Fall 2010 – Winter 2011 Drought Status and Outlook
NOAA's National Weather Service Office, Raleigh NC
Issued September 16, 2010

Severe Drought Conditions Have Crept into Central NC

Overview

Note: There is a reference map at the end of this document with major river basins delineation across central NC as well as the extent of the hydrologic area served by the NWS Forecast Office, Raleigh

Rainfall has been below normal over much of central NC this summer. In addition, temperatures have been well above normal, breaking records at both the Raleigh-Durham International Airport (RDU), and the Piedmont Triad International Airport (GSO). Abnormally dry (D0) to moderate (D1) drought conditions developed over the area (encompassing the Tar, Neuse, Cape Fear, and Yadkin/PeeDee river basins) during the mid to late summer (Fig 1). Severe drought conditions crept southwest out of southeast Virginia into the northern coastal plain of NC in early September.

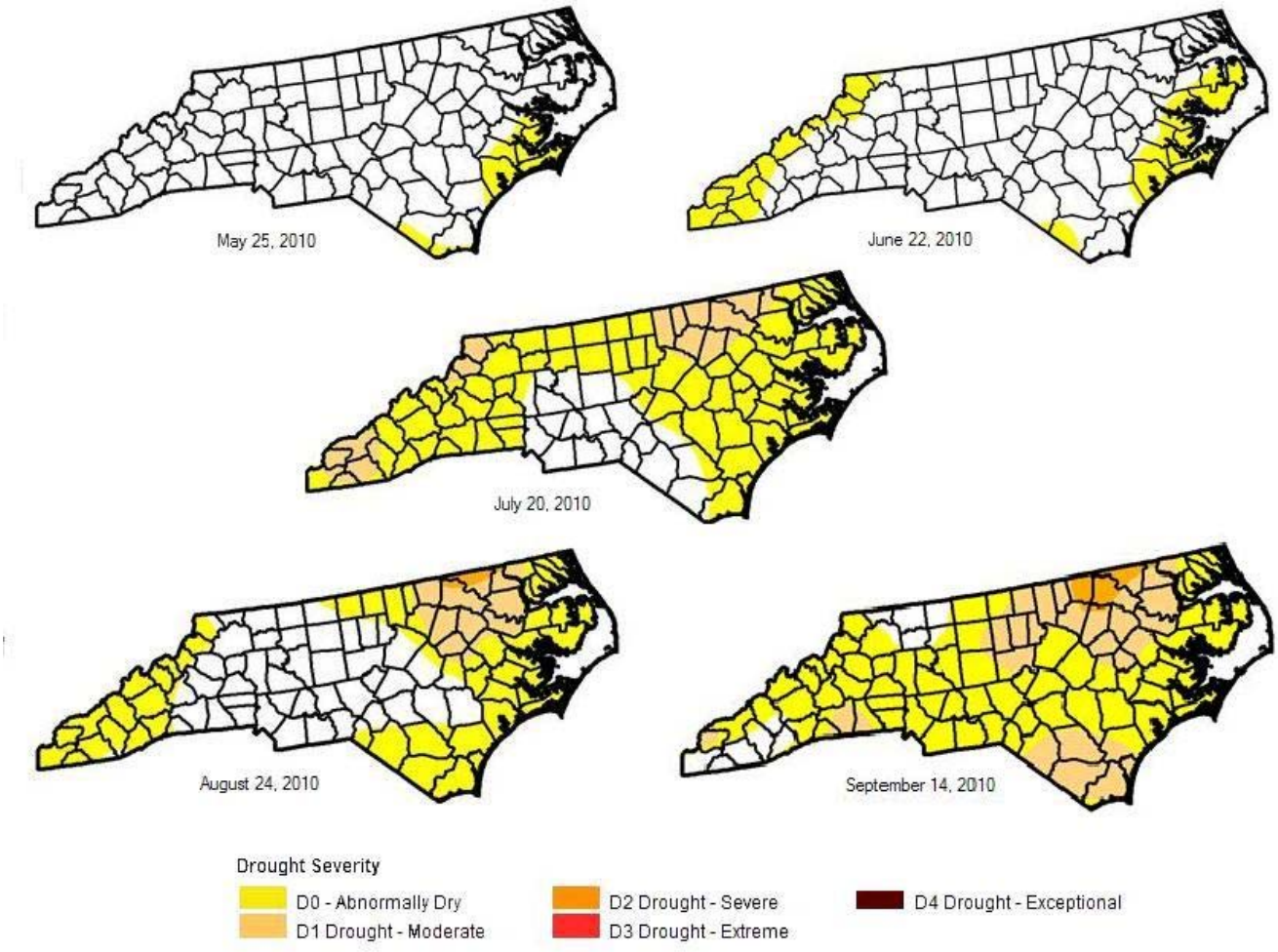

Fig 1 – Summer Drought Progression

Rainfall and Temperatures

In the short term, Hurricane Earl swept up the Atlantic seaboard, brushing coastal NC, on September 3rd. Unfortunately, significant rainfall from Earl was confined to coastal areas well east of Interstate 95, and no rain was recorded in the Triangle or Fayetteville areas. A weak cold front moved across the state on September 11th, but this front had moisture to work with, and most rain associated with the system fell on the western slopes of the Appalachians. In short, less than a quarter of an inch of rain has fallen over most of central NC thus far in September (Fig 2). Normally, we would expect around 2 inches of rain for this period.

