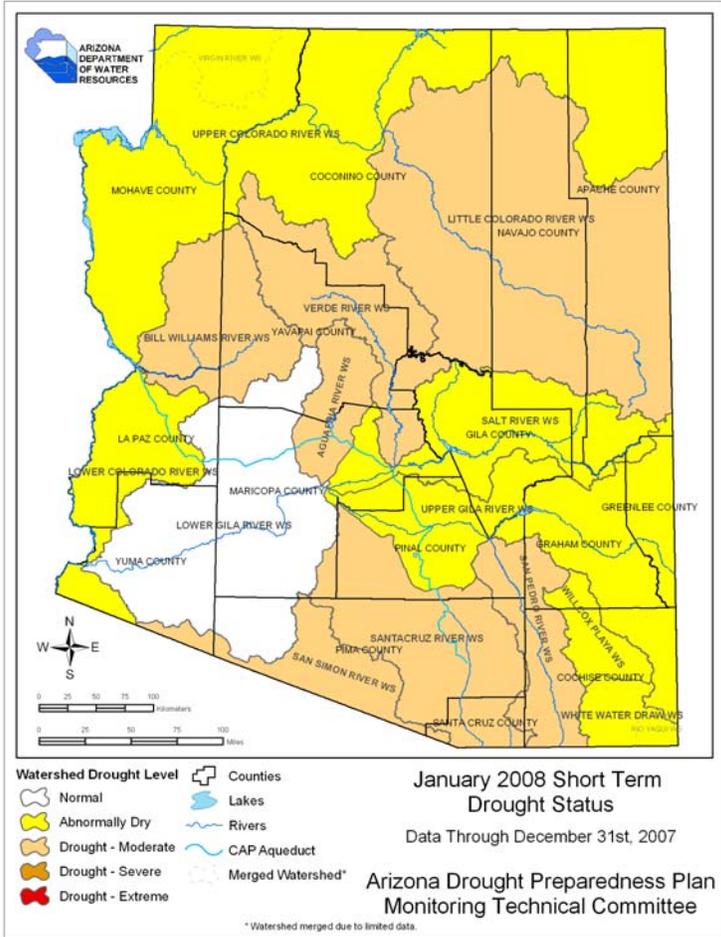
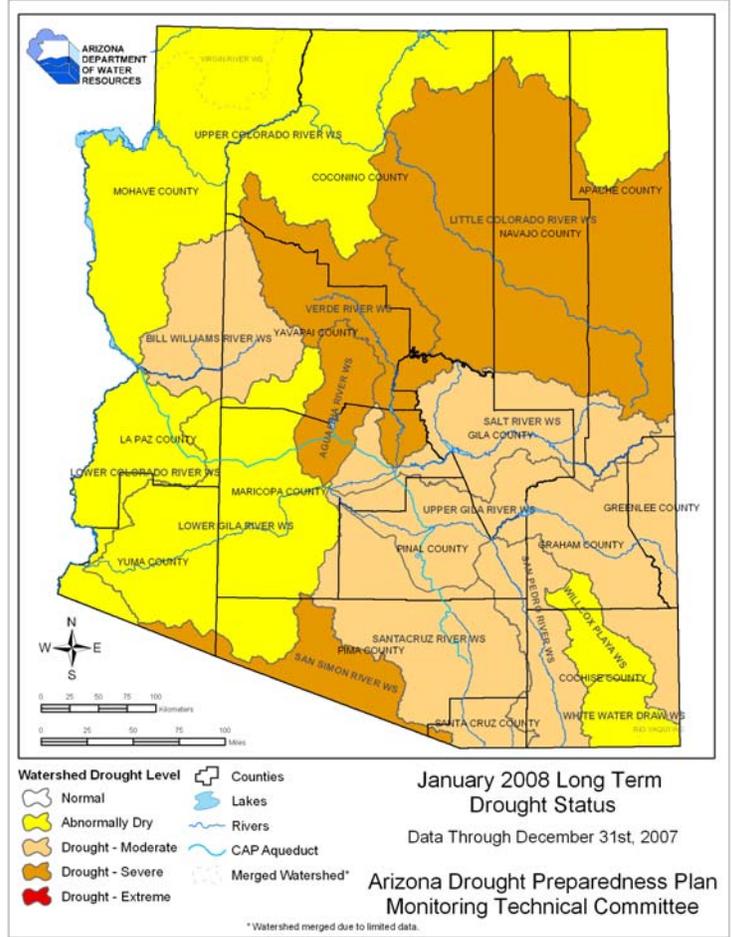


