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April 2022 Southwest Climate Outlook

Monthly/Seasonal Precipitation and Temperature: Mar precipitation was between below average and above average in Arizona and New Mexico (Fig. 1a). Mar temperatures were mostly above average in Arizona and mostly average in New Mexico (Fig. 1b). Jan-Mar precipitation was mostly below average to much below average in Arizona, and mostly average to below average in New Mexico (Fig. 2a). Jan-Mar temperatures were mostly average to above average in Arizona, and mostly average in New Mexico (Fig. 2b). Water year precipitation is between average and much below average in most of Arizona and New Mexico, with a majority of the region in the drier categories (Fig. 3).

Drought: The U.S. Drought Monitor (USDM) in the Southwest shows increases in categorical severity of drought characterizations in parts of Arizona and especially in eastern New Mexico (Fig. 4), and drought conditions are found across nearly the entire western United States. Long term accumulated precipitation deficits are a factor in these designations, but the relatively dry conditions over the water year to date are also playing their part in the drought.

Snowpack & Streamflow: Apr 1 snow water equivalent (SWE) was highly variable across the Southwest (Fig. 5), with SWE ranging from well below to well above median. Apr 1 streamflow forecasts are mostly below median in the Colorado River and Rio Grande basins, with southern Arizona and parts of New Mexico showing the lowest probability of exceeding the 50% threshold (Fig. 6). April 1 was peak snowpack in the higher country, and precipitation chances are waning, so these forecasts are unlikely to improve, but any late season snow or rainfall would be welcome, especially given the fire activity in New Mexico.

Water Supply: Most of the reservoirs in Arizona and New Mexico are at or below levels from this time last year. Most are also below their long-term average (see reservoir storage on p. 5). The outlook for warm and dry conditions does not bode well for water storage recovery in the short term, and will continue to raise concerns about Lakes Mead and Powell for long term storage and regional sustainability.

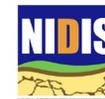
Wildfire: Fire season is already underway in the Southwest. The NIFC fire outlooks for April, May, and June predict above normal fire risk for much of Arizona and most of New Mexico.

ENSO Tracker: ENSO remains at La Niña status according to most outlooks. Previously, the forecast consensus was on a transition to ENSO-neutral conditions by summer, but there are now some indications of the potential for La Nina to persist into Fall (see ENSO-tracker for details).



Tweet Apr 2022 SW Climate Outlook

APR2022 @CLIMAS_UA SW Climate Outlook, Forecasts, ENSO Tracker, Streamflow & Snowpack, AZ & NM Reservoirs, 2022 CLIMAS Grad Fellows Blog bit.ly/3OuybNP #SWclimate #AZWx #NMWx



Online Resources

Figures 1-2
National Centers for Environmental Information
ncdc.noaa.gov/sotc

Figure 3
West Wide Drought Tracker
wwdt.dri.edu

Figure 4
U.S. Drought Monitor
droughtmonitor.unl.edu

Figures 5-6
National Resource Conservation Service (NRCS)
nrcs.usda.gov

April 2022 - Climate Summary

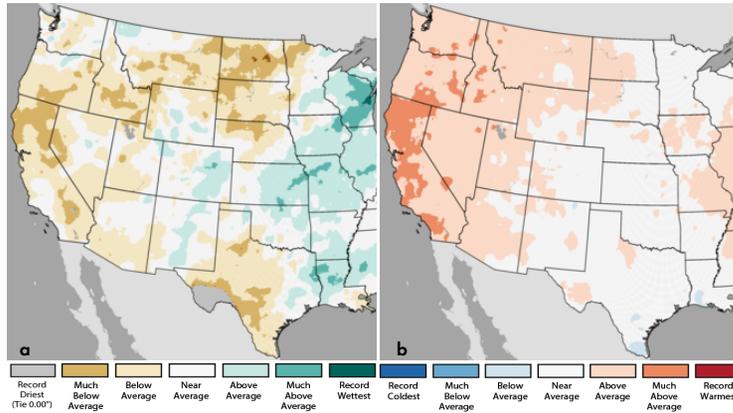


Figure 1: Mar 2022 Precipitation (a) & Temperature Ranks (b)

