September 2023: Southwest Climate Outlook

Stacie Reece
September 27, 2023

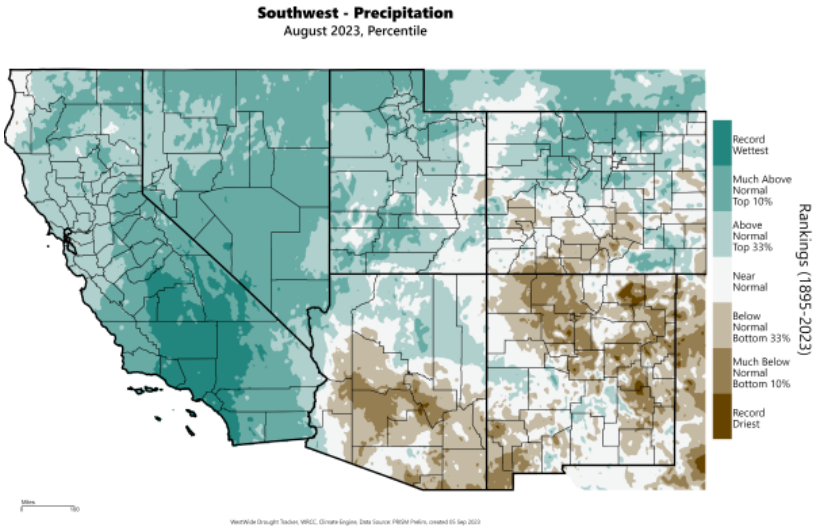
https://climas.arizona.edu/

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.

Questions/Contact: Stacie Reece, sreece@arizona.edu

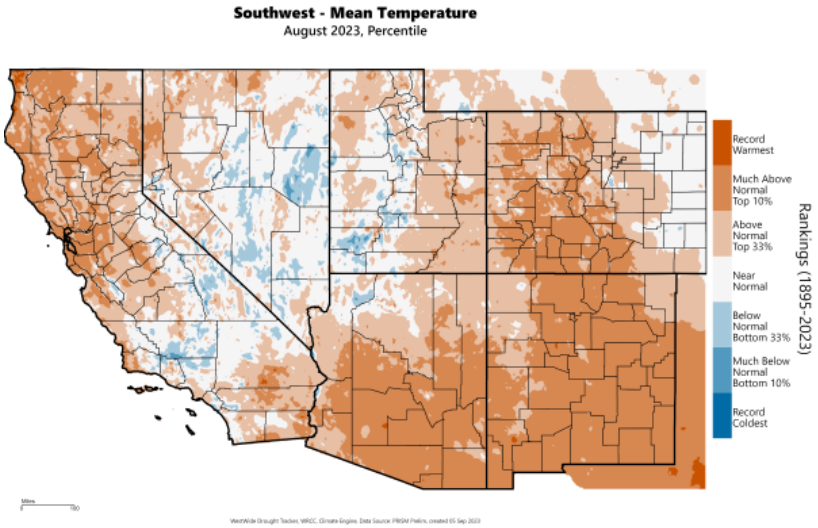
Precipitation and Temperature

Precipitation in August was below normal or much below normal for large parts of New Mexico and Arizona. For some locations, it was the driest August on record. Conditions were more favorable in Northern Arizona and the highlands of eastern New Mexico, where precipitation was close to normal or above normal.



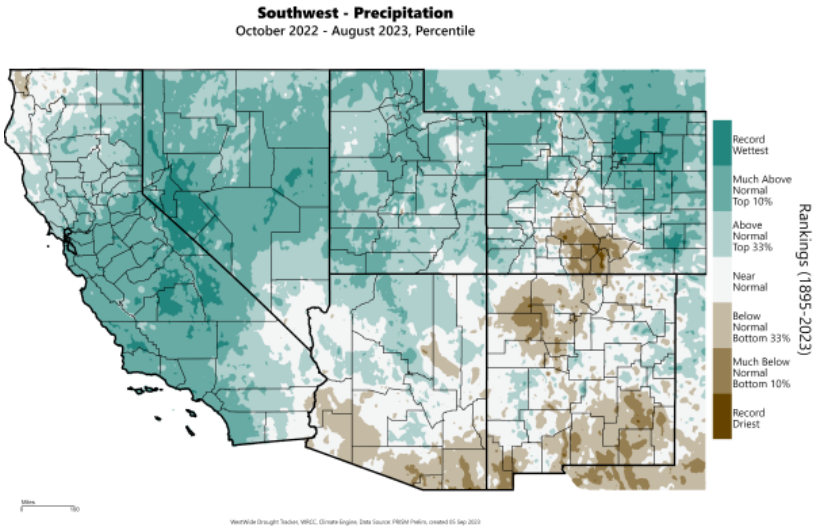
Source: WestWide Drought Tracker

August temperatures were above normal or much above normal for very nearly all of Arizona and New Mexico.



