

# CAROLINAS CLIMATE CONNECTION

QUARTER 1 | MARCH, 2020

[www.cisa.sc.edu](http://www.cisa.sc.edu) | (803) 777- 6875 | [www.facebook.com/usccisa](https://www.facebook.com/usccisa) | [cisa@sc.edu](mailto:cisa@sc.edu)  
@CarolinasRISA | UofSC Department of Geography | Callcott Building  
709 Bull Street | Columbia, SC 29208

Photo Source: Jake Ramthun

# CONTENTS



3

## **In the Spotlight**

Featured Researcher: Stafford Mullin

4

## **The Carolinas Climate Resilience Conference**

Mark your calendars, and [submit presentation & session proposals](#)

5

## **CISA Conducts Flood Vulnerability Assessment for Beaufort, SC**

Exploring flooding and sea level rise in coastal communities

7

## **Climate Injustice in North Carolina**

CISA supported research highlights adaptation barriers in underserved communities

9

## **Making the Connection - Climate and Public Health**

Recent stakeholder engagement highlights CISA's climate-health decision support tool

# STAFFORD MULLIN

CISA FEATURED RESEARCHER

Stafford is from Charleston, South Carolina and is a senior environmental studies student at the University of South Carolina. She has been working as an undergraduate research assistant for CISA since February of 2019. Stafford's role with CISA involves generating communications & outreach materials, and creating written and visual content for publications and documents. Additionally, she has been working on a literature review to assess current and past research endeavors related to heat illnesses in the state of South Carolina. By assessing research in this realm, groundwork will be put in place for CISA to expand their efforts on climate health research in the state of South Carolina.

Aside from science communications, Stafford's other academic and research interests includes climate change adaptation and planning, GIS, and urban heat islands. She hopes to pursue these interests in graduate school while pursuing a master's degree in geography after graduating from USC. When not working in the climate lab, she enjoys drinking coffee, listening to podcasts, and trying out new restaurants with her friends.



# THE CAROLINAS CLIMATE RESILIENCE CONFERENCE

DURHAM, NC | OCTOBER 26-28, 2020

We are now accepting presentation  
and session ideas for the 2020 CCRC.  
Submit your ideas here.

The Carolinas Climate Resilience Conference (CCRC) has become a biennial tradition and a hub for connection and sharing climate adaptation strategies in the Carolinas. Each conference's attendance grows, and most people report that the conference results in new connections and information. During the 2018 conference, the 1st Carolinas Regional Adaptation Leadership Award was given to Holly White in recognition of her advancement of adaptation strategies as a town planner in Nags Head, North Carolina.

CISA also worked to make the conference carbon neutral in partnership with Greensboro, North Carolina based Urban Offsets. Part of this work was conducted via local tree plantings in the host city of Columbia, South Carolina. For this year's conference, we are again looking to make the conference carbon neutral in partnership with Urban Offsets and through sponsorships.



The 2020 CCRC will be held October 26 – 28 in Durham, NC. Participants will explore the work being done at the state level in response to NC Executive Order 80 and the SC Floodwater Commission report. The conference program will include cross-cutting themes to generate discussion about how to implement climate adaptation in the Carolinas. Themes range from equity to economics, collaboration to communication, action to adaptation, and more. The inclusion of these themes is set to make this year's conference dynamic and grounded in what local climate practitioners face in their communities. New components in the program include the addition of workshops and trainings and a student poster competition with cash prizes for 1st, 2nd, and 3rd place winners.

As in past years, CISA offers travel support for local community representatives and continuing education credits for professionals to include floodplain managers, planners, engineers and surveyors. To learn more about this year's conference, check out the [conference web page](#) where you can sign up to receive information via email or social media, submit your ideas for a session or presentation, or become a sponsor or exhibitor. We hope to see you there!

2020 Carolinas Climate Resilience Conference





## CISA CONDUCTS FLOOD VULNERABILITY ASSESSMENT FOR BEAUFORT, SC

*By: Jory Fleming*

Beaufort is an idyllic seaside city in South Carolina, known for its Antebellum streets and historic downtown which was recently included in the Reconstruction Era National Historic Park. Bordered by rivers and the coast, the city is vulnerable to tidal and rainfall flooding. Flooding in the city is predicted to increase as a result of climate influence on extreme weather events and sea level rise, alongside an increase in population and impervious surfaces. At the request of the city, CISA partnered with the SC Sea Grant Consortium and the College of Charleston's Lowcountry Hazards Center to conduct a flood vulnerability assessment.

