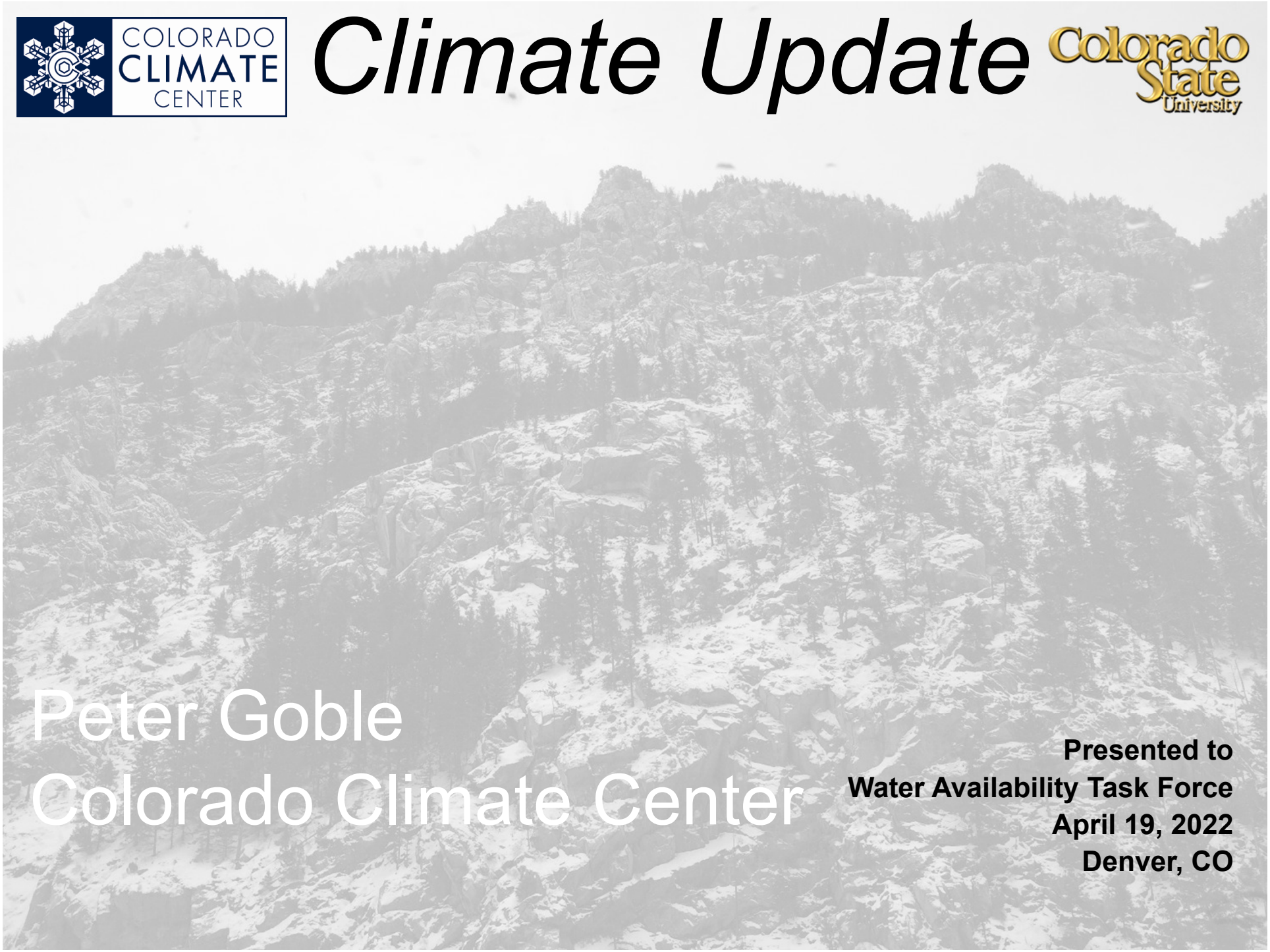


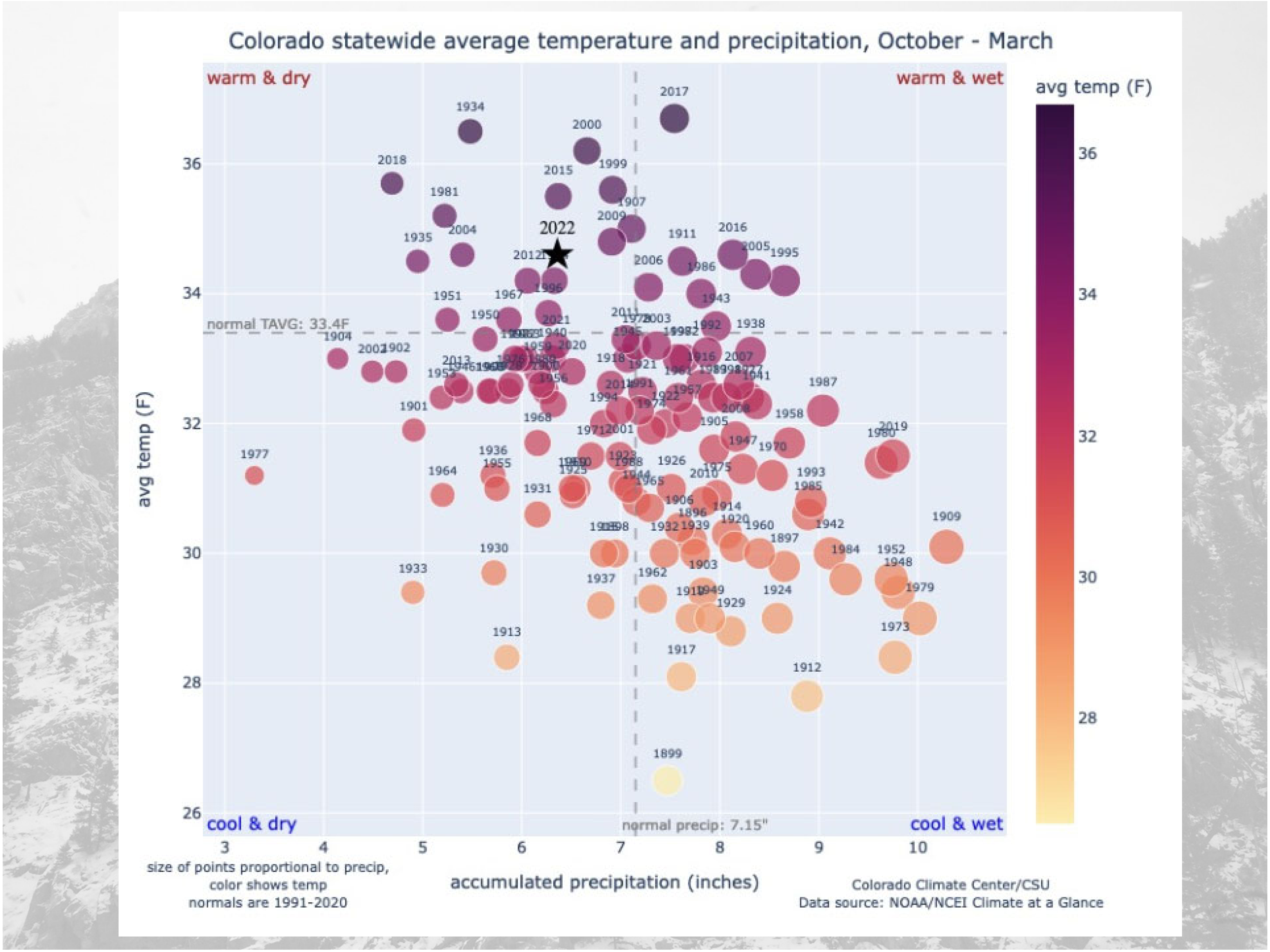
Climate Update

Peter Goble
Colorado Climate Center

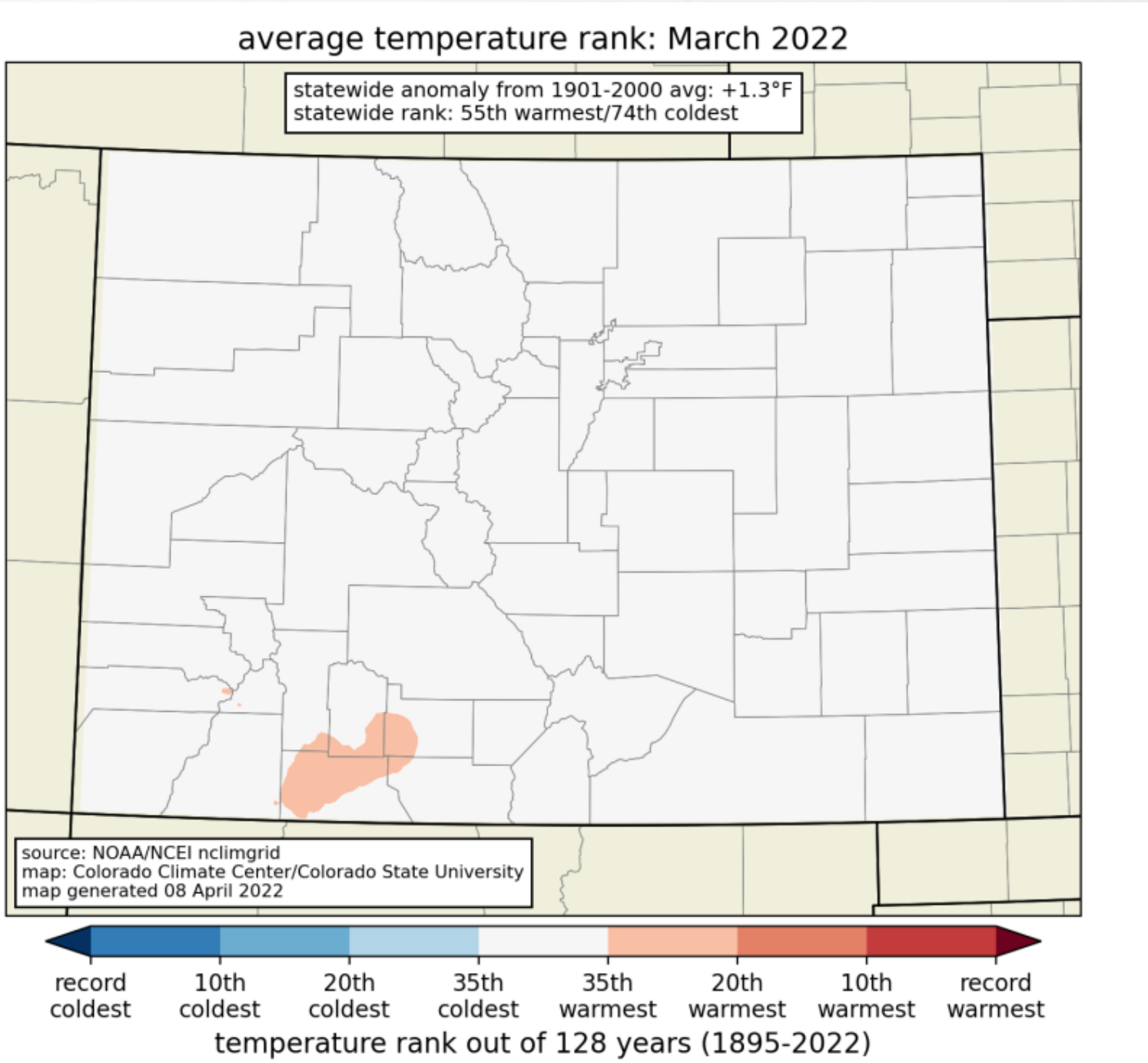
Presented to
Water Availability Task Force
April 19, 2022
Denver, CO

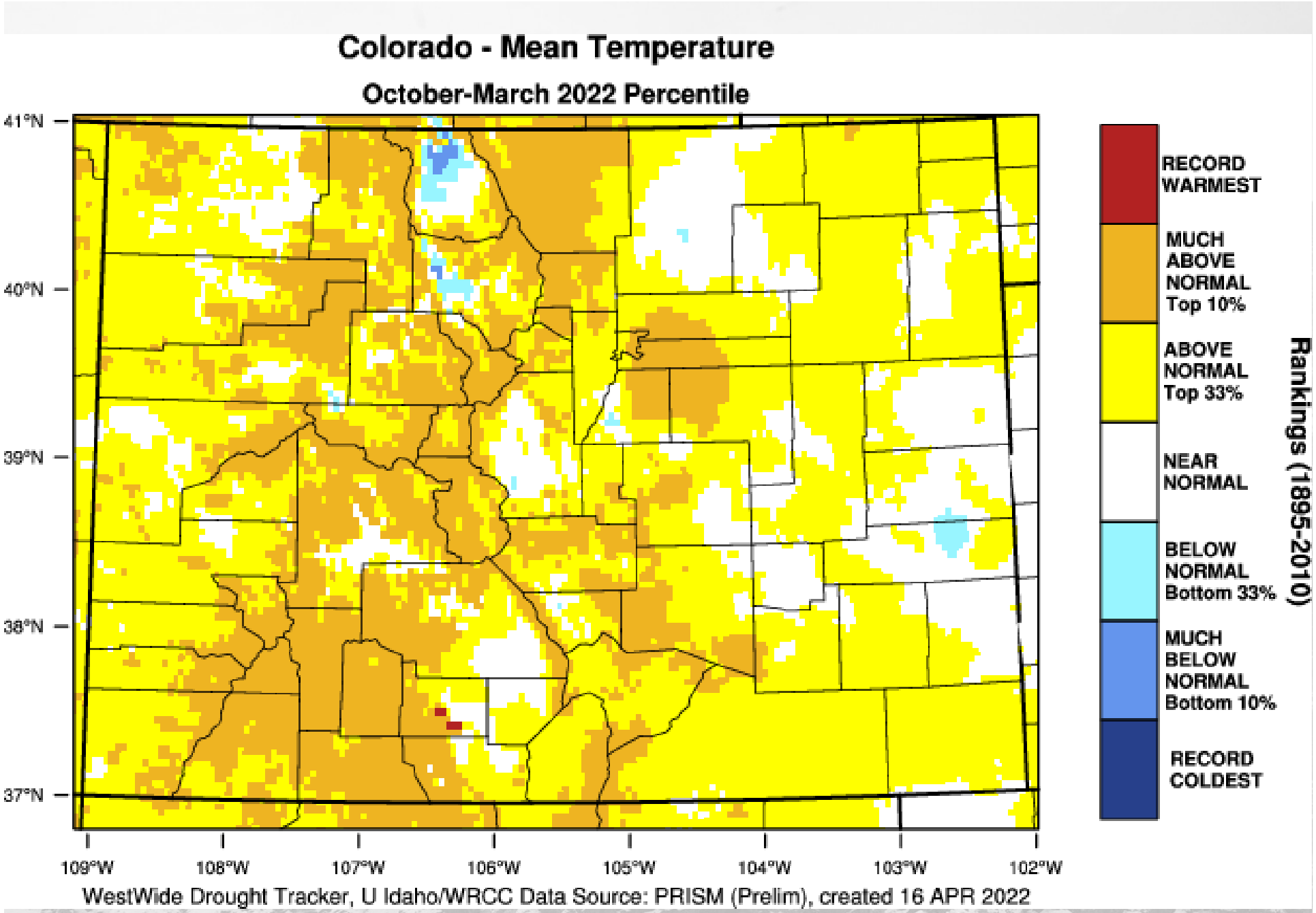
Agenda

- Current seasonal climate conditions update
- Drought update
- Seasonal Forecast info (when are we going to get spring moisture?)

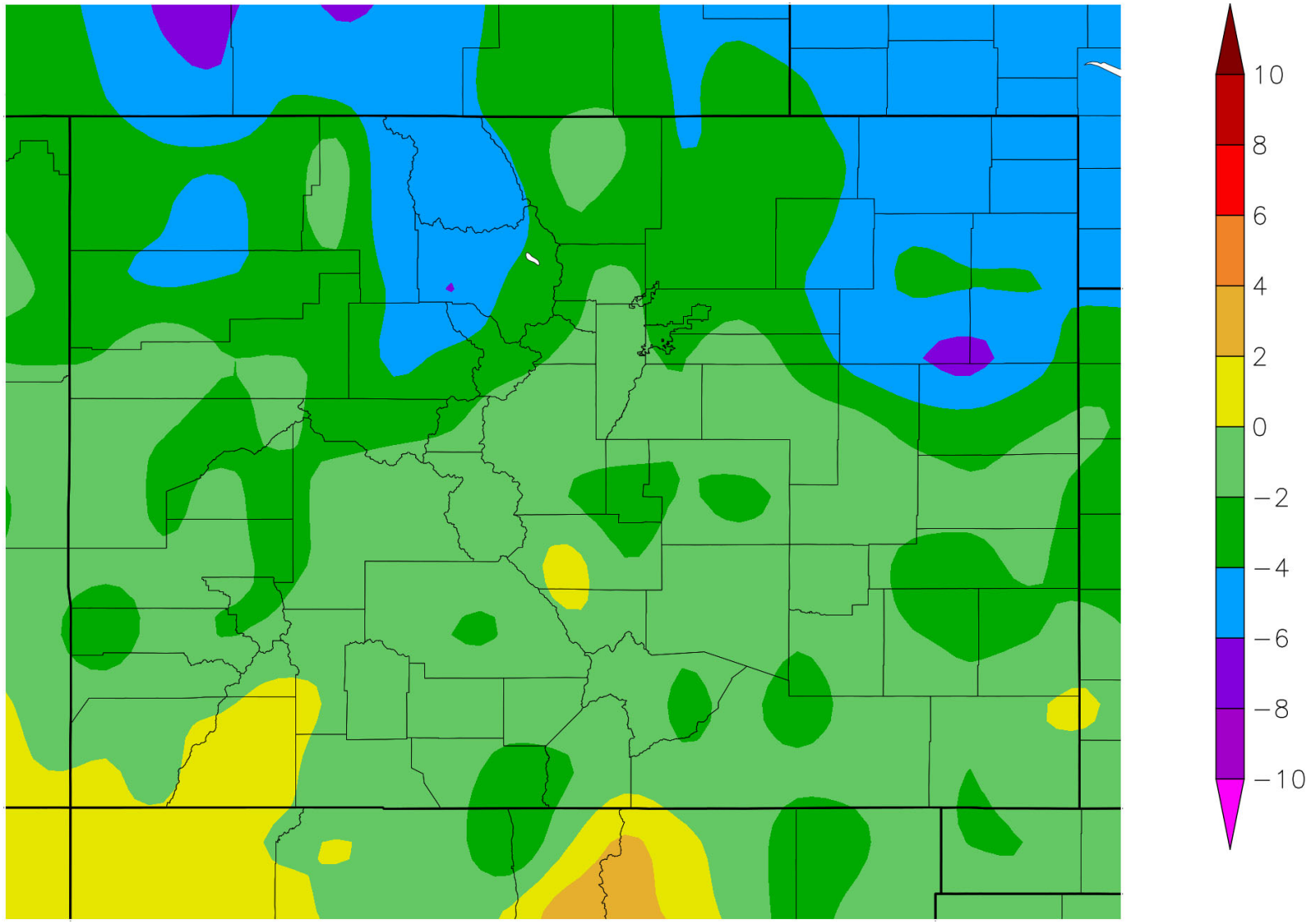


Colorado statewide average temperature and precipitation, October - March
warm & dry
warm & wet
cool & dry
cool & wet
avg temp (F)
2022
normal TAVG: 33.4F
normal precip: 7.15"
accumulated precipitation (inches)
size of points proportional to precip,
color shows temp
normals are 1991-2020
Colorado Climate Center/CSU
Data source: NOAA/NCEI Climate at a Glance


average temperature rank: March 2022
statewide anomaly from 1901-2000 avg: +1.3°F
statewide rank: 55th warmest/74th coldest
source: NOAA/NCEI nclimgrid
map: Colorado Climate Center/Colorado State University
map generated 08 April 2022
record coldest
10th coldest
20th coldest
35th coldest
35th warmest
20th warmest
10th warmest
record warmest
temperature rank out of 128 years (1895-2022)


Colorado - Mean Temperature
October-March 2022 Percentile
41°N
40°N
39°N
38°N
37°N
109°W
108°W
107°W
106°W
105°W
104°W
103°W
102°W
RECORD WARMEST
MUCH ABOVE NORMAL Top 10%
ABOVE NORMAL Top 33%
NEAR NORMAL
BELOW NORMAL Bottom 33%
MUCH BELOW NORMAL Bottom 10%
RECORD COLDEST
Rankings (1895-2010)
WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 APR 2022

Departure from Normal Temperature (F)
4/1/2022 - 4/17/2022



Generated 4/18/2022 at HPRCC using provisional data.

