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May Southwest Climate Outlook

Precipitation: In the past 30 days, most of New Mexico and much of central Arizona recorded well above-average precipitation (Fig. 1). Climatologically, this is one of the drier times of year for the Southwest, so any substantive precipitation during this timeframe is generally unexpected but welcome, as it helps tamp down fire risk. Water year observations since October 1 demonstrate the persistent and ongoing drought, with most western states, including Arizona, recording large areas of below-average to well below-average precipitation (Fig. 2). New Mexico and the eastern side of Colorado, Wyoming, and Montana have benefitted from some late season storms, but that rainfall on the other side of the Continental Divide, does not necessarily help the water situation in the Southwest.

Temperature: Lingering storms and above-average humidity contributed to mild and pleasant conditions across the Southwest, with temperature anomalies in Arizona and New Mexico between 2 and 6 degrees below average across the region in the past 30 days (Fig. 3). This counters more than six months of record or near-record warm average temperatures that have persisted in the Southwest and the western U.S. since the water year began on October 1 (Fig. 4).

Snowpack & Streamflow Forecasts: The late-season push for cooler than average weather had little impact on snowpack, and as of May 13, snow water equivalent (SWE) was far below average across the western U.S. (Fig. 5). Above-average temperatures and below-average precipitation, both contributing to a meager snowpack, were primary drivers in this pattern and resulted in below-average forecasts for streamflow (Fig. 6).

Drought & Water Supply: The U.S. Drought Monitor highlights persistent drought conditions across the West, with particularly severe conditions in California and Nevada, and emphasizes primarily long-term drought conditions across most of Arizona and much of New Mexico. Total reservoir storage was 44 percent in Arizona and 26 percent in New Mexico (see reservoir storage on page 5 for details). Below-average snowpack and above-average temperatures have resulted in earlier-than-normal melt-out in numerous areas and losses associated with sublimation and infiltration.

Wildfire: Mild spring weather, above-average precipitation, and relative humidity have resulted in reduced wildfire risk in Arizona and New Mexico so far this season. This can change quickly, especially since precipitation during the 2014 tropical storm season contributed to abundant fine fuels, which can escalate wildfire risk when the region eventually dries out. An early or even on-time start to the monsoon could limit the window of highest wildfire risk, but a delayed start could extend it, especially given the dry lightning associated with summer storms.

Precipitation & Temperature Forecasts: The May 21 NOAA-Climate Prediction Center seasonal outlook predicts above-average precipitation this spring into summer for much of the Southwest and Intermountain West, although California and most of Arizona are notable exceptions. Temperature forecasts remain split across the region, with elevated chances for above-average temperatures along the West Coast and eastward into Arizona (and most of the western U.S.), and increased chances for below-average temperatures in western Texas and into eastern New Mexico.

Tweet May SW Climate Outlook

CLICK TO TWEET

May 2015 @CLIMAS_UA SW Climate Outlook - El Niño get stronger, Winter - Spring Recap, Thinking Wildfire and Monsoon http://bit.ly/1IO0m55

Online Resources

Figure 1&2
NOAA/NWS - Advanced Hydrologic Prediction Service
http://water.weather.gov/precip/

Figure 3
High Plains Regional Climate Center
http://www.hprcc.unl.edu/

Figure 4
National Climatic Data Center
https://www.ncdc.noaa.gov/

Figure 5&6
Natural Resources Conservation Service
http://www.wcc.nrcs.usda.gov/gis/snow.html

