

Colorado Climate Center – *WATF Climate Update*

Russ Schumacher, state climatologist

Water Availability Task Force

May 25, 2021



ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY

Water year 2021 to date:

temperature, precipitation, snow,
evaporative demand



NWS Grand Junction
@NWSGJT

❄️ Check out this crazy view this morning from Red Mountain Pass in the San Juan Mountains of Colorado! Snow has been falling fast and furious at elevations over 10,000 feet. A Winter Weather Advisory is now in effect for the rest of the day- Be prepared! #COwx #snow 📷: @SJCOEM



10:25 AM · May 21, 2021 · Twitter Web App

63 Retweets 31 Quote Tweets 219 Likes

<https://twitter.com/NWSGJT/status/1395777660375105536>



Lincoln Sheriff
@LincolnCountySO

Tornado footage from a Deputy Sheriff, south of Limon! Deputies in the area checking for damage.

#CoWx #Tornado



6:23 PM · May 22, 2021 from Colorado, USA · Twitter for iPhone

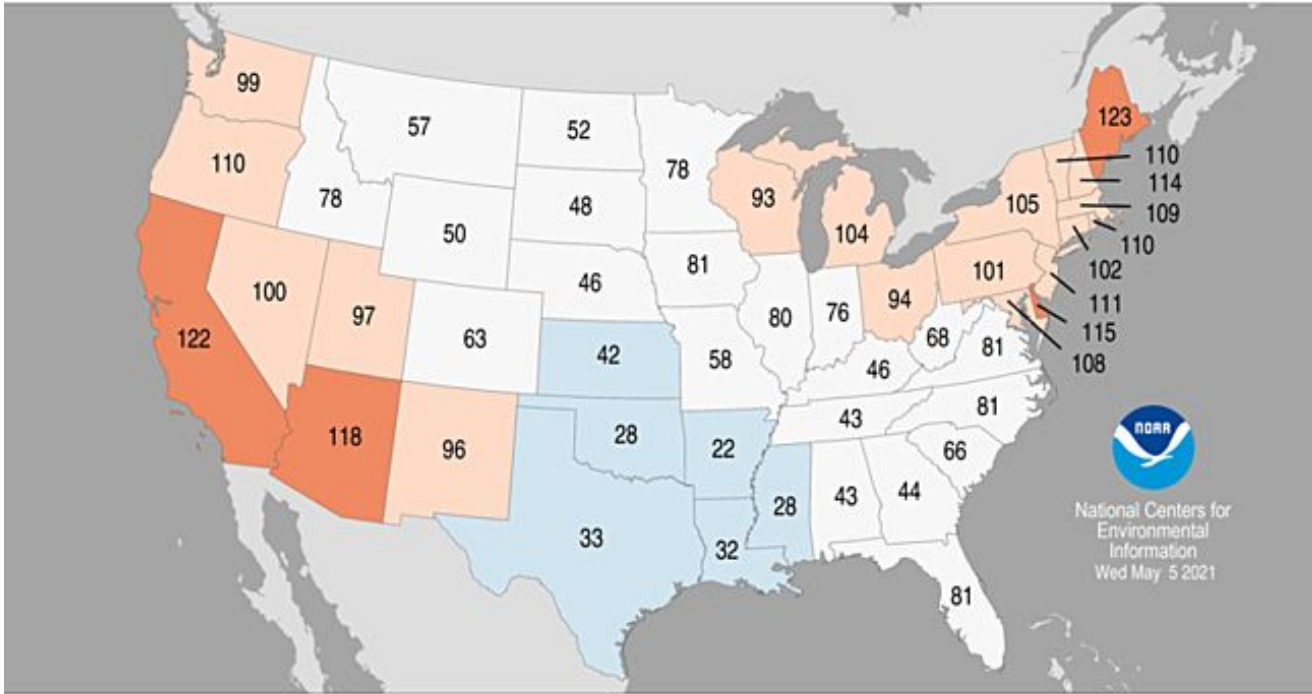
223 Retweets 34 Quote Tweets 966 Likes

<https://twitter.com/LincolnCountySO/status/1396260339075846146>



Statewide Average Temperature Ranks

April 2021
Period: 1895–2021

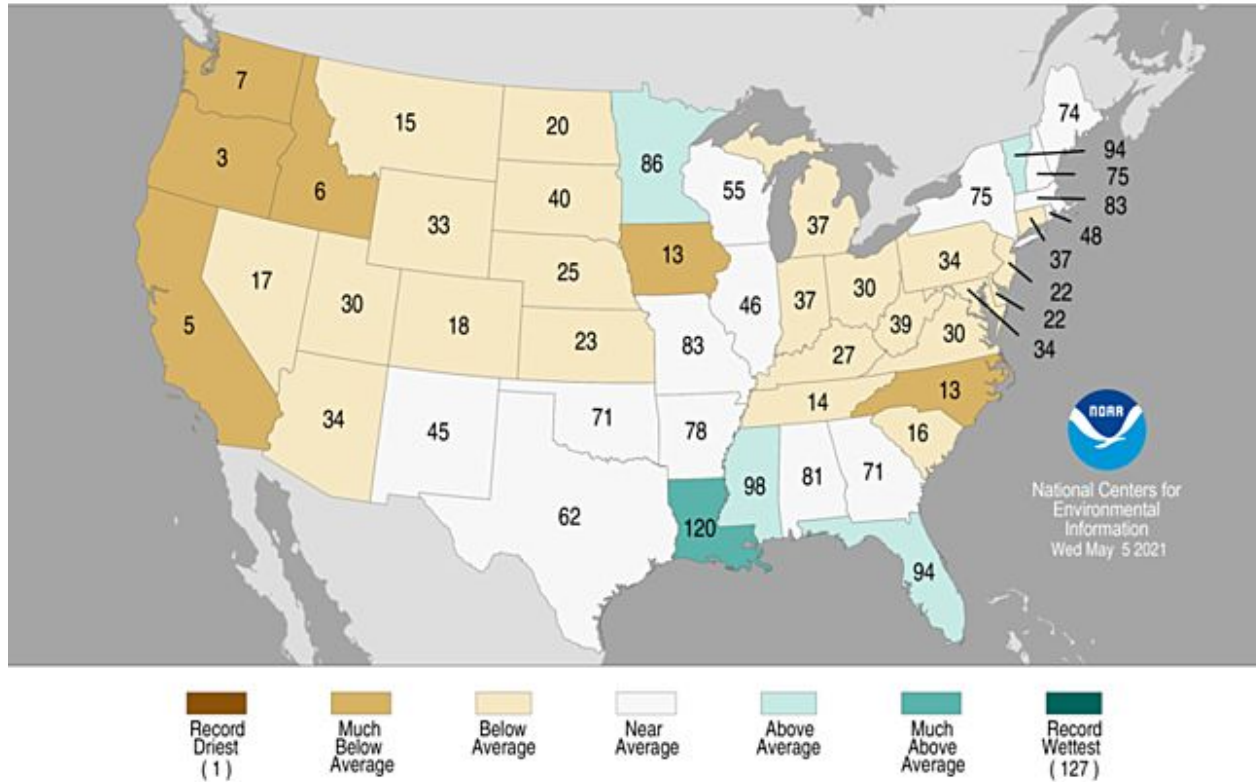


Statewide: 28th warmest October – April
1.5°F above 20th century average

Month	T Rank (of 127 years)	Above, below, or near avg?
Oct	54 th warmest	near avg
Nov	7 th warmest	much above
Dec	46 th warmest	near avg
Jan	33 rd warmest	above
Feb	28 th coolest	below
Mar	46 th warmest	near avg
Apr	62 nd warmest	near avg



Statewide Precipitation Ranks April 2021 Period: 1895–2021

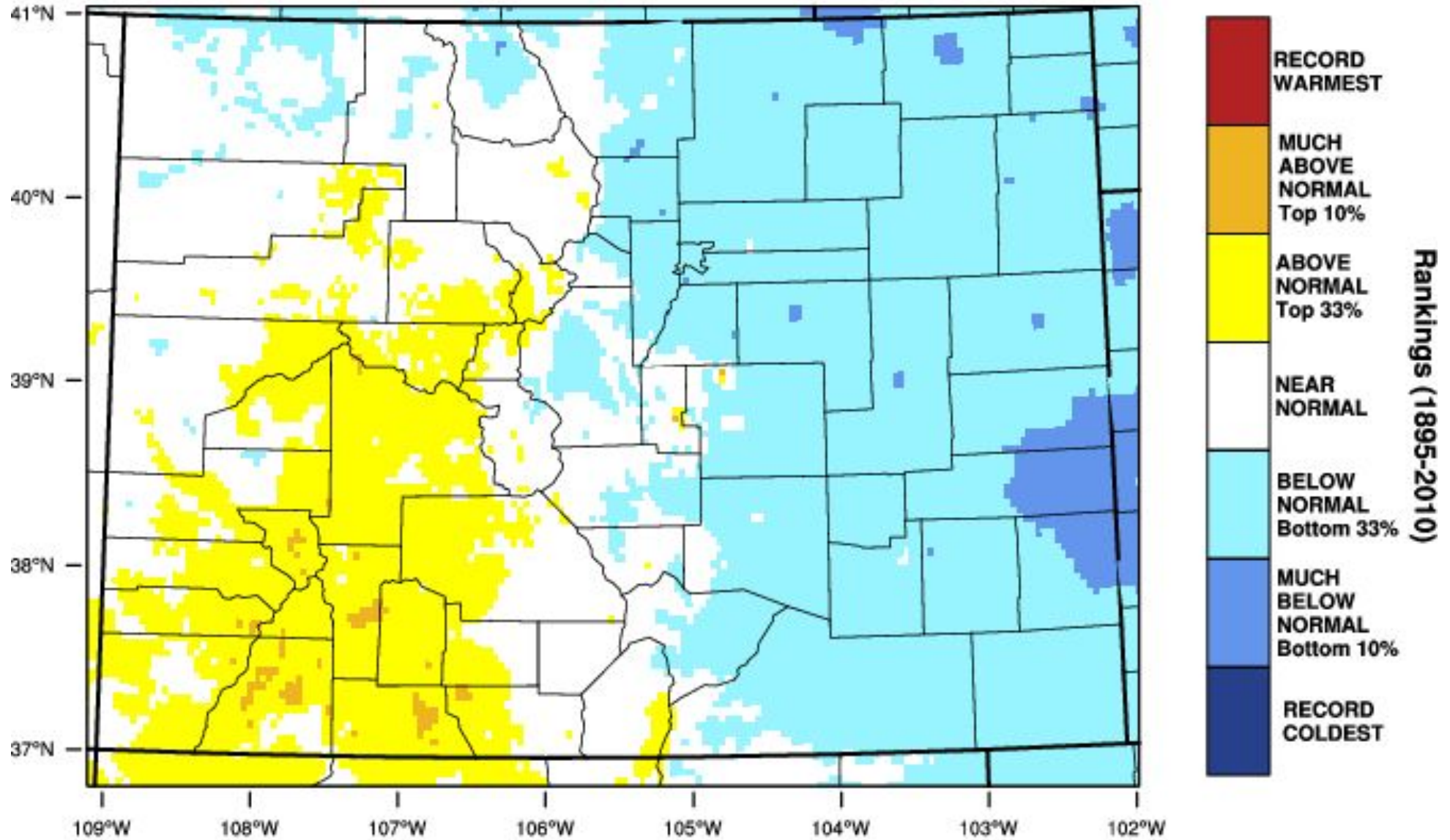


Statewide: 28th driest October-April
1.66" below 20th century average

Month	P Rank (of 127 years)	Above, below, or near avg?
Oct	16 th driest	below
Nov	44 th driest	near avg
Dec	56 th driest	near avg
Jan	38 th driest	below
Feb	70 th driest	near avg
Mar	22 nd wettest	above
Apr	18 th driest	below

Colorado - Mean Temperature

April 2021 Percentile

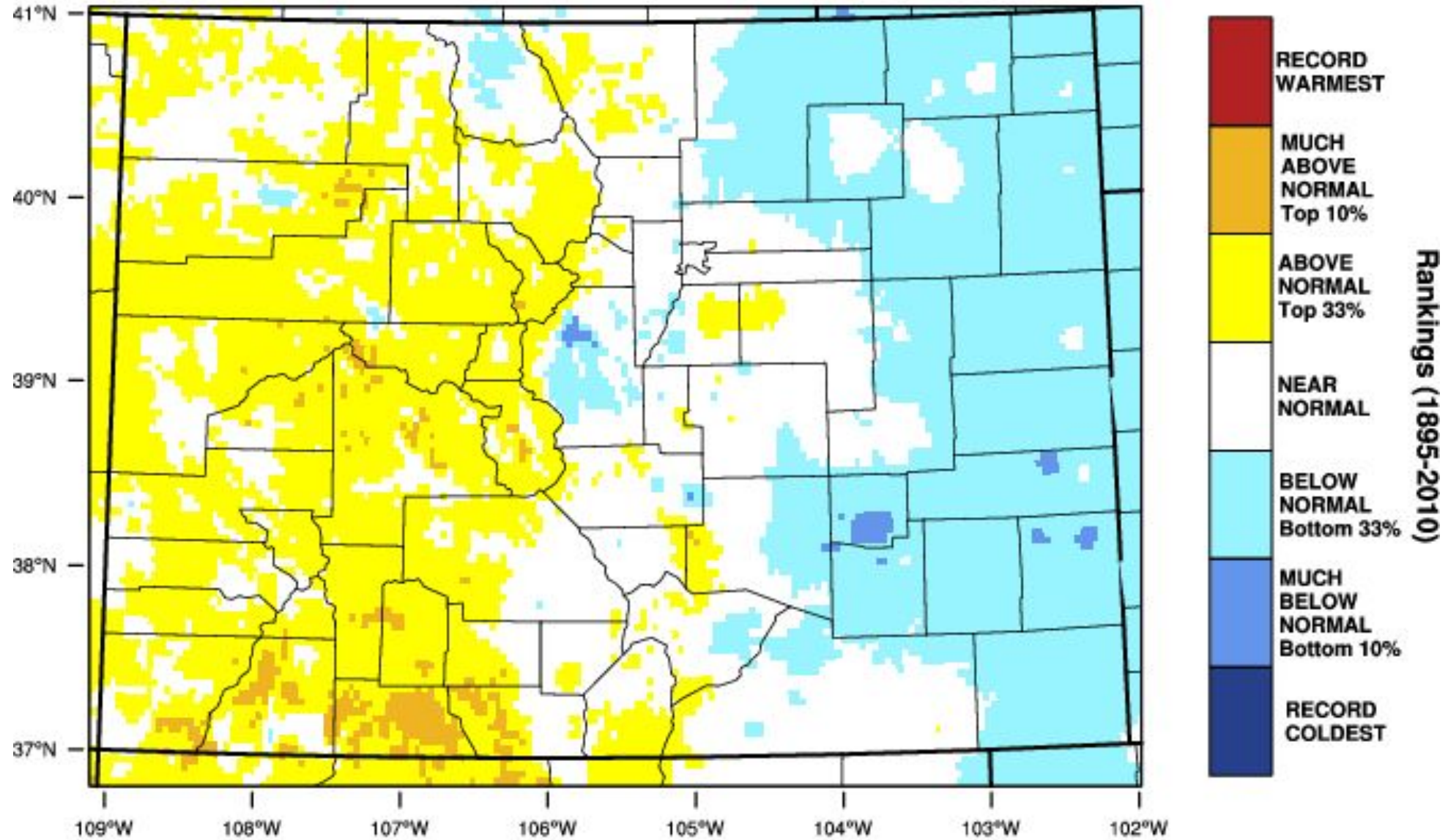


WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 MAY 2021



Colorado - Mean Temperature

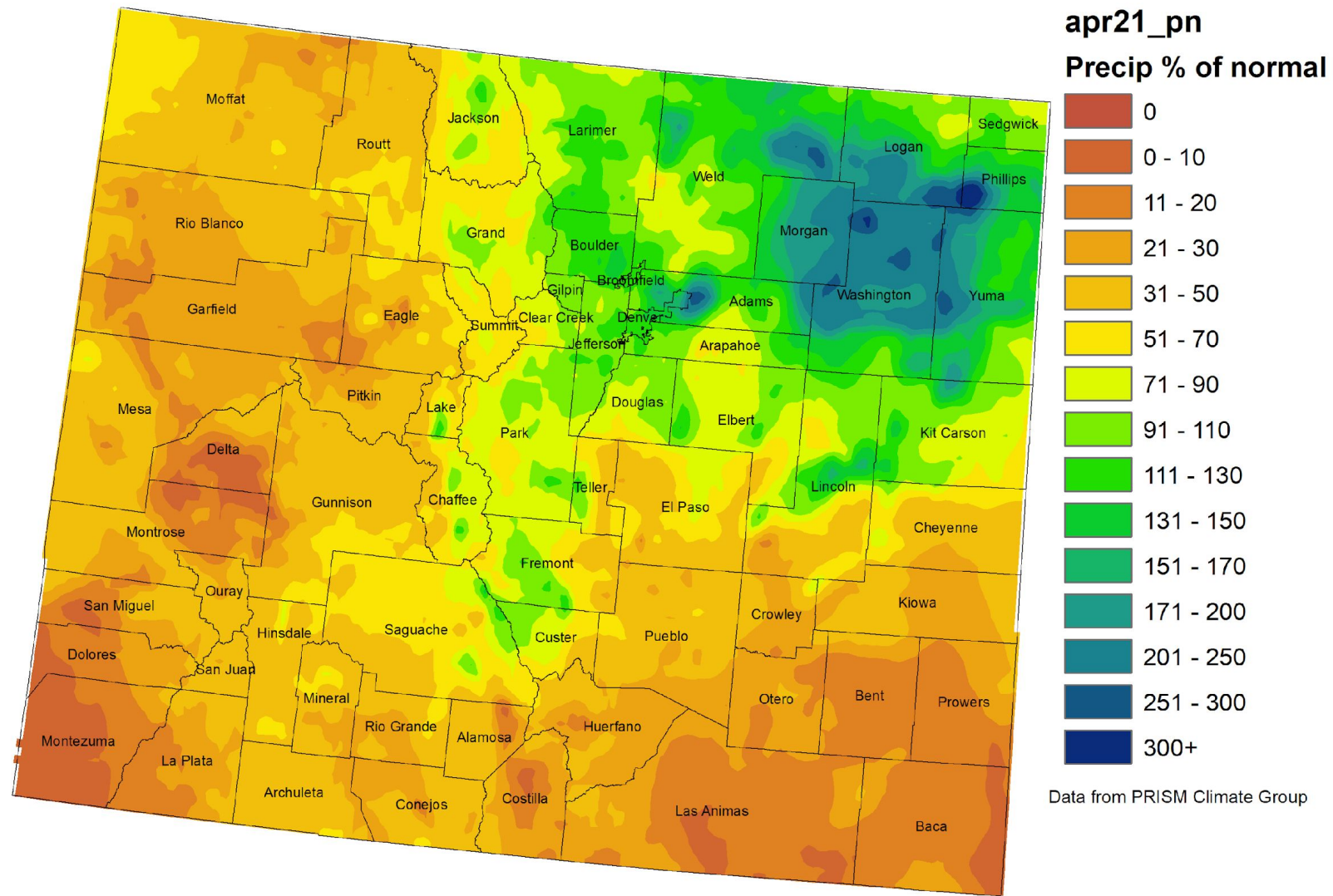
October-April 2021 Percentile



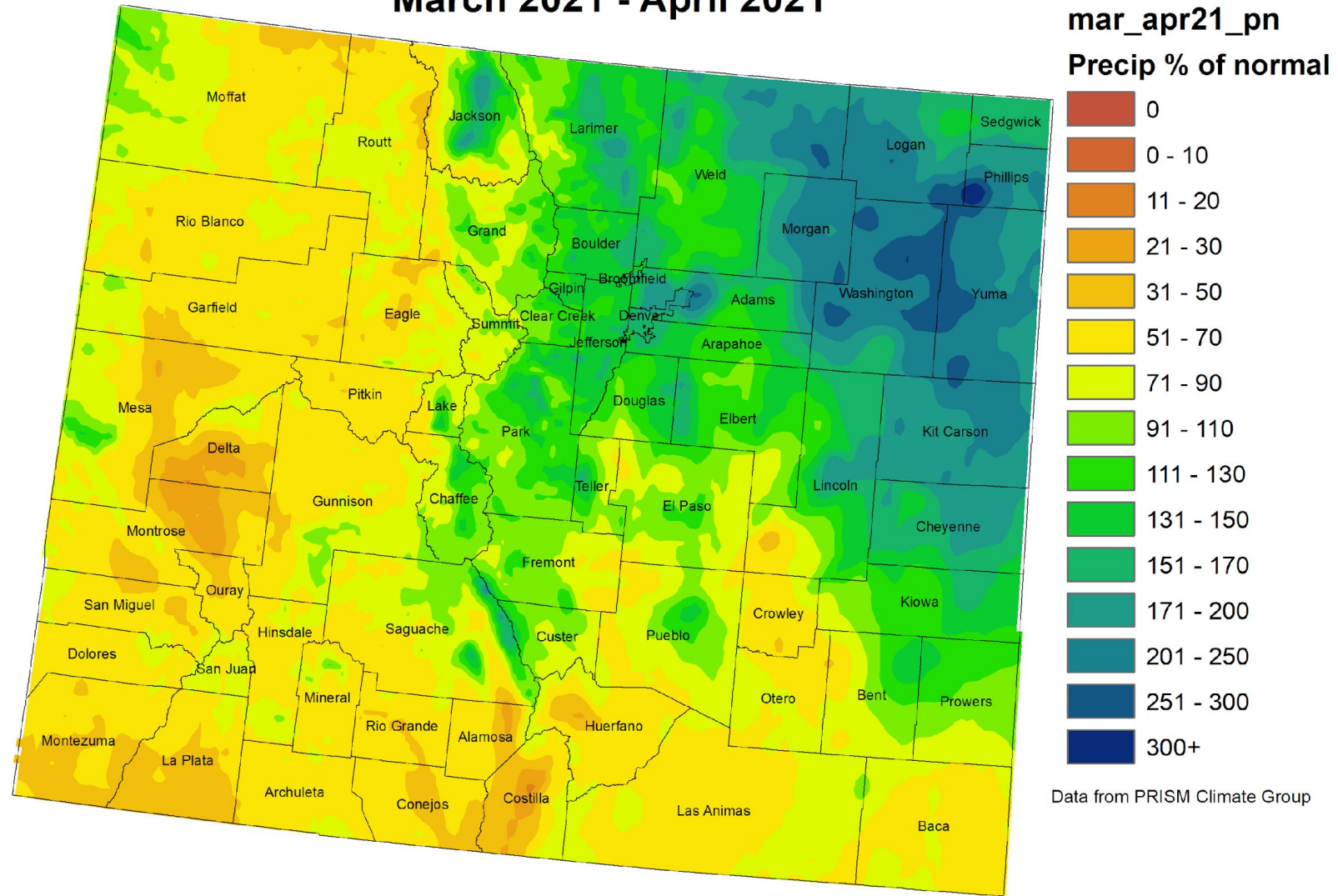
WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 MAY 2021



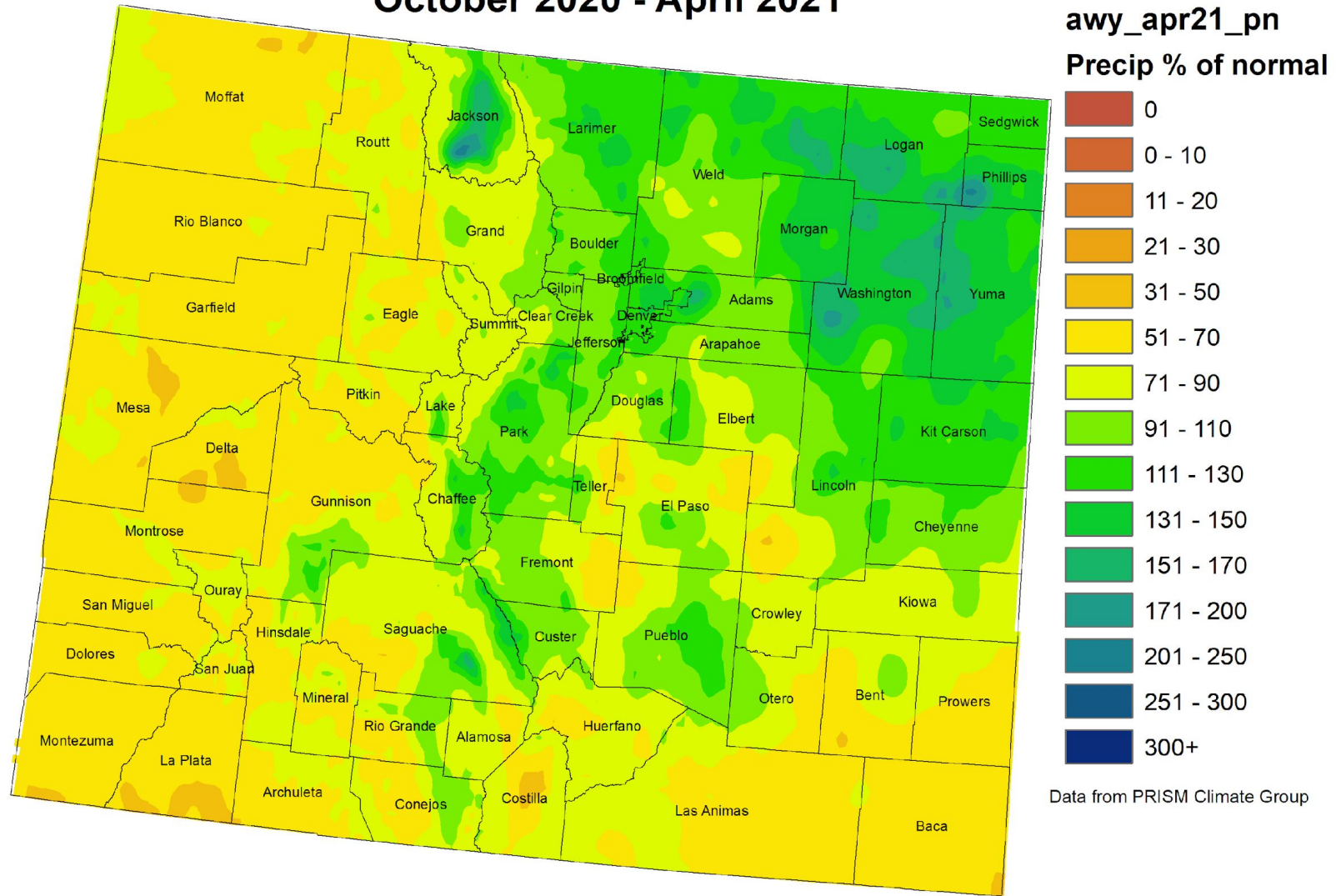
Colorado April 2021 Precipitation as a Percentage of Normal



Colorado Precipitation Accumulation as a Percentage of Normal March 2021 - April 2021

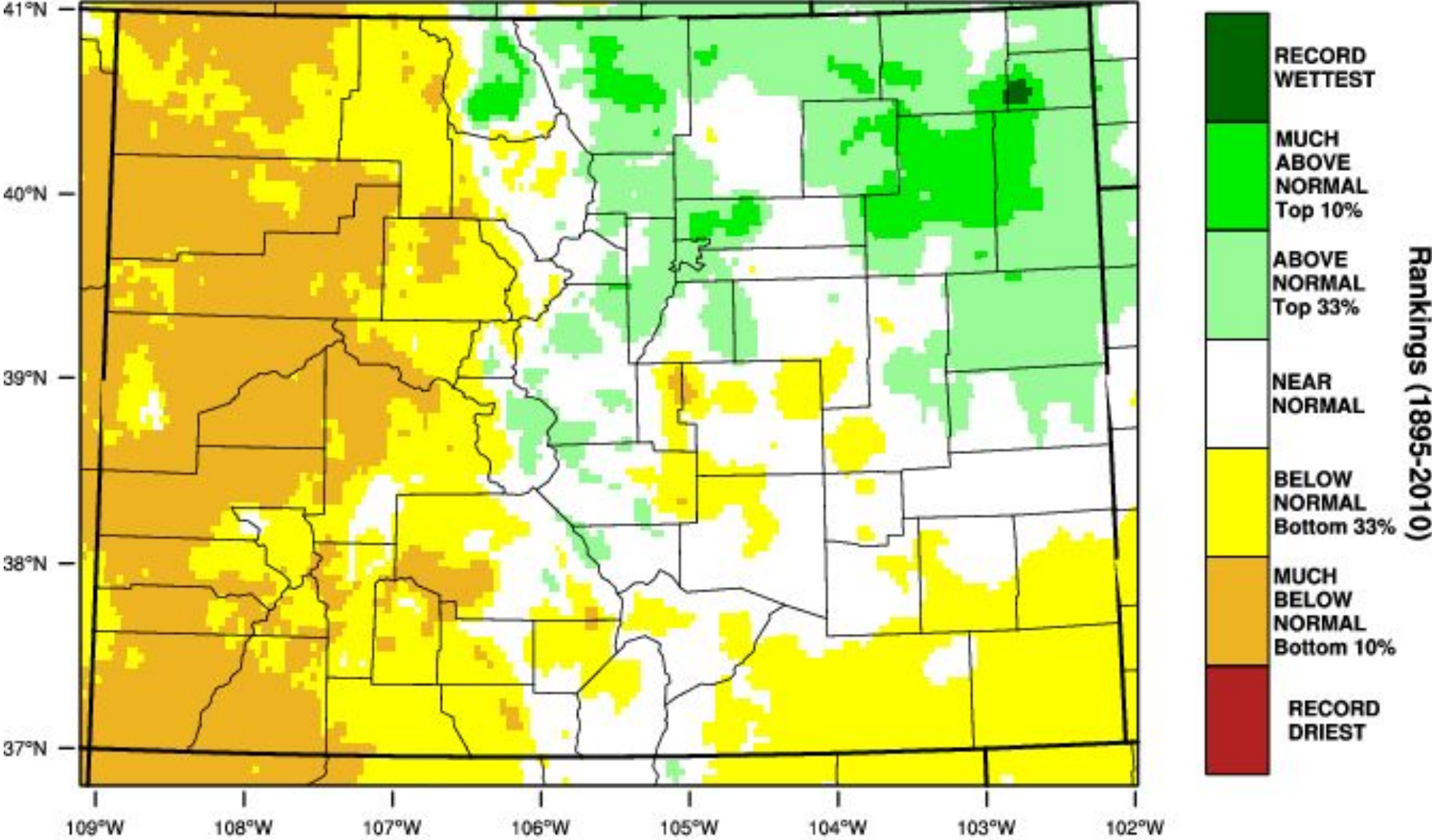


Colorado Water Year 2021 Precipitation as a Percentage of Normal October 2020 - April 2021



