

Climate Impacts on the Good Harbor Beach Ecosystem

TOWNGREEN 

Creating a Carbon Neutral Community

A Workshop/Webinar

Moderator – Maureen Aylward

October 26, 2022

TOWNGREEN 

Creating a Carbon Neutral Community

Outline

- I. Introduction – *Maureen Aylward and Dick Prouty – 10 mins*
- II. Good harbor beach ecosystem past and present – *50 mins*
 - A. Video by James McDougall – *Jayne Knott – 5 mins.*
 - B. History of the GHBE – *Mary Ellen Lepionka – 15 mins*
 - C. Understanding the GHBE – *Denton Crews – 15 mins*
 - D. Breakout groups – *15 mins*
- III. The future of the GHBE – *50 mins*
 - A. Incremental sea level rise – *Jayne Knott – 15 mins*
 - B. What does a hurricane with higher sea level look like? *Charles Waldheim and Kira Clingen – 15 mins*
 - C. Breakout groups – *20 mins*
- IV. How do we adapt to these changes?

Good Harbor Field Trip

- **What** – Alison Frye, Associate Director at the Salem Sound Coastwatch, will lead a walk of the beach and salt marsh. We will observe the rocky coastline, various species of vegetation growing in the marsh, creeks and tidal pools, and fish and invertebrates feeding in the marsh. Sites needing restoration will be identified
- **When** – Tomorrow, October 27 at 4:00 – 5:00 pm. It will take place under sunshine, cloudy skies, or light rain (but not in stormy weather).
- **Where** - Meet in the Good Harbor Beach Parking Lot
- **What to wear** – Walkers should wear outdoor clothing plus waterproof boots; binoculars are optional.





A History of Good Harbor

Mary Ellen Lepionka
October 2022



Good Harbor

Little Good Harbor River and Good Harbor Beach in the Foreground, with Salt Island, Briar Neck, and Thacher Island in the distance



Famille abénakise d'Odanak





Shows Good Harbor Beach and Salt Island, with 15 Pawtucket wigwams, kitchen gardens. and managed groves all around Gloucester Habor.

Samuel de Champlain's map of Gloucester Harbor



Collect and filter the sea water



Boil down the brine and spread out the residue to dry



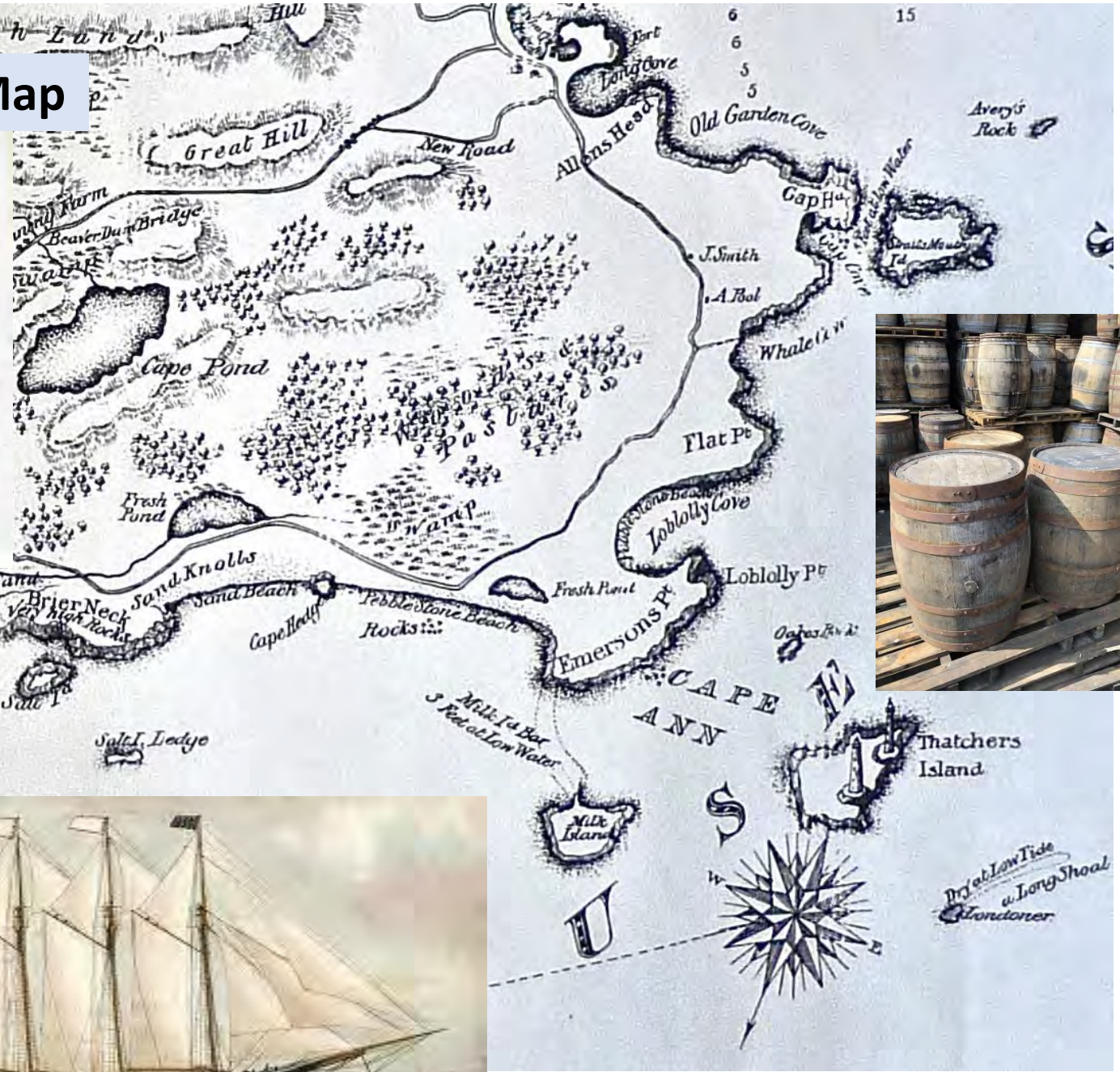
Rake up the crystals and pack



Detail from John Mason's 1831 Map

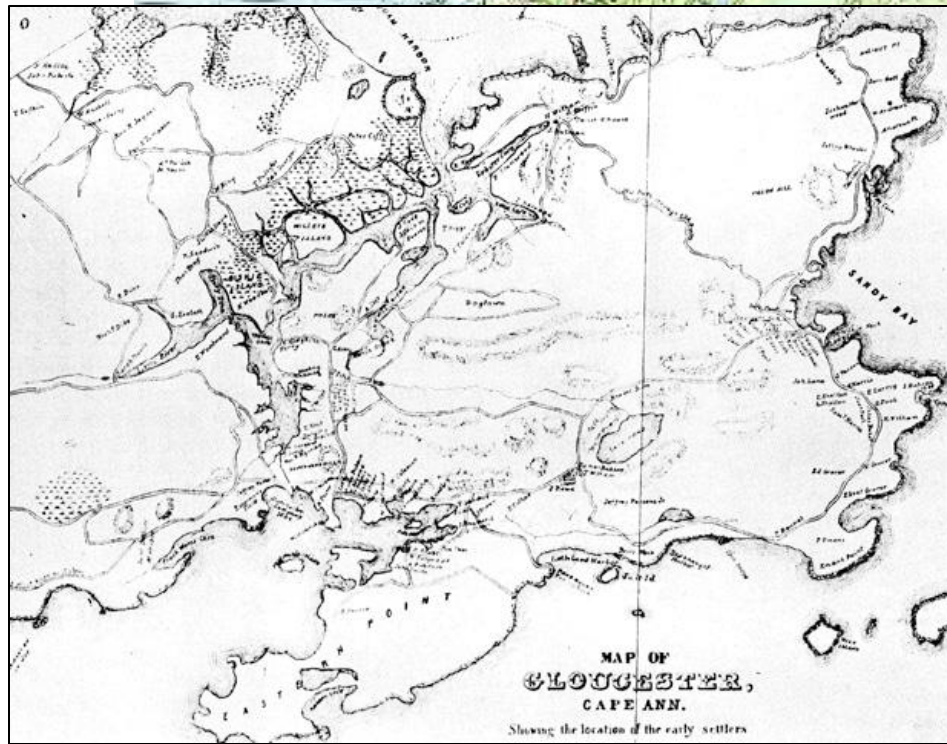


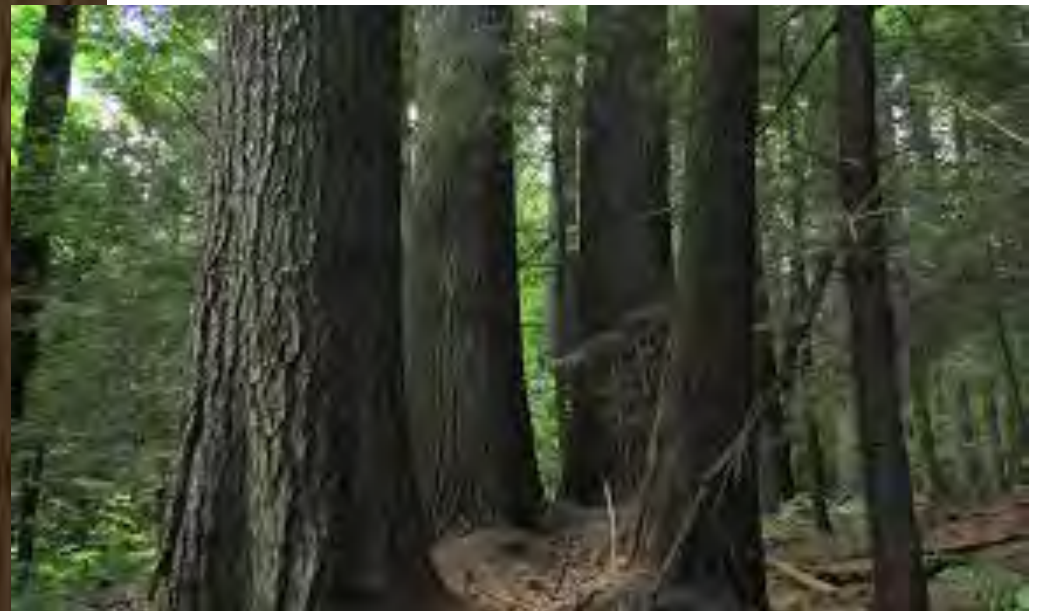
THE JAMES BABSON SHOP — BUILT IN 1658













THE DIARY
OF
WILLIAM BENTLEY, D. D.

PASTOR OF THE EAST CHURCH
SALEM, MASSACHUSETTS

Volume 1
APRIL, 1784 — DECEMBER, 1797

SALEM, MASS.
The Essex Institute
1995





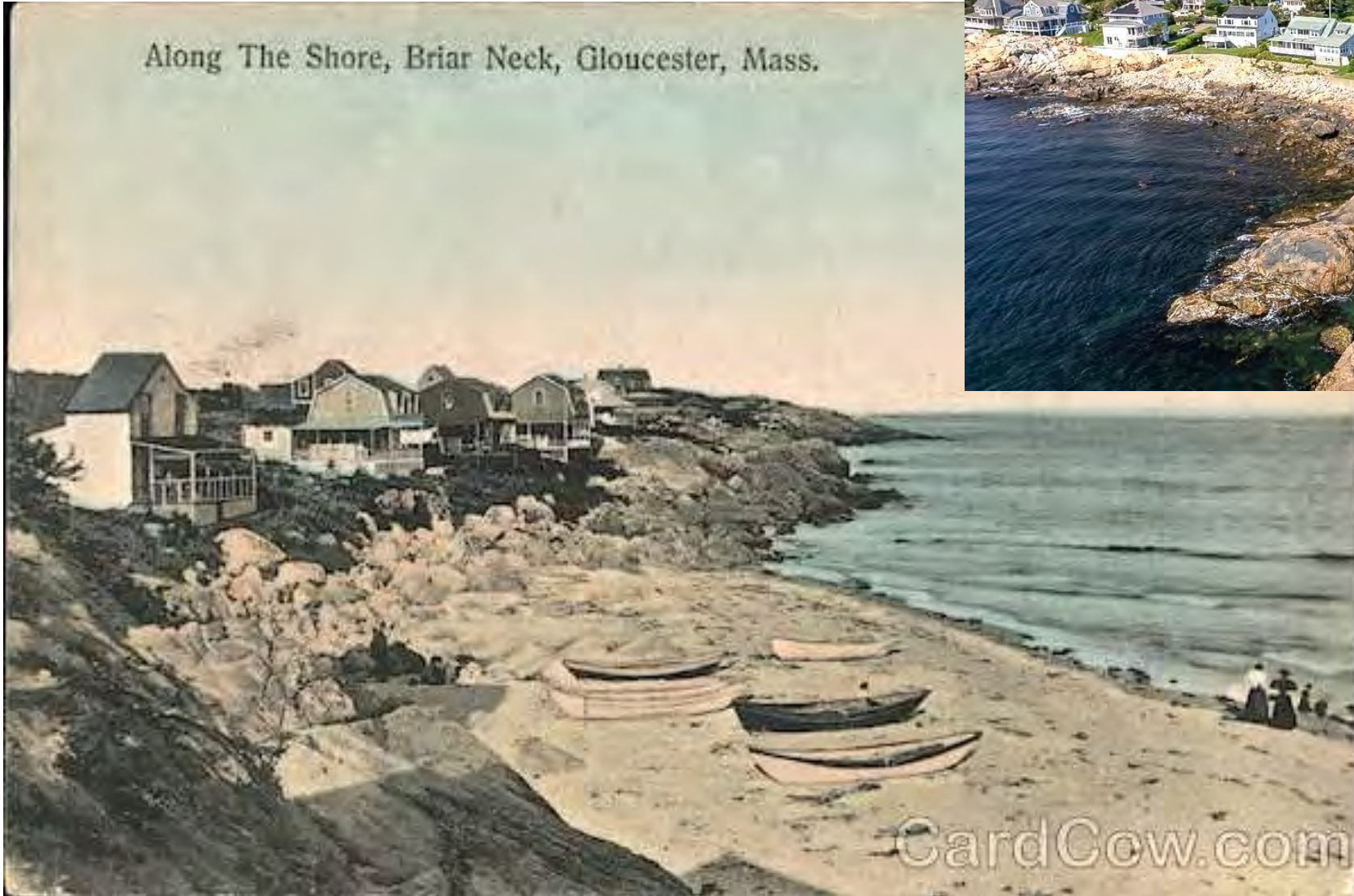


In 1873 the famous footbridge was built at the end of Ilseck Road.



Leon Kroll painting

Along The Shore, Briar Neck, Gloucester, Mass.



**Guy Parsons on Salt Island in the 1940s
with Brier Neck in the background**



Postcard of Salt Island circa 1910

The Trestle across Little Good Harbor Beach,
Bass Rocks, Gloucester, Mass.



Gloucester, Mass. The Pavilion,
Long Beach, Cape Ann.





Castle on Salt Island, 1919 (Alice M. Curtis/@Fredrik D. Bodin)





Fitz Henry Lane (1804-1865, Luminist Painter)



Charles C. Allen (1886-1950, Impressionist Painter)



Francis Augustus Silva (1835-1886, Hudson River School)



Maurice Prendergast (1858-1924, Post-Impressionist)



The Good Harbor Ecosystem

- Past and Present -



*TownGreen Workshop #1
October 26, 2022*

*Denton Crews
Friends of Good Harbor*

To stand at the edge of the sea, to sense the ebb and flow of the tides, to feel the breath of a mist moving over a great salt marsh, to watch the flight of shore birds that have swept up and down the surf lines of the continents for untold thousands of years . . . is to have knowledge of things that are as nearly eternal as any earthly life can be.

Rachel Carson
Under the Sea-Wind

Is the Good Harbor Ecosystem Resilient and Eternal?



Ecosystem: *a biological community of interacting organisms and their physical environment*

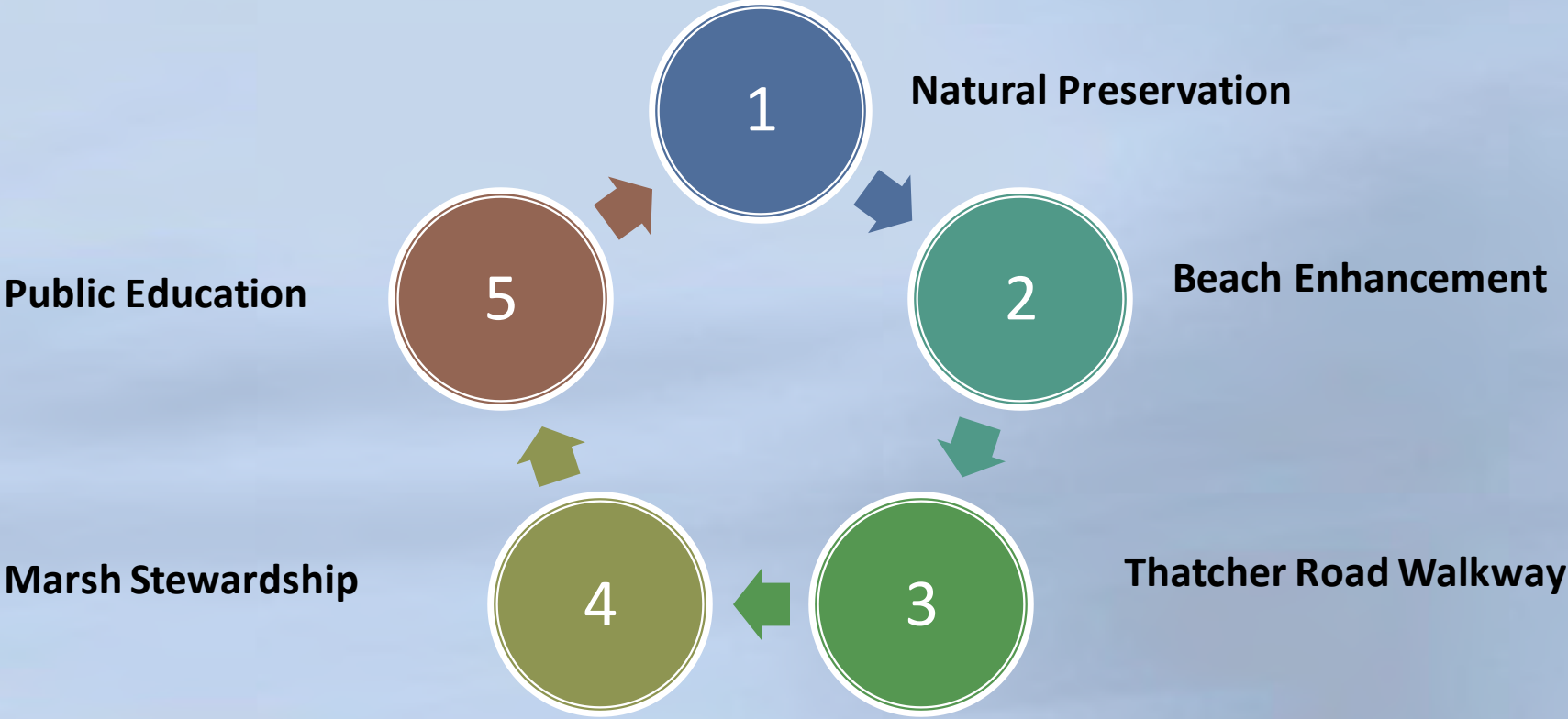


Resilience: *the ability to withstand adverse conditions and resume an original condition*

I. Friends of Good Harbor

Friends of Good Harbor, Inc.

