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February 2022 Southwest Climate Outlook

Precipitation and Temperature: Jan precipitation was between record driest and average in Arizona, and between much below average and above average in New Mexico (Fig. 1a). Jan temperatures were average to above average in Arizona and New Mexico (Fig. 1b). Two-month precipitation totals highlight a gradient that transitions from much below normal to record wettest, as you move from southeast to northwest in the U.S. Southwest and Intermountain West (Fig. 2). Water year precipitation is between much below average and average in most of Arizona and New Mexico, with pockets of above average (Fig. 3).

Drought: The U.S. Drought Monitor (USDM) in the Southwest is relatively stable since last month, with some increases in drought categorizations in southern and eastern New Mexico. Drought conditions are still found across nearly the entire western United States (Fig. 4). While much of Arizona has moved out of extreme and exceptional drought (D3 and D4, respectively), much of the region remains in the severe (D2) category or worse. Twenty percent of Arizona is in D2 and five-percent D3, while 48-percent of New Mexico is rated as D2, with 27-percent and 2.5-percent in D3 and D4, respectively. Long-term accumulated precipitation deficits are a factor in these designations, but recent dry conditions in January have not helped at all.

Snowpack & Streamflow: As of Feb 1, snow water equivalent (SWE) is highly variable across the Southwest (Fig. 5), with SWE ranging from well below to well above median for this time period. Feb 1 streamflow forecast includes a less optimistic picture for much of the Colorado River basins compared to last month, with southern Arizona and New Mexico basins showing the lowest probability of exceeding the 50% forecast threshold (Fig. 6).

Water Supply: Most of the reservoirs in Arizona and New Mexico are at or below the values recorded at this time last year. Most are also below their long-term average (see reservoir storage for Arizona and New Mexico). The outlook for warm and dry conditions (see p. 3) does not bode well for short-term water storage and will continue to raise concerns about Lakes Mead and Powell and the Colorado River, along with Elephant Butte on the Rio Grande, about long term storage and regional sustainability.

ENSO Tracker: ENSO conditions appear to have peaked at a weak La Niña with a likely transition to ENSO-neutral in spring or summer. This is based on observed and forecast SSTs, atmospheric conditions, and coupling between the two that is indicative of La Niña (see ENSO-tracker on p.4 for details).

Tweet Feb 2022 SW Climate Outlook

FEB2022 @CLIMAS_UA SW Climate Outlook, Seasonal Forecasts, ENSO Tracker, Streamflow & Snowpack, AZ & NM Reservoirs, https://bit.ly/3BtTwRy, #SWclimate #AZWx #NMWx

Online Resources

Figure 1
National Centers for Environmental Information
ncdc.noaa.gov/sotc

Figures 2-3
West Wide Drought Tracker
wwdt.dri.edu

Figure 4
U.S. Drought Monitor
droughtmonitor.unl.edu

Figures 5-6
National Resource Conservation Service (NRCS)
nrcs.usda.gov

February 2022 - Climate Summary

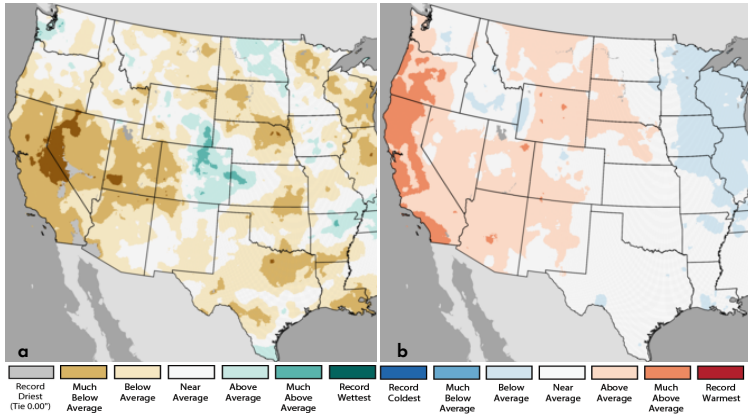


Figure 1: Jan 2022 Precipitation (a) & Temperature Ranks (b)

