

COLLEGE of  
CHARLESTON

Lessons from the Lowcountry Hazards Center:  
Communicating Natural Hazard Risk to Diverse  
Populations.



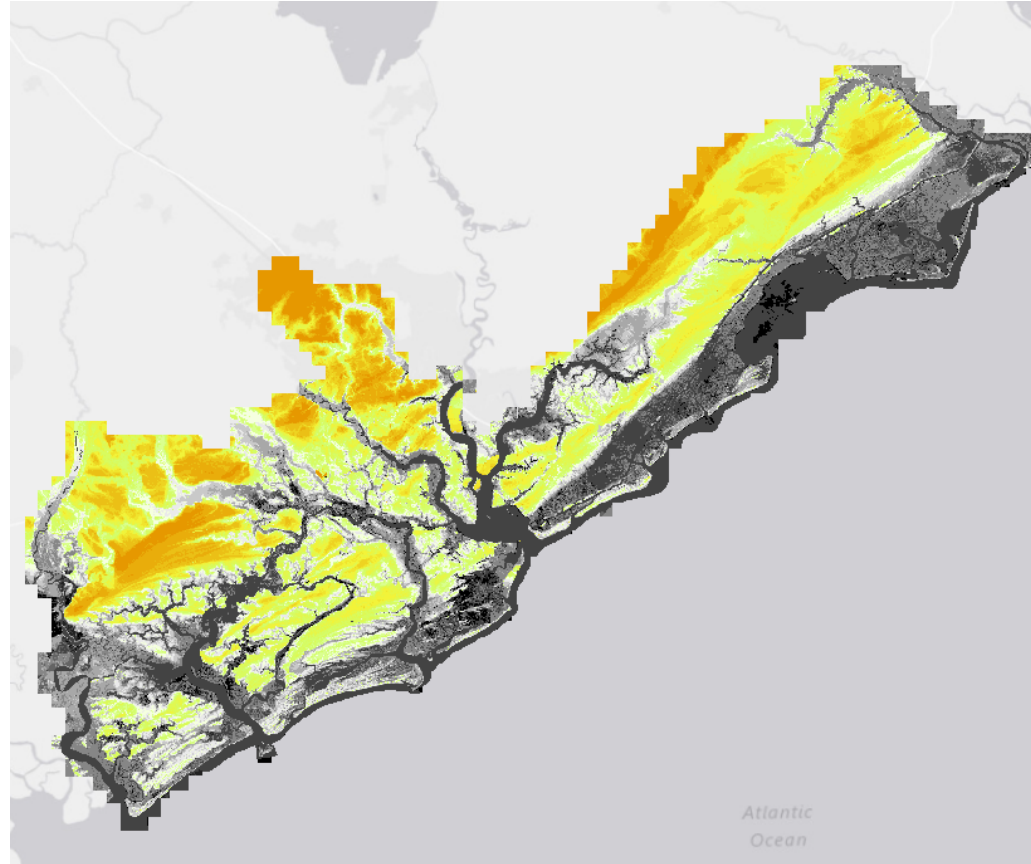
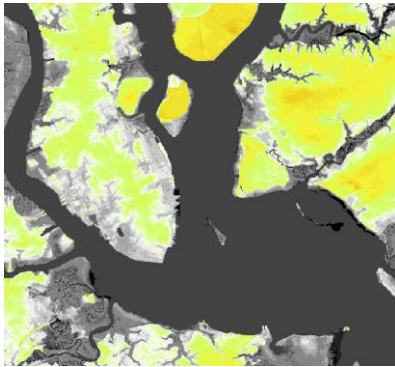
[Norman S. Levine](#) - [levinen@cofc.edu](mailto:levinen@cofc.edu), Erin K. Beutel, Steven C. Jaume, K. Adem Ali,  
Timothy J. Callahan, M Scott Harris

College of Charleston

- **North:** The Strom Thurman Institute at Clemson focused on Government and public affairs with hazards as a side concern
- **Mid-state:** USC hazards lab focuses on theoretical indices and social vulnerability / resilience
- **Low Country:** **College of Charleston's** Low Country Hazards Center focuses on Natural hazards and how they impact the state of South Carolina