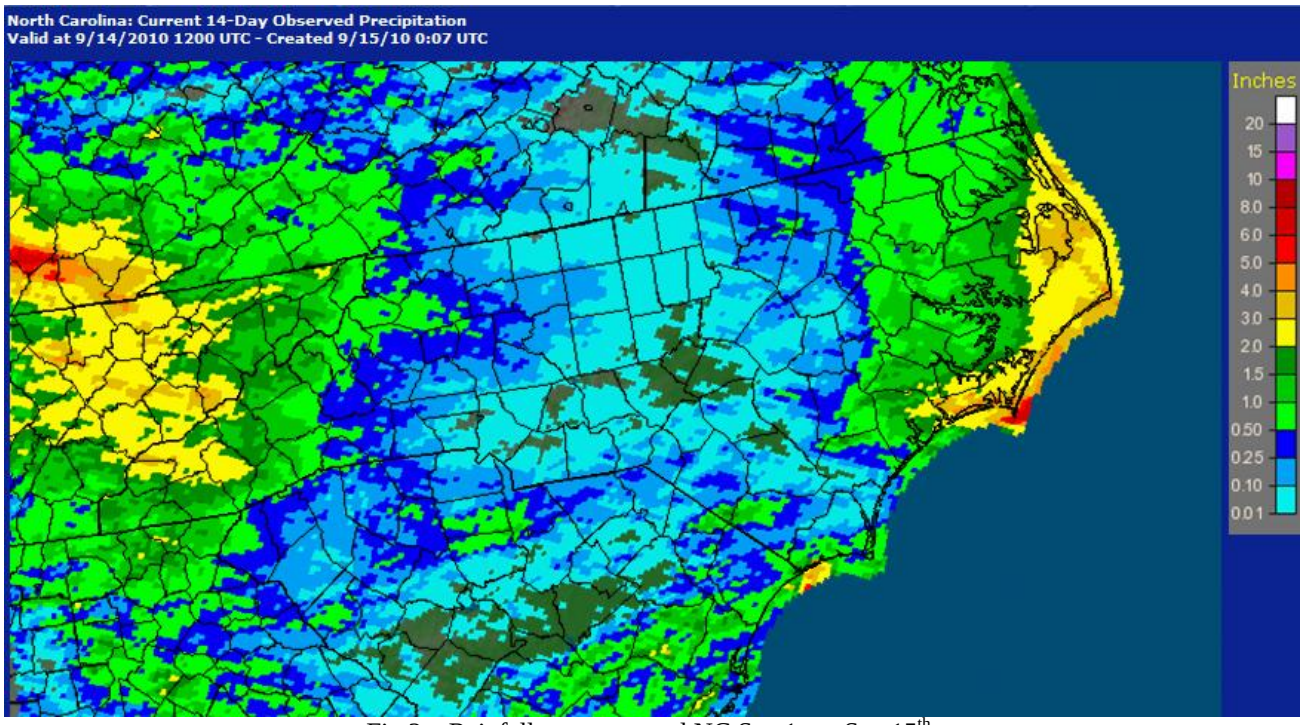

Fig 2 – Rainfall across central NC Sep 1st - Sep 15th.

The 2010 climatological summer (June...July...and August) was the warmest on record at both RDU, which averaged 81.7 degrees and broke the old record of 79.8 degrees from 2007, and GSO, which averaged 80.1 degrees and broke the old record of 78.5 degrees recorded in 2007 and 1993. June, in particular, was abnormally warm, with average temperatures of 6 to 7 degrees above normal across the entire area. Rainfall for the same period (Figs 3a and 3b) was also below normal (ranging from 50 to 90 percent of normal) over the Tar, Neuse, and Cape Fear river basins. Mainly northern portions of the piedmont and foothills (roughly from the Triad and Charlotte areas west to the mountains) were the only regions to receive near normal rainfall. Adding to these drought creating conditions, the Raleigh area has experienced a record number of days with temperatures of 90 degrees or hotter. The old record of 83 days of 90 degree temperatures was set in 2007 and as of September 15th Raleigh had tied the record with more 90 plus degree heat forecast. The frequency of high afternoon temperatures increases evaporation rates and natural water loss from reservoirs.

