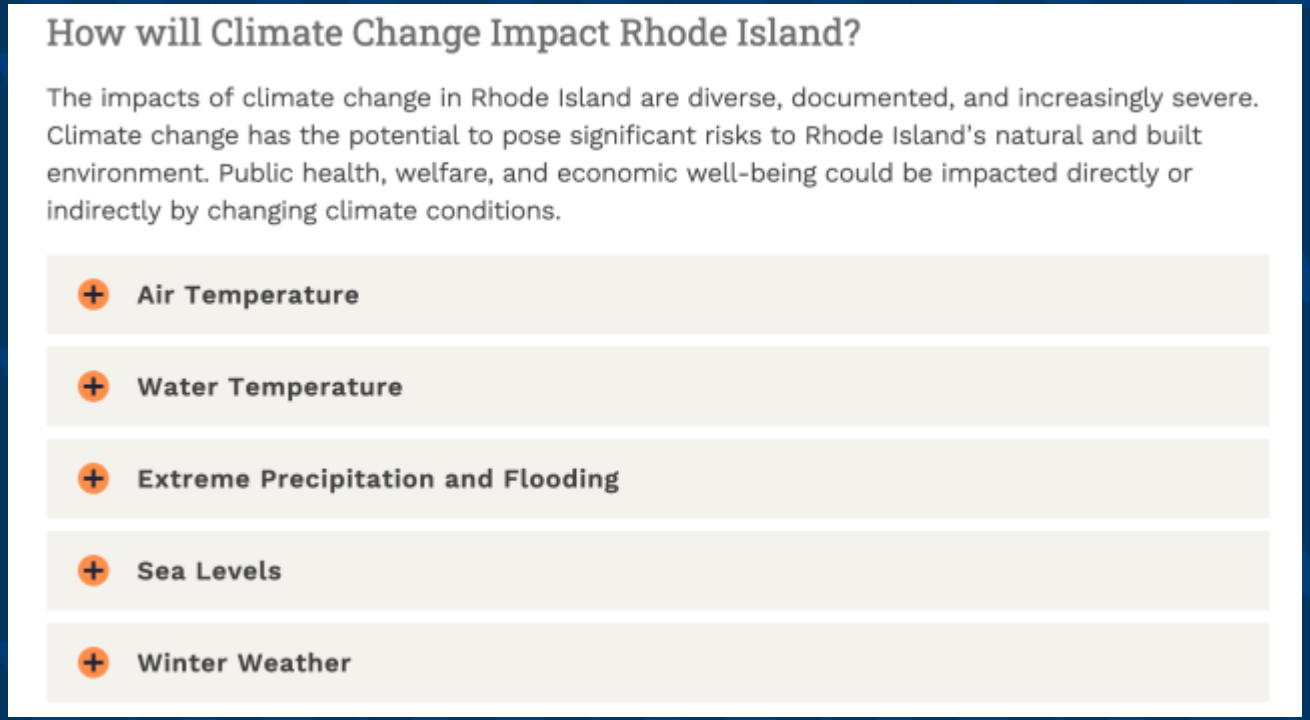
Local Climate Issues and Emerging Legal Situations

Julia Wyman
Director, Marine Affairs Institute
Roger Williams University School of Law
Rhode Island Sea Grant Legal Program

RWU LAW
ROGER WILLIAMS UNIVERSITY

THE
UNIVERSITY
OF RHODE ISLAND

What are the types of climate change effects Rhode Island will face?



How will Climate Change Impact Rhode Island?

The impacts of climate change in Rhode Island are diverse, documented, and increasingly severe. Climate change has the potential to pose significant risks to Rhode Island's natural and built environment. Public health, welfare, and economic well-being could be impacted directly or indirectly by changing climate conditions.

