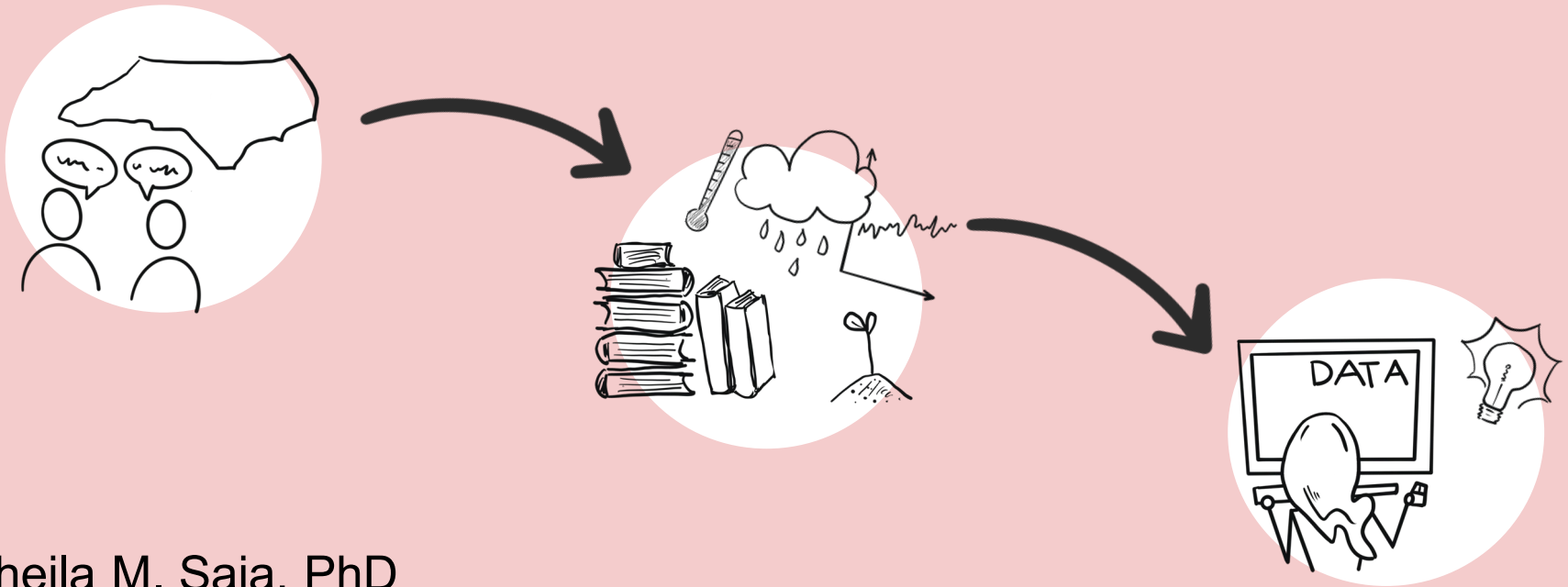


State Climate Office of North Carolina Initiatives for Data-Driven Extreme Event Monitoring and Response



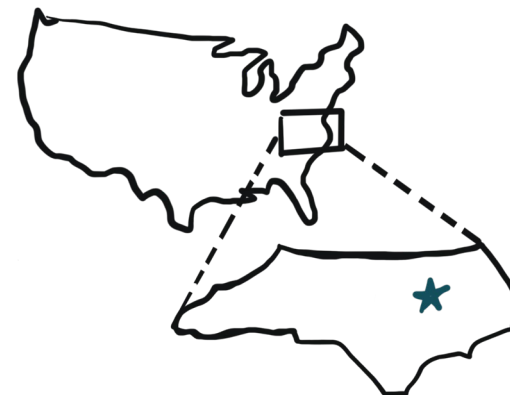
Sheila M. Saia, PhD

Kathie D. Dello, PhD

CPASW 2023



State Climate Office of NC



NC STATE
UNIVERSITY



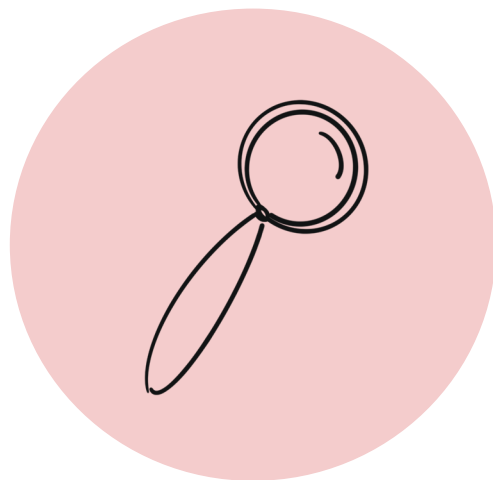
Visit our website at: <https://climate.ncsu.edu>

