

CRAC 4th quarter report

Discussion on Funding Mechanisms for CRP projects

- Select Board Strategic Plan objective “Incorporate the recommendations of the CRP in conjunction with other capital planning”
- Ideas generated by CRAC:
 - Needs to be a constant sustainable fee like the Land Bank fee
 - Component of a stabilization fund
 - Increase beach sticker price and a % goes into a coastal resilience fund
 - Need to put numbers to the list to see what is worth pursuing
 - Grants
 - Betterments
 - Create a resilience fund with the Community Foundation
 - Leverage private-public partnerships and make it easier/streamlined
 - Work with consultants/professionals to develop funding recommendations
- **John Giorgio went through the list and recommended setting up a special purpose stabilization fund supported by an override and potentially a revolver account but these need to be vetted by Finance Director**



Presentation on Building Codes, Zoning and Floodplain By-laws and maps by Shannon Hulst

- Cape Cod Cooperative Extension and Woods Hole Sea Grant's Deputy Director and Floodplain Specialist
- Gave great background and helped CRAC all be on same playing field on building codes, zoning and floodplain by-laws and maps
- Introduced the now mandatory 2020 Model Bylaw
 - Shannon went through our zoning bylaw and indicated what needs to be updated to be in compliance
- Helped CRAC develop suggestions to incorporate coastal resilience into Zoning by-laws



Hold Harmless Discussion with Rick Atherton



This idea was brought up over several CRAC meetings



Rick explained the failed proposals in 2015 and 2019 to:

Property owners would have to sign Hold Harmless agreement to get building permits

Shift responsibility to property owners who choose to build in at-risk areas

Town wouldn't be responsible to provide sewer/water/etc.



Tort Law “any act that harms an individual’s well being or damages their property” protects Town from getting sued

REQUESTS AND RECOMMENDATIONS

Are there current or upcoming issues for which the Select Board would like the CRAC's advice?

The Coastal Resilience Advisory Committee generally meets on the **second** and **fourth Tuesday** of each month at 10 am via Zoom. Meeting notices and agendas are posted on the Town's website at:

<https://nantucket-ma.gov/1391/Coastal-Resiliency-Advisory-Committee>

Contact Leah Hill, Coastal Resilience Coordinator,
lhill@nantucket-ma.gov



COASTAL RESILIENCE ADVISORY COMMITTEE

Dear Members of the Selectboard;

The Coastal Resiliency Advisory Committee, after meeting with John Giorgio to review financing ideas, respectfully ask you to explore the following options in order to develop funding mechanisms for the CRP, and to see if we could include any of these suggestions in the FY 26 Town Meeting Warrant.

1. Establishing a special purpose stabilization fund where monies could be directed and dedicated to fund future CRP projects – could be betterments, a future tax override or debt exclusion or a percentage of an existing fee that could be proposed, like 1% of the hotel tax for example.
2. Establishing a revolver account where fees established to support CRP activities would be directed – like the beach sticker fee suggested below.

One idea we discussed was to increase the price of beach stickers by \$50 and direct 50% of that fee to the revolver and 50% to the stabilization fund, we recognize that the initial revenue collected will be small in comparison to the magnitude of the project, but it gives us a start at collecting something that is related to the CRP, visible in the community and would be active over a long period of time.

We recognize that town meeting would need to authorize the creation of both accounts, and that the stabilization fund would need to pass at the ballot. Our thinking is that as we develop funding streams the money will need a place to go, and we will be prepared even if we start with a simple idea like adding a fee to the beach sticker.

We are open to any ideas, feedback or refinement and appreciate your consideration.

Thank you,

The Coastal Resilience Advisory Committee

2024 Nantucket and Madaket Harbors Action Plan



Prepared by:

The Town of Nantucket, the Urban Harbors Institute at the University of Massachusetts Boston,
and Woods Hole Group

- Coastal Resilience Advisory Committee
- Steamship Authority

2.7. Coastal Resiliency

Nantucket residents have a long history of resilience, with the capability to prepare for and bounce back from a variety of challenges—an essential quality for living on an island. Climate change poses a modern risk to Nantucket, tests the island’s capacity for resilience, and touches all topic areas of this plan.

The primary features of climate change on Nantucket include sea level rise, tidal flooding, storm surge, erosion, and groundwater table rise. Both Nantucket and Madaket Harbors are vulnerable to these coastal impacts. Specifically, the downtown area floods frequently, impacting ferry terminals, numerous wharves and piers, town offices, and other critical facilities. Madaket Harbor is also vulnerable to coastal impacts to houses, bridges, parking lots, public roadways, and other structures. In addition to the built environment, climate change poses significant risks to the island’s natural features, including water temperatures, shapes of coastlines, and conditions of wetland areas such as marshes, barrier beaches, and tidal flats.

Nantucket has been advancing coastal resiliency for decades, and there are several plans, studies, and reports available. Most recently, the Nantucket Coastal Resilience Plan is a comprehensive plan to build coastal resilience and reduce risks from flooding and erosion. A more detailed list of plans and studies can be found in Appendix xxx.

While climate change is woven throughout the harbor plan, this section focuses on the major drivers and local coastal impacts.

