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May Southwest Climate Outlook

Precipitation and Temperature: The Southwest was characterized by below-average precipitation in April, ranging locally from record driest to near average (Fig. 1a). Temperatures were mostly above average for yet another month, with record-warm conditions along the eastern third of Arizona and the edge of western New Mexico, but also with a band of average to below-average temperatures on the eastern edge of New Mexico (Fig. 1b). Water-year precipitation to date (Oct 2017 – Apr 2018) ranged from below average to record dry in Arizona, and from above average to record dry in New Mexico (Fig. 2). Temperatures for the same period reached record highs across most of southern Arizona and southwestern New Mexico and were above average to much-above average across the rest of the region (Fig. 3).

Snowpack & Streamflow Forecast: Snow water equivalent (SWE) values remained well-below average across the Southwest, although in Arizona and most of New Mexico, few stations had any snowpack and SWE to report. Warm and dry conditions continue to affect streamflow and runoff timing: streamflow forecasts for Arizona and New Mexico are all well-below average (Fig. 4).

Drought: Drought-designated areas continue to expand from last month. In the May 15 U.S. Drought Monitor, Arizona and New Mexico saw further increases in the extent and intensity of drought (Fig. 5), particularly in northeastern Arizona and northern New Mexico. These designations reflect short-term precipitation deficits, above-normal temperatures at monthly and seasonal timescales, and longer-term drought that tracks the cumulative effect of extended periods of warmer- and drier-than-normal conditions. May is typically dry in the Southwest, so normal conditions may not alter drought designations much. The next realistic hope for drought relief is the summer monsoon, but the extent of its impact will depend on when it starts and how much precipitation actually falls.

Wildfire: The National Significant Wildland Fire Potential Outlook for June identified above-normal wildland fire risk across the Southwest except for eastern New Mexico and far northwestern Arizona (Fig. 6). Warm and dry conditions this winter, in conjunction with above-normal fine-fuel loading and continuity, are major drivers of the elevated risk. The July outlook takes into account the anticipated decrease in fire risk during the monsoon and returns to normal wildland fire potential for most of the Southwest. However, a late start to the monsoon could extend the fire risk window, while an early start could help end it sooner.

ENSO & La Niña: The La Niña event is officially over with a return to neutral conditions across oceanic and atmospheric indicators, although the event was waning for the past few months. We have entered the period of the spring "predictability barrier" during which there is limited ability to forecast the ENSO status for the next several months. Climatological patterns suggest relatively equal chances of either an El Niño event starting up or ENSO neutral conditions continuing, with virtually zero chance for a La Niña event. By mid-summer, the forecasts and outlooks will have better information to determine the ENSO trajectory for late summer and fall.

Precipitation and Temperature Forecast: The three-month outlook for June through August calls for equal chances of above- or below-average precipitation in most of Arizona and New Mexico, with the exception of northern Arizona and northwestern New Mexico, where there are increased chances of above-normal precipitation (Fig. 7, top). The outlook calls for increased chances of above-average temperatures (Fig. 7, bottom) for the entire western United States.

Tweet May 2018 SW Climate Outlook CLICK TO TWEET

MAY2018 @CLIMAS_UA SW Climate Outlook, ENSOTracker, May Climate, AZ & NM Reservoir volumes https://bit.ly/2GtyMuW #SWclimate #AZWX #NMWX #SWCO

May 2018 SW Climate Outlook

Online Resources

Figure 1
National Centers for Environmental Information
ncei.noaa.gov

Figures 2-3
Western Regional Climate Center
wrcc.dri.edu

Figure 4
Natural Resources Conservation Svc
wcc.nrcs.usda.gov

Figure 5
U.S. Drought Monitor
droughtmonitor.unl.edu

Figure 6
National Interagency Fire Center
nifc.gov

Figure 7
NOAA - Climate Prediction Center
cpc.ncep.noaa.gov

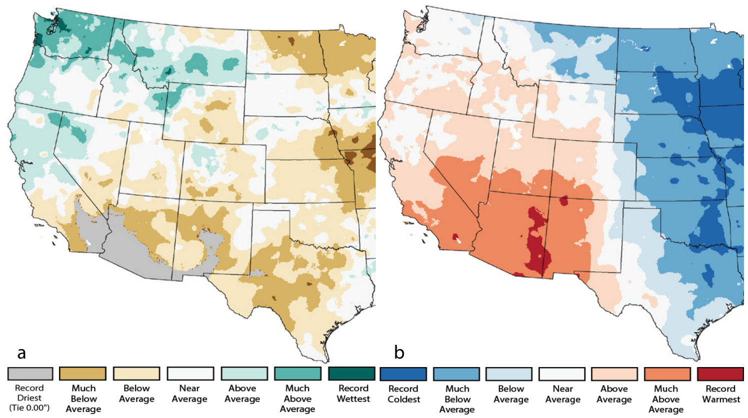


Figure 1: Apr 2018 Precipitation (a) & Temperature Ranks (b)

