

Colorado Climate Center – *WATF Climate Update*

Russ Schumacher, state climatologist

Water Availability Task Force

August 16, 2022



ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY

Water year 2022 to date:

temperature, precipitation,
evaporative demand

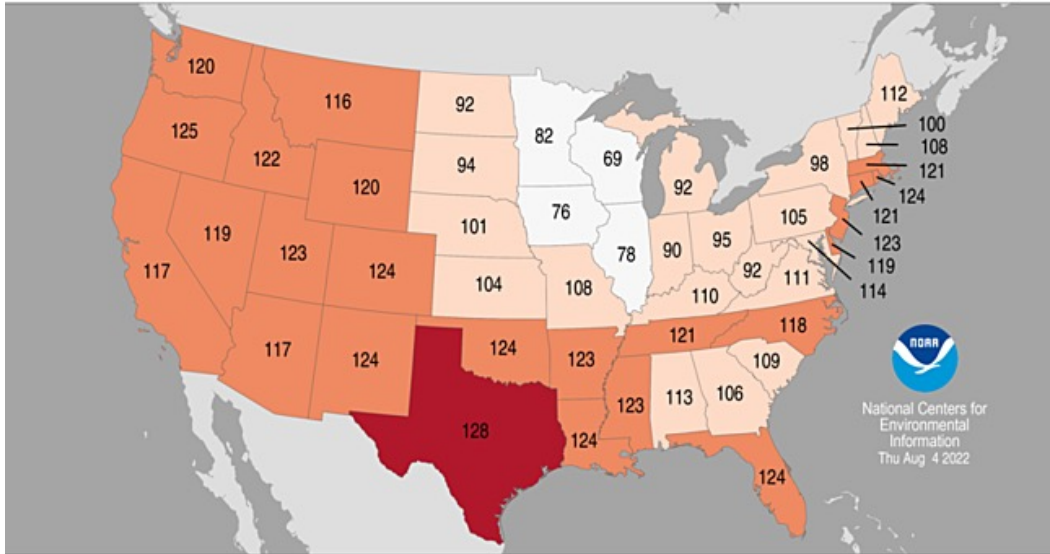


July 27, east of Fort Collins



Statewide Average Temperature Ranks

July 2022
Period: 1895–2022



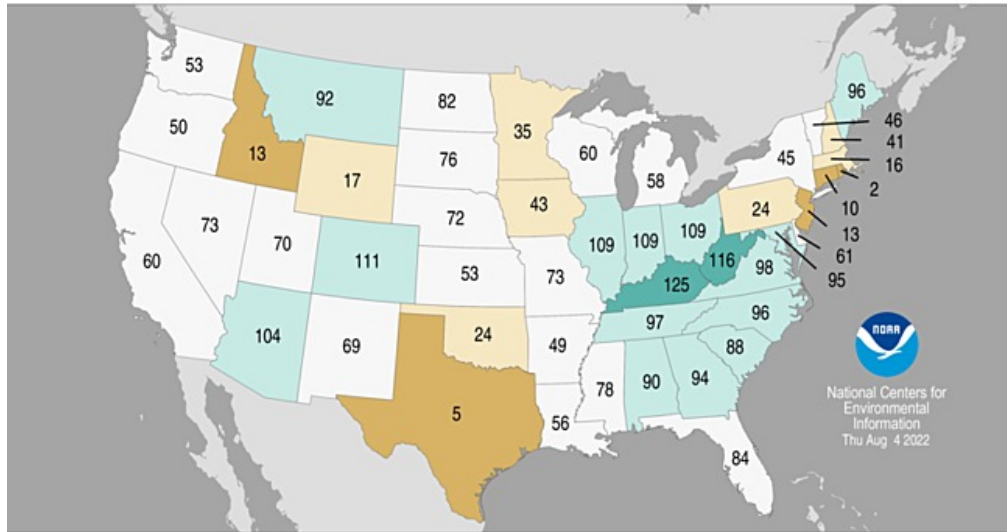
Statewide: tied for 8th warmest October-July
2.6°F above 20th century average
1.0°F above 1991-2020 average

Month	T Rank (of 127 years)	Above, below, or near avg?
Oct	41 st warmest	above
Nov	3 rd warmest	much above
Dec	2 nd warmest	much above
Jan	39 th warmest	above
Feb	30 th coolest	below
Mar	54 th warmest	near avg
Apr	49 th warmest	near avg
May	44 th warmest	above
Jun	23 rd warmest	above
Jul	5 th warmest	much above



Statewide Precipitation Ranks

July 2022
Period: 1895–2022



Statewide: 35th driest October-July
1.73" below 20th century average

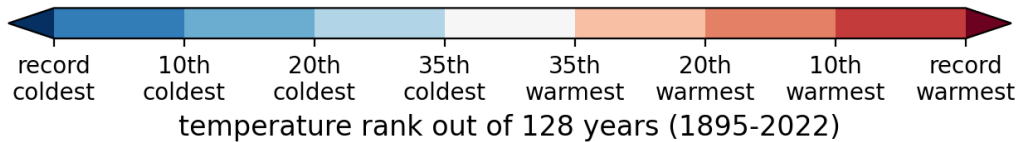
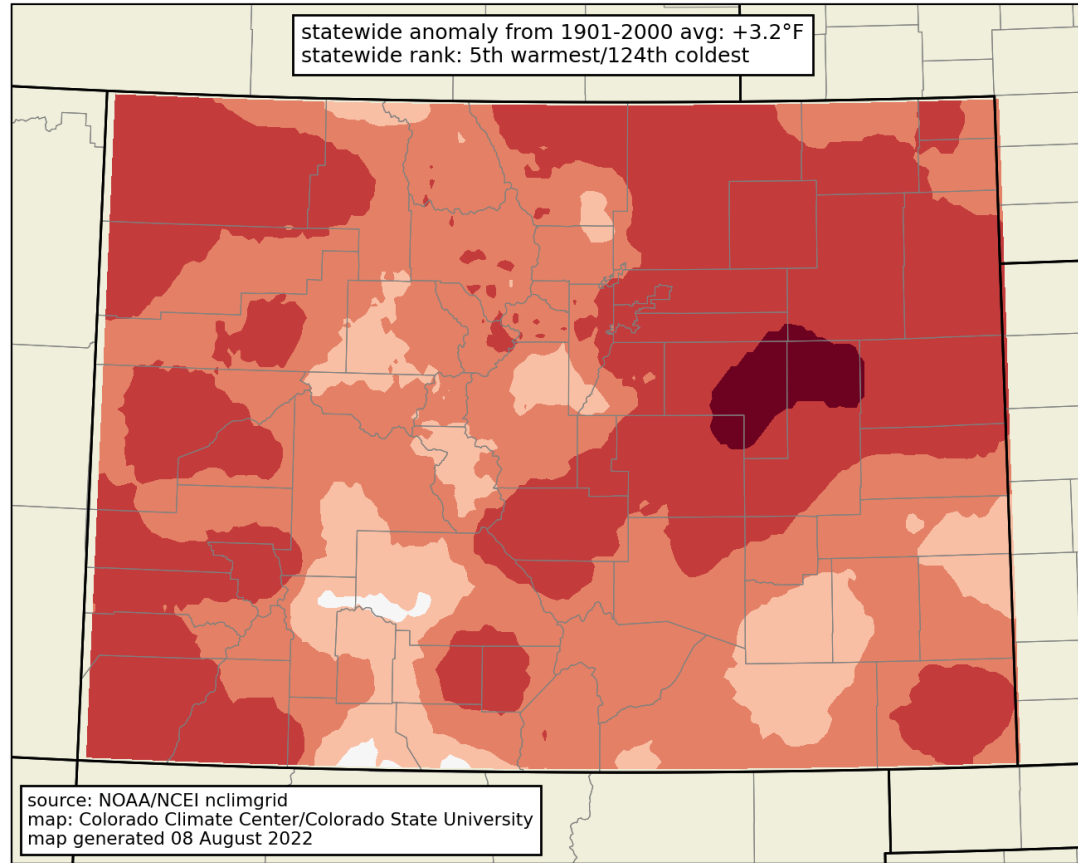
Month	P Rank (of 127 years)	Above, below, or near avg?
Oct	62 nd driest	near avg
Nov	10 th driest	much below
Dec	14 th wettest	above
Jan	39 th driest	below
Feb	52 nd driest	near avg
Mar	67 th driest	near avg
Apr	5 th driest	much below
May	45 th driest	near avg
Jun	67 th driest	near avg
Jul	18 th wettest	above



**Statewide: 5th
warmest July**

**Warmest month on
record in terms of
the average low
temperatures (i.e.,
lots of warm nights)**

average temperature rank: July 2022



[http://climate.colostate.edu/
co_cag/rank_maps.html](http://climate.colostate.edu/co_cag/rank_maps.html)