March Southwest Climate Outlook

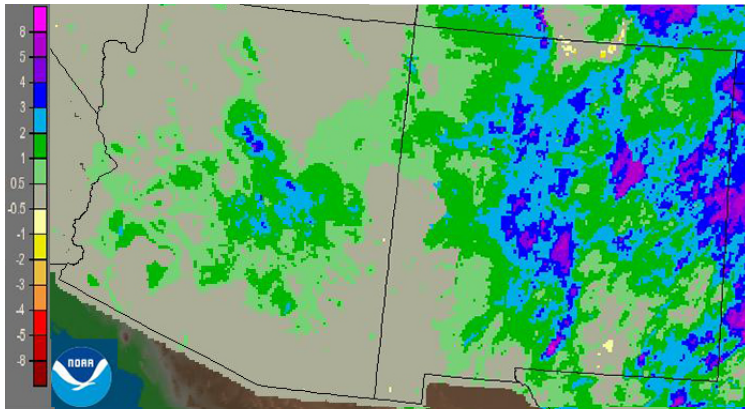

Figure 1: Departure from Normal Precipitation - Past 30 Days

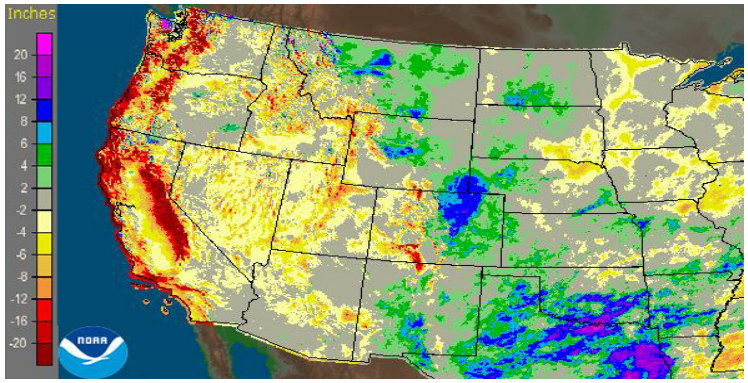

Figure 2: Departure from Normal Precipitation - Since Oct 1

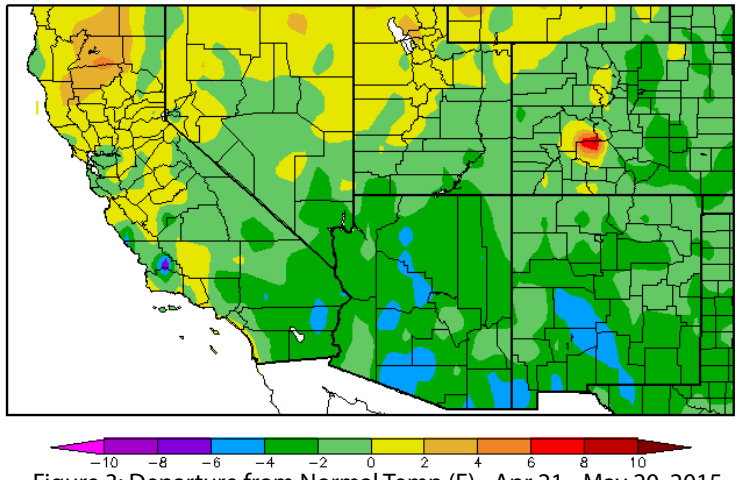

Figure 3: Departure from Normal Temp (F) - Apr 21 - May 20, 2015

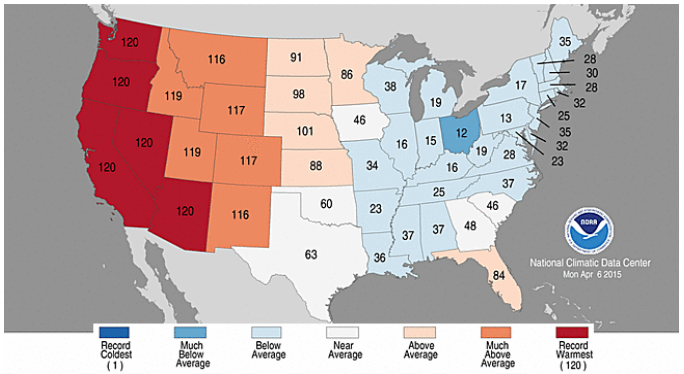

Figure 4: Statewide Average Temperature Ranks - Oct 2014 - Mar 2015

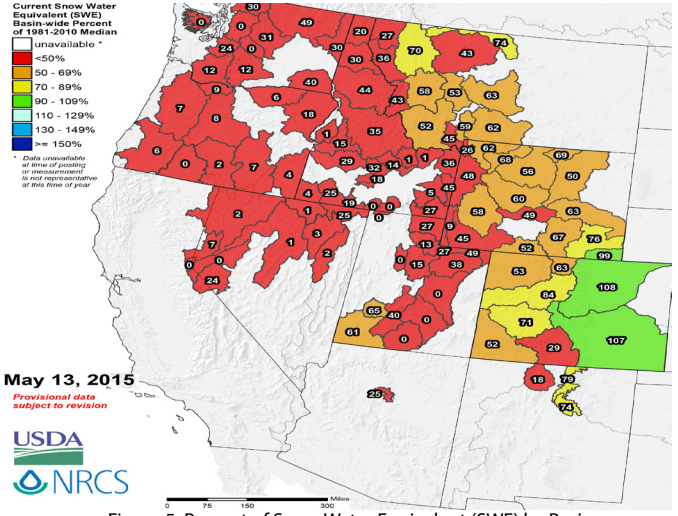

Figure 5: Percent of Snow Water Equivalent (SWE) by Basin

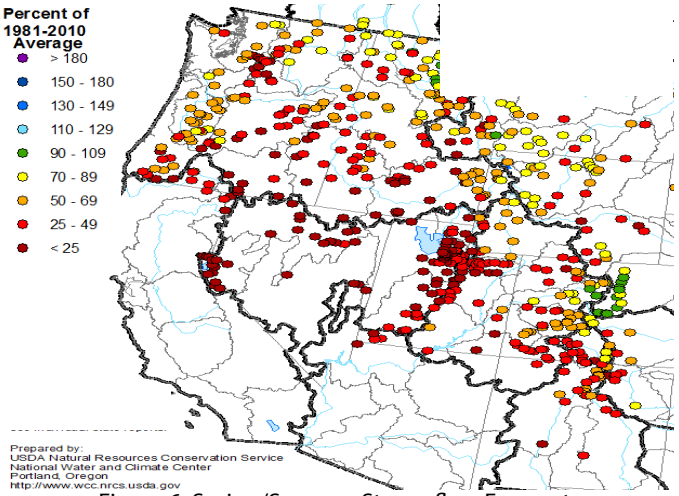

Figure 6: Spring/Summer Streamflow Forecasts

Online Resources

Figure 1.
Australian Bureau of Meteorology
http://www.bom.gov.au/climate/enso/index.shtml

Figure 2.
NOAA - National Climatic Data Center
http://www.ncdc.noaa.gov/teleconnections/enso/

Figure 3.
International Research Institute for Climate and Society
http://iri.columbia.edu/our-expertise/climate/forecasts/enso/

Figure 4.
NOAA - Climate Prediction Center
http://www.cpc.ncep.noaa.gov/products/NMME/current/plume.html

2015 El Niño Tracker

El Niño continued for a third straight month, with no signs of weakening or dissipating. Forecasts keyed in on persistent sea surface temperature (SST) anomalies (Figs. 1–2), along with weakening trade winds, ongoing convective activity, and El Niño-related ocean-atmosphere coupling. If these conditions continue, we are likely to see the effects of a moderate El Niño event–or stronger if conditions continue to strengthen. Spring forecasts have a higher degree of uncertainty, owing to the so-called spring predictability barrier, a likely source of vacillations in recent forecasts.

Current forecasts offer a consistent and bullish forecast compared to last month, when they were integrating mixed signals regarding the strength of El Niño. On May 12, the Japan Meteorological Agency reversed course with an observation that strengthening El Niño conditions in the equatorial Pacific reflected an ongoing El Niño event that was likely to last through at least fall 2015. On May 12, the Australian Bureau of Meteorology upgraded its tracker to official El Niño status, identifying persistent SST anomalies, weak trade winds, and increasing ocean-atmospheric coupling serving as indicators this El Niño event was strong enough to extend into 2015. On May 14, the NOAA-Climate Prediction Center (CPC) extended its El Niño advisory with a 90 percent chance that El Niño will continue through summer 2015 and an 80 percent chance the event will last through 2015. The CPC pointed to positive SST anomalies, along with ongoing ocean-atmospheric coupling and dateline convection activity, as indicators of a weak to moderate El Niño event that will likely continue for most of 2015. On May 21, the International Research Institute for Climate and Society (IRI) and CPC forecasts confirmed we are in the midst of an El Niño event that appears to be strengthening, with the current forecast suggesting a moderate to strong El Niño event persisting into 2016. The North American multi-model ensemble shows a moderate event extending through the spring, with potential for a strong event by summer or early fall (Fig. 4).

