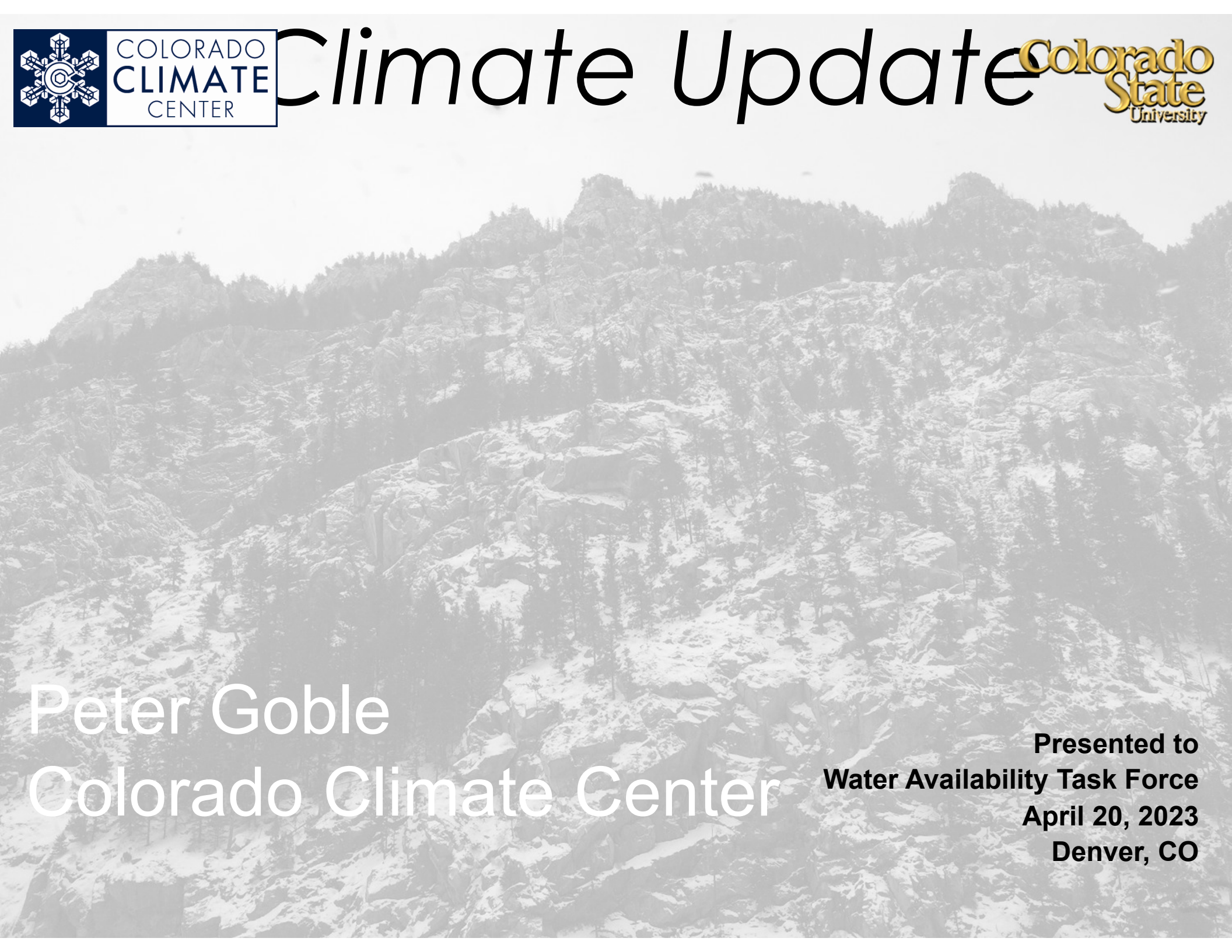
Climate Update

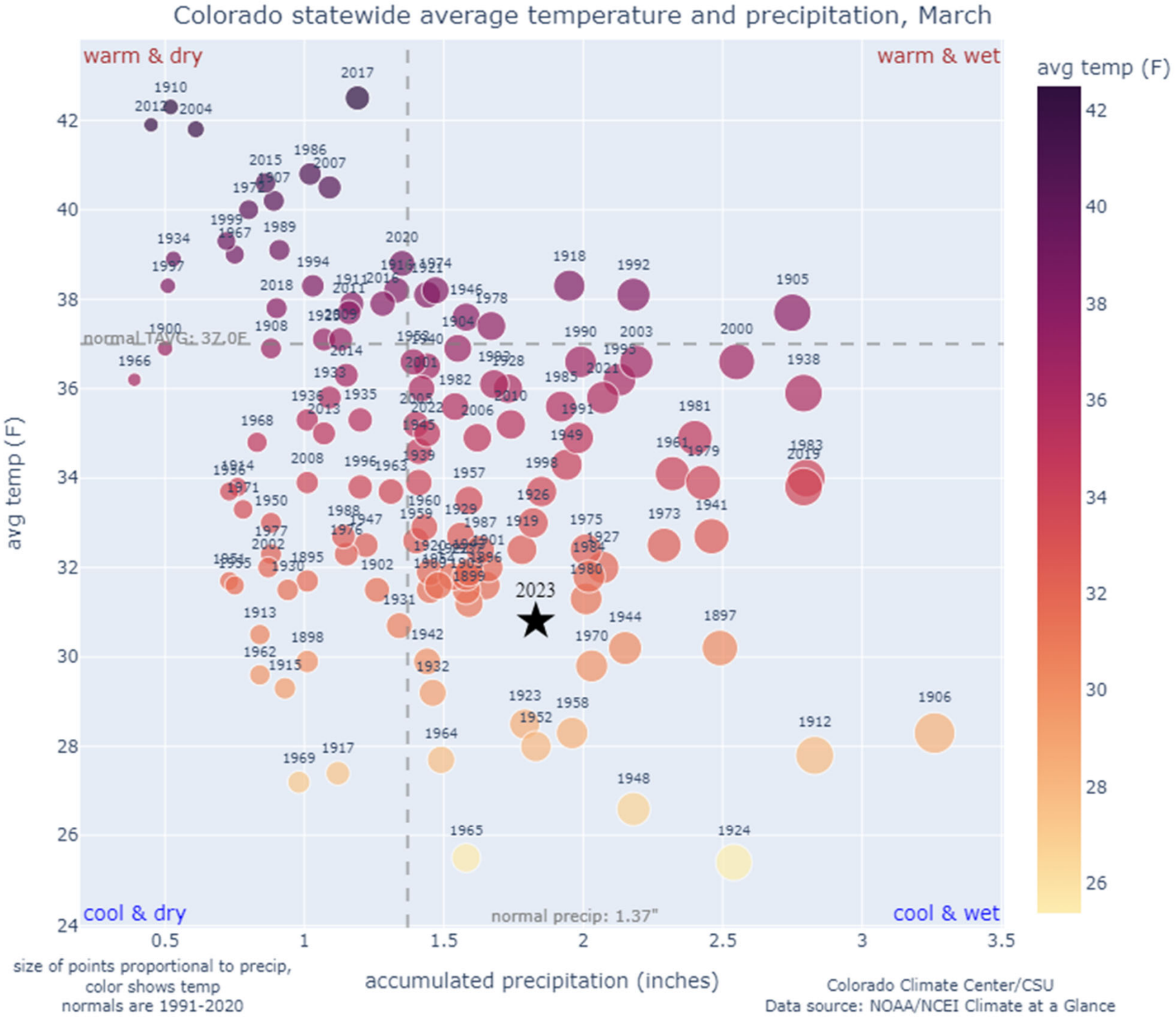


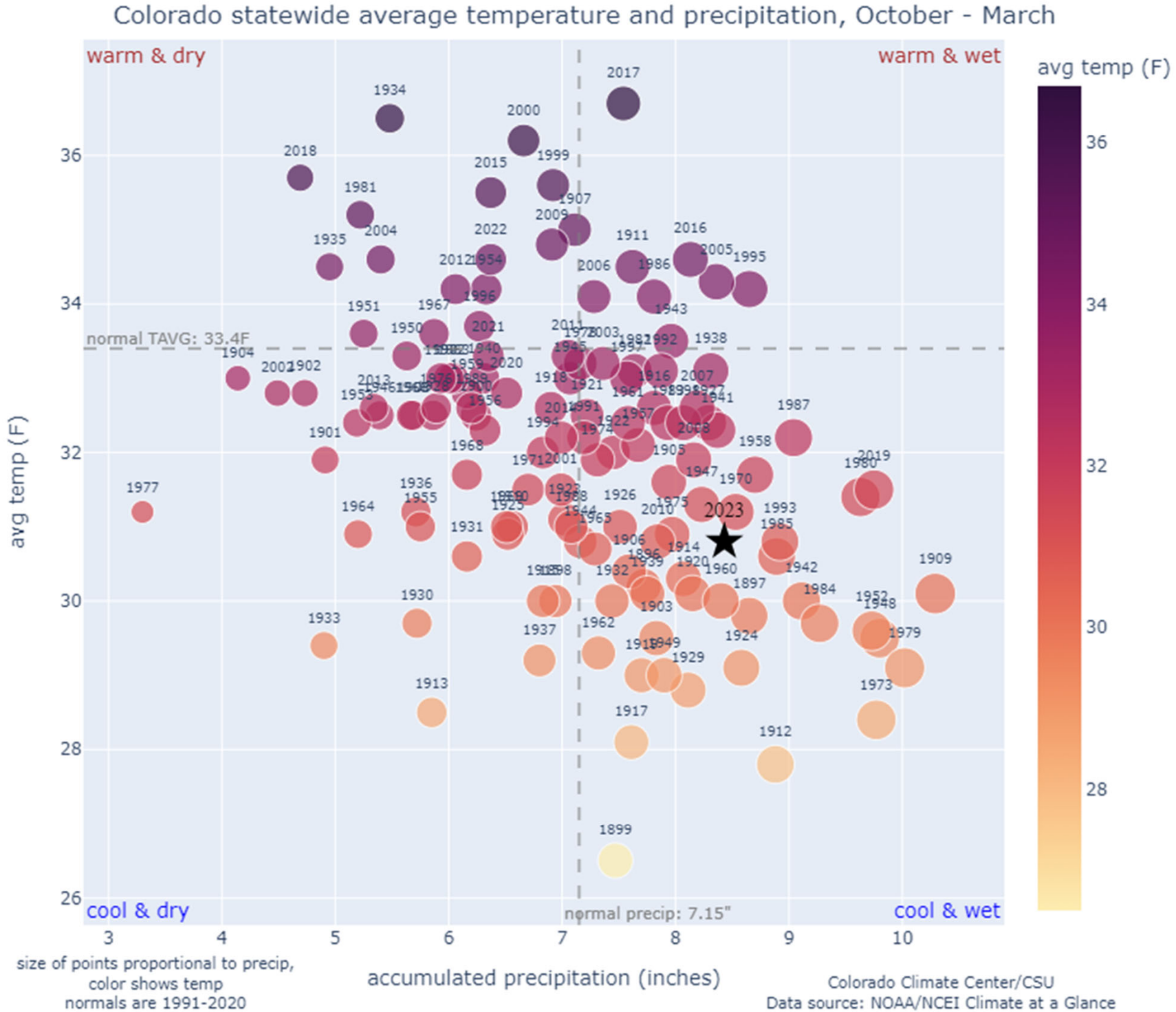
Peter Goble
Colorado Climate Center

Presented to
Water Availability Task Force
April 20, 2023
Denver, CO

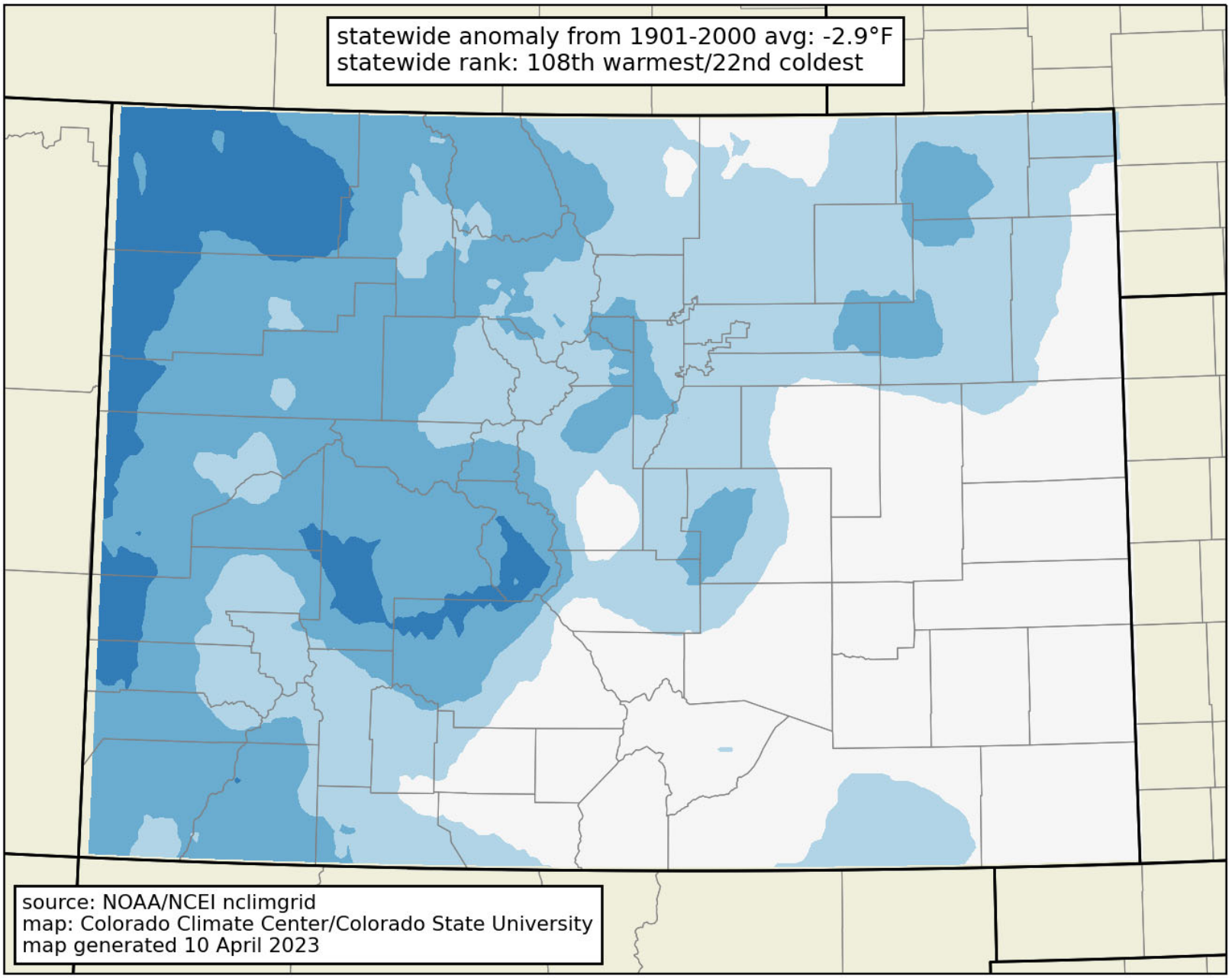
Agenda

- Current seasonal climate conditions update
- Drought update
- Seasonal Forecast info: Will we stay cold?

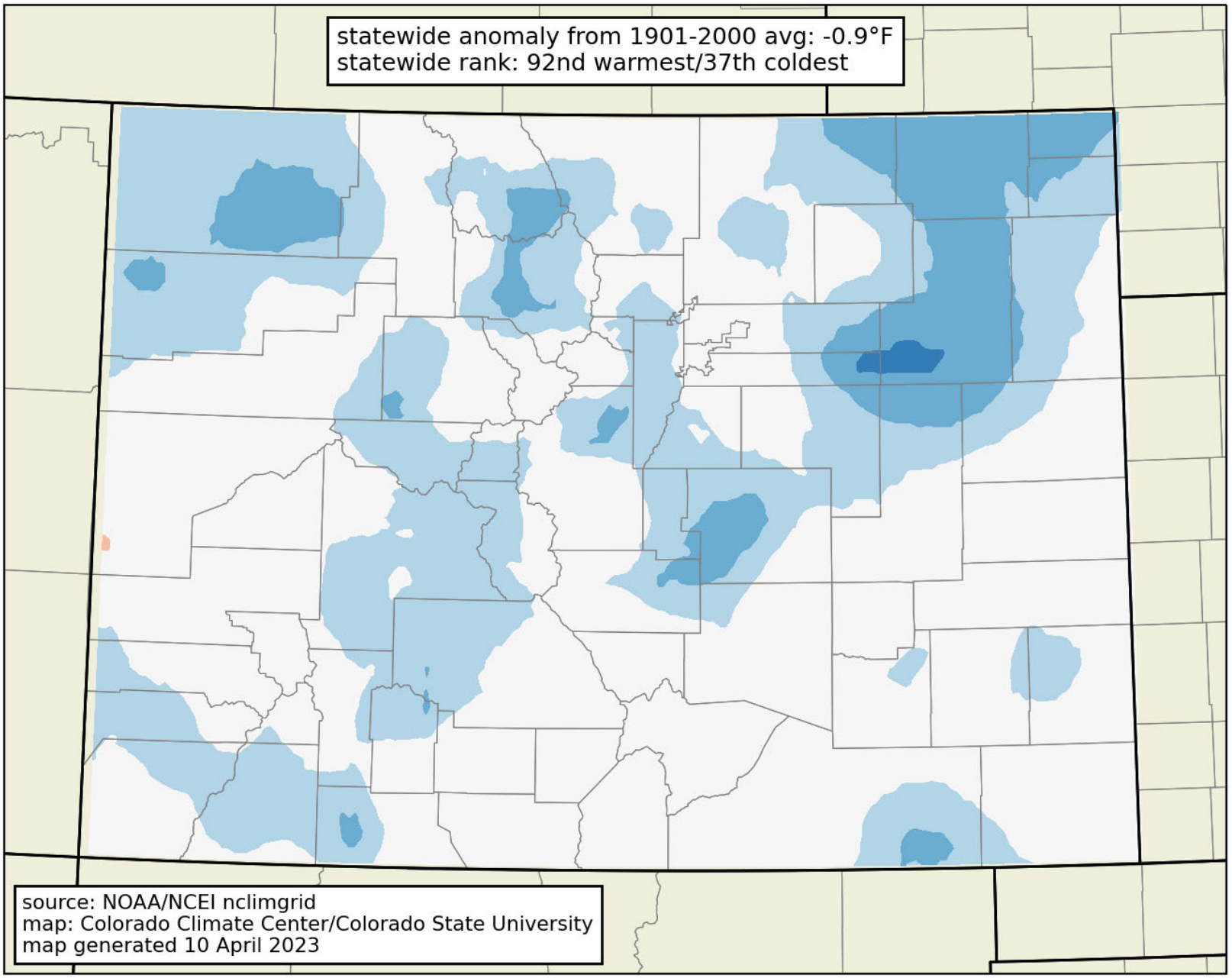

Colorado statewide average temperature and precipitation, March
warm & dry
warm & wet
cool & dry
cool & wet
normal TAVG: 37.0F
normal precip: 1.37"
2023
avg temp (F)
accumulated precipitation (inches)
size of points proportional to precip,
color shows temp
normals are 1991-2020
Colorado Climate Center/CSU
Data source: NOAA/NCEI Climate at a Glance


Colorado statewide average temperature and precipitation, October - March
warm & dry
warm & wet
cool & dry
cool & wet
normal TAVG: 33.4F
normal precip: 7.15"
avg temp (F)
36
34
32
30
28
26
3
4
5
6
7
8
9
10
2023
size of points proportional to precip,
color shows temp
normals are 1991-2020
accumulated precipitation (inches)
Colorado Climate Center/CSU
Data source: NOAA/NCEI Climate at a Glance

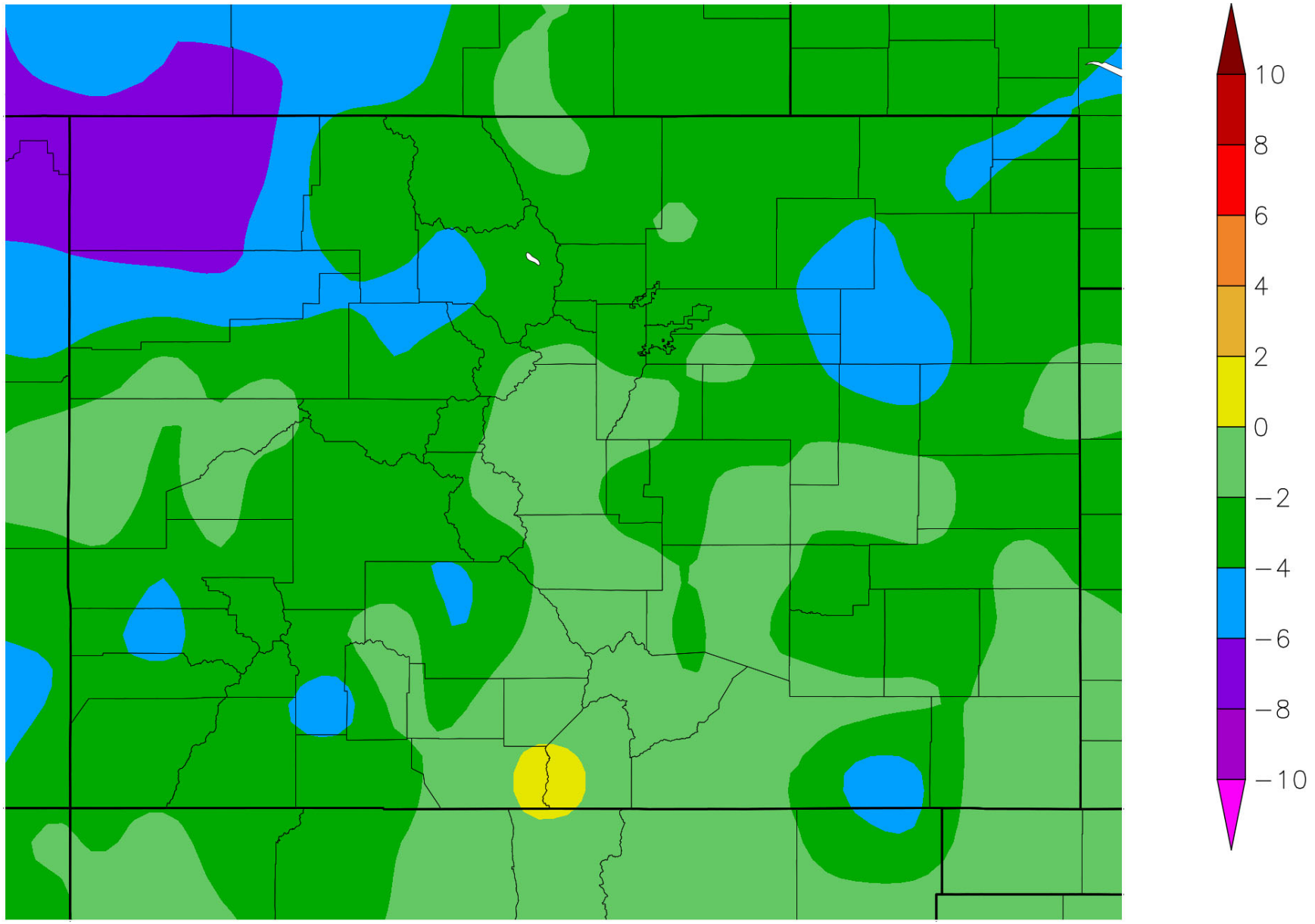
average temperature rank: March 2023



average temperature rank: 6 months ending March 2023 (Oct-Mar)



