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Published by the Climate Assessment for the Southwest (CLIMAS), with support from University of Arizona Cooperative Extension, the Arizona State Climate Office, and the New Mexico State Climate office.

January Southwest Climate Outlook

Precipitation: After an exceptionally dry November, a number of storms pushed into the Southwest in December and early January, but overall precipitation totals were highly variable across Arizona and New Mexico (Fig. 1).

Temperature: December continued the yearlong trend of above-average temperatures, with Arizona logging the warmest year on record in 2014 (as did California and Nevada), and New Mexico at near-record levels (Fig. 2). The extended warm temperatures were in part attributable to well above-average humidity that extended long after the monsoon ended. In particular, this kept nighttime lows above average, and we did not experience the typical pattern of cooling off and drying out in early fall.

Snowpack: While still relatively early in the season, snow water equivalent (SWE) remains low across Arizona and New Mexico, ranging from 0 to 70 percent of average in Arizona and 50 to 90 percent of average for most of New Mexico. SWE in the upper elevations that feed into Arizona and New Mexico are faring a little better, with most of the basins reporting more than 70 percent of average and many reporting between 90 and 110 percent of average (Fig. 3).

Water Supply: In December, total reservoir storage was 45 percent in Arizona (compared to 47 percent last year) and 23 percent in New Mexico (compared to 22 percent last year) (see reservoir storage on page 4, for details).

Drought: Continued consistent and repeated precipitation events, especially with El Niño-led above-average precipitation throughout the winter and spring, would push us in the right direction regarding long-term drought conditions. Alleviating the drought will take time however; widespread areas of the Southwest received well below-average precipitation over the past 12 to 36 months, with the Four Corners region, northeast New Mexico, and portions of southern Arizona experiencing the largest deficits in the past 12 months (Fig. 4).

ENSO: The most recent NOAA-Climate Prediction Center forecast scaled back its forecast for El Niño this year, albeit only slightly. Ongoing lack of atmospheric cooperation continues to sow confusion, despite generally above-average temperature anomalies in the Niño 3.4 region (see El Niño tracker on page 3, for details).

Precipitation Forecasts: The Jan. 15 NOAA-Climate Prediction Center seasonal outlook continues to predict above-average precipitation through the winter and into early spring for the southwest. This forecast is likely linked to El Niño-favorable conditions, but the extent of their impact remains to be seen (Fig. 5).

Temperature Forecasts: The Jan. 15 NOAA-Climate Prediction Center temperature forecasts remain split across the region, with elevated chances for above-average temperatures along the West Coast and eastward into Arizona and increased chances for below-average temperatures along the Gulf Coast into New Mexico. This pattern is projected through the winter and into the spring (Fig. 6).

Tweet Jan SW Climate Outlook

CLICK TO TWEET

Jan @CLIMAS_UA SW Climate Outlook -Climate Summary, Temp Records, El Niño, Snow-Water Supply, Winter Forecast http://bit.ly/1L3C7z6

January Southwest Climate Outlook

Online Resources

Figure 1,4
High Plains Regional Climate Center - HPRCC
http://www.hprcc.unl.edu/maps/current/

Figure 2
National Climatic Data Center - NCDC
http://www.ncdc.noaa.gov

Figure 3
Natural Resources Conservation Service - NRCS
http://www.wcc.nrcs.usda.gov/gis/snow.html

Figure 5-6
NOAA-Climate Prediction Center
http://www.cpc.ncep.noaa.gov/products/forecasts/

