September 2021 Weather Digest

Ray Chiarello

September 2021 Weather Summary

This September turned out to be near normal in several aspects. Temperatures were slightly above normal for most of the area, as the area seen a strong dry period through much of the middle part of the month. Rain fell mostly on the first five days of the month and the last five days of the month. Overall the month was near to slightly above normal across most of the area. The Monsoon season which typically ends the last week of September, ended on around the 25th this year (See the Monsoon section below). The rain at the beginning of the month was produced from a surge of tropical moisture, including remnants of Nora, streaming up from the south. The rainfall at the end of the month was caused by an early season intrusion of the polar jet, which brought a couple of upper low down to the Baja and Arizona, allowing moist southerly flow to spread rain across much of the area.

September 2021 Weather Summary, cont'd

Looking ahead to October, we have our first full month of autumn. Temperatures and daylight both accelerate their losses through the month. At El Paso, the month starts off with an average high temperature of 84 degrees and ends the month at 74 degrees. Daylight is 11 hours, 50 minutes on the first, and 10 hours, 55 minutes on the Halloween, the last day of the month. The Monsoon season is just a memory, and now we begin to see some fall storms that move in from the Pacific Ocean. October can still have some storminess, as we see a secondary uptick in strong storms that can produce large hail and damaging winds including small tornadoes (the primary time for these storms is April). However these storms are still infrequent and spotty. We can also begin to see a few windy, dusty events, although we are far from the peak of late winter and spring. Up in the sky, our full moon for October falls on the 20th, while the new moon occurs on the 6th. There are no lunar or solar eclipses in October.

Sep 1 El Paso Thunderstorm

Sep 1 Las Cruces Thunderstorm

Sep 1 Santa Teresa Thunderstorm

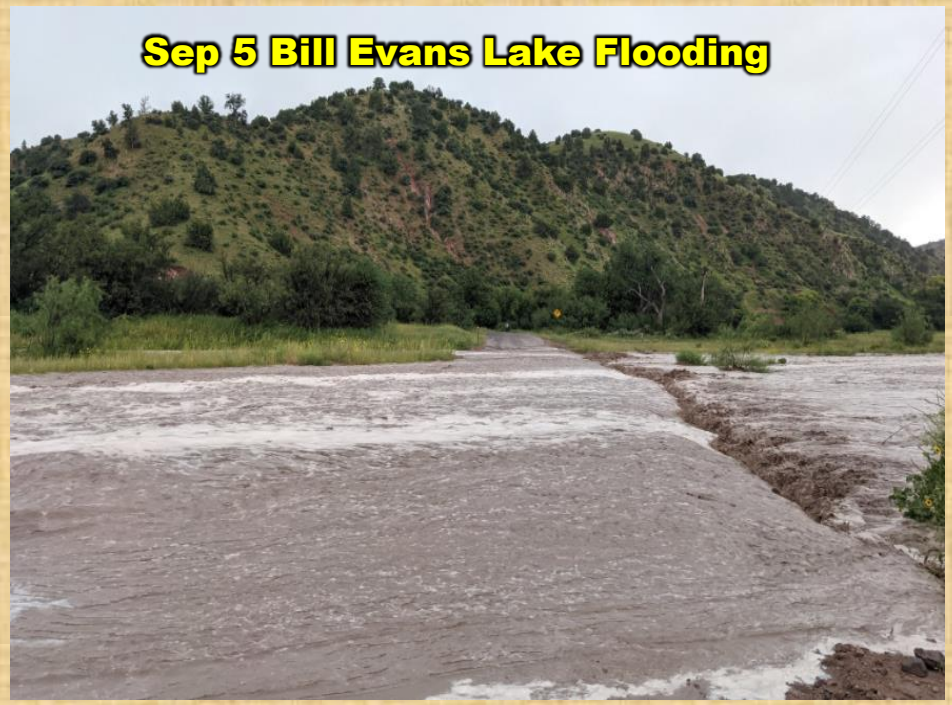
Sep 1 Santa Teresa Rainbow


Sep 3 Orogrande Thunderstorm


Sep 3 Same Storm 3 hours later


Sep 3 El Paso Thunderstorm
837652
40


Sep 4 Las Cruces


Sep 5 Bill Evans Lake Flooding


Sep 11 Organ Mountains in Smoke


Sep 14 Smoky Sunset

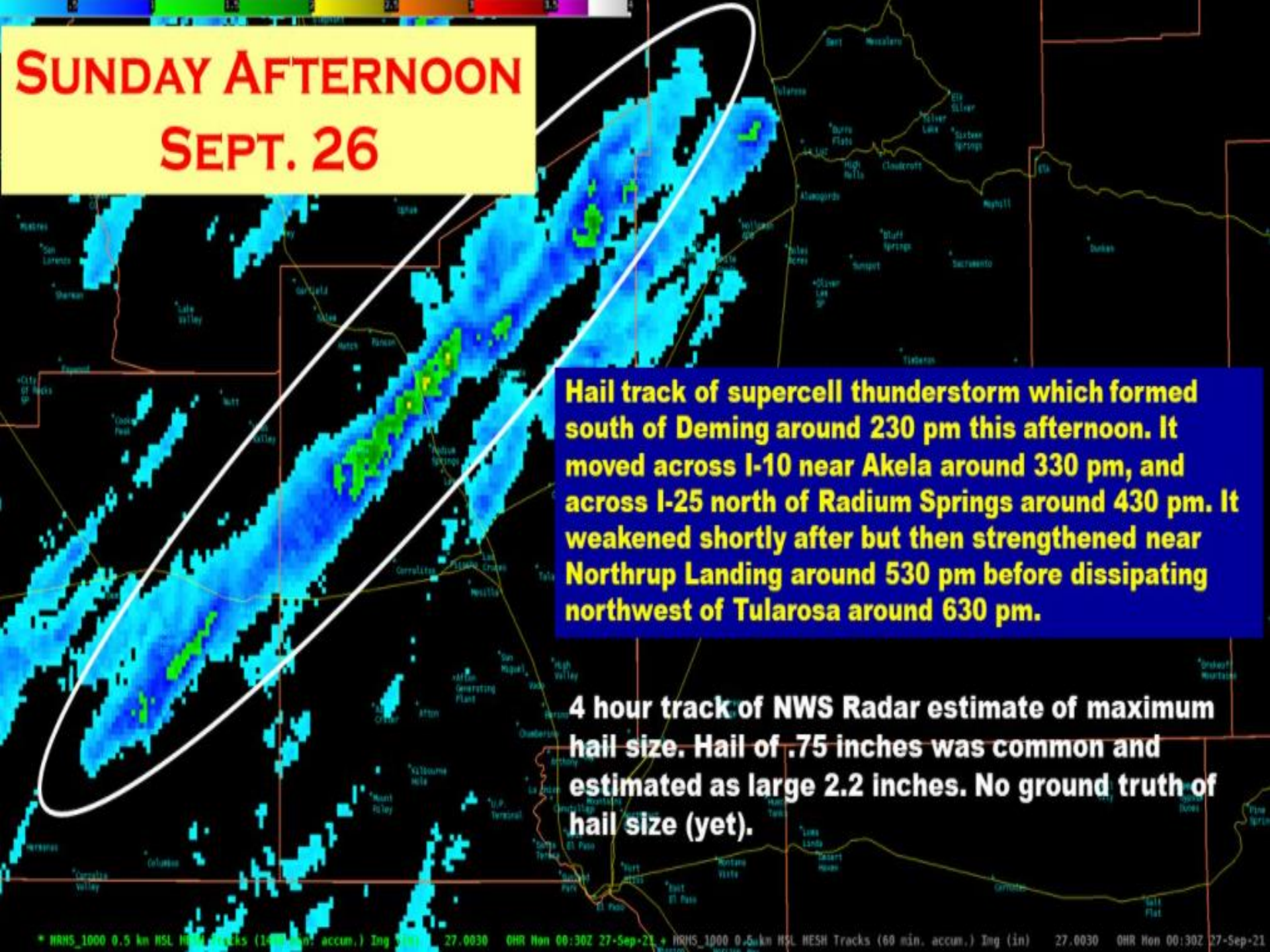

Sep 15 Far East El Paso


Sep 26 Lightning near Santa Teresa


Sep 26 Thunderstorm southern
Dona Ana County


Sep 26 Thunderstorm near Las Cruces


Sep 23 Jornada Sunrise


SUNDAY AFTERNOON
SEPT. 26
Hail track of supercell thunderstorm which formed south of Deming around 230 pm this afternoon. It moved across I-10 near Akela around 330 pm, and across I-25 north of Radium Springs around 430 pm. It weakened shortly after but then strengthened near Northrup Landing around 530 pm before dissipating northwest of Tularosa around 630 pm.
4 hour track of NWS Radar estimate of maximum hail size. Hail of .75 inches was common and estimated as large 2.2 inches. No ground truth of hail size (yet).

ENSO Alert System Status: La Niña Watch in Affect

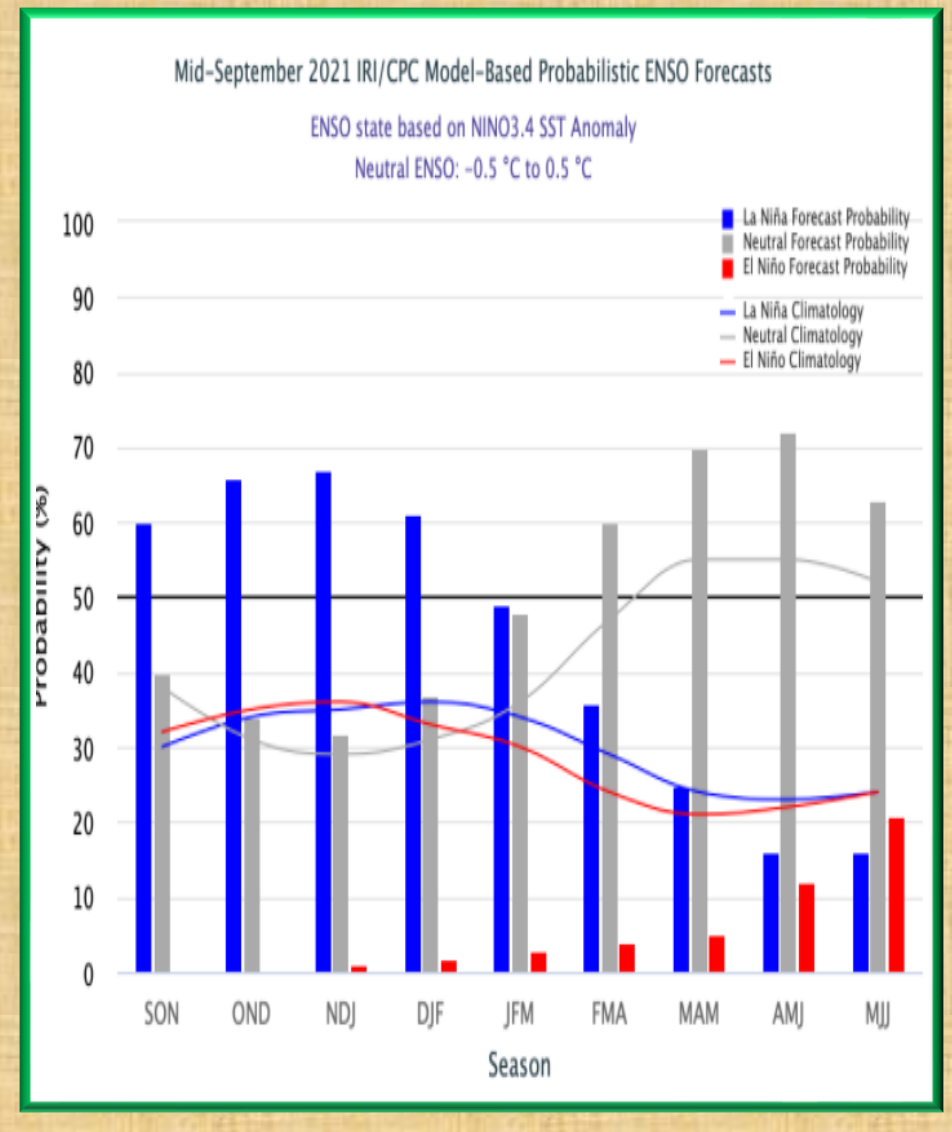
ENSO Alert System

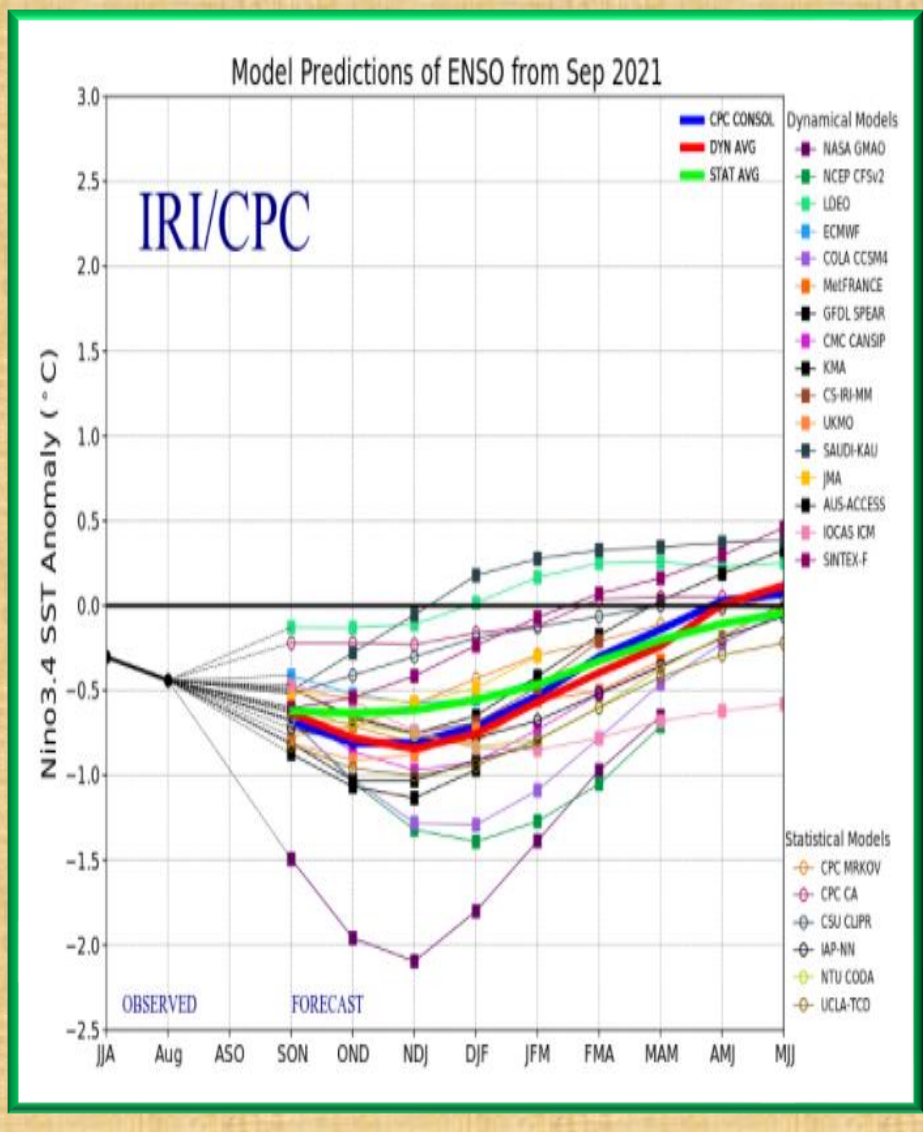
- El Niño or La Niña Watch: Issued when conditions are favorable for the development of El Niño or La Niña conditions in the next six months.

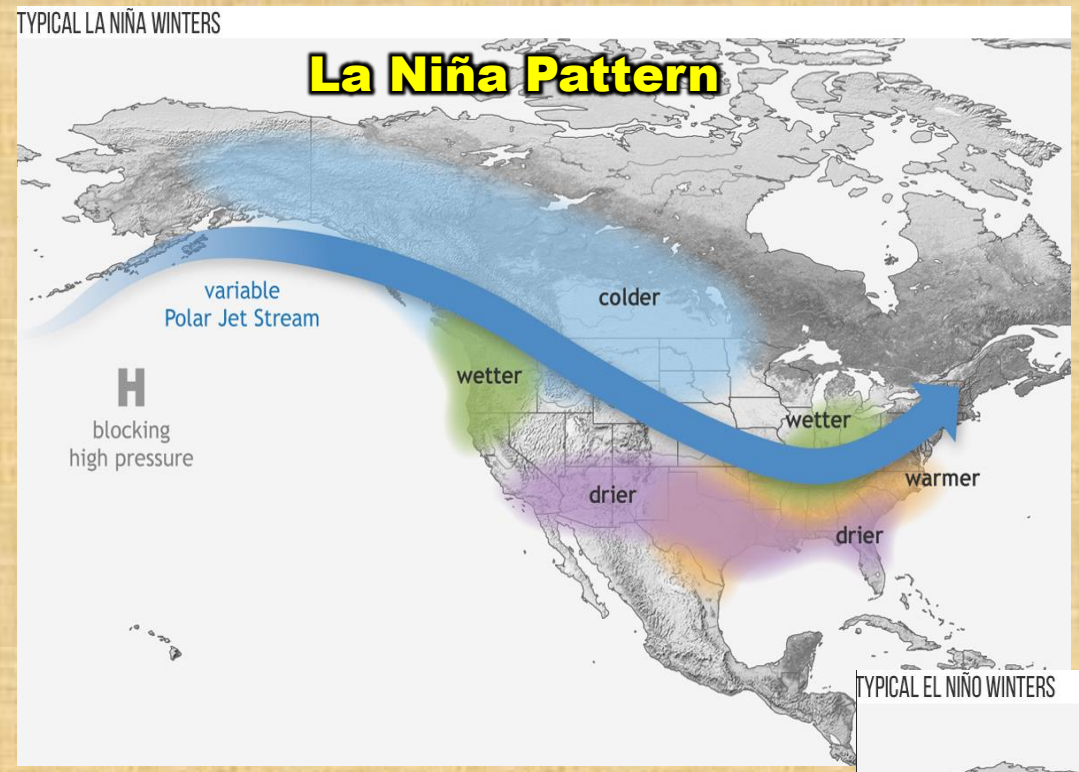
- El Niño or La Niña Advisory: Issued when El Niño or La Niña conditions are observed and expected to continue.

ENSO Forecast

ENSO is in a neutral status; good chance of returning to La Niña for much of the winter ahead.

