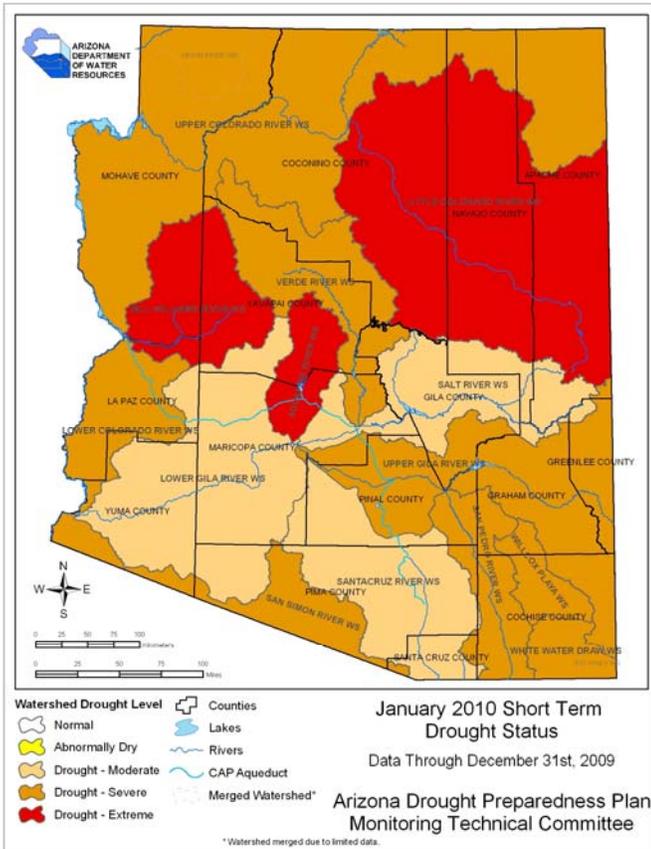


# Arizona Drought Monitor Report

## January 2010

To provide the most current information, changes are coming to this report. Details soon.



### Short-term drought

Short-term conditions improved in central and southern Arizona due to a few wet winter storms during December. The December storms were a preview of the El Niño activity that occurred in January and are expected to continue through April. This pattern should provide steady improvement of the short-term drought situation in most watersheds. In some areas, the mild temperatures and wet weather in January have caused some early green-up and budding of plants. The short-term drought status forecast through the end of January (February map to the right)



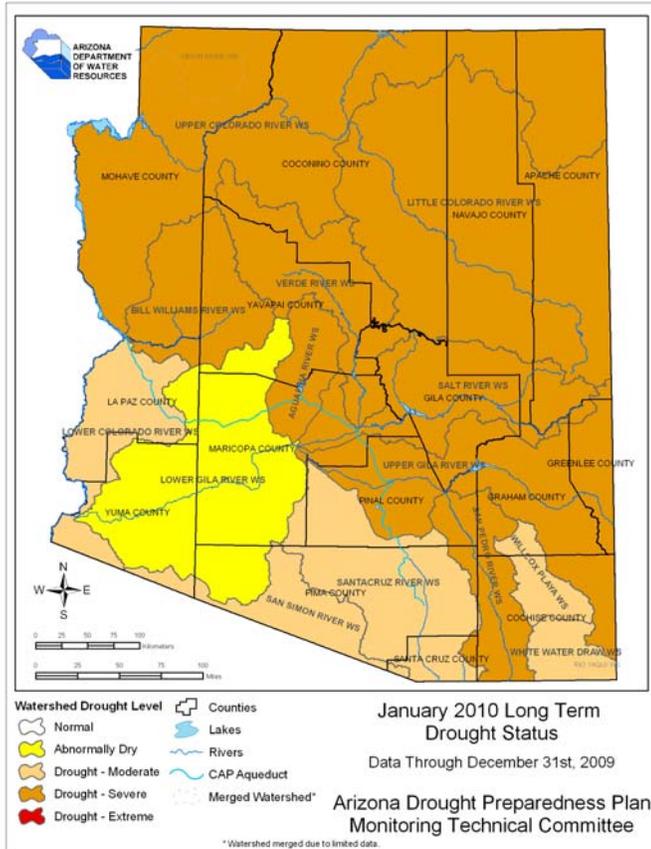
Forecast for February 2010

### Long-term drought

The long-term (hydrologic) drought depends on accumulated precipitation over multiple years. Since last year was exceptionally dry, including the late fall through November, only a few watersheds have seen improvement. If the January-March period continues to experience the wet El Niño pattern, there will be significant long-term improvement by the April update. However, since much of Arizona depends on the Colorado River for its water supply, alleviation of the long-term drought in Arizona is dependent on the snowpack in the Upper Colorado basin states. Currently the Upper Colorado River Basin has had less than 100% of their average winter precipitation, and water levels at Lakes Mead and Powell are extremely low.

