October 2024: Southwest Climate Outlook

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https://climas.arizona.edu/

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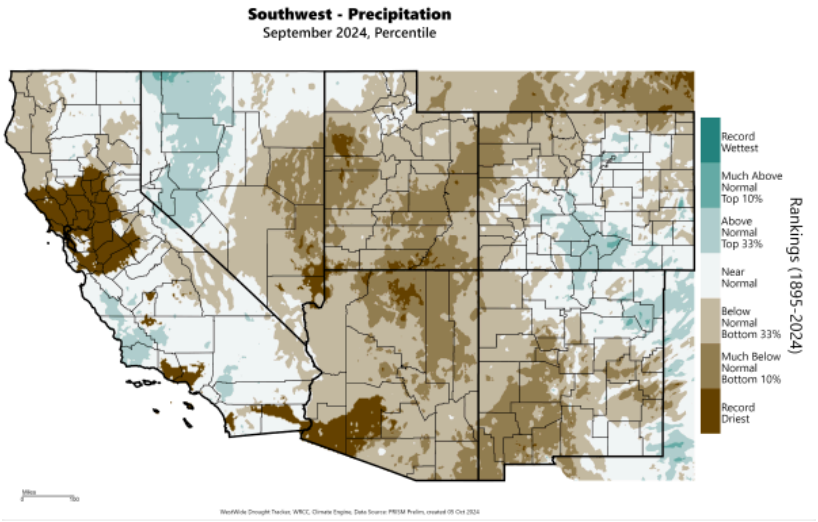
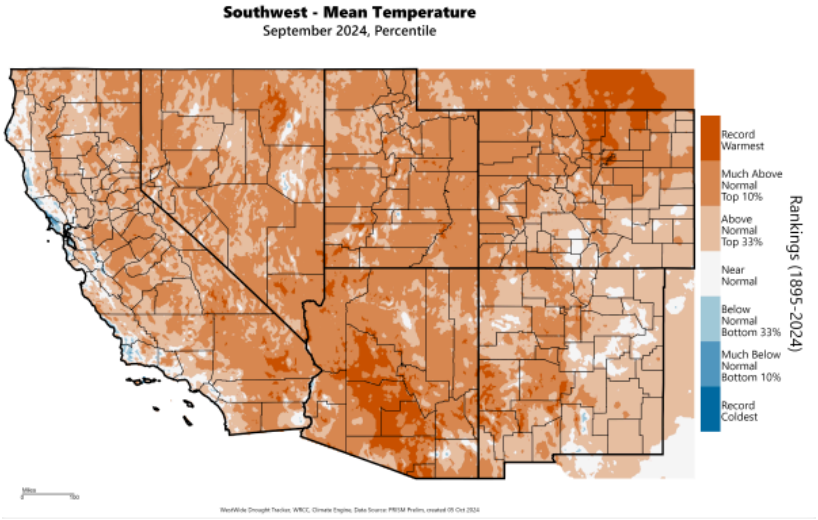
Precipitation and Temperature

September precipitation was below normal for Arizona and much of New Mexico and also much below normal for large parts of northern Arizona and southwest New Mexico. For some Arizona locations, including parts of Yuma and Maricopa counties, it was the driest September on record.



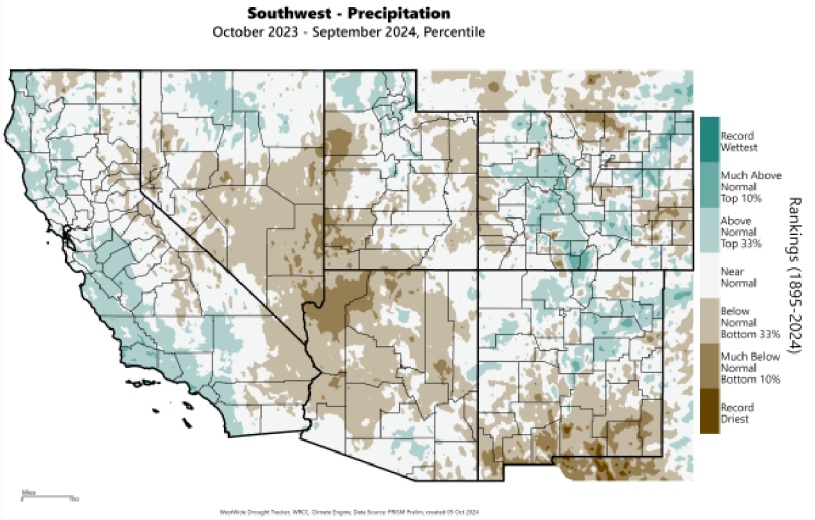
Source: WestWide Drought Tracker

September temperatures were above normal across Arizona and New Mexico, much above normal for much of western New Mexico and nearly all of Arizona, with many locations having the warmest September on record—including large parts central Arizona.



