November 2023: Southwest Climate Outlook

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November 30, 2023

https://climas.arizona.edu/

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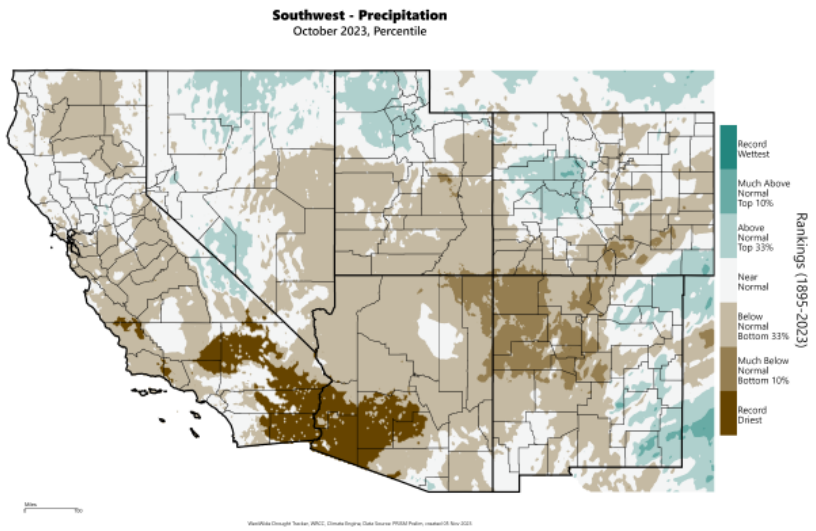
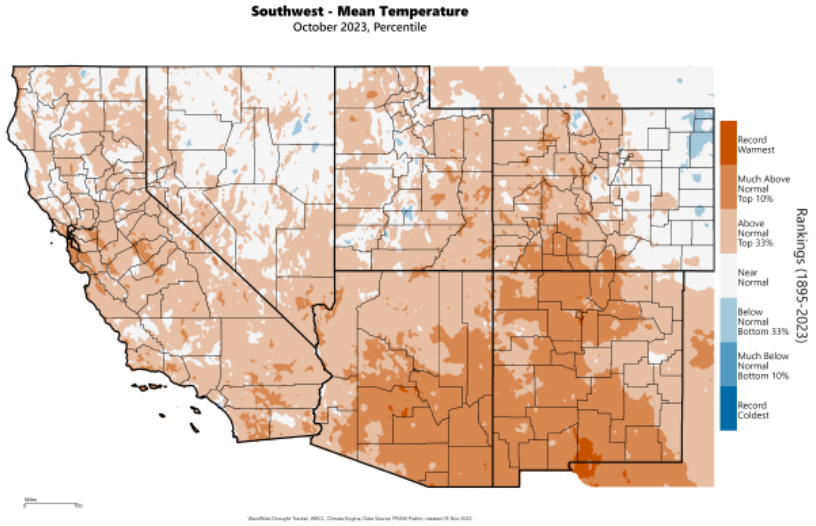
Precipitation and Temperature

October precipitation was below normal or much below normal across much of Arizona and New Mexico, and it was the driest October on record for a large portion of southwestern Arizona. Eastern New Mexico was an exception to the general pattern, with precipitation there coming in at near-normal or above-normal totals.



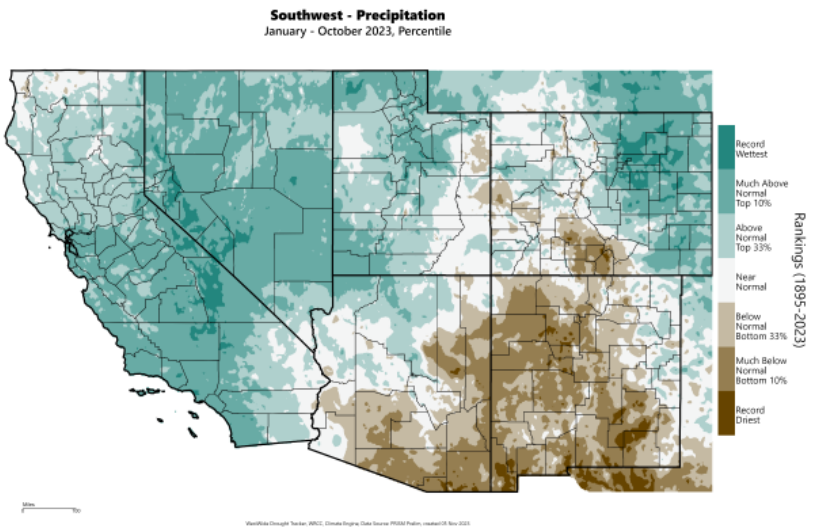
Source: WestWide Drought Tracker

Temperatures were above normal or much above normal across Arizona and New Mexico in October, and for some locations it was the warmest October on record.



