

December 2023 Central NC Climate Summary

By Phillip Badgett and James Danco

Drought turns around in a warm and wet December

December turned warm and more importantly wet across central NC. Temperatures more like fall continued into December, but significant rainfall events picked up dramatically. These rainfall events were frequent, widespread, and significant enough to knock back drought conditions that had been worsening in the previous months.

First for the temperatures across the region: NCEI reported that the preliminary average temperature across the state of NC for the month was 46.3°F. This made it the 19th-warmest December in the past 129 years. Locally, Raleigh had its 10th-warmest December on record, Greensboro tied for its 15th-warmest on record, and Fayetteville had its 16th-warmest. According to the NC state climate office, it was the 6th-warmest on record at Wilson going back to 1937. Most of central NC finished the month with an average temperature that ranged between 2.5 and 4.5°F above normal. 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)	55.6	34.6	45.1	+2.6	67 on 12/3	22 on 12/20
Raleigh-Durham (RDU)	60.2	38.2	49.2	+4.6	72 on 12/9	27 on 12/12, 12/20 and 12/21
Fayetteville (FAY)	61.4	38.0	49.7	+3.2	75 on 12/3 and 12/9	26 on 12/21

The time series of daily temperature for the month at Greensboro, Raleigh, and Fayetteville can be found in Figure 1. The first 10 days of the month were especially mild, as most had highs in the 60s and 70s. The warmest days at the climate sites were the 3rd and 9th. Temperatures briefly fell on the 19th and 20th when highs were mainly in the 40s. Another mild period then occurred around Christmas. Raleigh had 8 days in a row from the 21st through the 28th when highs reached the 60s. Temperatures fell to freezing or below in December a total of 13 times at Greensboro, 11

at Raleigh and 13 at Fayetteville. The lowest temperatures recorded this month were in the 20s, so there were some chilly nights, but unlike last December, no bitter Arctic cold was to be found.

