

Coastal Resiliency Issues and Recommendations for Updated Harbor Plan

The table below contains a summary of issues and recommendations to be considered for the 2024 Nantucket and Madaket Harbors Action Plan Update in the coastal resiliency and climate change section. The left side of the table contains general issues identified in public forums, committee meetings, and interviews during the planning process, while the right side contains potential solutions and recommendations to help address the issues.

Note: Coastal resiliency and climate change will also be discussed in other sections of the plan, as it relates to each section. The section below is primarily about coastal resiliency and the built environment/infrastructure. Coastal resiliency and climate change and how it relates to natural resources, fisheries, water quality, and other topics will be discussed in those sections.

This table is a working document in draft form and comments are encouraged.

Coastal Resilience - Infrastructure	
2023 Issues identified in public forums, committee meetings, interviews (will need to fit under a goal/objective statement)	Suggested solutions/recommendations (most heard from public or committee)
General Issues: 1. Cohesion Between Plans Nantucket Coastal Resilience Plan (2021) is the most recent Town plan with a comprehensive strategy and roadmap up to 2100 dealing with the effects of Climate Change and Sea Level rise in Nantucket and Madaket. The Nantucket and Madaket Harbor Plan should agree with and support other Town Plans.	Have inter-committee meetings to share objectives, challenges, and project prioritizations Highlight “living” sections of the CRP within the Harbor Plan, reflecting changing conditions and increasing/reducing risk Work with partners to address identified data/planning gaps: Need Groundwater-SLR modelling, study for where wetlands will develop. Need Research on Floodwall locations. Need Jackson Point Boat Ramp Study. More planning for Alt. Steamship Authority Location. Need study for additional in-town boat ramp. Work with under-represented communities to address their climate needs/interests related to ecological restoration, coastal resilience, relocation, climate disruptions. Cohesion between town and steamship authority in that they are open to resiliency work Potential to hire more project managers – a lot more projects so should hire more people Have hazard mitigation plan, and have MVP plan – make sure there is cohesion on state and federal level as well as local plans

	Also should have more green infrastructure initiatives in town and along harbor Incentivize public to consider relocation/retreat within town initiatives [placeholder for Doug Rose's comment] Resilient Nantucket guidelines – designed guidelines for flooding and adaptation; joint partnership with FEMA Invitation to not look at CRP as unchangeable or perfect document; our work would be additive CRP – not many projects related to modeling groundwater – could be interesting additive; look at groundwater rising – there is a project that is happening but not ready for publication Measuring groundwater and looking at levels in historical areas and how that would work with historic preservation We should look at the hyline doc – NIR – they need to be in sync with us Nantucket yacht club has formed a committee related to coastal resiliency – good to have it on the radar in a formal way Great harbor – has working group on coastal resiliency Perhaps CRAC is in touch with different committees – someone on implementation committee should be from CRAC Should check with other groups to see if something we should add in, yacht clubs, NIR, coast guard – have a sit down with them at the end Good to keep track of the progress of other groups – make sure they have all the documentation that will be provided Talk to yacht club and boat basin and see where they are Should say we are periodically checking in with groups and see where they are with plans – keep tabs on them Communication with yacht club and other organizations very important
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	The crp is a document for people to come to; they don't need to go to every homeowner and group to tell them what to do – to be a resource – they don't make sure everyone is doing the right thing – they work with the other groups; how else could they communicate with those groups UHI could go to these other groups – what we are doing, what is happening in the process Future coordination with all waterfront property owners – be sure they are involved in project related activities etc. In final plan, make sure we have link to the CRP How much engage private property owners? Peter morrison's organization? – may be better to go through an organization versus go one by one CRAC did a survey of civic league – important to know what the target is before ask people for their time Asking the people what they are doing related to coastal resiliency – may be going backwards to go back to homeowners We should focus on the big entities, and we will have more public forums We could do an event at the yacht club Public and private decision making should be coordinated – finances are also going to be a big discussion topic Land bank – in second phase for Washington street – going to do a lot of stakeholder and public input For anything to work, need very coordinated effort – bulkheads same height, etc. Are there regulatory things that can be done so people have to do certain things
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2. Rising Sea Levels Nantucket is already experiencing the effects of sea level rise. The NOAA tide gauge for Nantucket, located on Steamboat Wharf, has recorded eight inches of SLR (+0.14in/yr) between 1965 and 2019. Sea level rise is expected to worsen and exacerbate existing coastal problems of flooding and erosion in the future. Sea levels in Nantucket Harbor are projected to rise 2.5-3.2ft by 2100 on average. The Massachusetts Coastal Flood Risk Model by CZM and used by the State details extents and depths of flooding for 2030, 2050, and 2070. Sea level rise increases the probability of hazards such as Storm Surge, Coastal Flooding, Tidal Flooding, and Coastal Erosion, all of which Nantucket and Madaket experience.	Utilize CRP for flooding and erosion planning. Integrate MCFRM into policies and bylaws. Model wetland bylaw language is available through the Cape Cod Commission and can serve as an example. Model wetland regulations and zoning bylaws will be available through the Commission in the coming months.: https://capecodcommission.org/resource-library/file/?url=/dept/commission/team/projects/Project%20Files/MULTI-TOWN/EEA%20grant%20Responding%20to%20Climate%20Change/EEA%20Deliverables/ModelCoastalResilienceArticle.pdf could be used for many regulatory enforcement measures: bulkhead expansion if elevating houses Explore the opportunity for strategic retreat in extreme/high-risk areas (buyouts). Develop a stormwater management plan. As part of that, conduct Groundwater - SLR modelling. Join the Community Rating System of National Flood Insurance Program (Rewards communities for measures above federal minimums, discounts to policy holders, improve coastal resiliency, improved public awareness. Municipality - floodplain expert help, conserve resources, safer community). It has been recommended to do the community rating system – Holly has it Leah has updated data for sea level rise Because the data changes, pointing to a source that is updated because it is changing is better Noaa updates the data – also look at the high flooding scenario
3. Infrastructure Protection and Prioritization Large public desire to protect shared community infrastructure. General willingness to share costs associated with it. Need to prioritize flooding and erosion prevention projects Downtown, Steamship Wharf, and emergency services identified as most urgent attention	Adhere to project prioritization timeline from CRP and CRP update – update as risks change Town has adopted using a high sea level rise scenario Wet/Dry Proof + Elevate Town Buildings: Harbor Masters, 37 Washington St, 16 Broad St, Downtown Police Station. Likely won't raise 37 Washington Raise town dock to [MCFRM X% Y Year] or convert to floating docks. – Decide which SLR projection is of greatest

