

Using the *Surging Seas* free web tool within FEMA's Community Rating System (CRS)

Monmouth County CRS Users Group April 13, 2017

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Using the Surging Seas free web tool within FEMA's Community Rating System (CRS)



The *Surging Seas* CRS guide

We have identified many ways the *Surging Seas* web tool could be used to support activities that receive points within the CRS program through conversations with local CRS coordinators and implementers, and with FEMA CRS representatives. This guide provides step-by-step instructions on how to access and obtain information and downloads from the *Surging Seas* web tool that could be utilized within specific CRS activities in FEMA's *Coordinator's Manual* (FIA-15/2013).

Sample pages from the *Surging Seas* CRS Guide

CRS Activity 512a, Floodplain Management CRS Manual pg. 512-4

CRS Activity 512a, Floodplain Management Planning (FMP)

CRS MANUAL: The maximum credit for this element is 582 points.

FMP credit is provided for a community-wide floodplain management plan that was prepared by following a standard planning process. To receive any credit under this activity, the planning process must receive some credit under each of the 10 steps listed below. If the plan was approved by FEMA as a multi-hazard mitigation plan and one step is missing, the mitigation plan may receive credit, but FMP credit will be limited to 50 points. If two steps are missing, there is no credit for a multi-hazard mitigation plan.

What you get in the web tool

- Users can obtain risk information within *Surging Seas* related to flood hazards in foot or meter increments above the high tide line, or for other hazard scenarios.
- Surging Seas* provides analysis related to flood and sea level rise risk, projections, and maps.

Benefits from CRS experts

- FEMA representatives believe *Surging Seas* could be utilized within steps 4B1 and 4.3. In particular, the mapping layers found in Section 2 of this document could be utilized within step 5(a) and (f).
- We would be interested in hearing from additional CRS experts regarding this section in order to expand this part of the guide.

Table 2B-1: Planning steps for mitigation and the two CRS			
Minimum Standard/Points	CRS		Maximum
Step 1 - Administration	1. Register	14	
Step 2 - Risk Analysis	2. Evaluate hazard	182	
Step 3 - Risk Reduction	3. Develop plan	38	
Step 4 - Flood Hazard	4. Assess the hazard	38	
Step 5 - Flood Hazard	5. Assess the problem	38	
Step 6 - Flood Hazard	6. Set goals	2	
Step 7 - Flood Hazard	7. Determine priorities	38	
Step 8 - Flood Hazard	8. Fund or set plan	38	
Step 9 - Flood Hazard	9. Monitor plan	2	
Step 10 - Flood Hazard	10. Prepare a hazard map	38	
Step 11 - Flood Hazard			
Step 12 - Flood Hazard			
Step 13 - Flood Hazard			
Step 14 - Flood Hazard			
Step 15 - Flood Hazard			
Step 16 - Flood Hazard			
Step 17 - Flood Hazard			
Step 18 - Flood Hazard			
Step 19 - Flood Hazard			
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Step 44 - Flood Hazard			
Step 45 - Flood Hazard			
Step 46 - Flood Hazard			
Step 47 - Flood Hazard			
Step 48 - Flood Hazard			
Step 49 - Flood Hazard			
Step 50 - Flood Hazard			

Get started
To access *Surging Seas* customizable maps, analysis, and downloads follow the step-by-step guide starting on page 33.

Surging Seas Step-by-Step Guide

Surging Seas allows you to view, customize, download, and share maps that show areas vulnerable to coastal flooding from storm surge, tides, and permanent submergence from sea level rise.

- GO TO [SEALEVEL.CLIMATECENTRAL.ORG](http://sealevel.climatecentral.org) AND SEARCH FOR YOUR LOCATION IN THE SEARCH BOX LOCATED IN THE TOP RIGHT CORNER.
 - Zoom into neighborhoods, or out to broader regions using the "in" and "out" buttons located in the bottom right corner.



- ADJUST THE WATER LEVEL ON THE LEFT SIDE TO EXPLORE RISK FROM COASTAL FLOODING, SEA LEVEL RISE, OR BOTH.
 - Land shaded in blue is below the selected water level.
 - Land shaded in green indicates the area is potentially protected by natural ridges or levees.
 - Elevation data supplied by NOAA.



- SELECT THE "POPULATION" LAYER AT THE BOTTOM OF THE SCREEN.
 - View the tally of population living on land lower than the selected water level.
 - Different colors indicate different population densities.
 - For density calculations, population is assumed to be evenly distributed across the land within each Census block.



- SELECT THE "PROPERTY" LAYER.
 - View the tally of property value (in 2012 dollars) on land lower than the selected water level.
 - An EPA data source, based on property value listed by Census block group (assumed to be evenly distributed across each block group).
 - Depending on user selection, analysis may exclude areas that trees or other features appear to protect.



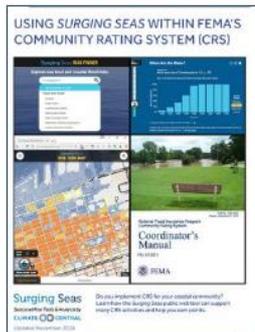
Get Guide

<http://sealevel.climatecentral.org/crs>



Related Links: [Full Report](#) ›

Climate Ready DC is the District's strategy to make the city more resilient to future climate change. It is based on the best available climate science and data. [Steps to Resilience](#) [Case Studies](#) [Tools](#) [Expertise](#) [Regions](#) [Topics](#) [Search](#) [Government](#) 



[Using "Surging Seas" Within FEMA's Community Rating System \(CRS\)](#) ›

Published: November 2016

From: [Climate Central](#)

Related Links: [Federal Emergency Management Agency | Community Rating System](#) ›
[Climate Central | Surging Seas](#) ›

This guide describes how Climate Central's *Surging Seas* web tool can be used to support activities that receive points within the Federal Emergency Management Agency's (FEMA) Community Rating System (CRS) program. It is informed by conversations with local CRS coordinators and implementers, and with FEMA CRS representatives. The guide provides step-by-step instructions on how to access and obtain information and downloads from the *Surging Seas* tool that could be utilized within specific CRS activities in FEMA's Coordinator's Manual (FIA-15/2013).



[The Emissions Gap Report 2016](#) ›

Published: November 2016

From: [United Nations Environment Program](#)

Related Links: [Executive Summary](#) ›
[Full report \(PDF\)](#) ›

Since 2010, United Nations Environment (UNEP) has produced annual Emissions Gap Reports based on requests by countries for an independent scientific assessment of how actions and pledges by countries affect the global greenhouse gas emissions trend, and how this compares to emissions trajectories consistent with the long-term goal of the United Nations Framework Convention on Climate Change. The difference has become known as the emissions gap. In addition to estimating the emissions gap, the reports focus on key options for achieving the emissions reductions necessary to bridge the gap, and provide an assessment of how these can be accelerated and scaled up. Countries have found these emissions gap assessments useful in informing the

How Are *Surging Seas* Web Tools Utilized?

Thousands of stakeholders – many of them planners – have customized and downloaded *Surging Seas* maps, slides, analysis, and projections from the *Surging Seas* web tools: [Risk Zone Map](#), [Risk Finder](#) and [Mapping Choices](#)

They tell us they use our web tool and its downloads to inform:

- screening-level planning
- vulnerability assessments
- emergency preparedness efforts
- research
- policy analysis
- public presentations
- education/communication
- training
- more

Surging Seas Risk Finder - <http://riskfinder.org>

Surging Seas Risk Zone Map - <http://ss2.climatecentral.org>

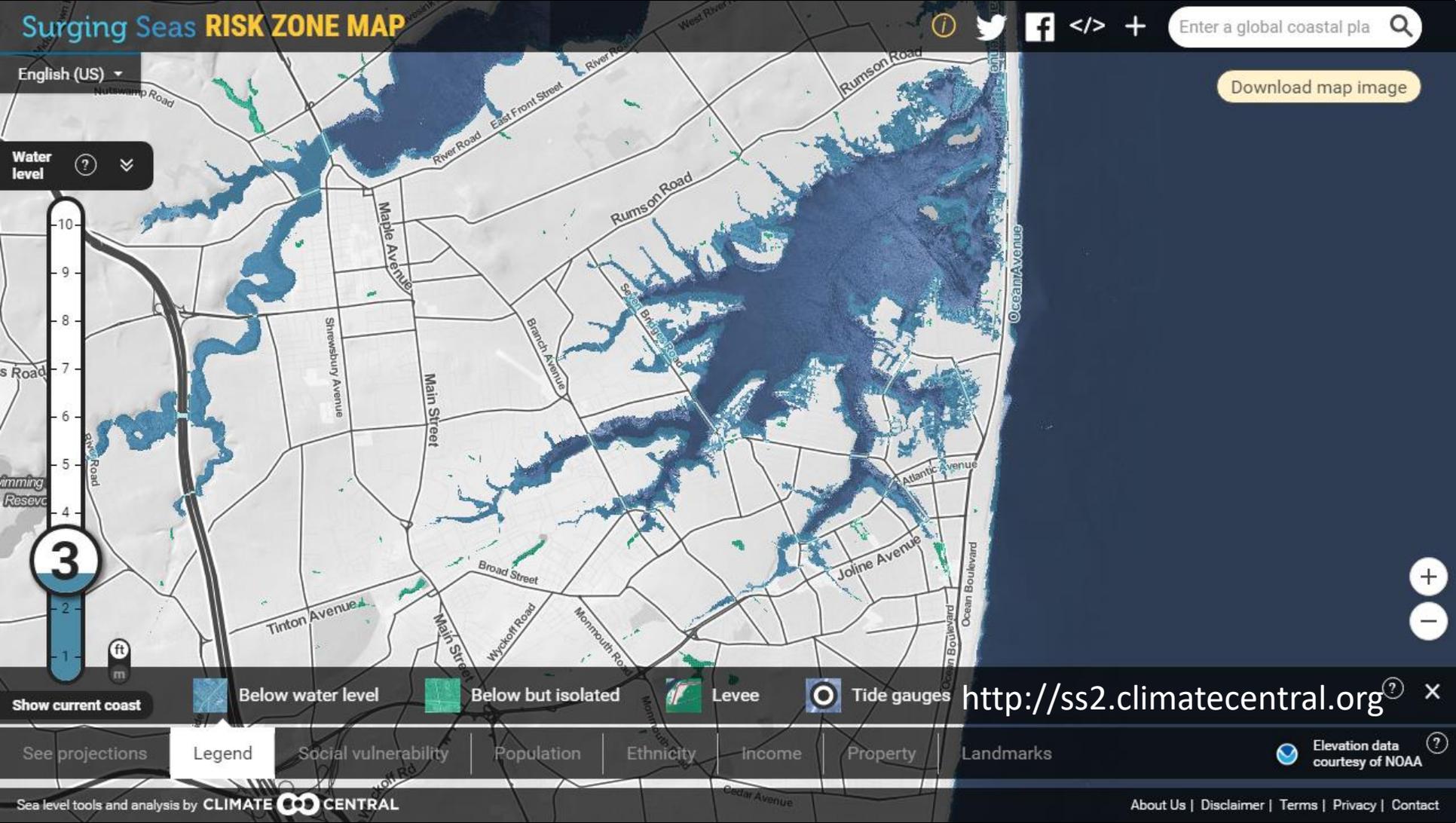
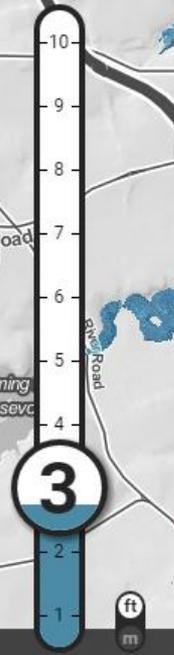
These interconnected *Surging Seas* screening-level tools provide:

- **an interactive submergence risk map:** shows areas vulnerable to flooding from combined sea level rise, storm surge, and tides; includes layers for social vulnerability, population, ethnicity, income, and property value; based primarily on LIDAR elevation data supplied by NOAA
- **localized sea level rise and flood risk projections:** dozens of sea level rise models and emissions scenarios
- **exposure analysis:** 100+ demographic, economic, infrastructure and environmental variables
- **community comparisons:** zip codes, towns, cities, counties, planning districts, agency districts, and more
- **downloads:** handouts, PowerPoint slides, spreadsheets & more – for coastal locations in the lower 48

Surging Seas RISK ZONE MAP

Download map image

Water level



Show current coast

- Below water level
- Below but isolated
- Levee
- Tide gauges

<http://ss2.climatecentral.org>

- See projections
- Legend**
- Social vulnerability
- Population
- Ethnicity
- Income
- Property
- Landmarks

Elevation data courtesy of NOAA

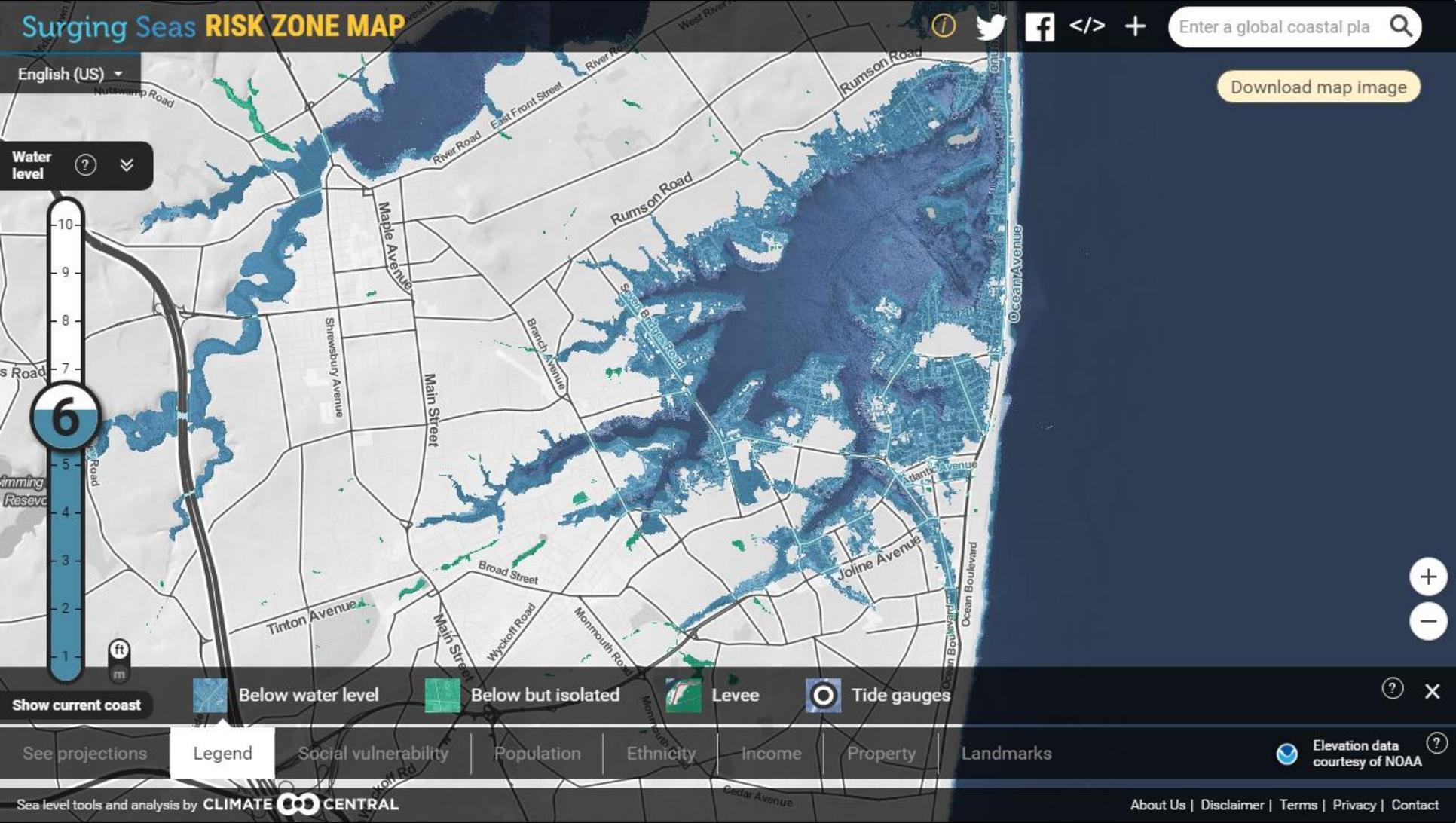
Surging Seas RISK ZONE MAP

English (US) ▾

📍 ⓘ 🌐 📱 🏠 </> + Enter a global coastal pla 🔍

Download map image

Water level ? ▾



Show current coast

- Below water level
- Below but isolated
- Levee
- Tide gauges

- See projections
- Legend**
- Social vulnerability
- Population
- Ethnicity
- Income
- Property
- Landmarks

Elevation data courtesy of NOAA ?