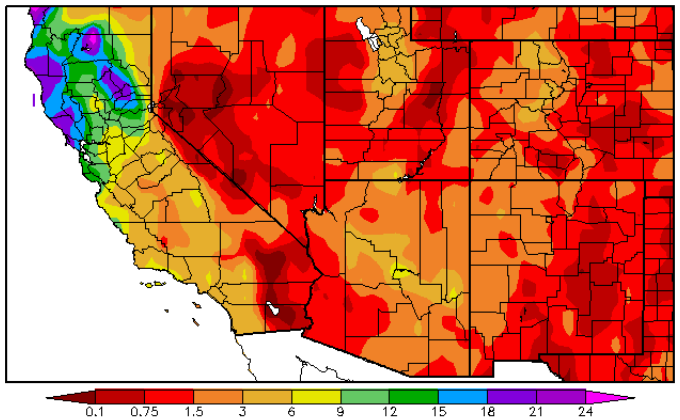


Figure 1: Total Precipitation 11/23/2014 - 01/21/2015

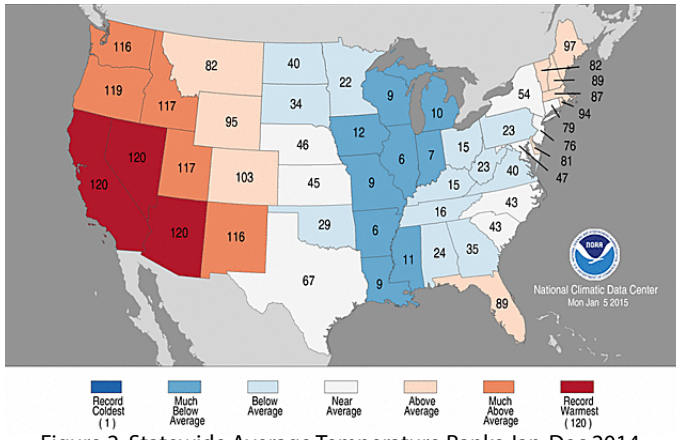


Figure 2: Statewide Average Temperature Ranks Jan-Dec 2014

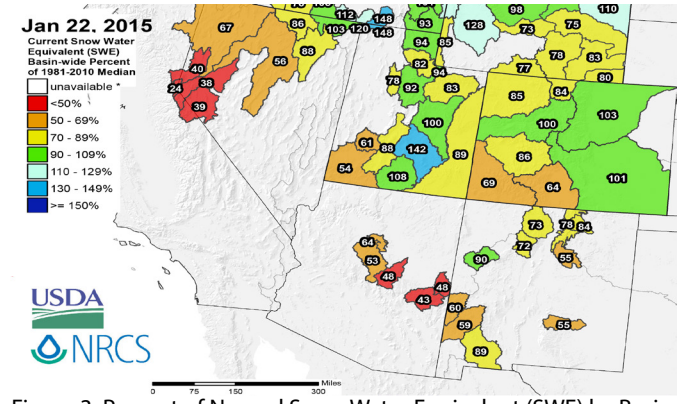


Figure 3: Percent of Normal Snow Water Equivalent (SWE) by Basin

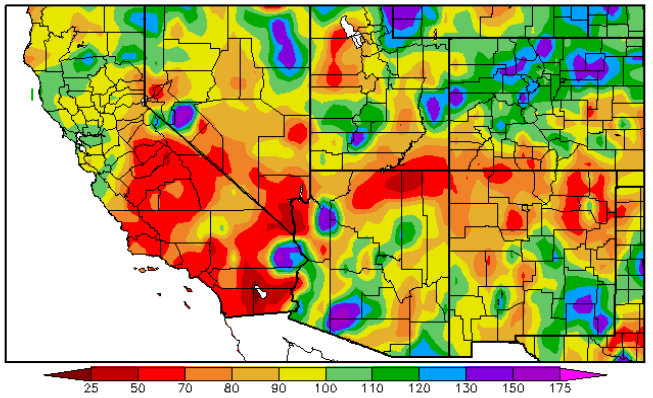


Figure 4: Percent of Normal Precipitation 1/22/2014 - 1/21/2015

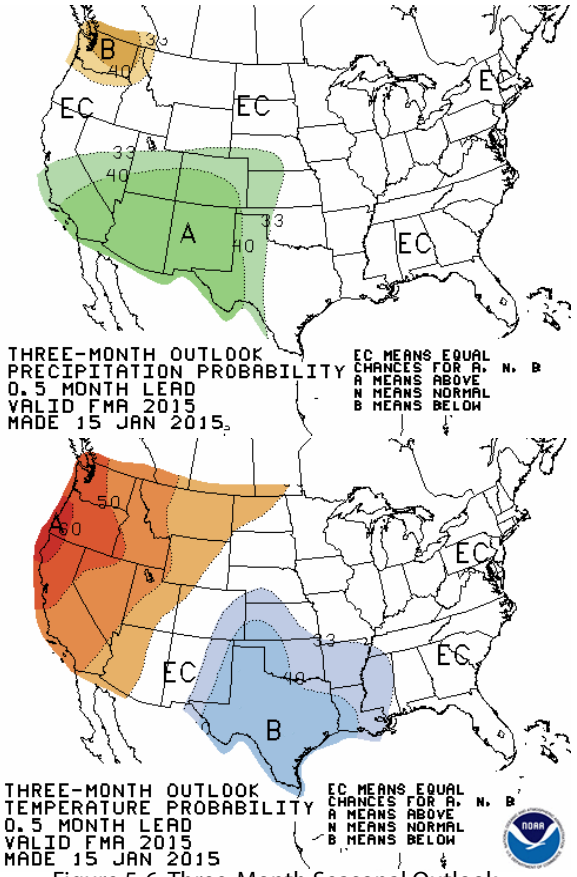


Figure 5-6: Three-Month Seasonal Outlook

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

2014-15 El Niño Tracker

Just when it looked like we were getting a more definitive answer regarding El Niño, ongoing lack of cooperation on the part of the atmosphere continues to muddy forecasts moving into 2015. Sea surface temperatures (SSTs) remain elevated across much of the equatorial Pacific Ocean (Fig. 1), and while temperature anomalies in the Niño 3.4 region are within the range of a weak El Niño event, they have declined in the past month (Fig. 2). It is a common refrain in forecast bulletins that a lack of coupling between ocean and atmosphere is responsible for decreased confidence in an El Niño event this winter. Additionally, a lack of temperature gradient along the equatorial Pacific and little in the way of El Niño wind patterns further reduce confidence that a stronger event is on the horizon.

The most recent forecasts remain in a cautious holding pattern, pending the emergence of a more decisive signal. On Jan. 8, the NOAA-Climate Prediction Center (CPC) issued another El Niño Watch, assigning a 50 to 60 percent probability that an El Niño would form in the next two months, with forecaster consensus that this would be a weak event extending into late winter or early spring. On Jan. 9, the Japan Meteorological Agency continued its assessment that El Niño conditions had been present in the equatorial Pacific for