- **Air Temperature**
- **Water Temperature**
- **Extreme Precipitation and Flooding**
- **Sea Levels**
- **Winter Weather**

Source: https:// climatechange.ri.gov/climate-science

Extreme Precipitation and Flooding

As with the entire Northeast, Rhode Island is already experiencing more intense and frequent rainfall events that cause urban and riverine flooding. According to the *Fifth National Climate Assessment*, extreme precipitation events have increased 60% in the Northeast since 1958, the largest increase anywhere in the U.S. Five of the top 10 wettest years in Rhode Island have occurred since 2000, with 2023 recording 57.66" of precipitation, the sixth highest amount since 1904. Urban and low-lying areas with poor drainage are particularly vulnerable to flooding that occurs with heavy precipitation events. As the global climate continues to warm, Rhode Island is expected to see more frequent and intense precipitation events.

Source:
https://climatechange.ri.gov/climate-science

Sea Levels

Along Rhode Island's 400 miles of coastline, sea levels are rising faster than the global average. In Newport, sea levels have risen 10" since 1930. Low-lying coastal areas along Narragansett Bay and Mount Hope Bay are particularly vulnerable to the impacts of sea level rise and saltwater inundation. As glaciers and ice sheets melt around the world in response to warmer temperatures, sea level rise will continue to impact Rhode Island's coastlines. By 2100, sea levels along Rhode Island's coastline are projected to rise another 12" – 48". As coastal storms become stronger in response to warmer ocean temperatures, higher sea levels will result in more intensive erosion along barrier beaches and shorelines.

