

Back to Oz – Tornadoes

SC Association for
Hazard Mitigation
Conference 2024

Hope Mizzell
SC State Climatology Office
March 18, 2024



Tornadoes

A violently rotating column of air extending from a cumulonimbus cloud to the ground, ranging in width from a few yards to more than a mile, with destructive winds which can be over 300 mph.

Any thunderstorm that causes a tornado is considered severe.

Did You Know?

No F5 or EF5 tornadoes have ever been recorded in SC

There have been 11 F4 or EF4 tornadoes

Most recent EF4, and the only one of the 21st Century in SC occurred the morning of April 13, 2020, in Hampton County

Five F4/ EF4 tornadoes were part of the outbreak of March 28, 1994



Photo by Shannon Mercer ,tornado struck Lexington , August 16, 1994, spawned by remnants of Tropical Storm Beryl.

Rated at F-3 on Fujita Scale in use at the time.



Enhanced Fujita Scale (EF Scale) classifies tornadoes based on a survey of damage along track.



EF Scale considers more variables than the original F-Scale (1971 – 2007) when assigning a wind speed rating



EF Scale incorporates 28 damage indicators (DIs), such as building type, structures, and trees.



For each damage indicator, there are multiple degrees of damage (DOD) ranging from the beginning of visible damage to complete destruction of the damage indicator. The original F-Scale did not take these details into account.

EF Scale	Class	Wind Speed (mph)	Description
EF0	Weak	65-85	Gale
EF1	Weak	86-110	Moderate
EF2	Strong	111-135	Significant
EF3	Strong	136-165	Severe
EF4	Violent	166-200	Devastating
EF5	Violent	> 200	Incredible

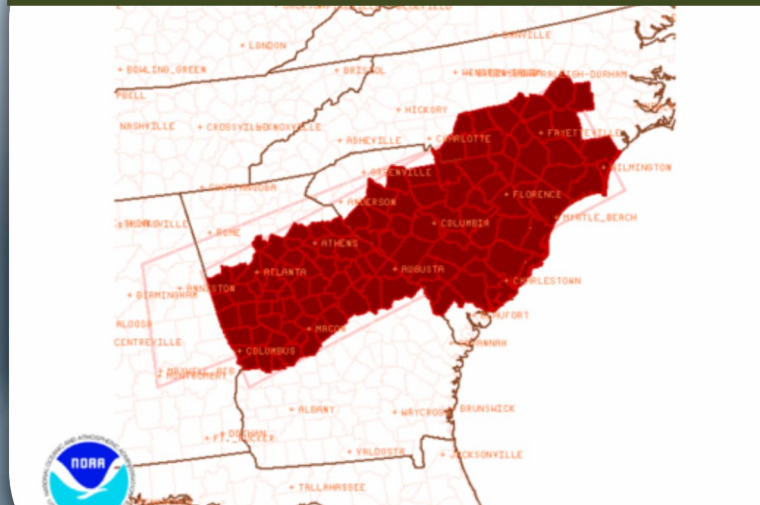
Outlooks, Watches and Warnings

Outlooks are issued up to 8 days in advance of a potential severe weather event to give advance notice of a threat. Conditions favorable for severe weather are forecast to occur in areas outlined in outlook areas.



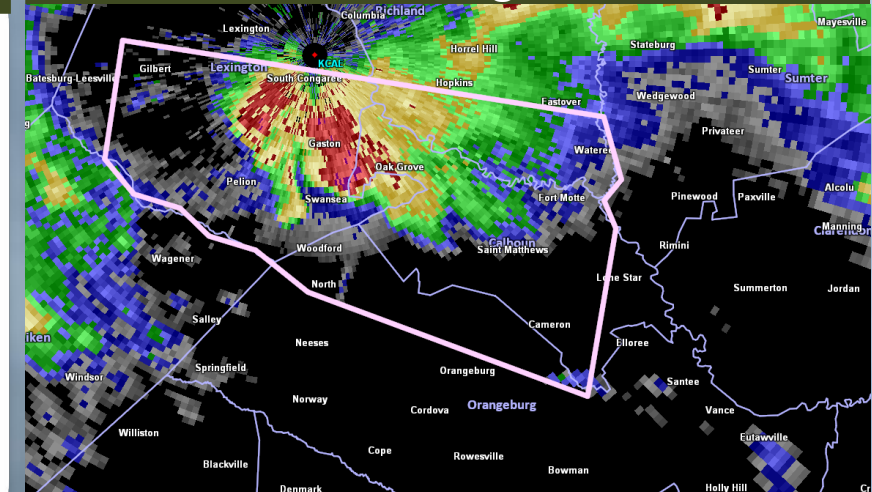
**Storm Prediction Center Day 4-8 Outlook
March 12, 2008**

Watches are issued for a period of hours. They mean that favorable conditions for severe weather exist, and that severe weather can begin soon or may even already be underway.



**Tornado Watch issued by Storm
Prediction Center at 4:35 p.m. on
March 15, 2008**

Warnings are issued when severe weather is occurring or imminent.

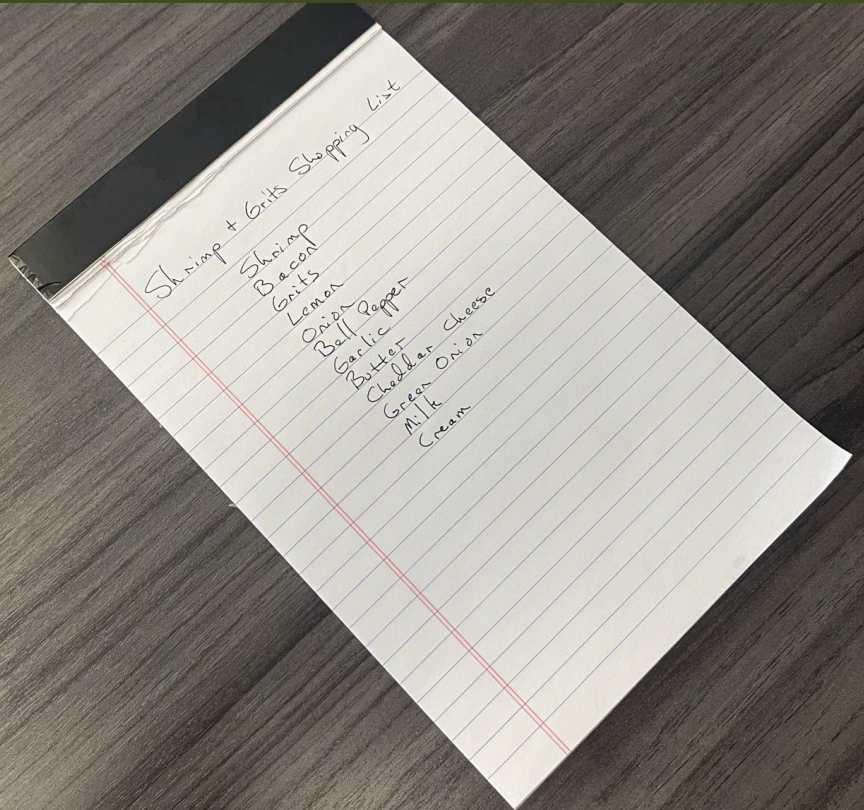


**Tornado Warning for Richland, Lexington,
Calhoun & Orangeburg Counties, issued
by NWS Columbia at 5:50 p.m. March 15,
2008**

