

# September 2022 Central NC Climate Summary

*By Phillip Badgett and James Danco*

A dry September ends with Ian.

September 2022 was largely dry with high pressure dominating the region. A cold front brought heavy rainfall to the NC mountains extending into the Piedmont during the first week of the month. As the front moved across central and eastern NC, the rainfall decreased considerably. Up to around 2 inches of rain fell as far east as Greensboro, with Raleigh totaling only 0.57 inches during the first week of the month. The middle of the month was dominated by high pressure with plenty of dry and warm weather. Very little rainfall was recorded. In fact, no measurable rain was recorded at both Greensboro and Fayetteville from September 12-24. At Raleigh, the stretch of no measurable rain lasted all the way from the 13<sup>th</sup> through the 29<sup>th</sup>! The stretch of dry weather extended into the latter half of the month until Hurricane Ian affected the region on the 30<sup>th</sup>. Through the 29<sup>th</sup>, Raleigh only totaled 1.35 inches for the month and Fayetteville just 1.19 inches. But once Ian's remnants passed, they rallied to 4.70 inches and 3.88 inches, respectively, which were still slightly drier than normal. According to NCEI, the state of NC had a preliminary average rainfall of 3.84 inches. This made it the 60<sup>th</sup>-driest September since 1895. The September 2022 monthly precipitation totals at the three climate sites are found in Table 1.

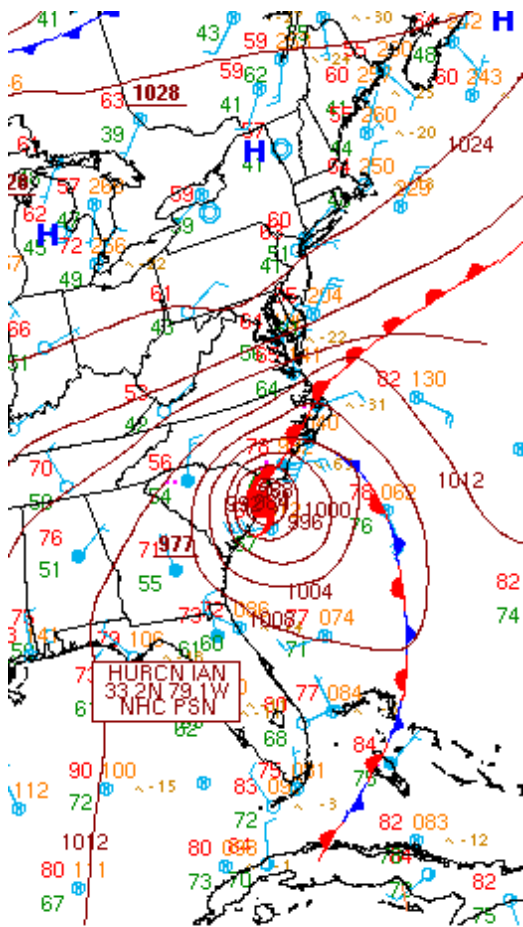
**Table 1: Monthly Precipitation Statistics**



Site	Total precipitation (in.)	Departure from Normal (in.)	Max Daily Precipitation (in.)
Greensboro (GSO)	5.44	+0.85	2.17 on 9/30
Raleigh-Durham (RDU)	4.70	-0.45	3.35 on 9/30
Fayetteville (FAY)	3.88	-0.99	2.69 on 9/30

Some of the cooperative station reports from around central NC included: Lexington 4.00 inches, Winston-Salem 4.29 inches, Mount Airy 5.58 inches, Danbury 4.74 inches, Yanceyville 6.47 inches, Henderson 2.36 inches, Carthage 5.32 inches, Cary 2.04 inches, Raleigh (NCSU) 6.74 inches, Louisburg 4.91 inches, Apex 1.35 inches, Chapel Hill 1.09 inches, Jackson Springs 5.21 inches, Clayton 3.75 inches, Laurinburg 1.61, Rocky Mount 4.37 inches, Tarboro 2.28 inches, and Clinton 1.70 inches. Note: Some of these totals may seem lower than expected. That is due to the rainfall from Ian going from September 30 into October 1. Therefore, some of Ian's rainfall will be reported in the October summary.