	concern to the Town, and raise Town dock to accommodate, or convert to floating docks. Revisit future projections once the first projection is nearly met (e.g. in 2050). – constructing something that far into the future could make the infrastructure un-usable They have a toolkit (Holly) – part of resilient Nantucket, available on town website People pay in for when they receive more benefit – way to make financing a project more feasible
4. Private vs. Public Cost Erosion and flooding are an island-wide issue Concerns on how the town will fund the projects in the CRP Rights of private landowners to protect property, high individual costs, potential hazards, private assumption of risk Responsibilities of Town to its citizens and historic conservation, high public costs	Explore potential cost-sharing models (assessments, etc.). – and develop procedures for public private partnerships Incorporate crp recs with other capital plans Develop programs and policies through which homeowners assume risk due to erosion-caused loss of utilities or services. Clarify regulatory expectations for private property owners. Pursue funding opportunities: Increased embarkation fee, Ch91 non-compliance penalties, state and federal grants, coastal resilience districts, betterments within climate resilience districts Increase Town Budget towards CR projects (current: \$1M/yr). Hire dedicated grant writer. Embarkation fee – increasing it; dave submitted details on embarkation fee before We should get ahead of issues by providing subsidies to homeowners for being proactive – give subsidies for moving properties in advance Many articles on green vs grey infrastructure – we need some hard infrastructure for some places, but for most property owners, they want a bulkhead – but it ends up being more expensive and disturbing to the environment

5. Regulatory Updates – STOPPED HERE	Explore opportunities to modify regulations to promote resiliency and facilitate adaptation. As part of this, explore: • Modify zoning bylaws and regulations. Consider (1) adaptive zoning, allowing modifications as conditions change, (2) stricter requirements in environmentally-sensitive areas, (3) preventing 2-level basements with bigger footprints than zoning allows for above ground, (4) encouraging resilient designs, (5) preventing construction in CRP defined High or Moderate risk areas, (5) offering regulatory relief for coastal resiliency-focused building changes, (6) basing building regulations on FEMA rules, developing, prioritizing green infrastructure where appropriate new building regulations based on MCFRM • science-based triggers for policy updates Develop Coastal Resilience Districts at Town Level with specific policies addressing different risk exposure. Updated wetland regulations that (in addition to including MCFRM) (1) encourage resilient design, (2) prohibit development on bluffs, dunes and beaches; (3) limit pool installation; (4) Prevent construction in CRP defined High or Moderate risk areas, (5) prioritize green infrastructure where appropriate. Enforce laws and regulations to ensure compliance. Conduct education/outreach to ensure awareness of laws and regulations. . Town develop relocation plan recommendation #1-4 Have coastal resiliency and public access regulations flexible to the specific uses of vulnerable areas. Prioritize solutions offering multiple co-benefits.
6. Community Involvement in Planning for Climate Change When deciding on coastal resiliency and adaptation policies or projects, there is support on both sides for public-led decision making (through voting/referendum) as well as expert-led approaches.	Incorporate community science into monitoring initiatives. Increase collaboration with On-Island Groups involved in coastal resiliency and adaptation (e.g., Conservation Commission with compensatory flood storage in Harbor, Nantucket Conservation Foundation with natural methods of sand-build-up, Land Bank with Housing crisis and Washington St. Resilience framework, Landscaping with Native veg, more salt tolerant).

