

# November 2006 NC Weather Review

## Overview

November 2006 turned out to be much wetter and warmer than normal throughout much of North Carolina. However, November 2006 will be remembered most for a deadly F3 tornado that struck the small community of Riegelwood, in Columbus County, during the early morning hours on November 16. Eight people were killed, 20 people injured, and 30 homes were destroyed. Additional information can be found at the following link:

<http://www.erh.noaa.gov/ilm/Nov162006tornadoes/>

The storm system that produced the tornado was just one of four major storms to affect North Carolina during November. Each of the four systems brought a round of heavy rain to the state, yet the two most memorable will be remembered for the destructive winds that they unleashed. In addition to the November 16<sup>th</sup> storm system that produced the F3 tornado in Columbus County, another much different storm produced destructive winds just prior to Thanksgiving. A strong and winter-like nor'easter buffeted the coast with damaging winds and coastal flooding on November 21 and 22. This storm was responsible for producing wind gusts to between 50 and 80 MPH along the coast and downing trees as far west as the Piedmont region. The rainfall tallies produced by the four storms combined totaled between 5 and 9 inches across the state - generally 3 to 6 inches above normal. The monthly rainfall across the state is plotted in figure 1.

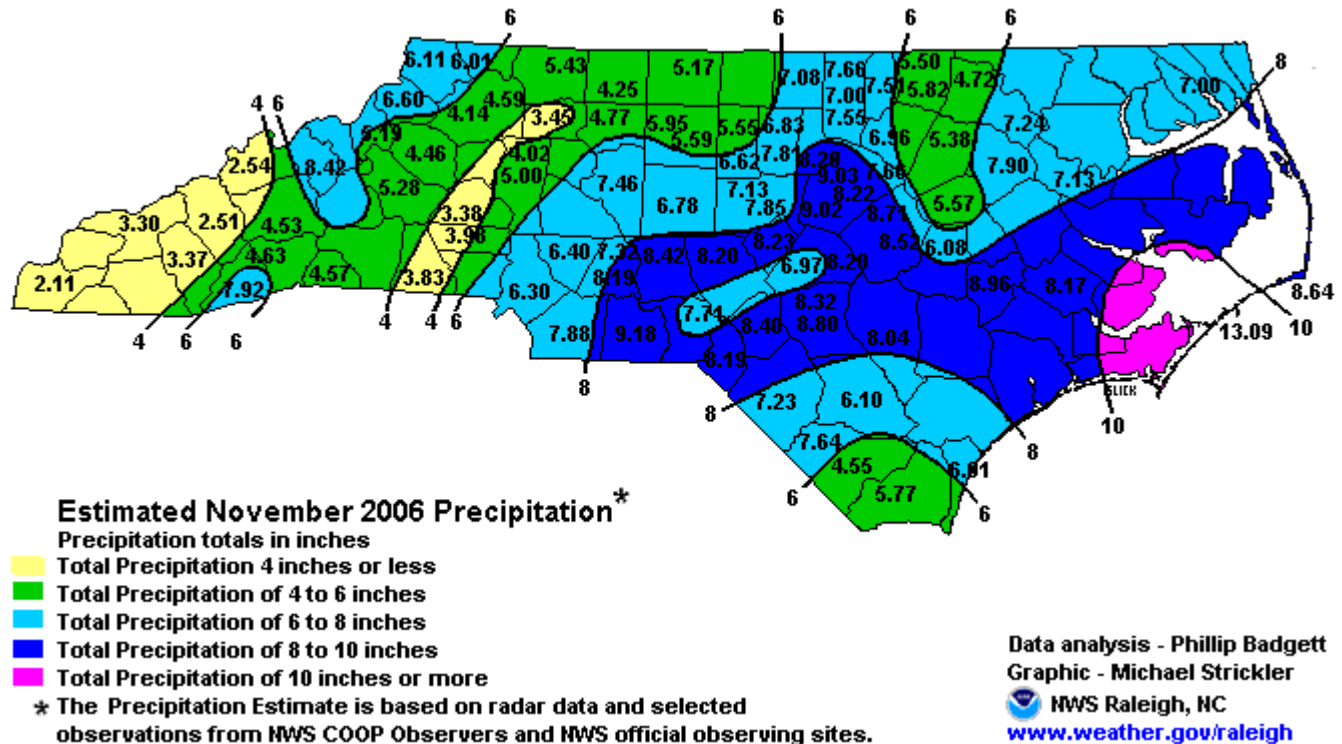


Figure 1. Estimated rainfall for November 2006. Plotted data was recorded by National Weather Service observation systems or cooperative observers.