multiple months but noted uncertainty as to the length or intensity of an El Niño event, with emphasis on a weak event that would transition to ENSO-neutral by early spring. On Jan. 15, the International Research Institute for Climate and Society (IRI) and CPC scaled back the probability of an El Niño formation to approximately 60 percent (Fig. 3) but indicated SST anomalies were sufficient enough to suggest a weak El Niño event was likely underway and would last through spring 2015. On Jan. 20, the Australian Bureau of Meteorology actually shifted its El Niño tracker status to neutral, given the fade in SST anomalies and lack of clear atmospheric signal. The North American multi-model ensemble shows a weak event that extends into summer (Fig. 4).

Vacillations in forecast percentages prompted the forecast community to describe current conditions as “El Limbo.” Despite lack of official status, El Niño-like conditions may already be driving winter patterns, and seasonal precipitation forecasts indicate an enhanced chance for above-average precipitation this winter across the Southwest, although confidence in this forecast is partially contingent on the strength of these El Niño conditions. Impacts associated with weak El Niño events are generally less certain than those of a moderate or strong event, with past weak events bringing both dry and wet conditions to the Southwest U.S. during the winter. Ultimately, the above-average tropical storm season and the humidity that remained in the region may be indicative of the effect of El Niño-like conditions, even in the absence of a formal designation, and give some idea that the regional patterns have shifted in favor of El Niño formation.

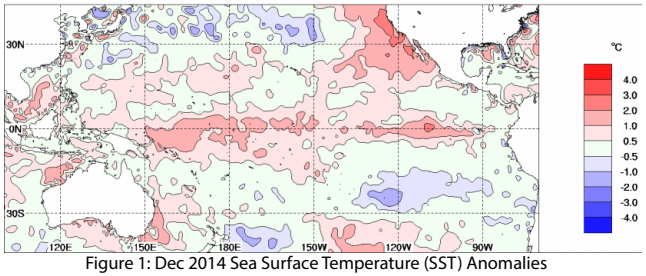


Figure 1: Dec 2014 Sea Surface Temperature (SST) Anomalies

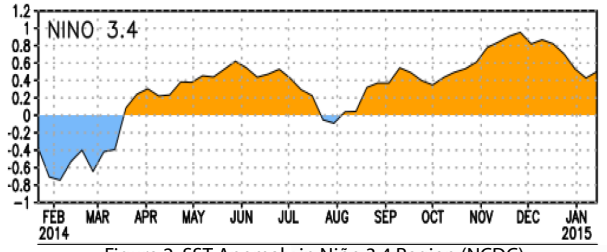


Figure 2: SST Anomaly in Niño 3.4 Region (NCDC)

