



WHERE WE ARE 1.5 YEARS AFTER THE ADOPTION OF NANTUCKET'S COASTAL RESILIENCE PLAN

Leah Hill

Coastal Resilience Coordinator
Town of Nantucket Natural Resources Dept.
Lhill@nantucket-ma.gov

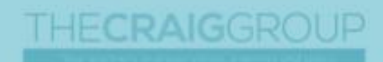


NANTUCKET COASTAL RESILIENCE PLAN

“The Coastal Resilience Plan draws on the cherished built and natural heritage of Nantucket to create a community-supported roadmap to implementation for a series of layered flood control and adaptation approaches that lessen the loss from storm surges and help the community adapt to rising seas and eroding coastlines. In coordination with other ongoing adaptation and sustainability initiatives, the plan addresses the whole island and county while respecting the unique characteristics of each neighborhood. Driven by the inclusive and equitable engagement of all, the plan aspires to create social, environmental, and economic benefits and value to everyone who will share in Nantucket’s future.”

1. Build coastal resilience and reduce coastal risks from flooding and erosion
2. Enhance safe access to, from, and across the island
3. Promote the health of natural ecosystems
4. Generate waterfront public space, connectivity, and safety
5. Develop implementable strategies that will result in reduction of flood and erosion risk

- Developed by over 100 stakeholders including Town departments, Coastal Resilience Advisory Committee, non-profits, residents and visitors
- Over 100 participants at each of the 2 public meetings
- Risk Assessment- uses high SLR projection by NOAA (i.e., 100 year storm) and the MC-FRM
- Guide for property owners
- 40 recommendations to be implemented by 2050 with a majority in the next 10-15 years



Vision + Risk + Toolkit = Resilience Strategy

Vision for a Resilient Nantucket

Prior plans → community engagement → refined with risk

Coastal Risk

Prior plans → risk analysis → focus areas → refined and prioritized with community engagement

Coastal Resilience Toolkit

Based on expertise and knowledge of area → refined with risk and engagement into actions → refined through strategy development

Evaluation Criteria

Strategies and Recommendations

vision + risk + toolkit = strategies

Strategies are realized through development of project alternatives → refinement through engagement and technical analysis → project prioritization and implementation

COASTAL RISKS



EROSION



GROUND WATER TABLE RISE



COASTAL FLOODING

- 2,373 structures at risk through 2070
- 84% of at-risk buildings are residential
- 9% of at-risk buildings are commercial
- 49% of at-risk buildings are historic
- 9% of at-risk buildings are tourism-related