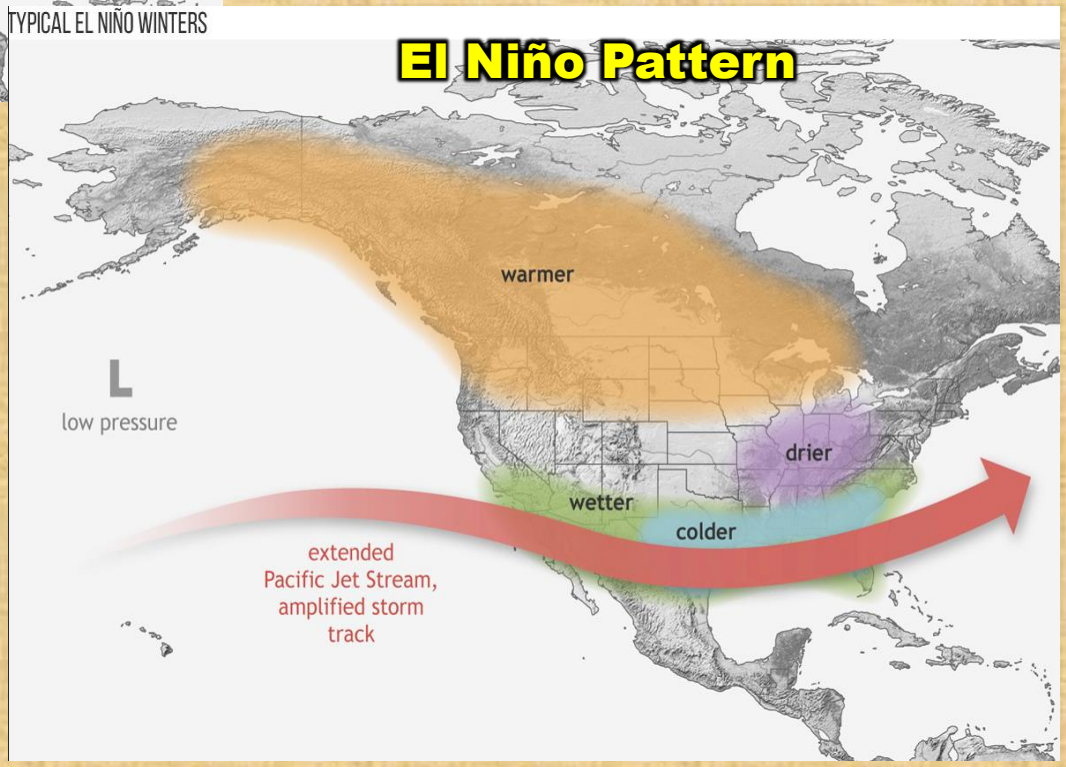


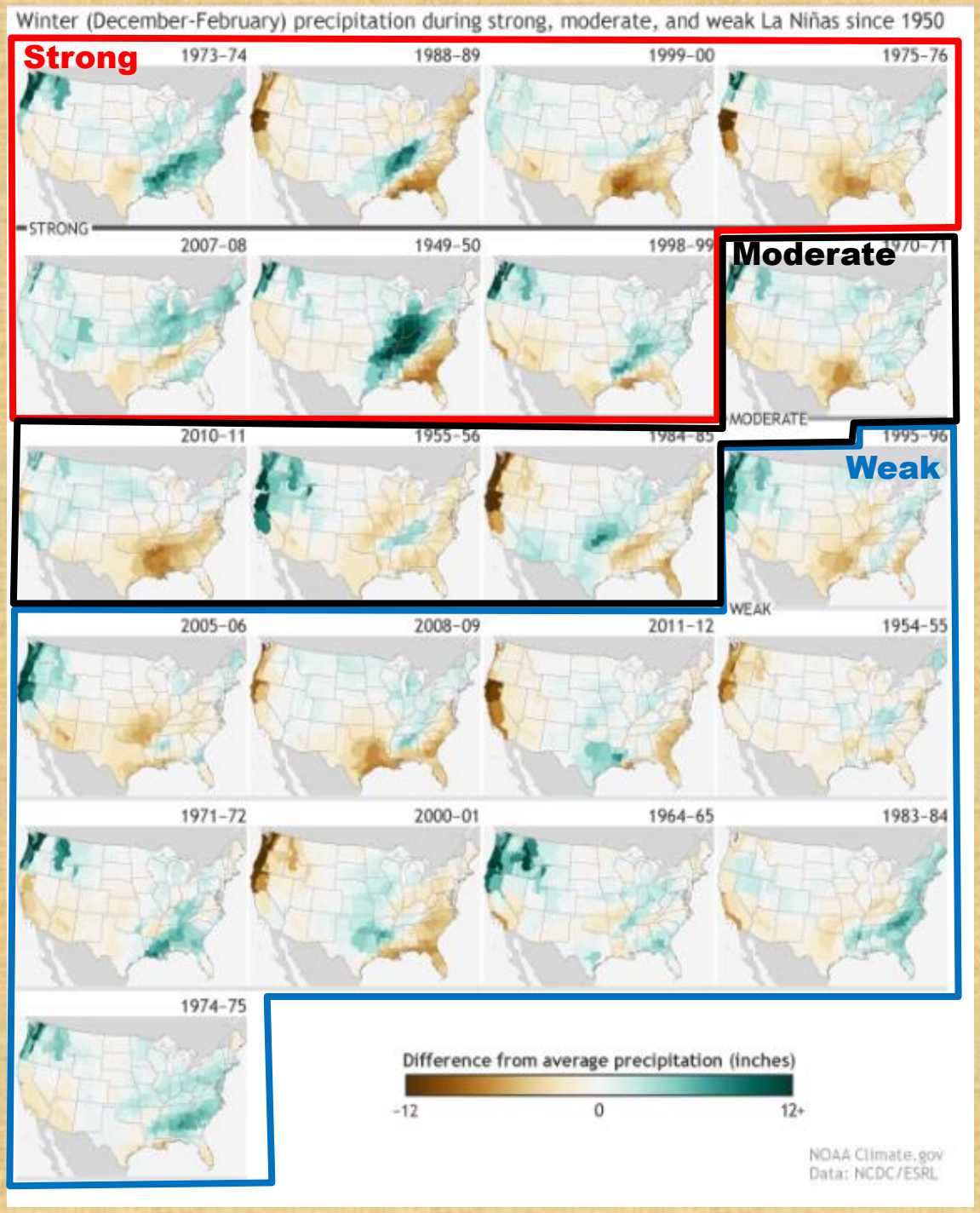




With a La Niña pattern, a ridge of high pressure tends to build off the west coast of the U.S., blocking most of our Pacific winter storm systems. These storms tend to end up moving across the northern Plains and down to the southeastern part of the country. Of course it is important to remember that these patterns are only what typically happens and are not guaranteed to occur.

With El Niño, we often see the opposite pattern where the eastern Pacific ridge of high pressure is often weak or non-existent, allowing winter storms to sweep across the southern U.S. This typically will give the south-western U.S. above normal precipitation.



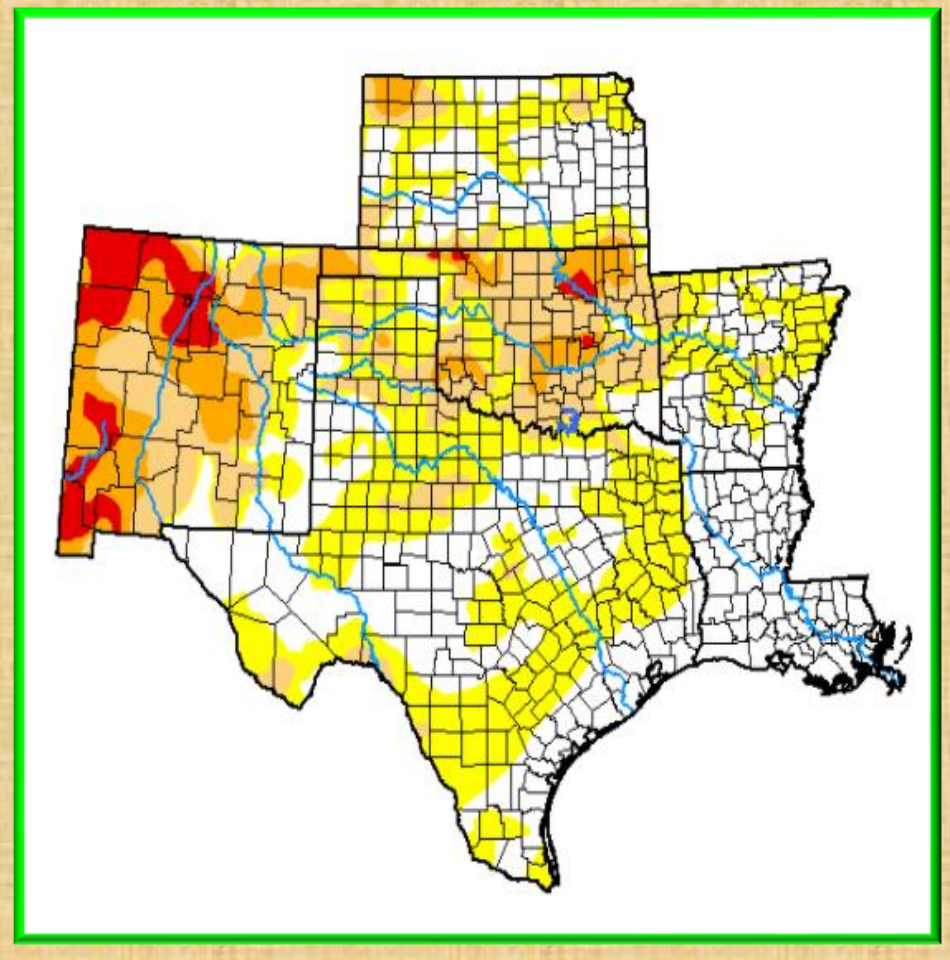


Examples of the numerous La Niña winters since 1950. These maps depict the departure from normal precipitation amounts for a winter.

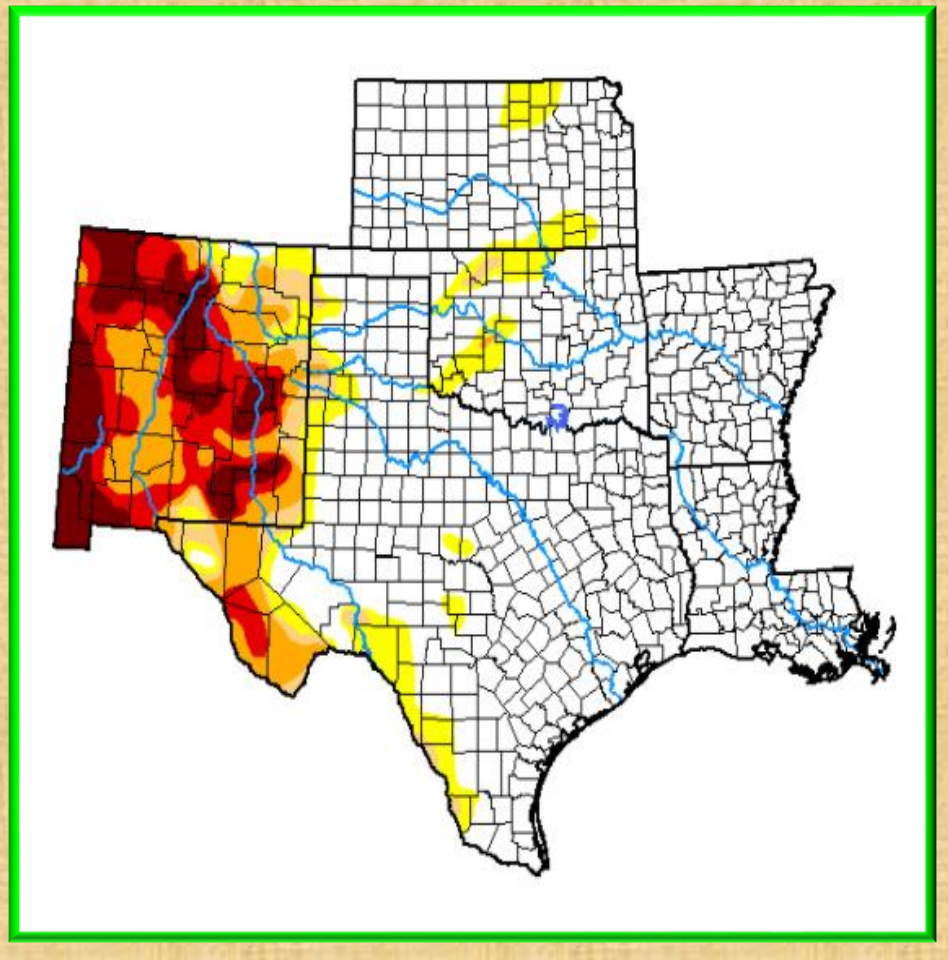
Current drought conditions and 3 month change

- Abnormally Dry – D0
- Moderate Drought – D1
- Severe Drought – D2
- Extreme Drought – D3
- Exceptional – D4

September , 2021



June 29, 2021

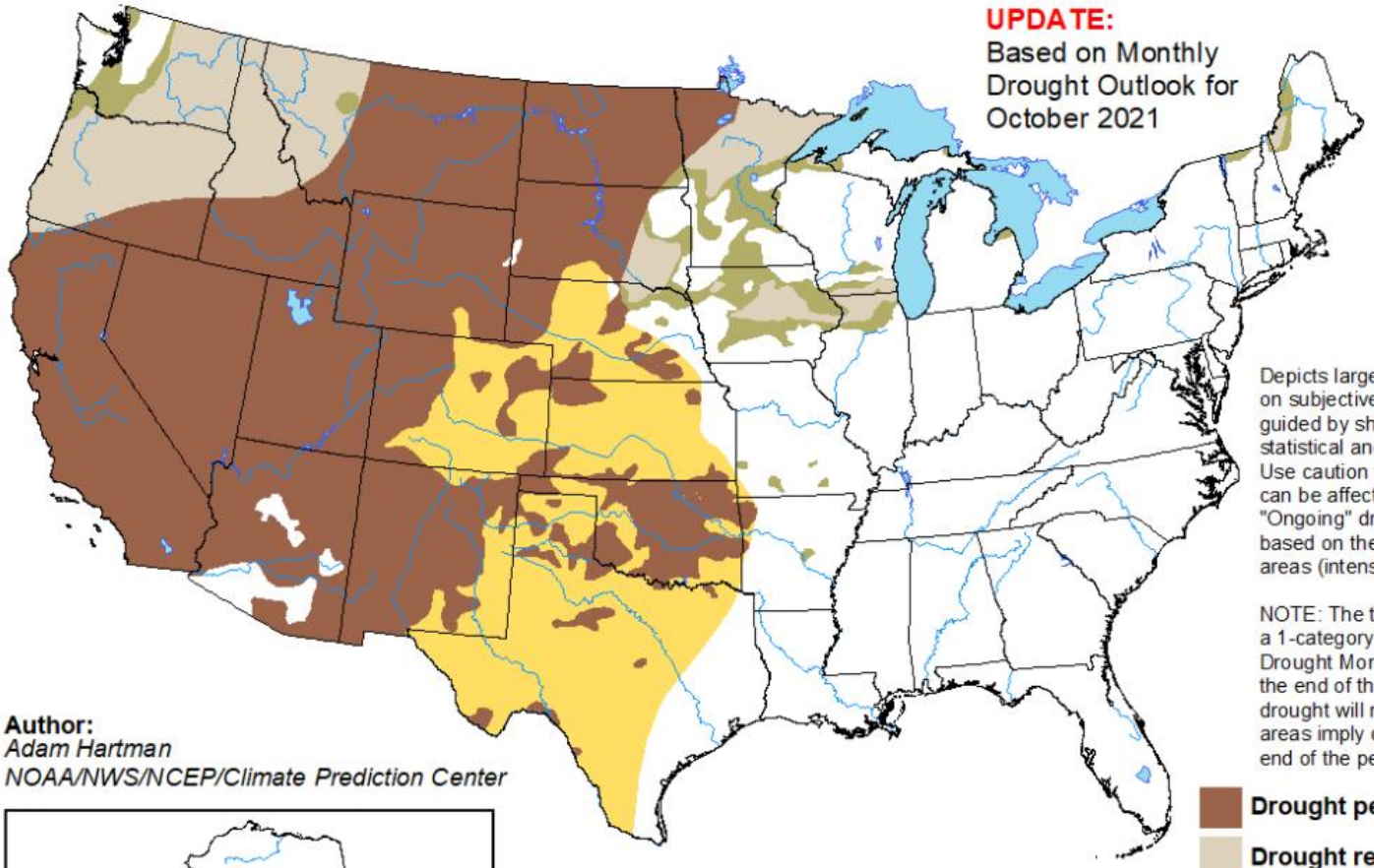


U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid for October 1 - December 31, 2021
Released September 30, 2021

UPDATE:
Based on Monthly Drought Outlook for October 2021

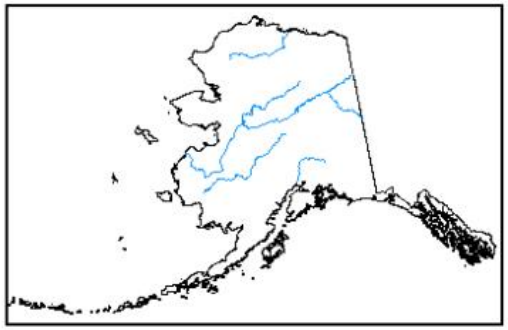


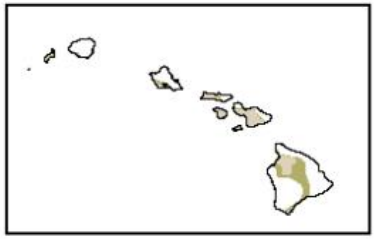
Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

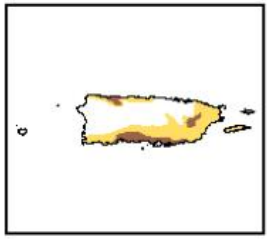
NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

- **Drought persists**
- **Drought remains but improves**
- **Drought removal likely**
- **Drought development likely**