Colorado - Precipitation

October-April 2021 Percentile



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 MAY 2021



Colorado average temperature and precipitation, October - April

Water year 2021 through April

Warm & dry

Warm & wet

Cool & dry

Cool & wet



Colorado Climate Center/CSU
Data source: NOAA/NCEI Climate at a Glance

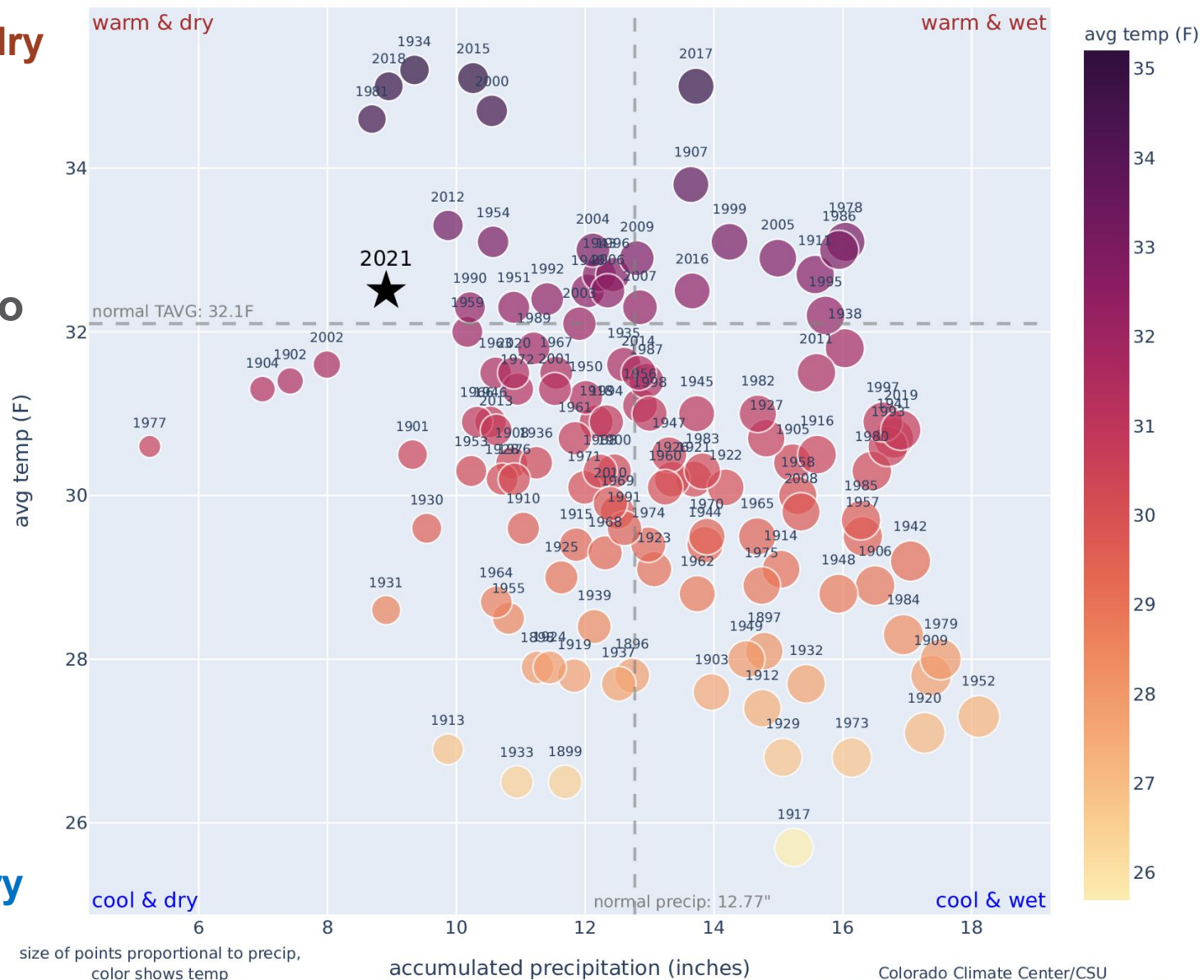


Colorado CD2 (Colorado drainage) average temperature and precipitation, October - April

Water year 2021 through April:
western Colorado

Warm & dry

Warm & wet



Cool & dry

Cool & wet



Colorado CD4 (Platte drainage) average temperature and precipitation, October - April

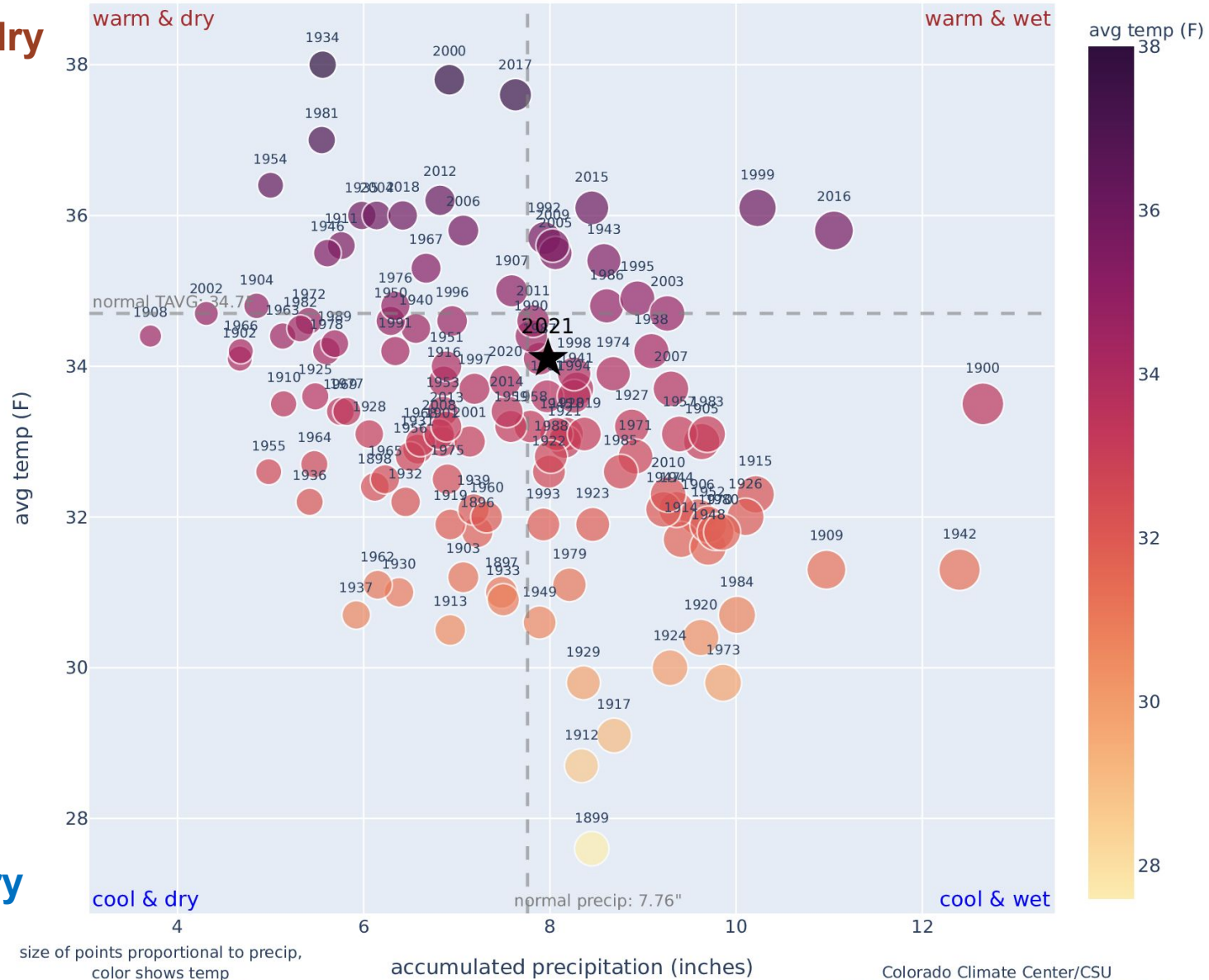
Water year 2021 through April:
Front Range/northeast Colorado

Warm & dry

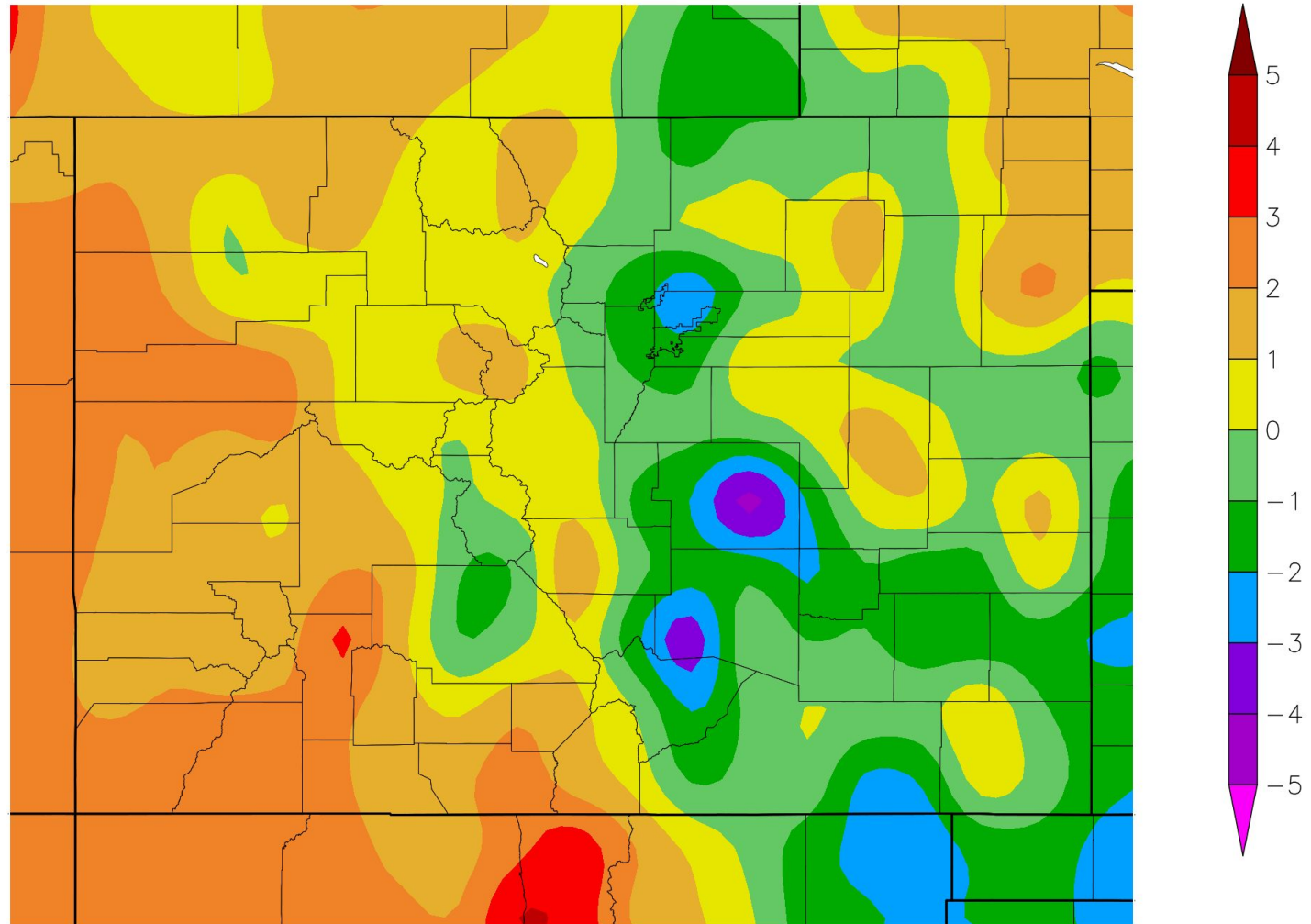
Warm & wet

Cool & dry

Cool & wet



Departure from Normal Temperature (F) 5/1/2021 – 5/23/2021

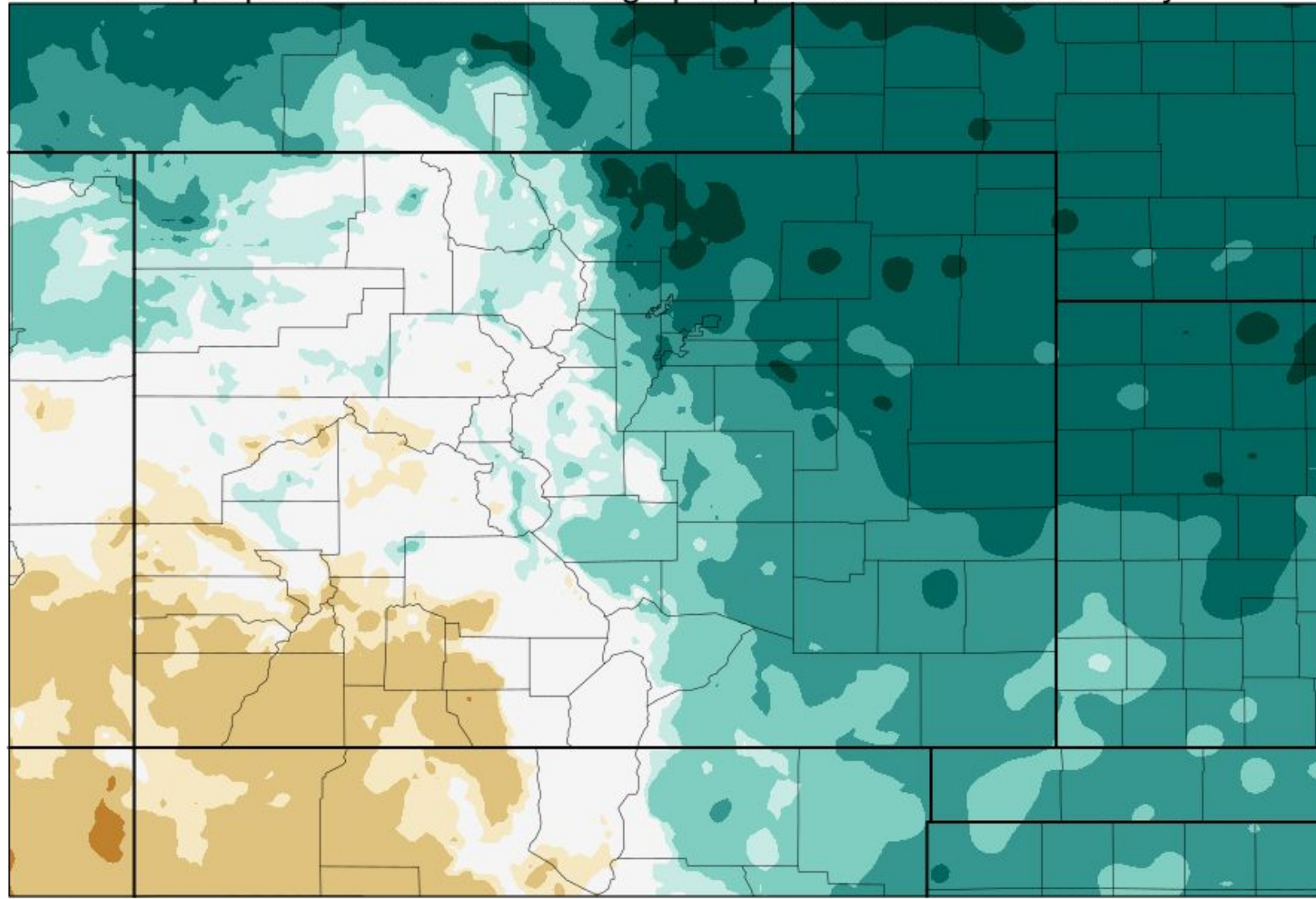


Generated 5/24/2021 at HPRCC using provisional data.

NOAA Regional Climate Centers



PRISM proportion of annual average precipitation in this month: May

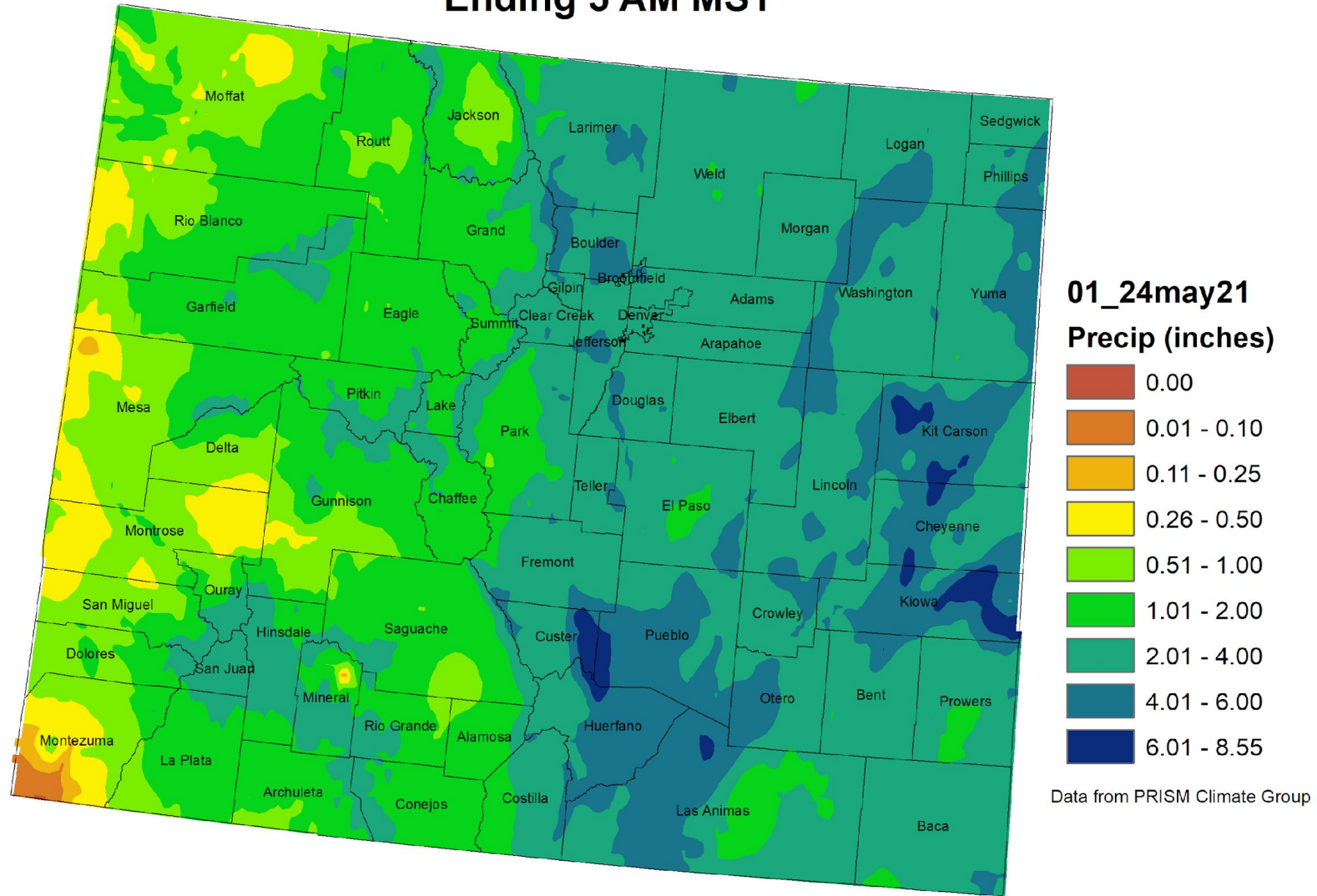


This is usually a dry month

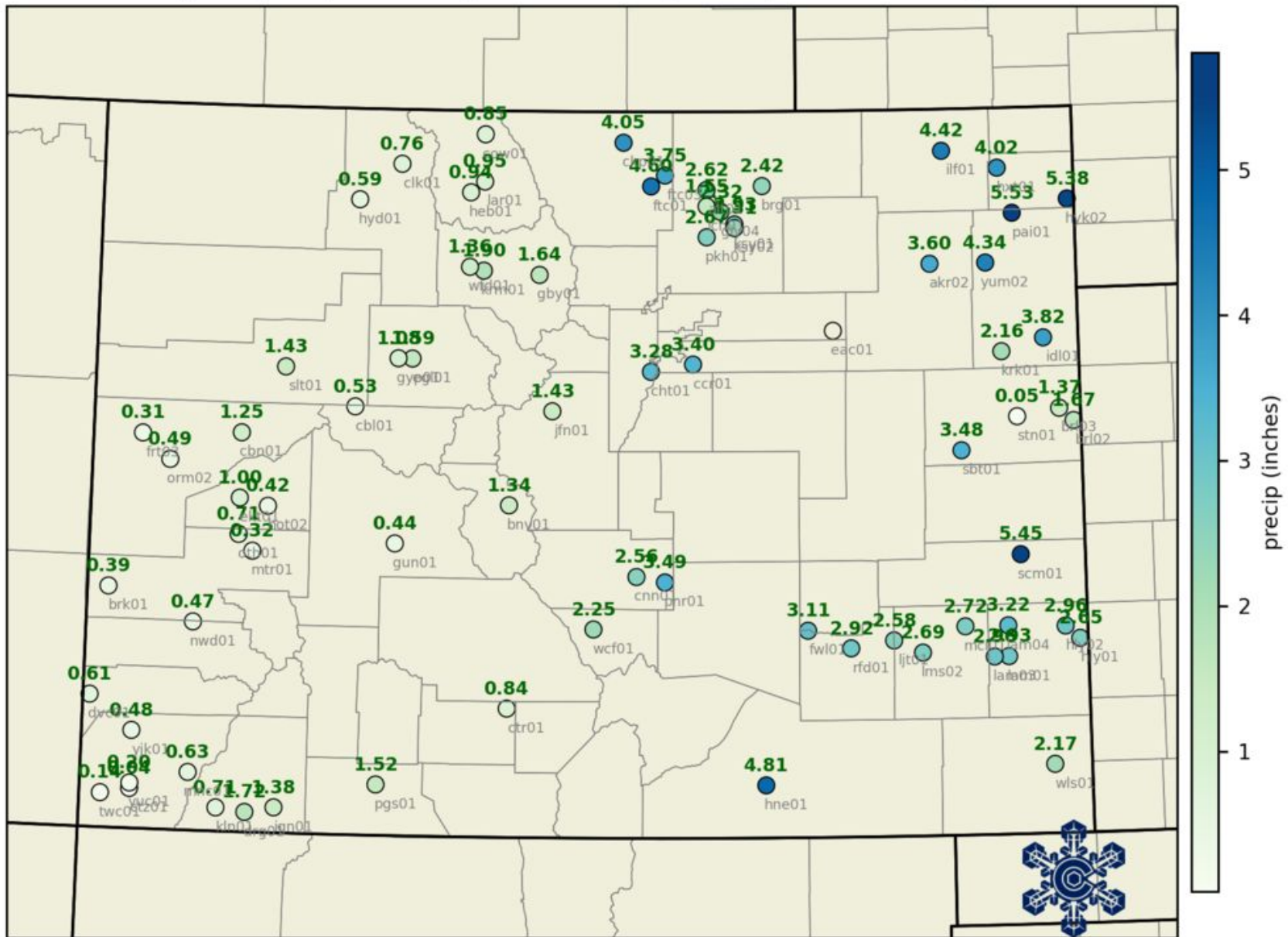
This is usually a wet month



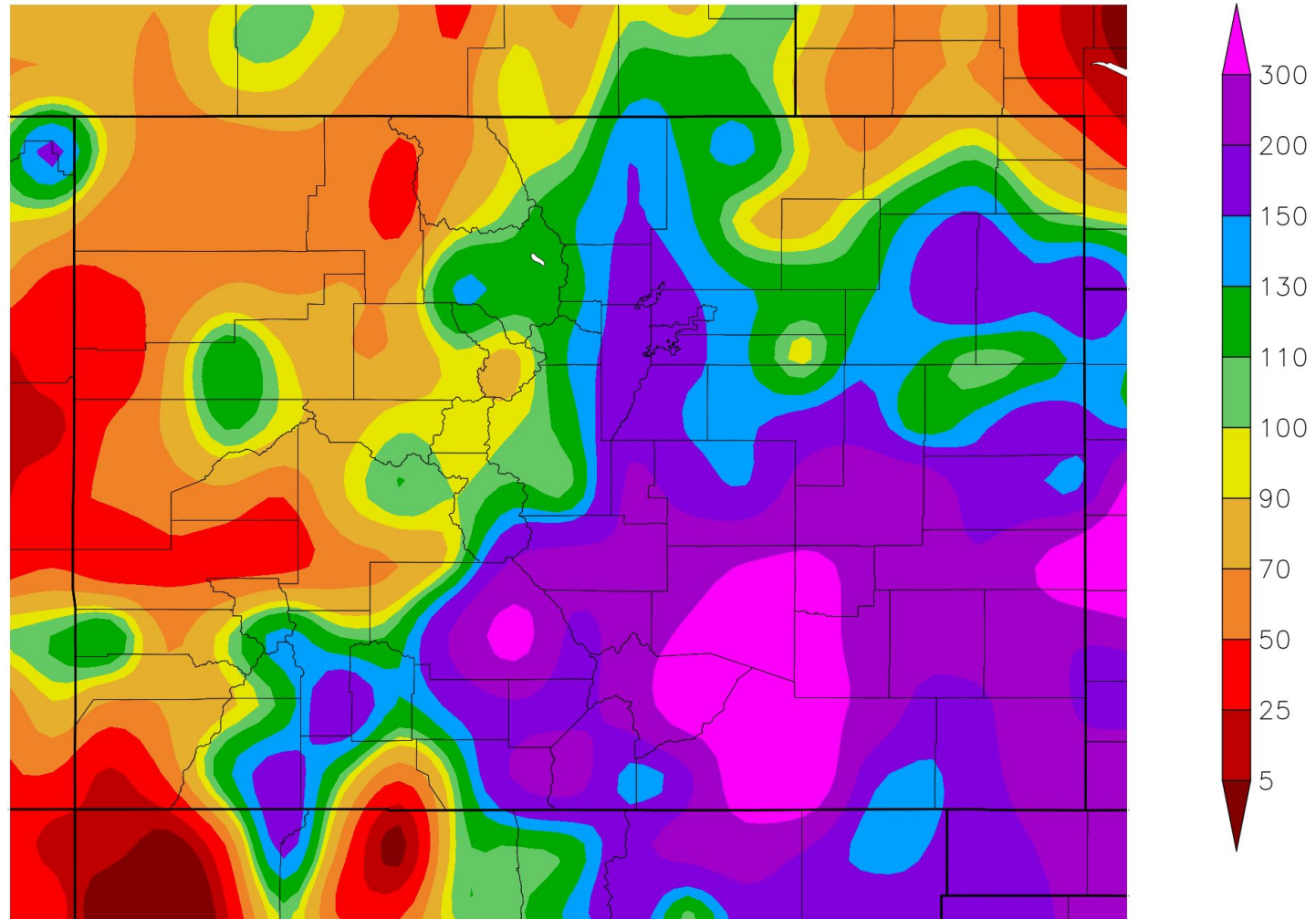
Colorado Month to Date Precipitation 1 - 24 May 2021 Ending 5 AM MST



CoAgMET precipitation in previous 30 days: 23 Apr 2021-23 May 2021



Percent of Normal Precipitation (%) 5/1/2021 – 5/23/2021



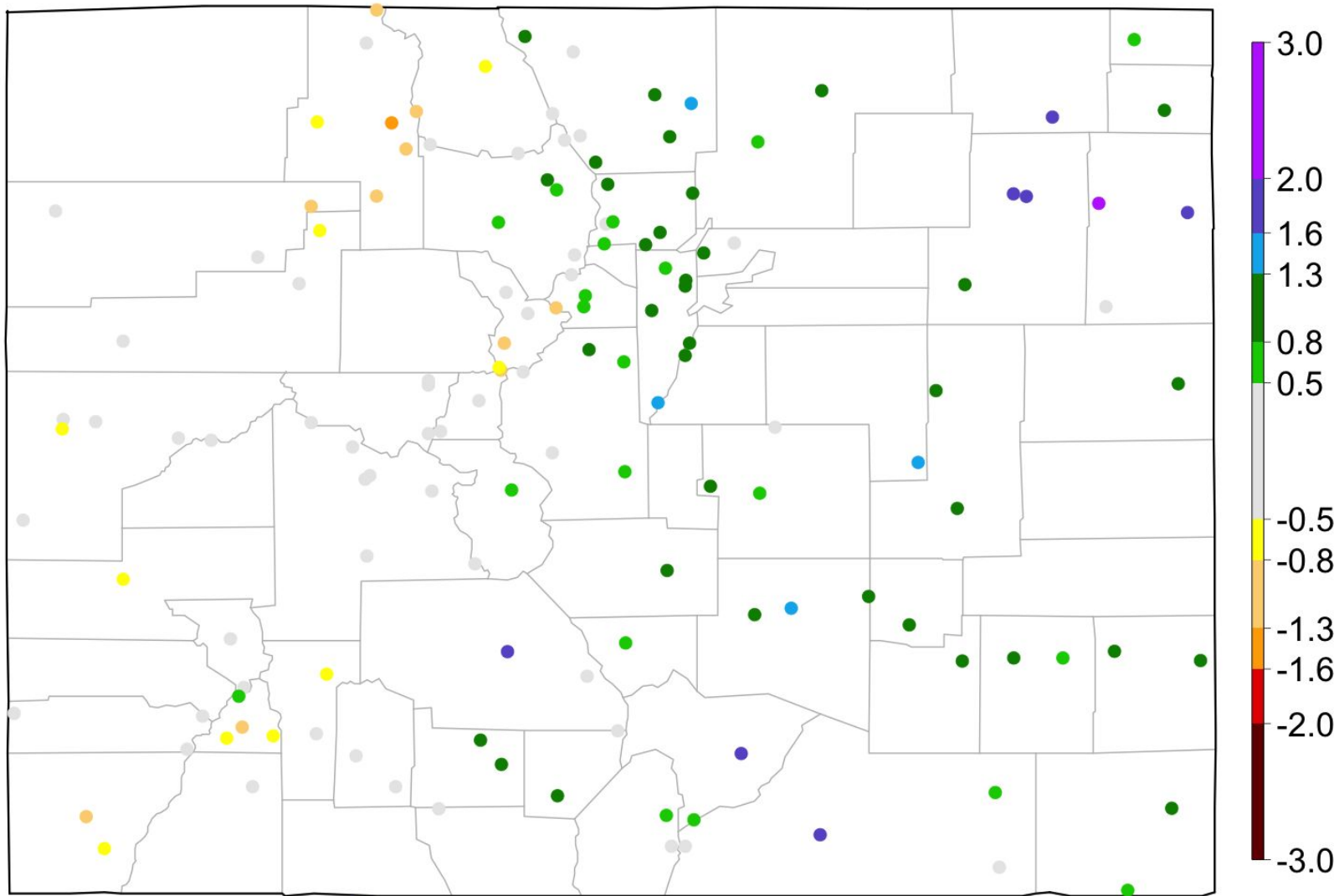
Generated 5/24/2021 at HPRCC using provisional data.

