Colorado Climate Update

Russ Schumacher, state climatologist

Water Availability Task Force

May 25, 2023

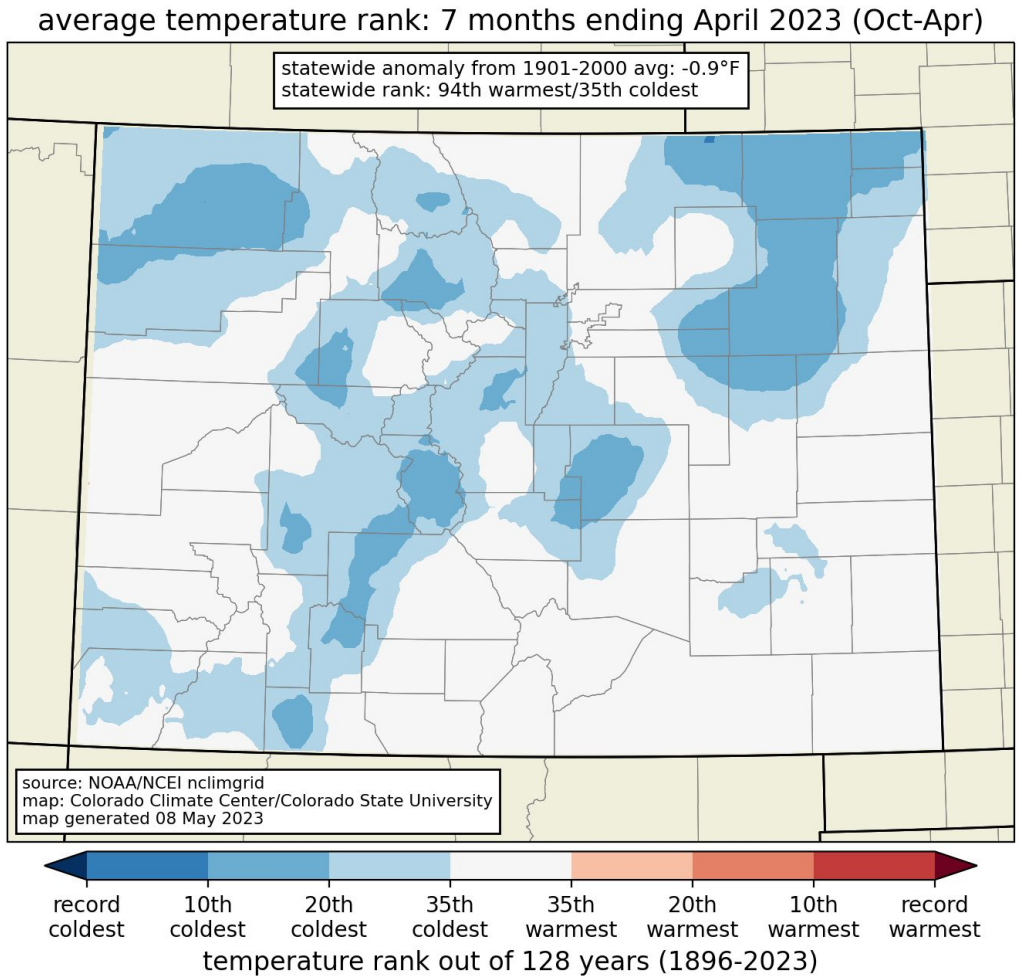
COLORADO CLIMATE CENTER

ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY

Water year 2023 to date:

temperature, precipitation, evaporative demand

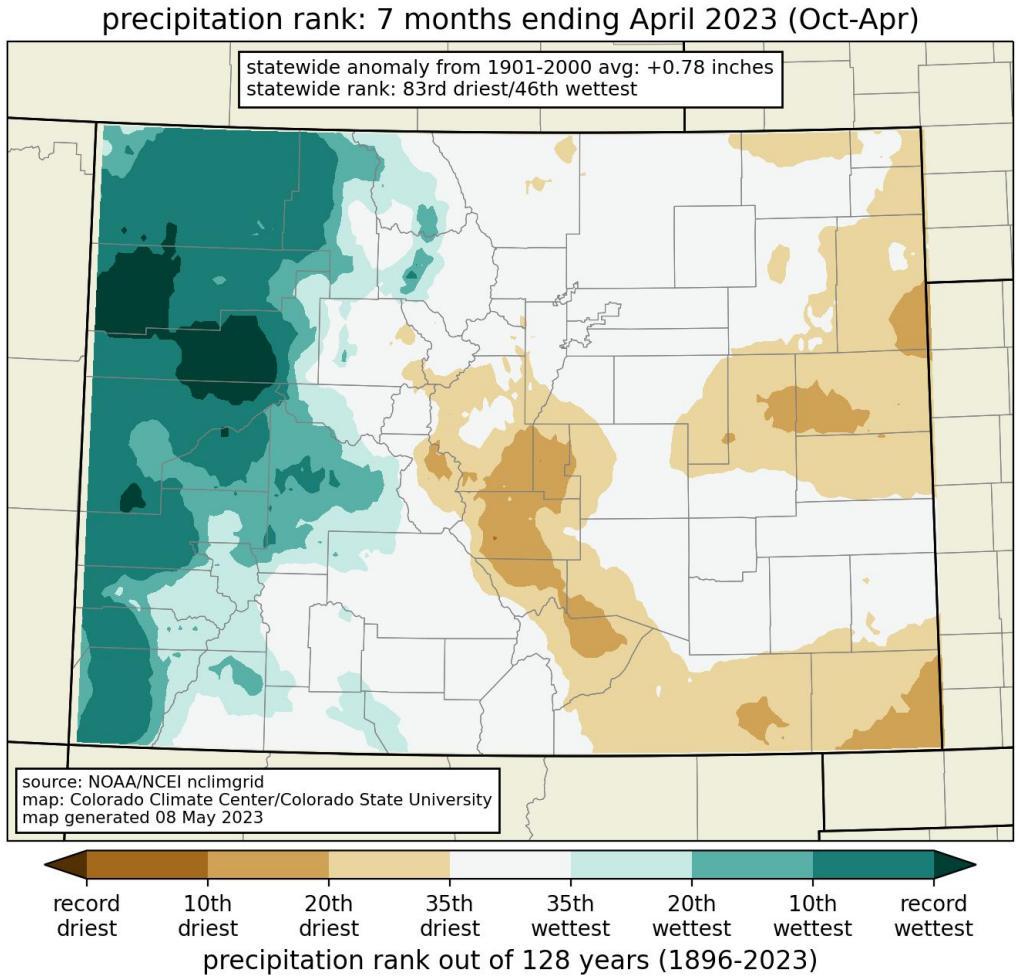
May 9, from Loveland



Colorado rankings:

Month	T Rank (of 128 years)	Above, below, or near 20th century avg?
Oct	45th warmest	near avg
Nov	29th coolest	below
Dec	52nd coolest	near avg
Jan	55th coolest	near avg
Feb	41st coolest	below
Mar	22nd coolest	below
Apr	41st coolest	below

Statewide: four-way tie for 31st coldest October-April (out of 128), coolest start to a water year since 1984



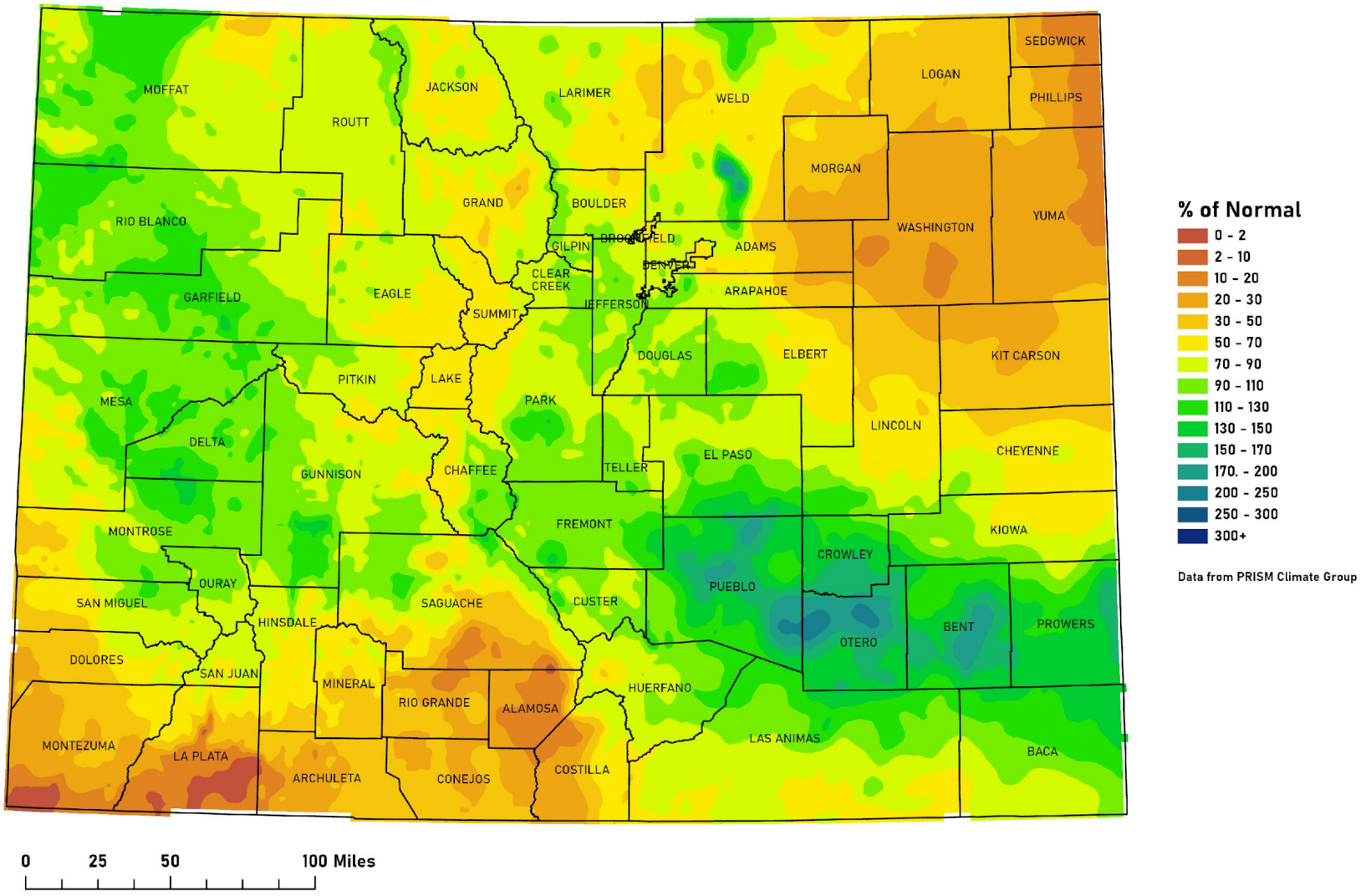
Colorado rankings:

Month	P Rank (of 128 years)	Above, below, or near 20th century avg?
Oct	63rd driest	near avg
Nov	52nd driest	near avg
Dec	20th wettest	above
Jan	10th wettest	much above
Feb	61st driest	near avg
Mar	32nd wettest	above
Apr	37th driest	below avg

Statewide: 46th wettest October-April (out of 128), wettest start to a water year since 2019

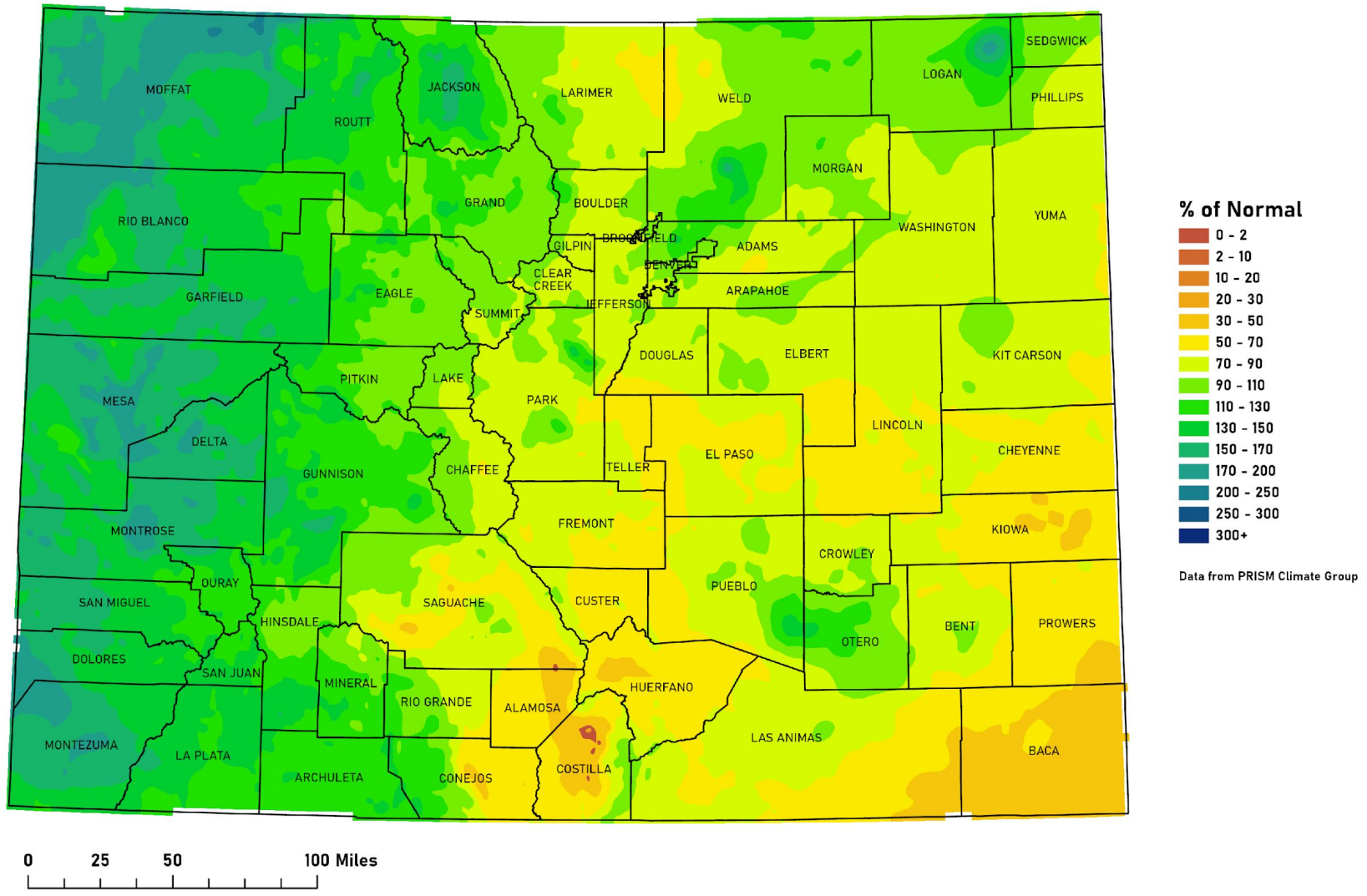
Colorado April 2023 Precipitation as a Percentage of Normal

