



North Carolina Department of Environment and Natural Resources

Beverly Eaves Perdue  
Governor

Dee Freeman  
Secretary

**MEMORANDUM**

TO: ENVIRONMENTAL REVIEW COMMISSION  
The Honorable David Rouzer, Chair  
The Honorable Mitch Gillespie, Co-Chair  
The Honorable Ruth Samuelson, Co-Chair

GOVERNOR OF NORTH CAROLINA  
Governor Beverly Eaves Perdue

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES  
Dee Freeman, Secretary

FROM: Kari Barsness *KKB*  
Director of Legislative and Intergovernmental Affairs

SUBJECT: Drought Management Advisory Council 2012 Annual Report

DATE: October 1, 2012

Pursuant to General Statute 143-355.1(g), the Division of Water Resources shall submit to the Environmental Review Commission, the Governor of North Carolina, and the Secretary of the Department of the Environment and Natural Resources a report on the Drought Management Advisory Council by October 1<sup>st</sup> of each year. Please consider the Water Resources 2012 Drought Management Advisory Council 2012 Annual Report attached as formal submission of this report.

If you have any questions or need additional information, please contact me by phone at (919) 707-8618 or via e-mail at [Kari.Barsness@ncdenr.gov](mailto:Kari.Barsness@ncdenr.gov).

cc: Robin Smith, Assistant Secretary of Environment  
Tom Reeder, Director, Division of Water Resources  
Kristin Walker, Fiscal Research Division  
Lanier McRee, Fiscal Research Division  
Mariah Matheson, Research Division

**North Carolina Department of  
Environment and Natural Resources  
Division of Water Resources**

**STATUS REPORT TO THE GENERAL ASSEMBLY  
ON  
THE NORTH CAROLINA DROUGHT MANAGEMENT ADVISORY COUNCIL  
JULY 1, 2011 THROUGH JUNE 30, 2012**

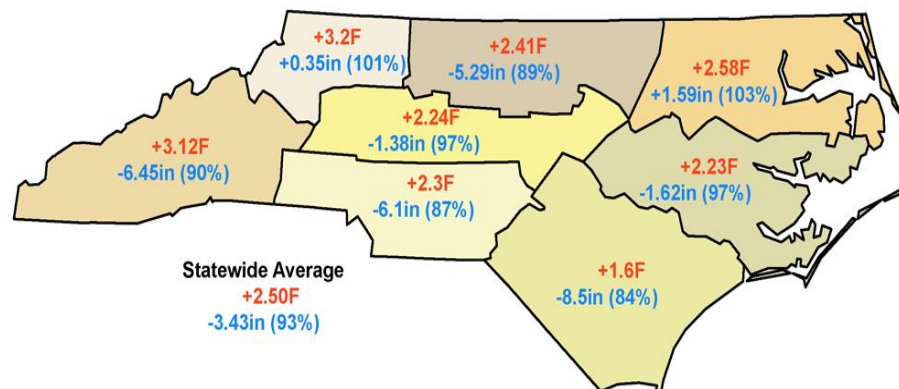
## Executive Summary

This is the eighth annual report of the North Carolina Drought Management Advisory Council required by North Carolina General Statute 143-355.1. In accordance with statutory requirements, the council submits the report to the Secretary of the N.C. Department of Environment and Natural Resources, the Governor of North Carolina and the N.C. Environmental Review Commission by Oct. 1 of every year.

## Drought Overview 2011/2012

### Climate Summary

#### Temperature and Precipitation by Climate Division Departures from Normal for July 2011-June 2012 *Based on Preliminary Data*

