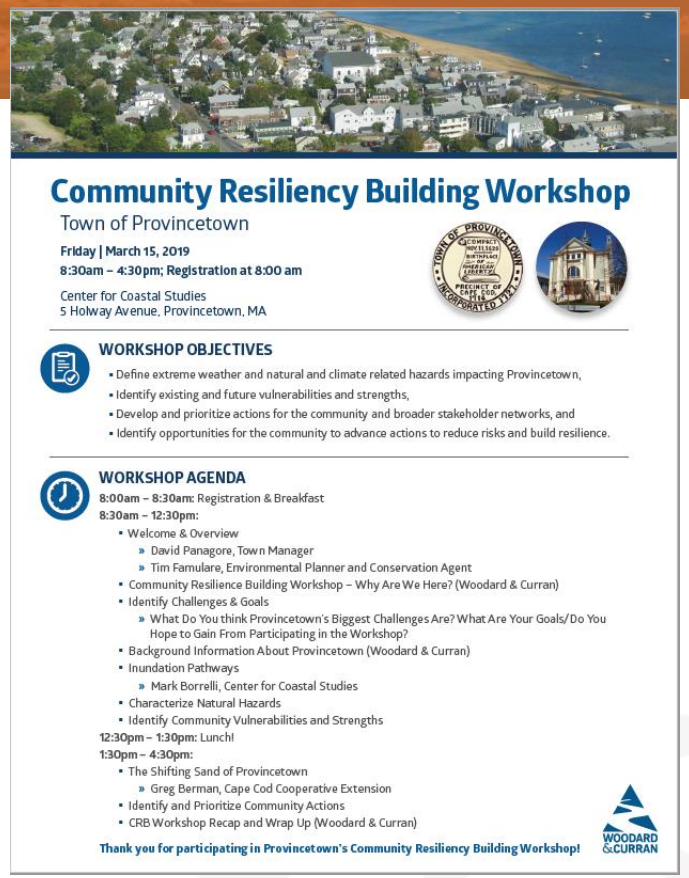
Provincetown, MA
Community Resiliency Building Workshop

March 15, 2019

WOODARD & CURRAN

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 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

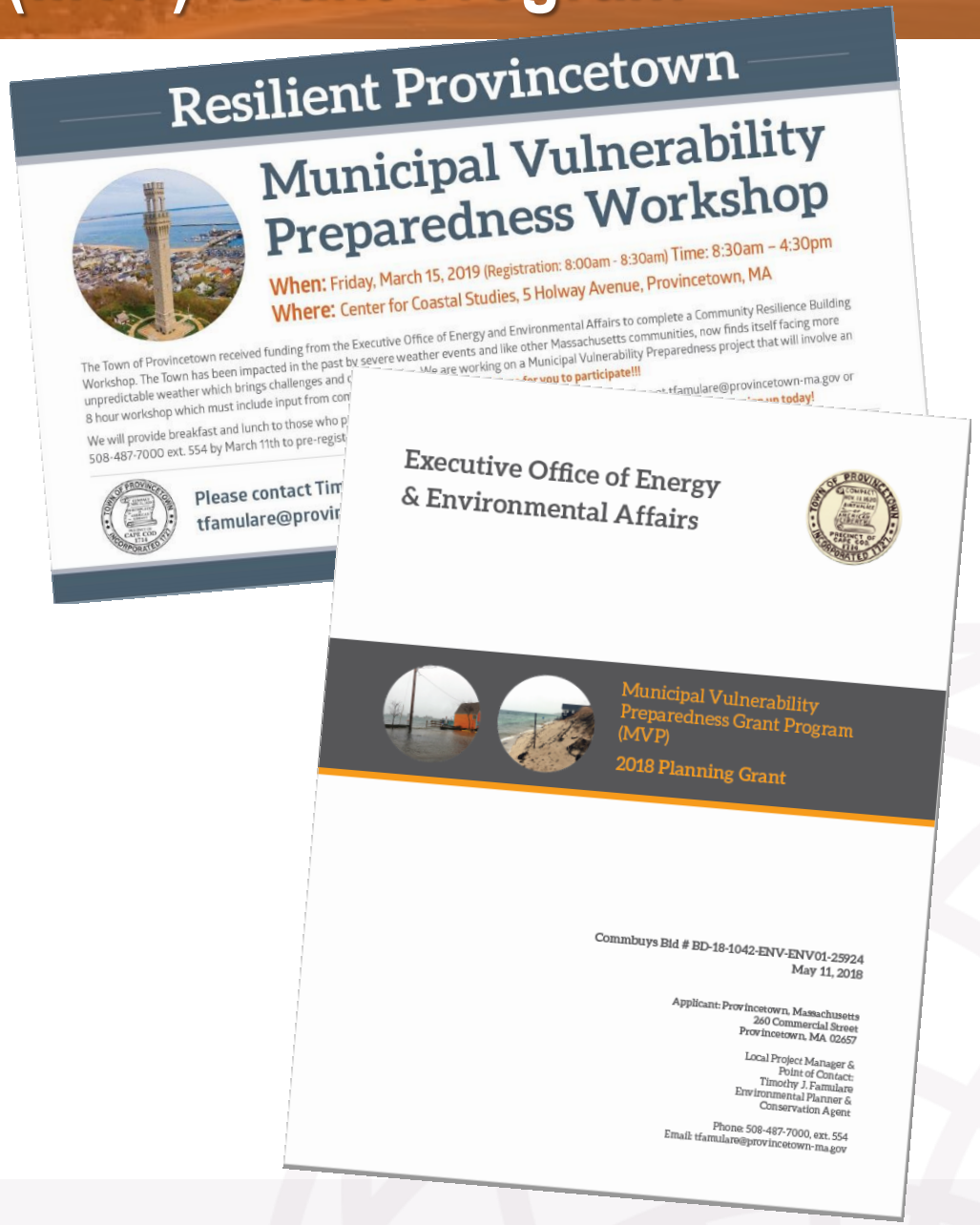
12:30pm – 1:30pm: Lunch!
1:30pm – 4:30pm:
- The Shifting Sand of Provincetown
  - Greg Berman, Cape Cod Cooperative Extension
- Identify and Prioritize Community Actions
- CRB Workshop Recap and Wrap Up (Woodard & Curran)

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

WOODARD & CURRAN

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


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

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

resilience

noun

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

adapt

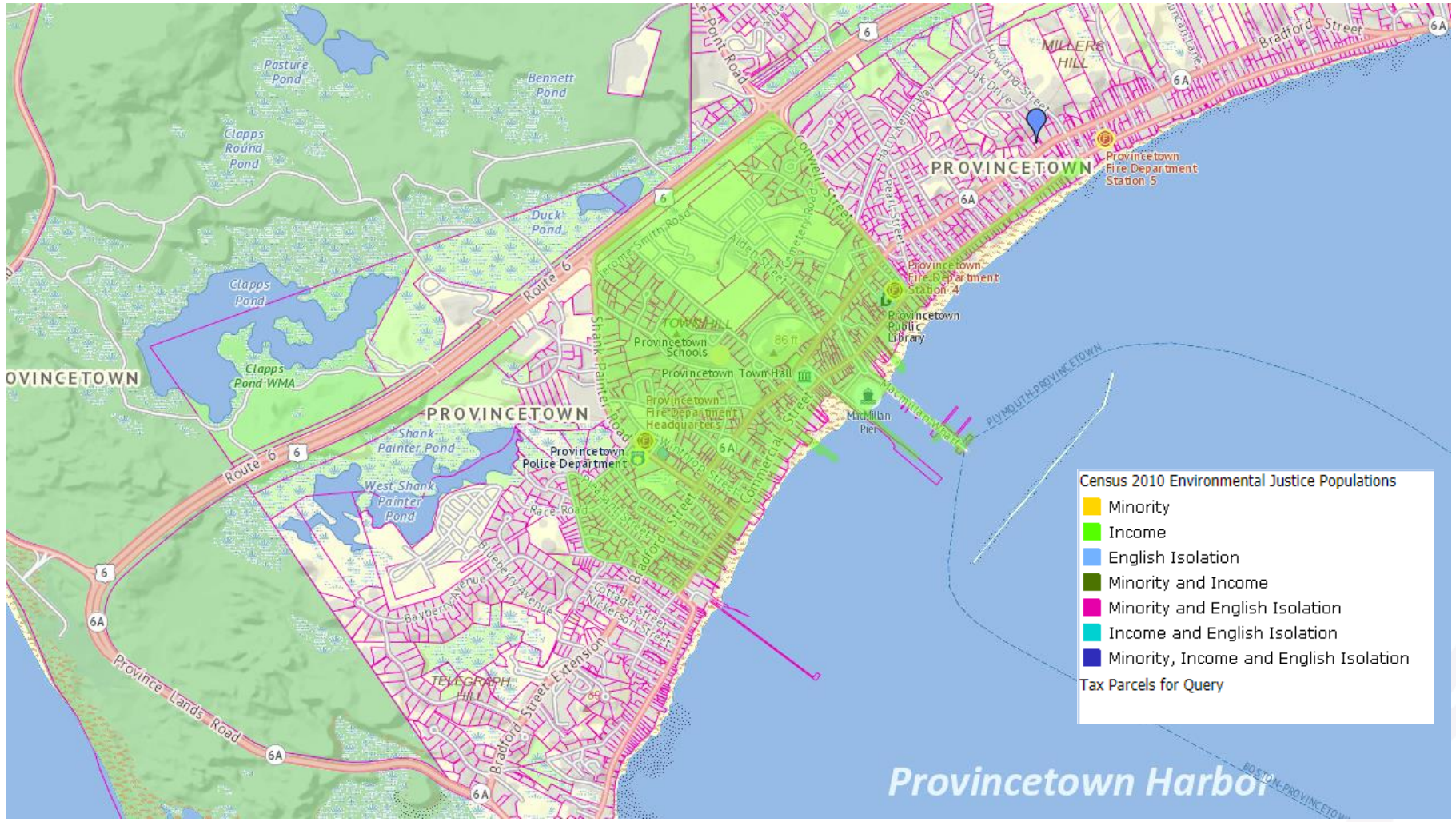
verb

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

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.

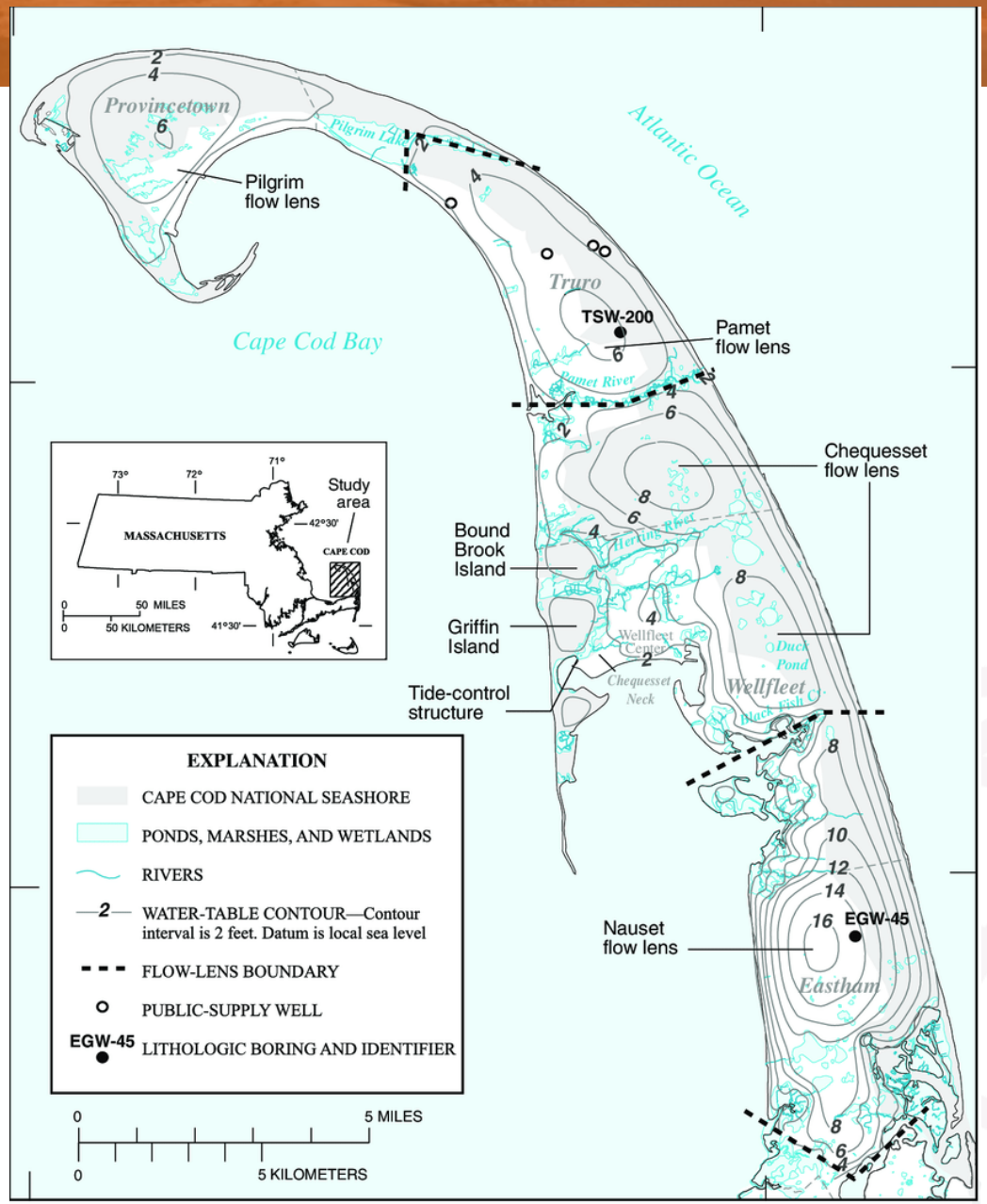
Environmental Justice Population - Income



