

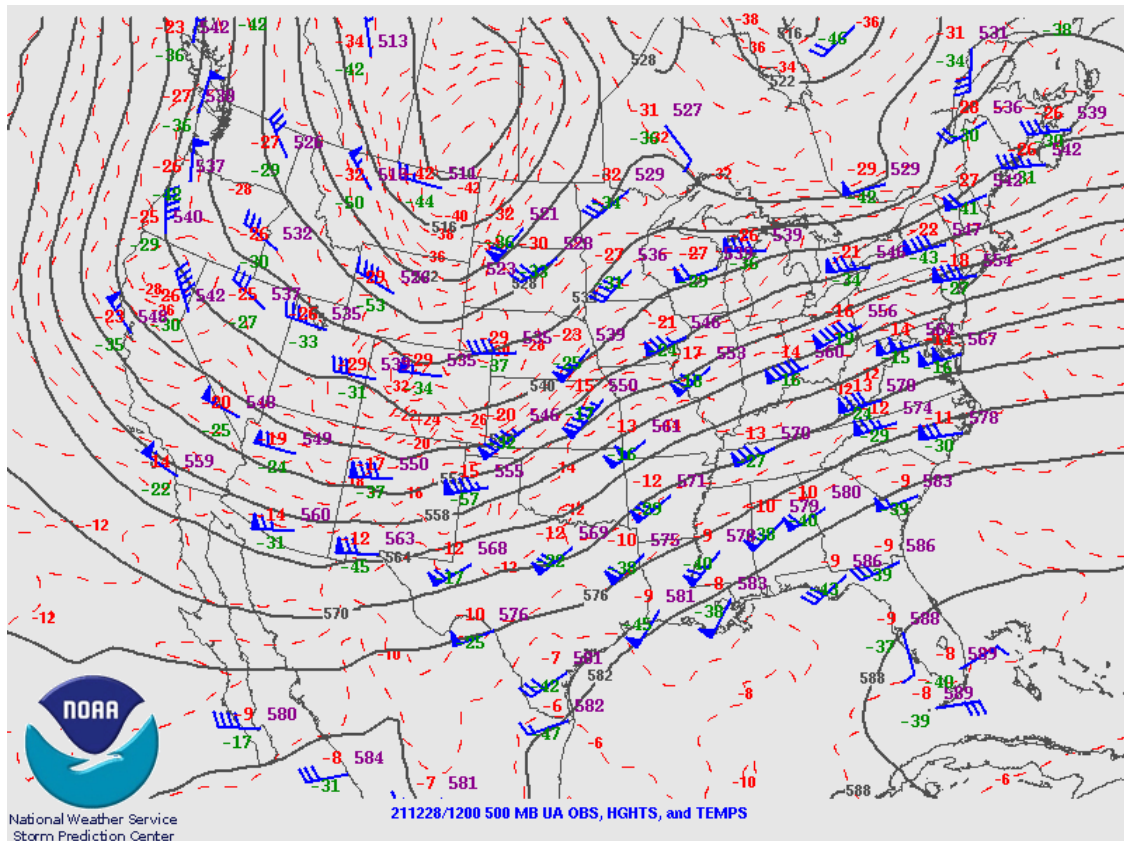
December 2021 Central NC Climate Summary

By Phillip Badgett and James Danco

December 2021 was the 2nd-warmest since 1903 at Greensboro, the 3rd-warmest since 1887 at Raleigh, and the 2nd-warmest since 1910 at Fayetteville.

December 2021 will go down in the record books as the 4th-warmest December in NC since records began in 1895, according to the National Centers for Environmental Information (NCEI). It was so warm and even humid at the end of the month (with highs in the 70s) that it felt more like April around Christmas and New Year's Eve than it did late December. Greensboro recorded the 2nd-warmest December since 1903 with a monthly average temperature of 50.9°F. This reading was a whopping 8.4°F above normal. Raleigh recorded its 3rd-warmest December on record with a monthly average of 52.6°F. This was 8.0°F above the 30-year monthly average. Fayetteville recorded its 2nd-warmest December on record with a monthly average of 54.2°F, 7.7°F above normal. A persistent ridge of high pressure continued to be frequently parked from the Gulf of Mexico to off the NC coast, with the main jet stream well to our northwest and strong (Figure 1).

