

Climate Adaptation for Coastal Communities



Engaging RI Local Governments in Mitigation and Resilience

March 14, 2015

RI Land and Water Conservation Summit, URI Kingston

Teresa A. Crean, AICP

University of Rhode Island Coastal Resources Center / RI Sea Grant

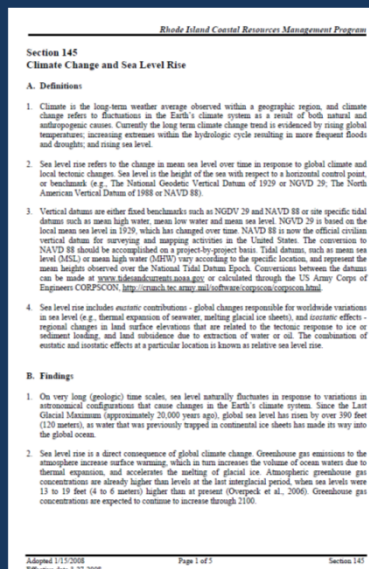
State Policies

RI Sea Level Rise Policy

- RI CRMC Red Book Section 145
- 3-5' by 2100

Comprehensive Plans

- Rhode Island 2012 Comprehensive Planning and Land Use Act update
- Requirement for plans to address Natural Hazards



PLANNING FOR NATURAL HAZARDS AND CLIMATE CHANGE

EMBODYING STATE GOALS AND POLICIES

To be consistent with the State's many goals for planning for natural hazards and to receive State approval, comprehensive plans must include **goals, policies and implementation actions** that address:

- Avoiding or minimizing the effects that natural hazards pose to lives, infrastructure and property.

Case Study: North Kingstown

- Adaptation to Natural Hazards and Climate Change in North Kingstown, RI
- Map Atlas
- SLAMM maps
- Data analysis
- Adaptation strategies
- Prioritization
- Comprehensive Plan, Goals & Objectives

10 Sept 2010

Photo: Teresa Crean

What is North Kingstown doing?

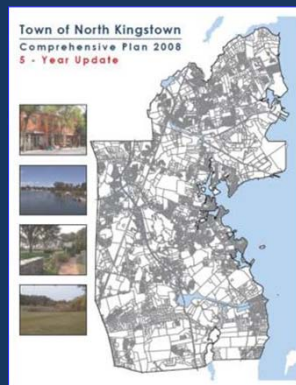
- **FEMA Community Rating System NK's Rating = 9**

- Currently **5% reduction** on flood insurance premiums town-wide
- NK taking steps to get down to an **"8" rating = 10% reduction!**



- **Hazard Mitigation Plan updated in 2013**, estimated adoption by end of year

- NK will incorporate natural hazards planning into **2014 rewrite of NK's Comprehensive Community Plan**



What can residents & businesses do?



- **Be informed.**

- Know your risk
- Know who to call & how to access resources

- **Make a plan.**

- Comp Plans & Hazard Mitigation Plans locally
- Elevate, relocate, or floodproof

- **Take action.**

- Evacuate areas at risk
- Get involved in Comprehensive Community Plan & Beach SAMP

- **Spread the word!**

Case Study: North Kingstown

1) STORMS:

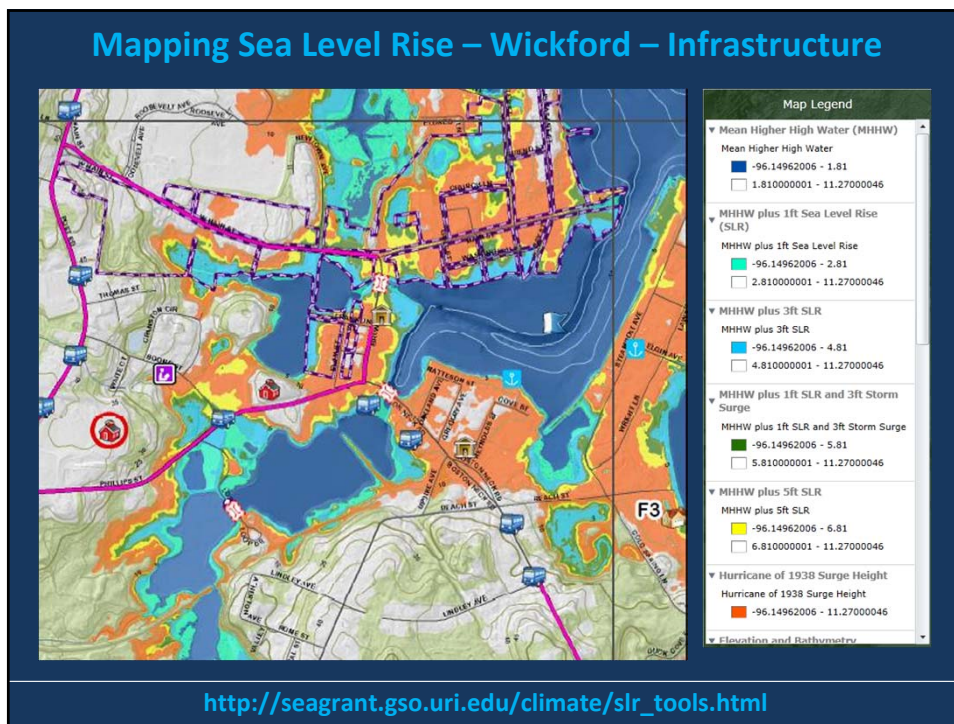
When the next storm hits Rhode Island this year and in years ahead, how far will the storm surge reach inland roads and properties, and how will the coastline erode and change as the waters surge and recede?