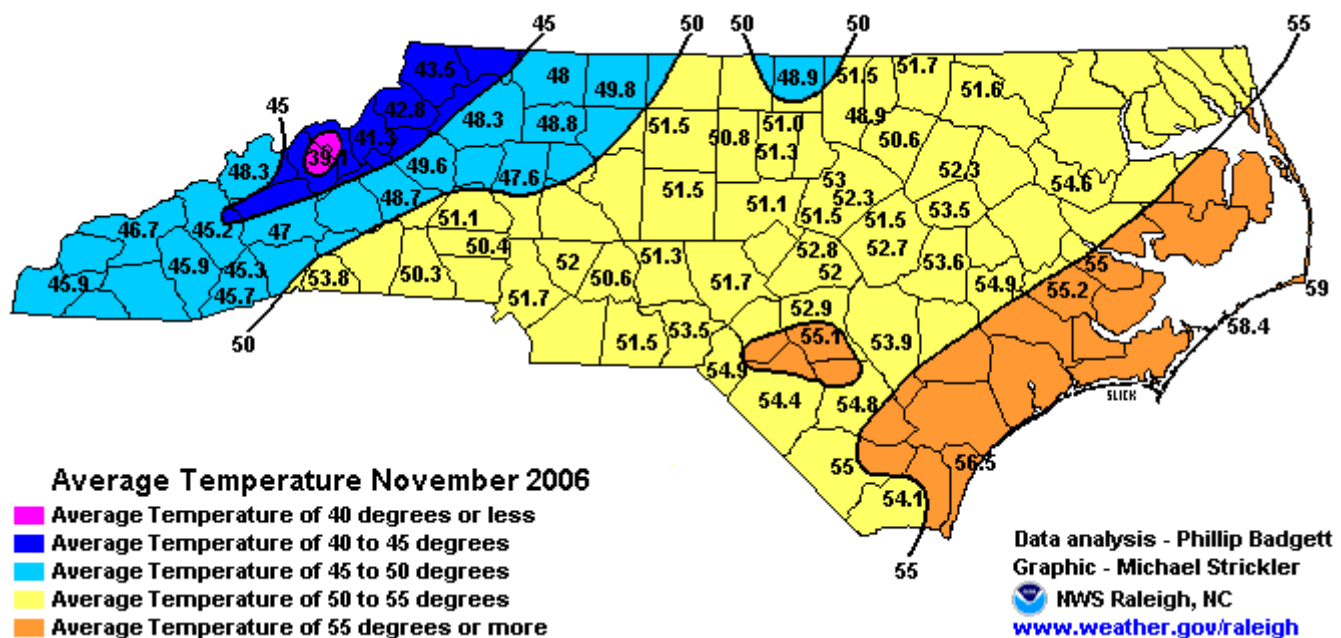


Figure 2. Average monthly temperatures during November 2006 across North Carolina.

The statewide November average temperatures generally ranged between 50 and 55 degrees, except cooler 40s over the Mountains and northern Foothills, and warmer readings near 60 along the Outer Banks. These readings averaged about 1 to 3 degrees above the 30 year normal. The average monthly temperatures from selected stations across North Carolina are plotted in figure 2.

