



THE GOSNOLD CLIMATE ACTION PLAN 2022

v.1.0 DATE: JULY 20, 2022



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EXECUTIVE SUMMARY

The town of Gosnold is a small, tight-knit island community of the coast of Massachusetts that faces an uncertain future due to climate change. Two decades into the 21st century, our island chain has already experienced adverse effects, and the next two decades (and beyond) may seem challenging, if not existential. Thankfully, while uniquely exposed to climate change, the town of Gosnold also contains unique strengths to adapt, respond, and even thrive.

The Gosnold-Cuttyhunk Climate Action Network (CCAN) was created in partnership with The Vineyard Way to help chart out this future. In this document, we focus on the vulnerabilities Cuttyhunk Island will face due to climate change in the short and long-term, and then identify solutions and next steps to solve these vulnerabilities. We recognize that the other islands in the Town of Gosnold are facing similar vulnerabilities and hope that this report will serve as a starting point for their climate action planning.

Our Climate Action Plan outlines six major goals to help our community navigate an uncertain future. These goals address areas of infrastructure, natural resource use, emergency management, energy transformation, and economic resilience. These goals build on much previous thought and discussion, and this document is intended to periodically be updated and revisited to address evolving climate change science and mitigation technologies.

Though long-term planning can often cause much doubt and stress, we are honored to look forward to a future of resilience and hope.

The Gosnold-Cuttyhunk Climate Action Network

GOALS FOR 2040

Goal #1: Infrastructure

By **2040**, Gosnold's critical barrier beaches, roads, and infrastructure will be protected or relocated from impacts posed by climate change.

Goal #2: Natural Resources

By **2040**, Gosnold's natural resources including land, water supply, and ecosystems will be protected from impacts posed by climate change.

Goal #3: Emergency Management

By **2040**, Gosnold will have an effective emergency preparedness, response, and recovery system.

Goal #4: Energy Transformation

By **2030**, Gosnold will have maximized its ability to transform to renewable energy.

Goal #5: Solid Waste Management

By **2024**, Gosnold will reduce waste generation by developing and implementing a comprehensive solid waste management program including recycling and composting.

Goal #6: Economic Resilience

By **2040**, Gosnold's economy will have the necessary diversification, resilience, and sustainability needed to meet the challenges and opportunities resulting from climate change.



GOAL #1: INFRASTRUCTURE

By **2040**, Gosnold's critical barrier beaches, roads, and infrastructure will be protected or relocated from impacts posed by climate change.

BACKGROUND FOR GOAL #1

We cannot forecast for certain how climate change will impact the town of Gosnold. What is certain is that much of our vital infrastructure will be vulnerable to sea level rise, flooding, and increased extreme storm events.

On Cuttyhunk, the main channel that allows access to the island's protected harbor is already at risk, due to the erosion of the sunken barges that historically have provided a man-made barrier.

On the other side of the harbor, Church's beach, besides being a reliable tourist attraction, also functions as a crucial conduit for utility lines that connect residents living on the neck with the rest of the island.

For the rest of the island chain, the Uncatena dock is vulnerable to storms and increased sea level rise. Further, the middle causeway between Naushon and Nonamesset is at risk of over washing, as is the critical access between the Upper Wharf and downtown.

The following three objectives focus mainly on securing Cuttyhunk's infrastructure, and the proposed actions, many already in progress or soon to be launched, will address the town's vulnerabilities.



OBJECTIVE 1:

By 2025, critical waterfront infrastructure in Cuttyhunk Pond including the fish dock, marina, ferry dock, and fuel dock will be protected.

Funding Source: Town of Gosnold
Mass. Dept of Env. Protection
Seaport Economic Council

Target Date: **2025**



Action 1.1

By 2023, an engineering plan will be developed with permitting to elevate or otherwise protect critical waterfront infrastructure in Cuttyhunk Pond including the Fish Dock, Marina, Ferry Dock, and the Fuel Dock.

Lead: **Foth Engineering**
Partners: Gosnold ConComm, MADEP

Action 1.2

By 2025, this engineering plan will be implemented.

Lead: **Foth Engineering**
Partners: Contractors



OBJECTIVE 2:

By 2030, the channel into Cuttyhunk Pond will be protected.

Funding Source: MACZM
Buzzards Bay Coalition
U.S. Army Corps of Engineers

Target Date: **2030**

Action 2.1

By 2024, strategies for mitigating the impacts of completing the dike on Barges Beach will be developed.

Partners: MADEP
Massachusetts Department of Coastal Zone Management (MACZM), Buzzards Bay Coalition, Audubon Society

Action 2.2

By 2026, an engineering plan and permitting for completing the dike on Barges Beach will be developed.

Partners: US Army Corps of Engineers, MADEP, MACZM, Buzzards Bay Coalition

Action 2.3

By 2030, the dike on Barges Beach will be completed.
Lead: **US Army Corps of Engineers**

OBJECTIVE 3:

By 2026, the utilities crossing Church's beach will be protected.

Funding Source:
Town of Gosnold
MEMA

Target Date: **2026**

Action 3.1



Action 3.2

By 2024, an analysis of the risks posed by climate change to the utilities crossing Church's beach will be conducted.

By 2026, protection and mitigation measures will be installed.

Lead: **Gosnold Water and Electric Departments**



SUCCESS INDICATORS

Objective 1: Protecting Critical Waterfront Infrastructure



Plan, permitting, and construction completed.

Objective 2: Protecting Cuttyhunk Channel



Plan, permitting, and construction completed.

Objective 3: Protecting Churchs Beach Utility Lines



Plan, permitting, and construction completed.





GOAL #2: NATURAL RESOURCES

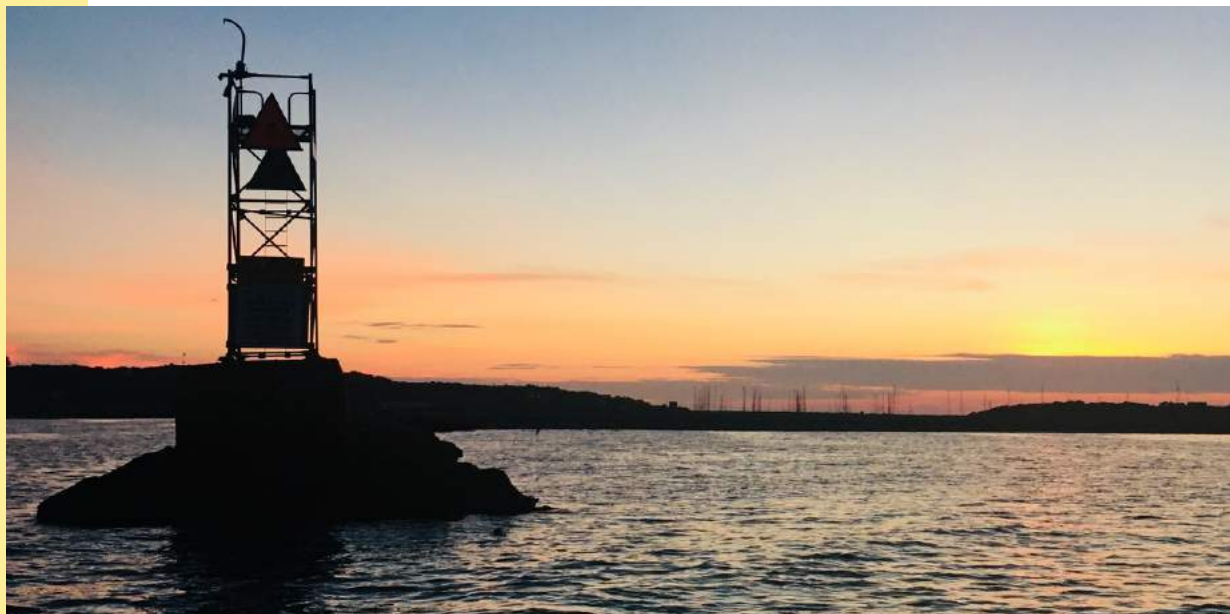
By **2040**, Gosnold's natural resources including land, water supply, and ecosystems will be protected from impacts posed by climate change.

BACKGROUND FOR GOAL #2

Just like the island's man-made infrastructure, Gosnold's natural resources are at risk. Cuttyhunk's water supply and the roads that access the water supply are all vulnerable to contamination, rainstorm washout, and wildfire.

Further, the issue of saltwater intrusion into the aquifer is a continued issue that the Town of Gosnold water department has already been focusing on, as the proposed actions demonstrate.

Climate change will only put more stress on the natural ecosystems that generate tourism and support local businesses. In particular, the ponds and watersheds on the Western end of the island are vulnerable to sea level rise and extreme storm events. Likewise changes in sea level, temperature, and acidification will have impacts on eel grass and fisheries. So, mitigation efforts must be studied and planned for in earnest to respond effectively to potential disruptions.



OBJECTIVE 1:

By 2030, water supplies at risk from sea level rise and overdrawing will be identified and protected.

Funding Source: Town of Gosnold
MADEP

Target Date: 2030

Action 1.1

By 2025, a hydrologic study of the Cuttyhunk water supplies will be conducted including identification of areas at risk of saltwater infiltration from both sea level rise and overdrawing. Impacts on water supply due to decreased rainfall and on septic leaching will also be assessed.

Lead: **Town of Gosnold Water Department**
Partners: Contractor

Action 1.2 ←

By 2027, mitigation measures will be designed and implemented to prevent saltwater infiltration into the Cuttyhunk water supply.

Lead: **Town of Gosnold Water Department**
Partners: Contractor





OBJECTIVE 2:

By 2030, natural resources and ecosystems at risk from climate change will be identified with mitigation strategies.

