



10. NATURAL HAZARDS & CLIMATE CHANGE

New Shoreham 2016 Draft Comprehensive Plan

VISION

New Shoreham will reduce the risk to people and property from natural hazards and climate change. Increased awareness of the threats, hazards and vulnerabilities will assist the town and its residents in preparedness efforts, implementing mitigation actions and long-term planning.

NATURAL HAZARDS & CLIMATE CHANGE

Supporting Documents

BLOCK ISLAND HARBORS SEA LEVEL RISE ADAPTATION STUDY. TOWN OF NEW SHOREHAM, RI. AUGUST 1, 2013. (APPENDIX)

Town of New Shoreham Hazard Mitigation Plan, 2016 (Under RIEMA Review) (APPENDIX)

Overview

Due to its geographical location, Block Island is vulnerable to hurricanes, coastal storms, storm surge and severe winter weather. Increasing vulnerability is the island's dependence on privately owned ferry and airline companies for transportation access to and from the mainland. Residents and the Town must prepare for future coastal storms on the scale of a Super Storm Sandy or greater, which caused significant damage to roads, structures and marine facilities due to wave action, storm induced erosion and flooding. The Town and residents must also plan for the long term impacts that a projected rising sea level will have on the island's road network, two harbors and the mainland harbor in Galilee.

The Natural Hazards & Climate Change element identifies the most likely and significant natural hazards that could affect Block Island, assesses the island's vulnerabilities to these hazards, and establishes goals, policies and actions designed to mitigate the risks from natural hazards and sea level rise.

This section also includes a number of maps which illustrate the island's vulnerable areas to the impacts of storms and climate change. For example, Map NHC 1 displays the flood hazard areas on Block Island, along with conserved lands. The map identifies significant public structures located within the flood zones including the beach pavilion, harbormaster's shack, North Light and the Coastguard Station.

To minimize future losses, communities need a clear understanding of how they are vulnerable to natural hazards and of strategies for increasing their resilience. The prospect of natural disasters including hurricanes, Nor-easters or severe winter storms impacting Block Island and accelerating natural shoreline erosion must be factored into the Town's planning process.

Priority Natural Hazards Profiles and Potential Impacts

Block Island is most susceptible to coastal storms, hurricanes, severe winter weather and climate change. Storm surge from seasonal storms including hurricanes, Nor'easters and severe winter storms often results in coastal flooding and erosion. Impacts from high winds, heavy rains, ice, and lightning associated with a variety of seasonal storms also pose significant threats to Block Island.

Hurricanes

A hurricane is a tropical cyclone with rotating winds of at least 74 mph and is usually accompanied by rain, thunder and lightning. These seasonal storms are spawned by low-pressure depressions moving over warm, tropical waters and typically occur over the Atlantic Ocean between June and October. Strong winds and heavy rainfall from hurricanes can pose a threat to life and property. When coupled with normal tides, storm surge can raise the mean water level substantially and also greatly contribute to coastal erosion.

New Shoreham's island location makes it particularly susceptible to hurricane related hazards and the island's small size means that the majority of properties and public infrastructure are vulnerable to hurricane impacts to some degree.

NHC Map 2 Hurricane Inundation illustrates that an estimated 117 structures are located within areas inundated by water as a result of a Category 4 hurricane surge and a number of public facilities could be at risk of flooding including the power company and state highway garage.

Severe Winter Storms

Another regular natural hazard likely to occur at least annually on Block Island are severe winter storms. Block Island, similar to other coastal areas and islands, falls in the transitional precipitation zone increasing its vulnerability to ice and heavy snow conditions. Due in part to their large size, slow speed and little advance notice, Nor'easters and severe winter storms can at times be more destructive than hurricanes. Typically occurring between November and March, Nor'easters and severe winter weather can bring high winds, heavy prolonged precipitation and long periods of high surf. Blizzard conditions including sustained winds and ice could result in significant loss of power and damage to property. High winds associated with severe winter weather also have the potential to produce significant storm surge leading to the inundation of roadways and flooding of structures.

Storm Surge and Flooding

Storm surge is the abnormal rise in water level caused by the wind and pressure forces of a hurricane, Nor'easter or severe winter weather. Storm surge can result in coastal erosion and minor flooding of low-lying areas nearby the Harbor areas, as well as causing island roads to be blocked or breached by water.

Storm surge most often occurs in and around Block Island's two harbors and impacts the island's roadway system that connects Old Harbor and New Harbor and commercial establishments with the outlying residential areas. The island's critical public safety facilities are vulnerable to the impacts of flooding. The

police station, fire station and rescue barn are all located on the same site accessed by roads (Ocean and Beach Avenues) subject to flooding.

The narrow northern neck of the island, Corn Neck Road, is especially vulnerable to being cut off from the rest of the island. This road serves as an evacuation route and is the only connection many homes on the northern end of the island have to the rest of the island. Recurring damage has occurred to Corn Neck Road as a result of storm surge impacts. During Super Storm Sandy in 2012, Corn Neck Road was significantly damaged for a length of 1,800 feet, isolating one business, restricting access to a number of residences and requiring travelers along the remainder of Corn Neck Road to use an alternate route (Ocean and Beach Avenues).

Climate Change and Sea Level Rise

Climate change and sea level rise are not issues to be addressed in the distant future but something already present and recordable, requiring Block Island to take action now to mitigate potential impacts. The main issues surrounding climate change are rising global temperatures, and the resulting increase in weather extremes such as more frequent floods, droughts and rising sea levels. Climate change and sea level rise also has the potential for displacement of coastal populations and threatened infrastructure.

According to the Rhode Island Coastal Resources Management Council (CRMC), potential effects of a rise in sea level include:

- INCREASED EXTENT OF FLOOD DAMAGE AND GREATER VULNERABILITY TO STORM SURGES IN LOWER ELEVATIONS;
- GREATER RISK TO INFRASTRUCTURE—ROADS, SEWERS, STORMWATER FACILITIES, UTILITIES—IN AREAS MORE PRONE TO FLOODING;
- SALTWATER INTRUSION INTO AQUIFERS CONTAMINATING WATER SUPPLIES;
- HIGHER WATER TABLES RESULTING IN SUBSURFACE ISSUES SUCH AS WET BASEMENTS;
- HIGHER WATER TABLES POTENTIALLY AFFECTING LOW LYING ONSITE WASTEWATER TREATMENT SYSTEMS IN CLOSE PROXIMITY TO THE SHORELINE, ESPECIALLY WITHIN GREAT SALT POND
- A SIGNIFICANT INCREASE IN INCIDENCE OF EXTREME HIGH TIDE LEVELS;
- MORE COASTAL LANDS BECOMING SUSCEPTIBLE TO EROSION DUE TO INCREASED INTENSITY AND FREQUENCY OF STORMS;
- A NET LOSS OF COASTAL MARSHES THAT BECOME INUNDATED AT A GREATER RATE, RESULTING IN A LOSS OF SALT MARSH VEGETATION AND AN ALTERATION OF HABITAT TYPES.

Block Island is one of the most susceptible communities in the State to impacts from projected rises in sea level. Recent NOAA scenarios, which CRMC adopted in 2016 for planning purposes (CRMP Section 145), project 2 meters (6.6 feet) of sea level rise by 2100. One foot of sea level rise is expected by 2035. In 2013, the Town conducted a sea level rise adaptation study which identified potential strategies the town can implement to prepare for and mitigate potential impacts of sea level rise. Inundation mapping conducted as

part of the study shows land, docks, and roadways surrounding the Great Salt Pond as being either inundated by sea level rise or more susceptible to flooding during extreme storm conditions as a result of sea level rise.

As a result of sea level rise, both hurricanes and severe winter storms will be more damaging to property on Block Island, and coastal flooding effects will be felt farther inland. For instance, storm surge heights will increase as sea level rises, resulting in many more properties being damaged or destroyed during a storm. Residential and commercial structures, roads, and bridges will be more prone to flooding. See *Map NHC 3 Sea Level Rise* which identifies the segments of roadways that could be inundated in the future as a result of sea level rise. The GIS analysis indicates that portions of Corn Neck Road (5 sections), Ocean Avenue (5 sections) and Beach Avenue (2 sections) are projected to be inundated as a result of 3 to 5 feet of sea level rise.

Sea level rise will also have an impact on saltwater marshes. See Map NHC4 SLAMM (Sea Level Affecting Marshes Model) for a visual of the potential impact on saltwater marshes at the 1-foot, 3-feet, and 5-foot sea level rise scenarios. SLAMM maps are available statewide at http://www.crmc.ri.gov/maps/maps_slamm.html. For additional discussion see the Natural Resources Chapter.

Mitigation Activities

The Town is currently working on implementing a number of mitigation projects that will protect the island and its environment from the impacts of natural hazards and climate change.

Erosion Mitigation Project at Closed Landfill

Recent storms have eroded the beach and caused the closed landfill to be uncovered. This erosion has resulted in debris on the beach and entering the ocean. This issue, if not corrected, has the potential to cause significant negative impacts on surrounding natural resources. Design work has been completed to construct a revetment from the shoreline to minimize ongoing erosion. The Town has received a CDBG-DR grant that will cover a portion of the construction costs. Construction is expected to be completed in 2017.

Dune Protection

Dunes provide an important natural barrier to the destructive forces of wind and waves and are our first line of defense against coastal storms and beach erosion. They absorb the impact of storm surge and high waves, preventing or delaying flooding of inland areas and damage to island structures. As such, dune restoration efforts are an important priority to the Town. Grasses are planted by the Town and its partners regularly and signs have been installed to remind people to remain off the dunes. The Town is also exploring the use of snow fencing to capture sand and allow dunes to rebuild in a cost-effective and sustainable manner.

Corn Neck Road is used by many daytrippers to access the Town Beach by foot from Old Harbor. In an effort to protect this important dune system, the Town is investigating options to install walkovers and stairs for the public to access the island's most heavily visited beach without compromising the dune grasses and other vegetation which stabilize the dunes.

Goals, Policies & Implementation Actions

GOAL NHCI: Reduce current and future risk of natural hazards and sea level rise to the built and natural environment

<u>POLICY</u>	<u>ACTION</u>	<u>RESPONSIBLE PARTY</u>	<u>TIMEFRAME</u>
NHCI.A. Plan for effects of projected sea level rise and flooding in the site selection and planning of parks, buildings and other public investments and direct improvements / town investments away from at risk areas	NHCI.A.1. Complete an assessment of the potential impacts to public structures and infrastructure resulting from projected sea-level rise	GIS; Engineering	Medium-term
	NHCI.A.2. Include in the capital improvement program projects required to mitigate threats to infrastructure and properties	Planning Board; Town Manager; Town Council; Facilities Manager	Ongoing
	NHCI.A.3. Evaluate current zoning and land use regulations related to future impacts from climate change and sea level rise	Planning Board	Medium-term
	NHCI.A.4. Analyze alternatives for Corn Neck Road, including relocation or raising of roadbed, to mitigate impacts of natural hazards and sea level rise	Engineering; Highway Department; Planning Board; Town Manager; Town Council	Short-term
NHCI.B. Reduce the impact of flooding in vulnerable areas	NHCI.B.1. Work with the land trust and other stakeholder to identify and protect from development low-lying land vulnerable to impacts from flooding and sea level rise and areas adjacent to coastal wetlands susceptible to increased inundation due to sea level rise	Town Council; Town Manager; Land Trust; Planning Board; GIS; Conservation Commission	Ongoing
	NHCI.B.2. Install walkovers to protect dunes along Corn Neck Road from pedestrian impacts	Town Manager; Conservation Commission	Short-term
	NHCI.B.3. Implement green infrastructure stormwater management strategies to enhance infiltration and increase retention on town properties and road right-of-ways	Engineering, Building, Zoning, Land Use & Planning; Planning Board	Long-term

	NHC.I.B.4. Evaluate the potential impacts of sea-level rise on public sewer infrastructure and potential inundation of onsite wastewater treatment systems	Engineering; Planning; Sewer Department	Medium-term
	NHC.I.B.5. Investigate options to mitigate flooding along Beach and Ocean Avenues and its impacts on public safety buildings and services	Engineering; Building, Zoning, Land Use & Planning; Planning Board	Medium-term
NHCI.C. Maintain and implement a FEMA-approved Hazard Mitigation Plan	NHCI.C.1. Apply for funding to assist in implementing projects identified in the town's Hazard Mitigation Plan	Town Manager; Engineering; Building, Zoning, Land Use & Planning	Ongoing
	NHCI.C.2. Establish a committee responsible for reviewing progress on implementation of the Hazard Mitigation Plan and activities resulting in CRS credit and other mitigation projects related to potential impacts of sea level rise	Town Council	Medium-term
NHCI.D. Reduce the risk and/or length of power outages on the island	NHCI.D.1. Assess the feasibility of burying power lines particularly in scenic and high risk areas and when road construction is planned	Town Manager	Medium-term; Ongoing

GOAL NHC2: Minimize risk to the public due to natural hazards through municipal preparedness and response

<u>POLICY</u>	<u>ACTION</u>	<u>RESPONSIBLE PARTY</u>	<u>TIMEFRAME</u>
NHC2.A. Improve the community's awareness of threats through education and communication	NHC2.A.1. Establish a process to directly contact special populations such as those who are particularly vulnerable due to location, age or infirmity, to ensure their understanding of procedures prior to and following a storm event	Emergency Management; Public Safety; Medical Center; Information Technology; GIS	Short-term
	NHC2.A.2. Collaborate with agencies monitoring the impacts of climate change with efforts such as documenting high tide events, storm flooding impacts, bluff erosion and impacts on species	Emergency Management, Public Safety; Conservation Commission	Ongoing

<p>NHC2.B. Participate in the Community Rating System and achieve reduced flood insurance costs to local property owners</p>	<p>NHC2.B.1. Undertake actions that qualify the town for advanced FEMA CRS scoring</p>	<p>Building, Zoning, Land Use & Planning; Town Manager</p>	<p>Short-term; Medium-term; Long-term; Ongoing</p>
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Timeframes: Short-term (1-3 years); Medium-term (4-6 years); Long-term (7-10 years)