3.4. RHODE ISLAND

3.4.1. NORTH KINGSTOWN, RI

Population Density	607.4/ sq. mi.
Form of Government	Town
Category	Bayfront Suburban
CRS Rating	9

Median Household Income	Median Per Capita Income	% Owner Occ	Population	2000-2010 Pop Growth Rate	% White	% Hispanic	% Minority	% Seasonal Housing
77478	35613	69.1	26486	0.06	94.7	2%	6.9%	3.3

Adaptations	Status	Incorporates CC	Type	Impact	Standard Costs		Funding Source
Assessment of Coastal Wetland Vulnerability	Completed	Yes	Procedural	Recommendation	Unique	Medium (<100,000)	NOAA Sea Grant
Climate Change Vulnerability Analysis	Completed	Yes	Procedural	Recommendation	Unique	NA	NA
Sea Level Rise Pilot Study and Plan	Completed	Yes	Procedural	Recommendation	Unique	Medium (<100,000)	NOAA Sea Grant

CONTACTS

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POPULATION AND GEOGRAPHY

North Kingstown is a coastal community located in Washington County, Rhode Island, boarding Narragansett Bay, 23 miles southeast of the state capital of Providence (USGS, 2008; NOAA, n.d.). The town is highly susceptible to flooding effects from hurricanes in the late summer months and nor'easters in the winter. Since 1900, Rhode Island has been impacted by 33 hurricanes (USACE, 1995). Narragansett Bay exacerbates storm surges due to a funneling effect

during coastal low pressure events, leaving adjacent towns like North Kingstown at increased risk (Freas et al., 2002). According to the state's hazard mitigation plan (State of RI, 2008),[2] just under 7,000 people with permanent residence and just over 300 people with seasonal occupancy live in the hurricane evacuation zone. Of the town's 45 square miles of land area, 9 square miles (or about 20%) are exposed to flood hazard, including about 850 homes and other structures in FEMA-designated flood hazard areas (Rhode Island, State Hazard Mitigation Plan 2008).

ADAPTATIONS

The Town of North Kingstown has implemented several ongoing low-cost adaptation efforts. The town is currently most active in assessing coastal vulnerability to sea level rise. Recent vulnerability assessment projects include: a sea level rise pilot study and plan, a coastal wetland vulnerability assessment, and a transportation network vulnerability study. The table below provides adaptation information, followed by brief project summaries.

Sea Level Rise Pilot Study and Plan

Following the state-wide flood mapping noted above, North Kingstown was selected as the site for a pilot study to identify critical assets vulnerable to sea level rise. The pilot study included the development of a map set that illustrates asset value at risk (North Kingstown, R.I. 2011). The study also identified opportunities to incorporate climate risks into the town hazards mitigation and comprehensive plans (North Kingstown, R.I. 2011). The pilot project cost less than $30,000, which is the total cost for the state-wide collection of LiDAR (Light Detection And Ranging) data and the North Kingstown pilot study. The working group included North Kingstown town staff in addition to those involved with the state-wide assessment (see above).

The University of Rhode Island's Coastal Resources Center recently was awarded the Statewide 2012 Planning Grant Challenge Grant to incorporate climate change components into North Kingstown's Town Comprehensive Plan, building on results from the NOAA pilot study (RI CCC, 2012). This project will include workshops to help other communities incorporate sea level rise into their comprehensive plans.

Assessment of Coastal Wetland Vulnerability

With LiDAR data and a sea level rise model in-hand, North Kingstown and collaborators from the sea level rise pilot study applied the Sea Level Affecting Marshes Model (SLAMM) to project migration of marshes in the town in response to various sea level rise scenarios (see Ruddock, 2011). Much of marsh habitats that line North Kingstown's coast have been lost to development and those that remain will be stressed by rising sea levels. If unimpeded, the marshes could migrate inland as seas rise. The SLAMM assessment helps decision-makers identify marsh areas most at risk, and locations where landward migration should be made possible. With good elevation data and a sea level rise flood extent model provided by the state-wide elevation project and the pilot study, developing the SLAMM model comprises the cost for the wetland vulnerability assessment.

[2] Based on 1990 U.S. Census data when the total permanent population for North Kingstown was 23,790 and seasonal population was 630.

Unique Considerations for Rhode Island

Rhode Island is in the unique position of being the smallest state in the union, which has implications for sea level rise and climate change planning.

Most importantly, the State passed an amendment to its comprehensive planning law in 2011 requiring all municipalities to consider natural hazards including flooding and sea level rise in their mandatory plans by 2016.

The best practices for North Kingstown involved pilot projects to do detailed sea level rise vulnerability assessments that were extensions of state-wide programs. Due to Rhode Island's small size, detailed analyses can often be scaled up and transferred to other locations or state-wide (see Pamela Rubinoff of NOAA Sea Grant citation in NOAA, 2009). With methods developed in North Kingstown, the state has plans to apply the pilot assessments state-wide (see RI CCC, 2012).

State-wide vulnerability assessments and a coastal wetlands migration study are underway, which draw from methods developed in North Kingstown pilot studies (RI CCC, 2012). Additionally, an erosion and inundation special area management plan (SAMP) is being implemented for all coastal areas in the state.

In RI, state level activities are significantly driving local adaptation, with local best practices largely taking the form of receptiveness and engagement with state adaptation efforts. Initiatives that are directly influencing North Kingstown's adaptation to coastal flooding hazards are outlined below:

- RI legislation enacted in 2011 (H 5380, S 0021) requires towns to map areas vulnerable to the effects of sea level rise and storm surge as well as other climate hazards. The legislation also requires towns to develop goals, policies, and adaptation techniques to reduce anticipated impacts.

- In 2010, the RI Climate Risk Reduction Act (RIGL 23-84) established the twenty-eight member RI Climate Change Commission. The Commission is charged with studying projected climate impacts, developing methods for adapting to expected impacts, and identifying mechanisms to mainstream adaptation into existing state and municipal programs such as infrastructure design and maintenance (see RI CCC, 2012). The Commission released its first report in November 2012 (RI CCC, 2012), which outlines key climate vulnerabilities, recommendations to begin adapting, and documents current adaptation initiatives taking place throughout the state.

- In 2008, the RI Coastal Resources Management Program (CRMP) adopted climate change policy to plan – Section 145 - for a 3 to 5 foot rise in sea level by 2100 in siting, design, and implementation of private and public coastal development projects (RI CRMP, 2008).

- A joint effort between the University of Rhode Island, RI Coastal Resources Management Council, Statewide Planning, The Nature Conservancy, and the RI

Emergency Management Agency mapped flood extents for 1', 3', and 5' sea level rise scenarios and the 1938 hurricane surge using a "bathtub" model for the entire state.

- The state's Department of Transportation was conducting a state-wide vulnerability assessment to identify vulnerable roads and bridges.

A recent and more comprehensive list of federal, state, and local adaptation initiatives in RI can be found in RI CCC (2012)

The cost-effectiveness of the North Kingstown pilot projects is in large part owed to how readily what is learned at the community level can be scaled up to a state-wide program. State-wide vulnerability assessments and a coastal wetlands migration study are underway, which draw from methods developed in North Kingstown pilot studies (RI CCC, 2012). Additionally, an erosion and inundation special area management plan (SAMP) is being implemented for all coastal areas in the state. Funds for the new SAMP are initially being provided by RI Bays, Rivers, and Waterways Coordination Team, NOAA, and the RI Coastal resources Management Council (RI CCC, 2012). The SAMP project budget is currently estimated at $497,112 (RI CRMC, 2012).