- Charleston is the largest city in South Carolina but third largest metropolitan area
- Approximately 43 people move into Charleston Region each day.
- The Tri-County Region is expected to have a population over 1 million within a decade.
- Charleston is the 24th fastest growing U.S. metropolitan region

- It is the largest county in South Carolina by total land and water area, 1,358 square miles (3,520 km<sup>2</sup>)



- Many home in the region have a 1<sup>st</sup> floor elevation of just over 10 feet
- The area is defined by wetlands, Made-land and a Dissected Terrain - over 700 bridges in region

# Charleston, South Carolina: The Hazards Capital of the East

- Earthquakes, Floods, Thunder Storms, Tornadoes, Freak Weather (snow - hail), Hurricanes, “Wildlife issues”, Mold, Allergens, Smog Pollution, Wildfires, Hazardous Materials, Poverty, Coastal Erosion, Artillery Bombardment (unexploded ordinance)

- - - and so much more.

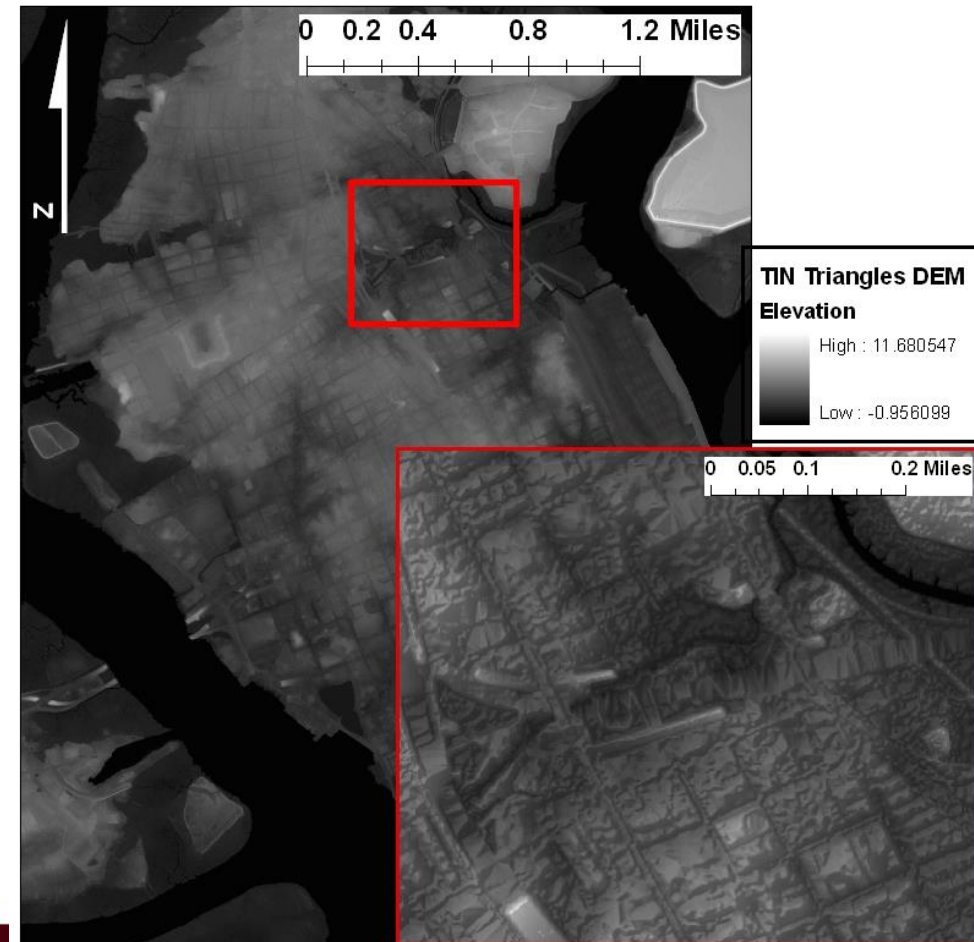


- SCEEP – South Carolina Earthquake Educations and Preparedness Program
  - State-wide lead for the great southeastern shakeout
  - State K – 12 education lead for traditional and non-traditional classroom support
  - HAZUS modeling and data development Lead for South Carolina