COLORADO CLIMATE CENTER



October 2022 – April 2023 Precipitation as a Percentage of Normal

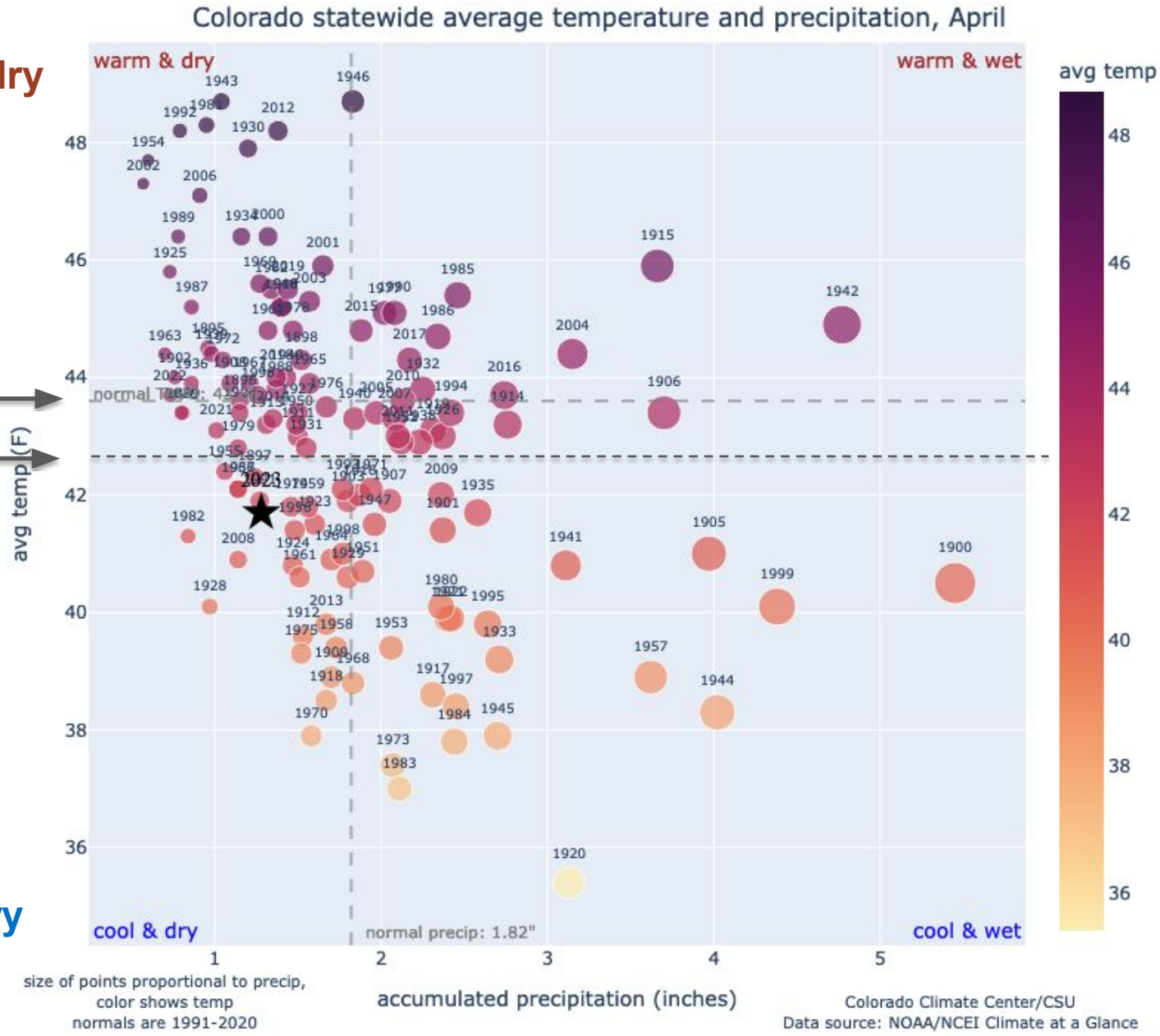
COLORADO CLIMATE CENTER



Warm & dry

Warm & wet

April 2023



1991-2020 avg temp

1901-2000 avg temp

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

Cool & dry

Cool & wet

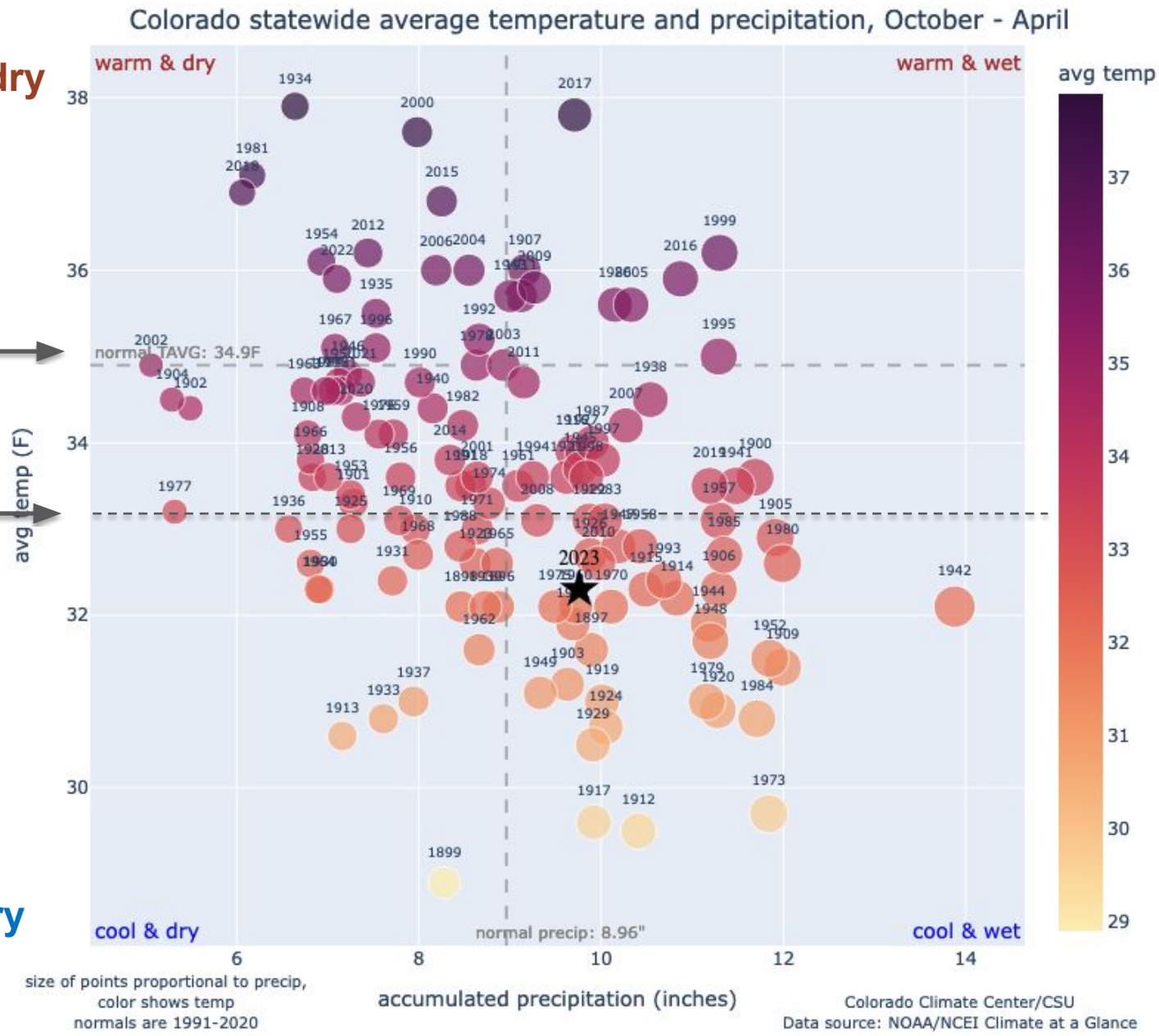
Warm & dry

Warm & wet

Water year 2023 through April

1991-2020 avg temp →

1901-2000 avg temp →



Cool & dry

Cool & wet

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

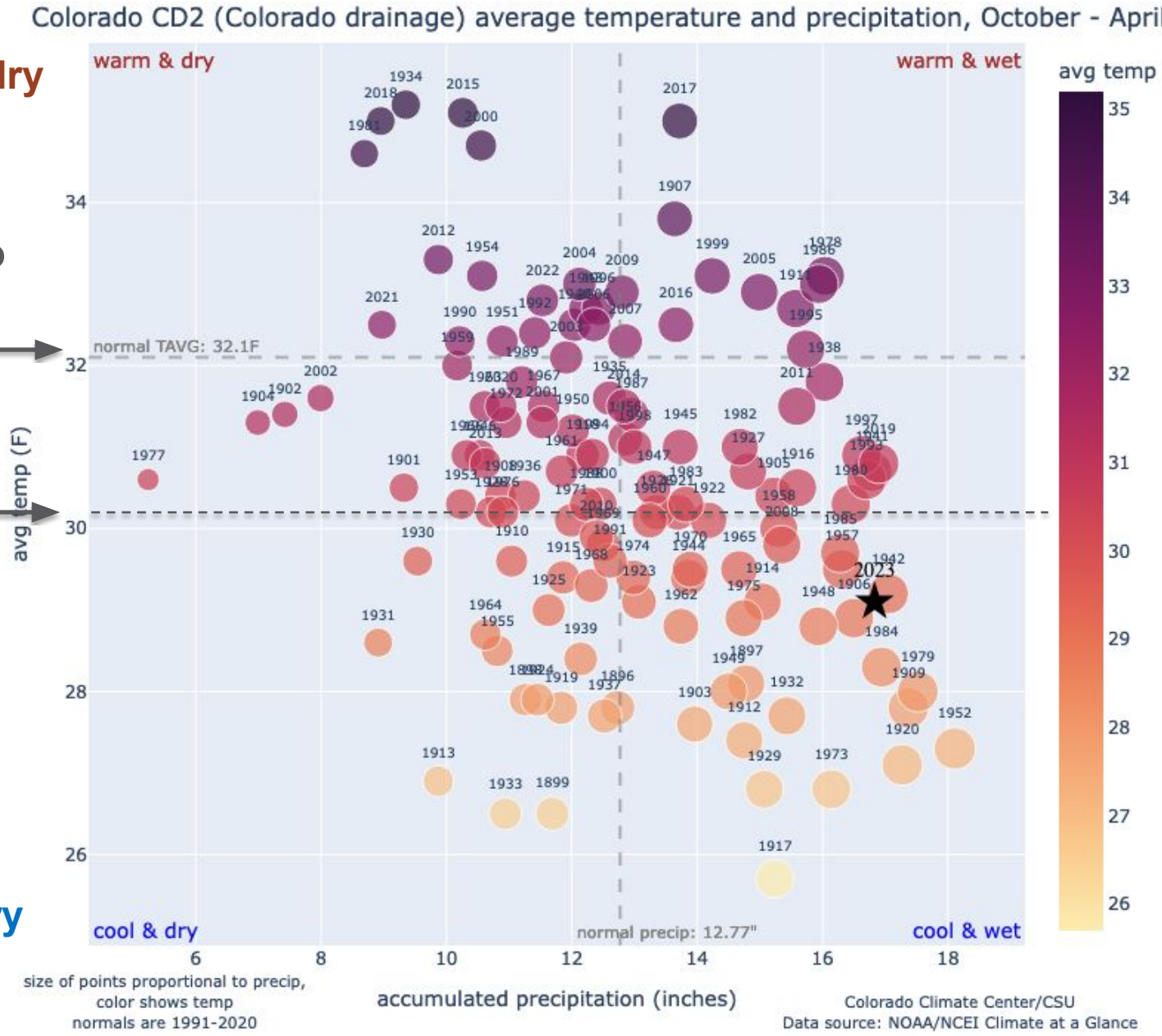
Warm & dry

Warm & wet

Water year 2023 through April: Western Colorado

1991-2020 avg temp →

1901-2000 avg temp →

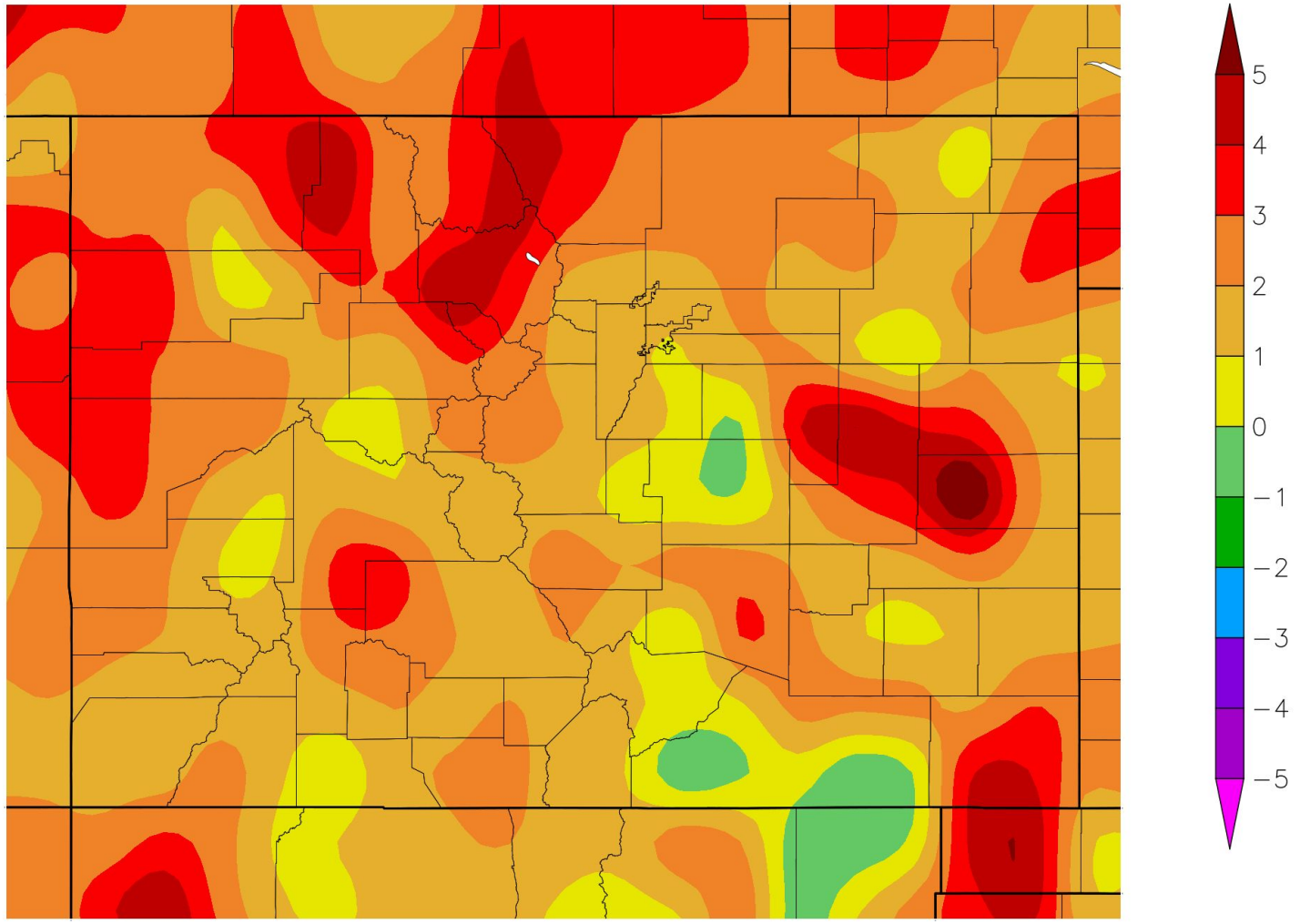


https://climate.colostate.edu/co_cag/quadrant.html

Cool & dry

Cool & wet

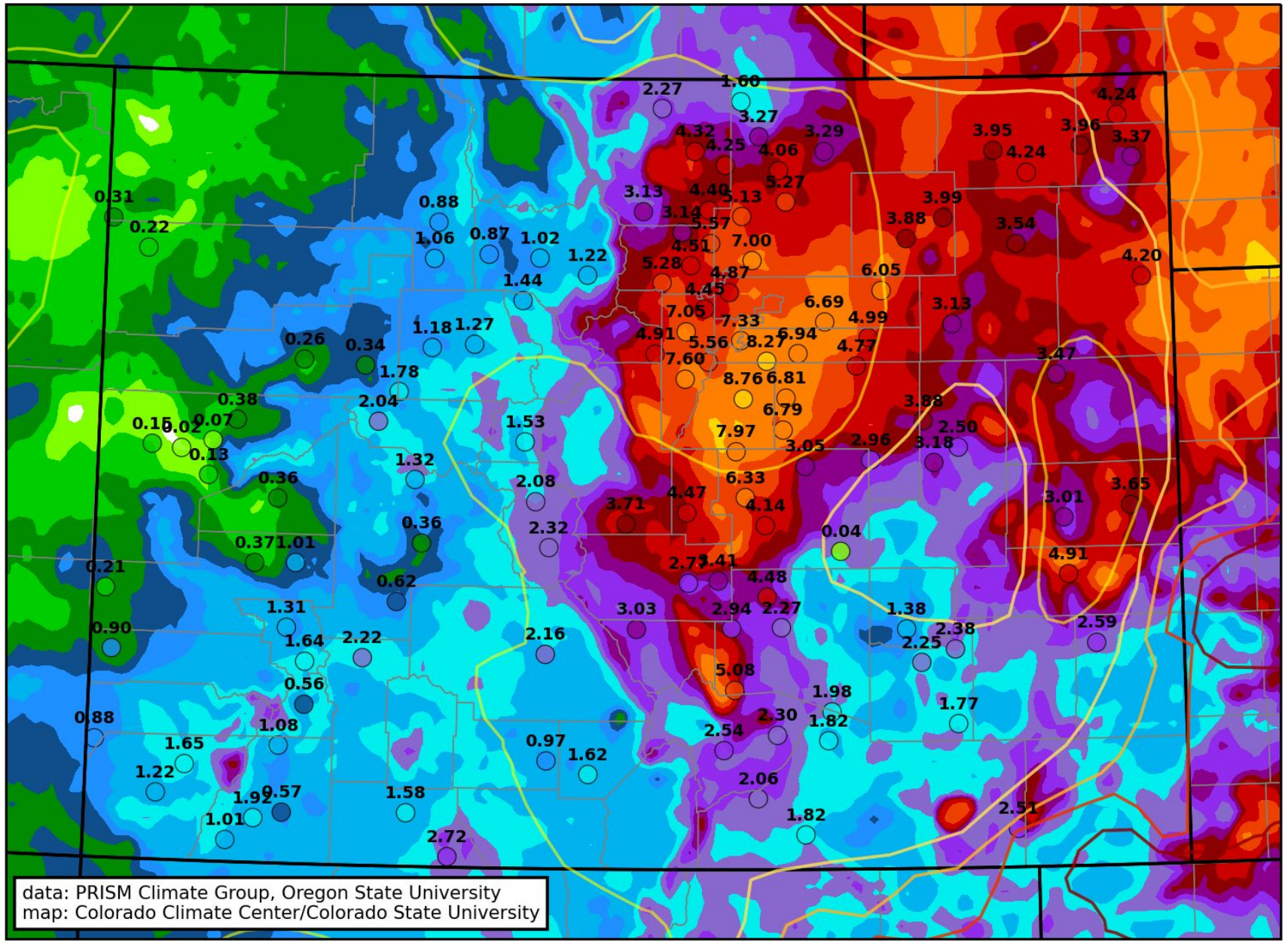
Departure from Normal Temperature (F)
5/1/2023 – 5/23/2023



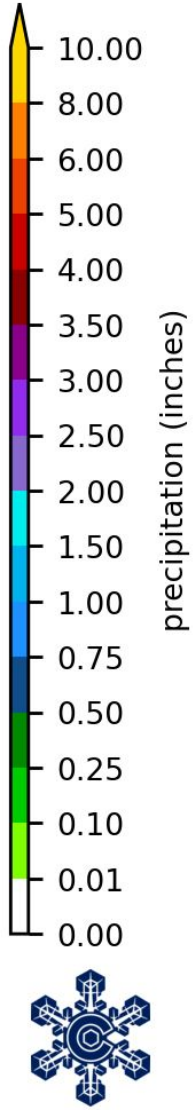
Generated 5/24/2023 at HPRCC using provisional data.

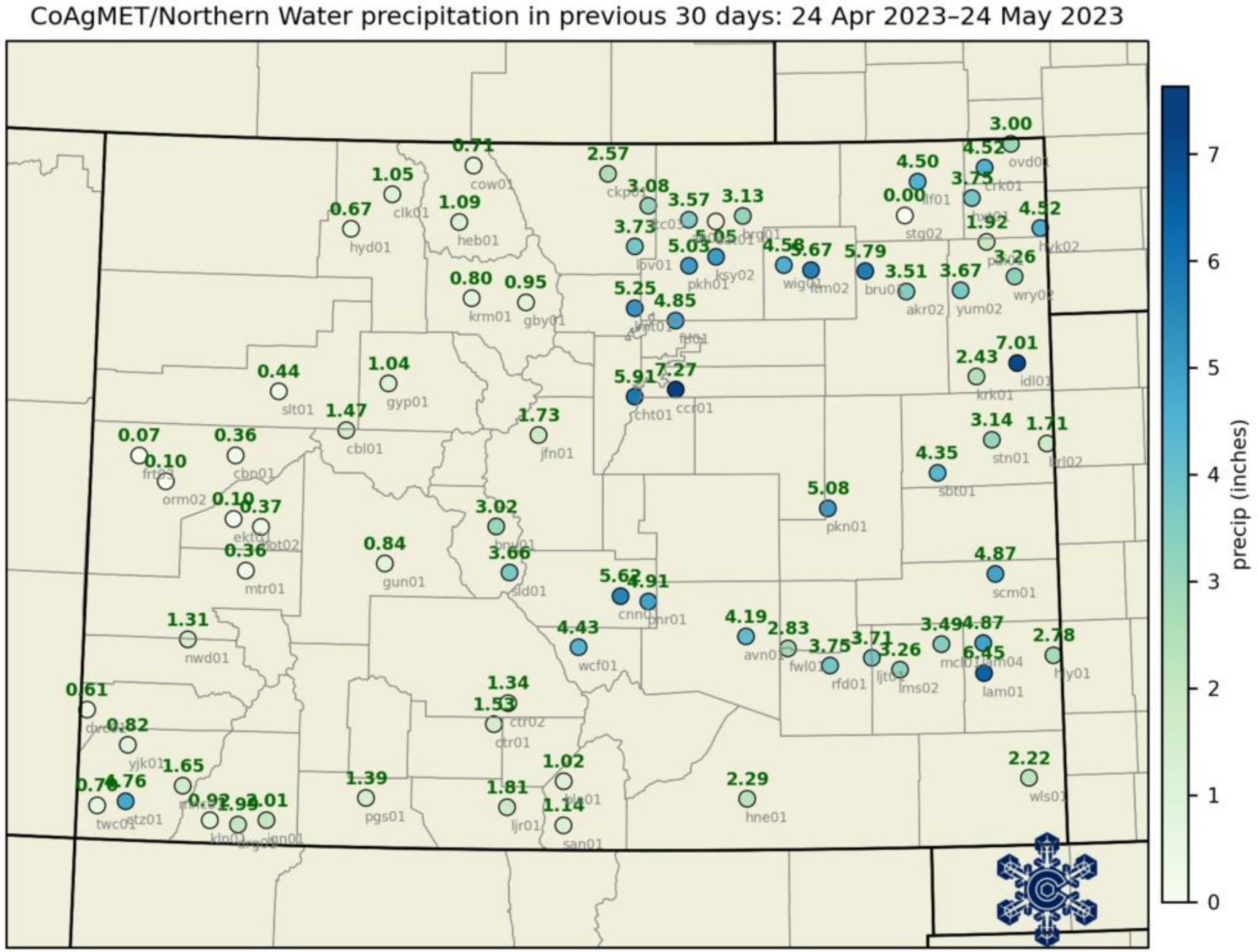
NOAA Regional Climate Centers

PRISM and CoCoRaHS month-to-date precipitation, US Drought Monitor through 5:00am MST Wed 24 May 2023

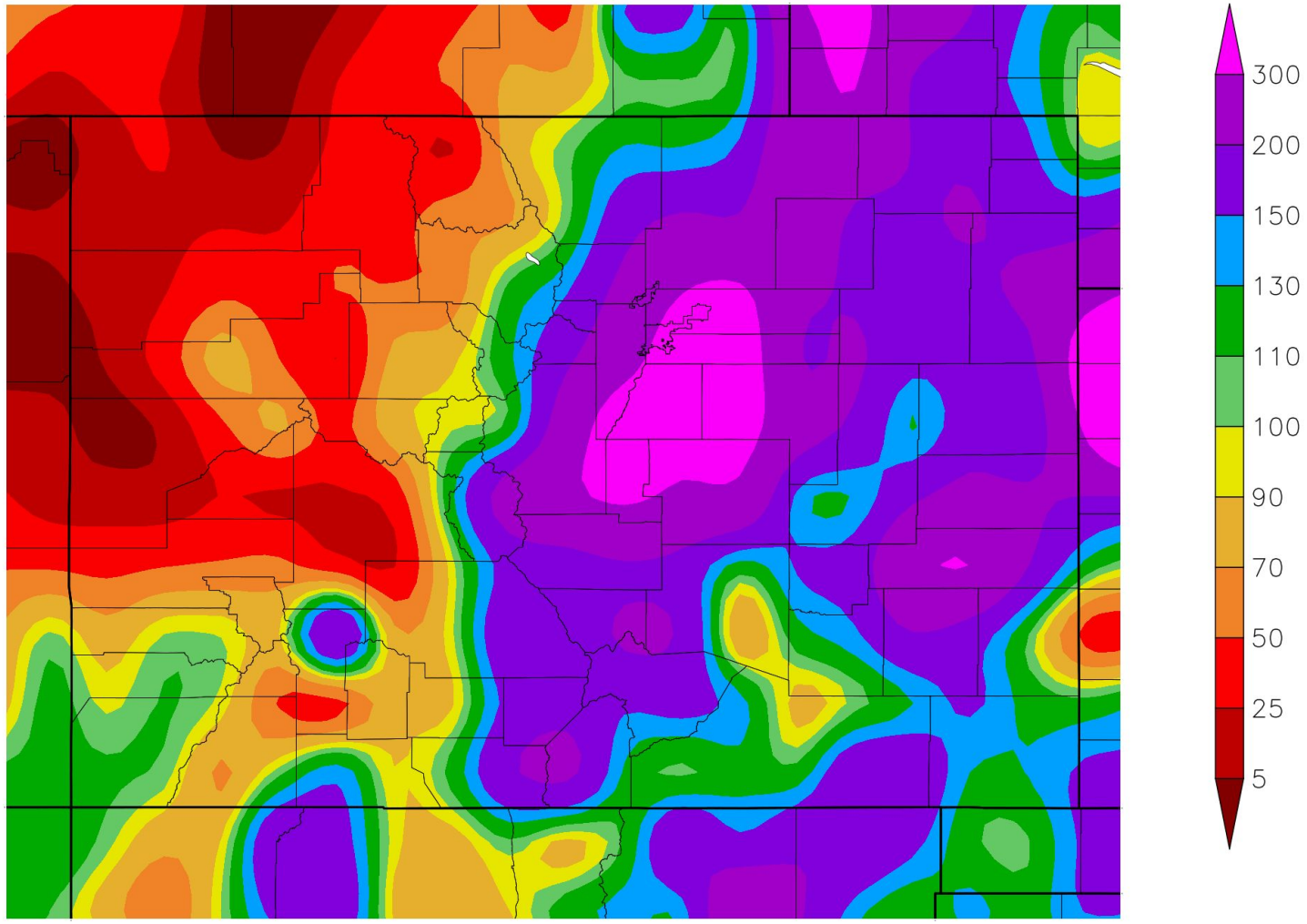


March precipitation through Tuesday morning




CoAgMET/Northern Water precipitation in previous 30 days: 24 Apr 2023–24 May 2023
precip (inches)
0
1
2
3
4
5
6
7
0.71
cow01
1.05
clk01
0.67
hyd01
1.09
heb01
2.57
3.08
3.57
3.13
3.73
5.03
4.58
3.67
5.79
3.51
3.67
4.50
3.75
0.00
stg02
3.00
4.52
ovd01
crk01
4.52
1.92
3.26
0.80
krm01
0.95
gby01
5.25
4.85
pkh01
ksy02
bru01
akr02
yum02
wry02
7.01
2.43
idl01
krk01
0.44
slt01
1.04
gyp01
1.47
cbl01
5.91
7.27
cht01
1.73
jfn01
3.14
1.71
stn01
0.07
0.10
frt01
0.36
cbn01
4.35
sbt01
orm02
0.10
0.37
ekt01
5.08
pkn01
3.02
0.84
gun01
0.36
mtr01
3.66
sld01
4.87
scm01
5.62
4.91
cnn01
1.31
nwd01
4.43
wcf01
4.19
2.83
3.75
3.71
3.26
3.49
4.87
6.45
2.78
rfd01
lms02
lam01
hly01
0.61
0.82
yjk01
1.34
1.53
ctr02
ctr01
1.65
0.76
4.76
twc01
gtz01
0.92
1.95
3.01
1.39
pgs01
1.81
ljr01
1.02
1.14
san01
2.29
hne01
2.22
wls01

Percent of Normal Precipitation (%)
5/1/2023 – 5/23/2023



Generated 5/24/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

Heavy rainfall stats for May

Denver:

•2.92” on May 11, wettest single day since 1973, 8th wettest day overall (records since 1872; wettest single day was 6.5” on 5/22/1876

•3.75” over two days (May 11-12), 2nd wettest 2-day period in Denver records

•4.40” over three days from May 10-12, 3rd wettest 3-day period in Denver records

•Already the 6th wettest May even if no more rain falls, wettest since 1973

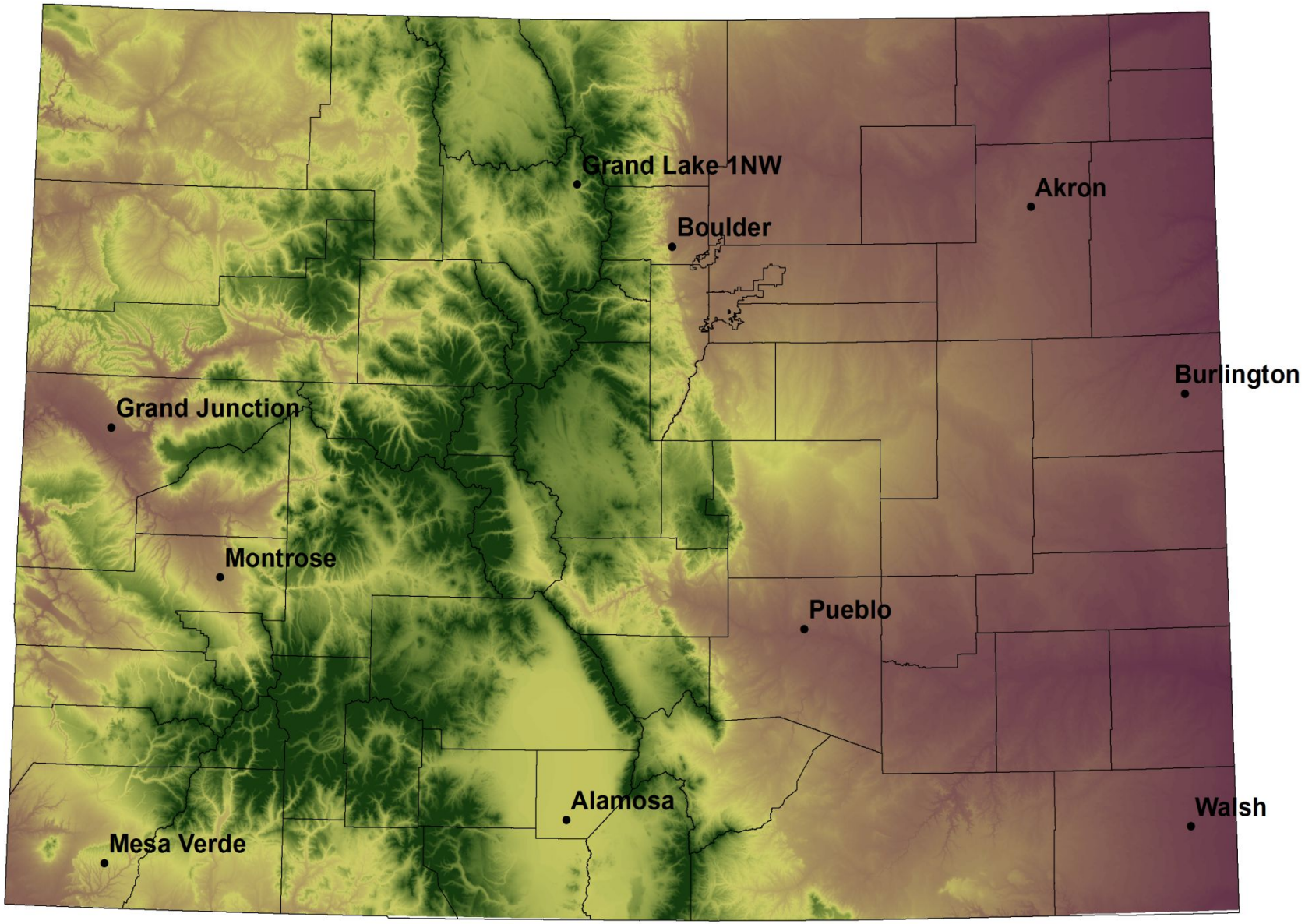
Colorado Springs:

- 3.18” on May 11, 7th wettest day on record; wettest single day in May
- 3.77” over two days (May 10-11); wettest 2-day period for May
- Already the 10th wettest May even if no more rain falls, wettest since 2015

Unusual to have such heavy rainfall in both locations from the same event – COS is not typically so wet in May whereas Denver northward is