This section was also developed in coordination with the 2021 Nantucket Coastal Resiliency Plan (CRP) and the Resilient Nantucket Toolkit.

Needs and Opportunities:

1. Nantucket is experiencing increasing inundation due to storm surge, tidal flooding, and groundwater table rise. The floodwater causes damage to properties and critical infrastructure, disruption to emergency services and daily life, loss of natural resources, and an increase in coastal erosion. Climate change is projected to increase the risk of coastal hazards due to sea level rise and a projected increase in frequency and strength of storms
2. Nantucket is vulnerable to isolation during severe weather events.
3. In addition to the Harbor Plan, Nantucket has multiple town plans to protect and improve the resiliency of essential facilities and critical infrastructure. Cohesion between plans and the coordination of resilience strategies and project priorities between town departments and non-town entities is necessary for timely and effective implementation.
4. There are funding limitations for supporting projects that improve Nantucket’s coastal resiliency. Public coastal resilience projects planned by the Town are estimated to cost hundreds of millions of dollars over the next 15+ years (\$800MM-900MM), with millions of dollars of maintenance costs.⁴

⁴ Executive Summary of the Coastal Resiliency Plan – add more details (pg 22)

5. Private coastal resilience efforts by businesses and homeowners can lead to inconsistent levels of protection along the shoreline and can have high individual costs.
6. Divergent perspectives exist regarding the most effective approach to harbor-based coastal resiliency projects and policies, with some advocating for public-led processes (voting/referendums) and others prioritizing expert-led solutions, underscoring the need for inclusive decision-making that incorporates diverse perspectives.
7. Public support is mixed regarding the most effective approaches to proposed coastal resilience protections within the harbor boundaries, which exist on a spectrum from structural (“hard” interventions) to nature-based (“soft” interventions).
8. Information on the coastal hazard risks and resilience opportunities pursued by the Town can be technically complex and challenging to share publicly/widely.

Recommendations:

Goal 1: To minimize and prepare for the impacts of climate change within the harbor planning area

Objective 1: Ensure cohesion of coastal resiliency and adaptation efforts between plans by the Town and local partners

Recommendation 1: Convene regular inter-committee/department meetings to coordinate coastal resiliency efforts, and share objectives, challenges, and project prioritizations.

Responsible Parties

- Coastal Resilience Advisory Committee
- Town Administration Department
- Natural Resources Department
- Land and Water Council
- Department of Public Works
- Sewer Department
- Information Technology Department
- Planning and Land Use Services
- Planning Board
- Select Board
- Board of Health
- Harbor and Shellfish Advisory Board
- Water Department
- Police Department
- Fire Department

Recommendation 2: Implement the town’s Coastal Resilience Plan (CRP) and future CRP updates. Follow the prioritization timeline of the town’s Coastal Resiliency Plan (CRP) and future CRP updates, while acknowledging the CRP is a “living document”, adapting to accommodate future changing climate conditions and increasing/reducing risk. Ensure that the goals of the CRP and future updates are aligned with/inform other planning efforts.

Responsible Parties

- Coastal Resilience Advisory Committee
- Town Administration Department
- Natural Resources Department
- Planning Board and Select Board
- Land and Water Council
- Department of Public Works
- Sewer Department
- Marine Department
- Planning and Land Use Services
- Water Department
- Nantucket Land Bank

Recommendation 3: Address known data and planning gaps including, but not limited to: a groundwater and sea level rise monitoring study, a Stormwater Management Plan, a numerical modeling study of Coatee breaching, a future wetlands migration study, an analysis of vulnerable public access sites, and a survey of Harbor coastlines for existing and future erosion and flood protections.

Responsible Parties

- Natural Resources Department
- Land and Water Council
- Coastal Resilience Advisory Committee
- Department of Public Works
- Planning and Land Use Services
- Marine Department
- Water Department
- Sewer Department
- MA Department of Environmental Protection
- Nantucket Land Bank

Recommendation 4: Work with environmental justice communities and other underrepresented communities to address their needs and interests related to coastal resilience, ecological restoration, relocation, and climate disruptions. Communicate information in multiple adaptive formats (*e.g.* video, audio) for non-English readers and speakers. Ensure that an environmental justice community representative is on the Harbor Plan Implementation Committee, and that harbor-related decisions and forums are communicated to the environmental justice communities.

Responsible Parties:

- Harbor Plan Implementation Committee
- Coastal Resilience Advisory Committee
- Natural Resources Department

- Department of Culture and Tourism

Recommendation 5: The Harbor Plan Implementation committee should include a member of the Coastal Resilience Advisory Committee.

Responsible Parties:

- Coastal Resilience Advisory Committee

Objective 2: Increase collaboration, education, and outreach with on-island groups involved in coastal resiliency and adaptation

Recommendation 1: Work with local partners to develop, implement, and improve coastal resiliency strategies, prioritizing nature-based solutions where possible. Examples include working with the Nantucket Conservation Commission to develop compensatory flood storage in the Harbor, the Nantucket Conservation Foundation on nature-based methods of erosion control, and local landscapers to introduce more salt-tolerant native vegetation.