# Arizona Drought Monitor Report January 2008

## Short-term Drought Status



## Long-term Drought Status



### Short-term Update

The short-term drought status continues to improve in central and southwestern Arizona on the Agua Fria and Lower Gila watersheds. Above average precipitation in the past six months in northern and eastern Arizona has also brought improvement to the Virgin, Upper Colorado, Upper Gila, and Willcox Playa watersheds. We now have seven watersheds in moderate drought in north central and south central Arizona, seven watersheds abnormally dry in northwest and southeast Arizona, and one in the southwest (Lower Gila), showing normal conditions. The recent precipitation in January should generate continued improvements in the short-term.

### Long-term Update

Prior to this month's report, the long term drought status had remained unchanged for the past three months, as long-term changes are now assessed on a quarterly/seasonal basis, rather than monthly. Long term drought is calculated with precipitation as well as streamflow to gauge potential impacts to water resources which respond to longer timescales of climate variability. With this month's report, the Lower Gila and Willcox Playa in southern Arizona have improved from moderate to abnormally dry and the Salt watershed has improved from severe to moderate. The extremely wet conditions of January 2008 will not be included in the long-term drought calculations until the 2<sup>nd</sup> quarter update in April. The Climate Prediction Center continues to forecast warmer and drier than average conditions for the southwestern U.S. While certainly welcome, the unusually wet conditions are not expected to continue throughout the winter.



# Reservoir Storage



# Vegetation Health

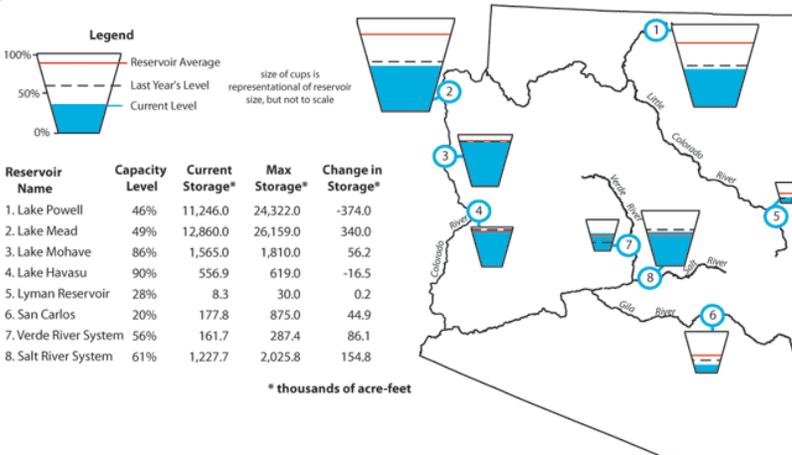


## Arizona Reservoir Status

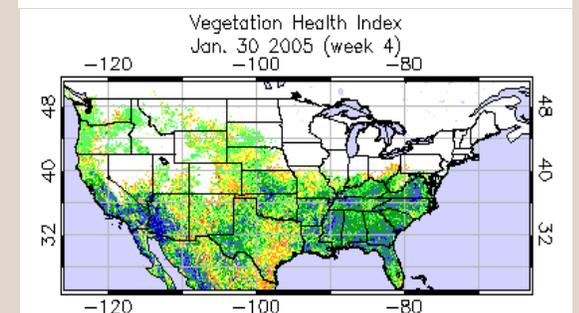
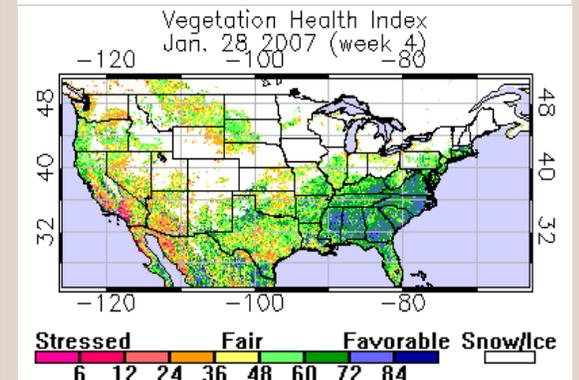
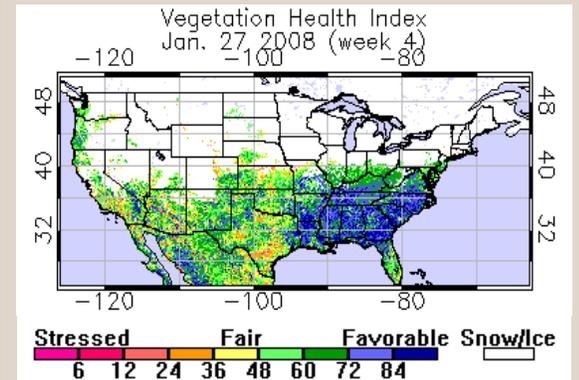
During the last month, storage increased in most Arizona reservoirs (see figure below). Storage in Lakes Powell and Mead is expected to decline until the spring 2008 snowmelt runoff season, when current forecasts anticipate slightly above-average inflow to Lake Powell. Storage in the Salt and Verde River reservoirs increased by more than 240,000 acre-feet during the last month, following a series of storms that began in late November.

