Colorado Climate Update

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Assistant State Climatologist

Water Availability Task Force

September 27, 2022

COLORADO CLIMATE CENTER

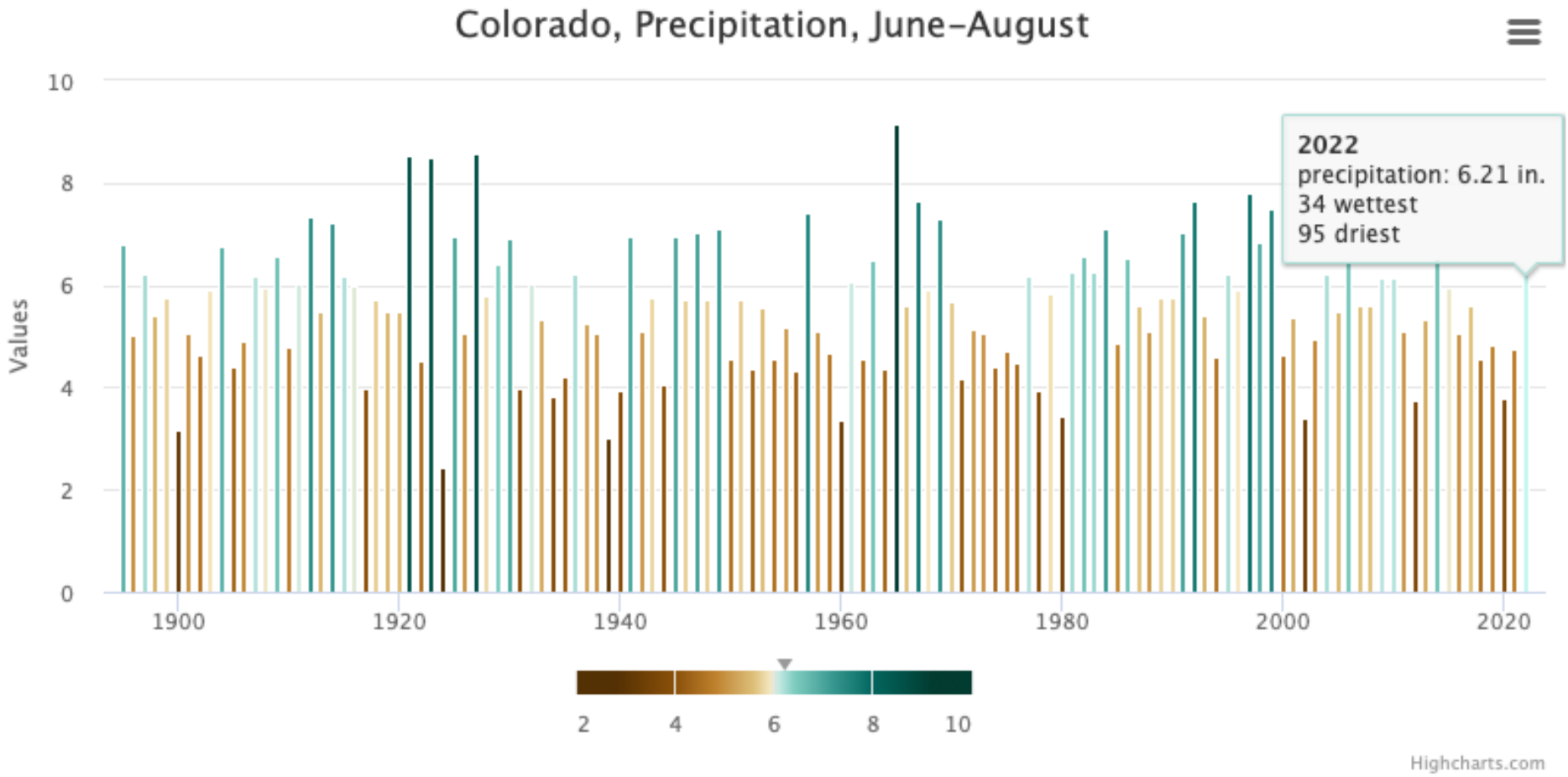
ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY

COLORADO CLIMATE CENTER

2022 Water Year to Date

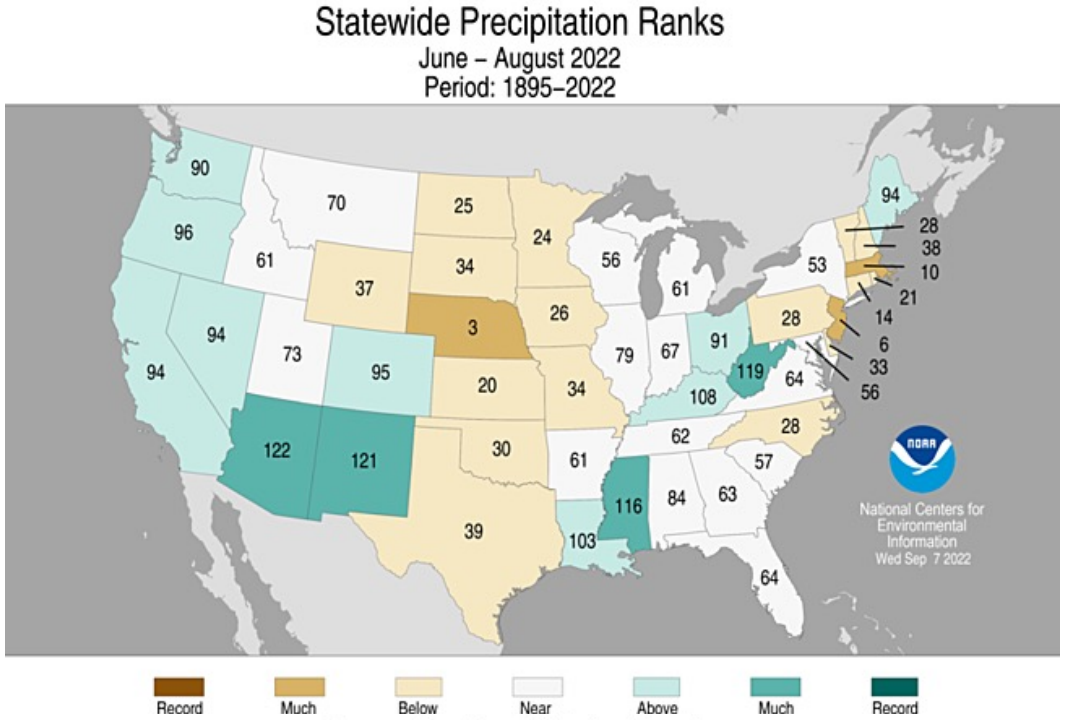
A look at Summer 2022

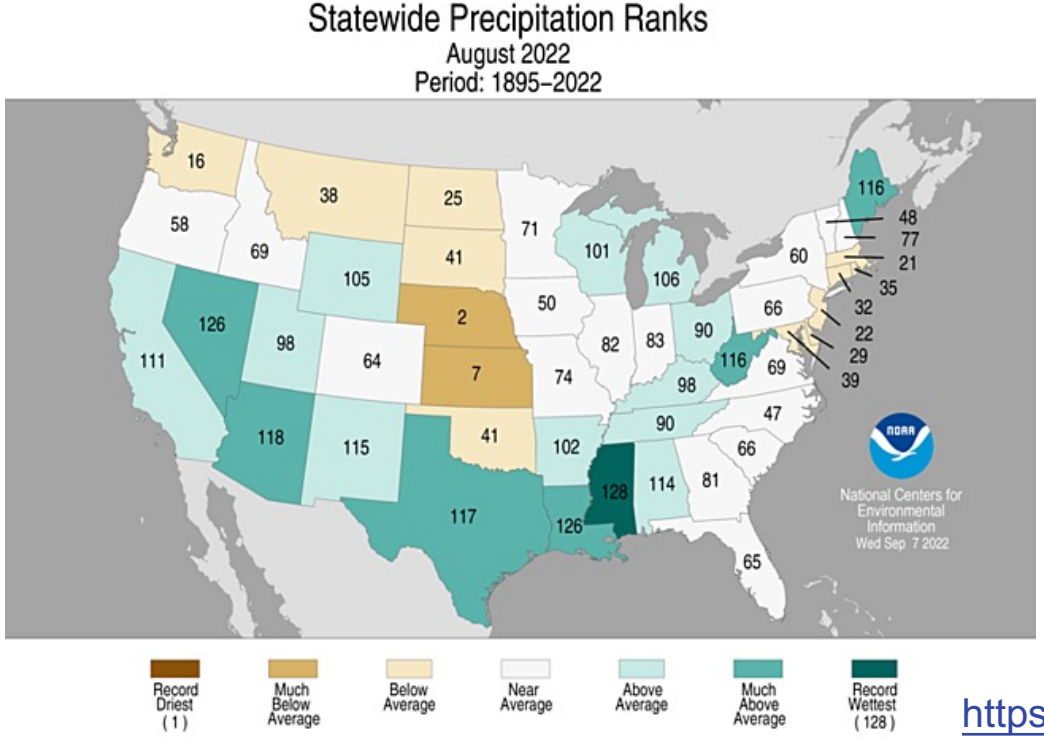
September 2022



Summer 2022 was the 34th wettest summer in the 128-year record, and 0.56” above average. This is the first above average summer for precipitation since 2015.

https://climate.colostate.edu/co_cag/cag_time.html

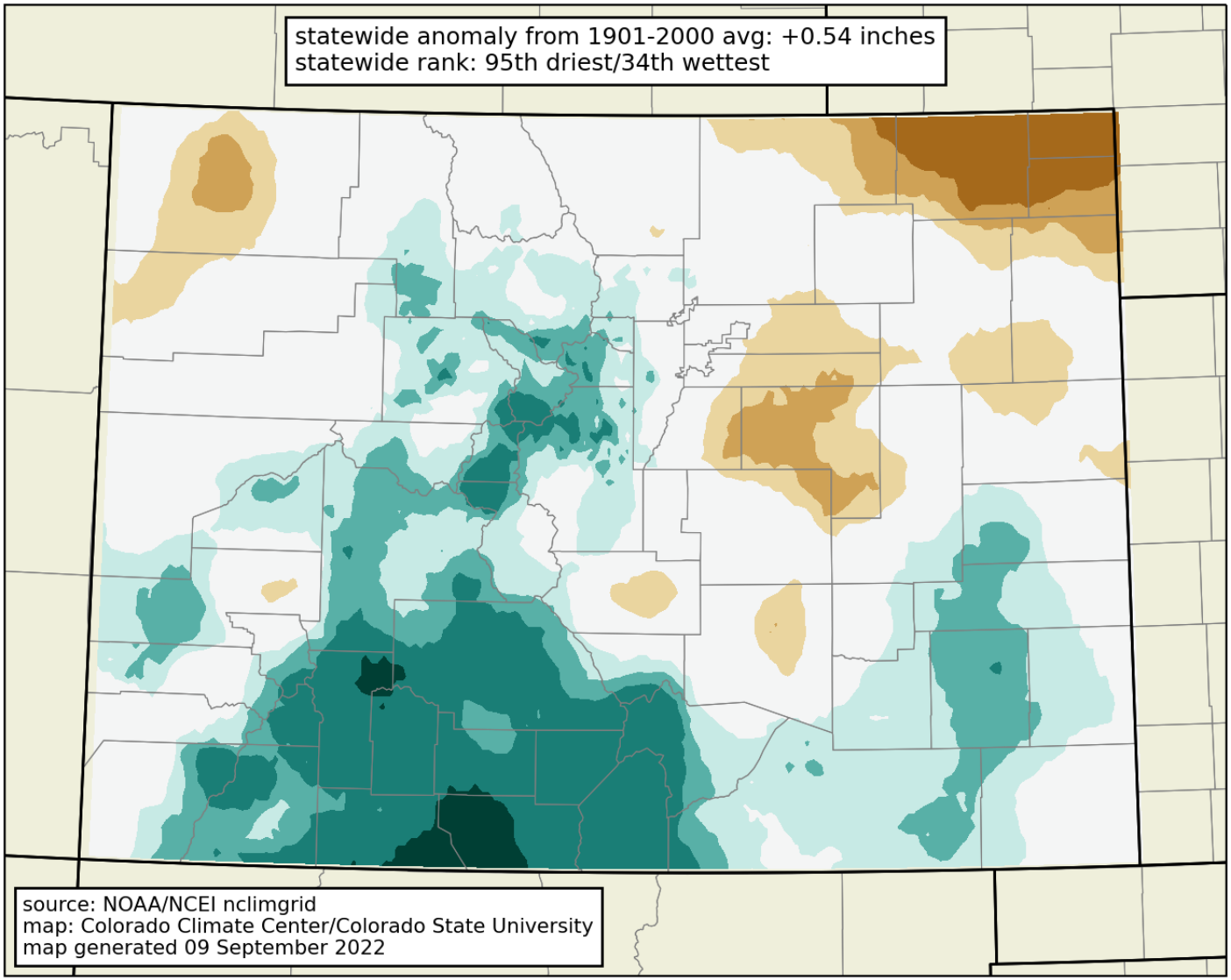




Month	P Rank (of 128 years)	Above, below, or near 20th century avg?
Oct	62nd driest	near avg
Nov	10th driest	much below
Dec	13th wettest	much above
Jan	40th driest	below
Feb	49th driest	near avg
Mar	62nd wettest	near avg
Apr	5th driest	much below
May	47th driest	near avg
Jun	57th wettest	near avg
Jul	18th wettest	above avg
Aug	64th wettest	near avg
Sep		

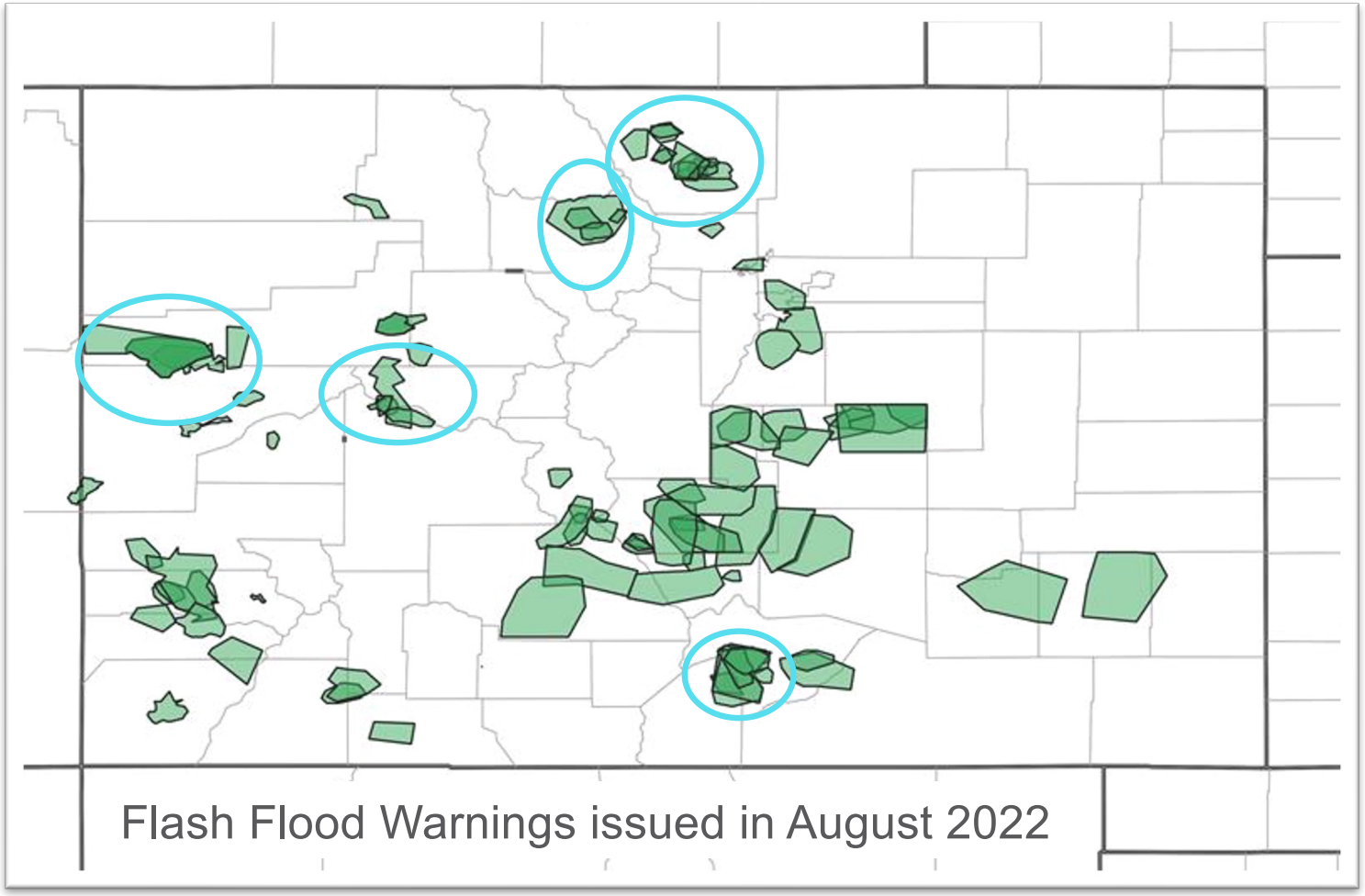
https://www.ncdc.noaa.gov/temp-and-precip/us-maps/

precipitation rank: 3 months ending August 2022 (Jun-Aug)