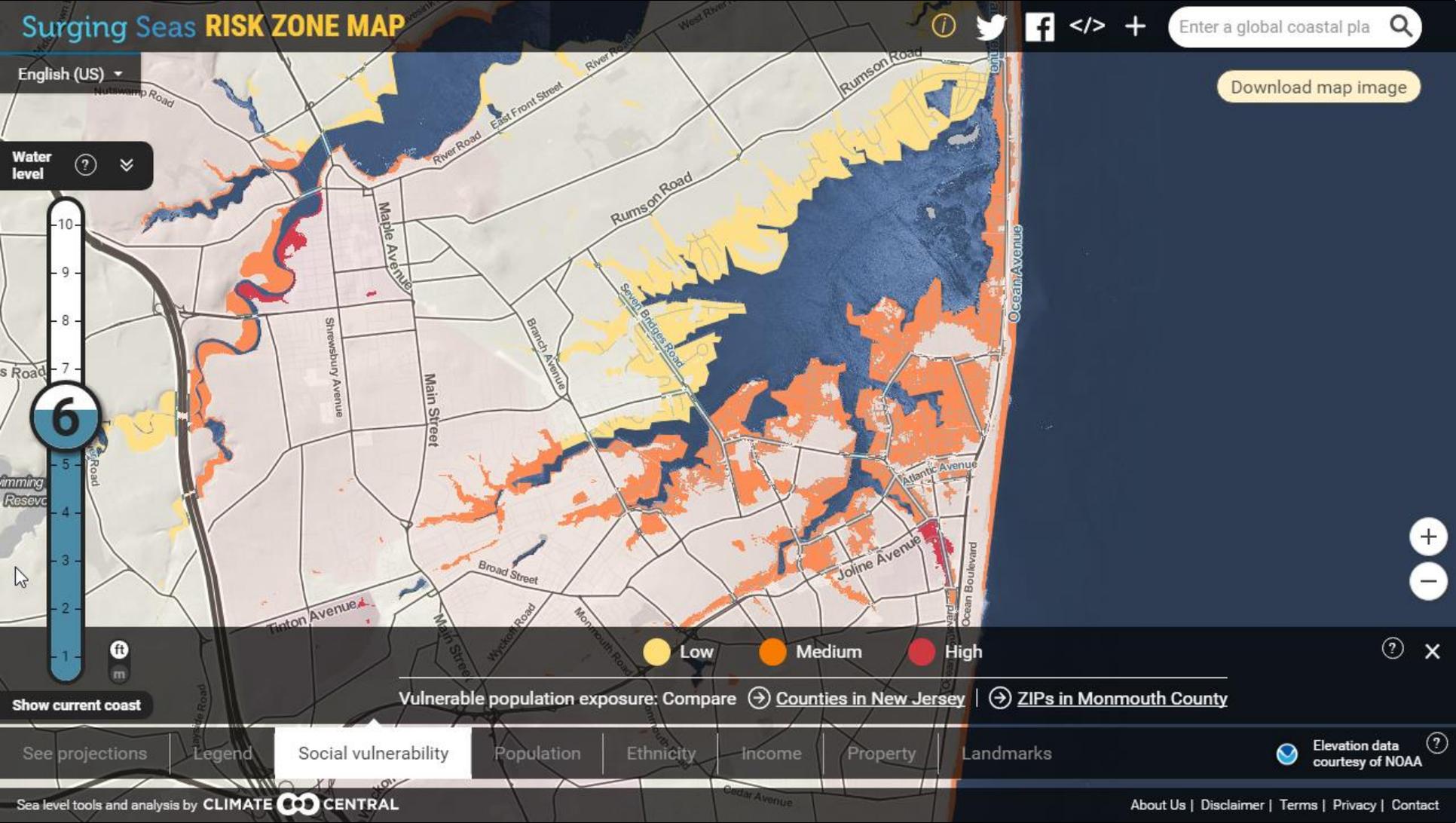
Surging Seas RISK ZONE MAP

English (US) ▾

Enter a global coastal pla

Download map image

Water level ? ▾



● Low ● Medium ● High

Vulnerable population exposure: Compare [Counties in New Jersey](#) | [ZIPs in Monmouth County](#)

Show current coast

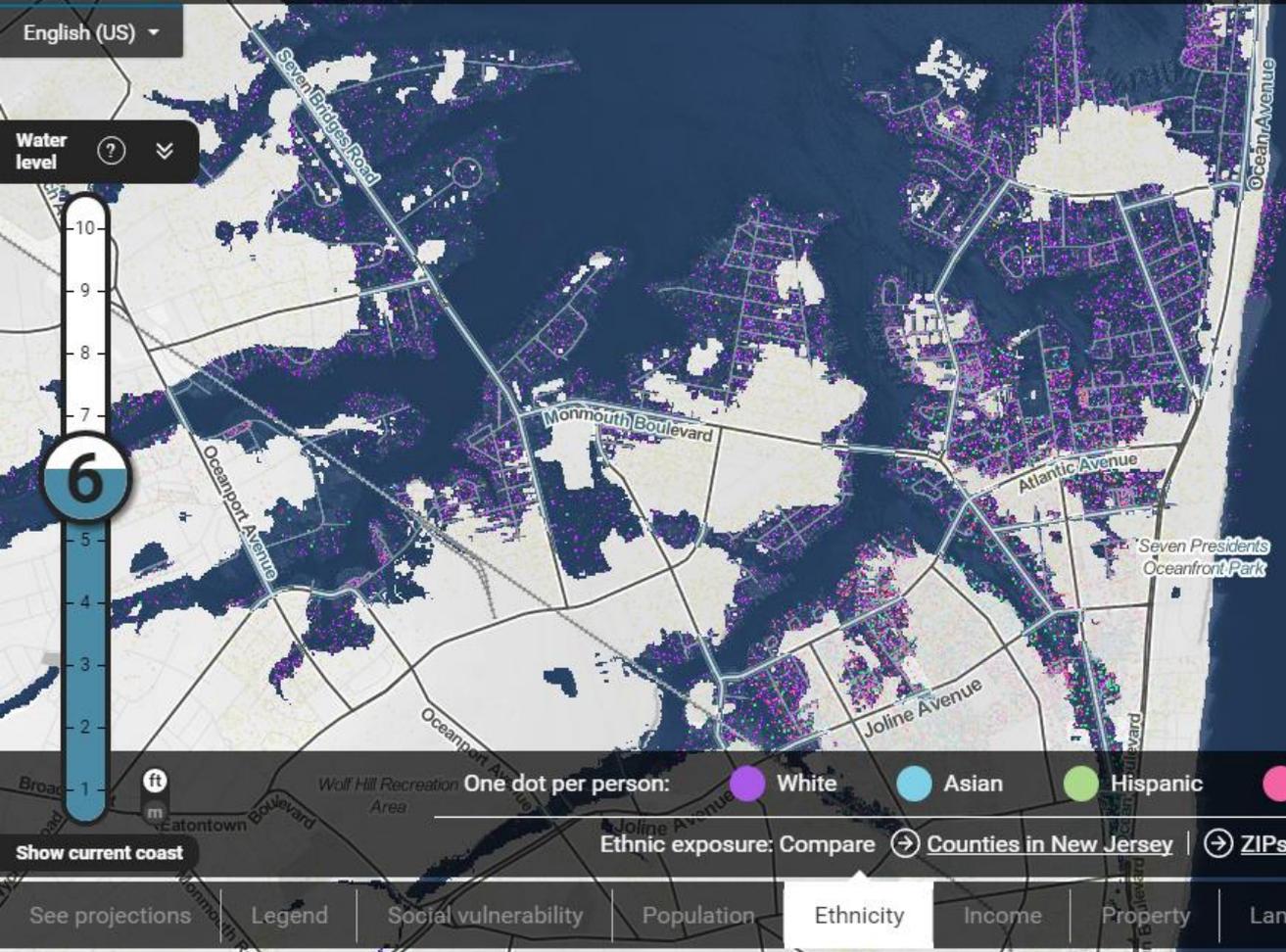
See projections | Legend | **Social vulnerability** | Population | Ethnicity | Income | Property | Landmarks

Elevation data courtesy of NOAA ?

Surging Seas RISK ZONE MAP

Download map image

Water level ? >>



One dot per person: White Asian Hispanic Black Native American ? X

Ethnic exposure: Compare ? X [Counties in New Jersey](#) | [ZIPs in Monmouth County](#)

Show current coast

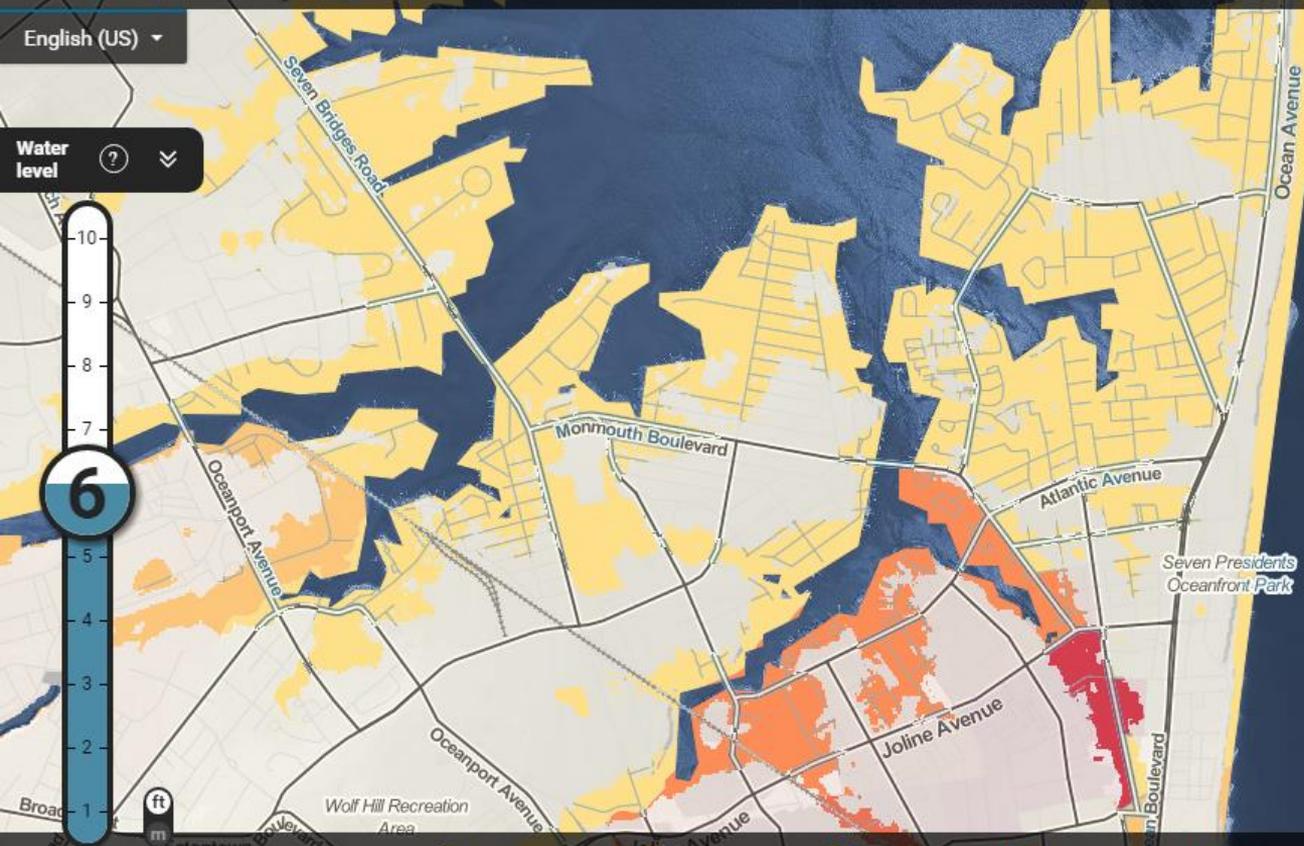
- See projections
- Legend
- Social vulnerability
- Population
- Ethnicity**
- Income
- Property
- Landmarks

Elevation data courtesy of NOAA ? X

Surging Seas RISK ZONE MAP

Download map image

Water level ? >>



Show current coast

Percentile: 80-100% 60-80% 40-60% 20-40% 0-20% ? x

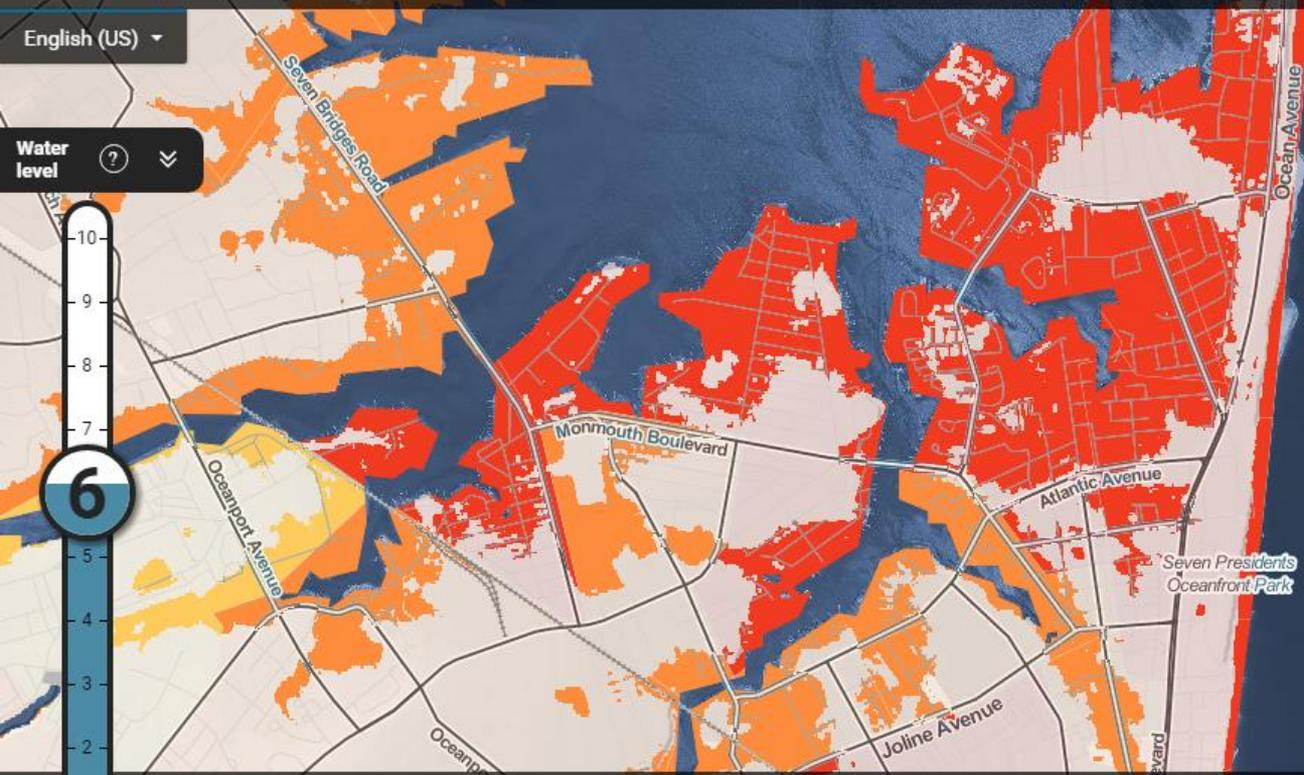
See projections Legend Social vulnerability Population Ethnicity **Income** Property Landmarks

Elevation data courtesy of NOAA ? x

Surging Seas RISK ZONE MAP

Download map image

Water level ? >>



Price per acre: ● Below \$100K ● \$100K-\$999K ● \$1M-\$10M ● \$10M-\$100M ● Over \$100M ? X

Property exposure: Compare → [Counties in New Jersey](#) | → [ZIPs in Monmouth County](#)

Show current coast

- See projections
- Legend
- Social vulnerability
- Population
- Ethnicity
- Income
- Property**
- Landmarks

Elevation data courtesy of NOAA ?

