

Colorado Climate Center – *WATF Climate Update*

Peter Goble, Service Climatologist

Water Availability Task Force

November 20th, 2020



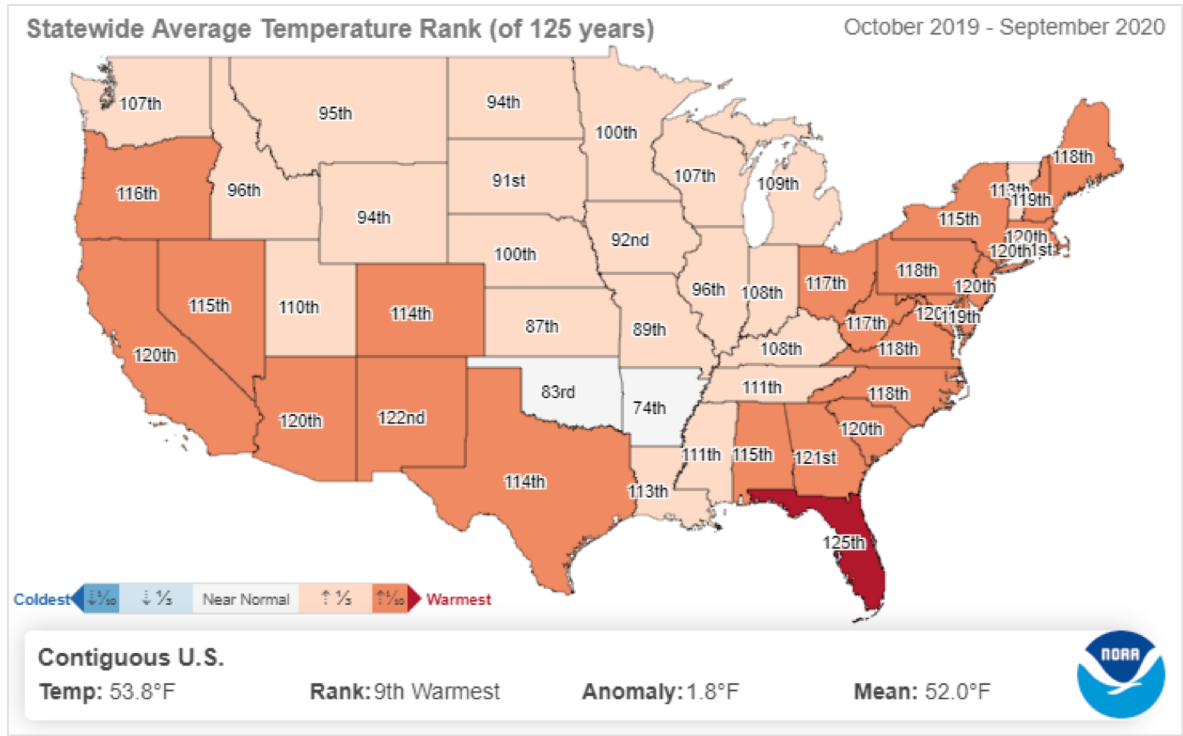
ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY



2020 Water Year To Date

temperature, precipitation,
standardized precipitation index



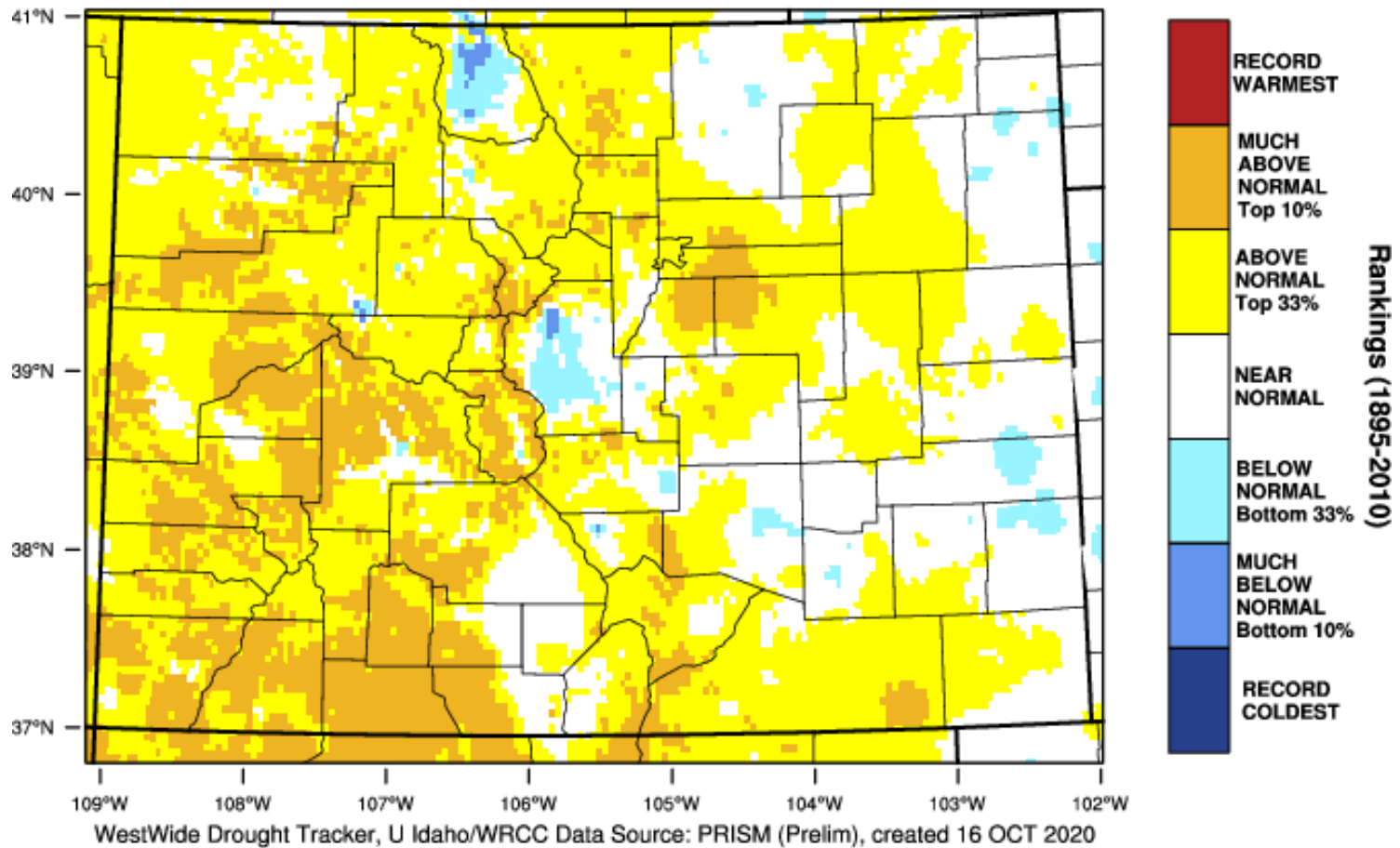


WY 2020 was the 12th warmest on record

Warm temperature anomalies took place during the summer more so than winter

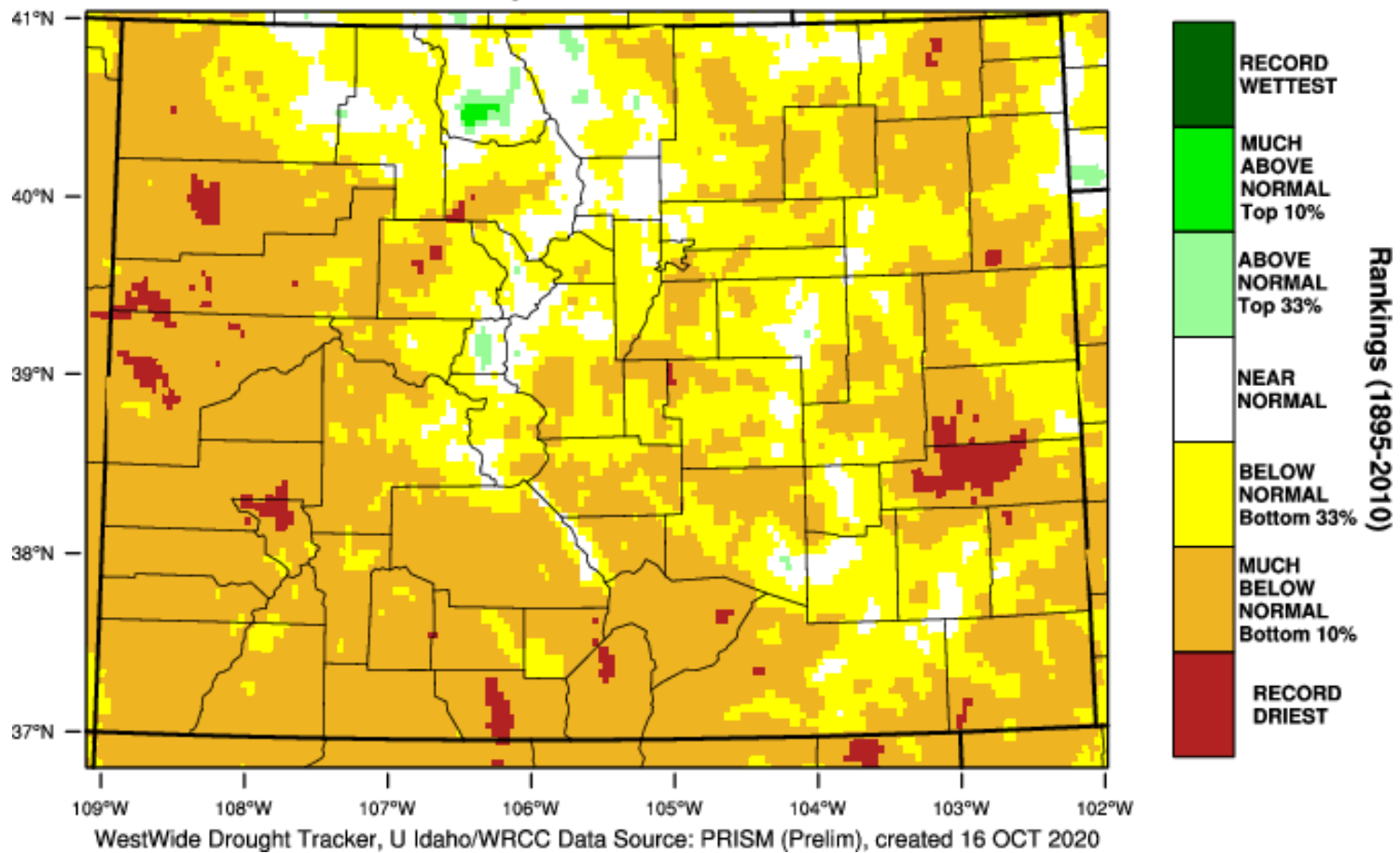
The water year started cold, but ended with near record warmth

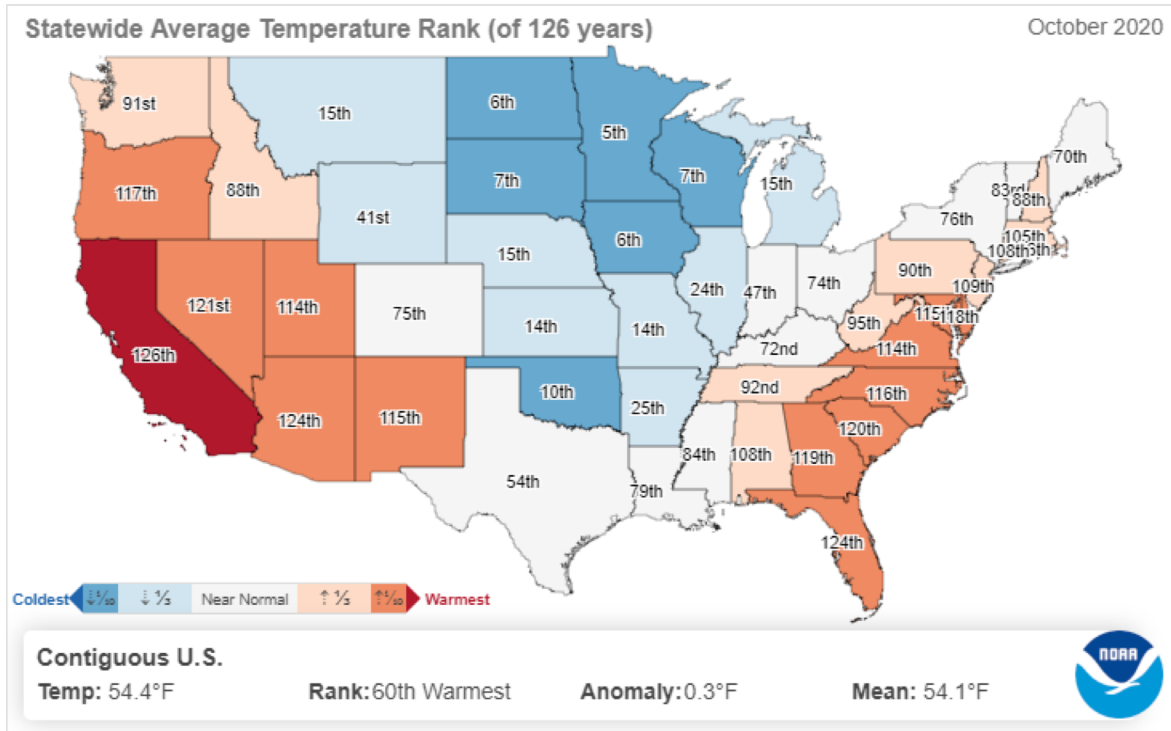
Colorado - Mean Temperature October-September 2020 Percentile



Colorado - Precipitation

October-September 2020 Percentile





October temperatures were above normal for most of the month, but a strong cold snap hit just before Halloween

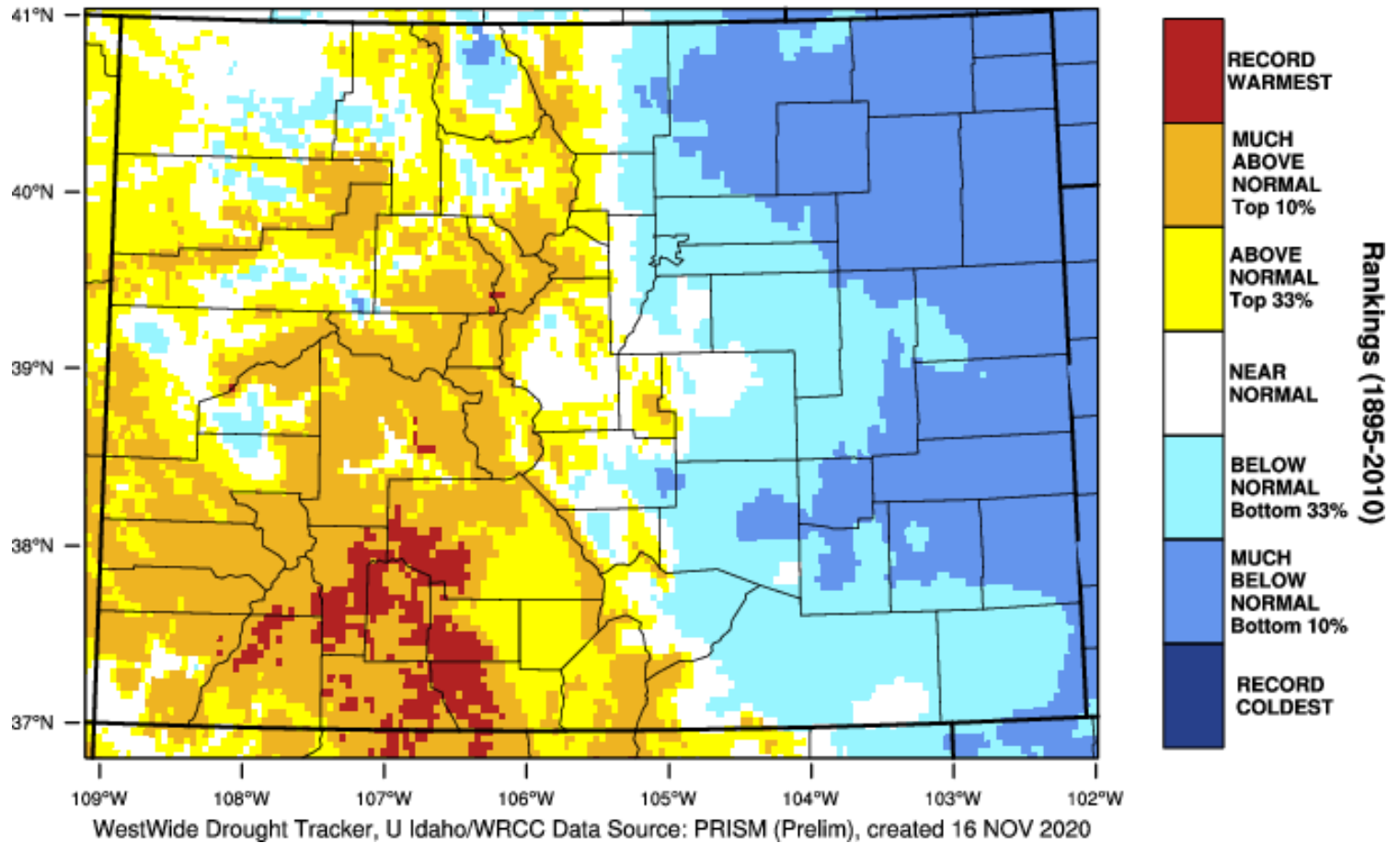
This is similar to what happened last year

