

Living with Water

Amanda Guthrie and April Turner
South Carolina Sea Grant Consortium




March 27, 2024
HHAAR



Introductions

- Name
- Real Estate Agency
- Favorite Coastal Activity





Calling the Coast Home

Course Series:

Living with Water

The Land Water Connection

Tidelands, Beaches & Creeks:
Regulations and Rebuilding

Coastal Lifestyle for Clean Water





South Carolina Coastal Information Network

<https://www.sccoastalinfo.org/>

Instruction and Information Provided by:

- ACE Basin National Estuarine Research Reserve
- Clemson University
- Coastal Carolina University
- North Inlet-Winyah Bay National Estuarine Research Reserve
- S.C. Sea Grant Consortium
- S.C. Dept. of Health and Environmental Control
- S.C. Dept. of Natural Resources
- University of South Carolina



Objectives and Agenda

- 🏠 What does it mean to “Live with Water”?
- 🏠 Our Coastal Landscape
- 🏠 Tides, Storms, and Flooding
 - *What questions are you asked about water, flooding, and storms?*
- 🏠 Break – 10 minutes
- 🏠 Flood Maps
- 🏠 Resources
- 🏠 Questions and Wrap-Up



SCCIN

Calling the Coast Home

Poll

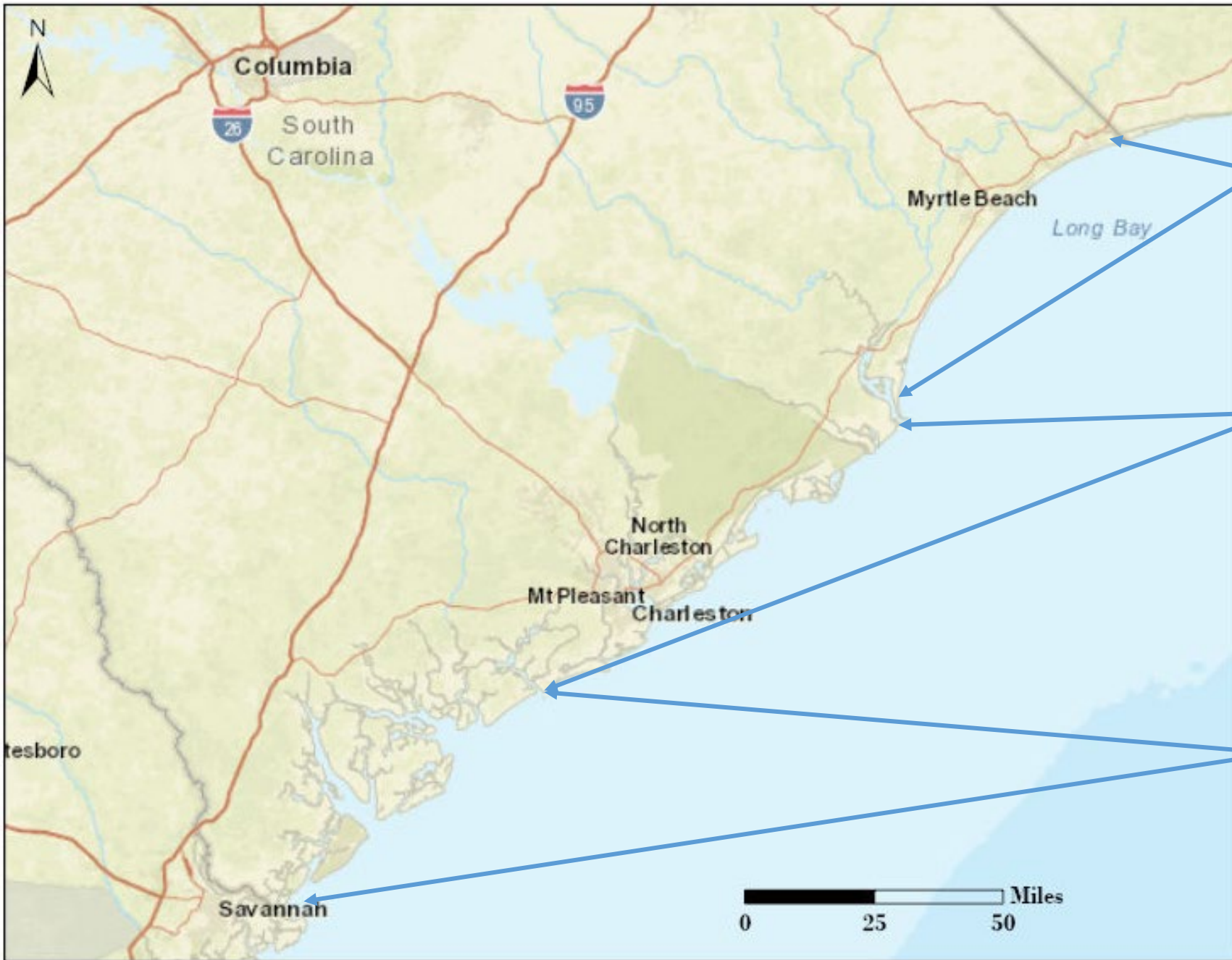
- How many years have you been working in real estate in coastal SC?



About Our Coast

- 190 linear miles of beaches
- 40 barrier islands and sea islands
- 350,000 acres salt marshes
- Over 20 million tourists per year
- > 30% of SC's 5.1 million residents live in the 8 coastal counties





North Coast

Greater
Charleston
Area

South Coast

South Coast

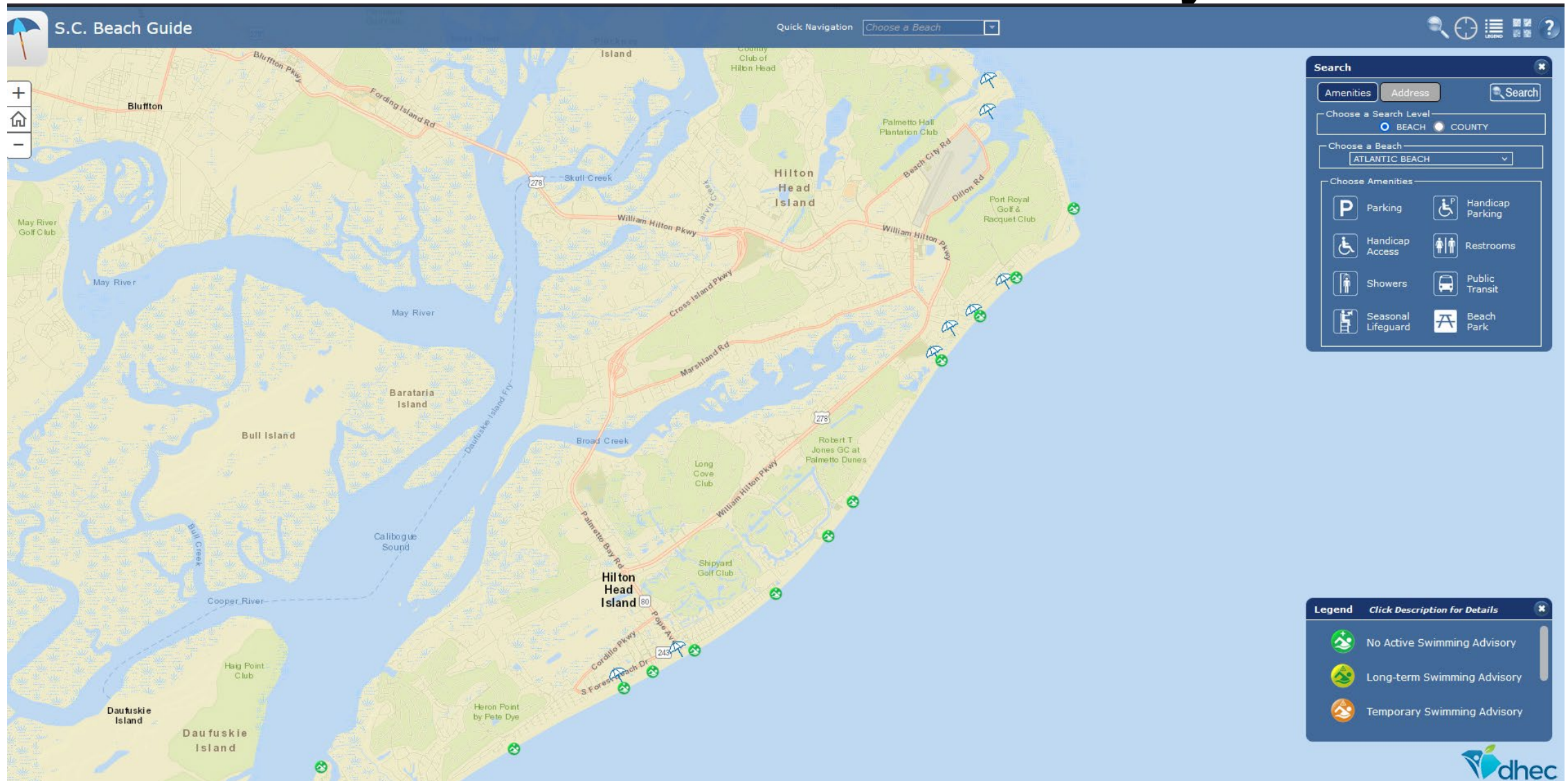
- Beaufort
- Bluffton
- Hilton Head





Barrier Islands & Beaches

Beach Access and Water Quality



Estuaries and Tidal Creeks

S.C. has more than 20% of the East Coast salt marshes

Tidal Creeks

+ Preface

"Many have the attitude toward development that we once had toward smoking: sure it's bad, but it won't be a problem for me."

Anna Quindlen's article, *Put 'Em in a Tree Museum*, 2004

Tidal creek ecosystems are the primary aquatic link between stormwater runoff from the land and **estuaries**. Small tidal creeks begin in upland areas and drain into larger creeks forming a network. The creeks increase in size until they join a tidal river, sound, bay, or harbor that ultimately connect to the coastal ocean. The upper regions or headwaters of tidal creeks are "first responders" to stormwater runoff and are an important habitat for evaluating the impacts of coastal development on aquatic ecosystems.

Coastal development has a negative impact on tidal creeks and ultimately impacts public health and the quality of coastal living. When the amount of **impervious cover** from development, including roads, parking lots and roofs, in coastal watersheds exceeds 10-30 percent, the physical, chemical, and biological processes in tidal creeks are impaired and potential human uses of these important habitats decrease. Properties along the shores of developed tidal creeks become more vulnerable to flooding as impervious cover levels increase.

This booklet is based on a synthesis of over 15 years of research in tidal creek systems. It is designed to inform local and state decision-makers and citizens about the consequences of rapid, poorly planned coastal development on tidal creeks and coastal communities.



Photo/George Steel



Saltmarsh Guide

Select Language ▼ [DOWNLOAD THE GUIDE PDF](#)

Guide to the Salt Marshes and Tidal Creeks of the Southeastern United States [Home](#) [Overview](#) [Guide](#) [Resources](#) [Glossary](#) [Contact](#) [Q](#)



Guide to the Salt Marshes and Tidal Creeks of the Southeastern United States

[ACCESS THE GUIDE HERE >](#)

ECOLOGICAL SETTING

The salt marsh-tidal creek ecosystem is a highly productive coastal wetland that occurs between upland areas, such as forests and urban environments, and estuaries, where fresh and salt water mix. [LEARN MORE >](#)

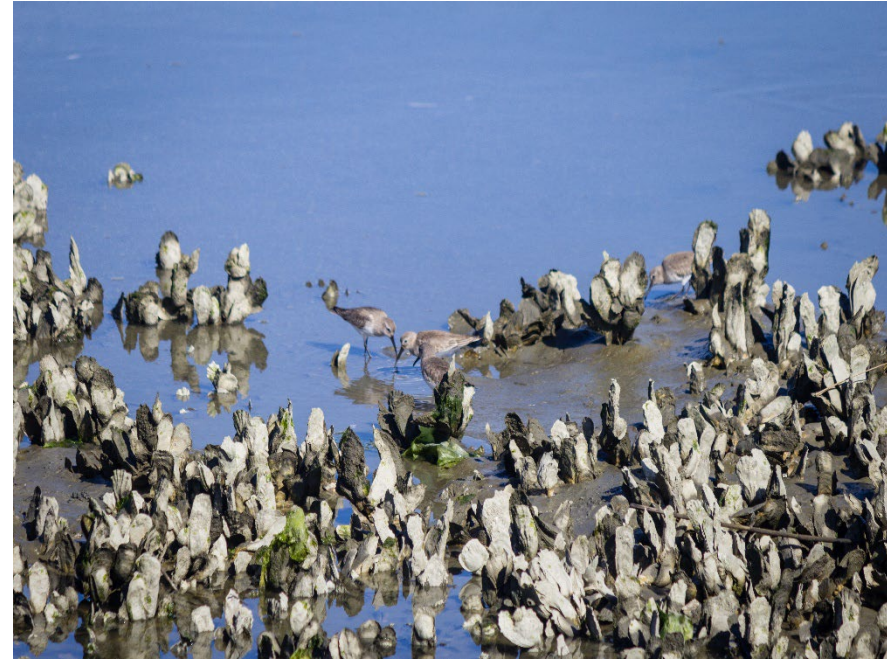


ECOSYSTEM SERVICES

Salt marshes and tidal creeks provide us with a wealth of benefits, referred to as ecosystem services, including maintaining healthy water, protecting us from flooding and erosion, providing nursery and essential habitat for commercial and recreational fisheries, and supporting recreational activities that have become part of the coastal lifestyle. [LEARN MORE >](#)



