

## Author/Editor

**Ben McMahan**

Assistant Research Professor, UArizona

## Contributors

**Mike Crimmins**

UArizona Extension Specialist

**Dave Dubois**

New Mexico State Climatologist

**Gregg Garfin**

Founding Editor

**Zack Guido**

Arizona Institutes for Resilience

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# August 2021 Southwest Climate Outlook

**Precipitation and Temperature:** July precipitation was between above average and record wet in most of Arizona, and between average and much above average in most of New Mexico (Fig. 1a). July temperatures were below average to average in most of New Mexico and most of southern Arizona, with much above average to record warmest in most of the rest of the western United States (Fig. 1b). 2021 precipitation ranks to date (Jan-Jul) were between below average and above average in most of Arizona and New Mexico, with drier-than-average conditions in most of the Southwest (Fig. 2a). Temperature ranks for 2021 were above average to much above average across most of the Southwest (Fig. 2b).

**Drought:** Water year precipitation (as of Jul 31) is between below normal and above normal across most of Arizona and New Mexico, and much below normal to record driest in much of the rest of the Southwest (Fig. 3). The U.S. Drought Monitor (USDM) scaled back drought categorizations following numerous monsoon events (Fig. 4), which has dramatically improved short-term drought conditions but has had little impact so far on longer-term impacts showing up in sectors like water resources.

**Water Supply:** Most reservoirs in the region are at or below the values recorded at this time last year. Most are also below their long-term average (see Arizona and New Mexico reservoir storage on p.6).

**Wildfire:** Monsoon activity has tamped down fire risk and activity in Arizona and New Mexico. As of Aug 11, total acres burned have not changed much from last month; Arizona is much above mean and median and New Mexico is at or below mean and median (Fig. 5). The National Interagency Fire Center (NIFC) significant wildland fire potential outlooks call for below-normal wildfire risk in much of Arizona and New Mexico in August, and normal wildfire risk in September and October.

**Monsoon Tracker:** Monsoon activity through Aug 16 has been widespread and persistent. Much of the region recorded between normal and much above normal precipitation (Fig. 6; see Monsoon Tracker on p.4-5 for details). There is still time for some locations to break monsoon records if this pattern continues.

**ENSO Tracker:** ENSO conditions are neutral, and there is not yet consensus in the seasonal outlooks about the certainty of a La Niña event this fall and winter (see ENSO-tracker on p.3 for details).

**Precipitation and Temperature Forecast:** The three-month outlook (Sept-Nov) calls for increased chances for above-normal precipitation in a few areas of Arizona and New Mexico (Fig. 7, top). The temperature outlook calls for equal chances of normal, above-, or below-normal temperatures in most of Arizona and increased chances of above-normal temperatures in most of New Mexico (Fig. 7, bottom).



## Tweet August 2021 SW Climate Outlook

AUG2021 @CLIMAS\_UA SW Climate Outlook, Monsoon Tracker, AZ & NM Reservoirs, SW Climate Podcast & 1075, Monsoon Fantasy Forecast, <https://bit.ly/2WaleCd> #SWclimate #AZWx #NMWx



# Online Resources

**Figures 1-2**  
National Centers for Environmental Information  
[ncdc.noaa.gov/sotc](http://ncdc.noaa.gov/sotc)

**Figure 3**  
West Wide Drought Tracker  
[wwdt.dri.edu](http://wwdt.dri.edu)

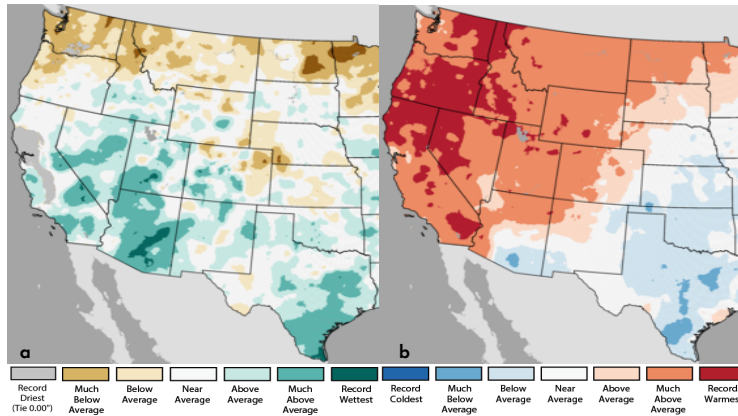
**Figure 4**  
U.S. Drought Monitor  
[droughtmonitor.unl.edu](http://droughtmonitor.unl.edu)

**Figure 5**  
CLIMAS: Climate Assessment for the Southwest  
[climas.arizona.edu](http://climas.arizona.edu)

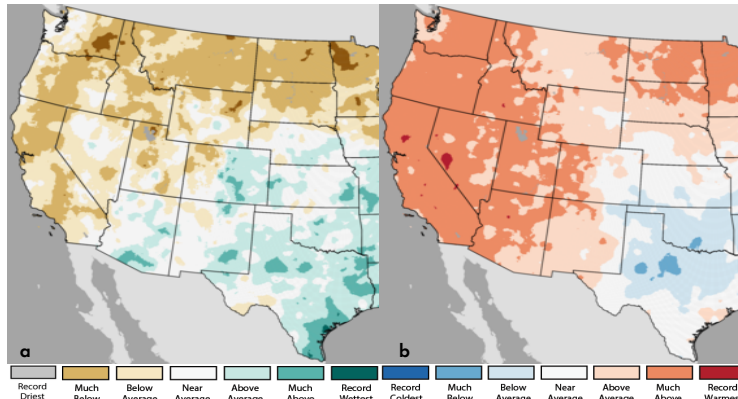
**Figure 6**  
UA Climate Science Applications Program  
[cals.arizona.edu/climate](http://cals.arizona.edu/climate)