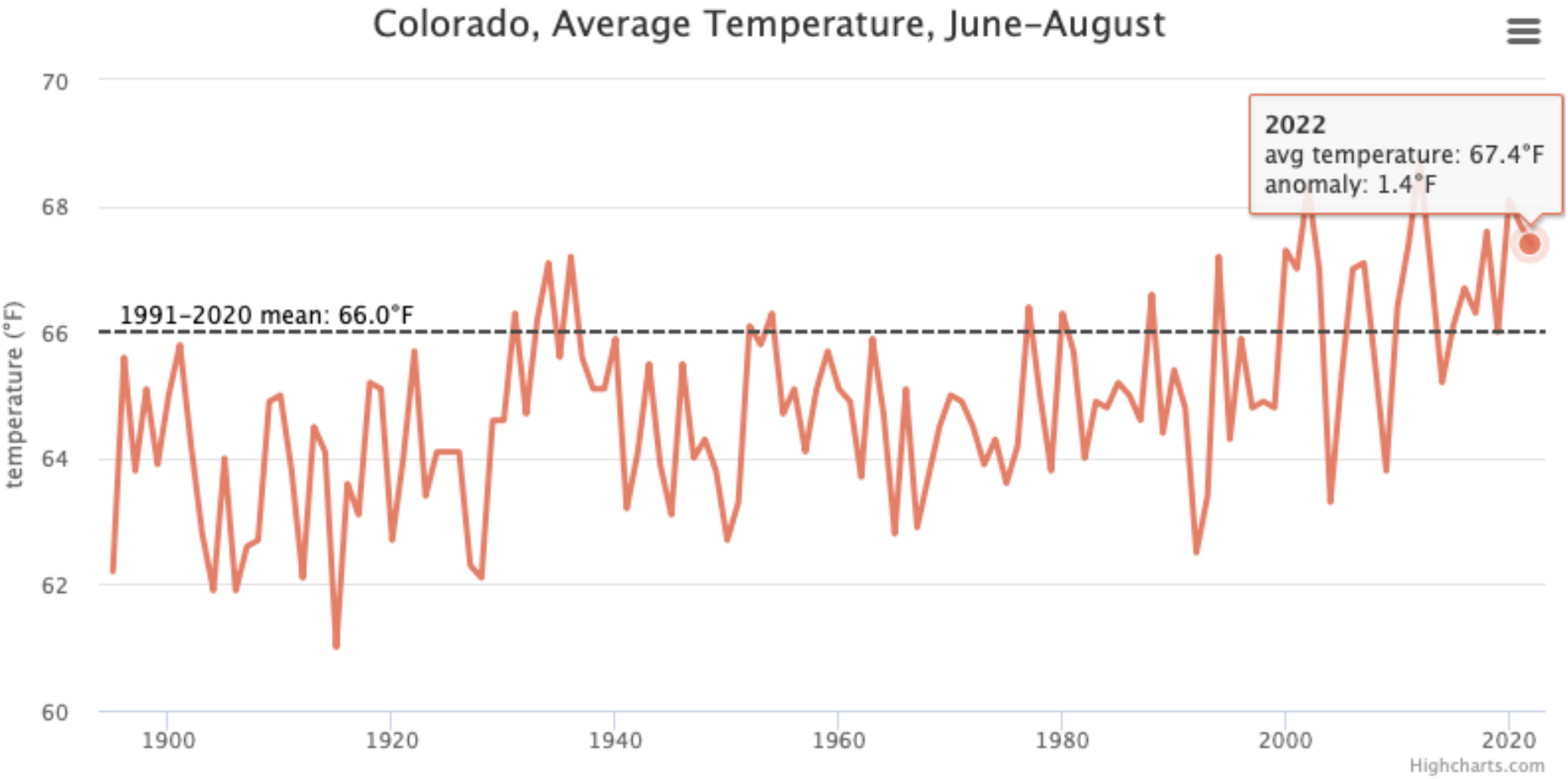


https://climate.colostate.edu/co_cag/rank_maps.html

Flash Flood Warnings

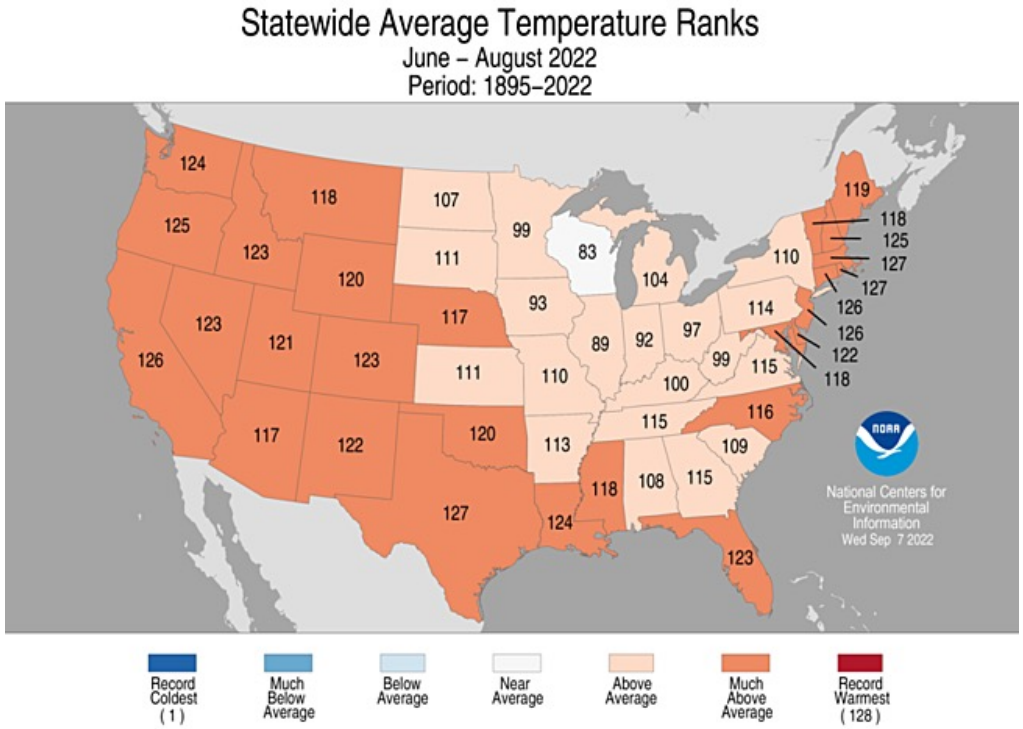


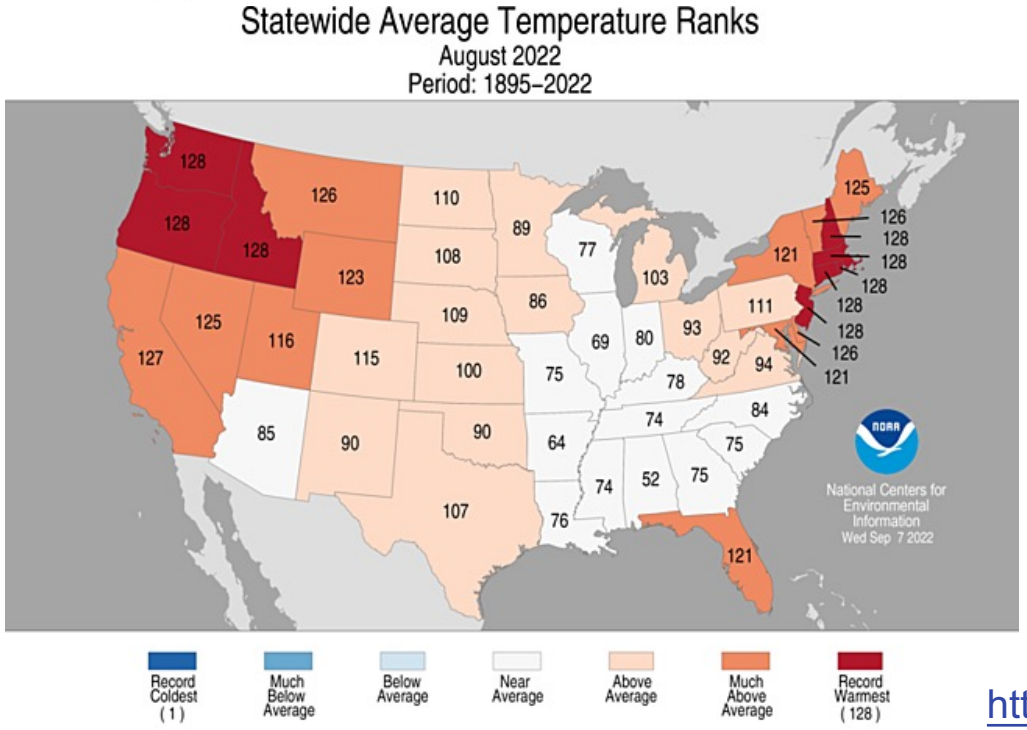
- 93 flash flood warnings issued in August 2022
- Previous high was 52 in 2013
- Total warnings in 2022 second only to last year (records back to 2008)



Summer 2022 was the 6th warmest summer in the 128-year record. It was second warmest for minimum temperatures, just behind summer 2012. Statewide anomaly was almost 3°F warmer than the 20th century average.

https://climate.colostate.edu/co_cag/cag_time.html

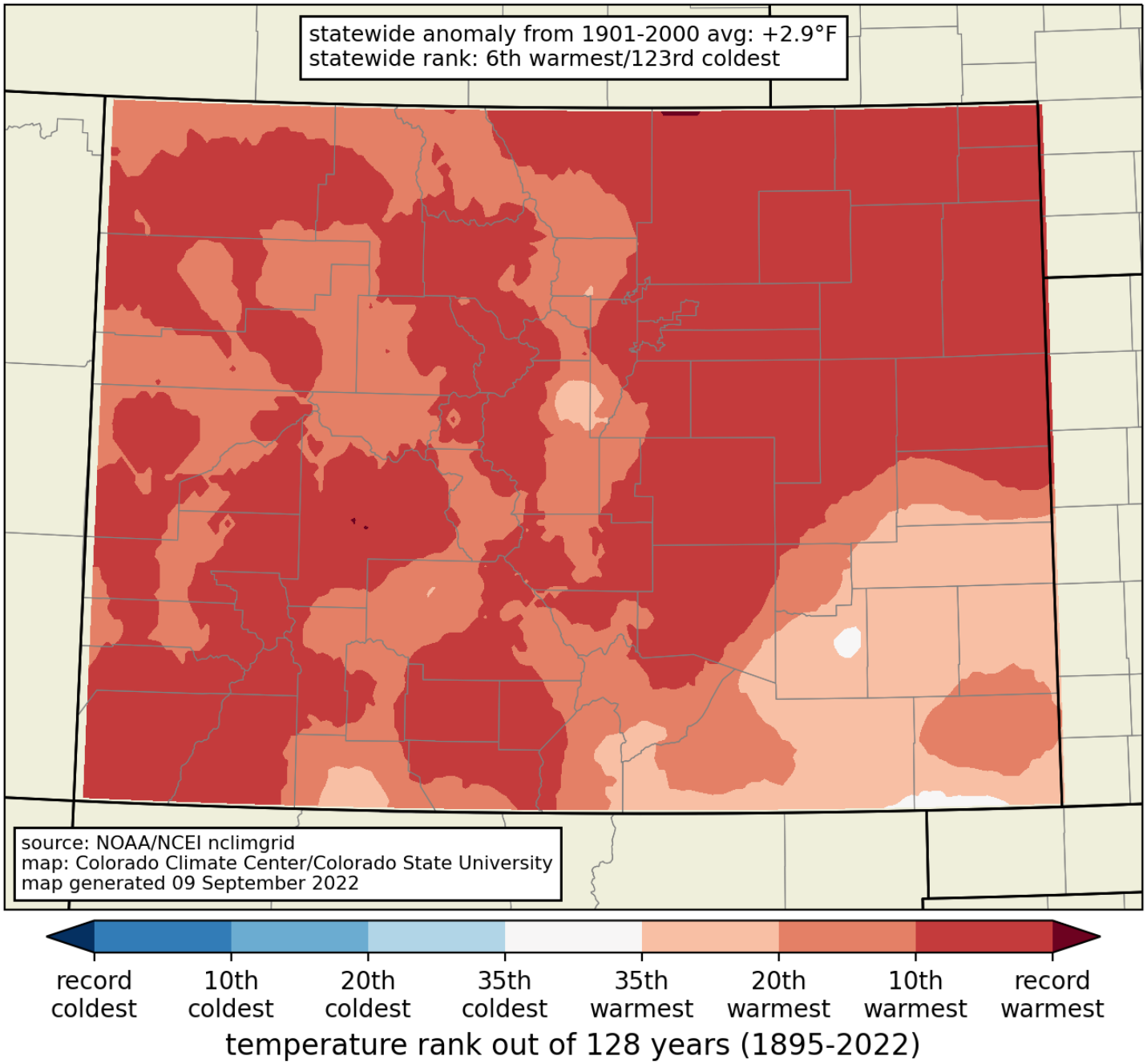




Month	T Rank (of 127 years)	Above, below, or near 20th century avg?
Oct	41st warmest	above
Nov	3rd warmest	much above
Dec	2nd warmest	much above
Jan	33rd warmest	above
Feb	31st coldest	below
Mar	54th warmest	near avg
Apr	49th warmest	near avg
May	41st warmest	above
Jun	24th warmest	above
Jul	5th warmest	much above
Aug	14th warmest	above
Sep		

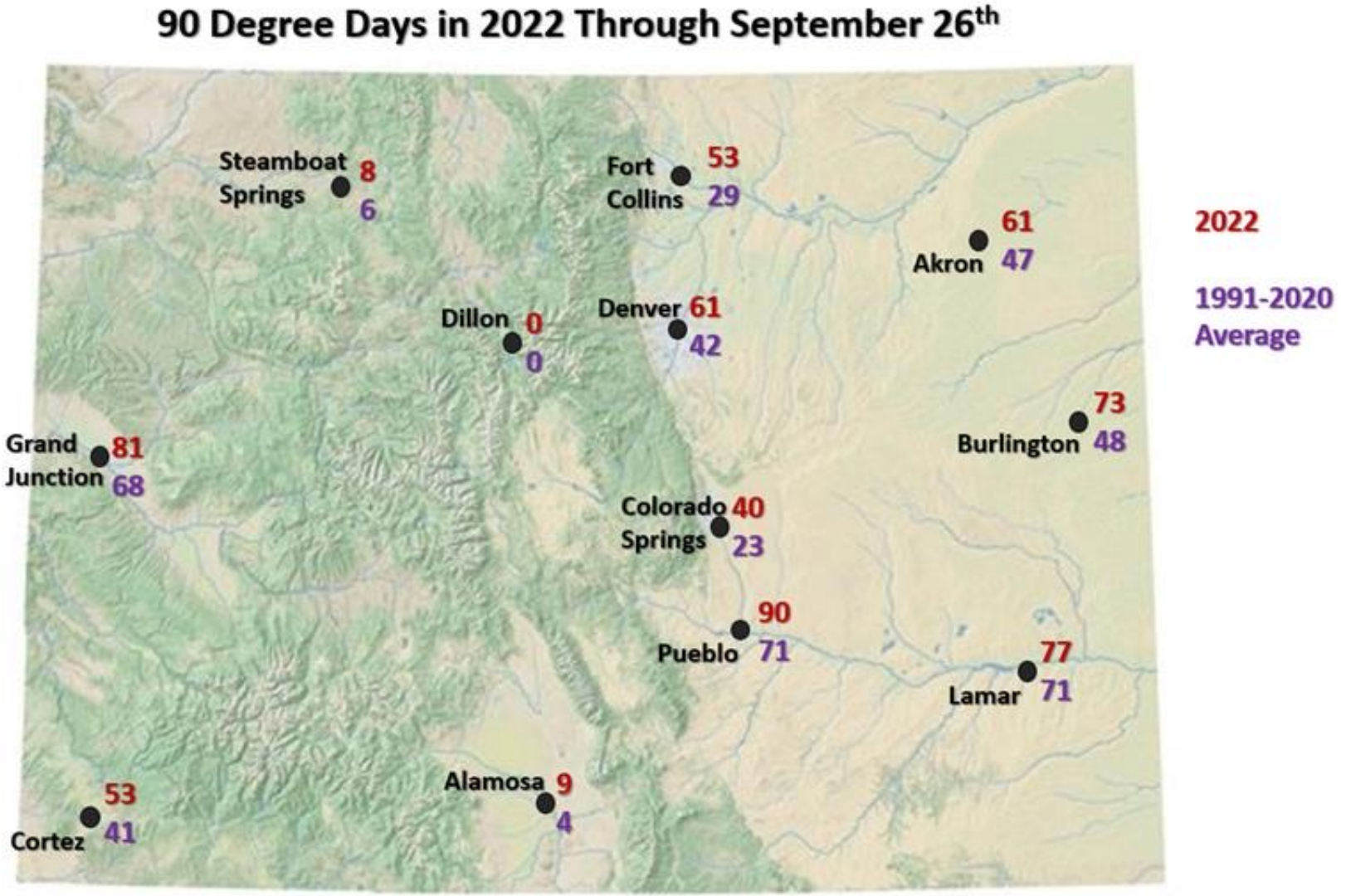
https://www.ncdc.noaa.gov/temp-and-precip/us-maps/

average temperature rank: 3 months ending August 2022 (Jun-Aug)



https://climate.colostate.edu/co_cag/rank_maps.html

90° Days


90 Degree Days in 2022 Through September 26th
Steamboat Springs 8 6
Fort Collins 53 29
Akron 61 47
Dillon 0 0
Denver 61 42
Grand Junction 81 68
Burlington 73 48
Colorado Springs 40 23
Pueblo 90 71
Lamar 77 71
Alamosa 9 4
Cortez 53 41
2022
1991-2020 Average

