

Arizona Drought Monitor Report

July 2009

Short-term drought

Monsoonal precipitation during June was well above average in the eastern half of the state, and near average or slightly wetter than average in most other parts of the state. This led to a one category improvement from moderate to abnormally dry drought conditions in the Bill Williams and San Pedro watersheds. Temperatures in June were also cooler than average, reducing water demand. As we move into the heart of the monsoon, further improvement in short-term drought is anticipated.



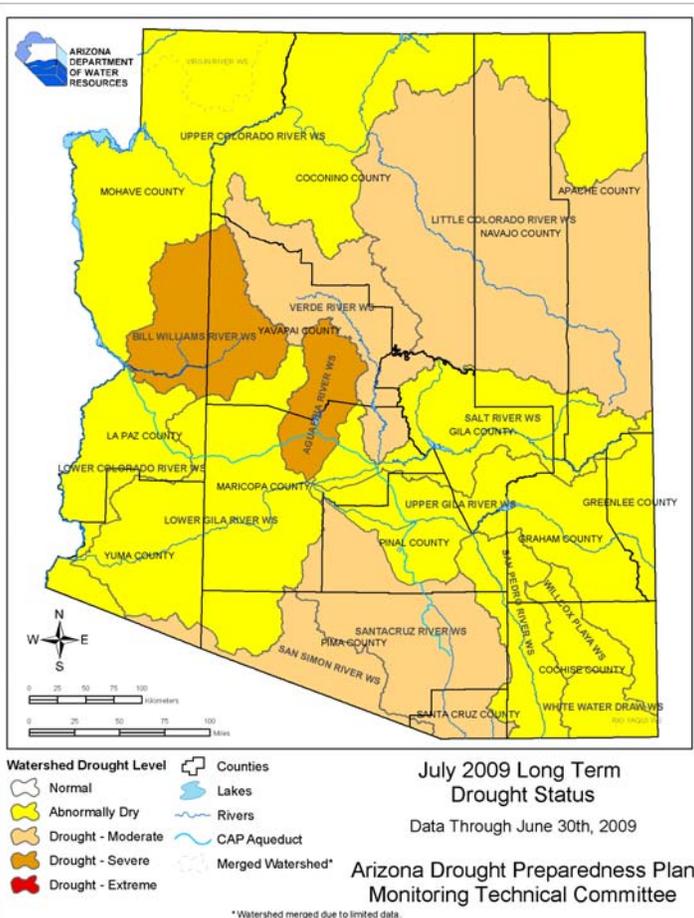
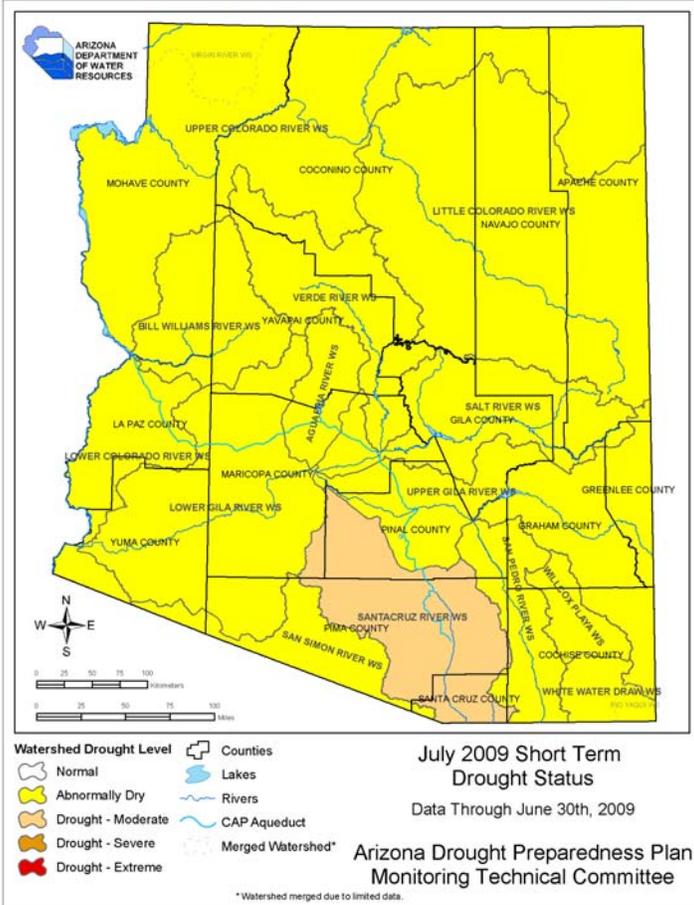
July 2008 short-term drought conditions.