Source: WestWide Drought Tracker

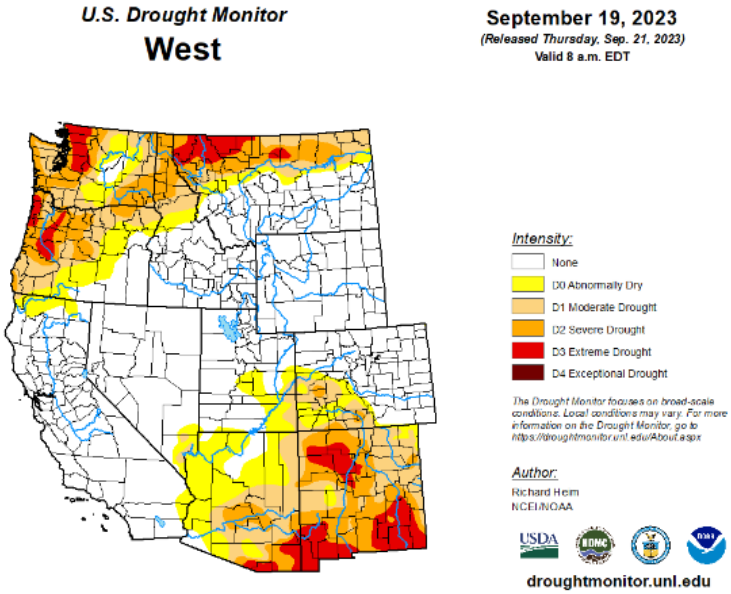
Water Year to-date (Oct 2022 – Aug 2023) precipitation totals are falling short of normal for large parts of New Mexico and southern Arizona, where this summer's rainfall deficits have exceeded last winter and spring's surplus. Elsewhere, the two anomalous seasons have effectively balanced each other out, with water-year totals looking to end up near normal. September is the last month of the Water Year.



Source: WestWide Drought Tracker

Drought

Nearly all of New Mexico and nearly half of Arizona are now classified as experiencing drought (D1-D4) by the U.S. Drought Monitor. Drought conditions are severe (D2) for 37% of New Mexico and 18% of Arizona, and extreme (D3) for 31% of New Mexico and 5% of Arizona.



Source: U.S. Drought Monitor

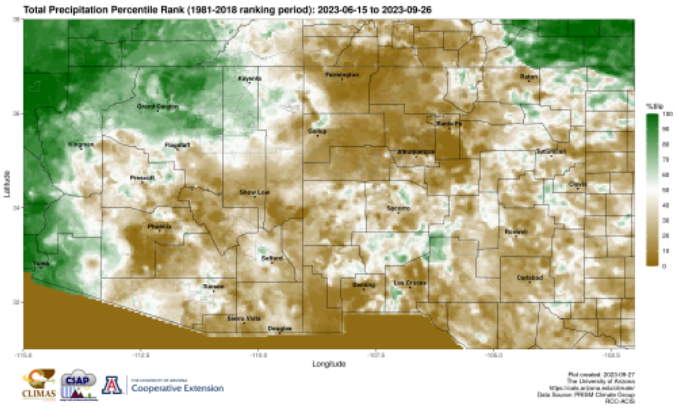
NIDIS Improved and Expanded State Pages on Drought.Gov

Arizona

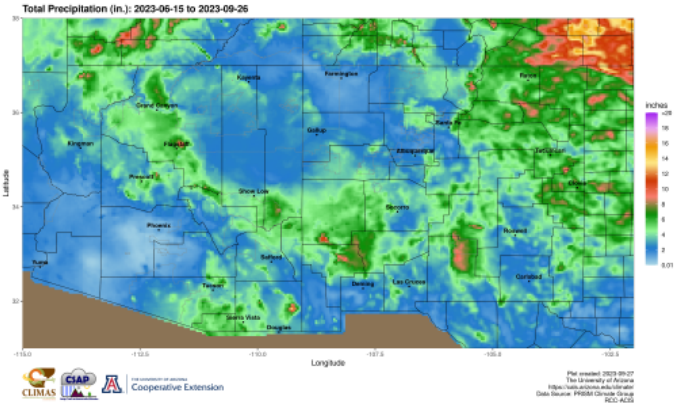
New Mexico

Monsoon

Monsoon precipitation to-date (Jun 15 – Sep 26) has been broadly below normal or much-below normal, with northern New Mexico seeing the most widespread severe rainfall deficits. Some scattered locations have managed to accumulate near-normal totals. Much of northern and western Arizona saw above-normal monsoon precipitation.



