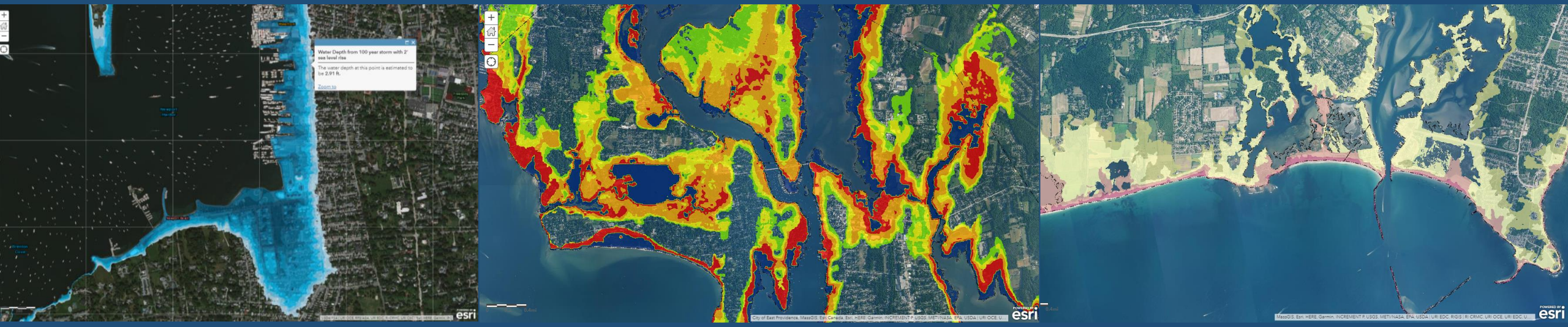
Rhode Island's
COASTAL HAZARD APPLICATION VIEWER



Grover Fugate
Executive Director, Rhode Island Coastal Resources Management Council

Teresa A. Crean, AICP
University of Rhode Island Coastal Resources Center / RI Sea Grant

CRMC Coastal Resources Management Council

www.beachsamp.org

The University of Rhode Island Graduate School of Oceanography | CRC Coastal Resources Center

The "biggest little state in the union"
Coastal Mapping DREAM TEAM

The Masterminds:

GROVER FUGATE
Executive Director, RI Coastal Resources Management Council

DR. MALCOLM SPAULDING
Professor Emeritus, University of Rhode Island

Dr. Annette Grilli
URI Ocean Engineering
(Modeling)

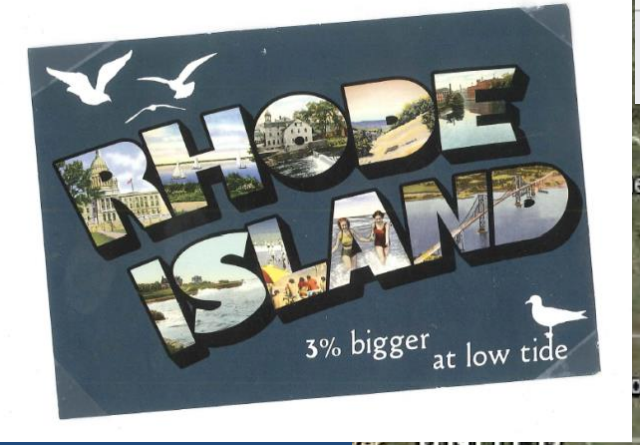
Dr. Bryan Oakley
Eastern CT State University
(Friendly Neighborhood
Geologist)

Gettin' it done...

Christopher Damon
URI Environmental Data Center (GIS Heavy Lifter, LiDAR Superstar, Applications Specialist)

Teresa Crean
URI Coastal Resources Center (Test Driver with End Users & Extension Specialist)

Aimee Mandeville
URI Environmental Data Center (ArcGIS Online & Applications Development Specialist)



Historical Hurricane Tracks

Hurricanes

County Strikes

Ottawa
Montreal
Toronto
Wisconsin
Chicago
Detroit
New York
Illinois
Ohio
St Louis
Kansas
Missouri
Kentucky
Tennessee
Oklahoma
Arkansas
Dallas
Texas
Houston
Monterrey
MÉXICO
Mexico City
Havana
CUBA
Guatemala
Caribbean Sea
Caracas
Atlantic Ocean

Pos: 8.32 , -58.36 Search Center: 41.59 , -71.47

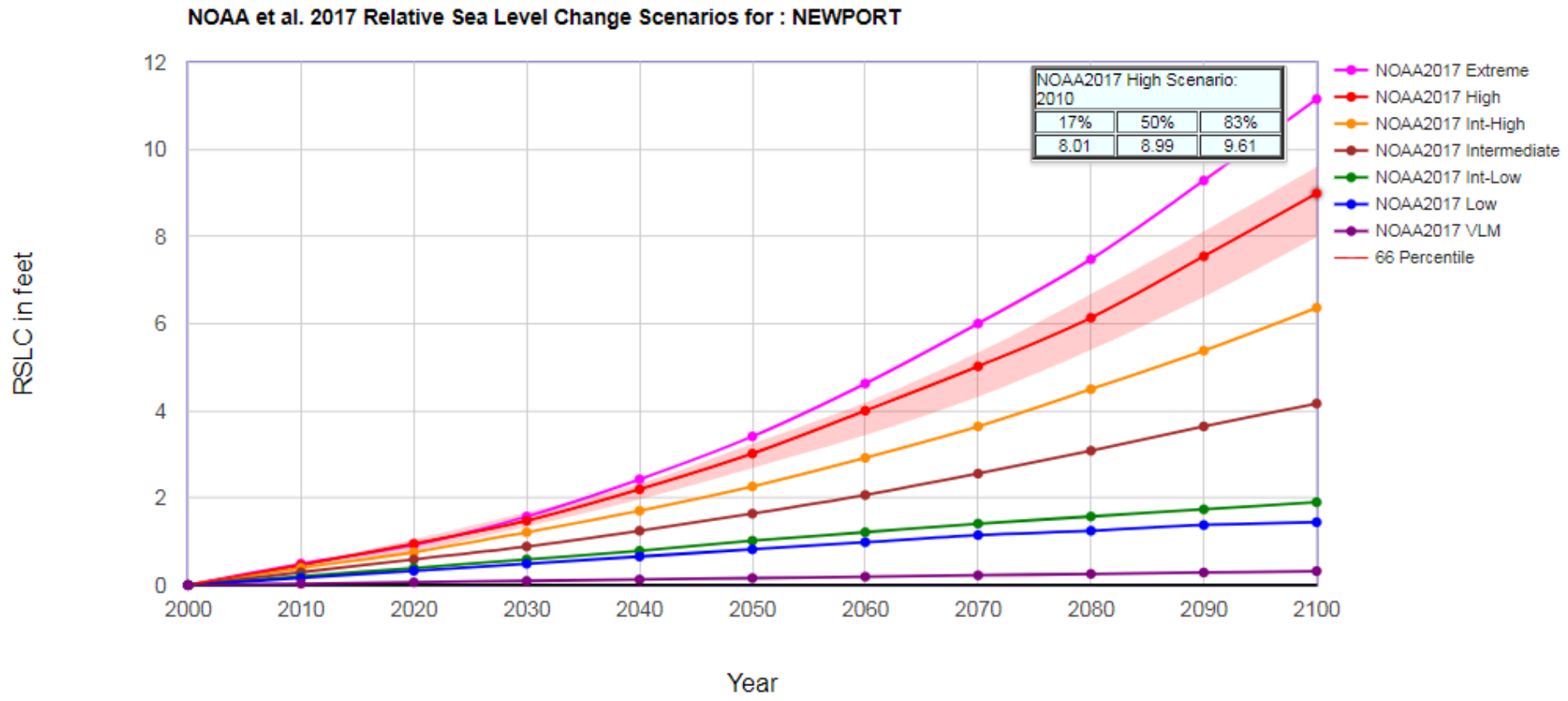
Category

TS	TD	ET	N/A
H1	H2	H3	H4	H5

US Army Corps of Engineers

Sea-Level Change Curve Calculator (Version 2019.21)

Gauge/Grid Selected: NEWPORT
NOAA2017 VLM: 0.00322 feet/yr
66 Percentile Confidence Range for the High Scenario is shown
All values expressed in feet
Lines shown are the result of interpolation between values plotted



