



## North Carolina Climate September 2011

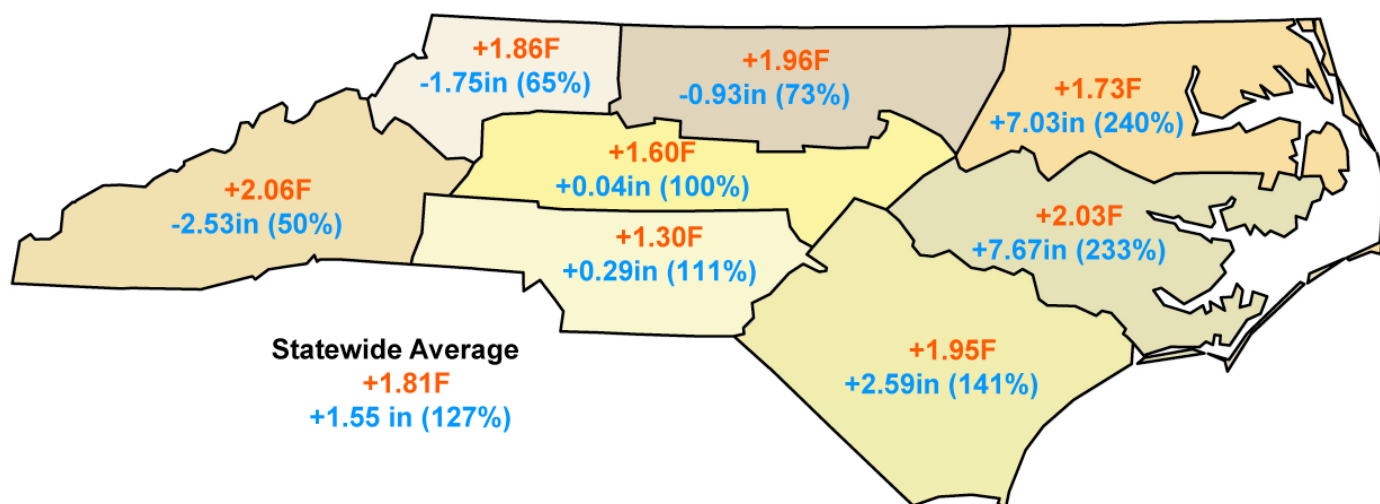
Online: <http://www.nc-climate.ncsu.edu/office/newsletters>

*North Carolina Climate*, the monthly newsletter of the State Climate Office of NC, covers a monthly climate summary for August with impacts across the state, a brief summary on Hurricane Irene, and information on new and soon to be retired staff.

