December 2024: Southwest Climate Outlook

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https://climas.arizona.edu/

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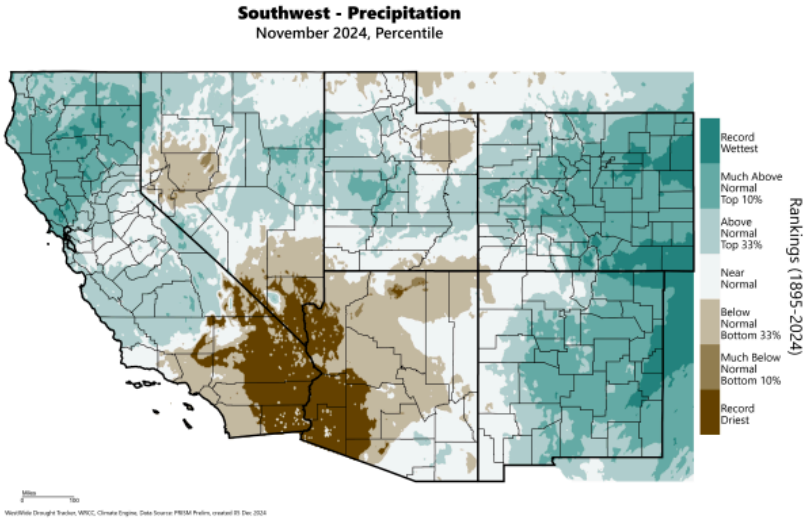
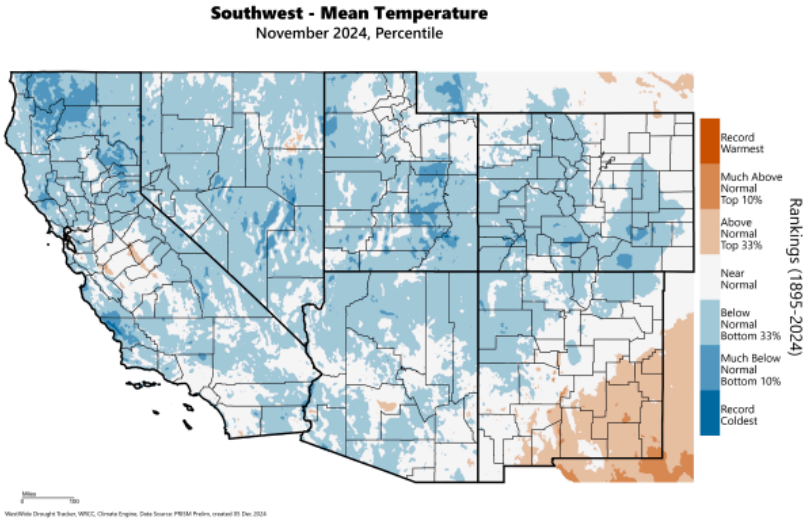
Precipitation and Temperature

November precipitation was generally above normal for New Mexico and below normal for Arizona. Parts of eastern New Mexico received record precipitation while for parts of western Arizona it was the driest November on record.



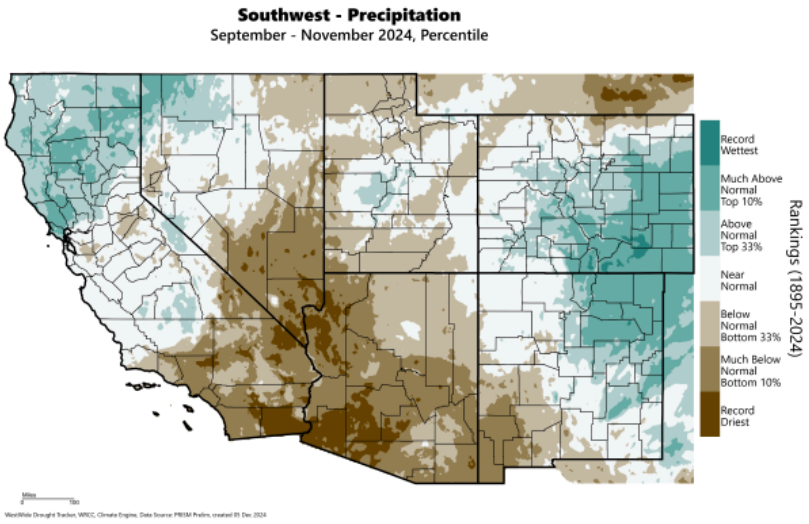
Source: WestWide Drought Tracker

November temperatures were near normal or below normal for much of Arizona and New Mexico. Temperatures were above normal parts of southern and eastern New Mexico.



