January 2022 Central NC Climate Summary

By Phillip Badgett and James Danco

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January 2022 turned colder, wintry, and wet after one of the warmest Decembers on record. January started extremely warm with daily average temperatures 30°F above normal at all three climate sites. High temperatures reached into the mid-70s to lower-80s on New Year's Day. Fayetteville hit 81°F, while Raleigh hit 79°F and Greensboro 77°F, all three of which were record highs for the day. All three climate sites also shattered the record high minimum temperatures for the day by 7 to 9 degrees, with lows only dropping into the 60's. Record high minimum temperatures were again broken on January 2 at Raleigh and Fayetteville, with lows in the upper-50s to lower-60s. The bottom then fell out behind a lead cold front that marked a major pattern change on January 3. The persistent upper-level ridge that was responsible for December's warmth was replaced by a deep trough over the eastern United States (Figure 1). This pattern change was accompanied by needed heavy rainfall from January 1-3, when amounts ranged between 2 and locally 5 inches. The 2.40 inches of precipitation at Greensboro and 2.29 inches at Raleigh on the 3rd both set daily rainfall records. This rainfall and turn to colder temperatures set the stage for the rest of the month that featured four different frozen precipitation events, including a changeover to snow at the end of the event on the 3rd when Greensboro received 2.0 inches. By month's end, the final monthly average temperatures were 2-2.5°F below normal at all three climate sites (Table 1). January 2022 had a preliminary statewide average temperature of 39.4°F according to NCEI data reported by the North Carolina State Climate Office (NCSCO). The NCSCO also noted that January 2022 was the coolest January in most areas of the state since 2018, and was 1.4°F colder than the 1991-2020 average statewide, tying for the 59th-coldest January in the past 128 years. Some places in central NC were even cooler. According to the NCSCO, it was the 24th-coldest January in Asheboro since 1927, and tied for the 19th-coldest in Tarboro since 1893.

Fig. 1: 500 mb Observations, Heights, and Temperatures on 1/1 (left) and 1/5 (right)

