

July 2022 Central NC Climate Summary

By Phillip Badgett and James Danco

July turned wet and remained hot across central NC.

In a dramatic turn of events, a wetter pattern emerged across our region in July. This occurred after a very dry June. The rain events became numerous throughout the month; however, scattered thunderstorms were the main rain events. Therefore, it took several thunderstorms for many areas to recover from the dryness experienced in June. The more widespread thunderstorms generally occurred on July 3-10, July 13-18, and July 26-31. Even though it didn't rain on every one of those days at all locations, there were thunderstorms reported or nearby on nearly all those days. By month's end, rainfall totals generally averaged 125% to 150% of normal for most of central North Carolina. All three main climate reporting sites were well above normal, by around 3-4 inches. With the increased wetness, July had a statewide average precipitation of 6.04 inches according to preliminary data from NCEI. This made it the 47th-wettest July since 1895. Raleigh had its 13th-wettest July with records going back to 1887. Other cooperative station reports from around central NC included: Lexington 5.13 inches, Pfafftown 6.21 inches, Winston-Salem 5.42 inches, Mount Airy 6.61 inches, Danbury 8.08 inches, Henderson 7.45 inches, Falls Lake 7.75 inches, Cary 4.48 inches, Raleigh NCSU 4.91 inches, Apex 4.89 inches, Chapel Hill 6.90 inches, Jackson Springs 4.03 inches, Clayton 4.03 inches, 6.54 inches, Laurinburg 4.60 inches, Rocky Mount 3.18 inches, Tarboro 4.66 inches, and Clinton 4.93 inches. The July 2022 monthly precipitation totals at the three climate sites are found in Table 1.

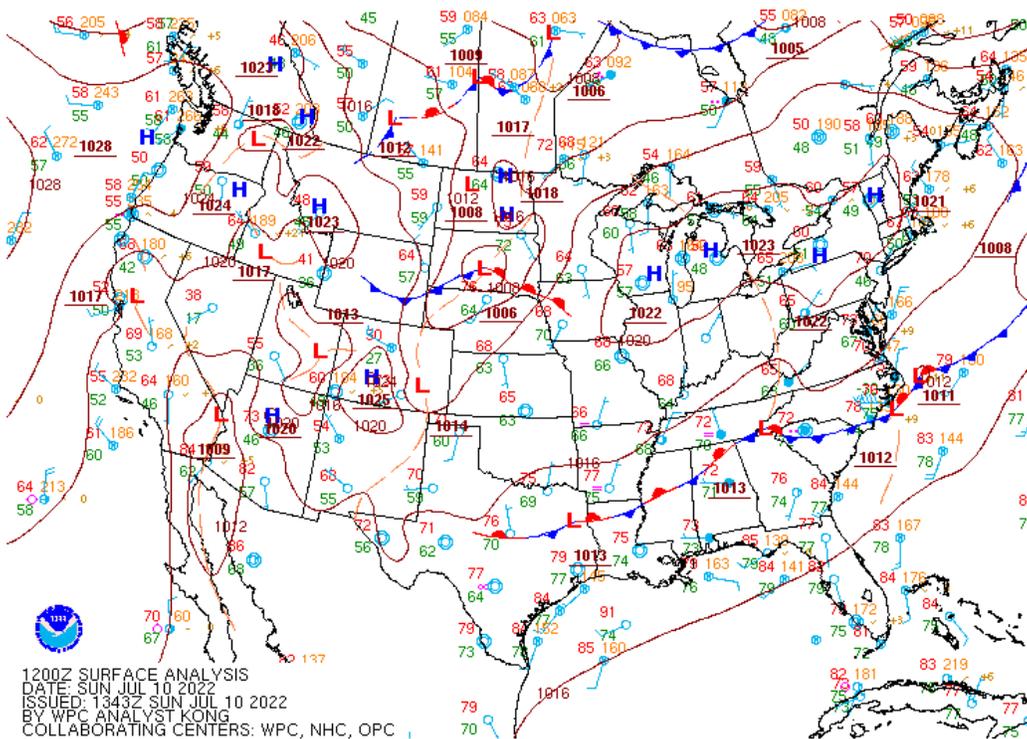
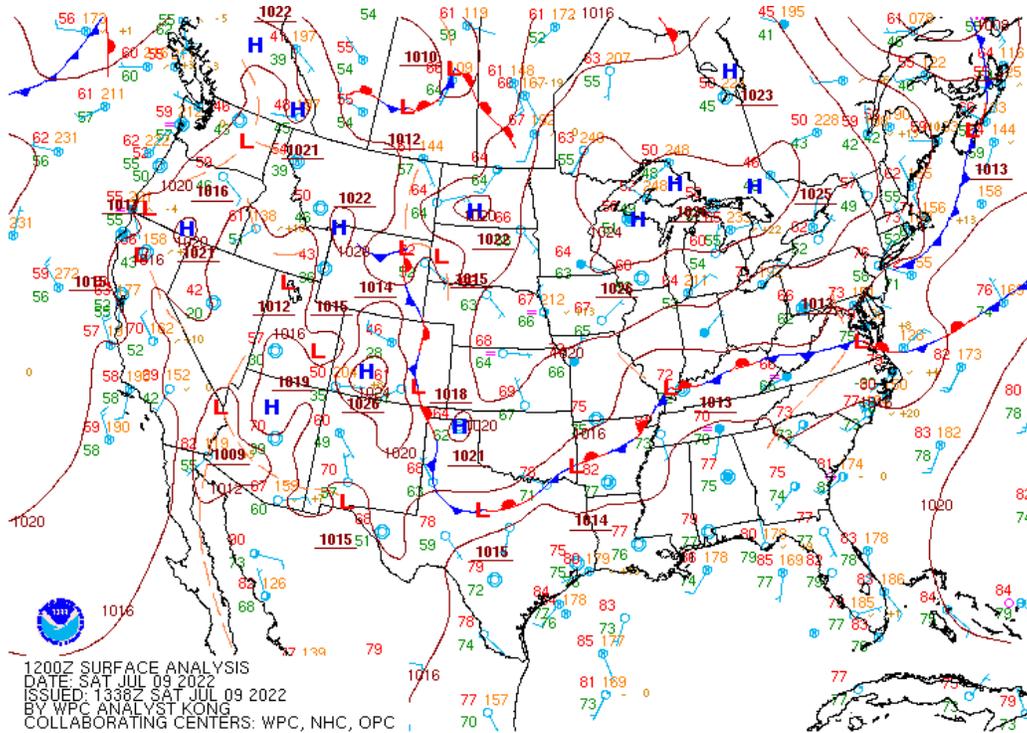
Table 1: Monthly Precipitation Statistics