COLORADO CLIMATE CENTER

Current Conditions

Temperature

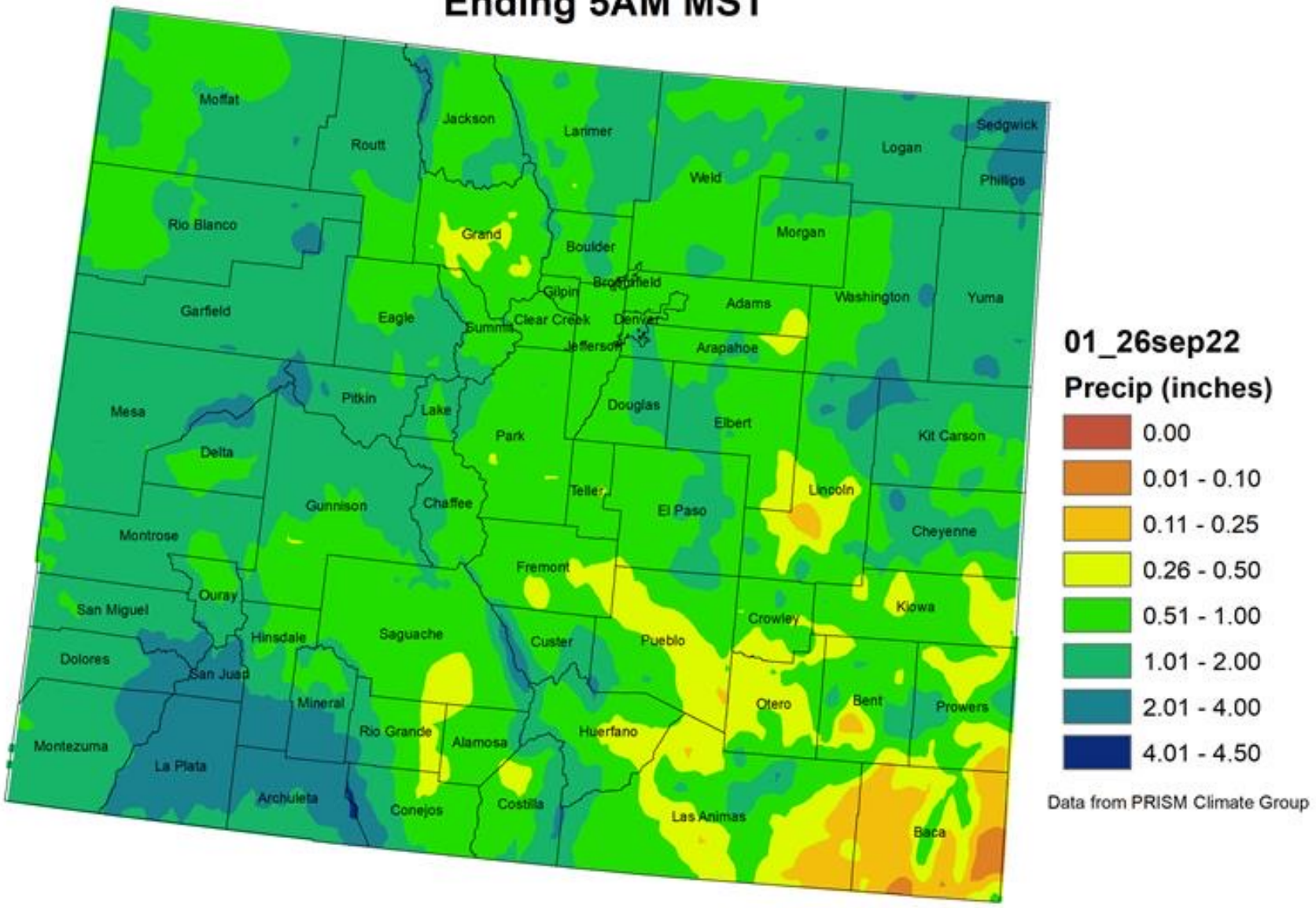
Precipitation

Evaporative Demand

Soil Moisture

Vegetation

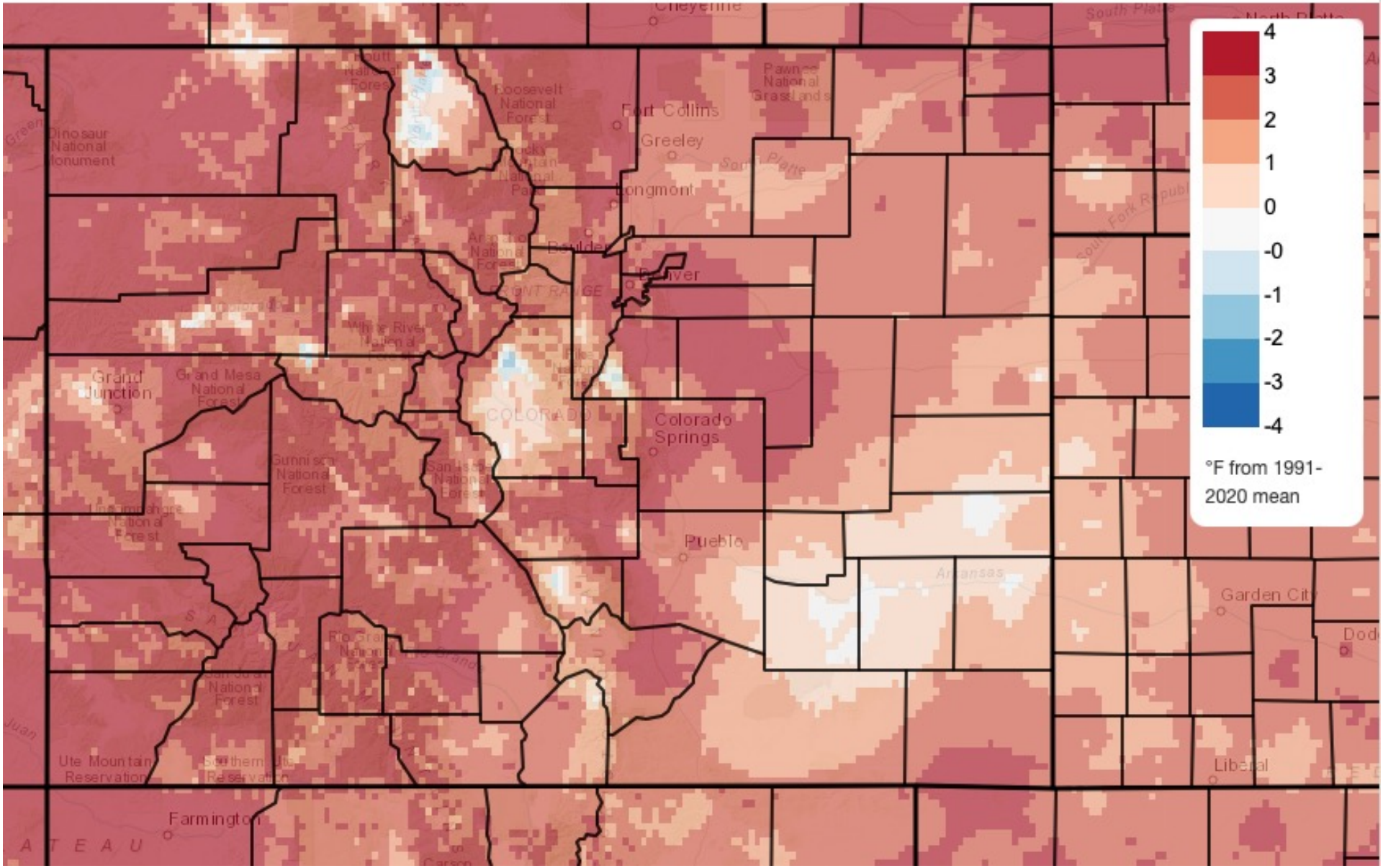
Colorado Month to Date Precipitation
1 - 26 September 2022
Ending 5AM MST



https://climate.colostate.edu/drought/

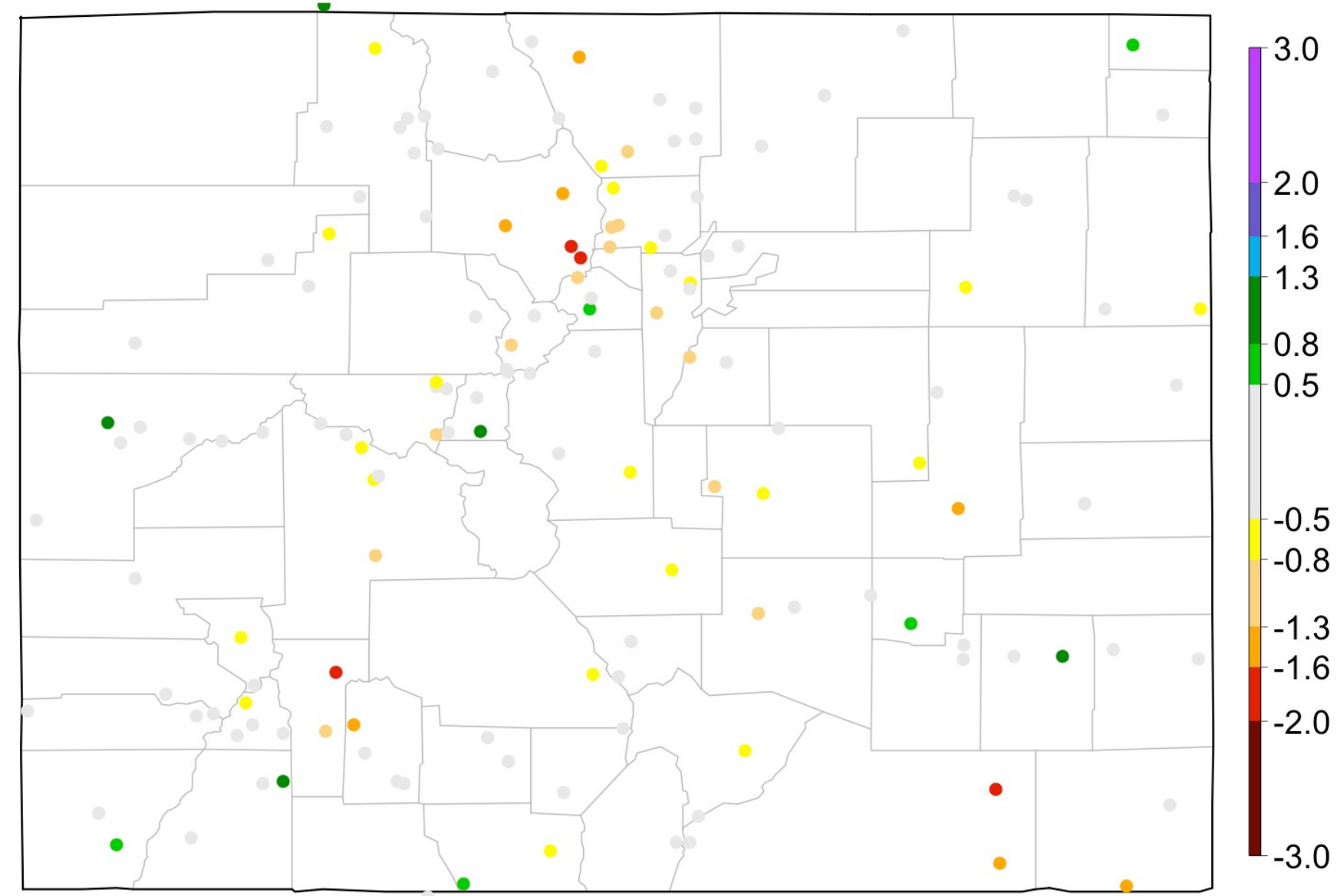
Mean Daily Temperature Anomaly, Last 30 Days

