

July 2023 Central NC Climate Summary

By Phillip Badgett and James Danco

Summer temperatures arrive in July.

The summer heat ramped up in July 2023 after the cool start in June. Rainfall was near normal on average, with typical spotty wet and dry areas depending on the thunderstorms. According to the NCEI, the preliminary statewide temperature averaged 78.7°F, which ranked as the 20th-warmest July in the 129 years of official records. Most areas finished the month with an average temperature that was 0.5 to 2°F above normal. As shown in Table 1, all three climate sites in central NC were warmer than normal. Raleigh tied for its 5th-hottest July, with records going back to 1887. The hottest days occurred during the last part of the month. Raleigh hit its monthly high temperature of 97°F on July 26, 27, and 28, while Fayetteville reached that plateau on July 21. Greensboro hit its monthly high temperature of 95°F on the 28th, its hottest day since June 22, 2022. The July tally of days 90°F or higher reached 27 at Fayetteville, 26 at Raleigh, and 14 at Greensboro.

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)	88.9	70.0	79.5	+0.6	95 on 7/28	65 on 7/11 and 7/23
Raleigh-Durham (RDU)	92.4	72.3	82.3	+1.8	97 on 7/26, 7/27, 7/28	66 on 7/12
Fayetteville (FAY)	91.9	73.4	82.7	+1.0	97 on 7/21	70 on 7/2, 7/18, 7/23

The system of the month was a highly unusual July tornado that hit in the Coastal Plain region on the 19th. A complex of thunderstorms moved east through the Tennessee Valley region into the southern mountains of NC during the evening of July 18 and overnight on July 19. This complex of storms produced some wind damage as it moved across the southern mountains, but weakened a bit as it reached near the Charlotte area around daybreak. The mesoscale convective vortex (MCV) remained intact as it moved ENE toward the Raleigh area by late morning, with heavy showers and some thunderstorms along the path. By late morning into the early afternoon, the air mass over the Coastal Plain became very unstable with heating of the already deep moisture in place. Thunderstorms strengthened with the MCV as it moved east of Raleigh into Nash and

Edgecombe Counties. A tornado touched down near Interstate 95 in Dortches, causing widespread tree damage and completely destroying multiple single-wide homes. The tornado strengthened as it moved ENE with a peak intensity of EF-3 (winds estimated at 140 to 150 mph) as it moved into the Belmont Lake Golf Club. It severely damaged a large pharmaceutical manufacturing plant and flipped/destroyed semi-trucks. It then weakened slightly as it crossed into Edgecombe County. In total, the tornado tracked for 16.5 miles and lasted for 33 minutes. It damaged or destroyed an estimated 89 structures in Nash County, and 16 people were injured.

Official records of tornadoes are kept by the Storm Prediction Center in Norman, Oklahoma. In the data that dates back to 1950, this is the strongest tornado that has been recorded in the month of July anywhere in NC. In addition, this was only the third tornado with the strength of an EF-3 that has been recorded in meteorological summer (June-August) in NC. The other unusual aspect of this tornado was the time of day, as it occurred from 12:25 to 12:58 PM EDT, instead of the typical late afternoon or early evening timeframe.

The time series of daily temperature for the month at Greensboro, Raleigh, and Fayetteville can be found in Figure 1.