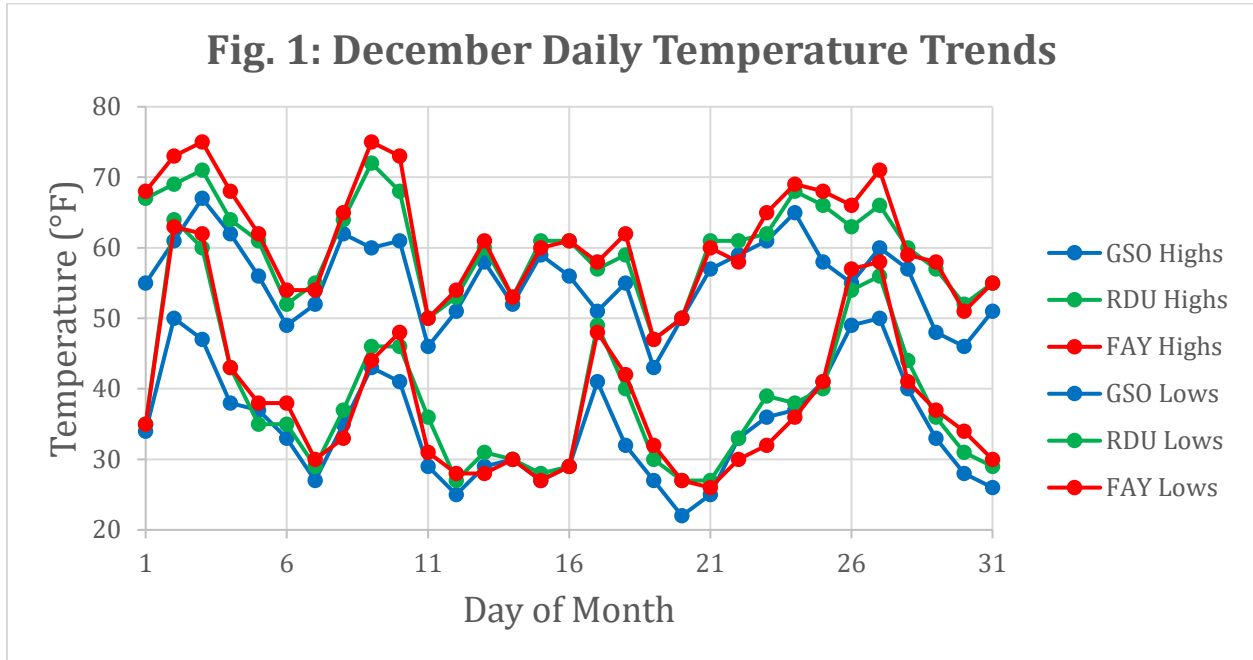
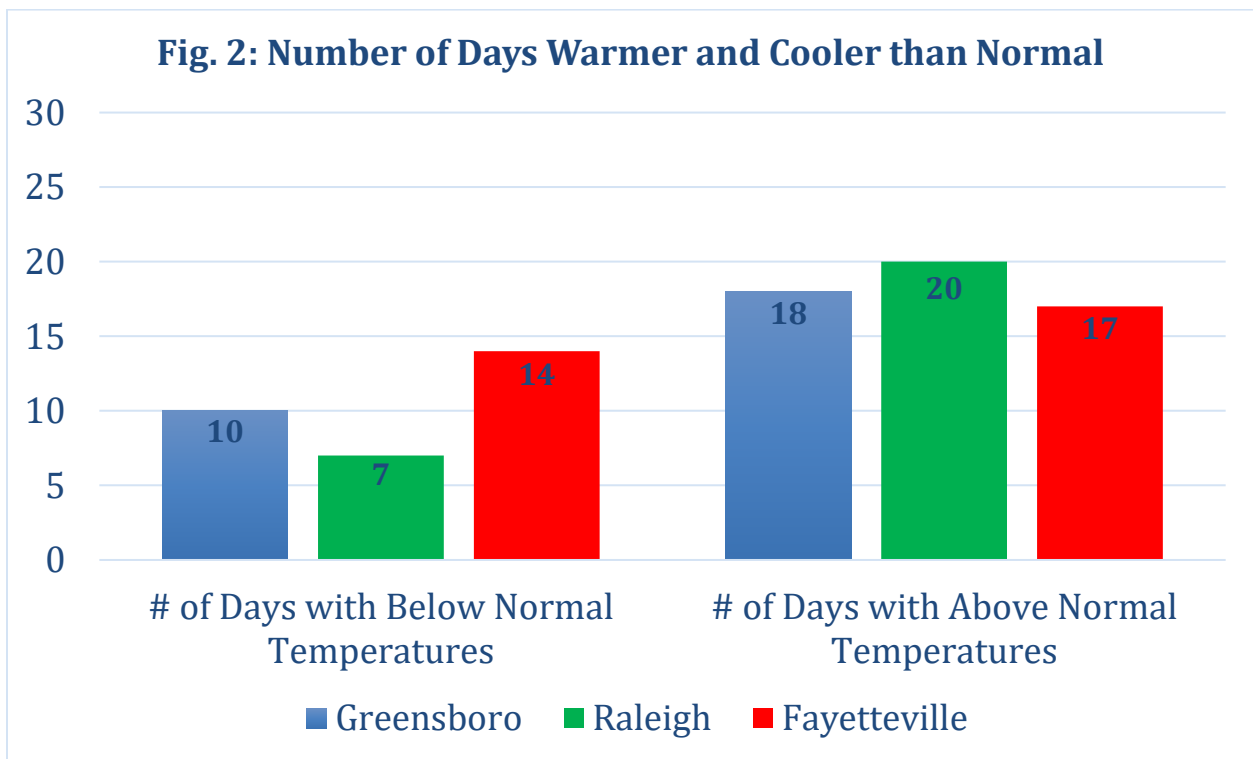


Figure 2 shows that the majority of days in December were warmer than normal at all three climate sites.