NOAA Regional Climate Centers

The wind has been relentless!

This is not only irritating, but evaporates moisture at much higher than normal rates

Maximum 3-day wind run (miles) at select CoAgMET stations

Fort Collins

date	Station	windrun_3day
2014-04-29	ftc01	1249.46
2014-04-30	ftc01	1238.89
1998-02-28	ftc01	1132.01
1998-03-01	ftc01	1113.31
1999-05-06	ftc01	1101.45

Kersey

date	Station	windrun_3day
2014-04-29	ksy01	1437.23
2022-04-07	ksy01	1312.40
1999-05-06	ksy01	1311.33
2014-04-30	ksy01	1274.49
1998-02-27	ksy01	1246.16

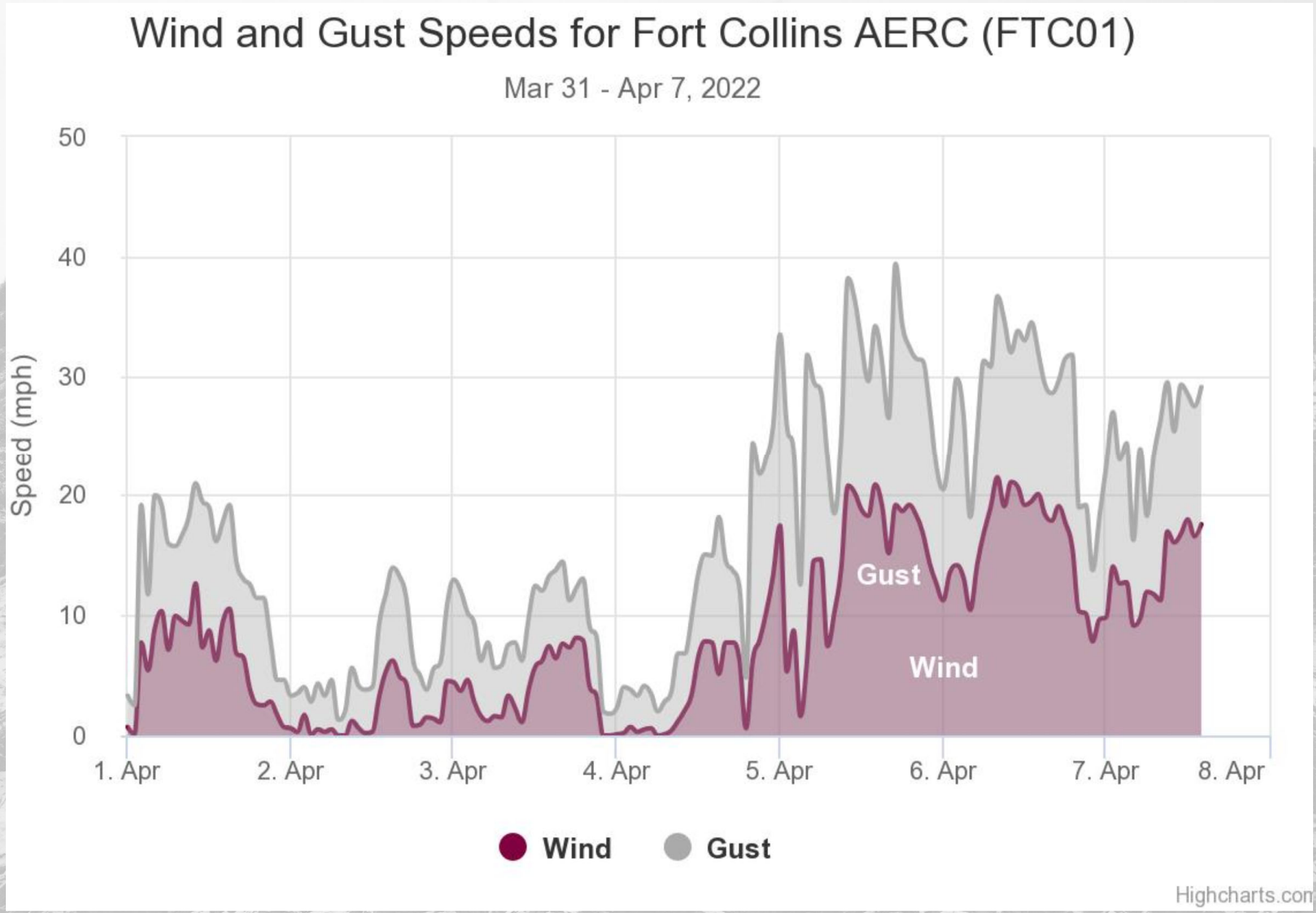
Yuma

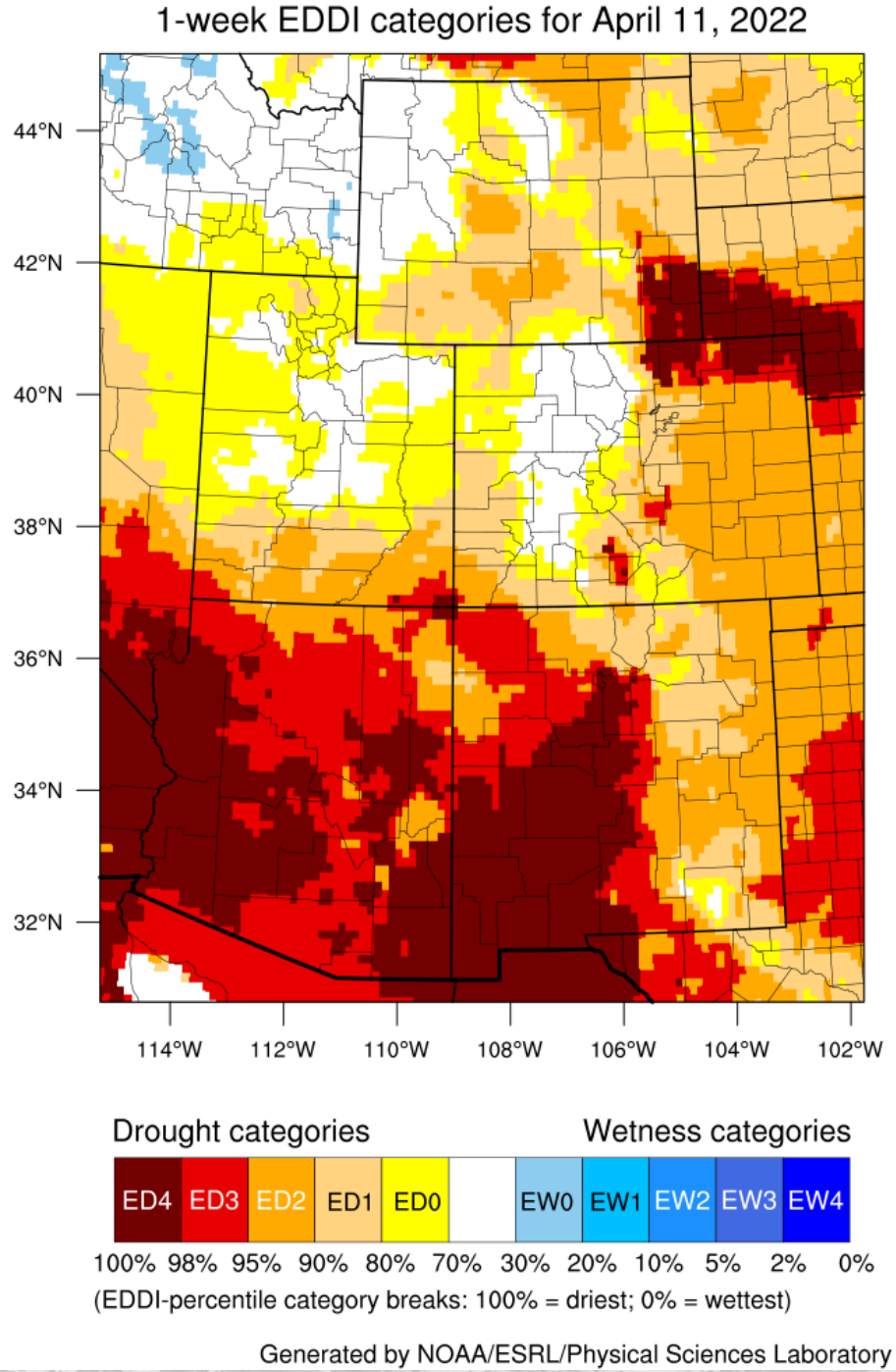
date	Station	windrun_3day
2014-04-29	yum02	1730.51
1998-03-01	yum02	1650.36
2014-04-30	yum02	1619.97
1998-02-28	yum02	1586.36
1998-02-27	yum02	1553.43
1999-05-06	yum02	1541.63
2022-04-07	yum02	1494.59

Burlington

date	Station	windrun_3day
2014-04-30	brl02	1669.12
2014-04-29	brl02	1618.67
2022-04-07	brl02	1596.11
2021-01-16	brl02	1524.91
1998-03-01	brl02	1517.39

*dates are the last day of the 3-day period


Wind and Gust Speeds for Fort Collins AERC (FTC01)
Mar 31 - Apr 7, 2022
Speed (mph)
50
40
30
20
10
0
1. Apr
2. Apr
3. Apr
4. Apr
5. Apr
6. Apr
7. Apr
8. Apr
Gust
Wind
Wind
Gust
Highcharts.com

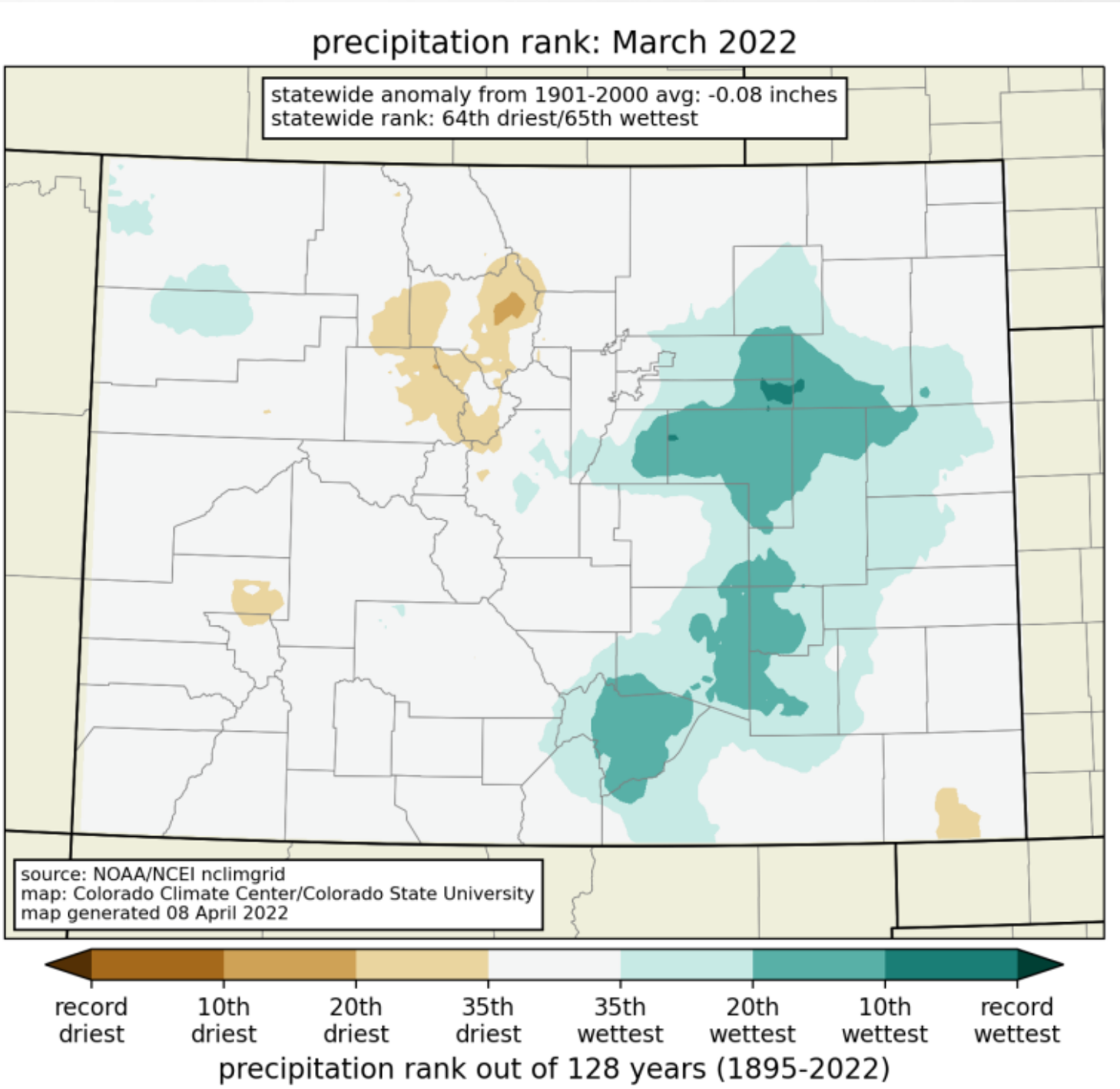

1-week EDDI categories for April 11, 2022
44°N
42°N
40°N
38°N
36°N
34°N
32°N
114°W
112°W
110°W
108°W
106°W
104°W
102°W
Drought categories
Wetness categories
ED4
ED3
ED2
ED1
ED0
EW0
EW1
EW2
EW3
EW4
100% 98% 95% 90% 80% 70% 30% 20% 10% 5% 2% 0%
(EDDI-percentile category breaks: 100% = driest; 0% = wettest)
Generated by NOAA/ESRL/Physical Sciences Laboratory

Is it Getting Windier?

We get asked this frequently, but the evidence available does not support the claim (though evidence is more limited for wind than temperature and precipitation)

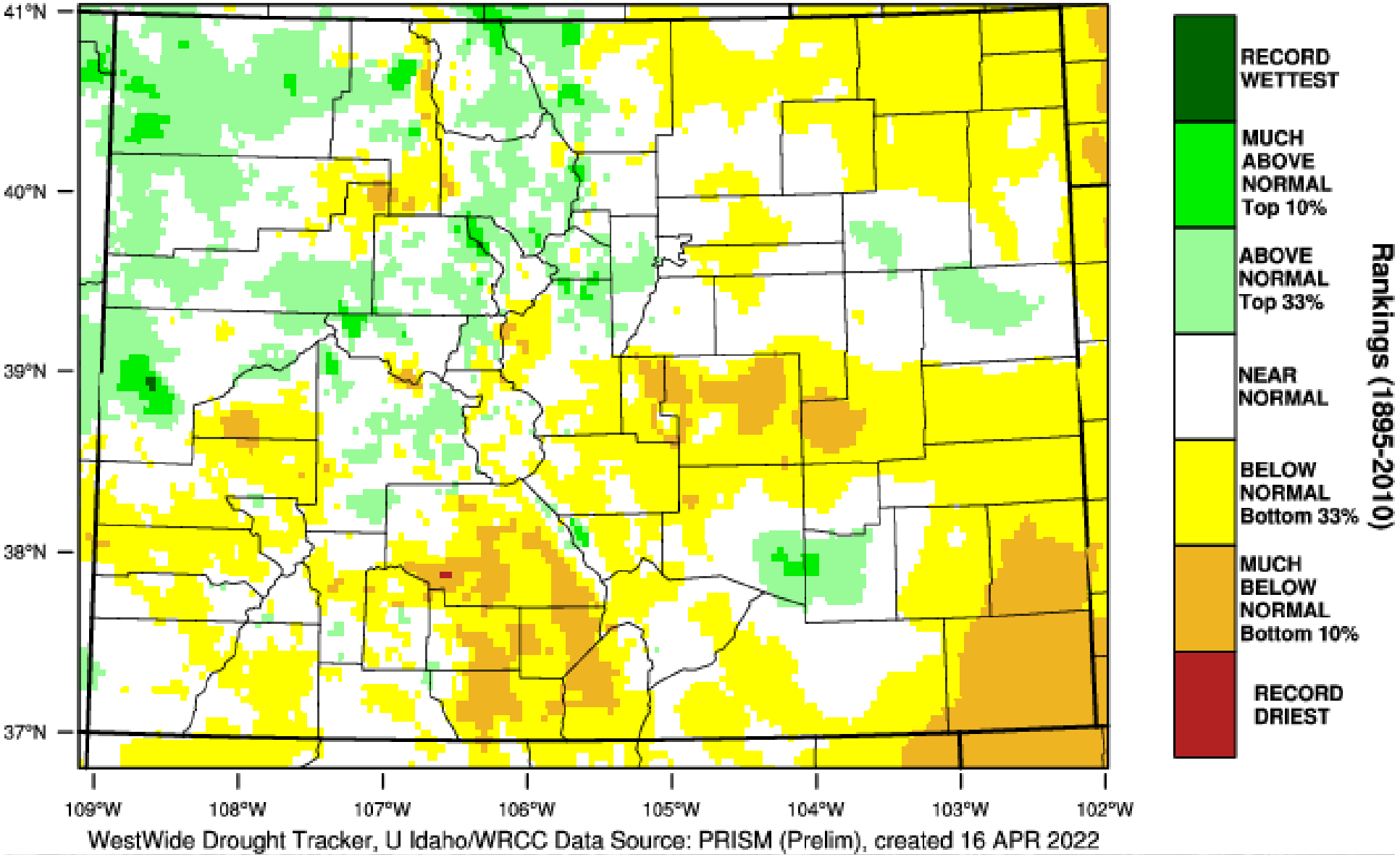
Climate models do not suggest that we should expect a windier future

April is the windiest month of the year in Colorado, and La Niña springs are significantly more windy than El Niño


precipitation rank: March 2022
statewide anomaly from 1901-2000 avg: -0.08 inches
statewide rank: 64th driest/65th wettest
source: NOAA/NCEI nclimgrid
map: Colorado Climate Center/Colorado State University
map generated 08 April 2022
record driest
10th driest
20th driest
35th driest
35th wettest
20th wettest
10th wettest
record wettest
precipitation rank out of 128 years (1895-2022)