Source: UA Cooperative Extension / CLIMAS



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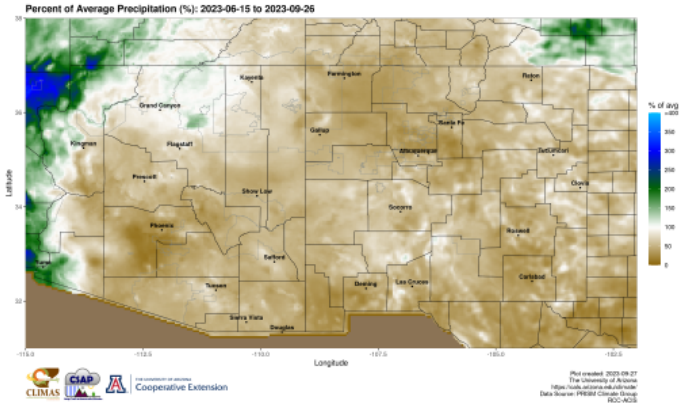

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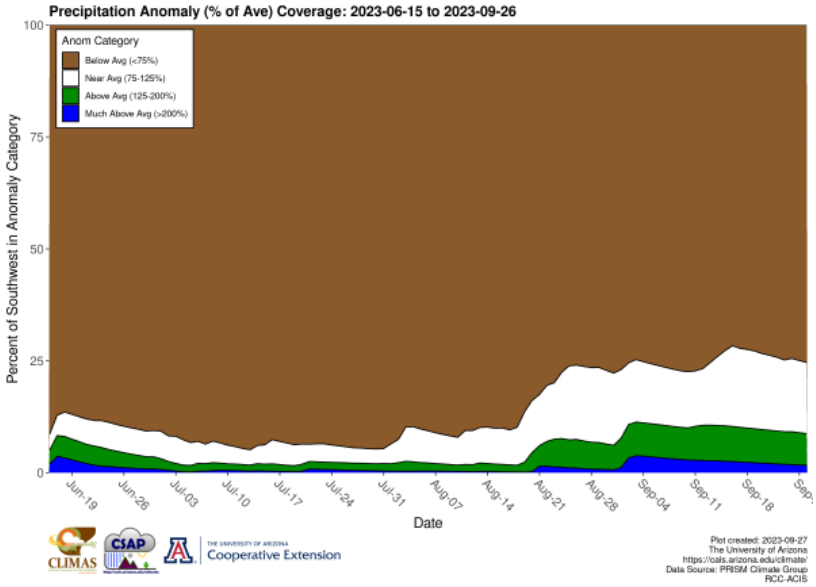
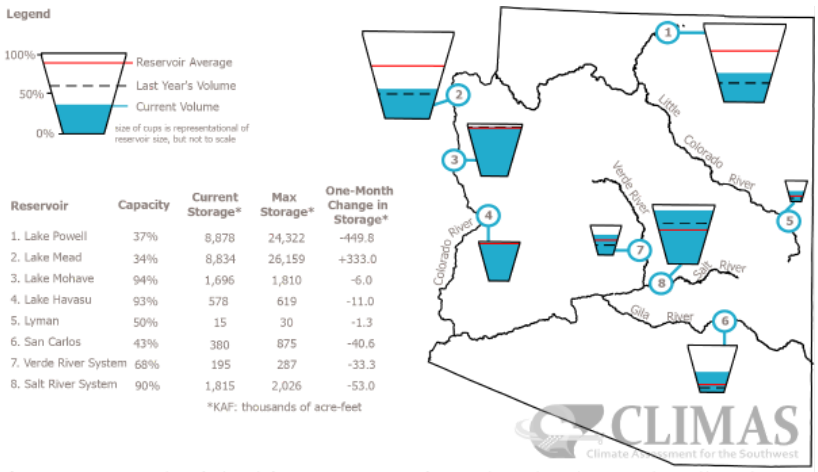