Quagga mussels were discovered at multiple sites in Lake Pleasant, northwest of Phoenix (Arizona Republic, January 1). These tiny invasive mollusks can multiply quickly and clog water intakes and pipes. Repairs can cost millions of dollars. The mussels pose no known human health risk, but they can disrupt ecosystems by robbing other aquatic life of oxygen. Currently, there is no safe method of eradicating quagga mussels. Arizona officials are encouraging boaters to inspect vessels that come in contact with the lake water.

Arizona reservoir levels for December 2007 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 indices from the NOAA Center for Satellite Applications and Research continue to show marked improvement in contrast to one year ago (middle graphic), and to one month ago (see December 2007 report). Conditions this year (top graphic), in contrast with 2005 (bottom graphic), another wet winter, show how 2005 precipitation, vegetation, and surface moisture was excellent in the western half of the state, whereas this winter's Moisture and vegetation response has been exceptional across the Mogollon Rim and east-central Arizona. (White areas indicate substantial cloud



Images are obtained from the NOAA National Environmental Satellite, Data and Information Service (NESDIS).

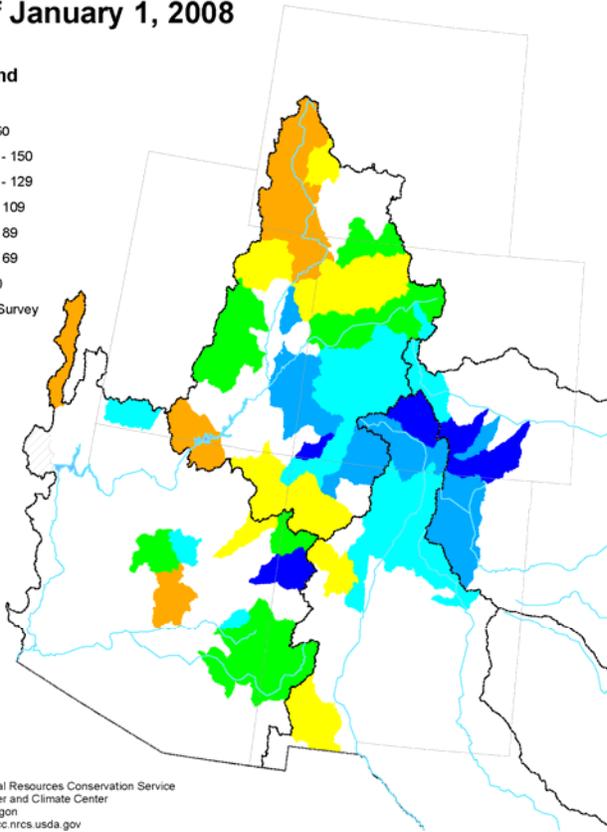


Photos by the National Park Service

# Mountain Precipitation



## Arkansas, Colorado and Rio Grande Basin Mountain Snowpack as of January 1, 2008



Prepared by  
 USDA, Natural Resources Conservation Service  
 National Water and Climate Center  
 Portland, Oregon  
<http://www.wcc.nrcs.usda.gov>

## Mountain Snowpack

As of January 1, basin snowpack levels range from 77 percent to 107 percent, averaging 93 percent statewide.

