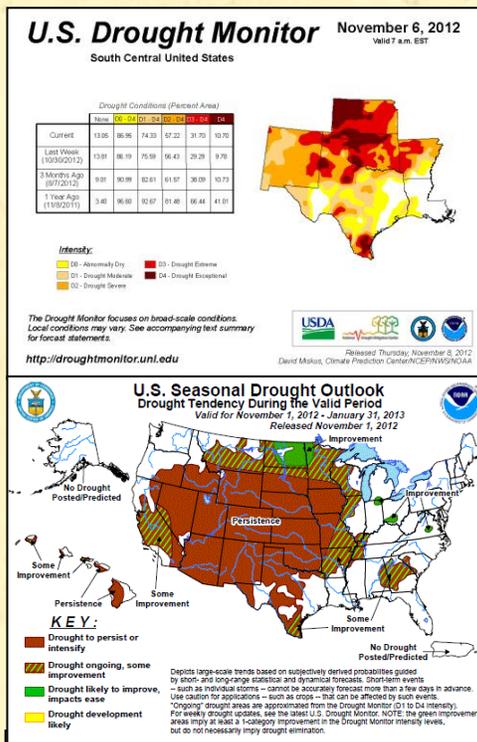


MANAGING DROUGHT

IN THE SOUTHERN PLAINS

Webinar Topic: The Chameleon El Niño of 2012/2013
November 8, 2012



Regional Drought Summary

Brian Fuchs, National Drought Mitigation Center

During the summer of 2012, a large footprint of drought developed over the mid-section of the country, peaking at 66% of the contiguous U.S. in some level of drought during the 3rd week of September. Since then, conditions have improved in the eastern corn belt but spread across the Northern Plains, with extreme and exceptional drought entrenched across Nebraska and North Dakota. There has been little, if any, improvement in Kansas and Oklahoma during the fall, threatening winter wheat development.

In the Southern Plains, this drought is part of a multi-year event, now progressing into Year 3. Continuing short-term conditions add to those longer-term depletions of reserve surface, ground and soil water. Soil moisture is depleted down to its deepest depths nearly statewide in Nebraska, Oklahoma and New Mexico with large deficits elsewhere. Stream flows in Nebraska through central Kansas, Oklahoma, Texas and westward show hydrologic problems related to this multi-year drought. Rainfall has been minimal in the last 30 days – a time when many parts of the region see a secondary peak in rainfall. Large long-term deficits remain in the ARK-LA-TEX area, along the Texas Gulf Coast, and in the Oklahoma and Texas Panhandles, with a surplus in east Texas and Louisiana.

The outlook shows a fairly vigorous storm system moving through this weekend, but not likely to be much of a rain-maker until it gets east of the drought region. Beyond this system, forecasts show a dry pattern returning with some moderation of temperature. As the prospects for El Niño-related winter precipitation continues to fade, areas that had previously been forecasted to be above-normal precipitation now show Equal Chances (EC), meaning there is not clear direction on rainfall in either direction. The Drought Outlook has been commensurately changed, with areas that had been favored for improvement, particularly in the corn belt, now looking much drier. As we head into the winter, which is normally a dry season in the Southern Plains, the prospects for significant changes to this drought pattern are minimal.

Resources

U.S. Drought Portal

<http://www.drought.gov>

National Drought Mitigation Center

<http://drought.unl.edu>

Drought Impact Reporter

<http://droughtreporter.unl.edu>

State Climatologists

<http://www.stateclimate.org>

Southern Climate Impacts Planning Program (SCIPP)

<http://www.southernclimate.org>

Climate Assessment for the Southwest (CLIMAS)

<http://www.climas.arizona.edu>

Southern Plains Portal

http://www.drought.gov/portal/serve.r.pt/community/southern_plains

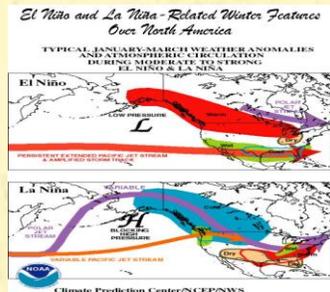
We need your help. Nobody knows drought impacts like the people who live there. Your reports to the [Drought Impact Reporter](http://droughtreporter.unl.edu) or your State Climatologist helps the [U.S. Drought Monitor](http://www.drought.gov) do a better assessment of conditions, which in turn helps federal agencies target assistance to vulnerable areas. Reports could be simply things you notice or it could be specific losses, such as crops withering, selling cattle, or wildlife changes.

The Chameleon El Niño of 2012/2013

There exists a strong relationship between sea-surface temperatures (SSTs) in the Central Pacific Ocean and precipitation in the Southern Plains. Therefore, we watch the development of El Niño very attentively. El Niño is a periodic warming of about 1-3 degrees Celsius that typically occurs every few years. Its counterpart, La Niña is a periodic cooling of about 1-2 degrees Celsius. Together these are called ENSO – the El Niño Southern Oscillation. There is a strong relationship between fall ENSO status and October-June precipitation in the Southern Plains.

Presenters:

Victor Murphy – NWS Southern Region
Climate Services Program Manager
Klaus Wolter – University of Colorado,
Research Associate, CIRES



During El Niño, a strong jet stream typically develops across the Southern U.S., bringing rich tropical moisture into the area. During La Niña the jet stream typically takes a more northwest-to-southeast track across the states, bringing drier air into the region. Because of these differences, it makes a big difference on the prospects for recharging our soils before next summer rolls around. El Niño tends to bring above-normal rainfall to the region, La Niña tends to bring drought.

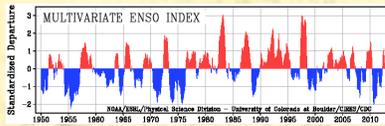
Sea-surface temperatures during July through September actually ran above normal, signaling a developing El Niño event. However since then, it appears to have stalled with temperatures

unchanged in the central Pacific Ocean and cooling in the eastern portion near the South American coast. The good news is this warming makes it unlikely that there will be a third consecutive year of La Niña. The middle ground – neutral conditions – makes the whole system less predictable and increases uncertainty for decision-makers.

About 3 months ago, oceanic temperatures and associated atmospheric patterns were lining up indicating a developing El Niño. However, the tropical Pacific wind anomalies are underwhelming and sea-surface temperatures have almost reversed themselves since then. The remaining warm anomalies near the dateline could help to reignite an El Niño event if the right wind pattern comes along, like it did in 2004/2005. The last time we experienced an El Niño that peaked early and dissipated was in 1953.



The Multivariate ENSO Index (MEI; <http://www.esrl.noaa.gov/psd/enso/mei>) shows a wide range of possibilities with a lot of uncertainty. This is coming off a period where the MEI indicated the recent 2010-2011 La Niña event was the strongest since 1975, playing a major role in development of the regional drought. Neutral conditions have been pretty rare, especially following a double-dip La Niña event like the winters of 2010-2011 and 2011-2012. This winter is the first neutral winter since 2003-04 so we need to look at other factors to improve our abilities to predict the outcome.



A key factor in our prospects for drought in the Southern Plains is the Pacific Decadal Oscillation (PDO). During this ongoing drought event, the PDO reached an extreme value cold anomaly not seen since 1933. Given this and the long time it takes for these patterns to change it is a pretty safe bet that it will remain in its current cold phase through the winter. When a cold PDO phase matches up with a neutral ENSO phase, it tends to be dry in the Southern Plains, but not as strong of a relationship as a cold PDO with La Niña.

The North Atlantic Oscillation (NAO) changes phase much more quickly than either PDO or ENSO and is not predictable beyond 1-2 weeks. Combined with a neutral ENSO, when the NAO is in a warm phase it tends toward slightly wetter in the Southern Plains, while in the cold phase it tends toward slightly drier. The increase in snow cover in Europe and Asia in October 2012 tilts the odds toward a cold phase, however this can change quickly and several times over the course of a season.

Most troubling is an alignment of a cold PDO with a warm North Atlantic Multidecadal Oscillation (AMO) that produces pervasive drought conditions in the Continental United States. During these scenarios, as was common in the 1950s, late fall precipitation is suppressed. In late winter, it is less tilted toward dry, especially in eastern Oklahoma and Texas, but in the springtime it tends to go back to dry again. Now entering the third year of drought in much of the region, that is not good news.

And if you are looking for hope that the forecasts may be wrong, well, when the MEI has forecasted dry conditions, it has verified every time. The neutral ENSO phase opens the door for these other circulation features to exert their influences. With PDO likely to stay cold and AMO warm, a lot will hinge on the status of the NAO, which is the least predictable part of this whole process!