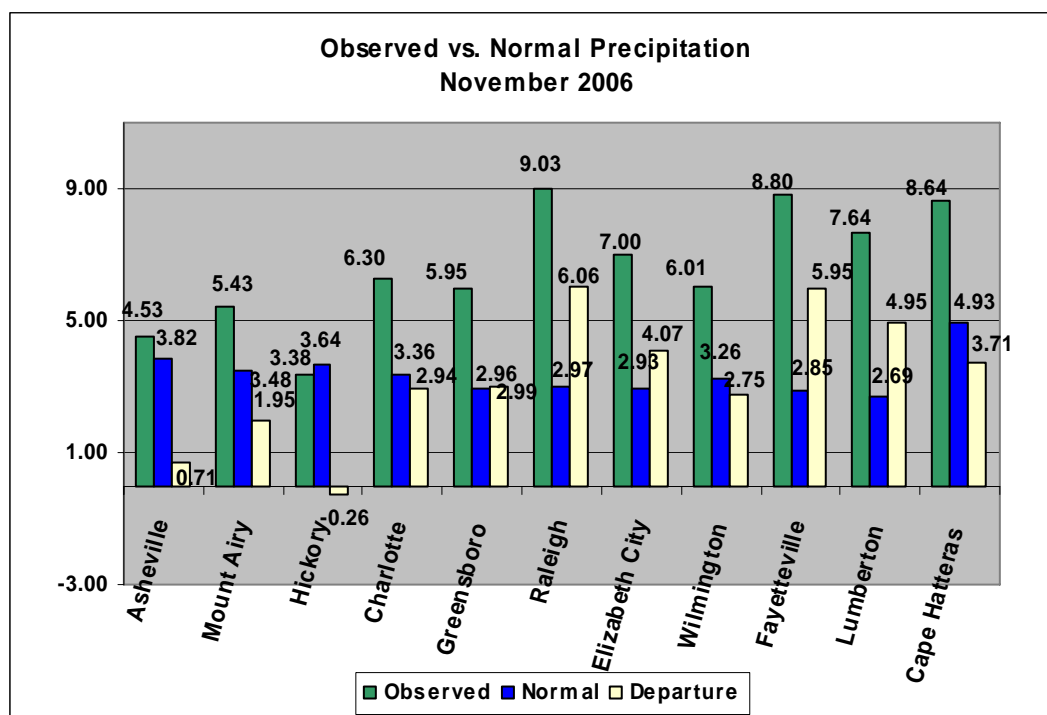
## Details

### November 2006 Precipitation

The four moisture laden storms that affected the state in November sent the monthly rainfall totals to well above normal levels. The final November rainfall totals across the state of North Carolina generally ranged from 5 to 9 inches. The rainfall totals ranged between 4 and 6 inches above normal over much of central and eastern North Carolina (150 to 300 percent of normal), and between 3 and 6 inches over the southwest Mountains (100 to 125 percent of normal). Raleigh-Durham recorded 9.03 inches of rain for a new November monthly rainfall record. The previous wettest November in the Raleigh-Durham area was 8.22 inches, recorded in 1948. The heavy rainfall led to river flooding of minor to moderate intensity across central and eastern North Carolina during the latter half of the month. The area lakes, which had suffered with well below normal levels earlier in 2006, filled to well above normal levels by the end of November.

The rainfall distribution for November was dominated by the four aforementioned storms. These storms affected the state with the most significant rain on or around November 7-8, November 11-12, November 15-16, and November 20-22. The rainfall totals were not evenly distributed across the state. The heaviest rainfall totals were recorded over portions of central North Carolina, where amounts reached 7 to 9 inches. Portions of the southwestern Mountains

around Cherokee, Murphy, and Robbinsville, totaled only 2 to 4 inches. Figure 3 is a comparison of observed versus normal rainfall for selected NWS sites across the state. Most areas were well above their 30 year rainfall average for November.



**Figure 3. Comparison of observed precipitation and normal precipitation for November 2006 at selected locations across North Carolina.**