Funding Source: MADEP

Target Date: 2030

Action 2.1

Survey West End Pond and Cuttyhunk Pond (harbor) for ecosystems at risk (e.g., eelgrass, shellfish) due to climate changes (e.g., sea level rise, temperature, and acidity), identify mitigations, design, fund, and implement mitigations.

Lead: **Town of Gosnold Conservation Commission**

Partners: Audubon Society, MADEP, Cuttyhunk Shellfish Co.



SUCCESS INDICATORS

Objective 1: Protecting Cuttyhunk's Water Supply



Mitigation measures installed.

Objective 2: Protecting Cuttyhunk's Watersheds



Mitigation strategies implemented, health of salt marsh and eel grass, shellfish harvests.



GOAL #3: EMERGENCY MANAGEMENT

By **2040**, an effective emergency preparedness, response, and recovery system for Gosnold will be in place.

BACKGROUND FOR GOAL #3

Shifting the focus from *proactive* studies and vulnerability assessments, Gosnold also needs a robust and well thought-through *reactive* emergency response plan to address inevitable crises that result from climate change.

Gosnold already has Memorandums of Understanding (MOUs) in place with the towns of New Bedford and Martha's Vineyard for Fire, EMS, and police emergencies. Further, there are already designated MassCare Center locations, and Cuttyhunk is an NFPA Federal Firewise Community.



OBJECTIVE 1:

By 2025, the Community Wildfire Protection Plan will be implemented including staffing, training, and specialized firefighting equipment.

Funding Source:
MADEP, MEMA

Target Date: **2025**

Action 1.1

Develop a schedule for plan implementation

Lead: **Town of Gosnold Fire and Emergency Management**
Partners: MEMA

OBJECTIVE 2:

By 2030, Gosnold will be prepared to address acute damage and disruption to critical supply chain infrastructure (piers, docks, wharves, ferries, harbors).

Funding Source:
Town of Gosnold, MEMA

Target Date: **2030**

Action 2.1

Develop and implement an emergency plan

Lead: **Town of Gosnold Fire and Emergency Management**
Partners: MEMA

SUCCESS INDICATORS

Objective 1:

Protect Cuttyhunk From Wildfire

✓ Trainings, controlled burns

Objective 2:

Create an Emergency Management Plan

✓ Emergency plans and drills, post-event reviews





GOAL #4: ENERGY TRANSFORMATION

By **2030**, Gosnold will have maximized its ability to transform to renewable energy.

BACKGROUND FOR GOAL #4

The human-driven emissions of Greenhouse gases (GHGs) are the primary driver of climate change. While large, multi-national corporations continue to be the main sources of GHG emissions, the town of Gosnold can certainly do its part to minimize its impact.

A first step is to create a baseline measurement of the town's total GHG emissions. With this data, the town can then make more informed decisions to advance towards a goal of net zero emissions, so that any GHGs put out by our community are cancelled out or compensated for. Another key step toward energy transformation is becoming certified as a Green Community. Some of the initiatives underway in the Green Community process are zoning and permitting to support renewable energy projects, energy audits of town buildings, energy reduction plan for town operations, and adopting the stretch building code.

Cuttyhunk currently has a large solar array that was installed in 2017. This project currently meets all of the demands of the island in the winter, but during the increased demand in the summer, particularly from the marina, a supplemental generator has been required. Naushon has a history of innovation in energy transformation starting with replacing light bulbs and appliances with more energy efficient types in the 1990s and installing a solar photovoltaic system in 2012.

OBJECTIVE 1:

By 2023, Gosnold will be a Green Community and begin development and implementation of Green Community objectives and a plan to be a net zero community.

Funding Source:
Town of Gosnold, MADOER

Target Date: 2023

Action 1.1

By 2022, conduct an energy audit of Town buildings

Lead/Partners:
Town of Gosnold, Contractor

Action 1.2

By 2022, complete and submit the MA Green Community application.

Lead/Partners:
Town of Gosnold, MADOER

Action 1.3

By 2023, develop and implement Green Community objectives.

Lead/Partners:
Town of Gosnold, MADOER

Action 1.4

By 2024, Cuttyhunk will conduct an evaluation of its carbon footprint and develop a plan to become a net zero community

Lead/Partners: Town of Gosnold, MADOER, Graduate school intern



SUCCESS INDICATORS

Objective 1:

Gosnold and Green Energy



Green Community objectives,
Carbon footprint, Plan for net zero



GOAL #5: SOLID WASTE MANAGEMENT

By **2024**, Gosnold will reduce waste generation by developing and implementing a comprehensive solid waste management program including recycling and composting.

BACKGROUND FOR GOAL #5

The town of Gosnold has no local way to deal with the demands of its residents' solid waste and recycling, and currently employs barges to transport this waste to locations off-island, to much expense and environmental impact.

As the climate changes, this will only become more expensive and burdensome, so a culture shift is needed to encourage the town's residents and visitors to lessen their impact. One easy area to decrease consumption is with single-use plastic water bottles, an initiative we already have begun.

Further, a municipal and/or residential composting system would greatly reduce the town's solid waste stream as would a better system for managing construction waste.

Naushon has a decentralized system of trash compactors in each house and a central composting pile (on hold during COVID). Single stream recyclables are collected separately from the compacted trash. Both are transported by ferry to Woods Hole.



OBJECTIVE 1:

By 2023, Gosnold will develop and implement an educational campaign to discourage use of disposable water bottles.

Funding Source:

Private Donations
Gosnold Community Fund
Gosnold Harbor Committee

Target Date: **2023**

Action 1.1

CCAN has purchased and will distribute without charge reusable branded water bottles

Lead: **Town of Gosnold, CCAN**

Action 1.2

Plans for new public restrooms at the Fish Dock on Cuttyhunk will include reusable water bottle refilling stations.

Lead: **Town of Gosnold, CCAN**



OBJECTIVE 2:

By 2024, Cuttyhunk residents and visitors will be educated to “Bring Less, Use Less, Leave Less” and will incorporate this philosophy into their daily decisions concerning Cuttyhunk.

Funding Source:
CCAN

Target Date: 2024

Action 2.1

CCAN will encourage businesses and residents to sign a Cuttyhunk CCAN pledge to make individual efforts to reduce waste production and make business decisions more environmentally friendly. CCAN will incentivize businesses to switch to non-plastic and non-Styrofoam materials and will announce a Cuttyhunk Green Business of the Week.

Lead: CCAN, Cuttyhunk residents and businesses.





OBJECTIVE 3:

Develop a more cost effective and environmentally sensitive system for managing solid waste on Cuttyhunk that will encourage residents and businesses to reduce and pay for what they produce.

Funding Source:

Town of Gosnold, MACZM, USDA

Target Date: 2023

Action 3.1

Develop a new waste transfer station on Cuttyhunk with improved management systems, procedures, and fees to encourage reduction in solid waste generation including improved recycling and a swap table.

Lead: Town of Gosnold Solid Waste

SUCCESS INDICATORS

Objective 1:

Reduce Plastic Water Bottle Use



Observed decrease in bottle disposal.

Objective 2:

Encourage A Cultural Shift Around Solid Waste Impact



Informal survey of attitudes and observation of behaviors.

Objective 3:

Re-design and Re-imagine Solid Waste Removal System



A reduction in number of barge trips for solid waste transport to the mainland by 25% by 2024.



GOAL #6: ECONOMIC RESILIENCE

By **2040**, Gosnold's economy will have the necessary diversification, resilience, and sustainability needed to meet the challenges and opportunities resulting from climate change.

BACKGROUND FOR GOAL #6

As a town, Gosnold relies mainly on tourism during a season stretching from late Spring to early Fall. While increased temperatures may prolong the length of this warm weather, it will certainly also disrupt many facets of what makes the town so attractive to visitors.

Further, the many businesses on island can also do their part to help the town reduce its GHGs and other environmental impacts.



OBJECTIVE 1:

By 2025, businesses on Cuttyhunk Island will understand their vulnerabilities to climate change and the challenges and opportunities that will enable them to transition to more sustainable business models.

Funding Source:
CCAN

Target Date: 2025

Action 1.1

Meet with Cuttyhunk business owners to discuss vulnerabilities, challenges, and opportunities. Develop revised business models and emergency plans.

Lead/Partners: Select Board/business owners

SUCCESS INDICATORS**Objective 1:**

Educate business owners about the impact and their role in mitigating climate change



Informal survey of business owners, 2024,
Business emergency plans



APPENDIX #1

2022

Gosnold CAP Situational Analysis Slide Deck



Gosnold Thematic Working Group

CLIMATE RESILIENCE



MARTHAS VINEYARD
COMMISSION

Agenda

- Review Situational Analysis
 - Review Plan component definitions & MV Goals
 - Discuss Gosnold Priorities for long term Goal development
 - Next Steps & Closing
-



Climate Change Hazards & Projections



Increased Air Temperature

Increase (~2 –5°F by 2050, and ~3–9°F by 2100)

Hotter summers

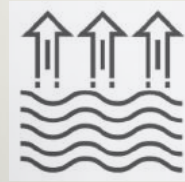
Warmer winters



Increase Sea Surface Temperature and Acidification

The Northeast is warming faster than the global average

Ocean pH is expected to become more acidic



Sea Level Rise

1970 – 2016 - risen ~ 6"

By 2030 – 6" to 1.6 ft

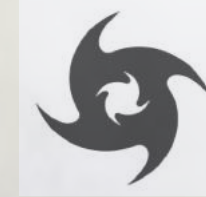
By 2050 - 1.3' to 3.1'

By 2100 will rise up to

~ 4 – 10'+

2020 expects no more than 3-7 sunny-day coastal flooding events

By 2050 expected to have 35–135 "per year



Extreme Storm Events

More intense and frequent storm events

North Atlantic hurricanes will produce more rain and may have higher wind speeds

Nor'easters may increase in both frequency and intensity



Changes in Precipitation

Projections for Martha's Vineyard show variability

Warmer, wetter winters

Hotter, dryer summers

Climate Change Impacts

- The main Entrance Channel is vulnerable to overwash in hurricanes and other storms.
- Barges Beach and Copicut Neck are vulnerable to damage in severe weather, and supply sand that blows or washes into the entrance channel.
- Church's Beach is vulnerable to storms.
- Waterfront facilities including docks, barge ramp and fuel and trash facilities are all vulnerable to sea level rise and to storms.
- The Ferry Dock and the Uncatena Dock are vulnerable to storms and to sea level rise.
- There are several bridges and a causeway. Of these, the middle one of three between Naushon and Nonamesset is a causeway that is regularly overwashed in storms and will be overwashed more frequently with higher sea level rise.
- On Cuttyhunk, the waterfront roads are vulnerable to sea level rise and to storms.