HIGH TIDE FLOODING

\$3.4 BILLION in calculated damages and losses to 2070

Total Coastal Flood and Erosion Risk to Buildings

\$180 Million in expected damages at 34 community facilities



Muskeget Island

Tuckernuck Island

Nantucket Sound

Atlantic Ocean

Nantucket Harbor

Brant Point

Coatue

Nantucket Harbor

Polpis

North Shore

Madaker

Downtown

Scosnet

South Shore

LEGEND

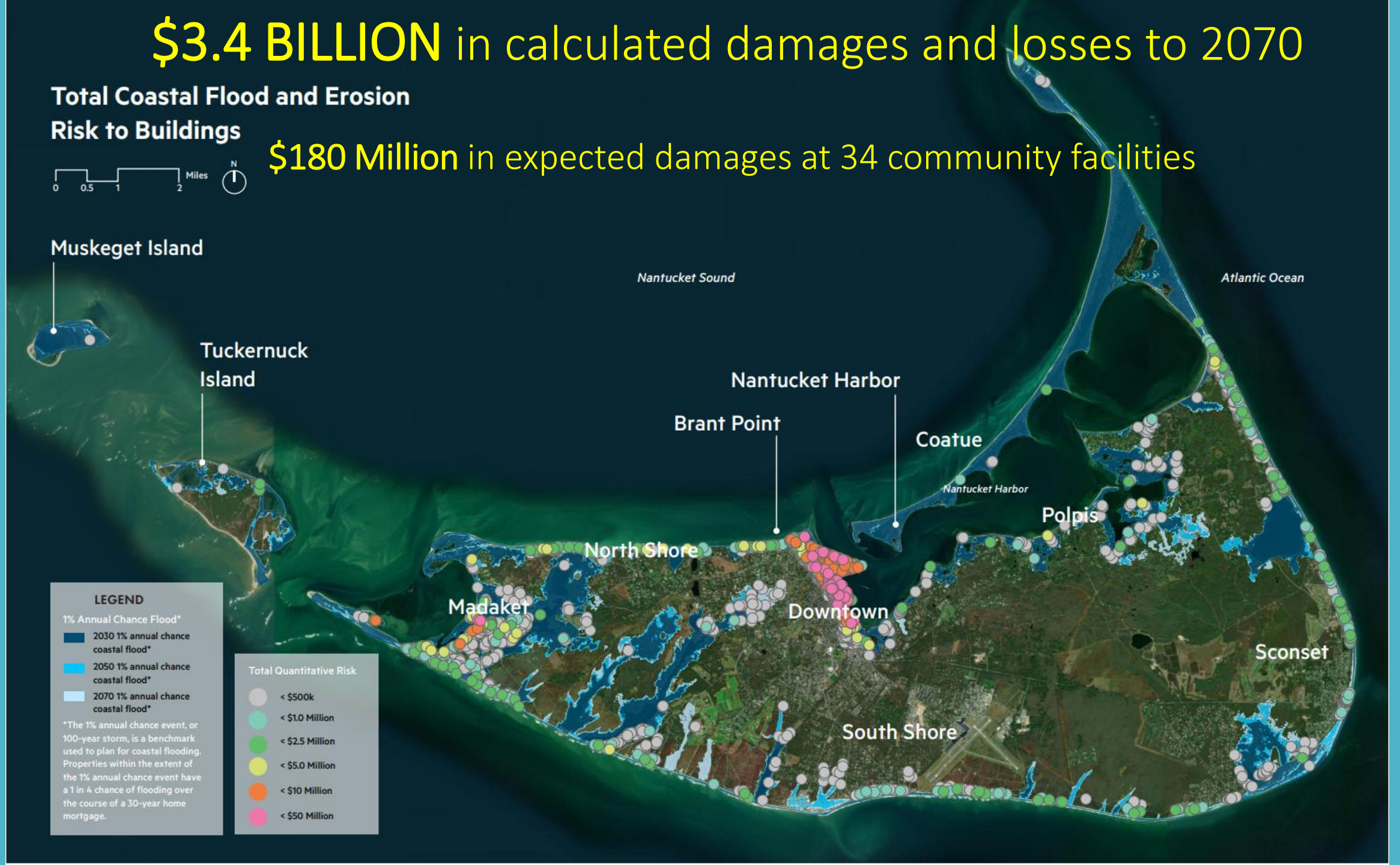
1% Annual Chance Flood*

- 2030 1% annual chance coastal flood*
- 2050 1% annual chance coastal flood*
- 2070 1% annual chance coastal flood*

*The 1% annual chance event, or 100-year storm, is a benchmark used to plan for coastal flooding. Properties within the extent of the 1% annual chance event have a 1 in 4 chance of flooding over the course of a 30-year home mortgage.

Total Quantitative Risk

- < \$500k
- < \$1.0 Million
- < \$2.5 Million
- < \$5.0 Million
- < \$10 Million
- < \$50 Million



Vision + Risk + Toolkit = Resilience Strategy

Vision for a Resilient Nantucket

Prior plans → community engagement → refined with risk

Coastal Risk

Prior plans → risk analysis → focus areas → refined and prioritized with community engagement

Coastal Resilience Toolkit

Based on expertise and knowledge of area → refined with risk and engagement into actions → refined through strategy development

Evaluation Criteria

Strategies and Recommendations

vision + risk + toolkit = strategies

Strategies are realized through development of project alternatives → refinement through engagement and technical analysis → project prioritization and implementation

