

Living with Water

April Turner and Katie Finegan
South Carolina Sea Grant Consortium




October 19, 2023
CTAR



Introductions

- Name
- Real Estate Agency
- Favorite Coastal Activity



A stylized map of the Southeastern United States coastline, showing the Gulf of Mexico and the Atlantic Ocean. The land is depicted in a light tan color, and the water bodies are in a light blue color. The map is positioned on the left side of the slide, partially overlapping the title.

Calling the Coast Home

Course Series:

Living with Water

The Land Water Connection

Tidelands, Water, and Beach:
Regulations and Rebuilding

Coastal Lifestyle for Clean Water





South Carolina Coastal Information Network

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

Instructors:

Kaitlyn Dirr
S.C. DNR & ACE Basin NERR

Amy Scaroni
Clemson Extension

Maeve Snyder
North Inlet-Winyah Bay NERR

Blair Williams
S.C. DHEC-OCRM

April Turner
S.C. Sea Grant Consortium

Amanda Guthrie
S.C. Sea Grant Consortium

Katie Finegan
S.C. Sea Grant Consortium

Matt Gorstein
S.C. Sea Grant Consortium



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

Poll

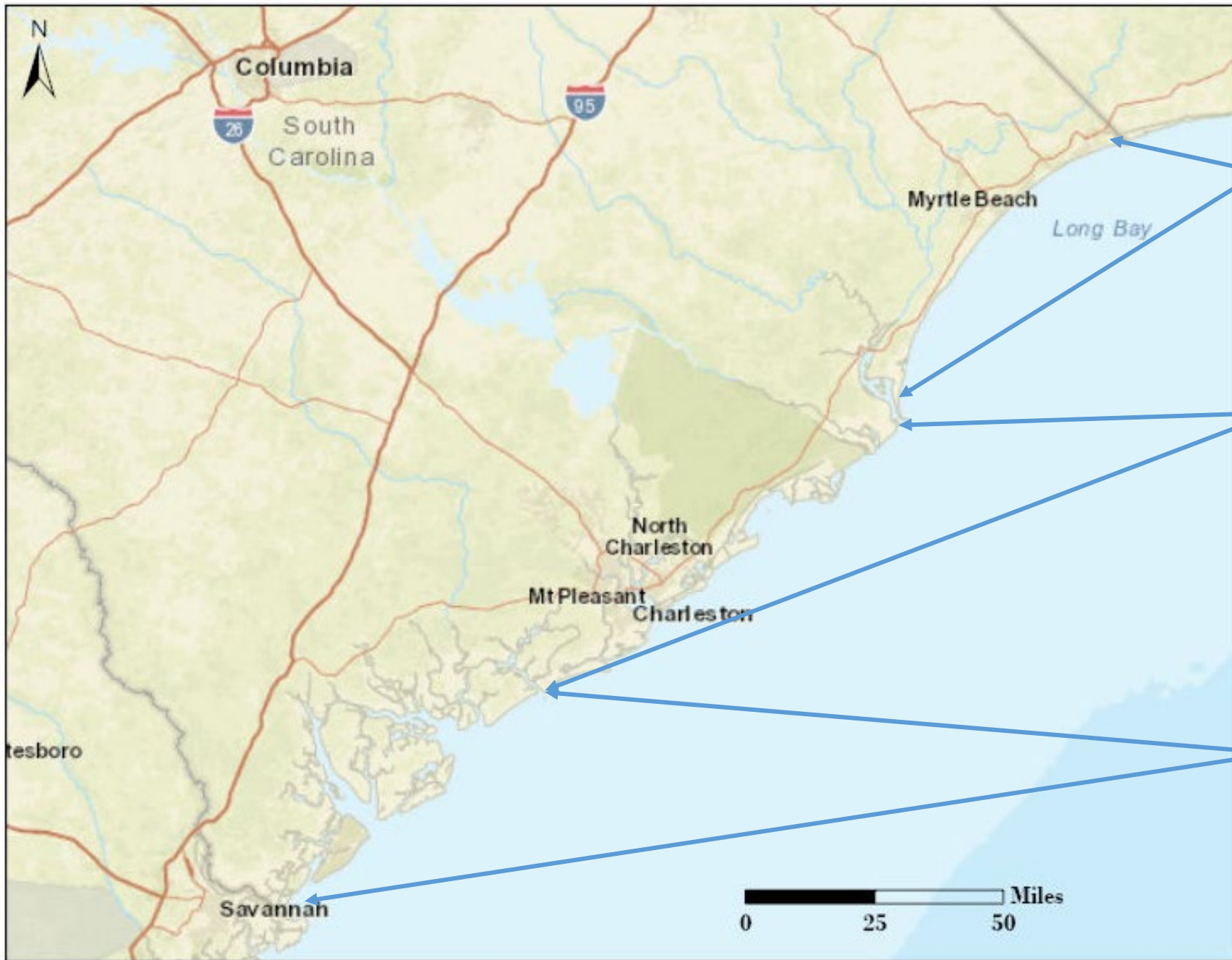
- How many years have you been working in real estate in coastal SC?



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

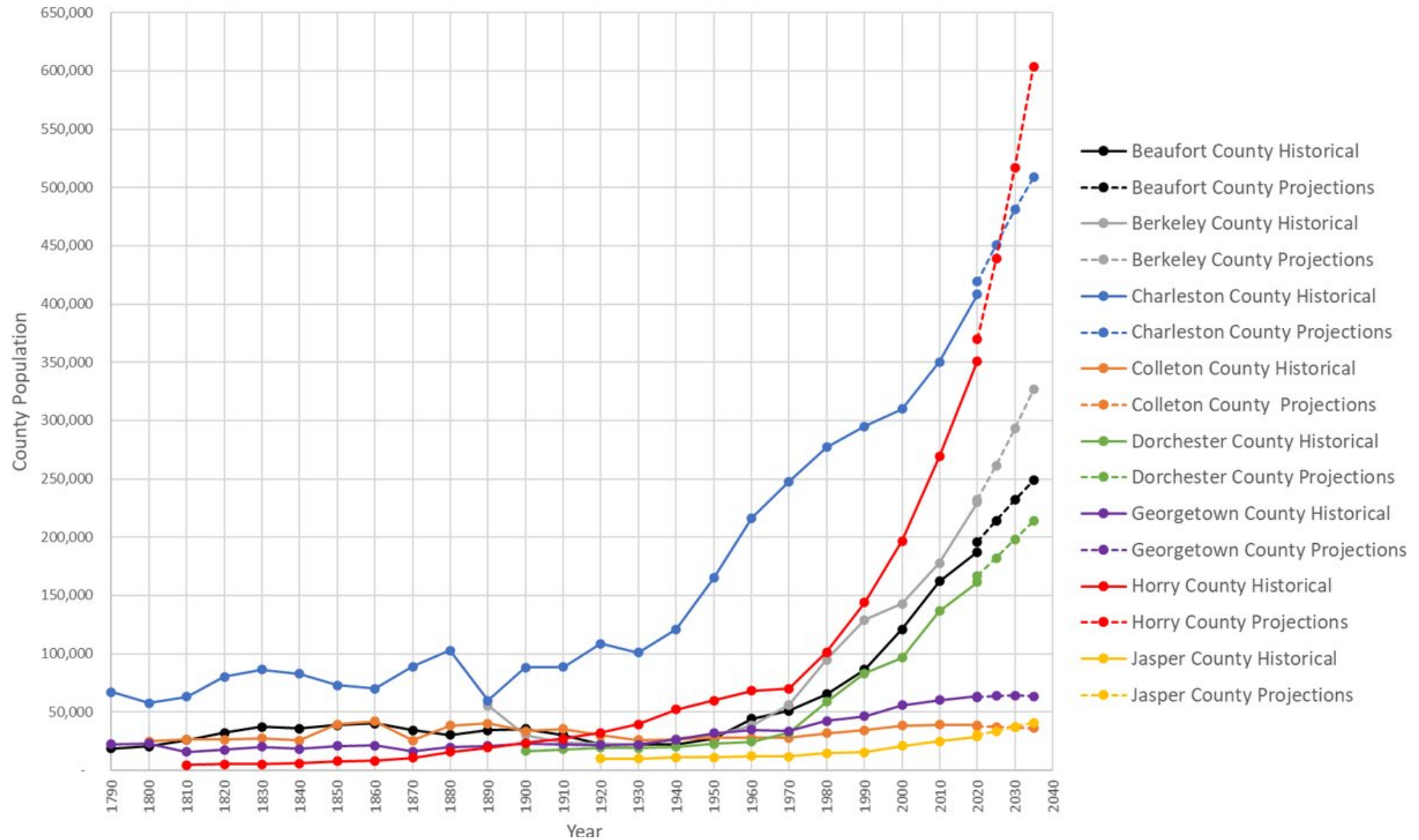
South Coast


Greater Charleston Area

- McClellanville
- Awendaw
- Mt. Pleasant
- Charleston
- North Charleston
- Summerville
- Moncks Corner



Population of South Carolina Coastal Zone Counties 1790-2035

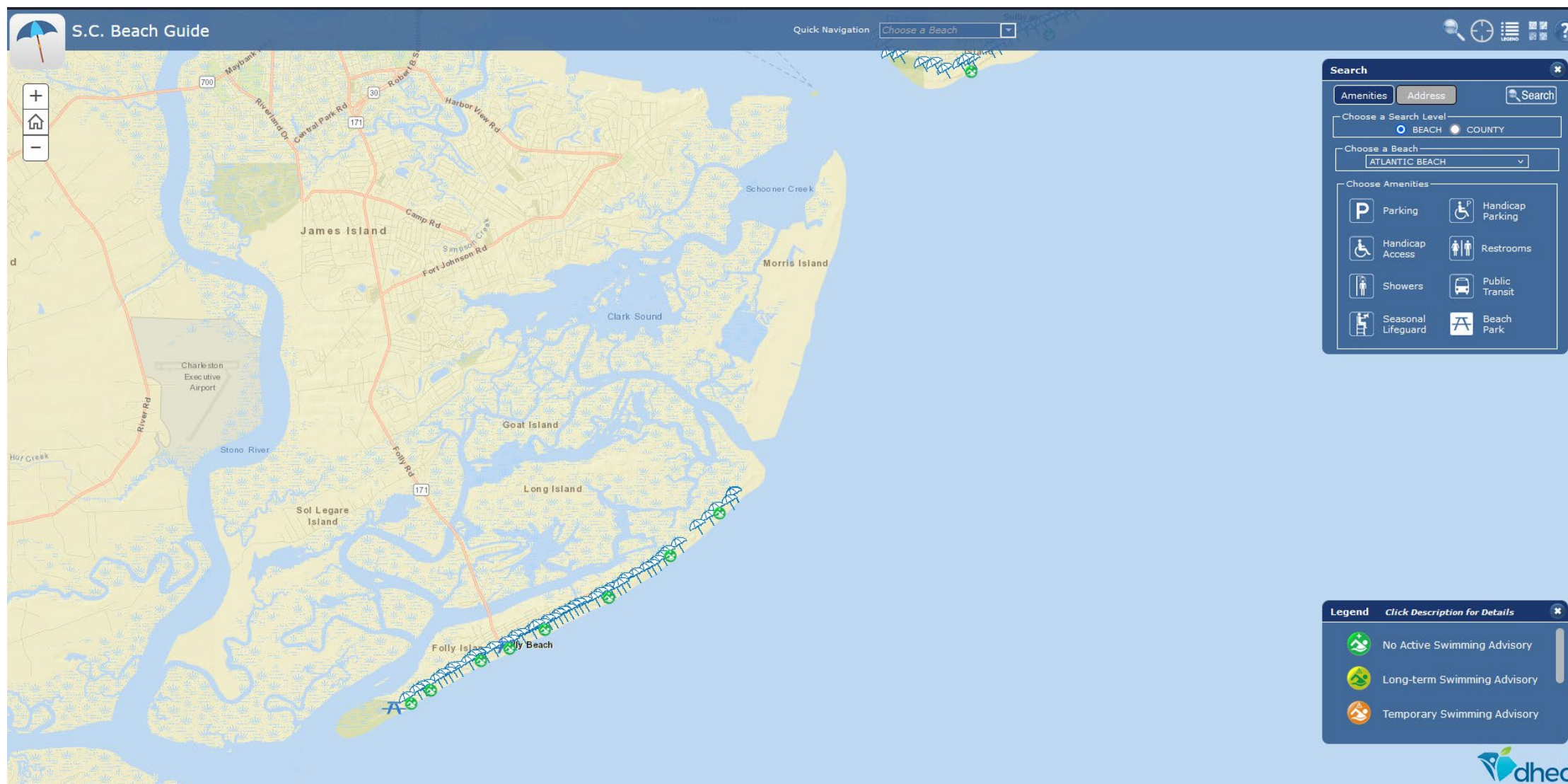




Barrier Islands & Beaches

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

Beach Access and Water Quality



Estuaries and Tidal Creeks

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

Tidal Creeks

4 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



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

ACCESS THE GUIDE HERE >



ECOLOGICAL SETTING

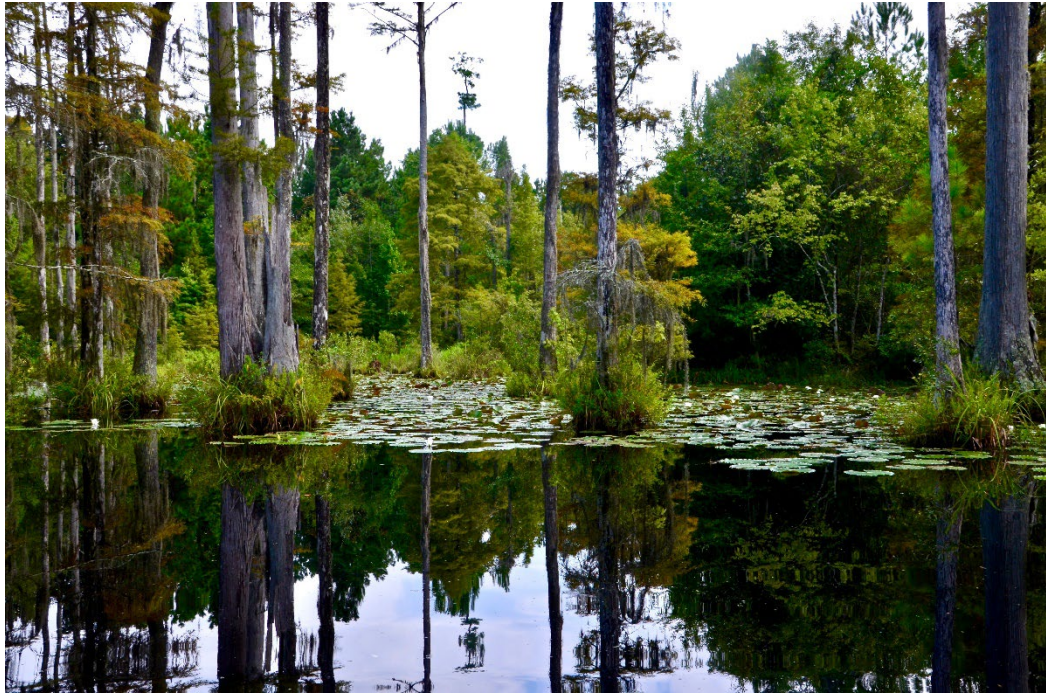
The salt marsh-tidal creek ecosystem is a highly productive coastal wetland that occurs between upland areas, such as forests and urban environments, and estuaries, where fresh and salt water mix. [LEARN MORE >](#)



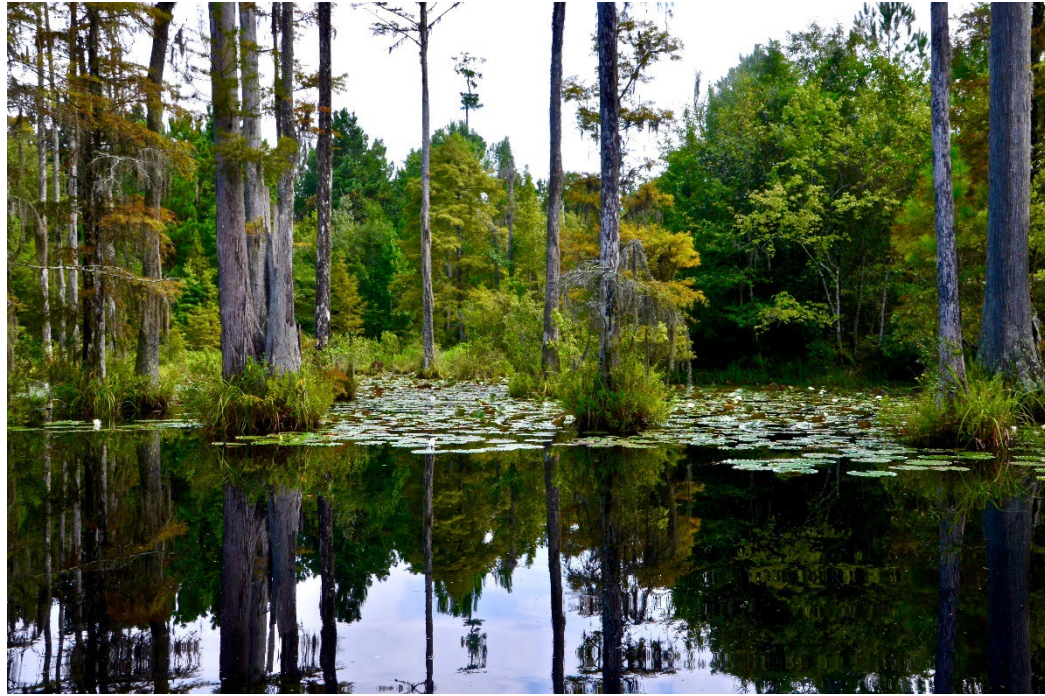
ECOSYSTEM SERVICES

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 >](#)