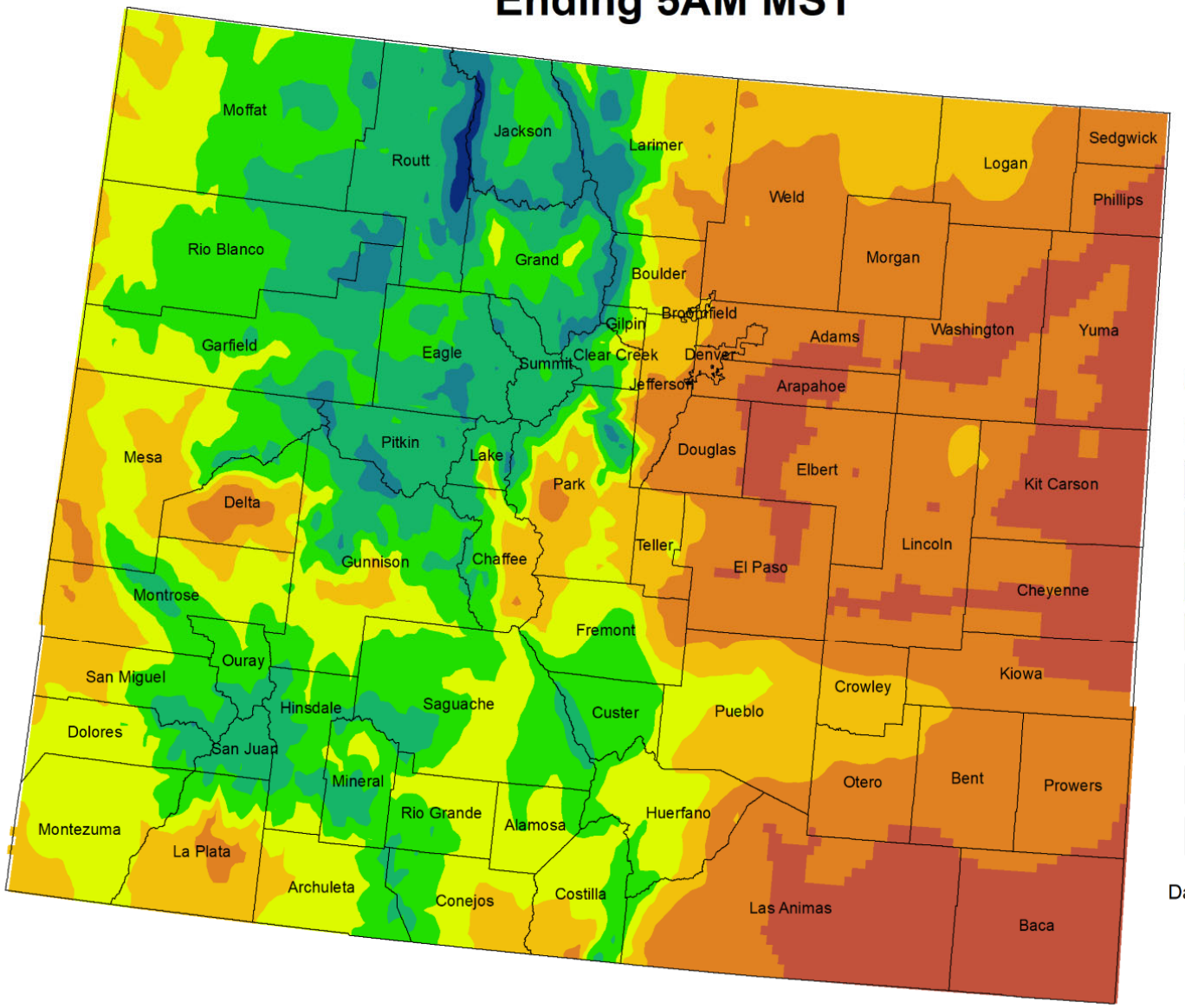
Colorado - Precipitation

October-March 2022 Percentile



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 APR 2022

Colorado Month to Date Precipitation
1 - 18 April 2022
Ending 5AM MST

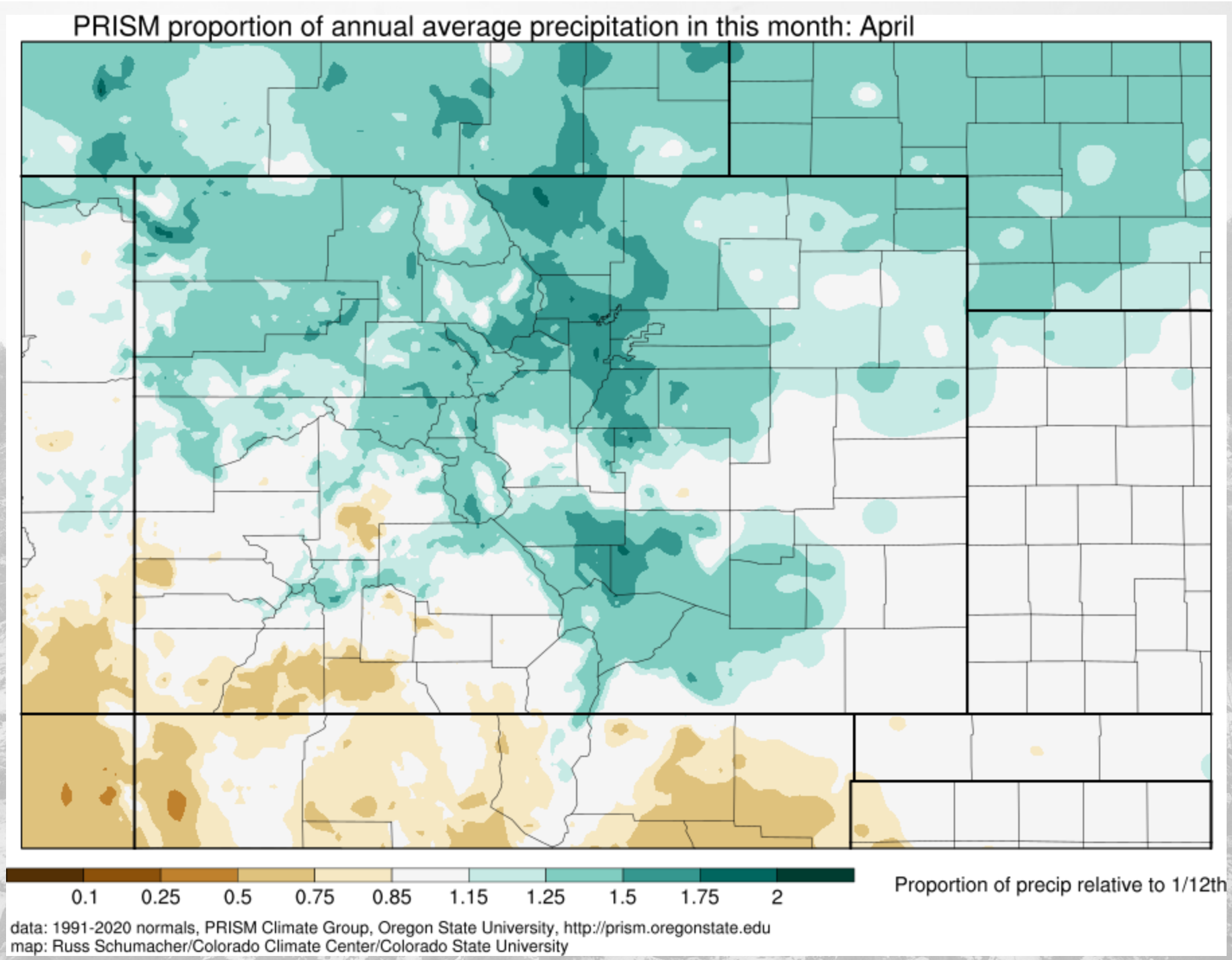


01_18apr22

Precip (inches)

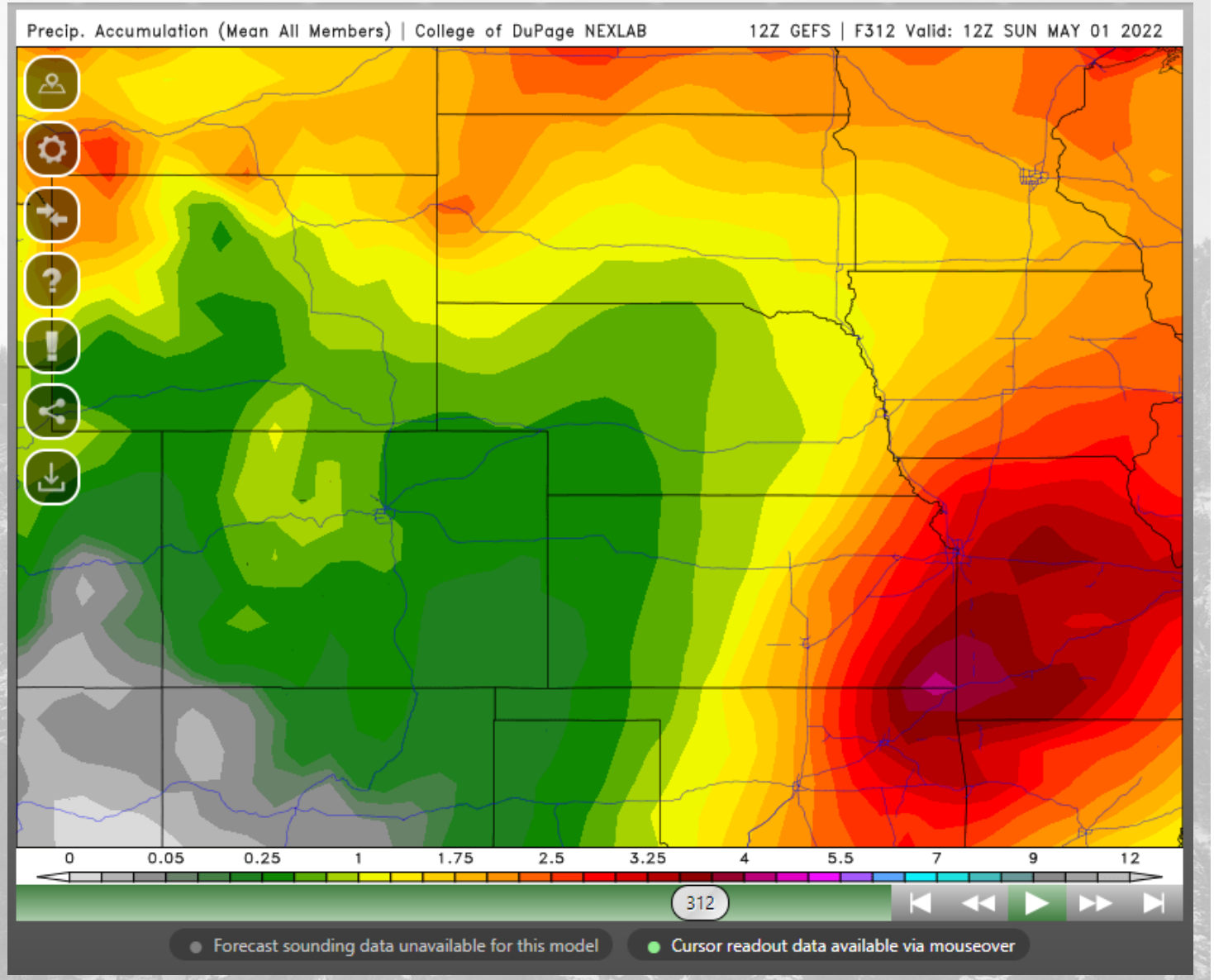
- 0.00
- 0.01 - 0.10
- 0.11 - 0.25
- 0.26 - 0.50
- 0.51 - 1.00
- 1.01 - 2.00
- 2.01 - 4.00
- 4.01 - 5.75

Data from PRISM Climate Group

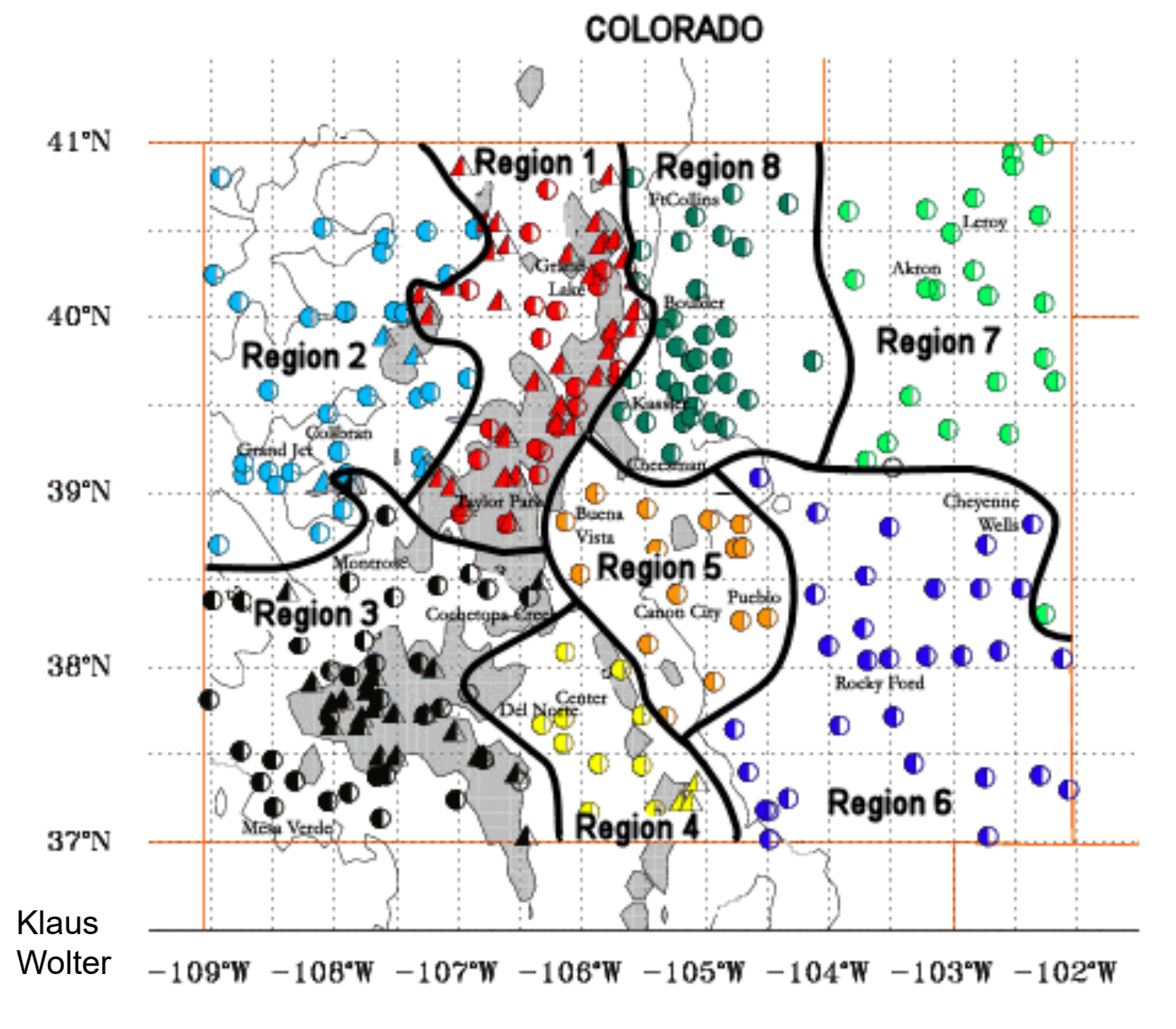

PRISM proportion of annual average precipitation in this month: April
0.1
0.25
0.5
0.75
0.85
1.15
1.25
1.5
1.75
2
Proportion of precip relative to 1/12th
data: 1991-2020 normals, PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu
map: Russ Schumacher/Colorado Climate Center/Colorado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

Weather model forecasts for the remainder of April show wimpy precipitation amounts: near normal in the northern Rockies, well below normal everywhere else