2) SEA LEVEL RISE:

Over the next 20, 50, and 100 years, how will incremental sea level rise change the coastline of town, and what roads and properties will be inundated by two high tides per day at levels higher than we are seeing today?

Historic Storm, 1938 Hurricane– Wickford





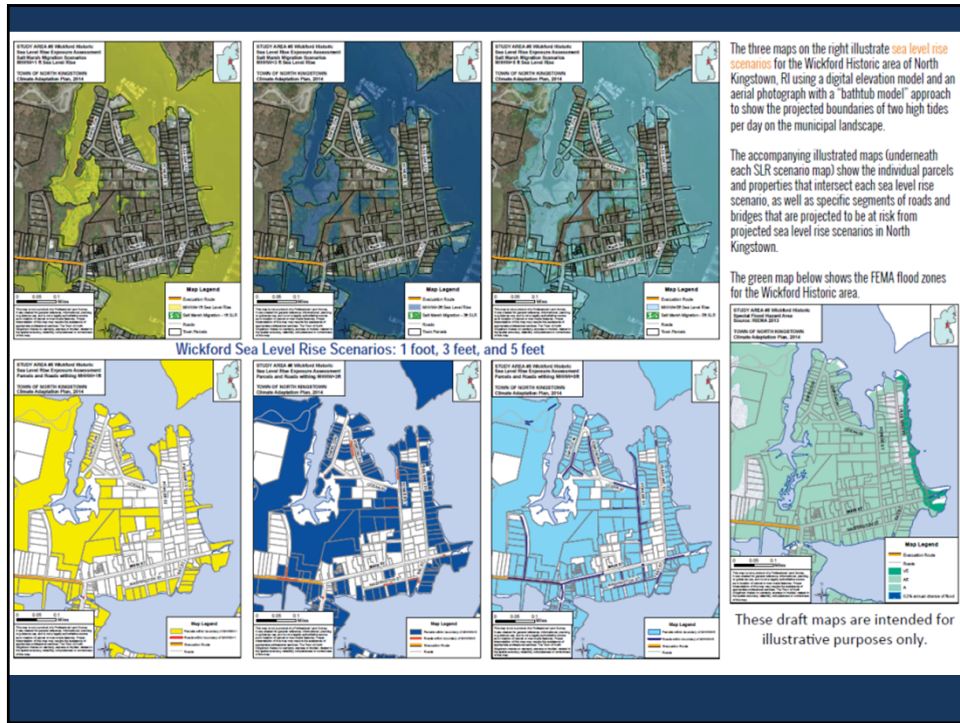
Local Applications

- Comprehensive Plan / Regulatory
- Hazard Mitigation
- Municipal Capital Improvement Plan
- State of RI Transportation Improvement Program (TIP)
- Building Code
- Open space acquisition
- Incorporate into town GIS and IMS
- Community Rating System (CRS)

Town of North Kingstown
Comprehensive Plan 2008
5 - Year Update

TIP

Emergency Management Cycle



MUNICIPAL ADAPTATION STRATEGIES BY SECTOR

1. Land Use
2. Transportation & Circulation
3. Building Stock
4. Municipal Properties & Facilities
5. Emergency Management Facilities
6. Wastewater
7. Stormwater Management
8. Drinking Water
9. Groundwater
10. Wetlands
11. Historic & Cultural Resources
12. Contaminated Sites
13. Open Space, Recreation, & Public Access
14. Vulnerable Populations
15. Greenhouse Gas Reduction (CO2 Mitigation)
16. Utilities and Other Infrastructure
17. Communications
18. Municipal Operations