Published September 8, 2011

### Climate Summary

#### Temperature and Precipitation by Climate Division Departures from Normal for August 2011 Based on Preliminary Data

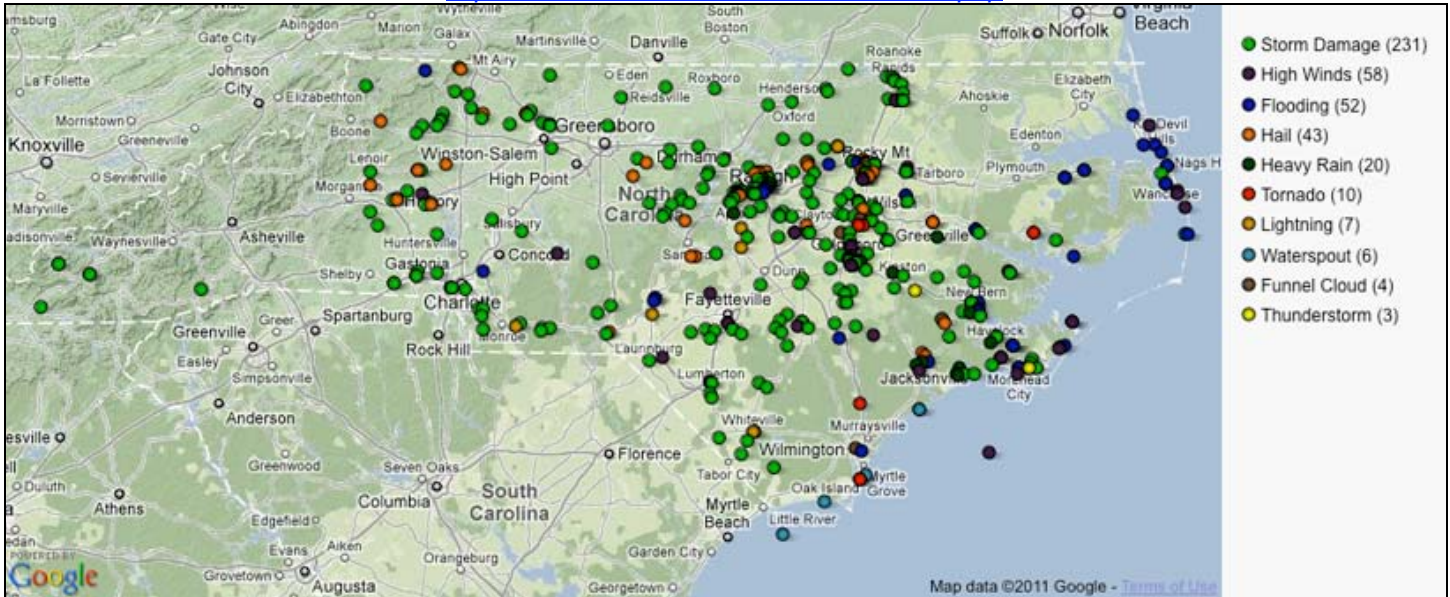


August 2011 was warm and dry – and along came Hurricane Irene, which you'll find highlighted in a special section below. While not as unusually warm as July was, August still brought the heat. For most cities in NC, temperatures in August ranked in the top 25% for warmth, while most locations in western NC ranked in the top 25% for dryness. August 2011 also brought several severe thunderstorm outbreaks with damaging winds, hail, and some localized flash flooding reported across the state.

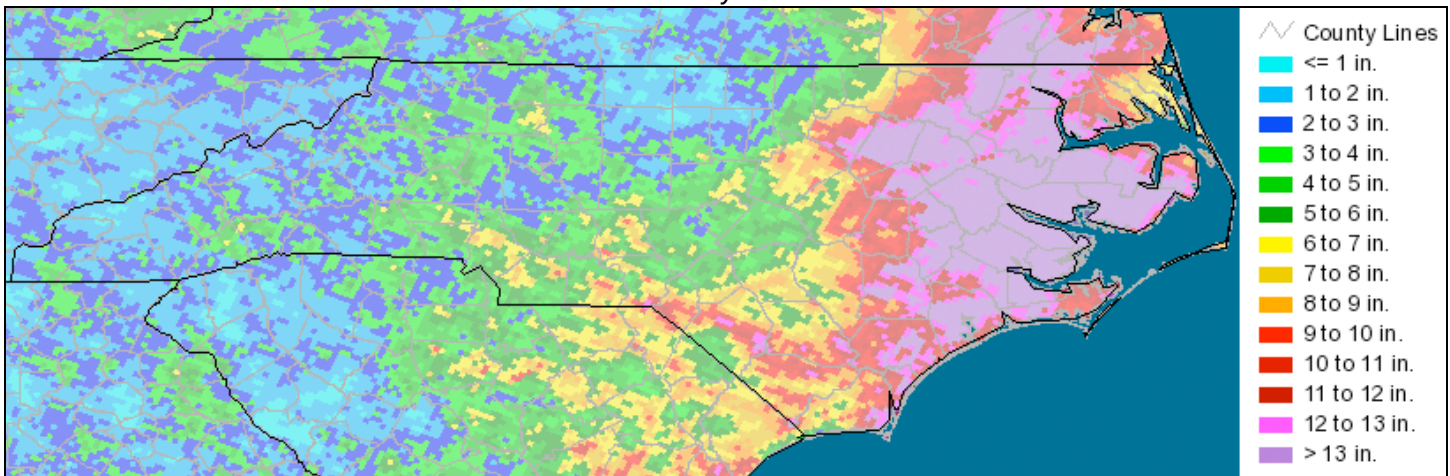
Irene changed everything in eastern North Carolina. Before Irene, drought was the primary concern for municipalities and growers. Afterward, all concerns turned to infrastructure, flooding, and crop damages. Hurricane Irene brought with it the usual ingredients for damage: high winds, storm surge, a few tornadoes, and tremendous rainfall. Certainly, Irene will be retired, and go into the history books as one to remember in North Carolina.