Greater Charleston Area



Natural Resources

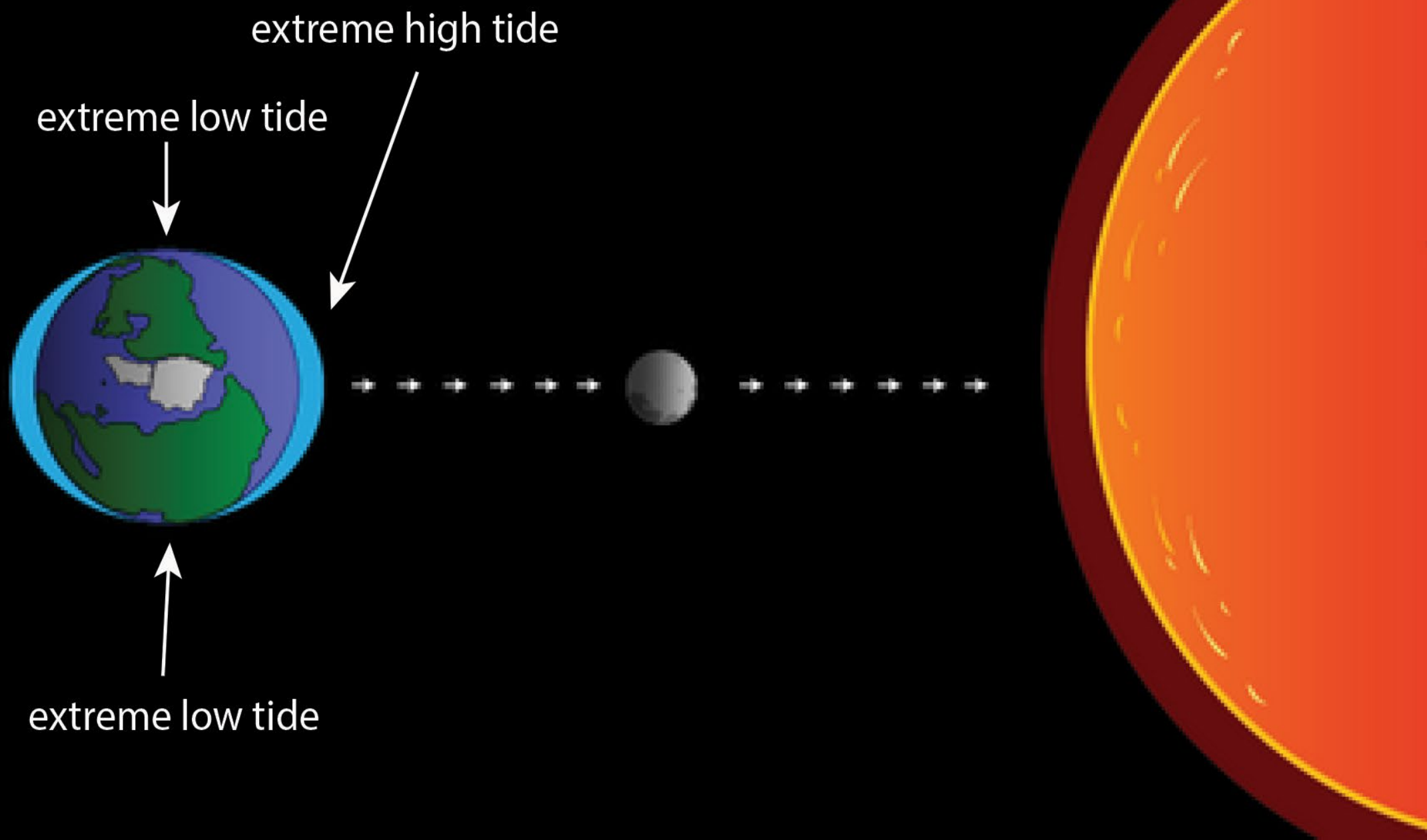




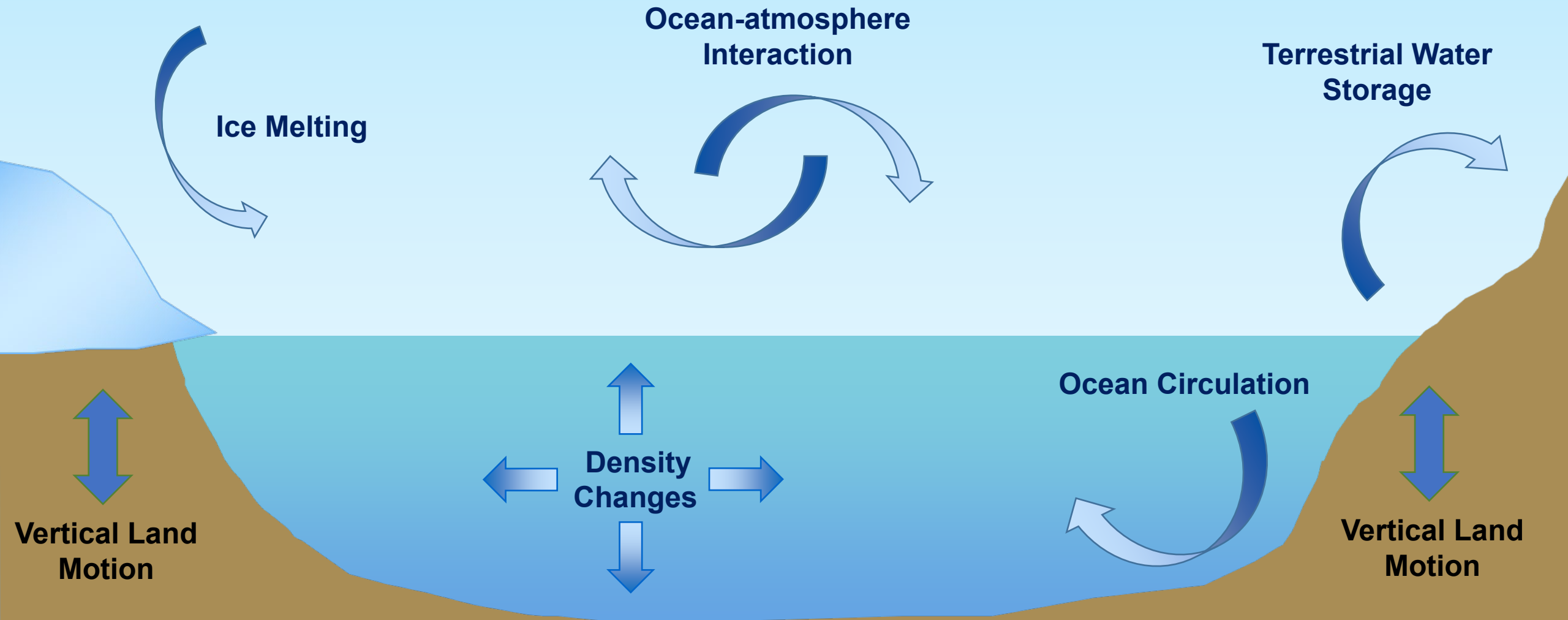
Part 2: Tides, Storms, & Flooding

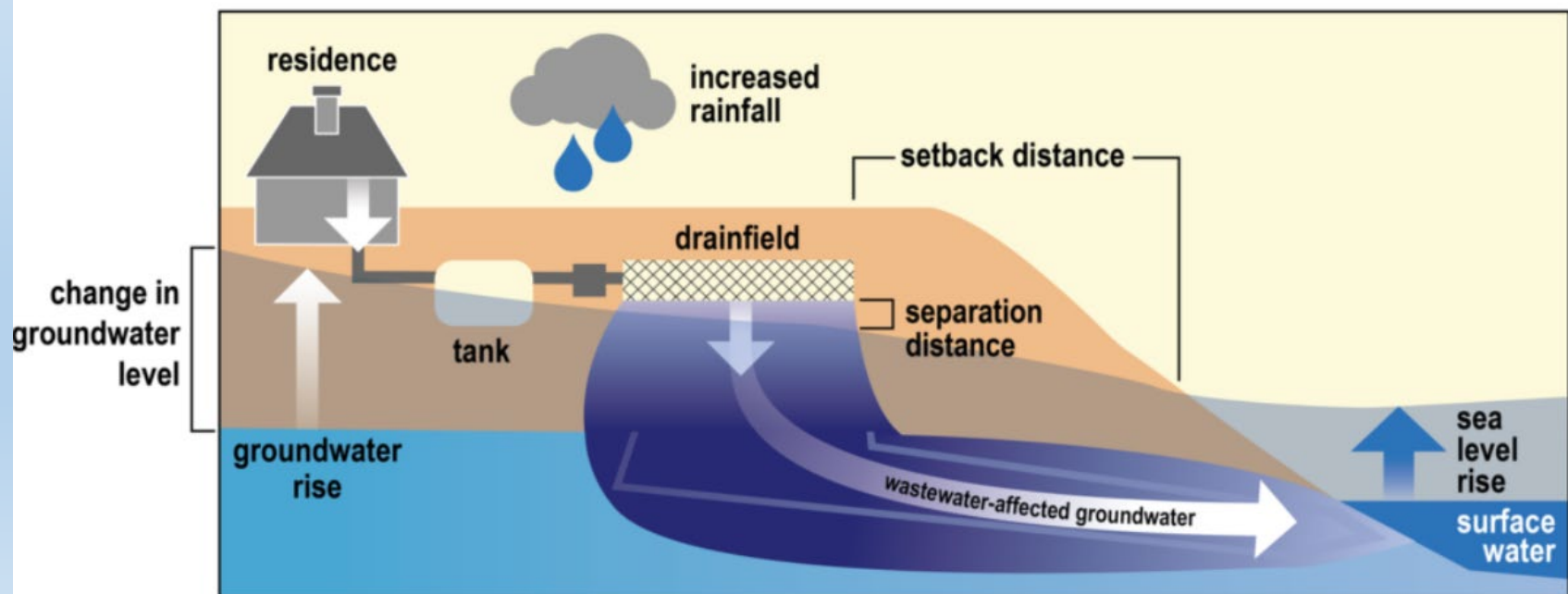
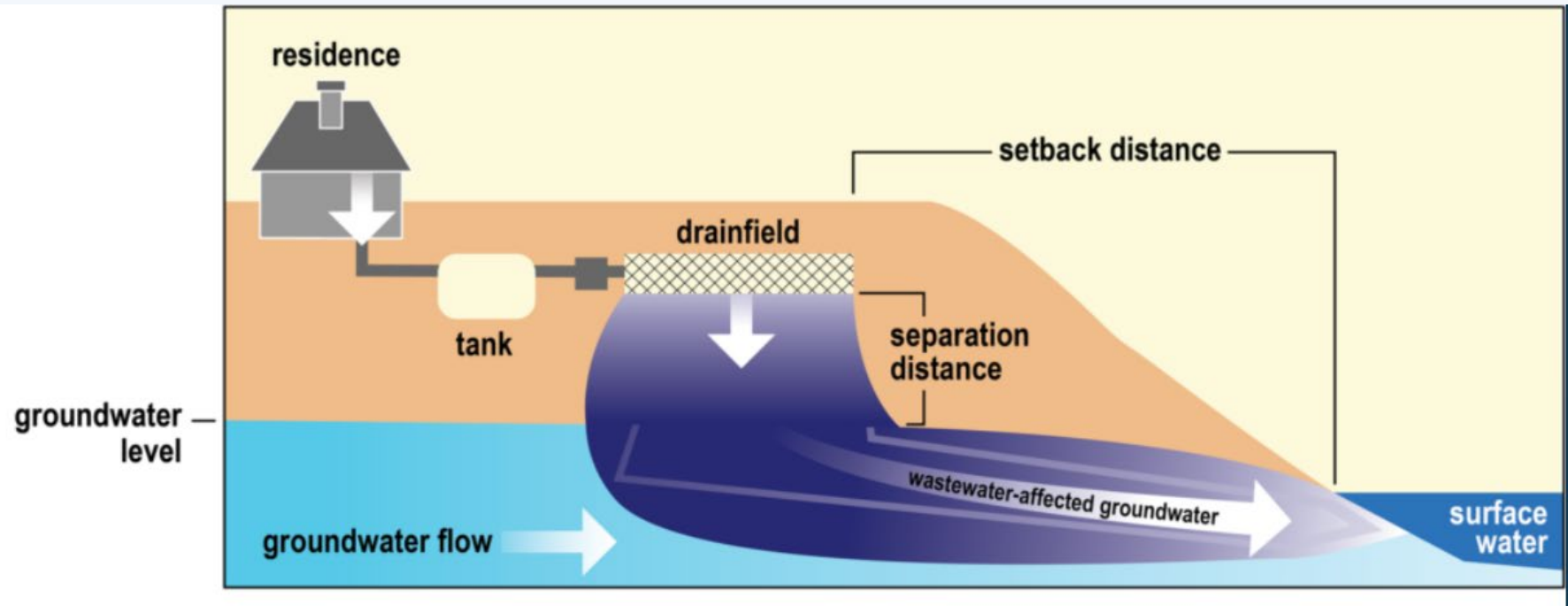
Poll

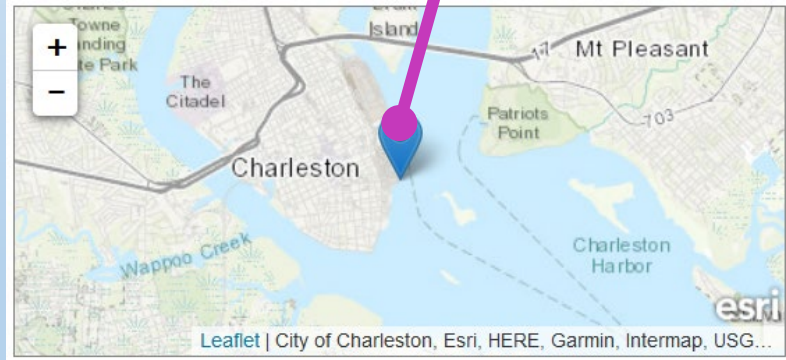
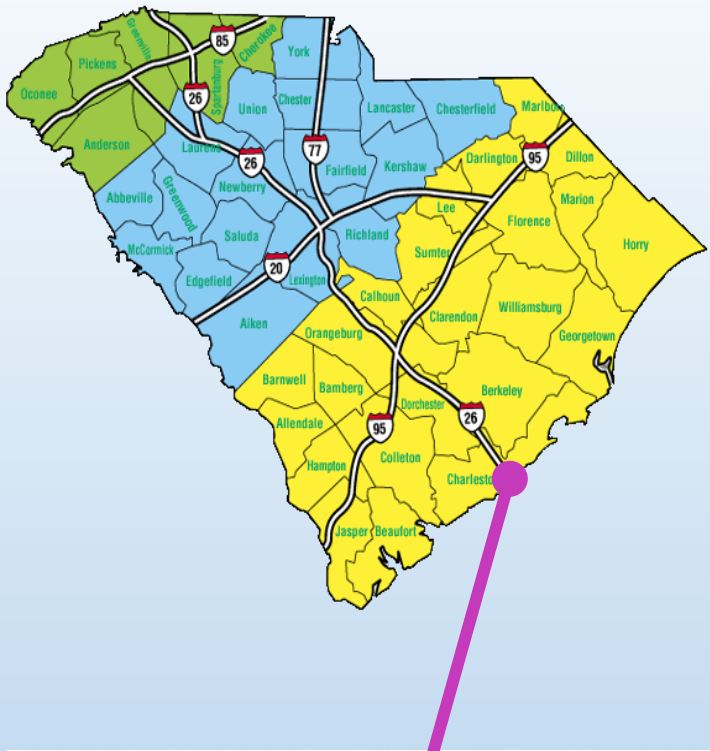
- What effects have you experienced from extreme weather?
 - Standing water on your street
 - Commute delays due to street flooding
 - Minor flooding in your home
 - Major structural damage to your home
 - Car damage from floodwaters
 - Wind damage
 - Evacuated ahead of a storm
 - Real estate sale affected