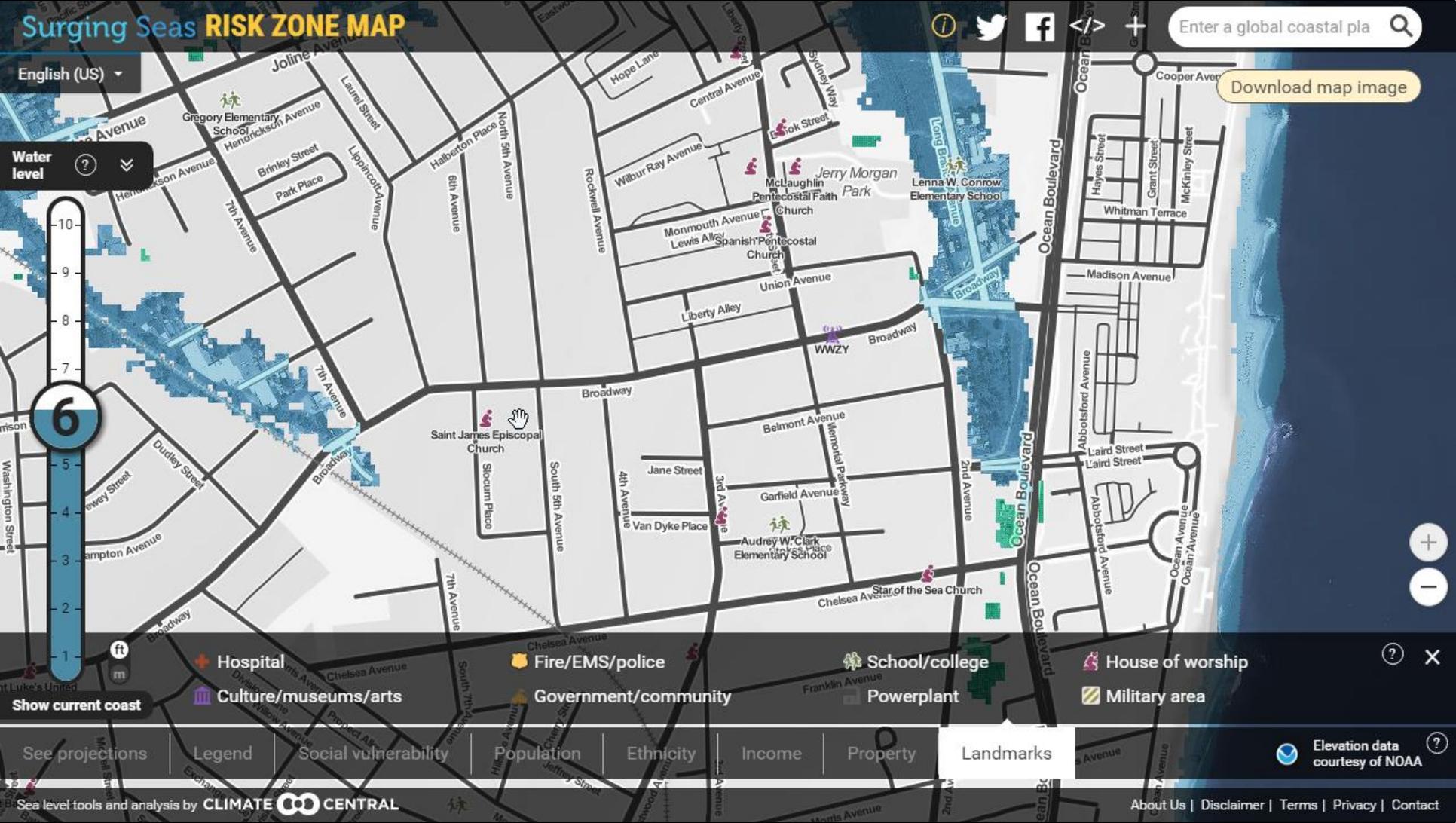
Surging Seas RISK ZONE MAP

English (US)

Enter a global coastal place

Download map image

Water level



Hospital

Culture/museums/arts

Fire/EMS/police

Government/community

School/college

Powerplant

House of worship

Military area

See projections

Legend

Social vulnerability

Population

Ethnicity

Income

Property

Landmarks

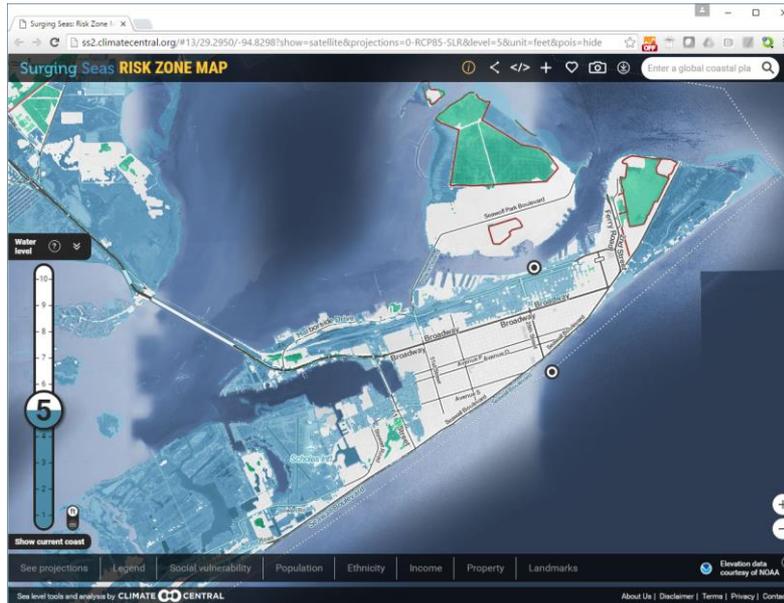
Elevation data courtesy of NOAA

Sea level tools and analysis by CLIMATE CENTRAL

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Link to *Surging Seas* Maps

We welcome you to link to our *Surging Seas* Risk Zone Maps or share links within your organization. Links that you use will reflect any customization you have done on the map (water level, zoom level, etc.).

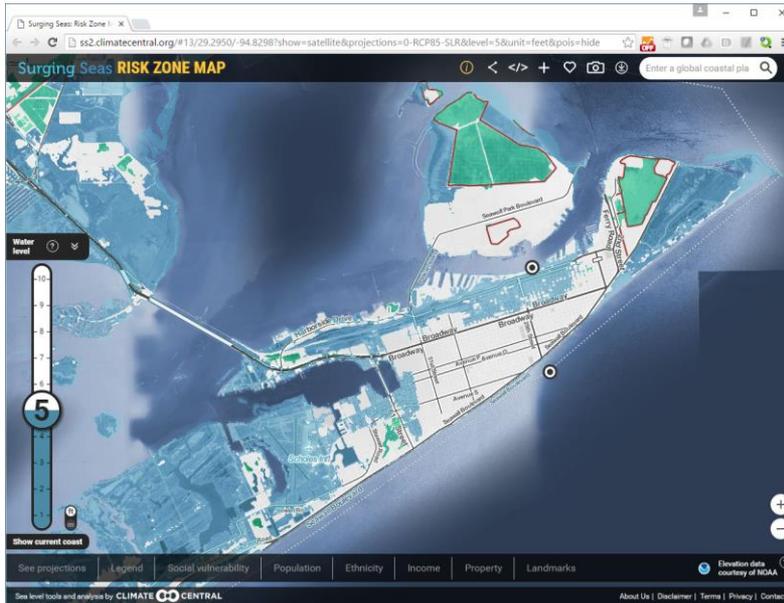


To link to a map:

1. Visit ss2.climatecentral.org
2. Search for your location
3. Set water level
4. Set zoom level
5. Select an impact layer (if desired), such as population, property, or social vulnerability
6. Copy the URL
7. Use this URL when you link to your customized map from your website

Embed *Surging Seas* Maps on Your Website

We welcome you to embed *Surging Seas* Risk Zone Maps on your website. Embeds will reflect any customization you have done on the map (water level, zoom level, population overlays, etc.).



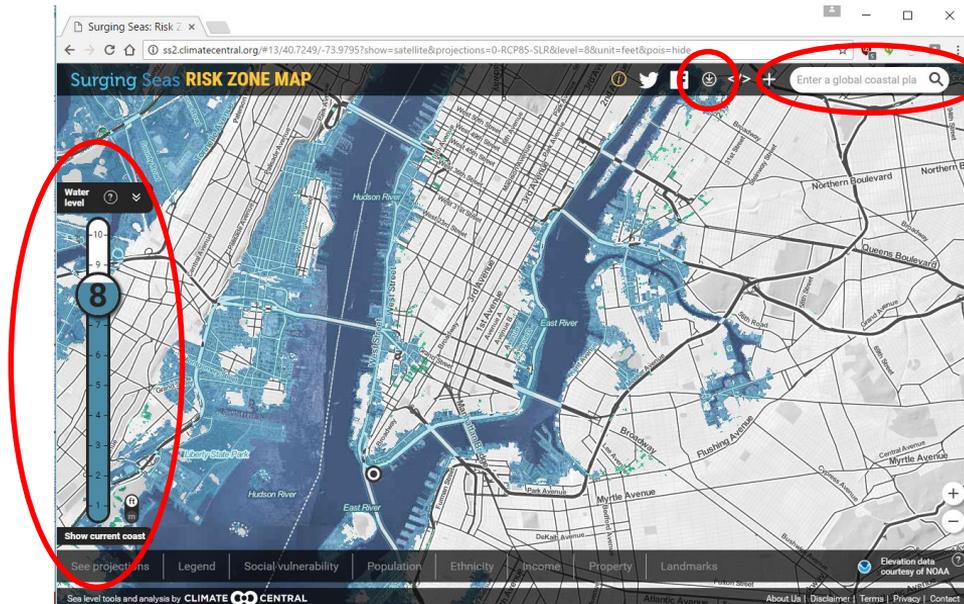
To embed a map on your site:

1. Visit ss2.climatecentral.org
2. Search for your location
3. Set water level
4. Set zoom level
5. Select an impact layer (if desired), such as population, property, or social vulnerability
6. Click the embed button on the top right of the screen
7. Enter your Name and Organization, Caption, and URL
8. Preview how the map will look on your site
9. Copy the code from the pop-up window for use on your website.

Write sealevel@climatecentral.org for help

View and Download *Surging Seas* Maps

Surging Seas Risk Zone Map allows you to see, customize, download, and share free maps that show areas vulnerable to coastal flooding from storm surge, tides, and permanent submergence from sea level. Land shaded in blue is below the selected water level. Land shaded in green indicates the area is potentially protected by natural ridges or levees. Elevation data supplied by NOAA.

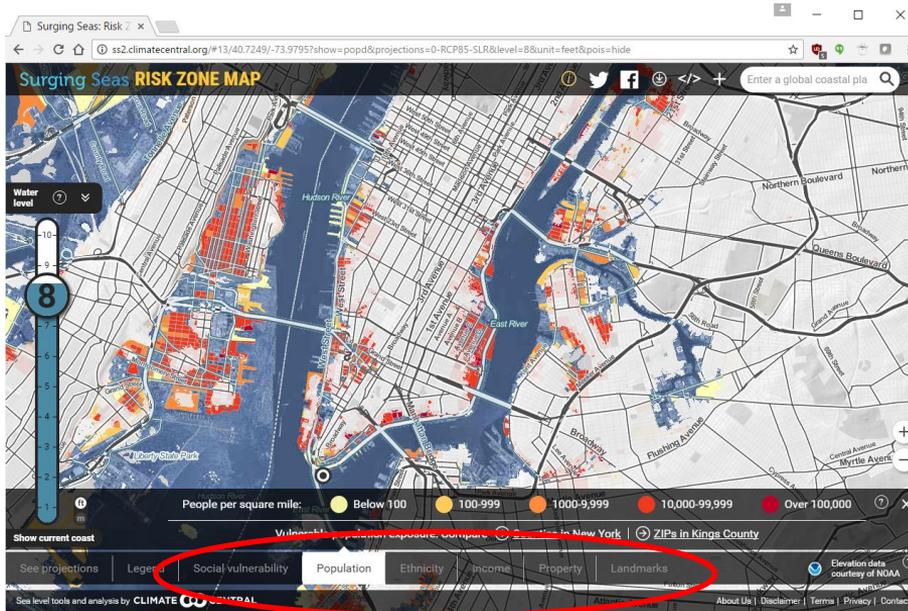


1. Visit ss2.climatecentral.org
2. Search for your location in the search box in the top right
3. Zoom into neighborhoods, or out to broader regions using the + and - round buttons located in the bottom right corner.
4. Set water level using the water slider on the left.
5. Click the download arrow icon in top right to download PowerPoint slide, image, or Google Earth layers.

Request maps:
sealevel@climatecentral.org

Select Data Overlays on *Surging Seas* Maps

Surging Seas Risk Zone Map allows you to overlay different data layers pertaining to social vulnerability, population density, ethnicity, income, property value, and landmarks. Click “?” for source information.



1. Visit ss2.climatecentral.org
2. Click on Population, or other layers at the bottom of the screen.
3. Further customize the map by zooming using the +/- buttons, setting the water level, or panning around.
4. Click the download arrow icon in top right to download PowerPoint slide, image, or Google Earth layers.

Write us at sealevel@climatecentral.org to request maps by email

Explore sea level and coastal flood risks

monmouth



Monmouth County, NJ, USA

Port Monmouth, NJ, USA

Monmouth Beach, NJ, USA

Places within New Jersey

Municipalities

Counties

Postal Codes

Congressional Districts

State Senate Districts

State Assembly Districts

Monmouth County, NJ, USA

Water level (ft) ?

Summary

Scroll or change settings for more info | [Video intro](#)

- Warming oceans and melting glaciers and ice sheets are raising global sea levels.
- About 23,000 people in Monmouth County live on exposed land below 6 feet (the selected level) ⓘ. [More threats](#) ↓
- The selected sea level scenario ⓘ points to a 50% risk of at least one flood over 6 feet taking place between today and 2050 in the Monmouth County area. [More scenarios](#) ↓
- Learn about [related places](#) ↓ and [how to reduce risks](#) ↓

DOWNLOADS

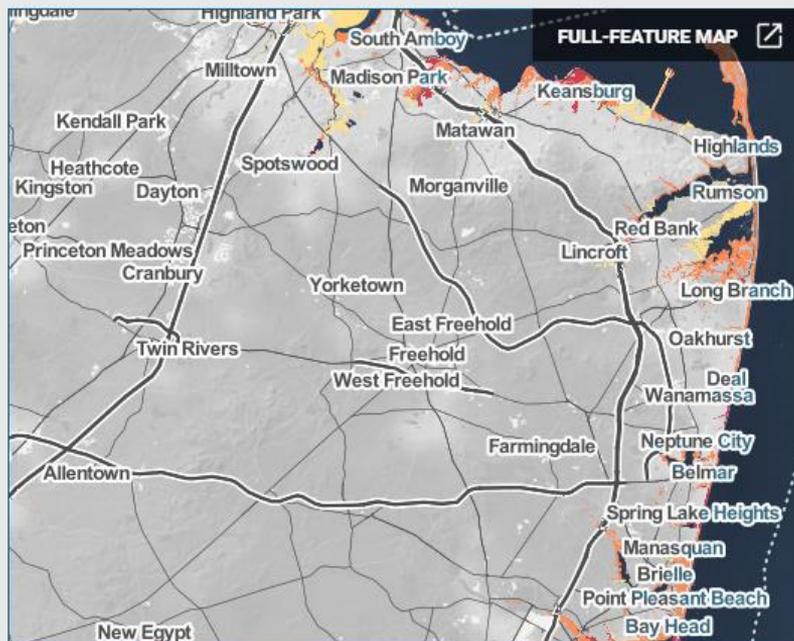
Local fact sheet

These PDF downloads summarize key information from this tool, for Monmouth County ("local" items) or for New Jersey. Find customizable slide, map and data downloads below.

Local report

State report

Have more specific needs? [Learn about our custom work](#)



Monmouth County area land below 6 feet is colored yellow through red to denote populations with low through high social vulnerability. Social vulnerability (e.g. from low income) can compound coastal risk. Maroon lines are levees. See full-feature map for legends and details. [Switch to property value map layer](#)

Coastal Floods Are Increasing

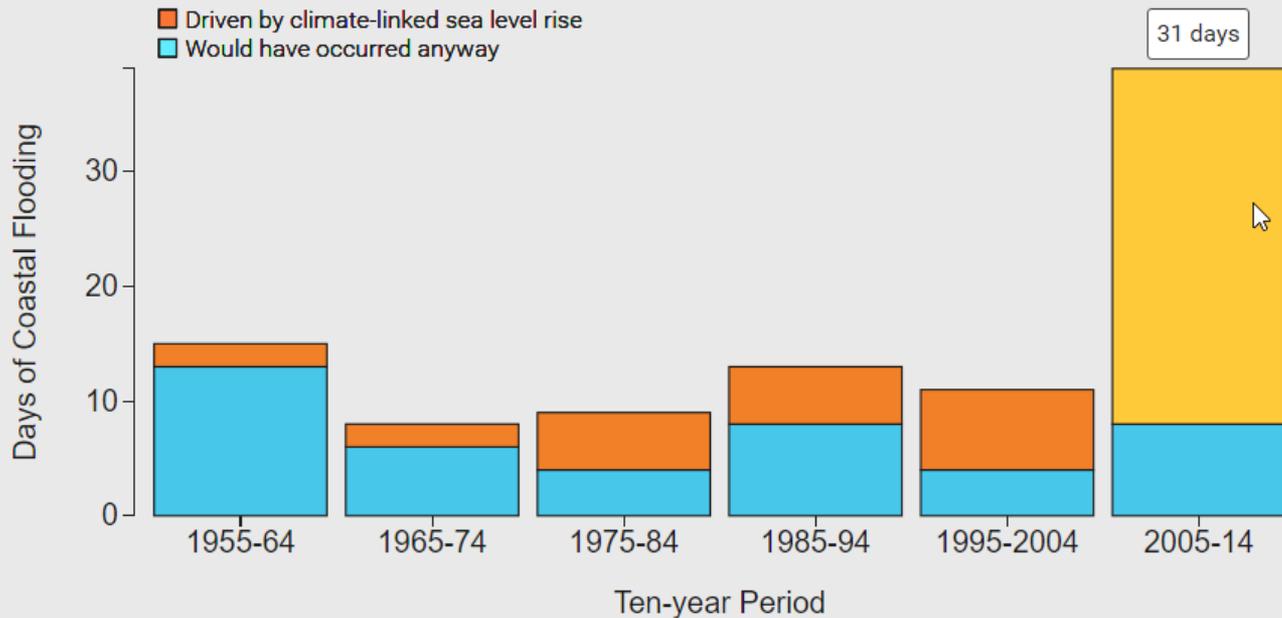


Water level (ft) ?