Outlooks, Watches and Warnings

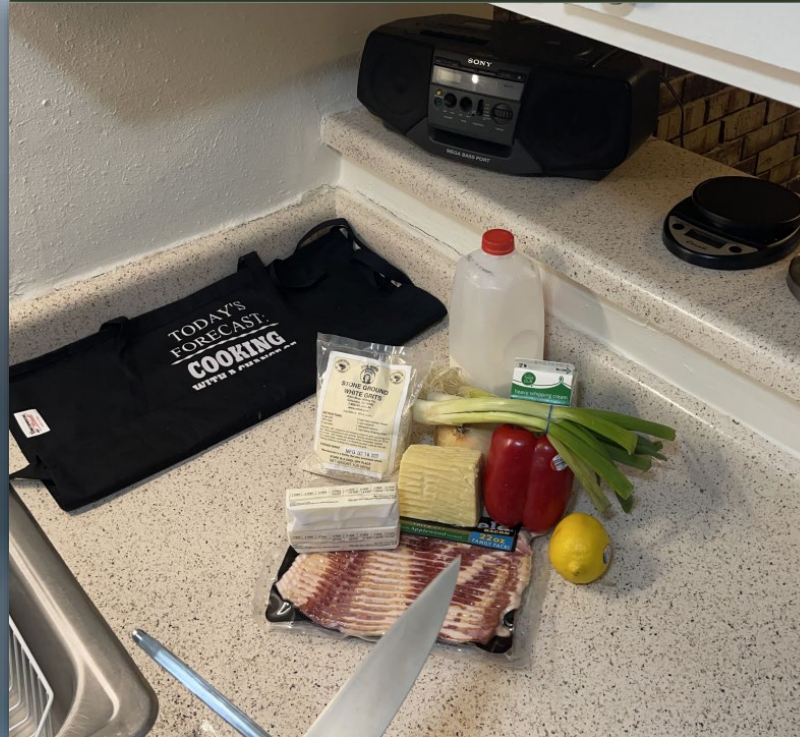
Shrimp and Grits Outlook:

Some risk for Shrimp and Grits, if the store has all the ingredients.



Shrimp and Grits Watch:

You have the ingredients, you're hungry and ready to cook!



Shrimp and Grits Warning!

Let's Eat!



Staying Connected During Severe Weather

Have least two ways to receive warnings!

Phone's emergency alerts, phone apps, weather radios, text messaging services and phone call services like SCEMD's CodeRed.

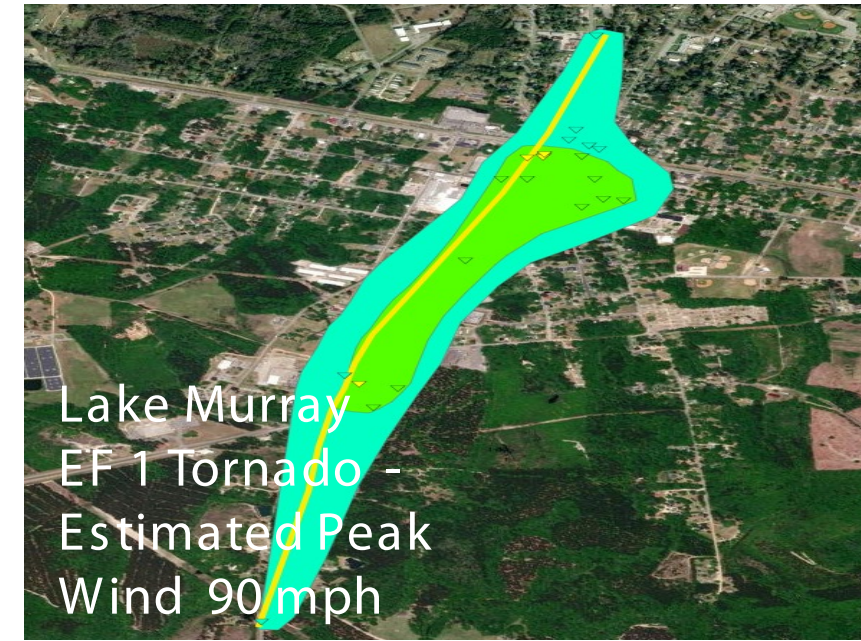
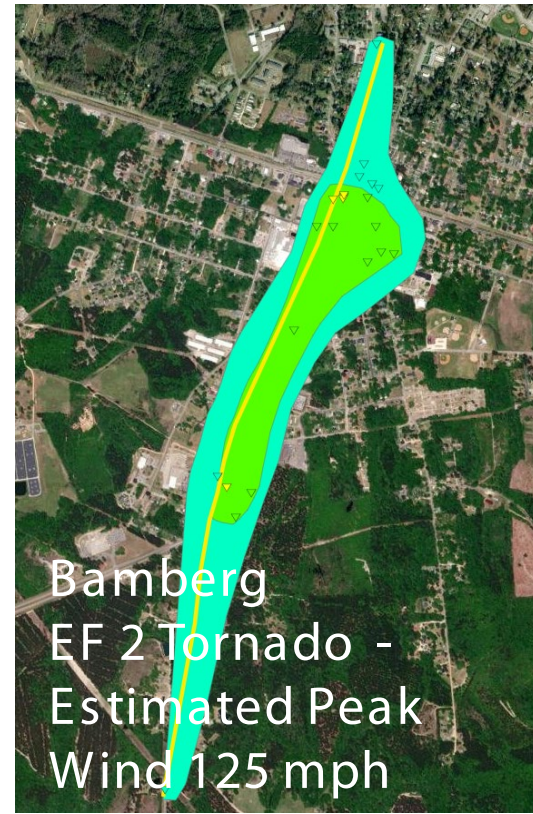
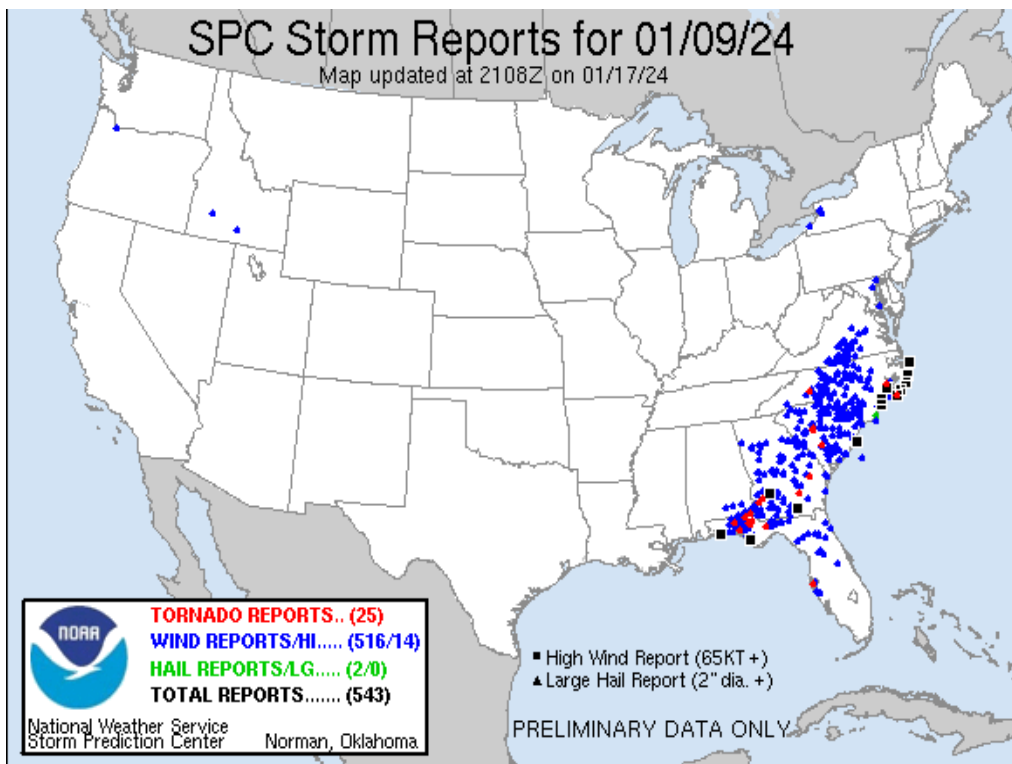
Monitor your preferred local media when event is unfolding.