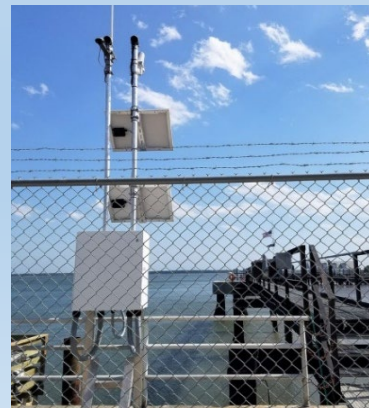
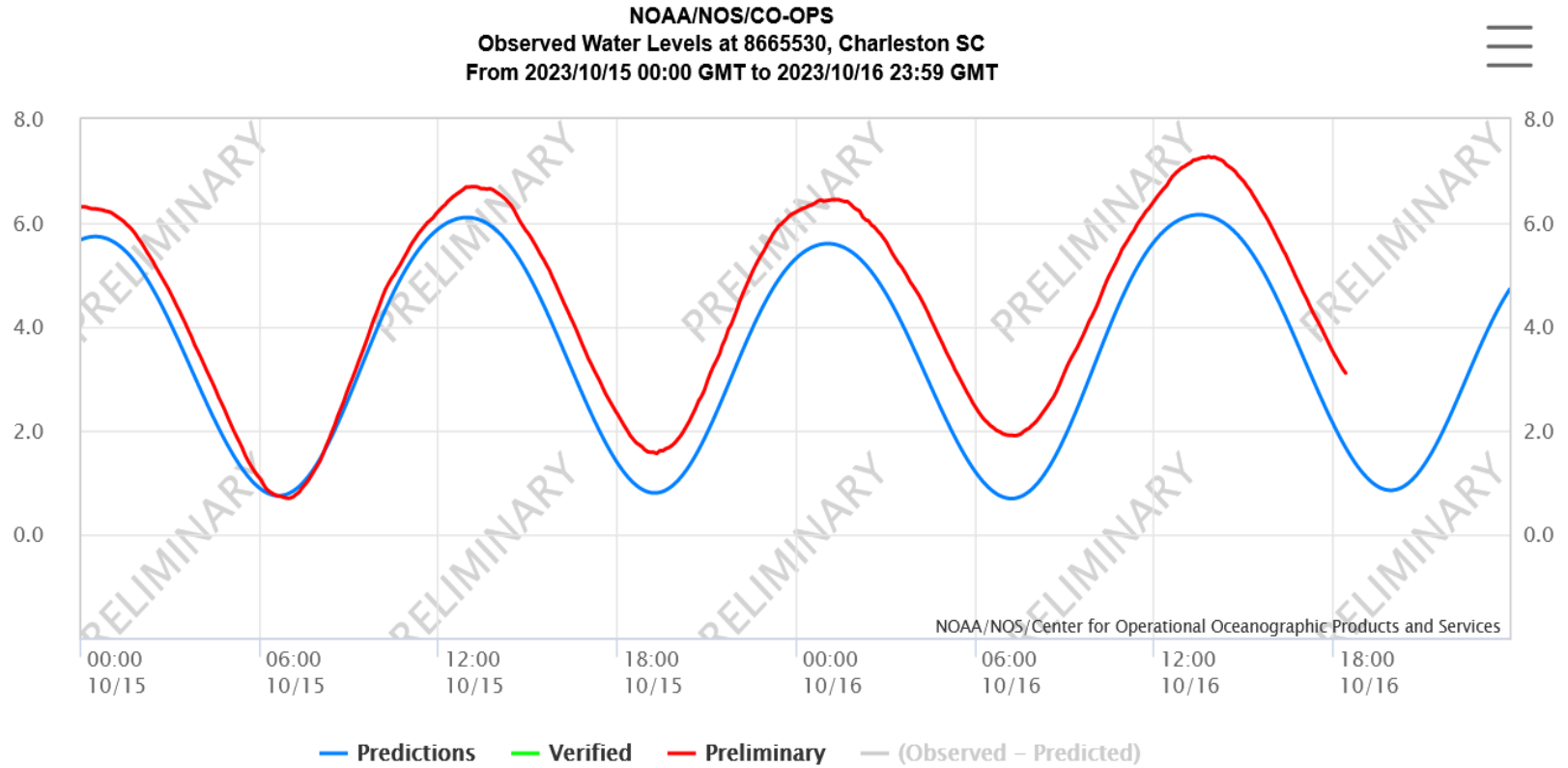
What causes sea level to change





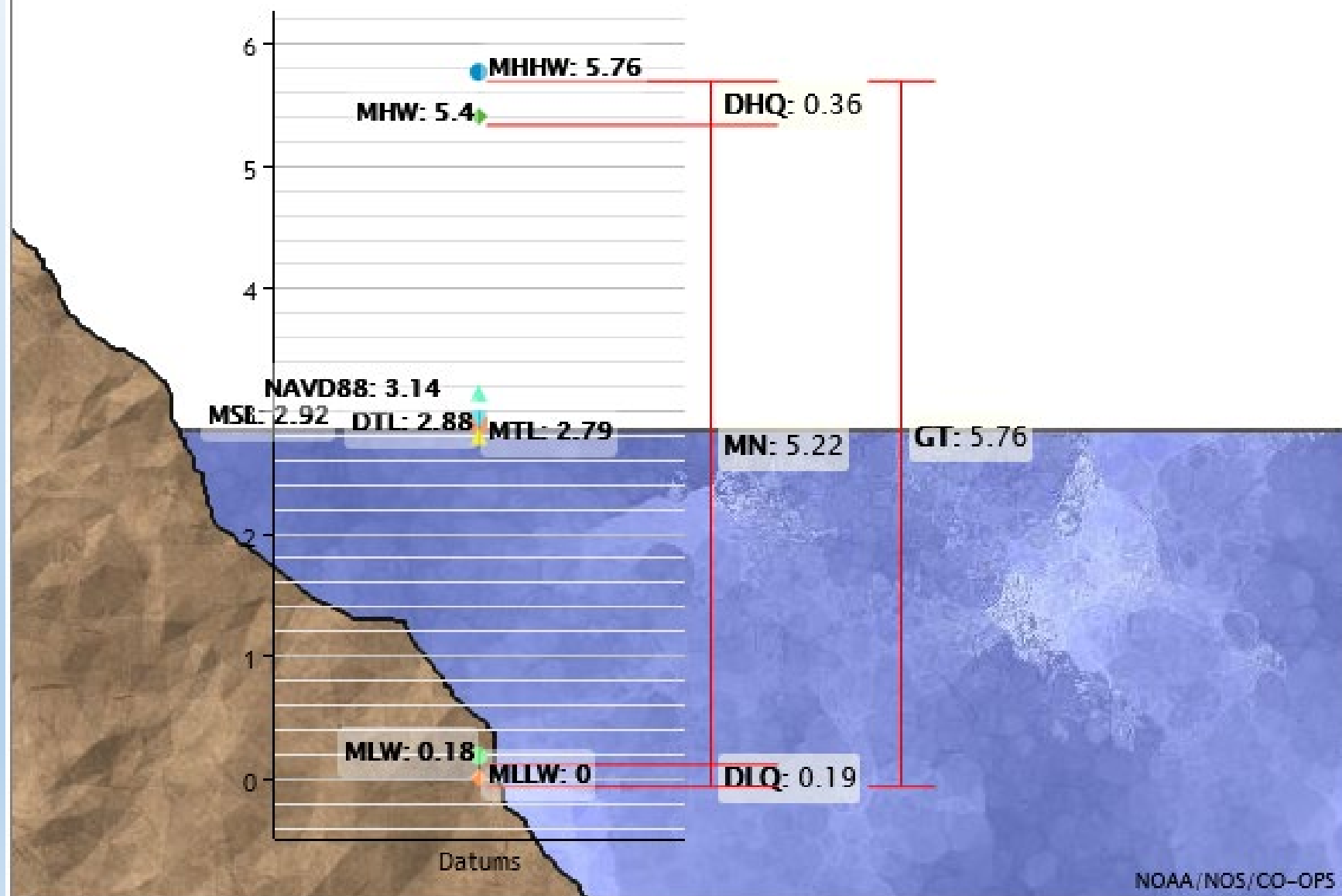


Height in feet (MLLW)



Datums for 8665530, Charleston, Cooper River Entrance, SC

All figures in feet relative to MLLW



Charleston Area Tides

<https://water.weather.gov/ahps/>

Select Charleston harbor station

National Oceanic and Atmospheric Administration's
National Weather Service

Local forecast by "City, St" Go

RSS Feeds

Warnings - current
3y State/County...
JV Alerts
Observations
Radar
Satellite
Snow Cover
Surface Weather...
Observed Precip
Forecasts
Local
Graphical
Aviation
Marine
Hurricanes
Severe Weather
Fire Weather
Not Messages
3y State
3y Message Type
National
Forecast Models
Numerical Models
Statistical
Index...
GFS Prod
MOS-LAMP Prod
Radar
Past Weather
Predictions
Weather Safety
Weather Radio
Hazard Assmt...
StormReady /
FloodReady
Skywarn
Education/Outreach

Site Map News Organization

National Observations

The NWS is terminating the Automated Flood Warning Systems web pages on or after April 05, 2022. Please see the Service Change Notification.

Warnings & Forecasts Graphical Forecasts National Maps Radar Water Air Quality Satellite Climate

River Observations River Forecasts Long-Range River Flood Risk Precipitation River Download Other Information

Auto Refresh: OFF Print this map Permalink

All Locations

Click on the map or select one of the data views below:

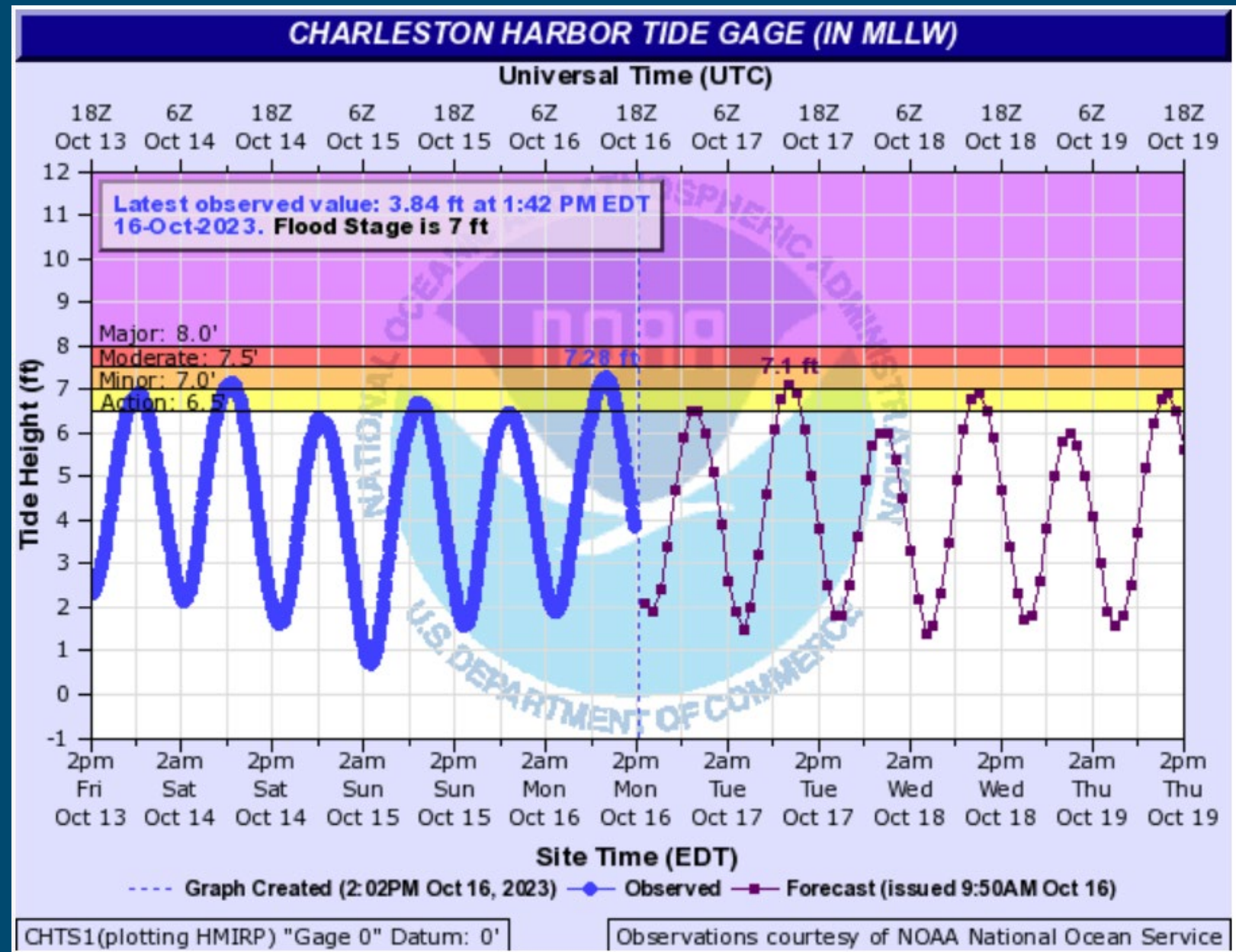
United States
NWS Weather Forecast Offices
NWS River Forecast Centers
Water Resources Regions

9941 total gauges
Show all locations in flood (80)

3 Gauges: Major Flooding
1 Gauges: Moderate Flooding
76 Gauges: Minor Flooding
120 Gauges: Near Flood Stage
9959 Gauges: No Flooding
2951 Flood Category Not Defined
17 At or Below Low Water Threshold
531 Gauges: Observations Are Not Current
283 Gauges: Out of Service

Show all locations

Last map update



Tidal Flooding

09/30/2023 | 10:38 am

Tidal Overview

1 hours 14 minutes after high tide

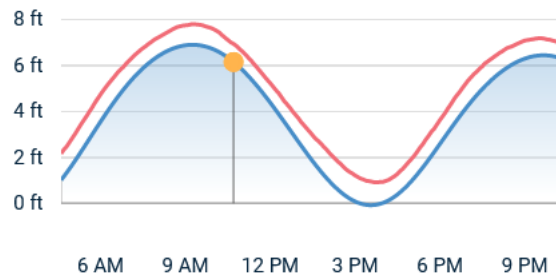
Data from **CHARLESTON (CUSTOMHOUSE WHARF)** (8.7 miles away)

Water Level (at time of report): 10:38 am, 7.1'

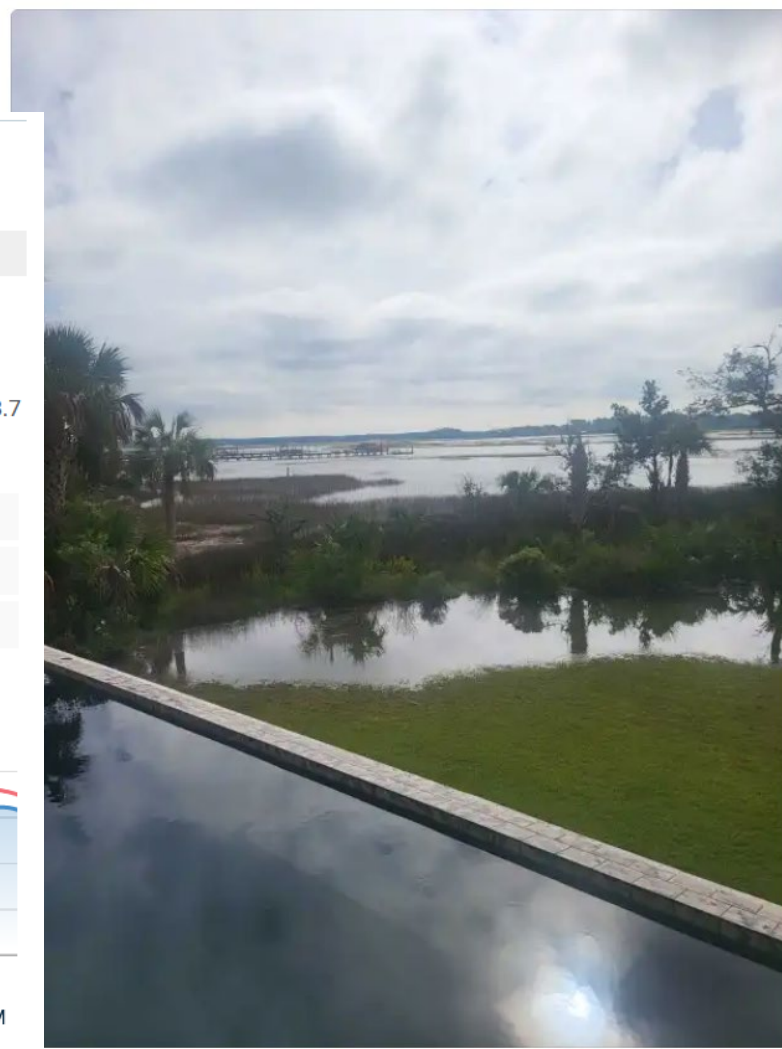
High Tide (Predicted): 9:15 am, 6.9'

High Tide (Observed): 9:24 am, 7.8'

■ Observed ■ Predicted water level ● Report time



(Click here for full tide details from NOAA Tides & Currents)