COASTAL RESILIENCE TOOLKIT

Protect



Examples in Dionis- west is a bulkhead and east is a rock revetment

Adapt



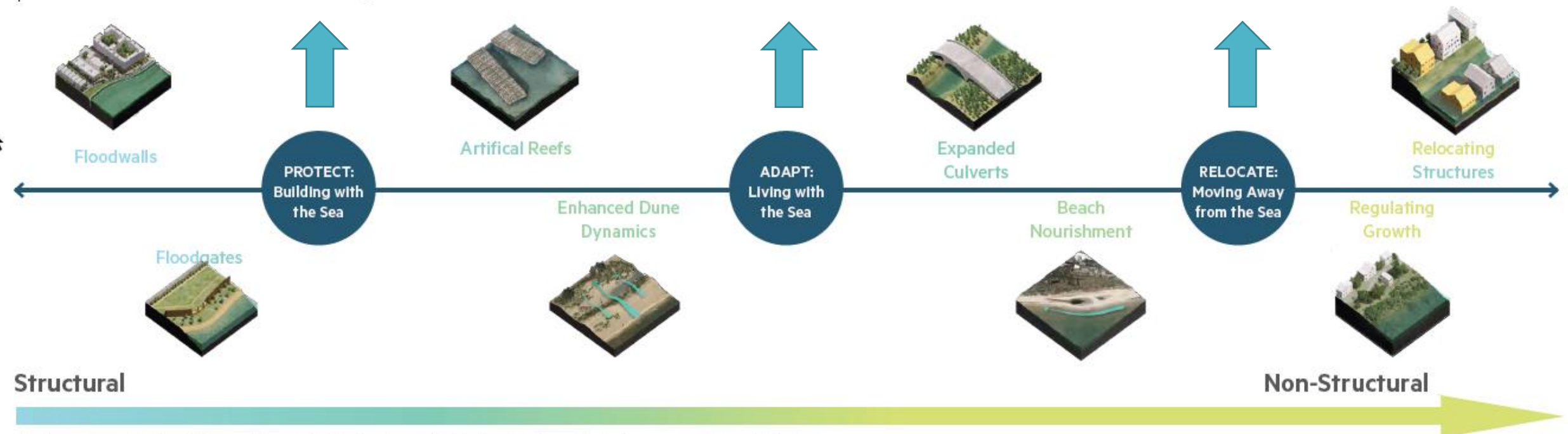
Raised house on Easton Street

Relocate



Picture from Tuscana Inc.

A house at the end of Hummock Pond Rd.



Vision + Risk + Toolkit = Resilience Strategy

Vision for a Resilient Nantucket

Prior plans → community engagement → refined with risk

Coastal Risk

Prior plans → risk analysis → focus areas → refined and prioritized with community engagement

Coastal Resilience Toolkit

Based on expertise and knowledge of area → refined with risk and engagement into actions → refined through strategy development

Evaluation Criteria

Strategies and Recommendations

vision + risk + toolkit = strategies

Strategies are realized through development of project alternatives → refinement through engagement and technical analysis → project prioritization and implementation

EVALUATION CRITERIA

Effectiveness

Is the strategy effective at addressing coastal risks to homes, businesses, critical facilities, community assets, and infrastructure?

Feasibility

Can the strategy be implemented given technical, regulatory, funding, cost, community support, and operations and maintenance considerations?

Ecological and Public Health Benefits

What are the benefits of the strategy to the health of natural and human communities over time?

Equity and Quality of Life Benefits

Does the strategy improve quality of life and adding value for residents and visitors and in promoting community development?

Value Creation

Does the strategy create new opportunities and economic value for the community?

Vision + Risk + Toolkit = Resilience Strategy

Vision for a Resilient Nantucket

Prior plans → community engagement → refined with risk

Coastal Risk

Prior plans → risk analysis → focus areas → refined and prioritized with community engagement

Coastal Resilience Toolkit

Based on expertise and knowledge of area → refined with risk and engagement into actions → refined through strategy development

Evaluation Criteria

Strategies and Recommendations

vision + risk + toolkit = strategies

Strategies are realized through development of project alternatives → refinement through engagement and technical analysis → project prioritization and implementation

UPDATES TO WETLAND ORDINANCE AND REGULATIONS



- High Priority
- Used a lot of the ideas generated from CRP
- Added definitions for coastal resilience, resiliency, sea level rise, coastal risk areas, high tide flooding, etc.
- When rebuilding a bulkhead/groin must examine using a living shoreline or moving the threatened building instead of rebuilding bulkhead
- In areas of an eroding coastal bank, the distance from all new structures to the coastal bank shall be at least 20 times the average annual erosion rate or 100 feet, whichever is greater.
- The no-disturbed buffer zones in marshes extended from 25ft to 50ft
- Multiple public hearings and more to come