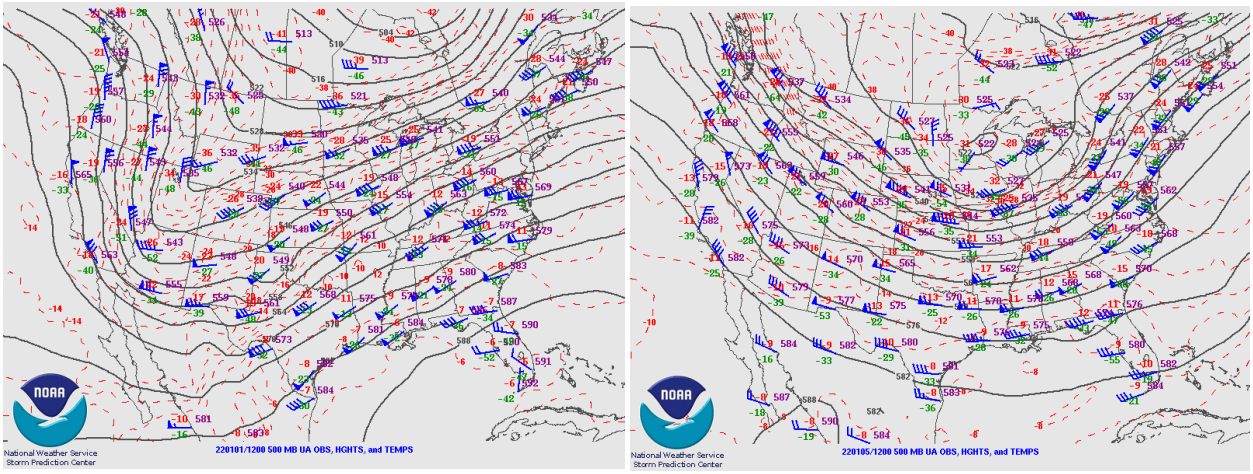
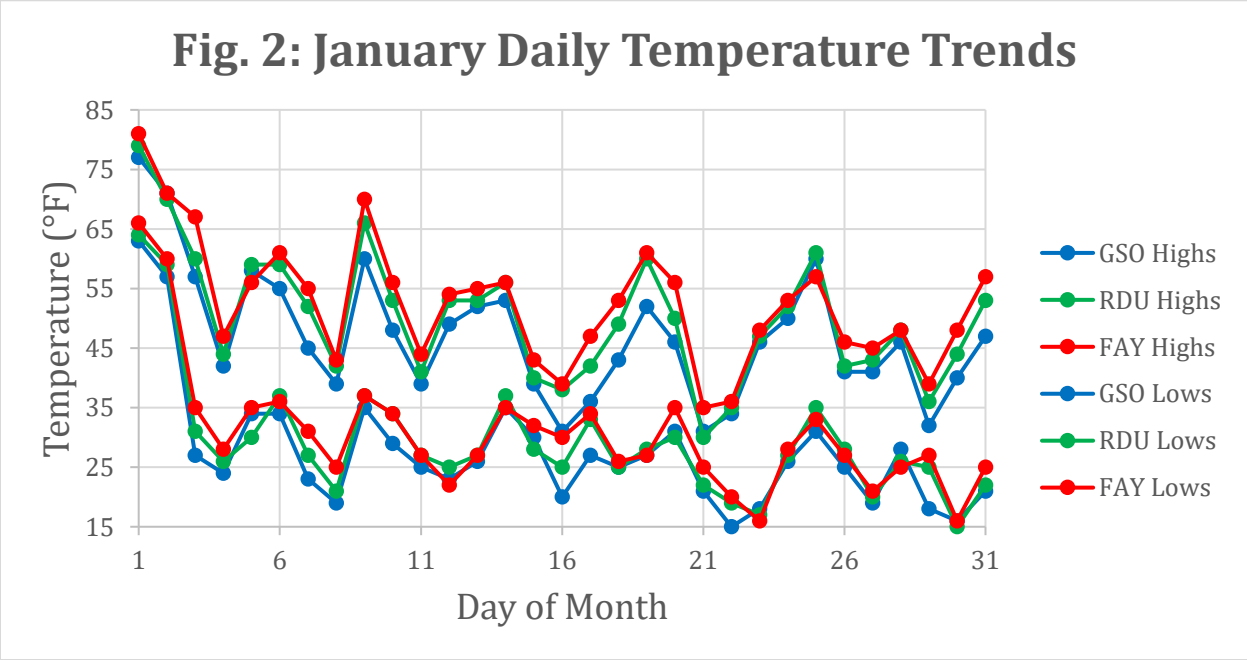


