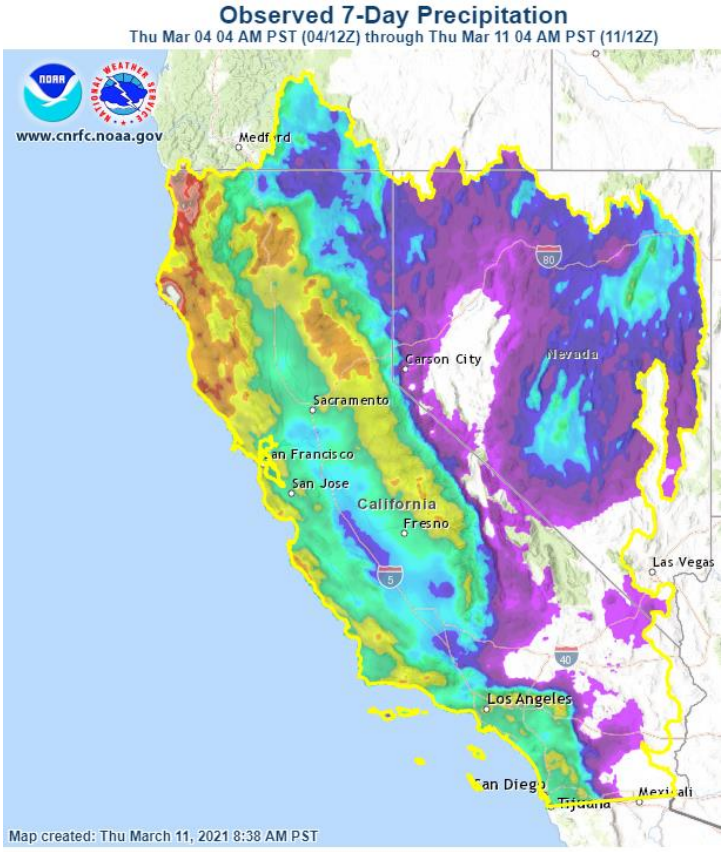
WY2021 Water Resources Update – March 11th, 2021

Summary:

- Short and medium range forecasts indicate there is not much hope for a “Miracle March”.
- What about an “Awesome April”? Long range forecasts do not look promising.
- Quickly running out of time for any meaningful late season snowpack recovery.
- Anticipating reduced runoff efficiency this year due to extremely dry soils.