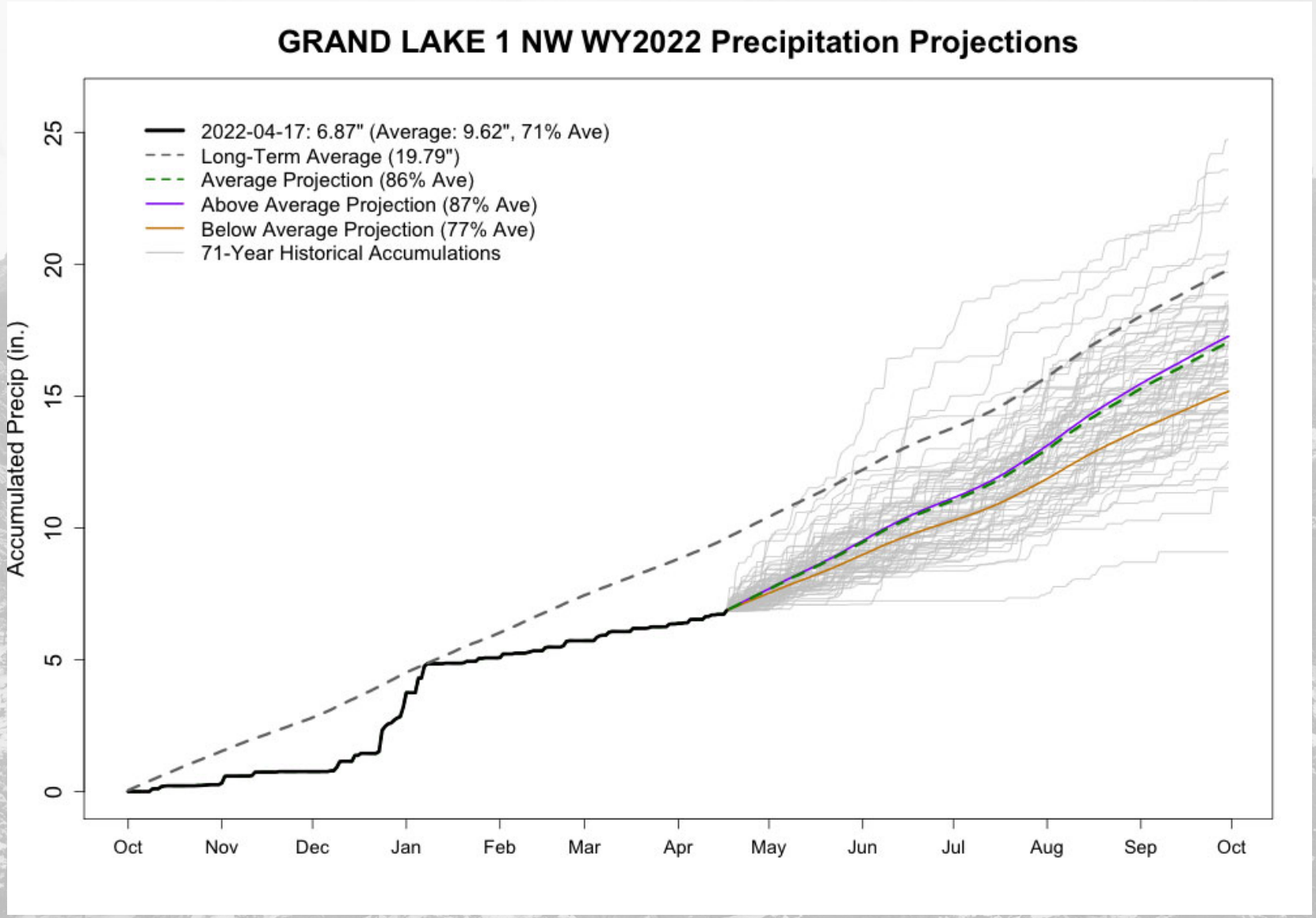
Probably not done with wind

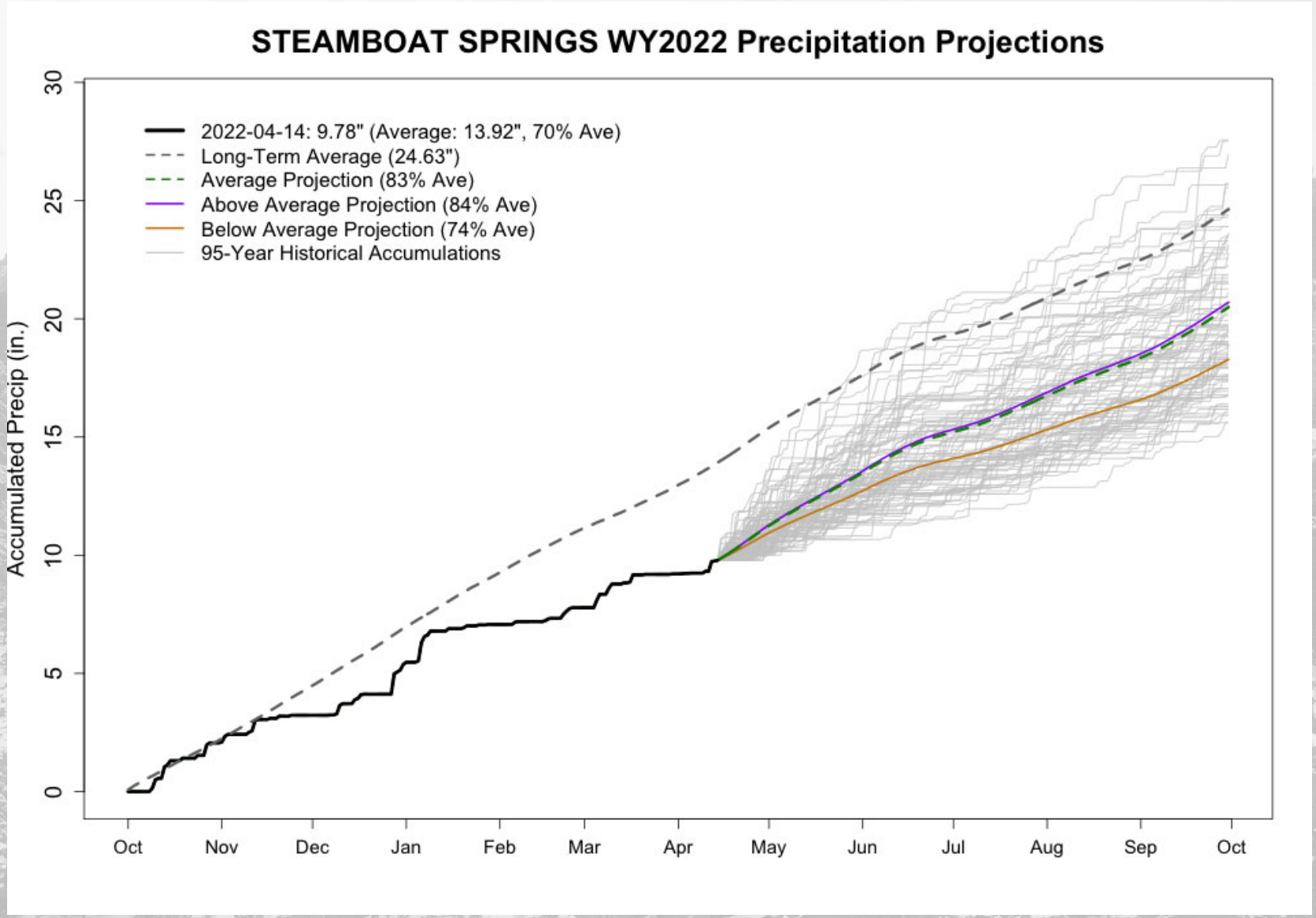


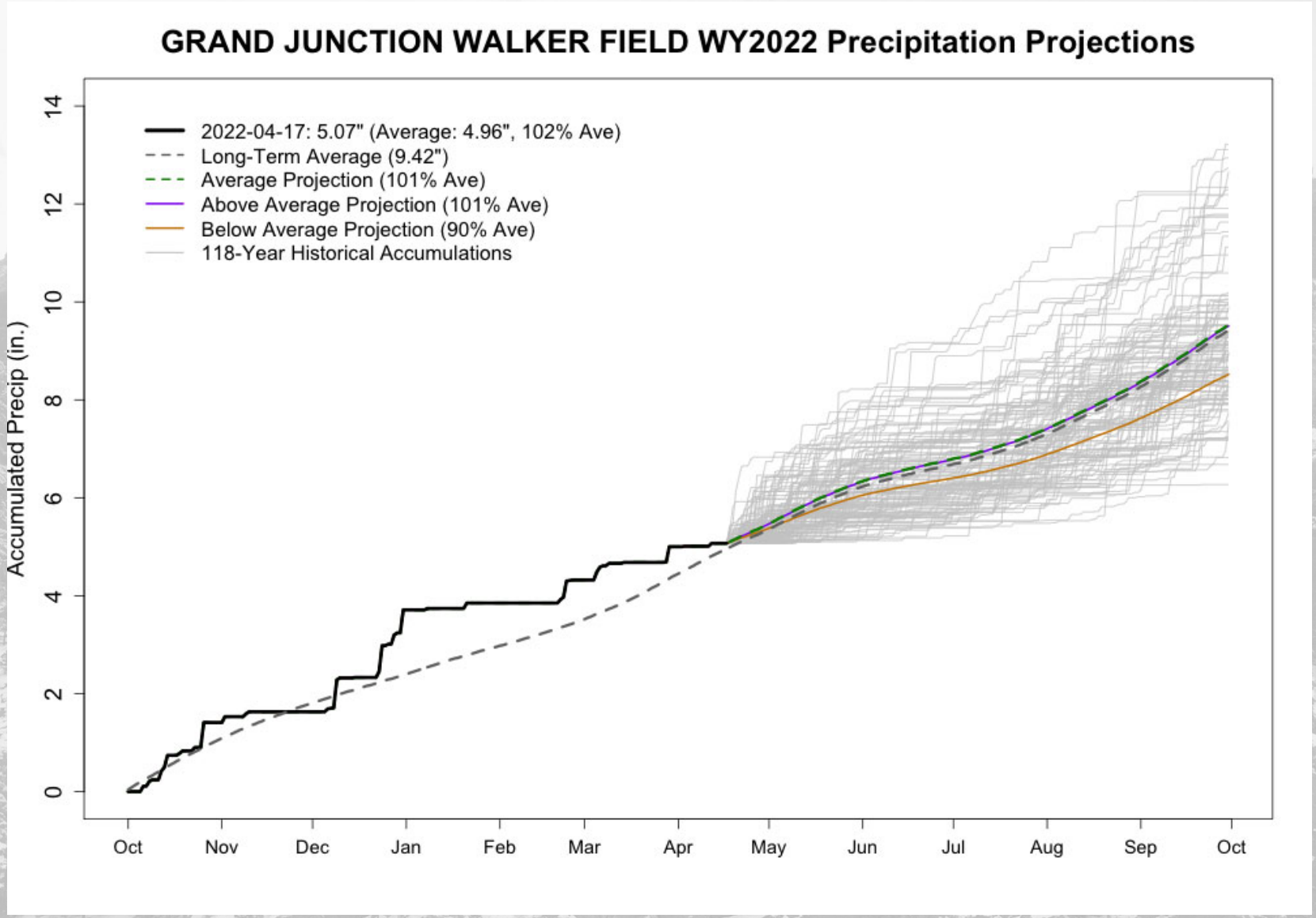
Climate divisions defined by Dr. Klaus Wolter of NOAA's Climate Diagnostic Center in Boulder, CO

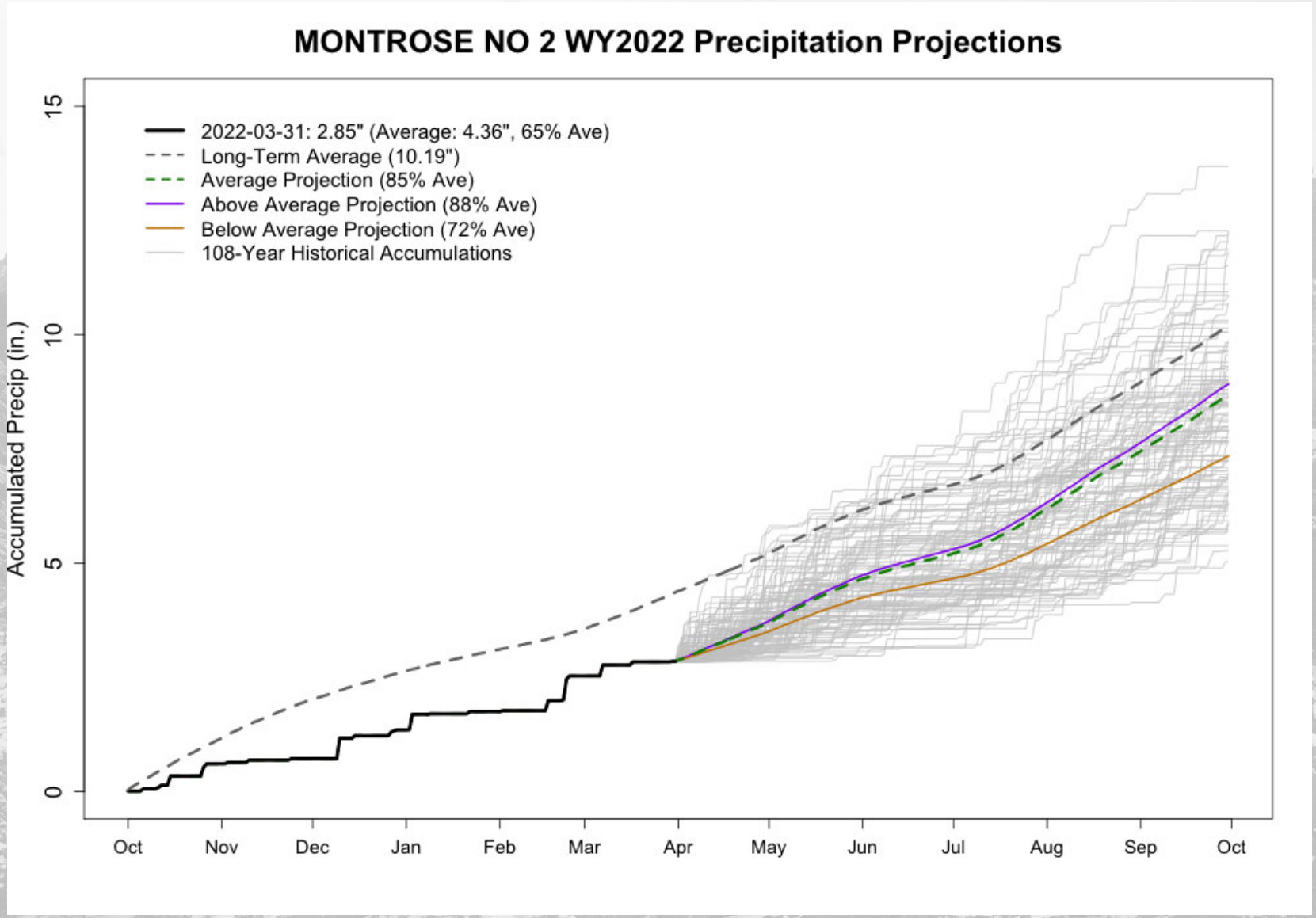


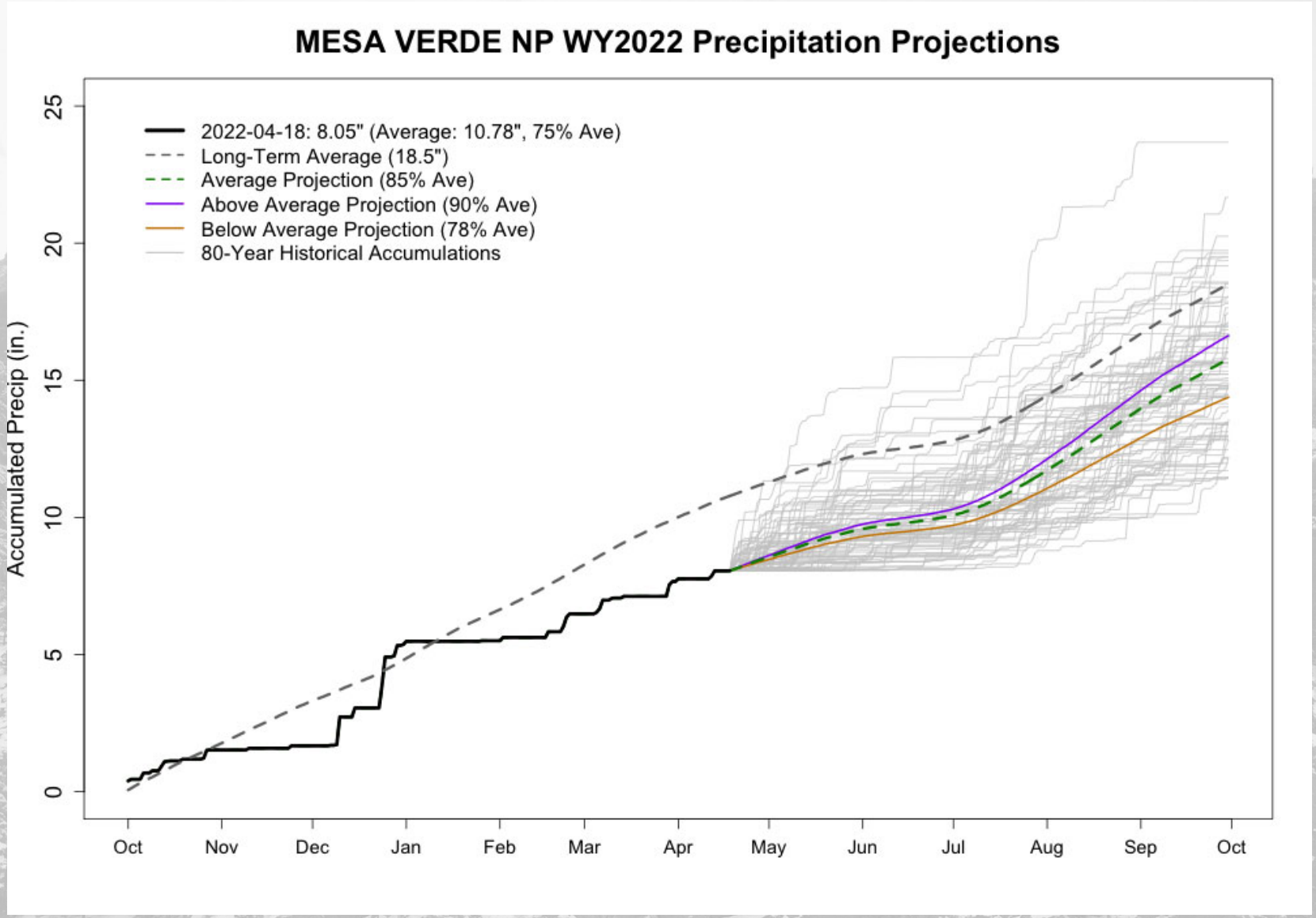
Klaus Wolter

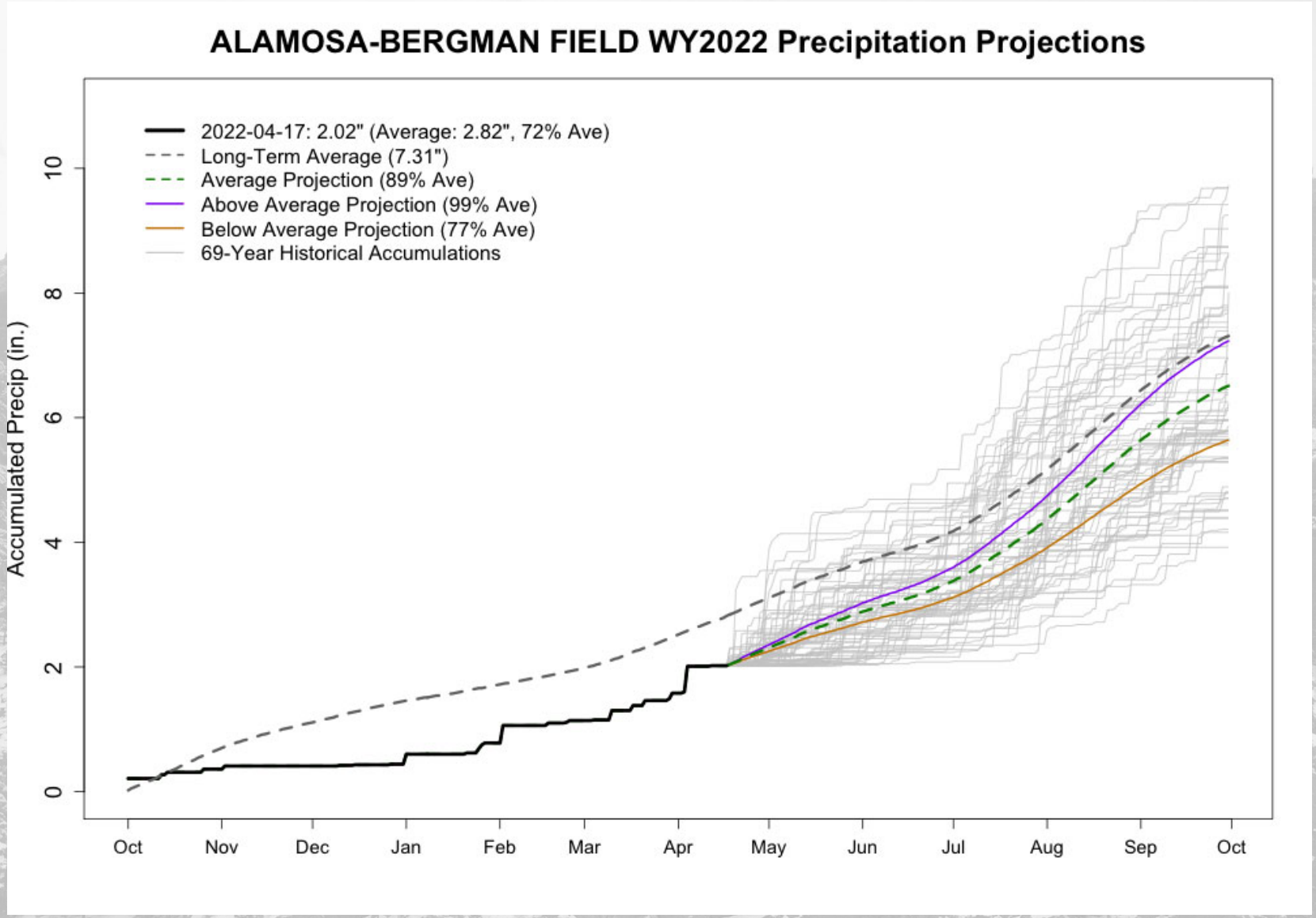

GRAND LAKE 1 NW WY2022 Precipitation Projections
2022-04-17: 6.87" (Average: 9.62", 71% Ave)
Long-Term Average (19.79")
Average Projection (86% Ave)
Above Average Projection (87% Ave)
Below Average Projection (77% Ave)
71-Year Historical Accumulations
Accumulated Precip (in.)
0
5
10
15
20
25
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct

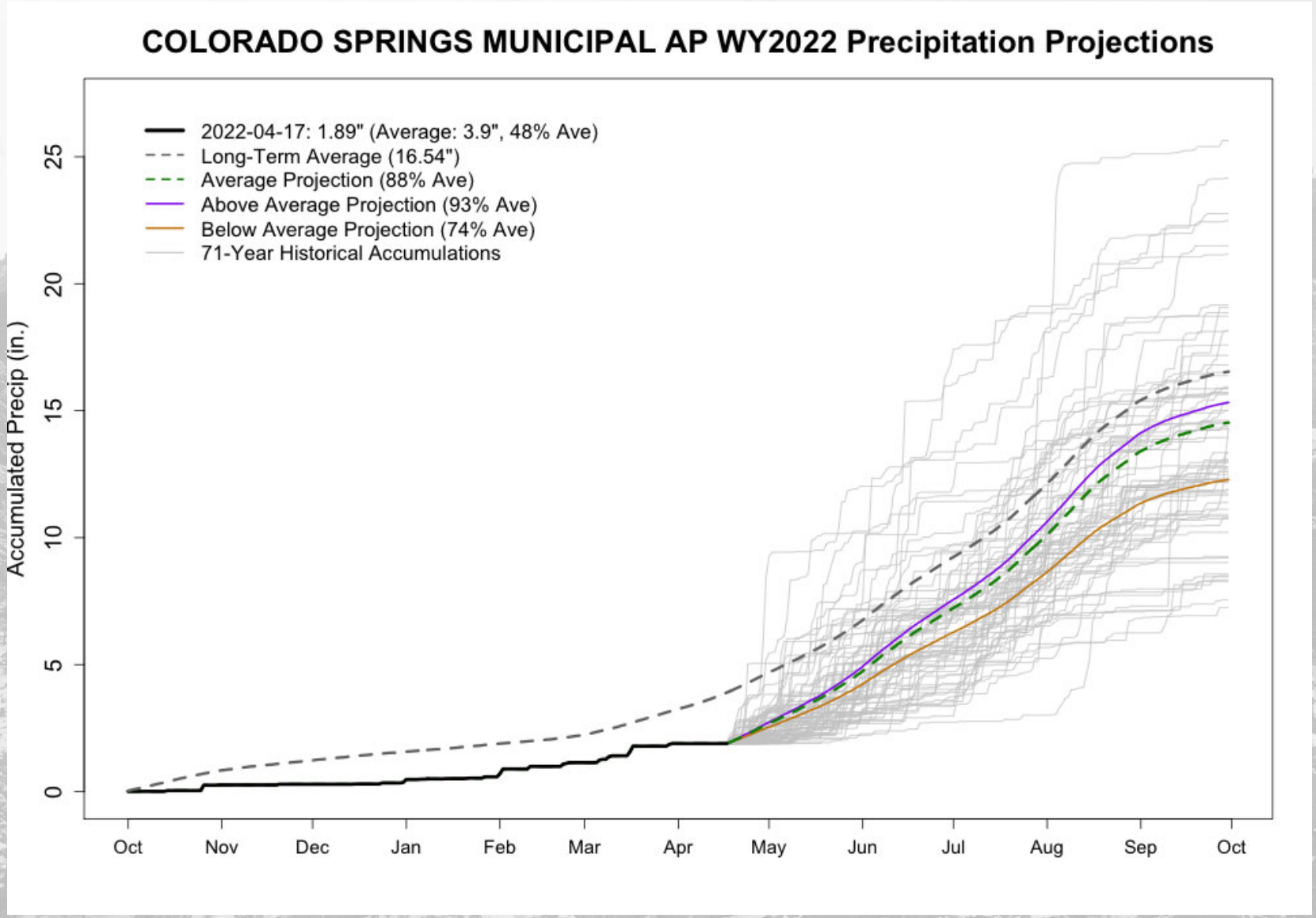

STEAMBOAT SPRINGS WY2022 Precipitation Projections
2022-04-14: 9.78" (Average: 13.92", 70% Ave)
Long-Term Average (24.63")
Average Projection (83% Ave)
Above Average Projection (84% Ave)
Below Average Projection (74% Ave)
95-Year Historical Accumulations
Accumulated Precip (in.)
0
5
10
15
20
25
30
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct

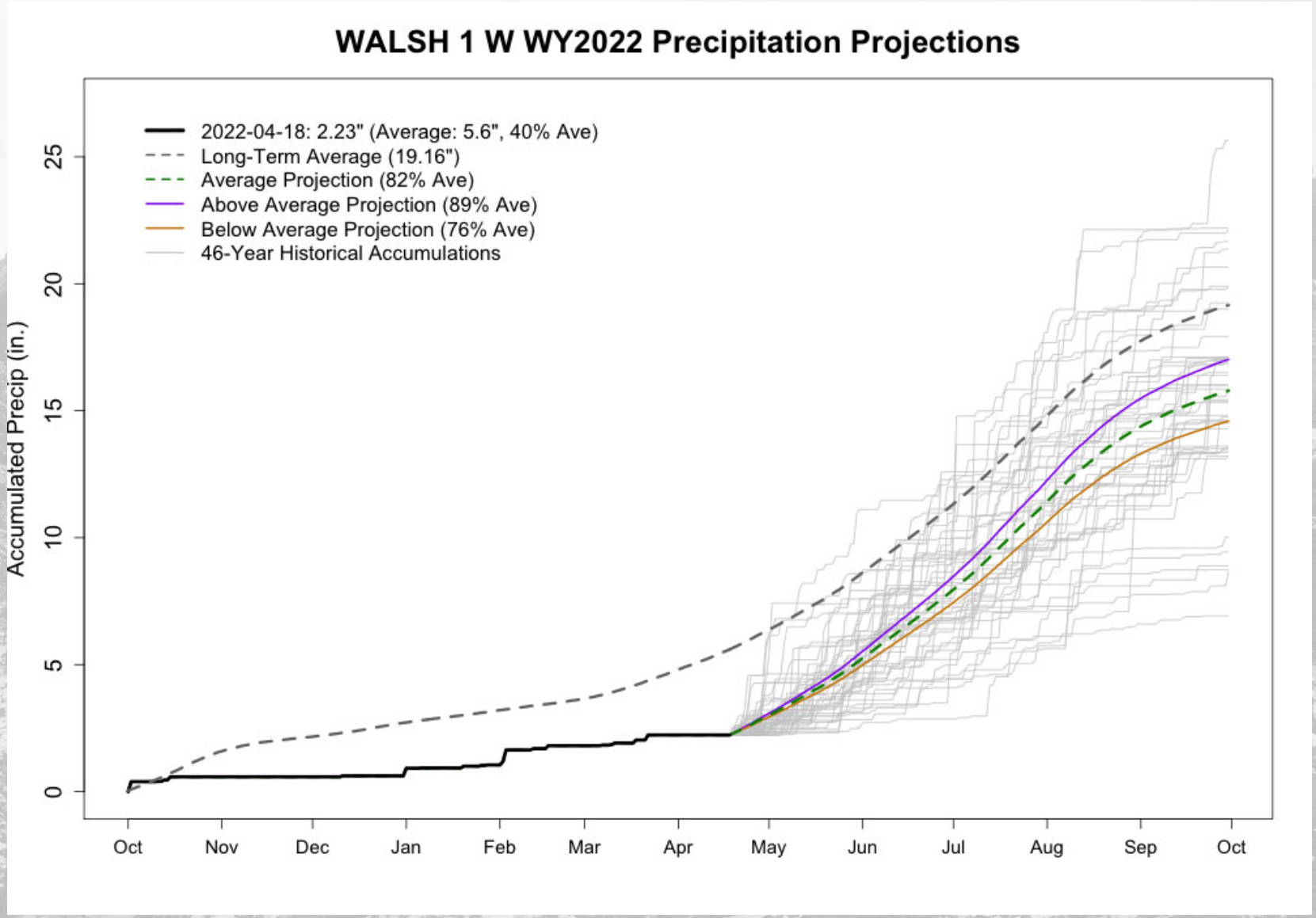

GRAND JUNCTION WALKER FIELD WY2022 Precipitation Projections
2022-04-17: 5.07" (Average: 4.96", 102% Ave)
Long-Term Average (9.42")
Average Projection (101% Ave)
Above Average Projection (101% Ave)
Below Average Projection (90% Ave)
118-Year Historical Accumulations
Accumulated Precip (in.)
0
2
4
6
8
10
12
14
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct

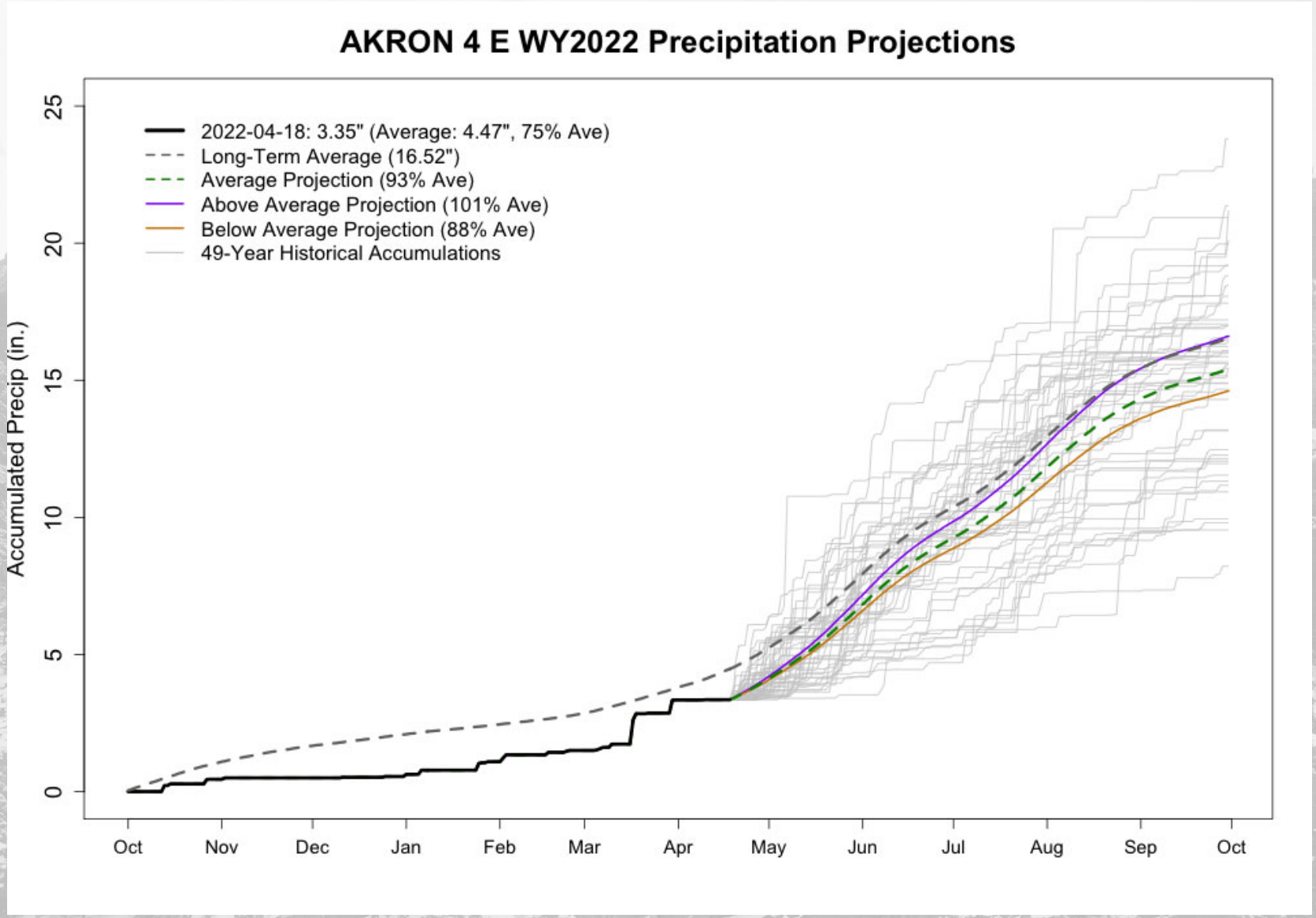

MONTROSE NO 2 WY2022 Precipitation Projections
2022-03-31: 2.85" (Average: 4.36", 65% Ave)
Long-Term Average (10.19")
Average Projection (85% Ave)
Above Average Projection (88% Ave)
Below Average Projection (72% Ave)
108-Year Historical Accumulations
Accumulated Precip (in.)
0
5
10
15
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct

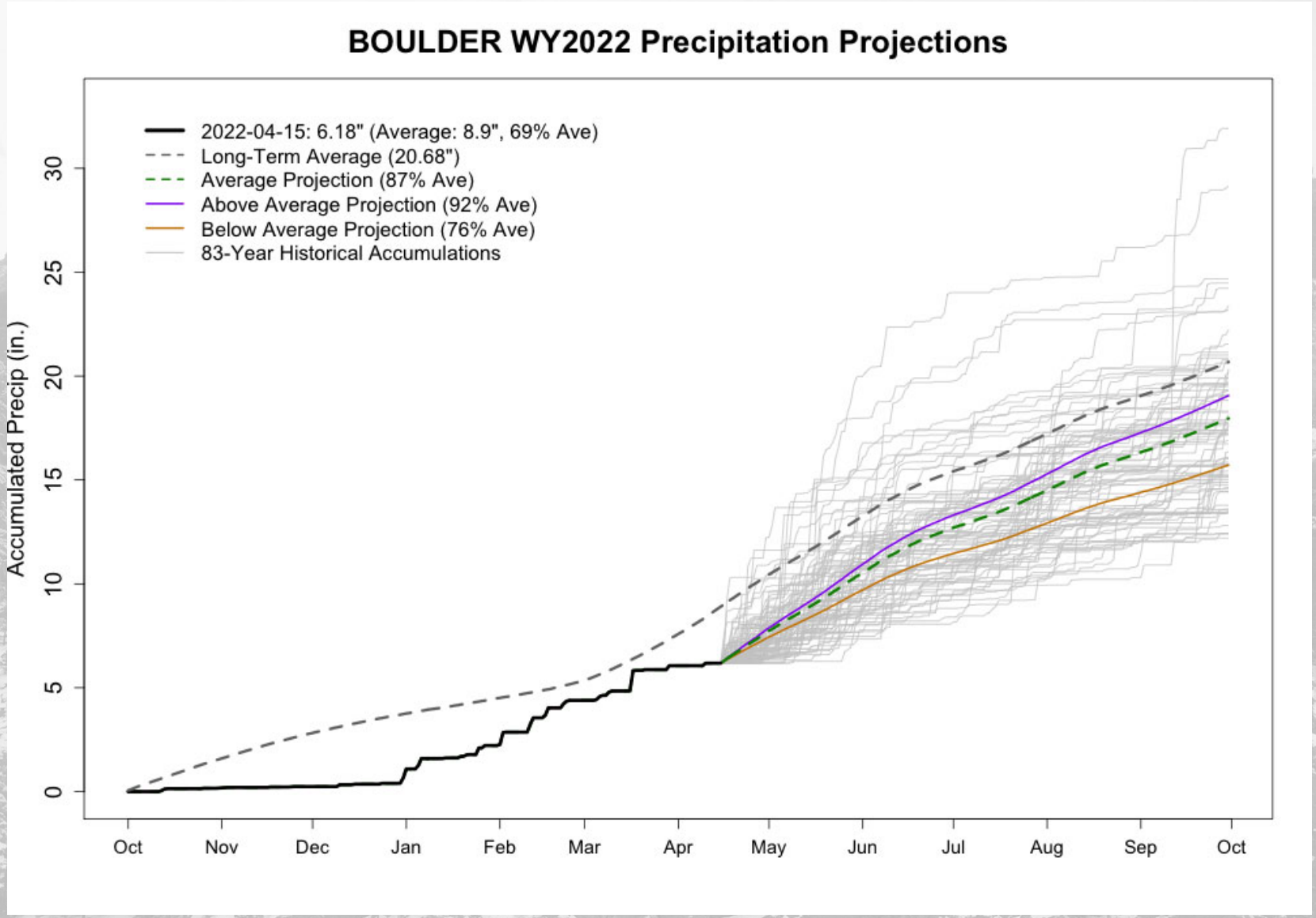

MESA VERDE NP WY2022 Precipitation Projections
2022-04-18: 8.05" (Average: 10.78", 75% Ave)
Long-Term Average (18.5")
Average Projection (85% Ave)
Above Average Projection (90% Ave)
Below Average Projection (78% Ave)
80-Year Historical Accumulations
Accumulated Precip (in.)
0
5
10
15
20
25
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct

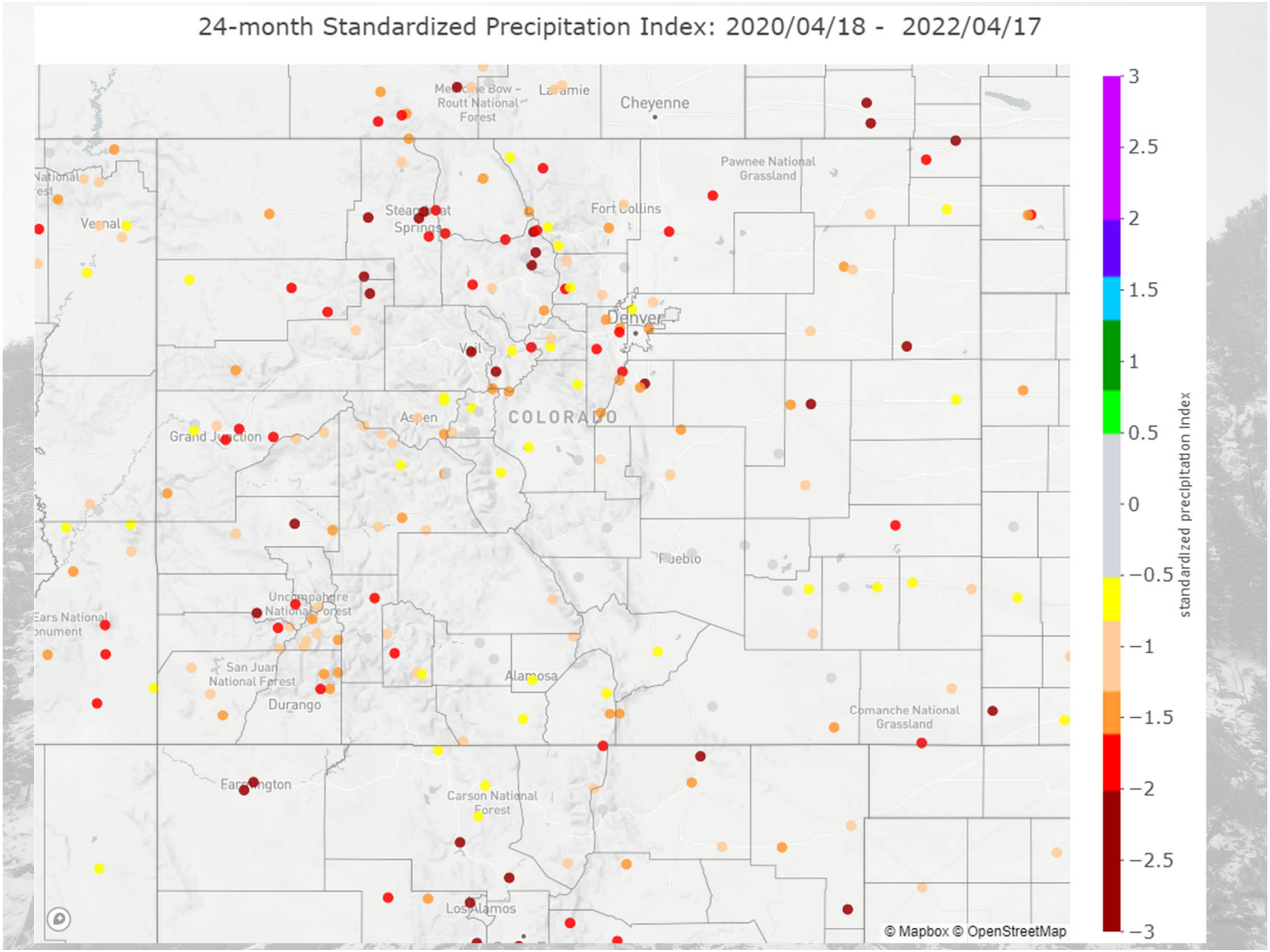

ALAMOSA-BERGMAN FIELD WY2022 Precipitation Projections
2022-04-17: 2.02" (Average: 2.82", 72% Ave)
Long-Term Average (7.31")
Average Projection (89% Ave)
Above Average Projection (99% Ave)
Below Average Projection (77% Ave)
69-Year Historical Accumulations
Accumulated Precip (in.)
0
2
4
6
8
10
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct

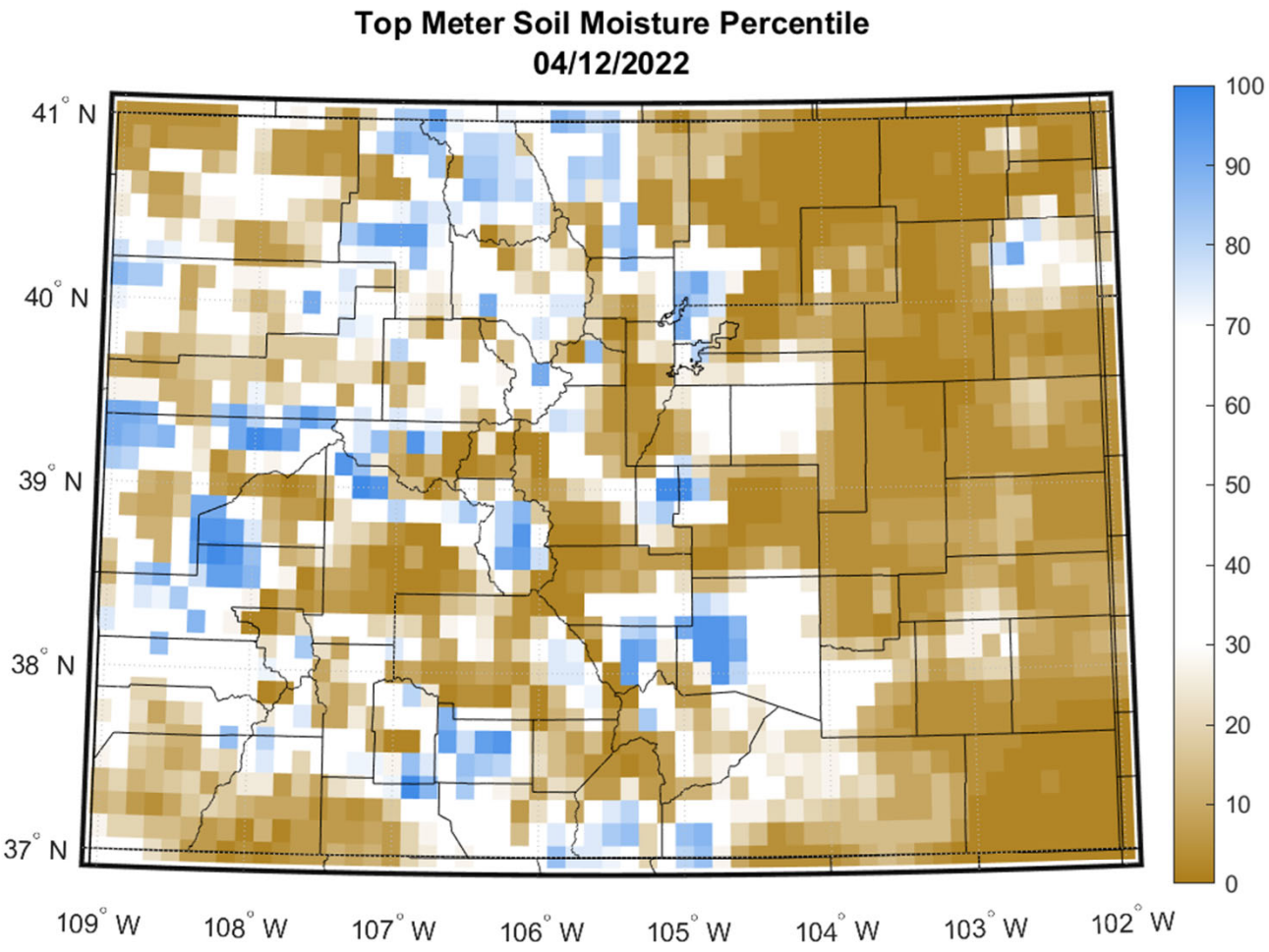

COLORADO SPRINGS MUNICIPAL AP WY2022 Precipitation Projections
2022-04-17: 1.89" (Average: 3.9", 48% Ave)
Long-Term Average (16.54")
Average Projection (88% Ave)
Above Average Projection (93% Ave)
Below Average Projection (74% Ave)
71-Year Historical Accumulations
Accumulated Precip (in.)
0
5
10
15
20
25
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct


WALSH 1 W WY2022 Precipitation Projections
2022-04-18: 2.23" (Average: 5.6", 40% Ave)
Long-Term Average (19.16")
Average Projection (82% Ave)
Above Average Projection (89% Ave)
Below Average Projection (76% Ave)
46-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


AKRON 4 E WY2022 Precipitation Projections
2022-04-18: 3.35" (Average: 4.47", 75% Ave)
Long-Term Average (16.52")
Average Projection (93% Ave)
Above Average Projection (101% Ave)
Below Average Projection (88% Ave)
49-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


BOULDER WY2022 Precipitation Projections
2022-04-15: 6.18" (Average: 8.9", 69% Ave)
Long-Term Average (20.68")
Average Projection (87% Ave)
Above Average Projection (92% Ave)
Below Average Projection (76% Ave)
83-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


24-month Standardized Precipitation Index: 2020/04/18 - 2022/04/17
Cheyenne
Laramie
Pawnee National Grassland
Fort Collins
Steamboat Springs
Vernal
Denver
Vail
Aspen
COLORADO
Grand Junction
Pueblo
Uncompahgre National Forest
San Juan National Forest
Durango
Alamosa
Comanche National Grassland
Farmington
Carson National Forest
Los Alamos
© Mapbox © OpenStreetMap
standardized precipitation index
3
2.5
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
−2.5
−3

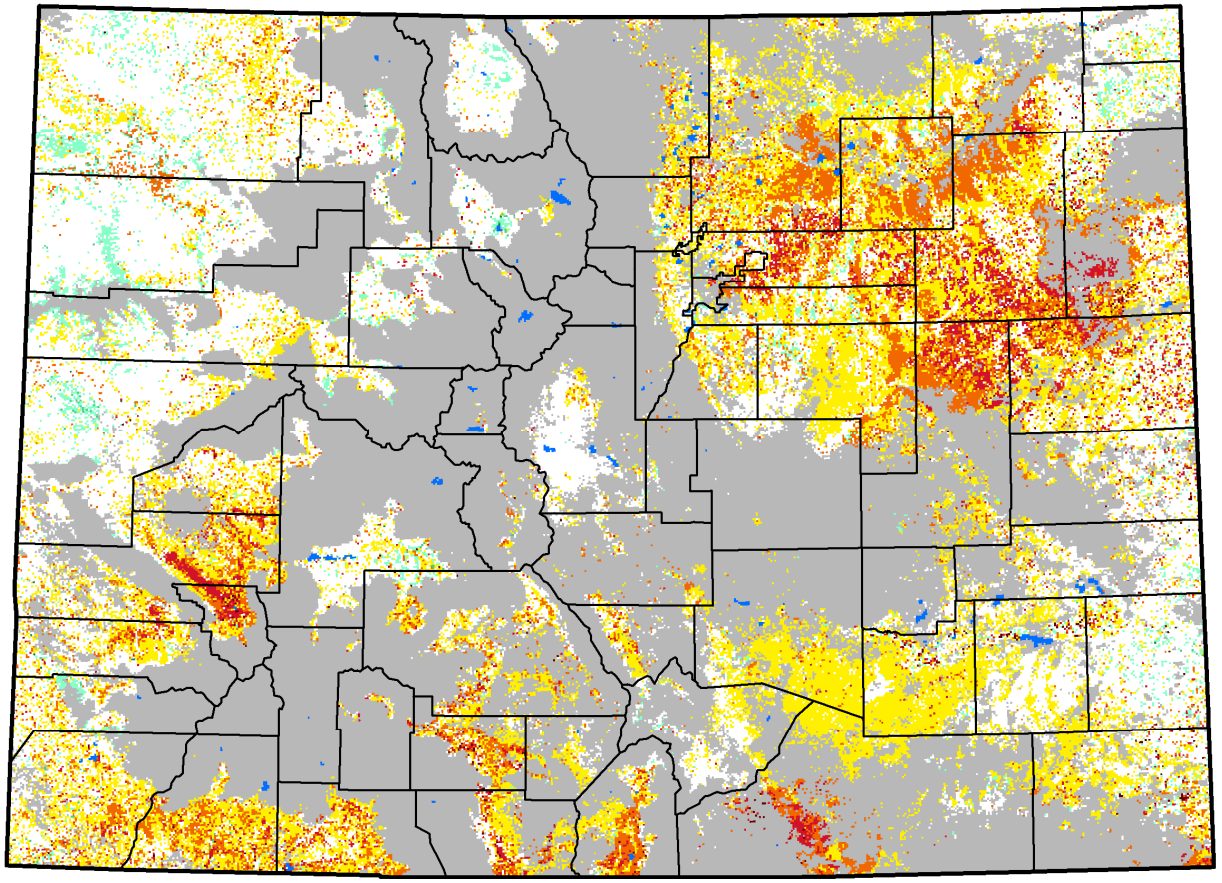


Data from North American Land Data Assimilation Systems NOAH Model

Vegetation Drought Response Index

Complete: Colorado

April 10, 2022



Vegetation Condition

- Extreme Drought
- Severe Drought
- Moderate Drought
- Pre-drought stress
- Near Normal
- Unusually Moist
- Very Moist
- Extreme Moist
- Out of Season
- Water

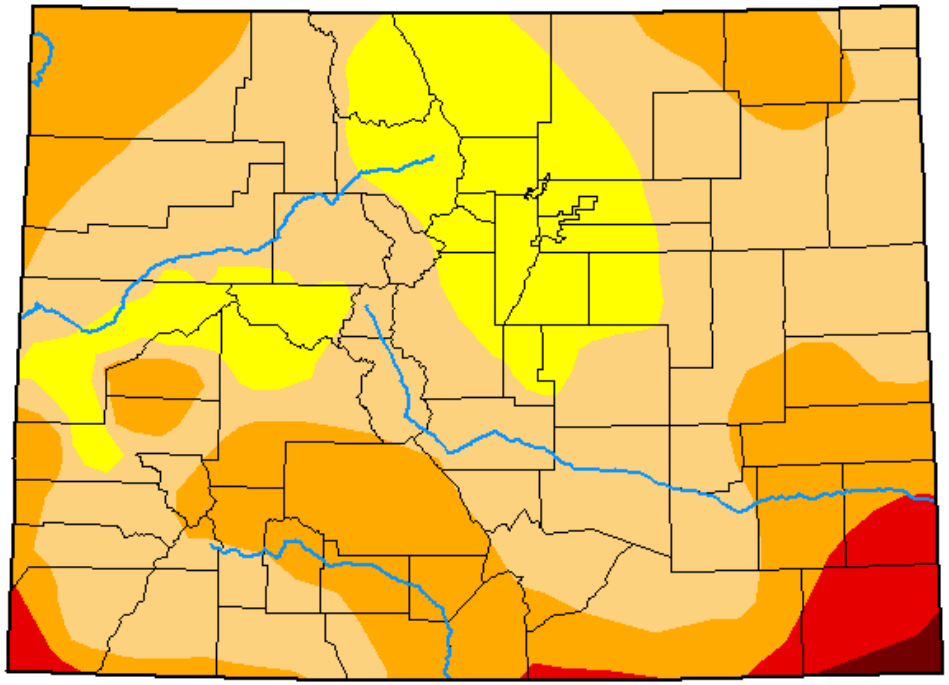
NDMC National Drought Mitigation Center, University of Nebraska

USGS science for a changing world

HPRCC

RMA

U.S. Drought Monitor
Colorado



April 12, 2022

(Released Thursday, Apr. 14, 2022)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	82.90	31.94	4.32	0.53
Last Week *04-05-2022*	0.00	100.00	82.85	31.94	4.32	0.13
3 Months Ago *01-11-2022*	0.00	100.00	88.32	65.93	20.59	0.00
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 *04-13-2021*	0.00	100.00	92.31	61.69	32.13	14.65

Intensity:

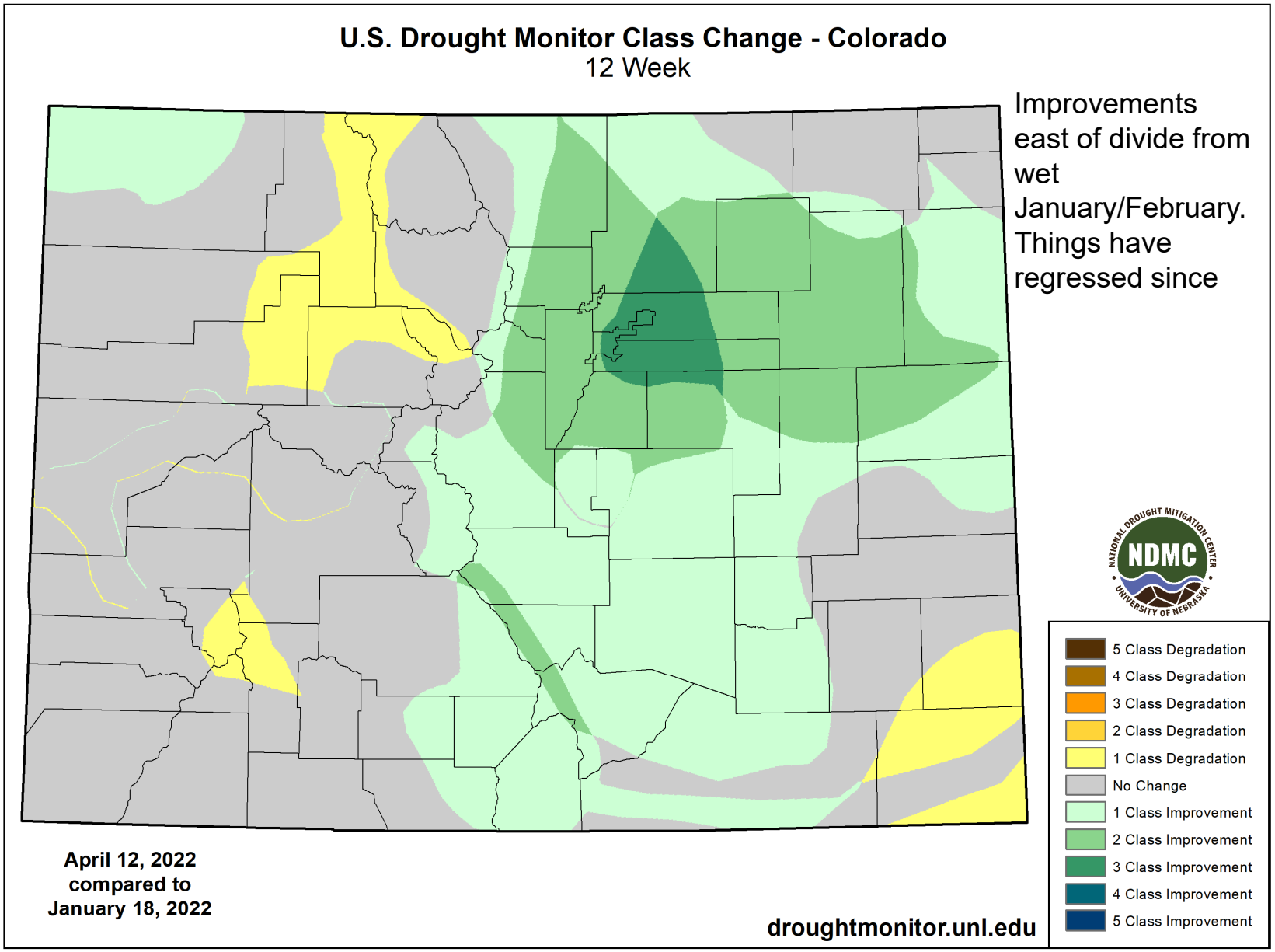
- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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:

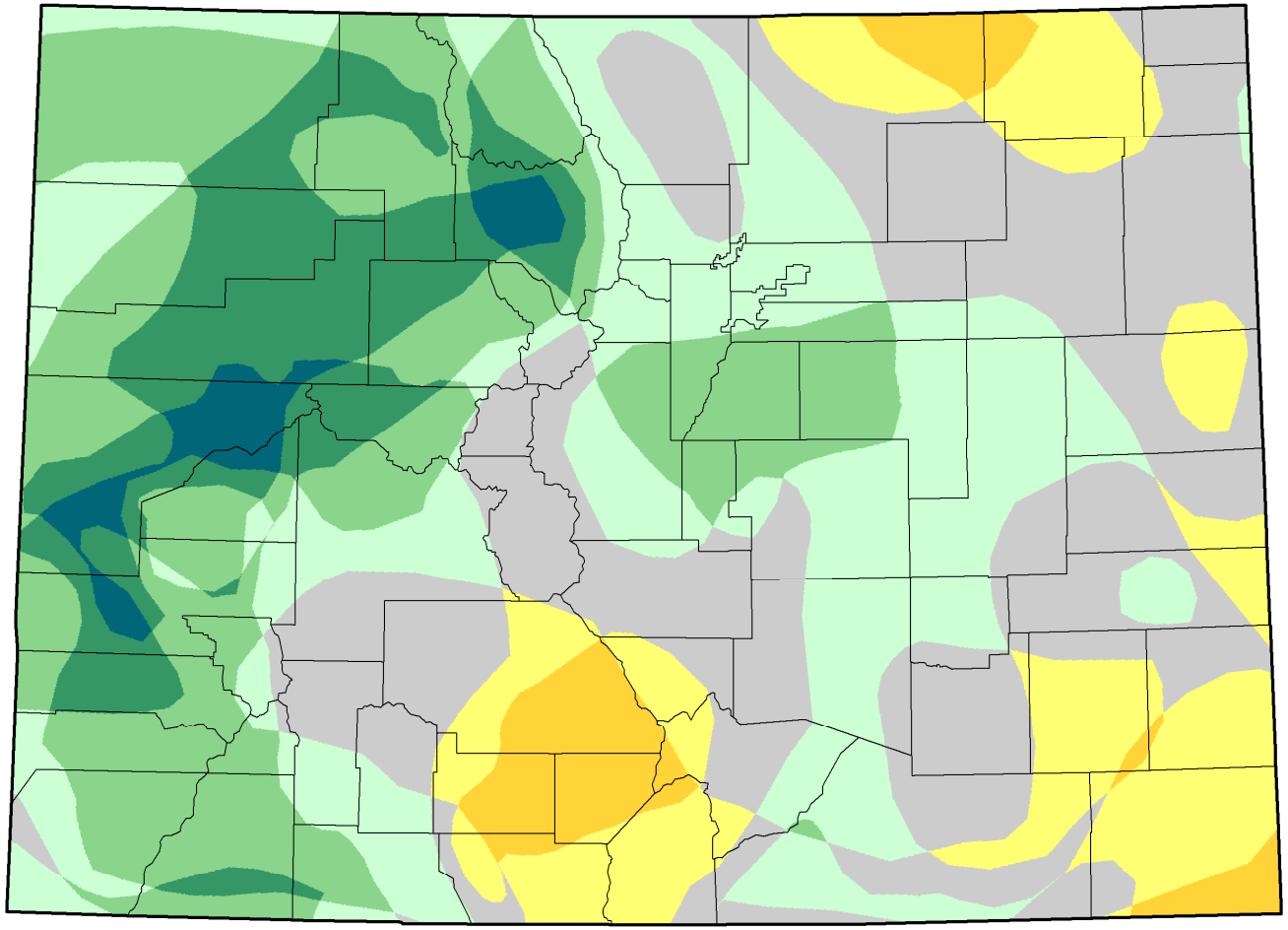
Richard Tinker
CPC/NOAA/NWS/NCEP

droughtmonitor.unl.edu


U.S. Drought Monitor Class Change - Colorado
12 Week
Improvements east of divide from wet January/February. Things have regressed since
NDMC
NATIONAL DROUGHT MITIGATION CENTER
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
April 12, 2022
compared to
January 18, 2022
droughtmonitor.unl.edu

U.S. Drought Monitor Class Change - Colorado

52 Week



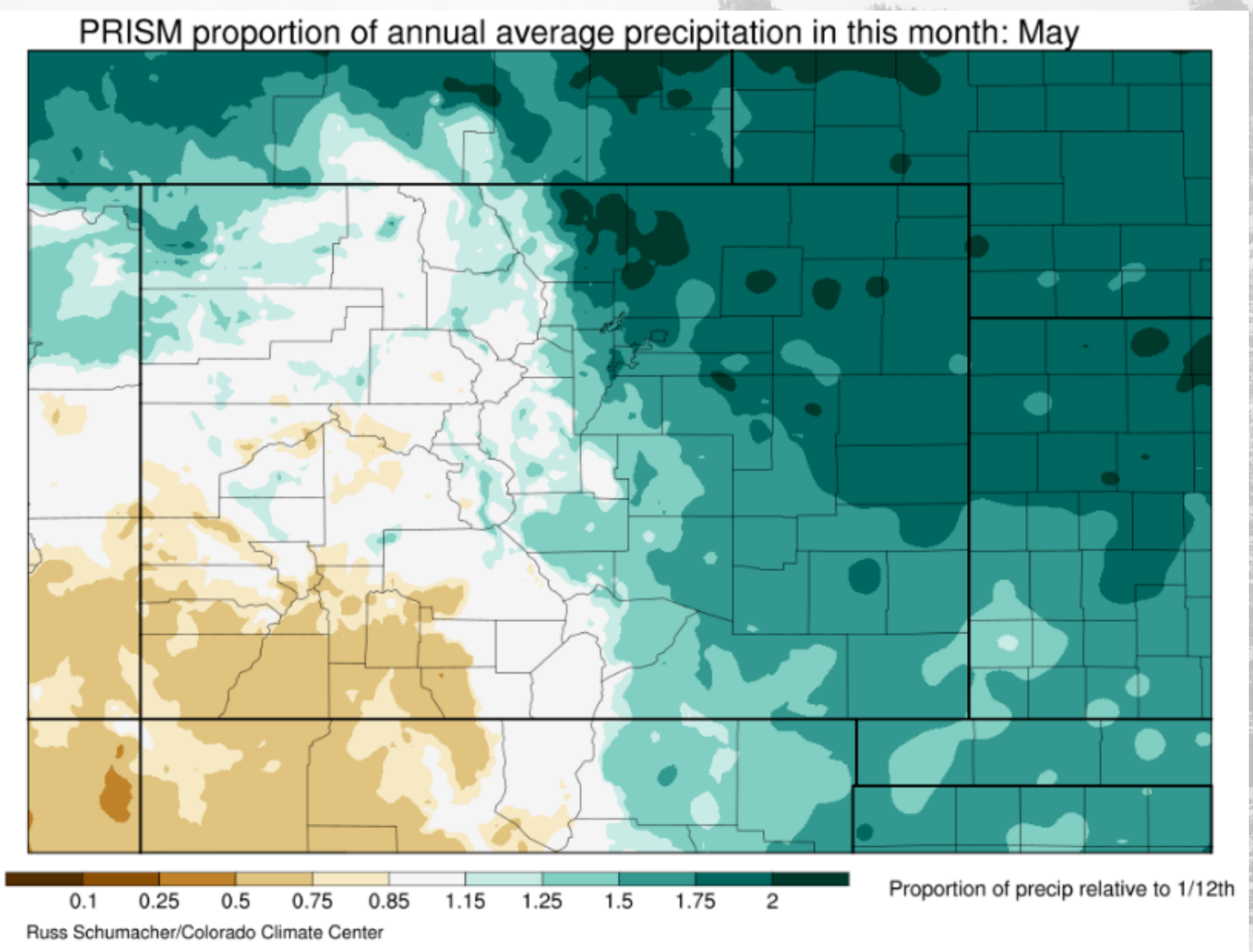
Big improvements west of divide (last summer monsoon)

