



# *Winter 2021-22 Outlook*

**Mark O'Malley**

National Weather Service

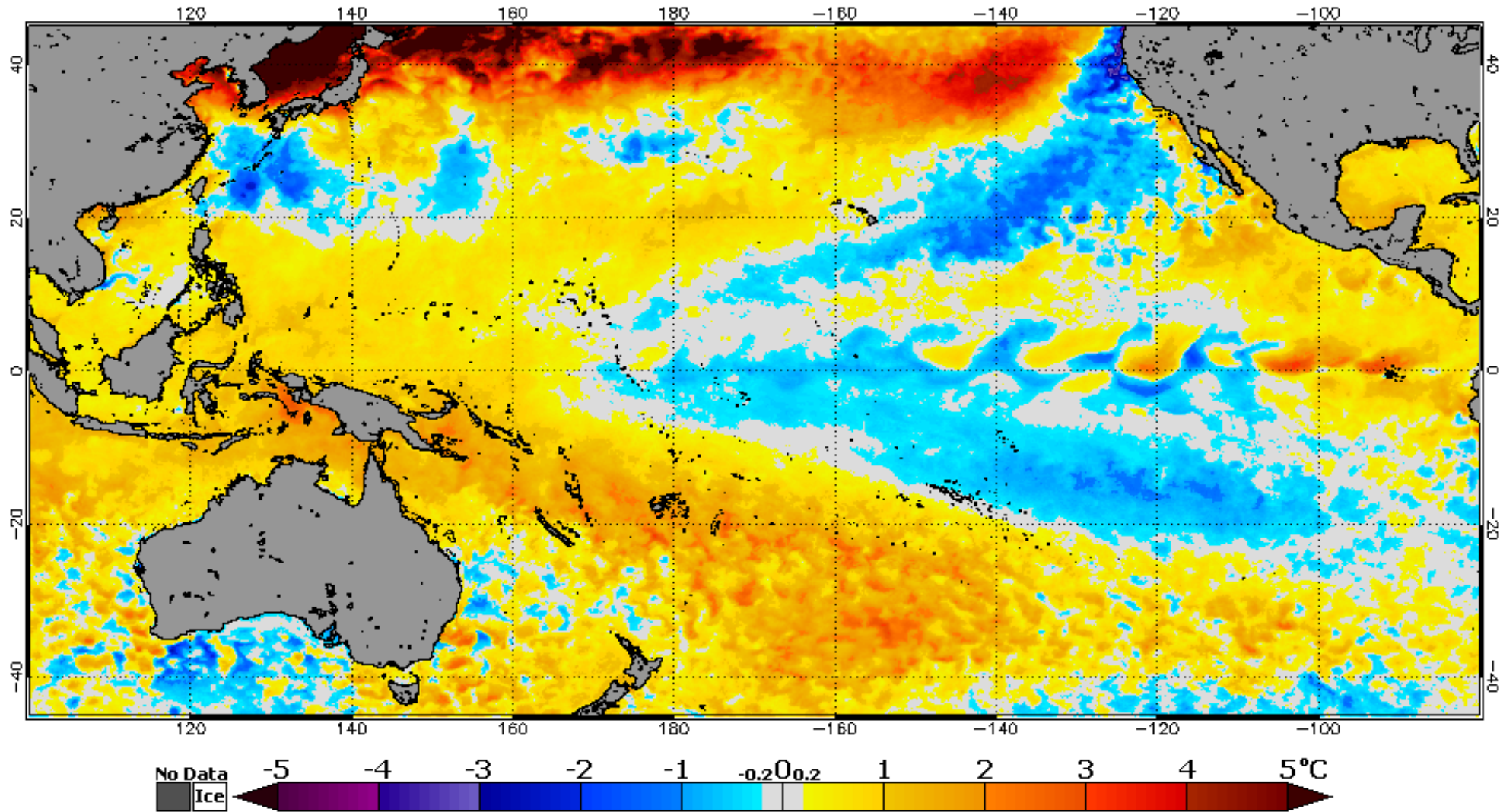
Phoenix, AZ

*[www.weather.gov/phoenix](http://www.weather.gov/phoenix)*



# La Niña

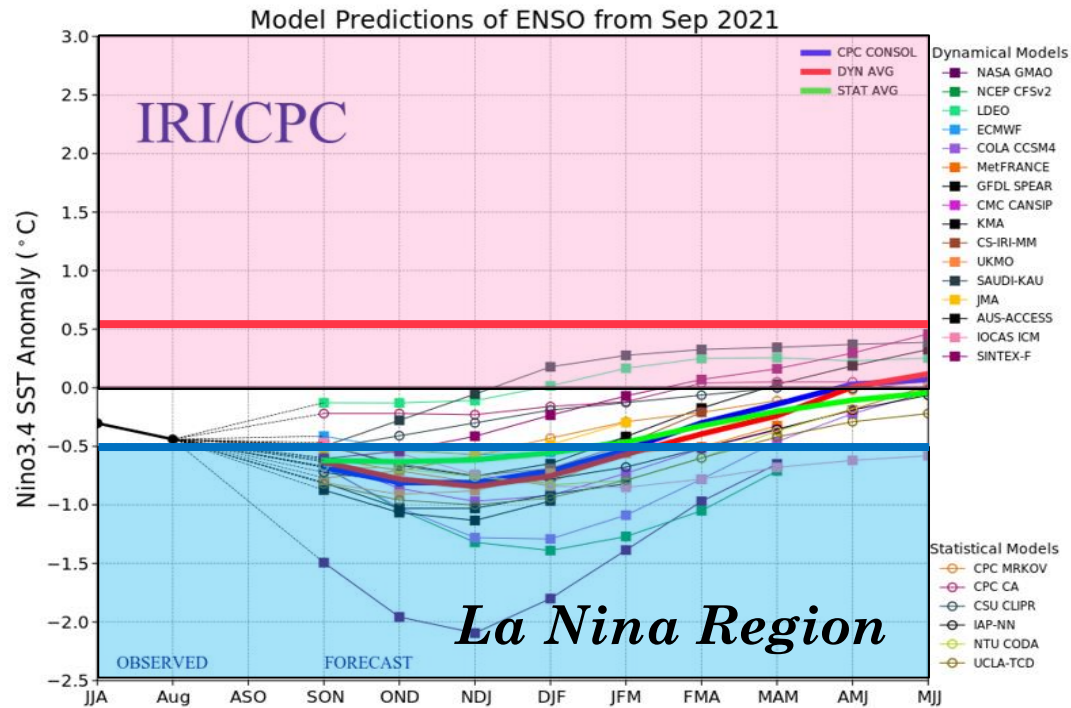