Wet start to March



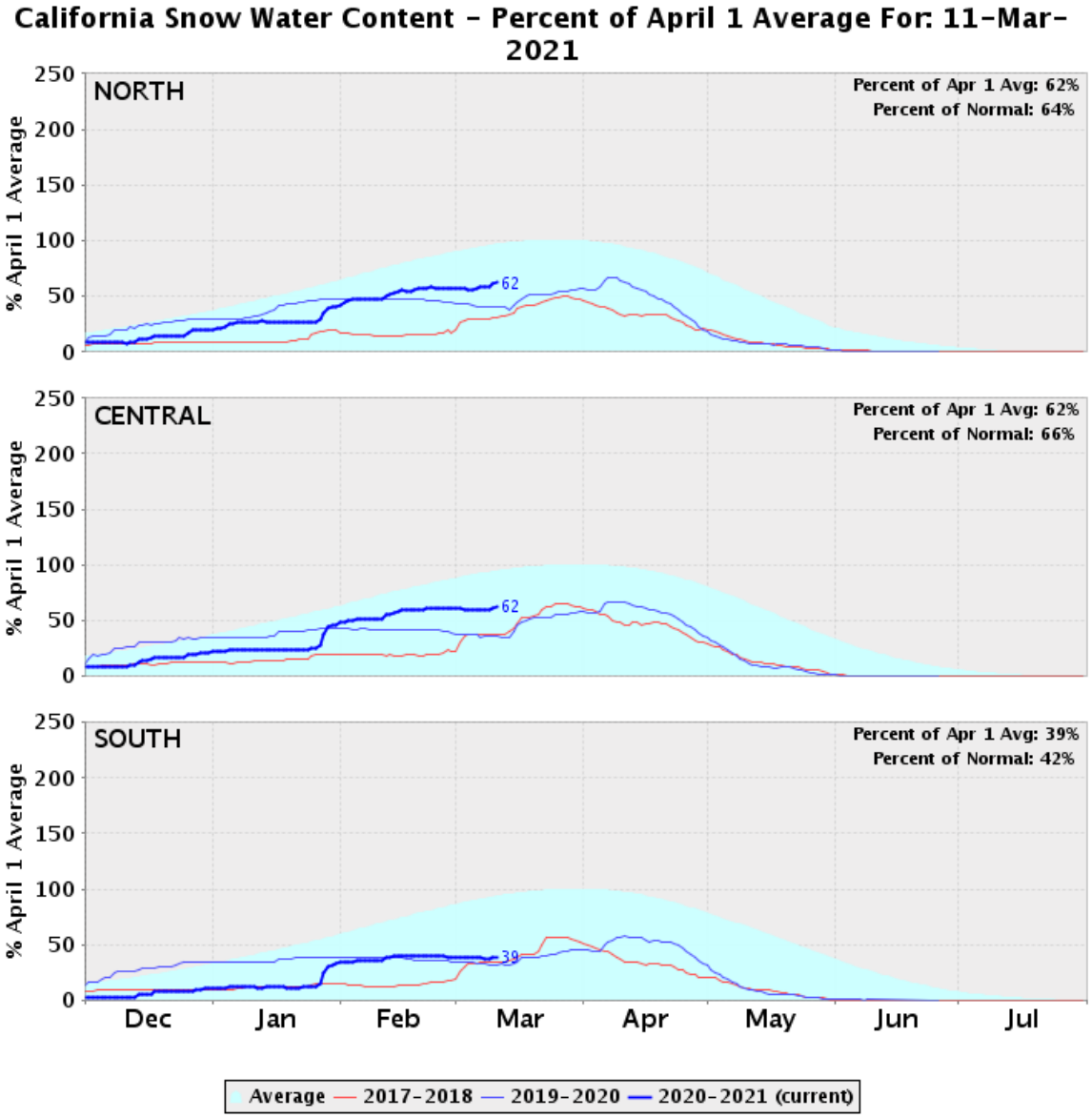
Source: www.cnrfc.noaa.gov

March got off to a nice start with widespread precipitation across the region. Many locations from the Shasta drainage through the Sierra received 1-3 inches of precipitation over the past week, with a few higher amounts reported along the north coast as shown in the figure to the left. Another round of precipitation will impact the area on Sunday into Monday, which will bring another 0.5-1.5 inches of precipitation to the Sierra. As we look ahead into early spring, it is looking likely that we will make it through the wet season without a single official forecast location hitting flood stage and without any weir flow on Sacramento River system.

