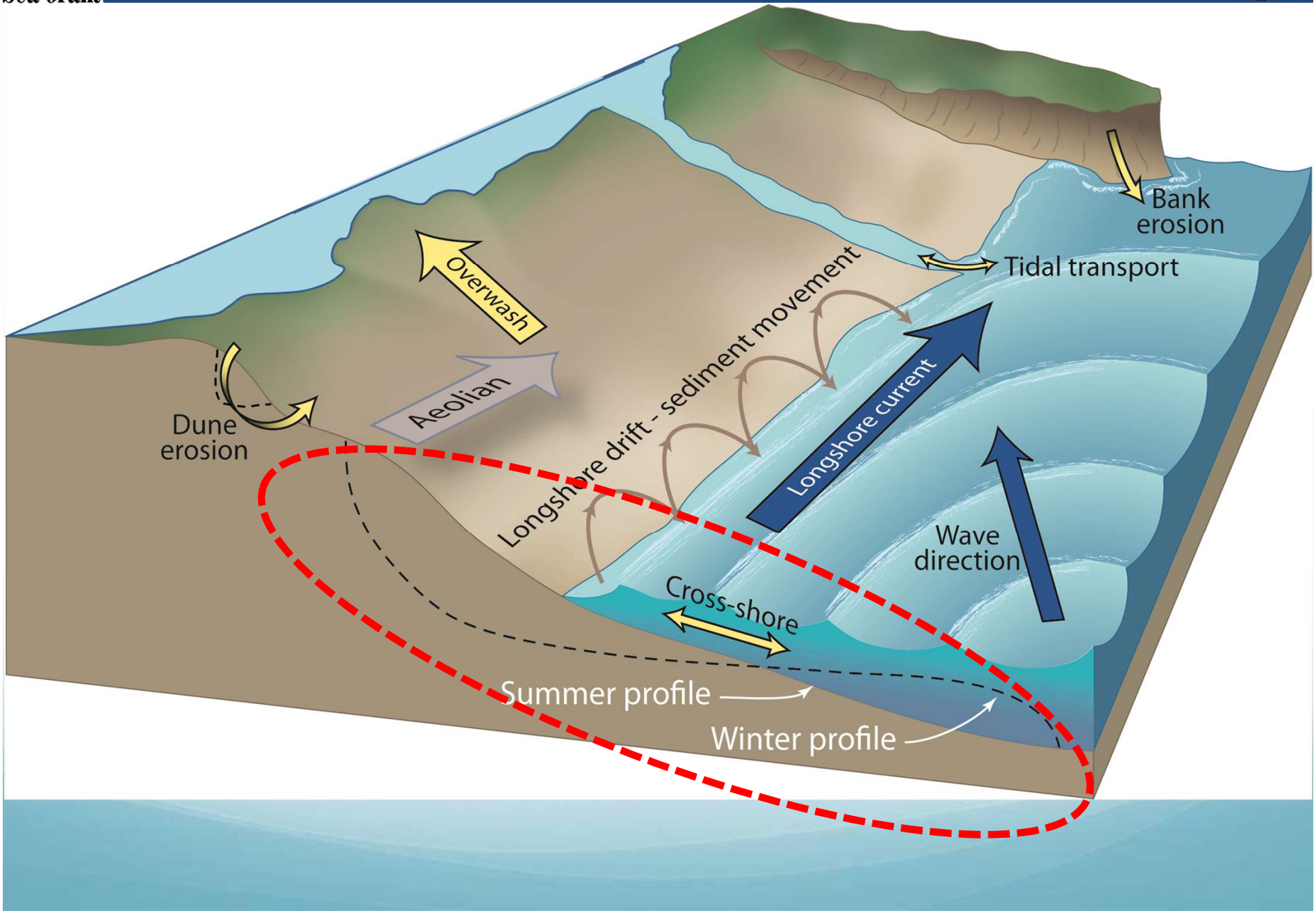
Longshore Sediment Transport



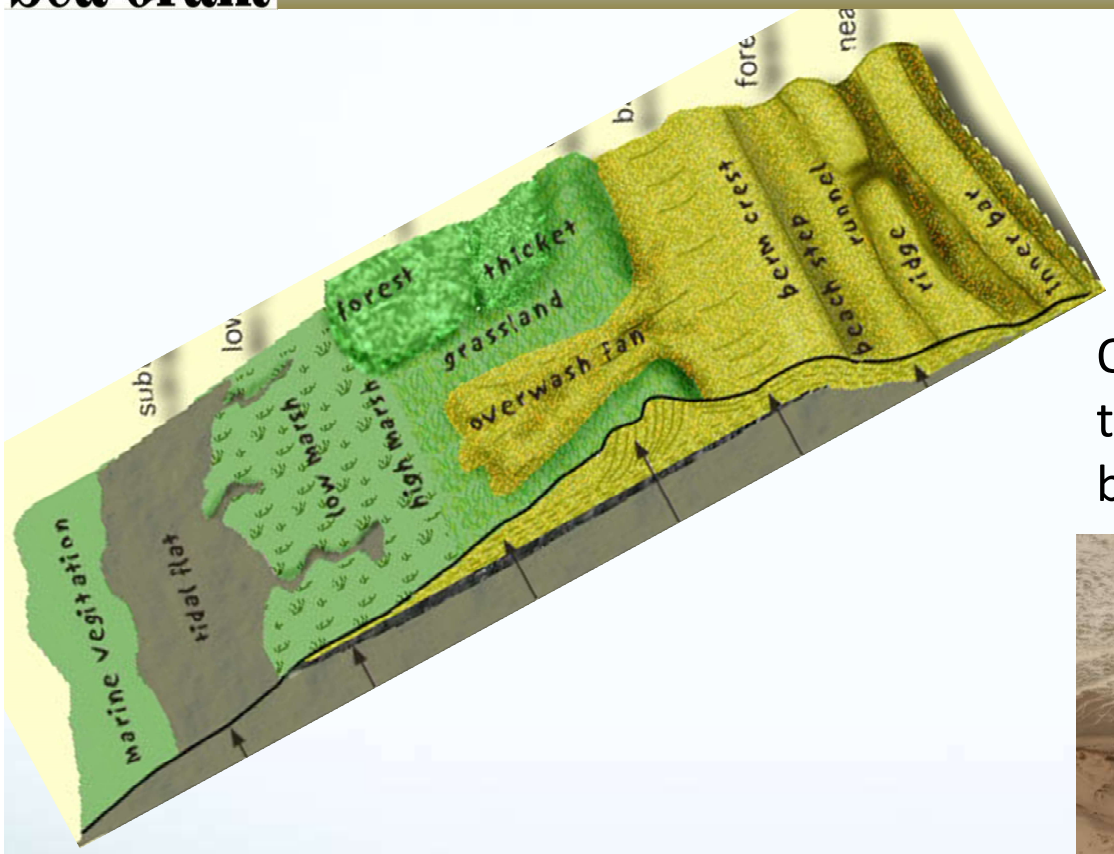
Longshore Sediment Transport

Google Earth Engine: Timelapse is a global, zoomable video that lets you see how the Earth has changed over the past 32 years. It is made from 33 cloud-free annual mosaics, one for each year from 1984 to 2016, which are made interactively explorable by Carnegie Mellon University CREATE Lab's Time Machine library.