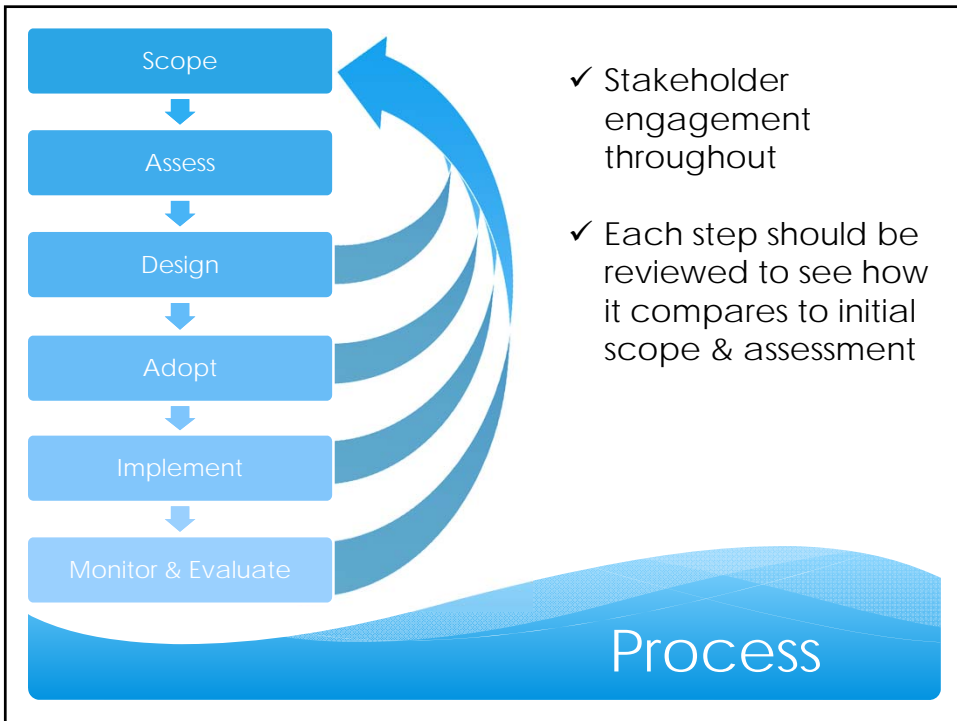
Wickford Village, MHHW+5 ft



Sea Level Rise, MHHW+5 ft



Sea Level Affecting Marshes Model, MHHW+5 ft



SCOPE

- Identify Goals
- Clarify Assessment Outcome
- Define Scale
- Data Needs and Sources
- Select a Planning Team
- Outline Public Process
- Capacity Building
- Prioritize Moving Forward



Photo credit: Melissa Devine, Rhode Island Sea Grant

SCOPE

| Natural Hazards | | Infrastructure, Assets, Resources and Populations | |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flood-Related | Riverine flooding Coastal flooding Flash, urban and stormwater-based flooding Storm surge Coastal erosion and shoreline change Sea Level Rise | Building and Infrastructure Residential neighborhoods & homes Commercial & Industrial areas & businesses Historic and cultural sites or structures Public or Emergency facilities Healthcare facilities, nursing homes & assisted living facilities Municipal buildings Major roads and evacuation routes Public Transportation routes, stops or hubs Rail lines and stations; Airports Water supply infrastructure Wastewater infrastructure Stormwater drainage Natural Gas, Electricity or Energy Production infrastructure Marine Facilities; Dams Solid waste transfer stations Telecommunication infrastructure | Natural Resources Parks and recreation facilities Lakes, rivers and other water bodies Reservoirs Wetlands (coastal and freshwater) Coastal barriers (dunes, marshes, coastal ponds) Wildlife and endangered species Forests; Undeveloped and/or conservation lands |
| Heat-Related | Drought; Wildfire; High Heat Days; Extreme Heat Waves | | |
| Wind-Related | Hurricanes; Tornadoes; Thunderstorms/Wind-Storms; Hail; Lightning | | |
| Winter-Related | Heavy Snow; Ice Storms; Blizzards; Extreme Cold | | |
| Earthquakes | | | |
| | | Special Populations Senior citizens Young children Low-income, unemployed or under-employed Renters | |

SCOPE

Flood Risk:



1% and 0.2% storm (also known as the 100 and 500 year storm event)

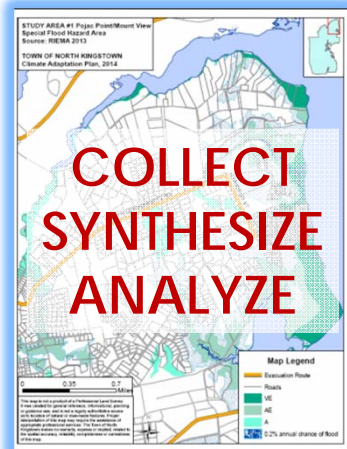


Special Flood Hazard Areas using the most recent Federal Emergency Management Agency's Flood Insurance Rate Maps



Projected areas inundated due to sea-level rise:
1 foot
3 feet
5 feet

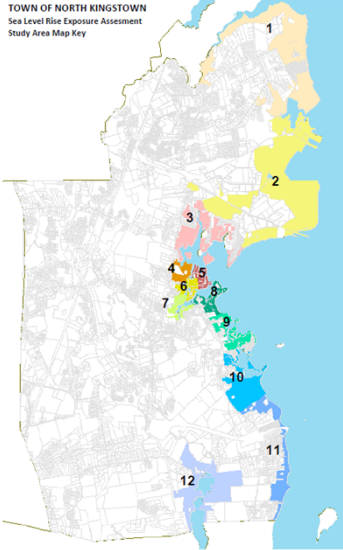
ASSESS



- Compile Data and Maps
- Identify Exposed Assets
- Determine the Vulnerability of Exposed Assets
- Identify Priority Impacts
- Compare Results to Other Planning Efforts
- Stakeholder Review