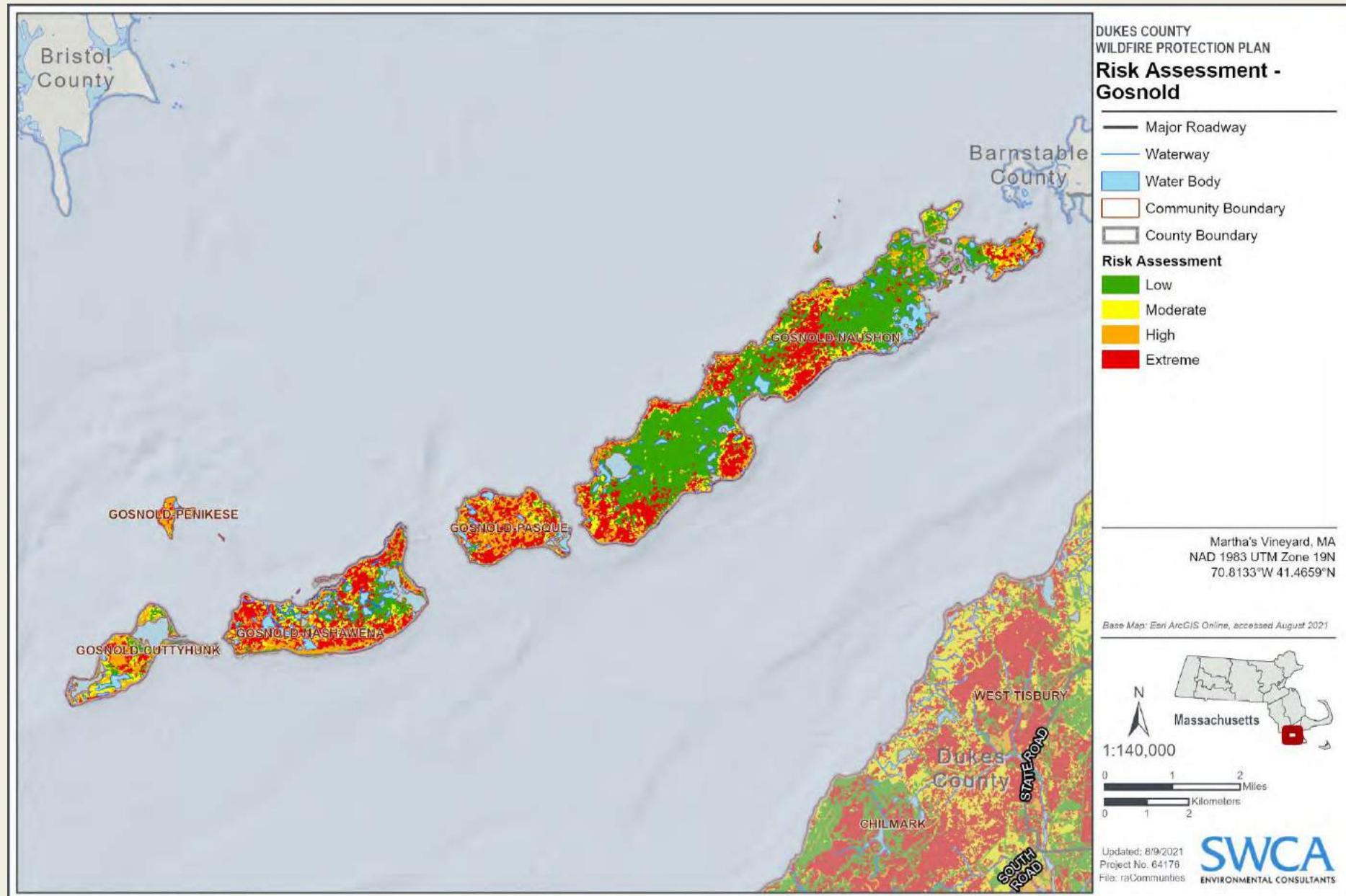
Climate Change Impacts Continued

- Cuttyhunk public water supply is vulnerable to contamination.
- The road to the Water Supply Control is vulnerable to rainstorm washout, as is Tower Road and the roadway adjacent to the infiltration pond.
- On Naushon, the critical access between Upper Wharf and downtown is vulnerable to rainstorm washout.
- Penikese School serves a vulnerable population, as does the Cuttyhunk School. As of 2018, Penikese School is closed, but is expected to reopen.
- A number of private homes are vulnerable to sea level rise and to storms.
- Cuttyhunk is vulnerable to wildfire.

Emergency Response & Preparedness?



Wildfire Risk Assessment Map (DCCWPP, 2021)



Primary Climate Change Impacts to Gosnold

Primary Categories of Concerns and Challenges

- **Disruption of Navigation and Water Transport** is the most serious concern. Sea level rise and storms threaten the entrance channel to Cuttyhunk and the waterfront infrastructure for both Cuttyhunk and Naushon. Public health and safety, and economic stability depend on access to the harbor and waterfront facilities.
- **Wildfire** is expected to increase in severity along with drought, as climate change brings about changing rainfall patterns.
- **Road washouts** are an increasing concern as climate change progresses. Climate change is seen now and in the future to modify rainfall so that more short-term periods of drought are punctuated by increasingly severe heavy rainstorms. As hurricanes increase in intensity, washouts from storm surge could disrupt the waterfront roads.



Existing Island Strengths & Opportunities (Cuttyhunk)

Gosnold:

- The small and close community is the main strength of Gosnold.
- NFIP – Gosnold participates in FEMA's National Flood Insurance Program. Floodplain by-laws have been adopted



Cuttyhunk:

- Maintenance dredging is performed by the USACOE (Army Corps of Engineers). Emergency dredging could also be provided, but not likely to be done in a timely manner.
- Waterfront facilities are critical for emergency response, for serving passengers and for freight. The Fish Dock was recently rebuilt. The Ferry Dock is new. The Fuel Dock was recently redecked.
- Town Hall is the site for emergency operations, a MassCare Center; houses a microwave, fridge and small hot water heater, the Church serves as a MassCare center, The school serves as a backup MassCare center; serves a vulnerable population in its day-to-day function.
- Wildfire Management Plan – Cuttyhunk has adopted and utilizes a wildfire management plan. Cuttyhunk is an NFPA Federal Firewise Community.

Existing Island Strengths & Opportunities (Cuttyhunk)

- A number of agreements are in place for response from larger communities. There are MOUs for Police with New Bedford and with all the Martha's Vineyard towns; for Fire and EMS with New Bedford and Oil spill equipment is kept on Cuttyhunk. Training is kept up.
- Cuttyhunk's electrical supply and distribution, Power House, and solar array are essential services that are secure.
- Cuttyhunk's airstrip is secure, however private, and essential for freight and emergency response, particularly if the harbor becomes impassable.
- Cuttyhunk's helipad is essential for emergency response.
- Cuttyhunk's public water supply is a critical service and not vulnerable as long as care is taken to keep from saltwater intrusion. Updated Dukes County Hazard Mitigation Plan, 2021
- Pond Water Quality 208 Equivalency Project – includes Cuttyhunk's West End Pond and Cuttyhunk Pond/Harbor – potential funding resource nitrogen reduction projects
- Comprehensive Wildfire Preparedness Plan – includes Cuttyhunk
- Gosnold is applying/has applied to become a Green Community



Existing Island Strengths & Opportunities (Naushon)



Naushon:

- The Ferry Dock was redecked about 15 years ago. Piling work was also done.
- Three bridges and a causeway are structurally sound.
- The barge ramp is in good condition.
- A number of agreements are in place for response from larger communities, most of them official Memoranda of Agreement (MOUs). There are MOUs for Police with New Bedford and with all the Martha's Vineyard towns; for Fire and EMS with New Bedford and Dartmouth; Naushon is on the Dukes County pager system. Naushon has in informal agreement for EMS services with Falmouth, and had access to a brush breaker that is no longer available.
- Naushon has landing sites for helicopter response, particularly important if the harbor is iced in.
- Oil spill equipment is kept on Naushon. Training is kept up.
- Naushon's generator and solar array are in good condition.

Highest Priority Actions



The highest priority for Cuttyhunk is to protect Cuttyhunk Entrance Channel and keep it open for navigation.

- The highest priority for protecting the Entrance Channel is to maintain Barges Beach by beach nourishment, dredging and reconfiguration.
- Next priority is elevation of the docks on Cuttyhunk (Fish Dock, Ferry Dock and Fuel Dock), and on Naushon (Ferry Dock and Uncatena Dock). Elevation should be included in future maintenance and repair projects.
- Wildfire management on Cuttyhunk is a high priority and ongoing. The Wildfire Management Plan includes firewise treatments, mowed firebreaks, prescribed burning, road clearance and/or widening. (See pg D31- D34)
- Protecting the public water supply on Cuttyhunk is a high priority. The sole source aquifer should be protected. A groundwater protection district bylaw is an important next step, and can be accomplished without outside funding.