Fig. 1: 500 mb Observations, Heights, and Temperatures on 12/28

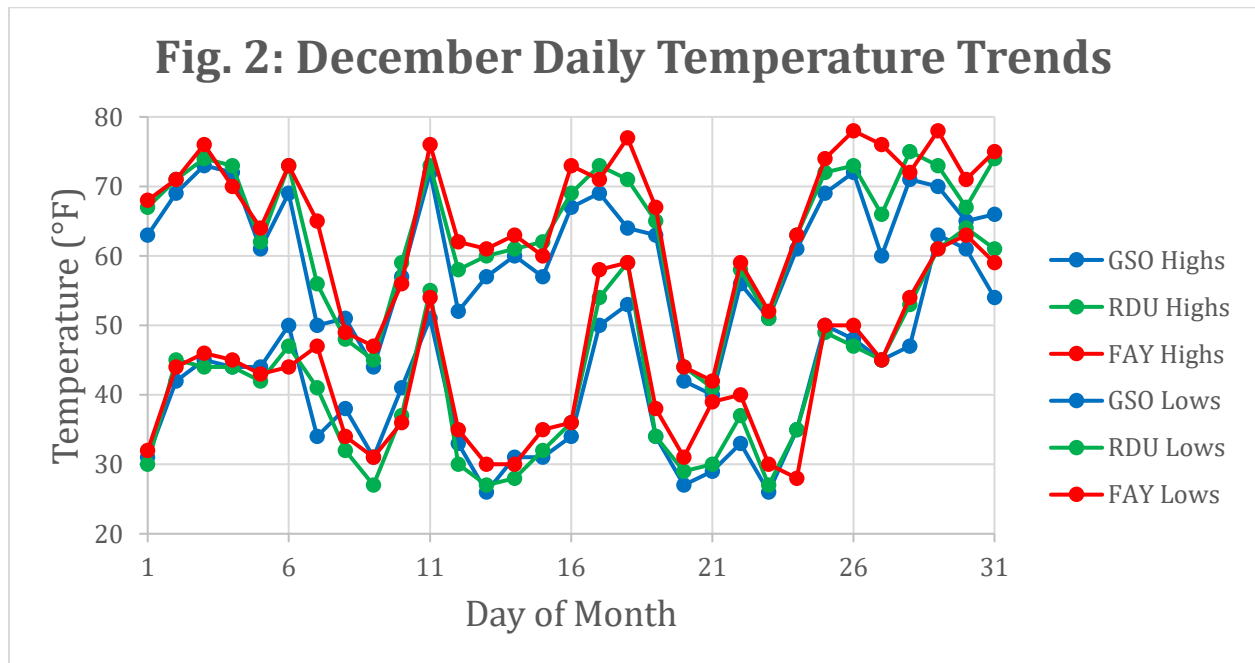


The December monthly average temperatures and their departures from normal at the three climate sites are depicted in Table 1.

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)	61.1	40.7	50.9	+8.4	73 on 12/3	26 on 12/13, 12/23
Raleigh-Durham (RDU)	63.8	41.4	52.6	+8.0	75 on 12/28	27 on 12/9, 12/13, 12/23
Fayetteville (FAY)	65.6	42.8	54.2	+7.7	78 on 12/26, 12/29	28 on 12/24