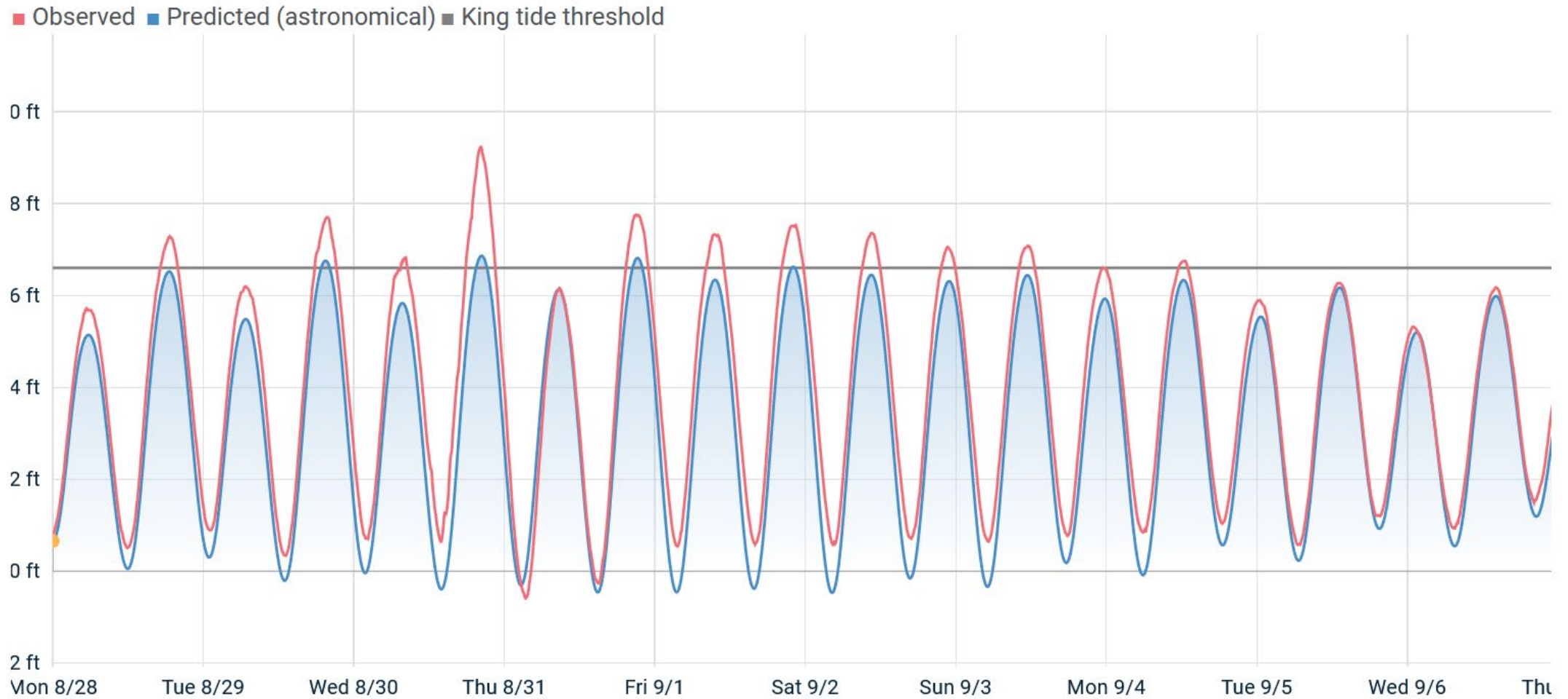
<https://mycoast.org/sc>

2023 Predicted King Tides

Based on NOAA Astronomical Tide Predictions for the **Charleston Harbor Tide Station**


- August 1-2
- August 29 – September 1
- September 26 – October 2
- October 27-31
- November 26-27

For details, see **DHEC's Tide Tables page**.





Water levels in feet relative to MLLW at Charleston Harbor Tide Station (8665530). Data from NOAA's *Tides and Currents*.


August 2023 King Tides





REPORT FLOODING

 NWS Alerts

 2023 King Tide Dates

 Tide Charts





 Learn More



*Last NWS Update: 2:24 pm

*Next TIDEeye Update: 04:43

TIDEeye • Mon, Oct 16





HIGH TIDES FORECAST

Charleston Harbor, SC

Mon

Oct 16



6.5' 9PM

 13 mph 

! Tue

Oct 17



7.1' 10AM

 11 mph 

Wed

Oct 18



6.9' 11AM


 8 mph 

Thu



Oct 19

6.9' 12PM



 8 mph 

 50%

6' 10PM

 11 mph 

6' 11PM

 8 mph 

CURRENT CONDITIONS


TIDES @

Cooper River


Church Creek

Latest Observed

2.90' 2:36 pm



2.53' 2:15 pm



Next High Tide

6.50' 9:00 pm

WEATHER @

Gaillard

Dock St

Forest Park

Church Creek


Temp (Feels Like)


63.8° 63.8°


66.3° 66.3°


66.8° 66.8°

-


 Winds

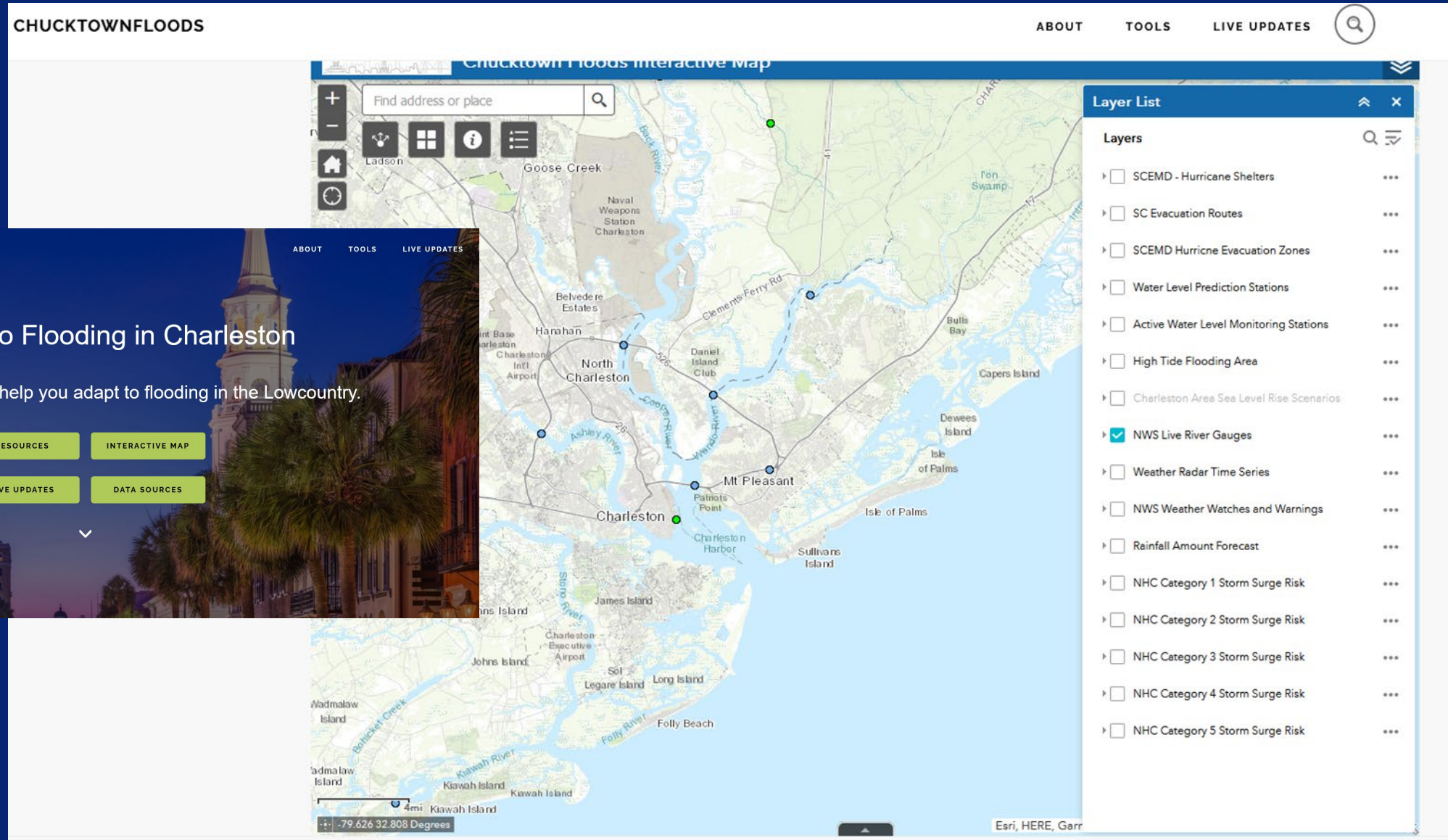
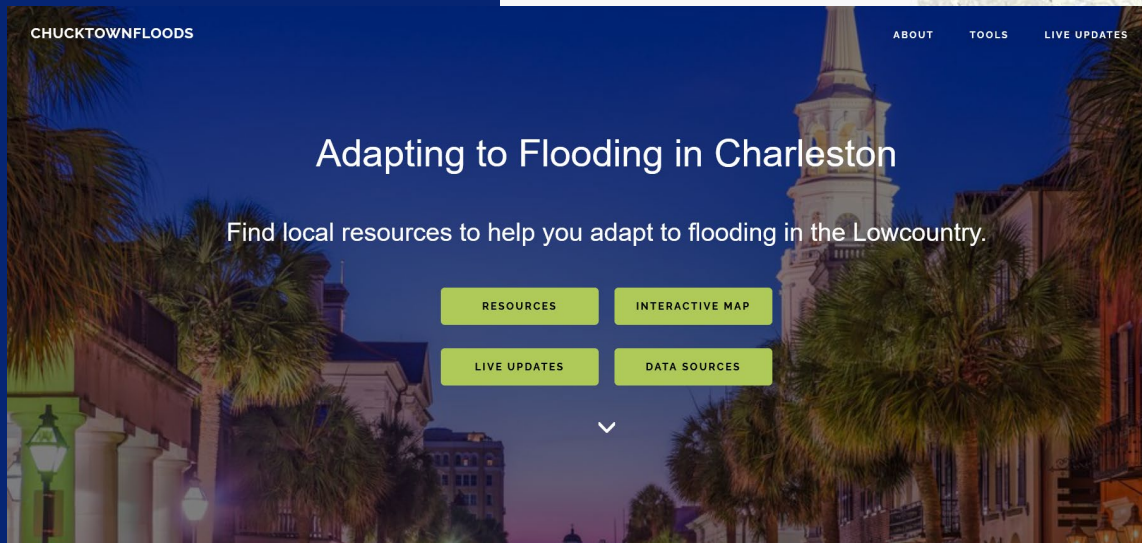
4.4 

3.9 

10.1 

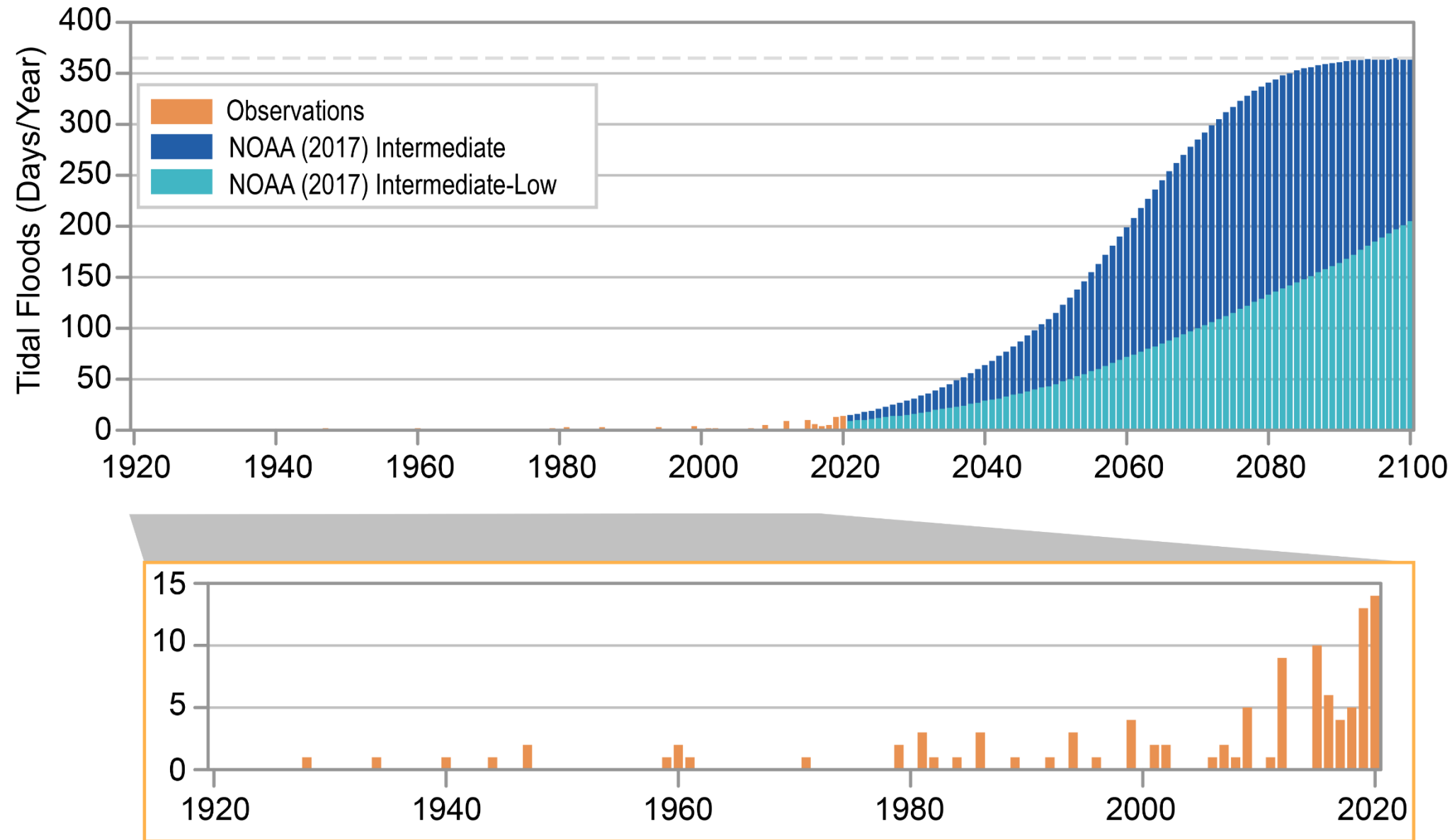
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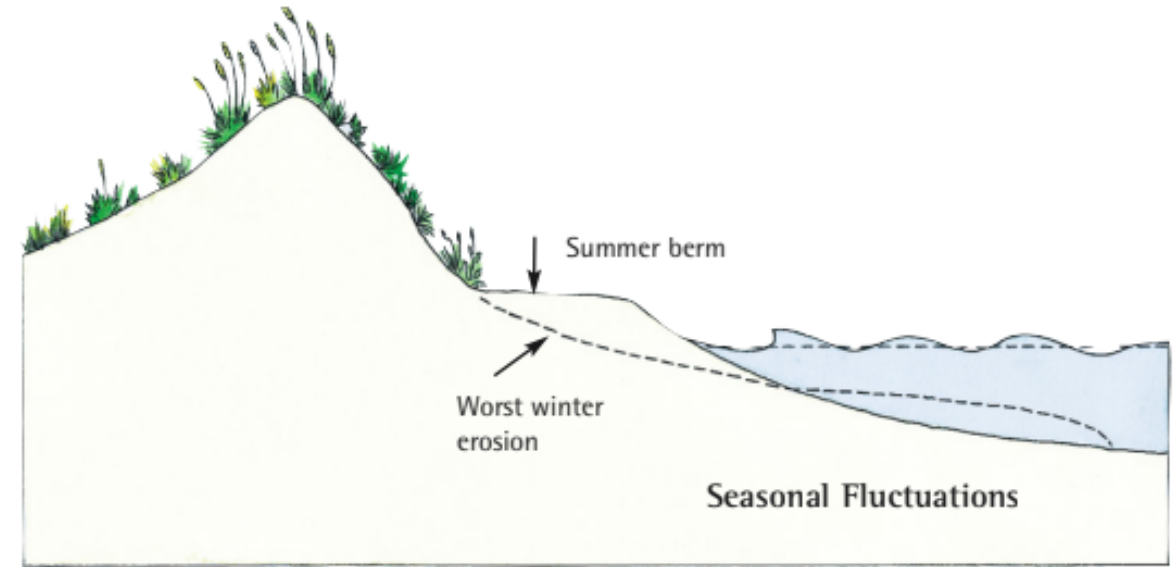
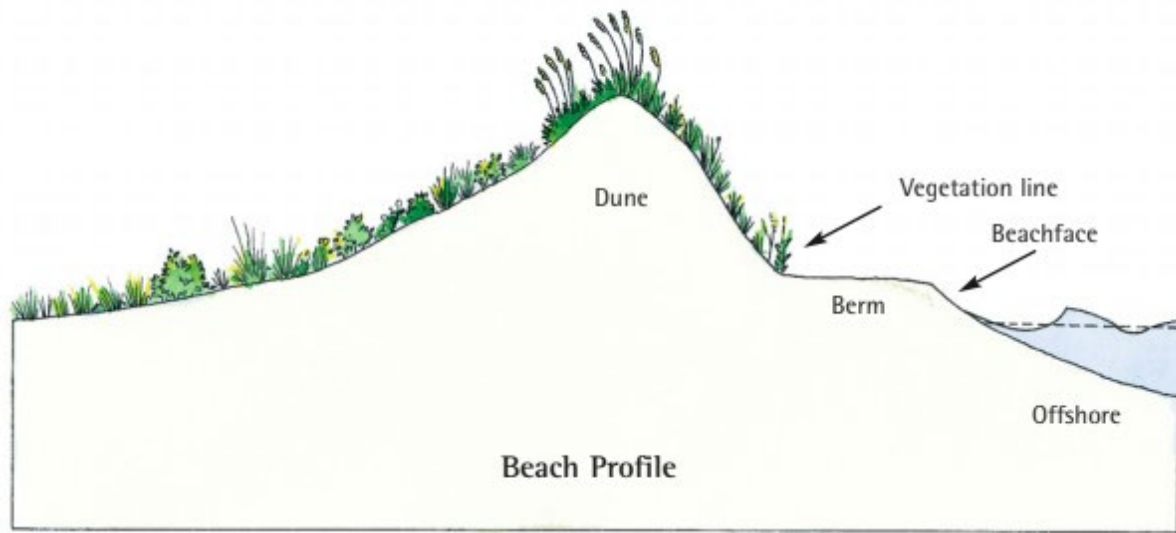


