

August 2023 Central NC Climate Summary

By Phillip Badgett and James Danco

Summer heat continues along with a late-month tropical storm.

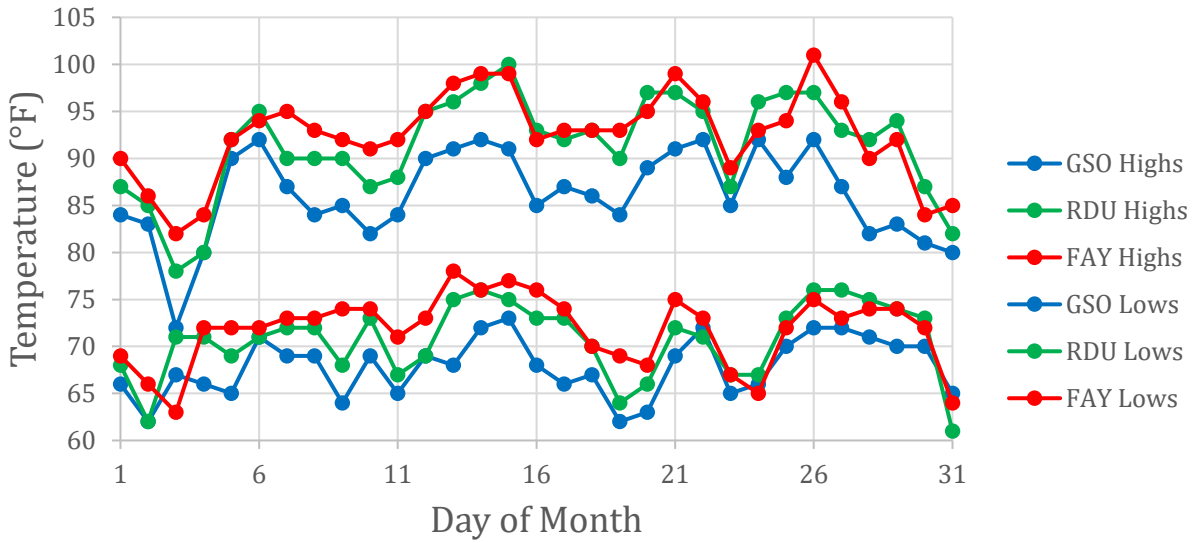
The heat continued through the heart of summer in August 2023. According to the NCEI, the preliminary statewide temperature was 77.4°F, which ranked as the 20th-warmest August in the 129 years of official records. Most areas (including Raleigh and Fayetteville) finished the month with an average temperature that was 2 to 3°F above normal, except in the NW Piedmont (including Greensboro) where the temperatures averaged close to normal. Raleigh and Fayetteville had their 5th and 4th warmest Augusts on record, respectively. The monthly average temperatures and their departures from normal at the three climate sites are depicted in Table 1.

Table 1: Monthly Temperature Statistics

Site	Avg High Temp (°F)	Avg Low Temp (°F)	Avg Temp (°F)	Departure From Normal (°F)	Maximum Temperature (°F)	Minimum temperature (°F)
Greensboro (GSO)	86.2	67.8	77.0	-0.3	92 on 8/22, 8/24 and 8/26	62 on 8/2 and 8/19
Raleigh-Durham (RDU)	91.4	70.6	81.0	+2.2	100 on 8/15	61 on 8/31
Fayetteville (FAY)	92.5	71.7	82.1	+2.3	101 on 8/26	63 on 8/3