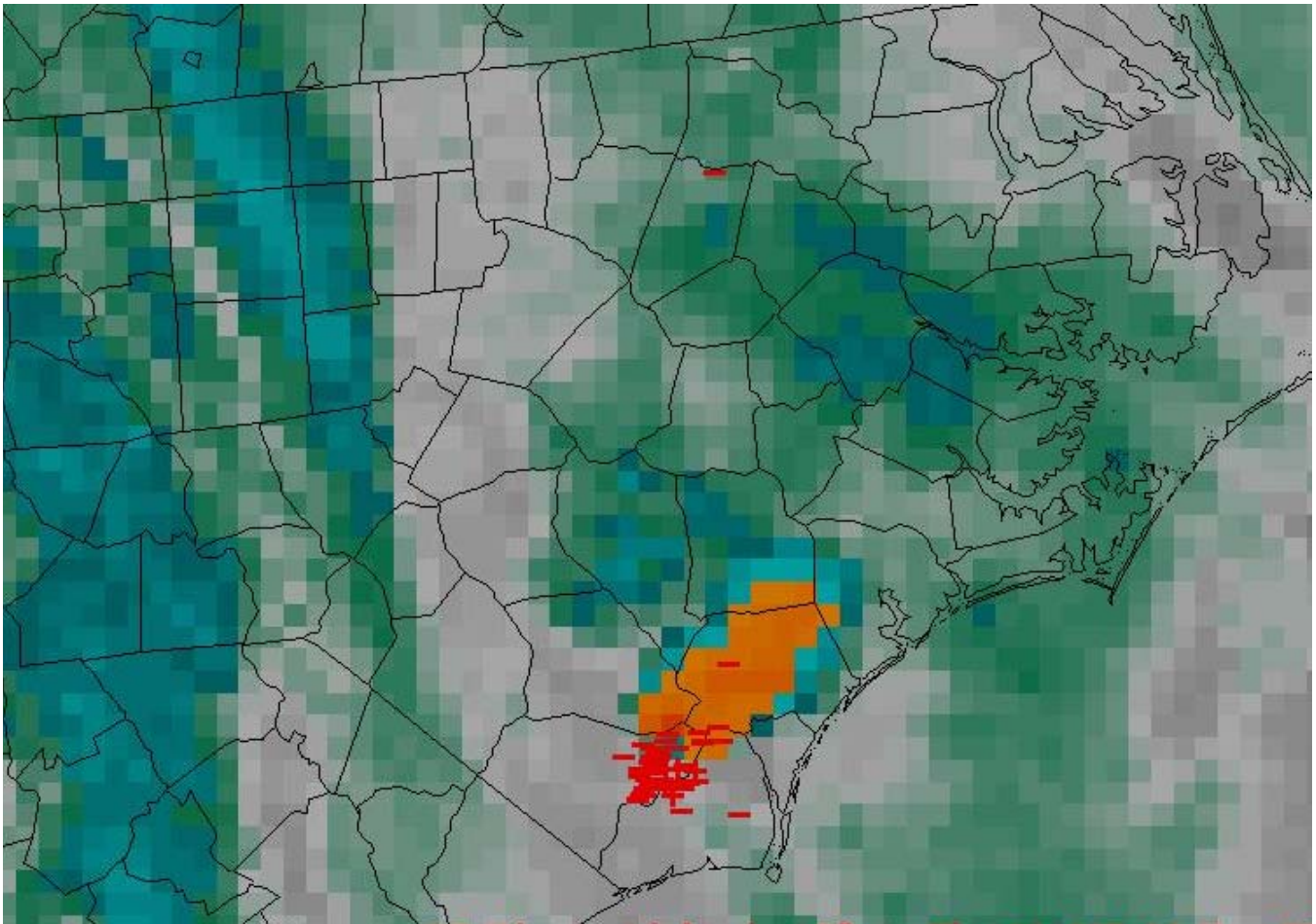
## November 2006 Temperatures

The monthly temperatures averaged in the 50s, except 40s over the Mountains and near 60 on the Outer Banks. These readings generally averaged one to three degrees above normal throughout North Carolina. The warmest areas were found across the northern and central portions of the state, including Greensboro (+2.3 degrees), Raleigh-Durham (+2.0 degrees), and Elizabeth City (+1.7 degrees). The southwestern and southeastern corners of the state averaged closer to normal. For example, the monthly average temperature at Asheville was only 0.6 degrees above normal, while Wilmington was right at the 30 year normal.

The month of November began with a cold shot of air on November 2-3. This cold spell brought the first freeze to many areas of central and eastern North Carolina. The Mountains and northwestern Piedmont already had recorded freezing temperatures in mid October, ending the growing season for 2006 in those locales.

Following the cold spell, the temperatures warmed to above normal levels from November 7-16. In fact, new daily record highs were set at both Greensboro and Raleigh-Durham on November 10 and 11. Raleigh-Durham reached 81 on the 10<sup>th</sup> and 80 on the 11<sup>th</sup> for new daily records. The warm spell ended with the passage of a strong cold front during the morning of the 16<sup>th</sup>, which was the morning of the infamous F3 tornado in Columbus County.

Figure 4 is a water vapor satellite image with the 15 minute cloud-to-ground lightning data superimposed, valid at 6:25 AM EST on November 16. This image was taken about 12 minutes before an F3 tornado reportedly touched down in Riegelwood, at 6:37 AM EST. The orange colors represent progressively colder cloud tops, which are often indicative of clouds extending to high altitudes in the atmosphere. There was a large supercell thunderstorm visible over eastern Bladen County. This storm had formed earlier over the Gulf Stream waters off Myrtle Beach, South Carolina, and had moved north-northeast to the position shown in the figure below. It was only a few minutes later that an F3 tornado ravaged Riegelwood in southeastern Columbus County.



**Figure 4. Water vapor satellite imagery and 15 minute cloud-to-ground lightning plot valid 6:25 AM, November 16, 2006.**

Once the cold front passed offshore during the 16<sup>th</sup>, colder air once again returned to the state. A strong nor'easter developed along the southeastern coast of the U.S. on November 20<sup>th</sup>. This system buffeted much of central and eastern North Carolina with wind and rain on the 21<sup>st</sup> and 22<sup>nd</sup>. Figures 5 and 6 depict the storm total rainfall and the peak wind gusts associated with the nor'easter of November 21-22, 2006.