2022/08/27 - 2022/09/25



https://climatetoolbox.org/tool/Climate-Mapper

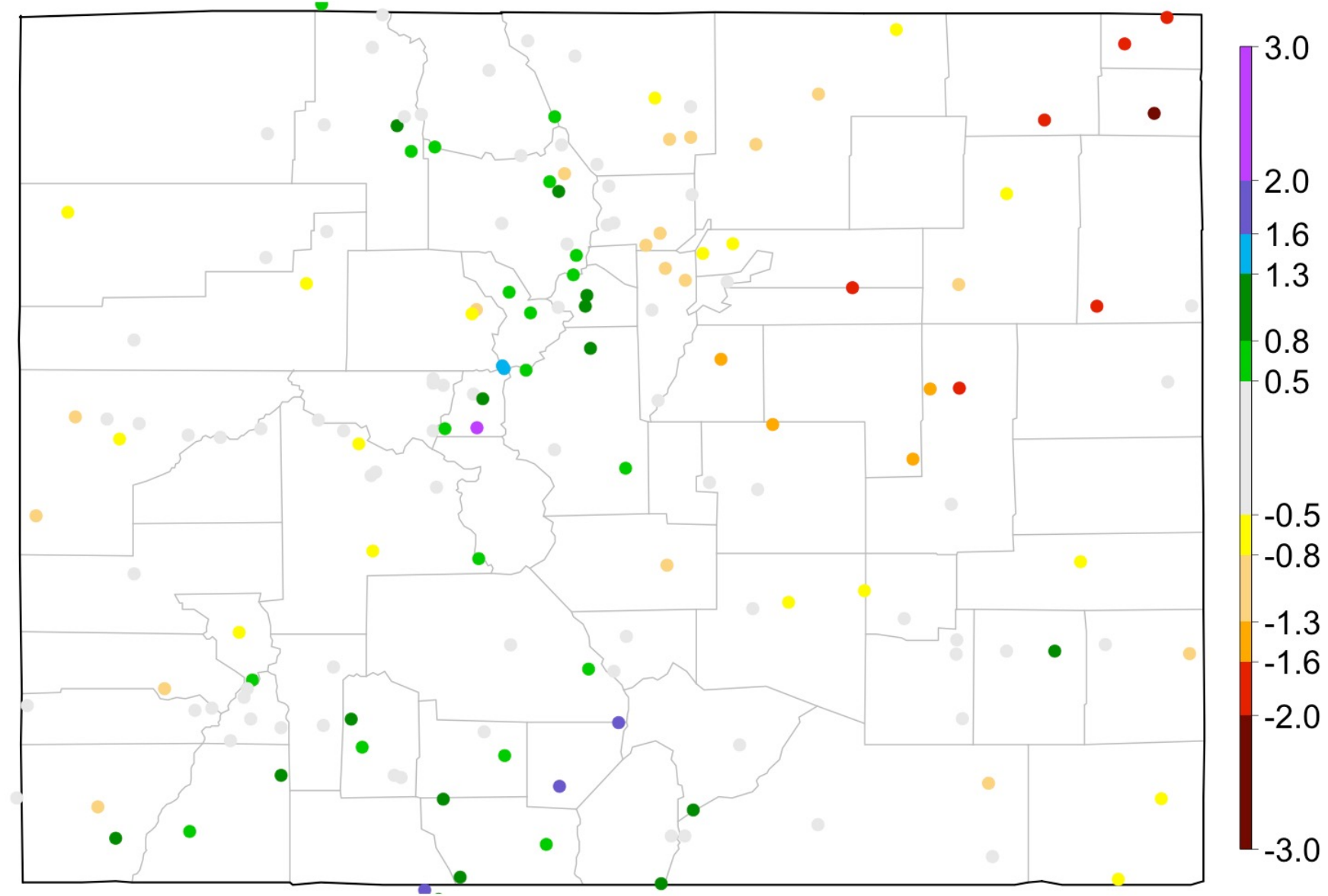
30-day SPI: 2022/08/27 - 2022/09/25



Data from High Plains Regional Climate Center and ACIS

https://climate.colostate.edu/drought/

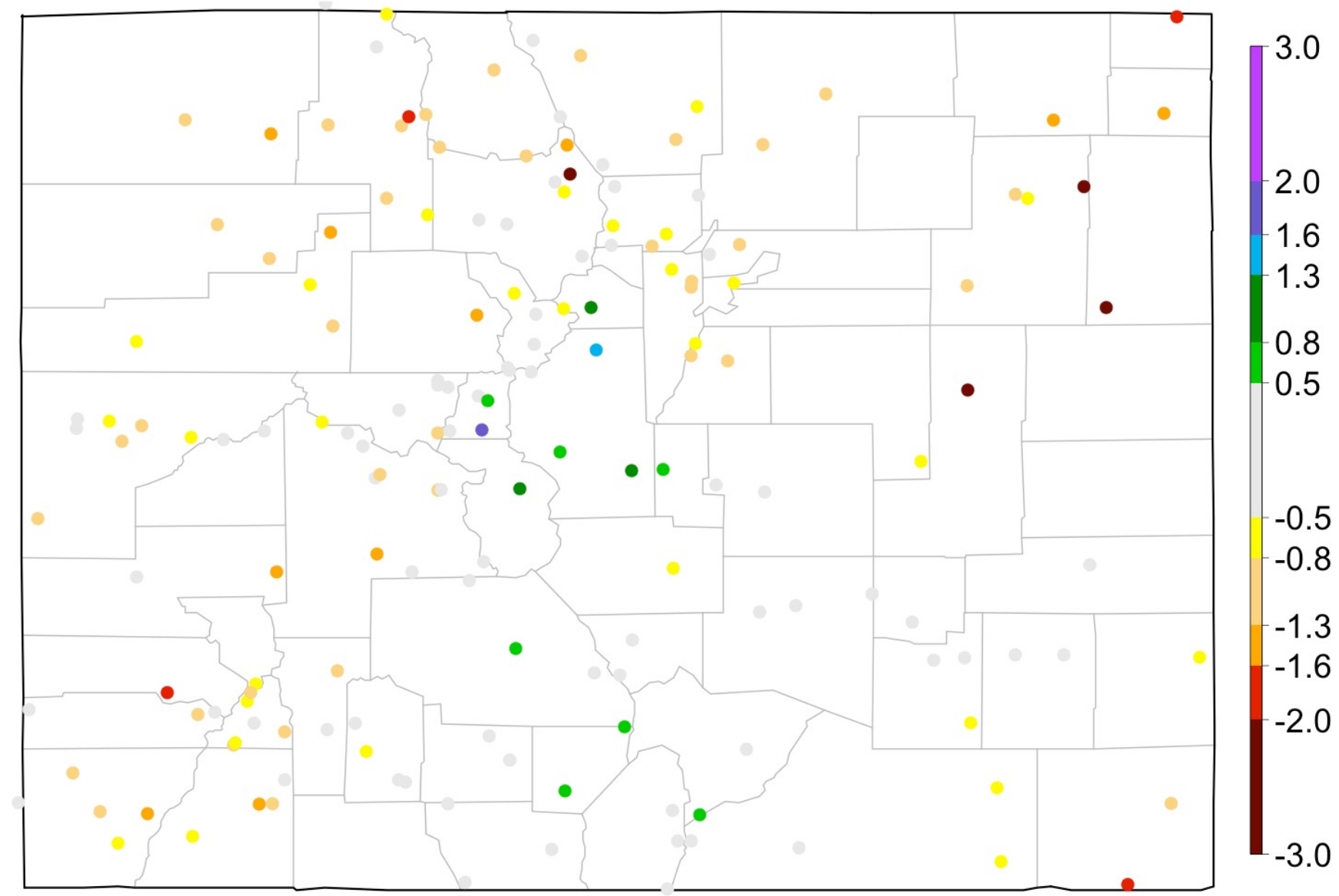
6-month SPI: 2022/03/26 - 2022/09/25



Data from High Plains Regional Climate Center and ACIS

https://climate.colostate.edu/drought/

24-month SPI: 2020/09/26 - 2022/09/25



Data from High Plains Regional Climate Center and ACIS

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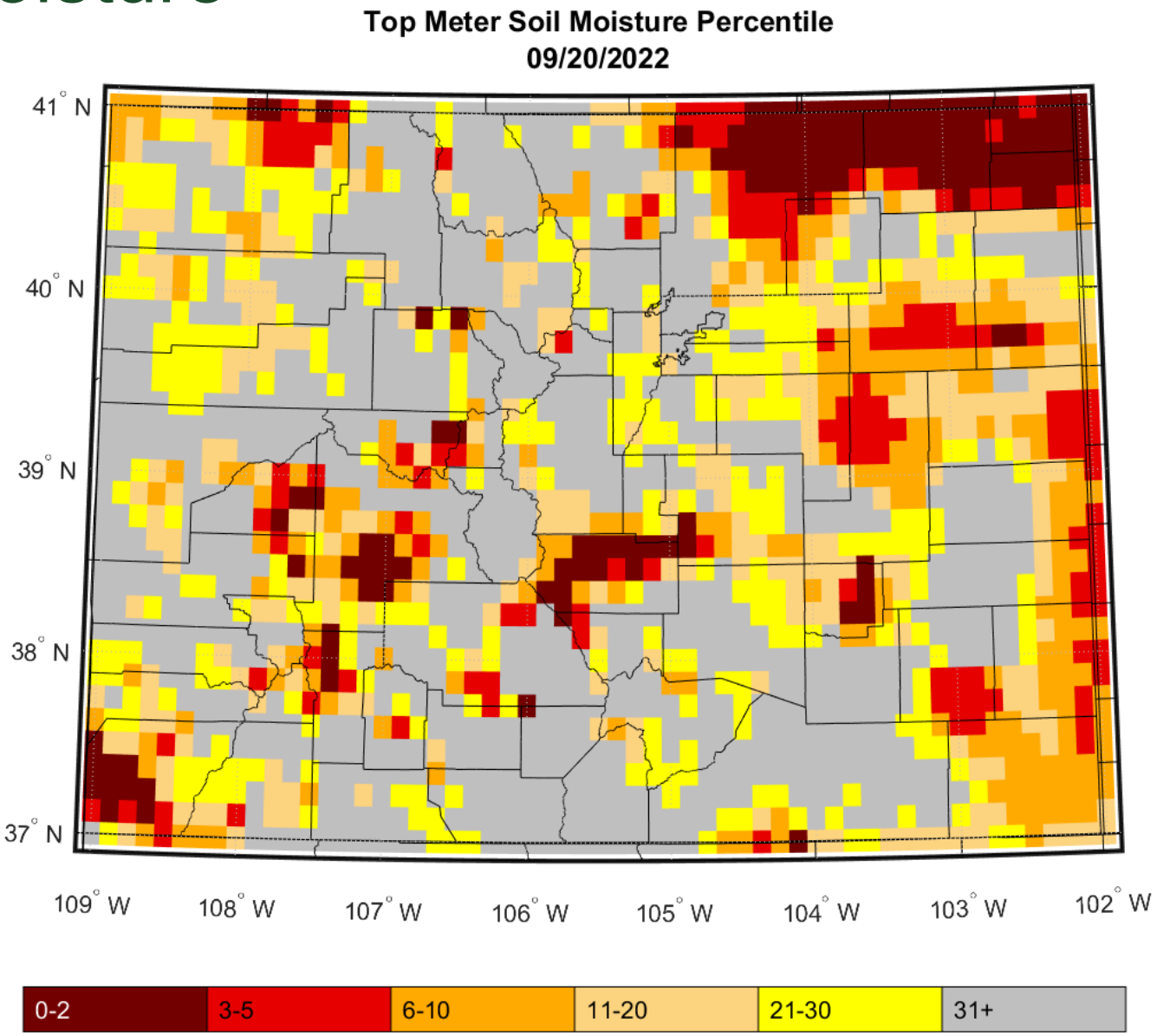
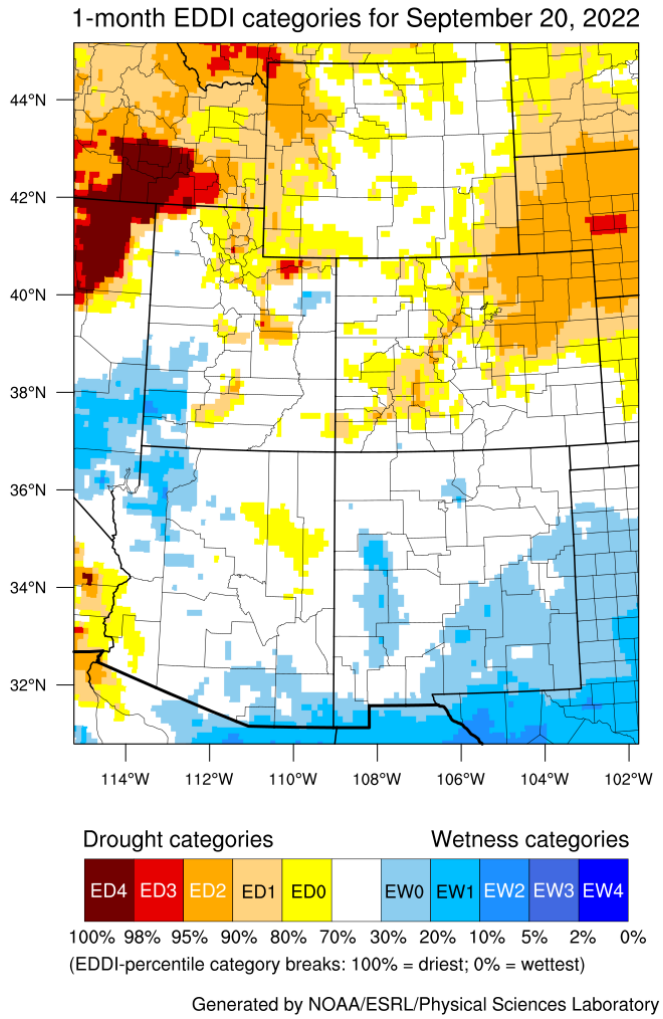
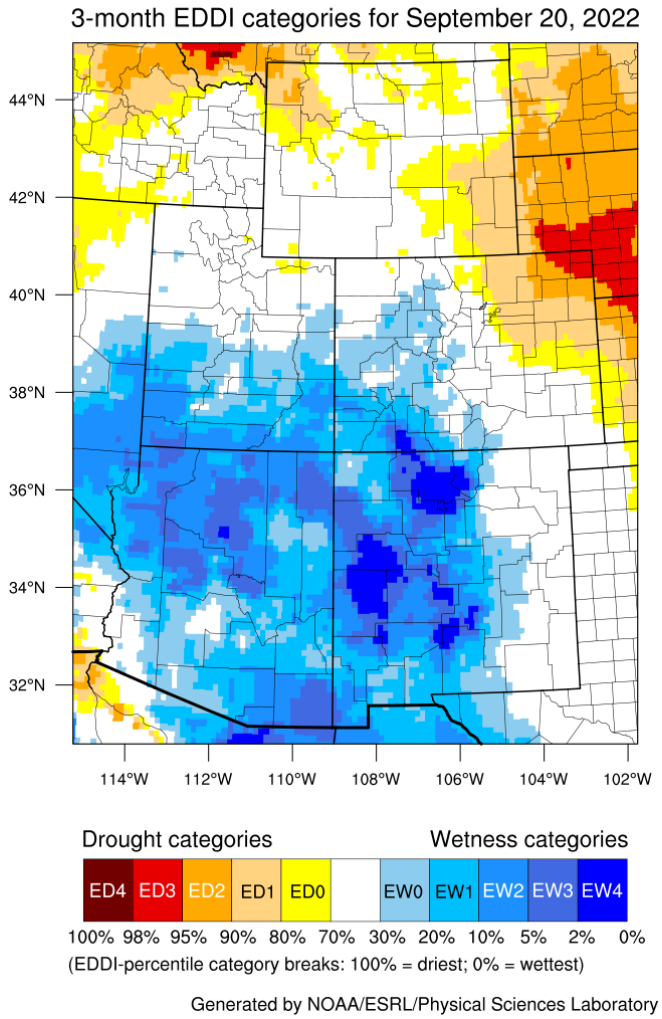
Soil Moisture



