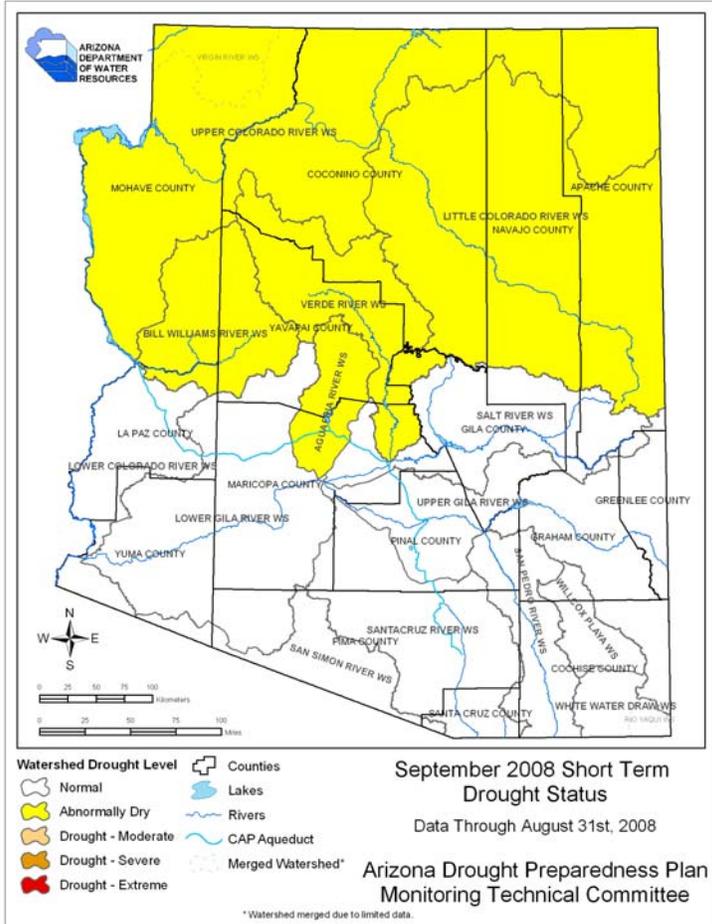
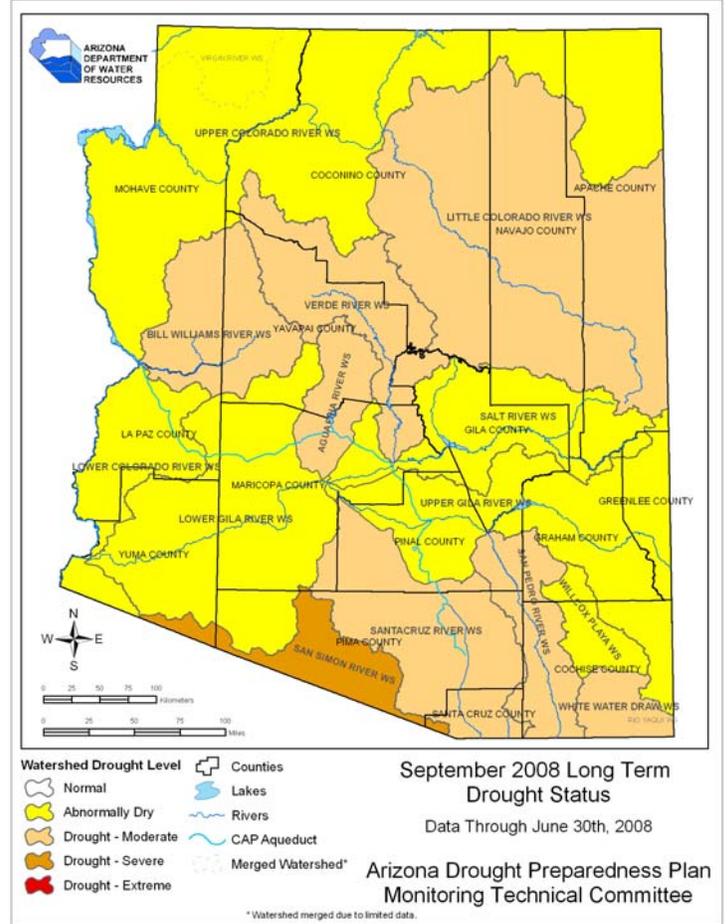