After a series of fits and starts, the pieces finally seem in place for the El Niño event forecasters expected to start last year. This is partially evidenced by the recent above-average precipitation and below-average temperatures in Arizona and New Mexico in late April and early May—exactly the sort of springtime weather we might expect to see if El Niño conditions were present and affecting our weather patterns. If the event persists into fall and winter 2015, and particularly if it remains a moderate to strong event, we will likely see patterns of above-average precipitation in the Southwest. There is also the possibility of a repeat of the 2014 tropical storm season, in which conditions favorable to El Niño were thought to have driven the increased tropical storm activity in the Southwest.

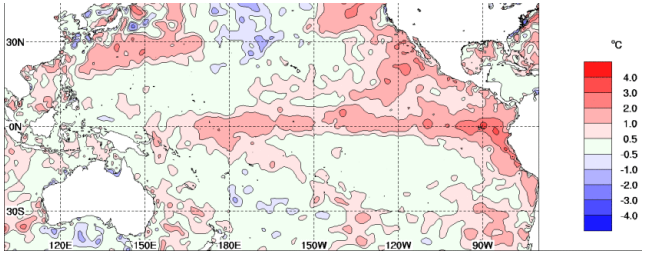

Figure 1: May 2015 Sea Surface Temperature (SST) Anomalies

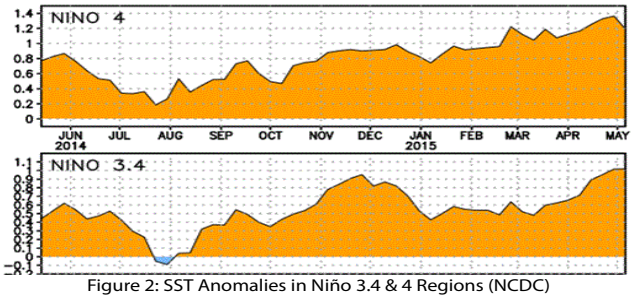

Figure 2: SST Anomalies in Niño 3.4 & 4 Regions (NCDC)

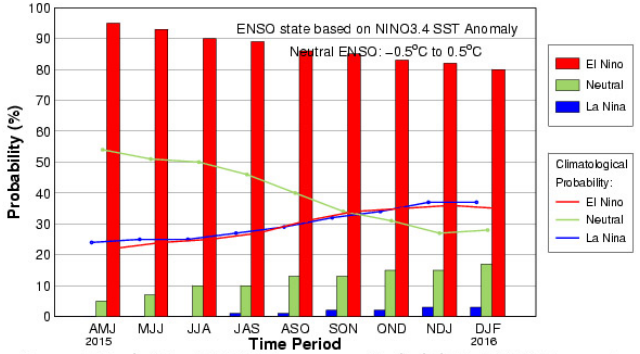

Figure 3: Early-May IRI/CPC Consensus Probabilistic ENSO Forecast

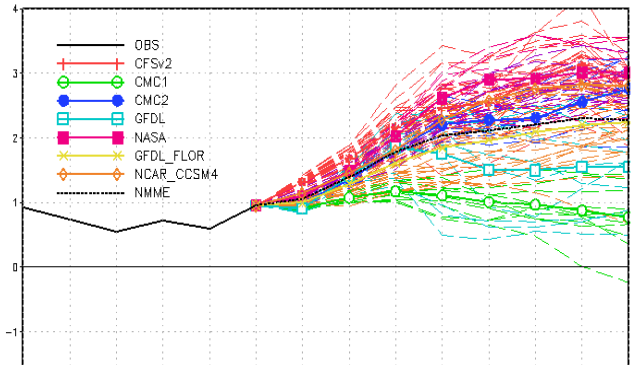

Figure 4: North American Multi-Model Ensemble Forecast for Niño 3.4

Online Resources

Figure 1
NOAA/NWS - Advanced Hydrologic Prediction Service
http://water.weather.gov/precip/