Long-term drought

Drier than average conditions this past winter, and throughout the past year, have led to worsening long-term drought conditions in four watersheds. Bill Williams and Agua Fria had been in moderate drought through March, but they both dropped to severe drought as the previous 36 and 48-month precipitation has been extremely dry, below the 25th percentile. In the southeast, the San Pedro and Whitewater Draw saw improvement in the past year from moderate drought to abnormally dry, and the San Simon watershed along the southern border improved from severe to moderate drought, mostly due to the summer monsoon rainfall over the last 24-months. Since the April update, the Santa Cruz and Verde watersheds, which respond more to winter precipitation, have dropped from abnormally dry to moderate drought, due to the dry conditions in the late winter and early spring.

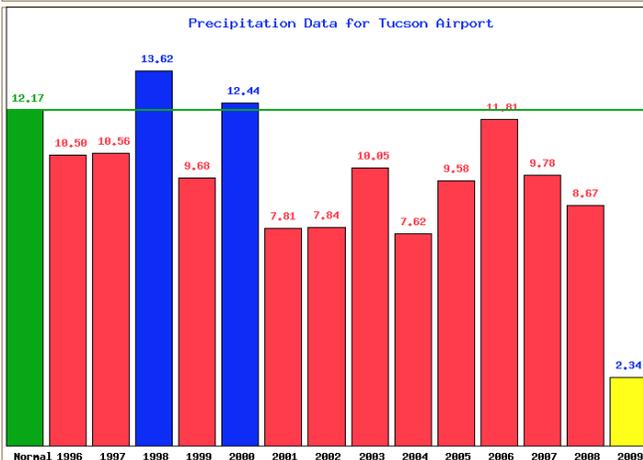
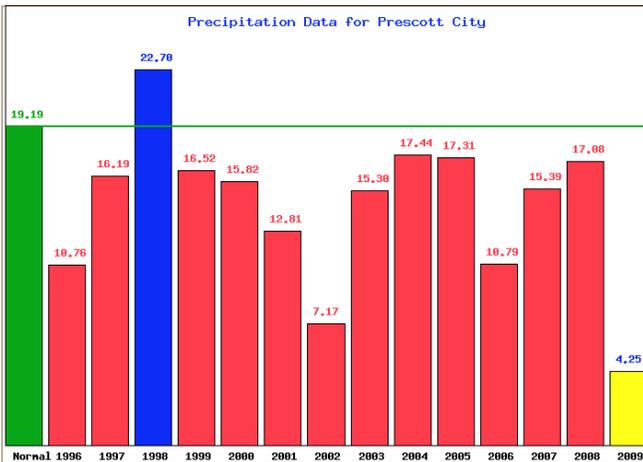
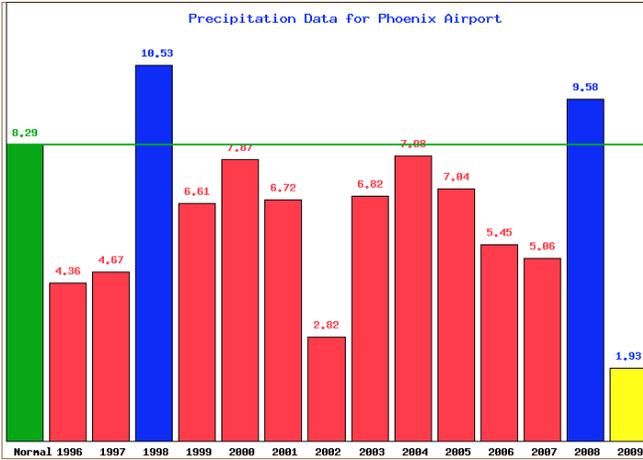
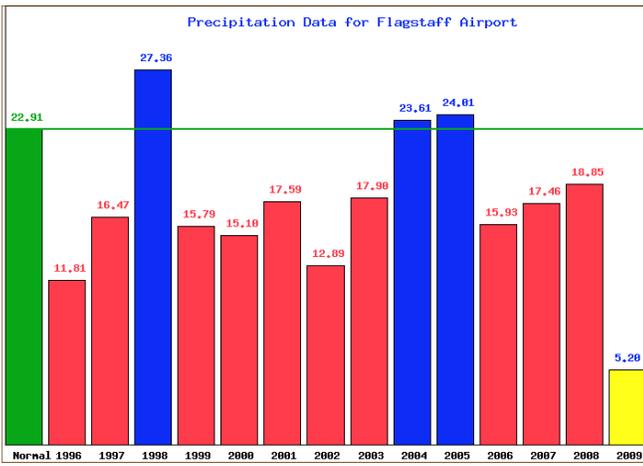


July 2008 long-term drought conditions.