NOAA Regional Climate Centers



Standardized Precipitation Index

30-day SPI: 2021/04/23 - 2021/05/22

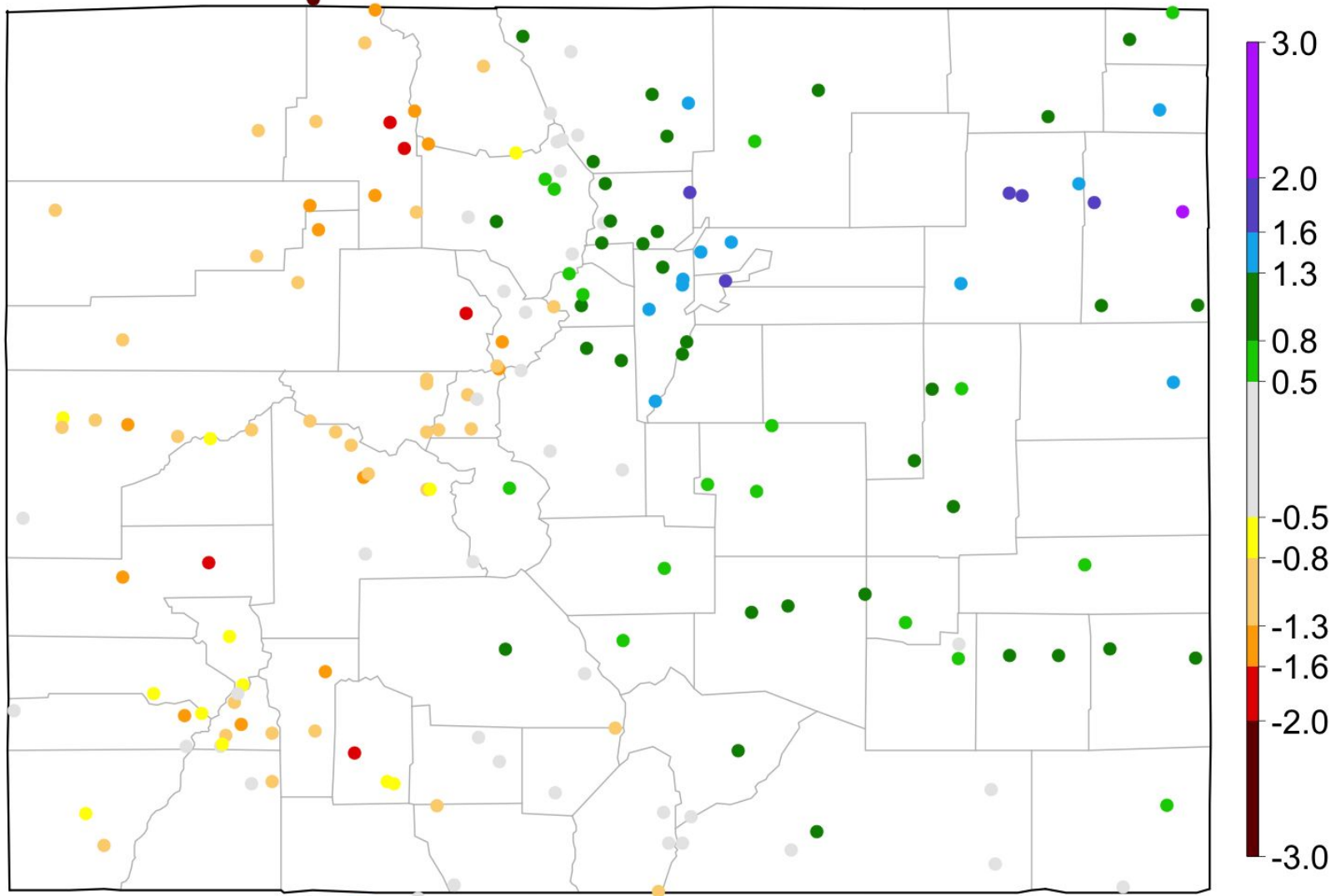


Data from High Plains Regional Climate Center and ACIS

nl



90-day SPI: 2021/02/21 - 2021/05/22

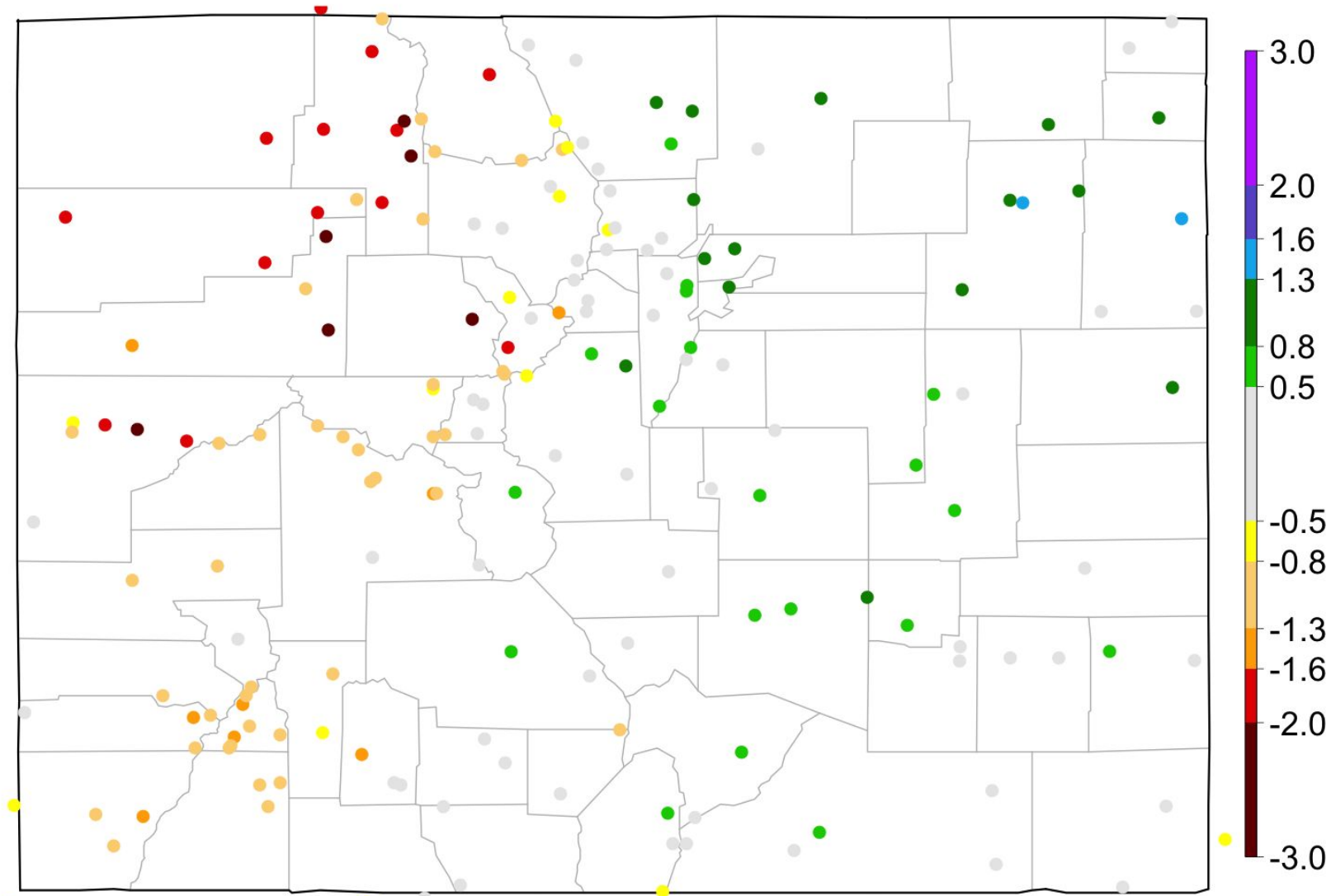


Data from High Plains Regional Climate Center and ACIS

nl



Water-year-to-date SPI: 2021/10/01 - 2021/05/22

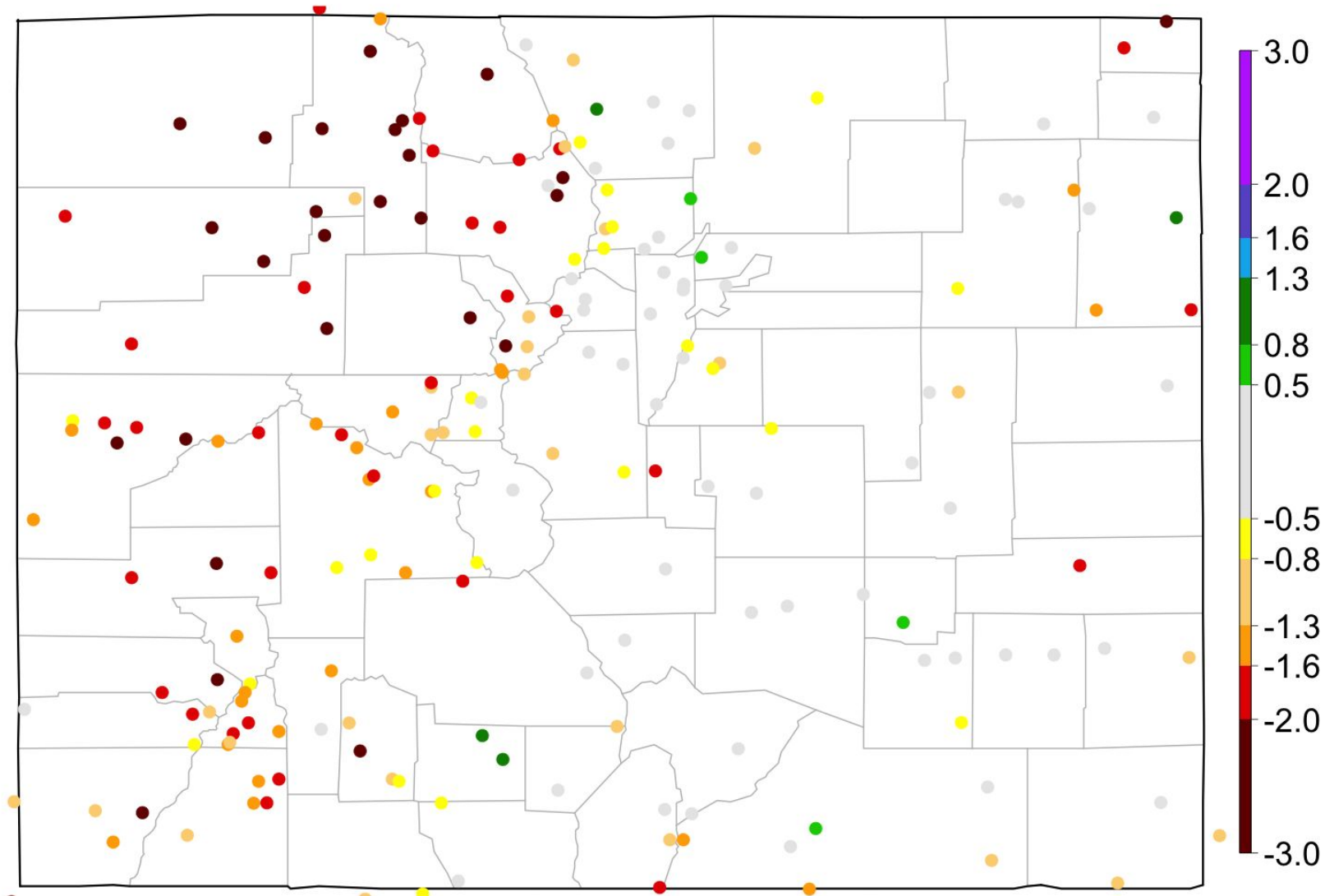


Data from High Plains Regional Climate Center and ACIS

nl



12-month SPI: 2020/05/23 - 2021/05/22

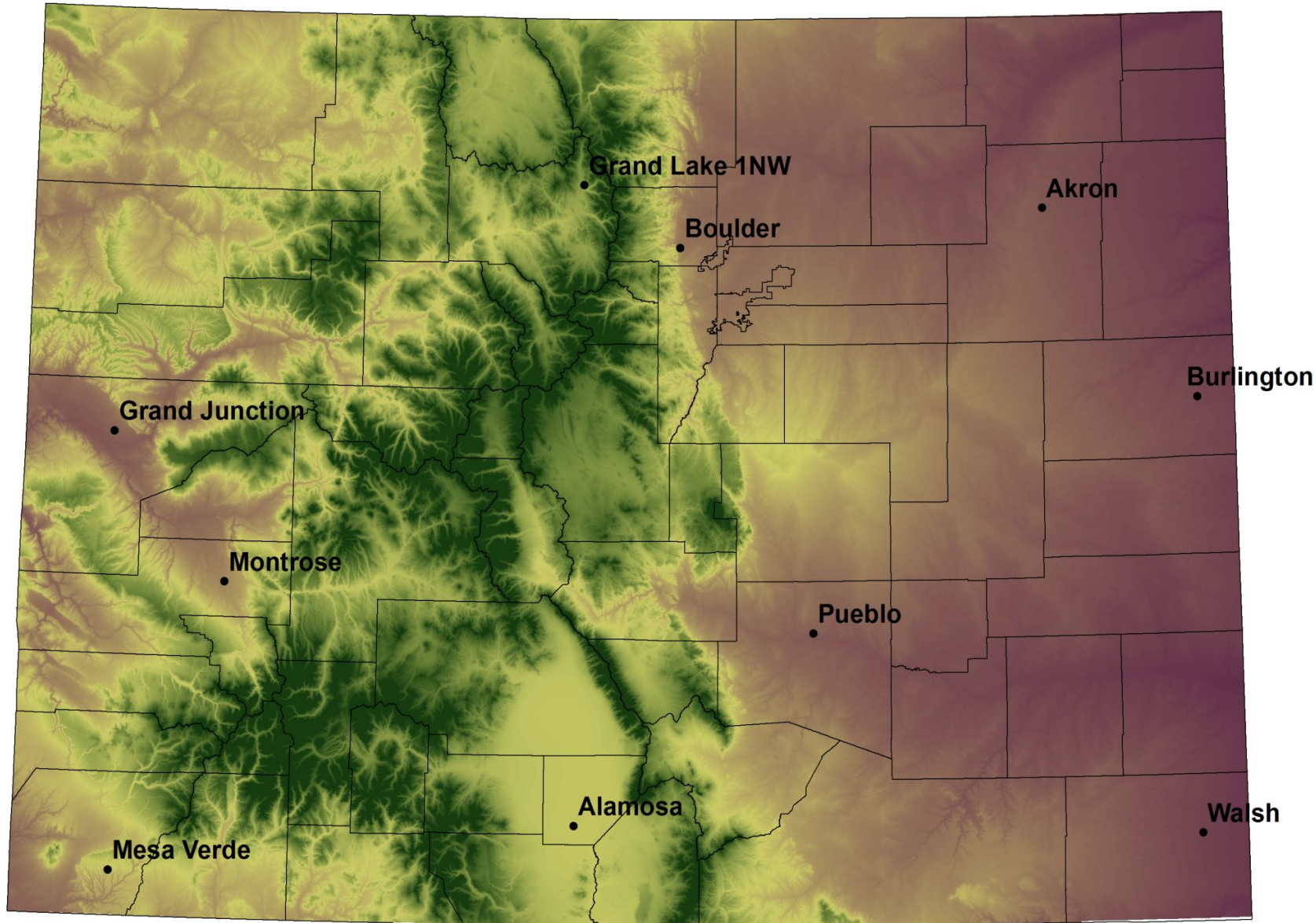


Data from High Plains Regional Climate Center and ACIS

nl



NWS Cooperative Stations for WATF



Water Year 2021 –
Station Updates



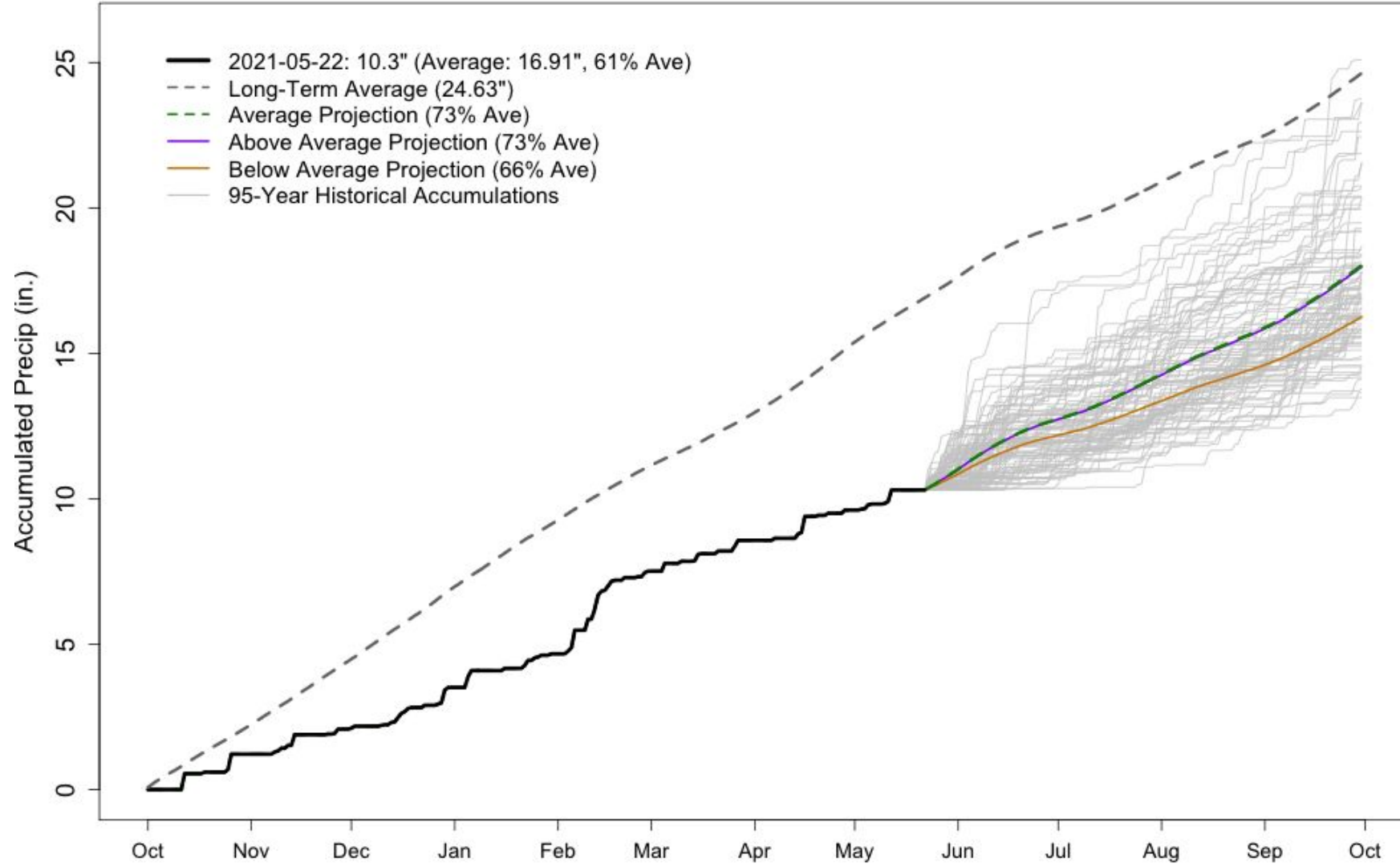
Grand Lake

(A lot of missing data from the fall – won't show this month)



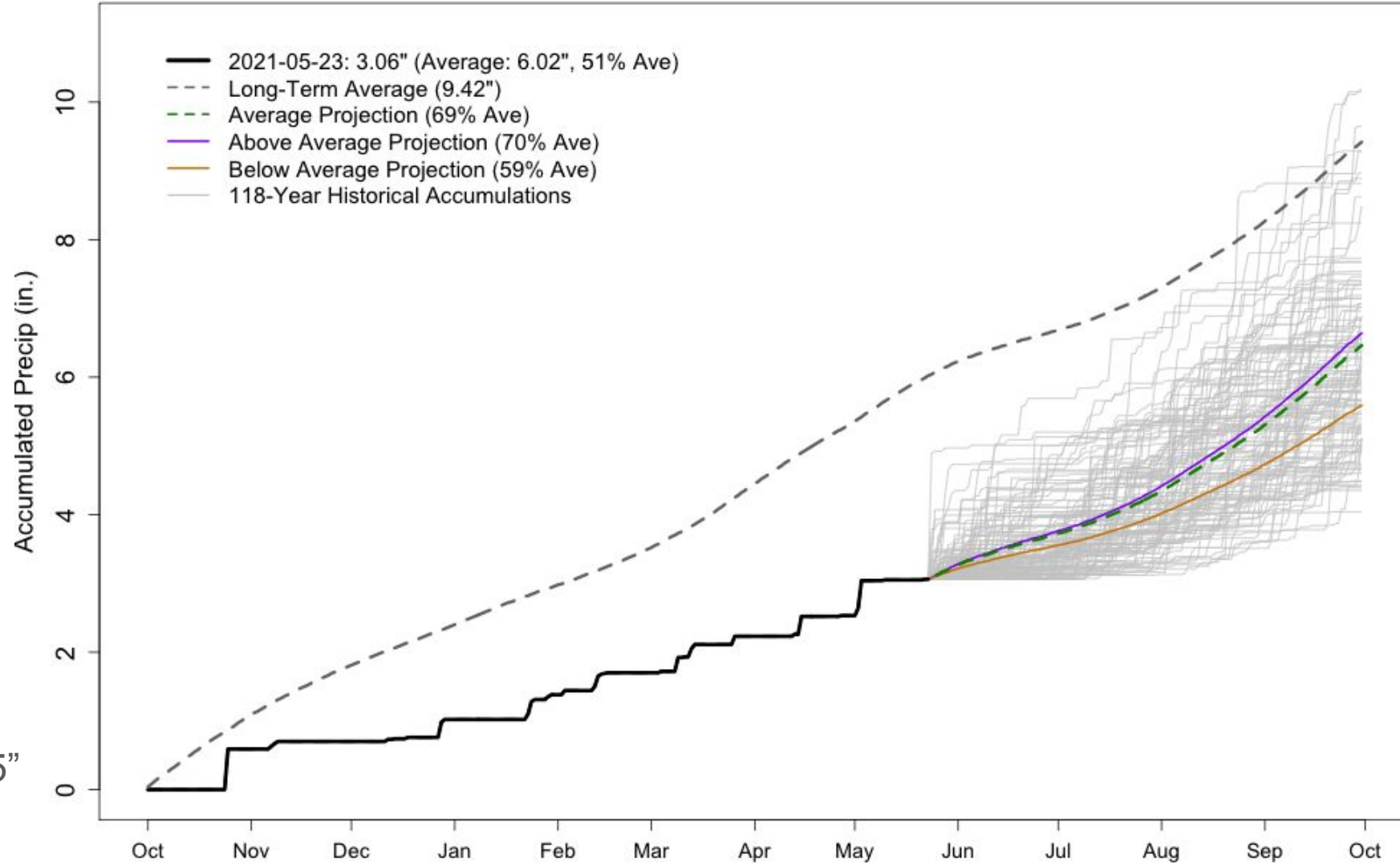
Steamboat Springs

STEAMBOAT SPRINGS WY2021 Precipitation Projections



Grand Junction

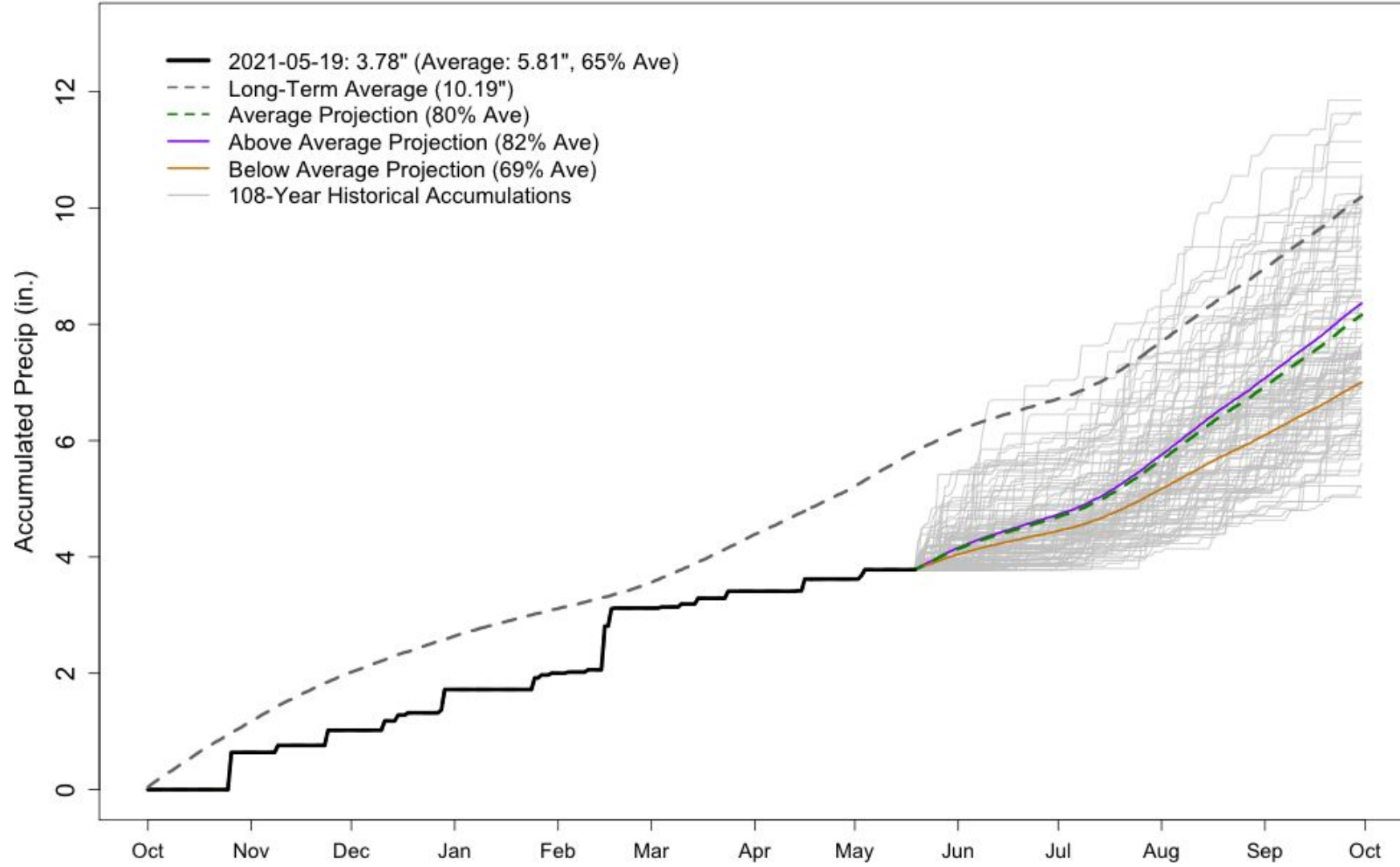
GRAND JUNCTION WALKER FIELD WY2021 Precipitation Projections



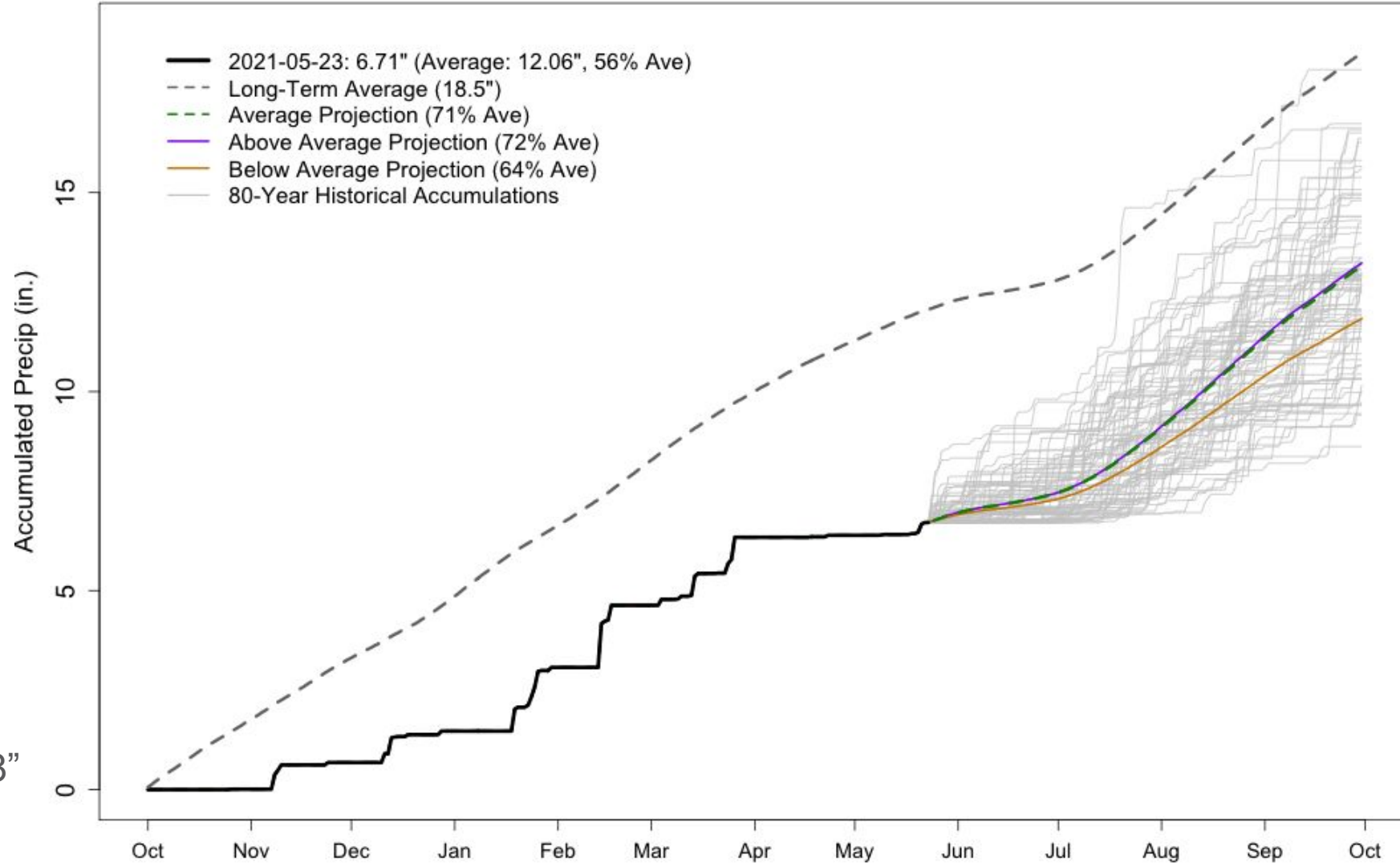
Since October 2019, 8.59" compared to average of 14.85" (58% of normal)