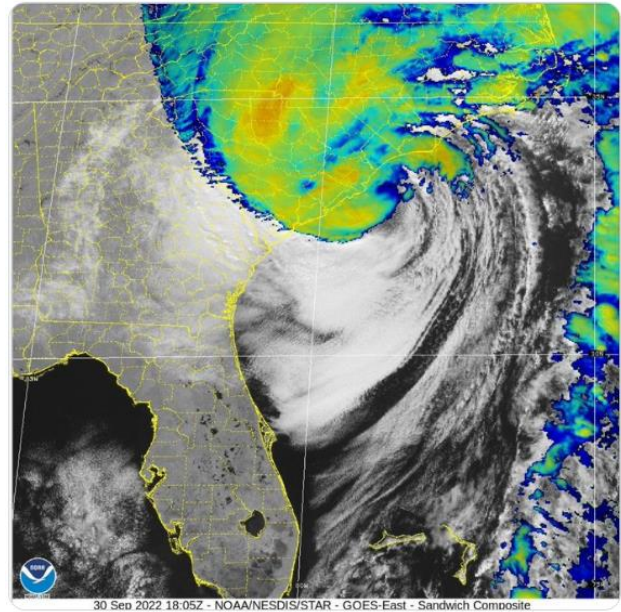
The system of the month was Hurricane Ian, which moved onshore near Georgetown, South Carolina on September 30<sup>th</sup> (Figure 1). It brought plenty of rain to a parched central NC as it moved north across the center of the state. Most of central NC tallied 2 to 4 inches of rain. Winds were strong and gusty as well, as there was a pressure gradient between Ian's low pressure center and high pressure to the north. Most of the wind gusts were in the 45 to 55 mph range over central NC. A map of the total precipitation and maximum wind gusts from Ian across the state, courtesy of the NC Climate Office, is shown in Figure 2. There were numerous reports of trees and power lines being damaged, with over 360,000 customers without power across the state. Every county in central NC reported at least some wind damage.

**Fig. 1: WPC Surface Analysis at 18z on 9/30 (left) and Ian Landfall Details/Satellite from the NHC (right)**



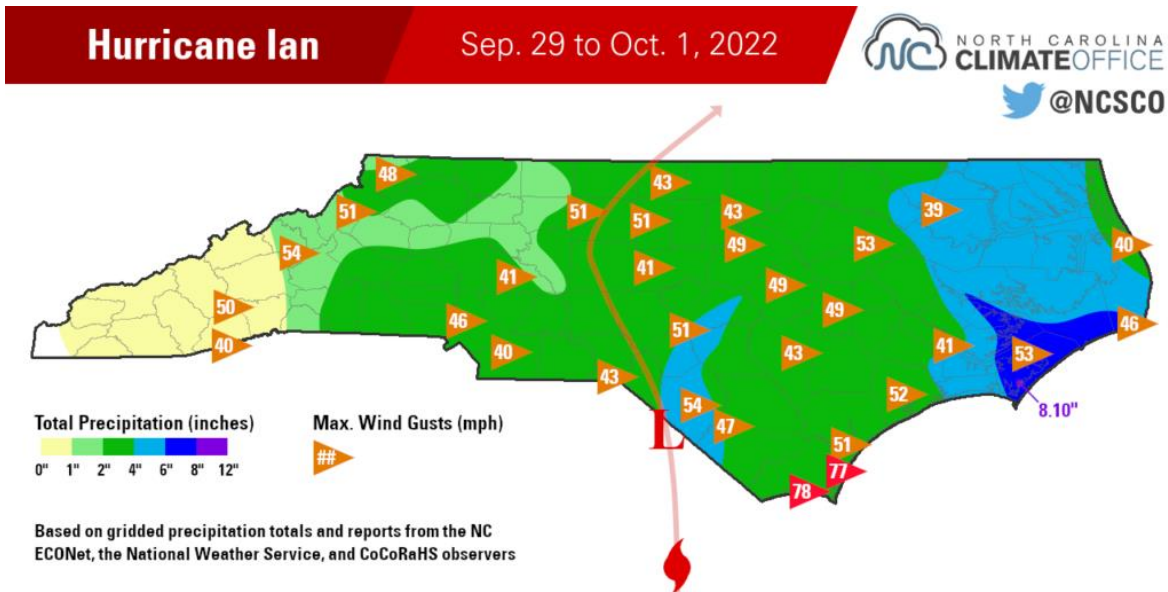
 National Hurricane Center   
@NHC\_Atlantic

Update: Surface observations indicate that the center of #Hurricane #Ian made landfall on Sep 30 at 205 pm EDT (1805 UTC) near Georgetown, South Carolina with maximum sustained winds of 85 mph (140 km/h) and an estimated minimum central pressure of 977 mb (28.85 inches).



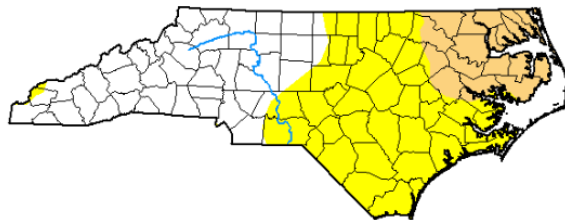
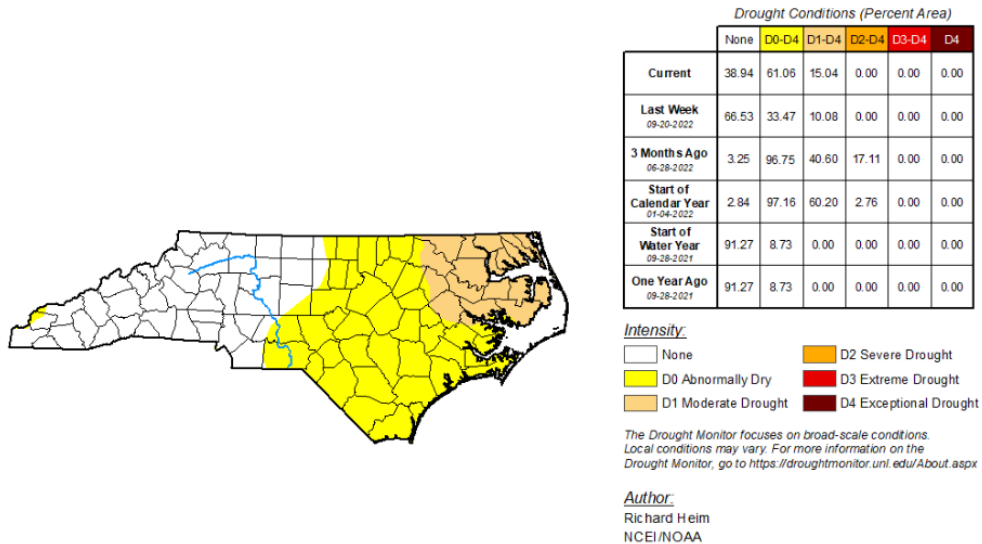
2:18 PM · Sep 30, 2022 · Twitter Web App