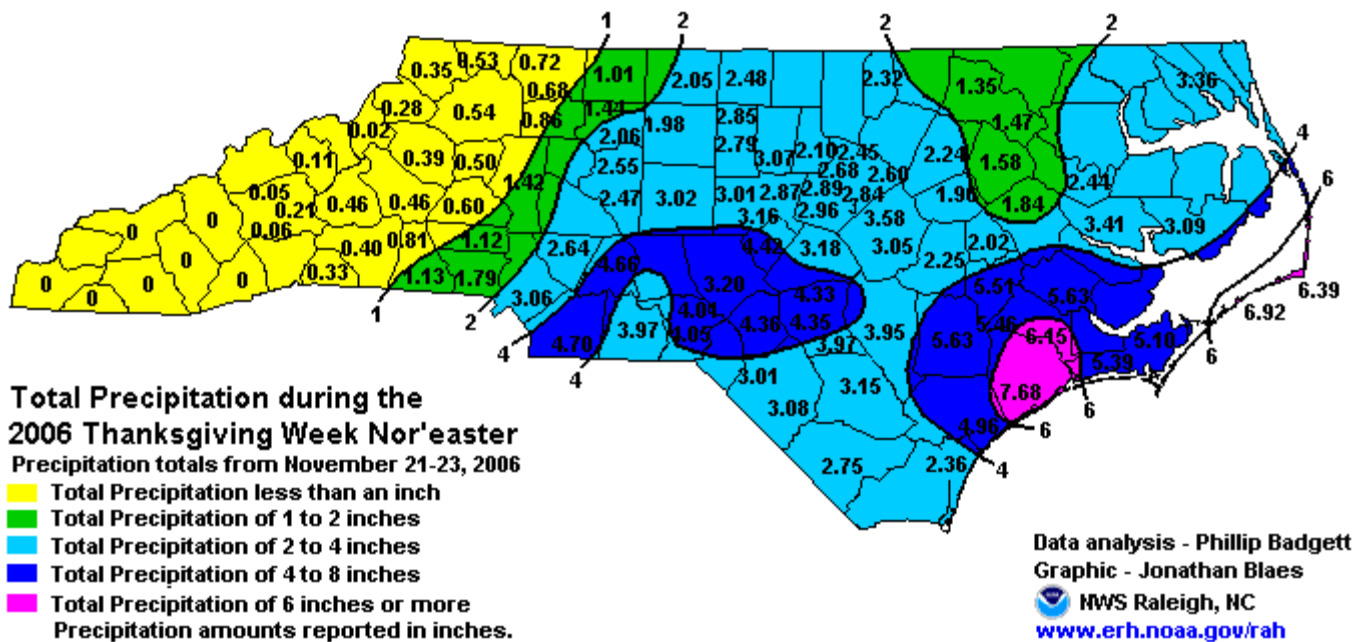


Figure 5. Storm total precipitation from the November 21-22, 2006 nor'easter.