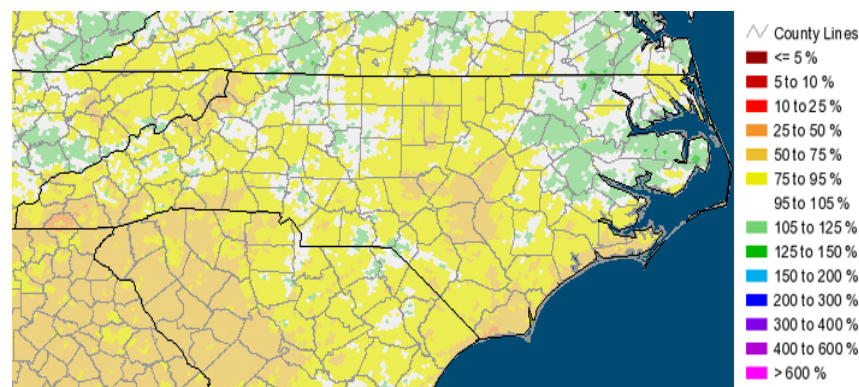


The summer of 2011 was exceptionally hot, with near-record temperatures across much of North Carolina in July. July was the warmest on record for the Raleigh-Durham Airport, Cape Hatteras, Elizabeth City and Aurora, while most other locations experienced temperatures that ranked in the top five warmest on record. Much of eastern North Carolina experienced very dry conditions, which continued into August until Hurricane Irene's landfall on Aug. 27. The dryness in western North Carolina led to deterioration of drought conditions for communities in the foothills and mountains until much-needed rainfall fell in September. October was cool and dry, with both Mount Mitchell and Beech Mountain reporting snow the first weekend of the month – breaking the record for the state's earliest snowfall. While parts of central and northeastern North Carolina experienced near normal precipitation, much of western and southeastern regions of the state were dry. Impacts to water resources were substantial in western N.C., where heavy rain the last few days of November eliminated drought impacts. However, areas of the southern coastal plain remained in a moderate drought due to lack of precipitation. December 2011 ranked as the 13<sup>th</sup> warmest in the state since 1895. While the western part of the state experienced above-normal precipitation throughout the month, the lack of rainfall in eastern North Carolina resulted in drought impacts to streams and groundwater supplies in those areas. The warmer temperatures and decreased precipitation in central and eastern North Carolina are typical of the La Niña effects that the state was experiencing.

Warmer temperatures – with wetter conditions in western North Carolina, and drier conditions in central and eastern portions of the state – persisted into January and February 2012, leaving many reservoirs much below normal for that time of the year. Record and near-record temperatures were observed in March for many locations, along with near-normal rainfall amounts, especially in eastern North Carolina. April temperatures remained above normal, despite two freeze events that brought damage to many fruit crops. Precipitation was generally near-normal throughout the month, keeping most surface reservoirs full. However, groundwater levels and base-flow in the streams remained lower than usual in central and eastern North Carolina. Warm conditions continued into May, while pre-season tropical storms Alberto and Beryl brought wetter conditions to the state – particularly in eastern North Carolina – leading to near, or above-normal, reservoirs and stream levels. Despite a heat wave that affected the state during the last few days of the month, cooler than normal temperatures were observed in June. Due to the wet conditions in May, drought conditions were eliminated in early June.

### **Precipitation for July 2011 - June 2012: Percent of Normal**

*Based on estimates from NWS Radar; Data Courtesy NWS/NCEP*



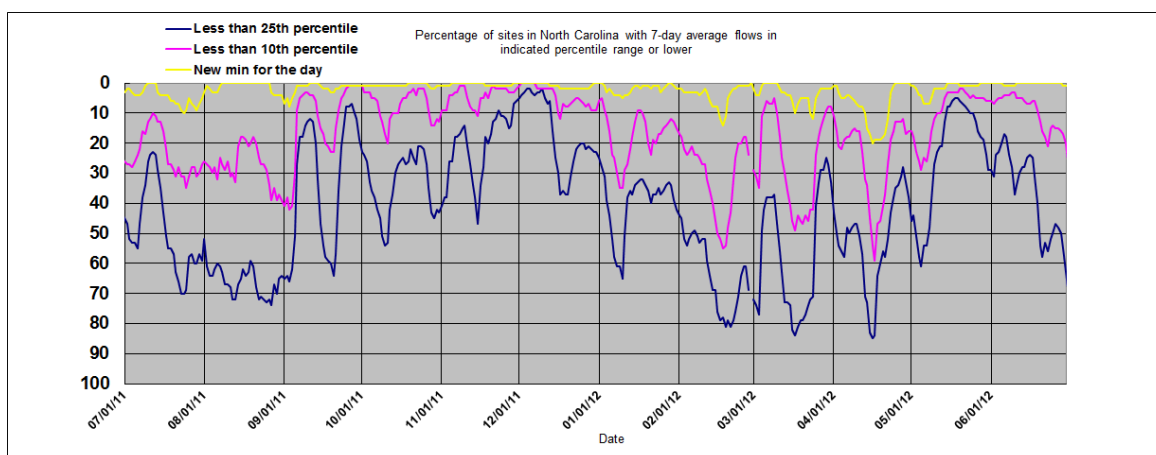
Statewide, the average temperature was 2.5 degrees Fahrenheit above normal from July 2011 through June 2012. This period ranked as the second-warmest since 1895, with only 1931-1932 experiencing warmer statewide average temperatures. July 2011-June 2012 received a statewide average of 3.43 inches of precipitation below normal, ranking the 2011-2012 period as the 64<sup>th</sup> wettest since 1895. The northern mountains observed the highest temperatures on average of 3.2 degrees Fahrenheit above normal, while the southern Coastal Plain observed the lowest rain amounts of 8.5 inches below normal. The northern mountains and northern Coastal Plain received normal precipitation.