MONMOUTH COUNTY AREA*

Coastal flood days



* At The Battery water level station, 29 miles from Monmouth County. This is the nearest station analyzed for these statistics. ?

- Humans are causing climate change, which is causing global sea level to rise.
- This graph shows just how much more flooding has come from this rise, plus the floods that would have taken place anyway.
- Flood definition: water level exceeds a local threshold set by the National Weather Service for "minor" flooding, based on



Water level (ft) ?

What Is at Risk?



Population

Buildings

Infrastructure

Contamination Risks

Land

Total population below 6ft in Monmouth County

Population: All ▾	Total
Population	22,994
Caucasian population	20,688
Medium social vulnerability population	18,389
Low social vulnerability population	4,096
Population of color	2,666
Hispanic population	2,071
African-American population	1,275

Sources for raw population data: Census 2010 | [Details](#)

Values exclude sub-6ft areas potentially protected by levees or other features. ?

Choose a threat to map using the scrollable list above

Total population below 6ft in Monmouth County by zip code ▾



6



Water level (ft) ?

What Is at Risk?



Population

Buildings

Infrastructure

Contamination Risks

Land

Total buildings below 6ft in Monmouth County

Buildings: All ▾	Total
Homes	11,932
Property value	\$6.5 Billion
Houses of worship	4
Libraries	4
Schools	3
Public Schools	1
Medical facilities	1

Sources for raw homes data: [Census 2010](#) | [Details](#)

Values exclude sub-6ft areas potentially protected by levees or other features. ?

Choose a threat to map using the scrollable list above

Total homes below 6ft in Monmouth County by zip code ▾



6



Water level (ft) ?

What Is at Risk?



Population

Buildings

Infrastructure

Contamination Risks

Land

Total infrastructure below 6ft in Monmouth County

Infrastructure: All ▾	Total
Roads	146 miles
Local roads	139 miles
State roads	8 miles
Secondary roads	8 miles
Transit passenger stations	3
Ferry stations	3
Passenger stations	3

Sources for raw roads data: Census 2012 | [Details](#)

Values exclude sub-6ft areas potentially protected by levees or other features. ?

Choose a threat to map using the scrollable list above

Total roads below 6ft in Monmouth County by zip code ▾



6



Water level (ft) ?

What Is at Risk?



Population

Buildings

Infrastructure

Contamination Risks

Land

Total contamination risks below 6ft in Monmouth County

Contamination Risks: All ▾	Total
EPA listed sites	50
RADINFO sites	25
Hazardous waste sites	25
Unspecified hazardous waste sites	22
Nonmajor wastewater sites	20
Wastewater sites	20
NPDES sites	20

Sources for raw epa listed sites data: EPA 2013 | [Details](#)

Values exclude sub-6ft areas potentially protected by levees or other features. ?

Choose a threat to map using the scrollable list above

Total EPA listed sites below 6ft in Monmouth County by zip code ▾





Water level (ft) ?

What Is at Risk?



Population

Buildings

Infrastructure

Contamination Risks

Land

Total land below 6ft in Monmouth County

Land: All ▾	Total
Property value	\$6.5 Billion
Land	8.8 sq. miles
Protected land	2 sq. miles
Federal protected land	0.2 sq. miles
State protected land	0.2 sq. miles
Local protected land	0.1 sq. miles

Sources for raw property value data: Neumann et al 2011 | [Details](#)Values exclude sub-6ft areas potentially protected by levees or other features. ?

Choose a threat to map using the scrollable list above

Total property value below 6ft in Monmouth County by zip code ▾



Property value

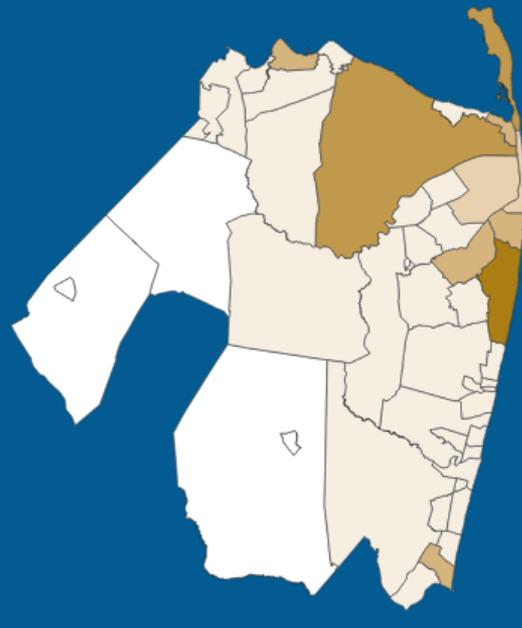
6

Choose a threat to map using the scrollable list above

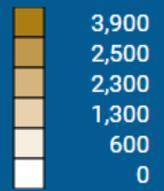
Total population below 6ft in Monmouth County by municipality



Water level (ft)



Population



Legend values are bin upper limits

Top threats on map

Long Branch	3,873
Middletown Twp.	2,518
Monmouth Beach Bor.	2,273
Highlands Bor.	2,232
Union Beach Bor.	2,087

Sources for raw population data: Census 2010 | [Details](#)

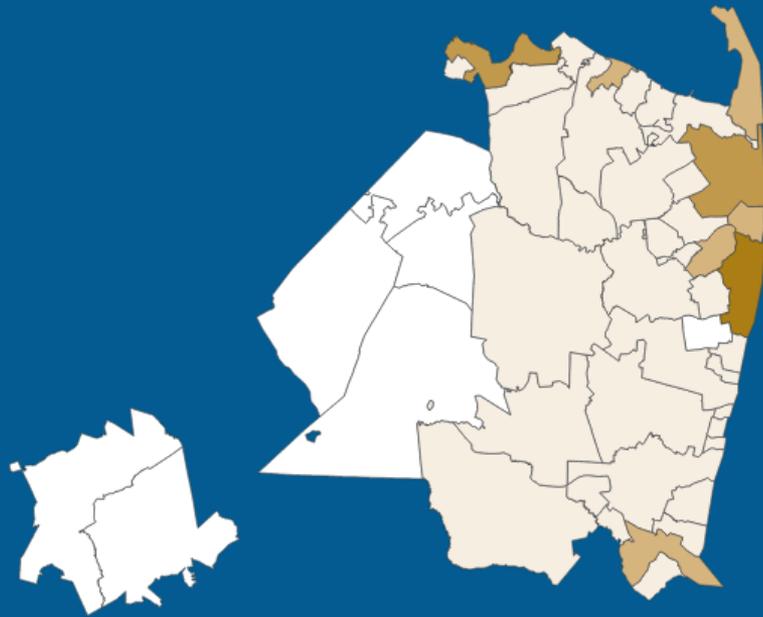
Values exclude sub-6ft areas potentially protected by levees or other features.

Choose a threat to map using the scrollable list above

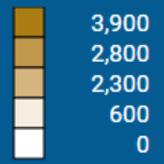
Total population below 6ft in Monmouth County by zip code



Water level (ft)



Population



Legend values are bin upper limits

Top threats on map

07740	3,874
07735	2,783
07760	2,576
07750	2,273
07732	2,264

Sources for raw population data: Census 2010 | [Details](#)

Values exclude sub-6ft areas potentially protected by levees or other features.



Water level (ft) ?

What Is at Risk?



Population

Buildings

Infrastructure

Contamination Risks

Land

Total population below 6ft in Long Branch

Population: All	Total
Population	3,873
Medium social vulnerability population	3,611
Caucasian population	2,634
Population of color	1,362
Hispanic population	854
African-American population	823
High social vulnerability population	263

Sources for raw population data: Census 2010 | [Details](#)Values exclude sub-6ft areas potentially protected by levees or other features. ?

Choose a threat to map using the scrollable list above

Total population below 6ft in municipalities in Monmouth County



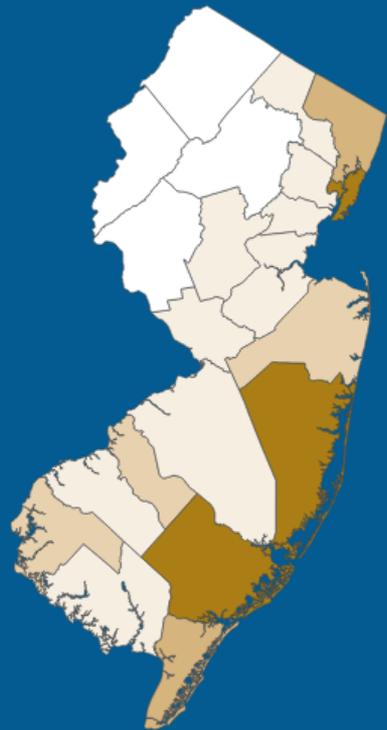


Choose a threat to map using the scrollable list above

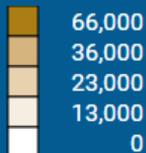
Total population below 6ft in New Jersey by county



Water level (ft) ?



Population



Legend values are bin upper limits

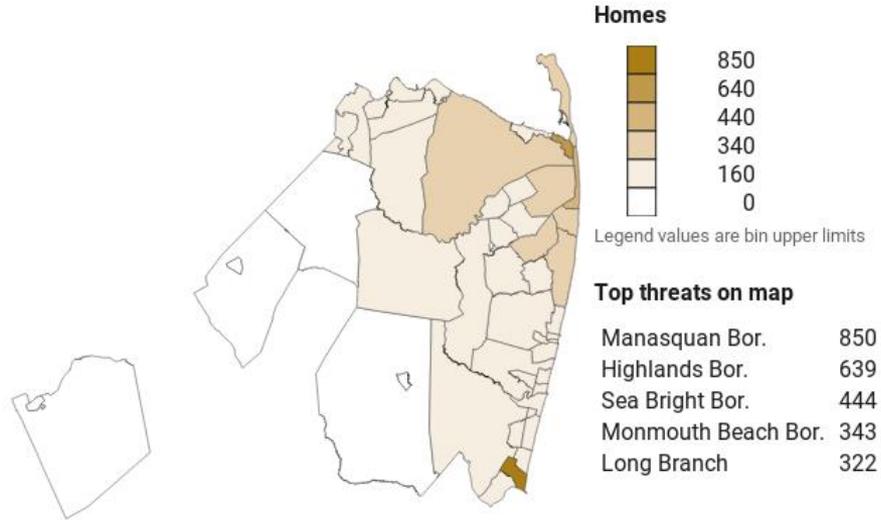
Top threats on map

Atlantic Co.	65,612
Ocean Co.	65,124
Hudson Co.	63,379
Cape May Co.	36,248
Bergen Co.	28,470

Sources for raw population data: [Census 2010](#) | [Details](#)

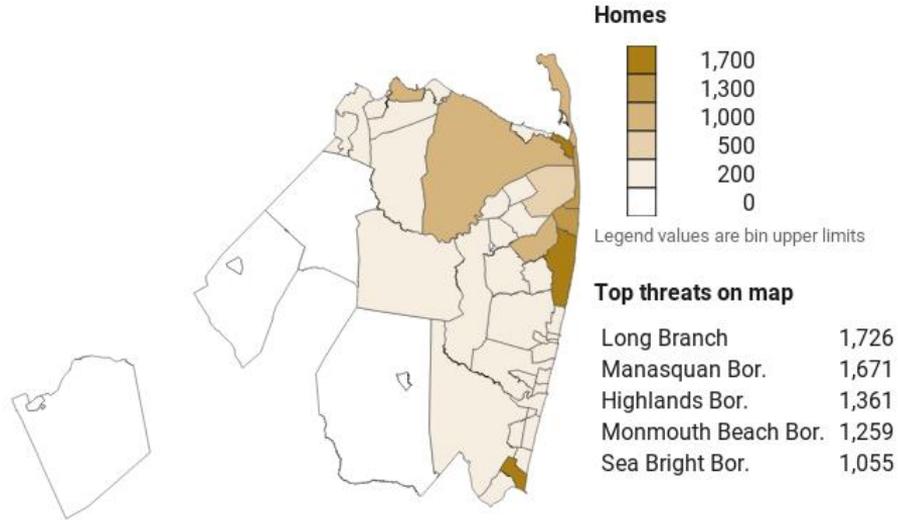
Values exclude sub-6ft areas potentially protected by levees or other features. ?

Total homes below 3ft in Monmouth County by municipality



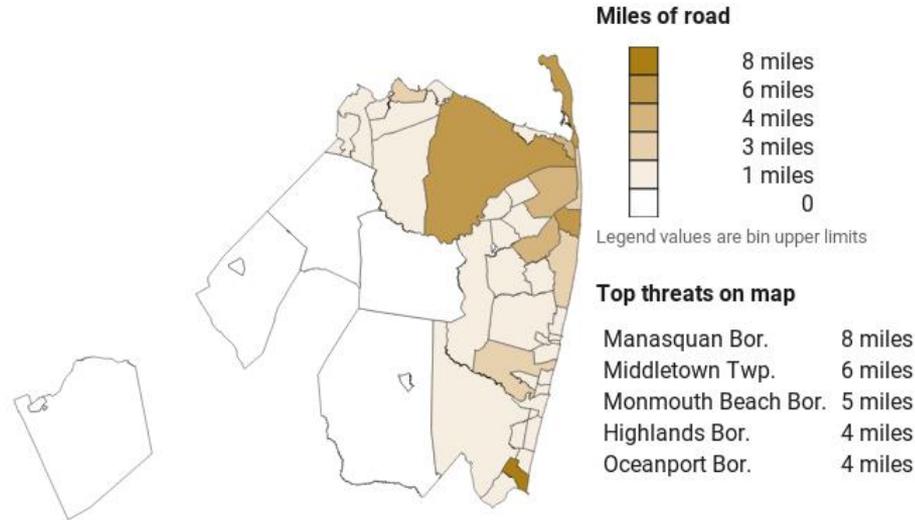
Values exclude sub-3ft areas potentially protected by levees or other features. Elevation is defined relative to local high tide lines. Source: Climate Central Risk Finder, 2017. <http://www.riskfinder.org/>

Total homes below 6ft in Monmouth County by municipality



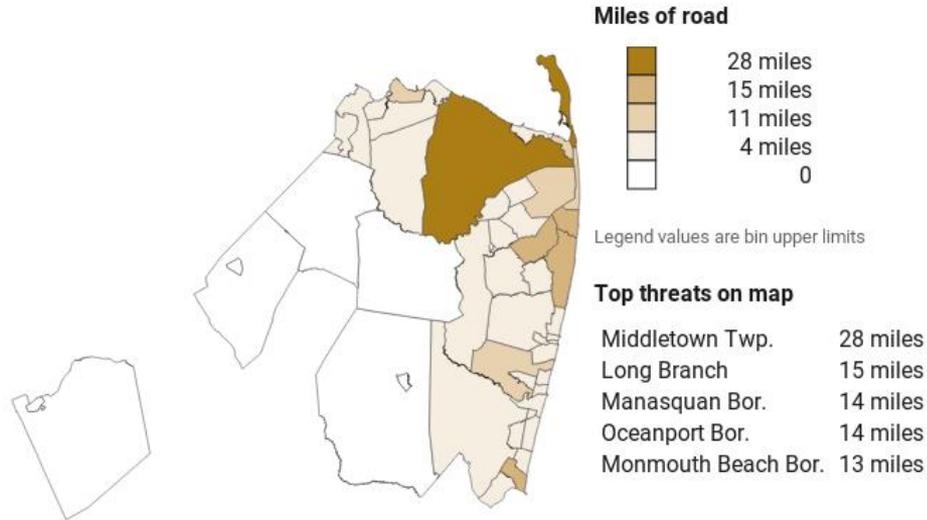
Values exclude sub-6ft areas potentially protected by levees or other features. Elevation is defined relative to local high tide lines. Source: Climate Central Risk Finder, 2017. <http://www.riskfinder.org/>