MONTROSE NO 2 WY2021 Precipitation Projections



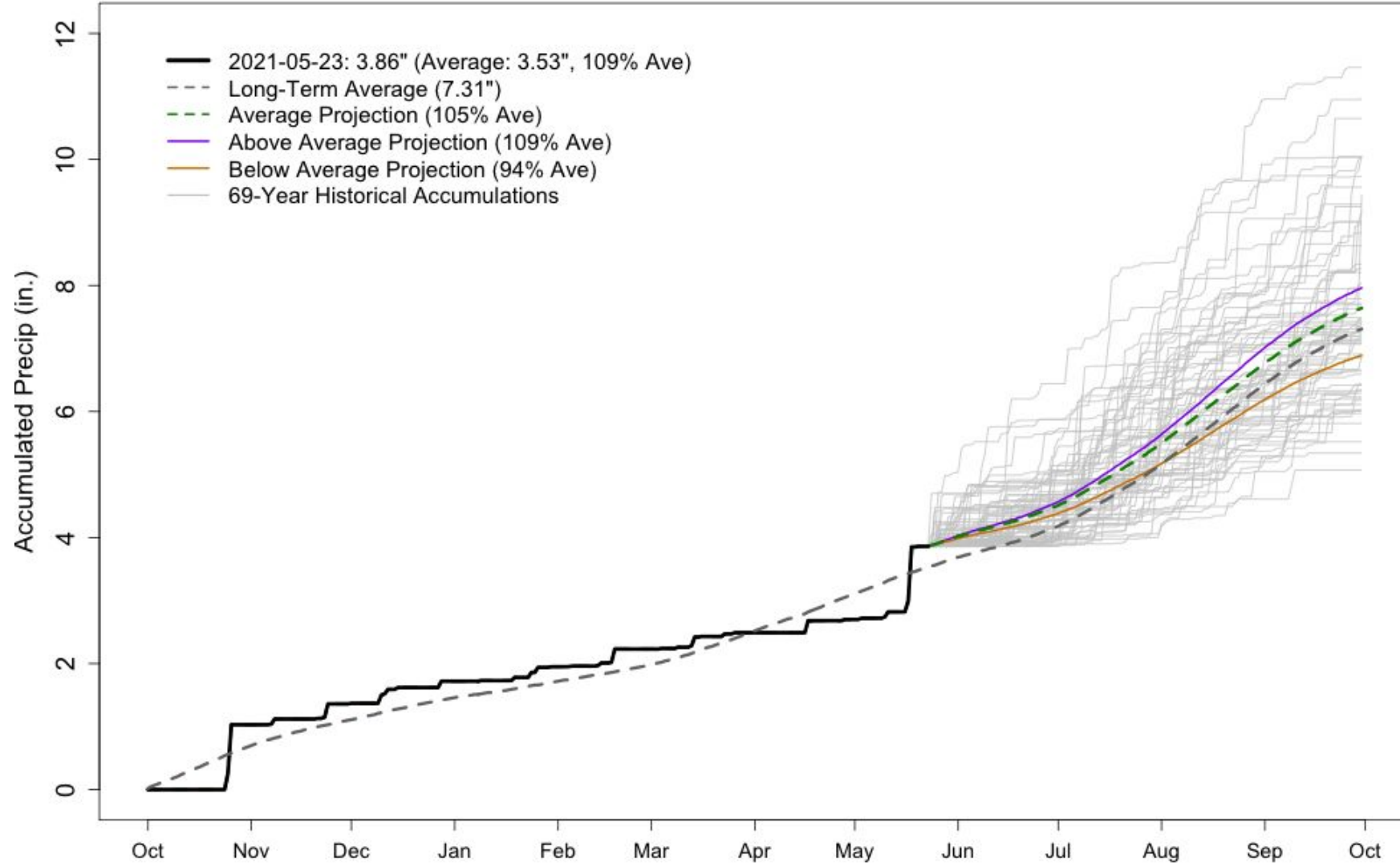
MESA VERDE NP WY2021 Precipitation Projections



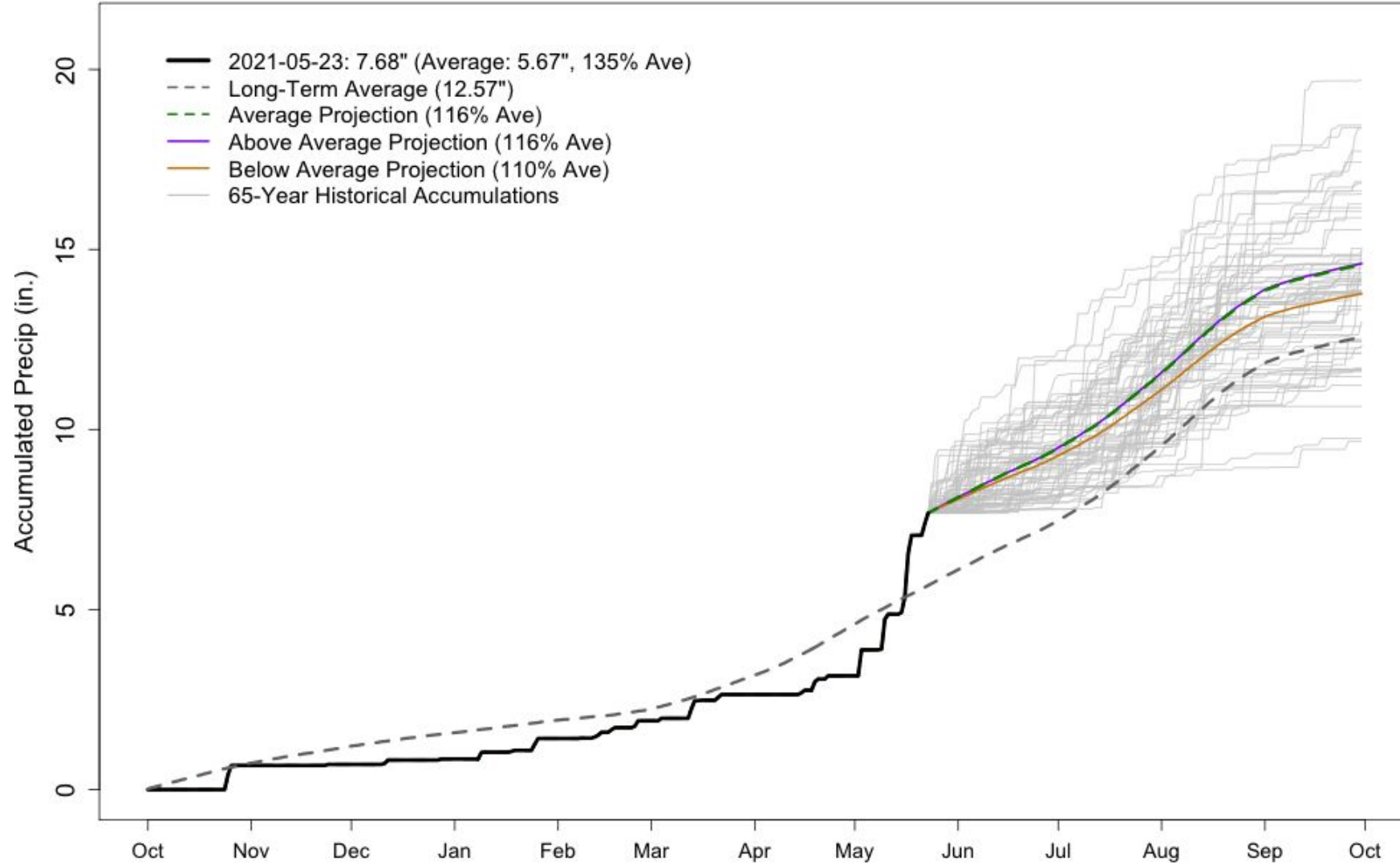
Since October 2019, 16.45" compared to average of 28.28" (58% of normal)



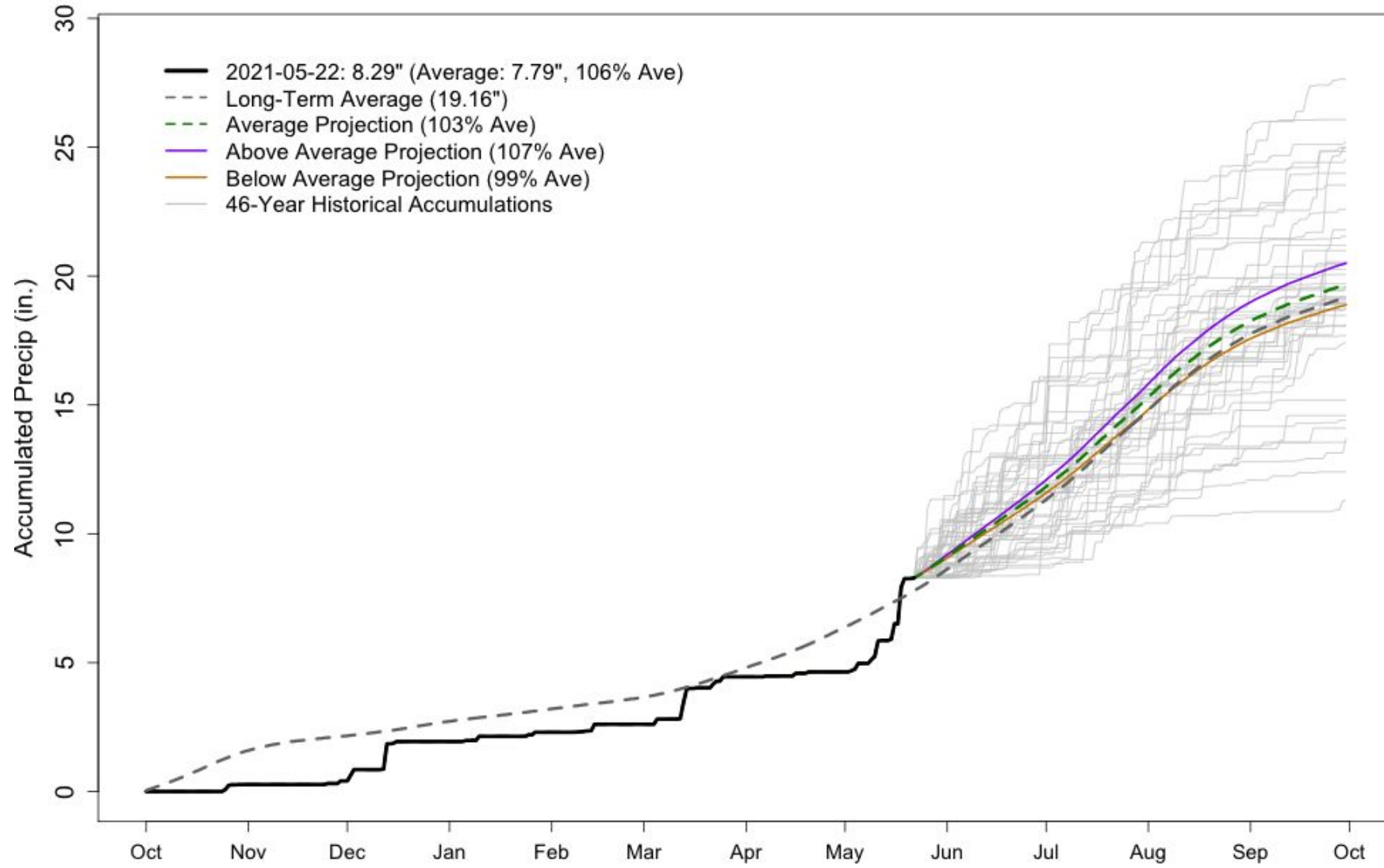
ALAMOSA-BERGMAN FIELD WY2021 Precipitation Projections



PUEBLO MEMORIAL AIRPORT WY2021 Precipitation Projections



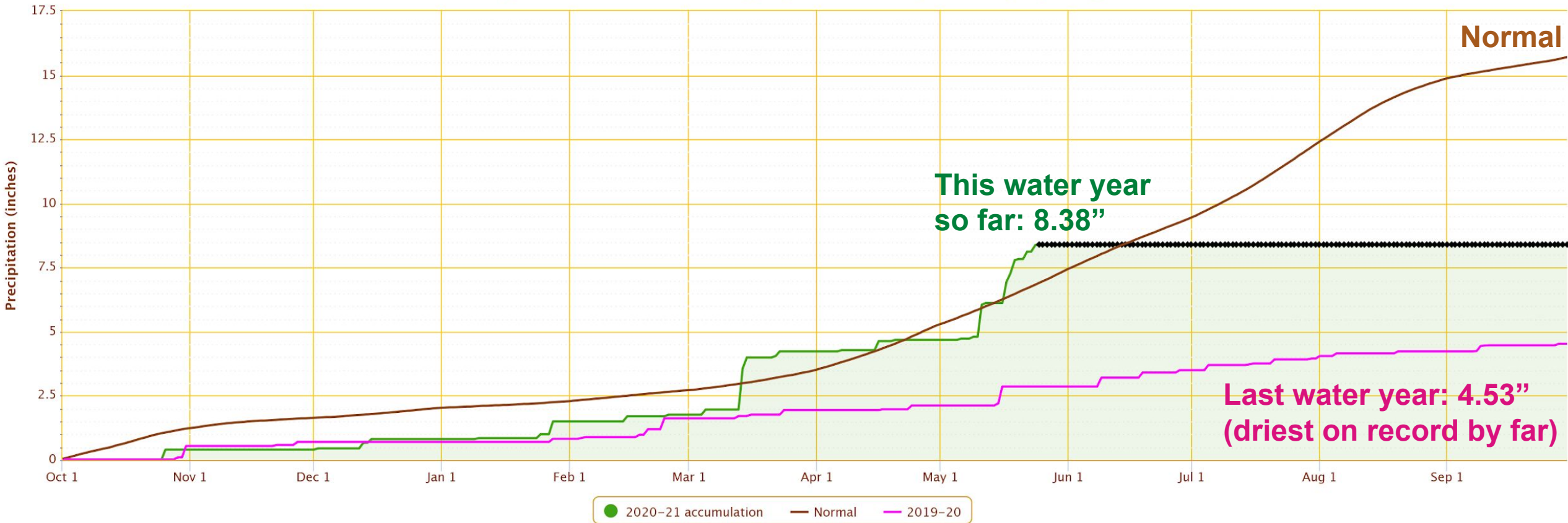
WALSH 1 W WY2021 Precipitation Projections



Eads

Accumulated Precipitation – EADS, CO

Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values

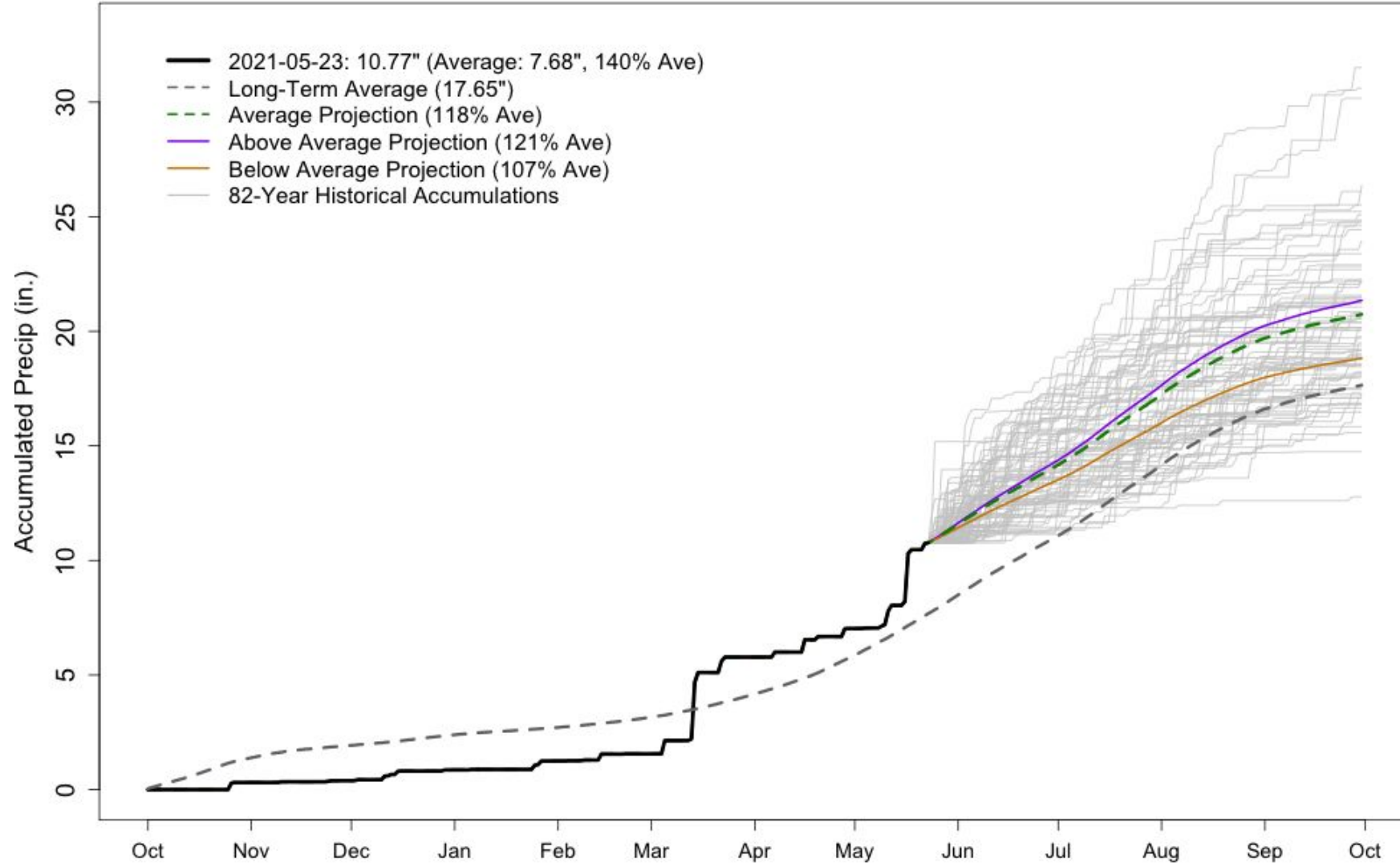


3.70" in May so far!

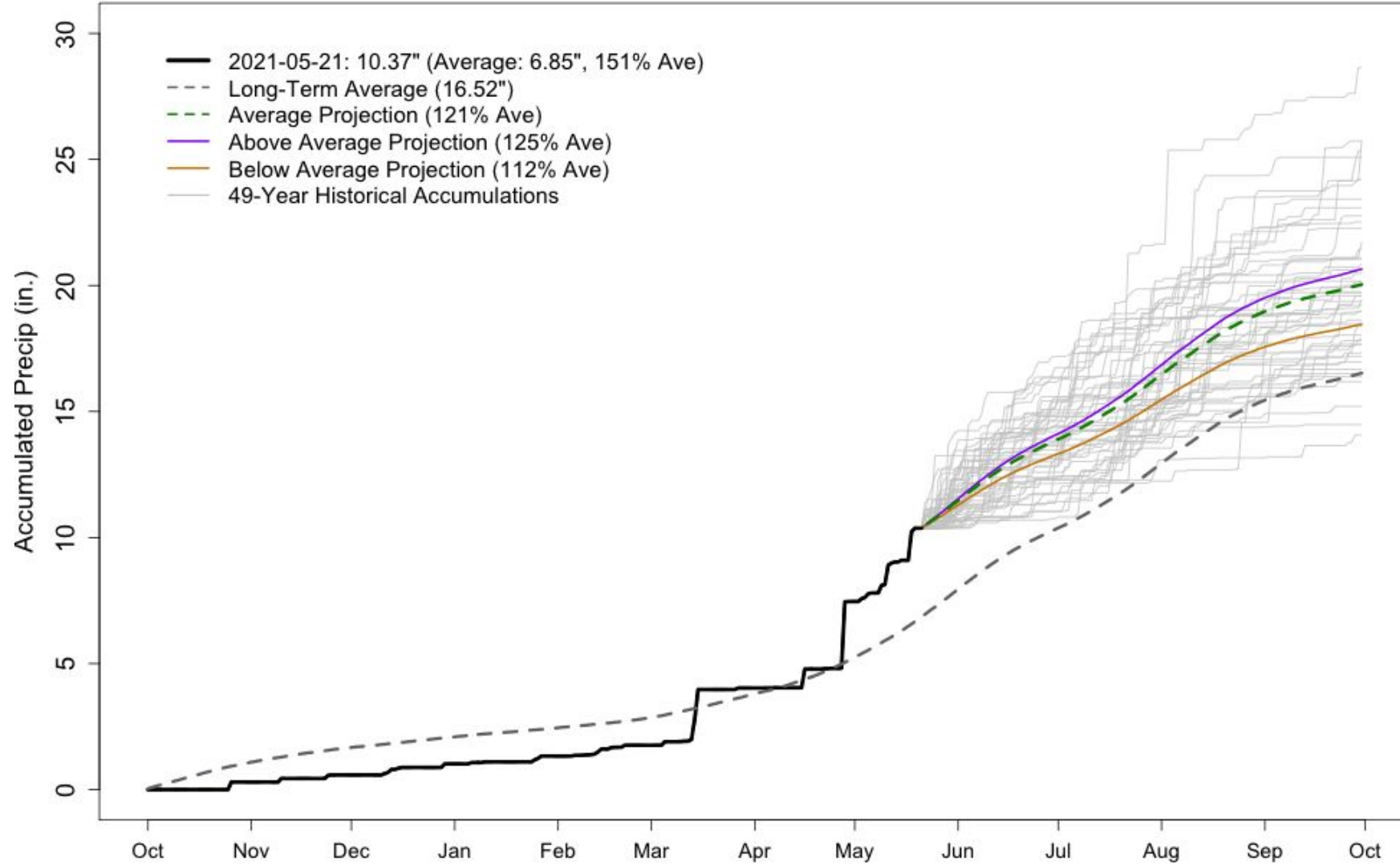
Powered by ACIS



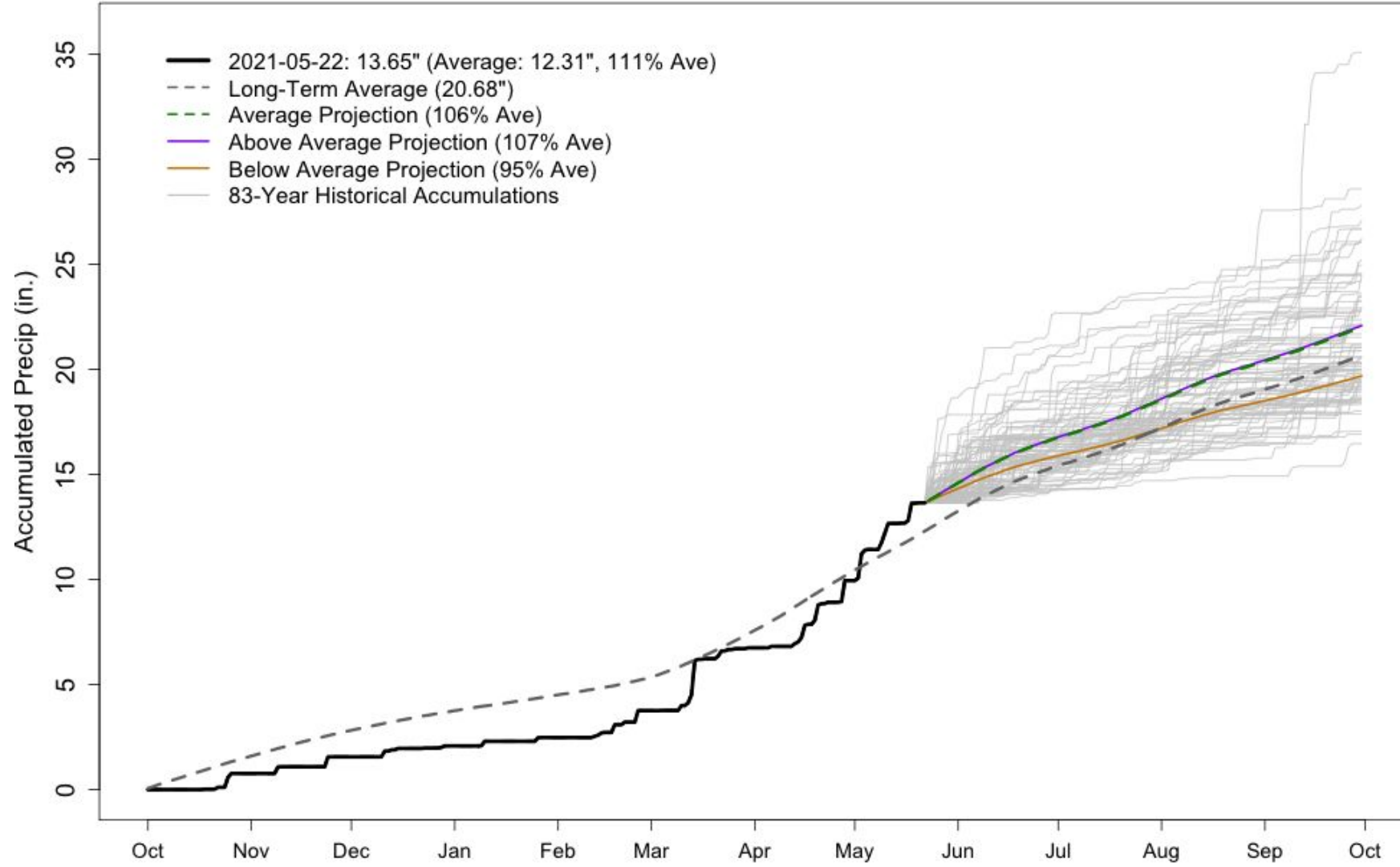
BURLINGTON WY2021 Precipitation Projections



AKRON 4 E WY2021 Precipitation Projections



BOULDER WY2021 Precipitation Projections





Drought Conditions

Webcam view of the Dillon Pinnacles and Blue Mesa Reservoir, May 24

<https://www.nps.gov/media/webcam/view.htm?id=81B46802-1DD8-B71B-0B3B619C8C1D1A09>

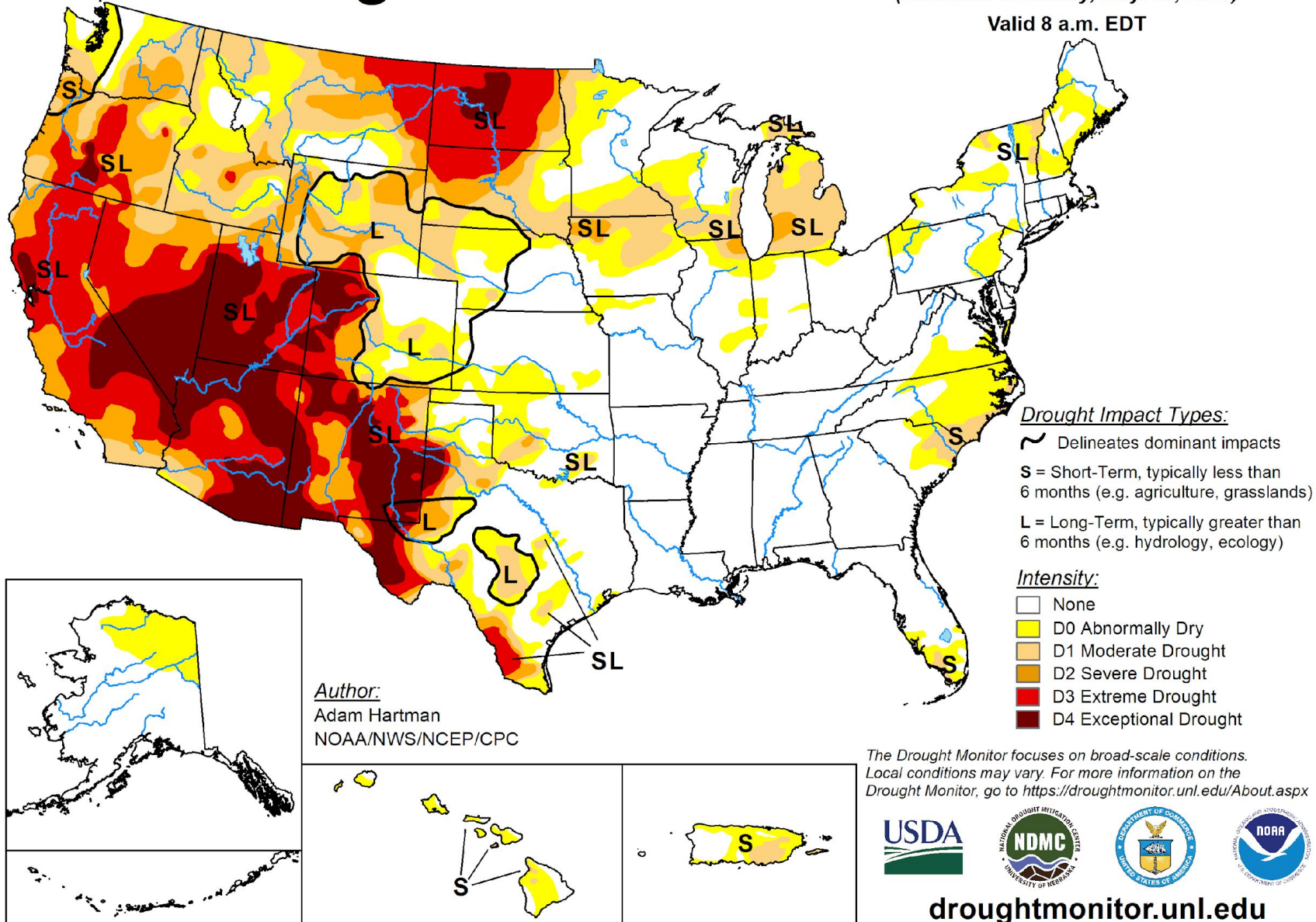


U.S. Drought Monitor

May 18, 2021

(Released Thursday, May. 20, 2021)

