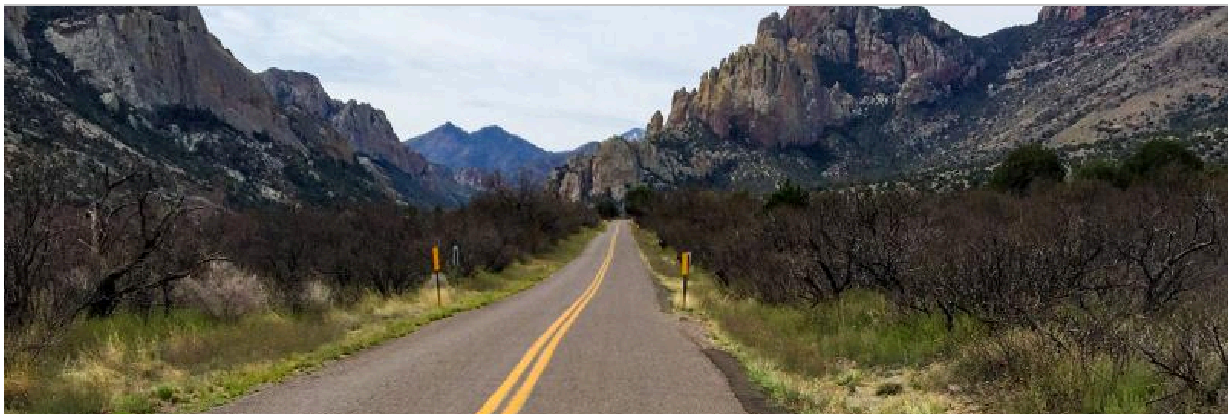

February 2025: Southwest Climate Outlook

Stacie Reece
March 3, 2025

https://climas.arizona.edu/

The Southwest Climate Outlook is published by the Climate Assessment for the Southwest (CLIMAS), with support from University of Arizona Cooperative Extension, and the New Mexico State Climate office.

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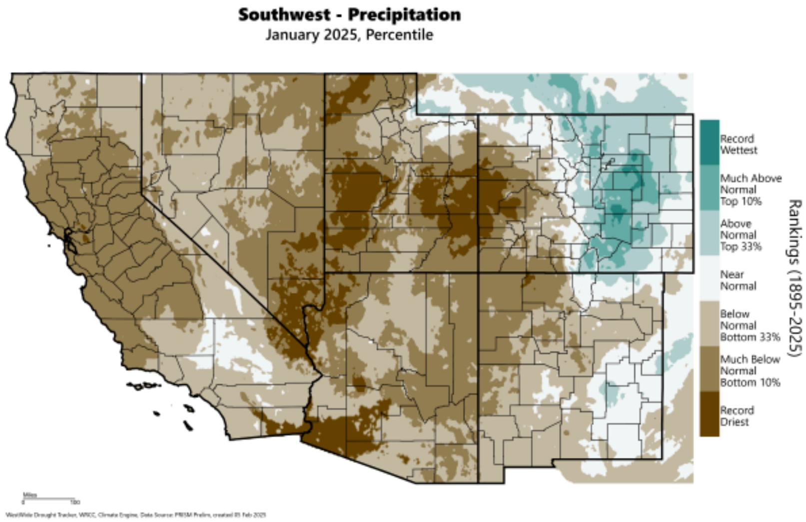
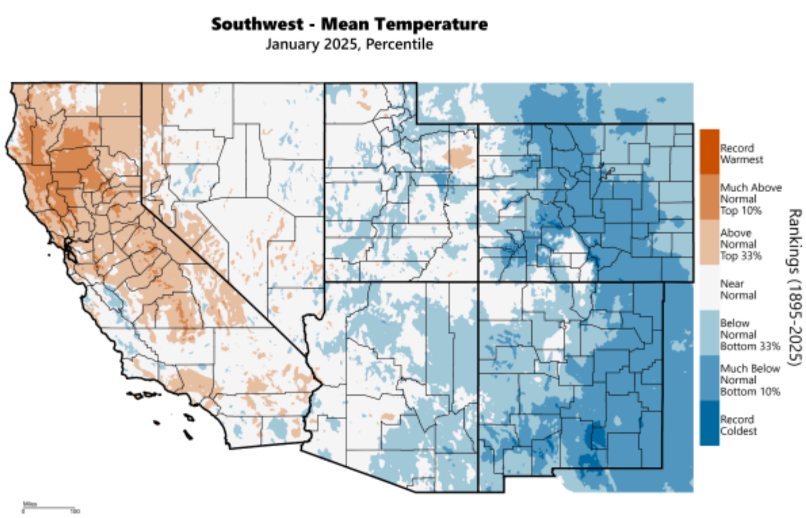
Precipitation and Temperature

January precipitation was below normal or much below normal across Arizona and much of New Mexico. It was the driest January on record for parts of Arizona, mainly in the western half of the state. Areas of eastern New Mexico saw near normal to above normal amounts of precipitation.