ASSESS

TOWN OF NORTH KINGSTOWN
Sea Level Rise Exposure Assessment
Study Area Map Key

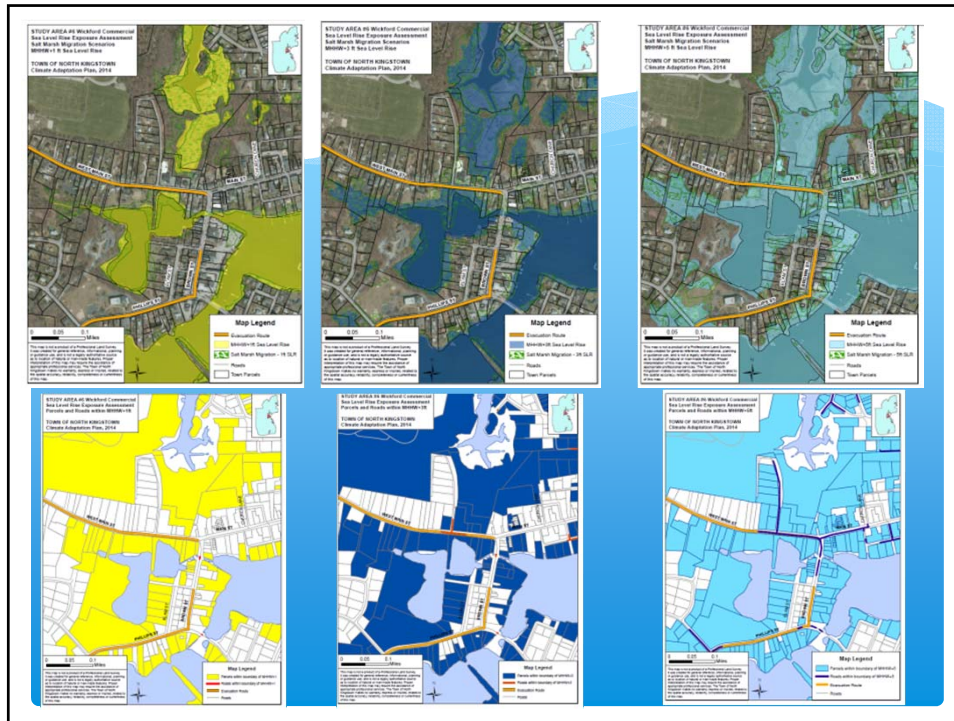


- Compile Data and Maps
- **Identify Exposed Assets**
- Determine the Vulnerability of Exposed Assets
- Compare Results to Other Planning Efforts
- Stakeholder Review

One potential process to identify vulnerable properties

- Creating a series of sea level rise maps for each study area
- Lighting up the parcels that are flooded under each scenario





DESIGN



- **Craft Adaptation Strategies**
 - Review Adaptation Options
 - Identify Opportunities to Mainstream Adaptation into Municipal Processes
 - Select Strategies and Actions
- **Prioritize Actions**
- **Integrate Adaptation into Planning Programs**
- **Stakeholder Review**

SAMPLE GOALS, POLICIES AND IMPLEMENTATION ACTIONS FOR NATURAL HAZARDS AND CLIMATE CHANGE

SAMPLE GOALS

- Our community will act in an integrated manner to implement a standard of resilience from natural hazards.
- Systems will be in place to minimize impacts from natural hazards in our vulnerable areas.

SAMPLE POLICIES

- Plan to accommodate a base rate of 3 to 5 foot rise in sea level by 2100 in the siting, design, and implementation of public and private coastal activities.
- Require municipal departments to incorporate climate change in all long-range planning and critical public infrastructure projects.
- Ensure that the local Hazard Mitigation Plan is up-to-date and utilizes the most recent available technical data for natural hazards and climate change.
- Ensure consistency between the Hazard Mitigation Plan, the Comprehensive Plan, SAMP plans, the city's land use regulations and the local Harbor Management Plan.
- Ensure that existing critical facilities are protected or otherwise improved to function in hazard and disaster situations.
- Ensure that new facilities are sited in areas that are not prone to flooding or other hazards.
- Improve the municipality's stormwater management system to enhance infiltration and expand stormwater retention areas.
- Ensure that there is adequate funding and administrative support to implement the recommendations in the local Hazard Mitigation Plan.
- Educate the public to better understand

the concept of community resilience and the meaning of probabilities and risk, especially for stream and coastal flooding.

- When making improvements to parks, playgrounds and other open spaces, include improvements so that these areas can function as stormwater retention areas.
- Encourage stormwater drainage improvements that reduce runoff and increase the permeability of the built environment.
- Expand the tree canopy in urbanized areas of the community to reduce heat impacts.
- Continue to improve community resilience in order to maintain the municipality's Community Rating System score.
- Encourage reduction of carbon emissions in the municipality through improved transportation efficiency, reduction of traffic congestion, encouragement of alternative transportation options (rail, bike, pedestrian infrastructure), and implementation of an anti-idling ordinance for trucks, buses, and other vehicles.
- Ensure that public facility improvements necessary for increasing resiliency have priority placement on the municipal Capital Improvement Program.

SAMPLE IMPLEMENTATION ACTIONS

- Define areas of the municipality that fall within these categories: **Protection Zones** that may be hardened to prevent or minimize floodwater intrusion; **Accommodation Zones** that are designed to be temporarily flooded with a high tide or storm event; **Retreat Zones** that have a master plan for managed retreat of structures and residents permanently out of the area and **Preservation Zones** that have an established management plan for natural or cultural resource preservation.
- Provide incentives for achieving a higher level of flood protection when designing and constructing municipal infrastructure.
- Update the local Hazard Mitigation Plan on a minimum of every 3 years and as needed after natural hazard events.
- Complete vulnerability assessments of all municipal infrastructure to determine priorities for adaptation.
- Complete an assessment to identify the vulnerability of all critical public facilities such as police and fire stations, hospitals and schools, and other services.
- Develop a priority list of facilities that need to be hardened or otherwise improved and seek funding for improvements.
- Determine an appropriate funding source for acquisition of properties in the municipality's most vulnerable areas.
- Revise local subdivision and land development regulations to require the incorporation of natural drainage systems, such as rain gardens and other small water management infrastructure, in private development.
- Design all new public buildings to include stormwater management best practices including the use of pervious materials, green roofs, and natural drainage systems.
- Undertake a study, working with the local land trust, to identify high priority water-adjacent land that could be designated as permanently protected open space.
- Review land uses in exposed areas to determine whether restrictions are necessary to prevent or lessen potential losses during large storm events.
- Develop design guidelines with examples of attractive design solutions for elevating existing buildings and for development of new elevated buildings.