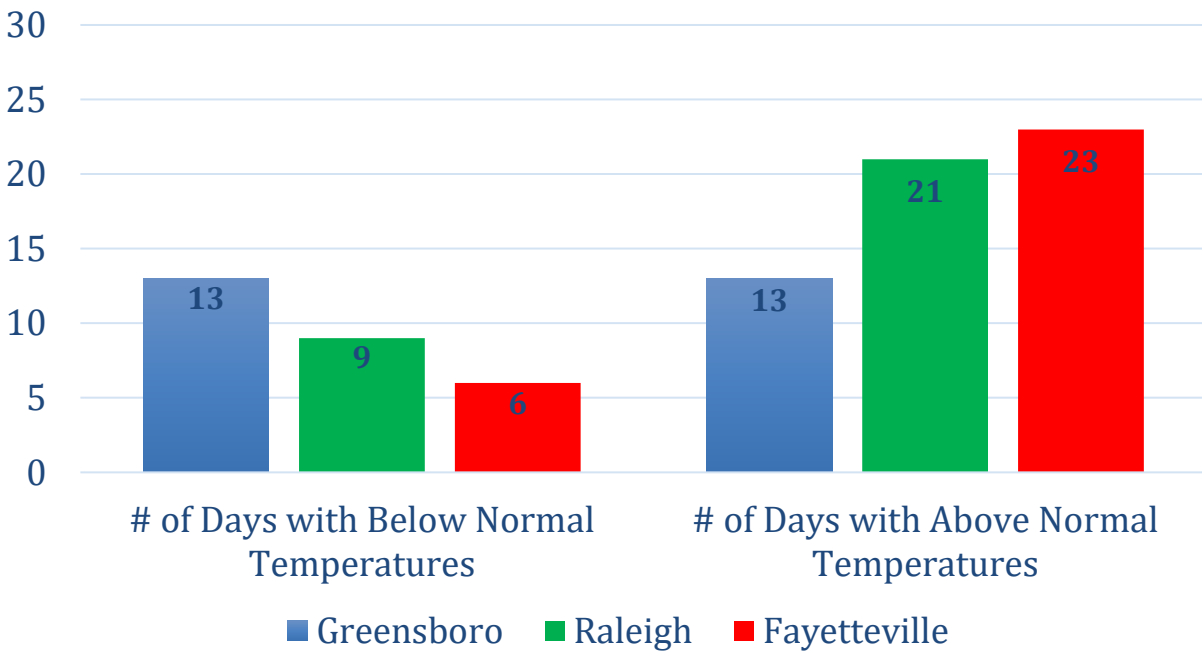
The time series of daily temperature for the month at Greensboro, Raleigh, and Fayetteville can be found in Figure 1. The hottest days occurred during the mid to latter part of the month, followed by a cooldown at the very end. Raleigh recorded a monthly high temperature of 100°F on August 15, its first time reaching the century mark since July of last year, while Fayetteville reached 101°F on August 26. The August tally of 90+°F days reached 25 at Fayetteville, 22 at Raleigh, and 10 at Greensboro. Raleigh was tied for the 4th-most such days in any August since records began in 1887. This included an 11-day stretch from August 12-22 when Raleigh reached a high of at least 90°F. Fayetteville tied for the 9th-most 90+°F days in August since records began in 1910, and it had a whopping 18 consecutive days from the 5th to the 22nd with temperatures reaching the 90s. Both Raleigh and Fayetteville also had the most such days in any August since 2016.

Fig. 1: August Daily Temperature Trends



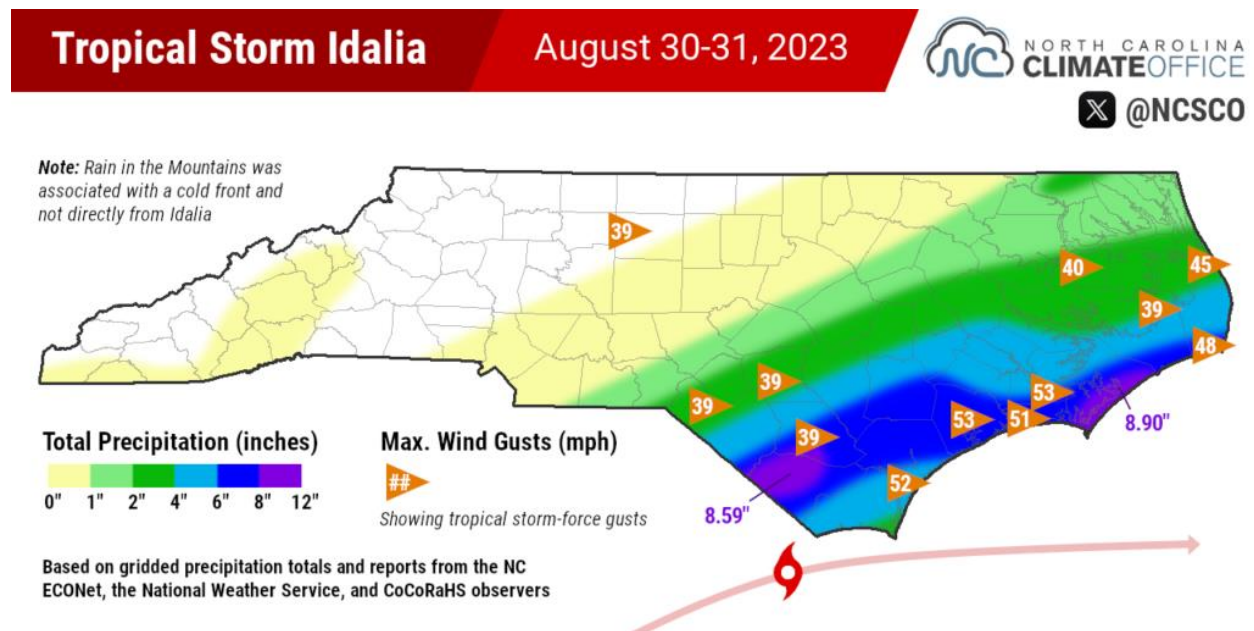
As displayed in Figure 2, Greensboro had equal numbers of days that were warmer and cooler than normal. But at Raleigh and Fayetteville, the vast majority of days (around 70%) were warmer than normal.