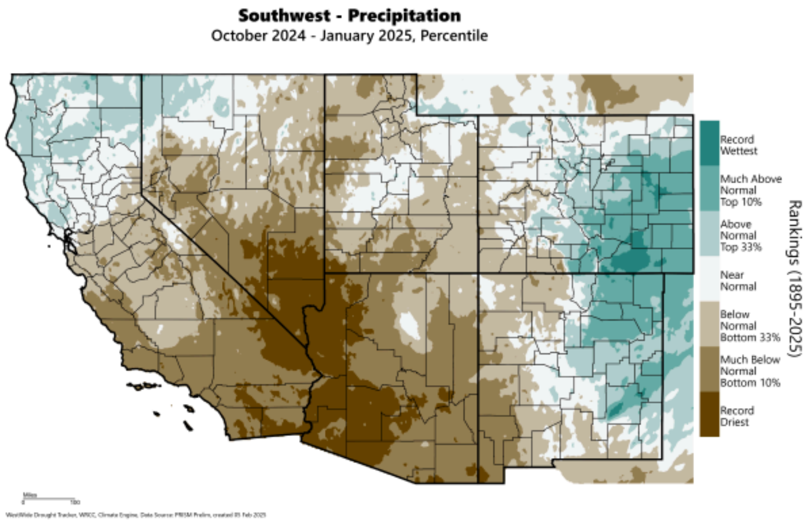
Source: WestWide Drought Tracker

January temperatures were below normal across New Mexico and much of Arizona, mainly in the eastern half of the state. Eastern New Mexico temperatures were much below normal—among the coolest ten percent of Januarys on record. In a few places it was the coolest January on record.



Source: WestWide Drought Tracker

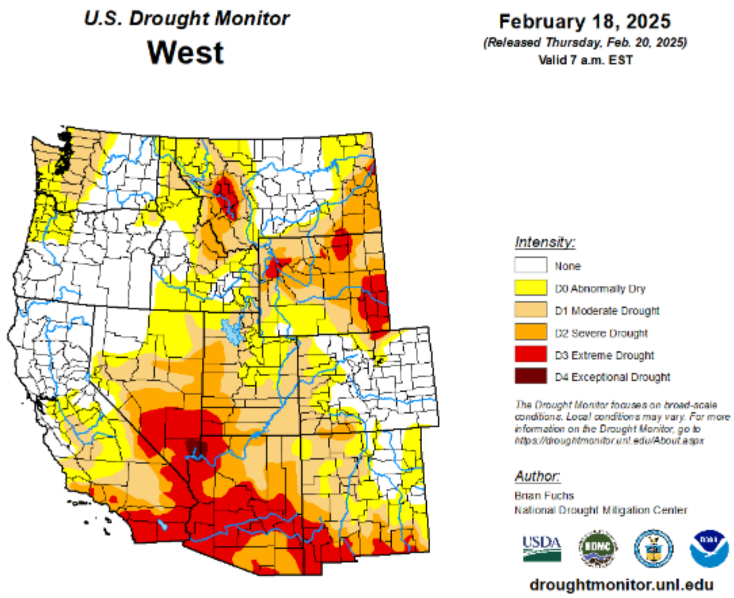
Precipitation totals for October 2024 – January 2025, the first four months of Water Year 2025, were much below normal for nearly all of Arizona—among the driest ten percent of four-month totals for that sequence of months across all years on record. For much of western Arizona it was the driest October – January on record. For New Mexico, this period was geographically split between drier than normal to much drier than normal in the western part of the state, to wetter than normal or much wetter than normal in the eastern part of the state.



Source: WestWide Drought Tracker

Drought

Severe (D2) to Extreme (D3) drought conditions extend across Arizona and southern New Mexico. Drought conditions are absent from parts of northeastern New Mexico, but in much of the northern half of the state conditions are considered Abnormally Dry (D0) or in Moderate Drought (D1). Increased potential for significant wildfire will be a major concern across the region in areas where unusually dry conditions persist into the spring as we enter the primary climatological fire season of the Southwest.