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

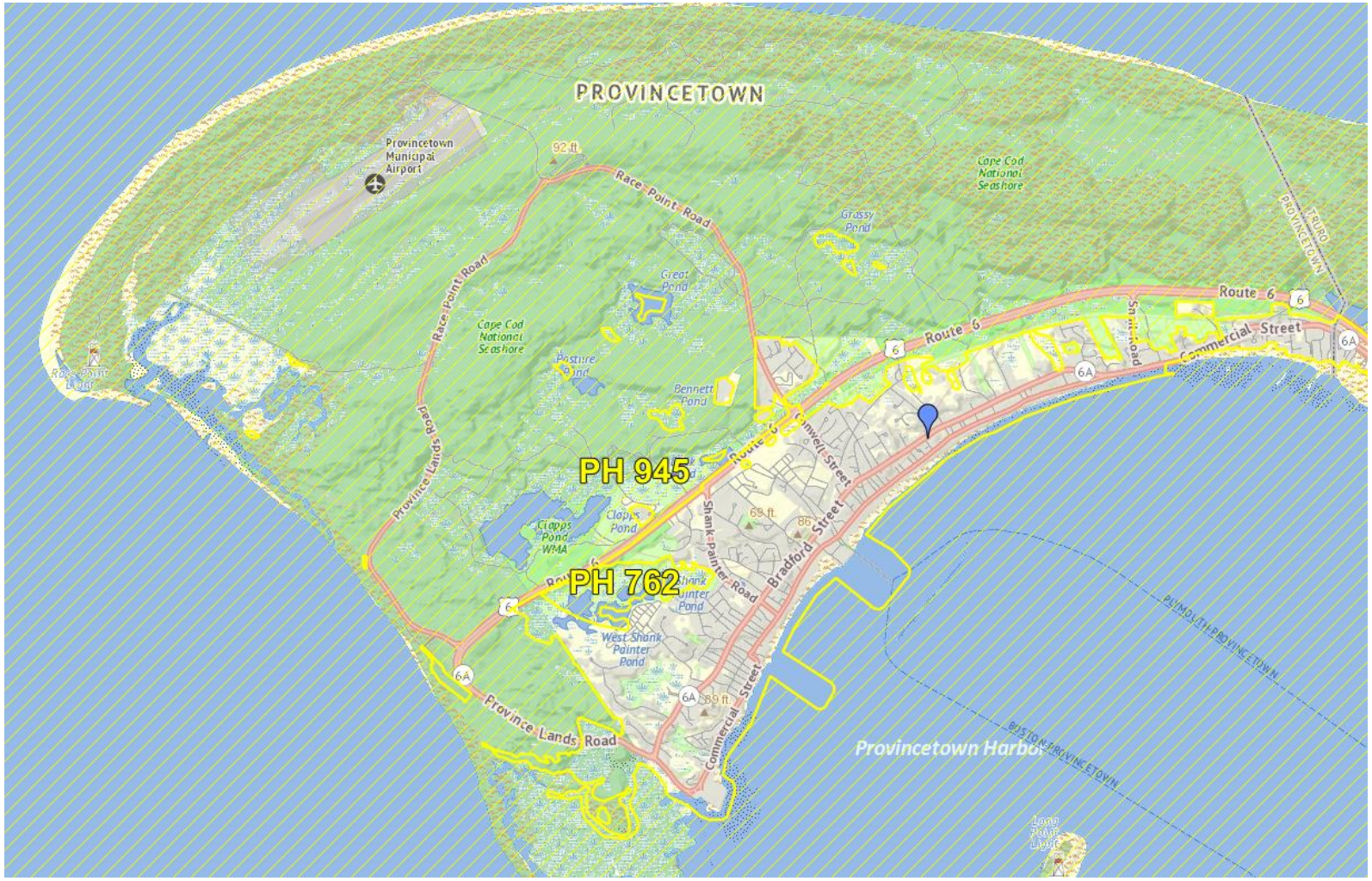
Transportation, Water & Sewer

- 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



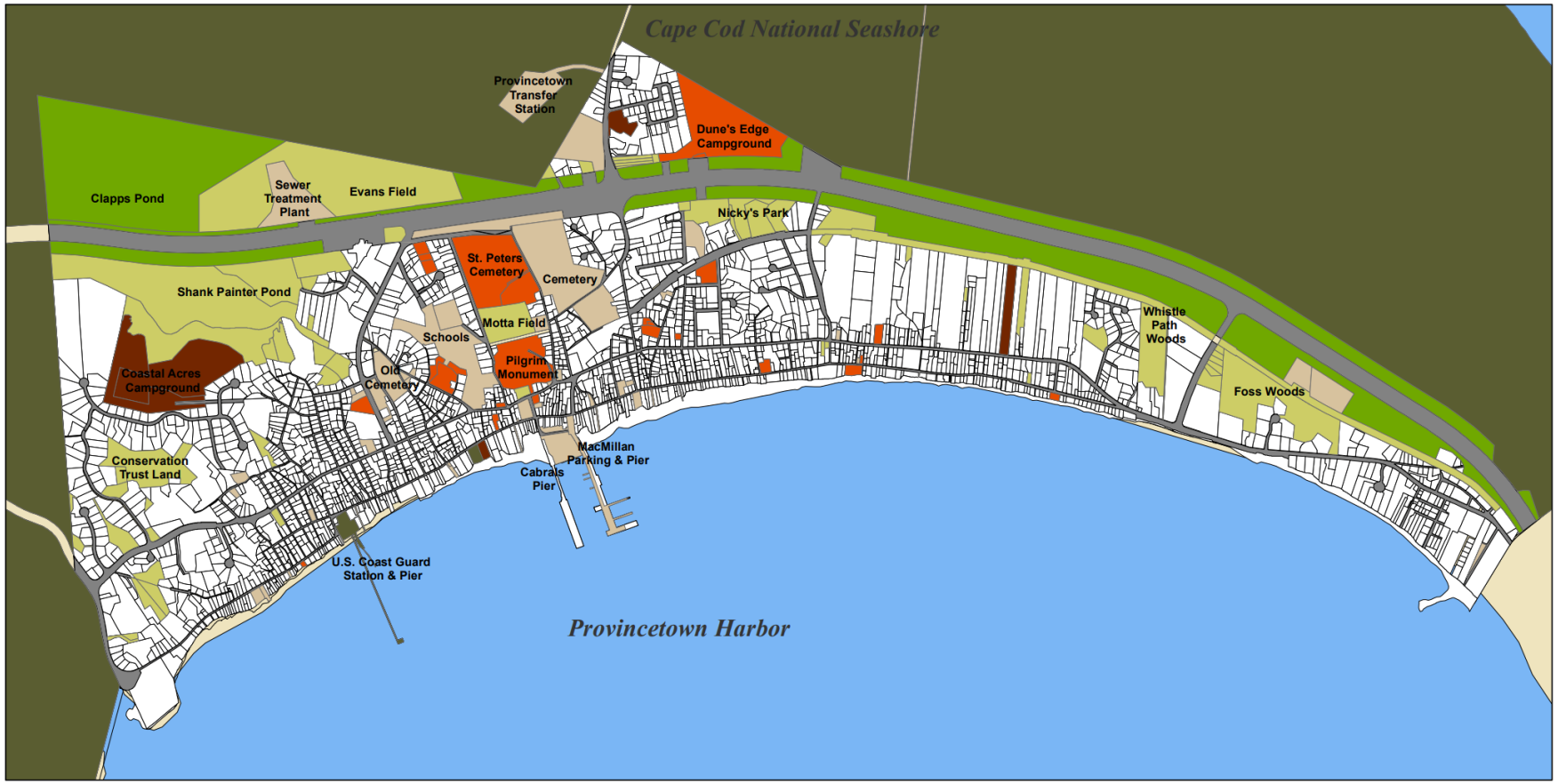
Base from U.S. Geological Survey Digital Line Graphs, and topographic quadrangles, Provincetown, Wellfleet, and Orleans, Massachusetts, 1:25,000, Polyconic projection, NAD 1927, Zone 19

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

Environmental Features



Legend

- Federal
- Mass Fish& Game
- Municipal
- Non-Profit
- Private
- Protected Land

Provincetown Open Space Plan

0 0.2 0.4 0.8 Miles

Prepared by MIS Dept. 8/18/2013

Map 8

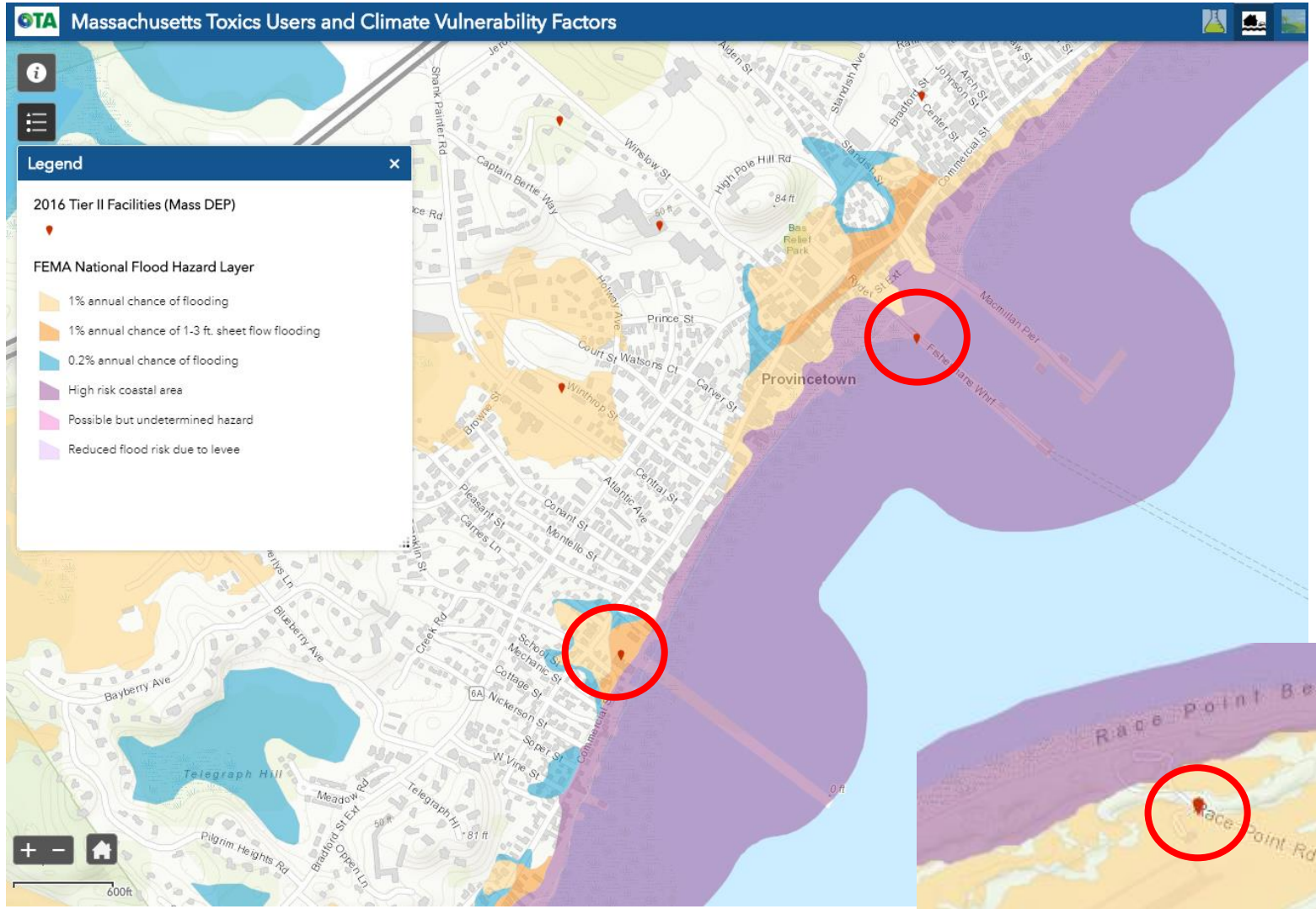
- Provincetown owns 99 acres of open space
- 333 acres of salt marsh (most in National Seashore)
- 10 ponds in town

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

Environmental Features



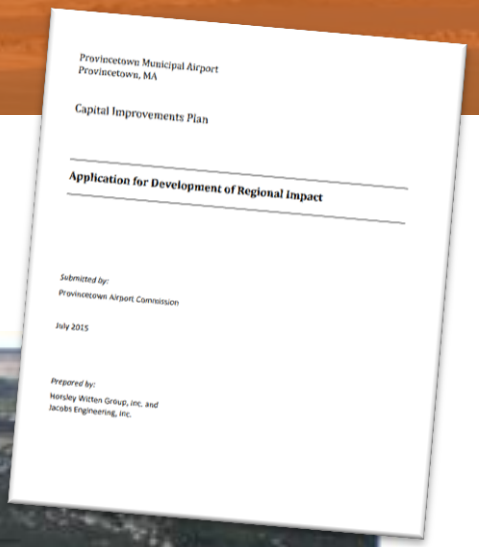
- Three DEP Tier II Facilities located in the floodplain
  - Coast Guard Facility
  - Provincetown Marina
  - Municipal Airport

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

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



Provincetown Municipal Airport
Provincetown, MA

Capital Improvements Plan

Application for Development of Regional Impact

Submitted by:
Provincetown Airport Commission

July 2015

Prepared by:
Horsley Witten Group, Inc. and
Jacobs Engineering, Inc.