Tweet at us: @NCSCO

Mission



Education &
Extension

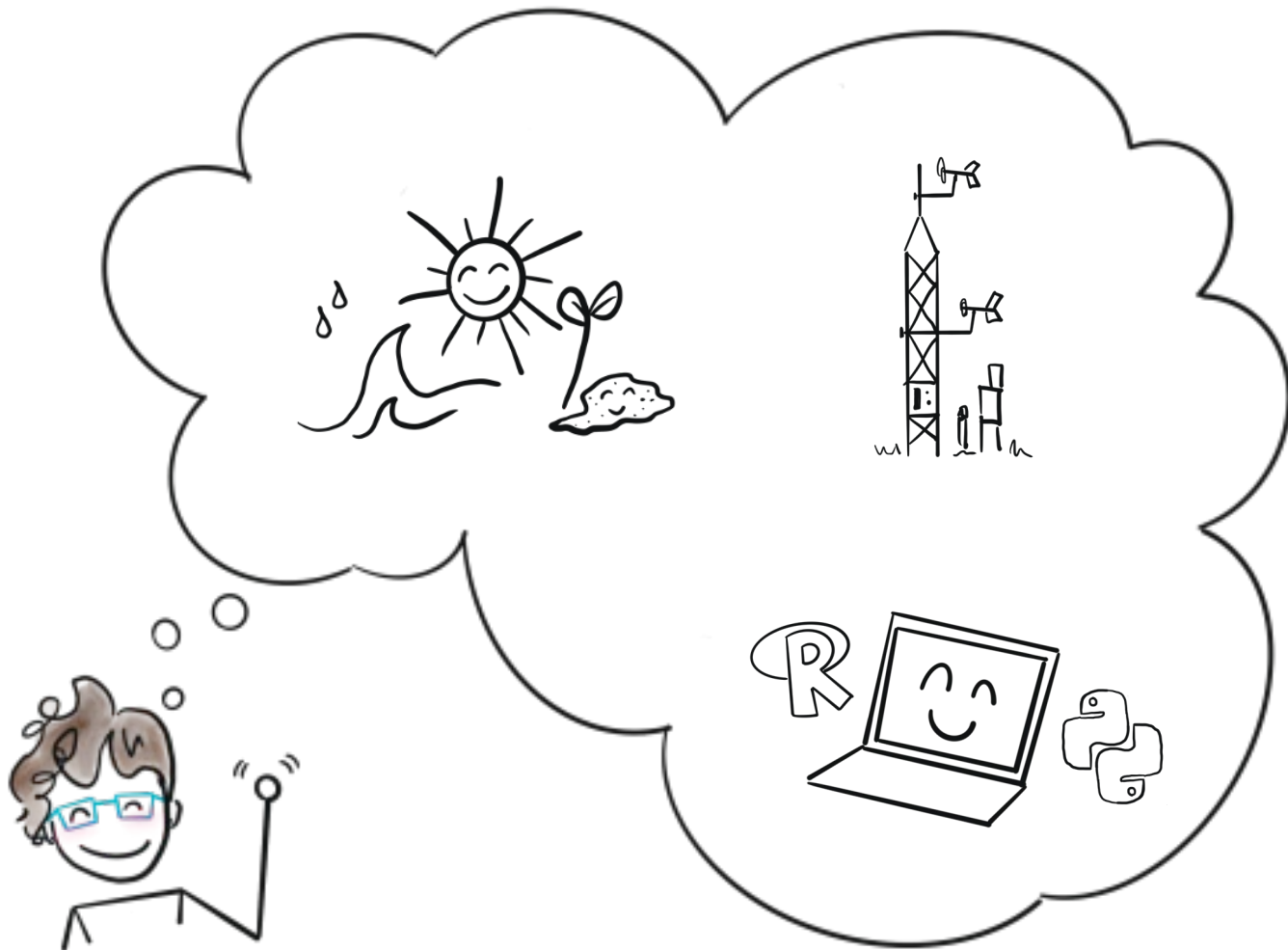


Monitoring



Research &
Applications

About Me



Education & Extension



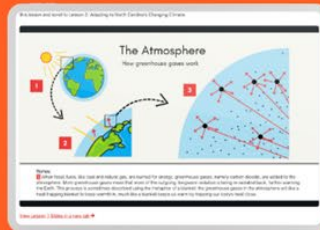
Education & Extension Initiatives Overview