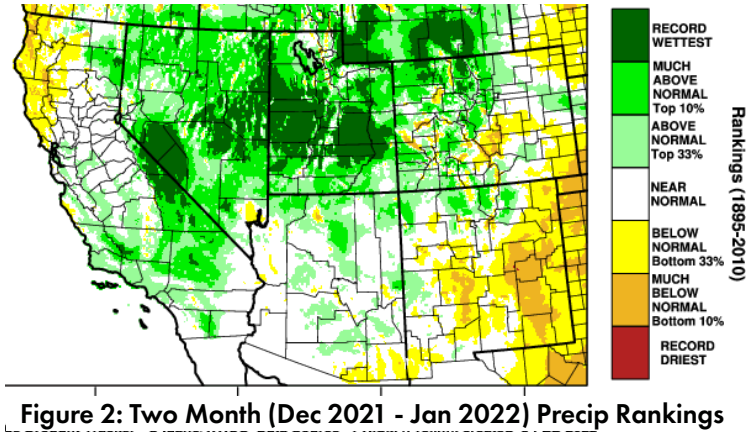


Figure 2: Two Month (Dec 2021 - Jan 2022) Precip Rankings

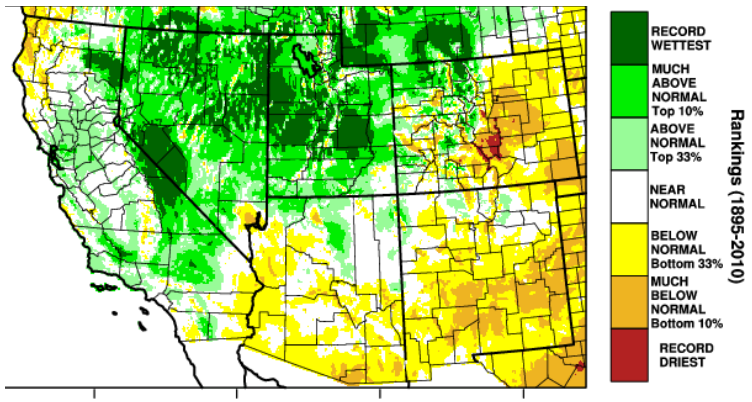


Figure 3: Water Year (Oct 2021 - Jan 2022) Precip Rankings

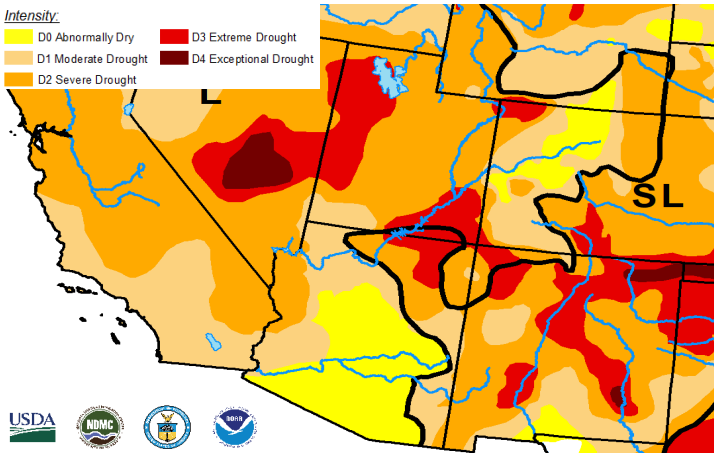


Figure 4: US Drought Monitor - Feb 8, 2022

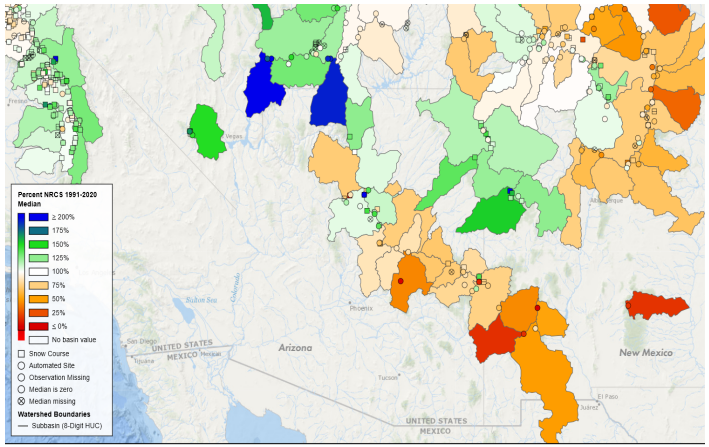


Figure 5: Feb 1 2022 Snow Water Equivalent (SWE) - Pct NRCS Median (1991-2020)

