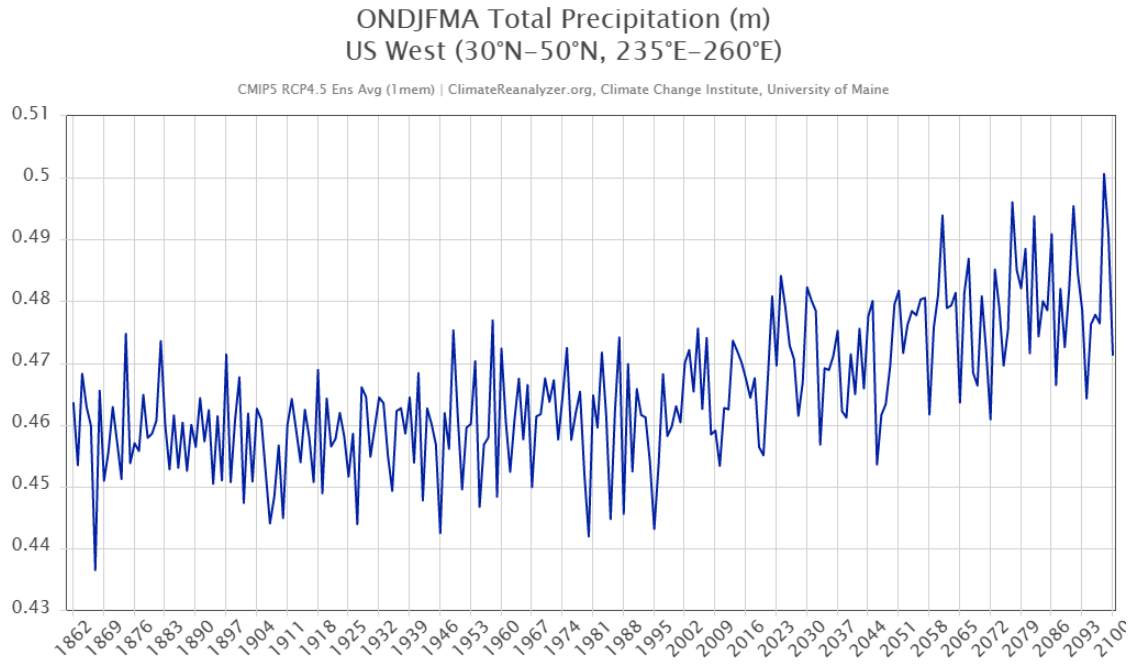
From: Deirdre Des Jardins <ddj@cah2oresearch.com>
Sent: Wednesday, February 21, 2024 1:16 PM
To: Delta Council ISB <DeltaCouncilISB@deltacouncil.ca.gov>