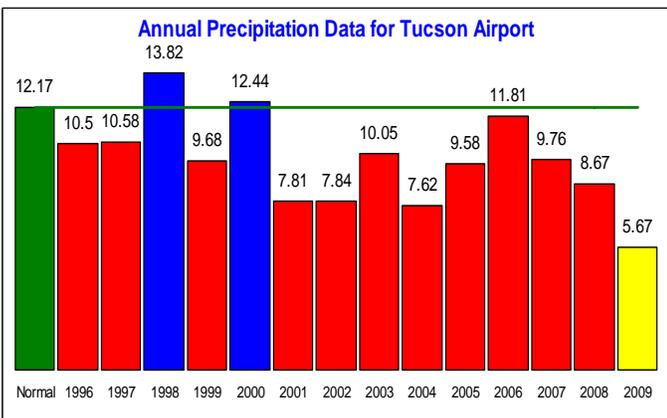
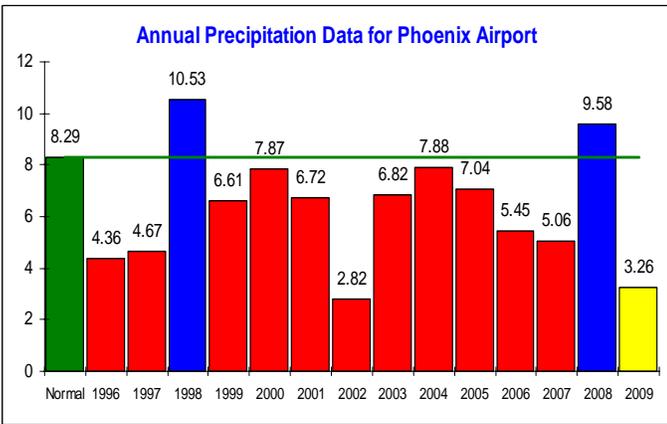
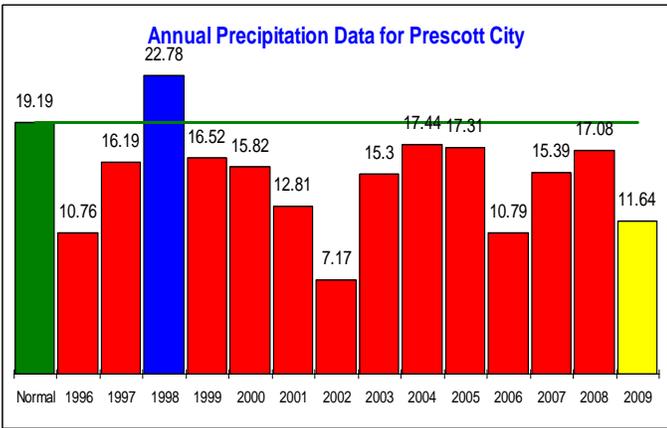
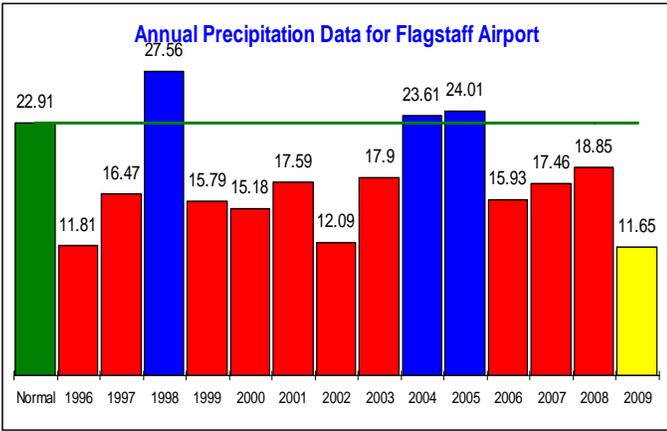


January 2009 long-term drought conditions



Exceptionally wet weather in January has provided substantial relief to short-term drought conditions across much of Arizona. January precipitation totals were 200% of average across most of the state with many locations receiving record one-day snowfall and rainfall amounts during strong winter storms in the second half of the month. The wet conditions have helped boost early season streamflows and water levels in reservoirs, but lingering drought impacts still remain across the state. Short-term drought impacts to agricultural operations (e.g. ranching) and ecosystems (e.g. vegetation condition) that emerged under the unusually dry conditions last summer and fall will continue to persist until the spring and summer growing seasons later this year. Longer-term drought impacts to water resources that have developed over the past ten years will also take an extended wet period beyond just this winter to fully recover.