Source: U.S. Drought Monitor

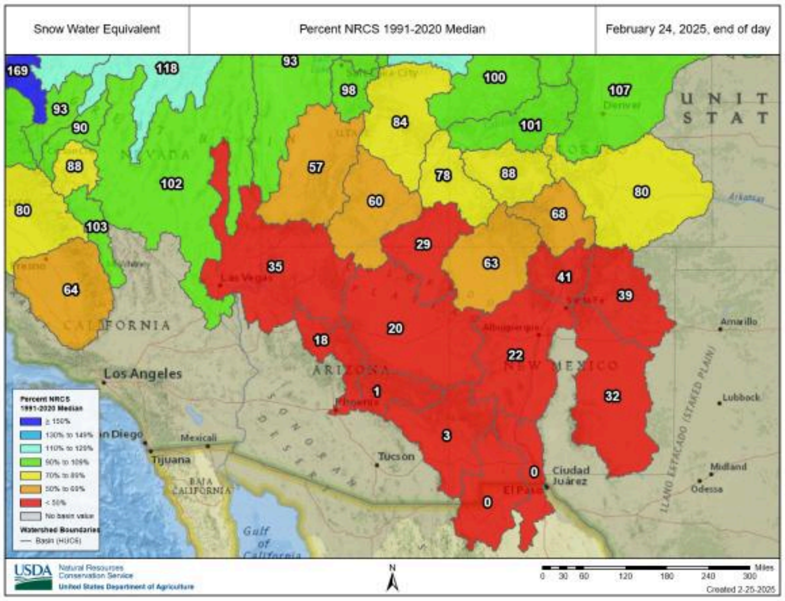
NIDIS Improved and Expanded State Pages on Drought.Gov

Arizona

New Mexico

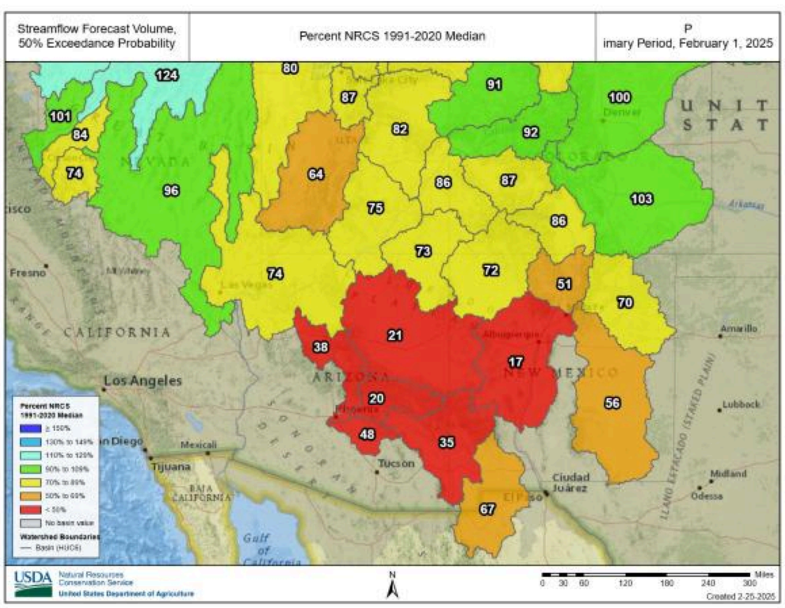
Snowpack & Streamflow

Snowpack levels across Arizona and New Mexico are much below normal, with basin-average snow water equivalent (SWE) measurements ranging from 41% of normal in the mountains of the upper Rio Grande in New Mexico to 1% of normal in the mountains feeding the Salt River in Arizona. SWE averaged for the Rio Grande headwaters is 68% of normal. Basins in states to the north are generally in better shape; SWE averaged for the Upper Colorado River Basin is 94% of normal.



[USDA-NRCS: National Water and Climate Center]

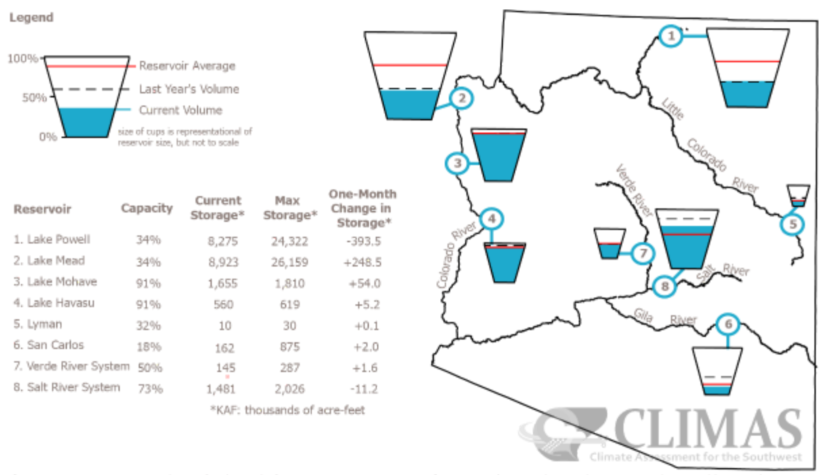
Forecasts of streamflow during the peak spring snowmelt-fed flow season, which are based in part on observations of current snowpack conditions, generally predict much below normal flows for streams with headwaters in Arizona and New Mexico. Streamflow in the Rio Grande headwaters is expected to be around 86% of normal, but Rio Grande flow entering the Middle Rio Grande at Otowi Bridge is expected to be around 51% of normal. Colorado River flow originating in the Upper Basin, entering Lake Powell, is expected to be around 79% of normal.