Shoreline Change SAMP Planning Boundary

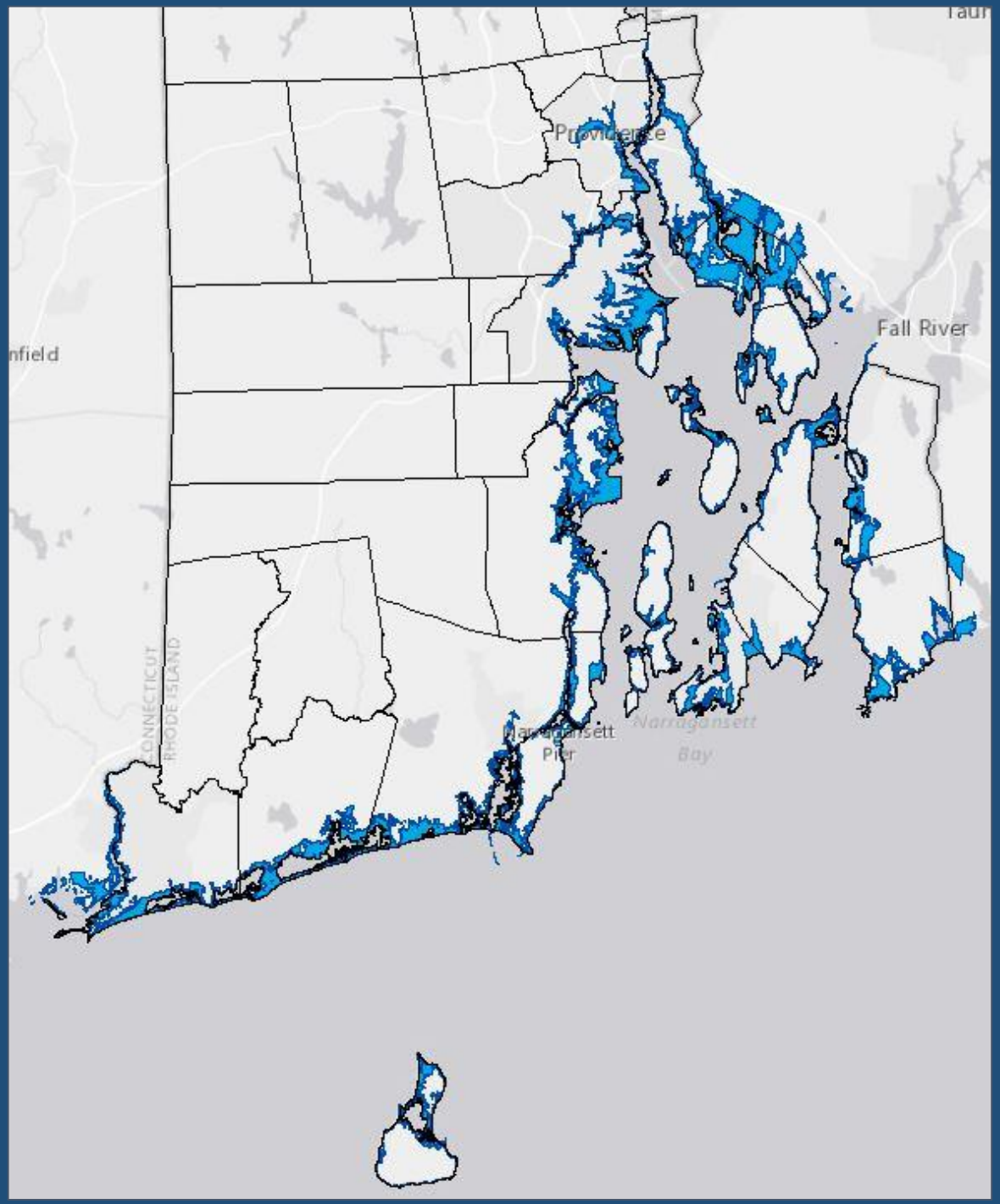
7-feet of

sea level rise

+

100-year return period storm

(similar to 1954 Hurricane Carol)



— 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

CRMC Coastal Resources Management Council

www.beachsamp.org

The University of Rhode Island Graduate School of Oceanography | CRC Coastal Resources Center

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).

STEP 1: PROJECT DESIGN LIFE	In this step, the applicant will choose an appropriate design life, or lifespan, for the project, and identify a projected sea level for the project site based on the selected design life.
STEP 2: SITE ASSESSMENT & BASE FLOOD ELEVATION	In this step the applicant will review specified maps and tools to assess the exposure and potential risk from coastal hazards at the project site.
STEP 3: LARGE PROJECTS	This step is for Large Projects and Subdivisions only. If not such a project, this step may be skipped.
STEP 4: DESIGN EVALUATION	The applicant will identify, document, and assess the feasibility of design techniques that could serve to avoid or minimize risk of losses.
STEP 5: SUBMIT AN APPLICATION	The applicant will submit the permit application and include the assessment from the previous steps in the application package to the CRMC.

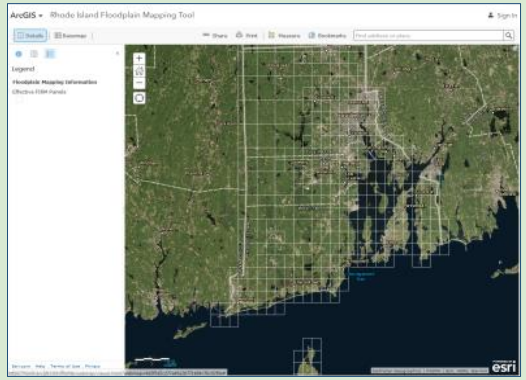
RI CRMC Permit Application Requirement

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

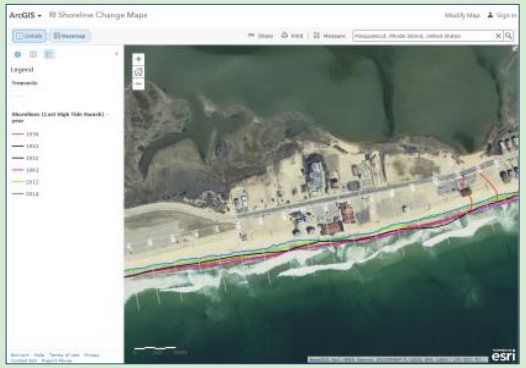
Rhode Island's MAPPING TOOLBOX

Past and Present

1. RIEMA Floodplain Mapping Tool

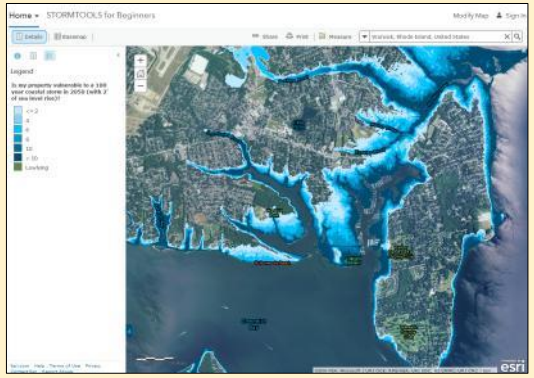


2. Coastal Erosion



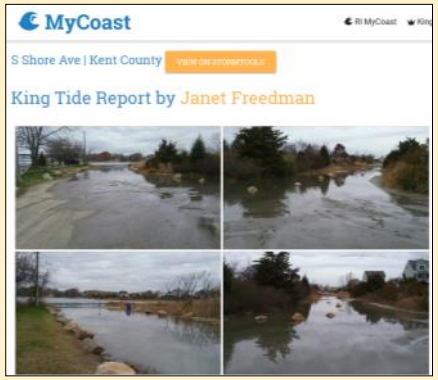
Future

3. STORMTOOLS



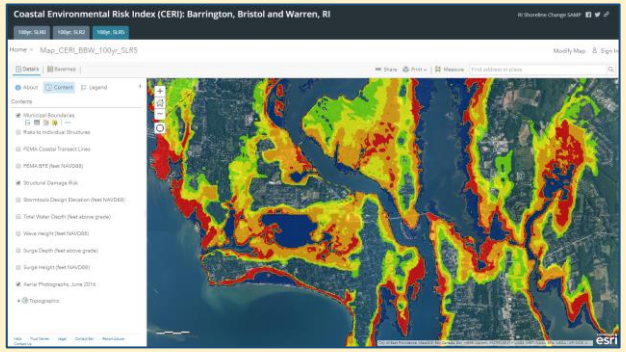
4. SLAMM

5. MyCoast

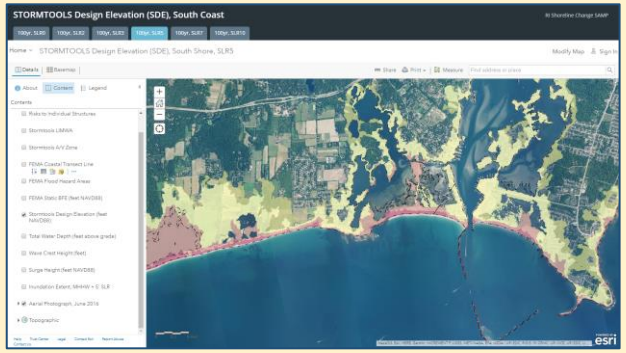


Future

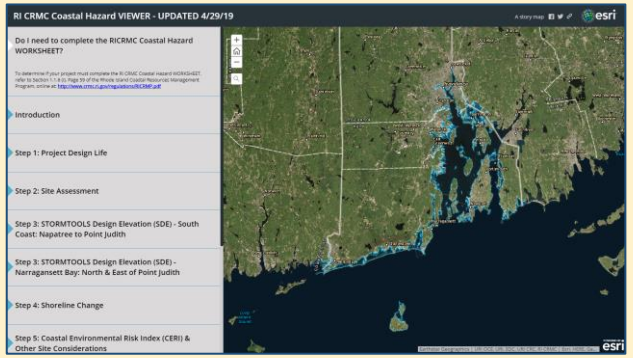
6. Coastal Environmental Risk Index (CERI)