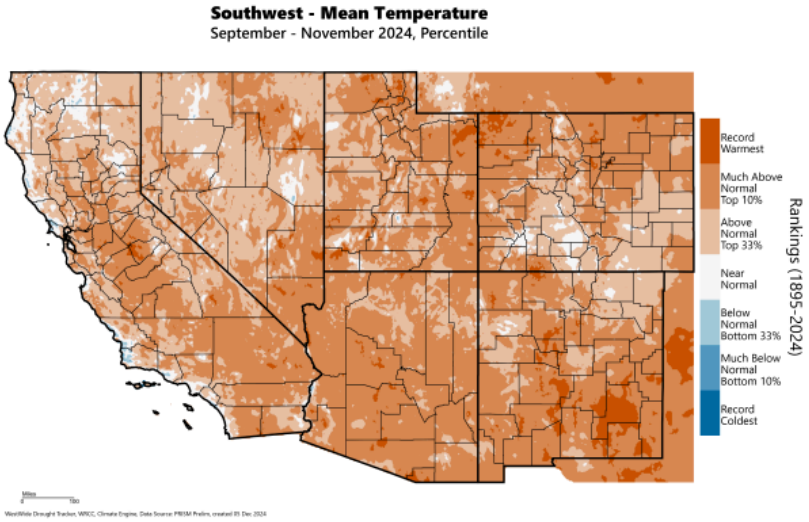
Source: WestWide Drought Tracker

September – November precipitation totals were much-below normal for most of Arizona, and it was the driest September – November season on record for parts of western Arizona. In New Mexico, precipitation was much-above normal in some northern and eastern areas of the state, but in the southwest it ranged below to much-below normal.



Source: WestWide Drought Tracker

September – November temperatures were much-above normal across Arizona and New Mexico. In some areas it was the warmest September – November season on record.

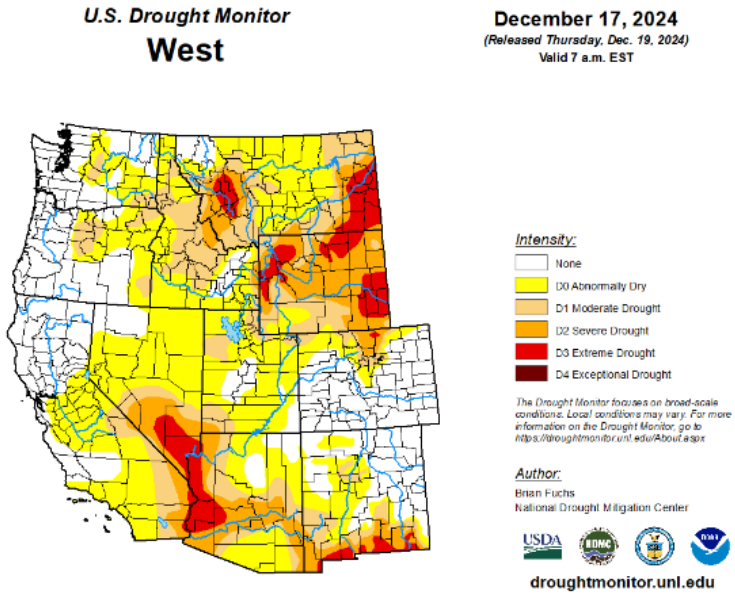


Source: WestWide Drought Tracker

Drought

Drought conditions have not yet improved in Arizona and New Mexico. Drought or abnormally dry conditions are diagnosed for over half of New Mexico and about 90% of Arizona, by area. The most acute drought conditions are found in the southernmost parts of New Mexico and in western Arizona, where drought has been classified as D3 Extreme Drought. Areas of D1 Moderate Drought to D2 Severe Drought

extend from those hardest-hit areas into central and southeast Arizona.