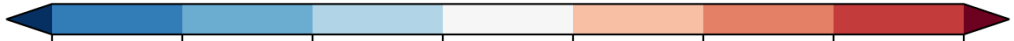
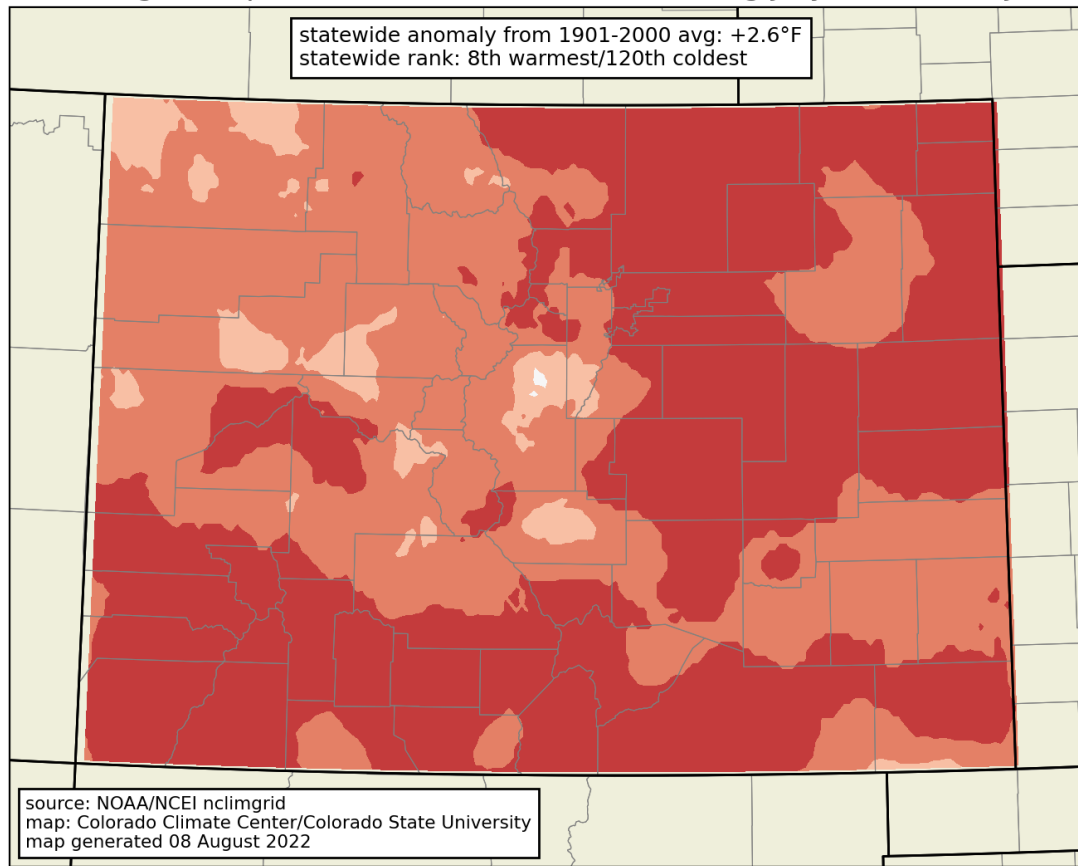


COLORADO CLIMATE CENTER



average temperature rank: 10 months ending July 2022 (Oct-Jul)

**Statewide: tied for
8thth warmest
October-July**

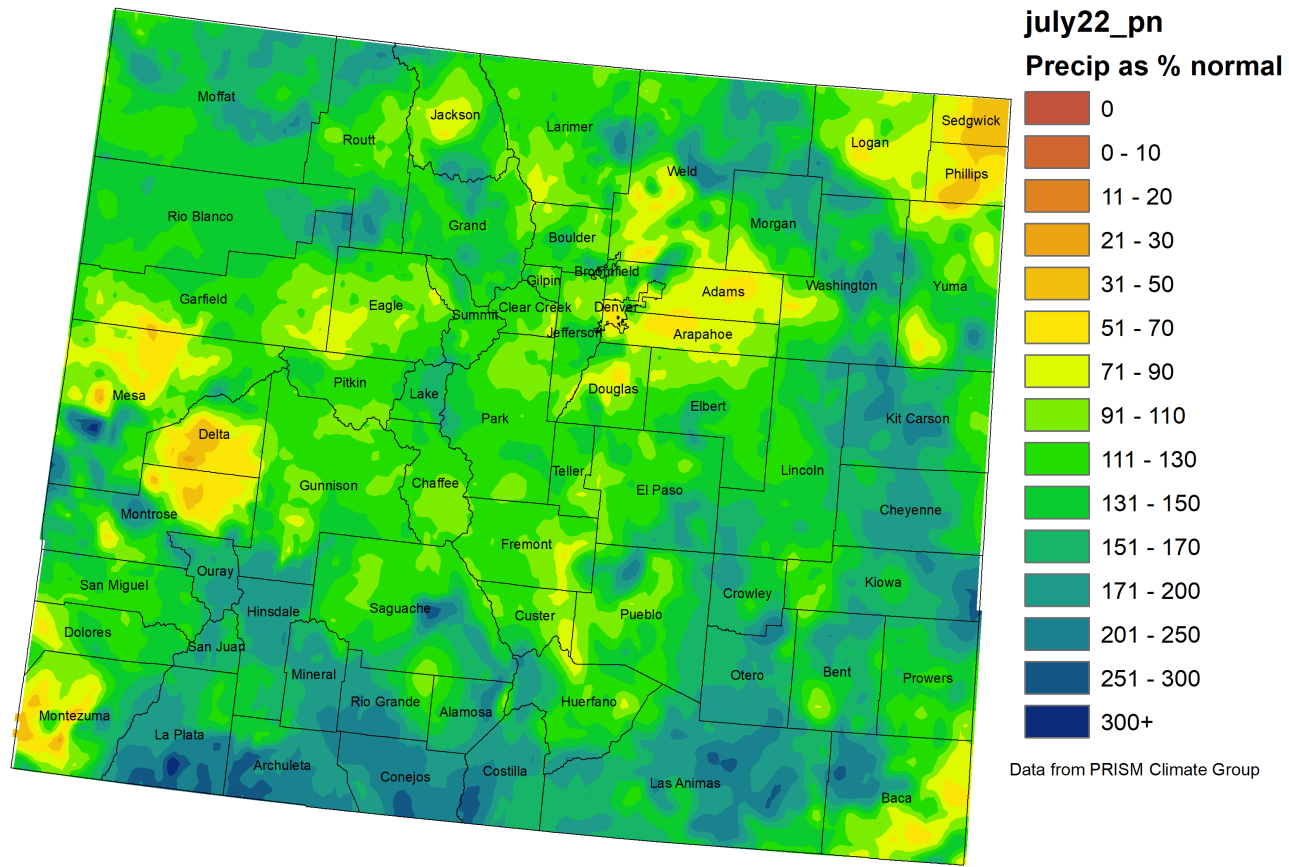


record coldest 10th coldest 20th coldest 35th coldest 35th warmest 20th warmest 10th warmest record warmest

temperature rank out of 127 years (1896-2022)

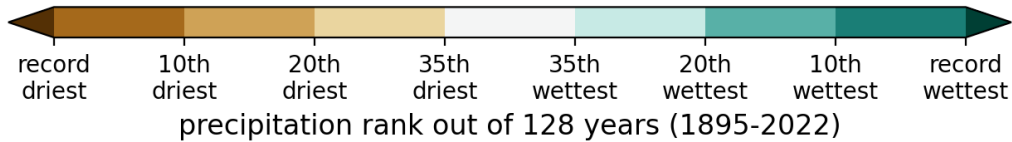
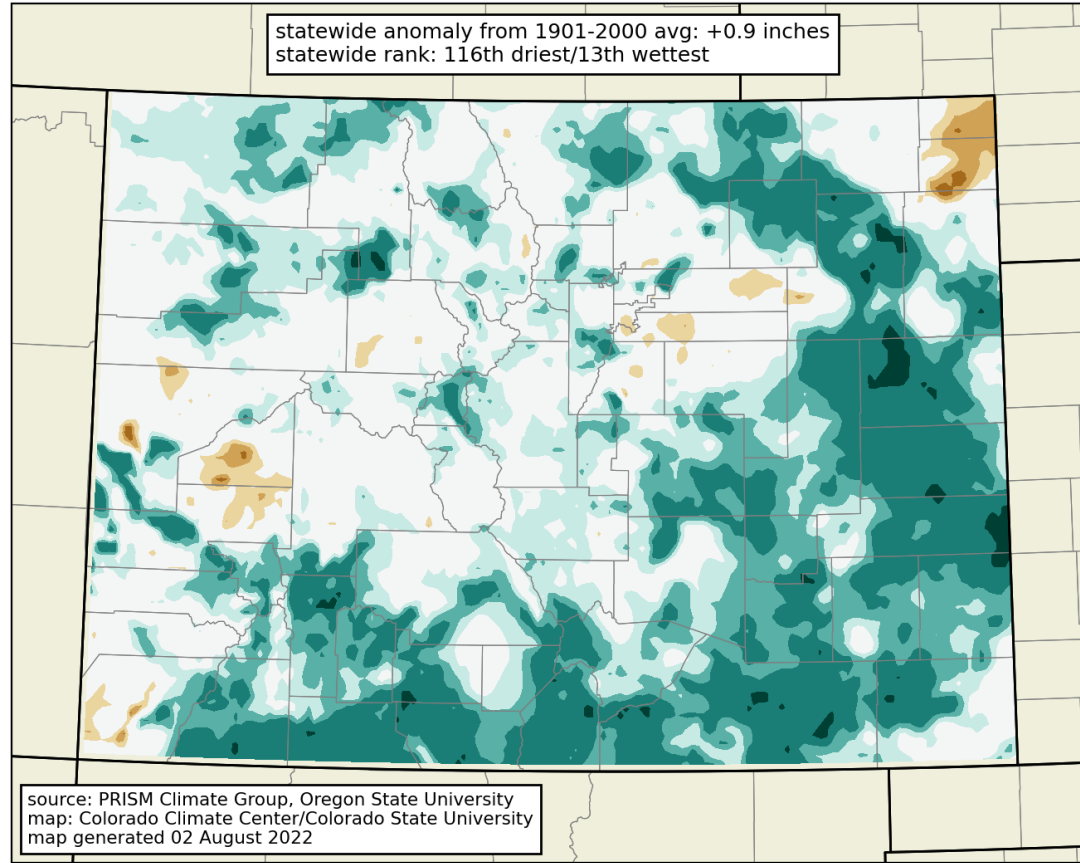
[http://climate.colostate.edu/
co_cag/rank_maps.html](http://climate.colostate.edu/co_cag/rank_maps.html)