# SCEEP

**South Carolina Earthquake Education and Preparedness**

- Water Defines the Lowcountry
  - The region is subject to extreme weather events
  - Hurricanes
  - Floods
  - Tidal Flooding
  - Sea Level Rise



LIDAR Peninsula

- The Low country Hazards center is a partner in with members taking leading roles in the region on –
- Coastal Erosion / Beach nourishment
- Water Quality and Algal Blooms
- Nuisance flooding
- Region-wide hazard and resilience planning



Hugo



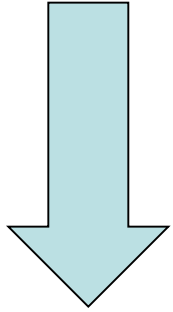
Matthew



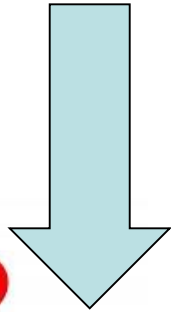
Irma

- One regional Challenge is the large number of new residents yearly who know little to nothing about the risks of living in the region.
- Messages must be available in multiple formats and venues to meet the needs of the diverse populations in the region
  - Elected officials    -- Residents    -- Bureaucrats
  - Educators        -- Students    -- Tourists

- Stock and trade of Geoscientists

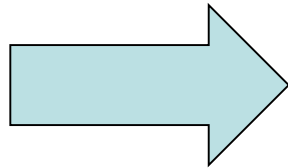


- Data Collection and Analysis
- Models and Visualizations
- Communication by most Geoscientists
  - Journal and Conference Based
  - Concise for the Informed reader



- Disconnect with the general Public

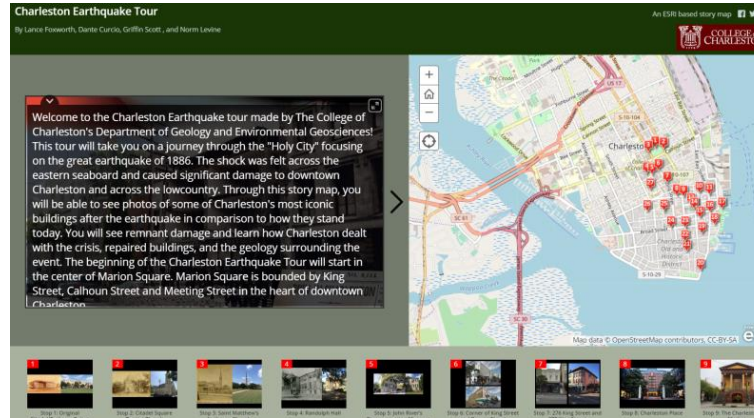
- Little to no background in specifics
- Science is scary or too hard to understand
- Lack of understanding leads to Mistrust



- One on One interactions are the best way to get the point across
  - Not enough Hours in the day
- Outreach activities
  - Higher numbers – Motivated audience
- Social Media
  - Accessible to Largest number
  - Available on the audiences schedule
  - Platform independent and Mobile capable