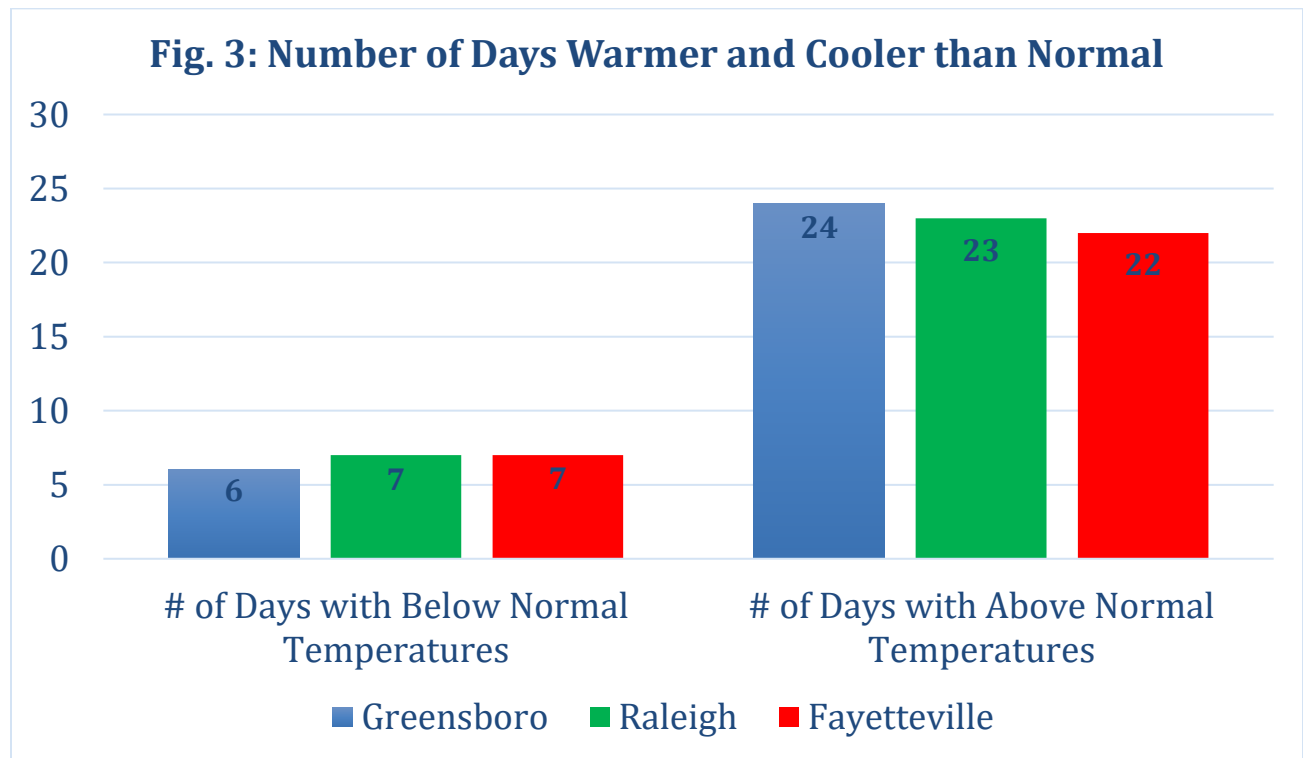
The time series of daily temperature for the month at Greensboro, Raleigh, and Fayetteville can be found in Figure 2.



Oddly, the warmest weather in December occurred during the last week of the month. This is when numerous daily temperature records were set at Greensboro and Raleigh. New daily record high minimum temperatures were set on consecutive days between December 29-31 at Greensboro and Raleigh. It was so warm at night during this period that the actual lows were frequently in the

lower-60s. These temperatures were about 10°F warmer than the average HIGH temperature for the last week of December! They are also equal to the average low temperatures typically recorded in late May! In addition, a new daily record high temperature of 74°F was set at Raleigh on December 31. A complete list of the records can be found at the end of this report.

As shown in Figure 3, the vast majority of days in December (around three quarters) were warmer than normal at all three climate sites.