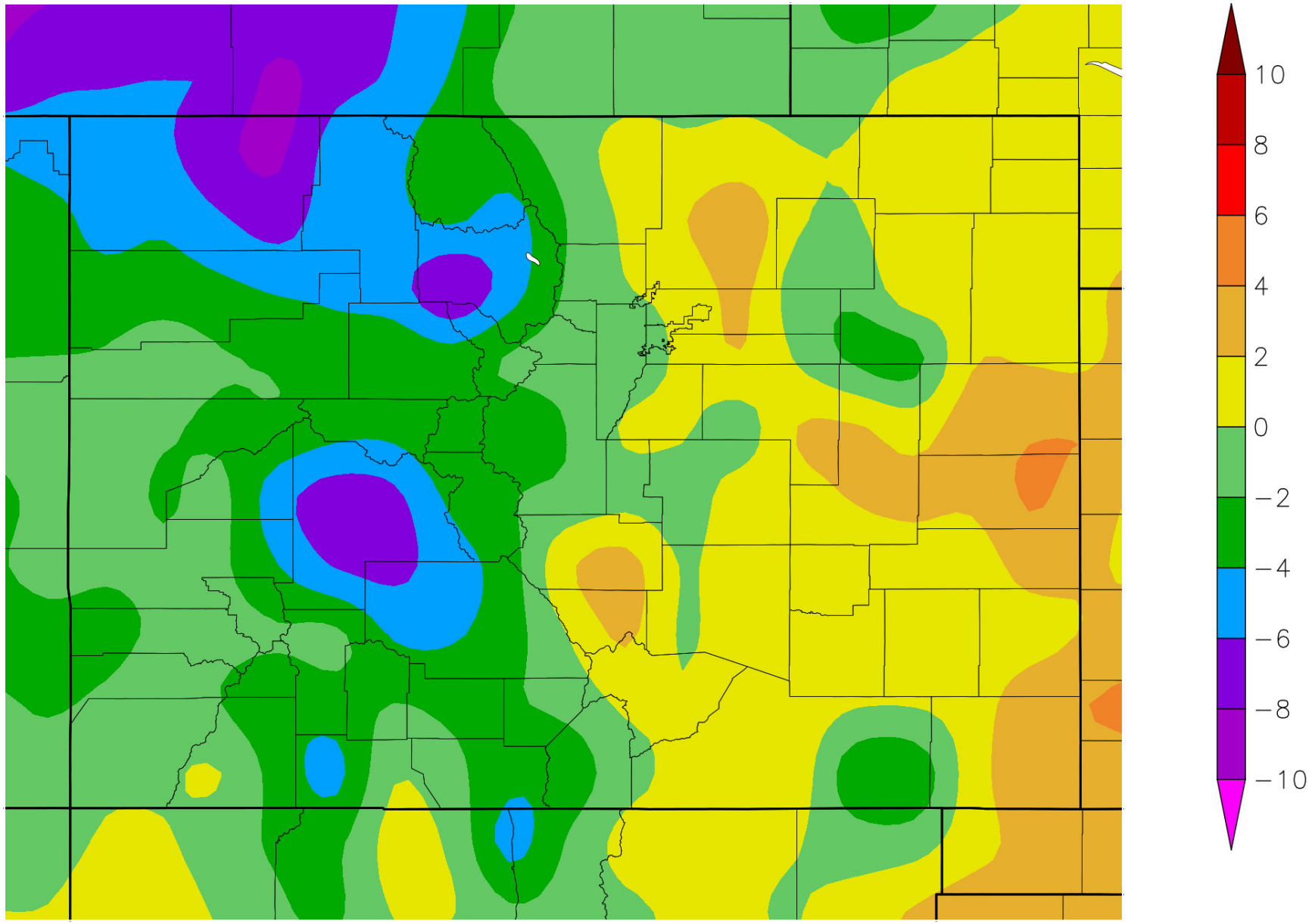
Departure from Normal Temperature (F)
10/1/2022 – 4/17/2023



Generated 4/18/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

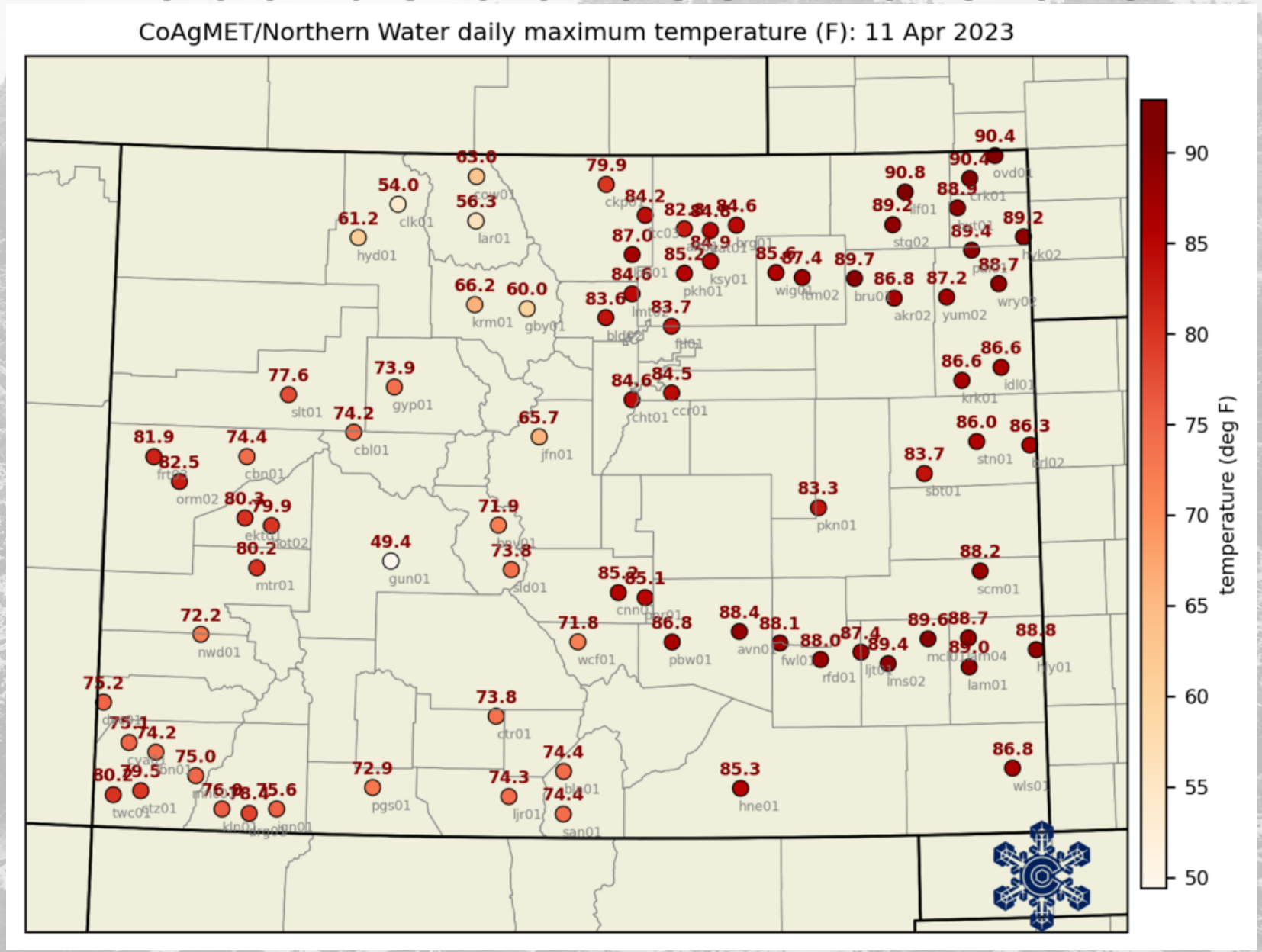
Departure from Normal Temperature (F)
4/1/2023 – 4/17/2023



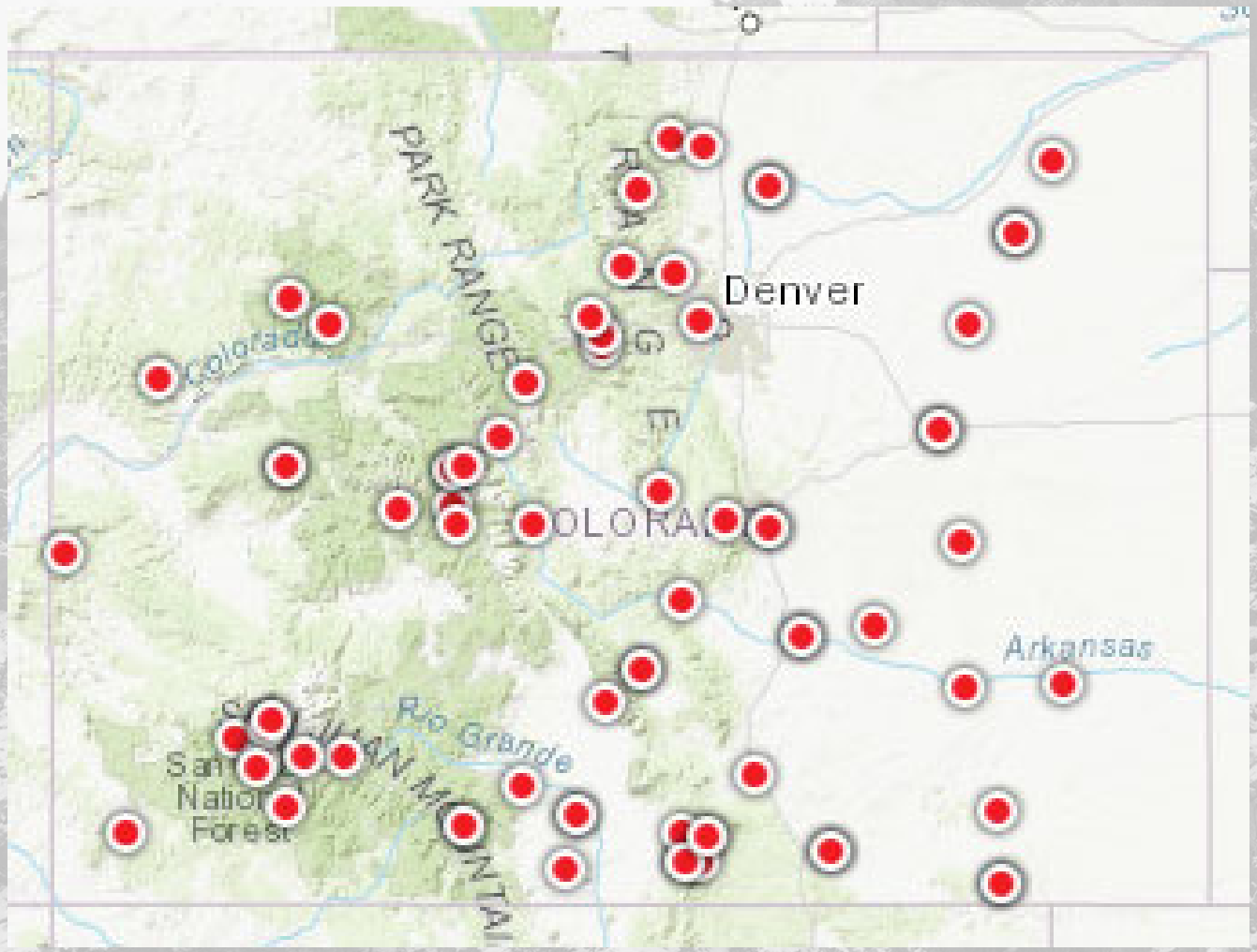
Generated 4/18/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

April 11th set temperature records across the state



High Temperature Records Broken



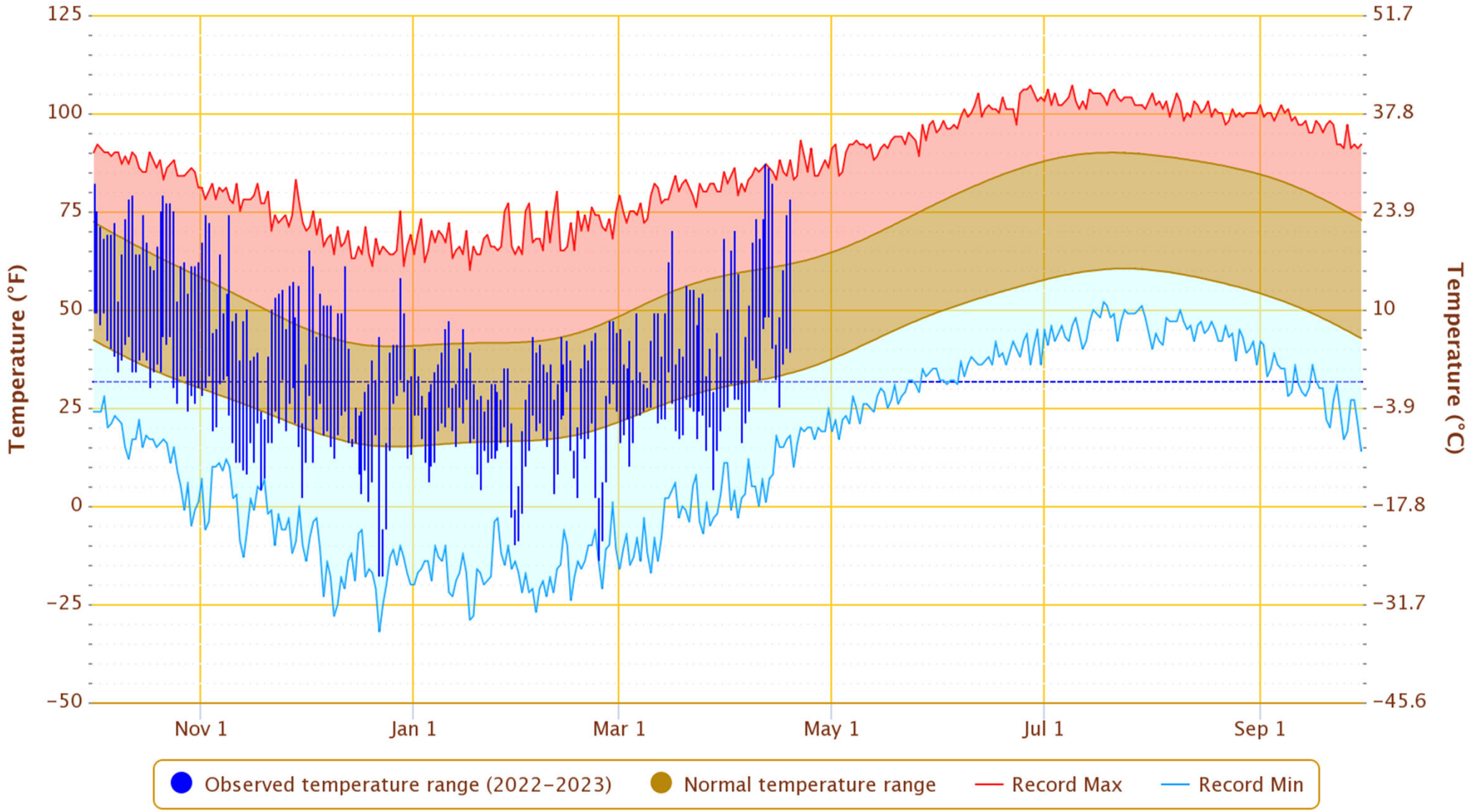
Records broken: 64

Records tied: 12

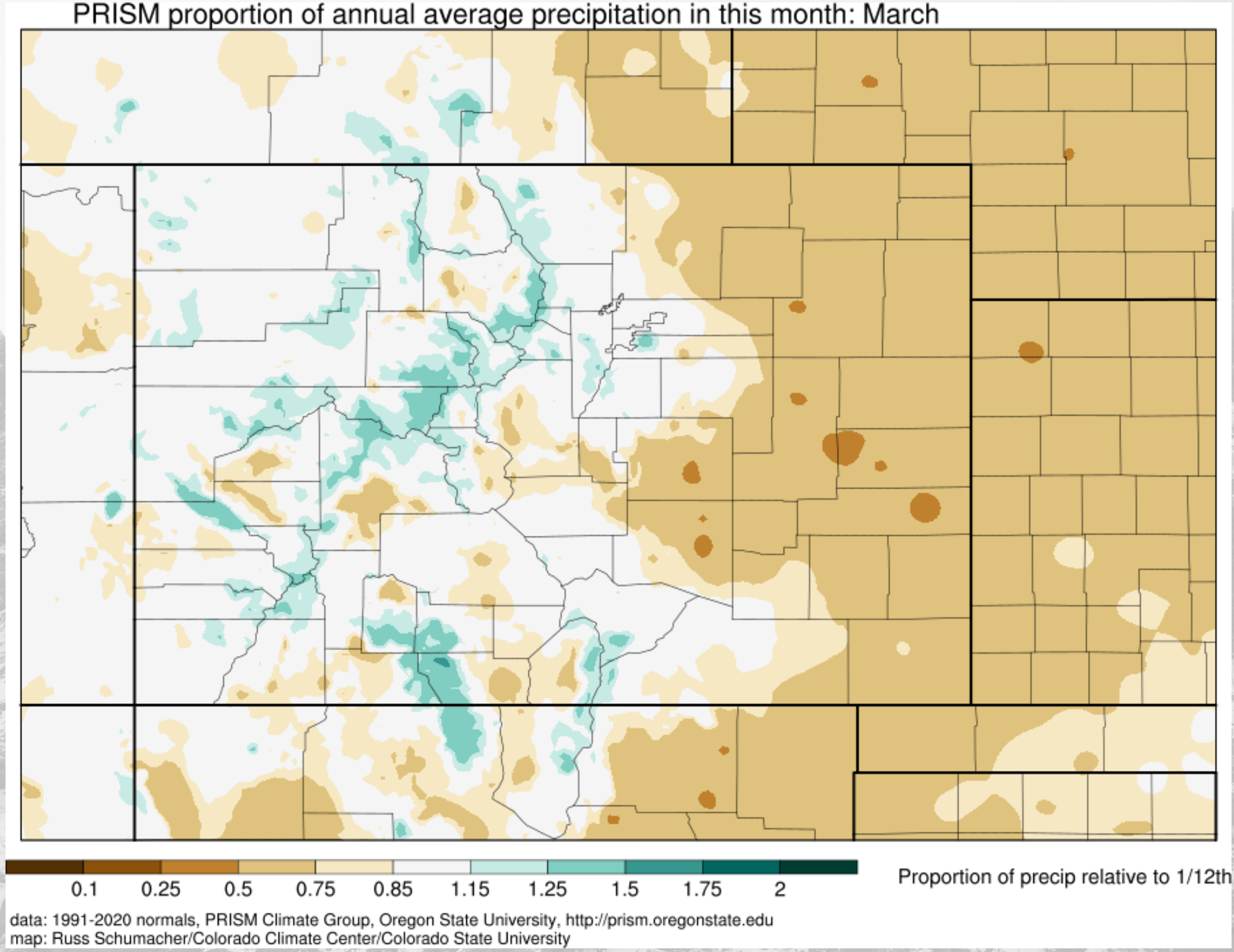
Records across all but the northwest corner of the state, where low elevation snowpack kept conditions cooler

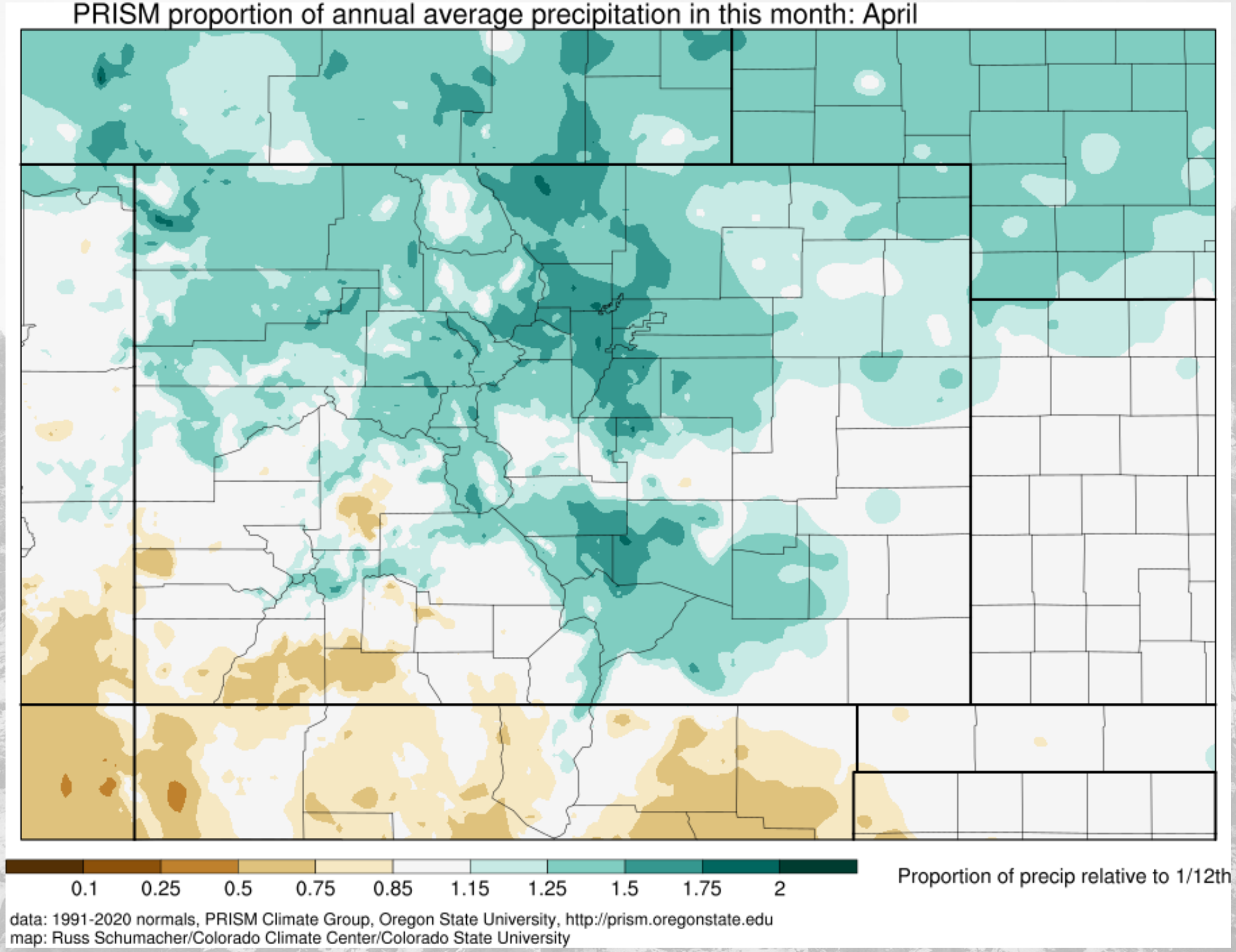
Daily Temperature Data – AKRON 4 E, CO

Period of Record – 1893-06-01 to 2023-04-19. Normals period: 1991-2020. Click and drag to zoom chart.