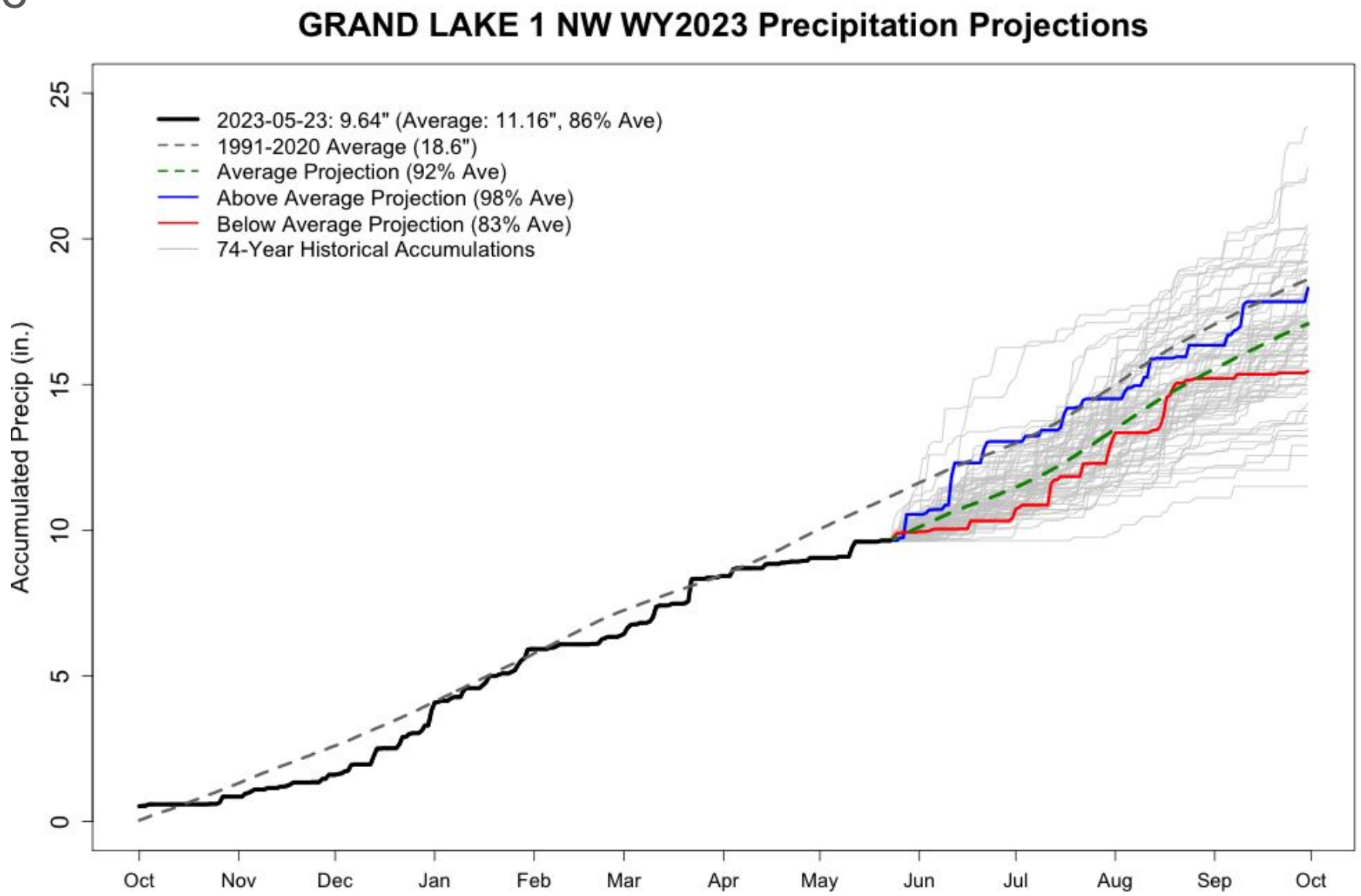
COLORADO CLIMATE CENTER

NWS Cooperative Stations for WATF

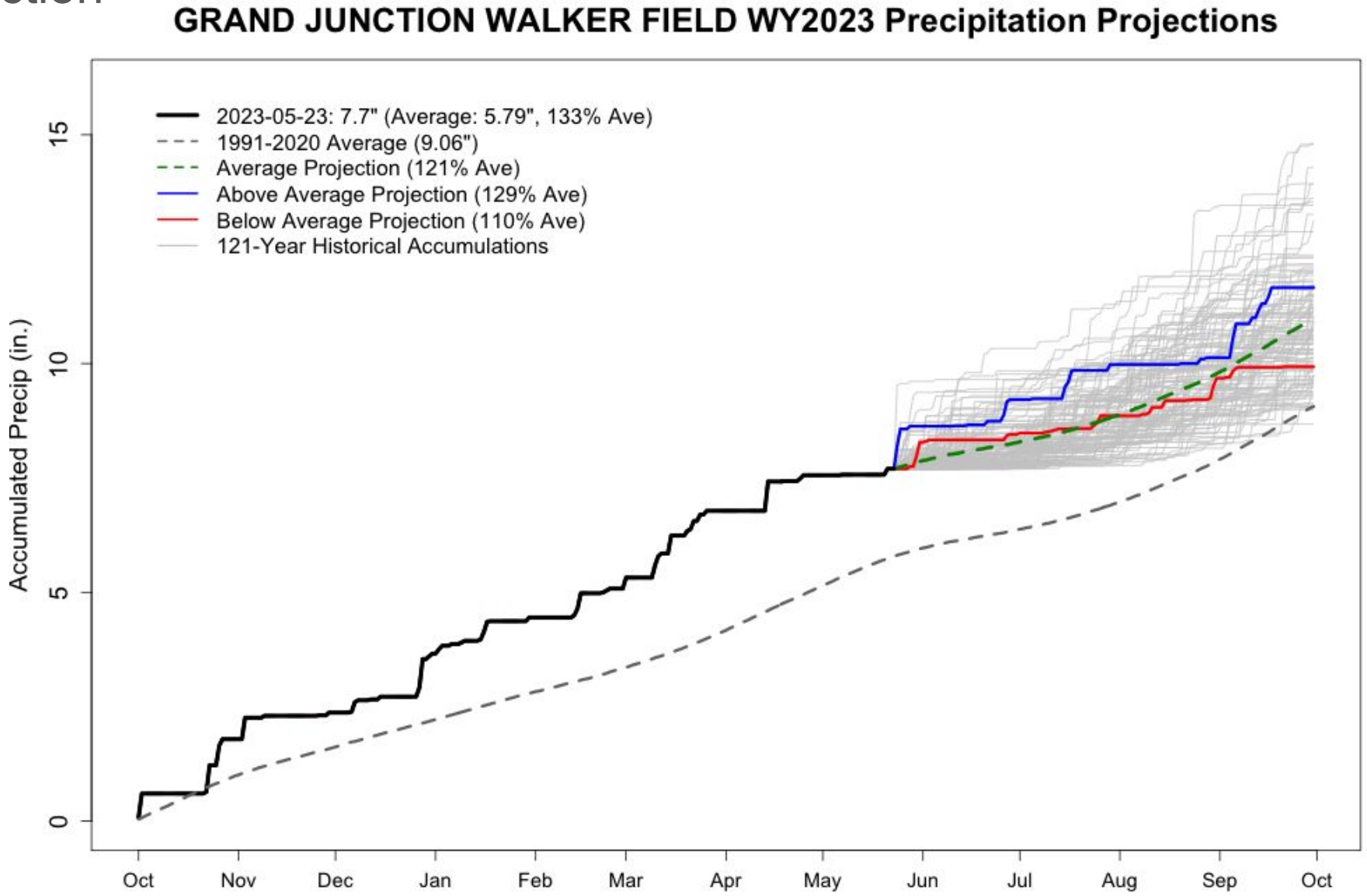


Water Year 2023 – Station Updates

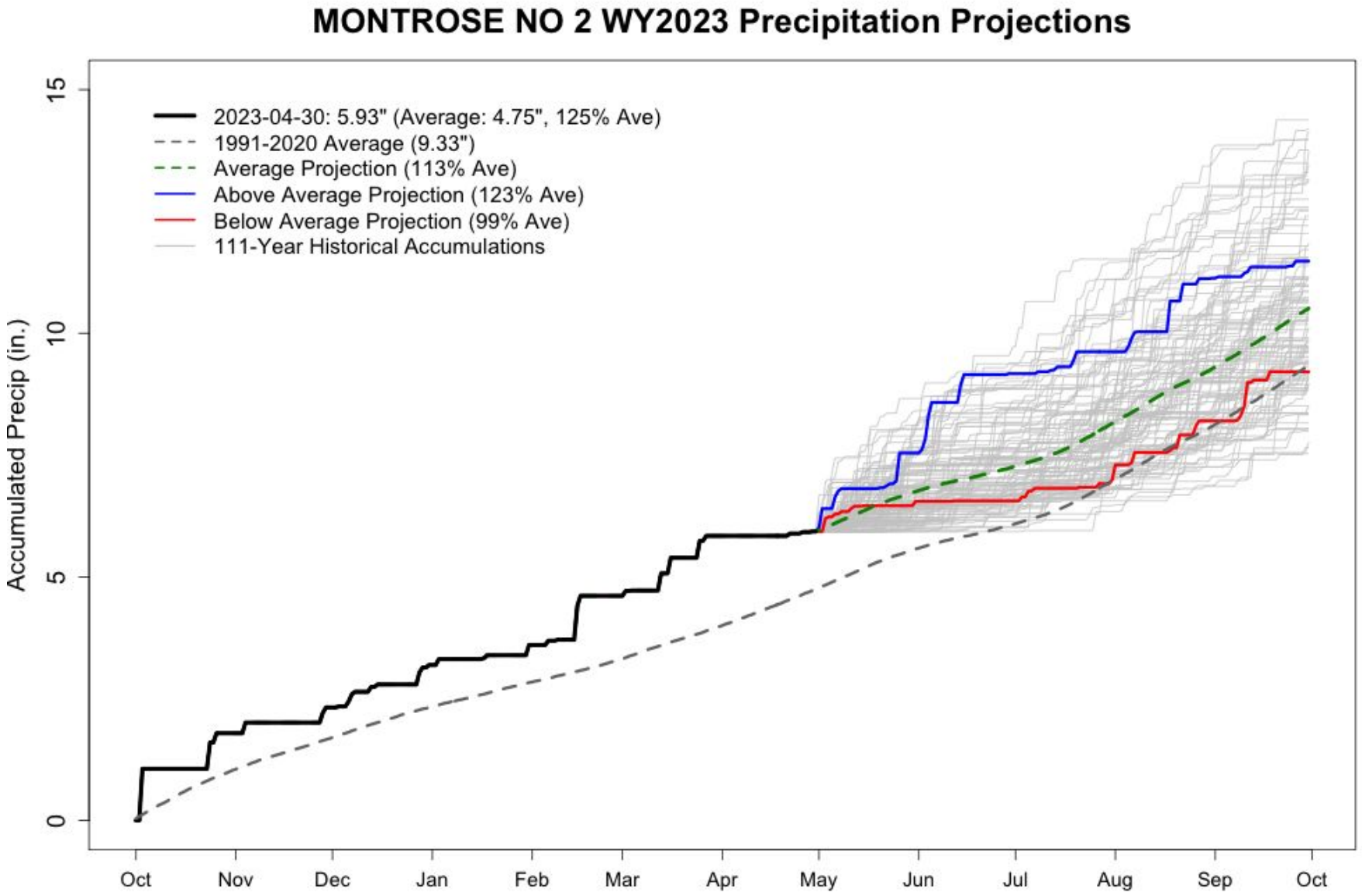
Grand Lake


GRAND LAKE 1 NW WY2023 Precipitation Projections
2023-05-23: 9.64" (Average: 11.16", 86% Ave)
1991-2020 Average (18.6")
Average Projection (92% Ave)
Above Average Projection (98% Ave)
Below Average Projection (83% Ave)
74-Year Historical Accumulations
Accumulated Precip (in.)
0
5
10
15
20
25
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct

Grand Junction

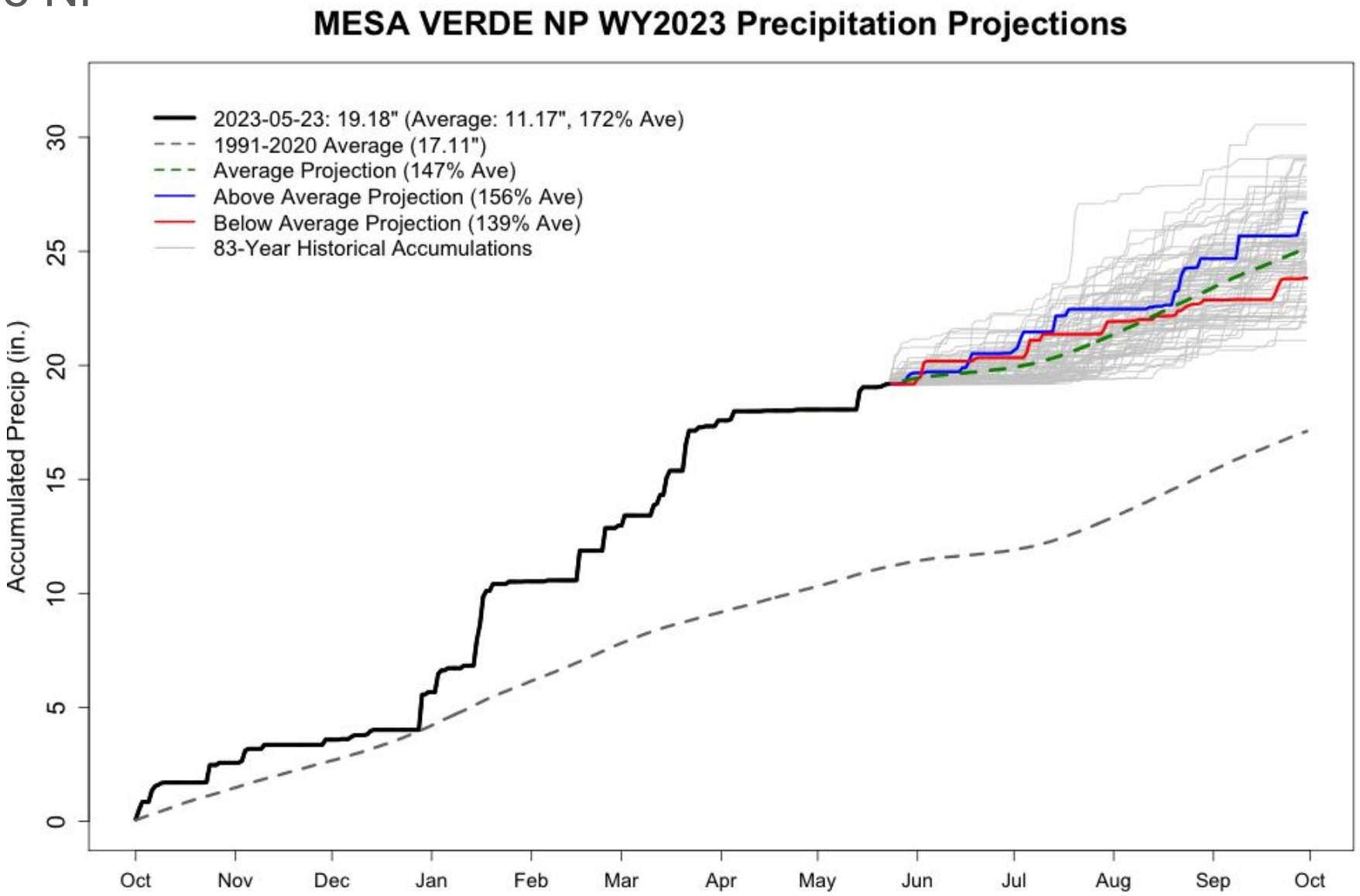


Montrose



Note: data only through end of April

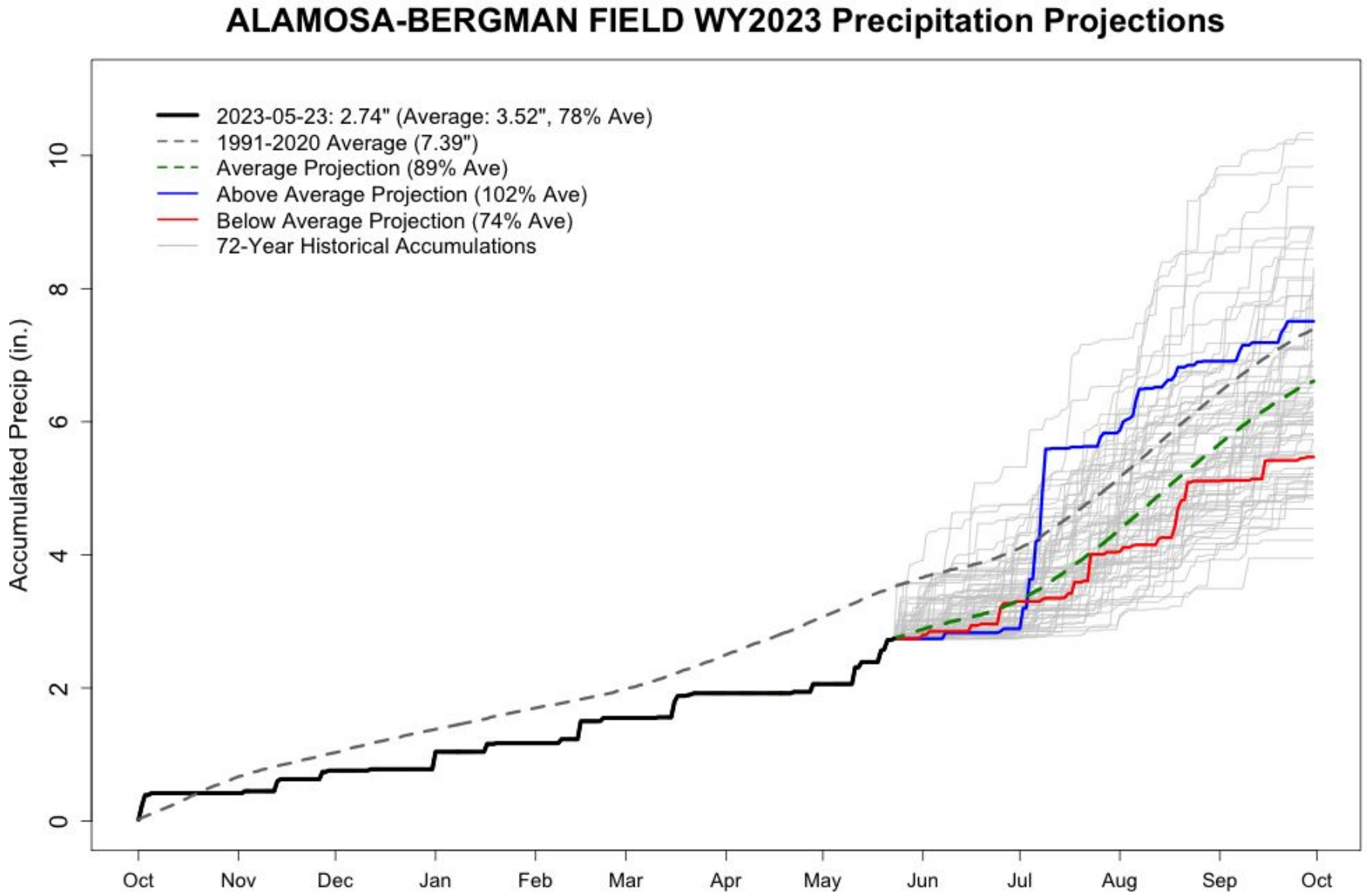
Mesa Verde NP



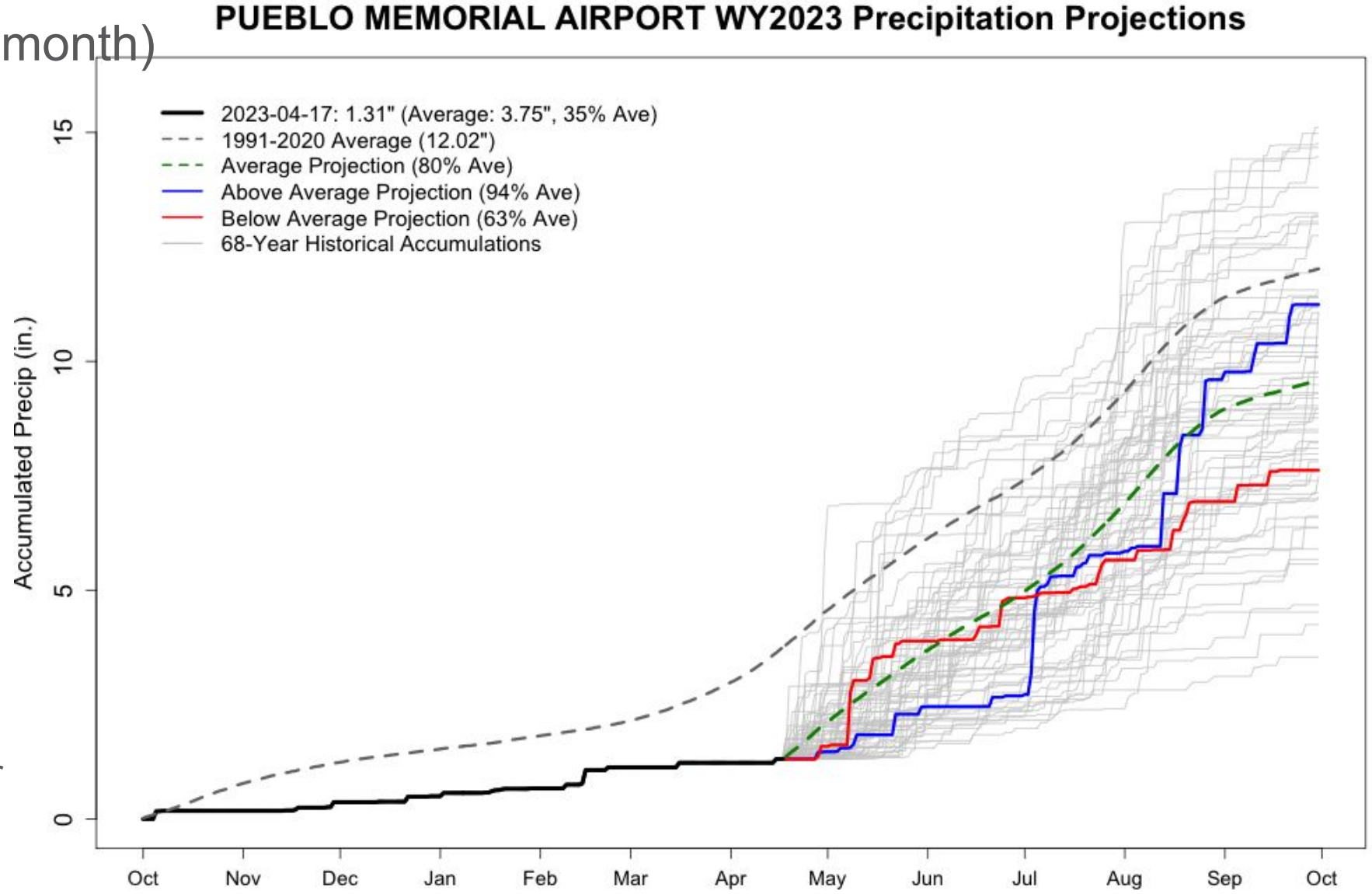
4th wettest water year to date

>2” more than the average for the full water year, with the monsoon yet to come!

Alamosa

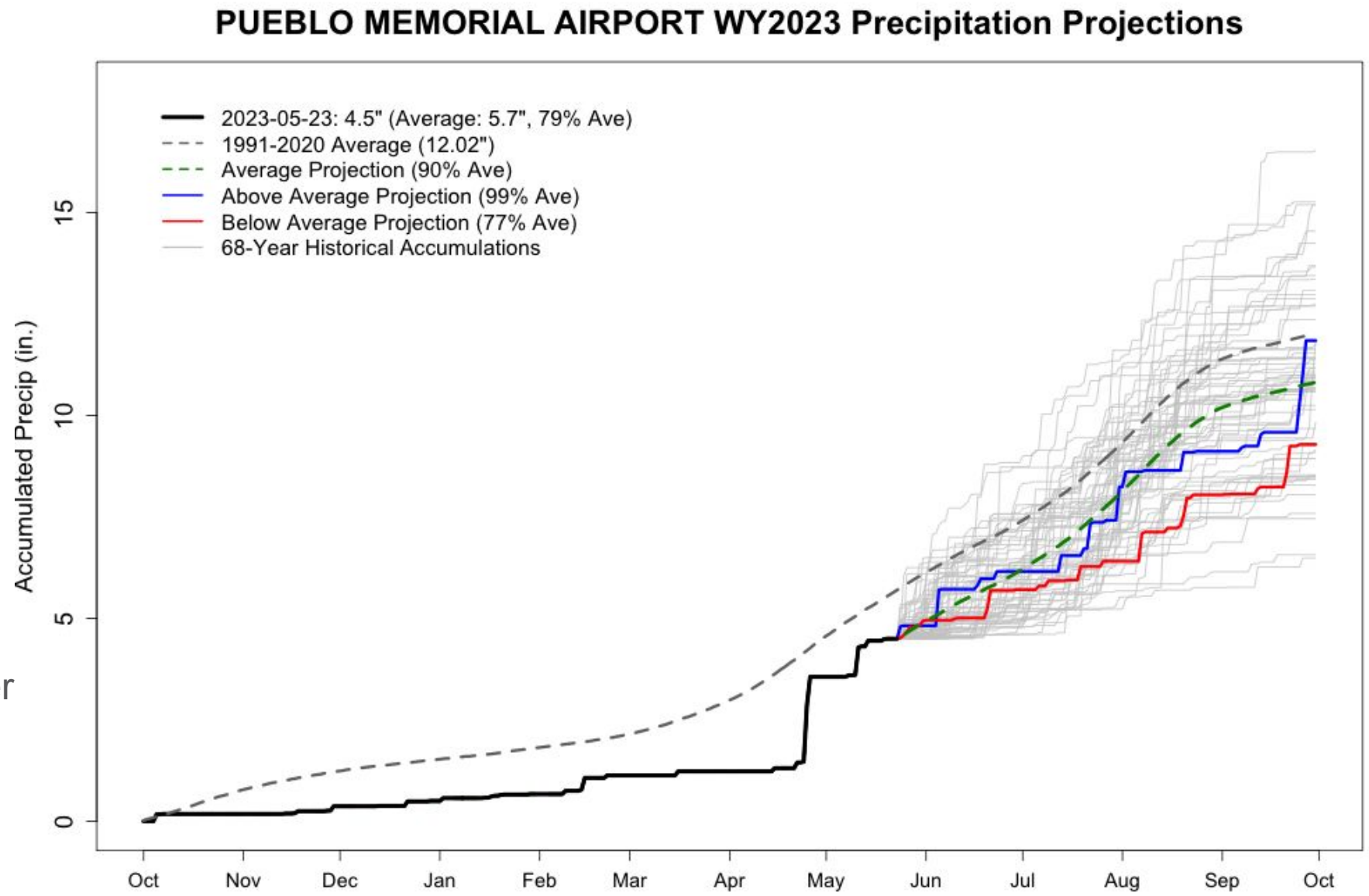

ALAMOSA-BERGMAN FIELD WY2023 Precipitation Projections
2023-05-23: 2.74" (Average: 3.52", 78% Ave)
1991-2020 Average (7.39")
Average Projection (89% Ave)
Above Average Projection (102% Ave)
Below Average Projection (74% Ave)
72-Year Historical Accumulations
Accumulated Precip (in.)
0
2
4
6
8
10
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct

Pueblo
(as of last month)



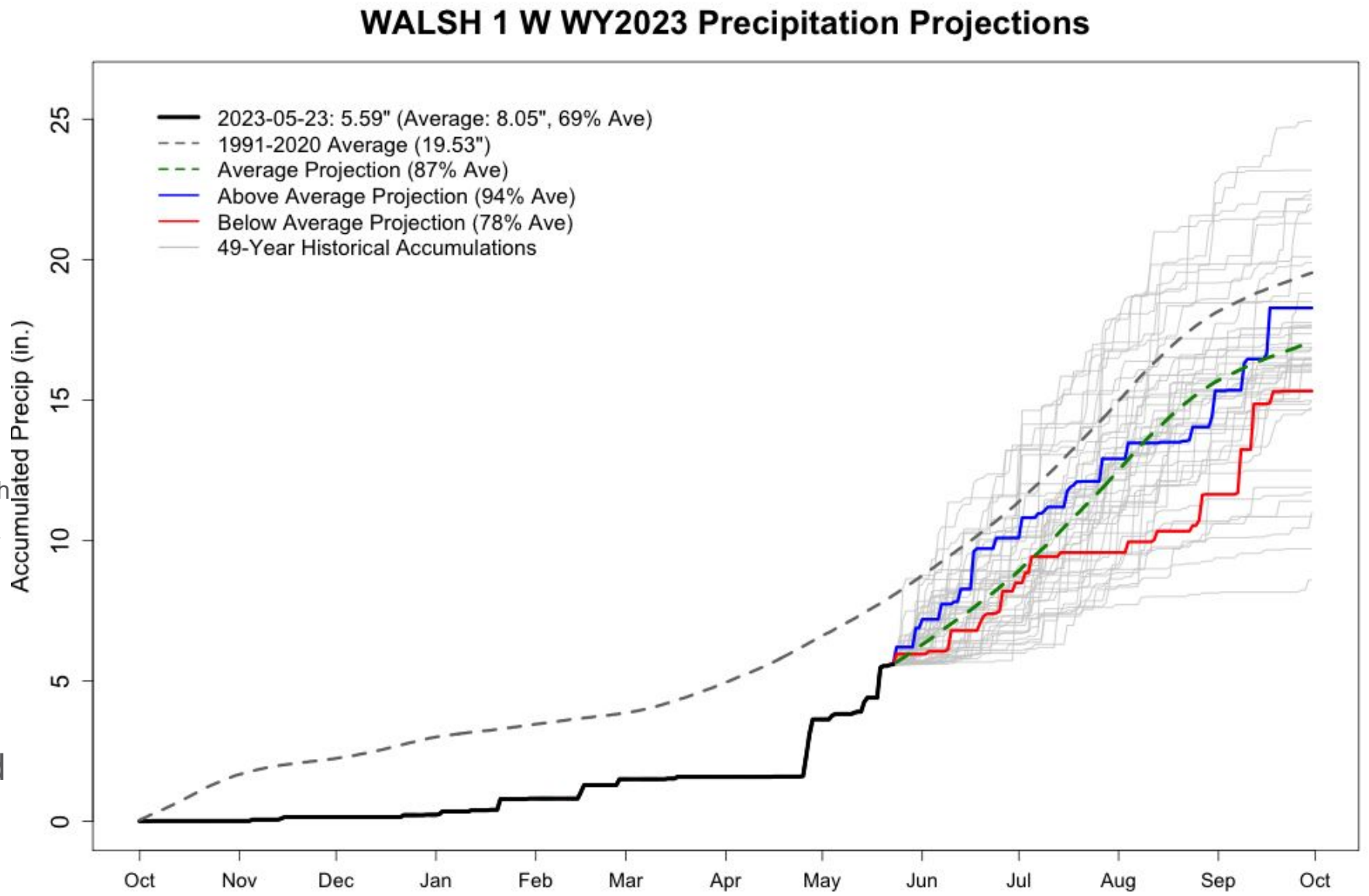
As of last meeting: 3rd driest water year to date

Pueblo



Now much closer to average!