Source: WestWide Drought Tracker

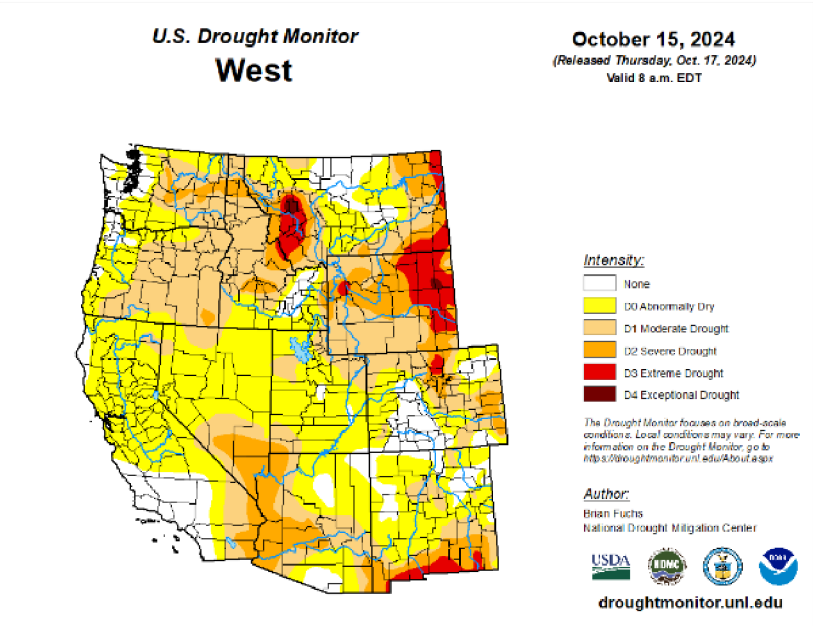
The passing of September concluded the 2024 water year (October 2023 – September 2024), which will enter into the climatological record as a year of below normal precipitation totals across much of Arizona and across southern New Mexico, where for some locations it was the driest water year in the record. Some areas of the northern half of New Mexico had above normal precipitation totals, but totals were either near normal or below normal for a larger proportion of that region.



Source: WestWide Drought Tracker

Drought

Drought conditions have worsened in New Mexico and in Arizona. In New Mexico, the proportion of the state's area meeting criteria for classification as abnormally dry (D0) or in moderate to extreme drought (D1 to D3) has increased over the past month. Also in the past month, Arizona has seen large increases in the proportion of the state's area classified as either abnormally dry or in moderate to severe drought, with the area in severe drought increasing from 5% to 27% of the state's area since last month.



Source: U.S. Drought Monitor

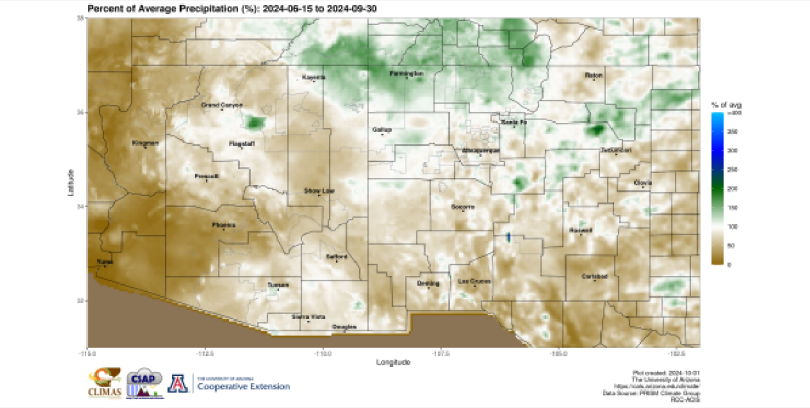
NIDIS Improved and Expanded State Pages on Drought.Gov