Current conditions

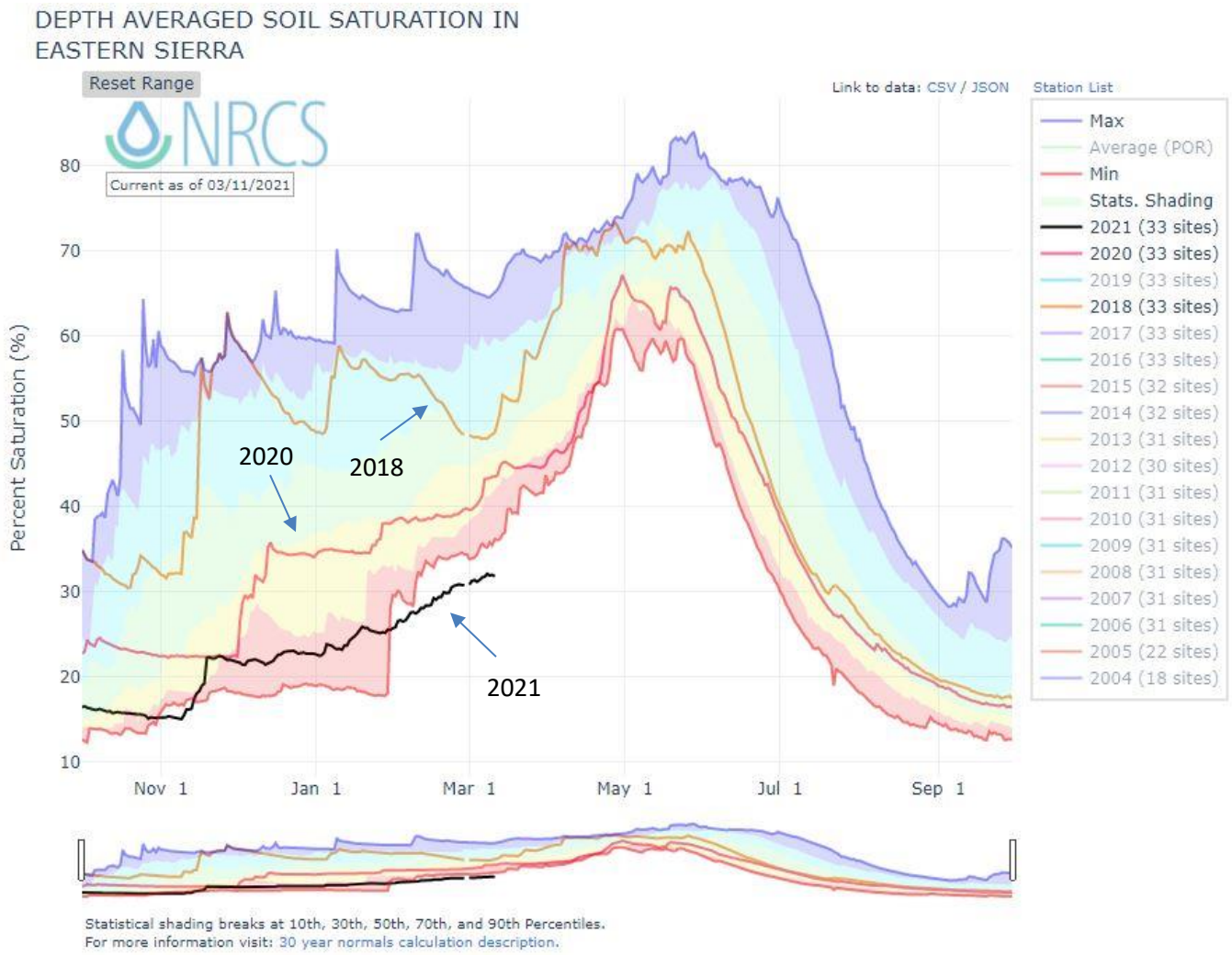
Current snowpack conditions across the region range from below normal across northern CA and Nevada, to extremely below normal in the southern Sierra where many snow pillows are reporting 30-50% of an average snowpack. The snowpack across the northern and central Sierra is a bit better at around 60% of normal.

The northern and central Sierra snowpack is currently tracking a bit ahead of 2018 and 2020, while the southern Sierra is tracking very closely as shown in the figure below. With only light precipitation in the short-term forecast, expect the current snowpack to receive only a slight increase over the next week or so. Another thing to note in the figure below is the nice bump in snowpack we saw last year during the first half of April. While this is not common, there is still some hope for impactful storms in late March and early April.