*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](http://www.azwater.gov/azdwr/statewideplanning/drought/droughtstatus.htm)*

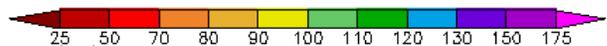
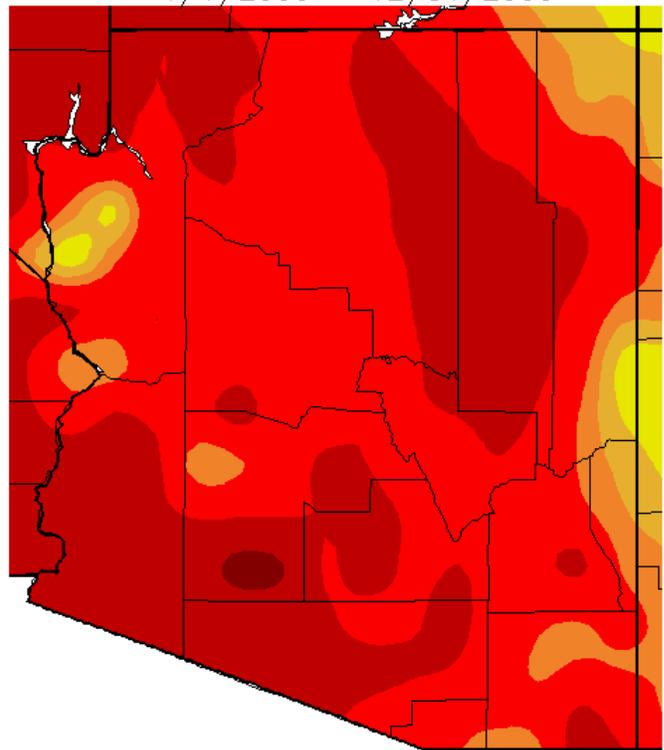


## Precipitation

Most of Arizona received less than 70% of their average annual precipitation in 2009. Southern and southwestern Arizona received less than half their annual average. This adds yet another dry year to the already prolonged period of drought in the southwest. Southern Arizona cities have had only two years with above average precipitation in the past 14 years. Flagstaff has had three relatively wet years during the past 14, but Prescott has only had one wet year during this long drought. Last winter the La Nina circulation steered winter storms to the north, and the monsoon stayed south this year, and occasionally moved northward into New Mexico, rather than Arizona.

