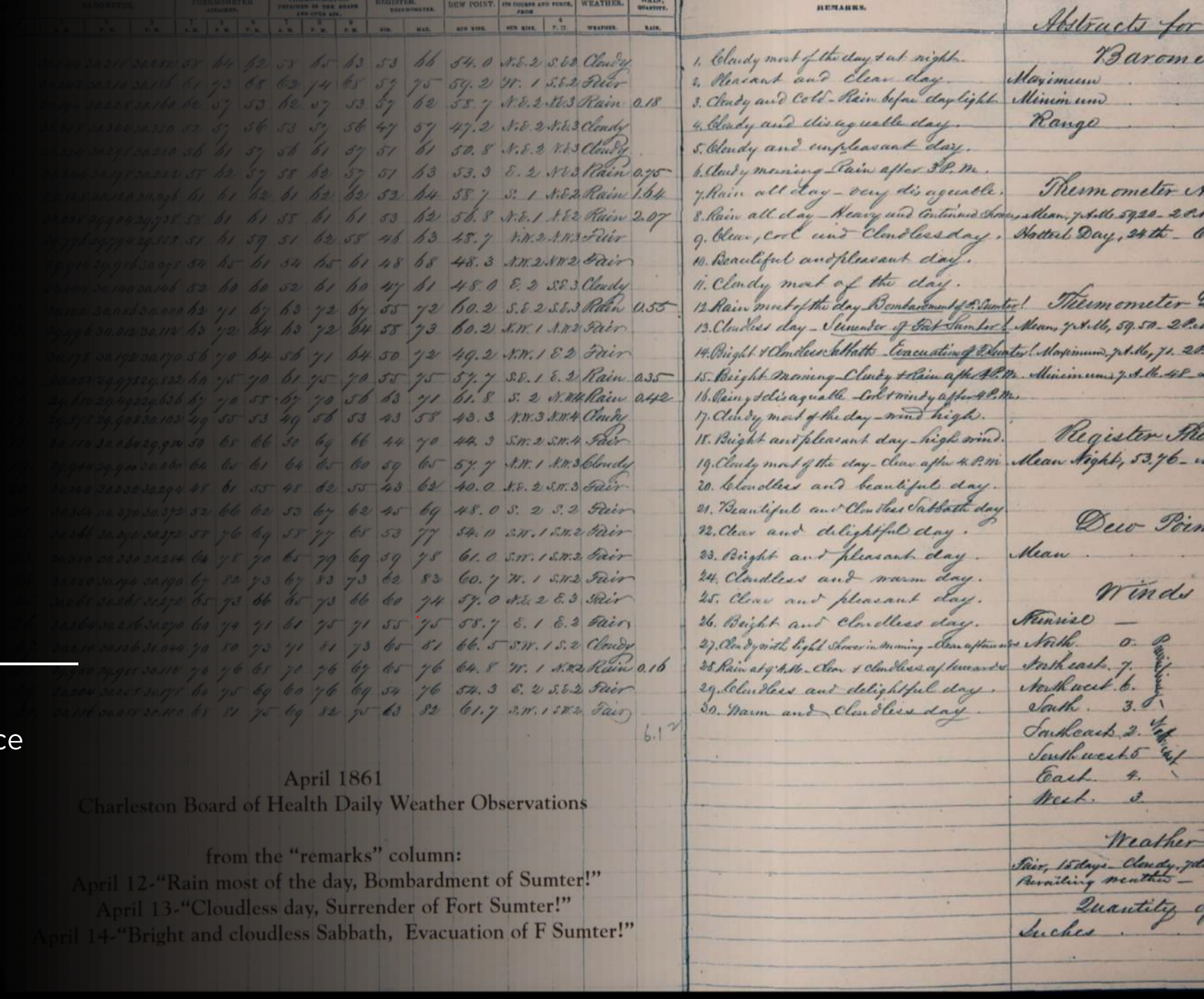
Climatology of South Carolina

Upper Savannah River Basin Council

Hope Mizzell & Elliot D. Wickham
South Carolina State Climatology Office
SC Department of Natural Resources
October 11th, 2023



SC State Climatology Office Team

Hope Mizzell
South Carolina
State Climatologist

Melissa Griffin
Assistant State
Climatologist

Elliot Wickham
Water Resource
Climatologist

Frank Strait
Severe Weather
Liaison

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What Is A State Climatology Office?

Promote climate and weather awareness and knowledge through the development and delivery of science-based climate services and tools on a local and state level.

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Climate Office Responsibilities

1

Coordinate and collect weather observations for the purpose of climate monitoring

2

Summarize and disseminate weather and climate information

3

Perform climate and weather impact assessments

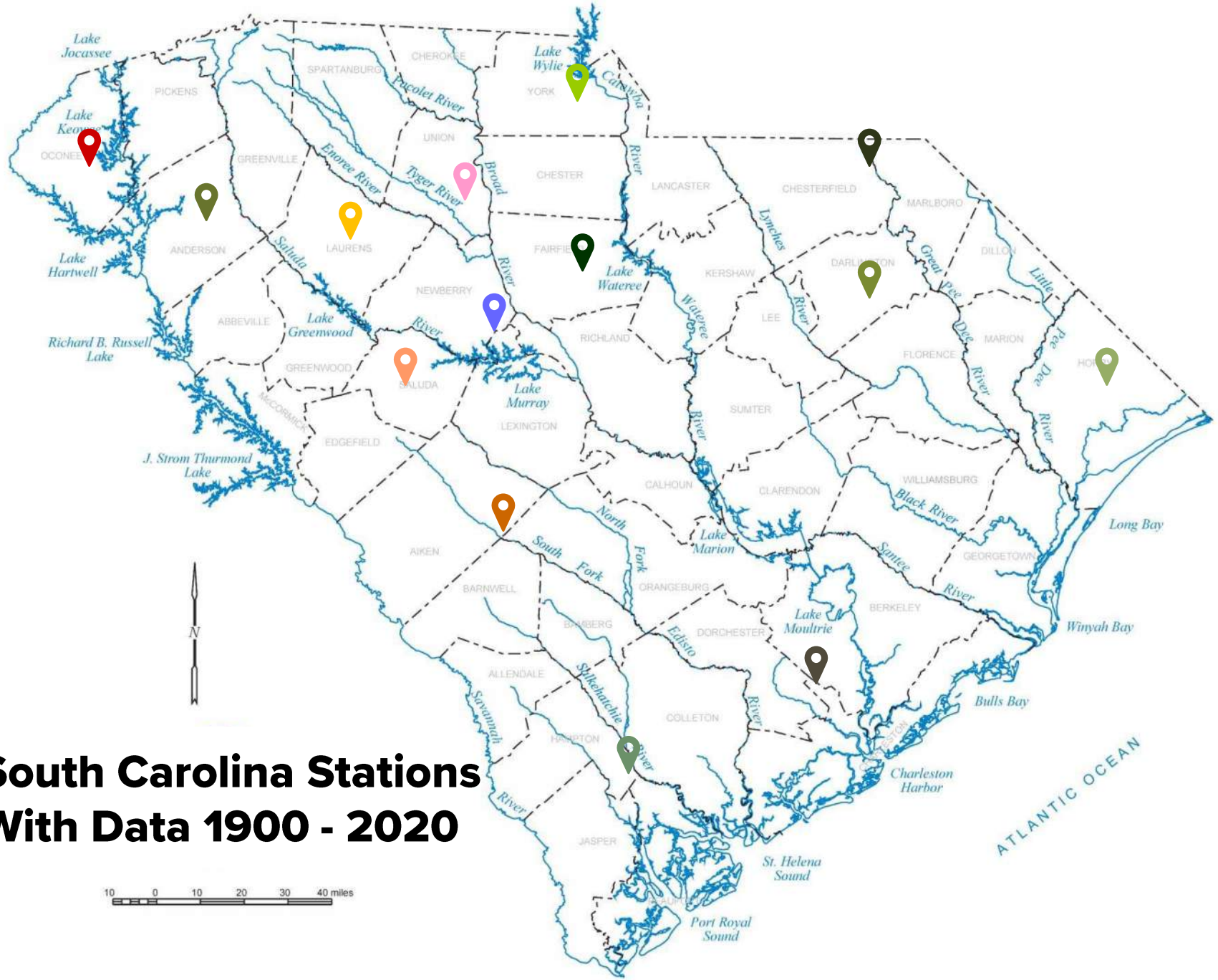
4

Demonstrate the value of climate information in the decision-making process

5

Conduct applied climate research

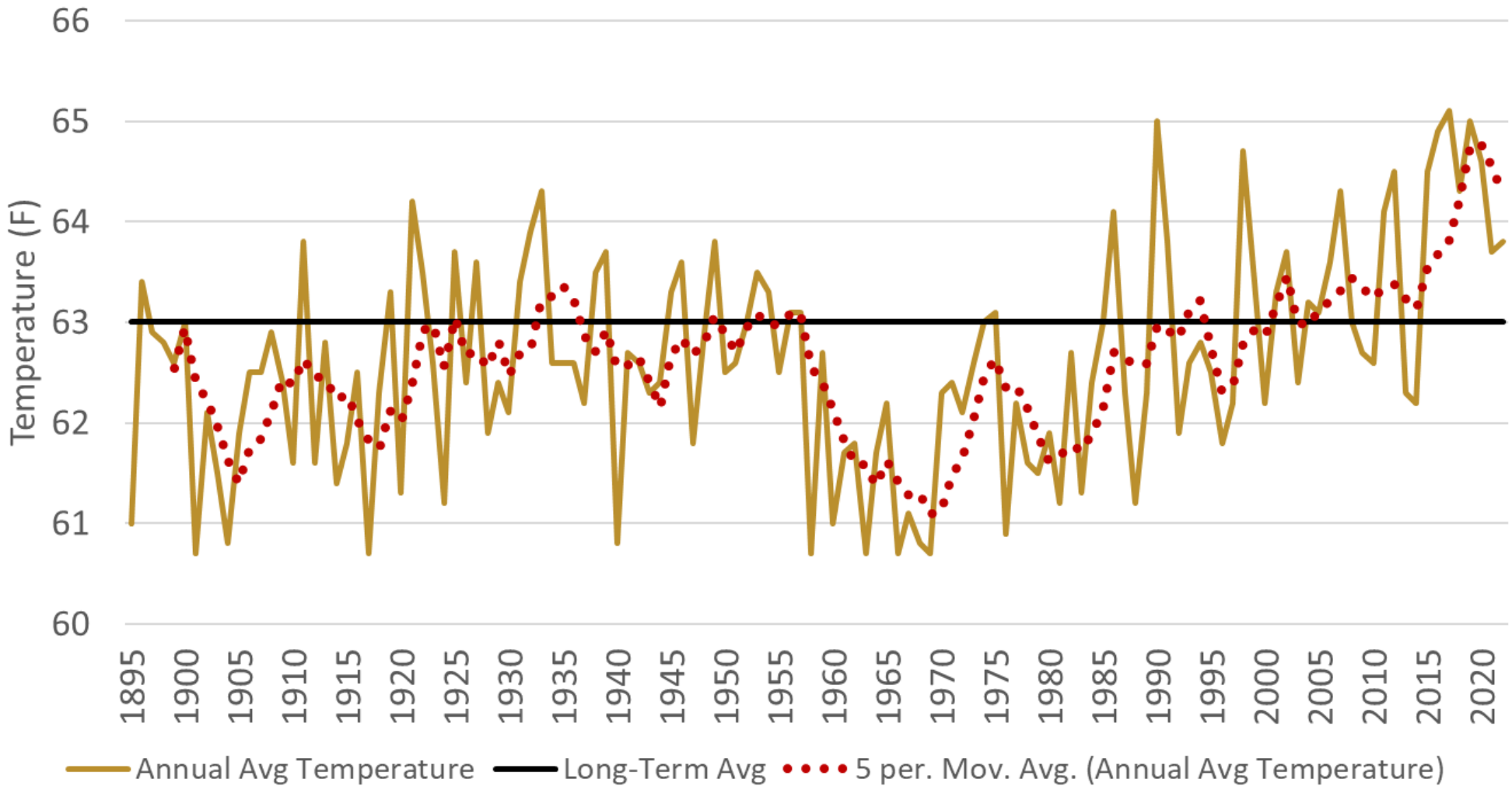
Temperatures



South Carolina Stations With Data 1900 - 2020

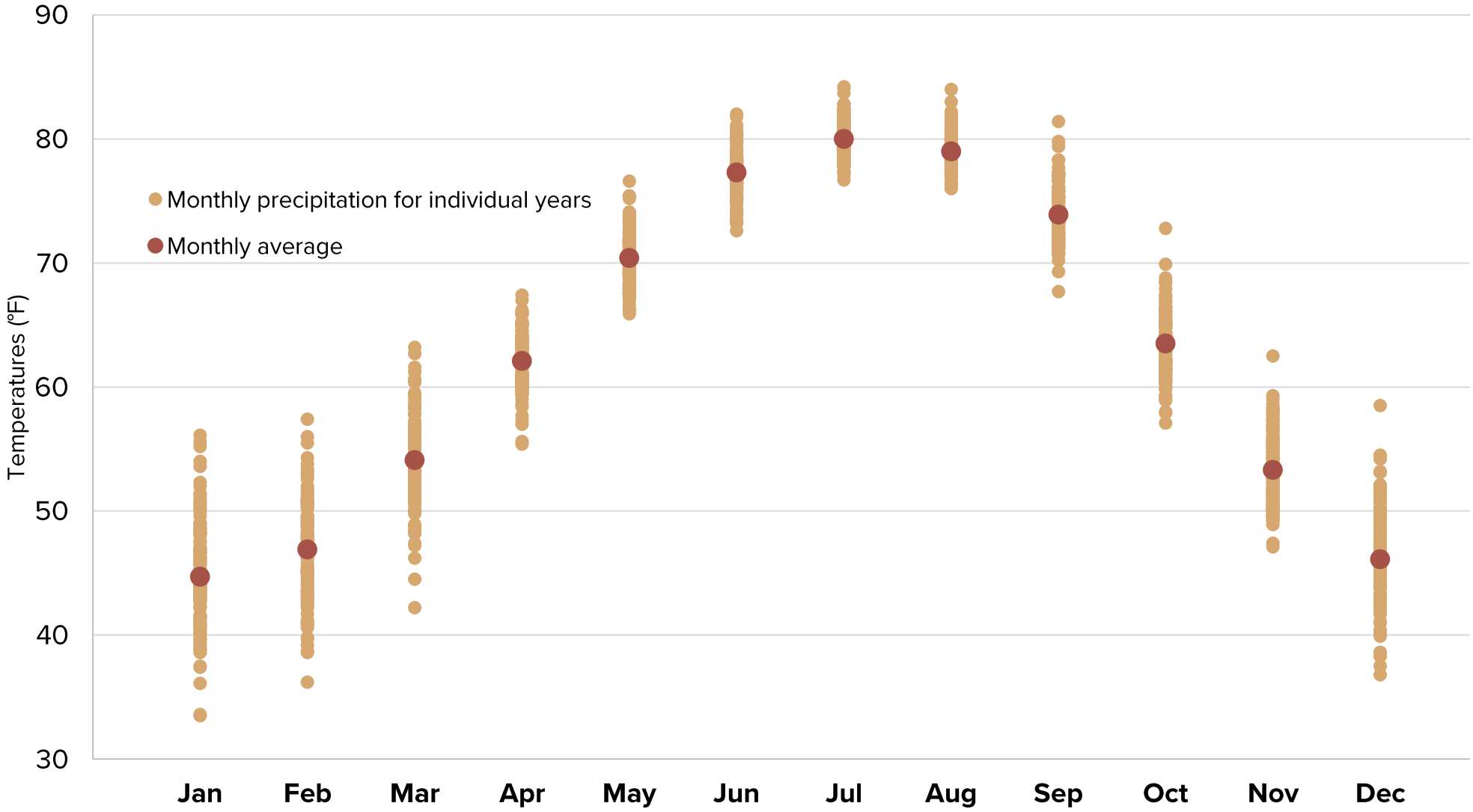
- Anderson
- Blackville
- Cheraw
- Conway
- Darlington
- Laurens
- Little Mountain
- Saluda
- Santuck
- Summerville
- Walhalla
- Winnsboro
- Winthrop University
- Yemassee

South Carolina Annual Average Temperature (1895-2022)

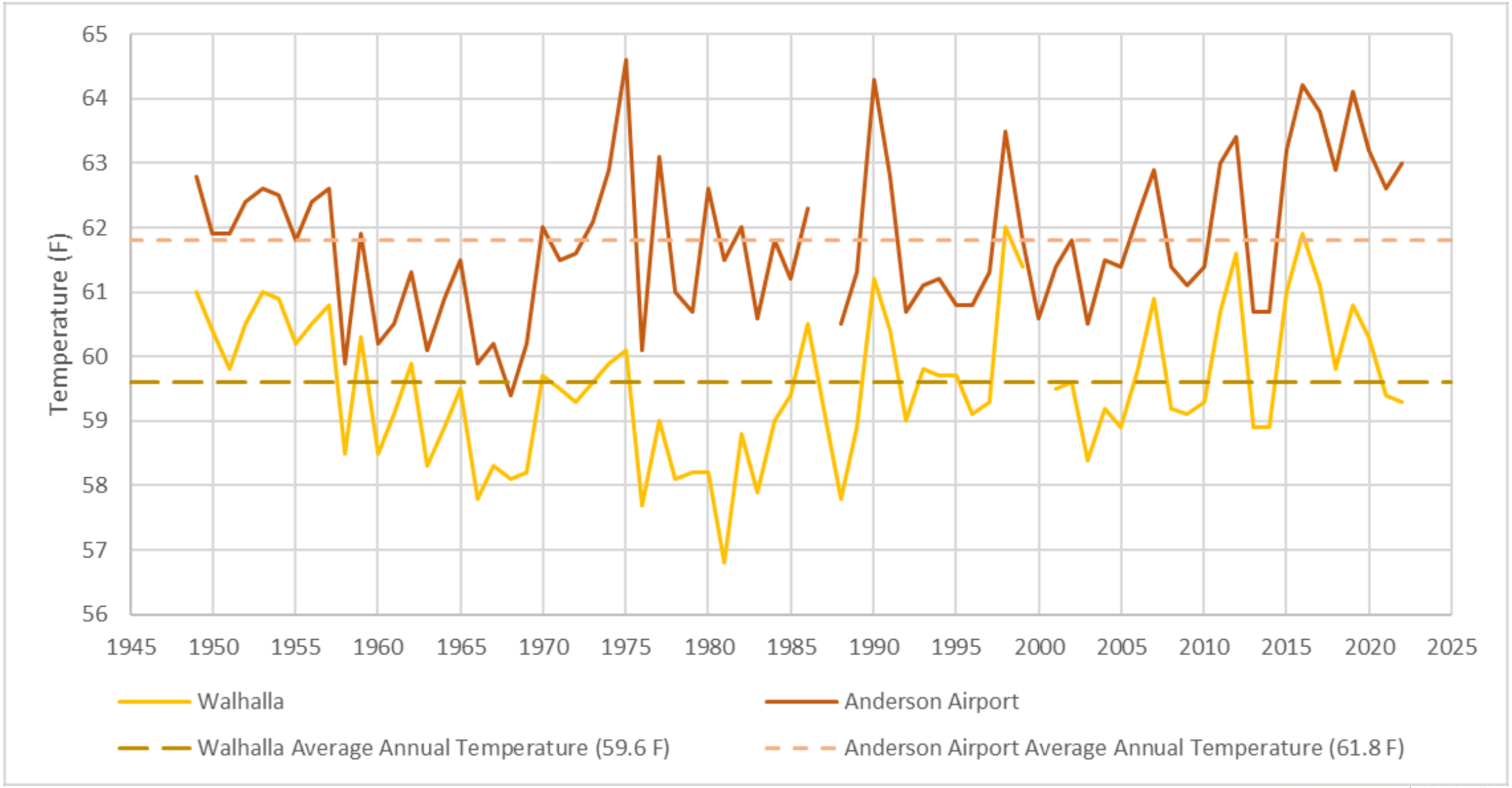


SC has warmed one degree Fahrenheit over the past 120 years.
This is less than Earth as a whole, which has warmed nearly two degrees.