NOAA Coral Reef Watch Daily 5km SST Anomalies (Version 3.1) 27 Jul 2021



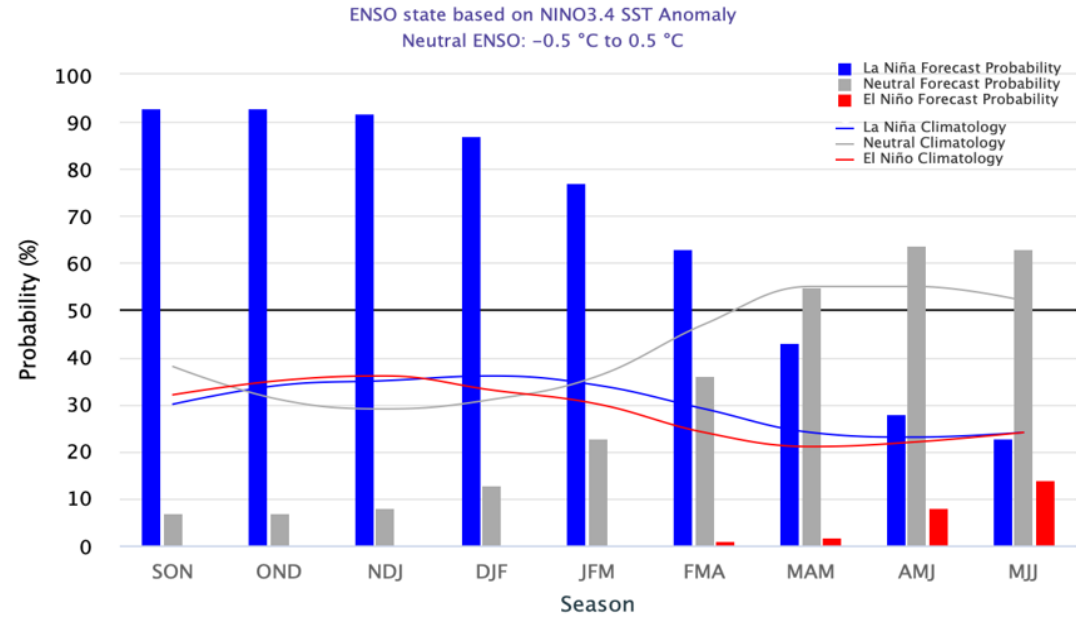


# La Niña

- Weak La Niña conditions have already become established, and will persist through the winter