DESIGN



- Craft Adaptation Strategies
- Prioritize Actions
- Integrate Adaptation into Planning Programs
- Stakeholder Review

DESIGN

IMPACT PRIORITIZATION TOOL - SAMPLE

Impact Statement: *"Bayfront Park" will be impacted by coastal erosion.*

| IMPACTS | IMPACT SEVERITY <small>(high, medium, low)</small> | ADAPTIVE CAPACITY <small>(high, medium, low)</small> | LEVEL OF NEED <small>(high, medium, low)</small> | ONSET | PRIORITY <small>(high, medium, low)</small> |
|-----------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------|------------------|------------------------------------------------|
| <i>Loss of bayfront walkway</i> | <i>Medium</i> | <i>High</i> | <i>Low Need</i> | <i>Near-term</i> | <i>Low</i> |
| <i>Loss of fishing area</i> | <i>Low</i> | <i>Low</i> | <i>Medium Need</i> | <i>Near-term</i> | <i>High</i> |
| <i>Interrupted use of only park in neighborhood</i> | <i>Medium</i> | <i>Low</i> | <i>High Need</i> | <i>Near-term</i> | <i>High</i> |

SEVERITY OF THE IMPACT

| | | | |
|--------|-------------|-------------|-------------|
| High | Medium Need | High Need | High Need |
| Medium | Low Need | Medium Need | High Need |
| Low | Low Need | Low Need | Medium Need |

ADAPTIVE CAPACITY

High Medium Low

ONSET OF THE IMPACT

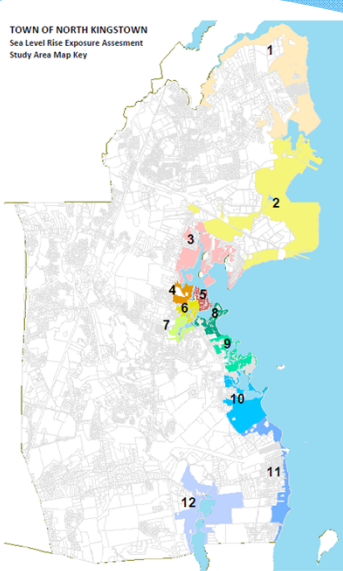
| | | | |
|-----------|--------------|-----------------|---------------|
| Near-term | Medium Need | High Priority | High Priority |
| Mid-term | Low Priority | Medium Priority | High Priority |
| Long-term | Low Priority | Low Priority | Medium Need |