Source: https://cdec.water.ca.gov/snowapp/swcchart.action

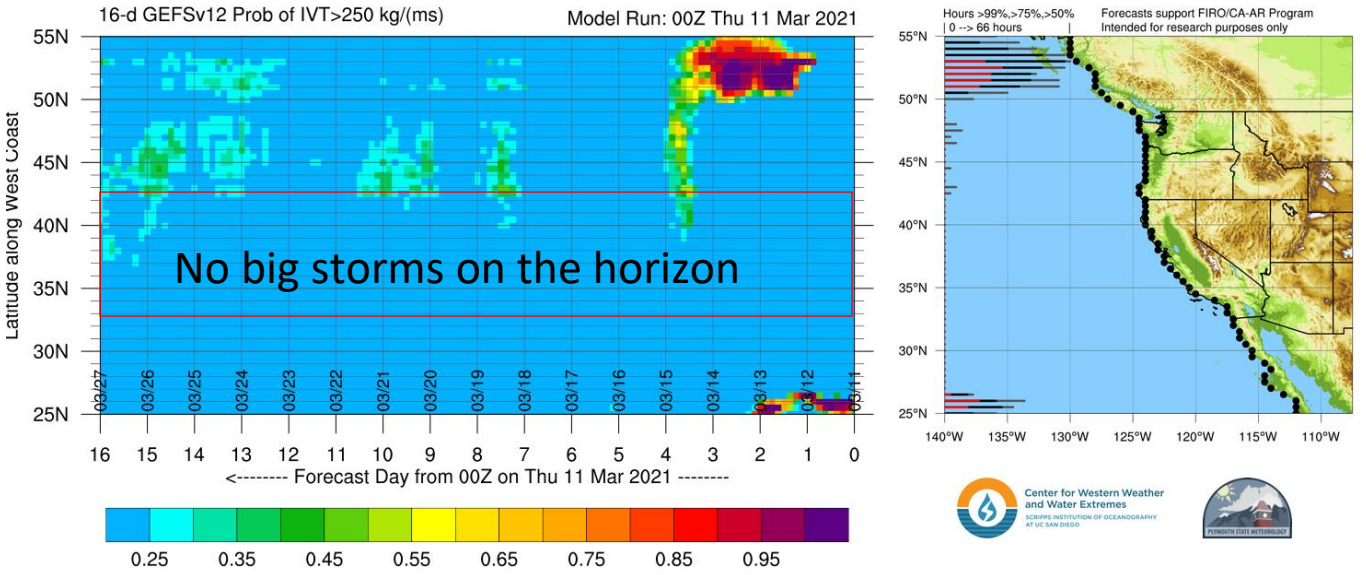
One thing that stands out this year compared to 2018 and 2020, and really all other recent years, is the extremely dry soil conditions. Lack of rainfall throughout the 2021 water year has left the soil moisture depleted below the snowpack. We anticipate this will lead to poor runoff efficiencies this season as some of the snowmelt will be lost to filling soil moisture deficits rather than translating to runoff. The figure below shows the average soil moisture conditions across SNOTEL sites in the eastern Sierra, which reveal record dry conditions for water year 2021 (note the period of record is relatively short for most sites at around 15 years). Similar dry soil moisture conditions exist on the west side of the Sierra and the Humboldt basin in Nevada as well.



Source: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/nv/snow/products/?cid=nrcseprd1685435