Source: U.S. Drought Monitor

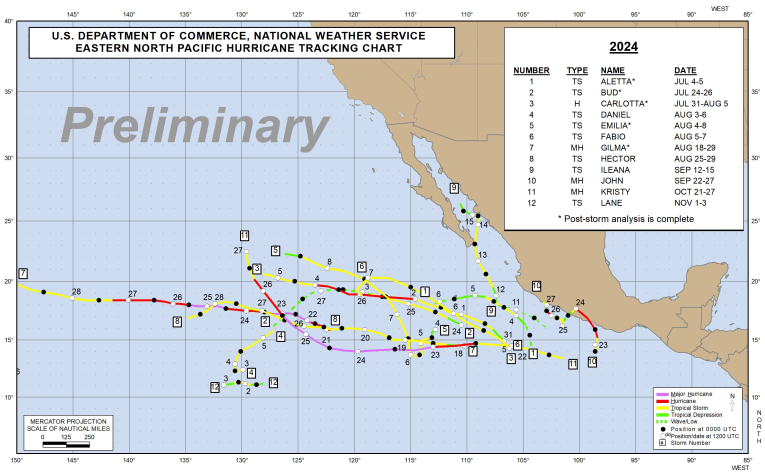
NIDIS Improved and Expanded State Pages on Drought.Gov

Arizona

New Mexico

Hurricanes & Tropical Storms

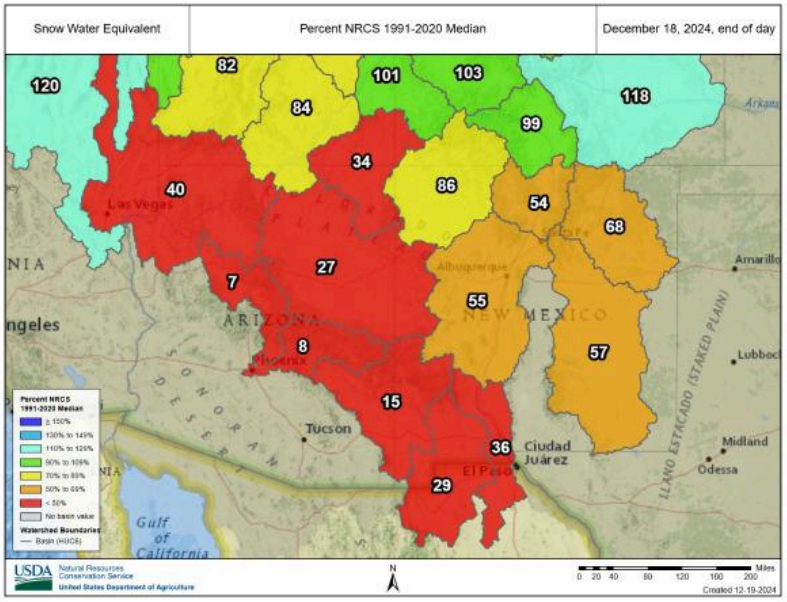
The count of named storms in the eastern North Pacific for the 2024 hurricane season reached 12 in November with the addition of tropical storm Lane—fewer named storms than the long-term average of 15. Pacific tropical cyclones steered clear of the Southwest for the most part this year; arguably, the Atlantic had a greater impact with tropical storm Alberto bringing widespread rain to Arizona and New Mexico in late June.