Source: UA Cooperative Extension / CLIMAS

Water Supply

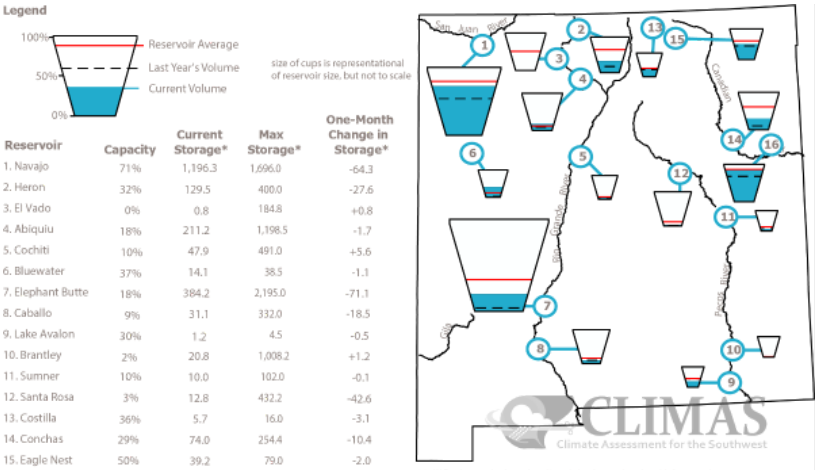
Most of the reservoirs in Arizona and New Mexico are at or above the levels for this time last year. Elephant Butte Reservoir and Lakes Mead and Powell remain far below their long-term average levels. Navajo and Ute Reservoirs are at levels near their long-term average. Arizona reservoirs on the Verde, Salt, and Gila Rivers are above their long-term average levels.



Reservoir	Capacity	Current Storage*	Max Storage*	One-Month Change in Storage*
1. Lake Powell	37%	8,878	24,322	-449.8
2. Lake Mead	34%	8,834	26,159	+333.0
3. Lake Mohave	94%	1,696	1,810	-6.0
4. Lake Havasu	93%	578	619	-11.0
5. Lyman	50%	15	30	-1.3
6. San Carlos	43%	380	875	-40.6
7. Verde River System	68%	195	287	-33.3
8. Salt River System	90%	1,815	2,026	-53.0

*KAF: thousands of acre-feet

Figure 1. Arizona reservoir volumes for the end of August 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	71%	1,196.3	1,696.0	-64.3
2. Heron	32%	129.5	400.0	-27.6
3. El Vado	0%	0.8	184.8	+0.8
4. Abiquiu	18%	211.2	1,198.5	-1.7
5. Cochiti	10%	47.9	491.0	+5.6
6. Bluewater	37%	14.1	38.5	-1.1
7. Elephant Butte	18%	384.2	2,195.0	-71.1
8. Caballo	9%	31.1	332.0	-18.5
9. Lake Avalon	30%	1.2	4.5	-0.5
10. Brantley	2%	20.8	1,008.2	+1.2
11. Sumner	10%	10.0	102.0	-0.1
12. Santa Rosa	3%	12.8	432.2	-42.6
13. Costilla	36%	5.7	16.0	-3.1
14. Conchas	29%	74.0	254.4	-10.4
15. Eagle Nest	50%	39.2	79.0	-2.0
16. Ute Reservoir	85%	170.8	200	-3.5

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

Figure 2. New Mexico reservoir volumes for end of August 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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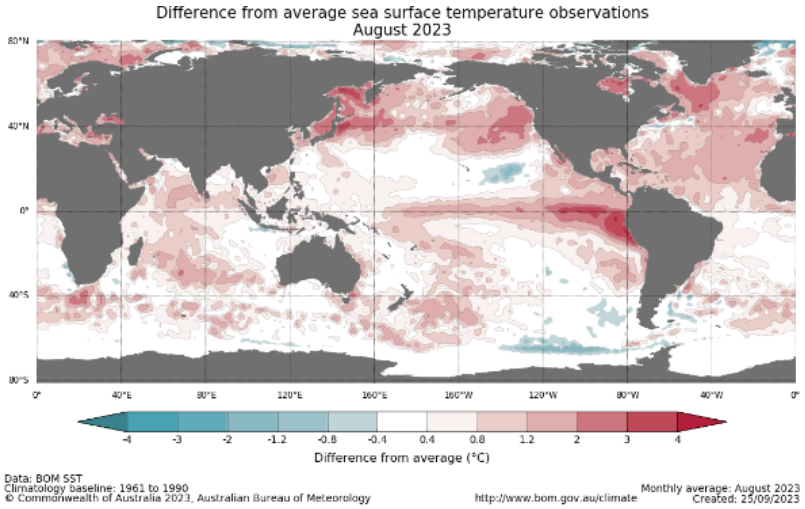
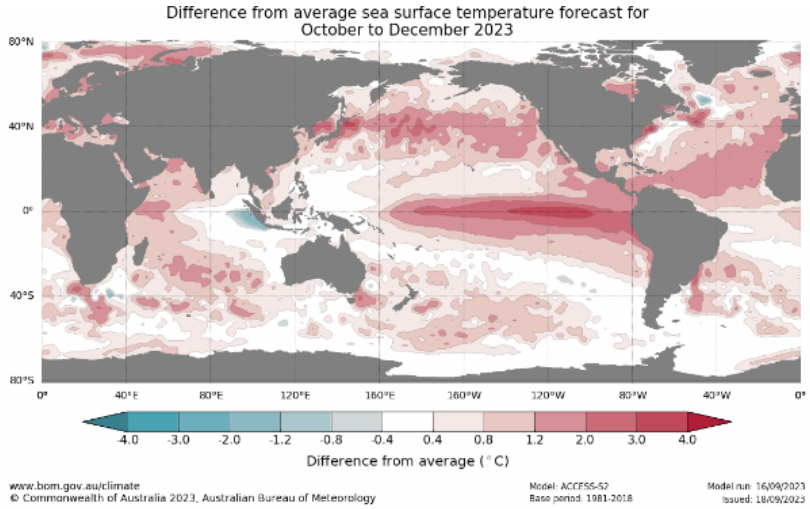
BOM: New Mexico Dashboard