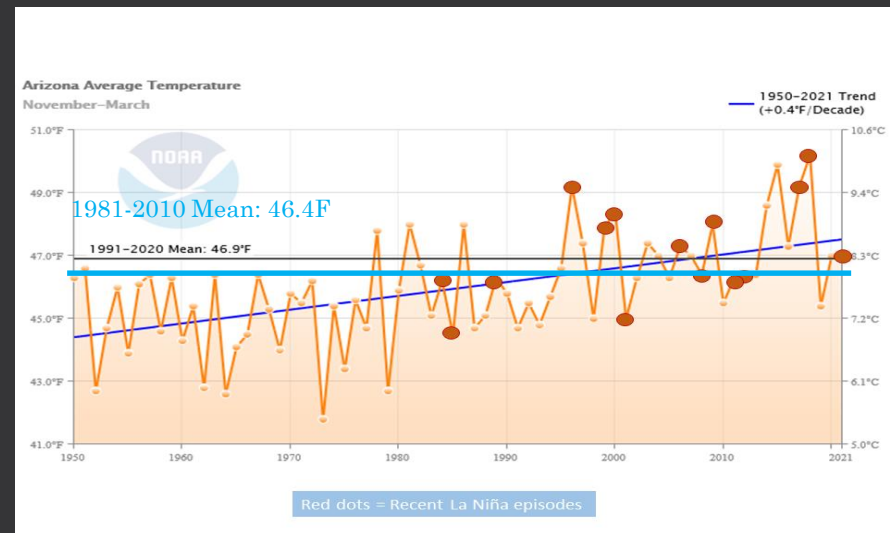
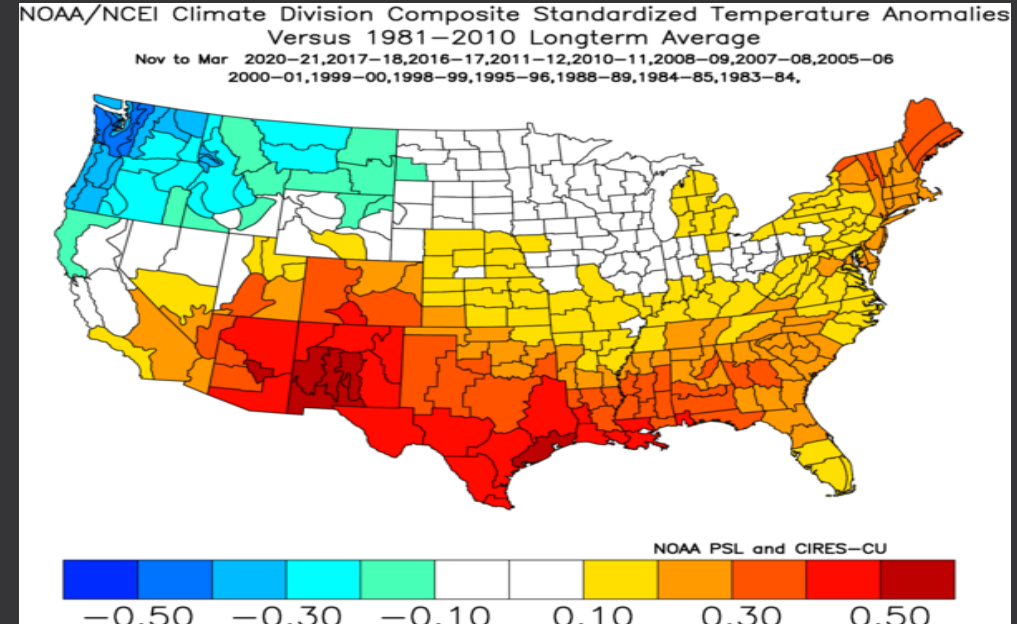
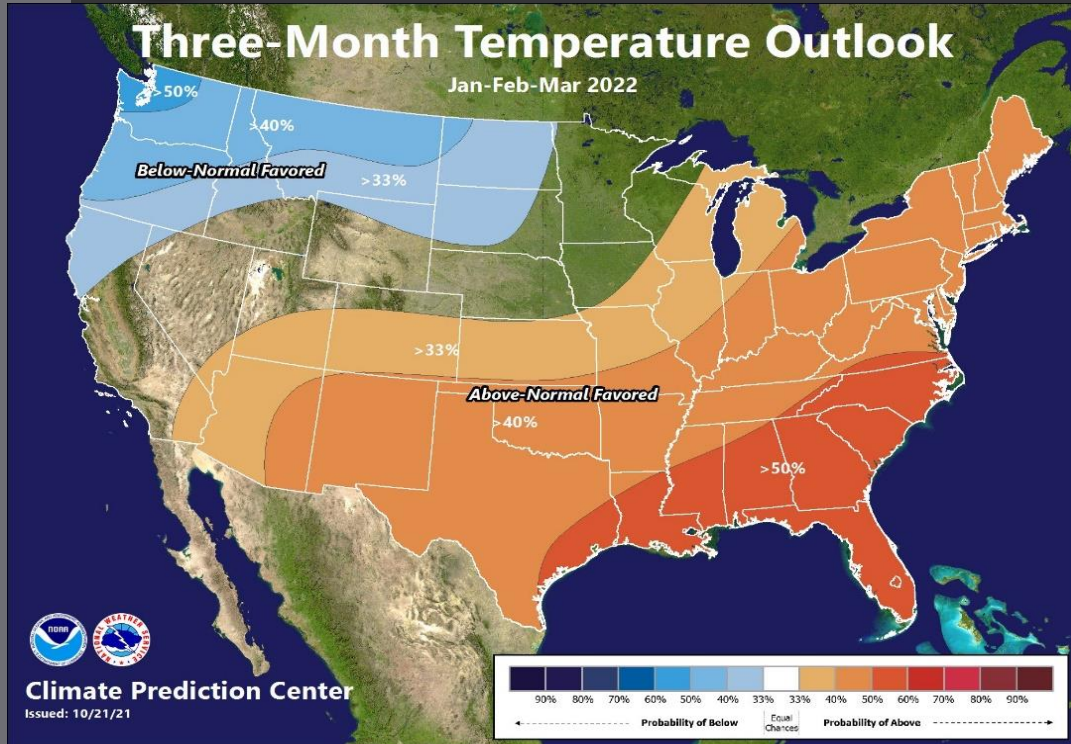
Early–October 2021 CPC/IRI Official Probabilistic ENSO Forecasts