The approach of Irene had many climatologists looking back in history to storms with similar tracks, especially [Hurricane Floyd](#) (1999), [Hurricane Donna](#) (1960), and the [Great Beaufort Hurricane of 1879](#). Like Floyd in 1999, Irene was very large and produced tremendous rainfall, but Irene arrived during a drought and produced less widespread flooding than Floyd. Like Donna (1960), Irene had some strong winds and created new breaches in barrier islands. The most intense storm with a track similar to Irene's may be the Great Beaufort Hurricane of 1879, which made landfall near Atlantic Beach at Category 3 strength and caused wind gusts upwards of 150 mph, and flooding throughout the streets of coastal towns including Beaufort. It becomes difficult to imagine the damage that might have occurred along today's more developed and densely populated coast if Irene's intensity had been comparable to the storm of 1879.

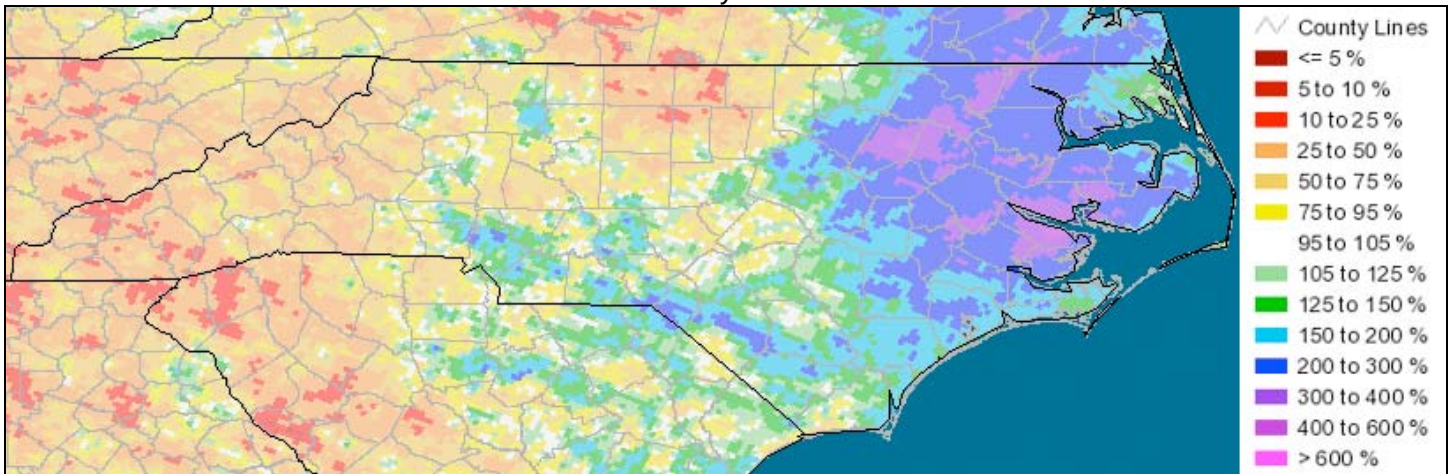
**Local Storms Reports for August 2011**  
 Preliminary Count of LSRs courtesy National Weather Service  
<http://www.nc-climate.ncsu.edu/lsrcdb/index.php>