LEVEL OF NEED

Low Medium High

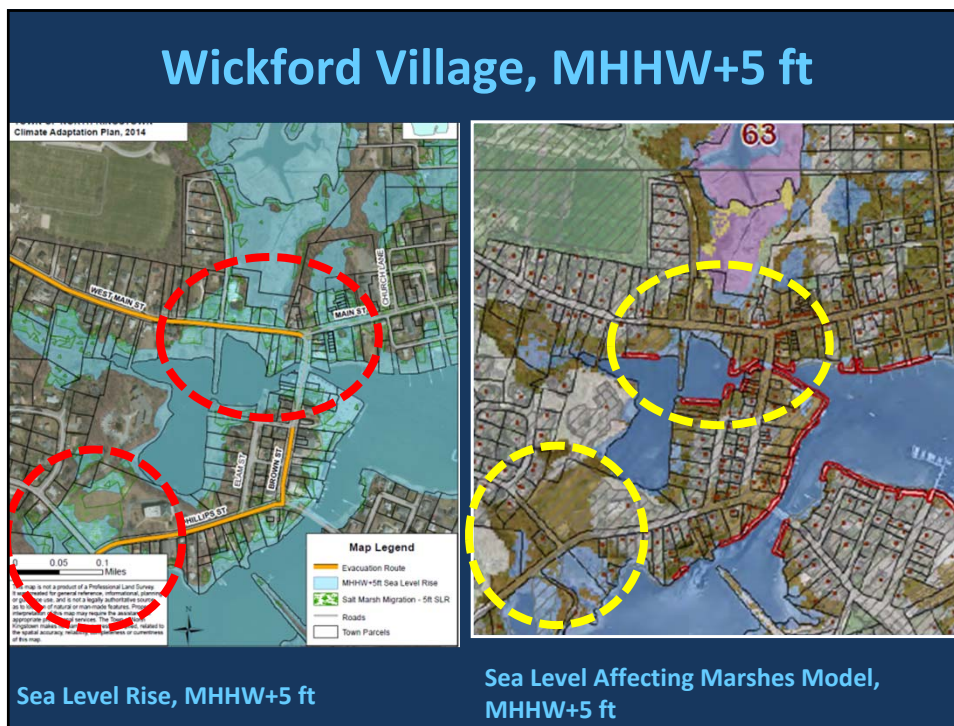
DESIGN

TOWN OF NORTH KINGSTOWN
Sea Level Rise Exposure Assessment
Study Area Map Key



NORTH KINGSTOWN Sea Level Rise Scenarios - Study Area Prioritization Worksheet

| STUDY AREA NUMBER | STUDY AREA NAME | Evacuation Route Impacted? | Barrier to Ingress/Egress? | Public Facilities Impacted? | State Roads Impacted by 1' SLR | State Roads Impacted by 5' SLR | Local Roads Impacted by 1' SLR > 60 ft/mi | Local Roads Impacted by 5' SLR > 60 ft/mi | Historic District Impacted? | TOTAL |
|-------------------|--------------------------------|----------------------------|----------------------------|-----------------------------|--------------------------------|--------------------------------|-------------------------------------------|-------------------------------------------|-----------------------------|-------|
| | POINT VALUE | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 11 |
| 6 | Wickford Commercial | 2 | 2 | 2 | 1 | 1 | 0 | 1 | 1 | 10 |
| 5 | Wickford Historic | 2 | 2 | 0 | 0 | 0 | 1 | 1 | 1 | 7 |
| 7 | Phillips / Loop | 2 | 2 | 0 | 1 | 1 | 0 | 1 | 0 | 7 |
| 9 | Duck Cove / Earle Drive | 0 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 4 |
| 8 | Poplar Point | 0 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 4 |
| 10 | Hamilton / Bissell Cove | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 1 | Pijac Point / Mount View | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 2 | Quonset / Davisville | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 3 | Mill Cove / Shore Acres | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | Intrepid Drive | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | Plum Point / Plum Beach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | Gilbert Stuart / Walmsley Lane | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |



DESIGN

INTEGRATE ADAPTAION INTO PLANNING PROGRAMS

- Plan Implementation Timeline and Identify Responsible Party
- Day to day, and long term
- Share with Stakeholders

Maintenance Schedule

Infrastructure Design Life

ADOPT

Local Adoption of Vulnerability Assessments & Adaptation Measures:

- Formal Adoption Options
- Guidance
- Incorporation into Standard Operating Procedures




Photo credit: Save the Bay




Photo credit: Pam Rubinoff, RISG




Photo credit: Pam Rubinoff, RISG

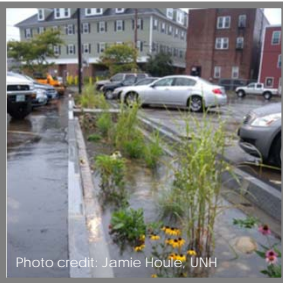



Photo credit: Jamie Houle, UNH

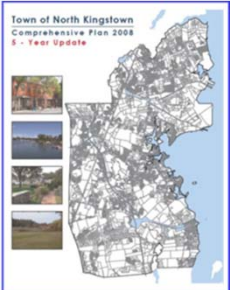
IMPLEMENT


Implementing Adaptation Measures:

- Adaptation Funding
- Governance
- Leadership
- Local Capacity Building
- Modify Municipal Operations, Departmental Duties & Processes



Emergency Management Cycle

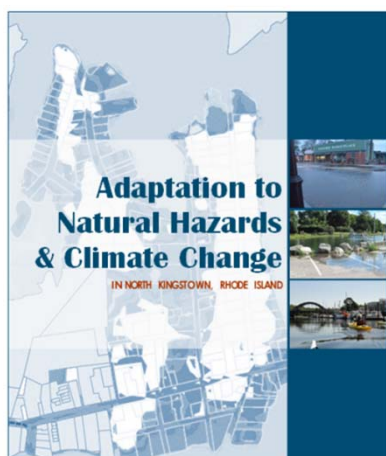




MONITOR & EVALUATE

- Mainstream Into Annual/Regular Updates
 - *Annual CIP or Biannual TIP, Hazard mitigation priorities*
 - *5 year Comprehensive Plan Implementation Report*
 - *Hazard Mitigation Review*
 - *NFIP Community Rating System (CRS) Audit*
- Capture Lessons Learned
- Compare to State Policy
- Create database of impacts & losses

Resources



<http://rhody.crc.uri.edu/accnk/>

Contact:
Teresa Crean
Tcrean@crc.uri.edu
401-874-6626

U.S. Department of Transportation
Federal Highway Administration

RHODE ISLAND
STATEWIDE
PLANNING
PROGRAM

Sea Grant
Rhode Island

COASTAL
RESOURCES
CENTER

THE
UNIVERSITY
OF RHODE ISLAND
GRADUATE SCHOOL
OF OCEANOGRAPHY

RIGIS

Rhode Island Sea Grant >>

RI Shoreline Change Special Area Management Plan

the Beach
SAMP

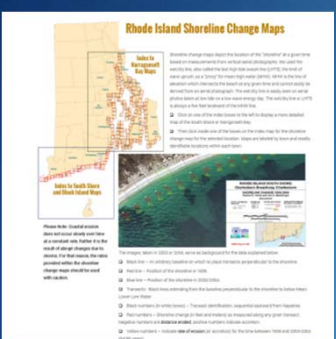
www.beachsamp.org











Rhode Island Shoreline Change Maps

Shoreline Change Maps report the location of the "Reference" or a point in time shoreline and the location of the "Current" or a point in time shoreline. The maps show the change in shoreline location over time. The maps are used to monitor shoreline change and to plan for future shoreline management.