Colorado July 2022 Precipitation as a Percentage of Normal



precipitation rank (preliminary PRISM data): July 2022

Statewide: 13th
wettest July (PRISM
dataset)

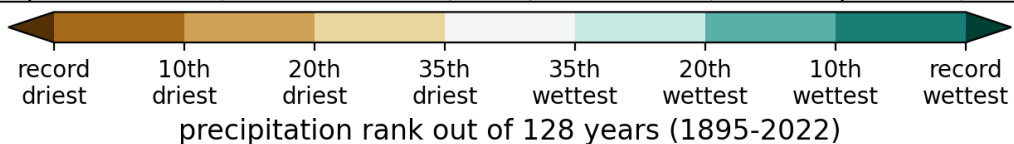
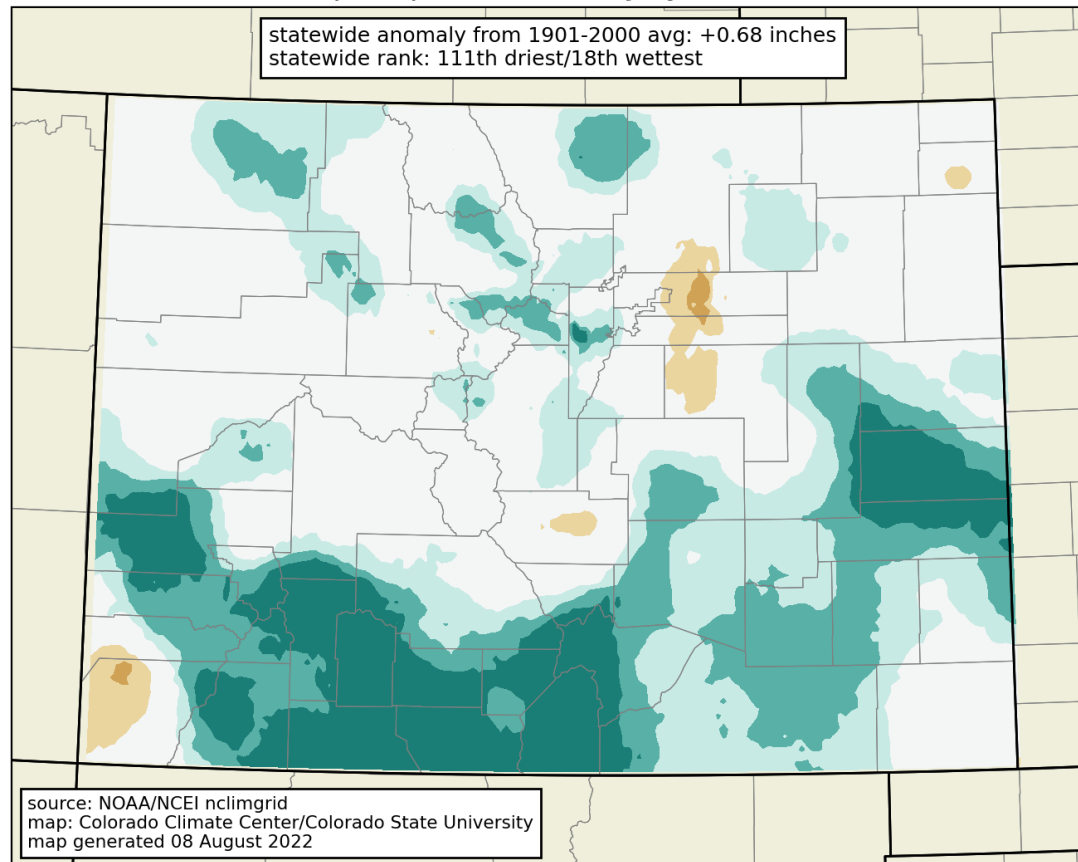


[http://climate.colostate.edu/
co_cag/rank_maps.html](http://climate.colostate.edu/co_cag/rank_maps.html)



precipitation rank: July 2022

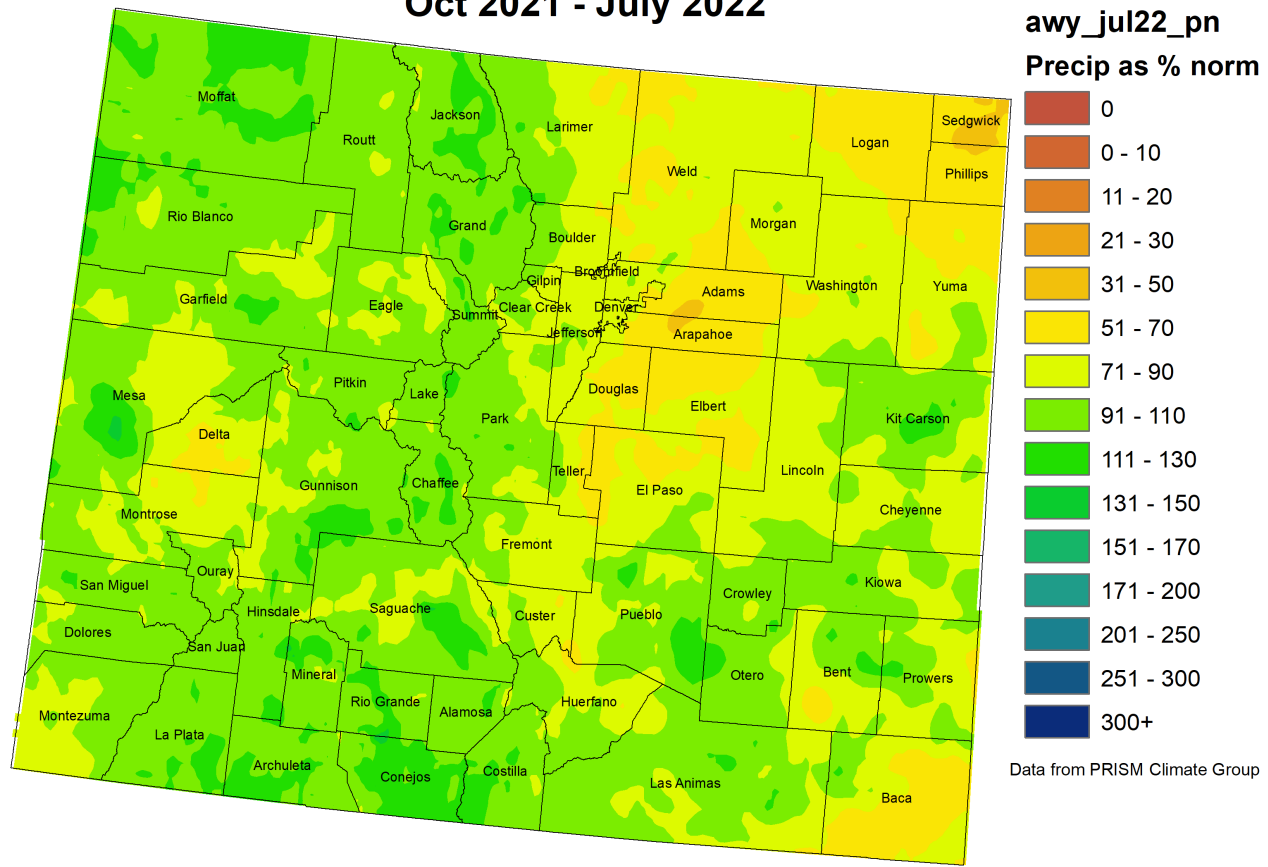
**Statewide: 18th
wettest July (official
NOAA dataset)**



[http://climate.colostate.edu/
co_cag/rank_maps.html](http://climate.colostate.edu/co_cag/rank_maps.html)