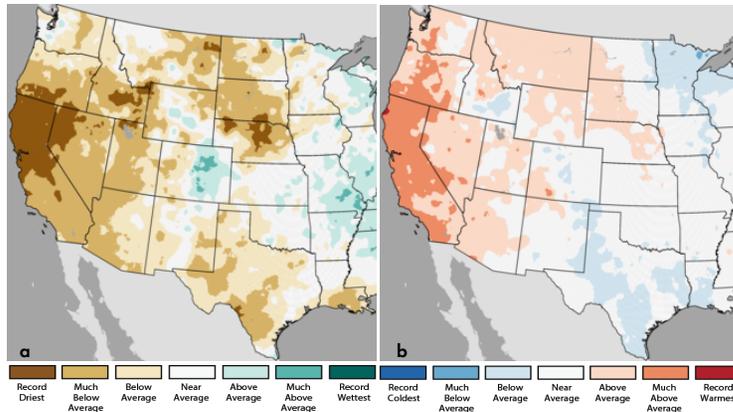


Figure 2: Jan - Mar 2022 Precipitation (a) & Temperature Ranks (b)

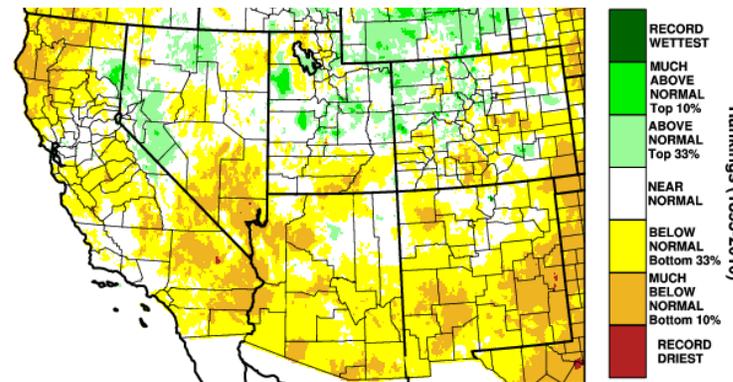


Figure 3: Water Year (Oct 2021 - Mar 2022) Precip Rankings

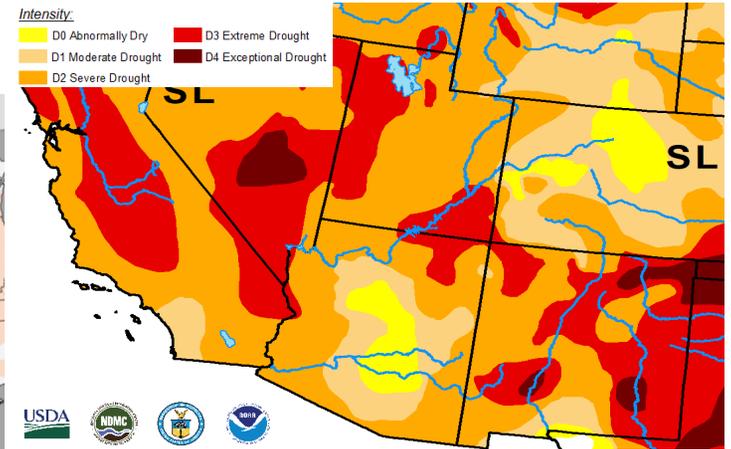


Figure 4: US Drought Monitor - Apr 12, 2022

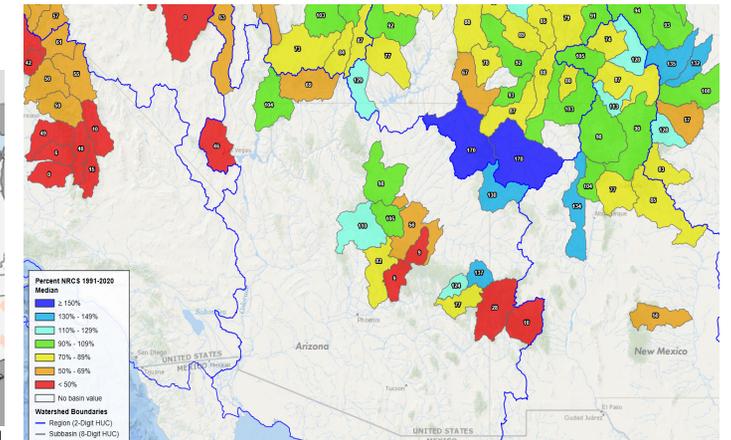


Figure 5: Apr 1 2022 Snow Water Equivalent (SWE) - Pct NRCS Median (1991-2020)