Shoreline Change 1952 - 2013 West Beach (The Dump)

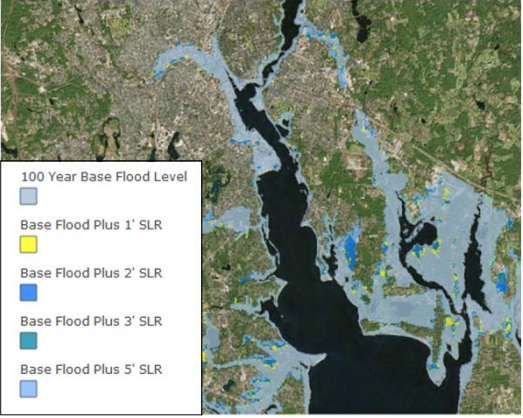
1952: Georeferenced Aerial Photo

2013: GPS Shoreline Position

Shoreline Change Mapping

- New Shoreline Change Map Online Interface
- Block Island Shoreline Change Map
- Updating Washington County Maps currently
- Monitoring along South Shore including Misquamicut Beach Nourishment, & on Block Island
- **UPCOMING- FUTURE SHORELINE PROJECTIONS**

StormTools: Maps of Storms+Sea Level Rise



Visualizations

Maps flooding from a 25, 50, 100-year storm PLUS Sea Level Rise

****More accurate depiction of future flooding risk**

Applications

Day-to-Day operations

Long term planning/financing

<http://www.beachsamp.org/maps/stormtools>


Vulnerability of Critical Facilities

STORMTOOLS

25-year Storm Event +SLR

Police / Fire / EMA

- First responders
- Recovery efforts



WARWICK – Is placement of existing fire stations sufficient for serving Warwick Neck during a storm event?

<http://www.beachsamp.org/maps/stormtools>

StormTools: Maps of Storms+Sea Level Rise



Also provides flooding depth at specific points

<http://www.beachsamp.org/maps/stormtools>

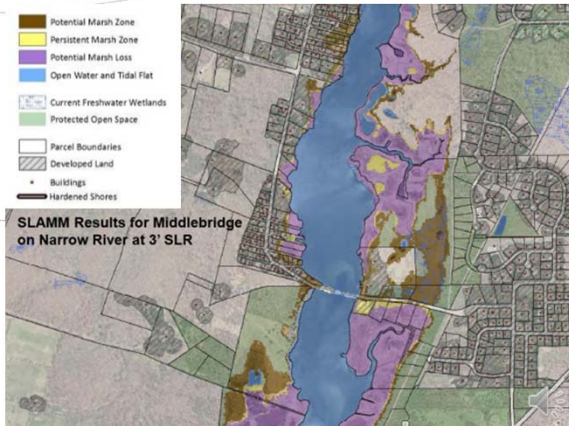
Salt Marsh Migration

Maps
ADOPTED by
CRMC

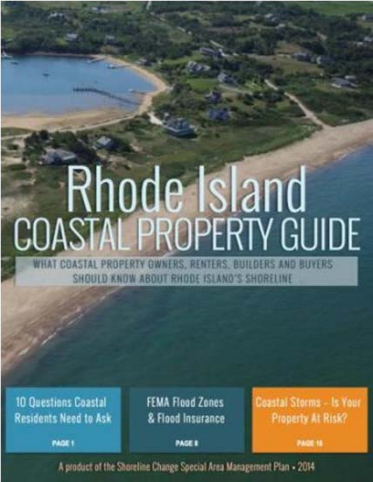
- Potential Marsh Zone
- Persistent Marsh Zone
- Potential Marsh Loss
- Open Water and Tidal Flat
- Current Freshwater Wetlands
- Protected Open Space
- Parcel Boundaries
- Developed Land
- Buildings
- Hardened Shores



SLAMM Results for Middlebridge on Narrow River at 3' SLR



Coastal Property Guide Informs Landowners and Buyers



- Coastal features
- CRMC water type classifications
- FEMA flood zones
- Flood insurance, program/premiums
- Coastal hazards: sea-level rise and erosion
- Shoreline protection structures
- Coastal hazards: storms & floods
- Existing buildings
- Septic system requirements
- Structural resilience

<http://www.beachsamp.org/coastalpropertyguide/>

10 Questions Property Owners Should Ask

| Question | Page |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 1 What kinds of coastal features are on or near the property, and what kinds of setbacks or regulations apply? | 3 |
| 2 Are there restrictions on the property due to the adjacent CRMC water classification? | 6 |
| 3 Is the property in a flood zone according to FEMA maps? | 8 |
| 4 If I am in a flood zone, do I have to obtain flood insurance? How can I find out what my flood insurance premiums will be? | 10 |
| 5 How will erosion and sea-level rise impact the property and surrounding area? | 12 |
| 6 Can I install structures along the shore to protect the property and buildings from erosion or flooding? | 14 |
| 7 How will coastal storms and flooding affect the property and structures? Will I be allowed to rebuild in the event of a flood or storm that partially or completely destroys the building? | 16 |
| 8 How do I determine if the buildings on the property meet the current design and construction standards for the flood zone? | 20 |
| 9 What kinds of septic systems are permitted in the coastal zone? Can I repair or replace a damaged septic system? | 22 |
| 10 Can I make the existing building more resilient? How do I build a new resilient structure? | 24 |



Identifying & Sharing Resilience Practices for Waterfront Business

Vulnerability




- ✓ Wind
- ✓ Storms, Flooding
- ✓ Tides, SLR

Best Management Practices

- ✓ Structural
- ✓ Non-Structural

Baird Sea Grant Science Symposium, 2014:

FORTIFIED™ Retrofit/Build to Reduce Potential Damage



BRONZE: STRENGTHEN THE ROOF SYSTEM

Minimizes the risk of water getting into the home and of the roof detaching from the walls.