April 12, 2022 compared to April 13, 2021

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

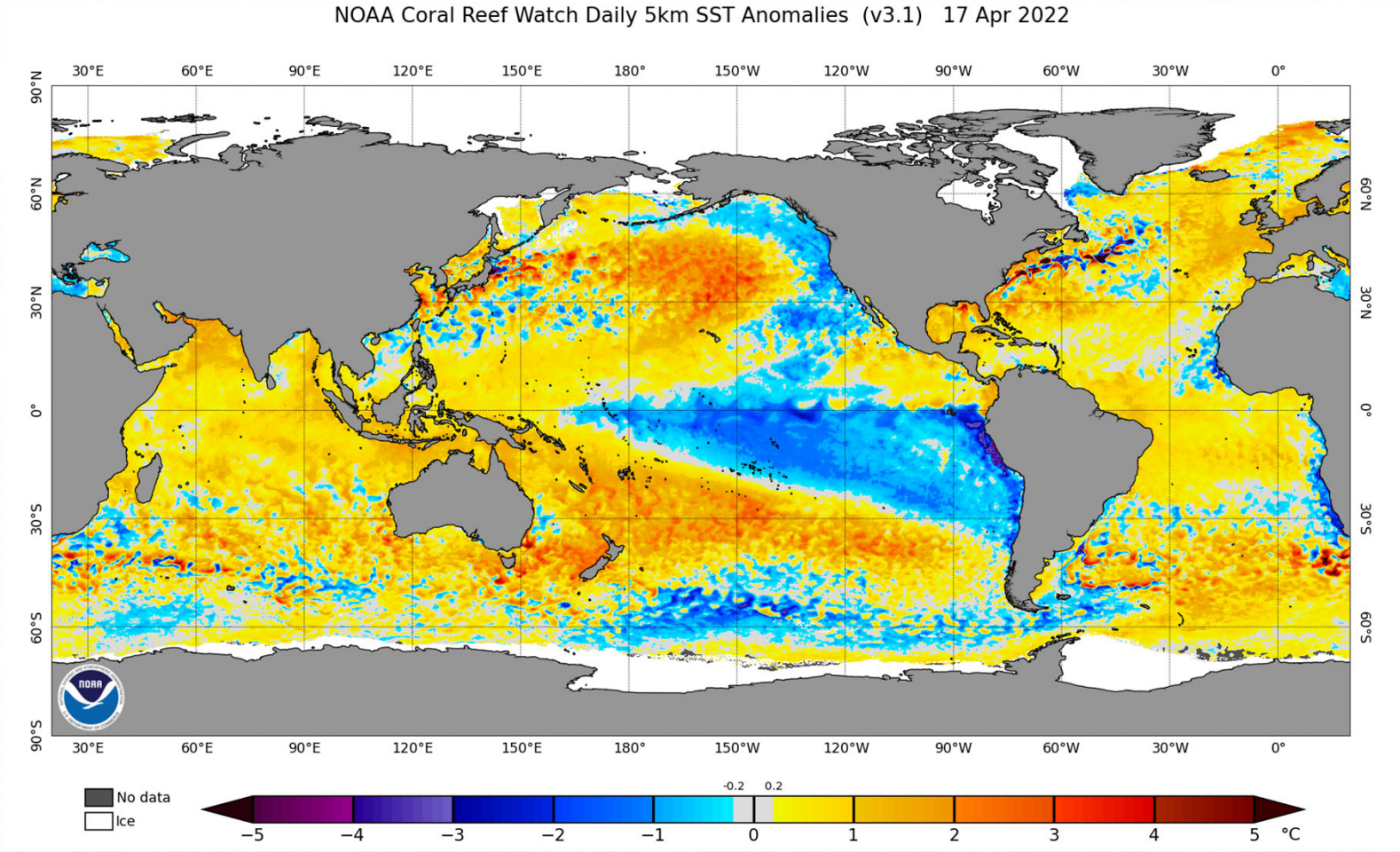
Seasonal Outlook



The wet season is mostly over for the high country. We now wait to see how temperatures impact demand

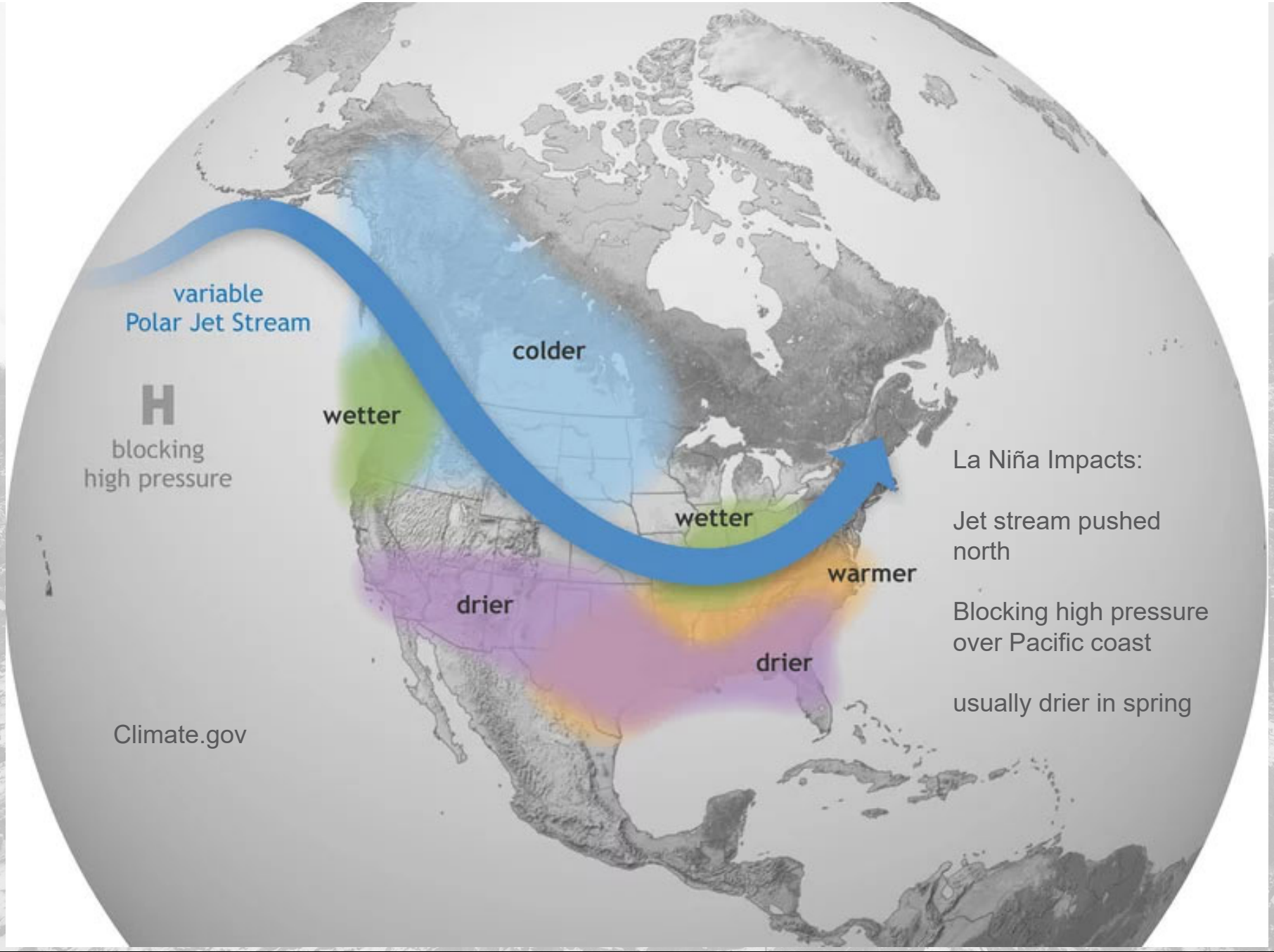
The wet season is just beginning for the eastern plains. Next six weeks are critical

Current Sea Surface Temperature Pattern



La Niña has not let go yet.

3rd year La Niña possible (which is rare)



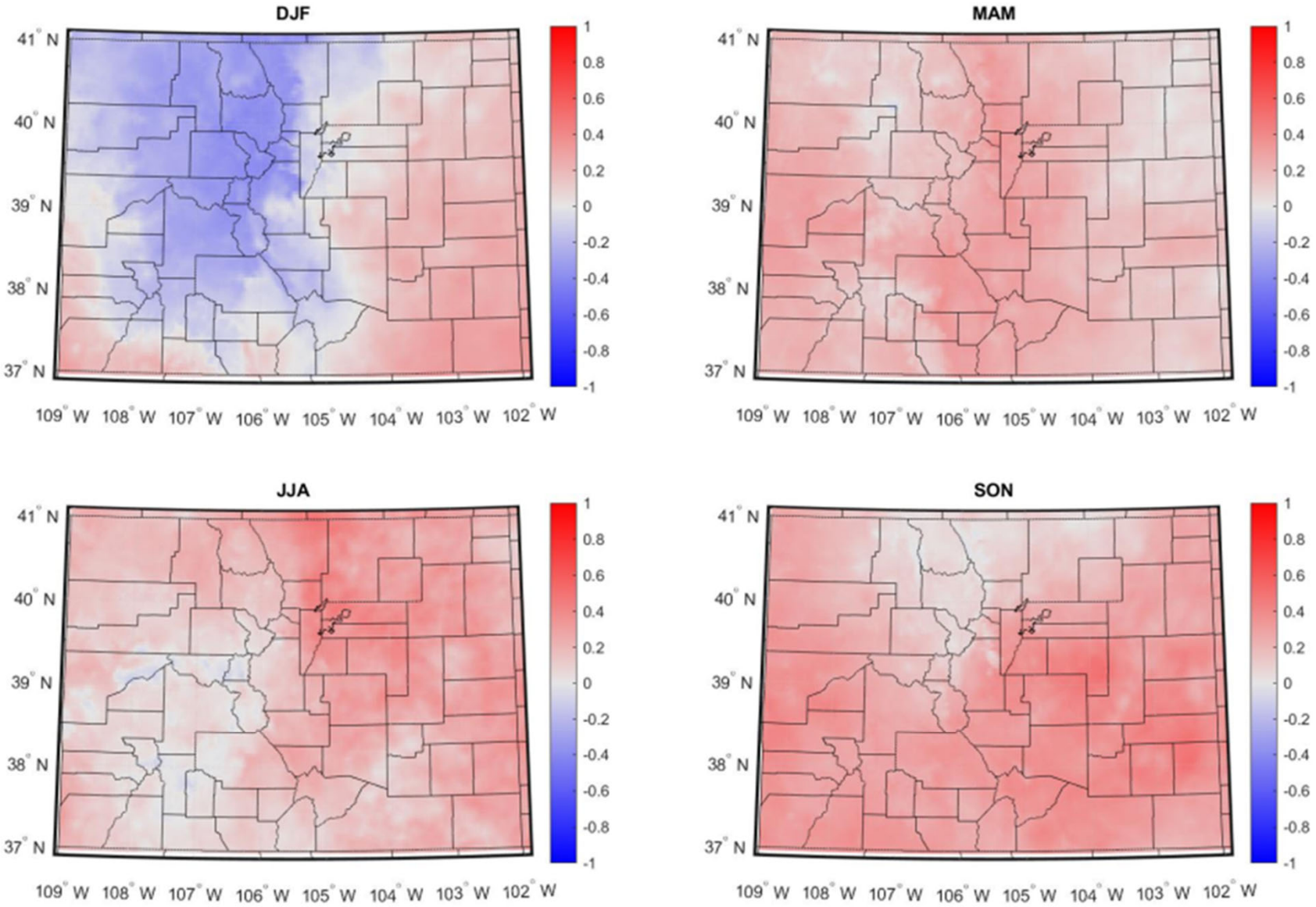
La Niña Impacts:

Jet stream pushed north

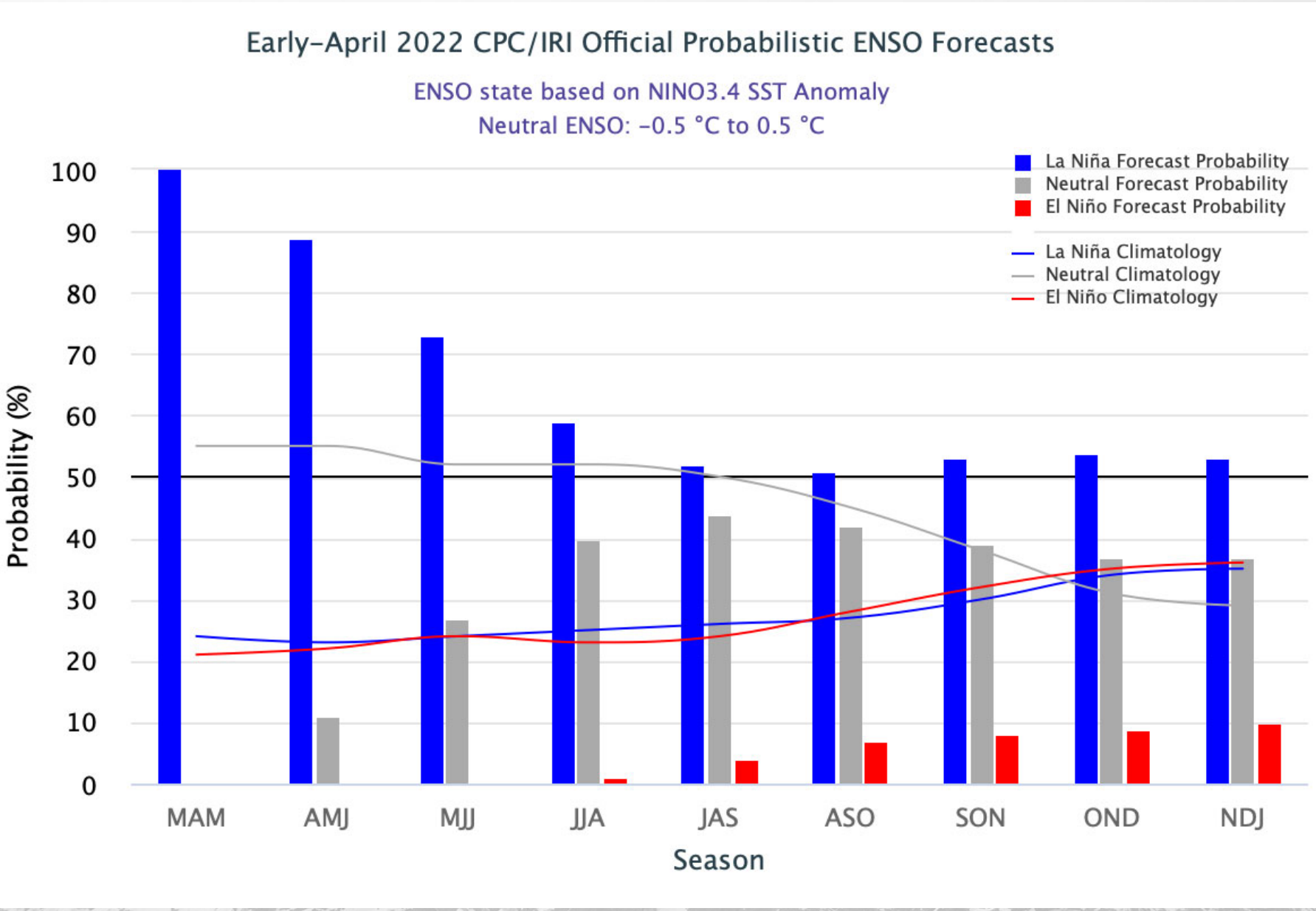
Blocking high pressure over Pacific coast

usually drier in spring

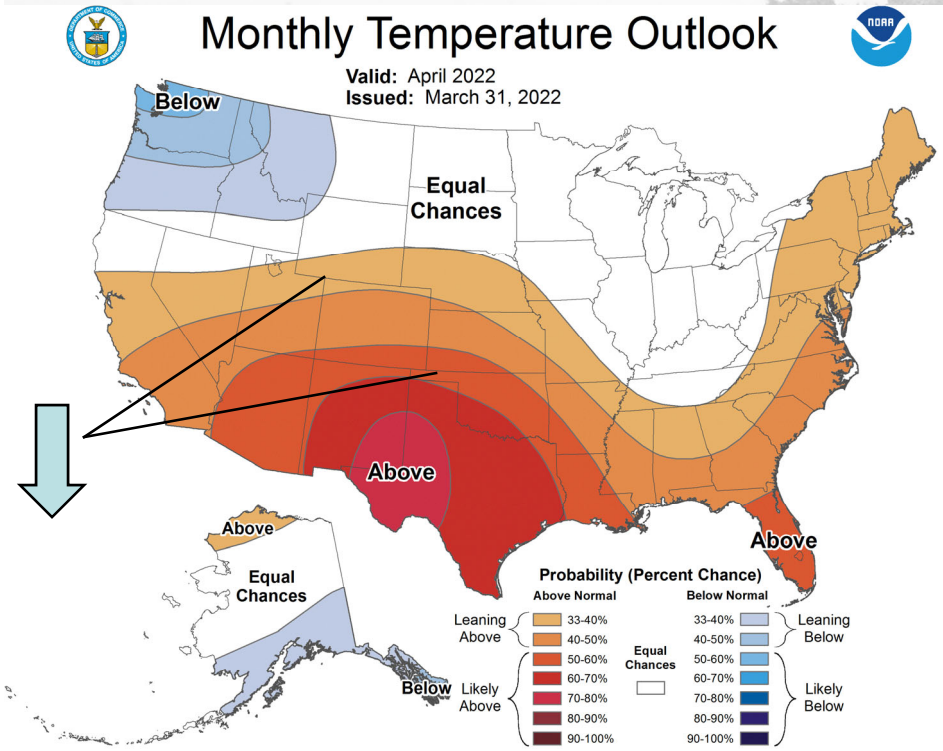
Correlation Between ENSO ONI and Seasonal Precipitation in Colorado (1951-2020)

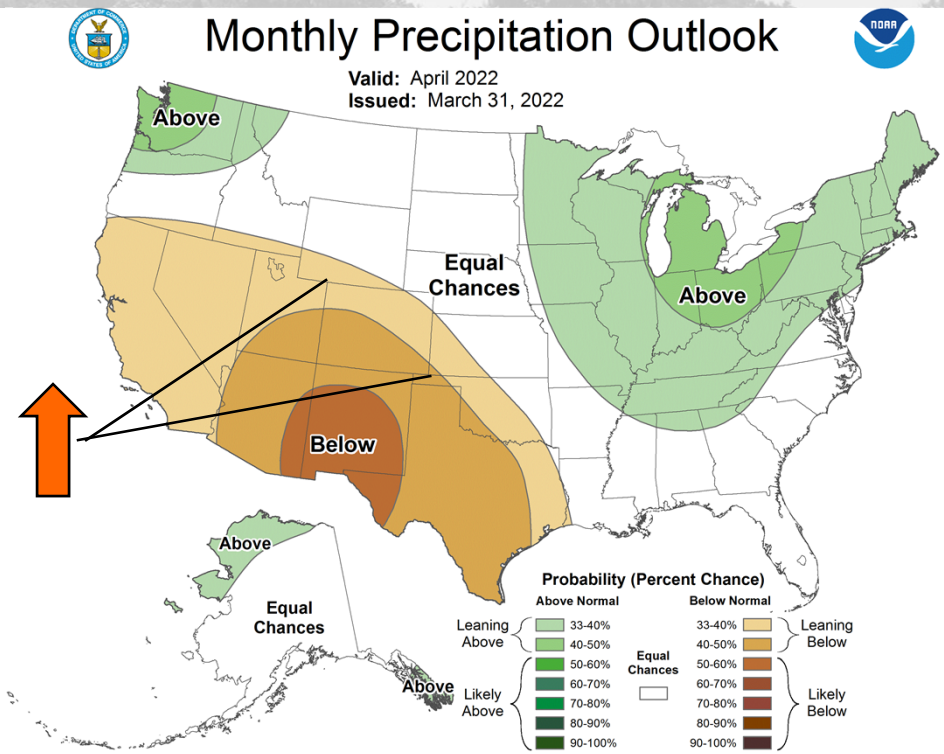


Blue = La Niña wetter Red = El Niño wetter


Early-April 2022 CPC/IRI Official Probabilistic ENSO Forecasts
ENSO state based on NINO3.4 SST Anomaly
Neutral ENSO: -0.5 °C to 0.5 °C
La Niña Forecast Probability
Neutral Forecast Probability
El Niño Forecast Probability
La Niña Climatology
Neutral Climatology
El Niño Climatology
Probability (%)
100
90
80
70
60
50
40
30
20
10
0
MAM
AMJ
MJJ
JJA
JAS
ASO
SON
OND
NDJ
Season