Source:
https://climatechange.ri.gov/climate-science

Increased precipitation, flooding, and rising sea levels in Rhod Island

Source: https://mycoast.org/

Increased precipitation, flooding, and rising sea levels in Rhod Island

Source: https://mycoast.org/

Increased precipitation, flooding, and rising sea levels in Rhod Island

Source: https://mycoast.org/

Increased precipitation, flooding, and rising sea levels in Rhod Island

Source: https://mycoast.org/

Increased precipitation, flooding, and rising sea levels in Rhod Island

Source: https://mycoast.org/

Increased precipitation, flooding, and rising sea levels in Rhod Island

Source: https://mycoast.org/

Increased precipitation, flooding, and rising sea levels in Rhod Island

Source: https://mycoast.org/

Increased precipitation, flooding, and rising sea levels in Rhod Island

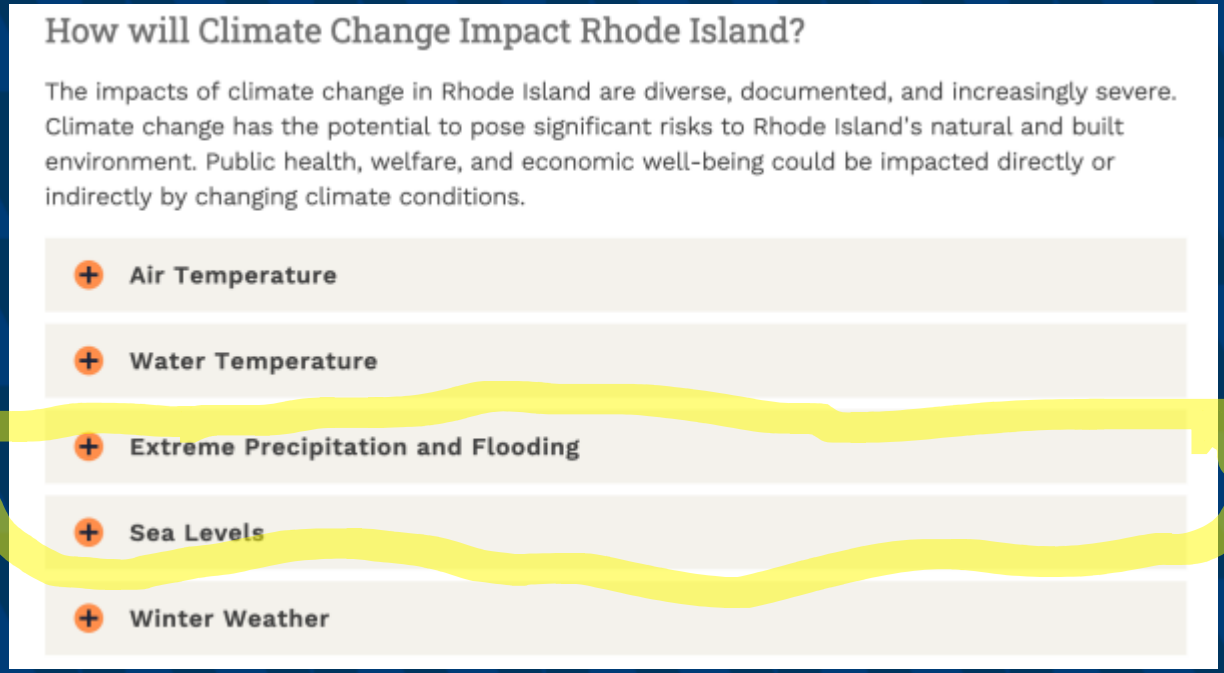
Source: https://mycoast.org/

Increased precipitation, flooding, and rising sea levels in Rhod Island

Source: https://mycoast.org/

What is on the minds of our environmental and municipa
leaders?

What is on the minds of our environmental and municipa leaders?