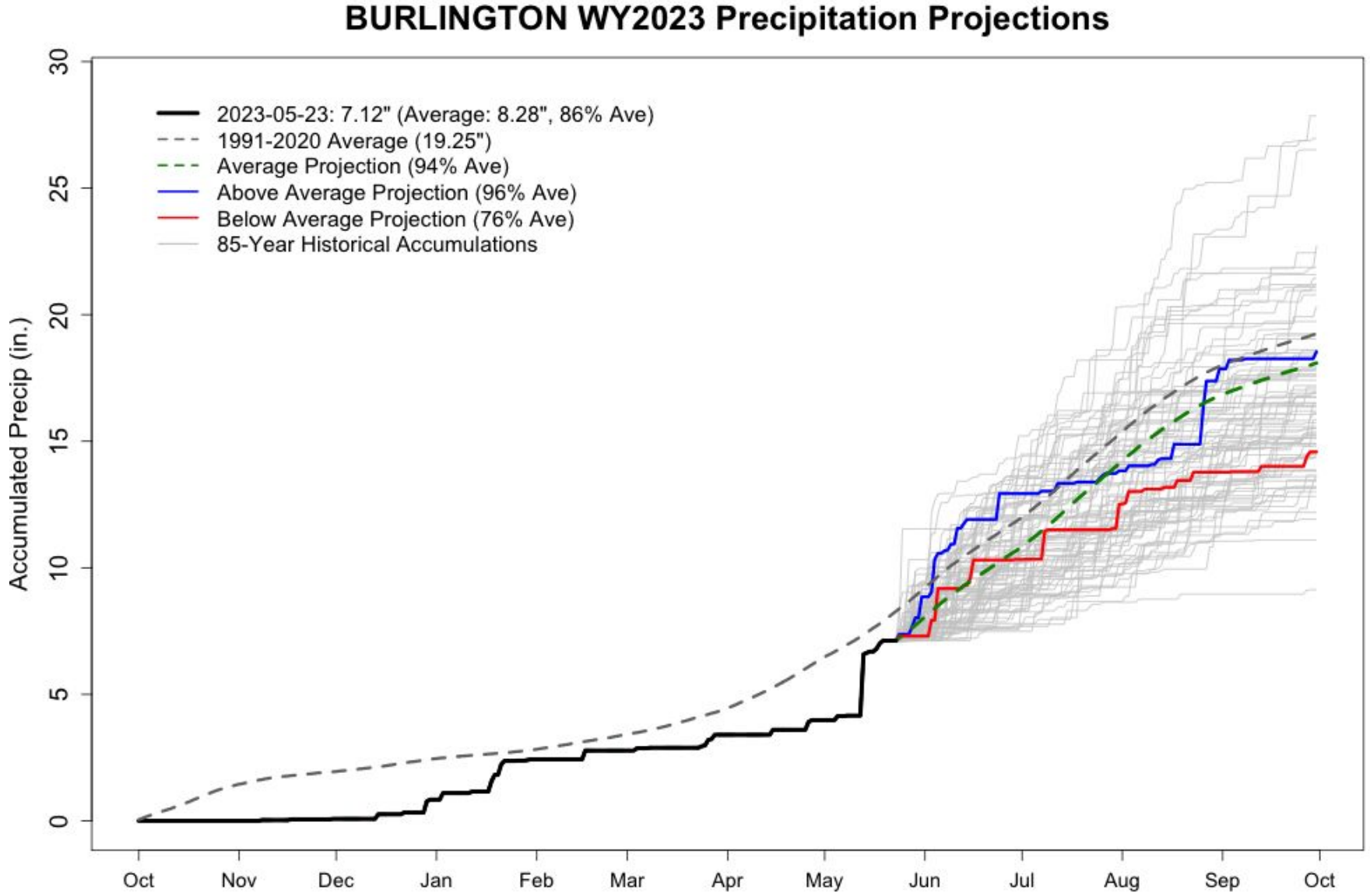
Walsh



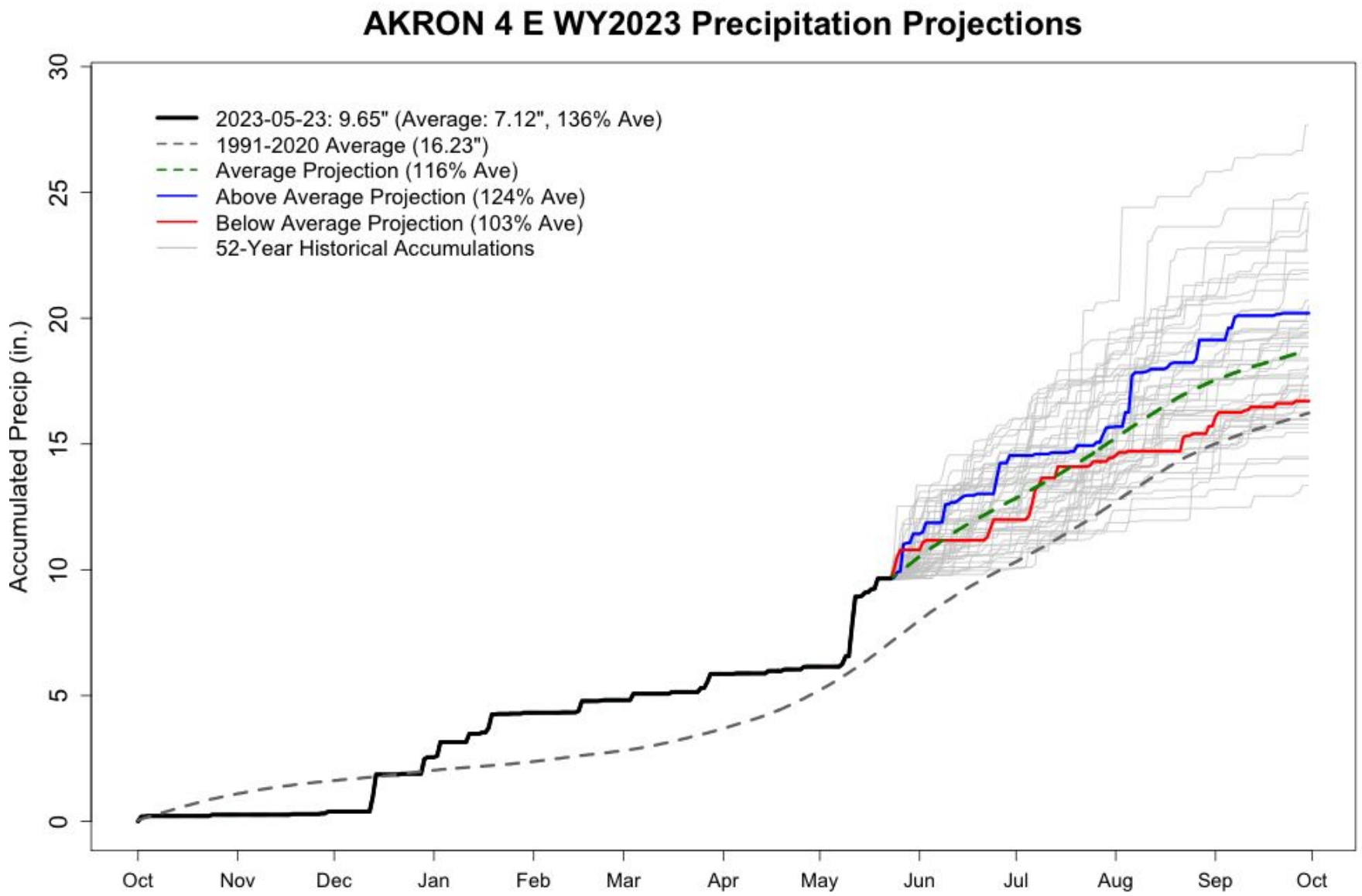
At last month's meeting in mid-April, was 4th driest water year to date

Still below average, but much closer, and with the wet season still to come

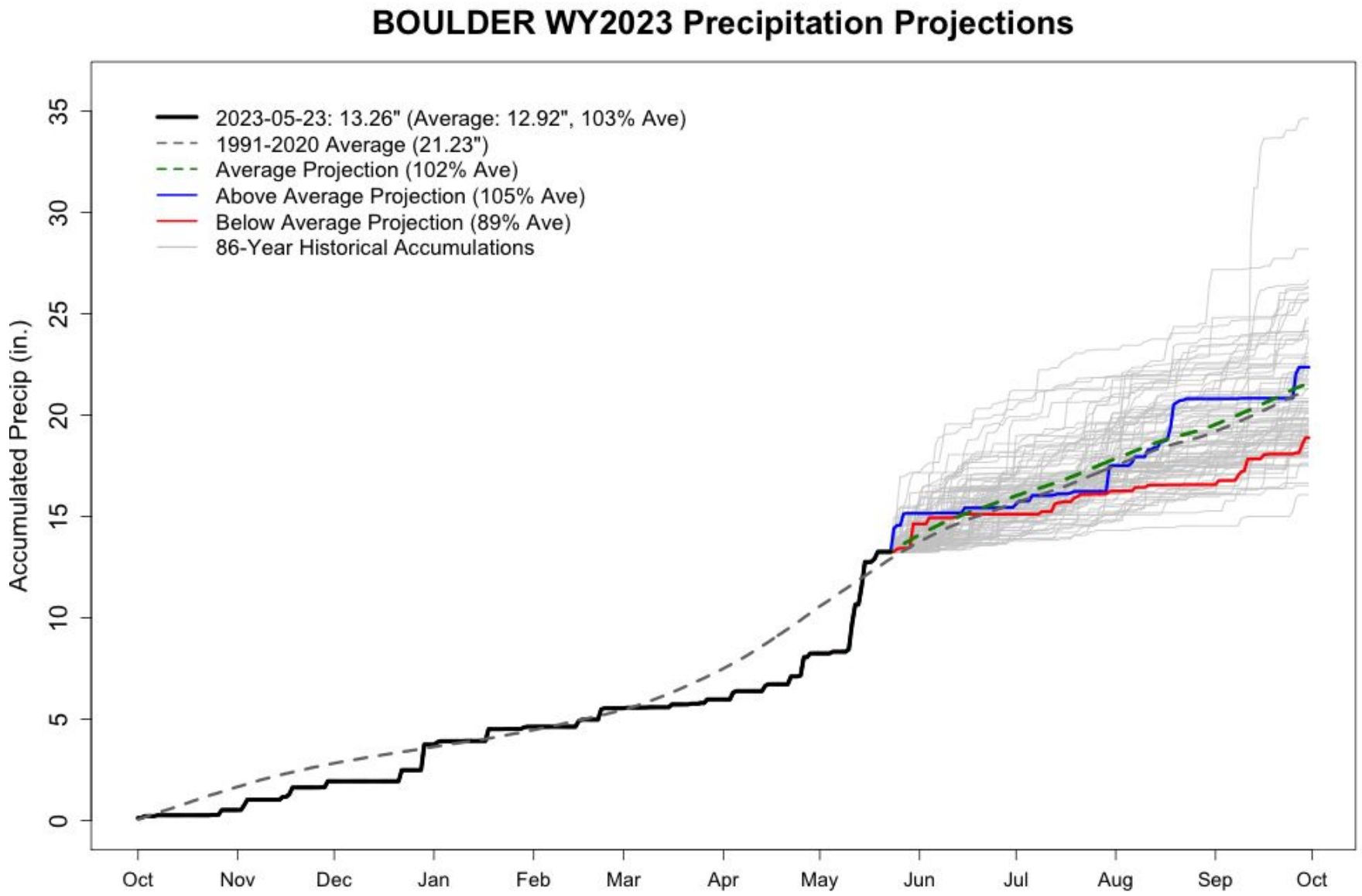
Burlington


BURLINGTON WY2023 Precipitation Projections
2023-05-23: 7.12" (Average: 8.28", 86% Ave)
1991-2020 Average (19.25")
Average Projection (94% Ave)
Above Average Projection (96% Ave)
Below Average Projection (76% Ave)
85-Year Historical Accumulations
Accumulated Precip (in.)
0
5
10
15
20
25
30
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct

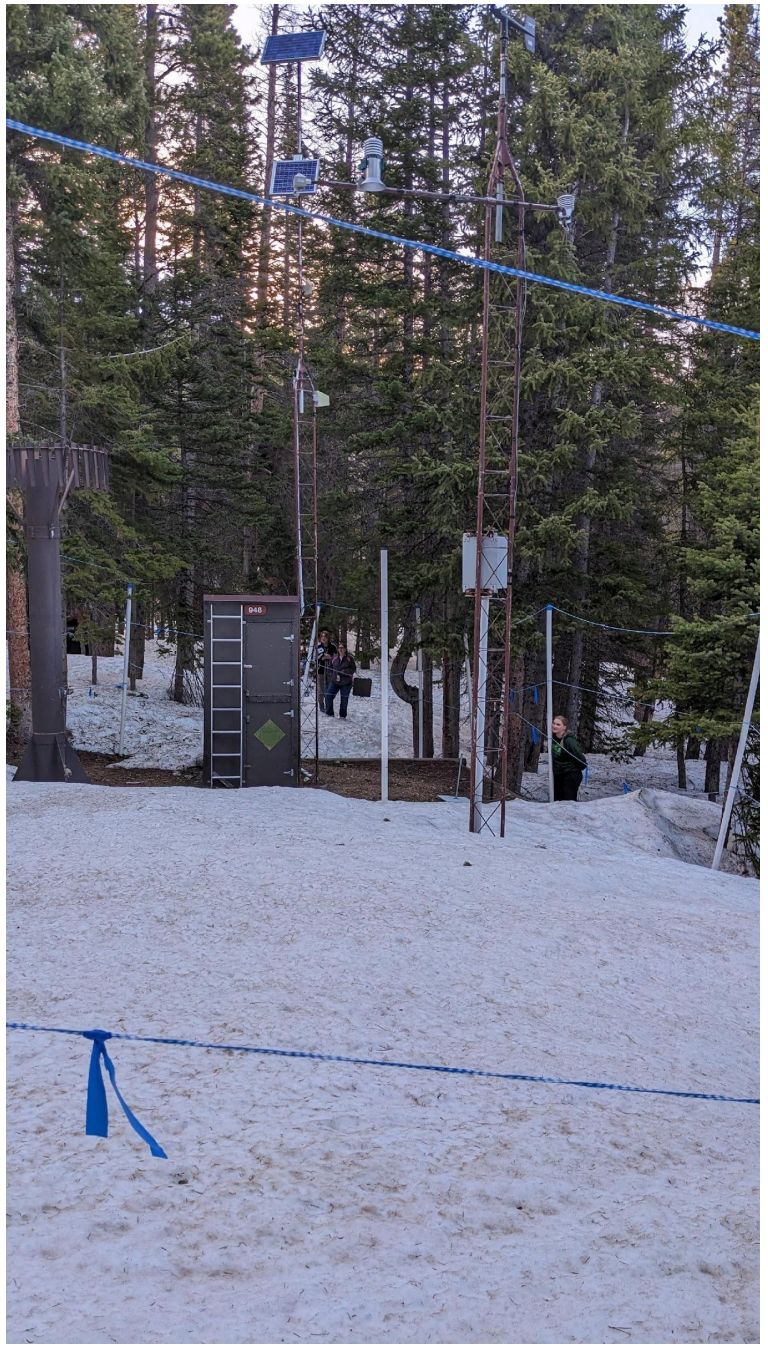
Akron


AKRON 4 E WY2023 Precipitation Projections
2023-05-23: 9.65" (Average: 7.12", 136% Ave)
1991-2020 Average (16.23")
Average Projection (116% Ave)
Above Average Projection (124% Ave)
Below Average Projection (103% Ave)
52-Year Historical Accumulations
Accumulated Precip (in.)
0
5
10
15
20
25
30
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct

Boulder


BOULDER WY2023 Precipitation Projections
2023-05-23: 13.26" (Average: 12.92", 103% Ave)
1991-2020 Average (21.23")
Average Projection (102% Ave)
Above Average Projection (105% Ave)
Below Average Projection (89% Ave)
86-Year Historical Accumulations
Accumulated Precip (in.)
0
5
10
15
20
25
30
35
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct

Drought conditions



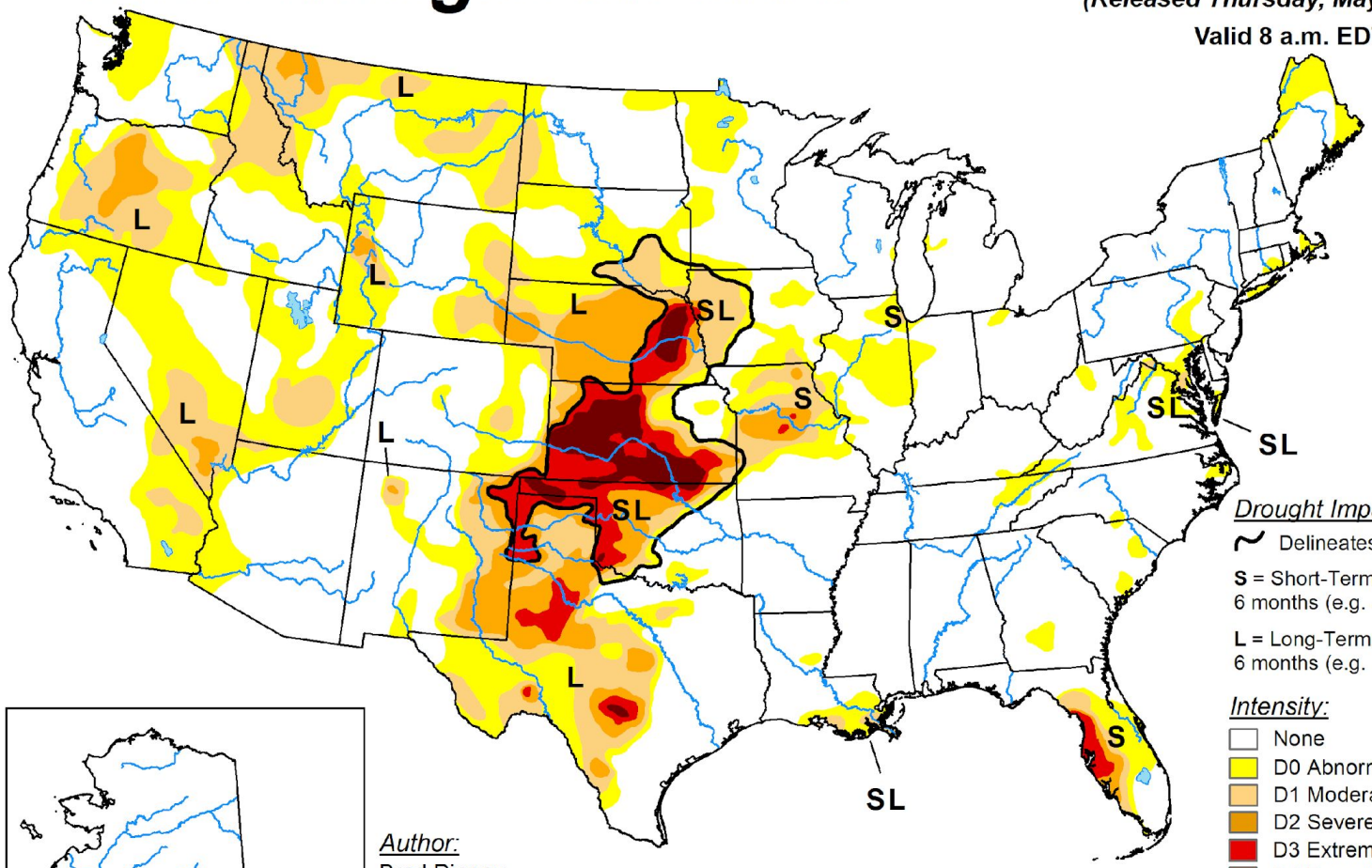
Bear Lake SNOTEL
Last Tuesday (May 16)
13.1” of SWE (95% of median)
Now down to 8.1” of SWE

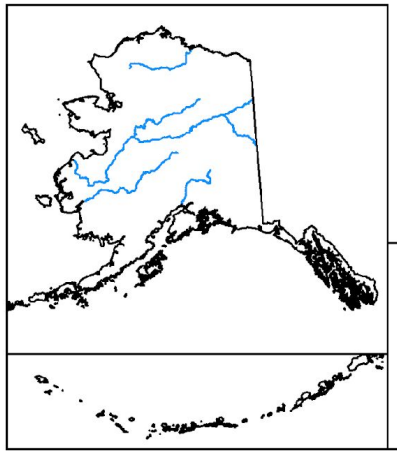
U.S. Drought Monitor

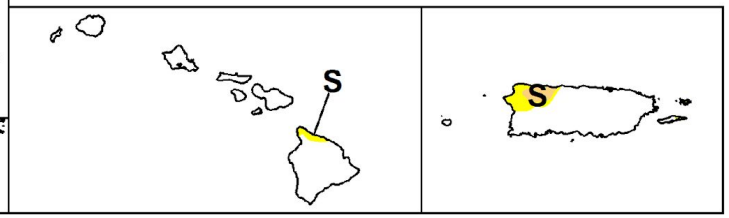
May 23, 2023

(Released Thursday, May. 25, 2023)