South Coast



ACE Basin National Estuarine Research Reserve

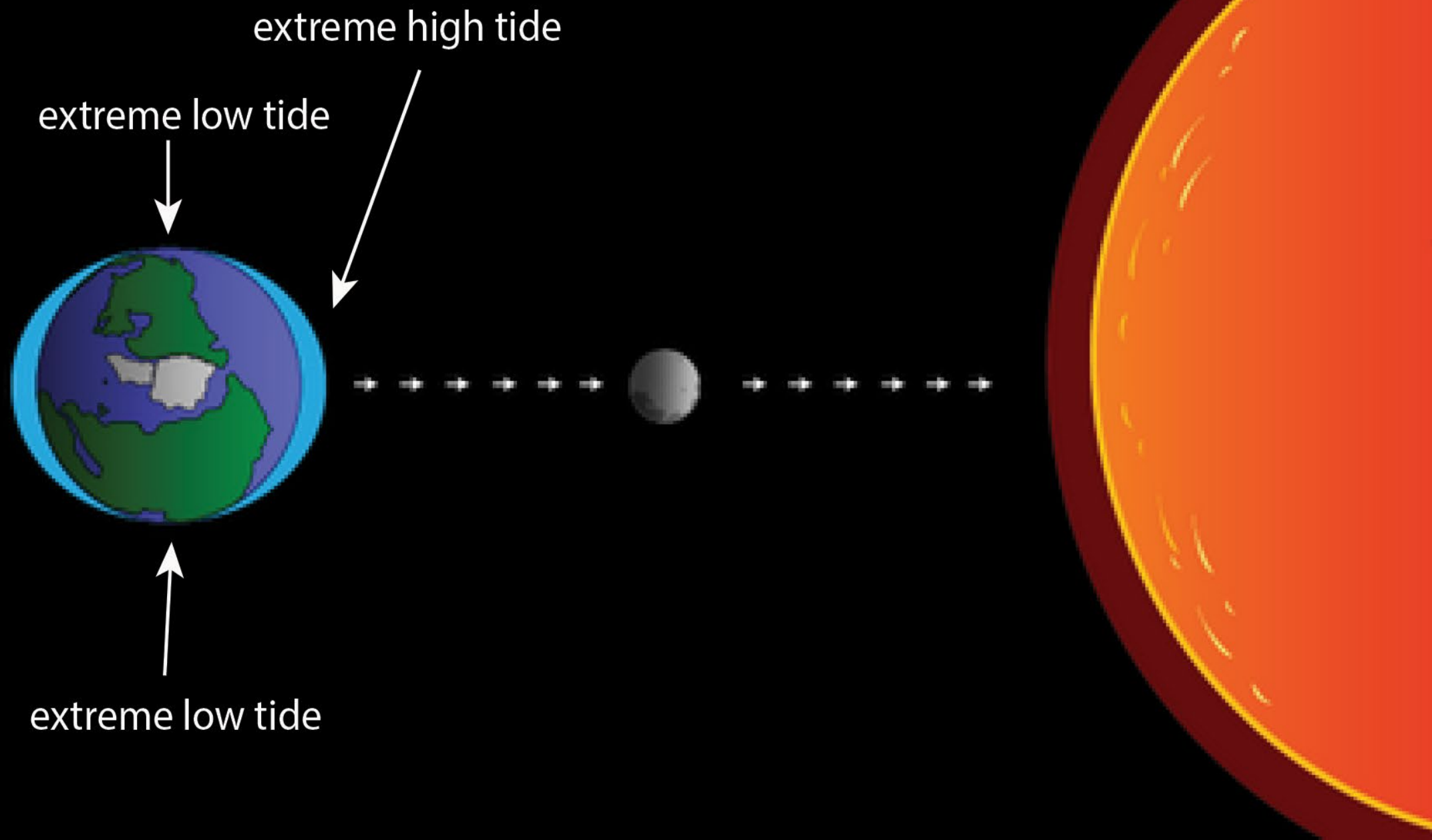




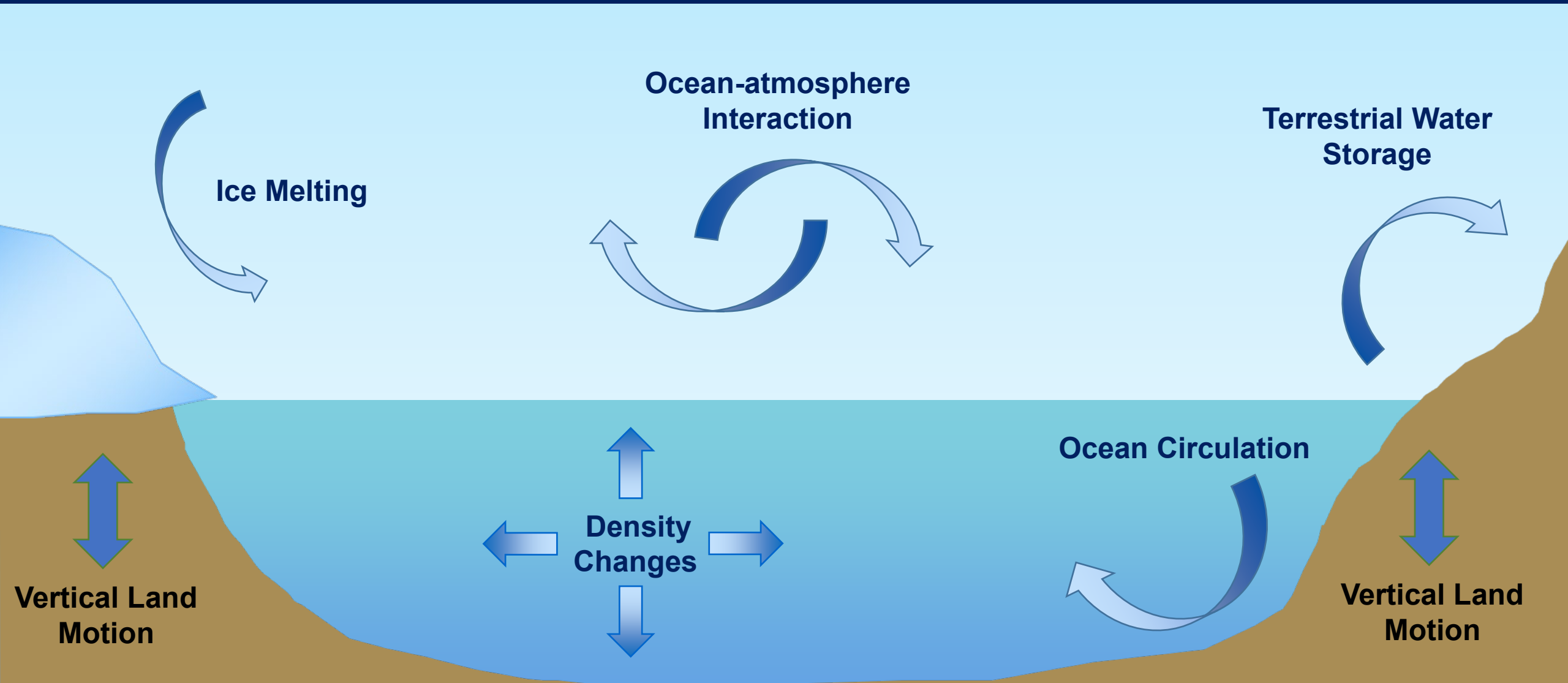
Tides, Storms, & Flooding

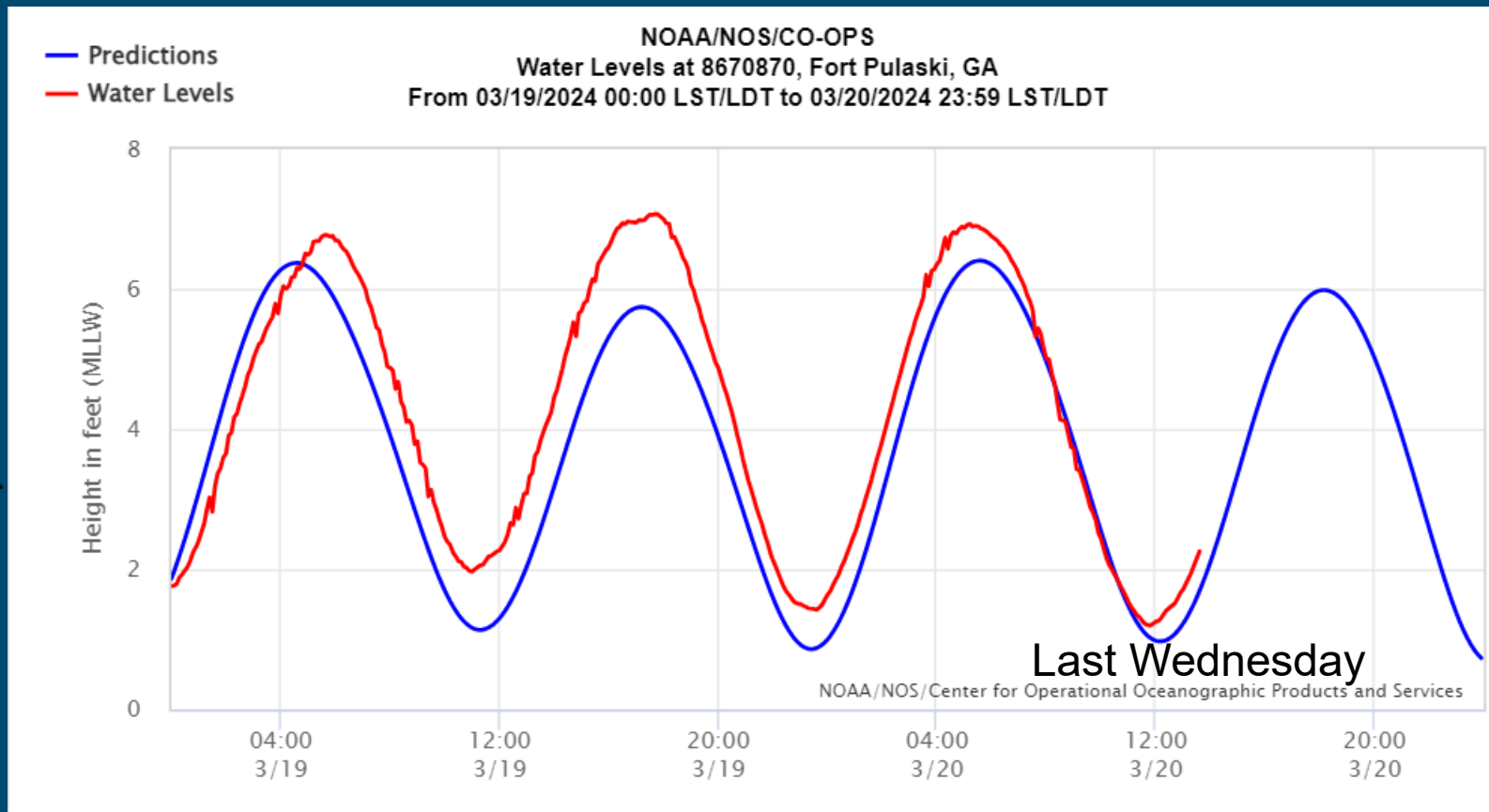
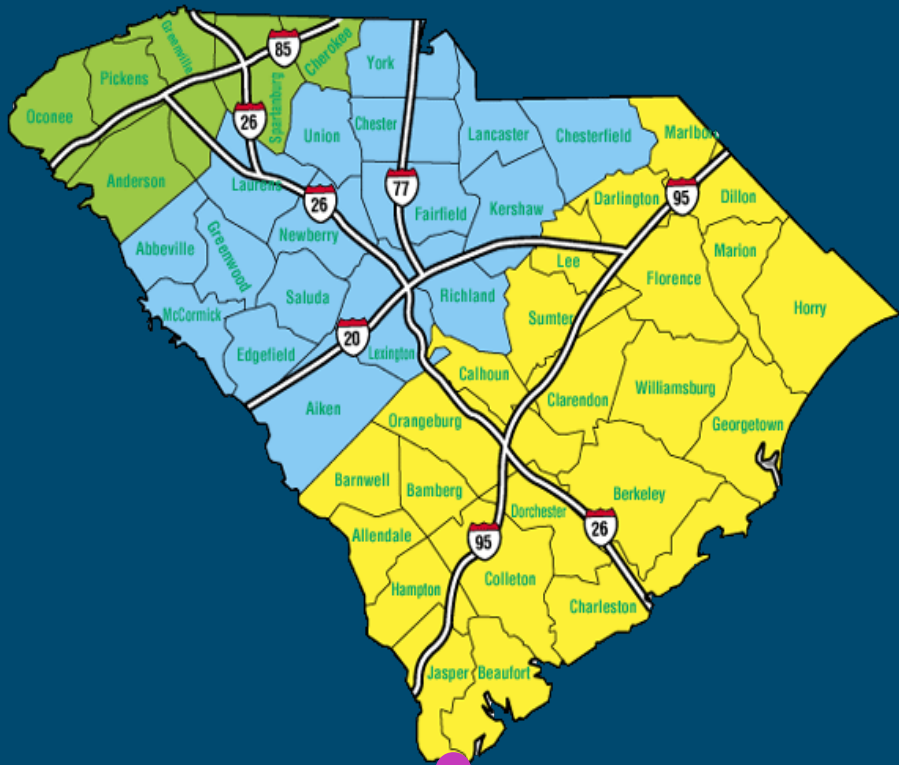
Poll