2020 Webinar Series on NC Climate Change



Online, Self-Paced Climate Change Lessons



Partnership with NC Extension and Extension Master Gardeners. Covers global to local (NC) climate change, and the science to solutions.

NC Climate Education Network



Partnership with NC Department of Environmental Quality to build capacity to teach climate change

Classroom Activities & Lesson Plans



Partnership with The Science House at NC State to build standards-aligned lessons and activities

Weather Kits for K-12 Classrooms



Collaborated with 4-H to create and distribute weather kits for 5th Grade classrooms

Year-In-Review Webinars each January



<https://climate.ncsu.edu/learn>

Climate Blog

July 19, 2022 | Climate Blog, Newswire, Our Curious Coast

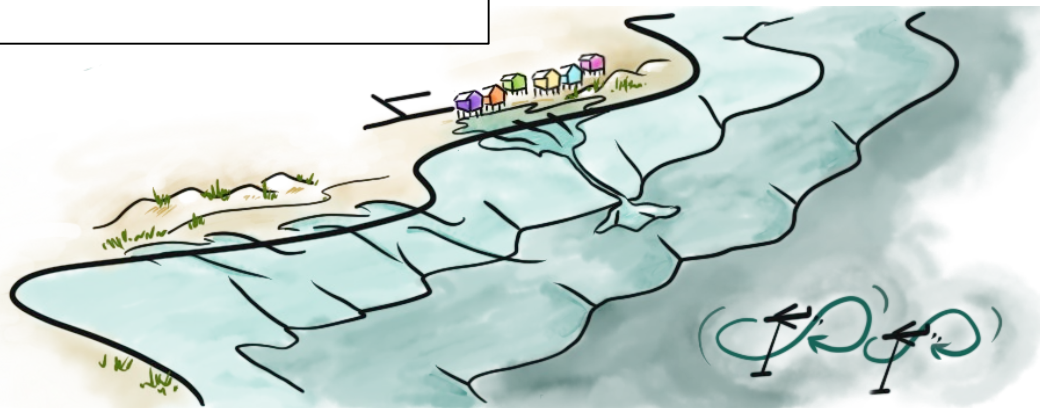
Our Curious Coast: The Ocean and Coastline

By Corey Davis and Sheila Saia

Simply taking a walk along one of North Carolina's beaches is enough to show how shifting its sand truly is.

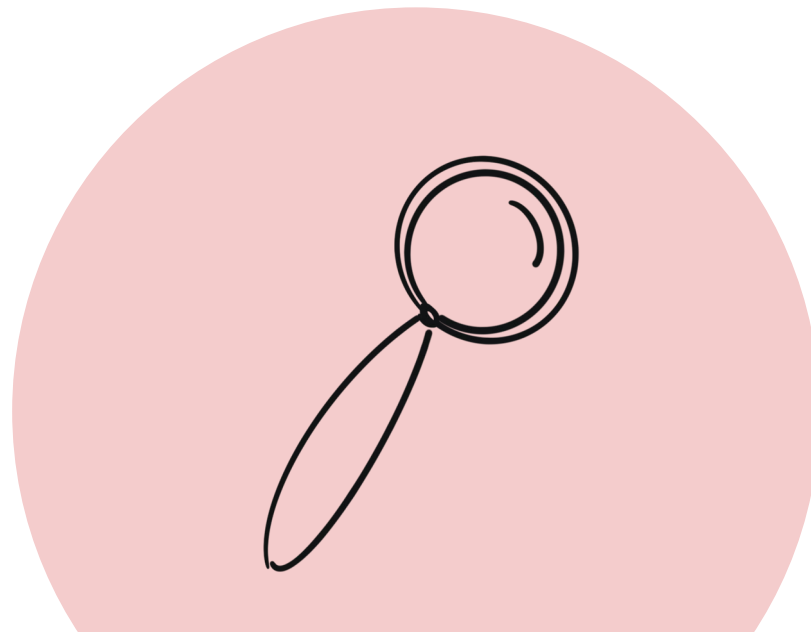
As the fine grains shuffle between your toes, get pushed around in the surf, and are whisked away by the winds, it's easy to see that they rarely stay in one place.