Month	T Rank (of 126 years)	Above, below, or near avg?
Oct	52 nd warmest	Near normal
Nov		
Dec		
Jan		
Feb		
Mar		
Apr		
May		
Jun		
Jul		
Aug		
Sep		

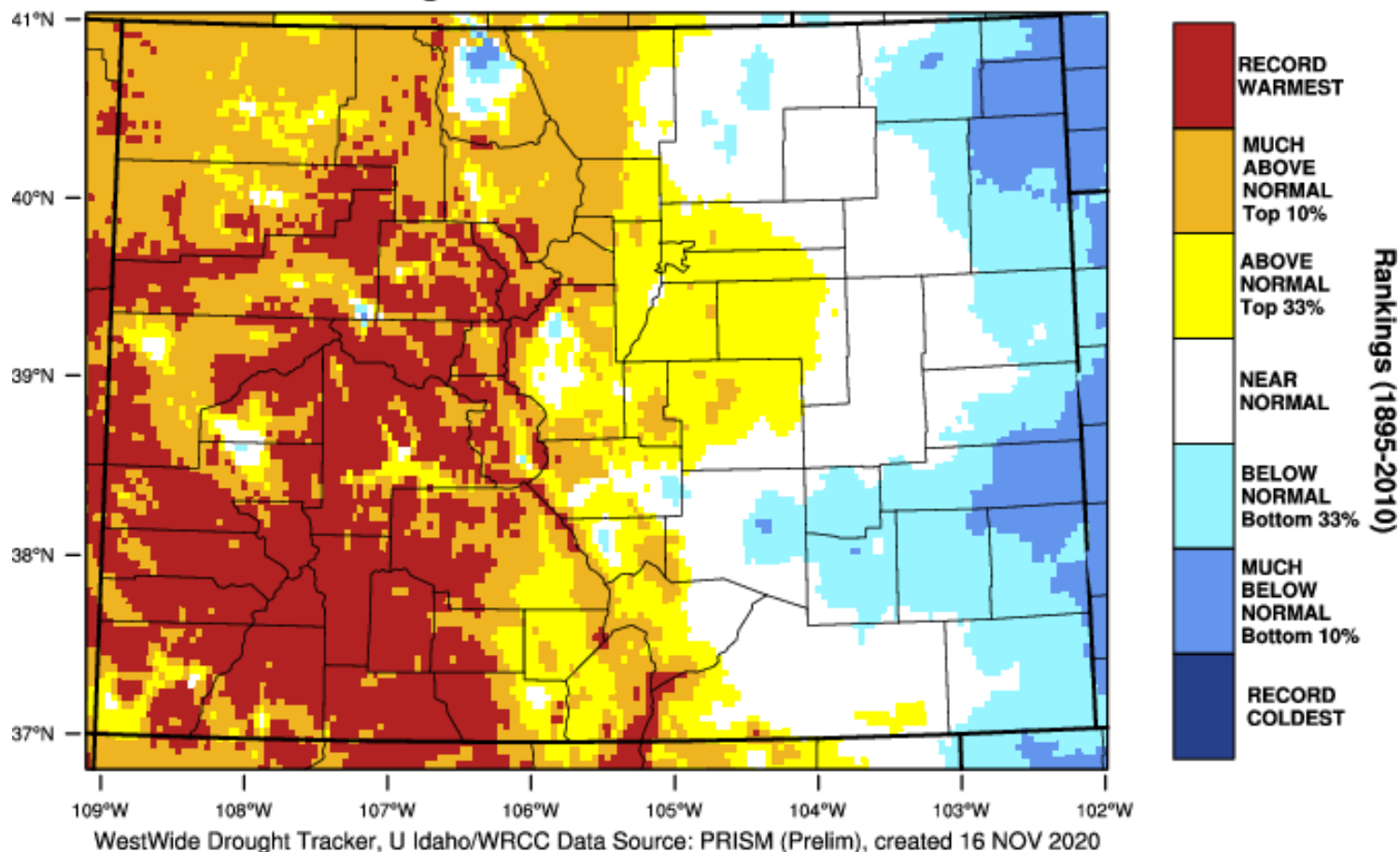


Colorado - Mean Temperature

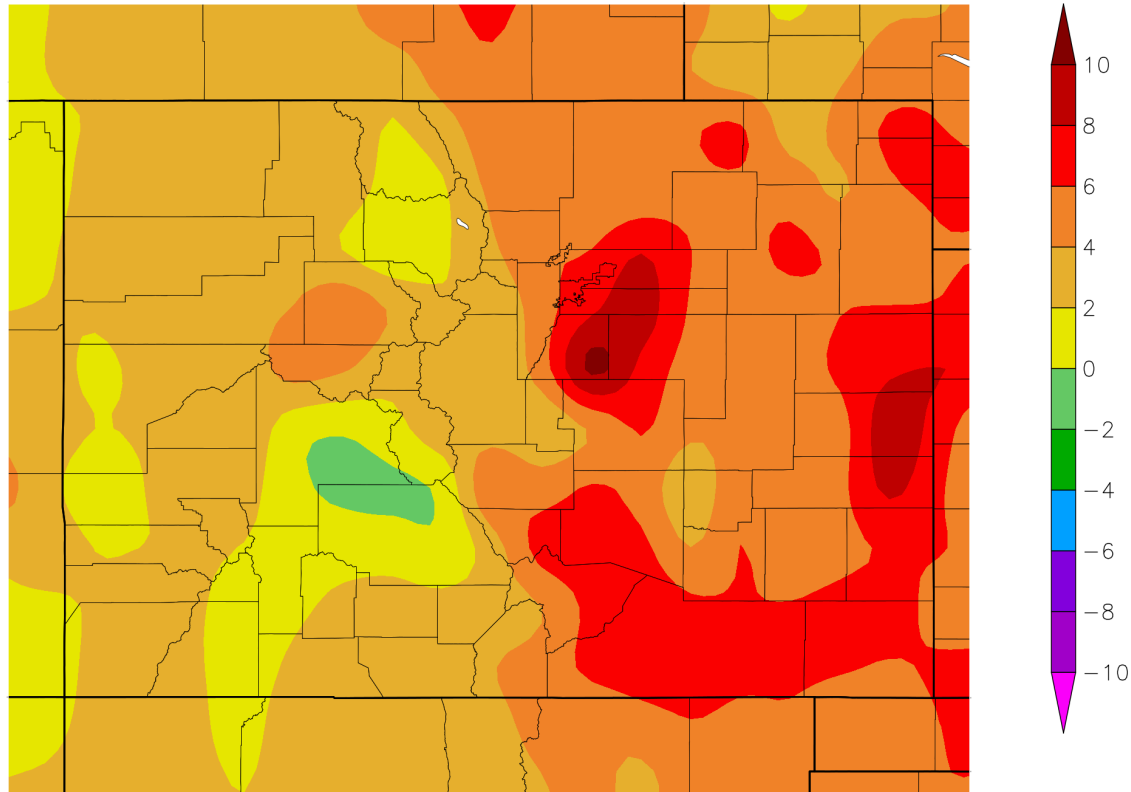
October 2020 Percentile



Colorado - Mean Temperature August-October 2020 Percentile



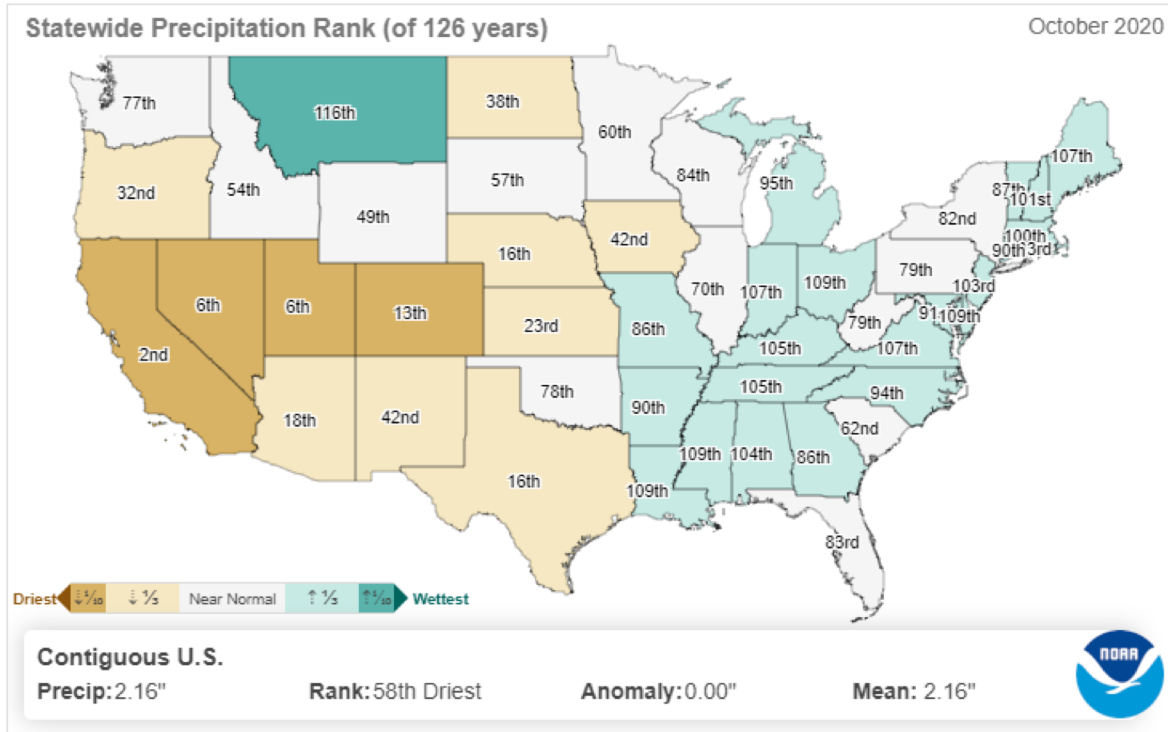
Departure from Normal Temperature (F) 11/1/2020 - 11/18/2020



November is off to a
warm start in eastern
Colorado

This is likely to continue



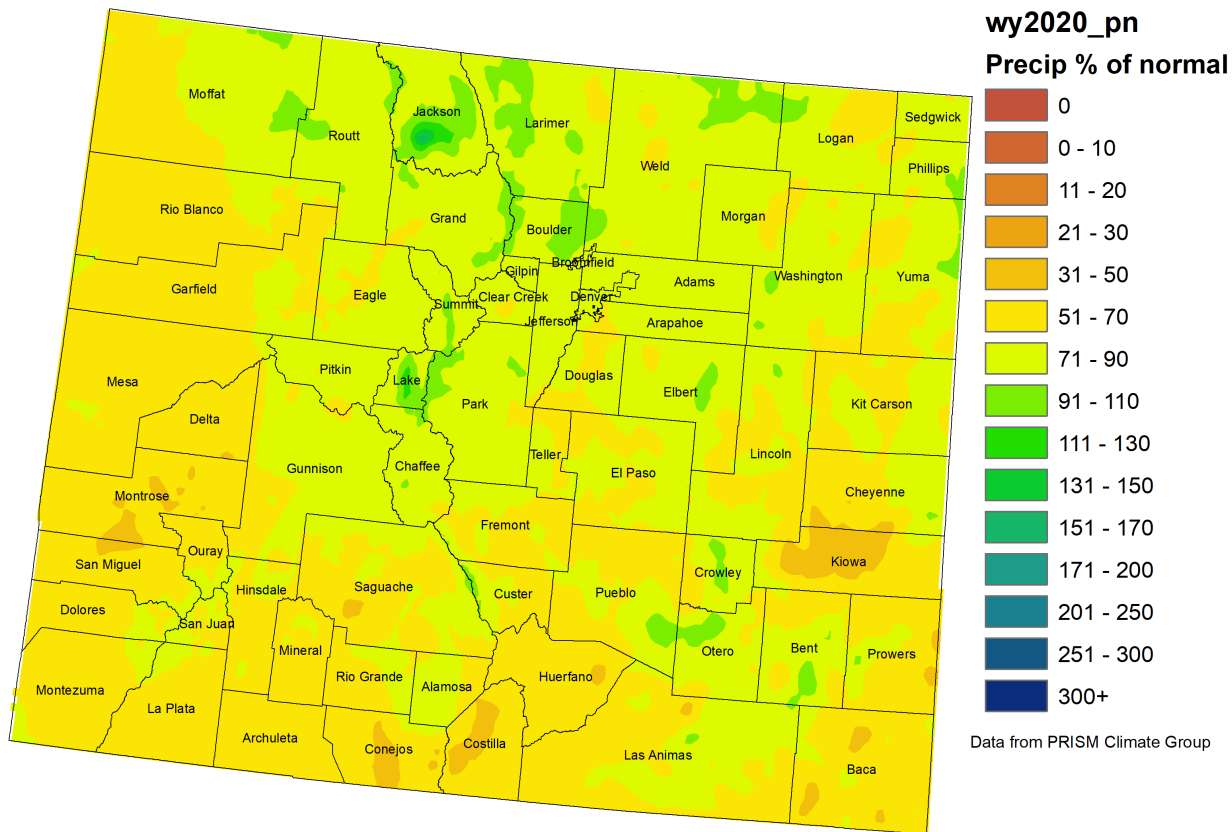


Month	P Rank (of 126 years)	Above, below, or near avg?
Oct	13 th driest	below
Nov		
Dec		
Jan		
Feb		
Mar		
Apr		
May		
Jun		
Jul		
Aug		
Sep		

Rough start to the water year from a moisture standpoint



Colorado Water Year 2020 Precipitation as a Percentage of Normal

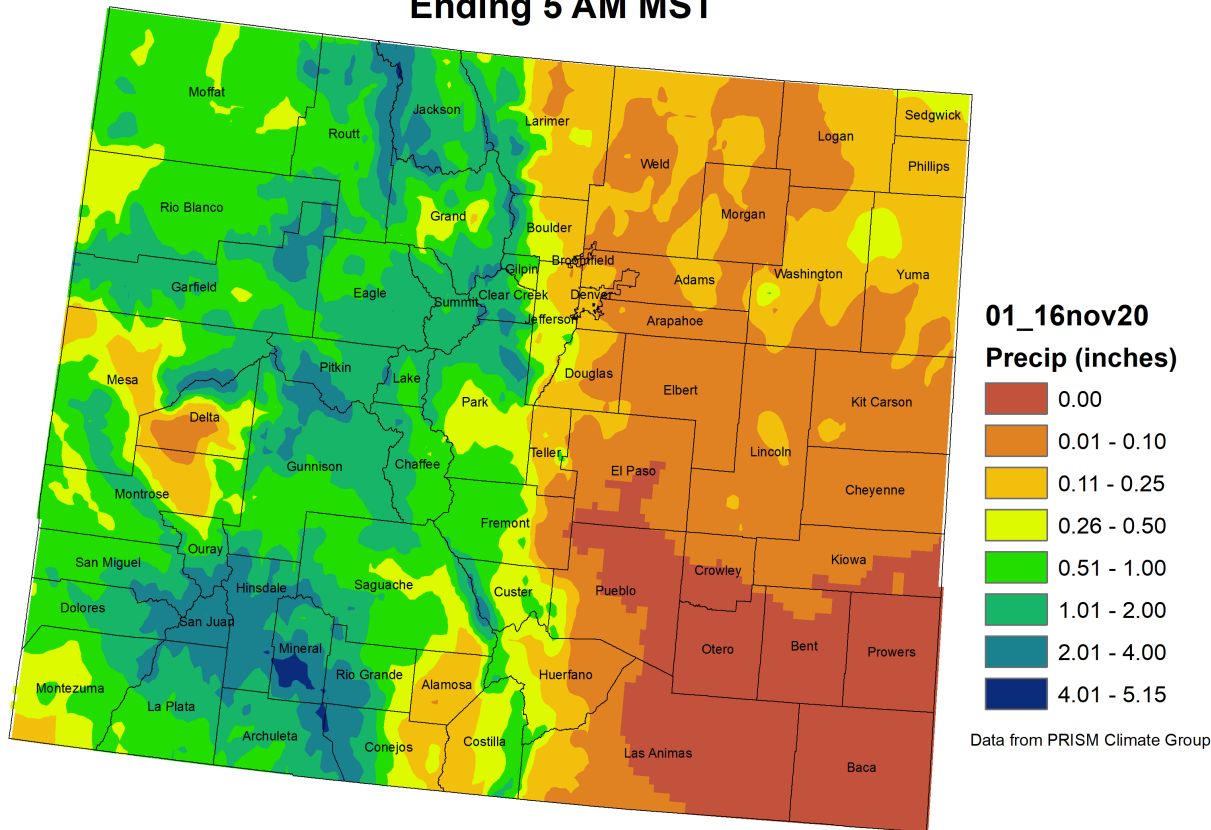


Colorado has leaned dry to start the water year, though anomalies are not as extreme as August