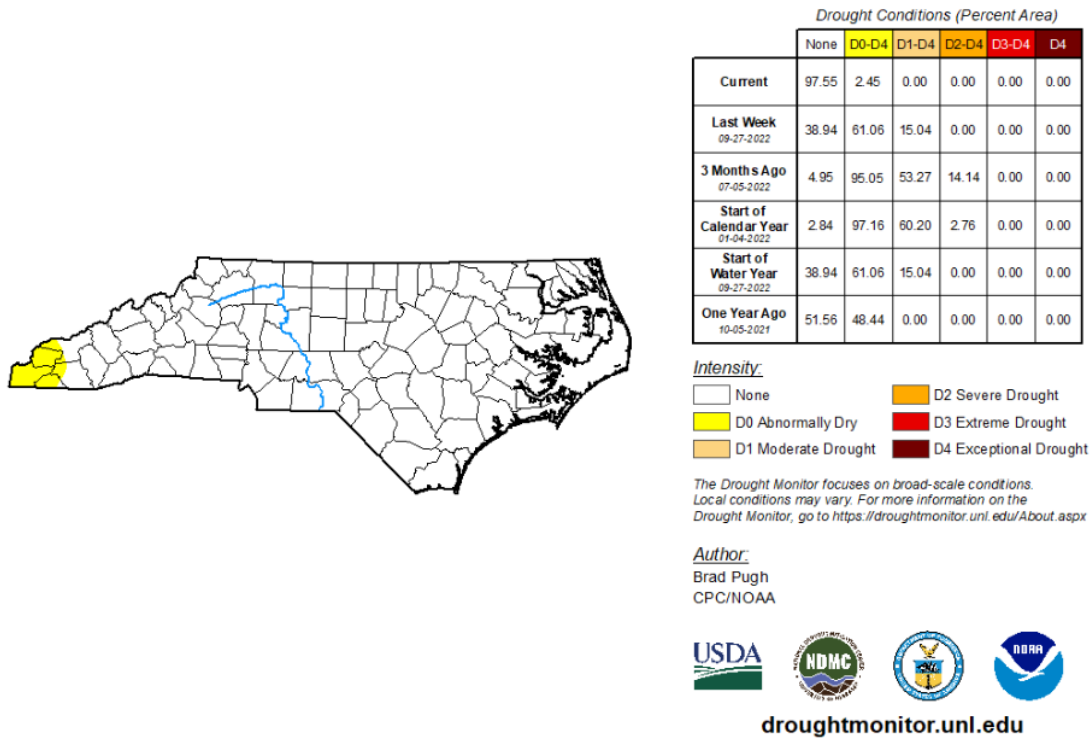
**Fig. 2: Total Precipitation and Maximum Wind Gusts from Ian**



The rainfall from Ian actually ended up being beneficial as only minor flooding was reported, and it helped the drought conditions by eliminating central NC from the D0 (Abnormally Dry) and D1 (Moderate Drought) categories. The US Drought Monitor maps from September 27 and October 4 are depicted in Figure 3. The D0 and D1 conditions were completely wiped away after Ian's rains.