South Carolina Monthly Average Temperature (1895 – 2022)



Walhalla and Anderson Regional Airport
Annual Average Temperature (1949 – 2022)



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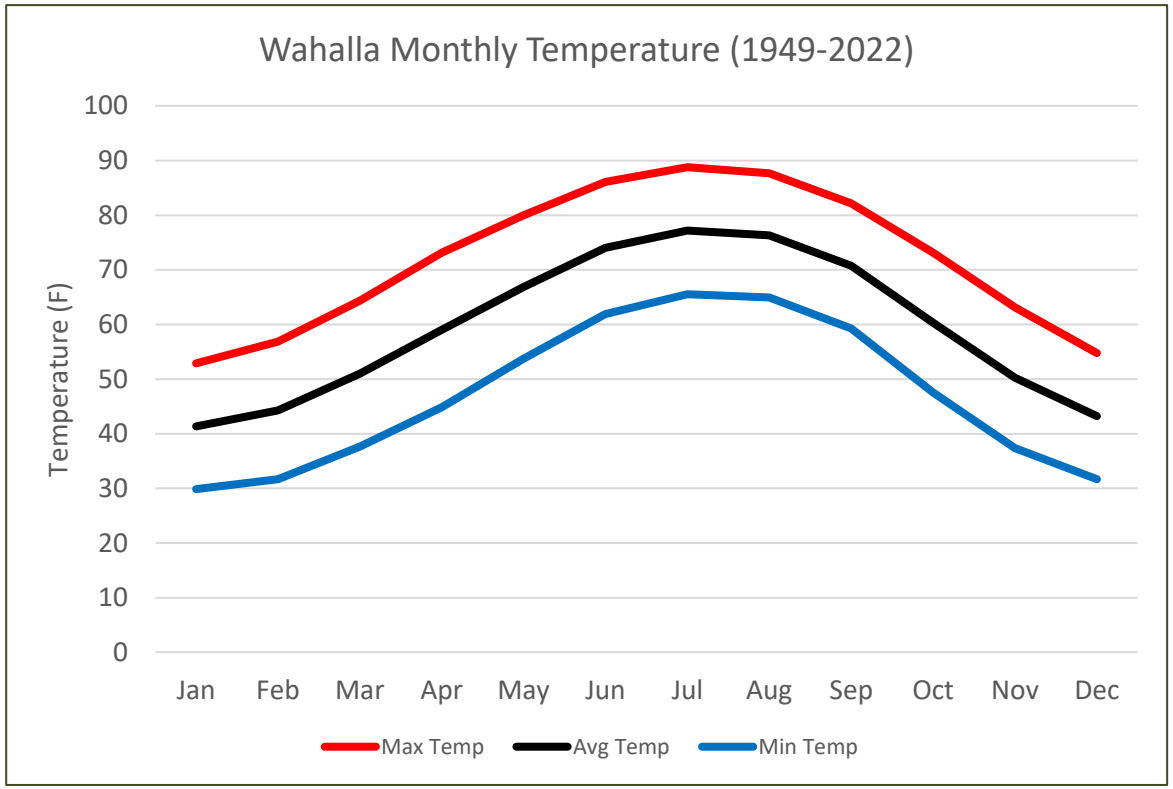
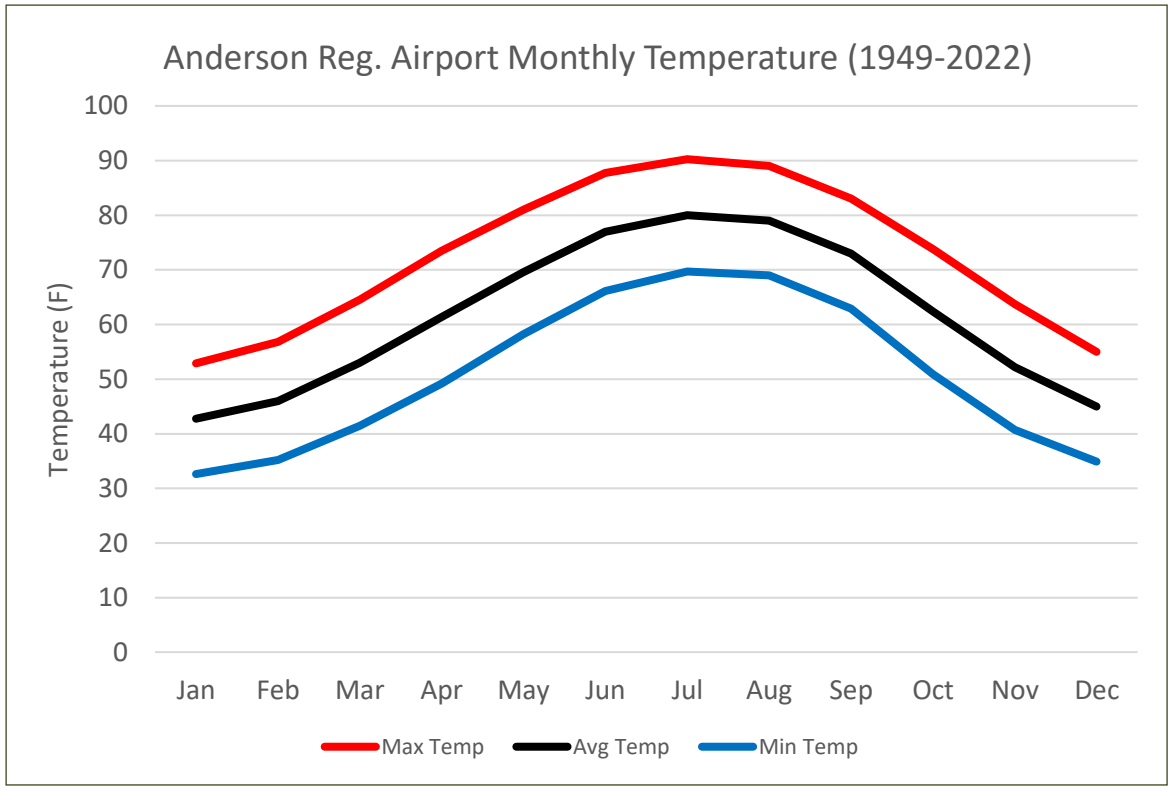
Monthly Temperature Comparison
Walhalla & Anderson Regional Airport





Minimum temperatures are the biggest differences between these two stations

- Minimum temperatures at Anderson Airport are 3 to 4.5 degrees higher than Walhalla

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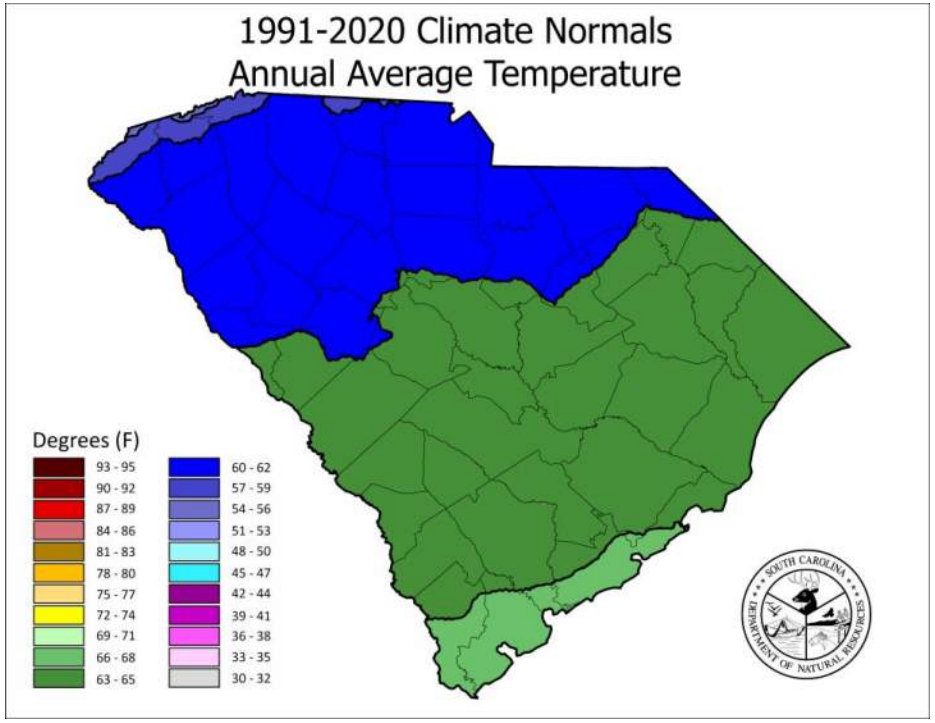
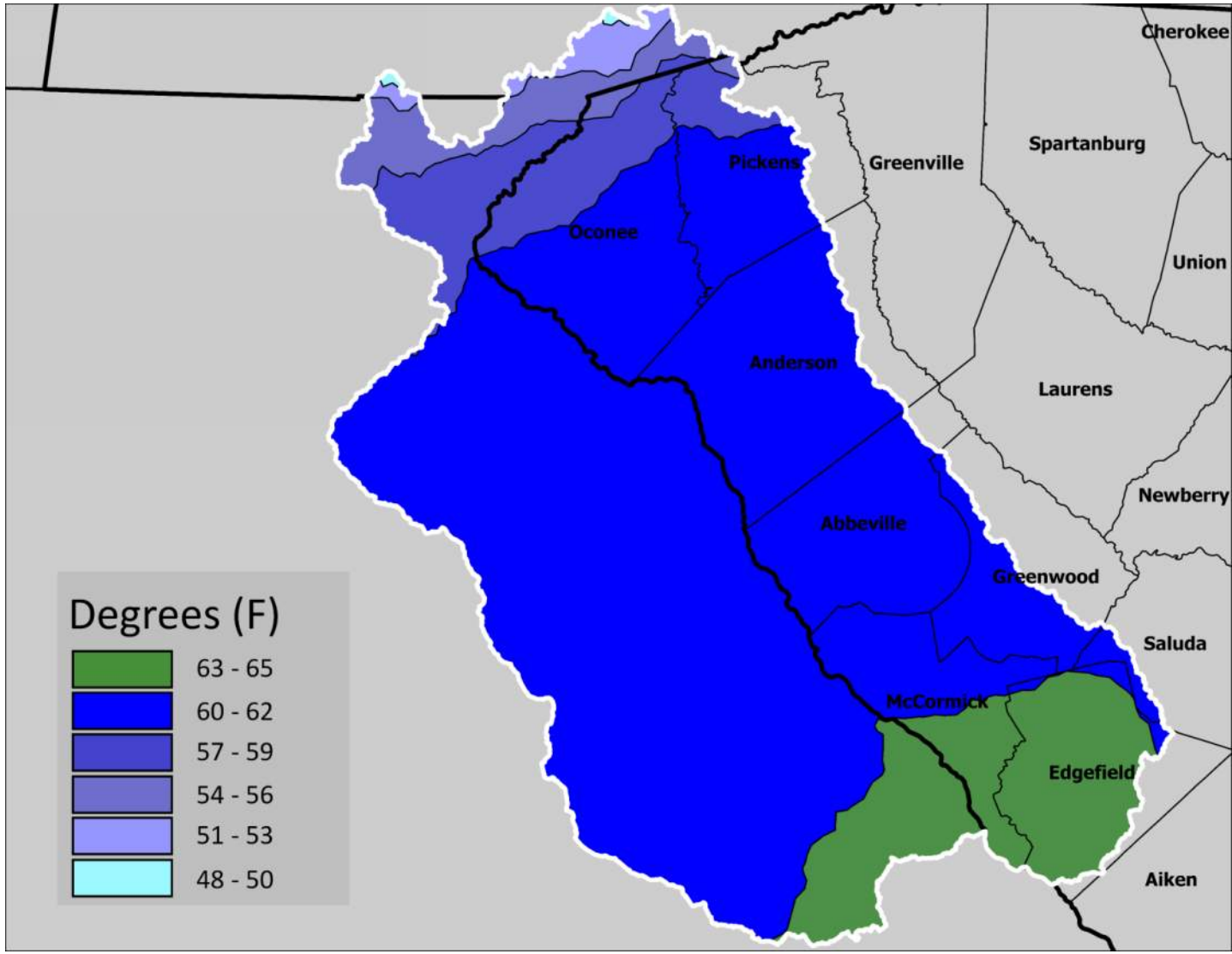
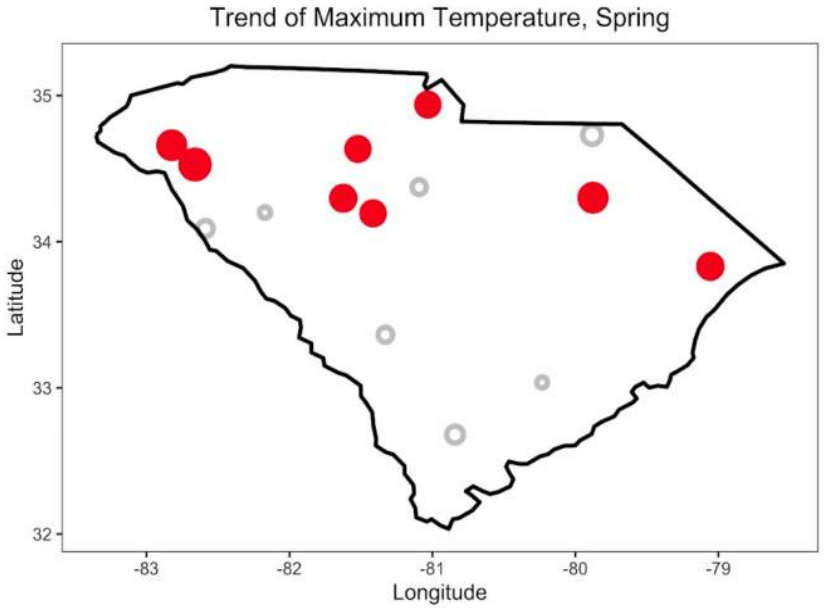
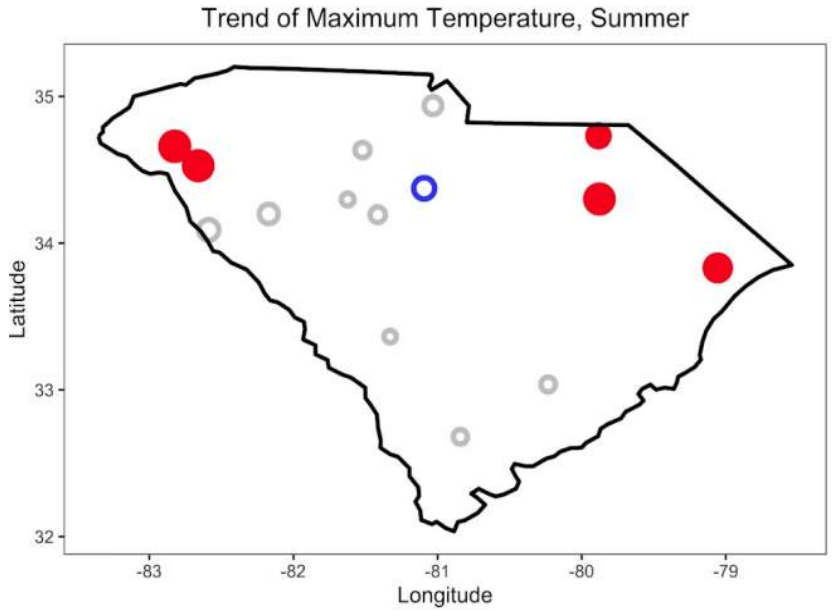
Upper Savannah Basin
Annual Average Temperature

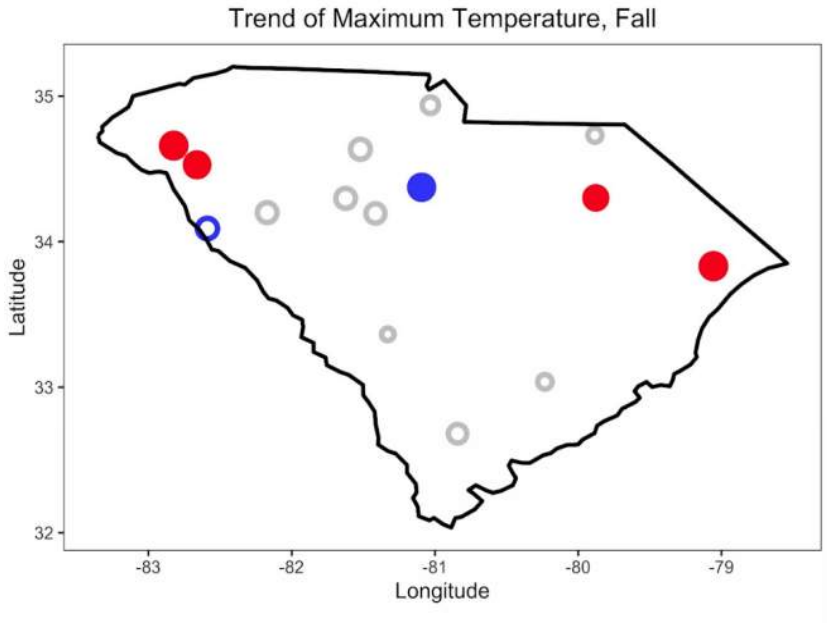


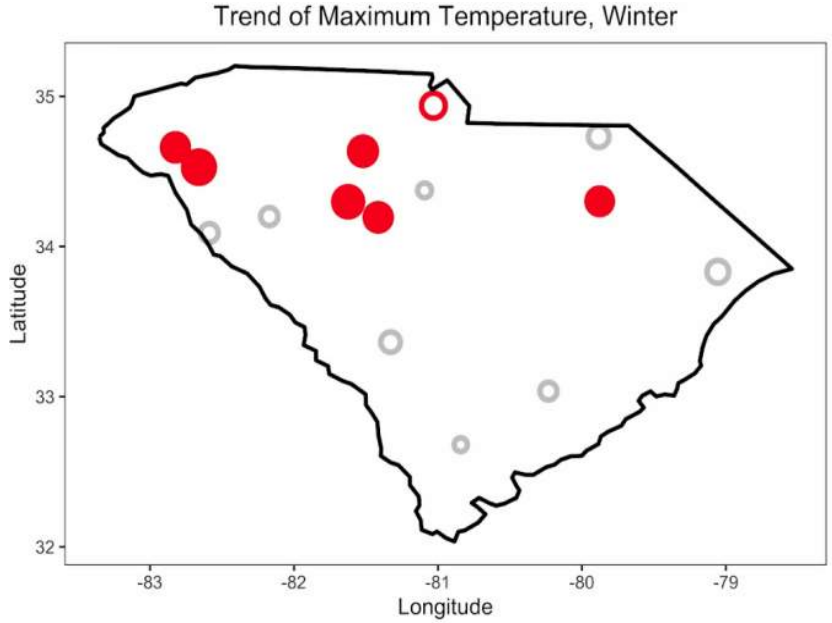
[South Carolina Climate Normal Maps]