Author:
Adam Hartman
NOAA/NWS/NCEP/Climate Prediction Center



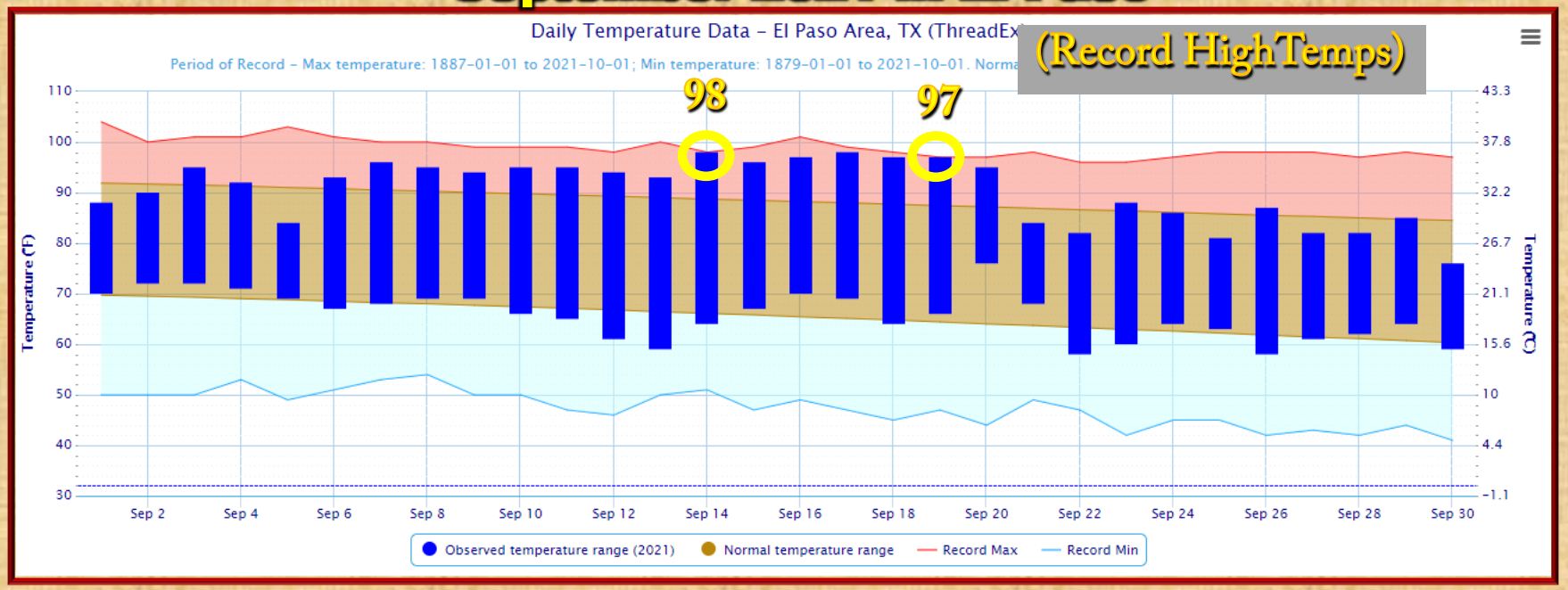


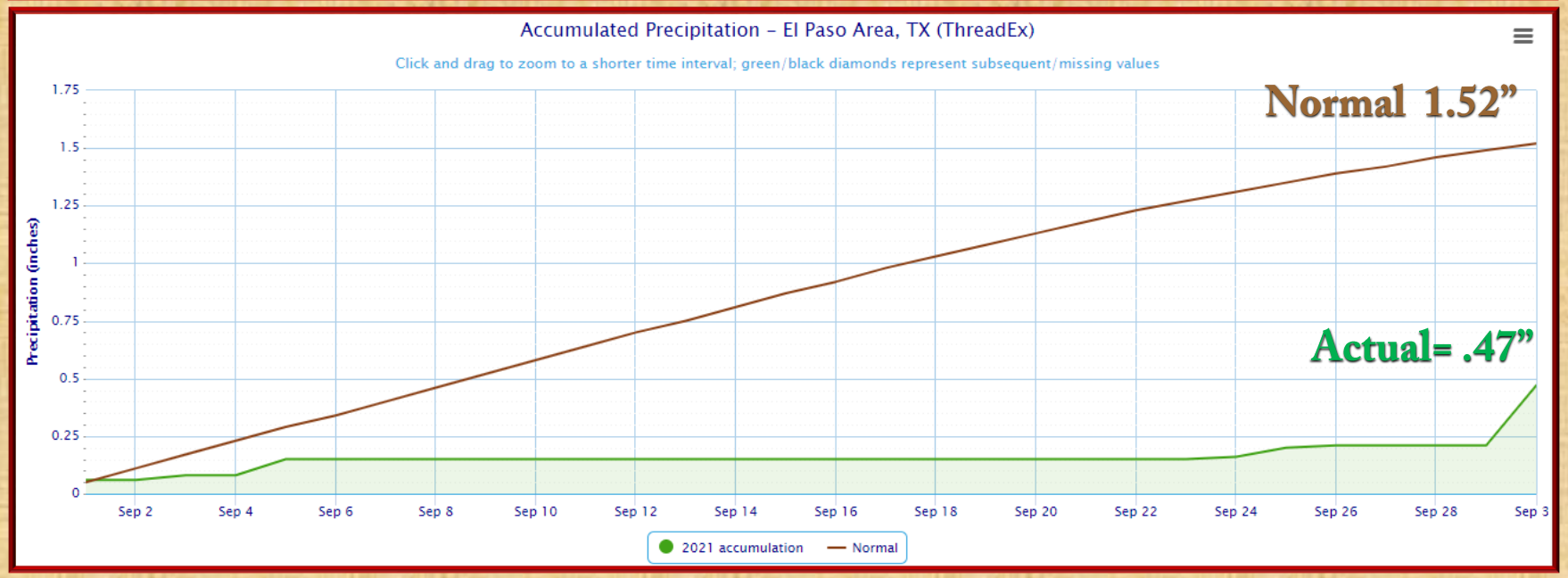


http://go.usa.gov/3eZ73

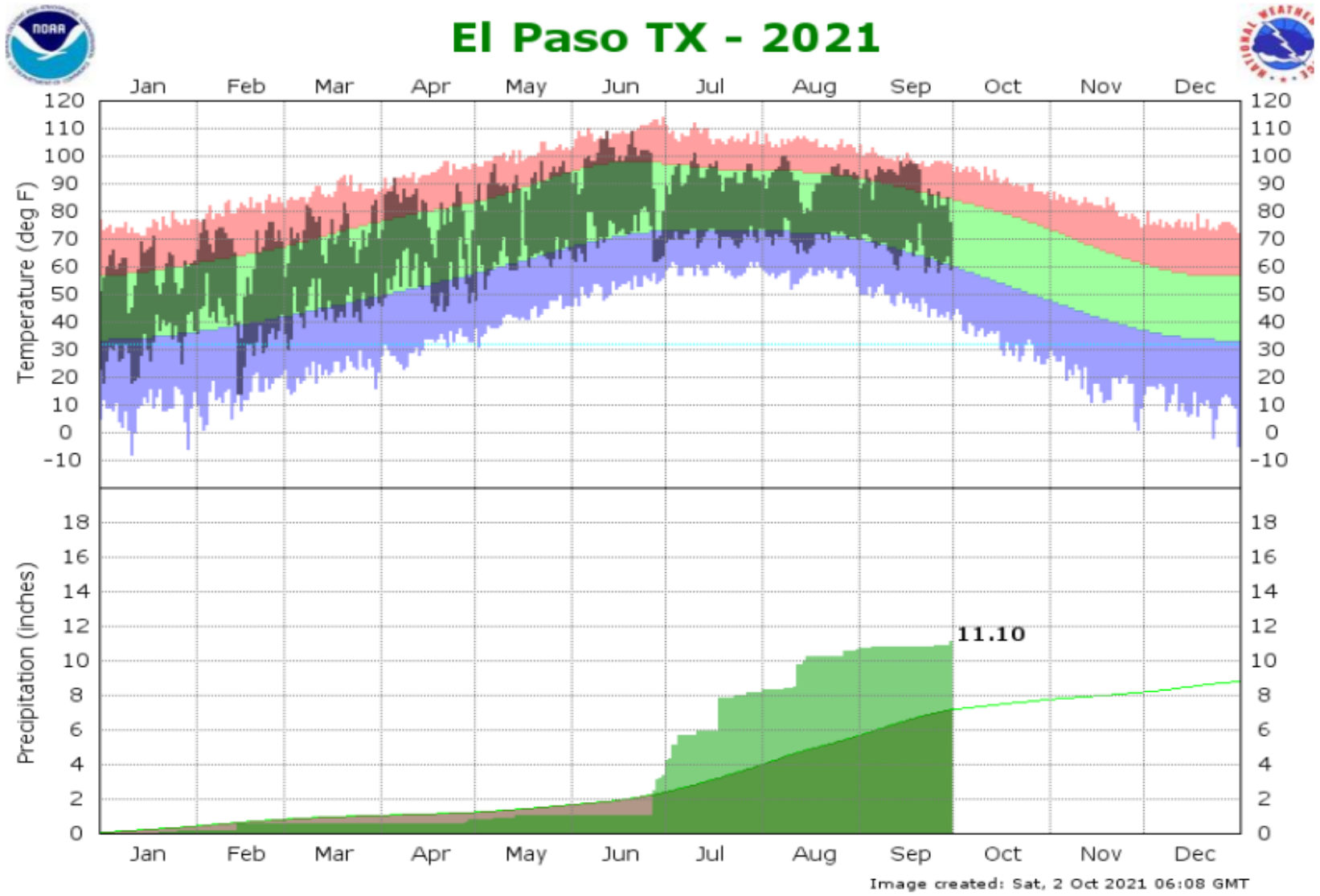
Temperature and precipitation data for September 2021 in El Paso

= record





2021: Temperature and Precipitation
YTD Data for El Paso



Temperature and Precipitation Plot for El Paso, Texas for 2021

Tracking the 2021 Monsoon Season across the El Paso Forecast Area

The long term average for the beginning of the Monsoon season normal begins around July 5, but it looks like this year the seasonal wind change pattern will begin the very last day or two of June. We use several parameters to judge the onset of the Monsoon from various studies. One important feature is the dewpoint. Persistent (>5 days) dewpoint temperatures above 50 degrees has occurred, beginning around June 29 or 30 [see fig. 1]. Another parameter to look at is sea surface temperatures in the northern Gulf of California [see fig. 2]. Studies have shown that temperatures of 26C in this area lead to an onset of the Monsoon within about 5-10 days. The temperature reached this mark around June 27 this year. The rain at the end of June was mostly pre-Monsoon as an upper low in the polar jet dropped over us. However, by the last day or two of June this low moved off and then the Bermuda high pressure cell extended westward to the Desert Southwest [see fig. 1], thus beginning the upper pattern of the Monsoon. Finally, the Outgoing Longwave Radiation and Satellite Precipitation maps [see fig. 5] from late June showed that widespread convection/rainfall had spread from the Sierra Madre Occidentals and northern Mexico up over New Mexico and west Texas.

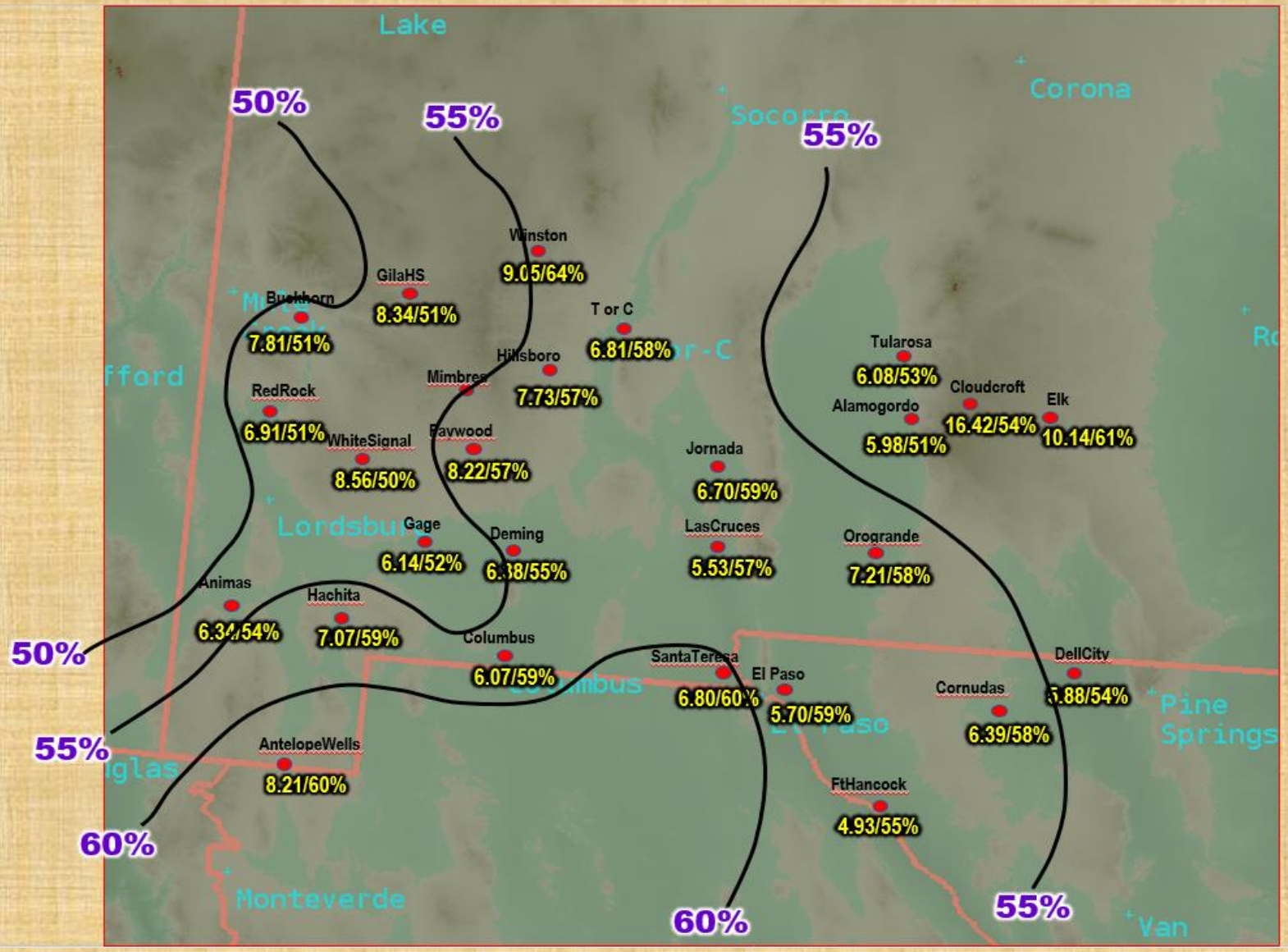
The monsoon rainfall kicked into high gear for much of July, especially east of the Continental Divide. Most of southern New Mexico and west Texas from the Rio Grande Valley east received about 150-400 percent of normal, while areas to the west were around 75-150 percent of normal. From more research, it has been found that from the date that which the northern Gulf of California sea surface temperature reaches 29C to the end of the Monsoon season (Sep 30) we will receive around 50-70% of our seasonal rainfall total. In other words from June 15 to the day of 29C in the Gulf of California (July 16 this year), we will receive around one-third to one-half of our total, with the other half to two-thirds falling after that date. [See Figs 3-4]

Tracking the 2021 Monsoon Season (cont'd)

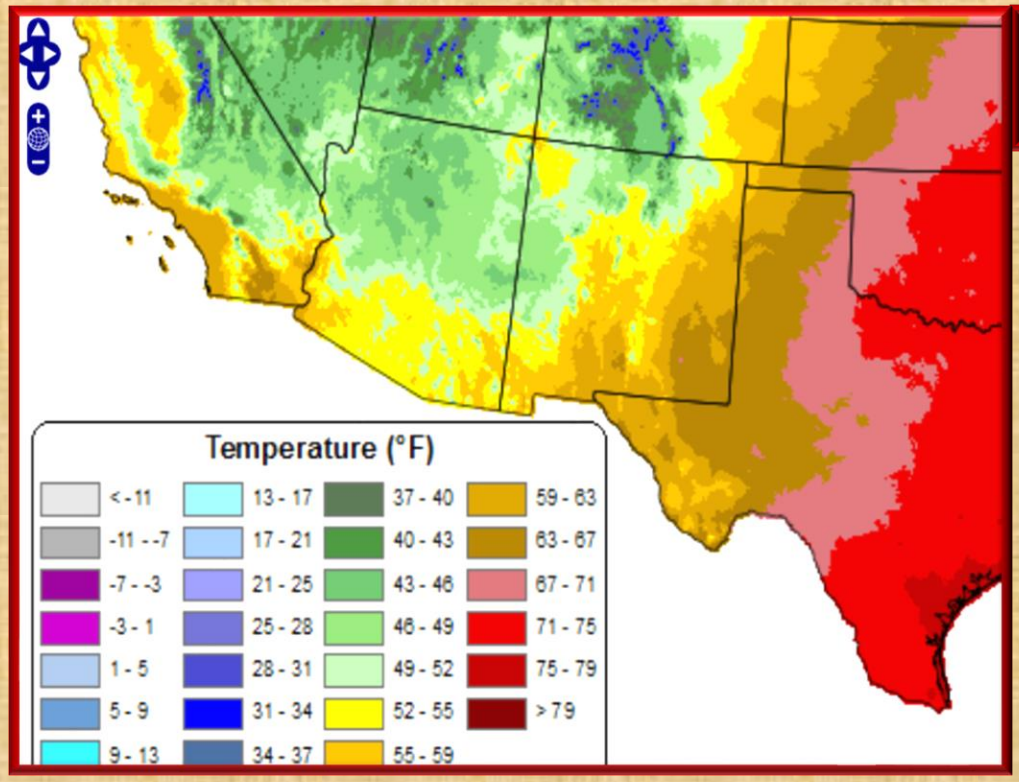
Tracking the Monsoon season through August, we saw that the unseasonably wet season continued, and finally the far west got in on the action. The majority of the area received from 125 to 300 percent of normal, and this included much of the area west of the Continental Divide. This Monsoon season should go along way toward easing the drought of the past couple of years.

Reviewing September, we reach the end of the Monsoon season (nearly every year). The normal ending to the season averages around September 23, though our official season runs to the end of the month. Looking at Fig. 6, we can see as of the end of August, dewpoint temperatures and the upper flow pattern were both still in mid Monsoon form. However by the last week of September, a strong polar jet with a couple of upper lows displaced and reduced the sub-tropical high pressure ridge. Additionally, dewpoint temperatures had consistently fallen into the 40s. Both of these parameters are good indicators of when the Monsoon season is ending. Once dewpoint temperatures decrease back under 50 degrees for a stretch of time the season is near the end. This normally occurs around the last week of September, and indeed this Monsoon season the lowering of the dewpoints occurred by around Sep 25-27. Thus Sep 25 is a good estimate of the end of the 2021 Monsoon season [See Fig. 7].

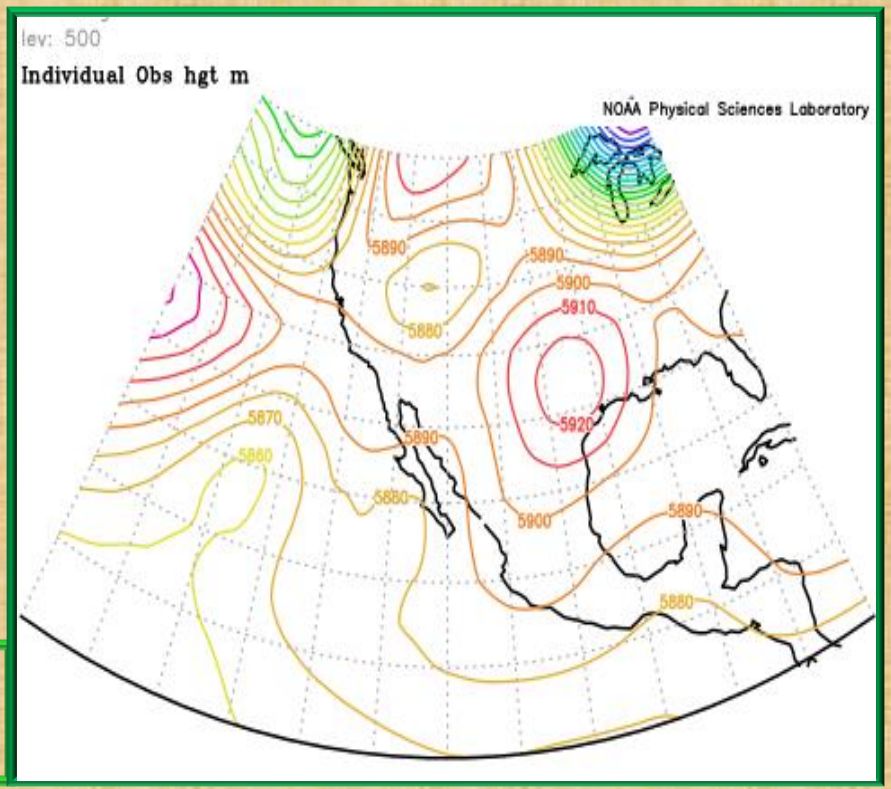
Tracking Percent of Annual Precipitation Falling During the Monsoon Season (Jun15-Sep 30)