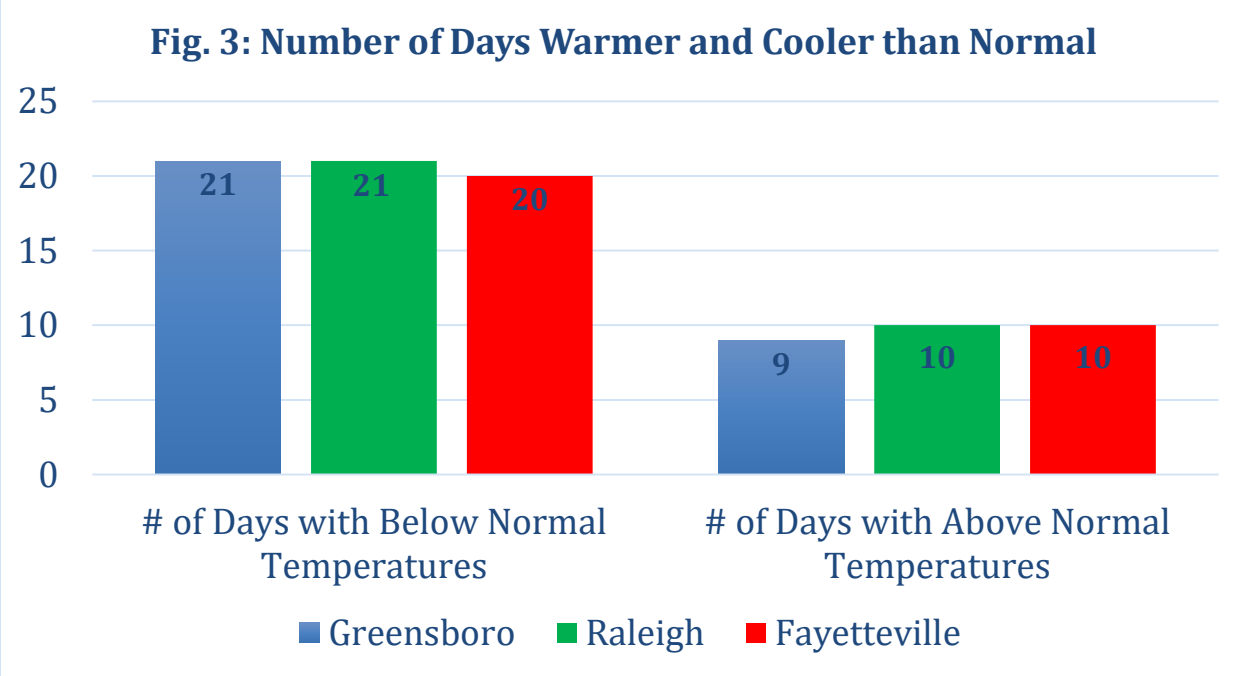
Table 1: Monthly Temperature Statistics

Site	Avg High Temp (°F)	Avg Low Temp (°F)	Avg Temp (°F)	Departure From Normal (°F)	Maximum Temperature (°F)	Minimum temperature (°F)
Greensboro (GSO)	47.1	27.5	37.3	-2.4	77 on 1/1	15 on 1/22
Raleigh-Durham (RDU)	50.2	29.3	39.7	-2.2	79 on 1/1	15 on 1/30
Fayetteville (FAY)	52.5	30.5	41.5	-2.5	81 on 1/1	16 on 1/23 and 1/30

The time series of daily temperature for the month at Greensboro, Raleigh, and Fayetteville can be found in Figure 2. Note the very warm start followed by a much cooler rest of the month. The coldest temperatures of the month occurred during and just after the wintry precipitation events. Greensboro recorded a monthly low temperature of 15°F on January 22 when there was an inch of fresh snow on the ground. This was followed closely by a low of 16°F on January 30 following another snow event. Raleigh reported a monthly low of 15°F on January 30 the day after 0.4 inches of snow fell. Raleigh also fell to 17°F on January 23 following 2.3 inches of snowfall. Fayetteville reported a monthly low of 16°F on both the 23rd and the 30th.



As shown in Figure 3, roughly two-thirds of days in January were cooler than average at all three climate sites.



The cold front on January 3 was followed by frequent cold fronts that brought not only colder temperatures but often bouts of wintry precipitation throughout the month. According to NCEI data relayed from the NCSCO, the statewide average precipitation totaled 4.70 inches. This made it the 29th-wettest January since 1895. Specifically for central NC, all three climate sites received 4 to 6 inches of precipitation, about 1 to 3 inches above normal. Raleigh received 5.97 inches, which tied for its 13th-wettest January on record, and Greensboro tied for the 18th-wettest with 5.03 inches. According to the NCSCO, Chapel Hill had its 11th-wettest January in 122 years with 6.26 inches, and Roanoke Rapids had its 2nd-wettest January since 1962 with 6.64 inches. The January 2022 monthly precipitation totals at the three climate sites are found in Table 2.