COASTAL RESILIENCE AND SUSTAINABILITY INTERDEPARTMENTAL WORKING GROUP

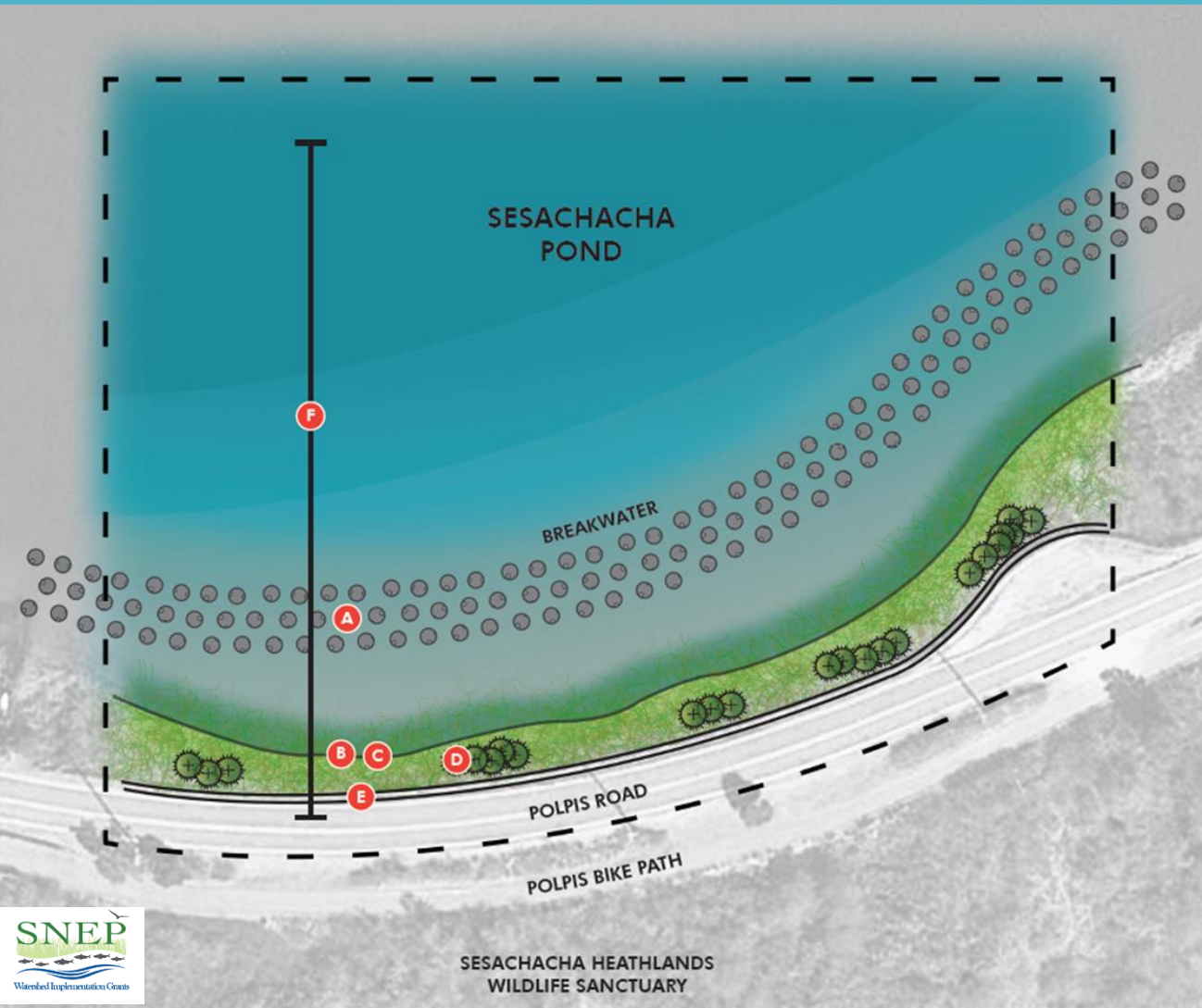
- Governance approach to encourage inter-departmental collaboration and coordination on issues related to coastal resilience and sustainability
- High priority
- Implemented in 2022
- Includes: Town Administration, NRD, PLUS, DPW
- Currently working on a sustainability and resiliency dashboard

COASTAL RESILIENCE AND SUSTAINABILITY PROGRAM



- Governance approach to establish a formal program with the necessary resources for managing coastal resilience and sustainability projects and programs across the island
- High priority
- Implemented in 2022 with hiring the TON Sustainability Programs Manager
- Comprised of Vince and Leah!

POLPIS ROAD RAISING, CULVERT EXPANSION, AND WAVE ATTENUATION AT SESACHACHA POND



Phase 1 Underway:

- Collaboration with Mass Audubon for all phases
- Idea of reef started in 2017
- Create nearshore oyster reef
- Funded by SNEP grant
- Implemented by 2024



POLPIS ROAD RAISING, CULVERT EXPANSION, AND WAVE ATTENUATION AT SESACHACHA POND

LIVING SHORELINES PROMOTE RESILIENCE

5 BENEFITS LIVING SHORELINES HAVE OVER TRADITIONAL COASTAL MANAGEMENT TECHNIQUES

Living Shorelines or "soft shoreline projects" are a coastal management tool that relies "on natural and nature-based features, such as marshes, dunes, and oyster reefs" to provide shoreline protection while also providing ecological and community benefits.



IMPROVE WATER QUALITY

OYSTER REEFS FILTER WATER

LIVING SHORELINES PROVIDE HABITAT, STORE NUTRIENTS, AND DECREASE SEDIMENT MOVEMENT.

NATURAL BARRIERS TO WAVES

LIVING SHORELINES ABSORB WAVE ENERGY TO DECREASE DAMAGE

15FT OF MARSH OR OYSTER REEFS CAN ABSORB 50% OF INCOMING WAVE ENERGY



STORE AND ABSORB CARBON

LIVING SHORELINES CREATE CARBON SINKS

THROUGH CARBON SEQUESTRATION, VEGETATION (LIKE MARSHES AND OTHER PLANTS) ABSORBS CARBON FROM THE ATMOSPHERE.