| Site | Total precipitation (in.) | Departure from Normal (in.) | Max Daily Precipitation (in.) |
|-----------------------------|---------------------------|-----------------------------|-------------------------------|
| Greensboro (GSO) | 7.01 | +2.83 | 1.97 on 7/21 |
| Raleigh-Durham (RDU) | 8.47 | +3.45 | 2.61 on 7/15 |
| Fayetteville (FAY) | 8.62 | +3.67 | 2.36 on 7/22 |

The system of the month for July had to be a cold front that meandered over or just north of the region on July 7-8, before moving through central NC on July 9, then settling just south of NC on July 10. This allowed surface high pressure to build from the Great Lakes region southward into the state on July 10-11. The cold front brought numerous showers and thunderstorms from July 7-10, providing a drenching rain for many areas that were in a drought at that time. Nearly all of central NC received at least 1-2 inches during this period, with localized spots around the Triangle, Fayetteville, and the Coastal Plain recording as much as 4-8 inches according to

CoCoRaHS. Figure 1 shows the cold frontal positions at 8:00 AM on July 9 and July 10. Note the front dives south into SC by July 10, with the “cool” high to the north building into NC.

Fig. 1: WPC Surface Analysis at 12z on 7/9 and 7/10



Radar-estimated precipitation and precipitation departure from normal across central NC are shown in Figures 2 and 3. While an area from much of southern Wake into Chatham, Lee, and Randolph counties had 2-5 inches for the month (near to even slightly drier than normal), almost the whole rest of central NC was wetter than normal, receiving as much as 6-10+ inches. The Coastal Plain was particularly wet, as were some of the most urban areas around the Triangle, Greensboro, and Fayetteville. A sharp gradient over Wake County is also apparent, with the northern part of the county receiving 10+ inches and the southern part as little as 2-4 inches.