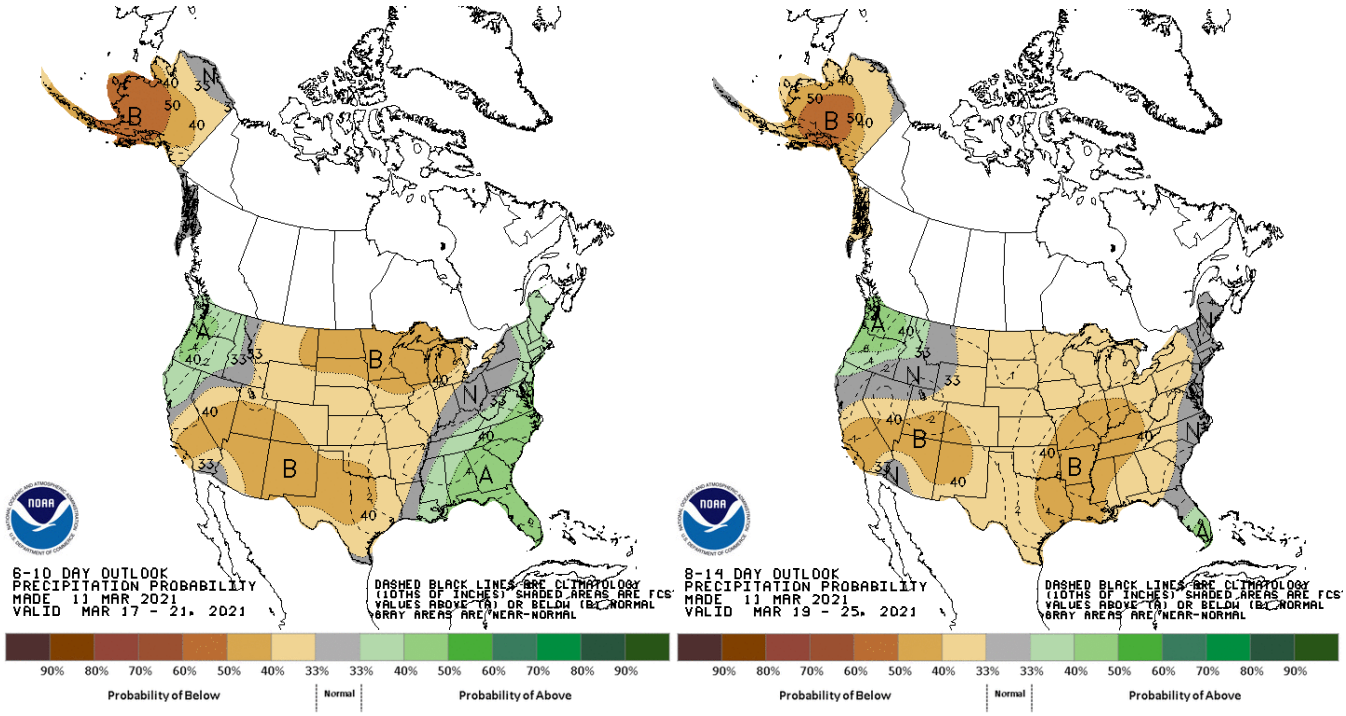
Medium range forecasts

The Atmospheric River (AR) Landfall Tool from CW3E pictured below shows all is quite out in the Pacific. With no large moisture transport in sight for the next 2 weeks, expect any storm systems that do come through to be on the light to moderate side. The European ensemble (not pictured) also shows a similar weather pattern through the next 2 weeks.