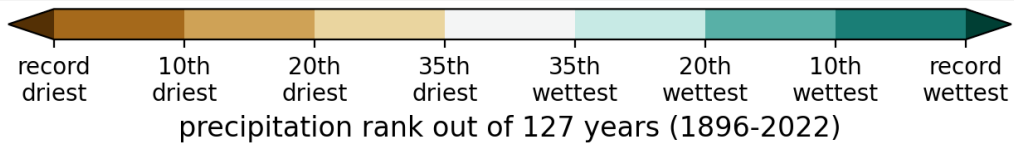
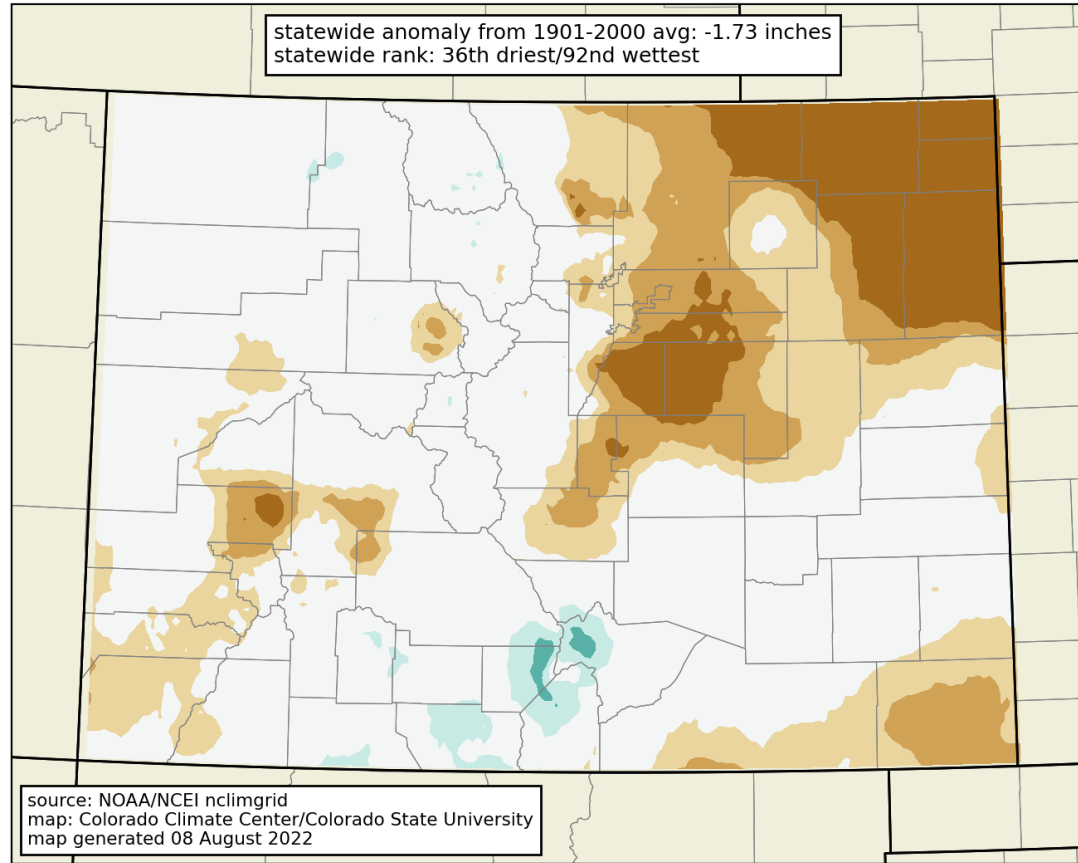


Colorado Water Year 2022 Precipitation as a Percentage of Normal Oct 2021 - July 2022



precipitation rank: 10 months ending July 2022 (Oct-Jul)

Statewide: 36th driest
October-July



[http://climate.colostate.edu/
ranks_monthly_maps.html](http://climate.colostate.edu/ranks_monthly_maps.html)



Colorado statewide average temperature and precipitation, July

Warm & dry

warm & wet

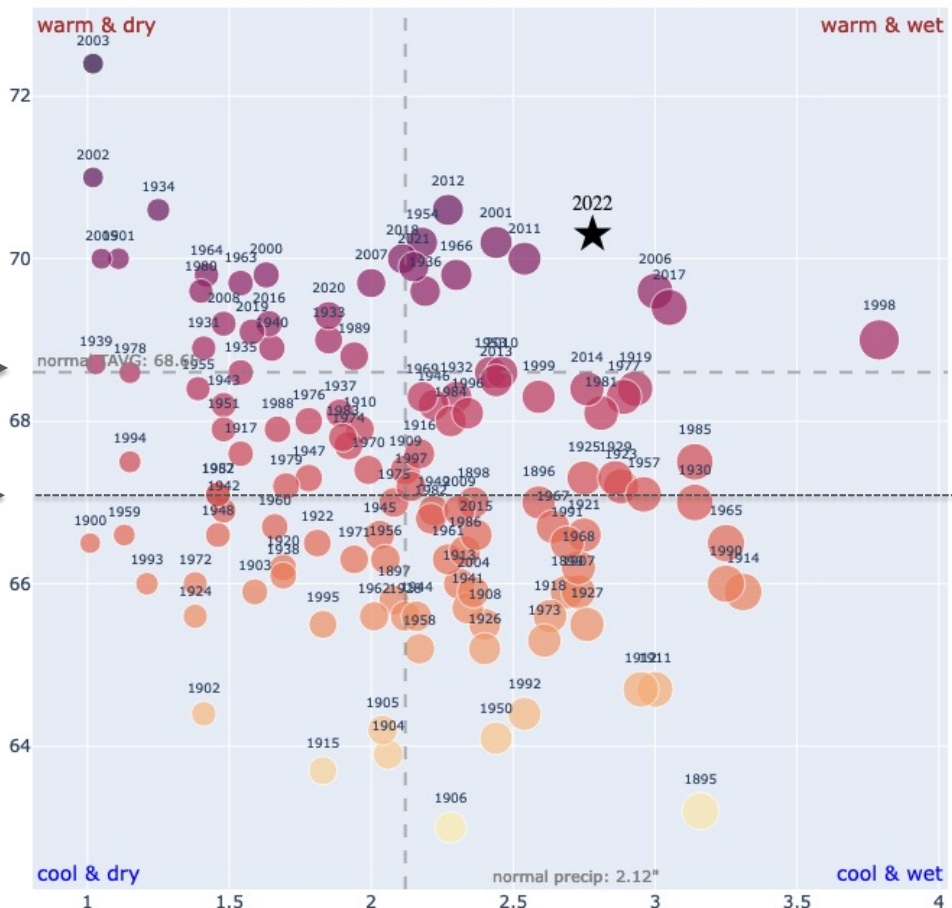
July 2022

Warm & wet

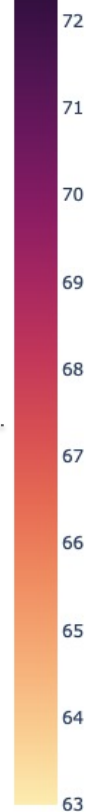
1991-2020 avg temp

1901-2000 avg temp

avg temp (F)



avg temp (F)



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

Cool & wet

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

Colorado statewide average temperature and precipitation, October - July

Warm & dry

warm & wet

avg temp (F)

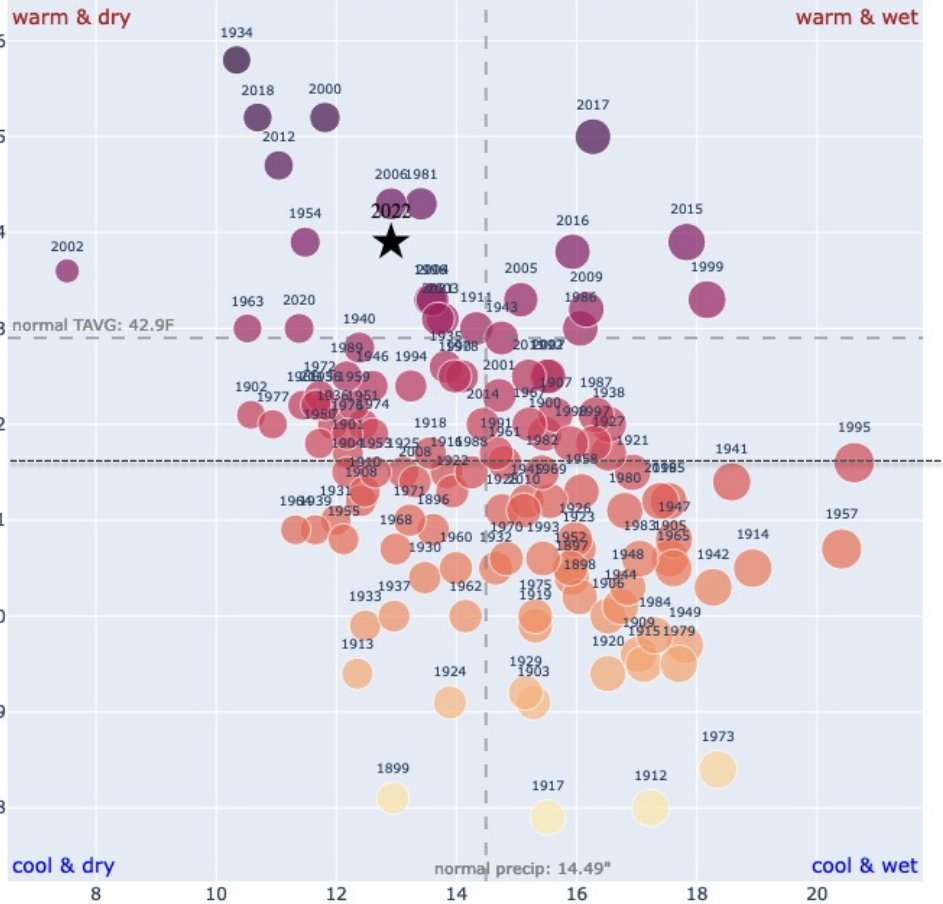
Warm & wet

Water year 2022 through July

1991-2020 avg temp →

1901-2000 avg temp →

avg temp (F)



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

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

Cool & dry

cool & dry

accumulated precipitation (inches)

cool & wet

Cool & wet



COLORADO CLIMATE CENTER



Station	Rank among all-time hottest 10-day periods	Dates	10-day average temperature
Fort Collins	1 st	July 14-23	79.4°F
Greeley UNC	1 st	July 14-23	84.0°F
Montrose	1 st	July 14-23	80.5°F
Walsh 1 W	1 st	July 15-24	86.2°F
Denver International AP	6 th	July 14-23	82.0°F
Colorado Springs	8 th	July 14-23	78.4°F
Denver-Central Park	12 th	July 14-23	80.4°F
Pueblo	17 th	July 14-23	83.1°F
Grand Junction	22 nd	July 14-23	85.1°F