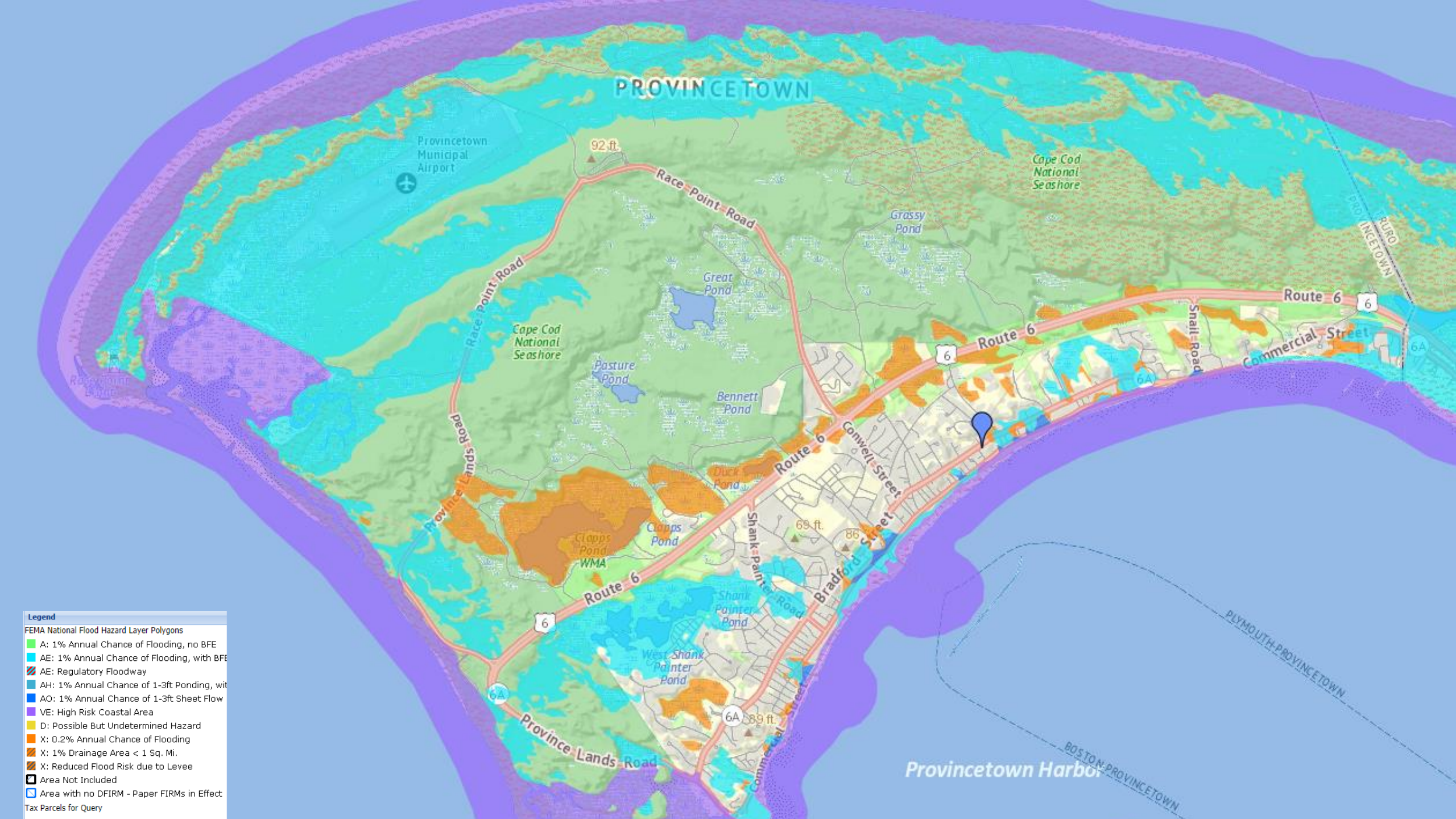
Photo 5. View of Hatches Harbor dike facing northeast. Photo credit Jacobs.

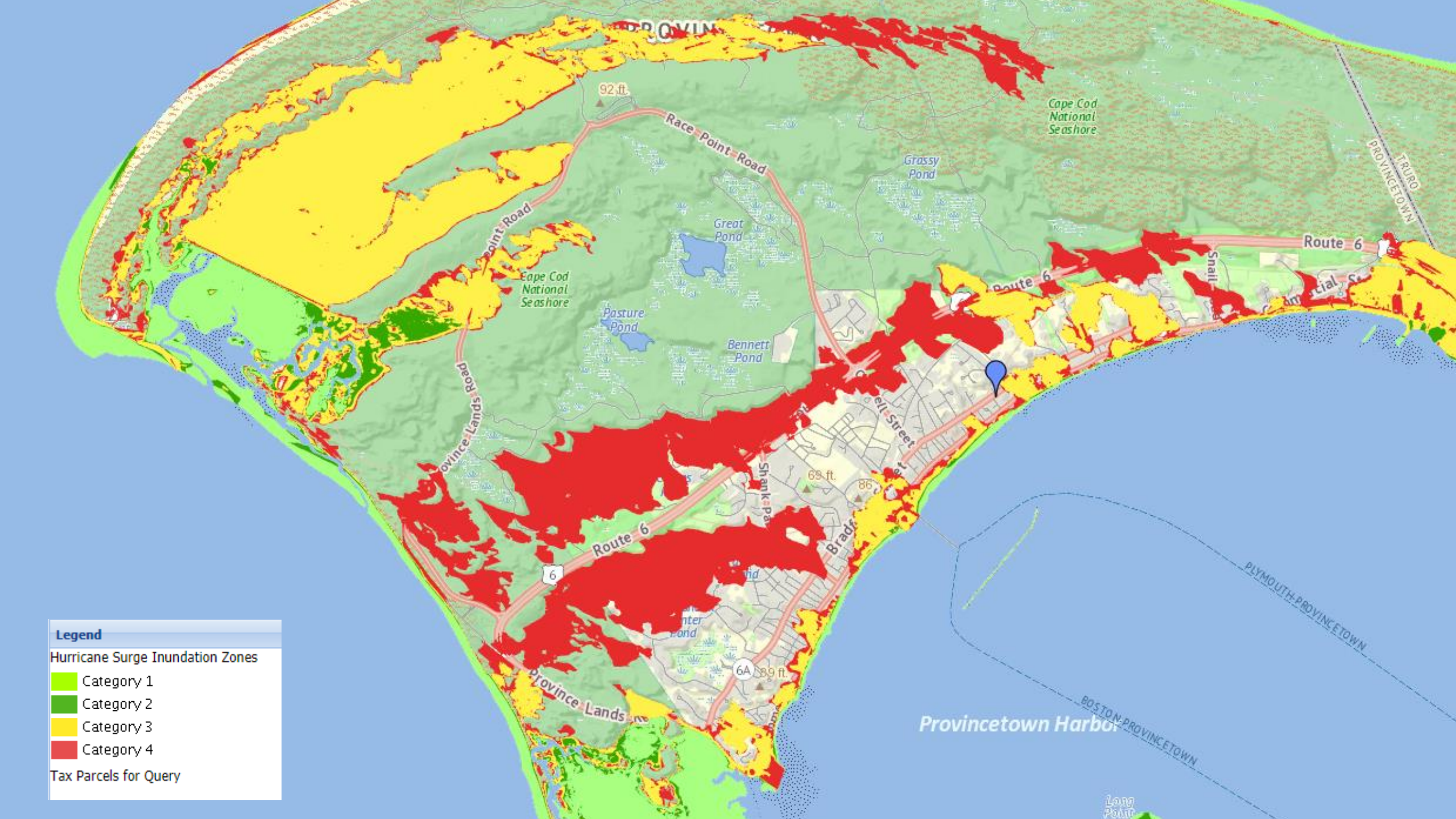
Severe Weather

- 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

January 2018 Storm Event

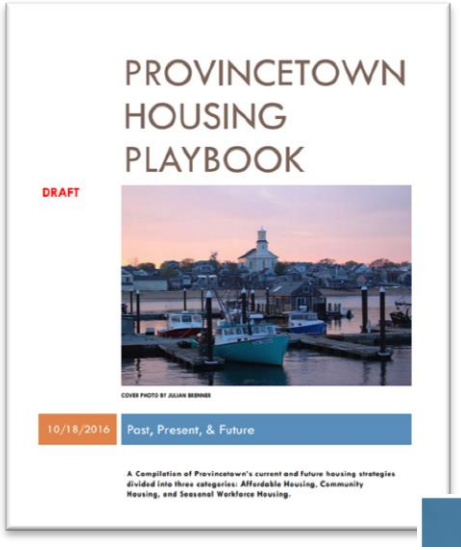
- January 2018 flooding event – many had not seen anything like this in Town
  - Provincetown Fire reported 3 feet of water on parts of Commercial Street and Province Lands Road
  - Loss of power
  - Damage to more than 50 homes and businesses
  - UU Meeting House (1847) had 6 inches of water on the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

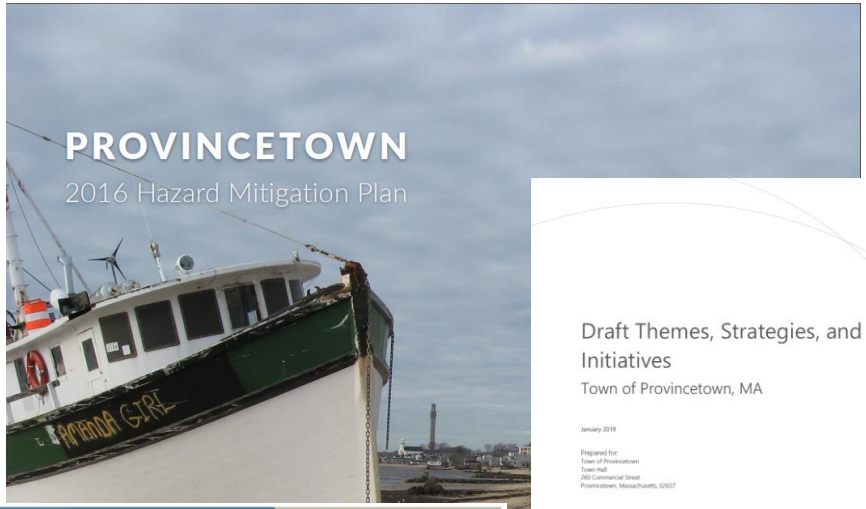

PROVINCETOWN
Provincetown Municipal Airport
92 ft.
Race Point Road
Cape Cod National Seashore
Grassy Pond
Great Pond
Pasture Pond
Bennett Pond
Route 6
Snail Road
Commercial Street
6A
Province Lands Road
Duck Pond
Clapps Pond
Clapps Pond WMA
Shank Painter Road
Shank Painter Pond
West Shank Painter Pond
Bradford Street
Conwell Street
69 ft.
86
89 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