Valid 8 a.m. EDT







Author:
Brad Rippey
U.S. Department of Agriculture

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

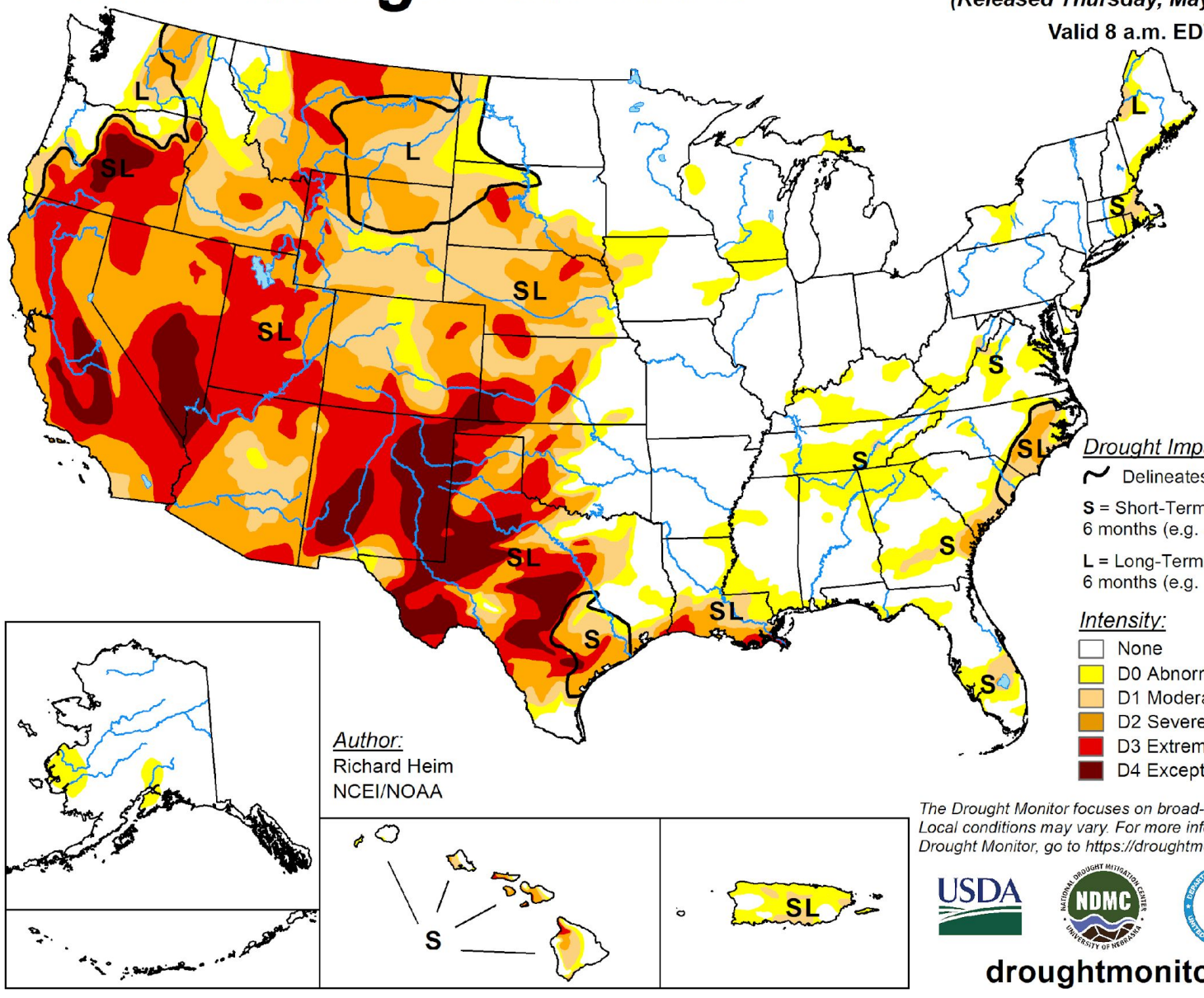
droughtmonitor.unl.edu

U.S. Drought Monitor

May 24, 2022

(Released Thursday, May. 26, 2022)

Valid 8 a.m. EDT



Author:
Richard Heim
NCEI/NOAA

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

USDA NDMC NOAA

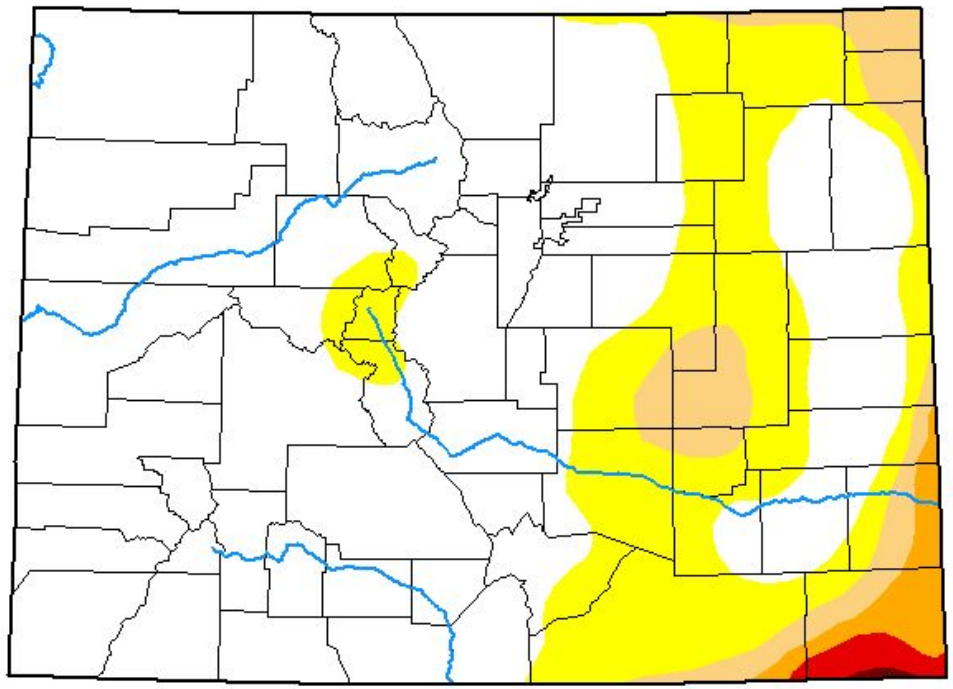
droughtmonitor.unl.edu

One year ago

One year ago:
>50% of CONUS in drought,
21% in D3-D4

Today:
19% in drought,
3.7% in D3-D4

U.S. Drought Monitor
Colorado



May 23, 2023

(Released Thursday, May. 25, 2023)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	71.93	28.07	7.83	2.53	0.81	0.08
Last Week *05-16-2023*	54.68	45.32	10.76	2.91	1.15	0.31
3 Months Ago *02-21-2023*	44.81	55.19	37.42	7.94	2.00	0.16
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 *05-24-2022*	0.00	100.00	89.73	59.61	18.12	2.61

Intensity:

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

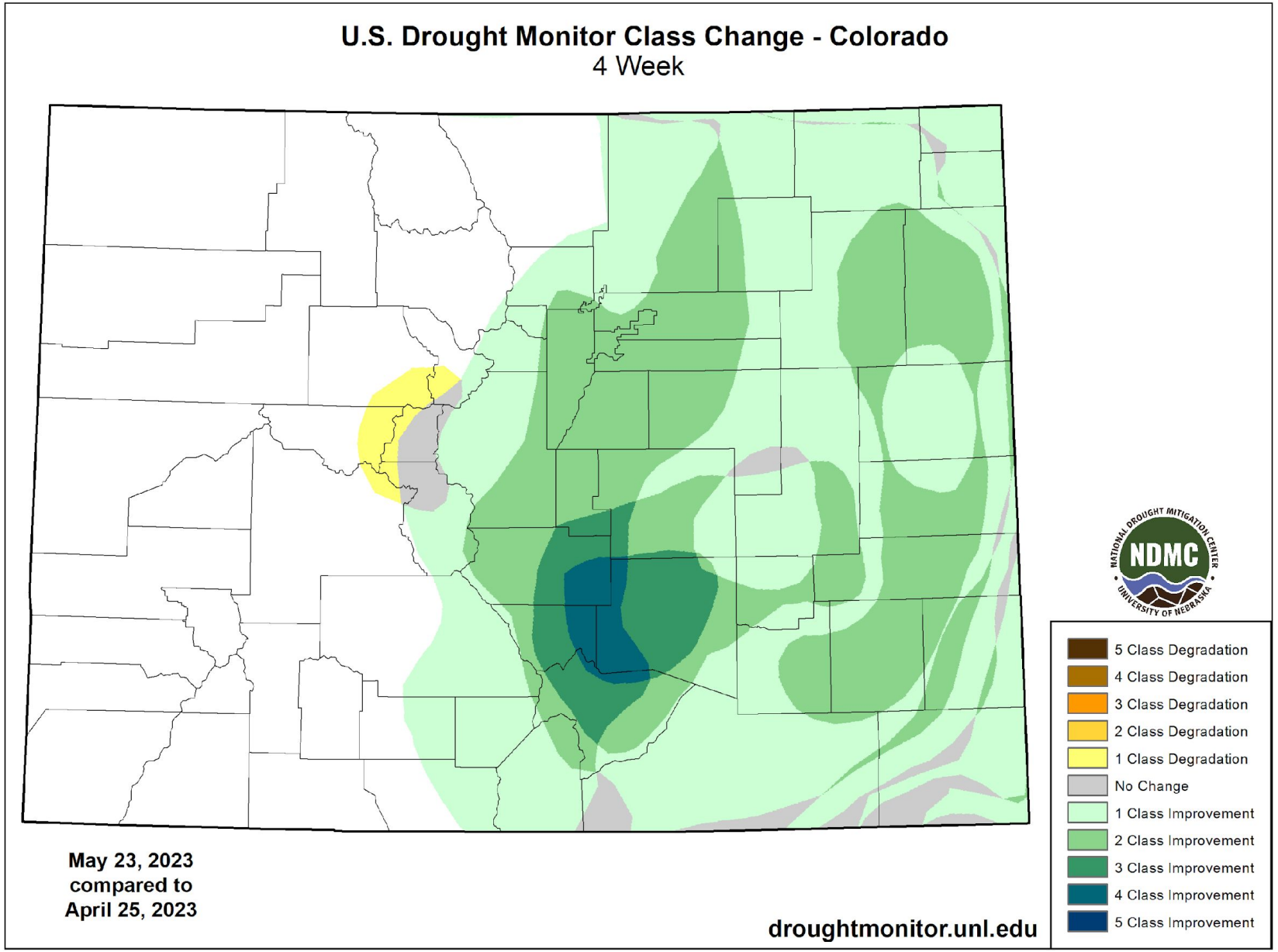
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:

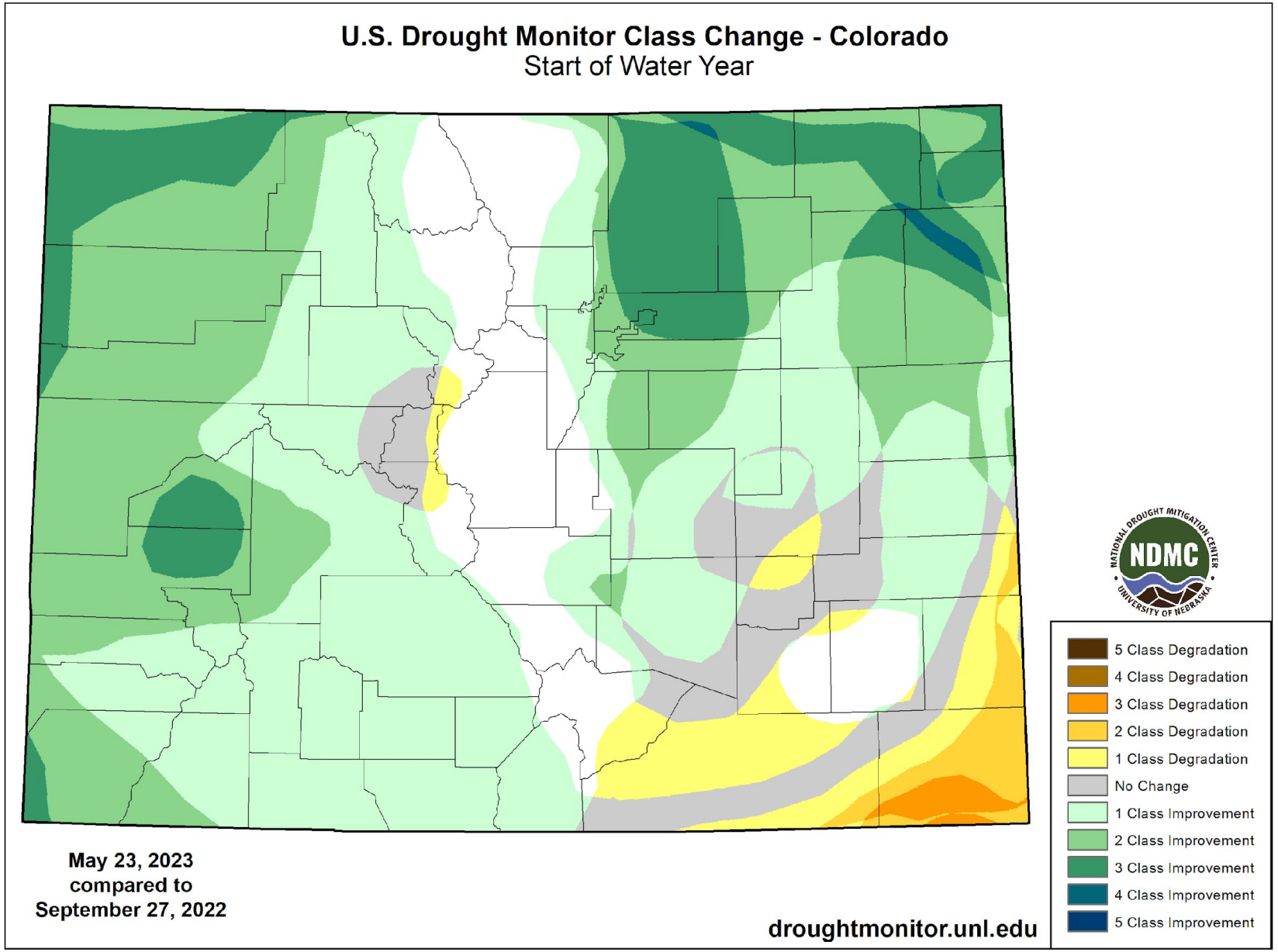
Brad Rippey
U.S. Department of Agriculture