A combination of hot days and unusually warm nights during a July heat wave led to new records for the warmest 10-day period at some long-term stations

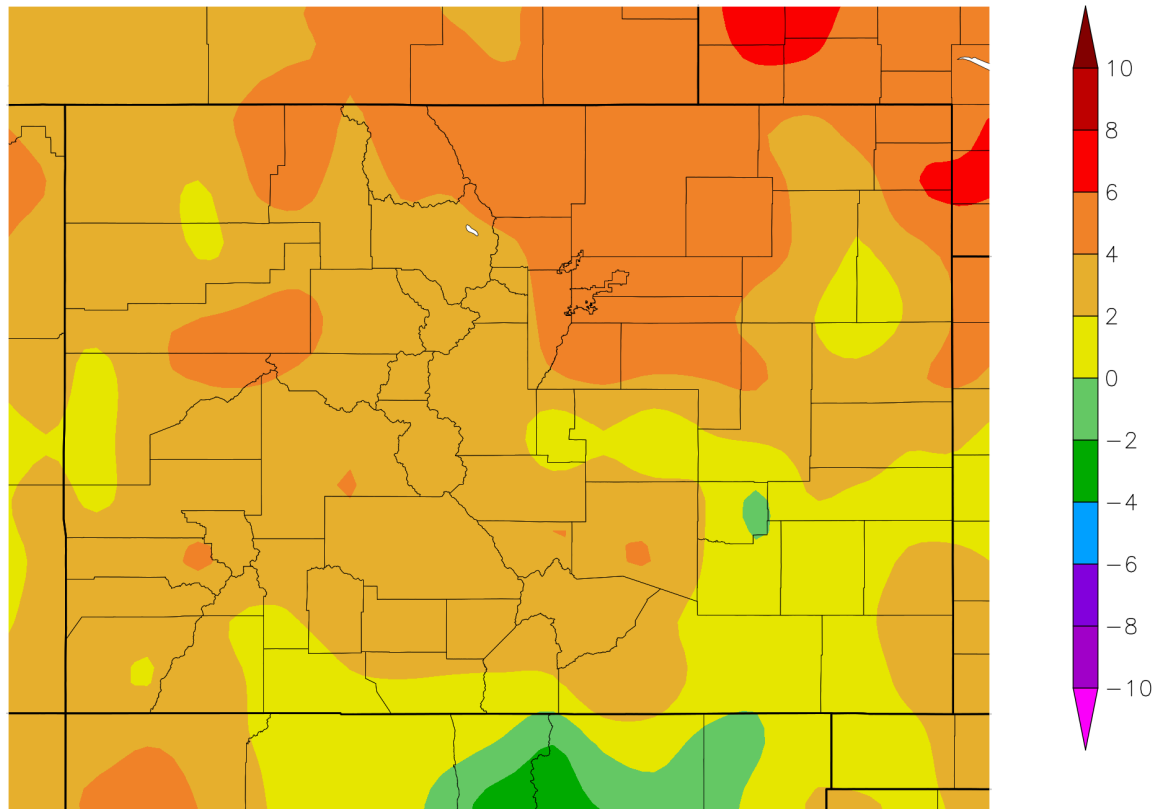
July 2022 heat wave: where did it rank?

From our monthly climate summary:

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



Departure from Normal Temperature (F) 8/1/2022 - 8/15/2022

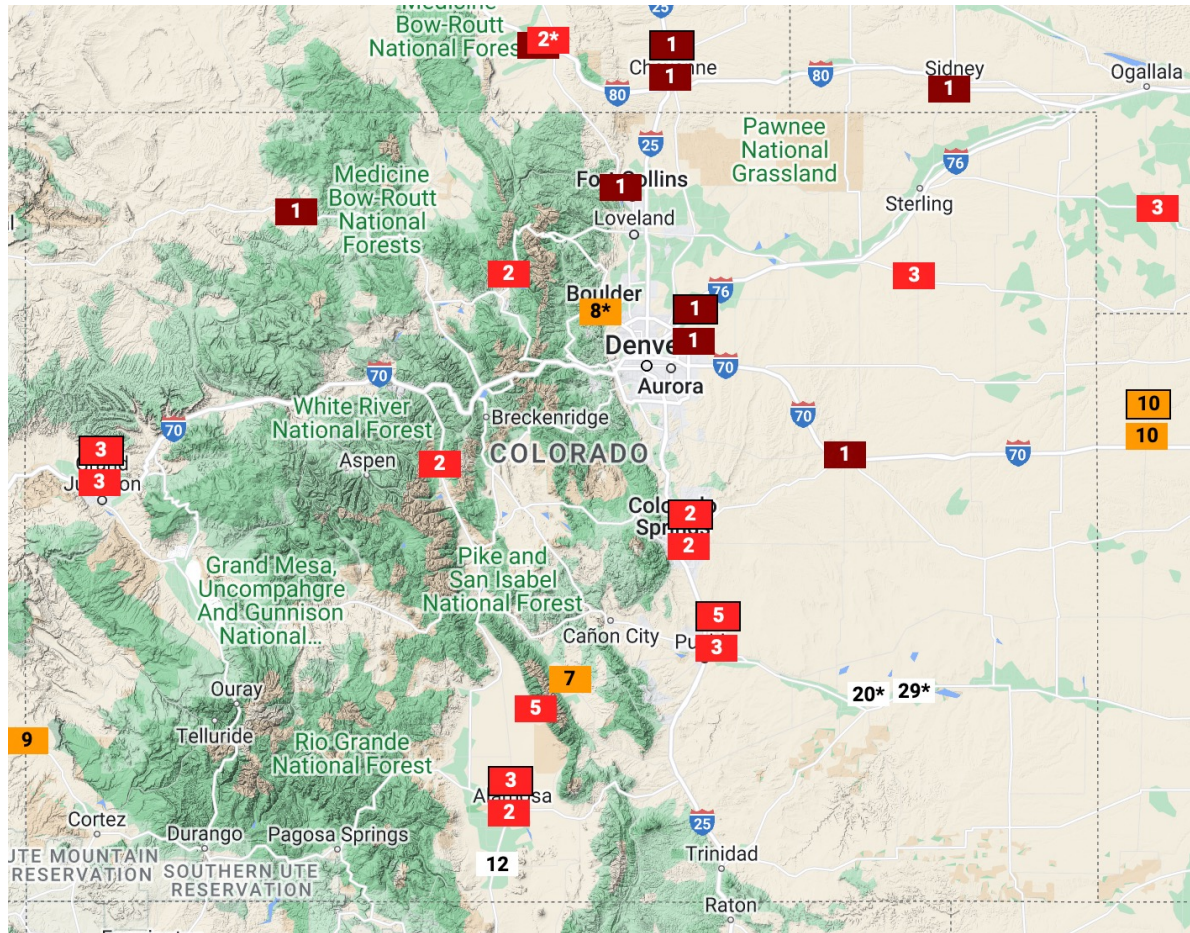


Generated 8/16/2022 at HPRCC using provisional data.