Summary Topics to Address

TOWN OF GOSNOLD



Cuttyhunk Harbor Entrance on April 17, 2018
Navigation Encroached by Sand

COMMUNITY RESILIENCE BUILDING WORKSHOP
SUMMARY OF FINDINGS

JUNE 2018

Summary Prepared by Jo-Ann Taylor, Martha's Vineyard Commission



- What priorities do you want to accomplish from your MVP report in the next 10 years?
- Are there topics that would benefit from collaboration for MV (that should be considered together/collaboratively)
- Have things come up since the MVP that you want to address?



APPENDIX #2

2018

Massachusetts Municipal Vulnerability Preparedness Plan

TOWN OF GOSNOLD



Cuttyhunk Harbor Entrance on April 17, 2018
Navigation Encroached by Sand

COMMUNITY RESILIENCE BUILDING WORKSHOP SUMMARY OF FINDINGS

JUNE 2018

Summary Prepared by Jo-Ann Taylor, Martha's Vineyard Commission



**TOWN OF GOSNOLD
COMMUNITY RESILIENCE BUILDING WORKSHOP
SUMMARY OF FINDINGS**

Overview

The Town of Gosnold includes the entire Elizabeth Islands chain. The larger islands are: Nonamesset, Uncatena, Weepecket, Naushon, Pasque, Nashawena, Penikese and Cuttyhunk. According to the 2010 census, Gosnold had a year 'round population of 52 on an area of 13 square miles of dry land, with a density of 4 persons per square mile.

The Town participated in the Commonwealth of Massachusetts' Municipal Vulnerability Preparedness (MVP) program to promote resiliency. Gosnold has been and continues to be dedicated to community resiliency. Gosnold participated in hazard mitigation planning to produce a first and then an updated Hazard Mitigation Plan. The effective approved plan in 2018 is *Dukes County Multi-Jurisdiction Hazard Mitigation Plan Update, 2015*. Upon undertaking the MVP program, Emergency Manager Seth Garfield and Selectman Gail Blout conferred with MVC staff Jo-Ann Taylor (Coastal Planner) and Chris Seidel (GIS) to map out the workshop planning, starting with a telephone conference with future workshop participants, on March 6. Participants chose to build on the Hazard Mitigation Plan and include more emphasis on climate change, in keeping with the MVP program; to focus on the most populated islands of Cuttyhunk and Naushon; and to hold 2 workshops in April and a Listening Session in June. Workshops were conducted using Community Resilience Building (www.communityresiliencebuilding.com). The workshops' central objectives were:

- Define top local natural and climate-related hazards of concern;
- Identify existing and future strengths and vulnerabilities;
- Develop prioritized actions for the Community;
- Identify immediate opportunities to collaboratively advance actions to increase resilience.

The first workshop was held on Cuttyhunk, April 17; and the second on April 24 in Woods Hole. The Summary of Findings was presented to the public on June 11, 2018 on Cuttyhunk.

Top Hazards and Vulnerable Areas:

In discussing top hazards and vulnerable areas, the workshop reviewed material on the subject in *Dukes County Multi-Jurisdiction Hazard Mitigation Plan Update, 2015*, and new material from *Massachusetts Climate Change Projections, 2017*. There was quick consensus that the main concern is for keeping navigation and waterfront facilities functioning in spite of rising sea level and the threat of hurricanes. Wildfire and stormwater round out the list.

Top Hazards

- Sea Level Rise
- Hurricane
- Drought/Wildfire
- Rainstorms

Areas of Concern

- Settlement is centered on two islands; the westernmost island of Cuttyhunk, and Naushon, the largest island in the chain and the easternmost. Ferry service for passengers and freight (no cars) is provided year 'round between Cuttyhunk and New Bedford and in summer from Menemsha. Ferry service for passengers and freight between Naushon and nearby Woods Hole is provided year 'round. Protection and functionality of harbor facilities are essential for the well-being of the residents.
 - On Cuttyhunk, the main Entrance Channel is the most critical. It is vulnerable to overwash in hurricanes and other storms.
 - Barges Beach (1)¹ is vulnerable to damage in severe weather, and supplies sand that blows or overwashes into the entrance channel.
 - On the north side of the channel, Copicut Neck protects the channel from Nor'easter storms, but is itself vulnerable to those storms and provides sand to be blown and overwashed into the channel.
 - On the north side of the harbor, Church's Beach protects the harbor and is vulnerable to storms.
 - Waterfront facilities including docks (2, 3, and 6), barge ramp (3) and fuel and trash facilities (2, 4) are all vulnerable to sea level rise and to hurricanes.
 - On Naushon;
 - The Ferry Dock (5) and the Uncatena Dock (1) are vulnerable to storms and to sea level rise.
 - There are several bridges (2, 8, and 10) and a causeway (7). Of these, the middle one of three between Naushon and Nonamesset is a causeway that is regularly overwashed in storms and will be overwashed more frequently with higher sea level rise.
 - The barge ramp (7) is vulnerable to storms and sea level rise, and is surrounded by lowlands.
- Cuttyhunk is served by a public water supply, which is vulnerable to contamination.
- Cuttyhunk is vulnerable to wildfire, as identified in the Cuttyhunk Wildfire Management Plan.
- Vulnerable roads were identified and mapped. On Cuttyhunk, the waterfront roads are vulnerable to sea level rise and to storms. The road to the Water Supply Control is vulnerable to rainstorm washout, as is Tower Road and the roadway adjacent to the infiltration pond. On Naushon, the critical access between Upper Wharf and downtown is vulnerable to rainstorm washout.
- Penikese School serves a vulnerable population, as does the Cuttyhunk School. As of 2018, Penikese School is closed, but is expected to reopen.
- A number of private homes are vulnerable to sea level rise and to storms.



The New Bedford ferry navigating the narrowed Cuttyhunk channel on June 11, 2018

¹ Throughout the Summary, the location numbers refer to the numbers on the basemaps for Cuttyhunk and Naushon



Cuttyhunk ferry dock (left), fuel dock (center) and barge ramp (right)



fuel storage



fish dock



Barges Beach



Church's Beach

Current Concerns and Challenges Presented by Hazards

Consensus was achieved quickly on the primary concern of navigation and water transport being disrupted by climate-related increases in sea level and intensity of hurricanes. Wildfire and road washouts present challenges as articulated in *Dukes County Multi-Jurisdiction Hazard Mitigation Plan Update, 2015*, with concurrence in the 2017 workshops.

Specific Categories of Concerns and Challenges

- **Disruption of Navigation and Water Transport** is the most serious concern. Sea level rise and storms threaten the entrance channel to Cuttyhunk and the waterfront infrastructure for both Cuttyhunk and Naushon. Public health and safety, and economic stability depend on access to the harbor and waterfront facilities.

- **Wildfire** is expected to increase in severity along with drought, as climate change brings about changing rainfall patterns.
- **Road washouts** are an increasing concern as climate change progresses. Climate change is seen now and in the future to modify rainfall so that more short-term periods of drought are punctuated by increasingly severe heavy rainstorms. As hurricanes increase in intensity, washouts from storm surge could disrupt the waterfront roads.

Strengths and Assets for the Town of Gosnold

The small and close community is the main strength of Gosnold. Knowledgeable leadership and highly effective personnel and volunteers keep a step ahead of trouble. The response to climate change is no different.

- NFIP – Gosnold participates in FEMA’s National Flood Insurance Program. Floodplain by-laws have been adopted, ensuring subsidies in flood insurance for seven properties.

Cuttyhunk:

- The main Entrance Channel is the most critical asset for Cuttyhunk. Maintenance dredging is performed by the USACOE (Army Corps of Engineers). Emergency dredging could also be provided, but not likely to be done in a timely manner.
 - Barges Beach (1) protects the channel from bad weather from the south.
 - On the north side of the entrance, Copicut Neck protects the harbor from damage by Nor’easters.
 - On the north side of the harbor, the barrier beach known as Church’s (18) protects the harbor from Nor’easters.
- Waterfront facilities are critical for emergency response, for serving passengers and for freight.
 - The Fish Dock (6) was recently rebuilt. The Ferry Dock (3) is new. The Fuel Dock (2) was recently redecked.
 - The Barge Ramp (3) is critical for some supplies, particularly if the docks are damaged.
 - The waterfront transfer station (4), propane and gasoline tanks (4), and toilet facilities (7) are all water-dependent uses that function well.
- Town Hall (11) – This is the site for emergency operations, a MassCare Center; houses a microwave, fridge and small hot water heater.
- Church (19) – The privately-owned Church serves as a MassCare center.
- Cuttyhunk School (12) – The school serves as a backup MassCare center; serves a vulnerable population in its day-to-day function.
- Wildfire Management Plan – Cuttyhunk has adopted and utilizes a wildfire management plan. Cuttyhunk is an NFPA Federal Firewise Community. Ongoing firewise measures include mowed firebreaks, prescribed burning; road clearance and/or widening.
- A number of agreements are in place for response from larger communities, most of them official Memoranda of Agreement (MOUs). There are MOUs for Police with New Bedford and with all the Martha’s Vineyard towns; for Fire and EMS with New Bedford and Oil spill equipment is kept on Cuttyhunk. Training is kept up.
- Cuttyhunk’s electrical supply and distribution, Power House (10), and solar array (13) are essential services that are secure.

- Cuttyhunk's airstrip (14) is secure, however private, and essential for freight and emergency response, particularly if the harbor becomes impassable.
- Cuttyhunk's helipad (9) is essential for emergency response.
- Cuttyhunk's public water supply is a critical service and not vulnerable as long as care is taken to keep from saltwater intrusion.