Total roads below 3ft in Monmouth County by municipality



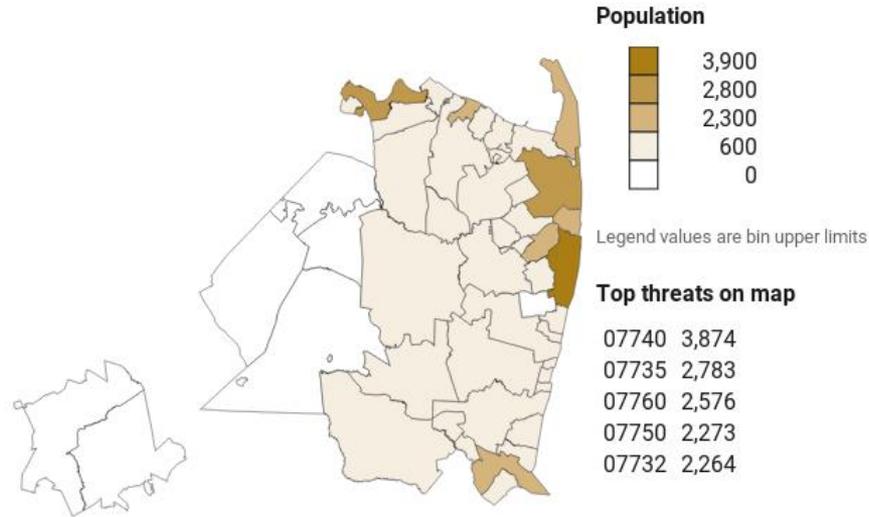
Values exclude sub-3ft areas potentially protected by levees or other features. Elevation is defined relative to local high tide lines. Source: Climate Central Risk Finder, 2017. <http://www.riskfinder.org/>

Total roads below 6ft in Monmouth County by municipality



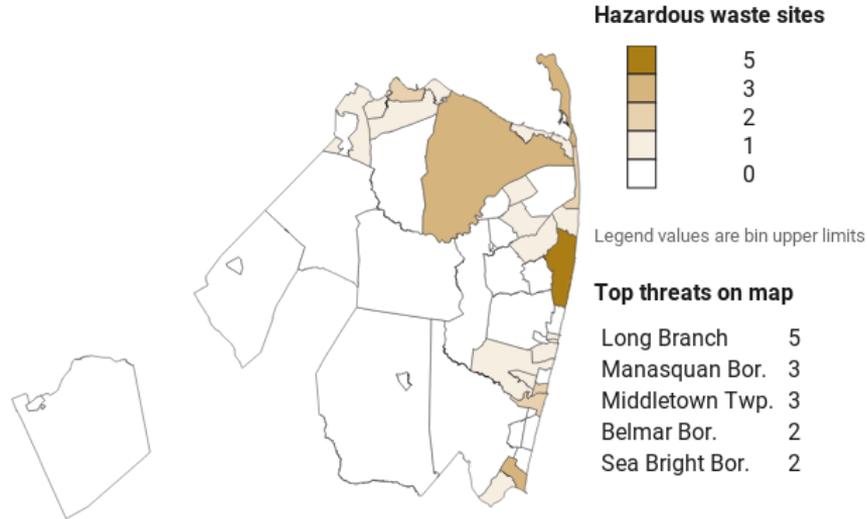
Values exclude sub-6ft areas potentially protected by levees or other features. Elevation is defined relative to local high tide lines. Source: Climate Central Risk Finder, 2017. <http://www.riskfinder.org/>

Total population below 6ft in Monmouth County by zip code



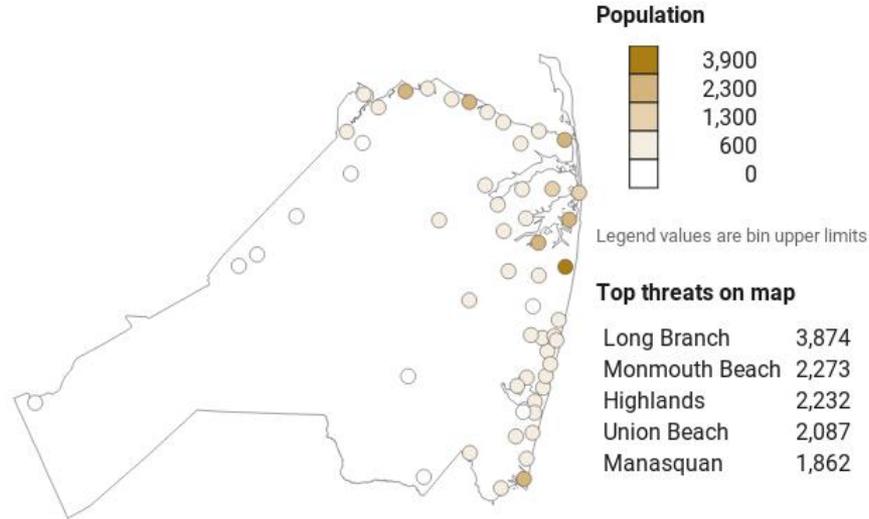
Values exclude sub-6ft areas potentially protected by levees or other features. Elevation is defined relative to local high tide lines. Source: Climate Central Risk Finder, 2017. <http://www.riskfinder.org/>

Total hazardous waste sites below 6ft in Monmouth County by municipality



Values exclude sub-6ft areas potentially protected by levees or other features. Elevation is defined relative to local high tide lines. Source: Climate Central Risk Finder, 2017. <http://www.riskfinder.org/>

Total population below 6ft in Monmouth County by town



Values exclude sub-6ft areas potentially protected by levees or other features. Elevation is defined relative to local high tide lines. Source: Climate Central Risk Finder, 2017. <http://www.riskfinder.org/>

Monmouth County, NJ, USA

When Are the Risks?



Water level (ft) ?

-10

-9

-8

-7

-6

-5

-4

-3

-2

-1

0

1

2

3

4

5

6

7

8

9

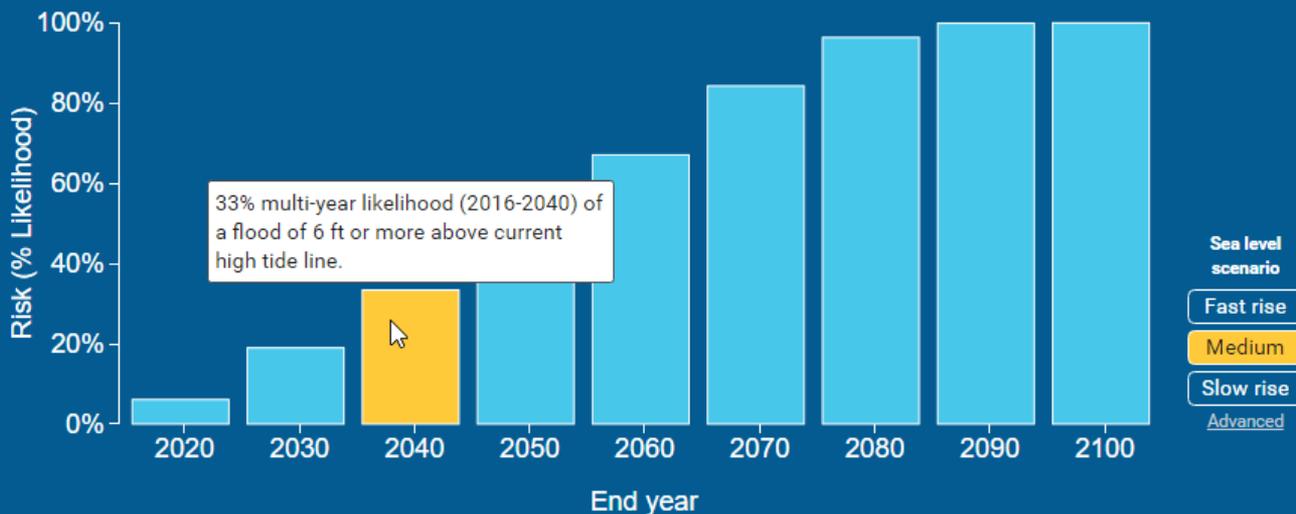
10

MONMOUTH COUNTY AREA*

Multi-year risk of flooding above 6 ft ▾



Risk of at least one flood from 2016 through each year shown



*At The Battery water level station, 29 miles from Monmouth County ? ⚙

Analysis uses sea level projections localized from the intermediate high global sea level scenario of the U.S. National Climate Assessment (2014). ? ⚙ [Key notes](#)

Monmouth County, NJ, USA

When Are the Risks?



Water level (ft) ?

-10

-9

-8

-7

-6

-5

-4

-3

-2

-1

0

1

2

3

4

5

6

7

8

9

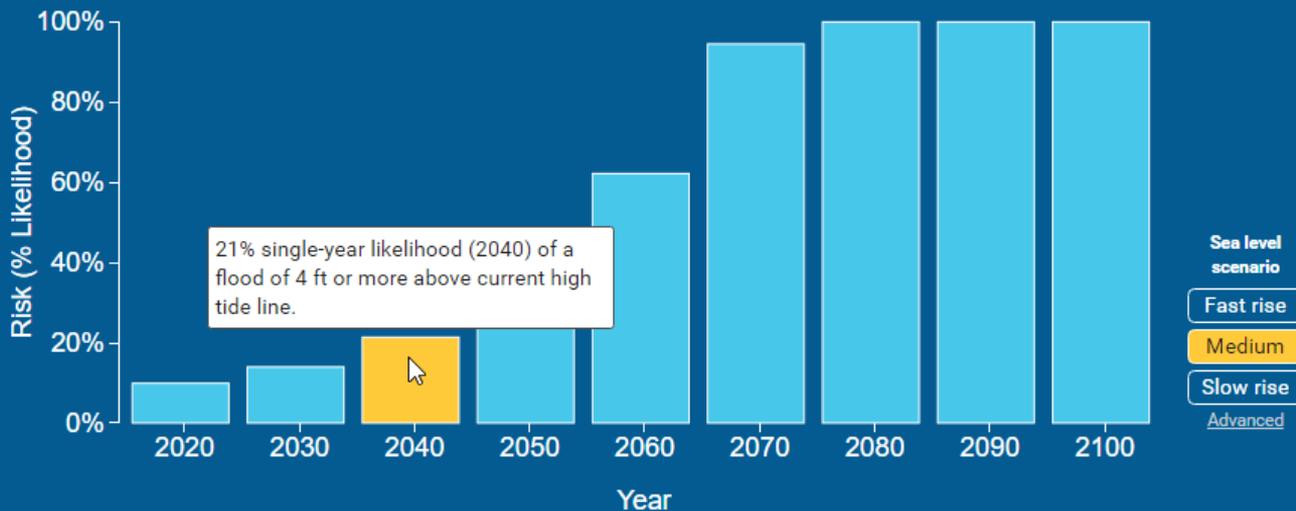
10

MONMOUTH COUNTY AREA*

Single-year risk of flooding above 4 ft ▾



Risk of at least one flood within each year shown



*At The Battery water level station, 29 miles from Monmouth County ? ⚙

Analysis uses sea level projections localized from the intermediate high global sea level scenario of the U.S. National Climate Assessment (2014). ? ⚙ [Key notes](#)



Monmouth County, NJ, USA

When Are the Risks?



Water level (ft) ?

-10

-9

-8

-7

-6

-5

-4

-3

-2

-1

0

1

2

3

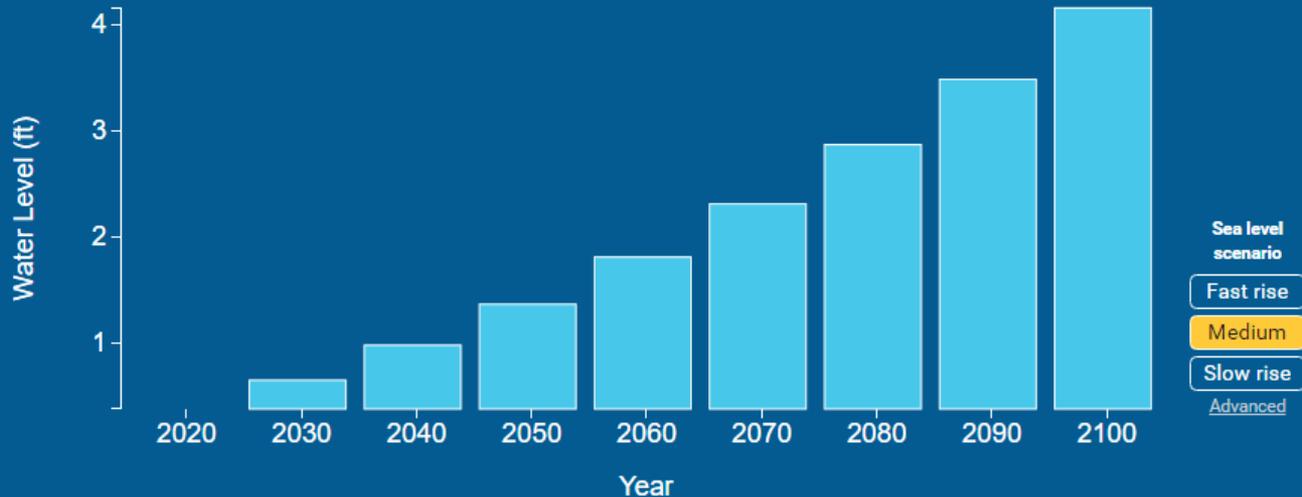
4

MONMOUTH COUNTY AREA*

Projected sea level rise ▾



A localized projection



Sea level scenario

Fast rise

Medium

Slow rise

Advanced

*At The Battery water level station, 29 miles from Monmouth County ? ⚙

Sea level projections are localized from the intermediate high global sea level scenario of the U.S. National Climate Assessment (2014).

ⓘ ⚙ Sea level rise is relative to a 1992 baseline. Projected values share the same scale as this tool's maps when taken as heights above the 1992 high tide line.



Monmouth County, NJ, USA

When Are the Risks?



Water level (ft) ?

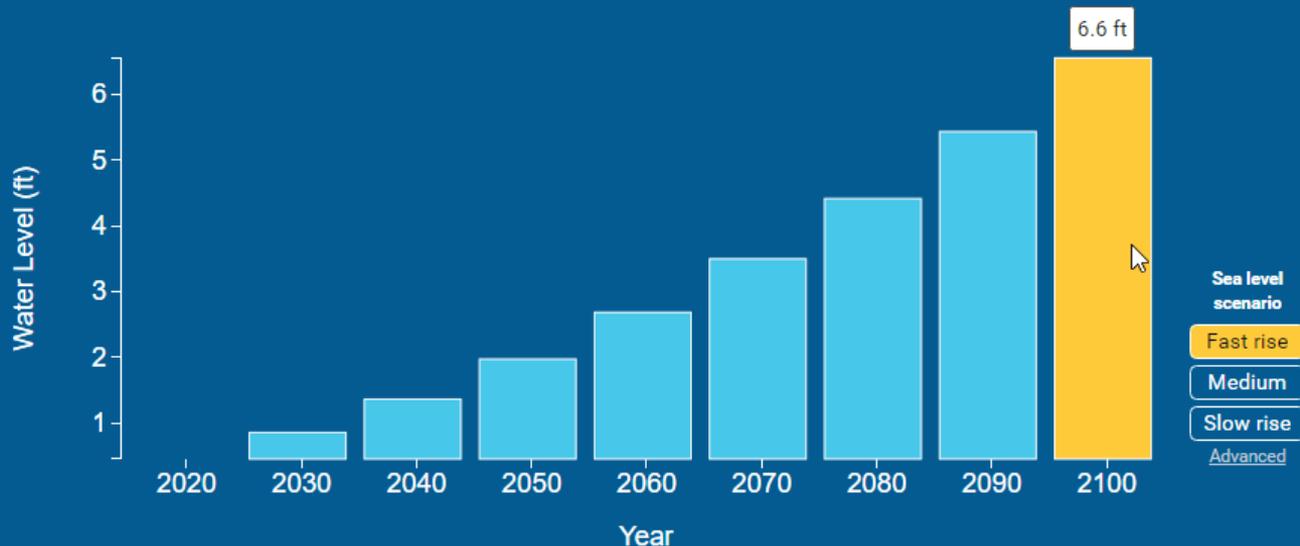


MONMOUTH COUNTY AREA*

Projected sea level rise ▾



A localized projection



*At The Battery water level station, 29 miles from Monmouth County ? ⚙

Sea level projections are localized from the highest global sea level scenario of the U.S. National Climate Assessment (2014). ? ⚙ Sea level rise is relative to a 1992 baseline. Projected values share the same scale as this tool's maps when taken as heights above the 1992 high tide line.



Monmouth County, NJ, USA

When Are the Risks?



Water level (ft) ?