Watershed	Percent of 30-Year Average Snowpack Levels as of	
	Dec. 1	Jan. 1
Salt River Basin	—	107%
Verde River Basin	—	77%
Little Colorado River Basin	—	87%
San Francisco-Upper Gila River Basin	—	104%
<b>Other Points of Interest</b>		
Chuska Mountains	—	84%
Central Mogollon Rim	—	64%
Grand Canyon	—	36%
San Francisco Peaks	—	126%
Arizona Statewide	—	93%

Source USDA-NRCS

## Water Year Precipitation

For the water year to date, cumulative precipitation is above average in all river basins, ranging from 111 to 136 percent of average (see table below). As a result of these conditions, water users can expect normal surface water supplies this spring unless current weather patterns shift.

Watershed	Percent of 30-Year Average
	Precipitation Oct 1-Dec 31
Salt River Basin	127%
Verde River Basin	123%
Little Colorado River Basin	136%
San Francisco-Upper Gila River Basin	111%
<b>Other Points of Interest</b>	
Chuska Mountains	--
Central Mogollon Rim	--
Grand Canyon	85%
San Francisco Peaks	--
Arizona Statewide	--

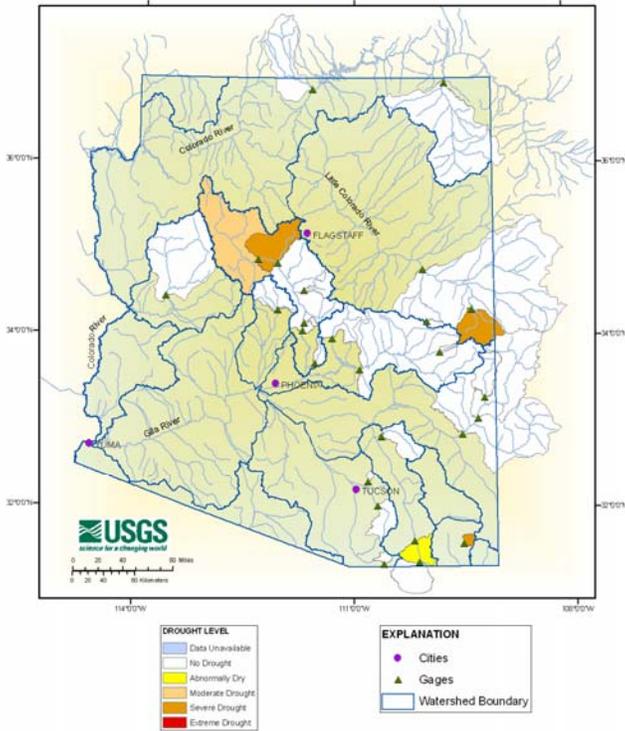
Source USDA-NRCS

# Mountain Streamflow



## Drought Levels Based on Monthly Streamflow Discharge

December 2007



## December Streamflow

Flows for key streams in Arizona were at levels well above median flow values, with the exception of Little Colorado River.

Water body	December Run-off in Acre Feet	% of Median
Salt River near Roosevelt	45,931	242%
Tonto Creek above Gun Creek near Roosevelt	9,162	415%
Verde River at Horseshoe Dam	32,404	172%
Combined Inflow to Salt River Project (SRP) reservoir system	87,497	225%
Little Colorado River above Lyman Lake	203	43%
Gila River to San Carlos Reservoir	48,452	256%

December Streamflow Observed at USGS Gauging Stations (NRCS from USGS data)

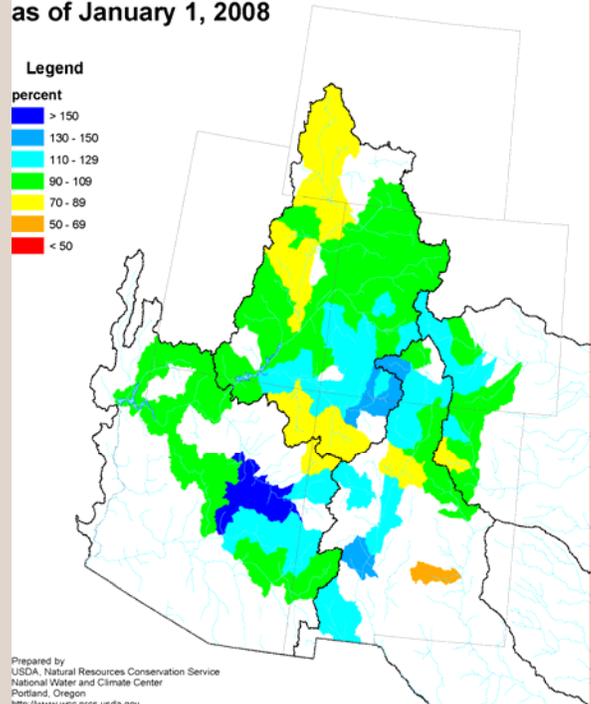
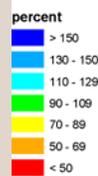
## Streamflow Forecasts