### **Stream flow and Groundwater**

Stream flow conditions at U.S. Geological Survey (USGS) stream gages during July 1, 2011, through June 30, 2012, were commonly in the below-normal ranges for much of North Carolina. But wide swings in conditions were observed from time-to-time during the period for various regions of the state. This pattern is reflected in the graph shown below that indicates the percentage of USGS stream gages in North Carolina with 7-day flows in the less than 25th, 10th and 1st percentiles (or record-low for the calendar date).

During February through April, more than 70 and 40 percent of sites across the state had percentiles for 7-day average flows below the 25th and 10th percentiles, respectively. Because the winter period is a critical recharge period for the hydrologic system, the occurrence of below-normal conditions raised serious concerns for the hydrologic system in the subsequent summer months.

Provisional new record minimum daily flows for the period of record were set at four sites across North Carolina during July 1, 2011, through July 31, 2012. Three of these four sites were located in the Coastal Plain. The fourth site was located in the Blue Ridge region. In the same period, provisional new monthly minimum average flows were set at 13 sites, with 11 of these located in the eastern half of the state.



Water levels monitored at 17 USGS observation groundwater wells within the [N.C. Climate Response Network](#), often indicated a wide range of conditions from week-to-week during July 1, 2011 through June 30, 2012. The groundwater levels during this period at the 10 wells in the Blue Ridge, Piedmont and Sand Hills regions were generally characterized by a mix of conditions in the normal and below-normal ranges, primarily during the first nine months of the period. During the last three months, water levels at most of the western Piedmont wells were in the below-normal ranges. Water levels at two eastern Piedmont wells were in the much below-normal and "record low for the month" ranges throughout most of the 12-month period.

Water levels at the six USGS observation wells in the Coastal Plain were a mix of normal and below-normal conditions during the same period, with levels commonly below normal during the months of December to April. The water levels during the last two months of the period were generally in the normal and above-normal ranges following some storm systems that moved across the Coastal Plain region. The one exception was the observation well at Southport in Brunswick County where water levels were in continual decline in the months following September 2011, with below normal conditions from January through June 2012. During the course of the annual cycle, groundwater levels decline during the summer months and typically "bottom out" in the late fall before rebounding during the winter period.

## Agriculture

Dry weather in July 2011 took a toll on crops. High temperatures, coupled with minimal rainfall, reduced topsoil moisture to very low levels. Hurricane Irene swept across eastern North Carolina causing damage to crops, equipment and buildings, as well as flooding in some areas. Toward the end of the 2010/2011 growing season, soil moisture conditions improved significantly. The 2011/2012 growing season started out strong as cooler, drier weather allowed producers to get plenty of fieldwork done. Planting of small grains (wheat, barley and oats) started in early October. Above-normal precipitation and warmer-than-usual average temperatures throughout the winter months and early spring allowed small grains to progress a few weeks ahead of schedule. Producers saw some impacts from frost in mid-April. Damage was mostly seen in small grains, Irish potatoes, corn and fruit (apples, peaches). In May, corn, cotton, peanut and soybean planting, as well as tobacco transplanting, all made progress with favorable weather conditions in many areas. June and July were particularly hot and dry months for N.C. producers, as soil moisture began to deplete rapidly. On July 8, statewide soil moisture levels were rated at 20 percent very short, 44 percent short, 36 percent adequate and 0 percent surplus. For three straight weeks, North Carolina saw above-normal average temperatures and below-normal precipitation, including multiple 100 degree plus days.

### **Forest Resources**

During the past year, drought acted as a stressor to many trees across North Carolina in both rural and urban forests. Drought stress also contributed to the decline and death of some urban trees. While forests across the state are showing residual effects from the lack of precipitation last year, the recent rains are helping in their recovery.

