

# March 2007 NC Weather Review

## Overview

March 2007 was much warmer and drier than average throughout North Carolina.

March was dominated by two extensive periods of very warm weather. The periods of warmth overwhelmed the few short stints of chilly weather during the month, which led to well above normal final monthly average temperatures. The monthly average temperatures generally ranged between 4 to 7 degrees above the 30 year averages. These readings were warm enough to make March 2007 the third warmest on record at both Raleigh-Durham and Greensboro.

The warmest temperatures this month occurred between the periods of March 10-17 and March 20-31. During these periods the daily temperatures averaged as much as 25 degrees above normal, as daily highs topped out well into the 80s. These temperatures were comparable to the average temperatures for the month of June. Chilly weather was limited to only a few days during the month, mainly occurring between March 4-9, March 17-19, and on March 29. The monthly low temperatures fell into the 20s March 18 and 19. The March 2007 average temperatures for selected stations across the state are depicted in figure 1.

Rain events were few and far between throughout March. The only significant rain events occurred March 1-2, and March 16-17. Although there were only two significant rain events this month, the rains came at very opportune times and were significant enough to keep the concerns of drought low. Most reporting stations across the western and northern sections of the state recorded only slightly below normal rainfall totals. It was much drier in the eastern third of the state, where most stations finished the month with 2 to 3 inch rainfall deficits. These totals equated to only 25 to 50 percent of normal. The March 2007 monthly precipitation totals for selected stations across the state are plotted in figure 2.

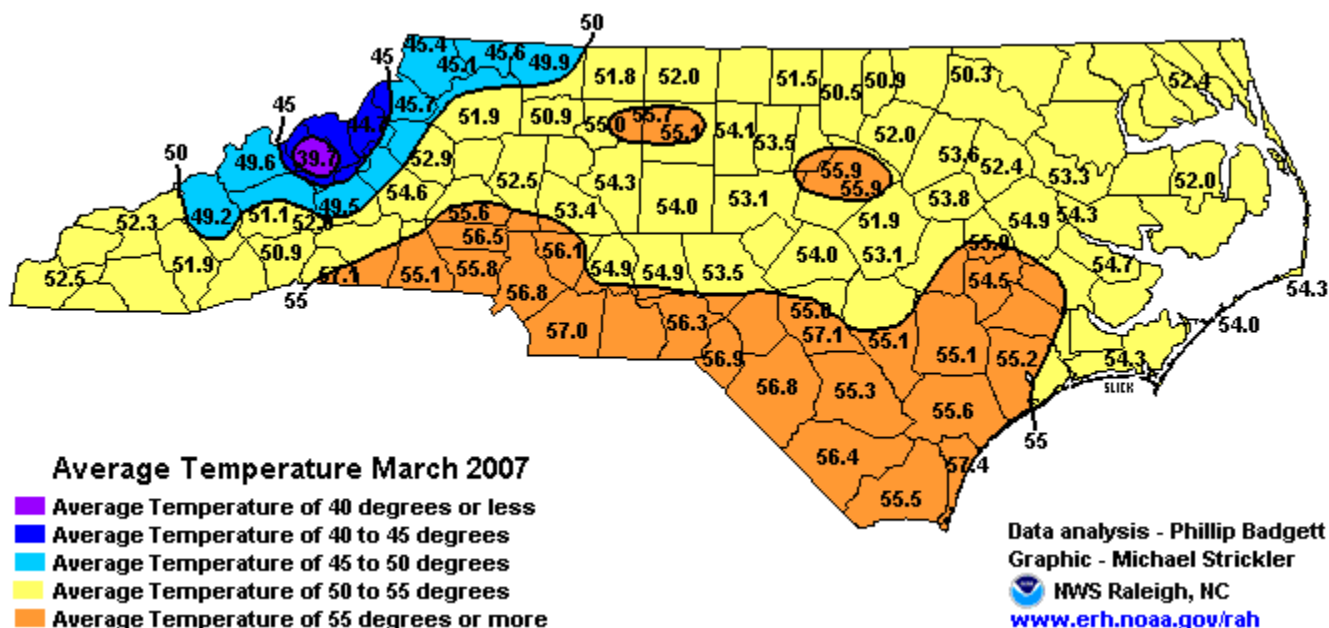


Figure 1. Average monthly temperatures during March 2007 across North Carolina.