**Precipitation for August 2011**  
 Based on estimates from NWS Radar  
 Data Courtesy NWS/NCEP



**Precipitation for August 2011: Percent of Normal**  
 Based on estimates from NWS Radar  
 Data Courtesy NWS/NCEP



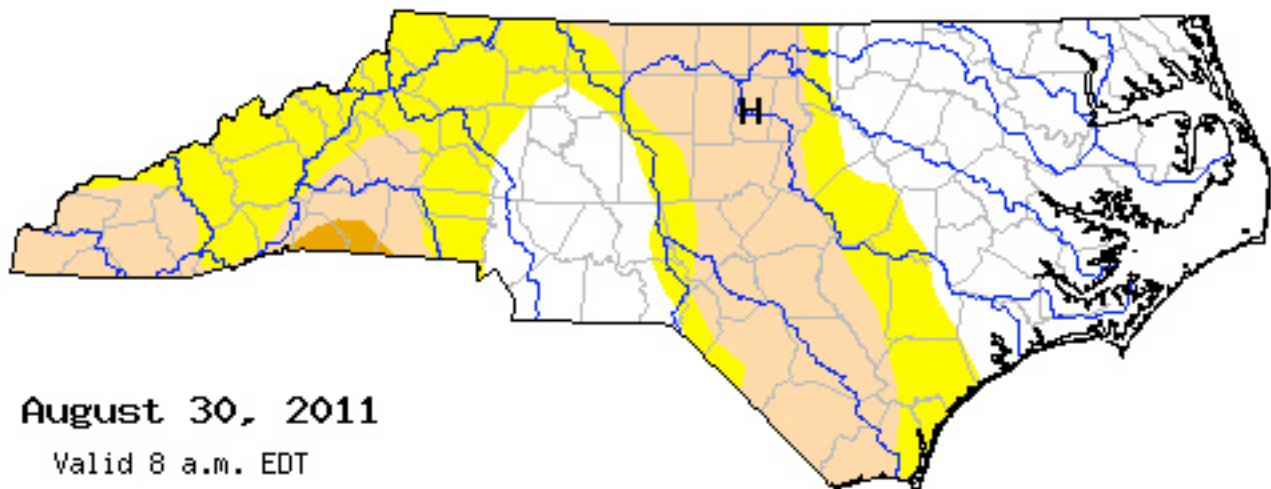
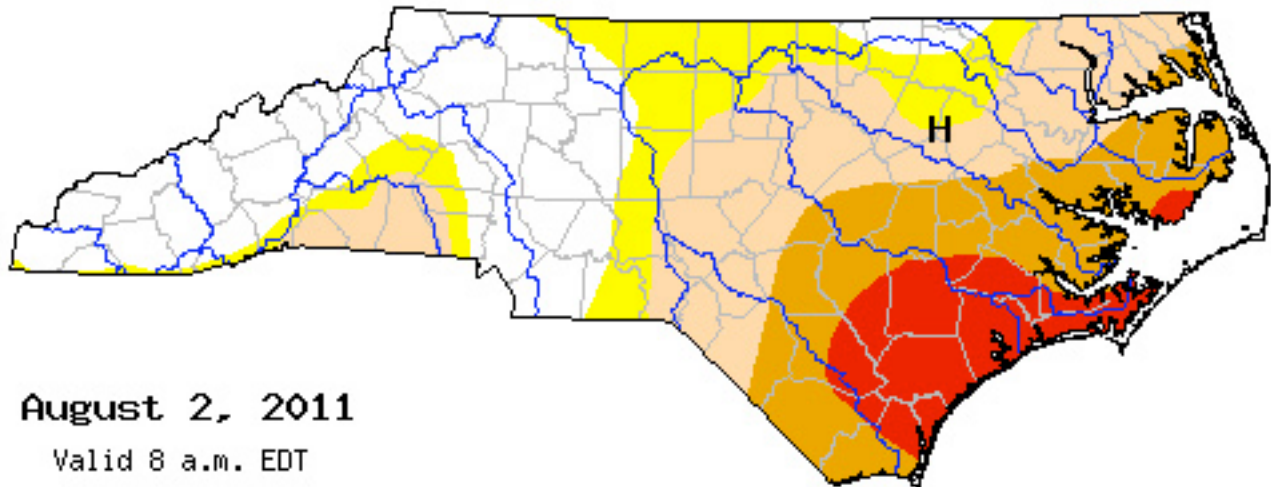
## Impacts to Agriculture and Water Resources