Valid 8 a.m. EDT



droughtmonitor.unl.edu



U.S. Drought Monitor Colorado

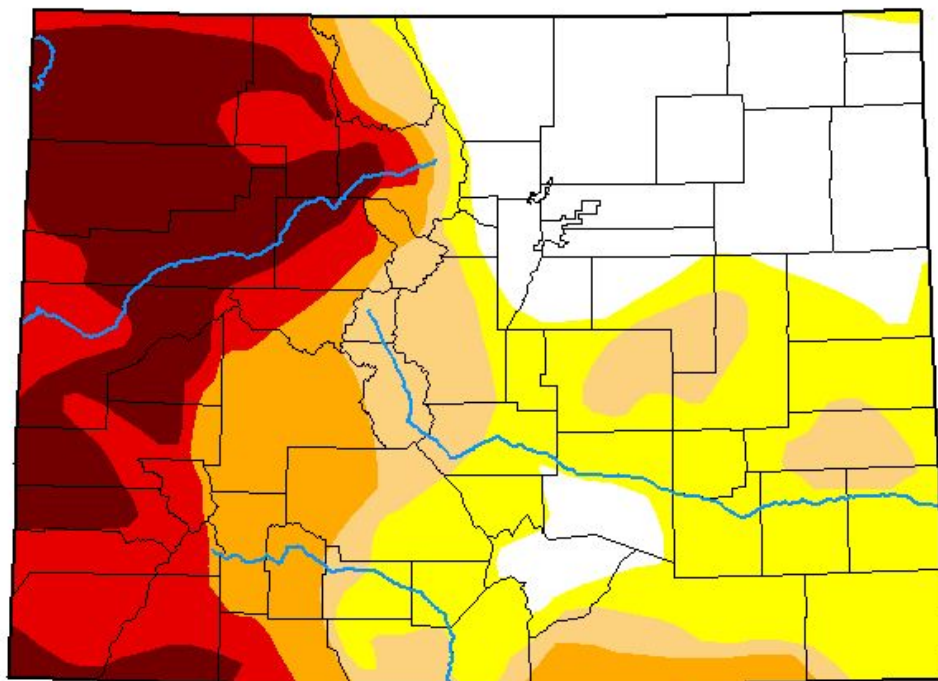
May 18, 2021

(Released Thursday, May. 20, 2021)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	23.30	76.70	51.80	39.29	28.96	16.39
Last Week <i>05-11-2021</i>	13.05	86.95	75.19	43.27	29.45	16.39
3 Months Ago <i>02-16-2021</i>	0.00	100.00	100.00	90.24	58.91	17.78
Start of Calendar Year <i>12-29-2020</i>	0.00	100.00	100.00	93.73	76.17	27.60
Start of Water Year <i>09-29-2020</i>	0.00	100.00	99.29	89.35	52.88	2.64
One Year Ago <i>05-19-2020</i>	23.22	76.78	65.20	46.31	17.52	0.00



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:

Adam Hartman
NOAA/NWS/NCEP/CPC



droughtmonitor.unl.edu



U.S. Drought Monitor Colorado

November 24, 2020

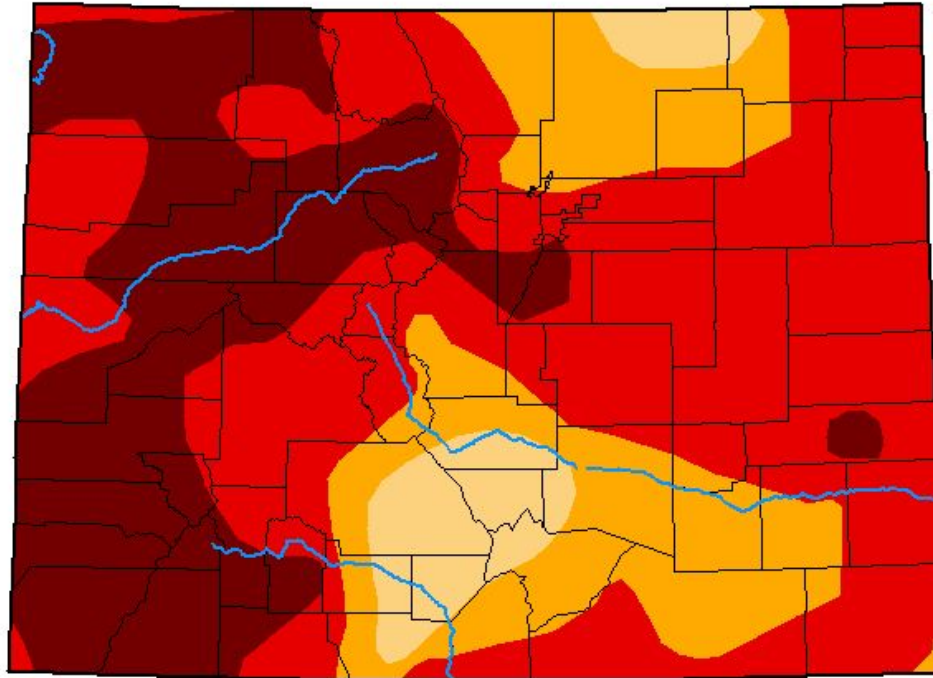
Six months ago

(Released Thursday, Nov. 26, 2020)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	93.71	74.63	27.22
Last Week <i>11-19-2020</i>	0.00	100.00	100.00	93.71	74.08	27.22
3 Months Ago <i>08-27-2020</i>	0.00	100.00	98.26	93.29	36.52	0.38
Start of Calendar Year <i>01-02-2020</i>	31.72	68.28	51.19	20.11	0.00	0.00
Start of Water Year <i>10-01-2020</i>	0.00	100.00	99.29	89.35	52.88	2.64
One Year Ago <i>11-27-2019</i>	24.08	75.92	61.85	32.29	0.00	0.00



Intensity:

- None
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- D3 Extreme Drought
- D4 Exceptional Drought

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Author:

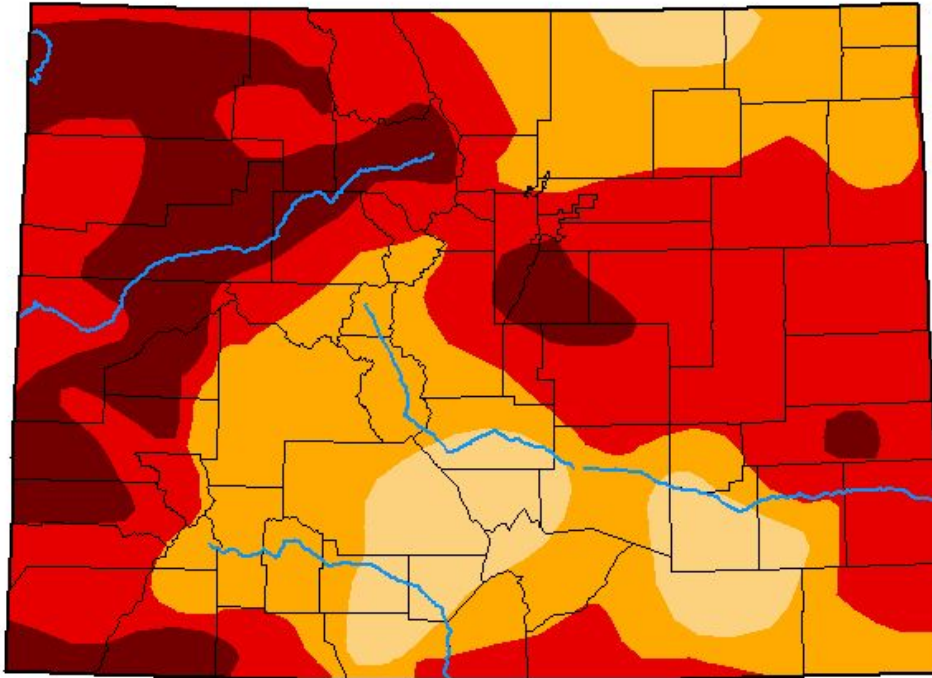
Richard Heim
NCEI/NOAA



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U.S. Drought Monitor Colorado



February 16, 2021 **Three months ago**
 (Released Thursday, Feb. 18, 2021)
 Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	90.24	58.91	17.78
Last Week <i>02-09-2021</i>	0.00	100.00	100.00	90.24	70.11	24.79
3 Months Ago <i>11-17-2020</i>	0.00	100.00	100.00	93.71	74.08	27.22
Start of Calendar Year <i>12-29-2020</i>	0.00	100.00	100.00	93.73	76.17	27.60
Start of Water Year <i>09-29-2020</i>	0.00	100.00	99.29	89.35	52.88	2.64
One Year Ago <i>02-18-2020</i>	28.74	71.26	43.82	3.30	0.00	0.00

Intensity:

- None
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Author:

David Miskus
 NOAA/NWS/NCEP/CPC

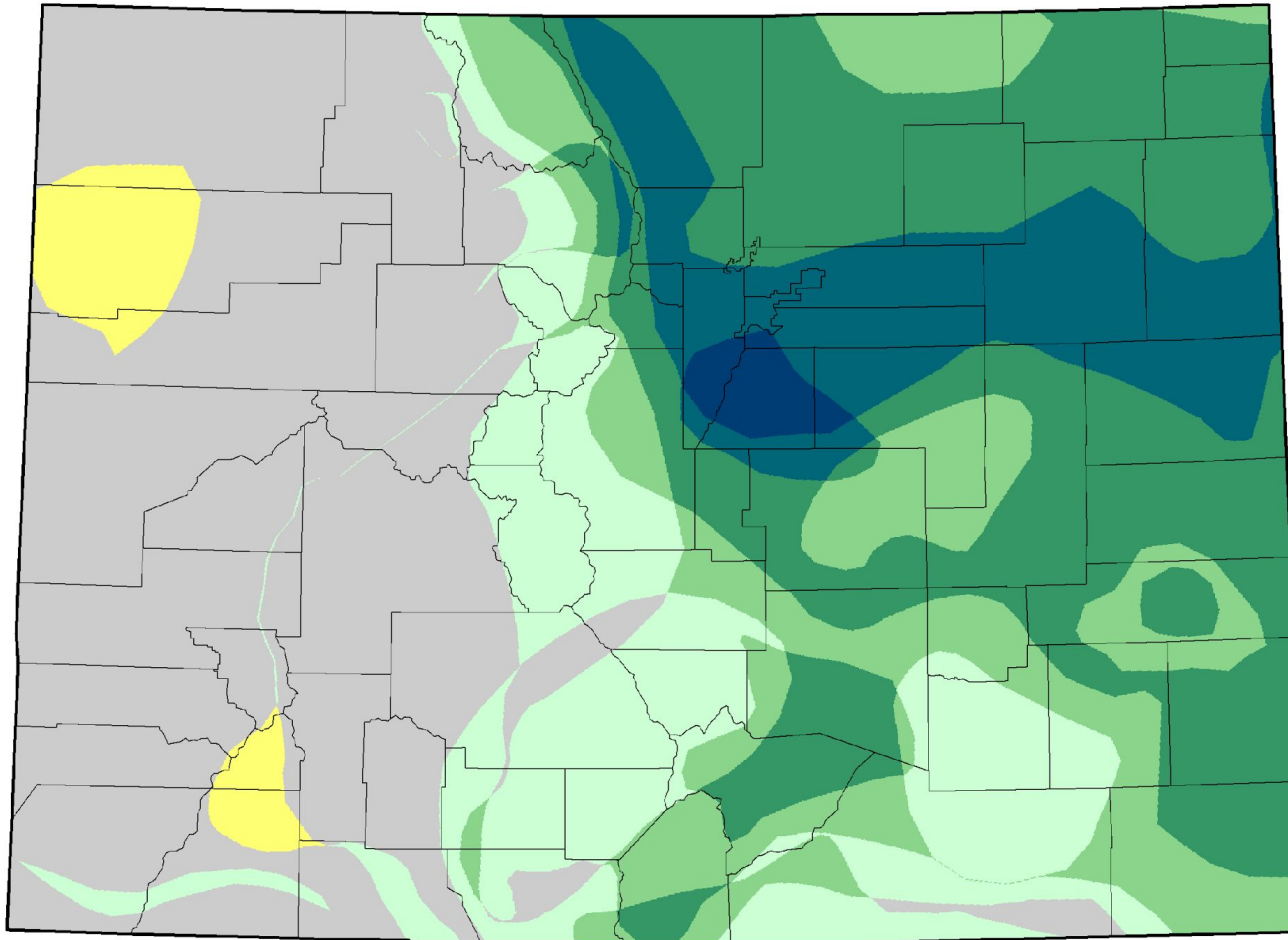


droughtmonitor.unl.edu



U.S. Drought Monitor Class Change - Colorado 13 Week

Change over three months



May 18, 2021
compared to
February 16, 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



U.S. Drought Monitor Colorado

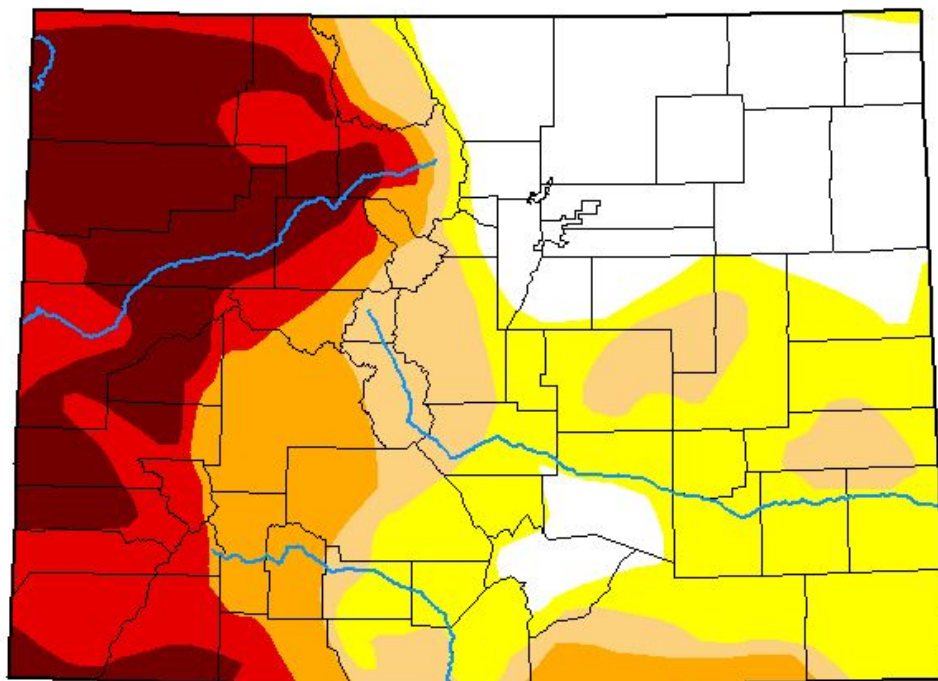
May 18, 2021

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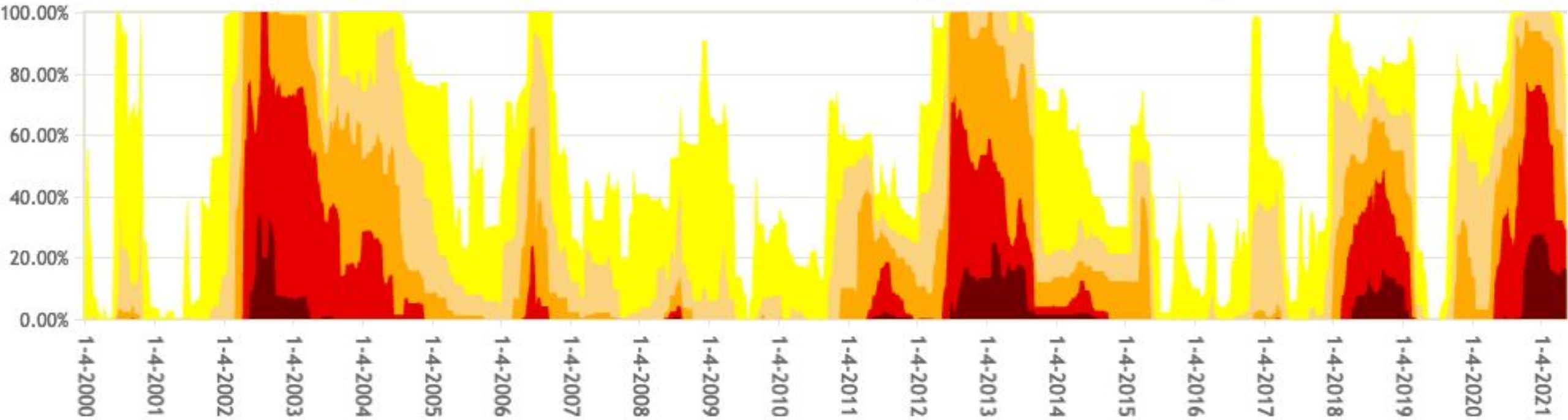
Adam Hartman
NOAA/NWS/NCEP/CPC



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Percent of Colorado in drought (since 2000)

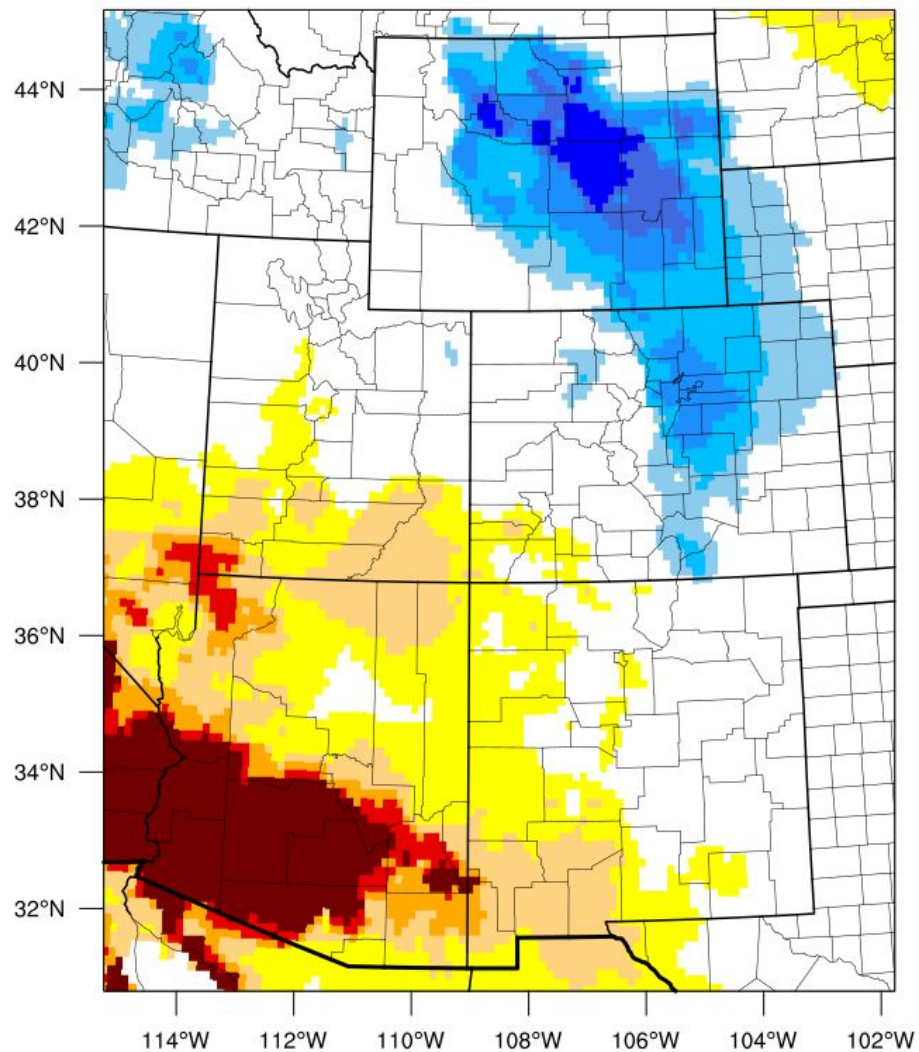


Intensity:

-  D0 Abnormally Dry
-  D1 Moderate Drought
-  D2 Severe Drought
-  D3 Extreme Drought
-  D4 Exceptional Drought



3-month EDDI categories for May 18, 2021



Drought categories

Wetness categories



100% 98% 95% 90% 80% 70% 30% 20% 10% 5% 2% 0%

(EDDI-percentile category breaks: 100% = driest; 0% = wettest)

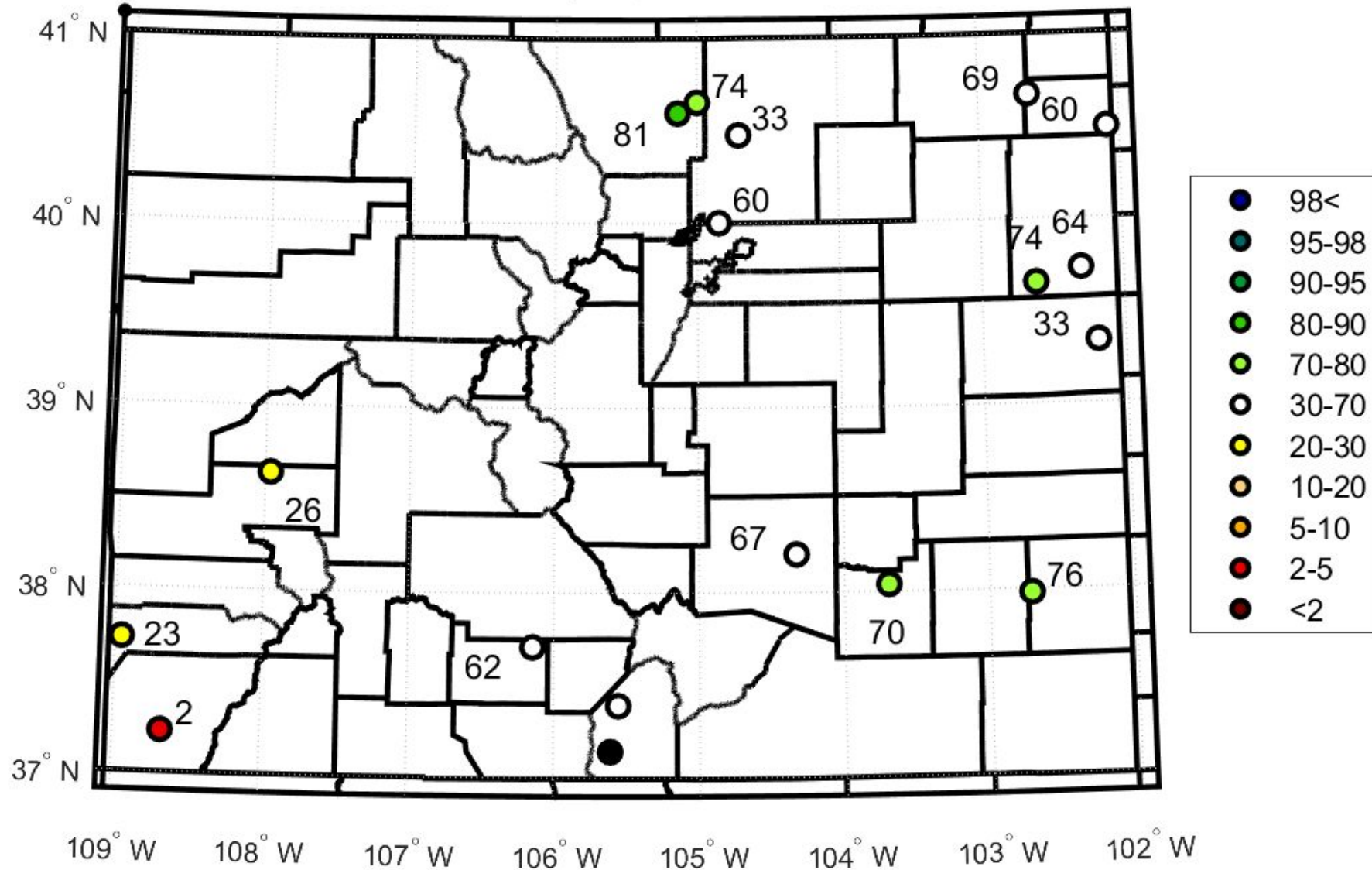
Evaporative Demand Drought Index

Over last 3 months, very low evaporative demand in northeast Colorado (cool, cloudy, humid); near-normal in western Colorado; very high in the desert southwest



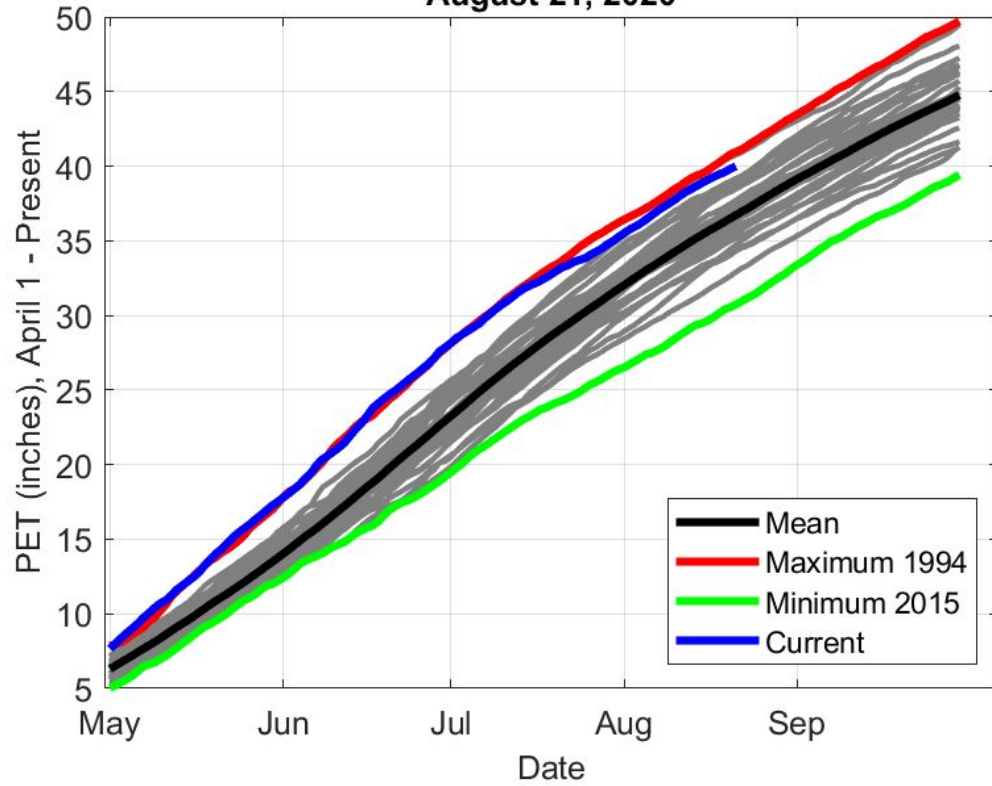
Growing Season Water Balance (P/PET) Percentiles