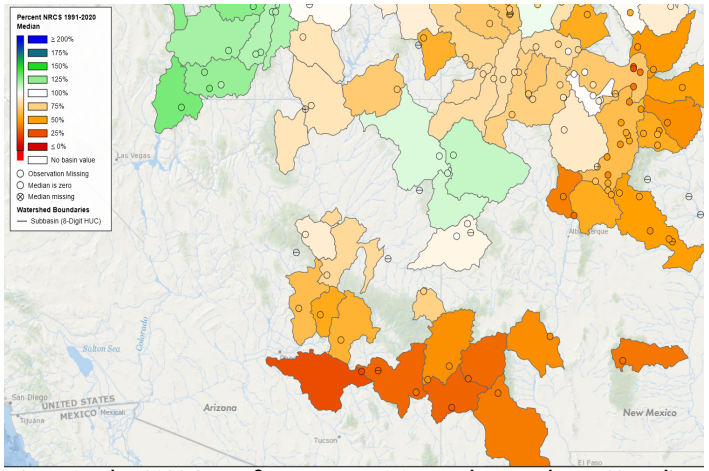


Figure 6: Feb 1 2022 Streamflow Forecast 50% Exceedence Prob., NRCS Median

Online Resources

Figure 7
Intl. Research Institute for Climate and Society
iri.columbia.edu

Figure 8
NOAA Climate Prediction Center
cpc.ncep.noaa.gov

February 2022 - Seasonal Forecasts

Precipitation

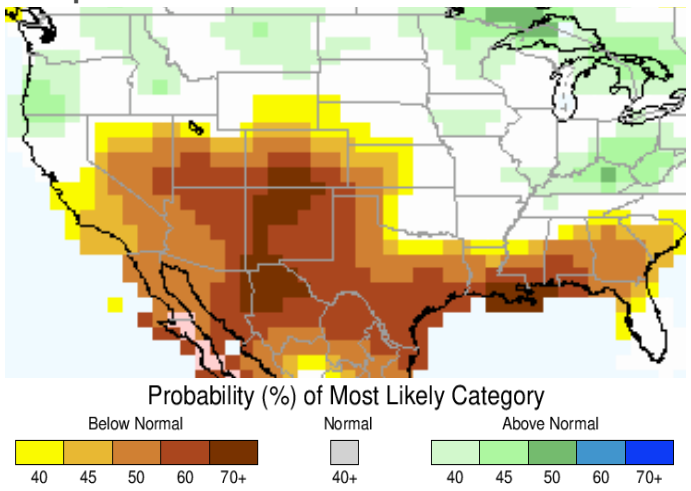


Figure 7A: Three-Month (Mar-May) Forecast for Precipitation

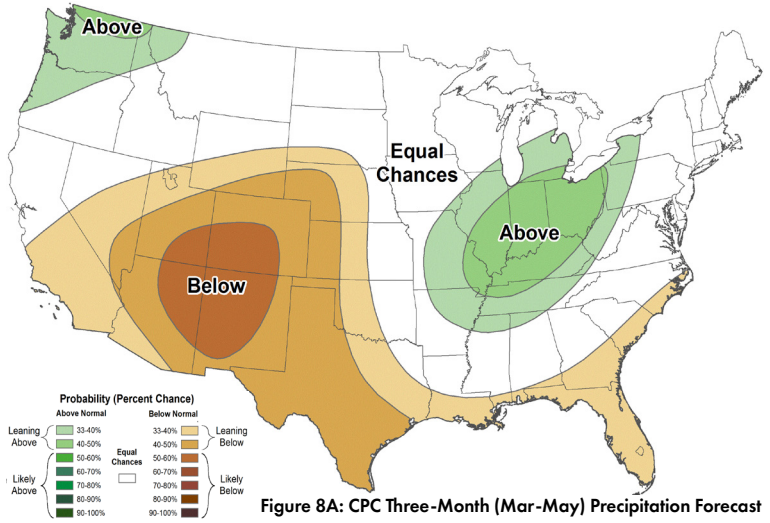


Figure 8A: CPC Three-Month (Mar-May) Precipitation Forecast

Temperature

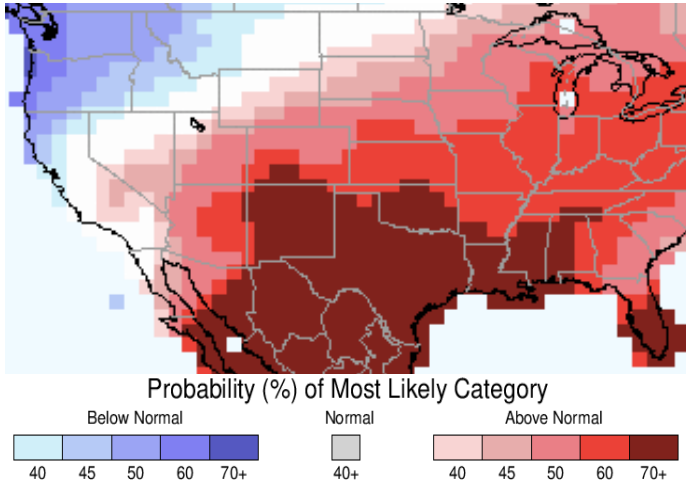


Figure 7B: Three-Month (Mar-May) Forecast for Temperature