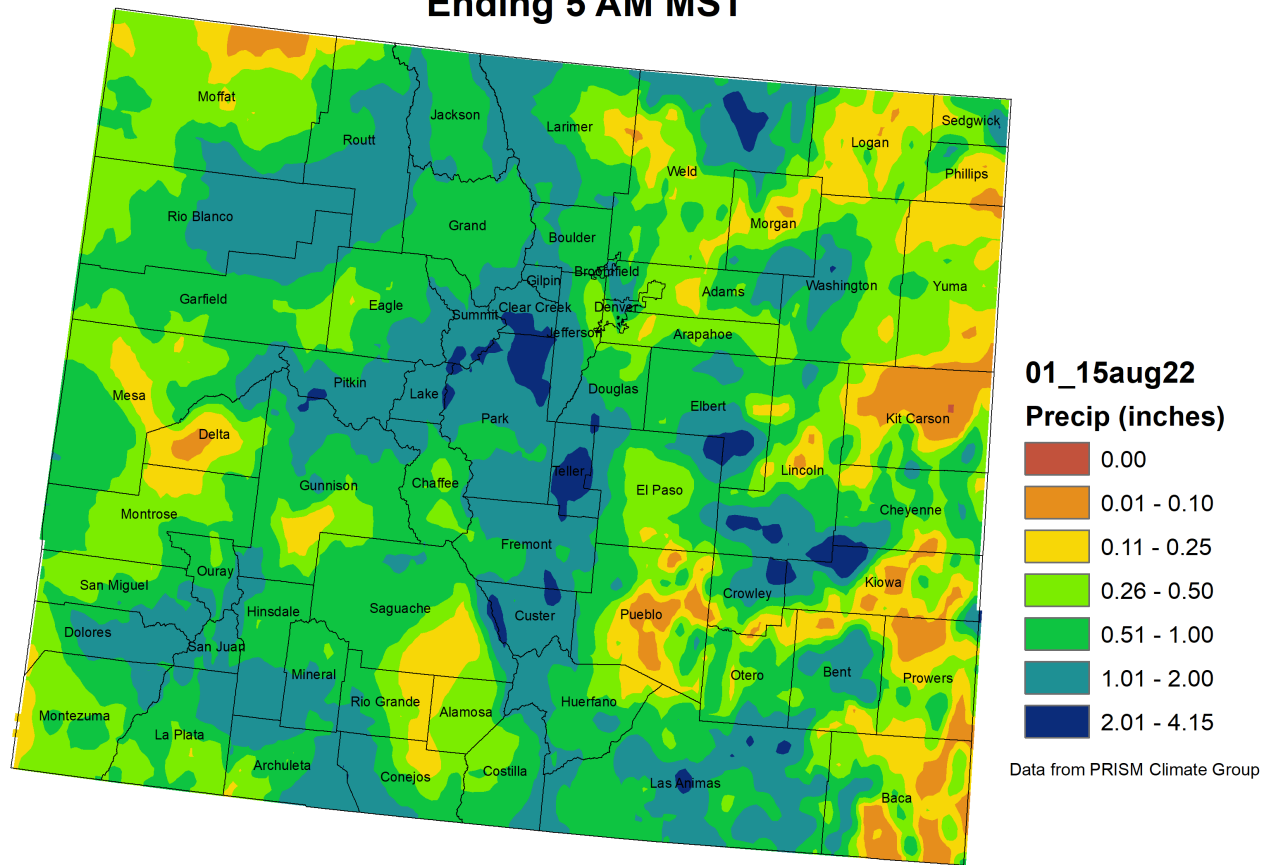
NOAA Regional Climate Centers



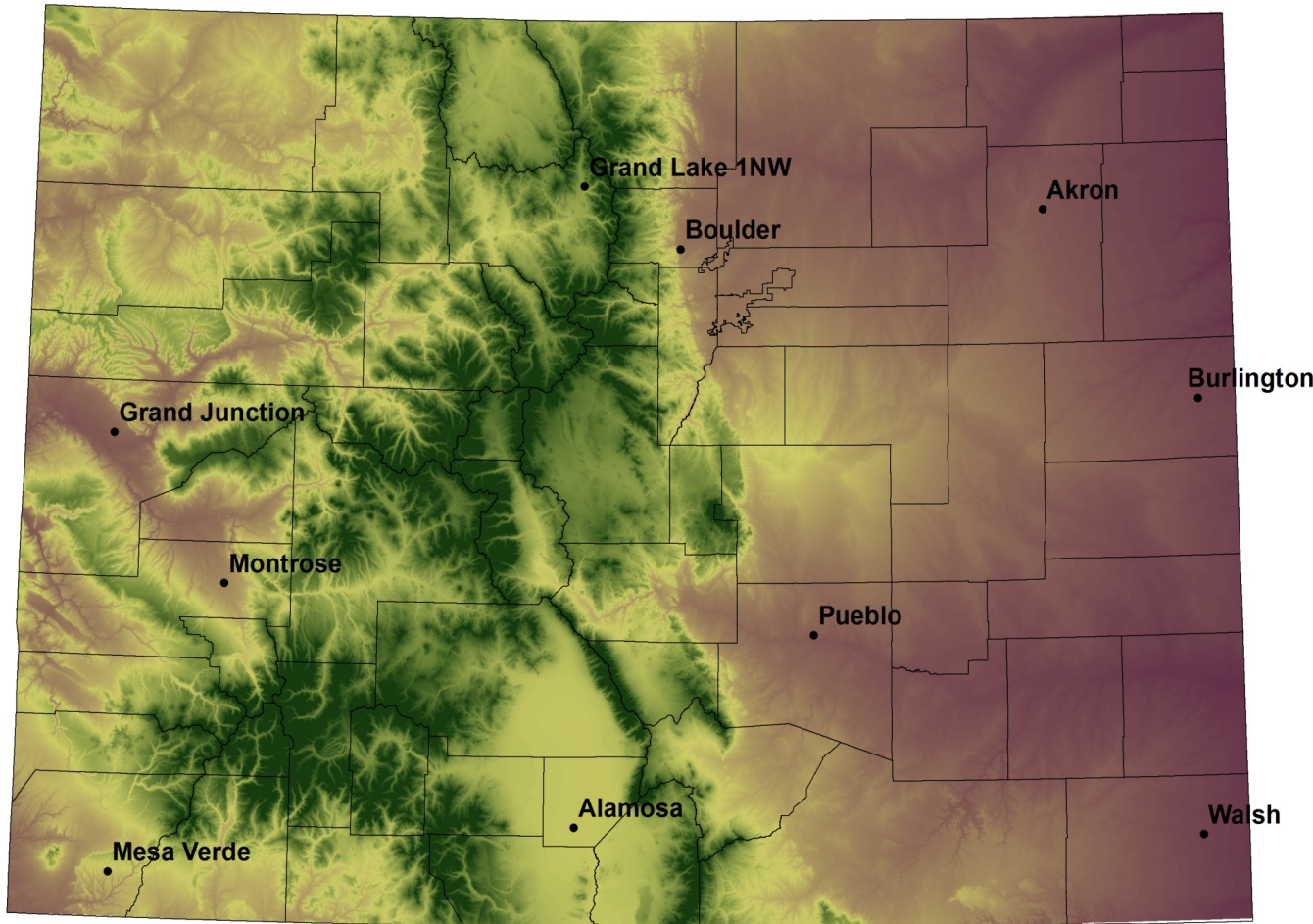
Average temperature rank, August 1-14



Colorado Month to Date Precipitation 1 - 15 August 2022 Ending 5 AM MST



NWS Cooperative Stations for WATF

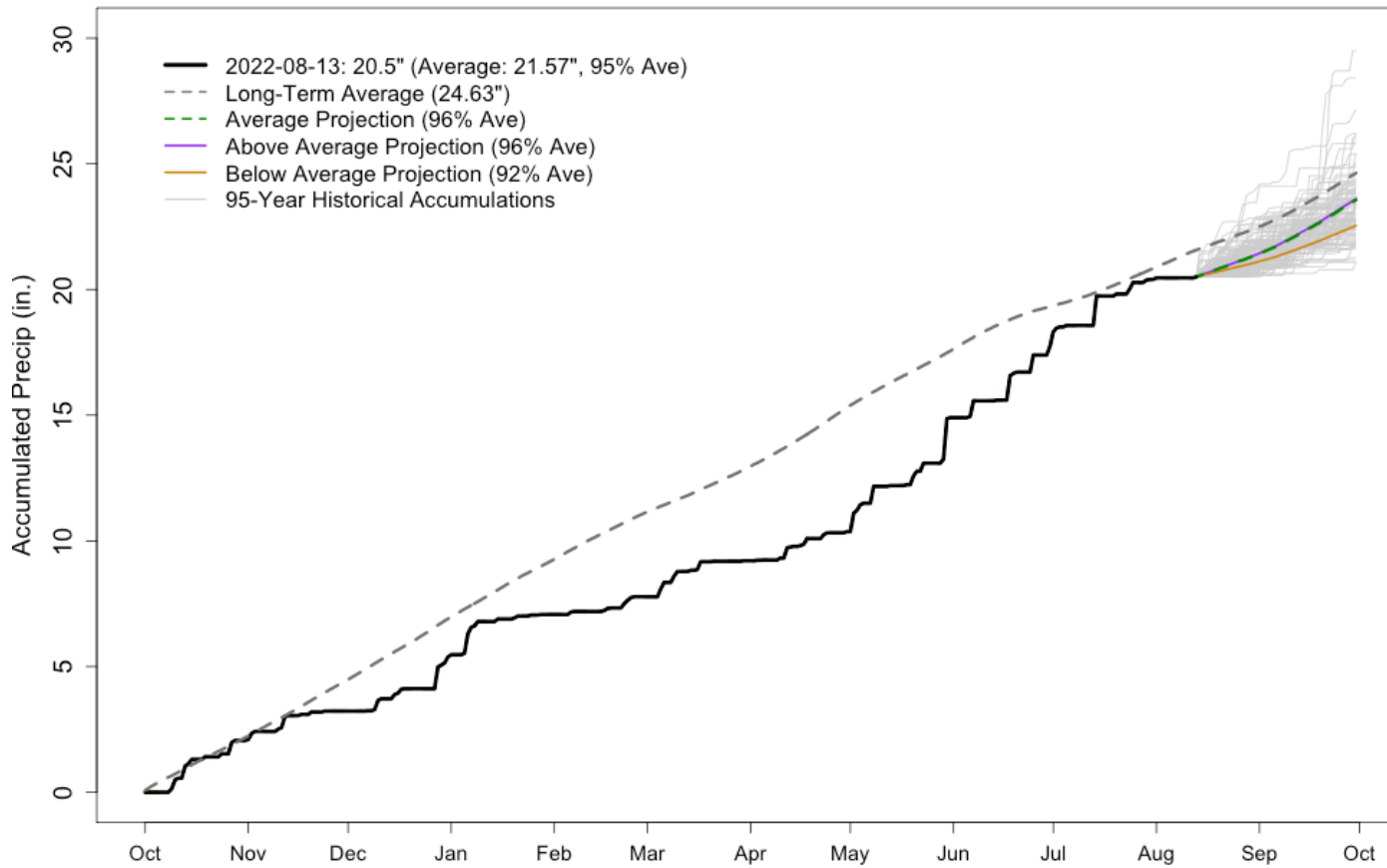


Water Year 2022 – Station Updates



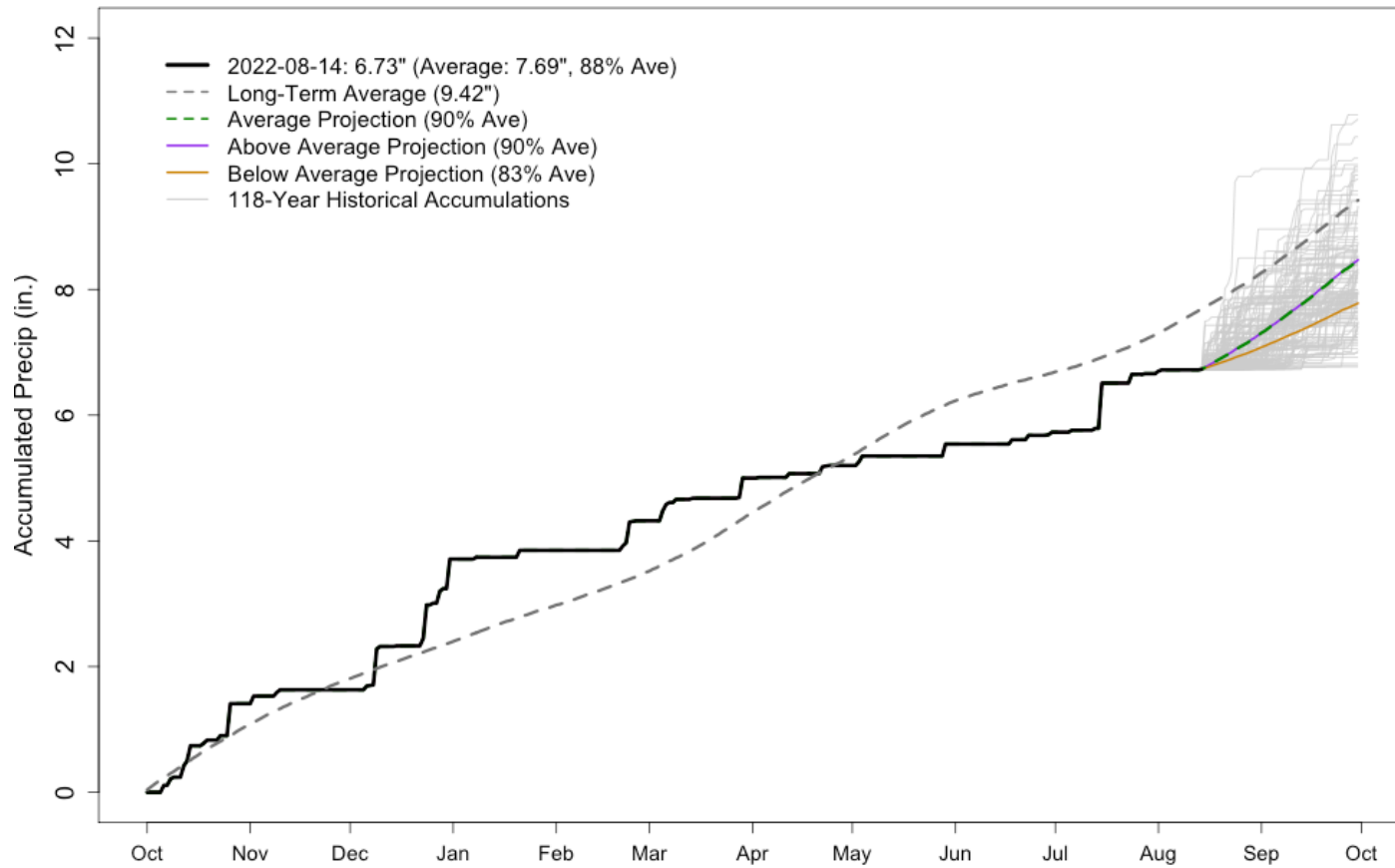
Steamboat Springs

STEAMBOAT SPRINGS WY2022 Precipitation Projections



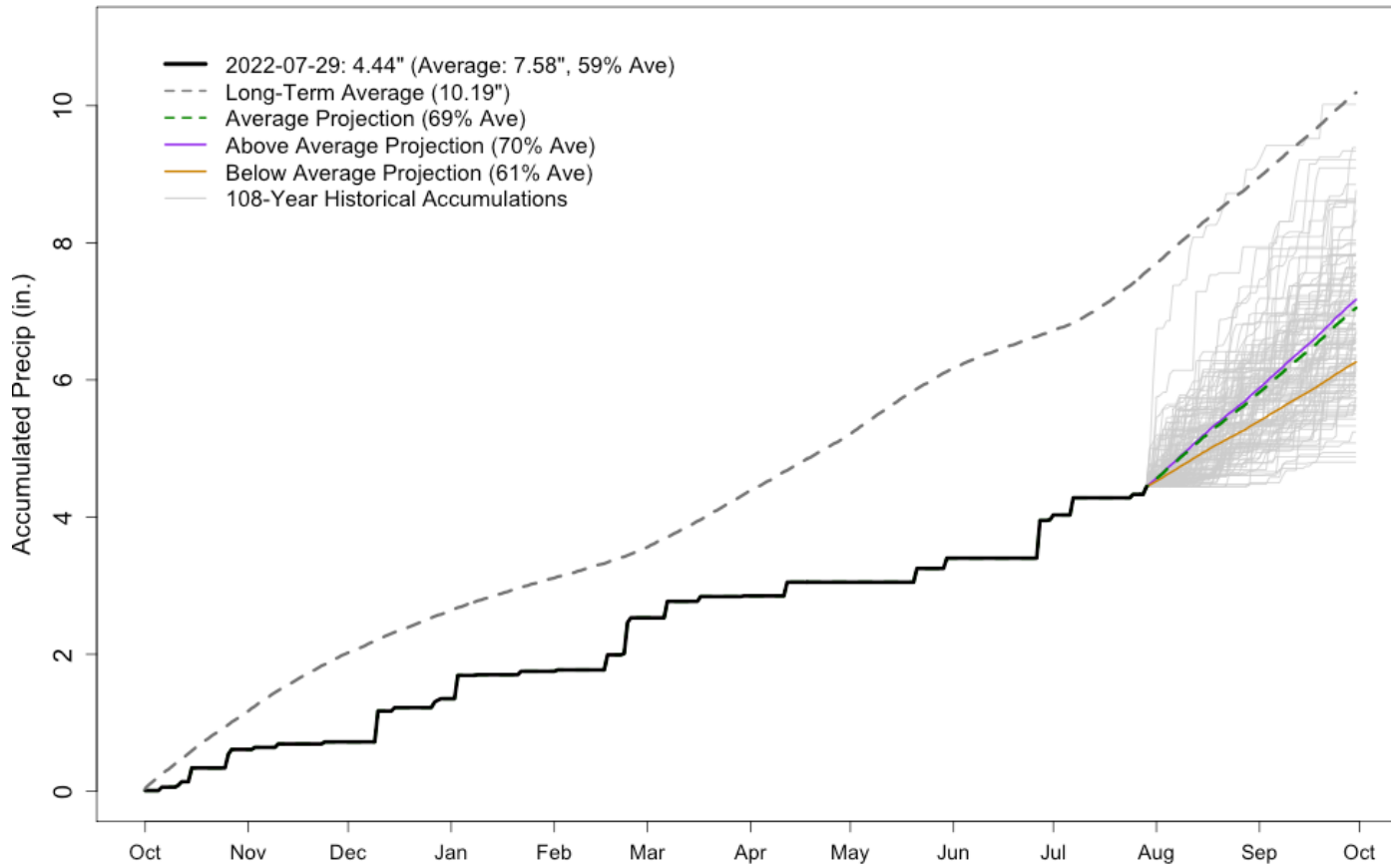
Grand Junction

GRAND JUNCTION WALKER FIELD WY2022 Precipitation Projections



Montrose

MONTROSE NO 2 WY2022 Precipitation Projections