Supporting the preservation and enhancement of the beach, marsh and wetlands surrounding Good Harbor



1. Natural Preservation

Property Acquisition and Protection



First Property:
70-74 Thatcher Road

Second Property:
Salt Island



2. Beach Enhancement

Enhancing the beach for recreation and preservation

Dune Restoration

Beach Cleanup

Beach Signs & Policies



3. Thatcher Road Walkway

Public access, education,
and safety on Thatcher
Road



Appreciation of Habitat



Pedestrian Safety

4. Salt Marsh Stewardship

Monitoring and restoration of the marsh



- Vegetation
- Nekton (fish)
- Invertebrates
- Salinity
- Avifauna (birds)
- Tidal Influence
- Land Use

5. Public Education



Appreciation
of Habitat



Walking Tours



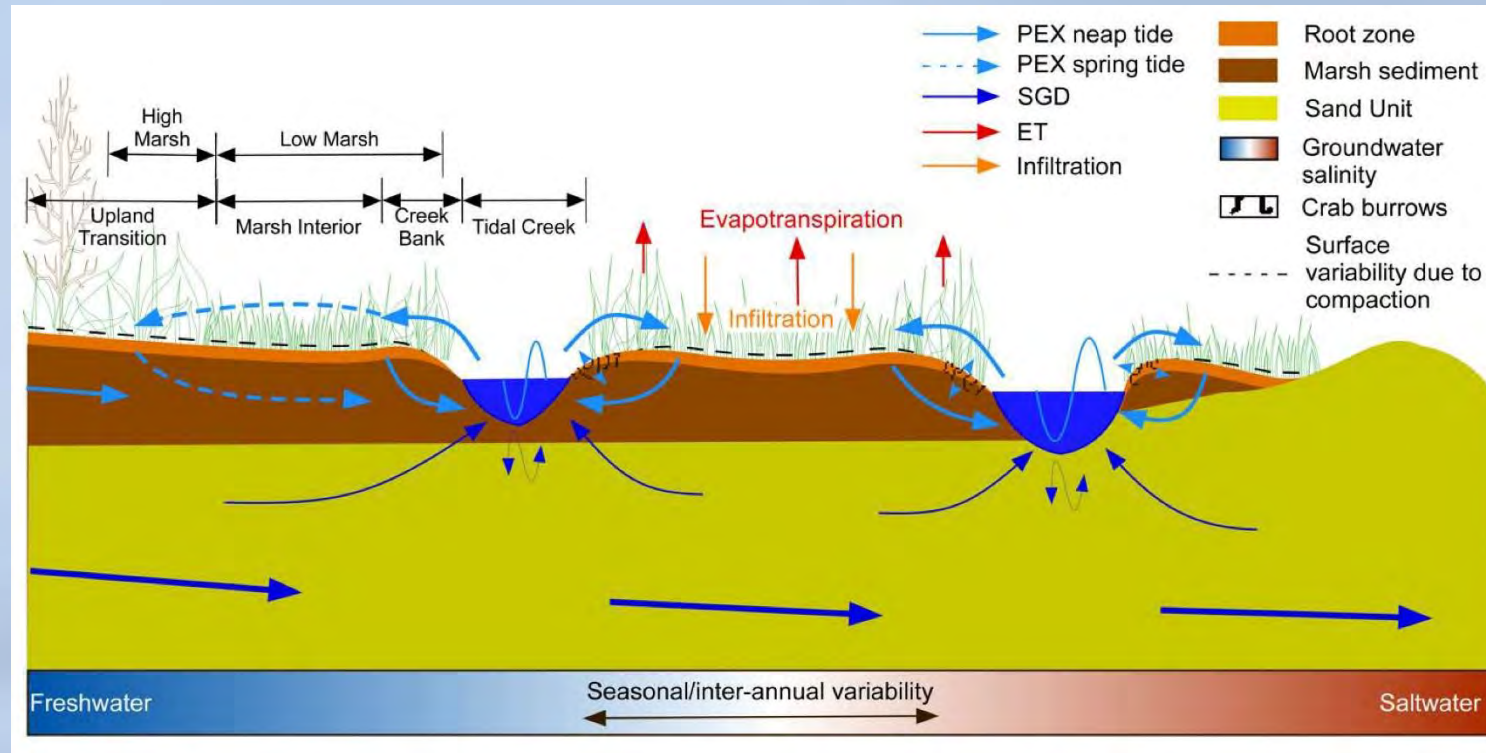
Advocacy



Awareness: Witham Street

II. Current Conditions of Good Harbor

Salt Marsh Composition & Parameters



WHAT Toolbox Measurement Parameters

Vegetation	Invertebrates	Avifauna (birds)
Nekton(fish)	Salinity	Tidal Influence
Land Use	Other: SLR, etc.	

Salem Sound Coast Watch Study

- Began in 2001 and continued four years
- SSCW used WHAT Toolbox
- Reference Site was Eastern Point restoration site (impaired marsh area at light house)
- Good Harbor was baseline site
 - Ecological integrity not impaired in 2002
 - By 2005 it was “somewhat impaired”

Audubon Society Study

- Prepared by Mass Audubon Society in 2003
- Focus was Gloucester wetlands and waterways
- Purpose to identify impaired or degraded sites
- Identified 225 sites, nine (9) Good Harbor Marsh
- Goal: Return sites to natural ecological conditions

City of Gloucester Study

- Undertaken in 2005 as collaboration of four departments: Health, Conservation, Shellfish, and Engineering Departments
- Funded by Coastal Zone Management (CZM)
- Purpose: long-term protection of Good Harbor drainage area
- Finding: primarily low salinity levels
- Recommendations: water sampling of Saratoga Creek, removal of dog waste, beach management, catch basin cleaning, water run-off ordinance; public education

Great Marsh Study

- Conducted in 2007 by Mass Division of Ecological Restoration (Fish & Game)
- Listed eight (8) projects in Good Harbor Area
 - Marsh restoration of 70-74 Thatcher Road
 - Impounded marshland east of Witham Street
 - Historically-filled marsh at westerly edge of Good Harbor parking lot
 - Degraded area west of Marina Drive
 - Degraded area west of Hartz Road
 - Remnant marsh south of Stop & Shop Plaza
 - Wetland north of beach and south of Thatcher Road impounded by parking lot driveway

FOGH-SSCW Marsh Assessment

- Conducted 2012-2014 utilizing WHAT Toolbox
- Expanded & updated baseline data of 2005 with new data in 2012 and in 2013
- Marsh system showed high salinity levels with healthy mix of vegetation, fish populations, and bird nesting
- Human-induced stressors were identified
 - Invasive species control
 - Culvert assessment and modification for tidal flow
 - Restoration of historically filled salt marsh
 - Assessment of stormwater management

FOGH-SSCW Rising Sea Survey

- Conducted in 2015-16, funded by Bruce J. Anderson Foundation
- Permanent markers and baseline data collected on both sides of Saratoga Creek
- Measures of salt pannes, raised islands, and creek changes from higher sea levels
- Changes noted in size of southern panne system, vegetated islands moving eastward, and creek widening with bank collapses
- Additional parameters added to WHAT protocols for monitoring sea level rise

Gloucester Vulnerability Reports

- In 2015, Gloucester was awarded grant to assess sea level rise vulnerability
 - Produced initial assessment of municipal facilities requiring adaptation and mitigation
 - Good Harbor was identified as an area of vulnerability
- In 2022, Gloucester released a draft *Climate Action and Resilience Plan* with recommendations for adaptation, including “Natural Resource Solutions” for Good Harbor
 - Natural Resource #11: Preserve salt marshes, clear phragmites, repair culvert that feeds pond

III. Opportunities for Preservation & Enhancement of Good Harbor

Strategies for Marsh Health 2001-2014

Continued marsh studies
**Restore impounded areas and
natural ecological conditions**
Enforce ordinances



Strategies for Natural Adaptation 2016ff

Remove barriers to hydrology
**Remove barriers to sediment
supply**
Remove shoreline barriers
Provide areas for marsh migration



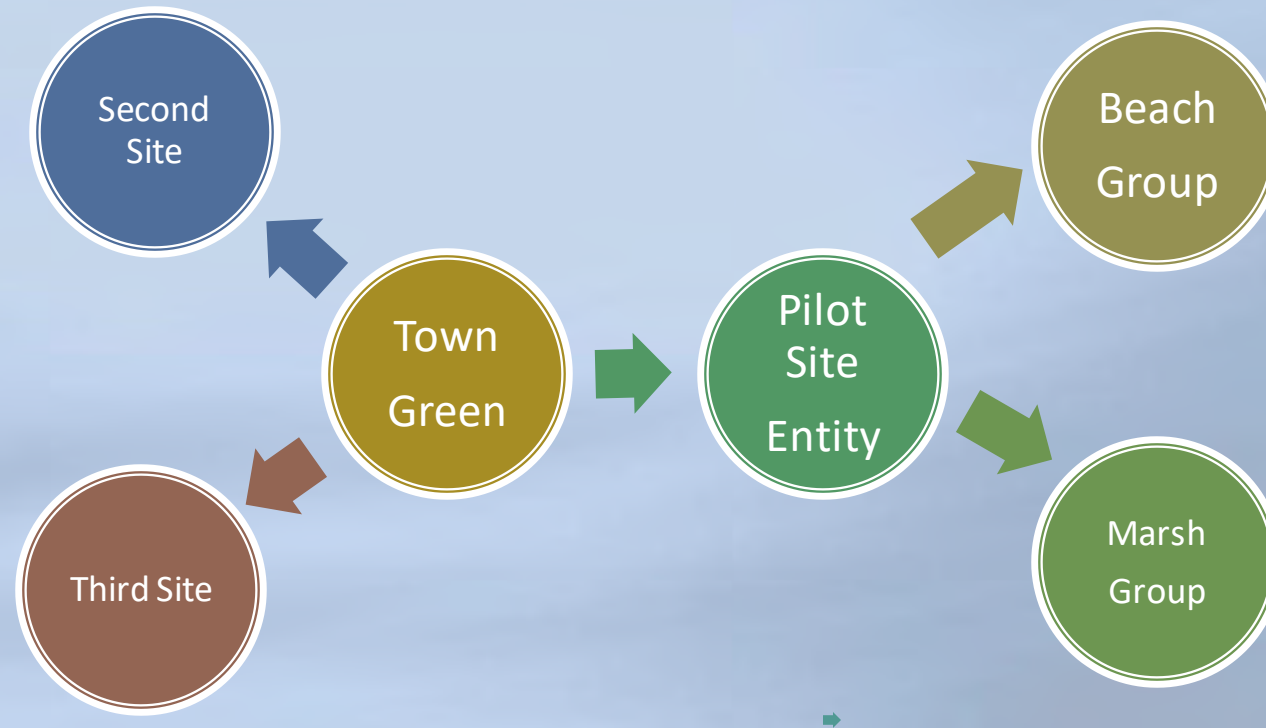
Good Harbor Conservancy

Comprehensive conservation of the ecosystem



TownGreen – Good Harbor Pilot

Catalyst and Community Partnership



“The Gift Outright”

*Something we were withholding made us weak
Until we found out that it was ourselves
We were withholding from our land of living,
And forthwith found salvation in surrender.*

Robert Frost

1st Breakout Group – 15 minutes

1. Take a picture of these instructions.
2. When in the group, first choose a scribe to record the responses.
3. If 5 people, each person speaks for 3 minutes.
4. Questions
 - a. Introduce yourself and share your connection to the GHBE
 - b. Are you seeing any climate-related changes?
 - c. What concerns do you have about the beach, the ecosystem, and/or the surrounding area?
5. Scribe – Please email your notes to: maureen@towngreen2025.org

The Future of the Good Harbor Beach Ecosystem

TOWNGREEN 

Creating a Carbon Neutral Community

Jayne Knott, Ph.D.

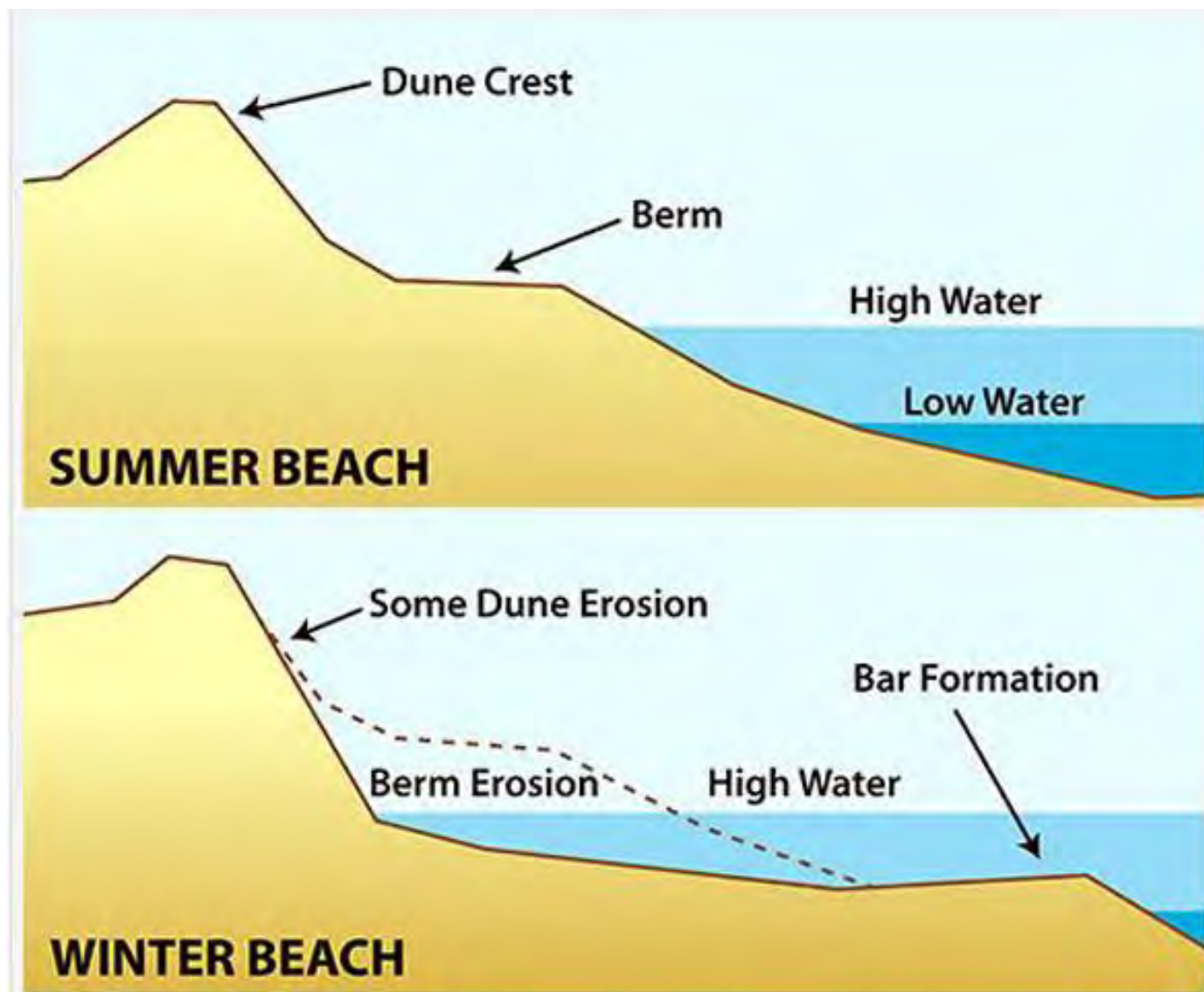
October 26, 2022

HydroPredictions

Healthy coastal ecosystems are essential for our economy to thrive

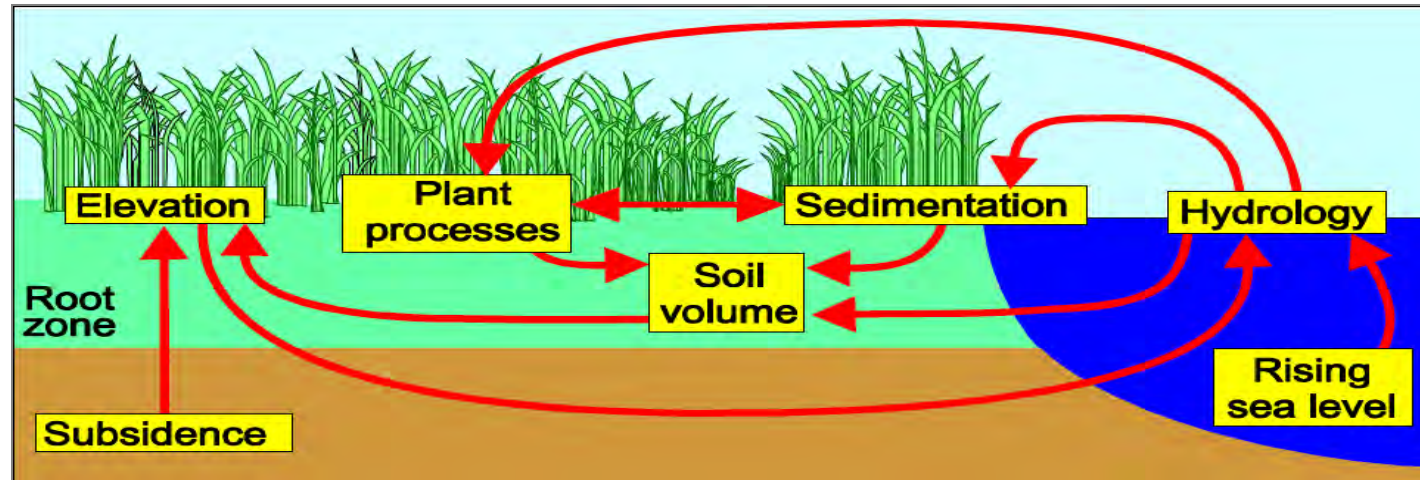


Amazing Natural Systems – Beach Profiles



Salt marshes are naturally resilient to sea level changes

- Reflect a dynamic balance of building processes;
 - Sediment trapping and binding
 - Root production and limited decomposition
 - Sea Level Rise (up to 5 mm /yr.)