Arizona

New Mexico

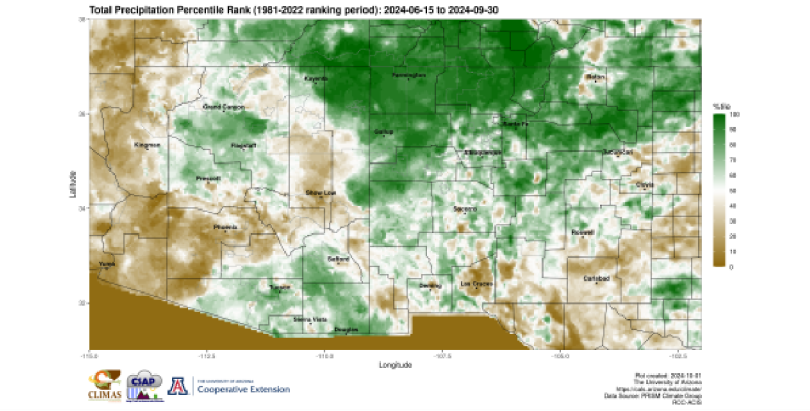
Monsoon

Looking back at this year's monsoon now that we have data for the complete June 15 – September 30 season, it's clear that for much of the Arizona-New Mexico region, monsoon rainfall was lackluster, with seasonal totals falling well short of the long-term average across large parts of Arizona and southern New Mexico.



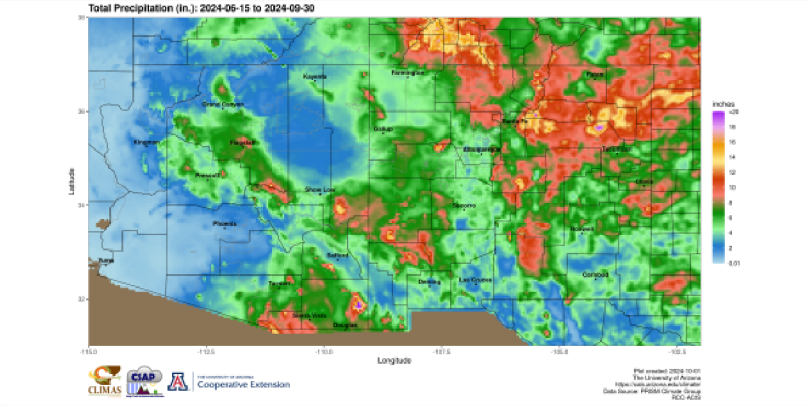
Southwest U.S. Summer Monsoon Season Precipitation Mapping

Ranking the seasonal totals by percentile against past years' totals shows that large parts of the Colorado Plateau and northern New Mexico had totals much above normal (normal in this case being the long-term median, or 50th percentile), parts of southeastern and north-central Arizona came in near normal to above normal, but those dry locations in southern New Mexico and across western, central and eastern Arizona did have totals ranking among the lowest in the record.



Southwest U.S. Summer Monsoon Season Precipitation Mapping

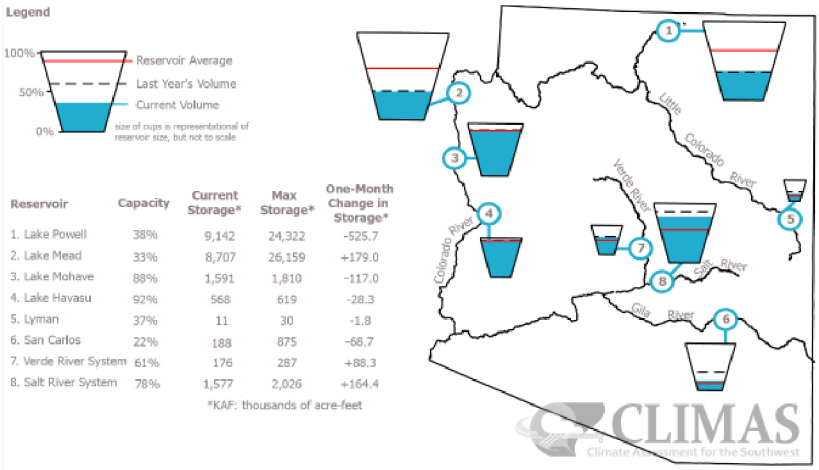
The map of total precipitation for the season is dominated by the pattern of topographic control on precipitation, with higher elevations generally receiving greater amounts of monsoon rainfall. However, eastern New Mexico shows several areas of rainfall maxima that are not driven by elevation and instead reflect more thunderstorm activity than usual.



