

## DEFINITIONS

**Coastal Flooding:** this occurs as a result of higher sea levels and lower land elevation. Sea levels can rise during a storm surge, when high winds push water onto land.

**Mean Higher High Water (MHHW):** Of the two daily high tides, one is often slightly higher than the other. The higher tide is used to determine the average highest water level in a normal day. In STORMTOOLS, flooding is shown above MHHW to show the maximum extent of the water.

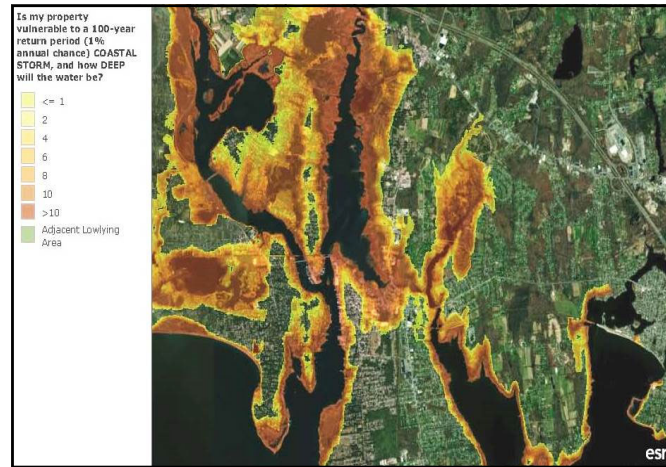
**Spring and King Tides:** especially large tides that happen on a regular basis throughout the year; spring tides happen roughly every 14 days, which occur at the full and new moons when the sun and moon are lined up and make the tides more extreme.

**Return Period:** Also known as a **recurrence interval**, this is the estimate of the likelihood of the storm or flood occurring. It is a statistical measurement based on historic storms. For example., a 50-year storm is a 1 in 50 chance or 2 percent annual chance of occurring.

**Sea Level Rise:** Sea levels have changed over Earth's history, but are rising faster than they have in the past few thousand years, because of climate change. As water warms, basic physics teaches us that it expands, which is one part of sea level rise. Another is melting of ice sheets over land in Greenland and West Antarctica, as well as changing weather patterns, which are adding more water to the ocean.

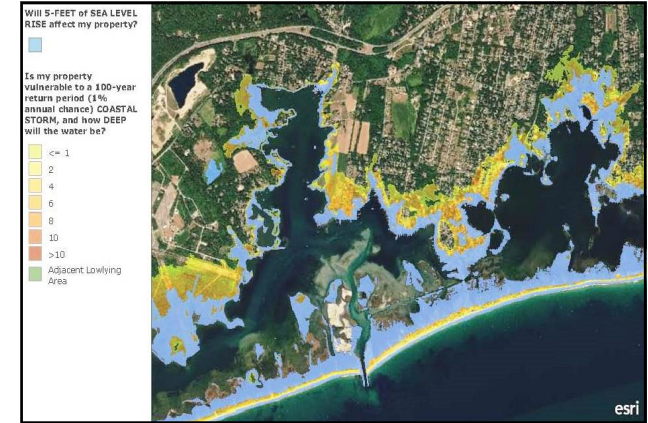
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*For more information on STORMTOOLS, go to <http://www.beachsamp.org/stormtools/>*



*Barrington showing the 100-yr storm vulnerability layer*

## Using STORMTOOLS



*Charlestown showing 7 ft of sea level rise (blue), 100-yr storm layer*

*A reference guide and tutorial for using STORMTOOLS, a one-map stop for all residents of Rhode Island to better understand their risk from coastal inundation*

*Developed by the University of Rhode Island's Coastal Resources Center, the Environmental Data Center, Rhode Island Sea Grant, and*

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# STORMTOOLS

## What is STORMTOOLS?

STORMTOOLS is a method to map storm inundation, with and without sea level rise, for storm scenarios with varying severity that covers all of Rhode Island's shoreline.

Predictions are provided showing water extent and depth at any given point for nuisance floods—those with one, three, five, and 10-year recurrence intervals—and the 25, 50, 100, and 500-year storm scenarios. Users can also select one, two, three, and five-foot sea level rise options, combined with the different storm scenarios. Maps are high resolution and users can type in an address or zoom in manually to an area and select different scenarios to better understand their risk.

**STORMTOOLS is available through [www.arcgis.com](http://www.arcgis.com) and can be used by anyone—there is no need to download software or go through extensive training.**

## How should it be used?

STORMTOOLS can be used to study an area of interest (or problem area) by coastal planners and current and potential homeowners.

Professionals can also use it to conduct

coastal planning and regulatory studies. Impacts of changes in the physical coastal landscape, and potential shoreline protection can be examined for varying storm events (10-year versus 500, for example), with or without sea level rise. This use is inexpensive and greatly improves existing coastal resilience planning and management tools.

## Options for Use

There are two ways to access STORMTOOLS: through interactive maps, or through the map journals.

**Interactive maps** have *layers* (a method of showing different data sets) that you can turn on or off. Map journals provide detailed information and photos and guide you through the tool, while still allowing for address searches and zooming.

The tool has two interactive maps—[STORMTOOLS For Beginners](#) and [Advanced STORMTOOLS](#).

**STORMTOOLS for Beginners** version answers:

- ◇ Is my property vulnerable to sea level rise?
- ◇ Is my property in the 100-yr storm floodplain?; and
- ◇ Is my property vulnerable to a 100-yr storm in 2050?

**Advanced STORMTOOLS** is a map gallery offering detailed flood layers, with clickable flooding extents showing water depths at click points, as well as other useful layers. Maps are organized

by time and severity of storms (nuisance or extra/tropical).

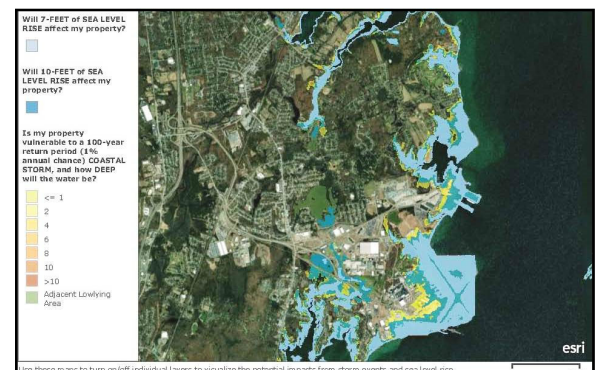
The **map journals** include STORMTOOLS101, Touring Historic Storms, and Coastal Flooding in Rhode Island, as well as information and pictures.

**It is recommended to go through STORMTOOLS101, especially if it is your first time using STORMTOOLS.**

## Navigating the Tool

Use the buttons on the map or your mouse to scroll and pan around the map (+ or - zooms in and out, and the home icon restores the map's original view).

The compass shows your current location, and the magnifying glass allows you to input an address. The legend is on the left side of the screen. Click on the tabs on top of the map to switch between scenarios, and click on the blue flood areas for water depth at that spot.



Quonset map showing 7, 10-ft sea level rise scenarios, and 100-yr storm