7. STORMTOOLS Design Elevation

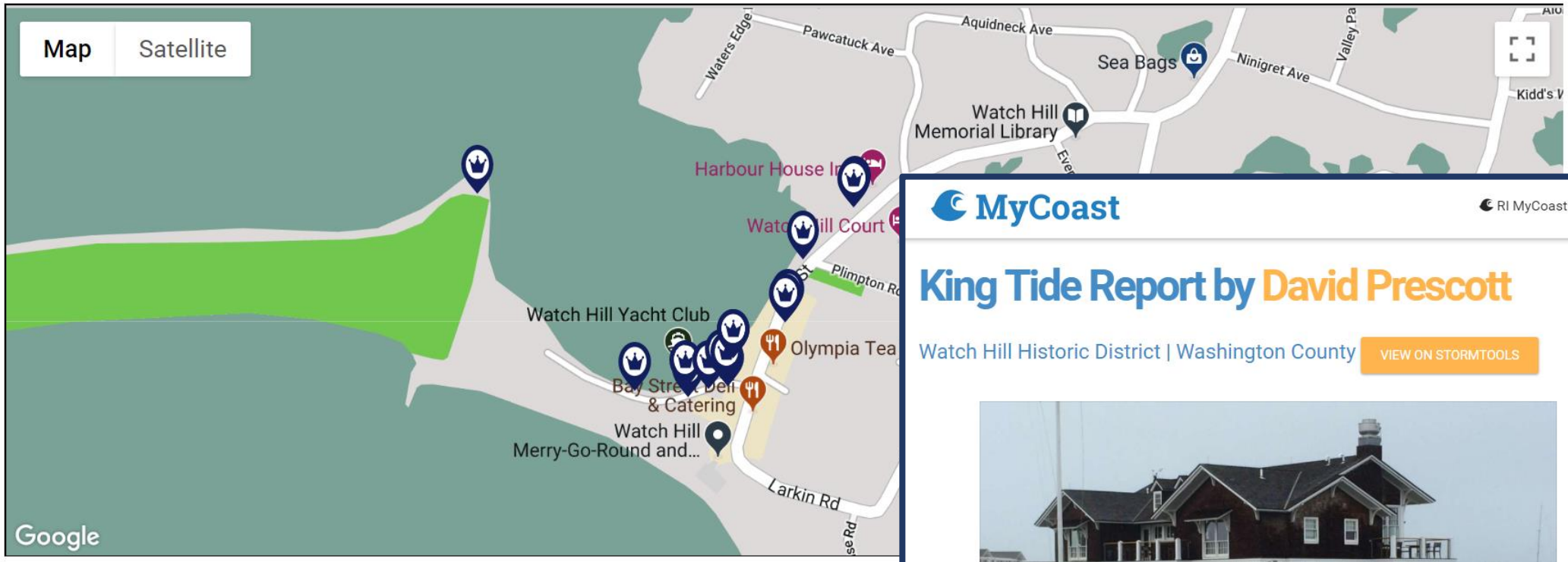


8. RICRMC Coastal Hazard Viewer



MyCoast

RI MyCoast | King Tides | StormReporter | Register | Log in



Please become a MyCoast contributor!

We need updated photos from Watch Hill in the online photo bank!

MyCoast

RI MyCoast | King Tides | StormReporter | Register | Log in

King Tide Report by David Prescott

Watch Hill Historic District | Washington County VIEW ON STORMTOOLS

09/30/2015 | 10:58 am

(0 hours 8 minutes before high tide)

Weather Overview

Wind Speed: 17.1 MPH
Wind Direction: 205°
Temperature: 73°F
Rainfall (Calendar Day): 1.32"
Rainfall (Past 24 Hours): 1.15"

(Click here for full weather details)

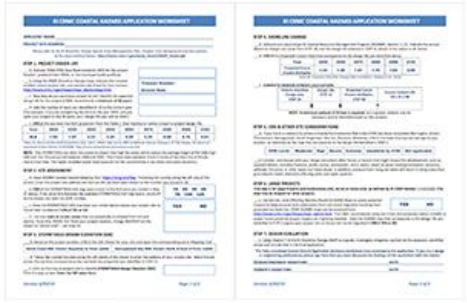
Tidal Overview

Data from New London (13 miles away)
Water Level: 4.5' (observed MLLW)
Observed tide: 11:06 am, 4.5'
Predicted tide: 11:31 am, 3.7'

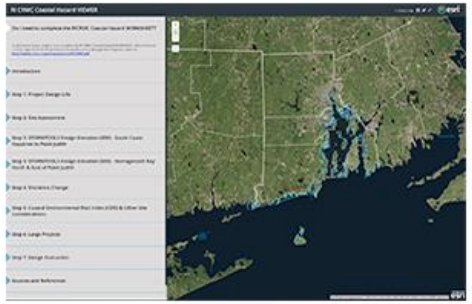
Coastal Hazard Application

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 shoreline change outlined below. http://www.crmc.ri.gov/samp_beach/SAMP_Beach.pdf

STEP 1. PROJECT DESIGN LIFE

___ A. Identify 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.

Transect Number:

Erosion Rate:

___ 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, 2020 + 30 = 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 1E. Sea Level Rise (SLR) Projections (Feb. 2017). NOAA High Curve, 83% Confidence Interval. Newport, RI Tide Gauge. All values are reported in feet relative to NAVD88. http://www.corpsclimate.us/ccaceslcurves.cfm

NOTE: The STORMTOOLS [illegible] 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 *RICRMC Coastal Hazard Mapping Tool* https://arcg.is/qTSqz. 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.

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

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

YES 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.

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. CERI & OTHER SITE CONSIDERATIONS

___ A. If you live in a community where a Coastal Environmental Risk Index (CERI) 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.

CERI 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 effecting 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. 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:_____

RI CRMC Coastal Hazard VIEWER - UPDATED 4/29/19

A story map

esri

Do I need to complete the RICRMC Coastal Hazard WORKSHEET?

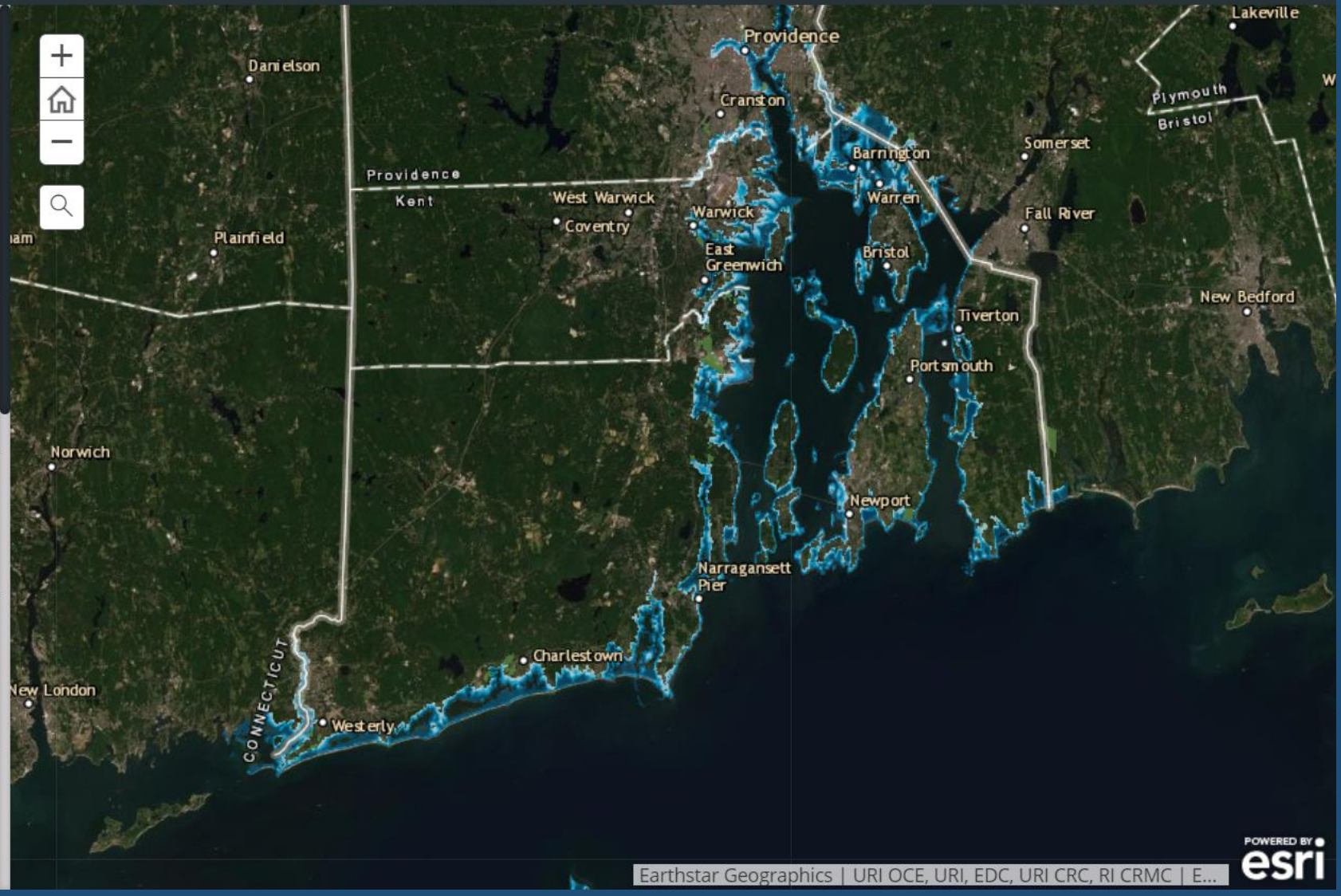
To determine if your project must complete the RI CRMC Coastal Hazard WORKSHEET, refer to Section 1.1.6 (I), Page 59 of the Rhode Island Coastal Resources Management Program, online at: http://www.crmc.ri.gov/regulations/RICRMP.pdf