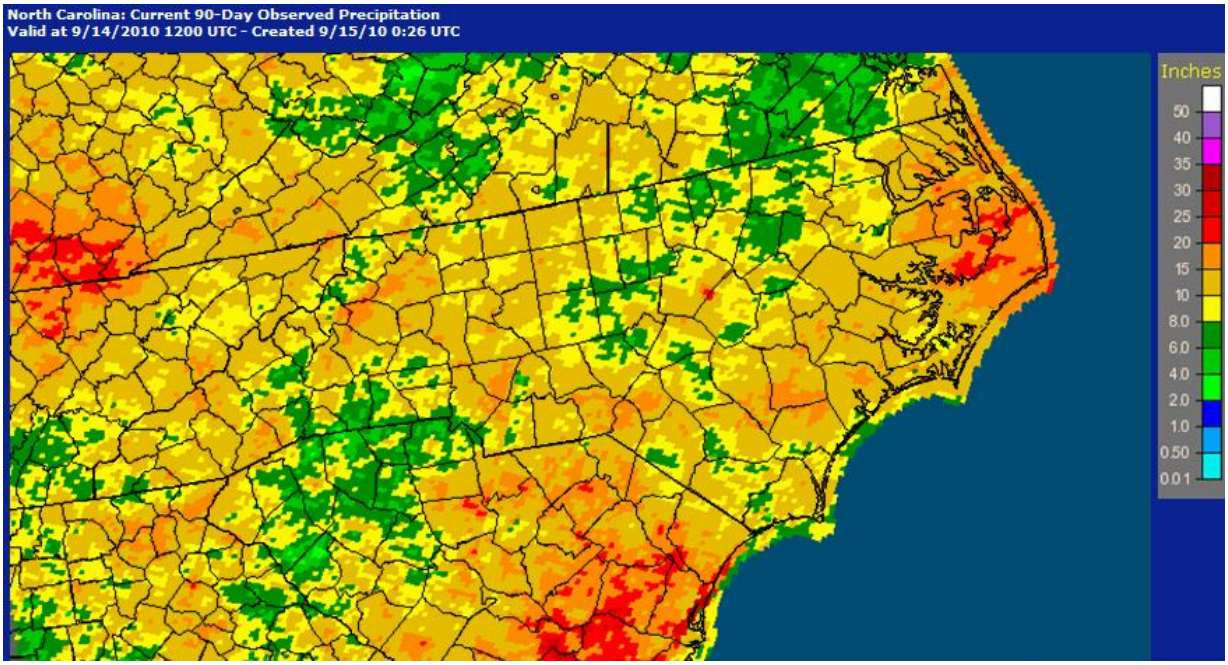

Fig 3a – Mid June through Mid September Rainfall

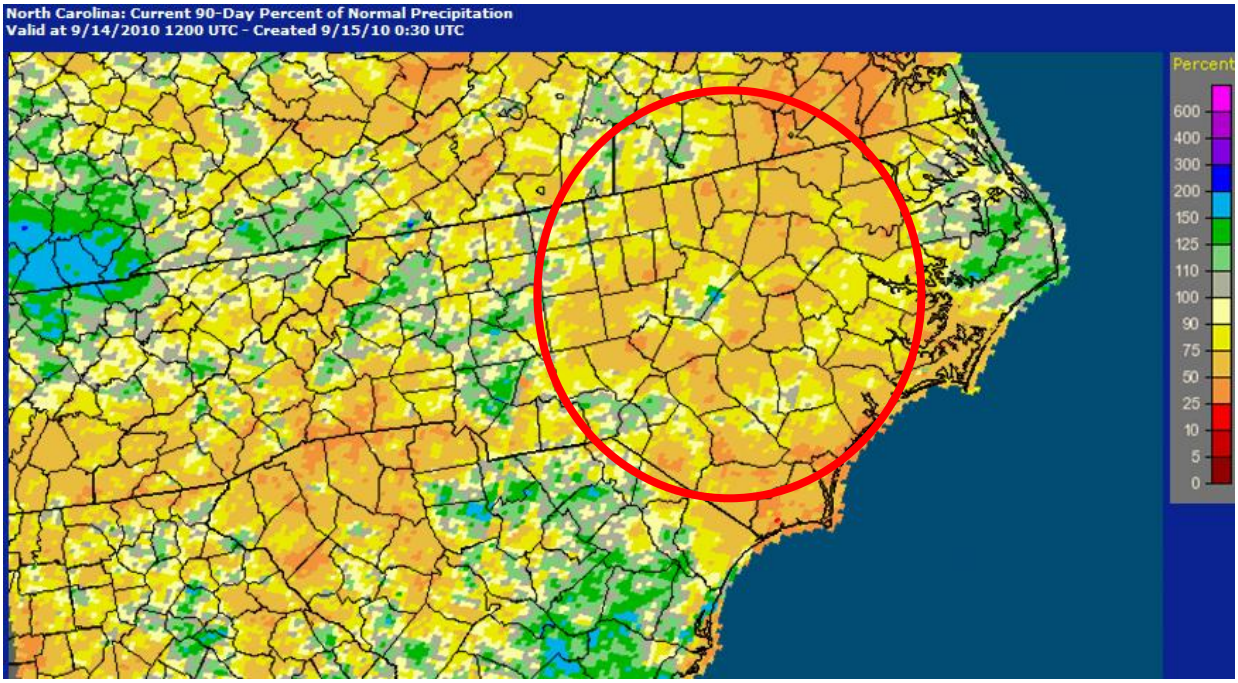

Fig 3b – Mid June through Mid September Rainfall – Percent of Normal, deficit circled

The trend of lower than normal rainfall stretches back to late winter, with February being the last month during which all of the state received above normal rainfall. The percentage of normal rainfall distribution (Figs 4a and 4b) is similar to (and largely caused by) the summer deficit above. The lack of tropical moisture this summer continues to exacerbate the dry conditions already in place.

