Nebraska Ag Climate Update

August 7, 2015

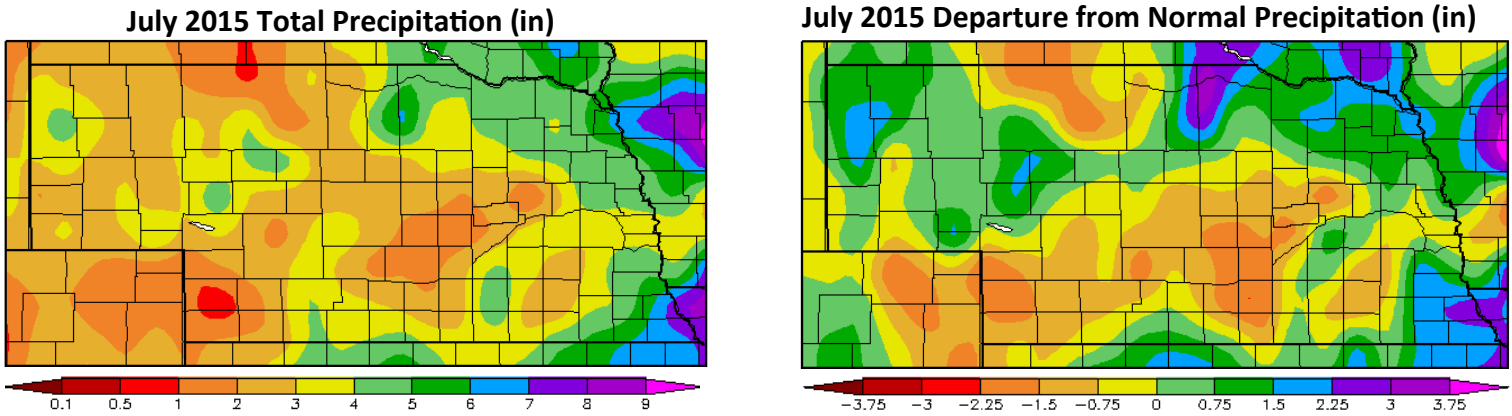

Figure 1.Total Precipitation (left) and Departure from Precipitation (right) for July 2015 for Nebraska. Maps from the High Plains Regional Climate Center—www.hprcc.unl.edu

State Summary

After a relatively cool and wet start to July, the summer heat made its entrance the middle of the month and persisted until the first day of August. The warm temperatures were accompanied by a lack of rainfall for many portions of Nebraska and resembled what we have come to expect this time of year (*Figure 1*). This "typical" July weather created some stress on crops during the reproductive period, but early rains and/or irrigation hopefully provided adequate moisture to battle through the tough conditions. Even though the last couple weeks of July were warmer than normal, July ended with average temperatures slightly below normal for most of the state. This doesn't tell the whole story because part of the month was quite hot with maximum temperatures in the upper 90s and low-to-mid 100s (*Table 1*).

In Nebraska we have become used to a lack of widespread rainfall in July. Since 1980, we have been in a decreasing trend for July precipitation at a rate of –0.22" per decade (*Figure 2*). Since 2000, the average Nebraska rainfall in July was 2.62", which is 0.43" below the 1901-2000 average. While these up-and-down cycles have occurred throughout recorded history, we're interested in their impact on Nebraska crops now. On the bright side, since 1980 (excluding 2015), June and August

Table 1. Temperature (°F) and precipitation (inches) overview for July 2015 for 13 Nebraska locations, using nearby COOP

Station	Avg. Max Temp	Max Temp	Avg. Min Temp	Min Temp	Total Precip
Ainsworth	86.7	96	62.2	53	2.89
Alliance	84.2	94	57.1	45	2.97
Ashland	84.8	95	64.3	53	6.44
Auburn	85.1	94	64.8	56	7.56
Benkelman	92.0	103	63.3	53	2.33
Callaway	86.4	101	61.1	50	3.69
Central City	85.7	96	64.1	53	2.01
Curtis	91.0	101	63.8	55	2.36
Geneva	85.6	94	66.0	52	4.87
Holdrege	86.1	99	61.7	51	3.60
Norfolk	83.3	93	62.4	48	3.97
Ogallala	88.0	99	61.5	57	2.46
Valentine	87.4	99	61.3	53	1.38