From January through July, more than 2,106 wildfires have occurred across the state, burning approximately 8,385 acres. This is about two-thirds of what is expected to occur in a normal year and about half of what was experienced last year. Due to drier-than-average conditions for the last several years, prescribed burns have been difficult to carry out. Conversely, since October 2011, the conditions have improved allowing for an increase in burning, particularly in the Piedmont region of the state.

The combination of stressed trees and unusually warm weather during the winter has allowed some insect populations to thrive, including the Ips beetle. Prior to October 1, 2011 personnel with the N.C. Forest Service were seeing scattered single-tree and small-patch mortality attributed to the Ips bark beetle attacking drought-stressed pines. In addition, oak decline was also reported scattered across the state. Since Oct. 1, 2011, there have been some new Ips spots and oak decline episodes, but overall conditions are favorable for tree growth. Episodes of Ips and oak decline are still being reported, but not at the rate of previous years.

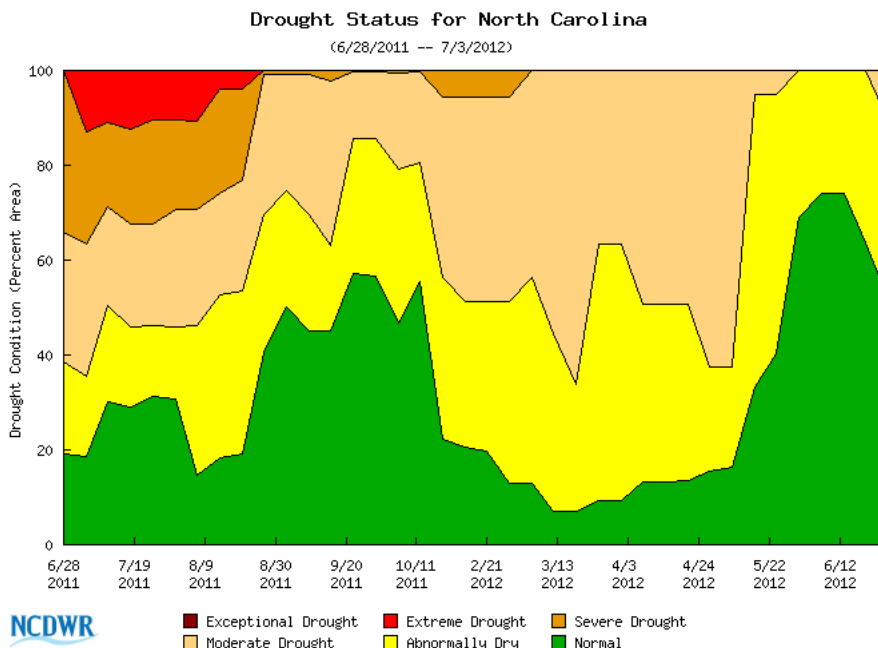
One benefit from a forestry standpoint is that tracts are fairly dry, enabling sites to be easily prepared for the planting season.

### **Drought Conditions**

During the past year in North Carolina, the worst drought conditions occurred the week of July 5, 2011. That week, 13 counties were in an extreme drought, 23 counties were in a severe drought

and 27 counties were in a moderate drought. The best conditions occurred during the month of June 2012 with no drought designations. During the week of July 5, 2011, the number of water systems that were affected by the drought conditions were:

- 123 water systems in an extreme drought (D3).
- 179 in a severe drought (D2).
- 194 are in a moderate drought (D1).
- 100 under abnormally dry conditions (D0).



## Council Meetings

Drought conditions in North Carolina are updated weekly through a webinar with a technical drought advisory team, which is a sub-group of the N.C. Drought Management Advisory Council. The team consists of experts on climate, weather, geology, water supply, forestry and agriculture that report each week on stream flows, groundwater levels, reservoirs levels, wildfire activity and crops. Based on this information, the team makes a recommendation to the U.S. Drought Monitor on the state's drought conditions for that week. The recommendation is used for the depiction of the national drought map released each Thursday. To see or download a copy of the current drought map, go to the [state's official drought website](#).

The N.C. Drought Management Advisory Council (DMAC) is required by law to meet face-to-face at least once each calendar year. The annual council meeting was held on April 26, 2012, with 30 representatives and associates of the DMAC and the news media in attendance. Items

discussed at the meeting included current impacts to stream flow and groundwater levels, lake and reservoir levels, agriculture, forestry and public water systems.