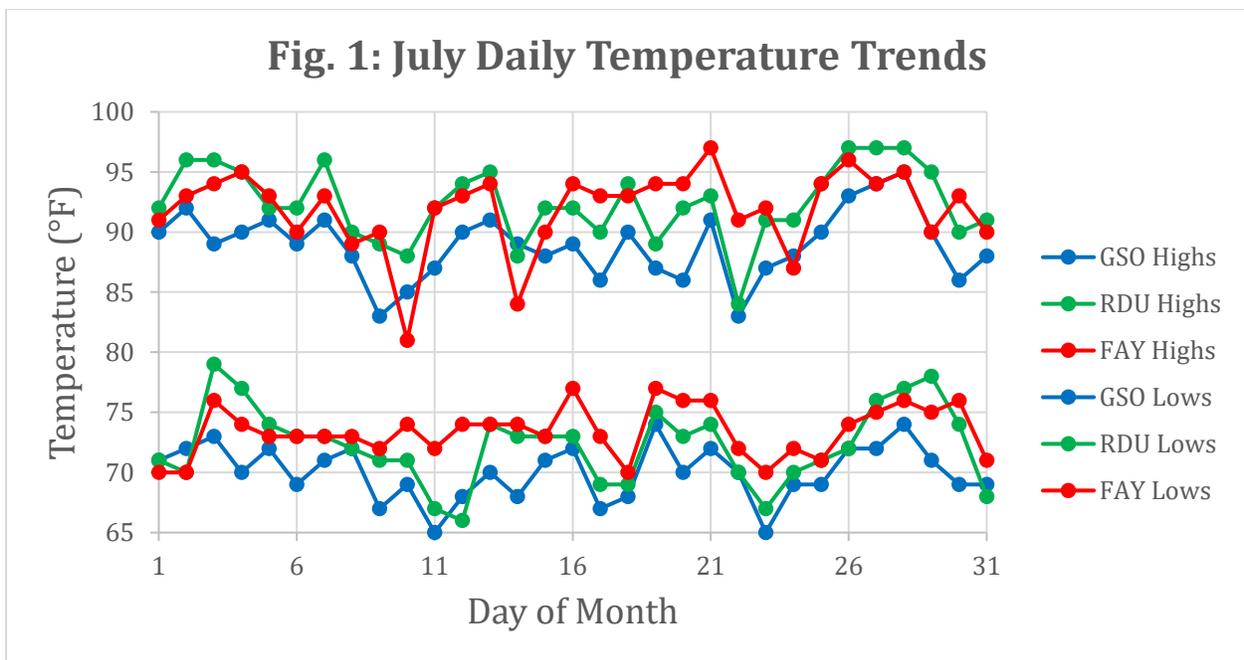
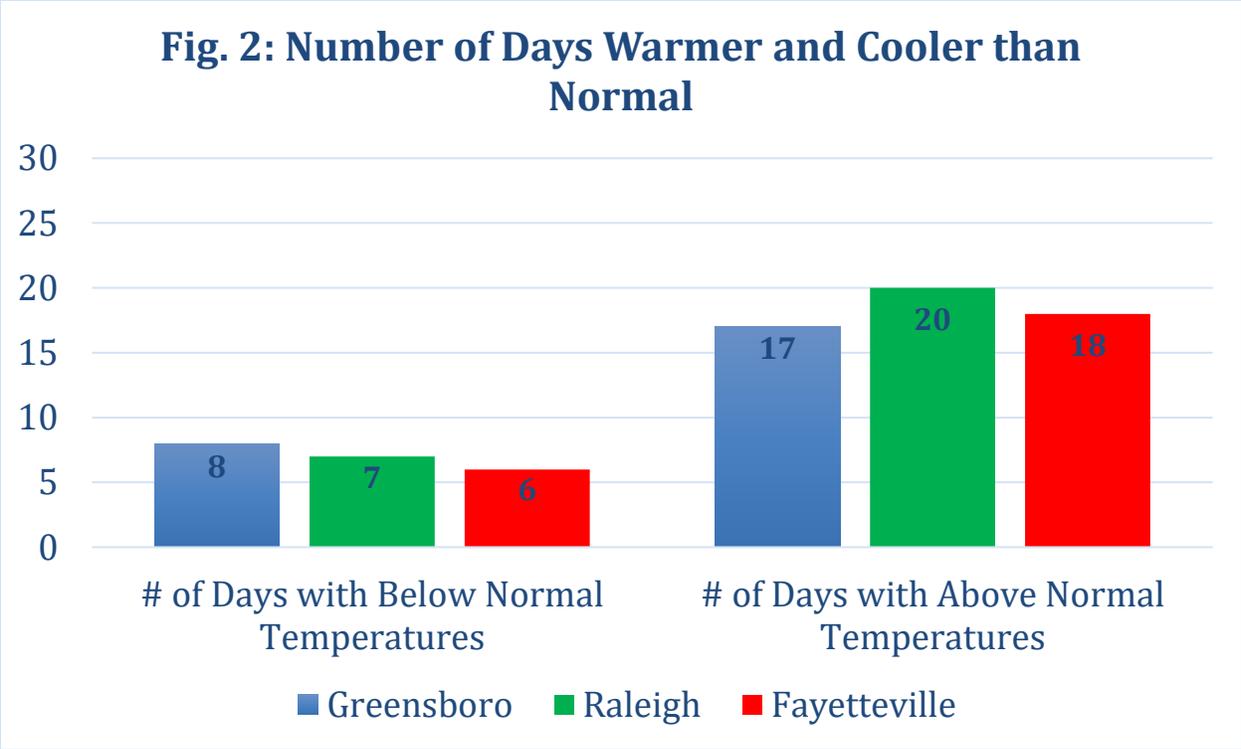