Continuing our blog series about the Coastal Plain, today's post focuses on where the land meets the water, how this boundary has moved in the past, and what the perpetual motion of the ocean could mean for coastal communities in the future.

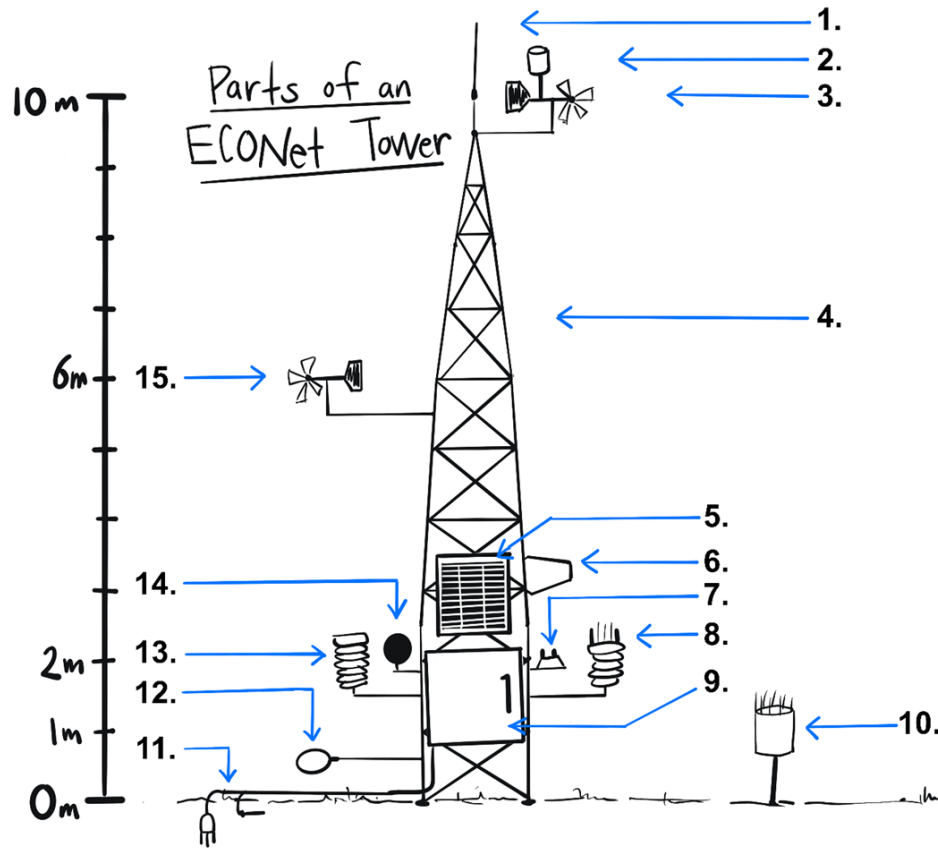


Subscribe at <https://climate.ncsu.edu/climateblog/>

Monitoring



North Carolina Environment & Climate Observing Network (ECONet)



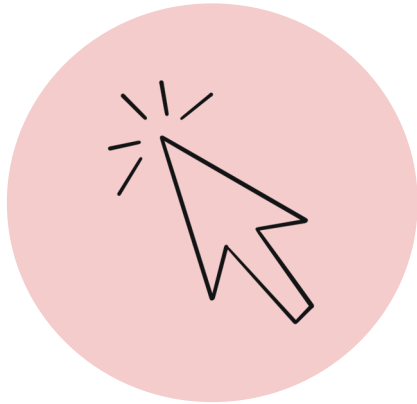
KEY

1. lightning rod
2. air temperature
3. wind speed & wind direction
4. ECONet tower
5. solar panel
6. communications antenna
7. total solar radiation & photosynthetically active radiation
8. all-weather sensor*
9. data logger & battery cabinet
10. rain gauge (tipping)
11. soil moisture & soil temperature
12. leaf wetness
13. air temperature & relative humidity
14. black globe thermometer
15. wind speed & wind direction