ENSO Tracker

Sea surface temperatures (SSTs) in the central and eastern equatorial Pacific are warmer than normal, in an El Niño-like general pattern that has continued for the past several months. Atmospheric criteria have now also been met, in addition to the SST criteria, for Australia's Bureau of Meteorology to officially designate this as an El Niño event.

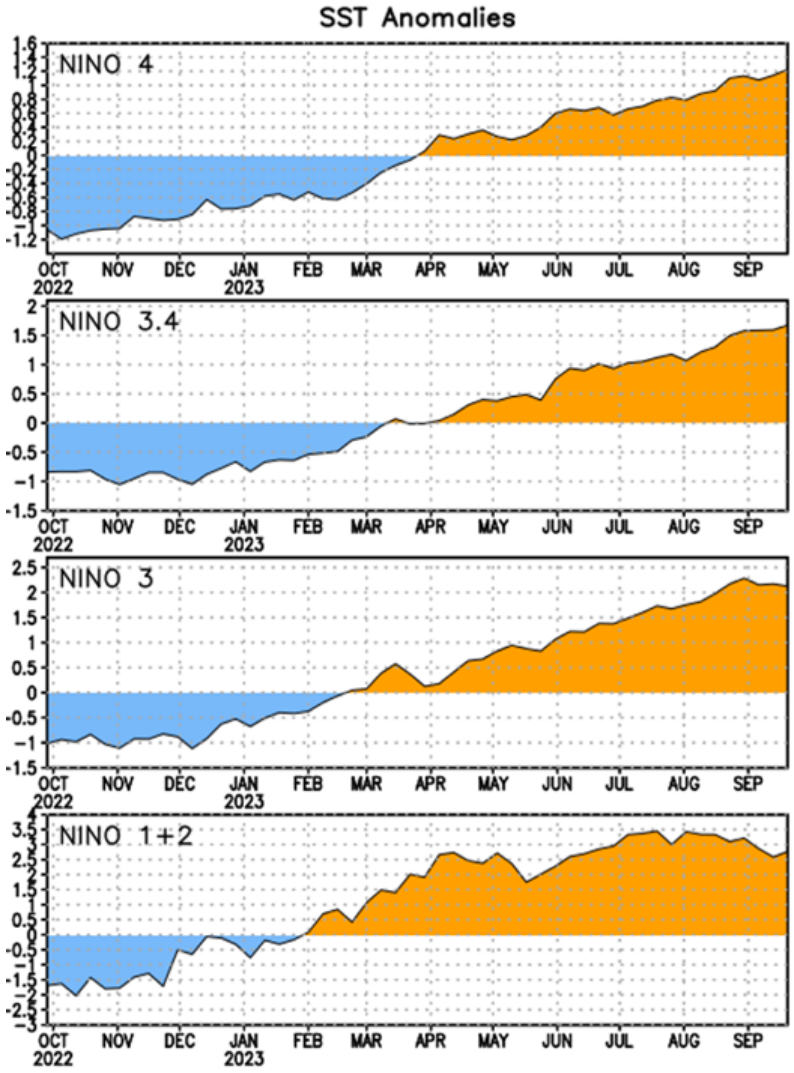


Source: Australian Bureau of Meteorology



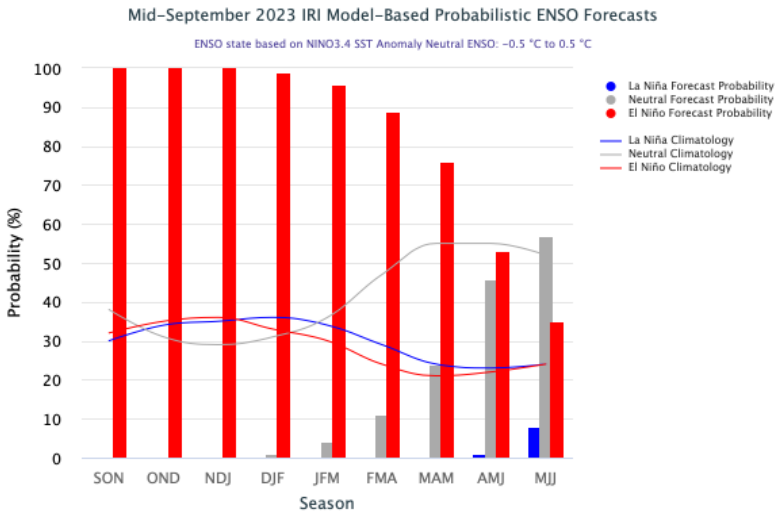
Source: Australian Bureau of Meteorology