Very few areas starting above average



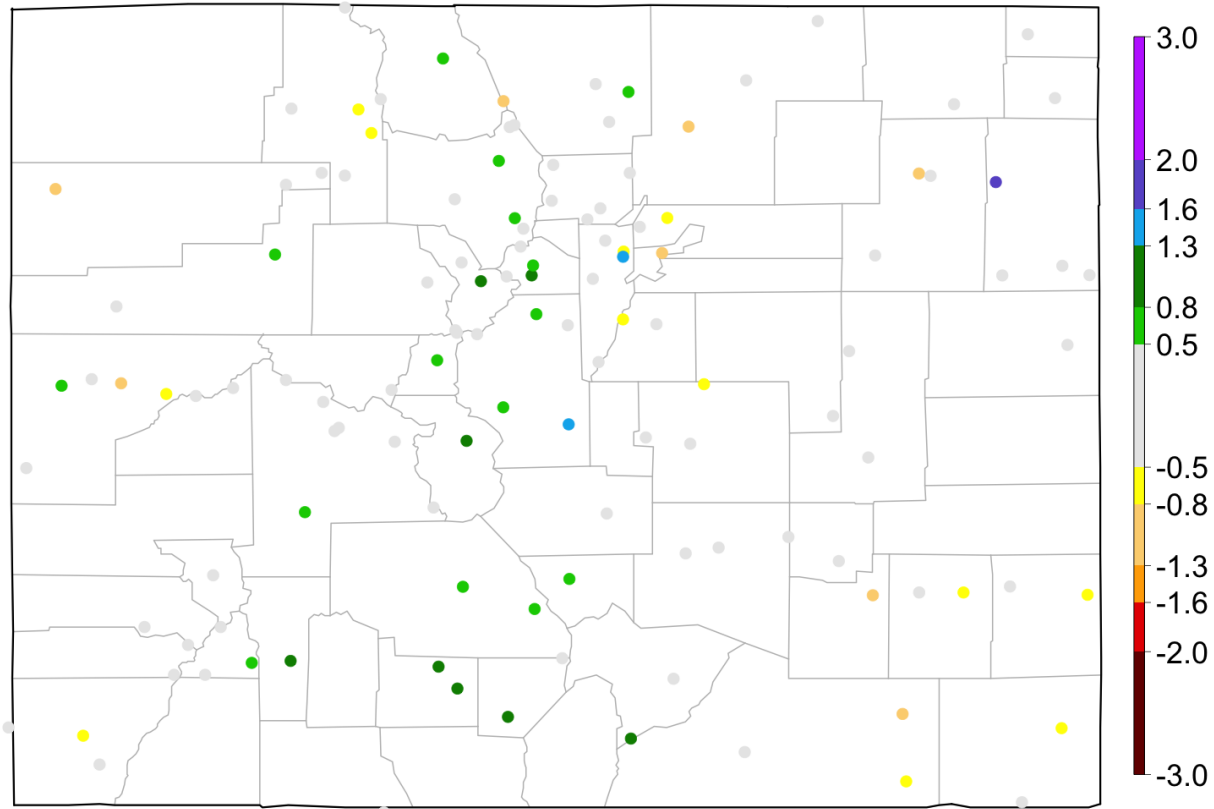
Colorado Month to Date Precipitation 1 - 16 November 2020 Ending 5 AM MST



November has given the mountains several decent storms, leading to an average start to the snow year



30-day SPI: 2020/10/18 - 2020/11/16

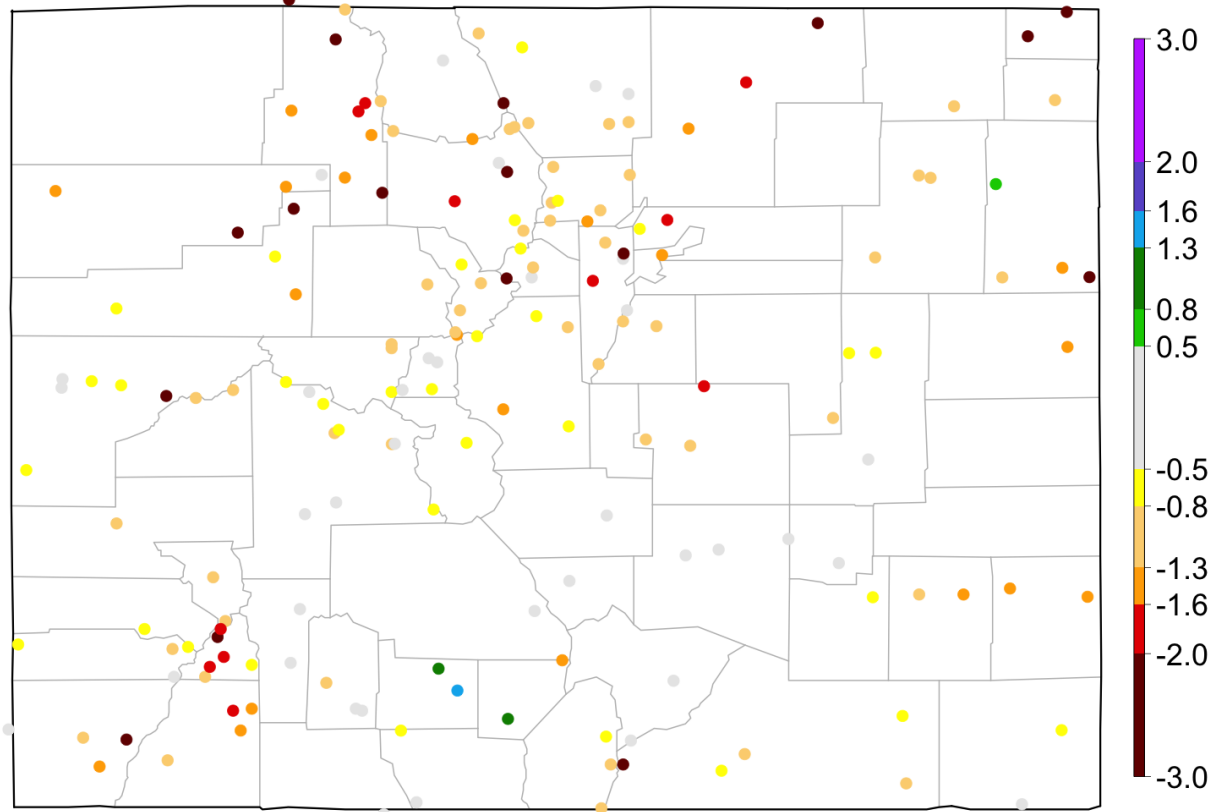


Data from High Plains Regional Climate Center and ACIS

<http://climate.colostate.edu/~drought/spi.html>



90-day SPI: 2020/08/19 - 2020/11/16



Data from High Plains Regional Climate Center and ACIS

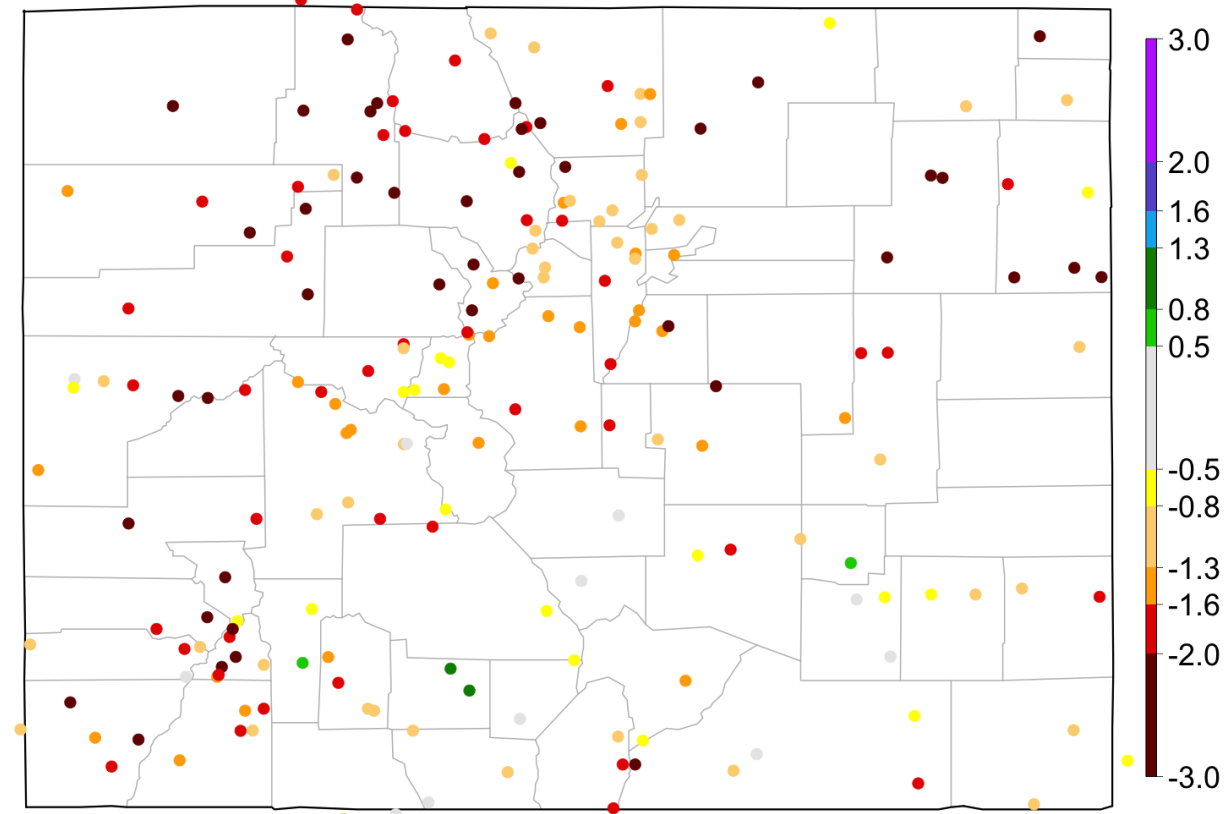
<http://climate.colostate.edu/~drought/spi.html>



COLORADO CLIMATE CENTER



6-month SPI: 2020/05/17 - 2020/11/16

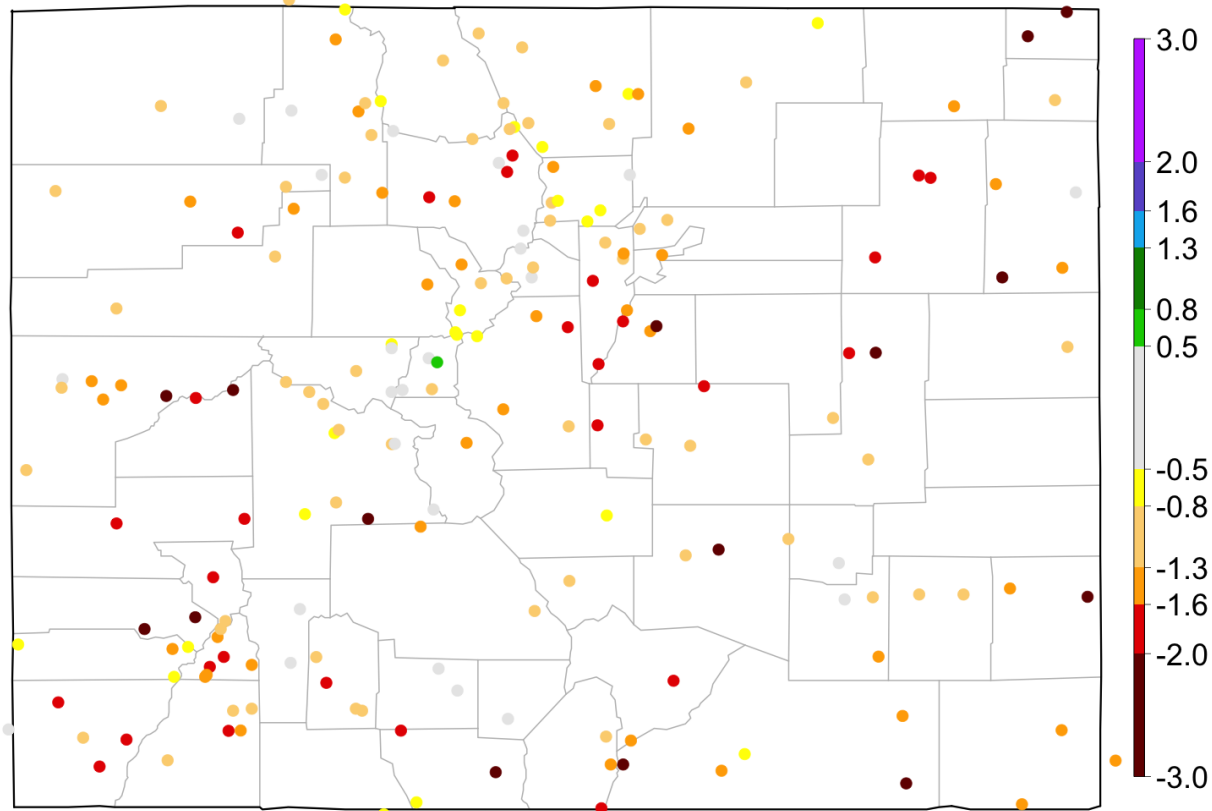


Data from High Plains Regional Climate Center and ACIS

<http://climate.colostate.edu/~drought/spi.html>



12-month SPI: 2019/11/17 - 2020/11/16



Our state hasn't caught a big break since spring 2019.

Data from High Plains Regional Climate Center and ACIS

<http://climate.colostate.edu/~drought/spi.html>





Drought

National Drought

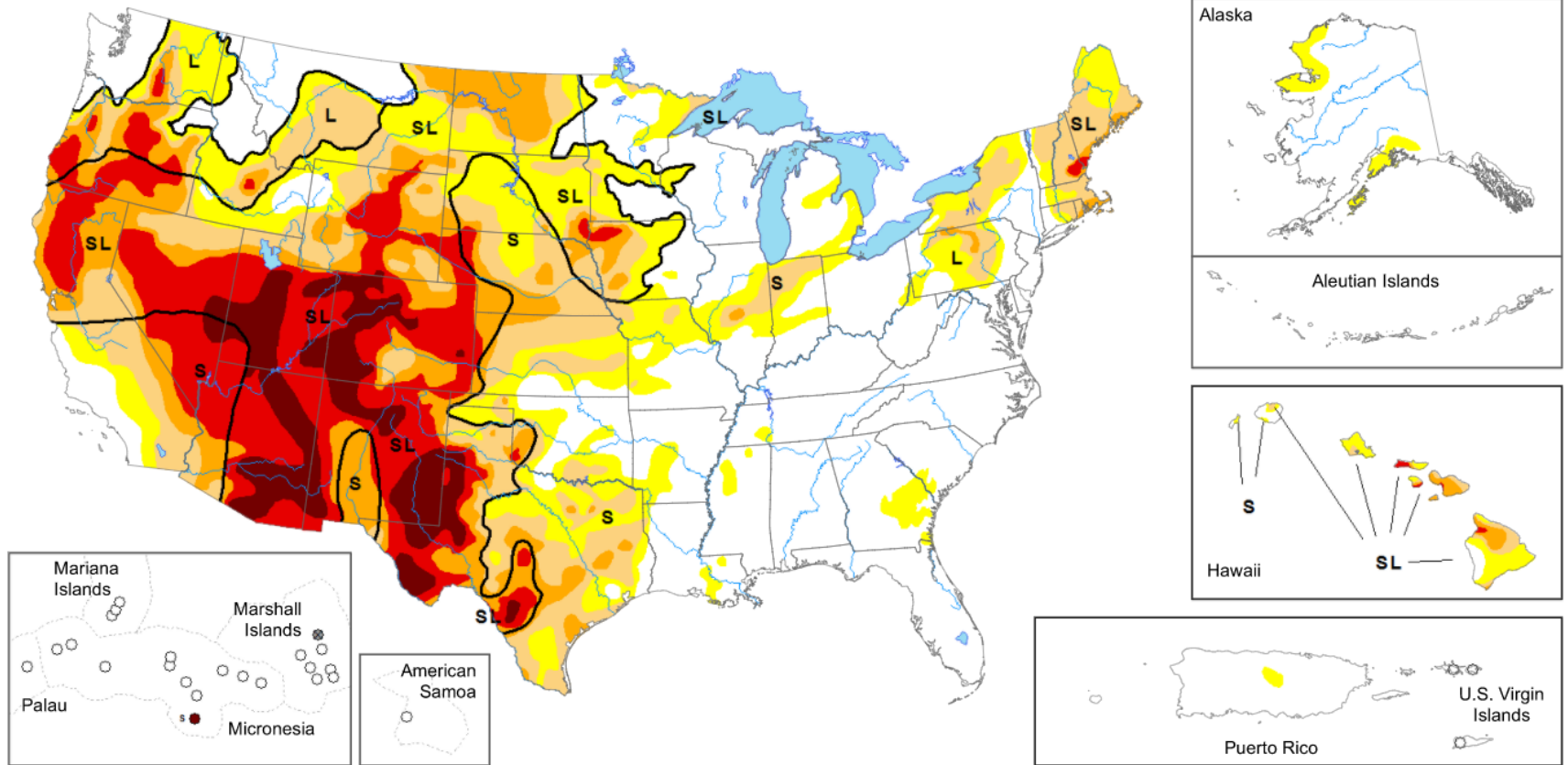
Colorado Drought

Flash Drought?