Source: https://climatechange.ri.gov/climate-science

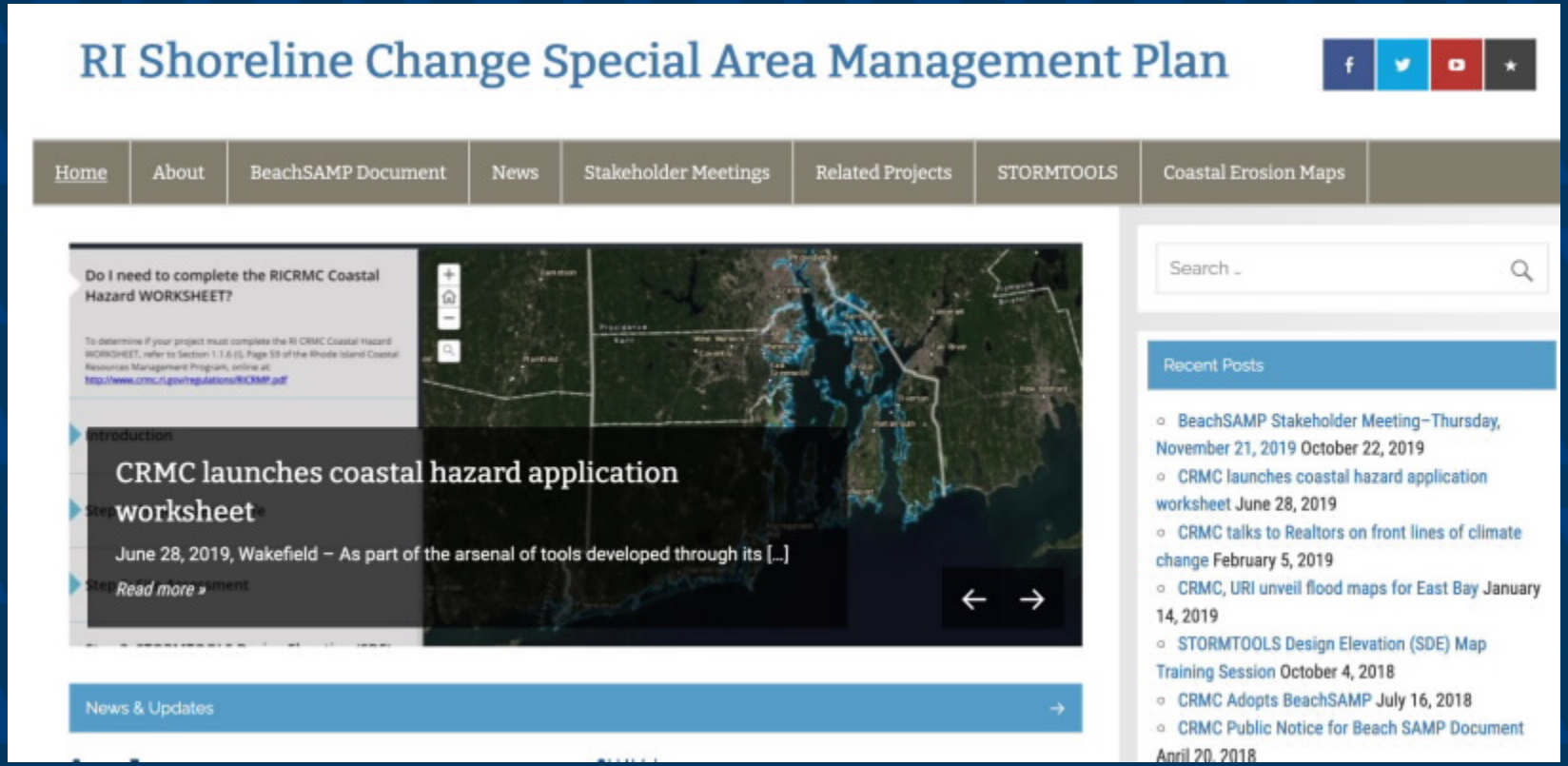
Emerging legal situations

What will municipalities be liable for?

What happens to public access and property ownership at the shoreline?

When do communities think about relocation?

Municipal liability



Source: https://www.beachsamp.org/

STORMTOOLS

Rhode Island STORMTOOLS

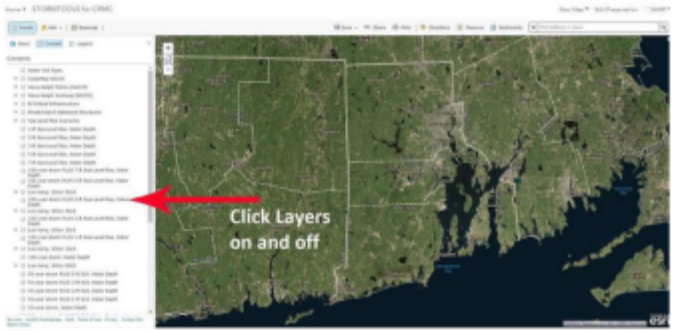
STORMTOOLS for Beginners | Advanced STORMTOOLS | RI CRMC Coastal Hazard Application | STORMTOOLS Design Elevation (SDE) | Inland STORMTOOLS | More

STORMTOOLS is a method to illustrate and display storm inundation, with and without sea level rise, for different types of storms that could occur along Rhode Island's coast line.

What is STORMTOOLS?