https://climate.colostate.edu/drought

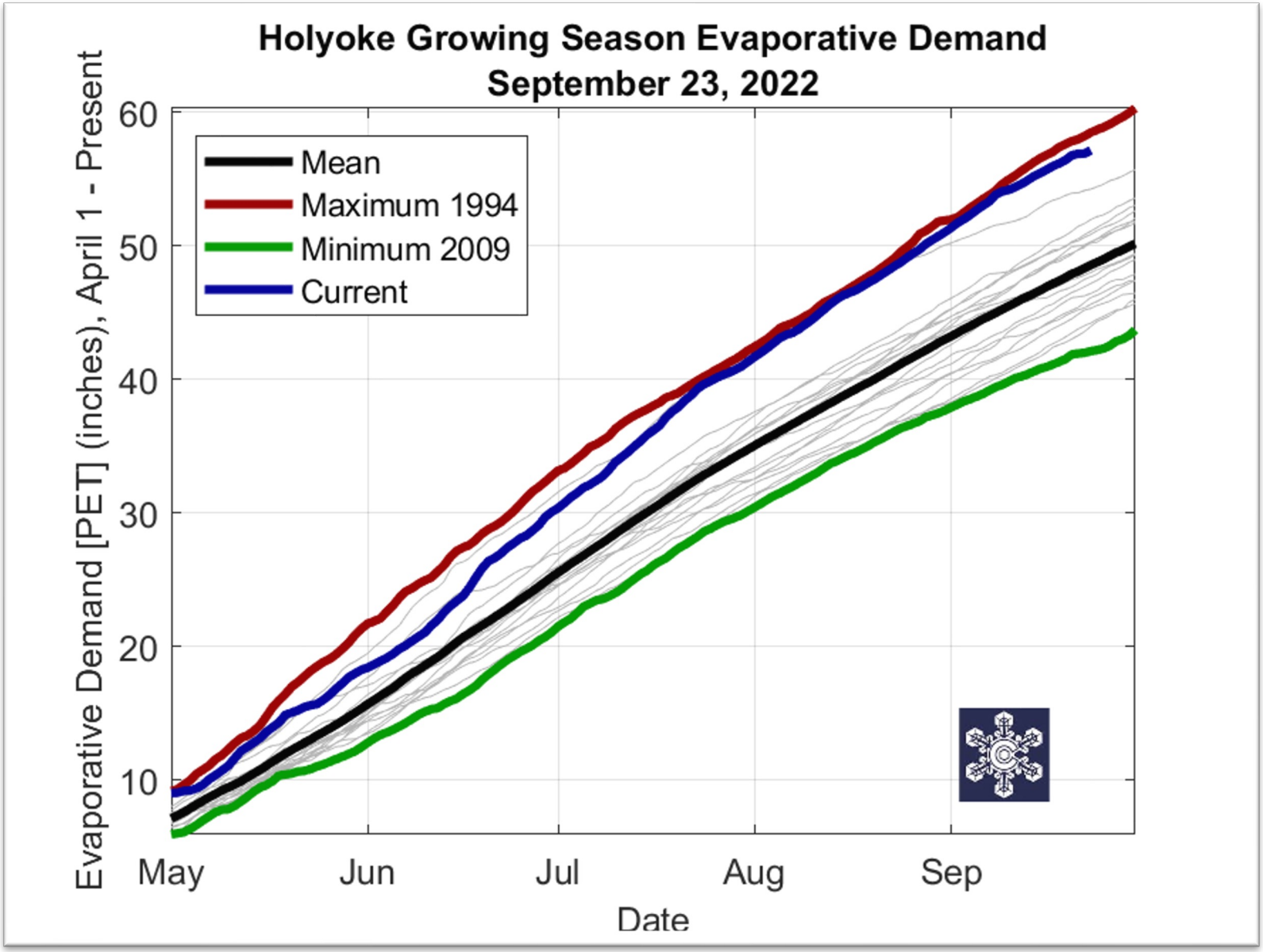
Evaporative Demand

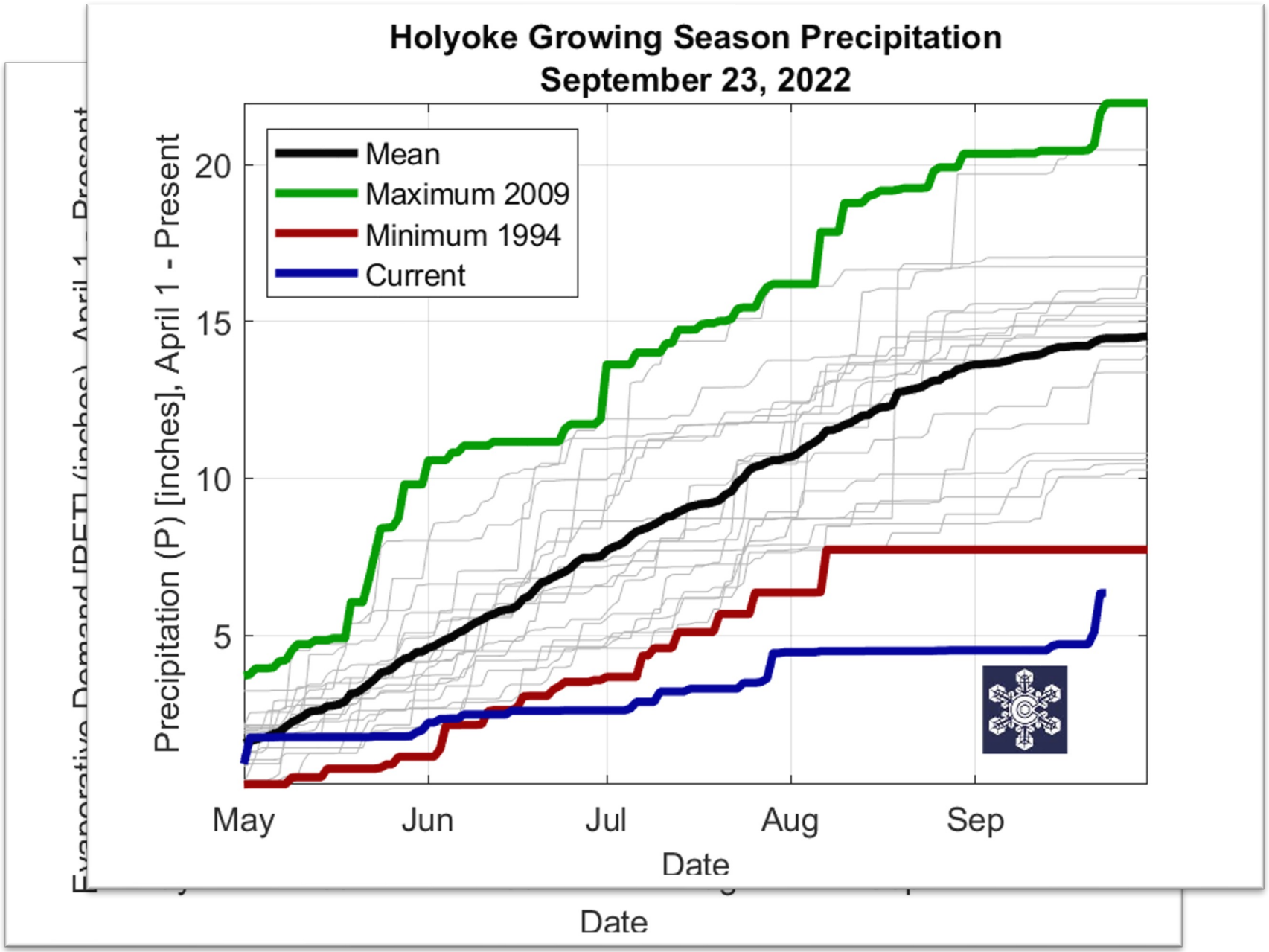


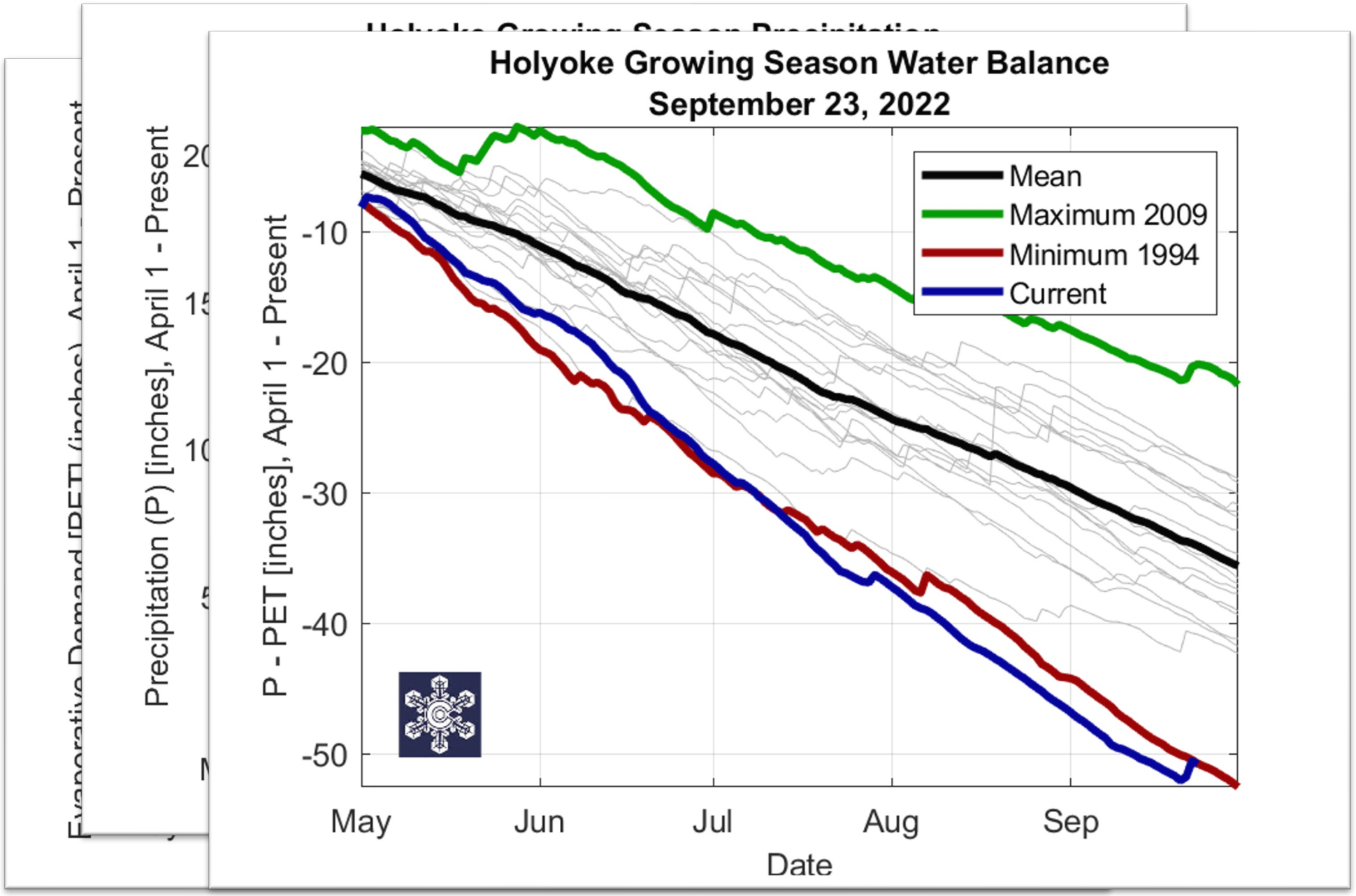


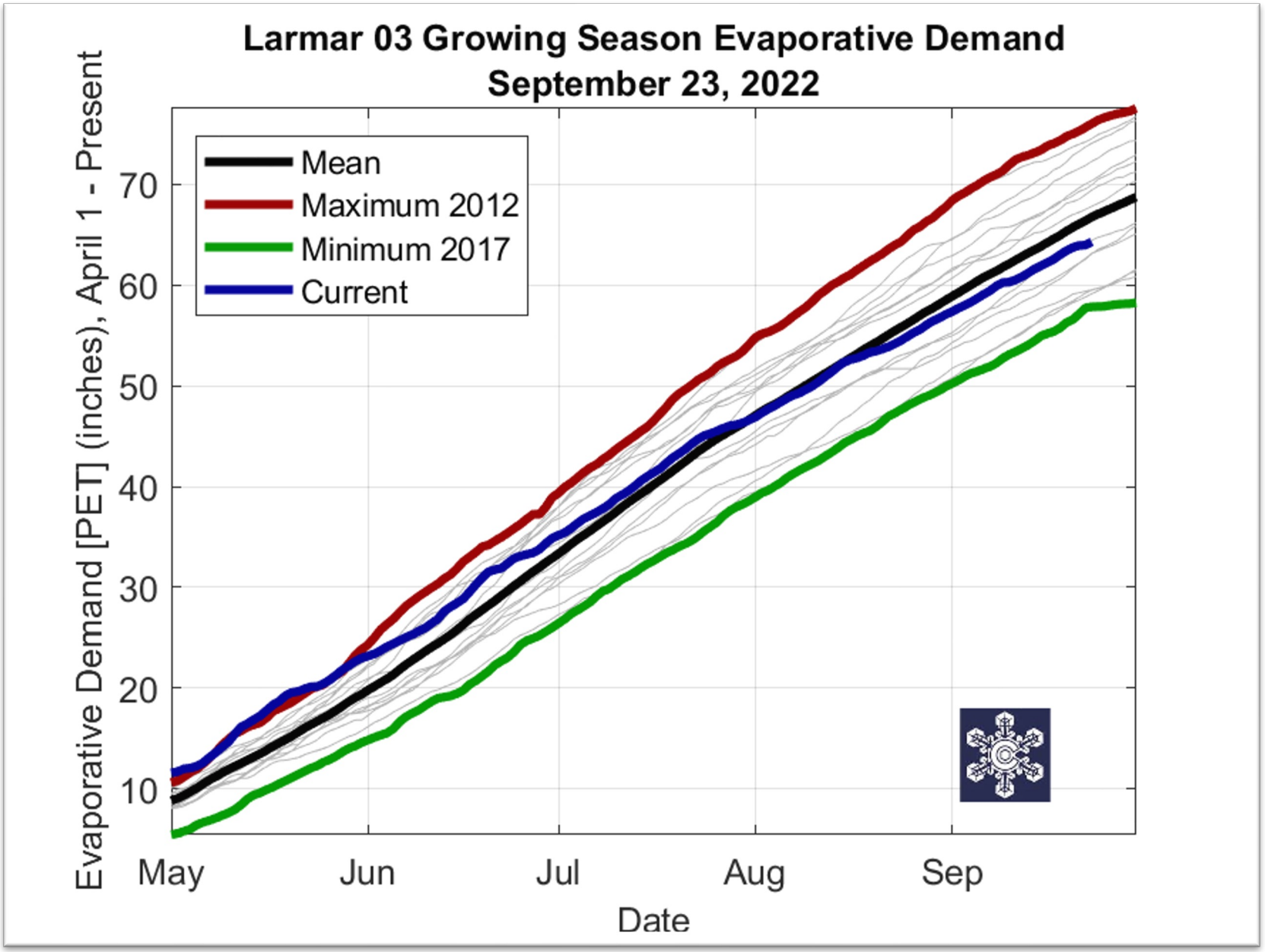
EDDI combines temperature, solar radiation, wind, and humidity – compares to historical record for that time period shown. Higher evaporative demand has been consistent over northeast CO. Much of western CO has experienced lower evaporative demand, thanks to more moisture in the air.

https://psl.noaa.gov/eddi/


Holyoke Growing Season Evaporative Demand
September 23, 2022
Evaporative Demand [PET] (inches), April 1 - Present
60
50
40
30
20
10
Mean
Maximum 1994
Minimum 2009
Current
May
Jun
Jul
Aug
Sep
Date


Holyoke Growing Season Precipitation
September 23, 2022
Mean
Maximum 2009
Minimum 1994
Current
Precipitation (P) [inches], April 1 - Present
20
15
10
5
May
Jun
Jul
Aug
Sep
Date
Date


Holyoke Growing Season Water Balance
September 23, 2022
Mean
Maximum 2009
Minimum 1994
Current
P - PET [inches], April 1 - Present
-10
-20
-30
-40
-50
May
Jun
Jul
Aug
Sep
Date
Precipitation (P) [inches], April 1 - Present


Larmar 03 Growing Season Evaporative Demand
September 23, 2022
Evaporative Demand [PET] (inches), April 1 - Present
Mean
Maximum 2012
Minimum 2017
Current
10
20
30
40
50
60
70
May
Jun
Jul
Aug
Sep
Date

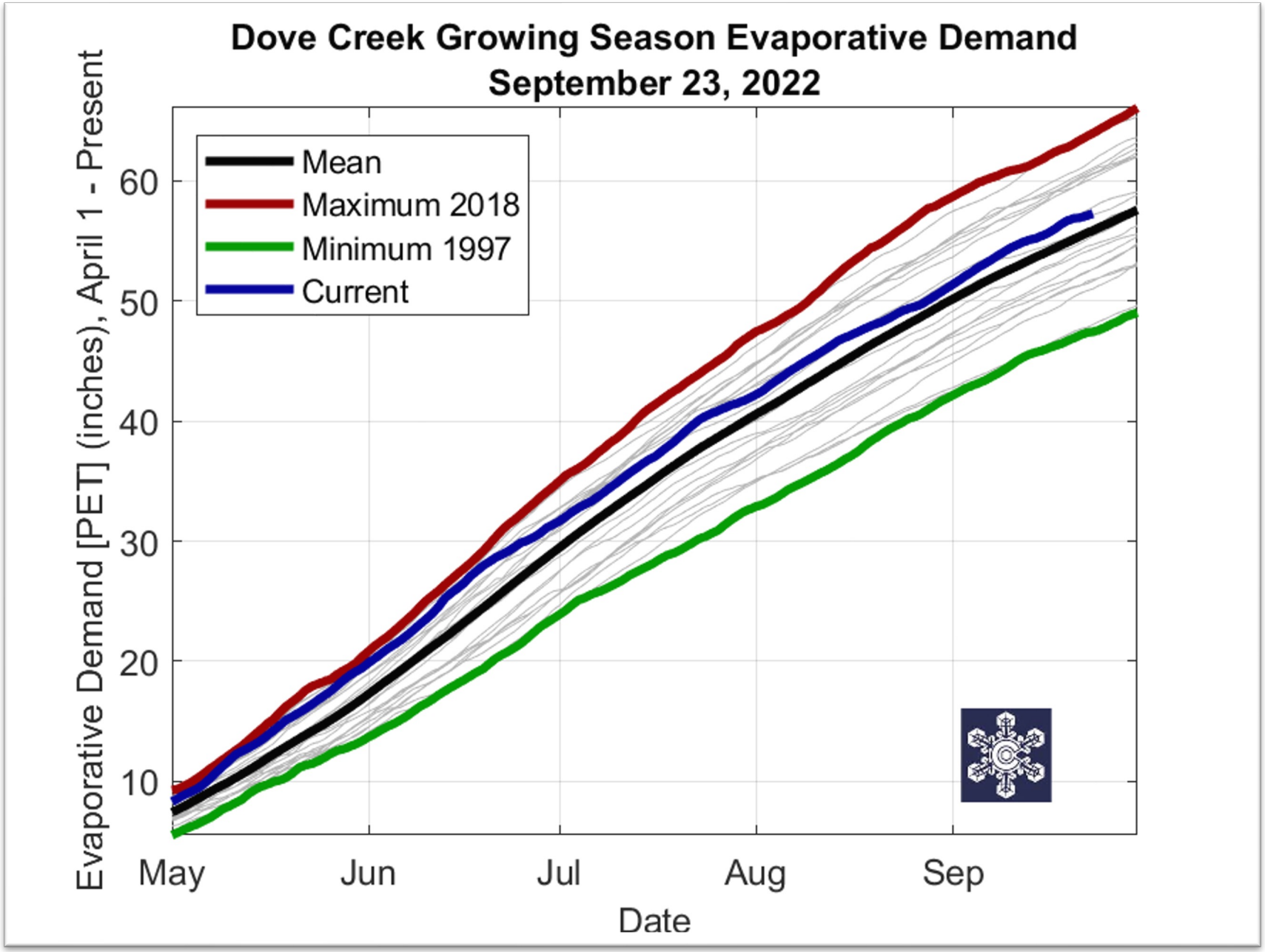

Dove Creek Growing Season Evaporative Demand
September 23, 2022
Mean
Maximum 2018
Minimum 1997
Current
Evaporative Demand [PET] (inches), April 1 - Present
10
20
30
40
50
60
May
Jun
Jul
Aug
Sep
Date