Southwest U.S. Summer Monsoon Season Precipitation Mapping

Water Supply

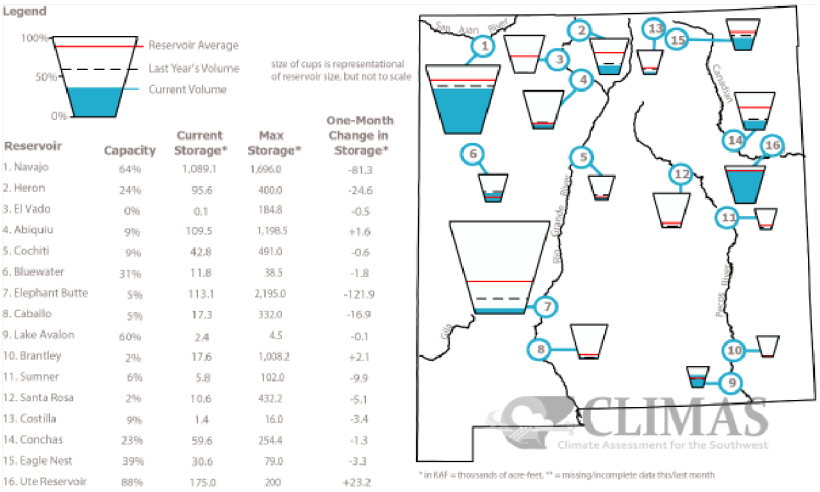
Reservoir levels in New Mexico are generally below where they were last year and lower than long-term average levels, except for Ute Reservoir and Lake Avalon, where levels are near or above average. Lake Mead and Lake Powell are well below long-term average levels but are holding close to last year's storage. Other Arizona reservoirs are at above average levels but hold less than they did last year.



Reservoir	Capacity	Current Storage*	Max Storage*	One-Month Change in Storage*
1. Lake Powell	38%	9,142	24,322	-525.7
2. Lake Mead	33%	8,707	26,159	+179.0
3. Lake Mohave	88%	1,591	1,810	-117.0
4. Lake Havasu	92%	568	619	-28.3
5. Lyman	37%	11	30	-1.8
6. San Carlos	22%	188	875	-68.7
7. Verde River System	61%	176	287	+88.3
8. Salt River System	78%	1,577	2,026	+164.4

*KAF: thousands of acre-feet

Figure 1. Arizona reservoir volumes for the end of September 2024 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	64%	1,089.1	1,696.0	-81.3
2. Heron	24%	95.6	400.0	-24.6
3. El Vado	0%	0.1	184.8	-0.5
4. Abiquiu	9%	109.5	1,198.5	+1.6
5. Cochiti	9%	42.8	491.0	-0.6
6. Bluewater	31%	11.8	38.5	-1.8
7. Elephant Butte	5%	113.1	2,195.0	-121.9
8. Caballo	5%	17.3	332.0	-16.9
9. Lake Avalon	60%	2.4	4.5	-0.1
10. Brantley	2%	17.6	1,008.2	+2.1
11. Sumner	6%	5.8	102.0	-9.9
12. Santa Rosa	2%	10.6	432.2	-5.1
13. Costilla	9%	1.4	16.0	-3.4
14. Conchas	23%	59.6	254.4	-1.3
15. Eagle Nest	39%	30.6	79.0	-3.3
16. Ute Reservoir	88%	175.0	200	+23.2

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

Figure 2. New Mexico reservoir volumes for end of September 2024 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

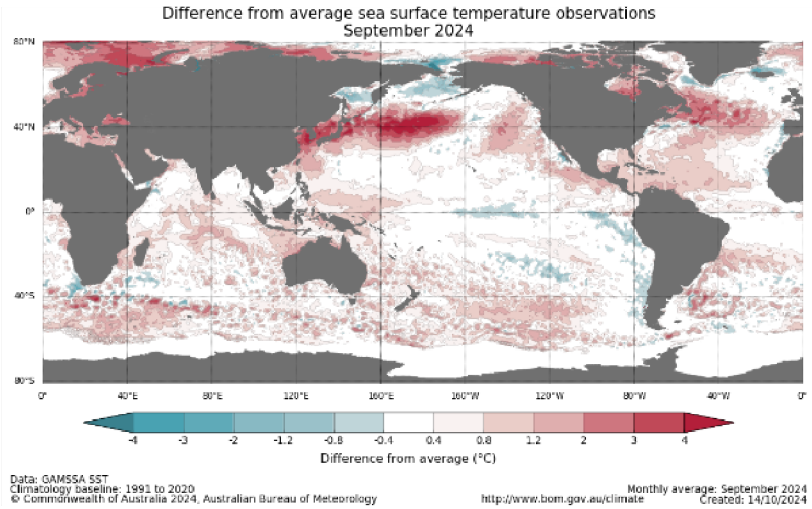
Resources Conservation Service - National Water and Climate Center (USDA)

.