Fig. 2: Radar-Estimated Monthly Precipitation

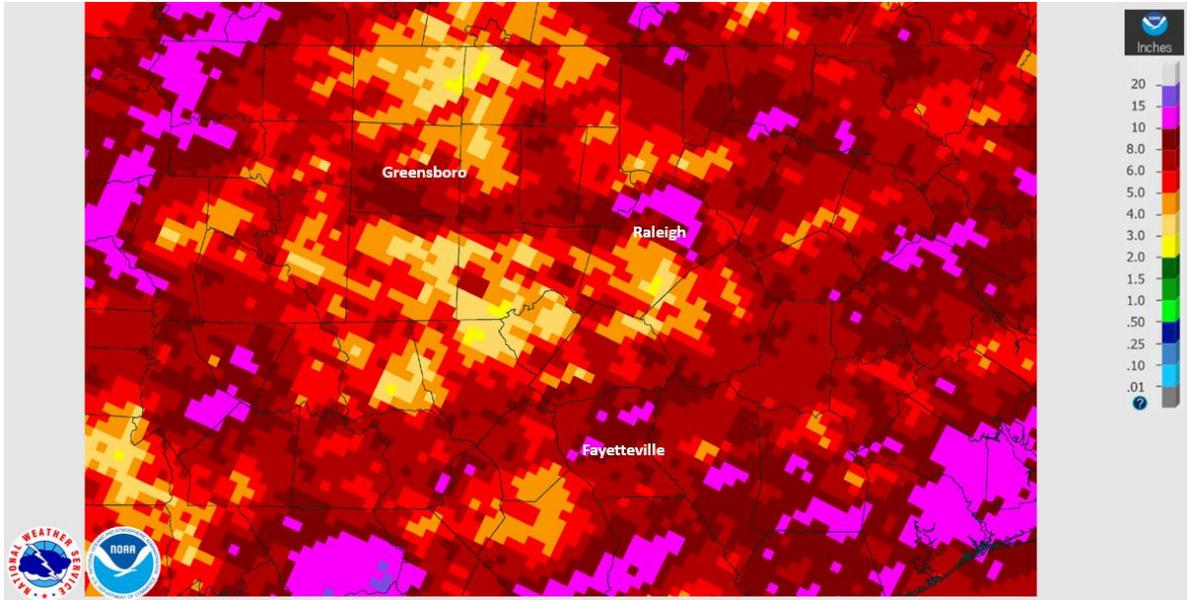
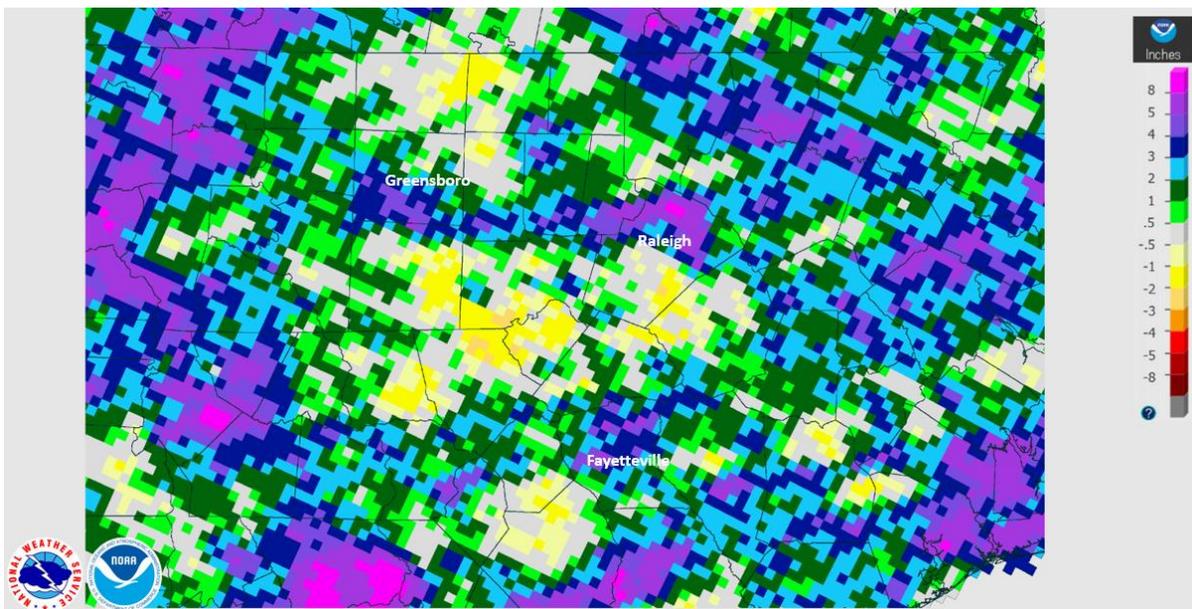