The rainfall from Hurricane Irene resulted in an unprecedented 4 category improvement in the US Drought Monitor for parts of eastern NC. While the drought monitor rarely changes more than 1-2 categories in a single week, the widespread 10+ inch rainfall brought recovery to topsoil, rivers, and groundwater supplies in the region. However, streamflow and groundwater levels continue to be below-normal further inland, resulting in D0 and D1 drought designations even in counties that experienced several inches of rainfall from Irene.

However, continued dryness in western NC led to deterioration of drought conditions for communities in the foothills and mountains.

### US Drought Monitor for North Carolina

*Courtesy NC DENR Division of Water Resources*



#### Drought Classifications

- D0 - Abnormally Dry
- D1 - Moderate Drought
- D2 - Severe Drought
- D3 - Extreme Drought
- D4 - Exceptional Drought

**A** = Agricultural (crops, pastures, grasslands)  
**H** = Hydrological (water)

## Hurricane Irene Strikes NC Coast

By Corey Davis

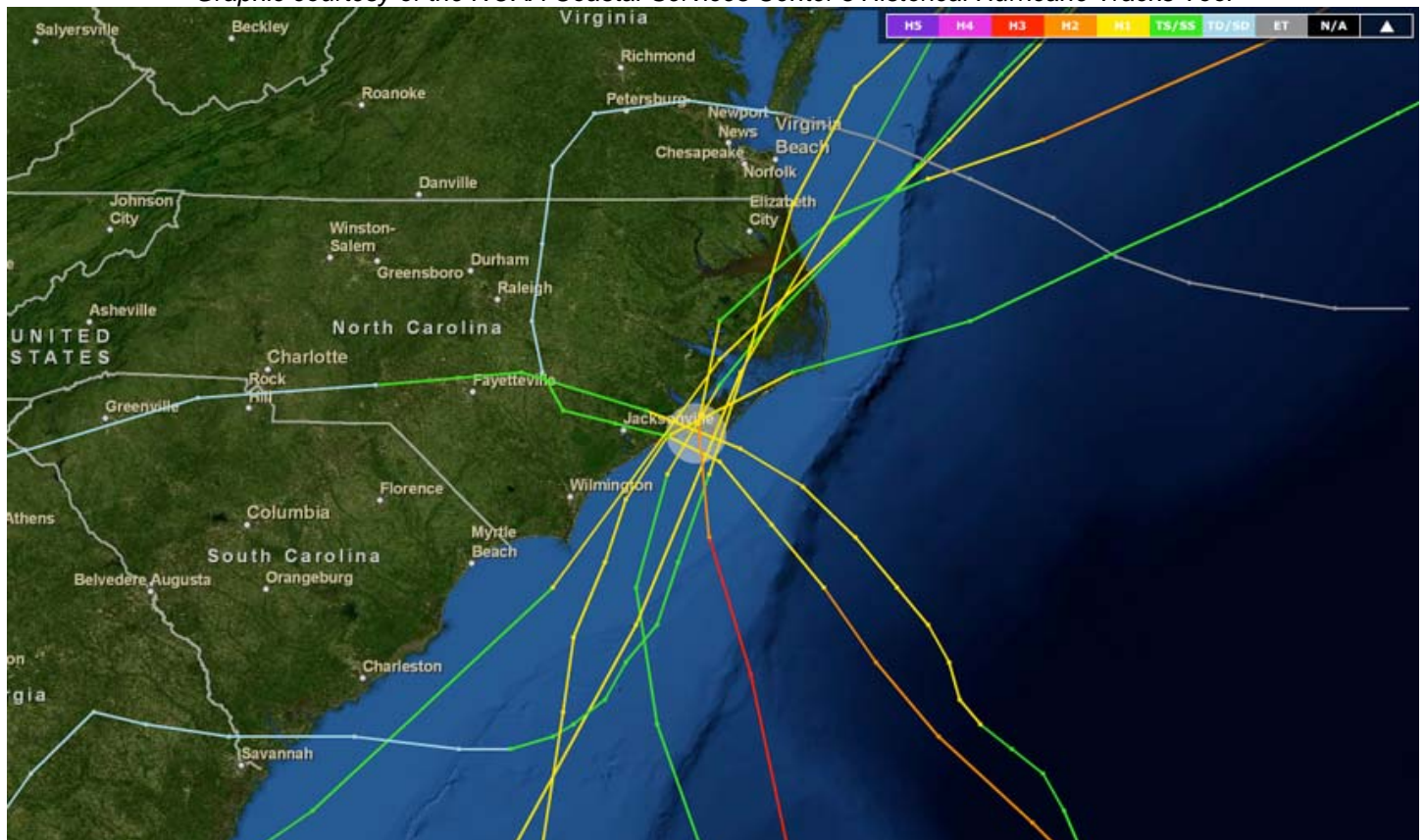
Hurricane Irene's landfall near Morehead City last month made it the first landfalling storm for North Carolina since [Hurricane Isabel](#) nearly eight years ago. Like Isabel, [Hurricane Irene](#) targeted the Outer Banks, bringing [wind gusts](#) as high as 115 mph near Cedar Island and causing [two breaches](#) of the barrier islands and NC Highway 12 just north of Rodanthe. A number of local storm reports were issued by the National Weather Service for the Outer Banks, including [road flooding](#) in Nags Head and an [83 mph wind gust](#) on Pea Island.