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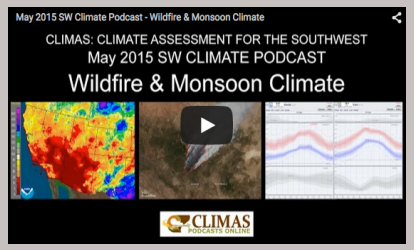
www.climas.arizona.edu/media/podcasts

This Month's Podcast

Mike Crimmins and Zack Guido talk about the winter and spring patterns that will affect the 2015 Wildfire Season, as well as how we differ from regions not affected by Monsoon Climate patterns.



For image credits and information:

www.climas.arizona.edu/blog

www.youtube.com/user/UACLIMAS/

Winter/Spring Recap 2014-2015

It may not be news to anyone who follows weather forecasting and climate outlooks, but winter 2014–2015 did not play out as expected. Last year, long-term seasonal forecasts keyed in on conditions favorable to the development of an El Niño event and suggested we were more likely to see above-average precipitation in our winter months. This was welcome news to a region that has been affected by a long-term and persistent drought, but rather than sustained above-average precipitation, we saw highly variable precipitation between October 2014 and April 2015 (Fig. 1) and cumulative water year-to-date precipitation that is below average across much of Arizona and parts of New Mexico (Fig. 2 on page 2). Temperature was much less variable, with record or near-record warm average temperatures across most of the western U.S. (Fig. 4 on page 2). So what does this mean for some key areas of concern in the Southwest?

Snowpack and water supply: The combination of below-average winter precipitation and above-average winter temperatures across the western U.S. meant there was less snow in the mountains and that it melted sooner in the season, which has implications for 2015 water supply. There was below-average precipitation overall, and precipitation that did occur often fell as rain instead of snow, with some losses to infiltration (owing to drier soils and the long-term drought) and sublimation (snow essentially evaporating associated with above-average temperatures and low relative humidity). Above-average temperatures also drove earlier-than-normal snowmelt, with most of the western U.S. recording well below-average snow, and many areas were snow-free far in advance of normal.

Wildfire: The repeated incursions of precipitation associated with an above-average eastern Pacific tropical storm season and rainfall tied to typical monsoon patterns drove the growth of fine fuels in the Southwest. This presents an increased fire risk when these fuels dry out, especially when the monsoon is ramping up and we see instances of dry lightning during building storms. The counterpoint is our recent pattern of mild temperatures, increased humidity, and the occasional rainstorm, all of which have tamped down the wildfire risk in the Southwest (see inset, left). This can change quickly if we get the sustained period of windy weather with low relative humidity and high ambient temperatures that is typical of late May and early June.

Pollen, Air Quality, and Human Health: The combination of precipitation last fall and elevated winter temperatures resulted in a banner year for wildflowers in the Southwest but also high pollen counts. Seasonal allergy sufferers will almost certainly already be aware of this, but cumulative exposure to an increasing level and diversity of pollen likely affects those with only infrequent or occasional allergy symptoms as well.