Fig. 3: Radar-Estimated Monthly Departure from Normal Precipitation



The cumulative precipitation at the three climate sites for the month of July is shown in Figure 4. The scattered nature of convection resulted in the heaviest rain occurring on different days at each location, but each site had some days with a lot of rain. Greensboro had three days (the 5th, 16th, and 21st) when at least an inch fell. Fayetteville had two days (the 7th and 22nd) when over two inches fell, both of which set new daily rainfall records. Raleigh received its heaviest rain of 2.61 inches on the 15th.

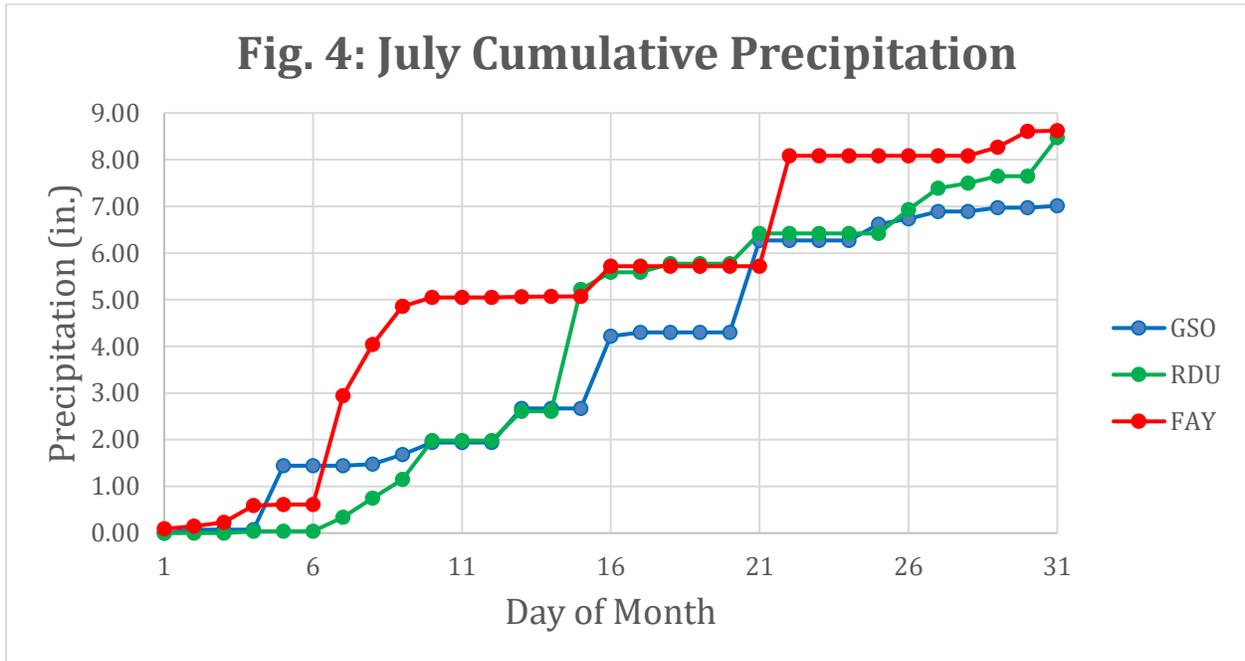
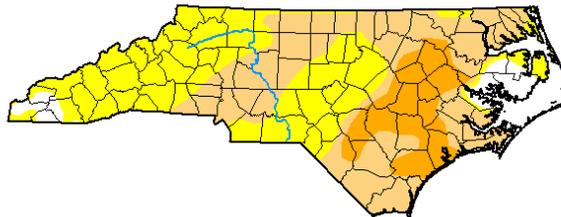


Figure 5 shows how the wet month was able to significantly reduce the drought across the state. There was generally a one to two category reduction across all of central NC over the three weeks from the beginning to the end of the month. The Triangle region southwest to the southern Piedmont went from D0 (Abnormally Dry) conditions to no drought conditions, while the Coastal Plain went from D2 (Severe Drought) to D1 (Moderate Drought) or D0 (Abnormally Dry). While nearly the entire state was in at least Abnormally Dry conditions and a majority in a Moderate Drought at the beginning of the month, by the end a majority of the state wasn't even in D0 and only 6% was in D1.