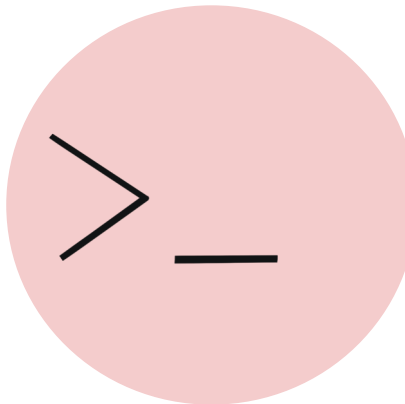
*The all-weather sensor measures air temperature, relative humidity, barometric pressure, precipitation, wind speed, & wind direction.



Data Access



Station Scout
& Cardinal



CLOUDS
API



Ask
us!

For data help email: help@climate.ncsu.edu

Station Scout (continued)



Cardinal: Station Scout UNCA - UNC Asheville Weather Tower

Current WX Location Parameters Recent Data Almanac NEW Thresholds

The Thresholds panel can display historical statistics for weather conditions reaching a given threshold, such as the average timing of first and last seasonal days below freezing or the number of days per year with temperatures at or above 90°F.

To begin, select a parameter, a threshold, and other options below, then click "View Statistics".

Select a Parameter

- Air Temperature
 - Maximum Temperature
 - Minimum Temperature Less or Equal To
 - Maximum Dew Point
 - Minimum Dew Point
- Humidity
- Precipitation
- Wind Speed & Direction
- Soil Temperature
- Soil Moisture
- Apparent Temperature

Select Time Options

Historical Period

- Entire period of record
- A specific date range

Year Type

- Aggregate by calendar year (January 1 to December 31)
- Aggregate by snow year (August 1 to July 31)
- Aggregate by water year (October 1 to September 30)

Filter Dates

- None
- By month
 - Months to include:
 - January April July October
 - February May August November
 - March June September December
- By season

[View Statistics](#)

Statistics

For station UNCA (UNC Asheville Weather Tower)

- Occurrence of **daily minimum temperature ≤ 32°F**
- Aggregated by **snow year** (Aug. to Jul.)
- Over the **station's period of record** (2019 to 2023)
- Only for the month of Apr

Average Days Per Year:	3.8
Total Days Meeting Criteria:	15
Years with Sufficient Data:	4

These statistics are calculated only from years with at least 90% of observations available

Data Display

Visualization: Annual Chart Annual Table Longest Streaks

The chart below shows the number of days per year meeting the selected criteria. Years highlighted in red have at least 10% of data missing or unavailable, so those results should be treated with caution.

Number of Days with Min. Temperature ≤ 32°F

For station UNCA only in Apr

Year	Days Per Year
2019-20	2
2020-21	7
2021-22	5
2022-23	1

Years in red have less than 90% of data available.

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- View current and historical conditions by station
- **Newer features:** Almanac & Thresholds tabs

Data-Driven Tools



Drought Updates





North Carolina Drought Update

For the assessment period ending May 2, 2023

This Week's Drought Monitor of North Carolina Map


From the US Drought Monitor, authored by Brad Pugh (NOAA/NWS/NCEP/CPC) with input from the North Carolina Drought Management Advisory Council (ncdrought.org)

 All major reservoirs are above their targets, and some such as Falls and Jordan lakes had more than 200% of their median April inflows.

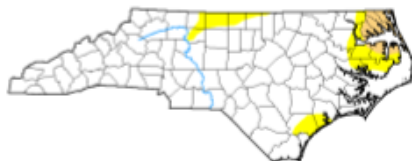
 In Elizabeth City, groundwater levels rose 1.5 feet in the past week, and are now in the normal range for this time of year.

Some of the heaviest rains last week fell across the southwest Piedmont, including 3.74" on Sunday in Shelby.



 With lower rainfall totals over its small watershed, the New River near Gum Branch still shows below-normal streamflows over the past 7 days.

Last Week's Drought Map



This infographic was created by



Statewide Condition Summary

What's Changed? All drought and dryness in NC was finally wiped out by last weekend's heavy rainfall, which put most areas in a springtime precipitation surplus.

How Long Has It Been? This is the first time the state drought map has been clear of any drought and dryness in more than two full years – since April 13, 2021.