Source: http://cw3e.ucsd.edu/iwv-and-ivt-forecasts/#LFT

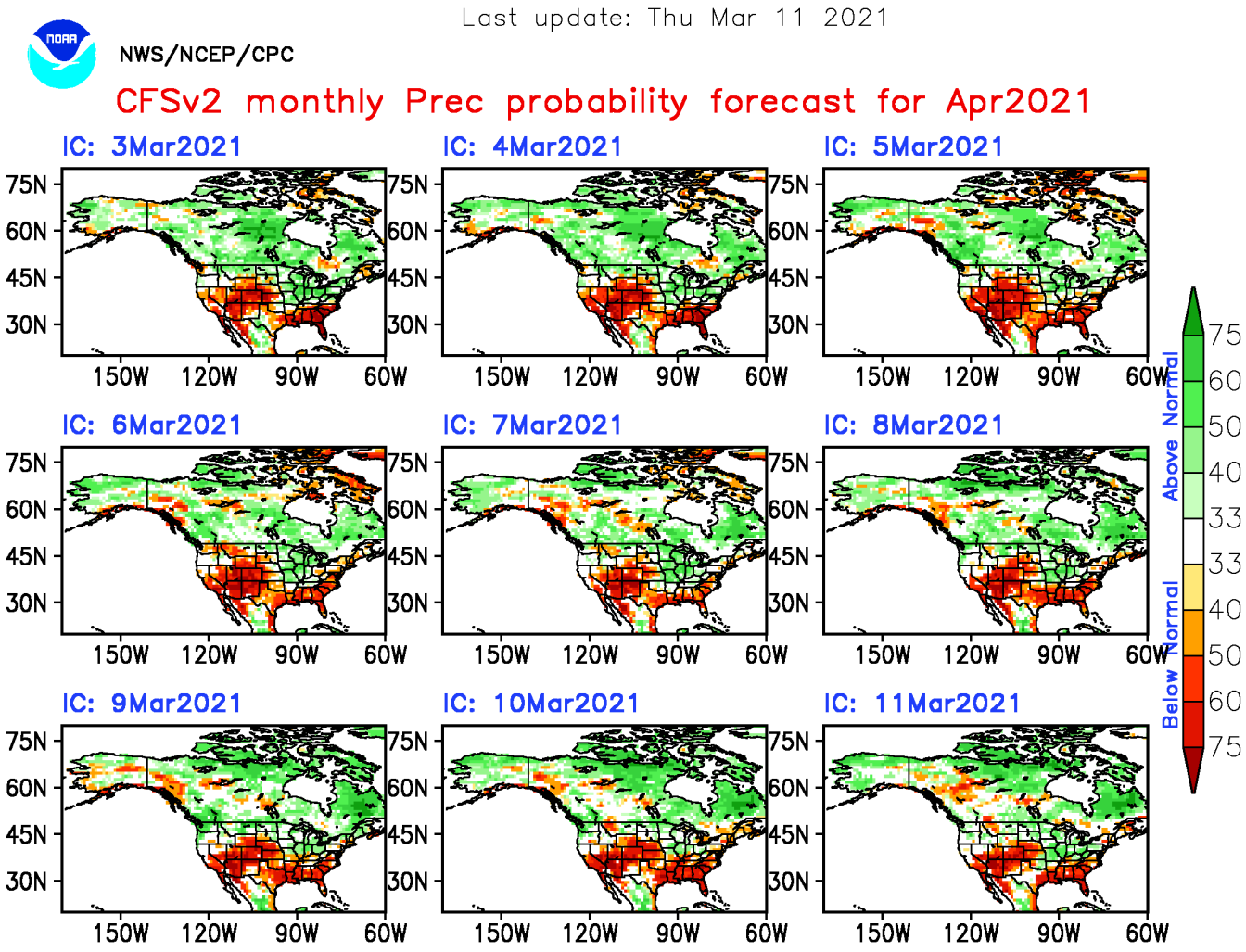
The latest medium range precipitation outlooks from the Climate Prediction Center shown in the graphics below indicate near neutral chances for above average precipitation across northern and central CA, with lower probabilities across much of southern CA for the next 2 weeks.



Source: https://www.cpc.ncep.noaa.gov

April outlook

The monthly climate anomaly forecast from the NCEP version 2 coupled forecast system model (CFSv2) below shows increased probabilities for below normal precipitation for the month of April across much of central and southern CA. In fact, the model indicates a high probability for much of the west to remain dry south of approximately 45 degrees latitude. Chances are more neutral across much of norther CA with the transition line near the I-80 corridor in recent model runs.