- Using ESRI's Story Mapping Application For Content



- Promoting Applications thru Social Media Sites

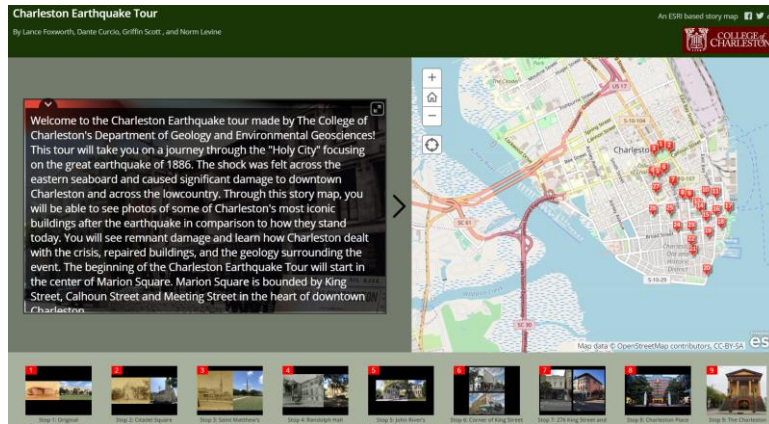


- Effective and efficient Means of Communication to the general Public

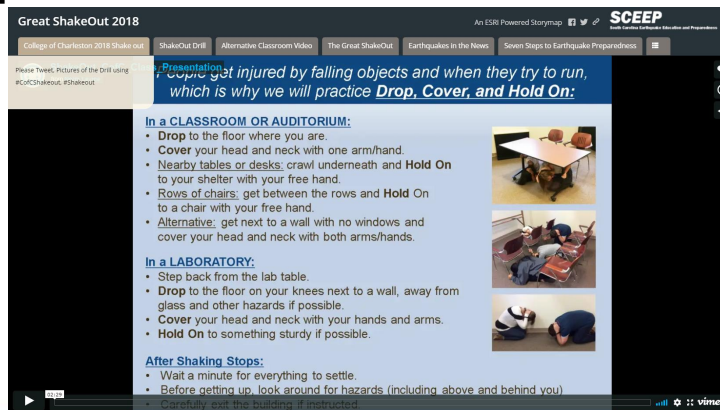
## Communication Seismic Risk: Shake – Rattle and Roll

- Life in Charleston can be considered “a ground shaking” Experience
- Background of 3-5 felt earthquakes a year indicates things are still moving.
- This low number of earthquakes makes it harder to predict.
- Estimate a recurrence of a 7.0 magnitude or greater is 400-500 years based on liquefaction features. (let's here it for the age dating community)
- 5 and 6 magnitude may not leave evidence—could happen at any time.

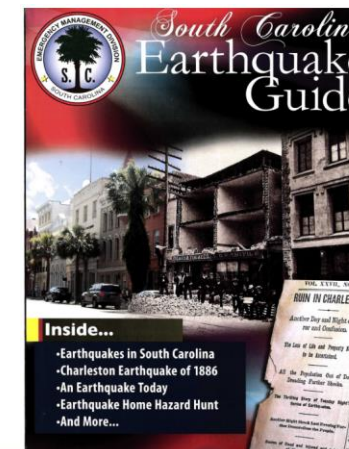
- The Low Country Hazards Center, SCEEP and SCEMD have now developed a number of Online resources for Earthquake outreach and understanding Seismic risk



Earthquake tours



Earthquake Primers



## Great ShakeOut 2018

An ESRI Powered Storymap



**SCEEP**

South Carolina Earthquake Education and Preparedness

College of Charleston 2018 Shake out

ShakeOut Drill

Alternative Classroom Video

The Great ShakeOut

Earthquakes in the News

Seven Steps to Earthquake Preparedness



Please Tweet, Pictures of the Drill using  
#CofCShakeout, #Shakeout

*People get injured by falling objects and when they try to run,  
which is why we will practice **Drop, Cover, and Hold On:***

### In a CLASSROOM OR AUDITORIUM:

- **Drop** to the floor where you are.
- **Cover** your head and neck with one arm/hand.
- Nearby tables or desks: crawl underneath and **Hold On** to your shelter with your free hand.
- Rows of chairs: get between the rows and **Hold On** to a chair with your free hand.
- Alternative: get next to a wall with no windows and cover your head and neck with both arms/hands.



### In a LABORATORY:

- Step back from the lab table.
- **Drop** to the floor on your knees next to a wall, away from glass and other hazards if possible.
- **Cover** your head and neck with your hands and arms.
- **Hold On** to something sturdy if possible.

### After Shaking Stops:

- Wait a minute for everything to settle.
- Before getting up, look around for hazards (including above and behind you)
- Carefully exit the building if instructed.



02:29

vimeo

A story map



## South Carolina Earthquakes

While most people associate earthquakes in the United States with the West Coast, earthquakes occur frequently on the East Coast as well. Seismic instruments in Summerville, SC detect seismic waves from earthquakes quite often, and in fact, Charleston is predicted to be one of the next cities on the East Coast that could suffer from a substantial earthquake over the next century. Based on the major destruction from the 1886 Charleston earthquake, it is essential for all living in the Charleston area to be educated on potential earthquake hazards and earthquake preparedness.