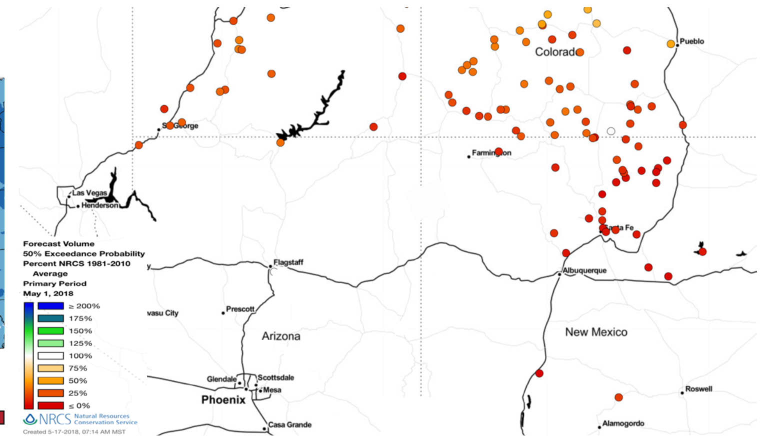


Figure 4: May 1, 2018 NRCS Streamflow Forecast

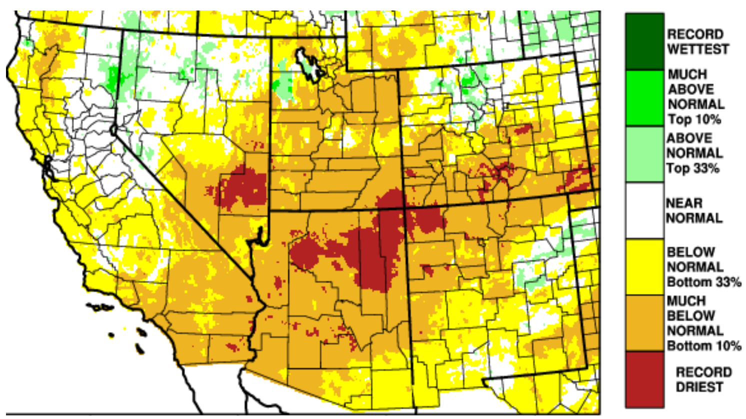


Figure 2: Oct 2017 - Apr 2018 Precipitation Rankings

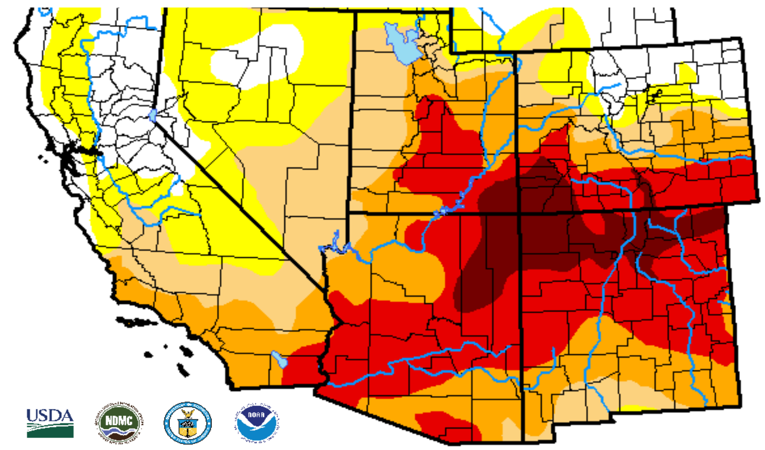


Figure 5: US Drought Monitor - May 15, 2018

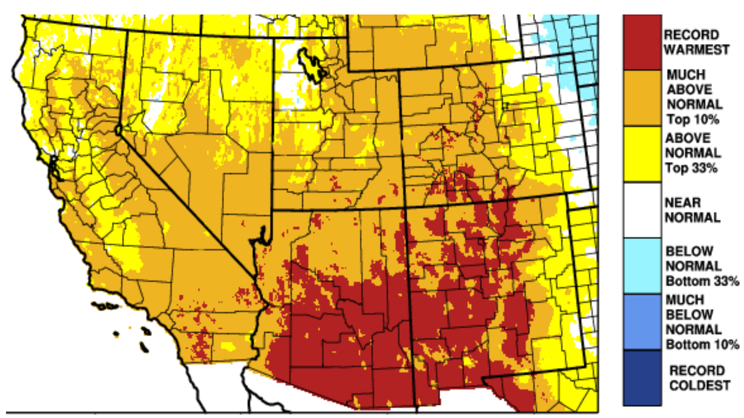


Figure 3: Oct 2017 - Apr 2018 Mean Temperature Rankings

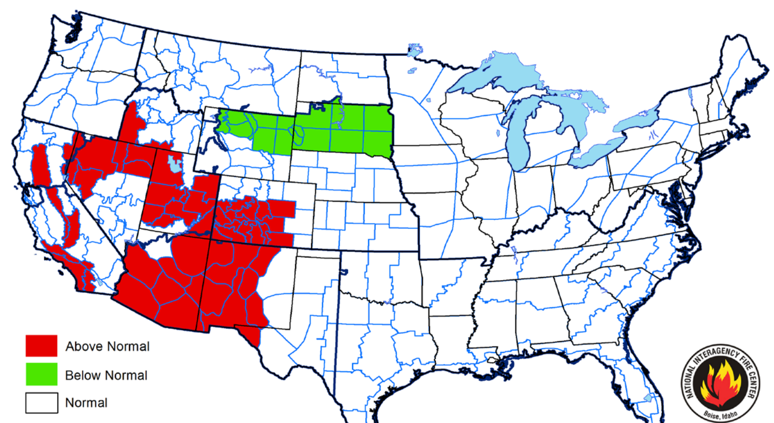


Figure 6: June 2018 Significant Wildland Fire Potential

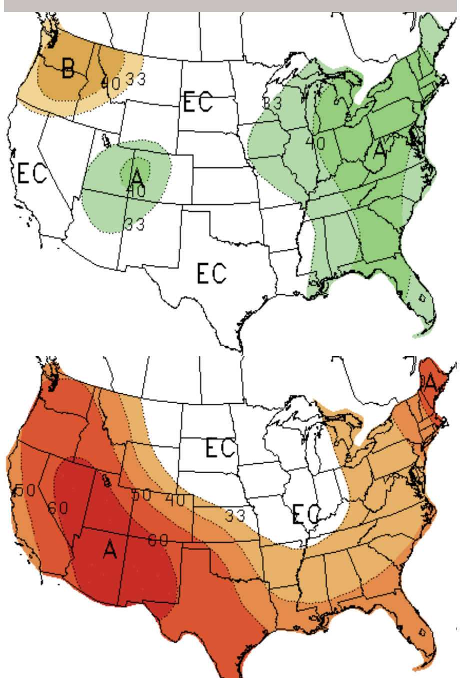


Figure 7: Three-Month Outlook - Precipitation (top) & Temperature (bottom) - May 17, 2018

Online Resources

Figure 1
Australian Bureau of Meteorology
bom.gov.au/climate/enso

Figure 2
NOAA - Climate Prediction Center
cpc.ncep.noaa.gov

Figure 3
International Research Institute for Climate and Society
iri.columbia.edu

Figure 4
NOAA - Climate Prediction Center
cpc.ncep.noaa.gov

climate.gov - Spring Predictability Barrier
https://bit.ly/1Xipsx7

El Niño / La Niña

Information on this page is also found on the CLIMAS website:

climas.arizona.edu/sw-climate/el-niño-southern-oscillation

ENSO Tracker

Oceanic and atmospheric conditions returned to ENSO-neutral over the last month (Figs. 1-2) and most ENSO forecasts and outlooks reflect this transition. On May 8, the Australian Bureau of Meteorology maintained its ENSO Outlook at “inactive,” with indications of neutral conditions persisting through at least this summer. On May 10, the NOAA Climate Prediction Center (CPC) issued its final La Niña advisory, indicating that ENSO-neutral conditions had returned and were favored to continue through November, and then showing a 50-percent chance of an El Niño event developing this winter. On May 10, the International Research Institute (IRI) issued its ENSO Quick Look, which showed ENSO-neutral conditions in oceanic and most atmospheric indicators, although “the precipitation pattern and the upper level wind anomalies continued to show lingering weak La Niña conditions.” The Quick Look called for neutral conditions through fall but a “nearly 50-percent chance” of El Niño by the end of the year (Fig. 3). On May 11, the Japanese Meteorological Agency (JMA) identified lingering La Niña conditions that would end this spring and a 70-percent chance of ENSO-neutral conditions over summer. The North American Multi-Model Ensemble (NMME) returned to ENSO-neutral conditions, also noting a trend consistent a possible return to El Niño conditions by year’s end, albeit with considerable uncertainty over the latter half of 2018 (Fig. 4).

Summary: With La Niña in the rearview mirror, we turn to what comes next. ENSO-neutral conditions are a near-certainty in the short term regardless of what later 2018 might hold. Taking a longer view, the most likely outcome is ENSO-neutral conditions persisting through fall, followed by a roughly 50-percent chance of El Niño conditions forming by winter. But these forecasts come with caveats. First, this time of year is notoriously difficult to forecast, given the presence of the so-called spring predictability barrier (see sidebar). Seasonal transitional conditions bring a high degree of uncertainty to any longer-term forecast. The NMME plot in Figure 4 provides a good illustration of the wide range of predicted outcomes. This plot also highlights the low probability of a return to La Niña conditions in 2018. Second, a closer look at how this forecast compares to climatology is probably a better metric of what we might expect in 2018. The IRI plots reveal that a “nearly 50-percent chance” of El Niño (Fig. 3) is really only about a 15-percent increase in probability above climatology, while the roughly 10-percent chance of La Niña is about 25 percent below climatology. This comparison further reinforces the point that while an El Niño event is plausible by the end of 2018, it is far from certain. Similarly, a La Niña event by the end of 2018 is not implausible, but it is far from likely. Until more information is available later this summer, the uncertainty embedded in these forecasts remains frustratingly high, as it does every year at this time.

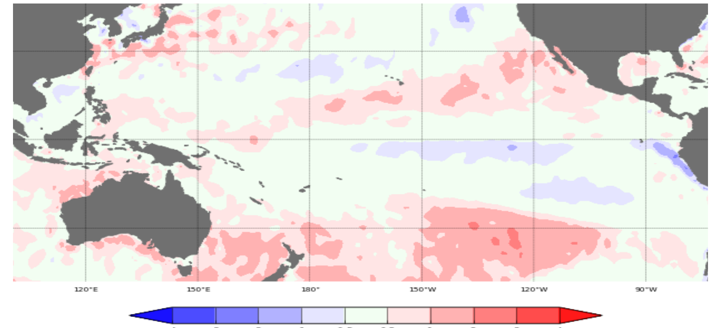


Figure 1: Apr 2018 Sea Surface Temperature (SST) Anomalies

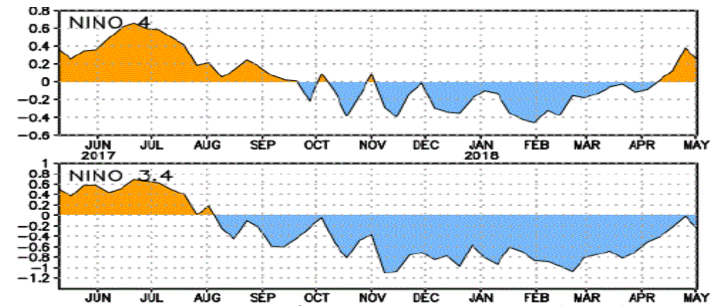


Figure 2: SST Anomalies in Niño Regions 3.4 & 4 (NCDC)