April Forecast

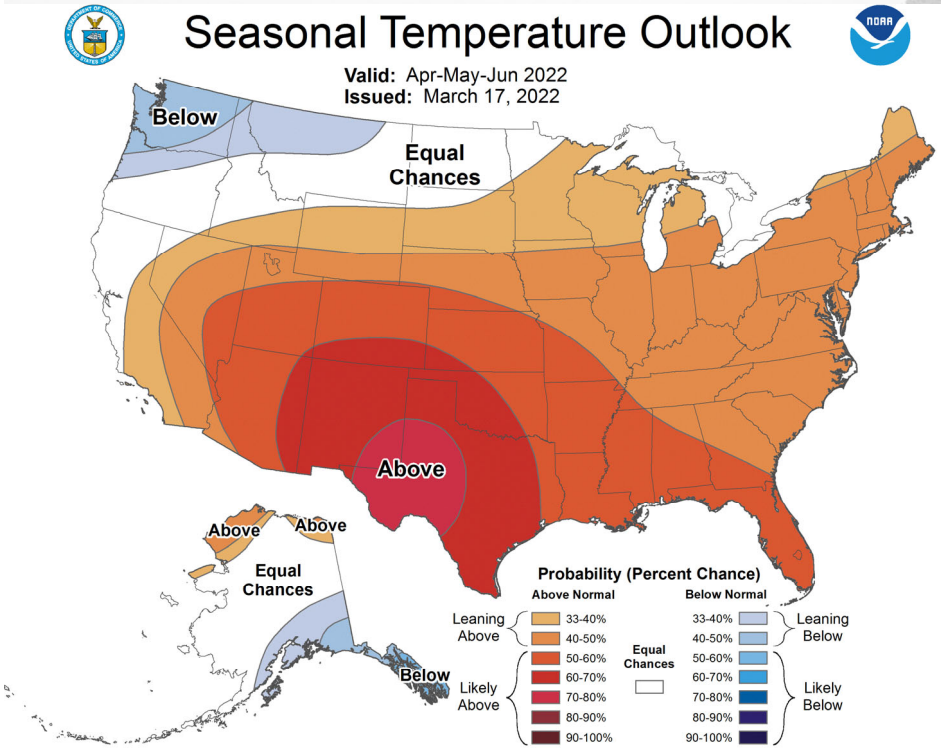


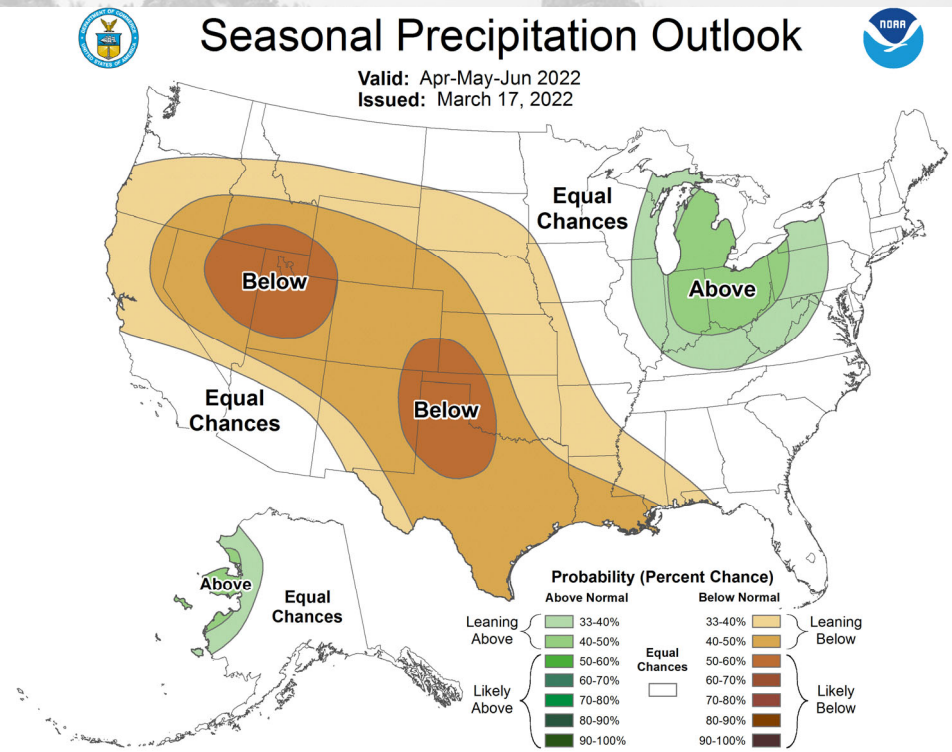


Wet springs are less common during La Niña, especially a 2nd year La Niña

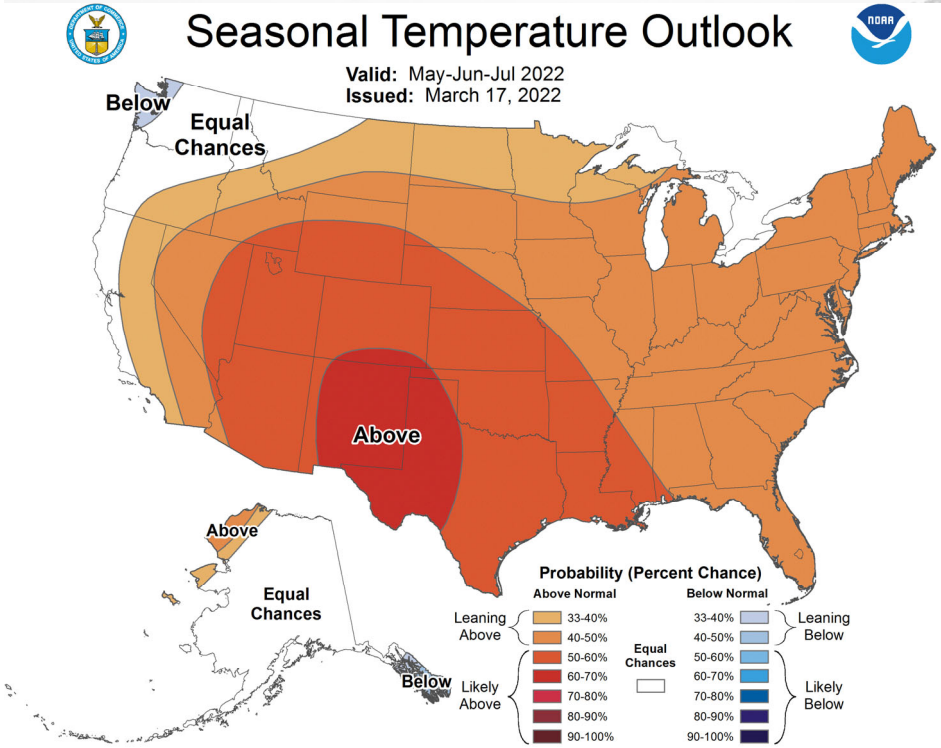
We are off to a slow start

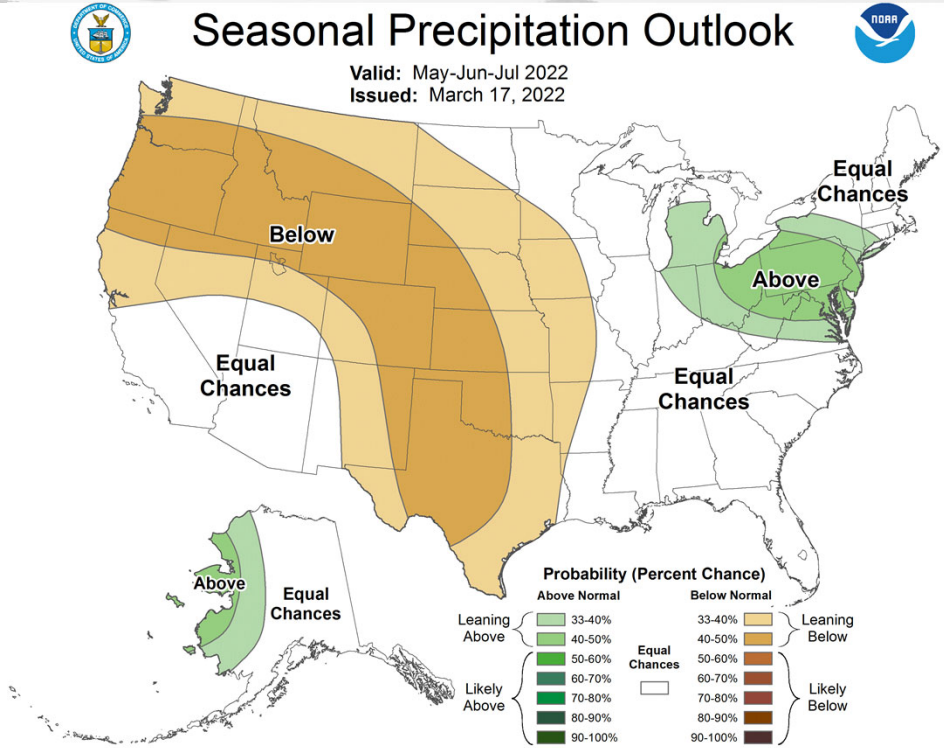
April-June Outlook





CPC May-July Outlook



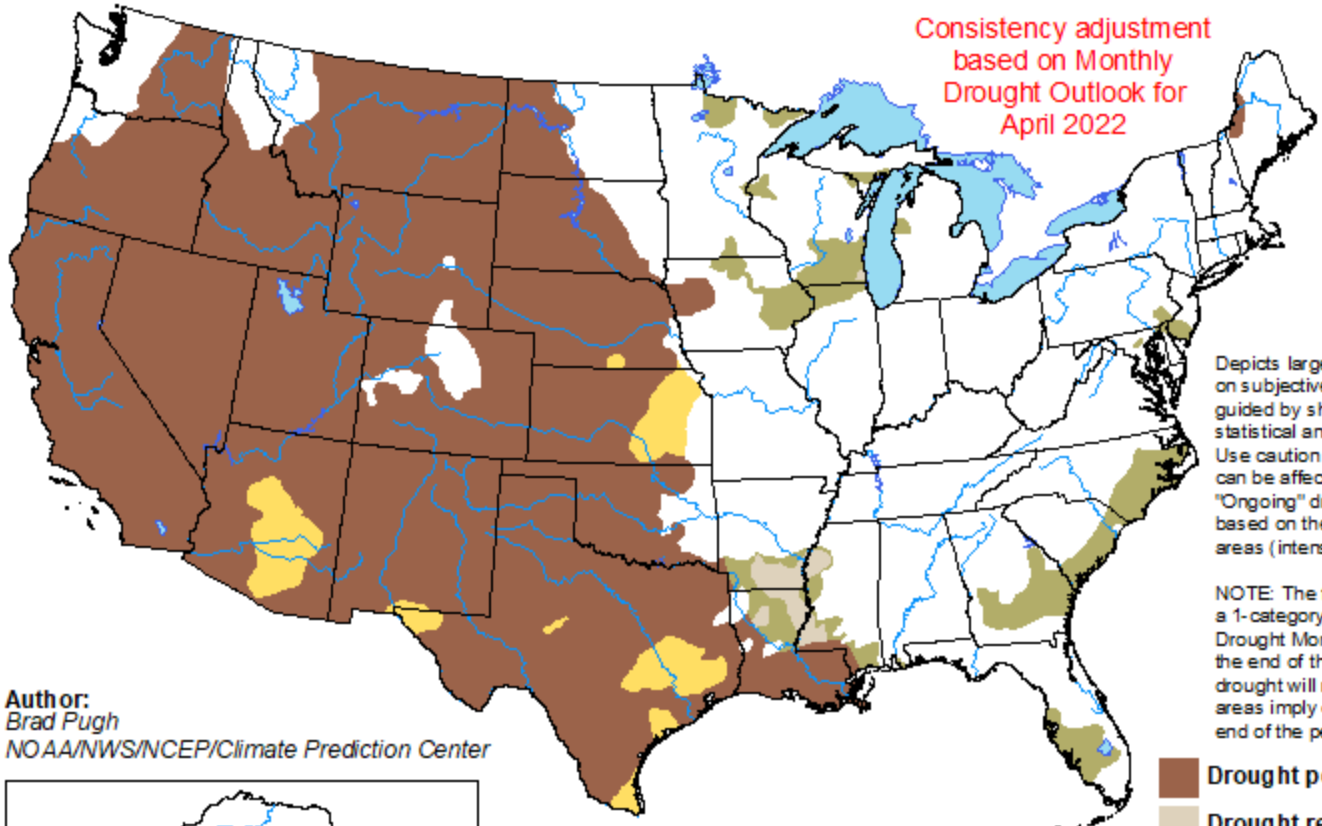


Land/atmosphere feedbacks could keep summer dry if spring is dry

U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid for April 1 - June 30, 2022
Released March 31, 2022



Author:
Brad Pugh
NOAA/NWS/NCEP/Climate Prediction Center

Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

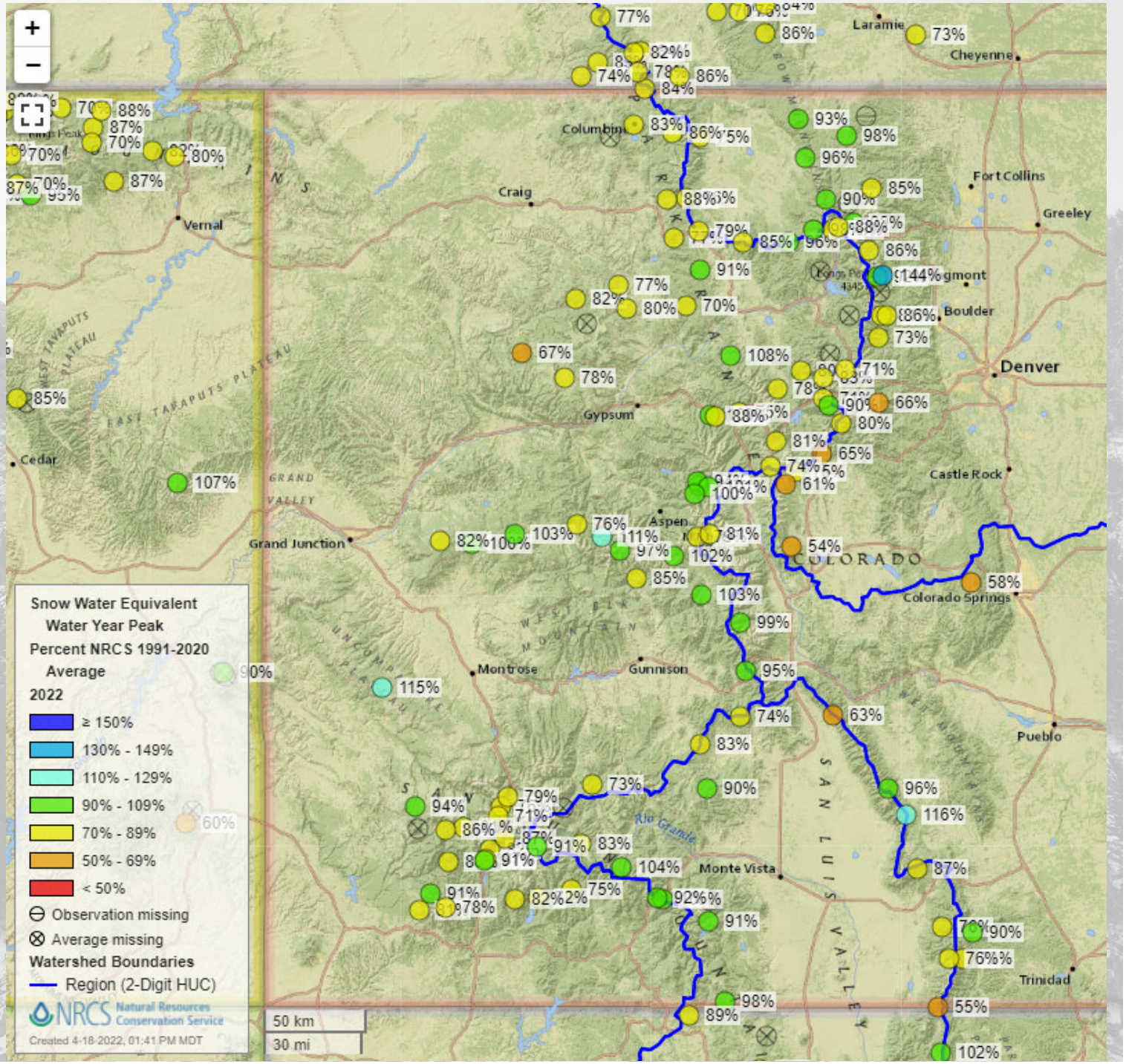
- **Drought persists**
- **Drought remains but improves**
- **Drought removal likely**
- **Drought development likely**

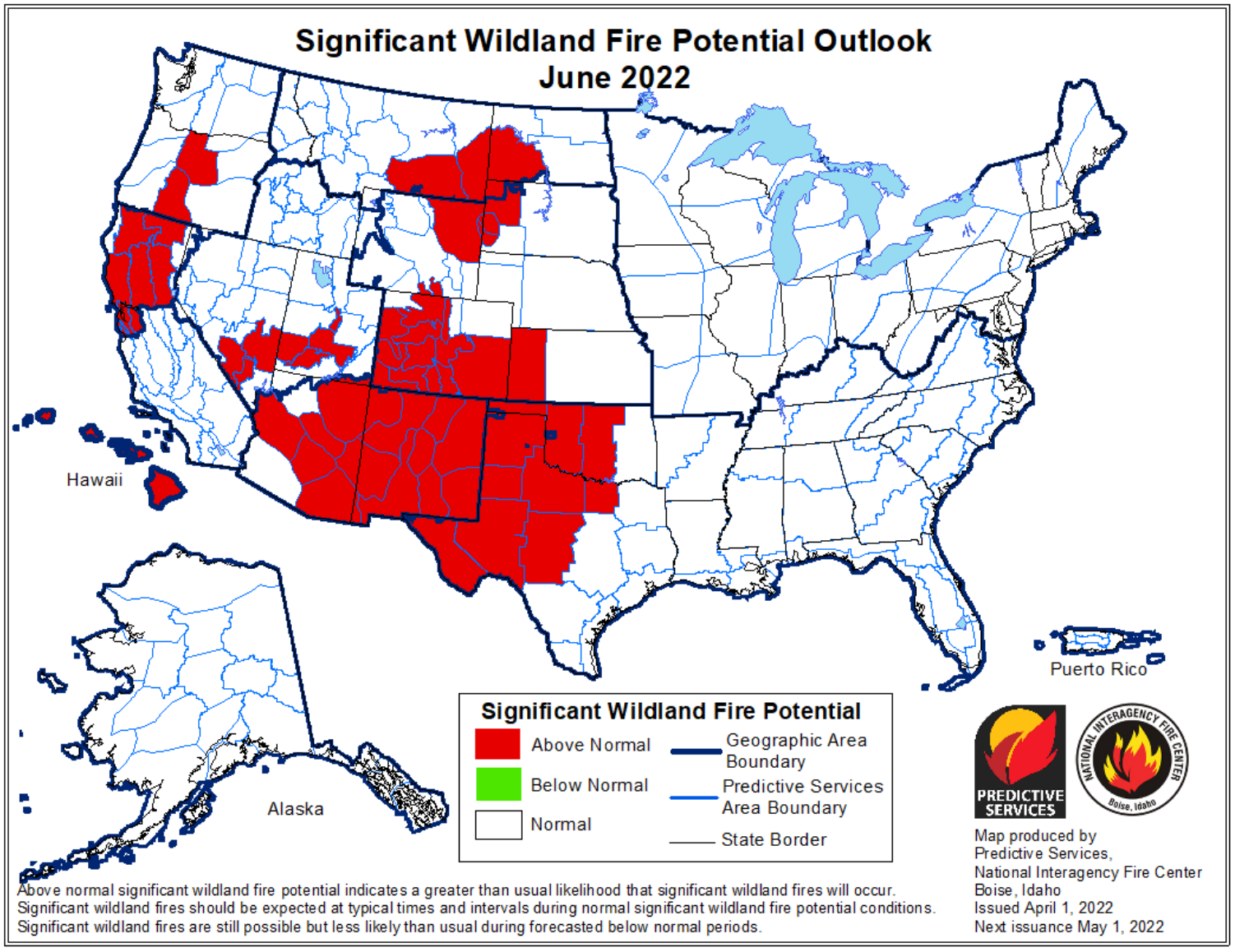
http://go.usa.gov/3eZ73

Peak snowpack was higher this year than last, and antecedent soil conditions were better

Still far from a drought buster

More from NRCS





An early melt and a warm, dry summer forecast leaves us vulnerable to another big fire year

The threat will shift from our plains/foothills to our mountains as the snow melts

Takeaways

- We saw a mix of conditions in March: cool and on the wet side early. Warm and on the dry side late. Overall, it was average
- Long-term conditions are still well on the dry side of normal. This is reflected in soils, plant stress, and surface water
- What happens over the next 4-6 weeks will be crucial for our water supply
- La Niña is not letting go, and may stick around for a 3rd year. This reduces our chances of drought recovery this spring and summer.
- Our summers are getting hotter. The current seasonal forecast is a reflection of this. The coming season will come with above normal risk for fires across much of the state, and low water storage in western Colorado and beyond

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

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