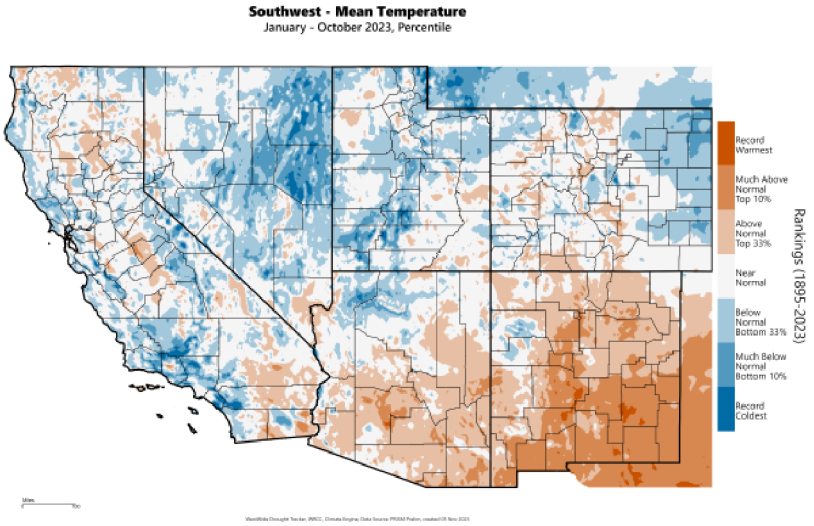
Source: WestWide Drought Tracker

January-October precipitation was below normal, much below normal, or record-driest in most of New Mexico, and in southern and eastern Arizona. Northern Arizona and much of the remaining western U.S. stand in contrast, having had an anomalously wet year so far.



Source: WestWide Drought Tracker

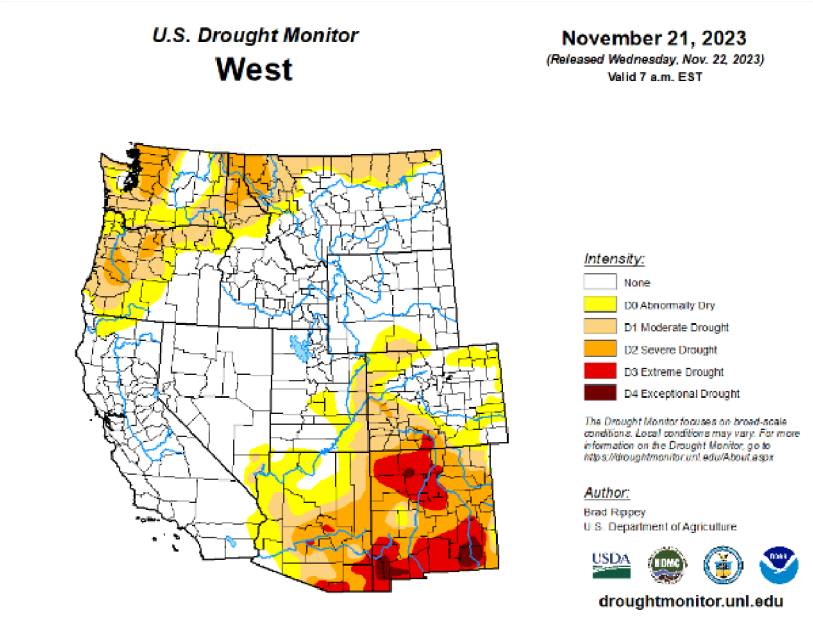
January-October temperatures were above normal across New Mexico and a large portion of Arizona, and much above normal in southern New Mexico and the Rio Grande valley.



Source: WestWide Drought Tracker

Drought

Drought conditions are moderate or worse for over 90% of New Mexico and more than half of Arizona. Severe or worse drought conditions prevail over 88% of New Mexico and 35% of Arizona. Parts of southeastern and central Arizona (6%) are in extreme drought, and 48% of New Mexico is under extreme-to-exceptional drought.