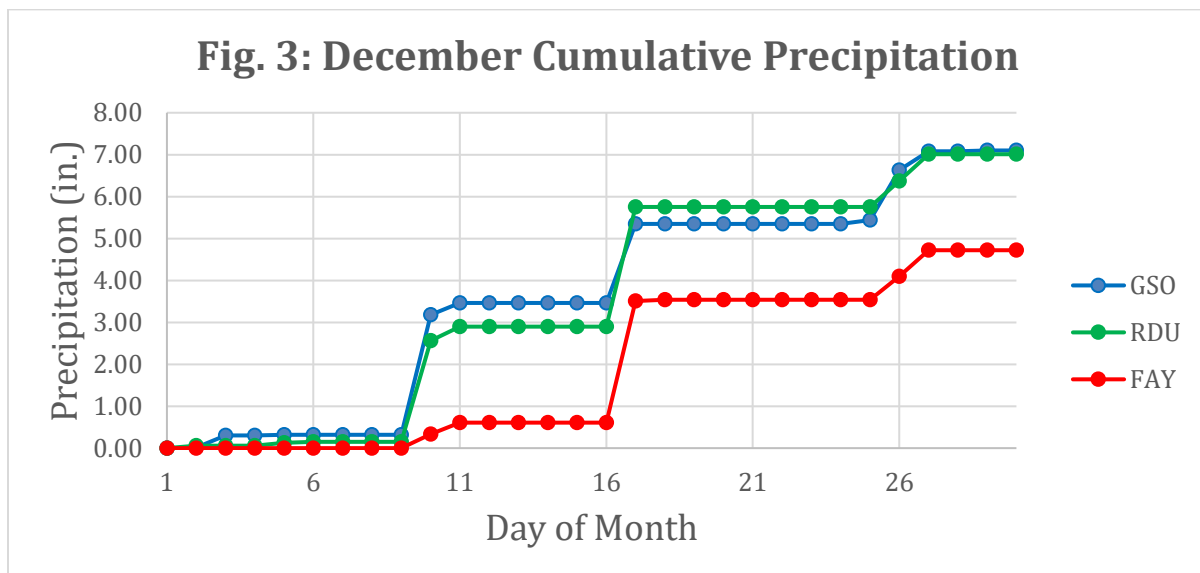


The rain returned in dramatic fashion across the state in December, as moisture-rich systems moved in from the south and east as we typically see during El Niño winters. System after system brought soaking rains with the heaviest rains recorded on December 10-11, December 17 and from December 25-27. The event on the 10th and 11th dumped 1-3 inches of rain over the Piedmont, and both Greensboro and Raleigh set daily rainfall records on the 10th. All 3 climate sites set new daily rainfall records on the 17th, which dumped 2-5 inches across most of the region. According to the NCEI, December 2023 was the 7th-wettest December statewide since 1895, with an average rainfall of 6.53 inches. Central NC fared exceptionally well in the final rainfall totals. All 3 climate sites were well above normal, by close to 4 inches at Greensboro and Raleigh which received just over 7 inches for the month and had their 2nd-wettest Decembers on record. Fayetteville was nearly 2 inches wetter than normal. The December 2023 monthly precipitation totals are found in Table 2. Despite all the rain, no snow fell at any of the climate sites, making 2023 a snowless calendar year for much of the region. It was the first year without any measurable snow since 2019 at Greensboro and Raleigh.