Tracking the 2021 Monsoon Season across the El Paso Forecast Area. Fig 1

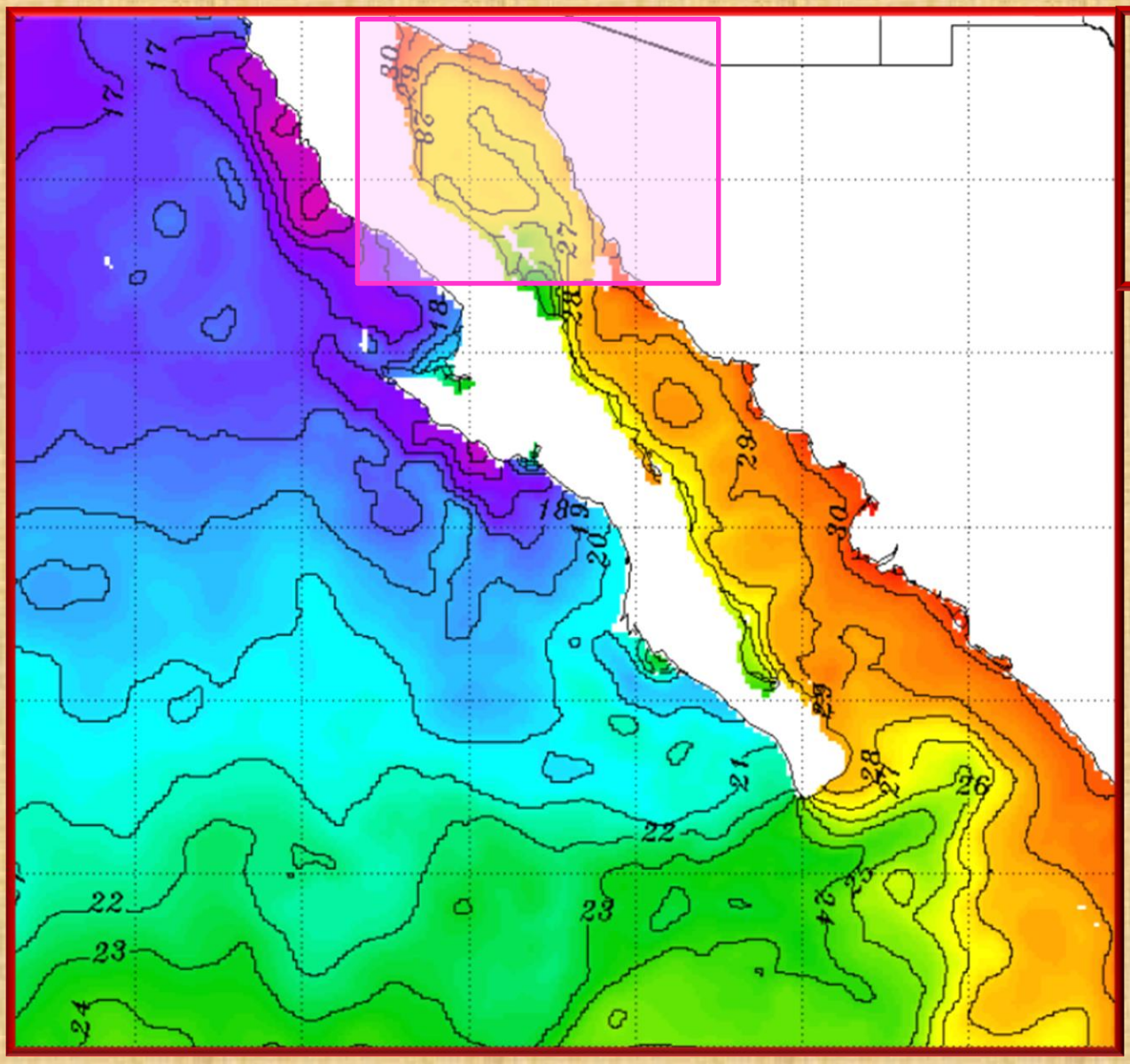


June 30 – Dewpoints reach into the 50s across the area



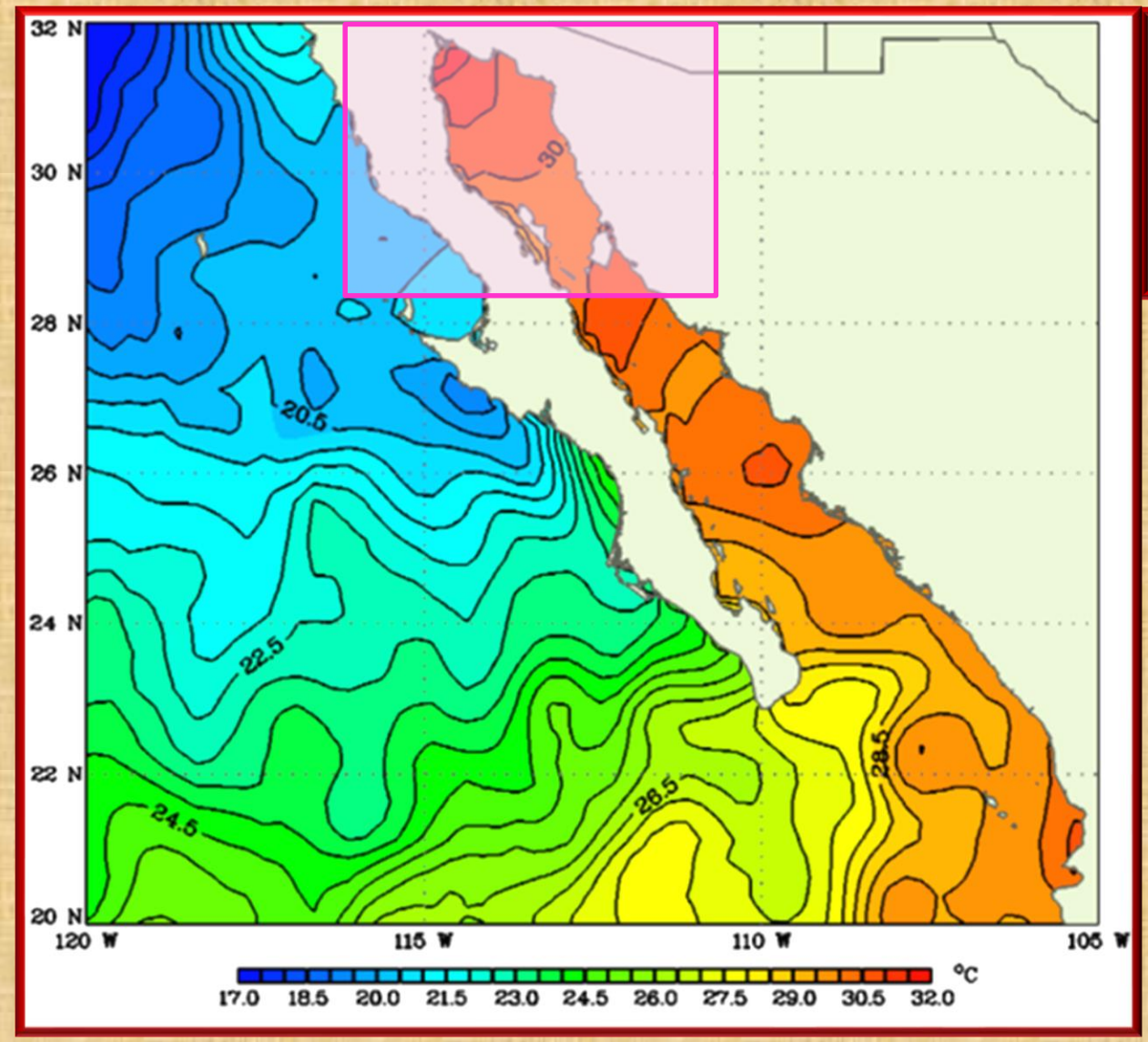
By July 2, 500mb sub-tropical high reaches the Desert Southwest

Tracking the 2021 Monsoon Season across the El Paso Forecast Area. Fig. 2



June 27 – Sea surface temperatures in the northern Gulf of California reach 26C deg (79F)

Tracking the 2021 Monsoon Season across the El Paso Forecast Area. Fig. 3



July 16 – Sea surface temperatures in the northern Gulf of California reach 29C deg (84F)

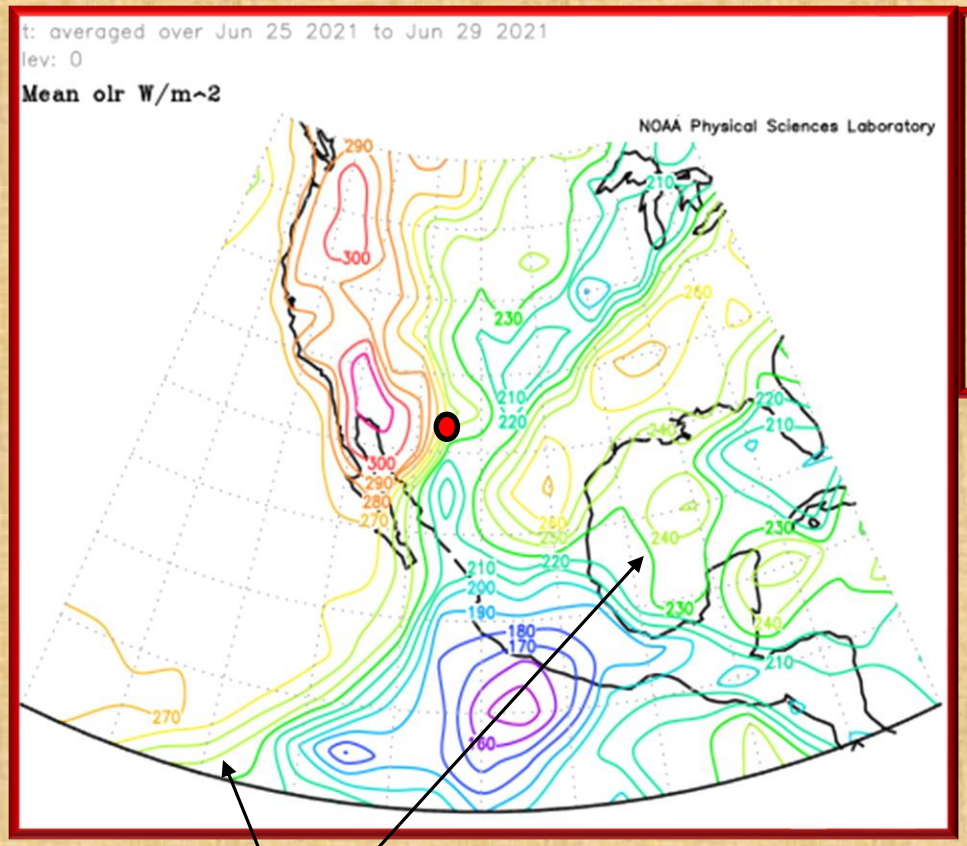
Fig. 4

Percent of Monsoon rainfall after 29C							
Year	29C Date	ELP	DMN	CLD	ANM	TCS	HIL
2021	Jul 16	51	75	MSG	MSG	60	63
2020	Jul 22	88	65	67	MSG	98	89
2019	Aug 8	83	91	62	67	71	49
2018	Jul 21	59	46	74	38	80	62
2017	Jul 23	58	67	66	48	88	61
2016	Aug 3	93	92	71	57	79	85
2015	Jul 27	63	43	56	60	53	61
2014	Jul 23	92	82	77	MSG	91	89
2013	Aug 8	61	68	61	23	88	75
2012	Jul 24	53	64	73	65	42	52
2011	Jul 29	37	90	36	67	86	62
2010	Jul 29	47	31	43	71	33	47
2009	Jul 24	54	61	47	63	56	65
2008	Jul 27	48	39	54	44	46	58
2007	Jul 26	65	62	60	66	91	72
2006	Jul 29	84	81	73	76	86	85
2005	Jul 30	95	79	72	92	83	87
Ave	**Jul 27**	**67**	**67**	**62**	**60**	**72**	**68**

ELP=El Paso Intl Airport
DMN=Deming Airport
CLD=Cloudcroft COOP
TCS=T or C Airport
HIL-Hillsboro COOP

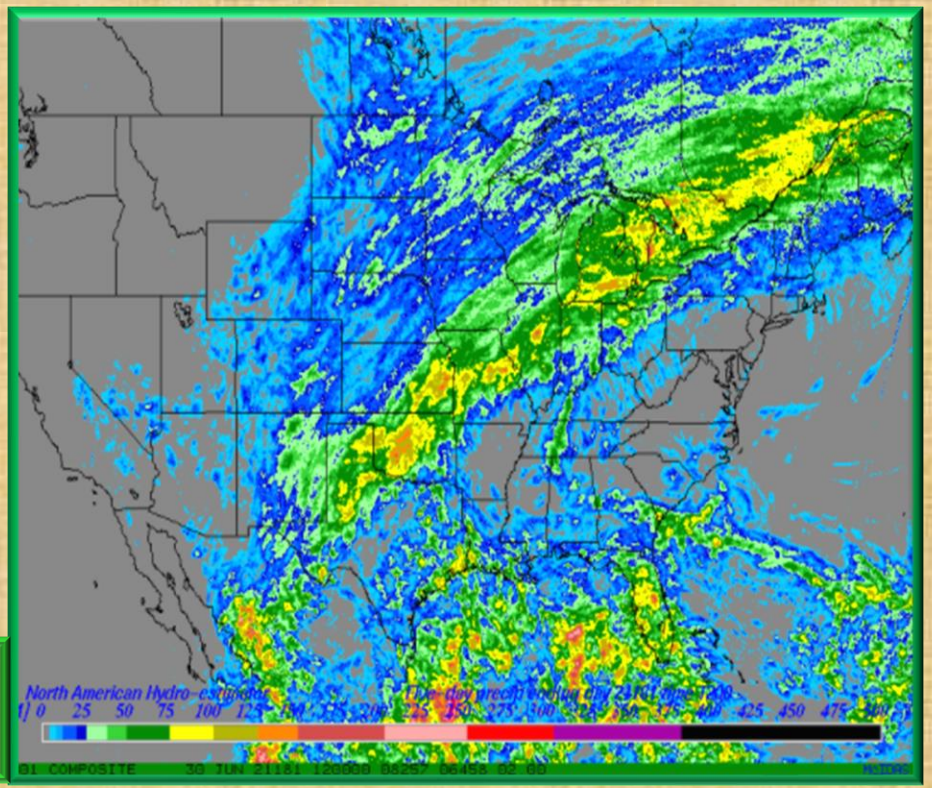
The northern Gulf of California sea surface temperature this year reached 29C on July 16. Research has shown that around 50-75% of the total Monsoon rainfall will fall after that date. Given that most of the sites listed above are well above normal, 50% is probably a reasonable forecast. Therefore the sites above are likely to double the rainfall values of June 15 through July 16.

Tracking the 2021 Monsoon Season across the El Paso Forecast Area. Fig. 5



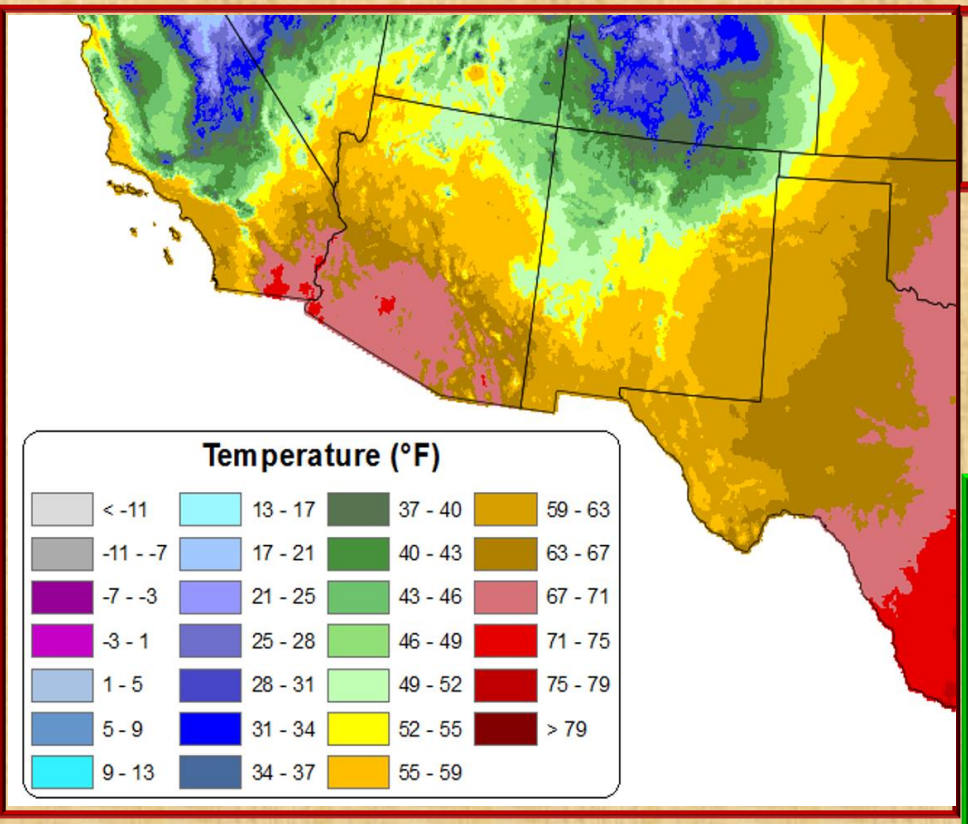
June29 – Outgoing Longwave Radiation (OLR) diminishes to less than 240 W/m^2 Thick clouds and anvil tops from thunderstorms diminish the OLR values, often indicative of the monsoon moisture and thunderstorms moving into the area. (Pentad data Jun 25-29)

Lime Green lines=230

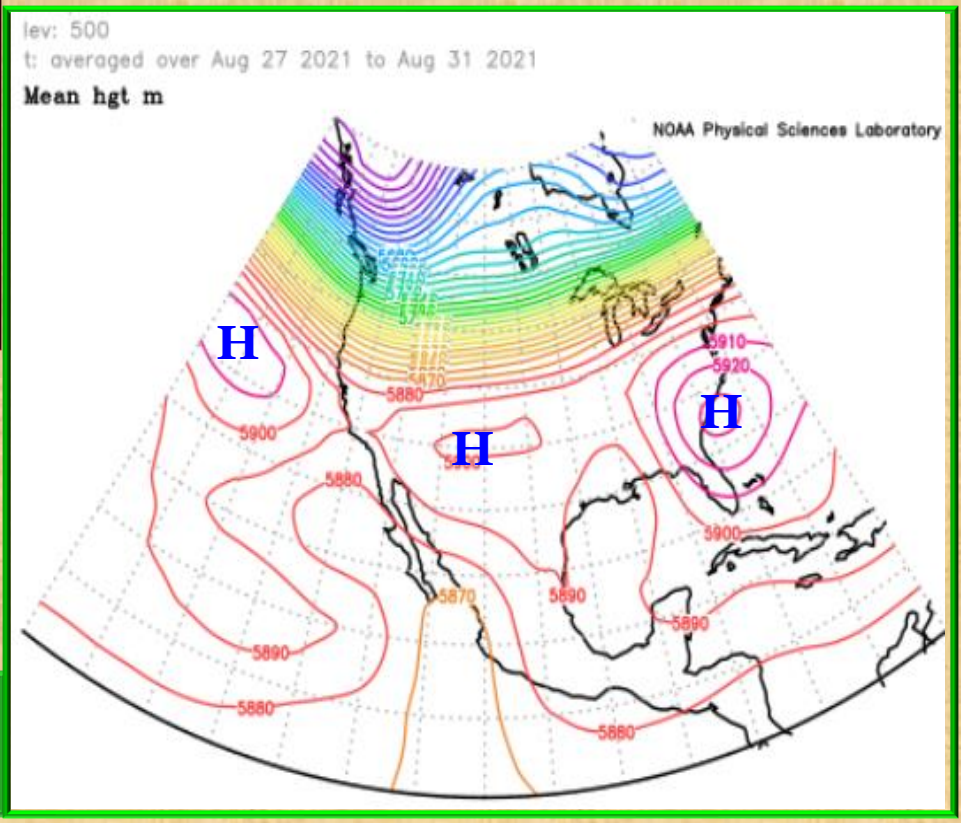


By June 26-30 the first area wide Monsoon precipitation occurs

Tracking the 2021 Monsoon Season across the El Paso Forecast Area. Fig. 6

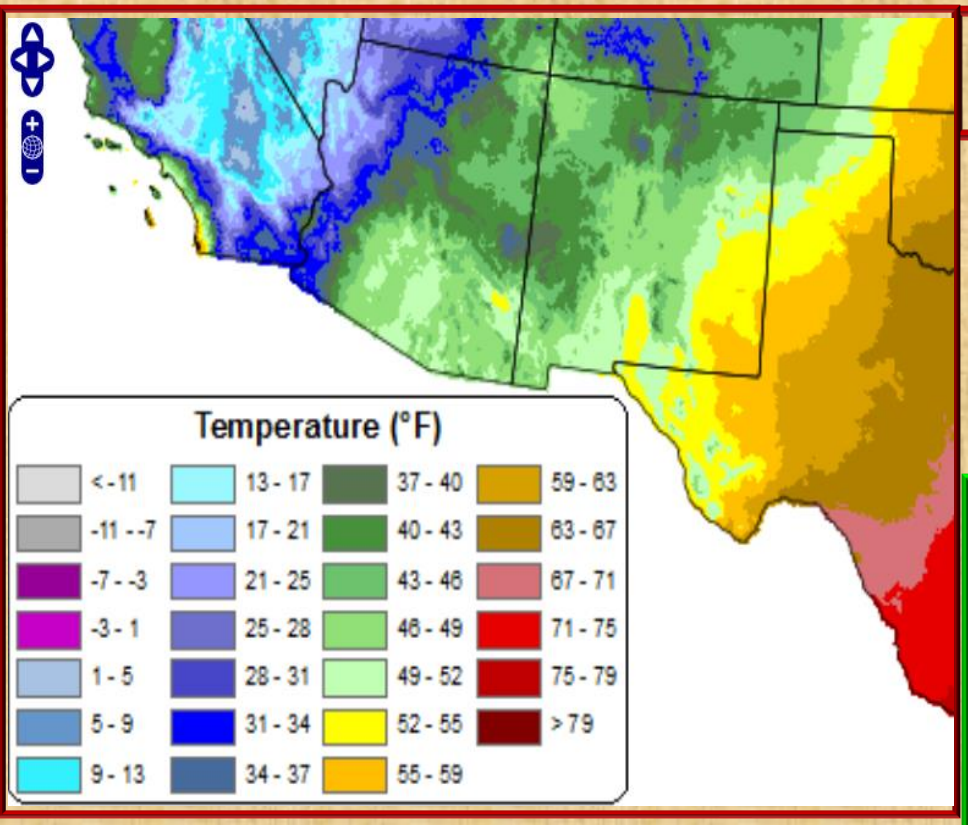


Aug 31 – Surface dewpoints still well into the 50s (deg) across the vast majority of the Desert Southwest