Decrease

Statistically-significant decrease

Increase

Statistically-significant increase

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Dept of Geography

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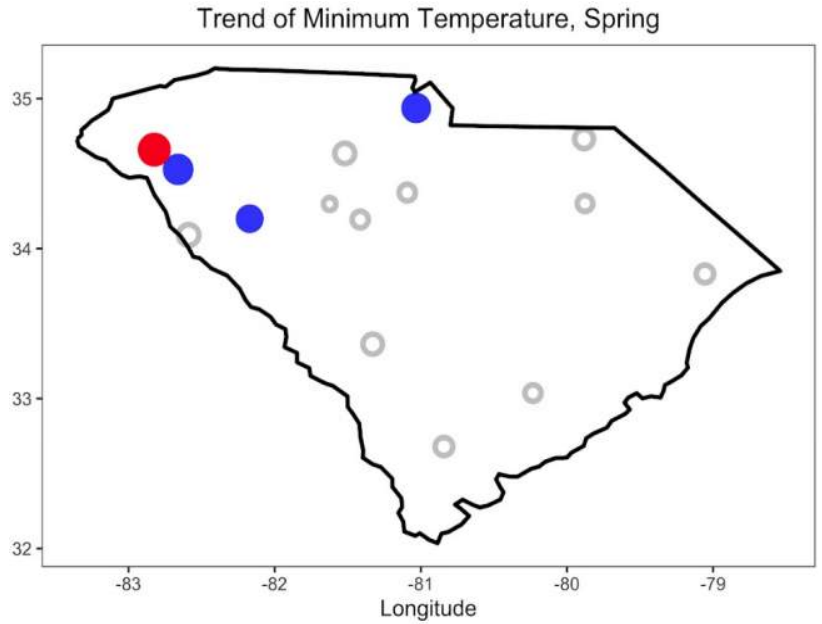
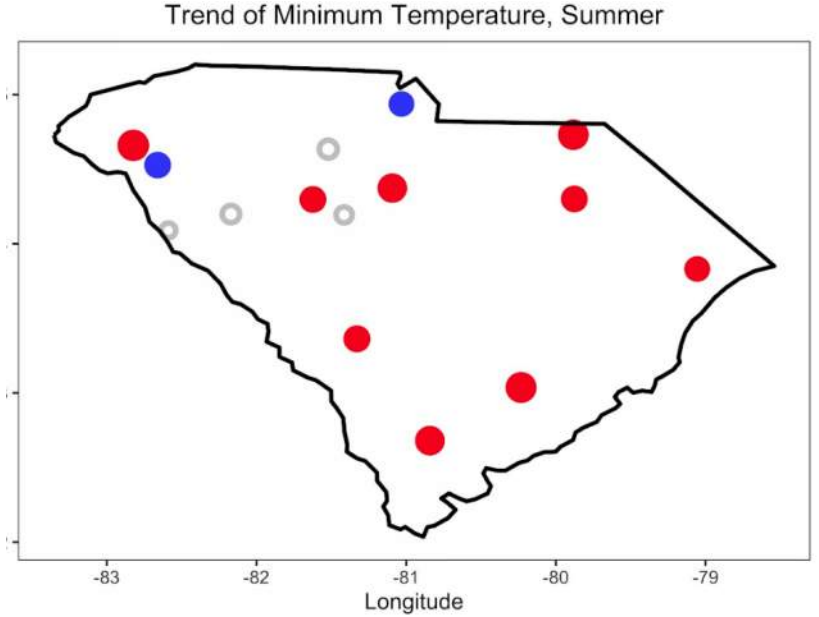
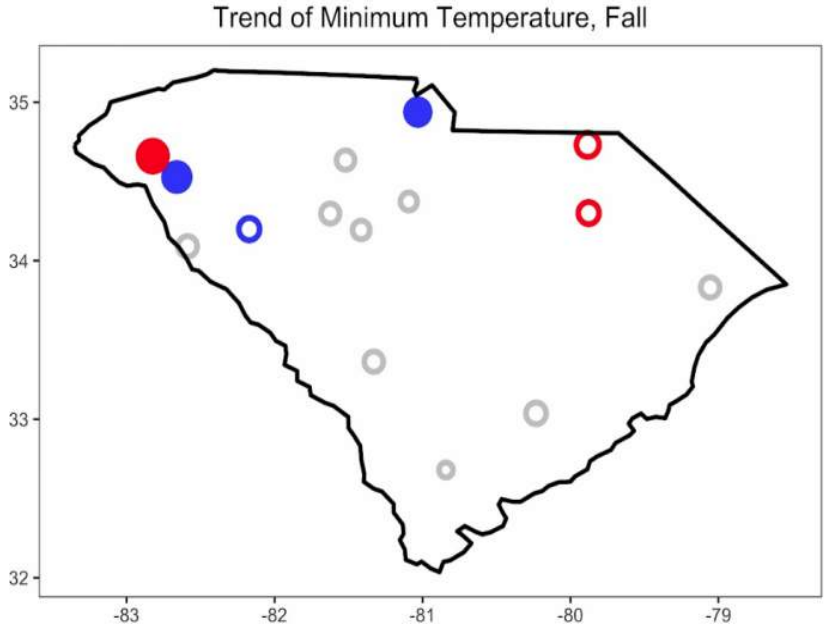
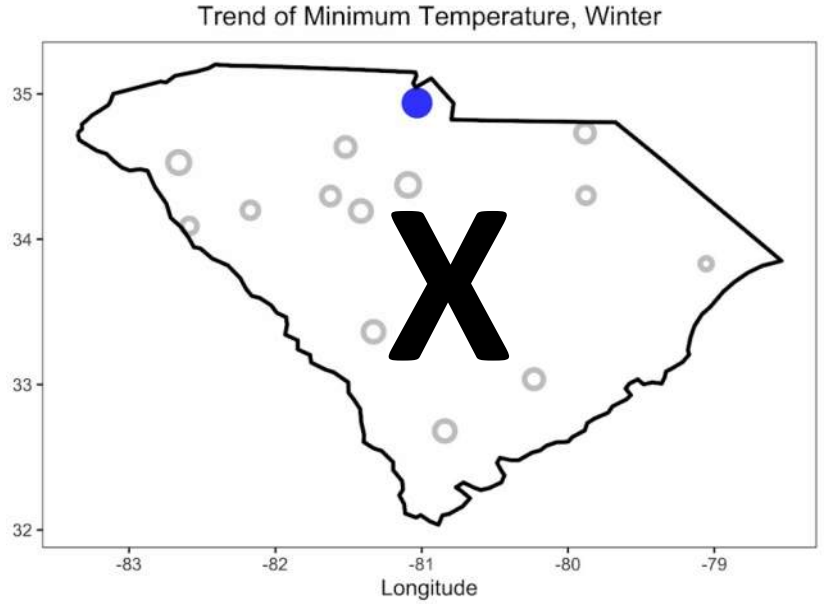








Statistically-significant decrease

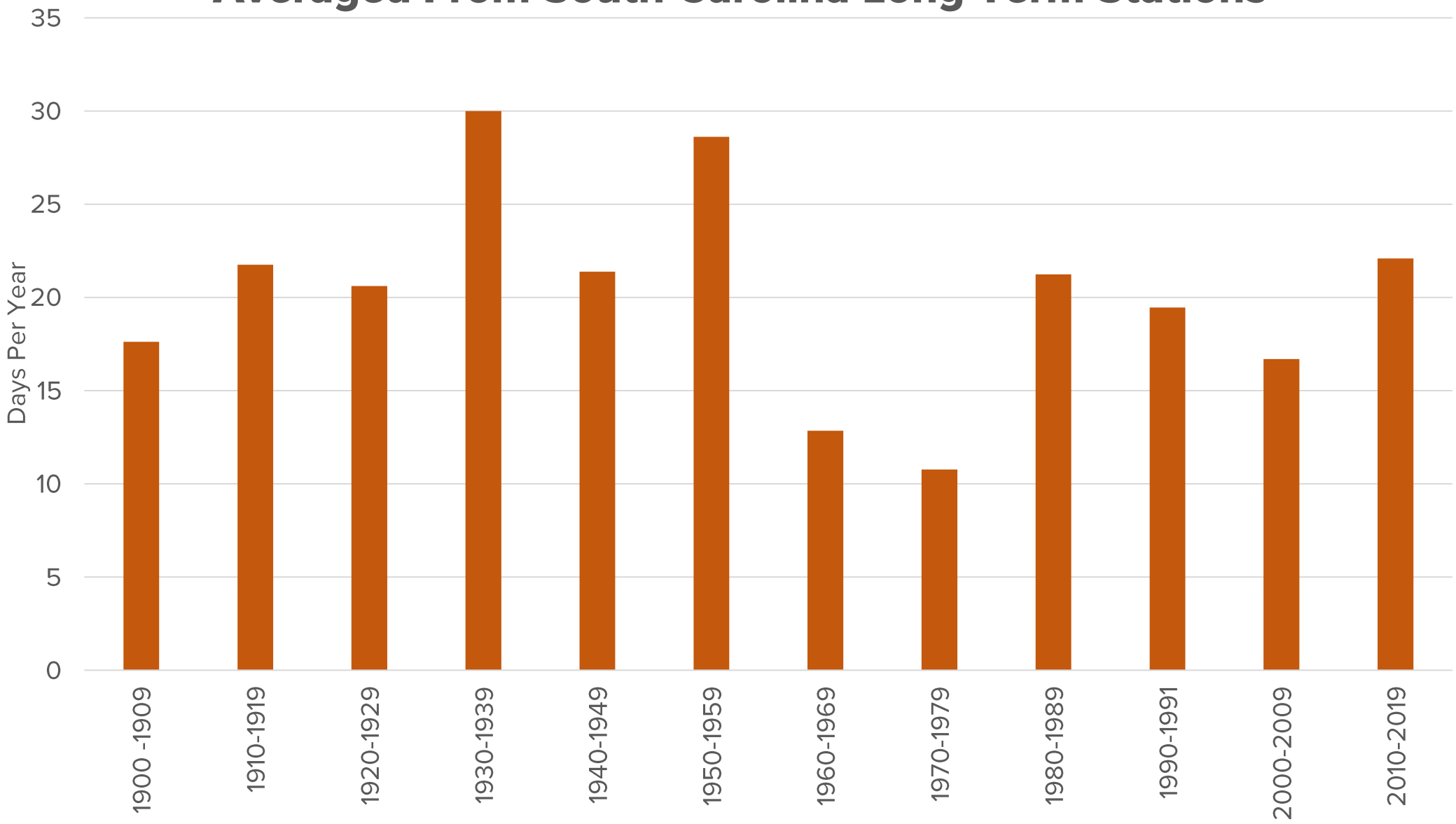
Decrease

Increase

Statistically-significant increase

Greg Carbone
Dept of Geography

Number of Days Maximum Temperature Above 95°F Averaged From South Carolina Long-Term Stations



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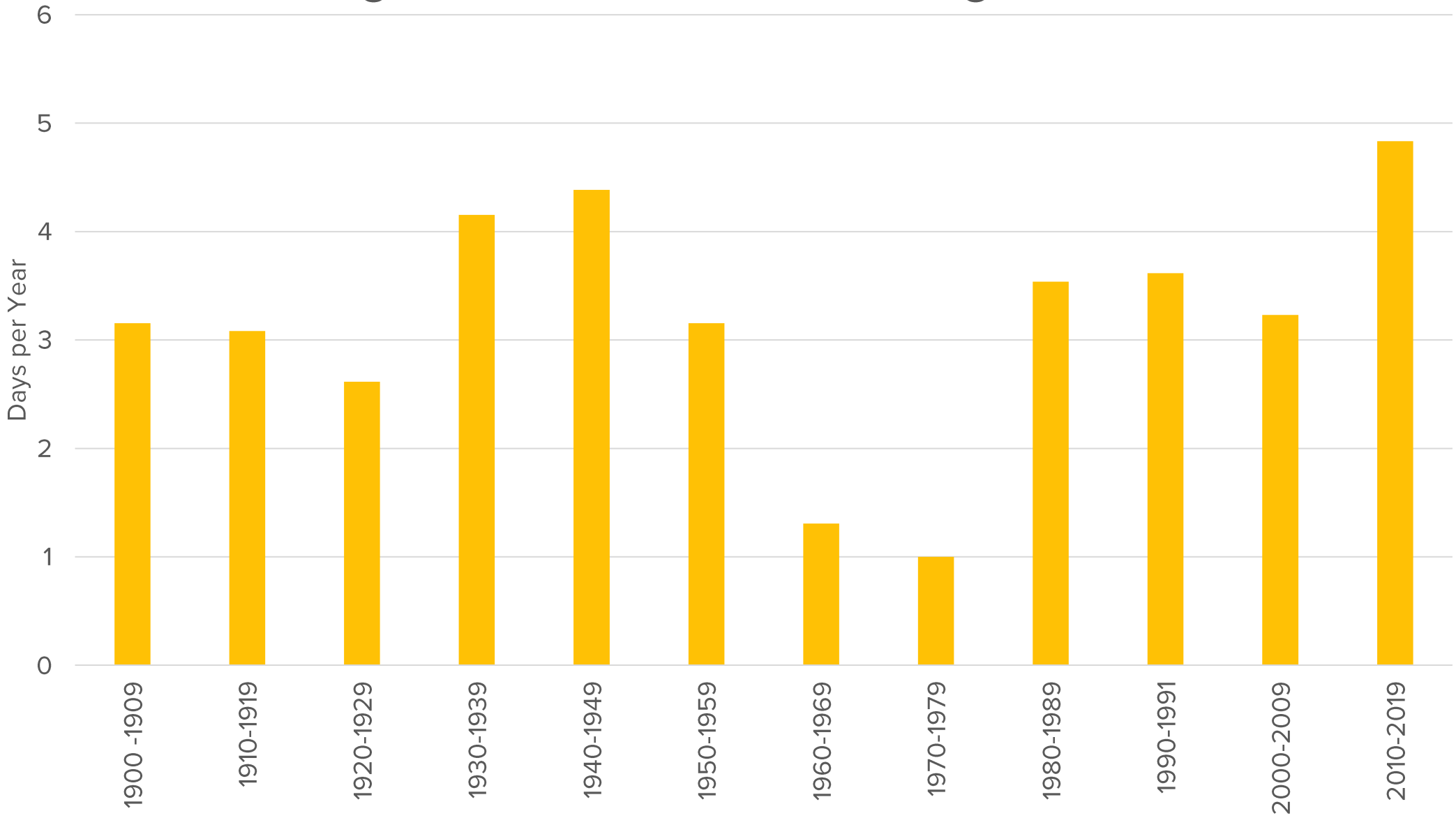
Number of Days Minimum Temperature Above 75°F Averaged From South Carolina Long-Term Stations