Fig. 2: Number of Days Warmer and Cooler than Normal



The system of the month was Tropical Storm Idalia that affected our region during the last week of August. Idalia formed in the Gulf of Mexico on August 27. It became a hurricane that hit the Big Bend region of Florida as a Category 3 storm on August 30. A strong mid and upper level trough was punching east across the Tennessee Valley and Appalachians, which steered the storm to the east as it approached southeastern NC. This kept the stronger winds offshore of the Carolinas. The wind did reach gusts to tropical storm force (39 mph) at Greensboro, Laurinburg-Maxton, and Fayetteville, but the strongest winds were along the coast where 53 mph wind gusts were measured at both Cherry Point and Jacksonville. Thus damage in central NC was very minimal, and the rain that pushed into southern and eastern NC was actually beneficial, as it had been a dry couple of weeks prior to the storm's approach. Fayetteville received 3.15 inches from Idalia, which pushed the monthly rainfall total nearly all the way back to normal. Rainfall over central NC ranged from 2 to 6 inches over the central and southern Coastal Plain and southeastern Sandhills, with amounts backing off significantly to the north and west. The Triad region, including Greensboro, did not record any measurable rainfall from the storm. The Triangle region only had about a half inch to an inch, with Raleigh-Durham Airport only receiving 0.45 inches. A map of the rainfall totals and highest wind gusts across NC from the state climate office is shown below.

Fig. 3: Total Precipitation and Maximum Wind Gusts from Tropical Storm Idalia across NC



Not unlike July 2023, August had some days with thunderstorms. This included the 15th when severe storms dropped hail up to golf ball sized in the Triad and caused a swath of damaging winds from there east into the Triangle and parts of the Coastal Plain. However, there were quite a few dry or mostly dry days, and central NC often missed out on the worst of the storms. This included much of the northern Piedmont and northern Coastal Plain, which also missed out on the rain from Idalia and finished mostly drier than normal. According to the NC state climate office, Roanoke Rapids had only 2.15 inches of rain for the whole month, which made it the 12th-driest August in the last 50 years. Even in the southeast, it remained relatively dry in most places until Idalia. Looking statewide, Idalia’s rains were able to push the monthly precipitation slightly wetter than normal overall. According to NCEI, the preliminary statewide average rainfall was 5.83 inches. This made it the 43rd-wettest August in the past 129 years. The final rainfall tallies for August 2023 from the three main central NC climate reporting sites show the aforementioned rainfall variability (Table 2). Thanks to Idalia, Fayetteville’s monthly total was very close to normal. But Greensboro was nearly an inch below normal and Raleigh nearly 3 inches below normal. While Raleigh wasn’t as dry as last August, it still tied for the 17th-driest August over 137 years of record.