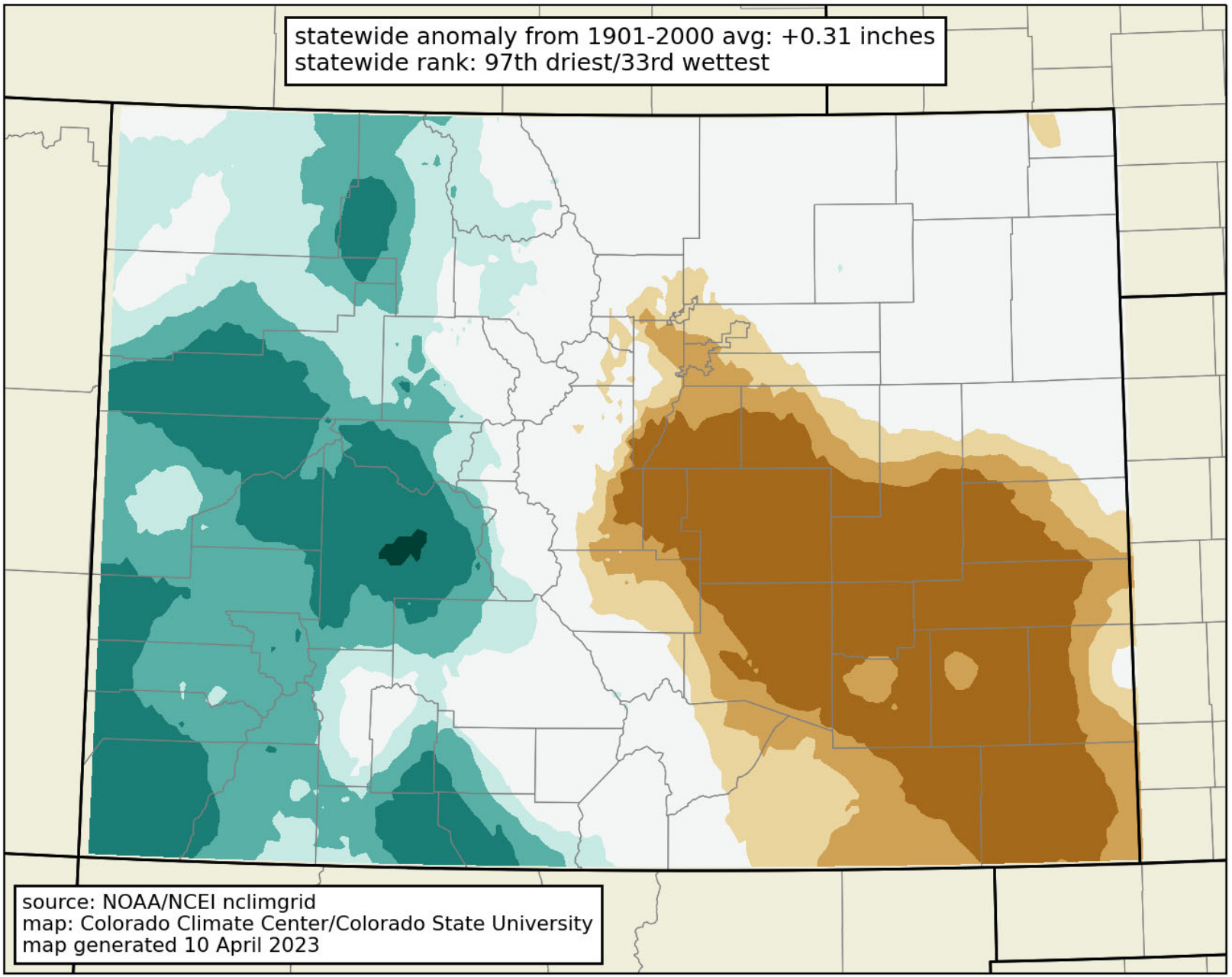


Powered by ACIS


PRISM proportion of annual average precipitation in this month: March
0.1
0.25
0.5
0.75
0.85
1.15
1.25
1.5
1.75
2
Proportion of precip relative to 1/12th
data: 1991-2020 normals, PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu
map: Russ Schumacher/Colorado Climate Center/Colorado State University


PRISM proportion of annual average precipitation in this month: April
0.1
0.25
0.5
0.75
0.85
1.15
1.25
1.5
1.75
2
Proportion of precip relative to 1/12th
data: 1991-2020 normals, PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu
map: Russ Schumacher/Colorado Climate Center/Colorado State University

precipitation rank: March 2023

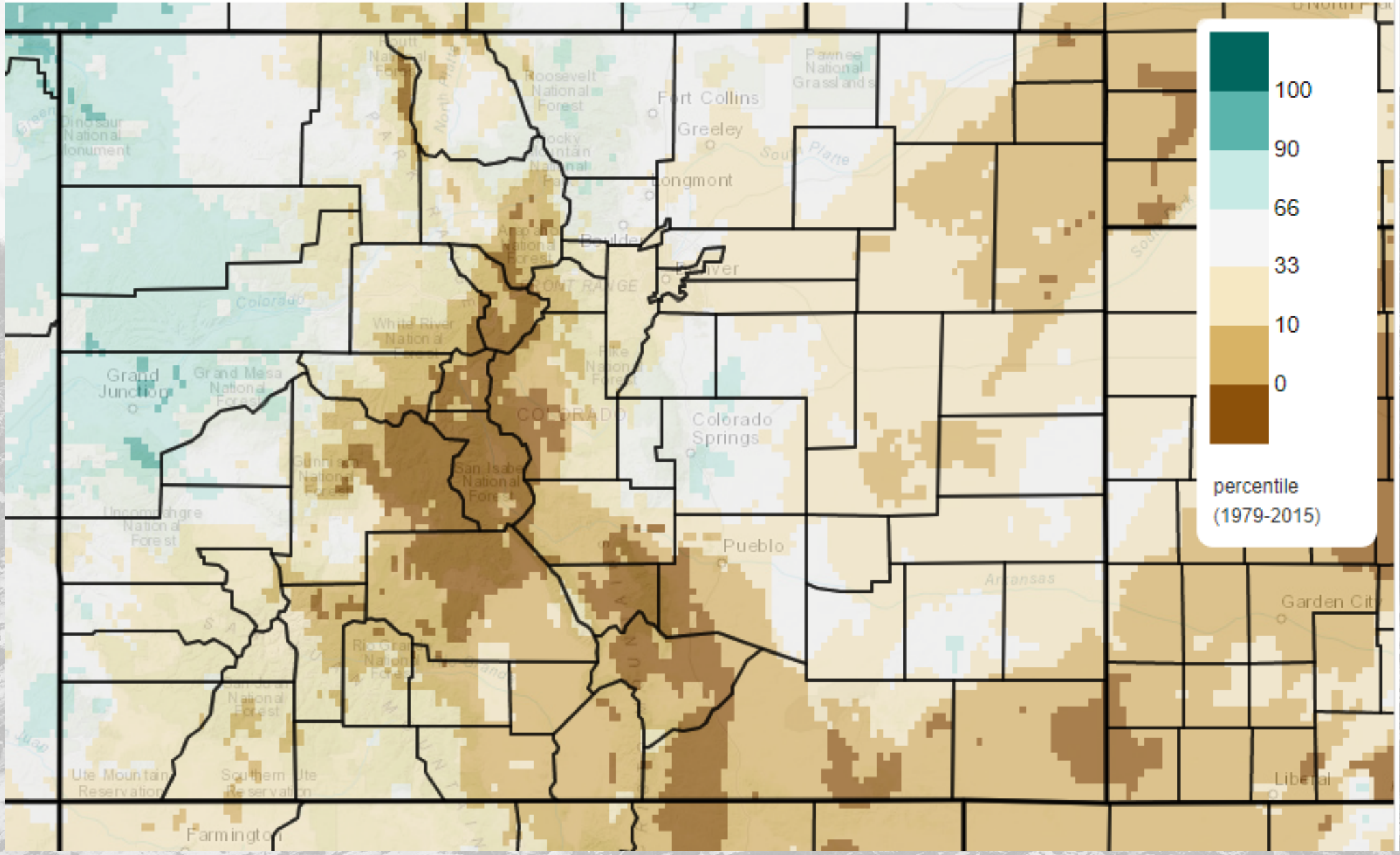


record driest | 10th driest | 20th driest | 35th driest | 35th wettest | 20th wettest | 10th wettest | record wettest

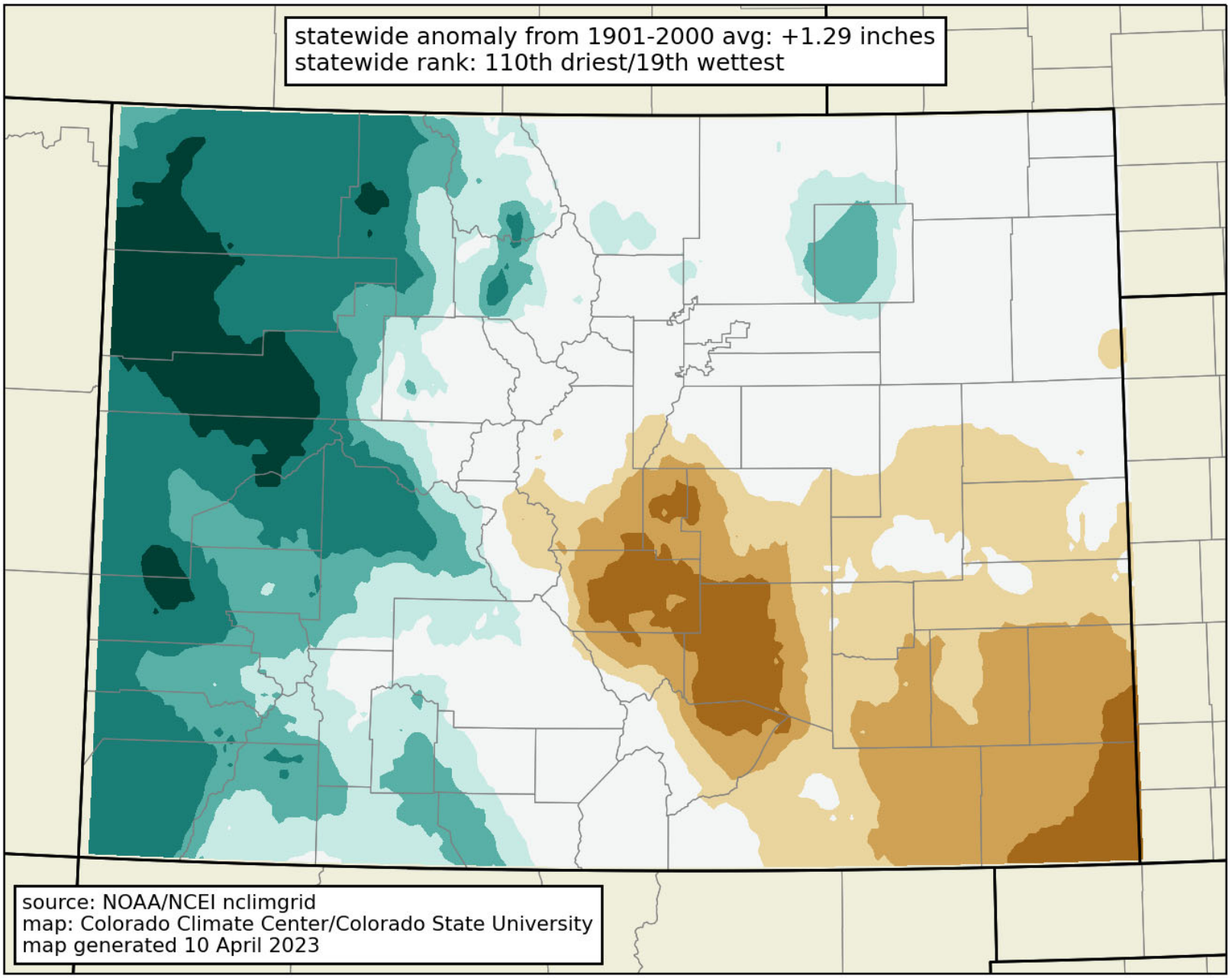
precipitation rank out of 129 years (1895-2023)

Total Precipitation Percentile, Last 15 Days

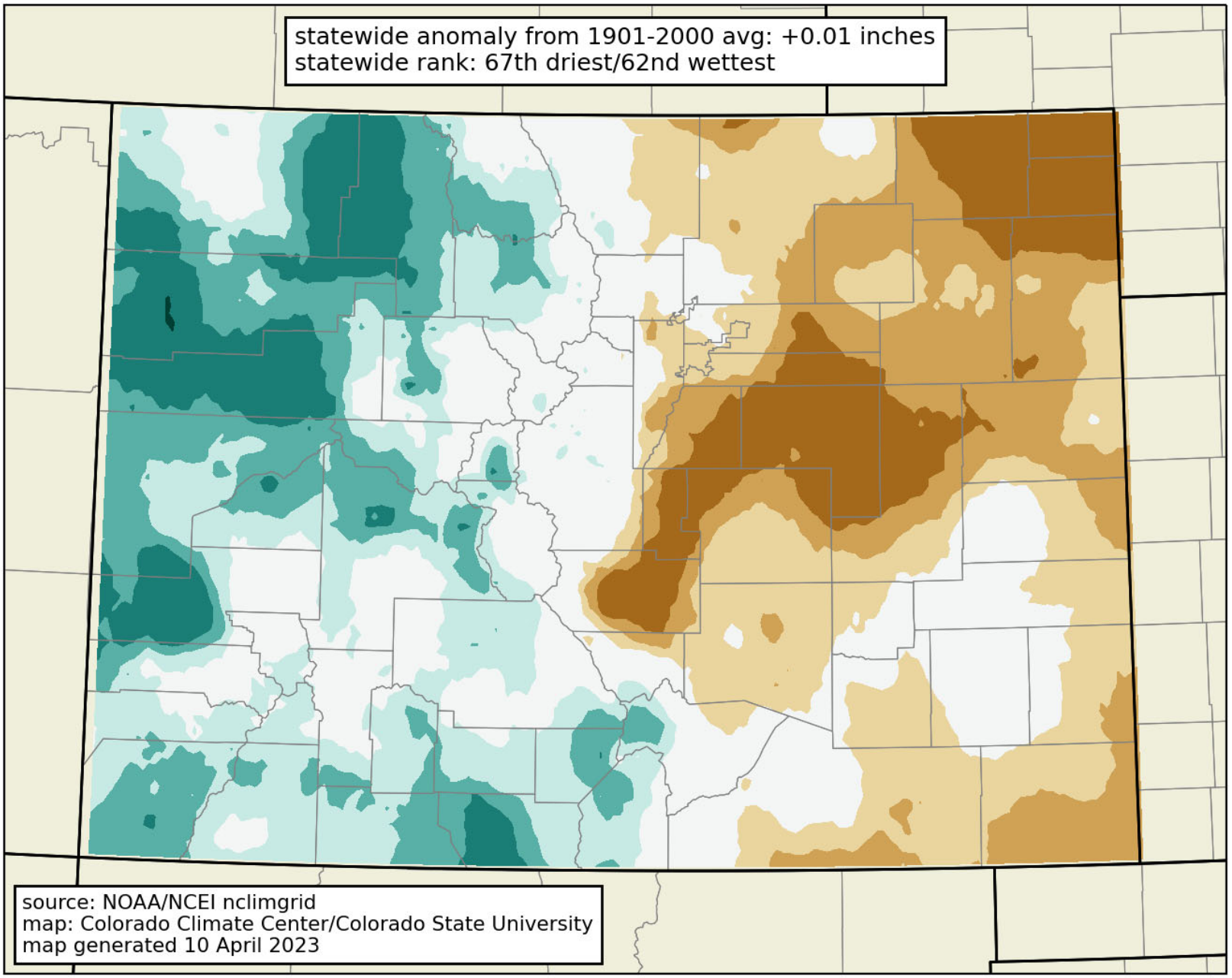
2023/04/02 - 2023/04/16



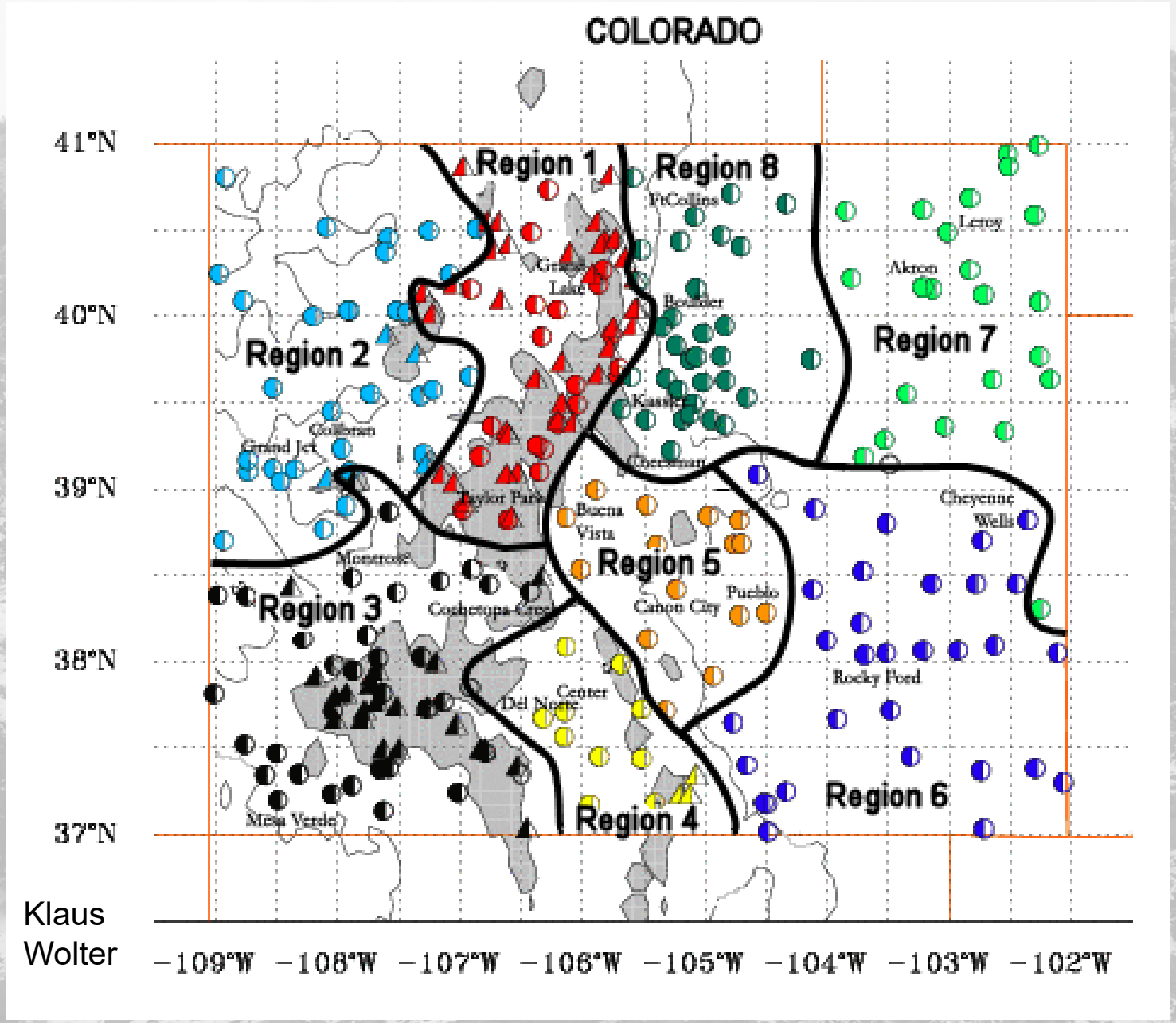
precipitation rank: 6 months ending March 2023 (Oct-Mar)



precipitation rank: 12 months ending March 2023 (Apr-Mar)

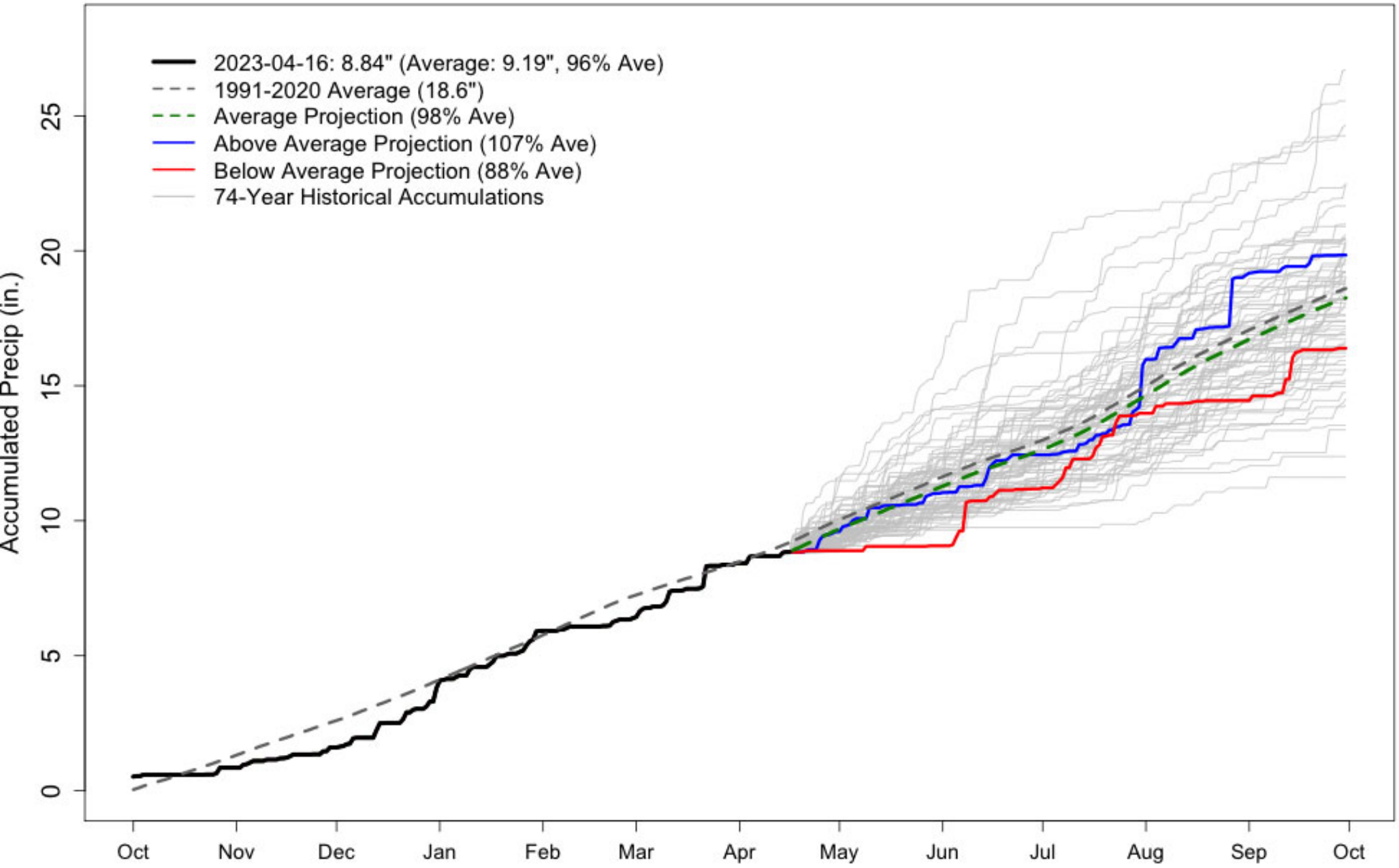


Climate divisions defined by Dr. Klaus Wolter of NOAA's Climate Diagnostic Center in Boulder, CO