**Figure 7**  
Intl. Research Institute for Climate and Society  
[iri.columbia.edu](http://iri.columbia.edu)

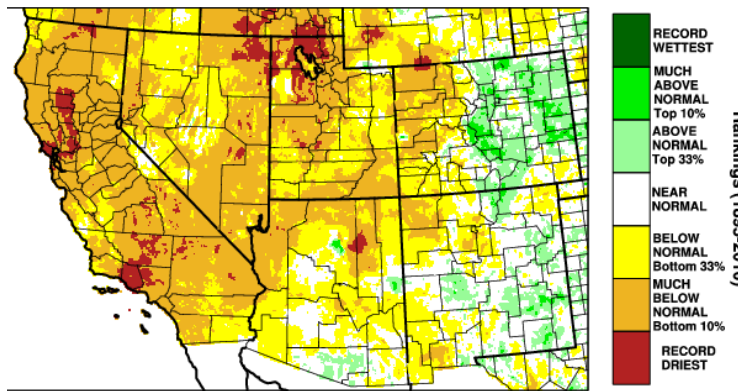
# August 2021 SW Climate Outlook



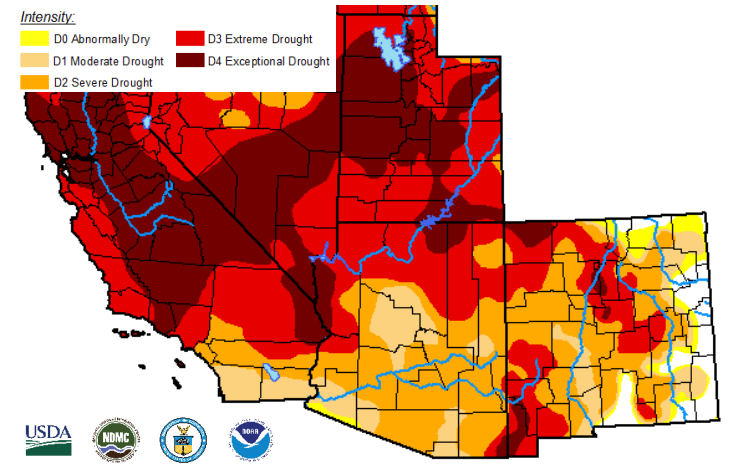
**Figure 1: July 2021 Precipitation (a) & Temperature Ranks (b)**



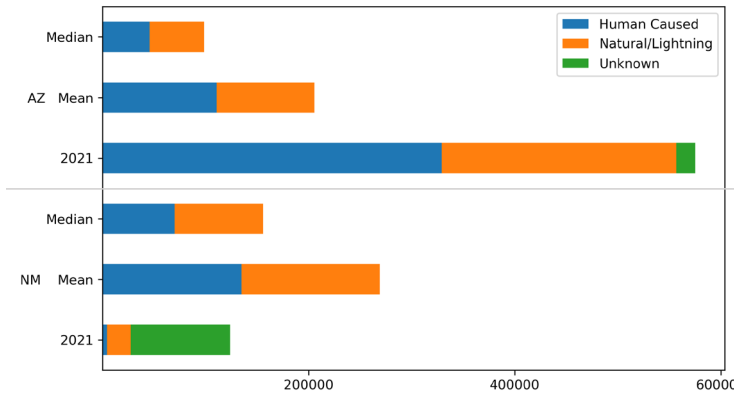
**Figure 2: Jan-Jul 2021 Precipitation (a) & Temperature Ranks (b)**



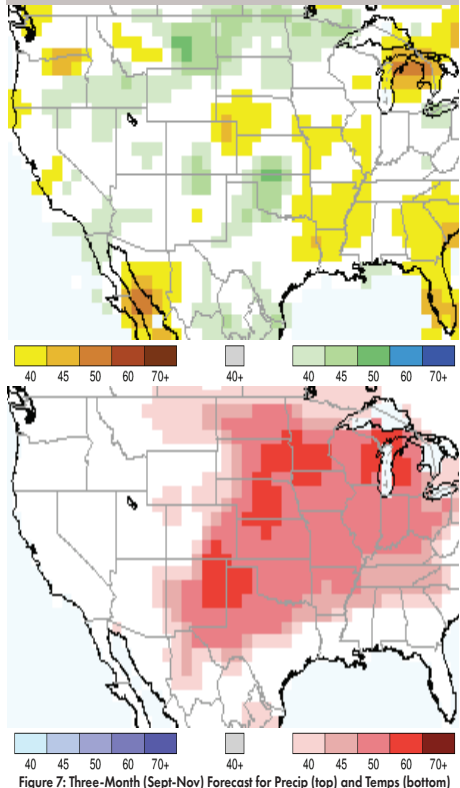
**Figure 3: Water Year (Oct 2020 - July 2021) Precip Rankings**