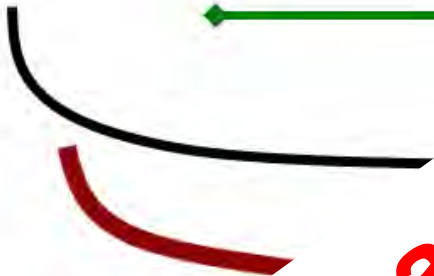
- . . . and eroding processes

- Compaction (by floods and ice)
- Decomposition of roots and peat (Temperature, Nitrogen)
- Physical exposure to waves and ice

Cahoon & Lynch
<http://www.pwrc.usgs.gov/set/>

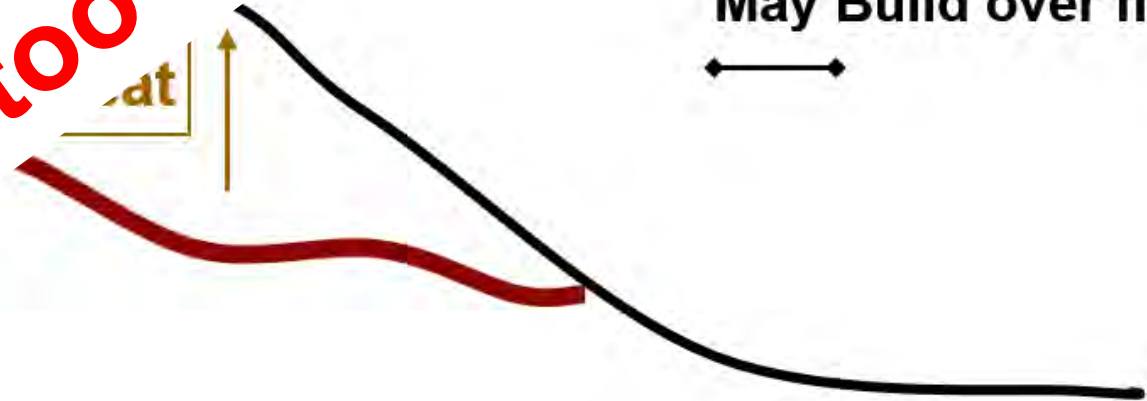
Marsh development during periods of sea level rise

Very slow
Transgression
over upland



**What if the marsh cannot
migrate inland or if the rate
of SLR is too fast?**

May Build over flats

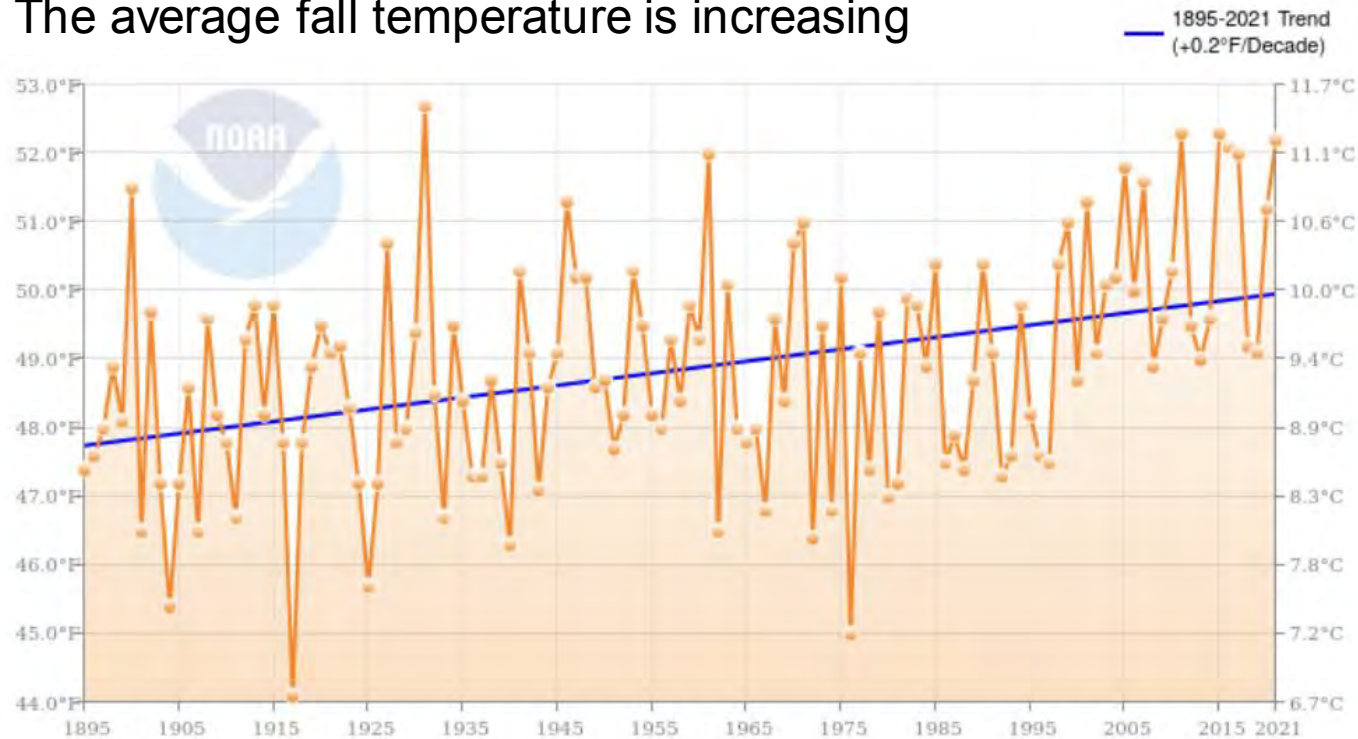


Subsidence
increases as peat
builds

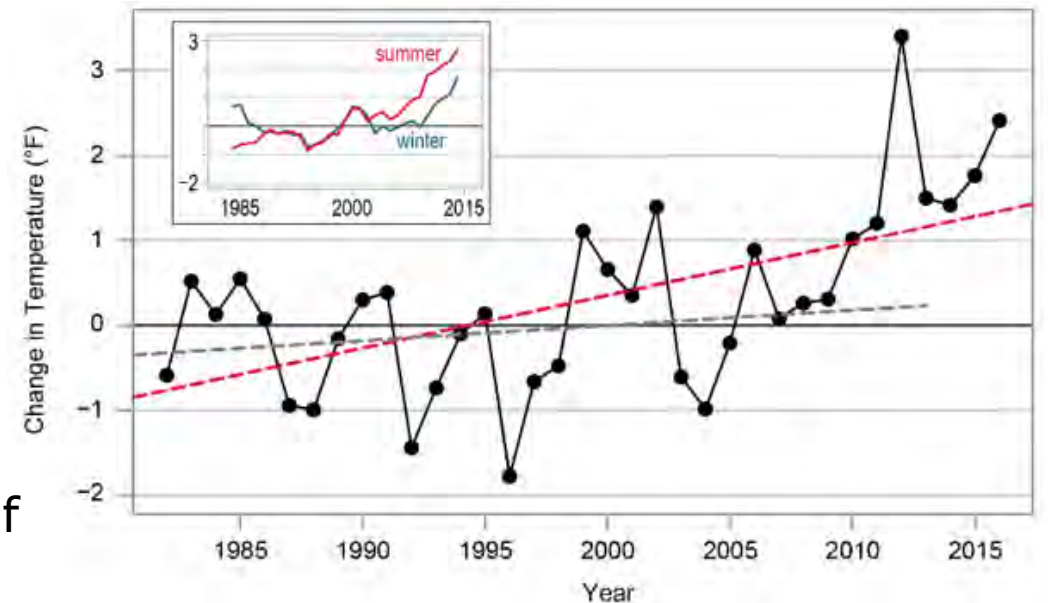
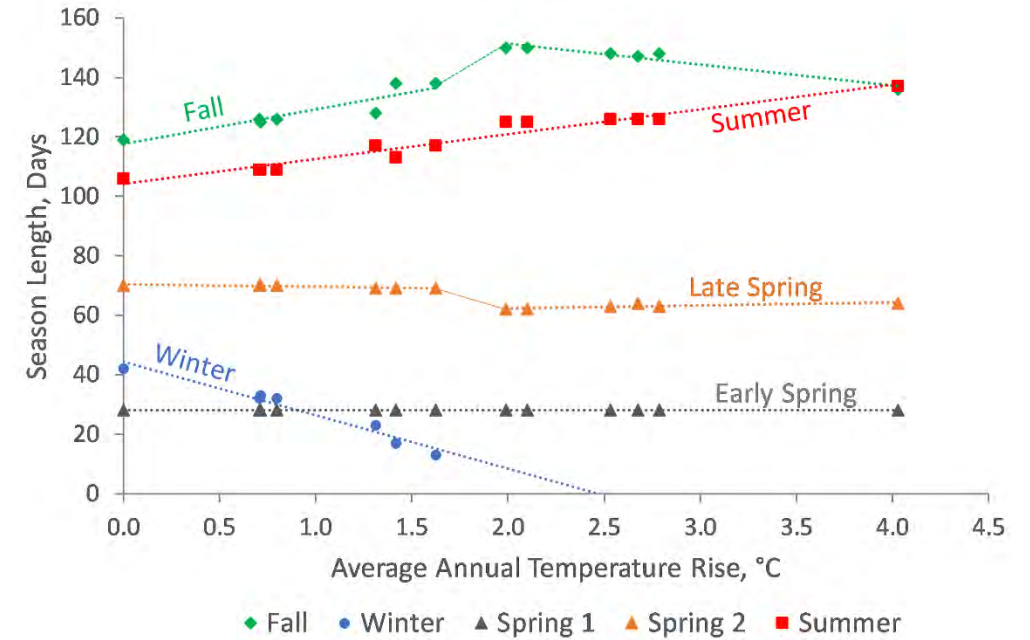


In New England, our seasons are changing

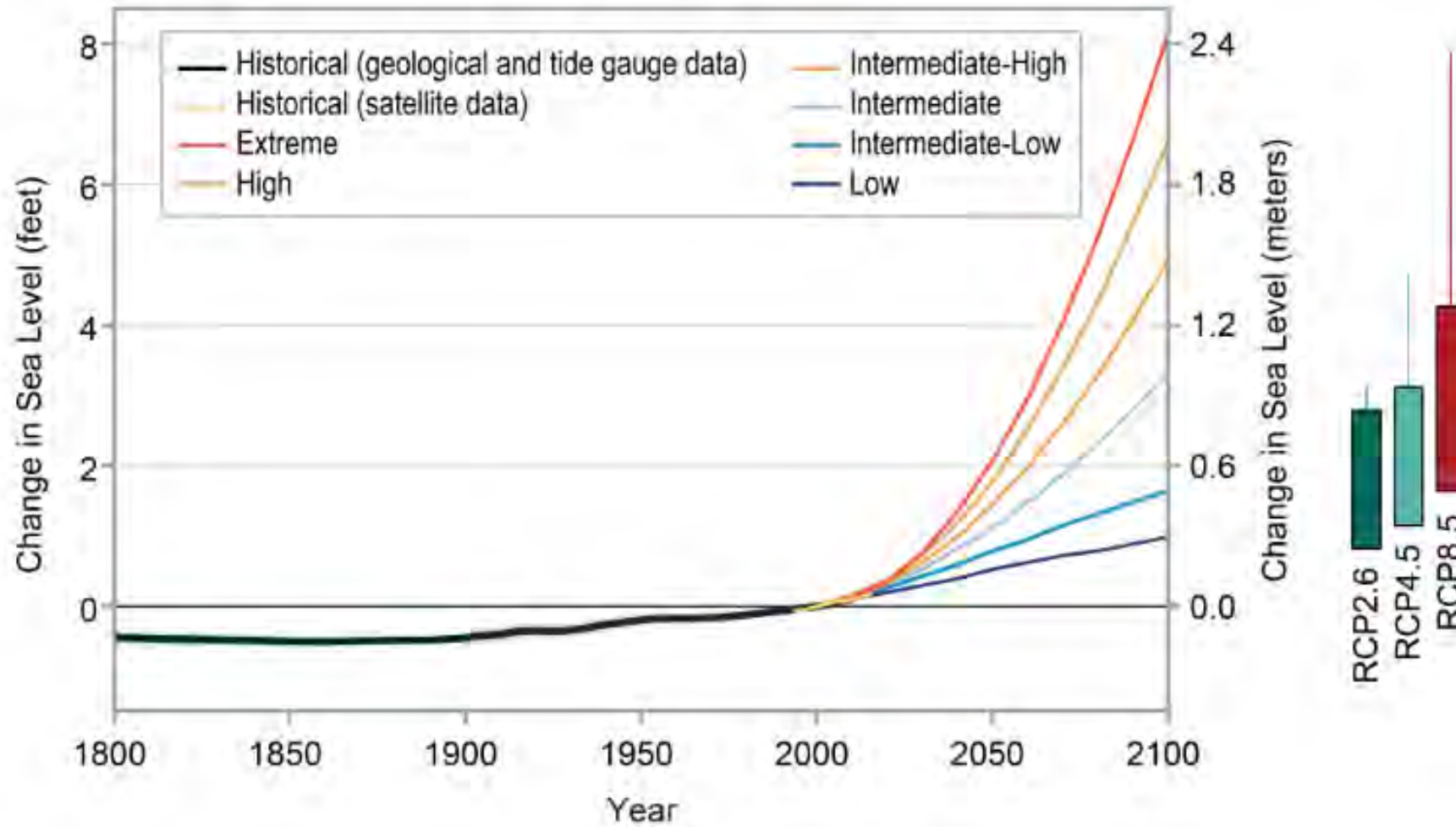
The average fall temperature is increasing



The sea-surface temperature of the Gulf of Maine is increasing



Projected Global Sea Level Rise Scenarios



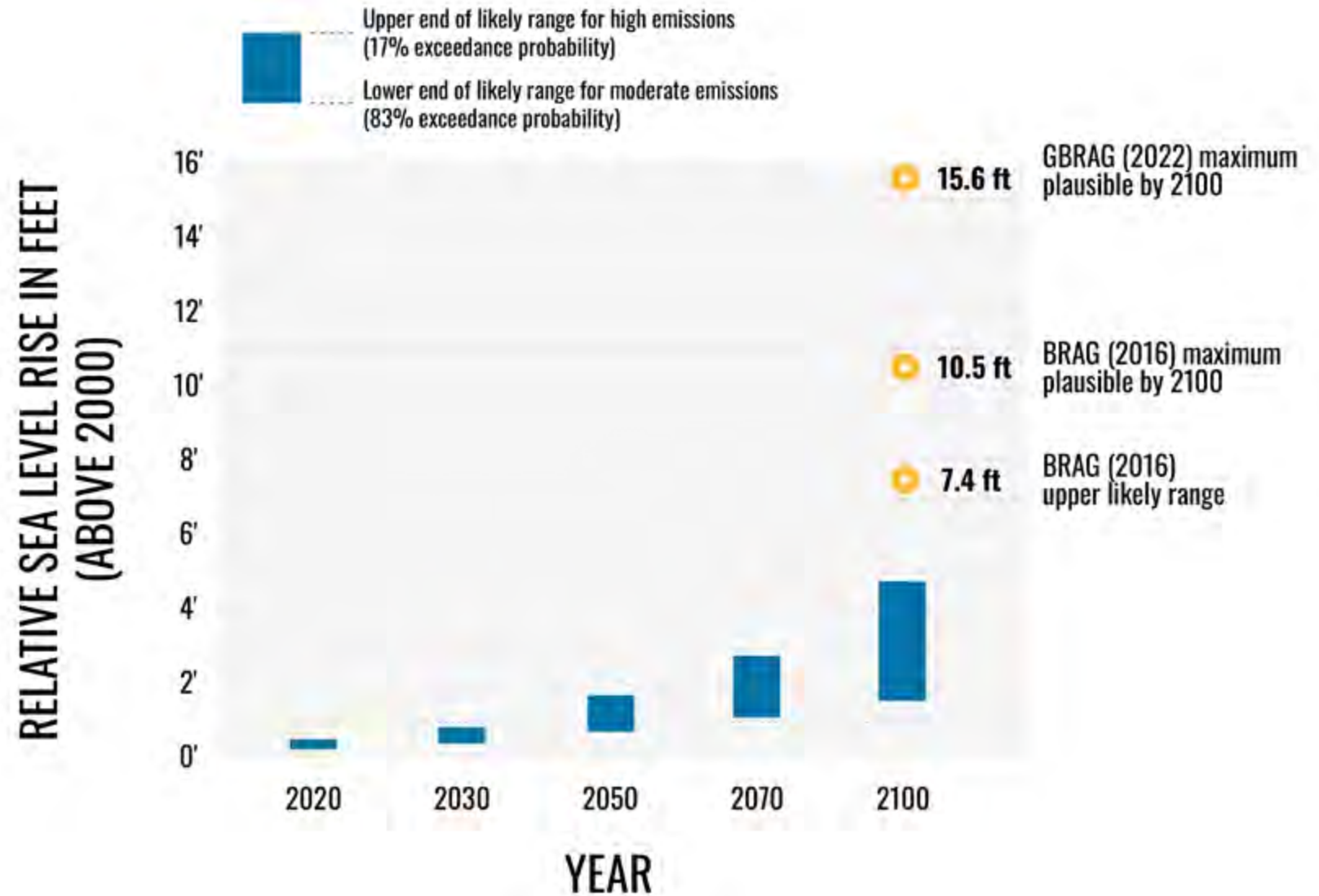
Source: 4th National Climate Assessment (2018)

LIKELY RANGE OF PROJECTED SEA LEVEL RISE FOR BOSTON AREA

From 2001 to 2019 RSLR in Boston RSLR = 5.4 mm/yr. (0.2 in/yr.)