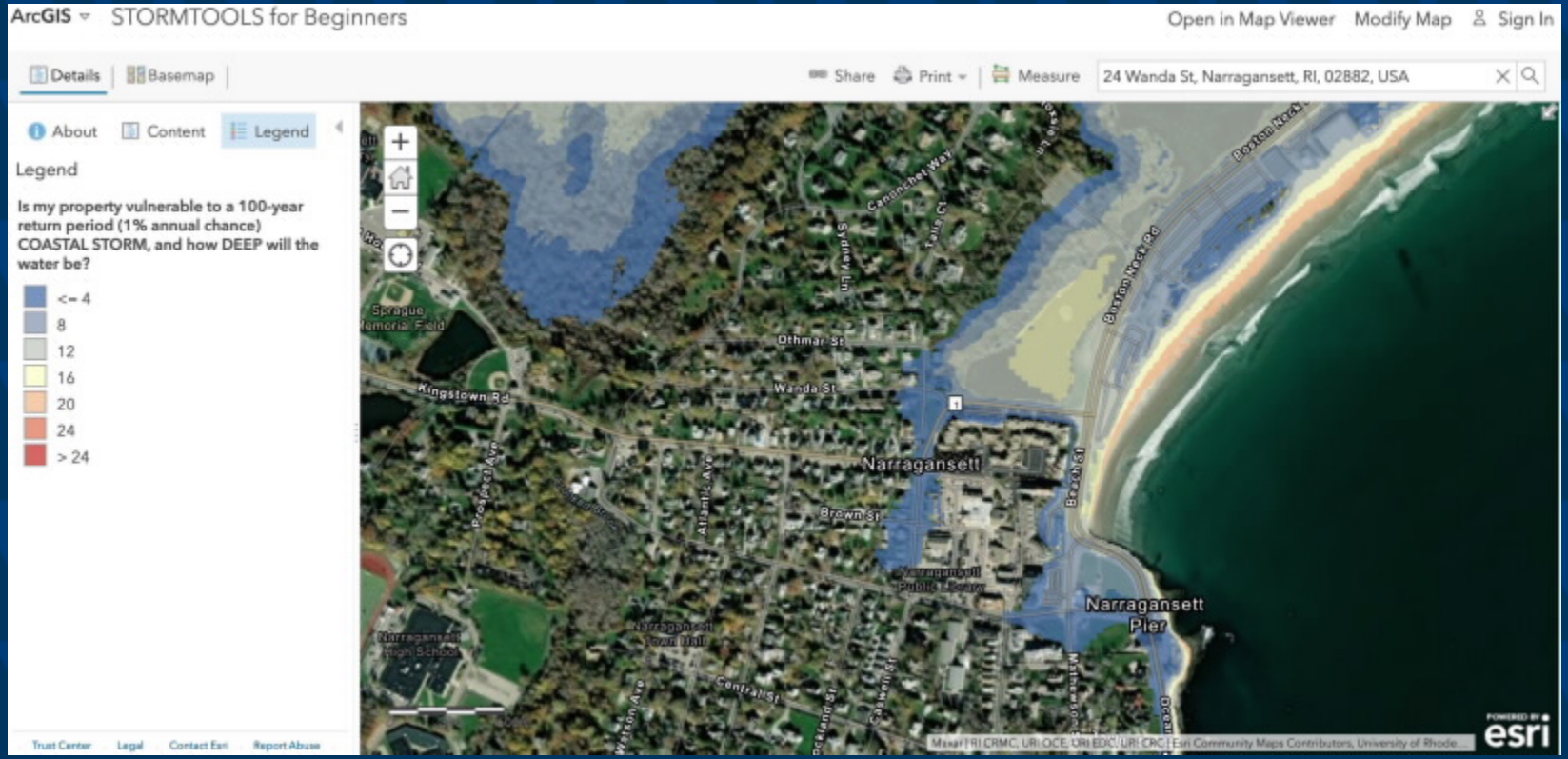
STORMTOOLS is a method to map storm inundation, with and without sea level rise, for varying return period storms that covers all of Rhode Island's coastal waters. Predictions are provided that show water extent and depth at any given point for nuisance floods (1, 3, 5, and 10 year recurrence intervals) and 25, 50, 100, and 500 year storm scenarios at a 95% confidence interval. Sea level rise of 1, 2, 3, 5, and 7 feet on their own on their own as well as combined with each storm scenario are also modeled. Flood maps are also provided for historical hurricanes to include 1938, 1954 (Carol), 1991 (Bob), and 2012 (Sandy).

STORMTOOLS is accessed online through ArcGIS.com and can be used by anyone - there is no need to download any software or go through extensive training. The maps are high resolution (1 m, 3 3.3 ft horizontal) and the user can type in an address of zoom to an area of interest and



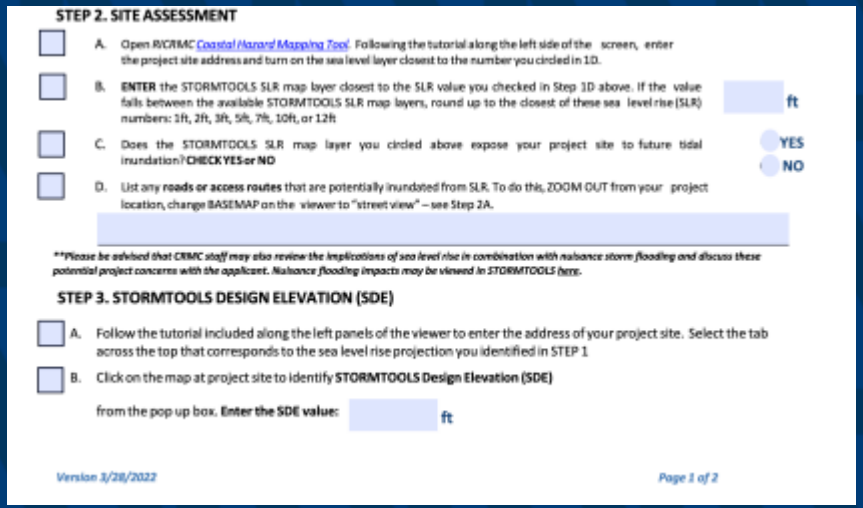
Source: https://stormtools-mainpage-crc-uri.hub.arcgis.com/