The long-range forecast calls for normal to above normal streamflow levels this season in all basins except for the San Francisco – Upper Gila Basin, which is forecast at below normal.

Water body	Forecasted Runoff (January-May unless noted) in Acre Feet	% of Median
Salt River near Roosevelt	450,000	117%
Tonto Creek	85,000	152%
Verde River at Horseshoe Dam	220,000	100%
San Francisco River at Clifton	80,000	114%
Gila River near Soloman	175,000	106%
San Carlos reservoir inflow	105,000	110%
Little Colorado River above Lyman Lake	Jan-June – 9,400	127%
Little Colorado River at Woodruff	6,000	167%
Colorado River inflow to Lake Powell	Apr-July – 8.0 million	101% of 30-yr. avg.
Virgin River at Littlefield	Apr-July – 65,000	88% of 30-yr. avg.

## Arkansas, Colorado and Rio Grande Spring and Summer Streamflow Forecasts as of January 1, 2008

### Legend



Prepared by  
USDA, Natural Resources Conservation Service  
National Water and Climate Center  
Portland, Oregon  
<http://www.nrcs.usda.gov>

# Temperature and Precipitation



December was extremely wet everywhere in the state. Most of the precipitation fell in a five day period from the 6<sup>th</sup> through the 11<sup>th</sup>, as part of a major winter storm that brought significant snowfall to the mountains. The series of cold fronts that passed through the state lowered temperatures dramatically from the previous month. December temperatures were near average along the lower Colorado River and well below average elsewhere, with Yavapai County at the 24<sup>th</sup> percentile.

The 3-month period of October through December had nearly average precipitation in the northern and southeastern watersheds, and well above average precipitation in the central and southwestern watersheds. The wet conditions are mostly a result of the very wet December across the state. The cold December, averaged with the very warm October and November, brought the three-month average temperatures down near the 80<sup>th</sup> percentile in most climate divisions.

The 6-month period precipitation was near average in the southeast, and well above average in all other watersheds. This period reflects both the wet monsoon and the wet early winter. The hot summer and fall have kept the six-month temperatures up above the 85<sup>th</sup> percentile everywhere in the state.

The 12-month period is now about average for precipitation in most watersheds, with the wet second half of the calendar year balancing

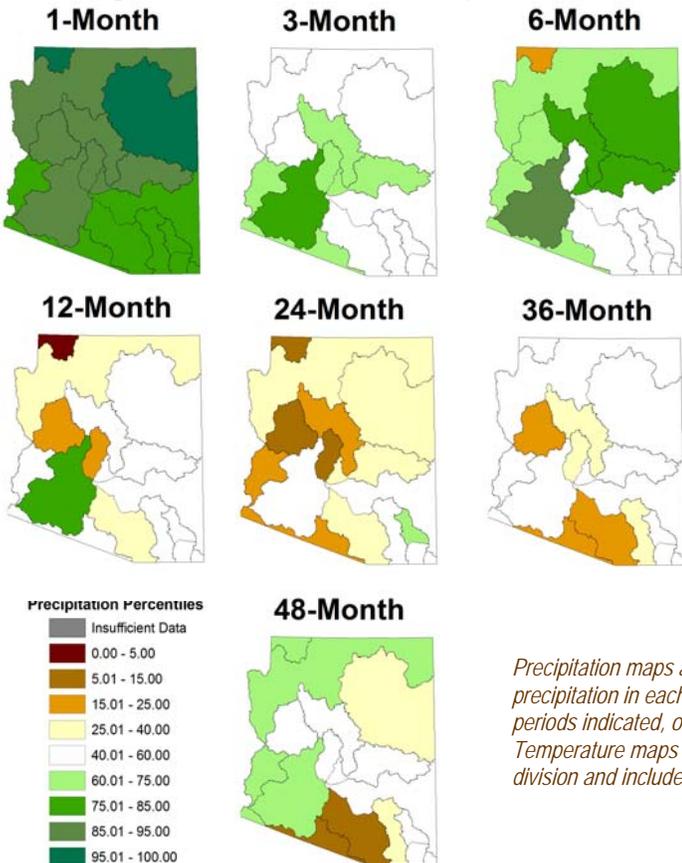
out the dry first half of the calendar year. Notable exceptions are the very dry Virgin, Bill Williams and Agua Fria watersheds and the very wet lower Gila watershed. The past 12 months have continued to be very hot with temperatures above the 83<sup>rd</sup> percentile in all climate divisions.