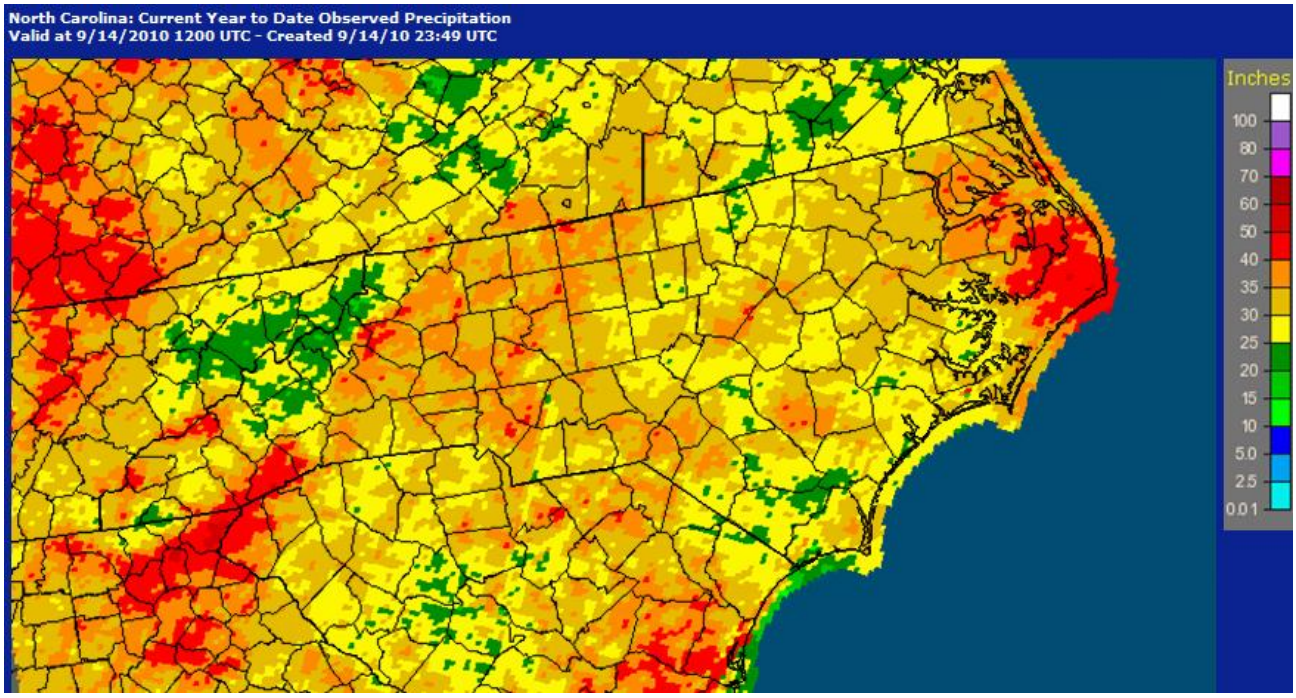

Fig 4a – Year to Date Rainfall

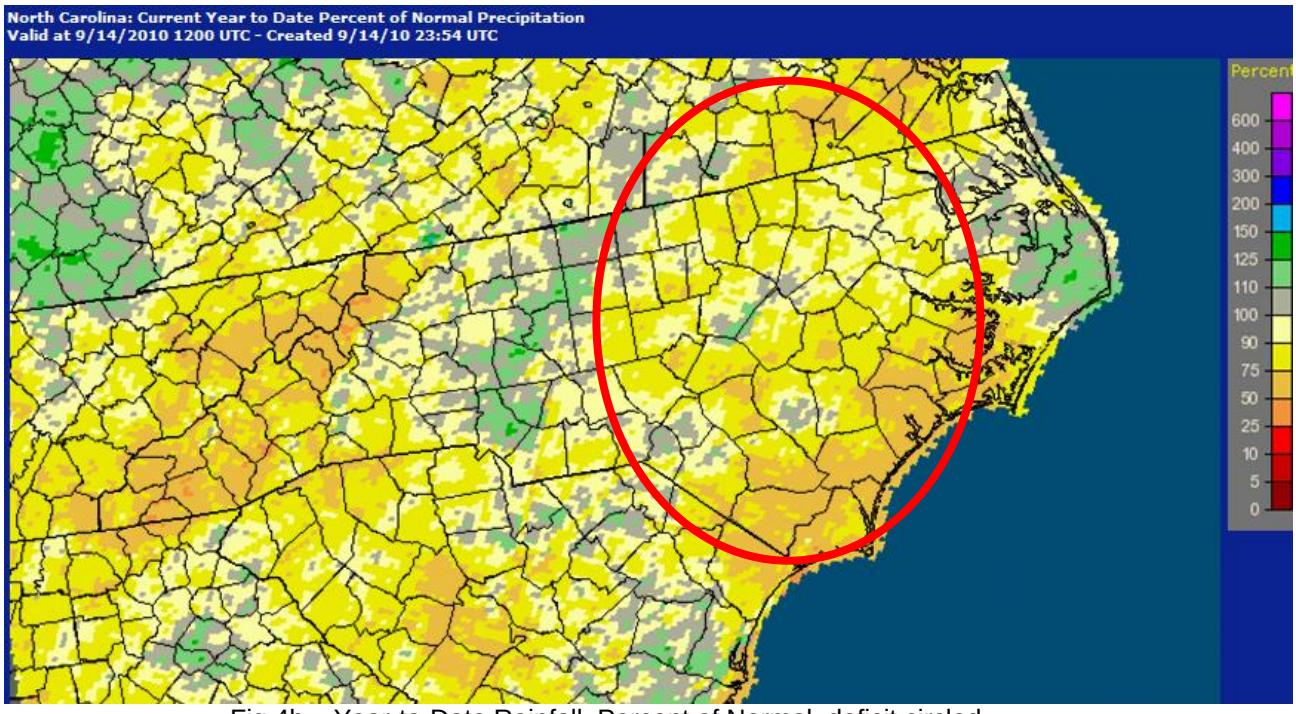

Fig 4b – Year-to-Date Rainfall, Percent of Normal, deficit circled

Streamflows and Reservoir Levels

Streams and rivers fell rapidly to well below normal levels in response to the short term rainfall deficit, and a number of gaged sites are now flowing below the 10th percentile for this time of year. The distribution of sites with these particularly low flows aligns neatly with the rainfall deficit maps above (Fig 5). In addition, nearly 70 percent of the gaged sites across the state are now below the 25th percentile for this time of year (Fig 6). Water supply reservoirs have been on a downward trend as well, and are below target levels. Inflows into these lakes has fallen off as well, and there is now more water coming out than going in, as indicated by the negative inflows (Fig 7). The quick response to rainfall deficit points towards an underlying soil moisture deficit (Fig 8), which is also evident in deteriorating crop and pastureland conditions (Fig 9).

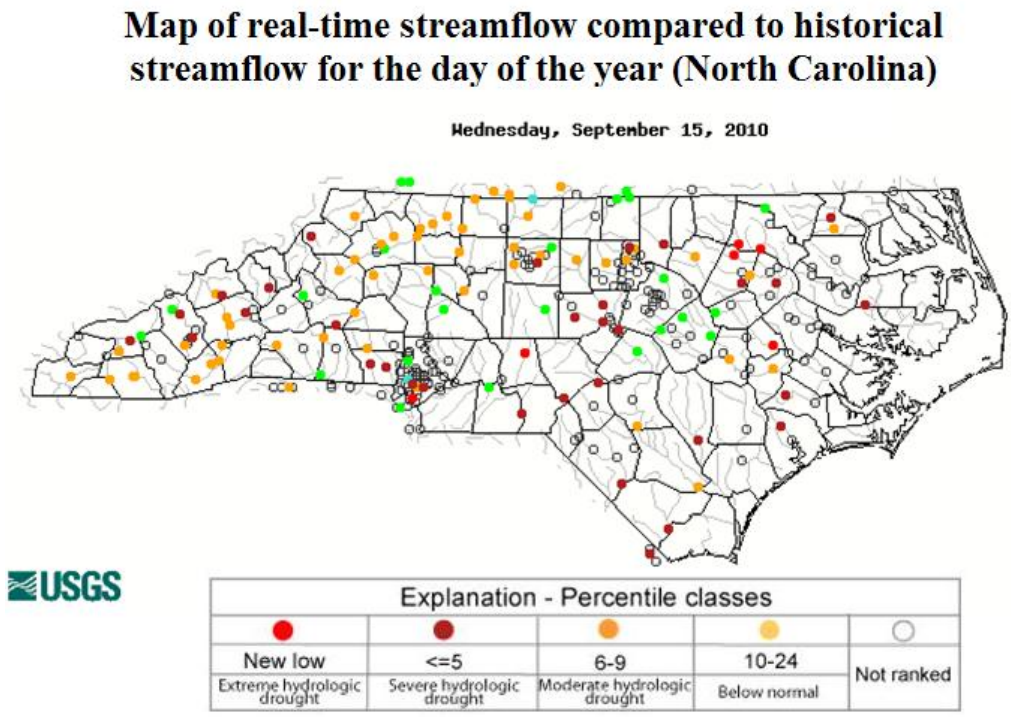

Fig 5 – Streamflow Percentiles

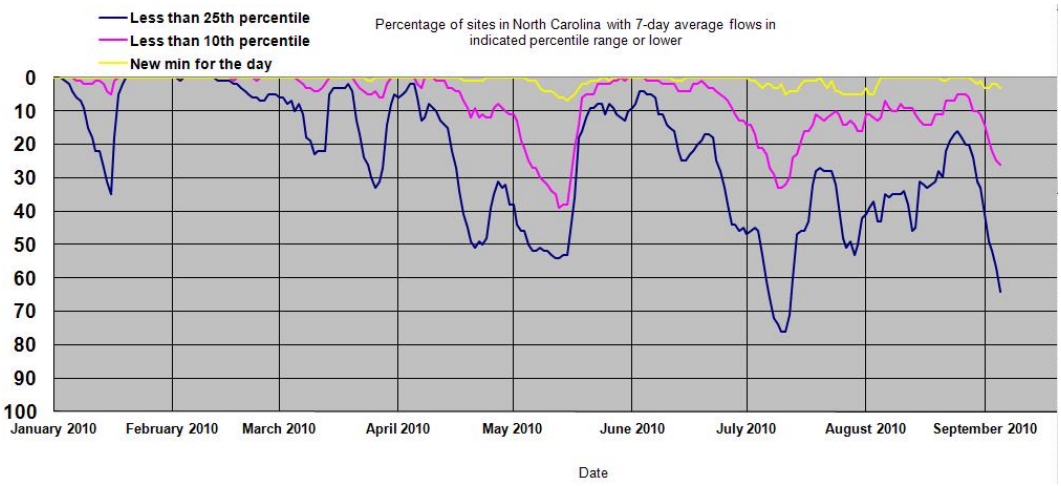

Fig 6 – Percentage of Streams at Percentile

Reservoir Project Summaries:

Reservoir	13-Sep-10 0800 EL (ft-msl)	Guide Curve (ft-msl)	Forecast 20-Sep-10 Elevation (ft-msl)	7-day Av Inflows cfs (% median)	September Av Inflows cfs (% median)	September Rainfall at Dam (inches)
Falls	249.45	251.5	249.1	-97 (NA)	-104 (NA)	0.18
Jordan	215.06	216.0	214.8	-5 (NA)	-10 (NA)	0.01
Scott	1029.27	1030.0	1029.0	244 (64%)	246 (64%)	0.68
Kerr	297.33	299.5	296.5	1191 (43%)	1235 (44%)	0.25
Philpott	968.69	972.10	968.0	51 (41%)	50 (40%)	0.04

	Current Flood Storage Percent Remaining	Current Water Quality Percent Remaining	Forecast 80% WQ Remaining	Forecast 60% WQ Remaining	Current Water Supply Percent Remaining	Forecast 80% WS Remaining	Forecast 60% WS Remaining
Falls	100	78	NA	20 Nov	78	NA	20 Nov
Jordan	100	88	20 Sept	20 Oct	98	*	*
Scott	100				98	*	*
Kerr	100						
Philpott	100						

NOTE: Water Supply and Water Quality forecasts extend through end of December 2010. "*" indicates that storage remaining does not drop below indicated thresholds by end of forecast period.