# Arizona Drought Monitor Report September 2008

## Short-term Drought Status



## Long-term Drought Status



### Short-term Update

Wetter than average conditions in southern Arizona during the past three and six month periods have improved the Santa Cruz, San Pedro, Willcox Playa, and White Water Draw watersheds from 'abnormally dry' to 'no drought.' Monsoon precipitation has been above the 85<sup>th</sup> percentile for southern Arizona, significantly improving range conditions, as well as streamflow. In northern Arizona, monsoon rainfall has been highly localized across the Colorado Plateau. Isolated locations on the upper Colorado River watershed, like Havasu Creek, have been extremely wet, with record flooding (see video at <http://az.water.usgs.gov>). Other parts of the upper Colorado have been extremely dry, particularly across the Navajo Nation in northeastern Arizona, so the watershed remains abnormally dry. The Little Colorado River watershed has also been very dry, especially at

the higher elevations, resulting in reduced streamflow, and a shift from 'no drought' to 'abnormally dry.' Although the average precipitation across the Verde watershed was above the 60<sup>th</sup> percentile for the monsoon, the higher elevations of the Verde have been dry, creating very low streamflows.

### Long-term Update

The long-term status will not be updated until October. Since September has been dry in most areas of the state, the long-term drought condition is unlikely to have many changes when updated next month. This is not unusual, as summer rainfall typically does not have great influence on long-term drought conditions.



# Reservoir Storage



# Vegetation Health

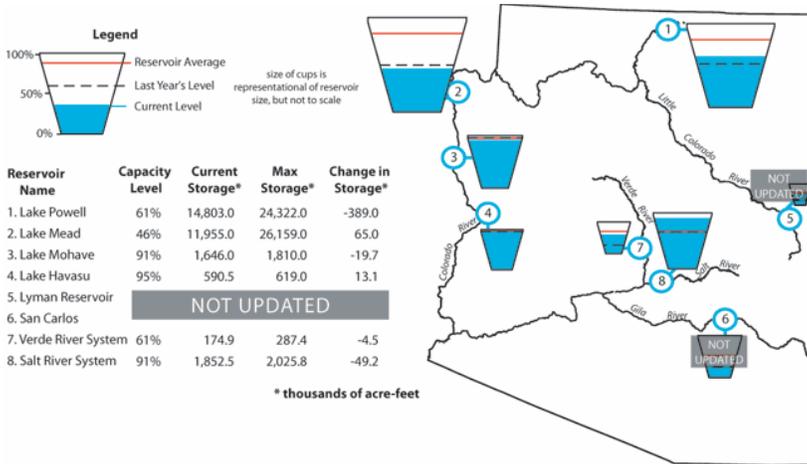


## Arizona Reservoir Status

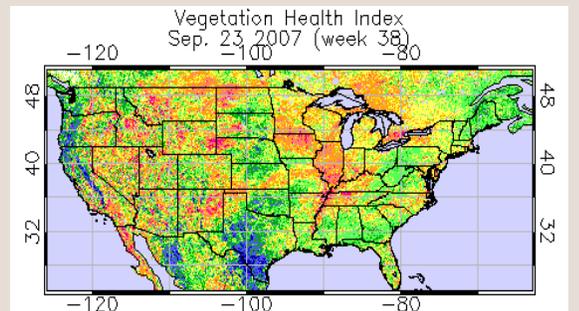
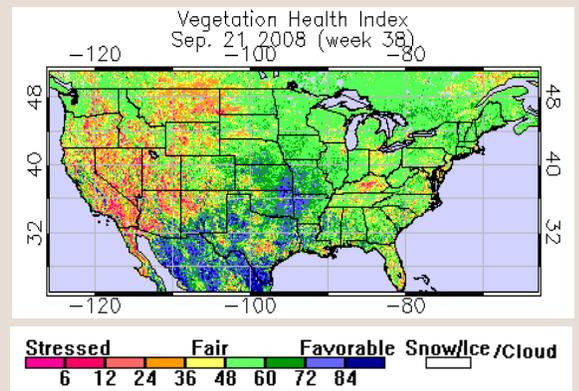
Combined reservoir storage in Lakes Powell and Mead decreased by approximately 300,000 acre-feet during August (see figure below). Nevertheless, compared with last August, combined volumes in the two lakes have increased by more than 2.0 million acre-feet. According to the U.S. Bureau of Reclamation, reservoir storage in the Colorado River basin above Lake Mead is projected to be about 58 percent of capacity at the end of the water year on September 30. During August, storage in the Salt and Verde River watersheds declined slightly, though levels are substantially higher than they were one year ago.