General Coastal Processes

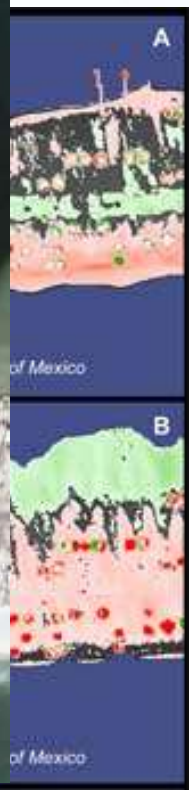


Coastal Processes: Barrier Migration Perpendicular to Shore



Waves

Overwash: Storms push sand across the island and into the lagoon area beyond. Barrier `rolls over on itself.'

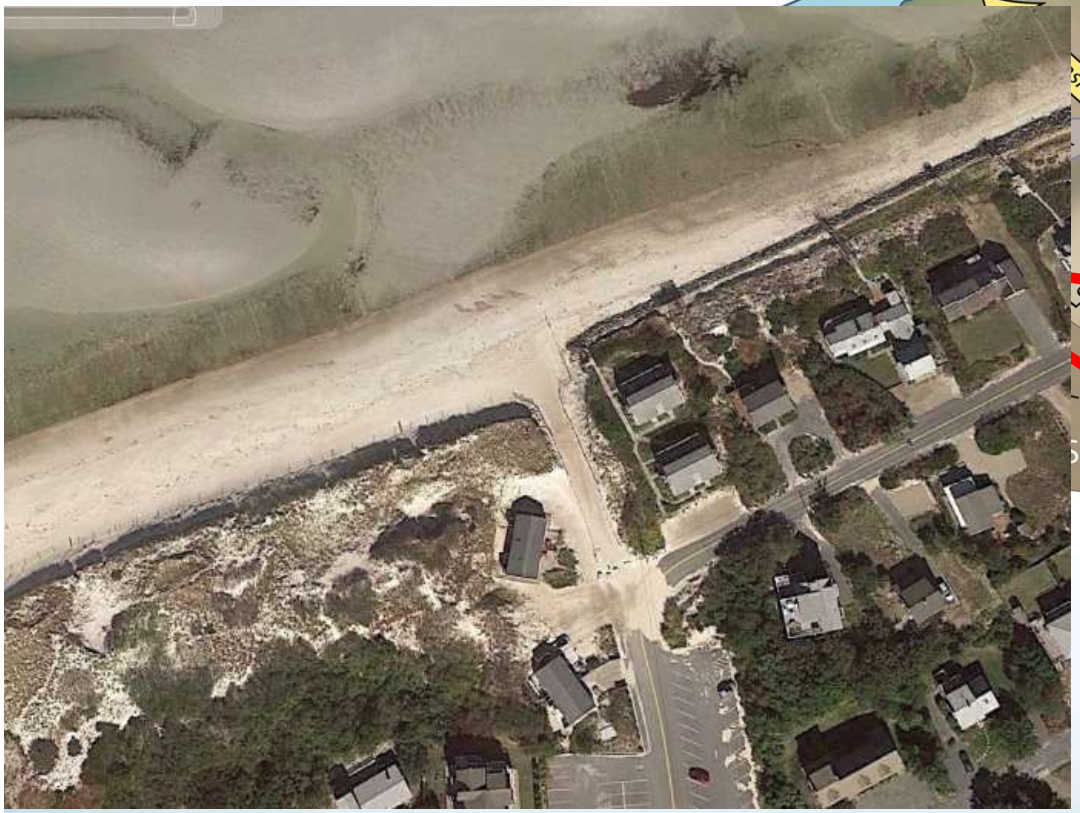


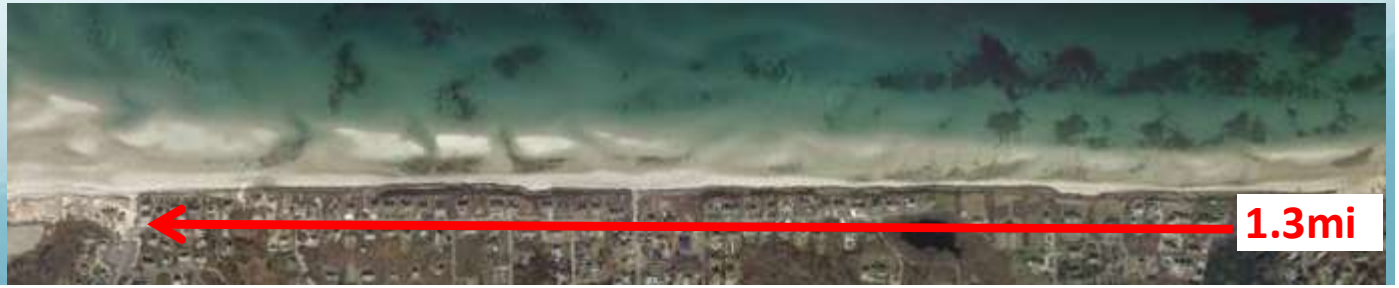
Adapted from http://www.nasa.gov/vision/earth/lookingatearth/katrina_poststorm.html