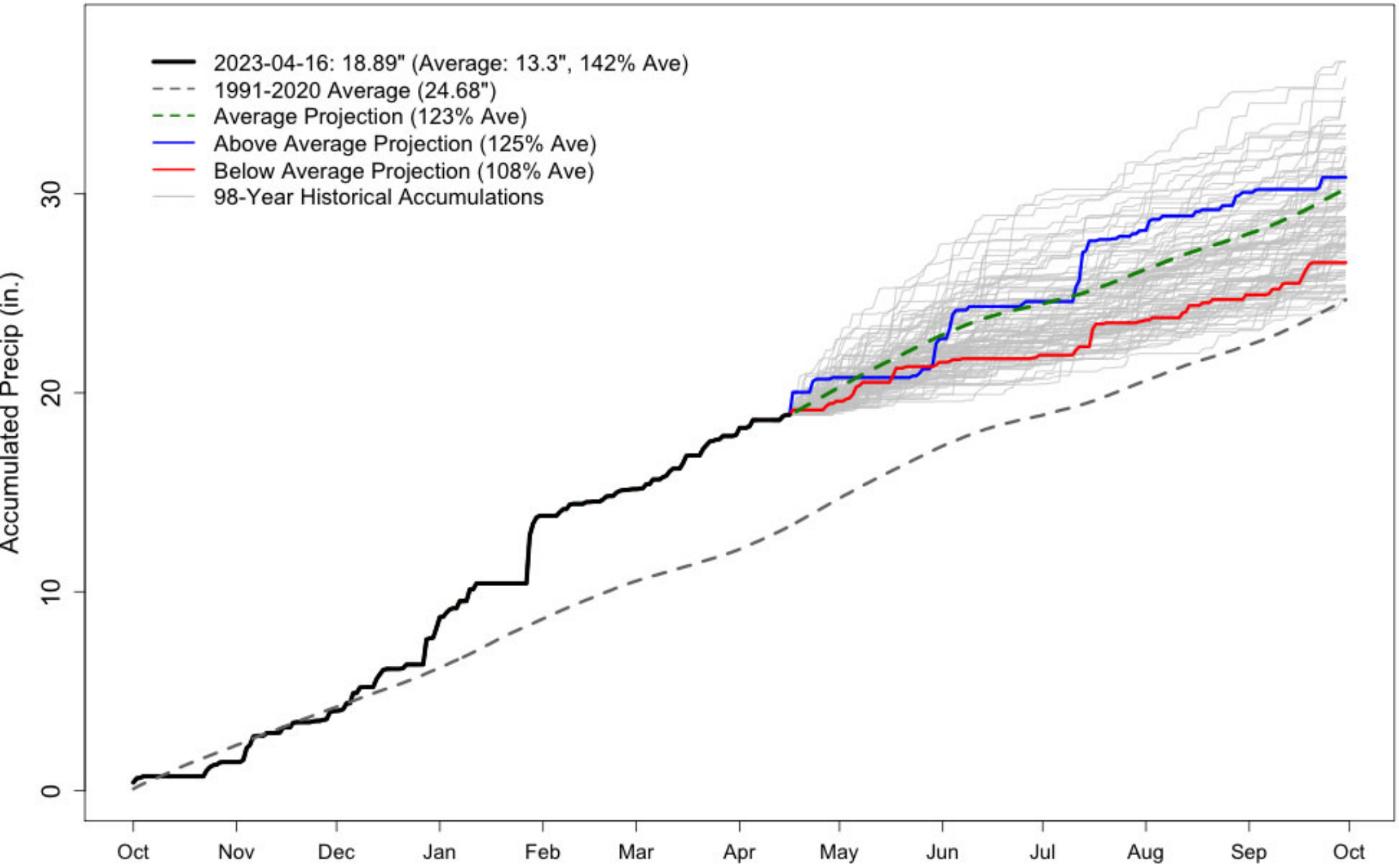


Klaus Wolter

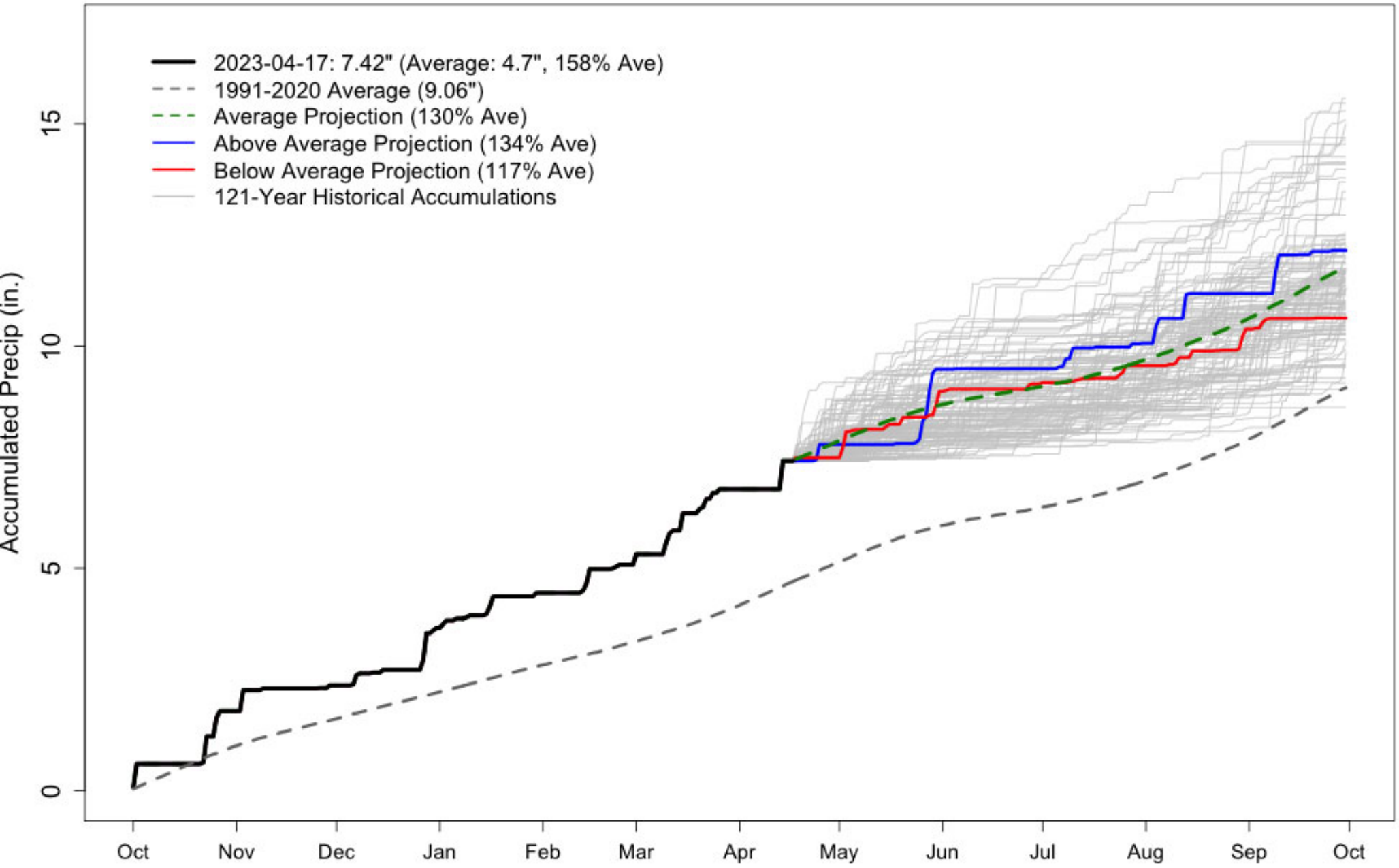
GRAND LAKE 1 NW WY2023 Precipitation Projections



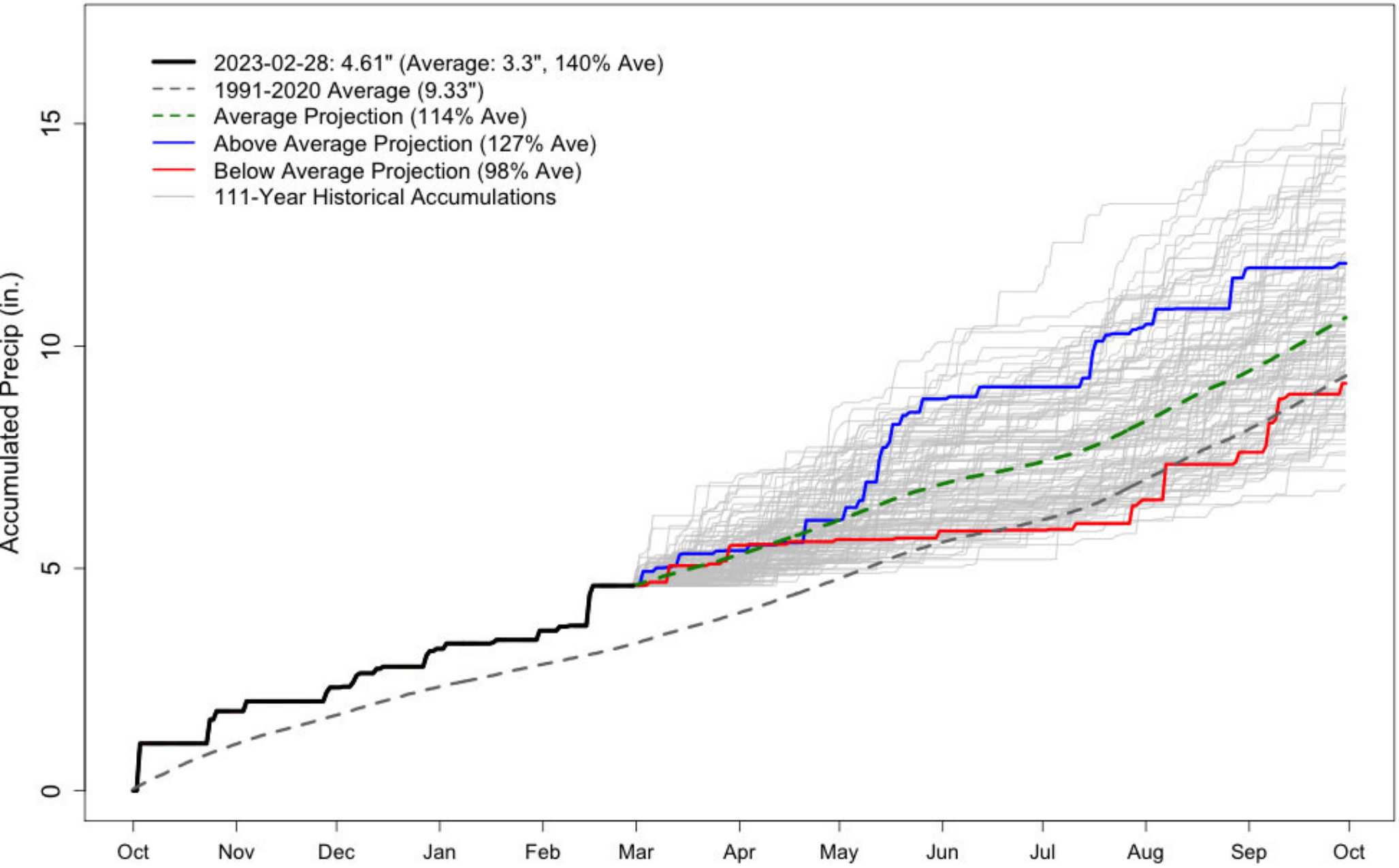
STEAMBOAT SPRINGS WY2023 Precipitation Projections



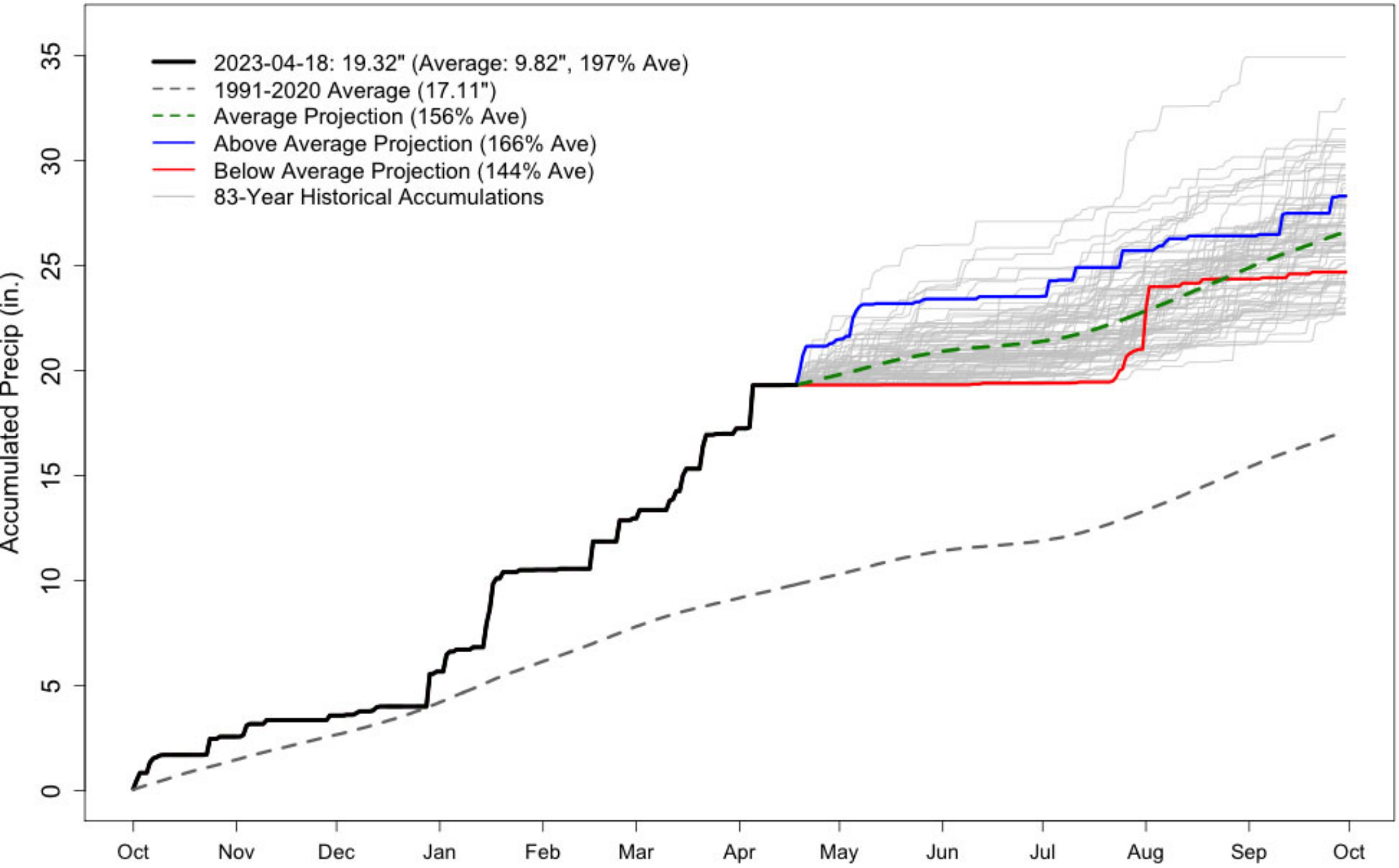
GRAND JUNCTION WALKER FIELD WY2023 Precipitation Projections



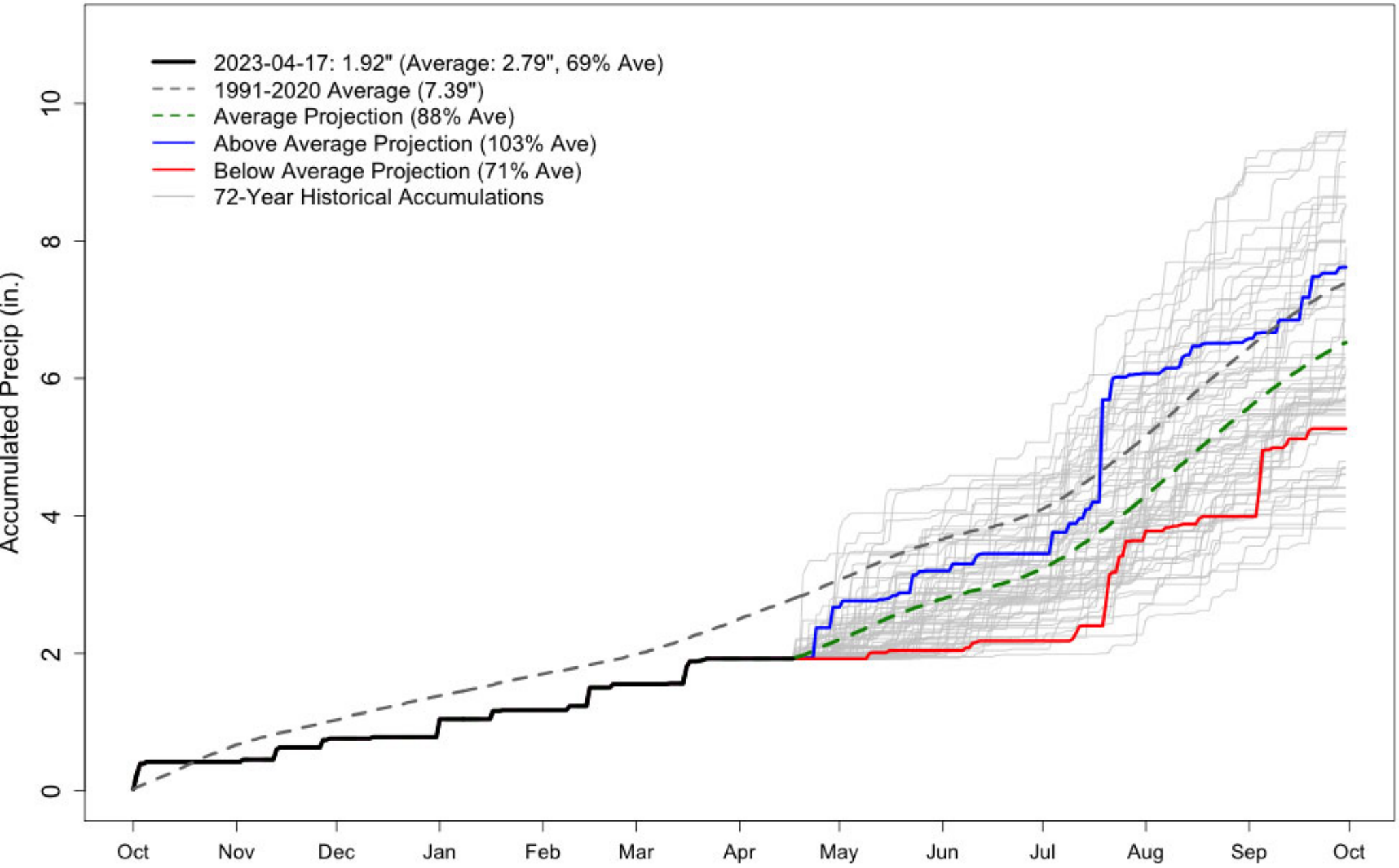
MONTROSE NO 2 WY2023 Precipitation Projections



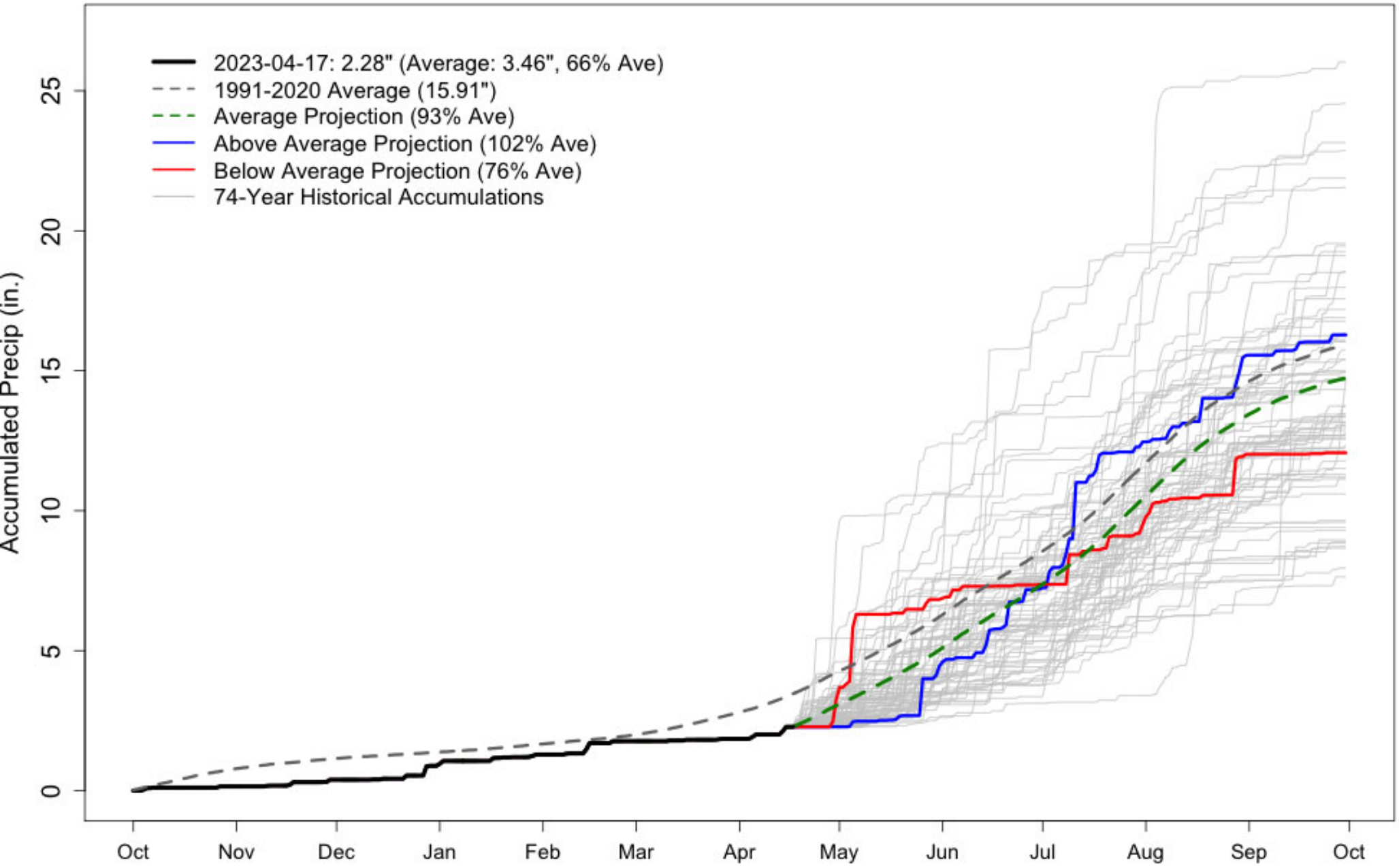
MESA VERDE NP WY2023 Precipitation Projections