Fig. 5: U.S. Drought Monitor for North Carolina on July 5 (top) and July 26 (bottom)

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



July 5, 2022
(Released Thursday, Jul. 7, 2022)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

| | None | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4 |
|---|-------|-------|-------|-------|-------|------|
| Current | 4.95 | 95.05 | 53.27 | 14.14 | 0.00 | 0.00 |
| Last Week 06-28-2022 | 3.25 | 96.75 | 40.60 | 17.11 | 0.00 | 0.00 |
| 3 Months Ago 04-05-2022 | 54.62 | 45.38 | 30.66 | 11.02 | 0.00 | 0.00 |
| Start of Calendar Year 01-04-2022 | 2.84 | 97.16 | 60.20 | 2.76 | 0.00 | 0.00 |
| Start of Water Year 09-28-2021 | 91.27 | 8.73 | 0.00 | 0.00 | 0.00 | 0.00 |
| One Year Ago 07-06-2021 | 52.40 | 47.60 | 2.38 | 0.00 | 0.00 | 0.00 |

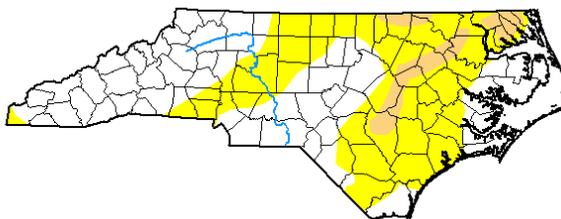
Intensity:
 None (White) D2 Severe Drought (Orange)
 D0 Abnormally Dry (Yellow) D3 Extreme Drought (Red)
 D1 Moderate Drought (Light Orange) D4 Exceptional Drought (Dark Red)

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



July 26, 2022
(Released Thursday, Jul. 28, 2022)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

| | None | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4 |
|---|-------|-------|-------|-------|-------|------|
| Current | 52.29 | 47.71 | 6.45 | 0.00 | 0.00 | 0.00 |
| Last Week 07-19-2022 | 51.46 | 48.54 | 7.47 | 0.00 | 0.00 | 0.00 |
| 3 Months Ago 04-26-2022 | 56.68 | 43.32 | 26.62 | 10.17 | 0.00 | 0.00 |
| Start of Calendar Year 01-04-2022 | 2.84 | 97.16 | 60.20 | 2.76 | 0.00 | 0.00 |
| Start of Water Year 09-28-2021 | 91.27 | 8.73 | 0.00 | 0.00 | 0.00 | 0.00 |
| One Year Ago 07-27-2021 | 82.23 | 17.77 | 0.00 | 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)

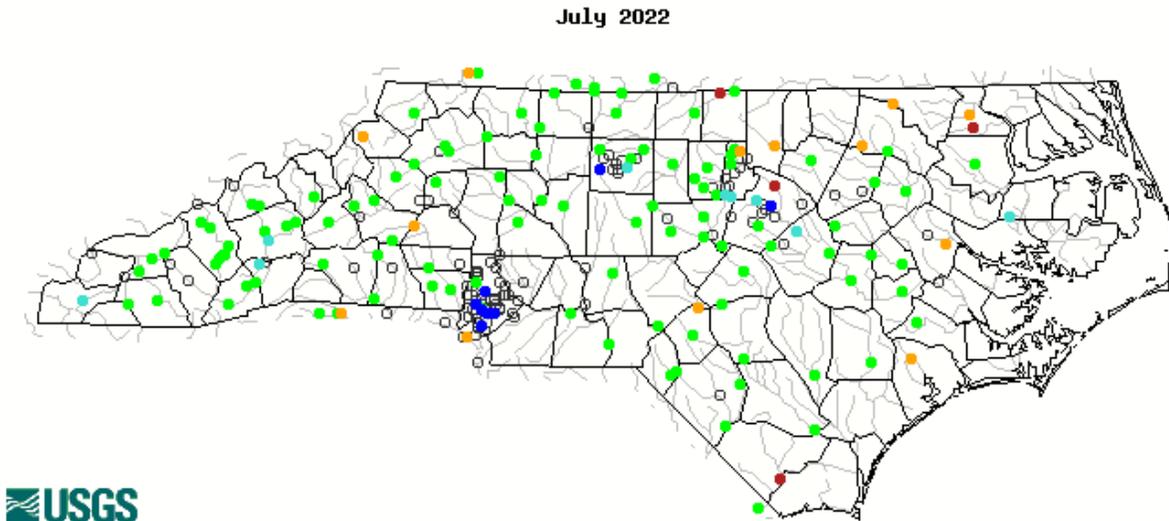
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The heavy rainfall in July resulted in a vast improvement in streamflow levels for much of central NC after many were well below normal at the end of June (Figure 6).