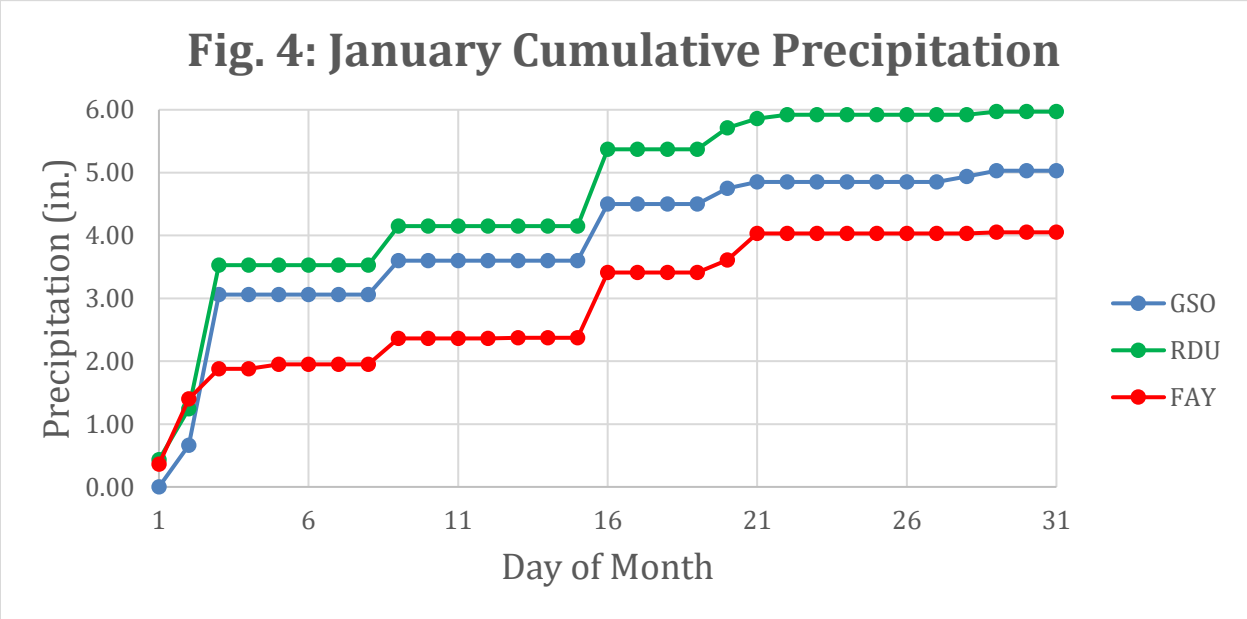
Table 2: Monthly Precipitation Statistics

Site	Total precipitation (in.)	Departure from Normal (in.)	Max Daily Precipitation (in.)
Greensboro (GSO)	5.03	+1.64	2.40 on 1/3
Raleigh-Durham (RDU)	5.97	+2.54	2.29 on 1/3
Fayetteville (FAY)	4.05	+0.90	1.04 on 1/2 and 1/16

Additional selected ASOS or cooperative observations for January 2022 are listed below. Note the turn to above-normal precipitation!

Winston-Salem (Forsyth County) 4.31 inches (0.96 above normal), Mount Airy (Surry County) 3.85 inches (0.14 below normal), Raleigh (NCSU) 6.97 inches (3.32 above normal), Louisburg (Franklin County) 6.41 inches (2.67 above normal), Rocky Mount (Nash County) 4.66 inches (1.15 above normal), Clinton (Sampson County) 4.70 inches (1.20 above normal), Asheboro (Randolph County) 5.20 inches (1.25 above normal), Yadkinville (Yadkin County) 4.23 inches (0.55 above normal), Reidsville (Rockingham County) 4.93 inches (0.95 above normal).

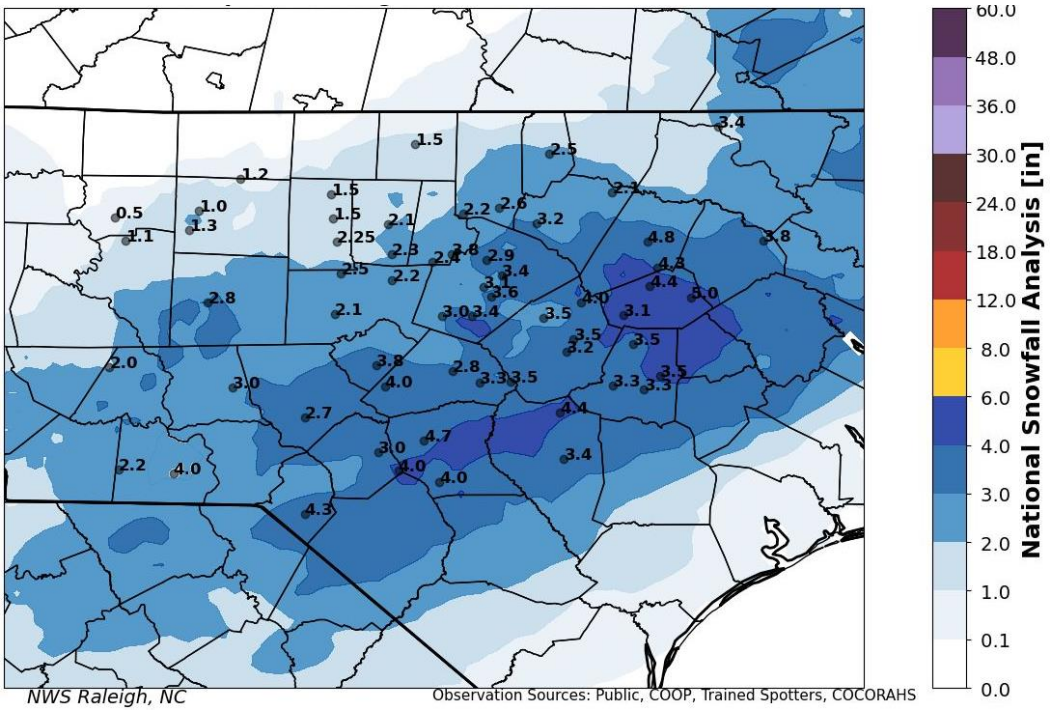
The cumulative precipitation in January at the three climate sites is shown in Figure 4. The heaviest precipitation fell the first three days of the month, but several other notable events occurred later on as well.