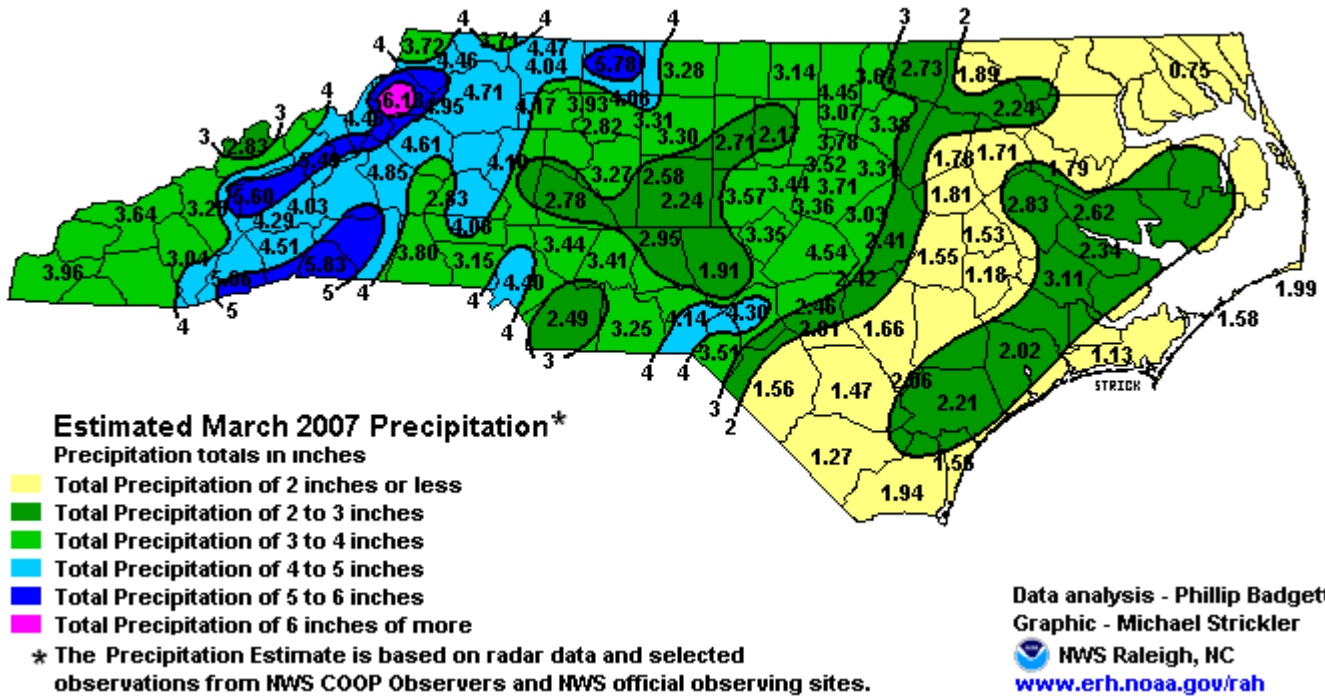


Figure 2. Estimated rainfall for March 2007. Plotted data was recorded by National Weather Service observation systems or cooperative observers.

## Details

### March 2007 Temperatures

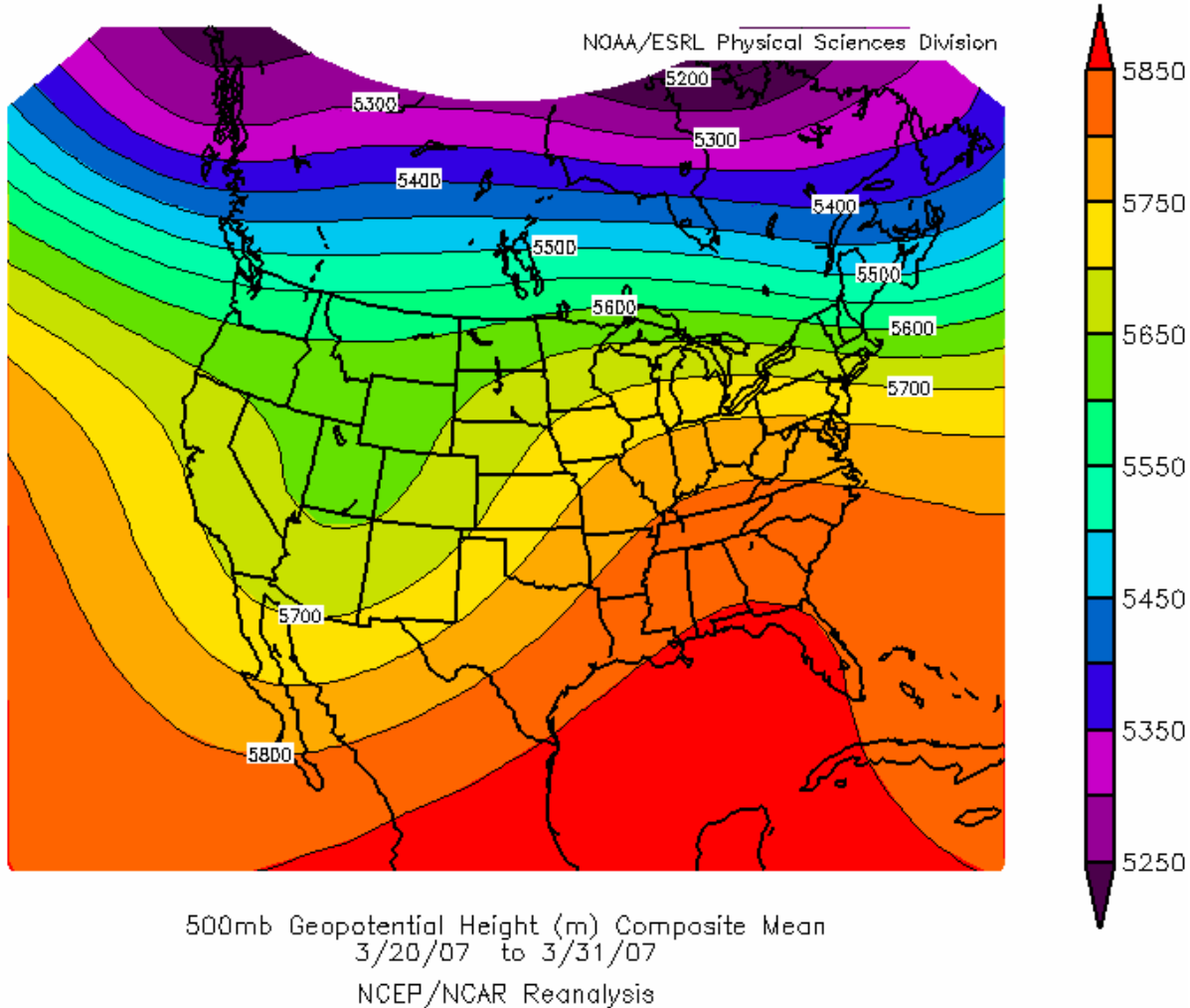
March is typically a transitional month with regard to temperatures, as winter turns to spring. There are often wide swings in temperatures, even on a daily basis. March 2007 was no exception, as temperature readings at Raleigh, for example, ranged from a low of 25 (March 19) to a high of 87 (March 27). In addition, there was a high of 81 (March 14) followed by a high of only 48 degrees 4 days later on the 18th. However, March 2007 will be most remembered for the extended periods of very warm and dry weather, which is atypical of late winter or early spring.