Introduction

Step 1: Project Design Life

Step 2: Site Assessment

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



VIEWER AND WORKSHEET – available to evaluate all coastal properties whether you are seeking a CRMC permit or not…

RI CRMC Coastal Hazard VIEWER - UPDATED 4/29/19

A story map

Introduction

Welcome to the RICRMC Coastal Hazard Mapping Tool!

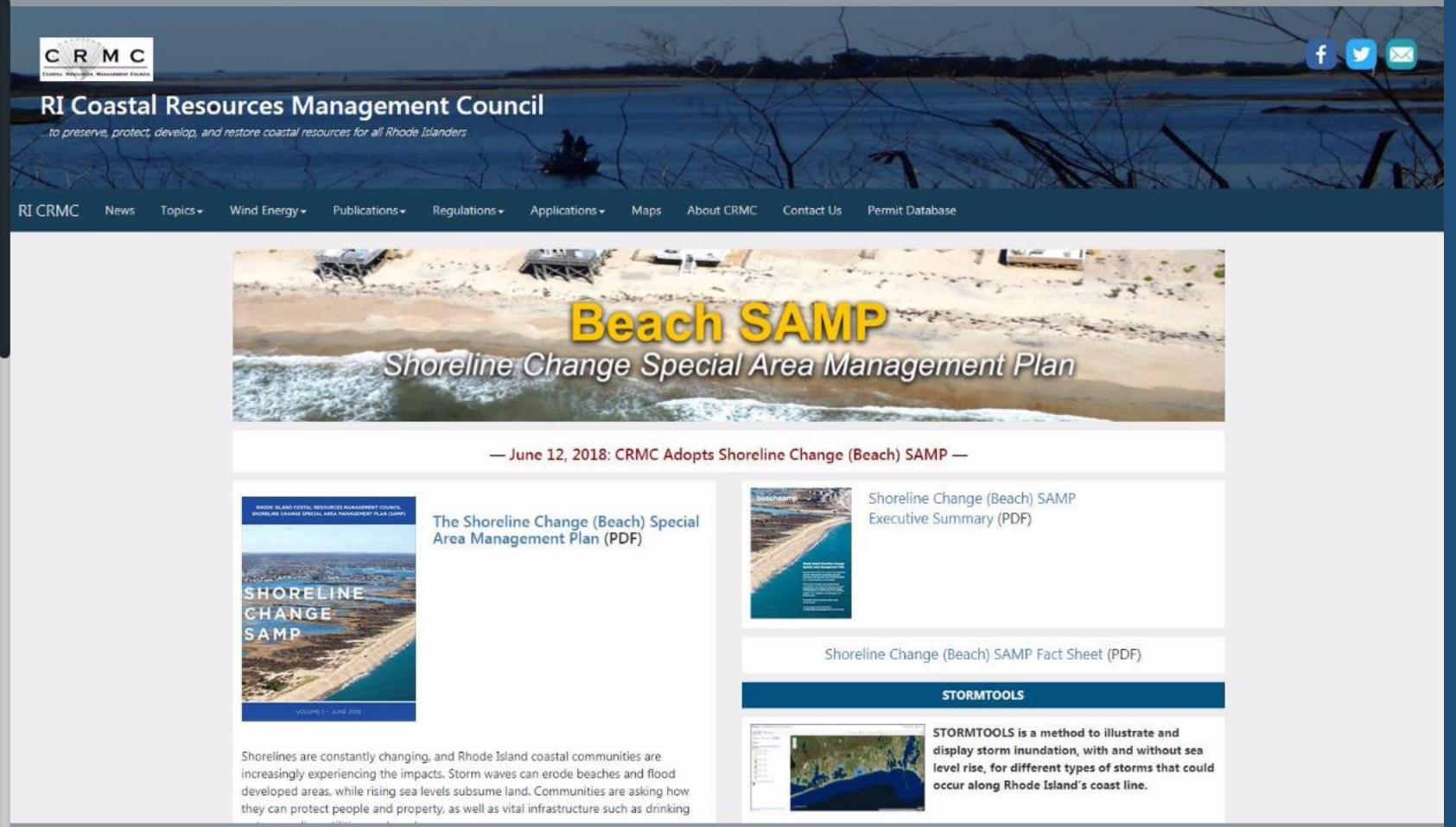
The steps presented below provide guidance for applicants to address Coastal Hazards for selected projects in the design and permitting process for the Rhode Island Coastal Resources Management Council (CRMC).

Chapter 5 of the Shoreline Change Special Area Management Plan (BeachSAMP), can be found online at 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

Step 1: Project Design Life

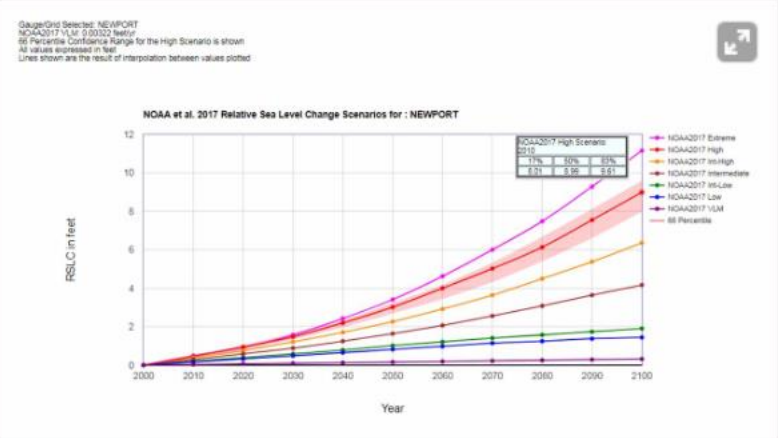


References & links to the Beach SAMP and the online worksheet

Step 1: Project Design Life

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

Identify a DESIGN LIFE, or lifespan, for the project, and the projected Sea Level Rise (SLR) for the project site for exposure to coastal flooding.

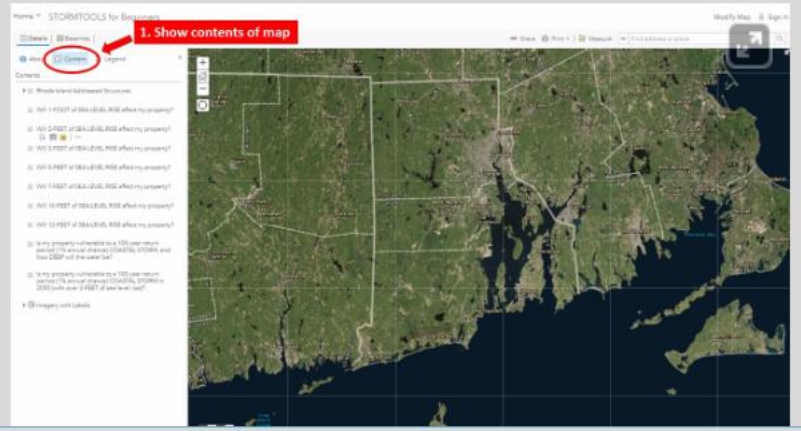
RI CRMC Coastal Hazard VIEWER - UPDATED 4/29/19

A story map

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:



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

ArcGIS STORMTOOLS for Beginners

Modify Map Sign In

Details | Basemap | Share | Print | Measure | 3 bay street, Watch hill ri

Legend

Will 1-FOOT of SEA LEVEL RISE affect my property?

Will 2-FEET of SEA LEVEL RISE affect my property?

Trust Center Legal Contact Esri Report Abuse

CRCOG/State of CT, Microsoft | URI COE, URI EDC, URI CRC, RI C...

