



— June 12, 2018: CRMC Adopts Shoreline Change (Beach) SAMP —

Beach SAMP Documents (PDF)

- Chapter 1 — Introduction
- Chapter 2 — Trends and Status: Current and Future Impact of Coastal Hazards in Rhode Island
- Chapter 3 — Assessing Coastal Hazard Risk
- Chapter 4 — Rhode Island's Exposure to Coastal Hazards
- Chapter 5 — RI CRMC Coastal Hazard Application Guidance
- Chapter 6 — State and Municipal Considerations
- Chapter 7 — Adaptation Strategies and Techniques for Coastal Properties

- Beach SAMP is a **guidance document** to support regulatory changes at RI Coastal Resources Management Council (CRMC)
- **APPROVED** June 12, 2018 by CRMC Council
- **Regulatory changes** will be made to the RI Coastal Resources Management Program (aka “Red Book”) & other existing SAMPs



[www.beachsamp.org](http://www.beachsamp.org)



# **RI CRMC Shoreline Change SAMP Stakeholder Engagement & Public Outreach**

## **Beach SAMP Management Team:**

*Rhode Island Coastal Resources Management Council, Executive Director*

*University of Rhode Island Ocean Engineering & Geosciences / Eastern CT State University*

*University of Rhode Island Environmental Data Center*

*University of Rhode Island Coastal Resources Center & RI Sea Grant*

## **RI CRMC Policy and Permit Staff**

## **State Agency Assistance and Coordination**

## **Coalition of Community Leaders**

## **Beach SAMP Chapter Review Focus Group Members**

## **Guest Speakers, Beach SAMP Stakeholder Meetings**

# Shoreline Change SAMP

## Stakeholder Engagement & Public Outreach

Shannon Brawley, Rhode Island Nursery and Landscape Association  
 Tim Stasiunas and Tom D'Angelo, Rhode Island Builders Association  
 Mark Male, Independent Insurance Agents of Rhode Island  
 Barbara Cardiff (deceased), Villa B&B, Westerly Chamber of Commerce

### Beach SAMP Chapter Review Focus Group Members

Lisa Bryer, Town of Jamestown  
 David Caldwell, Rhode Island Builders Association  
 Michael DeLuca, Town of Narragansett  
 William DePasquale, City of Warwick  
 David Everett, City of Providence  
 Daniel Gagan, City of Warwick  
 Meg Kerr, RI Audubon  
 Rita Lavoie, Town of Middletown  
 Kate Michaud, Town of Warren  
 Amy Moses, Conservation Law Foundation  
 Jay Parker, Town of Westerly  
 David Prescott, Save the Bay  
 Allison Ring, Town of New Shoreham  
 Chelsea Siefert, Town of South Kingstown  
 Larry Taft, RI Audubon  
 John Torgan, The Nature Conservancy  
 Jane Weidman, Town of Charlestown

### Guest Speakers, Beach SAMP Stakeholder Meetings

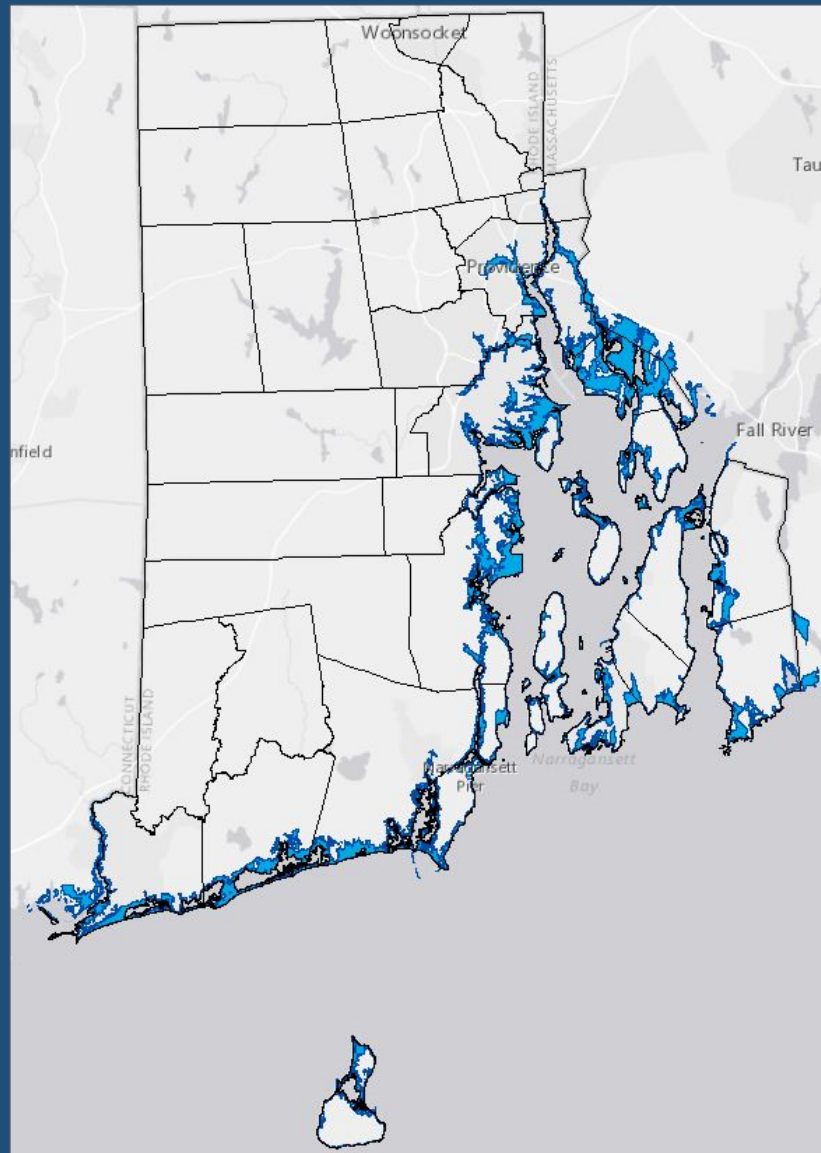
Jon Boothroyd (deceased), RI State Geologist, URI College of Environment and Life Sciences (April 4, 2013)  
 James Boyd, Coastal Policy Analyst, Rhode Island Coastal Resources Management Council (October 22, 2014 and August 25, 2016)  
 Michelle Burnett, (formerly) State Floodplain Coordinator, Rhode Island Emergency Management Agency (July 10, 2013 and September 29, 2015)  
 Caitlin Chaffee, Coastal Policy Analyst, Rhode Island Coastal Resources Management Council (October 22, 2014)  
 Margaret Davidson, J.D., (deceased) Acting Director, NOAA Office of Ocean and Coastal Resource Management (November 25, 2013)  
 Christopher Damon, GISP, Geographic Information Systems (GIS) Applications Specialist, URI Environmental Data Center (January 20, 2015)  
 Michael DeLuca, AICP, Director of Community Development, Town of Narragansett, RI (September 29, 2015)  
 Bob Desaulniers, Federal Emergency Management Agency (July 10, 2013)  
 Robert Fairbanks, P.E., President, Fairbanks Engineering Corp. (December 9, 2013)  
 Susan Farady, J.D., Director, Marine Affairs Institute and RI Sea Grant Legal Program (December 9, 2013)