Watersheds in Arizona have experienced significantly drier than average conditions over the last six months to four years. The cumulative effect of the dry periods requires consecutive wetter than average years to recover from the drought. Groundwater aquifers are very slow to recharge, compared to surface reservoirs, so the full reservoirs within the state of Arizona are not good indicators that the drought is easing. Water conservation is important even when we are not experiencing drought conditions. Practicing a low water-use lifestyle is a way each citizen can help ensure a long-term, sufficient water supply.

These maps refer to an integrated assessment of moisture status that includes consideration of precipitation, streamflow, vegetation, ecosystem health, rangeland status, and other measures of drought. They are not intended to portray the status of the state's water supplies. For an explanation of how these maps are produced, visit: www.azwater.gov/azdwr/statewideplanning/drought/droughtstatus.htm



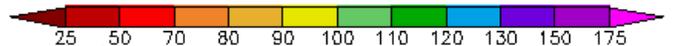
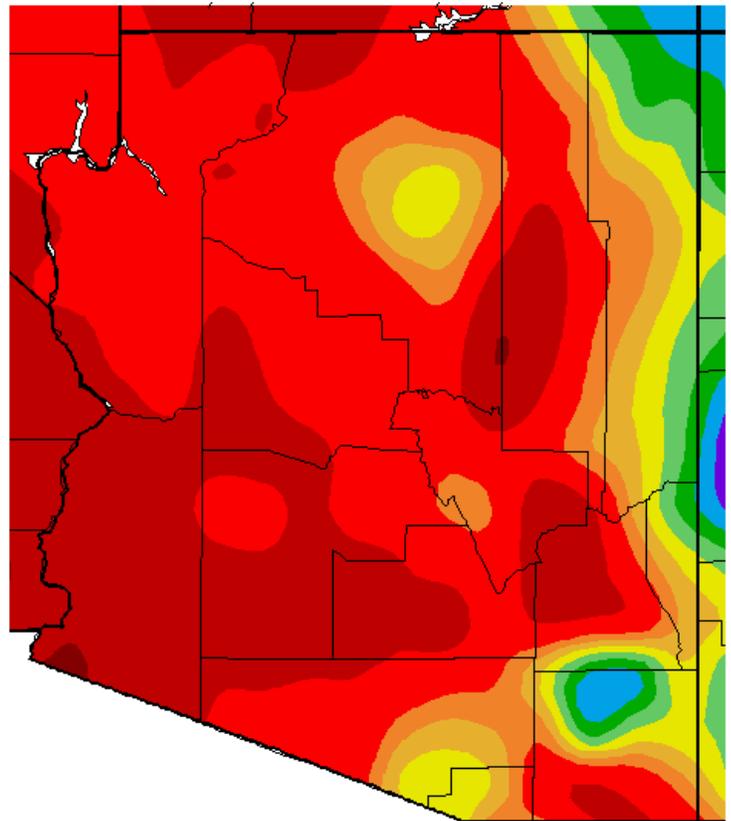
Precipitation

The graphs of annual precipitation to the left show the wet and dry years over the past 14 years. Tucson and Phoenix have only had two of the past 14 years above average for annual precipitation, and this year they have only received 25% of average. Prescott is also at 25% of the annual average, and has only had one wet year in the past 14. This year, Flagstaff has received 23% of average, and three wet years in the past 14. Unless the second half of the monsoon is exceptionally wet, we are unlikely to make up this deficit.

Precipitation across most of Arizona is still below 70% of average from January through June. The southwest deserts have received less than 50% of average. Some higher elevation areas along the New Mexico border and in the southeast have received 120% of average or more. Since monsoon precipitation stalled in mid-July, rangeland conditions are rapidly degrading as we await the next moisture surge.

For more climate information, visit the Arizona State Climate Office at <http://azclimate.asu.edu/>.