Table 2: Monthly Precipitation Statistics

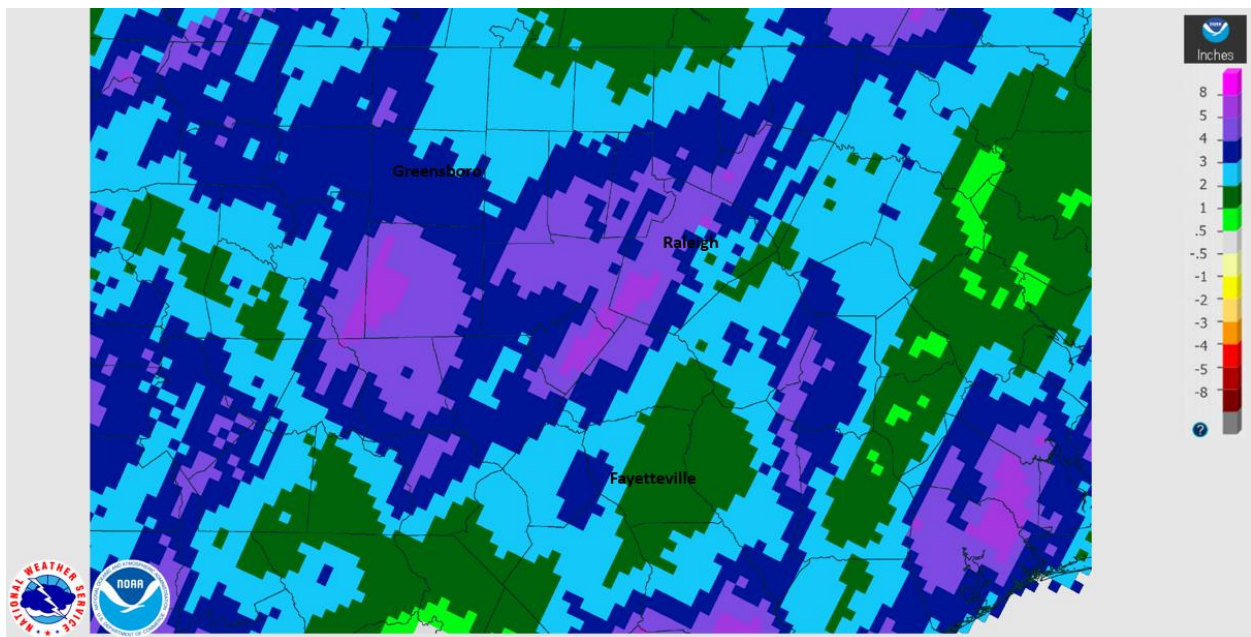
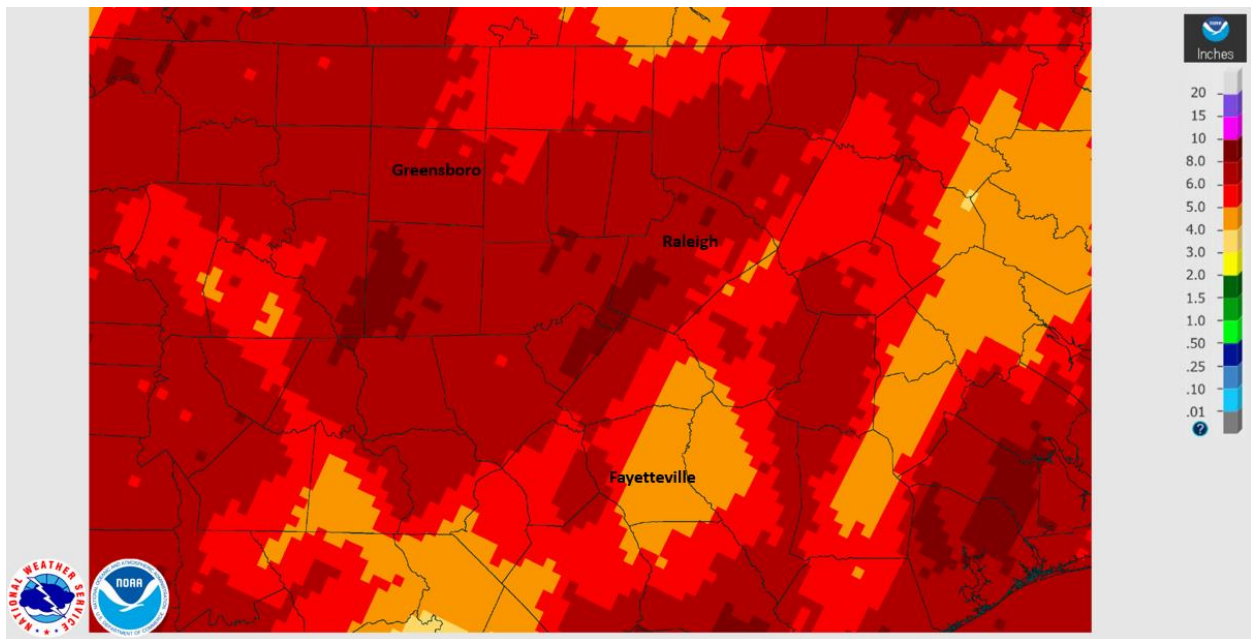
Site	Total precipitation (in.)	Departure from Normal (in.)	Max Daily Precipitation (in.)
Greensboro (GSO)	7.10	+3.93	2.86 on 12/10
Raleigh-Durham (RDU)	7.01	+3.62	2.85 on 12/17
Fayetteville (FAY)	4.72	+1.75	2.90 on 12/17

The cumulative precipitation at the three climate sites in December is shown in Figure 3.



As displayed by the radar-estimated precipitation and the radar-estimated precipitation departure from normal in Figure 4, the final monthly totals across central NC mostly ranged from 4-8 inches, which was 1-5 inches above normal. Some localized spots were even wetter than that.