What's New? Rainfall from last Friday through Sunday totalled more than 2 inches across most of the state, and parts of the Outer Banks had 3 to 5 inches. Most reports suggest this rain effectively acted as a reset, neutralizing any deficits dating back to the winter and leaving wet conditions, including some standing water, in its wake.

Statewide Coverage By Category

Category	Coverage This Week	Change Since Last Week
D0: Abnormally Dry	0.00%	-8.16%
D1: Moderate Drought	0.00%	-2.96%
D2: Severe Drought	0.00%	0.00%
D3: Extreme Drought	0.00%	0.00%
D4: Exceptional Drought	0.00%	0.00%

Air Quality & Fire Weather Portals



Data & Tools

- Ambient Information Reporter**: Past, current, and forecasted air quality and weather conditions.
- Ozone Design Value Predictor**: Ozone concentration data relative to design value attainment standards.
- Wind Rose Climatology Tool**: Summarized historical wind data for weather stations in North Carolina.
- Air Quality Model Guidance**: The latest high-resolution ozone and PM2.5 forecasts from NC DAQ.

<https://airquality.climate.ncsu.edu>

Fire Weather Intelligence Portal

A product of the State Climate Office of North Carolina

Map Details

- Use my current location and zoom level
- Zoom to a state
- Map Background: Terrain map (selected) or Street map
- County lines (checked)
- Latitude/longitude lines
- NC Forest Service regions
- River basins
- Fire Danger Rating Areas
- Forestry service districts

Point Data

- Show one parameter (selected) or Show four parameters
- Forecasted KBDI
- For this date: Tue, May 9
- Aggregate by Fire Danger Rating Area (where available)
- Update Point Data

Weather Station Networks:

- RAWWS (checked)
- NC ECONet (checked)
- ASOS (checked)
- AWOS (checked)