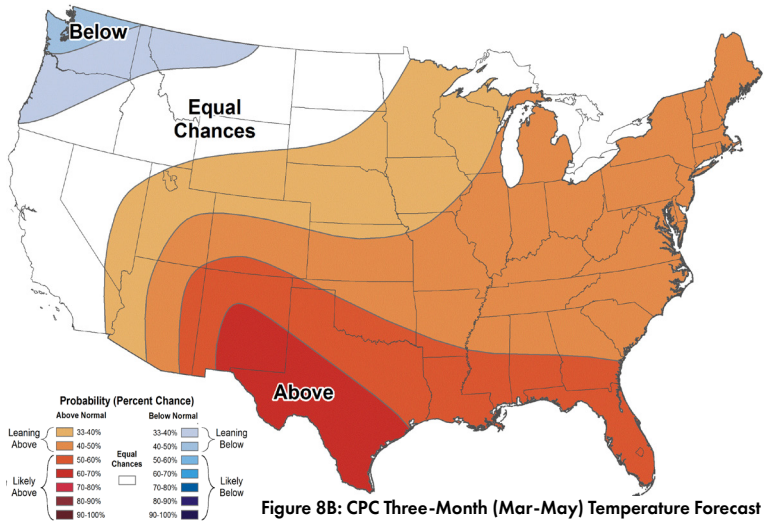


Figure 8B: CPC Three-Month (Mar-May) Temperature Forecast

Precipitation Forecasts: The IRI outlook calls for increased chances of below-normal precipitation across most of the southwestern U.S. and northern Mexico, (Fig. 7a). The CPC outlook calls for increased chances of below-normal precipitation across the Southwest (Fig. 8a).

Temperature Forecasts: The IRI outlook calls for increased chances of above-normal temperatures in most of the southwestern U.S. and northern Mexico (Fig. 7b). The CPC outlook calls for increased chances of above-normal temperatures across most of the Southwest (Fig. 8b).