May 21, 2021

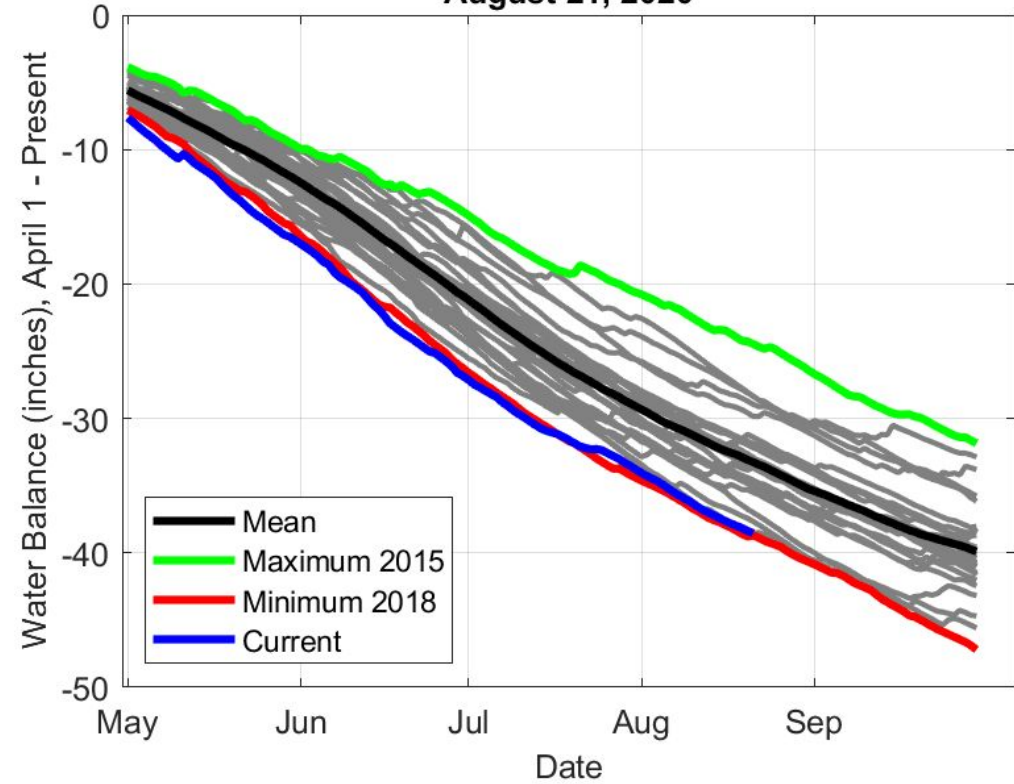


UPDATE THIS

Olathe Growing Season Evaporative Demand
August 21, 2020



Olathe Growing Season Water Balance
August 21, 2020

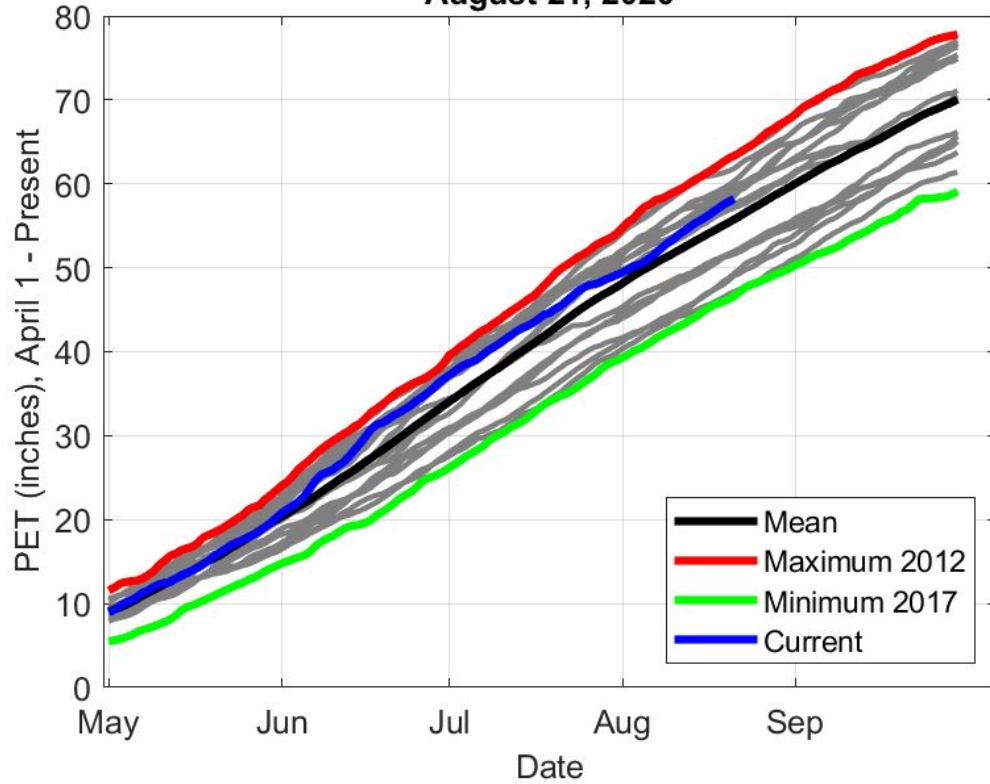


<http://climate.colostate.edu/~drought/et.php>

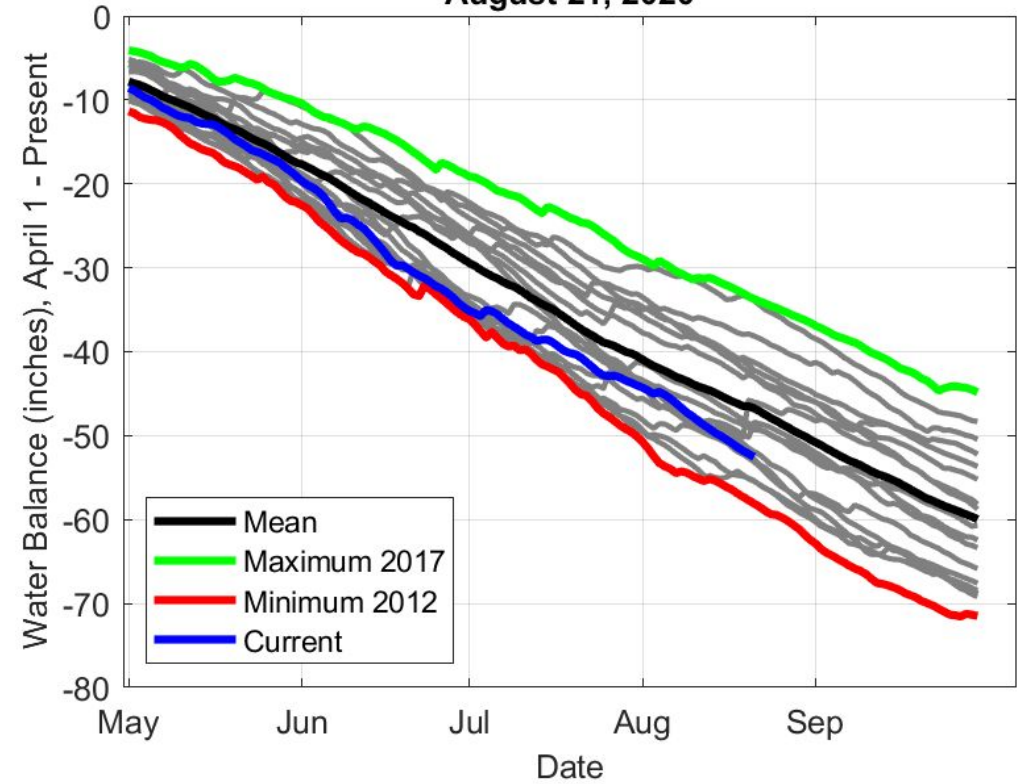


UPDATE THIS

Lamar Growing Season Evaporative Demand
August 21, 2020



Lamar Growing Season Water Balance
August 21, 2020



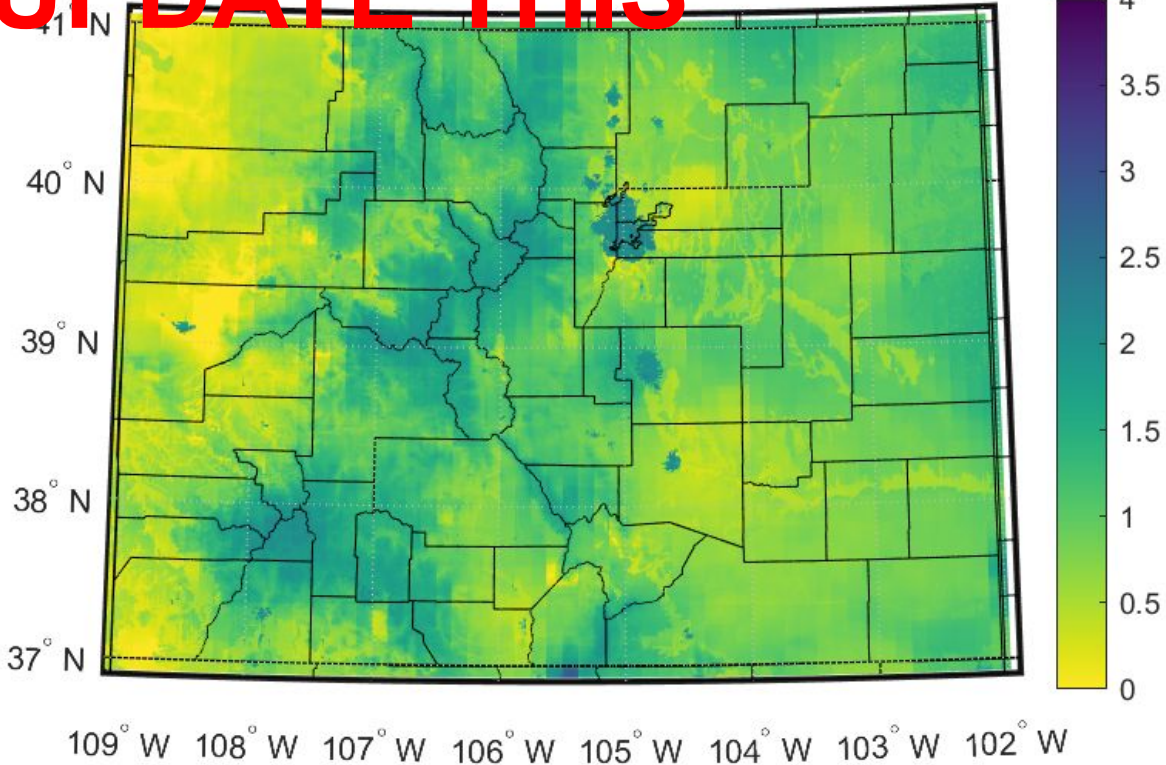
<http://climate.colostate.edu/~drought/et.php>



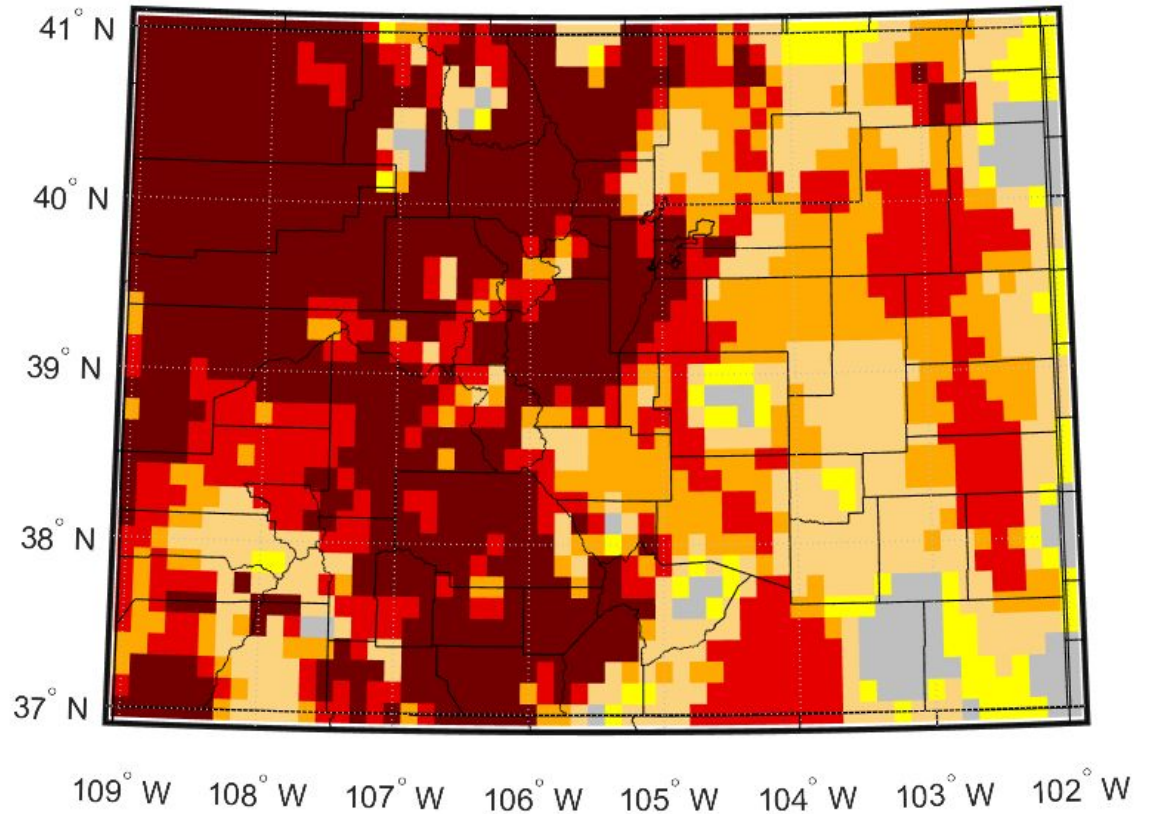
Top 10cm Available Plant Water (cm)

UPDATE THIS

08/15/20

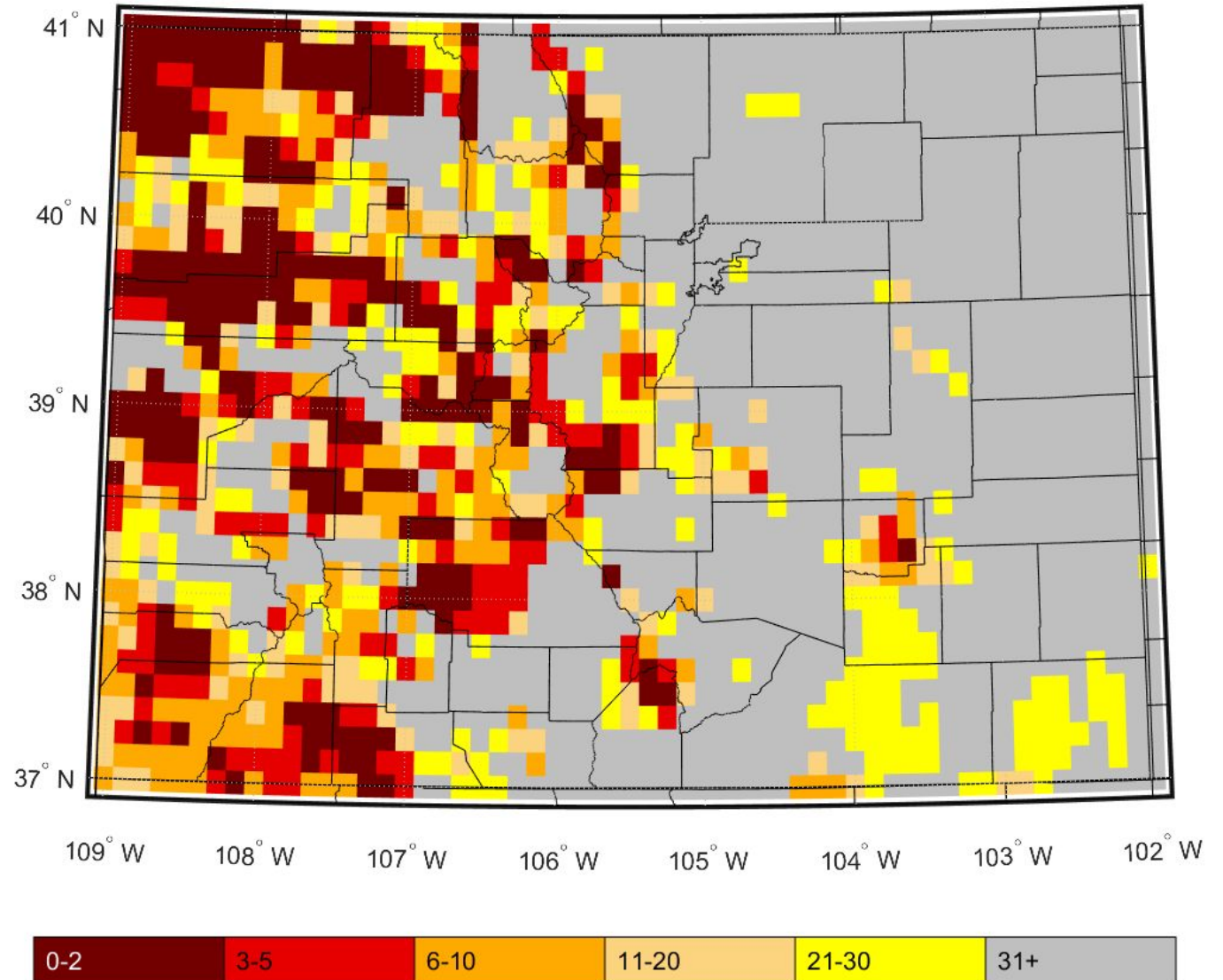


Top 10cm Soil Moisture Drought Category
08/19/2020



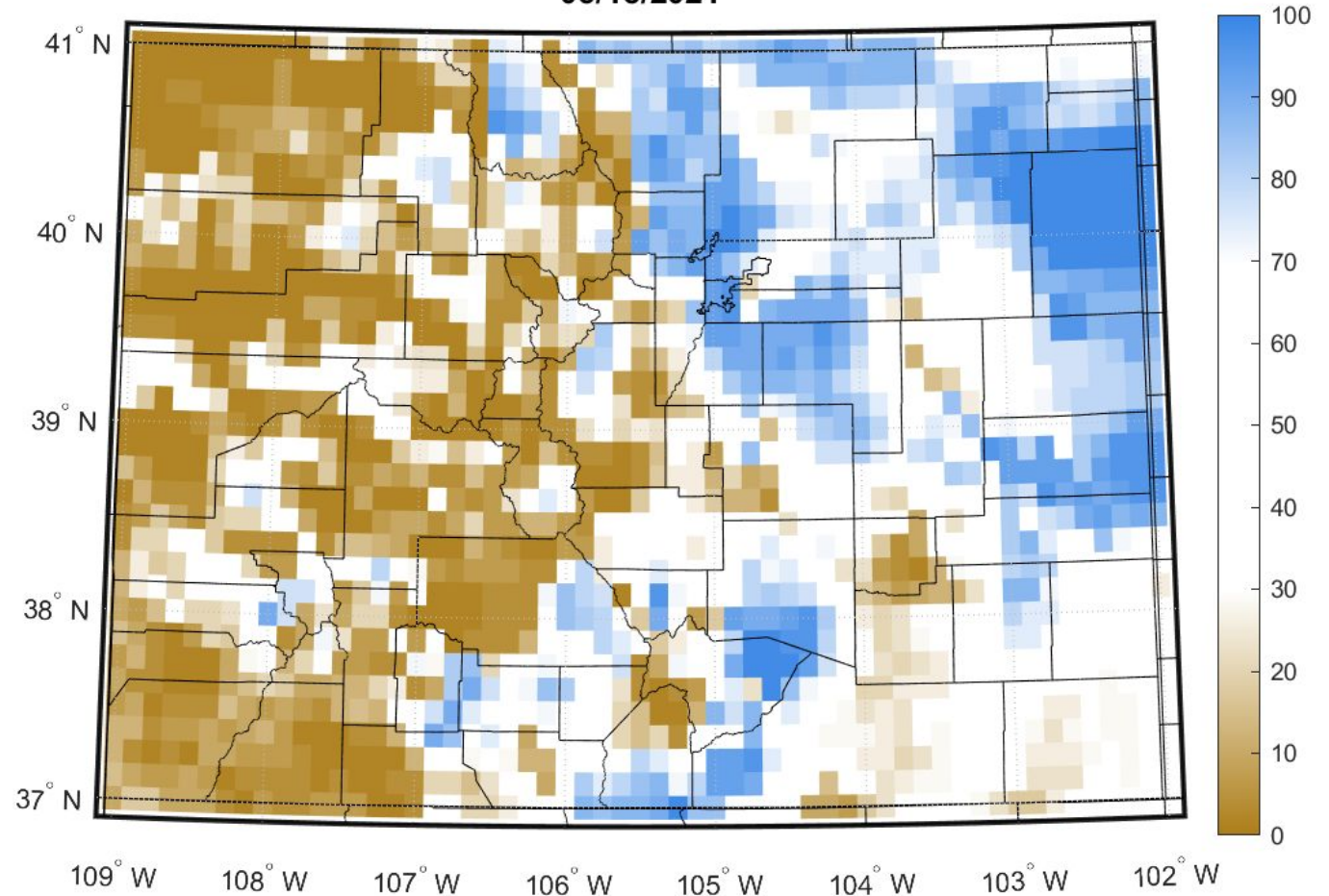
Deep soil moisture has recovered very well in eastern Colorado, but continues to be very bad across most of western Colorado

Top Meter Soil Moisture Percentile 05/18/2021



Deep soil moisture has recovered very well in eastern Colorado, but continues to be very bad across most of western Colorado

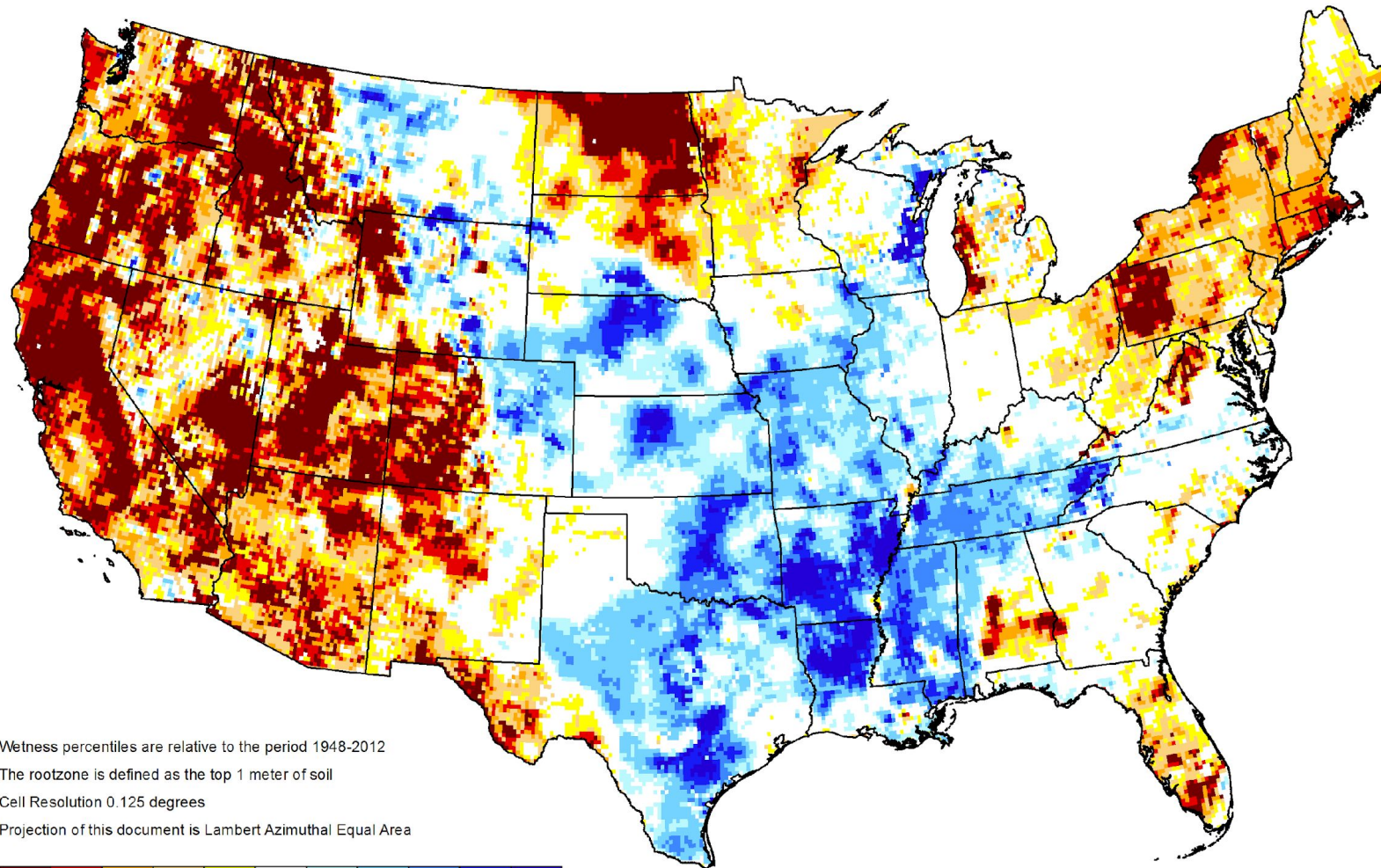
Top Meter Soil Moisture Percentile
05/18/2021



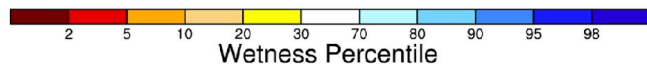


GRACE-Based Root Zone Soil Moisture Drought Indicator

May 17, 2021



Wetness percentiles are relative to the period 1948-2012
The rootzone is defined as the top 1 meter of soil
Cell Resolution 0.125 degrees
Projection of this document is Lambert Azimuthal Equal Area



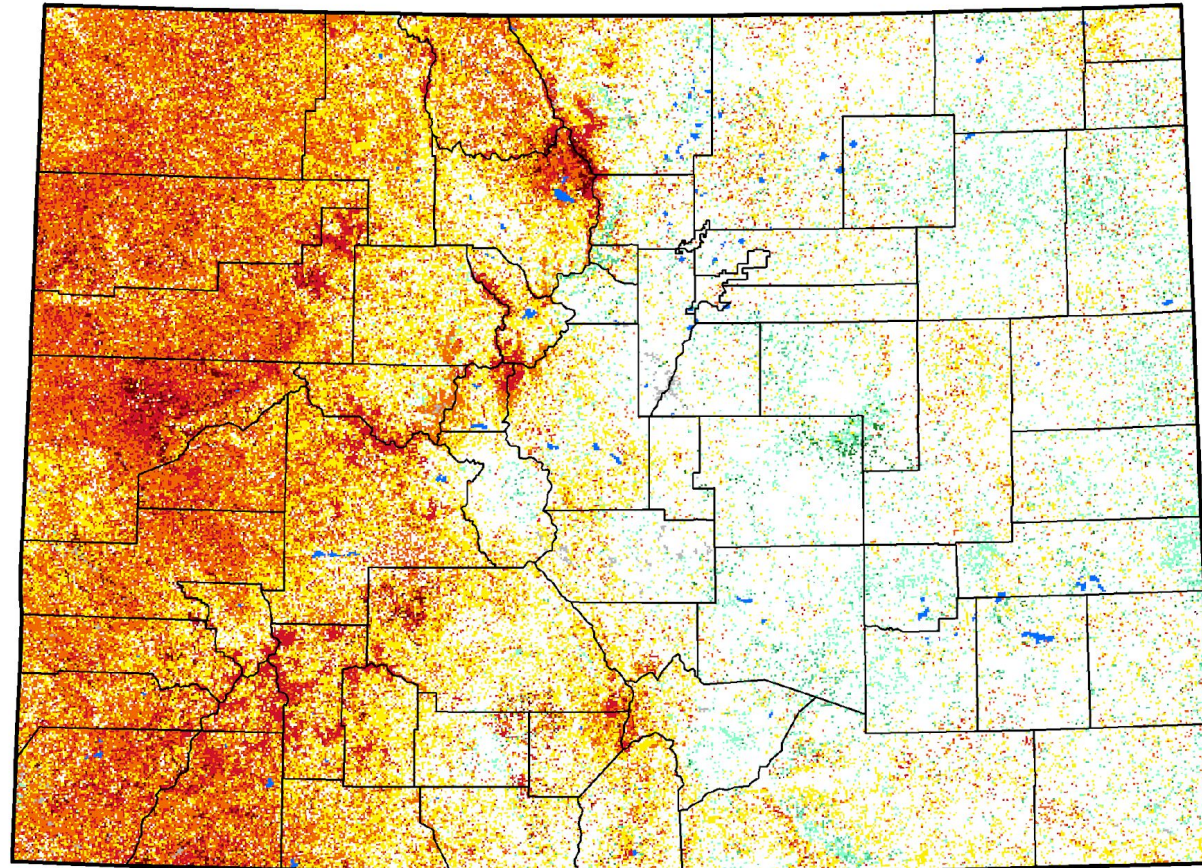
<https://nasagrace.unl.edu>



Vegetation Drought Response Index

Complete: Colorado

May 23, 2021

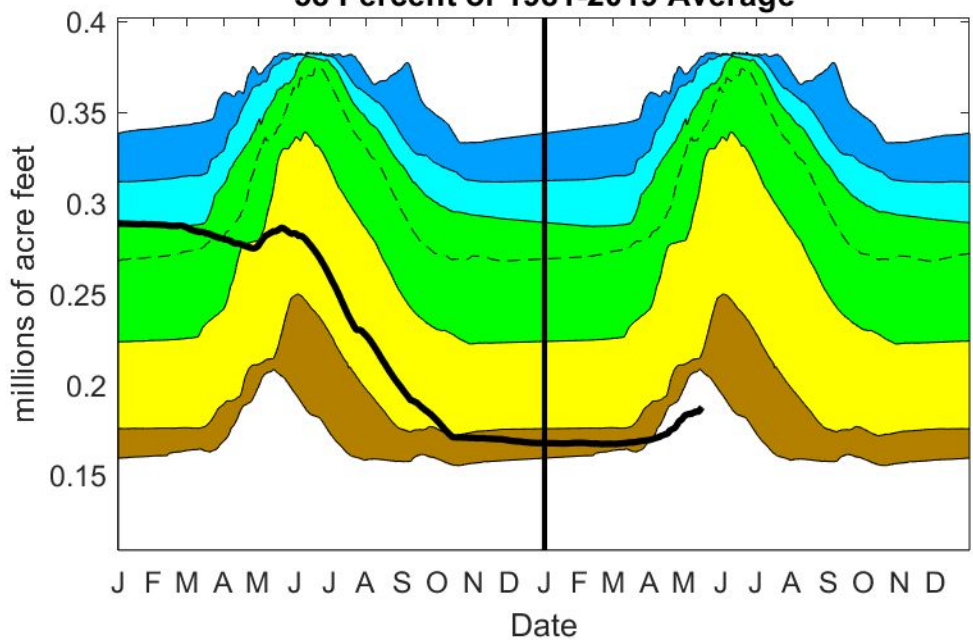


Vegetation Condition

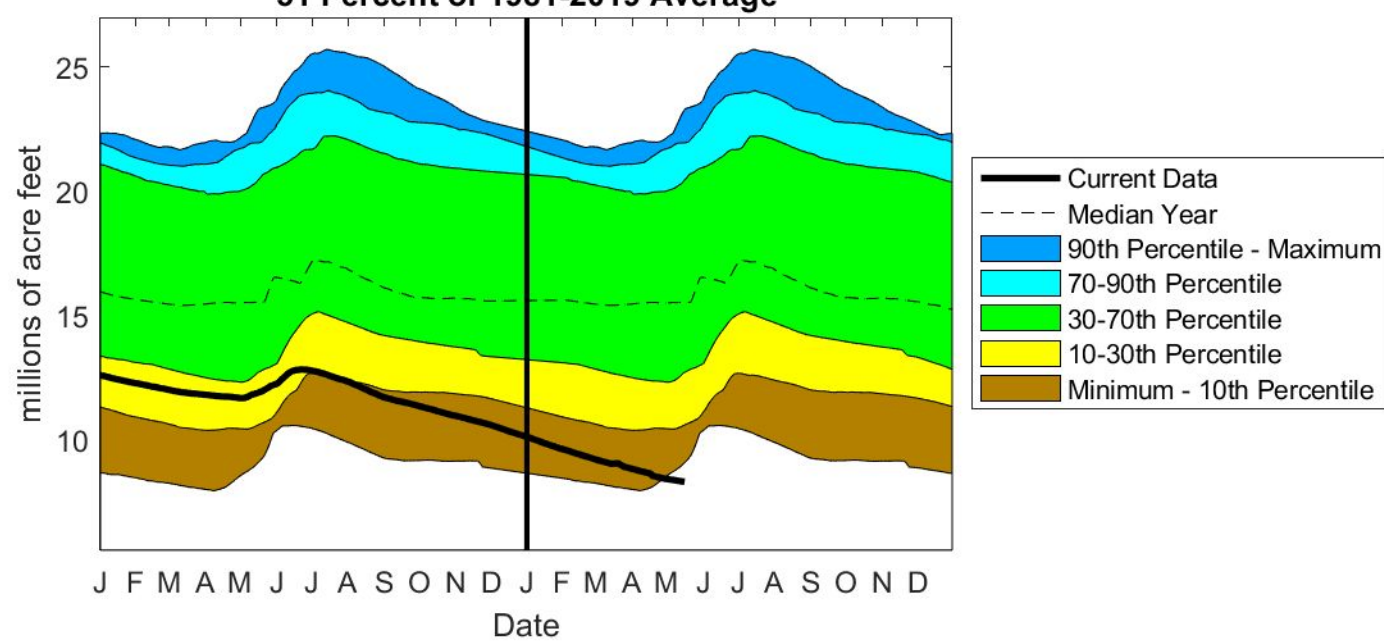
- Extreme Drought
- Severe Drought
- Moderate Drought
- Pre-drought stress
- Near Normal
- Unusually Moist
- Very Moist
- Extreme Moist
- Out of Season
- Water