Irene's impact wasn't limited to the Outer Banks, though. The heaviest rain from the storm fell along the Inner Banks and central coastal plain, with [storm total rainfall](#) greater than 10 inches in much of the region. The intense rainfall over a short time period led to flooding problems for some of the major state's major rivers. The [Tar River near Greenville](#) reached flood stage, with a crest of 14.79 feet on September 1. Fortunately, the rains did provide welcome relief for the severe drought conditions along much of the coast, and the Juniper Road wildfire in Pender County is now 100% controlled, according to the Forest Service.

At landfall, Irene was a Category 1 storm with maximum sustained winds of 85 mph. However, considering that Irene was at Category 3 strength less than 36 hours before it made landfall, the storm's impact could have been much worse. From a meteorological perspective, the storm first weakened when it underwent an eyewall replacement cycle. Storms often restrengthen once a new eye forms, which helps explain the National Hurricane Center's forecasts for a landfall at category three strength. However, dry air began to wrap around the north side of the eye and the storm encountered damaging vertical wind shear, which caused Irene to remain a weaker storm despite moving over the warm waters of the Gulf Stream. In hindsight, forecasters were able to make [very accurate](#) track forecasts nearly five days before the storm's landfall, which represents the significant forecasting improvements that have been made over the past 10 to 15 years – thanks largely to the development of computer models, better monitoring technology, and a more complete knowledge of storm dynamics. Similar advancements in all three areas should lead to improved track and intensity forecasts for Irene's meteorological brothers and sisters in years to come.

### **Landfalling Category 1 hurricanes within 20 statute miles of Morehead City, NC in past years**

Graphic courtesy of the NOAA Coastal Services Center's Historical Hurricane Tracks Tool



## We Say Goodbye, We Say Hello!



This month, the State Climate Office says goodbye to Bic Fort, who has served as our administration expert for over 10 years. Bic has served the NC State University community for 19 years, and will retire from NC State University and public service on September 9, 2011. Our warmest wishes go to Bic and his family.