droughtmonitor.unl.edu

Change over last 4 weeks

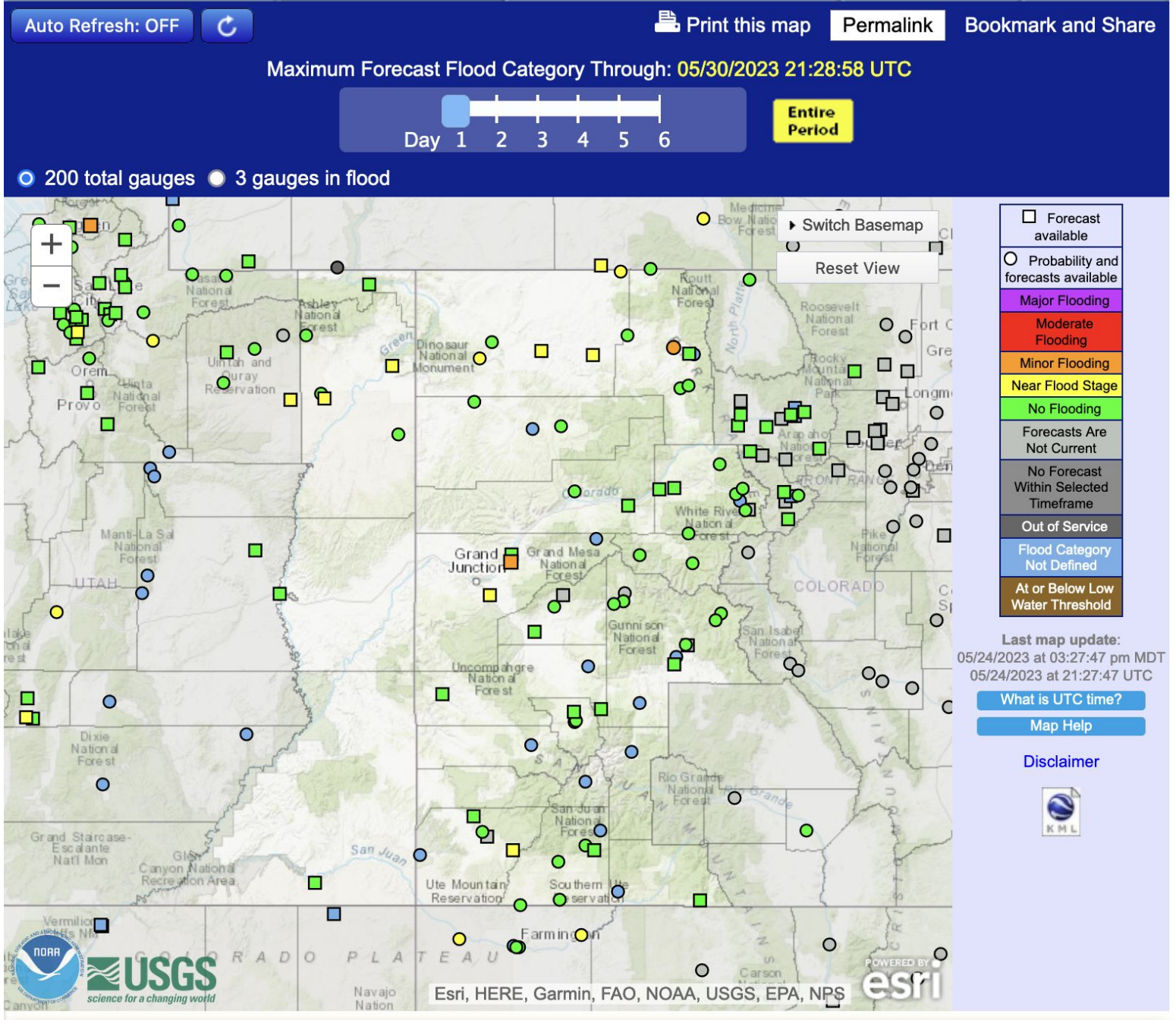


Change since start of water year

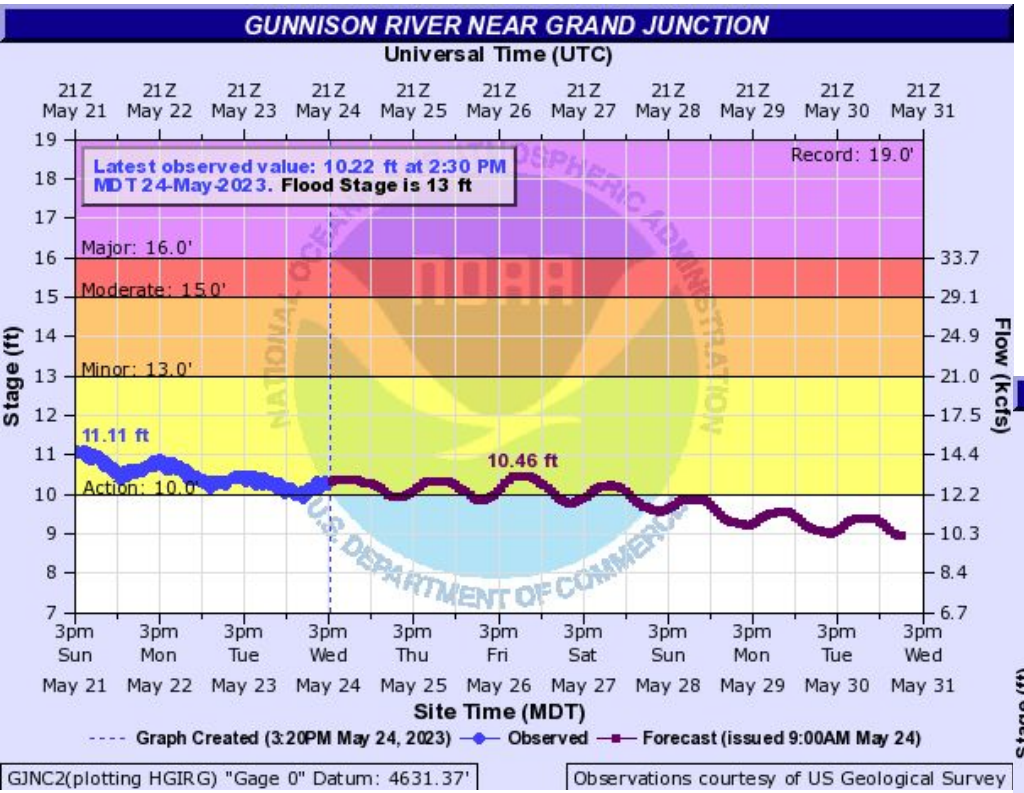


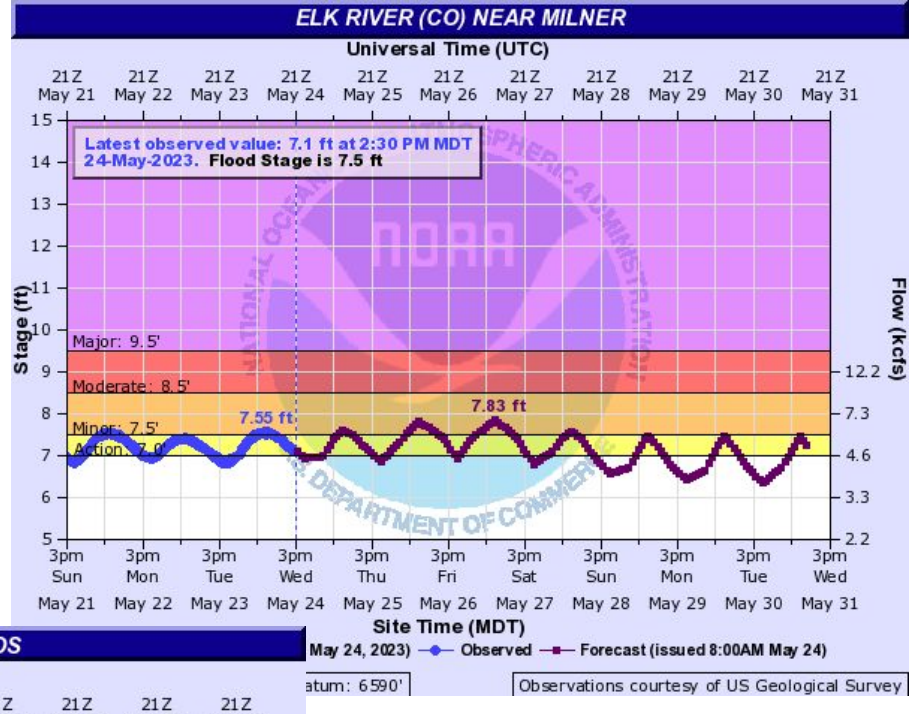
Flooding

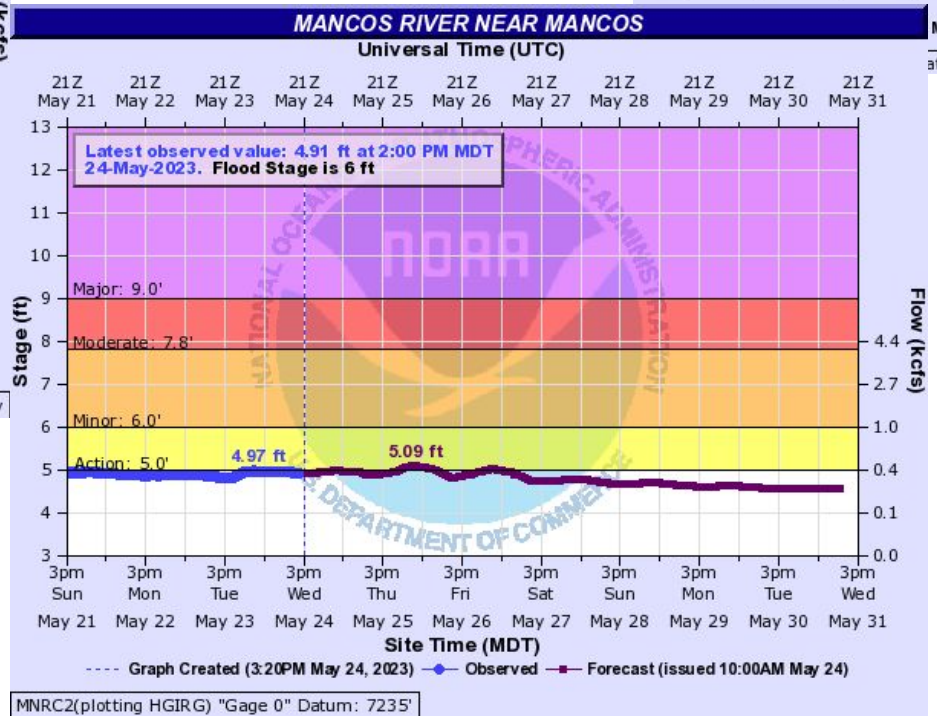
NWS flood forecasts, through May 30

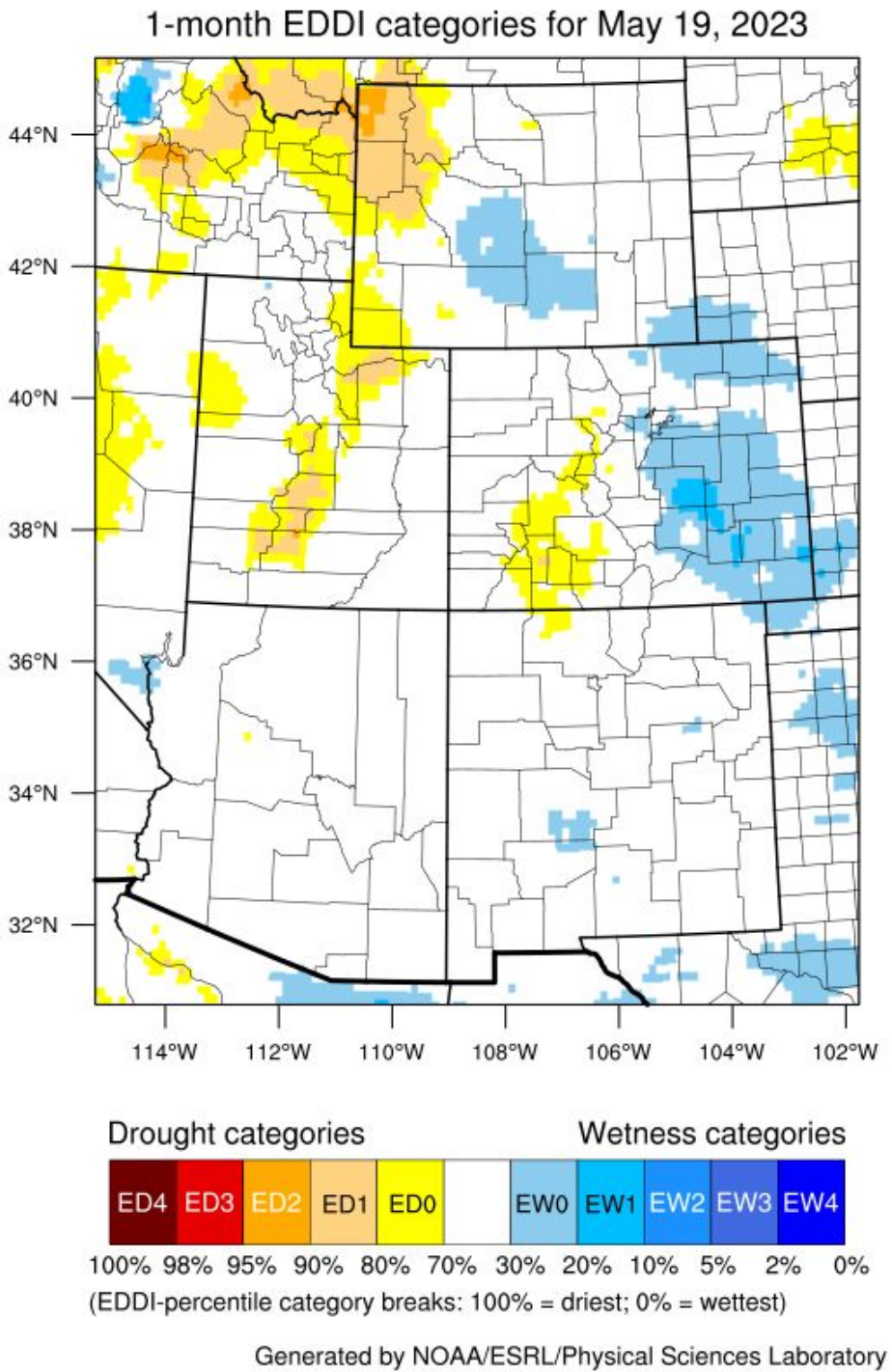


Western slope flooding









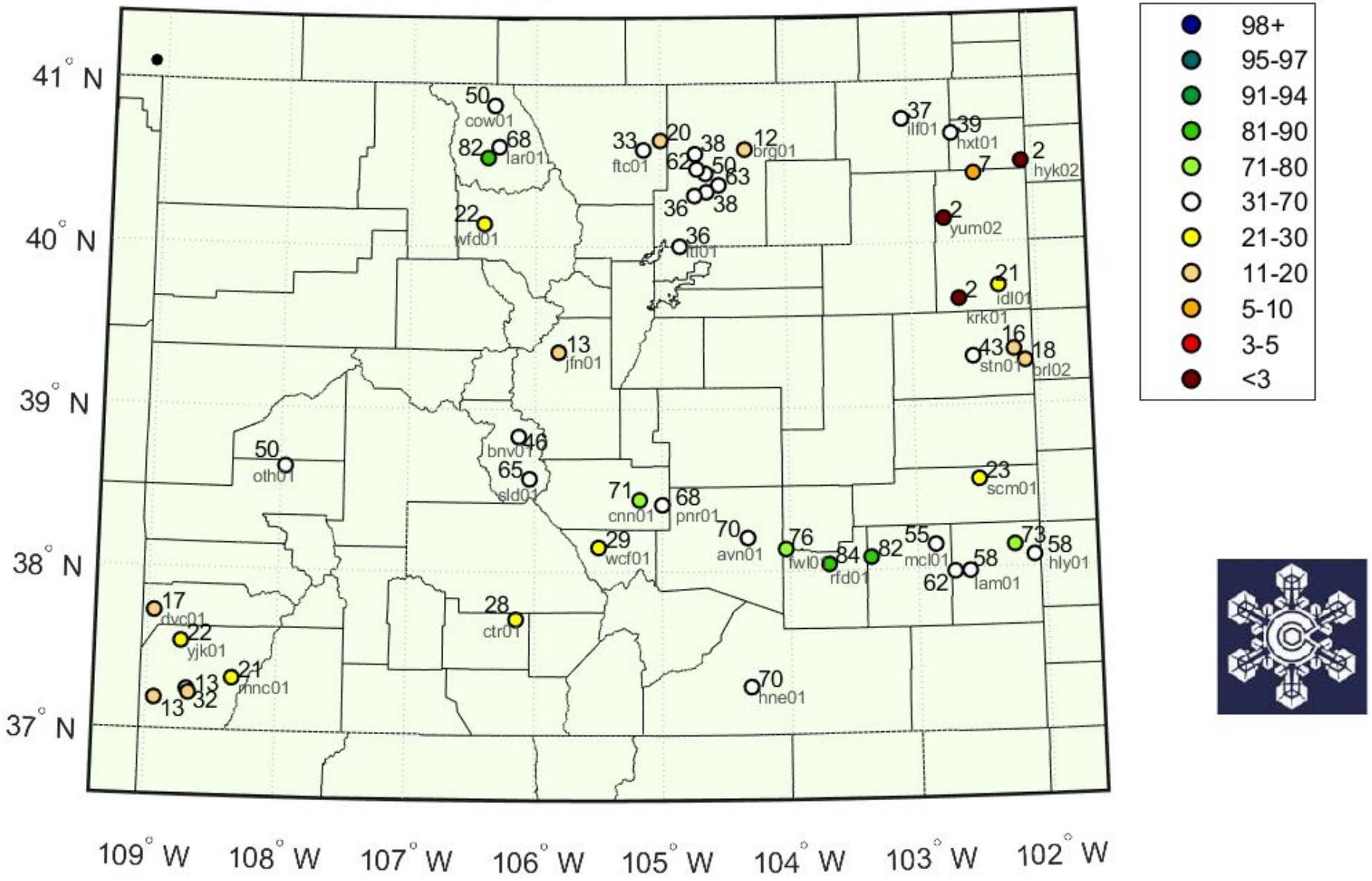
COLORADO CLIMATE CENTER

Evaporative Demand Drought Index

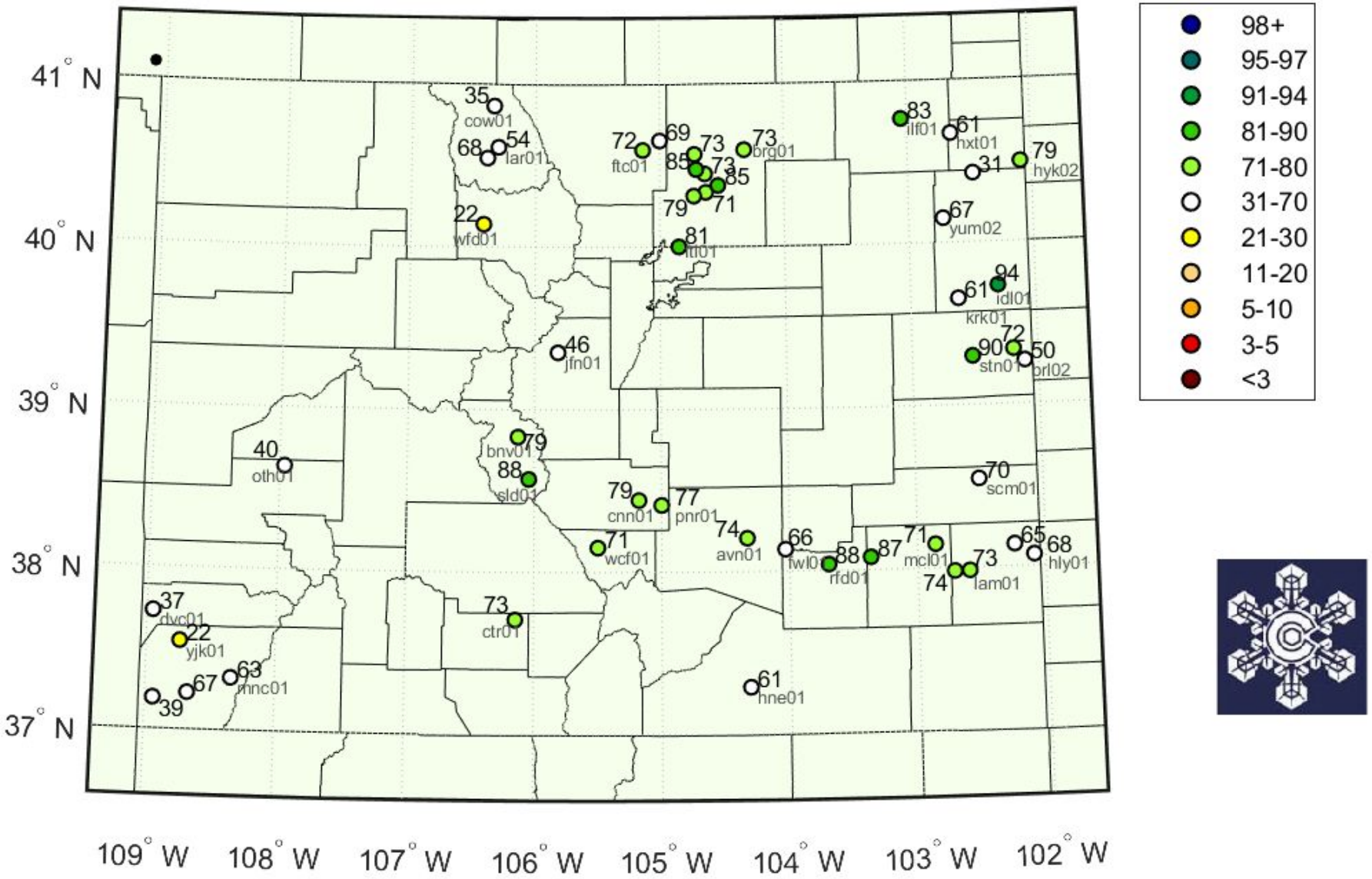
Evaporative demand over the last month has been below average across eastern Colorado, near to slightly above average in the mountains and western slope

Growing Season Water Balance (P/PET) Percentiles
May 5, 2023

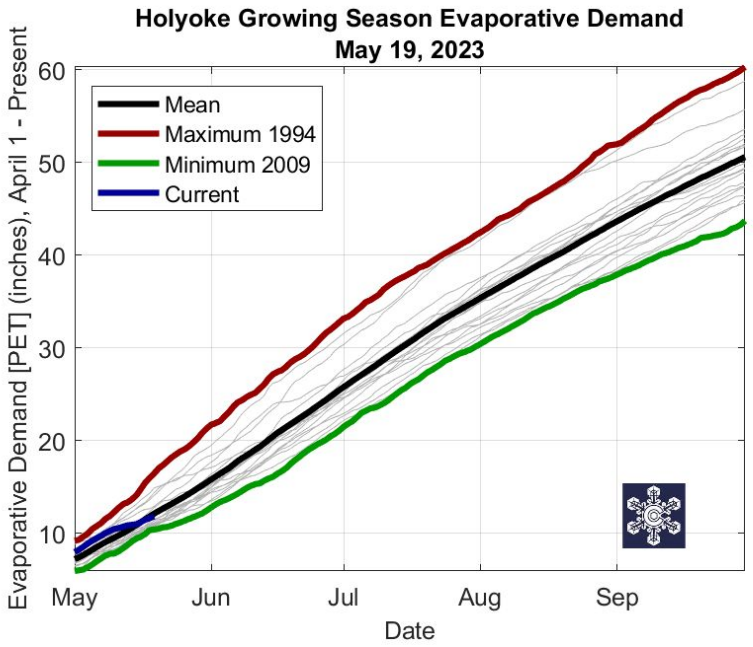
3 weeks ago



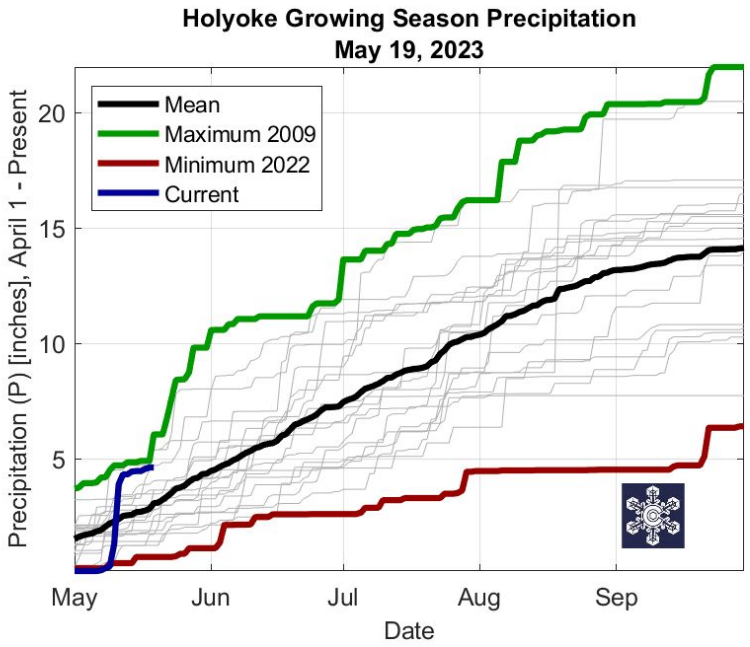
Growing Season Water Balance (P/PET) Percentiles
May 19, 2023



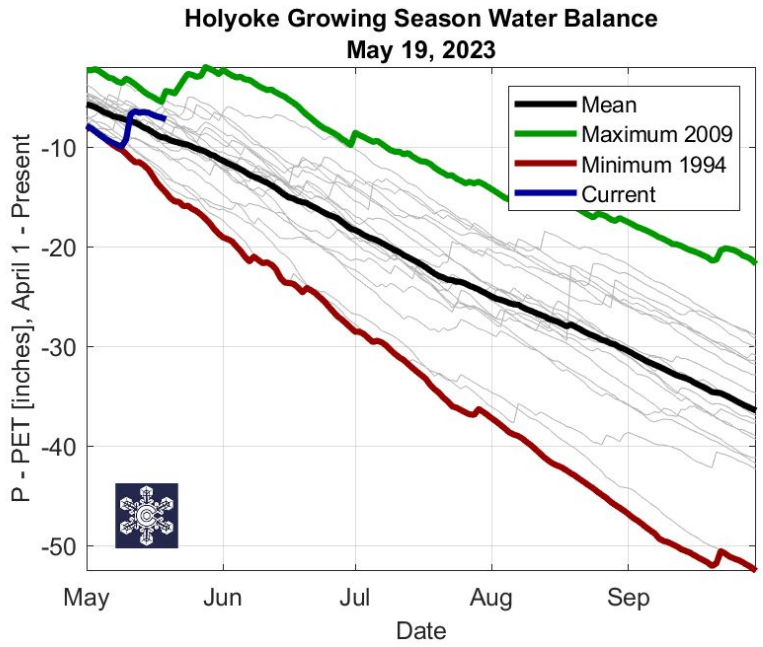
Holyoke CoAgMET station, since April 1



Evaporative demand now below average



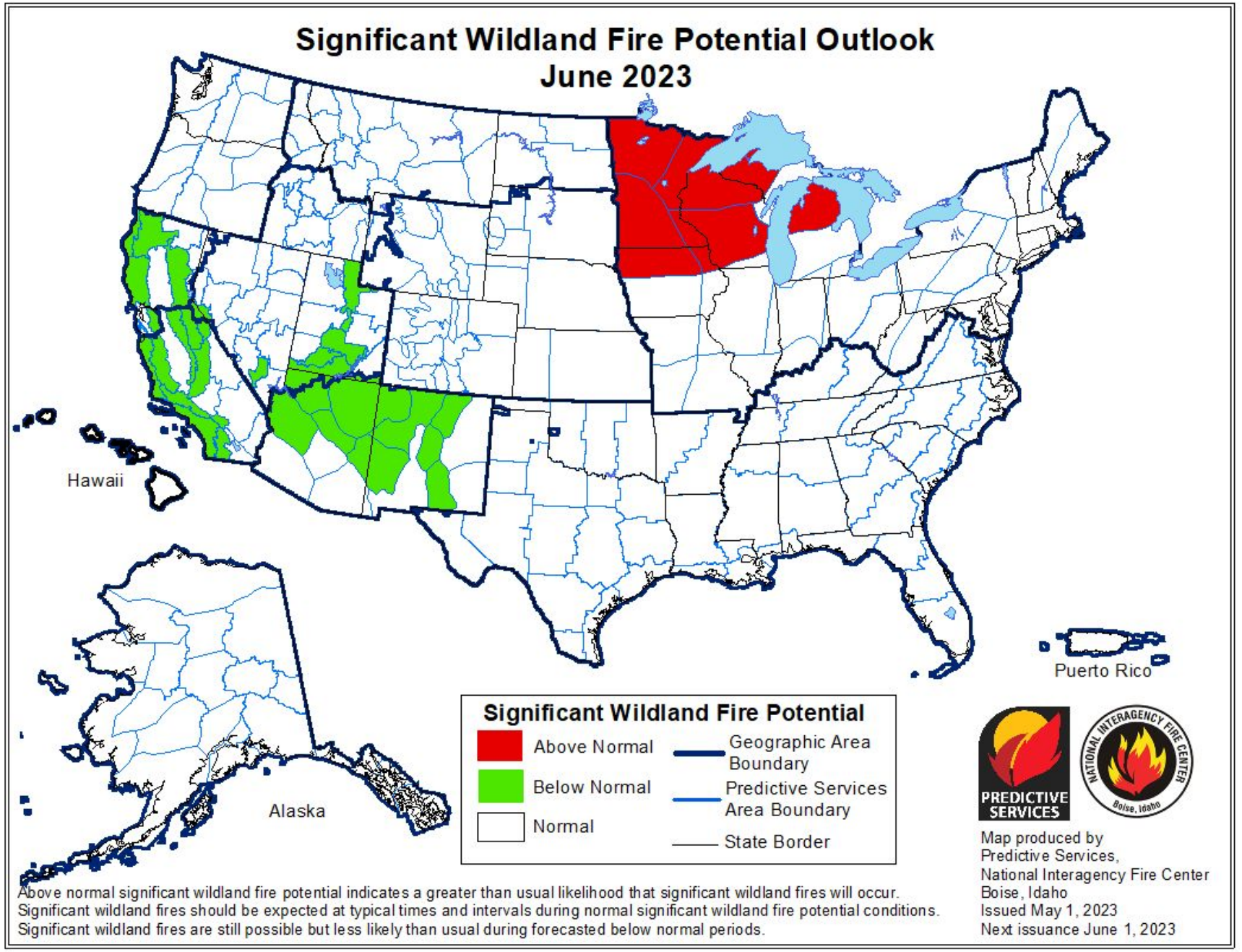
Huge jump from mid-May storm!

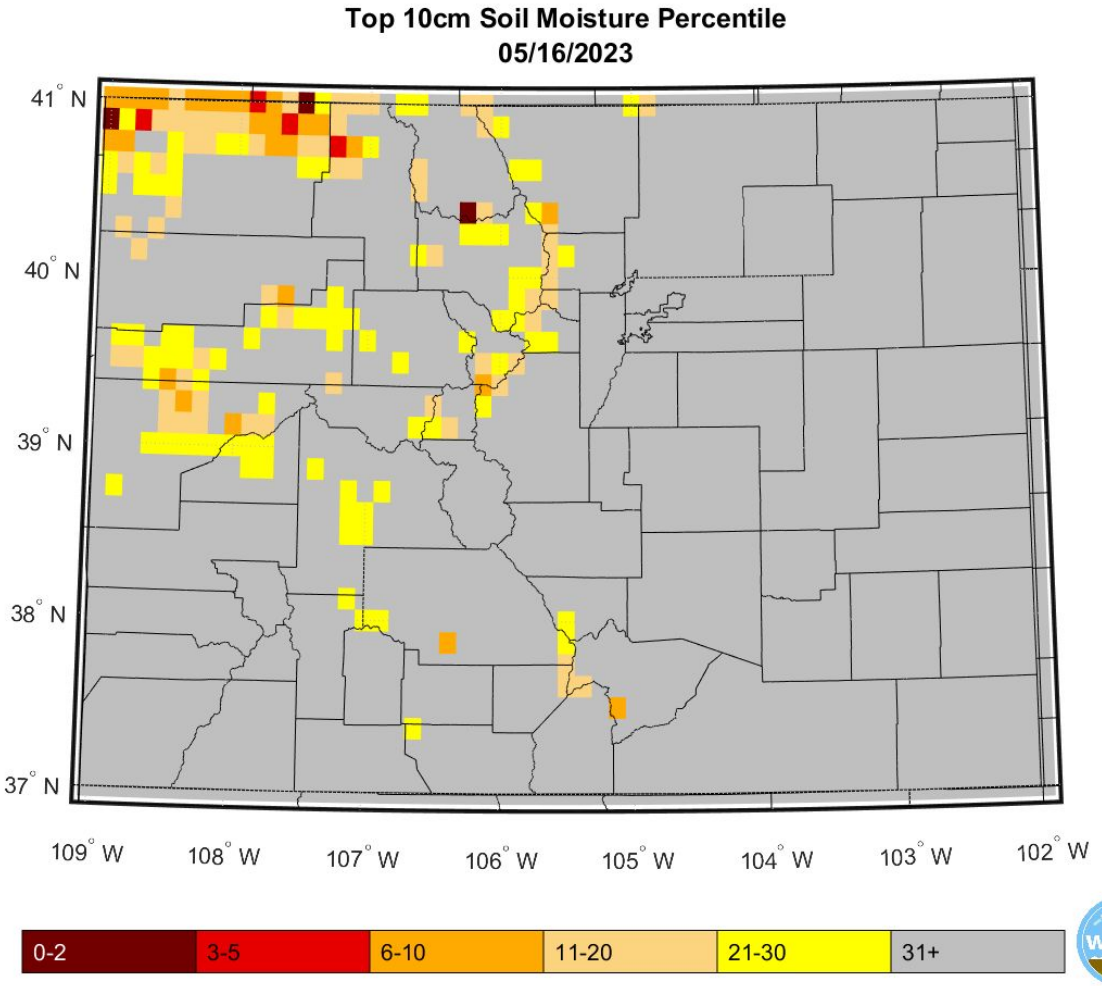


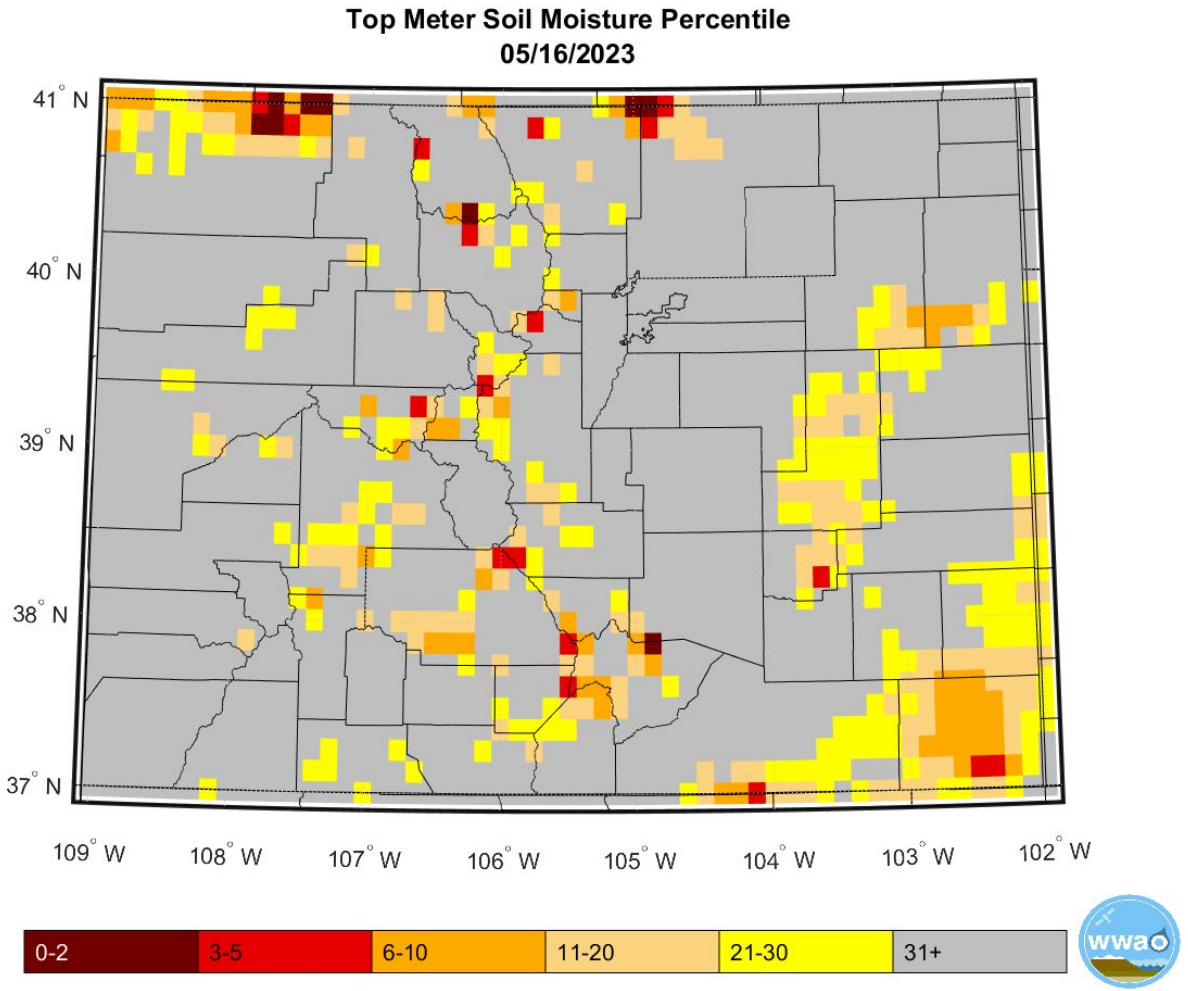
After record-dry start, now well above average