This event began with anomalously warm SSTs first emerging along the west coast of South America (Niño 1+2 region) in February of this year. Warm SST anomalies have since emerged and continued to strengthen in all other ENSO diagnostic regions, with the most resent weekly departures reaching 2.1°C in Niño 3 (longitudes 90W-150W, within 5° of the Equator) and 1.7°C in Niño 3.4 (120W-170W).



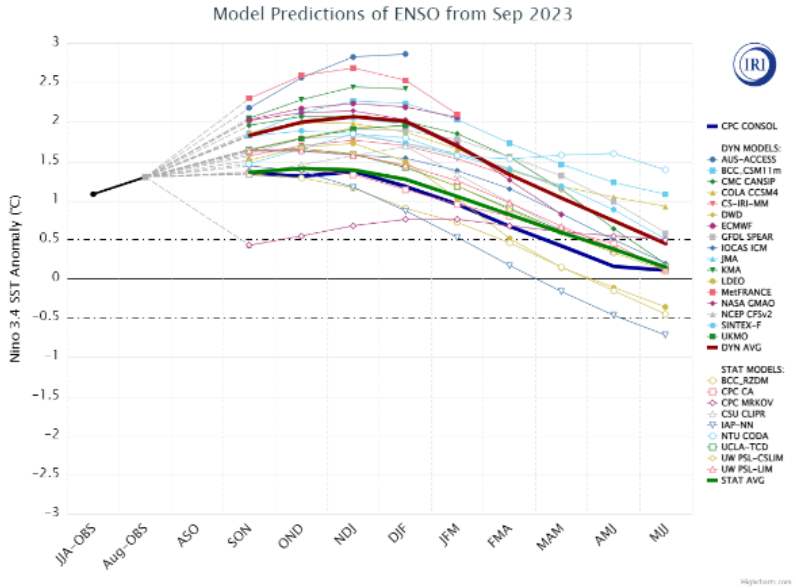
Source: Climate Prediction Center (NOAA)

ENSO forecasts indicate with near certainty that El Niño conditions will persist through January 2021, and give a >90% chance of El Niño lasting through the January-March season.