Percent of Average Precipitation
January - June 2009



Generated 7/01/2009 at WRCC using provisional data.
NOAA Regional Climate Centers

Annual precipitation totals compared to normal (green bar and line) from weather stations in Bullhead City, Jerome, Phoenix and Tucson. 2009 data from January to June. Resource - <http://www.wrh.noaa.gov/psr/DroughtPage.php?wfo=psr&data=ALLDATA>

Mountain Precipitation

Based on data from mountain monitoring sites, precipitation during June was widely variable across the basins, ranging from a low of 26% of average in the Verde River Basin to a high of 176% of average in the San Francisco-Upper Gila River Basin. Cumulative precipitation for the 2009 water year (October through June) remains average for the Salt River, Verde River, and Little Colorado River Basins, and below average for the San Francisco-Upper Gila River Basin (see graphic).

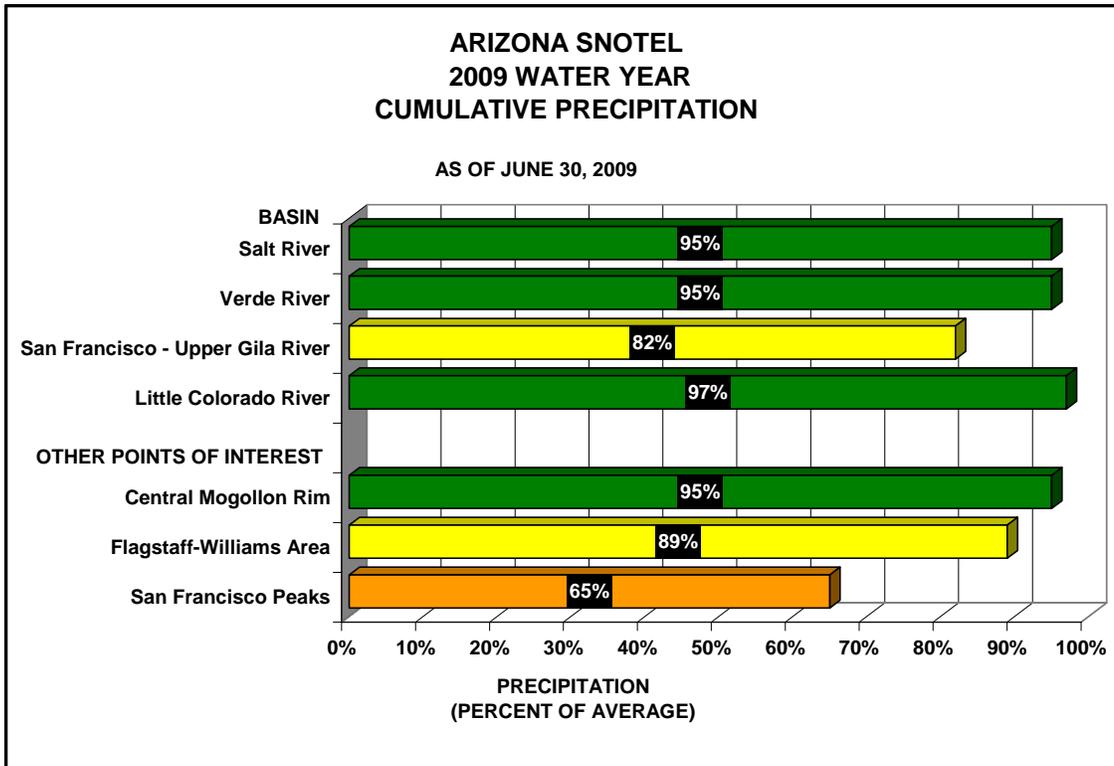
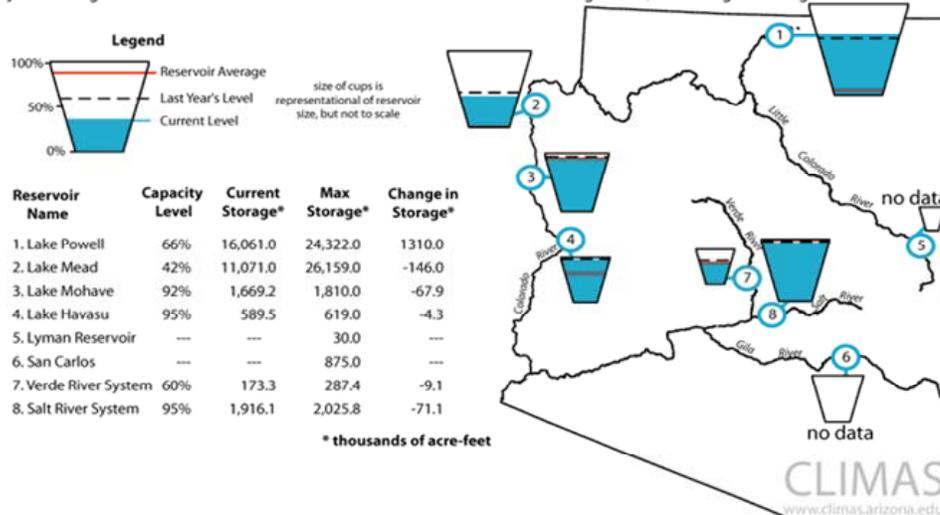


Figure 6. Arizona reservoir levels for June 2009 as a percent of capacity. The map depicts the average level and last year's storage for each reservoir. The table also lists current and maximum storage levels, and change in storage since last month.