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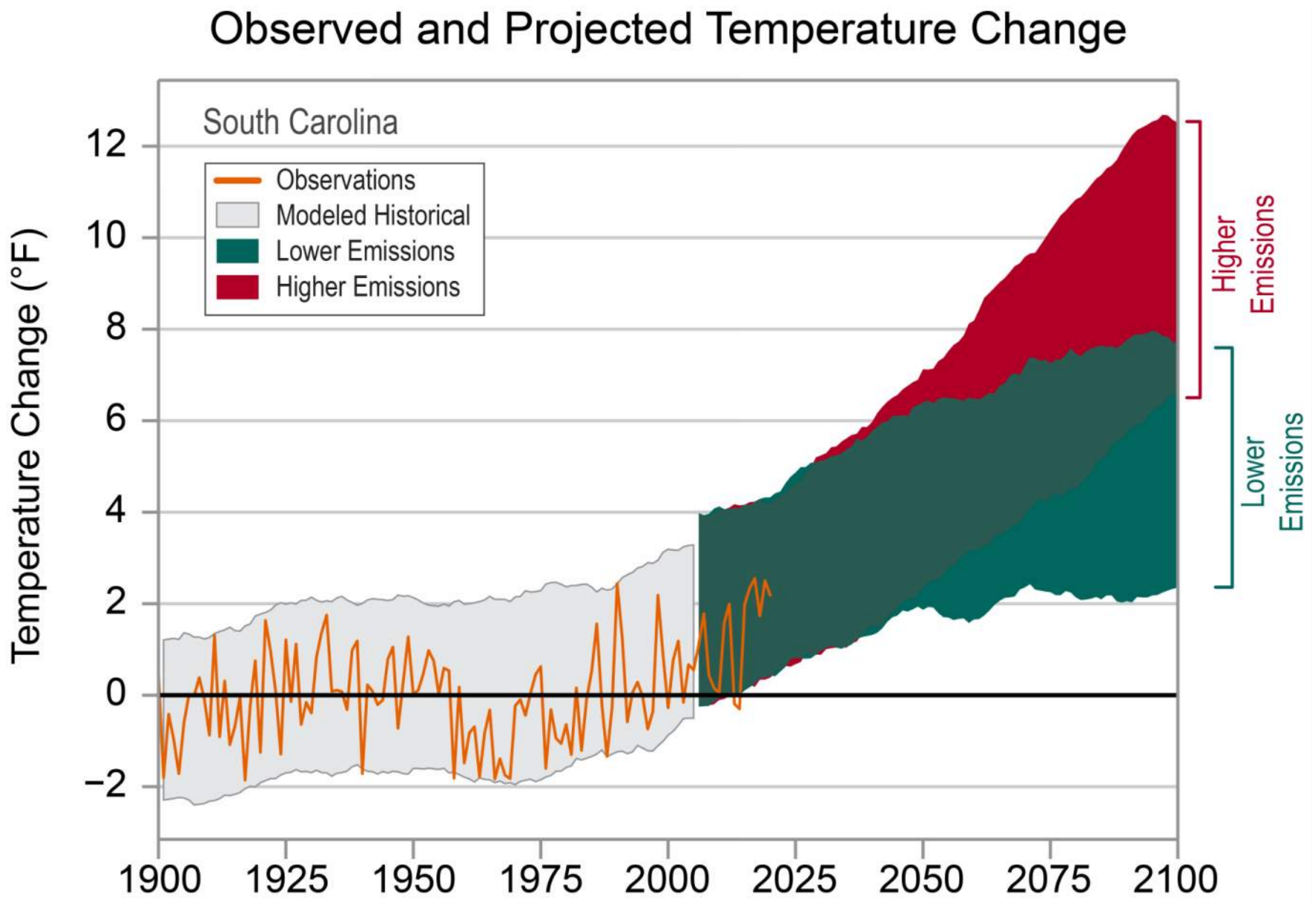
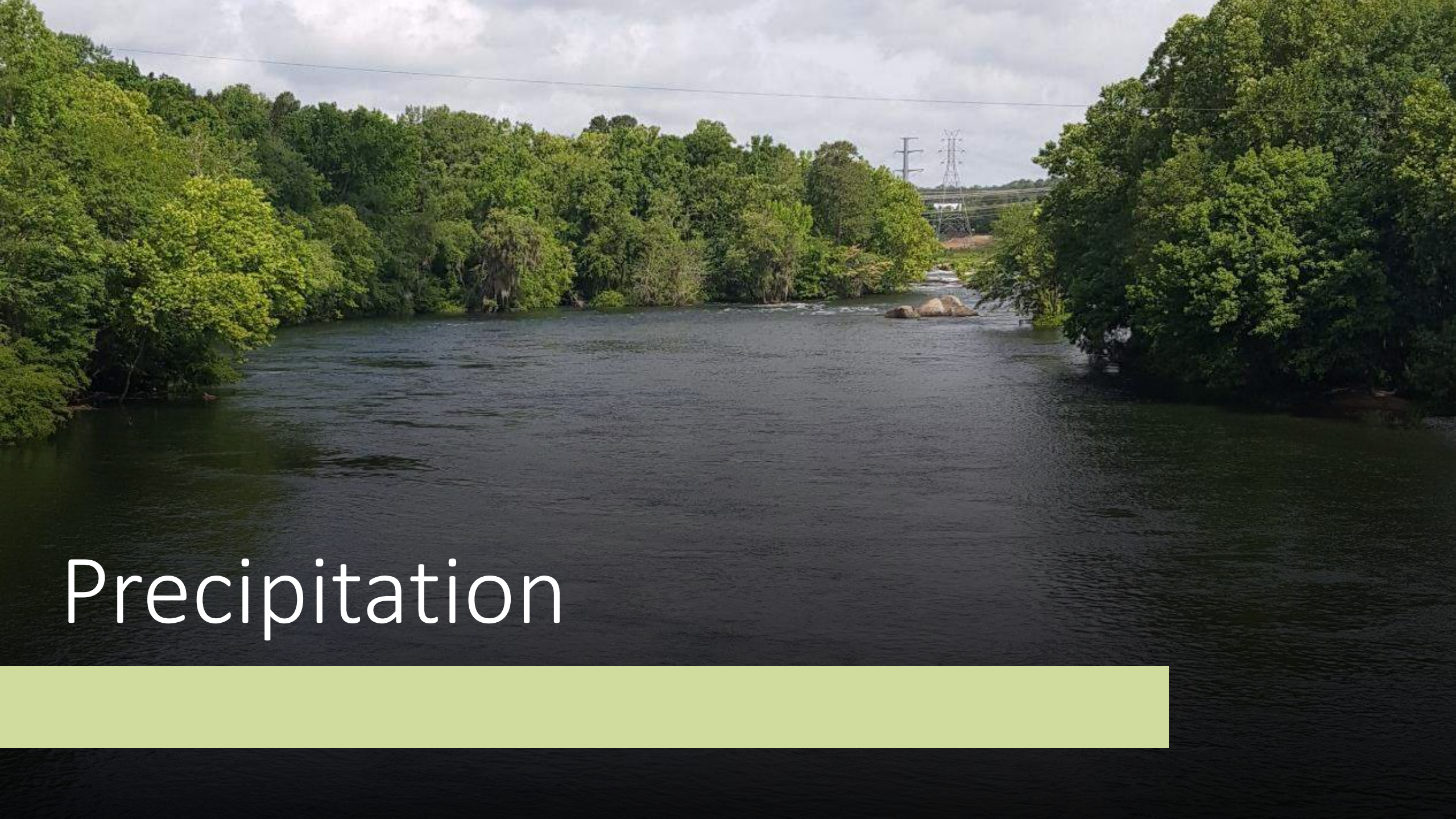
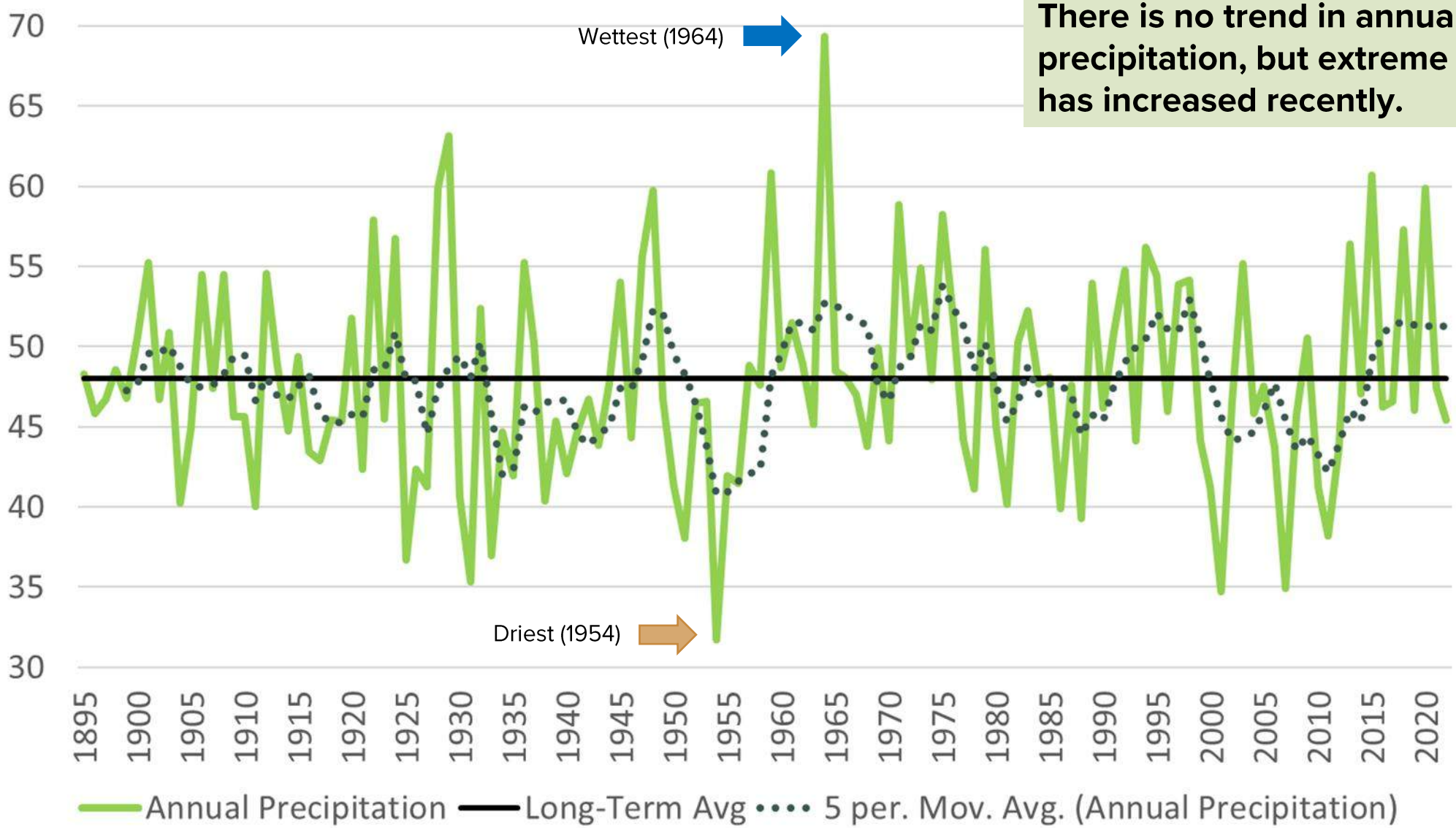


National Centers for Environmental Information
South Carolina State Climate Summary, 2022



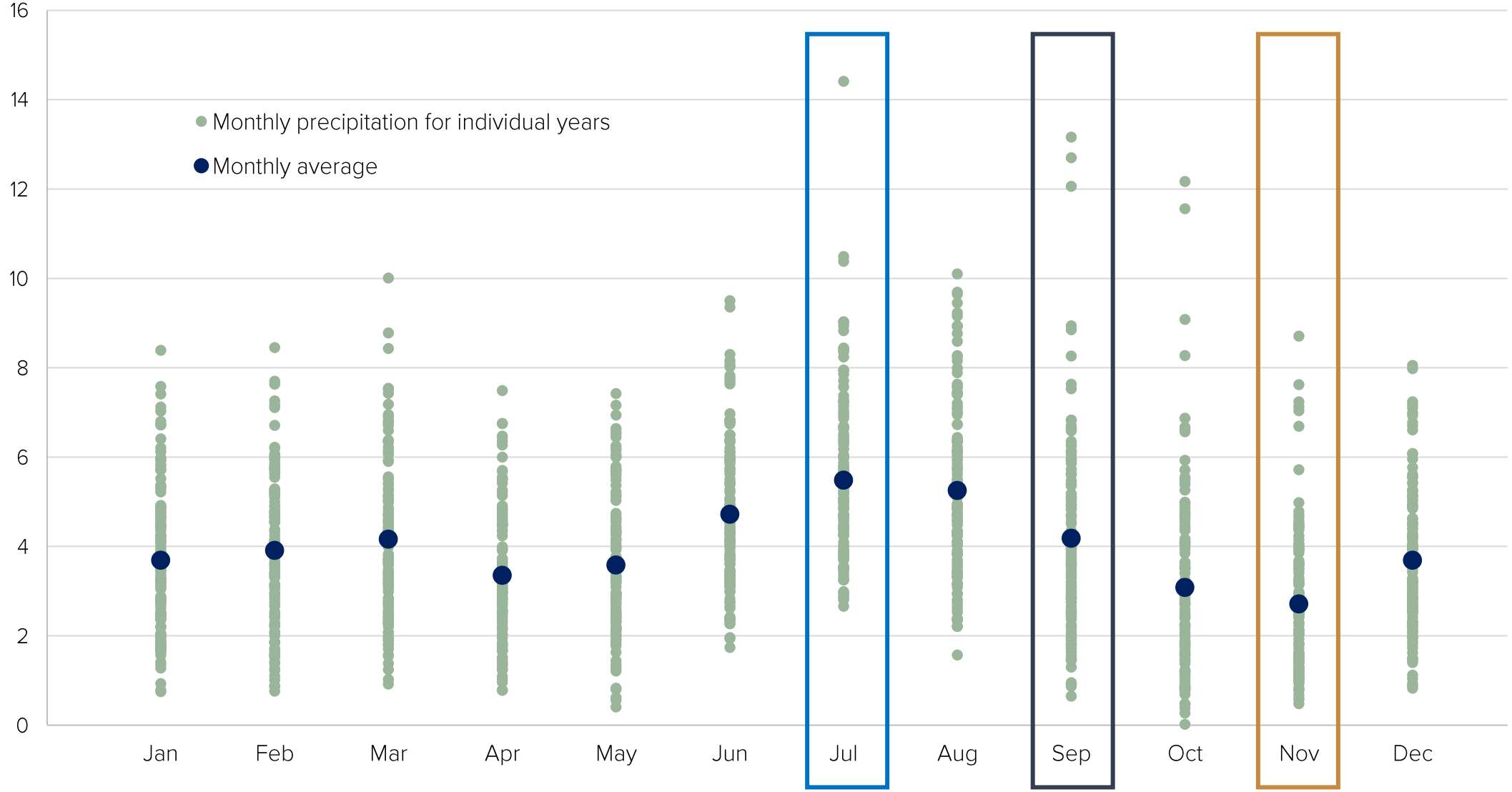
Precipitation

South Carolina Annual Precipitation (1895-2022)



There is no trend in annual precipitation, but extreme rainfall has increased recently.

South Carolina Monthly Precipitation (1895 – 2022)



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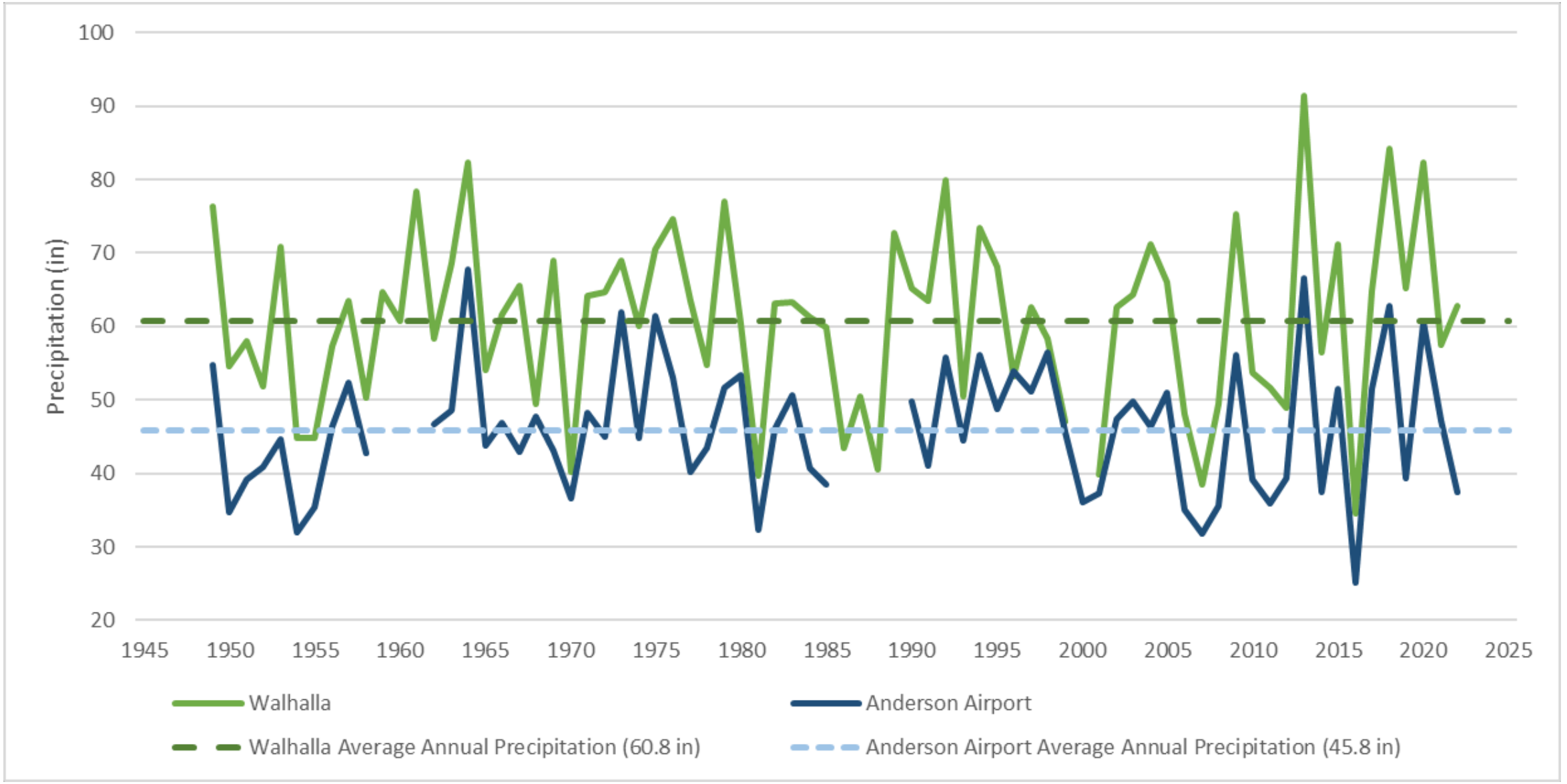
Walhalla and Anderson Regional Airport
Annual Average Precipitation (1949 – 2022)