[USDA-NRCS: National Water and Climate Center]

Water Supply

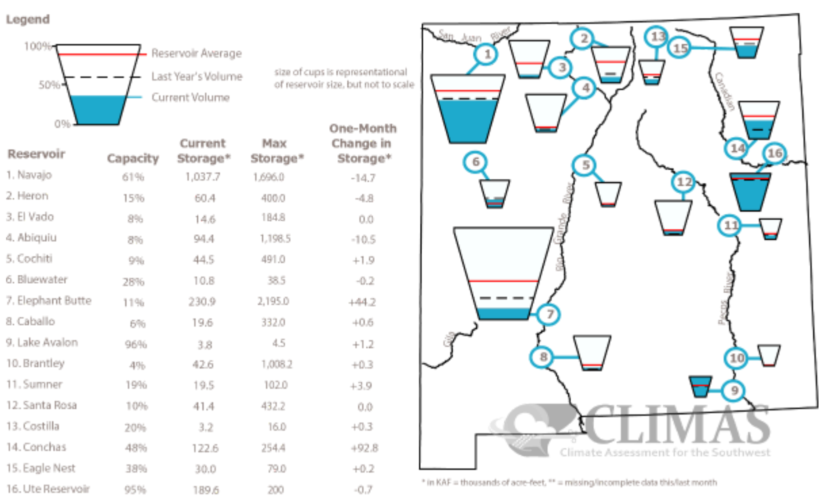
Lake Mead and Lake Powell are storing volumes near to last year's volumes, which is around one-third of total capacity and much below the respective long-term reservoir averages. Other Arizona reservoirs generally hold volumes near or above long-term average volumes, but less than they held last year. New Mexico reservoirs generally are storing less than long-term average volumes and less than last year's storage levels, with some exceptions—some reservoirs in the Pecos and Canadian River basins (Conchas, Ute, Avalon) are in better shape.



Reservoir	Capacity	Current Storage*	Max Storage*	One-Month Change in Storage*
1. Lake Powell	34%	8,275	24,322	-393.5
2. Lake Mead	34%	8,923	26,159	+248.5
3. Lake Mohave	91%	1,655	1,810	+54.0
4. Lake Havasu	91%	560	619	+5.2
5. Lyman	32%	10	30	+0.1
6. San Carlos	18%	162	875	+2.0
7. Verde River System	50%	145	287	+1.6
8. Salt River System	73%	1,481	2,026	-11.2

*KAF: thousands of acre-feet

Figure 1. Arizona reservoir volumes for the end of January 2025 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	61%	1,037.7	1,696.0	-14.7
2. Heron	15%	60.4	400.0	-4.8
3. El Vado	8%	14.6	184.8	0.0
4. Abiquiu	8%	94.4	1,198.5	-10.5
5. Cochiti	9%	44.5	491.0	+1.9
6. Bluewater	28%	10.8	38.5	-0.2
7. Elephant Butte	11%	230.9	2,195.0	+44.2
8. Caballo	6%	19.6	332.0	+0.6
9. Lake Avalon	96%	3.8	4.5	+1.2
10. Brantley	4%	42.6	1,008.2	+0.3
11. Sumner	19%	19.5	102.0	+3.9
12. Santa Rosa	10%	41.4	432.2	0.0
13. Costilla	20%	3.2	16.0	+0.3
14. Conchas	48%	122.6	254.4	+92.8
15. Eagle Nest	38%	30.0	79.0	+0.2
16. Ute Reservoir	95%	189.6	200	-0.7

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

Figure 2. New Mexico reservoir volumes for end of January 2025 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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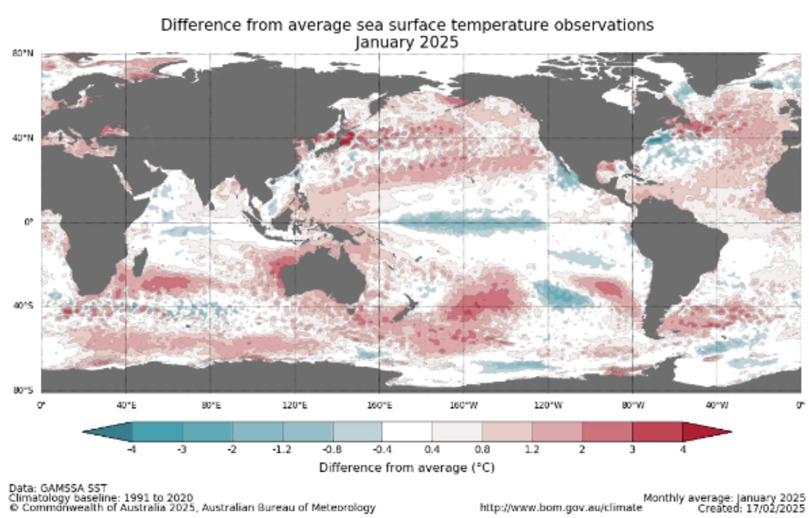
BOR: New Mexico Dashboard