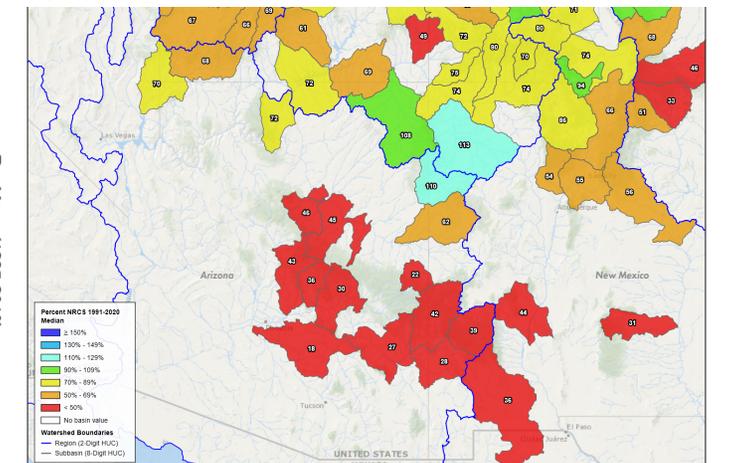


Figure 6: Apr 1 2022 Streamflow Forecast 50% Exceedance Prob., NRCS Median

Online Resources

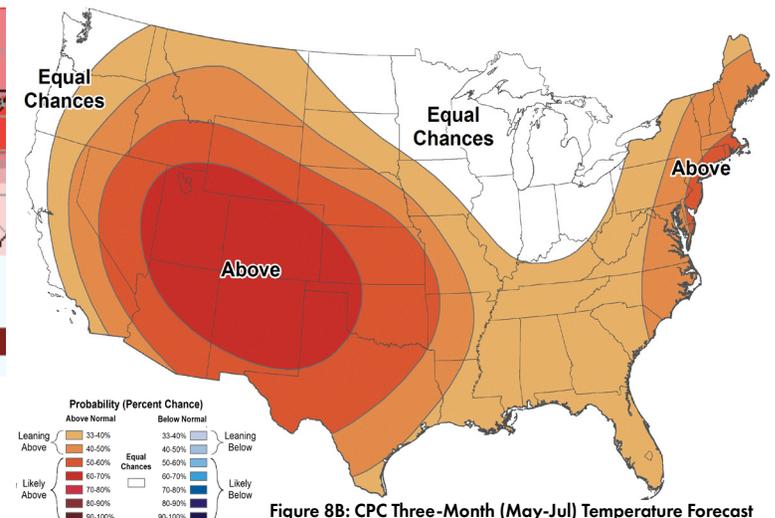
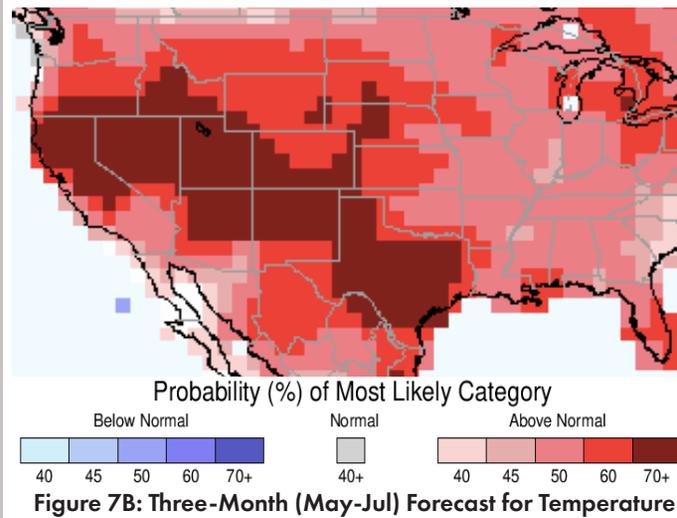
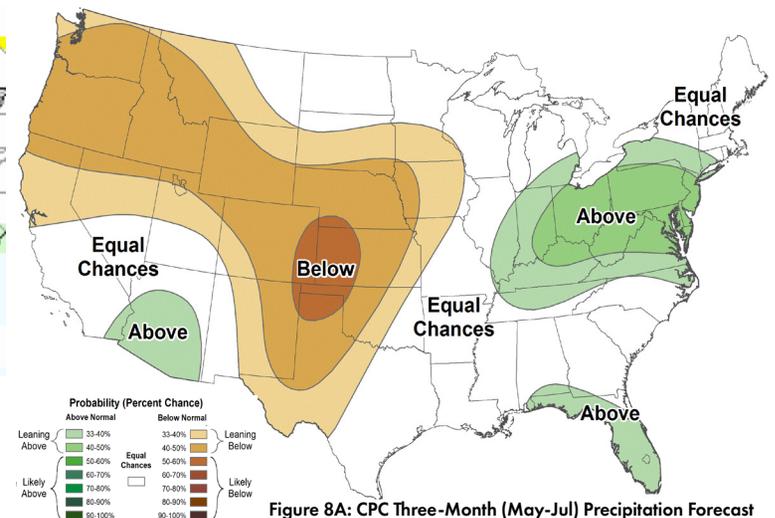
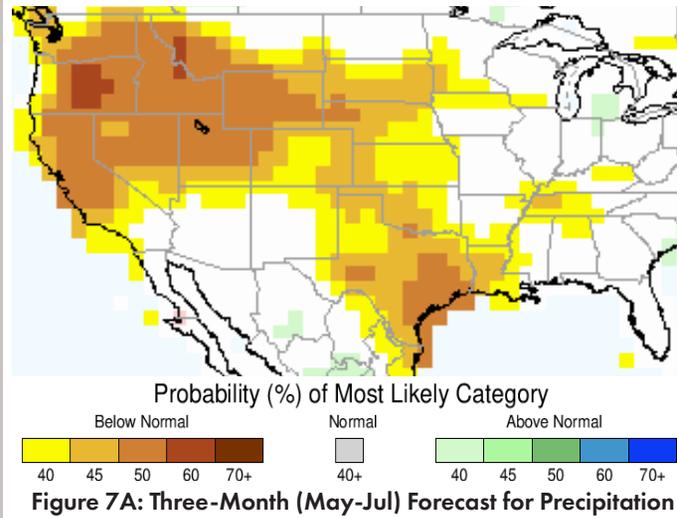
Figure 7