<https://chucktownfloods.cofc.edu/>

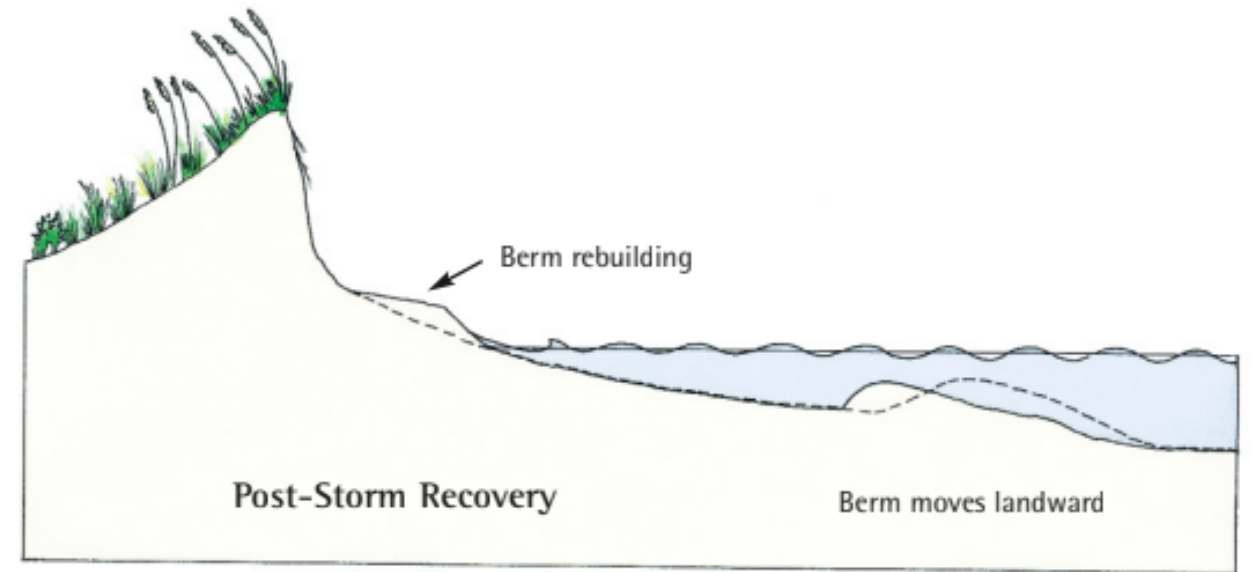
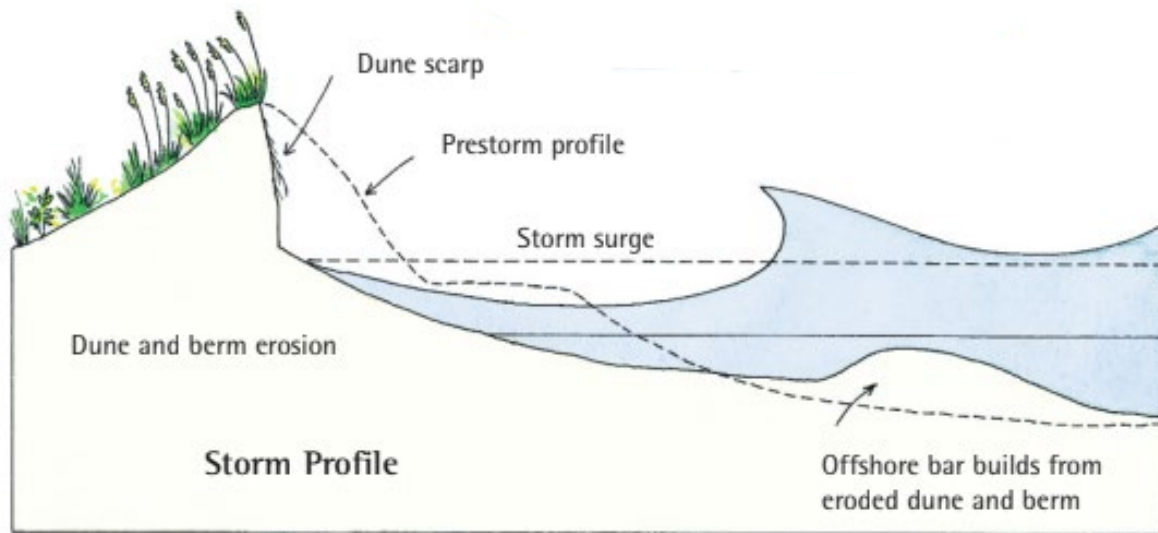
Observed and Projected Annual Number of Tidal Floods for Charleston, SC



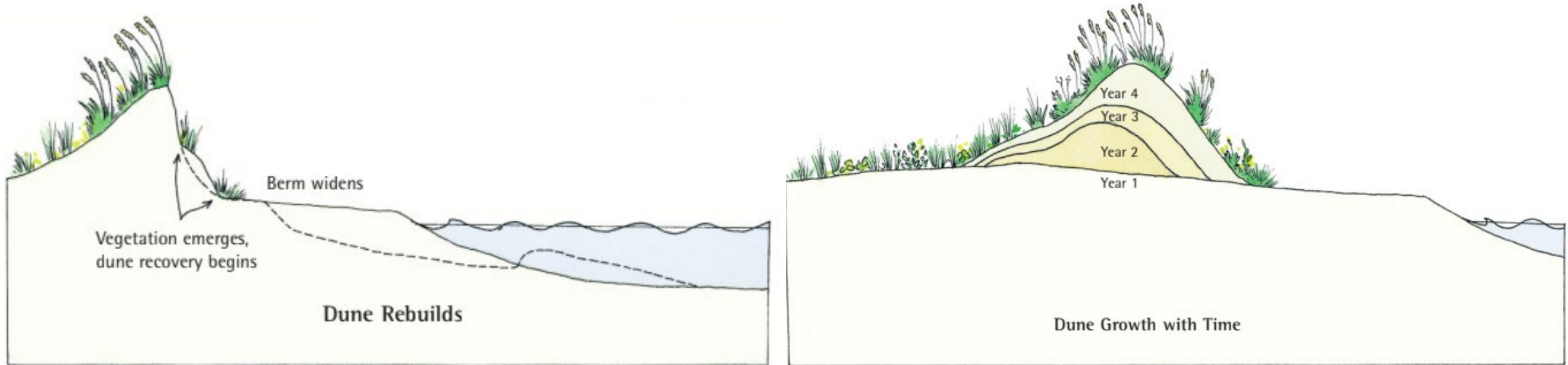
Beach Profiles



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

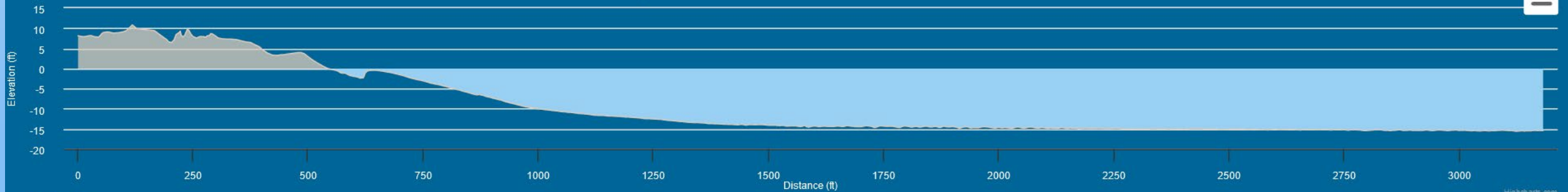
2022

ALL

VOLUME CALCULATOR



Folly Beach-Transect 2830, Collected 10/3/2013



DHEC

Highcharts.com

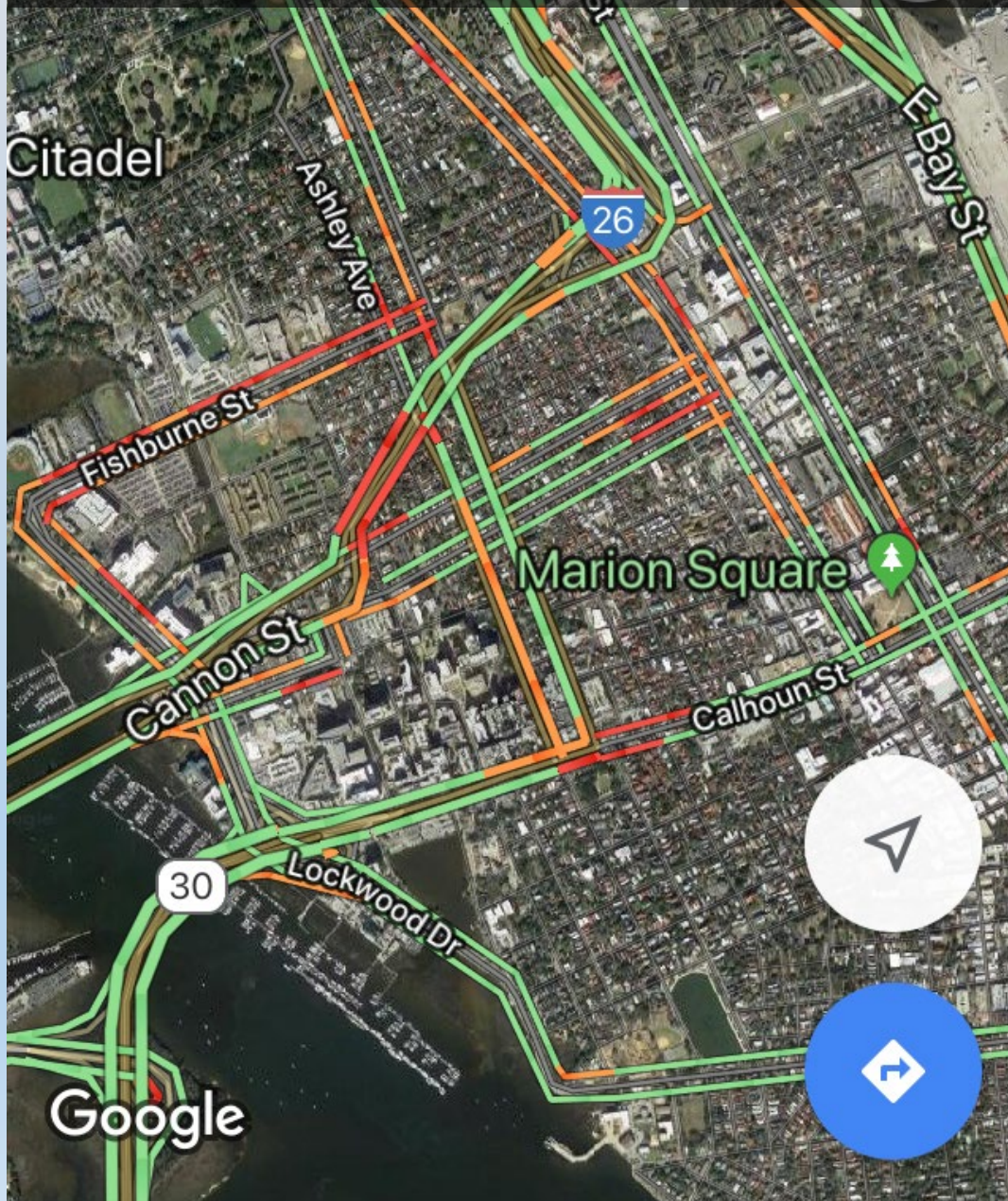
- <https://www.facebook.com/cityoffollybeach/videos/folly-beach-preserving-the-edge-of-america/232388191030881/>

Storm History

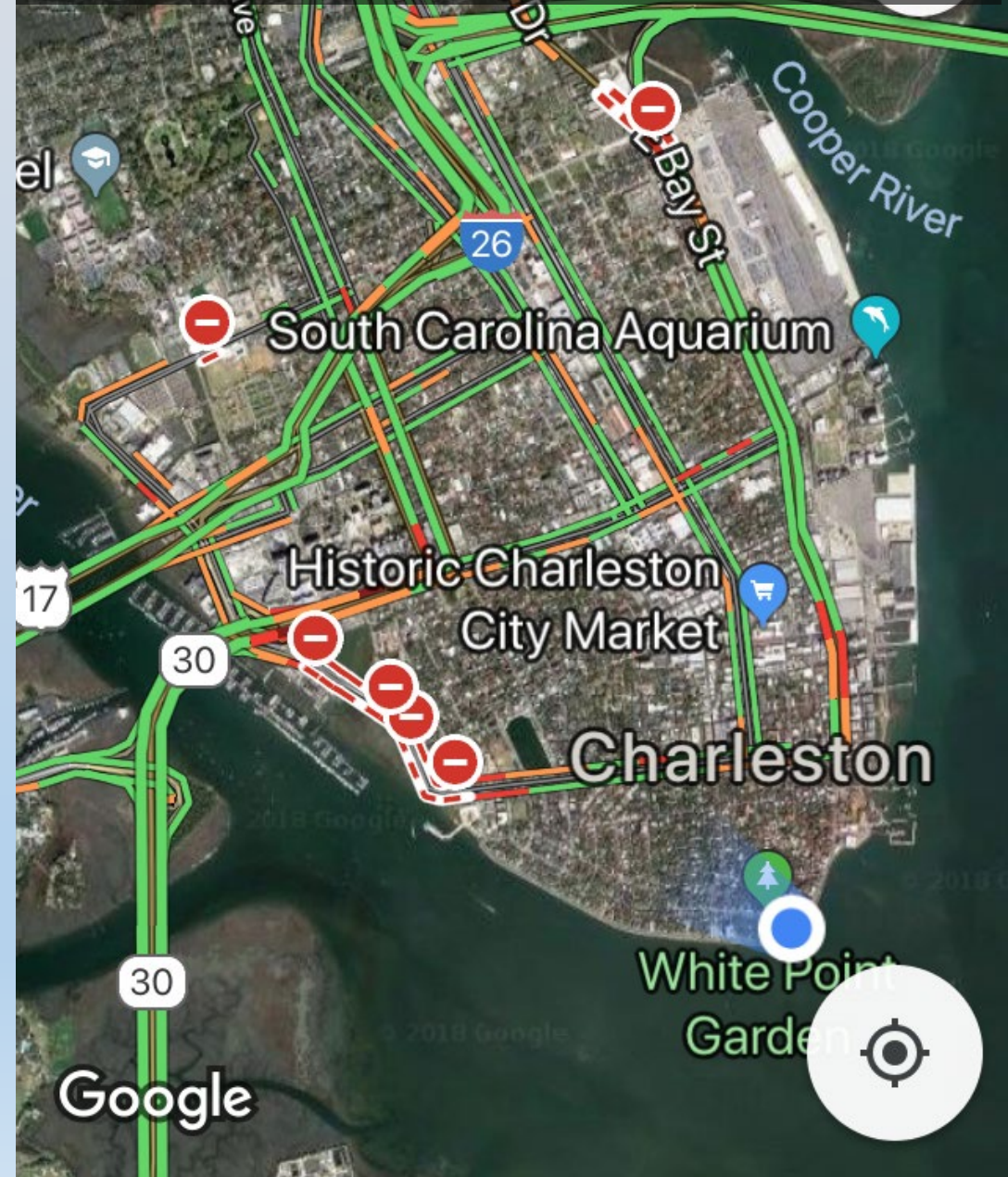
- Oct. 2015 flood
- Oct. 2016 Matthew
- Sept. 2017 Irma
- Sept. 2018 Florence
- Sept. 2019 Dorian
- Sept. 2022 Ian
- August 2023 Idalia