Peggotty Beach 2016

Video by Peter Miles

Perpendicular Transport…….Blocked



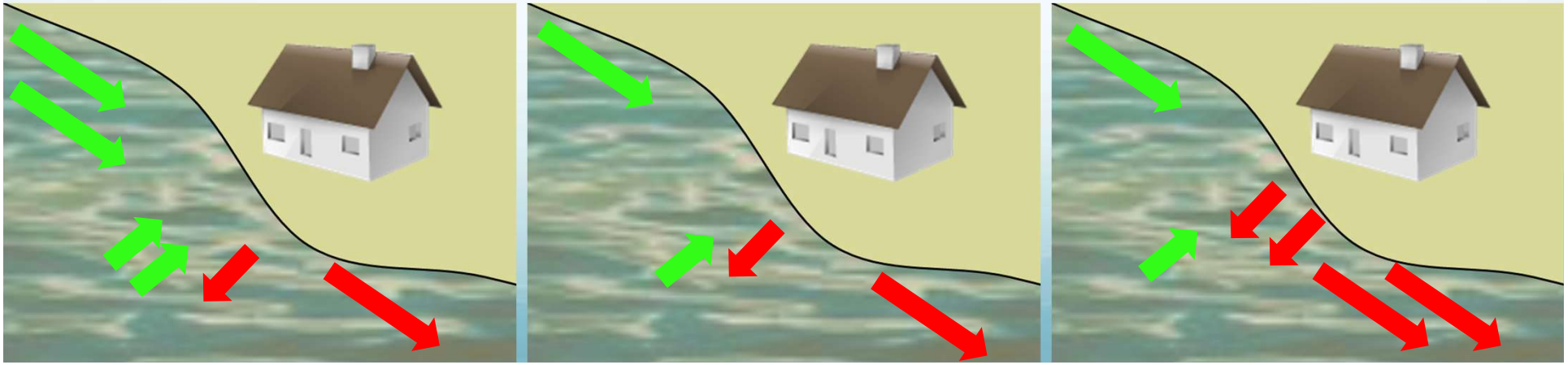


What is Erosion?

It's all sediment transport!

What is Erosion???..... just more leaving than coming in

Accretion | Dynamic Equilibrium | Erosion



Living with Erosion

1. **Erosion of glacial landforms is the MOST important source of sediment for dunes and beaches in Massachusetts.**

2. **Wind and waves then transport sediment.**

3. **Without erosion and then longshore re-deposition there would be no beaches.**

Living with Erosion

1. **Erosion of glacial landforms is the MOST important source of sediment for dunes and beaches in Massachusetts.**

2. **Wind and waves th**

3. **Without erosion ar** **on there would be no beaches.**

WHAT STRATEGIES INCREASE COASTAL RESILIENCY ON CAPE COD?

The Spectrum of Coastal Erosion Control Methods

- Do nothing
- Vegetation
- Re-grade
- Managed retreat
- **Beach nourishment = Fill of a CRA**

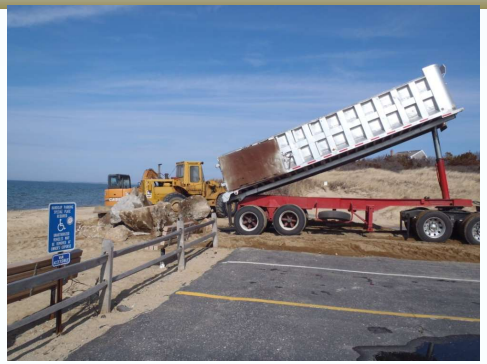


Photo Credit: Ted Keon

Sacrificial

Cobble (Mixed)