Responsible Parties:

- Natural Resources Department
- Land and Water Council
- Coastal Resilience Advisory Committee
- Nantucket Conservation Foundation
- Conservation Commission
- Nantucket Land Bank

Recommendation 2: Incorporate community-based science (*i.e.*, opportunities for community members to help gather scientific data) into the town's monitoring initiatives and engage the public, non-profit, and volunteer organizations in town monitoring programs, for example erosion and flood monitoring.

Responsible Parties:

- Coastal Resilience Advisory Committee
- Natural Resources Department
- Land and Water Council
- Nantucket Shellfish Association
- Nantucket Conservation Foundation
- MassAudubon
- Biodiversity Initiative (through its Grant Program)
- Nantucket Land Bank

Recommendation 3: Conduct education and outreach to encourage public awareness of coastal resiliency and adaptation best-practices. Examples include the Resilient Nantucket Toolkit and the Coastal Resilience Flyer for Homebuyers and Real Estate Agencies. Ensure that informational

presentations and best practice brochures are accessible in adaptive formats (e.g. video, audio) for non-English readers and speakers.

Responsible Parties:

- Coastal Resilience Advisory Committee
- Natural Resources Department
- Department of Culture & Tourism
- Land and Water Council
- Nantucket Conservation Foundation
- Nantucket Biodiversity Initiative (through its Grant Program)
- Realtors Association

Recommendation 4: Hire a dedicated coastal resiliency education coordinator and a dedicated coastal resiliency and adaptation grant writer. **[[Can we provide more details on how this would be funded and what gaps it would fill?]]**

Responsible Parties:

- Planning Board
- Select Board
- Natural Resources Department

Objective 3: Build coastal resilience within Nantucket and Madaket Harbors by improving infrastructure which reduces the risk of coastal hazards such as flooding and erosion, prioritizing natural, nature-based approaches, and green infrastructure to the extent possible.

Recommendation 1: Improve and expand the resilience of the town's docks and piers through **best available** methods, incorporating public access, and prioritizing nature-based solutions where possible.

Sites to consider include:

- Elevating Steamboat Wharf
- Raising Town dock or converting to floating dock
- Elevating the ramp at Children's Beach
- Elevating F Street boat ramp

Responsible Parties

- Natural Resources Department
- Harbor Master
- Planning Board
- Select Board
- Coastal Resilience Advisory Committee
- Department of Public Works
- Nantucket Land Bank

- Steamship Authority

Recommendation 2: Improve and expand the coastal resiliency of road infrastructure within the Harbor Planning Area through **best available** methods, incorporating public access, and prioritizing nature-based solutions where possible. Sites to consider include:

- Raising Easton Street, Hulbert Avenue, Washington Street Extension, Consue Springs, and Polpis Road
- Raising Madaket Road and the Ames Avenue Bridge
- Improving the resilience of Millie's Bridge and the Madaket Road/Ames Avenue intersection through erosion management

Responsible Parties

- Natural Resources Department
- Harbor Master
- Nantucket Land Bank
- Planning Board
- Select Board
- Coastal Resilience Advisory Committee
- Department of Public Works

Objective 4: Improve and diversify the Town's ability to fund coastal resilience and adaptation projects

Recommendation 1: Join the Community Rating System of the National Flood Insurance Program. This program provides discounts for flood insurance policy holders and floodplain expertise for municipalities based on efforts taken by the Town for flood prevention measures beyond federal minimums, improving coastal resiliency, and improving public awareness of flood risks. An additional funding source specific to harbors and infrastructure is the MA Seaport Economic Council Grants. Additional funding sources specific to habitat and natural resources include the NFWF National Coastal Resilience Fund and the MA CZM Coastal Resilience Grants.

Responsible Parties:

- Natural Resources Department
- Planning Board and Select Board
- Coastal Resilience Advisory Committee
- Conservation Commission

Recommendation 2: Incorporate recommendations from the Coastal Resilience Plan into the Town's capital funding process as a strategic goal.

Responsible Parties:

- Natural Resources Department
- Planning Board
- Select Board

- Coastal Resilience Advisory Committee

Recommendation 3: Continue to pursue funding such as increased embarkation fees, Ch91 non-compliance penalties [[should this be included as one of these funding opportunities?]], state and federal grants, public-private partnerships, coastal resilience districts, and betterments within coastal resilience districts to secure funding for resilience and adaptation projects. [note: to be discussed - there may be some conflicting opinions on whether increased embarkation fees are a good idea]

Responsible Parties

- Natural Resources Department
- Planning Board
- Select Board
- Coastal Resilience Advisory Committee
- Town Administration
- Town Finance Department

Recommendation 4: Work with homeowners to increase their awareness and improve their responses to climate risks. Examples include offering tax subsidies to homeowners for taking proactive coastal resiliency measures such as moving vulnerable infrastructure, engaging the real estate agents to educate buyers about risks, and developing programs and policies through which homeowners assume risk due to erosion-caused loss of utilities or services.

Responsible Parties

- Natural Resources Department
- Planning Board
- Select Board
- Coastal Resilience Advisory Committee
- Real Estate Agents and Brokers

Objective 5: Integrate climate resilience and adaptation measures into municipal regulations and bylaws.