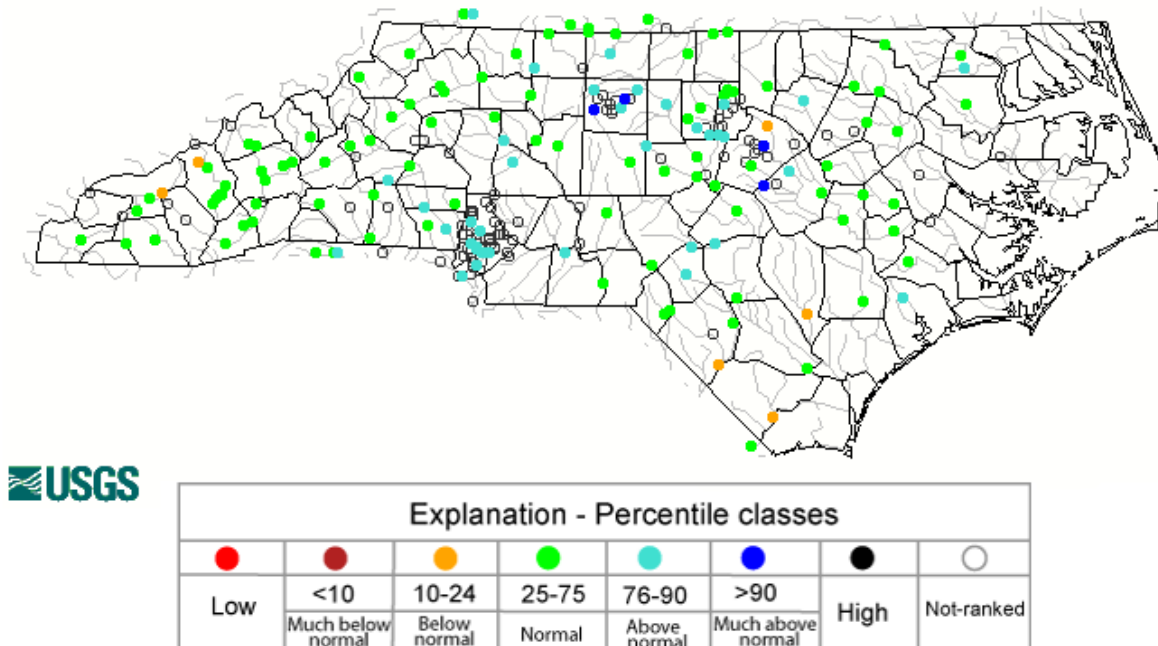
**Fig. 3: U.S. Drought Monitor for North Carolina on September 27 (top) and October 4 (bottom)**



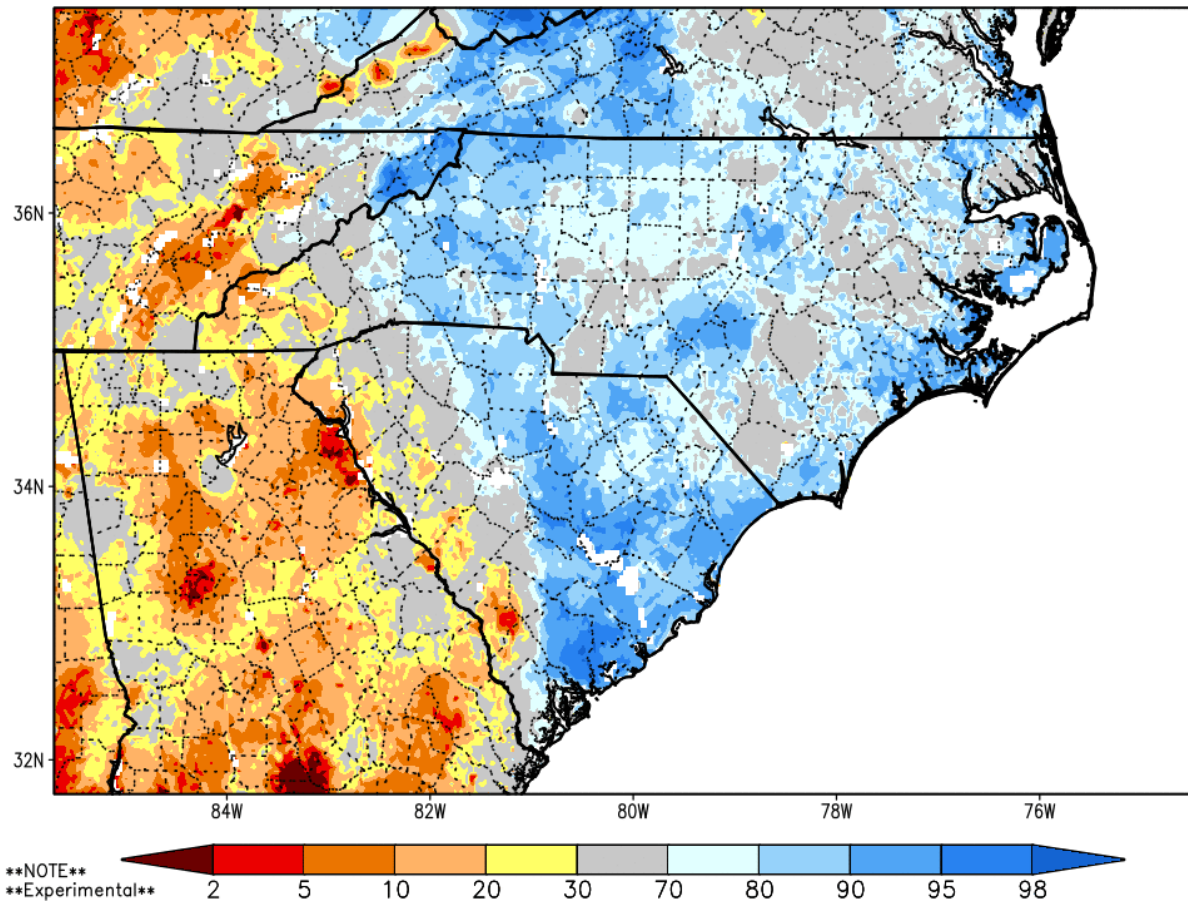


After the storm, streamflow and soil moisture surged to at or above normal levels across central NC, as shown in Figures 4 and 5.