Figure 6: Map of Monthly Streamflow compared to Historical Streamflow for the Month of the Year



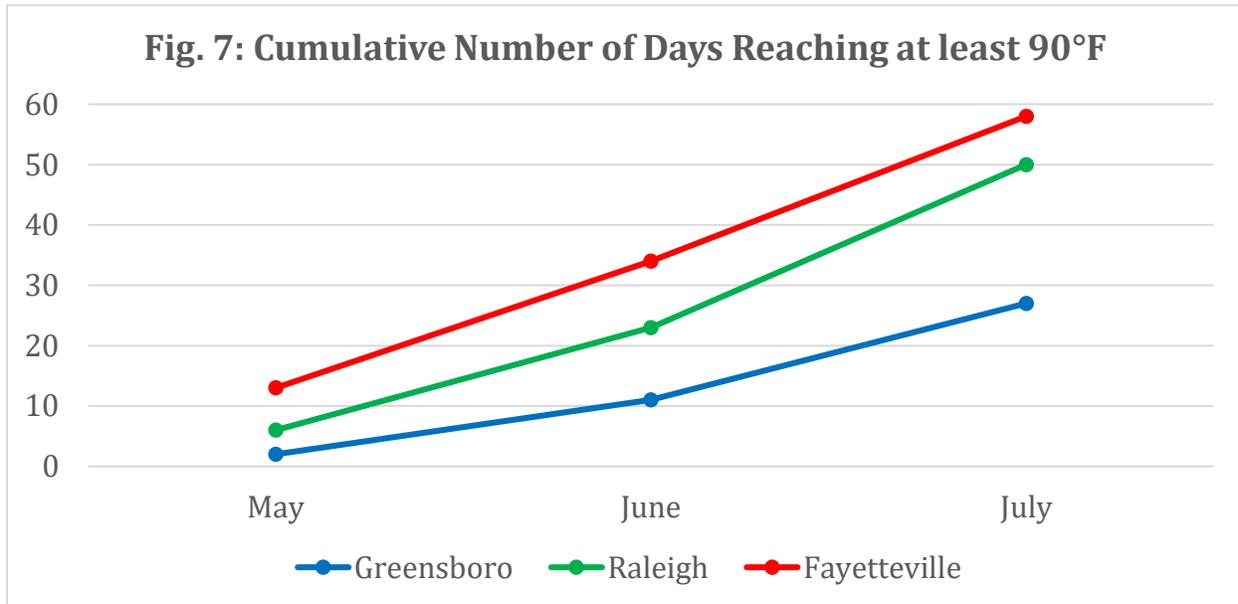
| Explanation - Percentile classes | | | | | | | |
|----------------------------------|--------------------------|-----------------------|-----------------|-----------------------|--------------------------|------|------------|
| ● | ● | ● | ● | ● | ● | ● | ○ |
| Low | <10 Much below normal | 10-24 Below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

July, the climatologically hottest month of the year, did not disappoint in 2022. It also continued the warmer-than-normal temperatures from spring into summer. By month's end, temperatures generally averaged 1-3°F above normal. The final monthly temperatures across the state of NC averaged 78.8°F according to NCEI, which ranked July 2022 as the 18th-warmest July since 1895. Based on just low temperatures, it was the 6th-warmest July on record statewide with an average low of 69.3°F. Raleigh had its 3rd-hottest July on record, averaging 2.3°F warmer than normal. Greensboro tied for its 18th-hottest July (with records going back to 1903) while Fayetteville tied for its 16th-hottest (with records going back to 1910). The July monthly average temperatures and their departures from normal at the three climate sites are depicted in Table 2.