Wenley Ferguson, Save the Bay (October 22, 2014)  
 Janet Freedman, Coastal Geologist, Rhode Island Coastal Resources Management Council (May 3, 2016)  
 Amy Grzybowski, (formerly) Director of Planning, Code Enforcement, and Grant Administration, Town of Westerly, RI (July 24, 2014)  
 Christopher Hatfield, Project Manager, U.S. Army Corps of Engineers (December 1, 2016)  
 Christopher P. Jones, P.E. (April 21, 2015)  
 Nicole Leporacci, URI Masters of Environmental Science & Management (MESM) (August 25, 2016)  
 Fred Malik, FORTIFIED Programs Manager, Insurance Institute of Business and Home Safety (April 3, 2014)  
 Bryan Oakley, Coastal Geologist, Eastern Connecticut State University (April 4, 2013, February 4, 2016 and December 1, 2016)  
 Michael Oppenheimer, Ph.D., Princeton University (May 3, 2016)  
 Jon Reiner, AICP, (formerly) Director of Planning and Community Development Town of North Kingstown, Rhode Island (November 25, 2013)  
 Tim Reinhold, Senior Vice President, Research and Chief Engineer, Insurance Institute of Business and Home Safety (April 3, 2014)  
 Julie Rochman, President and CEO, Insurance Institute of Business and Home Safety (April 3, 2014)  
 Chelsea Siefert, (formerly) Principal Planner, RI Division of Planning, Statewide Planning Program (RISPP) (September 29, 2015)  
 Curt Spaulding, (formerly) US Environmental Protection Agency, Region 1, Boston (January 20, 2015)  
 Malcolm Spaulding, Professor Emeritus, URI Ocean Engineering (January 20, 2015 and August 25, 2016)  
 Richard St Jean, P.E., President, St Jean Engineering (December 9, 2013)  
 Robert Thielert, Ph.D., U.S. Geological Survey- Coastal and Marine Geology Program (December 9, 2013)  
 David Vallee, National Weather Service (April 4, 2013)  
 Kevin Ruddock, The Nature Conservancy (October 22, 2014)  
 John Torgan, Director of Ocean and Coastal Conservation, The Nature Conservancy, Rhode Island Chapter (April 3, 2014)  
 Joe Warner, Building/Zoning Official and Floodplain Manager, Town of Charlestown, RI (July 24, 2014)  
 Adam Whelchel, Director of Science, The Nature Conservancy Connecticut Chapter (April 3, 2014)

The Shoreline Change SAMP team is also very appreciative of the valuable input provided by the public throughout the process.

## Shoreline Change SAMP Planning Boundary

**7-feet of  
sea level rise  
+  
100-year return  
period storm**  
*(similar to 1954  
Hurricane Carol)*

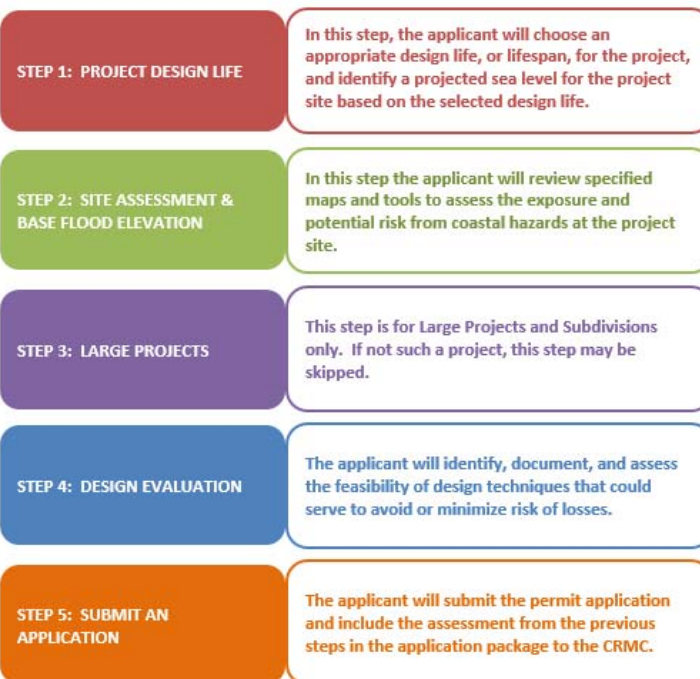


## CHAPTER 5

### RI CRMC Coastal Hazard Application Guidance

#### 5.1 Overview of Process

The steps presented below provide guidance for applicants to address Coastal Hazards for selected projects in the design and permitting process for the Rhode Island Coastal Resources Management Council (CRMC).



## RI CRMC Permit Application Requirement

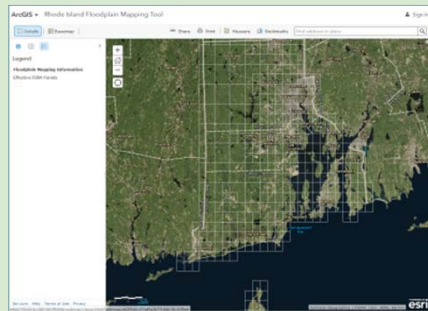
Applicants will complete a coastal hazard risk assessment process as part of their application package to CRMC