Naushon:

- The Ferry Dock (5) was redecked about 15 years ago. Piling work was also done.
- Three bridges (2, 8, 10) and a causeway (9) are structurally sound.
- The barge ramp (7) is in good condition.
- A number of agreements are in place for response from larger communities, most of them official Memoranda of Agreement (MOUs). There are MOUs for Police with New Bedford and with all the Martha's Vineyard towns; for Fire and EMS with New Bedford and Dartmouth; Naushon is on the Dukes County pager system. Naushon has in informal agreement for EMS services with Falmouth, and had access to a brush breaker that is no longer available.
- Naushon has landing sites for helicopter response, particularly important if the harbor is iced in.
- Oil spill equipment is kept on Naushon. Training is kept up.
- Naushon's generator (4) and solar array (3) are in good condition.

Strategies to Improve Resilience in Gosnold

The workshops served to review and update the mitigation proposed in *Dukes County Multi-Jurisdiction Hazard Mitigation Plan Update*. The highest priority actions are to protect the harbor accesses and waterfront facilities. Wildfire remains a concern, and Firewise treatments remain prominent in mitigation, along with partnerships in response. Stormwater remains a concern and the use of the 25-year rainstorm in calculations remains prominent.

Highest Priority

- The highest priority for Cuttyhunk is to protect Cuttyhunk Entrance Channel and keep it open for navigation.
 - The highest priority for protecting the Entrance Channel is to maintain Barges Beach by beach nourishment, dredging and reconfiguration.
- Next priority is elevation of the docks on Cuttyhunk (Fish Dock (6), Ferry Dock (3) and Fuel Dock (2)) and on Naushon (Ferry Dock (5) and Uncatena Dock (1)). Elevation should be included in future maintenance and repair projects.
- Wildfire management on Cuttyhunk is a high priority and ongoing. The Wildfire Management Plan includes firewise treatments, mowed firebreaks, prescribed burning, road clearance and/or widening.
- Protecting the public water supply on Cuttyhunk is a high priority. The sole source aquifer should be protected. A groundwater protection district bylaw is an important next step, and can be accomplished without outside funding.

Moderate Priority

Cuttyhunk

- In order to protect the harbor's Entrance Channel, modify the east end of Barges Beach (Barges Beach East), outside of the limits of the designated barrier beach, by reconfiguration and or armoring.
- In order to protect the harbor's Entrance Channel, modify Copicut Neck jetty by elevation and/or extension of the jetty.
- In order to protect the harbor, enhance Church's Beach (18). Consider participation in a future pilot program to mine sand in the vicinity, for beach nourishment.
- The barge ramp (3) near the Ferry Dock is vulnerable to sea level rise, and plans should be made and executed for retreat.
- The transfer station (4) is properly sited at the waterfront, near transportation. In the event of a hurricane, the dumpsters are moved to higher ground. A mobile trailer or truck is needed for moving the dumpsters and contents out of harm's way
- A number of waterfront roads, providing access to waterfront facilities, have been identified as vulnerable to sea level rise and hurricane inundation. Because retreat is not an option, elevation is the obvious choice for keeping the access. For other roads, such as Cemetery Road, retreat should be evaluated as perhaps a better option than elevation.
- A number of homes are vulnerable to sea level rise and to hurricane storm surge. Gosnold participates in the NFIP (subsidized flood insurance through the National Flood Insurance Program), which program requires elevation for new construction and for homes damaged more than 50%. As sea level rises, the heights needed for resilient building will conflict more and more with the height restrictions of Gosnold's traditional New England zoning. Zoning must be reviewed with consideration given to elevating vulnerable structures, particularly the waterdependent facilities that can't be drawn back to higher ground.
- Rainwater washes through the powerhouse. As rainstorms continue to increase in severity, this situation will only deteriorate. An engineered solution is needed, one that uses the 25-year rainstorm in place of the 10-year rainstorm typically used to size facilities.
- A mobile generator of about 7500 W, and connections, should be provided to share between Town Hall and Cuttyhunk Church for emergencies.

Naushon

- Naushon has a number of helicopter landing sites for emergencies. One site should be designated, such as Mansion House Meadow, in order to avoid confusion.
- The barge ramp (7) is vulnerable to sea level rise and surrounded by lowlands. Retreat must be planned and executed.
- The causeway (9) needs to be elevated, in order to accommodate sea level rise. Overwash occurs there, and will increase.
- Naushon had an informal arrangement for a small brush breaker from Falmouth for emergencies. Falmouth no longer has the truck. A new arrangement should be discovered and secured.

Lower Priority

- As the jetty off Copicut Neck becomes more and more submerged by sea level rise and in hurricanes, there will be less and less protection for the Entrance Channel into Cuttyhunk Harbor. The jetty could be elevated, extended or reconfigured.
- There needs to be a plan for retreat for the propane tanks (4) at the Cuttyhunk waterfront, as sea level rises.
- The Bulkhead (17) protecting the Bog keeps saltwater intrusion out of the Cuttyhunk Water Supply. As sea level rises, the bulkhead will need a plan for retreat designed and executed.
- As sea level rises, Cuttyhunk's Helipad ((9) will need a plan for retreat designed and executed.
- On Cuttyhunk, roads vulnerable to heavy rainstorms were identified: Road to the Water Supply Control, Tower Road, and the corner of Broadway and Bayview Drive (at the infiltration pond). An engineered solution is needed, one that uses the 25-year rainstorm in place of the 10-year rainstorm typically used to size facilities.
- On Naushon, the road (6) from Upper Wharf (5) to Downtown, connecting with waterfront transportation and emergency response, is vulnerable to rainstorms and will further deteriorate as rainstorms become more severe. An engineered solution is needed, one that uses the 25-year rainstorm in place of the 10-year rainstorm typically used to size facilities.

Next Steps

- Several strategies are regulatory in nature and will be addressed through the same mechanisms as other bylaws. Strategies will be reviewed, public input engaged, hearings held, and votes taken.
 - A groundwater bylaw will be pursued. Samples of text from Martha's Vineyard towns will be the first review step.
 - Resolving the dichotomy between elevation for resilience and the traditional look of low buildings will mean undertaking discussion, ideally with visual samples; and will likely result in zoning amendments regarding height.
- Several strategies focus on communication. For example, the confusion over helicopter landing sites on Naushon will be resolved by naming one, such as the Mansion House Meadow, and informing all response parties.
- Several strategies require funding for design and construction. A number of avenues for funding will be explored. Because Gosnold's hazard mitigation plan, *Dukes County Multi-Jurisdiction Hazard Mitigation Plan Update 2015*, is up-to-date and approved; the Town is eligible for 75% funding for FEMA mitigation grants. The Town hopes to achieve MVP status and secure State funding thereby. Other potential sources include Seaport Council and other awards and earmarks.
- The work done by the Town through the MVP project is expected to be helpful in a number of other planning efforts:
 - The Town has an active Long Range Planning Committee that will be able to use the strategies and priorities for guidance. Should a Capital Program Committee be established, the same guidance should be very helpful.
 - The Town is developing an Open Space Plan, which may also use the MVP results in its development.
 - In 2018-9, *Dukes County Multi-Jurisdiction Hazard Mitigation Plan Update 2015* will be updated for submission in its 5-year approval cycle. The MVP project has provided most of what the Town needs for that submission.

Workshops Participants

- Gail Blout; Chairman of Board of Selectmen
- Seth Garfield; Emergency Management Director, Fire Chief
- Beth Colts; Naushon resident and Managing Trustee
- George Isabel; Police Chief, Harbormaster
- Wayne Perrier; Electric Company Supervisor, Assistant Fire Chief
- Asa Lombard IV; Solid Waste Manager, Shellfish Warden
- Russell Wright; Water Manager
- Jo-Ann Taylor and Chris Seidel; MVC staff

Presentation of Summary of Findings, June 11, 2018

Participants

Jo-Ann Taylor
Dan Doyle
Barry Stringfellow
Chris Seidel
Gail Blout
Sarah Berry
Dix Leeson
Seth Garfield
Tim Buckeridge
George Shaw
Dillon Storek
Jeff Spear



Acknowledgement Funding provided by Massachusetts Municipal Vulnerability Preparedness (MVP) Program

Attachments

- **Base maps for Cuttyhunk and Naushon, finalized from notes during the Workshops**
- **Charts of Strengths, Vulnerabilities, Major Hazards, and Prioritized Strategies to Enhance Resiliency (ID numbers for facilities correspond with the ID maps on the base maps)**
- **Vulnerability Maps from *Dukes County Multi-Jurisdiction Hazard Mitigation Plan Update 2015* and *Cuttyhunk Wildfire Management Plan***
- **Climate Change data presented from *Massachusetts Climate Change Projections 2017***