Arizona water officials are studying the idea of importing desalinated ocean water from the Gulf of California to provide a future “permanent” water supply (*Arizona Republic*, August 31). The effort would be a collaboration between Puerto Peñasco, the Central Arizona Project, and Salt River Project. Officials are studying the cost, energy sources, and environmental issues associated with constructing a desalination plant.

Arizona reservoir levels for August 2008 as a percent of capacity. The map depicts the average level and last year's storage for each reservoir, while the table also lists current and maximum storage levels.



Vegetation health index (VHI) data from the NOAA Center for Satellite Applications and Research (top figure) shows favorable vegetation conditions in the central and southeastern parts of Arizona. In contrast to one year ago (bottom figure), the current VHI shows more robust green-up in the southeastern quadrant of the state. Exceedingly favorable VHI status in northern Mexico reflects the influence of tropical storm activity since late August, as well as monsoon precipitation. Tropical storms Julio and Lowell delivered substantial precipitation to Sonora and Sinaloa, with some moisture reaching the southeastern quadrant of the state.

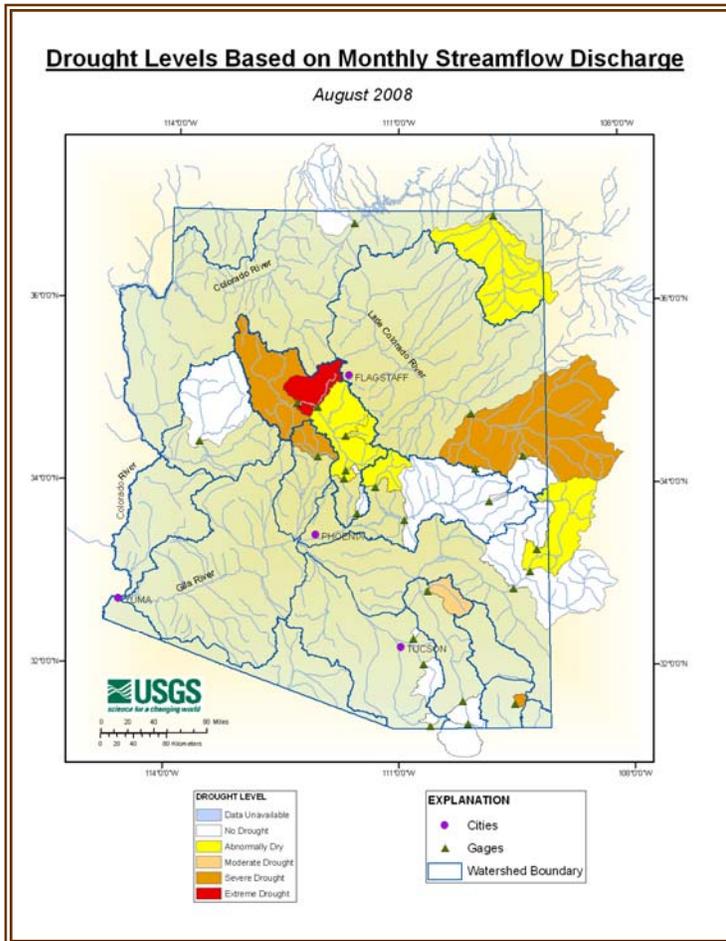


# Mountain Streamflow



## August Streamflow

For the month of August, monsoon storms have continued to supply moisture to watersheds in Arizona. Within the Salt River Project reservoir system only the Tonto Creek basin has had a decrease in streamflow since July. Even with this decrease the combined inflow is 106%. Both the Salt River near Roosevelt and the Gila River supplying the San Carlos Reservoir are well above normal. Elsewhere in the state, the Little Colorado River at Woodruff has had a significant increase in drought severity since July. Drought conditions for the upper Verde River Basin have worsened since April, going from abnormally dry to the current condition of severe drought, based on monthly streamflow records from Verde River near Clarkdale streamflow gaging station.