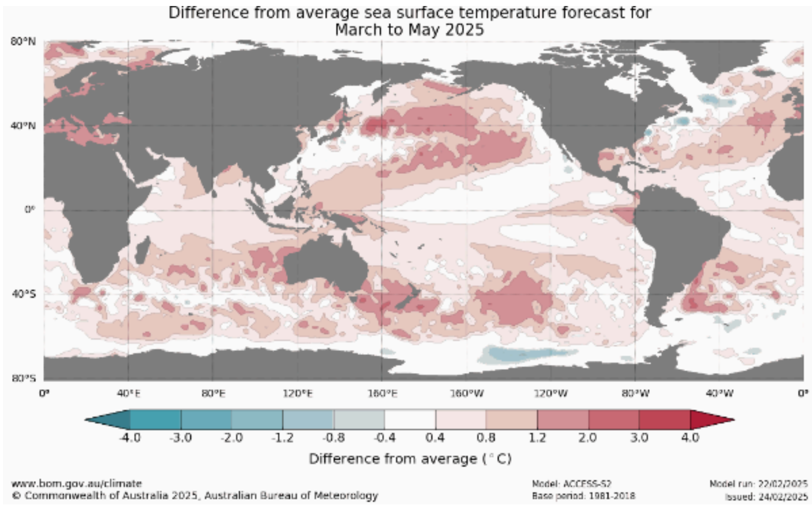
ENSO Tracker

January sea surface temperatures (SSTs) exhibited the La Niña pattern of cooler-than-average SSTs in the central-to-eastern equatorial Pacific and warmer-than-average SSTs in the western tropical Pacific.



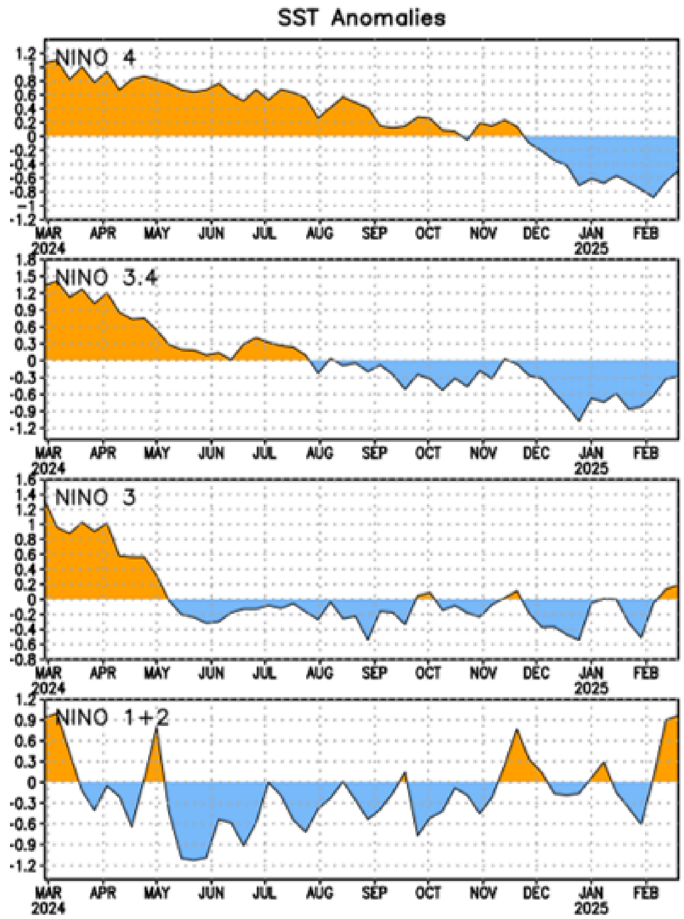
Source: Australian Bureau of Meteorology

A forecast of March – May SSTs shows a lack of the cooler-than-average SSTs in the central-eastern equatorial Pacific, indicating a possibly imminent end for La Niña. The forecast, from the Australian model, ACCESS-S2, is in general agreement with other dynamical (physics-based) model forecasts in favoring ENSO-neutral conditions for the March – May forecast window. Forecasts from statistical models (based upon past observations of the ENSO system) generally favor persisting La Niña conditions for this forecast window (see the plume of individual-model forecasts below).



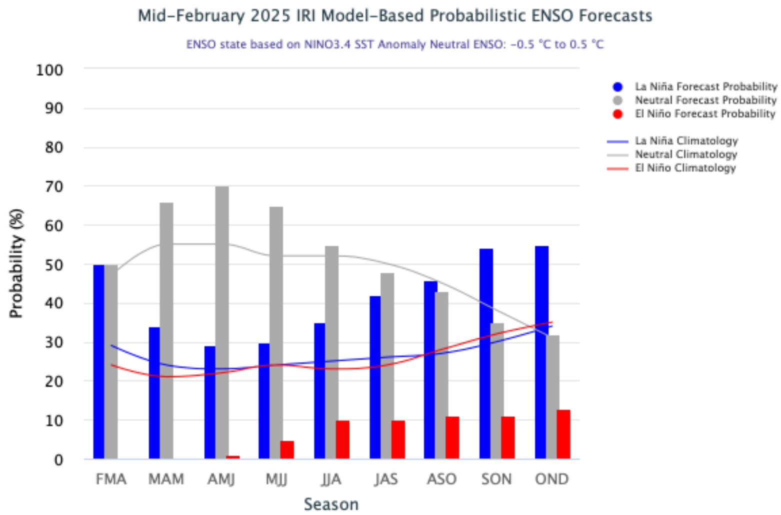
Source: Australian Bureau of Meteorology