REDUCE EROSION

PLANTS, STONE, & SAND LIMIT STORM RUNOFF

LIVING SHORELINES PROMOTE ECOSYSTEM HEALTH WHILE DECREASING EROSION AND COASTAL DAMAGE.



KEEP COMMUNITIES SAFE

LIVING SHORELINES SUPPORT RESILIENT COMMUNITIES

LIVING SHORELINES STABILIZE COASTS, REDUCE FLOOD RISKS, SAVE MONEY OVER TIME, AND PROMOTE RECREATION.



CREATED BY:

SYDNEY O'SHAUGHNESSY



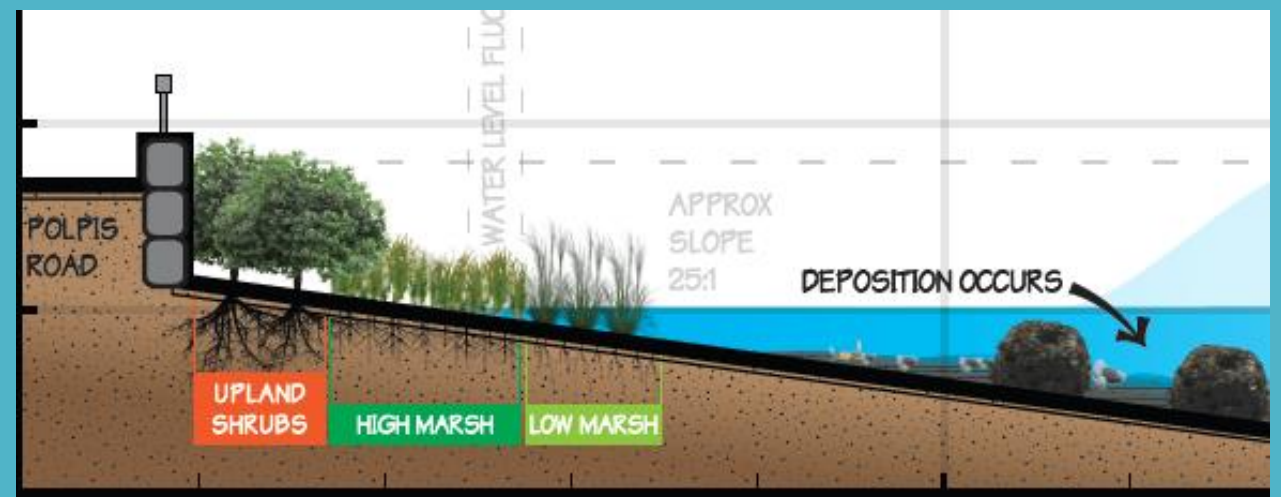
LEARN MORE:

EFRI.ORG

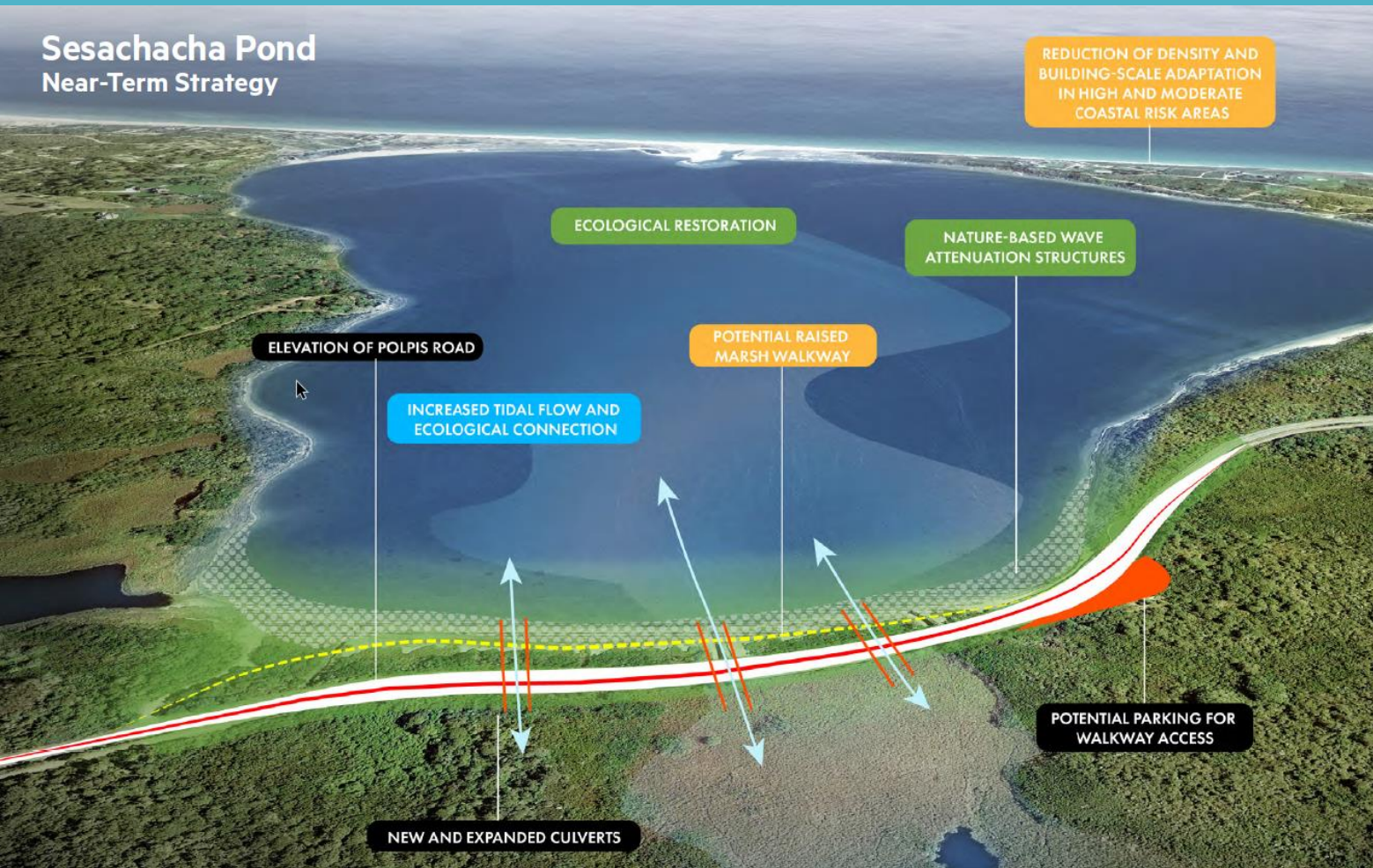
<https://www.eefri.org/articles/view/living-shorelines-protect-coasts-but-better-permitting-regulations-are-needed>