Figure 2 shows a majority of days during the month of July were warmer than normal at all three climate sites. Only about 20-25% were cooler than normal.



July 2023 had plenty of thunderstorms; however, these storms did not hit everyone and left some communities rather dry. Much of the eastern Piedmont and Coastal Plain were wetter than normal, while the southern Piedmont was left dry. Overall, according to NCEI, the preliminary statewide average rainfall was 4.33 inches. This made it the 34th-driest in the past 129 years. The final rainfall tallies for July 2023 from the three main central NC climate reporting sites showed this variability (Table 2). Greensboro was over an inch drier than normal while Fayetteville was nearly one and a half inches wetter than normal, and Raleigh was about a half inch wetter than normal.

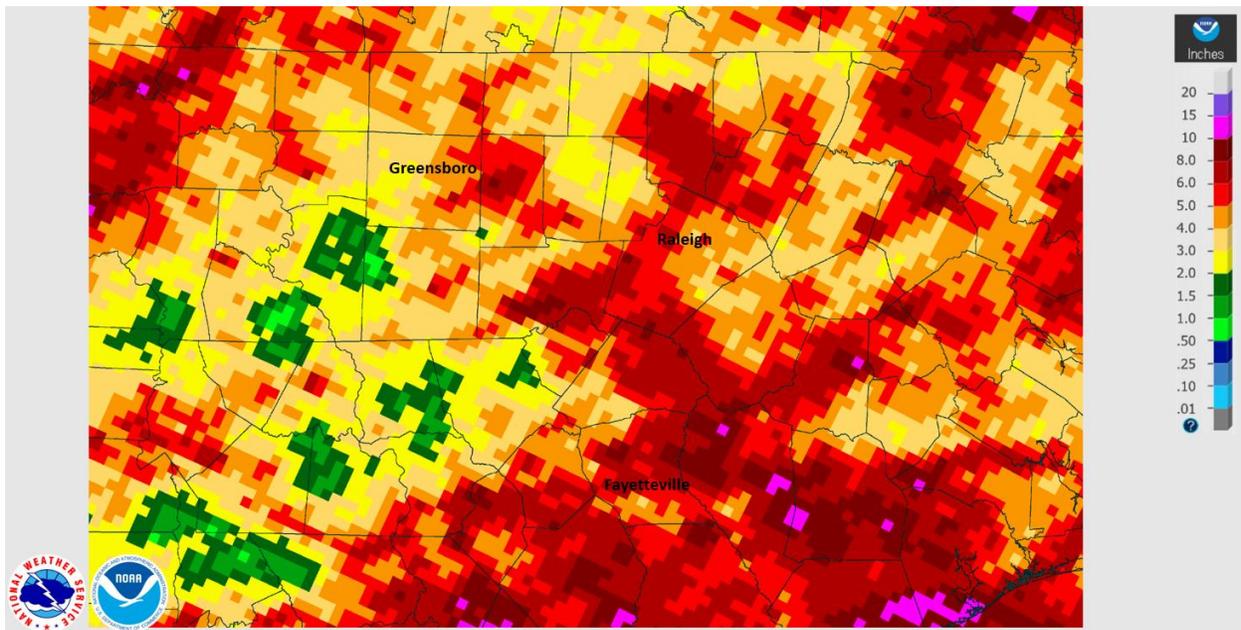
Table 2: Monthly Precipitation Statistics