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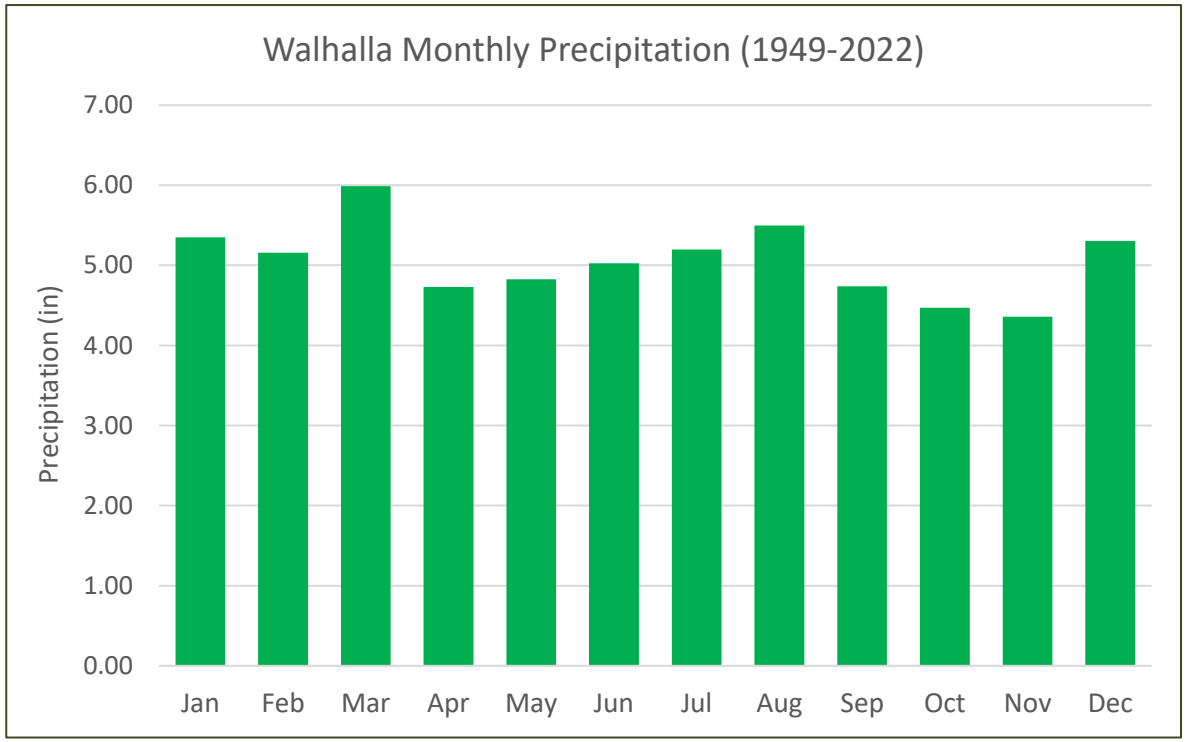
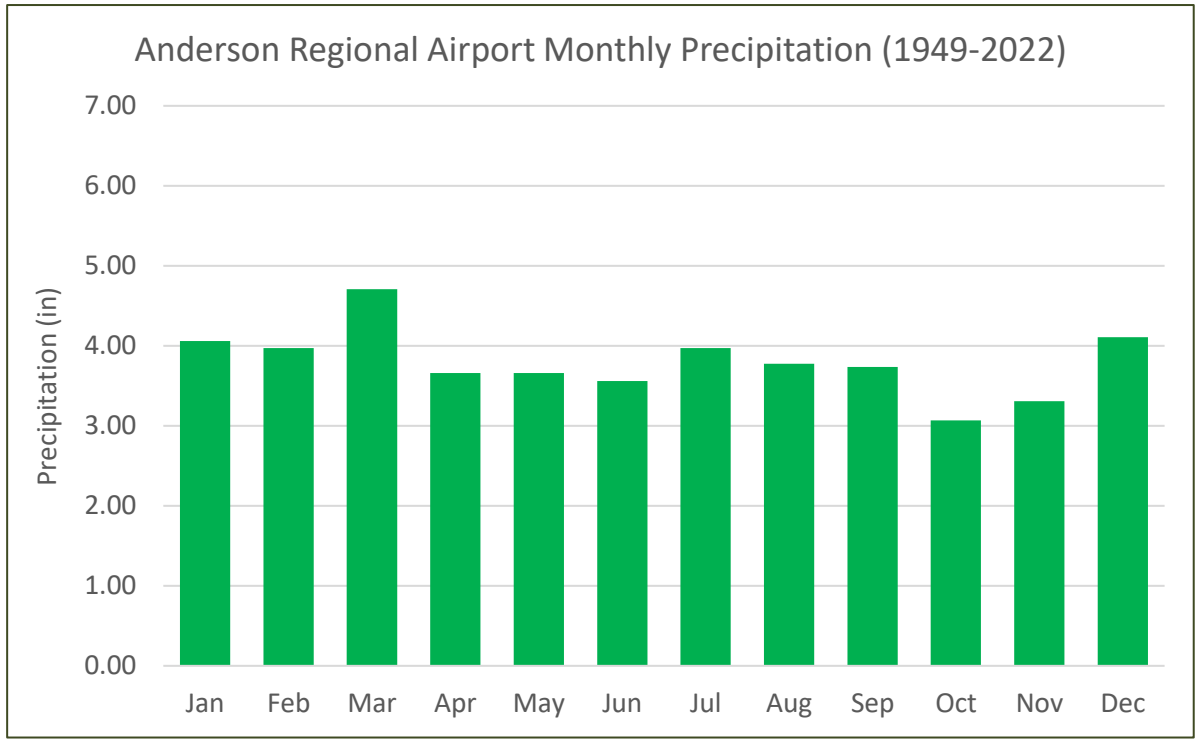
Monthly Precipitation Comparison
Walhalla & Anderson Regional Airport





Walhalla receives more rain than Anderson Airport

- Walhalla receives roughly 1 to 1.5 inches more rain each month

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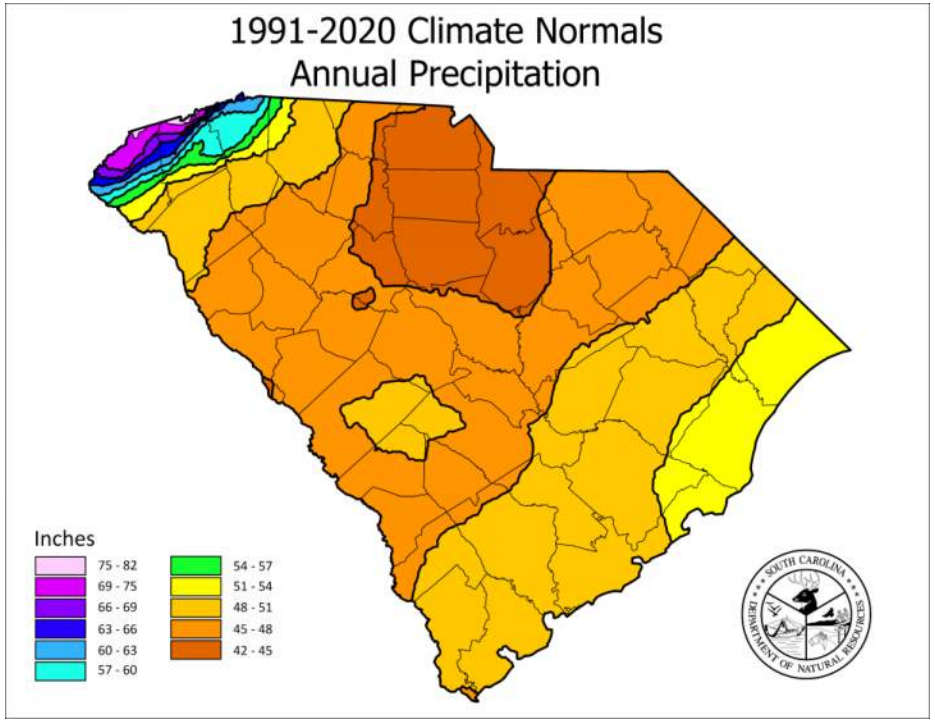
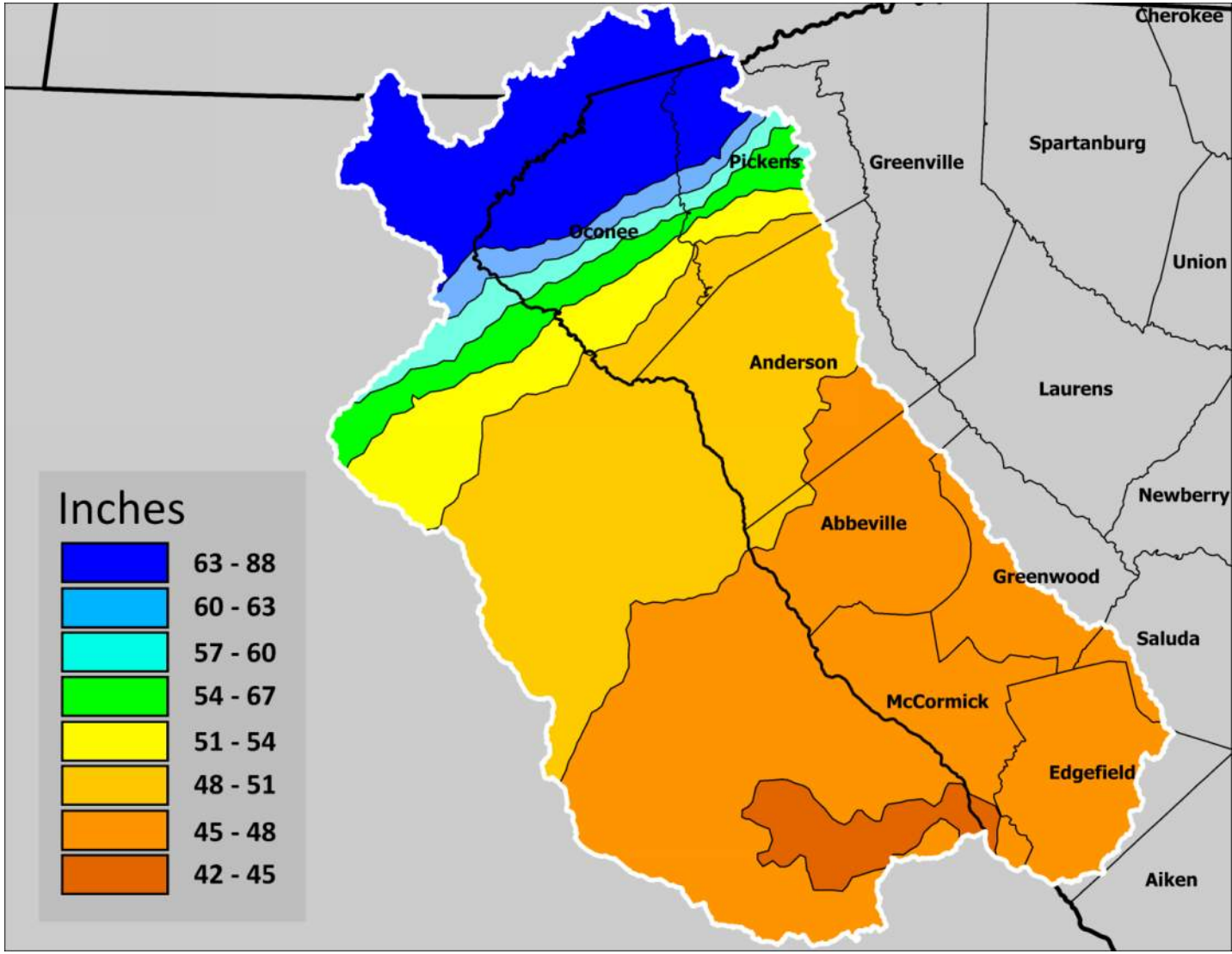
Upper Savannah Basin
Annual Average Precipitation



[South Carolina Climate Normal Maps]



Five Driest Years for Walhalla and Anderson Regional Airport (1949 – 2022)

	Walhalla Annual Average 60.80 inches		Anderson Regional Airport Annual Average 45.80 in	
Rank	Year	Precipitation (in)	Year	Precipitation (in)
1	**2016**	34.60	**2016**	25.07
2	**2007**	38.49	**2007**	31.80
3	**1981**	39.67	1954*	31.95
4	2001	39.89	1988	32.25
5	1970	40.23	**1981**	32.32

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Five Wettest Years for Walhalla and Anderson Regional Airport (1949 – 2022)

	Walhalla Annual Average 60.80 inches		Anderson Regional Airport Annual Average 45.80 in	
Rank	Year	Precipitation (in)	Year	Precipitation (in)
1	**2013**	91.36	**1964***	67.79
2	**2018**	84.27	**2013**	66.59
3	2020	82.37	**2018**	82.74
4	**1964***	82.26	1973	61.91
5	1992	79.95	1975	61.40

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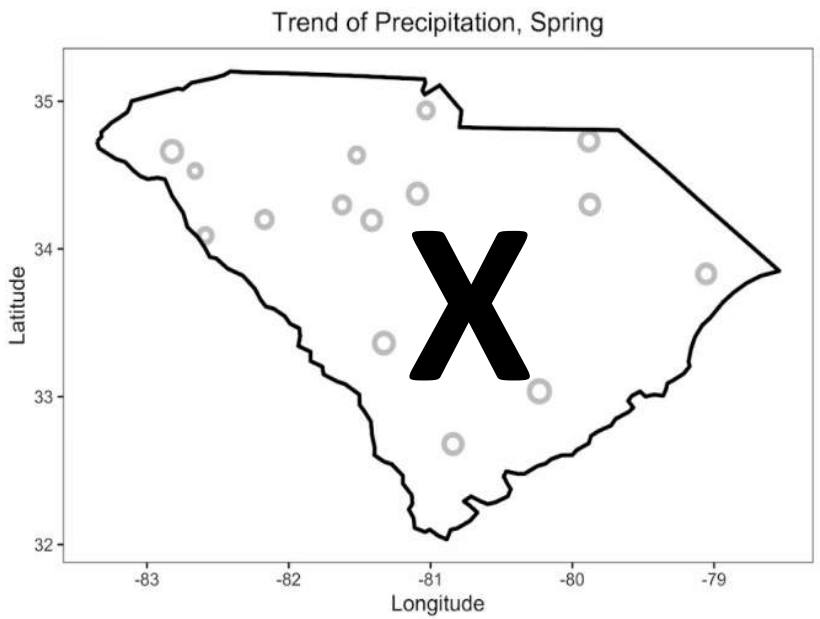