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

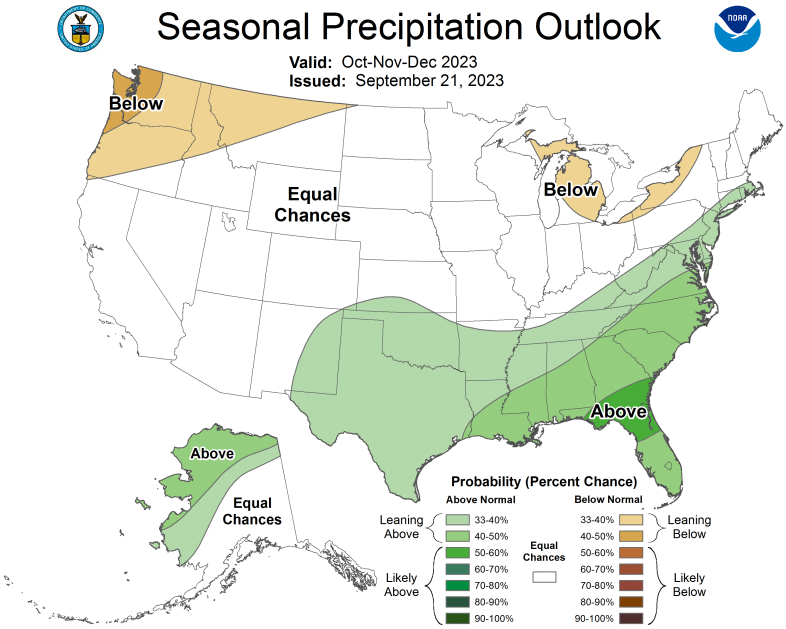
Individual forecast model estimates predict a range of strengths for the eventual peak of the event, which they place as most likely to occur in the November-February window. Forecast seasonally-averaged Niño 3.4 SSTs at the peak of the event are either near or above 1.5°C, with a few models peaking above 2.5°C, and an average among dynamical models of about 2°C. El Niño events exceeding 2°C are rare; there were only four in the last 50 years: 2015/6, 1997/8, 1982/3, and 1972/3.



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

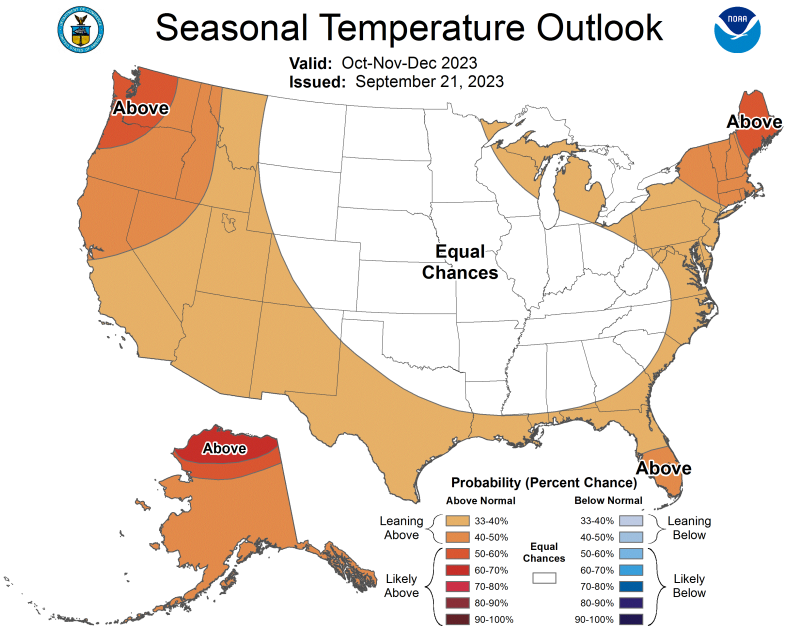
Seasonal Forecasts

The October-December seasonal precipitation forecast from NOAA-CPC calls for slightly increased chances of above-normal precipitation for eastern New Mexico but does not lean either way for Arizona and western New Mexico. The “equal chances” forecast can be interpreted to mean precipitation can be expected to be similar to climatologically normal precipitation.



Source: Climate Prediction Center (NOAA)

The October-December seasonal temperature forecast leans toward above-normal temperatures for New Mexico and Arizona. This forecast is the result of considering the competing influence of El Niño, which tends to lead to cooler temperatures across the southern U.S., and the long-term warming trend, with the warming trend ultimately determined to likely overwhelm the El Niño effect for this season.