Fig 7 – Corps of Engineer Lake Levels

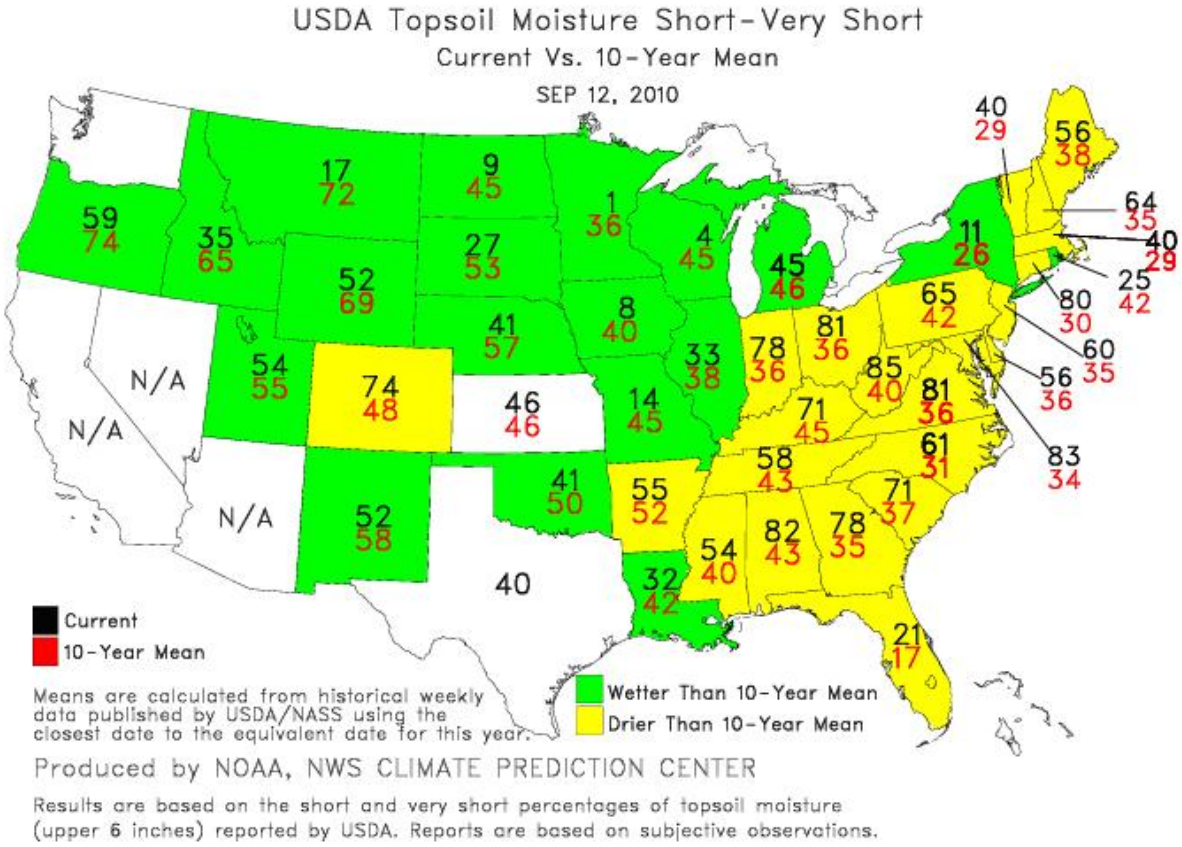

Fig 8 – Topsoil Moisture (percent of state vs. 10 year mean)

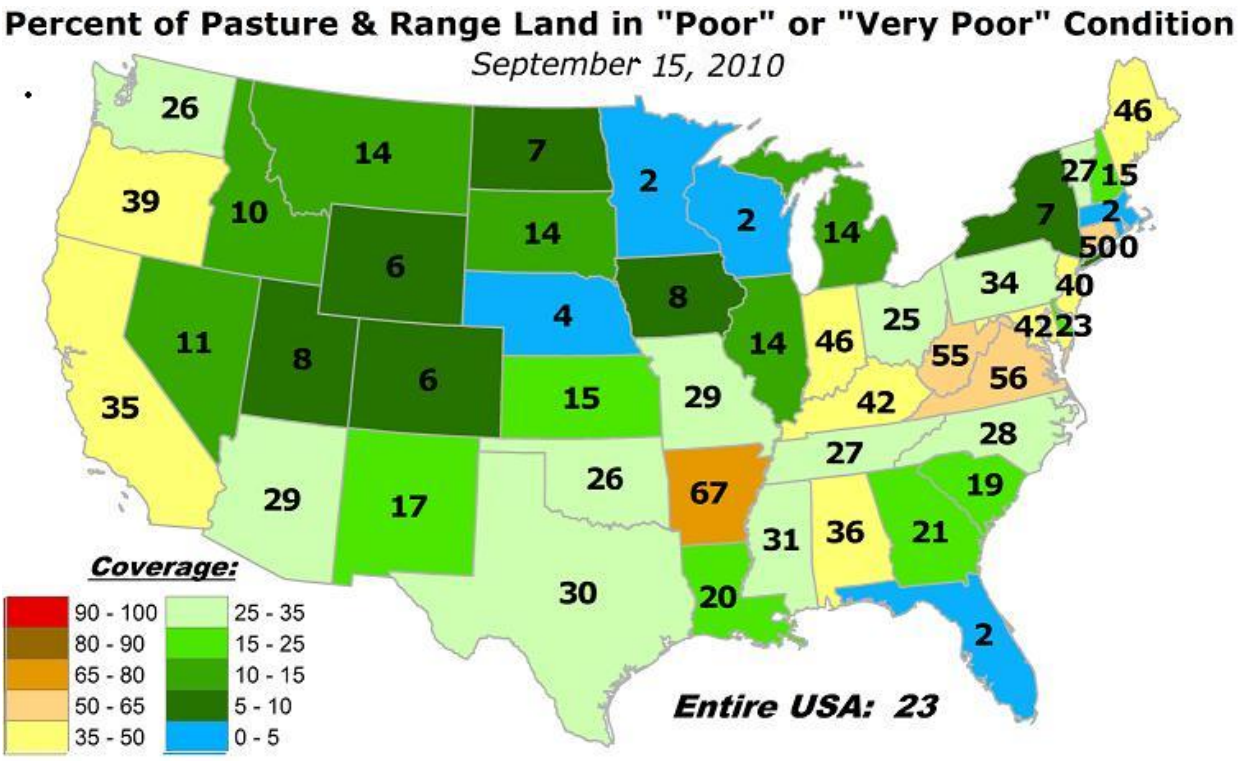

Fig 9 – Percent of Pasture in Very Poor or Poor Condition

Forecast

High pressure and dry conditions will dominate the short term weather pattern over the Tar Heel state, effectively limiting the chance for significant rain through the end of the month. In addition, there will be little relief, temperature-wise, as highs during the day are expected to be above normal through the period as well (Figs10a and 10b).