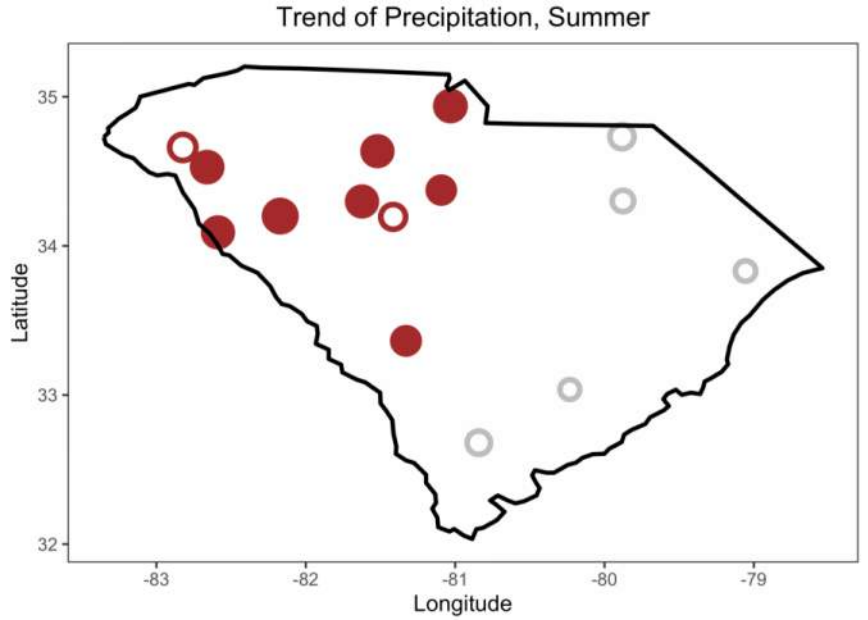

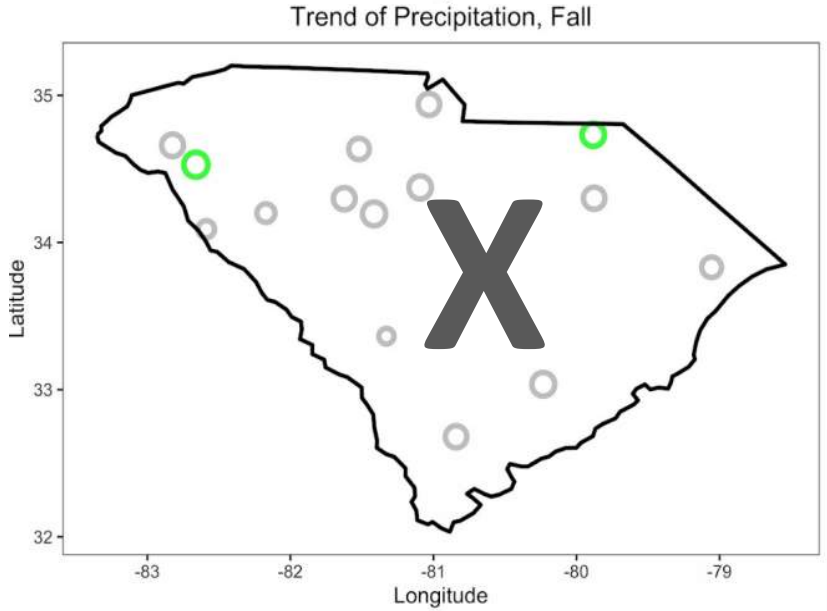

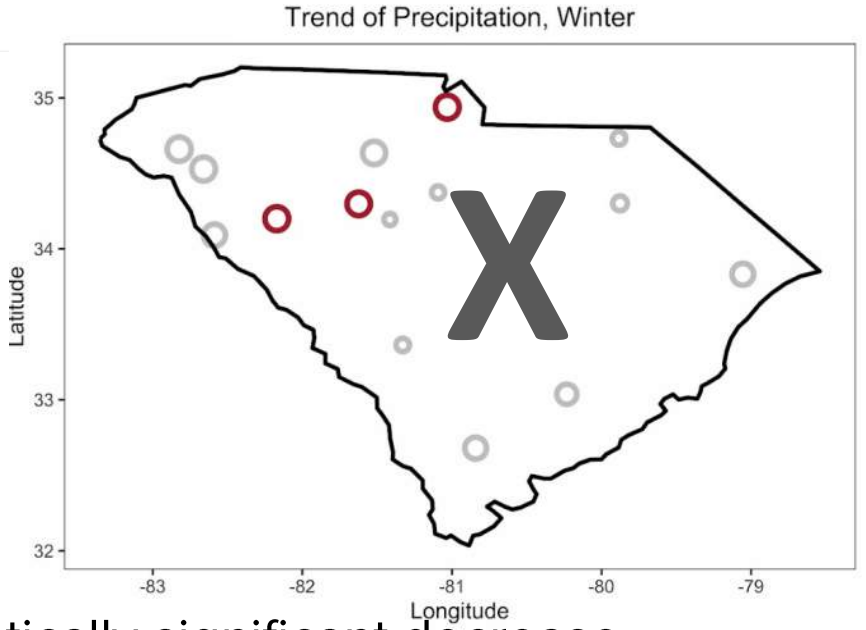

Decrease

Increase

Statistically-significant decrease

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Dept of Geography

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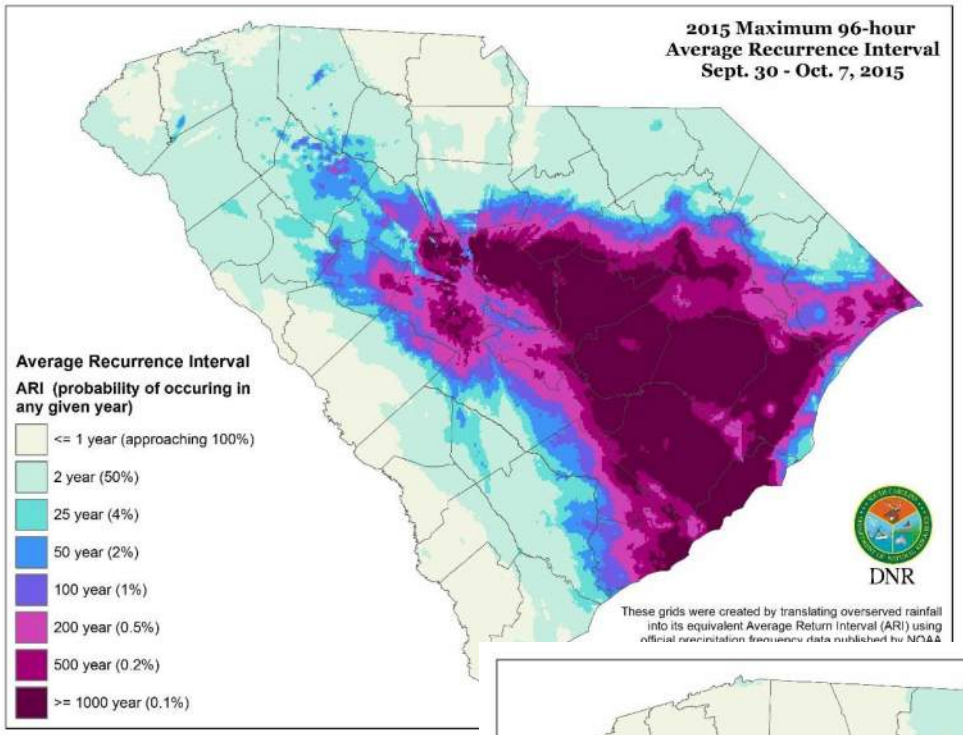
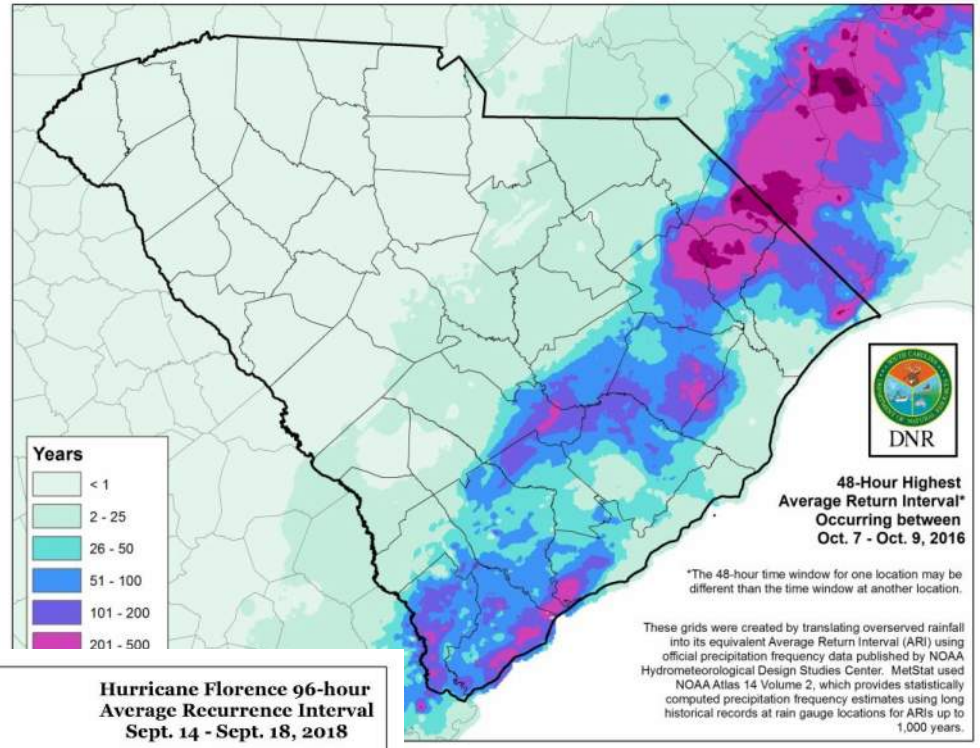
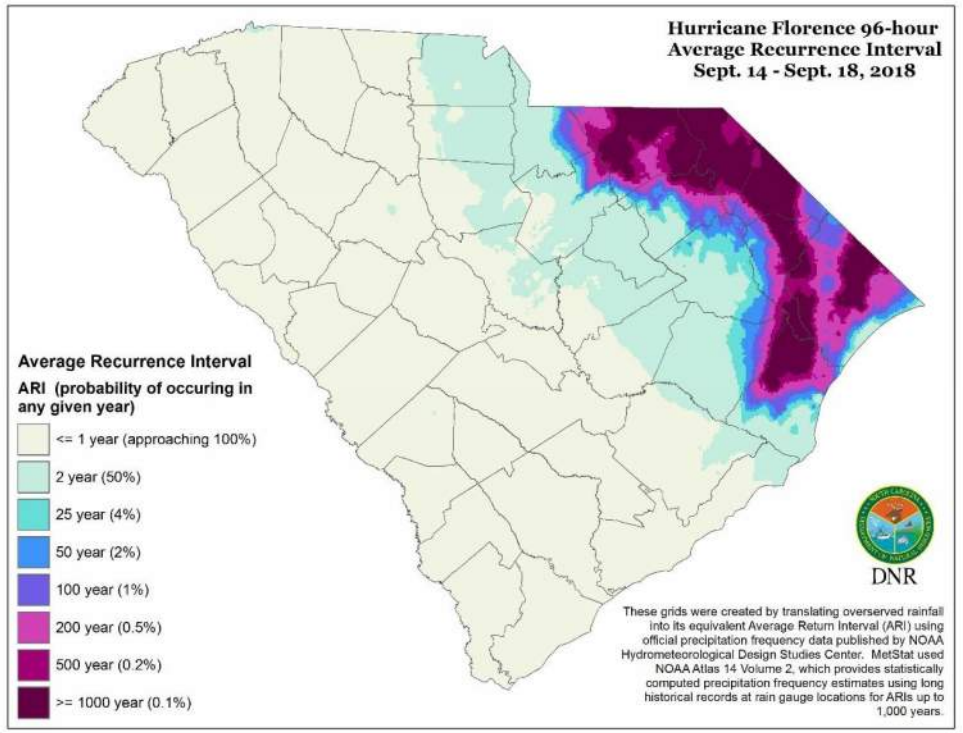
Extreme Rainfall







Areas in purple met or exceeded the 500-year event, a probability of 0.2% happening each year

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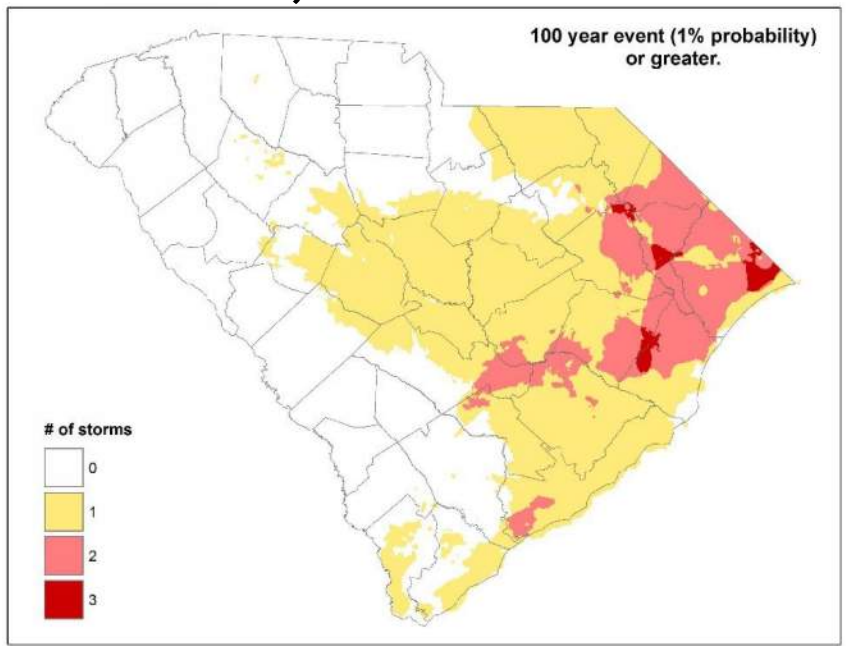
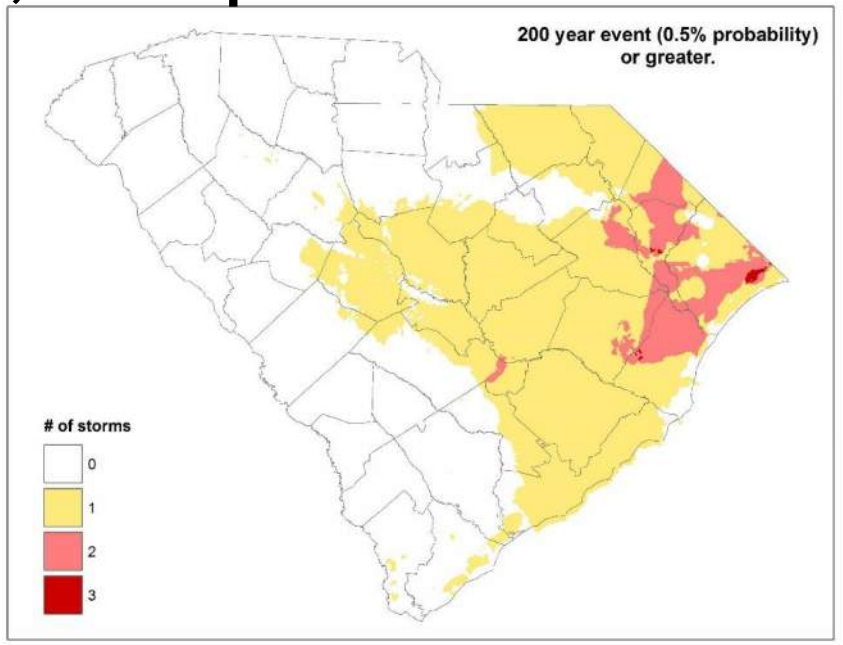
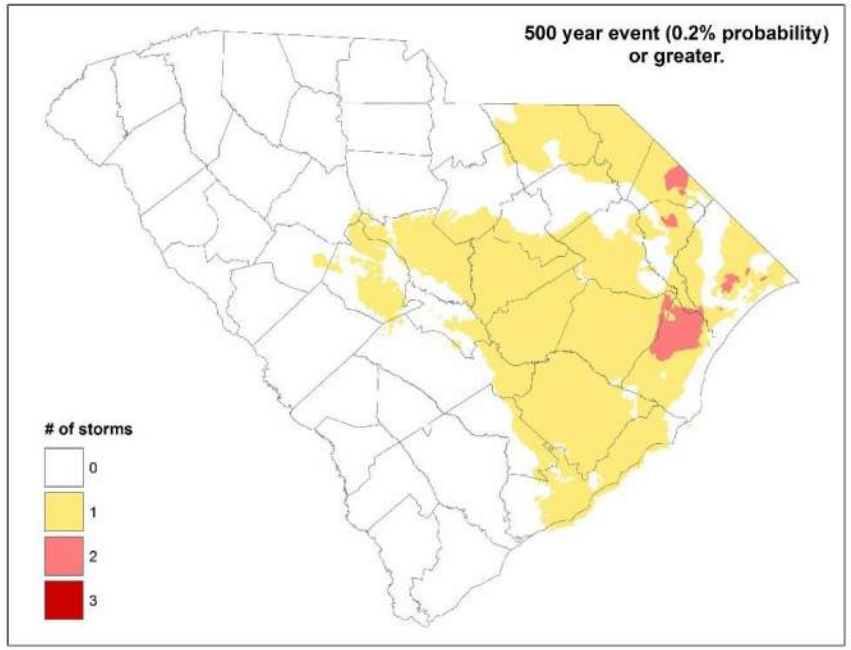
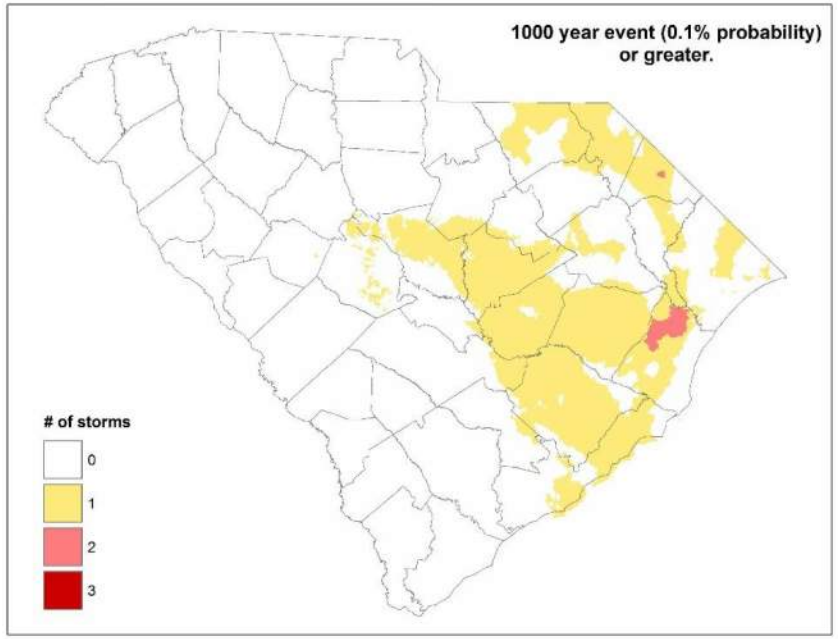
Areas impacted by one or more of the recent extreme storms (October 2015, Hurricane Matthew 2016, and Tropical Storm Florence 2018)









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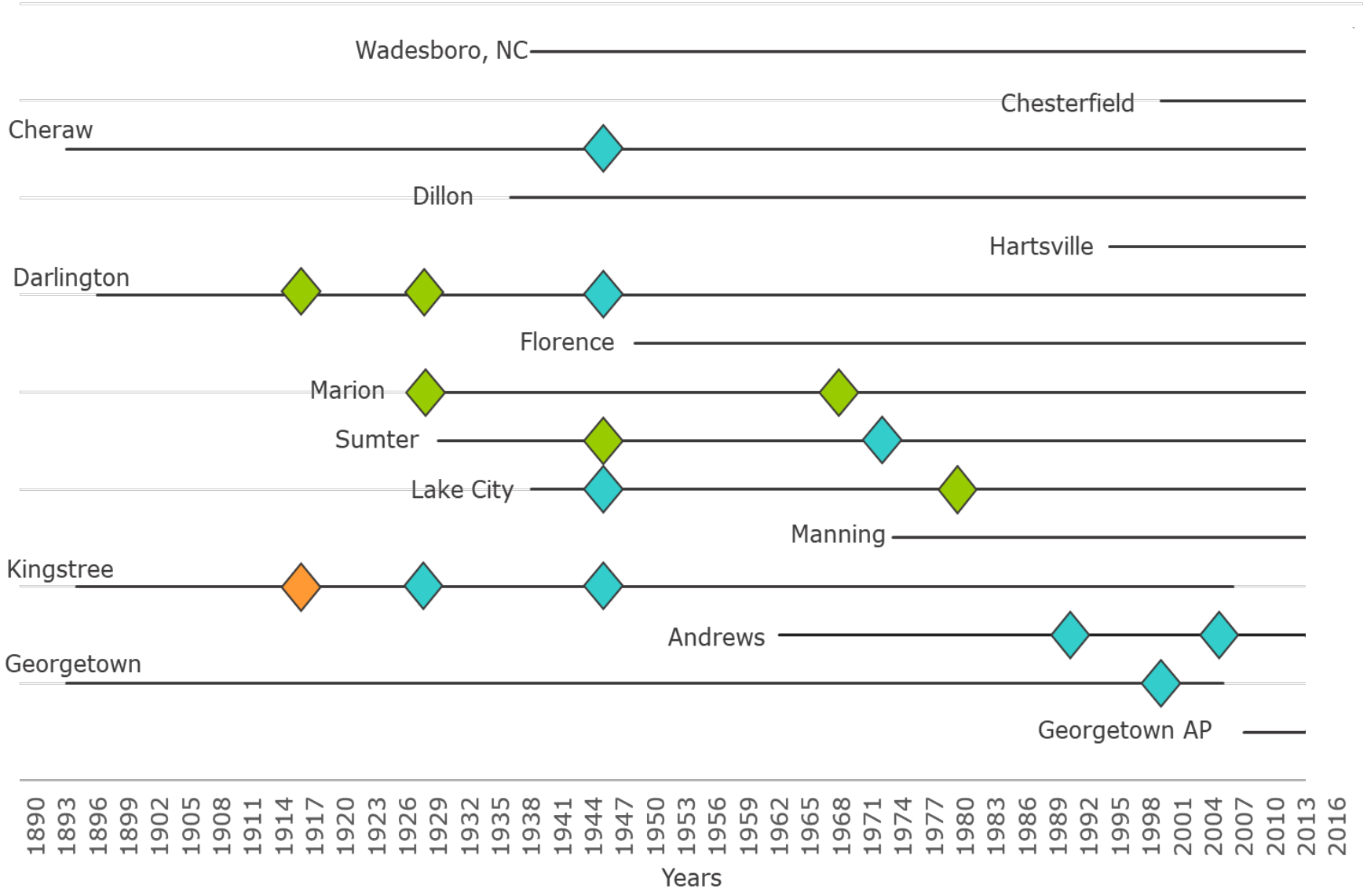
Timeline 4-day Maximum Rainfall Events Along The Pee Dee Watershed



The purposes of ARI/AEP analysis, the following scale will be used in this report

Average Recurrence Intervals (AEP)

- 1,000 Year (0.1%)
- 500 Year (0.2%)
- 200 Year (0.5%)
- 100 Year (1.0%)

(Ending 2014)

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Timeline 4-day Maximum Rainfall Events Along The Pee Dee Watershed

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- 1,000 Year (0.1%)
- 500 Year (0.2%)
- 200 Year (0.5%)
- 100 Year (1.0%)

(Ending 2020)

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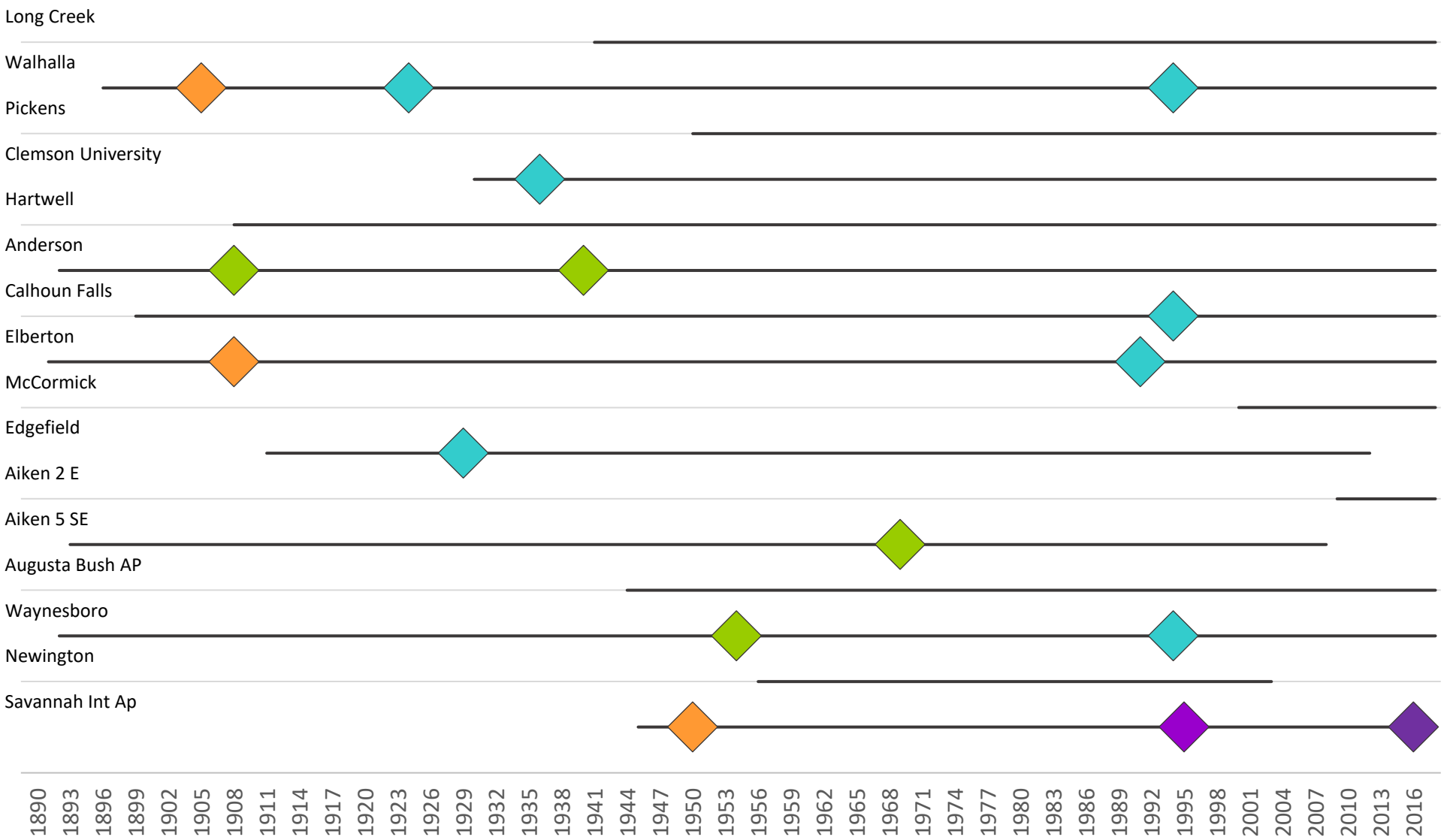
Timeline of 4-day Rainfall Events along the Savannah River