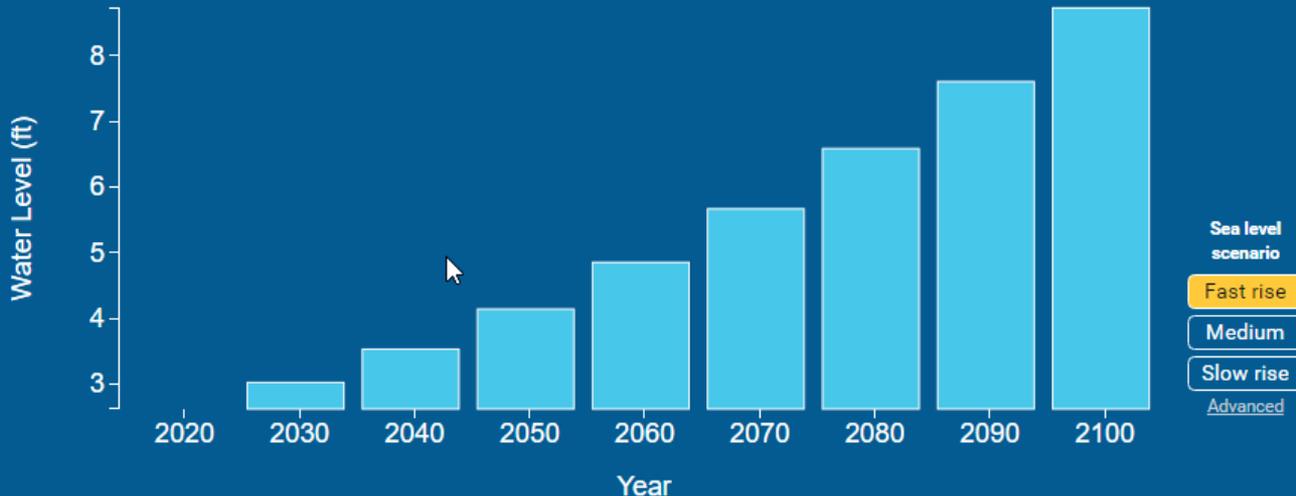


MONMOUTH COUNTY AREA*

Projected sea level rise + mild flood level



A "mild flood" averages once per year



Sea level scenario

Fast rise

Medium

Slow rise

Advanced

*At The Battery water level station, 29 miles from Monmouth County ? ⚙

Sea level projections are localized from the highest global sea level scenario of the U.S. National Climate Assessment (2014). ? ⚙ Sea level rise is relative to a 1992 baseline. A "mild flood" is locally defined as 2.2 ft above the high tide line in the year it occurs. [Key notes](#)

Monmouth County, NJ, USA

When Are the Risks?



Water level (ft) ?

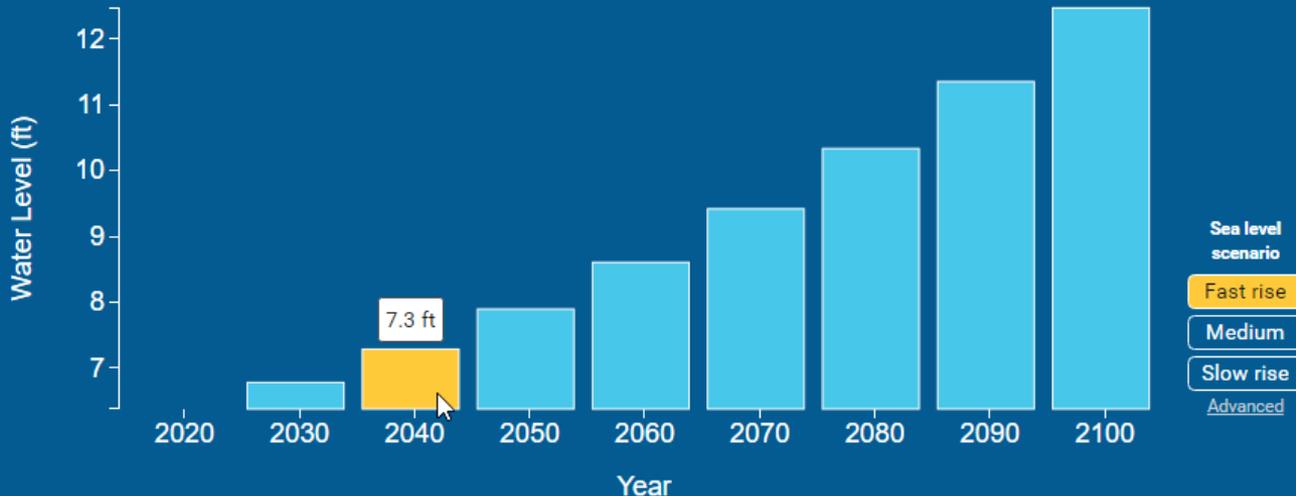


MONMOUTH COUNTY AREA*

Projected sea level rise + major flood level ▾



A "major flood" has a roughly 1% chance per year



*At The Battery water level station, 29 miles from Monmouth County ? ⚙

Sea level projections are localized from the highest global sea level scenario of the U.S. National Climate Assessment (2014). ? ⚙ Sea level rise is relative to a 1992 baseline. A "major flood" is locally defined as 5.9 ft above the high tide line in the year it occurs. [Key notes](#)

Water level (ft) ?

-10
-9
-8
-7
-6
-5
-4
-3
-2
-1

4

Reducing Your Risk

Even with strong action to curb heat-trapping pollution, some future sea level rise is inevitable.

Preparing yourself and your community

- [Actions you can take yourself](#) can reduce flood risk and sea level impacts.
- Surging Seas can help your community participate in FEMA's [Community Rating System](#) (CRS). [Get our guide](#).
- Climate Central's [tailored mapping, projections and analysis](#) can help you meet your more specific needs.

Select resources for New Jersey

- [New Jersey Climate Adaptation Alliance \(NJADAPT\)](#)
 - [The College of New Jersey: Sustainable Jersey](#)
 - [Getting to Resilience: A Community Planning Evaluation Tool](#)
 - [Comparison Matrix: Sea Level Rise and Coastal Flood Web Tools](#)
 - [Adaptation Clearinghouse: sea level rise adaptation](#)
 - [Georgetown Climate Center: state climate change preparations and progress](#)
 - [Climate Adaptation Knowledge Exchange \(CAKEX\): sea level rise](#)
- + *Show more*

Select national resources

- [U.S. Climate Resilience Toolkit](#)
- [NOAA Digital Coast](#)
- [National Sea Grant Resilience Toolkit](#)
- [FEMA: Coastal Flood Risks](#)
- [Data.gov \(coastal flooding\)](#)

How Can I Prepare for Flooding?

SMALLER STEPS **1** **2** **3** LARGER STEPS

[Home](#) [Facebook](#) [Twitter](#) [Google+](#) [Email](#)

Choose a **LEVEL 2** step to learn about below, or change your desired Level by choosing 1 or 3 above.

- Raise Wiring**
- Anchor
- Sewer
- Barriers
- Boat
- Alt Power
- Landline
- Safe Box



Raise Wiring

Raise electrical wiring above the highest expected flood line to reduce damage to your home. Raising electrical system components in a 1,000 square foot single-floor structure will cost about \$1,500 to \$2,000.

Text source: FEMA | Photo source: Ben Brennan, FEMA

EXPLORE YOUR RISK	
Alabama	California
Connecticut	Delaware
Florida	Georgia
Louisiana	Maine
Maryland	Massachusetts
Mississippi	New Hampshire
New Jersey	New York
North Carolina	Oregon
Rhode Island	South Carolina
Texas	Virginia
Washington	Washington, D.C.

USING SURGING SEAS WITHIN FEMA'S COMMUNITY RATING SYSTEM (CRS)

Surging Seas

Sea Level Rise Tools & Analysis by
CLIMATE CENTRAL

Updated November, 2016

Do you implement CRS for your coastal community? Learn how the *Surging Seas* public web tool can support many CRS activities and help you earn points.

Do you implement CRS for your community? Learn about how our free public web tool, *Surging Seas*, can help with your CRS efforts or help you earn CRS points. In the sections below, we excerpt the relevant text from the CRS Coordinator's Manual and provide specific guidance on how to use *Surging Seas* to support the applicable activities.

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Background

Community Rating System (CRS)

The National Flood Insurance Program's (NFIP's) Community Rating System (CRS) is a voluntary insurance rating program that recognizes communities for implementing floodplain management practices that exceed the Federal minimum requirements of the NFIP. In exchange for a community's proactive efforts to reduce flood risk, policyholders can receive reduced flood insurance premiums for buildings in the community. To learn more, visit: https://www.floodsmart.gov/floodsmart/pages/crs/community_rating_system.jsp

Surging Seas public web tools, analysis and downloads

Surging Seas is a suite of public web tool built with foundation support to help communities, planners, and leaders better understand sea level rise and coastal flood risks. Hundreds of planners and stakeholders are downloading our maps, slides, analysis, and projections and tell us they use the web tools for planning, vulnerability and risk assessments, and emergency preparedness efforts -- as well as for research, policy analysis, public presentations, education, and training. The tools are based on [peer-reviewed science](#) and listed as resources on the U.S. Climate Resilience Toolkit and NOAA's Digital Coast portal. View [case studies](#) to learn more.

Developing the Surging Seas CRS guide

Through conversations with local CRS coordinators and implementers, and with FEMA representatives working on CRS, we have identified many of the ways the *Surging Seas* web tool could be used to support activities that receive points within the CRS program. This guide provides step-by-step instructions on how to access and obtain specific information and downloads from this web tool that could be utilized within the specific CRS activities listed in this document, and contained in the CRS [Coordinator's Manual](#) (FIA-15/2013).

The Surging Seas web tool provides:

- **interactive submergence risk maps** – based primarily on LIDAR elevation data supplied by NOAA – that use a bathtub model to show areas vulnerable to flooding from combined sea level rise, storm surge, and tides
- **map layers** for population, property value, income, social vulnerability and ethnicity
- **localized sea level rise and flood risk projections** for each decade through the year 2100 based on dozens of selectable sea level rise models and emissions scenarios
- **exposure analysis** that covers over 100 demographic, economic, infrastructure and environmental variables using data drawn mainly from federal sources
- **community comparisons** that tabulate exposure for various area types including zip codes, municipalities, counties, planning districts, agency districts, states, and more
- **sharable downloads:** handouts, PowerPoint slides, spreadsheets & more – for every zip code, city, county, and other area analyzed in the tool

NOTE:

- The information and maps obtained from this web tool can support CRS activities that could lead to points. In most cases, within CRS, information alone will not lead directly to points. This guide does not determine whether you may receive points; your FEMA/ISO official does – frequently on a case-by-case basis.
- FEMA representatives tell us that *Surging Seas* can be very useful for a variety of flood and hazard projects that a community would want to do. They add that for CRS credited activities, use of *Surging Seas* would be credited primarily as a source of information on localized flooding (320 - MI3, and 350 - WEB), and for floodplain management planning (510). These CRS activities are covered in this guide.
- For all CRS activities there are specific criteria and prerequisites that must be met and reviewed by FEMA, and credit may be subject to impact adjustments (a means of reflecting the activity's impact on the community's flood insurance premium base).
- Our maps and analysis do not currently incorporate FEMA floodplains. Rather, they use a bathtub model to show areas vulnerable to flooding from 1-10 feet (and up to 30 meters) above the local high tide line.

Access our free web tools:

Surging Seas Risk Zone Map: <http://sealevel.climatecentral.org/maps/risk-zone>
 Surging Seas Risk Finder: <http://riskfinder.climatecentral.org/>

Science Behind Surging Seas

Surging Seas is based on [peer-reviewed science](#) and is listed as a resource on the following national portals: NOAA Digital Coast, US Climate Resilience Toolkit, and the White House Climate Data Initiative.

We are dedicated to providing a wide range of free and accessible analysis and maps to the public, and for use within CRS. We can also provide custom analysis for those who have more specific needs. Learn more here: <http://sealevel.climatecentral.org/maps/custom-analysis>

We want your feedback.

How are you using *Surging Seas* within CRS?
 How could this guide be improved?
 Are there additional CRS activities in which web tools could be of use?
 How could the *Surging Seas* web tool be incorporated into future versions of CRS?
 Reach us at sealevel@climatecentral.org.

Surging Seas Web Tool and Downloads

- *Surging Seas* allows you to view, customize, download, and share maps and analysis related to coastal flooding from storm surge, tides, and permanent submergence from sea level rise.
- Below are examples of the kinds of materials you can access at ss2.climatecentral.org and riskfinder.org.
- Find out how to access all of these materials by following the step-by-step guide starting on page 13.

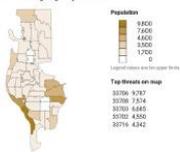
INTERACTIVE SUBMERGENCE RISK MAPS



LOCAL FACT SHEETS AND REPORTS

POWERPOINT SLIDES AND IMAGES

Total population below 4ft in Pinellas County by zip code



LOCAL REPORTS

EXCEL SPREADSHEETS

City	County	Population	Area (sq mi)	Sea Level Rise (ft)	Population at Risk
Albany	Albany	1,000	100	1	100
Albany	Albany	1,000	100	2	200
Albany	Albany	1,000	100	3	300
Albany	Albany	1,000	100	4	400
Albany	Albany	1,000	100	5	500
Albany	Albany	1,000	100	6	600
Albany	Albany	1,000	100	7	700
Albany	Albany	1,000	100	8	800
Albany	Albany	1,000	100	9	900
Albany	Albany	1,000	100	10	1,000

FACILITY LISTS

FIRM ID	Facility Name	Address	City	County	Population	Area (sq mi)	Sea Level Rise (ft)	Population at Risk
100000001	AMERICAN FOUNDATION FOR THE BLIND	1000 1st St	Albany	Albany	1,000	100	1	100
100000002	AMERICAN FOUNDATION FOR THE BLIND	1000 1st St	Albany	Albany	1,000	100	2	200
100000003	AMERICAN FOUNDATION FOR THE BLIND	1000 1st St	Albany	Albany	1,000	100	3	300
100000004	AMERICAN FOUNDATION FOR THE BLIND	1000 1st St	Albany	Albany	1,000	100	4	400
100000005	AMERICAN FOUNDATION FOR THE BLIND	1000 1st St	Albany	Albany	1,000	100	5	500
100000006	AMERICAN FOUNDATION FOR THE BLIND	1000 1st St	Albany	Albany	1,000	100	6	600
100000007	AMERICAN FOUNDATION FOR THE BLIND	1000 1st St	Albany	Albany	1,000	100	7	700
100000008	AMERICAN FOUNDATION FOR THE BLIND	1000 1st St	Albany	Albany	1,000	100	8	800
100000009	AMERICAN FOUNDATION FOR THE BLIND	1000 1st St	Albany	Albany	1,000	100	9	900
100000010	AMERICAN FOUNDATION FOR THE BLIND	1000 1st St	Albany	Albany	1,000	100	10	1,000

CRS Activity 322c, Map Information Service

Problems not shown on FIRM (MI3)

Up to 20 points for providing information about flood problems other than those shown on the FIRM.

What you get in the web tool

Use *Surging Seas* to view and download data about potential flood problems for any county, city, town, zip code, or legislative district. View and download excel files of flood exposure analysis for over 100 demographic, economic, infrastructure and environmental variables, using data drawn mainly from federal sources including the Census, DOE, DOI, EPA, FCC, FEMA, NOAA, and USGS.

This *Surging Seas* information can support the activity listed under 322(c): providing information about flood problems other than those shown on the flood insurance rate map (FIRM).

Reminders from CRS experts

- In order to earn points, the community would have to volunteer the information to everyone requesting flood information or information on properties identified as flood prone.
- Posting this information on a website alone would not lead to points.
- For 320 credit, select those exposure variables you feel are most related to flood and other hazards.

Additional options

You can also utilize *Surging Seas* as a visual communication tool – generally or for CRS – when speaking to citizens about building on property and the potential for future coastal flooding and sea level rise.

Get started

To access *Surging Seas* customizable maps, analysis, and downloads follow the step-by-step guide starting on page 13.

Please note

This guide does not determine whether you may receive points; your FEMA/ISO official does – frequently on a case-by-case basis.

CRS Activity 330, Outreach Projects

The **OBJECTIVE** of this activity is to provide the public with information needed to increase flood hazard awareness and to motivate actions to reduce flood damage, encourage flood insurance coverage, and protect the natural functions of floodplains.

Research has shown that awareness of the flood hazard is not enough to motivate people to take action to protect themselves and their property. People need to be told repeatedly, through various means, what specific actions to take before they will change their behavior. Research has also shown that a properly run local information program is more effective in bringing about change than are national advertising or publicity campaigns. Based on these research findings, Activity 330 provides credit to communities that engage in thorough, critical thinking about their public information needs and about what they want people in their communities to know and do with regard to floodplain resources and flood hazards. The activity provides extra credit for communities that develop locally customized strategies to increase awareness and motivate residents to take action.