POWERED BY esri

PERMANENT INUNDATION - Two tides each day, every day…

RI CRMC Coastal Hazard VIEWER - UPDATED 4/29/19

A story map

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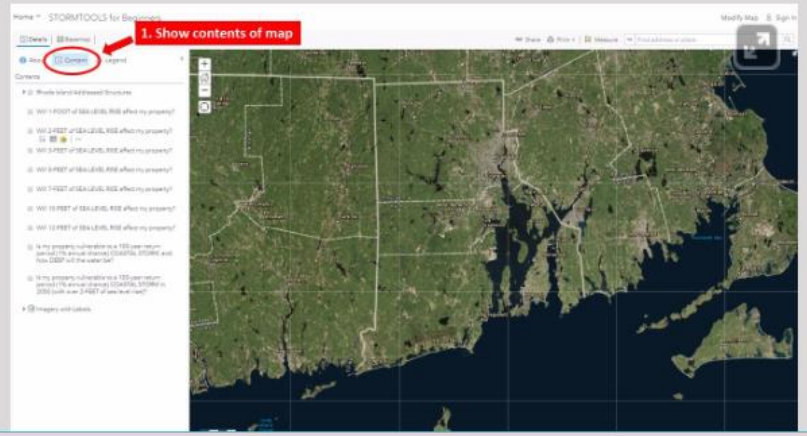

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ArcGIS STORMTOOLS for Beginners

Modify Map Sign In

Details Basemap Share Print Measure 3 bay street, Watch hill ri

Legend

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?

Trust Center Legal Contact Esri Report Abuse

CRCOG/State of CT, Microsoft | URI COE, URI EDC, URI CRC, RI C...

POWERED BY esri

PERMANENT INUNDATION - Two tides each day, every day…

RI CRMC Coastal Hazard VIEWER - UPDATED 4/29/19

A story map

Step 2: Site Assessment

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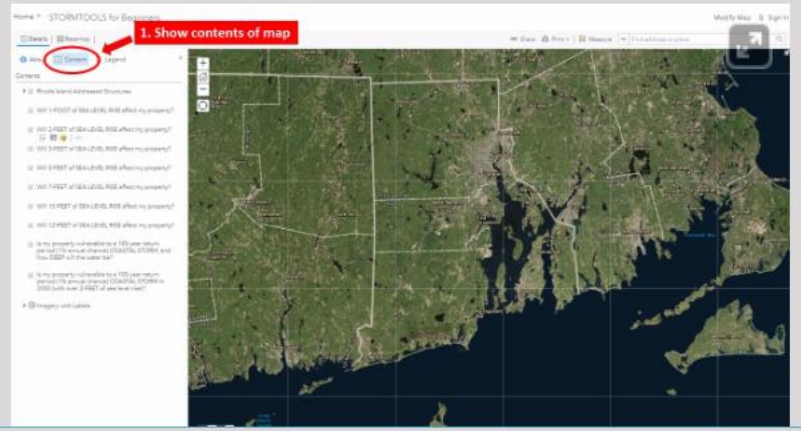

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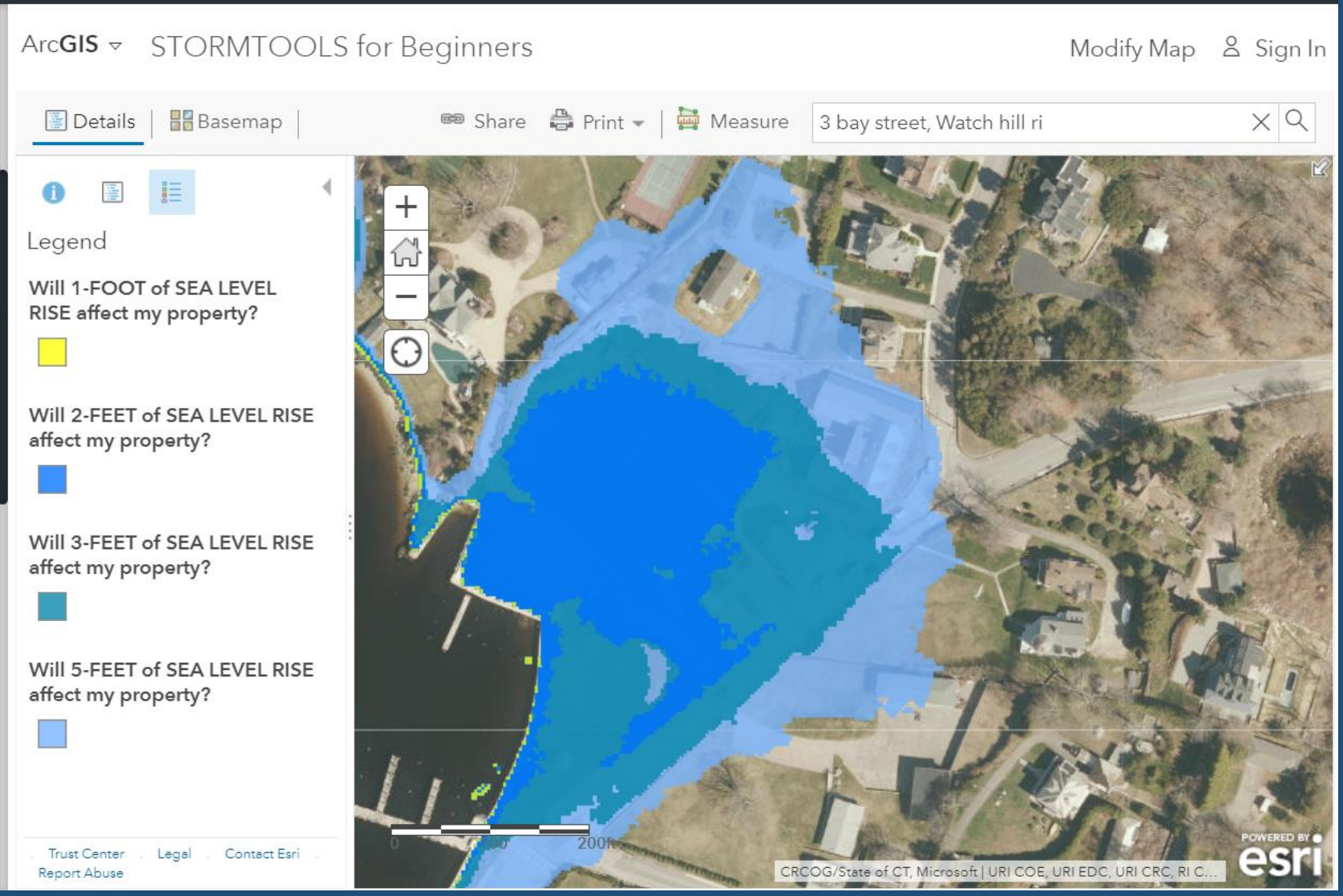


PERMANENT INUNDATION - Two tides each day, every day…

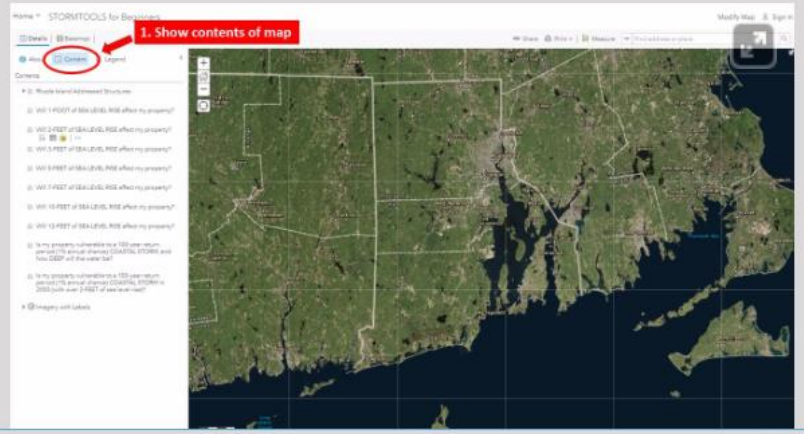
RI CRMC Coastal Hazard VIEWER - UPDATED 4/29/19

A story map

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:



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

ArcGIS STORMTOOLS for Beginners

Modify Map Sign In

Details | Basemap | Share Print Measure

3 bay street, Watch hill ri

Legend

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?

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(1 of 4)

Estimated Flood Depth with 5-FEET Sea Level Rise

The flood depth at this point is estimated to be **2.91 ft.**

Zoom to

CRCOG/State of CT, Microsoft | URI COE, URI EDC, URI CRC, RI C...