Source: U.S. Drought Monitor

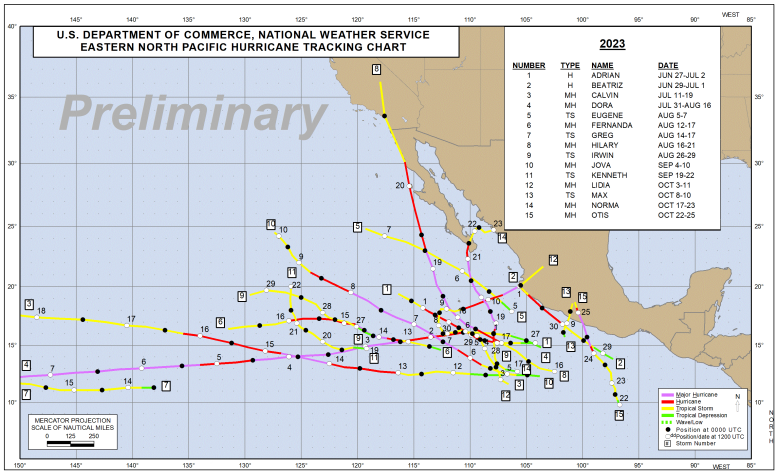
NIDIS Improved and Expanded State Pages on Drought.Gov

Arizona

New Mexico

Hurricanes & Tropical Storms

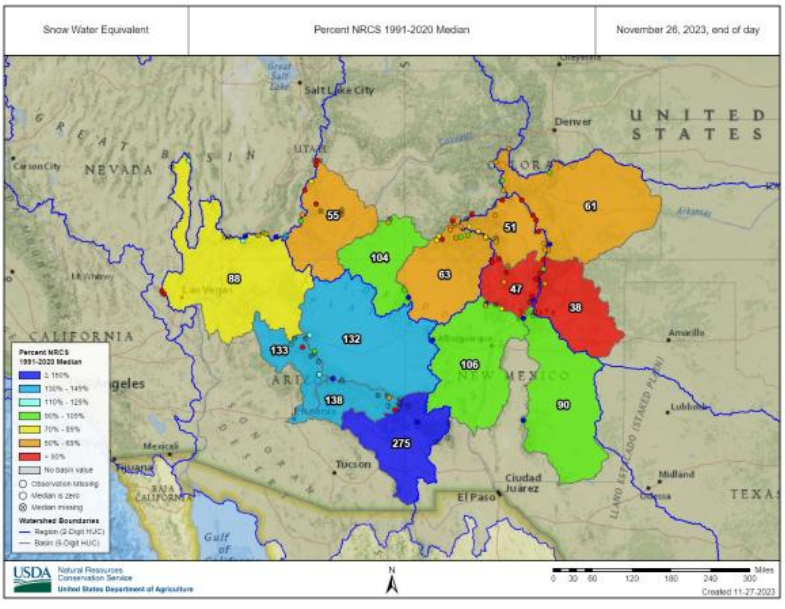
The east Pacific hurricane season extends from May 15th to November 30th. 2023 has been an active year for tropical cyclones in the eastern North Pacific basin; we have seen more named storms (16) than average (14), and more of the storms reached hurricane strength (10) than would be expected from the long-term average (8). The Accumulated Cyclone Energy (ACE, a measure of the combined strength and duration of storms) of the 2023 season has been 20% higher than the long-term average ACE.



NOAA - National Hurricane Center

Snowpack

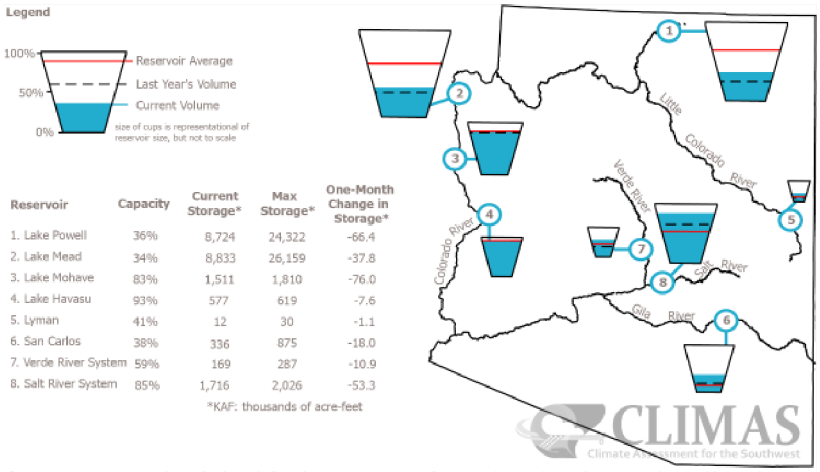
The season of snow accumulation has begun and NRCS has resumed tracking of snow water equivalent (SWE) for snow-fed watersheds. Current SWE is highly variable across space, but the broad pattern shows southern basins near or ahead of normal for this time of year, and northern basins generally lagging behind normal SWE for this time of year.