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

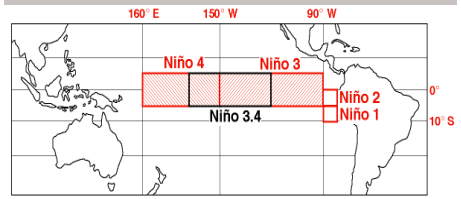
Figure 4
NOAA - Climate Prediction Center
cpc.ncep.noaa.gov

El Niño / La Niña

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

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

Equatorial Niño Regions



For more information: ncdc.noaa.gov/teleconnections/enso/indicators/sst/

Image source: aoml.noaa.gov/

ENSO Tracker

Sea surface temperature (SST) forecasts for Mar – May 2022 indicate cool conditions across the equatorial Pacific (Fig. 1). Current Nino 3.4/4 anomalies are still below the La Niña threshold (Fig. 2), and ENSO outlooks generally call for La Niña conditions to last through winter 2021-2022 and return to neutral conditions in spring/summer 2022.

Forecast Roundup: On Feb 10 the NOAA Climate Prediction Center (CPC) maintained their "La Niña Advisory" noting "the coupled ocean-atmosphere system reflected a weakening La Niña" and called for a 77-percent chance of La Niña lasting through the Mar-May period, and a 56-percent chance of ENSO-neutral conditions during May-Jul 2022. On Feb 10 the International Research Institute (IRI) issued an ENSO Quick Look (Fig. 3), noting "Sea Surface Temperatures remain below-normal in the central-eastern equatorial Pacific" and "the evolution of key oceanic and atmospheric variables is consistent with weak La Niña conditions". On Feb 10 the Japanese Meteorological Agency (JMA) observed La Niña conditions are present and an 80-percent chance they would transfer to ENSO neutral by the end of spring. On Feb 15 the Australian Bureau of Meteorology ENSO outlook stated "Atmospheric and oceanic indicators remain at La Niña levels, but have likely peaked in strength", and called for a "breakdown" in La Niña in the coming months. The North American Multi-Model Ensemble (solid and dashed black line, Fig. 4) remains in La Niña territory, but indicates weak intensity and a gradual transition back to neutral conditions by mid-2022.

Summary: La Niña 2021-2022 is shaping up as a weak event. This event is forecast to last through winter, before moving back to ENSO-neutral conditions in spring or early summer. La Niña winters are frequently warmer and drier than average in the Southwest, and the outlook for the next month and 3 month period reflect this climatological tilt in the odds. December conditions were not exactly canonical (i.e. wetter and at times cooler than anticipated), but January and into February has been much warmer and drier. The impact of La Niña will be assessed in seasonal or longer totals, not weather events on the daily to weekly timescales. The cool season precipitation (Dec-Mar) and water year to date (Oct-Mar) will be instructive as to La Niña's impact, especially since April and May are typically drier regardless of ENSO-phase.

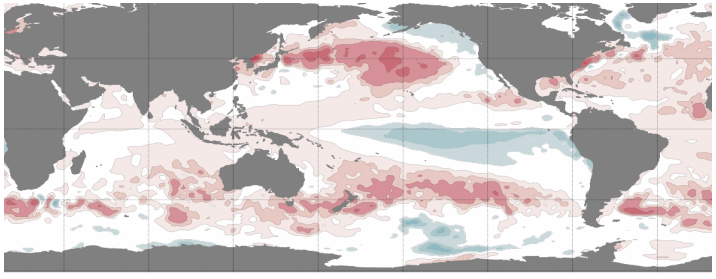


Figure 1: Mar-May 2022 Sea Surface Temperature (SST) Anomaly Forecast

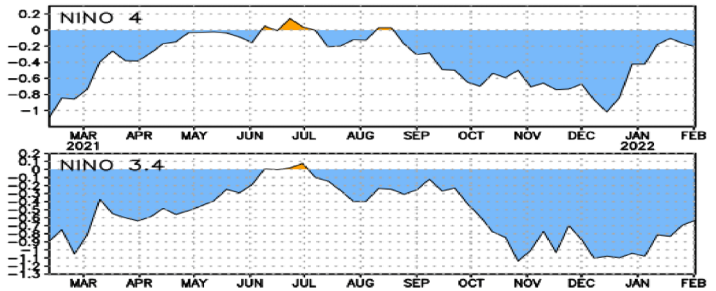


Figure 2: SST Anomalies in Niño Regions 3.4 & 4 (NCDC)