January 2022 was also snowy for much of central NC. Greensboro reported 8.2 inches of snowfall, which was 5.3 inches above the normal of 2.9 inches, and tied for the 13th-snowiest January on record. This included at least an inch on four days in the month (the 3rd, 16th, 21st, and 29th), the first time it snowed so frequently in the Triad since January 2000 according to the NCSCO. Raleigh totaled 2.7 inches of snowfall, 0.1 inches above the normal of 2.6 inches.

The largest winter storm to affect central NC impacted much of the state on January 21 and 22. Light snow developed over west-central NC the afternoon of January 21, peaked in the late evening and early overnight hours, and ended the morning of January 22. The highest totals occurred over the Coastal Plain and Sandhills where up to 5 inches fell. RDU Airport measured 2.3 inches of snow during the event, and 1.0 inch fell at Greensboro. Both locations had daily record snowfall on the 21st. With a strong Arctic high to the north, corresponding temperatures stayed below freezing for much of central NC. Greensboro had a high of 31°F and Raleigh a high of 30°F on the 21st, with much of the snow falling when temperatures were in the lower-to-mid-20s. A map of the snowfall totals for NC for the January 21-22 storm is depicted in Figure 5.

Fig. 5: Total Snowfall on January 21-22



Radar-estimated monthly precipitation and precipitation departure from normal are shown in Figures 6 and 7. Much of the Northeast Piedmont and Northern Coastal Plain received 5 to 8 inches (2 to 3 inches above normal), highest around the Triangle. Elsewhere, totals ranged from 2 to 5 inches (near normal to 2 inches above normal), lowest in the southwest.