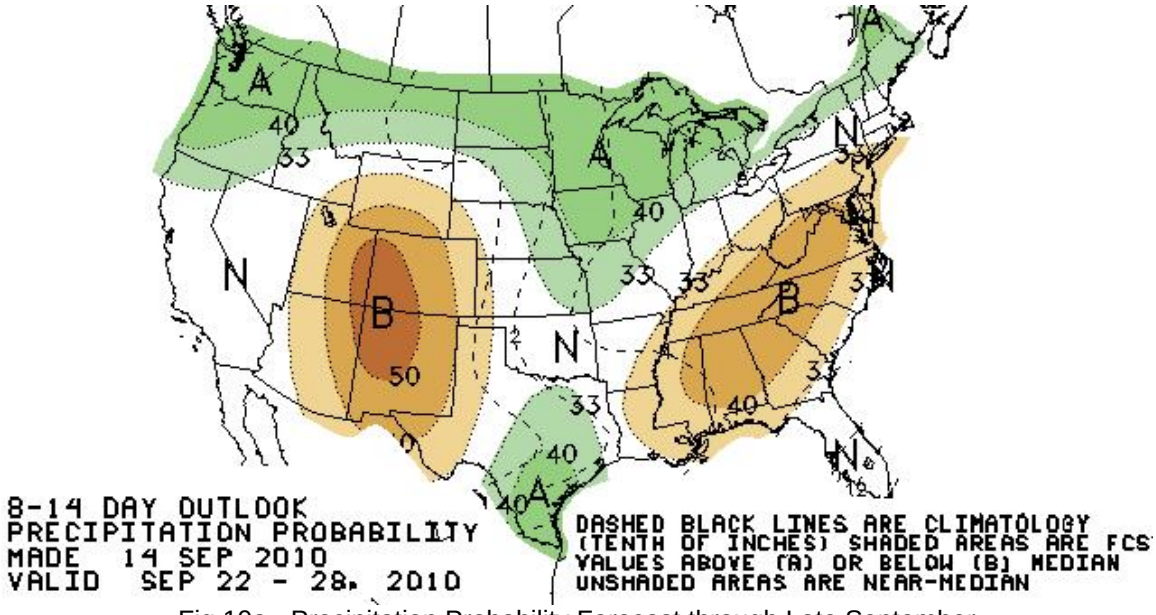

Fig 10a - Precipitation Probability Forecast through Late September

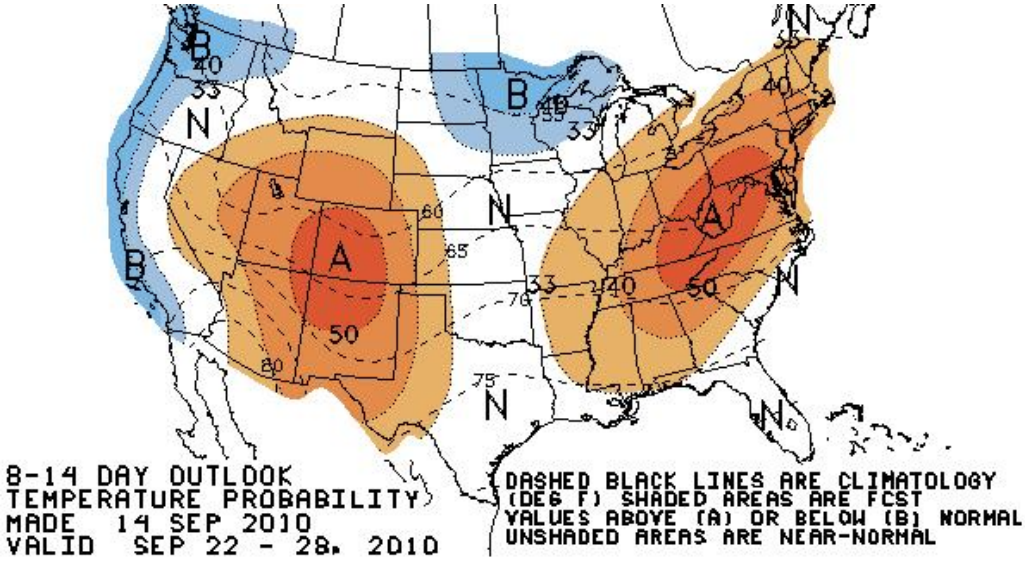

Fig 10b – Temperature Probability Forecast through Late September

In the seasonal outlook through Fall and Winter, La Nina conditions present (Fig 11) in the tropical Pacific and are forecast to persist through the Winter. Climatologically, La Nina produces drier and warmer than normal conditions across the southeastern US during the winter (Fig 12). Due to this climatological signal, the seasonal outlook is for the chance of precipitation across NC to remain less than normal as the winter approaches (Figs 13a-c).