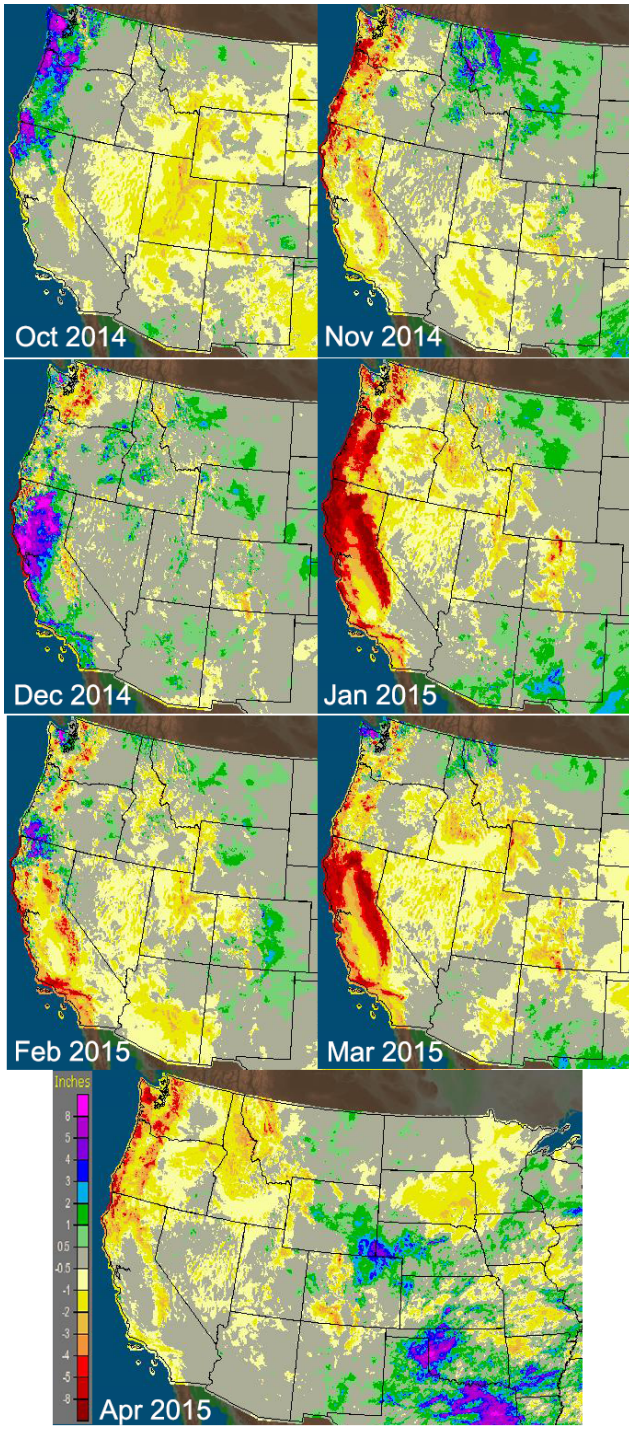


Figure 1: Departure from Normal Precipitation Oct 2014 - Apr 2015

Online Resources

Portions of the information provided in this figure can be accessed at the Natural Resources Conservation Service

Arizona: http://1.usa.gov/19e2BdJ

New Mexico: http://www.wcc.nrcs.usda.gov/cgibin/resv_rpt.pl?state=new_mexico

Notes

The map gives a representation of current storage for reservoirs in Arizona and New Mexico. Reservoir locations are numbered within the blue circles on the map, corresponding to the reservoirs listed in the table. The cup next to each reservoir shows the current storage (blue fill) as a percent of total capacity. Note that while the size of each cup varies with the size of the reservoir, these are representational and not to scale. Each cup also represents last year's storage (dotted line) and the 1981–2010 reservoir average (red line).

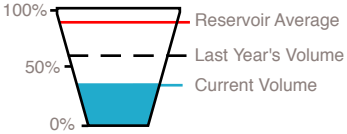
The table details more exactly the current capacity (listed as a percent of maximum storage). Current and maximum storage are given in thousands of acre-feet for each reservoir. One acre-foot is the volume of water sufficient to cover an acre of land to a depth of 1 foot (approximately 325,851 gallons). On average, 1 acre-foot of water is enough to meet the demands of 4 people for a year. The last column of the table lists an increase or decrease in storage since last month. A line indicates no change.