What you get in the web tool

Surging Seas maps and analysis could be used in the following ways:

- to identify target audiences for CRS outreach and for program for public information (PPI) activities
- as a source of information to send to the target audiences or to share at educational outreach events
- within target outreach projects for those conducting multijurisdictional PPI activities

You can zoom in on the interactive maps to see which blocks/properties may be flooded under different water levels. You can also view/download analysis on how many people, homes, and how much property value (and other variables) may be at risk within ZIP codes, towns or other areas types.

Additional options

You can also utilize *Surging Seas* as a visual communication tool when speaking to citizens about building on property and the potential for future coastal flooding and sea level rise.

Get started

To access *Surging Seas* the customizable maps, analysis, and downloads follow the step-by-step guide starting on page 13.

Please note

This guide does not determine whether you may receive points; your FEMA/ISO official does – frequently on a case-by-case basis.

CRS Activity 342d, Hazard Disclosure

Disclosure of other hazards (DOH)

Maximum credit: 80 points

342 Elements

- **Disclosure of the flood hazard (DFH):** Up to 25 points if real estate agents notify those interested in purchasing properties located in the Special Flood Hazard Area (SFHA) about the flood hazard and the flood insurance purchase requirement. An additional 10 points are provided if the disclosure program is part of a Program for Public Information credited under Activity 330 (Outreach Projects).
- **Other disclosure requirements (ODR):** Up to 5 points for each other method of flood hazard disclosure required by law, up to a maximum of 25 points.
- **Real estate agents' brochure (REB):** Up to 8 points if real estate agents are providing brochures or handouts that advise potential buyers to investigate the flood hazard for a property. An additional 4 points are provided if the disclosure program is part of a Program for Public Information credited in Activity 330 (Outreach Projects).
- **Disclosure of other hazards (DOH):** Up to 8 points if the notification to prospective buyers includes disclosure of other flood-related hazards, such as erosion, subsidence, or wetlands.

340 HAZARD DISCLOSURE: 342d Disclosure of other hazards (DOH)

Up to 8 points if the notification to prospective buyers includes disclosure of other flood-related hazards, such as erosion, subsidence, or wetlands. DOH provides credit for providing information to inquirers about other flood-related hazards. Potential property purchasers should be advised of other hazards that have been identified for specific sites. These include:

- Coastal wave hazards (as mapped as V Zones, LiMWA, or coastal A Zones);
- Coastal and channel erosion;
- Subsidence;
- Dam failure and levee failure;
- Areas subject to increased flooding due to climate change and sea level rise; and
- Tsunamis and the other special flood-related hazards listed in Section 401.

What you get in the web tool

- Information and analysis for a wide range of variables within a zip code or town can be generated within *Surging Seas Risk Finder*.
- Users can also download images of maps showing land at risk from 1-10 feet above high tide line within a given neighborhood.
- This information could be utilized within the actions listed within this CRS activity that could lead to points.
- This downloadable information could be put on fliers for distribution or disseminated in other ways.

Reminders from CRS experts

Within CRS, it is necessary to obtain disclosure of the flood hazard (DFH) credit in order to obtain disclosure of other hazards (DOH). Also, earning credit may be difficult unless the community/state already receives credit.

Get started

To access *Surging Seas* customizable maps, analysis, and downloads follow the step-by-step guide starting on page 13.

Please note

This guide does not determine whether you may receive points; your FEMA/ISO official does – frequently on a case-by-case basis.

CRS Activity 350, Flood Protection Information

351 Background

As noted in As noted in Activity 330, research has shown that people become interested in a subject when they receive repeated messages from different sources. When they do become interested, they need more information than what usually is covered in brief outreach projects. This activity credits providing that more detailed information. It also credits supplying additional information, such as real-time gage data, that can be disseminated effectively via websites.

The community library and community websites are obvious places for residents to look for detailed information about flooding and flood protection. These locations can contain a great deal of information and they offer alternatives for people who are hesitant to go to City Hall or talk to a local regulatory official about their flood problem or flood concerns. Libraries are best for providing guidebooks and handbooks to the public since they are typically costly to mail or are often too lengthy to be presented on a website. They are also a good source of materials for people who do not use the internet.

Websites have become the primary source of detailed information for more and more people. For some types of information, such as maps and current information on flooding, a website can be the most effective and efficient source. A website also allows links to other, more detailed information that is kept current by the agency or organization that is most familiar with it.

351 .a. Activity Description

The maximum credit for Activity 350 is 125 points.

This activity credits providing the public with more detailed information about flood protection measures. The flood protection information provided in this activity supports the messages presented under Activity's 330's outreach project. It also credits supplying community-specific documents and additional information, such as real-time gage data, that can be disseminated effectively via websites. The more detailed information is intended to help the public take steps to protect themselves and their property from the impact of flooding.

Two main sources of information are credited in this activity: libraries and websites.

What you get in the web tool: Link to or embed *Surging Seas* maps. Links and embeds will reflect any changes you make to the map (water level, zoom, scope, or layers displayed), so you can be assured viewers will see the map you have configured.

Get started: See the step-by-step instructions on page 24.

Please note: Your FEMA/ISO official determines whether you may receive points.

CRS Activity 412d, Higher Study Standards (HSS)

The maximum credit for HSS is 160 points.

HSS credits the use of study standards higher than those required by FEMA at the time of the study. A community may receive credit for HSS in areas where it does not receive credit for NS. For example, credit can be provided if the FIRM (or a later map adopted for regulatory purposes) was based on future-conditions hydrology, provided that the community's floodplain development regulations use base flood elevations based on future conditions.

HSS credit is provided for the following higher study standards:

- Using a factor of safety when calculating the 100-year discharge,
- Using better topographic data,
- Using future-conditions hydrology (including sea level rise), and
- Showing 500-year flood elevations and the boundaries of the 500-year floodplain.

Additional higher study standards may be submitted by the community. The ISO/CRS Technical Reviewer will determine if they warrant credit for HSS.

What you get in the web tool

Using *Surging Seas* you can view and download maps showing land at risk from 1-10 feet above the local high tide line.

Reminders from CRS experts

If these maps are used to regulate construction or development, they may be eligible for HSS credit.

Get started

To access *Surging Seas* customizable maps, analysis, and downloads follow the step-by-step guide starting on page 13.

Please note

This guide does not determine whether you may receive points; your FEMA/ISO official does – frequently on a case-by-case basis.

CRS Activity 432f, Protection of Critical Facilities (PCF)

The maximum credit for this element is 80 points.

For CRS credit purposes, critical facilities are defined in Section 120. There are usually two kinds of critical facilities that a community should address:

- Facilities that are vital to flood response activities or critical to the health and safety of the public before, during, and after a flood, such as a hospital, emergency operations center, electric substation, police station, fire station, nursing home, school, vehicle and equipment storage facility, or shelter.
- Facilities that, if flooded, would make the flood problem and its impacts much worse, such as a hazardous materials facility, power generation facility, water utility, or wastewater treatment plant. PCF credit is provided for regulations that either prohibit critical facilities or set higher standards for protecting them from flood damage. Full credit is for a prohibition on new critical facilities in the 500-year floodplain.

What you get in the web tool

- *Surging Seas* allows you to identify critical facilities within a town or zip code – both the location and name of the facility.
- You can determine which scenarios would pose risks to an existing facility or new facilities if built in this area.
- This can provide useful context for this activity, although it may not support the accumulation of points.
- You can utilize mapping layers found on page 13.

Get started

To access *Surging Seas* customizable maps, analysis, and downloads follow the step-by-step guide starting on page 13.

Please note

This guide does not determine whether you may receive points; your FEMA/ISO official does – frequently on a case-by-case basis.

CRS Activity 512a, Floodplain Management Planning (FMP)

CRS MANUAL: *The maximum credit for this element is 382 points.*

FMP credit is provided for a community-wide floodplain management plan that was prepared by following a standard planning process. To receive any credit under this activity, the planning process must receive some credit under each of the 10 steps listed below. If the plan was approved by FEMA as a multi-hazard mitigation plan and one step is missing, the mitigation plan may receive credit, but FMP credit will be limited to 50 points. If two steps are missing, there is no credit for a multi-hazard mitigation plan.

What you get in the web tool

- Users can obtain risk information within *Surging Seas* related to flood hazards in foot or meter increments above the high tide line, or for other hazard disclosure.
- *Surging Seas* provides analysis related to flood and sea level rise risk, projections, and maps.

Reminders from CRS experts

- FEMA representatives tell us *Surging Seas* could be utilized within steps 4(b) and (c).
- In particular, the mapping layers found in Section 2 of this document could be utilized within step 5(e) and (f).
- We would be interested in hearing from additional CRS implementers, coordinators and experts regarding this section in order to expand this part of the guide.

Multi-Hazard Mitigation Planning	CRS	Maximum
Phase I – Planning process		
\$201.6(c)(1)	1. Organize	15
\$201.6(c)(1)	2. Involve the public	120
\$201.6(c)(2) & (3)	3. Coordinate	35
Phase II – Risk assessment		
\$201.6(c)(2)(i)	4. Assess the hazard	35
\$201.6(c)(2)(ii) & (ii)	5. Assess the problem	52
Phase III – Mitigation strategy		
\$201.6(c)(3)(i)	6. Set goals	2
\$201.6(c)(3)(ii)	7. Review possible activities	35
\$201.6(c)(3)(iii)	8. Draft an action plan	60
Phase IV – Plan maintenance		
\$201.6(c)(4)	9. Adopt the plan	2
\$201.6(c)(4)	10. Implement, evaluate, revise	26
Total		382

Get started: To access *Surging Seas* customizable maps, analysis, and downloads follow the step-by-step guide starting on page 13.

Please note: Your FEMA/ISO official determines whether you may receive points.

Surging Seas step-by-step guide

Surging Seas allows you to see, customize, download, and share maps that show areas vulnerable to coastal flooding from storm surge, tides, and permanent submergence from sea level rise.

1. GO TO SS2.CLIMATECENTRAL.ORG AND SEARCH FOR YOUR LOCATION IN THE SEARCH BOX LOCATED IN THE TOP RIGHT CORNER

- Zoom into neighborhoods, or out to broader regions using the round + and - buttons located in the bottom right corner.



2. ADJUST THE WATER LEVEL ON THE LEFT SIDE TO EXPLORE RISK FROM COASTAL FLOODING, SEA LEVEL RISE, OR BOTH

- Land shaded in blue is below the selected water level.
- Land shaded in green indicates areas potentially protected by natural ridges or levees.
- Elevation data supplied by NOAA.



3. SELECT THE "POPULATION" LAYER AT THE BOTTOM OF THE SCREEN

- View the tally of population living on land lower than the selected water level.
- Different colors indicate different population densities.
- For density calculations, population is assumed to be evenly distributed across the land within each Census block.



4. SELECT THE "PROPERTY" LAYER

- View the tally of property value (in 2012 dollars) on land lower than the selected water level.
- An EPA data source, based on property value totals by Census block group (assumed to be evenly distributed across each block group).
- Depending on user selection, analysis may exclude areas that levees or other features appear to protect.



5. SELECT THE "SOCIAL VULNERABILITY" LAYER

- View social vulnerability, which assesses the ability of communities to prepare and respond to hazards like flooding.
- "High" (red) and "low" (yellow) indicate the 20% most and least vulnerable in coastal areas of each state, respectively.
- Data source: Hazards and Vulnerability Research Institute (HVRI)'s Social Vulnerability Index.



6. SELECT THE "ETHNICITY" LAYER

- View the tally of population of color (including multi-racial) living on land lower than the specified water level.
- 1 dot per person, based on Census 2010 block level data.
- For density calculations, population is assumed to be evenly distributed across the land within each Census block.



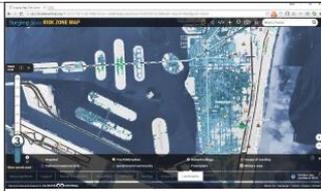
7. SELECT THE "INCOME" LAYER

- View per capita income, based on Census tract resolution data.



8. SELECT THE "LANDMARKS" LAYER

- View landmarks such as museums, hospitals, and schools by icon.
- Data sources: US DOT, US EIA, U.S. BGN / USGS, NTIA, NCES.



14

Download, Print, or Embed Surging Seas Maps

We welcome you use and share *Surging Seas* maps and materials broadly.

ONCE YOU HAVE CUSTOMIZED YOUR MAP, CLICK THE DOWNLOAD ARROW ICON TO DOWNLOAD A MAP POWERPOINT, IMAGE, OR GOOGLE EARTH LAYER

You will be prompted to save the file as a PowerPoint, or .png image to your computer. We welcome you to use these downloads within your flyers, reports, or presentations.



SELECT THE EMBED ICON TO OBTAIN THE SNIPPET OF CODE YOU CAN USE TO EASILY EMBED YOUR CUSTOMIZED MAP INTO YOUR OWN WEBSITE



Questions? Contact us at sealevel@climatecentral.org.

15

Download Local Fact Sheets

- The fact sheet is a free customizable 2-page PDF handout of sea level and coastal flood risk information specific to the location water level and sea level rise model you choose in *Surging Seas*.
- The fact sheet incorporates the maps and information available within *Surging Seas*, as displayed in other parts of this guide.
- Below is a sample fact sheet for Miami, FL.

COASTAL RISKS FOR MIAMI, FL

Select water level: 3 feet. The local Miami sea level rise coastal flooding, at both:

What's at risk on land below 3 feet?

- Population: 14,000
- Highway: 100 miles
- Property: 10,000 acres
- Business: 10,000 acres
- Historical: 10,000 acres

Rising seas = more floods?

- When sea level rises, the frequency of flooding increases.
- When sea level rises, the duration of flooding increases.
- When sea level rises, the volume of flooding increases.
- When sea level rises, the damage from flooding increases.

When could a 3-foot flood happen?

- By the year 2050, there is a 10% chance of a 3-foot flood.
- By the year 2070, there is a 50% chance of a 3-foot flood.
- By the year 2100, there is a 90% chance of a 3-foot flood.

What causes sea level rise?

- Global warming: The ocean warms and expands.
- Ice melt: The ice sheets and glaciers melt.
- Sea level rise: The ocean level rises.

Does sea level rise affect flooding?

- Yes, sea level rise affects flooding.
- Sea level rise increases the frequency of flooding.
- Sea level rise increases the duration of flooding.
- Sea level rise increases the volume of flooding.
- Sea level rise increases the damage from flooding.

What causes climate change?

- Global warming: The ocean warms and expands.
- Ice melt: The ice sheets and glaciers melt.
- Sea level rise: The ocean level rises.

Can sea level rise be slowed?

- Yes, sea level rise can be slowed.
- Reducing greenhouse gas emissions can slow sea level rise.
- Protecting coastal ecosystems can slow sea level rise.

REDUCING YOUR RISK

Preparing yourself and your community

- Check for sea level rise in your area.
- Check for sea level rise in your area.
- Check for sea level rise in your area.

Resources available for Florida

- Florida Sea Level Rise Task Force
- Florida Department of Transportation
- Florida Department of Environmental Protection
- Florida Department of Emergency Management
- Florida Department of Health

SEA LEVEL RISE AND COASTAL FLOODING FAQs

What causes sea level rise?

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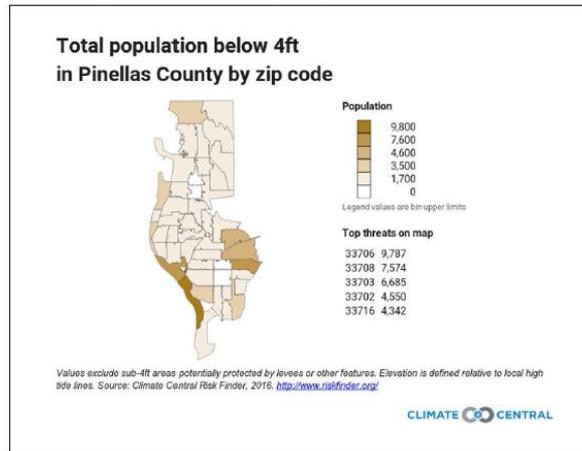
To create your own fact sheet:

- Visit riskfinder.org
- Search for your location (zip code, town, city, county or state)
- View analysis on 1 scrolling page
- Set the water level
- Select sea level rise projection in "When Are the Risks?" section (or leave the default setting)
- Click *Local Fact Sheet* button in the summary section at the top of the page.

Write us at sealevel@climatecentral.org to request fact sheets for your location by email.

Download PowerPoint Slides and Images

- Explore your location in *Surging Seas* compared to neighboring locations
- Export it as a PowerPoint slide or as an image (.png).
- Below is a sample fact sheet for Pinellas County, FL.



To create your own PowerPoint slide or image:

- Visit riskfinder.org
- Search for your location (zip code, town, city, county or state)
- Scroll down to the "What Is at Risk?" section
- Set the water level
- Choose the impact variable (population, road miles, schools, etc.) and area type (zip code, county, town, etc.)
- Click the PowerPoint or PNG icons

To request slides or images by email, write us at sealevel@climatecentral.org.