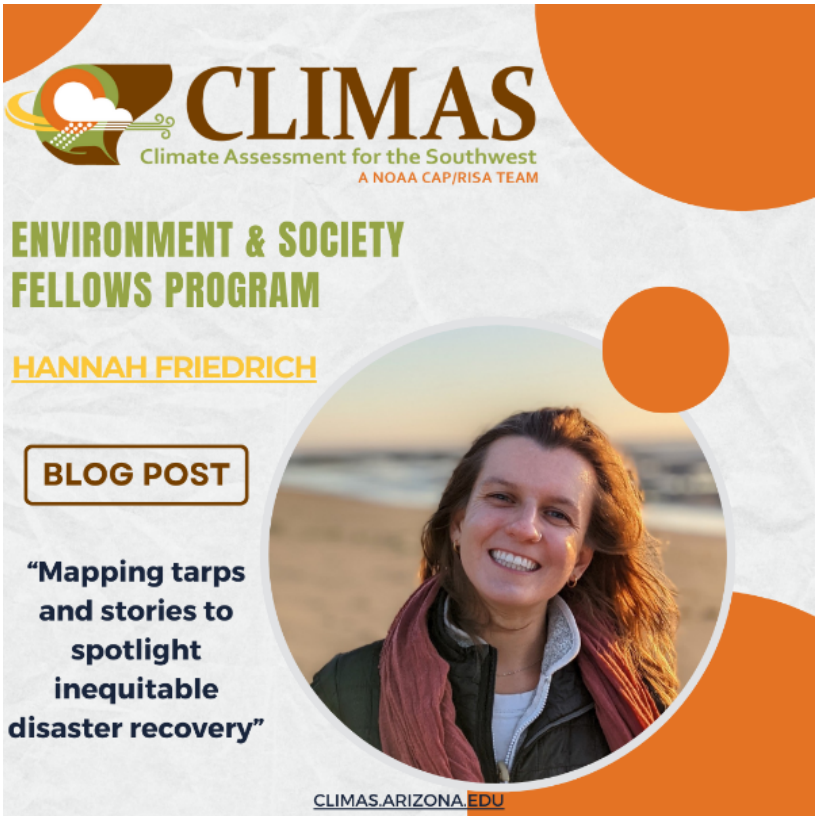
Source: Climate Prediction Center (NOAA)

E&S Fellow Blogs

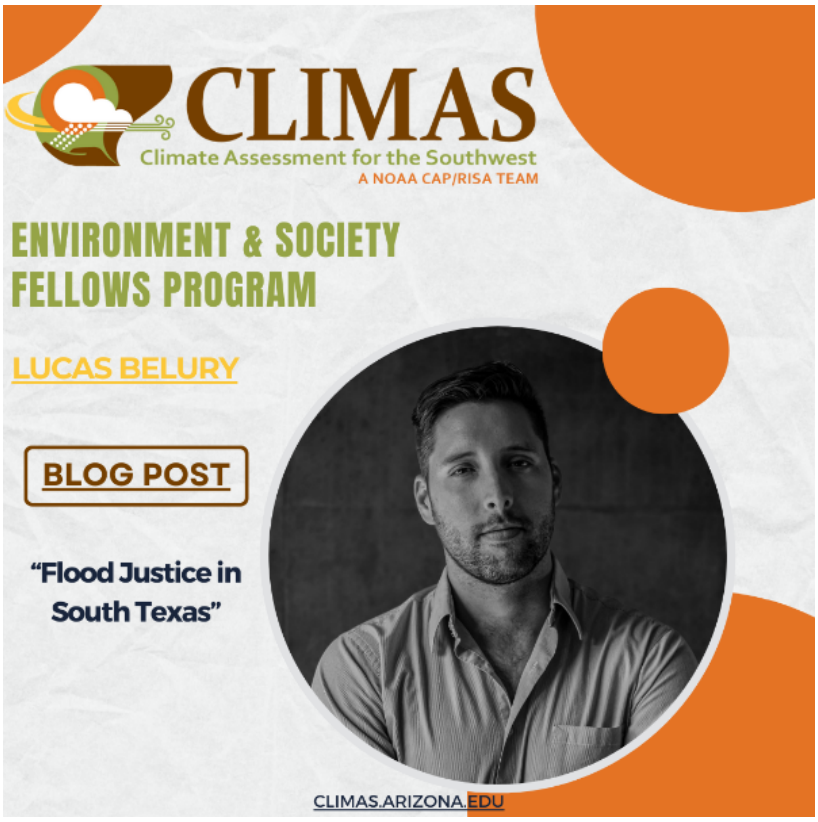
2023 CLIMAS Environment & Society Graduate Fellows

The Environment & Society Fellowship was created in 2013 as a funding opportunity for graduate students to practice use-inspired research and science communication. The Fellowship supports projects that connect social or physical sciences, the environment, and decision-making.

The 2023 Graduate Fellows shared their reflections on their experience on the CLIMAS blog:



"Mapping tarps and stories to spotlight inequitable disaster recovery"



"Flood Justice in South Texas"

Southwest Climate Podcast

August 2023 – The Existential Monsoon

In wrapping up a double-punch storm here in August '23, Zack Guido and Mike Crimmins are here to deconstruct the current monsoon season. They discuss various analogs to this year, cover Hurricane Hilary that made its way up through the western U.S. as well as the potential for additional tropical storms to bring more precipitation to the Southwest. Lastly they end on their predictions for September and into winter. Good luck to all the Southwest Monsoon Fantasy Forecasts participants out there!

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.

Disclaimer

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Southwest Climate Outlook contributors: Mike Crimmins & Matt Meko