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

Percent of Average Precipitation (%)  
1/1/2009 – 12/31/2009

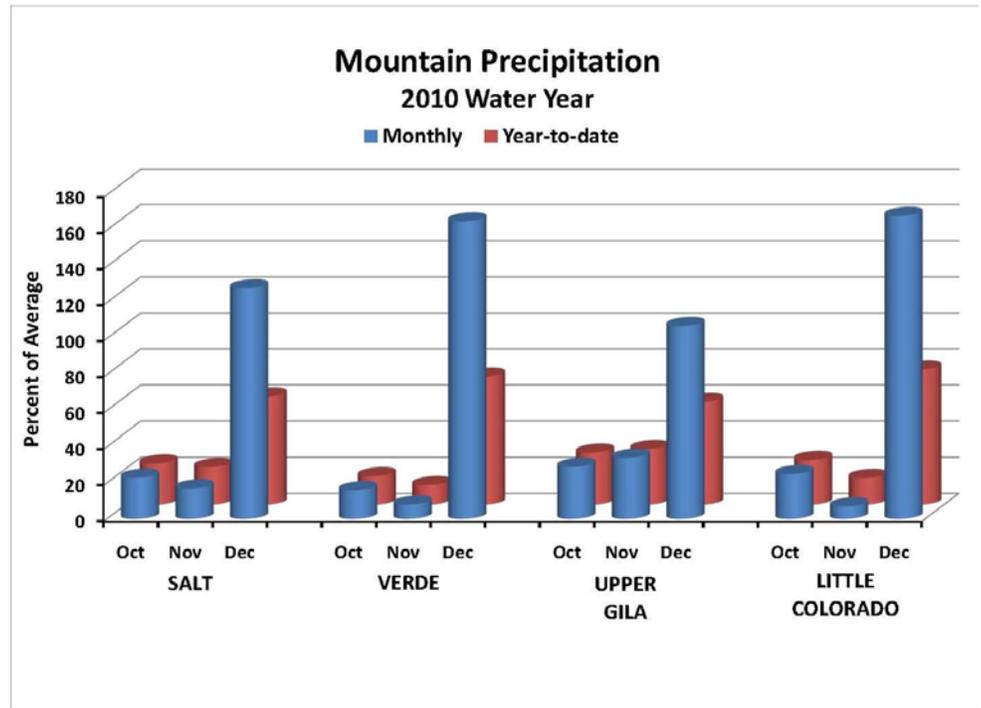


Generated 1/01/2010 at WRCC using provisional data.  
NOAA Regional Climate Centers

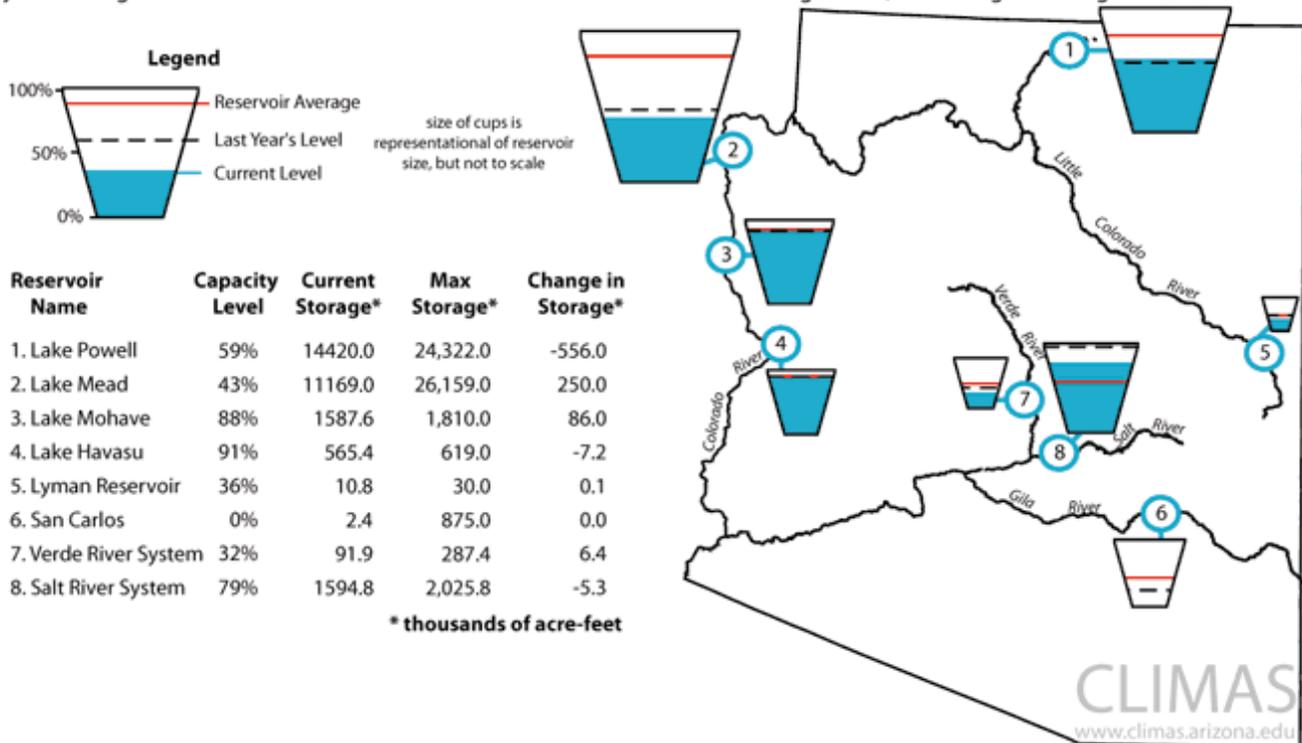
Annual precipitation totals compared to normal (green bar and line) from weather stations in Flagstaff, Phoenix, Prescott and Tucson. 2009 data from January to September. Resource - <http://www.wrh.noaa.gov/psr/DroughtPage.php?wfo=psr&data=ALLDATA>

## Mountain Precipitation

Mountain data from NRCS SNOTEL sites and National Weather Service Cooperator stations show that December precipitation was at or above the 30-year average in all basins. Cumulative precipitation for Water Year 2010 (October 1, 2009 through December 31, 2009) remains below average in all basins.