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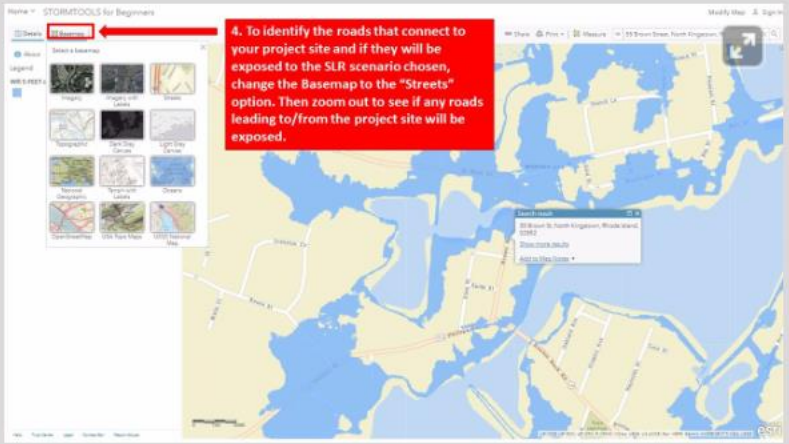
PERMANENT INUNDATION - Two tides each day, every day…

RI CRMC Coastal Hazard VIEWER - UPDATED 4/29/19

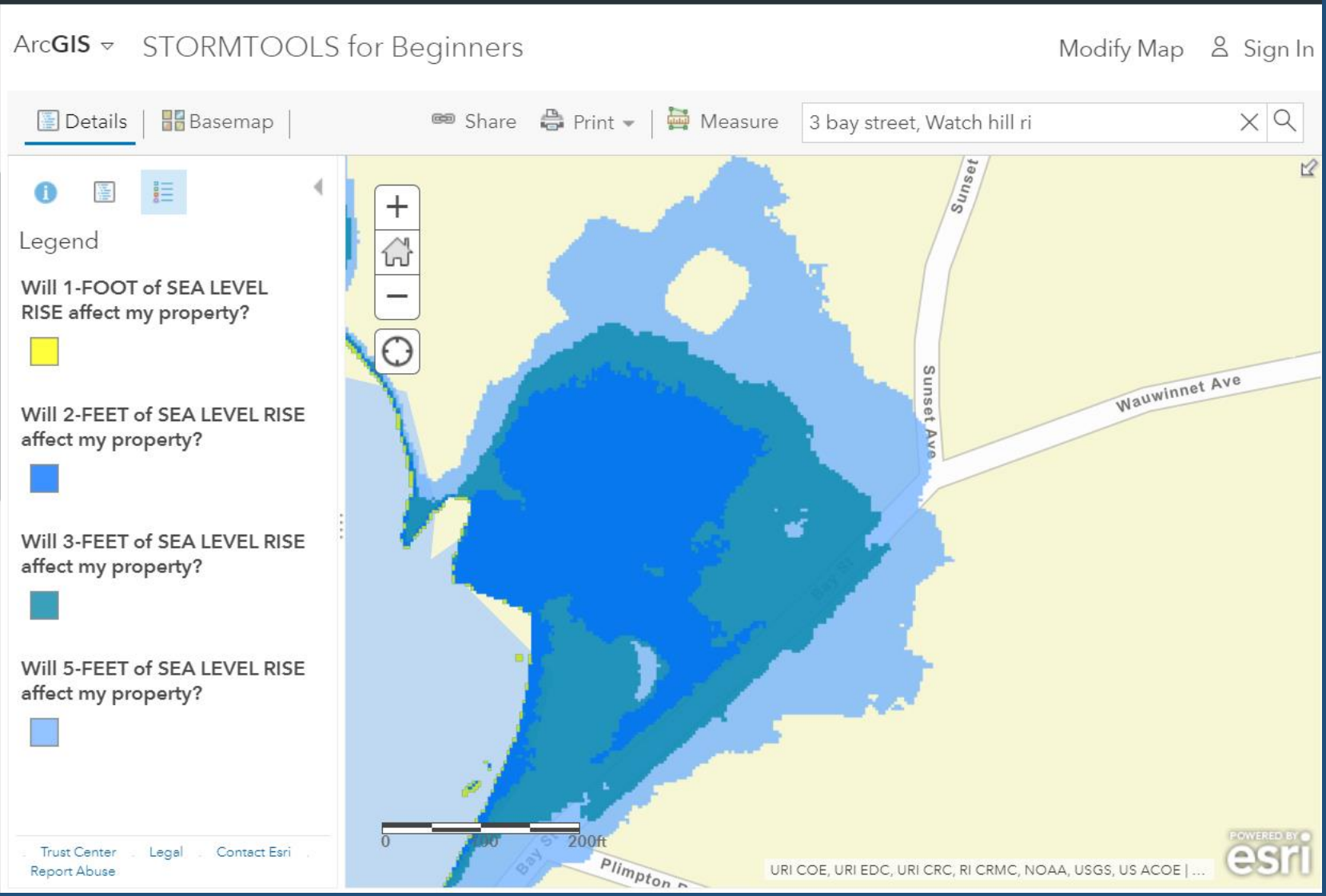
A story map

Step 2: Site Assessment

4. To identify the roads that connect to your project site and if they show exposure to SLR, change the Basemap to the "Streets" option. Then zoom out to see if any roads leading to/from the project site will be exposed.



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



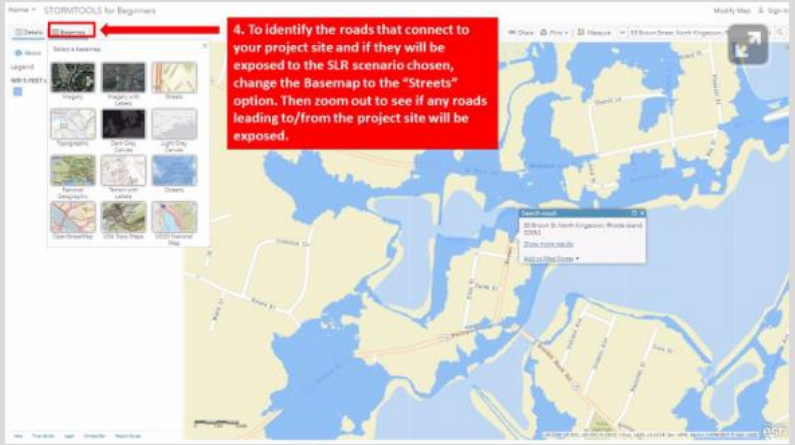
PERMANENT INUNDATION - Two tides each day, every day…
Will the roads be flooding in my neighborhood?

RI CRMC Coastal Hazard VIEWER - UPDATED 4/29/19

A story map

Step 2: Site Assessment

4. To identify the roads that connect to your project site and if they show exposure to SLR, change the Basemap to the "Streets" option. Then zoom out to see if any roads leading to/from the project site will be exposed.



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

ArcGIS STORMTOOLS for Beginners

Modify Map Sign In

Details Basemap Share Print Measure 3 bay street, Watch hill ri

Legend

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?

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Sunset

Sunset Ave

Wauwinnet Ave

(1 of 4)

Estimated Flood Depth with 5-FEET Sea Level Rise

The flood depth at this point is estimated to be **2.39 ft.**

Zoom to

0 100 200ft

URI COE, URI EDC, URI CRC, RI CRMC, NOAA, USGS, US ACOE | ...

PERMANENT INUNDATION - Two tides each day, every day…
Will the roads be flooding in my neighborhood?

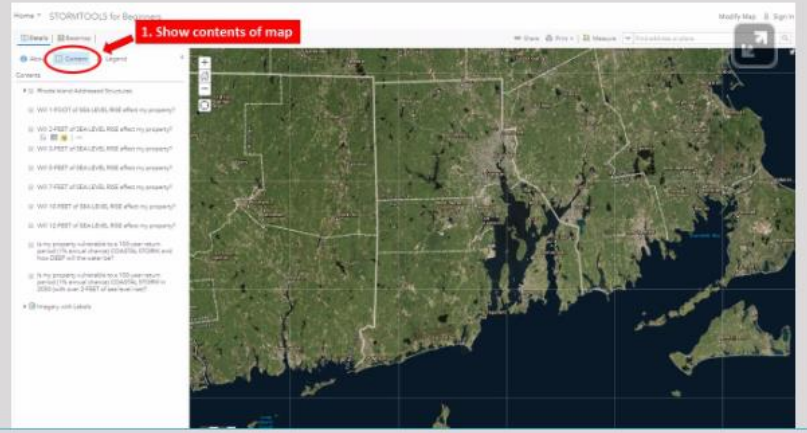
RI CRMC Coastal Hazard VIEWER - UPDATED 4/29/19

A story map

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:



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

ArcGIS STORMTOOLS for Beginners

Modify Map Sign In

Details | Basemap | Share | Print | Measure | 3 Bay St, Westerly, RI, 02891, USA

Legend

Is my property vulnerable to a 100-year return period (1% annual chance) COASTAL STORM, and how DEEP will the water be?

- <= 1
- 2
- 4
- 6
- 8
- 10
- >10
- Adjacent Lowlying Area

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Estimated Water Depth for 100yr Storm

The water depth at this point is estimated to be **8.26 ft.**

Zoom to

100 200ft

CRCOG/State of CT, Microsoft | URI OCE, RPS/ASA, URI EDC, RI ...