These extended periods of well above normal temperatures led to some daily record highs, and ultimately resulted in the third warmest March on record at both Greensboro and Raleigh-Durham. Greensboro had an average monthly temperature of 55.7 degrees, which was a whopping 6.6 degrees above normal. There were daily record highs set on March 23 (81 degrees), March 27 (85 degrees), and March 28 (85 degrees). Raleigh-Durham averaged 55.9 degrees for the month, which was 5.2 degrees above normal. Daily record highs were set on March 23 (83 degrees), March 24 (86 degrees), March 27 (87 degrees), and March 28 (86 degrees). The final monthly temperatures across the state generally averaged 4 to 7 degrees above normal except 1 to 3 degrees above normal along the immediate coast.

The early warmth was enough to allow early budding of important agricultural crops such as peaches and strawberries, and ornamental plants such as azaleas and hydrangeas. Since the average date of the last spring freeze is typically in mid April over central North Carolina, there

were concerns that a pattern change to colder weather would still bring a hard freeze that could damage these early budding plants and trees in April.

An early and persistent upper ridge that developed from the Gulf of Mexico into the south central and southeastern United States was responsible for the warmth. Figure 3 depicts the average 500 MB height across North America during the last week of March 2007. Note the large ridge centered in the Gulf of Mexico. This ridge effectively shut off any moisture flow into the southeastern states and resulted in the well above normal temperatures.



**Figure 3. 500 MB heights (in meters) over North American during the record warm pattern over southeastern and south central United States March 20-31, 2007.**

Figures 4 and 5 depict the daily maximum and minimum temperatures observed at Raleigh-Durham (RDU) and Greensboro (GSO) during March 2007. The dashed lines represent the normal maximum temperature (red) and the normal minimum temperature (blue).

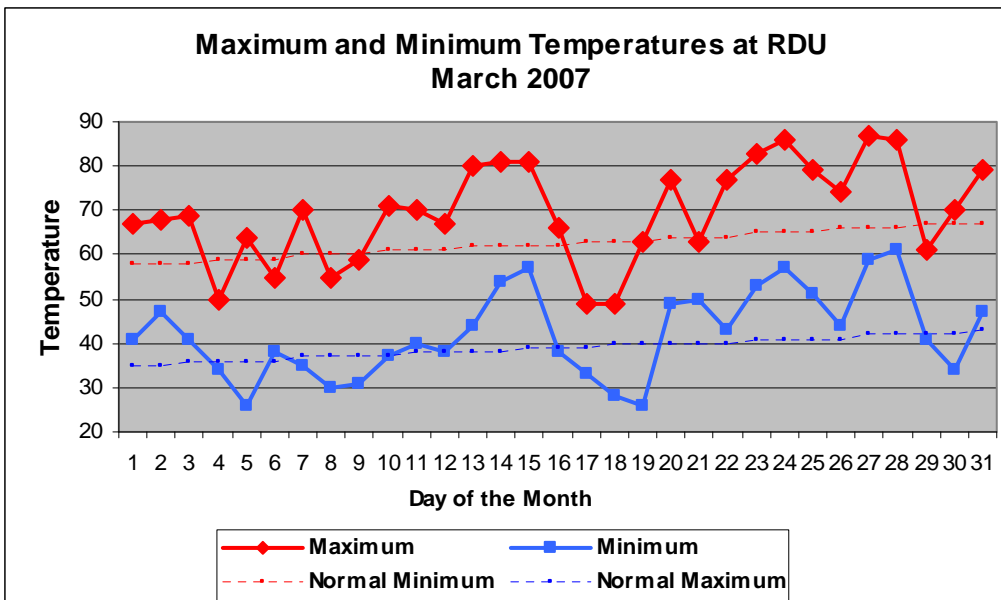


Figure 4. Daily maximum and minimum temperatures observed during March 2007 at Raleigh-Durham (RDU).

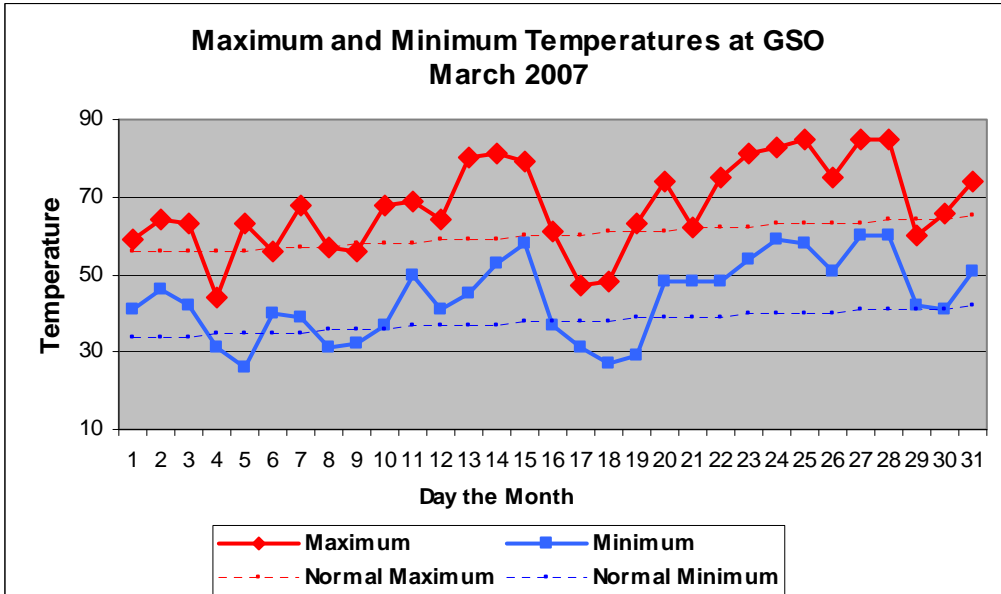


Figure 5. Daily maximum and minimum temperatures observed during March 2007 at Greensboro (GSO).