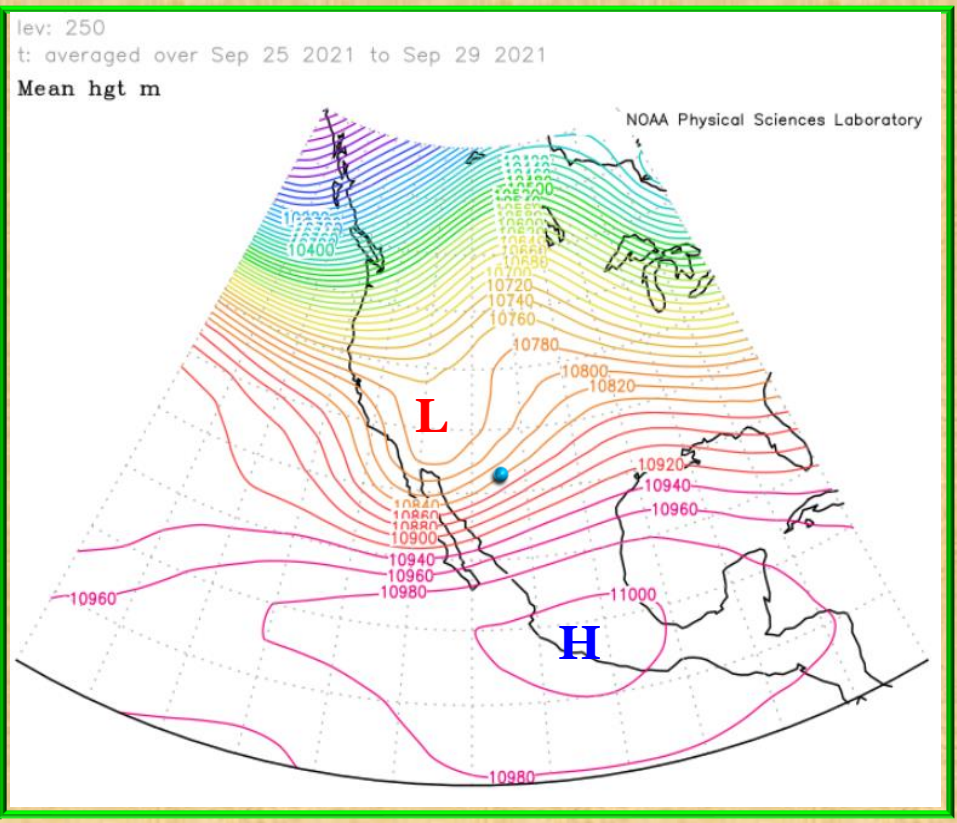


Aug 31 – Upper flow still showing typical monsoon pattern

Tracking the end of the 2021 Monsoon Season across the El Paso Forecast Area. Fig. 7



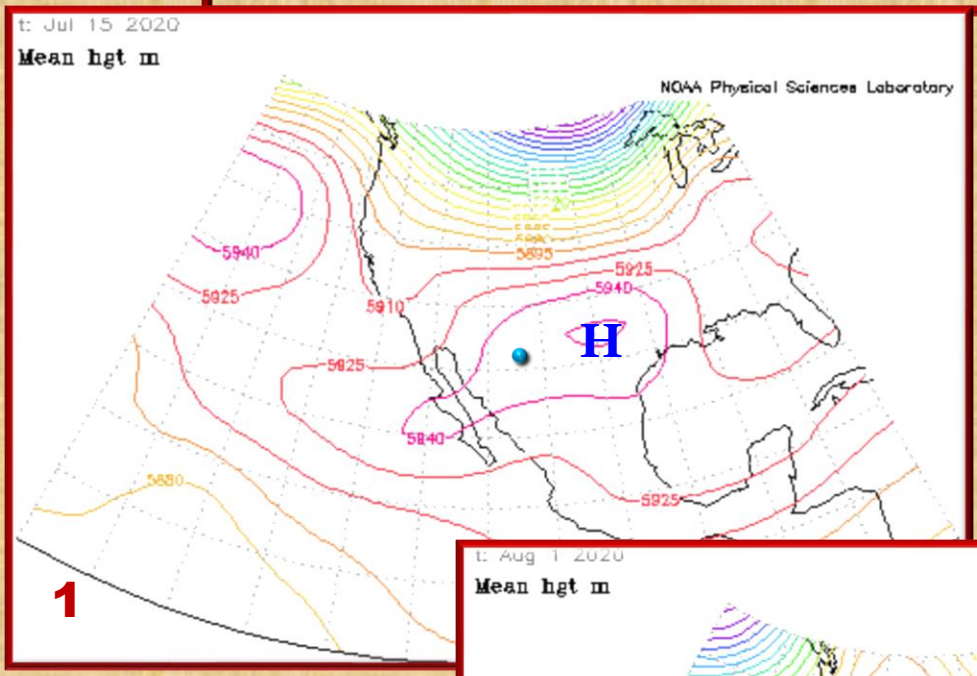
Sep 30 – Surface dewpoints had fallen into the 40s for several consecutive days.

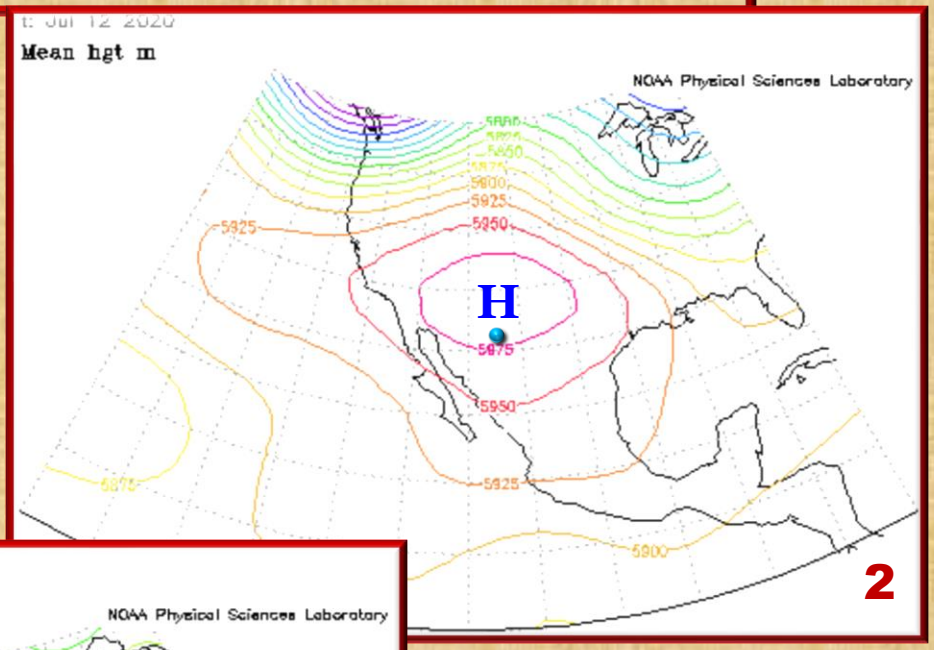


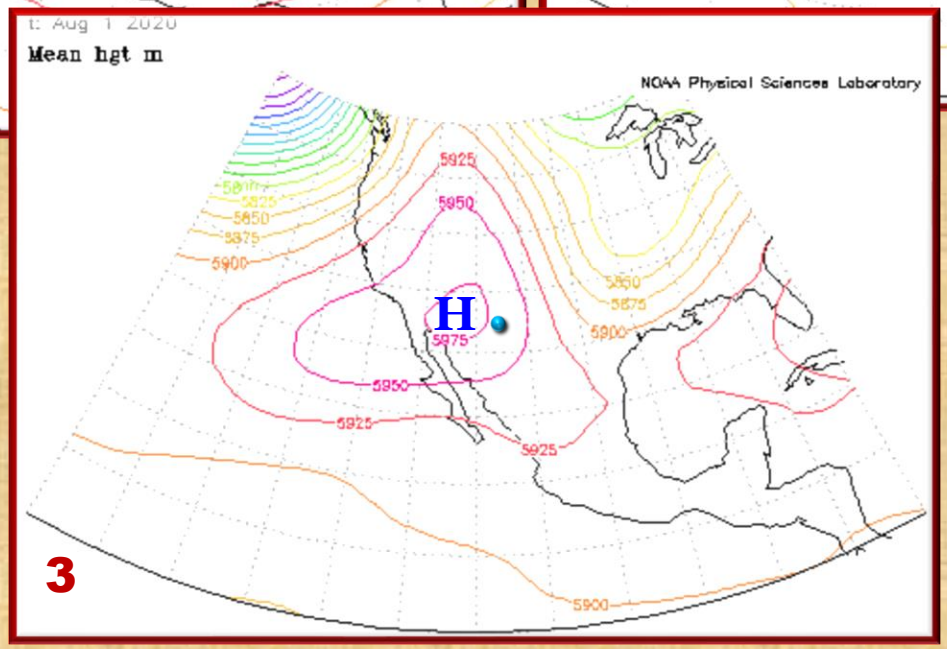
By Sep 25 the upper air pattern showed a consistently strong intrusion from the polar jet, thus ending the monsoon flow for the season.

Tracking the 2021 Monsoon Season across the El Paso Forecast Area. Fig. 7

Position of NAM upper high determines our rainfall potential. Blue dot represents El Paso.



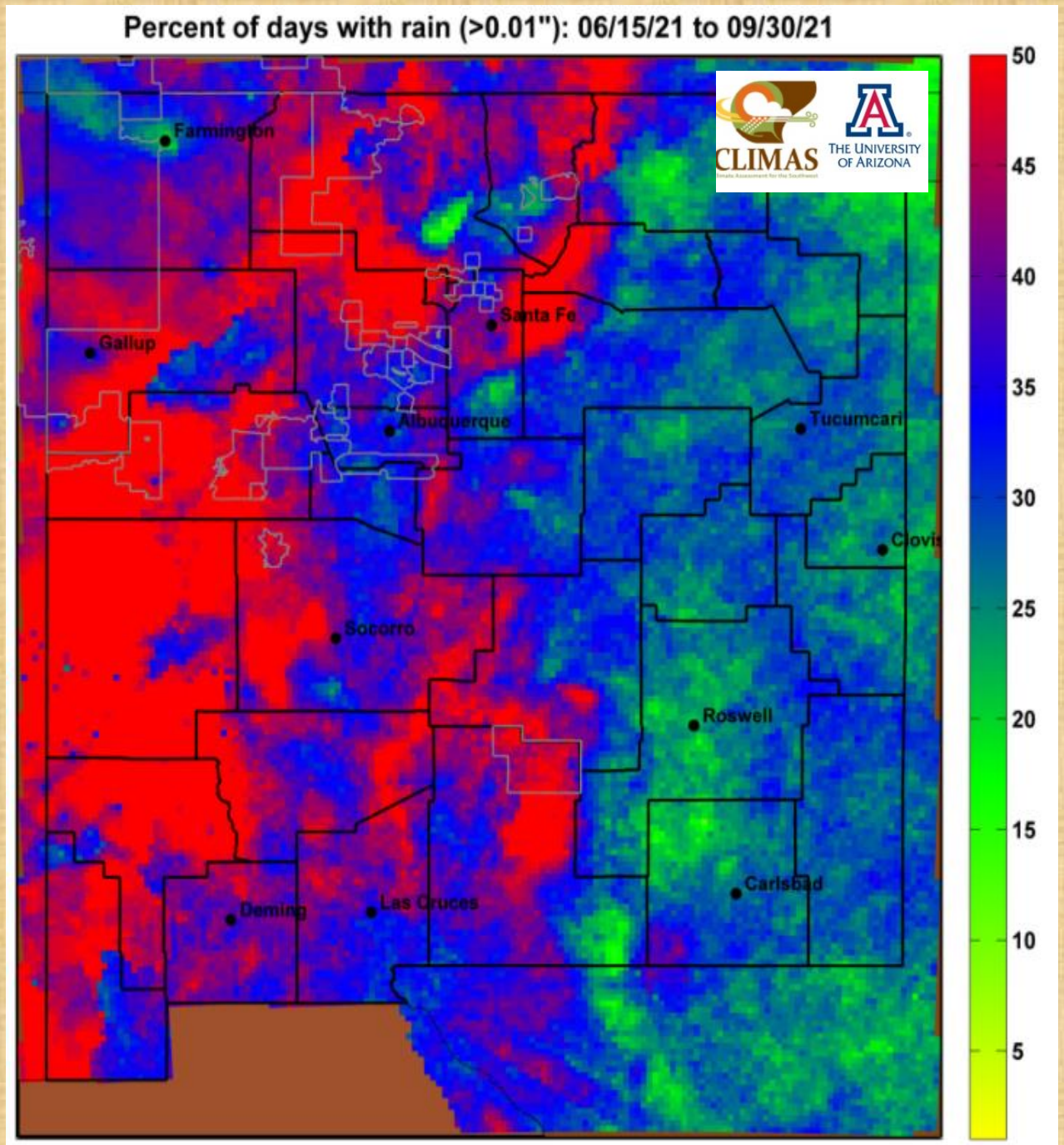




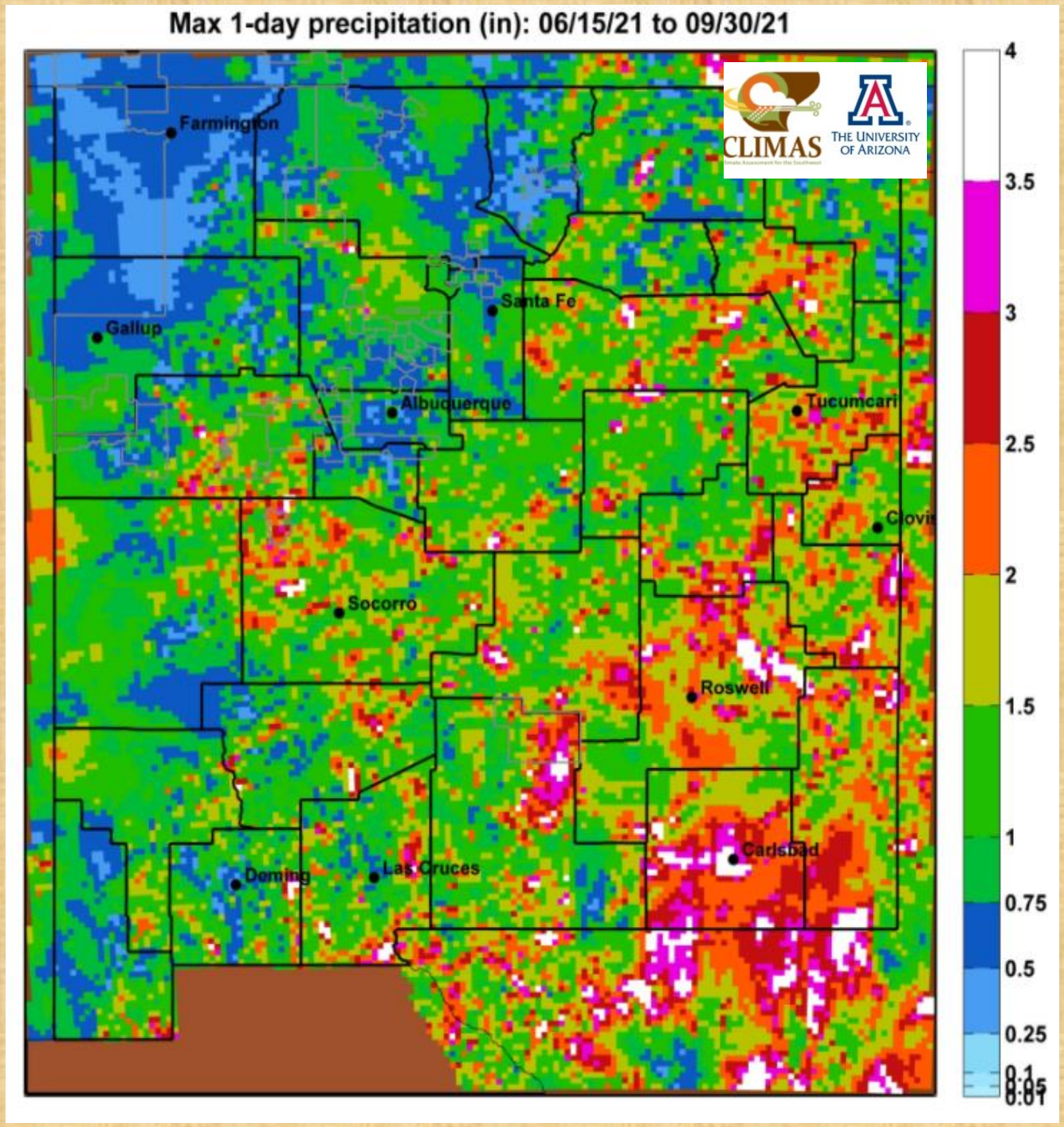
No. 1 High center east of New Mexico. Often brings ample tropical moisture and widespread heavy rain and flooding to the area

No. 2 High center over New Mexico. Often brings very hot temperatures and little if any rain (usually limited to the mountains).

No. 3 High center west of New Mexico. Often brings scattered storms with hit and miss heavy rains and large hail and strong wind potential.