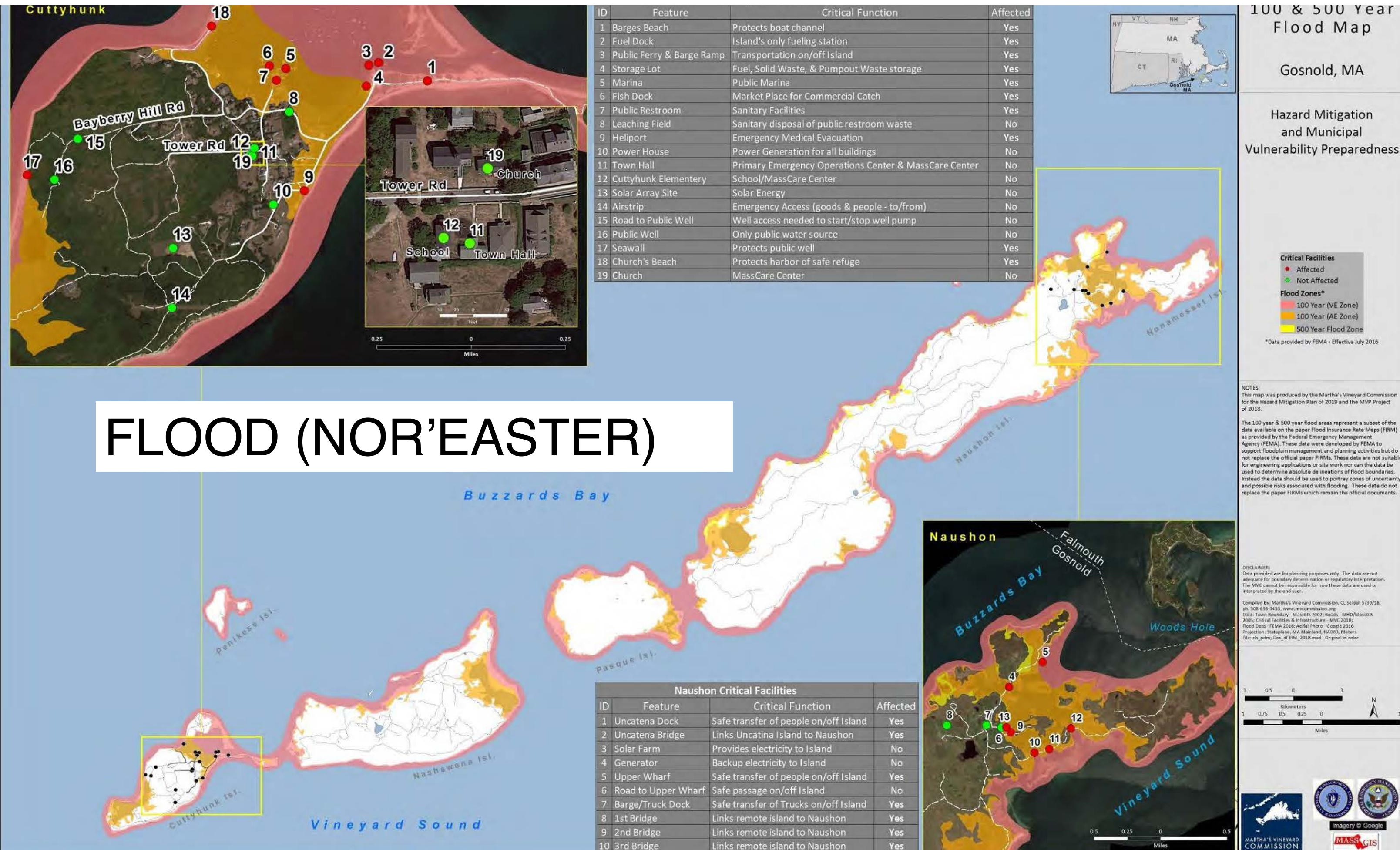
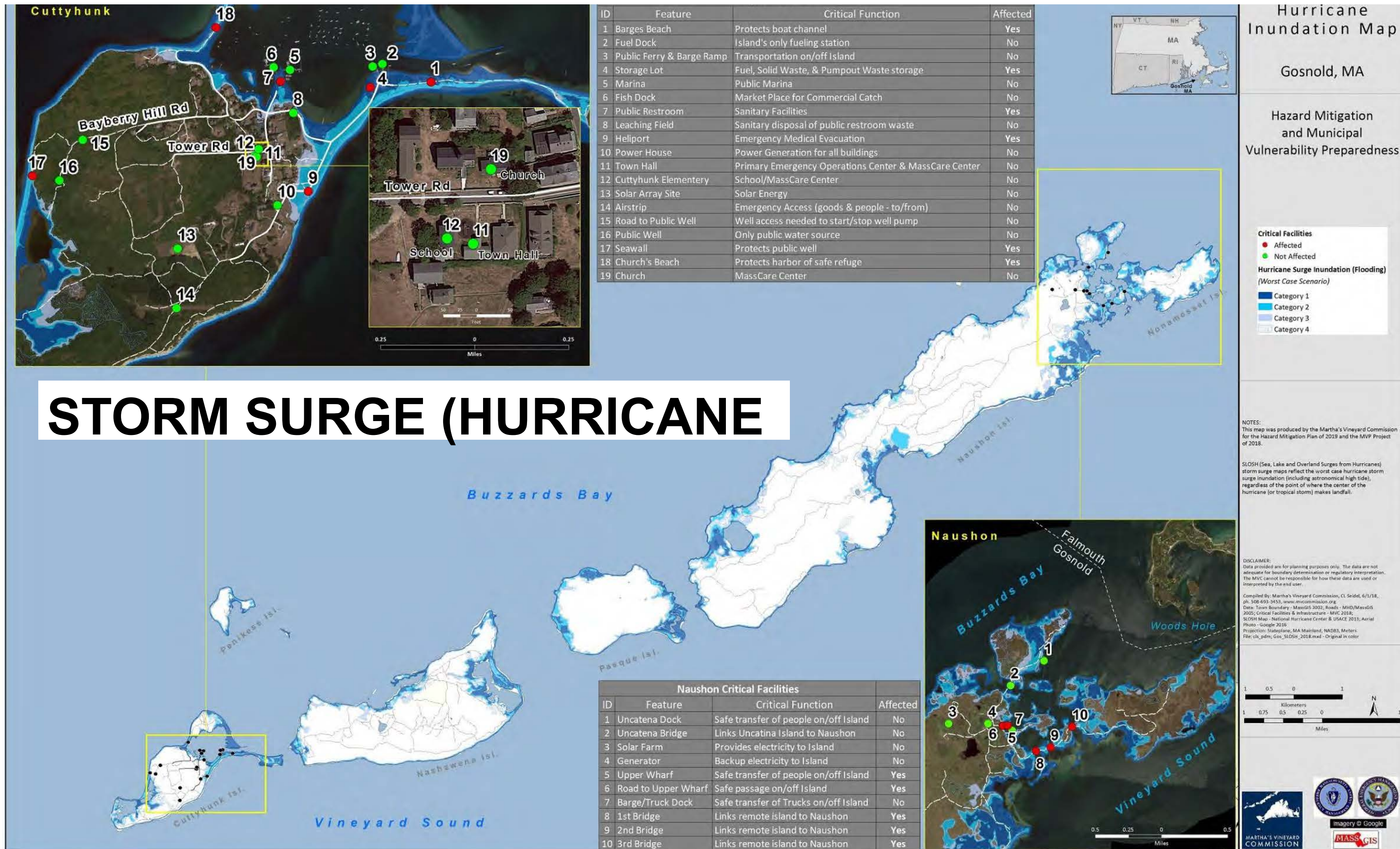
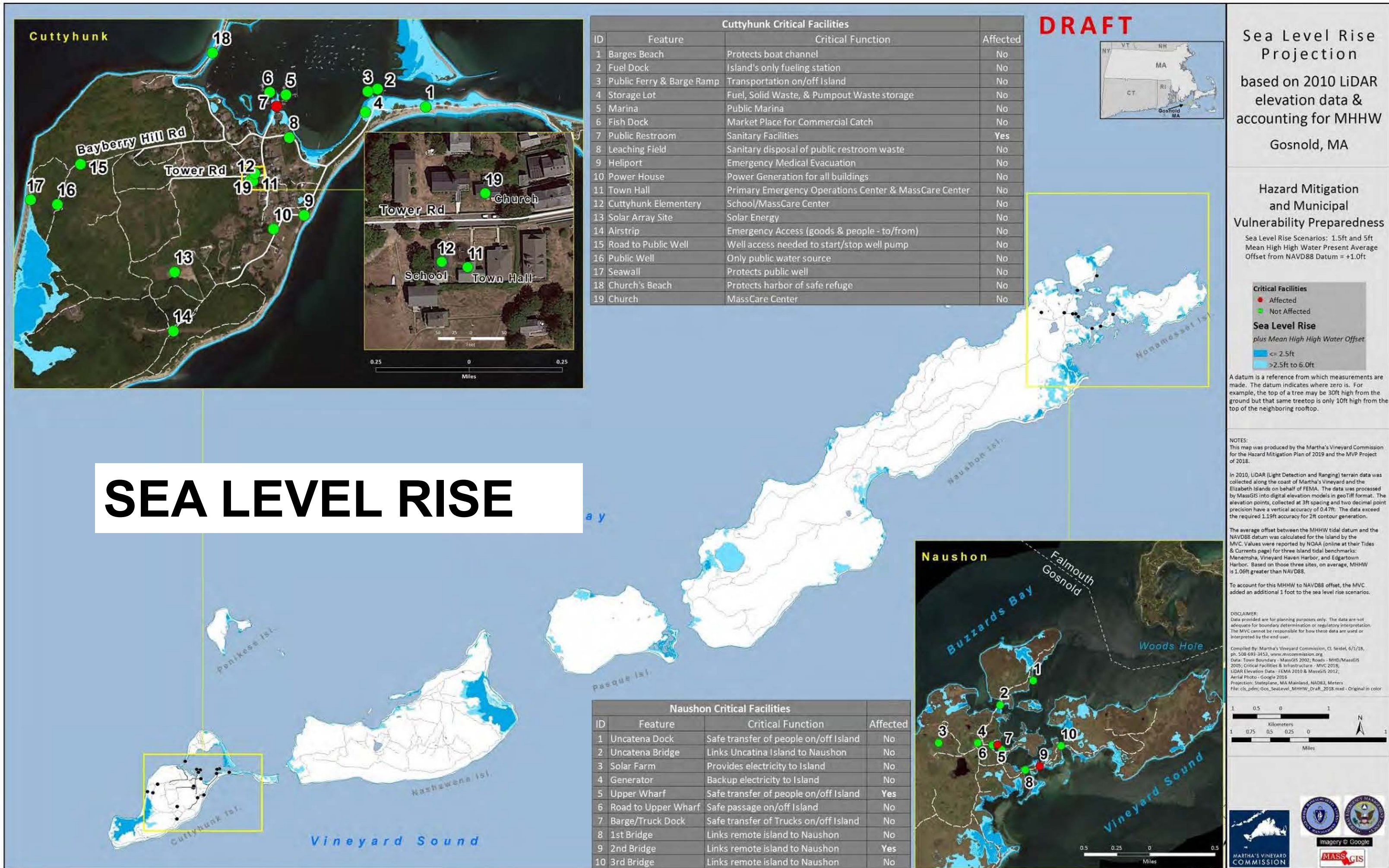