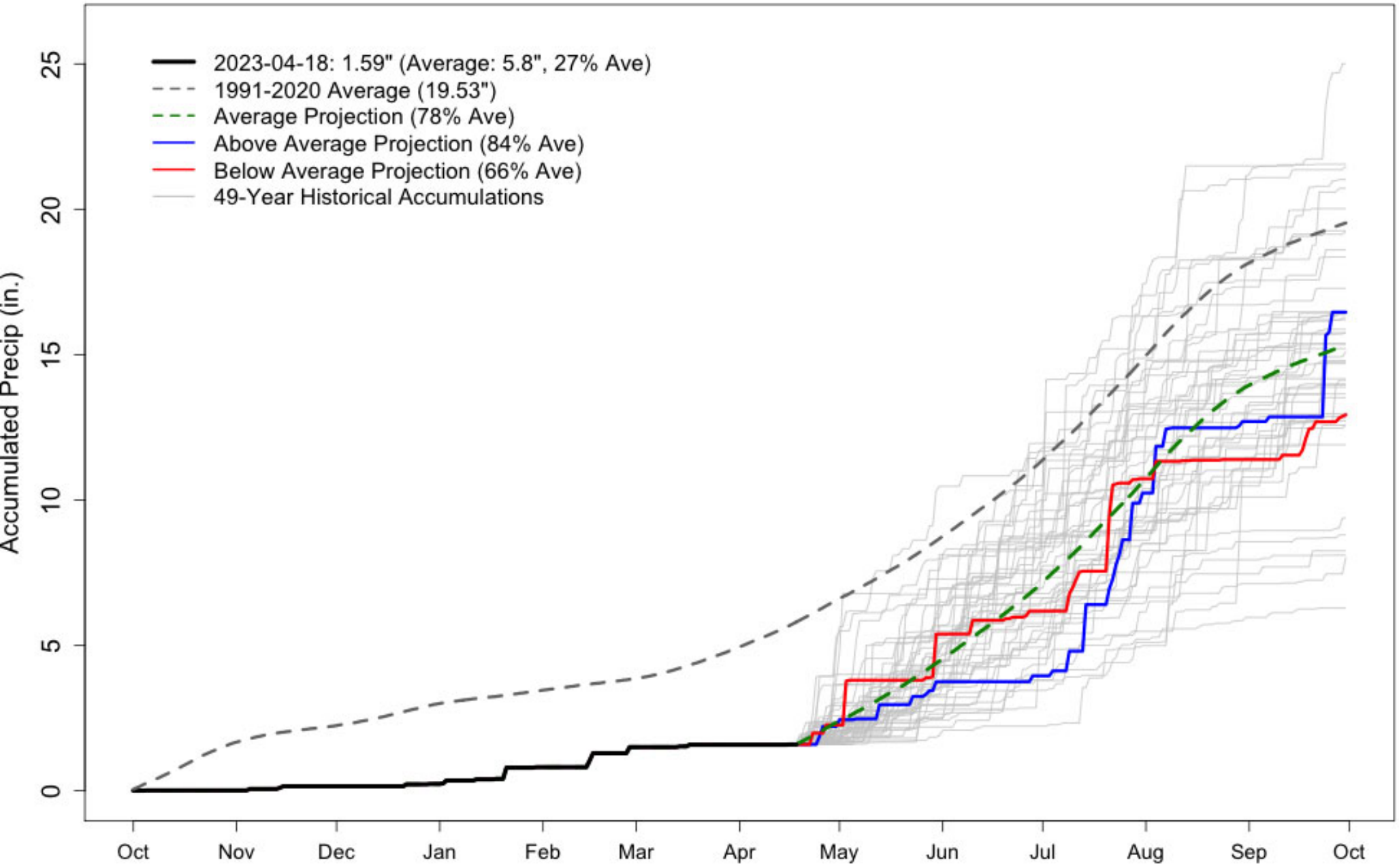
ALAMOSA-BERGMAN FIELD WY2023 Precipitation Projections



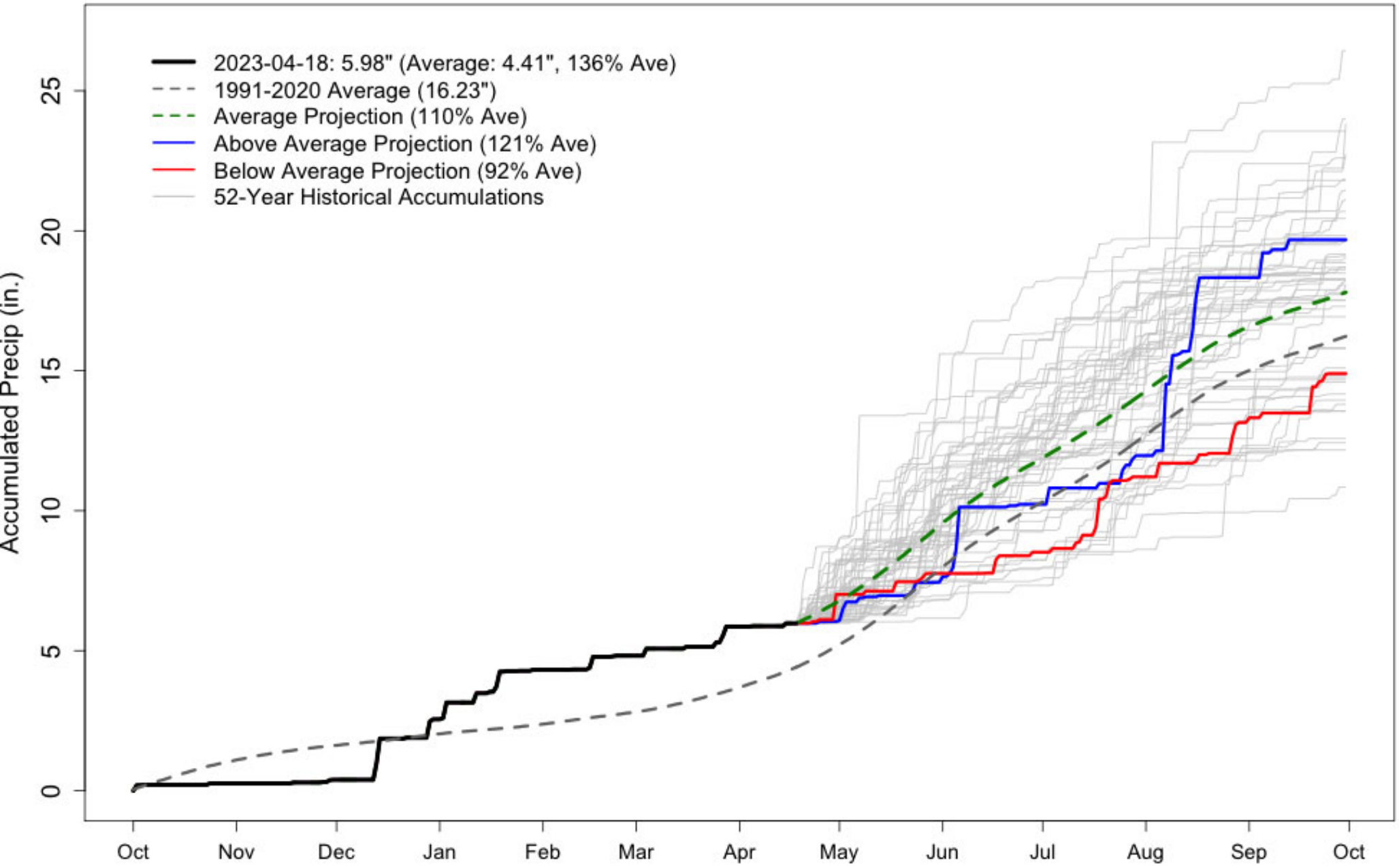
COLORADO SPRINGS MUNICIPAL AP WY2023 Precipitation Projections



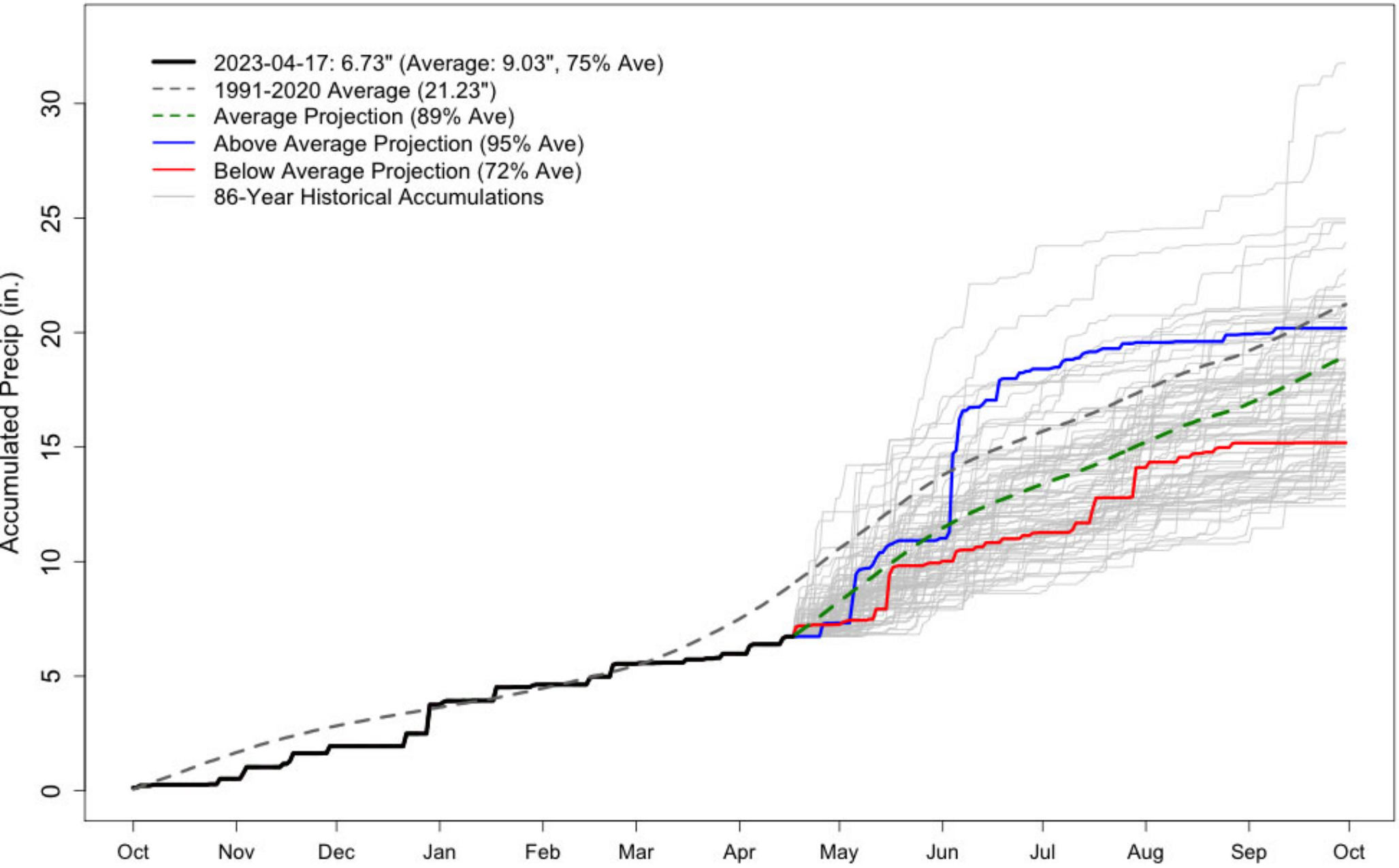
WALSH 1 W WY2023 Precipitation Projections



AKRON 4 E WY2023 Precipitation Projections



BOULDER WY2023 Precipitation Projections

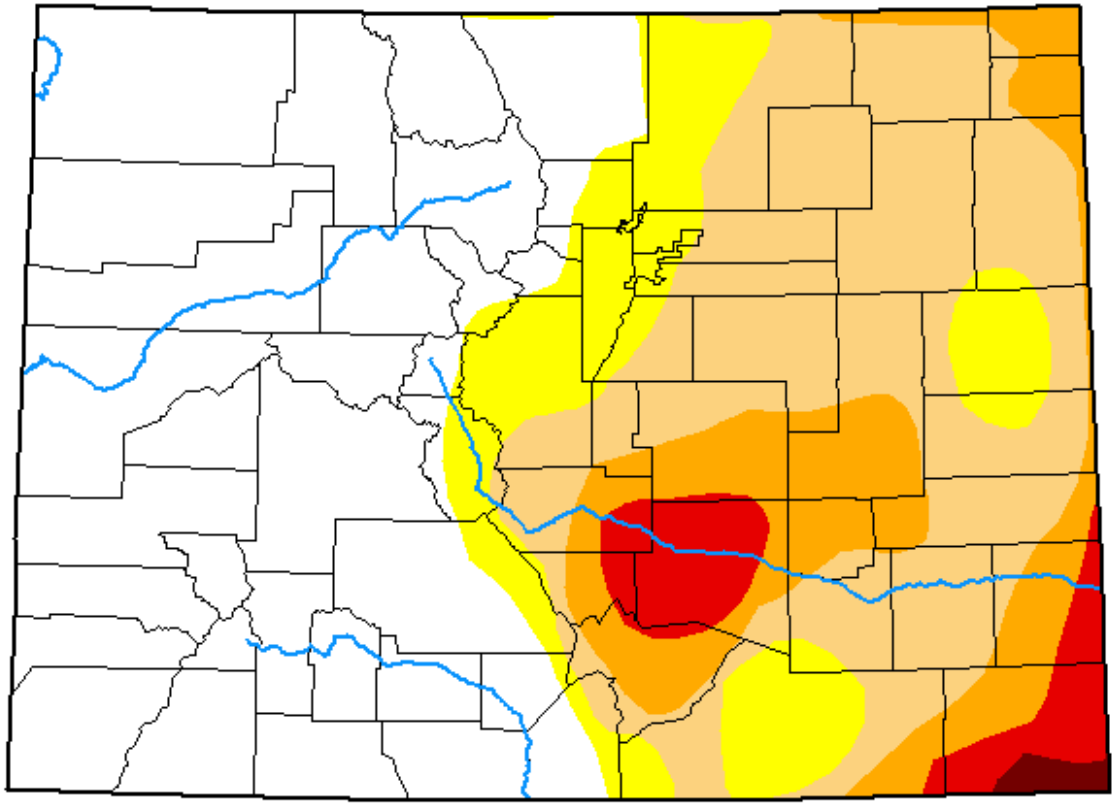


Drought Update

- Mostly good news/improvements since beginning of water year!
- Drought persistence with some redevelopment across the eastern plains

U.S. Drought Monitor

Colorado



April 11, 2023

(Released Thursday, Apr. 13, 2023)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	48.25	51.75	39.85	14.50	4.52	0.43
Last Week *04-04-2023*	52.49	47.51	37.88	12.75	2.24	0.43
3 Months Ago *01-10-2023*	39.98	60.02	35.67	12.28	2.28	0.04
Start of Calendar Year *01-03-2023*	39.97	60.03	33.83	12.28	1.91	0.01
Start of Water Year *09-27-2022*	15.46	84.54	45.65	15.47	3.73	0.57
One Year Ago *04-12-2022*	0.00	100.00	82.90	31.94	4.32	0.53

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

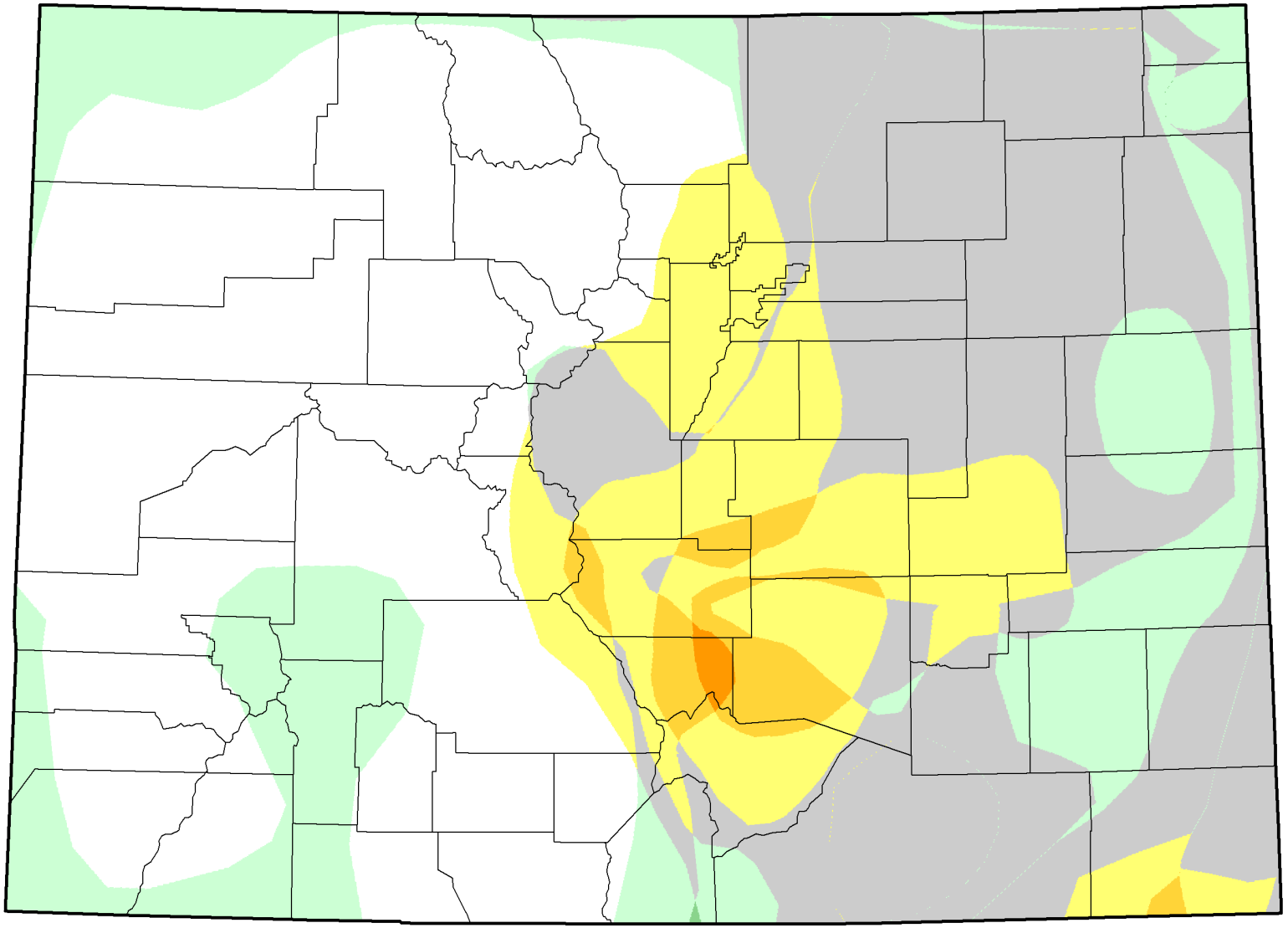
Author:

David Simeral
Western Regional Climate Center

droughtmonitor.unl.edu

U.S. Drought Monitor Class Change - Colorado

12 Week



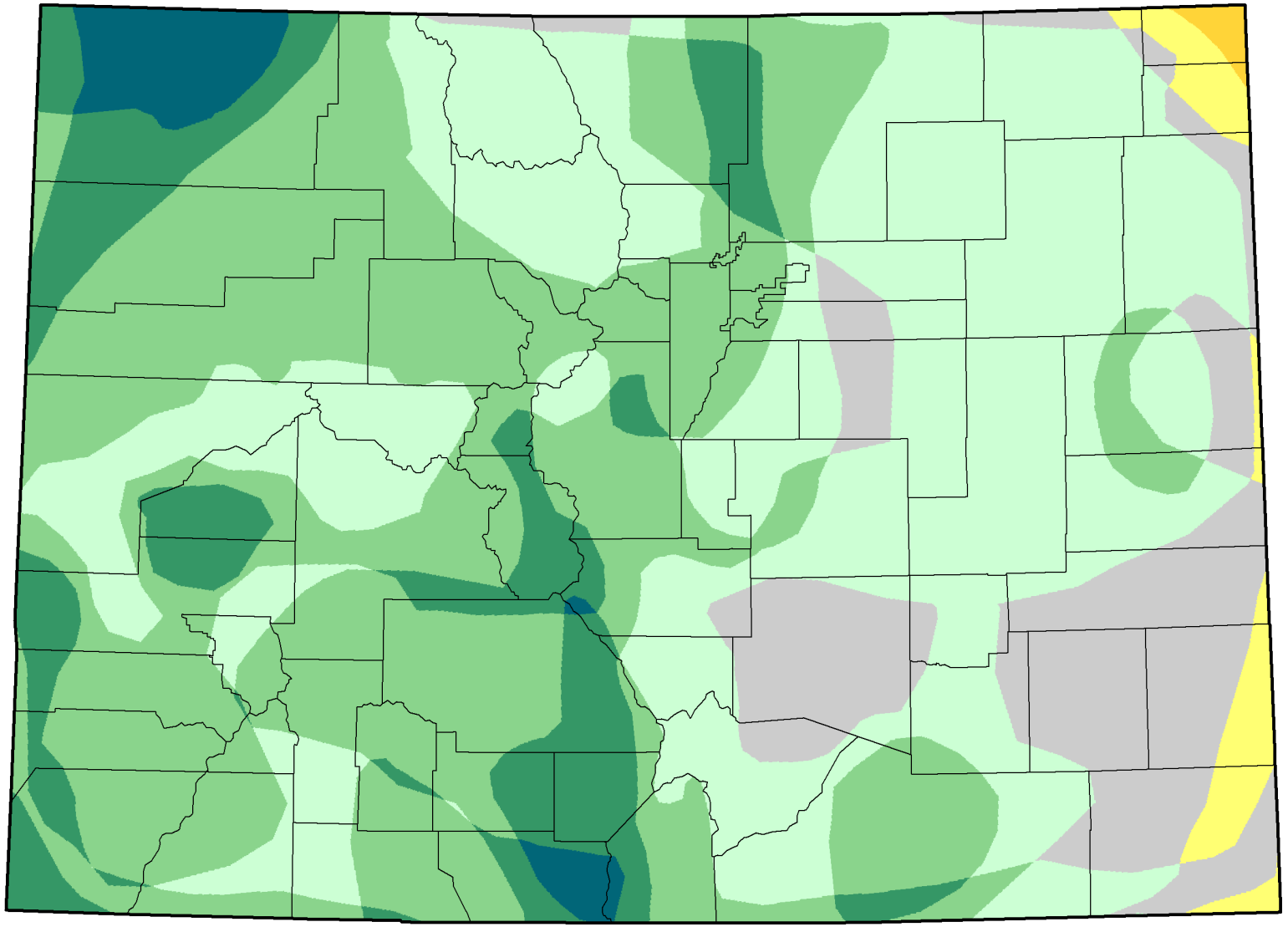
April 11, 2023
compared to
January 17, 2023

droughtmonitor.unl.edu

- 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

U.S. Drought Monitor Class Change - Colorado

52 Week



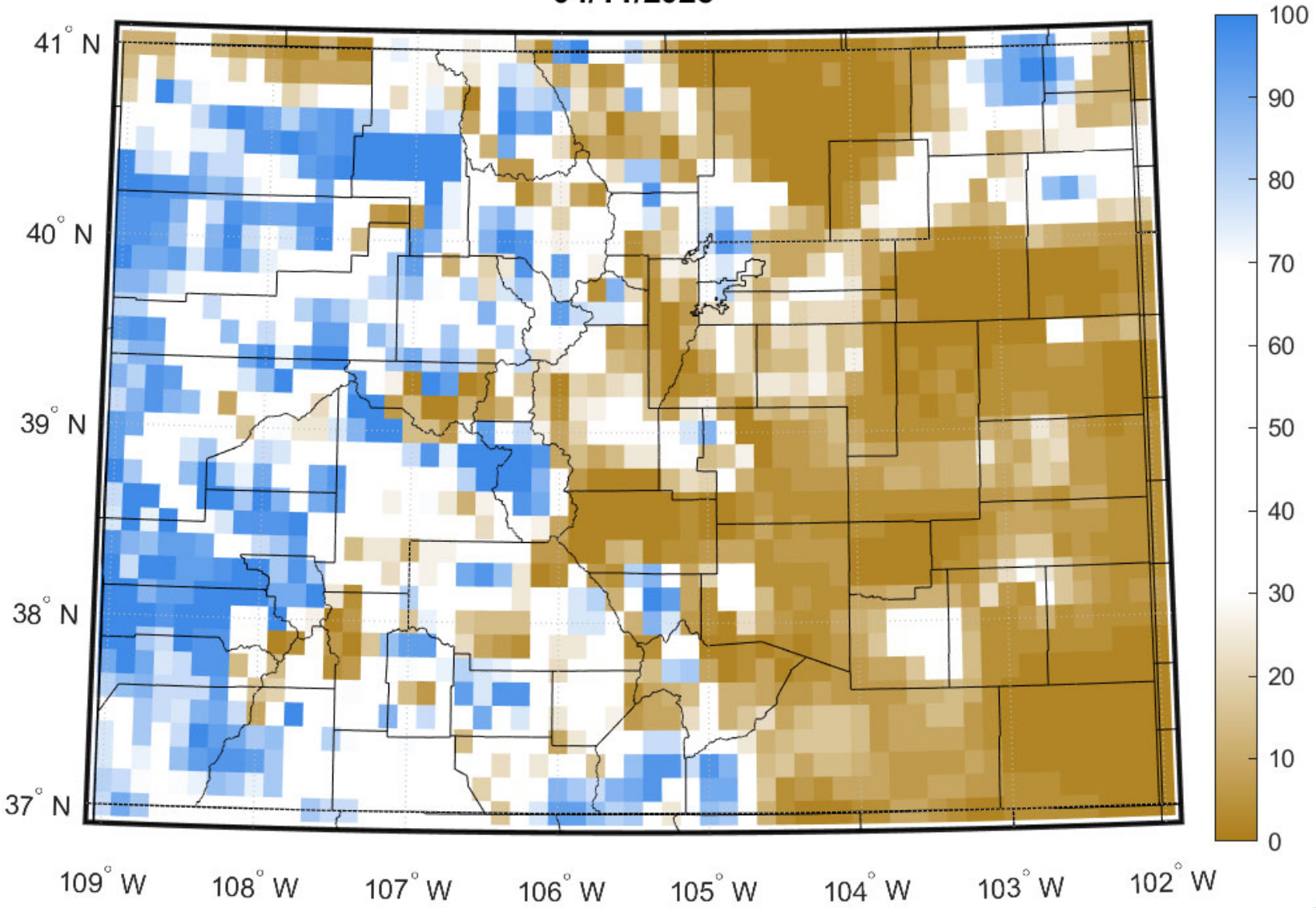
February 14, 2023
compared to
February 15, 2022

droughtmonitor.unl.edu

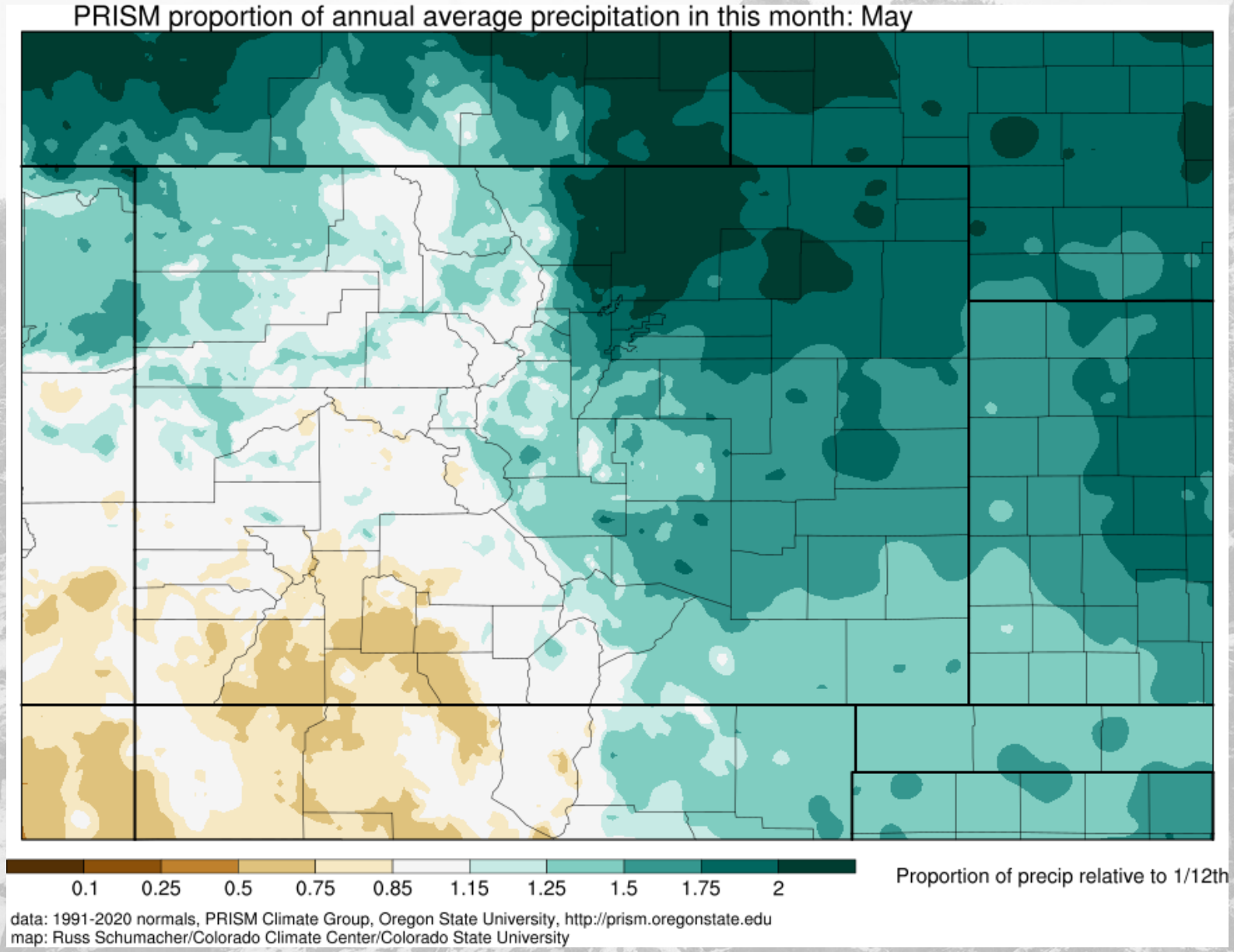
NATIONAL DROUGHT MITIGATION CENTER
NDMC
UNIVERSITY OF NEBRASKA

- 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

Top Meter Soil Moisture Percentile
04/11/2023



Seasonal Outlook

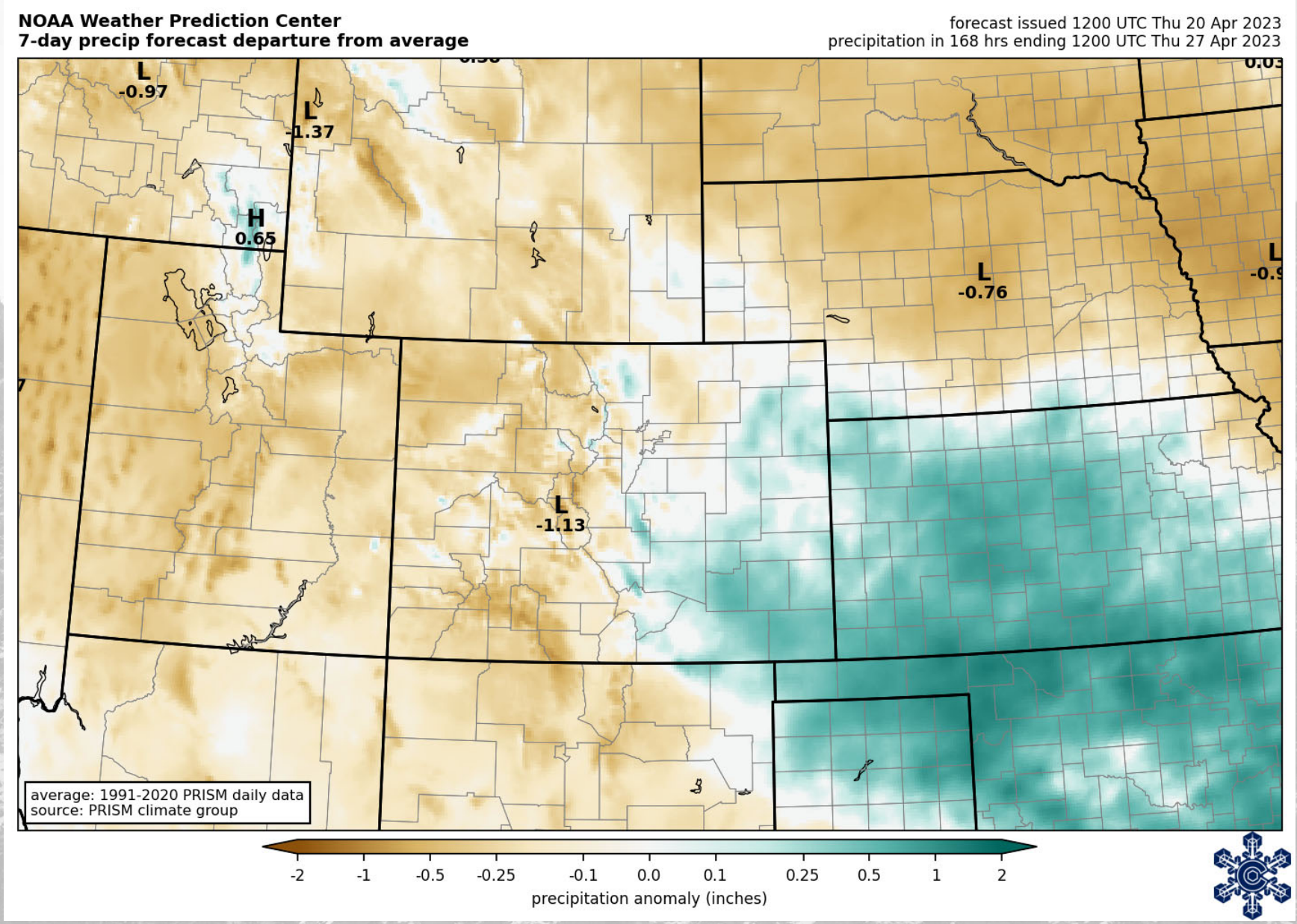


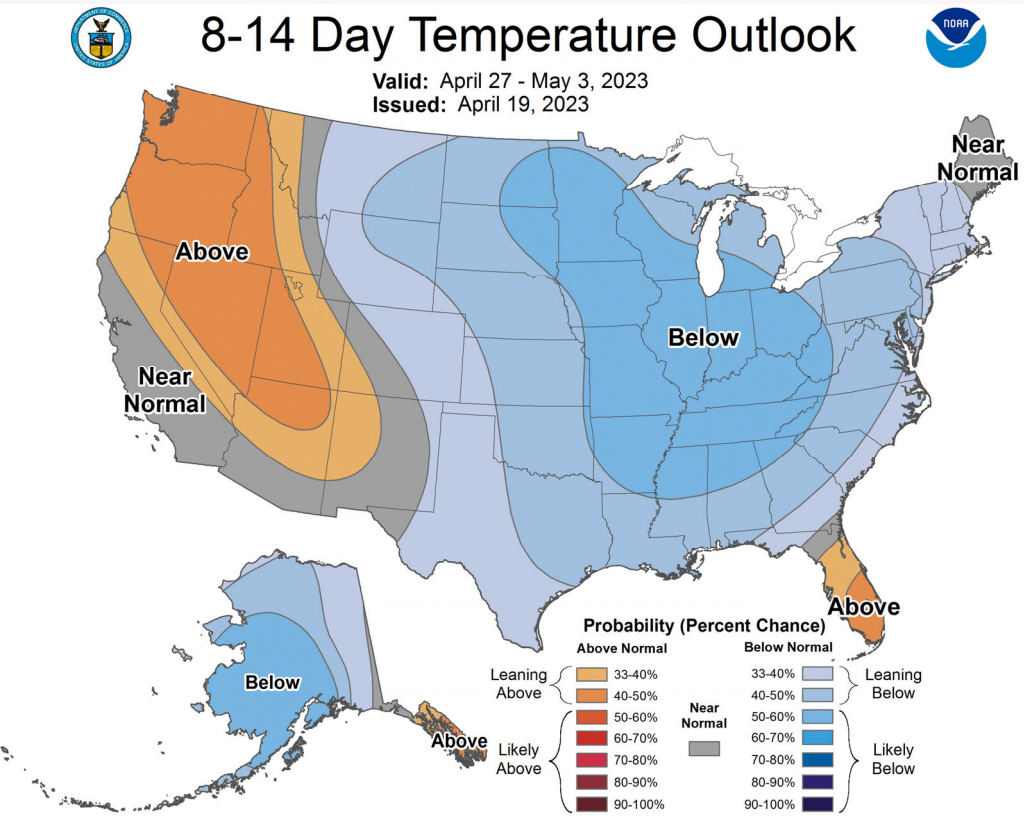
The coming 6-8 weeks are absolutely crucial for the agricultural health of our eastern plains

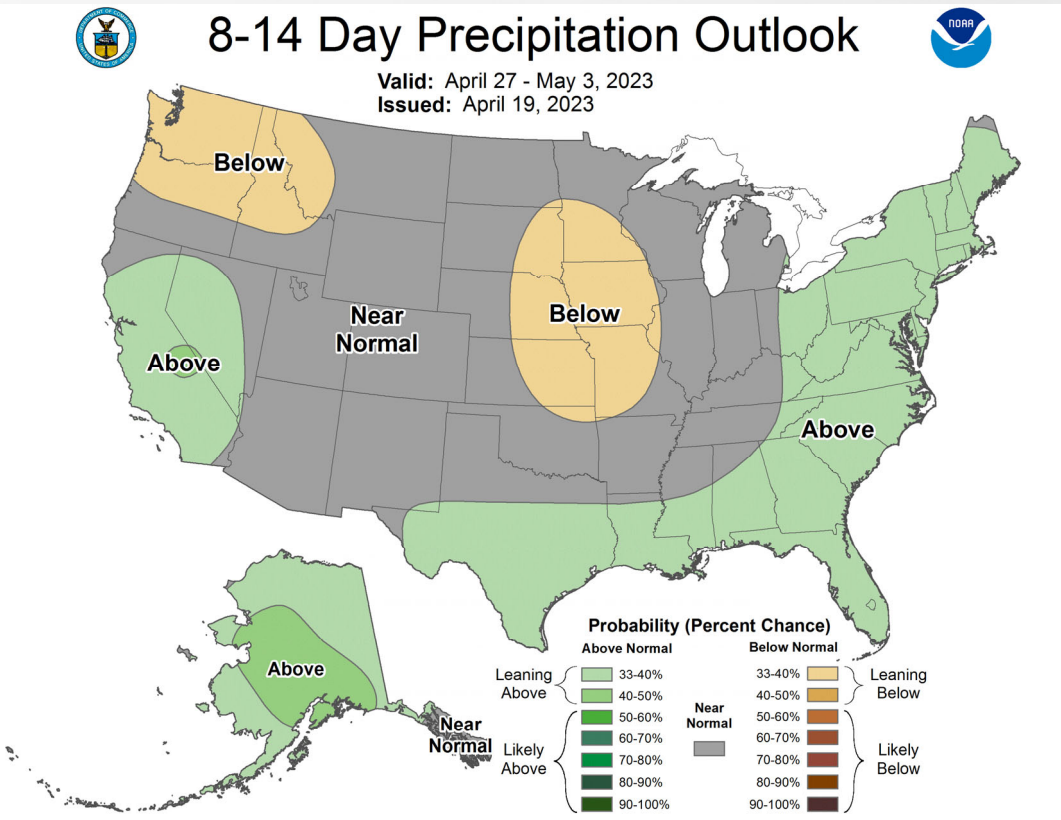
Sometimes these areas can make up a precipitation deficit in July/August from convective storms, but it's tool late at that point to produce

The coming week will bring some unsettled weather with cooler temps.

The European model is more optimistic than the GFS about this storm



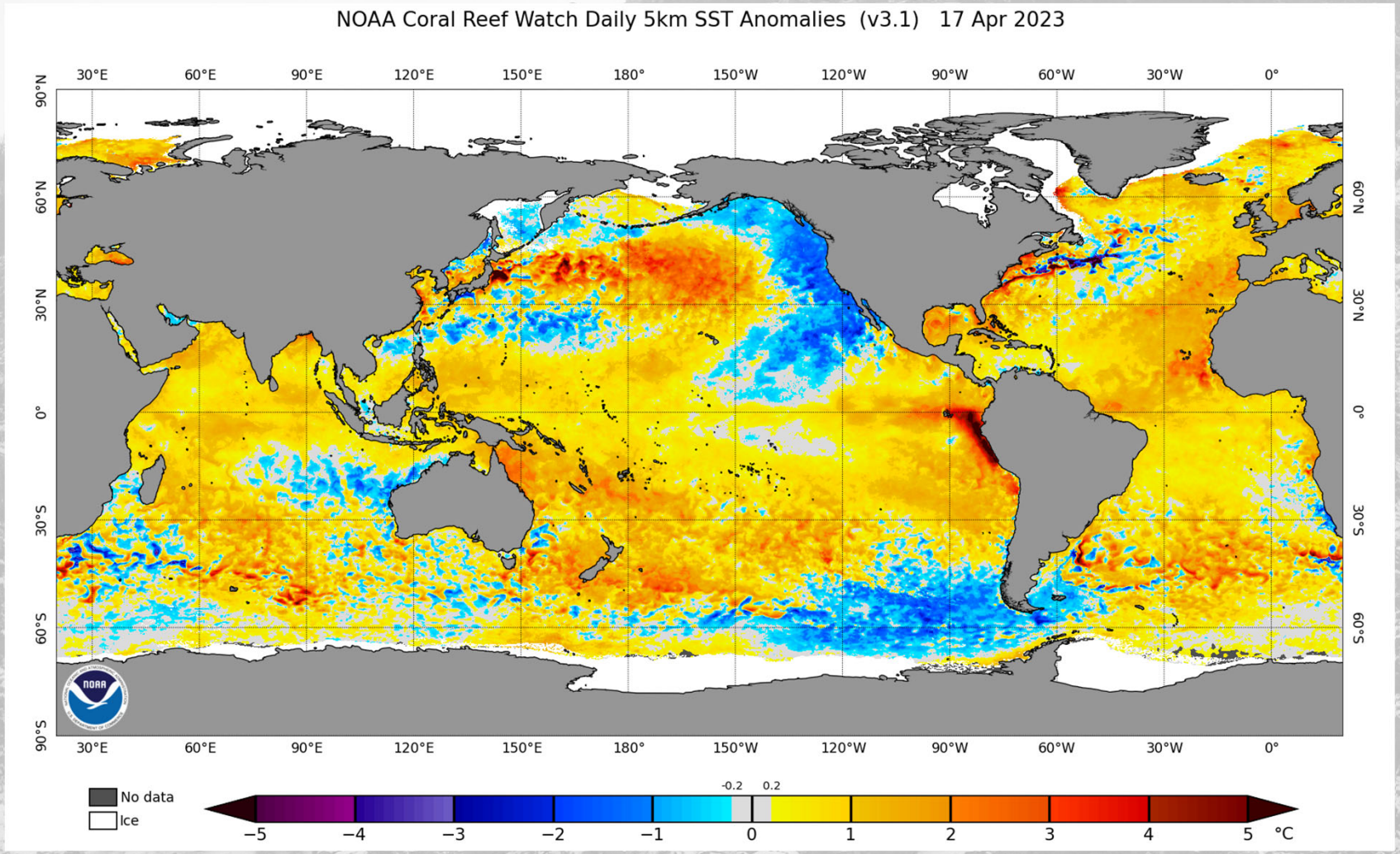




Likely ridging over west US at 8-14 days. Cool air spilling over the middle of the country