Recommendation 1: Update municipal bylaws and regulations to address current and anticipated climate concerns, with an emphasis on nature-based approaches. Examples include (1) integrating the best available flood projections into town regulations in order to regulate activities in future flood-prone areas. Model language for zoning and wetlands is available through the [Cape Cod Commission](#), (2) Implementing Coastal Resilience Districts to enhance planning, funding, and maintenance, and (3) promoting coordination across projects to ensure that they work together to provide regional benefits (e.g., align the heights of adjacent bulkheads). Other potential areas to explore include strategic retreat, moratoriums on development (including pools, homes, accessory dwelling units, decks) and redevelopment in flood-prone areas, and strategies that have multiple benefits such as resilience and public access.

Responsible Parties:

- Natural Resources Department

- Planning Board
- Select Board
- Coastal Resilience Advisory Committee
- Conservation Commission
- Historic District Commission
- Zoning Board of Appeals

Recommendation 2: Identify types of regulatory relief that may be necessary to facilitate adaptation and resilience projects.

Responsible Parties:

- Natural Resources Department
- Planning Board and Select Board
- Coastal Resilience Advisory Committee
- Conservation Committee
- Historic District Commission
- Board of Health
- Harbor and Shellfish Advisory Board

Recommendation 3: Develop and implement educational activities to encourage awareness of and compliance with bylaws and regulations.

Responsible Parties

- Natural Resources Department
- Planning Board and Select Board
- Coastal Resilience Advisory Committee
- Conservation Committee
- Department of Culture & Tourism

2.8. Administration and Coordination

This plan considered many existing plans, regulations, projects, and programs related to the harbor planning areas and topics to reinforce and provide consistency with those efforts where appropriate. Given the large number of harbor plan-related efforts and entities involved, implementation of this plan will require a coordinated approach. An Implementation Committee similar to the one created following approval of the 2009 plan will help facilitate that coordination and ensure that the implementation is advanced and tracked.

As a state-approved municipal harbor management plan, the Town will also need to continue to collaborate with the Massachusetts Department of Environmental Protection to ensure coordination of state and municipal activities subject to this plan, such as licensing under MGL Chapter 91, the Public Waterfront Act. Improved enforcement of licenses issued under the Public Waterfront Act was highlighted as a significant opportunity in this plan, and the Town can play an increased role by ensuring that its licenses mirror the language of those issued by the State.

1936	34770	Maintenance	Nantucket Harbor & Federal Channel
1937	96890	Maintenance	Nantucket Harbor & Federal Channel
1953	60000	Maintenance & Create Anchor Basin	Nantucket Harbor & Federal Channel
1959	70547	Maintenance	Nantucket Harbor & Federal Channel
1963	47235	Maintenance	Nantucket Harbor & Federal Channel
1968	54000	Maintenance	Nantucket Harbor & Federal Channel
1989	40000	Maintenance	Nantucket Harbor & Federal Channel
1940	Unknown	Create Channel	Polpis Harbor Channel
1965	32500	Maintenance	Polpis Harbor Channel
1992-1993	32500	Maintenance	Polpis Harbor Channel
1965	30963	Create Channel & Mooring Basin	Madaket Harbor & Hither Creek
1970	43723	Maintenance	Madaket Harbor & Hither Creek
1985	34570	New Channel Location	Madaket Harbor & Hither Creek
2005	2000	Maintenance	White Elephant & Children's Beach turning basin
? - post-1993	Unknown	Maintenance	Old North Wharf

A. 2.6. Coastal Resiliency

Nantucketers have a long history of resilience and have the capability to prepare for and bounce back from many different threats, an essential quality for living on an island and challenges that come with it. Climate change poses a modern risk to the communities and harbors of Nantucket and Madaket and touches all topic areas of this plan. Warming air and ocean temperatures alter the abundance and distribution of marine species. Rising sea levels increase flooding of docks, roads, businesses, and homes. Winds, waves, and precipitation from more powerful and more frequent storms increase erosion, reshaping coastlines, and impairing water quality.

While climate change is woven throughout the harbor plan, this section outlines the major drivers of local coastal impacts. Further, this section briefly highlights some existing efforts to address climate change including the 2021 Nantucket Coastal Resiliency Plan (CRP) and the Resilient Nantucket Toolkit. The harbor plan builds on these efforts and provides recommendations to help better protect the community of Nantucket and its natural resources for future generations to come.

1. Primary Coastal Climate Impacts:

Climate change will impact both the natural coastal features of Nantucket as well as the built and social/economic aspects of the Island. The main climate impacts include:

- **Sea Level Rise:** Sea level rise (SLR) is the increase in global sea levels caused by many different factors which can cause many coastal hazards such as flooding. Since SLR is expected to increase over time, the Town of Nantucket Select Board adopted NOAA's high sea level scenario for its planning purposes, in which Nantucket could experience +1.15ft by 2040 and by +6.66ft by 2100. [did the town update the state's sea level rise projections after the CRP?]