- What effects have you experienced from extreme weather?
 - Standing water on your street
 - Commute delays due to street flooding
 - Minor flooding in your home
 - Major structural damage to your home
 - Car damage from floodwaters
 - Wind damage
 - Evacuated ahead of a storm
 - Real estate sale affected

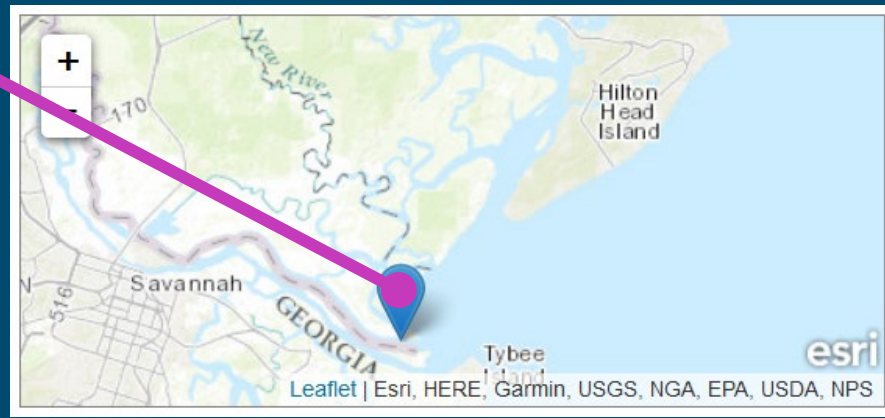


What causes sea level to change



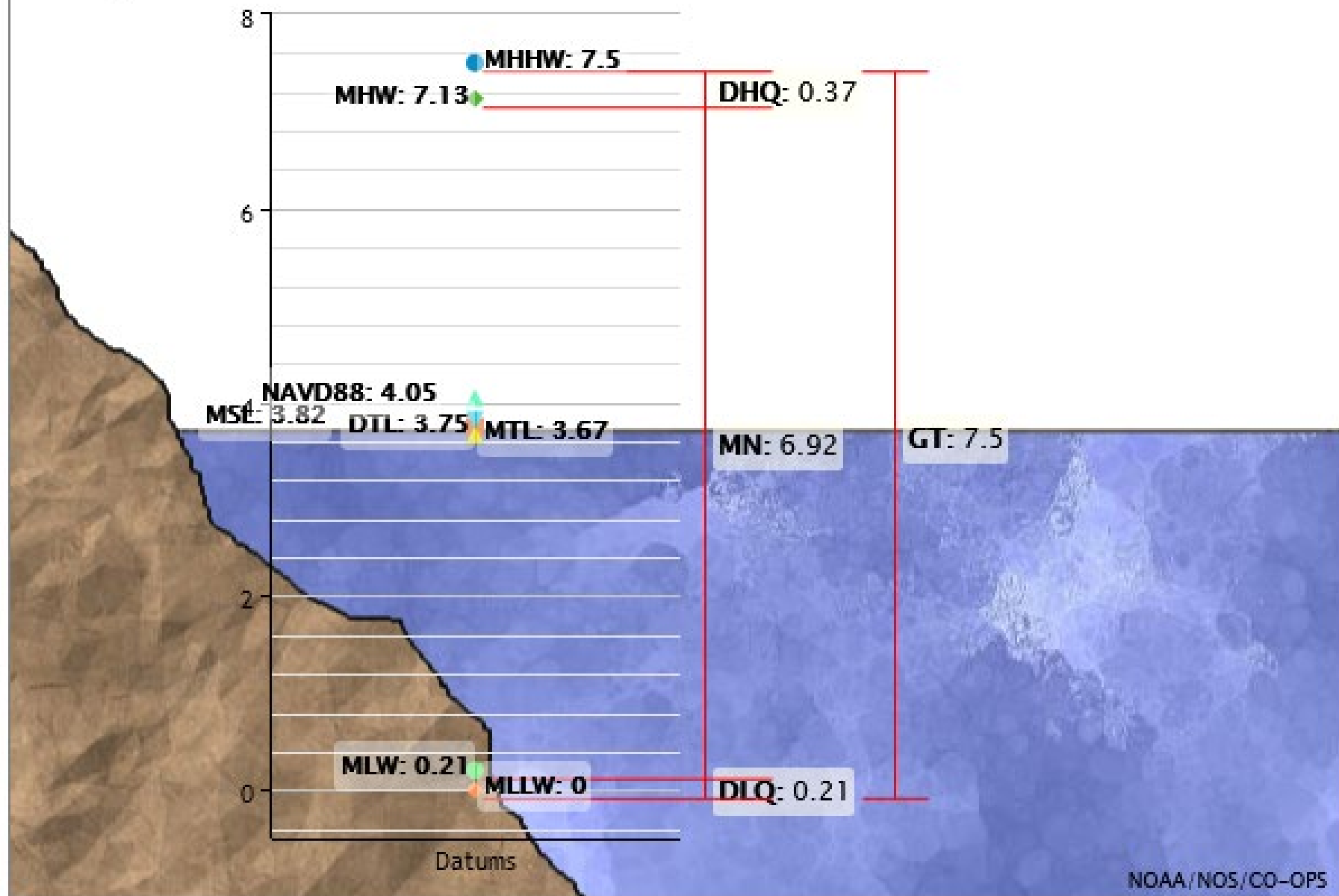


<https://tidesandcurrents.noaa.gov/>



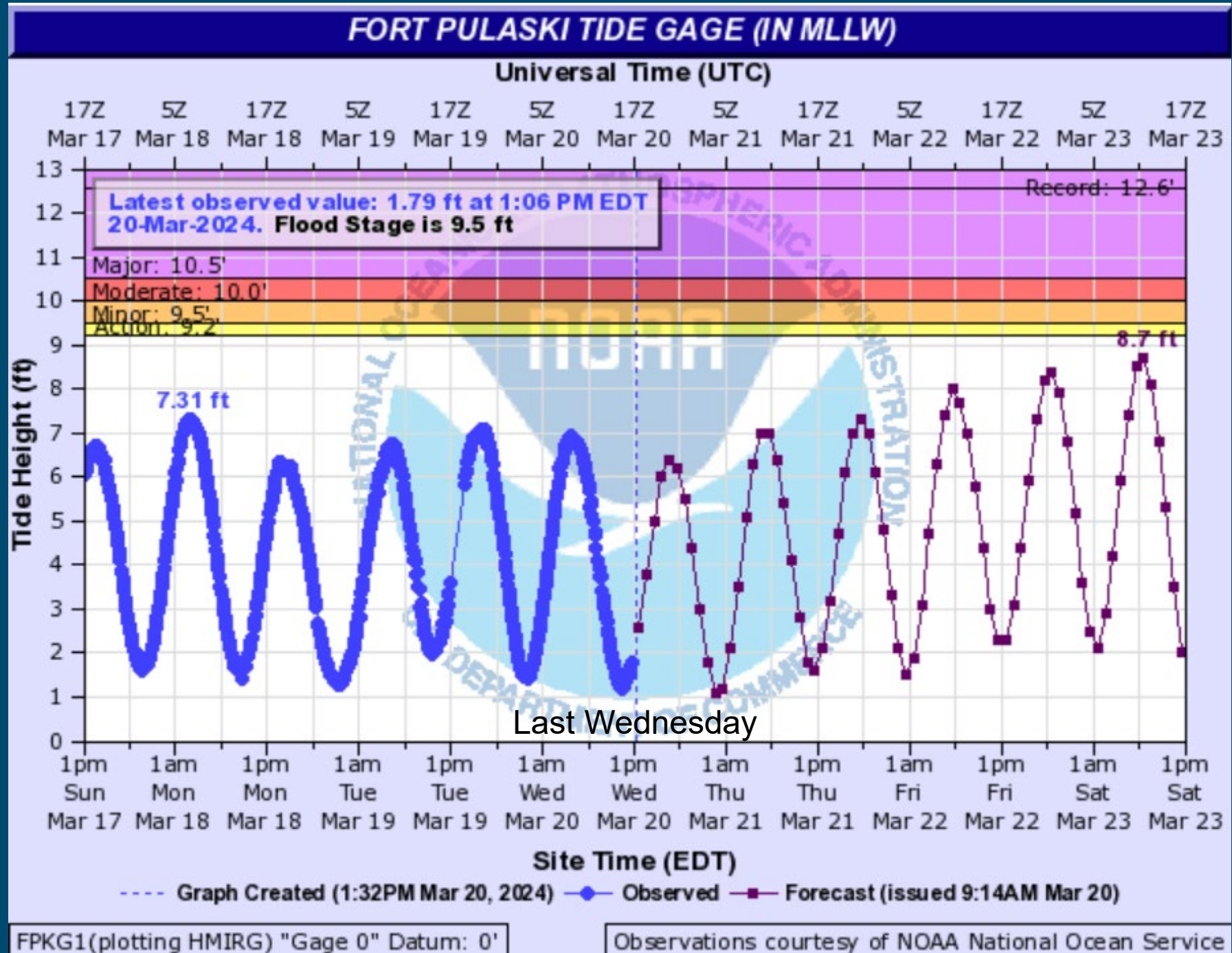
Datums for 8670870, Fort Pulaski, GA

All figures in feet relative to MLLW



South Area Tides

<https://water.weather.gov/ahps/>
Select Fort Pulaski station



Tidal Flooding

<https://mycoast.org/sc>

Beaufort, SC



MyCoast

SC MyCoast

King Tides

Storms

Boats

Adopt-A-Beach

Register

Log In

The SC King Tides Initiative

 King Tide Photo

South Carolina Department of Health and Environmental Control (DHEC) is leading the South Carolina King Tides initiative to document the effect that extreme tide events have on our state's beaches, coastal waterways, private property and public infrastructure.



2022 Predicted King Tides

- January 2-3
- May 15-18
- June 13-16
- July 12-15
- August 10-13
- September 7-10
- October 26-28
- November 23-26
- December 23-25

For details, see [DHEC's Tide Tables page](#).

King Tide Report by Steve Miano

Edisto Island, SC



November 2021 King Tides

Adapting to Flooding in Charleston

Find local resources to help you adapt to flooding in the Lowcountry.