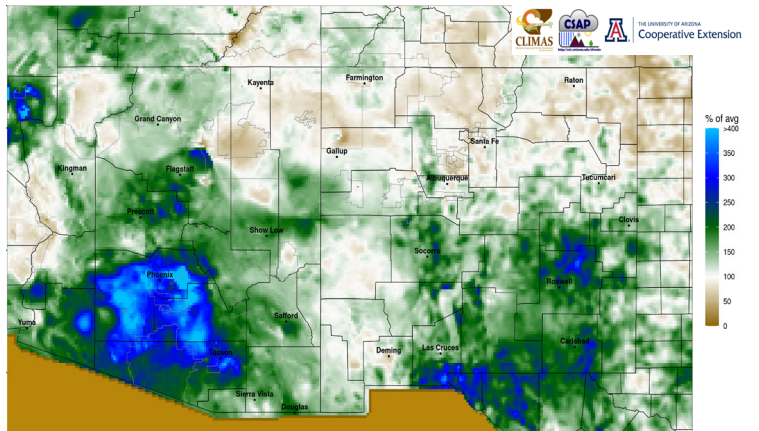
**Figure 4: US Drought Monitor - Aug 10, 2021**



**Figure 5: Wildfire Fire Acres burned - AZ and NM (as of Aug 11, 2021)**



**Figure 7: Three-Month (Sept-Nov) Forecast for Precip (top) and Temps (bottom)**



**Figure 6: Percent of Average Precipitation, Jun 15 - Aug 18, 2021 (PRISM Data)**

## Online Resources

### Figure 1

Australian Bureau of Meteorology  
[bom.gov.au/climate/enso](http://bom.gov.au/climate/enso)

### Figure 2

NOAA - Climate Prediction Center  
[cpc.ncep.noaa.gov](http://cpc.ncep.noaa.gov)

### Figure 3

International Research Institute for  
 Climate and Society  
[iri.columbia.edu](http://iri.columbia.edu)

### Figure 4

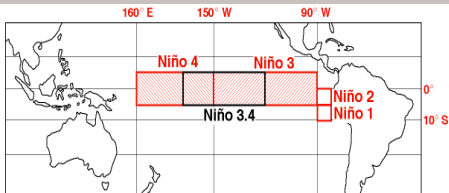
NOAA - Climate Prediction Center  
[cpc.ncep.noaa.gov](http://cpc.ncep.noaa.gov)

## El Niño / La Niña

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

[climas.arizona.edu/sw-climate/  
 el-niño-southern-oscillation](http://climas.arizona.edu/sw-climate/el-niño-southern-oscillation)

## Equatorial Niño Regions



For more information: [ncdc.noaa.gov/  
 teleconnections/enso/indicators/sst/](http://ncdc.noaa.gov/teleconnections/enso/indicators/sst/)

Image source: [aoml.noaa.gov/](http://aoml.noaa.gov/)

## ENSO Tracker

Sea surface temperature (SST) forecasts for Sept – Nov 2021 continue to indicate cooling conditions across the equatorial Pacific (Fig. 1). Current Niño 3.4/4 anomalies are neutral (Fig. 2), and ENSO outlooks note the persistence of neutral conditions in the short term, with lingering uncertainty as to whether La Niña conditions could emerge in winter 2021-2022, or whether conditions would not reach relevant La Niña thresholds and remain ENSO-neutral.

**Forecast Roundup:** On Aug 11, the Japanese Meteorological Agency (JMA) observed ongoing ENSO-neutral conditions, and called for a 60-percent chance of neutral conditions continuing to autumn. On Aug 12, the NOAA Climate Prediction Center (CPC) ENSO was at “La Niña Watch” status, with a 60-percent chance of ENSO-neutral through September, and a 70-percent chance of La Niña emerging in Nov-Jan. On Aug 12, the International Research Institute (IRI) issued an ENSO Quick Look (Fig. 3), noting a mix of “atmospheric variables consistent with ENSO-neutral conditions” along with “others (that) may hint at cooling to come”. They observed ENSO-neutral was likely through fall, but “with greater uncertainty later in the year”. On Aug 17, the Australian Bureau of Meteorology ENSO tracker was neutral/inactive, stating ENSO “remains neutral with most oceanic and atmospheric indicators within the neutral range”, but noted both likely cooling in the Pacific SSTs into Fall 2021, and uncertainty in the models as to whether this would last for more than a month or two. The North American Multi-Model Ensemble (solid & dashed black line, Fig. 4) is ENSO-neutral, and is expected to remain neutral through summer, but then reach or surpass La Niña levels in late 2021 and into 2022.

**Summary:** The seasonal forecasts are more or less certain that ENSO-neutral conditions will persist through the summer and into fall. Some forecasts are leaning into a possible return of La Niña in late 2021 given the forecast for oceanic cooling in the equatorial region. Other forecasts are still grappling with uncertainty in the models, along with emergent questions about whether cooling conditions would last long enough to be classified as a La Niña event. La Niña winters are frequently warmer and drier than average in the Southwest, so this forecast is something to watch, given drought conditions and cumulative precipitation deficits in the region.