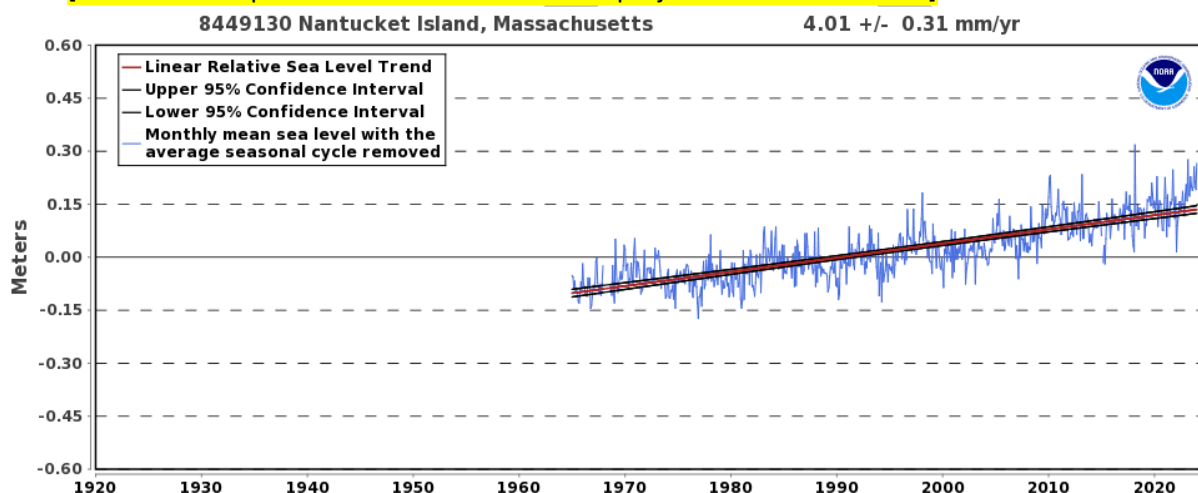


Figure 38: Historic Sea Level Rise at NOAA Steamboat Wharf tide station.

- **Tidal Flooding:** High tide flooding, or nuisance flooding, leads to public inconveniences such as road closures, backed up storm drains and catch basins, and damage to housing, storefronts, town administration buildings, and more. Tidal flooding has become more frequent over the years. In the Downtown area, Nantucket has experienced a six-fold increase in tidal flooding in the last 40 years, and in 2023 Easy Street was flooded a record of 75 days⁸³.
- **Coastal Flooding and Storm Surge:** Coastal flooding is the submergence of low-lying land by seawater and is caused by storm surge. Storm surge is an abnormal rise in water generated by a storm and can result in increased flooding in coastal areas. This can damage buildings, infrastructure, and erode shorelines. It can damage and disrupt homes, businesses, infrastructure, boats, and ecosystems.
- **Coastal Erosion:** Coastal erosion is a gradual loss of land or sediment along a coastline caused by a variety of factors. This erosion can potentially damage homes, infrastructure, and ecosystems. While beaches and dunes can be naturally replenished after erosion if a sand source is present,

⁸³ Town of Nantucket: Sea Level Rise. <https://www.nantucket-ma.gov/2989/Sea-Level-Rise>

bluffs cannot. While still the topic of ongoing research, most experts expect the rate of shoreline erosion to increase with future sea level rise.

- Groundwater Table Rise: Groundwater Table Rise is the increase of groundwater levels, primarily due to SLR. It can cause inundation of low-lying regions with a shallow water table, even in areas not directly on the shore. An increased groundwater table could create new wetlands and expand others, alter water drainage, and exacerbate flooding especially when high tides coincide with storm events. Increased groundwater can also impact the function of septic systems and in some cases affect drinking water.

2. Climate Impacts in the Planning Area

a. Nantucket Harbor

The Nantucket Harbor Planning area is vulnerable to multiple coastal hazards including flooding, erosion, storm surge, and groundwater table rise. Conditions of the natural and built environments within and along the harbor are dependent upon the barrier beach systems that shape the harbor and buffer the impacts of storms. The downtown area is home to Nantucket's public ferry terminals, numerous working wharves and piers, Town Offices and Archives, and multiple landmarks. The Brant Point peninsula is a largely residential neighborhood and hosts the Nantucket U.S. Coast Guard Facility, the iconic Brant Point lighthouse, and the town's shellfish hatchery. Low-lying areas of downtown and Brant Point are particularly vulnerable to storm surge flooding during coastal storms, with five of the top ten recorded flood levels occurring during storms in 2018⁸⁴.

Within the downtown and Brant Point area, the key coastal resilience challenges⁸⁵ include:

- Damage and disruption to businesses, cultural institutions, historic buildings, essential services, critical infrastructure;
- Loss of service on waterways, roadways, and critical/emergency access corridors.
- Potential for dune breaches (of Coattue, Brant Point, Great Point, and Wauwinet) which could cause an increase in flooding within Nantucket Harbor. This flooding would enhance the flood risk to buildings and infrastructure along the Harbor, including downtown, and increase harbor sediment accretion impacting navigation, shellfish fisheries, and eelgrass habitats.

The Coastal Resilience Plan recommends an infrastructure strategy for downtown and Brant Point that focuses on elevating critical infrastructure and roadways to mitigate the impacts of flooding. In Polpis Harbor and Coattue, it focuses on erosion management, culvert expansion, and road raising⁸⁶. Below are specific coastal resilience strategies identified in the Coastal Resilience Plan for Nantucket Harbor:

- Raising critical infrastructure and roadways to mitigate the damage from flooding and storm surge
- Elevating wharves and docks to minimize damage and disruption during tidal flooding and storm events

⁸⁴ Town of Nantucket Natural Hazard Mitigation Plan. March 8, 2019. Milone & MacBroom.