USDA-NRCS: National Water and Climate Center

Water Supply

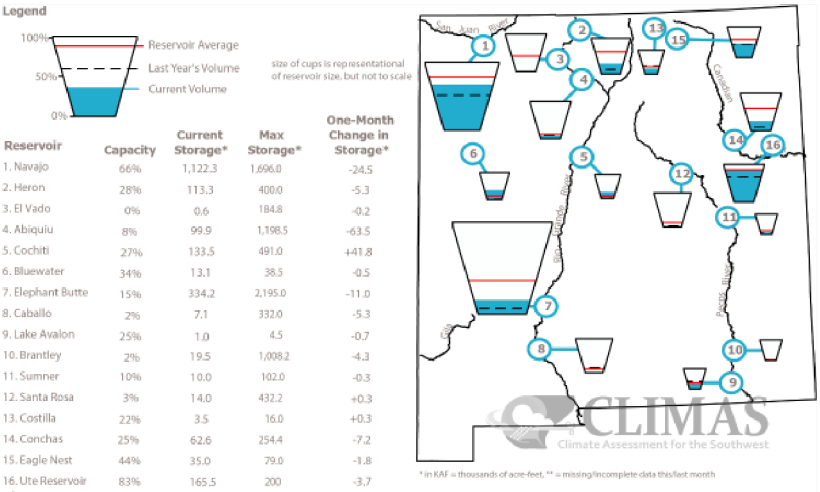
Arizona reservoirs and New Mexico's larger reservoirs are at higher levels than at this time last year due to above-average precipitation last winter season. Lakes Mead and Powell are well below long-term average reservoir levels, as are most reservoirs in New Mexico, including Elephant Butte and Navajo reservoirs. Arizona reservoirs outside of the mainstem Colorado River system are at levels above the long-term average for this time of year.



Reservoir	Capacity	Current Storage*	Max Storage*	One-Month Change in Storage*
1. Lake Powell	36%	8,724	24,322	-66.4
2. Lake Mead	34%	8,833	26,159	-37.8
3. Lake Mohave	83%	1,511	1,810	-76.0
4. Lake Havasu	93%	577	619	-7.6
5. Lyman	41%	12	30	-1.1
6. San Carlos	38%	336	875	-18.0
7. Verde River System	59%	169	287	-10.9
8. Salt River System	85%	1,716	2,026	-53.3

*KAF: thousands of acre-feet

Figure 1. Arizona reservoir volumes for the end of October 2023 as a percent of capacity. The map depicts the average volume and last year's storage for each reservoir. The table also lists current and maximum storage, and change in storage since last month.



Reservoir	Capacity	Current Storage*	Max Storage*	One-Month Change in Storage*
1. Navajo	66%	1,122.3	1,696.0	-24.5
2. Heron	28%	113.3	400.0	-5.3
3. El Vado	0%	0.6	184.8	-0.2
4. Abiquiu	8%	99.9	1,198.5	-63.5
5. Cochiti	27%	133.5	491.0	+41.8
6. Bluewater	34%	13.1	38.5	-0.5
7. Elephant Butte	15%	334.2	2,195.0	-11.0
8. Caballo	2%	7.1	332.0	-5.3
9. Lake Avalon	25%	1.0	4.5	-0.7
10. Brantley	2%	19.5	1,008.2	-4.3
11. Sumner	10%	10.0	102.0	-0.3
12. Santa Rosa	3%	14.0	432.2	+0.3
13. Costilla	22%	3.5	16.0	+0.3
14. Conchas	25%	62.6	254.4	-7.2
15. Eagle Nest	44%	35.0	79.0	-1.8
16. Ute Reservoir	83%	165.5	200	-3.7

* in KAF = thousands of acre-feet, ** = missing/incomplete data this/last month

Figure 2. New Mexico reservoir volumes for end of October 2023 as a percent of capacity. The map depicts the average volume and last year's storage for each reservoir. The table also lists current and maximum storage, and change in storage since last month.