| Water body   | August Runoff in Acre Feet | % of Median |
|--|----------------------------|-------------|
| Salt River near Roosevelt                                    | 29,084                     | 128%        |
| Tonto Creek above Gun Creek near Roosevelt                   | 1,291                      | 71%         |
| Verde River at Horseshoe Dam                                 | 12,236                     | 91%         |
| Combined Inflow to Salt River Project (SRP) reservoir system | 42,611                     | 106%        |
| Little Colorado River above Lyman Lake                       | 676                        | 100%        |
| Gila River to San Carlos Reservoir                           | 7,932                      | 133%        |

Streamflow Observed at USGS Gauging Stations

## Mountain Precipitation

Monitoring stations show above normal precipitation amounts occurring throughout the mountains of Arizona during August, ranging from 110% of average in the Little Colorado River Basin to 130% of average in the Salt River Basin. Cumulative precipitation for the water year (Oct. 1 to August 31) remains at or above average in all basins.

| Watershed                            | Precipitation Oct 1-Aug 31 (% of 30-Year Average) |
|--------------------------------------|---|
| Salt River Basin                     | 126%  |
| Verde River Basin                    | 115%  |
| Little Colorado River Basin          | 131%  |
| San Francisco-Upper Gila River Basin | 99%   |
| <b>Other Points of Interest</b>      |   |
| Chuska Mountains                     | --  |
| Central Mogollon Rim                 | 132%  |
| Grand Canyon                         | 90%   |
| San Francisco Peaks                  | 90%   |
| Arizona Statewide                    | --  |

# Temperature and Precipitation



**August:** was drier than average in the Little Colorado River watershed, near average on the lower Colorado, Agua Fria, Willcox, and Virgin River watersheds, and wetter than average in the other 10 watersheds. Overall, the monsoon has been very wet this year, especially in the southern half of the state. Temperatures have been near average in the southeast, slightly above average in Gila County, and well above average elsewhere in the state.

**The 3-month period:** The monsoon activity in August improved the three-month period of June through August, especially for the southern half of the state. The exception is the Virgin River, which has been exceptionally dry. Three-month temperatures were only slightly above average in the southern counties, but well above average along the lower Colorado River and in central Arizona.

**The 6-month period** precipitation, from March through August, was much wetter than average in the southern half of the state and near or below average in the northern half of the state. The dryness in the north occurred as the winter storm activity abruptly stopped in mid February, and most of the monsoon activity remained in the southern half of the state. Six month temperatures were above average.

**The 12-month period** precipitation was near average in central Arizona, and above average along the upper Colorado as numerous winter storms brought heavy snowfall. South central Arizona was