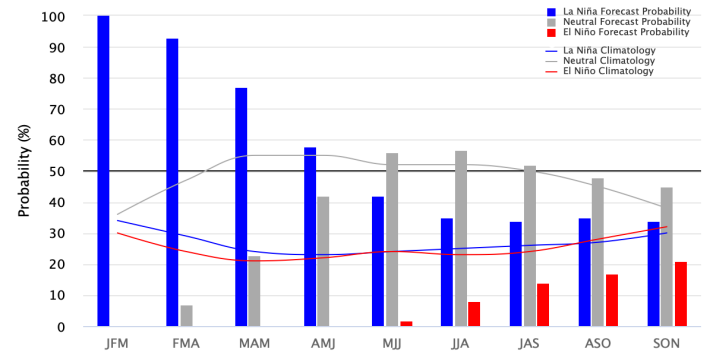


Figure 3: Early-Feb IRI/CPC Model-Based Probabilistic ENSO Forecast

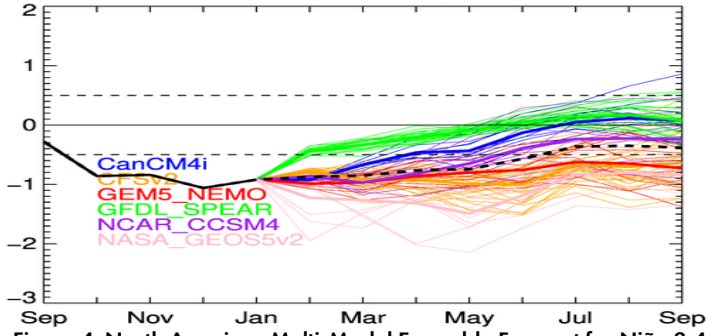


Figure 4: North American Multi-Model Ensemble Forecast for Niño 3.4

Online Resources

Portions of the information provided in this figure is available at the Natural Resources Conservation Service
www.wcc.nrcs.usda.gov/BOR/basin.html

Contact Ben McMahan with questions/comments.

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).

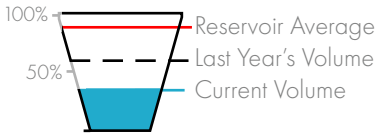
The table details more exactly the current capacity (listed as a percent of maximum storage). Current and maximum storage are given in thousands of acre-feet for each reservoir. One acre-foot is the volume of water sufficient to cover an acre of land to a depth of 1 foot (approximately 325,851 gallons).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

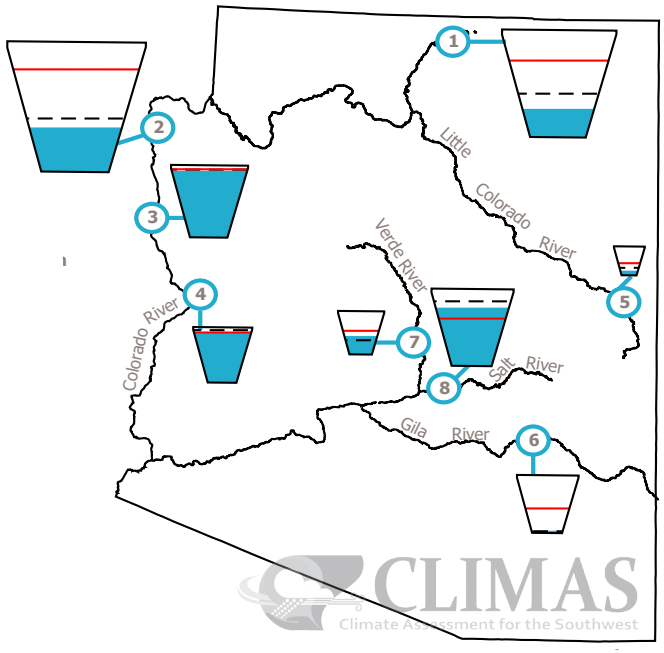
These data are based on reservoir reports updated monthly by the National Water and Climate Center of the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS).