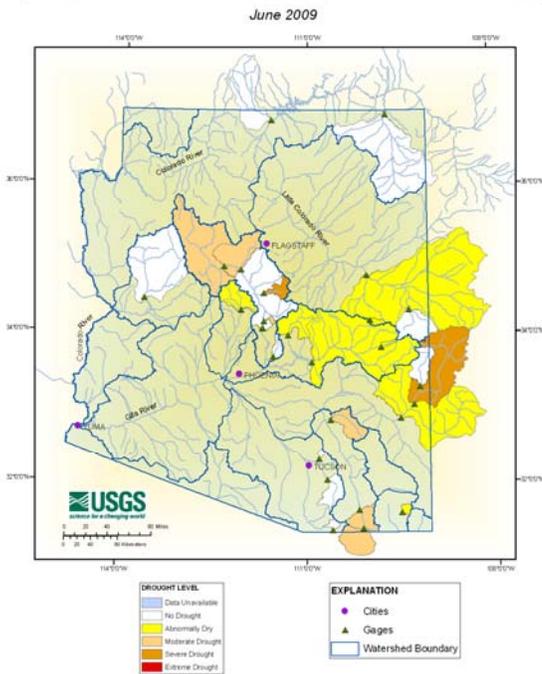


Reservoir Status

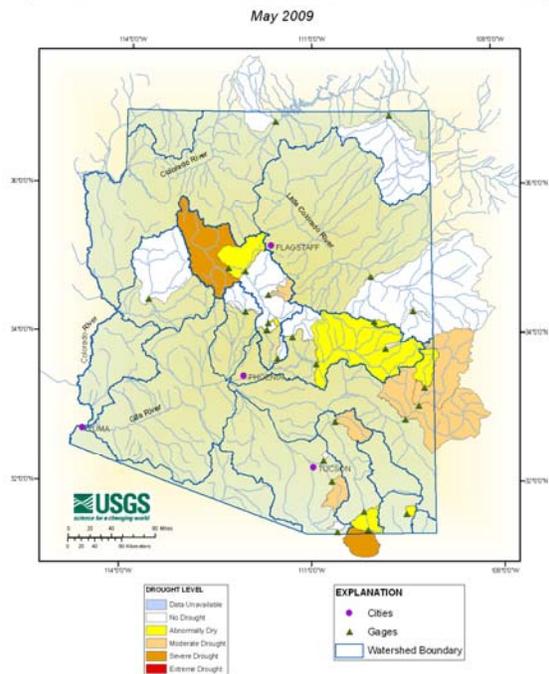
Water levels in Lake Powell increased by 1.3 million acre-feet during June. However, water storage in all the other large reservoirs dropped slightly this past month, and no water level data have been reported for the San Carlos and Lyman reservoirs (Figure 6). Even with the rise in water level, Lake Powell is at 66 percent of full capacity, well below the long-term average of 81 percent. Lake Mead is at 42 percent of capacity, which reflects the effects of long-term drought conditions across the Upper Colorado River Basin.

In water-related news, the Arizona Game and Fish Department received a \$74,145 Water Quality Improvement grant to improve riparian habitat along the Little Colorado River in Apache County (wmicentral.com, July 17). The grant will help protect important wildlife habitat and two federally threatened and endangered species: the southwestern willow flycatcher, a small passerine bird, and the Little Colorado spinedace, a threatened native fish.

