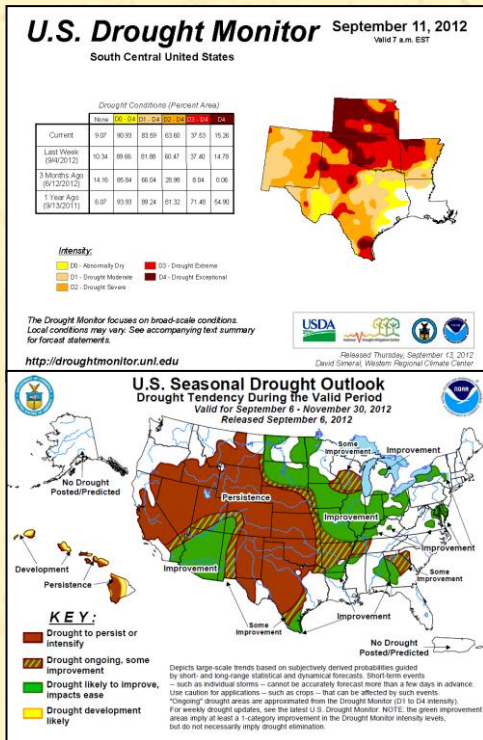


MANAGING DROUGHT

IN THE SOUTHERN PLAINS

Webinar Topic: Drought Impacts on Public Health
September 13, 2012



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

Regional Drought Summary

Brian Fuchs, National Drought Mitigation Center

By August development of extreme to exceptional drought conditions was apparent across the Plains and Midwest, while parts of West Texas and New Mexico never really recovered. Meanwhile, most of Texas has been able to withstand the drought this year, except for some portions like far South Texas where extreme drought has crept back in recently. Drought development was aided by extremely hot temperatures, much like was the case last year in the Southern Plains.

Currently, 64% of the country is in drought – the greatest proportion during any summer since the Drought Monitor began in 2000. While most of Texas has not experienced the extremes of last year, by the end of summer, Oklahoma saw a return to conditions similar to last year. To our east, Hurricane Isaac brought relief along the Mississippi River Valley, but its beneficial rains did not extend much into Oklahoma and Kansas where farmers are getting concerned about the potential for a winter wheat crop this coming year. Soil moisture is depleted well down into the soil column which will affect runoff from the Rocky Mountains next spring. Many pastures are burnt up, leaving challenges for feeding cattle through the fall and winter.

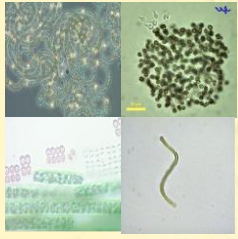
For the past year, precipitation deficits of 8-12 inches or more remaining South Texas, undermining short-term recent rain events and limiting recovery. Monsoonal moisture in the Southwestern U.S. has not made it into New Mexico. The outlook for the upcoming week calls for some easing of drought with more than an inch of rain in the forecast in Oklahoma and Texas and temperatures running more than 5 degrees below normal as a more active weather pattern moves into the region.

Beyond the upcoming week, it looks to be cool for the eastern half of the country while returning to near normal across Texas. The central plains are expected to be dry, with the fringe of this dry area extending down into New Mexico and Oklahoma. Beyond the next few weeks, September is expected to be warm in the Northern Plains while the Southern Plains are less certain. Precipitation is unknown except for a wet signal along the Gulf Coast.

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.

Drought Impacts on Public Health

Blue-Green Algae (BGA) has become a common occurrence related to drought. Warm, stagnant water becomes a breeding ground for algae, causing enormous algae blooms. These algae produce toxins which cause health problems, posing a threat to drinking water supplies, recreational activities, pets and livestock.



BGA gets energy through photosynthesis, just like plants, absorbing the sun's energy and using it to grow. It is present in almost all surface waters in small numbers but can reproduce rapidly in certain conditions. Blooms look either like spilled paint along the surface or like pea soup where it is distributed through a deeper water column. Not all blooms produce toxins and some produce several types of toxins. Most common are dermal toxins causing skin irritation like poison ivy rashes or gastrointestinal and respiratory problems if ingested. More severe are neurotoxins which affect the central nervous system and hepatotoxins which affect liver function. Toxins can produce rashes, flu-like symptoms, neurological disorders and abnormal liver function.

BGA has become more common in Oklahoma during the last two summers. Blooms occur when there is excessive nitrogen and phosphorus from fertilizer and urban runoff – a food source for the algae – coupled with hot, dry, sunny, and windless weather conditions and low lake levels with stagnant water. Prolonged dry periods allow suspended clay to settle which increases light penetration and warms the water, allowing blooms to continue into late Fall and early Spring.

2011 was the first time in which widespread blooms were found in Oklahoma lakes. Eleven lakes were affected; in 2012 that number rose to 24. The first and most prominent bloom in 2011 occurred at Grand Lake, a popular summertime tourist destination, near the 4th of July holidays. Flooding rains in the spring washed nutrients into the lake, followed by hot, dry conditions as the drought settled in. Wind pushed the BGA into leeward coves where it then expanded into deeper waters, up to 90 feet deep. The most serious case in 2012 occurred at Clear Creek Lake near Duncan, in southwestern Oklahoma. The lake was 9 feet below normal due to the extended drought. There was no visual sign of a bloom, but 2-3 feet below the surface there was an incredible concentration of algae with no chlorophyll. Even larger concentrations were found in the Cimarron River, where blooms of such magnitude have never been found in free-flowing streams in Oklahoma before.



Treating water for BGA requires removing the cells prior to applying disinfectant, because as the cells die, they release toxins. Tests on water supply systems found that the removal process was highly effective, so the problem appears to be confined to the source lakes. Longer-term climate projections favoring more frequent and more severe droughts in this region suggest that this will become a perennial problem.



Another public health threat that seems to be thriving in drought-related conditions this year is West Nile Virus (WNV). WNV resides in nature in birds and is transmitted by mosquitos. It occurs naturally in Africa, the Middle East and India but became established in North America beginning in 1999. It was first detected in New England but spread quickly to



warmer climates in the South as birds made their annual migrations. While many bird species are not significantly affected and can be carriers of the virus, blue jays and crows succumb to its effects. Most of the blue jay and crow population in Tennessee was wiped out and is only now coming back. Although there seems to be some relationship to weather patterns, that relationship is complex and evolving. Each season is somewhat different.

In the vast majority of cases, humans bitten by an infected mosquito show no symptoms. For some however, they develop a fever with flu-like illness that in a few cases can require hospitalization. It is difficult to discern WNV cases from regular influenza; one distinct difference is that WNV often does not produce a cough. In the most serious cases, WNV can get into the central nervous system, causing inflammation similar to meningitis and encephalitis. This happens primarily among those already immuno-compromised, primarily among those over 50 years of age.

As of September 12, there were 1,405 neuro-invasive cases causing 118 deaths. Texas, Michigan, Louisiana, Oklahoma and Mississippi accounted for nearly half of these cases. Three factors contributing to these numbers are climate, drought and society. Warm weather permits infected mosquitos to survive and start breeding earlier. Also the hot summer weather allows the virus to replicate more rapidly, infecting more mosquitos. Drought, although reducing the amount of standing water, concentrates water in fewer places causing more interaction between mosquitos, birds and other wildlife. Social aspects come into play through things like neglected pools at foreclosed homes and overflow from irrigation on lawns leaving puddles to become breeding sites. However, it is not clear why some drought areas are affected more than others; possible explanations revolve around migratory patterns of birds or micro-effects that are unknown.



Presenters:

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