We also welcome a new addition to the Climate Office staff. Heather Dinon has joined as a new climatologist effective August 1. Heather is not a new face to our group – she finished her MS degree this past spring from NC State University and was selected after a national search. She will be contributing to several projects and will focus on our agriculture and forestry science and extension efforts.



## Statewide Summary for August 2011

As part of the monthly newsletter, the SCO provides a basic summary of monthly conditions for ECONet stations. A daily version of this product for all locations that have an automated reporting station is available online at:

<http://www.nc-climate.ncsu.edu/cronos/review>

Station	Avg Daily Max Temp	Avg Daily Min Temp	Total Rainfall	Avg Daily Wind Speed	Max Daily Wind Speed	Vector Avg Wind
Boone, NC (BOON)	83.6° F (+8.2° F) 1 mi	62.1° F (+5.5° F) 1 mi	1.8 in	3.5 mph	29.1 mph	2.1 mph West Northwest (288°)
Buckland, NC (BUCK)	89.3° F (+2.5° F) 15 mi	67.6° F (+3.6° F) 15 mi	9.9 in	2 mph	25.4 mph	0.1 mph Northwest (306°)
Burnsville, NC (BURN)	81.4° F (+0.4° F) 8 mi	60° F (+3.5° F) 8 mi	2.2 in	3.1 mph	37.4 mph	1.6 mph Northwest (311°)
Castle Hayne, NC (CAST)	89.6° F (+1.2° F) 0 mi	71.6° F (+2.9° F) 0 mi	11.9 in	3.1 mph	36.6 mph	0.5 mph Northwest (316°)
Clayton, NC (CLAY)	88.8° F (+1.2° F) 3 mi	69.7° F (+2.5° F) 3 mi	3.8 in	3.8 mph	32.2 mph	0.5 mph Northwest (325°)

Clayton, NC (CLA2)	90.4° F (+2.8° F) 3 mi	67.4° F (+0.2° F) 3 mi	9.2 in	1.4 mph	20.6 mph	0.4 mph North Northwest (348°)
Clinton, NC (CLIN)	90.2° F (+2° F) 0 mi	69.8° F (+1.5° F) 0 mi	8.7 in	3.6 mph	40.1 mph	1.4 mph East Southeast (106°)
Fletcher, NC (FLET)	85.6° F (+3.1° F) 0 mi	62.8° F (+3.8° F) 0 mi	3.2 in	2.4 mph	21.4 mph	2.2 mph North (0°)
Franklin, NC (WINE)	73.7° F (-9.5° F) 11 mi	56.7° F (-4.5° F) 11 mi	5 in	3.8 mph	26.7 mph	1.9 mph North Northwest (327°)
Goldsboro, NC (GOLD)	90° F (+0.7° F) 5 mi	70° F (+0.4° F) 5 mi	11.7 in	2.8 mph	45.2 mph	0.8 mph West Northwest (302°)
Greensboro, NC (NCAT)	88.6° F (+2.9° F) 12 mi	68° F (+1.2° F) 12 mi	2.4 in	3 mph	22.8 mph	2.4 mph West Northwest (285°)
Hamlet, NC (HAML)	91° F (+1.9° F) 4 mi	68.2° F (+2.4° F) 4 mi	11.1 in	3.7 mph	25.3 mph	1 mph North Northeast (16°)
Hendersonville, NC (BEAR)	74.5° F (-8.7° F) 7 mi	61.3° F (+1.7° F) 7 mi	4.2 in	8.8 mph	47.3 mph	5.8 mph Northwest (316°)
High Point, NC (HIGH)	88.4° F (+1° F) 2 mi	66.6° F (+0.5° F) 2 mi	1.8 in	1.5 mph	17.6 mph	0.5 mph North Northwest (328°)
Jackson Springs, NC (JACK)	89.6° F (+2.2° F) 0 mi	69° F (+1.1° F) 0 mi	5.4 in	4.5 mph	32.2 mph	1.6 mph North (3°)
Kinston, NC (KINS)	89.3° F (-1.1° F) 0 mi	70° F (+1.7° F) 0 mi	16.6 in	3.3 mph	38.1 mph	0.4 mph North Northwest (342°)
Laurel Springs, NC (LAUR)	78.4° F (+0.1° F) 1 mi	58.7° F (+4.3° F) 1 mi	1 in	3.6 mph	26.9 mph	1.3 mph Northwest (314°)
Lewiston, NC (LEWS)	87.8° F (-0.1° F) 0 mi	68.8° F (+3.1° F) 0 mi	12 in	3.4 mph	45.2 mph	0.4 mph North Northwest (332°)
Lilesville, NC (LILE)	91.1° F (+2.6° F) 9 mi	69.1° F (+0.3° F) 9 mi	1.6 in	2.9 mph	24.4 mph	1.1 mph North Northwest (345°)
Mount Mitchell, NC (MITC)	66.2° F (-1.4° F) 0 mi	54.1° F (+2.5° F) 0 mi	3.3 in	12.5 mph	57.9 mph	9.9 mph West Northwest (293°)
Oxford, NC (OXFO)	89.4° F (+2.7° F) 0 mi	69° F (+3.8° F) 0 mi	6.4 in	2 mph	22.1 mph	0.3 mph West (279°)
Plymouth, NC (PLYM)	87.7° F (-0.6° F) 2 mi	69.2° F (+1.2° F) 2 mi	13.2 in	4.9 mph	58.7 mph	0.7 mph Northeast (50°)
Raleigh, NC (LAKE)	89.4° F (+2.2° F) 0 mi	69.4° F (+1.2° F) 0 mi	5.1 in	4.3 mph	32.9 mph	0.7 mph North Northwest (334°)