STORMTOOLS



Source: https://stormtools-mainpage-crc-uri.hub.arcgis.com/

Coastal Hazard Analysis



STEP 2. SITE ASSESSMENT

A. Open RICRMC *Coastal Hazard Mapping Tool*. 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 1D.

B. **ENTER** the STORMTOOLS SLR map layer closest to the SLR value you checked in Step 1D above. If the value falls between the available STORMTOOLS SLR map layers, round up to the closest of these sea level rise (SLR) numbers: 1ft, 2ft, 3ft, 5ft, 7ft, 10ft, or 12ft _____ ft

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

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

***Please be advised that CRMC staff may also review the implications of sea level rise in combination with nuisance storm flooding and discuss these potential project concerns with the applicant. Nuisance flooding impacts may be viewed in STORMTOOLS here.*

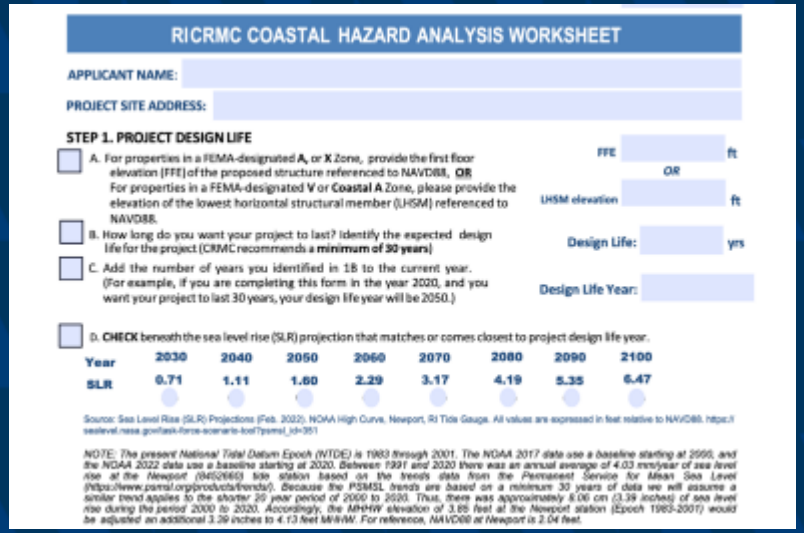
STEP 3. STORMTOOLS DESIGN ELEVATION (SDE)

A. 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 1

B. Click on the map at project site to identify **STORMTOOLS Design Elevation (SDE)**

from the pop up box. **Enter the SDE value:** _____ ft

Version 3/28/2022 *Page 1 of 2*



RICRMC COASTAL HAZARD ANALYSIS WORKSHEET

APPLICANT NAME:

PROJECT SITE ADDRESS:

STEP 1. PROJECT DESIGN LIFE

A. For properties in a FEMA-designated **A,** or **X** Zone, provide the first floor elevation (FFE) of the proposed structure referenced to NAVD88, **OR** For properties in a FEMA-designated **V** or **Coastal A** Zone, please provide the elevation of the lowest horizontal structural member (LHSM) referenced to NAVD88. **FFE** _____ ft **OR** **LHSM elevation** _____ ft

B. How long do you want your project to last? Identify the expected design life for the project (CRMC recommends a **minimum of 30 years**) **Design Life:** _____ yrs