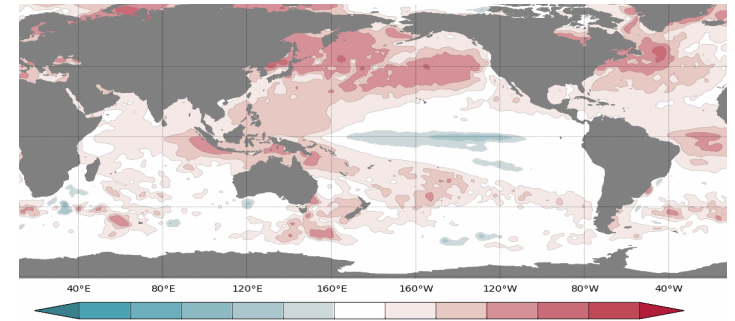


Figure 1: Sept - Nov 2021 Sea Surface Temperature (SST) Anomaly Forecast

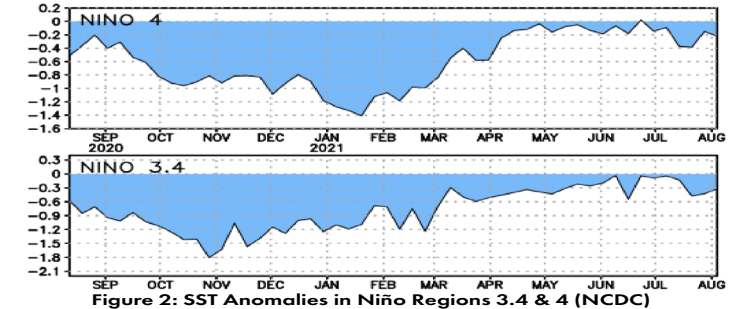


Figure 2: SST Anomalies in Niño Regions 3.4 & 4 (NCDC)

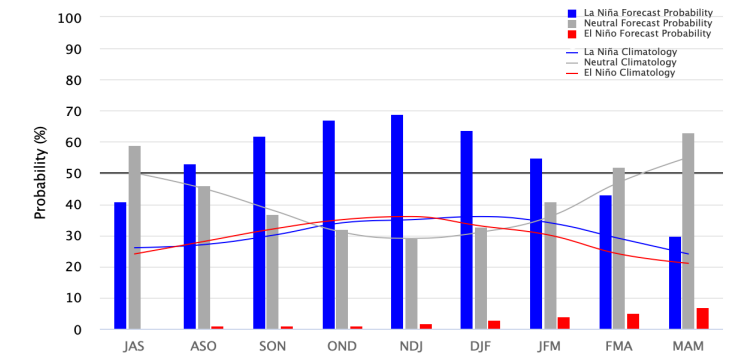


Figure 3: Early-Aug IRI/CPC Model-Based Probabilistic ENSO Forecast

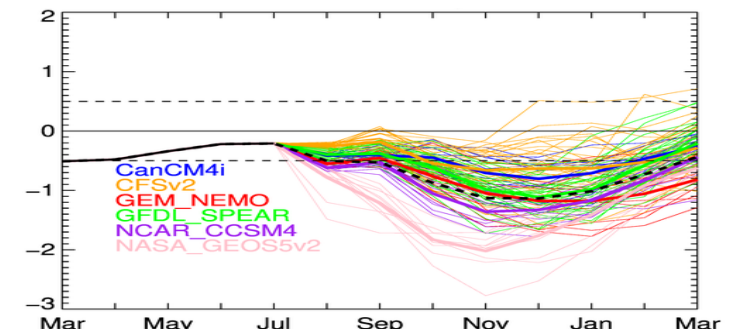


Figure 4: North American Multi-Model Ensemble Forecast for Niño 3.4

# Online Resources

Figures 1-2  
UA Climate Science Applications  
Program  
cals.arizona.edu/climate  
Data: PRISM