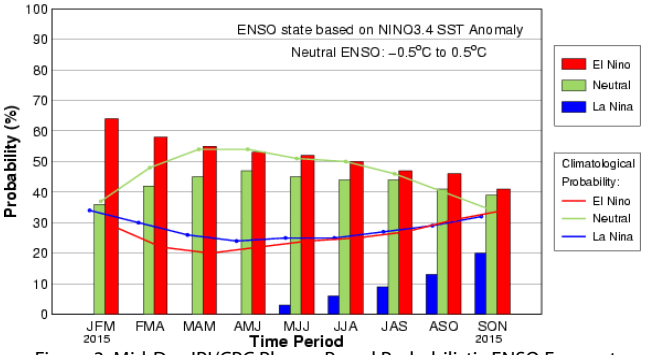


Figure 3: Mid-Dec IRI/CPC Plume_Based Probabilistic ENSO Forecast

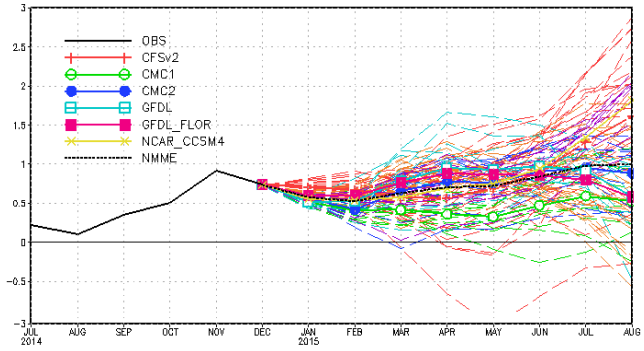


Figure 4: North American Multi Model Ensemble Forecast for Niño 3.4

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).

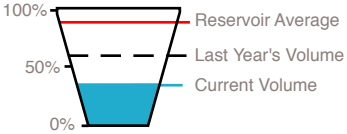
The table details more exactly the current capacity (listed as a percent of maximum storage). Current and maximum storage are given in thousands of acre-feet for each reservoir. One acre-foot is the volume of water sufficient to cover an acre of land to a depth of 1 foot (approximately 325,851 gallons). 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.

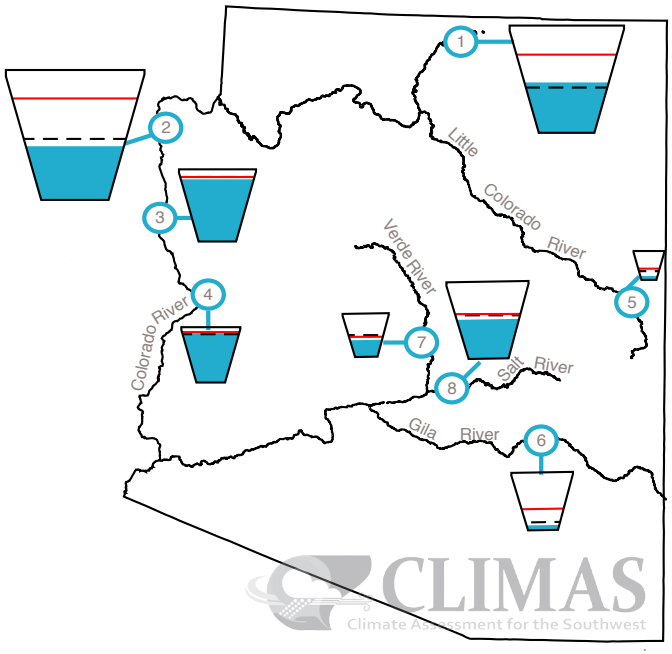
These data are based on reservoir reports updated monthly by the National Water and Climate Center of the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS).

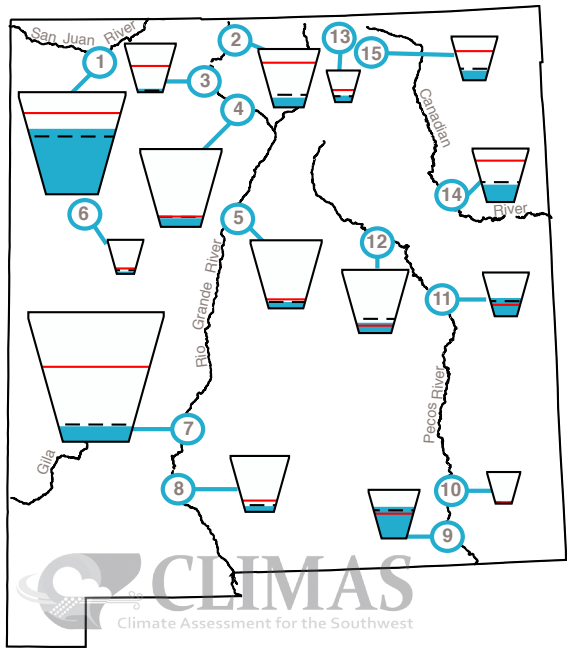
Reservoir Volumes

DATA THROUGH DECEMBER 31, 2014

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	47%	11,523.0	24,322.0	-406.0
2. Lake Mead	41%	10,676.0	26,159.0	367.0
3. Lake Mohave	86%	1,559.7	1,810.0	39.6
4. Lake Havasu	89%	551.1	619.0	-24.6
5. Lyman	13%	4.0	30.0	0.2
6. San Carlos	8%	74.3	875.0	-0.5
7. Verde River System	38%	110.0	287.4	-3.3
8. Salt River System	50%	1,020.5	2,025.8	11.1