Know your area! Be able to find where you live on a map and know which county you live in.

Traveling on a day with severe weather threat, pay attention to which county you're in and nearby cities, so you know where you are in relation to a threat if you find yourself in a warned area.



DNR Photo



January 9, 2024 Tornadoes





When Warnings Are Issued

**When a Severe Thunderstorm Warning is issued:
Go indoors into a sturdy building!**

If time permits ahead of the storm:

- Secure loose items in your yard
- Put your car in your garage
- Bring pets indoors
- Tell others you see outdoors that a severe storm is approaching

During the storm:

- Stay away from windows
- Monitor local media or a weather radio, wait for the warning to expire or be canceled and the storm to move away before going outdoors
- If driving, stay alert, reduce speed, find a safe spot to stop if you can. Never stop under an overpass or in a travel lane!



When Tornado Warning is issued for your area:

Follow your predetermined tornado action plan!

- **Go to your predetermined tornado shelter area!**
- **If outdoors, go into a sturdy building immediately!**
- **Abandon mobile homes for sturdy shelter!**
- **Abandon your car for a sturdy building!**
 - **If no sturdy building is nearby and you have a safe escape route drive at a right-angle to the tornado's path as quickly and carefully as possible. Otherwise, park your car at a distance from trees, stay in the car with the engine running and your seat belt on. Never try to outrun a tornado in your car!**
- **If outdoors with no shelter, find a low spot away from trees and take refuge, lying flat and covering your head with your arms. Watch for flooding.**

Tornado Emergencies

Tornado emergency is an enhanced tornado warning. Means a strong tornado is confirmed in warned area and a population center is threatened.

It is meant to convey a greater level of certainty of a life-threatening situation and potential for property damage.

Precautions for a tornado emergency are the same as a tornado warning, just with an extreme level of urgency.

Since the inception of tornado emergency by NWS in 1999, only one has been issued in SC, for tornado which struck Walterboro area of Colleton County, April 13, 2020.

NWS Offices Serving South Carolina

Greer, SC
Phone: 864-848-3859
www.weather.gov/gsp
Email: gsp.webmaster@noaa.gov
Twitter: @NWSGSP
Facebook: @NWSGSP

Wilmington, NC
Phone: 910-762-4289
www.weather.gov/ilm
Email: ilm.webmaster@noaa.gov
Twitter: @NWSWilmingtonNC
Facebook: @NWSWilmingtonNC

Columbia, SC
Phone: 803-822-8135
www.weather.gov/cae
Email: NWS.Columbia@noaa.gov
Twitter: @NWSColumbia
Facebook: @NWSColumbia

Charleston, SC
Phone: 843-747-5860
www.weather.gov/chs
Email: nws.charlestonsc@noaa.gov
Twitter: @NWSCharlestonSC
Facebook: @NWSCharlestonSC



National Weather Service appreciates severe weather reports.

- Never jeopardize your safety! Wait until any danger has passed to give report.
- Prioritize helping those hurt over giving a report.
- Use map to determine which NWS office to report to.
- Give name, contact information and location
- Latitude and longitude is preferred, but address, nearby intersection or nearby interstate mile marker are also good.
- Give type of severe weather (high wind, large hail, tornado or flooding). Include a wind speed measurement if you have a home weather station and the size of the largest piece of any hail.
- Include time and duration, estimates are fine.
- Include damage such as downed trees and power lines, structural damage (and the type of structure), hail dents or broken windshields, hail covering the ground (and how deep if it's notable), and roads blocked by debris.
- Include photos if you can safely get a good picture.