NHC Tropical Cyclone Reports - 2024 Eastern Pacific Hurricane Season

Snowpack

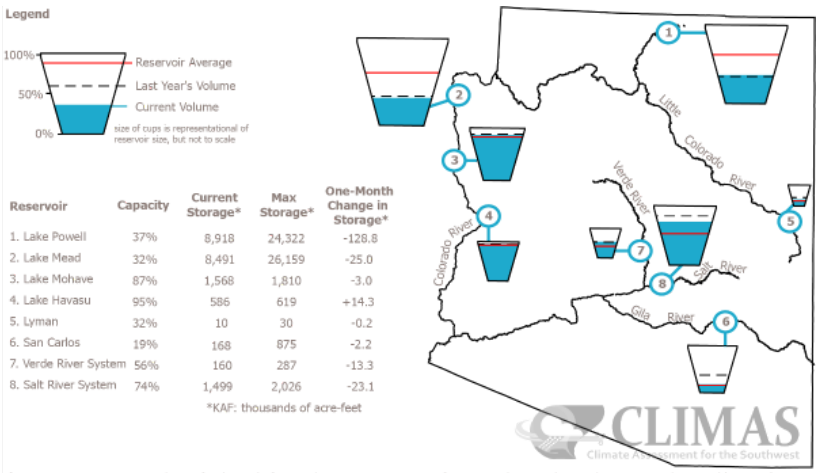
Snowpack in Arizona and New Mexico is generally below normal to much-below normal. Snow water equivalent (SWE) is closer to normal in basins to the north—as of December 30, 2024, SWE aggregated for the Upper Colorado Basin is 95% of normal.



USDA-NRCS: National Water and Climate Center

Water Supply

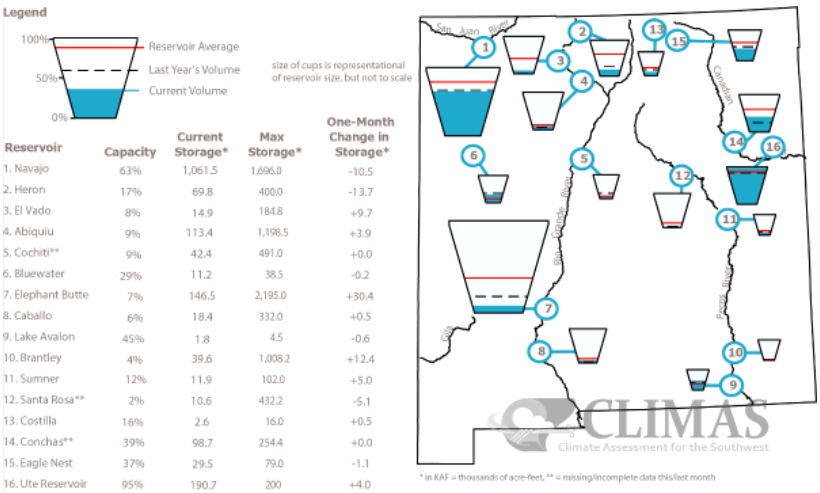
Water storage at Lake Mead and Lake Powell is well below long-term average levels, but close to where levels were last year. Other major reservoirs in Arizona are near or above long-term average levels, but in most cases holding less than last year. New Mexico reservoirs are generally below long-term average levels with a few exceptions—Ute Reservoir is near capacity, and Avalon is up over last year and above the long-term average.



Reservoir	Capacity	Current Storage*	Max Storage*	One-Month Change in Storage*
1. Lake Powell	37%	8,918	24,322	-128.8
2. Lake Mead	32%	8,491	26,159	-25.0
3. Lake Mohave	87%	1,568	1,810	-3.0
4. Lake Havasu	95%	586	619	+14.3
5. Lyman	32%	10	30	-0.2
6. San Carlos	19%	168	875	-2.2
7. Verde River System	56%	160	287	-13.3
8. Salt River System	74%	1,499	2,026	-23.1

*KAF: thousands of acre-feet

Figure 1. Arizona reservoir volumes for the end of November 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	63%	1,061.5	1,696.0	-10.5
2. Heron	17%	69.8	400.0	-13.7
3. El Vado	8%	14.9	184.8	+9.7
4. Abiquiu	9%	113.4	1,198.5	+3.9
5. Cochiti**	9%	42.4	491.0	+0.0
6. Bluewater	29%	11.2	38.5	-0.2
7. Elephant Butte	7%	146.5	2,195.0	+30.4
8. Caballo	6%	18.4	332.0	+0.5
9. Lake Avalon	45%	1.8	4.5	-0.6
10. Brantley	4%	39.6	1,008.2	+12.4
11. Sumner	12%	11.9	102.0	+5.0
12. Santa Rosa**	2%	10.6	432.2	-5.1
13. Costilla	16%	2.6	16.0	+0.5
14. Conchas**	39%	98.7	254.4	+0.0
15. Eagle Nest	37%	29.5	79.0	-1.1
16. Ute Reservoir	95%	190.7	200	+4.0