RESOURCES

INTERACTIVE MAP

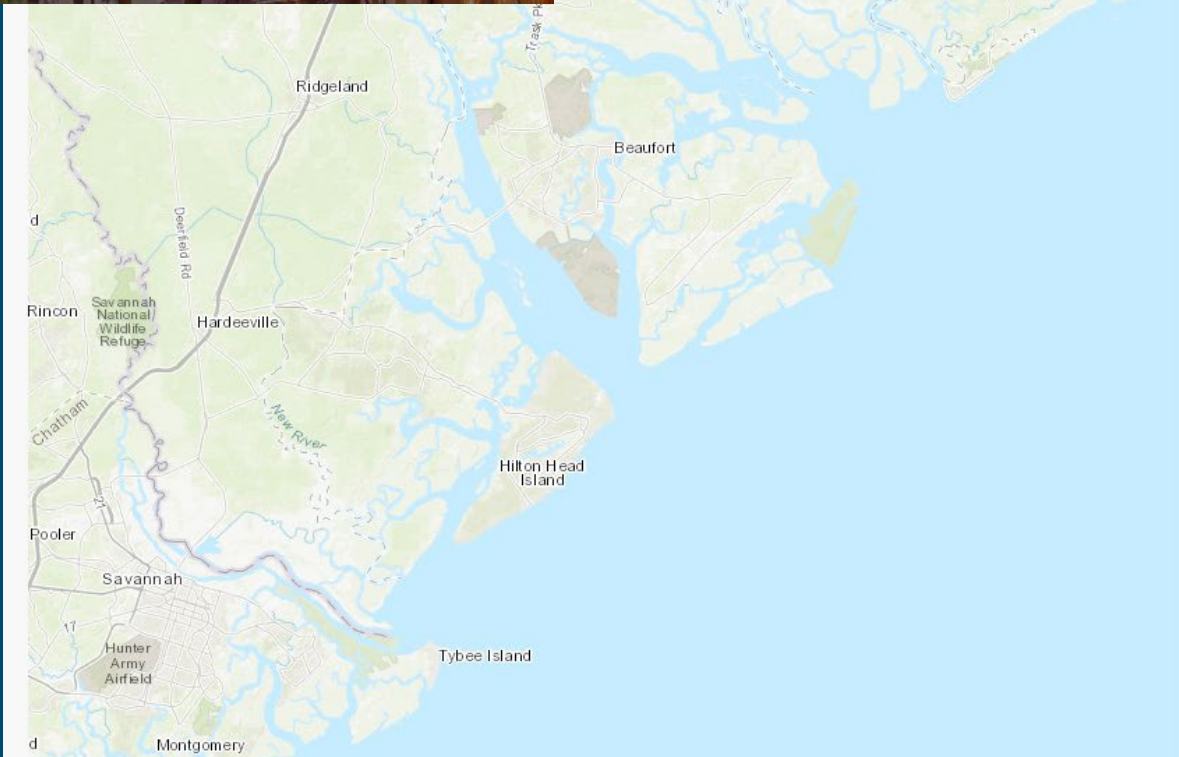
LIVE UPDATES

DATA SOURCES



chucktowntfloods.cofc.edu

Interactive Map



Layer List

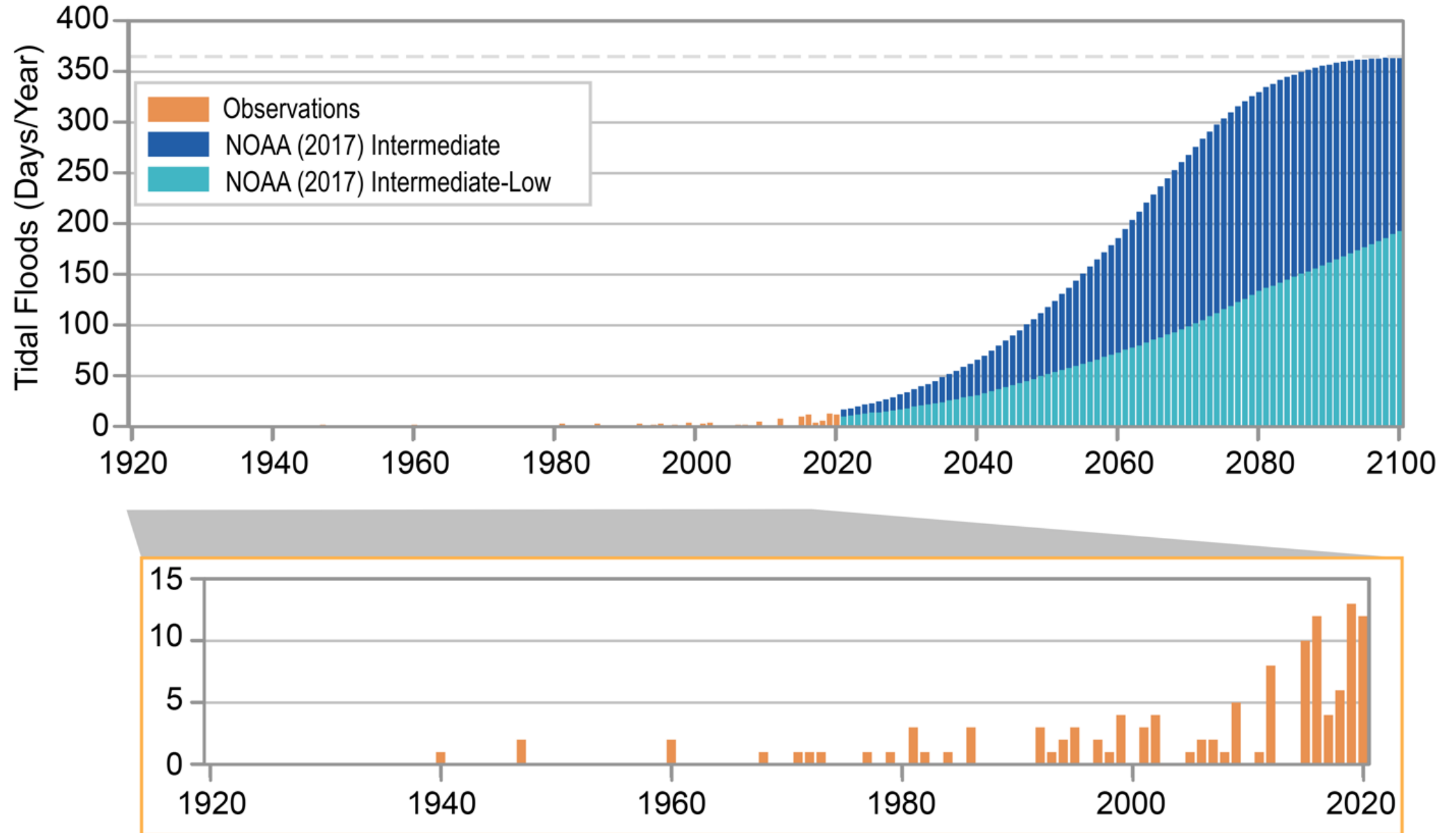
Layers

- SCEMD - Hurricane Shelters ...
- SC Evacuation Routes ...
- SCEMD Hurricane Evacuation Zones ...
- Water Level Prediction Stations ...
- Active Water Level Monitoring Stations ...
- High Tide Flooding Area ...
- Charleston Area Sea Level Rise Scenarios ...
- NWS Live River Gauges ...
- Weather Radar Time Series ...
- NWS Weather Watches and Warnings ...
- Rainfall Amount Forecast ...
- NHC Category 1 Storm Surge Risk ...
- NHC Category 2 Storm Surge Risk ...
- NHC Category 3 Storm Surge Risk ...
- NHC Category 4 Storm Surge Risk ...
- NHC Category 5 Storm Surge Risk ...

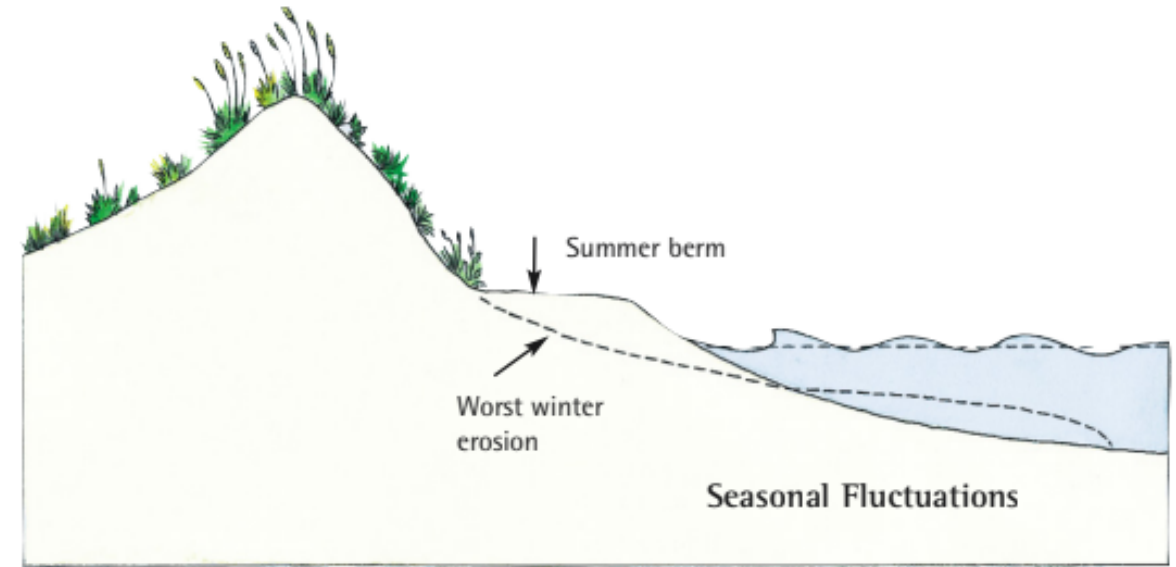
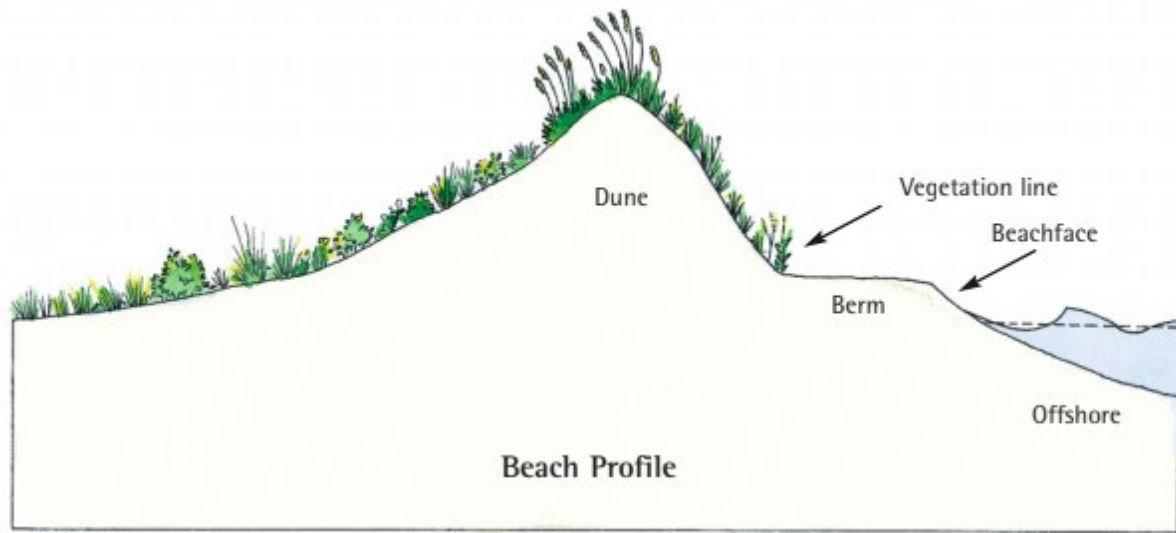
Frequent tidal flooding on the South Coast



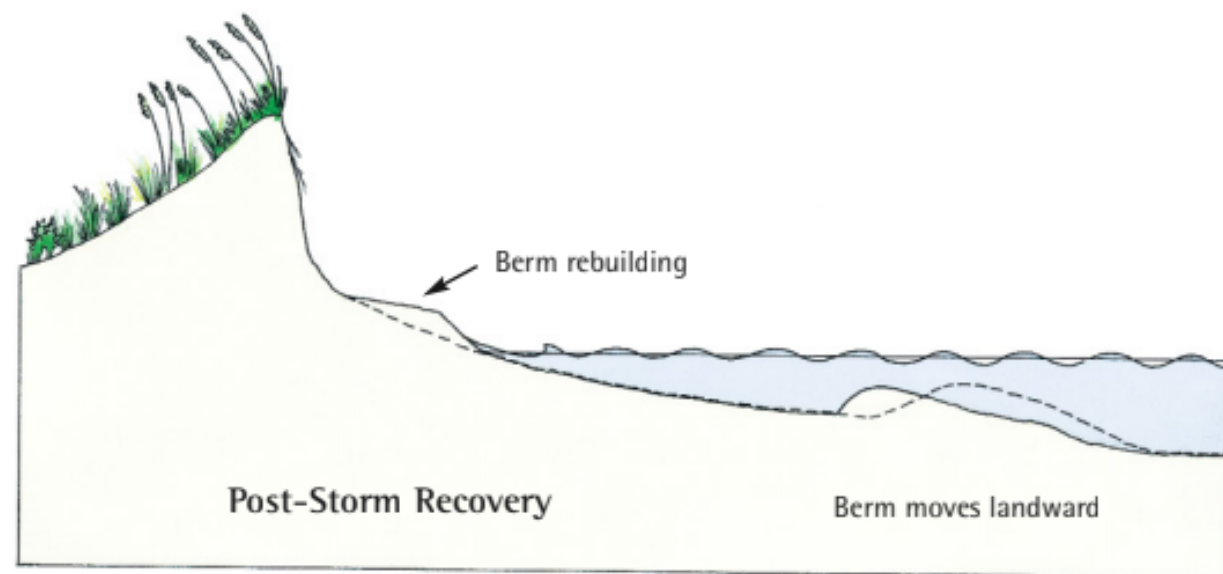
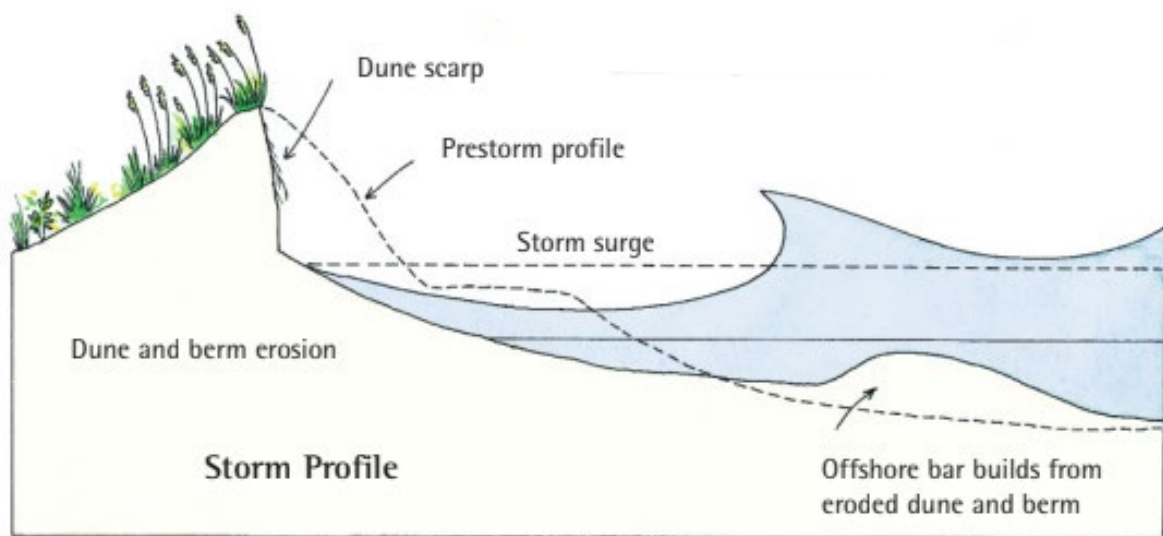
Observed and Projected Annual Number of Tidal Floods for Fort Pulaski, GA