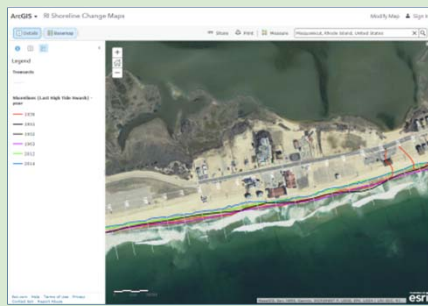
# Rhode Island's MAPPING TOOLBOX

## Past and Present

### 1. RIEMA Floodplain Mapping Tool

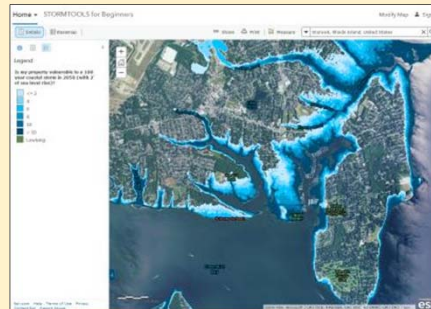


### 2. Coastal Erosion



## Future

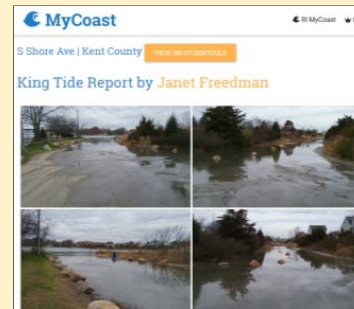
### 3. STORMTOOLS



### 4. SLAMM



### 5. MyCoast

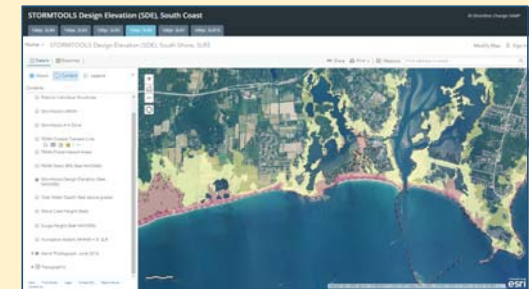


## Future

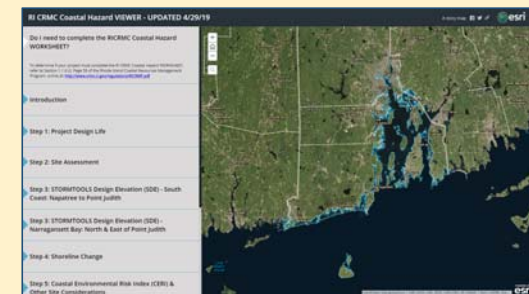
### 6. Coastal Environmental Risk Index (CERI)



### 7. STORMTOOLS Design Elevation



### 8. RICRMC Coastal Hazard Viewer





# RI Coastal Resources Management Council

...to preserve, protect, develop, and restore coastal resources for all Rhode Islanders



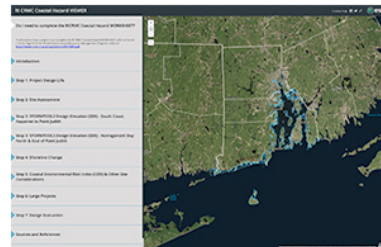
RI CRMC News Topics Wind Energy Publications Regulations Applications Maps About CRMC Contact Us Permit Database

## Coastal Hazard Application

Welcome to the RICRMC Coastal Hazard Application WORKSHEET and ONLINE VIEWER!

Please download and print the **RICRMC Coastal Hazard Application WORKSHEET** from the link below, and use the **ONLINE VIEWER** to access the maps and other information required for completion of the **WORKSHEET**.

Coastal Hazard Application Worksheet (PDF)



Coastal Hazards Application Online Viewer

The list of projects below must complete the RICRMC Coastal Hazard Application WORKSHEET to be filed in addition to and with your standard CRMC application (<http://www.crmc.ri.gov/applicationforms.html>).

Any of the following **new projects**, including tear downs and rebuilds, located on a coastal feature or within the 200-foot contiguous area:

1. construction of new residential buildings as defined in § 1.1.2;
2. construction of new commercial and industrial structures as defined in § 1.1.2;
3. construction of new beach pavilions as defined in § 1.1.2;
4. construction of any new private or public roadway, regardless of length;
5. construction of any new infrastructure project subject to §§ 1.3.1(F), (H), and (M); and
6. construction of any new subdivisions with six (6) or more lots, any portion of which is within 200 feet of a shoreline feature.



## RI CRMC COASTAL HAZARD WORKSHEET

APPLICANT NAME: \_\_\_\_\_

PROJECT SITE ADDRESS: \_\_\_\_\_

Please refer to the RI Shoreline Change Special Area Management Plan, Chapter 5 for background and descriptions of the terms outlined below. [http://www.crmc.ri.gov/samp\\_beach/SAMP\\_Beach.pdf](http://www.crmc.ri.gov/samp_beach/SAMP_Beach.pdf)

### STEP 1. PROJECT DESIGN LIFE

\_\_\_ A. Determine the base flood elevation (BFE) for the project location, available from FEMA, or the municipal building official.

\_\_\_ B. Using the CRMC Shoreline Change maps, indicate the transect number closest to your site, and erosion rate listed for that transect. [http://www.crmc.ri.gov/maps/maps\\_shorechange.html](http://www.crmc.ri.gov/maps/maps_shorechange.html)

\_\_\_ C. How long do you want your project to last? Identify the expected design life for the project (CRMC recommends a minimum of 30 years)

\_\_\_ D. Add the number of years you identified in 1C to the current year. (For example, if you are completing this form in the year 2020, and you want your project to last 30 years)

\_\_\_ E. CIRCLE the sea level rise (SLR) projection from the Table 1E that matches or comes closest to project design life.

Year	2020	2030	2040	2050	2060	2070	2080	2090	2100
SLR	1.05	1.67	2.33	3.25	4.20	5.35	6.69	8.14	9.61

Table 1E. Sea Level Rise (SLR) Projections (Feb. 2017). NOAA High Curve, 83% Confidence Interval. Newport, RI Tide Gauge. All values are in feet relative to NAVD88. <http://www.corpsclimate.us/ccaceslcurves.cfm>

NOTE: The STORMTOOLS SLR map layer is based on the average height of the daily high tide over the 19-year period between 1983 and 2001. There have been between 4 and 5 inches of sea level rise in Rhode Island since then. The higher modeled water level accounts for the uncertainties in ice sheet and ocean dynamics.

### STEP 2. SITE ASSESSMENT

\_\_\_ A. Open RIMC Coastal Hazard Mapping Tool <https://arcg.is/qTSag>. Following the tutorial along the left side of the screen, enter the project site address and turn on the sea level layer closest to the number you circled in 1E.

\_\_\_ B. CIRCLE the STORMTOOLS SLR map layer closest to the SLR value you circled in Step 1E above. If the value falls between the available STORMTOOLS SLR map layers, round off to the closest sea level rise (SLR) number.

\_\_\_ C. Does the STORMTOOLS SLR map layer you circled above expose your project site to future tidal inundation? CIRCLE YES or NO

\_\_\_ D. List any roads or access routes that are potentially inundated from SLR and storms. To do this, ZOOM OUT from your project location, change BASEMAP on the viewer to "street view" – see Step 2A.

1ft 2ft 3ft 5ft  
7ft 10ft 12ft

YES NO

### STEP 3. STORMTOOLS DESIGN ELEVATION (SDE)

\_\_\_ A. Based on the project location, CIRCLE the SDE Viewer for your site, and open the corresponding tab in Mapping Tool:

South Coast SDE Viewer: Napatree to Point Judith Narragansett Bay SDE Viewer: North & East of Point Judith

\_\_\_ B. Follow the tutorial included along the left panels of the viewer to enter the address of your project site. Select the tab across the top that corresponds to the sea level rise projection you identified in STEP 1E.