BOR: New Mexico Dashboard

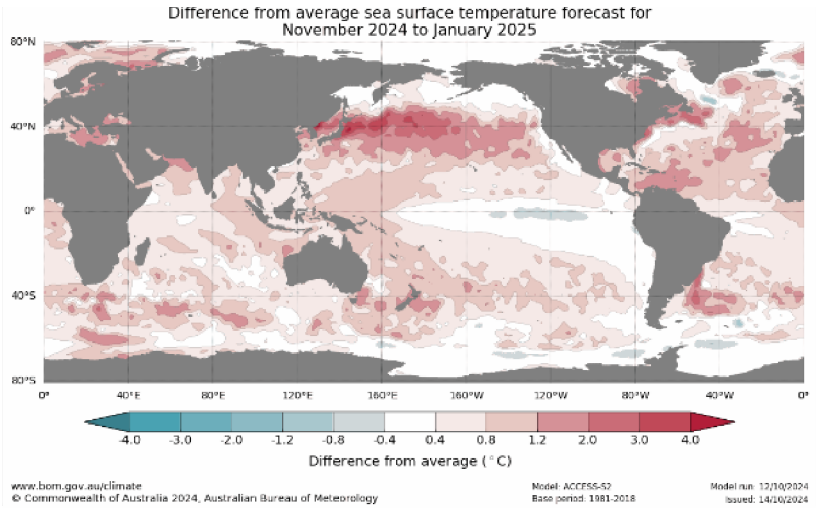
ENSO Tracker

Sea surface temperatures (SSTs) in the tropical Pacific look much like they have for the past several months: warmer than average in the west, with some areas of cooler-than-average SSTs in the east and central equatorial Pacific. This is the general pattern associated with La Niña, however the central-eastern tropical Pacific cool anomalies have not been cool enough, extensive enough, or persistent enough to yet qualify as La Niña conditions.



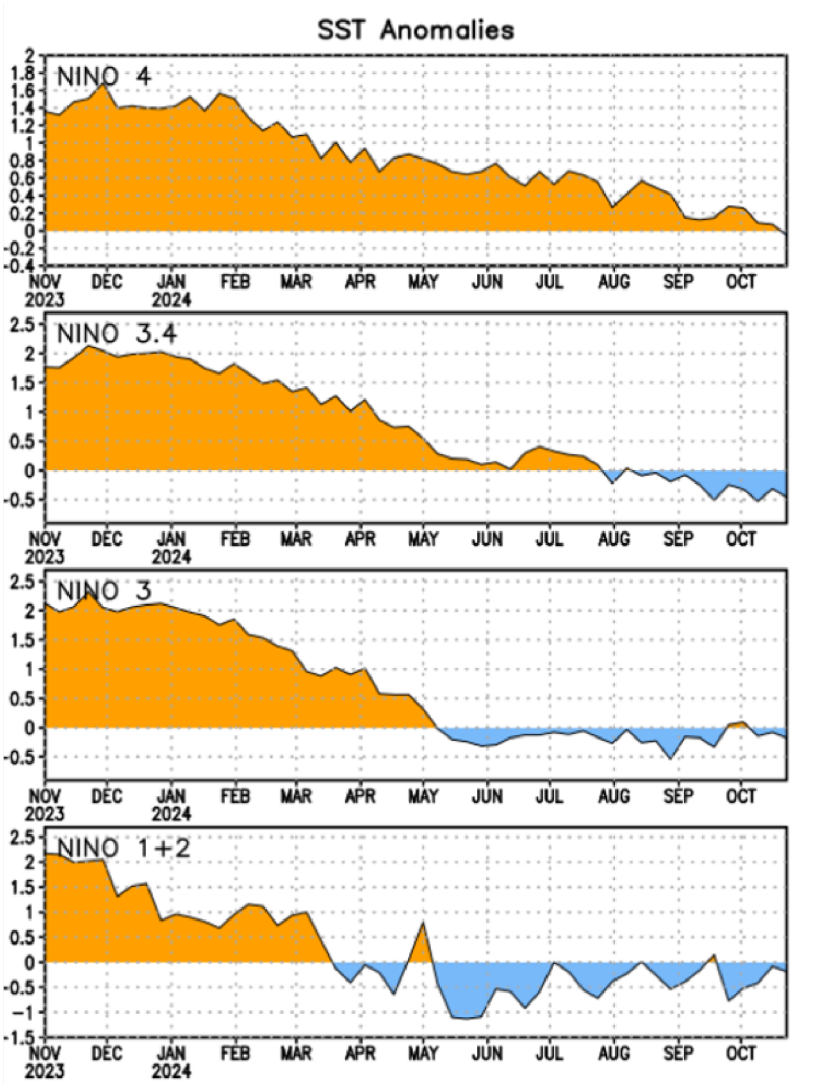
Source: Australian Bureau of Meteorology

A November – January SST forecast from the Australian Bureau of Meteorology's dynamical model shows that the current edge-of-La Niña state in the Pacific may very well persist—the central-eastern equatorial Pacific SSTs in the forecast are comparable to those in the current observations.