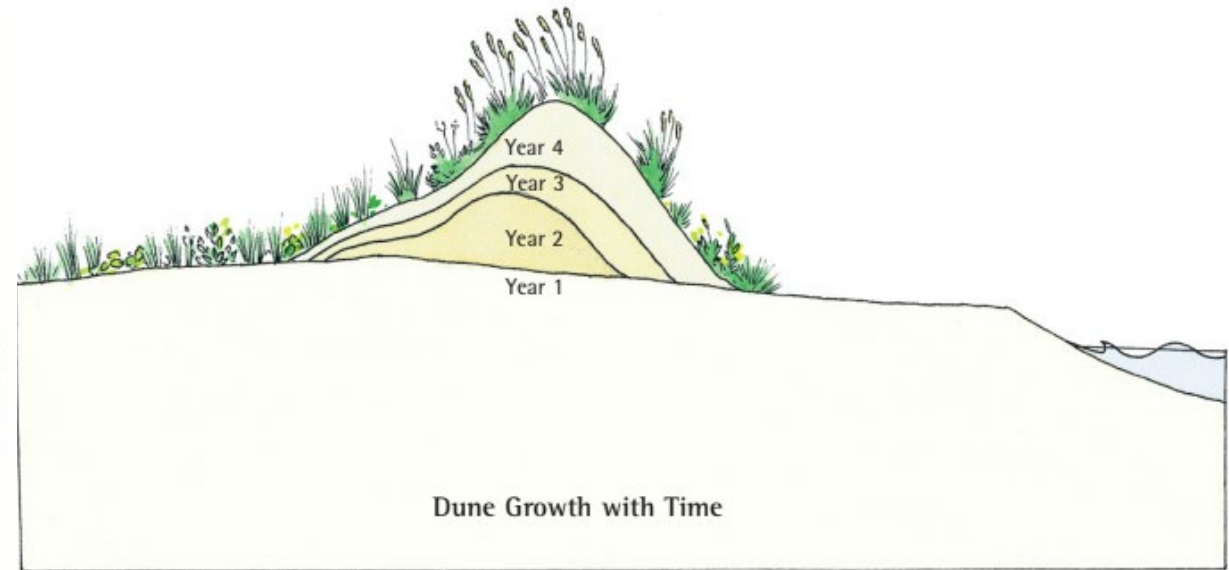
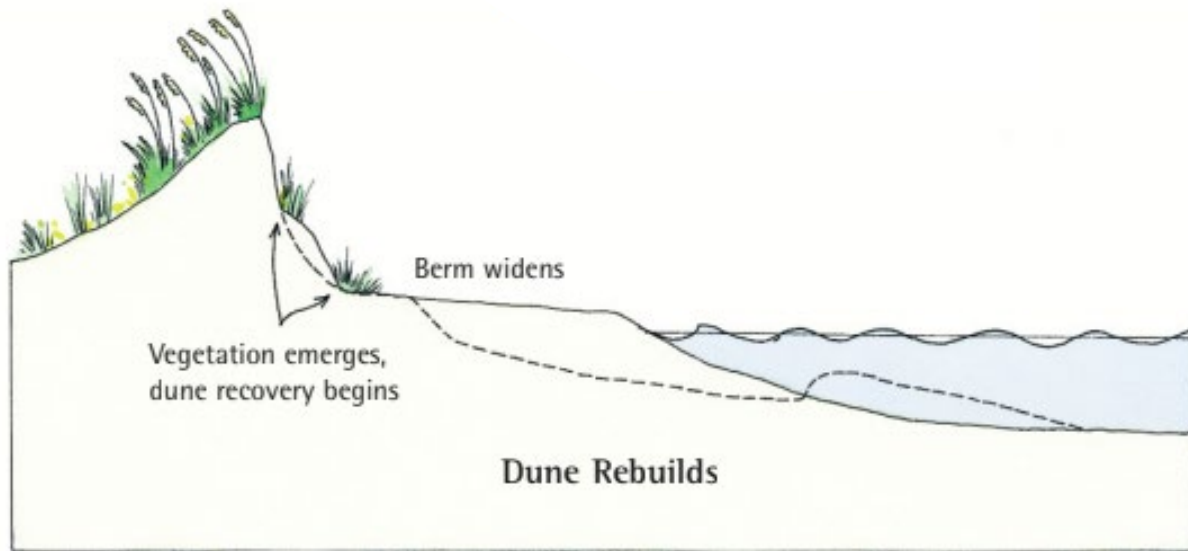
Beach Profiles



Beach Profiles



Beach Profiles



<https://gis.dhec.sc.gov/bermexplorer/>

B.E.R.M. EXPLORER

DHEC - OCRM Beach Erosion Research & Monitoring Profile Viewer

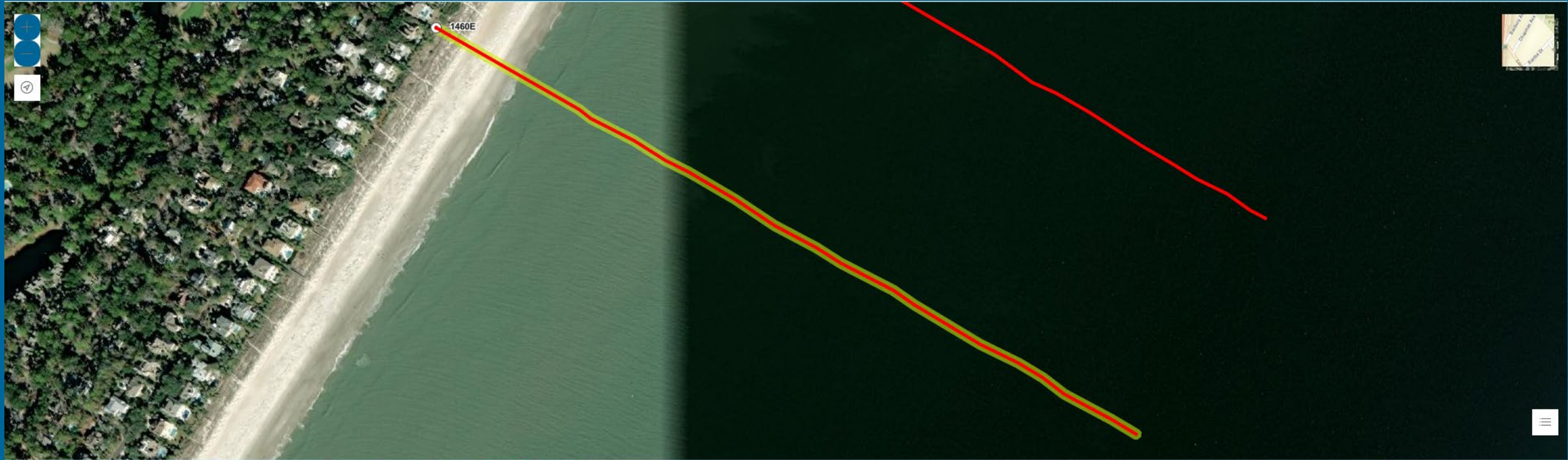
Select Beach Download Print Help



B.E.R.M. EXPLORER

DHEC - OCRM Beach Erosion Research & Monitoring Profile Viewer

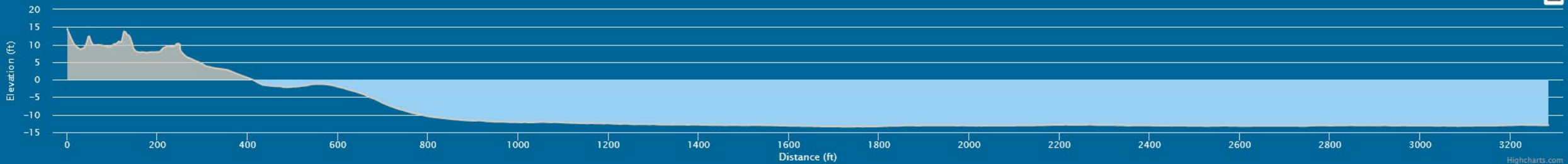
Select Beach Download Print Help



PROFILE YEAR 2014 2015 2016 2017 2018 2019 2020 2021 ALL

VOLUME CALCULATOR

Hilton Head Island—Transect 1460, Collected 3/31/2021



Highcharts.com

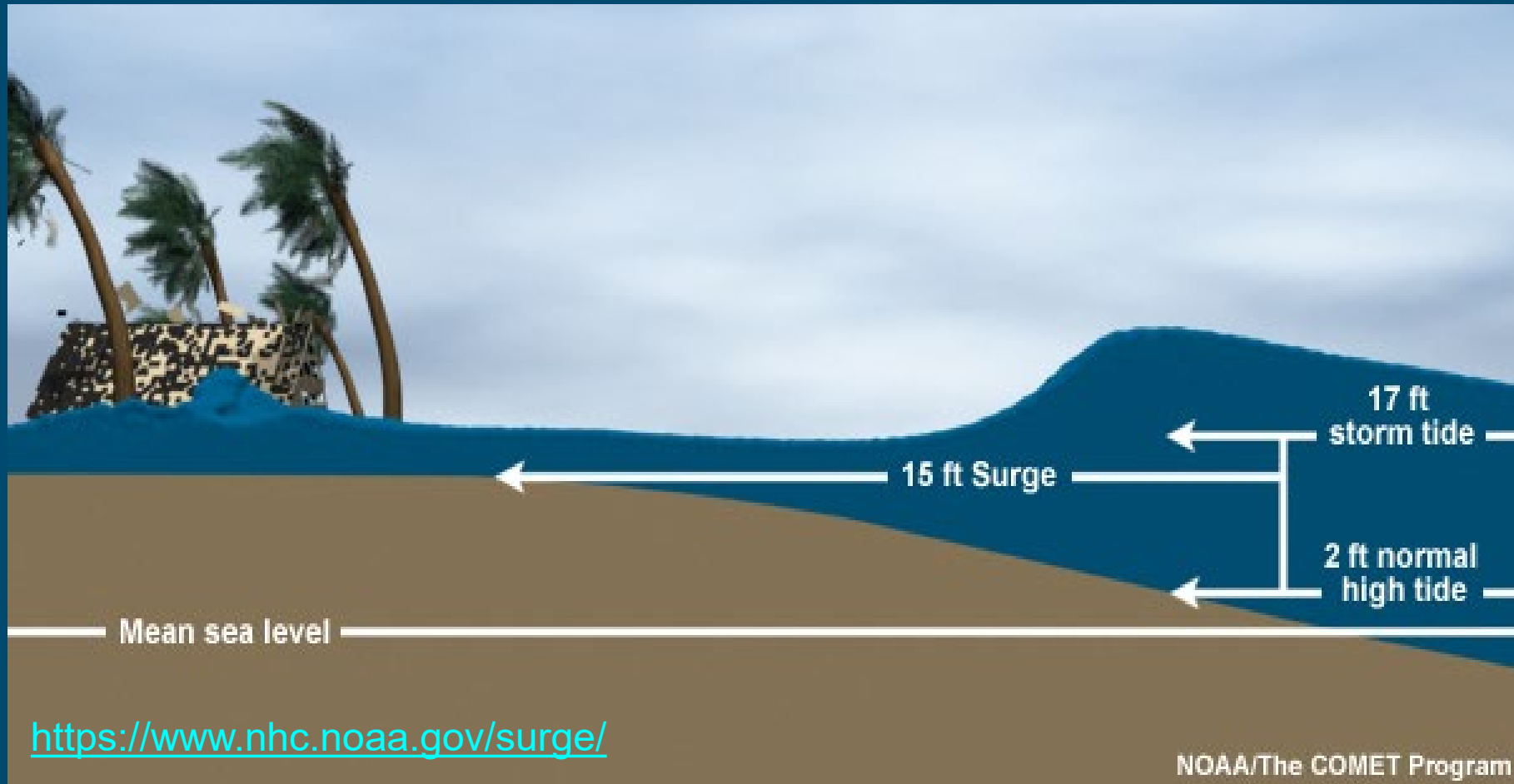
- <https://youtu.be/NHT--ND5rHI>
- <https://youtu.be/pWbScxjgrtY>

Storm History

A photograph of a flooded road with a yellow dashed line, surrounded by trees and a building in the background. The water is dark and reflects the surrounding environment. The road is partially submerged, and the water level appears to be quite high. The background shows a line of trees and a building, possibly a school or a community center, partially obscured by the trees. The overall scene is one of a significant flooding event.