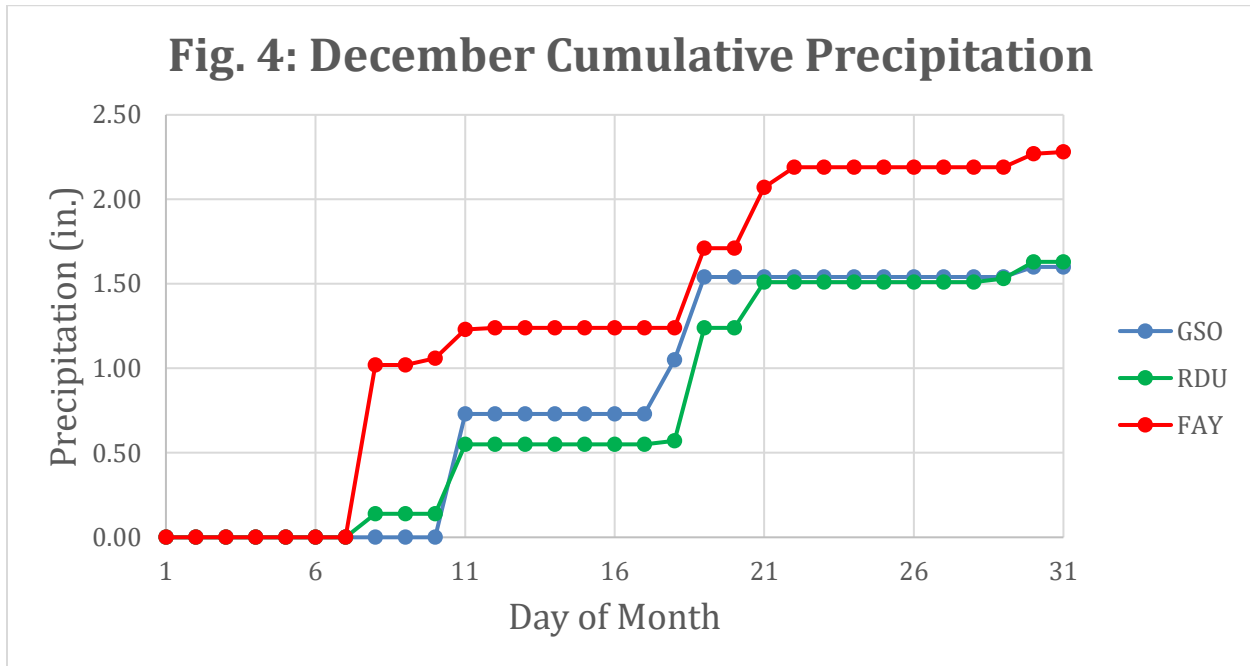
December started very dry just as November 2021 ended. However, rainfall events did pick up again especially in the latter half of the month. Even with the much-needed increase in rainfall events, the month ended according to NCEI as the 15th-driest for the state of NC. Specifically for central NC, all three climate sites were drier than normal. Greensboro recorded only 1.60 inches, which was 1.57 inches below normal and tied for the 16th-driest December on record. In Raleigh, a total of 1.63 inches fell, which was less than 50% of the normal rainfall and the 15th-driest December on record. The December 2021 monthly precipitation totals are found in Table 2.

Even though rainfall events did become a bit more frequent during December, they were still few and far between, especially in the first half of the month. Greensboro reported measurable rainfall (0.01 inches or more) on only four days in December, while Raleigh had measurable rainfall on seven days. Only one day had a half inch or greater at all three climate sites.

Table 2: Monthly Precipitation Statistics

Site	Total precipitation (in.)	Departure from Normal (in.)	Max Daily Precipitation (in.)
Greensboro (GSO)	1.60	-1.57	0.73 on 12/11
Raleigh-Durham (RDU)	1.63	-1.76	0.67 on 12/19
Fayetteville (FAY)	2.28	-0.69	1.02 on 12/8

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



Additional selected ASOS or cooperative observations for December 2021 are listed below. Note the below-normal rainfall amounts continued to be widespread.

Winston-Salem (Forsyth County) 1.48 inches (1.82 below normal), Mount Airy (Surry County) 0.87 inches (3.33 below normal), Raleigh (NCSU) 3.26 inches (0.42 below normal), Louisburg (Franklin County) 1.53 inches (1.95 below normal), Rocky Mount (Nash County) 2.47 inches (0.46 below normal), Clinton (Sampson County) 2.85 inches (0.68 below normal), Asheboro (Randolph County) 1.86 inches (1.78 below normal), Yadkinville (Yadkin County) 1.15 inches (2.68 below normal), and Reidsville (Rockingham County) 1.33 inches (2.24 below normal).