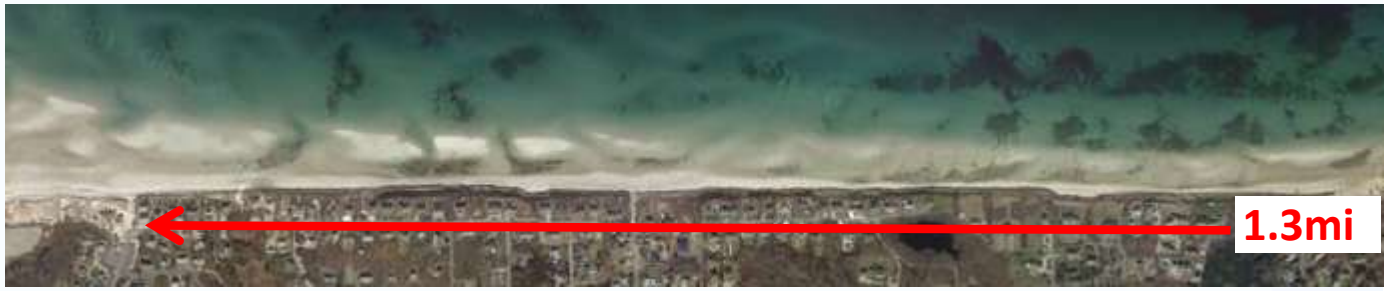
Photo Credit: CZM

The Spectrum of Coastal Erosion Control Methods

- Do nothing
- Vegetation
- Re-grade
- Managed retreat
- **Beach nourishment**

The Spectrum of Coastal Erosion Control Methods

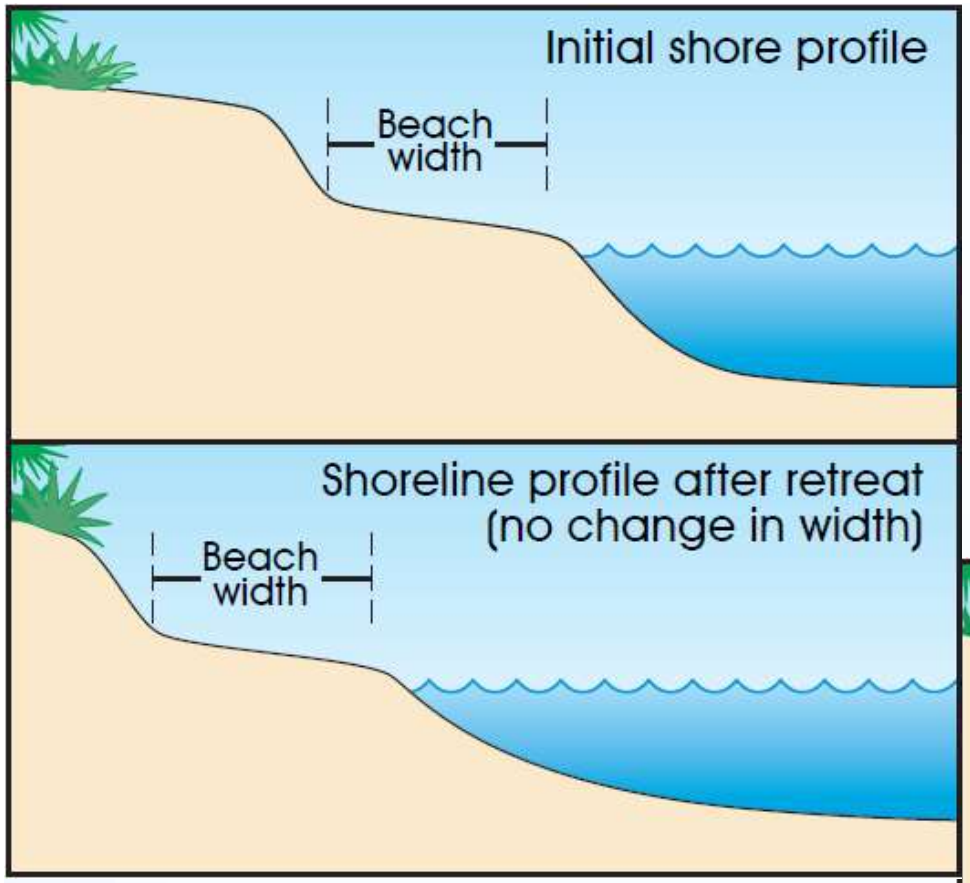
- Do nothing
- Vegetation
- Re-grade
- Managed retreat
- Beach nourishment
- Sand fencing
- Fiber rolls
- Coir Envelopes



C E S

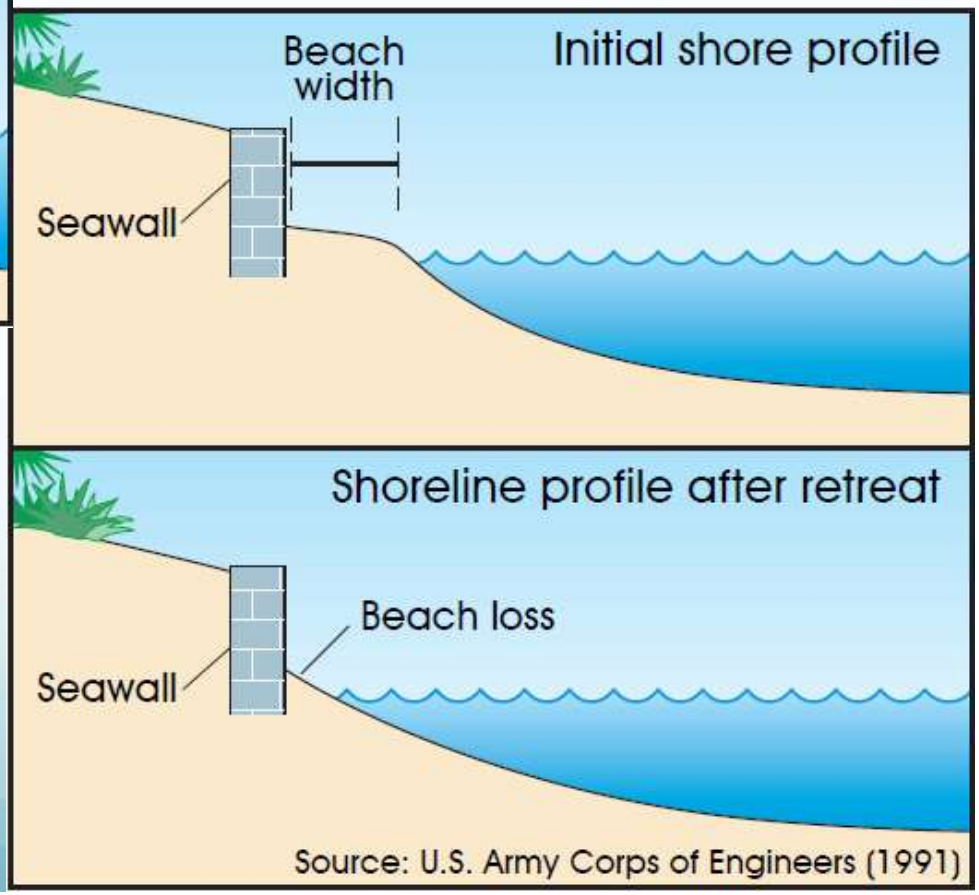
- Groin
- Jetty

- Sand Bags
- Gabion
- Breakwater / Sill
- **Revetment**



A beach undergoing net longterm retreat will maintain its natural width.

Beach loss eventually occurs in front of a seawall for a beach experiencing net longterm retreat.