Phase 2 Underway:

- 2018 Polpis Road closed due to erosion
- Remove emergency, concrete wall
- Create a living shoreline
- Slated for 2025/2026:



POLPIS ROAD RAISING, CULVERT EXPANSION, AND WAVE ATTENUATION AT SESACHACHA POND



Phase 3:

- Priority 2
- Slated for 2035
- Raise road and replace culverts with bridge to connect Pond with wetlands
- Maintain emergency access while restoring ecology
- Estimated to cost \$40-50 million
- \$3-11 million in benefits

SHORELINE CHANGE MONITORING PROGRAM



- Priority 2
- Planning to upgrade to mobile technology and other tools to engage the community members in the process of monitoring shoreline changes across the Island
- Uses methods from MA CZM for shoreline change transects-stakes at 20ft intervals and measure from nearest stake to edge of coastal bank
- Underway since 2021 by NRD Coastal Resource Tech

SEDIMENT SOURCING AND TRANSPORT STUDY & DREDGE PLAN

- High priority
- Started in 2023 by NRD and will take 18 months
- Study area: Nantucket Harbor, Polpis Harbor, Madaket Harbor, Hither Creek
- Develop understanding of stable and unstable sediment, sensitive ecological areas, and shoals and barriers to navigation
- Use that information to develop a needs-based plan for dredging which will include appropriate uses for dredged sand, storage, sale, beach nourishment, and CR projects