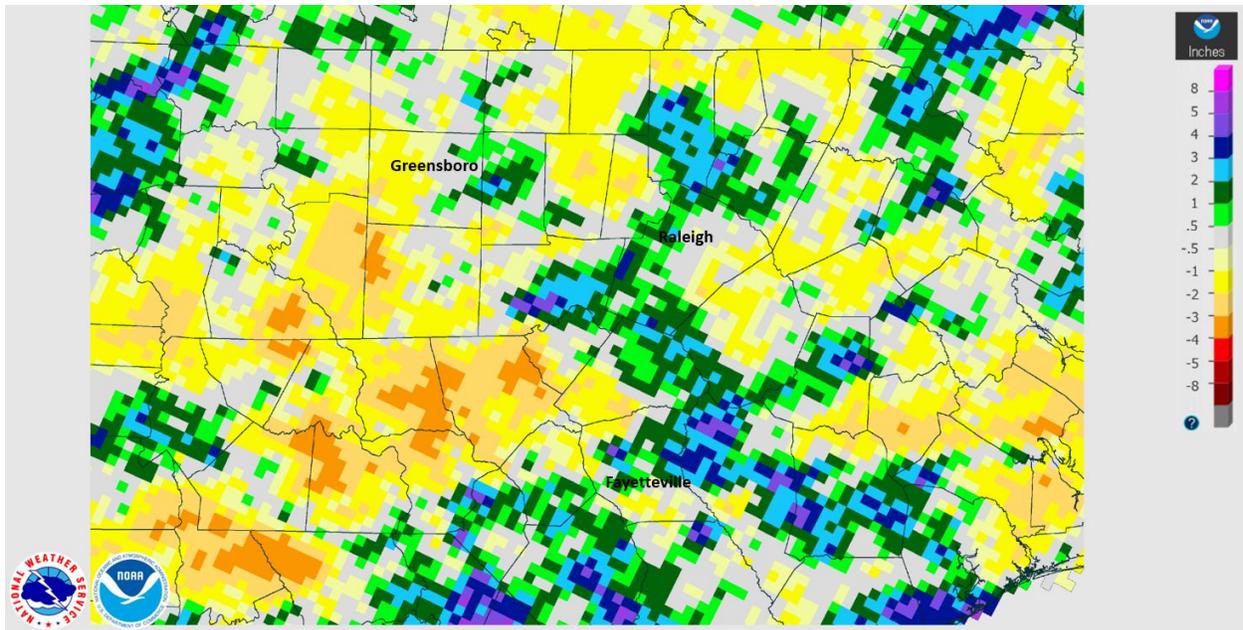
Site	Total precipitation (in.)	Departure from Normal (in.)	Max Daily Precipitation (in.)
Greensboro (GSO)	3.08	-1.10	1.62 on 7/9
Raleigh-Durham (RDU)	5.54	+0.52	1.39 on 7/14
Fayetteville (FAY)	6.40	+1.45	1.67 on 7/14