## SW Monsoon Tracker - 2021 to Date

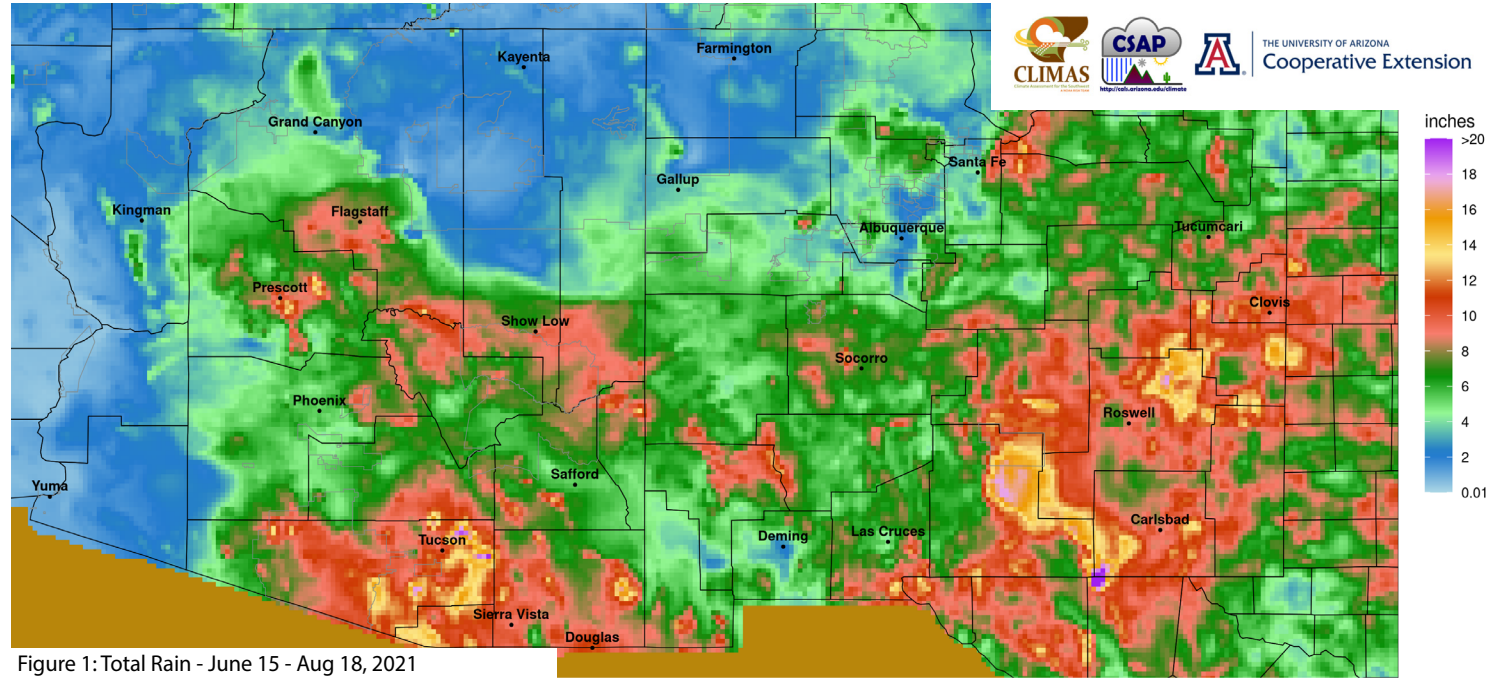


Figure 1: Total Rain - June 15 - Aug 18, 2021

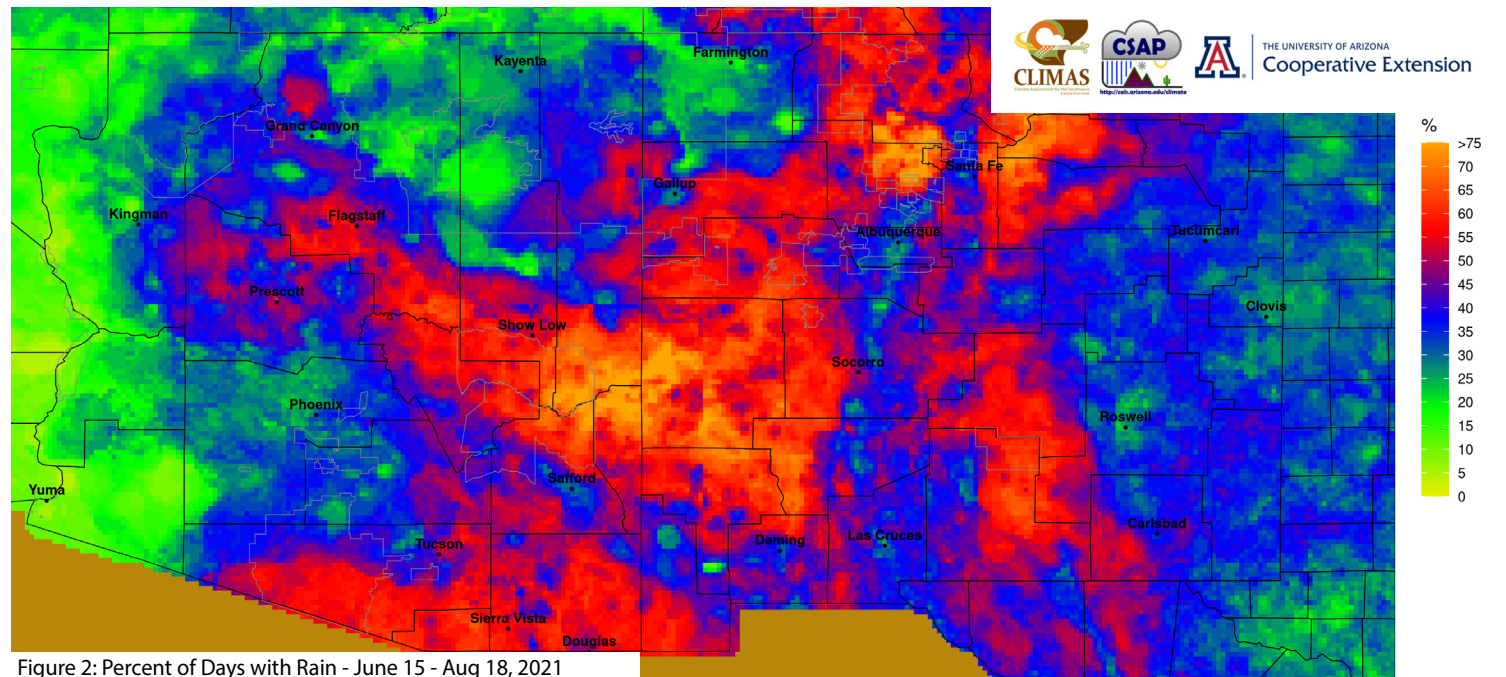


Figure 2: Percent of Days with Rain - June 15 - Aug 18, 2021

## Online Resources

**Figure 3**  
 CLIMAS: Climate Assessment for the Southwest  
[climas.arizona.edu](http://climas.arizona.edu)  
 Data: ACIS & MesoWest