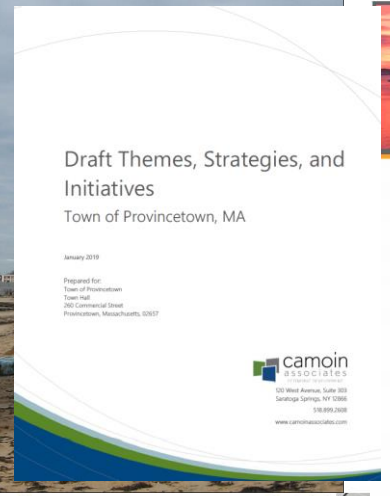


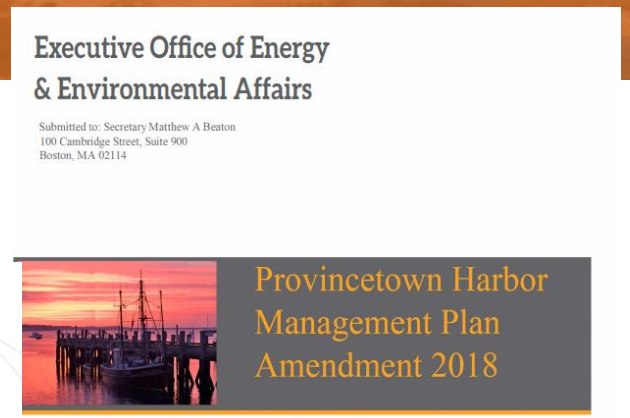
Legend
Hurricane Surge Inundation Zones
Category 1
Category 2
Category 3
Category 4
Tax Parcels for Query
Race Point Road
Cape Cod National Seashore
Grassy Pond
Great Pond
Pasture Pond
Bennett Pond
Route 6
Province Lands Road
Provincetown Harbor
PLYMOUTH-PROVINCETOWN
BOSTON-PROVINCETOWN
TRURO PROVINCETOWN
92 ft.
69 ft.
86
89 ft.
6
6A

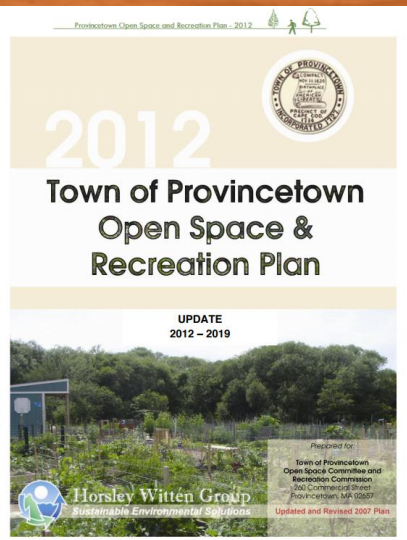
Recent Planning Efforts

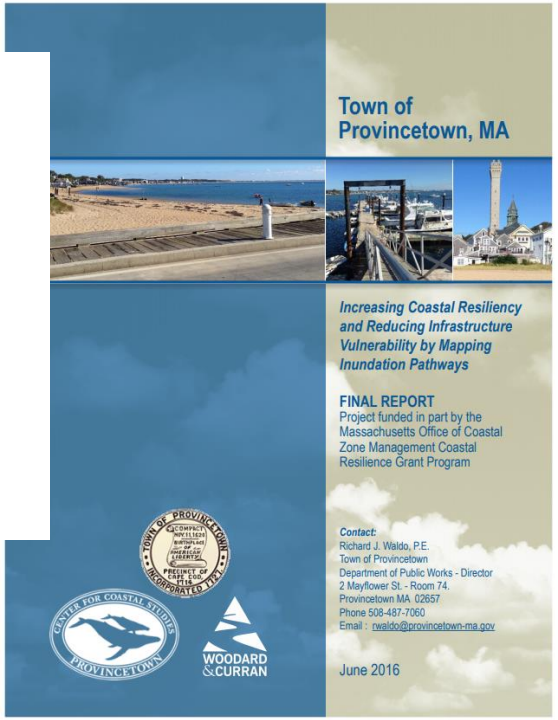


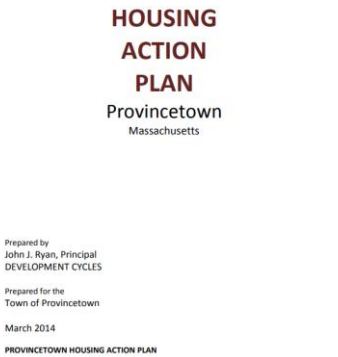












Natural Hazards Impacting Provincetown

- 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

Parcels & Buildings Vulnerable to Flooding – V Zone

Parcels and Buildings Vulnerable to Flooding

Flooding (V Zone)						
	Number of Parcels			Value of Buildings		
Type of Structure	# 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

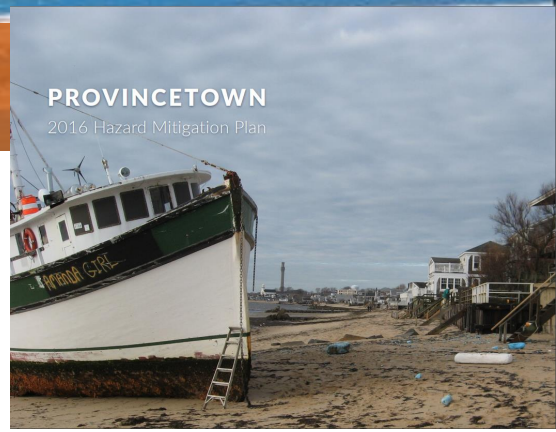
Parcels & Buildings Vulnerable to Flooding – A Zone

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

Hazard Mitigation Plan – Actions

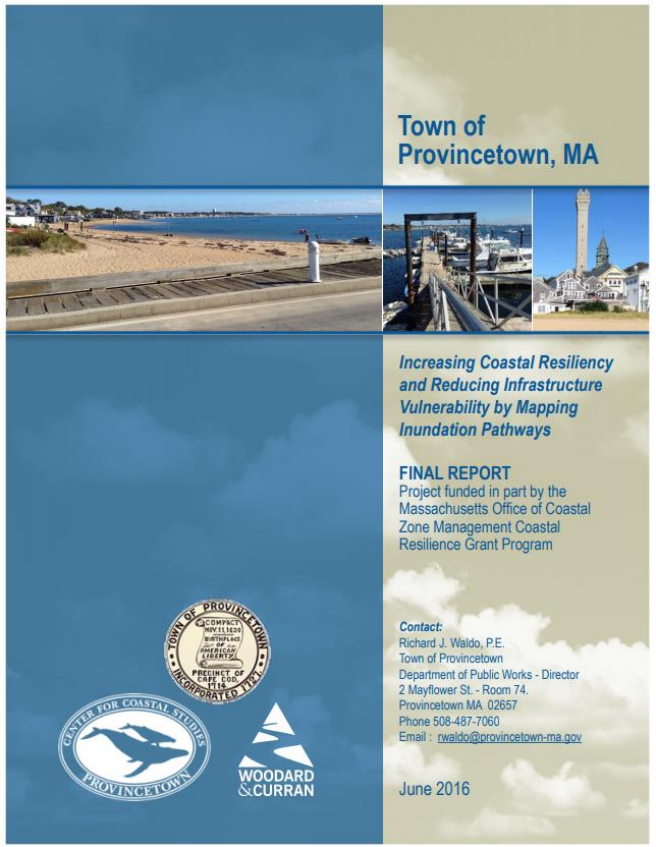


- Public education materials
- Zoning, regulatory, policy changes
- Detailed infrastructure vulnerability and risk assessments and improvement projects
- Monitor beach conditions, evaluate for stabilization/restoration
- Investigate underground electric transmission lines
- Improve NFIP CRS rating
-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

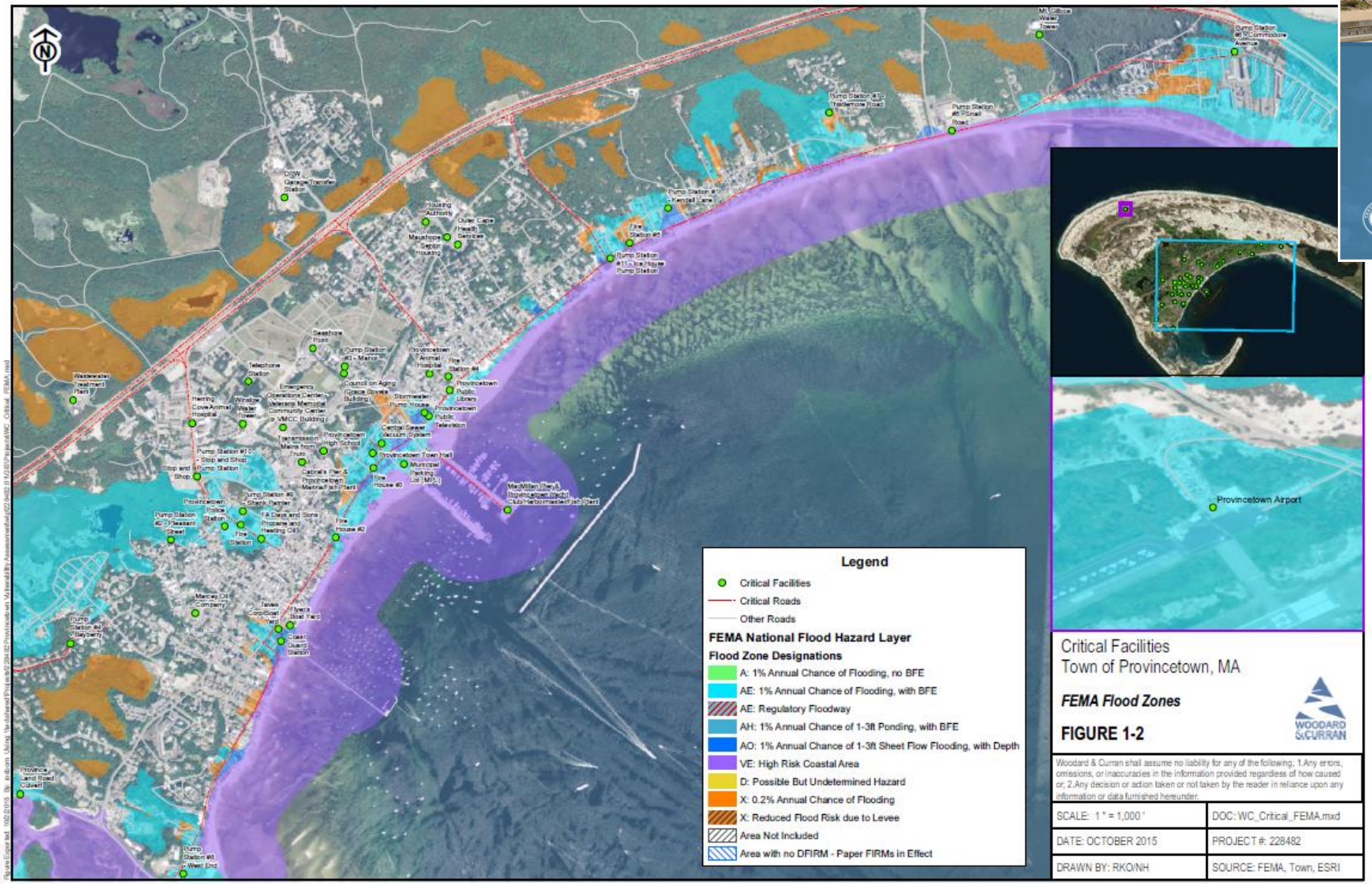
Infrastructure Vulnerability Assessment

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.



Infrastructure Vulnerability Assessment

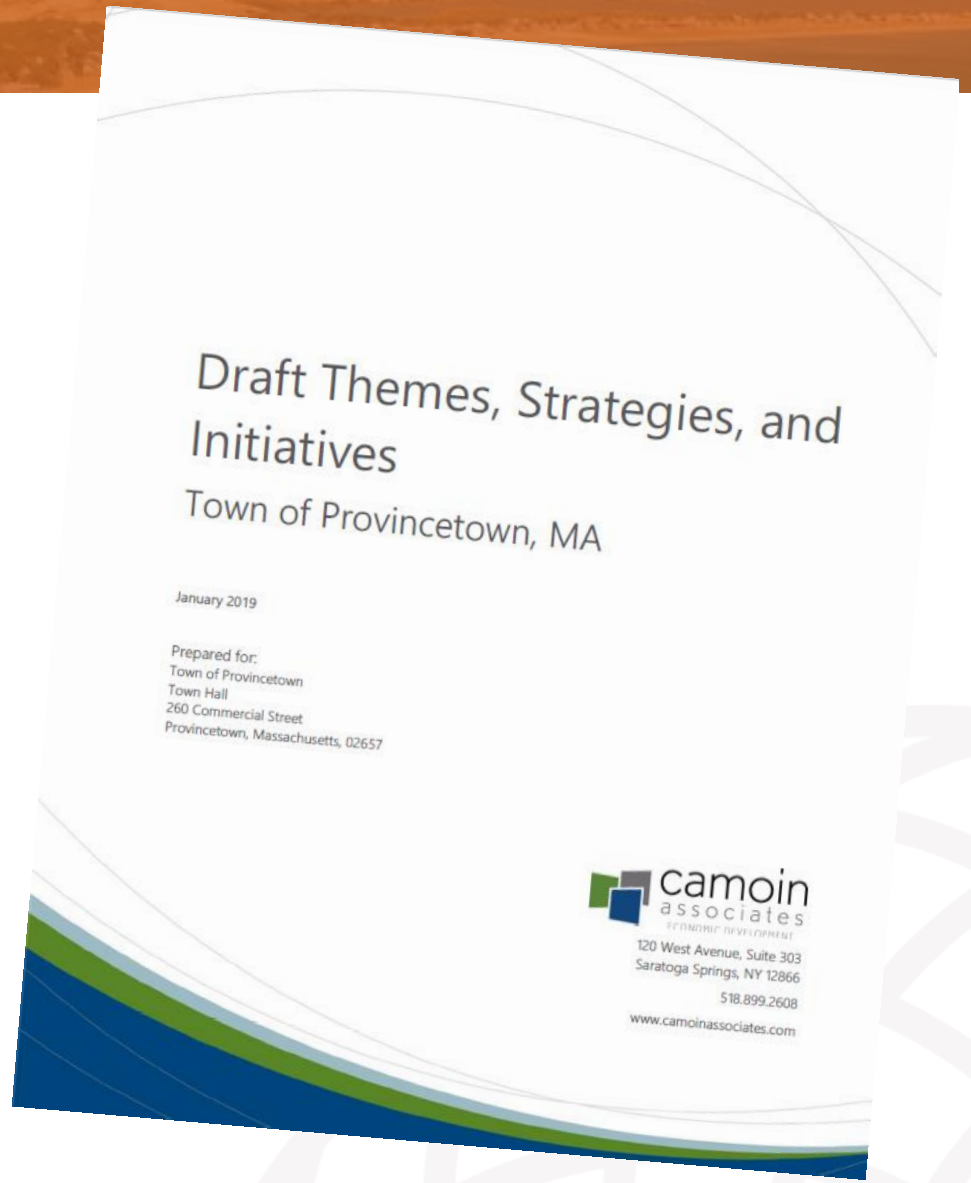


Infrastructure Vulnerability Assessment

- 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.