**Figure 6.** Arizona reservoir levels for December 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.

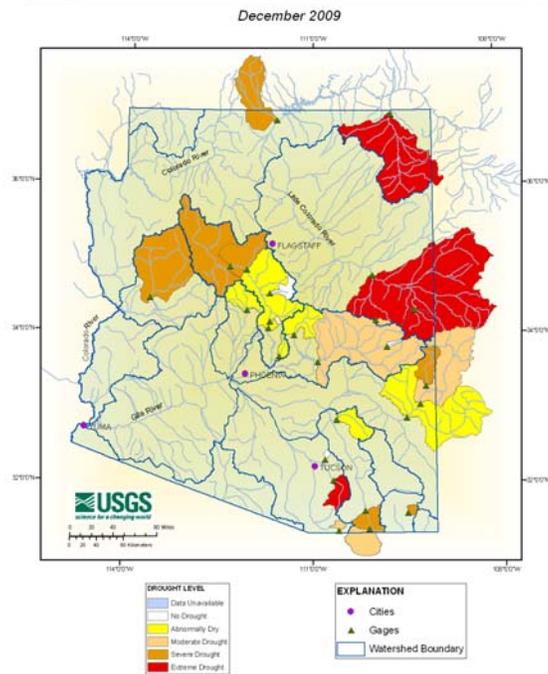


## Reservoir Status

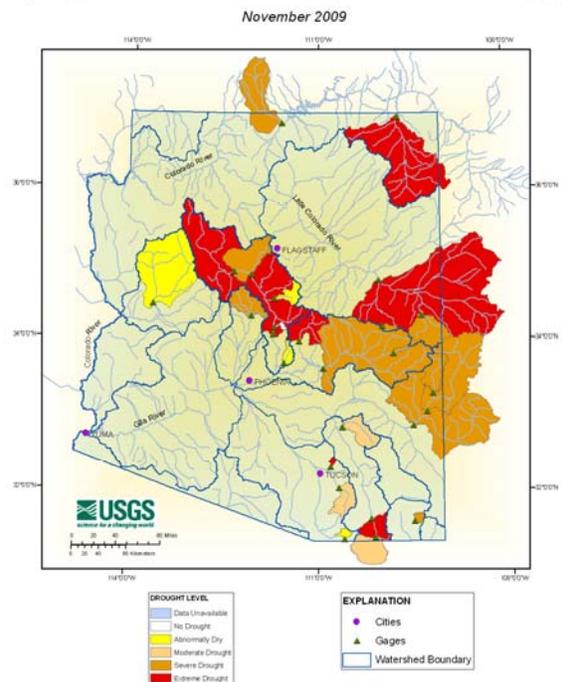
Water storage in Lake Powell declined by 556,000 acre-feet in December and currently stands at 59 percent of capacity. Observed unregulated inflow into Lake Powell in December was 71 percent of the 30-year average, according to the U.S. Bureau of Reclamation. Lake Mead, on the other hand, gained 250,000 acre-feet in December. Combined storage in the Salt and Verde river basin systems increased in December and remains well above average. As of January 21, storage in the San Carlos reservoir was still at minimum pool level—the minimum amount required to protect fish—and releases to irrigators were being curtailed.

In water-related news, a new dam is about 88 percent complete in Southern California, about 25 miles west of Yuma, Arizona. The dam will store water that is often not used (Yuma Daily Sun, January 2). The Central Arizona Project, Metropolitan Water District of Southern California, and the Southern Nevada Water Authority are funding the project.

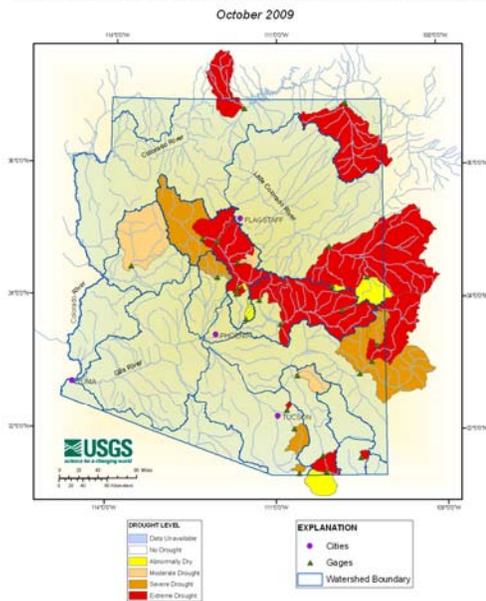
**Drought Levels Based on Monthly Streamflow Discharge**