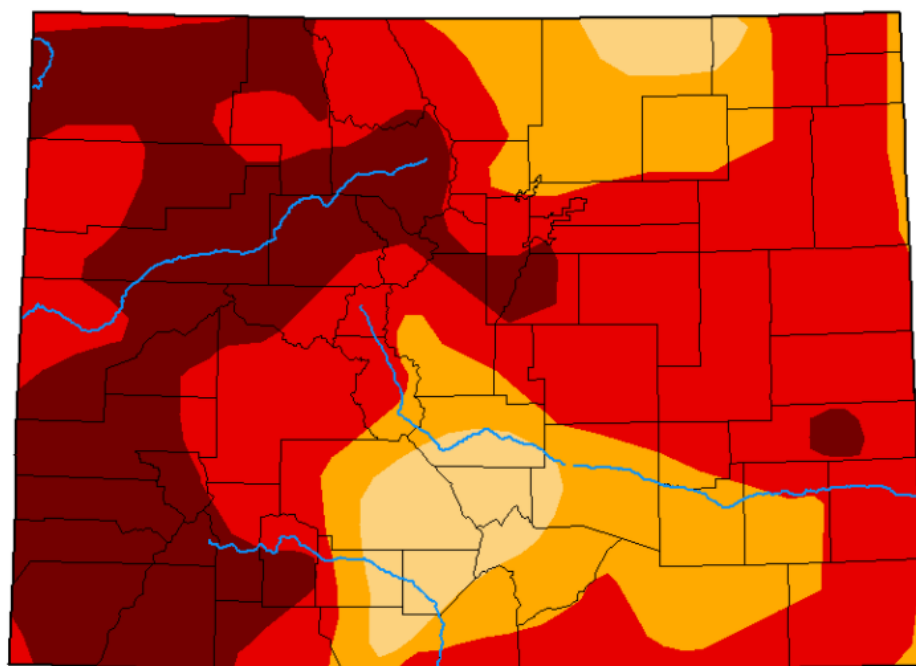
Map released: November 19, 2020

Data valid: November 17, 2020



Map released: Thurs. November 19, 2020

Data valid: November 17, 2020 at 7 a.m. EST



Intensity:

- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)
- No Data

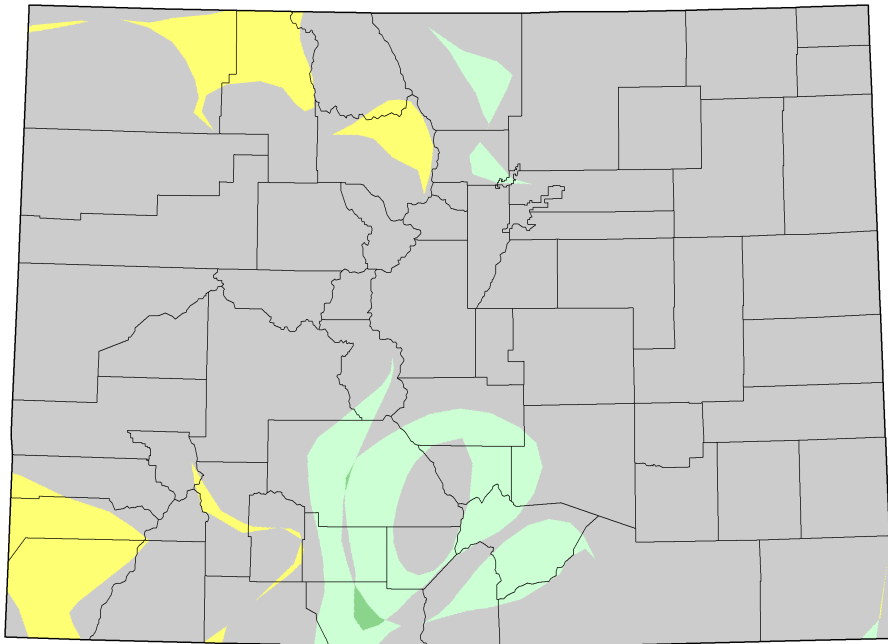
Author(s):

Richard Tinker, NOAA/NWS/NCEP/CPC

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying [text summary](#) for forecast statements.



U.S. Drought Monitor Class Change - Colorado
1 Month



- 5 Class Degradation
- 4 Class Degradation
- 3 Class Degradation
- 2 Class Degradation
- 1 Class Degradation
- No Change
- 1 Class Improvement
- 2 Class Improvement
- 3 Class Improvement
- 4 Class Improvement
- 5 Class Improvement

November 17, 2020
compared to
October 20, 2020

droughtmonitor.unl.edu

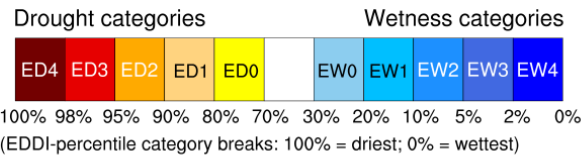
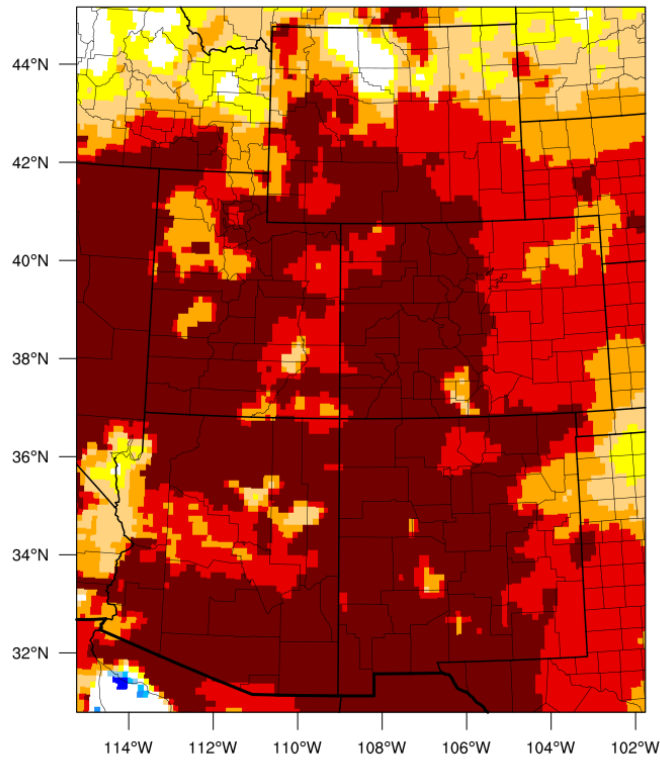
Improvements in San Luis Valley

Degradations in W CO

Steadily bad most places



3-month EDDI categories for November 15, 2020



Generated by NOAA/ESRL/Physical Sciences Laboratory

Highest fall evaporative demand across much of the west

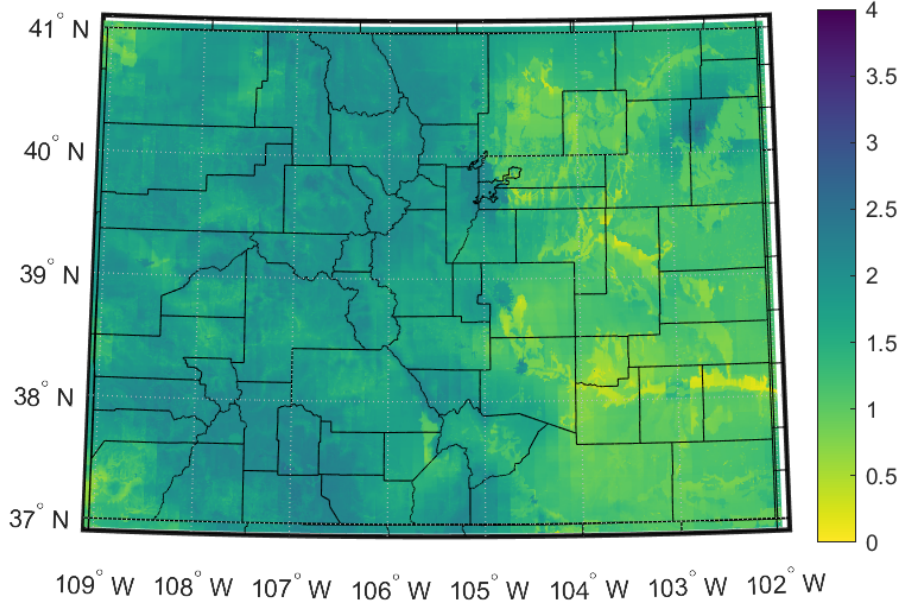
These numbers are August-heavy

Wind has been a factor

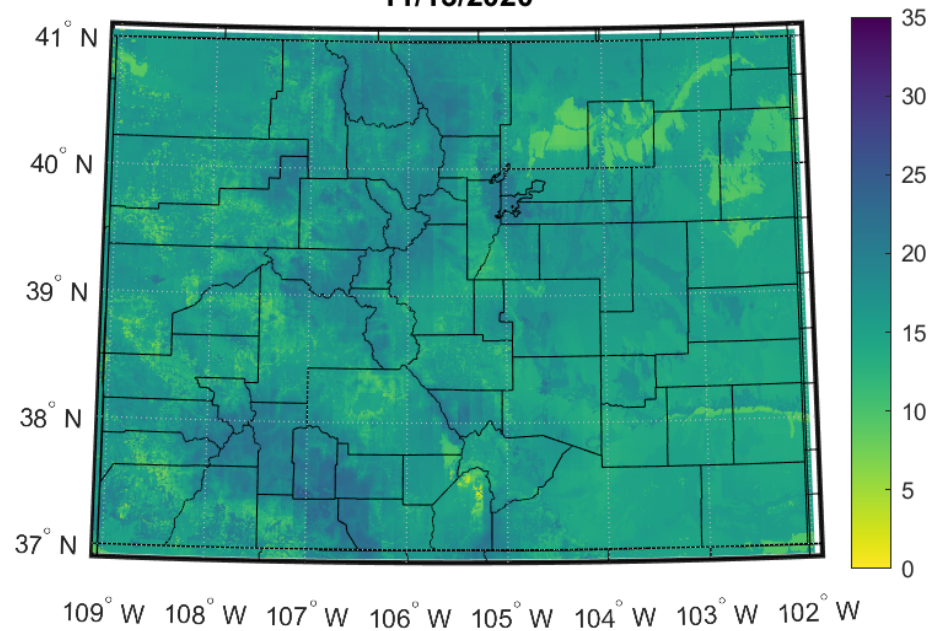
This played a role in the fire situation



Top 10cm Plant Available Water (cm)
11/13/2020



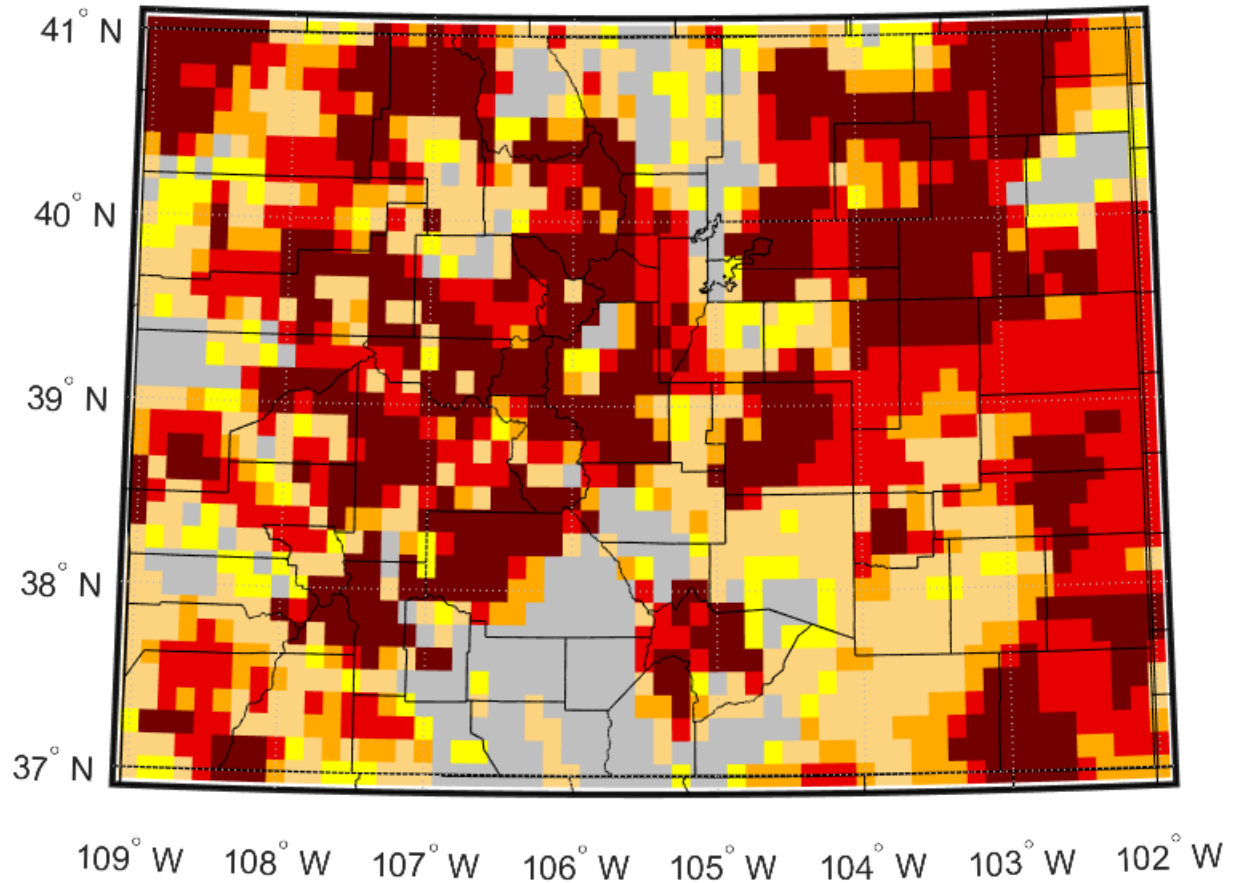
Top Meter Plant Available Water (cm)
11/13/2020



Soil moisture has actually improved recently save for the Arkansas basin



Top Meter Soil Moisture Drought Category 11/13/2020



But it's still awfully low. This will have consequences on the runoff season come springtime

Dark red = drier than 2002, 2012, 2018

Fires

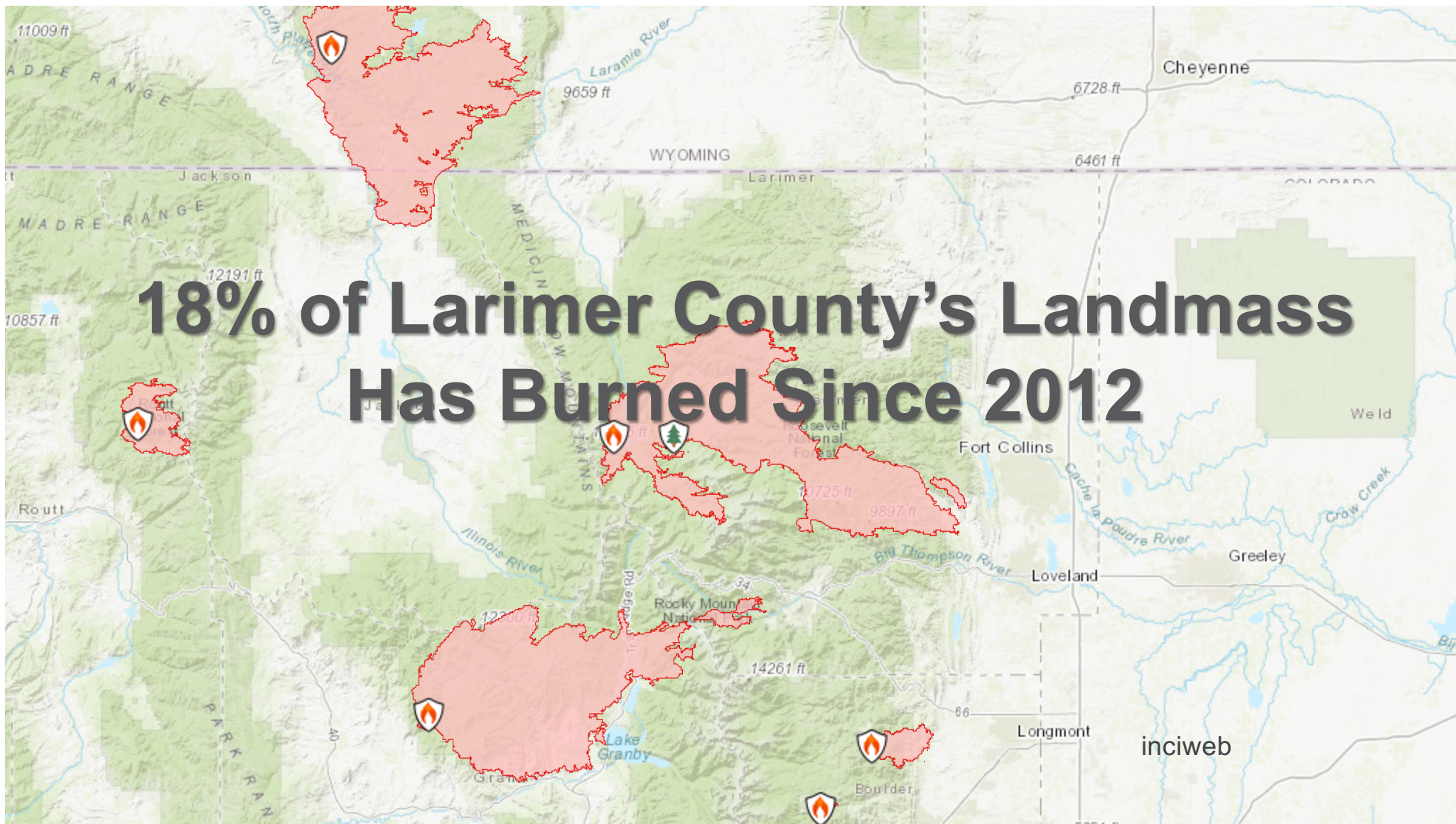
- Cameron Peak (209ka), East Troublesome (194ka), and Pine Gulch (139ka) Fires are now the three largest wildfires in state history (in that order)
- 2020 is now Colorado's largest fire season on record
- Such rapid and intense expansion of fires in October is completely unprecedented. The East Troublesome fire's 193,812 acre footprint was burned completely in October
- Is this the new normal? Not every year will suck like 2020, but in a warmer climate dry years hurt more