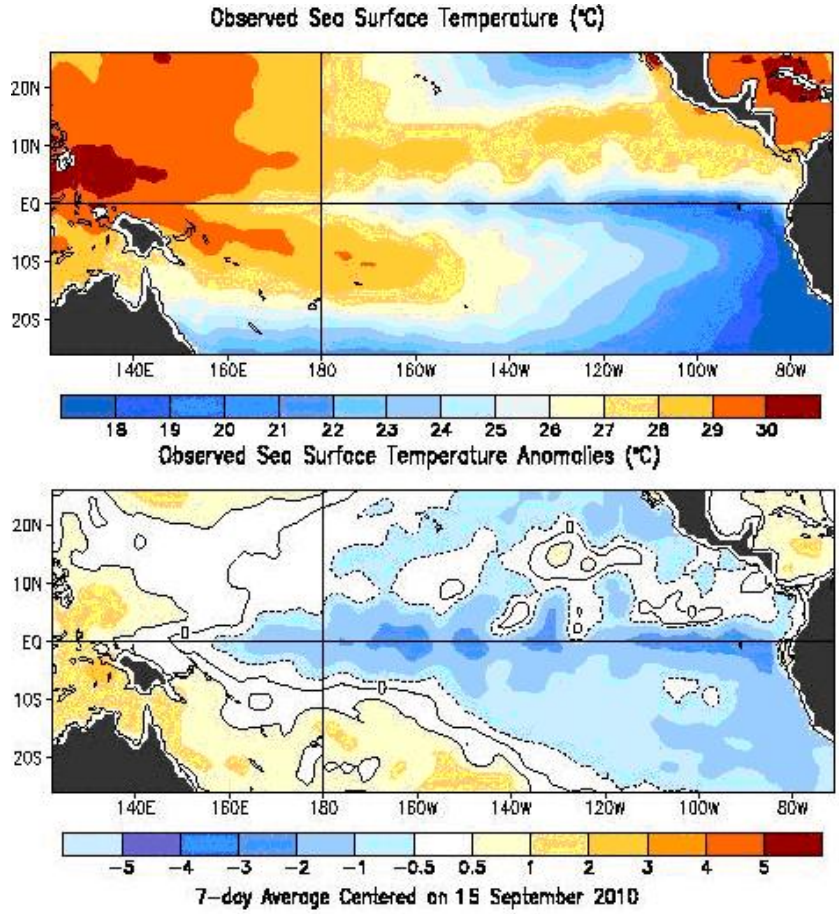

Fig 11 – Sea Surface Temperatures Cooler than Normal in the Equatorial Pacific, Indicative of La Nina Conditions.