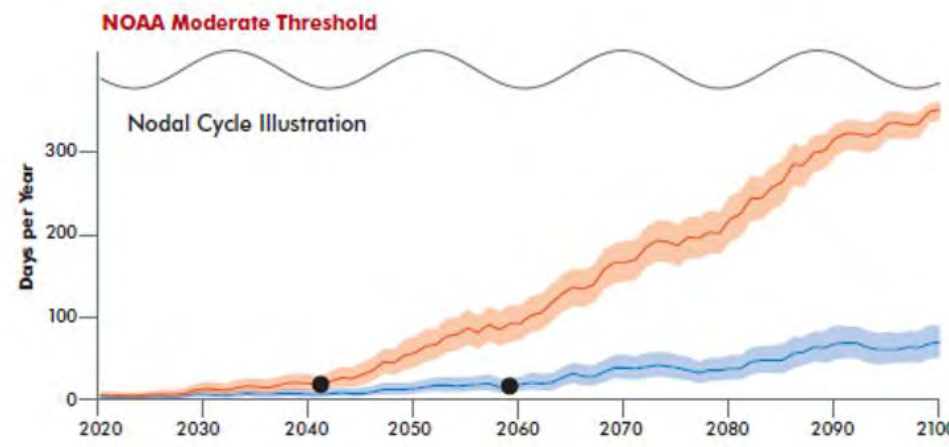
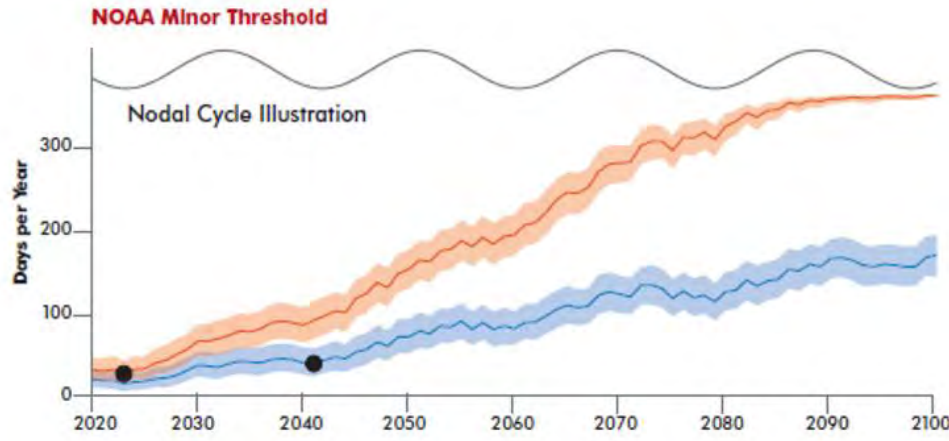
Likely projections of RSLR:

- 2030 to 2050 – 13 mm/yr. (0.5 in/yr.)
- 2050 to 2070 – 18 mm/yr. (0.7 in/yr.)
- 2070 to 2100 - 20 mm/yr. (0.8 in/yr.) under RCP4.5



Source: GBRAG Report (2022)

Projected Days of “Sunny-Day Flooding” in Boston



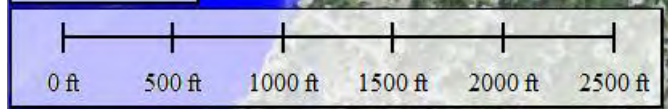
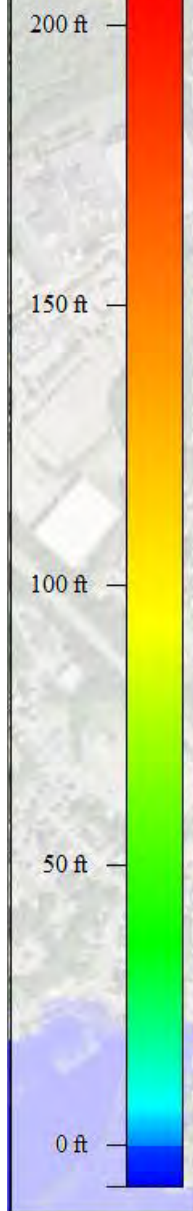
Blue - Intermediate low SLR

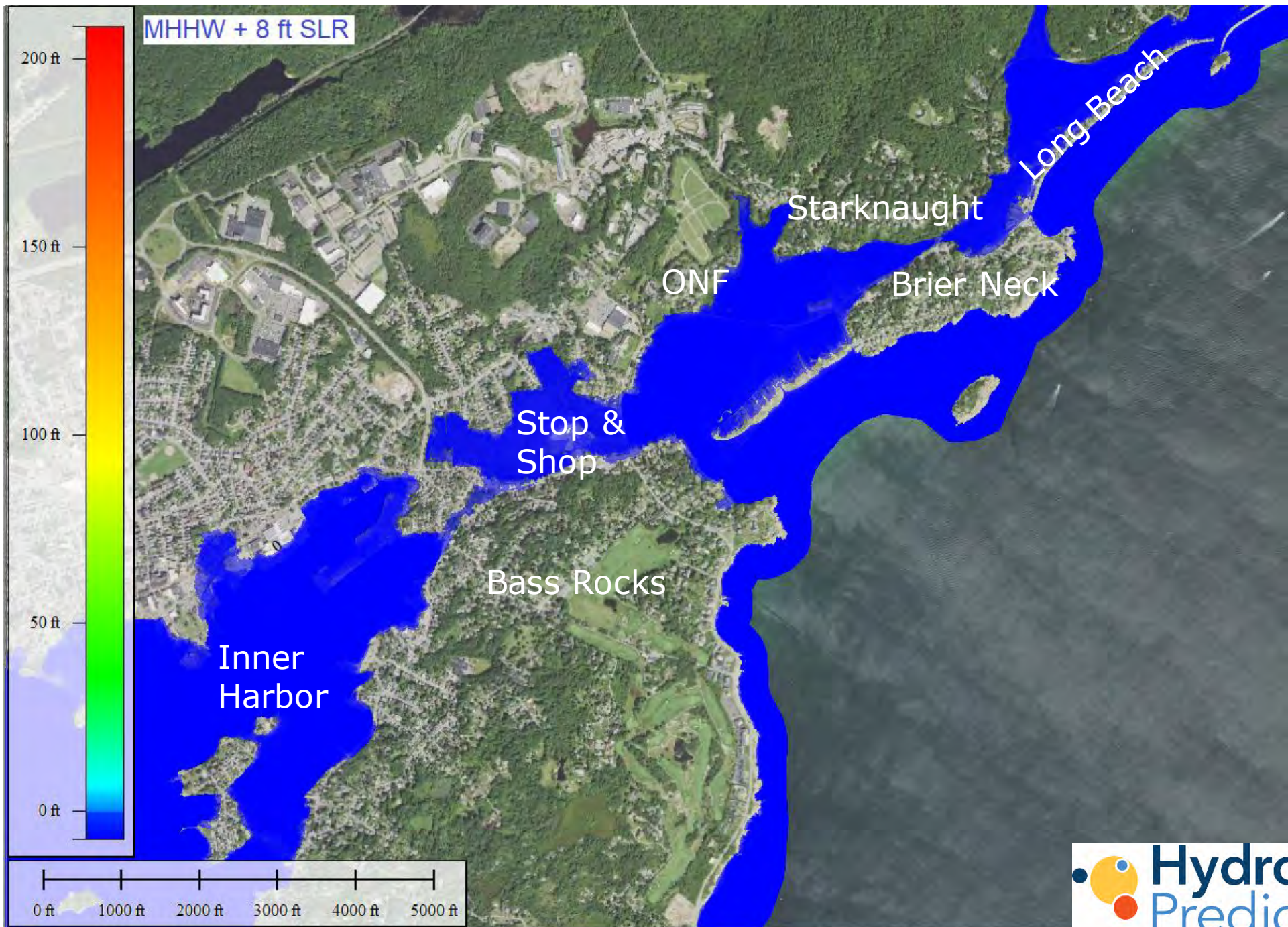
Red - Intermediate SLR



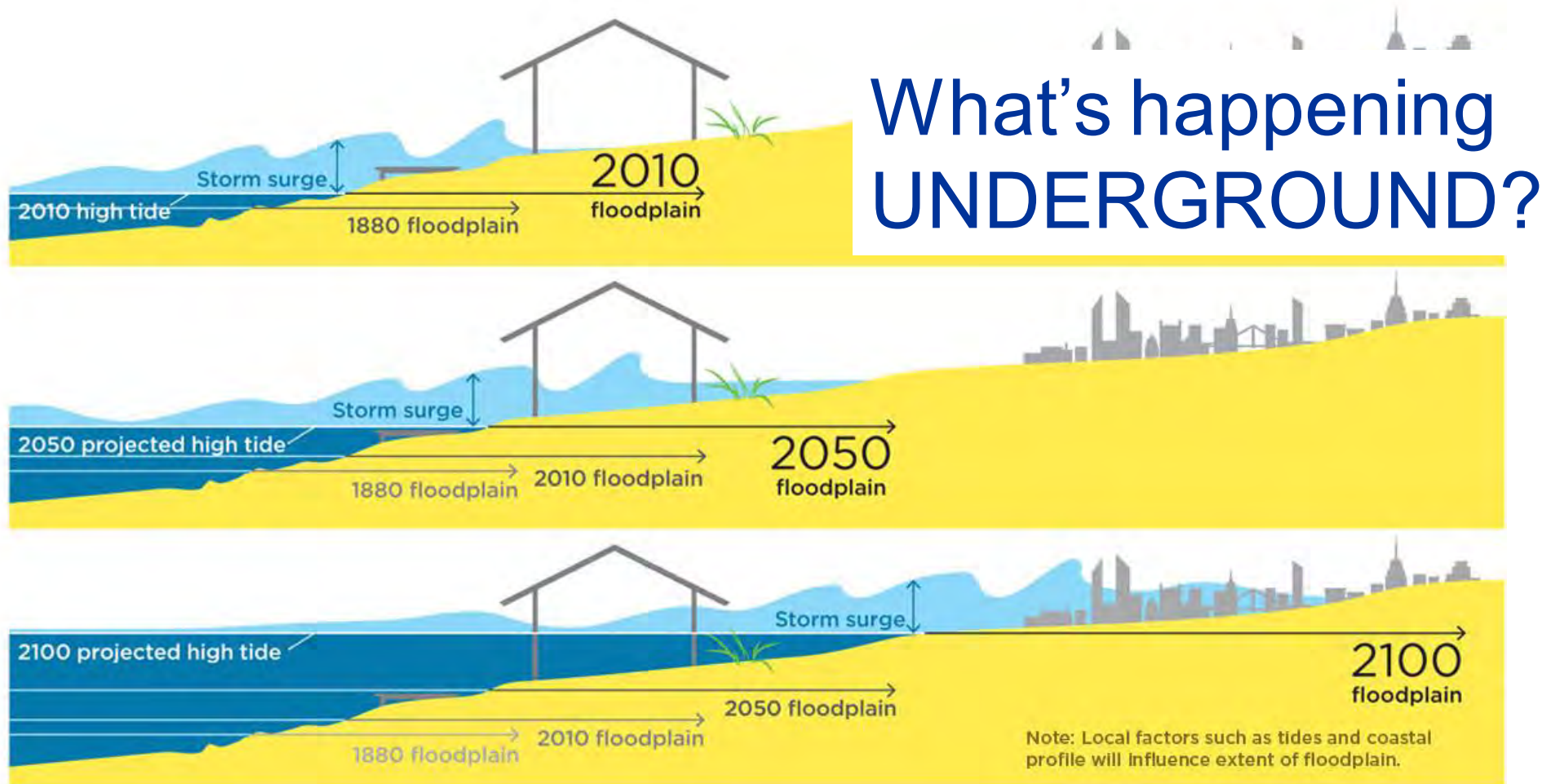
Incremental sea level changes - a baseline for storm surge

MHHW + 8 ft SLR

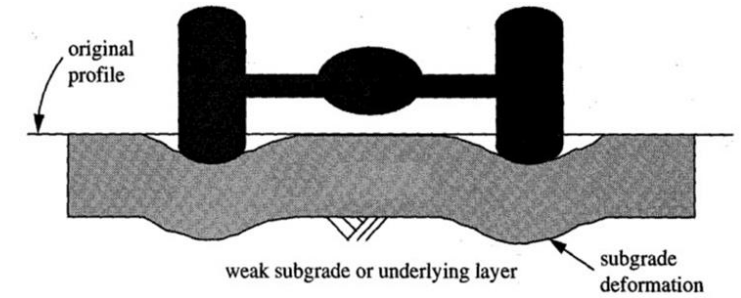
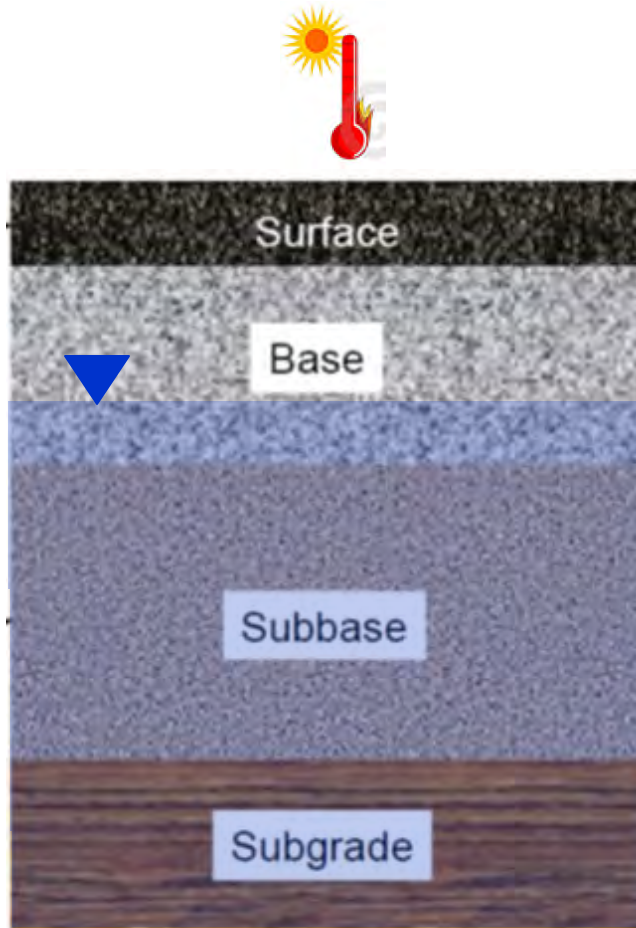
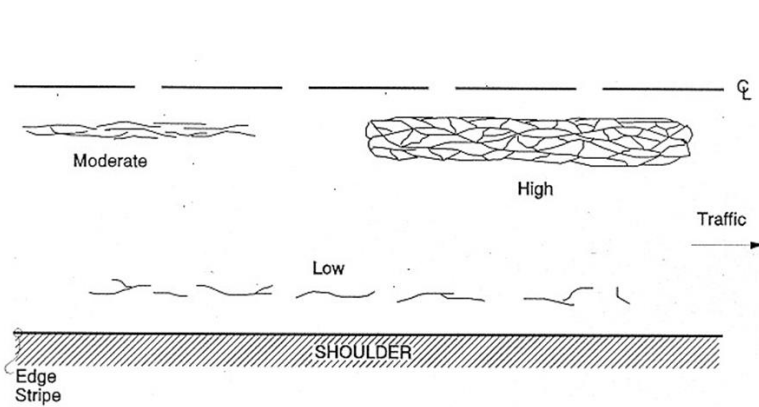