Gridded Data

- Dataset: * Select a parameter *
- Update Gridded Data

Forecasted KBDI

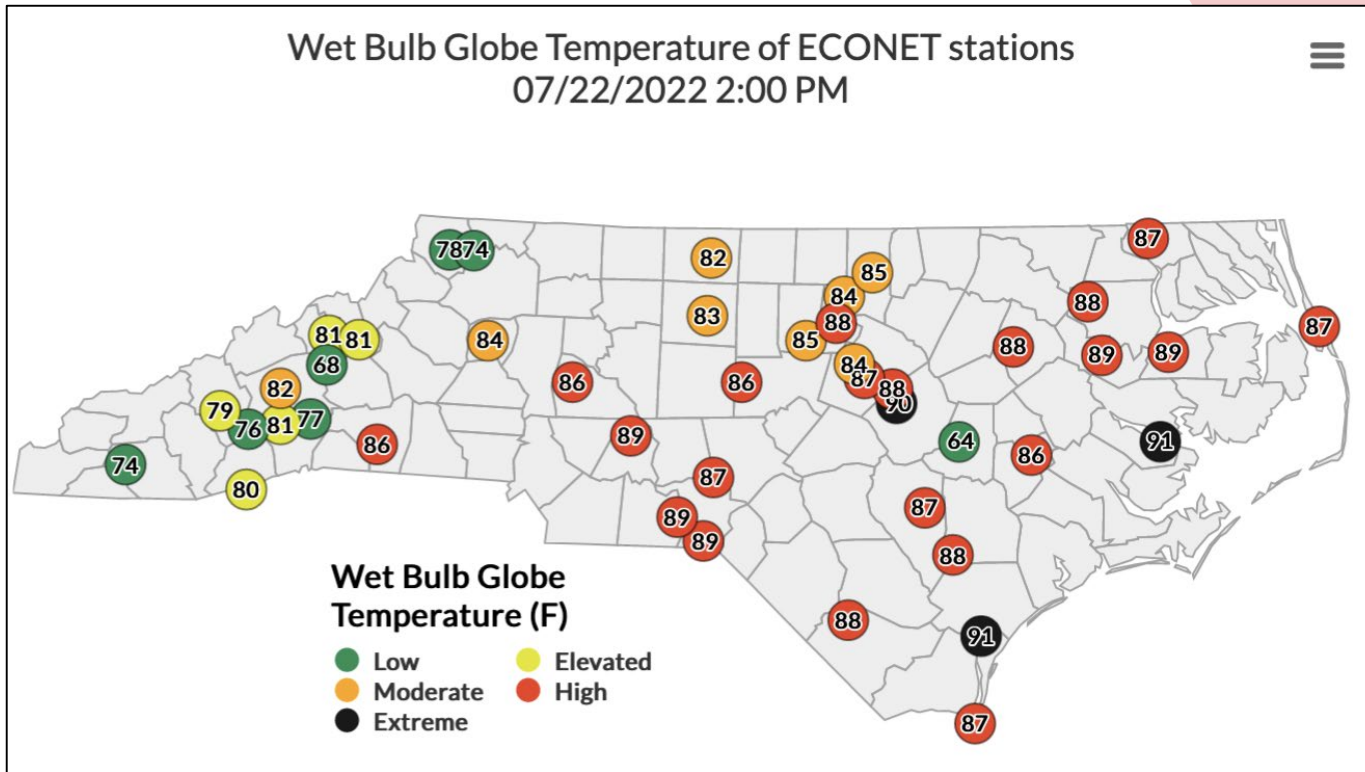
For Tuesday, May 9 at 1 pm

<https://climate.ncsu.edu/fwip/>

Human Heat Stress



Wet Bulb Globe Temperature (WBGT)



Black Globe Thermometer

Urban Heat Mapping

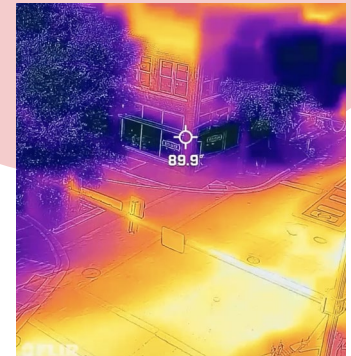
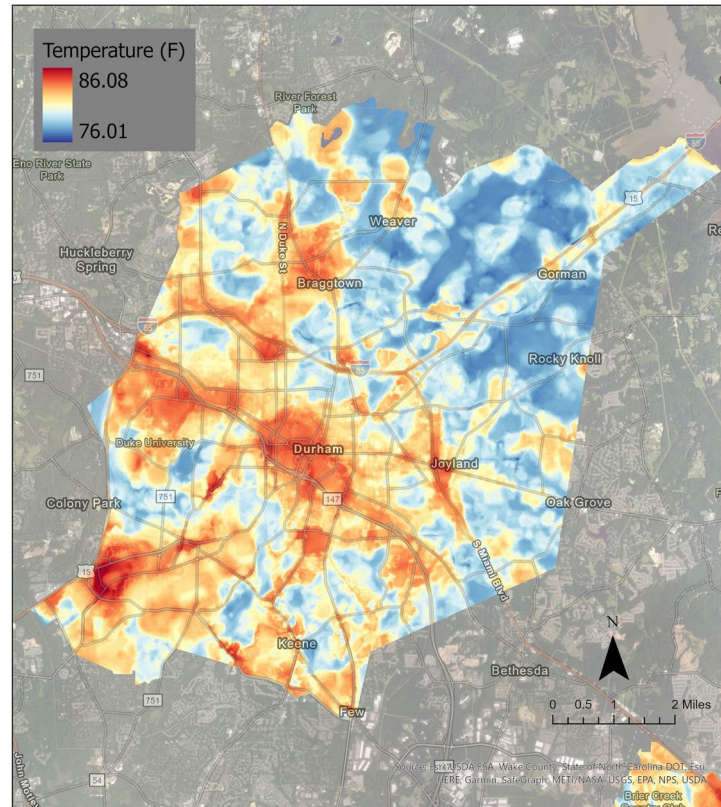


Vehicle Sensor Set-up



Bicycle Sensor Set-up

Durham Evening Temperature (7-8pm)
July 23, 2021



Infrared Camera Image
(deg F)



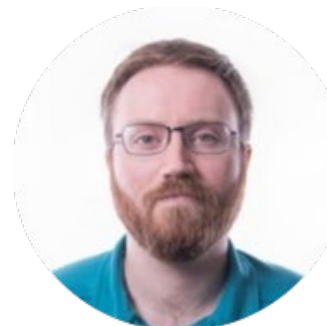
Urban Heat Island Mapping
climate.ncsu.edu/research/uhi

Let's collaborate!



Visit our website at <https://climate.ncsu.edu/>

Thank you!



Contact:

Sheila Saia

ssaia@ncsu.edu



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