McPhee Reservoir Level 05/23/2021
58 Percent of 1981-2019 Average



Lake Powell Level 05/23/2021
51 Percent of 1981-2019 Average



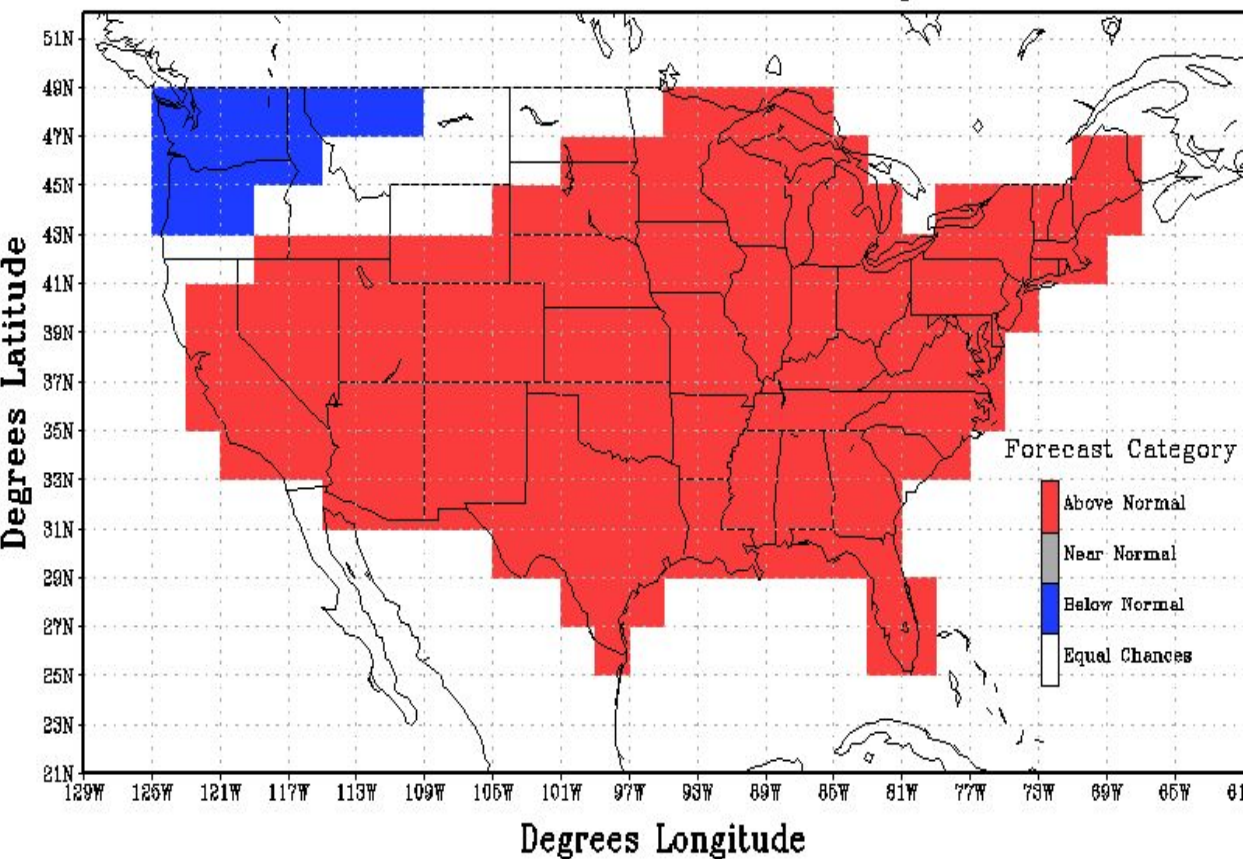
- Current Data
- - - Median Year
- 90th Percentile - Maximum
- 70-90th Percentile
- 30-70th Percentile
- 10-30th Percentile
- Minimum - 10th Percentile



Looking back at the Feb-Mar-April outlooks

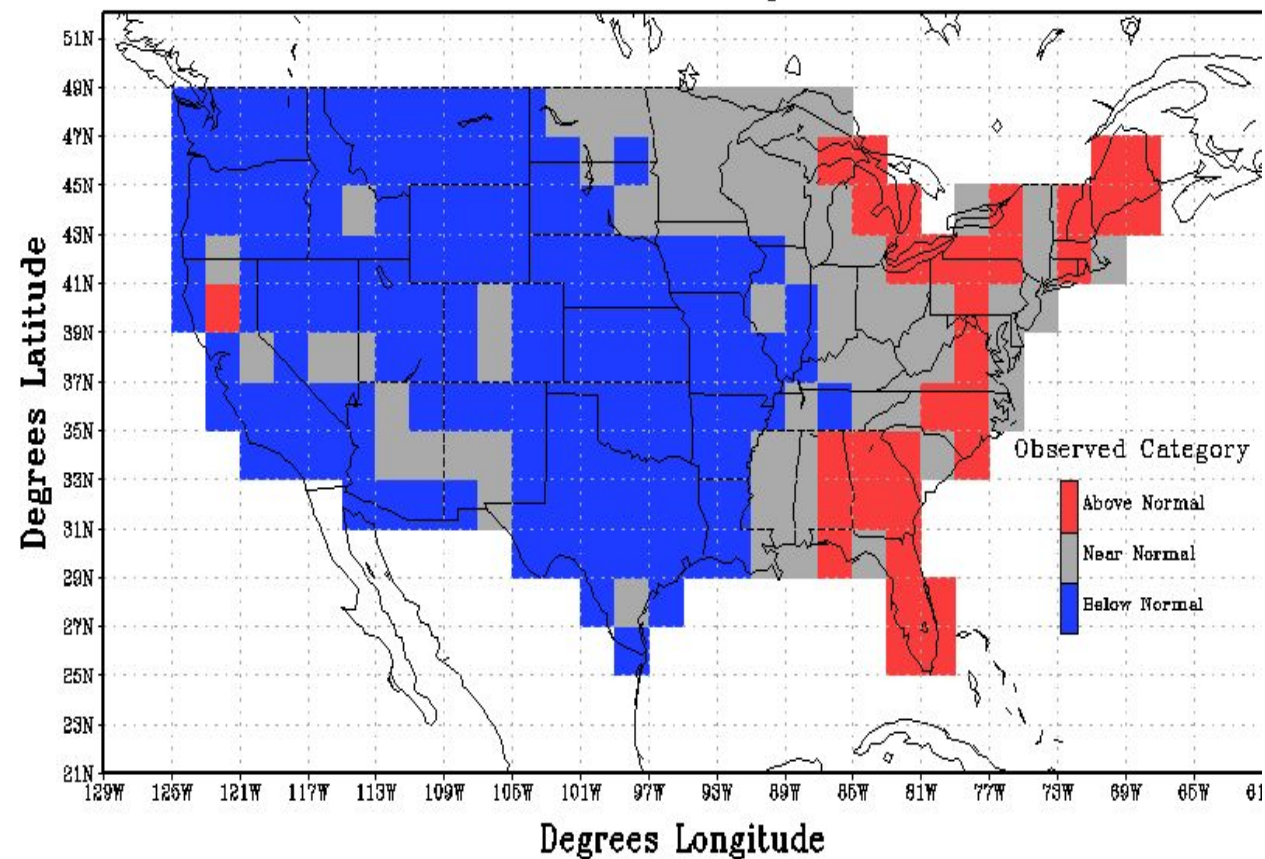
3-month outlook issued in late January

Categorical Temperature Official Forecast
Issued: Jan 2021 Valid: Feb-Mar-Apr 2021



What actually happened

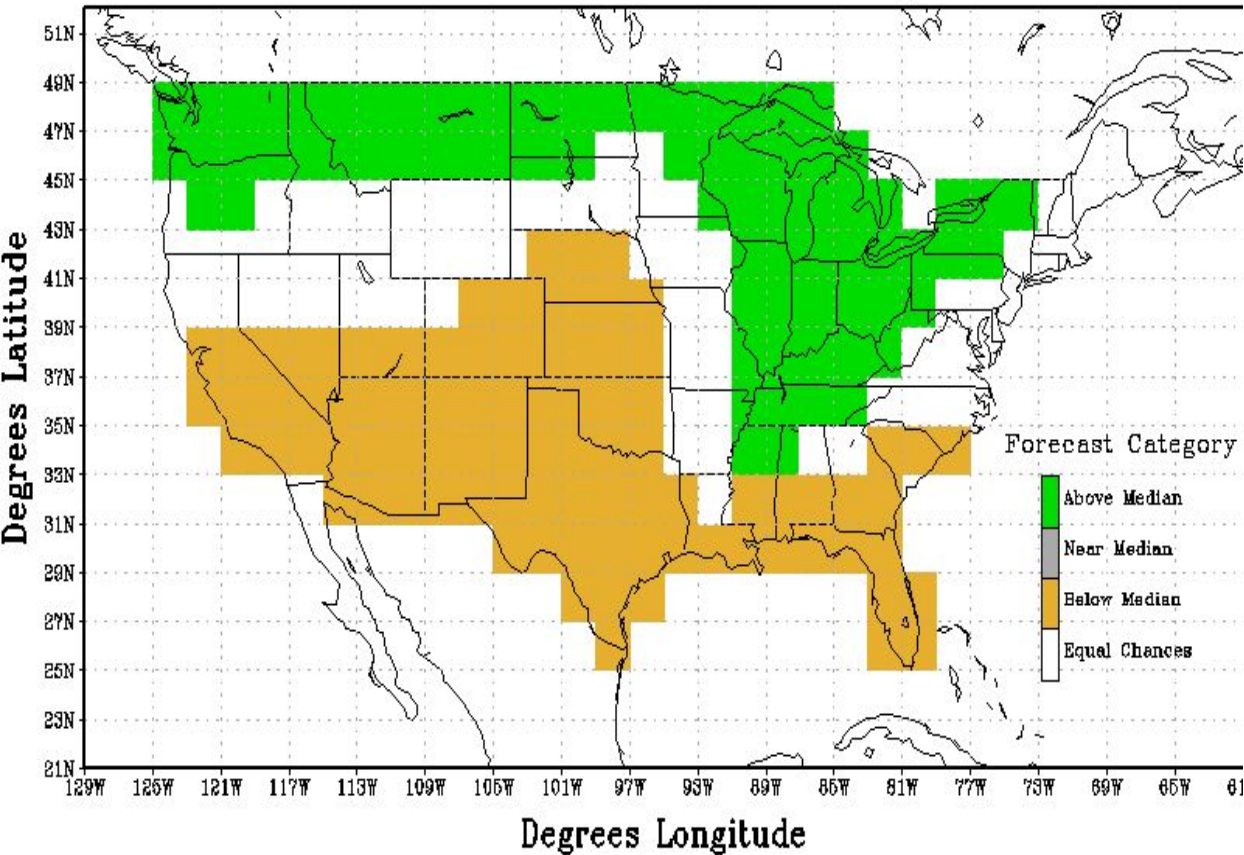
Categorical Temperature Observations
Valid: Feb-Mar-Apr 2021



Looking back at the Feb-Mar-April outlooks

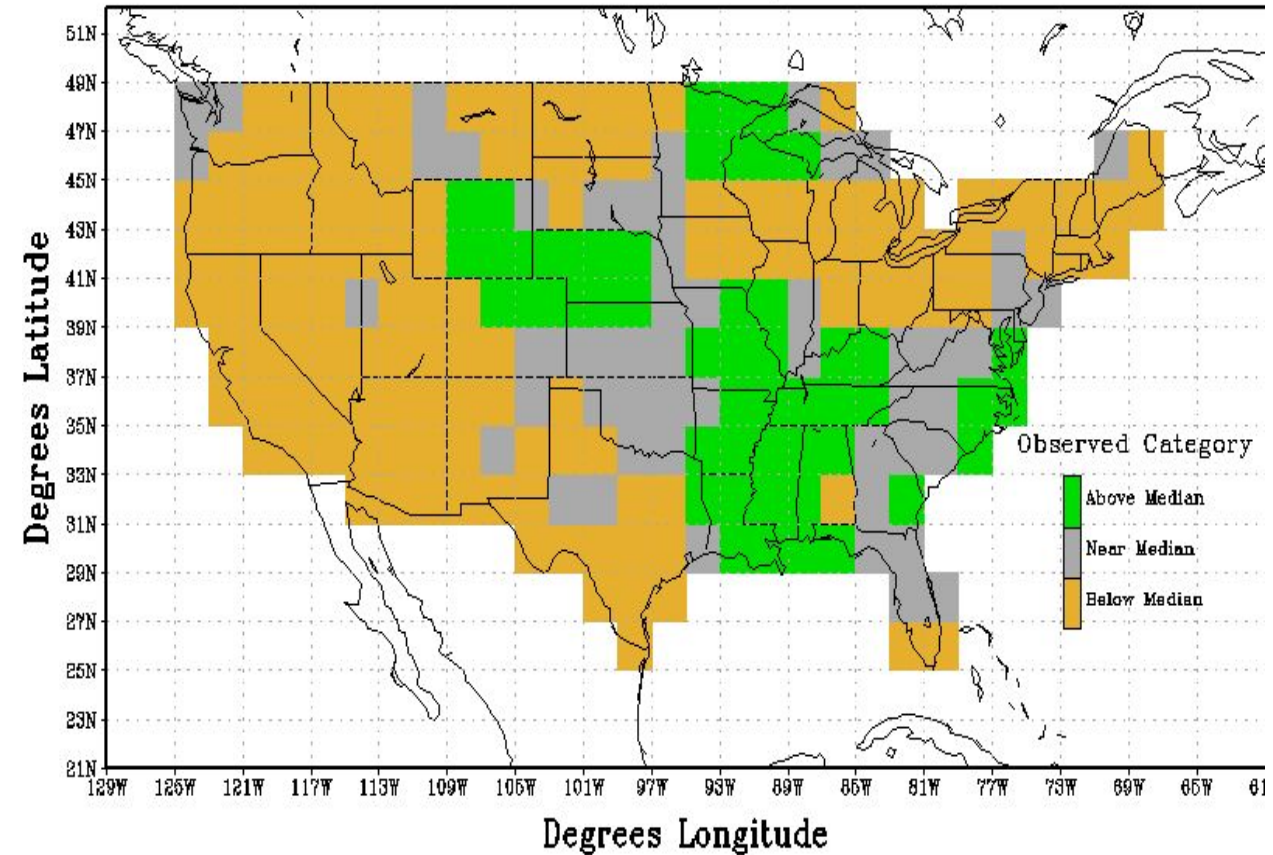
3-month outlook issued in late January

Categorical Precipitation Official Forecast
Issued: Jan 2021 Valid: Feb-Mar-Apr 2021



What actually happened

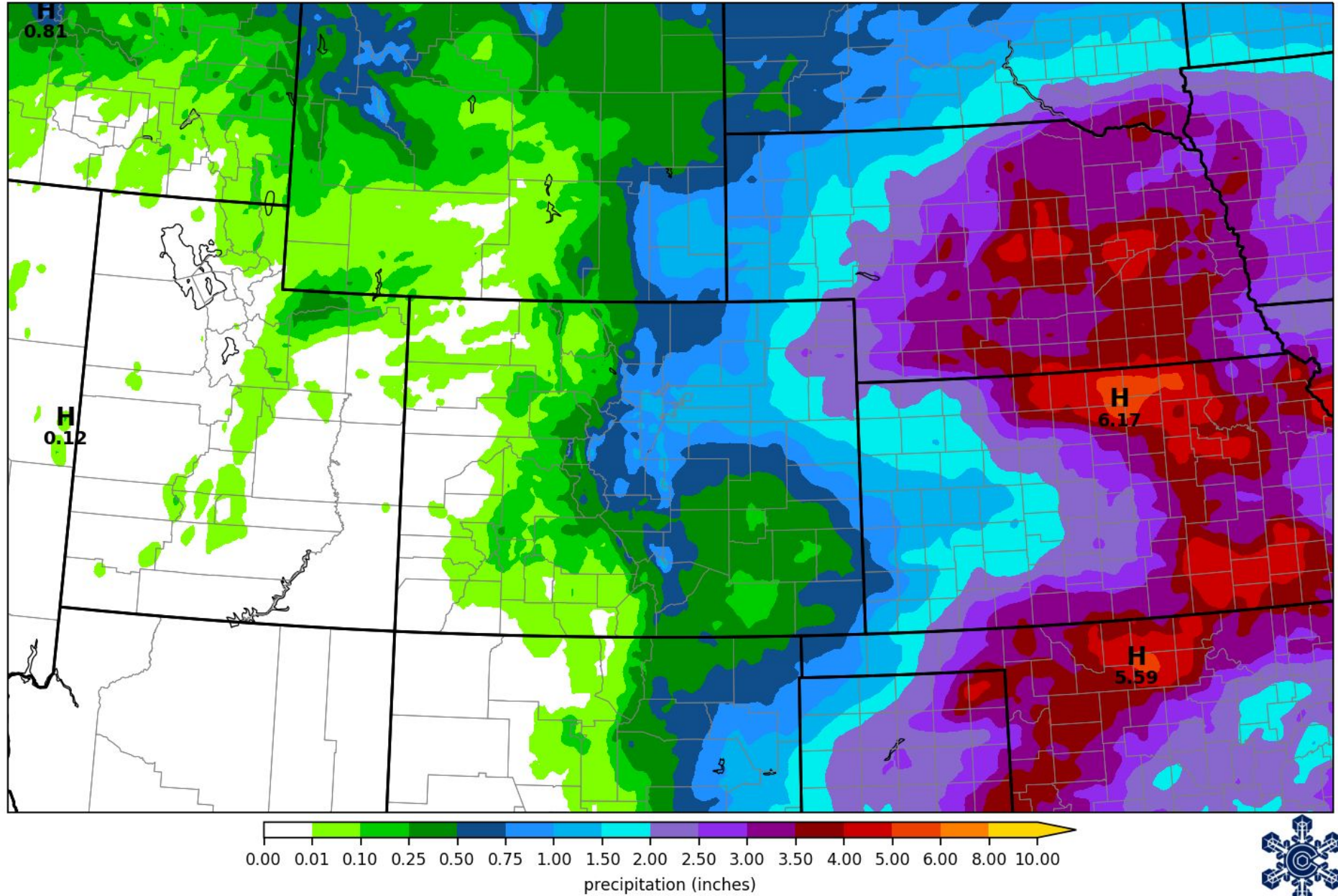
Categorical Precipitation Observations
Valid: Feb-Mar-Apr 2021



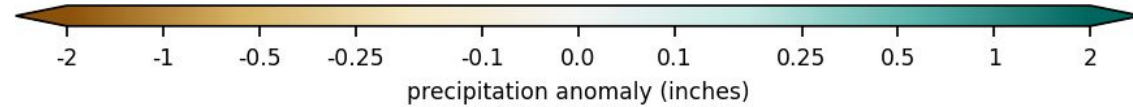
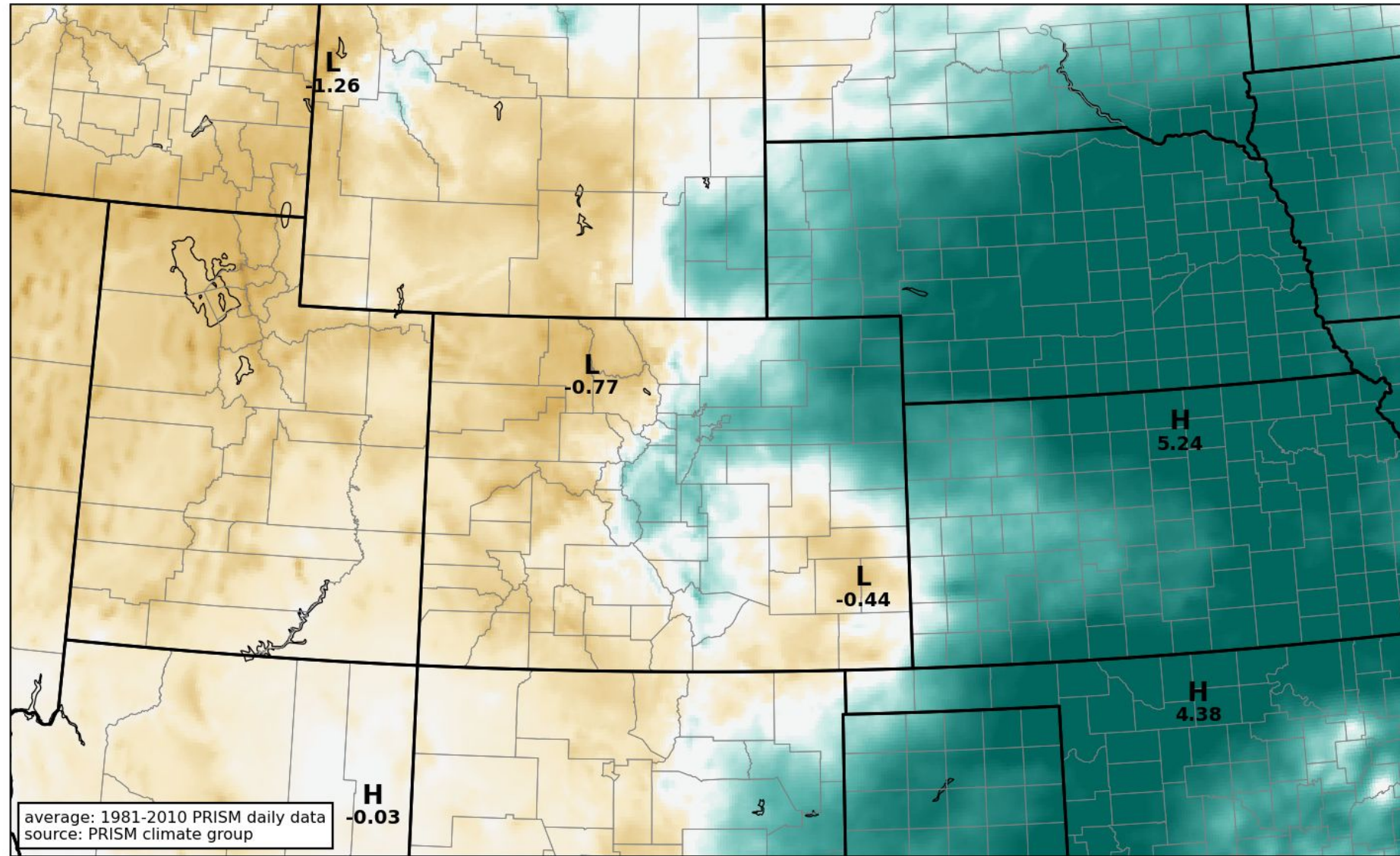
NOAA 7-day precipitation forecast

NOAA Weather Prediction Center
7-day precipitation forecast

forecast issued 1200 UTC Tue 25 May 2021
precipitation in 168 hrs ending 1200 UTC Tue 01 Jun 2021



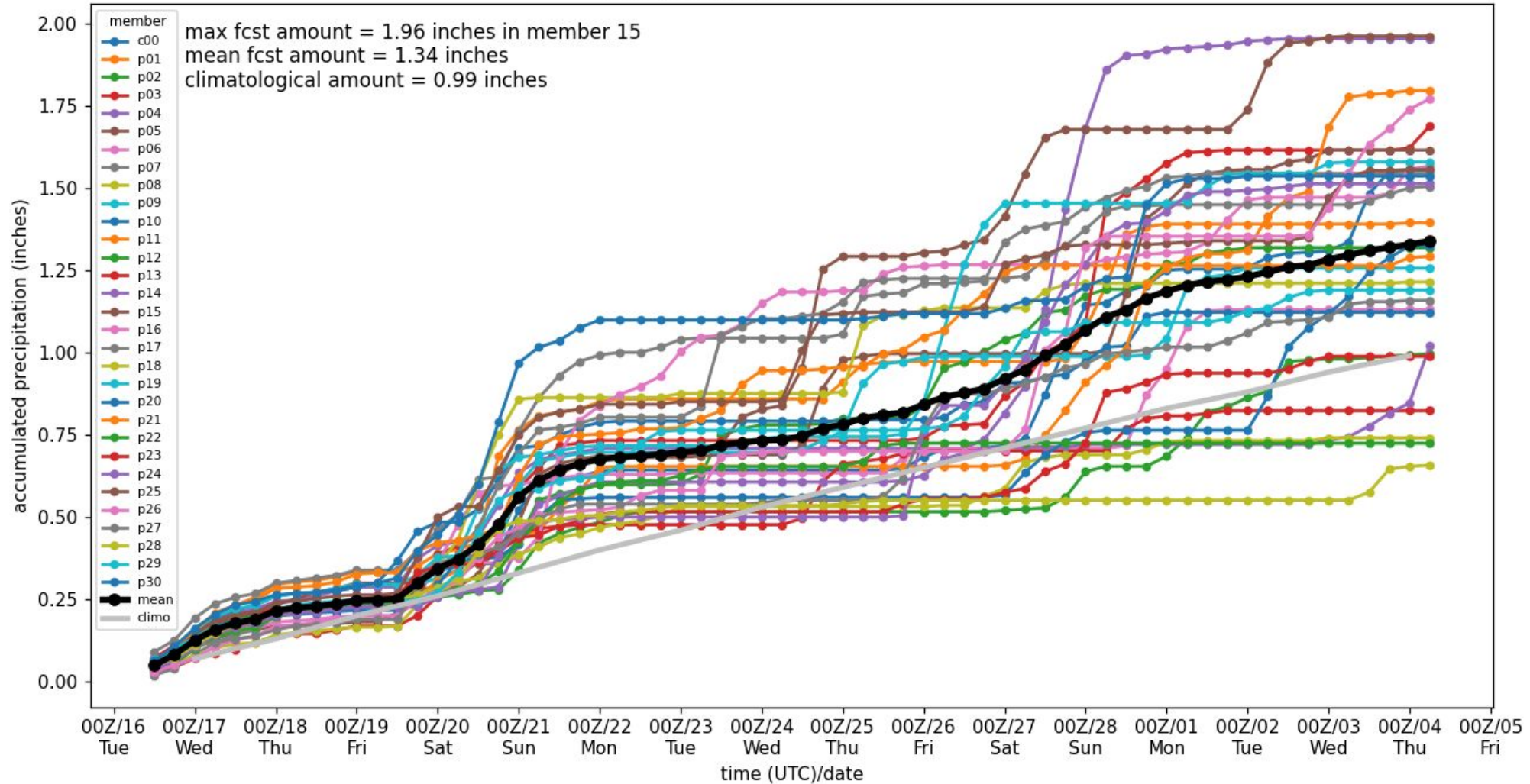
NOAA 7-day precipitation forecast (difference from average)