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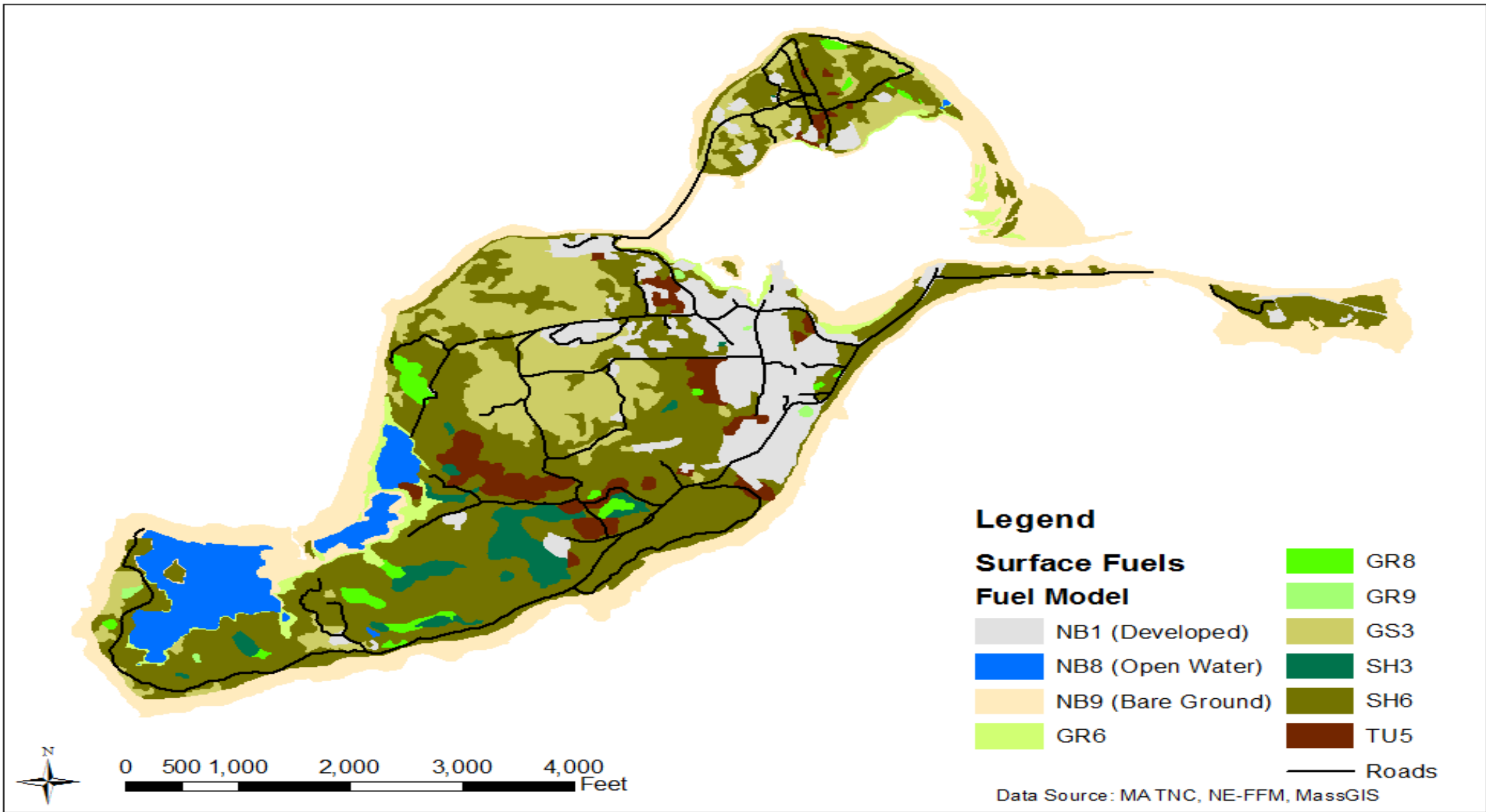
Community Resilience Building Risk Matrix				Town of Gosnold	www.CommunityResilienceBuilding.org				
				Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)					
H-M-L priority for action over the Short or Long term (and Ongoing)				Sea Level Rise	Hurricane	Drought/Wildfire	Rainstorms	Priority	Time
V = Vulnerability S = Strength								H - M - L	Short Long Ongoing
Features	Location	Ownership	V or S						
Societal									
Town Hall - emergency ops center, MassCare Center (critical) (microwave, fridge, small hot water heater; 120 V) (furnace 220 V)	11	Town	S		mobile generator and connections (~7500W)			M	S
Church - MassCare Center (critical)	19	Private	S		share mobile generator, install connections			M	S
Cuttyhunk School (critical- vulnerable population, backup MassCare Center)	12	Town	S,V						
Penikese School and Dock (critical- vulnerable population)		US Fish & Wildlife	V						
Wildfire Management Plan - An NFPA Federal Firewise Community			S			Firewise treatments, Mowed firebreak, Prescribed burning, Road clearance and/or widening		H	Ongoing
Participation in NFIP (7 subsidized policies)			S						
MOUs for Police with New Bedford, all MV PDs			S						
MOUs for Fire, EMS with New Bedford, Dartmouth			S						
Naushon - informal response by Falmouth EMS			S			Need a new arrangement for small brush truck (was Falmouth to Naushon)		M	S
Naushon on Dukes County pager system			S						
Naushon - Helicopter rescue (particularly if harbor is iced in)		Private	S		Need to designate a single site, such as Mansion House Meadow	Need to designate a single site, such as Mansion House Meadow		M	S

Community Resilience Building Risk Matrix				Town of Gosnold				www.CommunityResilienceBuilding.org			
H-M-L priority for action over the Short or Long term (and Ongoing)				Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)						Priority	Time
V = Vulnerability S = Strength				Sea Level Rise	Hurricane	Drought/Wildfire	Rainstorms	H - M - L	Short Long Ongoing		
Features	Location	Ownership	V or S								
Environmental											
Church's Beach (critical)	(18) Protects Harbor	Private with public access	S,V	beach nourishment, pilot sand mining				M	Ongoing		
Barges Beach (critical)	(1) Protects Harbor Entrance Channel, Overwash threatens Channel	Private with public access	S,V	beach nourishment, dredging, reconfiguration				H	S		
East Barges (critical)	Protects Harbor Entrance, Overwash threatens entrance	Private with public access	S,V	reconfiguration?	armor east of designated barrier beach			M	L		
Copicut Neck (critical)	Protects Harbor Entrance Channel, Overwash threatens Channel	Mass Audubon	S,V	Elevate/extend jetty?				L	L		
Oil Spill equipment on hand, training (critical); Cuttyhunk and Naushon		Town	S		Need to relocate boxes on Cuttyhunk			L	S		