Fig. 6: Radar-Estimated Monthly Precipitation

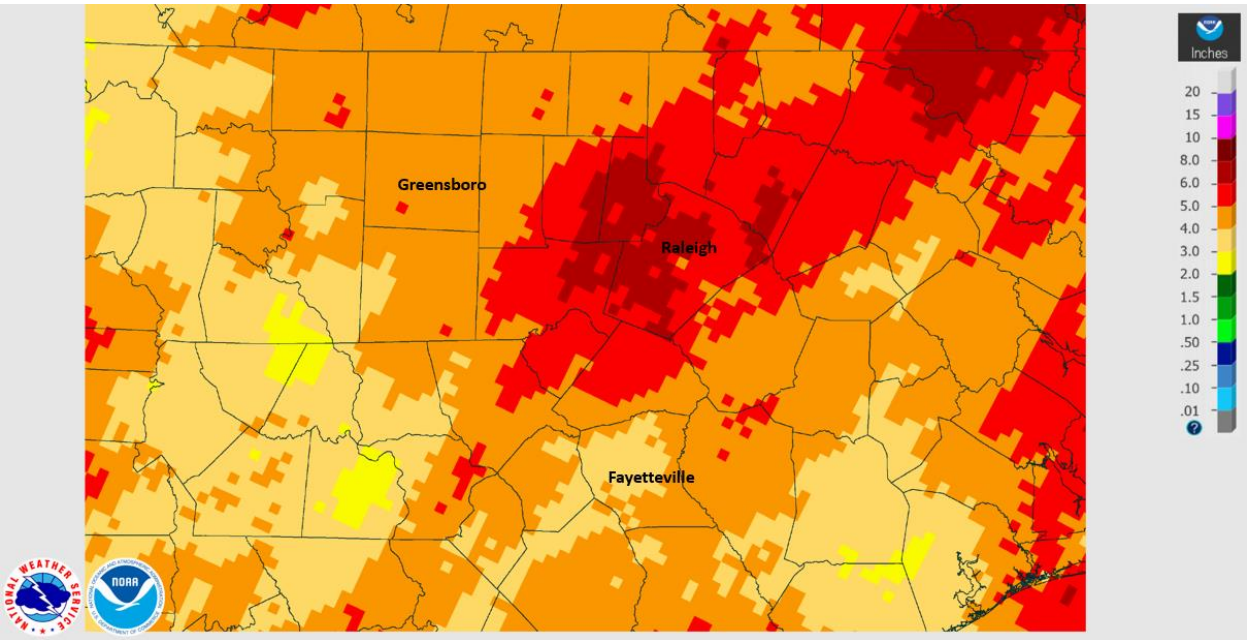


Fig. 7: Radar-Estimated Monthly