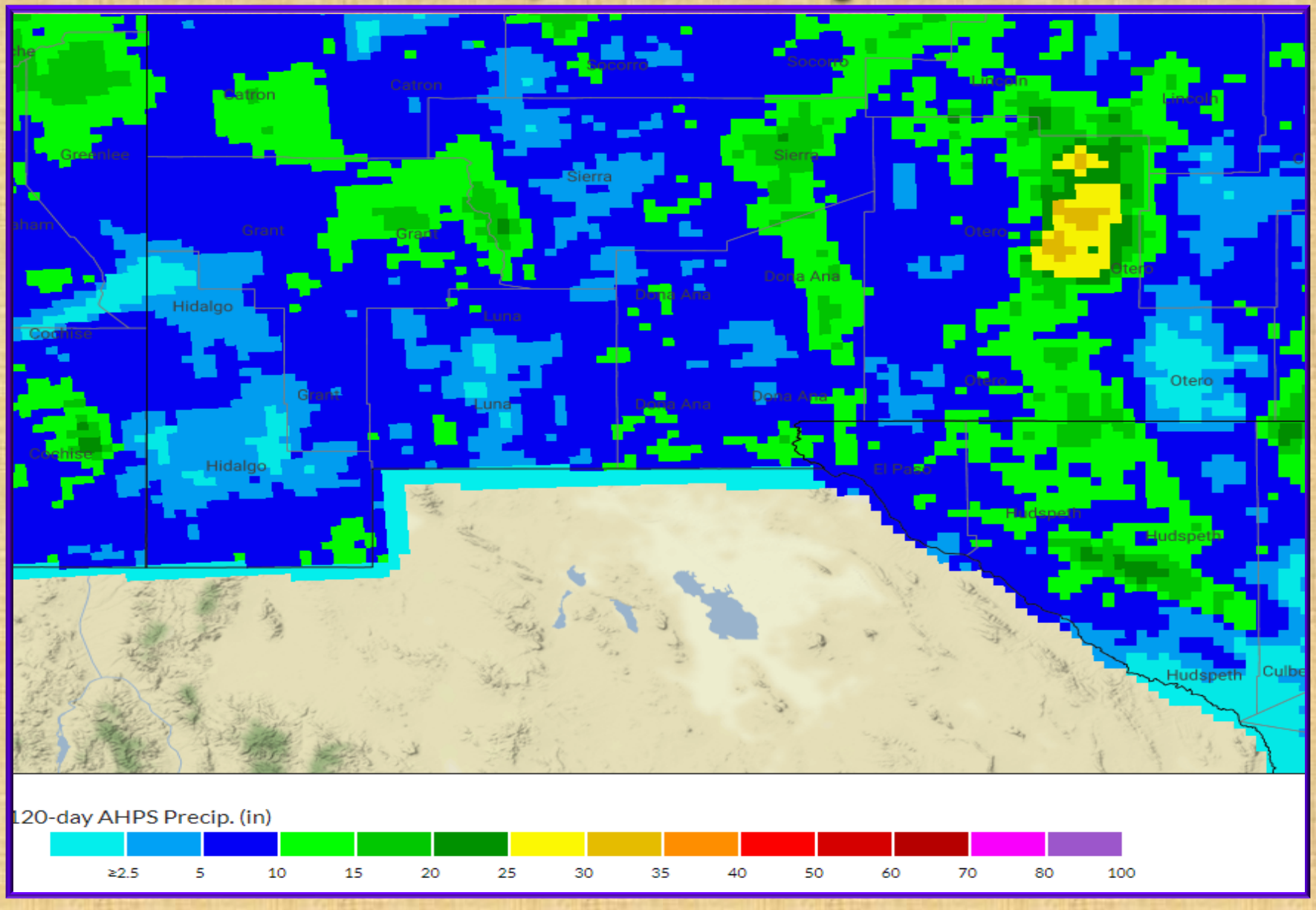


This map shows the percentage of measurable rainfall days during the Monsoon season. Courtesy of Climate Assessment for the Southwest.

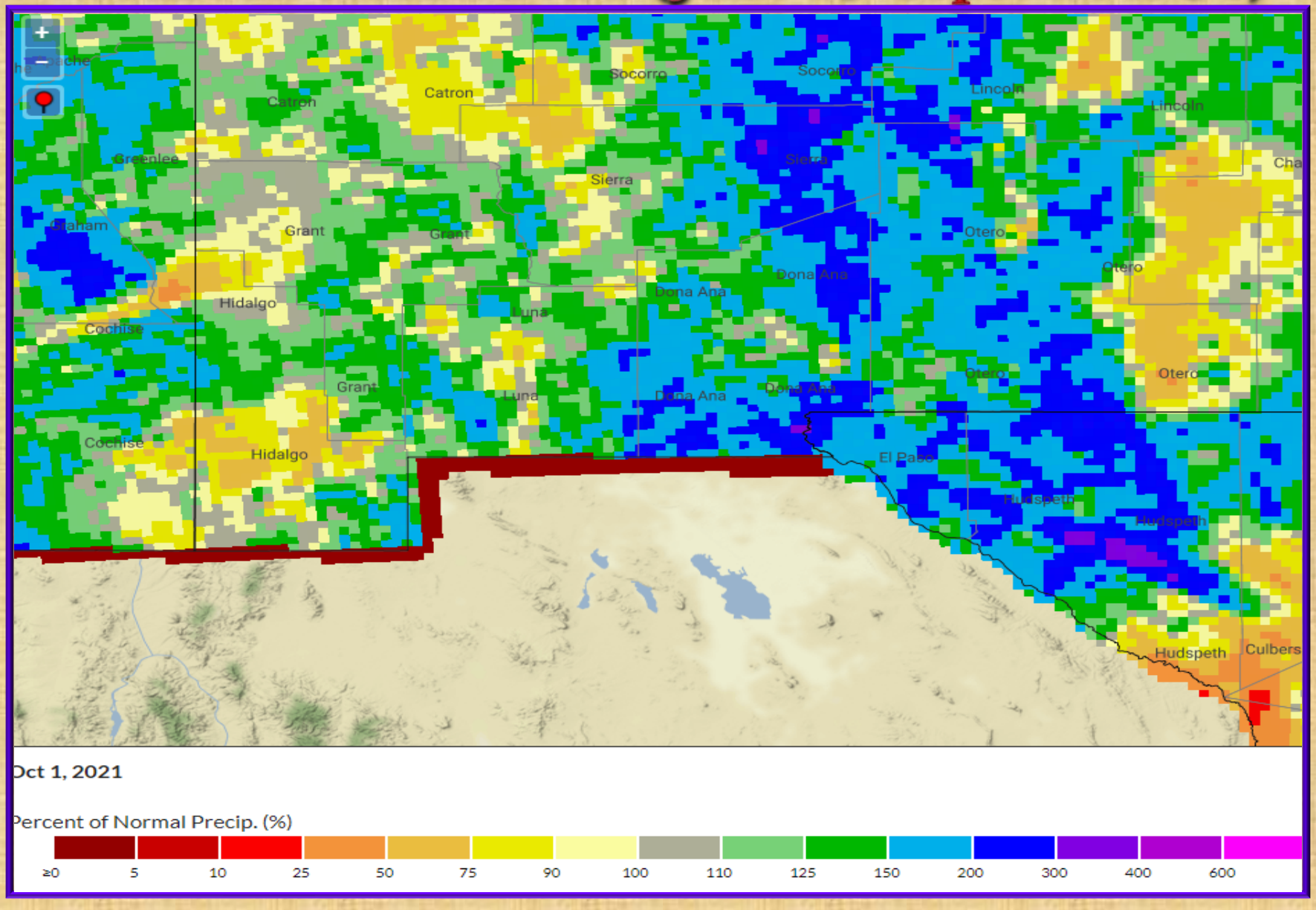


This map shows greatest one day rainfall total during the Monsoon season. Courtesy of Climate Assessment for the Southwest.

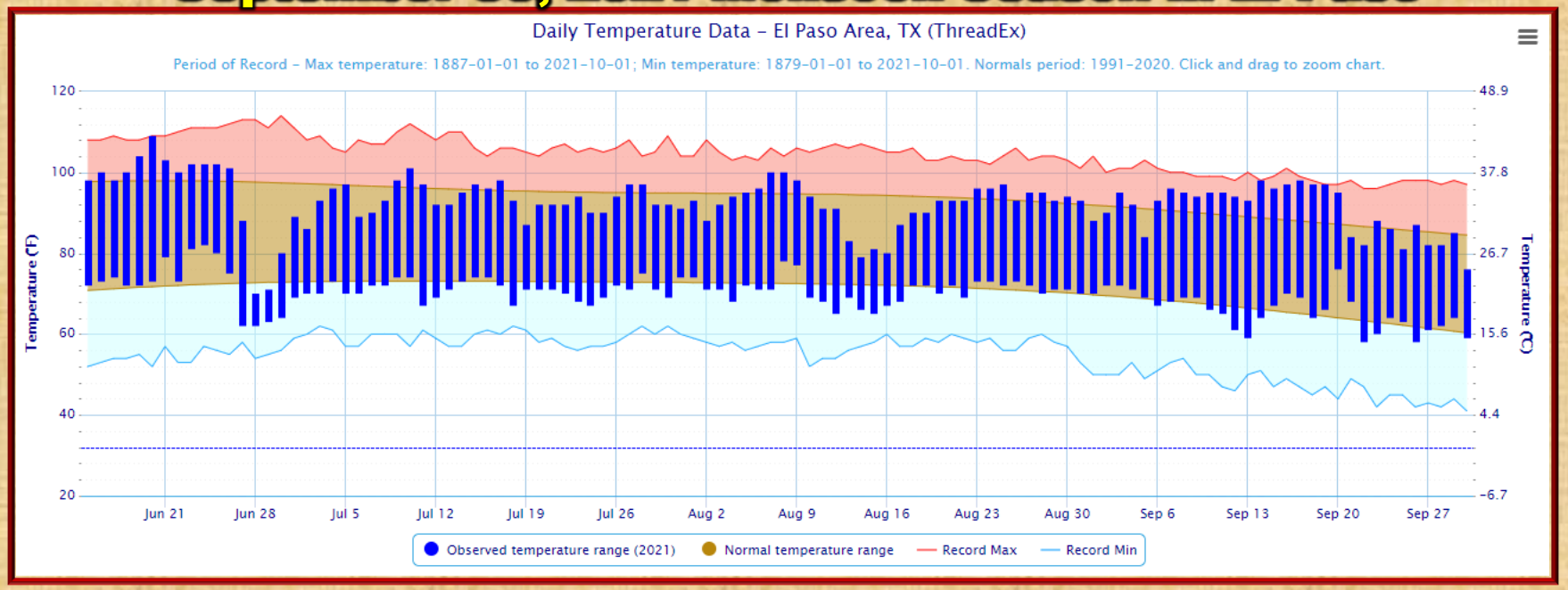
Radar rainfall estimate for the Monsoon Season 2021 (June 15 – September 30)

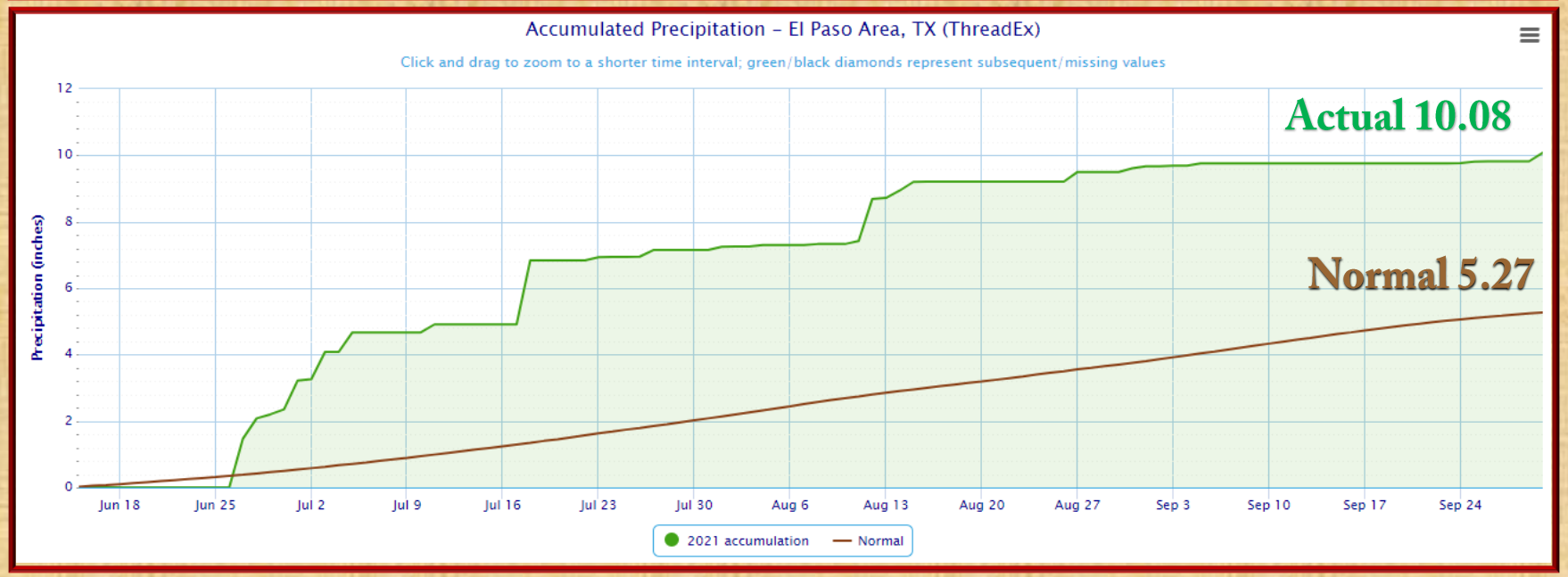


Radar rainfall estimate percent of normal for Monsoon season 2021 (June 15-September 30)



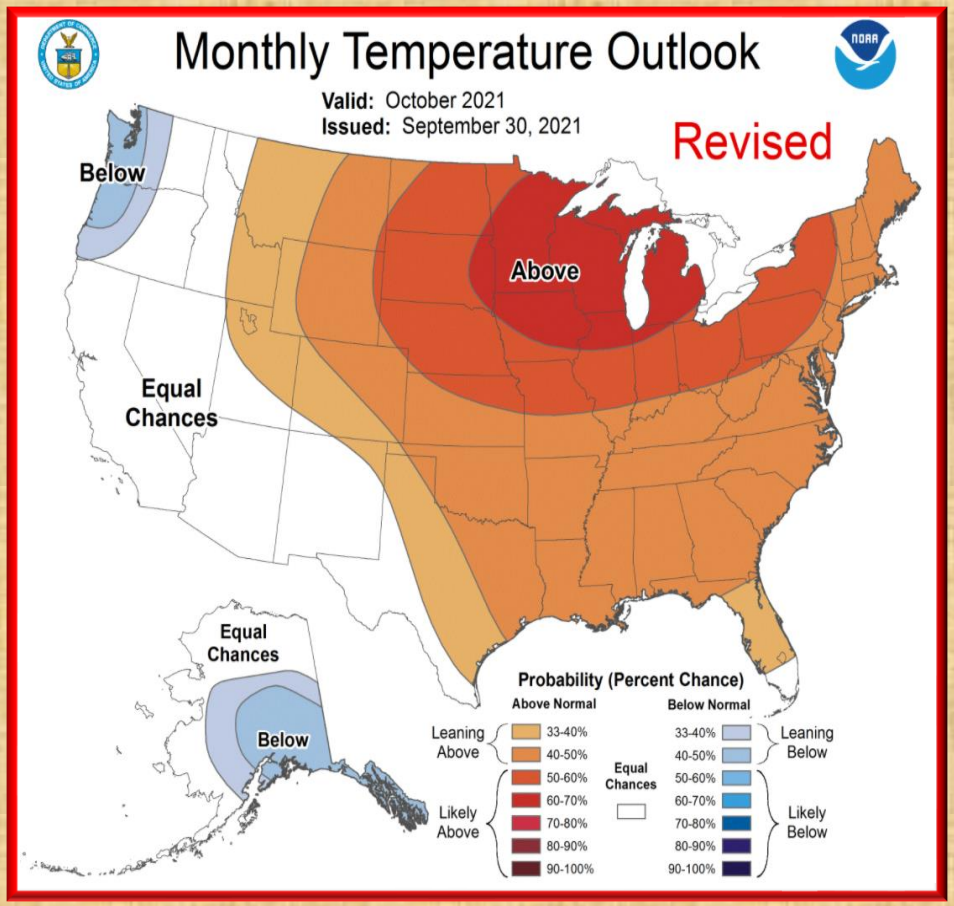
Temperature and precipitation data through September 30, 2021 Monsoon Season in El Paso



