



# Some Long Range Forecasts

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# Our forecast – Winter 2020-2021

- ▶ Winter Temperatures: We'll forecast these to be 0.5 sigma below normal to maybe slightly above normal. (-1.5° F below to 0.5° F above).
- ▶ The Reality: For 11 weeks, the temperature was quite warm, nearly +4.0 F. But, a mighty Polar Vortex lasting two weeks, brought temperatures 10 F below normal for February\*. The winter ended up at 31.7 F or -0.4 F below the normal. A two point forecast.
- ▶ \* the polar vortex was so strong it will 'lower' all of the 2021 temperature by 0.92 F.

# Our forecast – Winter 2020-2021

- ▶ Precipitation: we're going to stay slightly on the wet side of normal, up to 0.5 sigma above normal. (from about -0.5 inches to +1.1 inches).
- ▶ The Reality: We recorded a very dry December and February and racked up only 5.18 inches of rain for winter. This was more than 0.5 Sigma below normal. We'll award only one point.
- ▶ We projected 15 inches of snow for the winter. And roughly 16 fell. So all in all a good forecast.

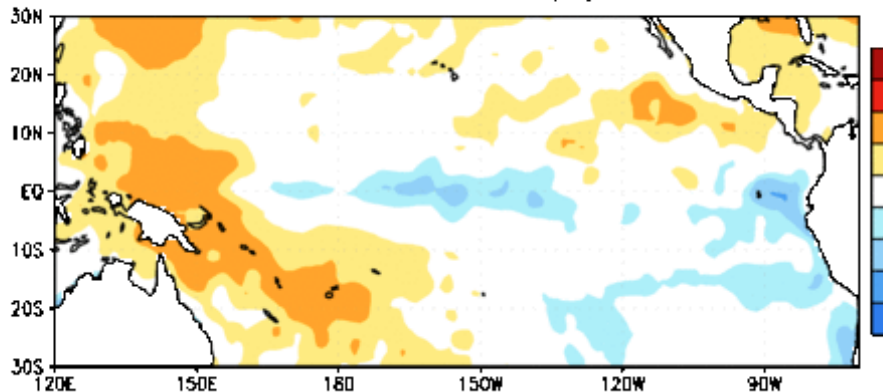
# Our forecast – Winter 2020-2021

- ▶ Reasoning: We're headed into a La Niña year (albeit weak), and we are confident in this ENSO forecast. The forecast on the December – February period we are also confident (4 of 5 with 5 being highest). This year's jet stream will not repeat last year, and most years of this type feature strong blocking during the winter. We could see an early cold spell in November.
- ▶ All in all – dead on!!!

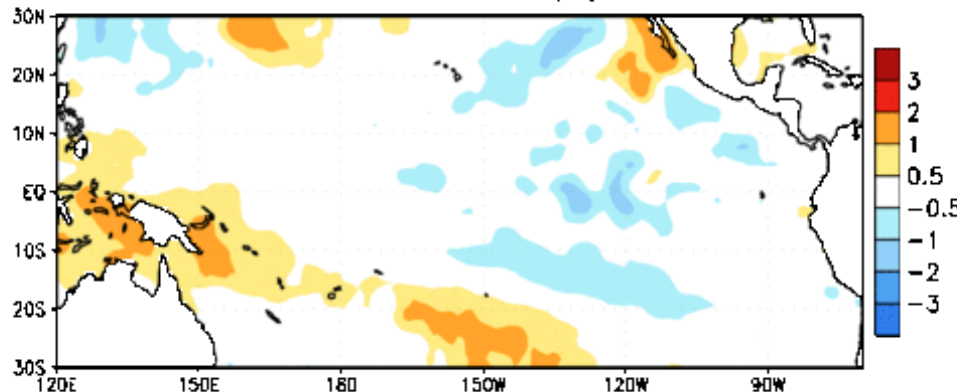
# Winter 2021-2022 (mid-MO)

- ▶ Somewhat similar tropical SSTs to last year – headed toward a repeat La Niña? See the cool anomalies along the equator. Also, cool in the west Pacific.  
<https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/enso.shtml>

Week centered on 12 AUG 2020  
SST Anomalies (°C)