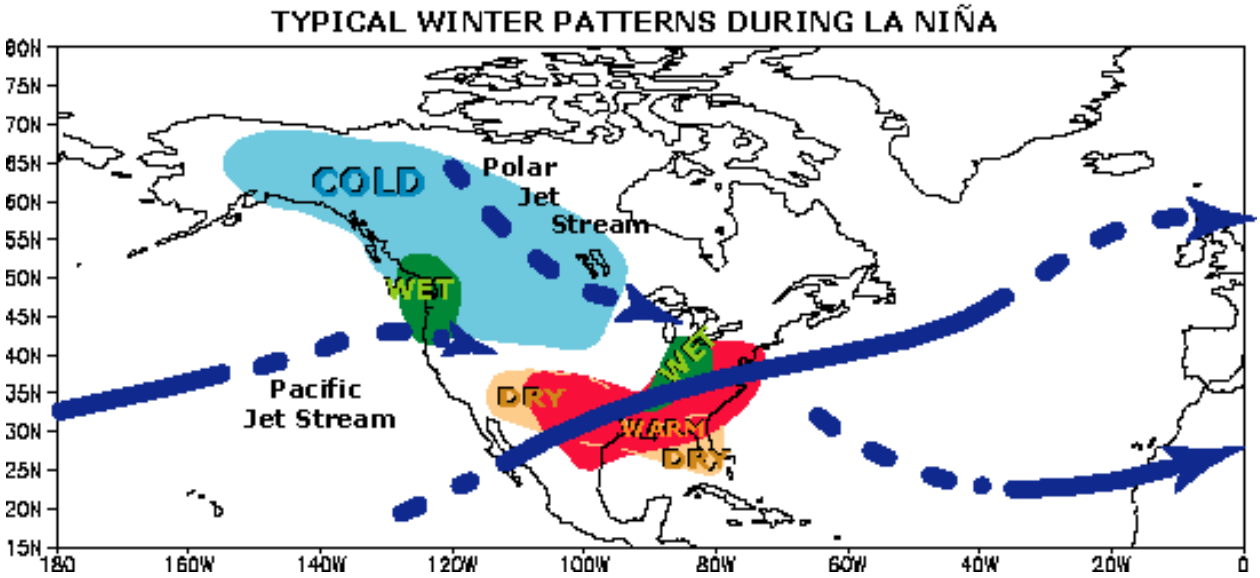

Fig 12 – Typical Winter Conditions Produced by La Nina

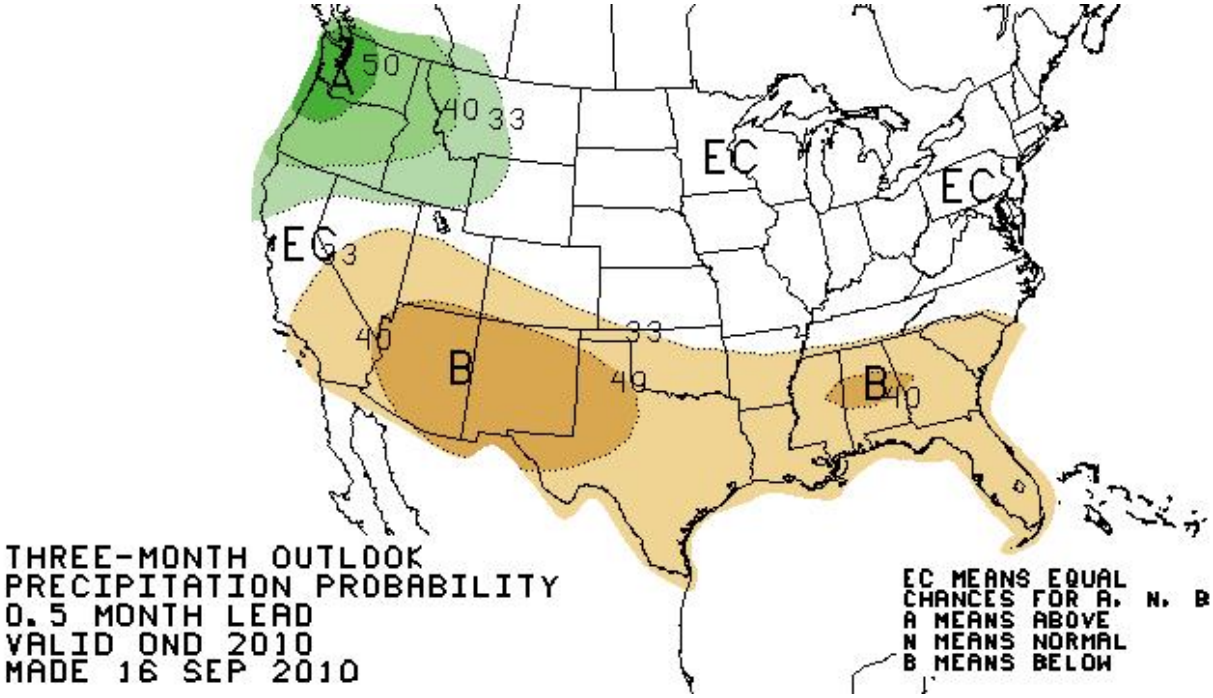

Fig 13a – Seasonal Outlook (Oct, Nov, and Dec) for Precipitation Probability

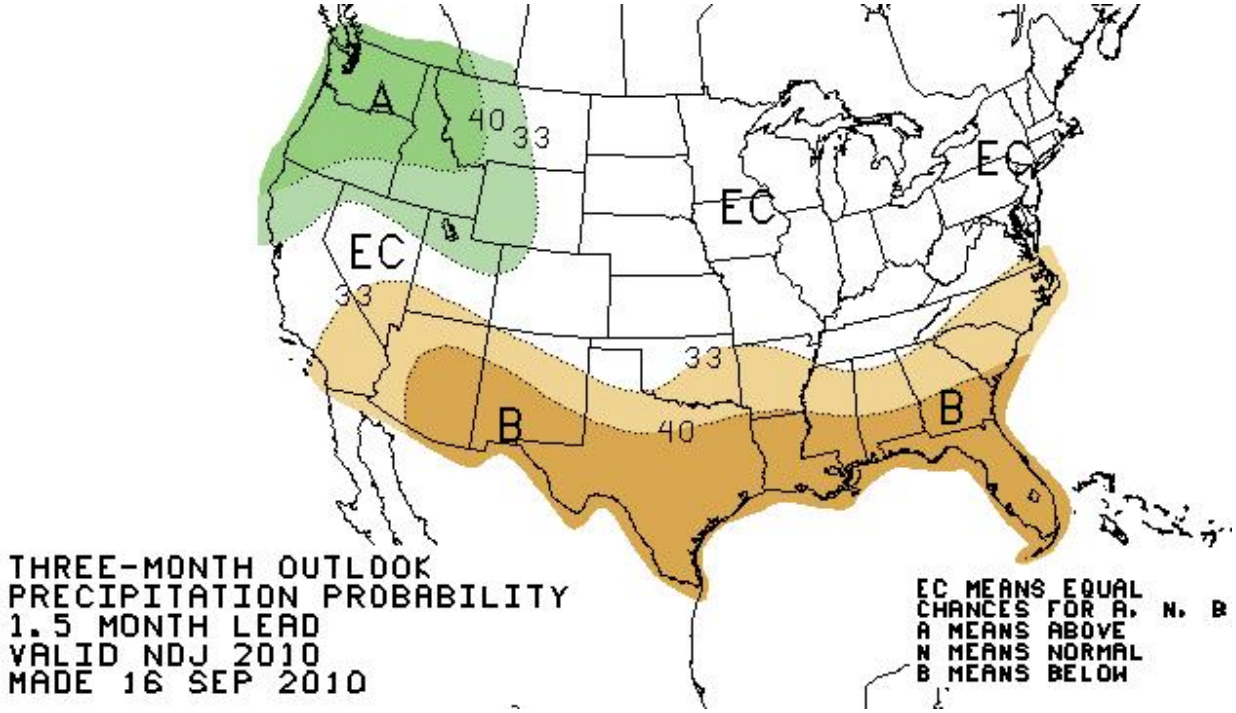

Fig 13b – Seasonal Outlook (Nov, Dec, and Jan) for Precipitation Probability

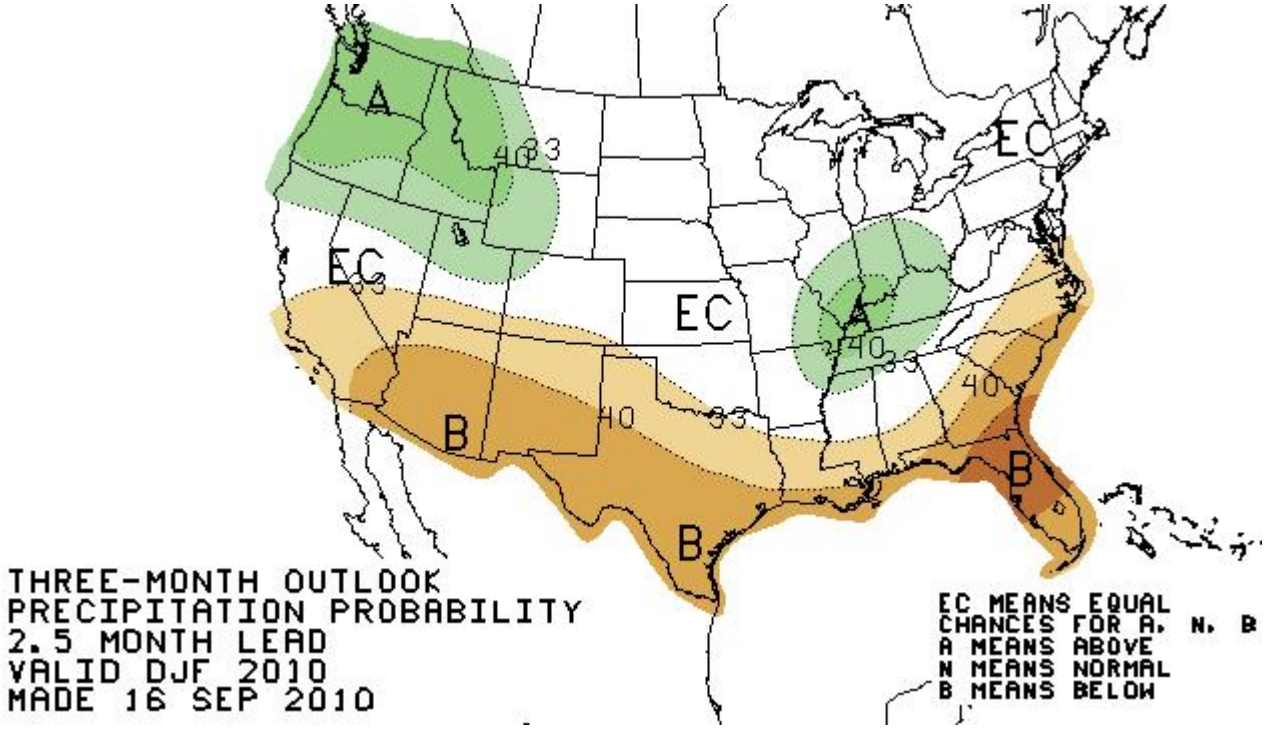

Fig 13c – Seasonal Outlook (Dec, Jan, and Feb) for Precipitation Probability

Websites

National Integrated Drought Information System (NIDIS)
http://www.drought.gov

NC Drought Monitor
http://www.ncdrought.org

NWS Drought Page
http://www.erh.noaa.gov/rah/drought/

State Climate Office of North Carolina
http://www.nc-climate.ncsu.edu/

National Weather Service Raleigh, NC
http://www.erh.noaa.gov/rah/

Climate Prediction Center
http://www.cpc.ncep.noaa.gov

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