We have been viewing the surface-water impacts of sea level rise



Pavement life decreases when GW moves into the underlying layers and increased temperature weakens the AC



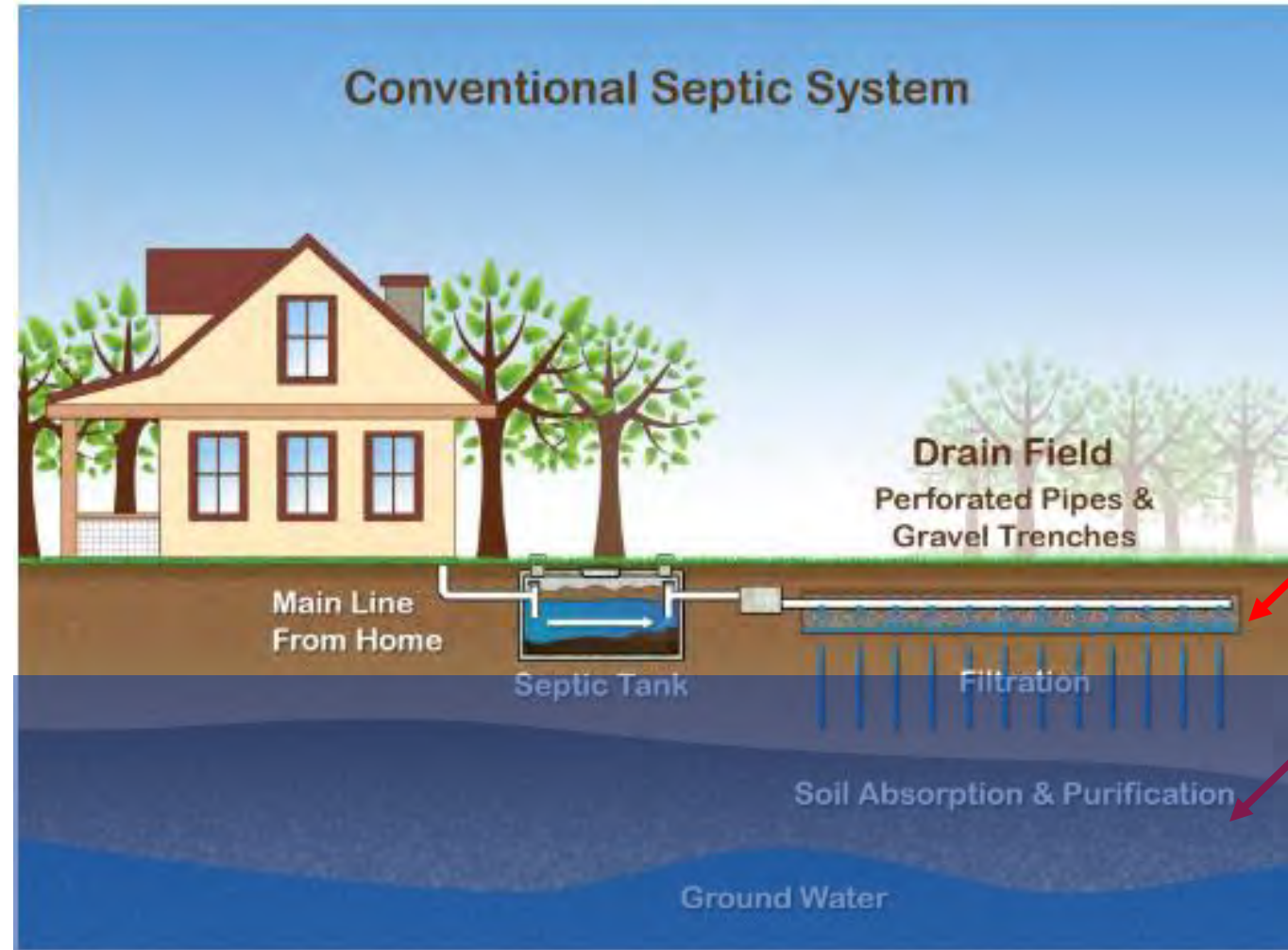
Fatigue cracking



Rutting

When the water table rises septic systems can fail

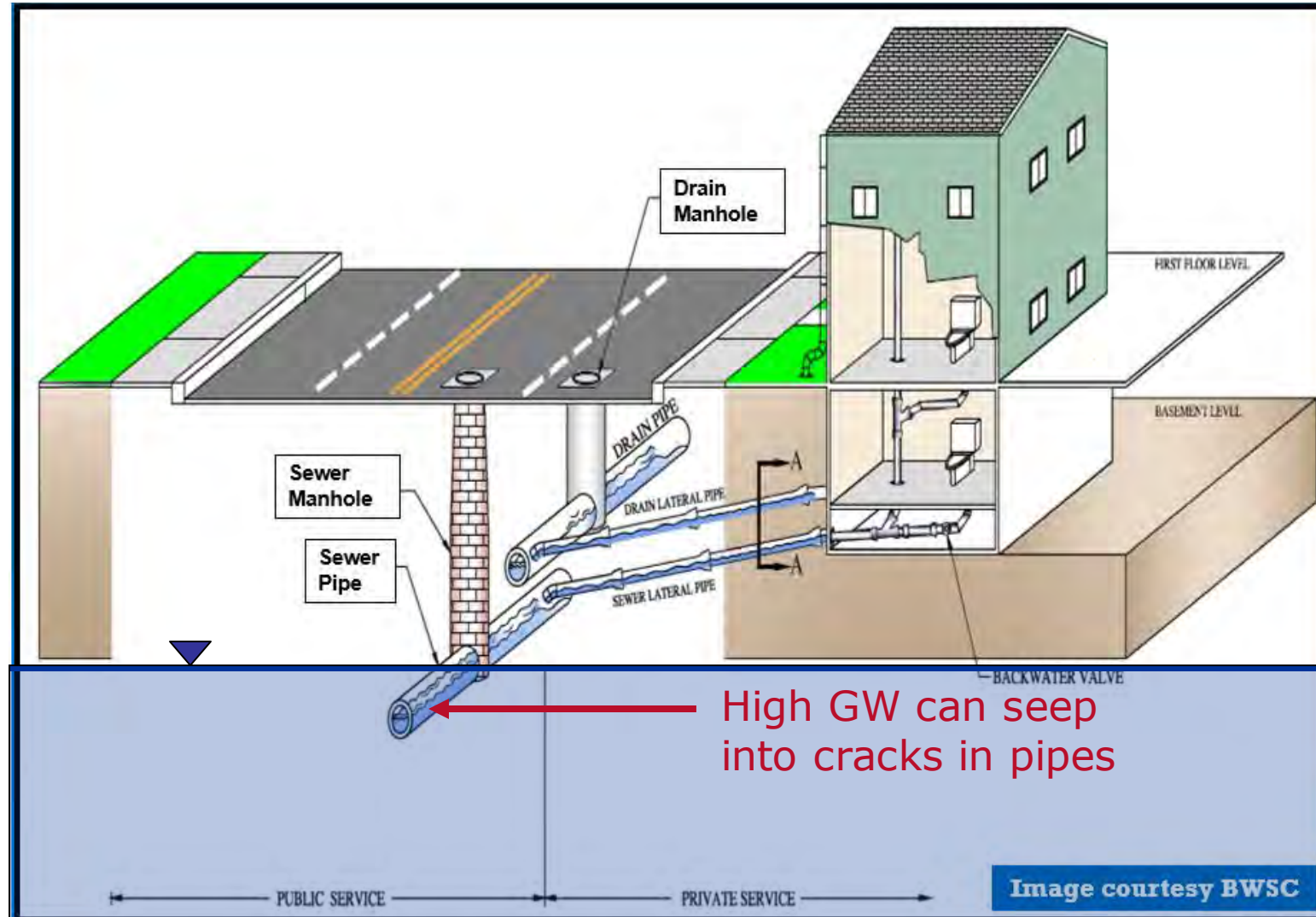
- **Low Risk of Failure** – Groundwater table is at least 4 feet below the trench base
- **High Risk of Failure** – Groundwater table is below the trench base by less than 4 feet*.
- **Failed** – Groundwater table is above the trench base.



Trench

Treatment zone

Rising coastal groundwater can damage wastewater treatment systems



Some possible impacts to the community

- Direct costs to buildings/infrastructure
- Lost wages/tourism
- Loss of neighborhoods
- Loss of tax revenues
- Health consequences
- Loss of Ecosystem Services that support infrastructure

We have three choices: mitigation, adaptation, and suffering

- We are going to do some of each. The question is what is the mix going to be.
- The more mitigation we do, the less adaptation will be required and the less suffering there will be.
- Many changes are happening now, and these changes will be **accelerating**.
- We must work with each other and nature to mitigate (reduced GHG emissions and remove GHGs) and adapt to these changes.

Acknowledgements

4th National Climate Assessment – U.S. Global Change Research Program

Greater Boston Research Advisory Group's (GBRAG) Report - *Climate Change Impacts and Projections for the Greater Boston Area*

University of New Hampshire

University of Massachusetts – Boston

Katharine Hayhoe, Ph.D. - Chief Scientist, Nature Conservancy

Paul Kirshen, Ph.D. - Professor, University of Massachusetts-Boston

David Burdick, Ph.D. – Professor, University of Massachusetts



United States
Global Change
Research Program

Thank you

Contact: Jayne F. Knott, Ph.D.
Email: jfknott@hydropredictions.com



What if a hurricane hits later this century?

OFFICE FOR URBANIZATION

Future of the American City Initiative

THE CASE OF CAPE ANN:
Compound Vulnerabilities

Climate Impacts on the Good
Harbor Beach Ecosystem

October 26, 2022

Introduction

The Harvard Graduate School of Design's Office for Urbanization draws upon the School's history of design innovation to address societal and cultural conditions associated with contemporary urbanization. It develops speculative and projective urban scenarios through sponsored design research projects.

Introduction

The goal of scenario planning is not to predict the most likely outcome, but to reveal biases and blind spots in complex and non-linear situations.

Scenario planning is particularly effective in grappling with climate change, which is beyond the control of a single individual, institution, or community and entails high degrees of uncertainty.

Compound Vulnerabilities: The Case of Cape Ann

Scenario 0: The Great Storm of 2038

evaluates changes on the Cape that are already happening and projects a Category 3 hurricane that shows the potential costs of doing nothing

Scenario 1: Near Future Adaptations

evaluates the potential of a hybrid approach to adapting coastal development using hard and soft protection, as well as strategies for relocation

Study 2: Building Net Zero

projects a range of net-zero housing options across Cape Ann that are accessible to a wider range of residents

Study 3: Recovering Waste

proposes to reduce greenhouse gas emissions generated by decomposing solid waste and envisions a new strategy for regional wastewater treatment

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≡ CAPE ANN
≡ COMPOUND VULNERABILITIES

- CHANGES ON THE CAPE
- THE GREAT STORM
- IMPACTS AND AFTERMATH

CAPE ANN
DOSSIER

HISTORIC
HURRICANES

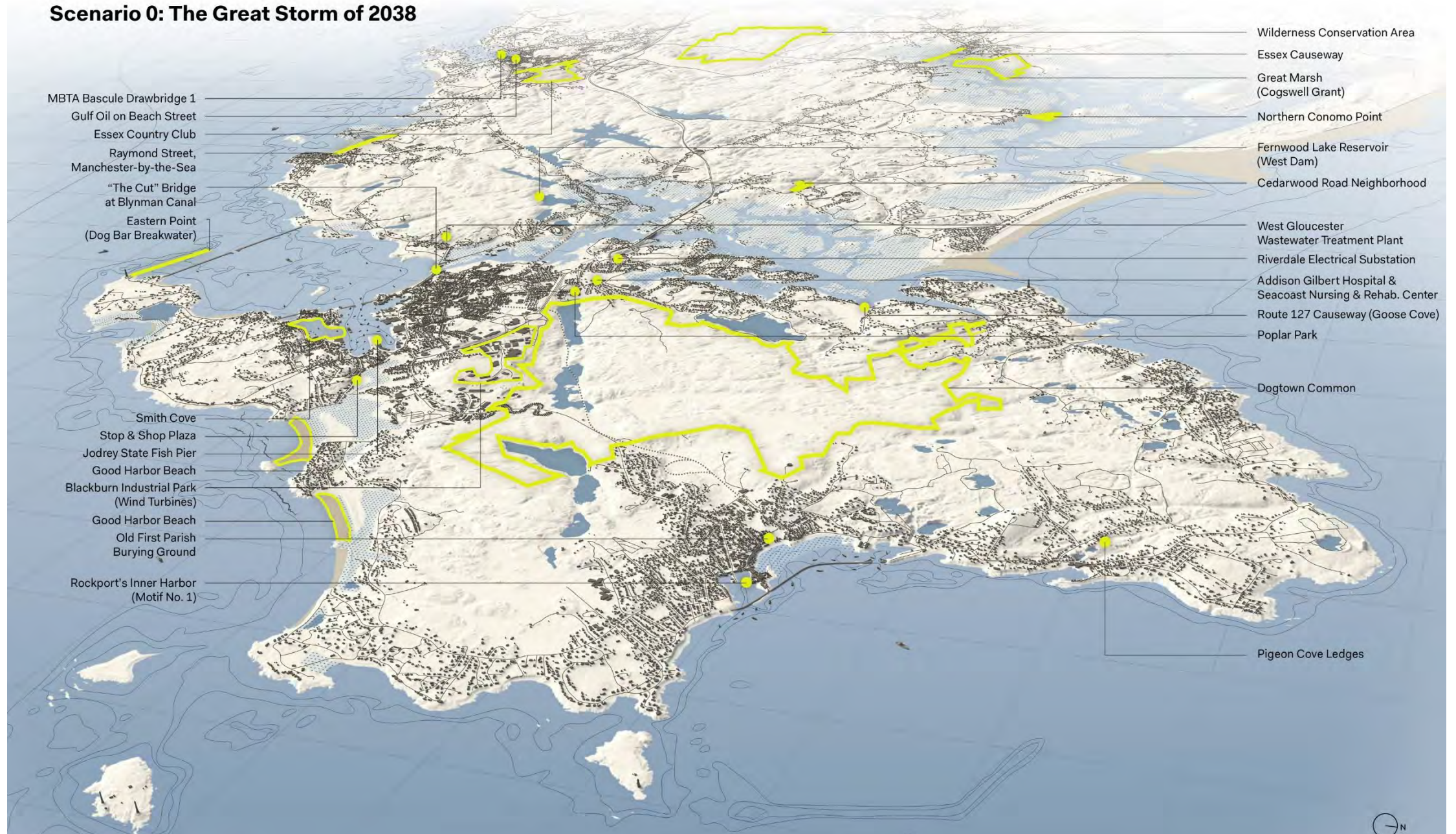
VULNERABILITY
MAPS

Scenario 0: The Great Storm of 2038 imagines and represents a synthetic future extreme weather event through various media.

Through visualization, stakeholders immerse themselves in this plausible future to explore issues and uncertainties that enable second- and third-order thinking.

By reframing the issue of an extreme storm event on Cape Ann through one possible outcome among many, this work is intended to support stakeholders as they make decisions in the present.

Scenario 0: The Great Storm of 2038



MBTA Bascule Drawbridge 1
 Gulf Oil on Beach Street
 Essex Country Club
 Raymond Street,
 Manchester-by-the-Sea
 "The Cut" Bridge
 at Blynman Canal
 Eastern Point
 (Dog Bar Breakwater)

Smith Cove
 Stop & Shop Plaza
 Jodrey State Fish Pier
 Good Harbor Beach
 Blackburn Industrial Park
 (Wind Turbines)
 Good Harbor Beach
 Old First Parish
 Burying Ground
 Rockport's Inner Harbor
 (Motif No. 1)

Wilderness Conservation Area
 Essex Causeway
 Great Marsh
 (Cogswell Grant)
 Northern Conomo Point
 Fernwood Lake Reservoir
 (West Dam)
 Cedarwood Road Neighborhood
 West Gloucester
 Wastewater Treatment Plant
 Riverdale Electrical Substation
 Addison Gilbert Hospital &
 Seacoast Nursing & Rehab. Center
 Route 127 Causeway (Goose Cove)
 Poplar Park
 Dogtown Common
 Pigeon Cove Ledges



Scenario 0: The Great Storm of 2038



Good Harbor Ecosystem

The Good Harbor ecosystem has been developed and degraded over time.