Data since 1992 at this station

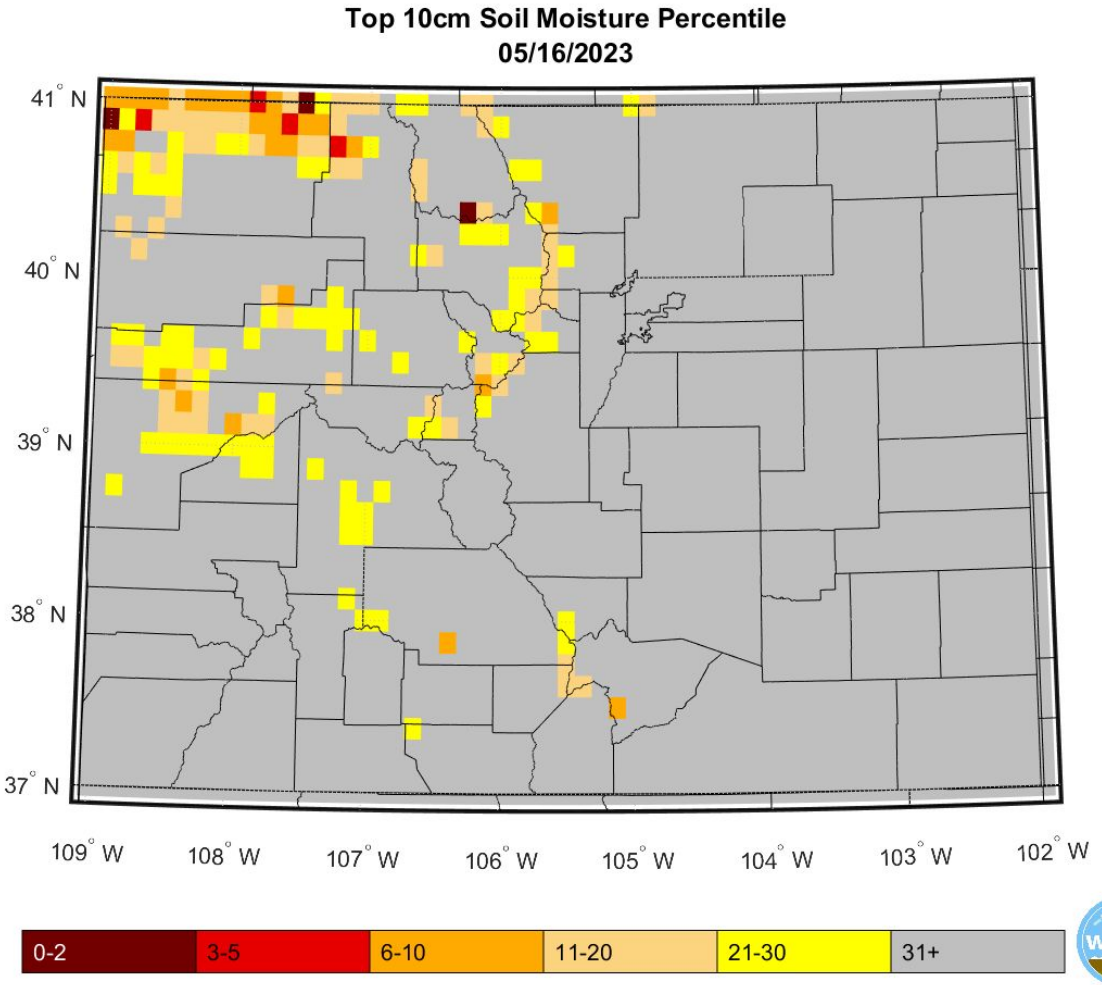
USDA outlooks for wildfire potential show near-normal risk across Colorado

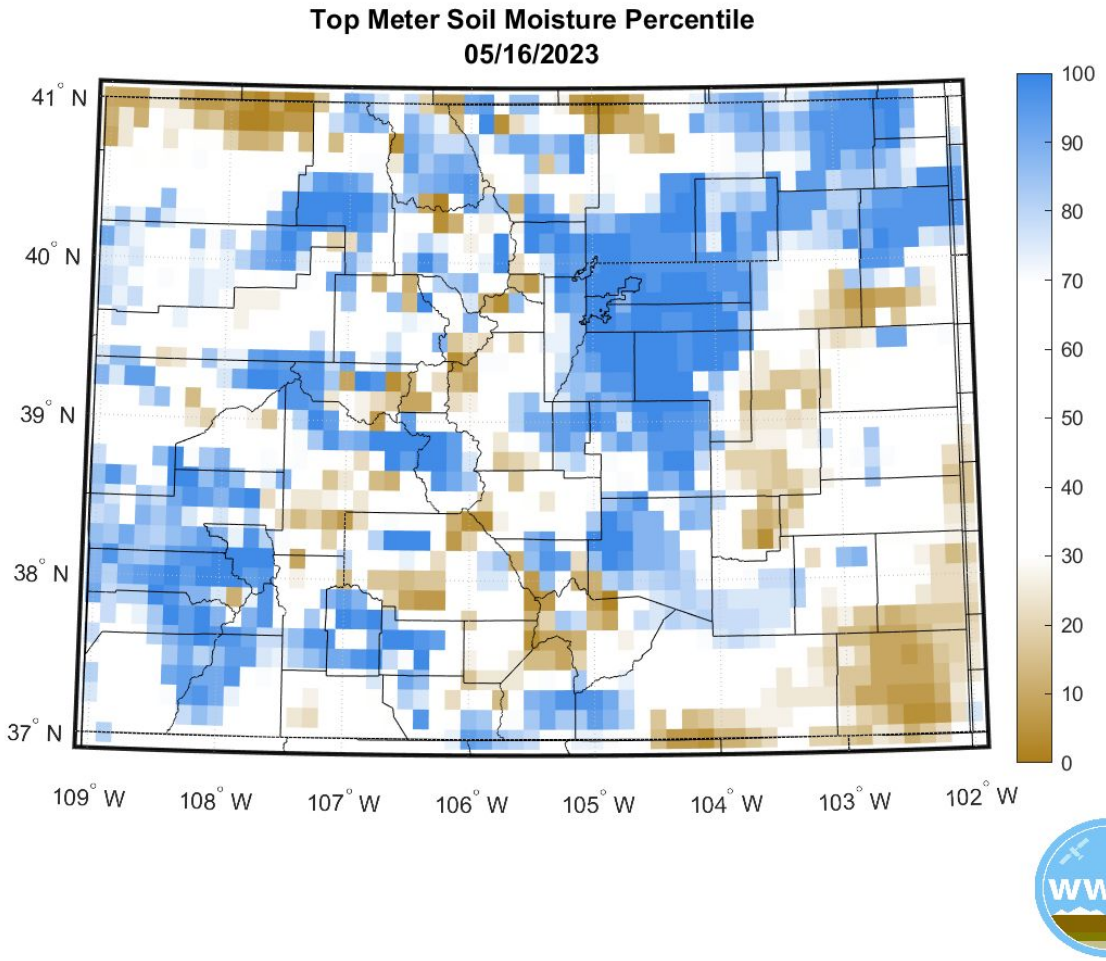




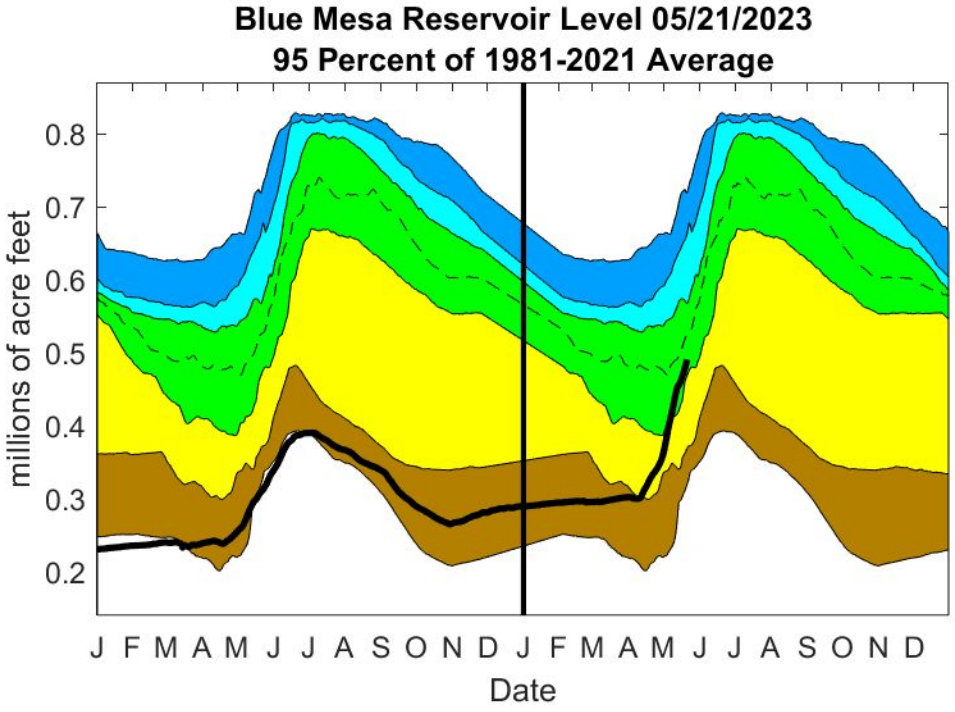


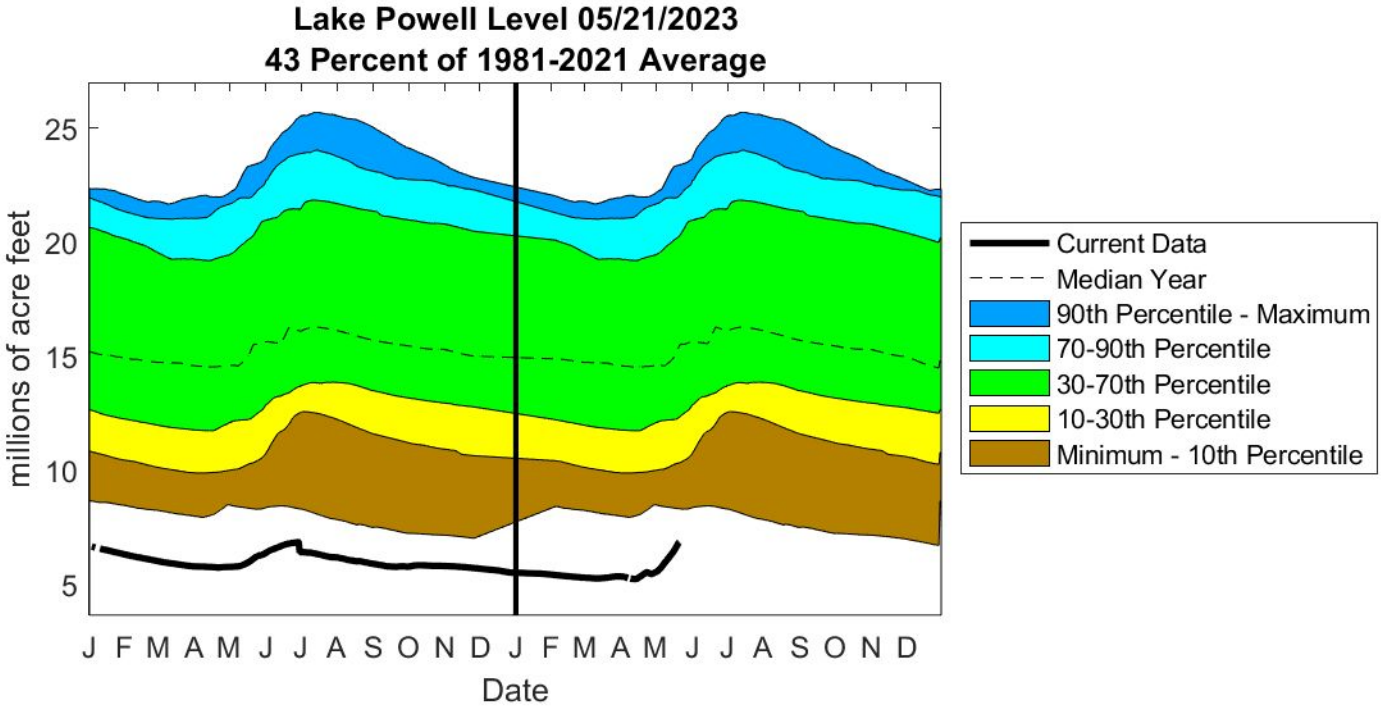
Soil moisture conditions are generally looking good across Colorado, except for the southeast corner where dry conditions persist





Soil moisture conditions are generally looking good across Colorado, except for the southeast corner where dry conditions persist



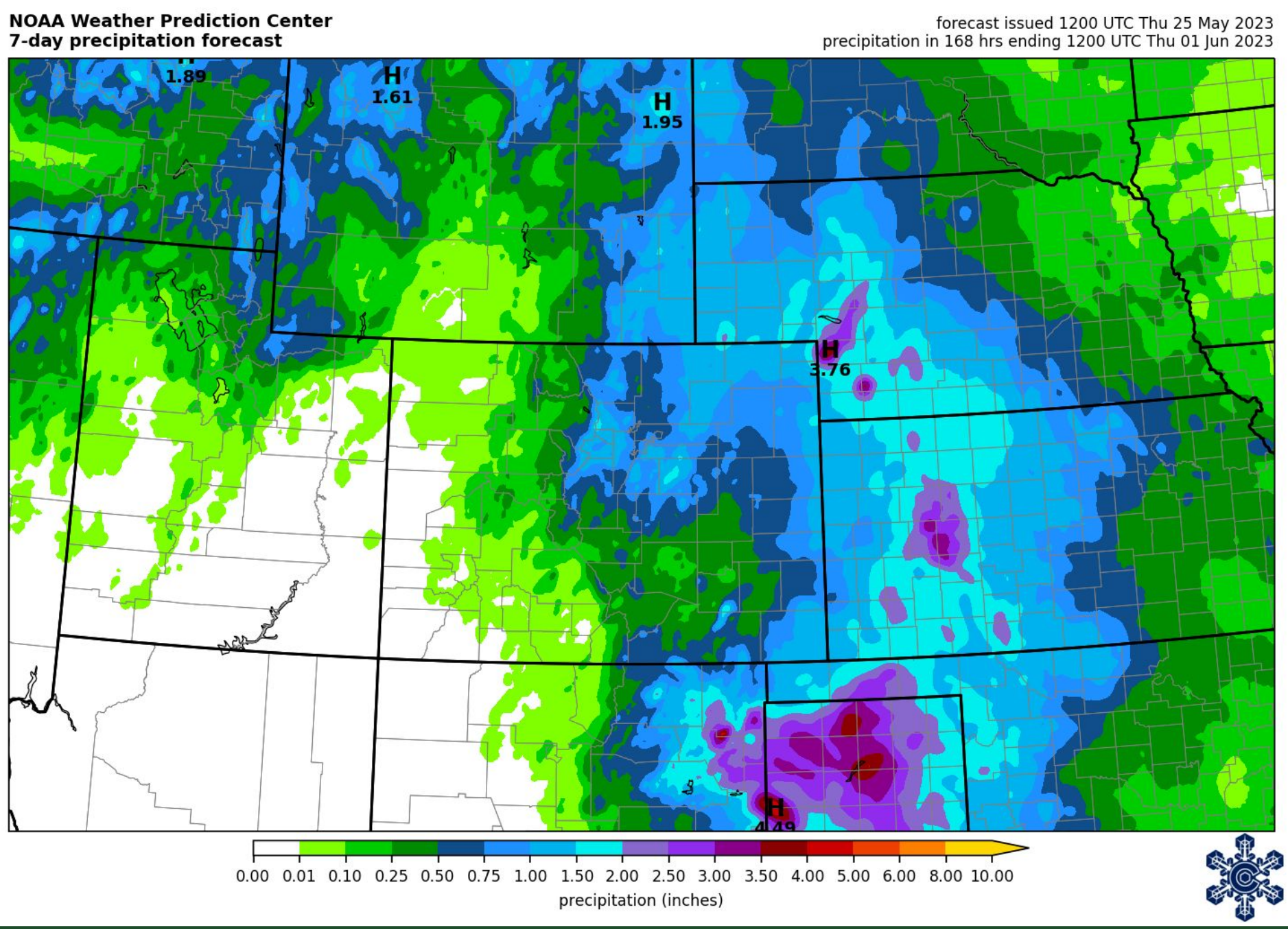


See others on our drought page:
https://climate.colostate.edu/drought/

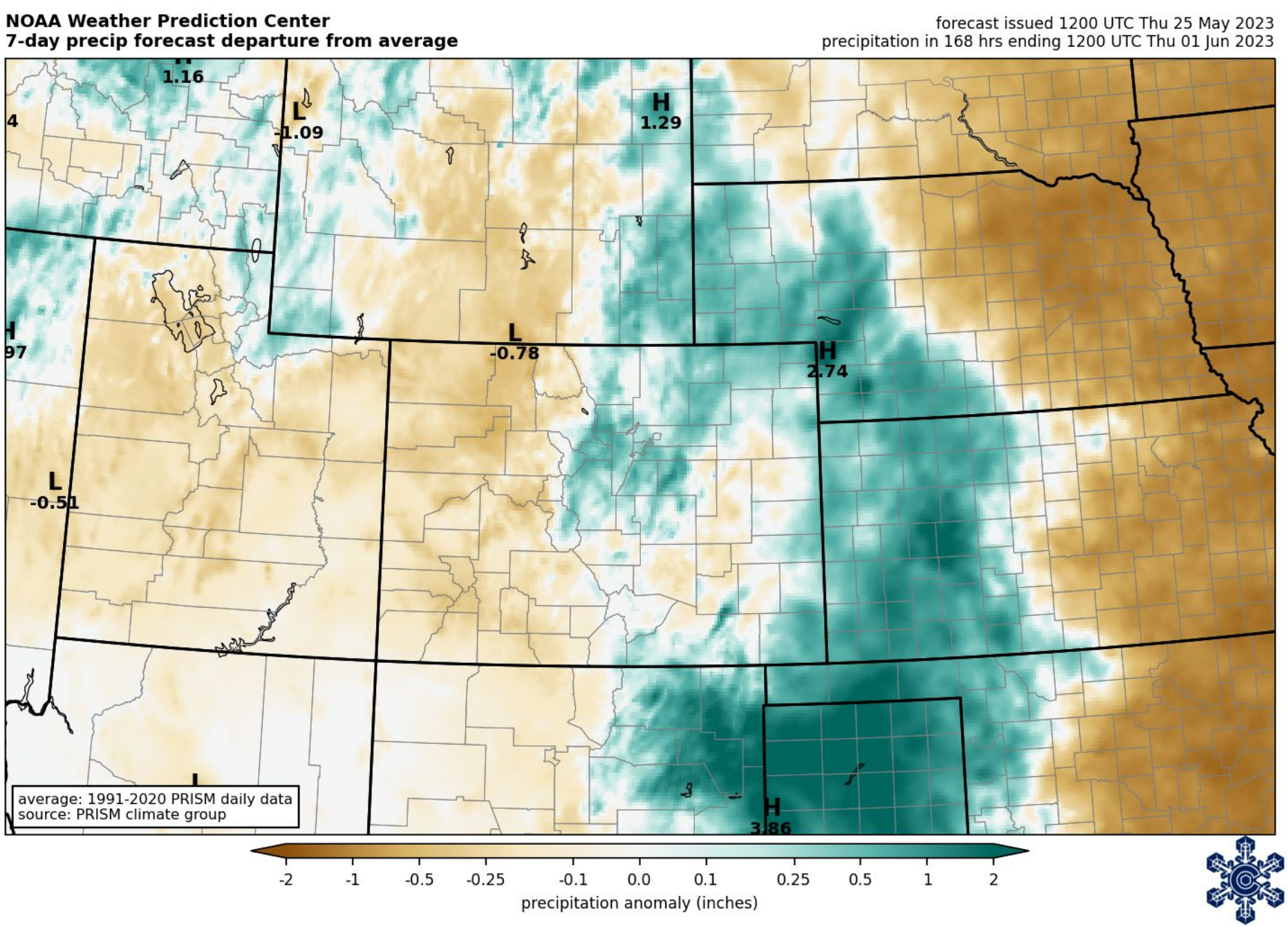
COLORADO
CLIMATE
CENTER

Outlook

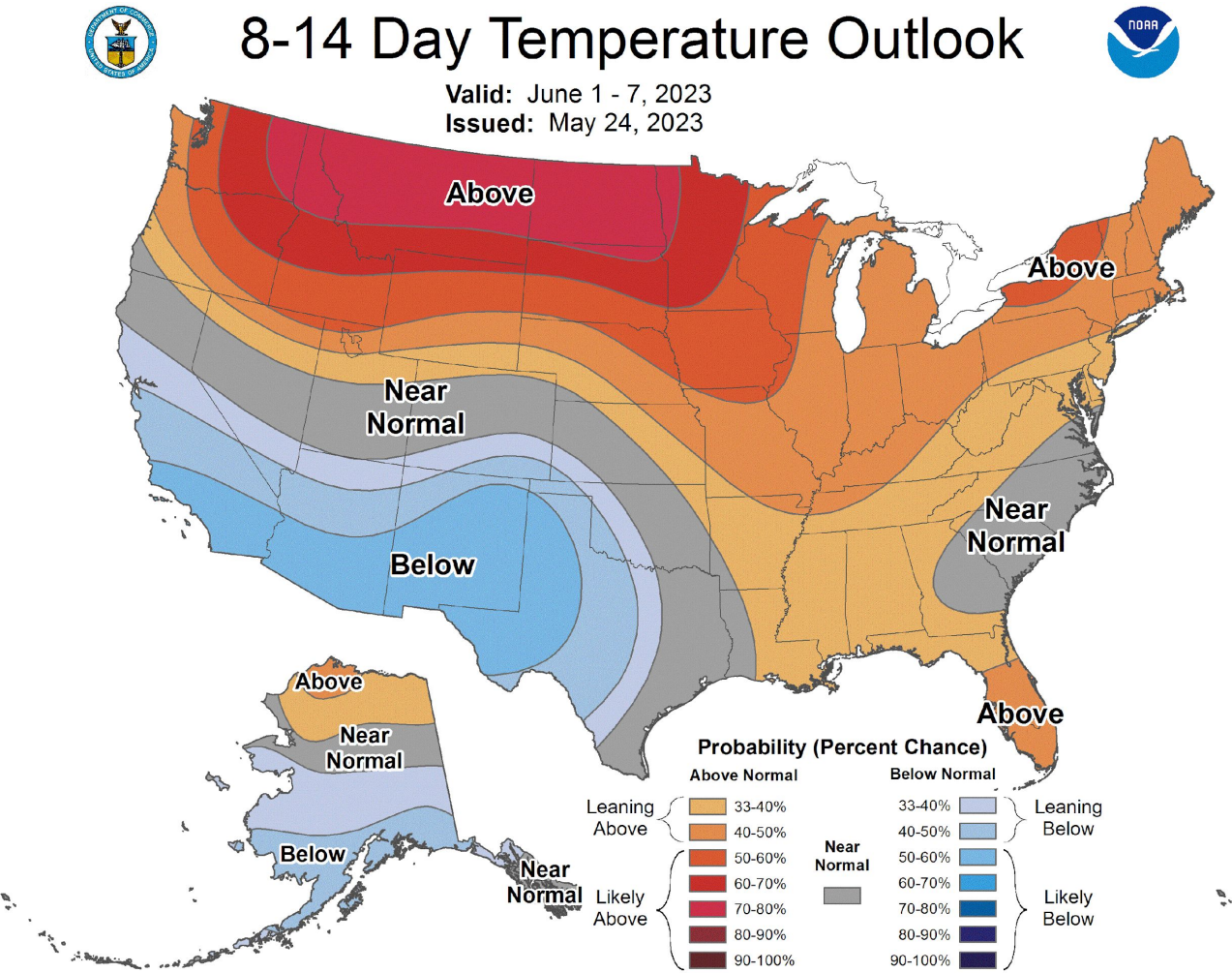
NOAA 7-day precipitation forecast

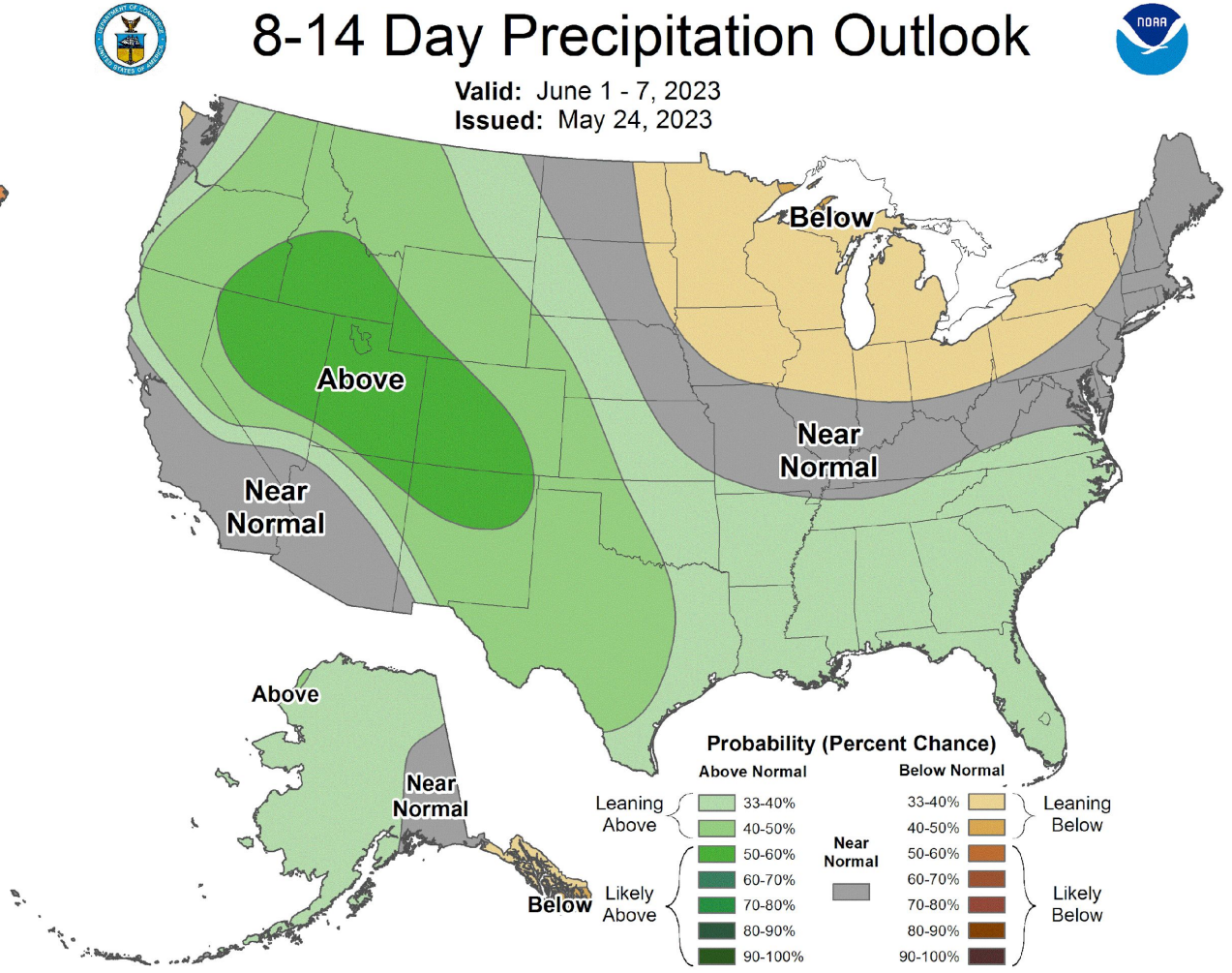


NOAA 7-day precipitation forecast (difference from average)