# SW Monsoon Tracker: 2021 Temperature, Dewpoint & Precipitation

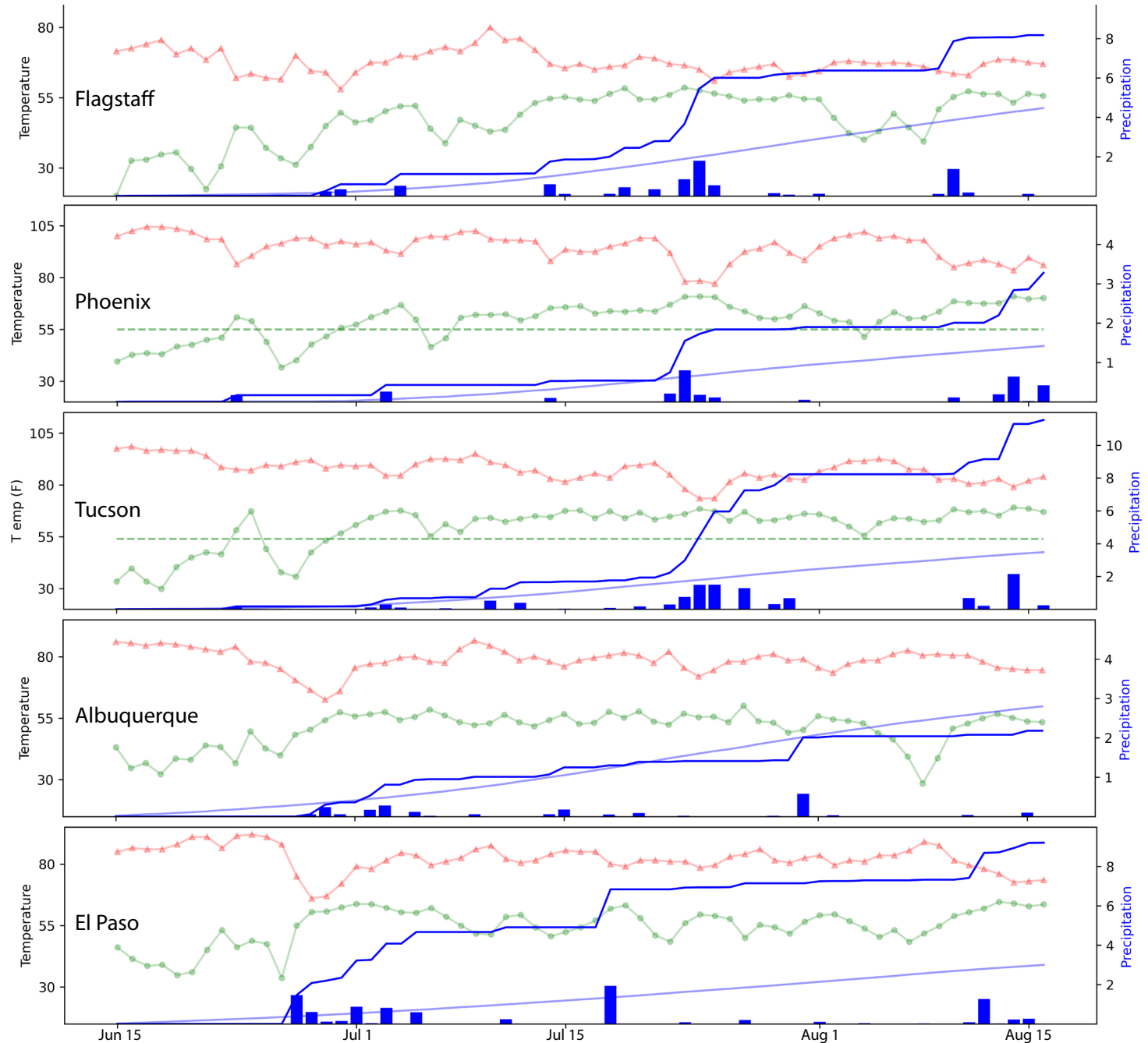


Figure 3: Daily Average Temperature and Dewpoint, Daily and Cumulative Precipitation - Jun 15 - Aug 16, 2021