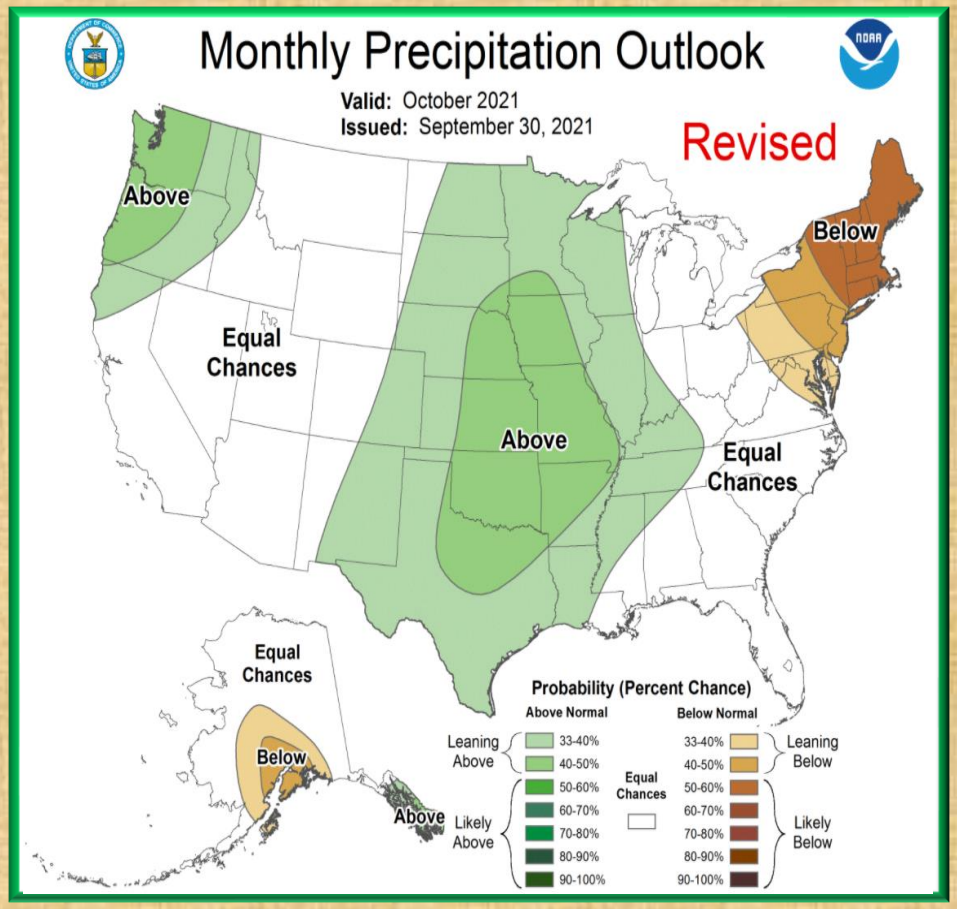


Temperature and precipitation outlook for October 2021

Temperature

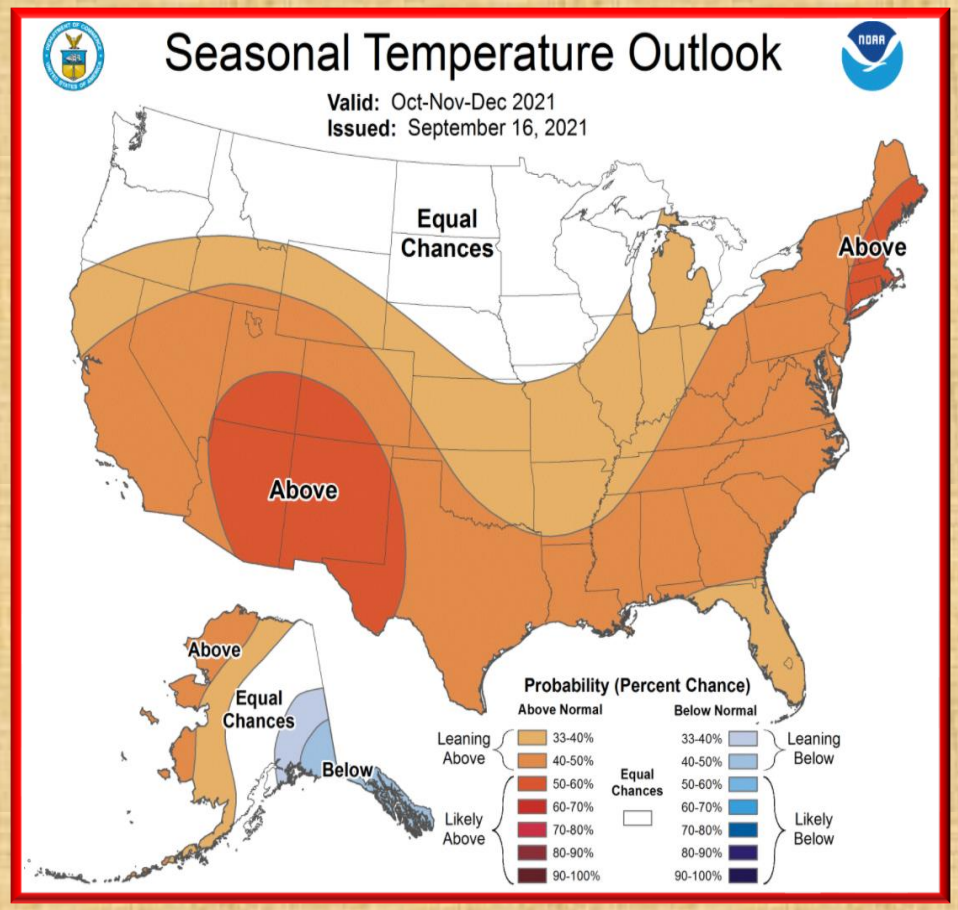


Precipitation

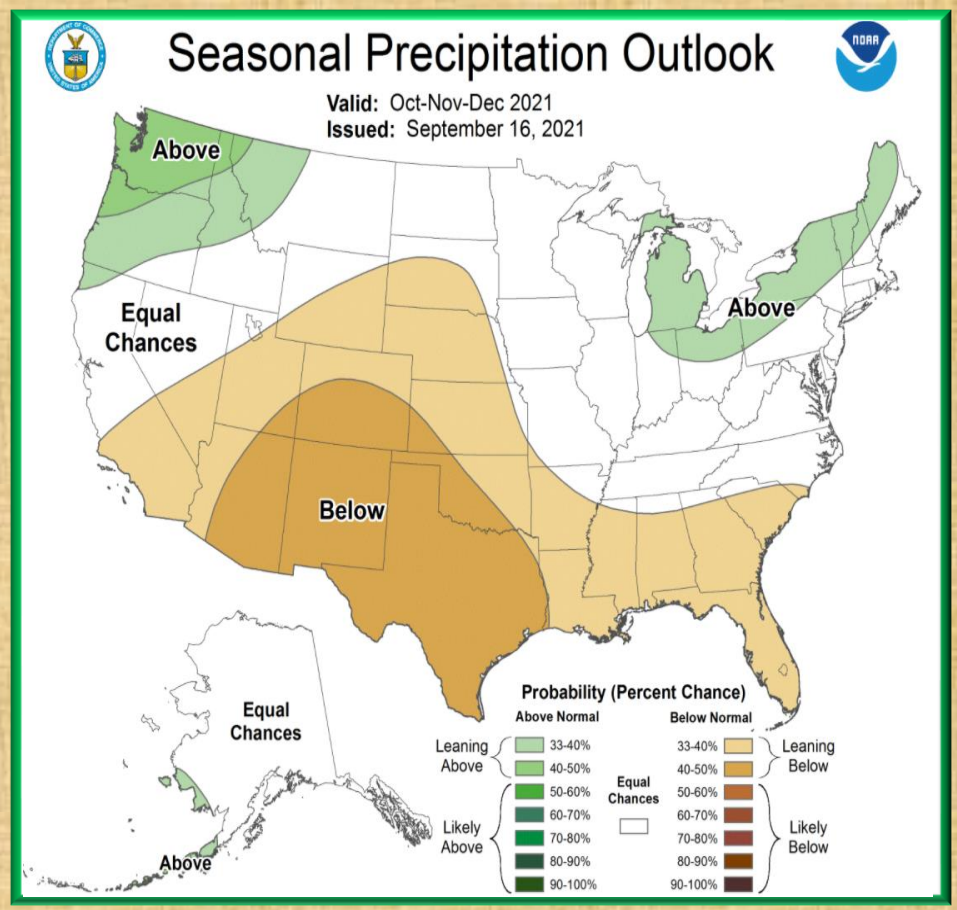


Temperature and precipitation outlook For October-December 2021

Temperature

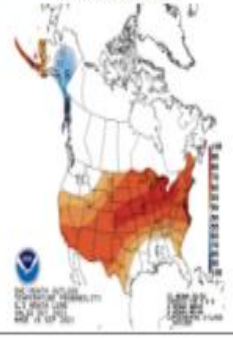


Precipitation

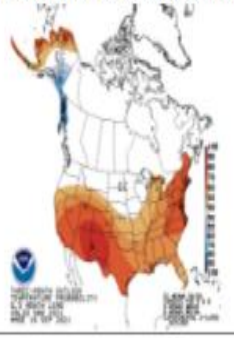


Temperature Outlook Through December 2022

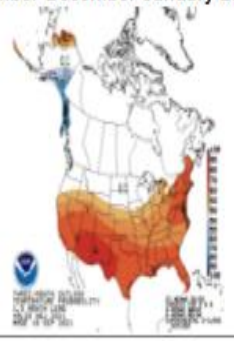
October 2021



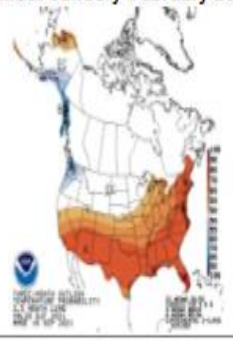
October-November-December 2021



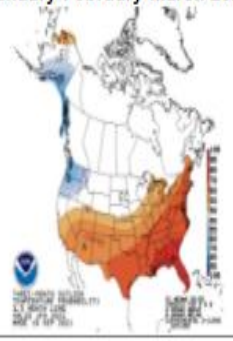
November-December-January 2021/22



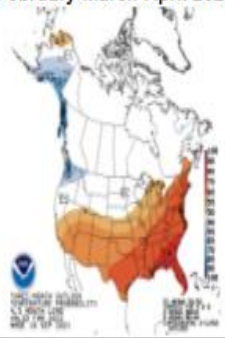
December-January-February 2021/22



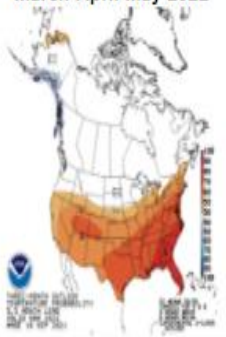
January-February-March 2022



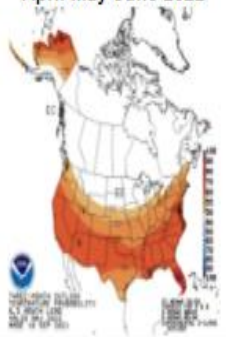
February-March-April 2022



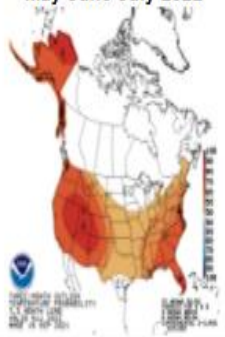
March-April-May 2022



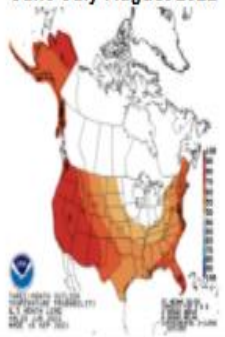
April-May-June 2022



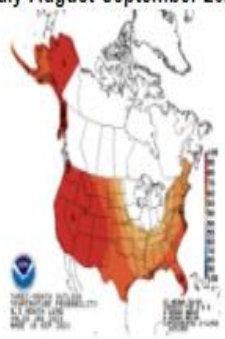
May-June-July 2022



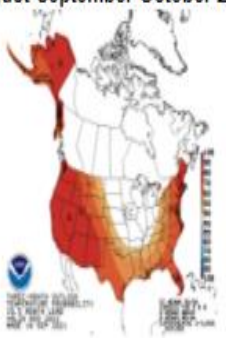
June-July-August 2022



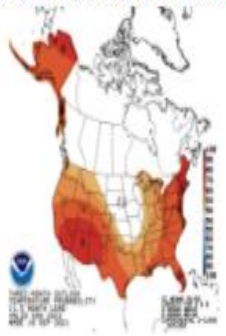
July-August-September 2022



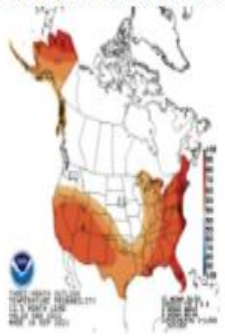
August-September-October 2022



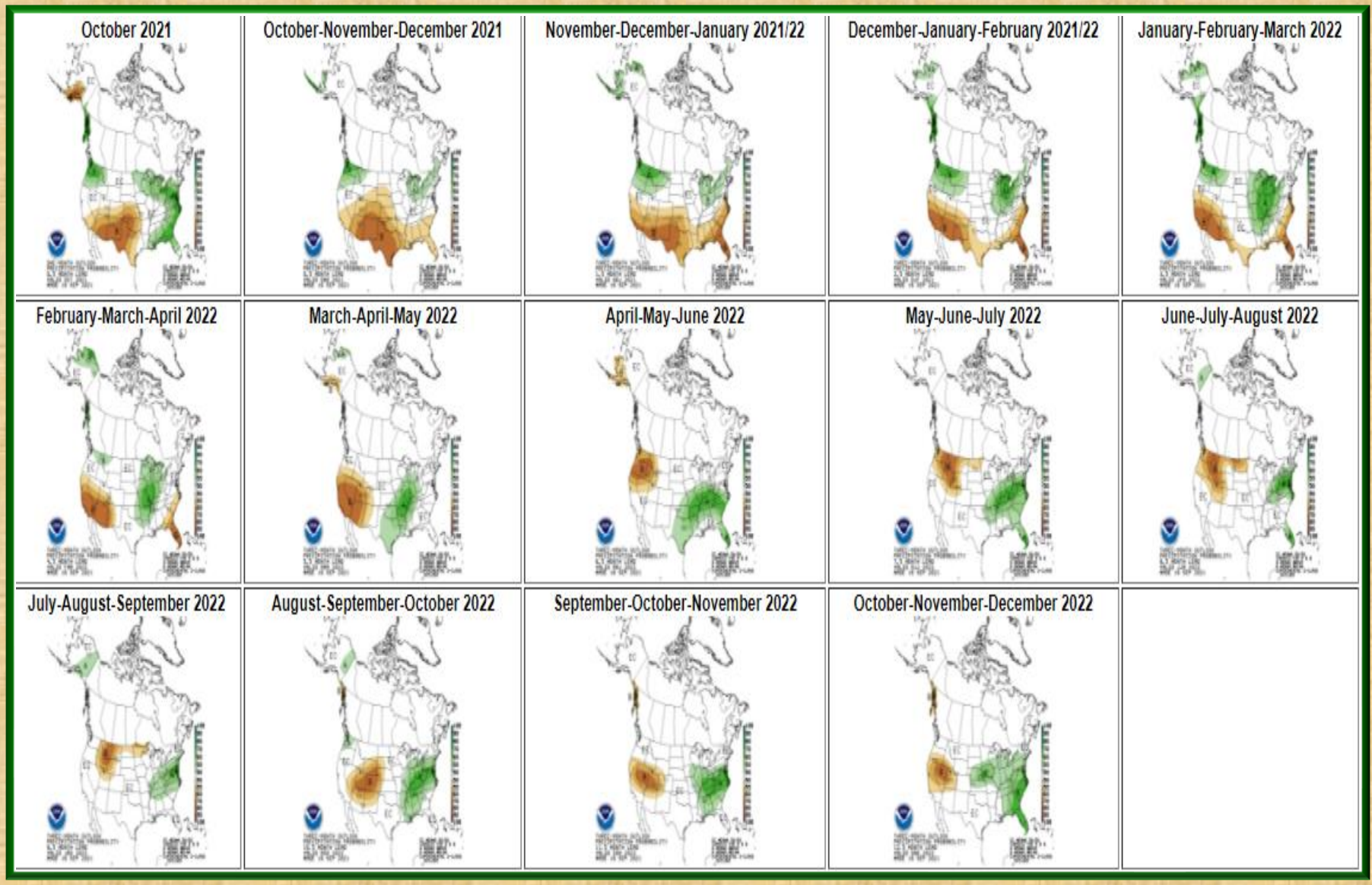
September-October-November 2022



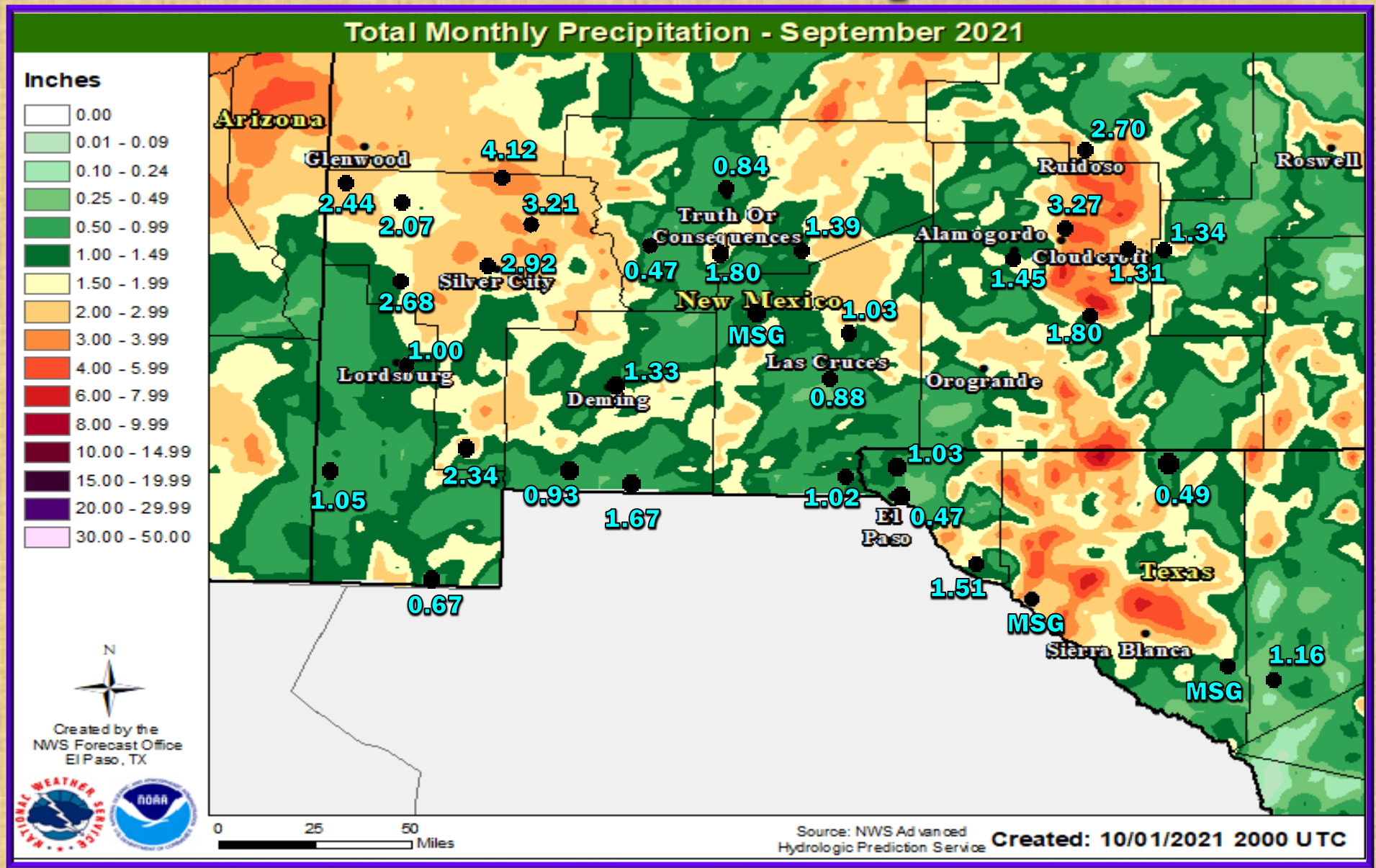
October-November-December 2022



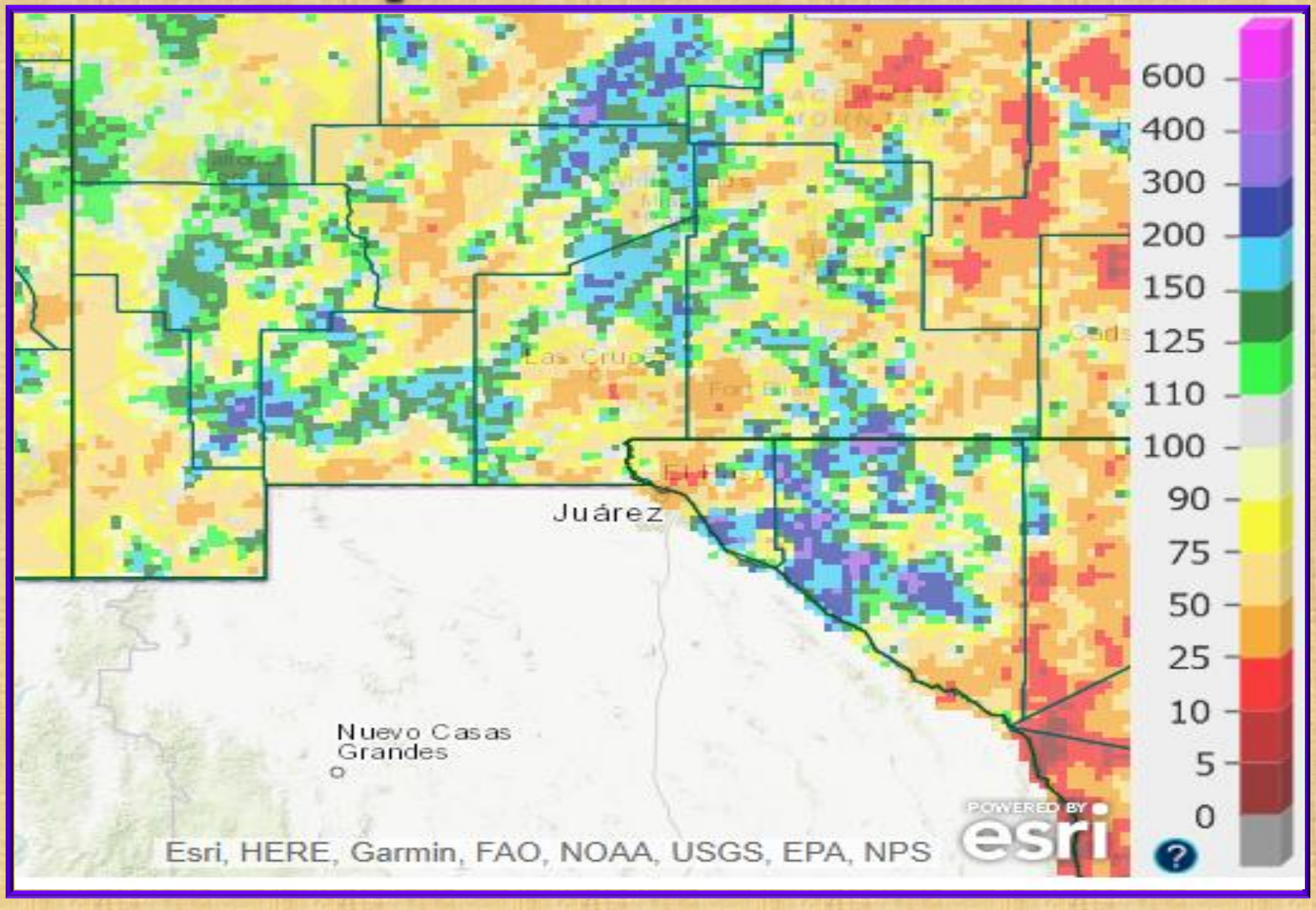
Precipitation Outlook Through December 2022