Data from NOAA Applied Climate Information System - http://drought.rcc-

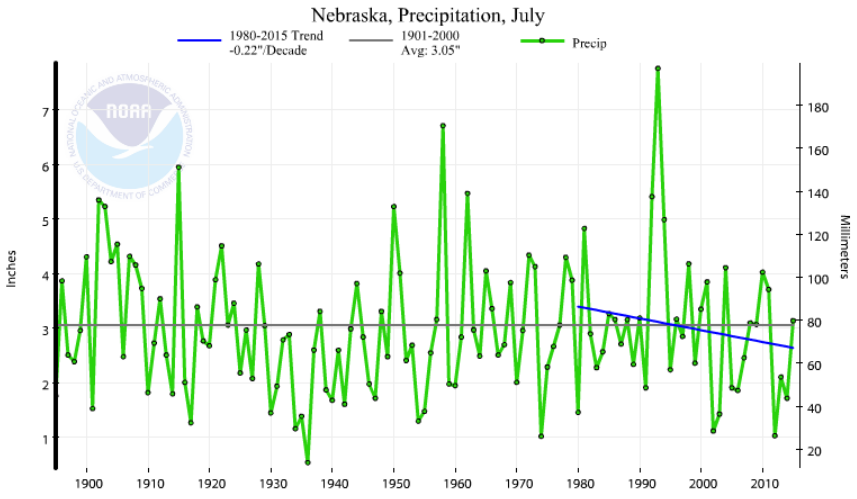

Figure 2. Total Precipitation for Nebraska for July from 1895-2015. Blue line represents the trend from 1980-2015 and the gray line is the 1901-2000 average. Map from the National Climate Data Center—www.ncdc.noaa.gov

have had an increasing trend with +0.30" and +0.07" per decade, respectively.

The most recent VegDri (*Figure 3*) shows vegetation conditions in the "Pre-Drought" stage for a large portion of central and northeast Nebraska. There are also locations in southeast and western Nebraska which have continued to stay in the "Unusually Moist" and "Very Moist" category. This map gives a good "snapshot" of the impacts that the warm and dry conditions have had on crops in Nebraska. The August 4, 2015 Drought Monitor (*Figure 4*) is also showing short-term drought conditions and their impact on crops. The recent rains have kept conditions from reaching a "drought" category, keeping portions of the state in the "Abnormally Dry" category.

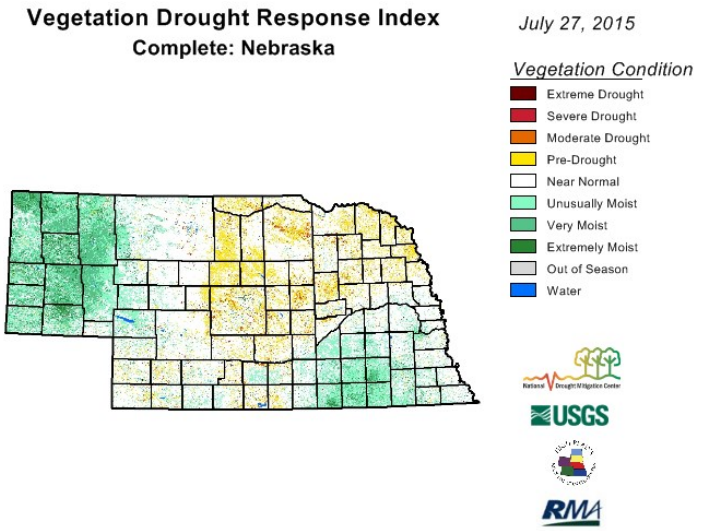

Figure 3. Vegetation Drought Response Index (VegDRI) is a depiction of vegetation (crops and rangeland) stress based on remote sensing data. Map is from National Drought Mitigation Center—http://drought.unl.edu/

Many of the lakes and streamflows in Nebraska are still benefiting from the heavy rains this summer and spring (*Figure 5*). As of August 3, the elevation of Lake McConaughy was 23 feet higher and the inflow was over 400 cfs (cubic feet per second) more than this time a year ago. The streamflows on the Platte River at Overton, Kearney, and Grand Island were around 1731, 1010, and 1418 cfs higher than a year ago, respectively. This allows reservoirs to increase their water storage and reduce outflows necessary to maintain adequate streamflow levels.

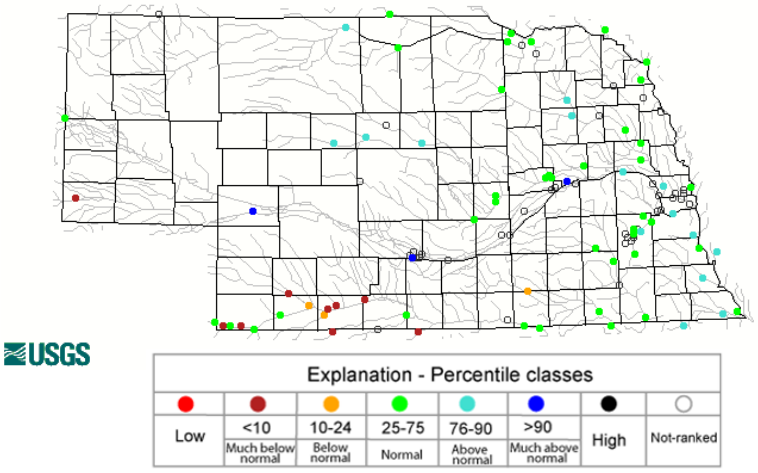

Figure 4. Map of July 2015 Monthly Average Streamflow compared to historical streamflow for select rivers in Nebraska. Map from the United States Geological Survey—www.usgs.gov