SSTs averaged over the Nino 3.4 region, the primary monitoring region for determining ENSO status, have been cooler than 0.5°C below average—the La Niña threshold—through December and January, but in February Nino 3.4 SSTs have increased week over week, with the most recent measurement indicating SSTs only 0.3°C cooler than average, which is on the ENSO-neutral side of the La Niña threshold.



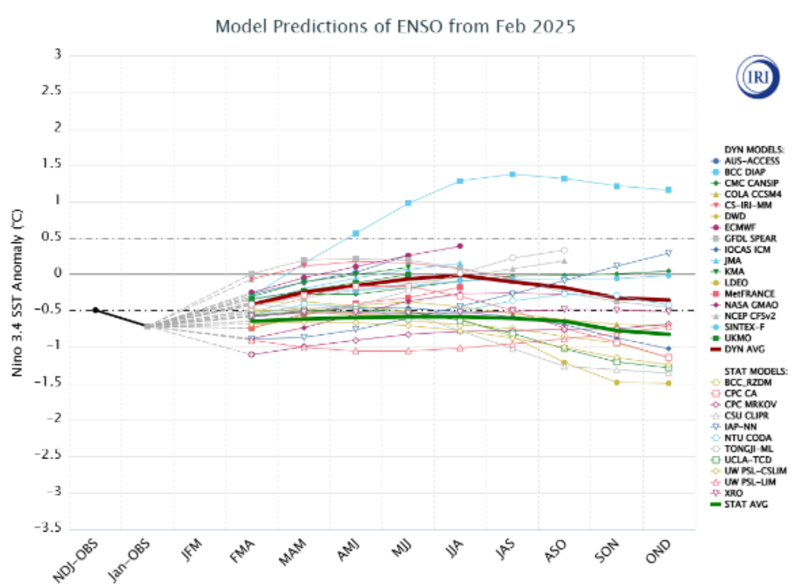
Source: Climate Prediction Center (NOAA)

The probabilistic summary of recent ENSO forecast model runs gives equal chance of La Niña or ENSO-neutral conditions persisting through the February – April forecast window. In subsequent months, beginning with the March – May window's forecast, models favor ENSO-neutral conditions with near 2:1 odds. ENSO has little or no utility for predicting summer seasonal climate in the Southwest; whether we have a La Niña or El Niño during the coming fall and winter will be the more consequential question. At present, models favor La Niña for the fall forecast windows, but that should be taken as a low-confidence prediction; ENSO forecasters often refer to a "spring predictability barrier", a name for the difficulty of predicting the fall/winter state of ENSO from this time of year.



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

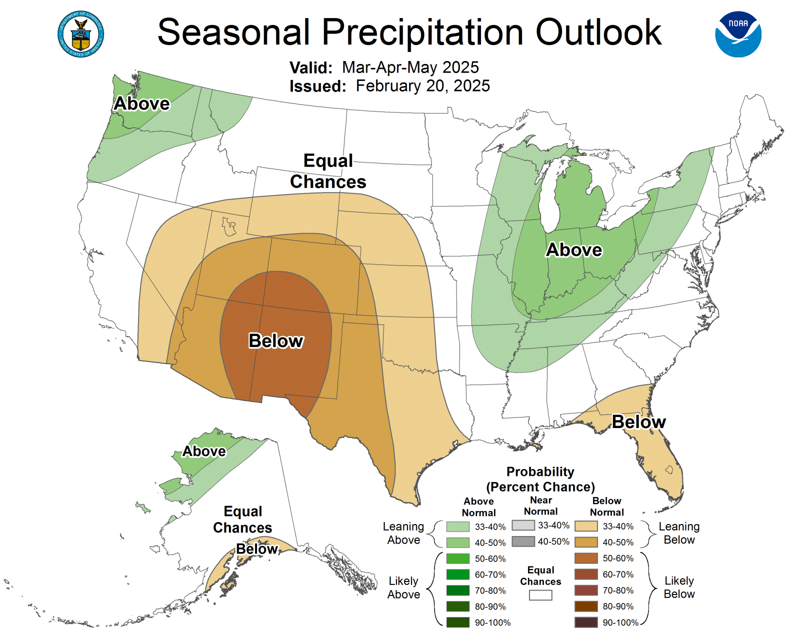
As summarized by the above probabilistic forecast, the individual model forecasts generally fall into one of two categories: those that predict La Niña conditions will persist in the coming months, and those that predict ENSO-neutral conditions. The statistical forecast models (based on observed behavior of ENSO in past years) tend to fall into the La Niña camp, while the dynamical models (more complex, physics-based) tend to predict ENSO-neutral.