Table 2: 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) | 89.0 | 70.1 | 79.5 | +0.6 | 94 on 7/23 | 62 on 7/11 |
| Raleigh-Durham (RDU) | 93.1 | 72.4 | 82.8 | +2.3 | 102 on 7/6 and 7/7 | 64 on 7/11 |
| Fayetteville (FAY) | 91.9 | 73.4 | 82.6 | +0.9 | 100 on 7/28 | 64 on 7/11 |

As seen in Figure 7, the number of 90+°F days continued to skyrocket in July. A whopping 27 of the 31 days in July (or 87% of all days) had high temperatures of at least 90°F at Raleigh. This makes 50 days through July 31 that reached 90°F at Raleigh, the 4th-most such days through the end of July on record. Fayetteville recorded 24 such days while Greensboro totaled 16 in July.



The time series of daily temperature for the month at Greensboro, Raleigh, and Fayetteville can be found in Figure 8. Raleigh hit a monthly high of 102°F on July 6 and 7, which both tied daily record highs. This made three days that Raleigh hit 100°F so far this summer, the most at this point in the year since 2012. Smithfield reached 104°F on July 6. This hot spell was followed by a thundery and cooler period from July 8-11, with a very sharp cooldown on July 10. Raleigh only reached 73°F and Fayetteville 74°F on July 10, both of which were daily record low maximum temperatures (for details see the records section below). Greensboro only reached 70°F on this

day. These highs were generally 15-25°F lower than the day before and more typical of mid-April than mid-July. All three climate sites also reached their monthly low temperatures on July 11, with Greensboro recording a low of 62°F and Raleigh and Fayetteville reaching 64°F. The cooldown was short-lived, however, with plenty of heat occurring later in the month as well. Greensboro reached a monthly high of 94°F on the 23rd while Fayetteville's monthly high of 100°F occurred on the 28th. The last six days of the month all had a high of at least 95°F at Fayetteville.