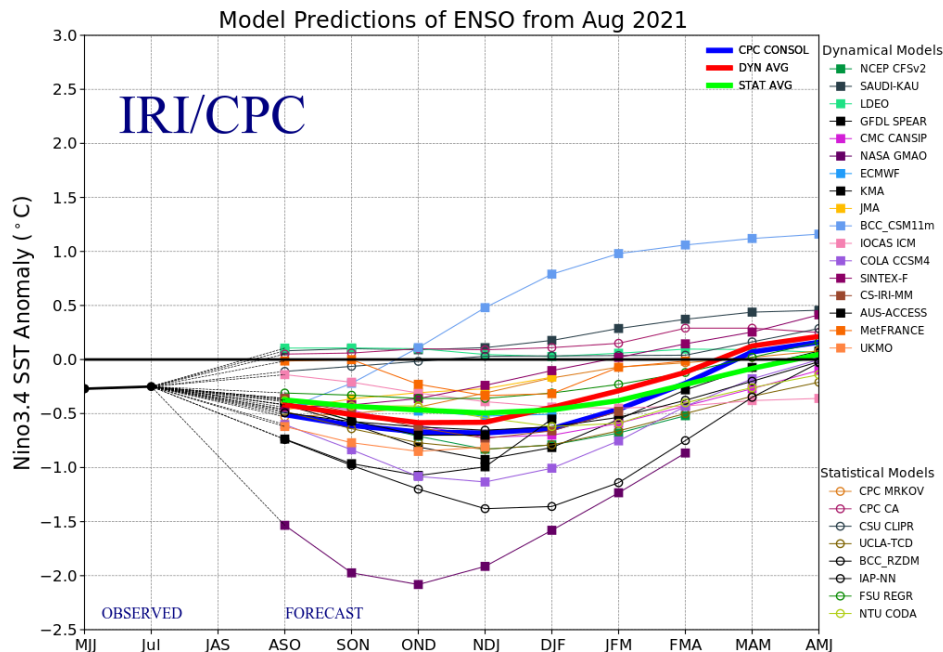


Week centered on 11 AUG 2021  
SST Anomalies (°C)



# Winter 2021 - 2022

- ▶ All models dynamic and statistical models are consistent in projecting repeat La Niña conditions.  
<https://iri.columbia.edu/our-expertise/climate/enso/>

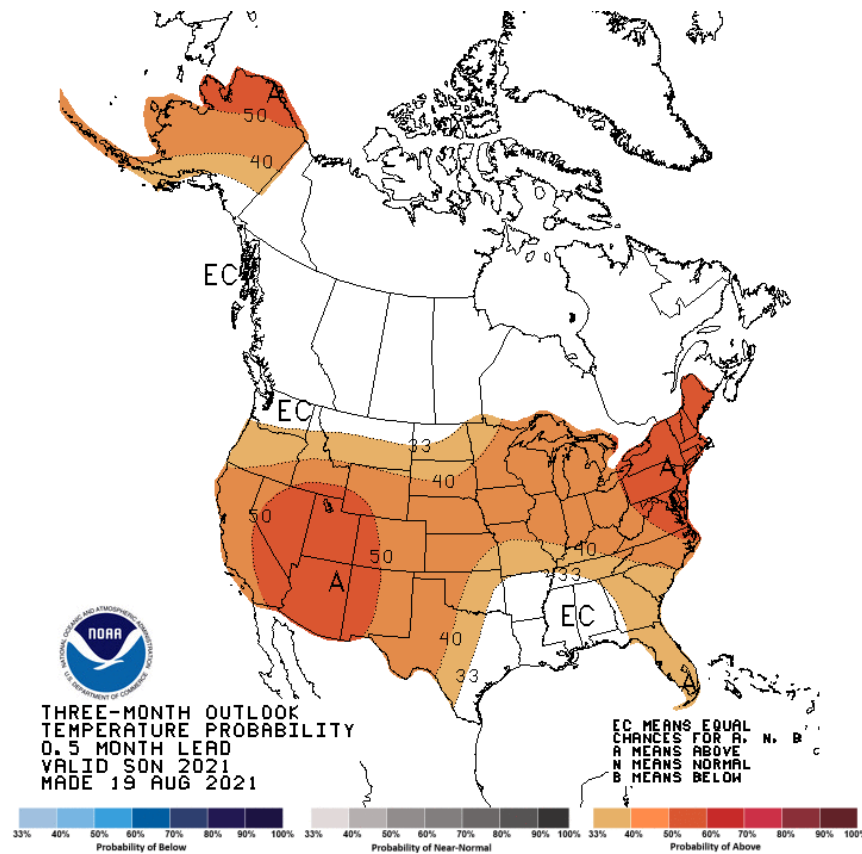


# Summer 2021 (Mid MO)

- ▶ Our temperature forecast so far is kind of good. We said about 1.0 sigma above normal (+2.0° F) for summer. We were at 1.5 F as of 20 Aug.
- ▶ As for precipitation, we projected near normal. We are dry in August, but June is so wet, we are nearly +1.0 sigma.
- ▶ Our forecast was based on the weakening La Niña and the continuation of La Niña..
- ▶ Those analogues were ok.