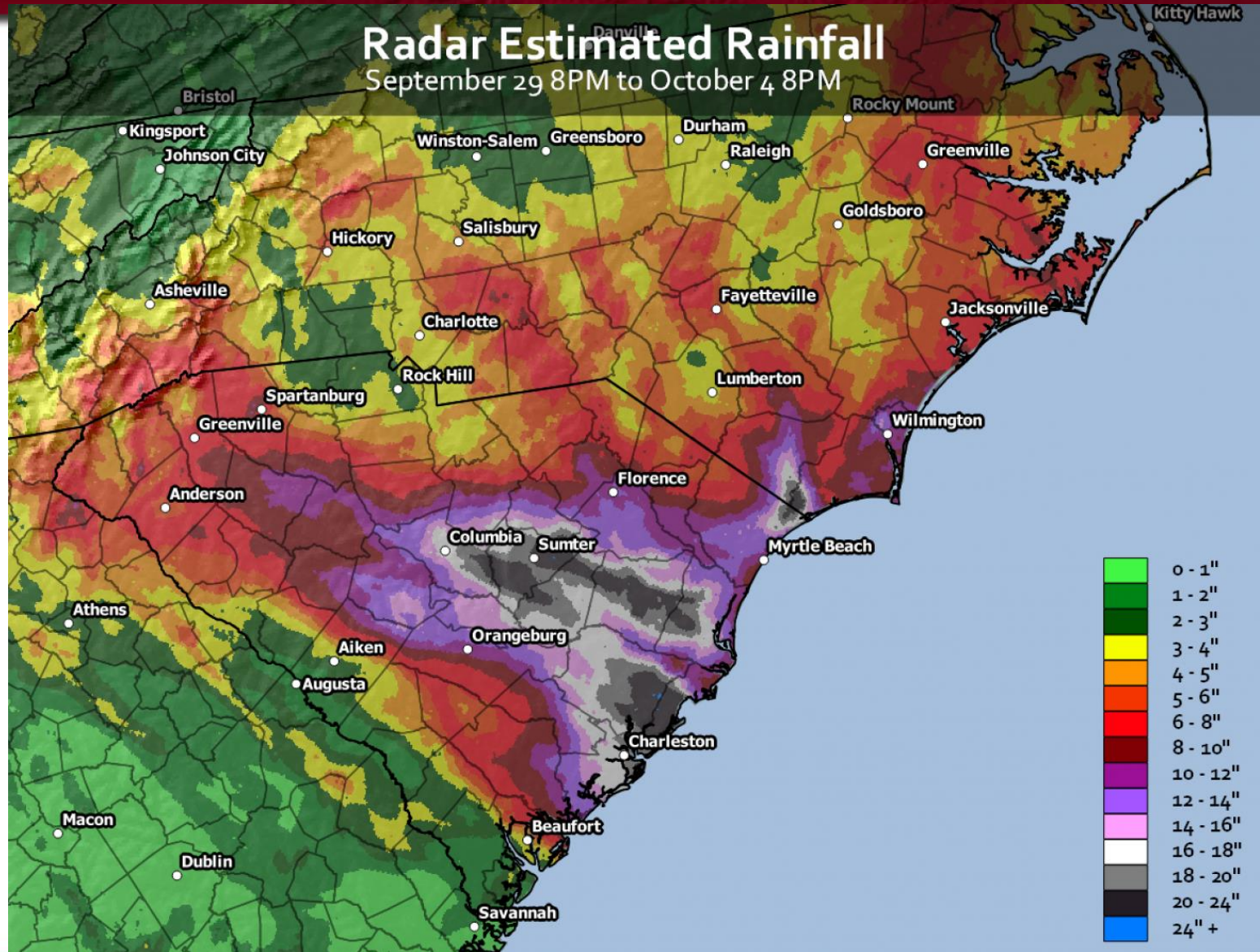


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- Flooding has been a concern across the state .....but it defines our coasts
- Charleston has already experienced over a foot of sea level rise in the past century
- Frequent tidal events cause regular minor flooding - nuisance flooding
- This term does not suggest how large of a problem this can be for our coastal cities,
- Nuisance flooding can cause infrastructure damage - transportation, sewer systems, as well as pose human health risks, and real estate impacts
- United States has 8 of 20 of the world's most vulnerable cities in terms of annual loss due to flooding
  - A recent Charleston study found that nuisance flooding will cost just under what extreme events cost the city.