- Oct. 2015 flood
- Oct. 2016 Matthew
- Sept. 2017 Irma
- Sept. 2018 Florence
- Sept. 2019 Dorian
- Sept 2022 Ian

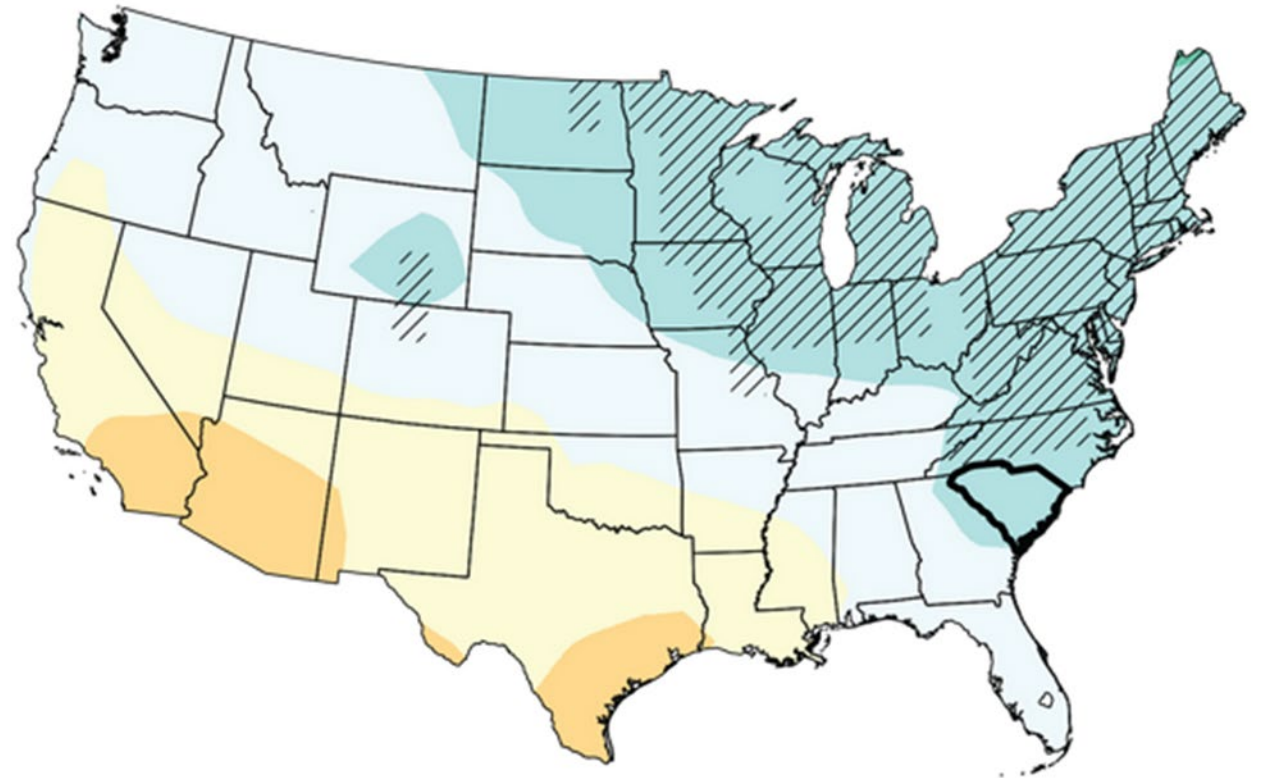
Storm Surge [video](#)



Rain Bombs



Projected Change in Annual Precipitation



Change in Annual Precipitation (%)



<math><-20</math> -15 -10 -5 0 5 10 >15



Business Operation

A photograph of a road completely submerged in floodwater. The road has two yellow double lines down the center. In the foreground, two orange traffic cones are visible, one on the left and one on the right. The water is dark and reflects the surrounding green trees and foliage. A semi-transparent dark grey box is overlaid on the lower half of the image, containing the text 'Public Safety' in white. The background shows a dense line of trees and a small green structure in the distance.

Public Safety

Tourism





Fisheries

More Frequent Heavy Rainfall





‘Wetter’ Hurricanes



Challe

mmutes



Activity and Break

*What questions are you asked
about water, flooding, and storms?*



10 Minute Break

Flood Insurance

- National Flood Insurance Program (NFIP) managed by FEMA
- All rates are 'equal' for a unique property, do not need to shop around
- Required to purchase in high-risk flood areas
- May be required by mortgage lender even if outside high-risk area
- Flood insurance will pay claims regardless of whether there is a Presidential Disaster Declaration
- Community discounts available based on Community Rating System classification
- [Floodsmart.gov](https://www.floodsmart.gov)

Flood Risk and Flood Insurance

**Determine your flood risk.
Everyone has a risk.**

Low Risk

- Zone X (Unshaded)

Moderate Risk

- Zone X (Shaded)
- 0.2 % Annual Chance flooding

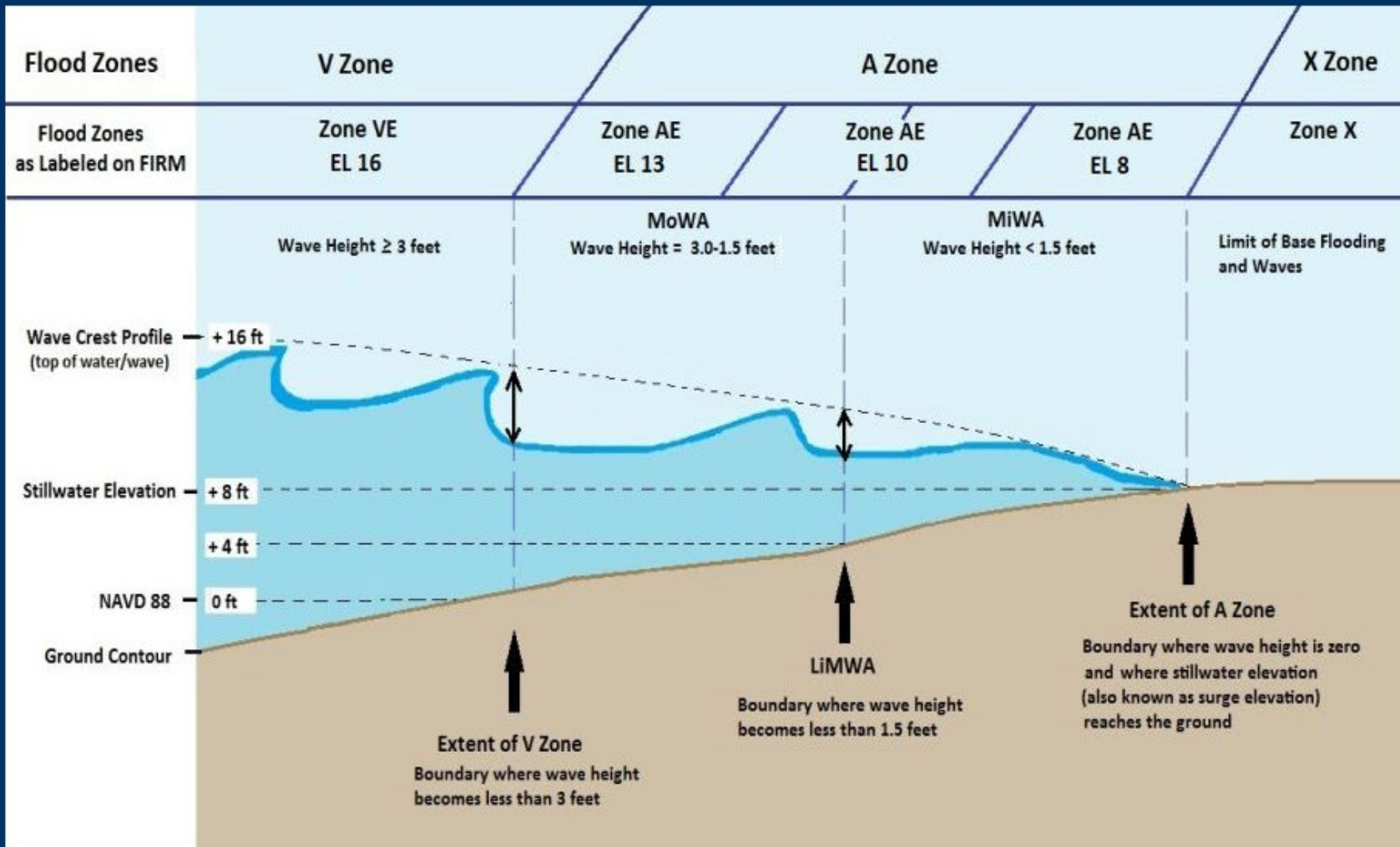
High Risk

- Special Flood Hazard Area (SFHA)
- Zone A, AE, AH, AO, or VE



FEMA

FloodFactor[®]



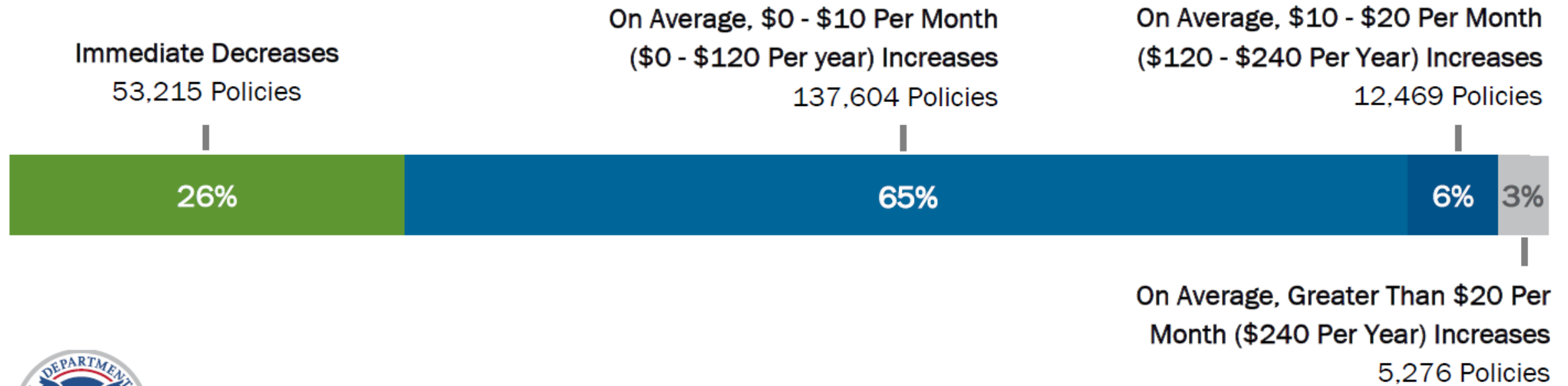
<https://www.fema.gov/coastal-flood-risk-study-process>

FEMA Risk Rating 2.0:

- [FEMA Risk Rating 2.0 main website](#)
- Deliver FAIRER rates, use replacement cost data
- Effective for new policies Oct. 1, 2021
- Effective for renewals April 1, 2022
- Elevation Certificates are no longer required to purchase insurance coverage

NFIP Policies in Force in SC	Properties in SC Not Covered by NFIP Policy	Average NFIP Claim Payout in SC in the Past 10 Years	Average Individual Assistance Claim Payout in SC in the Past 10 Years
208,600	1.7 million	\$27,100	\$3,600

Risk Rating 2.0 in South Carolina



FEMA

[video](#)

March 2021 1

An aerial photograph of a residential street. The street is paved and runs vertically through the center. On either side of the street are houses with grey roofs and green lawns. There are several trees and bushes scattered throughout the scene. A white car is parked on the left side of the street, and a blue car is parked on the right side. The word "more" is written in a bold, yellow, sans-serif font in the lower right quadrant of the image.

more

Flood Maps

🏠 Flood Insurance Rate Map (FIRM)

🏠 Flood maps ONLY show risk for storm surge, not flooding from heavy rain.

🏠 There are a lot of houses that have flooded that are not in a mapped floodplain

FEMA Flood Map Service Center: Welcome!

Looking for a Flood Map? [?](#)

Enter an address, a place, or longitude/latitude coordinates:

Search

Looking for more than just a current flood map?