Some of the cooperative station rainfall reports from around central NC from July 2023 included: Sparta 5.42 inches (+0.49), Lexington 2.76 inches (-1.92), Winston-Salem 4.58 inches (+0.34), Burlington 8.85 inches (+4.20), Mount Airy 8.42 inches (+3.73), Danbury 7.84 inches (+3.46), Yanceyville 3.57 inches (-0.84), Eden 4.15 inches (+0.27), Henderson 1.75 inches (-2.68), Carthage 1.34 inches (-3.38), Cary 4.31 inches (-1.00), Raleigh (NCSU) 5.15 inches (+0.50), Louisburg 5.00 inches (+0.19), Apex 6.08 inches (+1.01), Chapel Hill 5.00 inches (+0.18), Jackson Springs 1.62 inches (-2.96), Laurinburg 2.26 inches (-+2.07), Rocky Mount 4.90 inches (+0.31), Tarboro 2.43 inches (-1.49), and Clinton 9.65 inches (+3.82).

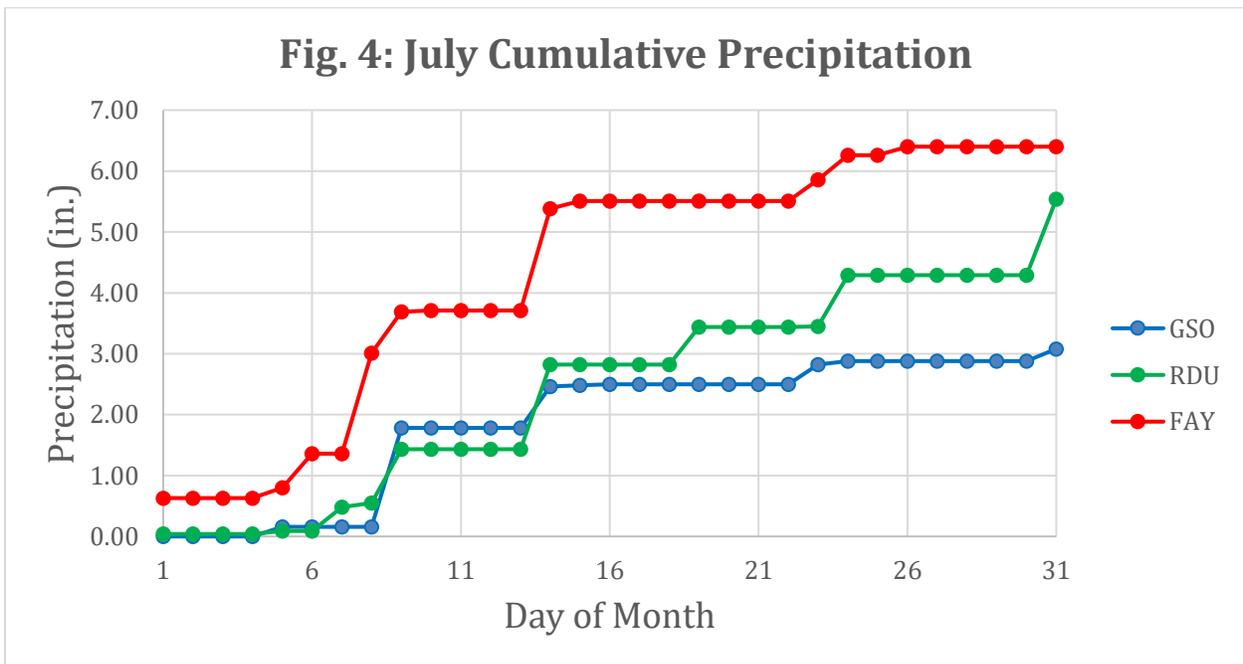
As displayed by the radar-estimated precipitation and the radar-estimated precipitation departure from normal in Figure 3, rainfall totals were very hit-or-miss across central NC, which is typical during the summer. Some locations, including most of the northeast Piedmont, Coastal Plain and eastern Sandhills, received 4-8 inches with locally higher amounts. This was near to above normal. However, parts of the western Sandhills and much of the southern Piedmont were drier than normal. Some pockets in the southern and western Piedmont only had 1-2 inches for the month. According to the NC Climate Office, the 1.62 inches measured at their ECONet station in Jackson Springs was 3.47 inches below average and its 2nd-driest July in the past 21 years.