SILVER: STRENGTHEN THE WINDOWS & DOORS

Minimizes the risk of wind entering the home and causing a roof failure. Also effective at reducing the risk of water getting into the home.



GOLD: STRENGTHEN THE STRUCTURAL SYSTEM

Ties all of the elements of the home together and to the ground. The most effective way to minimize risks from high winds.



FORTIFIED FOR SAFER LIVING®

A multi-hazard program specifying construction, design and landscaping standards to increase a home's resilience and deliver superior performance during ALL natural hazards.

Focus on Key Components

- Roof, walls, windows, doors, equipment
- The right products and installation
 - Proper elevation



Sealed roof deck damage estimate

\$5,408²⁹

Unsealed roof deck damage estimate

\$16,935²³

<https://www.disastersafety.org>

URI Engineering Senior Design Class

Assessment of Marinas to
storms and sea level rise

Template for others to use



25 Year Return Period Water Level with SLR

| Greenwich Bay South Yard Marina | | |
|---------------------------------|----------------|-----------------------|
| Projected Date | Sea Level Rise | 25 Year Return Period |
| --- | None | 8.26 R (2.52 m) |
| 2034 | 1 R (0.30 m) | 9.55 R (2.91 m) |
| 2071 | 3 R (0.91 m) | 12.12 R (3.69 m) |

➤ Referenced to NAVD88
• At 1 R (0.30 m) SLR and a 25 year return period, half of the marina would be inundated

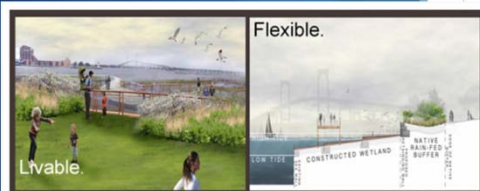


URI Landscape Architecture Studios

- ◆ Newport
- ◆ Wickford
- ◆ Focused on Adaptation Design



VIEW FROM BOARDWALK IN 25 YEARS

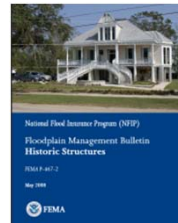
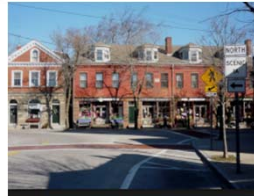


Design by Dennis Staton, URI LAR graduate, to illustrate his vision of Storrs Park in 25 years.

Design by Amanda Gao, URI LAR graduate, to depict what the park might look like in 25 years with her design of a boardwalk through a reconstructed marsh.

Adapting Historic Structures

- ◆ Guidance on how to adapt historic structures or districts to SLR
- ◆ Tailored to Rhode Island



Green Infrastructure + Experiential Learning

- ◆ Green Infrastructure Design
 - ◆ Newport
 - ◆ Warwick
 - ◆ North Kingstown



Informing & Engaging the Public



RI's Climate Challenge
 RI Climate Change Collaborative presents
www.RIClimateChange.org
 What can we expect?
 What can we learn?
 What can we do?
 Find out at riclimatechange.org

*Let us not seek to fix the blame for the past.
 Let us accept our own responsibility for the future.*

www.RIClimateChange.org



Building Tools in Partnership

THE UNIVERSITY OF RHODE ISLAND GRADUATE SCHOOL OF OCEANOGRAPHY

Sea Grant Rhode Island

CR Coastal Resources Center

CRMC Coastal Resources Management Council

THE UNIVERSITY OF RHODE ISLAND COLLEGE OF THE ENVIRONMENT AND LIFE SCIENCES

RHODE ISLAND STATEWIDE PLANNING PROGRAM

DEM EMERGENCY MANAGEMENT

EMERGENCY MANAGEMENT

Commerce RI

EDC Environmental Data Center

COASTAL INSTITUTE

RHODE ISLAND MARINE TRADES ASSOCIATION

SOUTH KINGSTOWN LAND TRUST

PELL CENTER for INTERNATIONAL RELATIONS and PUBLIC POLICY

NEWPORT CHAMBER OF COMMERCE

COASTAL INSTITUTE

NEWPORT BRIDGE ISLAND

SAVE THE BAY. NARRAGANSETT BAY

NMA Newport Maritime Alliance

North Kingstown Rhode Island

TETRA TECH

USDA Risk Management Agency

RHODE ISLAND MARINE TRADES ASSOCIATION

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

EASTERN CONNECTICUT STATE UNIVERSITY

GEOLOGICAL SURVEY

NORR

vbcf

11TH HOUR RACING

PRINCE CHARITABLE TRUSTS

RHODE ISLAND FOUNDATION
 Lead, Transform, Inspire