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 1991–2020 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 Natural Resources Conservation Service - National Water and Climate Center (USDA)

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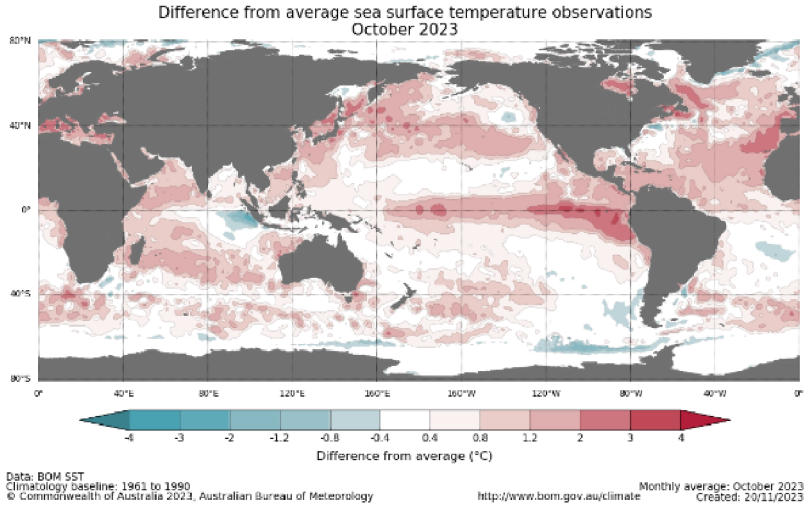
BOM: New Mexico Dashboard

ENSO Tracker

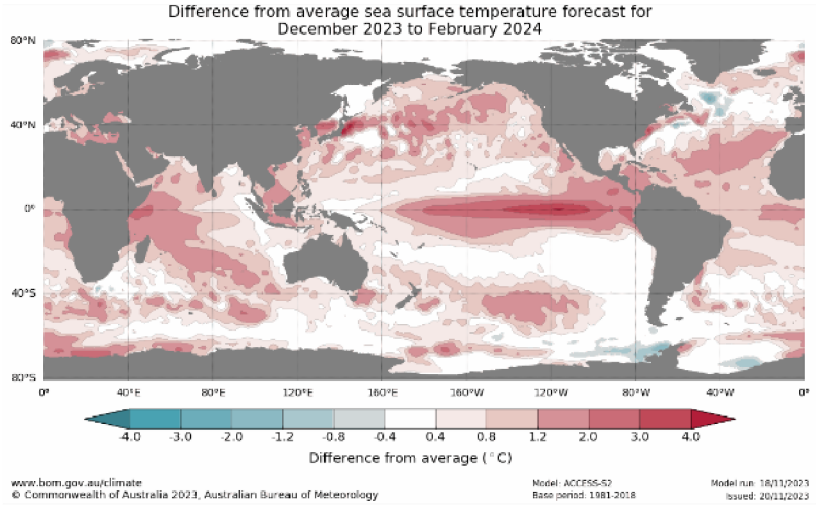
This year's strong El Niño event is ongoing—sea surface temperatures (SSTs) in the eastern and central equatorial Pacific were elevated by more than 1°C above normal, with near-normal SSTs in the western Pacific. In recent months the tropical atmosphere has also been showing El Niño-consistent behavior.