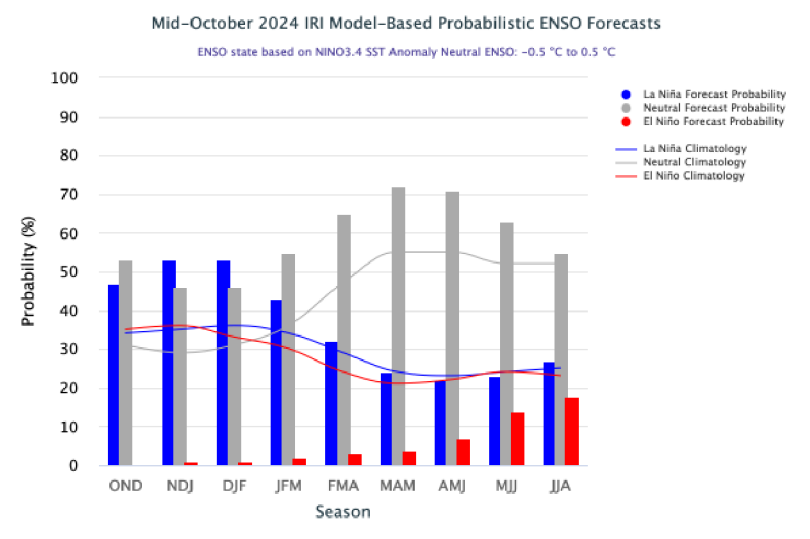
Source: Australian Bureau of Meteorology

Weekly time series of SST anomalies for the ENSO monitoring regions show that SSTs in the Nino 3.4 region have intermittently crossed the –0.5°C (difference from long-term average) threshold used to classify La Niña events. To be entered into the record as a La Niña event, Nino 3.4 SSTs will have to remain persistently below average such that a 3-month average satisfies or surpasses that –0.5°C condition for five consecutive (overlapping) 3-month seasons.



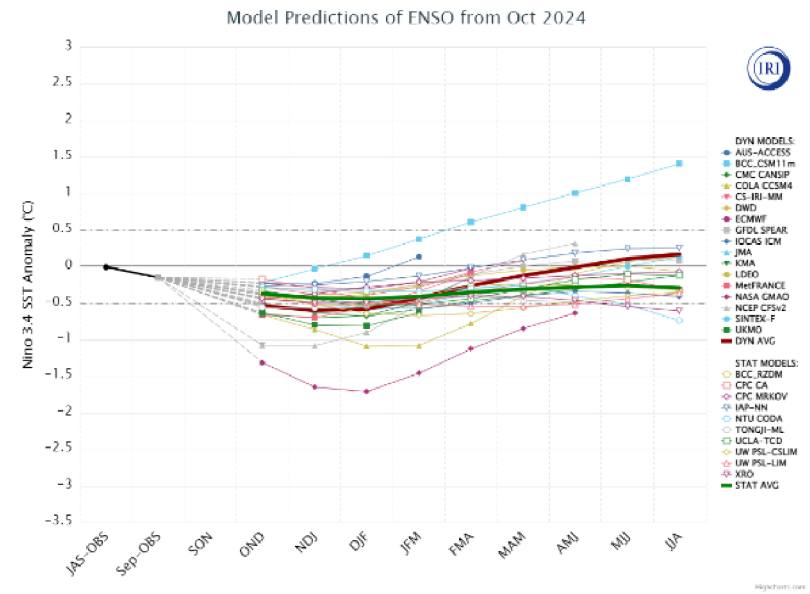
Source: Climate Prediction Center (NOAA)

The probabilistic summary of ENSO forecasts favors a meeting La Niña criteria for the November – January and December – February seasons, but also indicates a >40% chance that ENSO neutral conditions persist for those seasons. ENSO-neutral is favored for all other seasons in the forecast window. So, although La Niña conditions are favored to emerge for one or two 3-month seasons, they are not at this time favored to persist for long enough to be recorded as a La Niña "event".