Credit: Estes Park Inc



18% of Larimer County's Landmass Has Burned Since 2012



Outlook

Next 7 days

CPC Outlooks

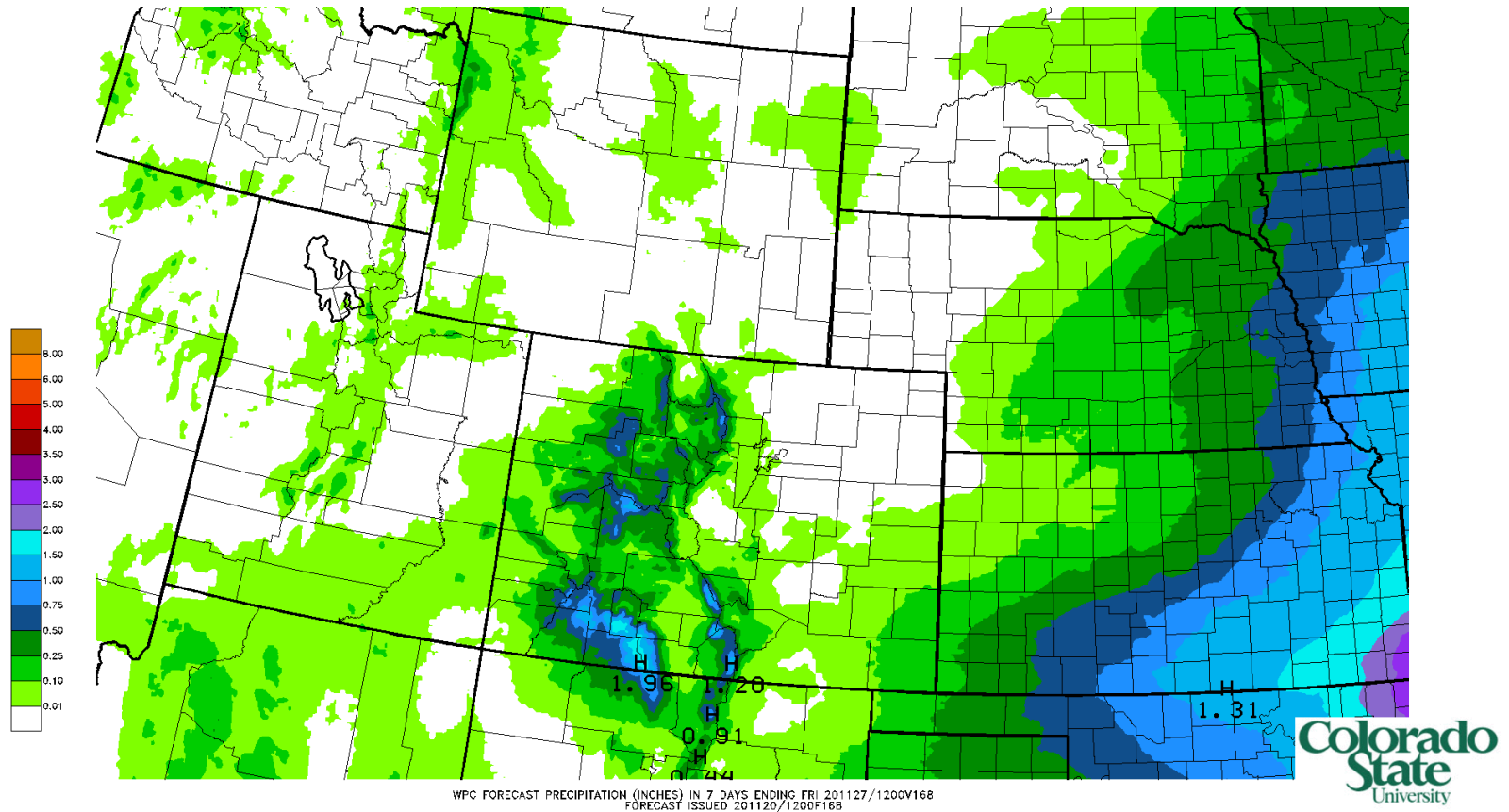
ENSO Information

Precipitation Projections



NOAA 7-day precip forecast

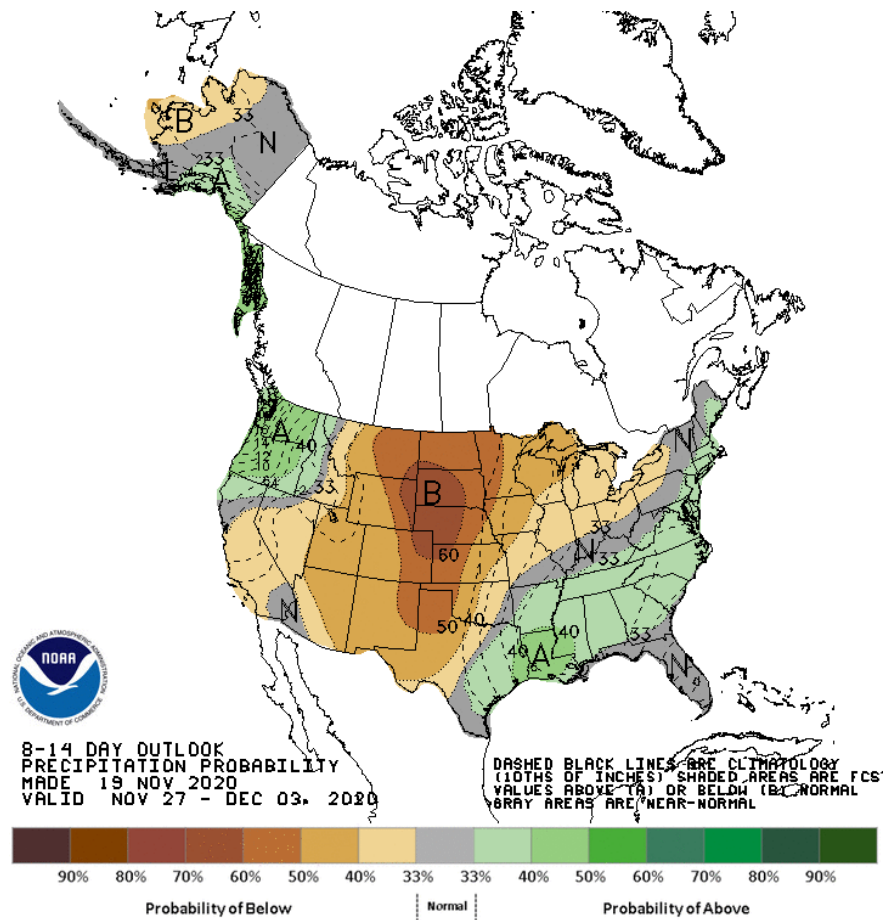
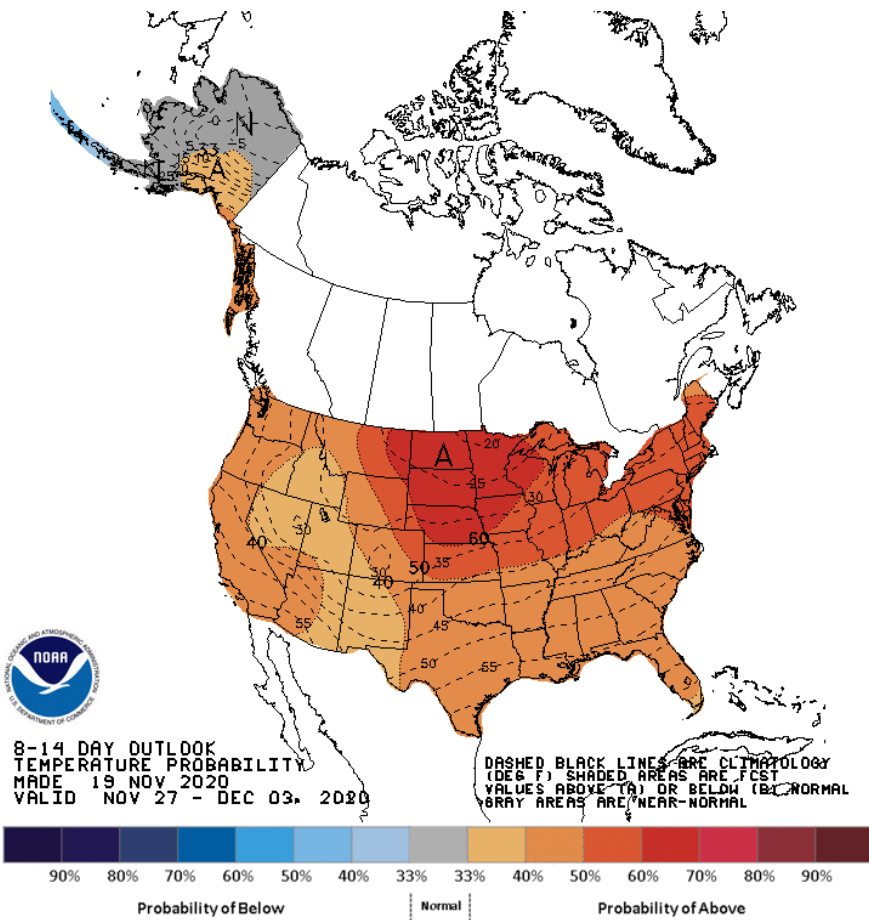
Another sparse QPF. We would like to see our high terrain averaging 0.75-1.00"/week



http://schumacher.atmos.colostate.edu/weather/real_time/hpc_qpf_168h_imw/hpc_qpf_168h_imw.gif

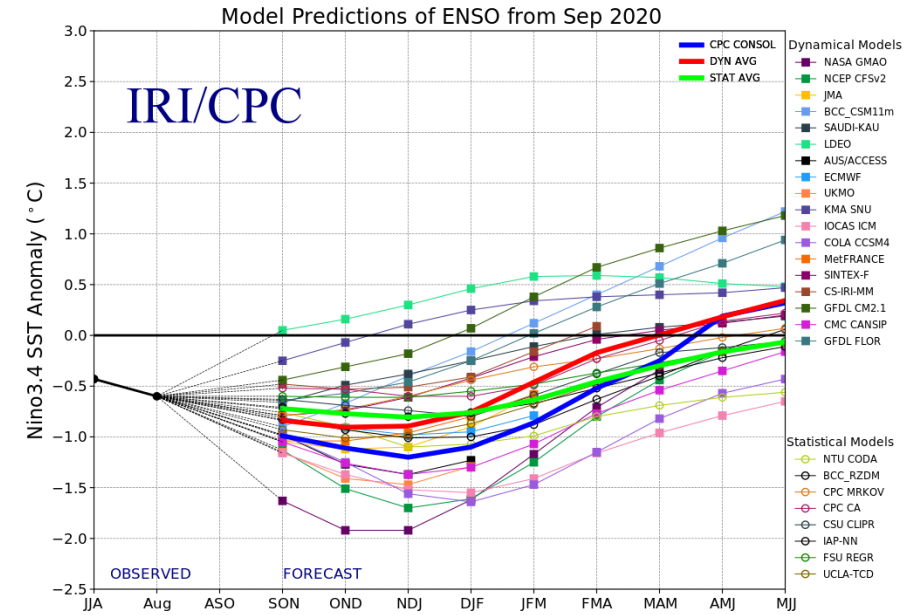
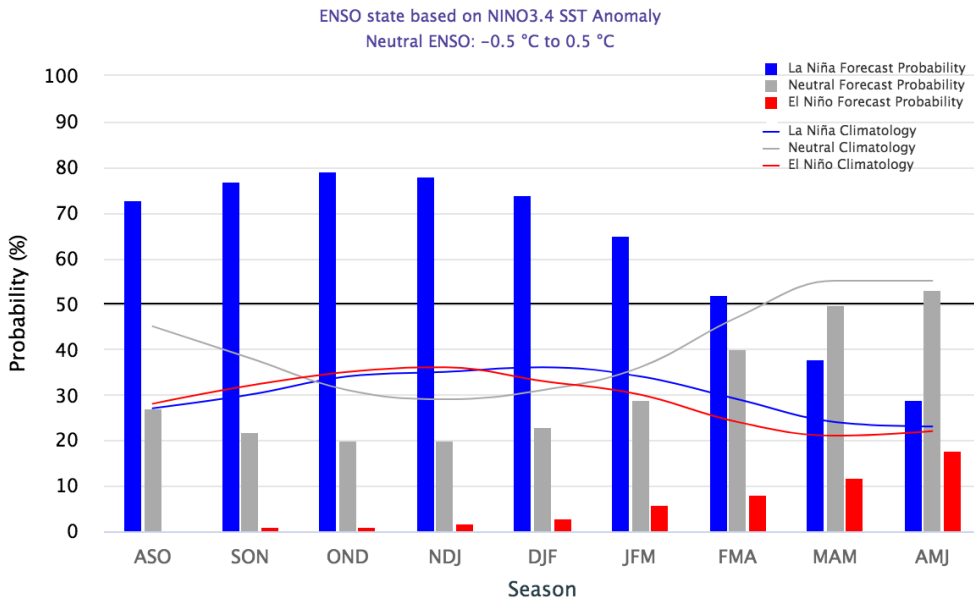


8-14 day outlook



What's the ENSO forecast?

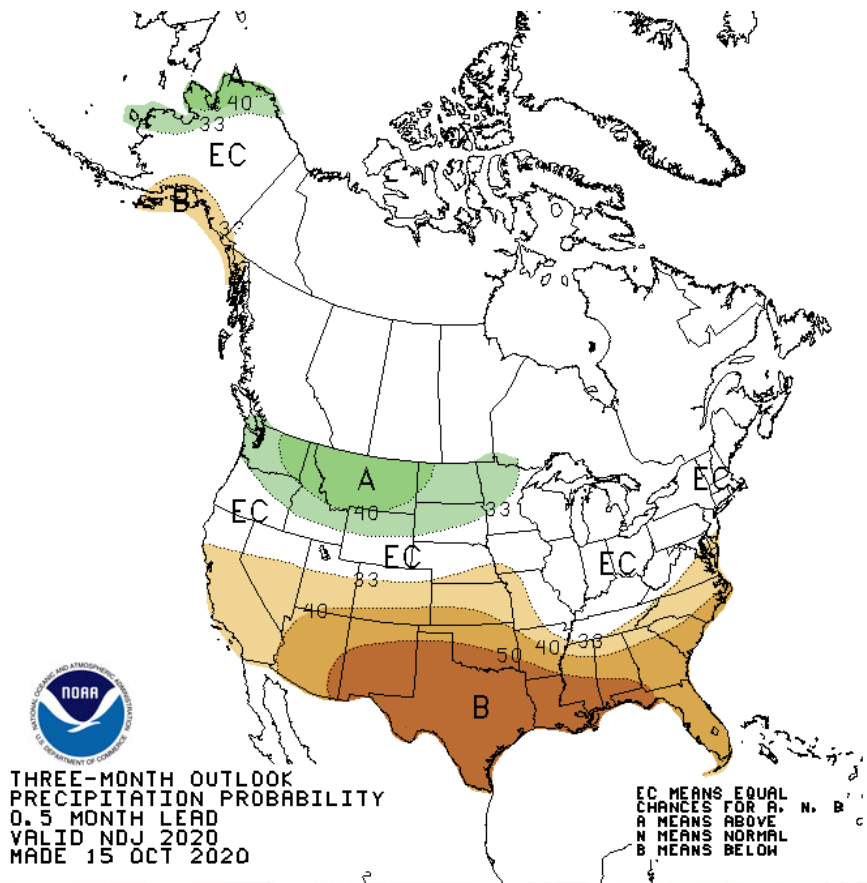
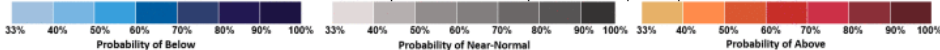
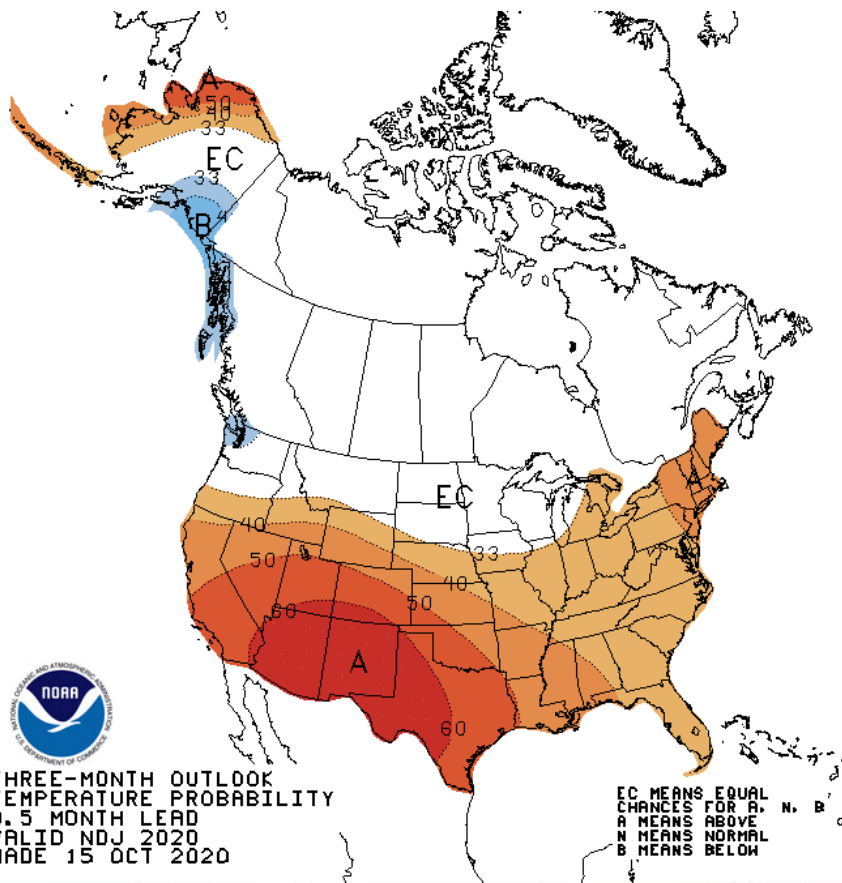
Early-September 2020 CPC/IRI Official Probabilistic ENSO Forecasts



La Niña conditions are likely to last through the winter. It may well fall apart in the spring. That is actually a good combination for Colorado.



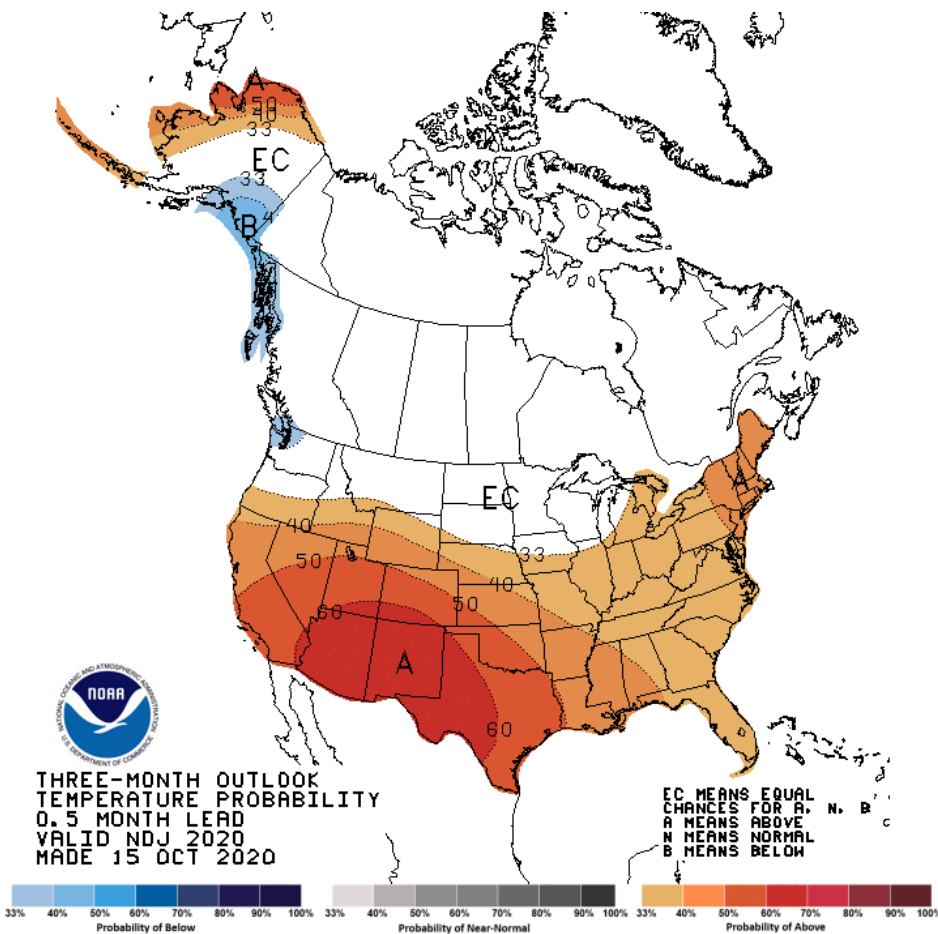
Seasonal outlook



Seasonal outlook

Moderate La Niña in play. May strengthen further

Temperature trends heavily factor into all seasonal guidance

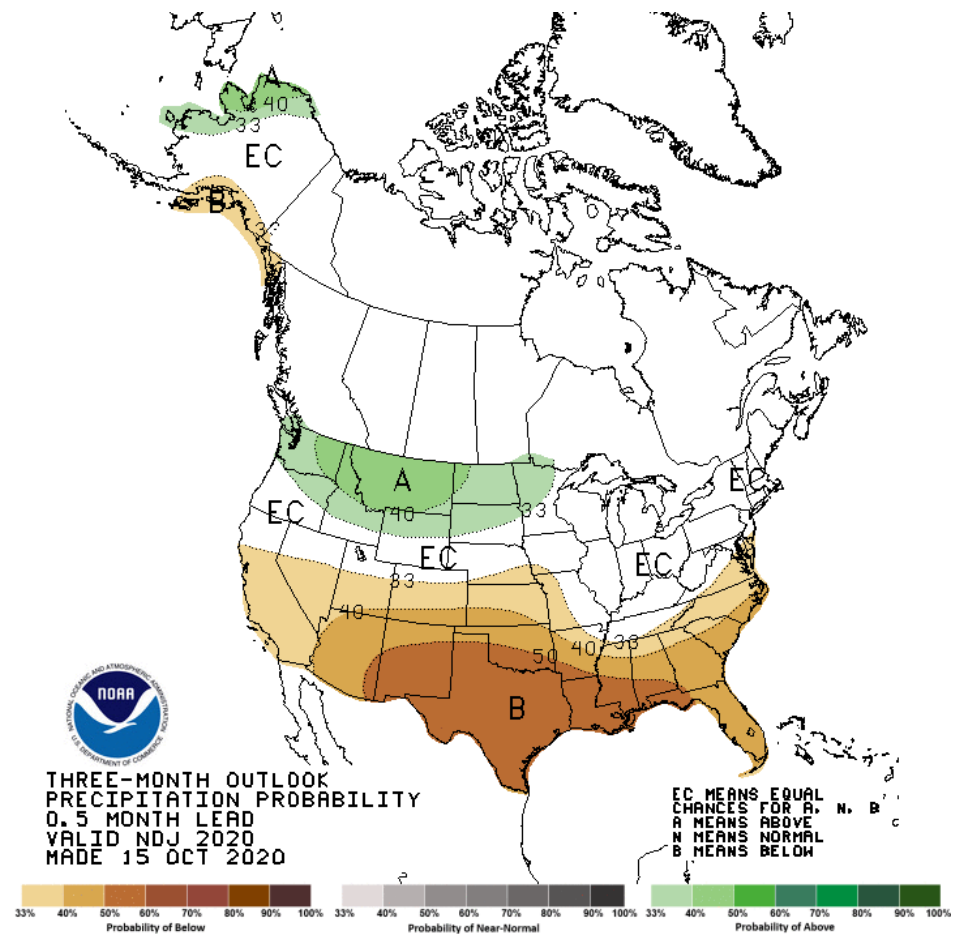


Seasonal outlook

La Niña generally means more moisture to the north, less to the south

La Niña actually leads to snowier winters in the northern Rockies. Tilt towards below normal precip oversimplifies topographic impacts

Expect snow in the northern Rockies and wind in the Ark Valley



Seasonal outlook

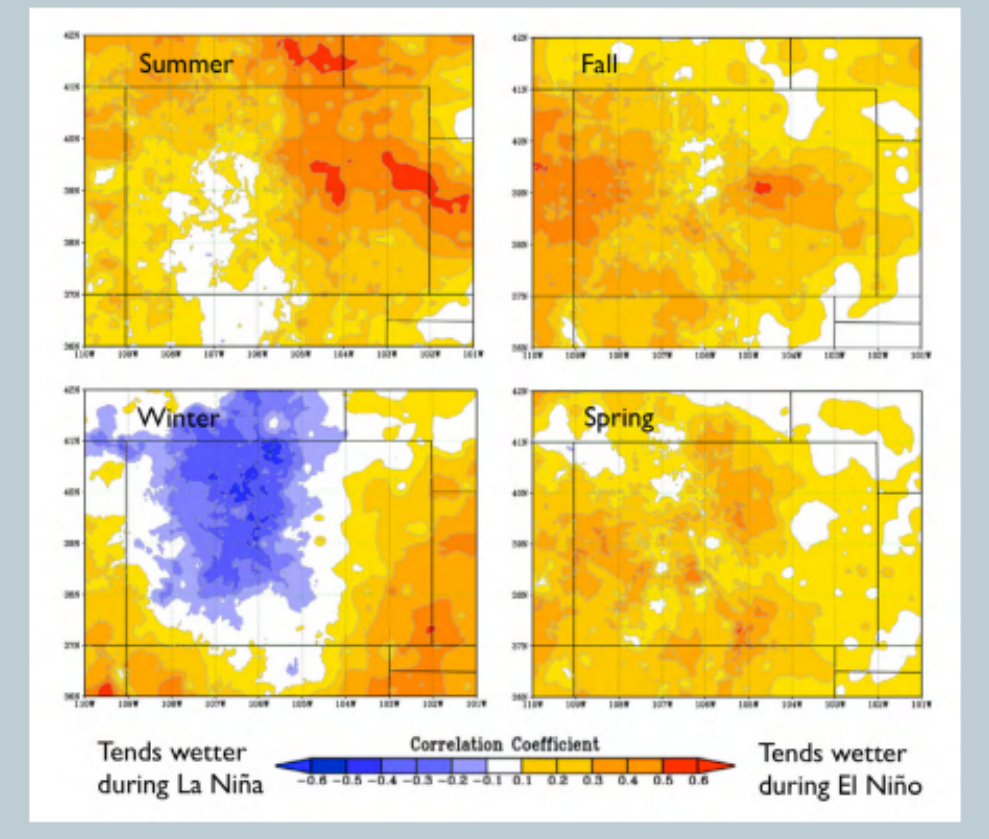
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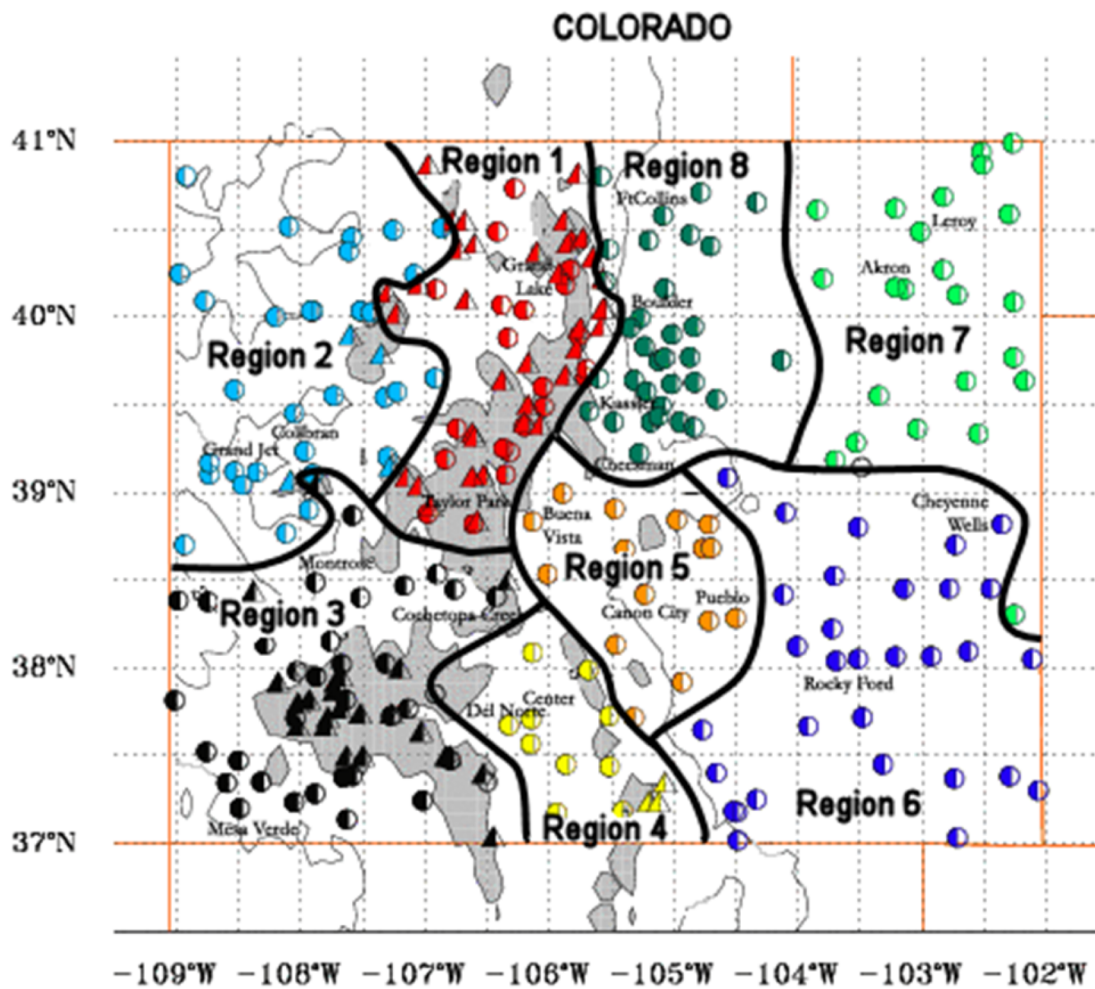
La Niña actually leads to snowier winters in the northern Rockies. Tilt towards below normal precip oversimplifies topographic impacts

Expect snow in the northern Rockies and wind in the Ark Valley

Lukas et al.
2014

FIGURE 2-4. Correlations between seasonal precipitation for Colorado and Multivariate ENSO Index (MEI), 1956–2005