Source: Australian Bureau of Meteorology

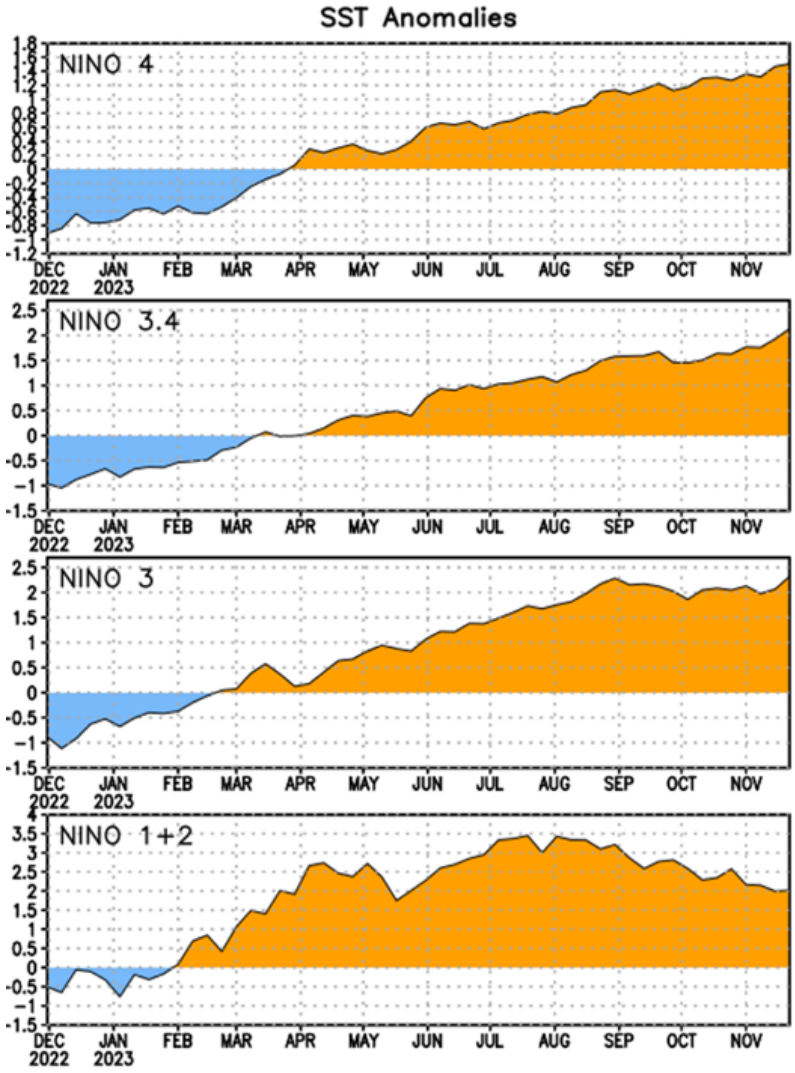
The El Niño SST pattern is expected to persist and strengthen through the next few months with a 55% chance that the

‘strong’ (> 1.5°C Niño 3.4 SSTs) event will persist and a 35% chance that it will become ‘historically strong’ (> 2°C Niño 3.4 SSTs). A historically strong event would put it in company with past events like 2015-16, 1997-98 and 1982-83.



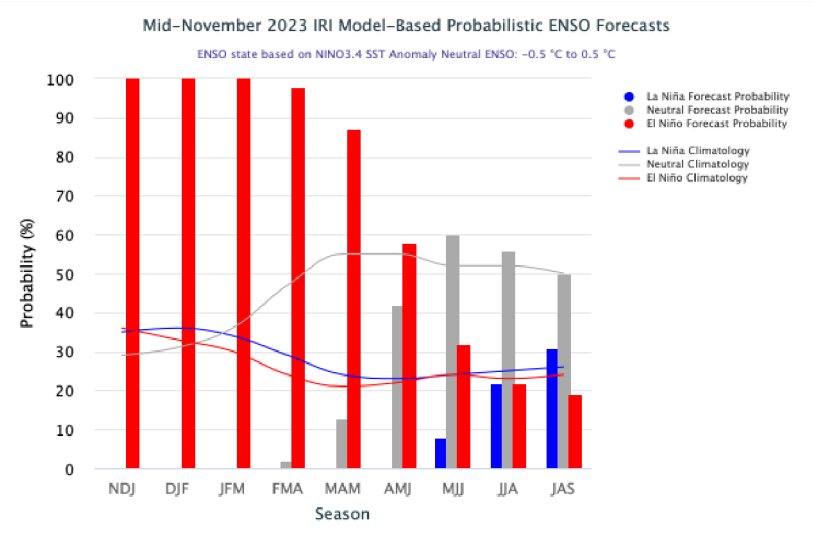
Source: Australian Bureau of Meteorology

SSTs in the central Pacific diagnostic regions Niño 3.4 and Niño 4 have continued to increase in recent weeks, and the most recent Niño 3.4 weekly SST departure measured 2.1°C above normal.