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

Figure 2. New Mexico reservoir volumes for end of November 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)

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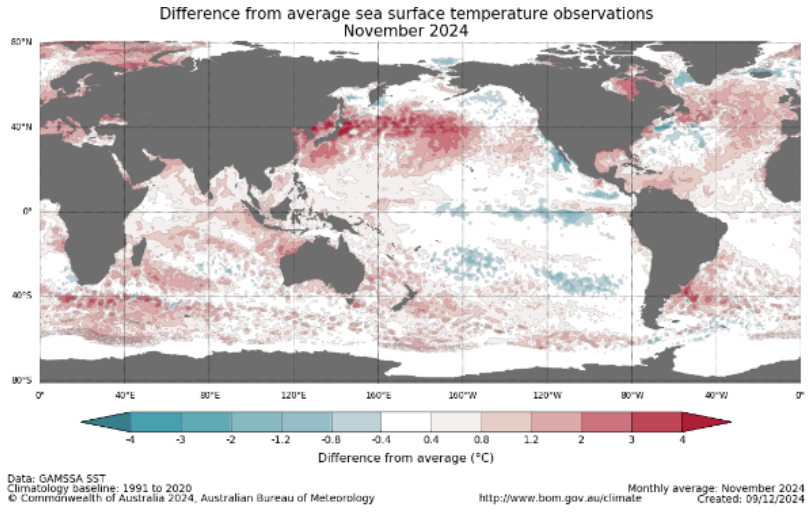
BOR: New Mexico Dashboard

ENSO Tracker

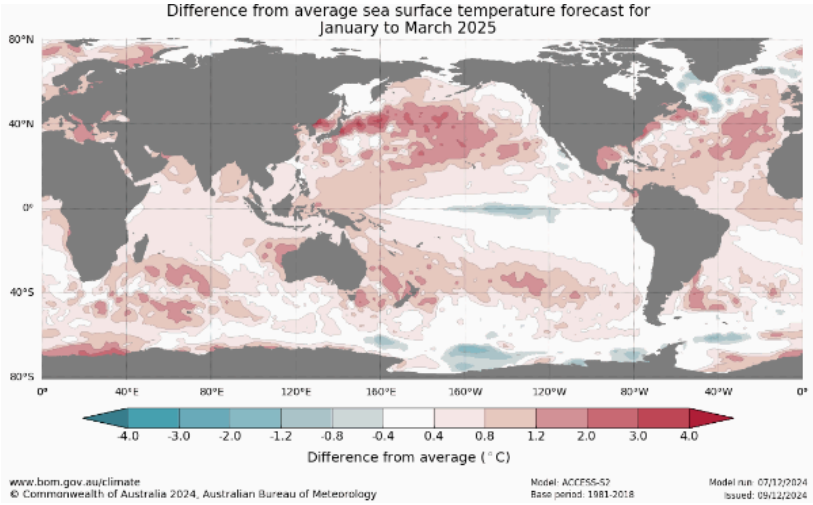
November sea surface temperatures (SSTs) in the equatorial Pacific showed a La Niña-like pattern of below-normal SSTs in the central-eastern Pacific and above-normal SSTs in the west. But, as in the preceding months, the strength of the negative SST anomalies was not great enough to mark the beginning of a La Niña