The 24 month period is yet again the driest period. The dry watersheds are toward the north half of the state, indicating that the 24-month deficit is due more to winter dryness than summer dryness. Temperatures are all above the 81<sup>st</sup> percentile, with the southern third of the state above the 98<sup>th</sup> percentile.

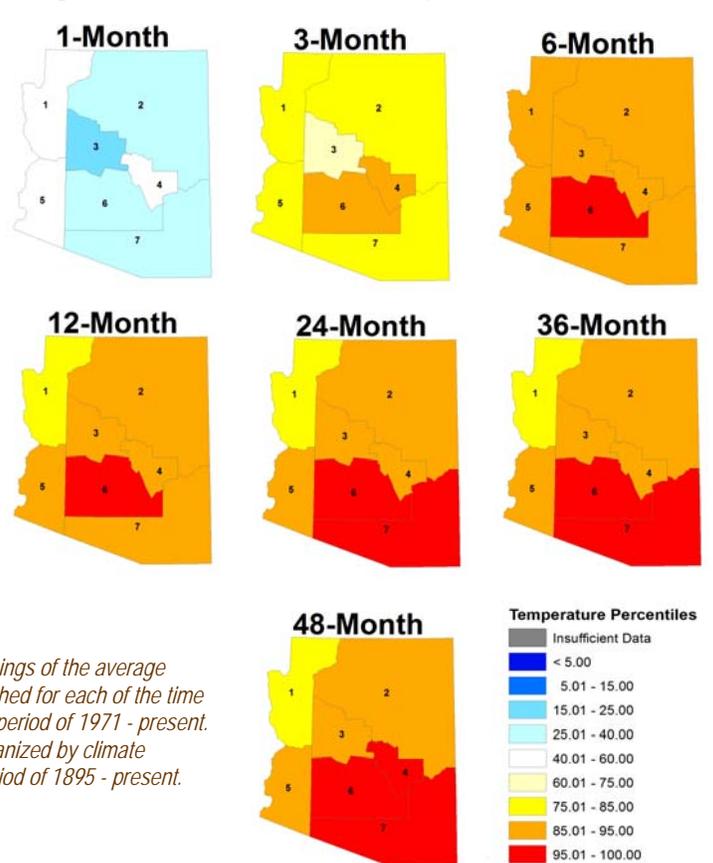
The 36-month period has nine watersheds near normal for precipitation, and only three at or below the 20<sup>th</sup> percentile. The Santa Cruz and San Simon watersheds in southern Arizona have been extremely dry for the three year period, as has the Bill Williams in central Arizona. Again, temperatures over the three-year period are extremely high.

The 48-month period again shows above average precipitation across the western part of the state, and near average precipitation in eastern and southern Arizona. The exceptions are the Santa Cruz and San Simon watersheds, both below the 15<sup>th</sup> percentile, and the San Pedro below the 30<sup>th</sup> percentile. There are still three climate divisions in the southern half of the state above the 96<sup>th</sup> percentile for temperature.