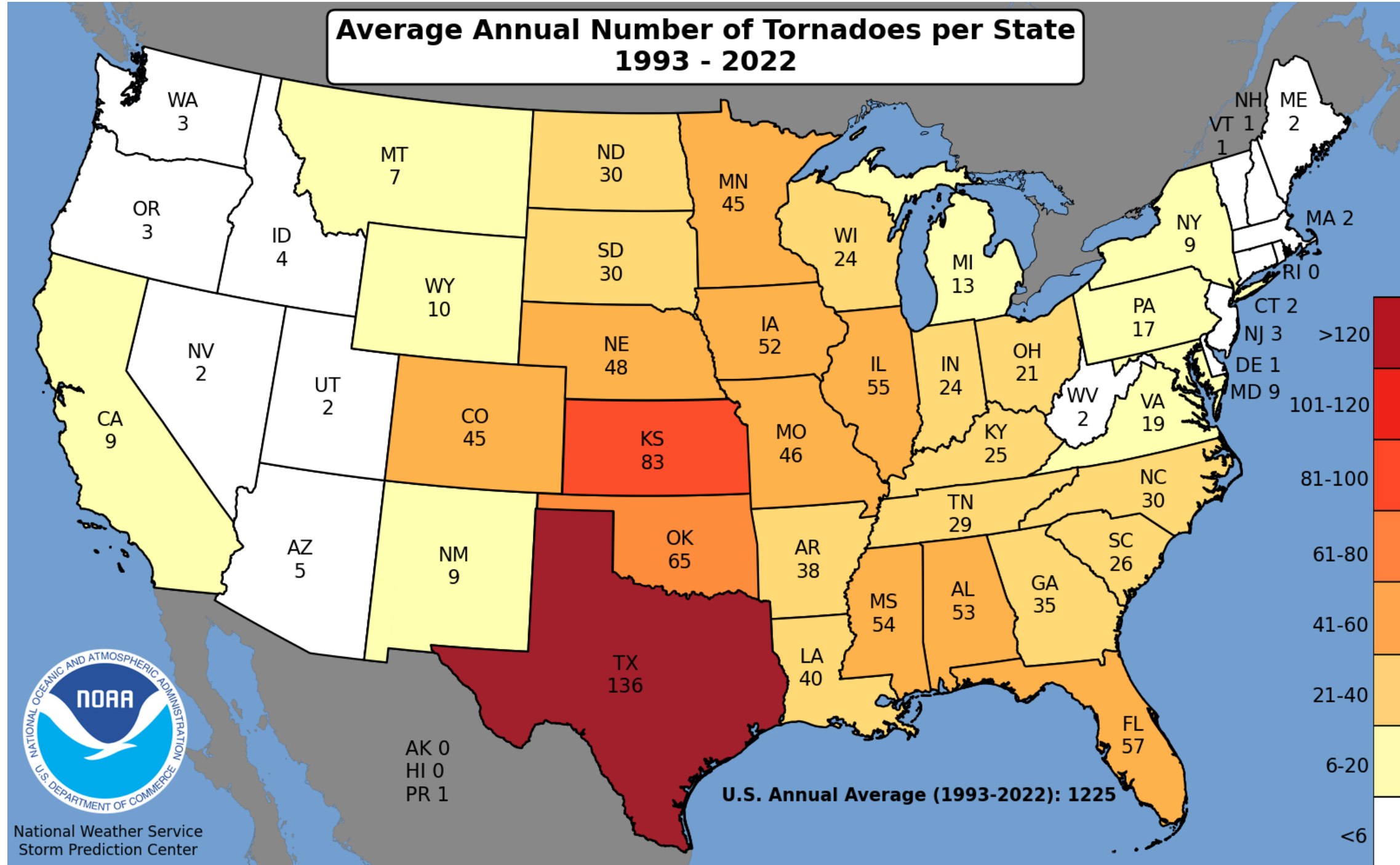


National Weather Service Offices Serving South Carolina

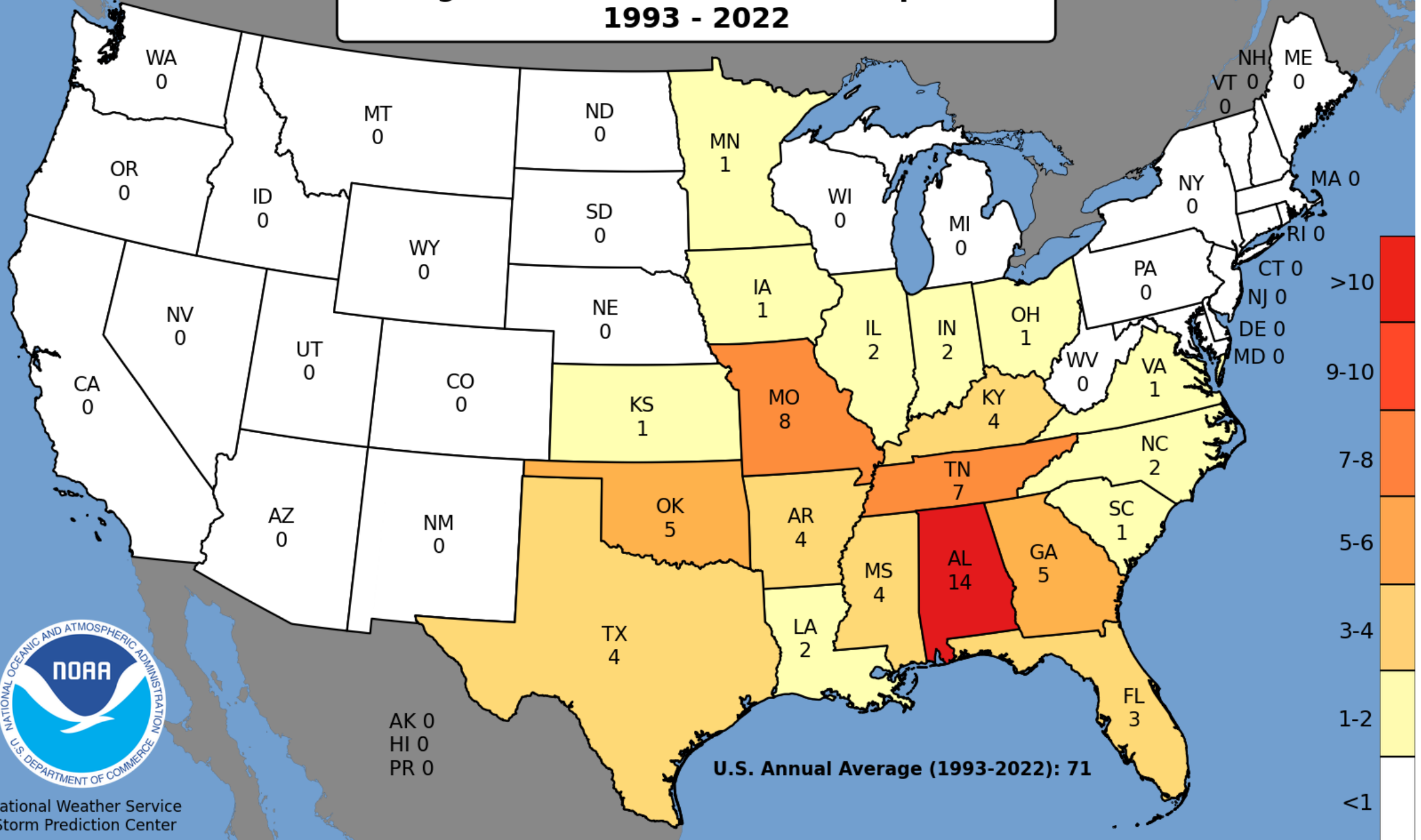
	Greer (GSP)	Columbia (CAE)	Charleston (CHS)	Wilmington (ILM)
Twitter	@NWSGSP (hashtags: #GSPwx, #SCwx)	@NWSColumbia (hashtags: #CAEwx, #SCwx)	@NWSCharlestonSC (hashtags: #CHSwx, #SCwx)	@NWSWilmingtonNC (hashtags: #ILMwx, #SCwx)
Facebook	@NWSGSP	@NWSColumbia	@NWSCharlestonSC	@NWSWilmingtonNC
Email	gsp.webmaster@noaa.gov	NWS.Columbia@noaa.gov	nws.charlestonsc@noaa.gov	ilm.wxreports@noaa.gov
Phone	800-267-8101	803-822-8037	888-383-2024	800-697-3901

You can also report severe weather on the internet using a form at inws.ncep.noaa.gov/report
Also, you can report any weather you see using the mPing app available from mping.nssl.noaa.gov

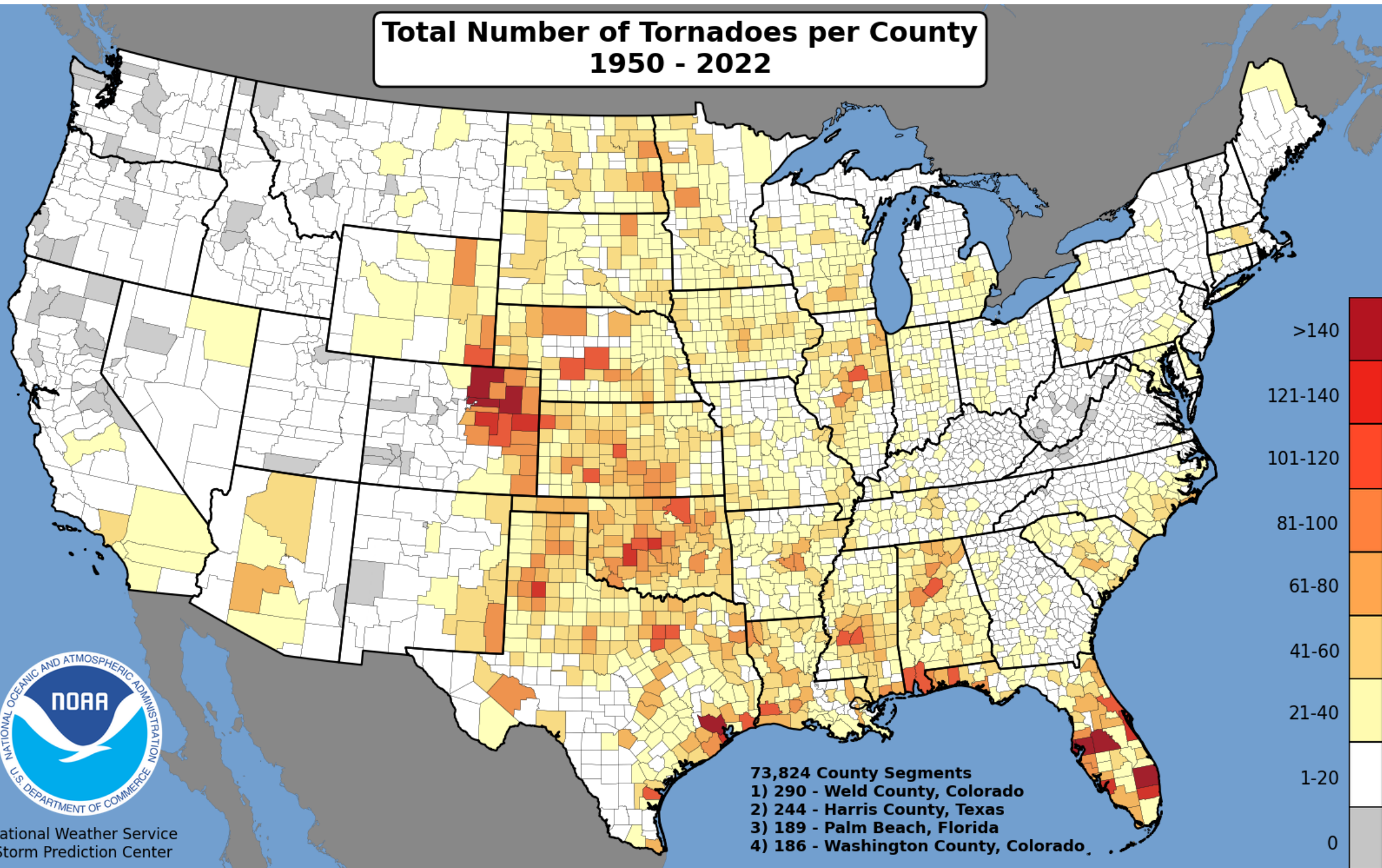
Average Annual Number of Tornadoes per State 1993 - 2022