\_\_\_ C. Click on the map at project site to identify STORMTOOLS Design Elevation (SDE) from the pop up box. Enter the SDE value here:

## RI CRMC COASTAL HAZARD WORKSHEET

### STEP 4. SHORELINE CHANGE

\_\_\_ A. Setbacks are required per RI Coastal Resources Management Program (RICRMP), Section 1.1.9. Indicate the annual shoreline change rate value from STEP 1B, and the design life selected in STEP 1C above. Enter values in 4C below.

\_\_\_ B. CIRCLE the Projected Erosion Rate that corresponds to the design life you identified above.

Year	2050	2060	2070	2080	2090	2100
Projected Future Erosion Multiplier	1.34	1.45	1.57	1.70	1.84	2.00

Table 4B. Projected Shoreline Change Rate multipliers. (Oakley et al., 2016)

### \_\_\_ C. COMPLETE EROSION SETBACK CALCULATION:

Historic shoreline change rate, STEP 1B	Design Life, STEP 1C	Projected Future Erosion Multiplier, STEP 4B	Erosion Setback (ft) 1B x 1C x 4B
	X	X	=

NOTE: A minimum setback of 50-feet is required, but a greater setback may be necessary and/or desirable based on this analysis.

### STEP 5. CERL & OTHER SITE CONSIDERATIONS

\_\_\_ A. If you live in a community where a Coastal Environmental Risk Index (CERL) has been completed (Barrington, Bristol, Charlestown, Narragansett, South Kingstown, Warren, Warwick, Westerly), CIRCLE the level of projected damage to your location, as indicated on the map that corresponds to the design life identified in STEP 1.

CERL Level:	Moderate	High	Severe	Extreme	Inundated by 2100	Not applicable
-------------	----------	------	--------	---------	-------------------	----------------

\_\_\_ B. Consider and discuss with your design consultant other forces or factors that might impact the development, such as coastal habitats, shoreline features, public access, wastewater, storm water, depth to water table/groundwater dynamics, saltwater intrusion, or other issues not listed above. In addition, pressure from rising sea levels will result in rising subsurface groundwater levels ultimately affecting wells and septic systems.

### STEP 6. LARGE PROJECTS

This step is for Large Projects and Subdivisions only, six (6) or more units, as defined by RI CRMP Section 1.1.6.I(1)(f). This step may be skipped for other projects.

\_\_\_ A. Use the Sea Level Affecting Marshes Model (SLAMM) Maps to assess potential impacts to large projects and subdivisions from salt marsh migration resulting from projected sea level rise. CRMC SLAMM maps can be accessed here:

[http://www.crmc.ri.gov/maps/maps\\_slamm.html](http://www.crmc.ri.gov/maps/maps_slamm.html). The CRMC recommends using the 5-foot SLR projection within SLAMM to assess future potential project impacts on migrating marshes. Does the SLAMM map that corresponds to the design life you identified in STEP 1 expose your project site to future salt marsh migration? CIRCLE YES or NO

YES NO

### STEP 7: DESIGN EVALUATION

\_\_\_ A. Using Chapter 7 of the RI Shoreline Change SAMP as a guide, investigate mitigation options for the exposure identified above and include that in the final application.

This fully completed Coastal Hazard Application Guidance worksheet must accompany the application. If you are a design or engineering professional, please sign here that you have discussed the findings of this worksheet with the Owner.

DESIGN/ENGINEER SIGNATURE: \_\_\_\_\_

DATE: \_\_\_\_\_

OWNER'S SIGNATURE: \_\_\_\_\_

DATE: \_\_\_\_\_



Do I need to complete the RICRMC Coastal Hazard WORKSHEET?

To determine if your project must complete the RI CRMC Coastal Hazard WORKSHEET, refer to Section 1.1.6 (I), Page 59 of the Rhode Island Coastal Resources Management Program, online at: <http://www.crmc.ri.gov/regulations/RICRMP.pdf>