As shown in Figures 5 and 6, monthly rainfall totals ranged from 1-2 inches (1-3 inches below normal) in much of the northern Piedmont and northern Coastal Plain to mostly 2-4 inches (near to slightly below normal) in the south.

Fig. 5: Radar-Estimated Monthly Precipitation

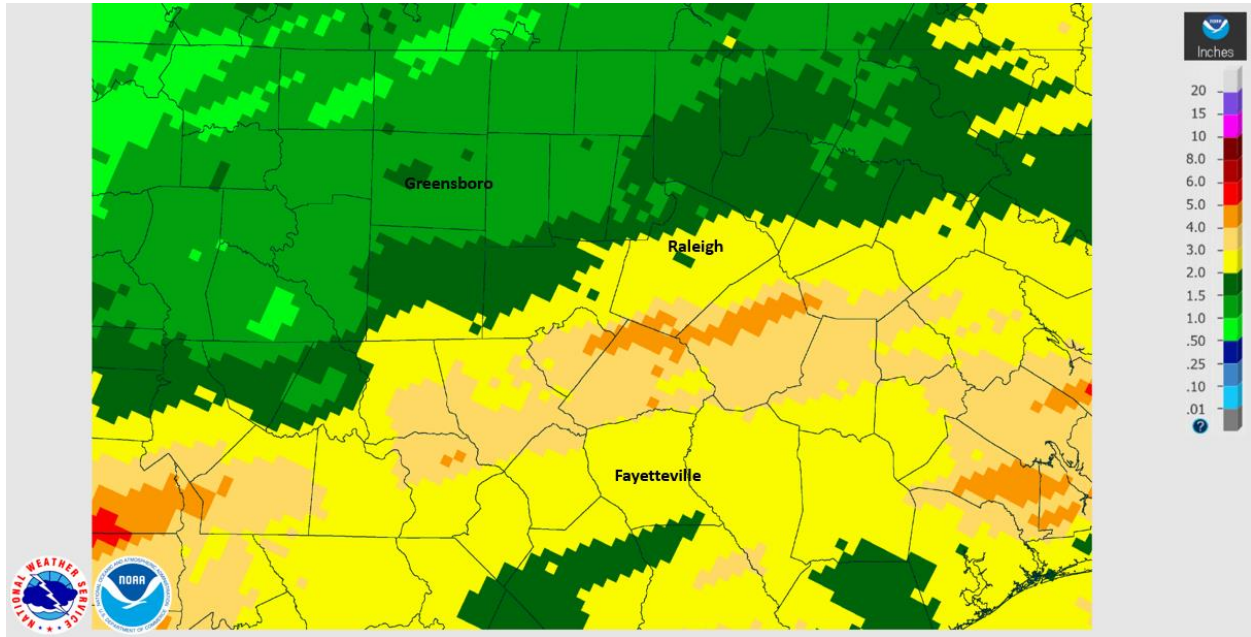
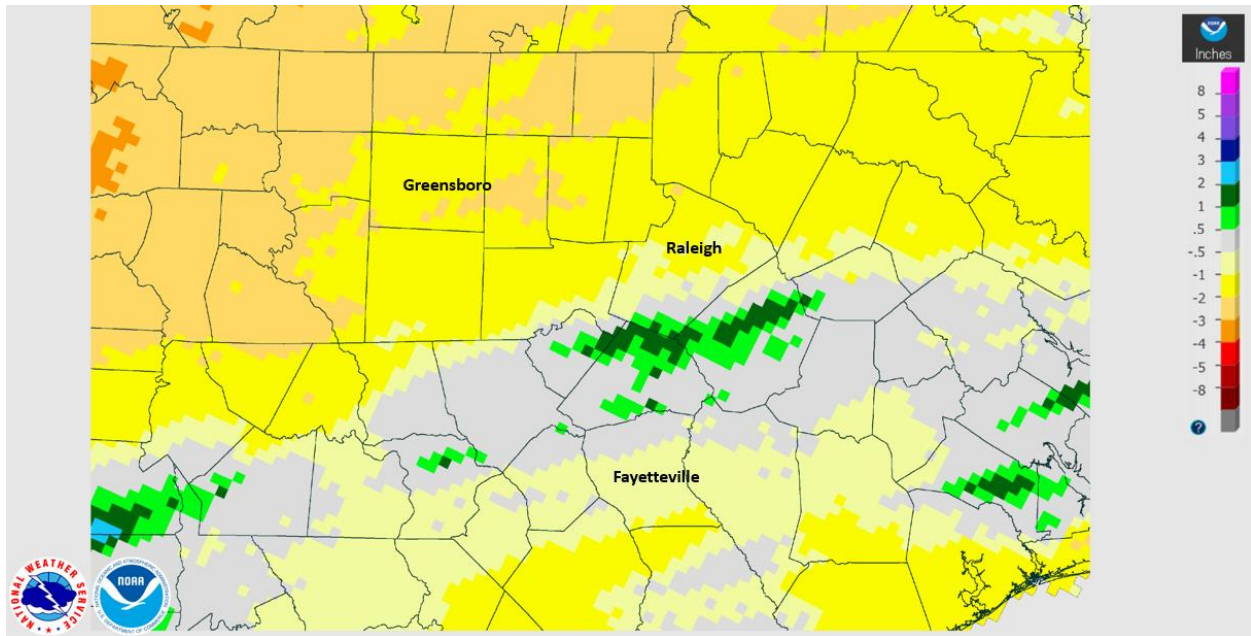
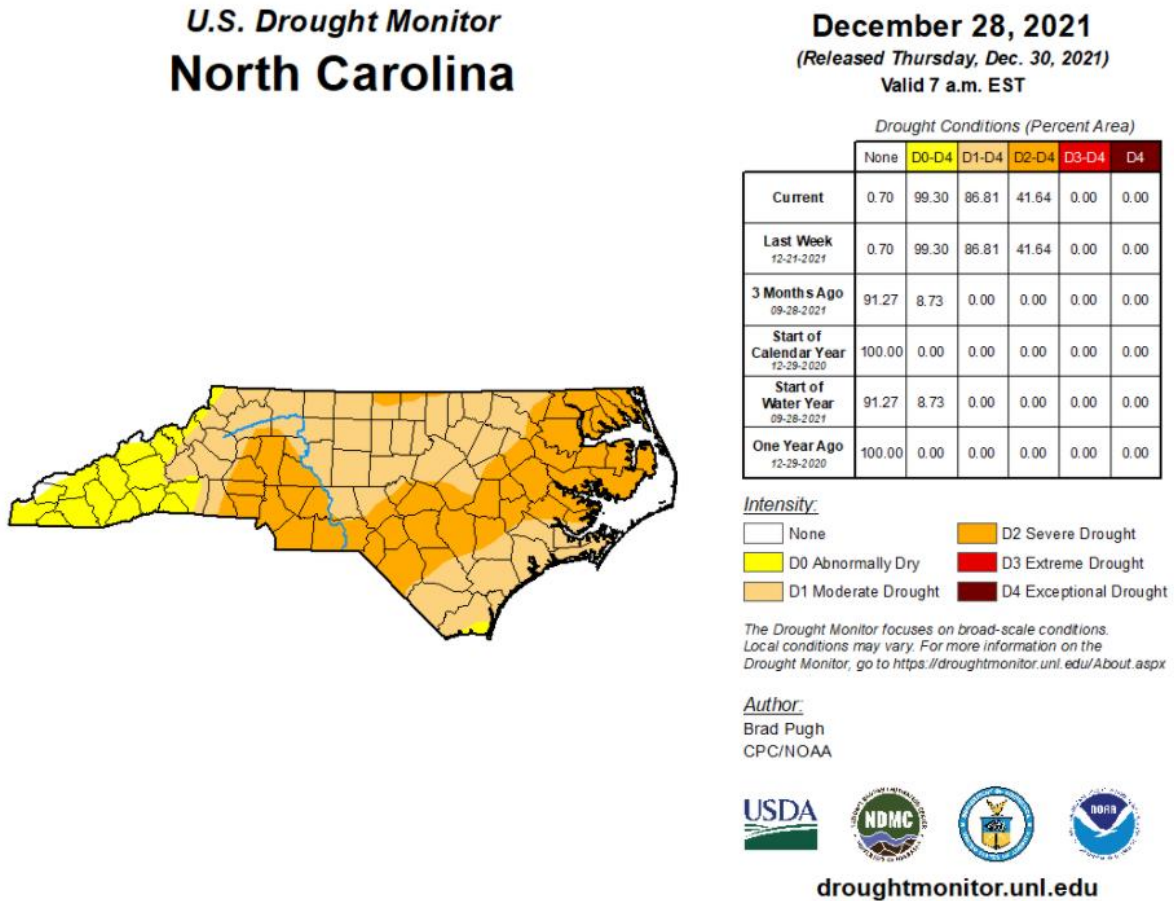