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


Draft Themes, Strategies, and Initiatives

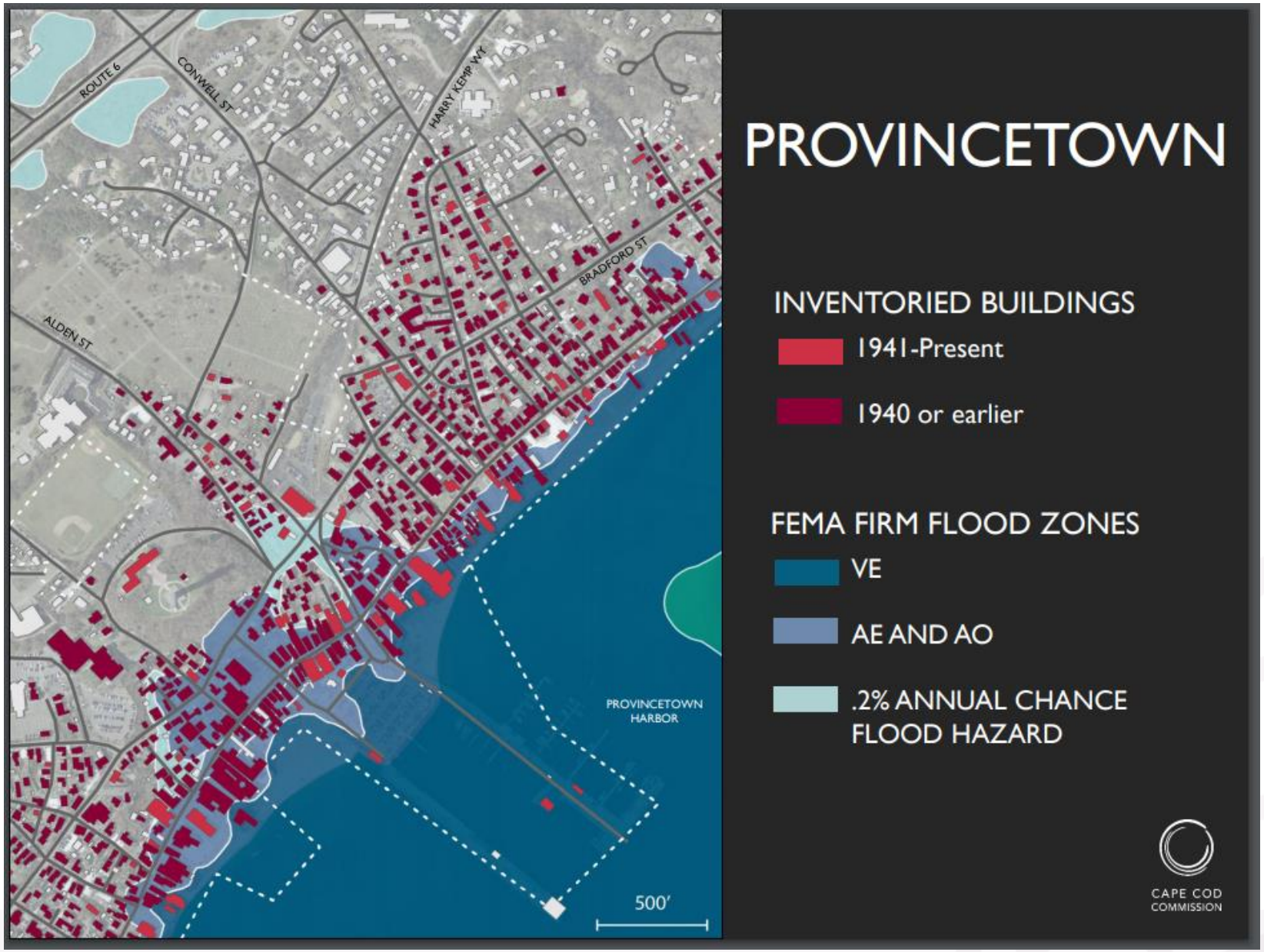
Town of Provincetown, MA

January 2019

Prepared for:
Town of Provincetown
Town Hall
260 Commercial Street
Provincetown, Massachusetts, 02657

camoin associates
ECONOMIC DEVELOPMENT
120 West Avenue, Suite 303
Saratoga Springs, NY 12866
518.899.2608
www.camoinassociates.com

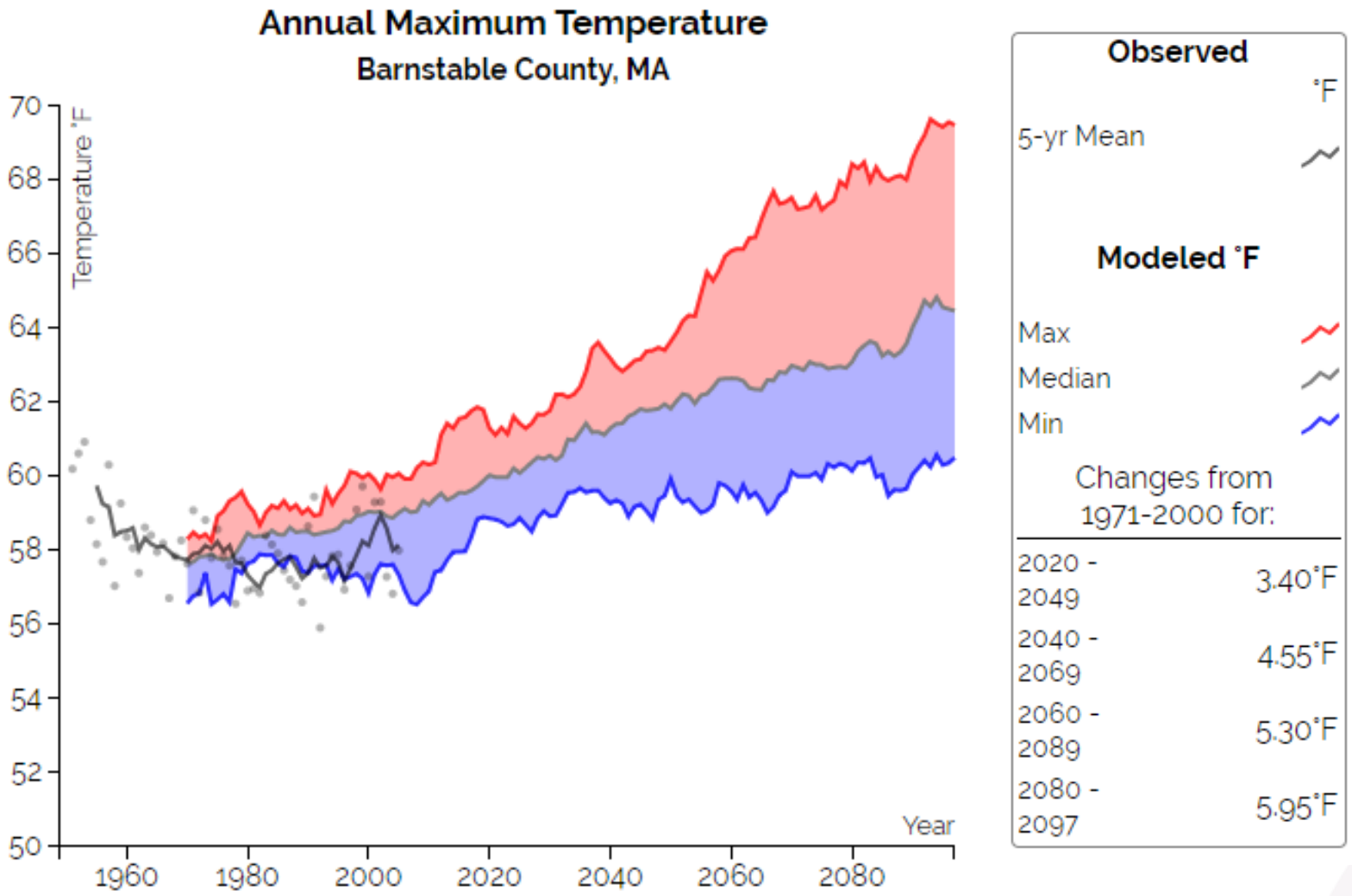
Historic District & Historic Buildings



What About the Future?