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STORM EVENT - The 1954 Hurricane Carol Scenario…

a.k.a., the 1% Annual Chance Storm or 100-year recurrence interval storm…

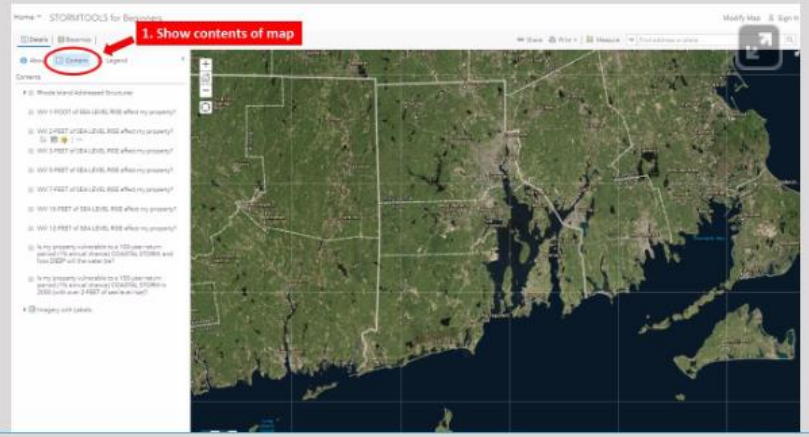
RI CRMC Coastal Hazard VIEWER - UPDATED 4/29/19

A story map

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:



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

ArcGIS STORMTOOLS for Beginners

Modify Map Sign In

Details | Basemap | Share | Print | Measure | 3 Bay St, Westerly, RI, 02891, USA

Legend

Is my property vulnerable to a 100-year return period (1% annual chance) COASTAL STORM in 2050 (with over 2-FEET of sea level rise)?

- <= 2
- 4
- 6
- 8
- 10
- > 10
- Lowlying

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Water Depth from 100 year storm with 2' sea level rise

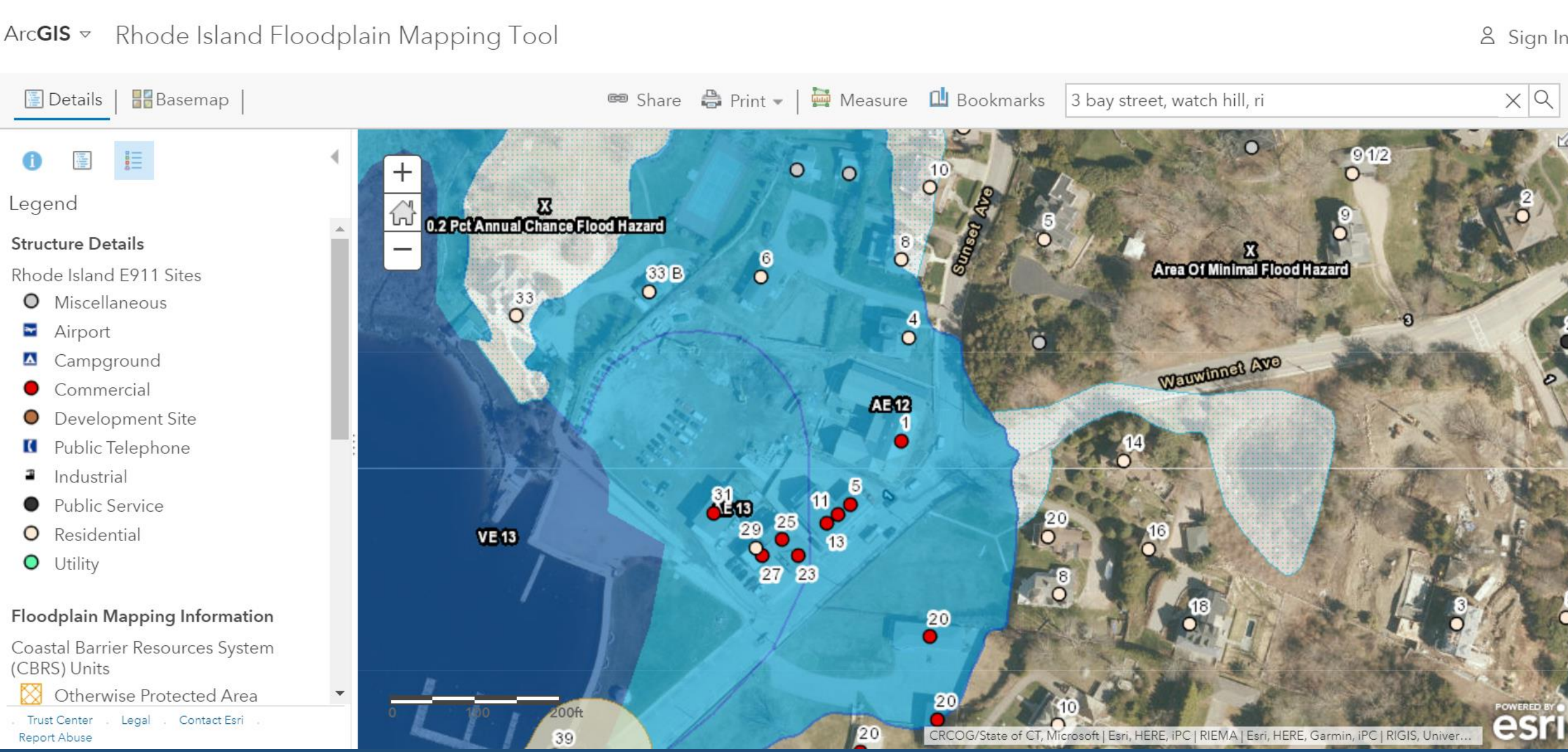
The water depth at this point is estimated to be **10.22 ft.**

Zoom to

CRCOG/State of CT, Microsoft | URI OCE, RPS/ASA, URI EDC, RI ...

POWERED BY esri

STORM EVENT - The 1954 Hurricane Carol Scenario…
WITH A "MOON TIDE" today, or 2 ft Sea Level Rise in the future



FEMA Flood Insurance Rate Maps DO NOT INCLUDE future Sea Level Rise projections – maps are based on past floods & storms.

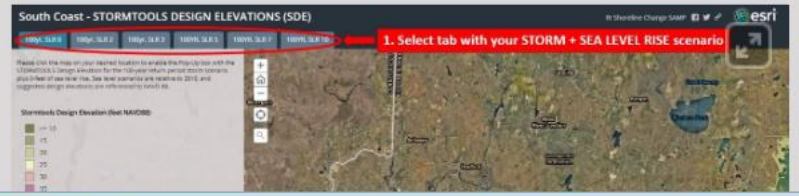
RI CRMC Coastal Hazard VIEWER - UPDATED 4/29/19

A story map

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

- FOR PROPERTIES ALONG RHODE ISLAND'S **SOUTH COAST**: 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



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

100yr, SLR 0 | 100yr, SLR 2 | 100yr, SLR 3 | 100YR, SLR 5 | 100YR, SLR 7 | 100YR, SLR 10

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 3-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

STORMTOOLS Design Elevation

Event: 100yr
SLR: 3 ft
SDE: 17.8 feet NAVD88

OVERVIEW MAP

CRCOG/State of CT, Microsoft | RI CRMC, URI OCE, URI EDC, URI C...

What elevation should I build to if I want to reduce risk of flooding with 3-feet of sea level rise (2050 scenario)?

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

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

What setback distance should be considered to accommodate future coastal erosion?