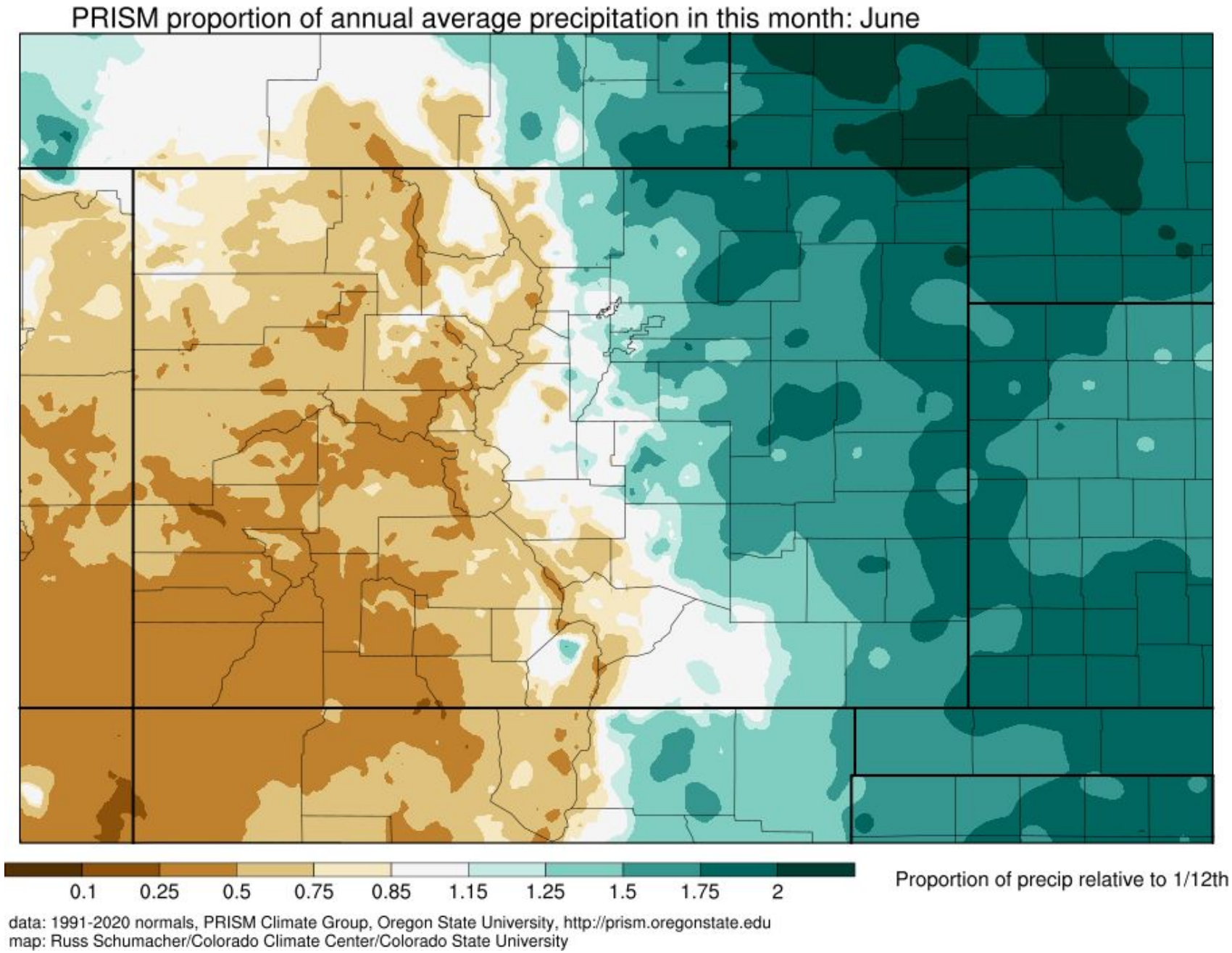


First week of June looks wet – heavy rain/flood risk likely to continue along Front Range & Plains

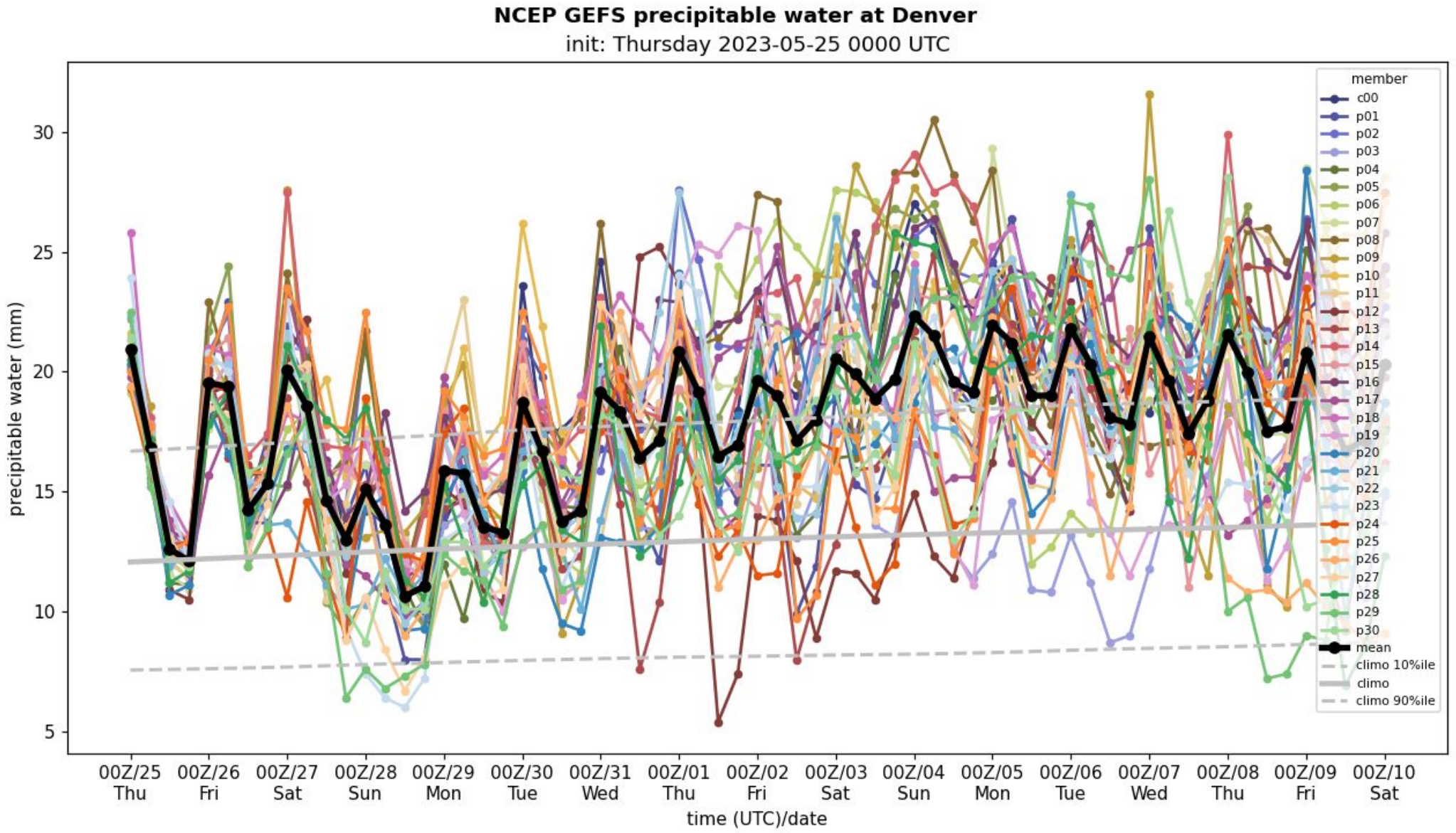




Is June typically a wet or dry month?



Precipitable water (moisture in the atmosphere) forecast



El Niño is emerging – just a question of when and how strong

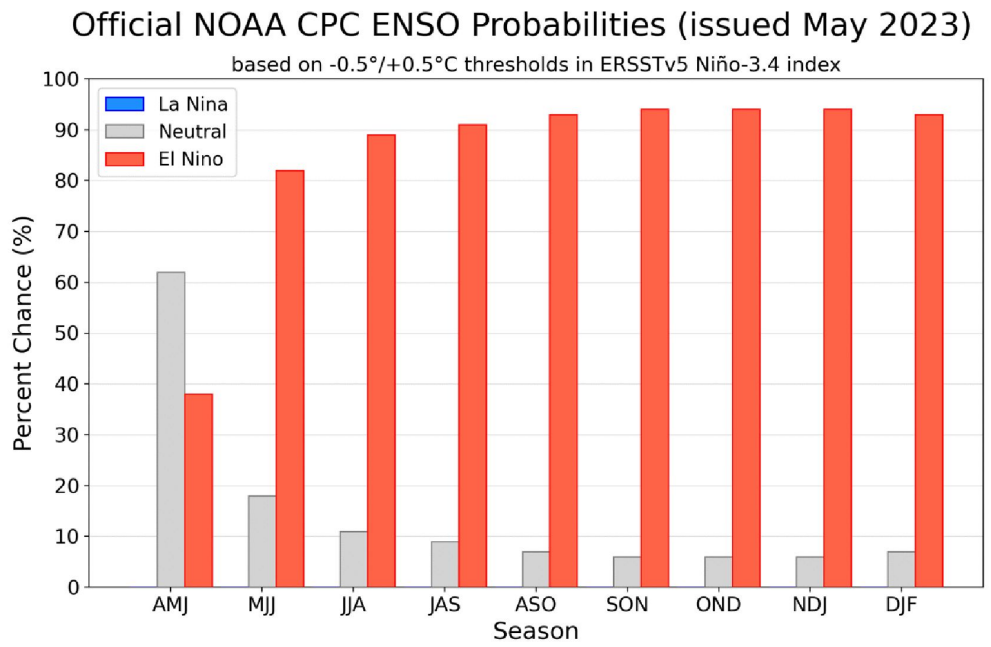


Figure 7. Official ENSO probabilities for the Niño 3.4 sea surface temperature index (5°N-5°S, 120°W-170°W). Figure updated 11 May 2023.

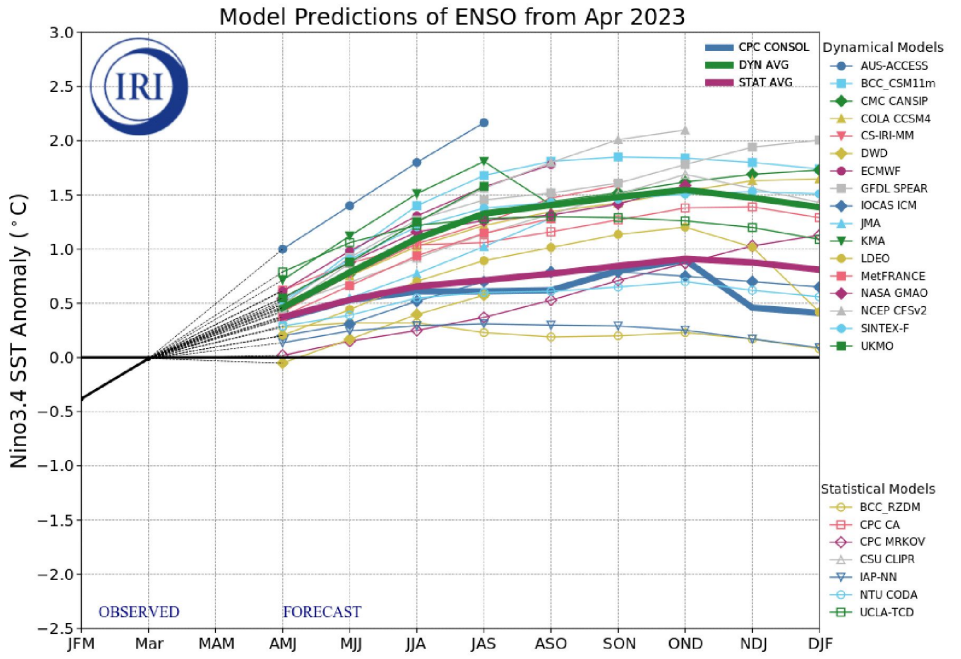
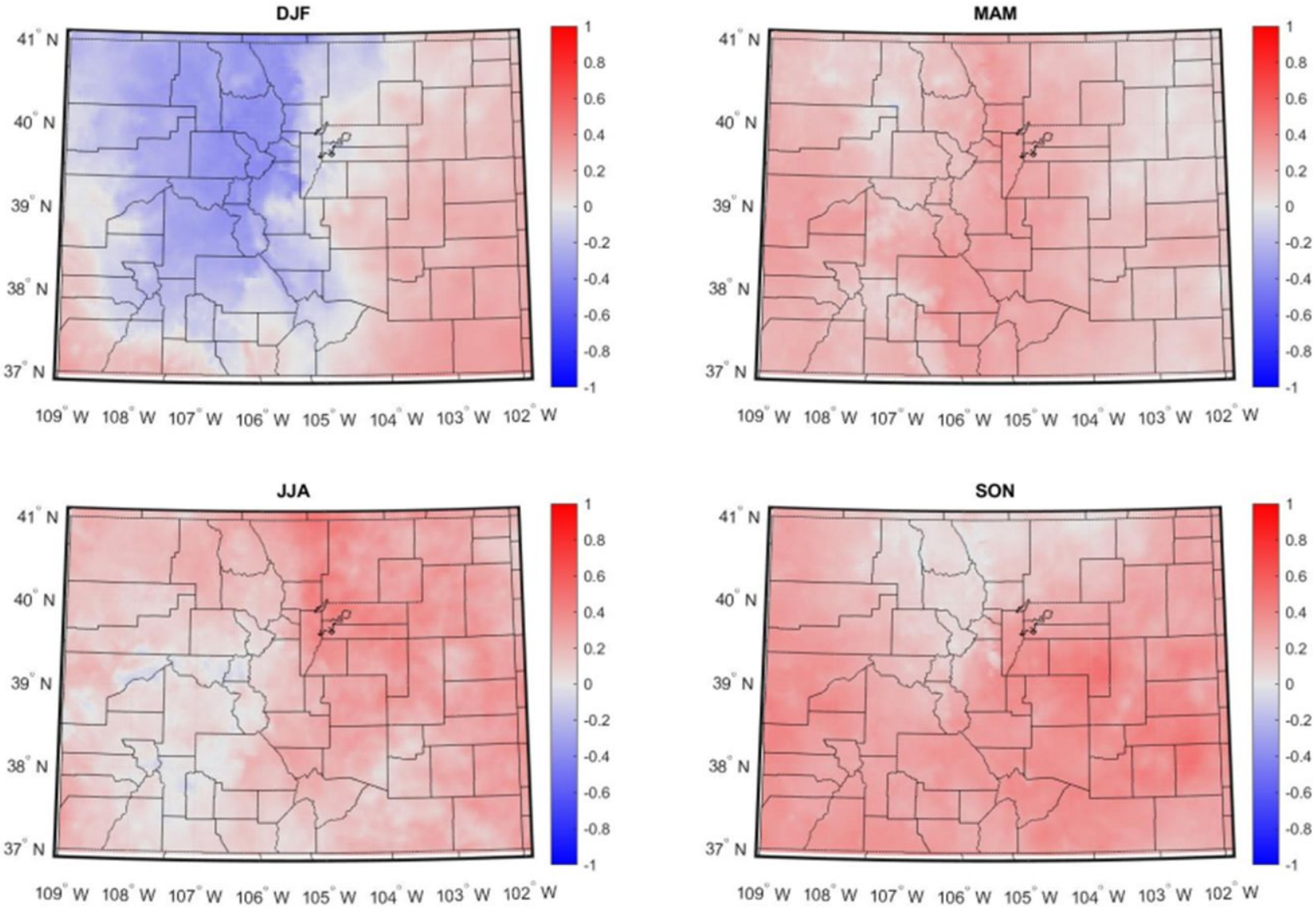


Figure 6. Forecasts of sea surface temperature (SST) anomalies for the Niño 3.4 region (5°N-5°S, 120°W-170°W). Figure updated 19 April 2023 by the International Research Institute (IRI) for Climate and Society.

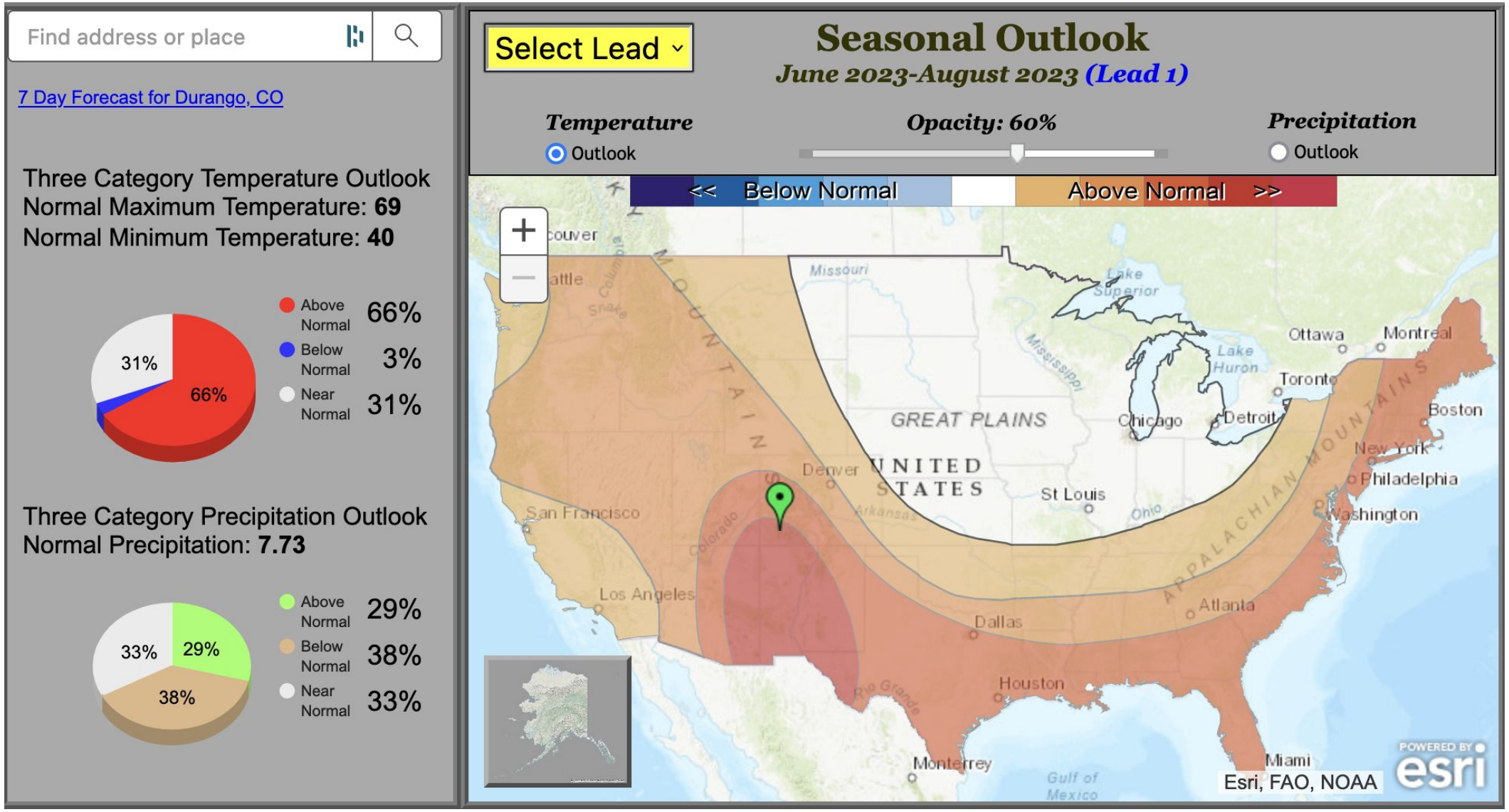
La Niña is over, and the Pacific is quickly transitioning from the current neutral conditions into El Niño. >90% chance of El Niño persisting into next winter

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

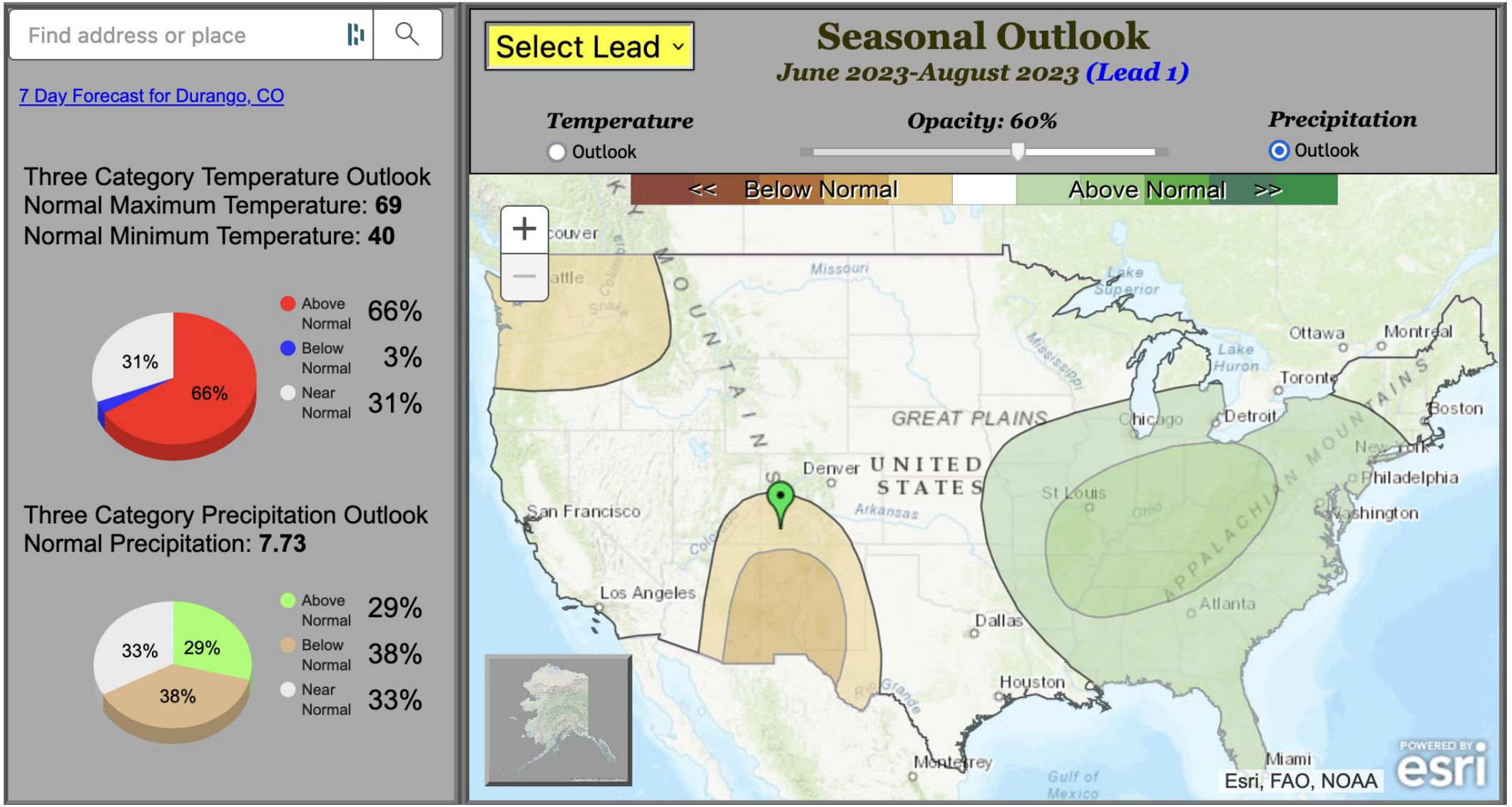


Blue = La Niña wetter Red = El Niño wetter

June-July-August outlook



June-July-August outlook



Takeaways

- We've had 6 months in a row of below-average temperatures (November through April), but May will break this streak
- May has been quite wet in eastern Colorado, relieving worries about drought after a dry start to spring
- Drought coverage down to less than 8% of the state (compared to nearly 90% a year ago, and 45% at the start of the water year). Reservoirs in Colorado are filling.
- Lots of snow still at the high elevations, and while there has been some flooding, fortunately so far it has not been major
- El Niño very likely to emerge soon (possibly rapidly), and likely to remain into next winter
- Summer precip outlook is uncertain; El Niño falls tend to be wet across Colorado

Save the dates!!

https://climate.colostate.edu/climate_summit.html

Thank you!

COLORADO CLIMATE CENTER

ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY