# Chapter 16
# Hazard Mitigation

**Elevated structure (L. Durfee)**

# Introduction

As defined by the Federal Emergency Management Agency (FEMA), "natural hazard mitigation planning is a process used by state, tribal, and local governments to engage stakeholders, identify hazards and vulnerabilities, develop a long-term strategy to reduce risk and future losses, and implement the plan, taking advantage of a wide range of resources."

A county-wide hazard mitigation plan was completed by the York County Emergency Management Agency in 2015. The 2015 plan is an update of the previous hazard mitigation plans for York County that were prepared in 2004 and 2010. Hazard mitigation plans are required to be prepared, updated, and submitted to the FEMA every five years to maintain eligibility for certain types of federal non-emergency disaster assistance. The following hazards are considered in the county-wide plan:

- Severe winter storm
- Flood, including dam failure, coastal erosion, landslide
- Severe summer storm, including tornado, hurricane, tropical storm
- Wildfire-urban interface and forest fire.

This master plan chapter is intended to serve as a supplement to the York County 2015 Hazard Mitigation Plan. Specific emphasis is placed on:

- Documenting coastal hazards
- Exploring the intersection between climate change and hazards
- Evaluating a human-made hazard: pandemics
- Reviewing objectives from the York County Hazard Mitigation Plan that are related to land use planning.

This chapter also includes a brief discussion of emergency management in Kennebunkport.

Preparing the hazard mitigation plan also helps the community:

- Increase education and awareness on natural hazards and community vulnerabilities
- Build partnerships with government, organizations, businesses and the public to reduce risk
- Identify long-term strategies for risk reduction with input from stakeholders and the public
- Identify cost-effective mitigation actions that focus resources on the greatest risks areas
- Integrate planning efforts and risk reduction with other community planning efforts
- Align risk reduction with other state, tribal or community objectives
- Communicate priorities to potential funders resources

(Source: FEMA)

# Critical Facilities and Evacuation Routes

Information from additional resources, including the Evacuation Route Signs & Emergency Shelters Report prepared in 2016 by Southern Maine Planning and Development Commission (SMPDC) and York Emergency Management Agency, is incorporated in this plan. Evacuation routes identified in this report are included in Figure 1.

The primary evacuation route in Kennebunkport is Route 9. Signage along the road identifies it as an evacuation route. As evident in Figure 1, there are no designated east-west evacuation routes. A study on hurricane evacuation found that the primary evacuation routes in York County (Route 1 and Interstate 95) may be vulnerable to high winds and flooding due to their proximity to the coast. Further, because they run parallel to the coast, their ability to move people away from vulnerable coastal locations may be limited.[1]

Fire stations, law enforcement facilities, schools, and government buildings identified in the State GIS database are also shown in Figure 1. Kennebunkport, Kennebunk, and Arundel have an agreement with RSU 21 in place to use the Kennebunk Middle School as an emergency shelter. The capacity of this shelter is 150 to 200 people.[2] Each town contributes minimal funds to pre-purchase and stage cots, blankets, and required toiletries. The Kennebunkport police station has a room that can function as an Emergency Operations Center.[3]

The Chief of Police serves as the Emergency Management Director. The Town has a Public Safety Committee that includes the Fire Chief, Public Works Superintendent/Wastewater Superintendent, Chief of Police/Emergency Management Director, and Kennebunkport Emergency Medical Services (KEMS)-Chief of Operations. Additional information about emergency response and mutual aid can be found in the Regional Coordination Chapter.

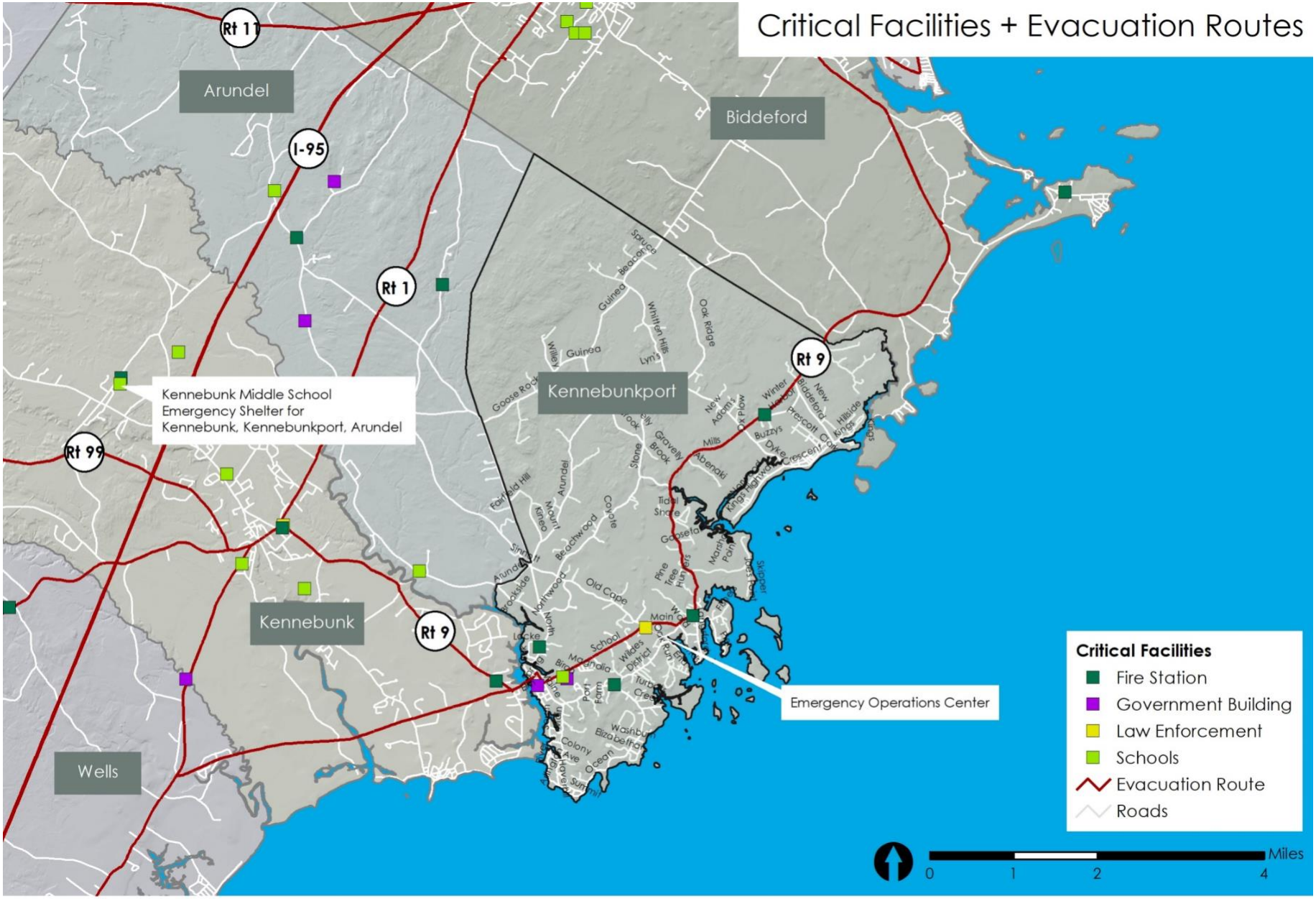


**Figure 16-1. Critical facilities and evacuation routes (Source: ME GIS, Maine Geological Survey, SMPDC)**

# Coastal Hazards

Kennebunkport is vulnerable to coastal hazards including flooding, erosion, storm surge, and sea level rise.

## COASTAL FLOODING

***COASTAL FLOODING*** IS THE TEMPORARY INUNDATION OF BEACHES AND OTHER LAND AREAS BY THE SEA, EITHER AS A RESULT OF COASTAL STORMS, HURRICANES, OR EROSION OR LANDSLIDES. (HAZARD MITIGATION PLAN)

## COASTAL EROSION

***COASTAL EROSION*** IS OR LOSS OF SHORELINE SEDIMENT. IT IS A COMPLEX PROCESS THAT CONTINUOUSLY RESHAPES THE SHORELINE AND CAN THREATEN COASTAL PROPERTY. WITH APPROXIMATELY 350,000 STRUCTURES LOCATED WITHIN 500 FEET OF THE NATION'S SHORELINE, EROSION IS A PROBLEM MANY U.S. COASTAL COMMUNITIES MUST ADDRESS. (NOAA)

## STORM SURGE

***STORM SURGE*** IS THE ABNORMAL RISE IN SEAWATER LEVEL DURING A STORM, MEASURED AS THE HEIGHT OF THE WATER ABOVE THE NORMAL PREDICTED ASTRONOMICAL TIDE. THE SURGE IS CAUSED PRIMARILY BY A STORM'S WINDS PUSHING WATER ONSHORE. (NOAA)

## SEA LEVEL RISE

***SEA LEVEL RISE*** IS THE GLOBAL RISING OF SEA LEVEL MOSTLY DUE TO A COMBINATION OF MELTWATER FROM GLACIERS AND ICE SHEETS AND THERMAL EXPANSION OF SEAWATER AS IT WARMS. (NOAA)

Locations along the coast and Kennebunk River are most vulnerable to coastal flooding. The Federal Emergency Management Agency (FEMA) flood maps identify areas that have a 1% annual chance of flooding (100-year floodplain). The VE FEMA Flood Zone includes coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. Properties within the VE zone have a 26% chance of flooding over the life of a 30-year mortgage.[4] There are approximately 360 parcels (200 acres of land) located within or partially within FEMA Flood Zone VE (preliminary 2017 FEMA flood map). Figure 16-2 shows the flood zones with 1% annual change of flooding (A, AE, VE) as well as the extent of the mean high tide in the vicinity of the Wildes District and Cape Porpoise. The Water Resources Chapter includes a town-wide map of the 100-year floodplain.

There are no coastal bluffs or landslide hazards associated with coastal bluffs in Kennebunkport, however, there are several dune erosion hazard areas. These areas are shown in Figure 16-3

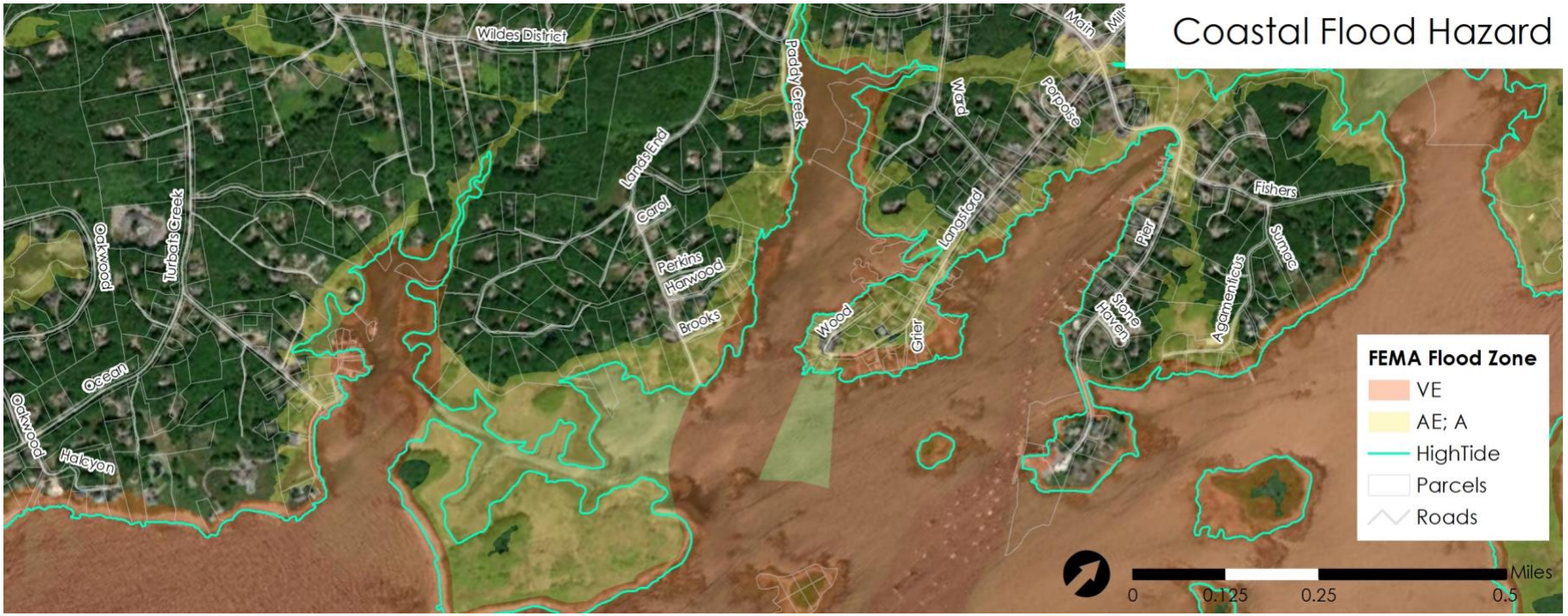


**Figure 16-2 Coastal flood hazard in the vicinity of the Wildes District and Cape Porpoise based on the preliminary 2017 FEMA flood maps (Source: FEMA, ME GIS, Town of Kennebunkport, ESRI basemap)**

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**Figure 16-3. Coastal erosion hazard areas (Source: Maine Geological Survey, ESRI basemap)**

The Maine Geological Survey has developed a geographic dataset with the approximate potential extent of inundations of six sea level rise and storm surge scenarios. These scenarios include a 1.2′, 1.6′, 3.9′, 6.1′, 8.8′, and 10.9′ of sea level rise and storm surge on top of the Highest Astronomical Tide, which is the maximum predicted tide. The scenarios represent low (1.2′) to extreme (10.9′) estimates of the extent of sea level by 2100 with a 50% confidence interval.[5] Figure 16-4 displays the extent of the 1.6′, 3.9′ and 8.8′ scenarios. The Maine Climate Council recommends committing to manage for 1.5′ of relative sea-level rise by 2050 and 3.9′ by 2100, as well as preparing to manage for 3′ of sea level rise by 2050 and 8.8′ by 2100 (Figure 16-5).[6]

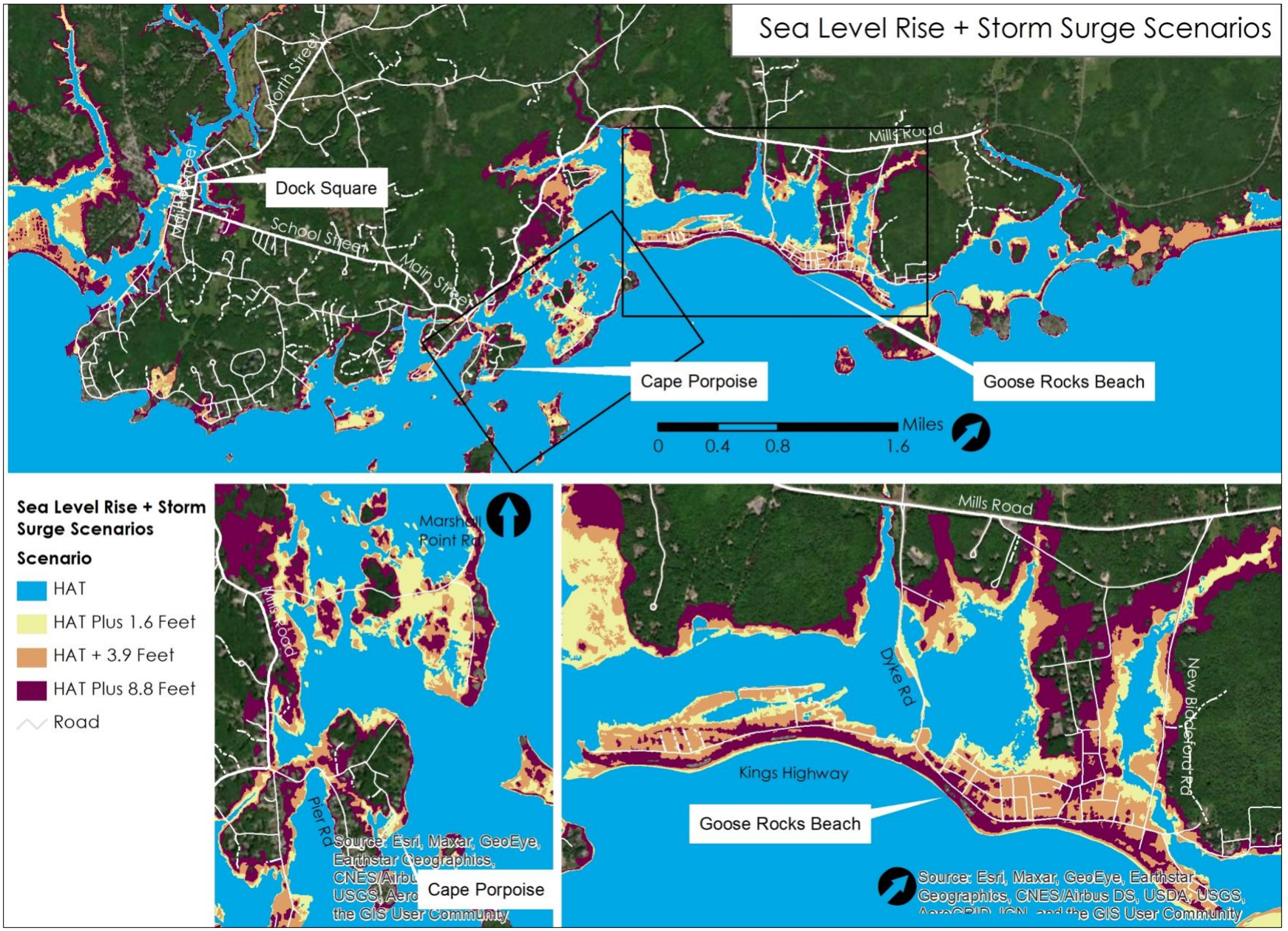


**Figure 16-4. Sea level rise and storm surge scenarios (Source: Maine Geological Survey, ESRI basemap)**

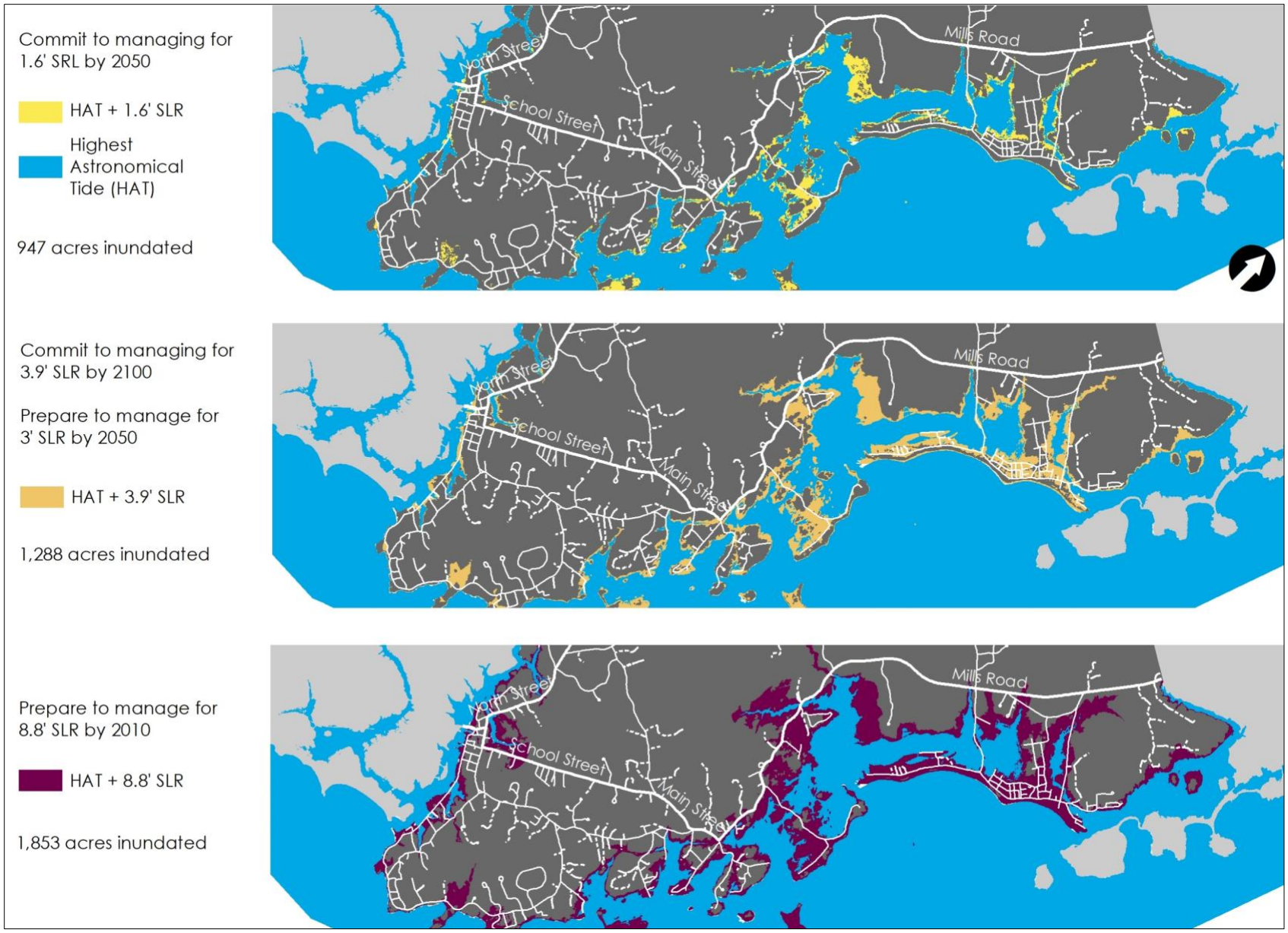


**Figure 16-4. Sea level rise and storm surge scenarios (Source: Maine Geological Survey)**

# Climate Change and Natural Hazards

Climate change exacerbates natural hazards. As noted in the York County Hazard Mitigation Plan:

> *With additional sea level rise, damage from 100-year storms (those storms with a 1 percent chance of occurring in any given year) may be expected to occur on a 10 year interval (a 10% probability in any given year). This is because less surge will be needed to cause damage as sea level increases. As a result, more homes, businesses, public infrastructure such as roads, and entire communities will be subject to more devastating coastal storms, as well as coastal erosion and landslides, on a more frequent basis.*[7]

Both the increase in temperature and heat events and the increase in severe winter weather pose a risk for public health. Residents will need access to cooling centers during extreme heat events, particularly when nighttime temperatures do not cool off. The Kennebunk Middle School can act as a cooling center if needed.[8] Additional locations within Kennebunkport should be identified.

Climate change may also increase the frequency of extreme weather events such as hurricanes or severe wind that cause power outages. Greater capacity at emergency shelters will likely be needed in the future.

# Pandemic

The COVID-19 pandemic that struck the U.S. in 2020 revealed the stark lack of planning for such an event at all levels of government. In Kennebunkport, the pandemic has highlighted the need for future planning and commitment for location that could serve in a multitude of situations (i.e. not only medical crises). If an emergency event such as a major storm event were to occur during a pandemic, capacity at shelters would need to be at least halved in order to comply with social distancing requirements. It has highlighted that communication from the state and county to the local levels is less than adequate. Maine and many states rely on local control, however COVID-19 testing and immunization have been controlled at the state and federal level. The result has not been a streamlined response.

While the scope of Hazard Mitigation Plans is often limited to natural hazards, these plans can include human-made disasters such as pandemics. Given the events that unfolded in 2020 and 2021, it is recommended that communities expand their hazard mitigation planning processes to include pandemics.

# Land Use Planning

The York County Hazard Mitigation Plan contains several objectives that are related to land use planning. These recommendations and a summary of the status of these objectives are summarized in Table 16-1.

**Table 16-1 Land use planning objectives in the Hazard Mitigation Plan and implementation status in Kennebunkport**

| Hazard Mitigation Plan Objectives | Status in Kennebunkport |
|---|---|
| Discourage future residential and commercial development in hazard prone areas | • Land within the flood way or coastal high hazard area on a flood boundary and flood way map or flood insurance rate map prepared by the US Department of Housing and Urban Development or its successor agency is not considered part of the net residential area of a lot or site that is suitable for development (Ch 240, Article 2.1) |
| Improve emergency evacuation routes and plans | • Some evacuation signs are posted.<br>• Route 9 is considered an evacuation route, however it is vulnerable to sea level rise and flooding.<br>• There are no established east-west routes. |
| Enact and enforce regulations that reduce the threat of hazard damage | The Town has adopted the following regulations:<br>• Floodplain Management Ordinance (Ch 219)<br>• Off-season storage of temporary floats, ramps, or walkways must be on upland areas. Ramps may be stored on piers or docks. All stored items must be properly and safely secured so as not to become a wind or wave borne hazard in a severe storm or hurricane (Ch 240, Article 5.11(B)(16))<br>• Construction (including all new construction, additions, and modifications to existing structures, including piers, docks, wharves, bridges, and causeways) in Flood Hazard Areas (within the 100-year floodplain) shall conform to the Town's Flood Plain Management Ordinance (Ch 240, Article 6.7)<br>• The Board of Appeals may not grant a variance when strict application of the provisions of the Ordinance would create a practical difficulty if the project is located within or partially within a flood hazard zone as defined by the LUO (Ch 240, Article 9.2(C)(f)<br>• Applicants for conditional uses must demonstrate to the Board of Appeals |

| Hazard Mitigation Plan Objectives | Status in Kennebunkport |
|---|---|
| | that the proposed use will not result in significant flood hazards or flood damage, drainage problems, ground or surface water contamination, or soil erosion (Ch 240, Article 9.2(H)(1)(f)<br>• A site plan may be denied if the design of the site will result in significant flood hazards or flood damage or is not in conformance with applicable flood hazard protection requirements (Ch 240, Article 10.10(A)(1)(h)<br>• Permit from the CEO is required for all construction or earth moving activities or other improvements within the 100-year floodplain designated on the FEMA Flood Insurance Rate Maps (Ch 240, Article 11.2(A) |
| Encourage owners of commercial properties and businesses to enact mitigation measures | To be discussed with the GPC and Town Planner |
| Enact strict mitigation standards for key public facilities | To be discussed with the GPC and Town Planner |
| Protect critical public facilities and services from hazard damage | To be discussed with the GPC and Town Planner |
| Use public funds to limit development of buildings and facilities in hazard-prone locations | To be discussed with the GPC and Town Planner |
| Preserve invaluable cultural and historic resources in hazard-prone areas | To be discussed with the GPC and Town Planner |
| Encourage property owners to undertake voluntary mitigation measures | To be discussed with the GPC and Town Planner |

The Town has recently collaborated with coastal communities to create a Regional Sustainability and Coastal Resilience Program Sustainability Coordinator, whose position includes conducting vulnerability assessments of businesses, coastal properties, and municipal infrastructure and developing methods to address these vulnerabilities. Additional information about this Southern Maine Regional Planning Commission staff position and work is included in the Regional Coordination Chapter.

**High water levels in Dock Square on Jan 20, 2021 (L. Durfee)**

The Georgetown Climate Center's Managed Retreat Toolkit includes several regulatory mechanisms to reduce future development and redevelopment in areas that are vulnerable to sea level rise. These include:

- Using overlay zones to impose additional regulations on an existing zone based on special characteristics in that zone, such as for natural, historical, or cultural resources protection.
- Using setbacks and buffers to prohibit property owners from building structures on or immediately adjacent to wetlands in order to protect wetlands and coastal dunes and facilitate coastal ecosystem migration.
- Requiring that owners remove or relocate vulnerable or damaged structures upon the happening or occurrence of a triggering event (such as a permanent movement of the tidal line demarcating public vs private lands) as a condition of a development permit.
- Encouraging the use of living shorelines or other "soft armoring" techniques like wetland restoration or dune creation to avoid the negative impacts of hard armoring structures, including increased flooding and erosion on surrounding properties and beaches.

[1] Evacuation report, and Post, Buckley, Schuh and Jernigan, Inc. 2007. Maine Hurricane Evacuation Study – Transportation Analysis.
[2] Craig Sanford, Chief of Police/Emergency Management Director, via email 2/19/21, 2/26/21.
[3] Ibid.
[4] Federal Emergency Management Agency. Definitions of FEMA Flood Zone Designations. Available at: https://snmapmod.snco.us/fmm/document/fema-flood-zone-definitions.pdf
[5] Maine Department of Agriculture, Conservation and Forestry. Maine Geological Survey. Sea Level Rise/Storm Surge. Available at: https://www.maine.gov/dacf/mgs/hazards/slr_ss/index.shtml
[6] Maine Climate Council. Maine Won't Wait. A four-year plan for climate action. 2020. https://www.maine.gov/future/sites/maine.gov.future/files/inline-files/MaineWontWait_December2020.pdf
[7] York County Emergency Management Agency. York County, Maine, Hazard Mitigation Plan. 2015.
[8] Craig Sanford, Chief of Police/Emergency Management Director, via email 2/19/21, 2/26/21.