WOODARD & CURRAN

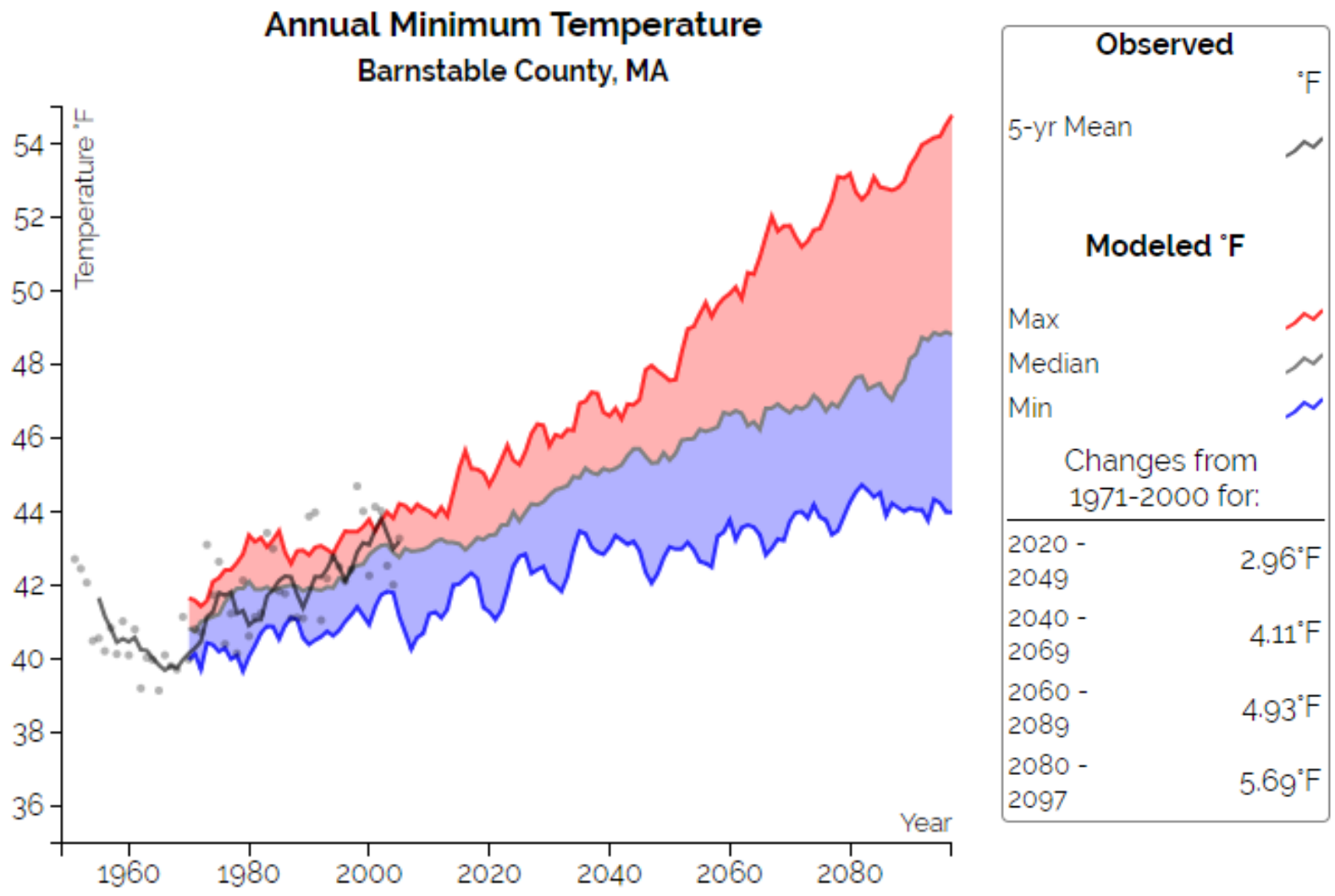
Annual Maximum Temperature



resilient MA

NECSC Northeast Climate Science Center

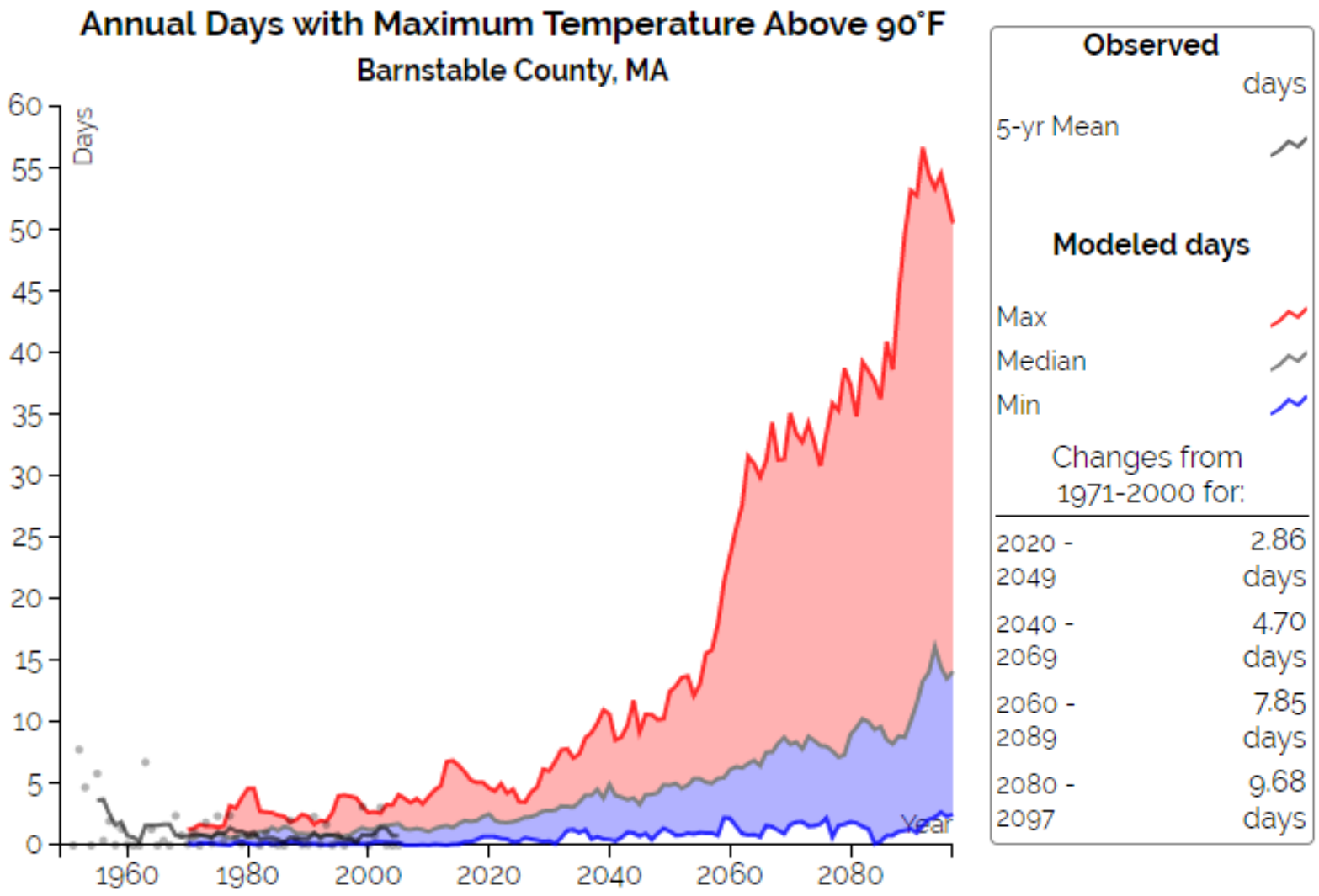
Annual Minimum Temperature



resilient MA

NECSC Northeast Climate Science Center

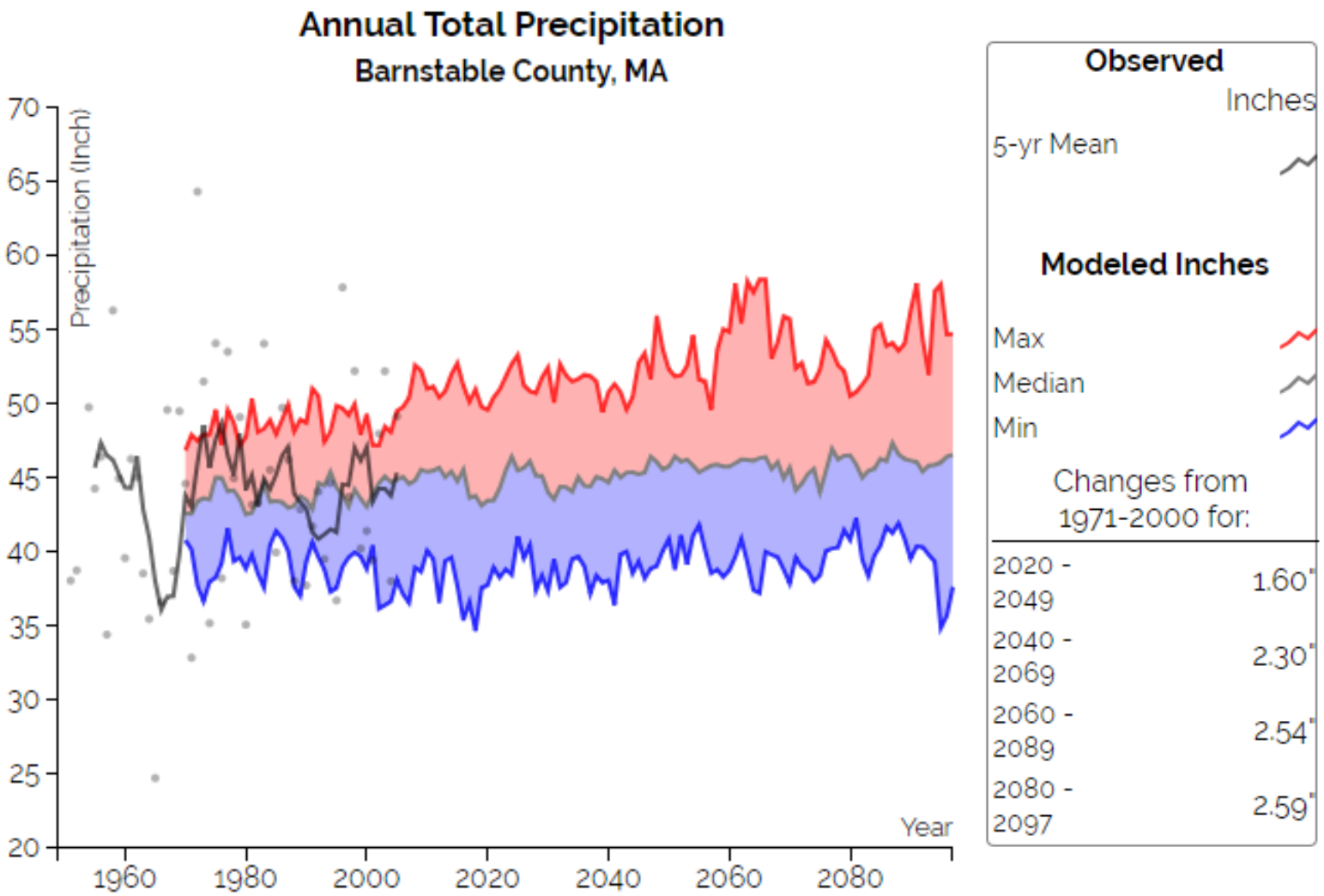
Annual Days With Maximum Temperature Above 90