The team explored the impacts of flooding by examining current trends, modeling future changes in flooding as a result of sea level rise and precipitation, and finally by investigating impacts to key city assets. The frequency of tidal flooding is increasing over time, with most major events occurring since 2015. Within the next 20 years, the city may experience tidal flooding for over 100 days out of each year (Figure 2). The extent of the flooding could eventually reach a sizable fraction of vital areas of the city. In response to local official's concerns, the Team also explored the impacts on people, properties, and businesses in the challenged areas identified by the city as already existing flooding issues. By individually modelling stormwater runoff for each of these districts, CISA mapped who was most at risk in future flood events and identified population groups, businesses, and public property within these challenged areas and in the wider city.

The team presented these results in a [report](#) to city council. The report provides data on critical assets and people that the city can use when developing their responses and in future city planning. Going forward, Beaufort can use the report as a base from which to explore policy responses and examine which best align with the city's needs. These could include drainage projects, building codes, and building risk and resilience thinking into city planning. This project marks the beginning of a partnership and CISA and our partners are looking forward to continuing to assist Beaufort as it rises to the resilience challenge.

Figure 1: NOAA 2017 Sea Level Rise Scenarios for South Carolina

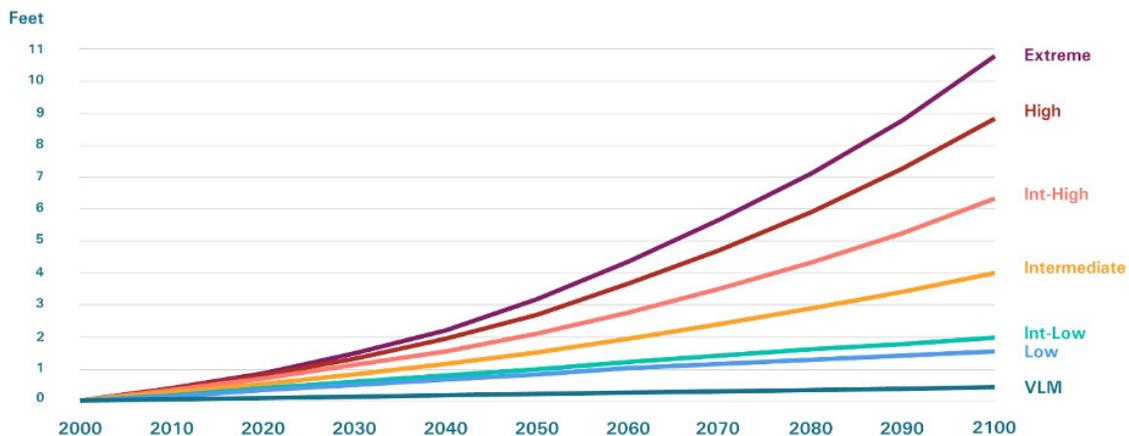
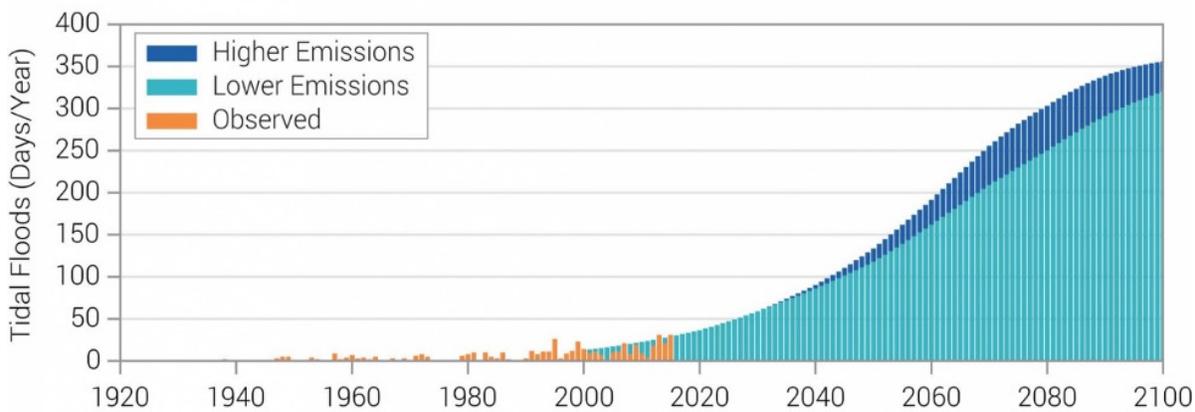


Figure 2: Observed and Projected Annual Number of Tidal Floods for Fort Pulaski, GA