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

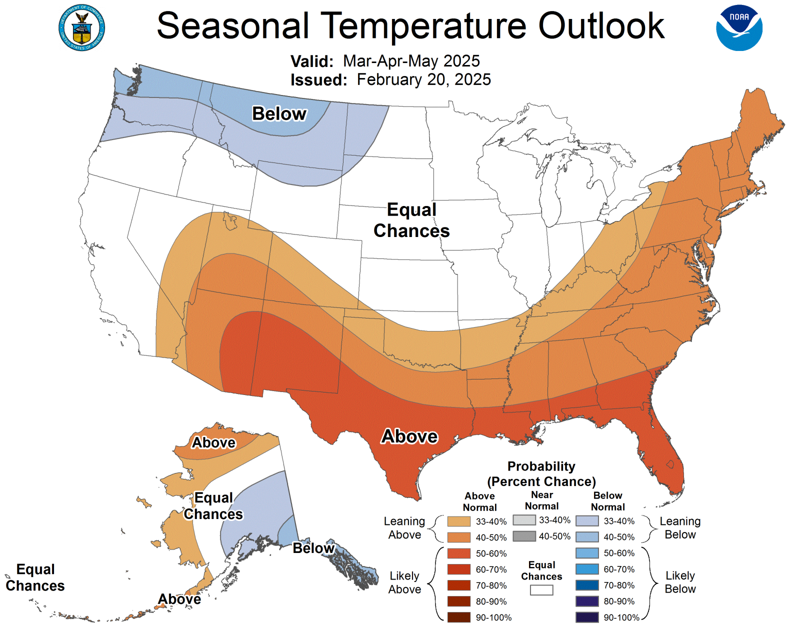
Seasonal Forecasts

The March – May seasonal precipitation forecast indicates a *likely* (50-60% probability) chance of below normal precipitation for an area that includes much of New Mexico and eastern Arizona. The forecast *leans* (40-50% probability) toward favoring below normal precipitation for an area that includes the remainder of Arizona and New Mexico.



Source: Climate Prediction Center (NOAA)

The March – May seasonal temperature forecast indicates *likely* (50-60% chances) of above normal temperatures for an area of much of New Mexico and eastern Arizona. The rest of Arizona and New Mexico are included in the area where the forecast *leans* (33-50% chance) toward a prediction of above normal temperatures.



Source: Climate Prediction Center (NOAA)

Rural Heat Blog

> *Originally published on the* Just Rural Futures *blog*:
>
> *https://justruralfutures.substack.com/p/expanding-the-focus-toward-heat-equity*

A billboard promoting the White Mountains of Arizona, home to the White Mountain Apache Tribe, as a cool getaway from the heat. Picture taken in Superior, a rural town of 2,407 residents in Pinal County, Arizona (A-L. Boyer, November 2024).

The newly released National Heat Strategy for the United States recognizes on page 3:

*“the many challenges our country faces in becoming more heat resilient, including the fact that many populations are disproportionately affected by extreme heat. This includes but is not limited to: workers in hot environments, (...) Tribal Nations, Indigenous communities, **rural communities**, (...) and more.”*

With the summer of 2024 being yet another record-breaking heat season and media coverage multiplying worldwide to highlight temperature records in cities scorched by extreme heat, public attention is gradually increasing. However, the efforts to address heat remain limited compared to other climate hazards such as hurricanes or wildfires. This disparity is especially evident when considering the overlooked issue of extreme heat in rural areas. For example, in the U.S., media coverage addressing the impact of extreme heat on rural communities are few. They include a piece in The New York Times (June 2024) discussing extreme heat on the East Coast; an article from NPR (August 2024) that focuses on seniors and emergency calls for heat-related illnesses in Montana, and a High Country News article (August 2023) examining local adaptation strategies on the Navajo Nation in the Southwest. These three articles, commendable for their existence, stand out particularly because they acknowledge the lack of coverage on heat-related issues in rural areas while addressing the invisible threat posed by extreme heat.

2024 marked a "**heatshed moment**" (Keith and Meerow, 2024), as increasing heat hazards due to climate change prompted more institutions to acknowledge these challenges and begin establishing governance frameworks and allocating resources to build a heat-resilient nation. Heat resilience is defined as the proactive mitigation and management of heat across the numerous systems and sectors it impacts (Keith and Meerow, 2022). However, the invisibility of heat issues raises significant equity concerns on two fronts: first, equitable heat response between urban and rural areas, and second, equity within rural areas themselves, where multiple vulnerability factors intersect. Rural communities face unique challenges, such as the prevalence of outdoor work, economies heavily reliant on climate-sensitive sectors like agriculture and tourism, aging and declining populations, and sparse, sometimes deteriorating infrastructure. Additionally, older, poorly insulated housing can often worsen indoor heat exposure. Recent studies demonstrate that rural areas are vulnerable to extreme heat and may experience heat-related health risks comparable to, or even exceeding, those faced in urban settings (Sugg et al., 2016; Cresswell et al., 2023).