<https://www.nantucket-ma.gov/DocumentCenter/View/24719/Town-of-Nantucket-2019-Hazard-Mitigation-Plan>

⁸⁵ Nantucket Coastal Resilience Plan – Final Report. Town of Nantucket. November, 2021. <https://www.nantucket-ma.gov/DocumentCenter/View/40278/Nantucket-Coastal-Resilience-Plan-PDF>. Page 138.

⁸⁶ Nantucket Coastal Resilience Plan – Final Report. Town of Nantucket. November, 2021. <https://www.nantucket-ma.gov/DocumentCenter/View/40278/Nantucket-Coastal-Resilience-Plan-PDF>. Page 190.

- Installing a neighborhood flood defense structure to reduce the impact of coastal flooding
- Mitigating erosion through dune nourishment, wetland restoration, eelgrass conservation, and the planting of native vegetation
- Adapting properties according to the recommendations in *Resilient Nantucket: Flooding Adaptation & Building Elevation Design Guidelines* [should insert some information from the historic preservation report]

b. Madaket Harbor

The Madaket Harbor planning area is also vulnerable to many coastal hazards such as sea level rise, flooding, and erosion. In Madaket Harbor, 50 structures and nearly 1 mile of public roadways are located within the zone that faces a variety of coastal threats⁸⁷. Homes and critical infrastructure, including the sole access bridge to Smith's Point, are highly vulnerable to flooding and erosion. The sister islands of Tuckernuck, with approximately 30 seasonally occupied homes, and Muskeget, uninhabited, are also vulnerable coastal hazards.

Madaket harbor, primarily used for recreation and limited commercial activity, is threatened by sea level rise and potential dune breaching between Smith's Point and Esther's Island. Dune breaching can be a contributing factor to eelgrass loss, while rising sea levels and erosion endanger inland areas, including residences and roads. The western shoreline is experiencing significant erosion due to its narrow beaches and eroding coastal bluffs. [do we have a map of where erosion is occurring on the western shoreline?]

The main coastal resiliency challenges in Madaket include⁸⁸:

- Loss of access on critical roadways such as Madaket Road, which serves as the main access route for the public and emergency transport to the area.
- Loss of bridge service at the Ames Avenue bridge, the only access to Smith's Point
- Loss of eelgrass and shellfish habitat in Madaket harbor due to sea level rise and breaching between Smith's Point and Esther's Island
- Loss of habitat and long-term tidal exchange through culverts on Madaket Road
- Erosion of the coastline especially at Smith's point and near the intersection of Ames Avenue and Madaket Road
- Loss of public water access points at Jackson Point and F Street boat ramps
- Damage and disruption to homes due to flooding and erosion

The Coastal Resilience Plan recommends an infrastructure strategy for Madaket Harbor that focuses on elevating critical roadways and replacing culverts to mitigate the impacts of flooding and erosion. Below are specific coastal resilience strategies called out in the Coastal Resilience Plan for Madaket Harbor⁸⁹:

- Raising Madaket Road and replacing existing culverts with bridges

⁸⁷ Nantucket Coastal Resilience Plan – Final Report. Town of Nantucket. November, 2021. <https://www.nantucket-ma.gov/DocumentCenter/View/40278/Nantucket-Coastal-Resilience-Plan-PDF>. Page 170.

⁸⁸ Nantucket Coastal Resilience Plan – Final Report. Town of Nantucket. November, 2021. <https://www.nantucket-ma.gov/DocumentCenter/View/40278/Nantucket-Coastal-Resilience-Plan-PDF>. Page 168.