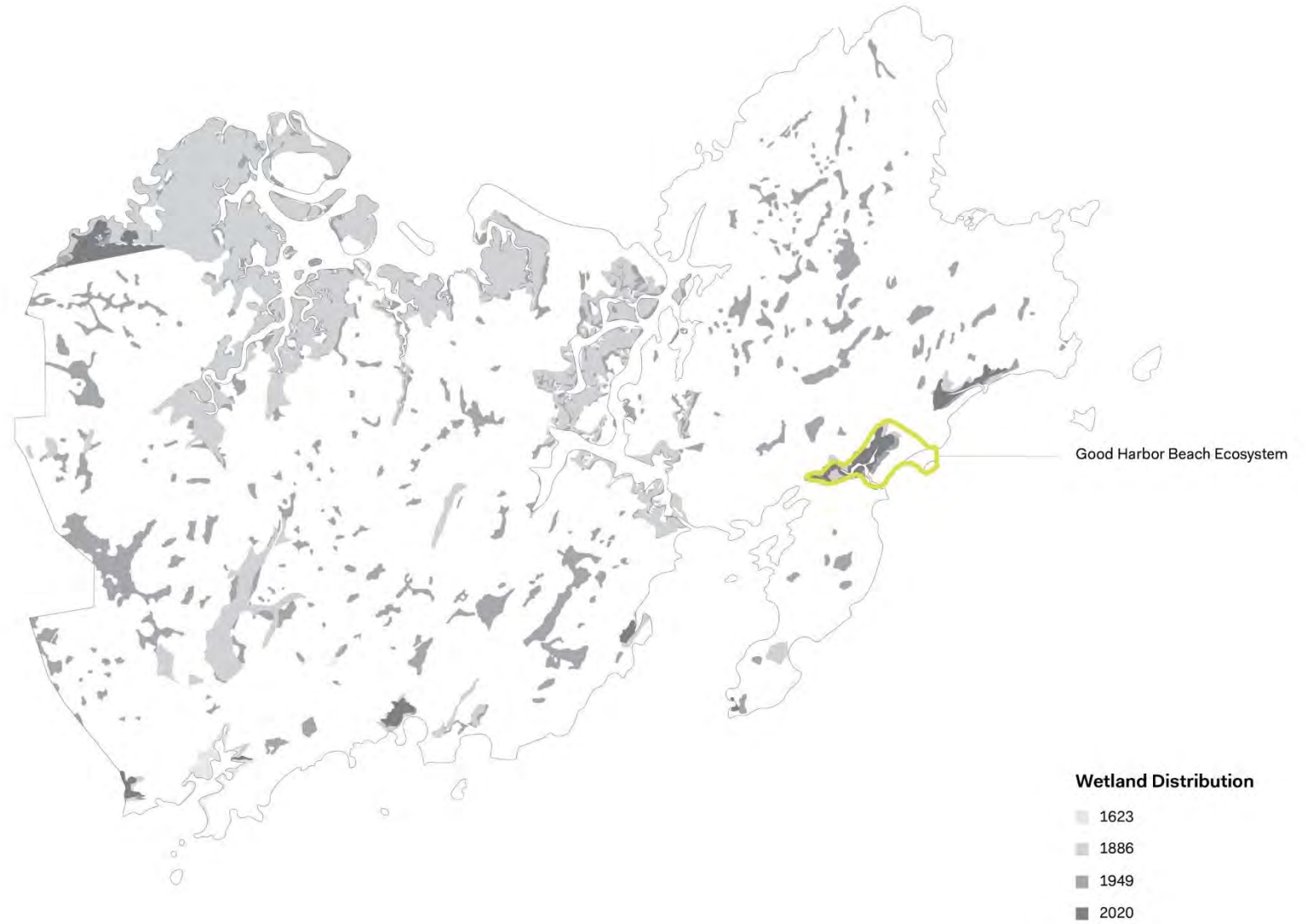


Martin del Vecchio. Drone video: *Flood Tide (Good Harbor Beach and Salt Marsh)*. October 13, 2014. Youtube.

Flood Projections: Historic Wetlands

Former salt marsh and wetland areas are likely to flood in the immediate future, regardless of sea level rise.

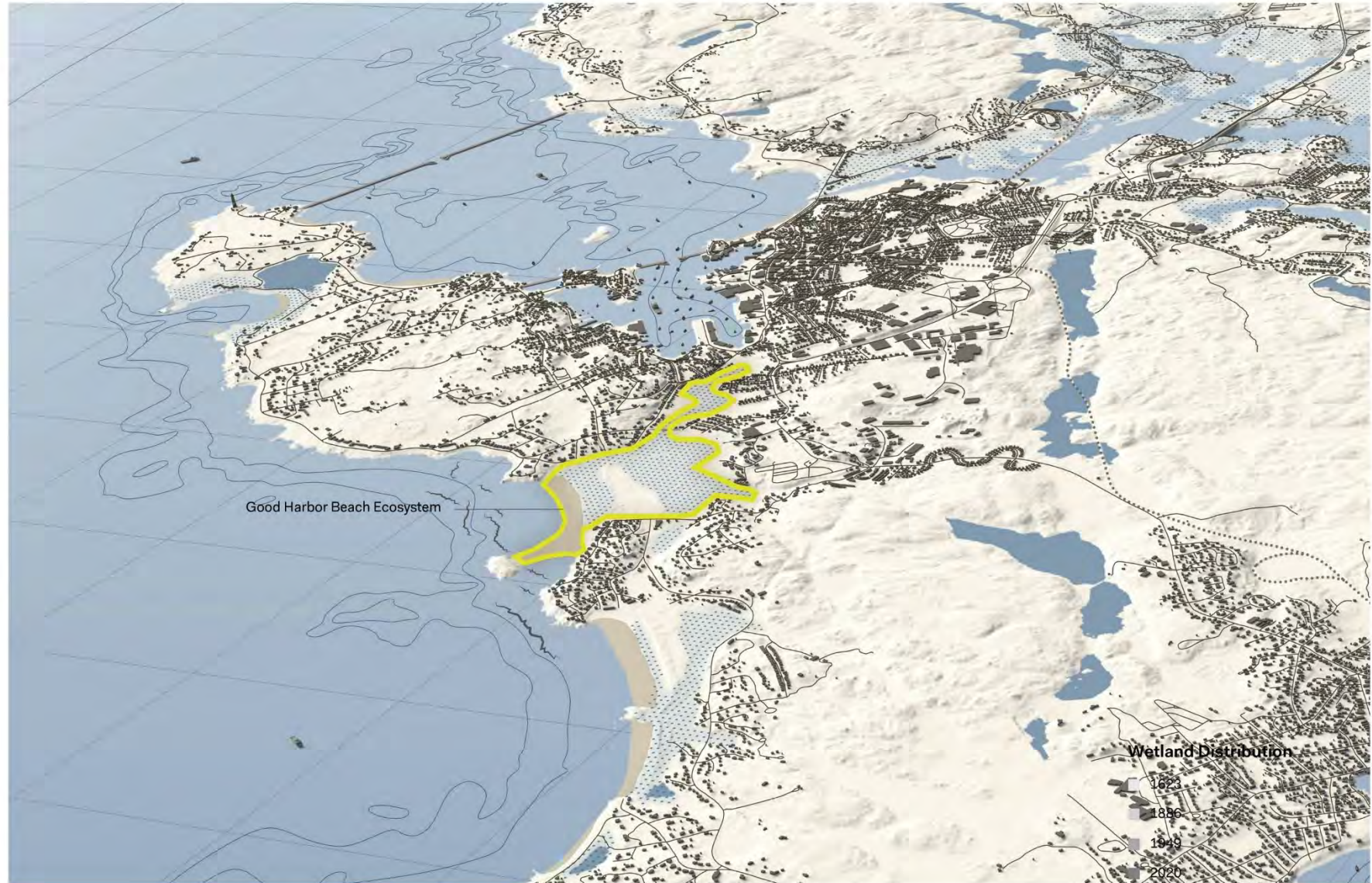
The Good Harbor ecosystem has been encroached by roads, buildings, and infrastructure built on filled salt marsh complexes.



Good Harbor Beach Ecosystem

Good Harbor has been developed directly behind and adjacent to the marsh.

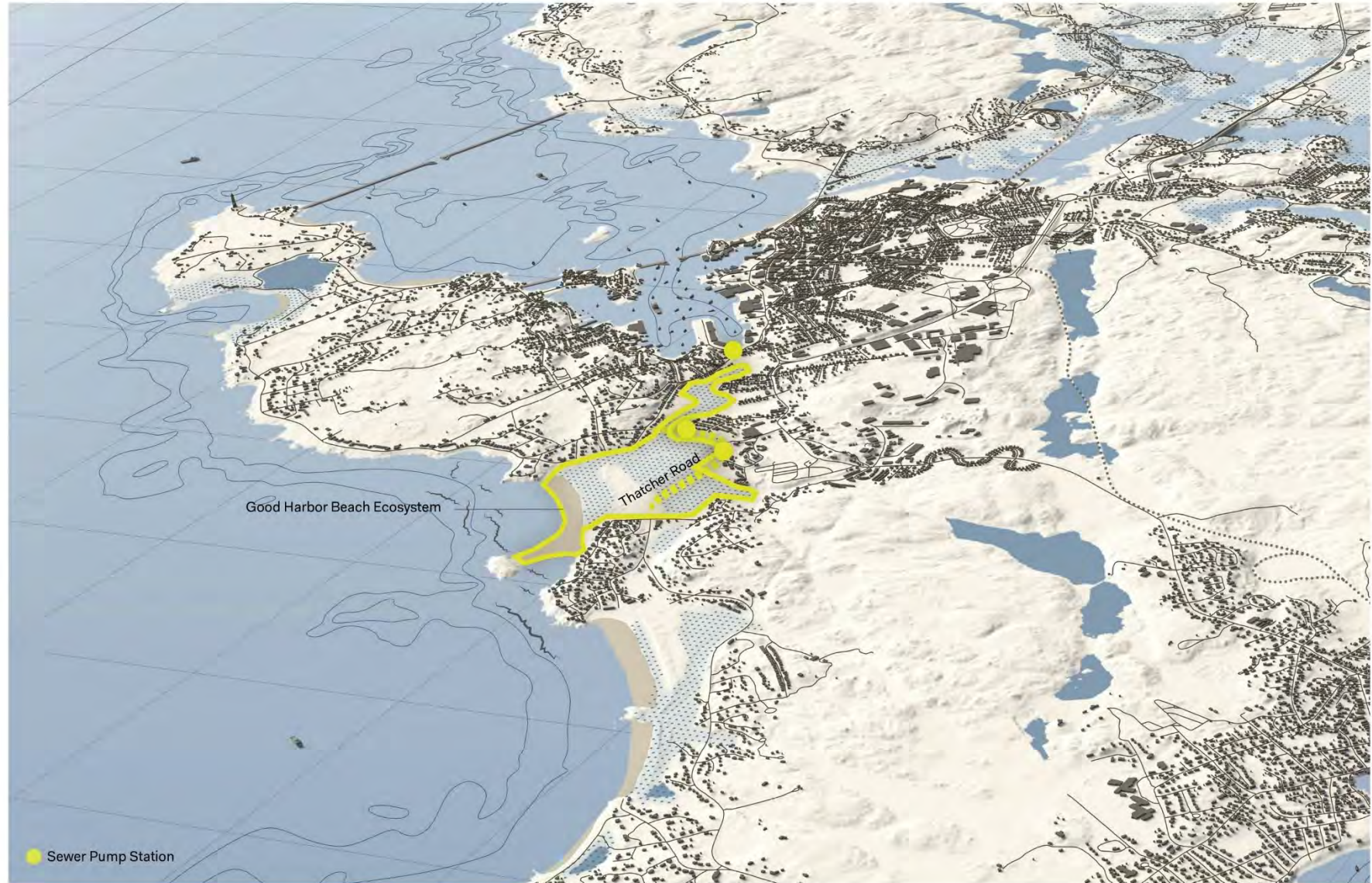
Development and the steep topography behind the ecosystem make it impossible for the beach to retreat inland.



Good Harbor Beach Critical Infrastructure

Thatcher Road and two sewer pump stations are also located in the Good Harbor ecosystem.

These critical infrastructures are vulnerable during a storm event.



Cape Ann has a history of hurricanes and nor'easters.



Gloucester Daily Times. *Mountainous waves crashed into Good Harbor Beach and the houses off Bass Rocks Road. 1991.*

Great New England Hurricane of 1938

DATE FORMED

September 10, 1938

MADE LANDFALL

2:45 PM EST on September 21 at Long Island; 3:40 PM in Connecticut

SHIFTED TO EXTRATROPICAL

September 22

DISSIPATED

September 23

MAXIMUM WIND SPEED

160 MPH

LOWEST BAROMETRIC PRESSURE

938 hPa

STORM SURGE

50' in Gloucester Harbor, 18-25' along the coast

TOTAL RAINFALL

3-6"

SS CATEGORY AT LANDFALL

3 (120 MPH)

FINANCIAL DAMAGES

\$463,705 across New England (\$8.9 billion adjusted for inflation)

FATALITIES

682 across New England

DAMAGES

3,000 boats lost; 2 billion trees downed; power lines, roads, bridges, railroads, fishing fleets, towns flooded. Electricity not restored for months in some areas.



Hurricane Bob

DATE FORMED

August 16, 1991

MADE LANDFALL

September 15 in Southhampton, NY, and Point Judith, RI

SHIFTED TO BECOME EXTRATROPICAL

August 20

DISSIPATED

August 29

MAXIMUM WIND SPEED

115 MPH

LOWEST BAROMETRIC PRESSURE

950 hPa

STORM SURGE

5.8'-6.7'

TOTAL RAINFALL

5.3-7.83"

SS CATEGORY AT LANDFALL

2

FINANCIAL DAMAGES

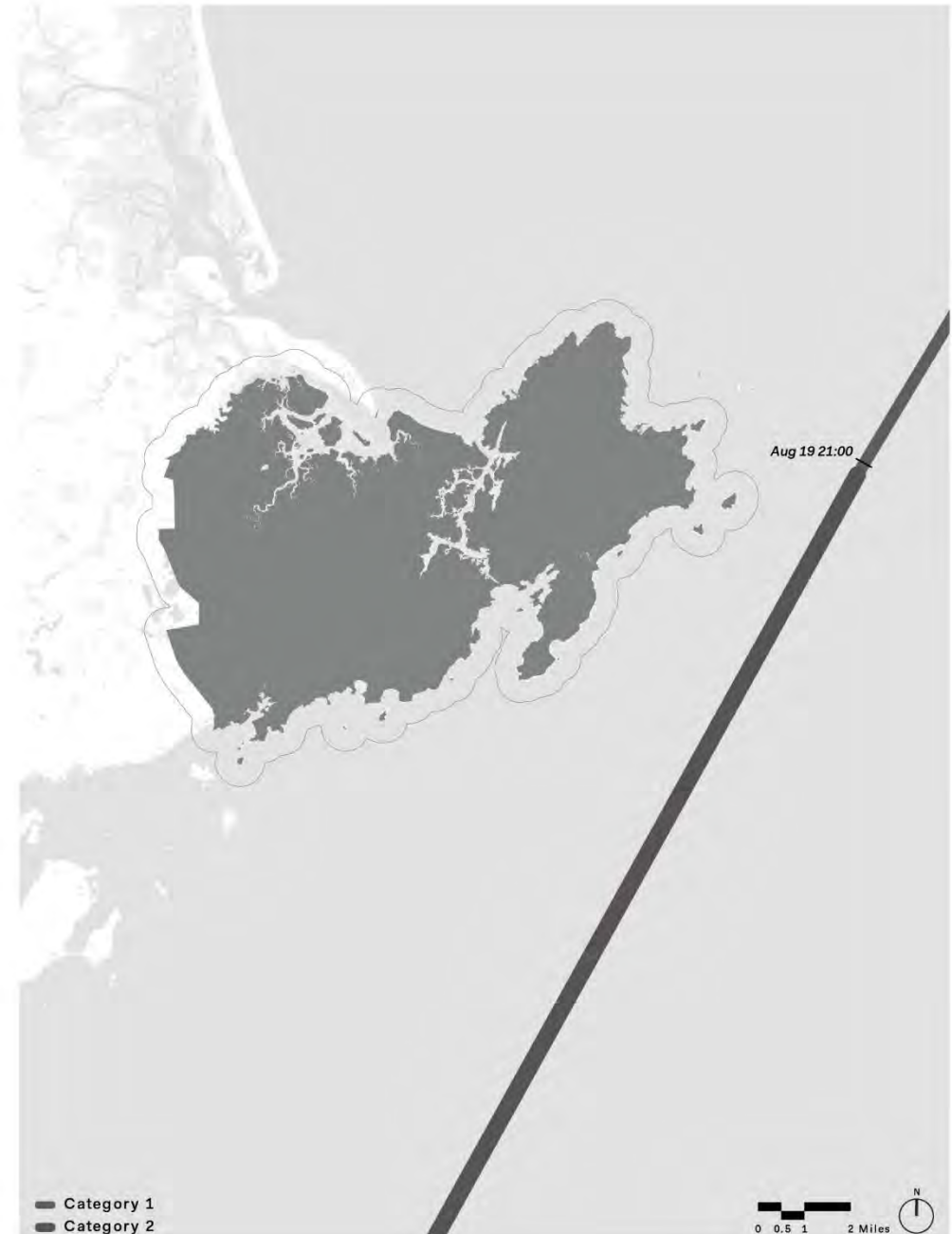
\$524 million in Massachusetts insured property damages (\$1 billion adjusted for inflation)

FATALITIES

12 across New England

DAMAGES

61 homes across Massachusetts were destroyed, along with power lines. Agriculture was salinated.



Hurricanes are becoming increasingly intense.