Source: Australian Bureau of Meteorology

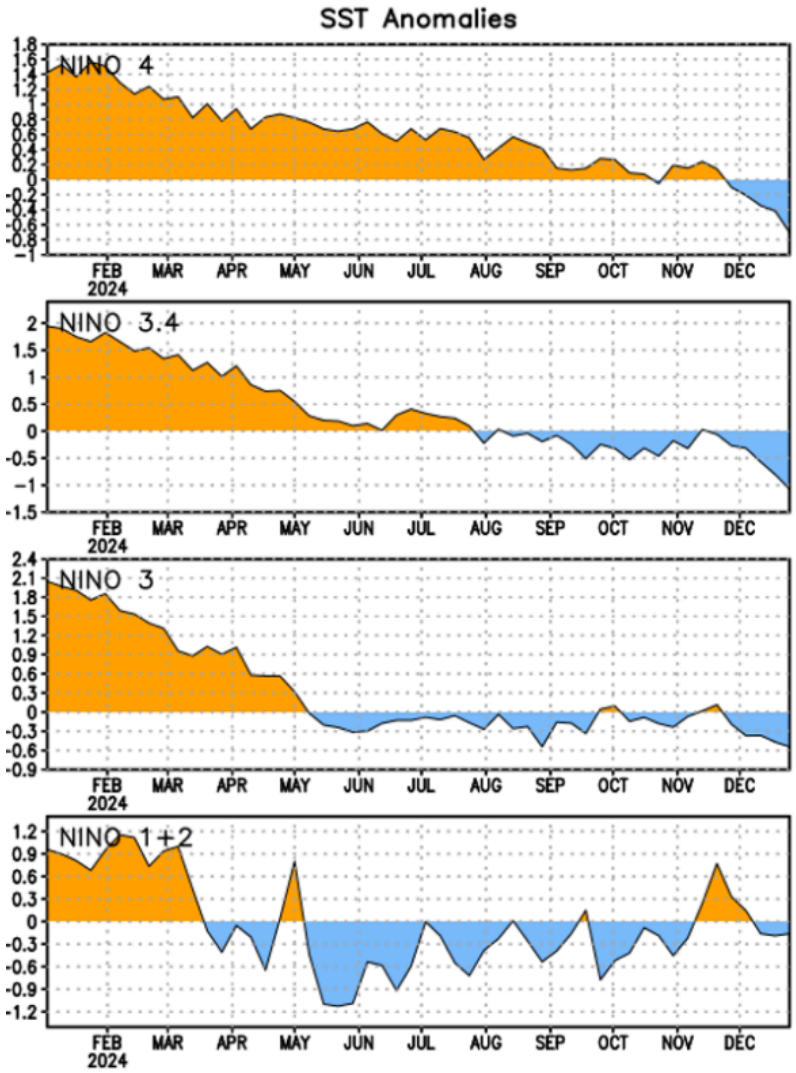
In the coming months, the La Niña-like pattern is forecast by most dynamical models to persist and strengthen, with the

area of cooler-than normal SSTs crossing the threshold of 0.5°C below normal averaged over the Nino 3.4 monitoring region, as shown in this SST forecast from the Australian ACCESS forecast model.



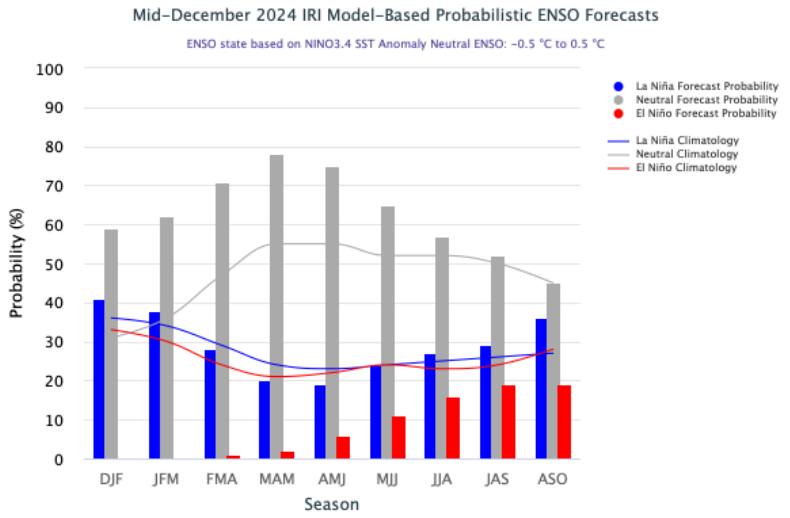
Source: Australian Bureau of Meteorology

SSTs averaged for the ENSO monitoring regions have trended sharply toward cooler-than-normal temperatures over the month of December. By the latest weekly measurement, Nino 3.4 SST is 1.1°C below normal, which is cool enough to mark a transition to La Niña conditions.