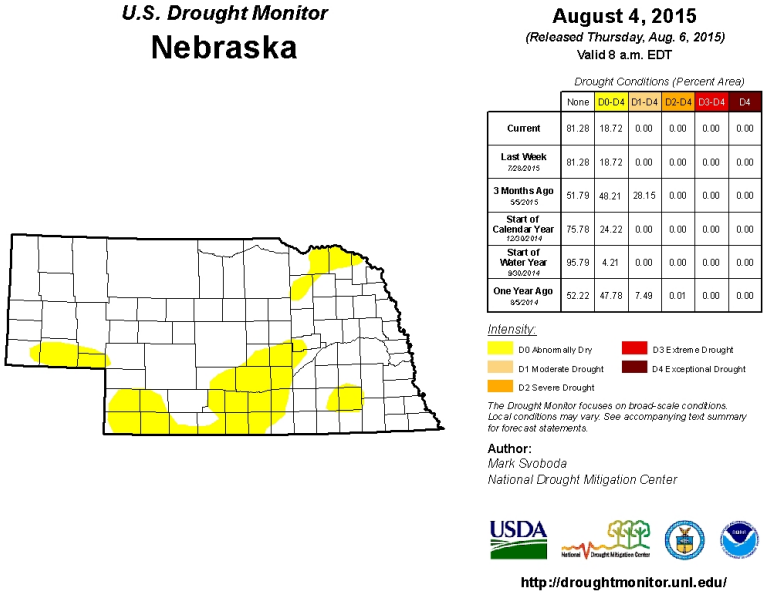

Figure 5. U.S. Drought Monitor on August 4, 2015 for Nebraska. Map from the National Drought Mitigation Center—http://droughtmonitor.unl.edu/

Looking Forward

Temperatures have been fairly cool for the last few days and many areas of the state have received some precipitation. Nebraska has been under the crest of a ridge located over the Southern Plains for the past few days, which has brought in numerous opportunities for precipitation and kept the very warm temperatures to our south. This pattern looks to continue through the weekend, but the ridge will amplify and build north and west of our area. We will be on the downslope side of this ridge, so we don't expect temperatures to stray too far from normal, but may warm up a bit. Areas to our north and west (Wyoming and Montana) will see much above normal temperatures, but that isn't expected to strongly impact Nebraska. The Nebraska Panhandle has a better chance than eastern Nebraska of seeing very warm temperatures. The biggest impact to Nebraska will be the dry air that will move in from the north. Chances of precipitation are small next week for much of the Plains, due to this

large ridge.

Looking further out to next weekend and beyond, the 6-10 day and 8-14 outlooks for August 12-20 from the Climate Prediction Center have increased odds for above normal temperatures and below normal precipitation for much of Nebraska. The ridge building in from the south, is expected to continue to dominate our weather for the next couple weeks. The one-month and three-month outlooks (*Figure 6*) from the CPC are still showing increased odds for below normal temperatures and above normal precipitation through October. In the short-term we expect to see a drying pattern, but the long-term outlooks support the overall pattern to be wetter than normal.