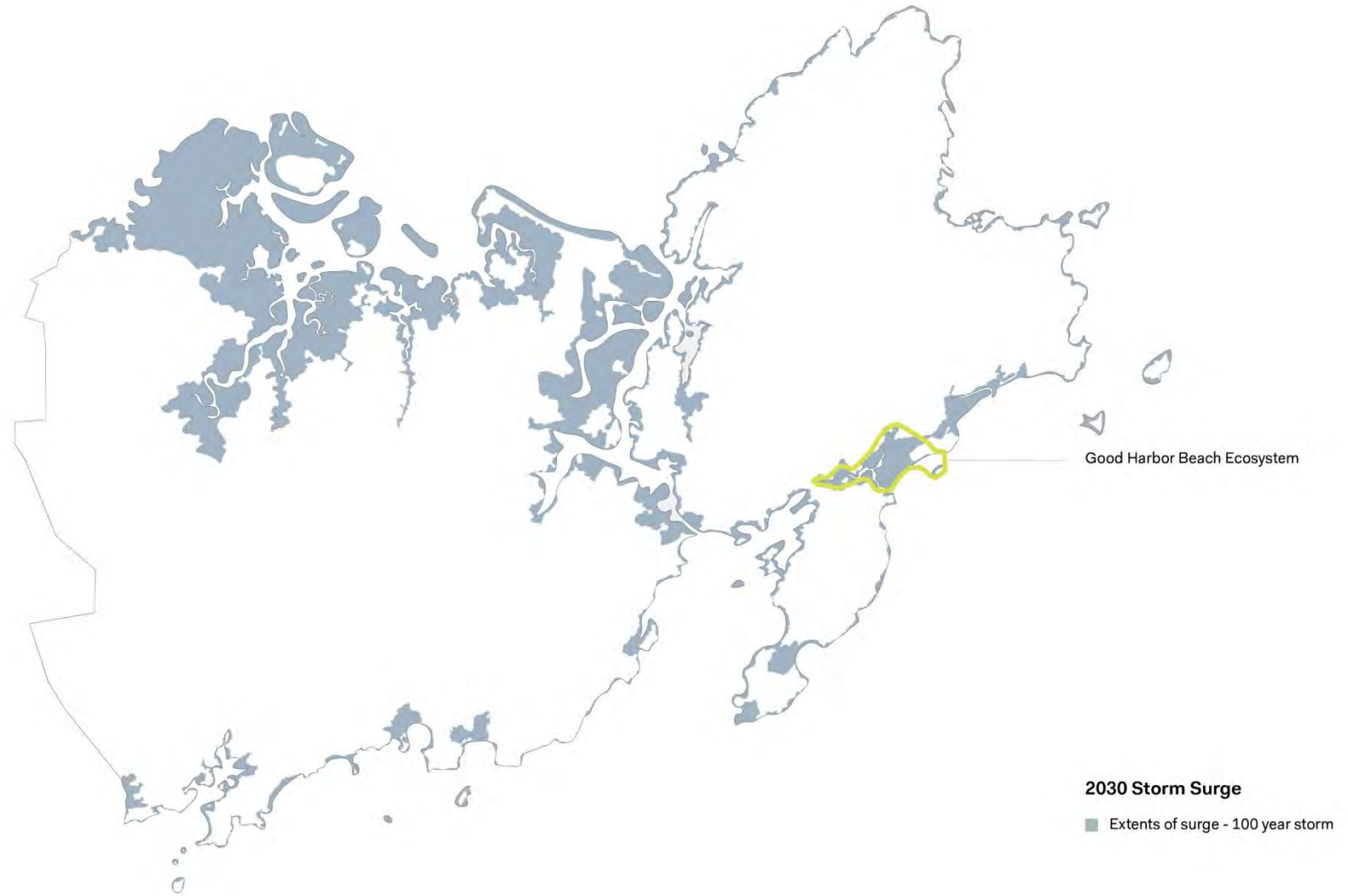


Gloucester Daily Times. *Edward Anderson was sitting in the den of his Bass Rocks Road home on the afternoon of the storm when a wave smashed through the window in front of him and washed over him. 1991.*

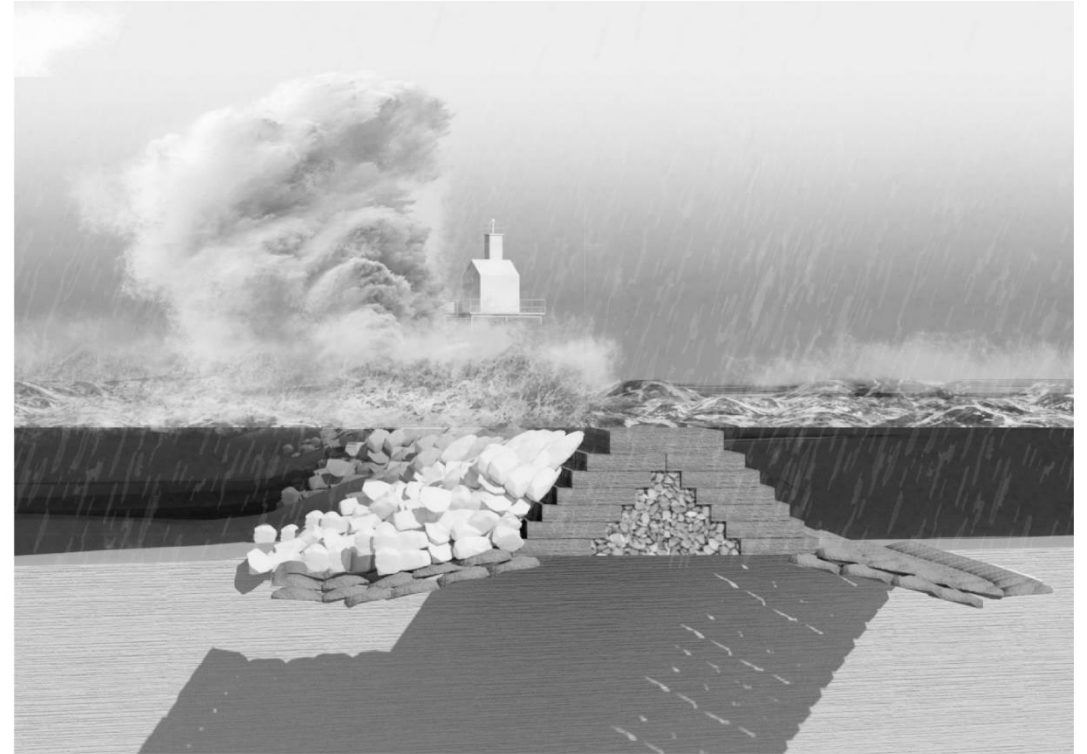
Flood Projections: 2030 Storm Surge

Low-elevation areas, including sandy beaches and salt marshes, are at increasing risk of large storm surge on top of tides.

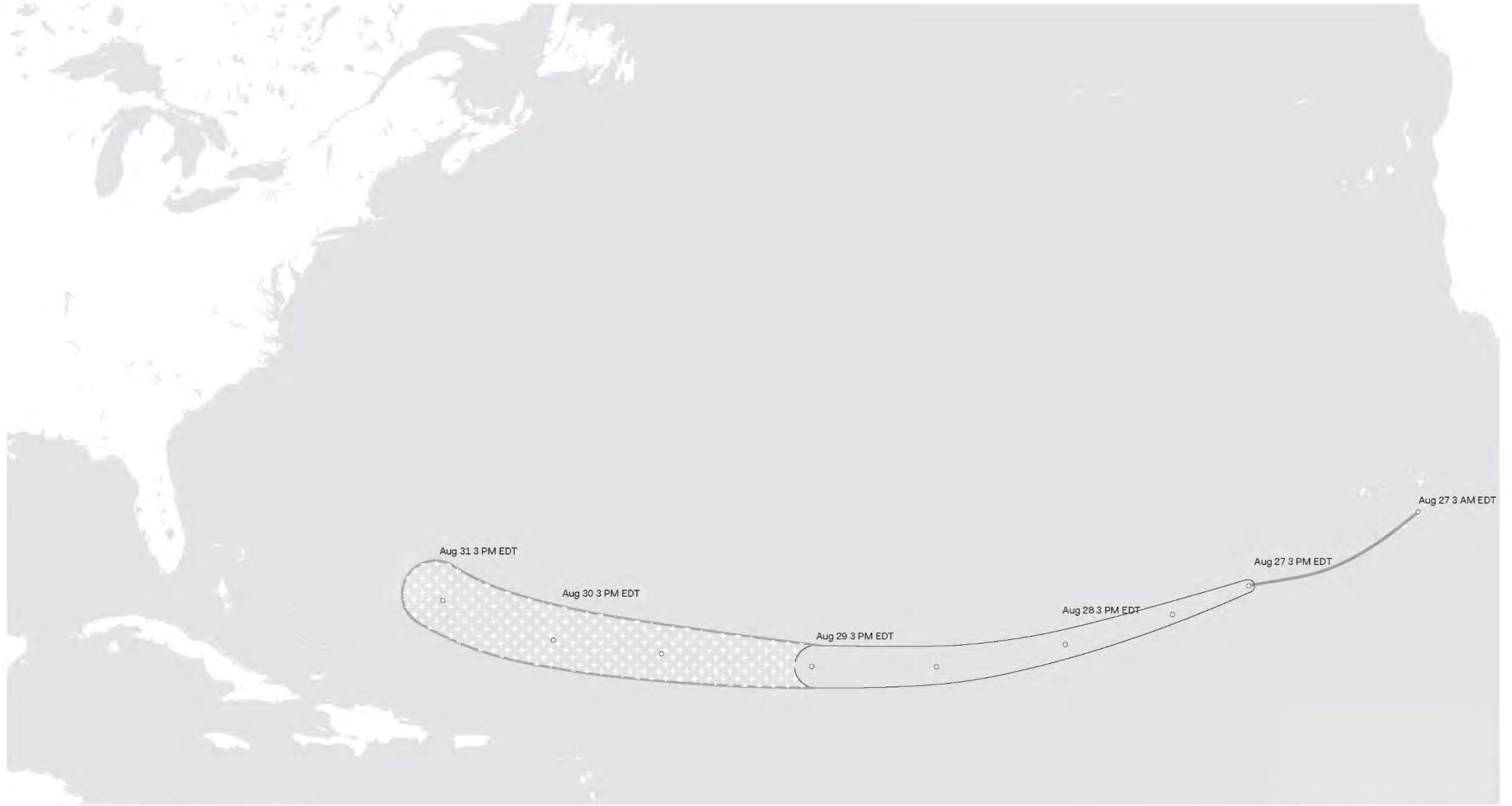
Good Harbor Beach is impacted by large waves during nor'easters and hurricanes. Storm surge can produce devastating damage in a matter of hours.



Cape Ann is particularly vulnerable to a westward tracking hurricane.



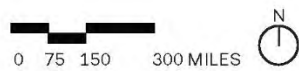
Office for Urbanization. *Dog Bar Lighthouse during Scenario 0: The Great Storm of 2038.* 2022.



HURRICANE FORMATION

August 27, 2038
3 PM EDT

The summer of 2038 is the rainiest in two decades. On August 17, a tropical storm forms off the leeward side of Cape Verde.





Hurricane Track
September 2, 2038



**During the hurricane,
agricultural ditches
act as flood pathways
and impede drainage.**



Google. Good Harbor Beach. 2022.

**Thatcher Road,
the Good Harbor
footbridge, and
the beach parking
lot will flood and
be damaged.**



Catherine. *Tide surge in typical spots.* 2022. Good Morning Gloucester.

**The Beach will erode,
exacerbating the
effects of sea level
rise and nor'easters.**

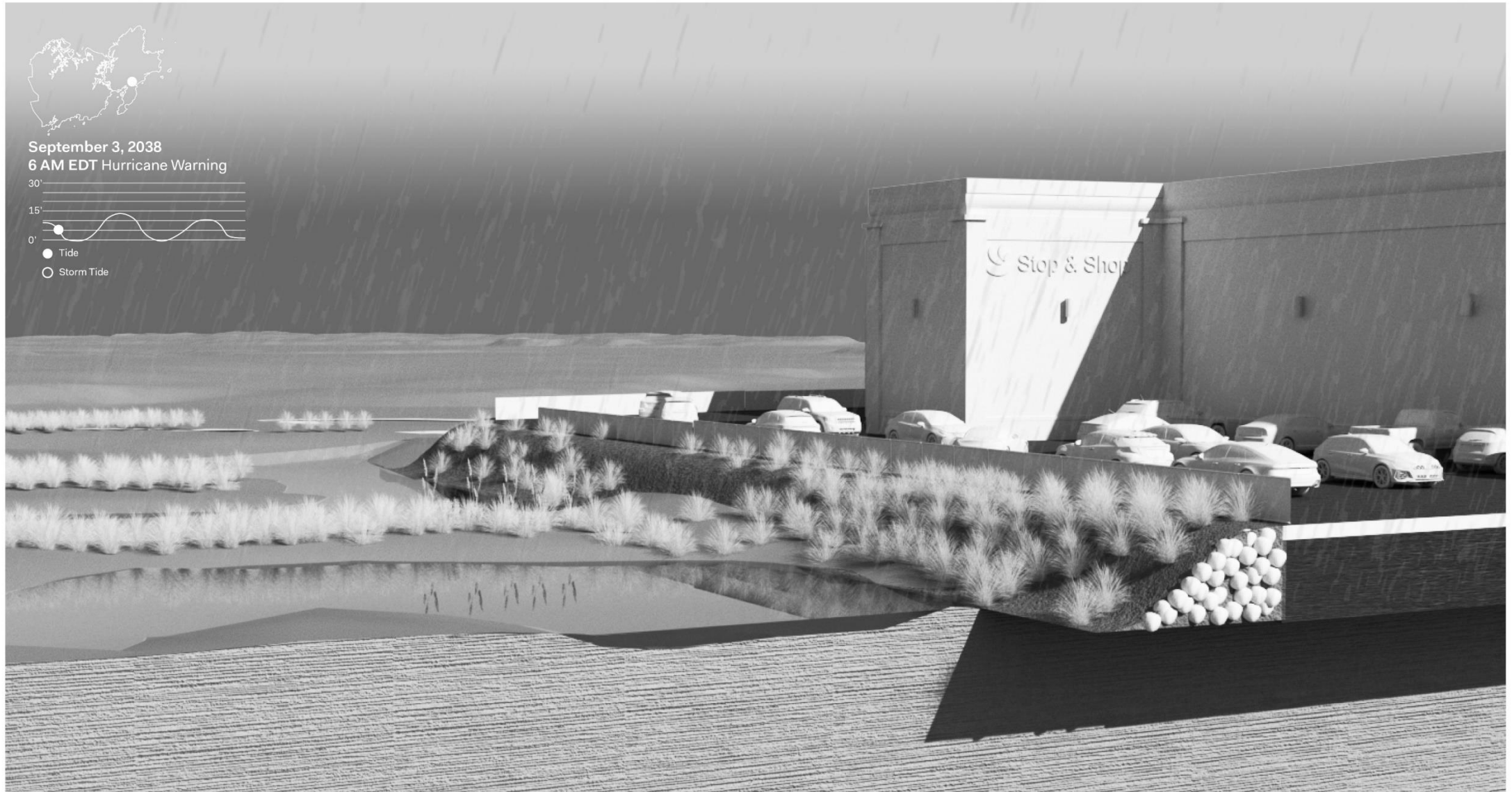


Kim Smith. *Good Harbor Beach Footbridge damaged*. 2018. *Good Morning Gloucester*.

Eighteen feet of storm surge will travel through the salt marsh behind Thatcher Road, threatening upland structures and roads.



Kim Smith. *Riley Storm*. 2018. Good Morning Gloucester.

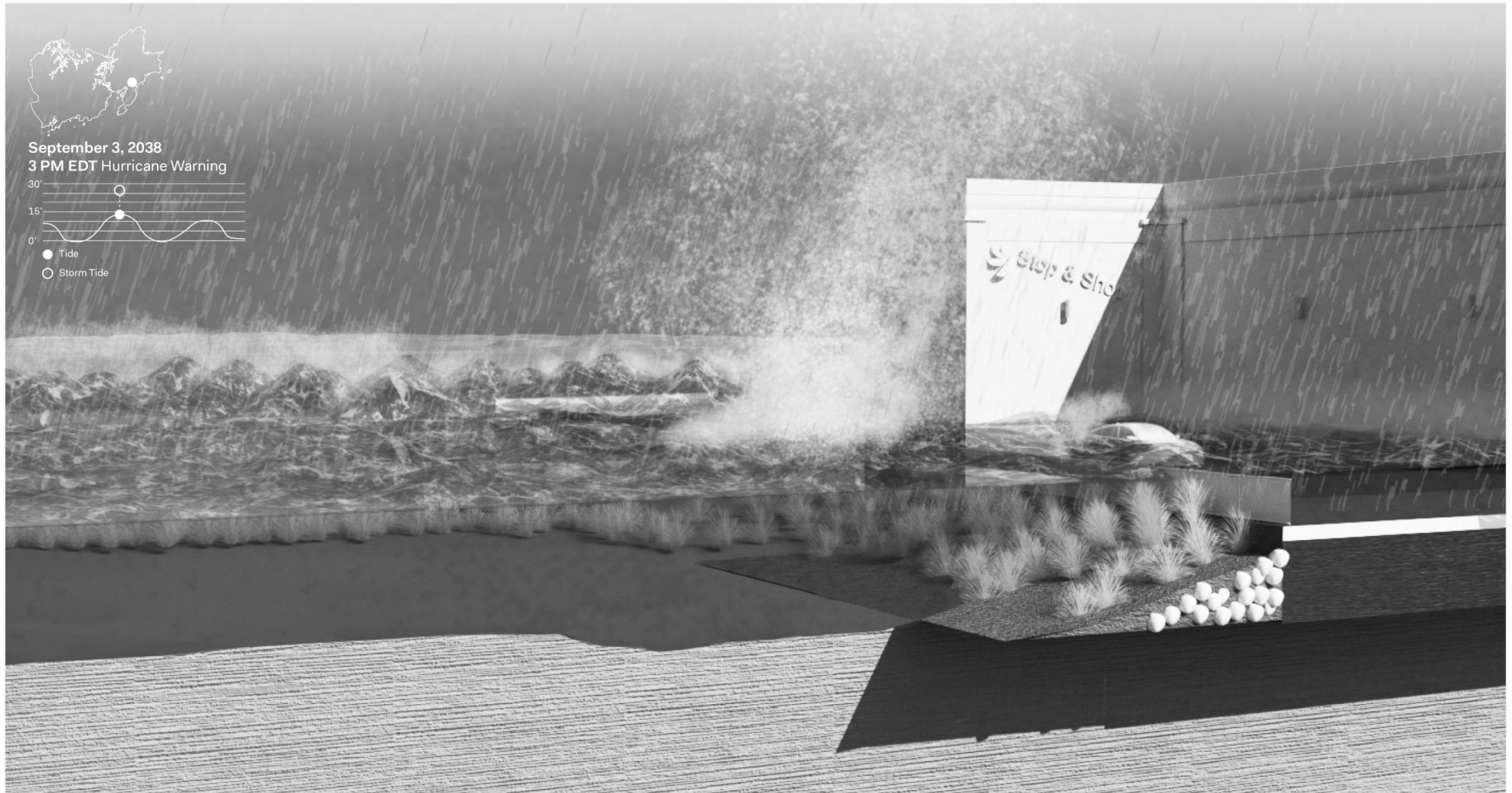


STOP AND SHOP PLAZA

6 Thatcher Road
Gloucester, MA 01930

Barometric Pressure 990 mbar
Maximum Storm Surge 1'
Temperature 64°F
Total Rainfall 2"
Wind Speed 45 mph
Wind Direction ESE

Shoppers rush to grocery stores for last-minute supplies. Those who did not or could not evacuate are ordered to shelter in place.