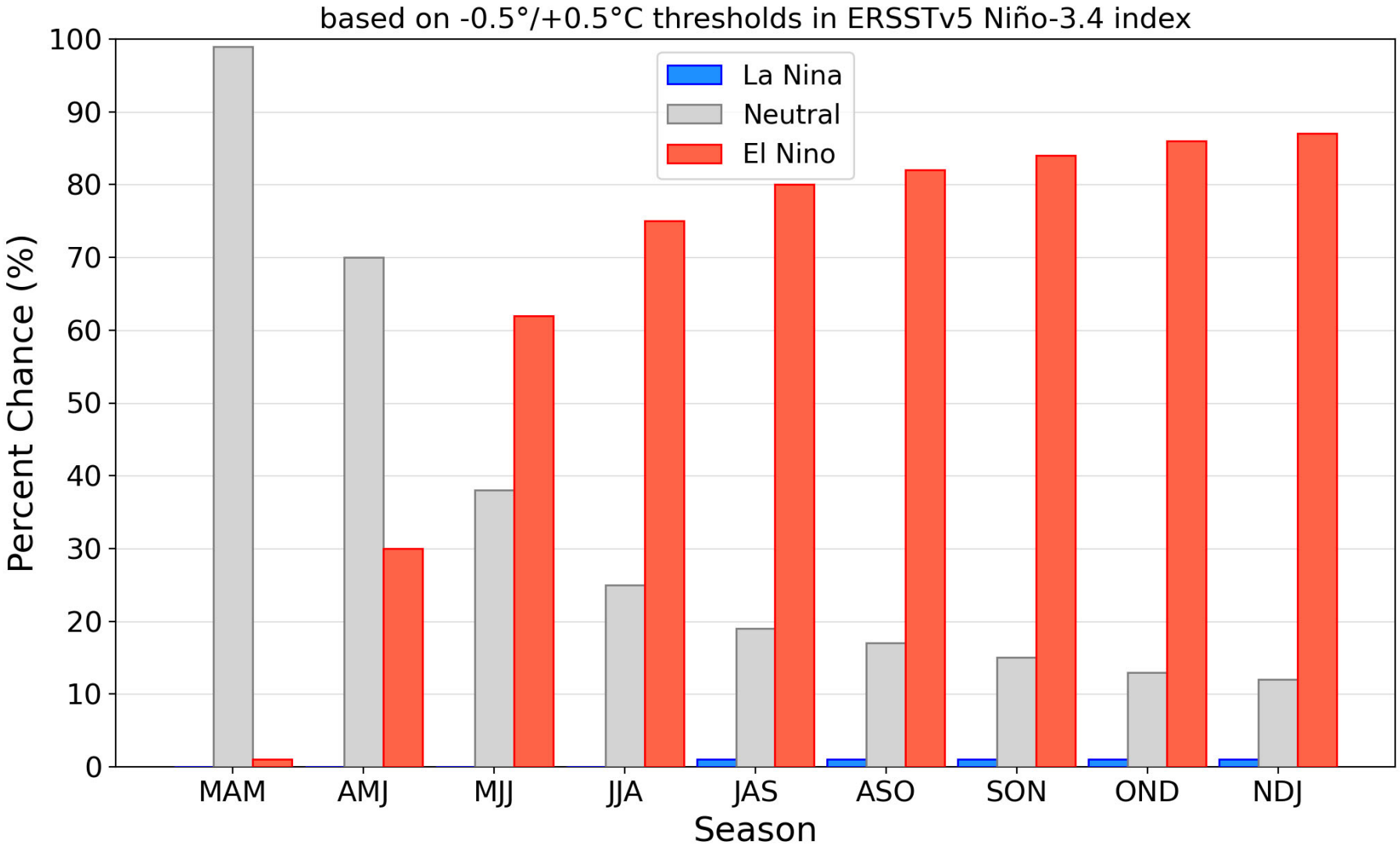
Cooler than normal east of the Continental Divide. Some precipitation (maybe snow). Could be warmer and drier west of the divide

Current Sea Surface Temperature Pattern

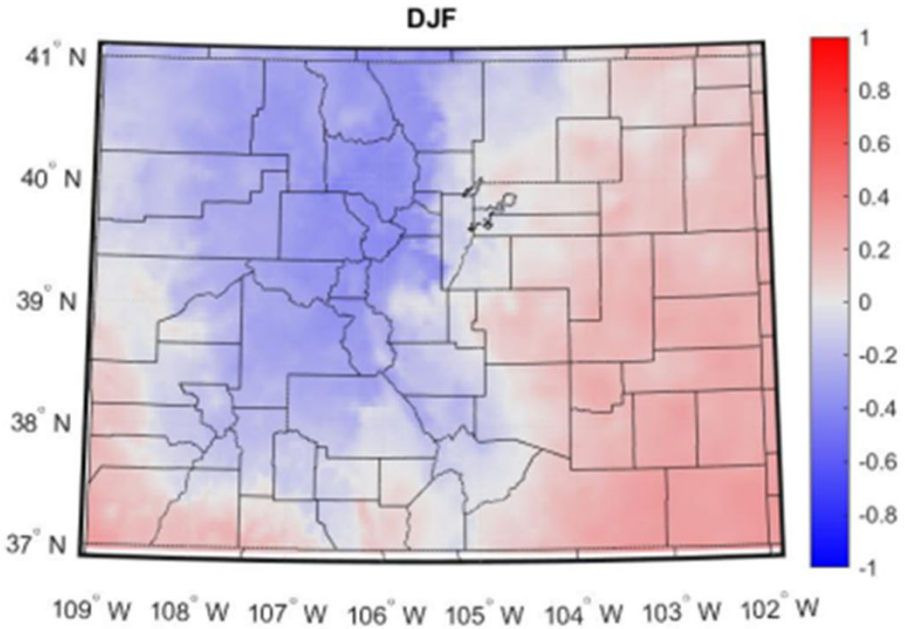


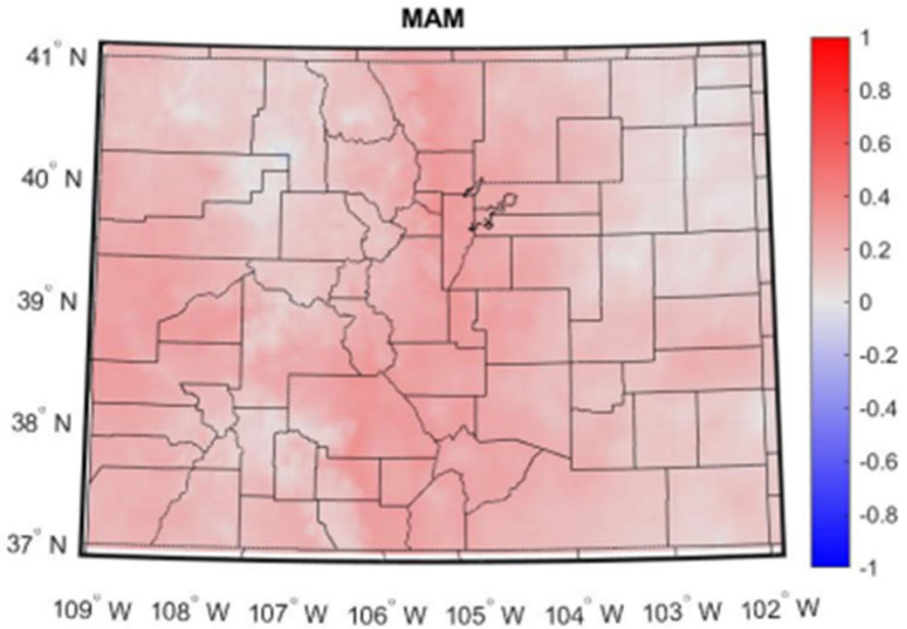
- Our three year La Niña is gone
- El Niño now developing off the eastern South America coast
- Cold waters remain between here and Hawaii

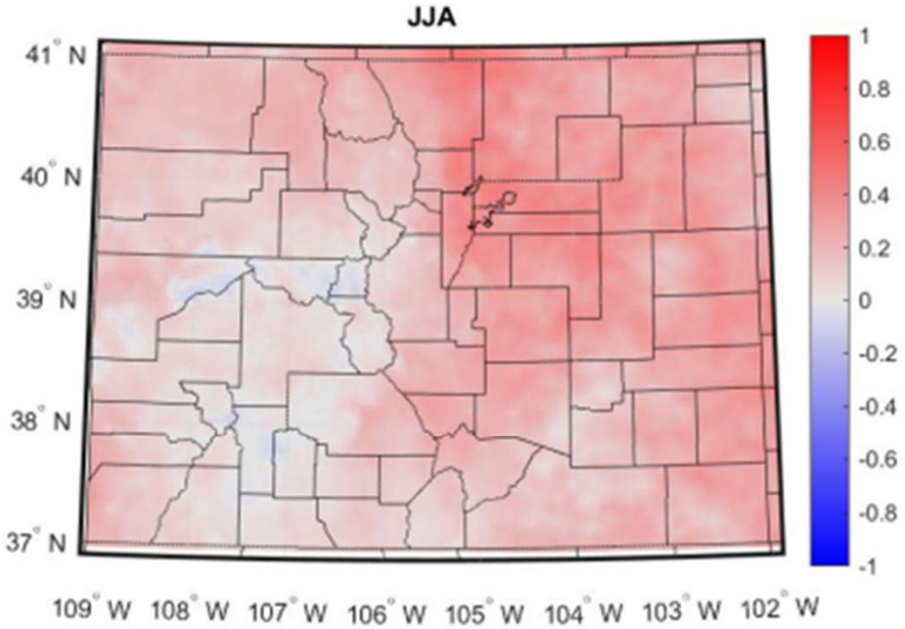
Official NOAA CPC ENSO Probabilities (issued Apr. 2023)

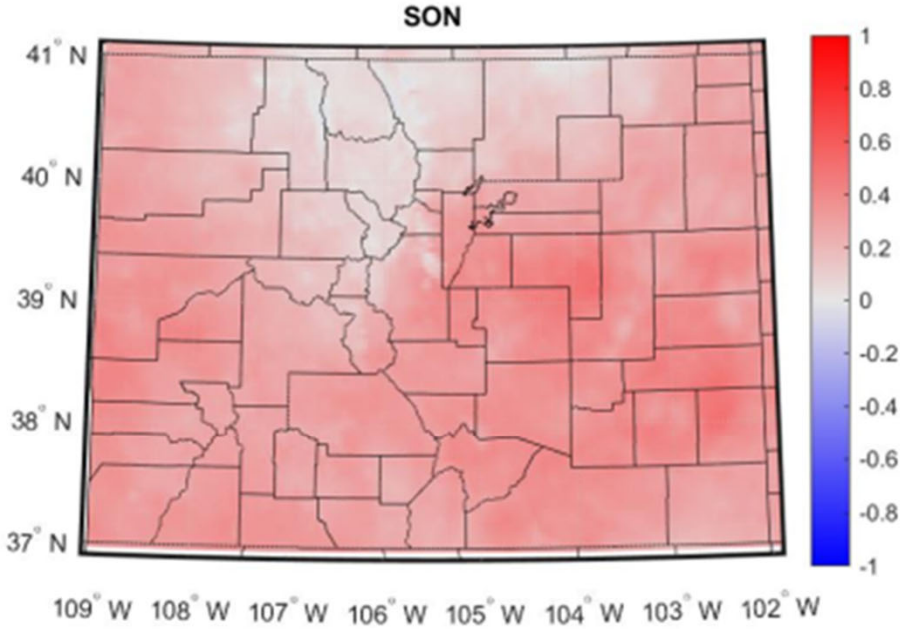


Correlation Between ENSO ONI and Seasonal Precipitation in Colorado (1951-2020)



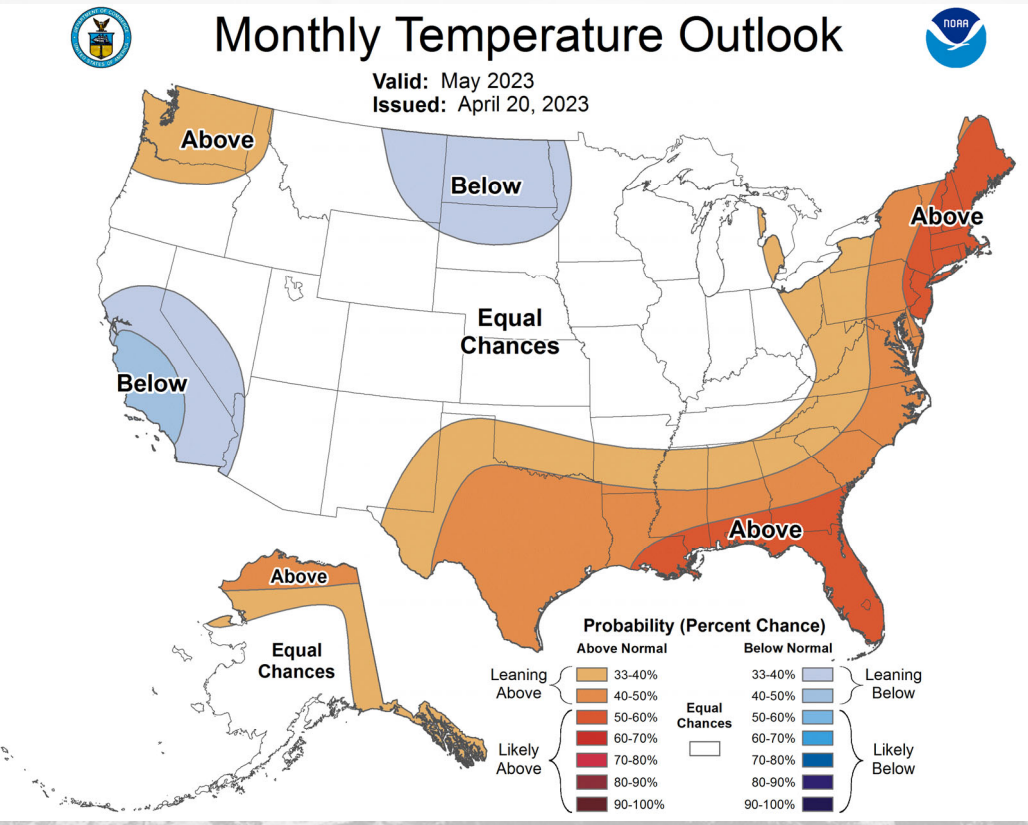


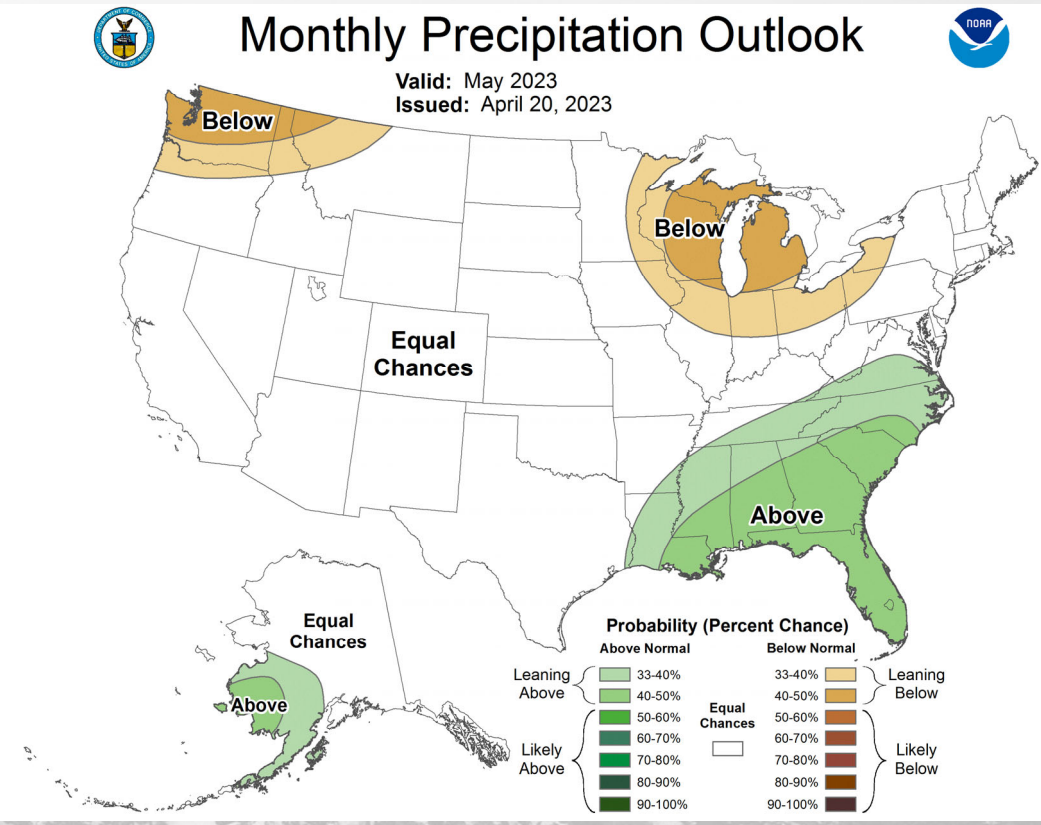




Blue = La Niña wetter Red = El Niño wetter

May Outlook



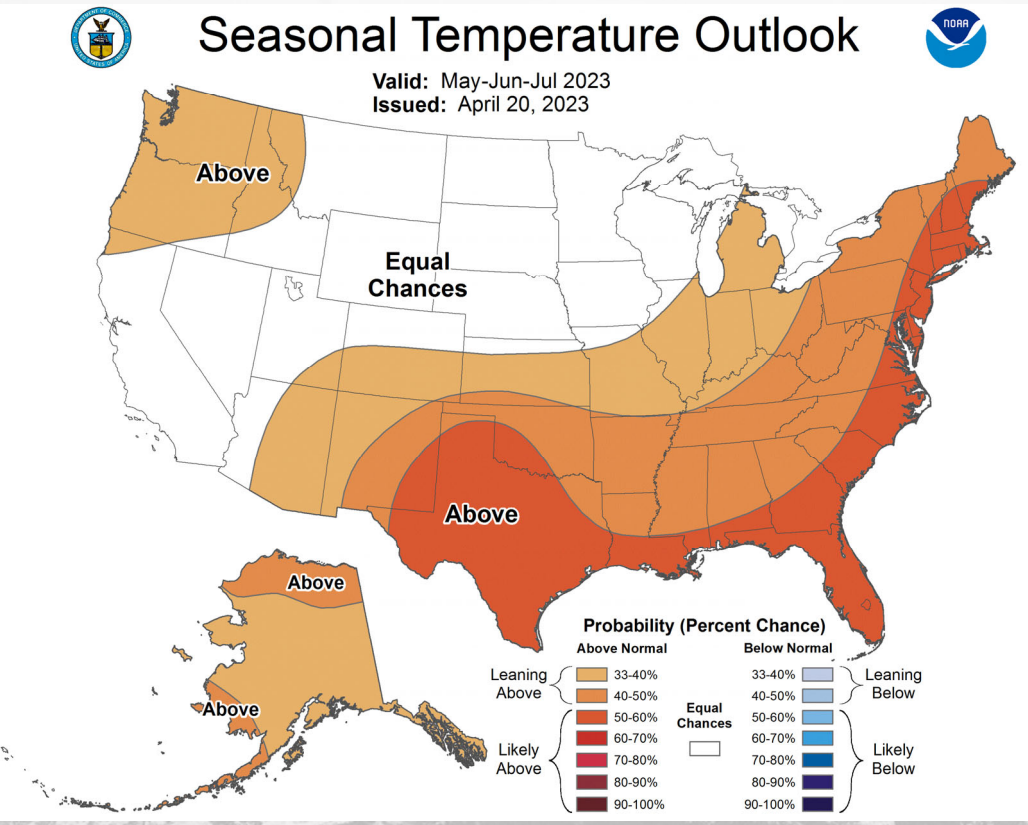


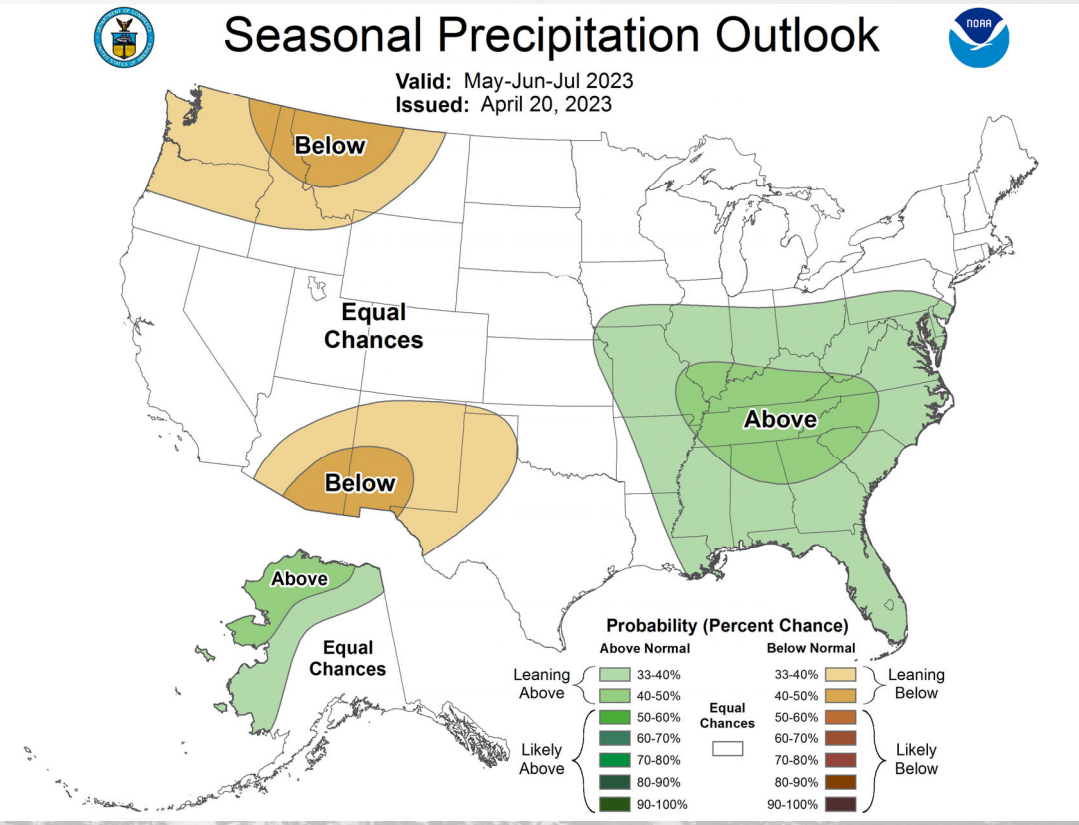
Most helpful outlook ever! 100% equal chances for temperature and precipitation