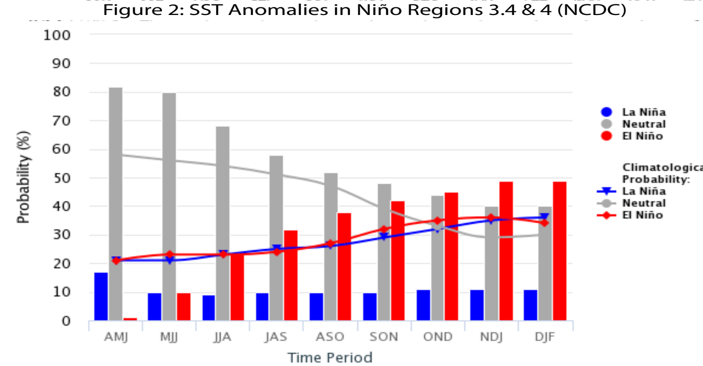


Figure 3: Early-May IRI/CPC Model-Based Probabilistic ENSO Forecast

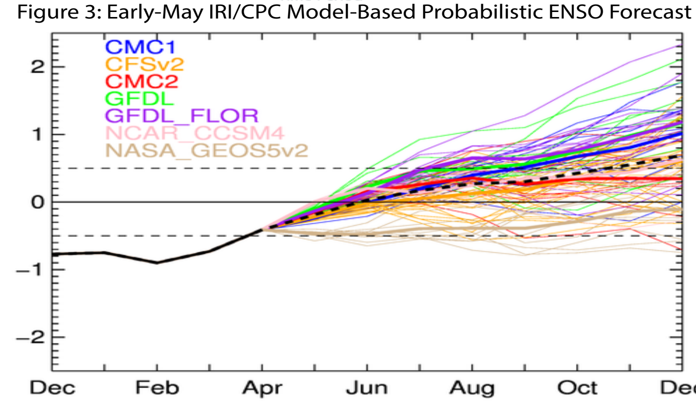


Figure 4: North American Multi-Model Ensemble Forecast for Niño 3.4

Online Resources

Figures 1-3
CLIMAS: Climate Assessment for the Southwest
climas.arizona.edu

Data: Applied Climate Information System:
rcc-acis.org/

Figure 4
CLIMAS: Climate Assessment for the Southwest
climas.arizona.edu

Data: National Weather Service Tucson
wrh.noaa.gov/twc/

Figures 5-6
National Interagency Fire Center
nifc.gov

May Climate & Weather in the Southwest

After a warm and dry winter (detailed in past issues of the SW Climate Outlook), drought, fire, and poor air quality (dust and pollen) are growing concerns as spring turns to summer. In May, warm temperatures (Fig.1), including triple-digit highs (Fig. 2), are increasingly common, while average precipitation is among the lowest monthly totals for the region (Fig. 3), and additional precipitation is unlikely. At the same time, the winds are picking up due to seasonal transitional conditions (Fig. 4), further increasing fire risk (Figs. 5-6) and impacting air quality and public safety (e.g. dust storms).

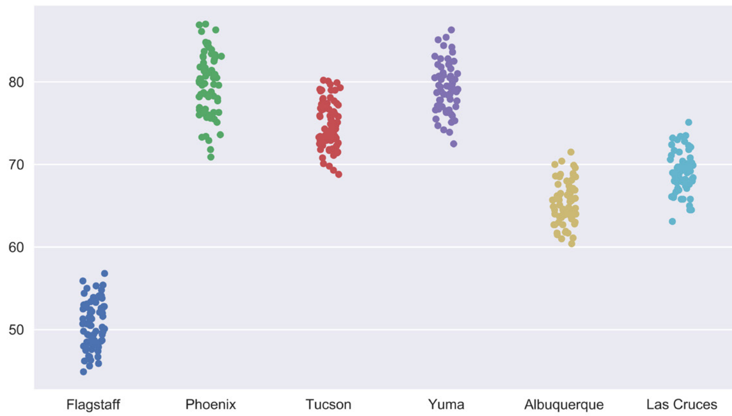


Figure 1: May Average Temperature Ranges in the Southwest (1950-2017)

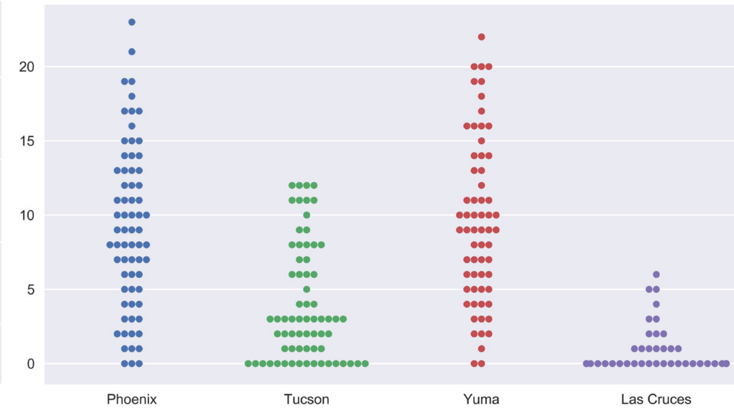


Figure 2: May Number of Days over 99 F in the Southwest (1950-2017)