STORMWATER BY-LAWS ASSESSMENT & SURFACE WATER & GROUNDWATER PROTECTION REGULATIONS

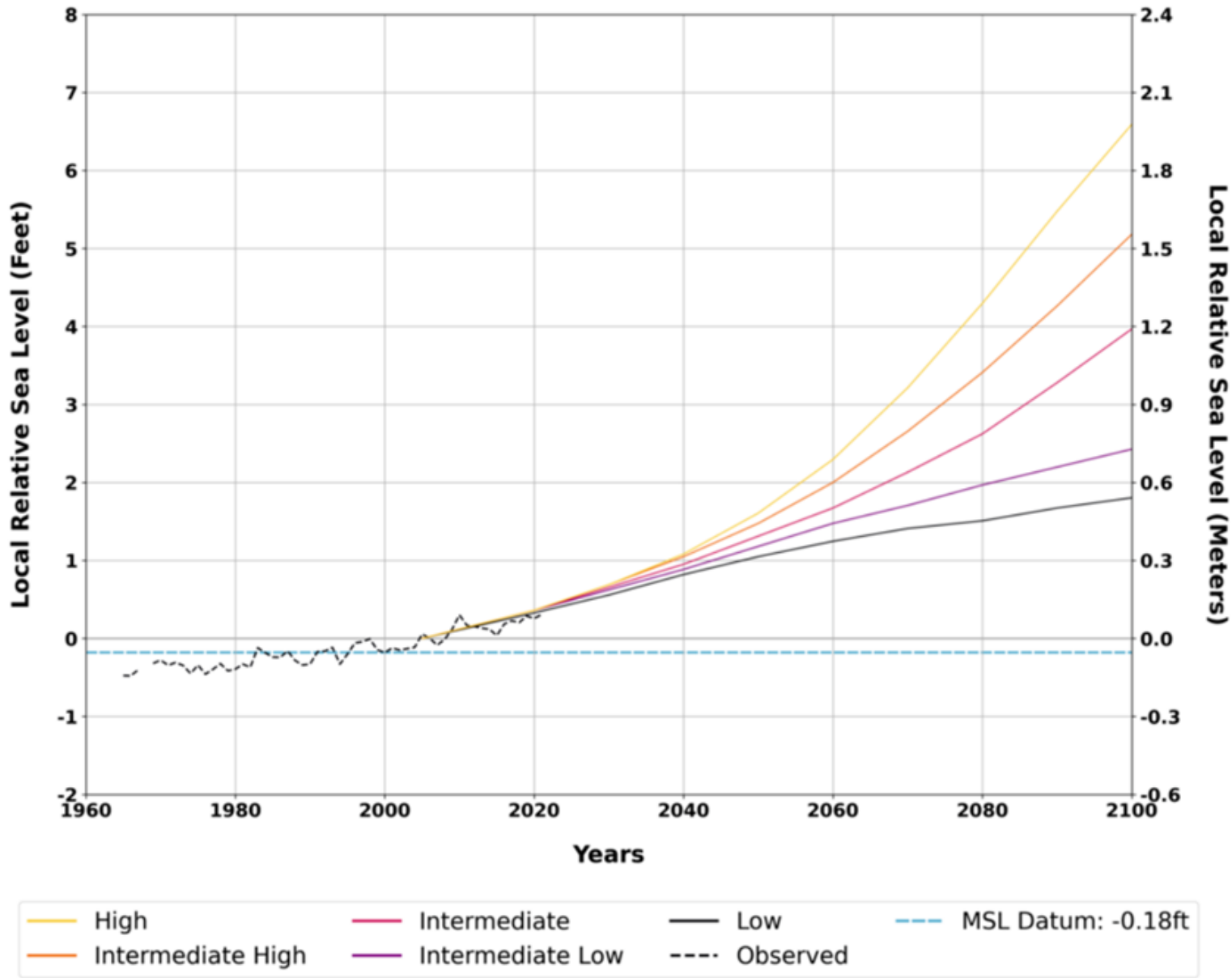
➤ Priority 3

➤ Planning step to conduct an assessment of existing by-laws and updating stormwater management by-law to encourage BMPs that address water quality and quantity issues

1. Prevent illicit discharges and connections to the Town's stormwater systems
2. Regulate discharges from swimming pools
3. Regulate land disturbance, development, or construction
4. Regulate generally the discharge of water to surface water bodies, Islands-wide

➤ Completed by TON Sewer Department and adopted by BOS on March 15, 2023

8449130 Nantucket Island



UPDATE LOCALLY-ADOPTED SEA LEVEL RISE SCENARIOS & BEST AVAILABLE FLOOD HAZARD DATA

- High priority
- Adopt sea level rise scenarios provide by the Commonwealth of Massachusetts and Massachusetts Coastal Flood Risk Model (MC-FRM) as the best available local flood hazard data.
 - MC-FRM on Town GIS
 - Updated recommendation underway by Coastal Resilience Advisory Committee