Average Annual Tornado Fatalities per State 1993 - 2022

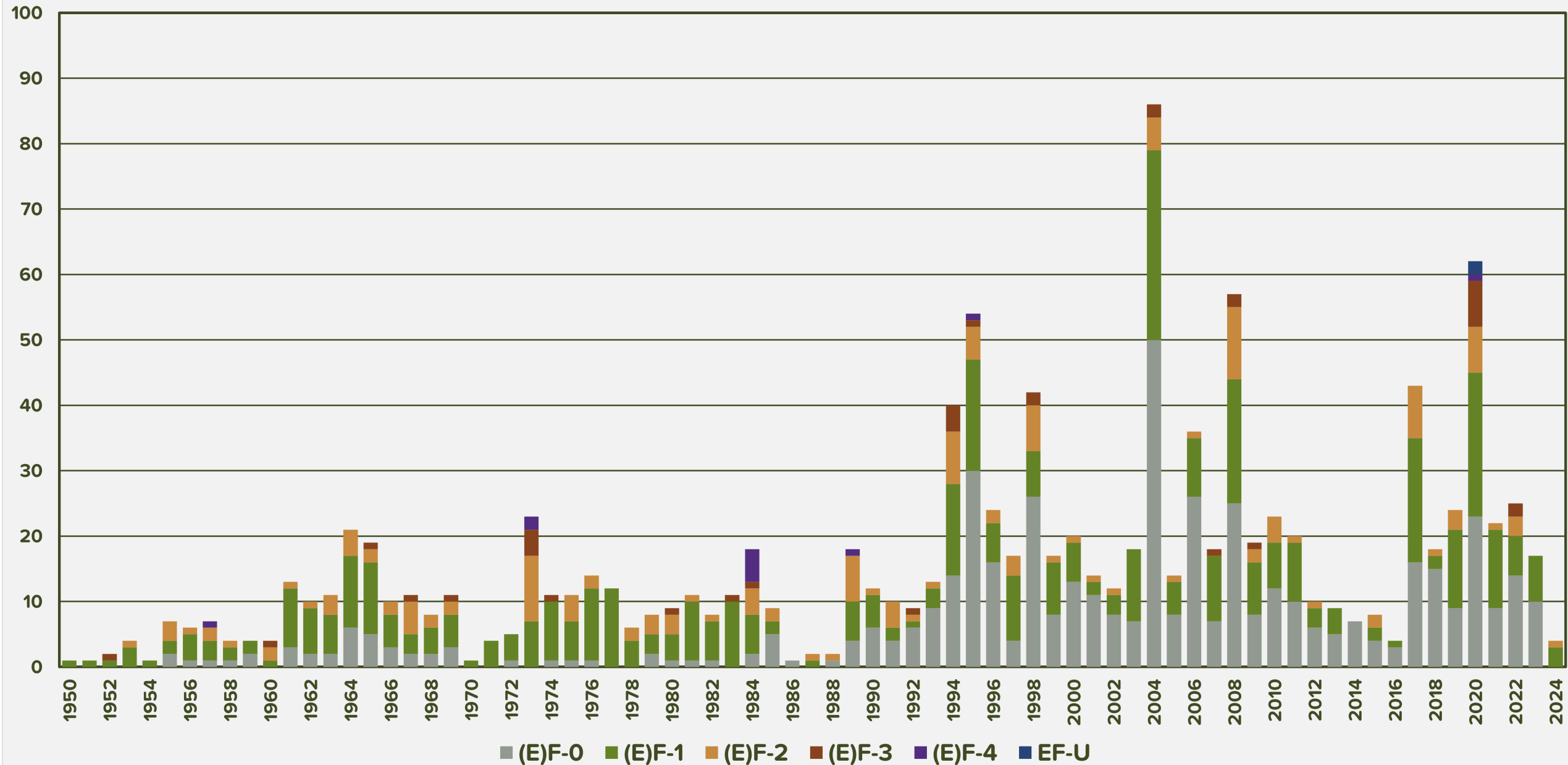


Total Number of Tornadoes per County 1950 - 2022



South Carolina Tornadoes By F/EF Scale Rating

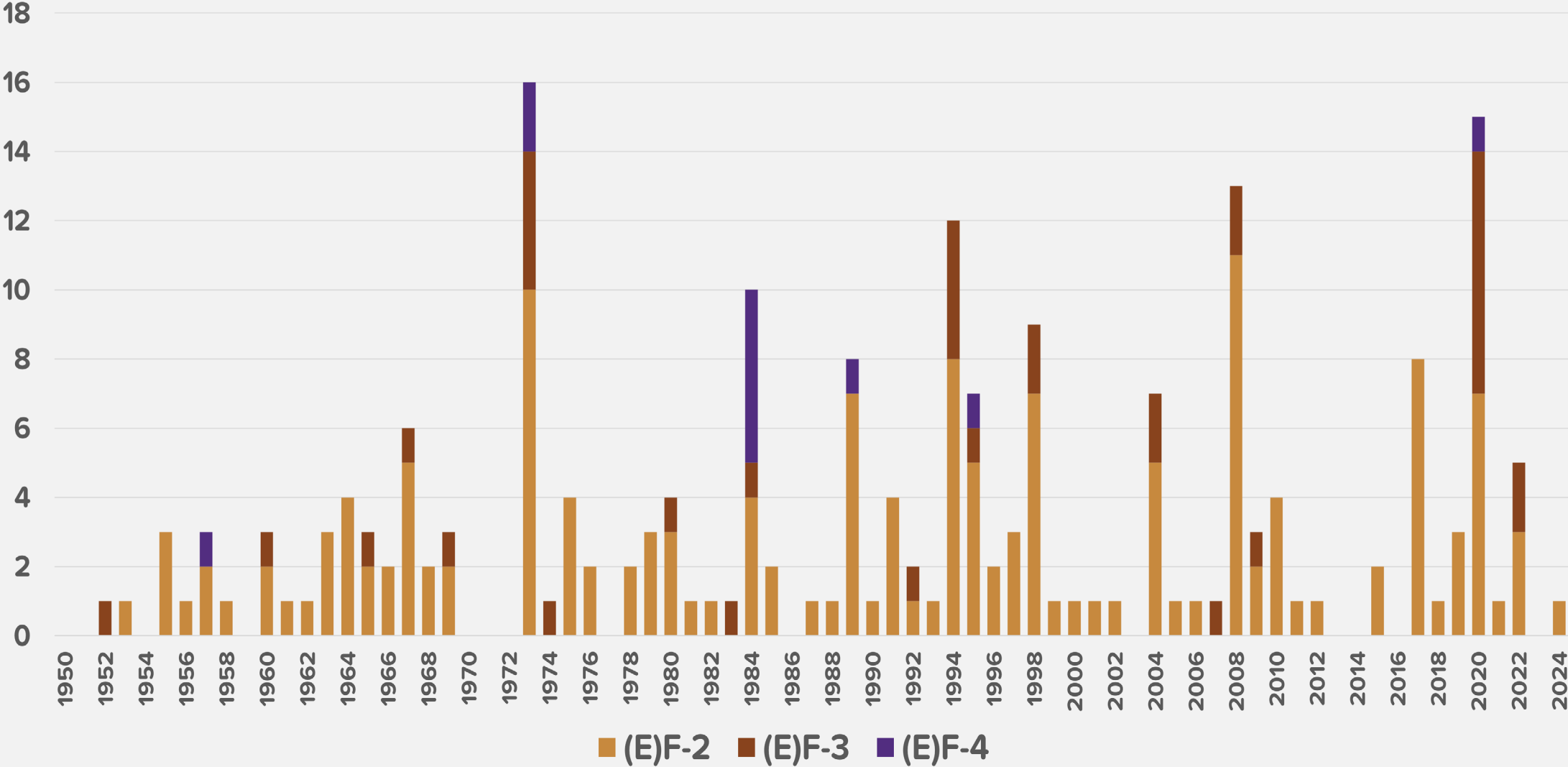
1950-Present



Significant Tornadoes in SC

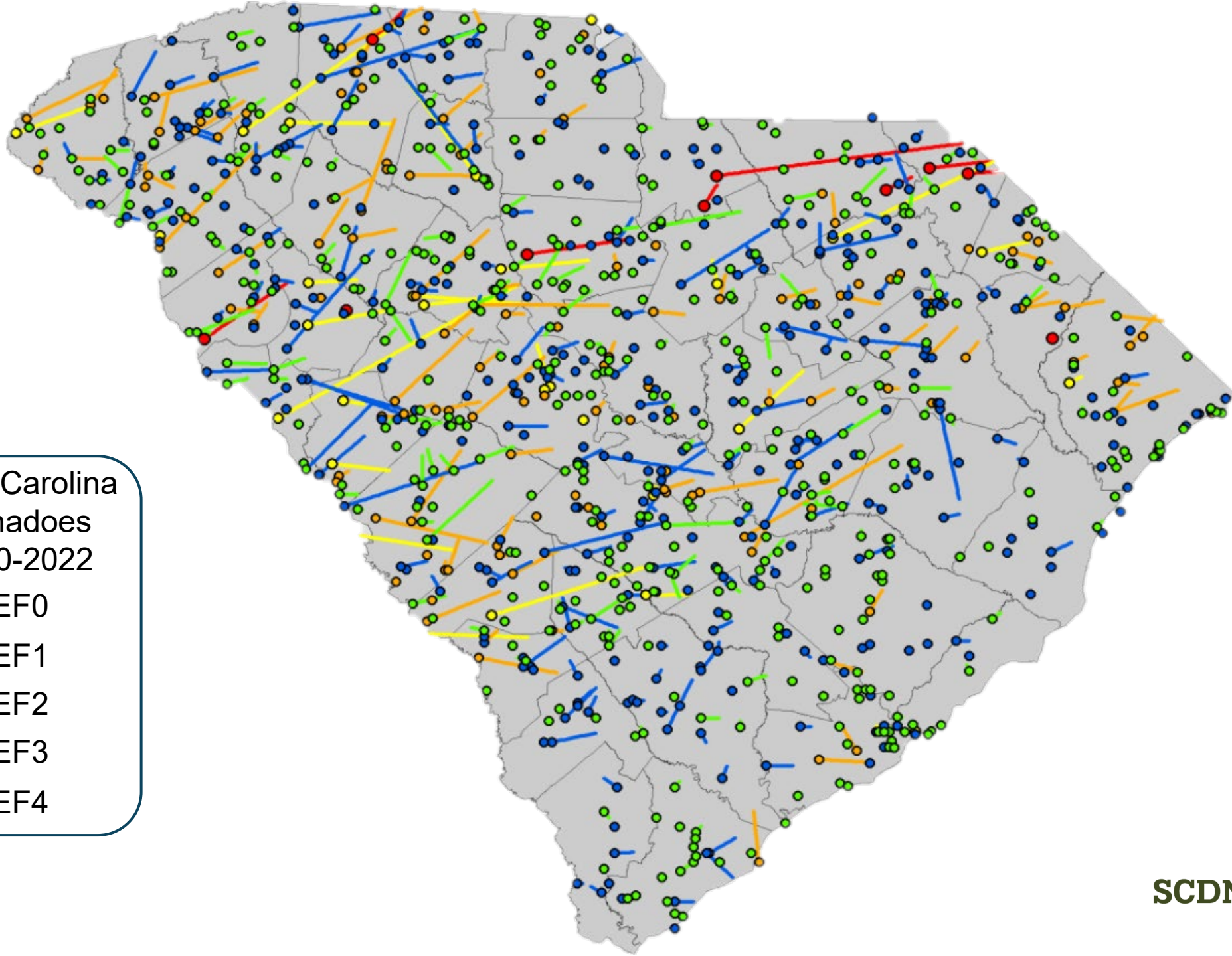
(EF-2 or Higher)

1950-2024



South Carolina
Tornadoes
1950-2022

- EF0
- EF1
- EF2
- EF3
- EF4



South
Carolina's
Most
Intense
Tornadoes
1950-2024

South Carolina's (E)F-4 Tornadoes							
Date	Start Time	Counties Affected	Path Length (Miles)	Path Width (Yards)	Deaths	Injuries	Damage (X \$1M nominal)
Apr 13, 2020	6:10 a.m.	Hampton	23.75	1300	5	60	Unknown
Nov 11, 1995	5:05 p.m.	Marion	0.7	40	0	1	0.800
May 5, 1989	3:20 p.m.	Spartanburg, Cherokee	9	700	2	35	5.0
Mar 28, 1984	6:20 p.m.	Marlboro, Three NC Counties	40	2600	2	115	25.0
Mar 28, 1984	6:10 p.m.	Marlboro, One NC County	17	2100	7	100	25.0
Mar 28, 1984	6:45 p.m.	Chesterfield	7	700	0	24	25.0
Mar 28, 1984	5:20 p.m.	Kershaw, Lancaster	36	530	0	36	50.0
Mar 28, 1984	5:00 p.m.	Fairfield	21	1000	5	49	25.0
Dec 13, 1973	2:30 p.m.	Greenwood	1	50	2	0	2.5
Mar 31, 1973	6:20 p.m.	Greenwood, Abbeville	22.6	200	7	30	2.5
Apr 8, 1957	3:00 p.m.	Lancaster, Chesterfield, Marlboro	55.5	150	0	16	0.750

Horrell Hill Tornado of April 30, 1924

Most deadly tornado on record for SC with 53 fatalities

105-mile path passed through Aiken, Lexington, Richland, Sumter, Lee and Darlington Counties.