# Extreme Weather Events



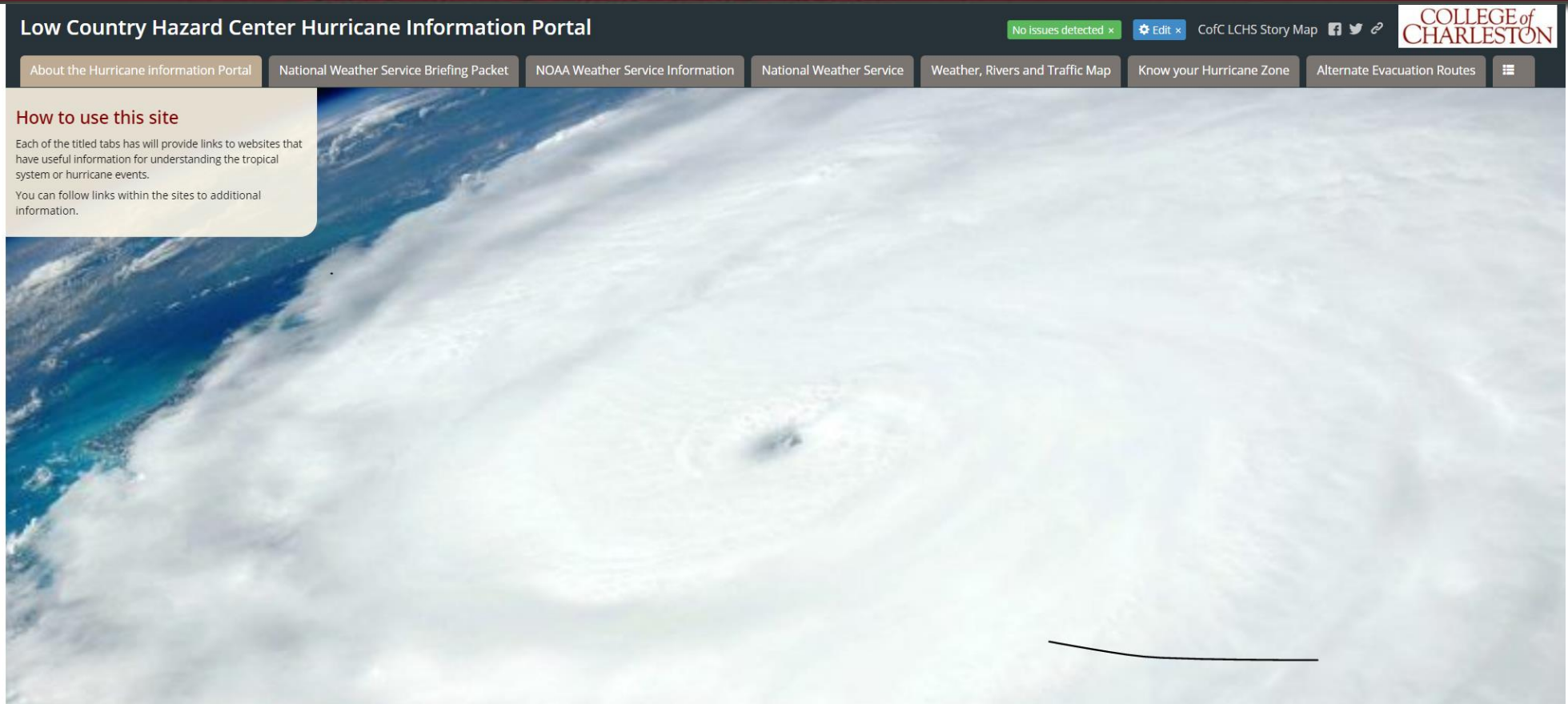
The 2015 “Rain Bomb”  
released up 24 inches of  
rain in 24 hour period