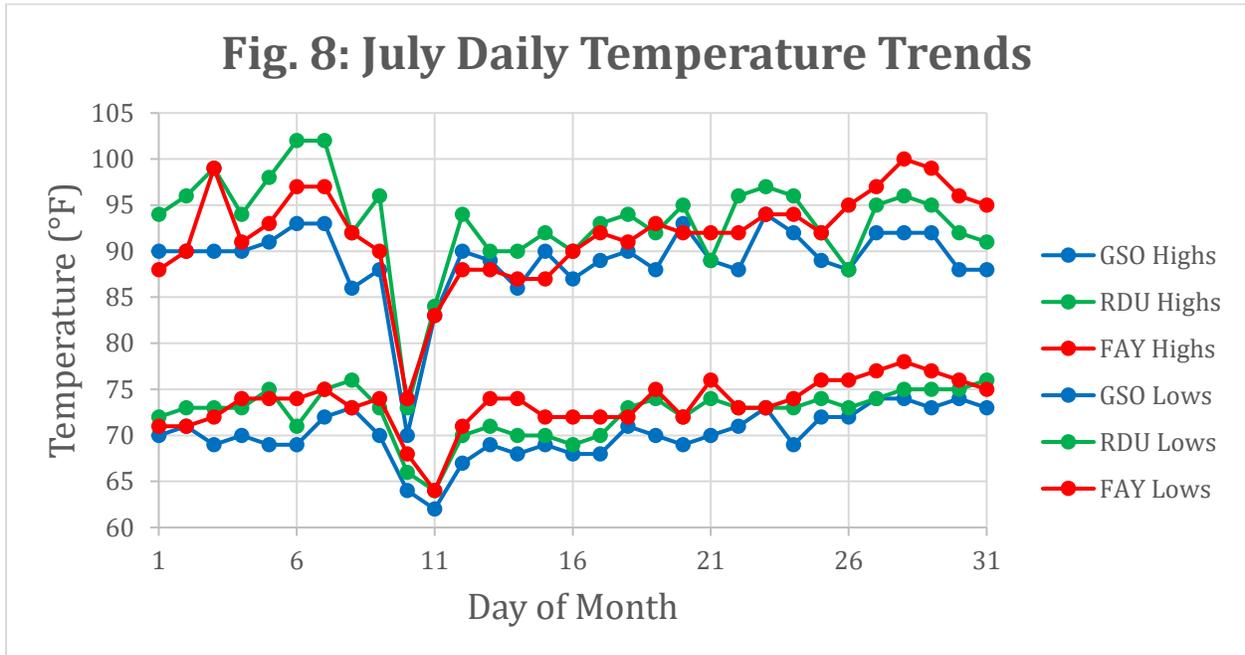
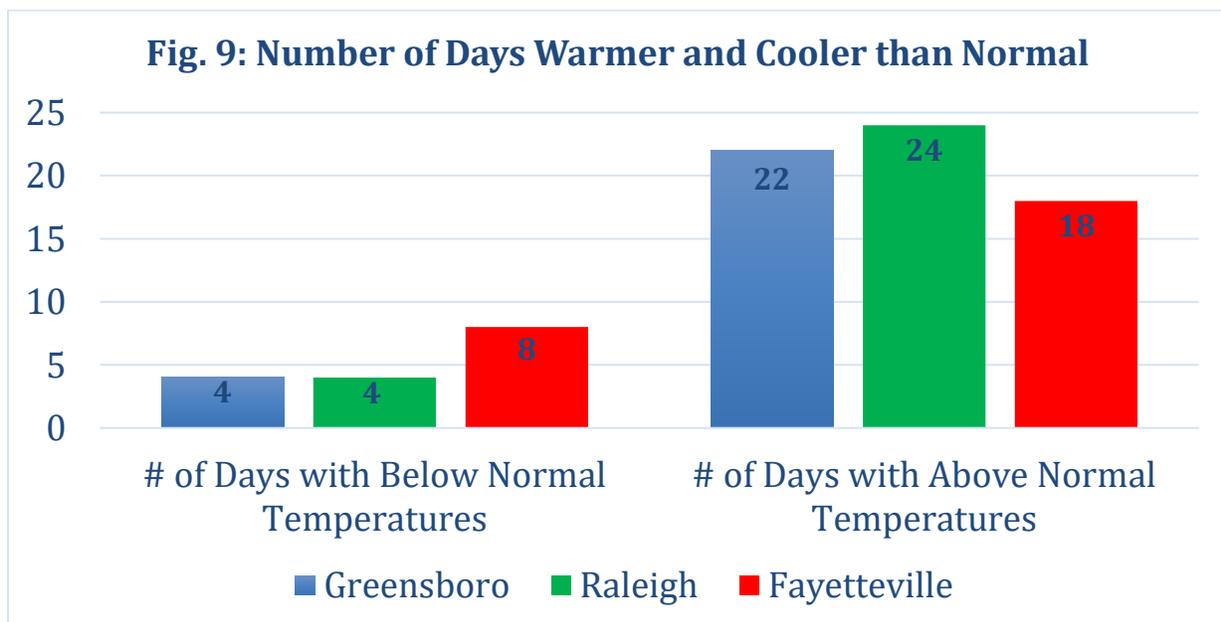


Figure 9 shows that most days in July were warmer than normal at Fayetteville, and the vast majority were at Greensboro and Raleigh. In fact, only 4 of the 31 days in the month (the 10th, 11th, 14th, and 16th) were cooler than normal at Greensboro and Raleigh.



Other notes:

Days with thunderstorms this month:

Greensboro: 17
Raleigh: 16
Fayetteville: 14

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

Greensboro: 3
Raleigh: 0
Fayetteville: 3

Strongest wind gusts and direction:

Greensboro: NW (310 degrees) at 64 mph on July 5
Raleigh: SW (230 degrees) at 46 mph on July 18
Fayetteville: W (290 degrees) at 57 mph on July 22

Daily records:

Greensboro:

A record high minimum temperature of 74°F was tied on July 28. This record was previously set in 2011.

Raleigh:

A record high temperature of 102°F was tied on July 6. This record was previously set in 1999.

A record high temperature of 102°F was tied on July 7. This record was previously set in 2012.

A record low maximum temperature of 73°F was set on July 10. This broke the old record of 76°F set in 1908.

Fayetteville:

A record rainfall of 2.33 inches was set on July 7. This broke the old record of 1.90 inches set in 1950.

A record low maximum temperature of 74°F was set on July 10. This broke the old record of 77°F set in 1950.

A record rainfall of 2.36 inches was set on July 22. This broke the old record of 1.97 inches set in 1974.

Monthly records:**Greensboro:**

None.

Raleigh:

July 2022 was the 3rd-hottest July on record with an average temperature of 82.8°F.

Fayetteville:

None.