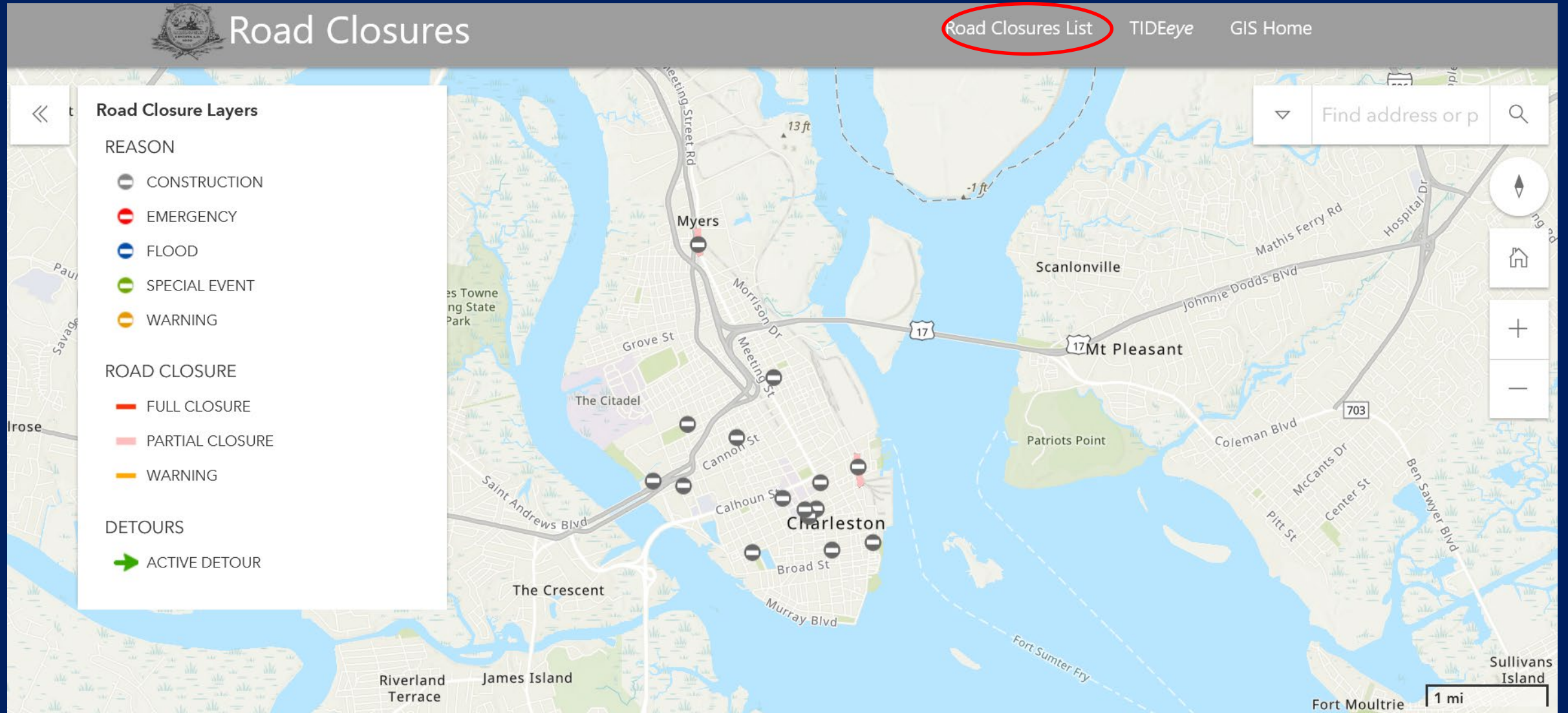
Heavy Rain



Tidal Flooding



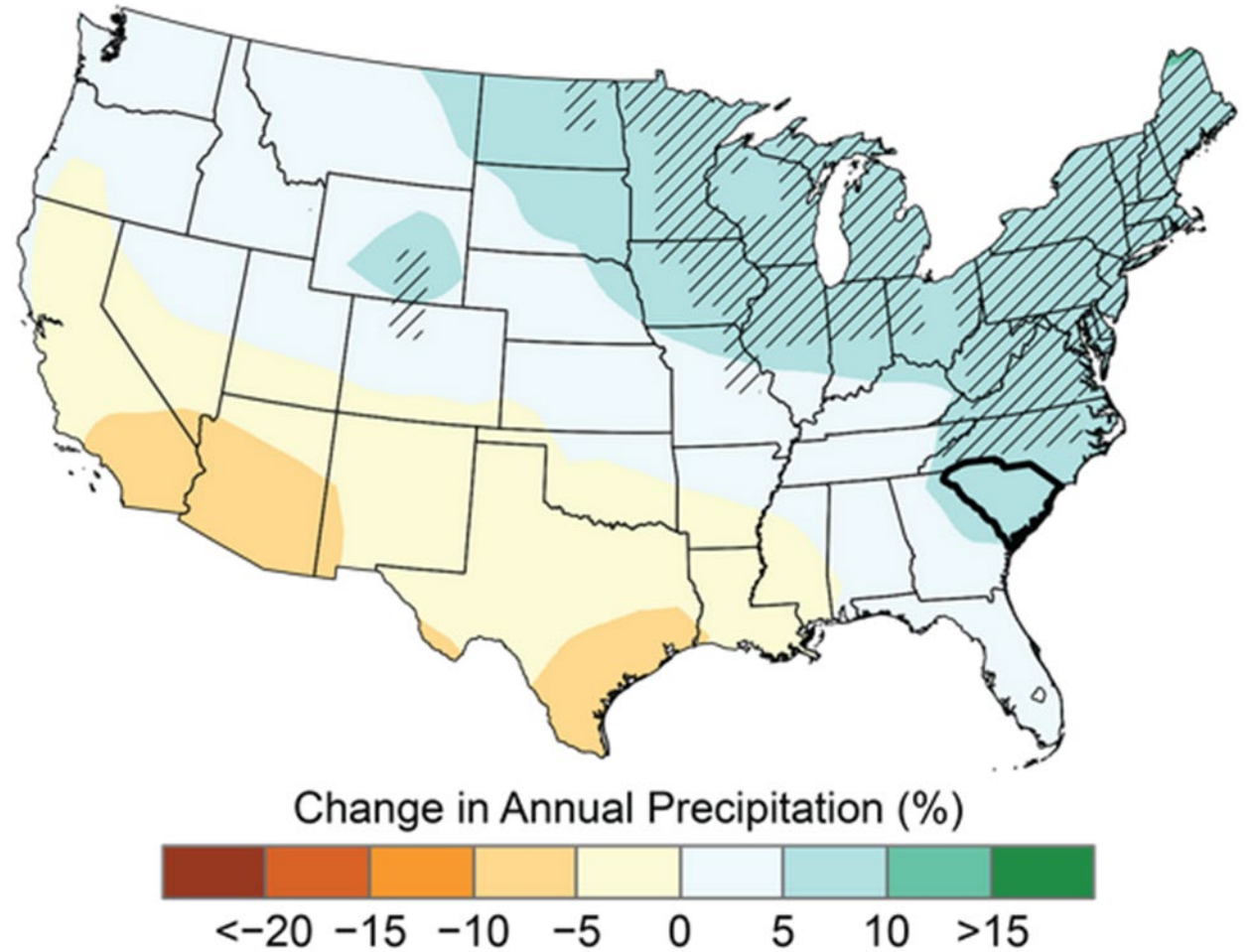
<https://gis.charleston-sc.gov/road-closures-regional/>



Rain Bombs

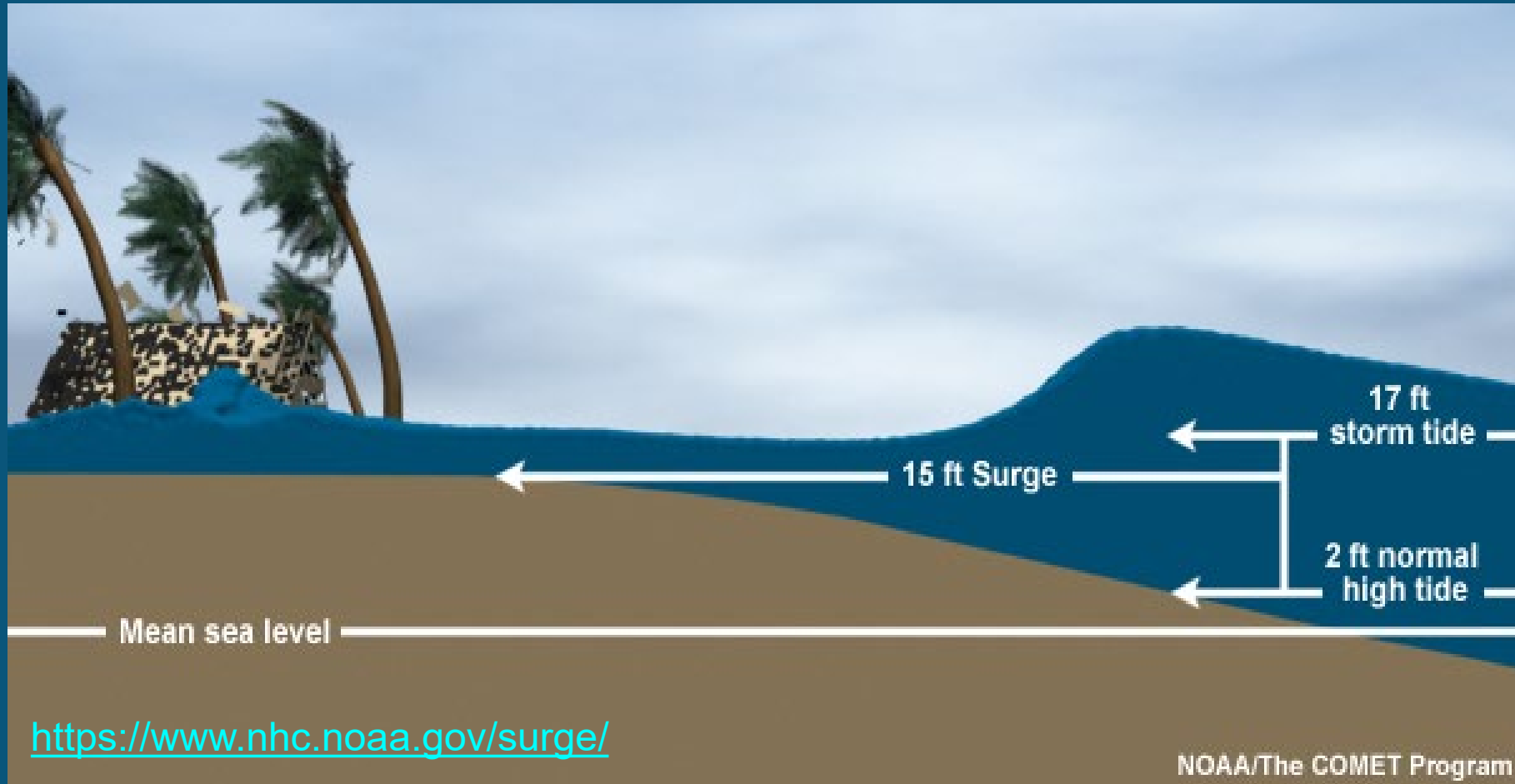


Projected Change in Annual Precipitation



Storm Surge

[video](#)





Business Operation



Public Safety

Tourism



More Frequent Heavy Rainfall





‘Wetter’ Hurricanes



Challe

nminutes



Activity and Break

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



10 Minute Break

information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

The AE Zone category has been divided by a Limit of Moderate Wave Action. The LIMWA represents the approximate landward limit of the 1.5-foot breaking wave. The effects of wave hazards between the VE Zone and the LIMWA (or between the shoreline and the LIMWA for areas where VE Zones are not identified) will be similar to, but less severe than those in the VE Zone.

Cos
0.0'
be
3.0ft
Elev
cont
the
Bou
betw
with
widt
Stuc

Cent
con
Floc
juris
The
Can
Diff
proc
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of 1
elev
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Silv
301

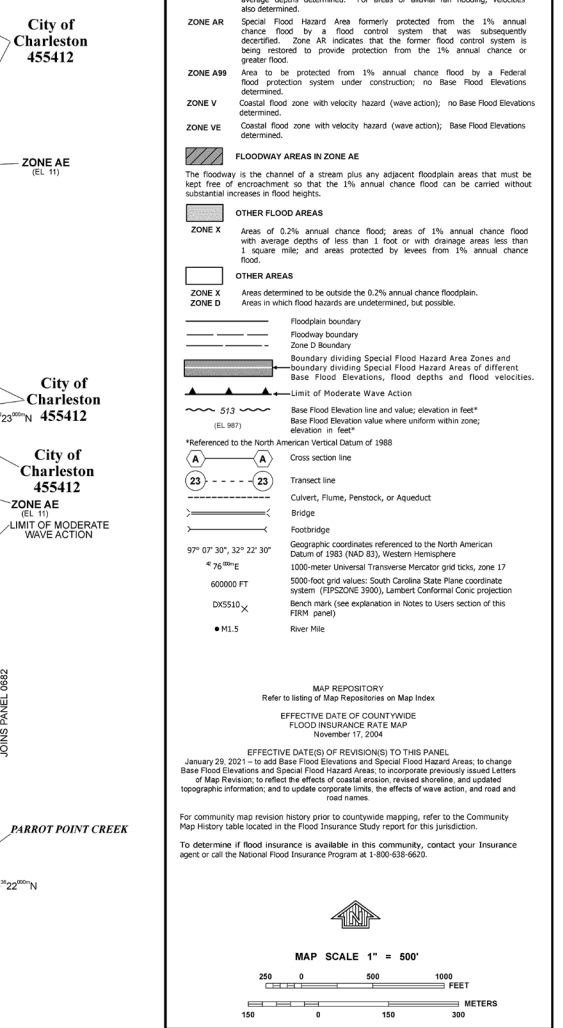
This map may reflect more detailed or up-to-date stream channel configurations than those shown on the previous FIRM. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations and improved topographic data. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed Map Index for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the FEMA Map Information eXchange (FMIX) at 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FMIX may also be reached by Fax at 1-800-358-9620 and their website at <https://www.msc.fema.gov/>

Coastal Barrier Resources System (CBRS) areas and "otherwise protected areas" (OPAs) are no longer shown on this map panel, but still may be present in this community. Current information on these areas is provided by the U.S. Fish & Wildlife Service (FWS). NFIP flood insurance is not available within CBRS areas for structures that are built or substantially improved on or after the dates indicated by FWS. Users should reference the most up-to-date information provided by FWS to determine NFIP insurance eligibility. The official maps and additional information regarding CBRS areas are provided on the FWS website at www.fws.gov/cbrs. FEMA also includes the official boundaries from FWS on our interactive and dynamic flood maps available through the FEMA Map Service Center.



- How comfortable are you with using flood maps?
- Comfortable
- Somewhat comfortable
- Not comfortable

FIRM			
FLOOD INSURANCE RATE MAP			
CHARLESTON COUNTY, SOUTH CAROLINA AND INCORPORATED AREAS			
PANEL 681 OF 855			
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)			
CONTAINS:			
COMMUNITY	NUMBER	PANEL	SUFFIX
CHARLESTON, CITY OF	455412	0681	K
CHARLESTON COUNTY	455413	0681	K
FOLLY BEACH, CITY OF	455415	0681	K
JAMES ISLAND, TOWN OF	450263	0681	K

Home Insurance

Grand Strand home insurance rates soar; why a perfect storm of factors are to blame

by Andrew James | Sun, March 12th 2023, 10:56 PM EDT



Homes along the SC Coast in Garden City Beach

MYRTLE BEACH

Grand Strand residents concerned about large increases in homeowners insurance

by: Maya Lockett

Posted: Jul 13, 2023 / 07:00 PM EDT

Updated: Jul 14, 2023 / 09:24 AM EDT

Florida's insurance industry is in flux as Idalia cleanup begins

Homeowners face uncertainty amid the upheaval that has emerged in Florida's insurance industry in recent years.