- Forecast models are very consistent in depicting a prolonged La Niña through spring 2022
- Most climate models keep this La Niña event in the “weak” category, though there is some output forecasting a “moderate” event peaking in early 2022



# Temperature Outlook: Nov 2021-Mar 2022

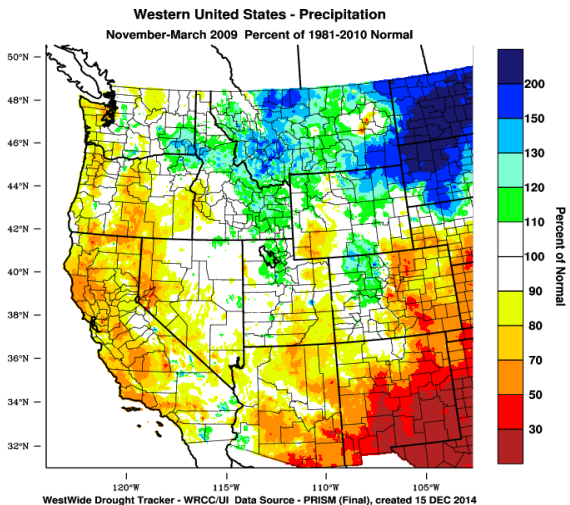


Three-month averages  
Better odds for above normal  
temperatures

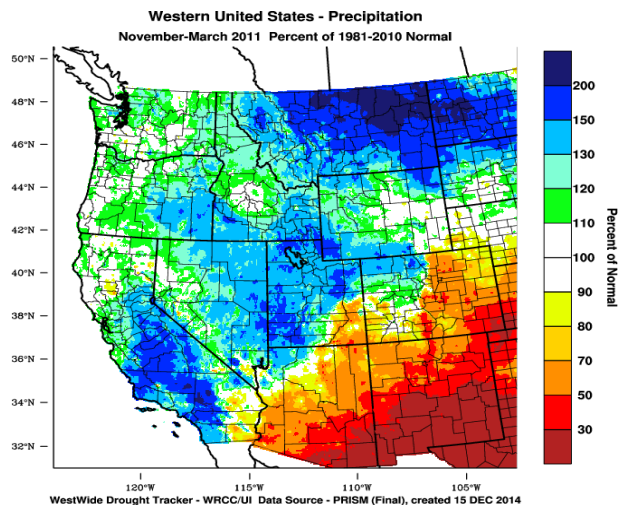
Red dots = Recent La Niña Events



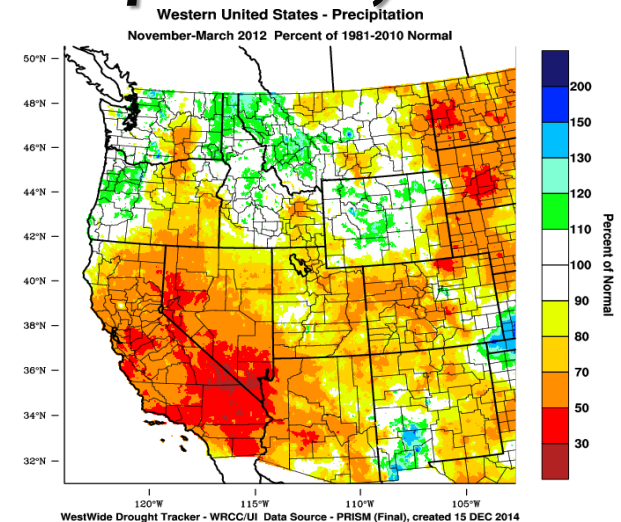
# Recent La Niña Winters (Nov-Mar Percent Average Precipitation)