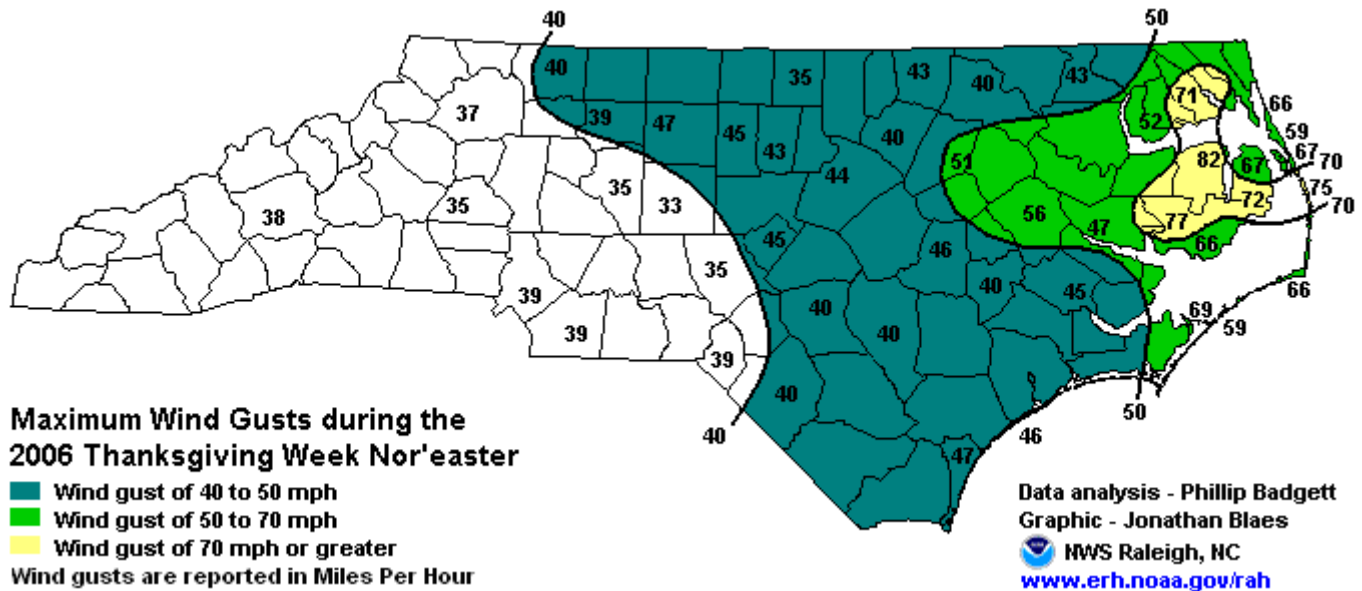
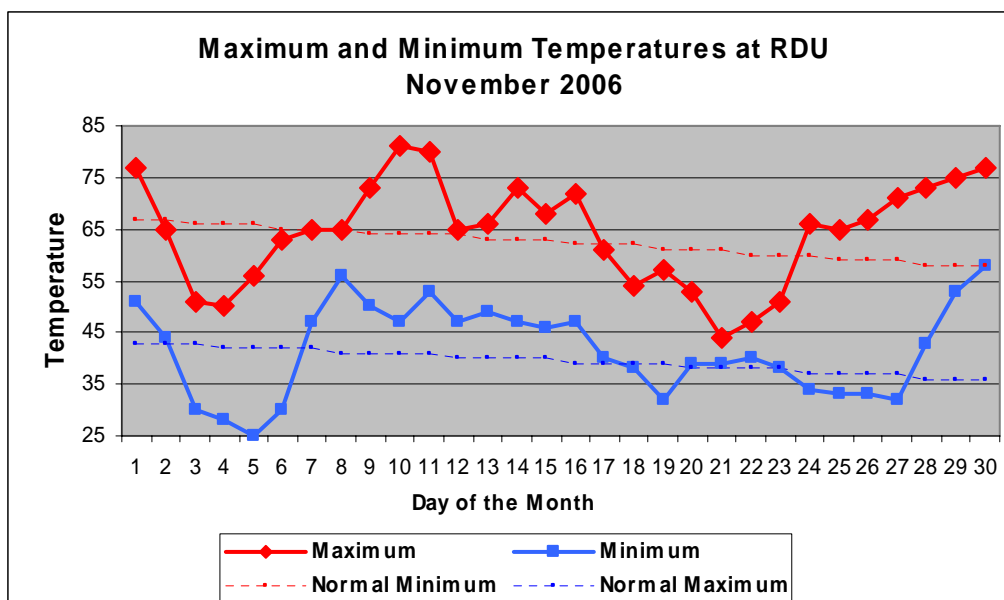


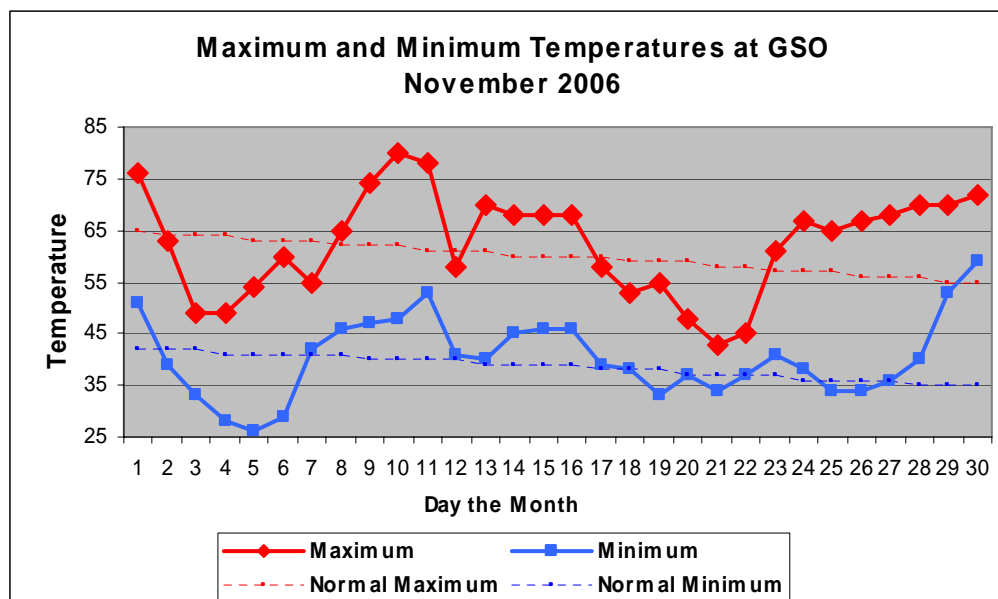
Figure 6. Peak wind gusts during the November 21-22, 2006 nor'easter.

After the pre-Thanksgiving nor'easter, conditions gradually began to dry out, aided by a building ridge of high pressure over the southern U.S. This high pressure area brought warm temperatures to the state November 27-30, when daily highs surged into the 70s over the interior sections. Raleigh-Durham recorded a daily record high of 77 degrees for November 30.

Figures 7 and 8 depict the daily maximum and minimum temperatures observed at Raleigh-Durham (RDU) and Greensboro (GSO) during November 2006. The dashed lines represent the normal maximum temperature (red) and the normal minimum temperature (blue).



**Figure 7. Daily maximum and minimum temperatures observed during November 2006 at Raleigh-Durham (RDU).**



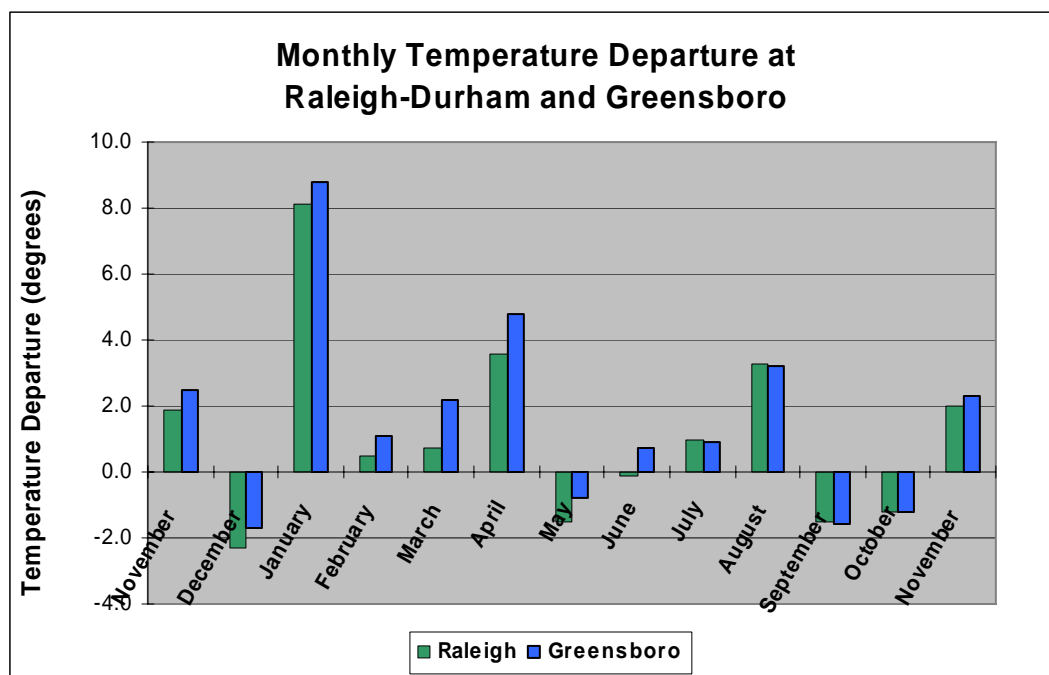
**Figure 8. Daily maximum and minimum temperatures observed during November 2006 at Greensboro (GSO).**

## Current, Semi-Annual and Annual Temperature Trends

The warmer than normal temperatures of November ended the two consecutive months with below normal temperatures at Raleigh and Greensboro. However, three of the past six months have been cooler than normal at Raleigh, while only two of the past six months below normal at Greensboro.

Figure 9 illustrates the monthly temperature departures from normal at Raleigh-Durham and Greensboro. 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. December 2005, May 2006, September 2006, and October 2006 have been the only months in the past year that averaged significantly cooler than the 30 year normal.



**Figure 9. Monthly temperature departures from normal at Raleigh-Durham and Greensboro from November 2005 through November 2006.**

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

The trend of above normal rainfall that began in the summer season, continued through November throughout much of North Carolina. The 9.03 inches of rain recorded at Raleigh-Durham were well above normal. This was the fifth time in the past six months that RDU has recorded above normal rainfall. RDU had a yearly rainfall surplus of 4.62 inches on September 30. This surplus had grown to 10.68 inches as of November 30. Figure 10 depicts the precipitation trends at RDU during the past 12 months. The dry pattern the first half of 2006 was replaced by wet conditions beginning in June.

The 5.95 inches of rain recorded at Greensboro was 2.99 inches above normal for November. This was also the fifth month in the past six that Greensboro has recorded above normal 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. Figure 11 depicts the monthly precipitation totals and the departure from normal during the past 12 months at Greensboro. Note the huge surplus in rainfall since June, after 5 consecutive very dry months.