## 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](http://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).

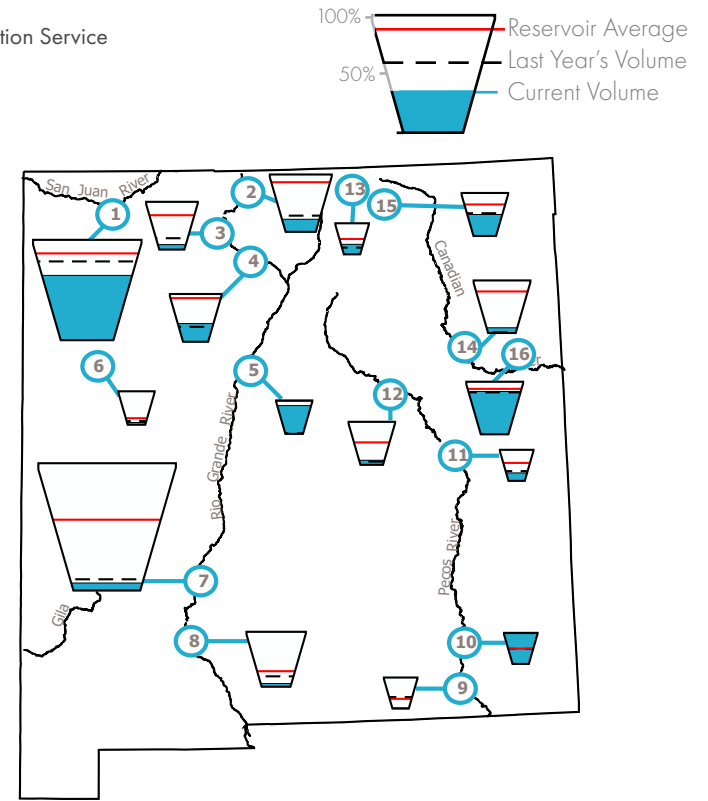
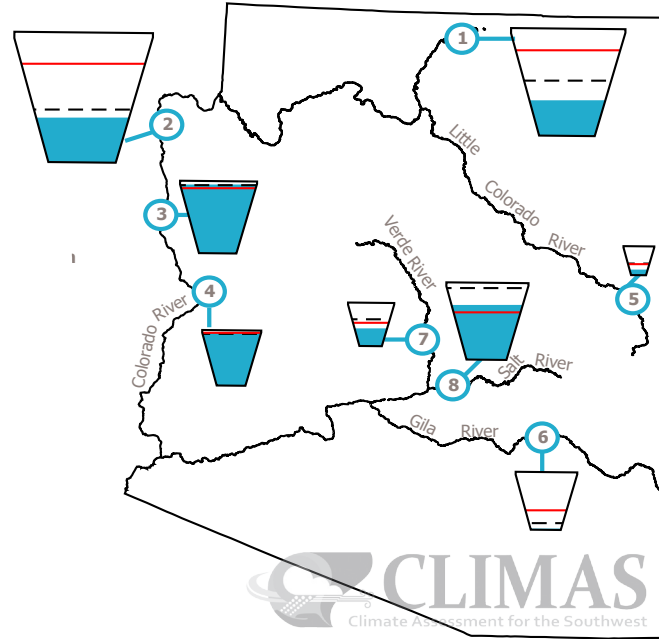
The table details more exactly the current capacity (listed as a percent of maximum storage). Current and maximum storage are given in thousands of acre-feet for each reservoir. One acre-foot is the volume of water sufficient to cover an acre of land to a depth of 1 foot (approximately 325,851 gallons). 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 AUG 1, 2021

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



\* in KAF = thousands of acre-feet

Reservoir	Capacity	Current Storage*	Max Storage*	One-Month Change in Storage*
1. Lake Powell	32%	7,866.3	24,322.0	-461.3
2. Lake Mead	34%	9,014.0	26,159.0	-88.0
3. Lake Mohave	94%	1,710.0	1,810.0	-4.0
4. Lake Havasu	95%	586.8	619.0	-5.9
5. Lyman	20%	6.0	30.0	1.2
6. San Carlos	1%	7.9	875.0	7.9
7. Verde River System	40%	113.6	287.4	29.0
8. Salt River System	71%	1,437.2	2,025.8	7.5

\*KAF: thousands of acre-feet

Reservoir	Capacity	Current Storage*	Max Storage*	One-Month Change in Storage*
1. Navajo	63%	1,069.8	1,696.0	-44.5
2. Heron	21%	82.9	400.0	-9.5
3. El Vado	10%	19.0	190.3	3.0
4. Abiquiu	37%	69.7	186.8	5.4
5. Cochiti	83%	41.7	50.0	0.0
6. Bluewater	6%	2.4	38.5	-0.1
7. Elephant Butte	6%	120.9	2,195.0	-18.1
8. Caballo	5%	17.6	332.0	-6.7
9. Lake Avalon	0%	0.0	4.5	0.0
10. Brantley	97%	41.1	42.2	18.1
11. Sumner	25%	8.9	35.9	3.0
12. Santa Rosa	10%	10.4	105.9	6.9
13. Costilla	31%	4.9	16.0	-1.3
14. Conchas	8%	21.1	254.2	8.5
15. Eagle Nest	49%	38.8	79.0	0.2
16. Ute Reservoir	79%	158	200	12.0

## Southwest Climate Podcast

[climas.arizona.edu/media/podcasts](https://climas.arizona.edu/media/podcasts)

### iTunes

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

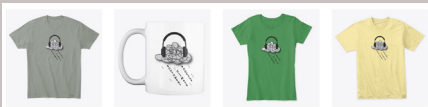
### Android

<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](https://teespring.com/stores/the-southwest-climate-podcast).

Prices are the wholesale cost, so we don't make any money, but 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

### August 2021 Southwest Climate Podcast 2021 - A Generational Monsoon?

In the August 2021 edition of the CLIMAS Southwest Climate Podcast, Mike Crimmins and Zack Guido sit down to discuss the "monsoon that comes to you" (i.e. it's just about everywhere, and it just keeps coming!). They discuss the (record) July for some areas, as well as the well above average conditions around much of the region. They also deconstruct the elements that are feeding into this persistent monsoon rainfall and take a deep dive into a few of the events that have contributed to impressive totals. They wrap up with a discussion of outlooks for the rest of the season, whether any stations might hit record monsoon totals (Tucson is definitely in the running), and what this has meant for the monsoon fantasy game (suffice to say, the guesses for July did not anticipate the record wet conditions).

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



### 1075' - Shortage on the Colorado River Ep. 1 - Management of the Colorado River

Originally released in 2014, this CLIMAS podcast series that explores what the first ever shortage declaration on the Colorado River would mean to those living in the Southwest. The first episode takes a broad view of the Colorado River Basin, exploring how the river is managed, who uses the water, and what a potential shortage could mean for the system. The guest is Doug Kenney, Director of the Western Water Policy Program at the University of Colorado School of Law.

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

## Southwest Monsoon Fantasy Forecast Game

Every year the most anticipated weather words (in the Southwest) are spoken:

### "What will the monsoon be like?"

Here's your chance to use your experience and be a forecaster. Researchers at the Arizona Institutes for Resilience created a game where players make monsoon forecasts, score points based on them, and compete with others. July and August guesses are locked, but there is still time to play in September!