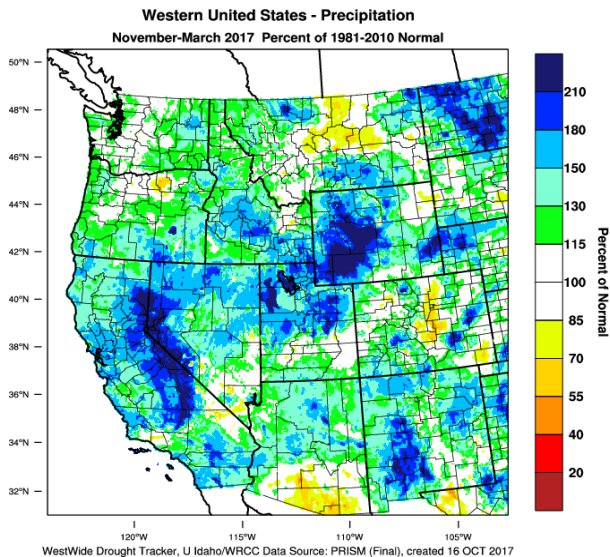
**2008-09**



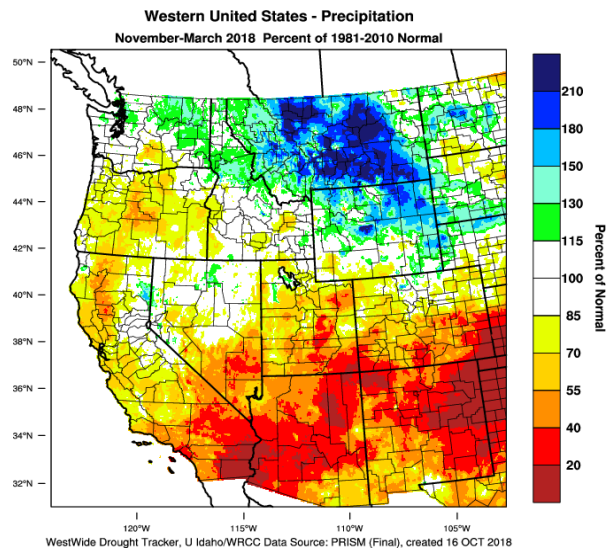
**2010-11**



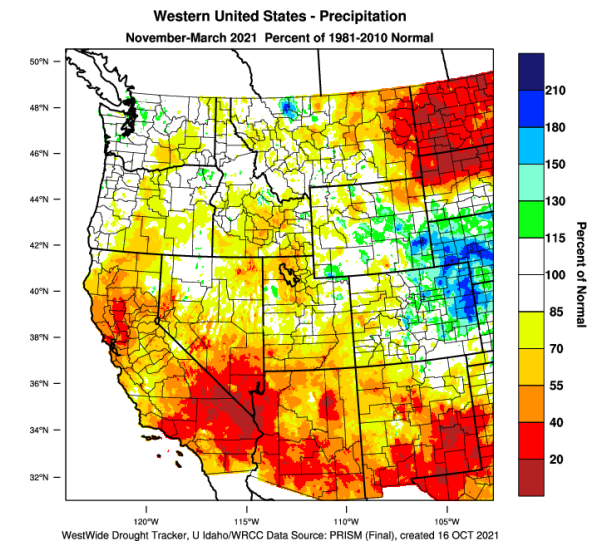
**2011-12**



**2016-17**



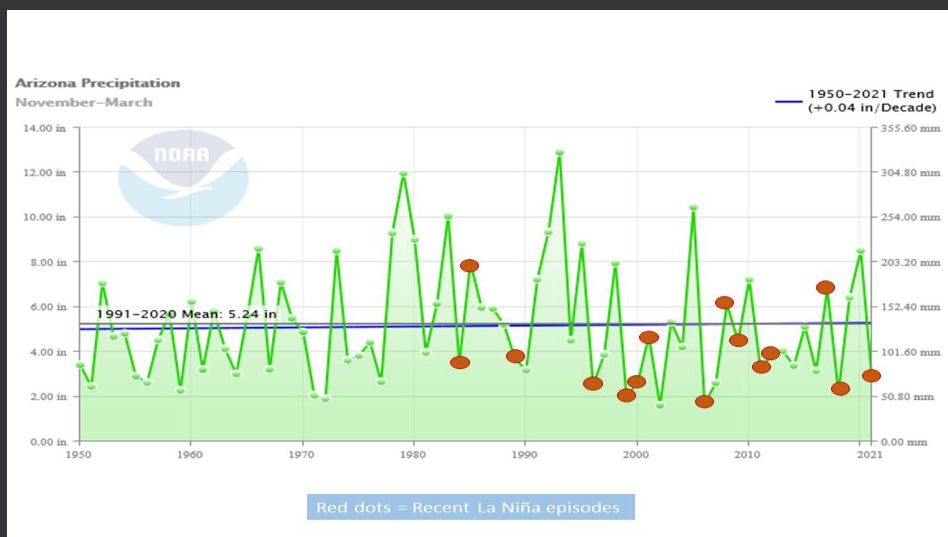
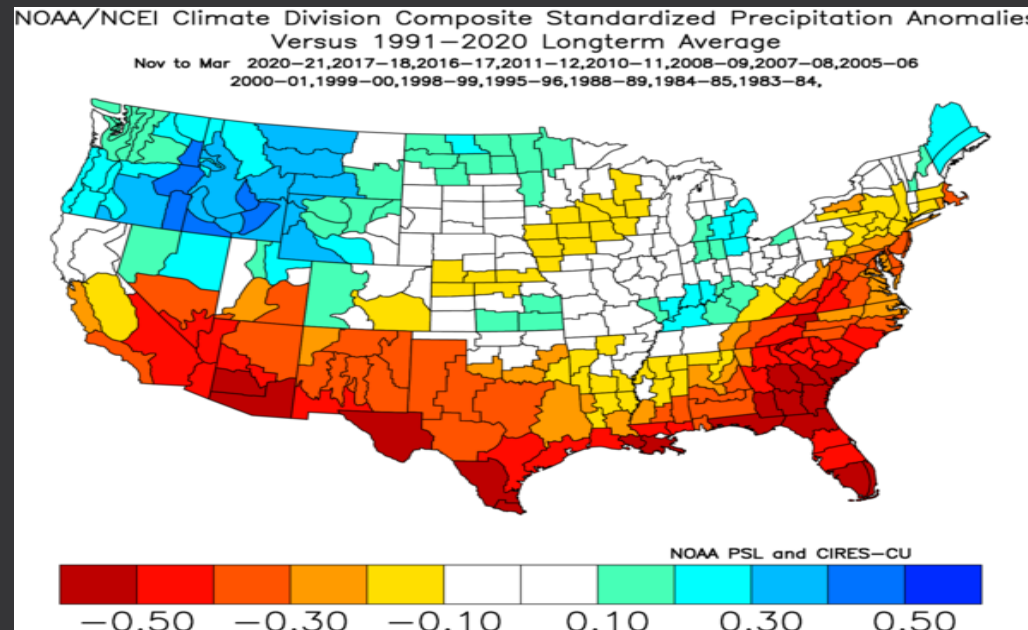
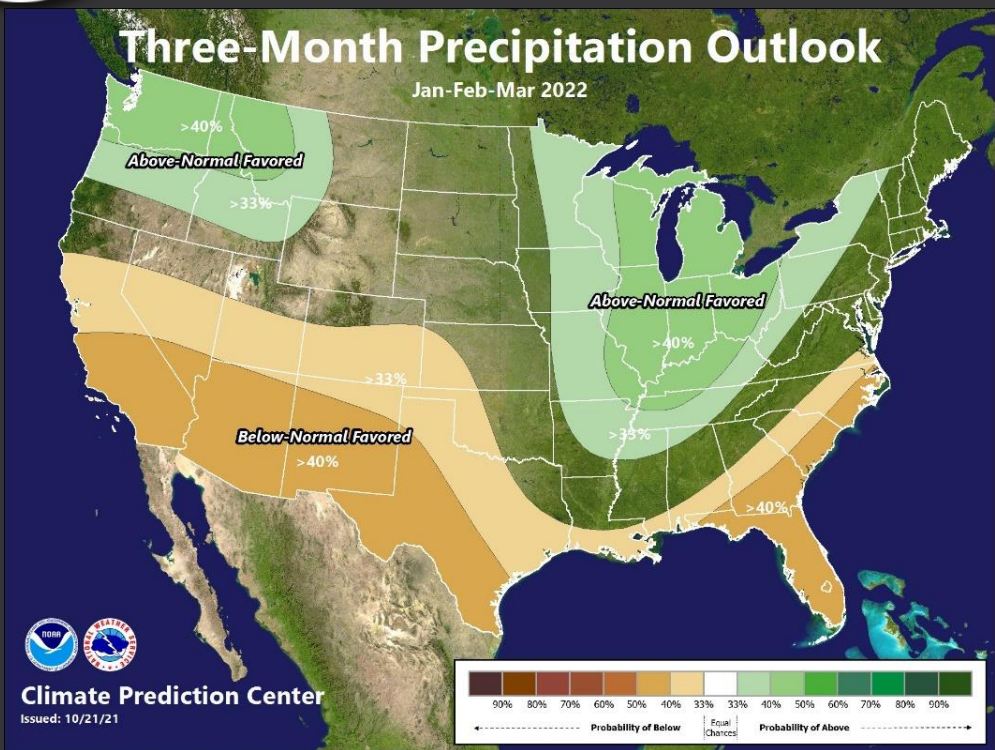
**2017-18**