Fig. 6: Radar-Estimated Monthly Departure from Normal Precipitation



The continued dry weather resulted in worsening drought conditions across central NC. By the end of the month, the entire region was in Moderate Drought (D1) or Severe Drought (D2), as was nearly 87% of the state of NC. The Severe Drought ran from the southwestern Piedmont to the Sandhills to much of the Coastal Plain (Figure 7). However, the more frequent rainfall late in the month at least helped prevent the drought from getting worse. A statewide burn ban issued in late November was lifted everywhere by mid-December.

Fig. 7: U.S. Drought Monitor for North Carolina on December 28



The dry month also resulted in continued degrading of the streamflow and soil moisture across much of central NC compared to November, especially across the north, as shown in Figures 8 and 9.

Fig. 8: NASA SPoRT-LIS 0-100 cm Soil Moisture percentile valid 12/31/21

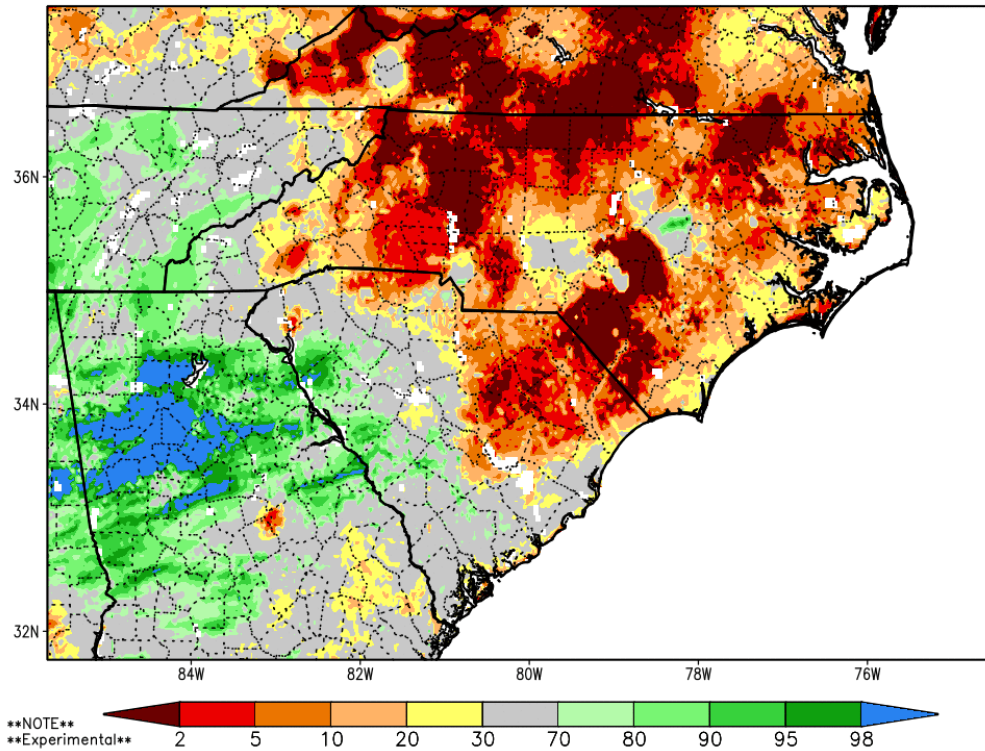
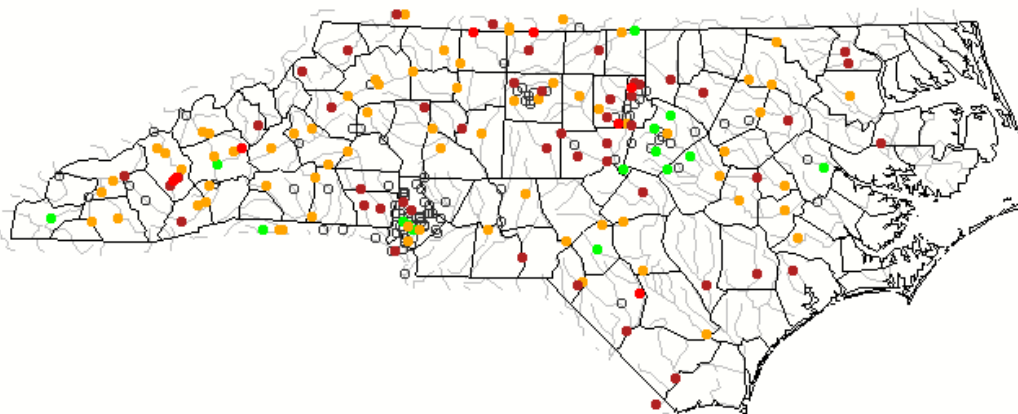