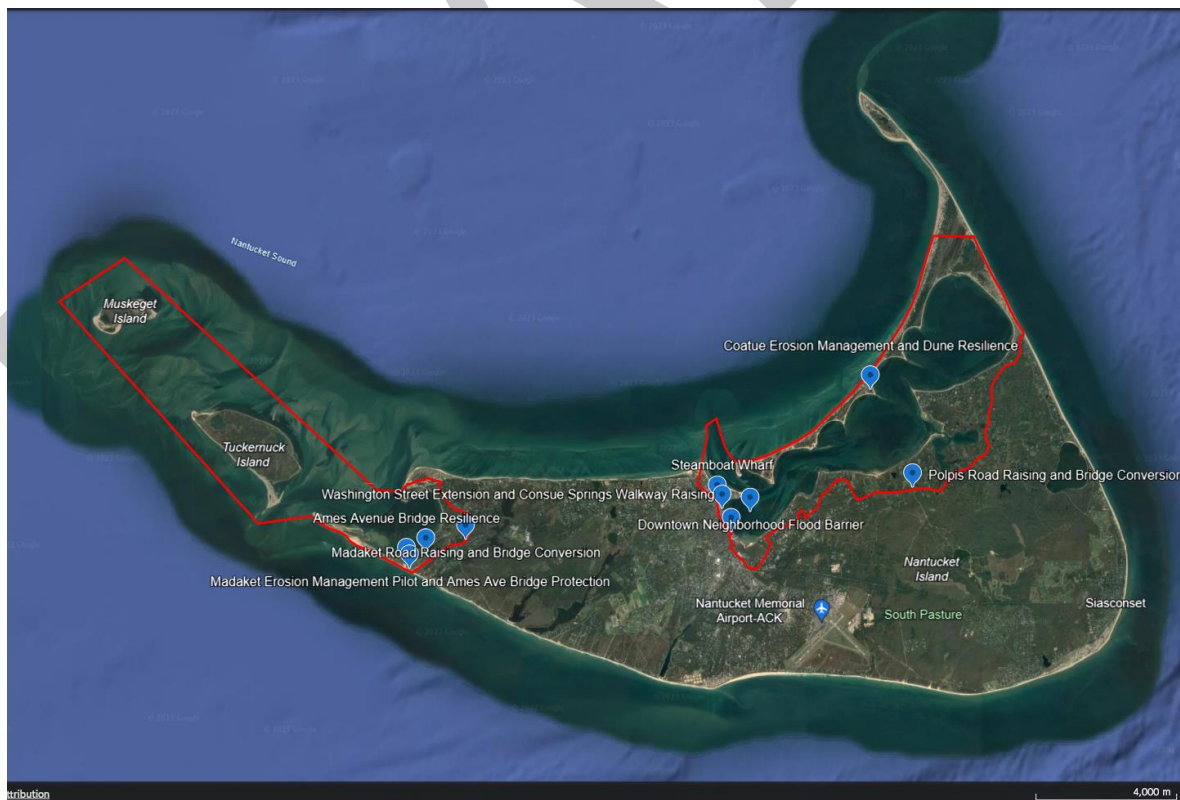
⁸⁹ Nantucket Coastal Resilience Plan – Final Report. Town of Nantucket. November, 2021. <https://www.nantucket-ma.gov/DocumentCenter/View/40278/Nantucket-Coastal-Resilience-Plan-PDF>. Page 172.

- Enhancing dunes to mitigate flooding and erosion risk to Ames Avenue Bridge and the Madaket Road/Ames Avenue intersection
- Elevating F Street boat ramp and access roads, and consolidating Jackson Point Boat ramp once flooding causes loss of service
- Adapting properties according to the recommendations in the Resilient Nantucket Toolkit

3. Regulations and Actions towards improving Coastal Resiliency on Nantucket

Nantucket has been working to address coastal resiliency issues on Nantucket for decades. Below is brief overview of plans, studies, and reports that have been conducted (note: this list is not comprehensive):

- **The Nantucket Coastal Resilience Plan (CRP) (2021)**
- In 2021, the Town of Nantucket adopted the Coastal Resilience Plan which takes a location-specific strategy to protect critical infrastructure. The goals of the coastal resiliency plan⁹⁰ are to:
 - Build coastal resilience and reduce coastal risks from flooding and erosion
 - Enhance safe access to, from, and across the island
 - Promote the health of natural ecosystems
 - Generate waterfront public space, connectivity, and safety
 - Develop implementable strategies that will result in reduction of flood and erosion risk.



⁹⁰ Nantucket Coastal Resilience Plan – Final Report. Town of Nantucket. November, 2021. <https://www.nantucket-ma.gov/DocumentCenter/View/40278/Nantucket-Coastal-Resilience-Plan-PDF>. Page 32.

Figure 41: Map of Proposed Coastal Resilience Plan Projects within the Harbor Planning Area.

- [Town of Nantucket Article 69 \(2024\)](#)): The Town approved the establishment of Coastal Resilience Districts, creating a new mechanism to aid development of coastal resilience projects and identify properties that would benefit from them.
- [Nantucket Blue Pages: A Citizen's Guide to Protecting Nantucket's Waters \(2024\)](#): This educational guide for residents and visitors on how to operate and care for homes, cars, boats, and landscaping to minimize harbor pollution.
- [Resilient Nantucket](#): This educational guide was developed to inform residents, property owners, and real estate professionals [on flood risks, coastal hazard emergency planning, and measures to improve coastal resilience](#). Specific features listed below:
 - [Resilient Nantucket: Flooding Adaptation & Building Elevation Design Guidelines](#): This document [provides design guidelines to improve the coastal resiliency of historic Nantucket buildings](#).
 - [Resilient Nantucket: 3D Digital Documentation and Sea Level Rise Visualization](#): [Depicts visualizations of sea level rise projections in Downtown, waterfront, and Brant Point](#).
- [Nantucket's Sustainability Assessment Recommendations Report \(2020\)](#): This report provides recommendations and establishes a roadmap for the Town to achieve its sustainability goals.
- [Town of Nantucket Coastal Risk Assessment and Resiliency Strategies \(January 2020\)](#): [This report identifies coastal risks and presents potential strategies to build coastal resilience](#).
- [Municipal Vulnerability Preparedness \(MVP\) Report \(2019\)](#): [This report identified community concerns regarding coastal hazards, prioritizing actions to improve hazard preparedness](#).
- [Town of Nantucket Natural Hazard Mitigation Plan \(HMP\) \(2019\)](#): [This FEMA-approved plan details Nantucket's capabilities for mitigating and responding to natural hazards](#).
- [FEMA Region I Coastal Erosion Study – Nantucket County \(2019\)](#): [This study developed projected future erosion maps for Nantucket incorporating sea level rise](#).
- [Storm Tide Pathways & Hurricane Inundation Projections \(2016\)](#): [These projections model potential storm inundation and hurricane events on Nantucket, available in the town's GIS system](#).
- [Town of Nantucket Coastal Management Plan \(2014\)](#): [This plan established priorities and procedures for managing and protecting town infrastructure on the coastline](#).
- [Nantucket Master Plan \(2009\)](#): [This Master Plan describes the town's plan for physical development on Nantucket, including housing, transportation, historic preservation, and natural resource conservation](#).