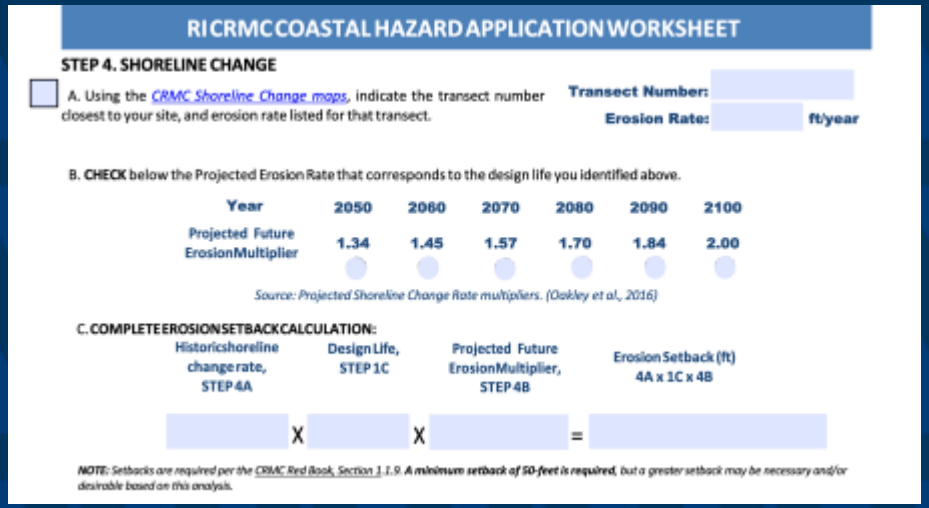
C. Add the number of years you identified in 1B to the current year. (For example, if you are completing this form in the year 2020, and you want your project to last 30 years, your design life year will be 2050.) **Design Life Year:** _____

D. **CHECK** beneath the sea level rise (SLR) projection that matches or comes closest to project design life year.

Year	2030	2040	2050	2060	2070	2080	2090	2100
SLR	0.71	1.11	1.60	2.29	3.17	4.19	5.35	6.47

Source: Sea Level Rise (SLR) Projections (Feb. 2022): NOAA High Curve, Newport, RI Tide Gauge. All values are expressed in feet relative to NAVD88. https://sealevel.nasa.gov/task-force-scenario-tool?psmsl_id=351

NOTE: The present National Tidal Datum Epoch (NTDE) is 1983 through 2001. The NOAA 2017 data use a baseline starting at 2990, and the NOAA 2022 data use a baseline starting at 2020. Between 1991 and 2020 there was an annual average of 4.03 mm/year of sea level rise at the Newport (8452660) tide station based on the trends data from the Permanent Service for Mean Sea Level (https://www.psmsl.org/products/trends/). Because the PSMSL trends are based on a minimum 30 years of data we will assume a similar trend applies to the shorter 20 year period of 2000 to 2020. Thus, there was approximately 8.06 cm (3.39 inches) of sea level rise during the period 2000 to 2020. Accordingly, the MHHW elevation of 3.88 feet at the Newport station (Epoch 1983-2001) would be adjusted an additional 3.39 inches to 4.13 feet MHHW. For reference, NAVD88 at Newport is 2.04 feet.



RICRMC COASTAL HAZARD APPLICATION WORKSHEET

STEP 4. SHORELINE CHANGE

A. Using the *CRMC Shoreline Change maps*, indicate the transect number closest to your site, and erosion rate listed for that transect. **Transect Number:** _____ **Erosion Rate:** _____ **ft/year**

B. **CHECK** below 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

Source: Projected Shoreline Change Rate multipliers. (Oakley et al., 2016)

C. **COMPLETE EROSION SETBACK CALCULATION:**

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

***NOTE:** Setbacks are required per the CRMC Red Book, Section 1.1.9. **A minimum setback of 50-feet is required,** but a greater setback may be necessary and/or desirable based on this analysis.*

Source: http://www.crmc.ri.gov/coastalhazardapp.html

Municipal liability

Activities that may generate liability concerns:
-building and maintaining roads and bridges
-installing and maintaining stormwater facilities
-approving subdivisions
-issuing building permits

Municipalities may:
-create low-impact development zones or overlay zones

See more: https://prep-ri.org/prep-ri/liability/

Municipal liability

-Physical Takings
-Regulatory Takings

Public access

Photo courtesy of Rhode Island Sea Grant

Public access

-2021 Special Legislative Commission to Study and Provide Recommendations on the Issues Relating to Lateral Access Along the Rhode Island Shoreline (Rep. Cortvriend, Chair, Rep. Filippi, Vice-Chair)

-In 2023, the shoreline access bill was signed into law.

-Rhode Island Constitution:

Section 16. Compensation for taking of private property for public use — Regulation of fishery rights and shore privileges not public taking.