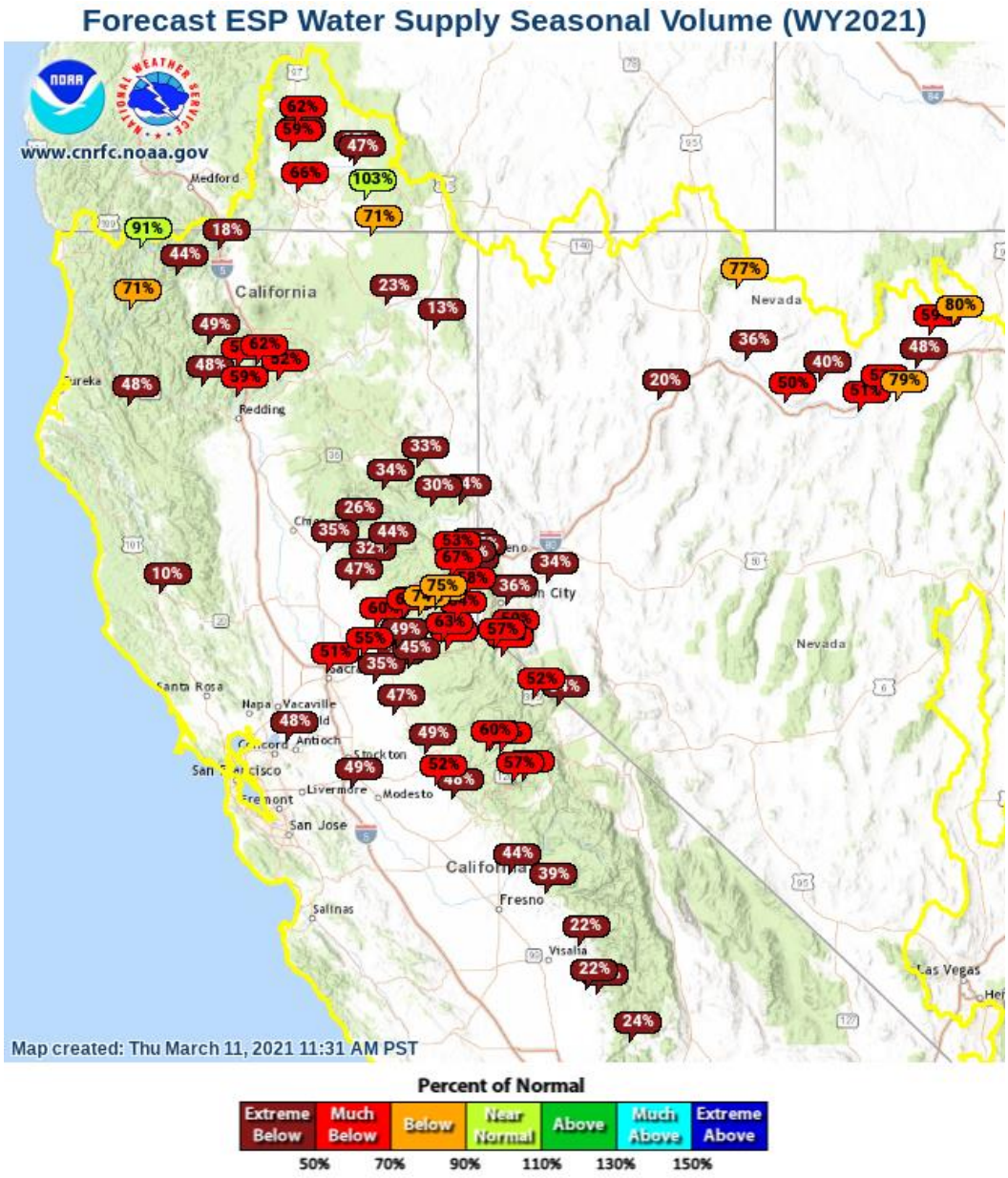
Source:
https://www.cpc.ncep.noaa.gov/products/people/mchen/CFSv2FCST/monthly/images/summaryCFSv2.NaPrecProb.202104.gif

Water supply forecasts

As you could probably guess by this point, April-July water supply forecasts remain well below average across the region, with many forecasts below 50% of average as shown in the figure below. Forecasts have remained mostly steady in many areas through the first week of March, but forecasts will begin falling if more storms do not materialize in the latter half of the month.

As mentioned above, we currently have large soil moisture deficits this year, which will add another layer of uncertainty to the water supply forecasts. This **could** lead to

underperformance in the runoff forecasts and skew observed volumes more towards the drier range of those forecasts, or even outside the current range of those forecasts. Recall that ensemble forecasts generated by the CNRFC only account for future precipitation uncertainty and do not account for hydrologic uncertainty. This is something to keep in mind when evaluating the range of possibilities in our water supply forecasts.



Source: www.cnrfc.noaa.gov

Conclusion

With no big storms on the horizon, we are quickly running out of time for any meaningful late season snowpack recovery. Snowpack conditions are well below average across the area with little precipitation expected in the short term forecast. Extremely dry soil conditions below the snowpack are expected to reduce runoff efficiency as the snow begins to melt in the coming weeks.