Photo courtesy Nick Trainor, Arapahoe County

COLORADO CLIMATE CENTER

Drought

National Drought

Colorado Drought

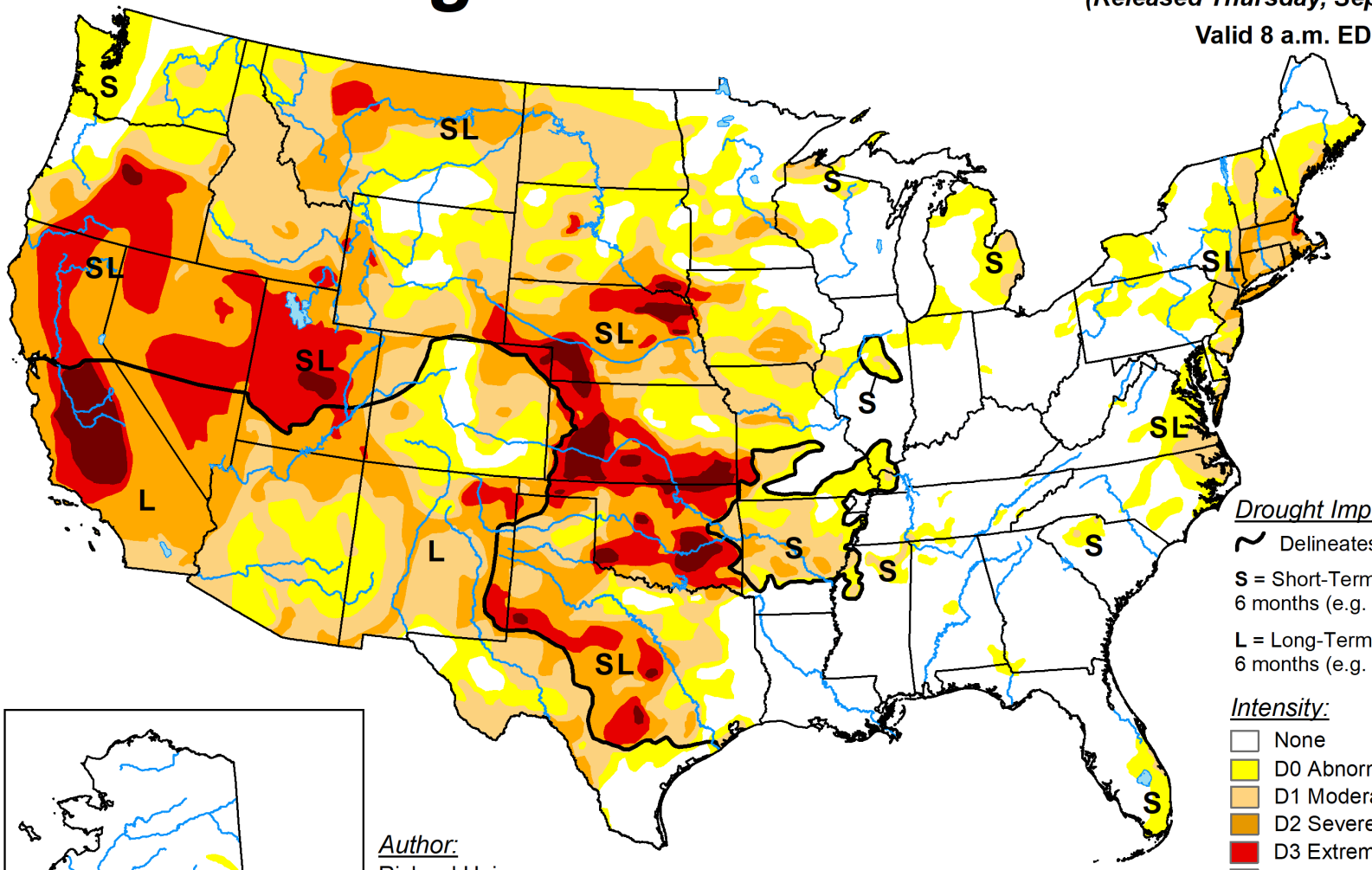
Some Drought Facts

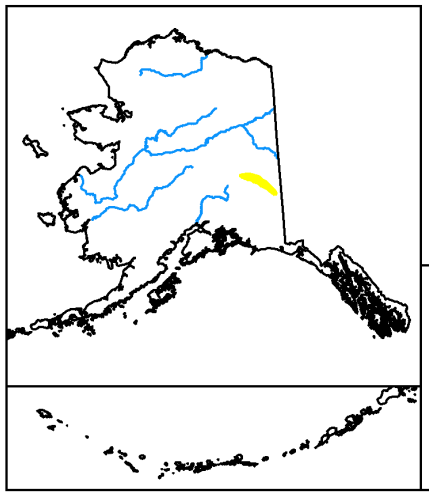
U.S. Drought Monitor

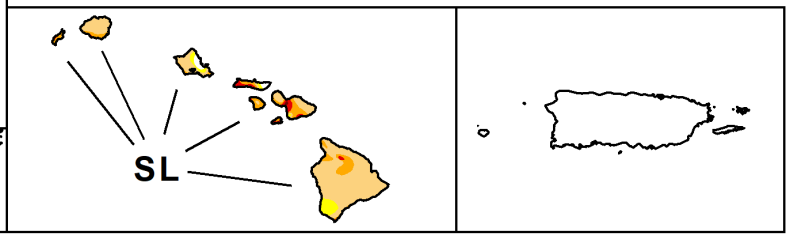
September 20, 2022

(Released Thursday, Sep. 22, 2022)

Valid 8 a.m. EDT







Author:
Richard Heim
NCEI/NOAA

Drought Impact Types:

~ Delineates dominant impacts

S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)

L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

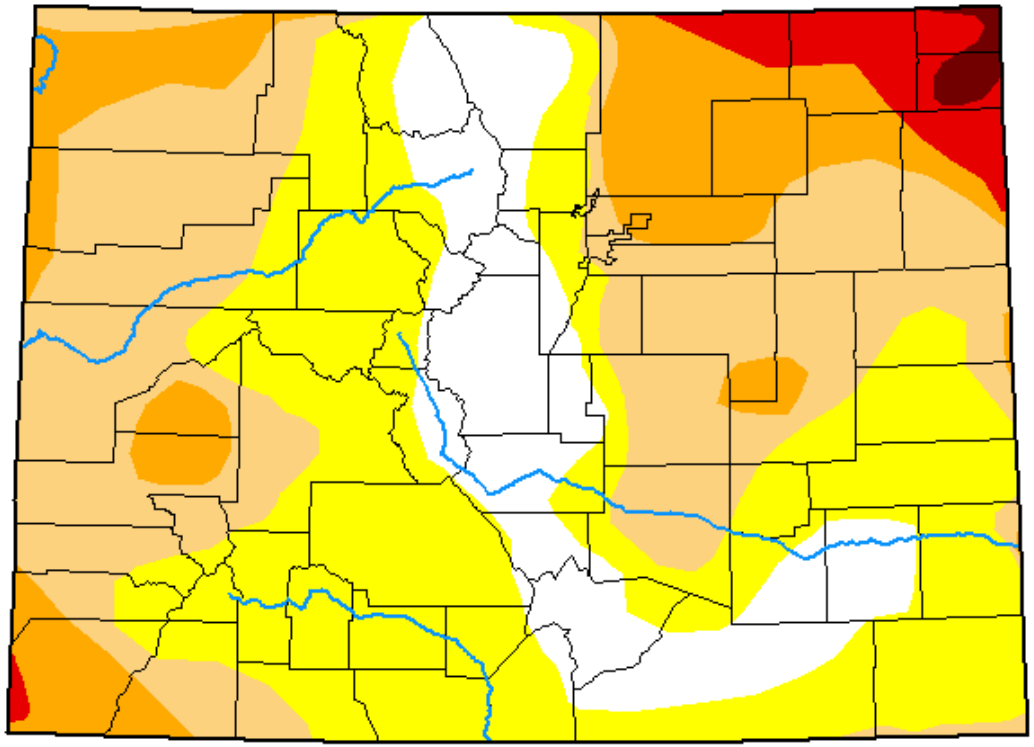
Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

droughtmonitor.unl.edu

U.S. Drought Monitor
Colorado



September 20, 2022
(Released Thursday, Sep. 22, 2022)
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Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	15.72	84.28	47.84	17.53	3.91	0.57
Last Week *09-13-2022*	15.72	84.28	46.41	16.97	3.91	0.57
3 Months Ago *06-21-2022*	1.09	98.91	81.55	43.08	12.76	0.23
Start of Calendar Year *01-04-2022*	0.00	100.00	95.49	67.08	22.25	0.00
Start of Water Year *09-28-2021*	12.72	87.28	46.42	26.30	15.05	3.91
One Year Ago *09-21-2021*	16.92	83.08	40.94	24.58	15.05	3.91

Intensity:

- None
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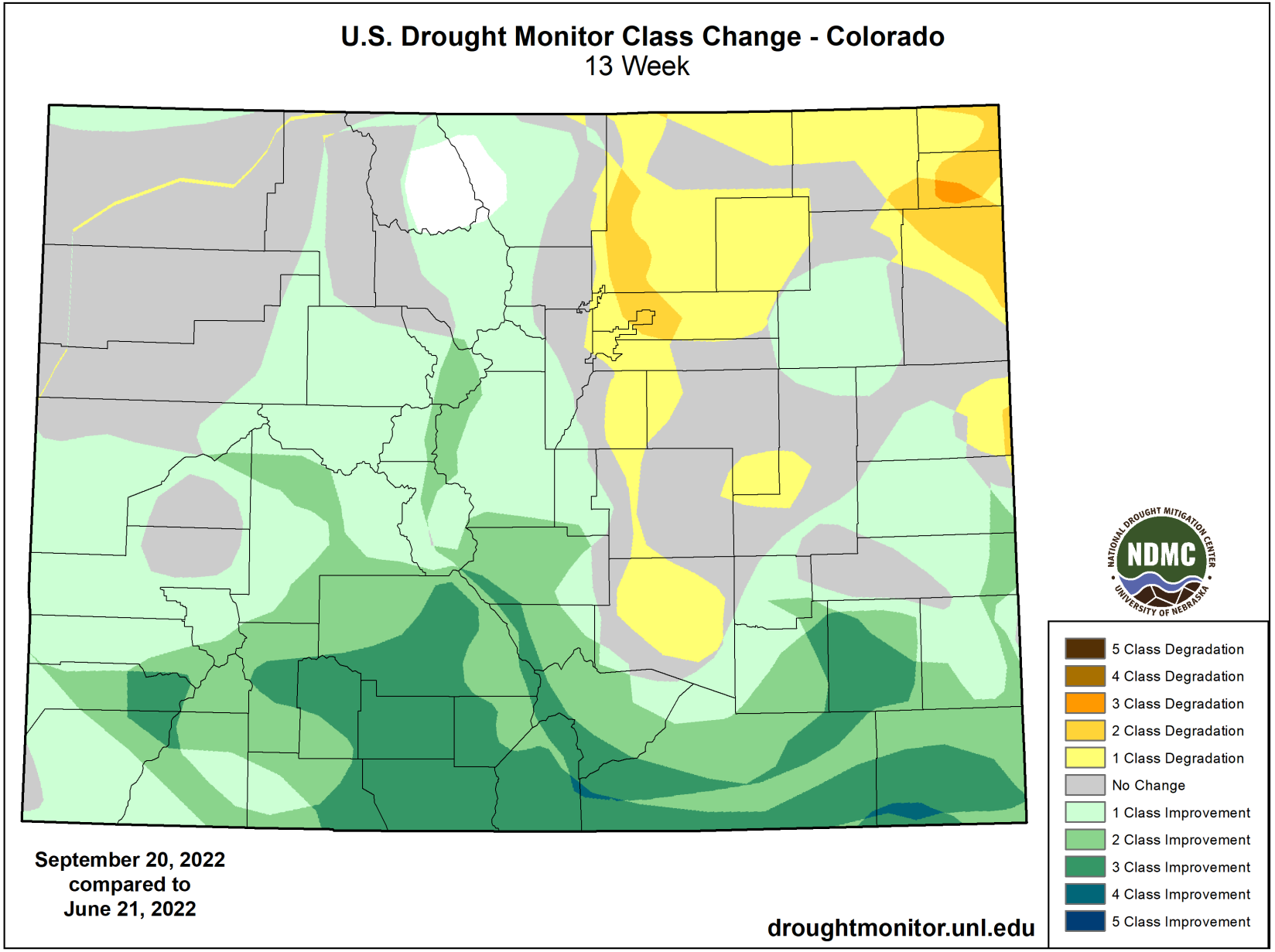
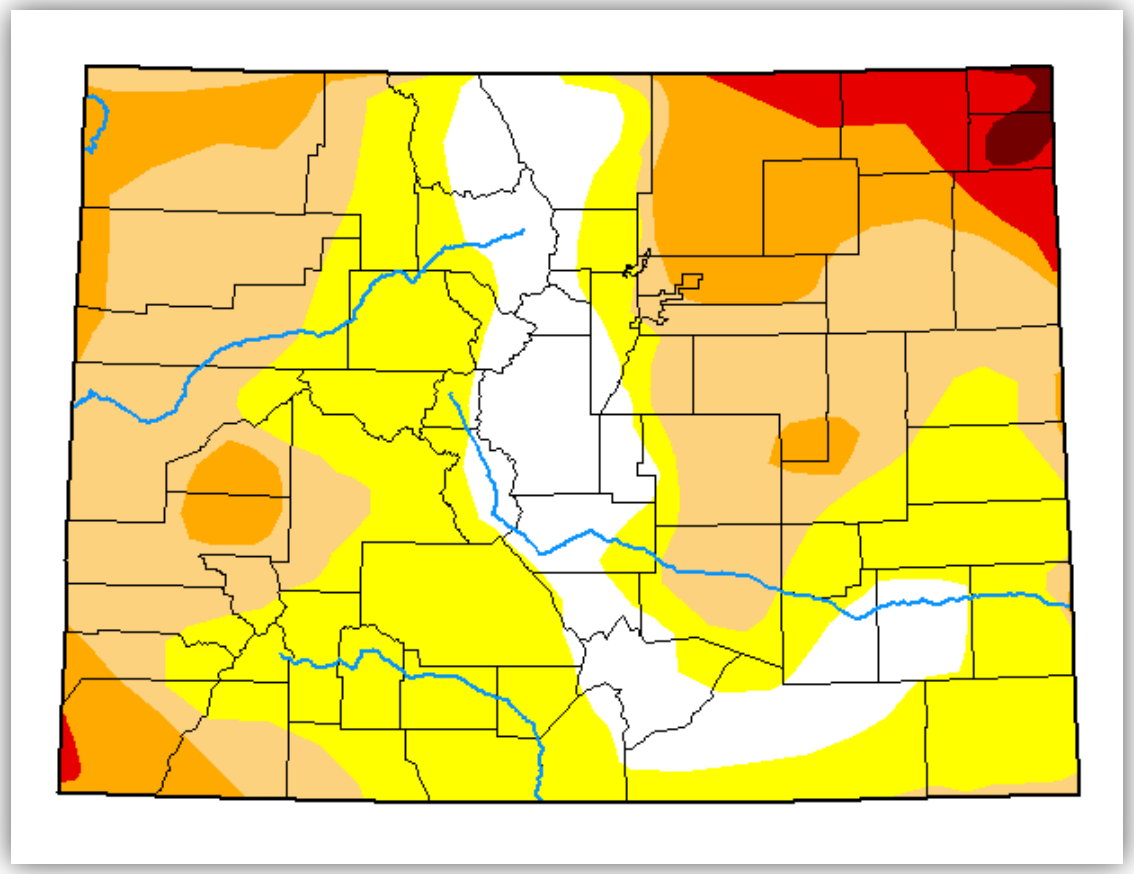


Since the beginning of summer, widespread improvements in drought conditions have occurred over southern CO. Northeast CO has seen degradations.



Some weekly drought stats…

Weld County – 13 weeks in D3
Logan County – 13 weeks in D3
Yuma County – 11 weeks in D3

Phillips County – 7 weeks in D4
Sedgwick County – 7 weeks in D4

Montezuma County – 122 weeks in D3
Since May 19, 2020!