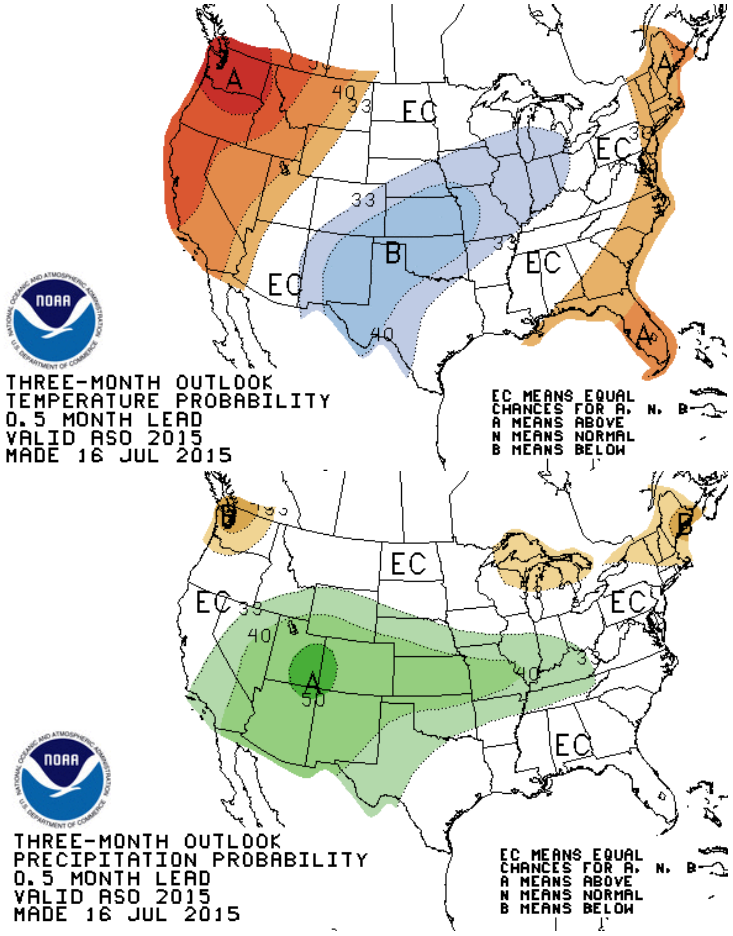

Figure 6. Temperature (top) and Precipitation (bottom) Outlooks for August through October from the Climate Prediction Center. Source: Climate Prediction Center—www.cpc.ncep.noaa.gov

El Niño Impact

A lot of attention given has been given to the El Niño and the high likelihood of it continuing through early next spring. There is also potential that this El Niño will be considered a "strong" El Niño. This means that ocean temperatures in the eastern Pacific Ocean will be much above normal and persist for an extended period of time (*Figure 7*). We can still use the general pattern from a typical El Niño to help with prediction, but the strength of this El Niño may slightly alter that forecast.

A typical El Niño alters the jet stream pattern over the U.S., which enhances storm tracks and moves the polar jet stream further north during winter. This leads to warmer temperatures in the northern U.S. and cooler and wetter conditions in the southern U.S, due to an enhanced storm pattern. The million dollar question is if this "strong" El Niño will push the storm tracks further north into our region or will it do something else? No two El Niños are alike.

As it relates to agriculture in Nebraska, El Niño can provide some useful forecasting information. One impact is that above trend-line corn yields are usually associated with El Niño conditions. This is due to cooler summer temperatures, which are positive for corn production. On the down-side, we typically see cooler fall temperatures during an El Niño year, which may hinder crop maturity and dry-down time. After a slow start for some regions this spring, a cool and potentially wet fall will not be a positive. Another impact is the potential for winter-kill on winter wheat. During an El Niño winter, the northern U.S. is usually warmer and drier than normal. This leads to exposed winter wheat with the lack of snowfall and numerous breaks in dormancy with warmer temperatures. It will still get cold, but those warm days may increase the vulnerability of winter wheat.

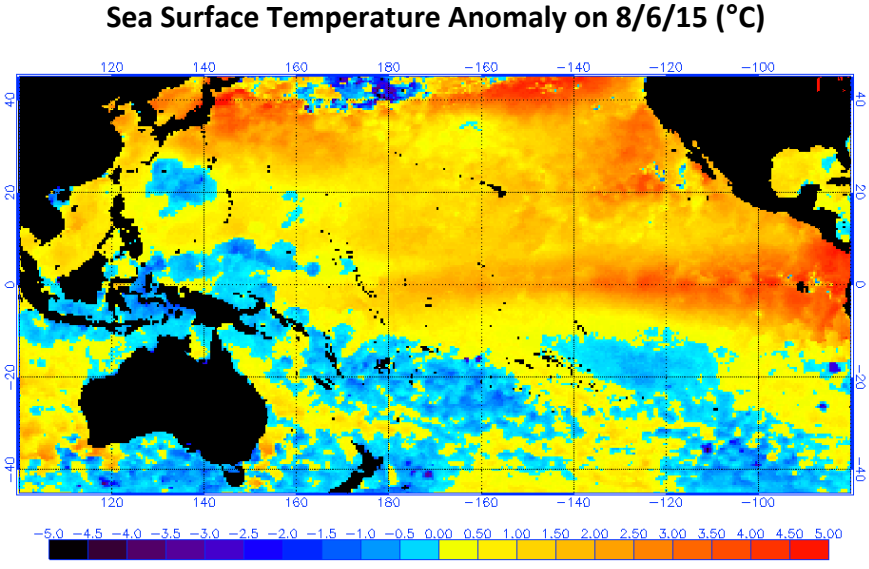

Figure 7. Sea surface temperature anomaly from normal for the Pacific Ocean as of August 6, 2015. Map from NOAA Office of Satellite and Product Operations—www.ospo.noaa.gov

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