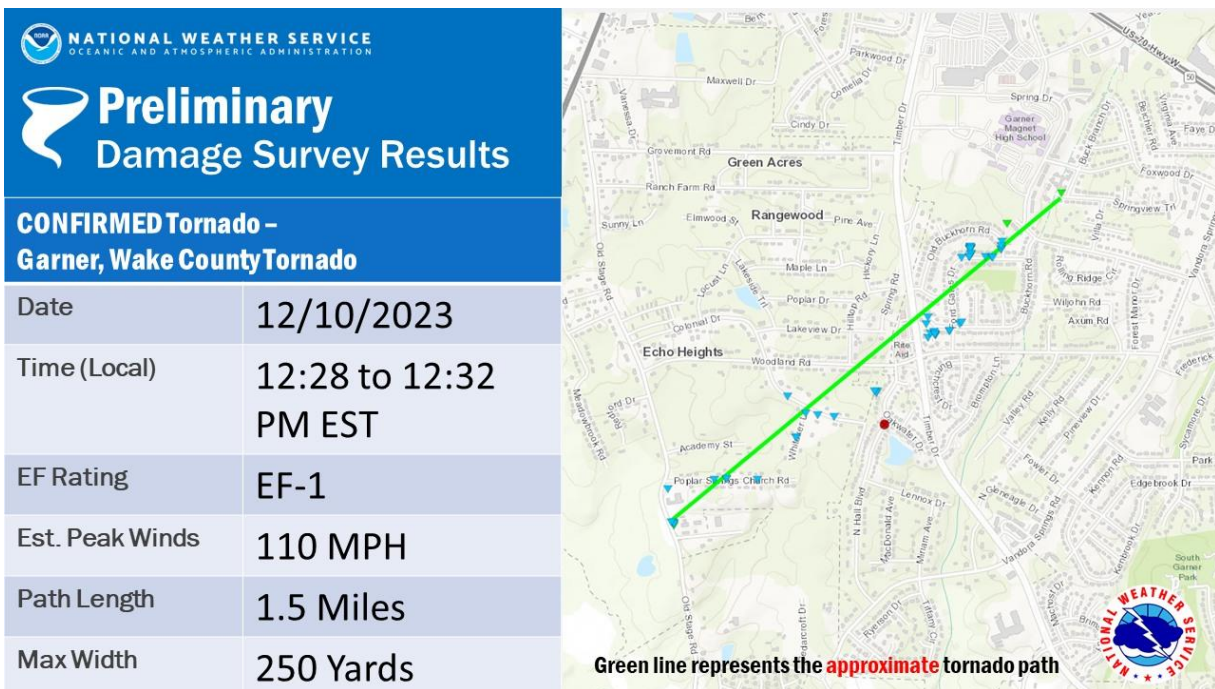
Fig. 4: Radar-Estimated Monthly Precipitation (top) and Departure from Normal Precipitation (bottom)



Some of the cooperative station rainfall reports from around central NC from December 2023 included: Sparta 7.99 inches (+3.98), Lexington 7.90 inches (+4.50), Winston-Salem 6.33 inches (+3.33), Burlington 6.25 inches (+3.13), Mount Airy 6.40 inches (+2.20), Danbury 6.44 inches (+3.52), Henderson 7.23 inches (+3.34), Cary 6.75 inches (+3.22), Raleigh (NCSU) 8.85 inches (+5.17), Louisburg 6.53 inches (+3.05), Apex 8.29 inches (+4.62), Laurinburg 5.00 inches (+2.45), Rocky Mount 5.82 inches (+2.89), and Clinton 7.83 inches (+4.43).

During the December 10 rainfall event, the NWS confirmed an EF-1 tornado occurred in Garner with an estimated maximum wind speed of 110 mph. Details are shown in Figure 5. The total track was 1.5 miles, and the tornado was on the ground for 4 minutes. Most of the damage was snapped and uprooted trees, along with some subsequent building damage due to trees falling on several structures. There were no injuries or fatalities.

Figure 5: December 10, 2023 Garner Tornado Details

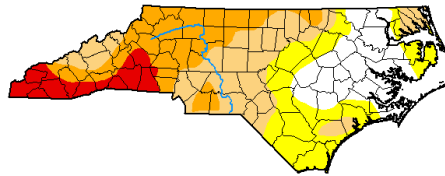


These heavy rains in December flipped the script when it came to drought. After much below normal rainfall the entire fall season led to the rapid expansion and deepening of drought conditions, the sheer number of widespread heavy rain events in December turned the drought on its head. Figure 6 shows the December 5, 2023 and January 2, 2024 U.S. Drought Monitor Maps for NC. On December 5, D3 (Extreme Drought) conditions had overspread southwestern NC, D2 (Severe Drought) conditions had expanded into the far northern and western Piedmont, and D1 (Moderate Drought) conditions had expanded into much of the rest of the Piedmont and western Sandhills. Also of note, the only area without any drought or dry conditions was over the Coastal Plain. By January 2, 2024 the drought had been cleared from much of central NC, with only lingering areas of D0 (Abnormally Dry) conditions over the western Piedmont and Sandhills. D1 and D2 was confined to the Mountains. NC went from nearly 58% of the state in some form of

drought at the beginning of the month to only 13% by January 2. It will take several more soaking rains to totally eliminate all the dry conditions observed over NC.