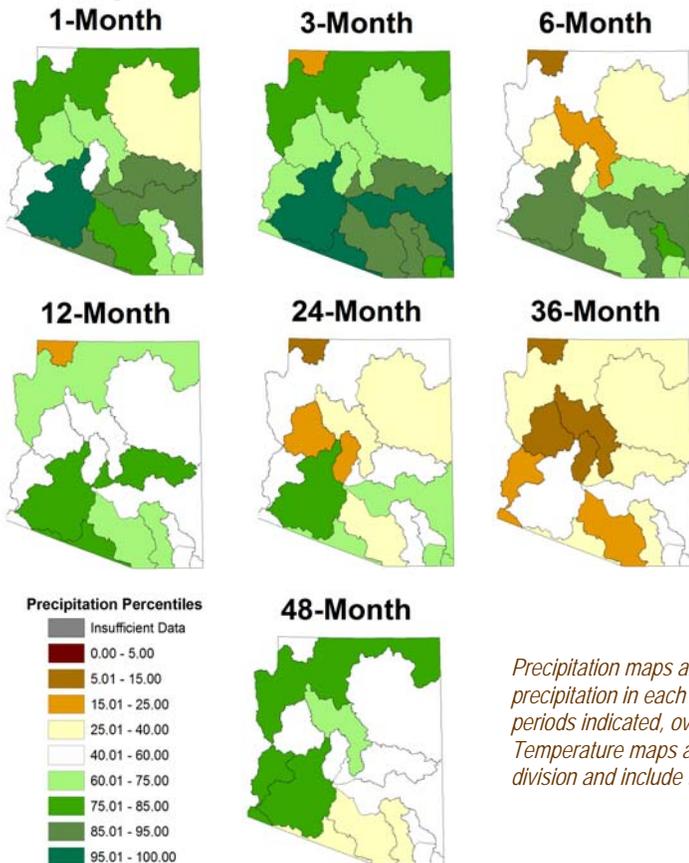
also wetter than average this year as summer thunderstorms moved across the southern part of the state. Temperatures were warmer than average across the state.

**The 24-month period** was drier than average across the northern half of the state, with extreme variability in precipitation across the southern half of Arizona. Storm activity over the two year period has been very isolated, leaving some locations very dry while nearby locations were extremely wet. Temperatures for the 24-month period continue to be much warmer than average everywhere, with the coolest area in the northwest.

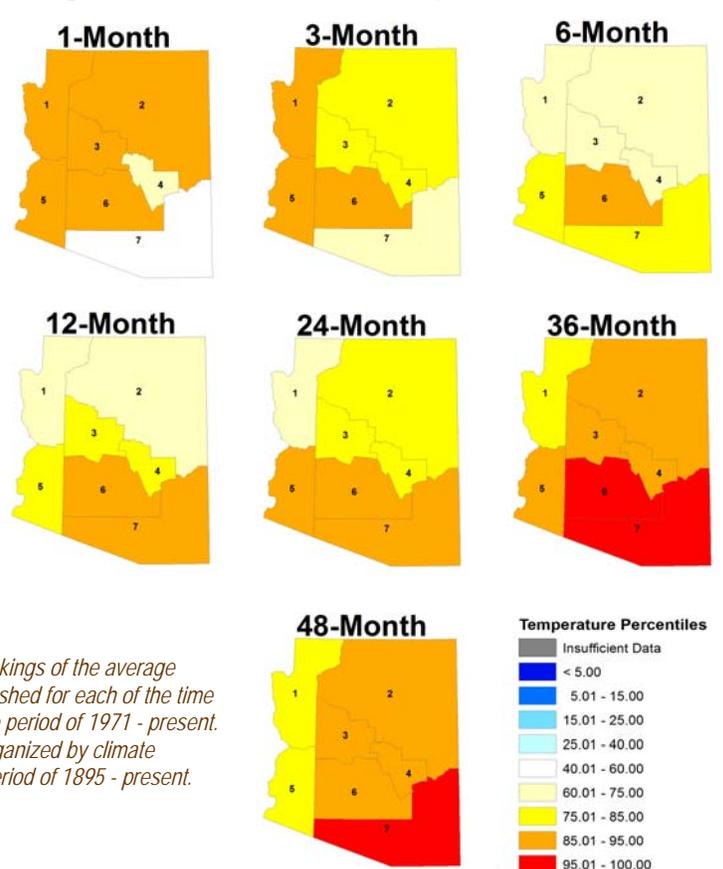
**The 36-month period** continues to be the driest period statewide, with only the upper and lower Gila basin, Willcox Playa and White-water Draw in the southeast near average. All other watersheds are well below average, including four in northern Arizona below the 12<sup>th</sup> percentile. Temperatures for the three year period were extremely high, with the southeast climate division being the warmest in 112 years.