Fig. 3: Radar-Estimated Monthly Precipitation and Precipitation Departure from Normal



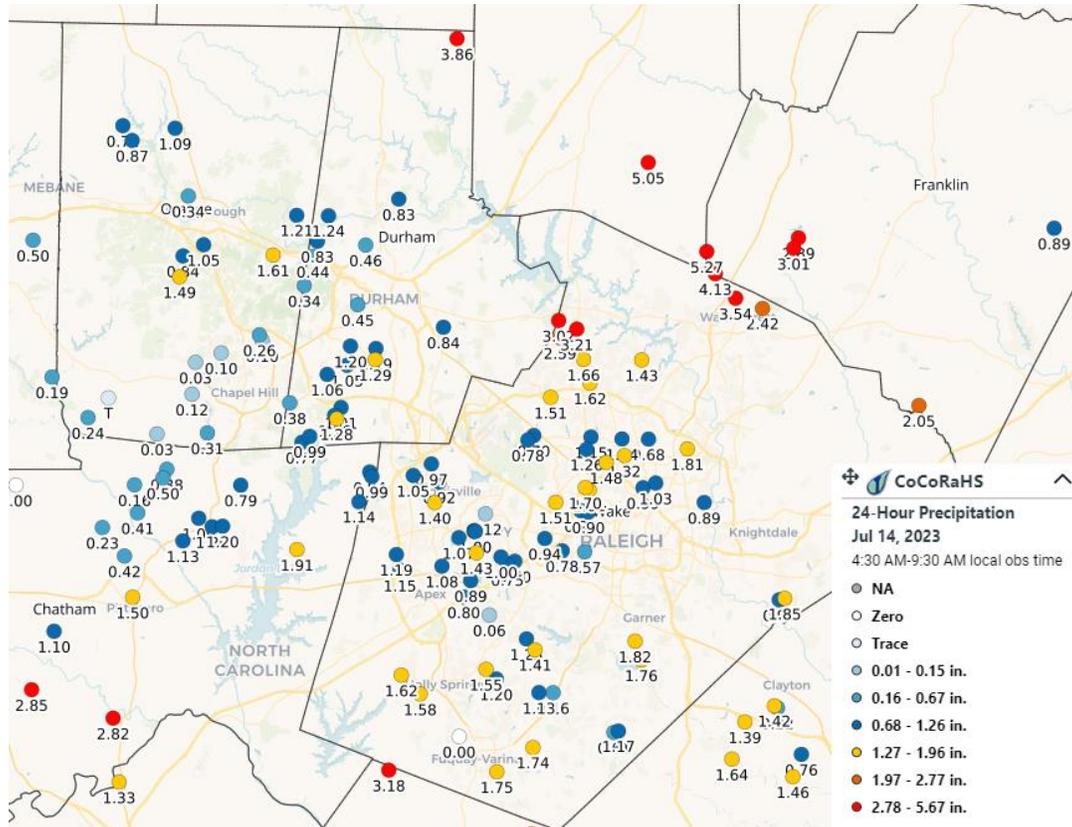


The cumulative precipitation at the three climate sites for the month of July is shown in Figure 4.



One example of heavy rain from thunderstorms occurred in northern Wake County on July 13-14. According to CoCoRaHS reports, 3-5 inches of rain fell (Figure 5). This caused flooding along the Smith Creek and Sanford Creek Greenways as well as the Holding Park Aquatic Center in Wake Forest.