Forward speed estimated 70 mph

THREE SCORE STORM DEATHS

TWENTY LOSE LIVES IN RICHLAND COUNTY

*Two Tornadoes Meet in Horrell
Hill Section*

SCHOOLHOUSE DEMOLISHED

*Other Sections Below Columbia Also in Path of Disaster—Lykesland Hit Hard—Noble Work
by Relief Parties.*

Twenty dead, eleven of them white women and children; scores injured, some perhaps fatally; homes and farm houses, uncounted, literally torn to pieces; schoolhouse and a church razed; mighty trees gnarled and broken and twisted and the entire countryside littered with debris—as twin tornadoes, appearing just before noon yesterday, tore their way of destruction through Lower Richland county.

The storm, moving generally northeast, seemed to have entered the county in the Big Lake section from Lexington county, striking with terrible force at Lykesland, Adams Pond, Horrell Hill and James Crossing. Everywhere it left in its wake death and devastation—a mile wide path of demolished buildings and broken trees, extending for miles through scattered farms and villages.

At Horrell Hill, where the schoolhouse—filled to capacity with children and teachers at the time—was demolished, and various homes razed, and at Lykesland, where two white children and three negroes lost their lives, were the centers of greatest destruction. The toll of known dead at Horrell Hill amounted to twelve, eight white women and children and four negroes, the two storms having, it appears, here met and being united swept on to wreak havoc for miles about. Only four of the 75 school children were killed. One



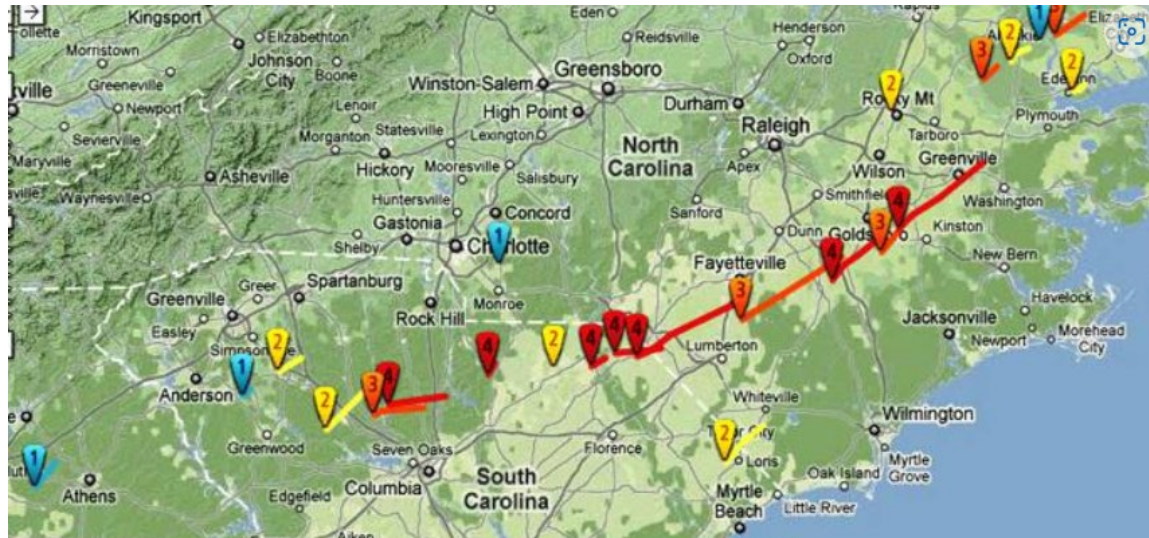
The wrecked Horrell Hill school house, in lower Richland, where four children were killed and many injured by the tornado yesterday.

March 28, 1984 Outbreak

2a. TORNADO OUTBREAK in the CAROLINAS on March 28, 1984

During a 6-hour period in the late afternoon and early evening of March 28th, a strong line of thunderstorms produced 22 tornadoes in North and South Carolina. Of the 22 tornadoes, 7 were F4 in strength, 5 F3, 7 F2, and 3 were F1. The path lengths varied from less than a mile to 45 miles, and totaled 310 miles. The longest tornado path (#11, McColl Tornado) was also the widest, with a mean width of 1.5 miles and maximum width of 2.5 miles. Many of the paths followed each other along lines indicating that the tornadoes were of a family type (spawned one after another by the same parent thunderstorm). One tornado (#16, Snug Harbor) began as a waterspout over Albemarle Sound. In South Carolina the tornadoes were accompanied by 3 large down-burst areas, each producing F1 damage.

The total number of deaths for the two states from these tornadoes was 57, 21 of which (37%) occurred in mobile homes. 1,248 people were injured.



Trailer lands on cars
Leslie Stanford Jr., 30, climbs out of the

window of his mobile home, which overturned Wednesday night at the Southern Mount Olive Mobile Home Village in Mount Olive. Seven

people were inside the trailer when it overturned on Stanford's cars. No one was injured seriously.

Cost of disaster will be 'incredible'



Rescue workers survey the remains of a store in the Northwood Shopping Center in Bennettsville, S.C.

Red Cross needs cash

To fund relief work for victims of the tornadoes, the Cape Fear Chapter of the American Red Cross is asking for cash donations.

"The cost is just going to be incredible," said Clem Jordan, chairman of the board of the local chapter. Food and clothes donations are not needed, he said.

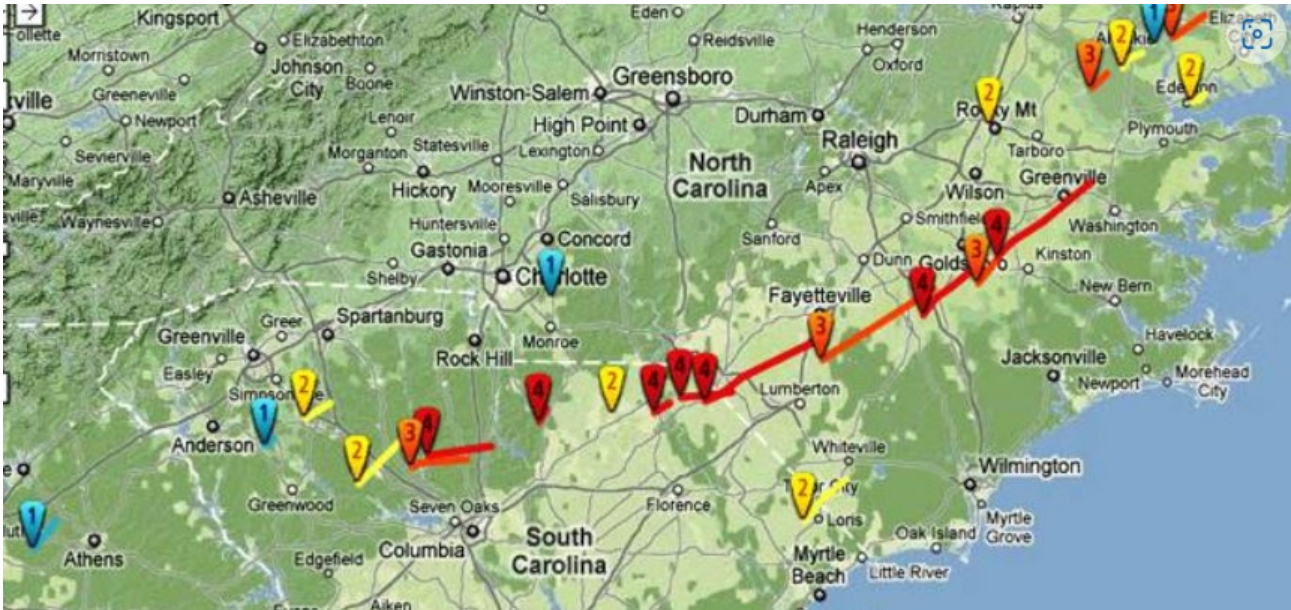
Contributions may be sent to the Cape Fear Chapter, American Red Cross, 411 S. Front St., Wilmington, 28401. Checks should be made payable to the American Red Cross, Jordan said.