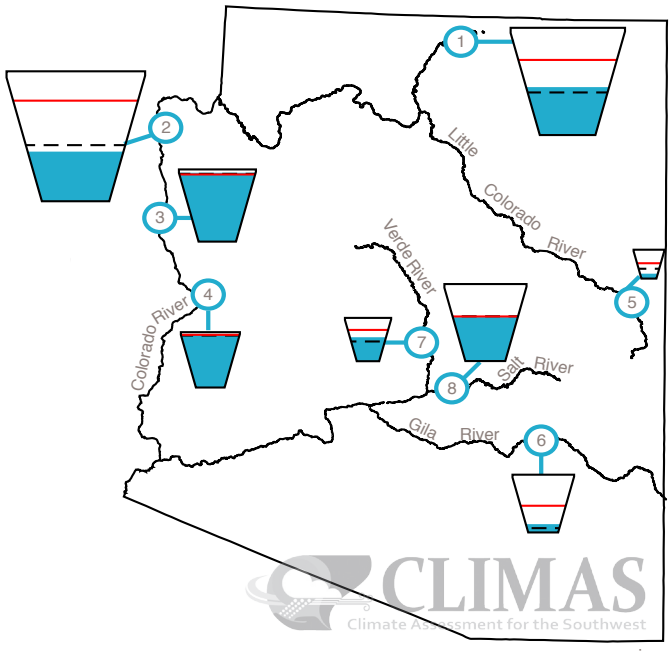
These data are based on reservoir reports updated monthly by the National Water and Climate Center of the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS).

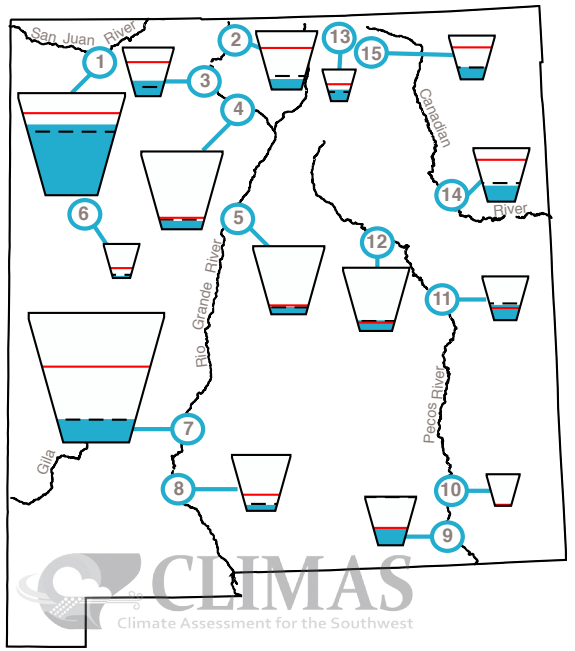
Reservoir Volumes

DATA THROUGH APR 30, 2015

Data Source: National Water and Climate Center, Natural Resources Conservation Service







Reservoir	Capacity	Current Storage*	Max Storage*	One-Month Change in Storage*
1. Lake Powell	45%	10,845.9	24,322.0	-71.1
2. Lake Mead	38%	9,917.0	26,159.0	-502.0
3. Lake Mohave	95%	1,722.6	1,810.0	29.9
4. Lake Havasu	94%	584.2	619.0	6.3
5. Lyman	17%	5.0	30.0	0.2
6. San Carlos	14%	119.3	875.0	-19.1
7. Verde River System	55%	158.5	287.4	-30.0
8. Salt River System	57%	1,155.0	2,025.8	8.5

*KAF: thousands of acre-feet

Reservoir	Capacity	Current Storage*	Max Storage*	One-Month Change in Storage*
1. Navajo	69%	1,170.5	1,696.0	20.1
2. Heron	18%	70.5	400.0	2.9
3. El Vado	32%	61.6	190.3	24.3
4. Abiquiu	11%	129.1	1,192.8	-4.4
5. Cochiti	10%	48.5	491.0	-0.2
6. Bluewater	6%	2.3	38.5	-0.1
7. Elephant Butte	18%	398.3	2,195.0	25.2
8. Caballo	11%	35.3	332.0	-0.8
9. Lake Avalon	35%	1.4	4.0	0.1
10. Brantley	7%	73.5	1,008.2	-11.4
11. Sumner	35%	36.0	102.0	-9.6
12. Santa Rosa	17%	74.4	438.3	3.2
13. Costilla	36%	5.7	16.0	0.9
14. Conchas	30%	75.6	254.2	-8.8
15. Eagle Nest	28%	22.4	79.0	1.9

* in KAF = thousands of acre-feet