Private property shall not be taken for public uses, without just compensation. The powers of the state and of its municipalities to regulate and control the use of land and waters in the furtherance of the preservation, regeneration, and restoration of the natural environment, and in furtherance of the protection of the rights of the people to enjoy and freely exercise the rights of fishery and the privileges of the shore, as those rights and duties are set forth in Section 17, shall be an exercise of the police powers of the state, shall be liberally construed, and shall not be deemed to be a public use of private property.

Section 17. Fishery rights — Shore privileges — Preservation of natural resources.

The people shall continue to enjoy and freely exercise all the rights of fishery, and the privileges of the shore, to which they have been heretofore entitled under the charter and usages of this state, including but not limited to fishing from the shore, the gathering of seaweed, leaving the shore to swim in the sea and passage along the shore; and they shall be secure in their rights to the use and enjoyment of the natural resources of the state with due regard for the preservation of their values; and it shall be the duty of the general assembly to provide for the conservation of the air, land, water, plant, animal, mineral and other natural resources of the state, and to adopt all means necessary and proper by law to protect the natural environment of the people of the state by providing adequate resource planning for the control and regulation of the use of the natural resources of the state and for the preservation, regeneration and restoration of the natural environment of the state.

Public access and property ownership at the shoreline

Photo credit: Lane Turner/Boston Globe Staff

When should communities think about relocation?

Market to Metacom

Climate Resilience and Economic Development Plan

Welcome

Welcome to the digital home of the Town of Warren's "Market to Metacom Project"! As our community plans for a future with the challenges from climate change impacts, it will be critical to share information and talk with each other about the potential futures for the Market Street neighborhood and the Metacom Avenue corridor.

Project Description

The Town of Warren is working on an overall neighborhood plan that holistically addresses water quality and climate change challenges while promoting economic redevelopment. This plan will serve as an example of how to combine green infrastructure and climate change actions, such as retreat, in a manner that attracts a shift in private investment while improving the overall resilience of the neighborhood.

Source:
https://experience.arcgis.com/experience/6243398bbb804cc794fbdfbf2e5a71c0/page/Home/

When should communities think about relocation?

Photo credit: Sofie Rudin/The Public's Radio

Workshop on community-driven relocation

Marine Affairs Institute
Roger Williams University School of Law
Friday, January 31, 2025

Useful links to explore more

Beach SAMP:
https://www.beachsamp.org/

STORMTOOLS:
https://stormtools-mainpage-crc-uri.hub.arcgis.com/

CRMC's Coastal Hazard Application:
http://www.crmc.ri.gov/coastalhazardapp/CH_App_Worksheet_Interactive.pdf

Red Book (650-RICR-20-00-1):
https://rules.sos.ri.gov/regulations/part/650-20-00-1

Marine Affairs Institute workshop on municipal liability:
https://law.rwu.edu/academics/marine-affairs-institute/research-and-outreach/symposiaconferences/legal-aspects-coastal-adaptation-resilience-ri-dec-2015

Marine Affairs Institute symposium on legal strategies for climate adaptation in New England:
https://law.rwu.edu/academics/marine-affairs-institute/research-and-outreach/symposiaconferences/legal-strategies-climate-adaptation

Useful links to explore more

Marine Affairs Institute reports:
https://marineaffairsinstitute.org/

PREP-RI:
https://prep-ri.org/

MyCoast Rhode Island:
https://mycoast.org/ri

State of Rhode Island climate information, including all official reports:
https://climatechange.ri.gov/

Special Legislative Commission to Study and Provide Recommendations on the Issues Relating to Lateral Access Along the Rhode Island Shoreline Final Report:
https://www.rilegislature.gov/commissions/shac/commdocs/Final%20Report%20Shoreline%20Access%20Commission%20March%2031%202022.pdf

Rhode Island Transfer of Development Rights Manual:
https://web.archive.org/web/20210814234110/http://www.dem.ri.gov/programs/bpoladm/suswshed/pdfs/devright.pdf

Thank you!

Julia Wyman
Director
Marine Affairs Institute
Roger Williams University School of Law
Rhode Island Sea Grant Legal Program
jwyman@rwu.edu