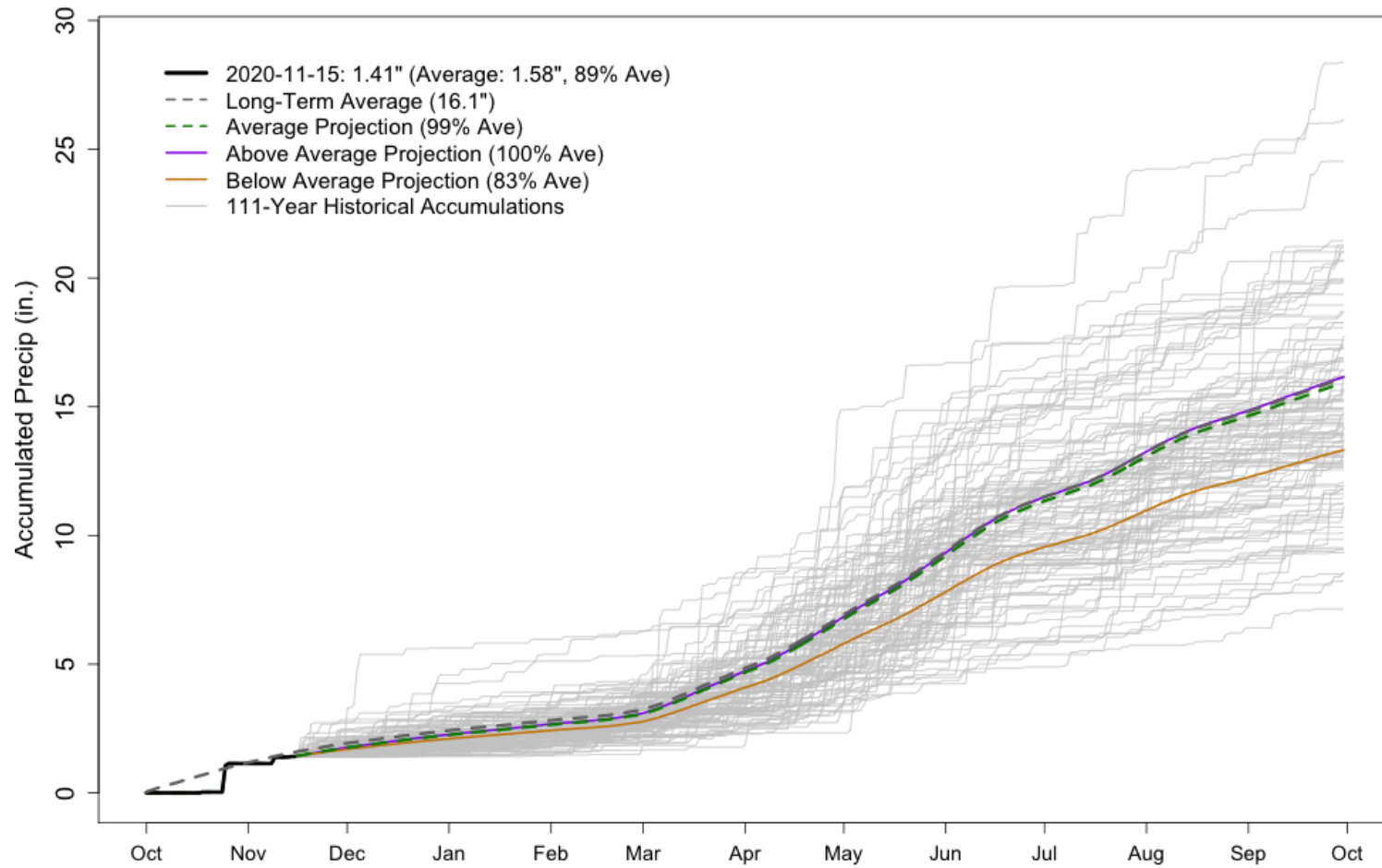




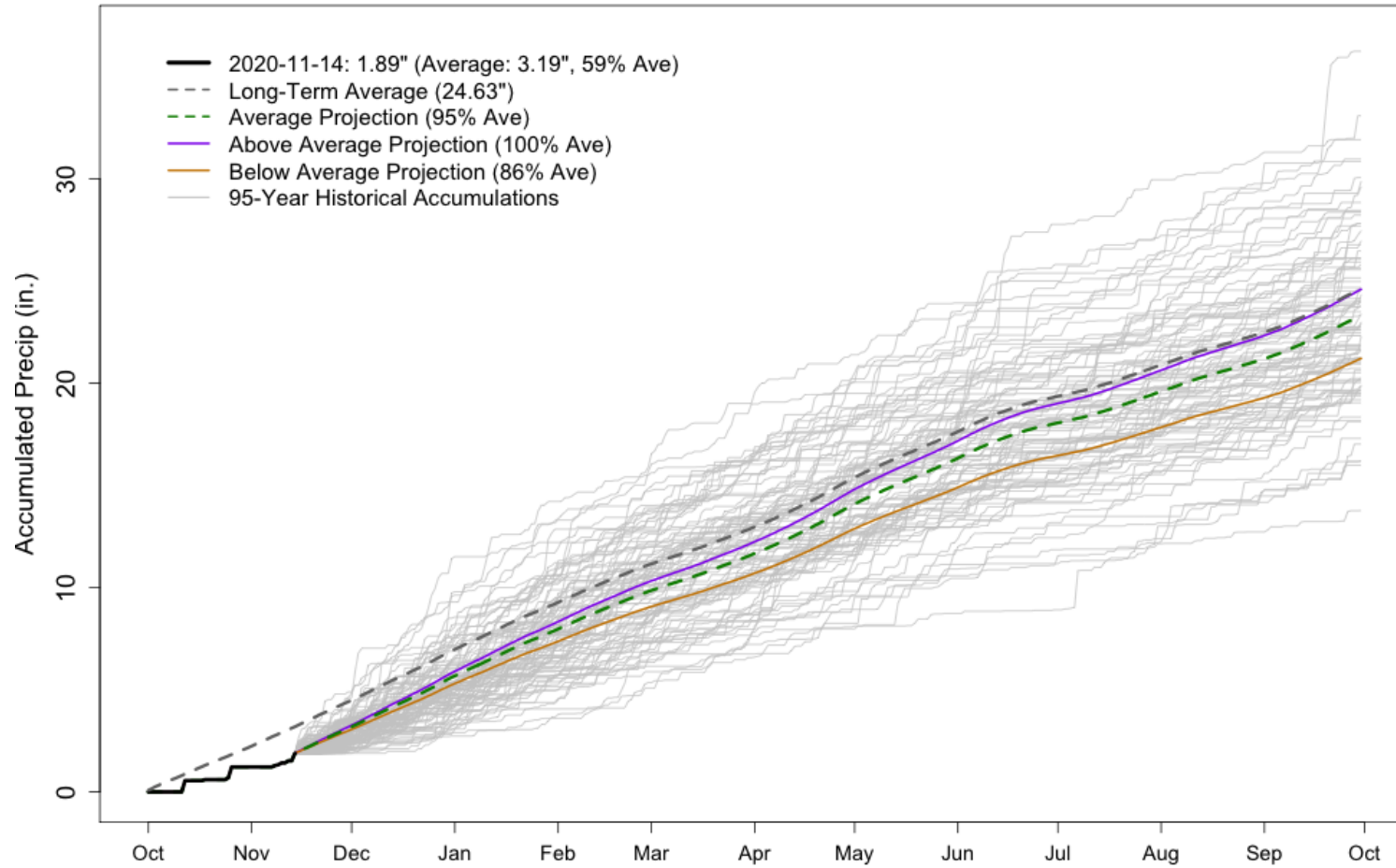
Precipitation Projections by Climate Region (credit: Klaus Wolter NOAA)



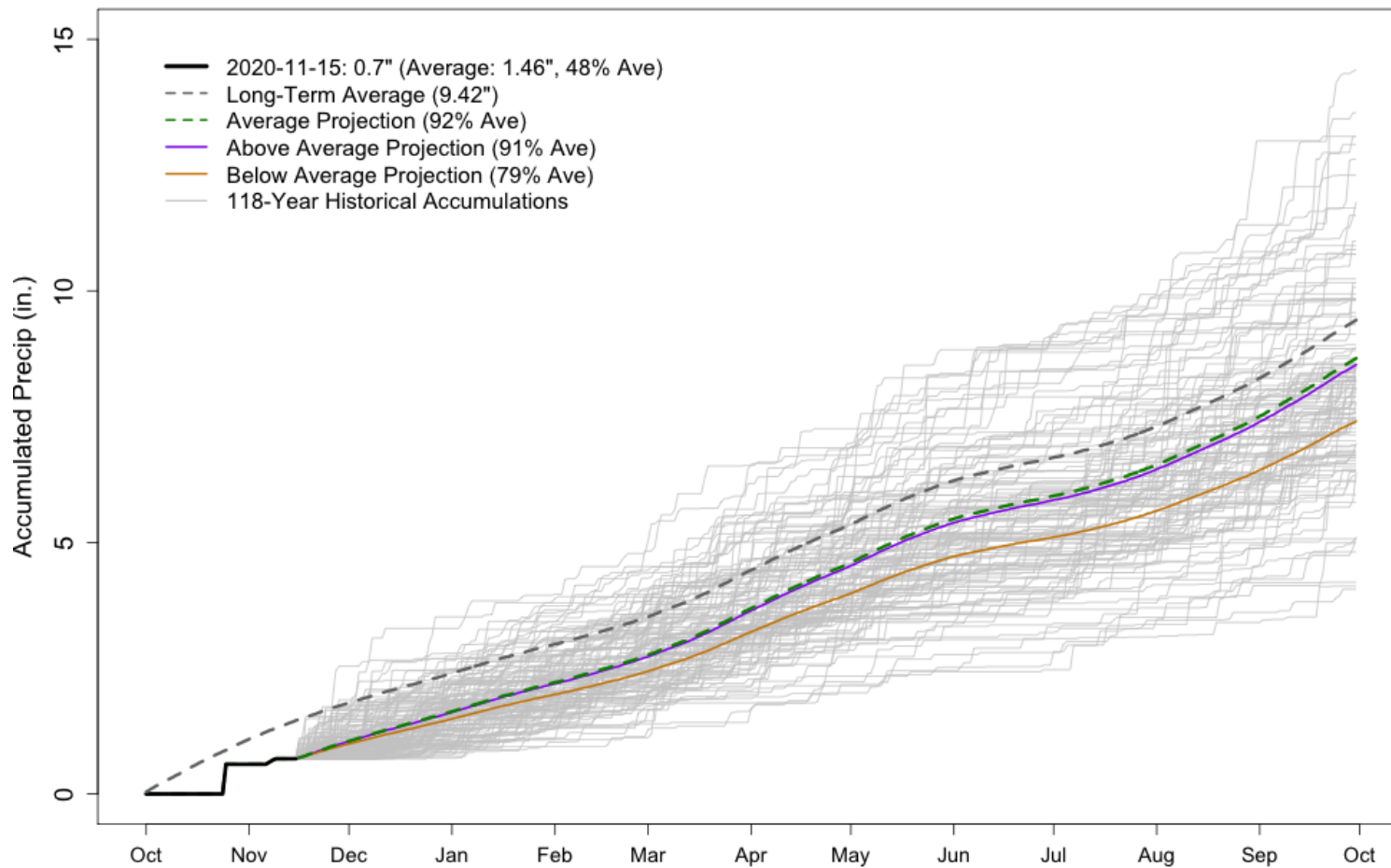
FORT COLLINS WY2021 Precipitation Projections



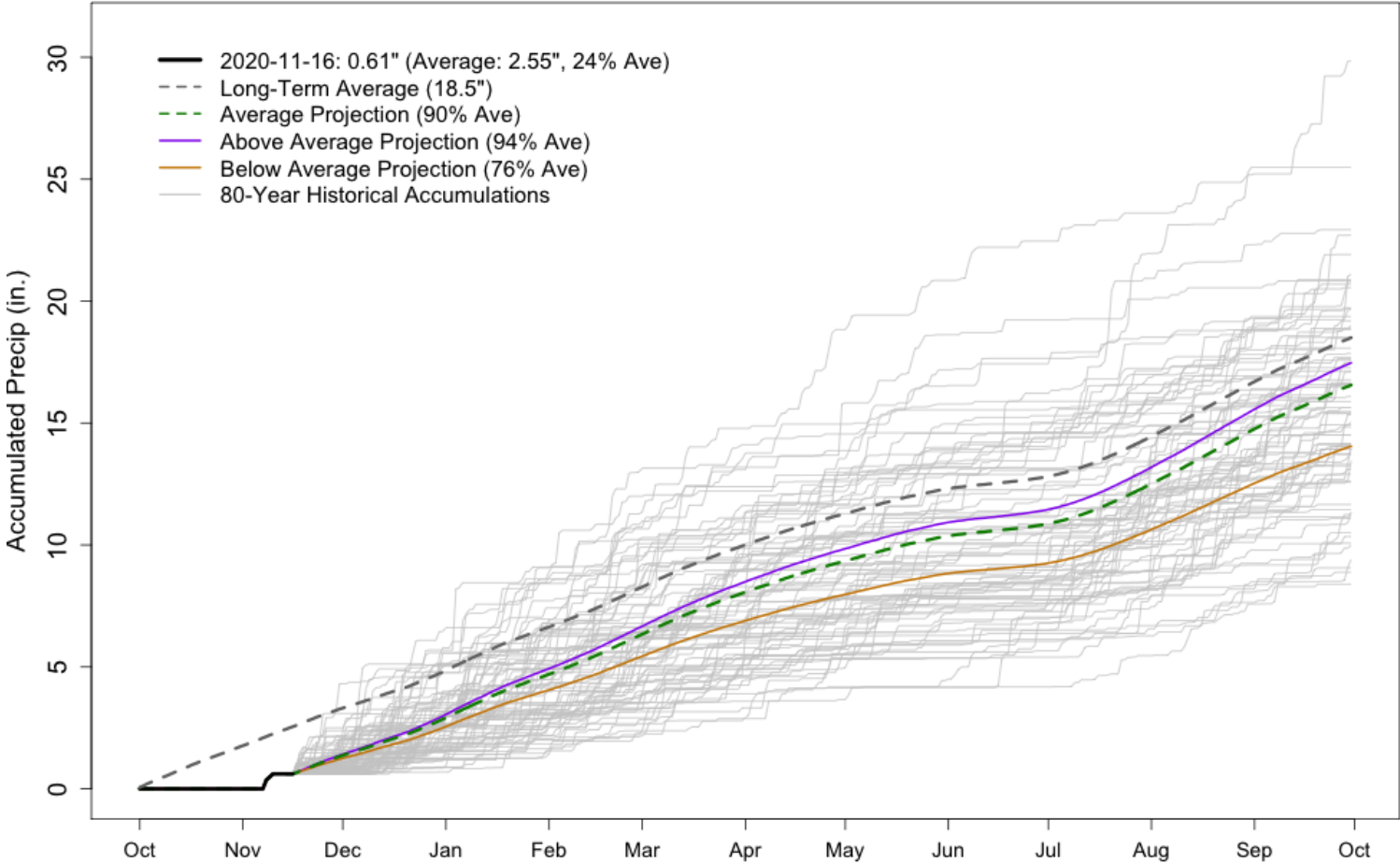
STEAMBOAT SPRINGS WY2021 Precipitation Projections



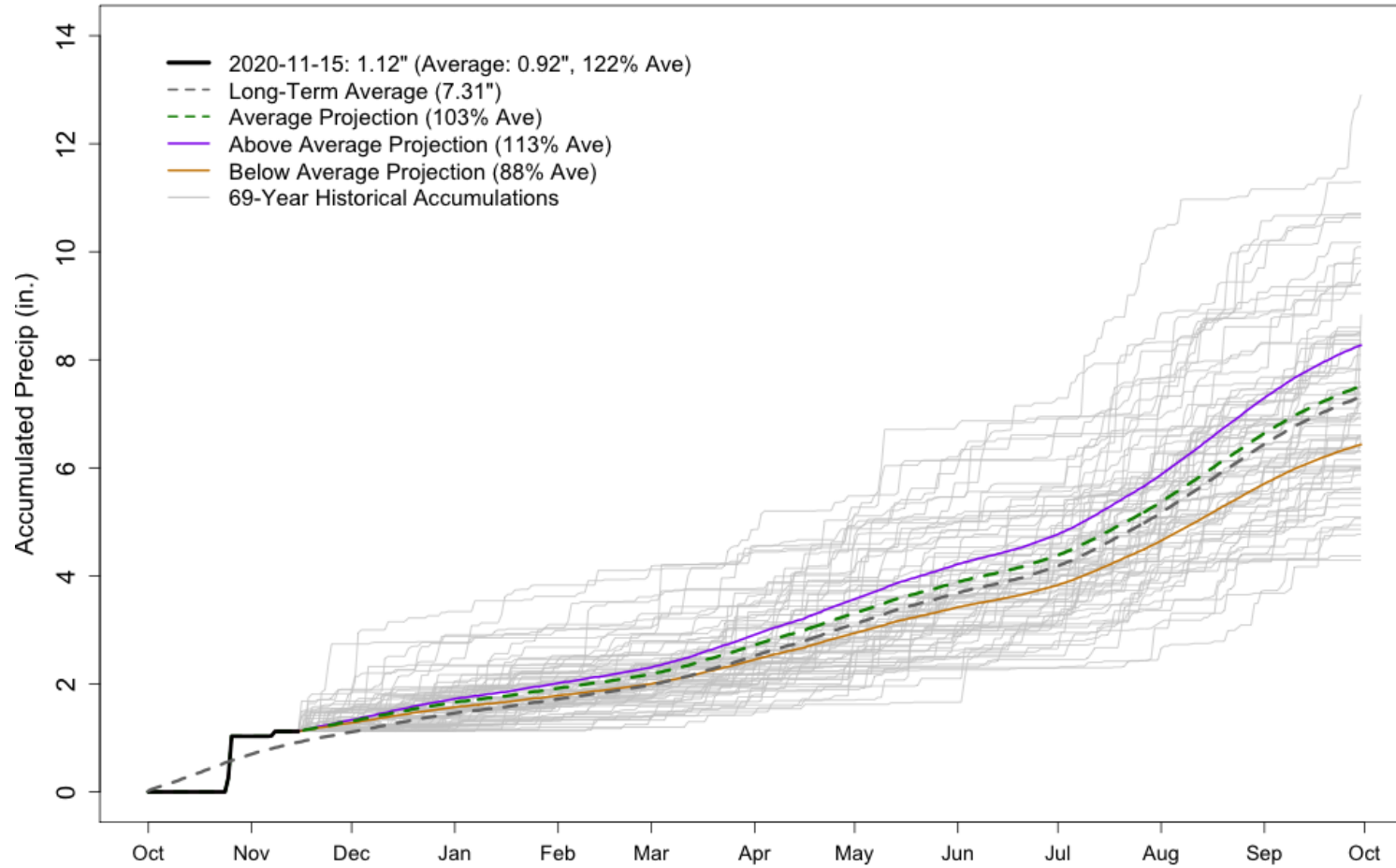
GRAND JUNCTION WALKER FIELD WY2021 Precipitation Projections