7. Green vs. Grey Protections Flooding and erosion protections exist on a spectrum from ‘Hard’ to ‘Soft’ interventions, ‘grey’ to ‘green’ infrastructure, and ‘engineered’ to ‘nature-based’ solutions CRP states an emphasis on nature-based solutions where possible. Public support is mixed Requires a holistic comparison of alternative systems Research needed on long-term viability of each option Examples: • Green: Beach grass planting, saltmarsh/wetland restoration, eelgrass planting, living shorelines, oyster reefs • Grey: Dredging, concrete barriers, geotubes, groins, underwater wave breaks, bulkheads, rip-rap • Both: Harbor Barrier, artificial shoals, living seawalls	In vulnerable areas, conduct site-specific assessments for protections. Where appropriate, include potential hybrid approaches that incorporate both green and grey measures. Secure additional funding for natural solutions (oyster reefs, living shorelines, eelgrass restoration etc.). Conduct monitoring of resilience and adaptation projects to ensure effectiveness and to inform future projects. Create additional pocket Parks with native vegetation for stormwater holding. Conduct a study to quantify Blue Carbon Storage in eelgrass and marshes.
8. Education	Map vulnerable locations and make map publicly accessible online and through other means. Develop a Town-wide map with likelihood of future protection to inform current and future homeowners For example, 1. Developed (shore protection almost certain), 2. Intermediate (shore protection likely), 3. Undeveloped (shore protection unlikely), 4. Conservation (no shore protection). Hire education coordinator for coastal resiliency and natural resource projects w/ science background. Encourage property owners to take coastal resiliency steps (comment provided by public). Include CRAC letter to MA Director of Waterways and DEP regarding public access, include in plan

The table below contains CRP projects within the Harbor planning area, as well as the status of those projects as described by Leah Hill. We are seeking ideas/comments for ways the Harbor Plan/Committee can support projects and address potential barriers.

CRP Projects In Harbor Plan Area	Project Status	Recommendations
Updates to zoning bylaw	LH: not started but should start to encourage less development along the harbors	
Community outreach on property owner resilience best practices		
Strategic retreat and relocation program	LH: not started. Will include areas along harbors	
Stormwater management plan	LH: not started but Sewer Dept received funding to start a small portion of this. Coincides with Stormwater Bylaws assessment and regulations update	
Sediment budget	LH: Sand Feasibility study not started	
Downtown neighborhood flood barrier (both phases)	LH: Downtown Neighborhood Flood Barrier- Initial phase Underway. This project is a Select Board high priority, CRP and Hazard Mitigation Plan high priority too. Like I mentioned above we just had the kickoff meeting for this project. Funding is secured for developing 4 alternatives and the one that is picked through community and stakeholder engagement and the Town will be developed to 30% design. We will need to secure funding to develop the design further and for construction. Downtown Neighborhood Flood Barrier- Later phase Not started. Can't start until Initial Phase is complete.	KU: Changes should incorporate public access (maybe) Ensure that these changes maintain important services for the island such as transport of goods and people
Steamboat wharf resilience	LH: Not started. Conversations were had with the Steamship 2 years ago and they said they won't be able to start this for another 8-10 years because they need to finish their terminal in Woods Hole first before they can think about this one. I will be in contact with them since the initial phase of the Downtown Neighborhood Flood Barrier just kicked off and they will be major stakeholders for that project.	KU: Ensure that Steamship Authority Ch91 License promotes public access and is inline with Town Goals

Easton St and Hulbert Avenue Rd raising	LH: Not started	KU: Changes should incorporate measures to enhance pedestrian/bike use (we heard that parking and cars need to be addressed) and consider options to enhance visual access where appropriate? (not sure that's realistic)
Washington St. extension and consue springs walkway raising	LH: Not started. I imagine this happening once the Land Bank/Town Washington St resilience projects gets underway.	LH: Work with Land Bank to implement Washington St. Resilience Framework (Project)
Building scale resilience at 37 Washington st.	LH: Not started. I added this to your list because I believe it is in the boundary (its across from the Harbor Master's Building). I am planning to put this in for a local grant to get a risk assessment and feasibility study done first which will tell us what to do for this building.	
F street Boat ramp resilience	LH: Not started.	KU: As designs are developed, include exploration of measures to preserve (and increase if Jackson point sis going to lose service) parking, if needed. Develop plans to restore Jackson Point to natural state once it is no longer functional as a boat ramp.
Polpis Rd raising and bridge conversion at Folger's Marsh	LH: Not started. The planning phase of this is in for Capital request for this fiscal year 2025. This project needs to start because the culvert is undersized so its restricting the flow to the wetlands on the other side of the road. In addition the road is failing- there is a small sink hole.	KU: Consider designs that would allow the migration of the marsh system as sea levels rise
Coatue Erosion management and dune resilience	LH: I think underway. Nantucket Conservation Foundation and the Trustees of Reservation received a NFWF grant to start part of this project. I need to contact them to find out the exact location. I will be in touch with more information about this.	KU: The plan may think about how the above dune creation/maintenance will be funded – e.g., coastal resilience districts, fees related to con com permits, etc.
Numerical modeling study of Coatue breaching	LH: I added this in. Not started. This should start soon. We received a quote from Arcadis that it would cost \$300k for modeling of 1 breaching and \$800k for 5 breaching events.	