# Fall 2021 – CPC Forecast

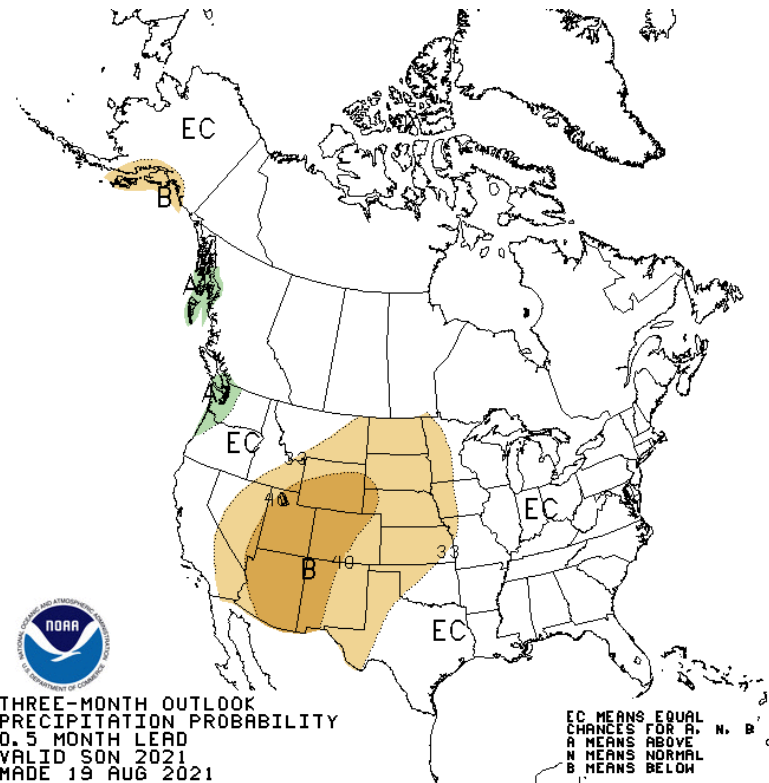
- ▶ Fall Temps – SON (above normal - similar pattern to last year – but cooler?)





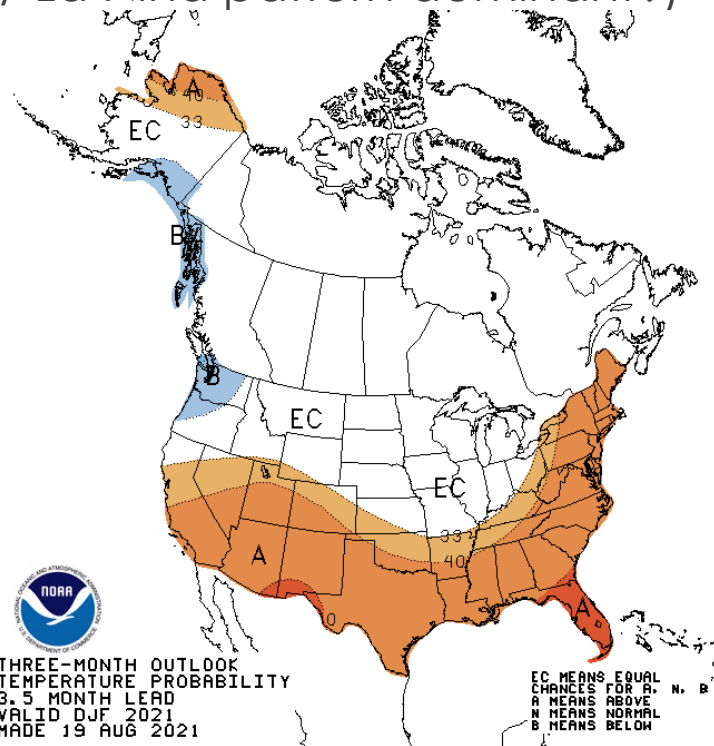
# Fall 2021 – CPC Forecast

- ▶ Fall Precipitation: SON (dry and similar to last year – dry conditions exist to our west already)