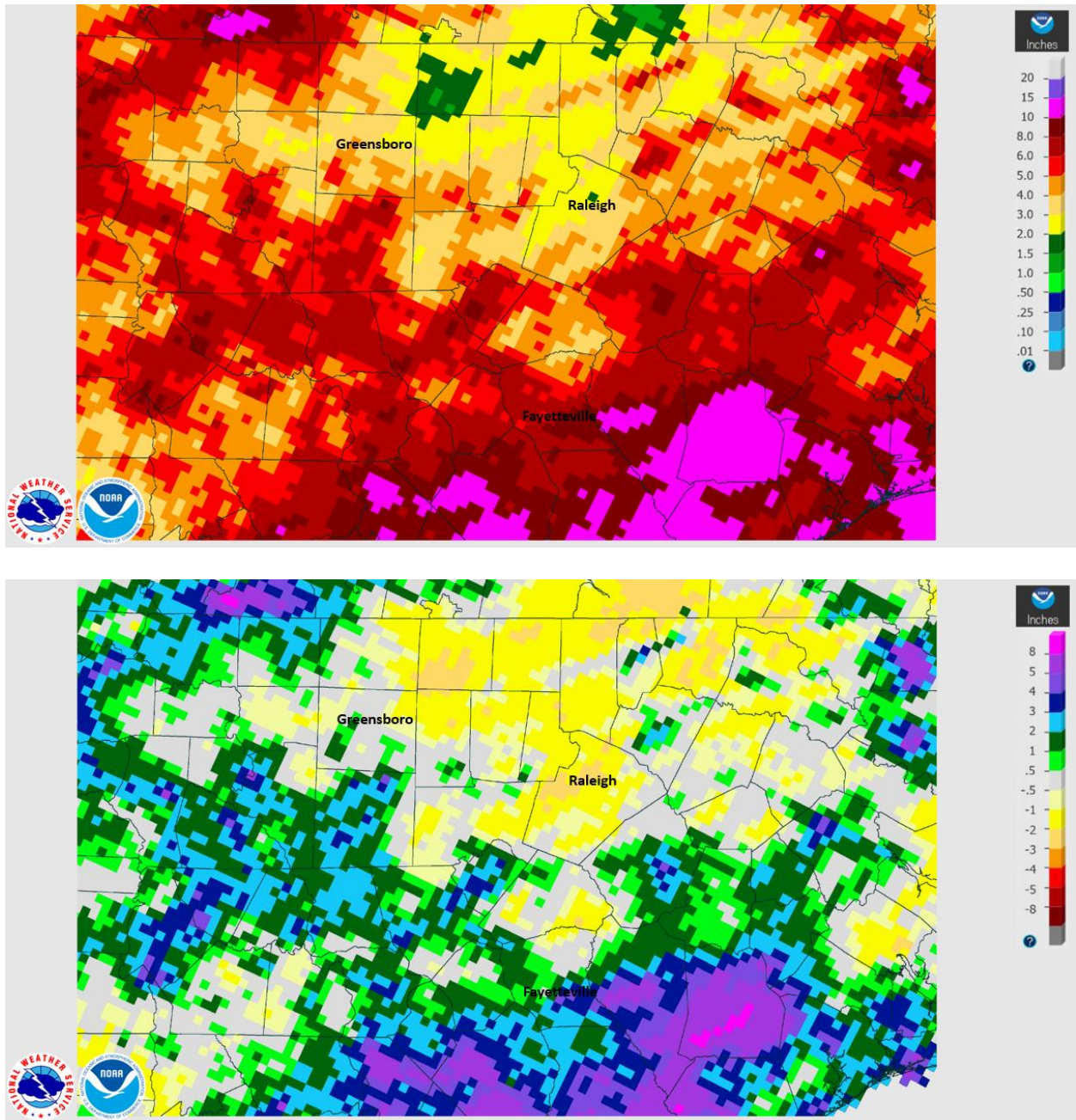
Table 2: Monthly Precipitation Statistics

Site	Total precipitation (in.)	Departure from Normal (in.)	Max Daily Precipitation (in.)
Greensboro (GSO)	3.46	-0.90	0.90 on 8/10
Raleigh-Durham (RDU)	1.83	-2.88	0.43 on 8/10
Fayetteville (FAY)	5.25	-0.11	2.75 on 8/30