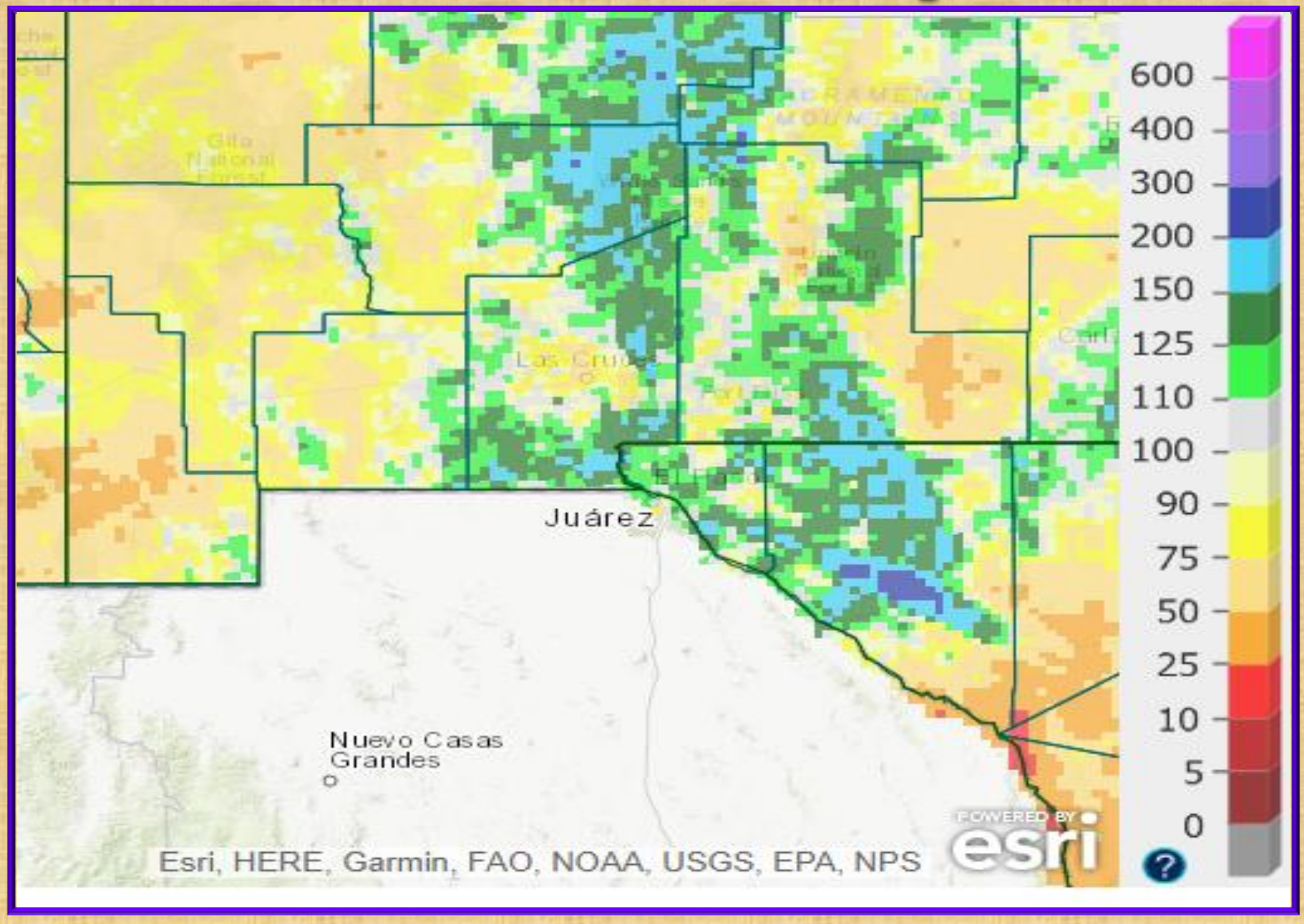
September 2021 radar rainfall estimate with surface rainfall reports



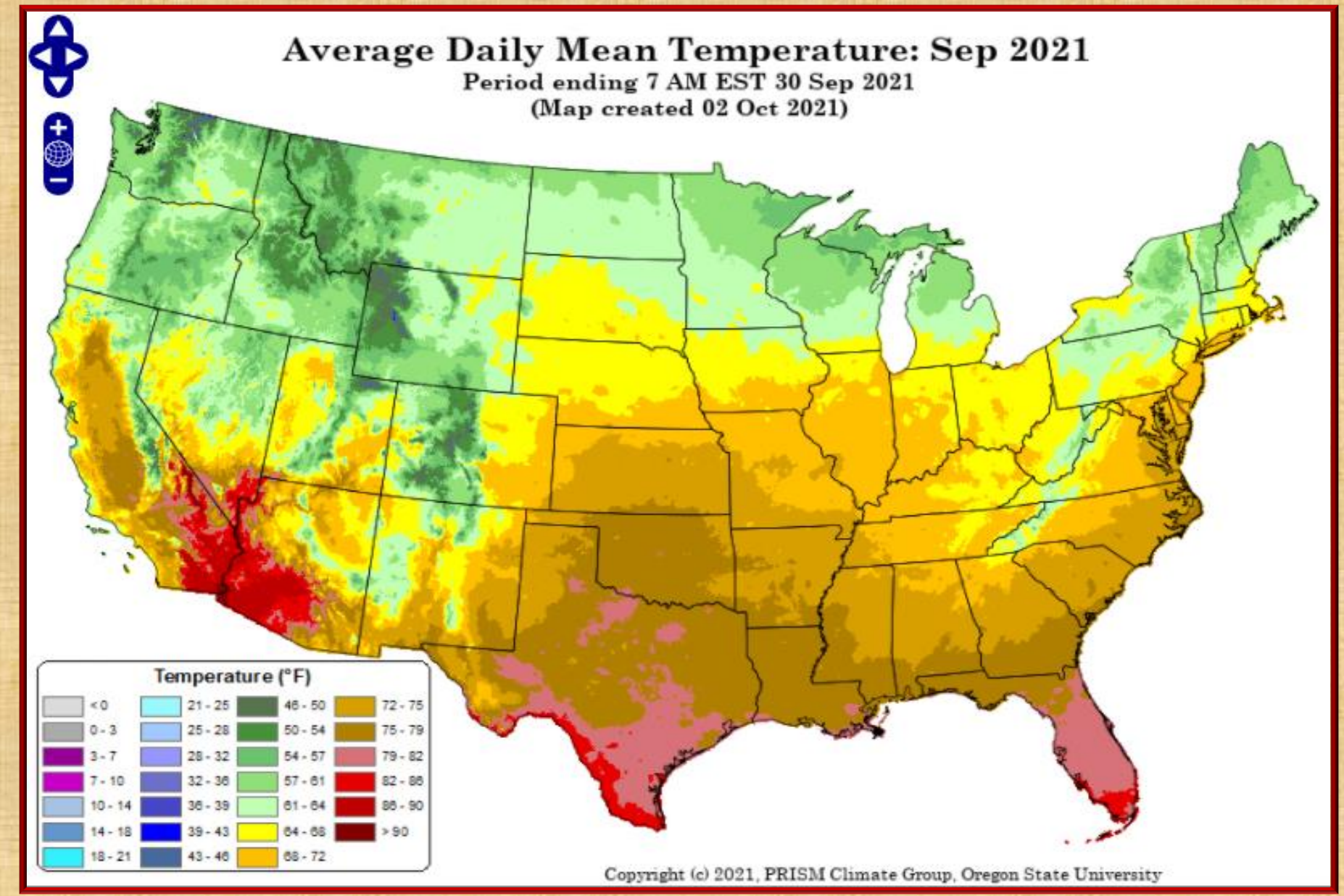
September 2021 radar rainfall estimate percent of normal



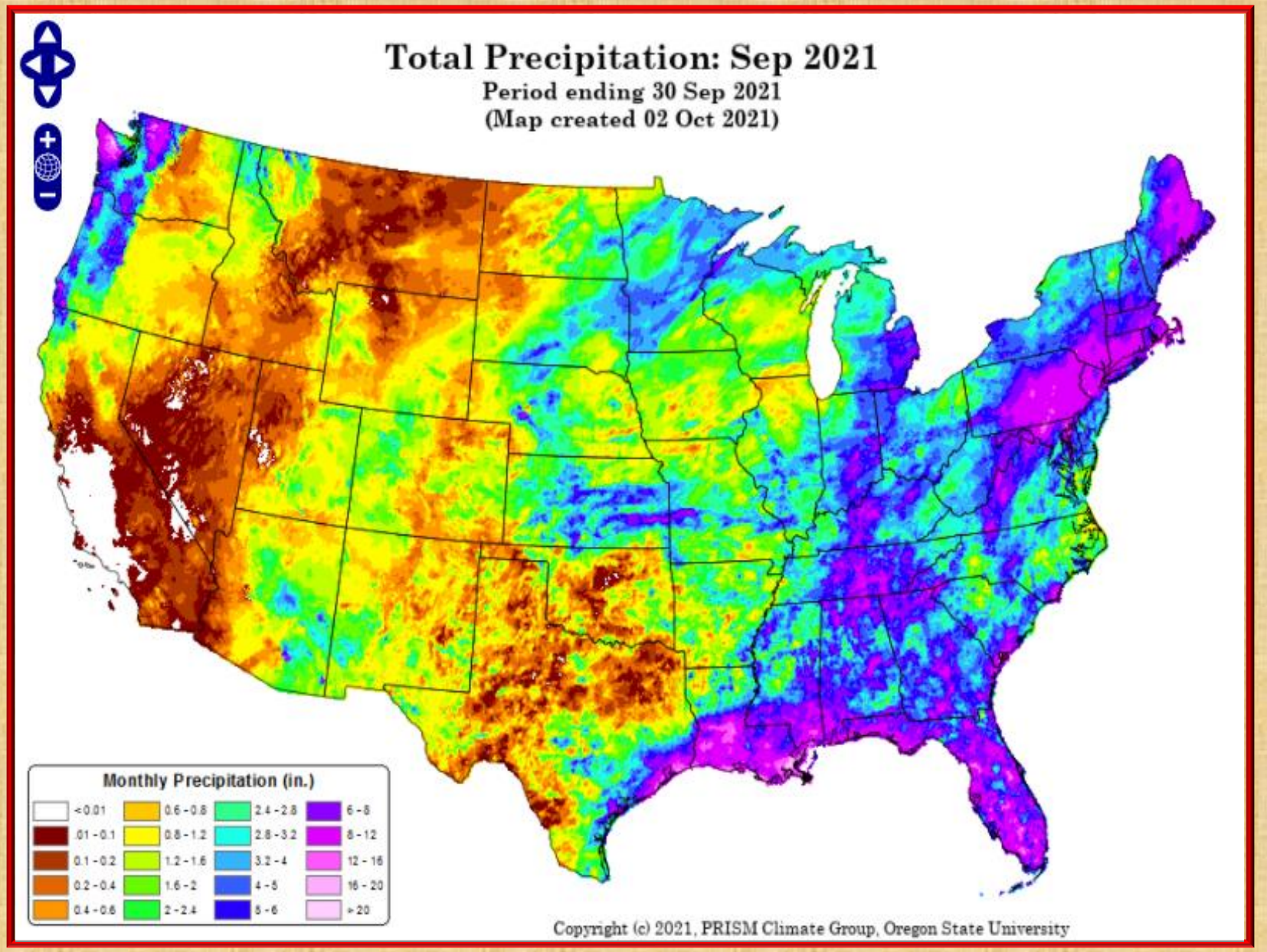
Radar rainfall estimate percent of normal for the Water Year (Oct 1 – Sep 30)



Average Daily Mean Temperature for September 2021

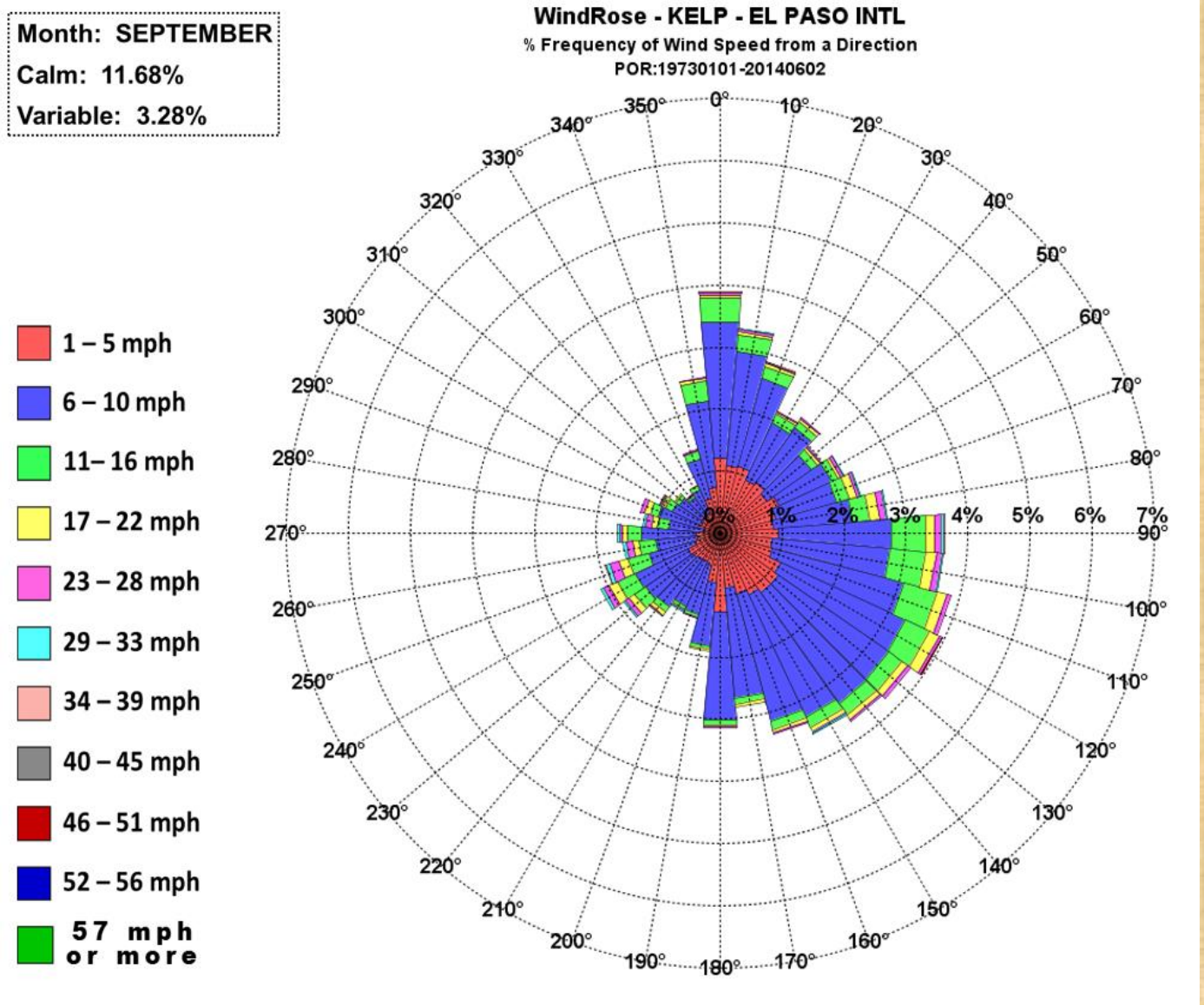


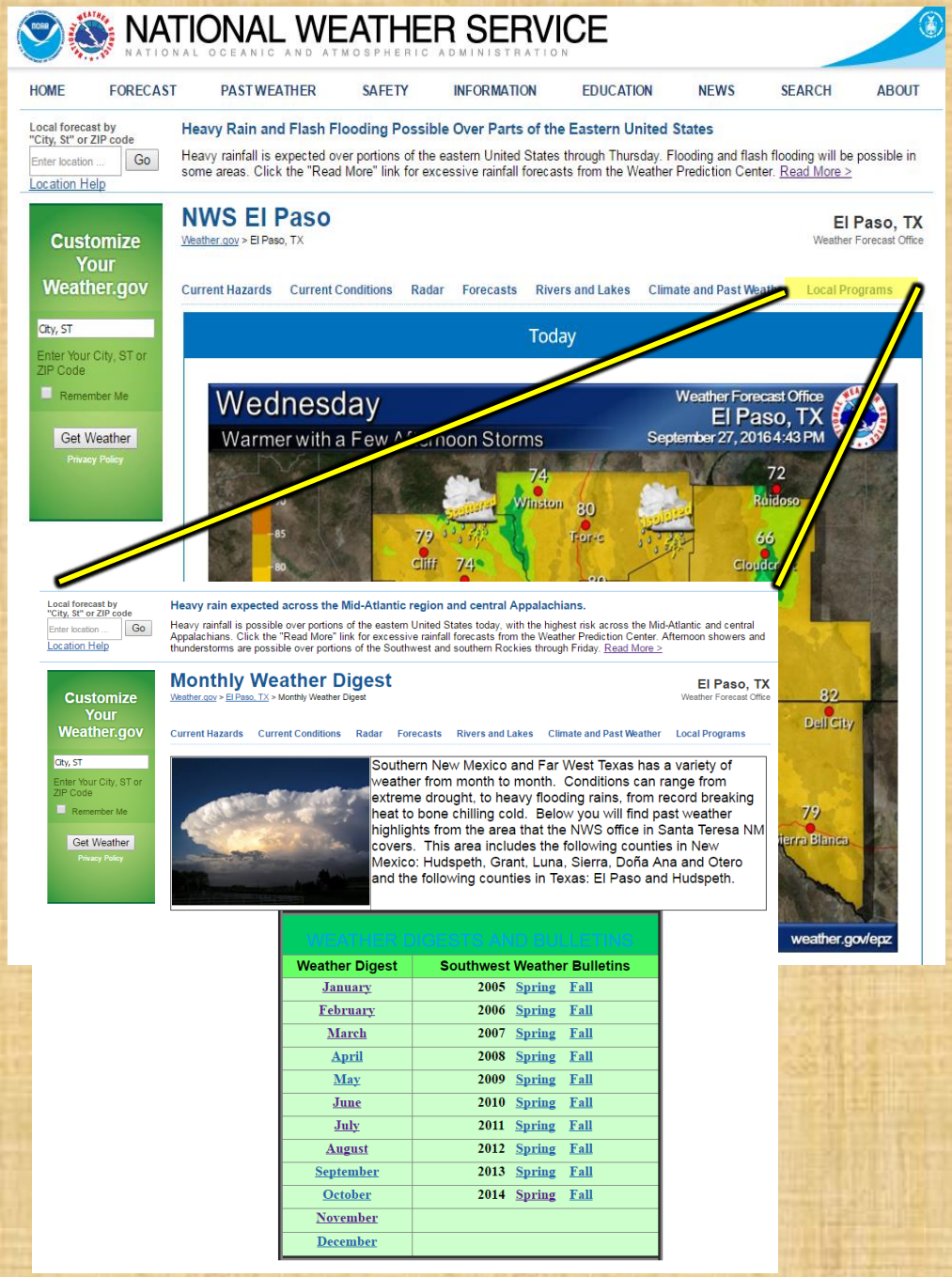
Total Precipitation for September 2021



Special Features

http://www.srh.noaa.gov/epz/?n=elpwindrosedata





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Just click on "Local Programs>Weather Digest", then choose which month's Digest to view. Also, though discontinued, don't forget to check out our back issues of Southwest Weather Bulletin.