# CLIMATE INJUSTICE IN NORTH CAROLINA

*By: Matthew Jurjonas, Erin Seekamp, Louie Rivers III, and Bethany Cutts*

As climate related impacts continue to affect coastal regions globally, community efforts to adapt are needed to maintain threatened local livelihoods and quality of life. In addition, rural coastal areas—especially those along the inland estuarine waters like the Albemarle and Pamlico Sounds in North Carolina—already face many challenges due to job loss, rural flight, and limited social services. When combined with the historical context in the Southeast US, where many African American communities occupy some of the lowest lying areas in the coastal plain, adaptation efforts must recognize unique vulnerabilities and community needs to adapt to flooding and sea level rise. However, long standing inequalities and exclusion from planning processes, public scoping, and both state and federal level coastal management has left many historically marginalized communities to fend for themselves. North Carolina also passed a moratorium on using sea level rise in state level planning that expired in 2016, which likely led to little outreach about projected changes to coastal hazard impacts under climate change.

**In order to improve understanding of the adaptation context and the specific needs of low-lying African American communities in eastern North Carolina, Carolinas Integrated Sciences and Assessments funded the “Resilience Inclusion on the Coast” project. The grant extended the research of the NC State University SALT Team that was funded by the [College of Natural Resources](#) to answer coastal management questions. In 2017, the team engaged three low-lying predominately black communities to start a dialogue about adaptation and strategies that can be considered. The meetings began with a presentation on coastal hazards by North Carolina Sea Grant, before a facilitated discussion on the vulnerabilities of the communities and potential strategies for adaptation. However, in contrast to meetings that were conducted with predominately white stakeholders the year before, the meetings uncovered unique barriers that are limiting the ability to adapt.**

**[Access the full journal article here](#)**

*Focus group participants in Columbia, NC discuss climate injustice as an undercurrent of coastal hazard adaptation.*



The engaged communities recounted increased flooding impacts after the construction of several public. The challenges documented by this research highlight specific barriers that must be overcome to prepare for flooding and sea level rise impacts. Further, the engagement highlighted that the methods for engagement that were used to brainstorm adaptation ideas in the predominately white communities in the region led to discussions about inequality and justice in the predominately black communities. The engagement highlighted the need for tailored outreach specific to the communities that have not received prior information on sea level rise. Since this project, North Carolina has taken an important step by creating the Office of Recovery and Resiliency to improve the management of coastal hazards. Moving forward, all communities must be included in these resilience efforts in order to address the unique adaptation barriers documented by this project.

The challenges documented by this research highlight specific barriers that must be overcome to prepare for flooding and sea level rise impacts. Further, the engagement highlighted that the methods for engagement that were used to brainstorm adaptation ideas in the predominately white communities in the region led to discussions about inequality and justice in the predominately black communities. The engagement highlighted the need for tailored outreach specific to the communities that have not received prior information on sea level rise. Since this project, North Carolina has taken an important step by creating the Office of Recovery and Resiliency to improve the management of coastal hazards. Moving forward, all communities must be included in these resilience efforts in order to address the unique adaptation barriers documented by this project.

# MAKING THE CONNECTION: CLIMATE AND PUBLIC HEALTH

*By: Elijah Charette and Jory Fleming*

The CISA team at UNC Chapel Hill developed the Hazardous Extremes Risk Assessment (HERA) tool in 2017 as part of their ongoing investigation into the nexus of health and climate interactions. HERA provides information about the types of weather and climate events that might impact public health planning and preparedness in the Carolinas. HERA is designed to assist state healthcare coalitions in developing their annual Hazard Vulnerability Assessments (HVAs) by creating an interface to explore the likelihood of severe weather events in a given area. HVAs are detailed emergency plans that are created by healthcare facilities and submitted to the federal government. The HERA tool provides information at a county level to help communities understand how their region differs from other parts of their state. HERA uses a variety of datasets to inform public health planners about the probability of weather events and the resulting damages for a given area.

A HERA engagement was held on March 5 in Columbia, SC. In this meeting, the CISA team met with representatives from the U.S. Army National Disaster Medical System, South University, and the South Carolina Department of Health and Environmental Control. The engagement explored changes and additions to the HERA tool to best facilitate the HVA development process. After exploring how HVAs are used in South Carolina, CISA's climate-health integration and outreach associate Dr. Ferdouz Cochran presented the HERA tool.

Participants shared ideas for tool improvement and ways HERA could address their needs. A frequent topic of discussion was the need for supplemental information to improve decision making. For example, incorporating demographic details and other key information to help decision makers connect weather events with potential impacts for which public health planners need to prepare. Providing a balance of the right amount of information and considering the best geographic scale were also discussed, with participants responding positively to HERA's use of county level information for planning.