**For details on how to play, information on scoring and prizes, and to sign up, visit the game page:**

**<https://monsoonfantasy.arizona.edu/home>**

## Online Resources

### Figure 1 Climate Program Office

[cpo.noaa.gov](http://cpo.noaa.gov)

### RISA Program Homepage

[cpo.noaa.gov/Meet-the-Divisions/Climate-and-Societal-Interactions/RISA](http://cpo.noaa.gov/Meet-the-Divisions/Climate-and-Societal-Interactions/RISA)

### New Mexico Climate Center

[weather.nmsu.edu](http://weather.nmsu.edu)

## CLIMAS Research & Activities

### CLIMAS Research

[climas.arizona.edu/research](http://climas.arizona.edu/research)

### CLIMAS Outreach

[climas.arizona.edu/outreach](http://climas.arizona.edu/outreach)

### Climate Services

[climas.arizona.edu/climate-services](http://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.

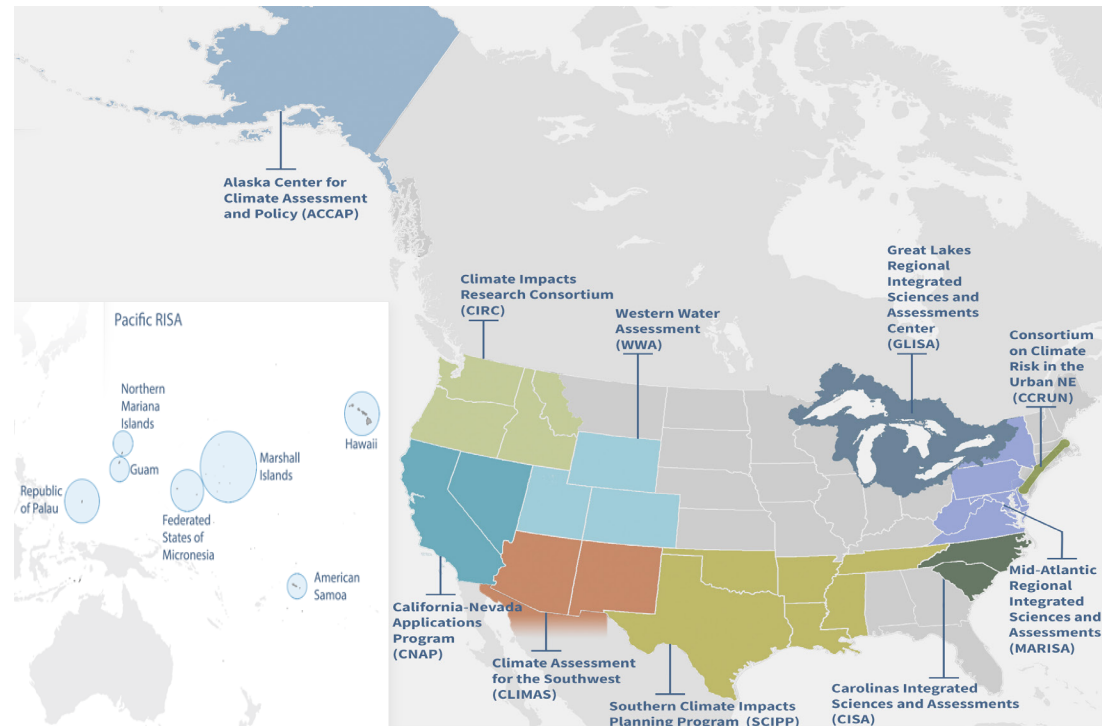


Figure 1: NOAA Regional Integrated Sciences and Assessments Regions



## 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**

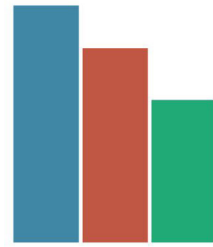
climas.arizona.edu/research

**CLIMAS Outreach**

climas.arizona.edu/outreach

**Climate Services**

climas.arizona.edu/climate-services



# ASAP Private Sector Climate Service Providers Academy

AMERICAN SOCIETY OF  
ADAPTATION PROFESSIONALS



GLISA  
A NOAA RISA TEAM



## American Society of Adaptation Professionals 2021 Private Sector Climate Service Providers Academy

Oct 14-28, on Zoom

Despite growing demand, we know it can be challenging to build a business in the climate change space. What if you could get the best climate data and information, put into practice innovative climate resilience principles, and attract more customers? We are looking for companies to join the Private Sector Climate Service Providers Academy in October to do just that!

Hosted by American Society of Adaptation Professionals (ASAP), this virtual course will give you the tools you need to develop higher quality climate services and help your business succeed in the rapidly evolving climate services marketplace.

### You will come away with:

- New skills for accessing the very best climate data and information for the Great Lakes, Carolinas, and Southwest regions.
- Sophisticated knowledge and relevant examples of the strategies and approaches that constitute high quality climate change adaptation and resilience practice across North America.
- Connections to complementary businesses and potential partners and collaborators.

This virtual course will give you the tools you need to develop higher quality climate services and help your business succeed in the rapidly evolving climate services marketplace.

<https://adaptationprofessionals.org/private-sector-workshop-registration/>

The ASAP Climate Services Provider Academy is in partnership with Adaptation International, CLIMAS, Carolinas Integrated Sciences & Assessments, and GLISA.