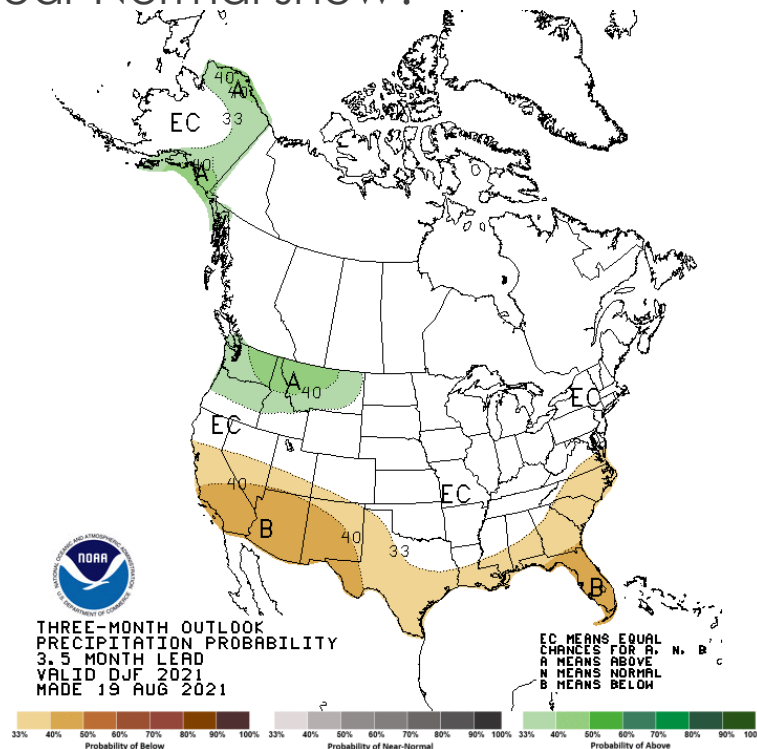
# Winter 2021 – 2022 CPC forecast

- ▶ CPC Winter temps – DJF (near normal? This forecast is like the last three years – leaning toward a ‘Classic’ positive PNA / La Niña pattern dominant?) But slightly cooler?



# Winter 2021 – 2022 CPC forecast

- ▶ CPC Winter Precipitation DJF (Maybe close to normal here? – A classic La Niña pattern) Very similar to last year? Near Normal snow?

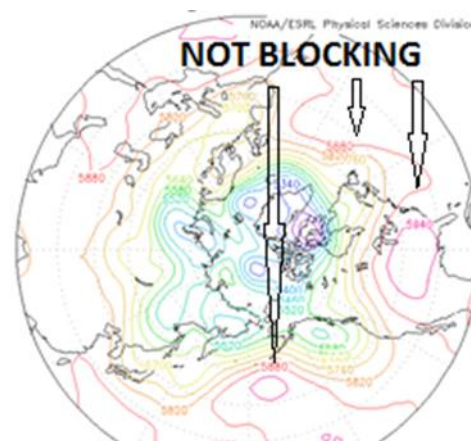
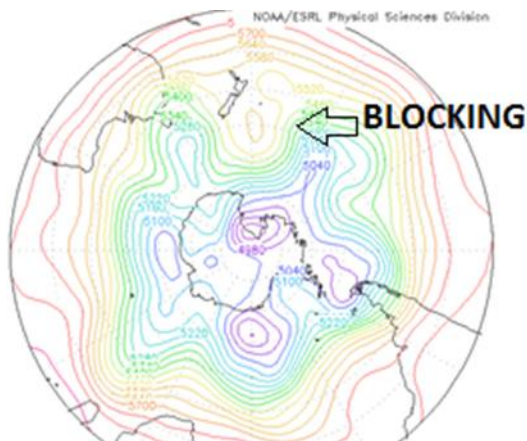


# Winter 2021 - 2022

- ▶ CPC forecast is for a typical winter temperature-wise and precipitation-wise in MO. They forecast equal chances of normal, above normal, and below normal.
- ▶ In the spring and summer, cool neutral conditions have persisted La Nina-like conditions. So maybe a repeat? The possible La Nina analogs are 1998-1999, 2007 – 2008, 2010-2011, 2017-2018, 2020-2021. Four of the five of these are cold or normal and normal precipitation.
- ▶ La Nina repeats: 1999-2000, 1974-1975, 1971 – 1972, 1955-1956. All over the place, but three of four are warmer than the previous winter.