droughtmonitor.unl.edu

Outlook

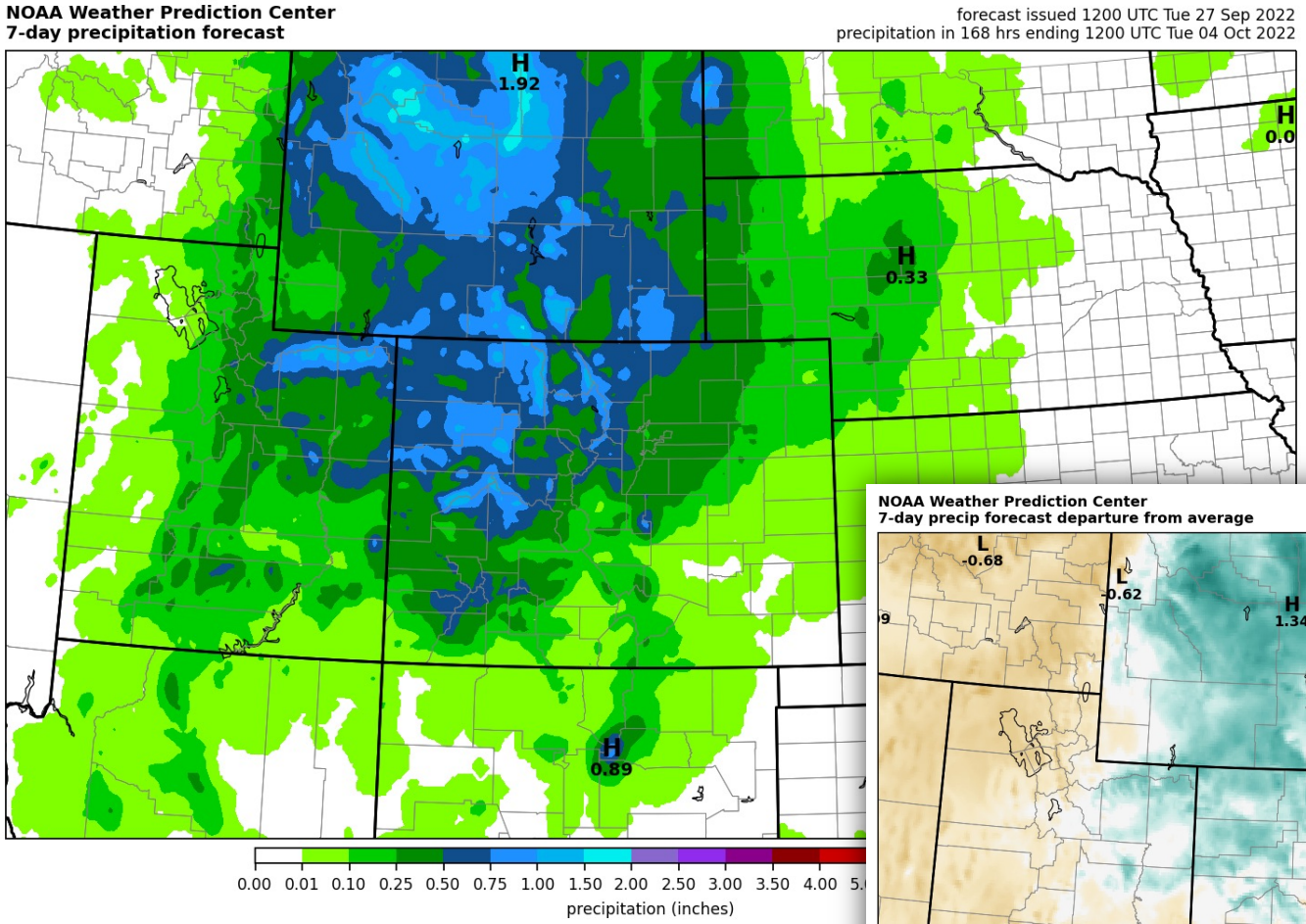
Next 7 days

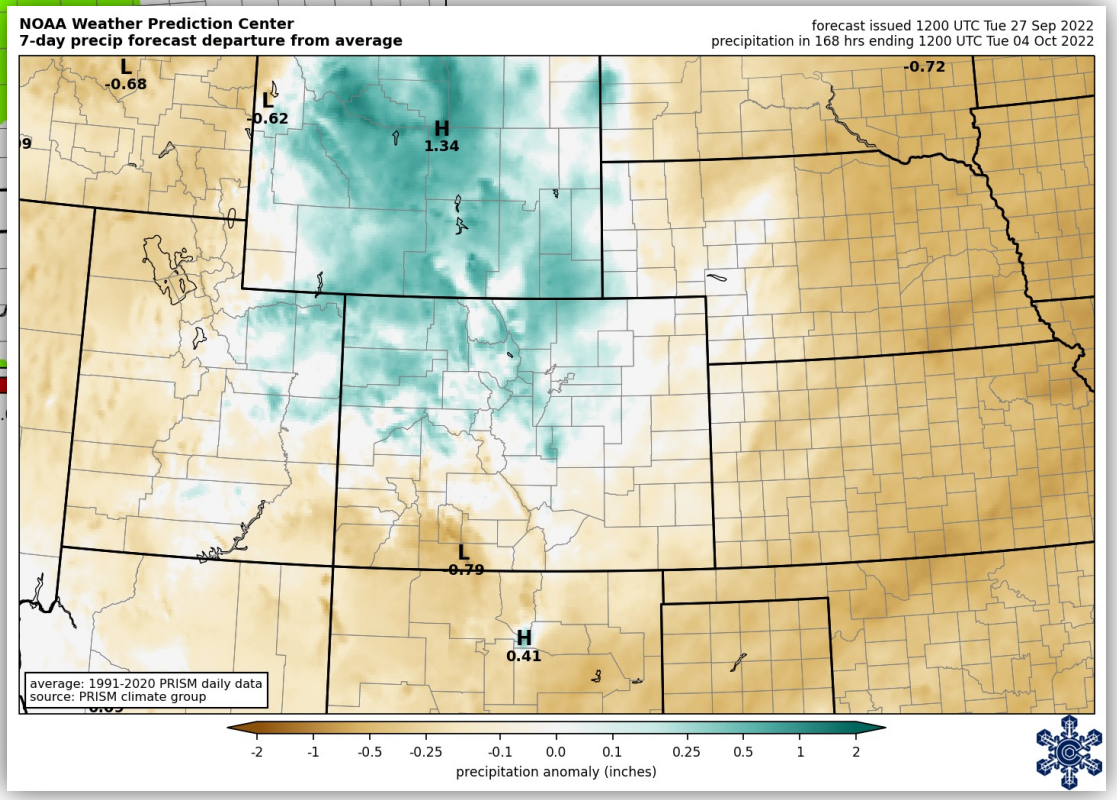
8-14 day Outlook

CPC Outlooks

La Niña

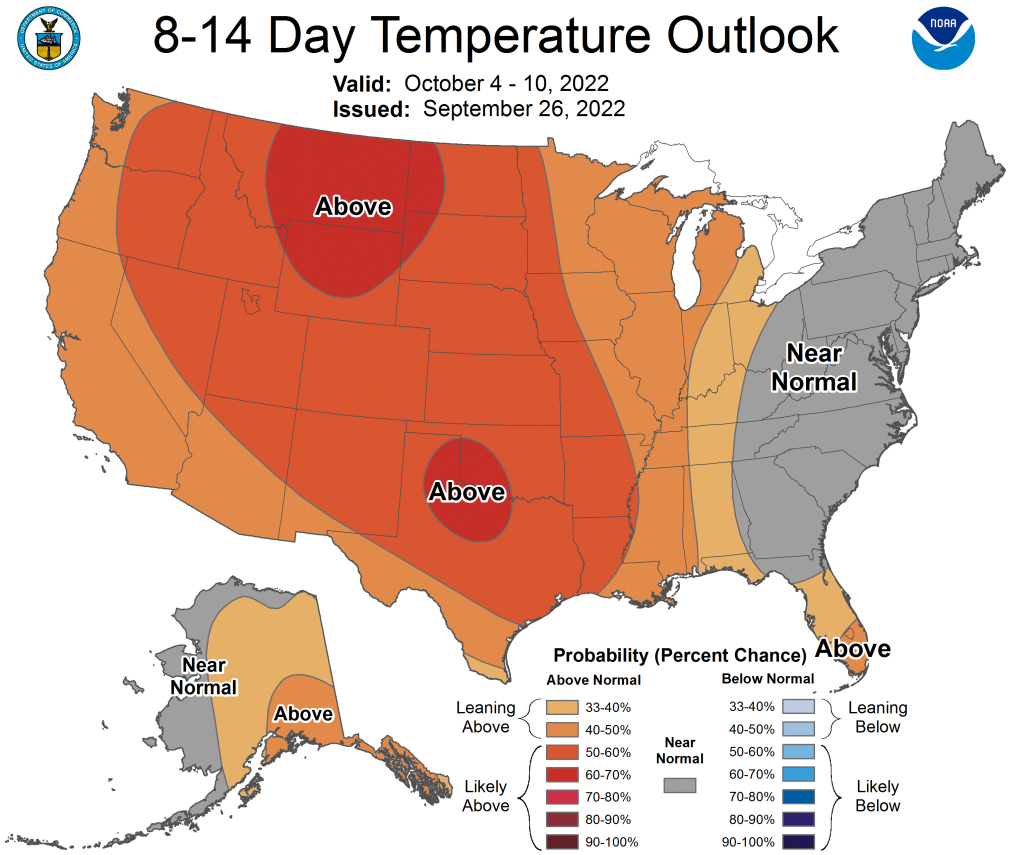
NOAA 7-day precip forecast

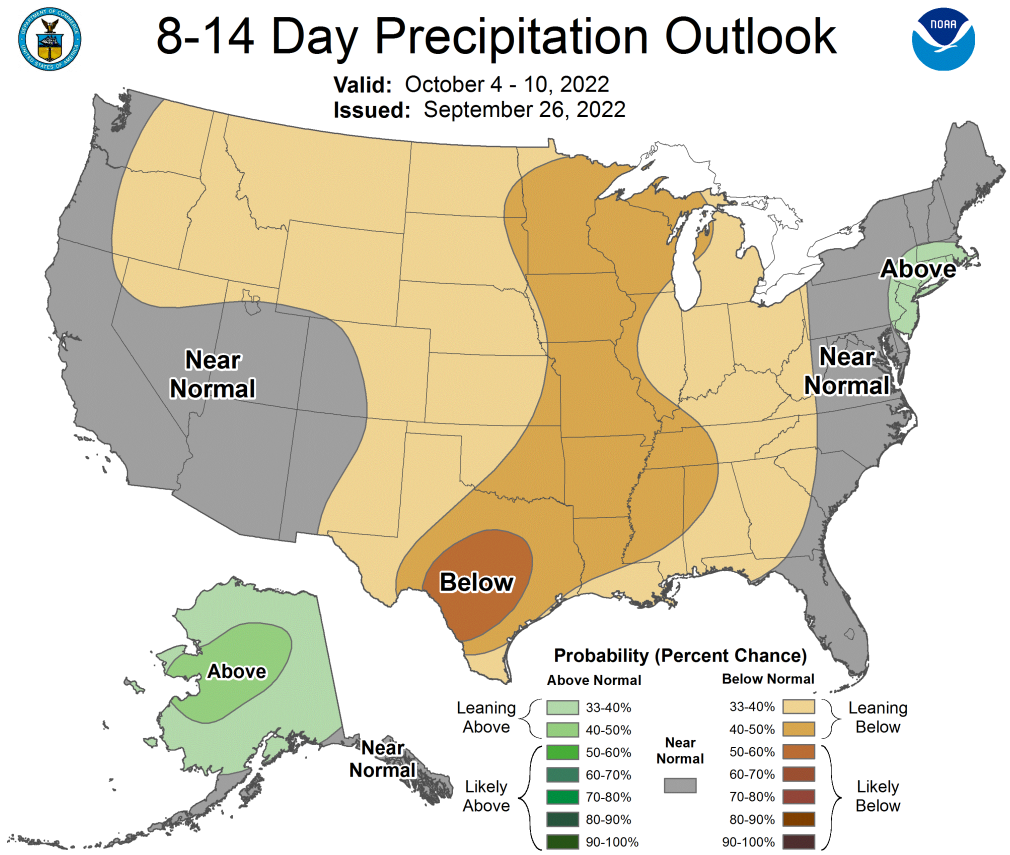




http://schumacher.atmos.colostate.edu/weather/

8-14 day outlook

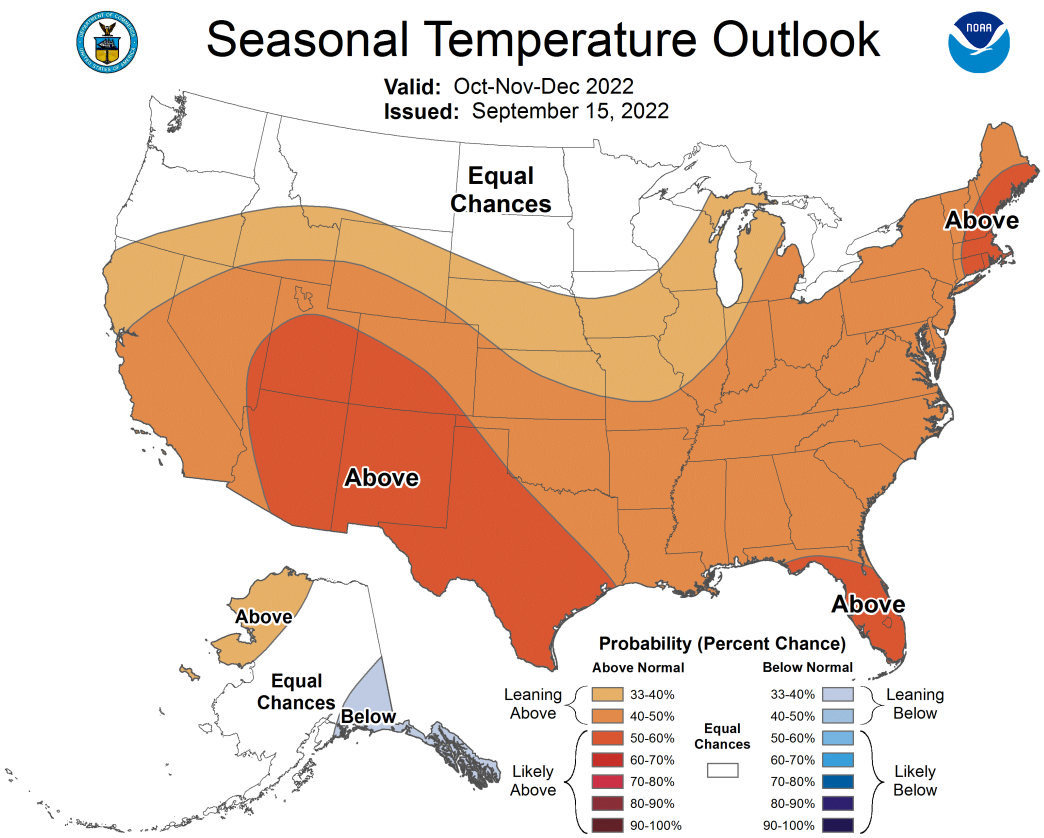


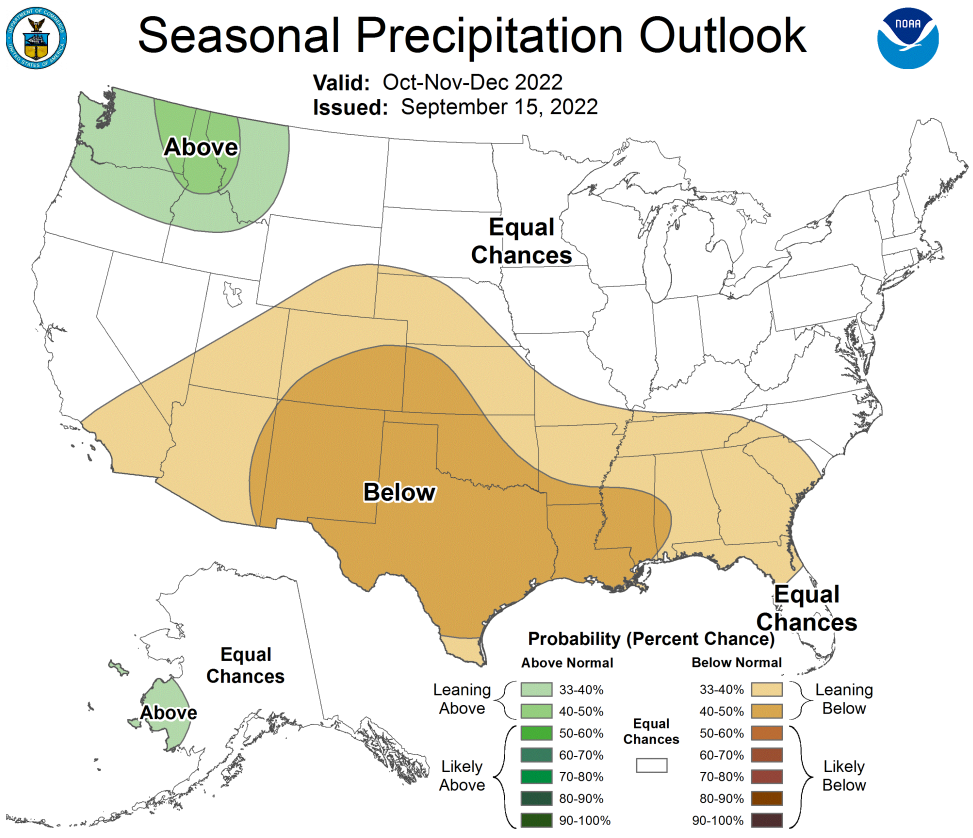


We are expected to see warmer than average conditions as we head into early October. Precipitation is expected to be near normal, with a slight leaning toward drier than average for the eastern plains.

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

Seasonal outlook

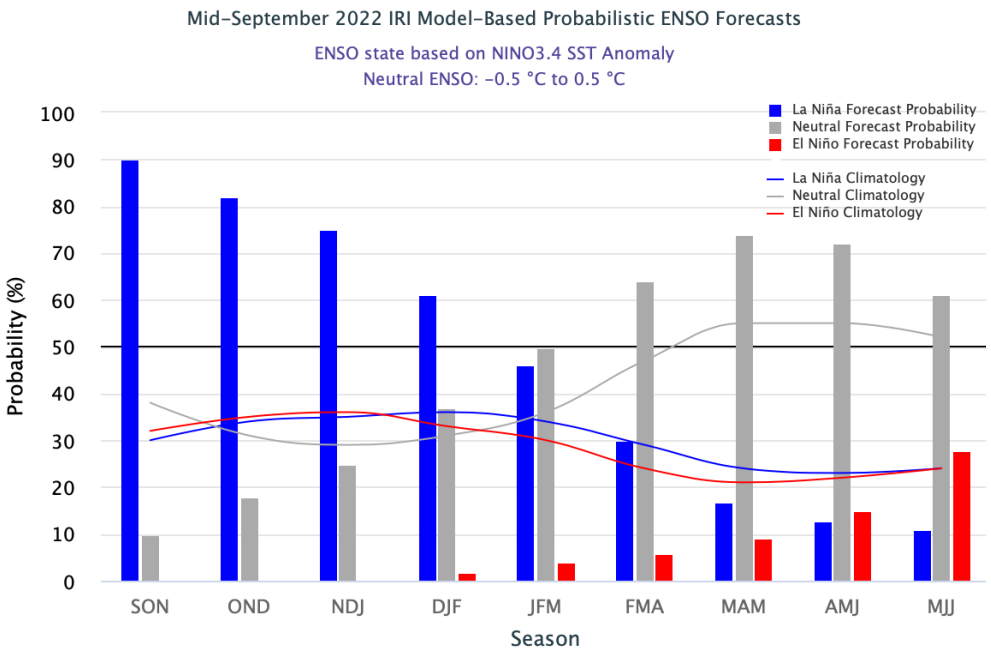


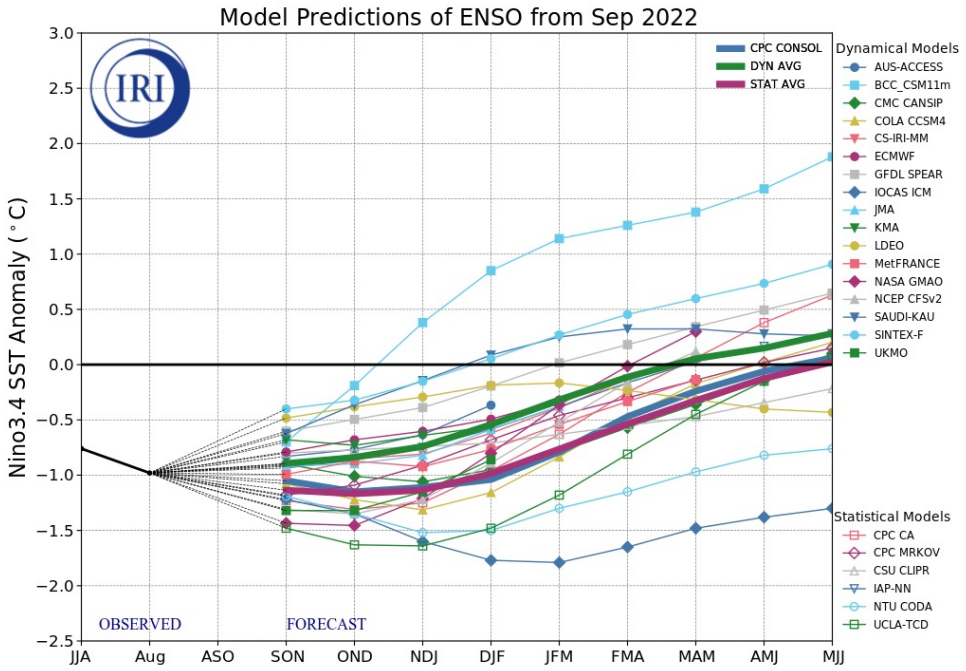


Fall temperatures more likely to be above average, with the strongest confidence to the south (consistent with La Niña). Conditions more likely than not to be drier than average for the next 3 months.