Northern mountains look to stay pretty active, not as much to the south

NCEP GEFS accumulated precipitation at Steamboat Springs

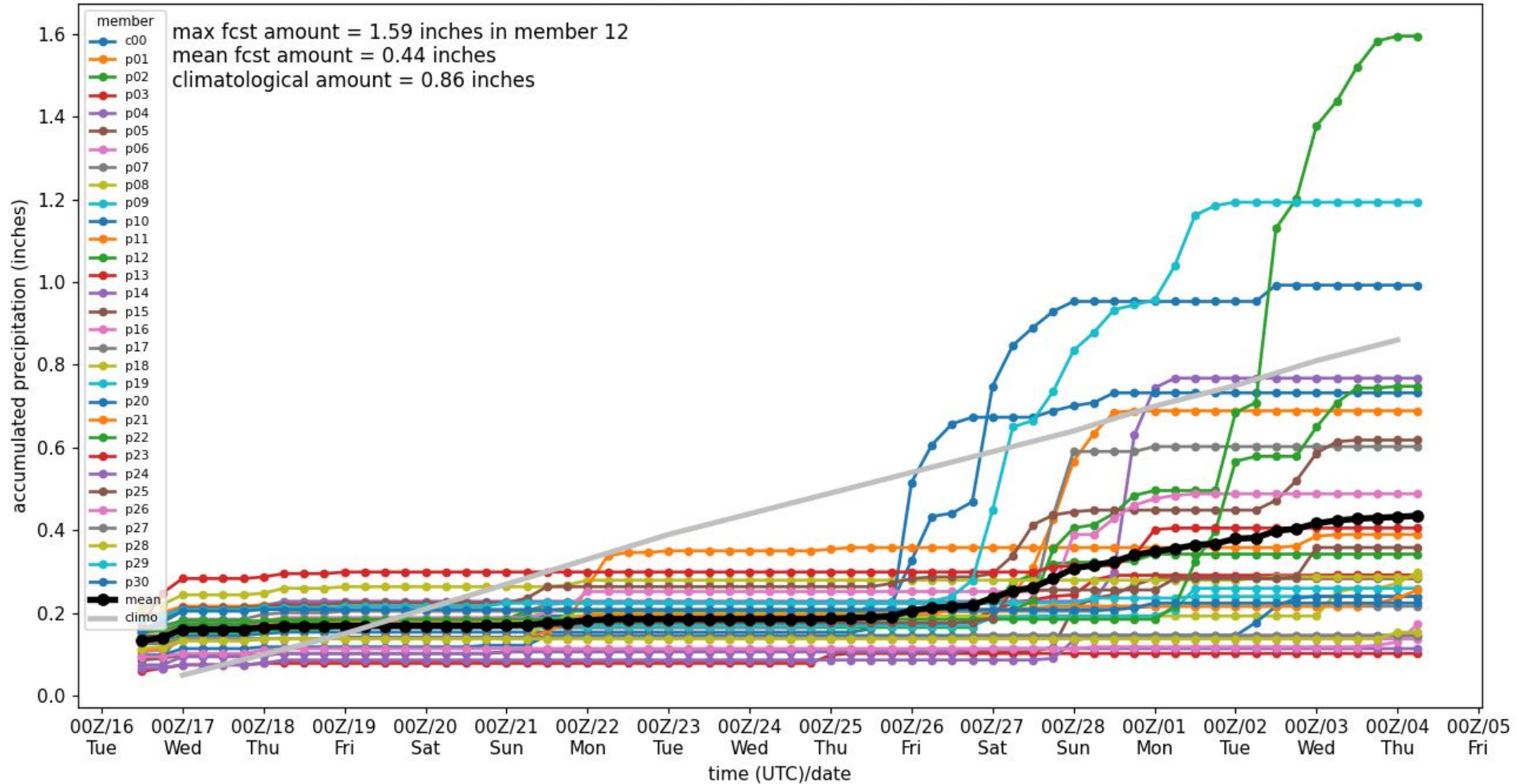
init: Tuesday 2021-02-16 0600 UTC



Northern mountains look to stay pretty active, not as much to the south

NCEP GEFS accumulated precipitation at Durango

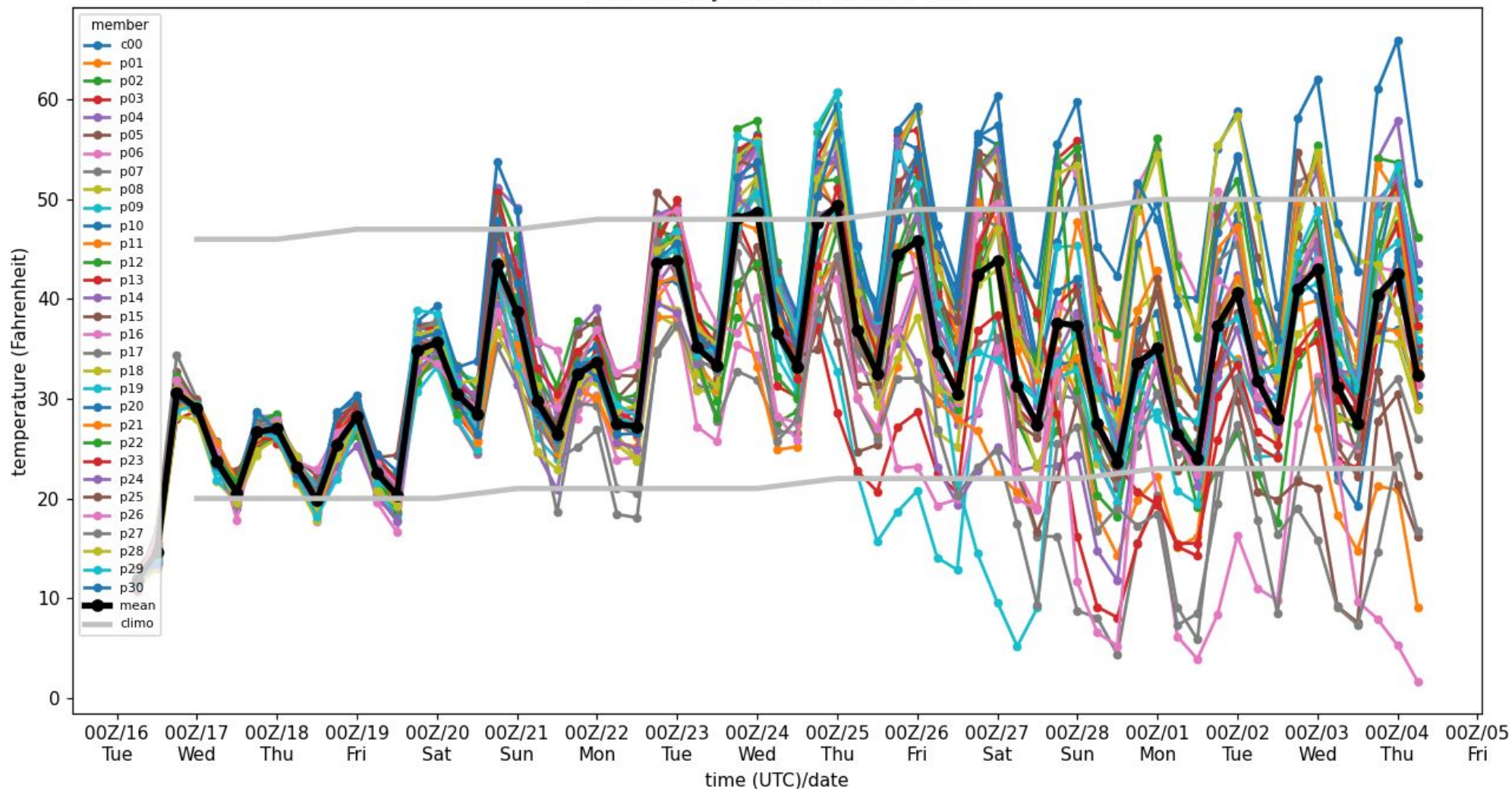
init: Tuesday 2021-02-16 0600 UTC

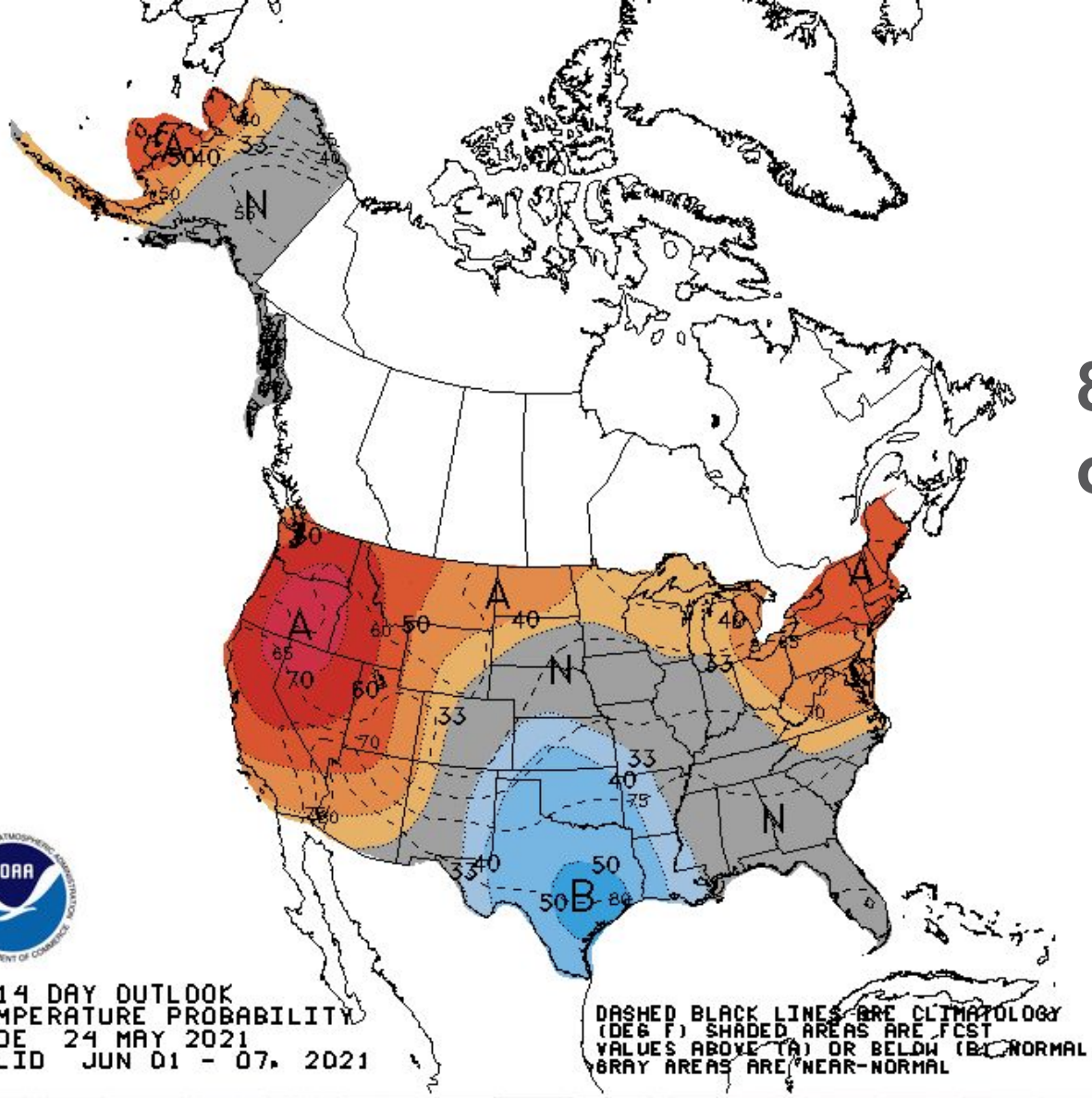


We'll be slowly climbing out of the deep freeze, still cold the rest of this week, near-normal temps returning by the weekend/next week

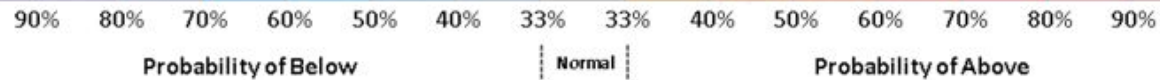
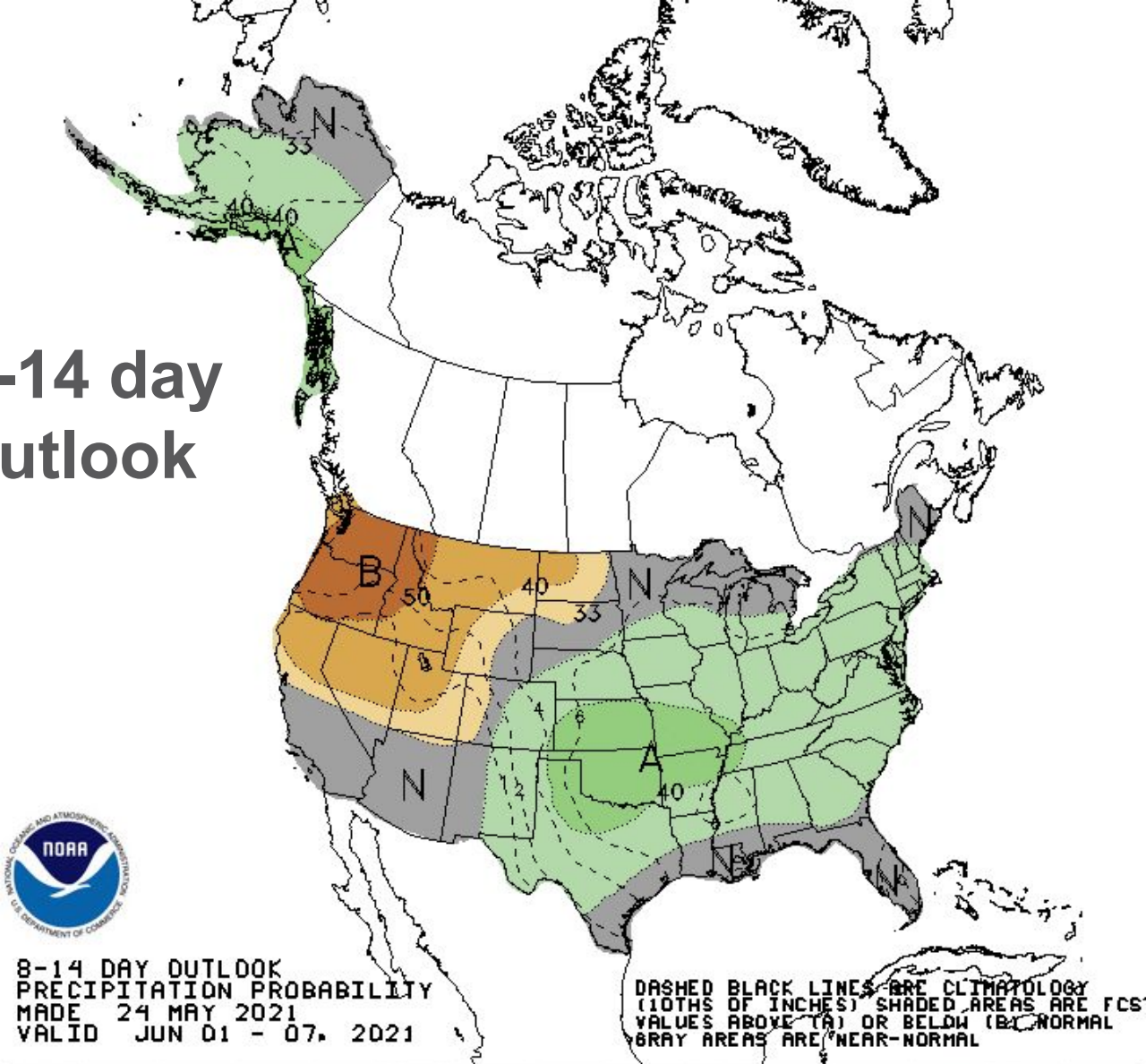
NCEP GEFS 2-m temperature at Denver

init: Tuesday 2021-02-16 0600 UTC





8-14 day outlook



La Niña has ended, ENSO neutral likely through summer

Early-May 2021 CPC/IRI Official Probabilistic ENSO Forecasts

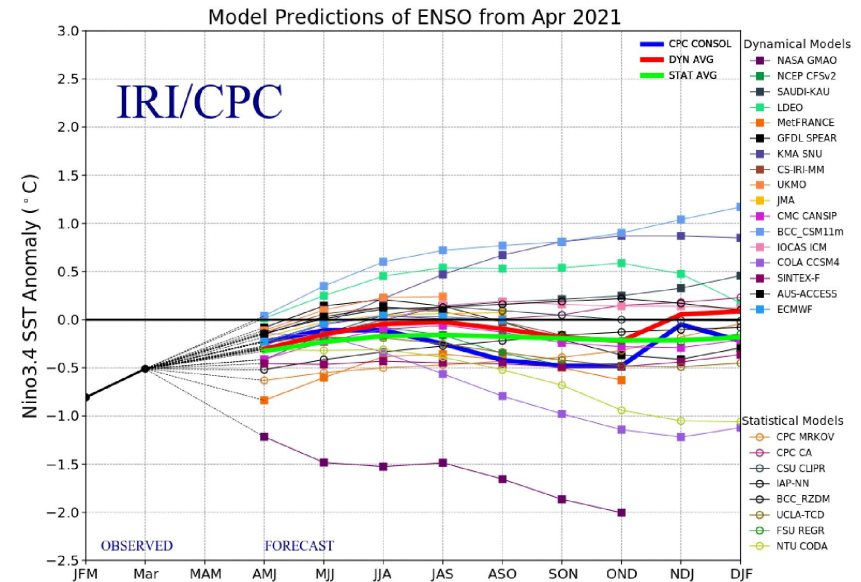
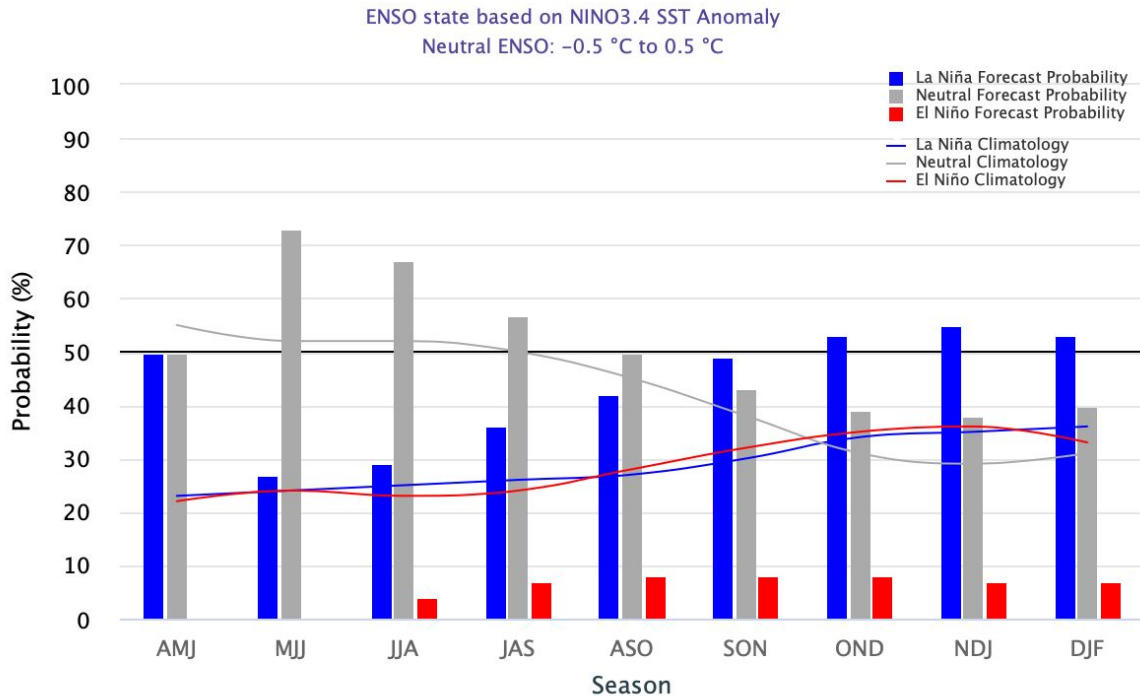


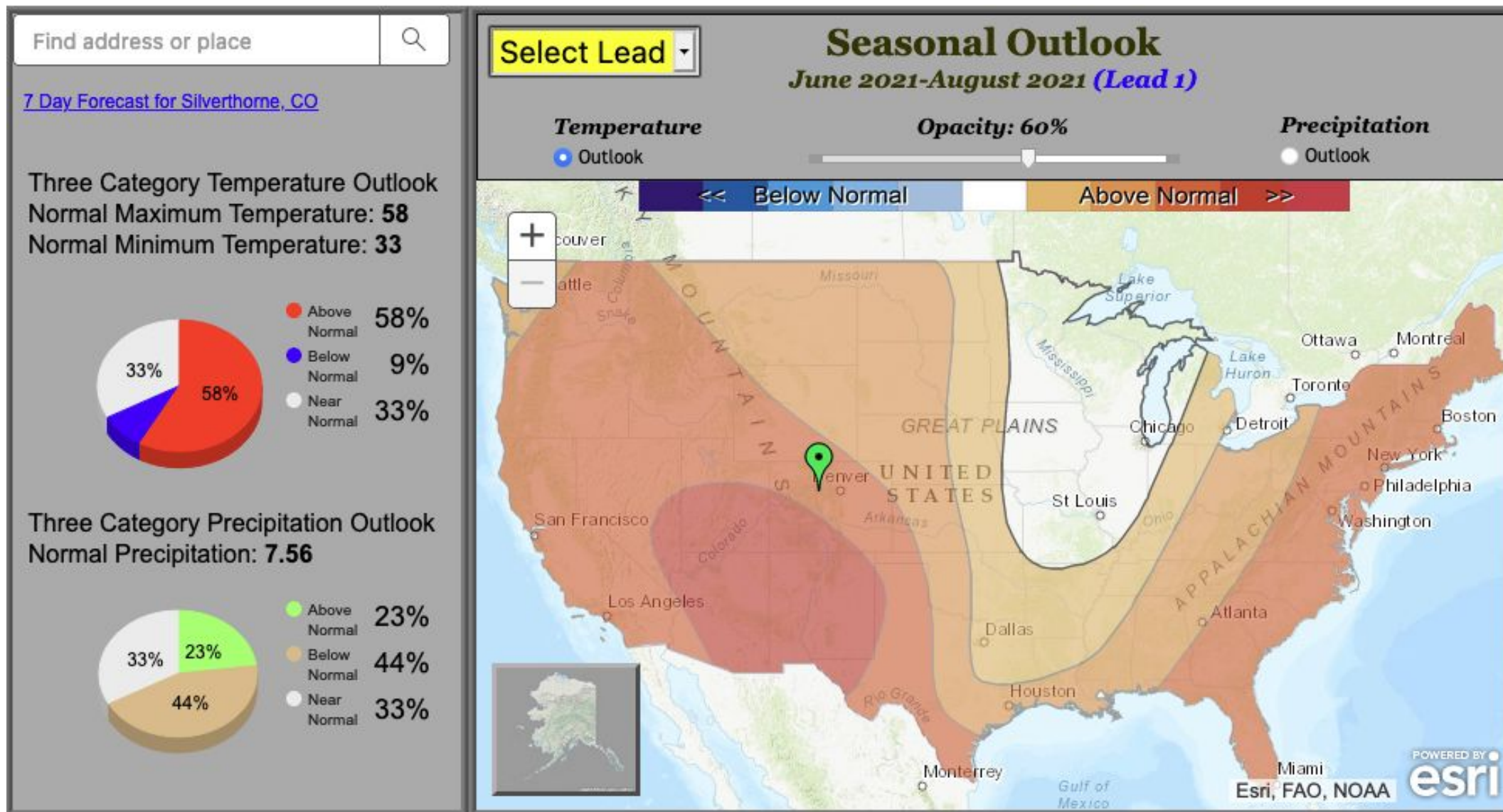
Figure 6. Forecasts of sea surface temperature (SST) anomalies for the Niño 3.4 region (5°N - 5°S , 120°W - 170°W). Figure updated 19 April 2021.

ENSO-neutral conditions are expected through summer

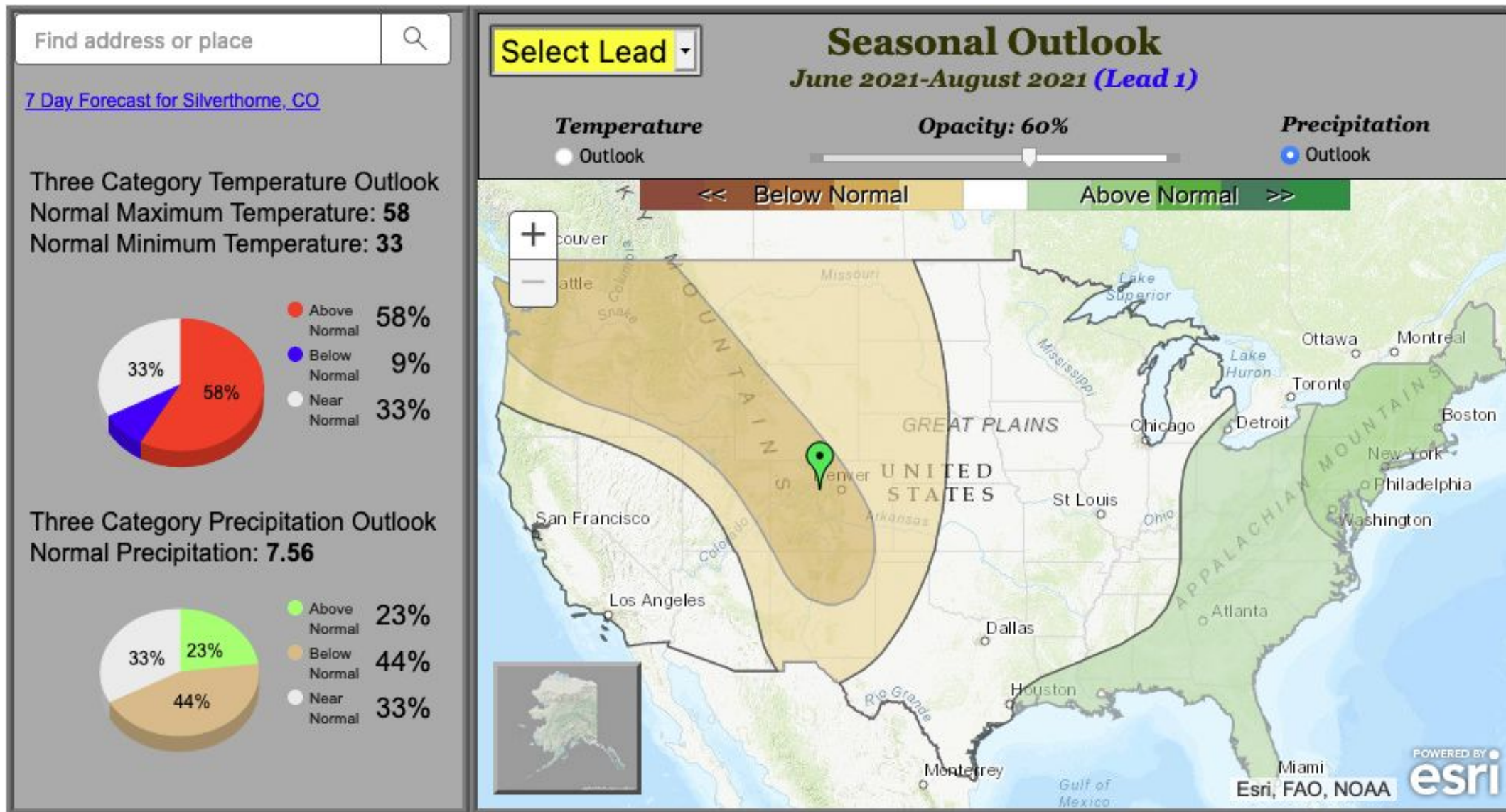
There's a decent chance of La Niña returning by fall/winter (which would be bad), but ENSO forecasts are not very good in the spring, so take with a grain of salt



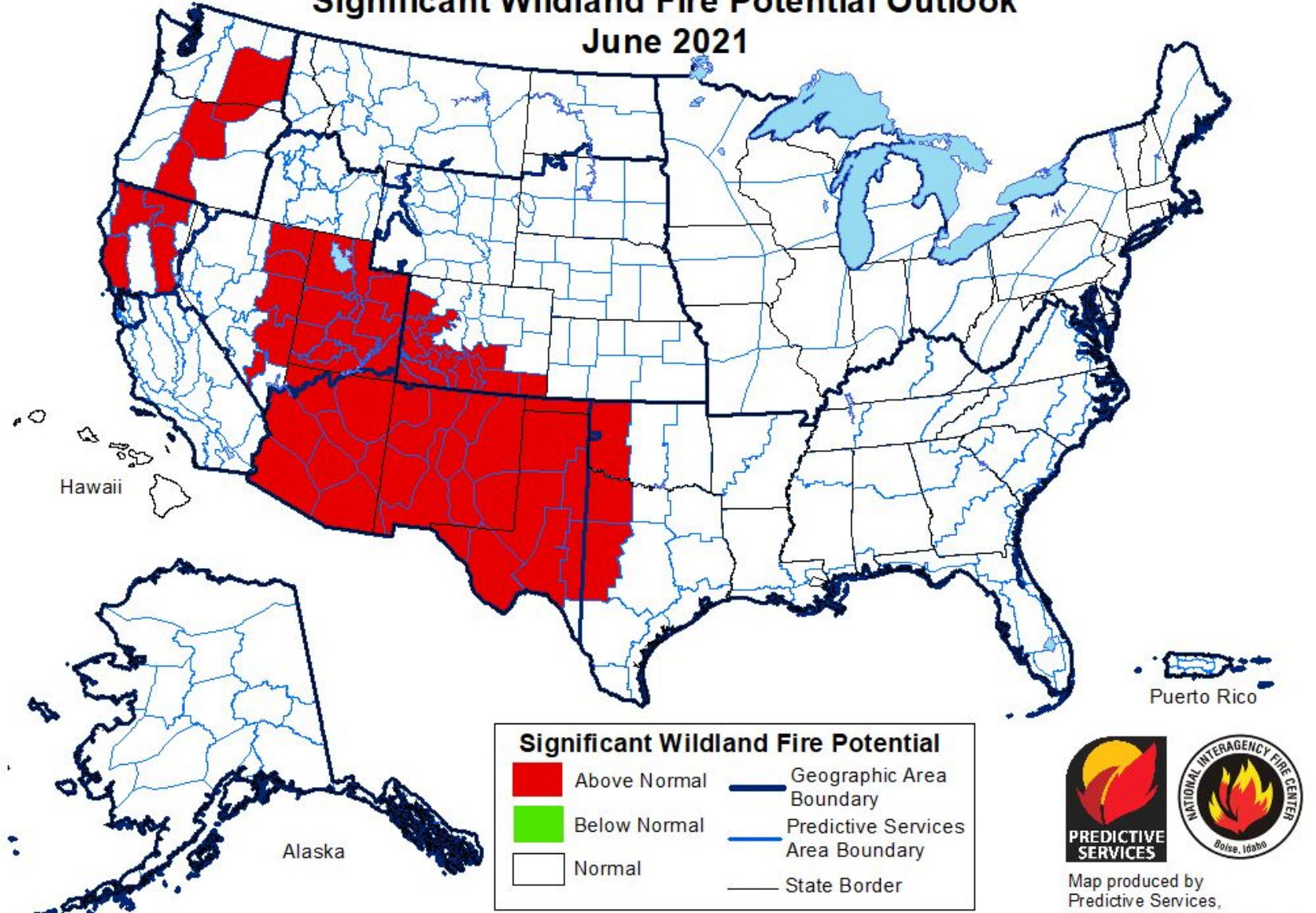
June-July-August outlook



June-July-August outlook



Significant Wildland Fire Potential Outlook June 2021



Above normal significant wildland fire potential indicates a greater than usual likelihood that significant wildland fires will occur. Significant wildland fires should be expected at typical times and intervals during normal significant wildland fire potential conditions. Significant wildland fires are still possible but less likely than usual during forecasted below normal periods.



Map produced by
Predictive Services,
National Interagency Fire Center
Boise, Idaho
Issued May 1, 2021
Next issuance June 1, 2021

<https://www.predictiveservices.nifc.gov/outlooks/outlooks.htm>



Takeaways

- Continental divide is serving as a “drought divide” right now.
 - Eastern Colorado has had a cool, stormy spring, leading to major improvements in drought conditions
 - Western Colorado has missed out on these storms and remains in extreme to exceptional drought in most locations
- Snowpack, soil moisture, and streamflow on the western slope looks very bad as we head into the mountain dry season
- La Niña has ended; summer outlook tilted toward warmer than average
- Early summer is likely to be rough in western Colorado; let’s hope for a decent monsoon this year



Thank you!



ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY