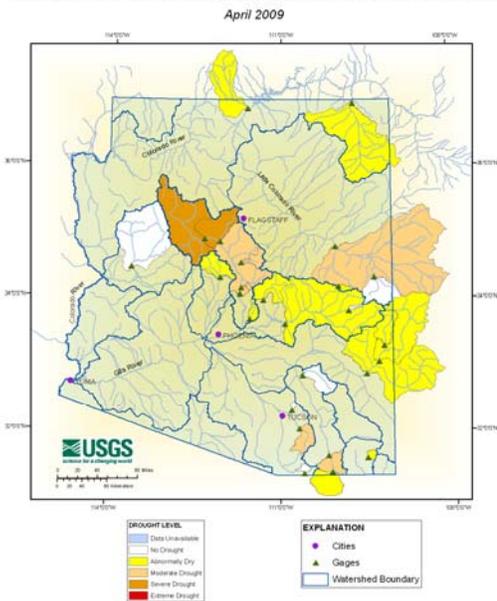
Drought Levels Based on Monthly Streamflow Discharge



Drought Levels Based on Monthly Streamflow Discharge



Drought Levels Based on Monthly Streamflow Discharge



Water body	June Runoff in Acre Feet	% of Median
Salt River near Roosevelt	11,187	64%
Tonto Creek above Gun Creek near Roosevelt	265	31%
Verde River at Horseshoe Dam	6,843	85%
Combined Inflow to Salt River Project (SRP) reservoir system	18,295	66%
Little Colorado River above Lyman Lake	952	344%
Gila River to San Carlos Reservoir	411	22%

Streamflow Observed at USGS Streamflow-Gaging Stations

Streamflow

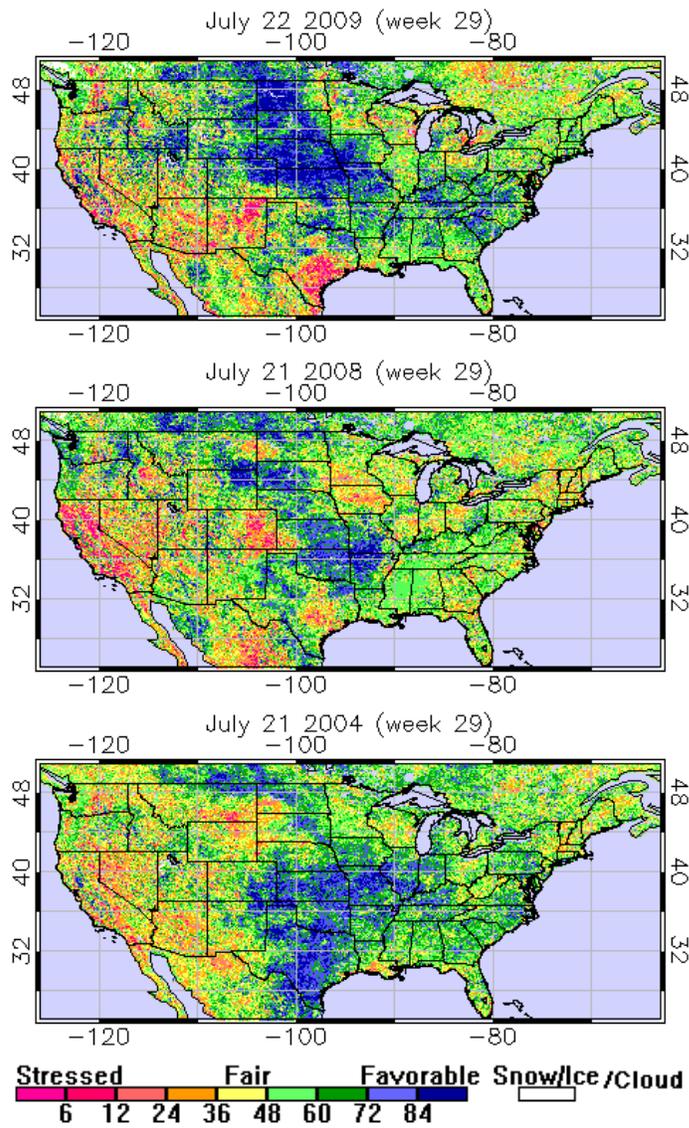
From April through June 2009 streamflow within Arizona indicated low to moderate drought conditions. From April to May six basins changed to No Drought status. From May to June conditions remained stable for the most part. At the end of May there was a fair amount of precipitation but it unfortunately did not result in significant increases to streamflow. Each month during this quarter there were only two instances of severe drought and no instances of extreme drought.

Basins contributing streamflow to the Salt River Project reservoir system show that things have been relatively stable during this quarter. Although they appear stable they are far below normal. During May the Little Colorado River above Lyman Lake increased to near normal conditions and then in June significantly exceeded normal monthly streamflow. This is due to discharge from upstream reservoirs. The Gila River that contributes streamflow to the San Carlos reservoir has remained far below normal and has averaged 18% of

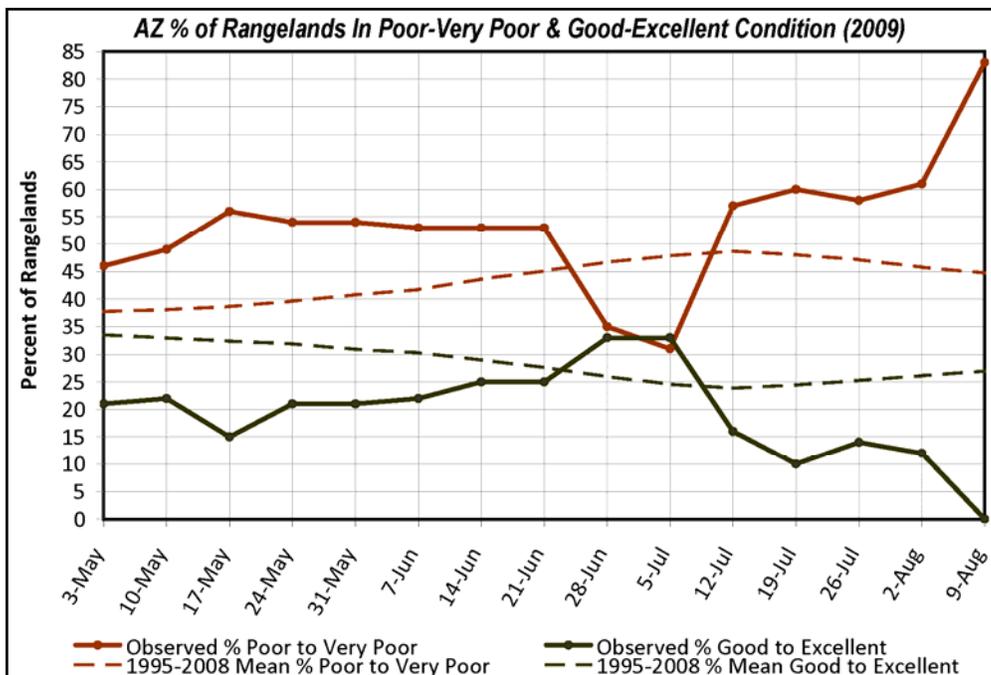
Vegetation Health

Across much of Arizona vegetation health index (VHI) values are in the stressed-to-fair range (top). Fair-to-favorable vegetation stress levels are mostly found along the Mogollon Rim, Colorado River, and the Four Corners region. The VHI values reflect below average water year precipitation across most of the state, and a spotty North American Monsoon, thus far. Note the favorable VHI values for the northwest Mexico highlands, and across the central plains of the U.S. Compared to one year ago, VHI values are considerably lower (middle), except in the rainshadow to the northeast of the Mogollon Rim. Though there are no exact analogues in the past, this month's VHI map for Arizona looks a little like 2004 (bottom). Thus far, acres burned in Arizona wildland fires are well below the historical average. For more information on fire, from the Southwest Coordination Center, see <http://gacc.nifc.gov/swcc/index.htm>.

NOAA Center for Satellite Applications and Research



Rangeland Health



The graph to the left shows a time series of rangeland conditions by week for this year in Arizona compared to the 1996-2008 mean.

There is rapid deterioration of rangelands underway in the state. Notice the striking change from August 2nd to the 9th. Even in the desert, flash drought conditions can occur.

Arizona Drought Monitor Report -
Produced by the Arizona State Drought Monitoring Technical Committee

Chair:
Nancy Selover, State Climatologist
Arizona State University

Mike Crimmins, Extension Specialist,
University of Arizona Cooperative
Extension

Gregg Garfin, University of Arizona –
Institute for the Study of Planet Earth

Dino DeSimone, Natural Resources
Conservation Service

Charlie Ester, Salt River Project

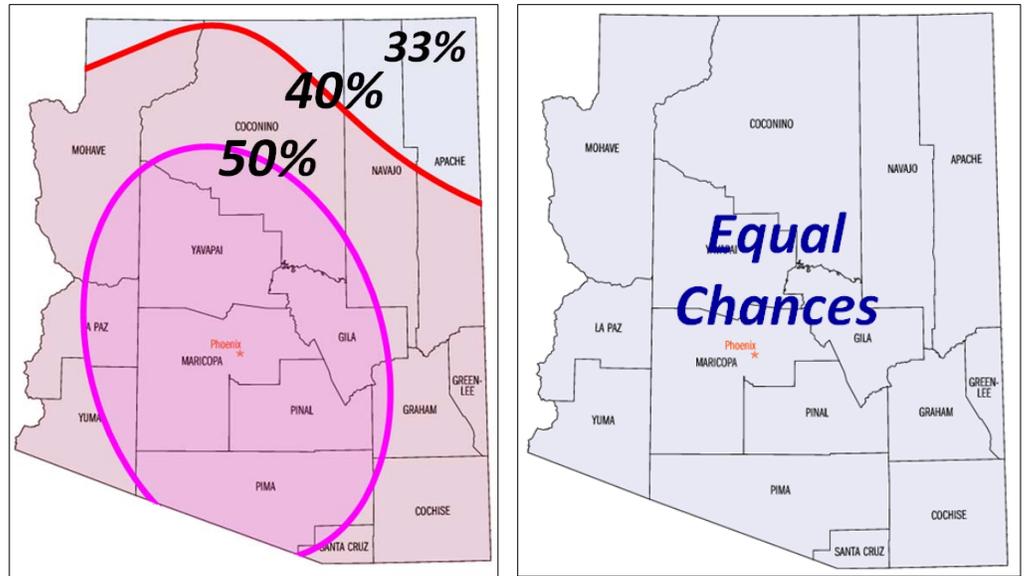
Ron Ridgway, Arizona Division of Emer-
gency Management

Chris Smith, U.S. Geological Survey

Coordinator: Susan Craig, Arizona
Department of Water Resources
Computer Support: Andy Fisher, Ari-
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Department of Water Resources

For more information visit
http://www.azwater.gov/azdwr/statewide_planning/drought/droughtstatus.htm

Three-month Temperature and Precipitation Outlook

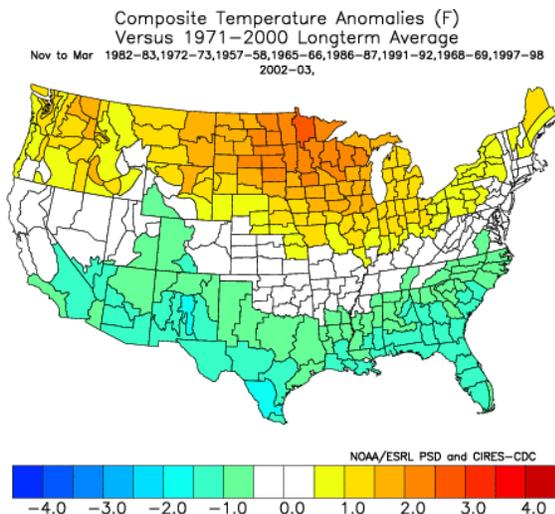


The CPC Temperature Outlook for August through October indicates an increased probability for the mean temperature during the 90-day period to be above normal (35-55%). The CPC Precipitation Outlook for the same time period indicates equal chances for above, near, or below normal precipitation across Arizona.

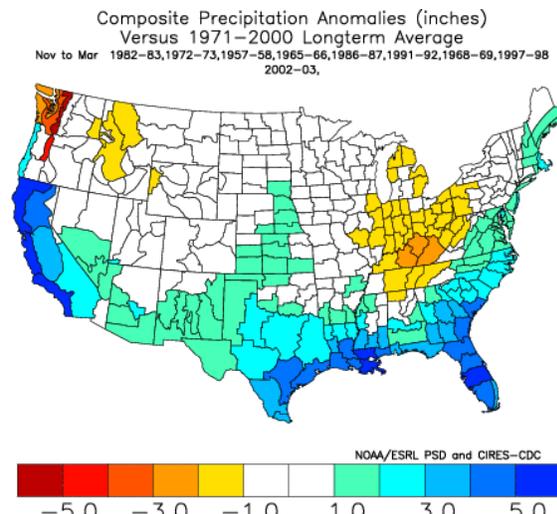
Drought Outlook - The NOAA CPC Drought Outlook, released August 6, 2009, forecasts that drought development is likely in the eastern half of the state.

El Niño Advisory in Effect...

El Niño conditions will continue to develop and are expected to last through the Northern Hemisphere Winter 2009-2010. During June 2009, conditions across the equatorial Pacific Ocean transitioned from ENSO-neutral to El Niño conditions. Current conditions and recent trends favor the continued development of a moderate-to-strong strength El Niño into Fall 2009, with further strengthening possible thereafter.



During previous El Niño events, temperatures across the southern U.S., including Arizona, have tended to be cooler than normal during the winter.



During previous El Niño events, precipitation amounts across the southern U.S., including most of Arizona, have tended to be higher than normal during the winter.