Introduction

Step 1: Project Design Life

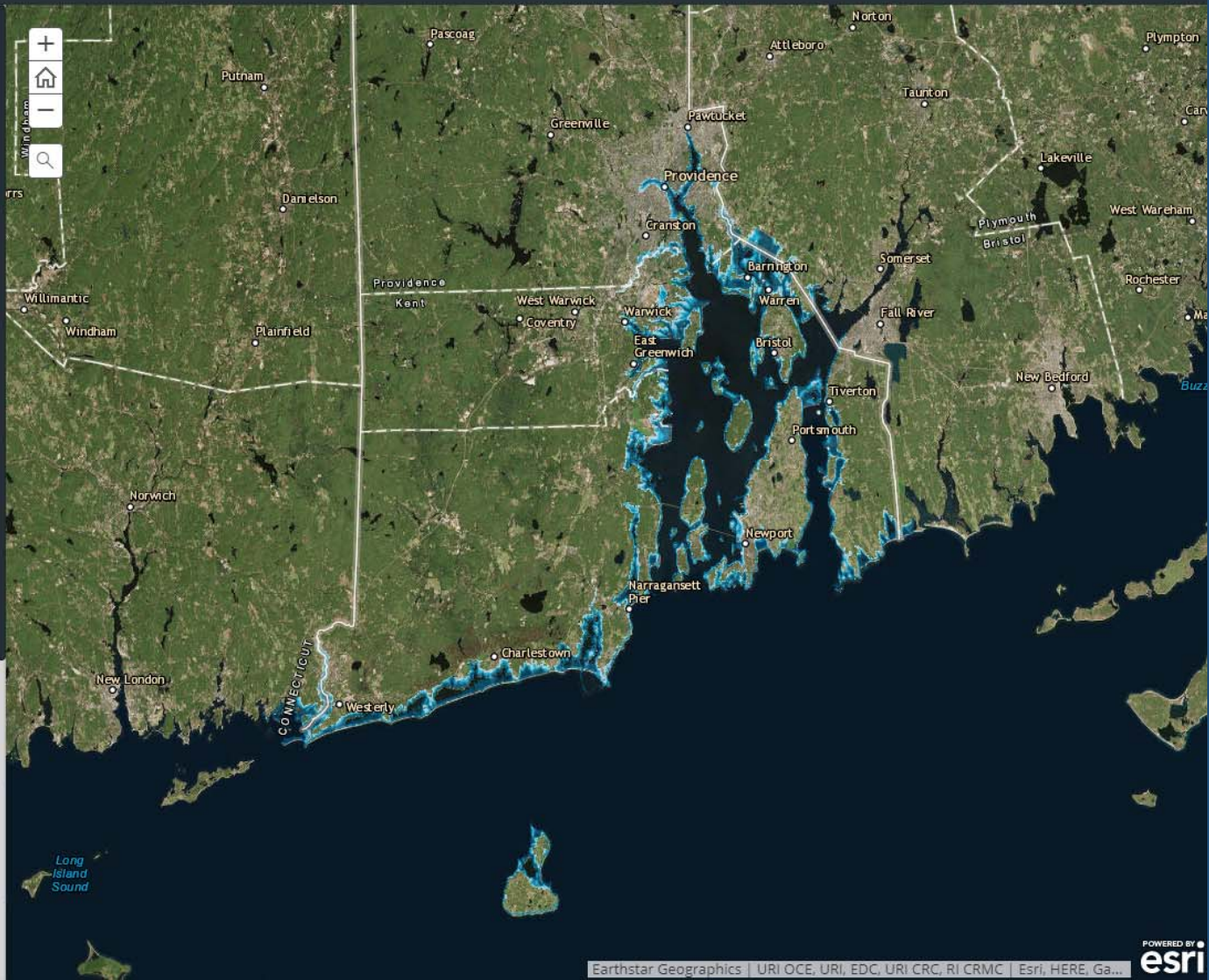
Step 2: Site Assessment

Step 3: STORMTOOLS Design Elevation (SDE) - South Coast: Napatree to Point Judith

Step 3: STORMTOOLS Design Elevation (SDE) - Narragansett Bay: North & East of Point Judith

Step 4: Shoreline Change

Step 5: Coastal Environmental Risk Index (CERI) & Other Site Considerations

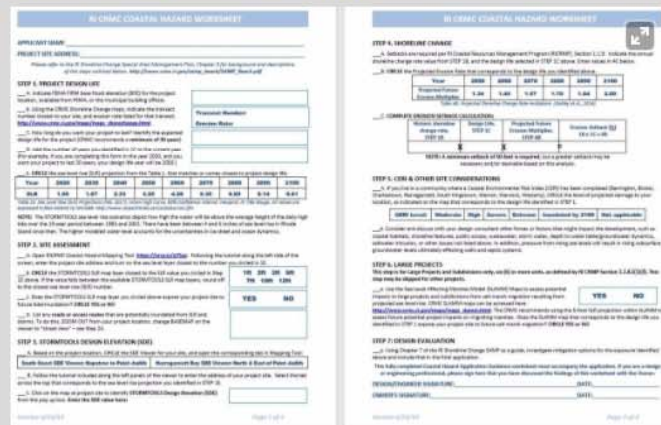


## Introduction

Chapter 5 of the Shoreline Change Special Area Management Plan (BeachSAMP), can be found online at [http://www.crmc.ri.gov/samp\\_beach.html](http://www.crmc.ri.gov/samp_beach.html)

Please download and print the RICRMC Coastal Hazard WORKSHEET, and fill in the blanks using the following tabs outlined below. The worksheet can also be found online at:

<http://www.crmc.ri.gov/coastalhazardapp.html>

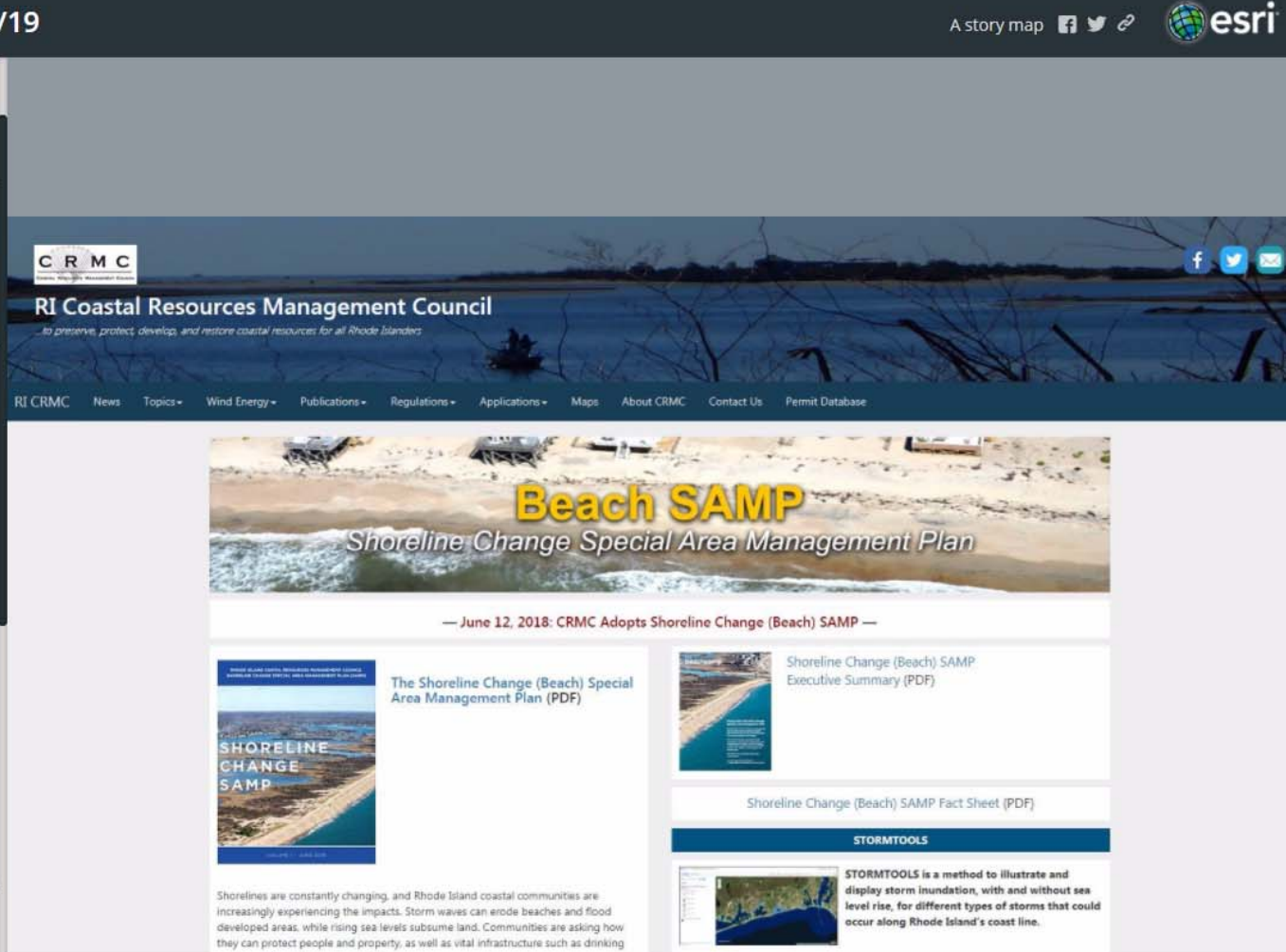


The screenshot shows the 'RICRMC COASTAL HAZARD WORKSHEET' with two main sections visible. The first section, 'APPROPRIATE USER', includes instructions for various users like the Rhode Island Department of Environmental Management, local municipalities, and private property owners. The second section, 'STEP 1: PROJECT DESIGN LIFE', contains a table for 'DESIGN LIFE' with columns for 'DESIGN LIFE (Years)' and 'DESIGN LIFE (Feet)'. The table has rows for 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100 years, with corresponding design life values in feet. Below the table, there are checkboxes for 'DESIGN LIFE' and 'DESIGN LIFE (Feet)'.