List of CRAC's Suggestions for Updating Nantucket's Zoning and Land Use Regulations incorporating Shannon Hulst's comments

From the CRP:

- Adopt the provisions included in the Massachusetts 2020 model floodplain by-law in order to continue participation in the National Flood Insurance Program (NFIP)
- Adopt Model Floodplain Overlay District Zoning Bylaw-Optional Higher Standards (June 2024) to:
 - A. Update Flood Hazard Overlay District to consider predicted climate changes such as sea level rise and more frequent and intense storm events
 - B. Expand the Nantucket Flood Hazard Overlay District to an inland geography that incorporates the future floodplain including sea level rise.
 - C. Incorporate a requirement that project proponents subject to Town approvals must demonstrate how their building and site plan will manage a 1% annual chance flood elevation including wave action with sea level rise expected as soon as 2070 or 2100 depending on the type and anticipated life of the structure
 - D. Establish recommended Design Flood Elevations (DFE) based on a selected sea level rise increment above the minimum elevations required by Massachusetts Building Code. The DFE would represent the new minimum for lowest occupiable floor and critical systems for residential uses or flood proofing for non-residential structures
- Excluding necessary flood protection elements, required access to elevated buildings, structures for elevated mechanicals, setbacks, and other resilience measures, from gross floor area and lot coverage calculations
- Changing the definition of building height to exclude uninhabited space used for flood risk mitigation, such as wet floodproofing or measure height from Design Flood Elevation instead of Base Flood Elevation
- Disallowing or imposing Special Permit restrictions on essential/critical Facilities and high-risk structures, such as hospitals, schools, assisted living facilities, and Town administrative offices in areas subject to the 1% annual chance flood with sea level rise expected as soon as 2070 or 2100 depending on the type and anticipated life of the structure
 - a. Use Design Flood Elevation from adjacent 0.2% chance flood zone or the Maximum Wave Crest from the Massachusetts Coast Flood Risk Model or other best available flood models
- Where development review or approval is required, establish protocol for Planning staff and Planning Board review of development proposals within Priority Action and High Coastal Risk Areas for consistency with long-term planning goals of reduced density and development
- In Priority Action (i.e. faces extreme coastal risk now-2030) and High Coastal Risk Areas (i.e. faces coastal risk now-2050)
 - a. make all structures obtain special permit,

- b. Increasing minimum lot size to encourage aggregation of lots and reduce overall residential density within an area,
 - c. in coordination with local wetland regulations, require maximum practical setbacks from mean high water,
 - d. impose reporting requirements that the property is located in an area of high coastal risk and that residential retreat is likely in the future
 - e. Limiting lot coverage for overall development to the greatest extent practical, ideally below 20%.
 - f. Prohibiting accessory uses that increase impervious cover including pools and other outbuildings
- Create a Special Coastal Risk Overlay District that incorporates Priority Action (i.e. faces extreme coastal risk now-2030) and High Coastal Risk areas (i.e. faces coastal risk now-2050)
 - Explore the designation of Districts of Critical Planning Concern. This tool has been used on Cape Cod and Martha's Vineyard to pause certain types of development in specified areas. Nantucket could use this tool to temporarily limit development in areas of high coastal risk and allow time for further land use planning.
 - a. May be accomplished if adopt Model Bylaw- Higher Standards
 - Join the Community Rating System

Other Suggestions:

- Explore hold harmless agreement in at risk areas and sign a waiver for responsibility
- Create a zoning overlay district to help give the zoning board guidance, that takes coastal resilience concerns into account while interpreting the zoning bylaw and maintenance and continuation of utilities is not guaranteed
- Create incentives for implementing resiliency strategies on properties like design and engineering strategies that are adaptable to the need for future height changes
- Update definitions section in zoning by-law
 - a. Flood Hazard Overlay District (FHOD) definition can be expanded in any way that enables it to include the insurances rates as well as considering metrics such as depth to groundwater, land subject to coastal storm flowage designation and any other aspects that would facilitate limiting further building in areas where the Town will be challenged by the requirement to improve and maintain access
- Explore road discontinuous and other options
- Adopt the Model Floodplain Overlay District Zoning Bylaw- Optional Higher Standards produced in June 2024

Commented [LH1]: Model Floodplain Overlay District Zoning Bylaw-Optional Higher Standards may cover this

Commented [LH2]: This is included in the scope for Retreat and Relocation Plan

Commented [LH3]: Model Floodplain Overlay District Zoning Bylaw-Optional Higher Standards would include this