The purposes of ARI/AEP analysis, the following scale will be used in this report

Average Recurrence Intervals (AEP)

- 1,000 Year (0.1%)
- 500 Year (0.2%)
- 200 Year (0.5%)
- 100 Year (1.0%)
- 50 Year (2.0%)

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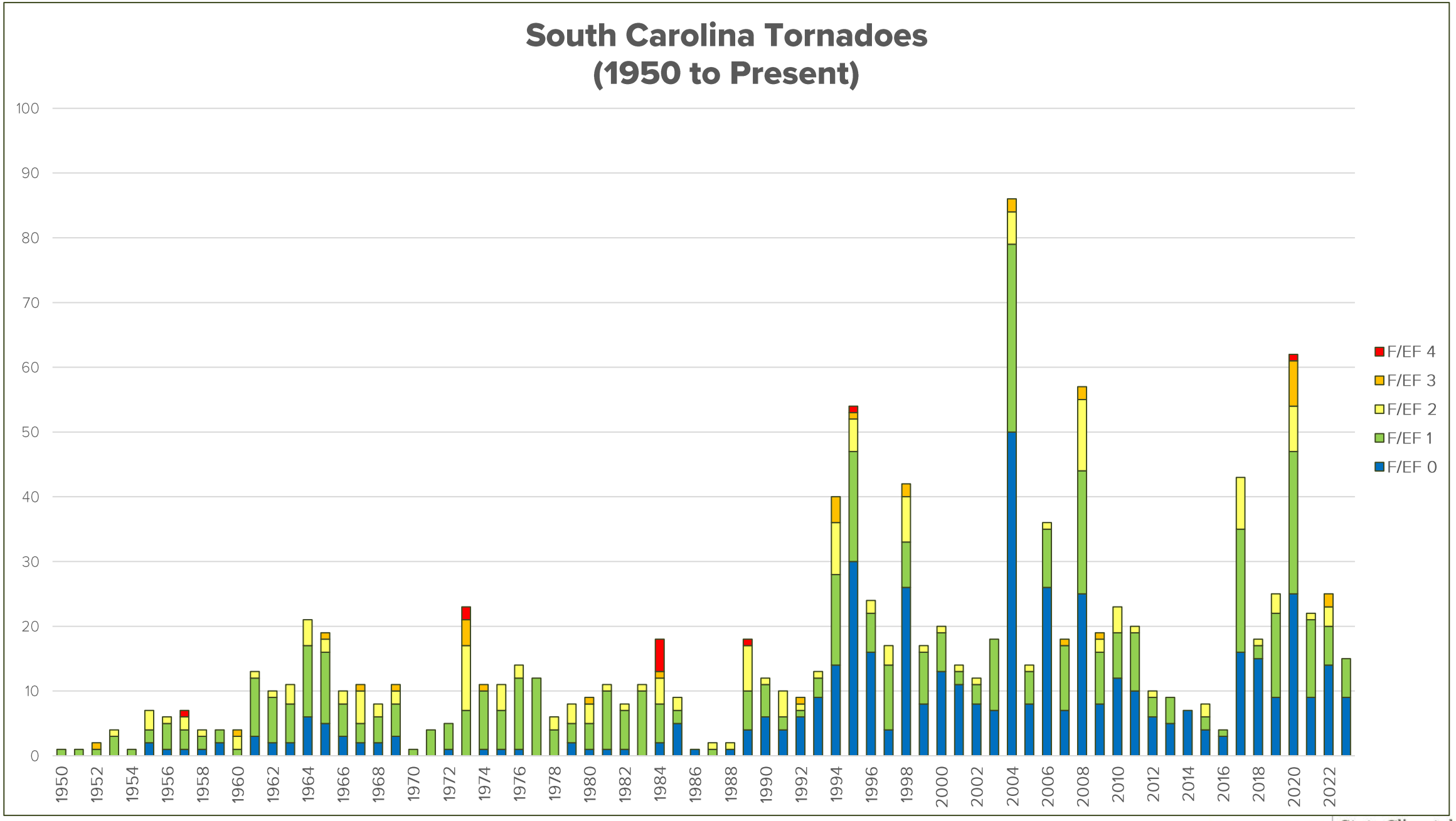
Tornadoes

South Carolina Tornadoes (1950 to Present)



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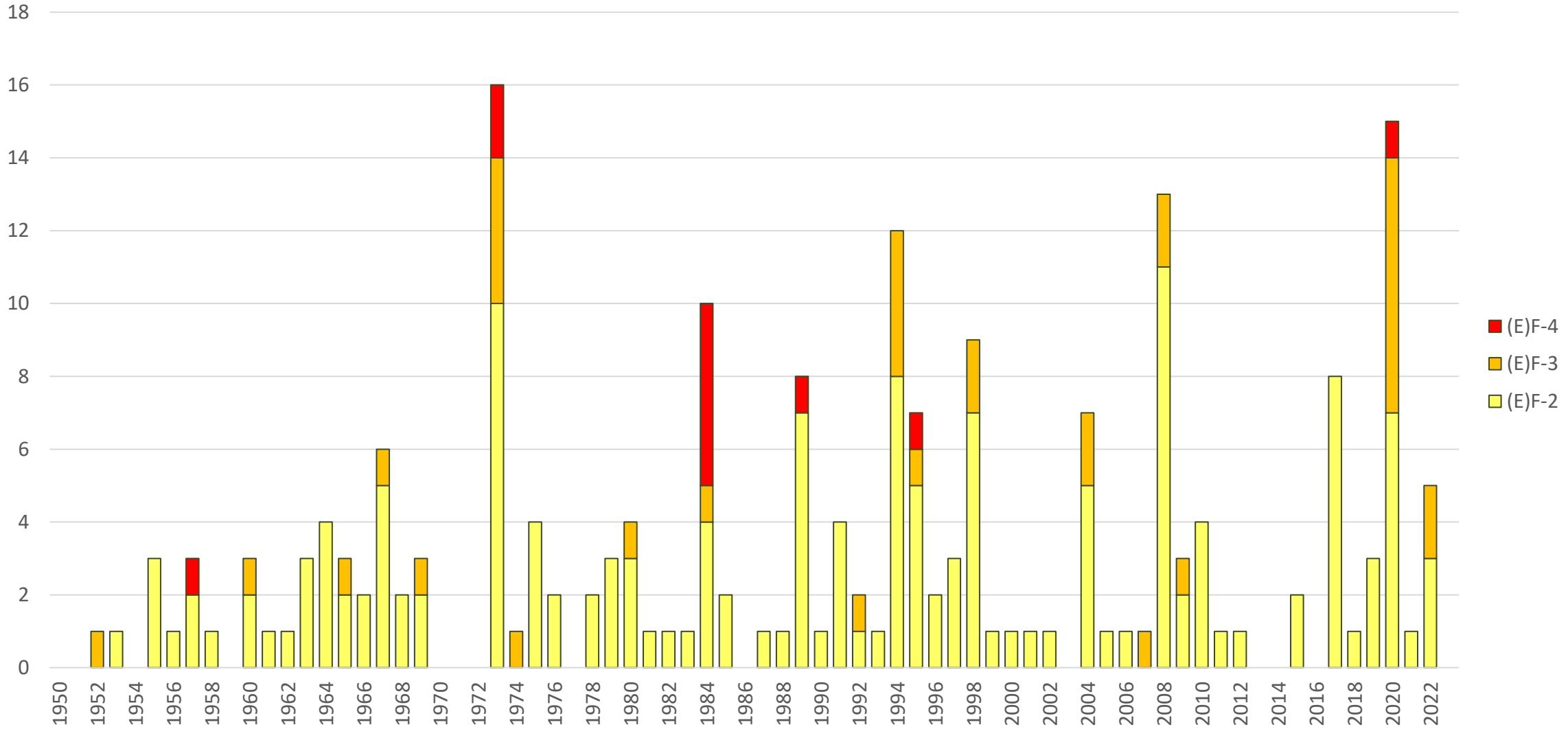
Significant Tornadoes, Rated (E)F-2 Or Higher
In South Carolina
1950-Present



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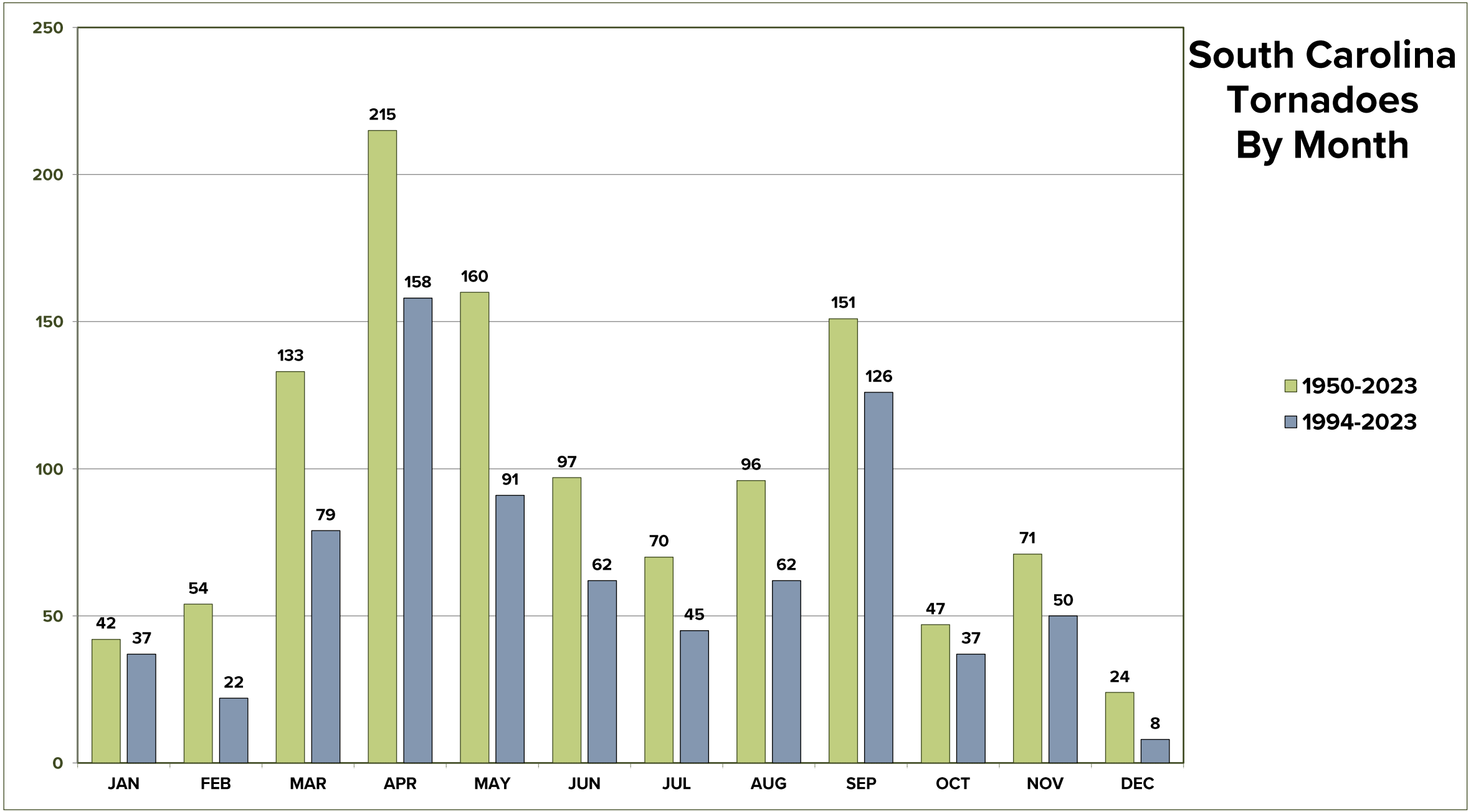
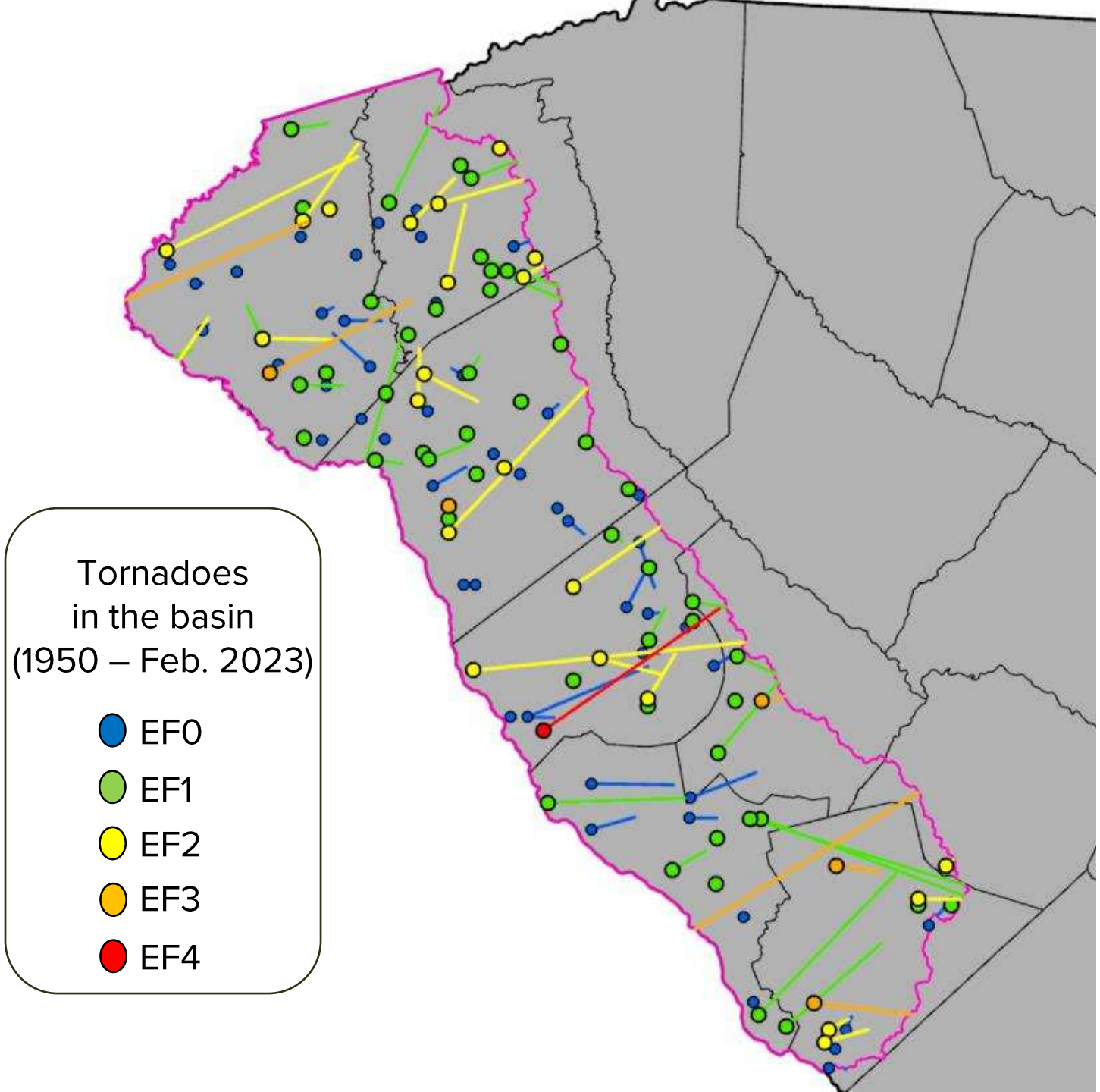

South Carolina Tornadoes By Month
1950-2023
1994-2023
250
200
150
100
50
0
JAN 42 37
FEB 54 22
MAR 133 79
APR 215 158
MAY 160 91
JUN 97 62
JUL 70 45
AUG 96 62
SEP 151 126
OCT 47 37
NOV 71 50
DEC 24 8



Tornado numbers for the basin

- 139 tornados have affected the basin
- Of that, 134 tornados have spawned inside the basin
- By Category (tracking through the basin)
  - 56 EF0s
  - 53 EF1s
  - 23 EF2s
  - 7 EF3s
  - 1 EF4s