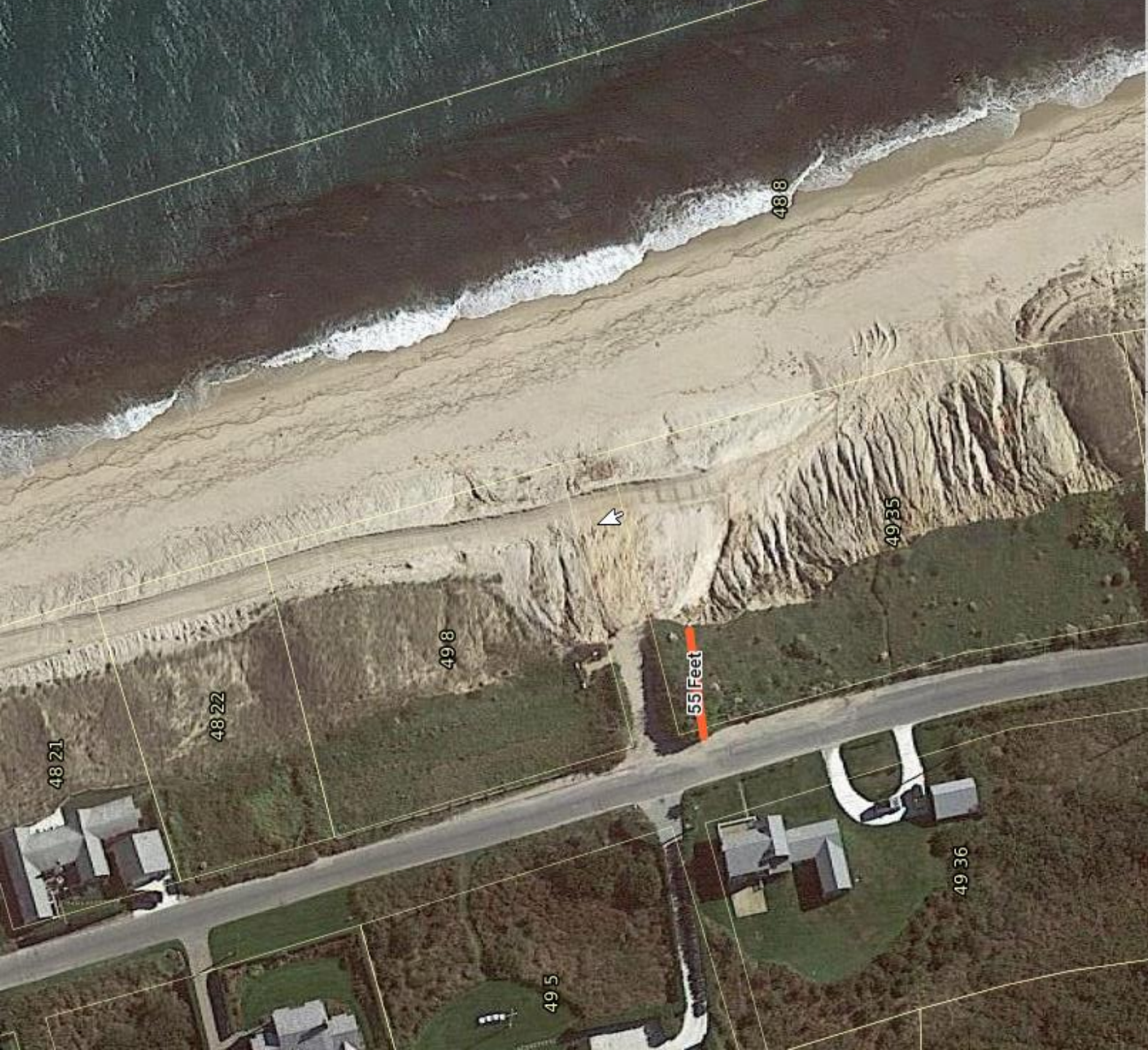


DEPARTMENT OF PUBLIC WORKS FACILITY AND LAND FILL RESILIENCE

- High Priority
- Building scale resilience and operational resilience planning to reduce risk of damage and limit disruption to core operations at the facilities. The first step in this recommendation is a site-specific study to determine the appropriate risk mitigation approaches for the facility.
- 2023 Underway by Town Administration and DPW: FY '24 capital funding secured to look at other potential locations or adaptations at current site

BAXTER ROAD ALTERNATIVE ACCESS

- Priority 2
- Planning for and implementation of road relocation, including acquisition of easements, access and maintenance agreements, finalization of road alignment, and development of final designs for construction.
- Underway by TON and property owners since 2021 and due to be completed in 2024
- Route selected, currently designing the route and getting planning applications together



TOM NEVERS FIELD EROSION MITIGATION PILOT PROJECT



- High priority
- Pilot program of dune restoration, sand fencing, and beach nourishment. Monitoring program to evaluate how well the pilot project performs to inform future investment in Tom Nevers Park, as well as erosion management elsewhere on the island.
- Underway since 2022 by TON Parks and Recreation



SHEEPS POND RELOCATION STUDY

- Priority 2
- Planning step to work with property owners and Nantucket Conservation Foundation to develop and implement plan for relocation of public infrastructure on Sheep Pond Road.
- Not a study but relocation efforts underway TON, NCF, private homeowners
- Currently reviewing potential layout locations

CRP RECOMMENDATION PROGRESS

- In the last year since the CRP was adopted by the Select Board (Jan. 2022):
- Projects complete = 3 (7.5%)
- Projects underway = 9 (22.5%)
- Projects in development = 10 (27.5%)
- Projects not started = 17 (42.5%)

More than half of the projects are in development, underway or complete!!!!

THANK YOU!

Leah Hill

Coastal Resilience
Coordinator

Town of Nantucket

Lhill@nantucket-ma.gov

508-228-7200 ext. 7603