### March 2007 Precipitation

There were extended periods during March in which little or no rain fell. Significant rain fell across the state on March 1-2 and again on March 16-17. As it turned out, 95 percent of the monthly rainfall totals for both Raleigh and Greensboro fell during these two rain events alone. In between these two rain events, there were 13 consecutive days with no measurable rainfall between March 3-15, followed by a 10 day dry streak between March 17 and 27. The rain that fell late in the month to end the dry streak only amounted to between one tenth and one quarter of an inch.

Most areas throughout the state generally totaled 75 to 90 percent of the 30 year normal rainfall, except at coastal sites, which recorded less than 50 percent of normal. The monthly totals generally ranged between 3 and 5 inches across the western and central portions of the state, with lesser amounts between 1 and 3 inches along the coast. The highest totals occurred in the Mountains, where 5 to 6 inches were recorded from Pisgah Forest, in Buncombe County, northeast to Boone, in Watauga County. The minimum rainfall amounts occurred near and along the coast, where Elizabeth City in Pasquotank County, only received three quarters of an inch. Figure 6 is a comparison of observed and normal precipitation for March 2007 at selected locations across North Carolina.

Severe weather occurrences were below normal during March. There was a severe weather event that affected the northern portions of North Carolina on March 28, 2007. A case event summary for this March 28, 2007 event can be found at:

<http://www4.ncsu.edu/~nwsfo/storage/cases/20070328/>

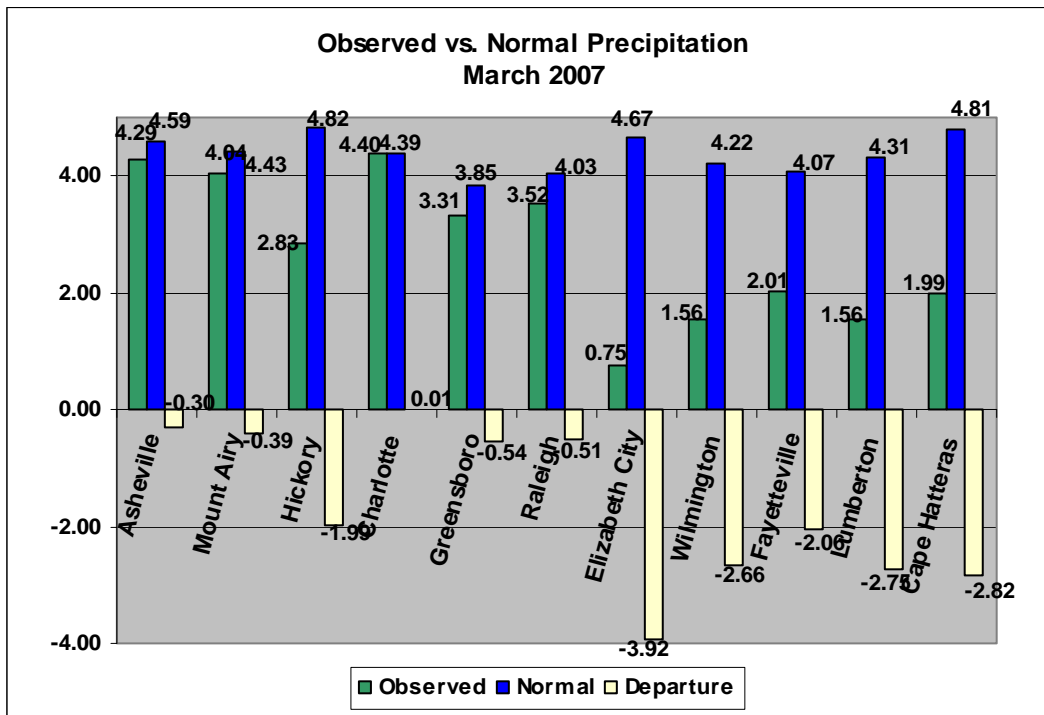


Figure 6. Comparison of observed precipitation and normal precipitation for March 2007 at selected locations across North Carolina.

### Current, Semi-Annual and Annual Temperature Trends

The warmer than normal March broke the one month trend of below average temperatures for the month of February. It also marked the fourth time in five months with above normal temperatures at both Raleigh and Greensboro. Four of the past six months have been warmer than normal at Raleigh and Greensboro. The past two winter seasons, consisting of the months of December, January, and February, have averaged well above normal. The warmth peaked each winter season in January, when the monthly average temperatures averaged 6 to 8 degrees above normal.

Figure 7 illustrates the monthly temperature departures from normal at Raleigh-Durham and Greensboro. Note that 4 of the past 5 months have been significantly above normal. Also of note is that eight of the past twelve months have been warmer than normal at Raleigh-Durham. Nine of the past twelve months have been warmer than normal at Greensboro.