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

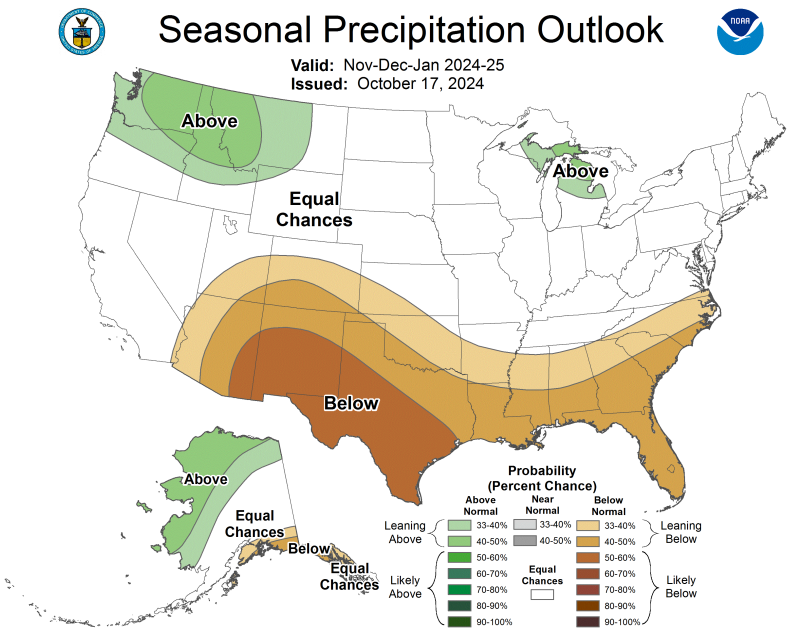
The plume of individual model ENSO forecasts shows most models clustering tightly around a trajectory that hews close to the ENSO-neutral – La Niña threshold of –0.5°C Nino 3.4 SST anomaly. A few outlier forecasts dip into the moderate La Niña territory of -1°C, and a single outlier forecast predicts a strong La Niña with Nino 3.4 SSTs more than 1.5°C cooler than average. The outlier forecast should be regarded as very unlikely future states given the good agreement (tight spread) among the other models.



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

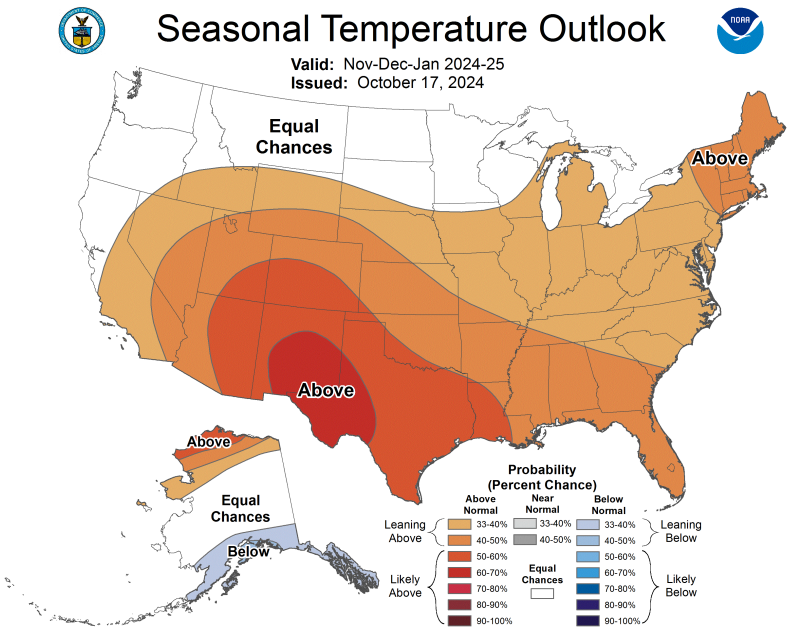
Seasonal Forecasts

The November – January seasonal precipitation forecast indicates below normal precipitation is *likely* (50% - 60% chance) for an area that includes part of southeastern Arizona and much of New Mexico. The forecast *leans toward* (>33% chance) below normal precipitation for an area that includes the remainder of Arizona and New Mexico. The expectation of La Niña conditions, by forecasters and as reflected in seasonal weather prediction models, is a key component in this seasonal forecast.