Fig. 9: Monthly Streamflow in North Carolina Compared to Historical Streamflow for December 2021



Explanation - Percentile classes							
●	●	●	●	●	●	●	○
Low	<10 Much below normal	10-24 Below normal	25-75 Normal	76-90 Above normal	>90 Much above normal	High	Not-ranked

Other notes:

Days with thunderstorms this month:

Greensboro: 1
Raleigh: 0
Fayetteville: 0

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

Greensboro: 4
Raleigh: 1
Fayetteville: 7

Strongest wind gusts and direction:

Greensboro: W (290 degrees) at 49 mph on December 11
Raleigh: W (250 degrees) at 37 mph on December 11
Fayetteville: SW (230 degrees) at 39 mph on December 25

Daily records:

Greensboro:

A record high temperature of 73°F was tied at Greensboro on December 3. This record was last set in 2012.

A record high minimum temperature of 53°F was tied at Greensboro on December 18. This record was last set in 1933.

A record high minimum temperature of 63°F was set at Greensboro on December 29. This broke the old record of 60°F set in 1954.

A record high minimum temperature of 61°F was set at Greensboro on December 30. This broke the old record of 52°F set in 1974.

A record high minimum temperature of 54°F was set at Greensboro on December 31. This broke the old record of 52°F set in 1936.

Raleigh:

A record high temperature of 73°F was set at Raleigh on December 17. This broke the old record of 72°F set in 1924.

A record high minimum temperature of 59°F was set at Raleigh on December 18. This broke the old record of 55°F set in 1937.

A record high minimum temperature of 61°F was tied at Raleigh on December 29. This record was last set in 1954.

A record high minimum temperature of 64°F was set at Raleigh on December 30. This broke the old record of 63°F set in 2015.

A record high temperature of 74°F was set at Raleigh on December 31. This broke the old record of 72°F set in 1929.

A record high minimum temperature of 61°F was set at Raleigh on December 31. This broke the old record of 59°F set in 1923.

Fayetteville:

No daily records were set this month.

Monthly records:**Greensboro:**

December 2021 was the 2nd-warmest December on record at Greensboro. The average temperature was 50.9°F (8.4°F above normal).

Raleigh:

December 2021 was the 3rd-warmest December on record at Raleigh. The average temperature was 52.6°F (8.0°F above normal).

Fayetteville:

December 2021 was the 2nd-warmest December on record at Fayetteville. The average temperature was 54.2°F (7.7°F above normal).