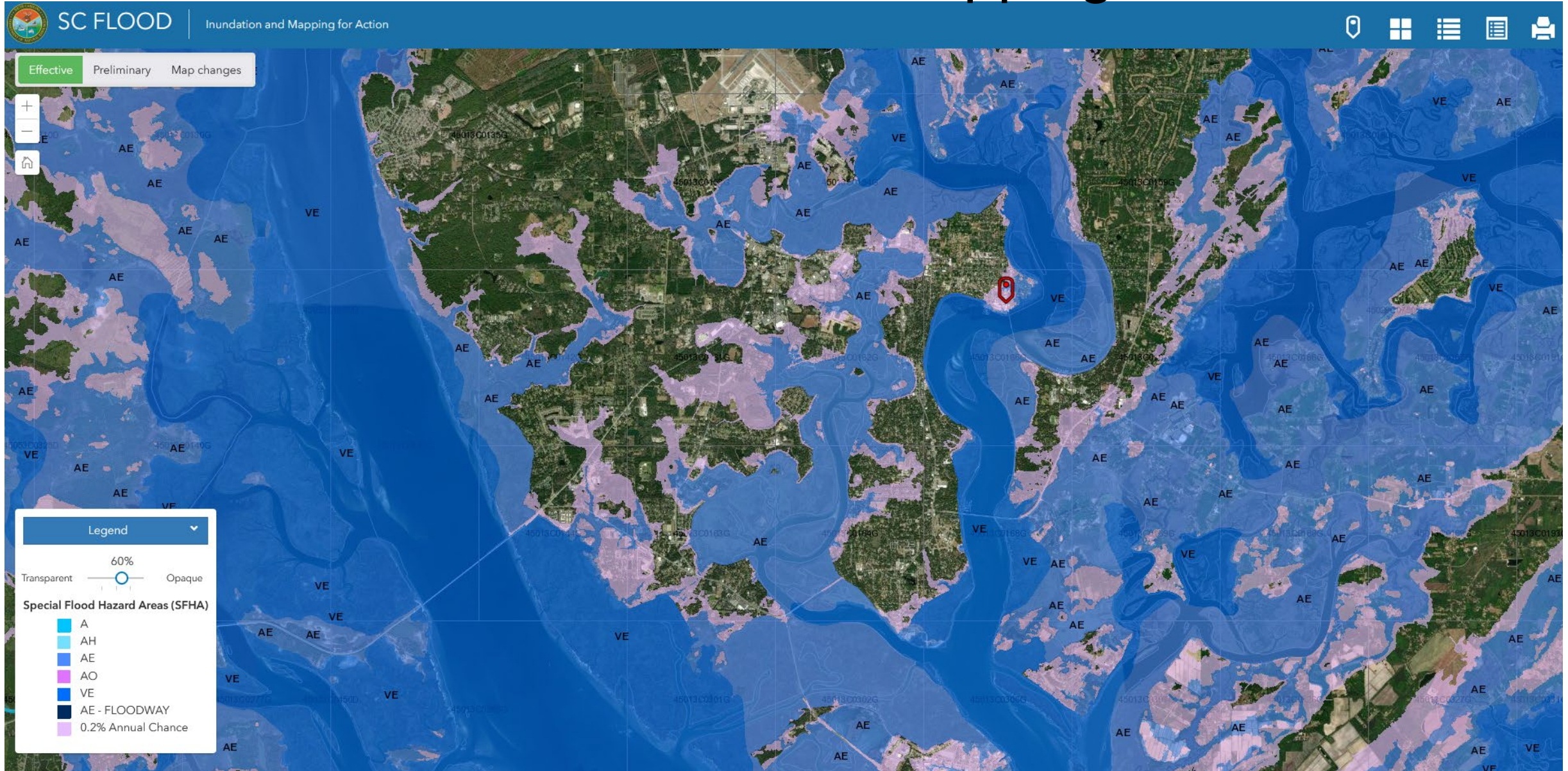
Visit [Search All Products](#) to access the full range of flood risk products for your community.





<p>PIN</p> <p> Approximate location based on user input and does not represent an authoritative property location</p>	<p>SPECIAL FLOOD HAZARD AREAS</p> <p> Without Base Flood Elevation (BFE) Zone A, V, A99</p> <p> With BFE or Depth</p> <p> Regulatory Floodway Zone AE, AO, AH, VE, AR</p>	<p>OTHER AREAS OF FLOOD HAZARD</p> <p> 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X</p> <p> Future Conditions 1% Annual Chance Flood Hazard Zone X</p> <p> Area with Reduced Flood Risk due to Levee. See Notes. Zone X</p> <p> Area with Flood Risk due to Levee Zone D</p>	<p>OTHER FEATURES</p> <p> Cross Sections with 1% Annual Chance Water Surface Elevation</p> <p> Coastal Transect Base Flood Elevation Line (BFE)</p> <p> Limit of Study</p> <p> Jurisdiction Boundary</p> <p> Coastal Transect Baseline</p> <p> Profile Baseline</p> <p> Hydrographic Feature</p>
<p>MAP PANELS</p> <p> Selected FloodMap Boundary</p> <p> Digital Data Available</p> <p> No Digital Data Available</p> <p> Unmapped</p>	<p>OTHER AREAS</p> <p> Area of Minimal Flood Hazard Zone X</p> <p> Effective LOMRs</p> <p> Area of Undetermined Flood Hazard Zone D</p> <p> Otherwise Protected Area</p> <p> Coastal Barrier Resource System Area</p>	<p>GENERAL STRUCTURES</p> <p> Channel, Culvert, or Storm Sewer</p> <p> Levee, Dike, or Floodwall</p>	

SC Flood Inundation and Mapping for Action



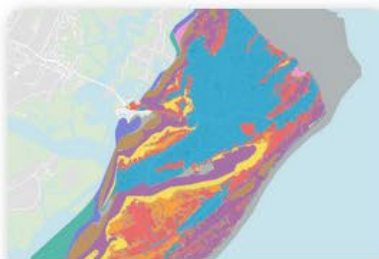


Capital Projects Dashboard



MyHHI Request Tracker

Search Our Data



Hilton Head Island FEMA
Flood Zones

Explore



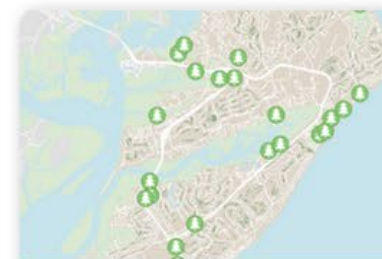
Hilton Head Island Permit
Finder

Explore



Hilton Head Island Town
Council Ward Search

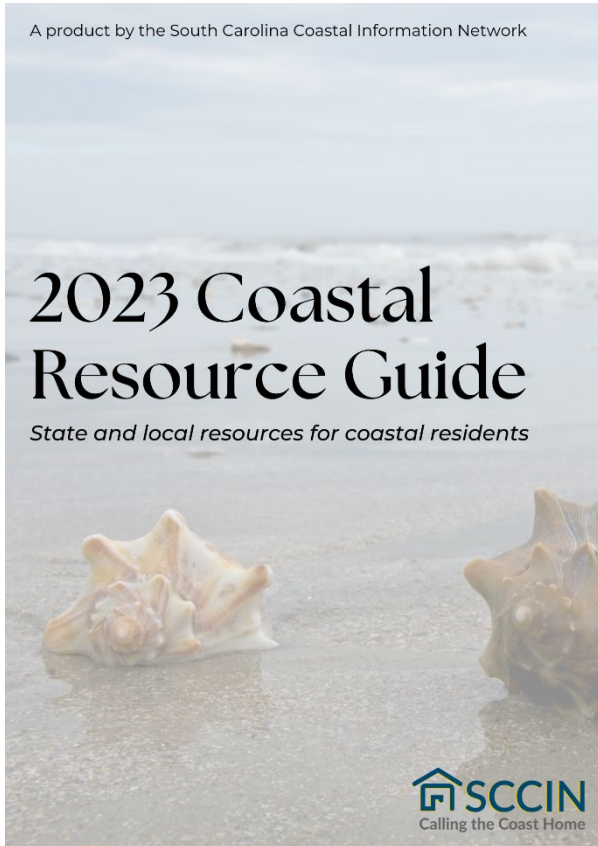
Explore



Hilton Head Island Parks
and Amenities Map

Explore

Coastal Resources Guide



National & State Resources



[SCDOT Evacuation Routes](#)
[Storm Travel Resources](#)



[NWS Charleston](#)



[My Coast](#)



[Know Your Zone Hurricane Guide](#) [Create a Disaster Plan Recovery Assistance](#)



[National Flood Insurance Program](#)
[Community Rating System](#)



[Be Informed - Floods](#)
[Be Informed - Hurricanes](#)

Topics Covered:

- Community Rating System (CRS)
- Evacuation Routes
- Emergency Preparedness & Remediation Resources

State → County → Municipality

Resources by County

Beaufort County

- Community Rating System
- Evacuation Routes
- Building Inspections and Flood Information
- Flood Brochure
- Lowcountry Council of Governments
- Office Contacts

Jasper County

- SCDOT Evacuation Routes
- Hurricane Information
- Lowcountry Council of Governments
- Office Contacts

Colleton County

- Community Rating System
- Evacuation Routes
- Floodplain Documents
- Natural disaster FAQs
- Lowcountry Council of Governments
- Office Contacts

Community Rating System

- A voluntary incentive program through [FEMA](#) that recognizes and encourages community floodplain management activities that exceed the minimum National Flood Insurance Program (NFIP) requirements.

Common practices:

Open Space Preservation

Floodplain Mapping

Stormwater Management

[More Listed in their Brochure](#)



National Flood Insurance Program

Community Rating System

A Local Official's Guide to
Saving Lives, Preventing Property Damage, and
Reducing the Cost of Flood Insurance

FEMA B 573 / 2018



FEMA

1 All SCDOT Evacuation Routes and Map Information

Welcome to SCDOT's interactive Evacuation map.

*****LANE REVERSALS have been discontinued. I-26 and US 501 have returned to normal operation with traffic moving in both directions.*****

The black crosses symbolize open evacuation shelters. These shelters are not maintained by SCDOT

To visit the SCDOT Storm Resources Page click [here](#).

To navigate through this map on your mobile device swipe to the left. If you are on a computer click on the tabs labeled 2-8.

To navigate to a specific address or street: click on the magnifying glass icon to the right and type in the address where you are located. Be sure to include city and state.

If you are using a GPS enabled device, you can locate yourself using the circle with the hashmarks located above the magnifying glass.

For detailed evacuation instructions click on the push-pins that appear when zoomed in to the metro level.

To download the entire file, please click [here](#).