*KAF: thousands of acre-feet

Reservoir	Capacity	Current Storage*	Max Storage*	One-Month Change in Storage*
1. Navajo	64%	1090.5	1,696.0	-5.4
2. Heron	16%	64.3	400.0	-3.6
3. El Vado	7%	13.5	190.3	-4.2
4. Abiquiu	11%	128.6	1,192.8	0.9
5. Cochiti	9%	45.8	491.0	-0.1
6. Bluewater	6%	2.4	38.5	0.0
7. Elephant Butte	12%	256.4	2,195.0	43.9
8. Caballo	10%	32.5	332.0	0.9
9. Lake Avalon	65%	2.6	4.0	0.6
10. Brantley	8%	81.1	1,008.2	1.6
11. Sumner	41%	41.5	102.0	3.3
12. Santa Rosa	16%	69.2	438.3	-0.6
13. Costilla	21%	3.3	16.0	0.4
14. Conchas	33%	83.9	254.2	-0.7
15. Eagle Nest	22%	17.2	79.0	0.2

* in KAF = thousands of acre-feet

Southwestern Oscillations

Be sure to visit our blog, Southwestern Oscillations

http://www.climas.arizona.edu/blog

CLIMAS YouTube Channel

Visit our new YouTube channel for mini-videos of content/discussion pulled from the podcast

https://www.youtube.com/user/UACLIMAS/

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Visit our website or iTunes to subscribe to our podcast feed

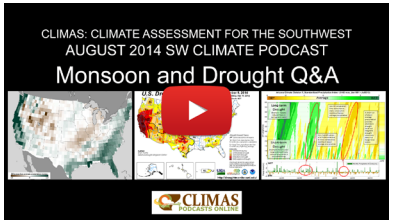
www.climas.arizona.edu/media/podcasts

https://itunes.apple.com/us/itunes-u/climate-in-the-southwest/id413143045

Notes from the Podcast - New Mini-Podcast Videos

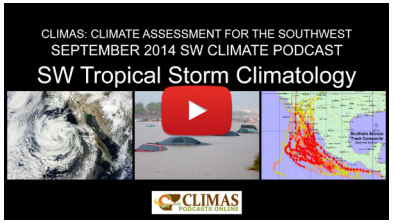
Regular podcast listeners will know that we cover a wide range of Southwest climate topics in a conversational manner. To make these discussions even more accessible and useful, we are pulling small segments from the podcasts and adding maps, images, and video to supplement the content. These offer an opportunity to quickly digest key points from the podcast and also serve as stand-alone teaching/illustration tools that are suitable for a wide range of audiences. You can find the videos and subscribe to the YouTube channel at https://www.youtube.com/user/UACLIMAS/.

We already have posted several mini-video podcasts:



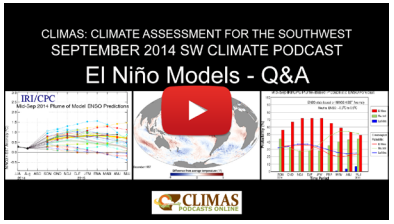
Monsoon and Drought Q&A

https://www.youtube.com/watch?v=Dk001_Yr-7k



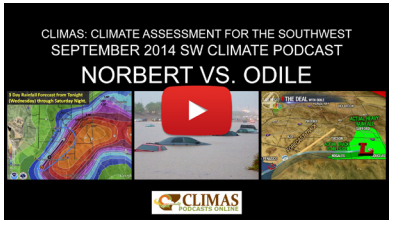
Southwest Tropical Storm Climatology

https://www.youtube.com/watch?v=IPRQxKI_jrw



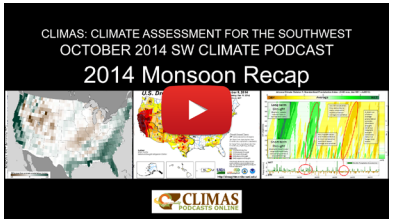
El Niño Forecast Models Q&A

https://www.youtube.com/watch?v=4kkQoArI8ck



Norbert vs. Odile - Tropical Storms in the Southwest

https://www.youtube.com/watch?v=UZpfyV2YCtw



2014 Monsoon Recap

https://www.youtube.com/watch?v=xkB7zHHpypU