Departure from Normal Precipitation

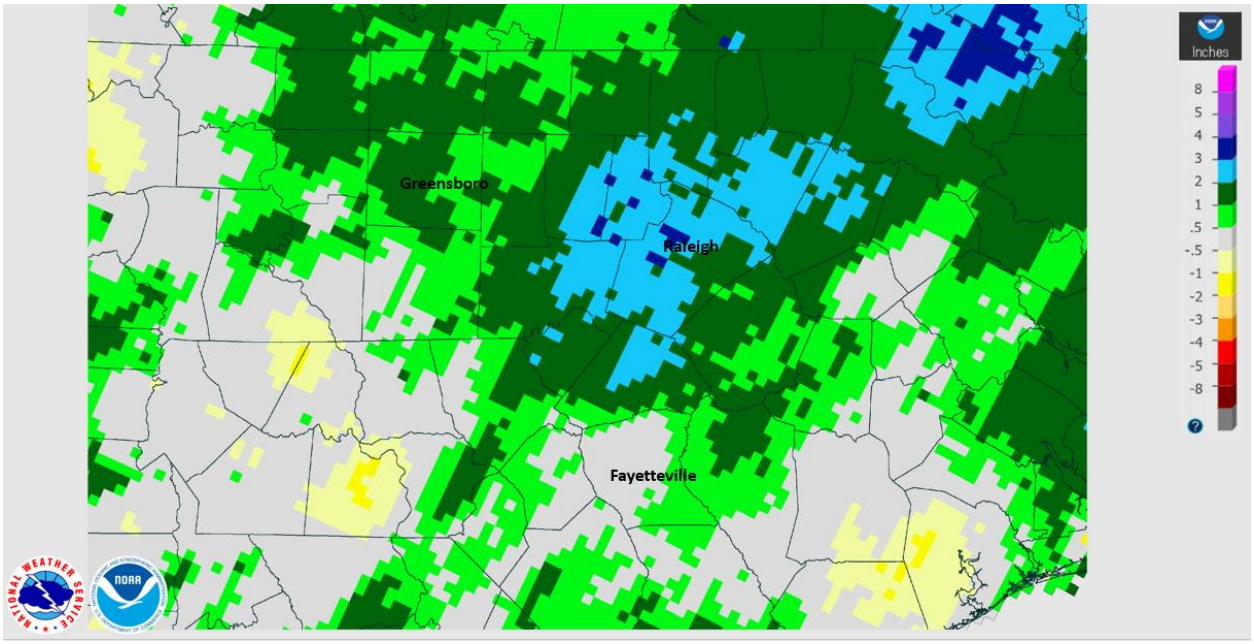
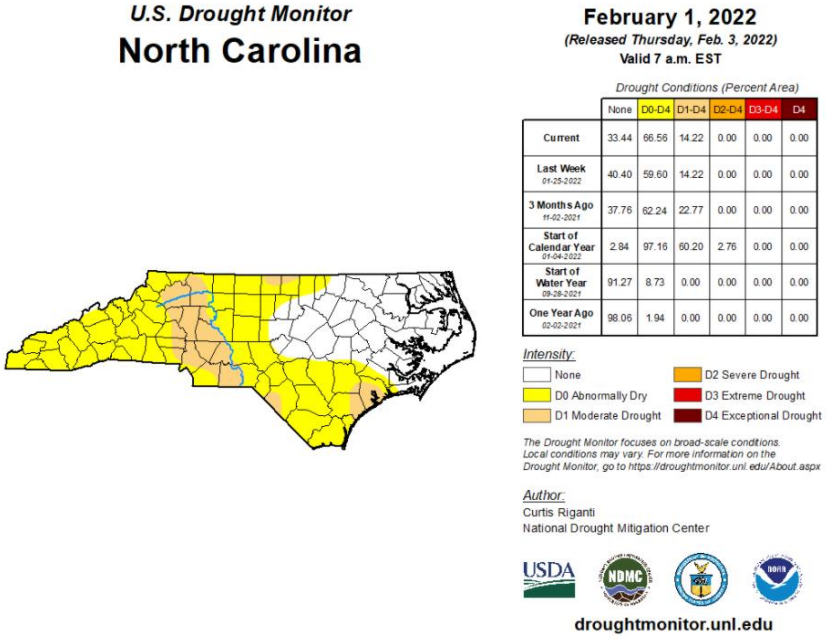