Reidsville, NC (REID)	88.6° F (+1.8° F) 0 mi	67.9° F (+3.5° F) 0 mi	2.5 in	3.3 mph	28.1 mph	1.5 mph Northwest (316°)
Rocky Mount, NC (ROCK)	89.8° F (+2.2° F) 0 mi	68.8° F (+1.9° F) 0 mi	14.2 in	3.3 mph	33.8 mph	0.7 mph North (355°)
Salisbury, NC (SALI)	89.7° F (+3.4° F) 0 mi	65.7° F (+0.7° F) 0 mi	1.7 in	2 mph	25.1 mph	1 mph North Northwest (342°)
Siler City, NC (SILR)	89.9° F (+3.1° F) 5 mi	65.5° F (-0.1° F) 5 mi	2.9 in	2.9 mph	25.9 mph	0.9 mph North Northwest (339°)
Taylorsville, NC (TAYL)	88.2° F	65.6° F	1.6 in	1.5 mph	38.5 mph	0.7 mph Northwest (322°)
Wallace, NC (WILD)	90.5° F (+0.6° F) 8 mi	69.5° F (+0.4° F) 8 mi	13.9 in	3.5 mph	38.5 mph	0.4 mph North Northwest (330°)
Waynesville, NC (WAYN)	83.5° F (+2° F) 0 mi	58.7° F (+2.5° F) 0 mi	1.1 in	1.2 mph	18.8 mph	0.9 mph Northeast (43°)
Whiteville, NC (WHIT)	90.9° F (-0.1° F) 0 mi	69.5° F (+2.1° F) 0 mi	9.7 in	2.2 mph	29.3 mph	0.2 mph Northeast (55°)
Williamston, NC (WILL)	88.4° F (+1.5° F) 4 mi	69.3° F (+1.6° F) 4 mi	15.7 in	2.5 mph	37 mph	0.5 mph Northwest (316°)

**Legend:**

Parameter

Parameter's value approximated from hourly data.

( +/- Departure from normal )

Distance to reference station