RI CRMC Coastal Hazard VIEWER - UPDATED 4/29/19

A story map

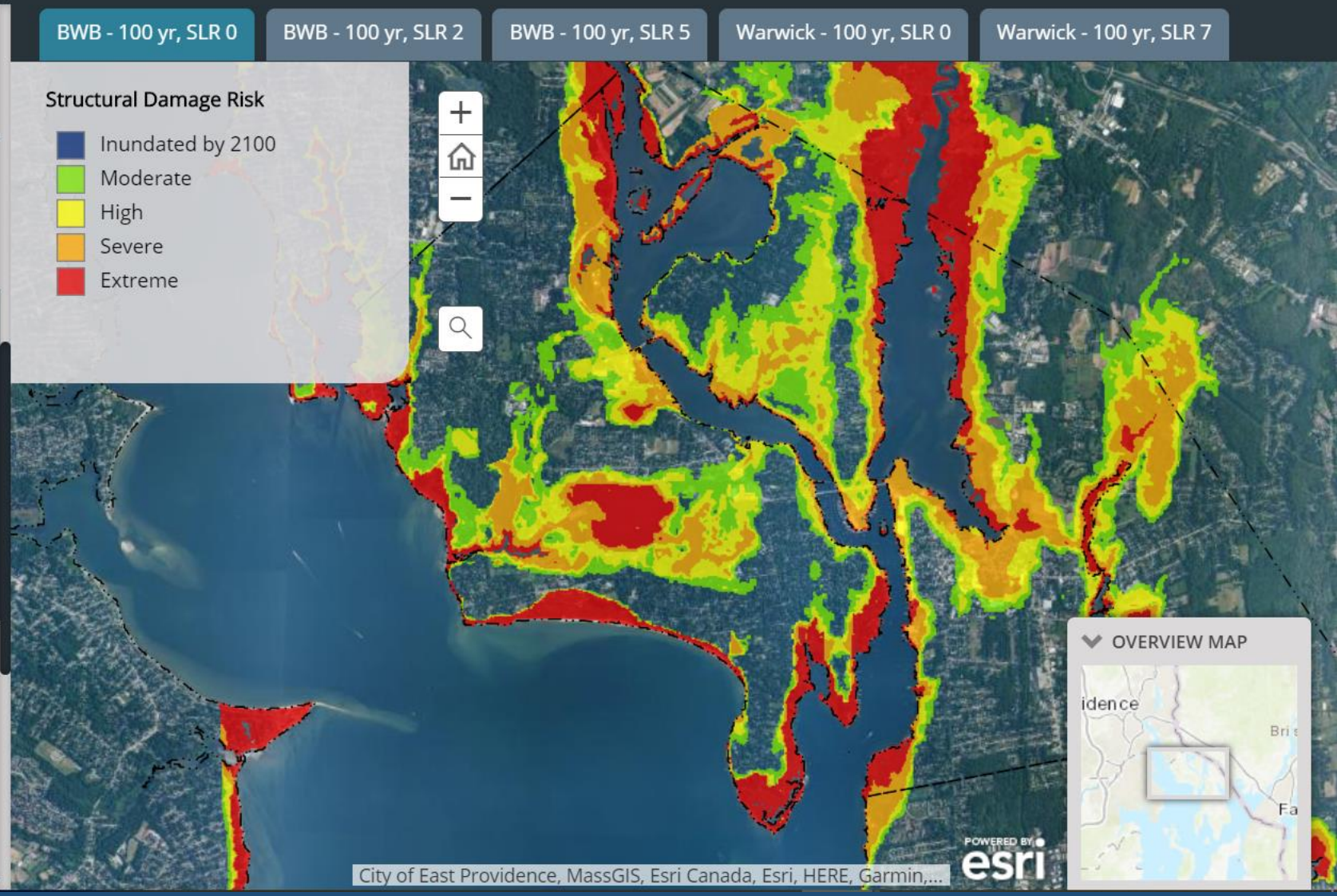
Step 4: Shoreline Change

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:



What extent of structural damage is possible with a 1954 Hurricane Carol scenario? (South Coast will be added to the viewer shortly).

STORMTOOLS Coastal Environmental Risk Index (CERI), South Coast

RI Shoreline Change SAMP

100yr, SLR0 | 100yr, SLR2 | **100yr, SLR3** | 100yr, SLR5 | 100yr, SLR7 | 100yr, SLR10

Home ▾ STORMTOOLS Coastal Environmental Risk Index (CERI), SLR3

Modify Map | Sign In

Details | Basemap | Share | Print ▾ | Measure | Find address or place

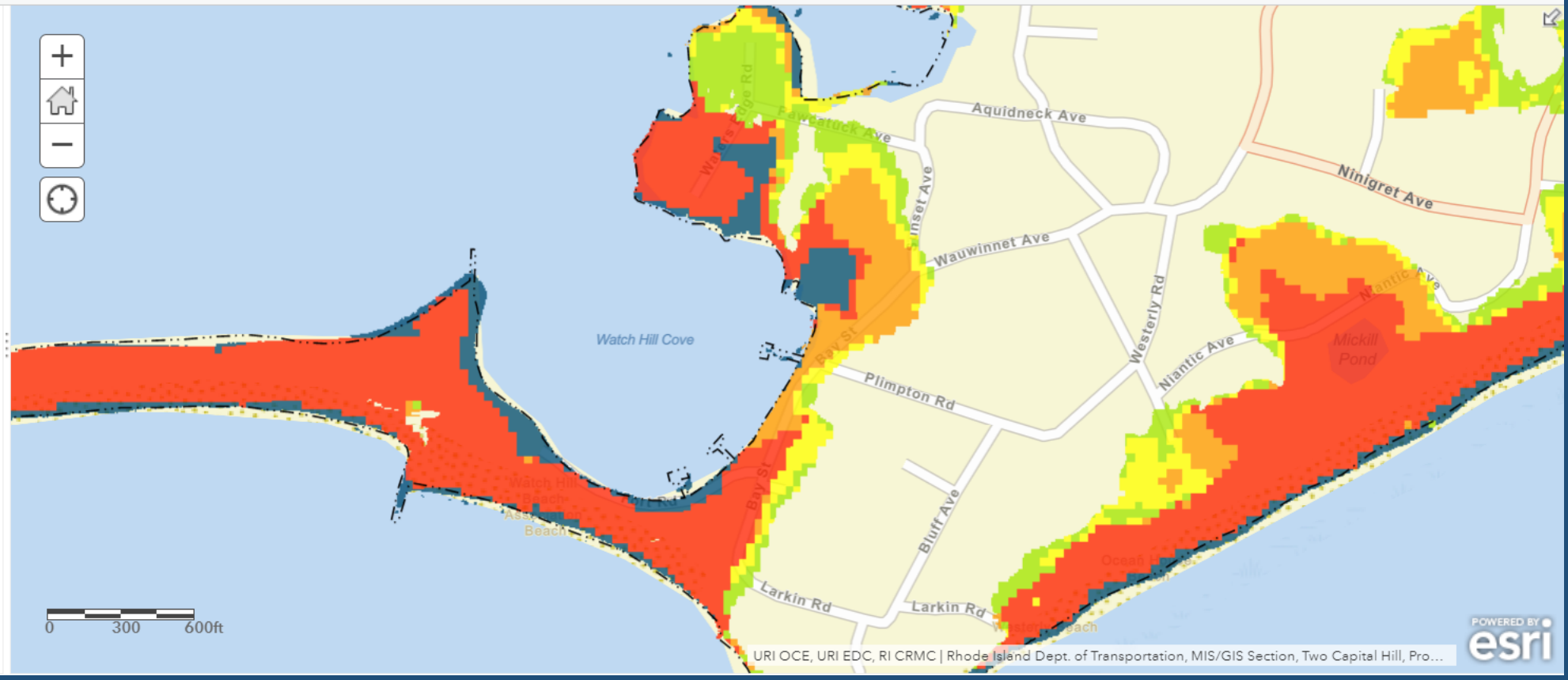
About | Content | **Legend**

Legend

Municipal Boundaries

Structural Damage Risk

- Inundated by 2100
- Moderate
- High
- Severe
- Extreme



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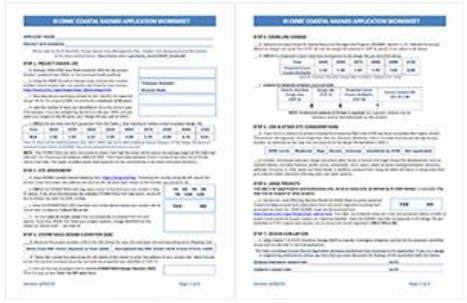
What extent of structural damage is possible with a 1954 Hurricane Carol scenario plus 3-feet of Sea Level Rise?

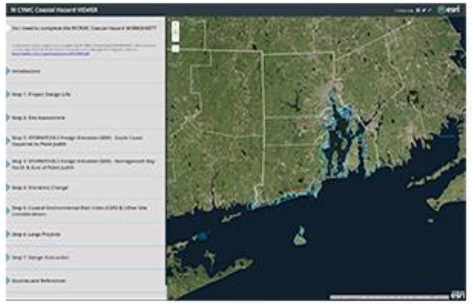
Coastal Hazard Application

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)



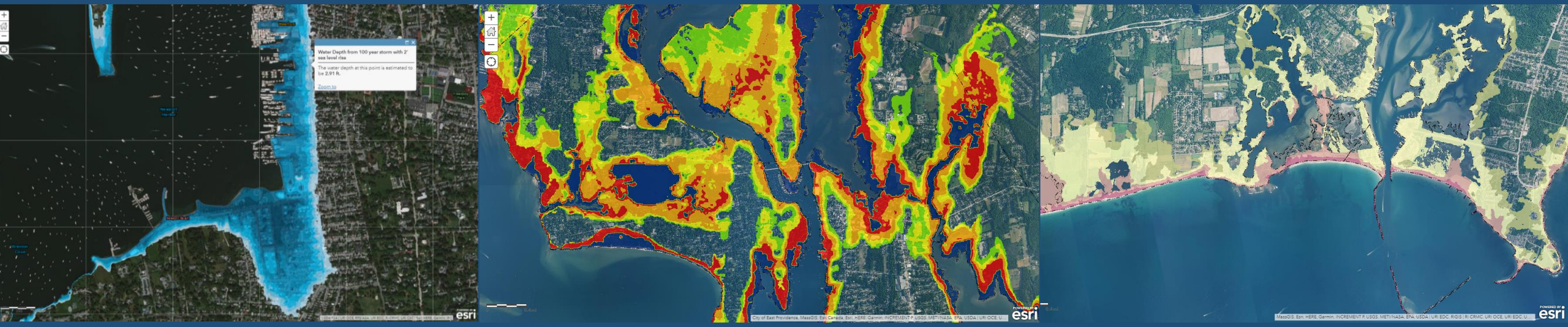
Coastal Hazards Application Online Viewer

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.

Rhode Island's
COASTAL HAZARD APPLICATION VIEWER



Grover Fugate
Executive Director, Rhode Island Coastal Resources Management Council

Teresa A. Crean, AICP
University of Rhode Island Coastal Resources Center / RI Sea Grant

CRMC Coastal Resources Management Council

www.beachsamp.org

The University of Rhode Island Graduate School of Oceanography | CRC Coastal Resources Center