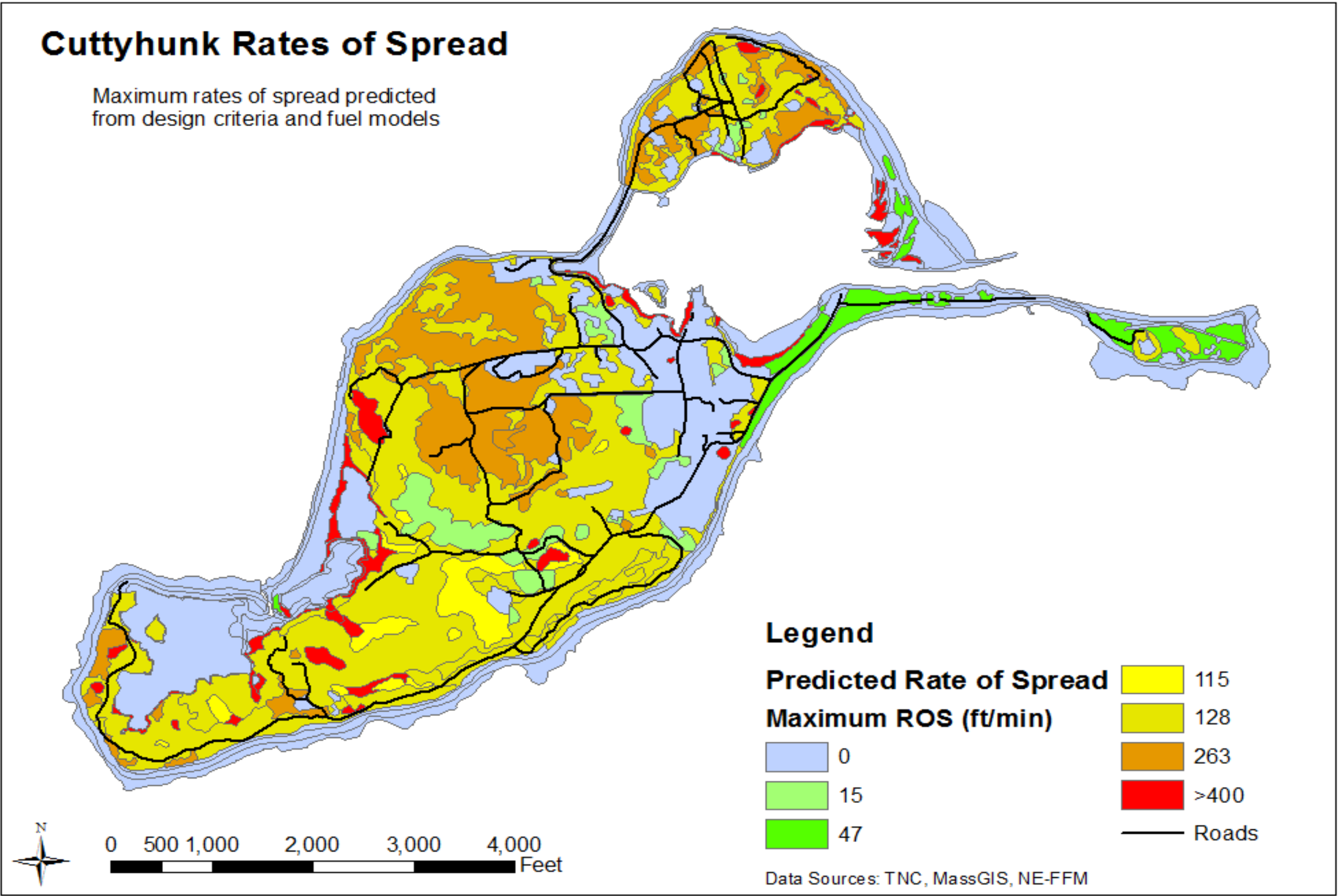
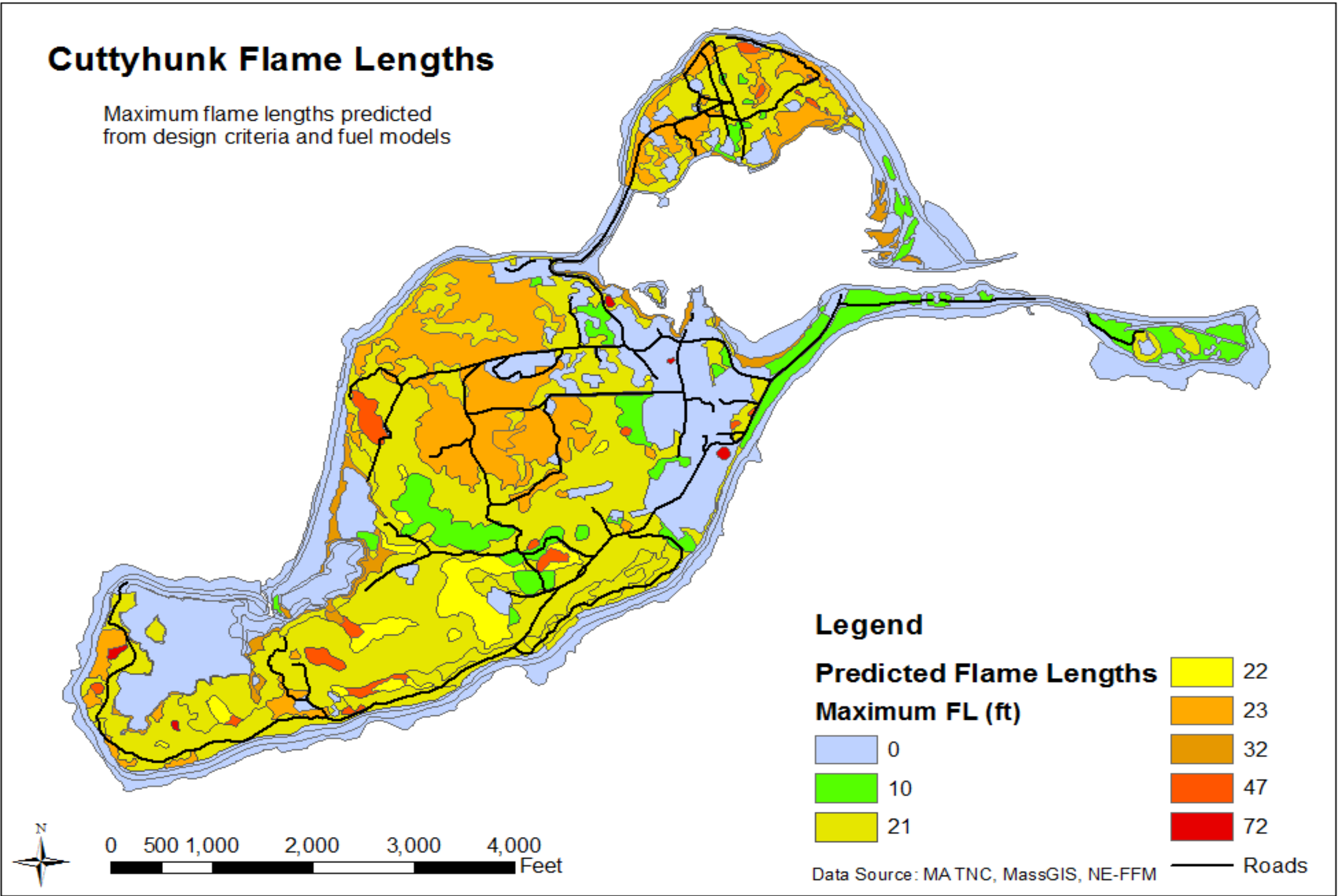
Flood, Storm and Sea Level Rise Vulnerabilities



Vulnerability to Wildfire



Fuel Model	TNC Classification	Location
GR6 – Moderate load grass	Salt Marsh	Westend Pond and Cuttyhunk Pond edges
GR8 – High load, very coarse grass	Shallow Marsh	Phragmites stands scattered across island
GR9 – Very high load grass	Deep Marsh	Phragmites stands scattered across island
GS3 – Moderate load grass-shrub	Sandplain/Panicum Grassland	Concentrated in the northwest end of the island
SH3 – Moderate load shrub	Shrub Swamps	Southern end of island around area of airstrip
SH6 – Low load shrub	Maritime/Coastal Shrubland	Majority of island
TU5 – Very high load timber-shrub	Successional Maritime Forest	Isolated stands of trees in center of island



Climate Impacts - Rainfall and Drought

Presentation on April 17, 2018 - Gosnold MVP

Martha’s Vineyard Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)			Mid-Century Projected Change in 2050s (Days)			Projected Change in 2070s (Days)			End of Century Projected Change in 2090s (Days)		
Days with Precipitation Over 1”	Annual	6.65	+0.31	to	+1.75	+0.55	to	+2.90	+0.50	to	+3.12	+0.78	to	+3.36
	Winter	1.22	-0.13	to	+0.55	-0.05	to	+0.62	-0.02	to	+0.99	-0.04	to	+1.18
	Spring	1.72	+0.22	to	+0.61	+0.12	to	+0.93	+0.34	to	+1.04	+0.36	to	+1.06
	Summer	1.82	-0.32	to	+0.58	-0.04	to	+0.76	-0.26	to	+0.68	-0.41	to	+0.68
	Fall	1.89	-0.26	to	+0.75	-0.14	to	+0.99	-0.17	to	+0.86	-0.19	to	+1.27
Days with Precipitation Over 2”	Annual	0.52	-0.01	to	+0.37	+0.03	to	+0.34	+0.05	to	+0.45	+0.07	to	+0.57
	Winter	0.08	-0.06	to	+0.13	-0.05	to	+0.14	-0.03	to	+0.14	-0.02	to	+0.24
	Spring	0.03	-0.01	to	+0.10	-0.01	to	+0.13	+0.00	to	+0.12	-0.01	to	+0.17
	Summer	0.25	-0.04	to	+0.09	-0.01	to	+0.12	-0.01	to	+0.11	-0.02	to	+0.17
	Fall	0.16	-0.03	to	+0.14	-0.02	to	+0.13	-0.01	to	+0.16	-0.03	to	+0.27
Days with Precipitation Over 4”	Annual	0.03	+0.00	to	+0.02	-0.03	to	+0.04	-0.03	to	+0.06	-0.03	to	+0.08
	Winter	0.00	+0.00	to	+0.00	+0.00	to	+0.00	+0.00	to	+0.00	+0.00	to	+0.00
	Spring	0.00	+0.00	to	+0.00	+0.00	to	+0.00	+0.00	to	+0.00	+0.00	to	+0.00
	Summer	0.00	+0.00	to	+0.02	+0.00	to	+0.03	+0.00	to	+0.02	+0.00	to	+0.03
	Fall	0.03	-0.03	to	+0.01	-0.03	to	+0.03	-0.03	to	+0.03	-0.03	to	+0.07

HEAVY RAINFALL

Martha’s Vineyard Basin		Observed Baseline 1971-2000 (Days)	Projected Change in 2030s (Days)			Mid-Century Projected Change in 2050s (Days)			Projected Change in 2070s (Days)			End of Century Projected Change in 2090s (Days)		
Consecutive Dry Days	Annual	17.68	-0.89	to	+1.72	-0.25	to	+2.39	+0.00	to	+3.05	-0.54	to	+3.87
	Winter	10.41	-0.50	to	+1.30	-0.36	to	+1.62	-0.47	to	+1.80	-0.62	to	+1.99
	Spring	10.26	-1.11	to	+0.95	-0.90	to	+1.13	-0.76	to	+0.85	-1.62	to	+1.16
	Summer	14.65	-0.87	to	+1.93	-0.59	to	+2.39	-0.63	to	+3.13	-0.47	to	+4.18
	Fall	13.1	-0.42	to	+2.05	+0.08	to	+2.40	-0.20	to	+3.32	-0.11	to	+3.29

DROUGHT



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**Goal #1:
Infrastructure**

Page 11-15

**Goal #4:
Energy Transformation**

Page 16-19

**Goal #2:
Natural Resources**

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**Goal #5:
Solid Waste Management**

Page 24-29

**Goal #3:
Emergency Management**

Page 30-32

**Goal #6:
Economic Resilience**

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Ellie Garfield Page 24, 25, Michael D Regan Back Cover



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Chris Larson Page 8; Nancy Wilder Page 9, 15, 26; Jon Winet Page 5, 6, 11, 13, 31, 33;