**Fig. 4: 7-day Average Streamflow compared to Historical Streamflow for the Day of the Year on October 3, 2022**

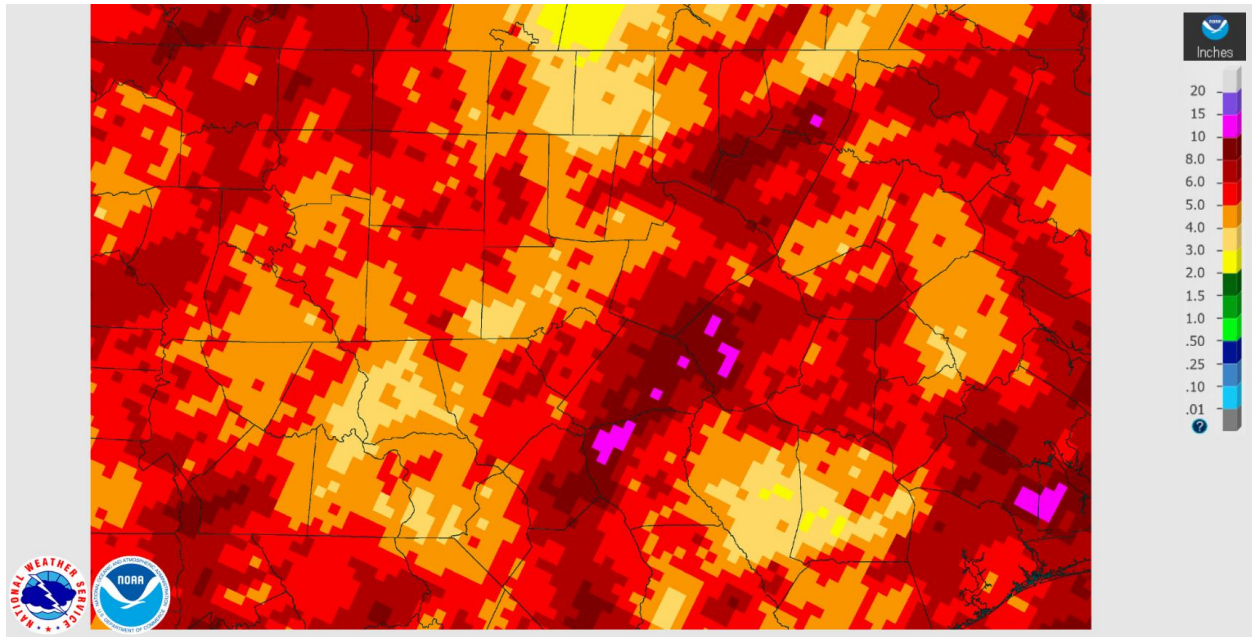


**Fig. 5: SPoRT-LIS 0-40 cm Soil Moisture Percentile on October 3, 2022**

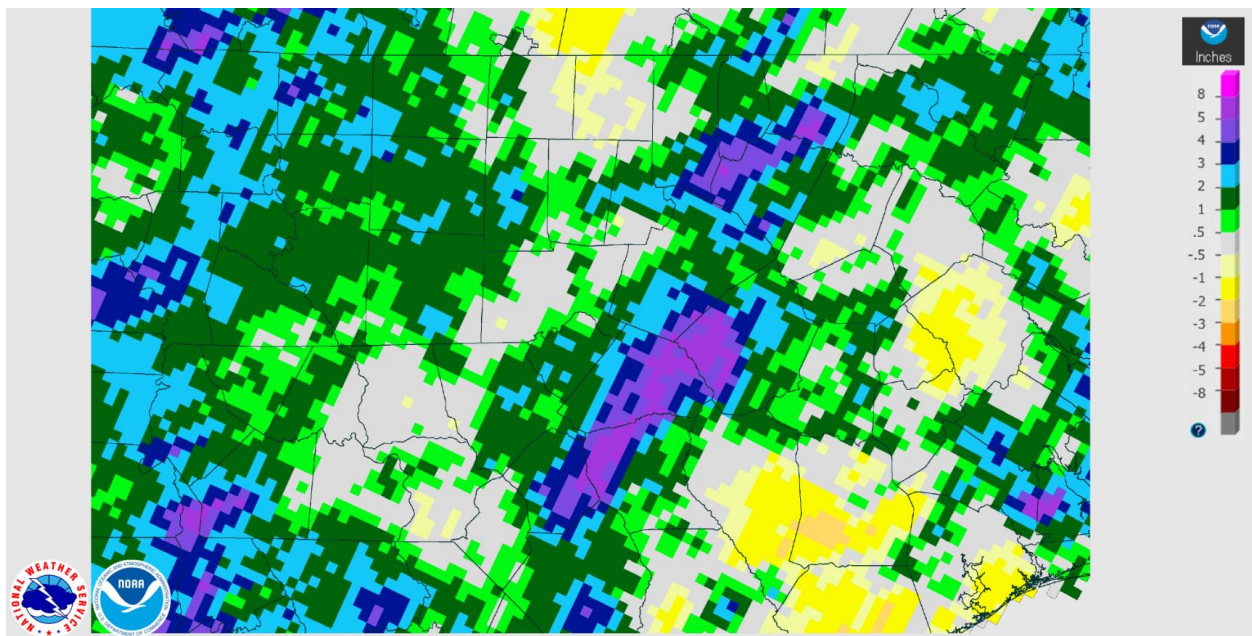


Radar-estimated precipitation and the radar-estimated precipitation departure from normal for the month are shown in Figures 6 and 7. Precipitation totals ranged from 3-8 inches across most of central NC, but isolated pockets of 8-10 inches were observed