## 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  
Monitoring Technical Committee

Co-chairs:  
Gregg Garfin, University of Arizona -  
Institute for the Study of Planet Earth

Tony Haffer, National Weather Service

Mike Crimmins, Extension Specialist,  
University of Arizona Cooperative  
Extension

Charlie Ester, Salt River Project

Larry Martinez, Natural Resources  
Conservation Service

Ron Ridgway, Arizona Division of Emer-  
gency Management

Nancy Selover, State Climatologist  
Arizona State University

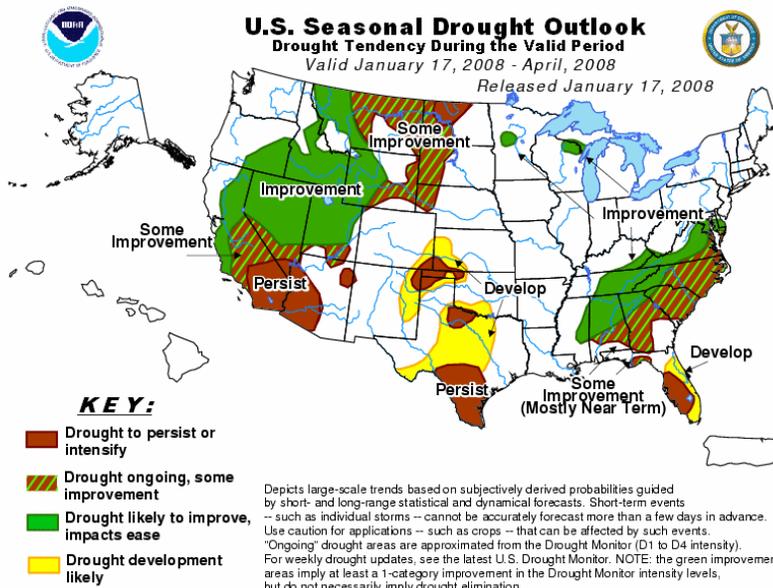
Chris Smith, U.S. Geological Survey

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



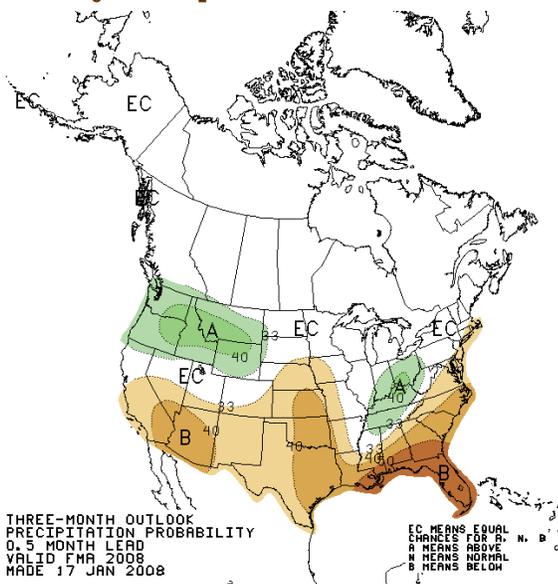
## Drought Outlook

The CPC Seasonal Drought Outlook indicates drought conditions across the western half of the state will continue to experience drought conditions through at least April 2008.



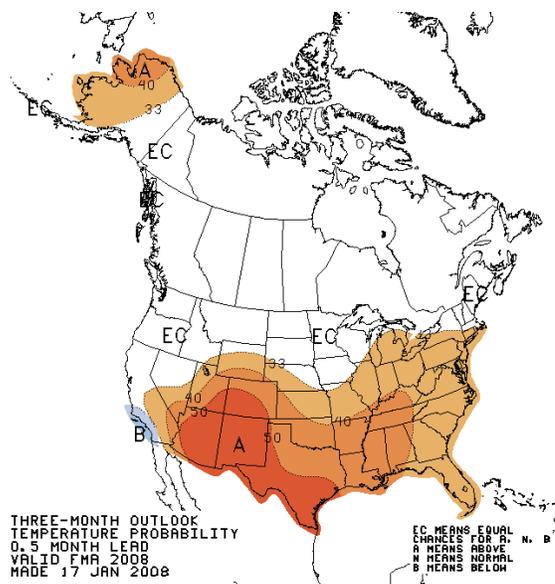
Also see the most current Southwest Climate Outlook - [www.ispe.arizona.edu/climas/forecasts/swoutlook.html](http://www.ispe.arizona.edu/climas/forecasts/swoutlook.html)  
For additional weather information from the Office of the State Climatologist for Arizona - <http://geography.asu.edu/azclimate>

## February to April Weather Outlooks



### Precipitation

Moderate level of confidence precipitation will be below average across the state during the 90-day period



### Temperature

Moderate to high level of confidence temperatures will be above average across the entire state