½ the amount in Houston

One of the largest single  
rainfall events in the USA

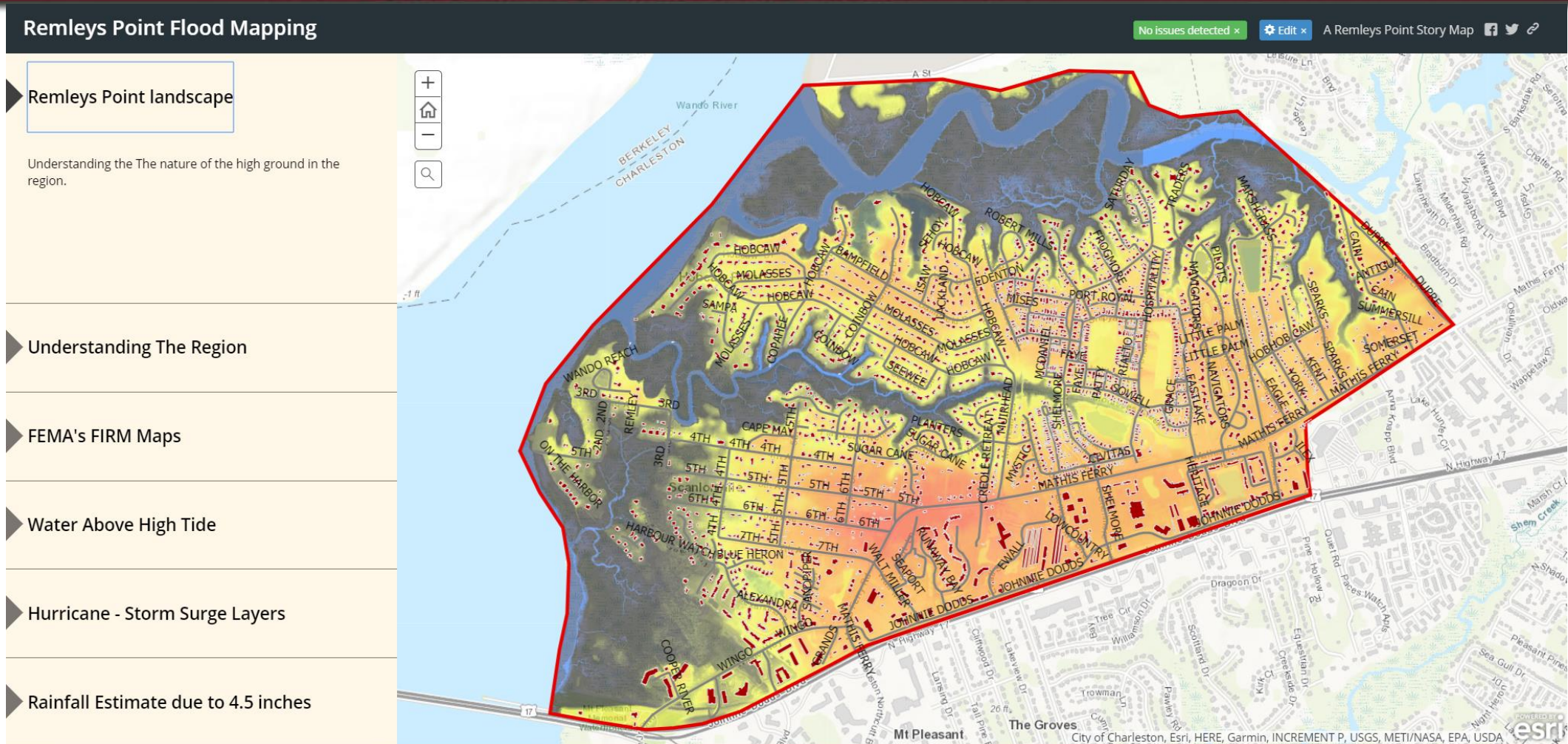
Slow moving Florence  
saw for many area a  
revisiting of flooding in the  
region





- Information Sources and knowing who to trust during an event can be the difference between panic and orderly safe evacuation.

**COLLEGE of CHARLESTON** **Flooding and Resilience Apps**



- Outreach Activities can be run directly thru the apps on site During face to face and still be available after the event is over.

- Geoscientists need to take the primary position in being responsible for the messages we put in the public forum.
  - The lack of knowledge in the public means that the experts must engage directly to stem the trend of mistrust
- Story maps and Social Media are essential in getting the message across
  - Controlling the message scientists can better affect the conversation and monitor the content.

- Questions

»Comments