Download the RICRMC Coastal Hazard WORKSHEET for use with this online mapping tool at: <http://www.crmc.ri.gov/coastalhazardapp.html>.

## Step 1: Project Design Life

## Step 2: Site Assessment



The screenshot shows the website of the RI Coastal Resources Management Council. The header includes the CRMC logo and the tagline 'to preserve, protect, develop, and restore coastal resources for all Rhode Islanders'. The main navigation bar lists various topics like News, Topics, Wind Energy, Publications, Regulations, Applications, Maps, About CRMC, Contact Us, and Permit Database. The main content area features a large banner for 'Beach SAMP' with the subtitle 'Shoreline Change Special Area Management Plan'. Below the banner, there is a section titled '— June 12, 2018: CRMC Adopts Shoreline Change (Beach) SAMP —'. To the right, there are links to 'The Shoreline Change (Beach) Special Area Management Plan (PDF)' and 'Shoreline Change (Beach) SAMP Executive Summary (PDF)'. At the bottom, there is a section for 'STORMTOOLS' with a link to 'Shoreline Change (Beach) SAMP Fact Sheet (PDF)'.



Step 1: Project Design Life

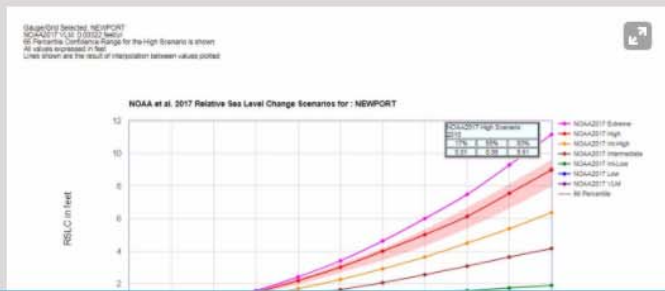
- \_\_\_ C. How long do you want your project to last? Identify the expected design life for the project (CRMC recommends a minimum of 30 years)
- \_\_\_ D. Add the number of years you identified in 1C. to the current year. (For example, if you are completing this form in the year 2020, and you want your project to last 30 years, your target year will be 2050.)
- \_\_\_ E. **CIRCLE** the sea level rise (SLR) projection from the Table 1. that matches or comes closest to project design life.

Year	2020	2030	2040	2050	2060	2070	2080	2090	2100
SLR	1.05	1.67	2.33	3.25	4.20	5.35	6.69	8.14	9.61

Table 1 – Sea Level Rise (SLR) Projections (Feb. 2017). NOAA High Curve, 82% Confidence Interval. Newport, RI Tide Gauge. All values are expressed in feet relative to NAVD83. <http://www.corpsclimate.us/coastalcurves.cfm>

Why does the model show 1.05 of feet sea level rise by 2020?

The STORMTOOLS sea level rise scenarios depict how high the water will be above the average height of the daily high tide over the 19-year period between 1983 and 2001. There have been between 4 and 5 inches of sea level rise in Rhode Island since then. The higher modeled water level accounts for the uncertainties in ice sheet and ocean dynamics.



Step 2: Site Assessment

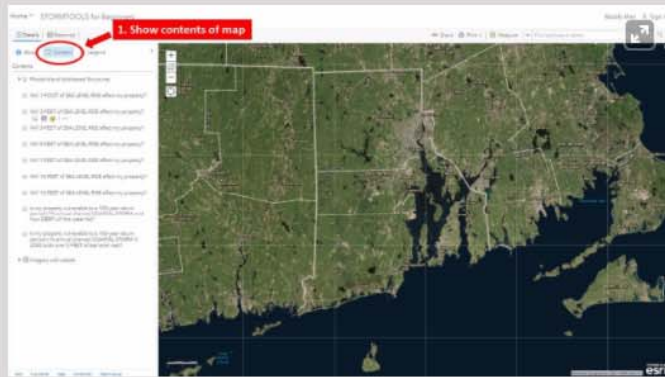
Step 3: STORMTOOLS Design Elevation (SDE) - South Coast: Napatree to Point Judith



Step 2: Site Assessment

This step uses STORMTOOLS for Beginners, which can be accessed through the map screen to the right, or online here: <https://arcg.is/4HrvP>

1. In order to select the SLR map layer for your proposed project, first click the "Show Contents of Map" button on the left side panel:



2. Select the SLR map layer that comes closest to the SLR value you derived from STEP 1.



Step 3: STORMTOOLS Design Elevation (SDE) - South Coast: Napatree to Point Judith

Step 3: STORMTOOLS Design Elevation (SDE) - Narragansett Bay: North & East of Point Judith

ArcGIS STORMTOOLS for Beginners Modify Map Sign In

[Details](#) [Basemap](#) [Share](#) [Print](#) [Measure](#)

**Contents**

- ☐ Rhode Island Addressed Structures
- ☐ Will 1-FOOT of SEA LEVEL RISE affect my property?
- ☐ Will 2-Feet of SEA LEVEL RISE affect my property?
- ☒ Will 3-Feet of SEA LEVEL RISE affect my property?
- ☒ Will 5-Feet of SEA LEVEL RISE affect my property?
- ☐ Will 7-Feet of SEA LEVEL RISE affect my property?
- ☐ Will 10-Feet of SEA LEVEL RISE affect my property?
- ☐ Will 12-Feet of SEA LEVEL RISE affect my property?
- ☐ Is my property vulnerable to a 100-year return period (1% annual chance)?

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**Search result**

55 Brown St, North Kingstown, Rhode Island, 02852

[Add to Map Notes](#)

Microsoft | URI COE | URI EDC | URI CRC | RI CRMC | NOAA | USGS | US ACOE | Esri

POWERED BY



Step 2: Site Assessment

Step 3: STORMTOOLS Design Elevation (SDE) - South Coast: Napatree to Point Judith

Step 3: STORMTOOLS Design Elevation (SDE) - Narragansett Bay: North & East of Point Judith

- FOR PROPERTIES WITHIN NARRAGANSETT BAY: Determine your recommended STORMTOOLS Design Elevation (SDE) using the map to the right.
- Reference State Law Elevation Allowances. *NOTE: 1-foot of freeboard (elevation) is required, above BFE is required but up to 5-feet of additional freeboard may be provided voluntarily.*
- SDE Maps may be substituted for FEMA FIRM maps, per R.I. Gen. Laws § 45-24-31(12)
- Applicant should coordinate with the design engineer on this issue.