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
- With house purchase policy effective immediately, otherwise 30 day waiting period
- [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

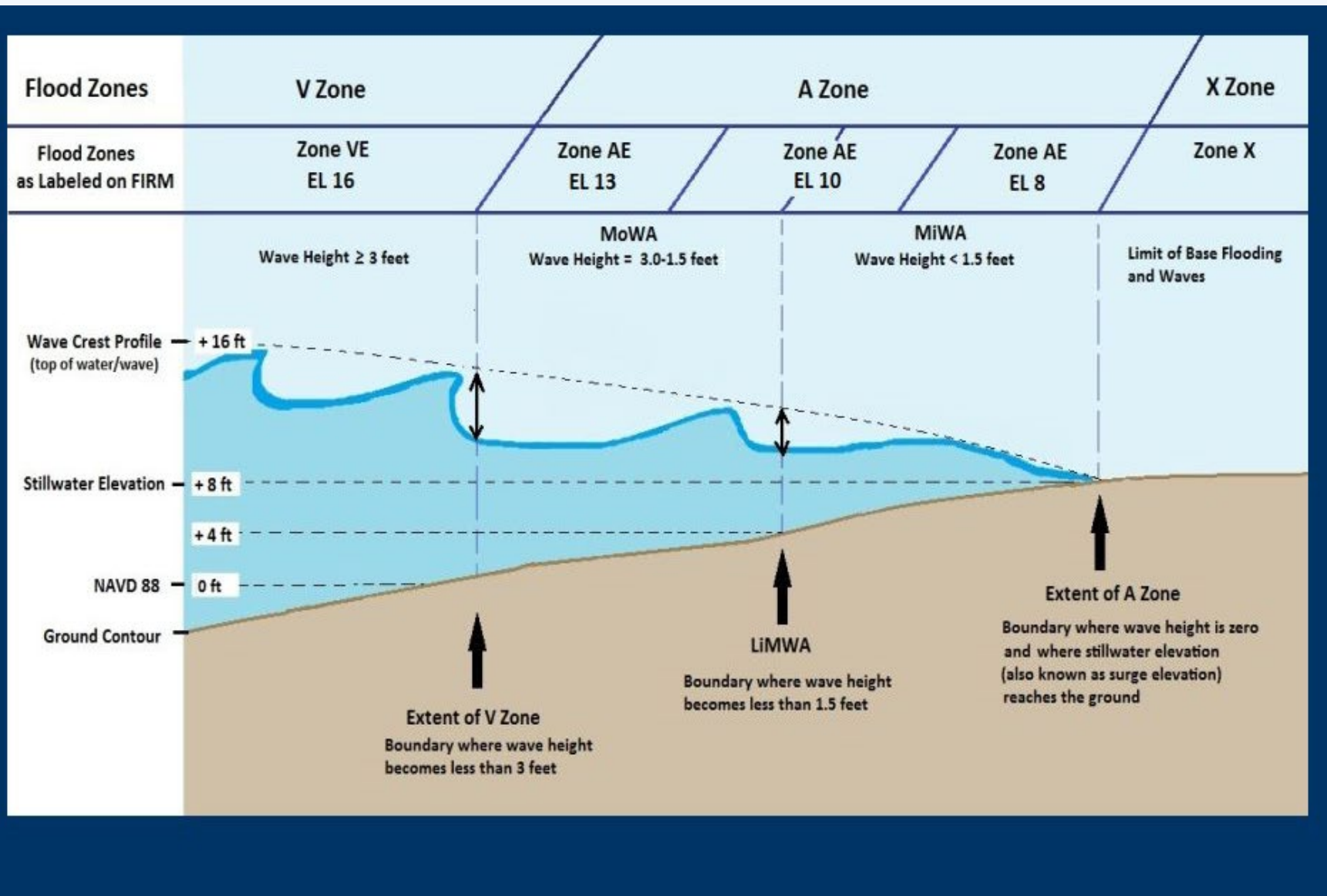
High Risk

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



FEMA

FloodFactor[®]



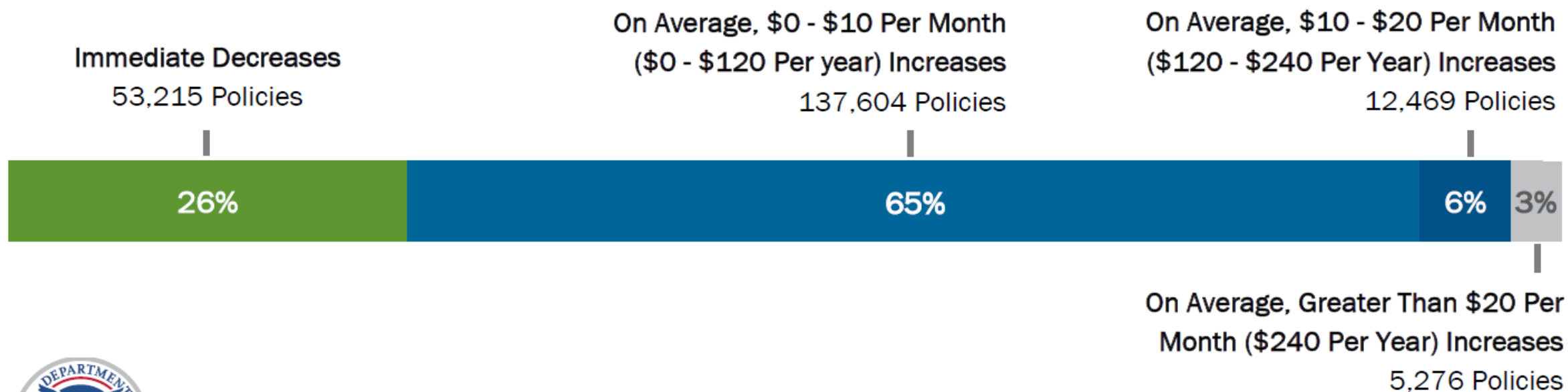
<https://www.fema.gov/coastal-flood-risk-study-process>

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

An aerial photograph of a suburban neighborhood. A central road runs vertically through the middle of the frame. On either side of the road are residential lots with houses, green lawns, and trees. Some houses have dark roofs, while others have lighter-colored roofs. There are some parked cars visible on the streets. The overall scene is a typical suburban residential area.

more

Flood Maps

<https://msc.fema.gov/portal/home>

🏠 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 in the Charleston region that are not in a mapped floodplain

🏠 When in doubt ask your County/City for help interpreting maps

FEMA Flood Map Service Center: Welcome!

Looking for a Flood Map? ?

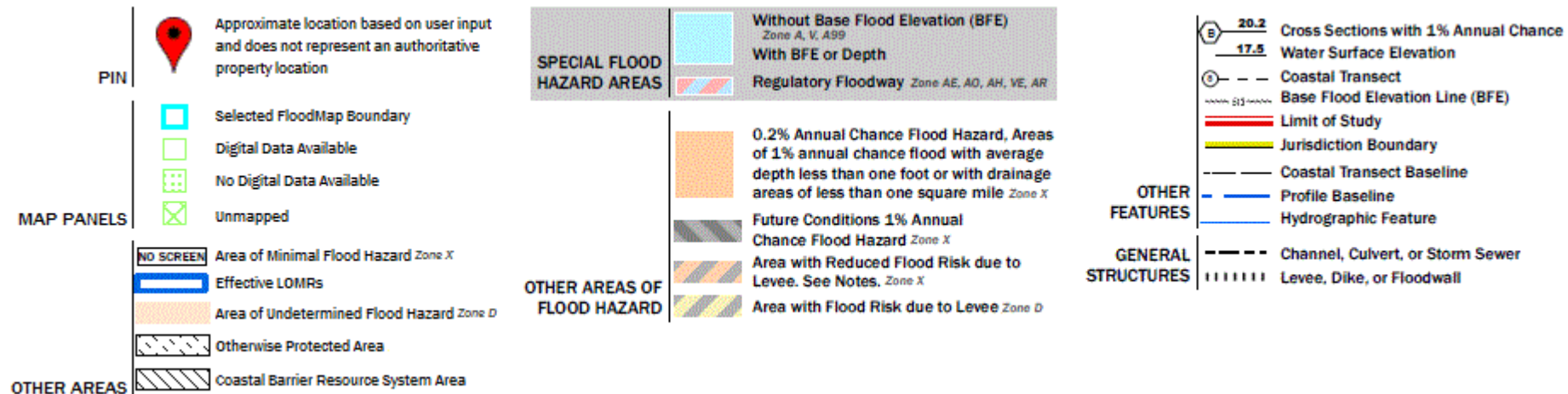
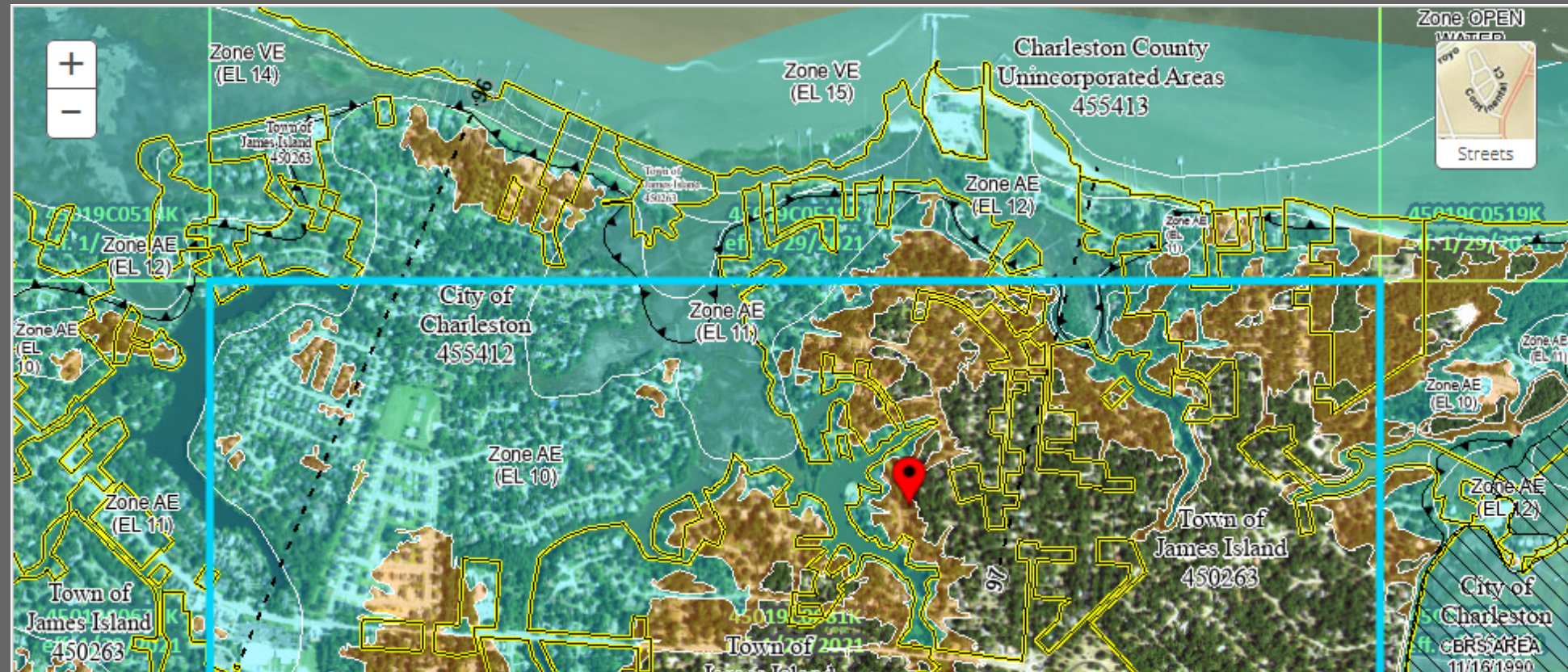
Enter an address, a place, or longitude/latitude coordinates:

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.



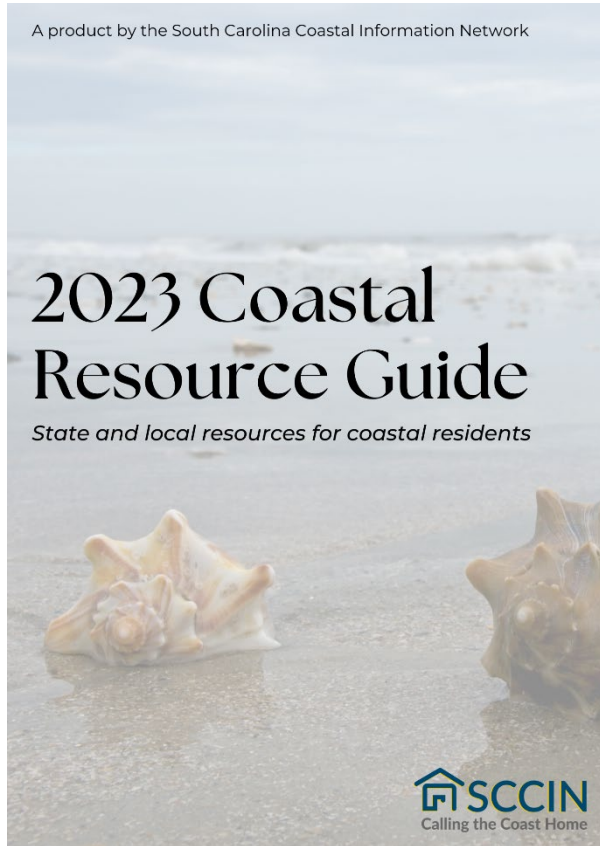


SC FLOOD Inundation and Mapping for Action



<https://scfloodimpact.com/Index>

Coastal Resources Guide



National & State Resources



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



[NWS Charleston](#)



[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

Charleston County

- Community Rating System
- Evacuation Routes
- Remediation Resources
- Hurricane Preparedness
- Charleston Regional Hazard Mitigation Plan
- BCD-Council of Government
- Office Contacts

Berkeley County

- Community Rating System
- Evacuation Routes
- FAQs, useful links
- Hurricane Information
- Office Contacts

Dorchester County

- SCDOT evacuation routes
- Emergency services
- Hurricane information
- Flood Zones
- BCD-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

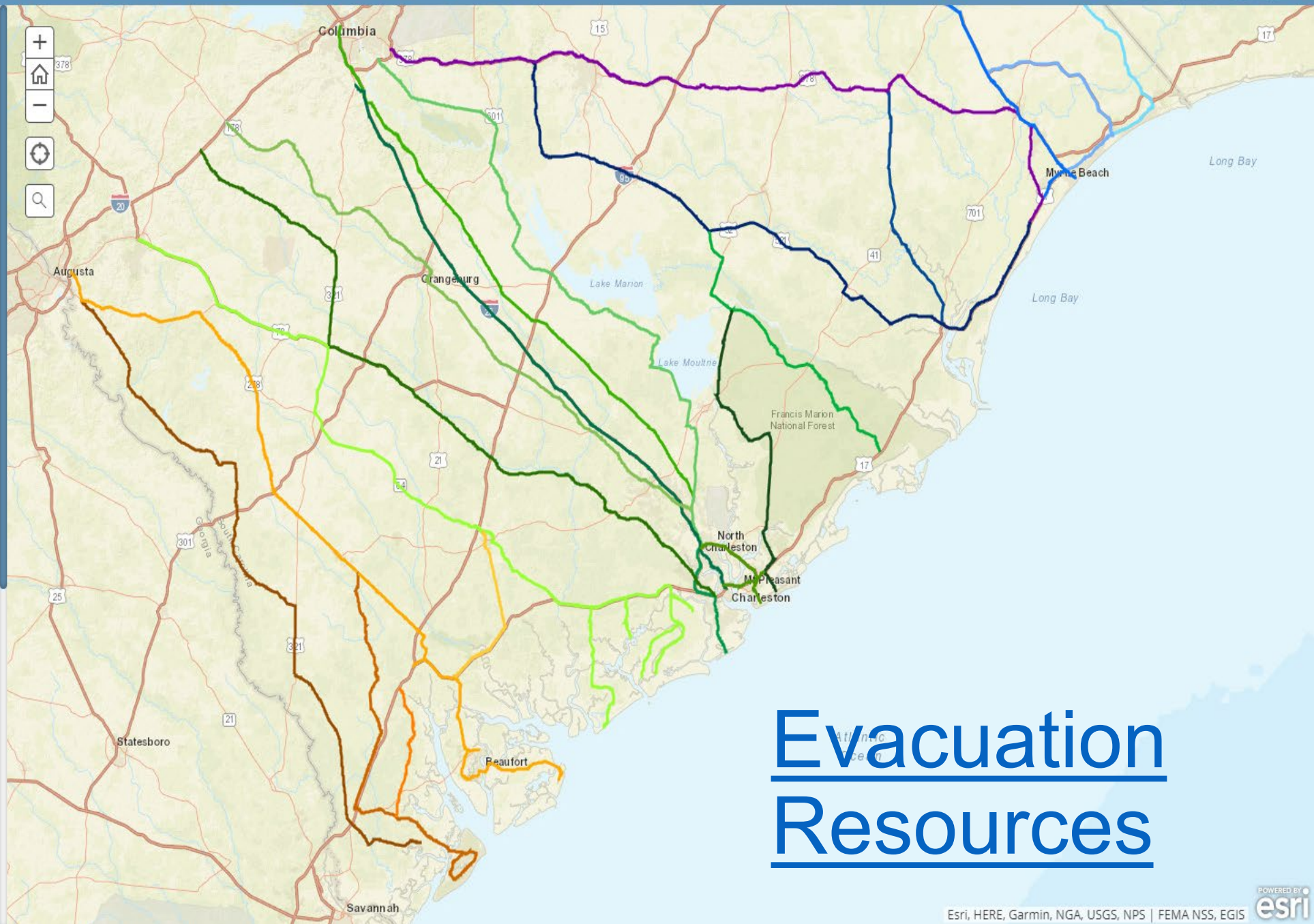
Welcome to SCDOT's interactive Evacuation map.