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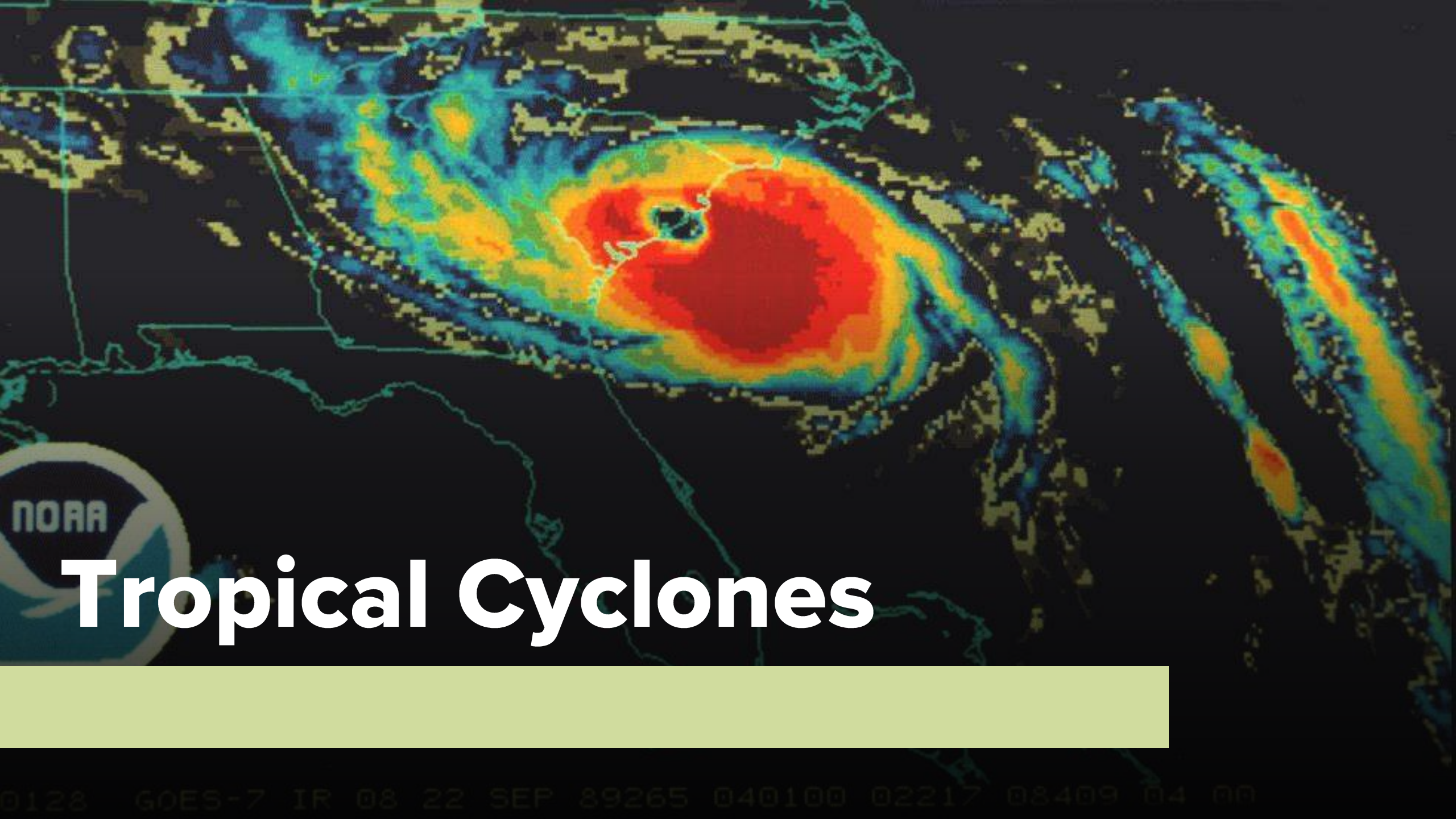


Tropical Cyclones

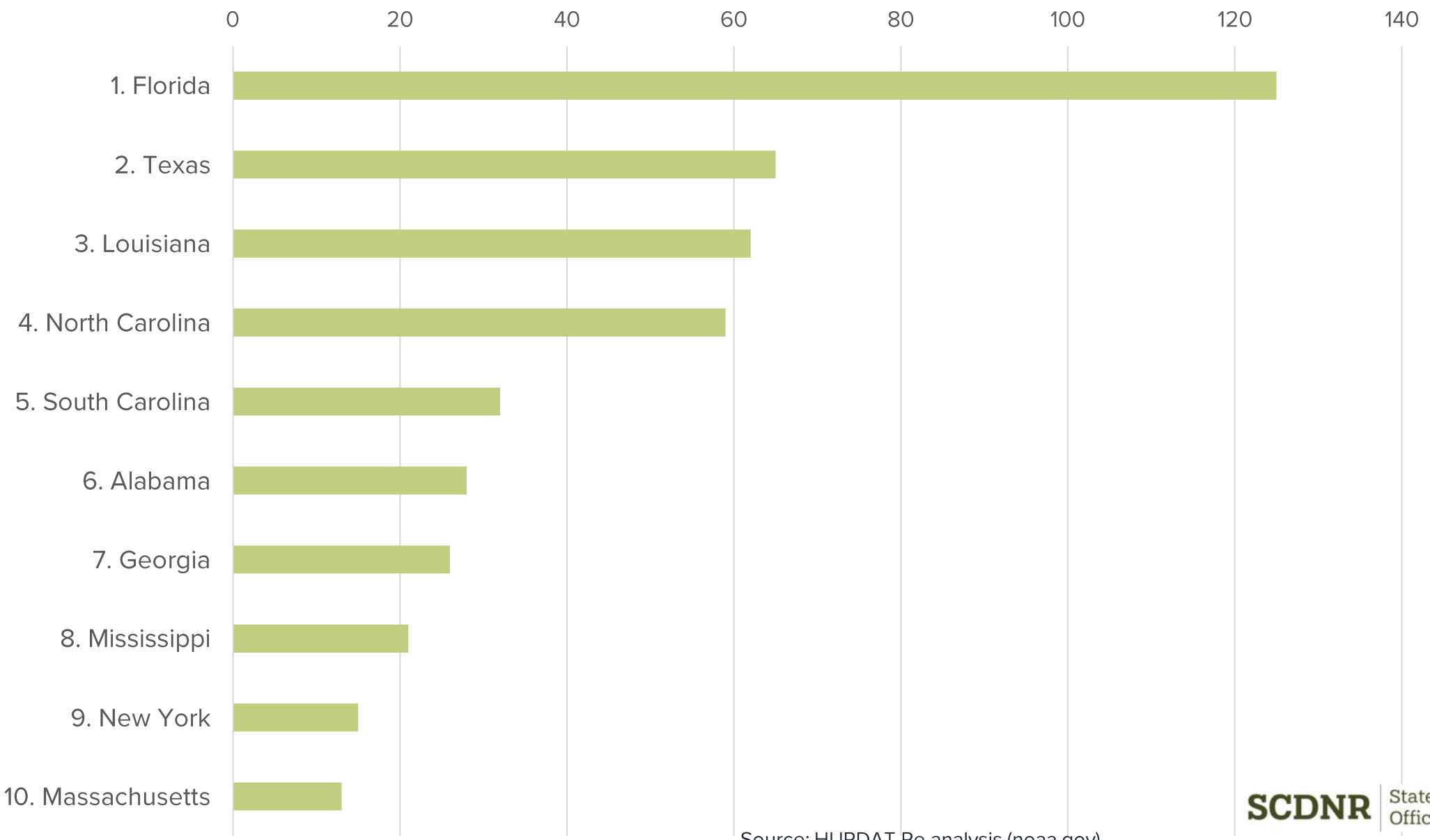
Tropical Storms are part of South Carolina's Climatology and History.

Impacts are not limited to the coast.

Inland portions of the state have been affected by:

- Heavy rains
- Flooding
- High winds
- Tornadoes

10 States Where Hurricanes Hit the Most



Source: HURDAT Re-analysis (noaa.gov)

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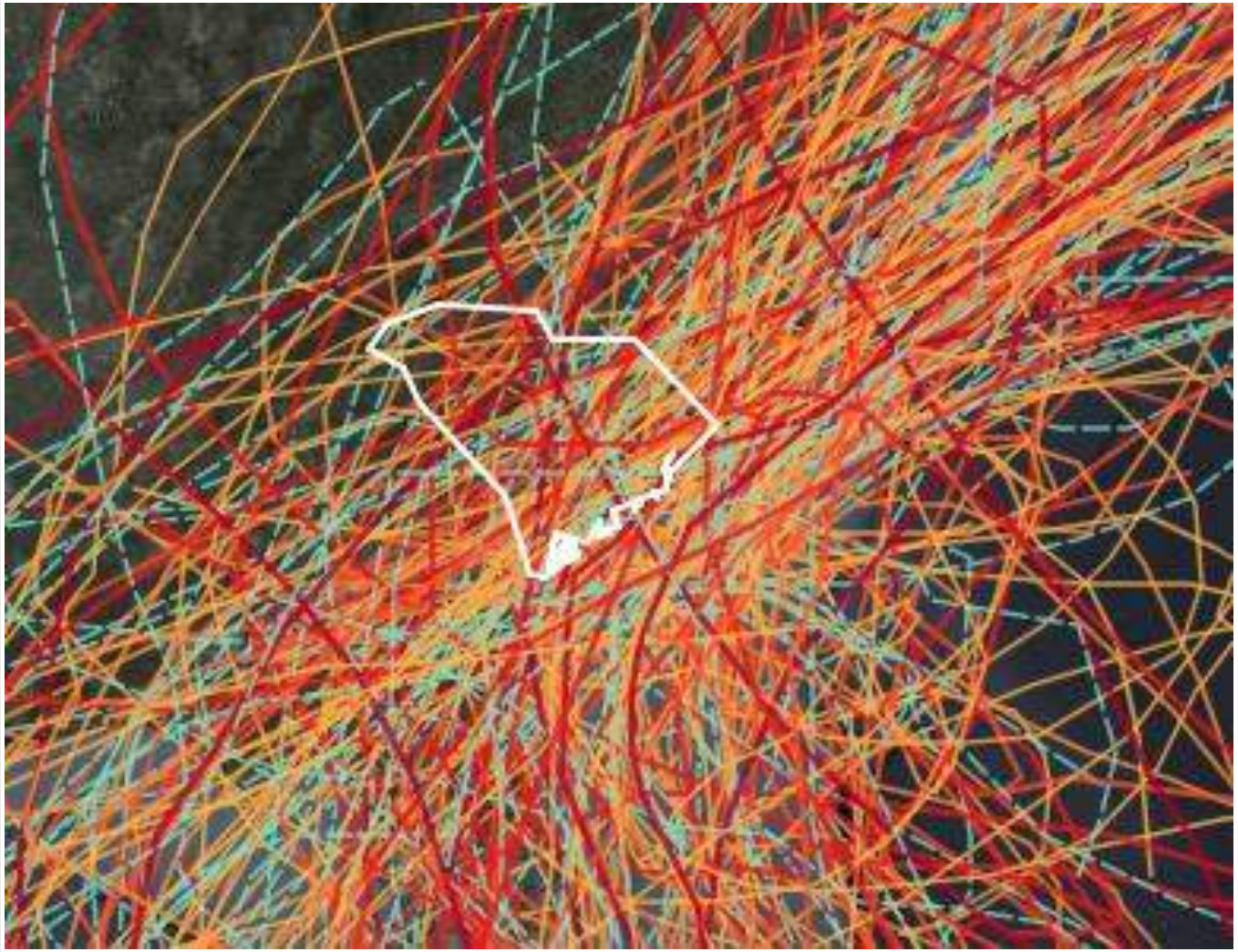
Tracks Of Tropical Cyclones To Impact South Carolina



80%

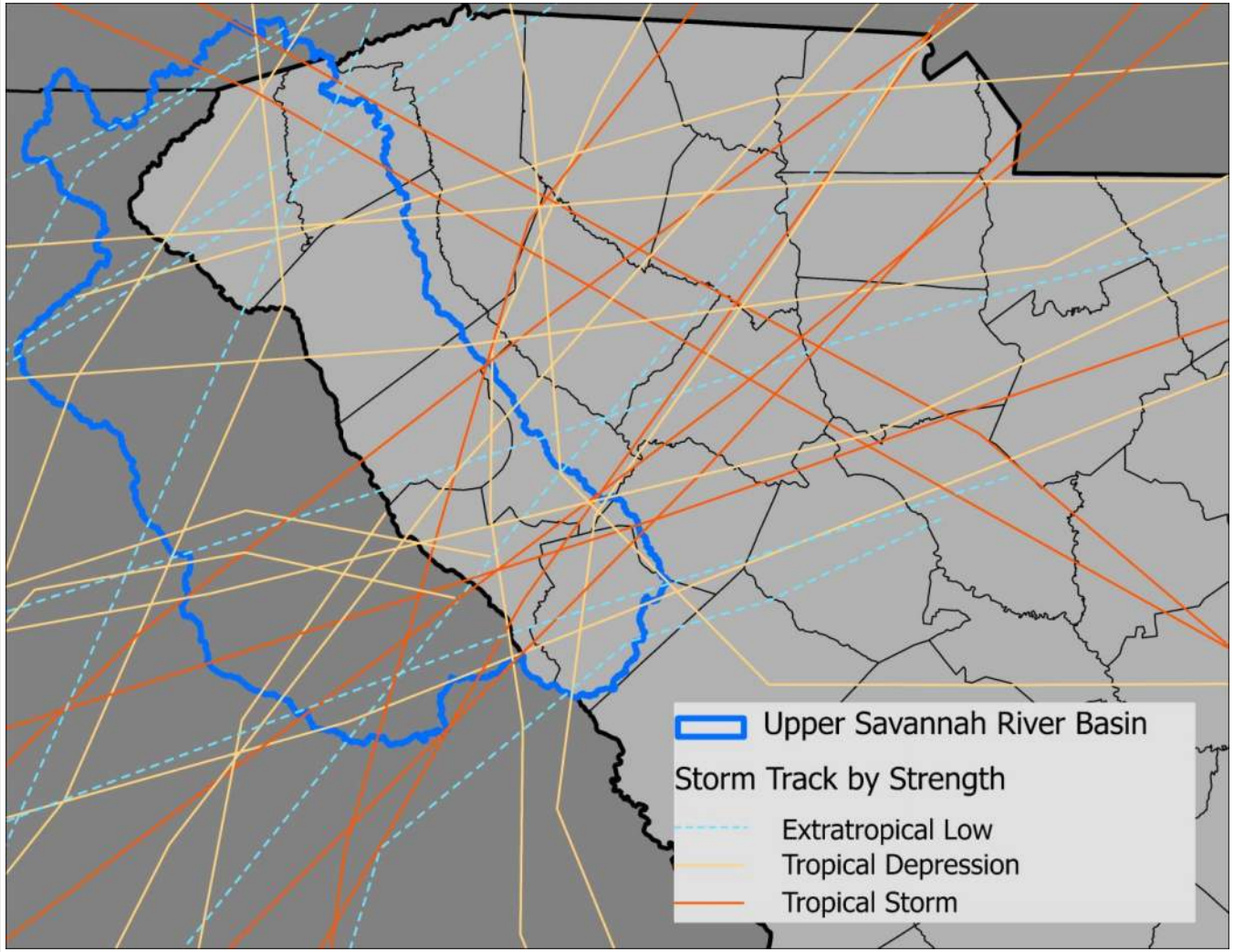
CHANCE OF BEING IMPACTED BY A TROPICAL SYSTEM EACH YEAR

THE BREAKDOWN:

260	SYSTEMS HAVE IMPACTED SC
138	HAVE TRACKED INTO THE STATE
60	WERE CATEGORY 1 OR HIGHER
44	MADE DIRECT LANDFALL ON THE COAST
4	MAJOR (CAT. 3+) LANDFALLS

UPPER SAVANNAH BASIN
TROPICAL CYCLONES BY THE NUMBERS

*based on
1851-2021 period of record



THE BREAKDOWN:

31 HAVE TRACKED INTO THE BASIN

9 WERE EXTRATROPICAL LOW STRENGTH

14 WERE TROPICAL DEPRESSION STRENGTH

8 WERE TROPICAL STORM STRENGTH

For Reference:
- Tropical Depression: max wind of 38 mph
- Tropical Storm: max winds of 39-73 mph

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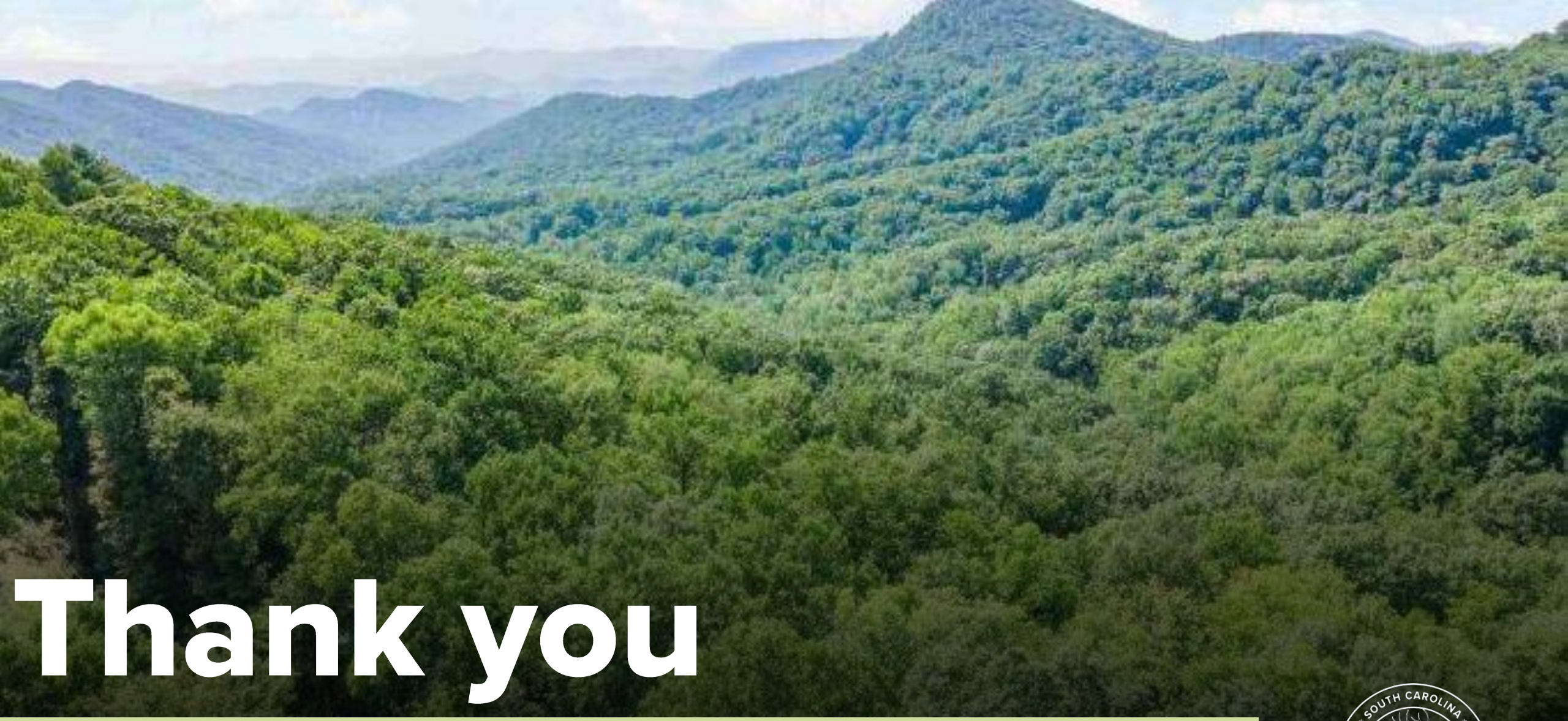

Thank you

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