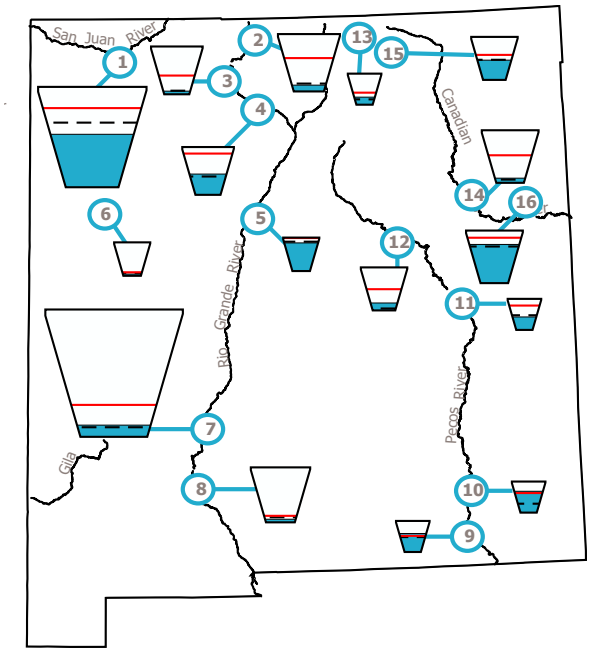
Reservoir Volumes

DATA THROUGH FEB 1, 2022

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







* in KAF = thousands of acre-feet

Reservoir	Capacity	Current Storage*	Max Storage*	One-Month Change in Storage*
1. Lake Powell	26%	6,335	24,322.0	-378
2. Lake Mead	34%	8,970	26,159.0	+52
3. Lake Mohave	92%	1,664	1,810.0	+91
4. Lake Havasu	89%	552	619.0	-18
5. Lyman	16%	4.8	30.0	0
6. San Carlos	4%	36.4	875.0	+16.8
7. Verde River System	42%	120.4	287.4	+9.1
8. Salt River System	75%	1,520	2,025.8	+48

*KAF: thousands of acre-feet

Reservoir	Capacity	Current Storage*	Max Storage*	One-Month Change in Storage*
1. Navajo	51%	859.1	1,696.0	-12.7
2. Heron	10%	40.3	400.0	+0.1
3. El Vado	6%	10.8	190.3	-3.8
4. Abiquiu	43%	81.0	186.8	+3.1
5. Cochiti	82%	41.0	50.0	-0.5
6. Bluewater	5%	2.0	38.5	0.0
7. Elephant Butte	9%	195.5	2,195.0	+27.7
8. Caballo	5%	15.7	332.0	+0.7
9. Lake Avalon	58%	2.6	4.5	+0.4
10. Brantley	67%	28.1	42.2	+1.3
11. Sumner	41%	14.9	35.9	+3.1
12. Santa Rosa	17%	18.3	105.9	-0.1
13. Costilla	24%	3.9	16.0	+0.3
14. Conchas	8%	19.3	254.2	-0.8
15. Eagle Nest	45%	35.8	79.0	+0.3
16. Ute Reservoir	72%	144	200	-1.0

Southwest Climate Podcast

climas.arizona.edu/media/podcasts

iTunes

https://apple.co/3kHh8bf

Spotify

https://spoti.fi/3zZIvWu

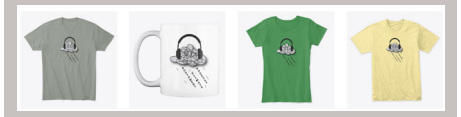
Android

https://bit.ly/2ILYHos

Stitcher

https://bit.ly/3nEWhHd

We also finally have podcast gear (shirts and mugs).



Order at: teespring.com/stores/the-southwest-climate-podcast.

If you are interested in showing your support - or enjoying the (lack of a) monsoon in style, this is one way to do so.