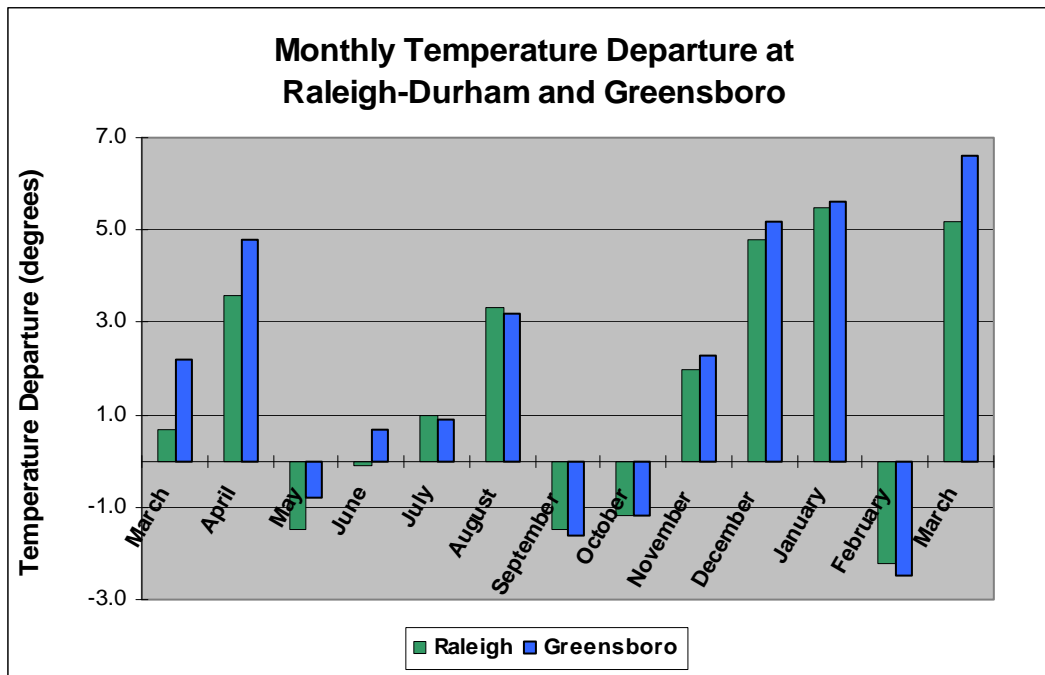


Figure 7. Monthly temperature departures from normal at Raleigh-Durham and Greensboro from March 2006 through March 2007.

### Current, Semi-Annual, and Annual Precipitation Trends

The sub par rainfall recorded during March marked the fourth consecutive month of below normal rainfall at Raleigh-Durham. The rainfall deficit during the four months totaled only 3.14 inches. This marked the fifth time in the past eight months in which rainfall averaged below normal at Raleigh. RDU finished 2006 with a 12 month surplus of 10.64 inches. Figure 8 depicts the precipitation trends at RDU during the past year. The dry pattern during the first half of 2006 was replaced by wet conditions in June, which lasted through November 2006. It has been dry every month thus far in 2007.

Greensboro's string of consecutive months of sub par rainfall also reached four. It also marked the fifth month in the past eight with sub par rainfall. Greensboro completed a dramatic turn from a 7.50 inch rainfall deficit for 2006 at the start of June, to an 8.55 inch 2006 rainfall surplus by November 30. Greensboro ended 2006 with a final surplus of 7.22 inches. It has since been dry every month to begin 2007. Figure 9 depicts the monthly precipitation totals and the departure from normal during the past year at Greensboro.

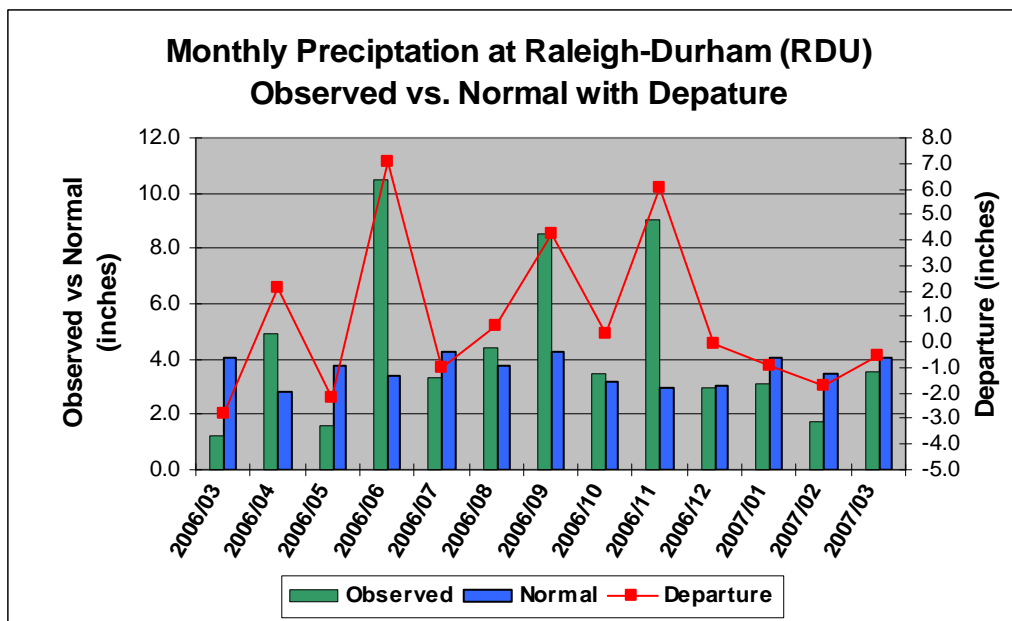


Figure 8. Semi-annual and annual precipitation trends at Raleigh-Durham (RDU).