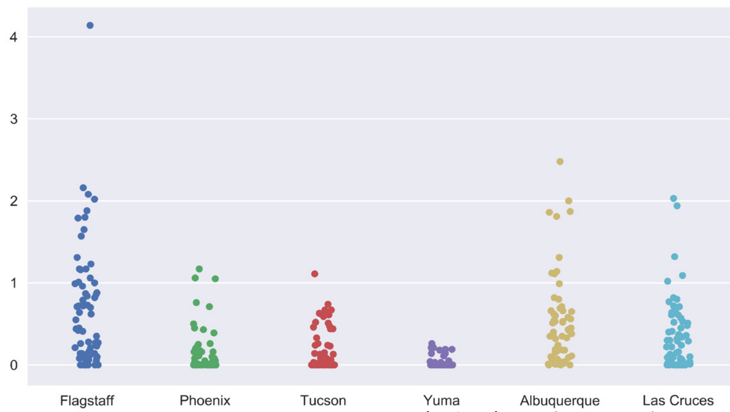


Figure 3: May Precipitation Ranges in the Southwest (1950-2017)

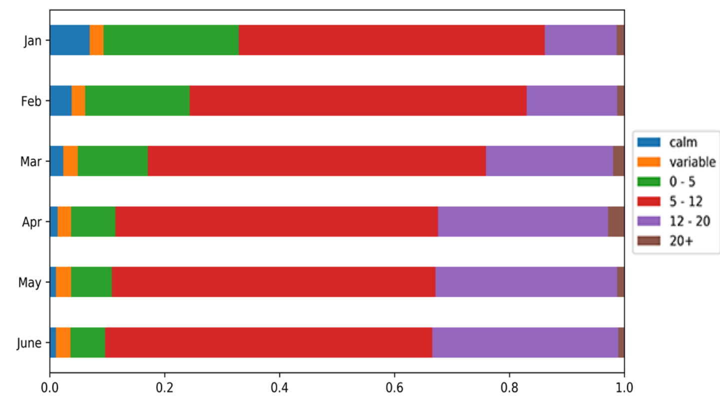


Figure 4: Wind Intensity (1pm-8pm) at Tucson Int. Airport (Monthly Average: Jan - June)

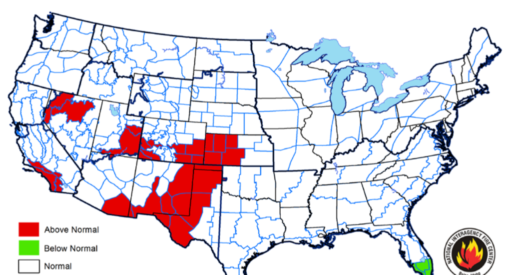


Figure 5: May 2018 Significant Wildland Fire Potential

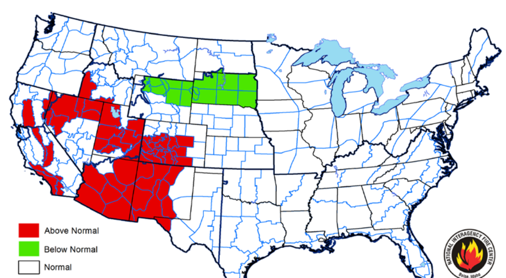


Figure 6: June 2018 Significant Wildland Fire Potential

Online Resources

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

www.wcc.nrcs.usda.gov/BOR/basin.html

Contact Ben McMahan with any questions or comments about these or any other suggested revisions.

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).

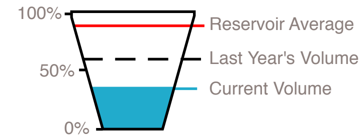
The table details more exactly the current capacity (listed as a percent of maximum storage). Current and maximum storage are given in thousands of acre-feet for each reservoir. One acre-foot is the volume of water sufficient to cover an acre of land to a depth of 1 foot (approximately 325,851 gallons).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