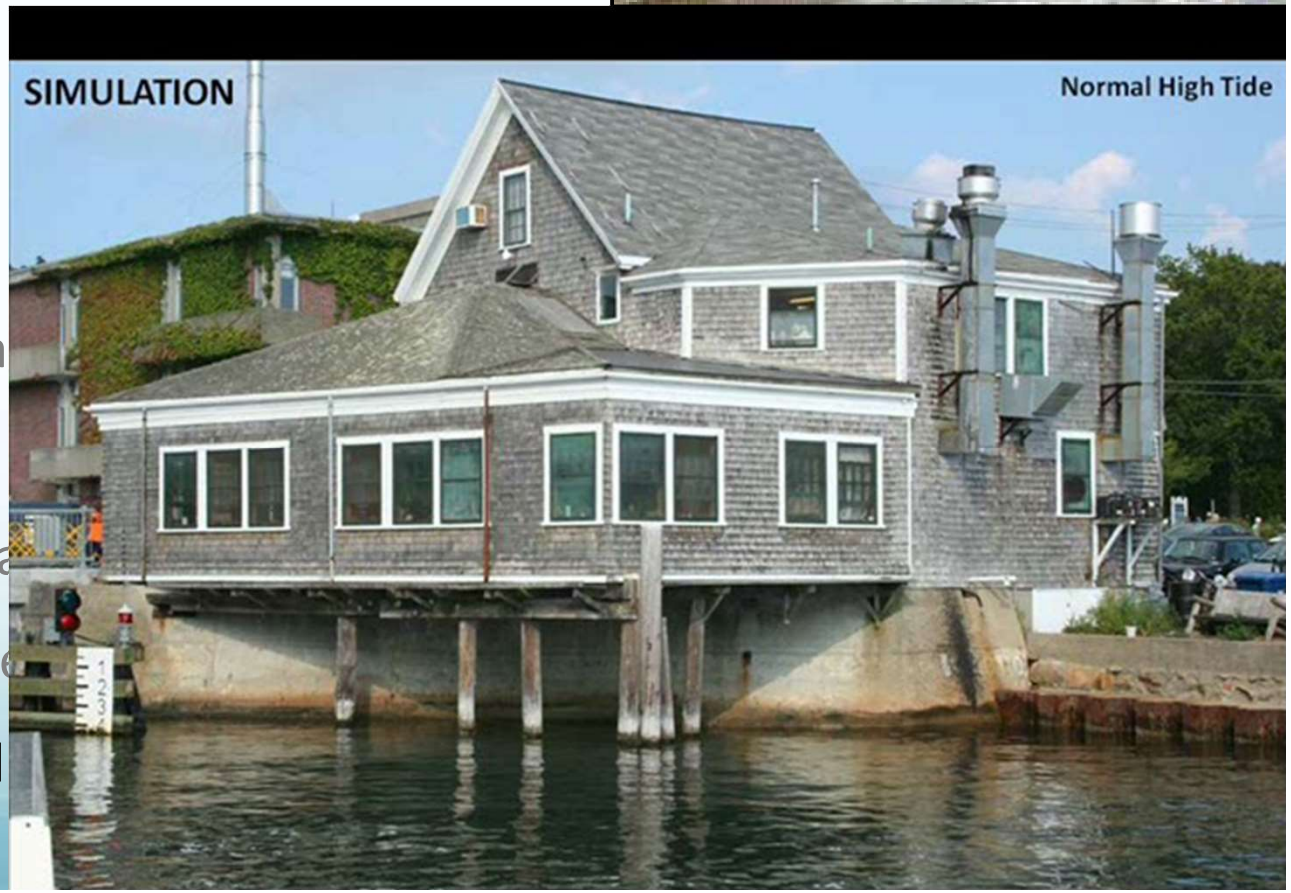
Images adapted from ***Natural Hazard Considerations for Purchasing Coastal Real Estate in Hawaii - A Practical Guide of Common Questions and Answers,*** by University of Hawaii Sea Grant College Program, 2006.

The Spectrum of Coastal Erosion Control Methods

- Do nothing
- Vegetation
- Re-grade
- Managed retreat
- Beach nourishment
- Sand fencing
- Fiber rolls
- Coir Envelopes

C E S

- Groin
- Jetty
- Sand Ba
- Gabion
- Breakwa
- Revetme
- **Seawall**



The Spectrum of Coastal Erosion Control Methods

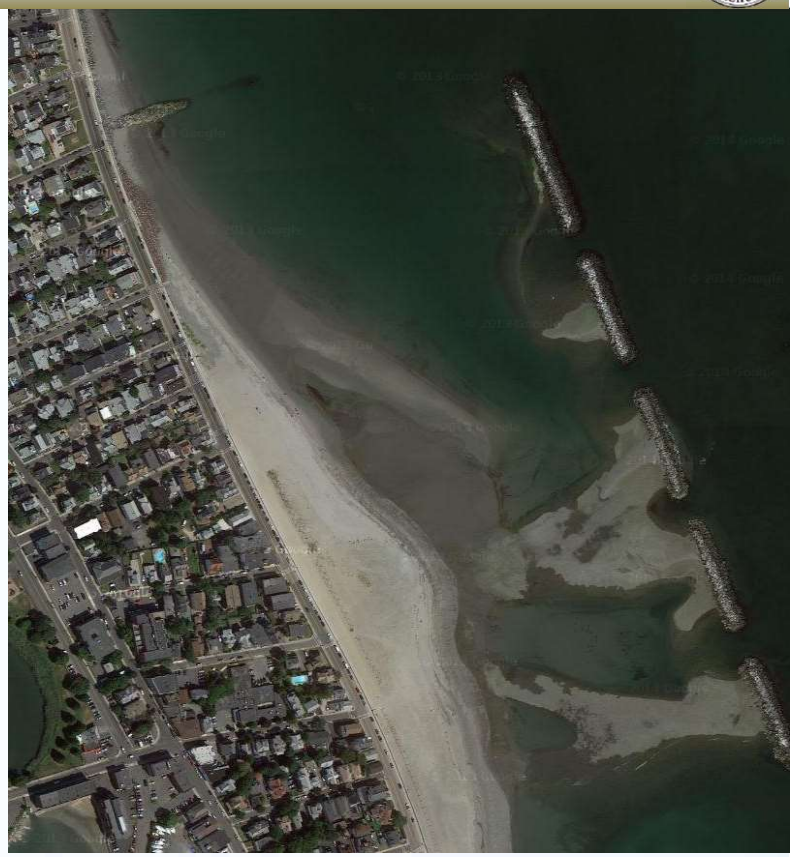
- Do nothing
- Vegetation
- Re-grade
- Managed retreat
- Beach nourishment
- Sand fencing
- Fiber rolls
- Coir Envelopes