The engagement also presented possible new opportunities to apply CISA's expertise in climate data into existing tools like Palmetto, an emergency management dashboard used by SC state agencies. Incorporating climate information in conjunction with contextual information provides additional avenues to integrate CISA's health research into systems that are already used by public health professionals in South Carolina. The CISA team will implement these suggestions and grow the HERA tool as we continue to explore of the linkages between climate and health in the Carolinas.

## HERA COUNTY-AT-A-GLANCE (IN DEVELOPMENT)

Look for the dropdown menus below to select a weather hazard, the hazard subcategories and the year(s) of the events to be displayed in the map and charts.

Hazards

Precipitation

State

(All)

Year

1989

Subcategories

Top 5%



### County Map of Precipitation Events

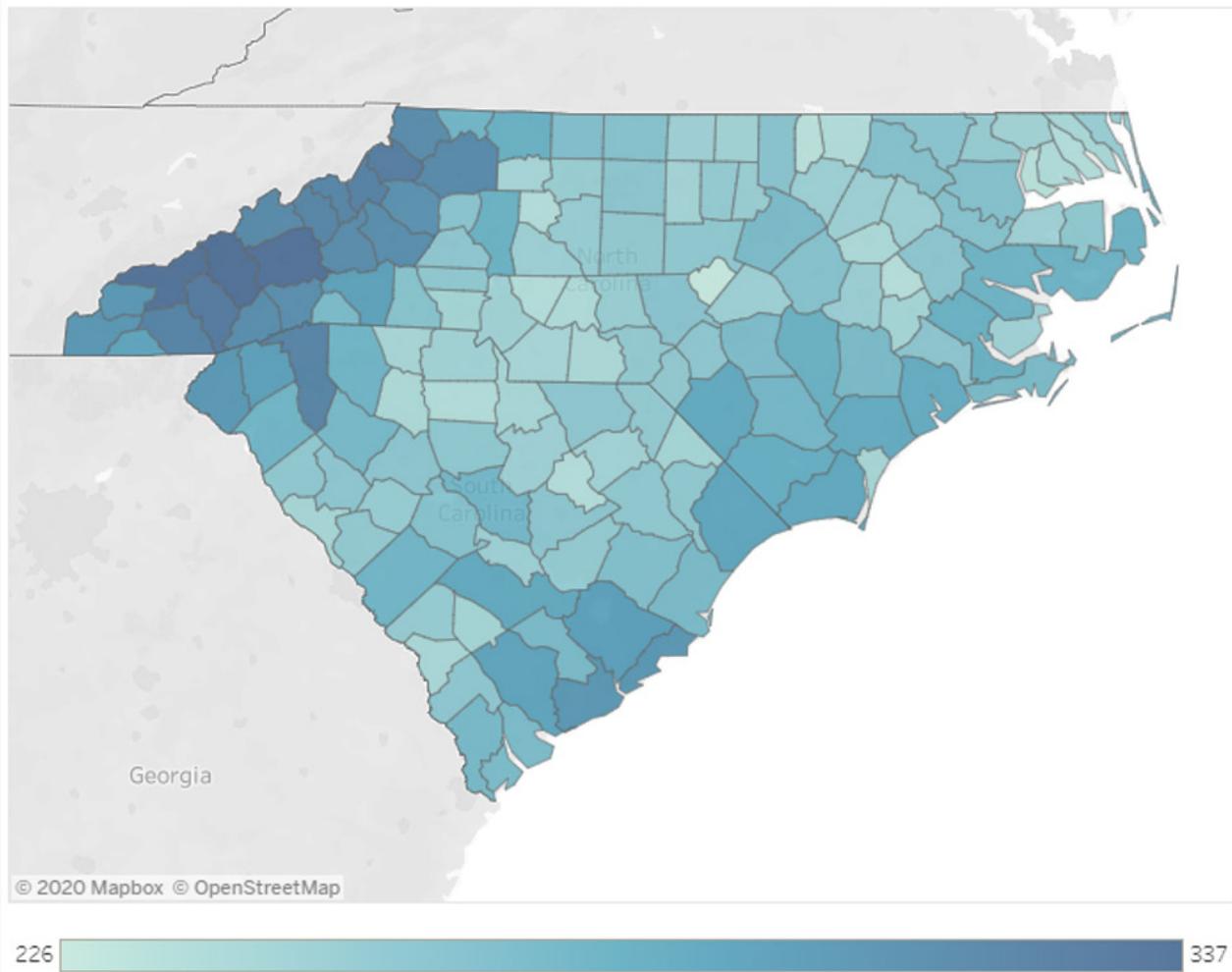


Figure 3: The HERA tool is currently being re-designed by CISA team members at UNC Chapel Hill. Here, heavy precipitation events are mapped for the Carolinas.