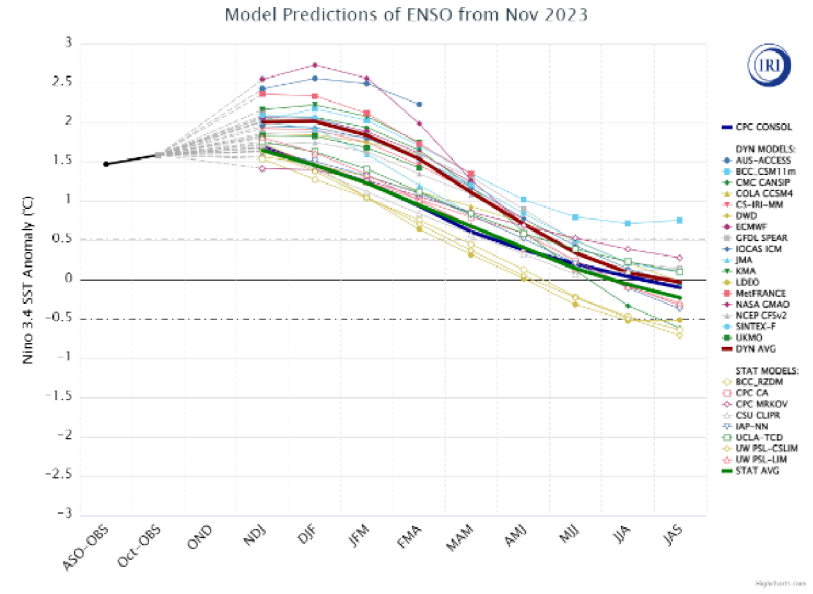
Source: Climate Prediction Center (NOAA)

Model-based ENSO forecasts indicate this El Niño event will very likely continue into the spring of 2024, with a probability >90% that February-April Niño 3.4 SSTs will average >0.5°C above normal. By the May-July season, forecasts indicate ENSO will more likely than not return to a neutral state.



Source: The International Research Institute for Climate and Society, Columbia University Climate School

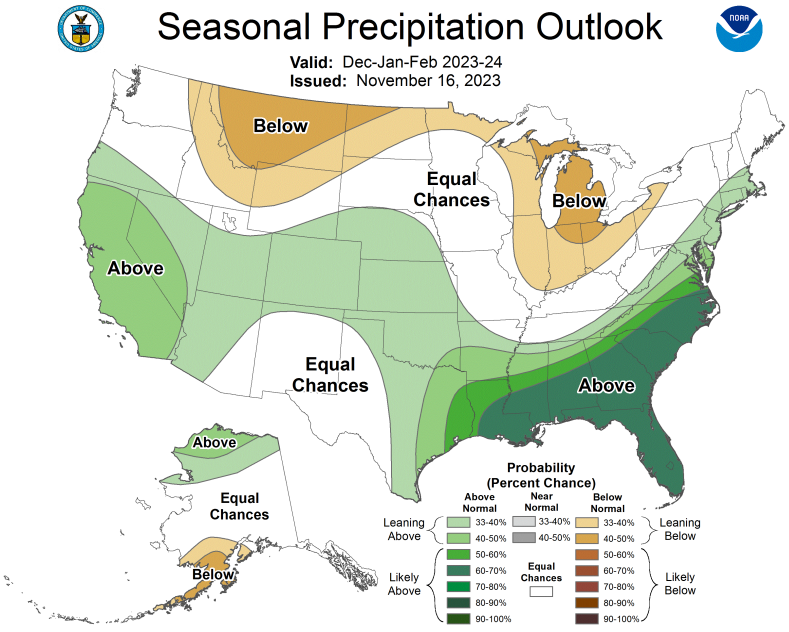
The ensemble average of dynamical ENSO forecasts suggests that this event will likely peak with the Nov-Jan or Dec-Feb season near the current Niño 3.4 SST anomaly of 2.1°C, but the range of individual models includes a peak Dec-Feb Niño 3.5 SST anomaly near 2.75°C. The models are nearly unanimous regarding the subsequent weakening of El Niño, with all but one model indicating a return to ENSO-neutral by May-July 2024.



Source: The International Research Institute for Climate and Society, Columbia University Climate School