**Drought Levels Based on Monthly Streamflow Discharge**



**Drought Levels Based on Monthly Streamflow Discharge**



Water body	Dec. Runoff in Acre Feet	% of Median
Salt River near Roosevelt	11,191	59%
Tonto Creek above Gun Creek near Roosevelt	922	42%
Verde River at Horseshoe Dam	16,417	87%
Combined Inflow to Salt River Project (SRP) reservoir system	28,530	73%
Little Colorado River above Lyman Lake	160	43%
Gila River to San Carlos Reservoir	2,521	13%

Streamflow Observed at USGS Streamflow-Gaging Stations

**Streamflow**

Drought levels gradually improved through the first quarter of the 2010 water year. Extreme drought levels in the state decreased by about half each month from October till December. In October the average drought level for the state was Severe/Extreme, but in December the average was Moderate. Elevated streamflow due to precipitation early in December was significant and did much to elevate the drought situation as defined by USGS stream gages.

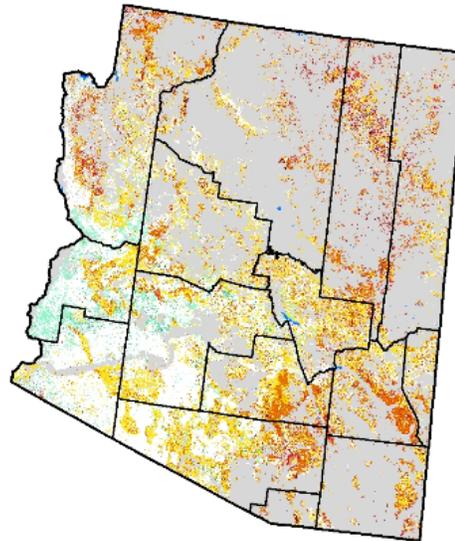
## Vegetation Health

Three main messages from this month's VegDRI map: (1) most of the state is in "out of season" status, which means that either substantial amounts of the vegetation cover, such as rangelands, are dormant, or the area is snow-covered; (2) vegetation in approximately one quarter of Arizona, mostly in the southwestern part of the state, is in "near normal" status; and (3) vegetation in approximately one quarter of Arizona is exhibiting drought stress. Nevertheless, since the last state drought status report, vegetation drought stress has substantially ameliorated in those parts of the state that currently show some level of drought stress. Vegetation health for Arizona and northern Mexico, as portrayed by NOAA's Vegetation Health Index (not shown) is still at greater stress levels than this time last year, or at this time in 2005 – which was a very wet winter in at least the western half of Arizona.

VegDRI combines precipitation-based drought indicators, such as 36-week Standardized Precipitation Index with satellite based vegetation status data. This combination allows for an improved evaluation of vegetation health related to drought, as opposed to insect pests, disease and other non-climate factors.

## Vegetation Drought Response Index Complete: Arizona

January 25, 2010



### Vegetation Condition

	Extreme Drought
	Severe Drought
	Moderate Drought
	Pre-Drought
	Near Normal
	Unusually Moist
	Very Moist
	Extremely Moist
	Out of Season
	Water



\* VegDRI is a national product, produced by a partnership of USGS, USDA Risk Management, National Drought Mitigation Center, and the High Plains Regional Climate Center. [http://drought.unl.edu/vegdiri/VegDRI\\_State.htm?AZ](http://drought.unl.edu/vegdiri/VegDRI_State.htm?AZ)



### Get Involved with Arizona DroughtWatch

AZ DroughtWatch is an internet reporting tool designed to collect and display timely observations of drought impacts across Arizona. Local drought impact group members, agency field experts, and local volunteers can contribute impact information through the survey on a monthly basis. These observations are invaluable in properly monitoring and characterizing drought across Arizona's complex landscape. Information collected through AZ DroughtWatch will be used by:

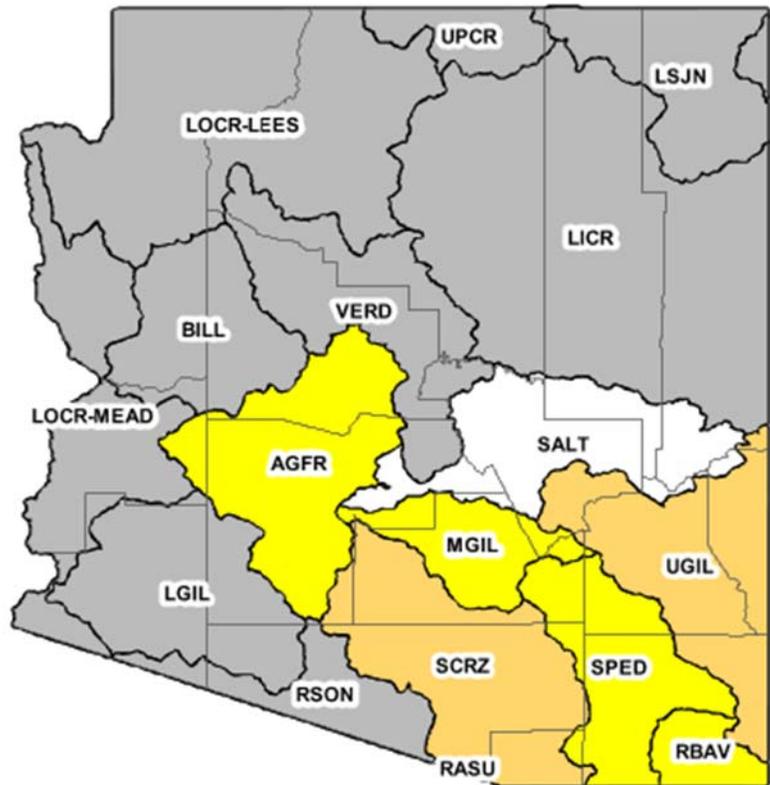
- Local communities to monitor conditions in support of drought mitigation plans and to guide longer-term risk assessment
- State Drought Monitoring Technical Committee in the production of monthly drought status maps
- National Drought Mitigation Center in the development of the weekly National Drought Monitor

If you are interested in learning more or would like to contribute impact reports go to [azdroughtwatch.org](http://azdroughtwatch.org).



# NEW DroughtWatch Impact Summary (November 2009 January 2010)

Recent wet conditions from early winter storms have helped improve drought conditions across the state, but drought impacts from the exceptionally dry and warm summer and fall continue to linger across Arizona. Most impact reports came from southeast Arizona where lack of summer rainfall created widespread and deep impacts to rangeland vegetation and local water resources that may continue to persist until relief can come in the form of summer season rain.



Over 20 impacts were reported across Arizona during this period with most tied to ranching/rangelands and surface waters. Impacts reported during this period include:

## Desert Ecosystem

- Plant stress due to unusually low soil moisture
- Plant mortality

## Societal and Community

- Impact on property value/declining property sales due to drought (e.g. lack of water resources, ordinances, changes in landscape)
- Strain on local communities due to drought impacts (e.g. business closures, property foreclosures, declining population, economic strain)

## Livestock/Ranching

- Unusually low range productivity
- Unusually low range productivity (e.g. forage amounts per acre)
- Unusually low water levels in stock ponds/tanks
- Poor forage nutritional quality/increased toxicity of forage

## Surface Water

- Unusually low flows in streams, rivers, and springs
- Unusually low groundwater levels due to long-term precipitation deficits/lack of recharge
- Need for supplemental water due to drought impacts on local surface water resources (e.g. hauling water)

For more information, visit [azdroughtwatch.org](http://azdroughtwatch.org) and click on 'Detailed Impact Reports'.

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

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Nancy Selover, State Climatologist  
Arizona State University

Gary Woodall, National Weather Service

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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

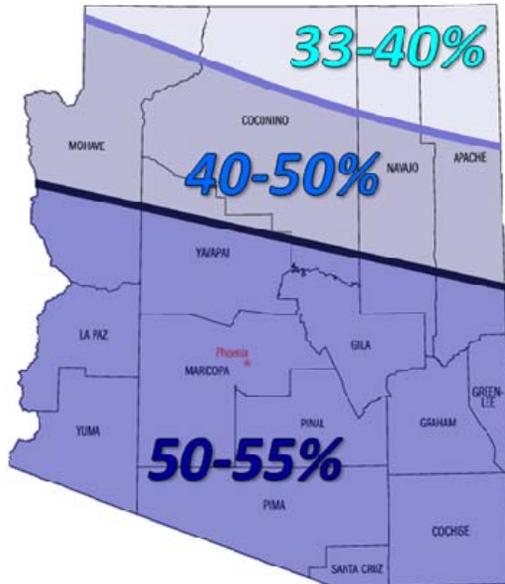
Ron Ridgway, Arizona Division of Emer-  
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Coordinator: Susan Craig, Arizona  
Department of Water Resources  
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zona Department of Water Resources