**2020-21**



# Precipitation Outlook: Nov 2021-Mar 2022

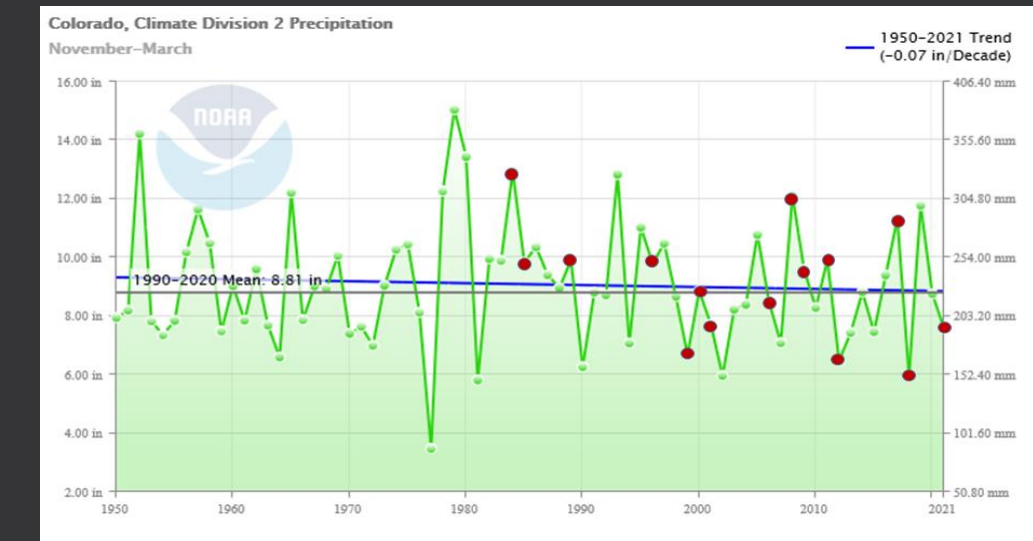
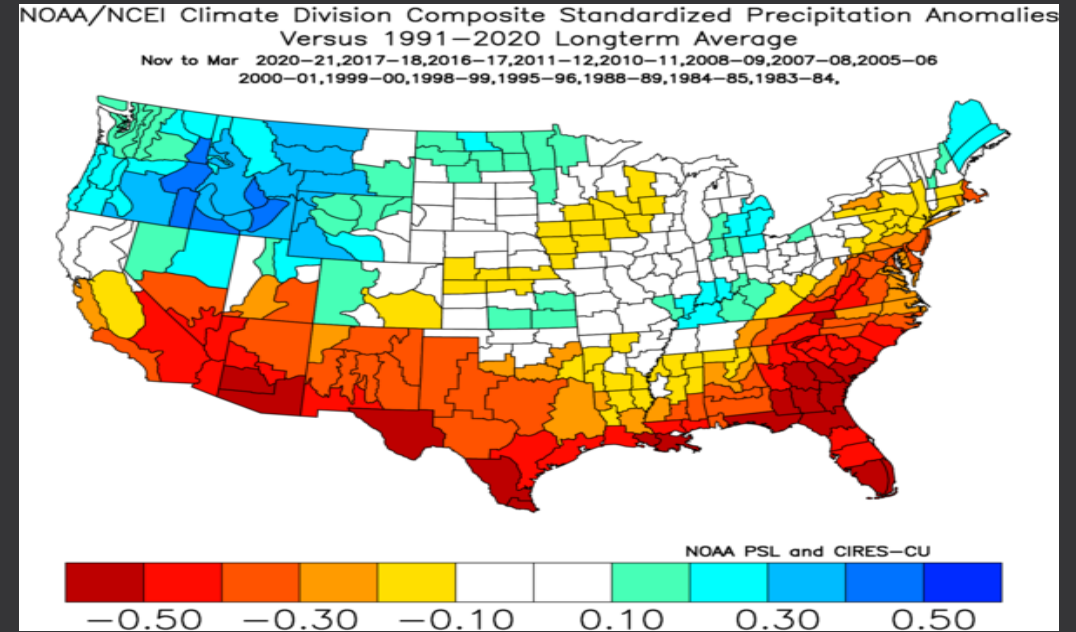
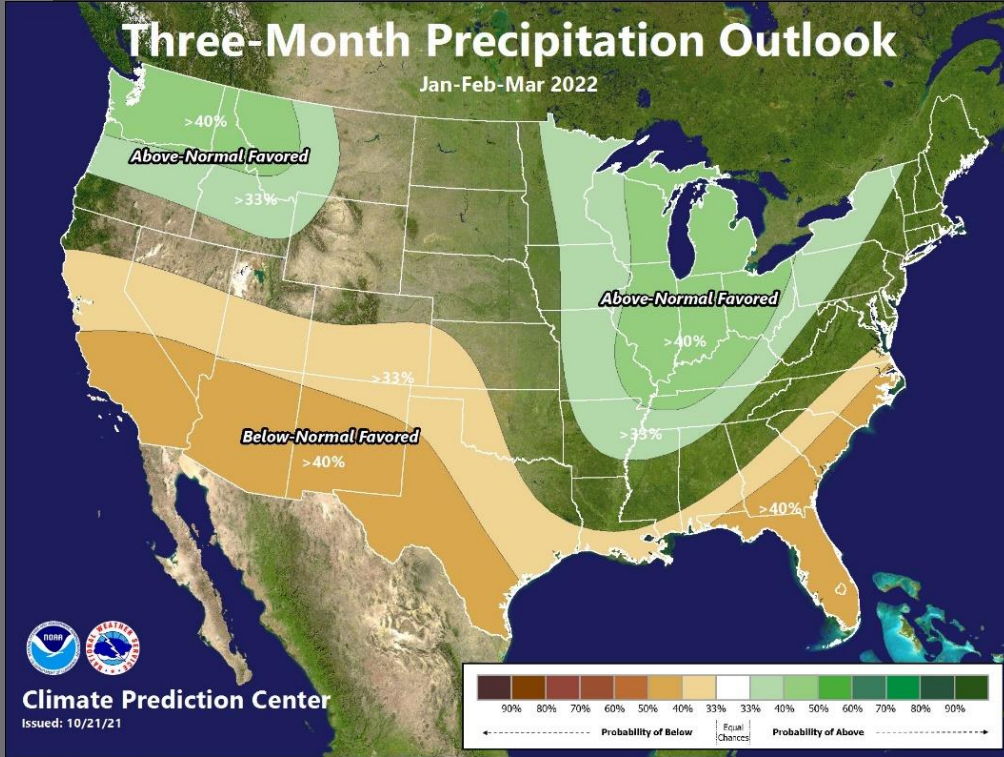