along a line from near Fayetteville up to Franklin and Warren counties. Other than Sampson County, these totals were near to as much as 3-5+ inches wetter than normal across central NC.

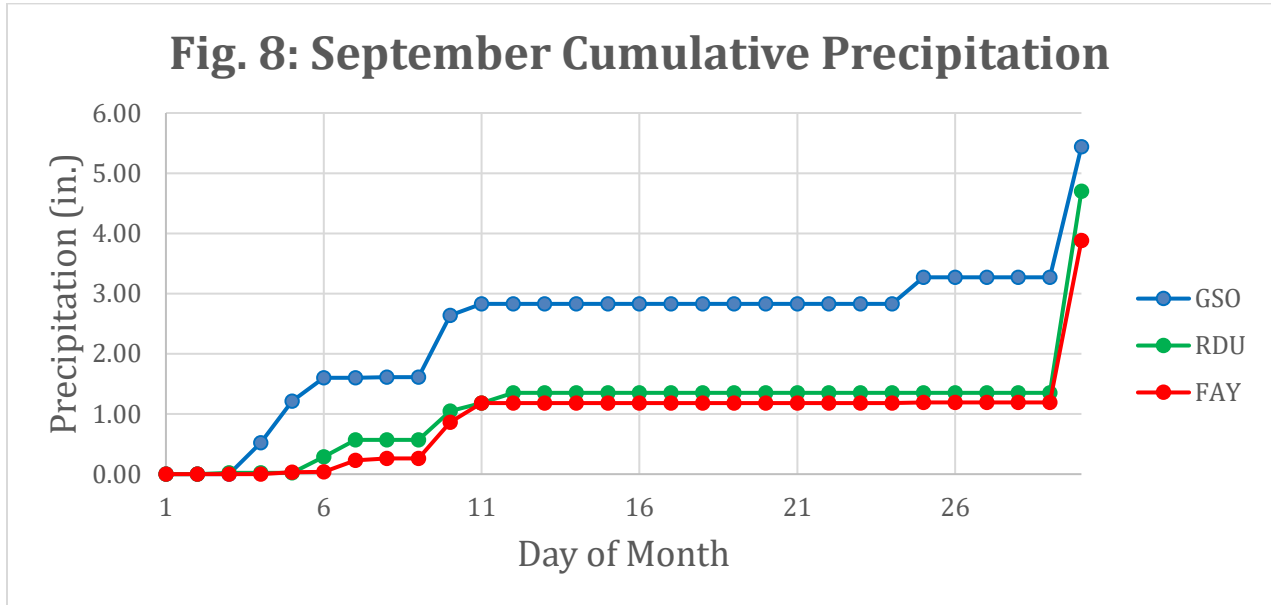
**Fig. 6: Radar-Estimated Monthly Precipitation**



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



The cumulative precipitation at the three climate sites for the month of September is shown in Figure 8. The very dry middle of the month is evident, with a spike at the very end from Ian.