Intl. Research Institute for Climate and Society
iri.columbia.edu

Figure 8

NOAA Climate Prediction Center
cpc.ncep.noaa.gov

April 2022 - Seasonal Forecasts



Precipitation Forecasts: The IRI outlook for May-Jul calls for equal chances of above or below average precipitation in most of Arizona and New Mexico, and increased chances of below average precipitation in most of the western U.S. (Fig. 7a). The CPC outlook calls for increased chances of above normal precipitation in most of Arizona and increased chances of average or below average precipitation in the rest of the Southwest.(Fig. 8a).

Temperature Forecasts: May-Jul outlooks for IRI (Fig. 7b) and the CPC (Fig. 8b) call for increased chances of above average temperatures in the Southwest and across much of the western United States.

Online Resources

Figure 1

Australian Bureau of Meteorology
bom.gov.au/climate/enso

Figure 2

NOAA - Climate Prediction Center
cpc.ncep.noaa.gov

Figure 3

International Research Institute for Climate and Society
iri.columbia.edu

Figure 4

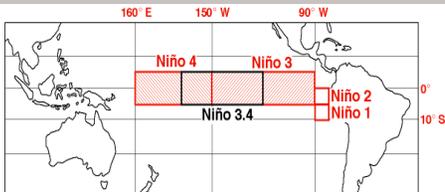
NOAA - Climate Prediction Center
cpc.ncep.noaa.gov

El Niño / La Niña

Information on this page is also found on the CLIMAS website:

climas.arizona.edu/sw-climate/el-niño-southern-oscillation

Equatorial Niño Regions



For more information: ncdc.noaa.gov/teleconnections/enso/indicators/sst/

Image source: aoml.noaa.gov/

ENSO Tracker

Sea surface temperature (SST) forecasts for May – Jul 2022 still indicate cool conditions across most of the equatorial Pacific (Fig. 1). Current 3.4/4 anomalies are still below the La Niña threshold (Fig. 2), and while most ENSO outlooks generally call for La Niña conditions to last into summer, there are now some indications in outlooks of a continuation of La Niña into Fall 2022, although there is considerable uncertainty in models and forecasts during the so-called spring (predictability barrier).

Forecast Roundup: On Apr 12 the Australian Bureau of Meteorology ENSO outlook stated, “Atmospheric and oceanic indicators persist at La Niña levels”, but called for a likely return to neutral conditions. On Apr 11 the Japanese Meteorological Agency (JMA) observed La Niña conditions had a 60-percent chance to continue through the end of spring, and a 70-percent chance of ENSO-neutral by summer. On Apr 14 the NOAA Climate Prediction Center (CPC) maintained their “La Niña Advisory” noting “the coupled ocean-atmosphere system reflected the continuation of La Niña” and called for a 59-percent chance of La Niña lasting through the Jun-Aug period, and a 50-55-percent chance of La Niña lasting through Fall 2022. On Apr 14 the International Research Institute (IRI) issued an ENSO Quick Look (Fig. 3), noting “Sea Surface Temperatures remain below-average (strengthening slightly) in the central-eastern equatorial Pacific” but noted “slight disagreement between the two forecast methods on the dissipation of the current event”, and highlighted nearly equal chances of La Niña or ENSO-Neutral conditions in the ‘subjective’ (forecaster consensus) outlook. The North American Multi-Model Ensemble (solid and dashed black line, Fig. 4) remains in La Niña territory, and in a shift from previous months, now shows persistence of La Niña conditions into Fall 2022.