> A review of scientific literature shows the predominance of heat research focused on cities, where a greater proportion of the population, the urban heat island effect, and growing awareness of the phenomenon attract more focus. In this dominant field of heat research skewed towards cities, rural areas are often used merely as comparative references to emphasize the higher temperatures in cities. Thus, the focus on urban heat resilience has produced strategies like cool pavement, urban forestry, and cooling centers, which are often impractical for rural communities. This focus on urban versus rural studies is not limited to heat research, but is widely acknowledged across many disciplines (Frank and Reiss, 2014).

A closer examination of the literature reveals two main research areas on rural heat resilience. The first area explores climate projections and crop yields of major cereals, assessing how extreme heat and drought—intensified by climate change—could significantly alter agricultural practices in the Great Plains and Corn Belt. For instance, sorghum, is highly sensitive to temperature increases, with a 2°C rise in growing season temperatures causing an average yield reduction of 24%, casting doubt on its viability as a climate-resilient alternative (Miller et al., 2021). The second area addresses public health, labor issues, and environmental justice, focusing on the conditions of farmworkers, especially immigrant and seasonal workers in hot states like California and Florida, who experience occupational heat-related mortality rates 35 times higher than workers in other sectors (Greco, 2023).

Despite the growing relevance of challenges like climate change, food security, and energy security (in this case, specifically related to cooling needs) in rural research, there are very few case studies in the U.S. that examine how rural communities are addressing heat (Houghton et al., 2017; Guthman et al., 2022). These studies are essential to understanding both the barriers rural communities face and the successes they achieve. Addressing heat hazards requires developing heat governance, meaning institutions, coordination, and policies at all levels of government and across sectors (Keith et al., 2021). Rural research on heat is essential to inform these efforts, as they provide insights into how rural communities' unique identity, social cohesion, local knowledge, and distinct economic and environmental conditions shape their perceptions and responses to extreme heat (Williams et al., 2017).

Clark and Ward (2023) emphasize that rather than viewing vulnerability solely through an urban versus rural lens, it is more critical to understand the specific conditions that make certain populations more vulnerable. It is essential to prioritize heat equity in both research and practice, ensuring rural communities are equipped with the resources and support needed to address to extreme heat and mitigate and manage its impacts. This includes addressing disparities in access and affordability of healthcare, housing, and energy, considering the distance to essential infrastructures and services, and developing tailored rural heat resilience strategies that leverage the unique strengths and address the specific challenges of rural communities. Only by focusing on these disparities can we ensure that heat resilience is effective and equitable for all communities, regardless of geographic location.

Southwest Climate Podcast

February 2025 SW Climate Podcast – Well... It's Been Sunny

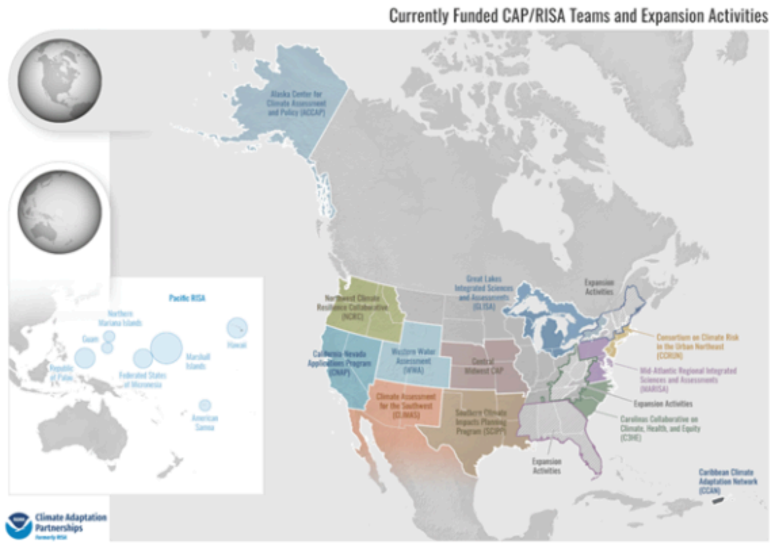
Recorded 2/14/2025, Aired 2/18/2025

It's a new year and in this month's episode of the Southwest Climate Podcast hosts Zack Guido and Mike Crimmins are looking for good news. Zack gives a tour of recent statistics for the past few months and Mike goes over the related atmospheric happenings. They cover La Niña and the climatology of the Southwest during this winter season. Can we shake off this persistent dry spell and bring on a magnificent March? Lastly they cover the Santa Ana winds which played a part in the destructive L.A. fires and begin to delve into AI weather modeling and forecasting.

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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