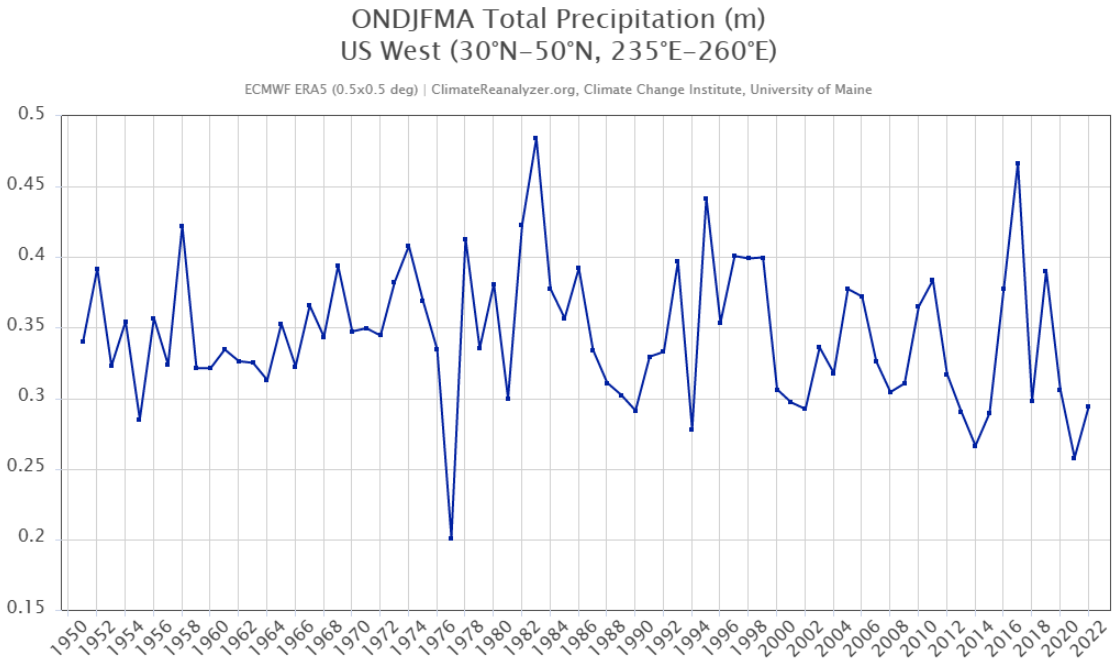
Subject: CMIP5 models project wetter trends than observed in western US

Observed precipitation trends in the western US in the 21st century are significantly drier than CMIP5 and CMIP6 model projections.
The CMIP5 ensemble mean projects wetter trends in the 21st century than observed, as well as more precipitation than observed in the historical period.

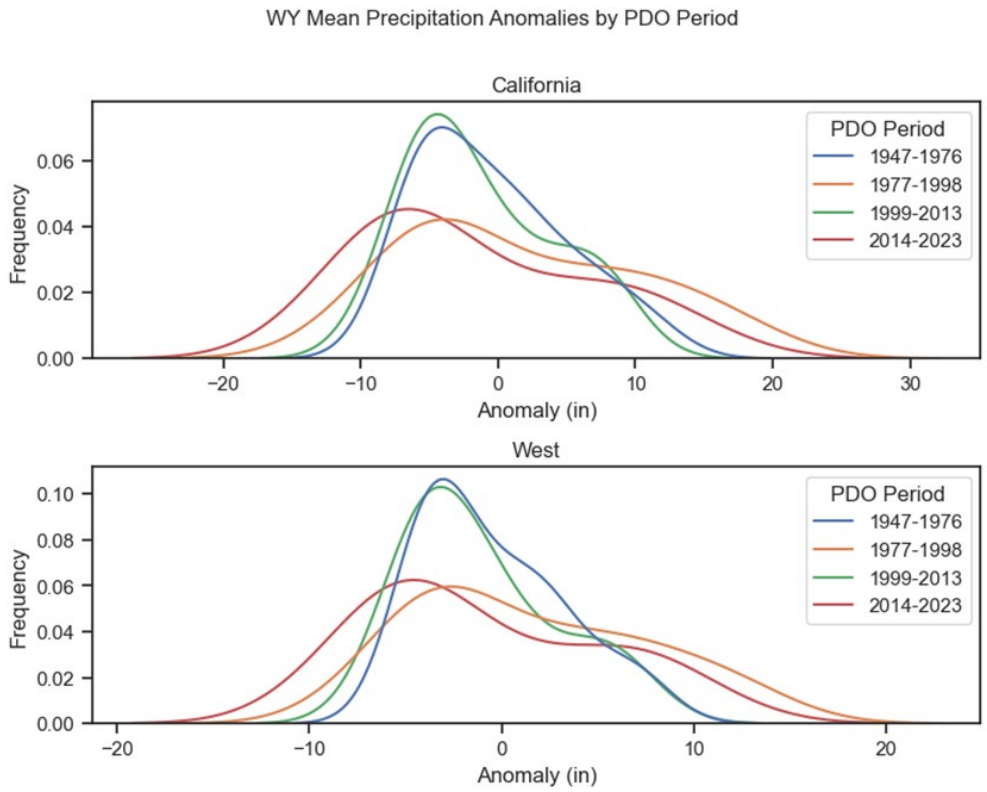
These are the CMIP5 projections for the western US for Oct - April (from Climate Reanalyzer.)