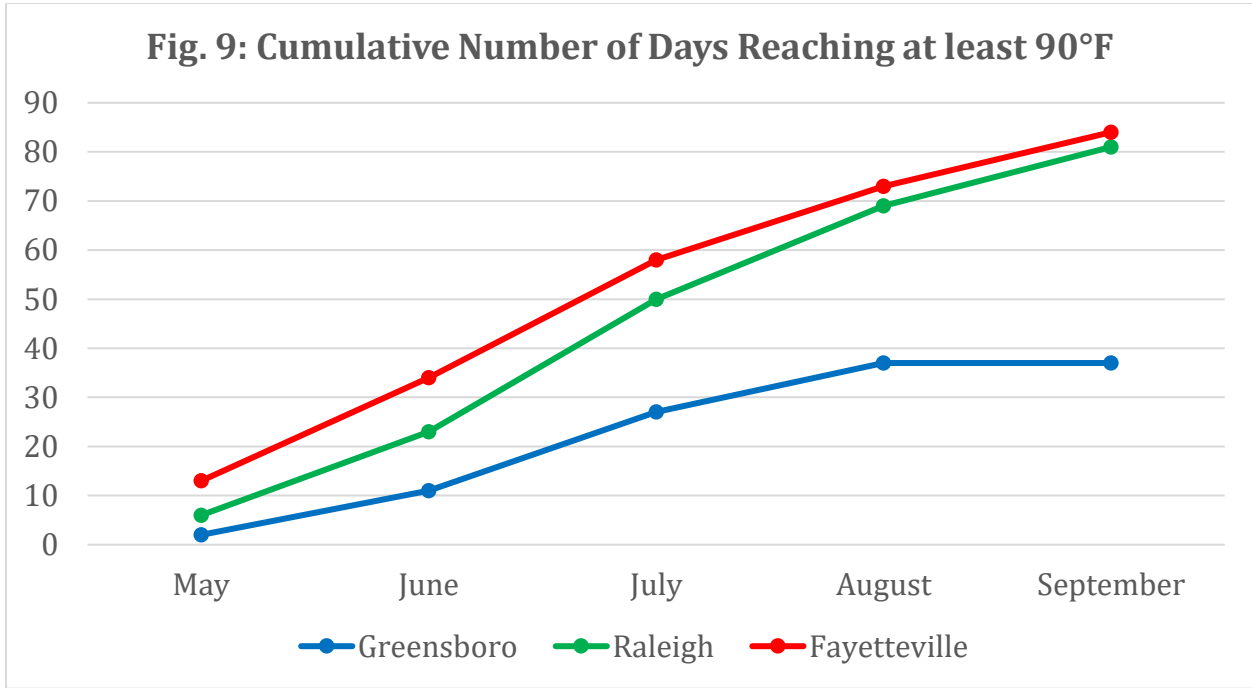


September temperatures started very summer-like before cooling during the last week of the month after the passage of a strong cold front late on the 22<sup>nd</sup>. Just ahead of this front, all three climate sites hit their monthly high temperatures on the 22<sup>nd</sup>, with monthly lows in the 40s to follow. Raleigh dropped from a record-tying high of 98°F on the 22<sup>nd</sup> to a high of 75°F on the 23<sup>rd</sup>. This was very fitting timing for the beginning of astronomical fall, as the autumn equinox was on the 22<sup>nd</sup>. By month's end, temperatures generally averaged within 1°F of normal at all three climate sites. The monthly temperatures across the state of NC averaged 70.5°F according to NCEI, which ranked September 2022 as the 57<sup>th</sup>-warmest in the past 128 years. The monthly average temperatures and their departures from normal at the three climate sites are depicted in Table 2.

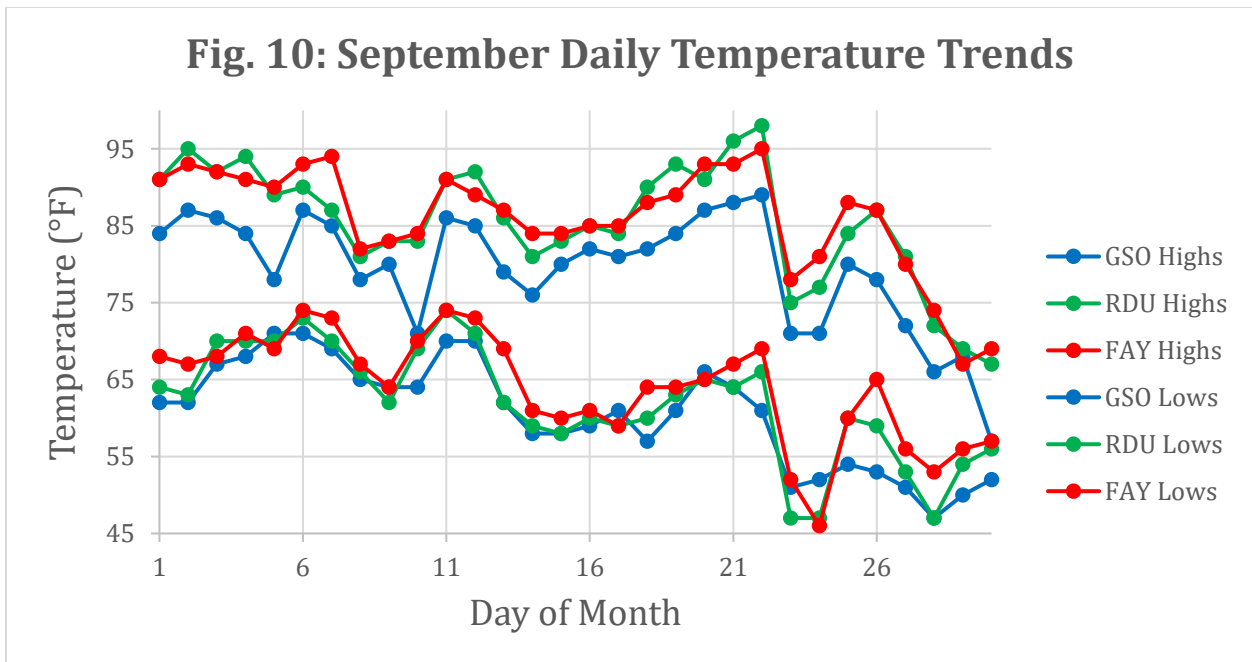
**Table 2: Monthly Temperature Statistics**

Site	Avg High Temp (°F)	Avg Low Temp (°F)	Avg Temp (°F)	Departure From Normal (°F)	Maximum Temperature (°F)	Minimum temperature (°F)
Greensboro (GSO)	79.4	60.7	70.0	-1.0	89 on 9/22	47 on 9/28
Raleigh-Durham (RDU)	85.6	62.0	73.8	+1.2	98 on 9/22	47 on 9/23, 9/24, 9/28
Fayetteville (FAY)	86.0	64.1	75.0	+0.8	95 on 9/22	46 on 9/24

The number of days that reached or exceeded 90°F began to tail off in September, as seen in Figure 9. Raleigh still managed to have 12 such days, while Fayetteville recorded 11 and Greensboro did not have any. This brought the yearly total of 90+°F days to 37 at Greensboro, 81 at Raleigh, and 84 at Fayetteville.