The Southwest Climate Podcast

Jan 2022 Southwest Climate Podcast - La Niña, Winter Storms, & the Jetstream

In the January 2022 edition of the CLIMAS Southwest Climate Podcast, Mike Crimmins and Zack Guido dive into the winter weather so far, tracking how this lines up with expectations in a La Niña year, and what to track this winter to look for La Nina effects - temperature, snow water equivalent, streamflow forecasts, etc. They also take a closer look at the jetstream and the role this plays in winter weather in the Southwest, and where these recent events (and the monsoon) leave us in terms of drought. They wrap with some discussion of the outlooks for the next month/season, as well as some obligatory pining for the monsoon.
https://bit.ly/3LgUbKp

Dec 2021 Southwest Climate Podcast Holiday 2021 Edition

In the December/Holiday edition of the CLIMAS Southwest Climate Podcast, Mike Crimmins and Zack Guido sit down for a quick look at the weather of the last month or so, some recent events bringing winter storms to the region, and what a La Nina might bring in the rest of 2021 and through the rest of winter 2022. They also reflect on 2021 and memorable events in the Southwest, and not surprisingly, this brings them both back to monsoon 2021.

https://bit.ly/3qq0z9P

Online Resources

Figure 1
Climate Program Office
cpo.noaa.gov

RISA Program Homepage

cpo.noaa.gov/Meet-the-Divisions/Climate-and-Societal-Interactions/RISA

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

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 Institute of the Environment—is a collaboration between the University of Arizona 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

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.

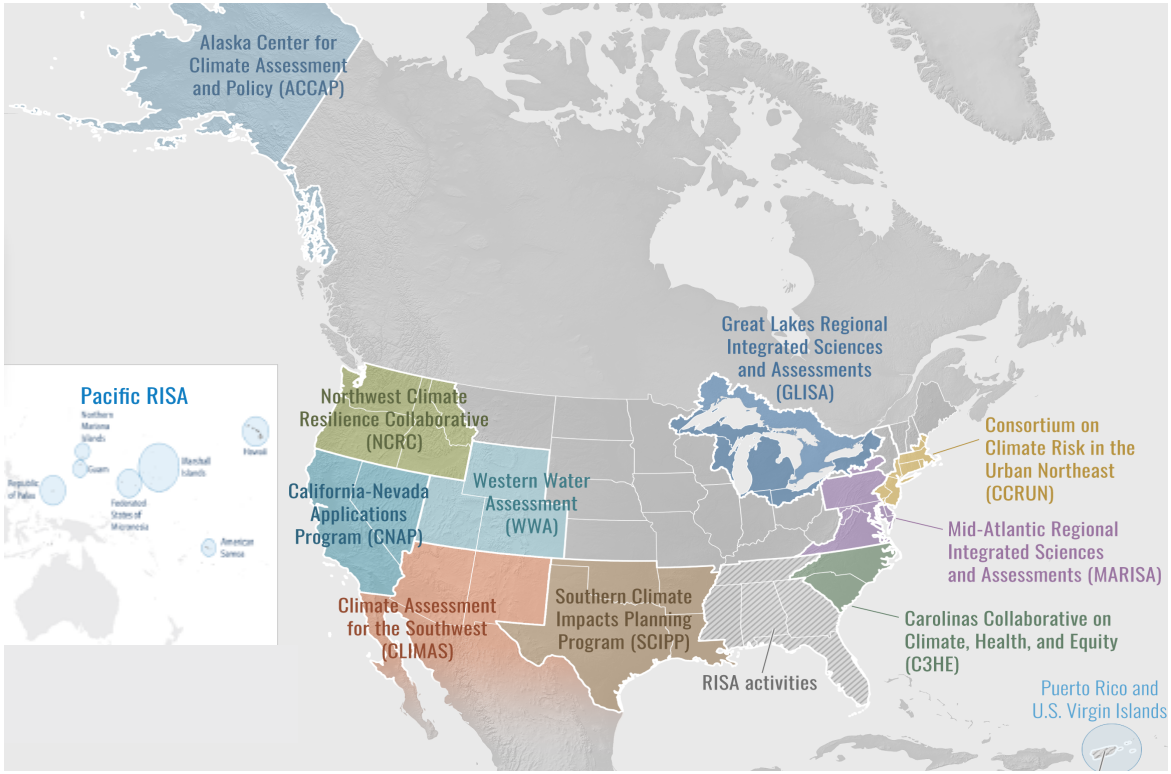


Figure 1: NOAA Regional Integrated Sciences and Assessments Regions