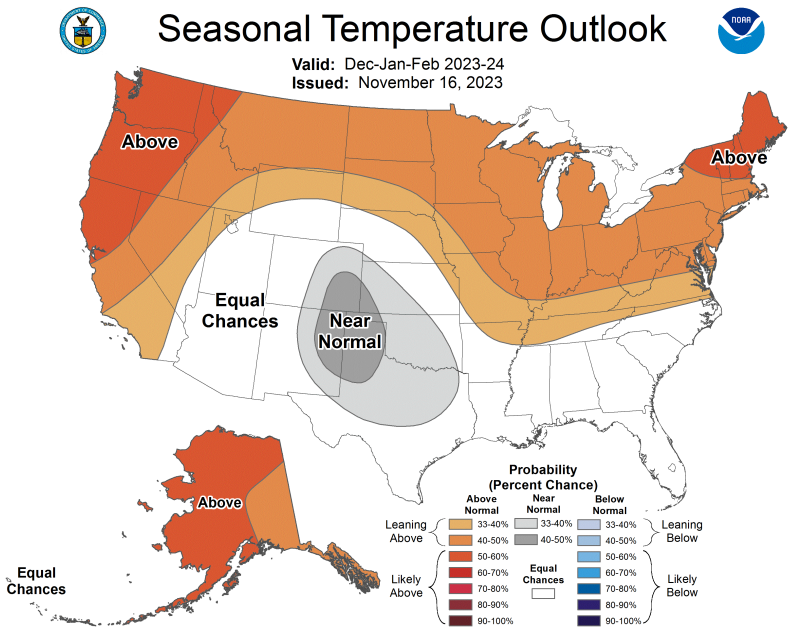
Seasonal Forecasts

The December-February seasonal precipitation forecast very slightly favors above-normal precipitation across most of Arizona but does not lean one way or the other regarding precipitation in New Mexico. Above-normal precipitation is also slightly favored over the Rio Grande headwaters in Colorado, and over much of the upper Colorado River basin. Although El Niño is statistically associated with increased cool-season precipitation across the southern tier of the U.S., that association is weaker in the Southwest than in the southeastern states. And in the case of this season's El Niño, the long-range dynamical models also appear to be in greater agreement regarding the likelihood of increased precipitation in the Southeast.



Source: Climate Prediction Center (NOAA)

The December-February seasonal temperature forecast leans toward near-normal temperatures in eastern New Mexico, and settles on equal chances of above-normal, below-normal, and near-normal temperatures for the rest of the region.



Source: Climate Prediction Center (NOAA)

Southwest Climate Podcast

November 2023 - Winter is Coming

In this month's Southwest Climate Podcast, Zack Guido and Mike Crimmins are back from Thanksgiving to give a recap of November, which was not much to write home about. They start gearing us up for the next few months by taking a look back at previous winters and give a glimpse into this coming season as far as impacts, synoptic features, and large-scale drivers. The team rounds it out with a deep dive into El Niño and the complex forecasting that may or may not bring us some needed winter precipitation. Also - the monsoon is gone but not forgotten!

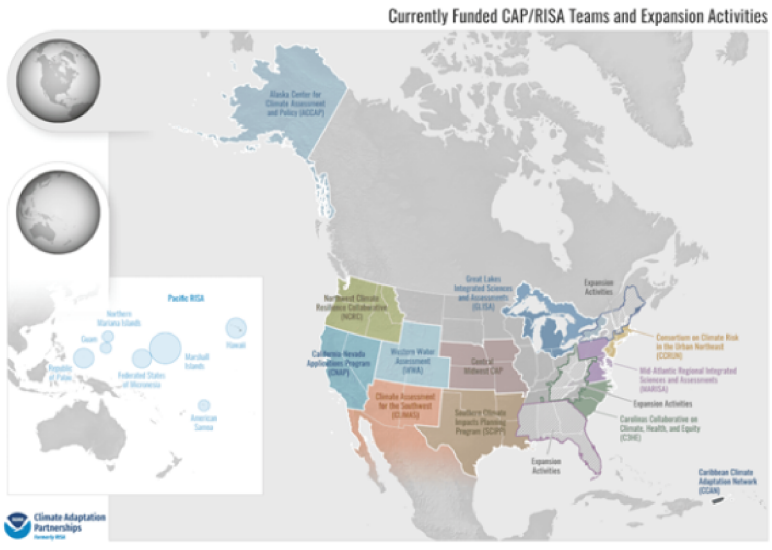
Last Call! The Southwest Climate Podcast is looking to do a special MailBag episode for the end of 2023! We are asking for listeners to send in their questions - Can be anything Southwest Climate related or try and stump the hosts by

sending in your inquiries and postulations at uaclimas@gmail.com.

Listen Here

About CLIMAS

The Climate Assessment for the Southwest (CLIMAS) program was established in 1998 as part of the National Oceanic and Atmospheric Administration's Climate Adaptation Partnerships (CAP) Program (formerly known as Regional Integrated Sciences and Assessments, or RISA). 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.



Learn more about the NOAA CAP program here

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