Summary: Last month, most outlooks called for a gradual transition out of La Niña over summer, but this month, some outlooks shifted to the possibility of La Niña extending into Fall 2022. If La Niña does persist through summer, the impact on spring and summer is less consistent or predictable, given the inherent variability and volatility of the monsoon, and limited sample size of ENSO events that persist over the summer period.

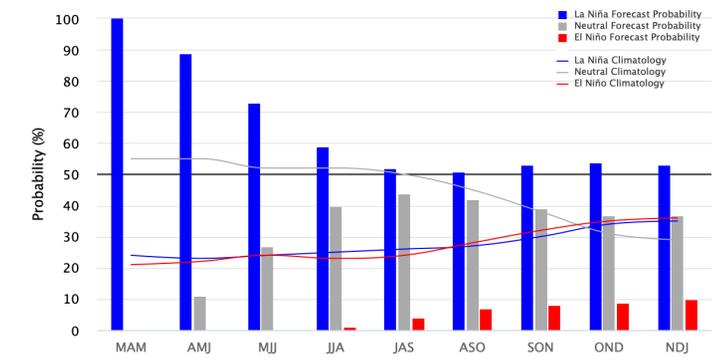
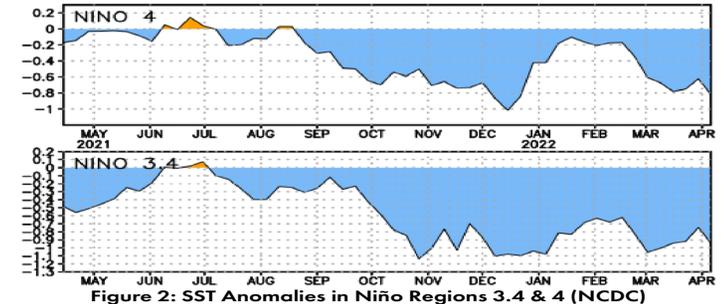
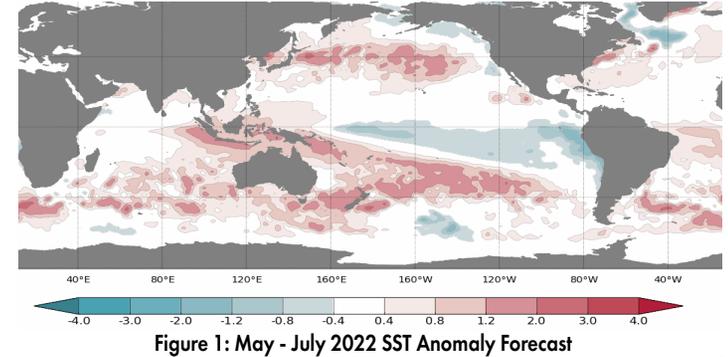


Figure 3: Early-Apr IRI/CPC Model-Based Probabilistic ENSO Forecast

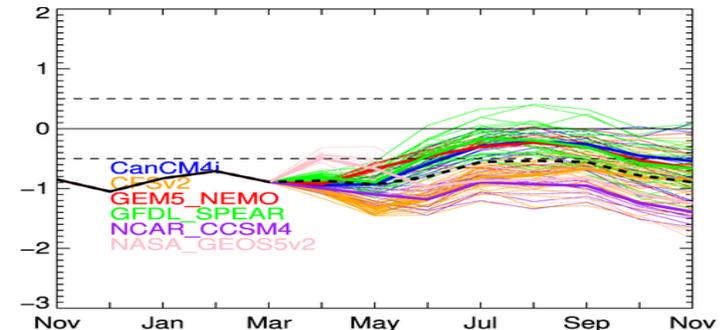


Figure 4: North American Multi-Model Ensemble Forecast for Niño 3.4

Online Resources

Portions of the information provided in this figure is available at the Natural Resources Conservation Service www.wcc.nrcs.usda.gov/BOR/basin.html

Contact Ben McMahan with questions/comments.

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 1981–2010 reservoir average (red line).