# Our forecast – Winter 2021-2022

- ▶ What is atmospheric blocking? This semi-persistent ridging can impact our weather quite strongly. Here is some information from the leading expert on the topic:
- ▶ <http://www.globalweatherclimatecenter.com/advanced-meteorological-research-topics>



# Our forecast – Winter 2021-2022

- ▶ Last year – there was more normal blocking and the flow was more meridional (negative Arctic Oscillation ) including the strong Stratospheric Warming and Polar Vortex ‘split’ in February.
- ▶ Winter analogs on blocking to the five recent La Nina winters – features very strong Atlantic or Pacific Region blocking.
- ▶ Given these realities, I would expect at least blocking similar to those winters and a mainly negative AO this year.

# Our Winter Forecast 2021 - 2022

- ▶ For temperature, we'll stay to the warm side on normal, roughly 0.5 sigma (1.0 – 2.0 F above normal). Similar to the last few years: some early and late season cold.
- ▶ Precipitation, we're going to stay slightly on the wet side of normal, up to 0.5 sigma above normal. (from about -0.5 inches to +1.1 inches). Similar to last year.
- ▶ Snow: Warmer doesn't always mean less snow, we'll say roughly 15 – 20 inches this year.

# Our Winter Forecast 2021 - 2022

- ▶ Reasoning: La Nina years tend to bring stronger blocking in the key regions of the Pacific and Atlantic that influence our temperatures. Also, La Nina repeats are invariably warmer than their previous year. While it's a small sample, these associations can be robust, although the probability of failure can be high. Still, this year's La Nina looks quite similar to last year's. While we're a little less sure than last year (4) we'll say about 3.5 – 4 this year.

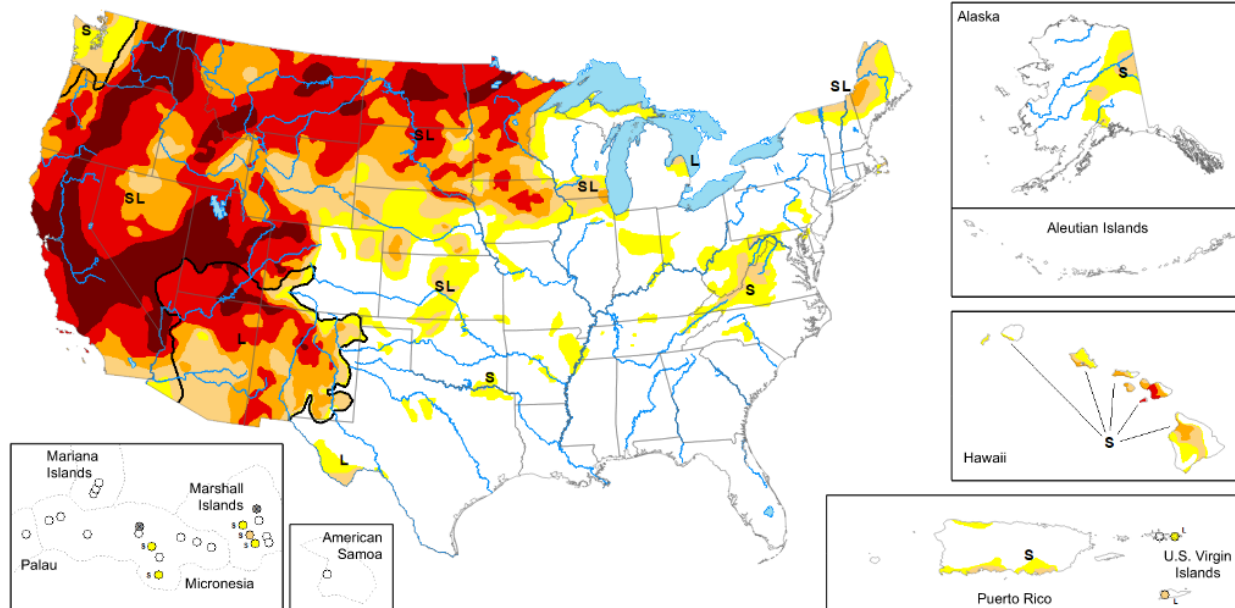


# National drought map

**Currently: MO is in good shape.** As of 19 August, 2021 – summer has seen Devastating drought to the west and north. But, very little drought in MO.

Map released: August 19, 2021

Data valid: August 17, 2021



# CoCoRaHs

- ▶ Please consider joining CoCoRaHs. This data will be used by agencies to decide crop loss information. It's worth it to you to join Missouri CoCoRaHs. (State Climatologist Patrick Guinan)
- ▶ <http://www.cocorahs.org>
- ▶ Email: [lupoa@missouri.edu](mailto:lupoa@missouri.edu)