2 North Myrtle Beach

3 Myrtle Beach, Surfside, Garden City

Evacuation Resources

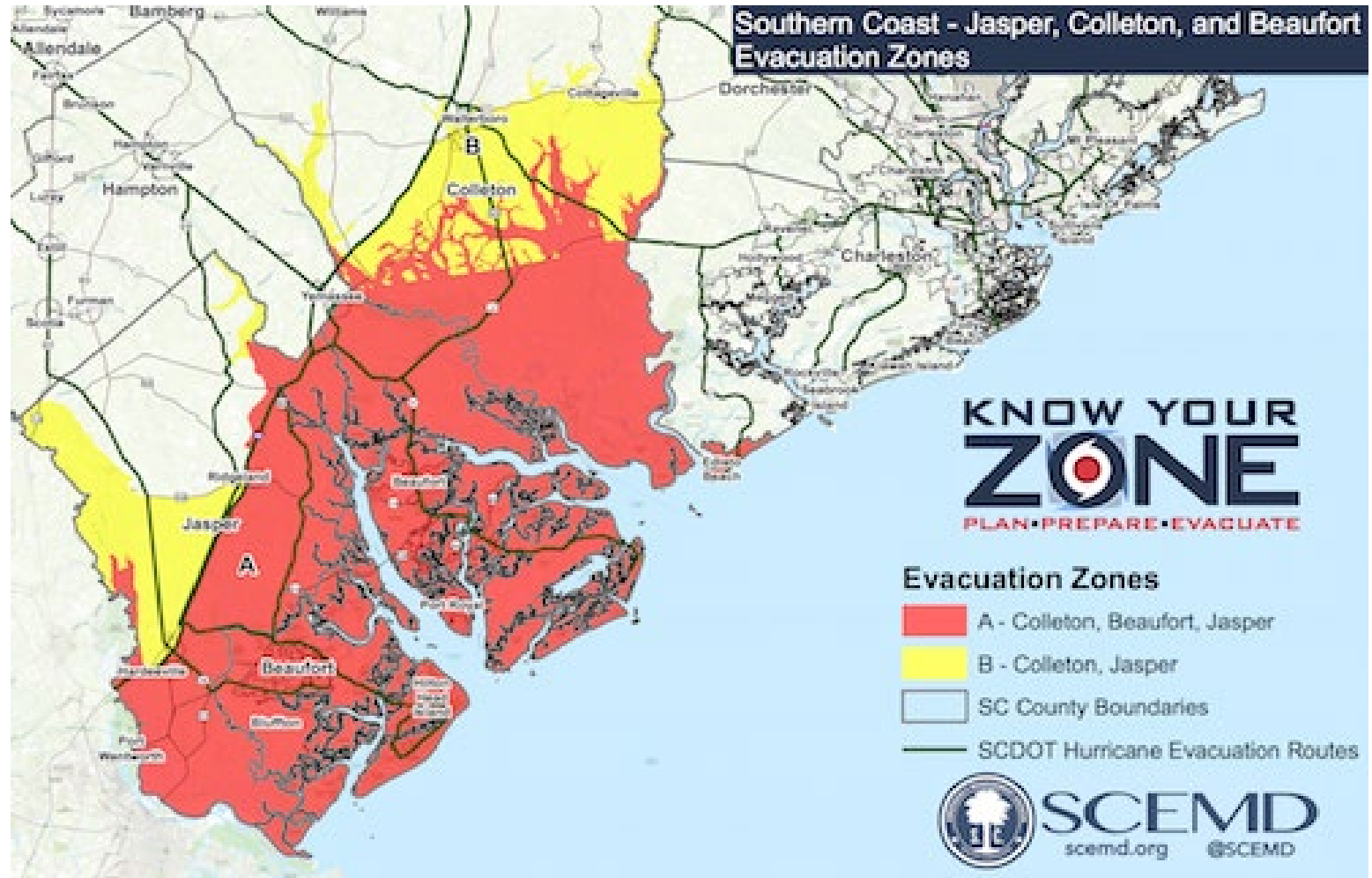
Know Your Zone

POWER TO YOUR EMERGENCY PLAN
DOWNLOAD THE SCEMD APP FOR ON-THE-GO TOOLS & RESOURCES AT YOUR FINGERTIPS

Download on the  **App Store** GET IT ON  **Google Play**

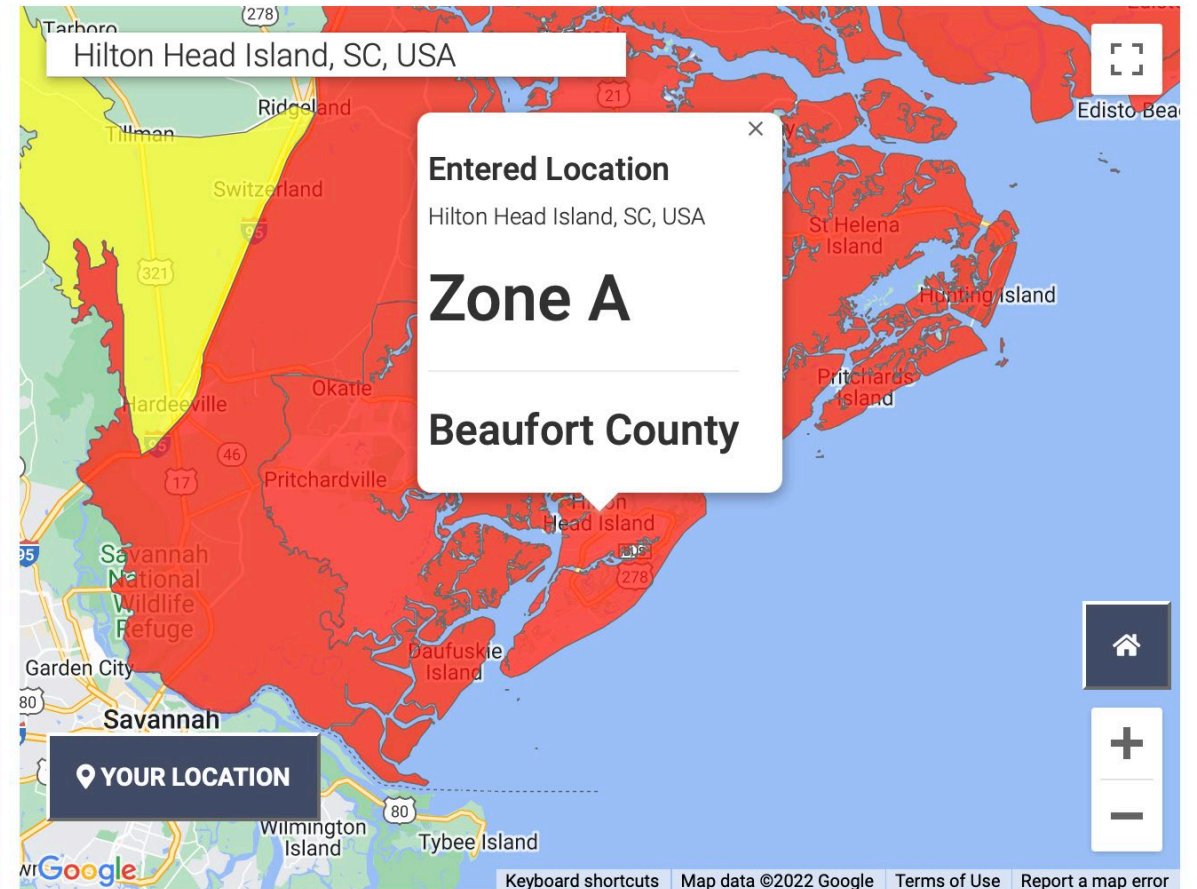
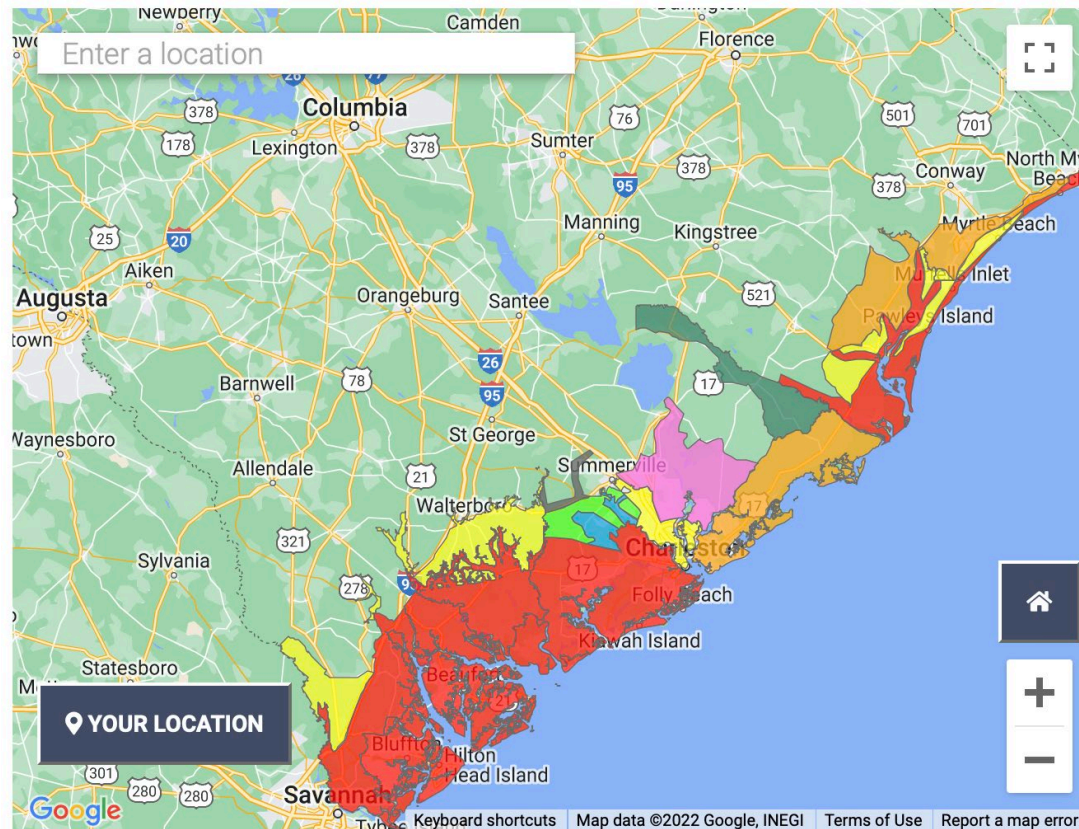


The South Carolina Emergency Manager Mobile App **+GET**



Beaufort Zone

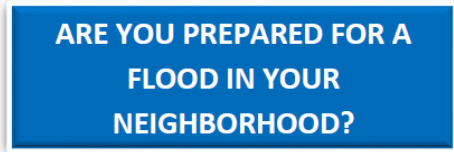
Use these maps and links below to determine your vulnerability to storm surge.



Emergency Preparedness and Remediation Resources



Citizen's Guide

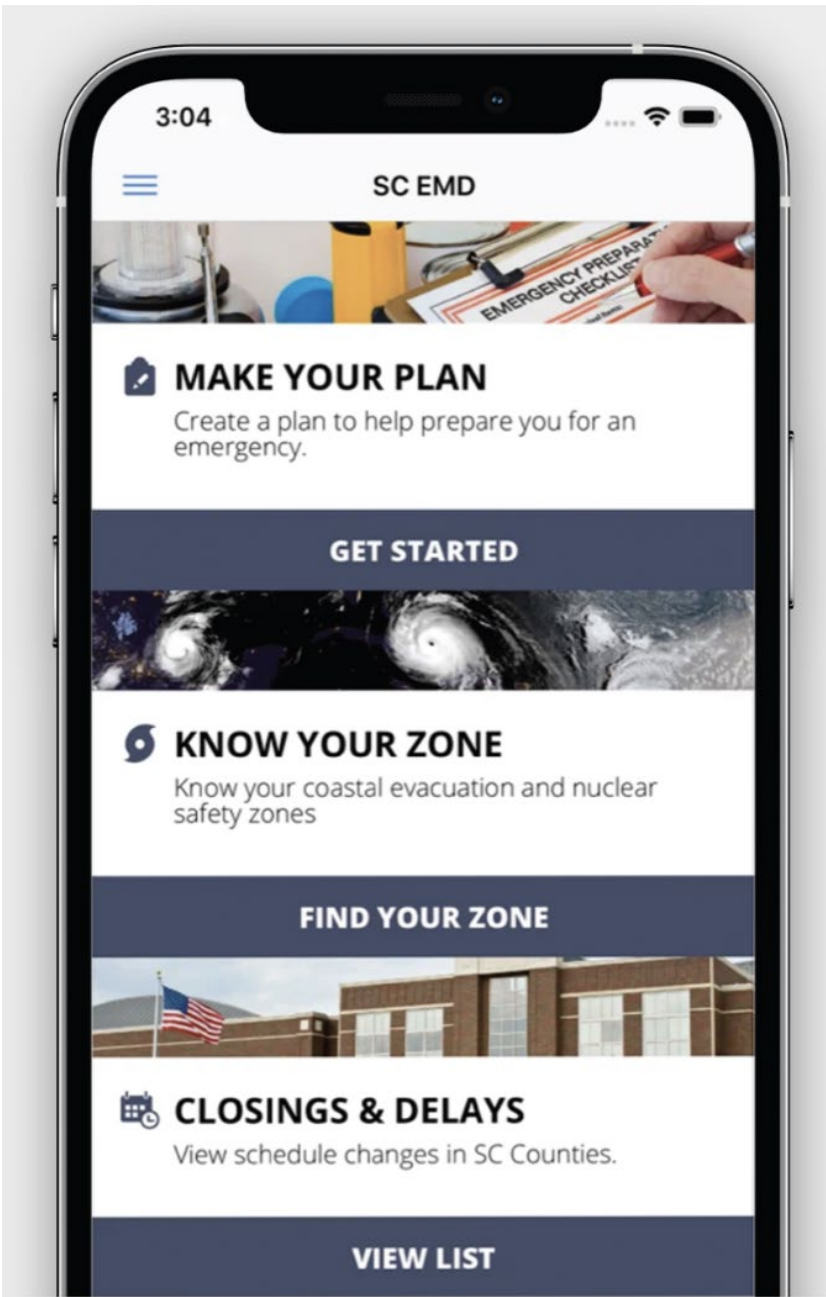


CITIZEN'S GUIDE TO
EMERGENCY
PREPAREDNESS



Colleton County
South Carolina





<https://hurricane.sc/>

Apply for re-entry passes!

In the event of an enforced evacuation, the Beaufort County Sheriff's Office — along with local municipalities — will issue re-entry passes to qualified individuals per the Sheriff's Office's Incident Emergency Response and Re-Entry Pass System.

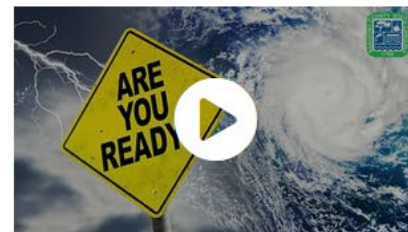
[LEARN MORE](#) [DOWNLOAD HURRICANE GUIDE](#)



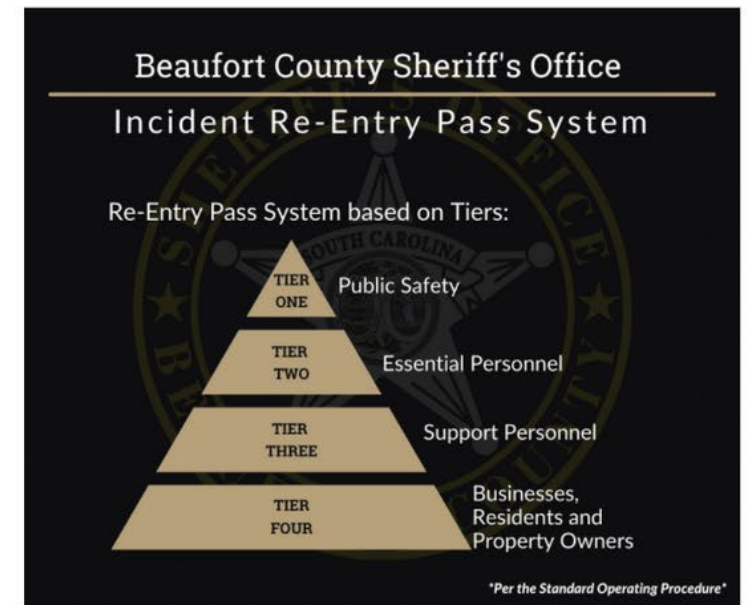
Hurricane Preparedness



Hurricanes and Pets



Hurricane To-Go Bag



Poll

- What resources will you share with your clients?



For more information and course materials

South Carolina Coastal Information Network

<https://www.sccoastalinfo.org/>



Instructors:

Kaitlyn Dirr
S.C. DNR & ACE Basin NERR

April Turner
S.C. Sea Grant Consortium

Amy Scaroni
Clemson Extension

Amanda Guthrie
S.C. Sea Grant Consortium

Matt Slagel
S.C. DHEC-OCRM

Katie Finegan
S.C. Sea Grant Consortium

Blair Williams
S.C. DHEC-OCRM

Sophia Truempi
S.C. Sea Grant Consortium

Please let us know how we can improve this course and the series.

Calling the Coast Home

Complete the course
evaluation here



Calling the Coast Home

www.sccoastalinfo.org

- **Course Series:**
- **Living with Water**
- **The Land Water Connection**
- **Tidelands, Water, and Beach: Regulations and Rebuilding**
- **Coastal Lifestyle for Clean Water**

Instruction and Information

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