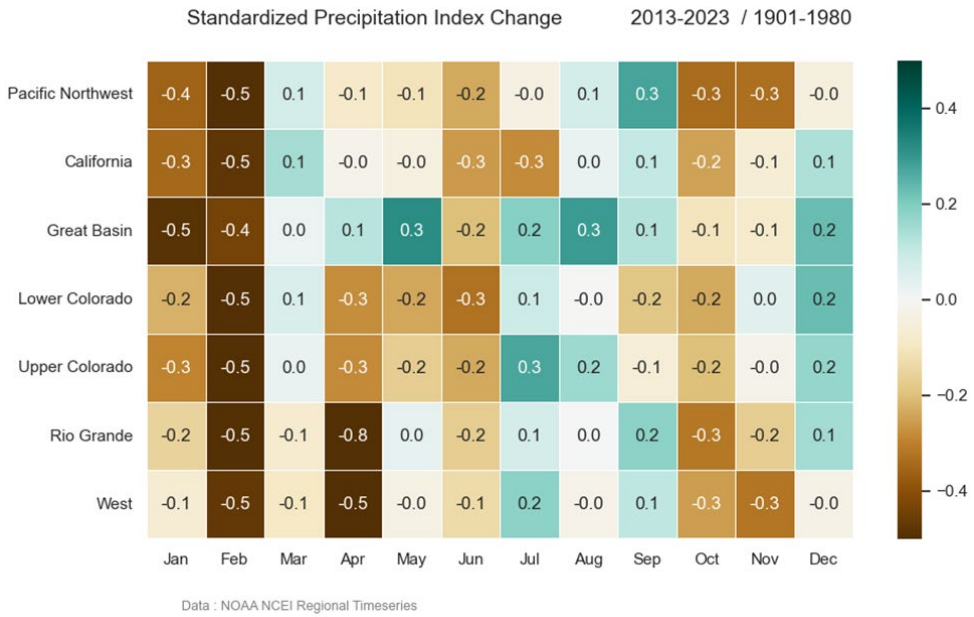
The chart below shows Oct - April precipitation in the western US, from the ECMWF ERA5 reanalysis dataset. Not only has precipitation ***not*** increased in the 21st century, there has also been a significant increase in dry periods.



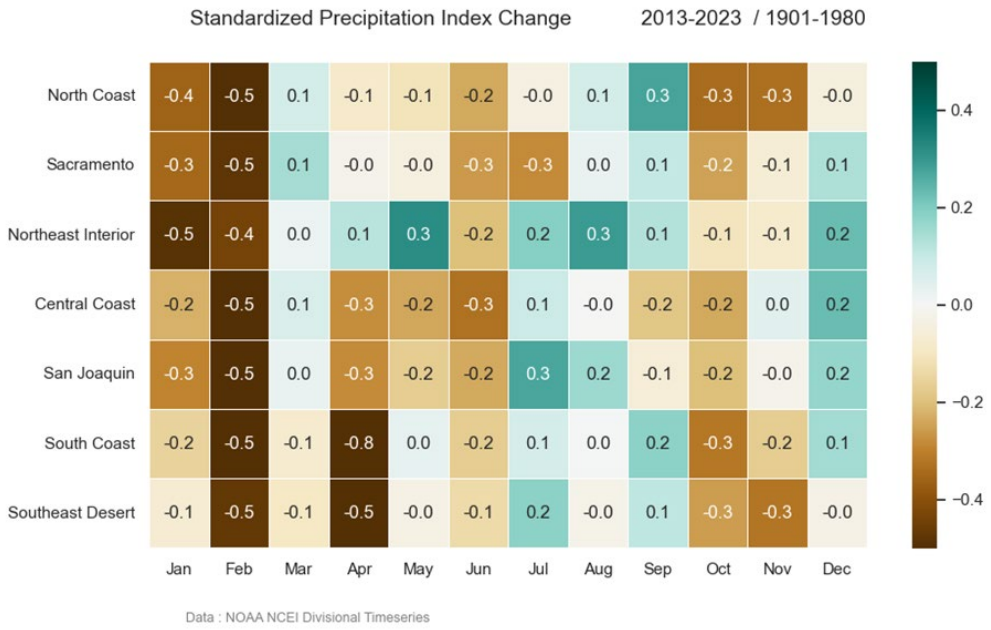
I used kernel density estimation to plot the change in the distribution of precipitation anomalies by Pacific Decadal Oscillation period. In the last decade, the precipitation distribution has flattened We're seeing both wetter wets and drier dries, and less in the middle.