1. Select the Sea Level Rise scenario that matches your WORKSHEET



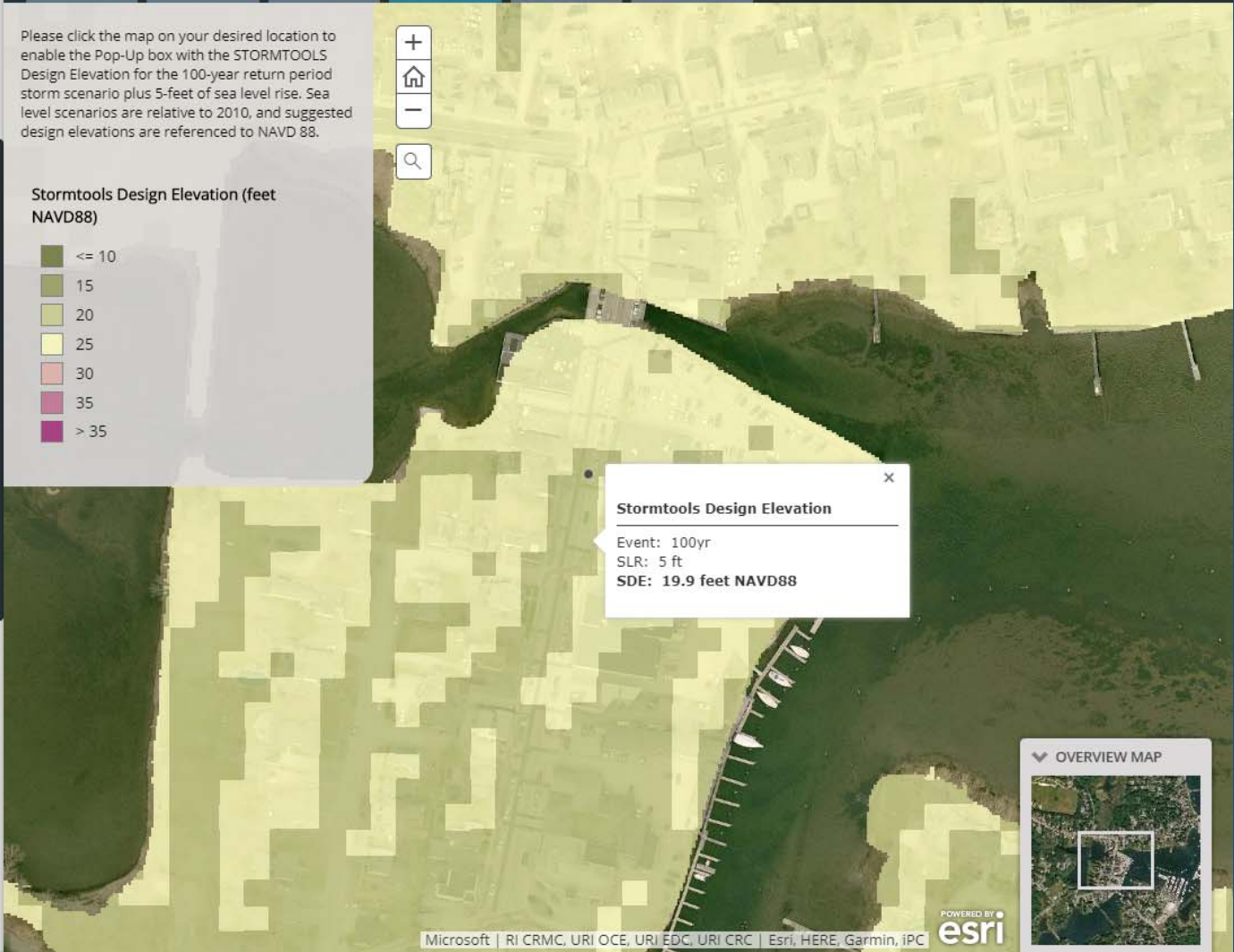
Select the Sea Level Rise scenario that matches your WORKSHEET.

- 100yr. SLR0
- 100yr. SLR2
- 100yr. SLR3
- 100yr. SLR5
- 100yr. SLR7
- 100yr. SLR10

Please click the map on your desired location to enable the Pop-Up box with the STORMTOOLS Design Elevation for the 100-year return period storm scenario plus 5-feet of sea level rise. Sea level scenarios are relative to 2010, and suggested design elevations are referenced to NAVD 88.

Stormtools Design Elevation (feet NAVD88)

- <= 10
- 15
- 20
- 25
- 30
- 35
- > 35



Step 4: Shoreline Change

See Erosion Maps in RICRMP and meet the Regulatory setbacks (Section 1.1.9 Setbacks, formerly § 140).

\_\_\_A. Setbacks are required per RI Coastal Resources Management Program (RICRMP), Section 1.1.9. Indicate the annual shoreline change rate value from STEP 1B, and the design life selected in STEP 1C above. Enter values in 4C below. **NOTE: A minimum setback of 50-feet is required, but a greater setback may be necessary and/or desirable based on this analysis.**

\_\_\_B. **CIRCLE** the Projected Erosion Rate that corresponds to the design life you identified above.

Year	2050	2060	2070	2080	2090	2100
Projected Future Erosion Multiplier	1.34	1.45	1.57	1.70	1.84	2.00

Table 2 – Projected Erosion Rate multipliers. (Oakley et al., 2016)

Projected Erosion Rate Multipliers (Oakley et al., 2016)

\_\_\_C. COMPLETE EROSION SETBACK CALCULATION:

Historic shoreline change rate, STEP 1B	Design Life, STEP 1C	Projected Future Erosion Multiplier, STEP 4B	Erosion Setback (ft) 1B x 1C x 4B
X	X		=

NOTE: A minimum setback of 50-feet is required, but a greater setback may be necessary and/or desirable based on this analysis.

SOURCE: Oakley, B.A., Hollis, R.J., Patroliia, E., Rinaldi, M., and Boothroyd, J.C., 2016, Projected Shorelines and Coastal Setbacks: A Planning Tool for the Rhode Island South Shore: Technical report prepared for the RICRMC Shoreline Change Special Area Management Plan

Step 5: Coastal Environmental Risk Index (CERI) & Other Site Considerations

Step 6: Large Projects





## Step 5: Coastal Environmental Risk Index (CERI) & Other Site Considerations

5A. For development applications in Barrington, Warren, Bristol and Warwick, identify the risk and potential damage profile of a property using the map to the right. *Please note: for Barrington, Warren, & Bristol, the 100-year return period storm (1% annual chance) with 0-ft, 2-ft and 5-ft sea level scenarios are shown; for Warwick, the 100-year return period storm (1% annual chance) with 0-ft & 7-ft sea level scenarios are shown.*

The maps to the right illustrate projected risk to residential structures for a 100-year storm event with sea level rise scenarios. Risk is represented by the percent of damage a structure is expected to receive assuming a worst-case scenario -- two story house with a basement located within the flood zone.