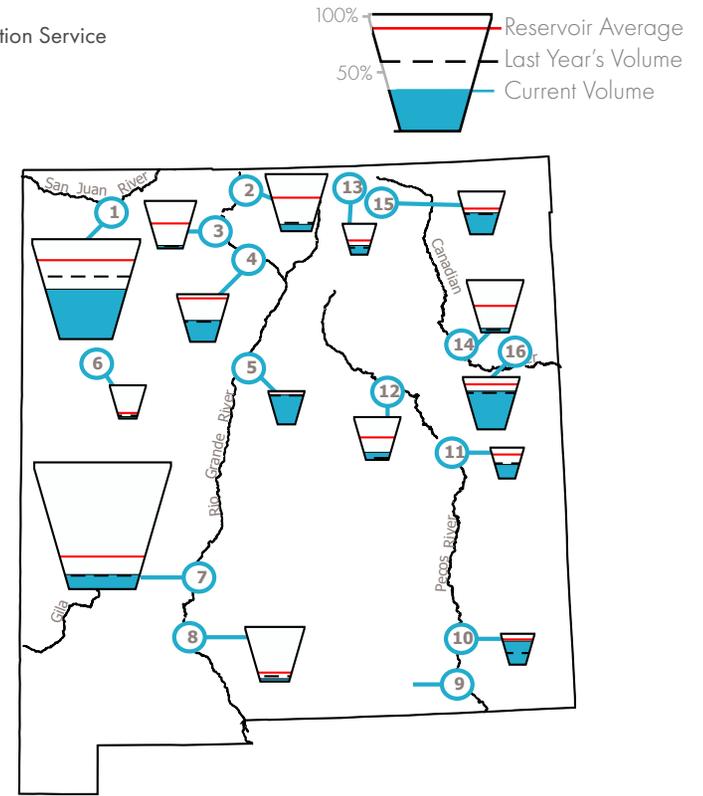
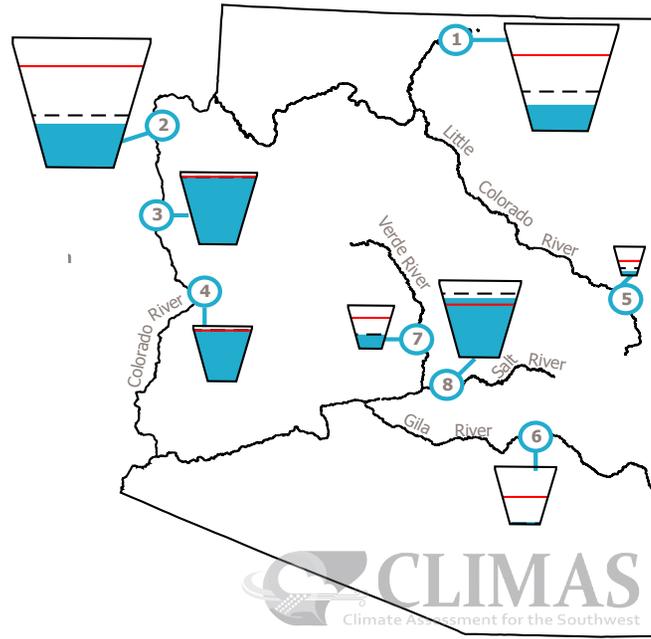
The table details more exactly the current capacity (listed as a percent of maximum storage). Current and maximum storage are given in thousands of acre-feet for each reservoir. One acre-foot is the volume of water sufficient to cover an acre of land to a depth of 1 foot (approximately 325,851 gallons). 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 National Water and Climate Center of the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS).

Reservoir Volumes

DATA THROUGH APR 1, 2022

Data Source: National Water and Climate Center, Natural Resources Conservation Service



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

Reservoir	Capacity	Current Storage*	Max Storage*	One-Month Change in Storage*
1. Lake Powell	24%	5,812	24,322.0	-236
2. Lake Mead	33%	8,536	26,159.0	-410
3. Lake Mohave	94%	1,696	1,810.0	+31
4. Lake Havasu	94%	583	619.0	+30
5. Lyman	15%	4.6	30.0	-0.2
6. San Carlos	2%	21.5	875.0	-9.6
7. Verde River System	32%	92.9	287.4	-15.0
8. Salt River System	77%	1,551	2,025.8	+21

*KAF: thousands of acre-feet

Reservoir	Capacity	Current Storage*	Max Storage*	One-Month Change in Storage*
1. Navajo	50%	853.5	1,696.0	+5.0
2. Heron	11%	43.5	400.0	+3.1
3. El Vado	5%	8.7	190.3	+0.9
4. Abiquiu	44%	82.5	186.8	+1.3
5. Cochiti	86%	43.1	50.0	+1.2
6. Bluewater	5%	1.8	38.5	-0.1
7. Elephant Butte	11%	239.6	2,195.0	+21.7
8. Caballo	5%	15.9	332.0	0.0
9. Lake Avalon	**	**	4.5	**
10. Brantley	75%	31.7	42.2	+1.7
11. Sumner	44%	15.9	35.9	-0.6
12. Santa Rosa	17%	17.8	105.9	-0.3
13. Costilla	29%	4.6	16.0	**
14. Conchas	7%	17.4	254.2	-1.2
15. Eagle Nest	48%	37.6	79.0	+1.3
16. Ute Reservoir	71%	142	200	-1.0

Environment and Society 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

climas.arizona.edu/education/fellowship-program

The 2021 E&S Fellows shared reflections on their experience on the CLIMAS blog, and in a recap podcast hosted by Gigi Owen.