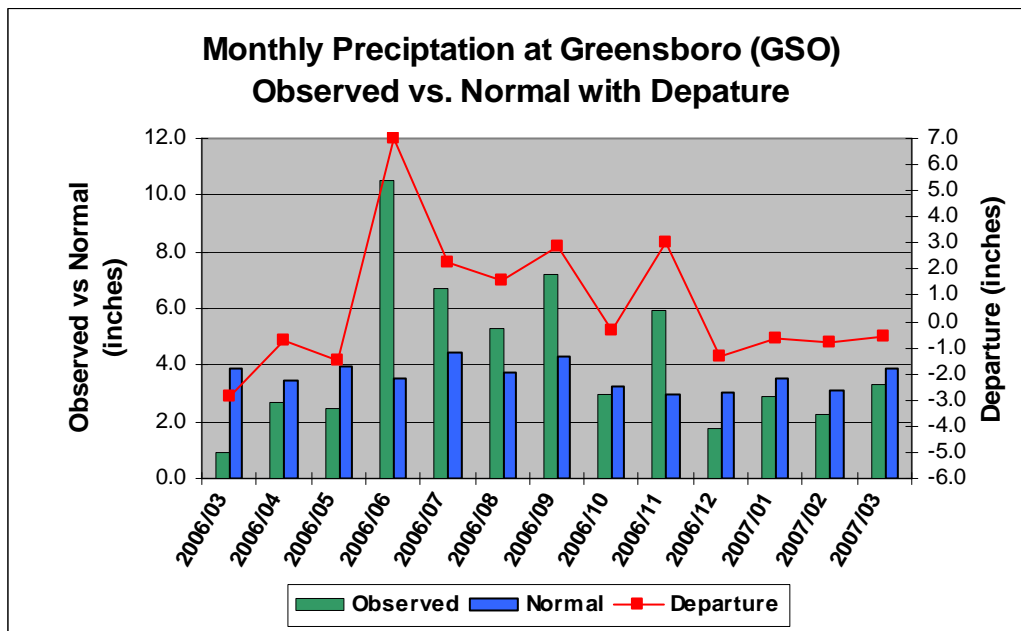


Figure 9. Semi-annual and annual precipitation trends at Greensboro (GSO).

## North Carolina Water Resources Information and Outlook

The drier than normal conditions that have been observed during the first three months of 2007 have resulted in a return to discussions of potential drought. However, the wet weather experienced during the latter half of 2006 continued to offset the short term dryness. The more rapid demise than expected of the El Niño conditions in the equatorial Pacific during the mid to late winter season, seemed at least partly responsible for the recent dry weather. The precipitation was generally less than forecast during the first half of the winter season from the Gulf Coast states northeastward across North Carolina. This was especially true for areas

along and west of the eastern continental divide, mainly along and west of Asheville and Boone.

The latest Drought Monitor indicated that abnormally dry conditions had crept throughout the North Carolina Mountains. Stage one drought conditions were being observed in the southwestern Mountains of North Carolina. These drought conditions become severe to extreme across the Tennessee Valley region. East of the eastern continental divide, the two significant rainfall events during March kept abnormally dry conditions at bay. These rains also kept the levels of streams, rivers, lakes, and reservoirs at near normal. Most reservoirs that supply water to the major cities in the center of the state were near normal on April 1, 2007. The latest Drought Monitor can be viewed in Figure 10. For the latest information concerning the drought, visit <http://www.ncwater.org/drought/>

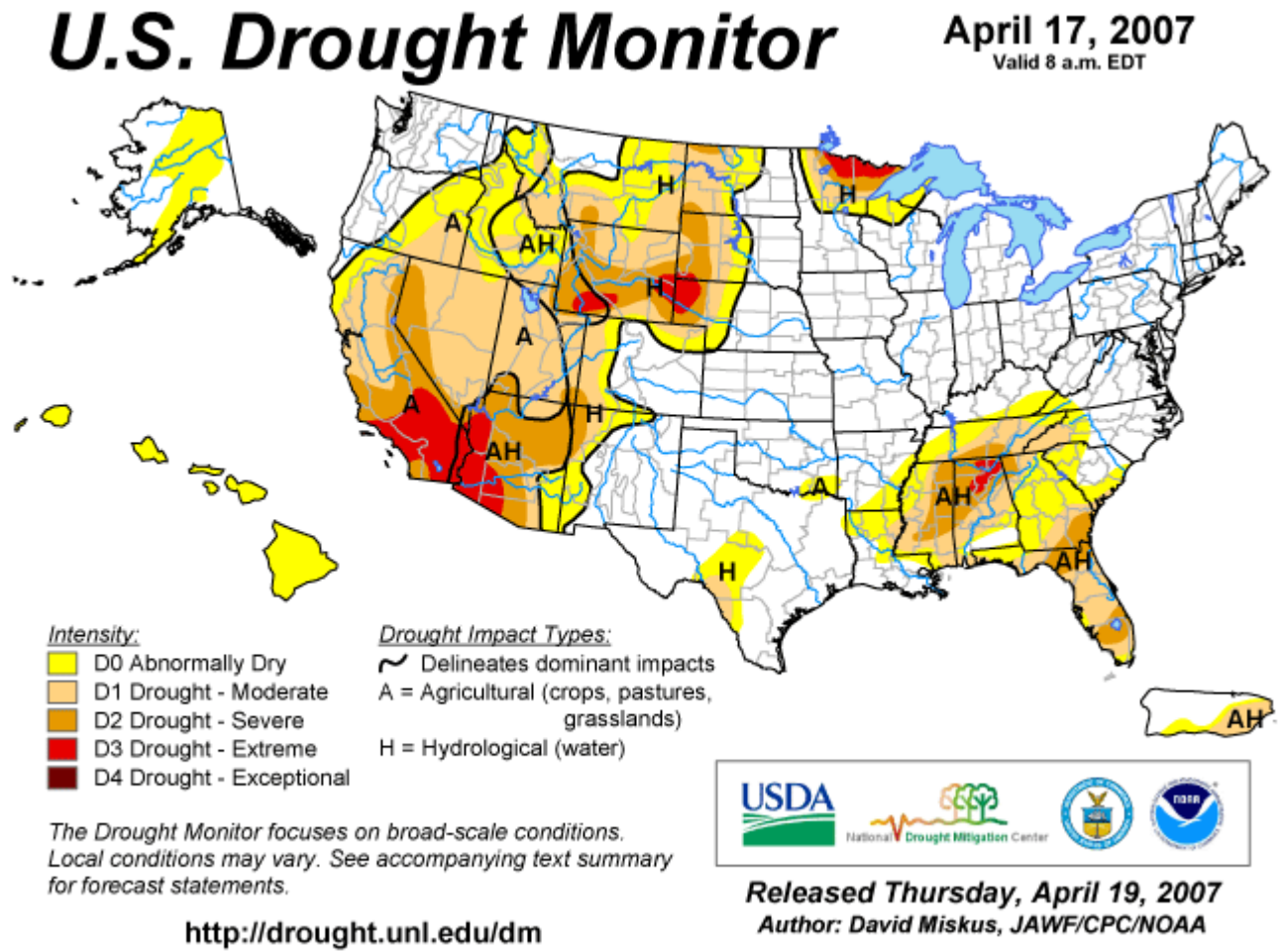


Figure 10. U.S. Drought Monitor as observed on April 17, 2007.