resilient MA

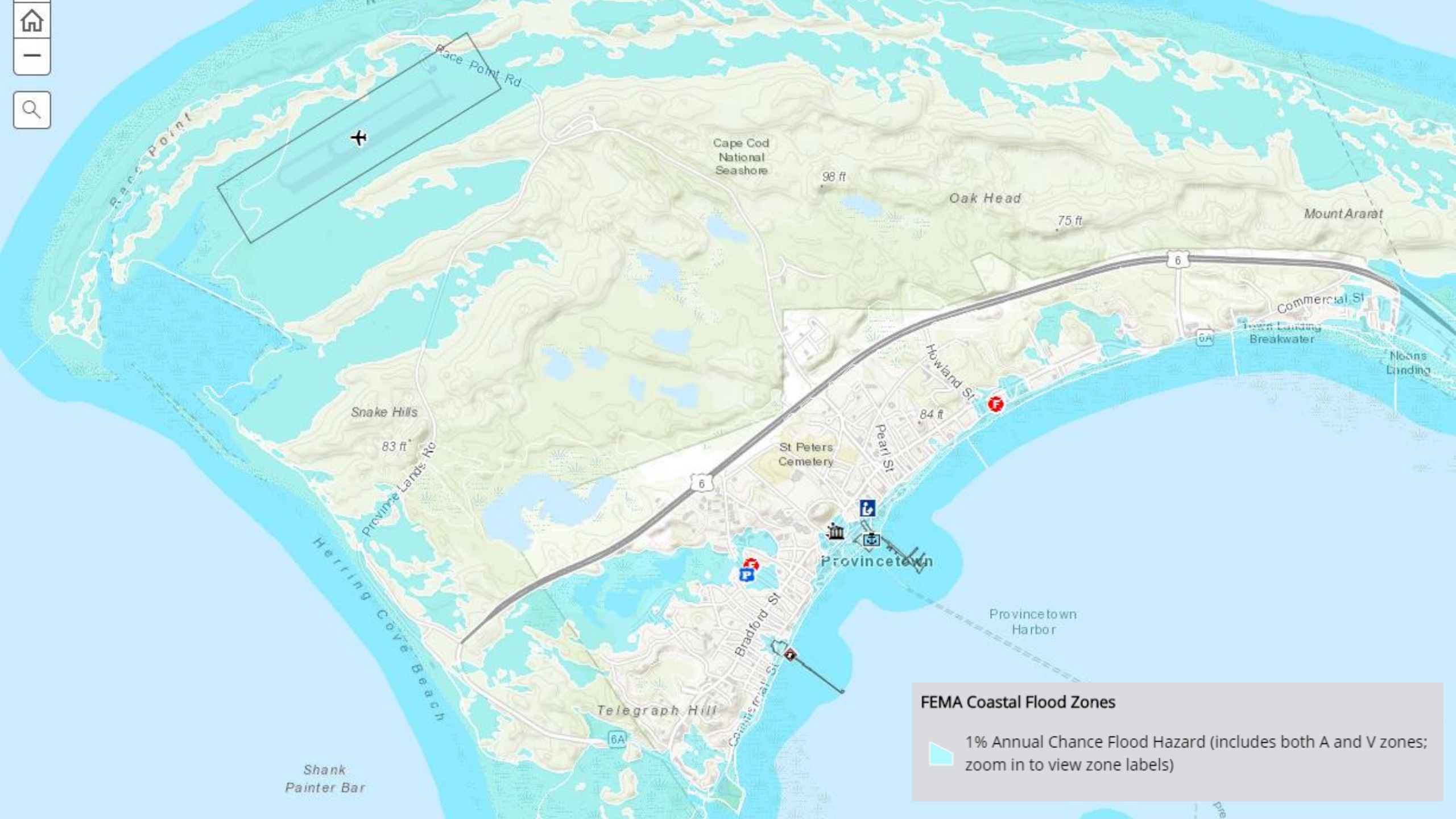
NECSC Northeast Climate Science Center

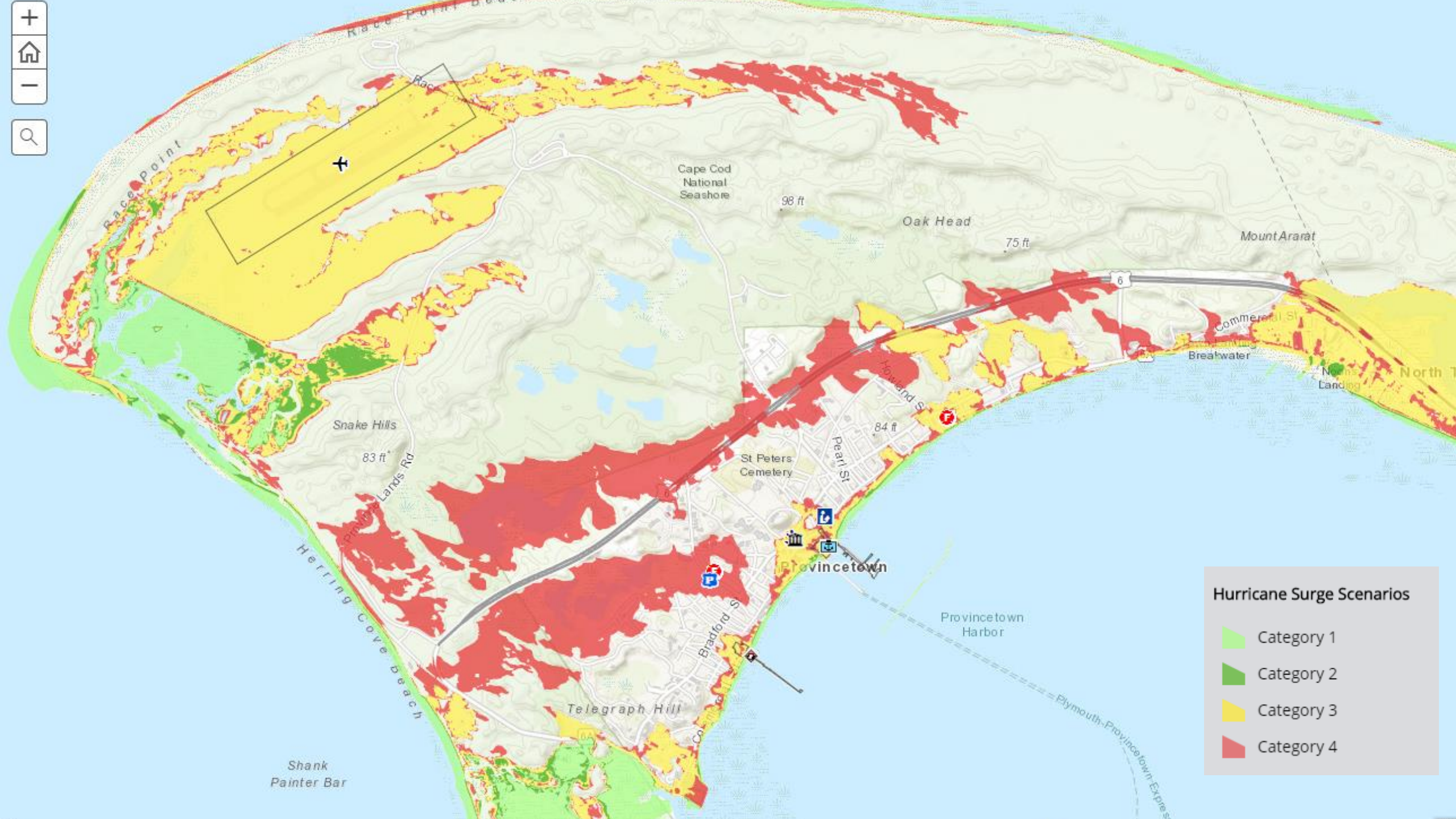
Annual Total Precipitation

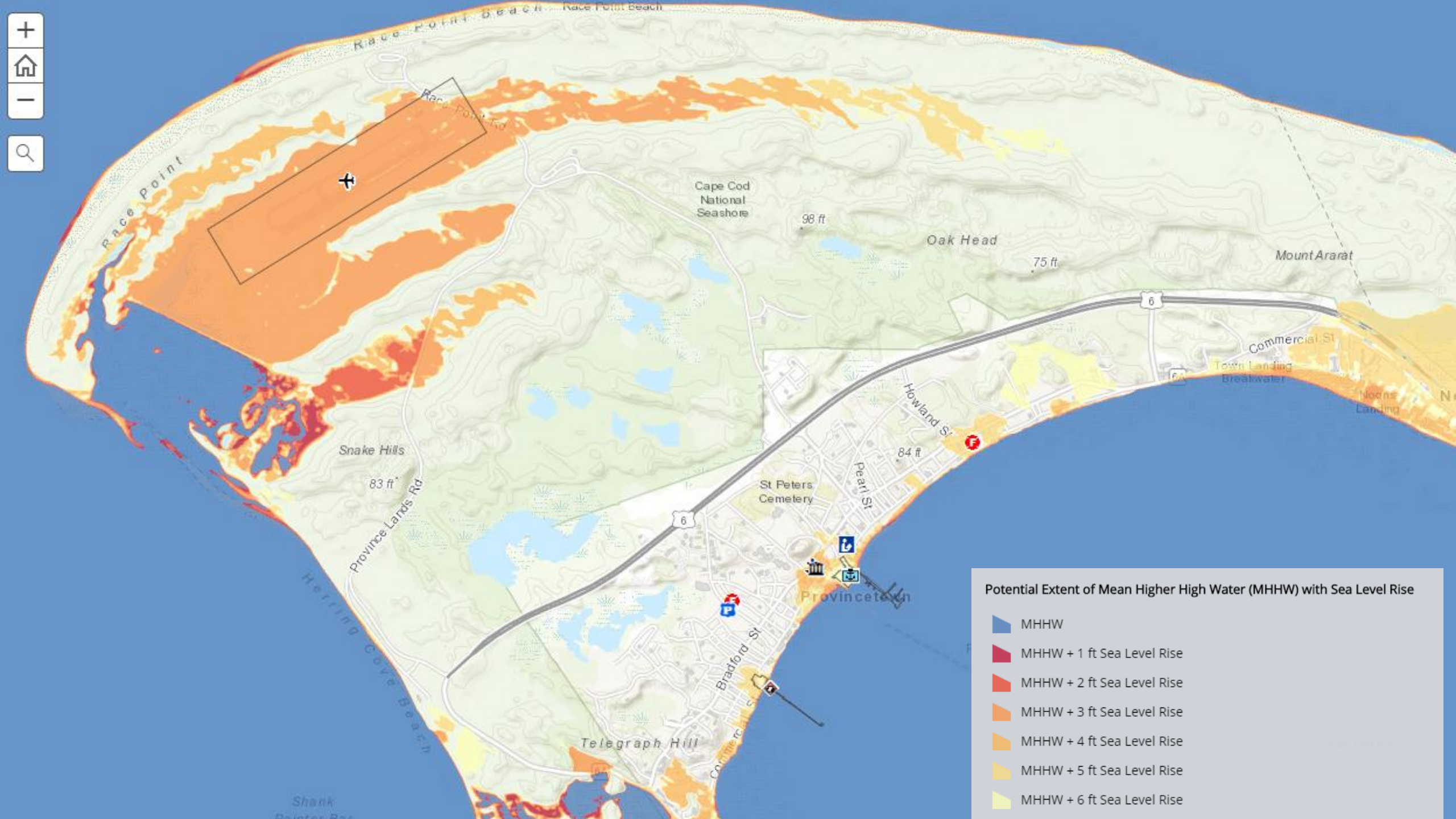


resilient MA

NECSC Northeast Climate Science Center


Race Point Rd
Race Point
Cape Cod National Seashore
98 ft
Oak Head
75 ft
Mount Ararat
6
Commercial St
Town Landing
Breakwater
6A
Noons Landing
Howland St
84 ft
Snake Hills
83 ft
Province Lands Rd
St Peters Cemetery
Pearl St
Provincetown
Herring Cove Beach
Bradford St
Provincetown Harbor
Telegraph Hill
Commercial St
Shank Painter Bar
FEMA Coastal Flood Zones
1% Annual Chance Flood Hazard (includes both A and V zones; zoom in to view zone labels)


Race Point Beach
Race Point
Cape Cod National Seashore
98 ft
Oak Head
75 ft
Mount Ararat
6
Commercial St
Breakwater
North Landing
North T
Howland St
84 ft
Pearl St
St Peters Cemetery
Snake Hills
83 ft
Provincetown Lands Rd
Provincetown
Herring Cove Beach
Bradford St
Provincetown Harbor
Telegraph Hill
Plymouth-Provincetown Express
Shank Painter Bar
Hurricane Surge Scenarios
Category 1
Category 2
Category 3
Category 4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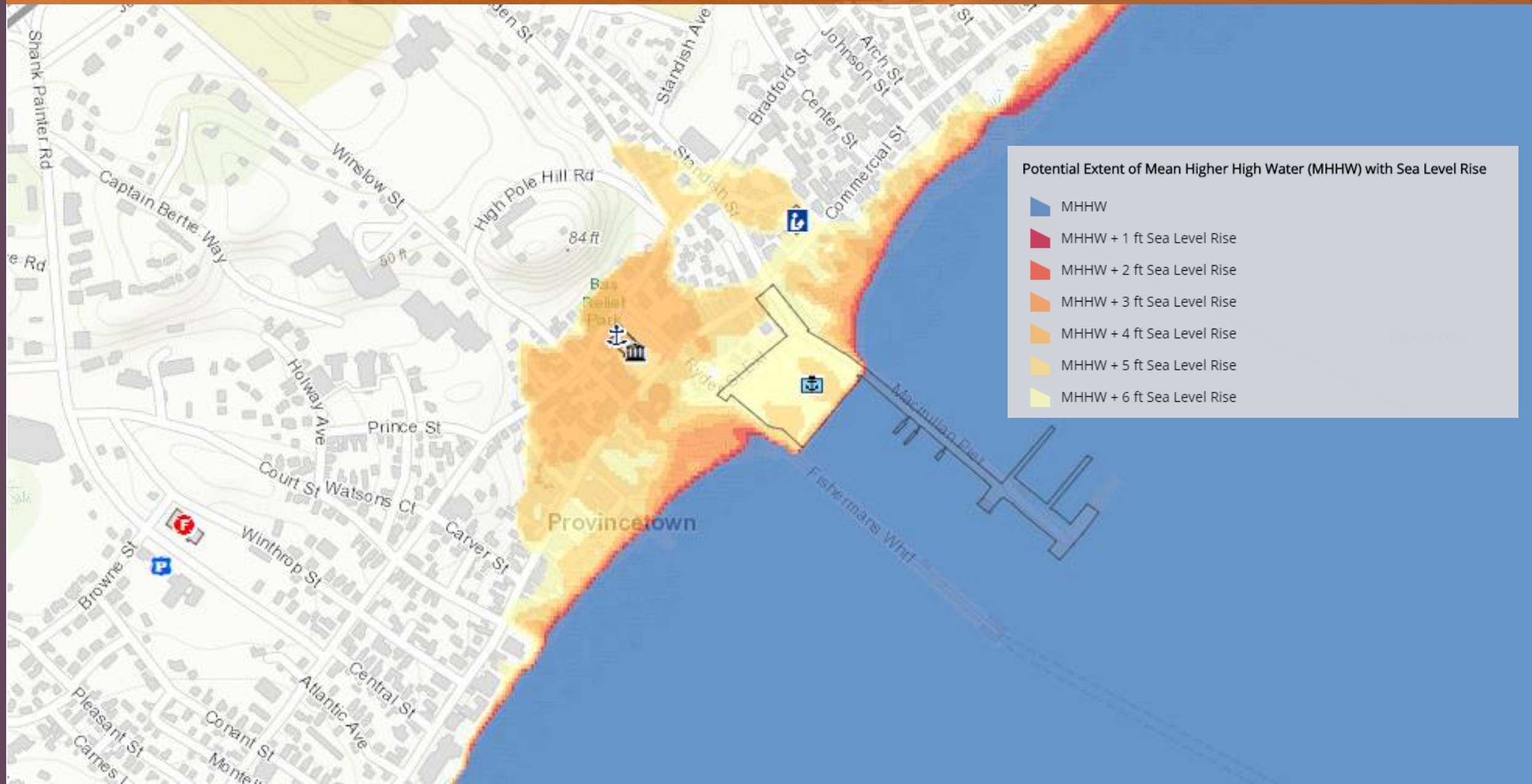
Provincetown
Bradford St
Telegraph Hill
Potential Extent of Mean Higher High Water (MHHW) with Sea Level Rise
MHHW
MHHW + 1 ft Sea Level Rise
MHHW + 2 ft Sea Level Rise
MHHW + 3 ft Sea Level Rise
MHHW + 4 ft Sea Level Rise
MHHW + 5 ft Sea Level Rise
MHHW + 6 ft Sea Level Rise