Source: Climate Prediction Center (NOAA)

The November – January seasonal temperature forecast indicates above normal temperatures are *likely* (>50% chance) for an area that includes New Mexico and central and eastern Arizona. The forecast *leans toward* (>40% chance) above normal temperatures for an area that includes western Arizona. The expected La Niña plays a role in this forecast, but even without a La Niña, seasonal forecasts have tended to lean toward warm temperatures based on the long-term warming trend, in absence of any other overwhelming factors.



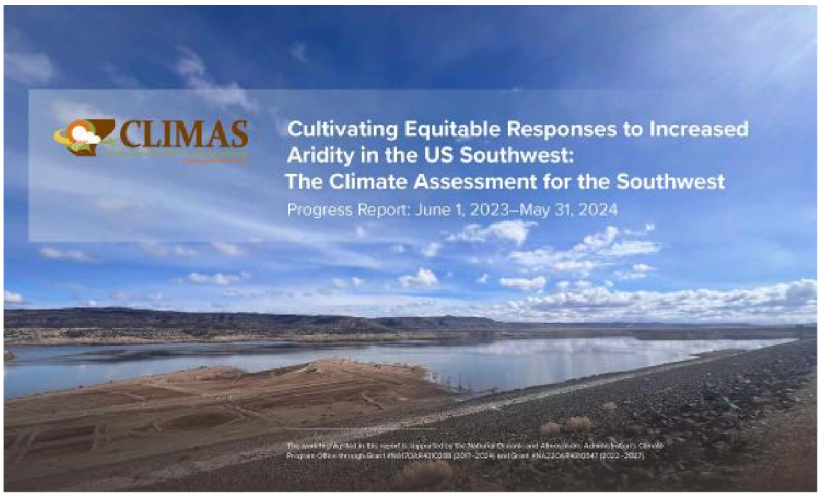
Source: Climate Prediction Center (NOAA)

2023-2024 Annual Report

CLIMAS's 2023-2024 Annual Report is now available!

Since 1998 the Climate Assessment for the Southwest (CLIMAS)—a NOAA funded partnership between the University of Arizona, the Inter Tribal Council of Arizona, and New Mexico State University—has been working with stakeholders from the private sector, academia, local, state, federal, and tribal government to bring the best-available knowledge to challenges related to weather and climate in the Southwest. The 2023-2024 Annual Report details some of CLIMAS's work throughout the past year, providing updates on research projects as well as major accomplishments.

To view or download the 2023-2024 CLIMAS Annual Report, click here.



CLIMAS 2023-2024 Annual Report

Southwest Climate Podcast

September 2024 SW Climate Podcast – A Tale of Two Monsoon Halves

Recorded 9/20/2024

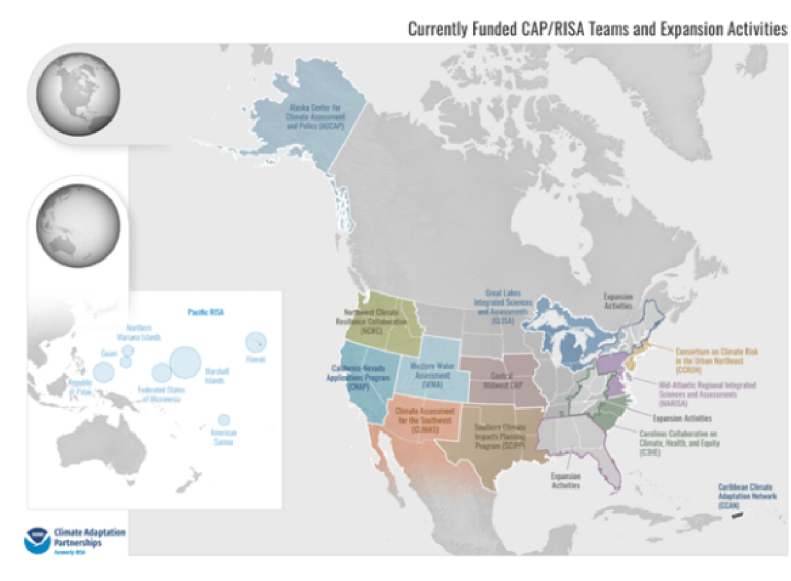
Aired 9/24/2024

In this month's Southwest Climate Podcast hosts Zack 'Generational' Guido and Mike "Dewpoint' Crimmins break down what the heck happened to the second half of the monsoon this year. They unpack the recent Atlantic tropical activity, or lack thereof, as well as any hope for the Pacific to bring some moisture to the Southwest. They end with some coverage of the rest of September and a look into the early winter outlooks. This episode is not without controversy - so download / stream today!

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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