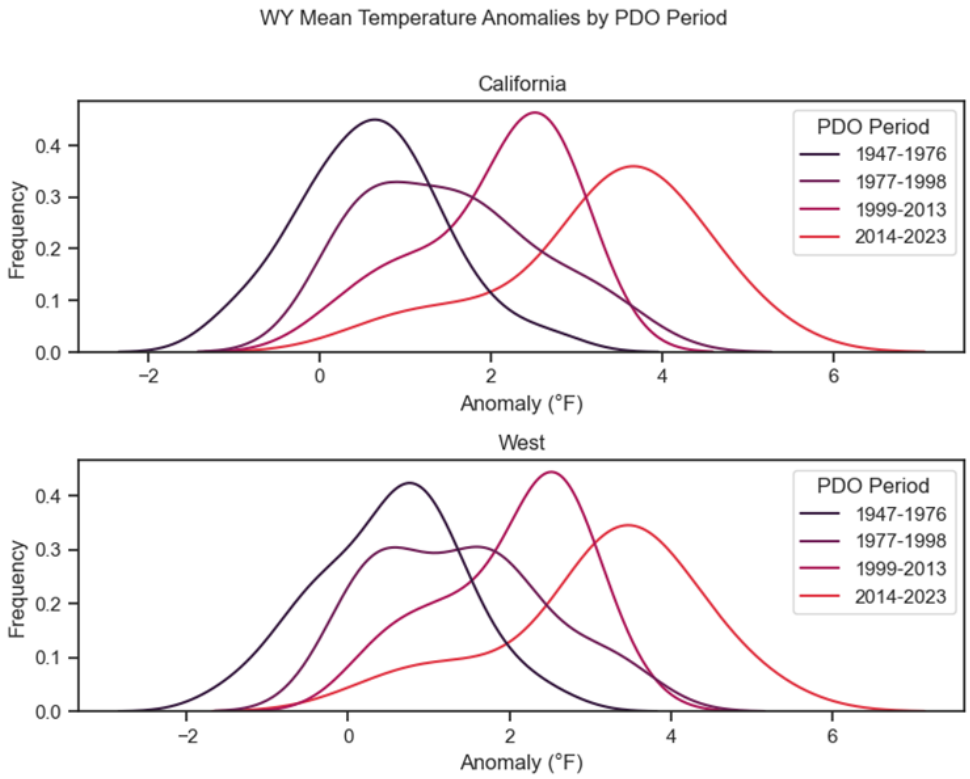
Here's the Standardized Precipitation Index across the western US:



And across California climate divisions:

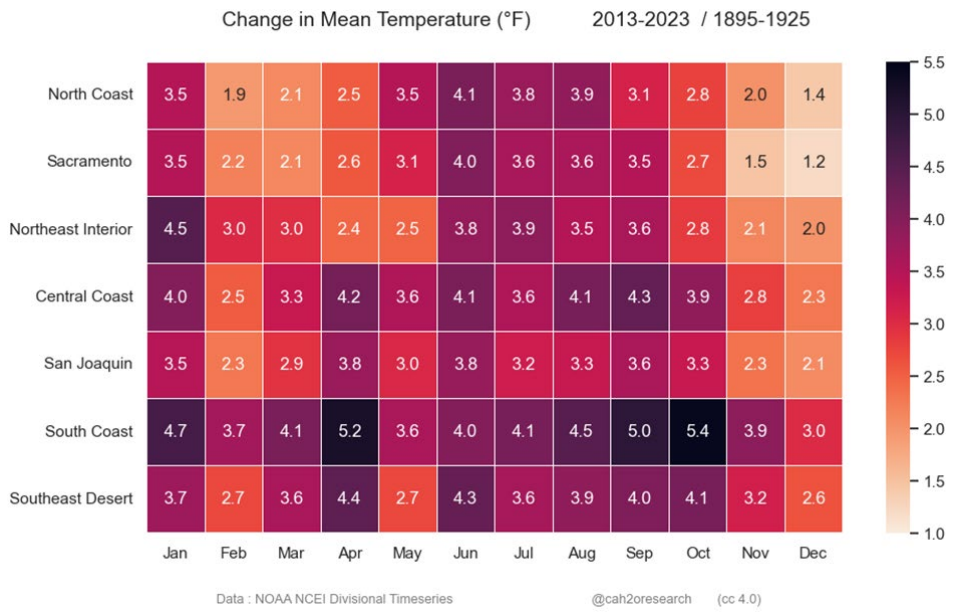


It has also been getting much hotter across the west, which results in an increasing share of precipitation going to evapotranspiration.

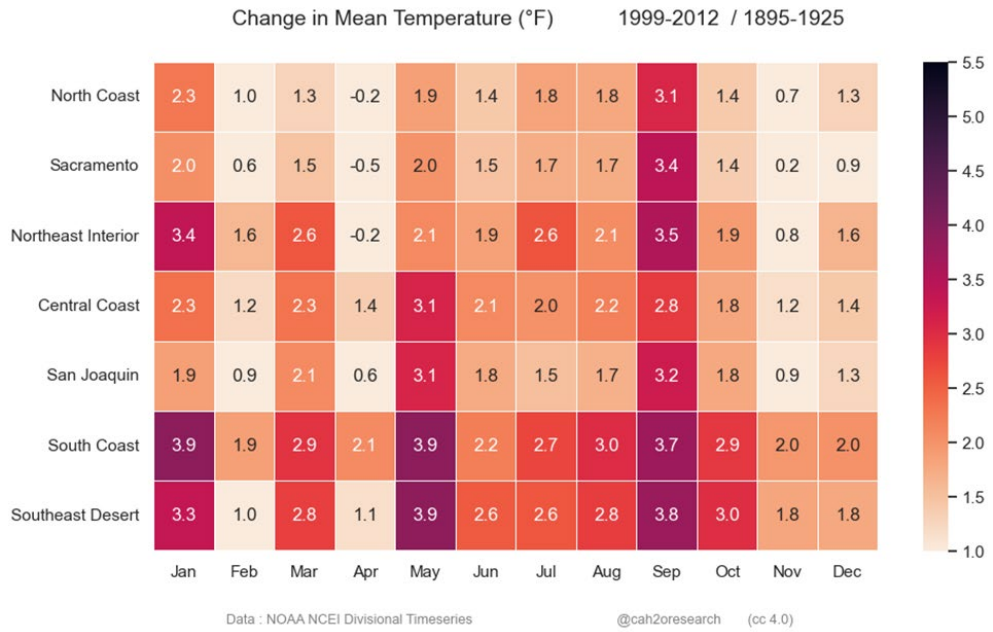


Here's the change in mean temperature over 1895-1925 (the first 30 years of the observational record)

in California Climate divisions:



It's a significant increase over 1999-2012 (the prior Pacific Decadal Oscillation period.)



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