Crews clean up fallen trees along Fifth Street in Tabor City.

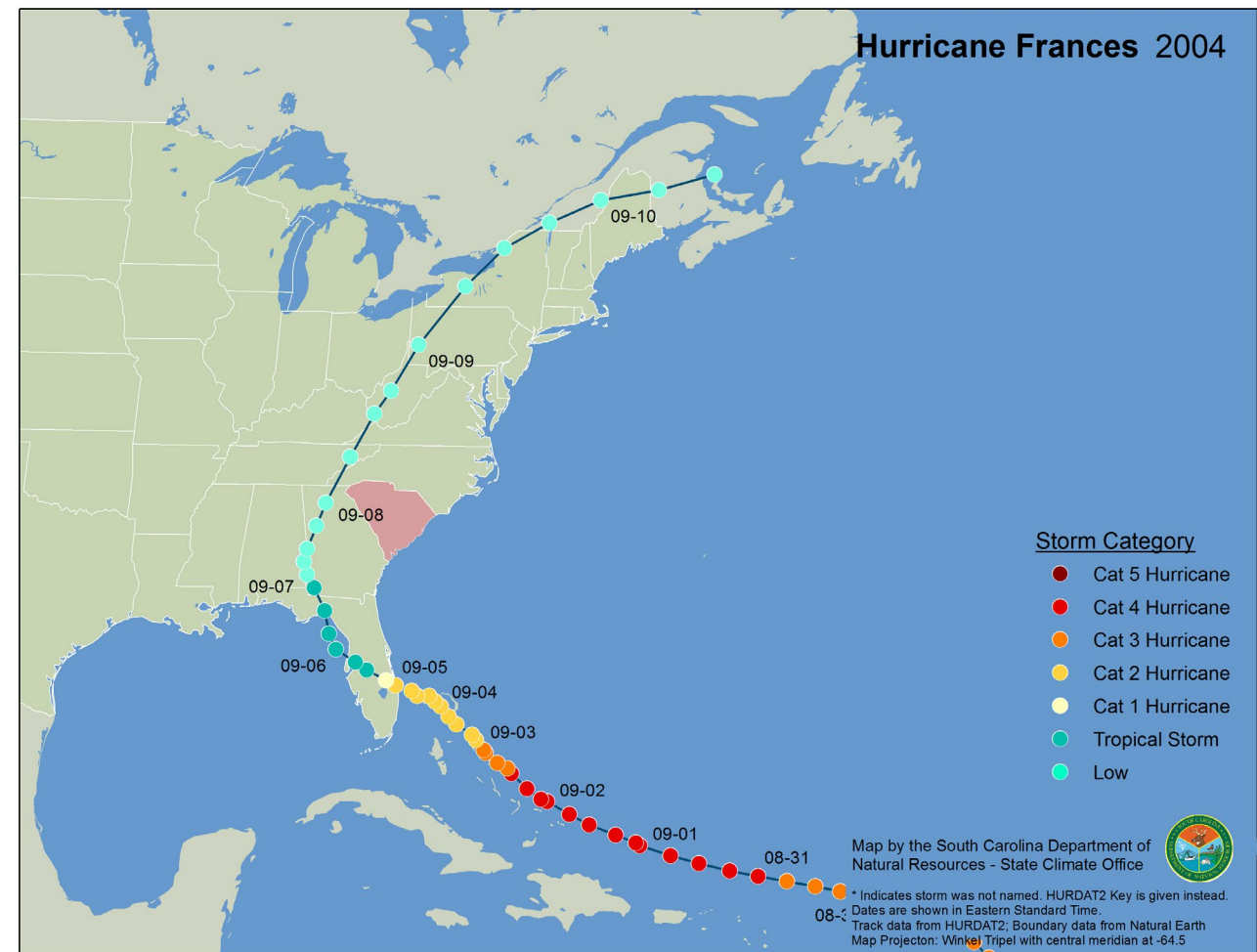


Carmen Faircloth and two small sons escaped injury when a tornado demolished their home near Roseboro in Sampson County.



Hurricane Frances – September 2004

- Most SC tornadoes from a single event
- Part of larger outbreak of 103 tornadoes over seven states.
- Injured 13 people in SC, no deaths
- F-3 hit Kershaw County north of Camden.
- F-2 hit Sumter area, passing near Sumter High School, damaging 55 homes, and demolishing nine.
- Total damage \$4.3 million (2022 dollars)



Damage to a horse stable near Camden, with a horse trailer thrown on top of it, caused by the F-3 tornado spawned by Frances on September 7, 2004 (SCDNR Archive Photo).



EF4 Damage
Estill, SC – 4/13/2020
Estimated Maximum Winds: 172 mph





EF3 Damage
Hilda, SC – 4/13/2020
Estimated Maximum
Winds: 145 mph





EF3 Damage
Livingston, SC –
4/13/2020
Estimated Maximum
Winds: 140 mph



EF3 Damage
Seneca, SC – 4/13/2020
Estimated Winds: 140
mph





EF2 Damage
Bamberg, SC – 1/10/2024
Estimated Maximum
Winds: 125 mph





EF2 Damage
Manning, SC – 4/5/2022
Estimated Maximum
Winds: 115 mph





EF1 Damage
Spartanburg, SC – 2/9/2020
Estimated Maximum Winds: 95 mph



EF1 Damage
Spartanburg, SC – 2/9/2020
Estimated Maximum Winds: 95 mph





EF0 Damage
Oats, SC 6/12/2022
Estimated Maximum
Winds: 85 mph





EF0 Damage
Mount Pleasant, SC
9/22/2022
Estimated Maximum
Winds: 70 mph



THE SOUTH'S 20 SEASONS

HUNTING
WINTER
POLLEN
WINTER
TORNADO
SO MUCH POLLEN
ONE MORE WINTER
TORNADO
ATTACK OF THE MOSQUITOS
SUMMER
MORE SUMMER
EVEN MORE SUMMER
PLEASE, LORD! MAKE THIS SUMMER END!
FOOTBALL
TORNADO
FALL
JUST KIDDING, HERE'S SOME MORE SUMMER
WINTER
CHRISTMAS
MAYBE ONE MORE SUMMER

IT'S A
Southern
THING

Thank You!

Hope Mizzell

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www.dnr.sc.gov/sco