Sea Level Rise Scenarios

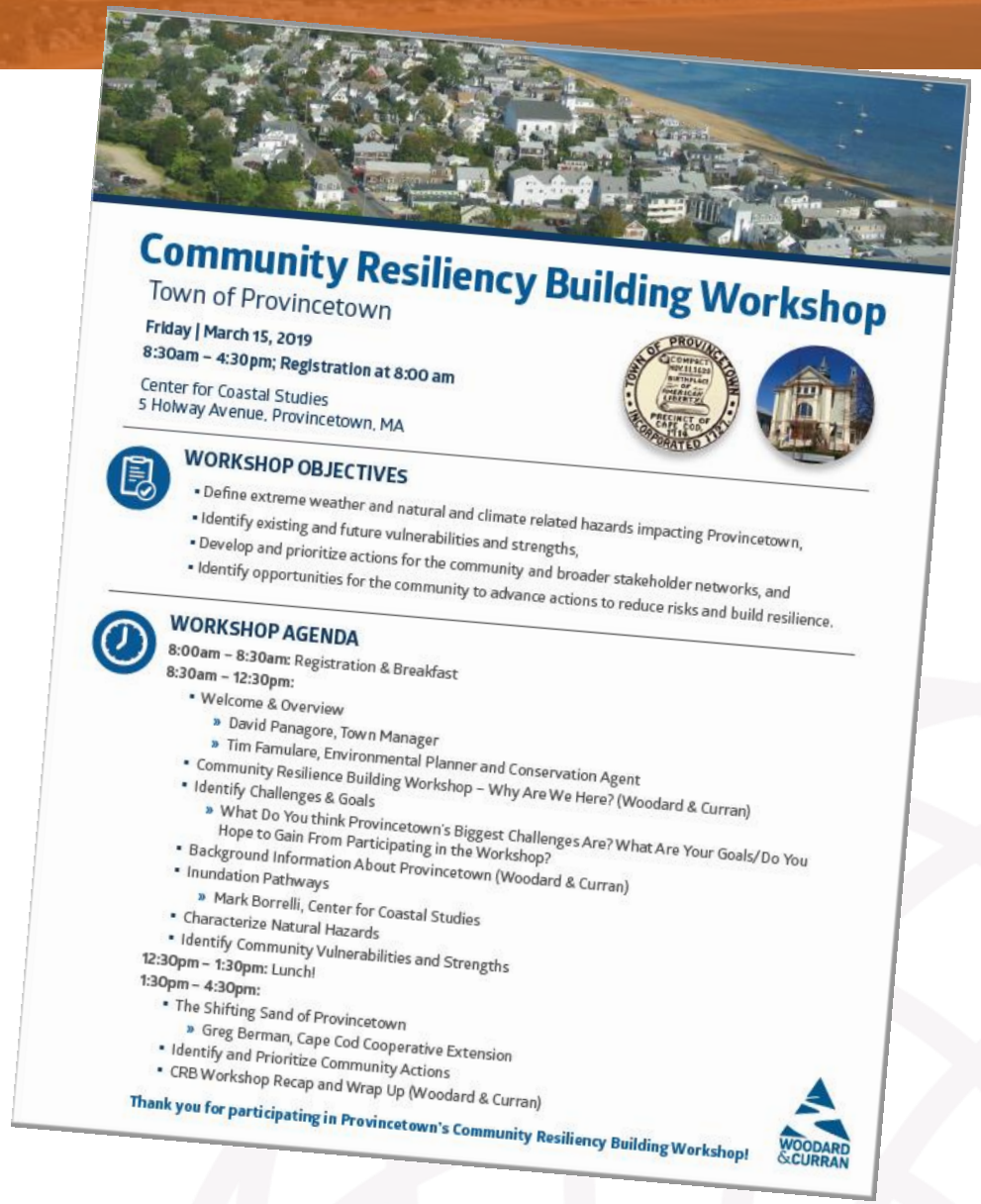


What Can We Do?

WOODARD & CURRAN

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 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

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

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

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?

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

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

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

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)

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

Conserve, Integrate, Restore

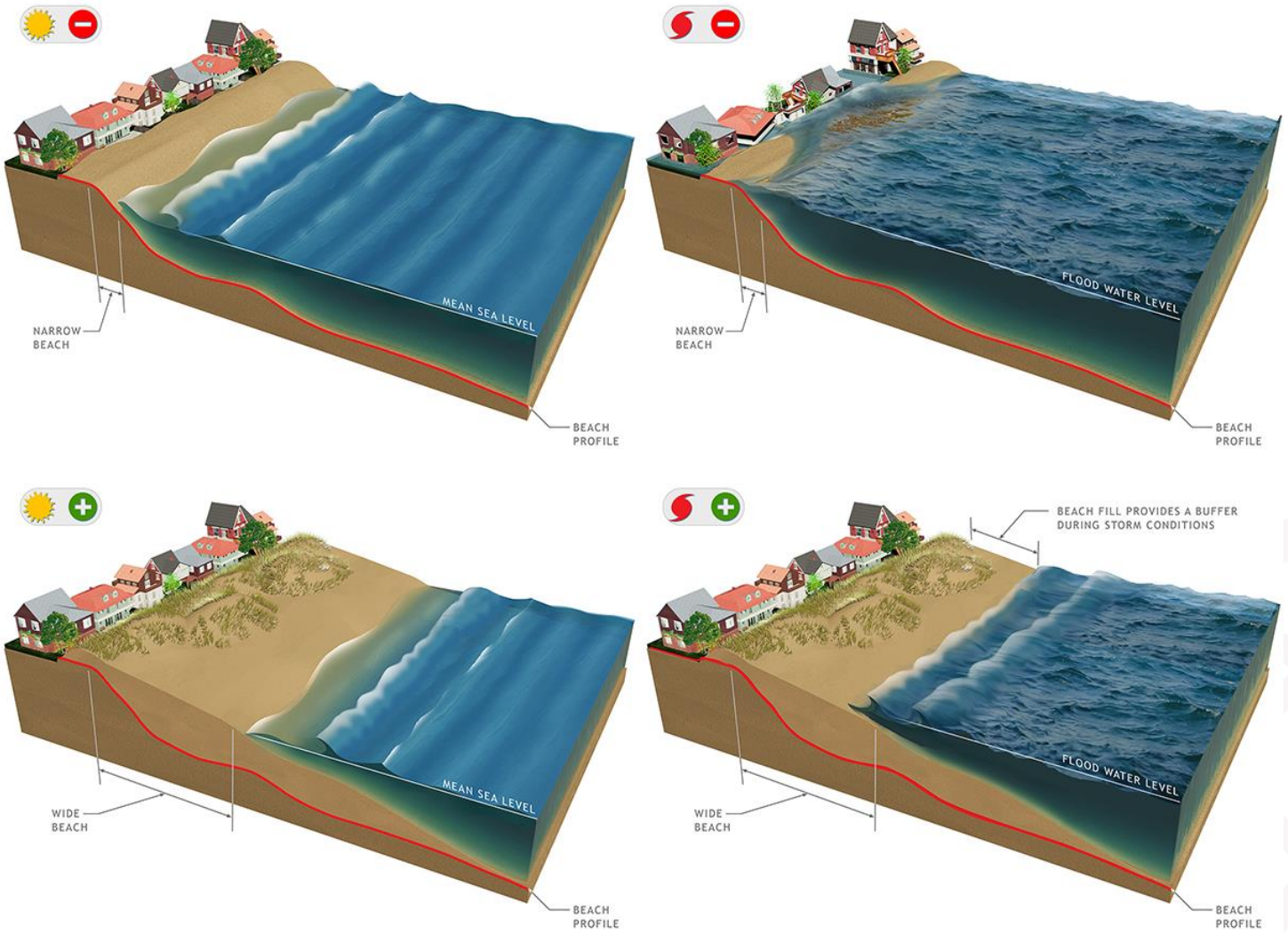
- **Conserve** the natural green infrastructure already providing free ecosystem services
- **Integrate** Low Impact Development and green infrastructure design into development
- **Restore** the resiliency of landscapes through LID

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

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



Living Shorelines

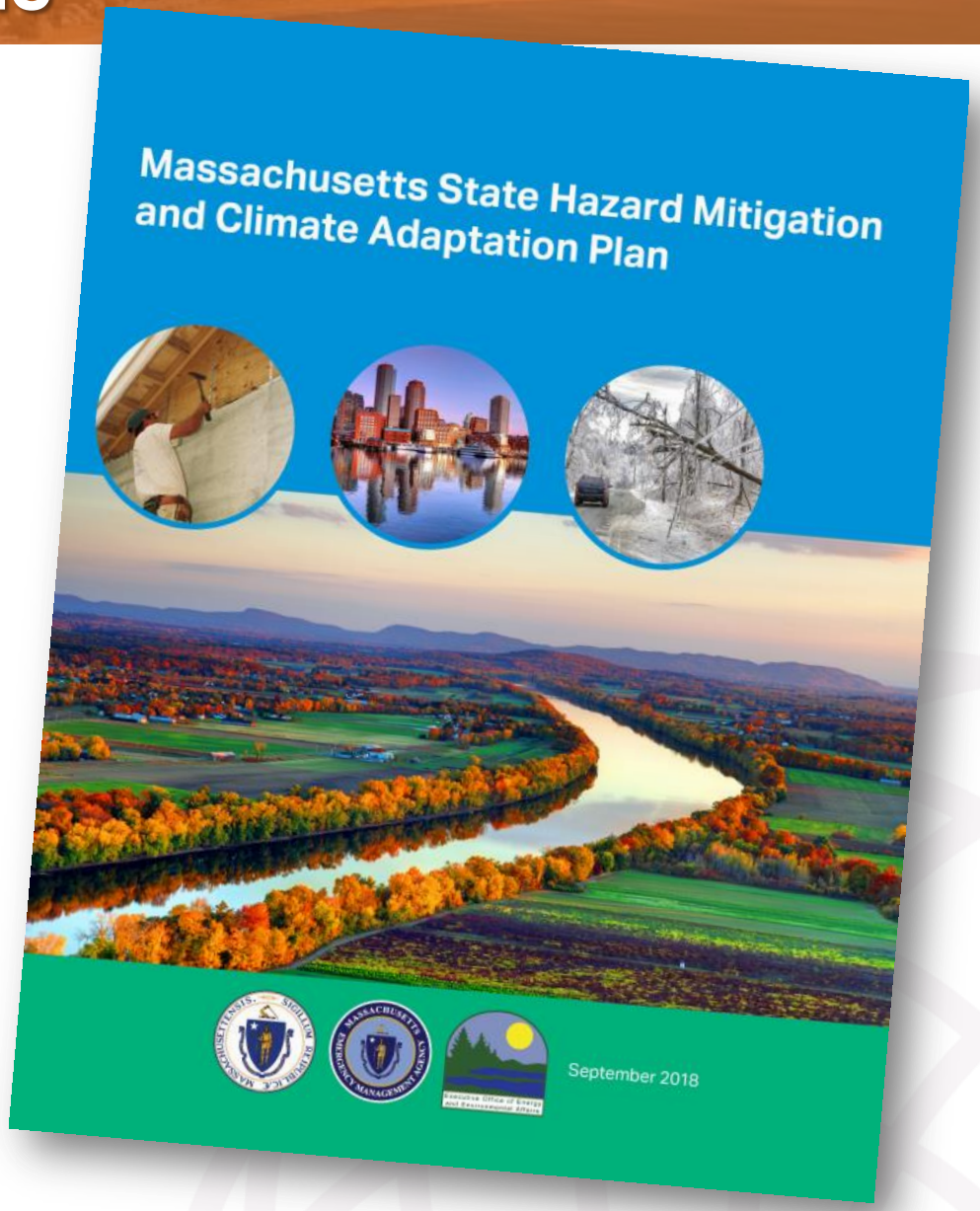
- Concept is cost–effective and quickly gaining popularity.
- Broad term that includes range of shoreline stabilization techniques with a footprint that is made up mostly of native material, and incorporates vegetation or other living elements alone or in combination with some type of harder shoreline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

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

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



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)

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

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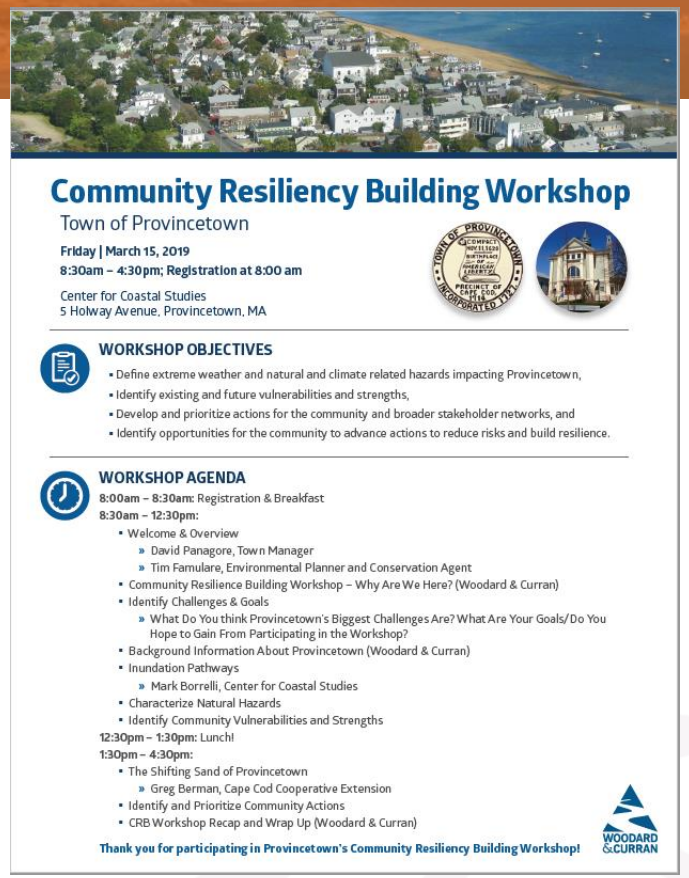

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WOODARD & CURRAN

Provincetown, MA
Community Resiliency Building Workshop

March 15, 2019

WOODARD & CURRAN