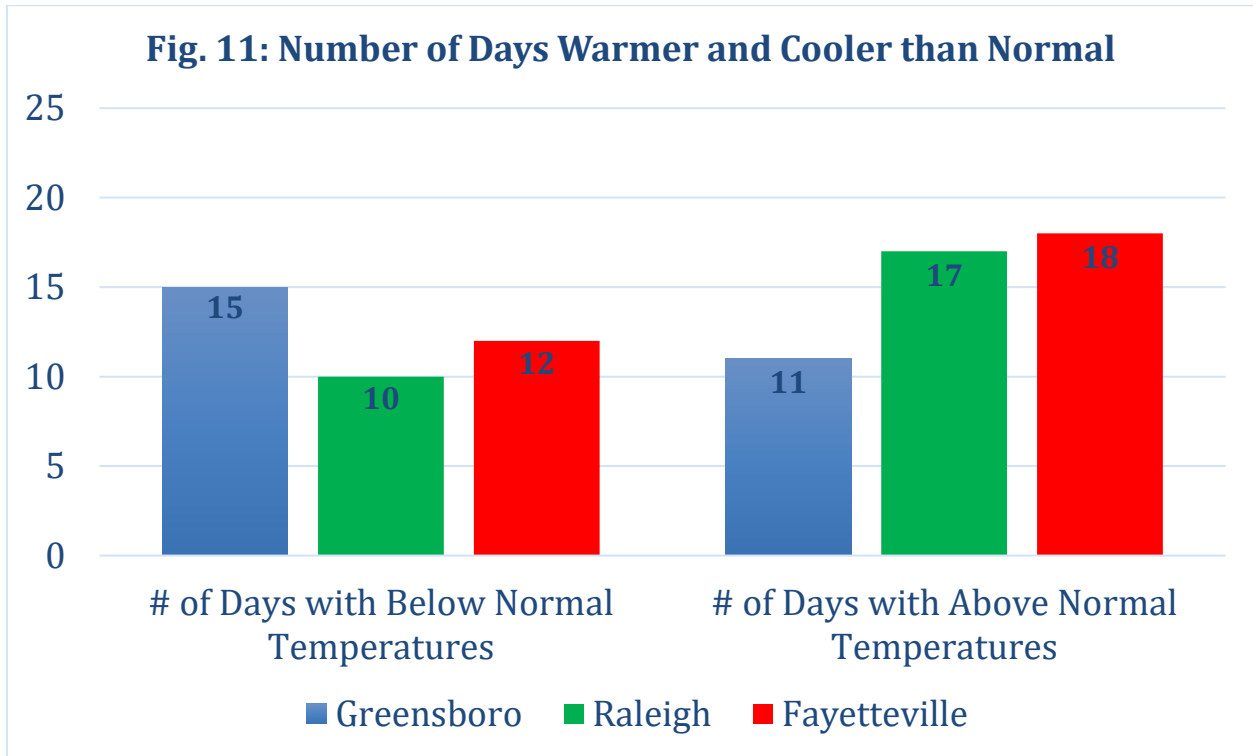


The time series of daily temperature for the month at Greensboro, Raleigh, and Fayetteville can be found in Figure 10. The sharp cooldown on September 23 stands out, as high temperatures were about 15-25°F lower than the previous day.





As displayed in Figure 11, half of the days during September were cooler than normal at Greensboro. On the other hand, slightly more than half of the days were warmer than normal at Raleigh and Fayetteville.



### Other notes:

#### Days with thunderstorms this month:

Greensboro: 3  
Raleigh: 4  
Fayetteville: 3

#### Days with dense fog (visibility of 1/4 mile or less) included:

Greensboro: 0  
Raleigh: 1  
Fayetteville: 0

## **Strongest wind gusts and direction:**

Greensboro: N (020 degrees) at 51 mph on September 30

Raleigh: NE (030 degrees) at 49 mph on September 30

Fayetteville: N (020 degrees) at 56 mph on September 30

## **Daily records:**

### **Greensboro:**

A daily record rainfall of 1.03 inches was set on September 10. This broke the old record of 0.82 inches set in 1940.

### **Raleigh:**

A record high temperature of 98°F was tied on September 22. This record was previously set in 1895.

A daily record rainfall of 3.35 inches was set on September 30. This broke the old record of 2.65 inches set in 1944.

### **Fayetteville:**

None.

## **Monthly records:**

### **Greensboro:**

None.

### **Raleigh:**

None.

### **Fayetteville:**

None.