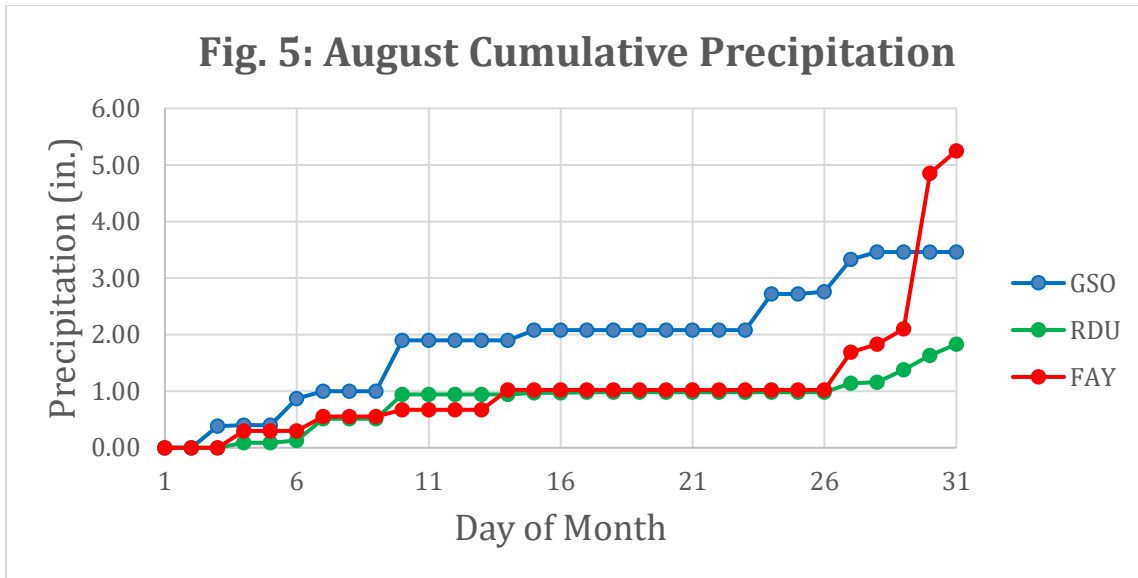
Some of the cooperative station rainfall reports from around central NC from August 2023 included: Sparta 6.22 inches (+1.29), Lexington 4.42 inches (-0.02), Winston-Salem 2.93 inches (-1.58), Burlington 2.90 inches (-0.63), Mount Airy 8.42 inches (+3.73), Danbury 7.84 inches (+3.46), Yanceyville 2.05 inches (-2.20), Eden 4.15 inches (+0.27), Henderson 7.13 inches (+2.00), Carthage 4.99 inches (+0.13), Cary 4.53 inches (-0.28), Raleigh (NCSU) 2.99 inches (-1.72), Louisburg 6.49 inches (+0.98), Apex 3.87 inches (-0.77), Chapel Hill 4.13 inches (-0.17), Jackson Springs 4.59 inches (+0.08), Laurinburg 6.14 inches (+1.06), Rocky Mount 4.85 inches (-0.07), Tarboro 3.96 inches (-1.07), and Clinton 7.31 inches (+1.30).

As displayed by the radar-estimated precipitation and the radar-estimated precipitation departure from normal in Figure 4, the lowest monthly totals of 2-4 inches (up to 1-3 inches below normal) were in much of the northern Piedmont. Amounts were above normal in much of the southern Piedmont, Sandhills, and central and southern Coastal Plain, which were more affected by Idalia.

Fig. 4: Radar-Estimated Monthly Precipitation and Precipitation Departure from Normal

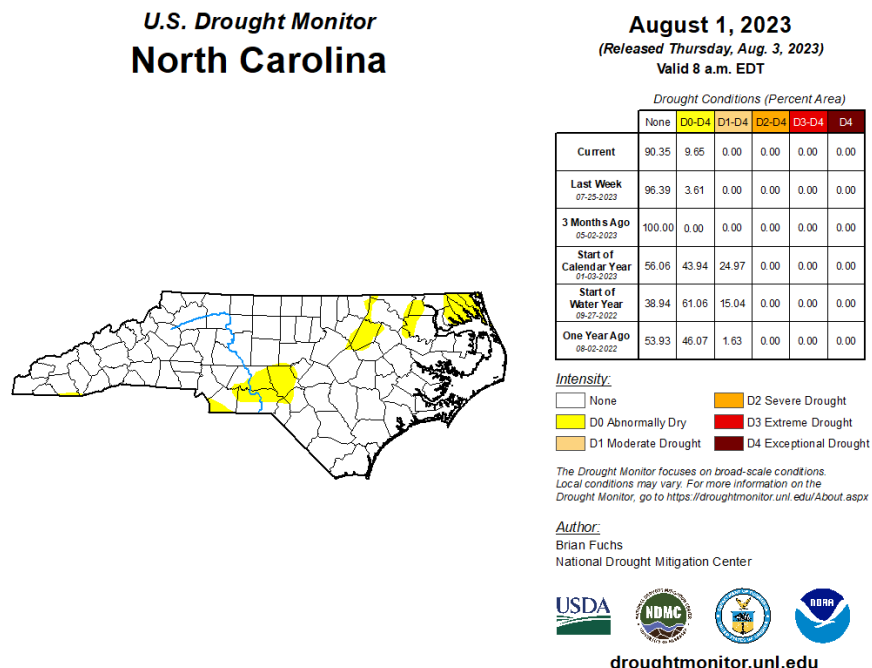


The cumulative precipitation at the three climate sites for the month of August is shown in Figure 5. After some minor rainfall events from cold frontal passages, particularly on the 7th and 10th, the middle to end of the month was dry overall until Idalia and the few days preceding it. Fayetteville received no measurable rainfall from the 15th through the 26th. Raleigh only received 0.04 inches from the 11th through the 26th, and Greensboro just 0.18 inches from the 11th through the 23rd.



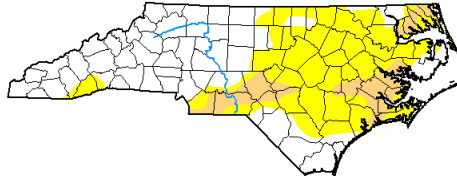
As shown in Figure 6, the US Drought Monitor map from the beginning of August only had a couple areas of D0 (Abnormally Dry) conditions: one in the southern Piedmont and the other in the northern Coastal Plain. By August 29, just about all of central NC outside of the NW Piedmont was in at least D0 conditions, with D1 (Moderate Drought) in parts of the southern Piedmont, Sandhills, and central Coastal Plain. However, these dry and drought conditions were wiped away in the southeast on the last two days of the month thanks to Idalia’s rain.

Fig. 6: US Drought Monitor for NC on August 1 (top) and August 29 (bottom)



**U.S. Drought Monitor
North Carolina**

August 29, 2023
(Released Thursday, Aug. 31, 2023)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	49.94	50.06	10.60	0.00	0.00	0.00
Last Week 08-22-2023	47.33	52.67	5.26	0.00	0.00	0.00
3 Months Ago 05-29-2023	97.53	2.47	0.00	0.00	0.00	0.00
Start of Calendar Year 01-01-2023	56.06	43.94	24.97	0.00	0.00	0.00
Start of Water Year 09-01-2022	38.94	61.06	15.04	0.00	0.00	0.00
One Year Ago 08-30-2022	71.07	28.93	0.01	0.00	0.00	0.00

Intensity:
 None
 D0 Abnormally Dry
 D1 Moderate Drought
 D2 Severe Drought
 D3 Extreme Drought
 D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

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droughtmonitor.unl.edu

Other notes:

Days with thunderstorms this month:

Greensboro: 8
Raleigh: 7
Fayetteville: 6

Days with dense fog (visibility of 1/4 mile or less):

Greensboro: 0
Raleigh: 2
Fayetteville: 2

Strongest wind gusts and direction:

Greensboro: NW (310 degrees) at 44 mph on August 7
Raleigh: NW (310 degrees) at 49 mph on August 15
Fayetteville: W (260 degrees) at 58 mph on August 7

Daily records:

Greensboro:

None.

Raleigh:

A daily record high temperature of 100°F was set on August 15. This broke the previous record of 99°F set in 2007.

A daily record high minimum temperature of 76°F was set on August 26. This broke the old record of 74°F set in 2011.

A daily record high minimum temperature of 76°F was tied on August 27. This record was previously set in 1998.

Fayetteville:

A daily record high temperature of 101°F was tied on August 26. This record was previously set in 1943.

A daily record high minimum temperature of 75°F was set on August 26. This broke the previous record of 74°F set in 2020.

Monthly records:

Greensboro:

None.

Raleigh:

August 2023 was the 5th-warmest August on record at Raleigh. The average temperature was 81.0°F for the month.

Fayetteville:

August 2023 was the 4th-warmest August on record at Fayetteville. The average temperature was 82.1°F for the month.