**The 48-month period** was much wetter than the 36-month period because it included the wet winter of 2005. However, the southeast watersheds were very dry, below the 36<sup>th</sup> percentile. Division 7 in the southeast continues to be the hottest 48-month period on record, and the other climate divisions are above the 76<sup>th</sup> percentile

## Precipitation Percentiles by Watershed



## Temperature Percentiles by Climate Division



*Precipitation maps are rankings of the average precipitation in each watershed for each of the time periods indicated, over the period of 1971 - present. Temperature maps are organized by climate division and include the period of 1895 - present.*

# Weather Outlook



*Arizona Drought Monitor Report* -  
Produced by the Arizona State Drought  
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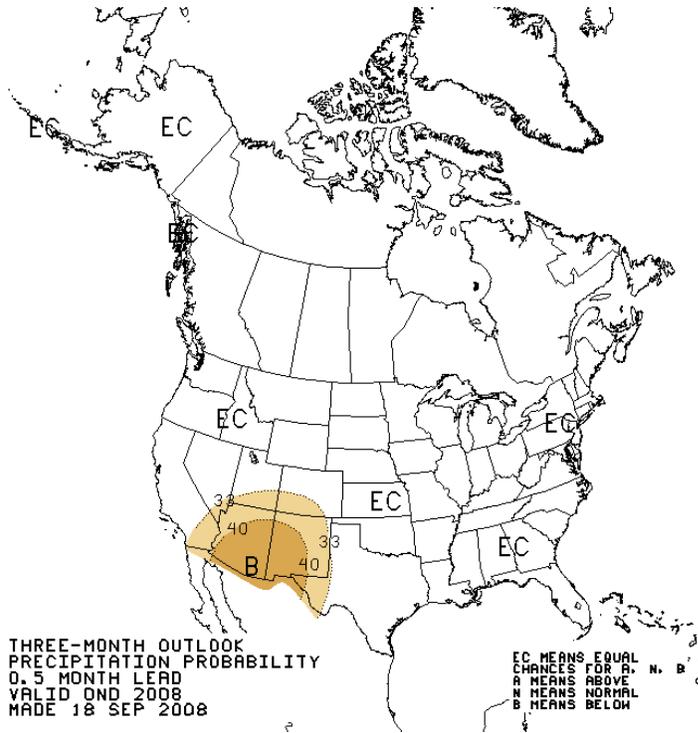
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Charlie Ester, Salt River Project

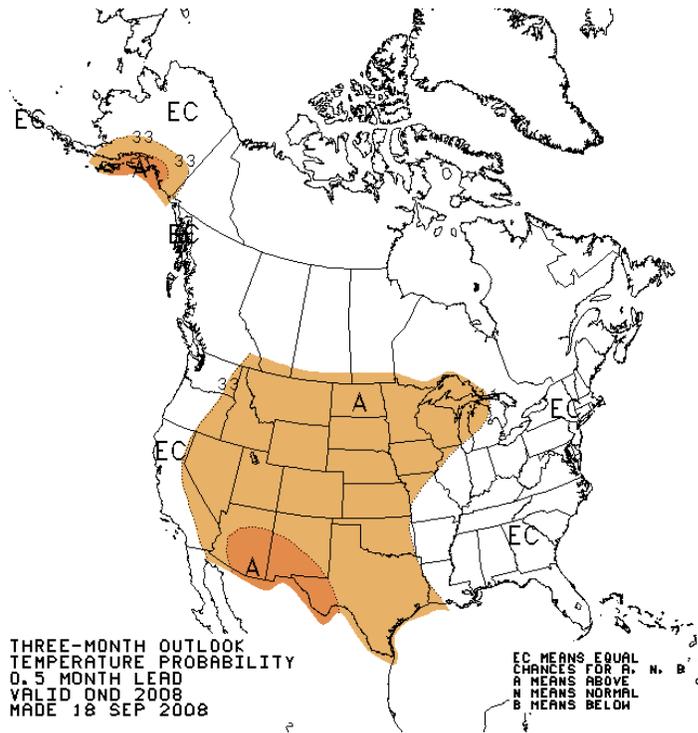
Ron Ridgway, Arizona Division of Emer-  
gency Management

Chris Smith, U.S. Geological Survey

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



There is a modest level of confidence precipitation will be below-average across the state during the 90-day period (October through December).



There is a modest to high level of confidence temperatures will be above average across the entire state for the 90-day period (October through December).