Three-month averages  
Better odds of below average  
precipitation

Red dots = Recent La Niña Events



# Precipitation Outlook: Nov 2021- Mar 2022



Three-month averages  
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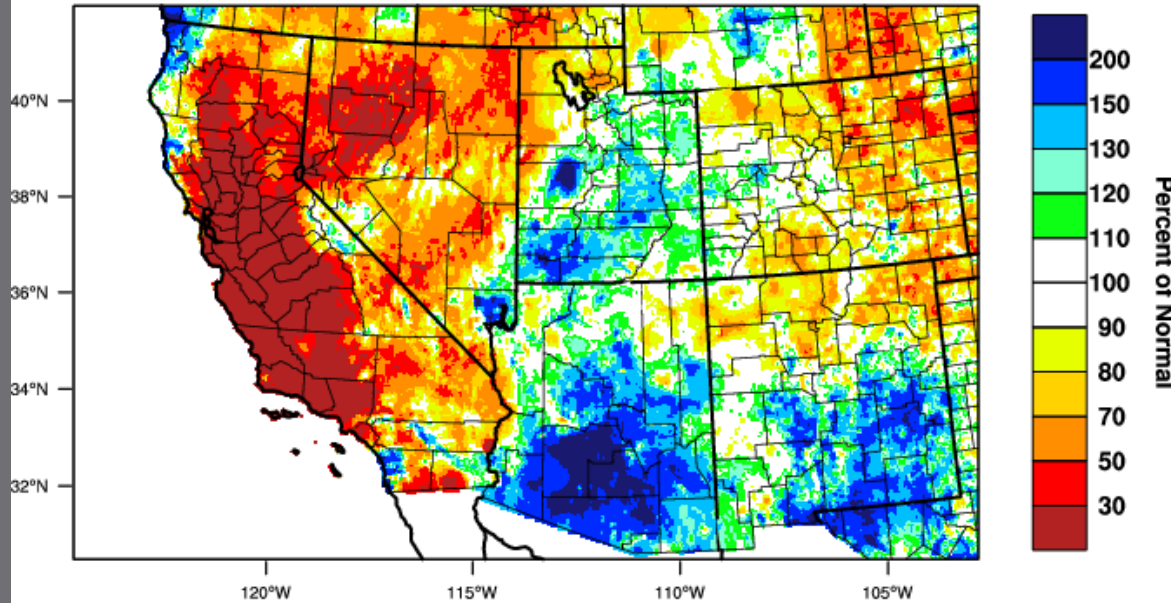
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# June-September 2021 Precipitation

## Southwest - Precipitation

June-September 2021 Percent of 1981-2010 Normal



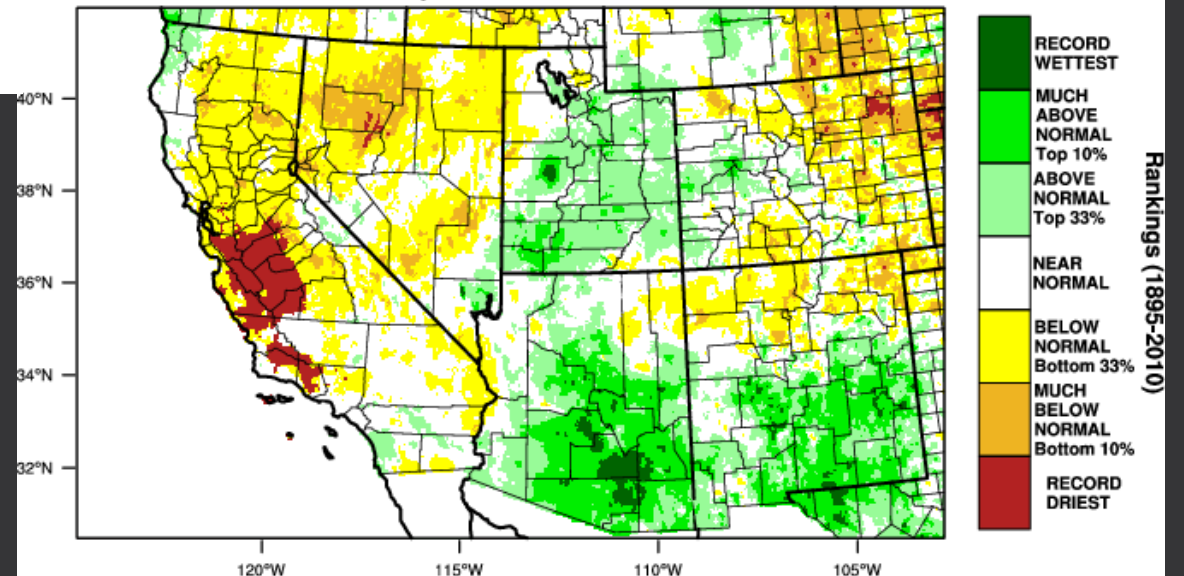
WestWide Drought Tracker - U Idaho/WRCC Data Source - PRISM (Prelim), created 16 OCT 2021

- For the bulk of Arizona, monsoon 2021 was much wetter than normal
- Soil moisture values have improved substantially, and subjectively runoff from late monsoon/early autumn rain has been efficient

- Summer rains were closer to average in NE Arizona and the Upper Colorado basin
- Soil moisture may not have responded as well, so more uncertainty regarding future runoff efficiency

## Southwest - Precipitation

June-September 2021 Percentile



WestWide Drought Tracker - U Idaho/WRCC Data Source - PRISM (Prelim), created 16 OCT 2021

Rankings (1895-2010)



# Summary

- The outlook for winter 2021-22 indicates at least weak La Niña conditions persisting through the spring 2022
- La Niña may reach moderate levels, and with only a few exceptions historically La Niña results in drier than normal conditions across Arizona
- Odds are shifted slightly towards a warmer than normal winter based on a combination of La Niña composites and trends over the past 10-15 years
- Climate models and historical La Niña composites indicate a tilt in odds towards a drier than normal winter
- Soil moisture recovery in central Arizona may aid winter/spring 2021-22 runoff, but possibly not as much recovery/aid occurred in upper parts of the Colorado basin



# Questions? Contact us!

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