## Climate Outlook for the spring and summer 2007

The Climate Prediction Center recently released the spring and summer outlooks. Details concerning this forecast can be found at the web address below:

[http://www.cpc.ncep.noaa.gov/products/predictions/multi\\_season/13\\_seasonal\\_outlooks/color/page2.gif](http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/page2.gif)

The headline for the spring season has been centered on the rapid demise of El Niño conditions in the equatorial Pacific and a return to near neutral ENSO conditions. The rapid demise of the El Niño during the late winter was thought to be at least partly responsible for the very dry weather currently observed across the Gulf Coast states, the Tennessee Valley, and the southeastern United States. However, forcing from the Tropical Pacific does not typically have a great impact on the climate across the United States during April (greatest impact occurs during the winter season). Therefore, the near neutral ENSO, or possibly a potential development of weak La Niña conditions in the coming months, is expected to have little effect on the climate outlook for North Carolina during the upcoming warm season.

The very dry weather observed over southwestern North Carolina, and especially to our south and west this spring, is expected to slowly improve. This improvement is depicted in the latest U.S. Seasonal Drought Outlook released on April 19, 2007, shown in figure 11. This outlook is valid through July 2007.

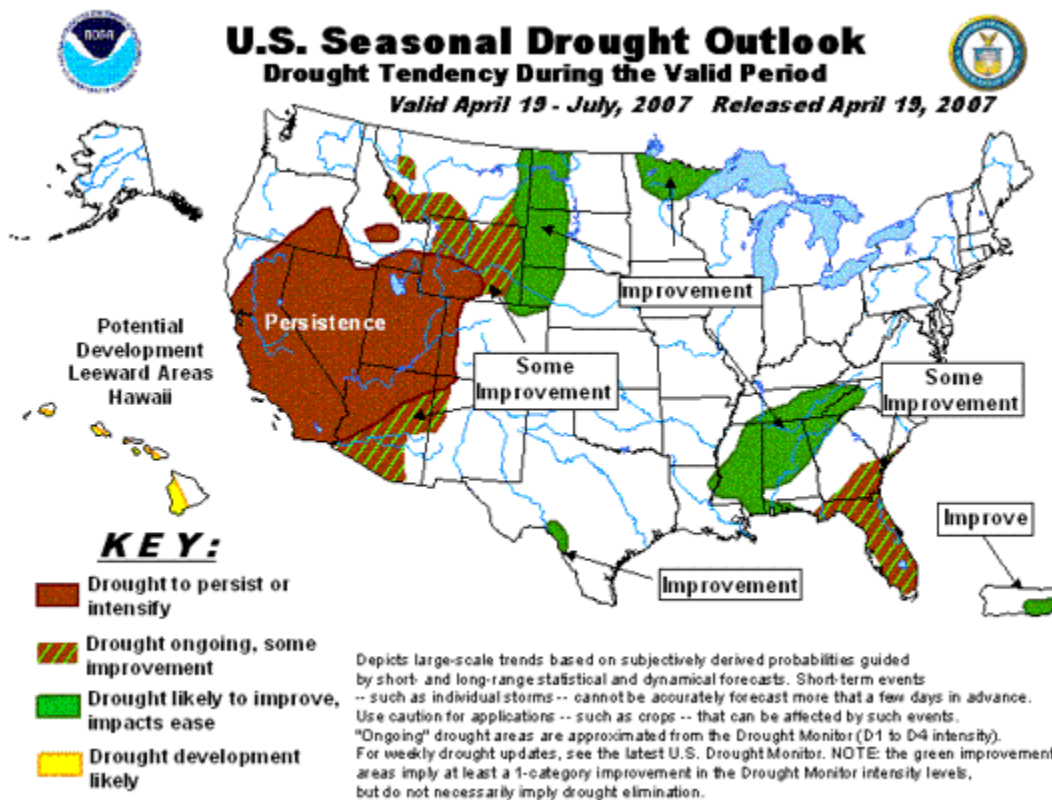


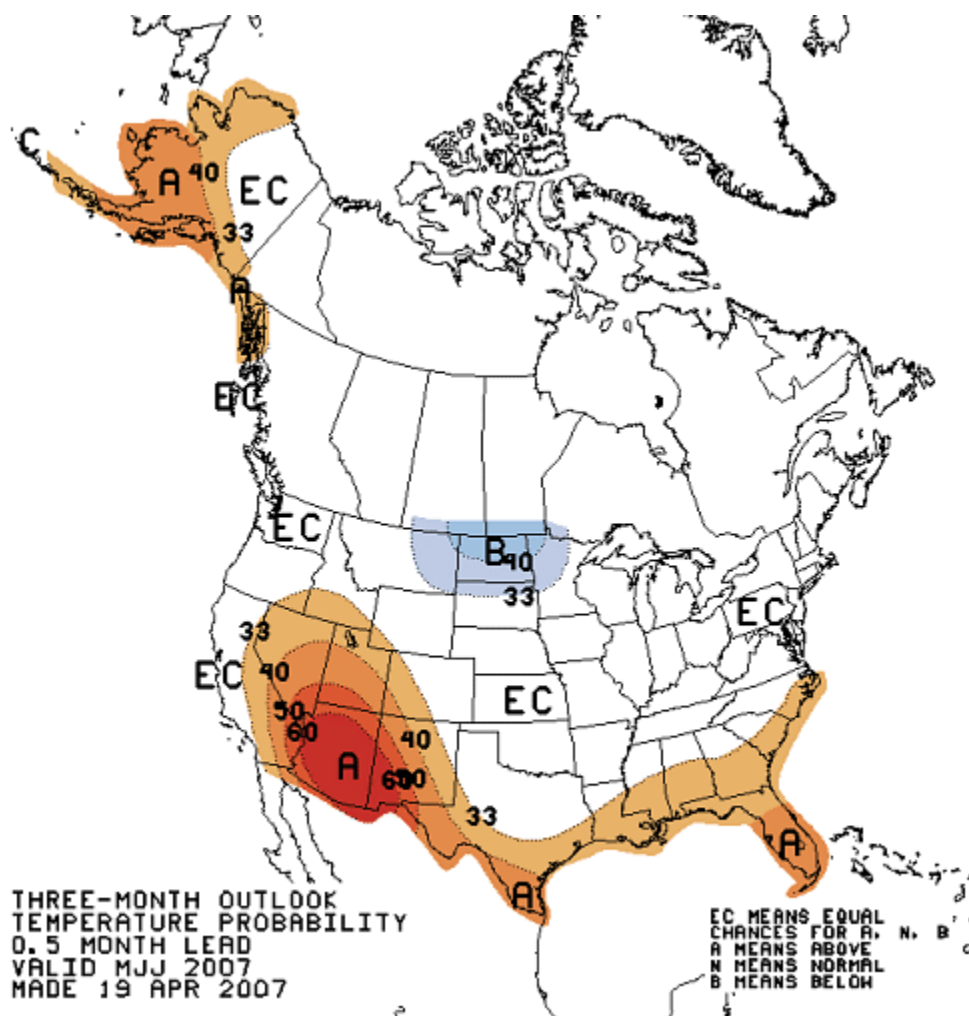
Figure 11. U.S. Seasonal Drought Outlook issued on April 19, 2007. This product is valid through July 2007.