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

What's the ENSO forecast?

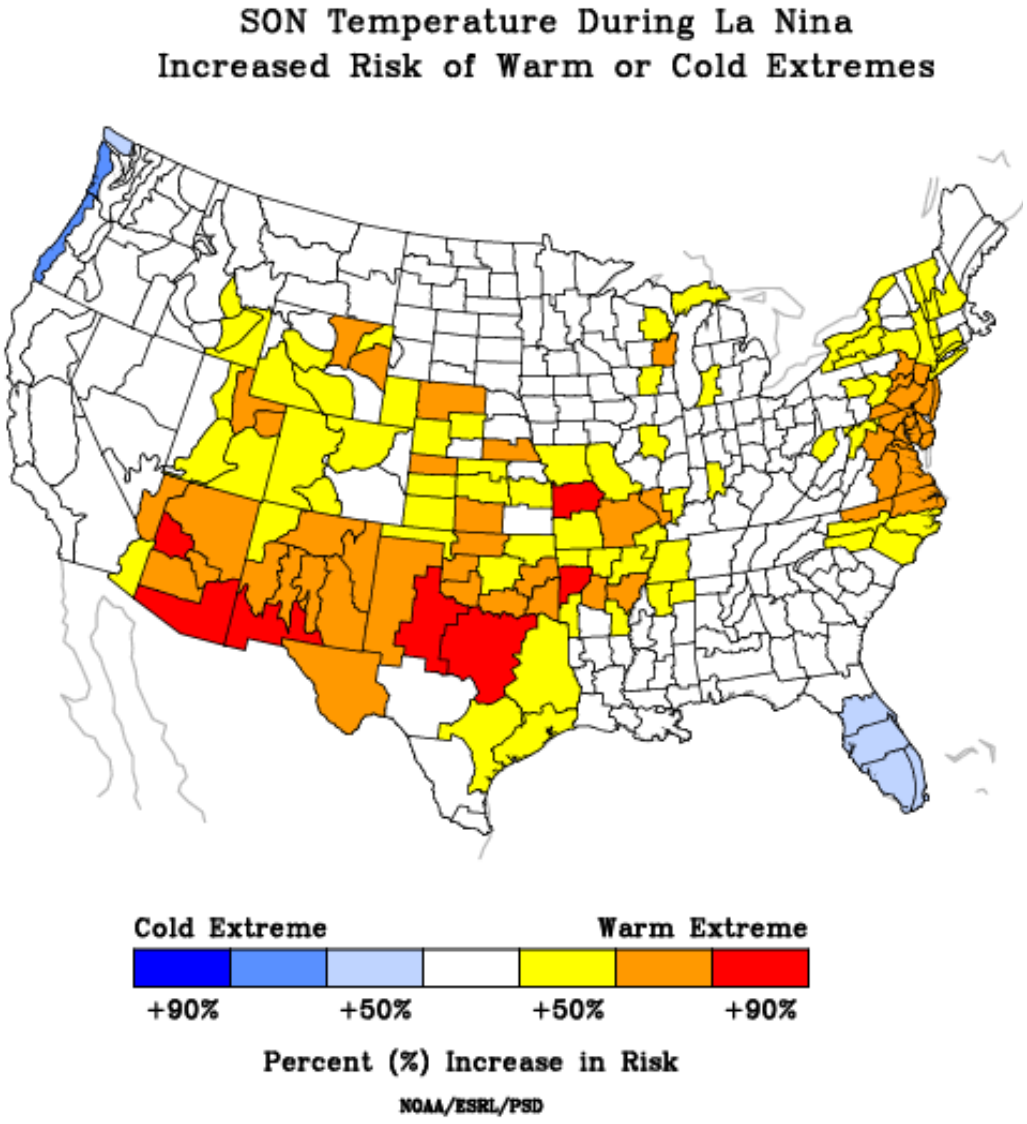


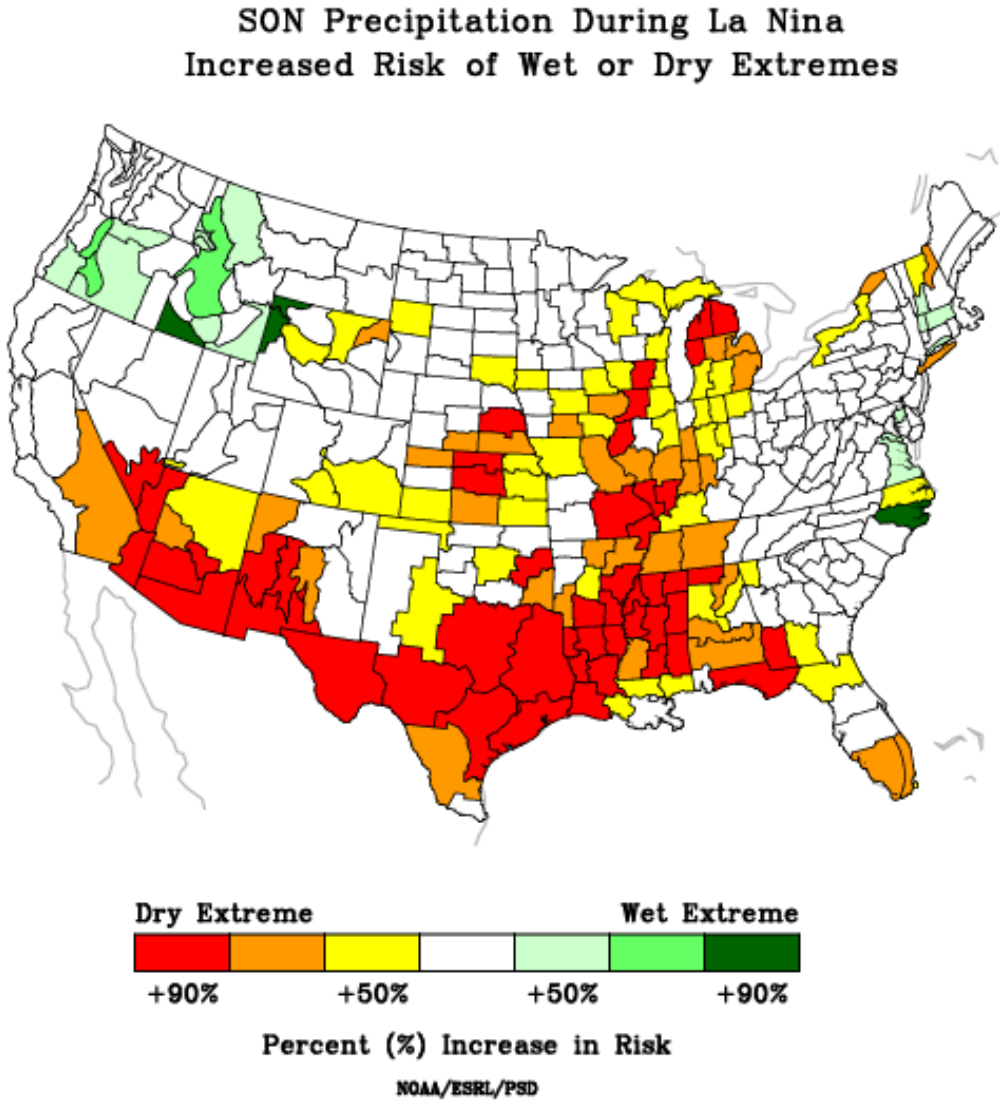


CPC/IRI September 19, 2022: In mid-September, sea surface temperatures in the central-eastern equatorial Pacific remain below-average. Key oceanic and atmospheric variables have remained consistent with La Niña conditions. A CPC La Niña Advisory still remains in place for September 2022. A large majority of the models in the plume predict SSTs to remain below-normal at the level of a La Niña until at least Dec-Feb 2023. Similar to the most-recent official CPC ENSO Outlook issued on September 08, 2022, the objective model-based ENSO outlook forecasts a continuation of the La Niña event with high probability during boreal fall and moderate probability values during winter. ENSO-neutral becomes the most likely category in Jan-Mar 2023 onward.

https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/

What does La Niña mean for the fall?

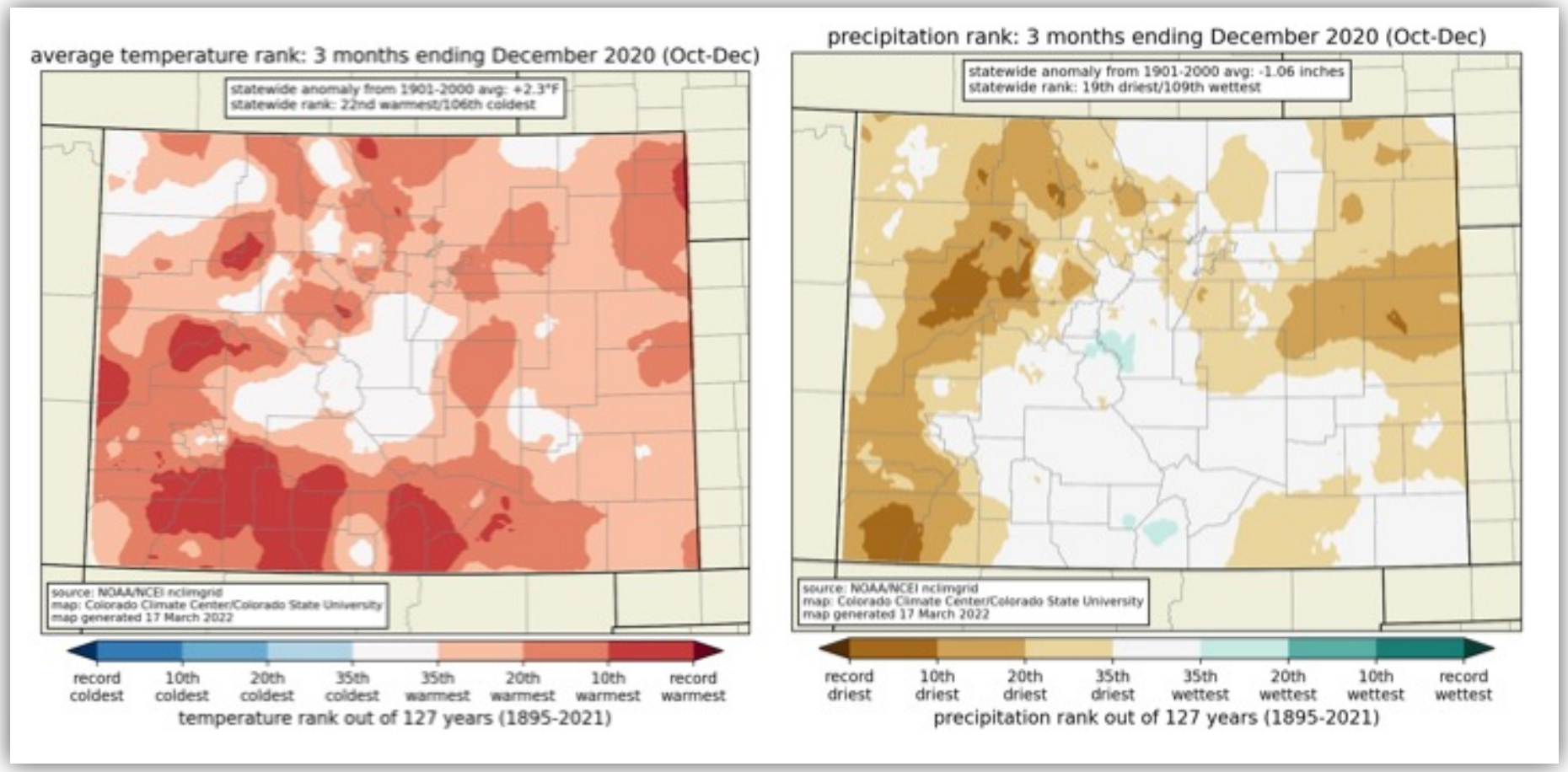




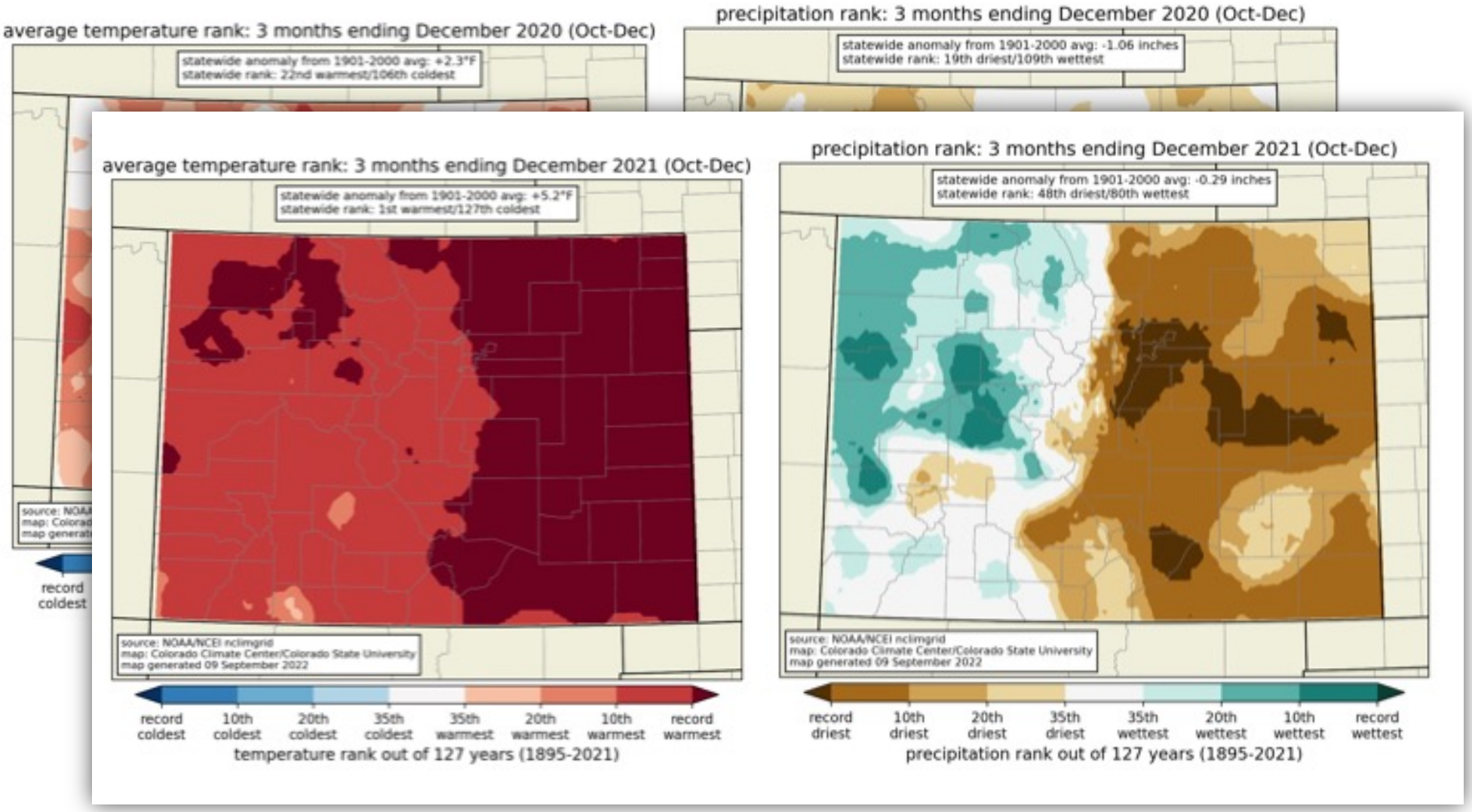
Risk of extremes during a La Niña, from https://psl.noaa.gov/enso/climaterisks/

The region is generally more likely to see warm and dry extremes in the fall during a La Niña. What would three La Niña winters in a row mean? Good question!

Our last two La Niña falls…



Our last two La Niña falls…



Key Takeaways

- Active monsoon over the summer was beneficial in several aspects –
  - Soil moisture recharge
  - Limiting evaporative demand
  - Drought improvement
- Long-term hydrologic drought remains
- Northeast CO biggest area of concern right now – did recent precipitation help with winter wheat planting?
- La Niña conditions will continue into the fall and beginning of winter.
- If the fall is warm and dry, that could worsen drought conditions and we would start with another snowpack season at a deficit.

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Thank you

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