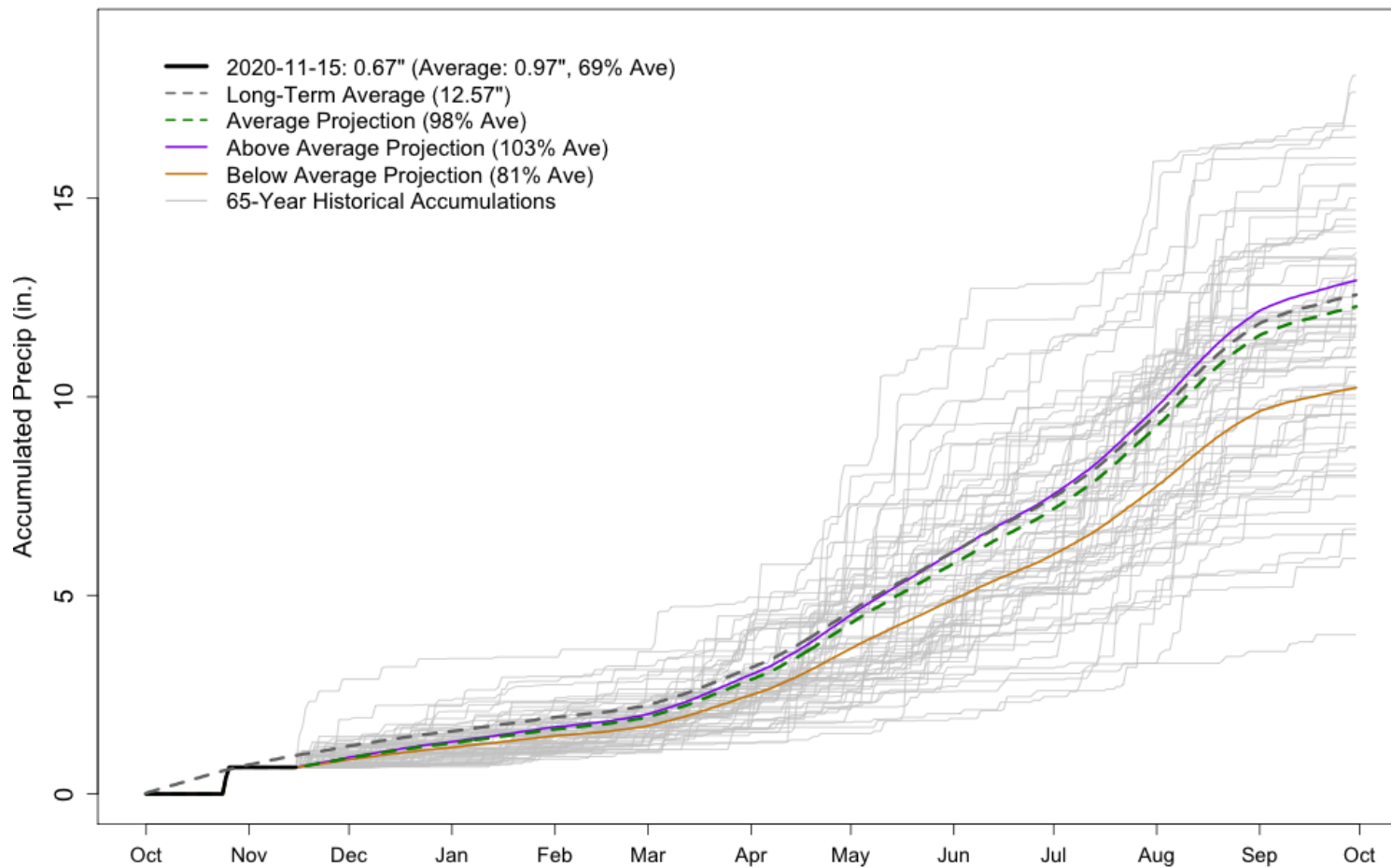
MESA VERDE NP WY2021 Precipitation Projections



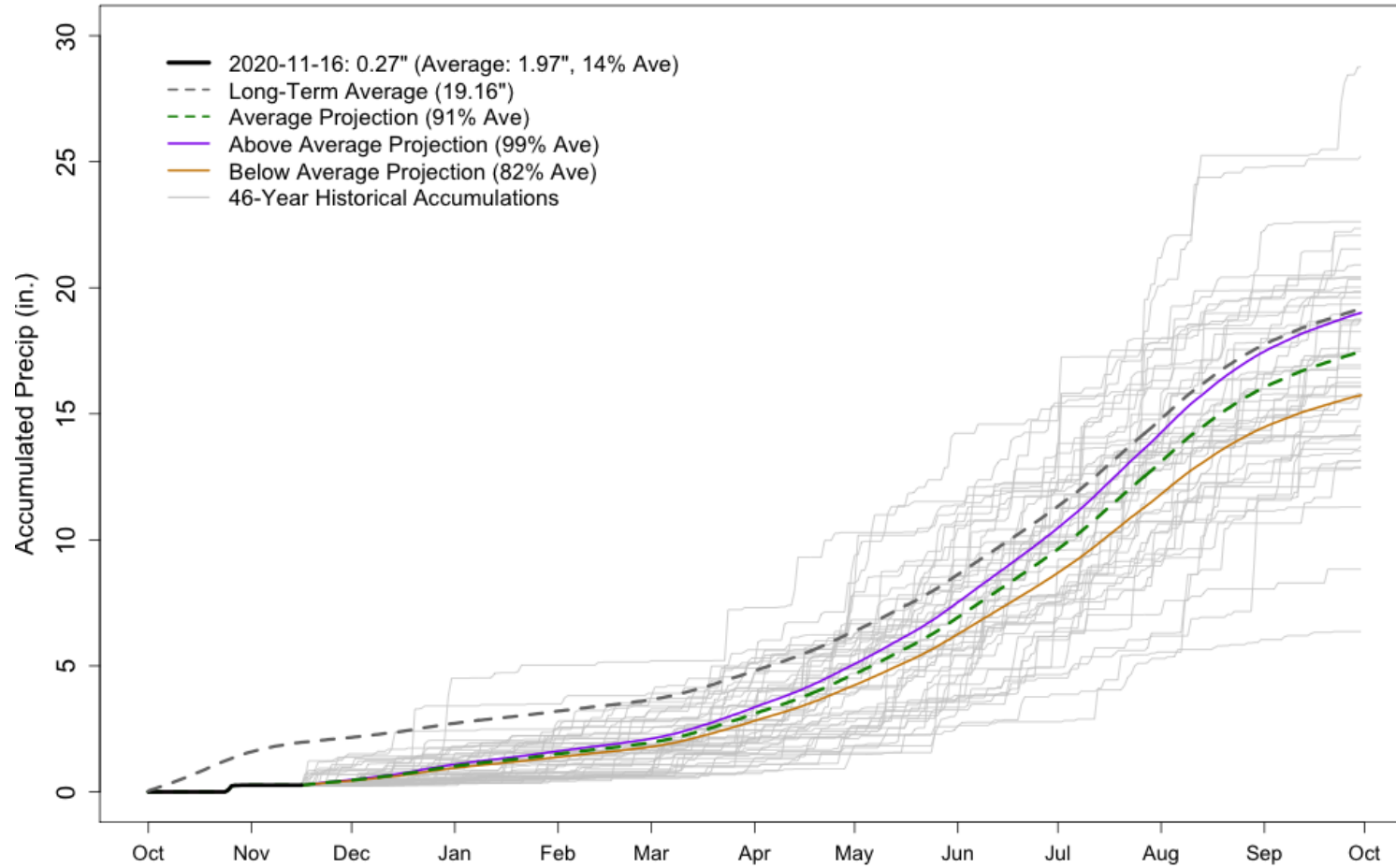
ALAMOSA-BERGMAN FIELD WY2021 Precipitation Projections



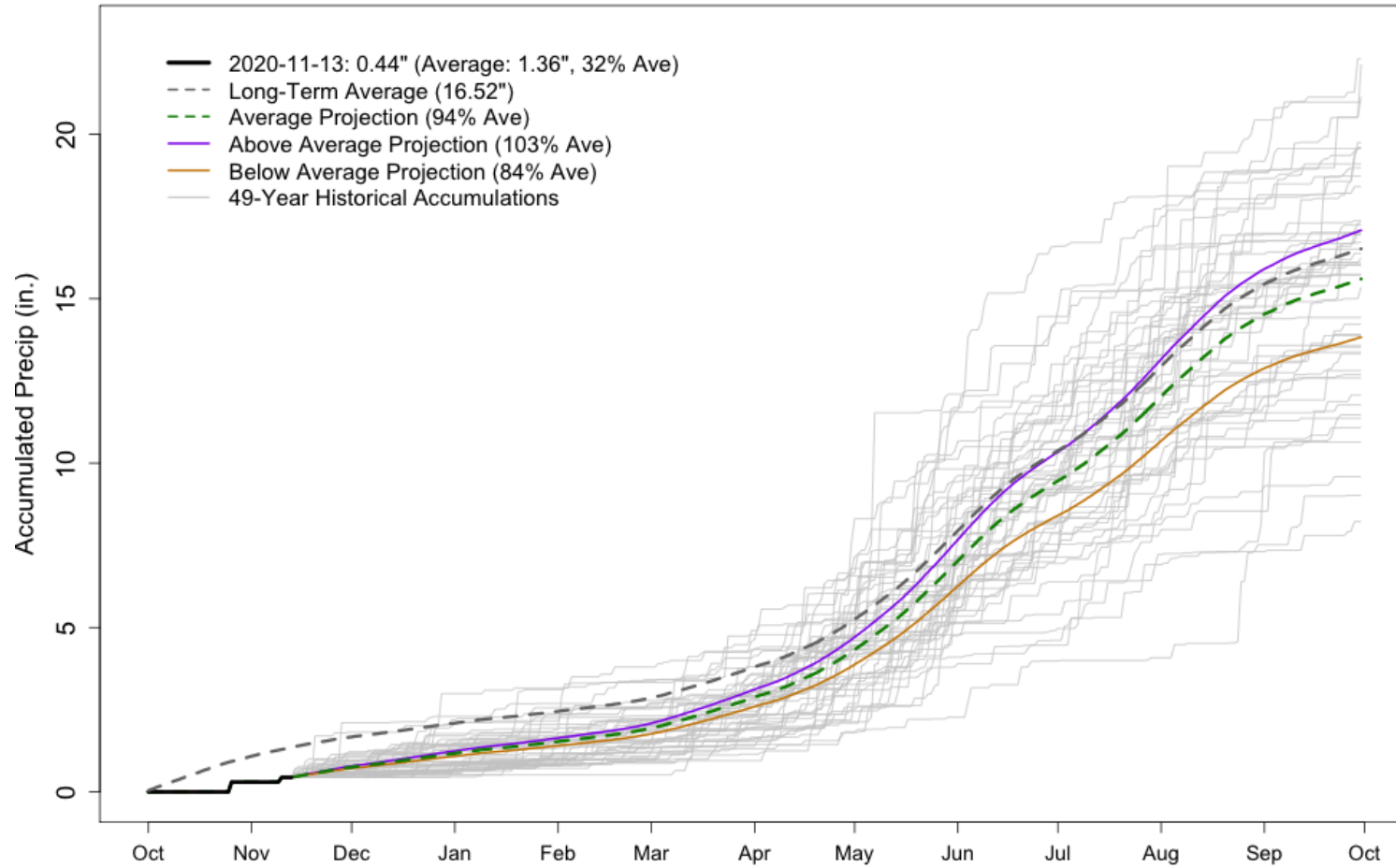
PUEBLO MEMORIAL AIRPORT WY2021 Precipitation Projections



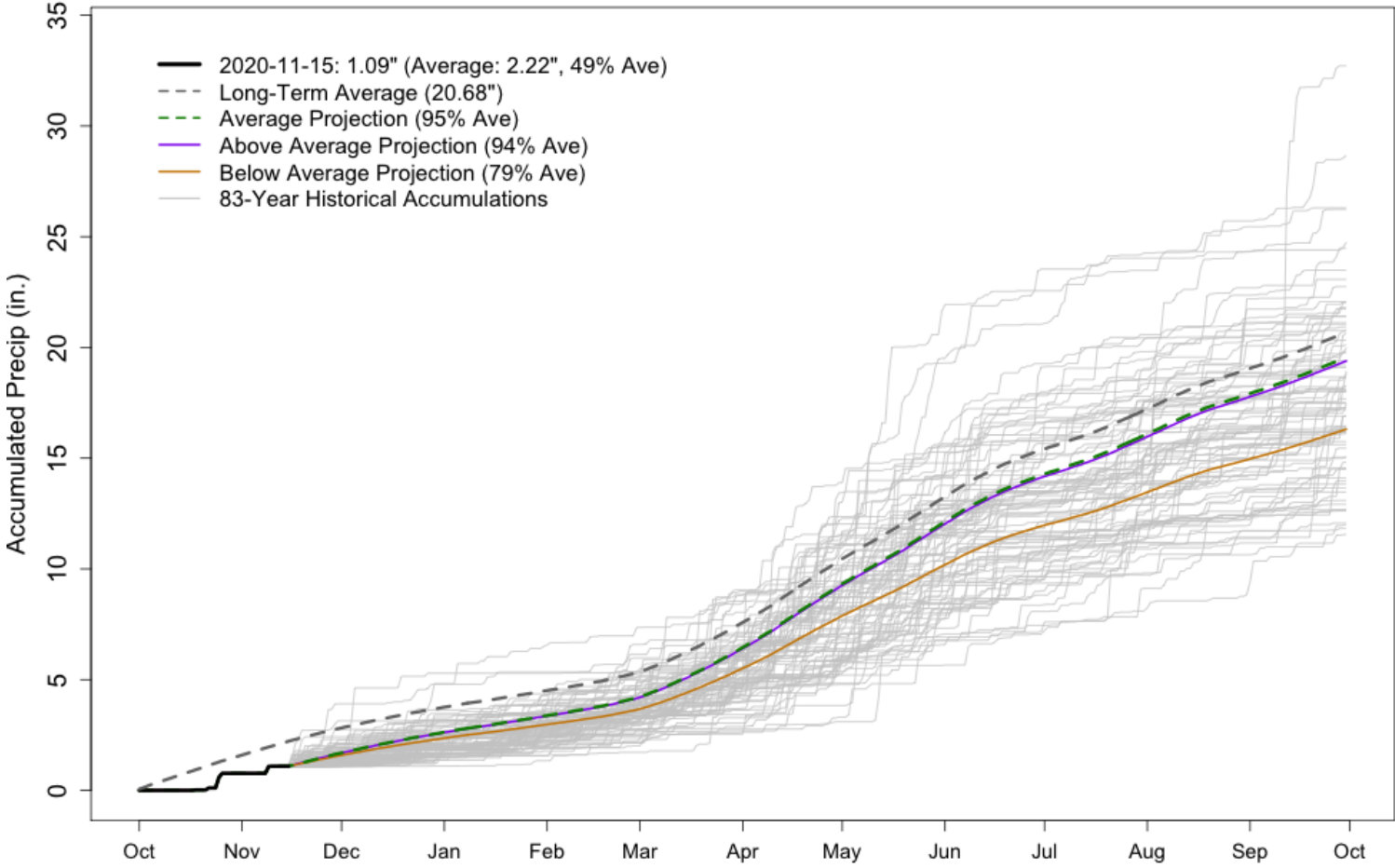
WALSH 1 W WY2021 Precipitation Projections



AKRON 4 E WY2021 Precipitation Projections



BOULDER WY2021 Precipitation Projections



Summary points

- WY 2020 is one we would like to forget (12th warmest and 3rd driest)
- The start of WY 2021 has been unsettling. We had a huge fire month in October, not typically part of high fire season for Colorado.
- The cool down at the end of October has brought back blue skies along the Front Range as fire growth have been brought back under control
- November to date hasn't been especially atypical. It has leaned a bit dry and warm with a few decent snows to start the mountain snowpack season
- The next several weeks are likely to lean warm and dry. No major breaks in the forecast. Expect snowpack numbers to fall a bit behind
- Weak La Niña is likely this winter. Expect warmer and dry conditions to be more likely to the south and more normal conditions to the north. Don't expect any widespread bailouts. Winners: NW CO. Losers: SE CO
- Above normal moisture is needed to put us on track next spring



To view this and other presentations:
http://climate.colostate.edu/ccc_archive.html

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Thank you!



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