Full versions of the blog posts at:

climas.arizona.edu/blog/

Listen to the podcast episode on Spotify, Apple Podcasts, the CLIMAS website, or wherever you listen to podcasts - details here:

climas.arizona.edu/media/podcasts/

climas.arizona.edu/podcast/special-episode-2021-climas-environment-society-graduate-fellows-interviews

Introducing the 2022 E&S Fellows



A Social Ecology of Whale-Watching Ecotourism in El Vizcaíno

Jake W. Dean

The Baja California Peninsula is one of the most naturally stunning parts of our globe, split from the mainland of Mexico by the San Andreas Fault. Yet for decades, outsiders saw the area as an isolated and unproductive land with minimal economic value. Especially following the decline of the local whaling industry in the early 1900s, regional economic opportunities were limited to fishing, irrigated agriculture and ranching outside of the rise of the saltworks industry in 1954 (more on that later). However, the 'secret' of Baja California's natural beauty was destined to get out. In the latter half the twentieth century, the arid landscape was reimagined by locals and officials as a tourist's paradise complete with beaches, surfing and—at least for a few months a year—the opportunity to get up close to Pacific gray whales.

Read more at: <https://climas.arizona.edu/blog/social-ecology-whale-watching-ecotourism-el-vizca%C3%ADno>



Our cities are what we eat

Julia Davies

It's late afternoon and I am sitting on the veranda at my parent's house in the small mountain town of Montagu in the Western Cape Province of South Africa. In front of me lies a fishpond, inhabited mostly by Koi, and beyond that stretches a green lawn scattered with a variety of fruit trees. Some overripe apples have fallen to the ground, enticing several of the plump hens who have free range in the garden. To my left is a large vegetable patch and the chicken coop where my mother collects fresh eggs every morning. Grapevines creep up and over the latticework above my head, creating a dappled shade, and hummingbirds flit around the birdfeeders that have been hung from the pillars.

Read more at: <https://climas.arizona.edu/blog/our-cities-are-what-we-eat-2022-climas-es-fellows-introductions>

Southwest Climate Podcast

climas.arizona.edu/media/podcasts

iTunes

<https://apple.co/3kHh8bf>

Spotify

<https://spoti.fi/3zZlVWu>

Android

<https://bit.ly/2ILYHos>

Stitcher

<https://bit.ly/3nEWhHd>

We also finally have podcast gear (shirts and mugs).



Order at: teespring.com/stores/the-southwest-climate-podcast.

If you are interested in showing your support - or enjoying the (lack of a) monsoon in style, this is one way to do so.

The Southwest Climate Podcast



Mar 2022 Southwest Climate Podcast Cold(ish), Windy, and Dry - Winter Recap

In the Mar 2022 edition of the CLIMAS Southwest Climate Podcast, Mike Crimmins and Zack Guido dive into a recap of winter (so far) in the Southwest. First, recap winter to date, and put it in the context of a double-dip La Niña, including precipitation totals, temperature, and snowpack. Then they take a closer look at the phases of the PNA (Pacific/North American pattern) and how this links to ENSO/La Niña and the weather conditions this winter. Finally, they revisit temperature to consider just how “cold” it has actually been, and preview a closer look at fire outlooks, snowpack, and water supply in upcoming podcasts.

<https://bit.ly/3lCHrBU>

Jan 2022 Southwest Climate Podcast - La Niña, Winter Storms, & the Jetstream

In the January 2022 edition of the CLIMAS Southwest Climate Podcast, Mike Crimmins and Zack Guido dive into the winter weather so far, tracking how this lines up with expectations in a La Niña year, and what to track this winter to look for La Nina effects - temperature, snow water equivalent, streamflow forecasts, etc. They also take a closer look at the jetstream and the role this plays in winter weather in the Southwest, and where these recent events (and the monsoon) leave us in terms of drought. They wrap with some discussion of the outlooks for the next month/season, as well as some obligatory pining for the monsoon.

<https://bit.ly/3LgUbKp>

2021 CLIMAS Environment & Society Graduate Fellows Interviews

In this special episode, Gigi Owen sits down for one on one conversations with Moriah Bailey Stephenson, Simone Williams, and Lea Schram von Haupt (the 2021 CLIMAS E&S Grad Fellows) to chat with each of them about their reflections and perspectives and their fellowship experience. You can also find more information about their projects in blog posts at climas.arizona.edu/blog.