*****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

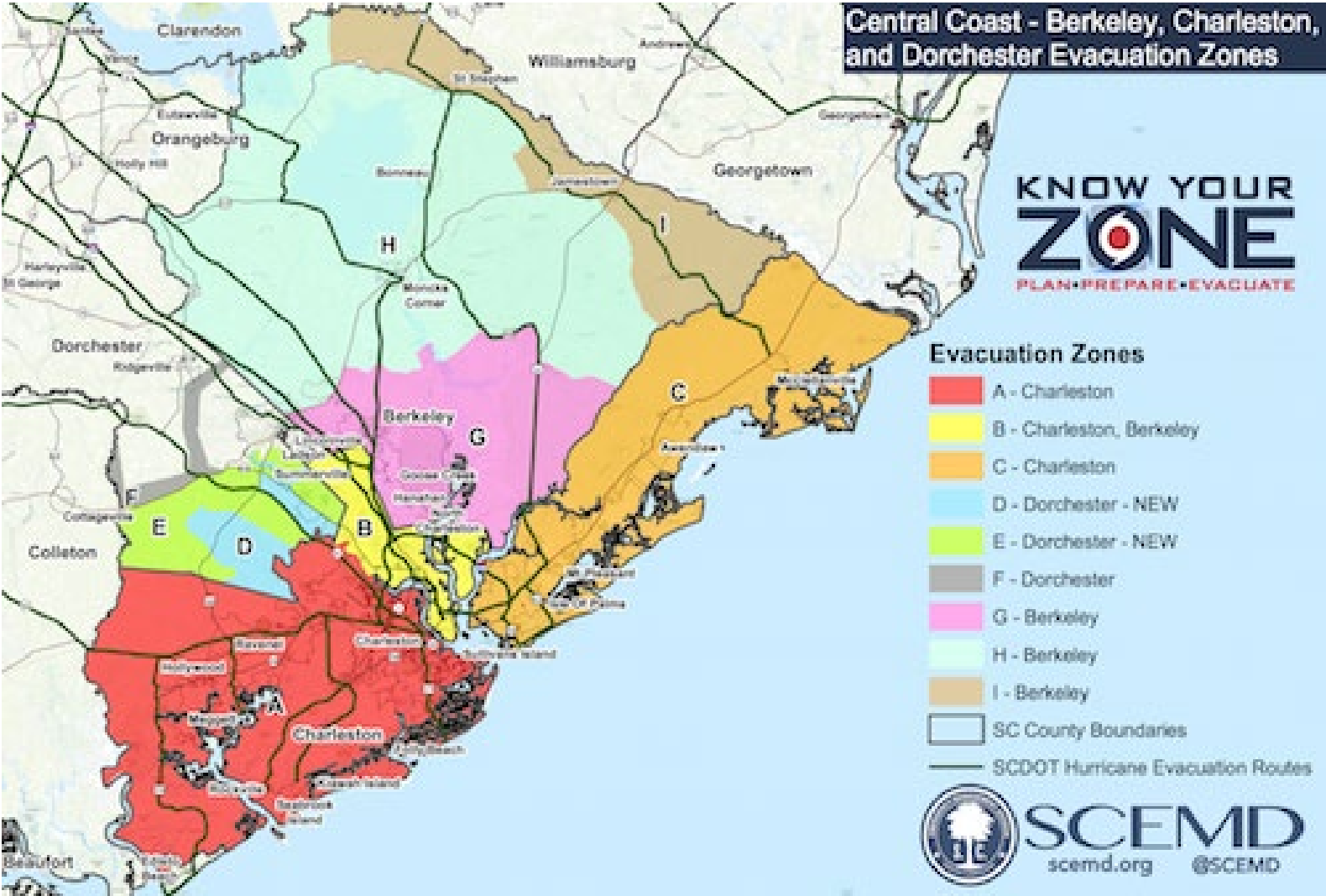
Download on the
App Store

GET IT ON
Google Play



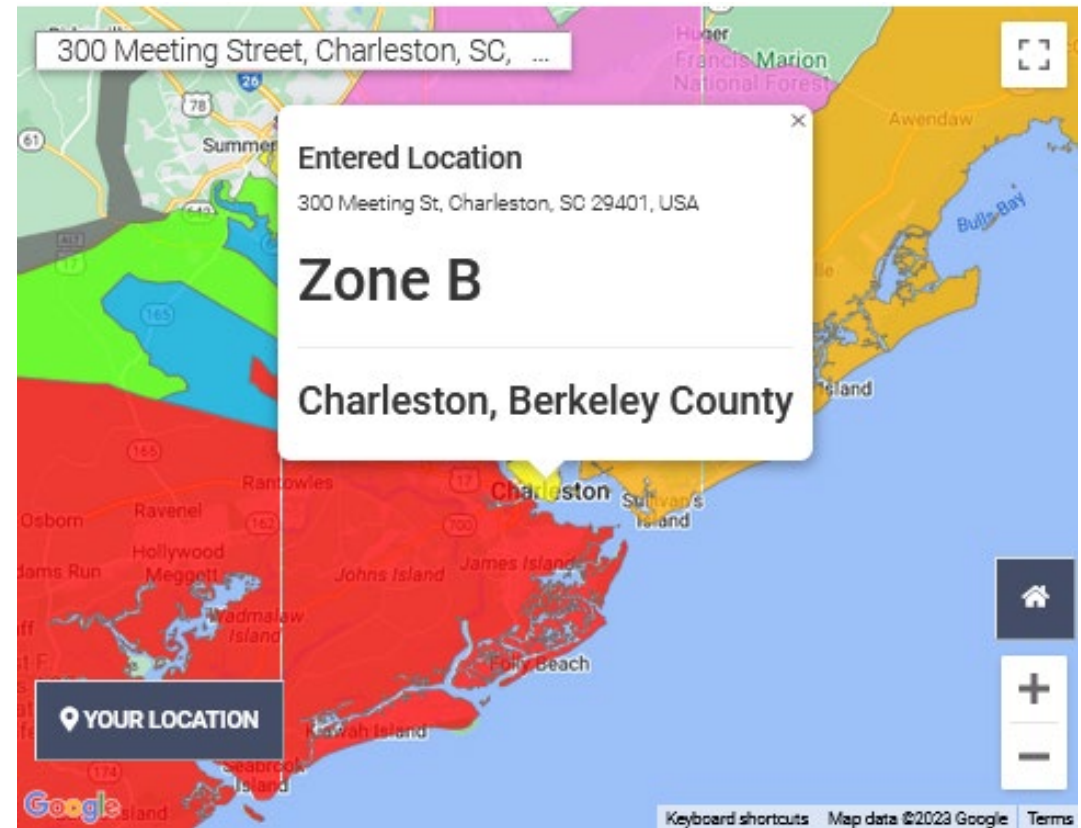
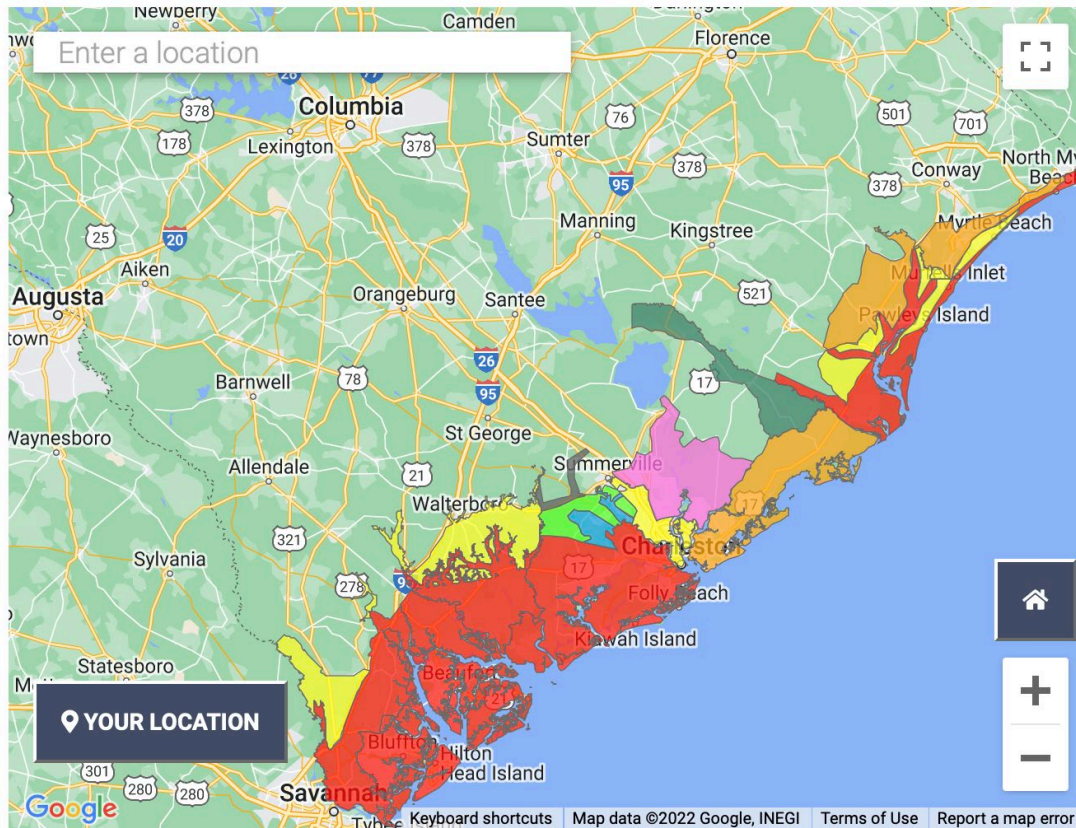
The South Carolina
Emergency Manager
Mobile App

+GET



Charleston Zone

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



Emergency Preparedness and Remediation Resources



TOWN OF SULLIVAN'S ISLAND



P.O. BOX 427
SULLIVAN'S ISLAND, SC 29482

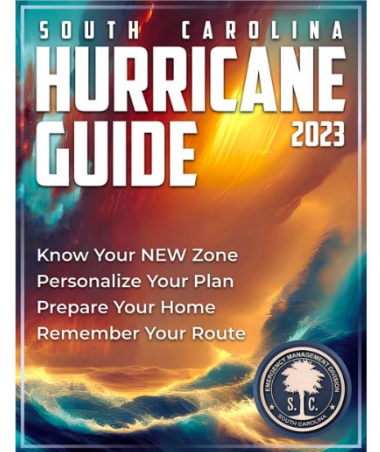
Sullivan's Island H O M E DISASTER G U I D E

Keep handy all year--on
your refrigerator or in your phone book.

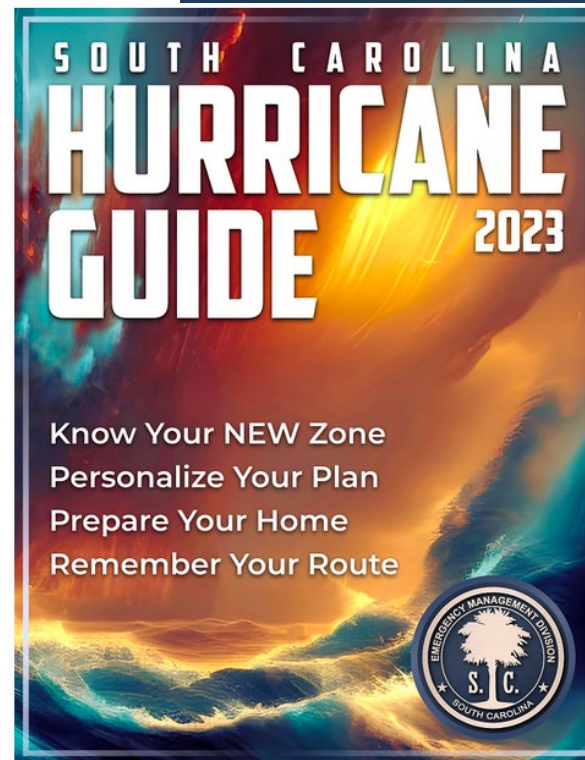
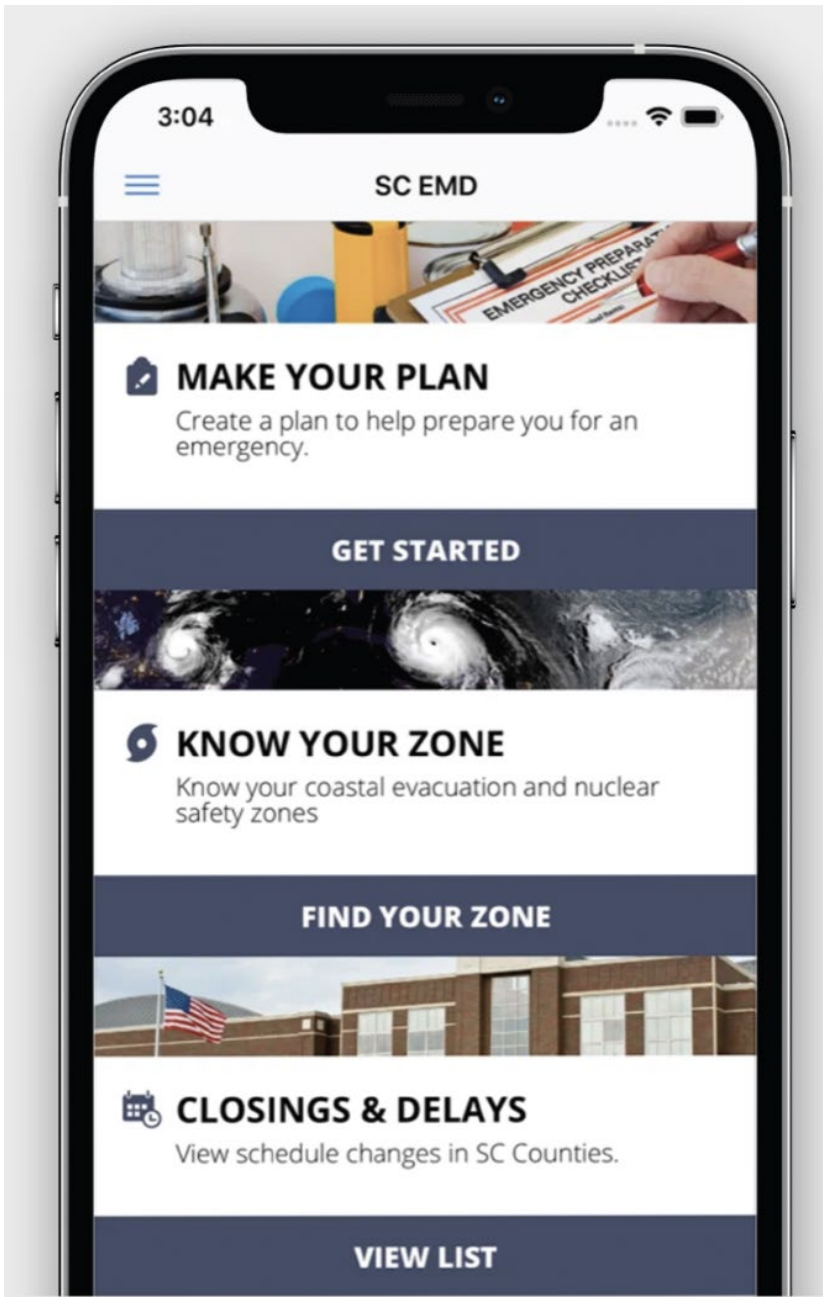


FLOODING ON KIAWAH ISLAND

A Guide to What You Should Know
Before, During and After a Flood



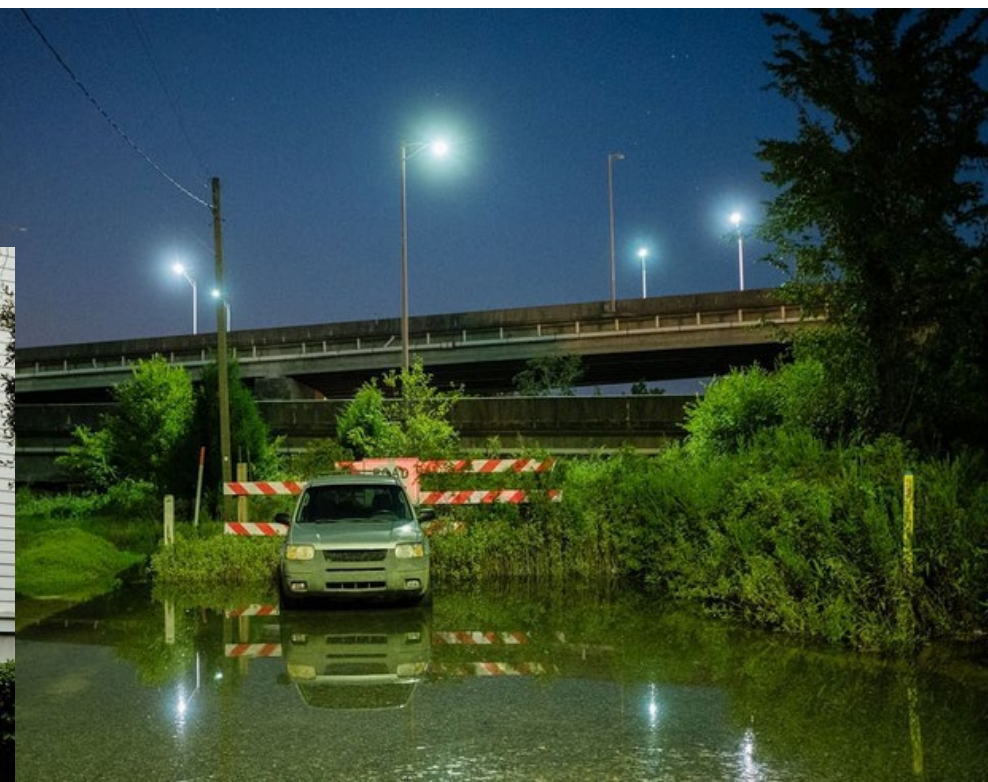
DISASTER PREPAREDNESS PLAN



<https://hurricane.sc/>

More resources





August & September 2023

Photo Credit: Jared Bramblett

<https://www.instagram.com/meanhighwater/>

Poll

- What resources will you share with your clients?



For more information and course materials



South Carolina Coastal Information Network

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

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S.C. DHEC

Matt Gorstein

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



Course Series:

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

Instruction and Information

Provided by:

S.C. Sea Grant Consortium;
S.C. Dept. of Natural Resources
ACE Basin National Estuarine
Research Reserve
Clemson University

University of South Carolina
North-Inlet Winyah Bay National
Estuarine Research Reserve
S.C. Department of Health and
Environmental Control