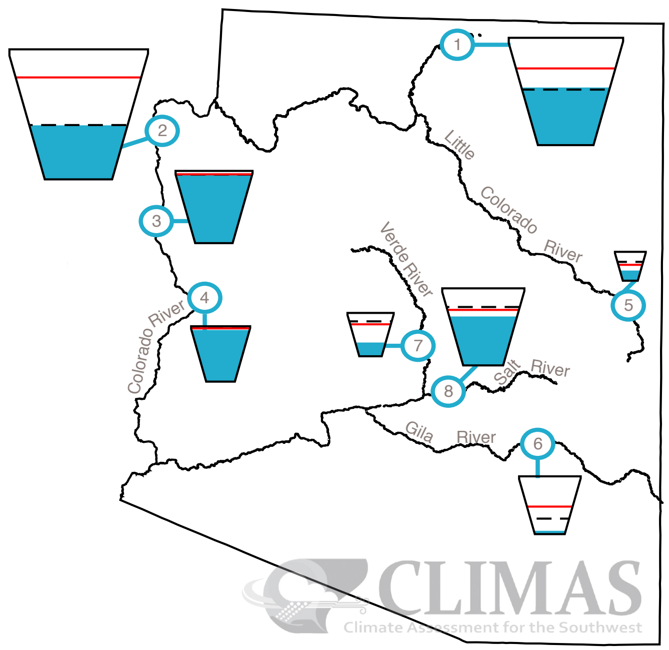
These data are based on reservoir reports updated monthly by the National Water and Climate Center of the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS).

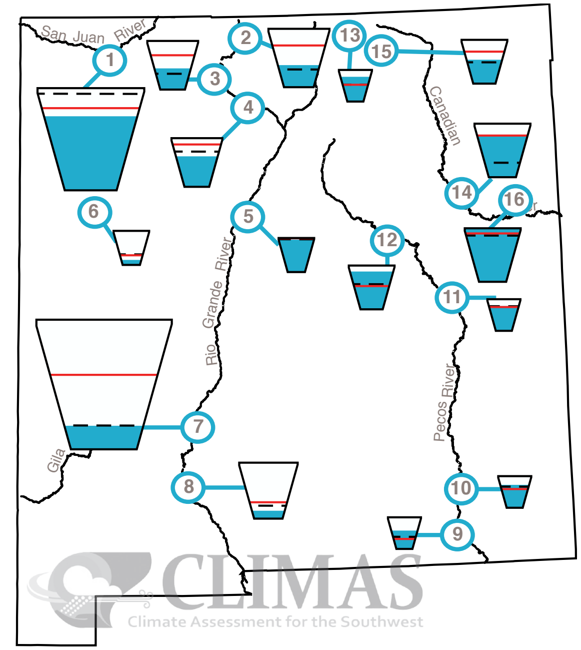
Reservoir Volumes

DATA THROUGH APRIL 30, 2018

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	52%	12,669.0	24,322.0	-287.1
2. Lake Mead	40%	10,387.0	26,159.0	-308.0
3. Lake Mohave	93%	1,677.0	1,810.0	-9.0
4. Lake Havasu	91%	565.6	619.0	-6.2
5. Lyman	34%	10.2	30.0	-0.7
6. San Carlos	4%	32.9	875.0	-19.9
7. Verde River System	31%	88.6	287.4	-0.1
8. Salt River System	62%	1,248.8	2,025.8	-38.1

*KAF: thousands of acre-feet

* in KAF = thousands of acre-feet

Reservoir	Capacity	Current Storage*	Max Storage*	One-Month Change in Storage*
1. Navajo	72%	1,222.4	1,696.0	-14.0
2. Heron	38%	152.3	400.0	12.4
3. El Vado	43%	81.8	190.3	9.7
4. Abiquiu	63%	118.0	186.8	-7.0
5. Cochiti	95%	47.3	50.0	-0.1
6. Bluewater	15%	5.7	38.5	-0.4
7. Elephant Butte	18%	394.3	2,195.0	-40.6
8. Caballo	14%	46.1	332.0	-11.8
9. Lake Avalon	58%	2.6	4.5	2.6
10. Brantley	72%	30.2	42.2	-7.8
11. Sumner	78%	28.1	35.9	-12.8
12. Santa Rosa	86%	91.6	105.9	-1.6
13. Costilla	78%	12.5	16.0	0.7
14. Conchas	79%	200.4	254.2	-11.1
15. Eagle Nest	54%	42.3	79.0	-0.7
16. Ute Reservoir	98%	196	200	-2.0

Online Resources

Figure 1
Climate Program Office
cpo.noaa.gov

RISA Program Homepage
http://cpo.noaa.gov/Meet-the-Divisions/Climate-and-Societal-Interactions/RISA

UA Institute of the Environment
environment.arizona.edu

New Mexico Climate Center
weather.nmsu.edu

CLIMAS Research & Activities

CLIMAS Research
climas.arizona.edu/research

CLIMAS Outreach
climas.arizona.edu/outreach

Climate Services
climas.arizona.edu/climate-services

CLIMAS
Climate Assessment for the Southwest
A NOAA RISA TEAM

What is CLIMAS?