Download Spreadsheets: Summary Count and Percentage

- *Surging Seas* offers spreadsheets that contain summary analysis of what sits on land from 1-10 feet in a given zip code, town, city, or county.
- See list of all variables *Surging Seas* analyzes on page 25.
- Below is a sample spreadsheet for Galveston, TX.

	A	B	C	D	E	F	G	H	I	J	K	L
1	TABLE: SEA LEVEL RISE AND COASTAL FLOOD EXPOSURE IN GALVESTON, TX ON LAND BELOW 1-10 FT											
2	Elevation relative to local high tide line (Mean Higher High Water)											
3	Unit	< 1ft	< 2ft	< 3ft	< 4ft	< 5ft	< 6ft	< 7ft	< 8ft	< 9ft	< 10ft	
4	BY TOTALS											
5	High social vulnerability population	Count	15	43	279	863	1802	3135	5063	15483	20915	23217
6	Medium social vulnerability population	Count	89	321	1335	2993	4512	6785	9187	11445	13265	14392
7	Low social vulnerability population	Count	142	395	1097	2216	3182	4109	4717	5339	5744	6454
8	Property value	\$Million	112	301	814	1491	2274	3285	4461	5133	5651	6911
9	Population	Count	245	759	2791	5763	9495	14020	21189	32057	40364	44654
10	Caucasian population	Count	223	623	2294	4447	7163	10208	15098	20915	26154	28960
11	Population of color	Count	25	119	554	1477	2615	4180	6518	12325	16297	16932
12	African American population	Count	7	30	155	354	747	1164	1413	1608	2017	2150
13	Asian population	Count	9	32	105	220	341	497	734	988	1297	1518
14	Hispanic population	Count	26	138	735	1621	2645	4061	7227	10170	12915	14346
15	Native American population	Count	3	8	49	94	163	295	389	544	711	785
16	Homes	Count	312	814	2388	4243	6106	8175	11761	23239	27570	30605
17	Hospitals	Count	0	0	0	0	0	1	2	5	6	7
18	Schools	Count	0	0	2	4	2	10	18	19	22	25
19	Colleges and Universities	Count	0	0	0	0	0	0	0	2	2	2
20	Libraries	Count	0	0	0	0	0	0	0	0	1	1
21	Theater, music & arts buildings	Buildings	0	0	0	0	1	1	1	1	1	1
22	Museums	Count	0	0	2	5	8	7	9	9	9	9
23	Houses of worship	Count	0	7	14	38	54	83	97	104	107	107
24	Government buildings	Count	0	0	0	1	3	4	5	5	5	5
25	Roads	Miles	3	13	46	103	165	237	316	369	406	425
26	Federal roads	Miles	0	0	0	0	2	3	3	3	4	4
27	Local roads	Miles	3	12	44	100	160	220	306	363	389	407
28	Primary roads	Miles	0	0	0	0	2	3	4	4	4	4
29	Secondary roads	Miles	0	0	1	3	4	6	12	13	13	14
30	State roads	Miles	0	0	1	3	4	6	12	13	13	14
31	Railroads	Miles	0	1	3	4	8	10	10	11	12	12
32	Maritime rail	Miles	0	1	1	1	2	2	2	2	2	2
33	Non-maritime rail	Miles	0	0	0	0	0	0	0	0	0	0
34	Rail yards	COF	0	0	0	0	1	1	1	1	1	1
35	Intermodal freight terminals	Count	0	0	0	0	0	0	0	0	0	0
36	Passenger stations	Count	0	0	0	0	1	1	1	1	1	1
37	Ferry stations	Count	0	0	0	1	1	1	1	1	1	1
38	Traffic passenger stations	Count	0	0	0	0	0	0	0	0	0	0
39	Airports	COF	0	0	0	1	1	1	1	1	1	1
40	Public airports	COF	0	0	0	1	1	1	1	1	1	1
41	Helipads	Count	2	3	4	5	6	6	6	6	6	6
42	Brownfields	Count	0	0	0	0	1	1	27	27	27	27

To download this spreadsheet:

- Visit riskfinder.org
- Search for your location (zip code, town, city, county or state)
- Scroll down to the "What is at Risk?" section
- Set the water level
- Click the XLS icon
- Select *All available categories in [location]: Summary* button
- Click *Get Download* button

Write us at sealevel@climatecentral.org to request spreadsheets by email.

Download Spreadsheets: Comparisons

- *Surging Seas* offers spreadsheets that contain comparative analyses for zip codes within a county, towns within a county, and other combinations.
- The example below is for population, but you can compare any of *Surging Seas'* 100 impact variables (homes, hospitals, hazardous waste facilities, etc.) in this way.

	A	B	C	D	E	F	G	H	I	J	K
1	TABLE: POPULATION EXPOSED IN GALVESTON COUNTY, TX ON LAND BELOW 1-10 FT (COUNT)										
2	Elevation relative to local high tide line (Mean Higher High Water)										
3		< 1ft	< 2ft	< 3ft	< 4ft	< 5ft	< 6ft	< 7ft	< 8ft	< 9ft	< 10ft
4	BY TOTALS										
5	77573	43	92	175	296	450	677	1001	1708	2635	4563
6	77510	0	0	1	2	5	11	19	32	51	78
7	77588	50	138	289	492	898	1641	2589	3696	4588	5540
8	77617	3	15	36	52	63	68	71	72	73	73
9	77650	54	201	451	872	1355	1950	2832	3981	5338	7080
10	77639	74	169	377	1072	2231	3202	4374	6081	8023	10628
11	77546	28	79	146	208	306	381	468	564	670	790
12	77623	22	33	46	63	81	93	104	113	121	130
13	77554	294	1028	2257	3760	5345	6565	7202	7690	8359	8571
14	77591	0	3	78	125	185	253	329	414	449	450
15	77590	112	429	2743	9018	18424	25344	28651	30135	30331	30350
16	77521	29	175	1112	2150	3169	4804	6451	8173	14588	16606
17	77550	13	40	180	1064	2679	4533	8421	14631	18980	21399
18	77618	4	10	17	24	33	42	52	66	82	98
19	77585	53	103	209	361	598	1087	1655	1966	2536	2965
20	77517	0	1	3	5	7	9	11	15	19	24
21	77563	235	447	800	1532	2260	2561	2921	3180	3563	5145
22											
23	BY PERCENTAGES										
24	77573	0.1%	0.1%	0.2%	0.4%	0.6%	0.9%	1.4%	2.4%	3.7%	6.4%
25	77510	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.2%	0.4%	0.6%
26	77588	0.3%	0.5%	1.0%	1.4%	2.0%	2.8%	4.0%	5.8%	7.8%	10.0%
27	77617	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
28	77650	2.9%	10.6%	24.3%	46.0%	71.5%	88.3%	96.6%	99.2%	99.6%	99.7%
29	77639	0.2%	0.4%	1.0%	2.8%	5.7%	8.3%	11.3%	16.7%	20.7%	27.4%
30	77546	0.1%	0.2%	0.3%	0.5%	0.6%	0.8%	1.0%	1.2%	1.4%	1.7%
31	77623	5.0%	7.4%	10.3%	14.1%	18.0%	20.8%	23.2%	25.1%	27.1%	29.0%
32	77554	4.4%	11.8%	25.6%	42.4%	60.3%	74.1%	81.3%	86.8%	94.3%	96.7%
33	77591	0.0%	0.0%	0.6%	2.5%	4.5%	6.5%	8.4%	10.2%	11.0%	11.9%

To download this spreadsheet:

- Visit riskfinder.org
- Search for your location (for example, county)
- Scroll down to the "What is at Risk?" section
- Set the water level
- Select "by zip code" above the heat map
- Click the XLS icon above the heat map
- Select *[variable] in [location]: Comparison by [area type]* button
- Click *Get Download* button

Write us at sealevel@climatecentral.org to request spreadsheets by email.

Download Spreadsheets: Individual Facilities Lists

- *Surging Seas* offers spreadsheets that contain the names, coordinates, and water levels of individual facilities of a certain type, by state.
- The example below shows hazardous waste facilities at different water levels in California.

A	B	C	D	E	F
588	SEA LEVEL RISE AND COASTAL FLOOD EXPOSURE OF HAZARDOUS WASTE SITES IN CALIFORNIA ON LAND BELOW 10 FT LIST 587				
588	LEVEL	ID	NAME	LAT	LOX
590	3F	110002607584	KASPER FOUNDATION HOSPITALS	37.87653	-122.29325
590	3F	11000244644	ADVALVOY INCORPORATED	37.42187	-122.9333
591	3F	110002951720	J S ENTERPRISES	33.66111	-117.55526
592	3F	110002798230	ATHENA NEURO SCIENCES INC	37.50617	-122.25063
593	3F	110002705631	DUMHE WALTER R ELECTRIC CORP	33.78174	-118.23305
594	3F	110002676665	MANDOR OF CALIFORNIA INC	37.65622	-122.14229
595	4F	110002647958	ASSOCIATED FREIGHT LINES	37.82006	-122.29059
596	4F	110009645769	CALIFORNIA AUTOMOTIVE SEALING	37.61689	-122.05726
597	4F	110002663207	UTAH INTERNATIONAL INC	37.40919	-122.02337
598	4F	110002912687	HYDRO AGRI NORTH AMERICA	37.94245	-121.334951
599	4F	110009638127	COSTELLI & PARDINI AUTO BODY	37.549167	-122.308355
600	4F	110002526307	OAK HARBOR FREIGHT LINES	37.76152	-122.21865
601	4F	110002165741	WARTSLA NORTH AMERICA INC	33.7965	-118.22138
602	4F	110002707867	OAKLAND SCAVERGER HAYWARD YARD	37.54869	-122.14104
603	4F	110002768688	LA PUMPING PLANT #72	33.78247	-118.24006
604	4F	110002641080	MORGAN ENVIRONMENTAL SERVICES	37.818142	-122.286411
605	4F	110009481869	A I CLEANERS	33.74323	-118.19034
606	4F	110002931992	CALIFORNIA ADVANCED ENV TECH CORP	37.65663	-122.33613
607	4F	110006473583	ARNESON MARINE INC	37.91754	-122.51073
608	4F	110009547044	RAVAN RENEVAL COMPANY	37.51923	-122.35009
609	4F	1100041019823	CHEVRON #92239	32.74947	-117.20679
610	4F	110002641715	J L SHELTON TRUCKING	37.49461	-122.21863
611	4F	110002673374	P G AND E BURLINGAME SUBSTATION	37.58933	-122.3636
612	4F	110009544225	SOLANO BODY SHOP II	38.13667	-122.25624
613	4F	110013369897	ORIX TECHNOLOGY CORPORATION	37.475067	-121.936487
614	4F	110008291268	TOXON CORPORATION EUREKA TERMINAL	40.72228	-124.95739
615	4F	110009628760	MISSION UNIFORM SERVICE	37.6023	-122.08213
616	4F	110002687959	PG&E SAN RAFAEL SERVICE CENTER	37.98974	-122.52619
617	4F	110002345248	ENVIRONMENTAL TECHNOLOGY INC	40.72262	-124.2187
618	4F	110009639048	CONCOR FREIGHT LINES	37.81678	-122.07765
619	4F	110023035213	NUVELO	37.51849	-122.26396
620	4F	110013308526	A A A EQUIPMENT	37.76487	-122.21383
621	4F	110002762030	AAMCO #26053	36.12133	-122.256

To download this spreadsheet:

- Visit riskfinder.org
- Search for your location (for example, county)
- Scroll down to the "What Is at Risk?" section
- Set the water level
- Select an impact variable that is made up of individual facilities, such as EPA listed sites, schools, hospitals, or hazardous waste facilities
- Click the XLS icon above the table
- Select *[variable]* in *[state]*: *Individual facilities list* button
- Click *Get Download* button

Write us at sealevel@climatecentral.org to request spreadsheets by email.

Download Spreadsheets: Breakdown by Protection Status and Social Vulnerability

- *Surging Seas* offers spreadsheets that breakdown which population, homes, or other variables may be potentially protected by levees or natural ridges.
- It also provides a social vulnerability breakdown.
- Below is a sample fact sheet for Bergen County, NJ.

TABLE: POPULATION EXPOSED IN BERGEN COUNTY ON LAND BELOW 1-10 FT (COUNT)										
	Elevation relative to local high tide line (Mean Higher High Water)									
	< 1ft	< 2ft	< 3ft	< 4ft	< 5ft	< 6ft	< 7ft	< 8ft	< 9ft	< 10ft
38 Total	3276	7815	12687	17404	22880	29020	35199	40771	45320	49234
39 Connected to the ocean	2251	6353	11149	16616	21690	26470	34669	40460	44962	48635
40 Not connected to the ocean	1015	862	638	888	1190	560	529	311	338	399
41 In high social vulnerability Census tracts	894	1678	2301	2559	2671	2701	2717	2721	2726	2748
42 In medium social vulnerability Census tracts	1872	4684	7708	10595	14234	18415	22401	26001	29401	32367
43 In low social vulnerability Census tracts	610	1453	2677	4109	6983	7903	10080	12050	13193	14179

To download this spreadsheet:

- Visit riskfinder.org
- Search for your location (zip code, town, city, county, or state)
- Scroll down to the "What Is at Risk?" section
- Set the water level
- Select an impact variable that is made up of individual facilities, such as EPA listed sites, schools, hospitals, or hazardous waste facilities.
- Click the XLS icon
- Select *[variable]* in *[location]*: *Breakdown by protection status and social vulnerability/levels* radio button
- Click *Get Download* button

Write us at sealevel@climatecentral.org to request spreadsheets by email.

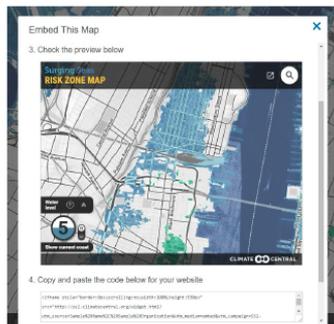
Link to or Embed Maps

LINK TO SURGING SEAS MAPS

- Visit ss2.climatecentral.org
- Search for your location
- Set water level
- Set zoom level
- Select an impact layer (if desired), such as population, property, or social vulnerability
- Copy the URL
- Use this URL when you link to your customized map from your website

EMBED SURGING SEAS MAPS ON YOUR WEBSITE

- Visit ss2.climatecentral.org
- Search for your location
- Set water level
- Set zoom level
- Select an impact layer (if desired), such as population, property, or social vulnerability
- Click the embed button </> on the top right of the screen
- Enter your Name and Organization, Caption, and URL
- Preview how the map will look on your site
- Copy the code from the pop-up window for use on your website



We want your feedback.

How are you using *Surging Seas* within CRS?

How could this guide be improved?

Are there additional CRS activities in which web tools could be of use?

How could the *Surging Seas* web tool be incorporated into future versions of CRS?

Reach us at sealevel@climatecentral.org.

List of *Surging Seas* Impact Variables

- Listed below are the demographic, economic, infrastructure, and environmental variables analyzed by *Surging Seas*
- We intersect these datasets with NOAA's LIDAR elevation data to provide screening-level analysis

- High social vulnerability population
- Medium social vulnerability population
- Low social vulnerability population
- Property value
- Population
- Caucasian population
- Population of color
- African-American population
- Asian population
- Hispanic population
- Native American population
- Homes
- Hospitals
- Schools
- Colleges and Universities
- Libraries
- Theater, music & arts buildings
- Museums
- Houses of worship
- Government buildings
- City Halls
- Roads
- County roads
- Federal roads
- Local roads
- Primary roads
- Secondary roads
- State roads
- Railroads
- Amtrak rail
- Mainline rail
- Non-mainline rail
- All passenger rail
- Intermodal freight terminals
- Passenger stations
- Amtrak stations
- Intercity bus stations
- Ferry stations
- Intercity passenger stations
- Rail stations
- Commuter or intercity rail stations
- Rail transit stations
- Transit passenger stations
- Airports
- Major airports
- Military airports
- Private airports
- Public airports
- Regional airports
- Heliports
- Power plants
- Commercial & industrial power plants
- Independent power plants
- Major power plants
- Minor power plants
- Utility power plants
- TV transmitter sites
- FM radio transmitter sites
- Brownfields
- EPA listed sites
- ACRES sites
- Biennial Reporters
- Superfund (CERCLIS) sites
- NPDES sites
- National Priorities List sites
- OIL sites
- OTAQREG sites
- RADINFO sites
- RMP sites
- SSTS sites
- TRI sites
- TSCA sites
- Hazardous materials facilities
- Listed carcinogen facilities
- Extreme hazmat facilities
- Oil facilities
- Pesticide facilities
- Hazardous waste sites
- Major hazwaste source sites
- Minor hazwaste source sites
- Unspecified hazardous waste sites
- Landfills
- Wastewater sites
- Major wastewater sites
- Nonmajor wastewater sites
- Sewage plants
- Land
- Protected land



Using the *Surging Seas* free web tool within FEMA's Community Rating System (CRS)

Thank you

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