Fig. 6: US Drought Monitor for NC on December 5 (top) and January 2 (bottom)

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



December 5, 2023
(Released Thursday, Dec. 7, 2023)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	20.04	79.96	57.96	31.11	8.84	0.00
Last Week 11-28-2023	20.04	79.96	57.90	31.37	5.62	0.00
3 Months Ago 09-05-2023	70.60	29.40	1.97	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 09-26-2022	82.24	17.76	0.36	0.00	0.00	0.00
One Year Ago 12-06-2022	46.38	53.62	21.11	0.00	0.00	0.00

Intensity:
 None (white) D2 Severe Drought (orange)
 D0 Abnormally Dry (yellow) D3 Extreme Drought (red)
 D1 Moderate Drought (light orange) D4 Exceptional Drought (dark red)

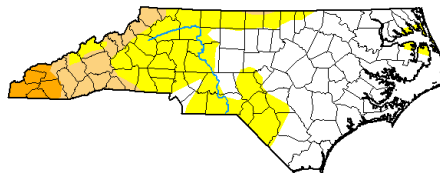
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

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droughtmonitor.unl.edu

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



January 2, 2024
(Released Thursday, Jan. 4, 2024)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	53.95	46.05	13.26	3.54	0.00	0.00
Last Week 12-28-2023	40.42	59.58	27.33	3.54	0.00	0.00
3 Months Ago 09-05-2023	58.93	41.07	1.56	0.00	0.00	0.00
Start of Calendar Year 01-01-2024	53.95	46.05	13.26	3.54	0.00	0.00
Start of Water Year 09-26-2023	82.24	17.76	0.36	0.00	0.00	0.00
One Year Ago 01-02-2023	56.06	43.94	24.97	0.00	0.00	0.00

Intensity:
 None (white) D2 Severe Drought (orange)
 D0 Abnormally Dry (yellow) D3 Extreme Drought (red)
 D1 Moderate Drought (light orange) D4 Exceptional Drought (dark red)

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droughtmonitor.unl.edu

All of the rain also caused a very fast recharge to the reservoirs across central NC. In mid-November, Jordan Lake was **more than 4 feet below normal**, with large areas of exposed shoreline. But at the end of the year, the lake was 3.5 feet above its target. Also, rough waters from the heavy rain farther downstream resulted in a **boating accident** along the Cape Fear River. Four people were rescued after going missing, but the body of the fifth person was found days later.

Other notes:

Days with thunderstorms this month:

Greensboro: 1
Raleigh: 1
Fayetteville: 0

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

Greensboro: 2
Raleigh: 1
Fayetteville: 3

Strongest wind gusts and direction:

Greensboro: NW (300 degrees) at 40 mph on December 18
Raleigh: SW (220 degrees) at 40 mph on December 10
Fayetteville: N (010 degrees) at 44 mph on December 17

Number of days with low temperatures at or below 32°F:

Greensboro: 13
Raleigh: 11
Fayetteville: 13

Daily records:

Greensboro:

A daily record rainfall of 2.86 inches was set on December 10. This broke the old record of 1.80 inches set in 1952.

A daily record rainfall of 1.89 inches was set on December 17. This broke the old record of 1.52 inches set in 1930.

Raleigh:

A daily record high minimum temperature of 60°F was set on December 3. This broke the old record of 58°F set in 1982.

A daily record rainfall of 2.41 inches was set on December 10. This broke the old record of 1.19 inches set in 1992.

A daily record rainfall of 2.85 inches was set on December 17. This broke the old record of 1.35 inches set in 1890.

Fayetteville:

A daily record rainfall of 2.90 inches was set on December 17. This broke the old record of 1.68 inches set in 1970.

Monthly records:

Greensboro:

December 2023 was the 2nd-wettest December on record with a total of 7.10 inches of precipitation.

December 2023 tied for the 15th-warmest December on record with an average temperature of 45.1°F.

Raleigh:

December 2023 was the 2nd-wettest December on record with a total of 7.01 inches of precipitation.

December 2023 was the 10th-warmest December on record with an average temperature of 49.2°F.

Fayetteville:

December 2023 was the 17th-wettest December on record with a total of 4.72 inches of precipitation.

December 2023 was the 16th-warmest December on record with an average temperature of 49.7°F.