Figure 8 displays that the wet weather in January helped to substantially alleviate the drought conditions across central NC, as well as the rest of the state. Compared to late December when nearly 87% of the state of NC and all of central NC were in a Moderate Drought (D1) or Severe Drought (D2), by February 1 only 14% of the state was in D1 and no D2 areas were left. A third of the state, from the Triangle region eastward, was not even in D0 anymore.

Fig. 8: U.S. Drought Monitor for North Carolina on February 1



Soil moisture and streamflow, which were very low at the end of December, also substantially improved in January, as shown in Figures 9 and 10. Compared to December when most streamflow gauges in central NC were below normal to much below normal, streamflow in January was largely near normal. However, one wet month was not enough to eliminate all signs of dryness, with some dry deeper soils still present across the western Piedmont and Sandhills.

Fig. 9: NASA SPoRT-LIS 0-100 cm Soil Moisture percentile valid 1/31/22

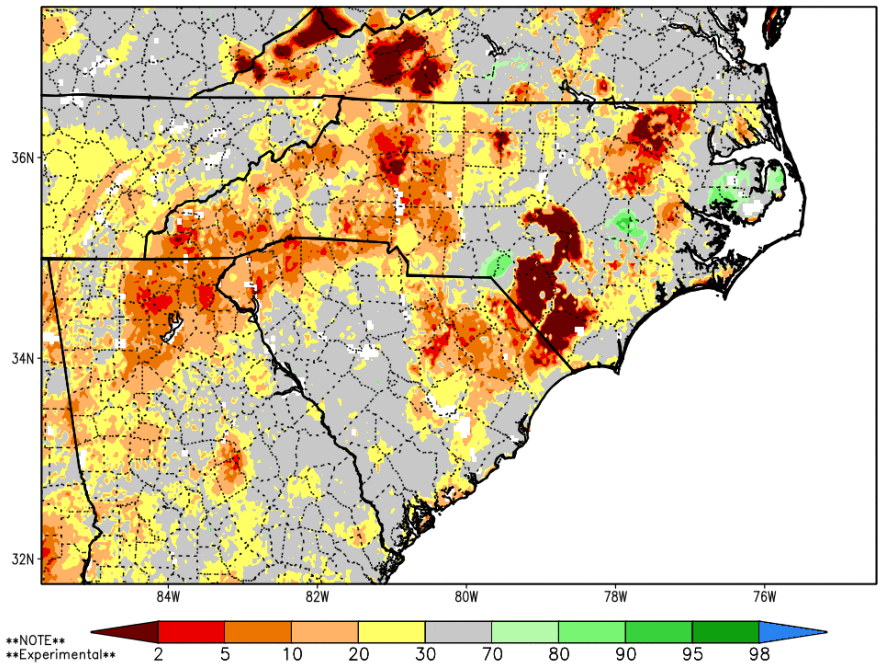
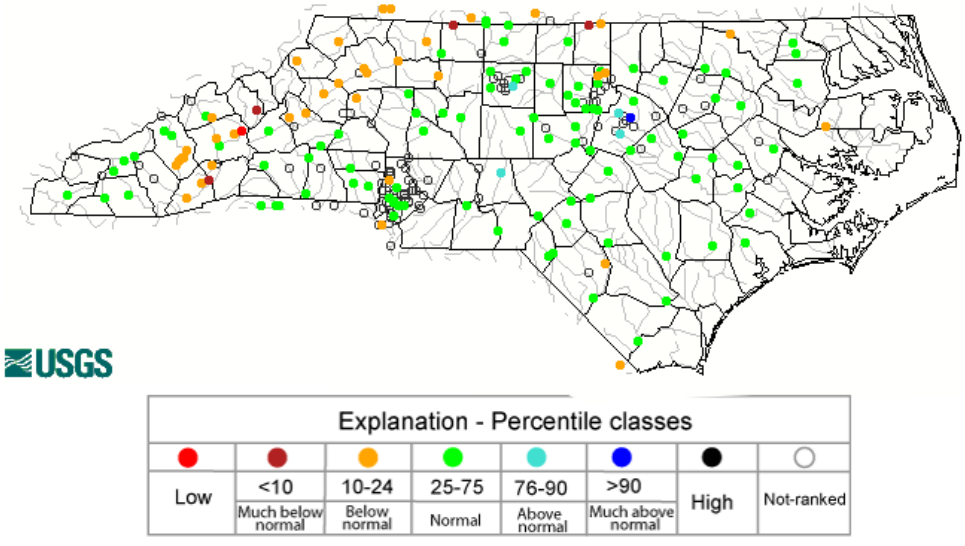


Fig. 10: Monthly Streamflow in North Carolina Compared to Historical Streamflow for January 2022



Other notes:

Days with thunderstorms this month:

Greensboro: 0
Raleigh: 1
Fayetteville: 0

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

Greensboro: 0
Raleigh: 1
Fayetteville: 0

Days with snow reported this month:

Greensboro: 8
Raleigh: 8
Fayetteville: 4

Strongest wind gusts and direction:

Greensboro: NE (060 degrees) at 54 mph on January 3
Raleigh: NE (030 degrees) at 50 mph on January 3
Fayetteville: S (200) at 47 mph on January 3

Daily records:

Greensboro:

A record high temperature of 77°F was set at Greensboro on January 1. This broke the old record of 75°F set in 1985.

A record high minimum temperature of 63°F was set at Greensboro on January 1. This broke the old record of 54°F set in 1966.

A record rainfall of 2.40 inches was set at Greensboro on January 3. This broke the old record of 1.77 inches set in 1992.

A record snowfall of 1.0 inch was set at Greensboro on January 21. This broke the old record of 0.4 inches set in 2014.

Raleigh:

A record high temperature of 79°F was set at Raleigh on January 1. This broke the old record of 75°F set in 1985.

A record high minimum temperature of 64°F was set at Raleigh on January 1. This broke the old record of 55°F set in 1979.

A record high minimum temperature of 59°F was set at Raleigh on January 2. This broke the old record of 56°F set in 1966.

A record rainfall of 2.29 inches was set at Raleigh on January 3. This broke the old record of 1.74 inches set in 1992.

A record snowfall of 1.5 inches was set at Raleigh on January 21. This broke the old record of 1.2 inches set in 1961.

Fayetteville:

A record high temperature of 81°F was set at Fayetteville on January 1. This broke the old record of 77°F set in 1974.

A record high minimum temperature of 66°F was set at Fayetteville on January 1. This broke the old record of 59°F set in 2019.

A record high minimum temperature of 60°F was set at Fayetteville on January 2. This broke the old record of 56°F set in 1985.

Monthly records:

None.