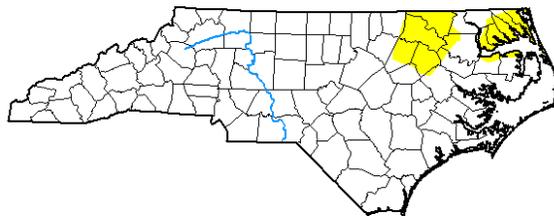
Fig. 5: CoCoRaHS 24-hour Precipitation ending the morning of July 14, 2023



The US Drought Monitor maps from early July and early August are shown in Figure 6. There was enough rain during July in the northern Coastal Plain to reduce the extent of the D0 (Abnormally Dry) conditions there, but the southern Piedmont was dry enough for D0 conditions to develop. There continued to be no actual drought (D1 or higher) conditions anywhere in NC.

Fig. 6: US Drought Monitor for NC on July 4 (top) and August 1 (bottom)

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



July 4, 2023

(Released Thursday, Jul. 6, 2023)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	92.11	7.89	0.00	0.00	0.00	0.00
Last Week 06-27-2023	92.11	7.89	0.00	0.00	0.00	0.00
3 Months Ago 04-04-2023	20.13	79.87	4.87	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 09-27-2022	38.94	61.06	15.04	0.00	0.00	0.00
One Year Ago 07-05-2022	4.95	95.05	53.27	14.14	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>

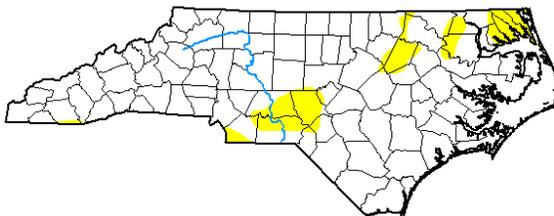
Author:

Curtis Riganti
National Drought Mitigation Center



droughtmonitor.unl.edu

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



August 1, 2023

(Released Thursday, Aug. 3, 2023)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	90.35	9.65	0.00	0.00	0.00	0.00
Last Week 07-25-2023	96.39	3.61	0.00	0.00	0.00	0.00
3 Months Ago 05-02-2023	100.00	0.00	0.00	0.00	0.00	0.00
Start of Calendar Year 01-03-2023	56.06	43.94	24.97	0.00	0.00	0.00
Start of Water Year 09-27-2022	38.94	61.06	15.04	0.00	0.00	0.00
One Year Ago 08-02-2022	53.93	46.07	1.63	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>

Author:

Brian Fuchs
National Drought Mitigation Center



droughtmonitor.unl.edu

Other notes:

Days with thunderstorms this month:

Greensboro: 12
Raleigh: 11
Fayetteville: 15

Days with dense fog (visibility of ¼ mile or less):

Greensboro: 1
Raleigh: 2
Fayetteville: 5

Strongest wind gusts and direction:

Greensboro: NW (310 degrees) at 43 mph on July 9
Raleigh: SW (240 degrees) at 37 mph on July 31
Fayetteville: NW (300 degrees) at 43 mph on July 6

Number of days with high temperatures at above 90°F this month:

Greensboro: 14
Raleigh: 26
Fayetteville: 27

Daily records:

Greensboro:

A daily record high minimum temperature of 74°F was tied on July 28. This record was previously set in 2022.

Raleigh:

A daily record high minimum temperature of 79°F was set on July 3. This broke the previous record of 75°F set in 2018.

A daily record high minimum temperature of 77°F was tied on July 28. This record was previously set in 1936.

A daily record high minimum temperature of 78°F was tied on July 29. This record was previously set in 1896.

Fayetteville:

A daily record high minimum temperature of 76°F was tied on July 3. This record was previously set in 2018.

A daily record high minimum temperature of 77°F was tied on July 19. This record was previously set in 1988.

Monthly records:

Greensboro:

None.

Raleigh:

July 2023 was tied for the 5th-warmest July on record, with an average temperature of 82.3°F for the month.

Fayetteville:

None.