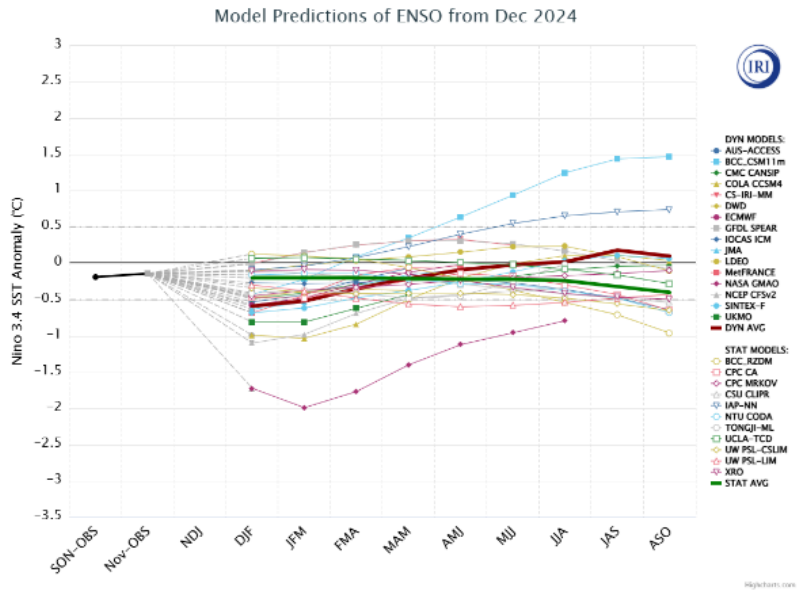
Source: Climate Prediction Center (NOAA)

ENSO forecasts favor ENSO-neutral conditions for the coming months, assigning a probability of near 40% to La Niña conditions for the December – February forecast window, versus a near 60% probability of ENSO-neutral conditions. For subsequent forecast seasons ENSO-neutral is favored by increasingly larger probability margins, through Spring 2025.



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

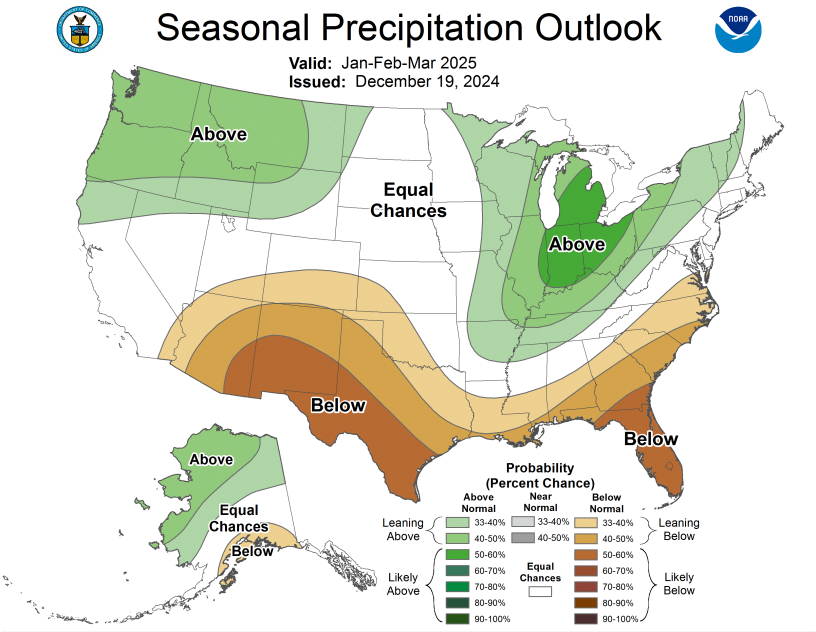
The plume of individual ENSO model forecasts shows that ENSO-neutral conditions for the December – February forecast window are favored almost exclusively by statistical forecast models (those based on past ENSO behavior) while the dynamical models (those based on simulating physics) favor La Niña. Of those models that do predict La Niña, all show a peak in either the December – February or January – March forecast window and a relaxation toward ENSO-neutral in following months.