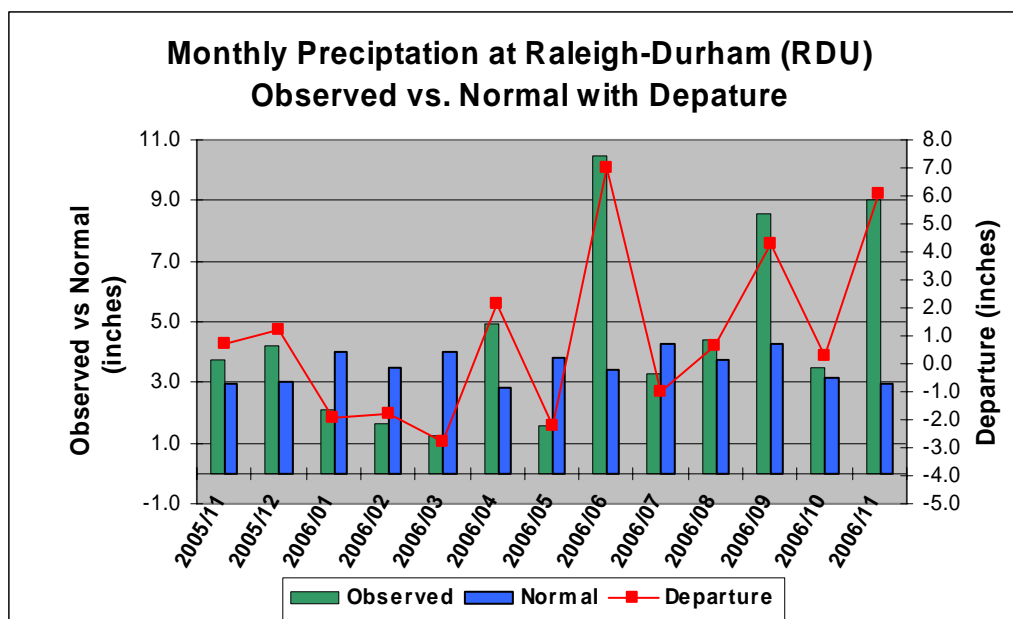


Figure 10. Semi-annual and annual precipitation trends at Raleigh-Durham (RDU).

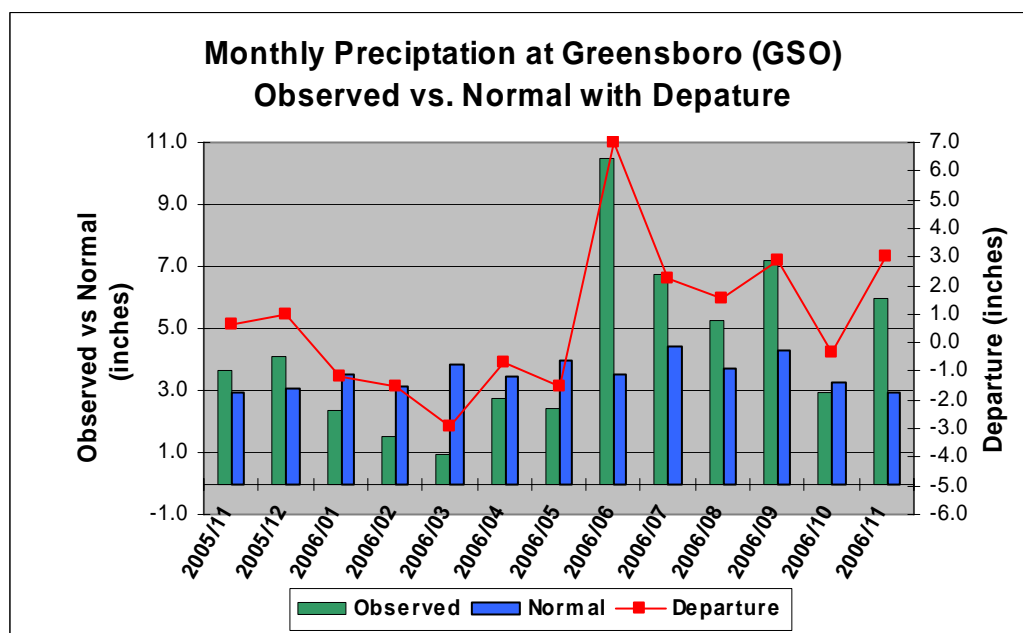


Figure 11. Semi-annual and annual precipitation trends at Greensboro (GSO).

## North Carolina Water Resources Information and Outlook

Due to the wet conditions that have been observed in the second half of 2006, drought was no longer a concern anywhere in North Carolina as the end of the year approached. Many of the reservoirs that supply water to major metropolitan areas of the Triad and Triangle regions topped full pool levels by October 31. Many had to begin releasing water during November, as the heavy rain events brought significant runoff.

For the latest information concerning the drought, visit <http://www.ncwater.org/drought/>