- 0-25% Damage - Moderate Risk
- 25-50% Damage - High Risk
- 50-75% Damage - Severe Risk
- 75-100% Damage - Extreme Risk

Learn more about CERI here:

<http://www.beachsamp.org/stormtools/stormtools-coastal-environmental-risk-index-ceri/> Full map viewers can be found here:

Barrington, Warren, & Bristol, RI - <https://arcg.is/1bPCmL0>

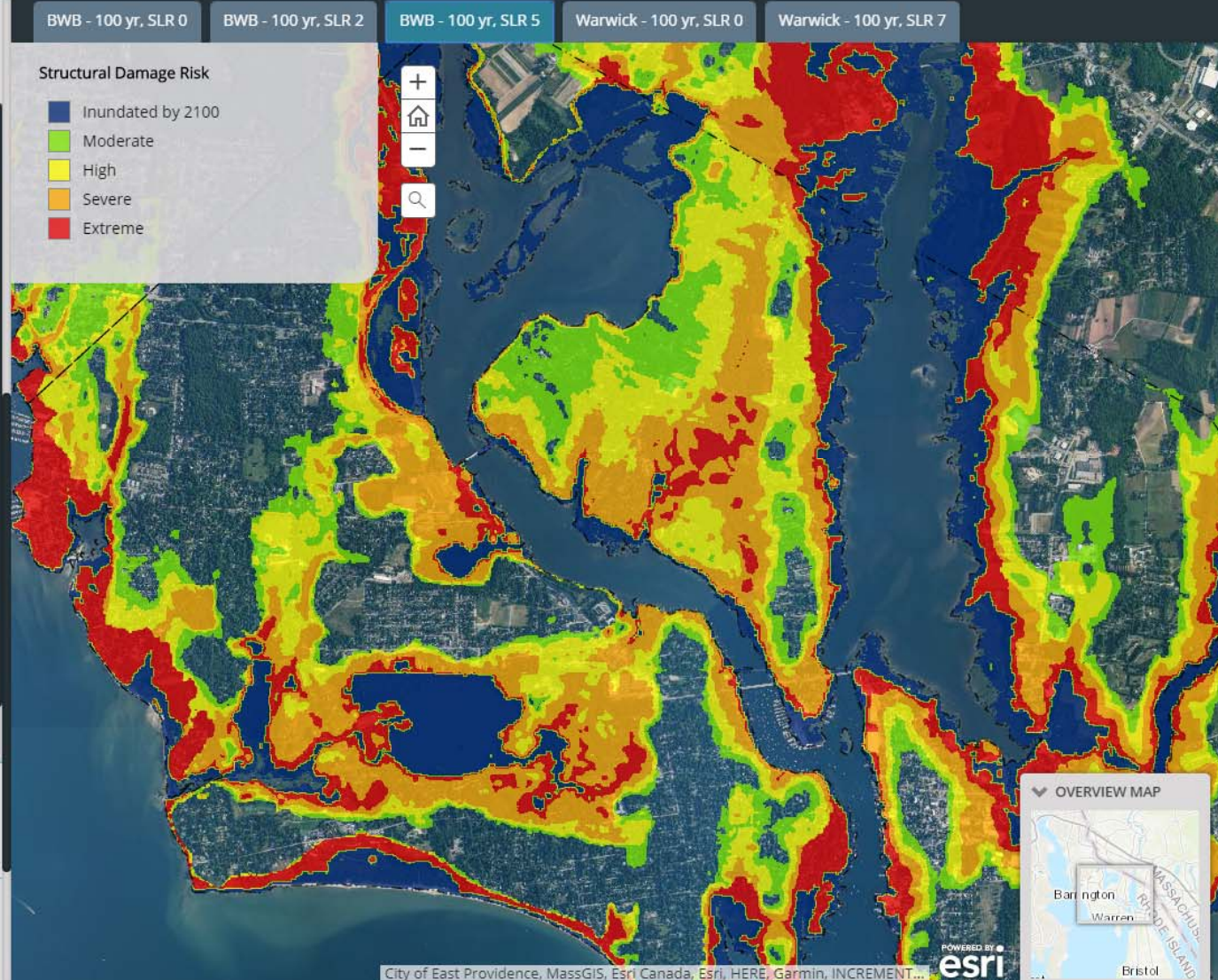
Warwick, RI - <https://arcg.is/yjP1S>

RI South Coast - In progress, to be completed in 2019

5B. Consider other risk factors that might impact the development, such as coastal habitats, shoreline features, public access, wastewater, stormwater, depth to water table/groundwater dynamics, saltwater intrusion, or other issues not listed above.

## Step 6: Large Projects

## Step 7: Design Evaluation





# RI Coastal Resources Management Council

...to preserve, protect, develop, and restore coastal resources for all Rhode Islanders



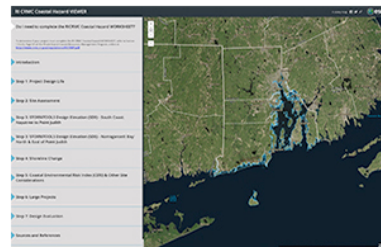
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## Coastal Hazard Application

Welcome to the RICRMC Coastal Hazard Application WORKSHEET and ONLINE VIEWER!

Please download and print the **RICRMC Coastal Hazard Application WORKSHEET** from the link below, and use the **ONLINE VIEWER** to access the maps and other information required for completion of the **WORKSHEET**.

Coastal Hazard Application Worksheet (PDF)



Coastal Hazards Application Online Viewer

The list of projects below must complete the RICRMC Coastal Hazard Application WORKSHEET to be filed in addition to and with your standard CRMC application (<http://www.crmc.ri.gov/applicationforms.html>).

Any of the following **new projects**, including tear downs and rebuilds, located on a coastal feature or within the 200-foot contiguous area:

1. construction of new residential buildings as defined in § 1.1.2;
2. construction of new commercial and industrial structures as defined in § 1.1.2;
3. construction of new beach pavilions as defined in § 1.1.2;
4. construction of any new private or public roadway, regardless of length;
5. construction of any new infrastructure project subject to §§ 1.3.1(F), (H), and (M); and
6. construction of any new subdivisions with six (6) or more lots, any portion of which is within 200 feet of a shoreline feature.