C E S

- Groin
- Jetty
- Sand Bags
- Gabion
- Breakwater / Sill
- Revetment
- **Sea**

The Spectrum of Coastal Erosion Control Methods

- Do nothing
- Vegetation
- Re-grade
- Managed r
- Beach nou
- Sand fenci
- Fiber rolls
- Coir Envelopes

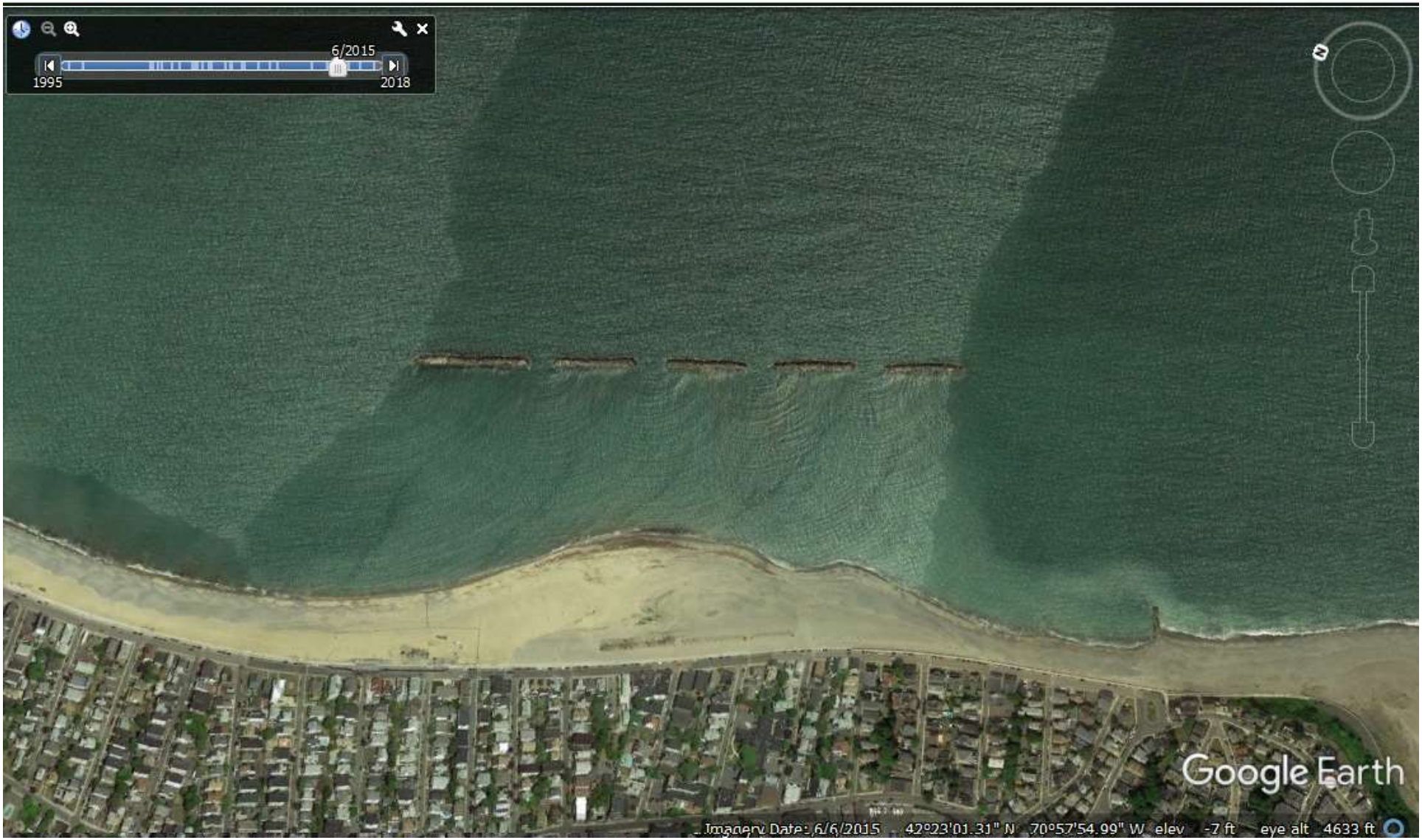


C E S

- Groin
- Jetty
- Sand Bags
- Gabion
- **Breakwater / Sill**

Sediment Management On Cape Cod

$30 million Winthrop Beach Project, DCR



Sediment Management On Cape Cod

Sediment Management On Cape Cod

Images from the 10/2010 Report of the CRWG to the Falmouth BOS

09/29/2015 - 01/15/2016 - 10/12/2017

Sediment Management On Cape Cod

Chatham - Andrew Harding's Beach

July 2005

Photo Credit: Ted Keon

Sediment Management On Cape Cod

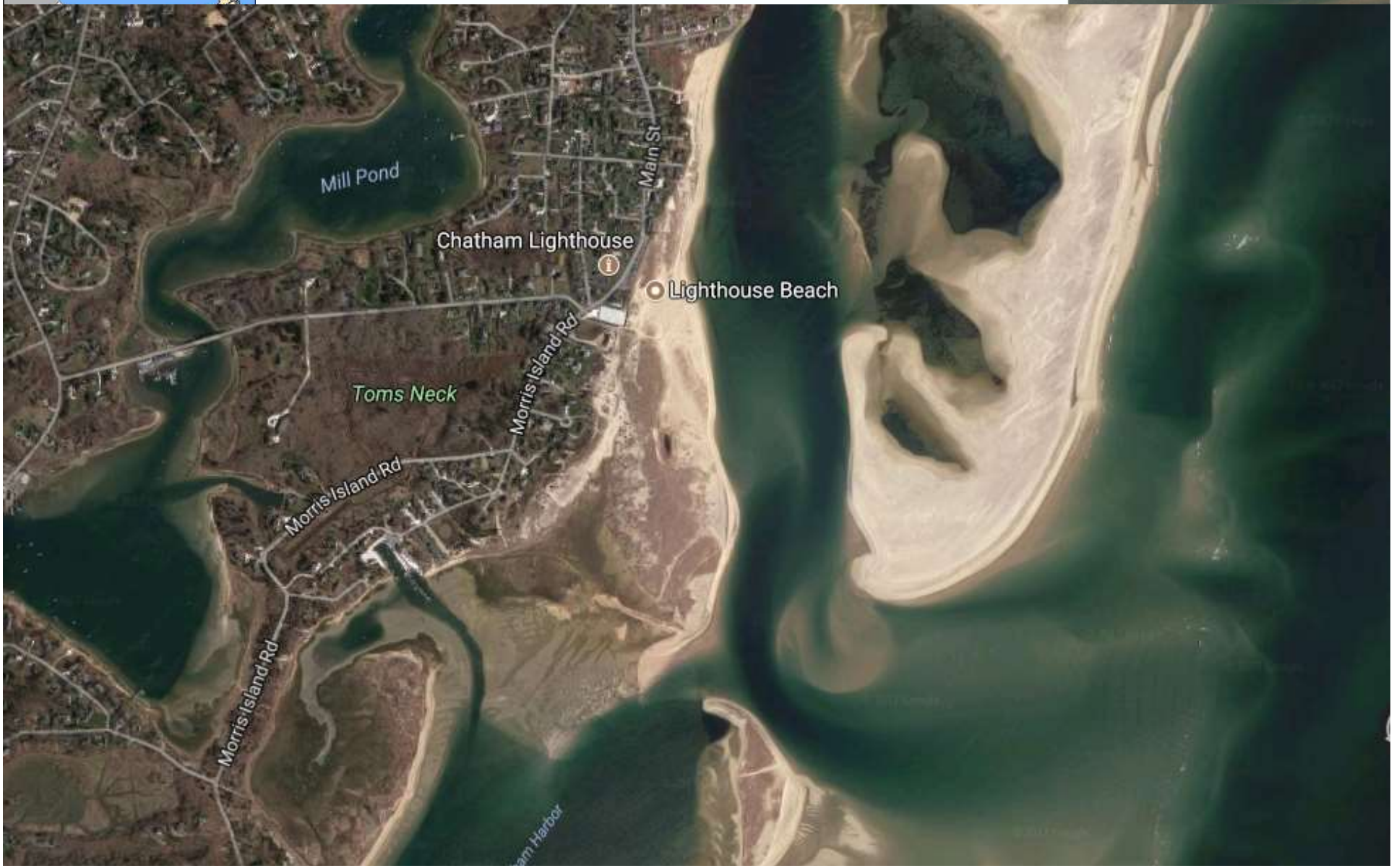
Chatham - Andrew Harding's Beach

July 2011

Photo Credit: Ted Keon

Sediment Management On Cape Cod

The only constant is change:



Sediment Management On Cape Cod

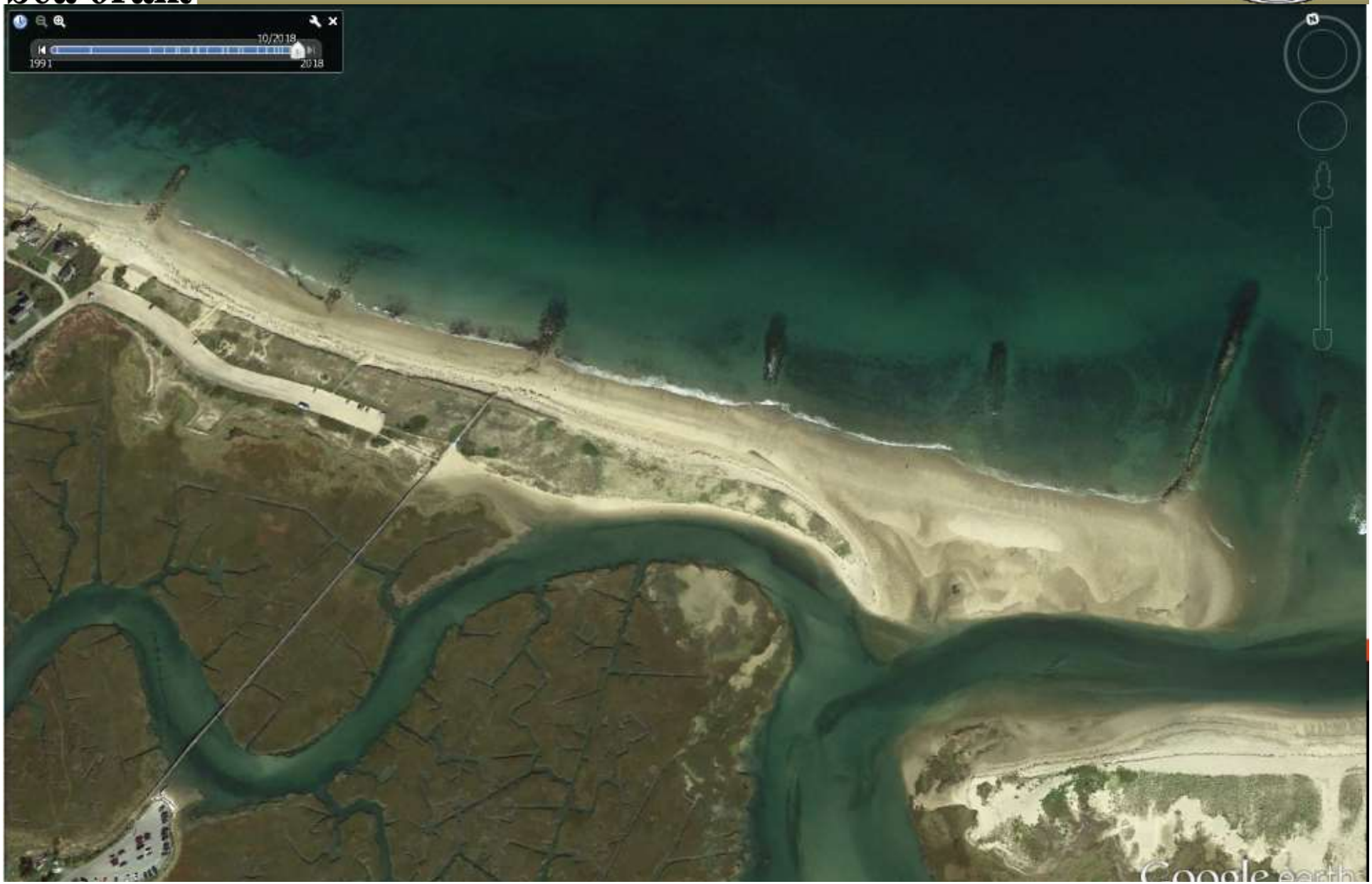
Chatham – Cockle Cove

permitted dredging locations

permitted placement locations

Mill Creek

Sandwich – Town Neck



Sandwich – Town Neck

Sandwich – Town Neck

Video by Peter Traykovski, WHOI

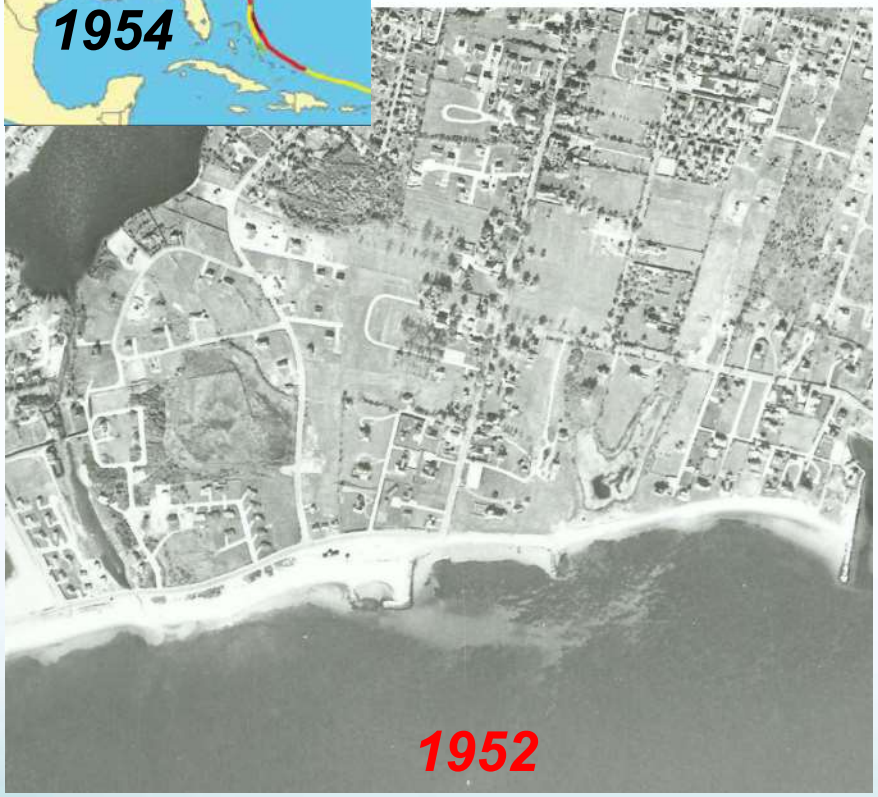
Sandwich – Town Neck

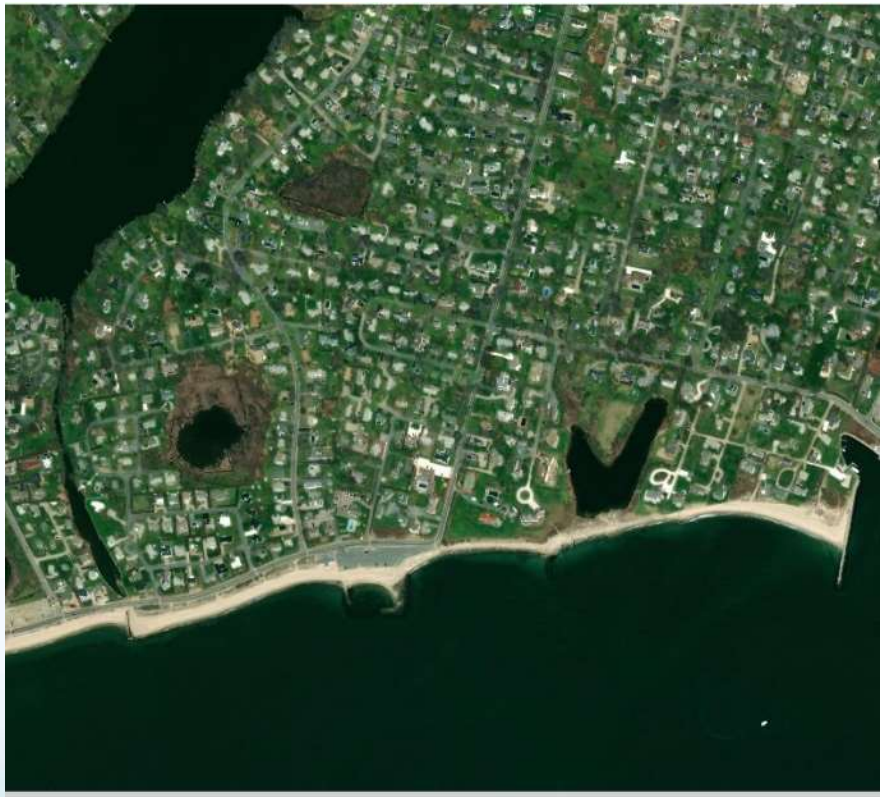
Video by Peter Traykovski, WHOI , Image by Issac Benaka

Sandwich – Town Neck

Victim of our own success?

Land-use change, population 4.75x 1950s





Questions?

Keep in mind:

- Assess local erosion and flooding
- Evaluate hazards & management
- Incorporate higher projected SL in coastal designs
- Avoid vulnerable areas

woodardcurran.com

COMMITMENT & INTEGRITY DRIVE RESULTS