North Carolina may once again be on the northern periphery of the driest conditions, but there were no clear signals concerning the precipitation forecast for the upcoming spring season. Therefore, equal chances of above normal, near normal, or below normal precipitation are forecast.

The temperature forecast for the spring season indicated that there is an equal chance of above normal, near normal, or below normal temperatures during the next three months as well. As is typically the case during the spring season across North Carolina, there will likely be large variability in temperatures and rainfall from week to week. Some weeks will likely average above normal, while others will be below normal. The temperature and precipitation outlooks for the United States for the spring can be viewed in Figure 12.

You can keep up with latest monthly and seasonal forecasts by visiting the Climate Prediction Center website at <http://www.cpc.ncep.noaa.gov/>.

Enhanced local three month temperature outlooks are now available at [http://www.weather.gov/climate/calendar\\_outlook.php?wfo=rah](http://www.weather.gov/climate/calendar_outlook.php?wfo=rah)



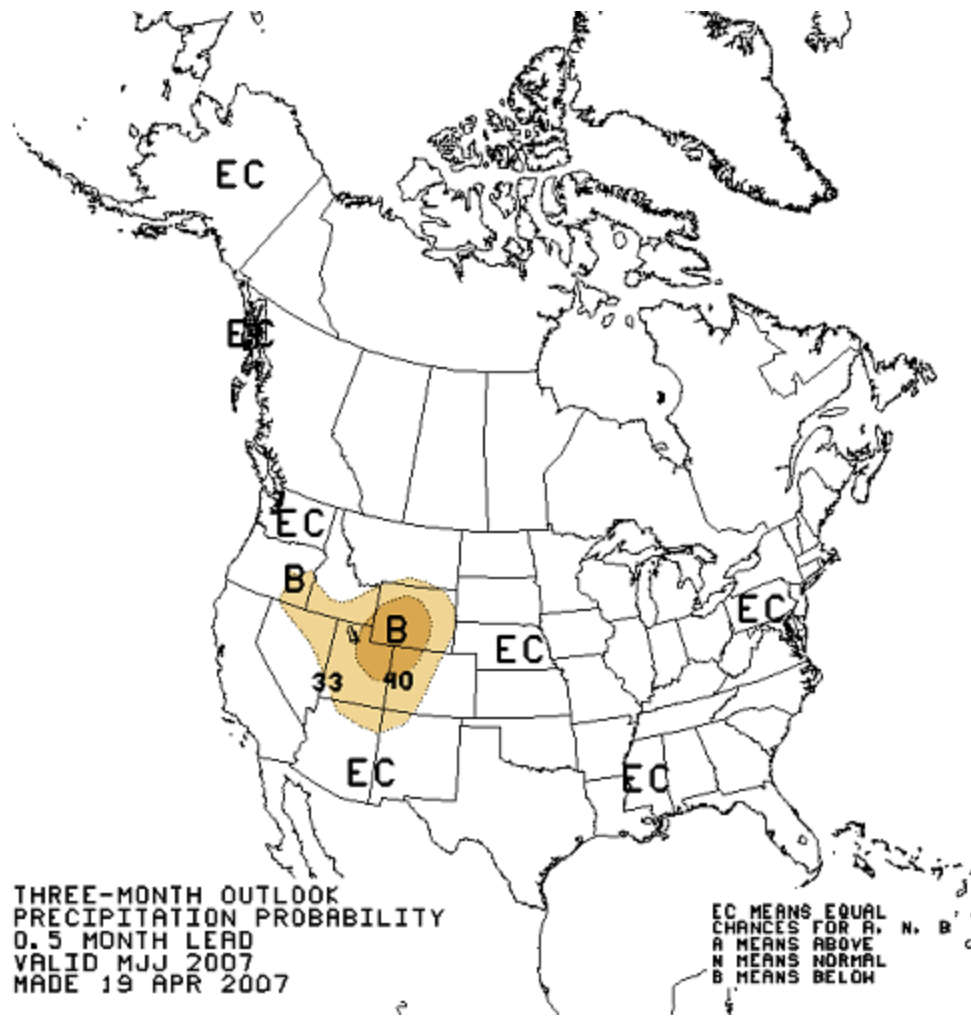


Figure 12. Temperature and Precipitation Outlooks from the Climate Prediction Center for May through July 2007.

## NC Weather Review Team

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