Current rapid transition to El Niño linked to high uncertainty

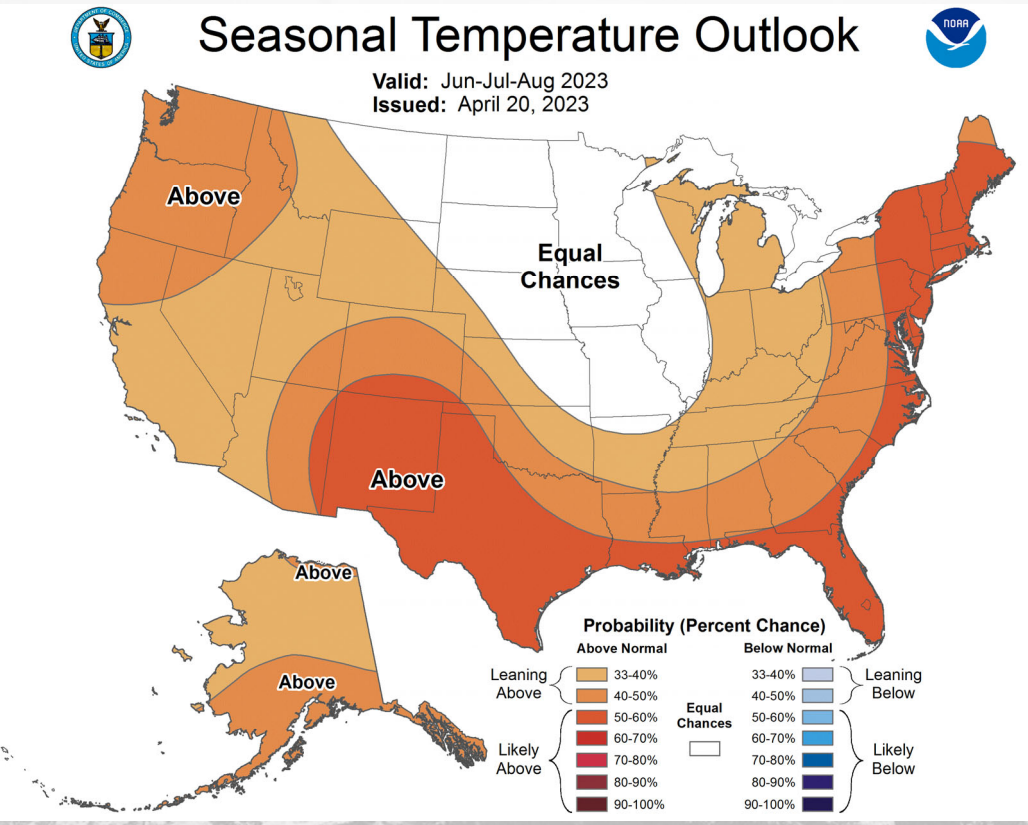
El Niño development should support an increased chance of a cold or wet extreme for eastern Colorado this time of year

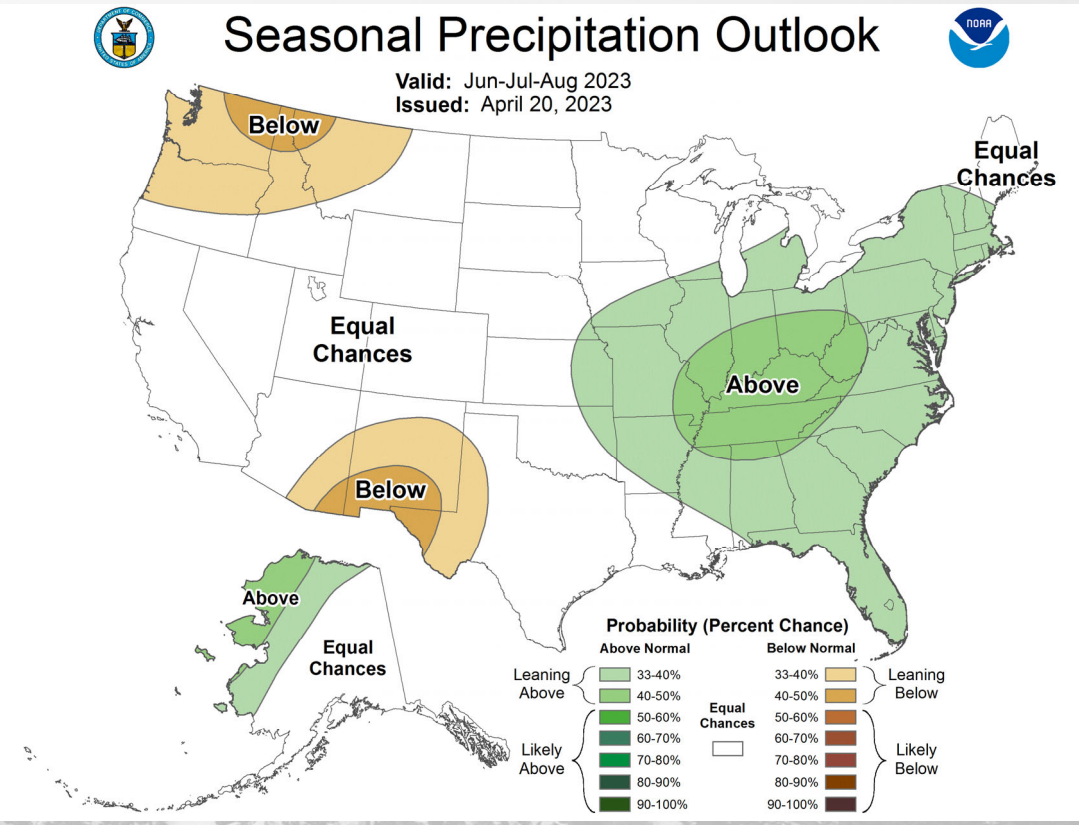
May-July Outlook





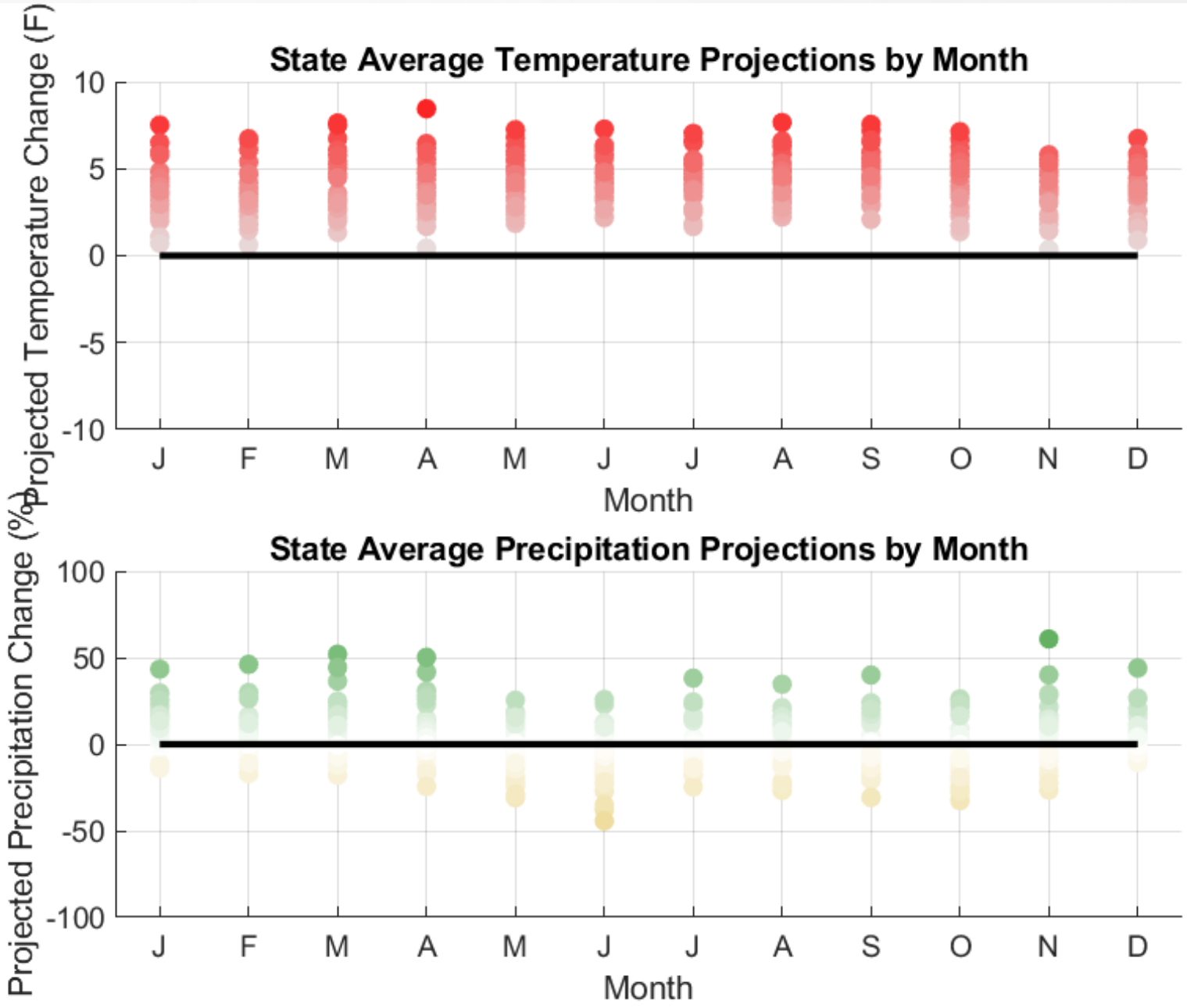
Summer Outlook





Largely trend-based. Our cold winter and spring do not guarantee a cooler summer. Our summer season shows the most consistent warming trend with less year-to-year variability than other seasons

Developing El Niño should increase odds of a wet summer, but we are also seeing a summer drying trend. Monsoon remains a bit question mark



Individual climate model projections by month (2035-2064 – 1971-2000)

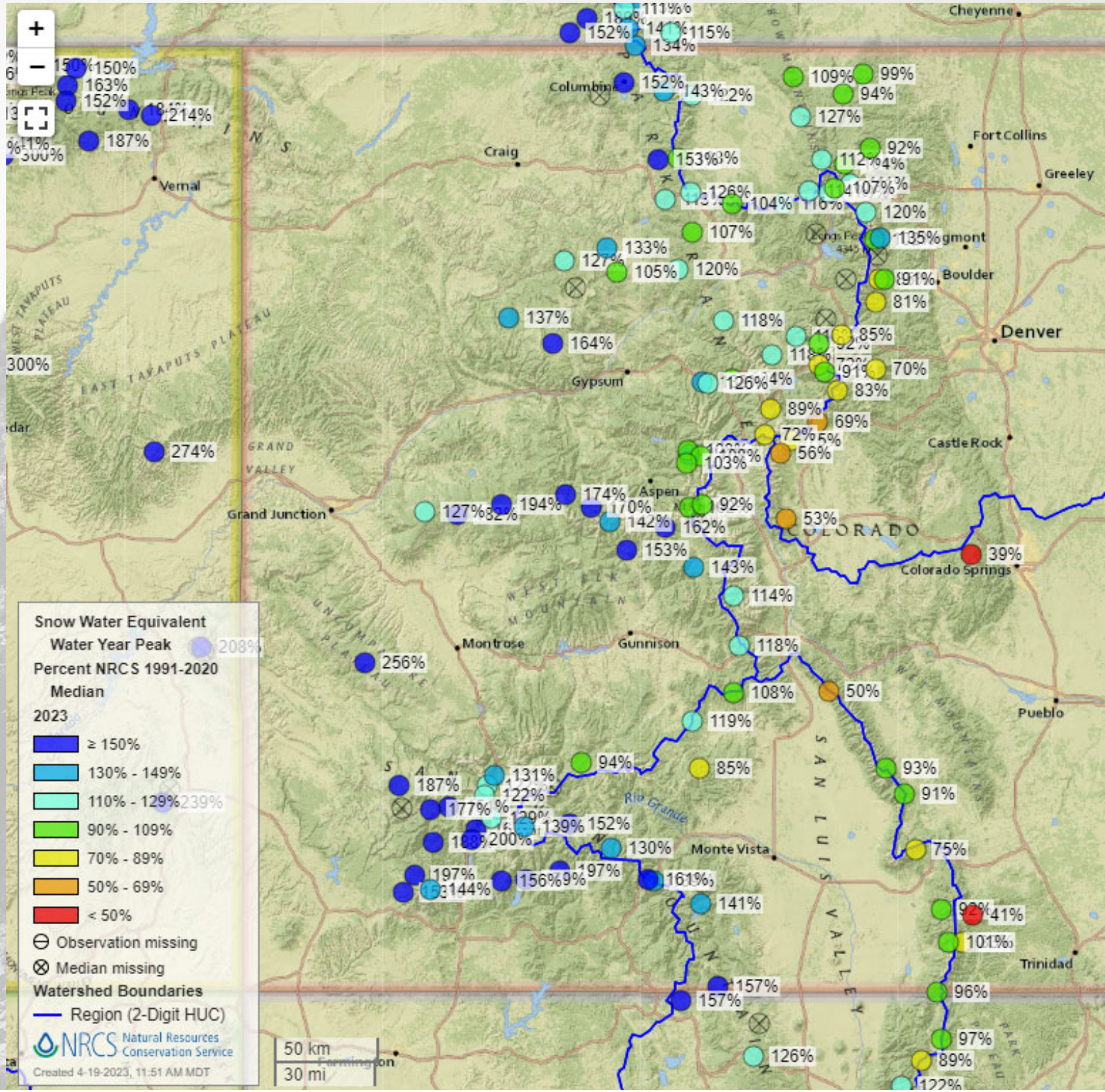
Strongest Drying projections in the state are in June

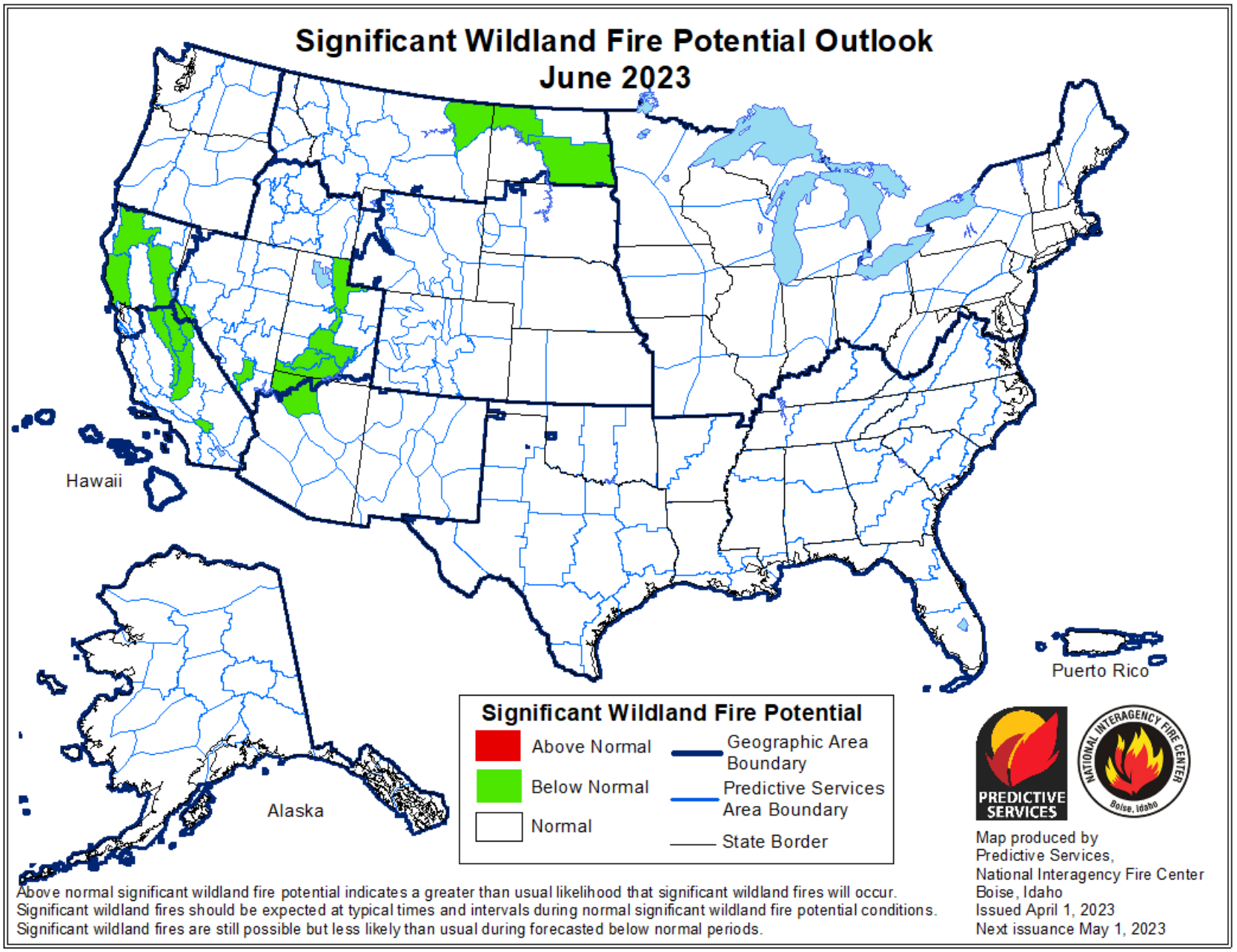
Snowpack peaked well above median values for western Colorado

This reduces our water shortage and wildfire risk this summer significantly

The Arkansas and South Platte Basins did have dry spots

More from NRCS





No elevated fire outlooks for late spring and summer

Hooray!

Flooding?

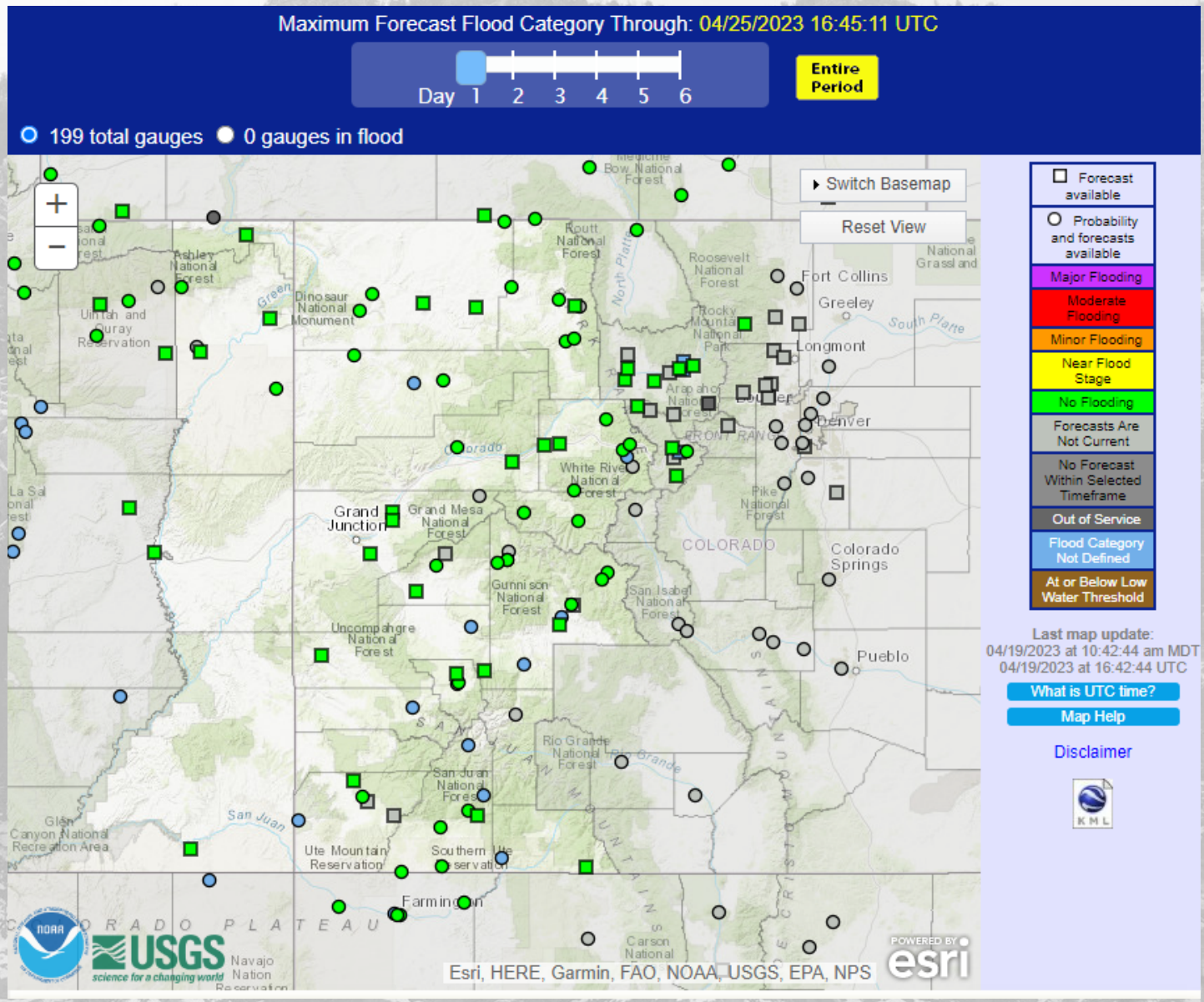
All large snowpacks have a melt surge at some point

No streamgages currently at flood stage

Mancos River Reached near flood stage after last week's heat

Early heat on high snowpack does not usually create flooding problems (exception in June 1984)

Will watch for big rain-on-snow events



Takeaways

- This water year has been consistently cooler than our most recent 1991-2020 normals. Oct-Mar have all been cooler than average statewide April looks to continue this trend.
- Snowpack has probably peaked as of last week's heatwave, but it peaked well. Water supplies in W CO will improve. More from NRCS. The eastern plains remain dry, and in need of spring moisture
- Short-term forecast shows some possible relief for the eastern plains (this weekend and next week). More uncertainty beyond
- We are not expecting cooler than normal conditions to continue into the summer, but even if summer is warm, what is on the ground now reduces our odds of fires and water shortages (for most)
- With this large snowpack, we'll be watching for rain-on-snow and high heat events with potential to trigger flooding. It is normal for big snowpacks to melt in bursts

Colorado Climate Center

Thanks, and let's keep in touch!

Peter Goble – peter.goble@colostate.edu
Russ Schumacher – russ.Schumacher@colostate.edu
Becky Bolinger – becky.bolinger@colostate.edu
Zach Schwalbe – zach.Schwalbe@colostate.edu

Viewing this, and previous WATF Briefings:
http://climate.colostate.edu/ccc_archive.html

COLORADO CLIMATE CENTER

Colorado State University
Knowledge to Go Places