The Climate Assessment for the Southwest (CLIMAS) program was established in 1998 as part of the National Oceanic and Atmospheric Administration's Regional Integrated Sciences and Assessments program. CLIMAS—housed at the University of Arizona's (UA) Institute of the Environment—is a collaboration between UA and New Mexico State University.

The CLIMAS team is made up of experts from a variety of social, physical, and natural sciences who work with partners across the Southwest to develop sustainable answers to regional climate challenges.

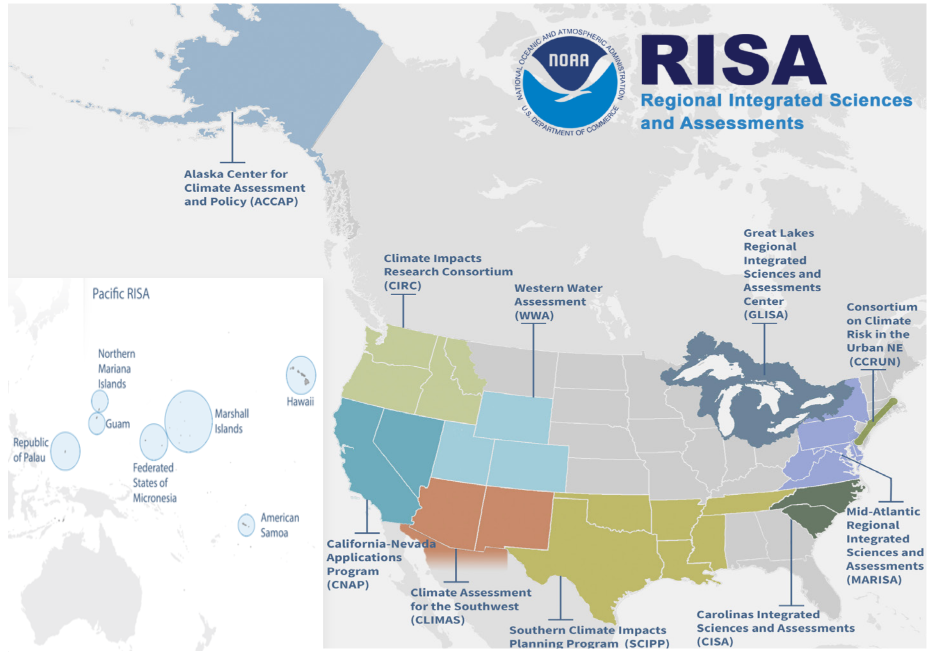


Figure 1: NOAA Regional Integrated Sciences and Assessments Regions

What does CLIMAS do?

The CLIMAS team and its partners work to improve the ability of the region's social and ecological systems to respond to and thrive in a variable and changing climate. The program promotes collaborative research involving scientists, decision makers, resource managers and users, educators, and others who need more and better information about climate and its impacts. Current CLIMAS work falls into six closely related areas: 1) decision-relevant questions about the physical climate of the region; 2) planning for regional water sustainability in the face of persistent drought and warming; 3) the effects of climate on human health; 4) economic trade-offs and opportunities that arise from the impacts of climate on water security in a warming and drying Southwest; 5) building adaptive capacity in socially vulnerable populations; and 6) regional climate service options to support communities working to adapt to climate change.

May 2018 SW Climate Podcast - Warm, Dry, and Windy - (this) May in the Southwest - https://bit.ly/2KrgD3I

In the May 2018 edition of the CLIMAS SW Climate Podcast, Mike Crimmins and Zack Guido sit down to discuss May's weather and climate, especially the windy conditions that seem to fire up every year around this time, and the role that plays in wildfire season. They also discuss the precipitation history of the past year, reflecting on the low precipitation totals across most of the Southwest, but how concentrated the rain events were in Southern Arizona (July during last the monsoon, and a good run of storms in February). This leads them to a discussion of drought in the region, which they discuss in terms of recent conditions, how this compares to other droughts in the past 20 years, and the data and information drought experts use to monitor regional drought conditions.