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

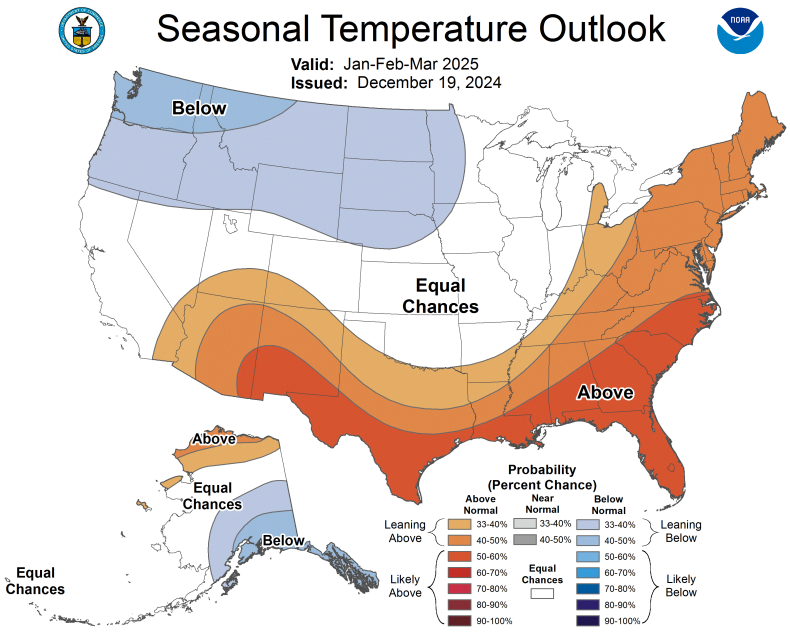
Seasonal Forecasts

The January – March seasonal precipitation forecast leans toward below normal precipitation (greater than 33% chance) for an area that includes Arizona and New Mexico. Southeastern Arizona and southern New Mexico are included in an area where the forecast calls below normal precipitation *likely*—with a probability between 50% and 60%.



Source: Climate Prediction Center (NOAA)

The January – March seasonal temperature forecast favors warmer-than-normal temperatures in Arizona and New Mexico. Both states are included in an area where the forecast either *leans* toward above normal temperatures (33% - 50% probability) or calls them *likely* (50% - 60% probability). The seasonal forecast generally follows the pattern of precipitation anomalies associated with La Niña; although by SST measures La Niña has been slow to emerge and apparently weak, the tropical atmosphere has been acting La Niña-like for several months, and it is the atmospheric response to ENSO that leads to seasonal climate anomalies in North America.



Source: Climate Prediction Center (NOAA)

Southwest Climate Podcast

December 2024 SW Climate Podcast – Relatively Speaking

Recorded 12/06/2024

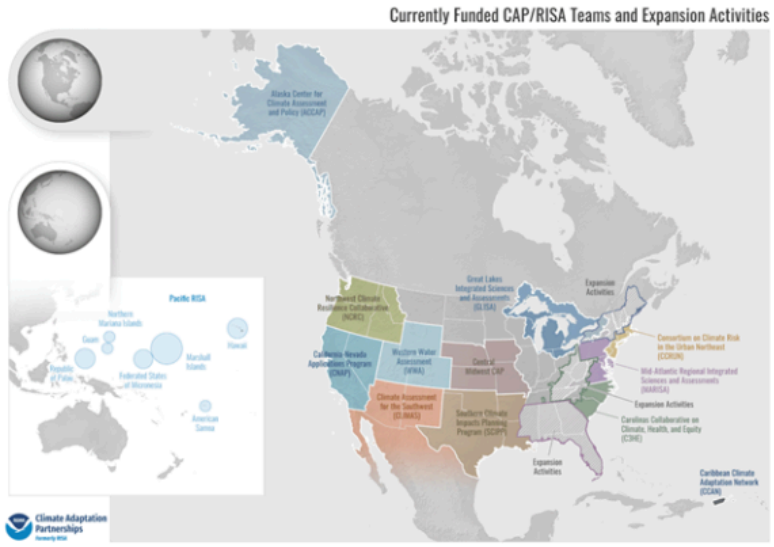
Aired 12/10/2024

In this month's episode of the Southwest Climate Podcast hosts Zack Guido and Mike Crimmins slow-roll into the winter season. They look back on 2024 followed by what happened in November and why - including the Atmospheric River event on the west coast. They dive into a recent paper that interrogates the expected intensification of cool season precipitation in the west. And close out with a teaser look at the La Niña outlook and precipitation forecast with a highlight of the Relative Oceanic Niño Index (RONI).

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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