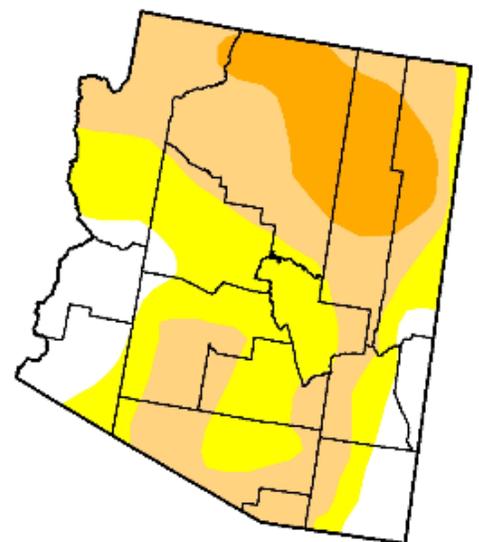
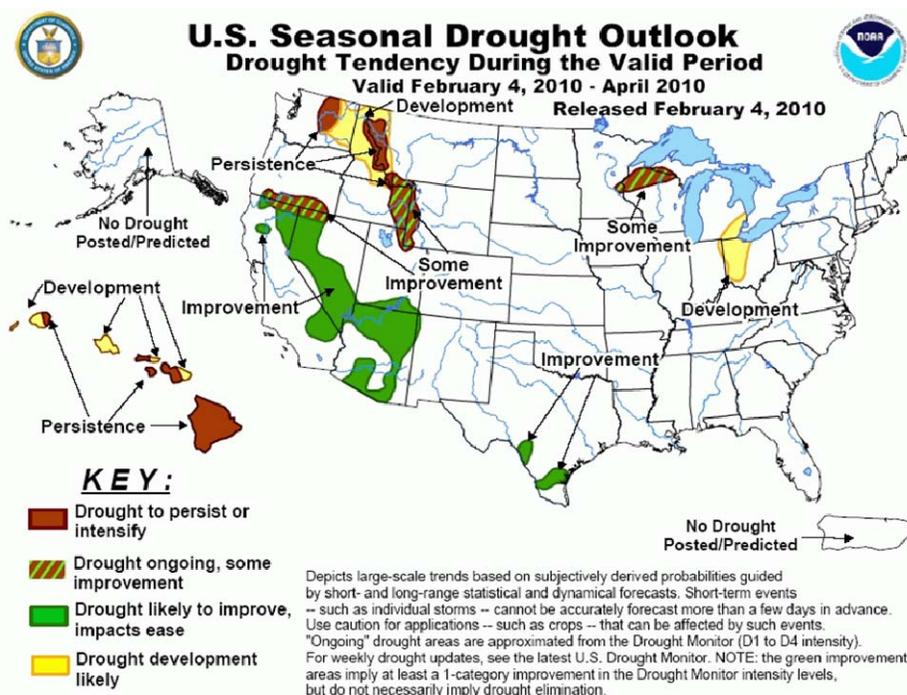
For more information visit  
[http://www.azwater.gov/azdwr/statewide\\_planning/drought/droughtstatus.htm](http://www.azwater.gov/azdwr/statewide_planning/drought/droughtstatus.htm)

**Three-month Temperature and Precipitation Outlook**



A moderate/strong El Niño continues to influence the weather of much of the world. As expected, winter thus far has been rather wet for Arizona. As the winter comes to an end, a heightened probability for above normal rain and snow continues for the Southwest. The NOAA CPC Precipitation Outlook for February-March-April depicts a greater than 50% probability for above normal precipitation during the three month period, with less than a 20% probability of below normal precipitation (above left). Temperatures during the same period have an equal probability of being near, above, or below climatology (above right).

**Drought Outlook** (based on January/February data) - The NOAA CPC Drought Outlook, released February 4, 2010, forecasts that some improvements are likely in the drought status across Arizona through April 2010.



■ D0 Abnormally Dry      ■ D3 Drought - Extreme  
■ D1 Drought - Moderate      ■ D4 Drought - Exceptional  
■ D2 Drought - Severe

National Drought Monitor February 16, 2010, Arizona drought status map