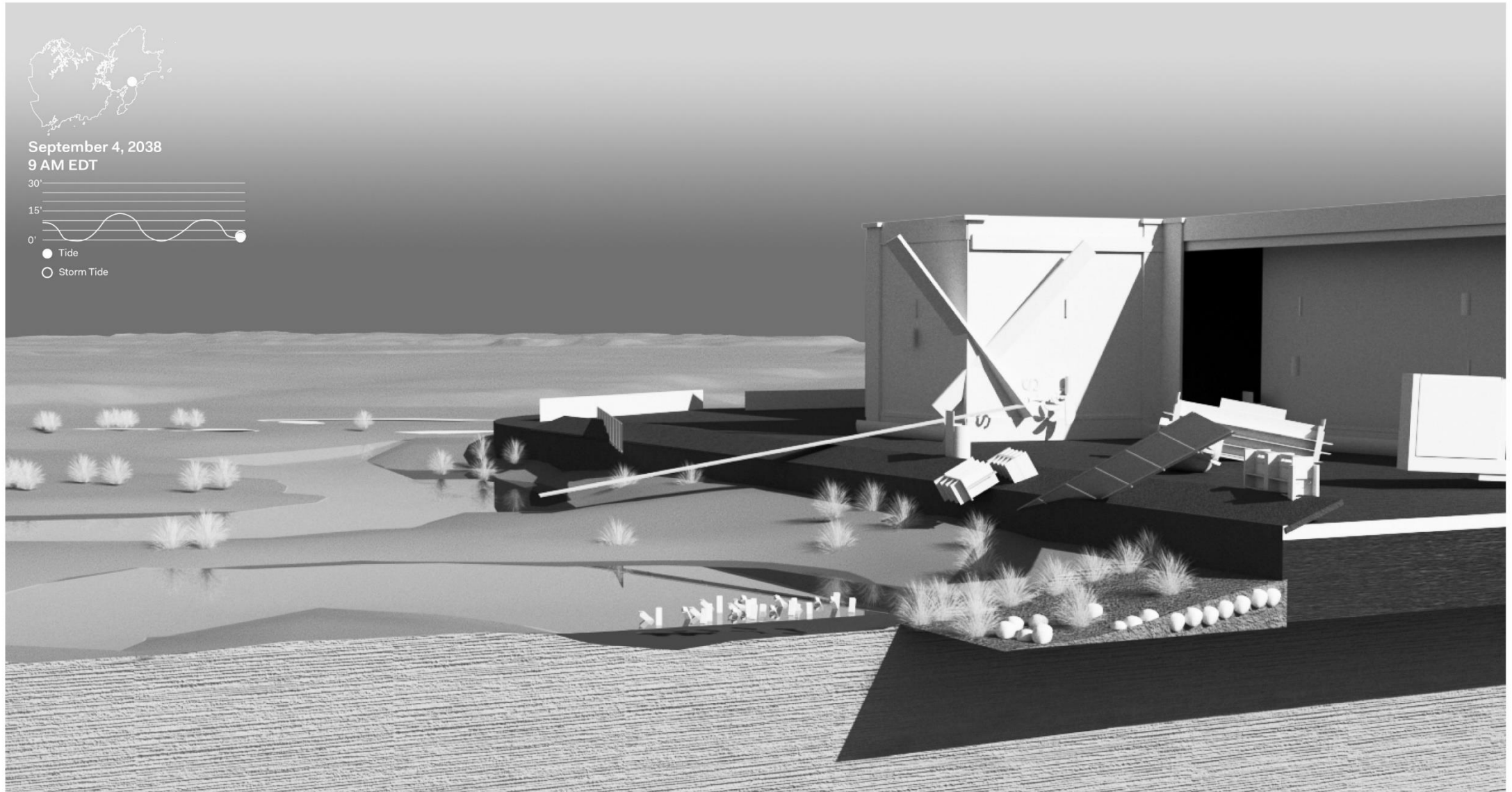


STOP AND SHOP PLAZA

6 Thatcher Road
Gloucester, MA 01930

Barometric Pressure 930 mbar
Maximum Storm Surge 18'
Temperature 80°F
Total Rainfall 10"
Wind Speed 115 mph
Wind Direction S

Rising waters in the Good Harbor swamp overtop the parking lot and spill into the grocery store. The berm supporting the plaza erodes into the marsh.



STOP AND SHOP PLAZA

6 Thatcher Road
Gloucester, MA 02138

Barometric Pressure 1000 mbar
Maximum Storm Surge 1'
Temperature 70°F
Total Rainfall 24"
Wind Speed 20 mph
Wind Direction NE

Residents seek emergency supplies for the weeks ahead. Grocery stores do not have power. Their shelves are empty or damaged by water. With its supporting berm compromised, Stop and Shop starts to sink into its foundation.

The salt marshes behind Good Harbor beach will be inundated with tons of overwash into marshland areas.

This will prevent the marsh grasses from growing back.



Martin del Vecchio. Drone video: *Flood Tide (Good Harbor Beach and Salt Marsh)*. October 13, 2014. Youtube.

Stormwater issues already affecting the marshes will be exacerbated as the hurricane batters sewer pump stations.



Kim Smith. SOARING BACTERIA LEVELS AT THE GOOD HARBOR BEACH CREEK = 140 TIMES THE ACCEPTABLE AMOUNT. 2022. Kim Smith Designs.

**The hurricane will
impact the Good
Harbor ecosystem
for years to come.**

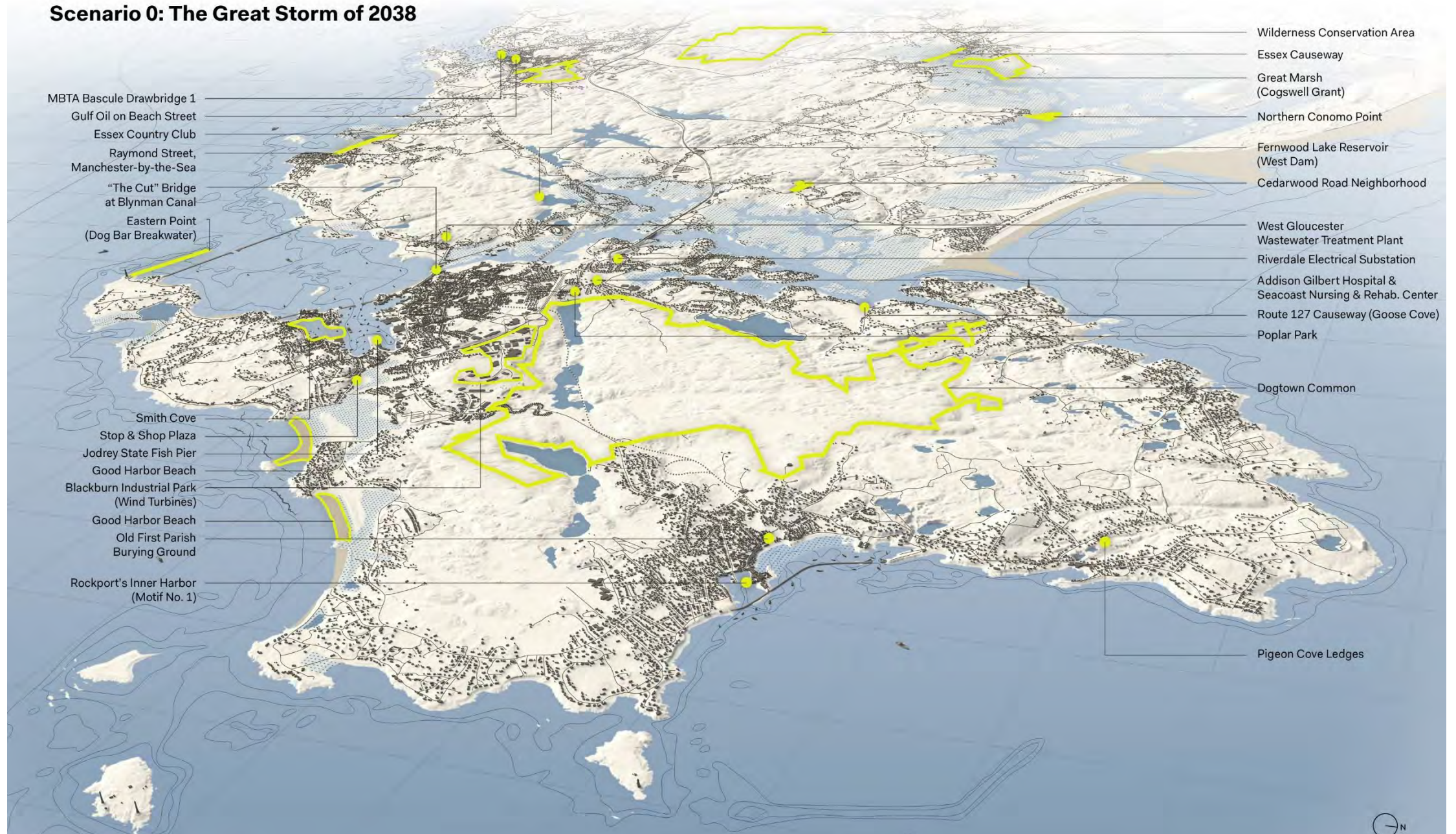


Kim Smith. Good Harbor Beach Storm Damage. 2018. Good Morning Gloucester.

Scenario 0: The Great Storm of 2038



Scenario 0: The Great Storm of 2038



MBTA Bascule Drawbridge 1
 Gulf Oil on Beach Street
 Essex Country Club
 Raymond Street,
 Manchester-by-the-Sea
 "The Cut" Bridge
 at Blynman Canal
 Eastern Point
 (Dog Bar Breakwater)

Smith Cove
 Stop & Shop Plaza
 Jodrey State Fish Pier
 Good Harbor Beach
 Blackburn Industrial Park
 (Wind Turbines)
 Good Harbor Beach
 Old First Parish
 Burying Ground
 Rockport's Inner Harbor
 (Motif No. 1)

Wilderness Conservation Area
 Essex Causeway
 Great Marsh
 (Cogswell Grant)
 Northern Conomo Point
 Fernwood Lake Reservoir
 (West Dam)
 Cedarwood Road Neighborhood
 West Gloucester
 Wastewater Treatment Plant
 Riverdale Electrical Substation
 Addison Gilbert Hospital &
 Seacoast Nursing & Rehab. Center
 Route 127 Causeway (Goose Cove)
 Poplar Park
 Dogtown Common
 Pigeon Cove Ledges



≡ CAPE ANN
≡ COMPOUND VULNERABILITIES

- CHANGES ON THE CAPE
- THE GREAT STORM
- IMPACTS AND AFTERMATH

CAPE ANN
DOSSIER

HISTORIC
HURRICANES

VULNERABILITY
MAPS

capeann.officeforurbanization.org/0

Welcome back, friend.

capeanncoalition@officeforurbanization.org

dogtowncommon



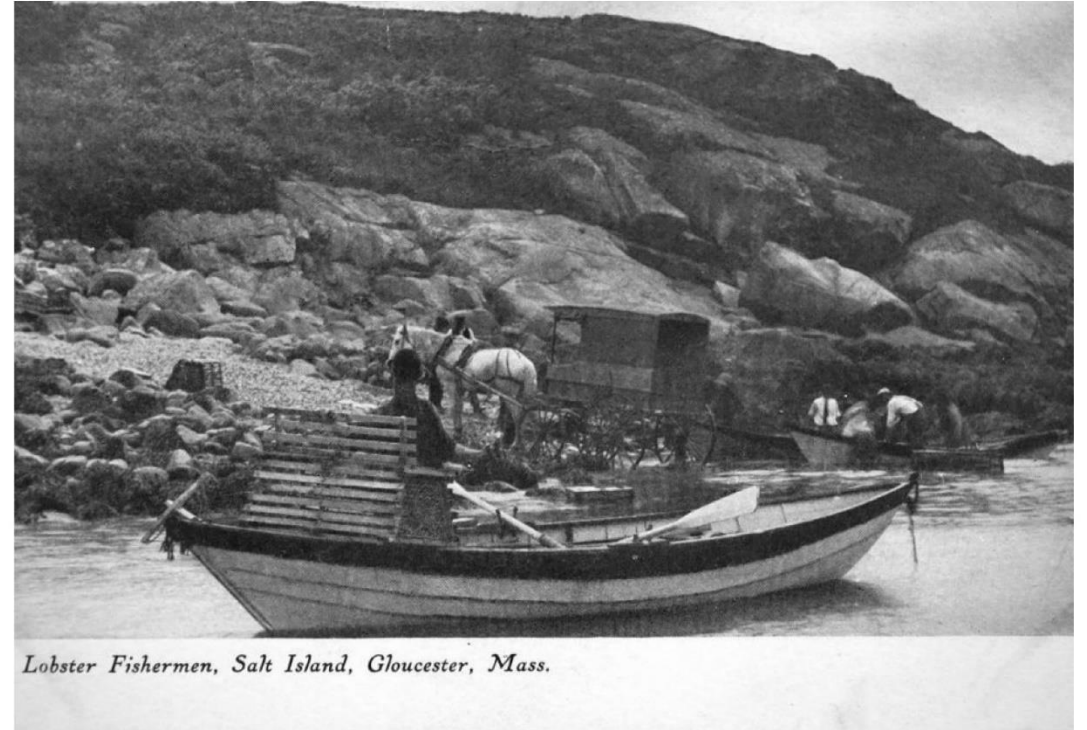
Remember Me

Sign in

2nd Breakout Group – 20 minutes

1. Take a picture of these instructions.
2. Choose a scribe to record the responses.
3. If 5 people, each person speaks for 4 minutes
4. Questions:
 - a. Now that you have received this information, what changes will impact you and/or your family's lives?
 - b. What time scales are important to you (the next 5 years, 10 years, 50 years, etc.)?
5. Scribe – Please email your notes to: maureen@towngreen2025.org

The Good Harbor Beach ecosystem is already changing.



Lobster Fishermen, Salt Island, Gloucester, Mass.

The Lobster Fishermen, Salt Island, Gloucester, Mass. 1900. Cape Ann Museum Archives.

Observed Changes

SEA LEVEL RISE AND STORM SURGE

Creek widening and bank collapse

Larger salt pannes developing in areas of former marshland

Marsh grass transitioning from high marsh (*Spartina patens*) to low marsh (*Spartina alterniflora*) species

Dune eroding

Beach eroding

Parking lot periodic flooding

Thatcher Road periodic flooding

Good Harbor footbridge destroyed and rebuilt

PUBLIC HEALTH AND RECREATION

Enterococci bacteria forming in large numbers in Good Harbor Creek

Water quality declining due to storm water runoff, pollution from sewers, lawn pesticides, highway maintenance, commercial construction, golf courses, waterfowl, and dog walking



Good Harbor Beach, Gloucester, Mass. 1900. Manuel F. Simões, *Good Morning Gloucester*.

No single strategy can eliminate coastal flooding impacts.

Strategies must work synergistically to reduce losses. Comprehensive coastal adaptation lies at the intersection of communication, accommodation, avoidance, resistance and resource allocation.



Catherine. Tide surge in typical spots. 2022. Good Morning Gloucester.

Remember Good Harbor Field Trip - **Tomorrow**

- **What** – Alison Frye, Associate Director at the Salem Sound Coastwatch, will lead a walk of the beach and salt marsh. We will observe the rocky coastline, various species of vegetation growing in the marsh, creeks and tidal pools, and fish and invertebrates feeding in the marsh. Sites needing restoration will be identified
- **When** – Tomorrow, October 27 at 4:00 – 5:00 pm. It will take place under sunshine, cloudy skies, or light rain (but not in stormy weather).
- **Where** - Meet in the Good Harbor Beach Parking Lot
- **What to wear** – Walkers should wear outdoor clothing plus waterproof boots; binoculars are optional.

Please Join Us for the 2nd Workshop/Webinar

What: To identify and discuss *adaptation options* for the Good Harbor Beach Ecosystem and the surrounding area.

When: Wednesday, November 30, 2022, from 6:30 to 8:30 pm

Where: Via ZOOM (please see the TownGreen website <https://towngreen2025.org/> to register)

Field Trip: To see and discuss the astronomical high tide (11.14 ft) at Good Harbor Beach. Monday, January 23 from 11:30 to 12:30 pm.

Thank you for participating...

Please continue the conversation!

Remember the next 3 upcoming events:

1. Good Harbor Field trip tomorrow, October 27 from 4:00 to 5:00 pm
2. 2nd Workshop/webinar on adaptation, November 30 from 6:30 to 8:30 pm.
3. 2nd Field Trip to see the high tide (11.1 ft) at Good Harbor Beach, January 23, from 11:30 am to 12:30 pm

Visit: capeann.officeforurbanization.org/0;

Login: capeanncoalition@officeforurbanization.org;

PW: dogtowncommon

AND <https://towngreen2025.org> for more information