<https://bit.ly/3Jk5IHw>

Online Resources

Figure 1 Climate Program Office

cpo.noaa.gov

RISA Program Homepage

cpo.noaa.gov/Meet-the-Divisions/Climate-and-Societal-Interactions/RISA

New Mexico Climate Center

weather.nmsu.edu

CLIMAS Research & Activities

CLIMAS Research

climas.arizona.edu/research

CLIMAS Outreach

climas.arizona.edu/outreach

Climate Services

climas.arizona.edu/climate-services



The Climate Assessment for the Southwest (CLIMAS) program was established in 1998 as part of the National Oceanic and Atmospheric Administration's Regional Integrated Sciences and Assessments program. 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.

What does CLIMAS do?

The CLIMAS team and its partners work to improve the ability of the region's social and ecological systems to respond to and thrive in a variable and changing climate. The program promotes collaborative research involving scientists, decision makers, resource managers and users, educators, and others who need more and better information about climate and its impacts. Current CLIMAS work falls into six closely related areas: 1) decision-relevant questions about the physical climate of the region; 2) planning for regional water sustainability in the face of persistent drought and warming; 3) the effects of climate on human health; 4) economic trade-offs and opportunities that arise from the impacts of climate on water security in a warming and drying Southwest; 5) building adaptive capacity in socially vulnerable populations; and 6) regional climate service options to support communities working to adapt to climate change.

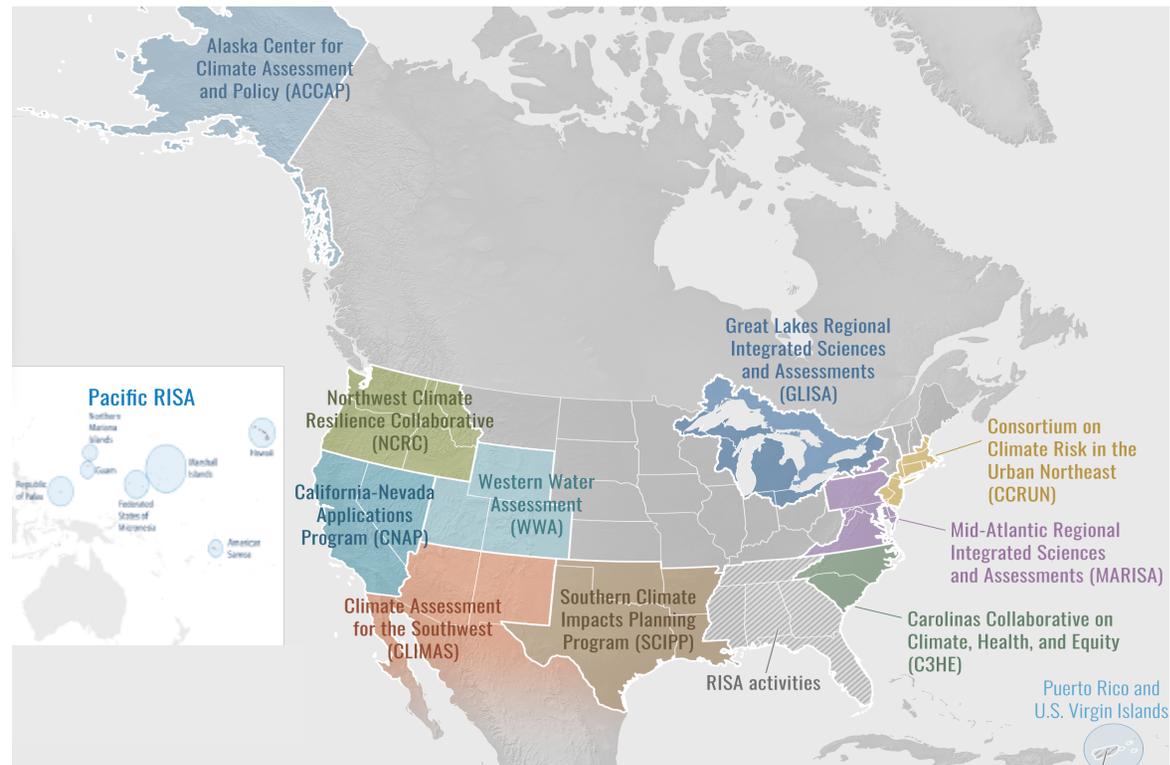


Figure 1: NOAA Regional Integrated Sciences and Assessments Regions