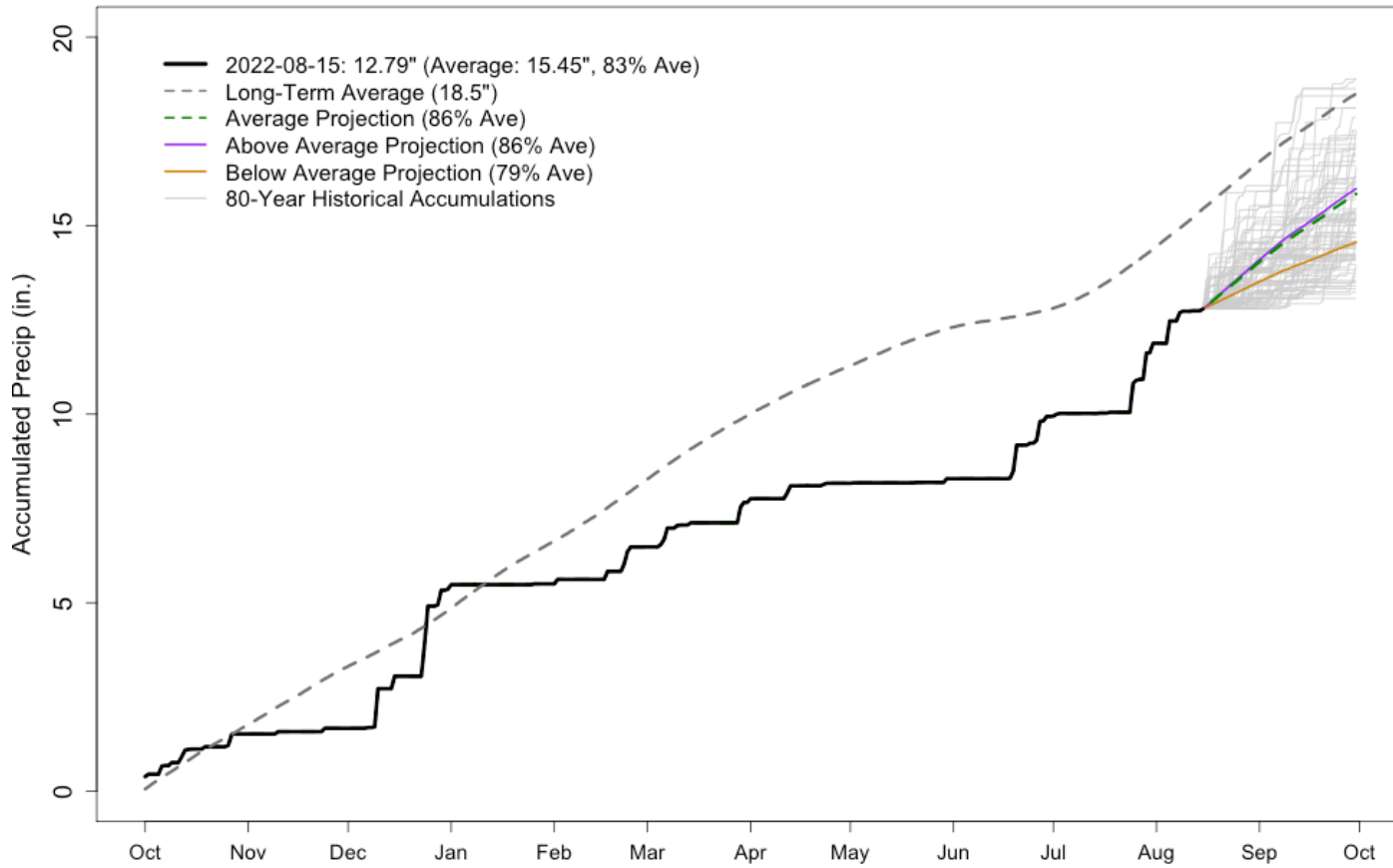


Note: data only through July 29. Nearby stations show around 0.5" since then



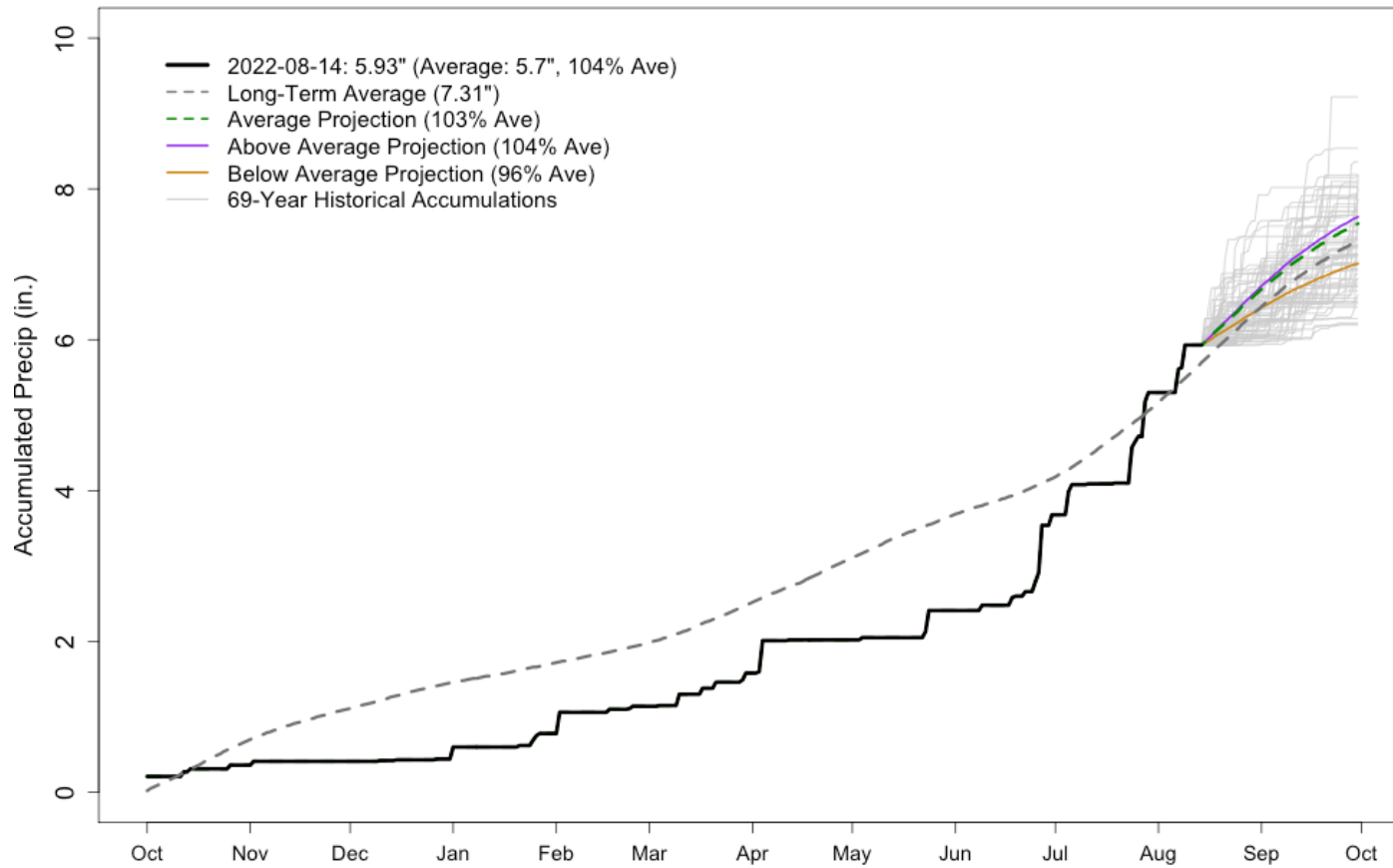
Mesa Verde NP

MESA VERDE NP WY2022 Precipitation Projections



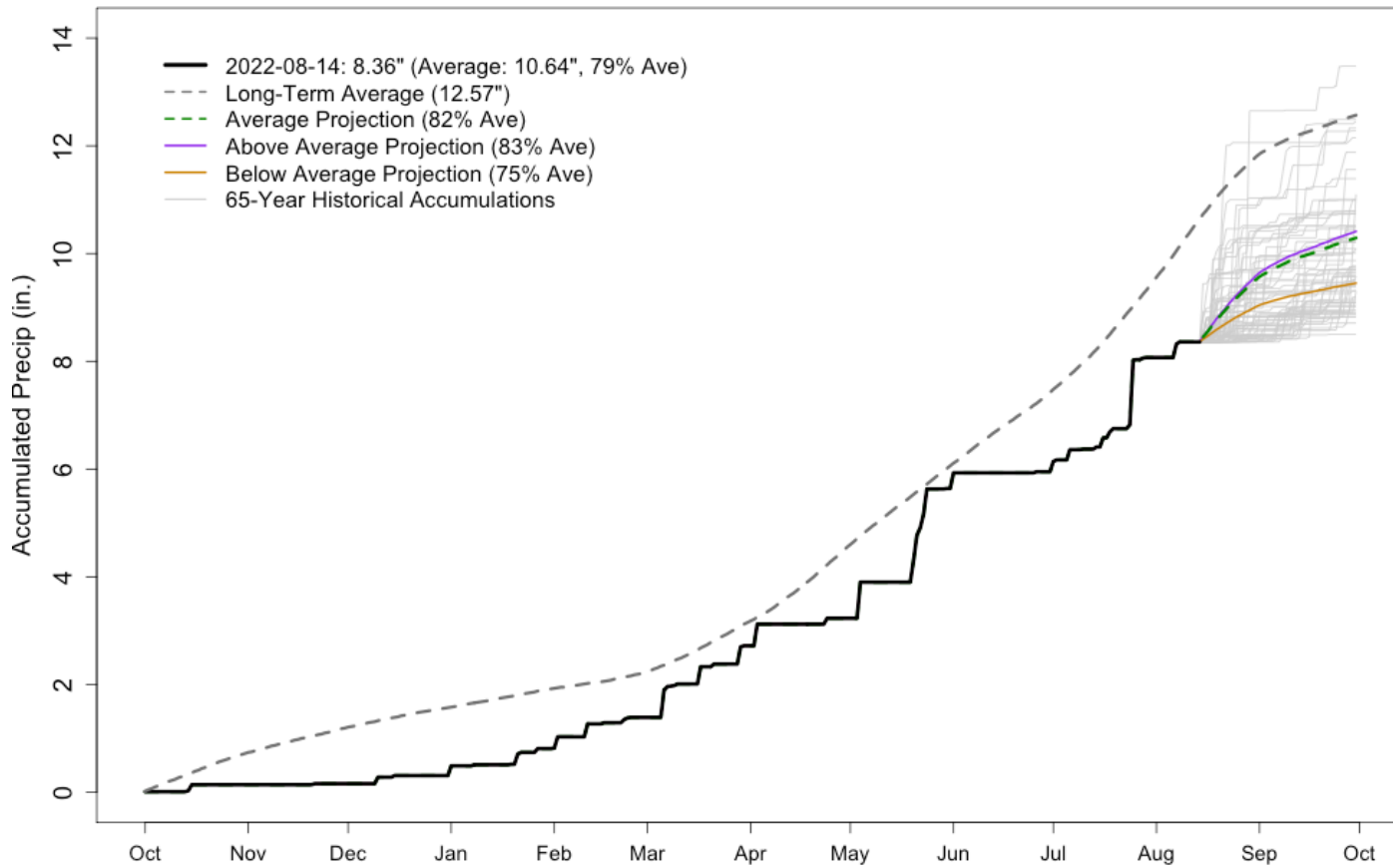
Alamosa

ALAMOSA-BERGMAN FIELD WY2022 Precipitation Projections



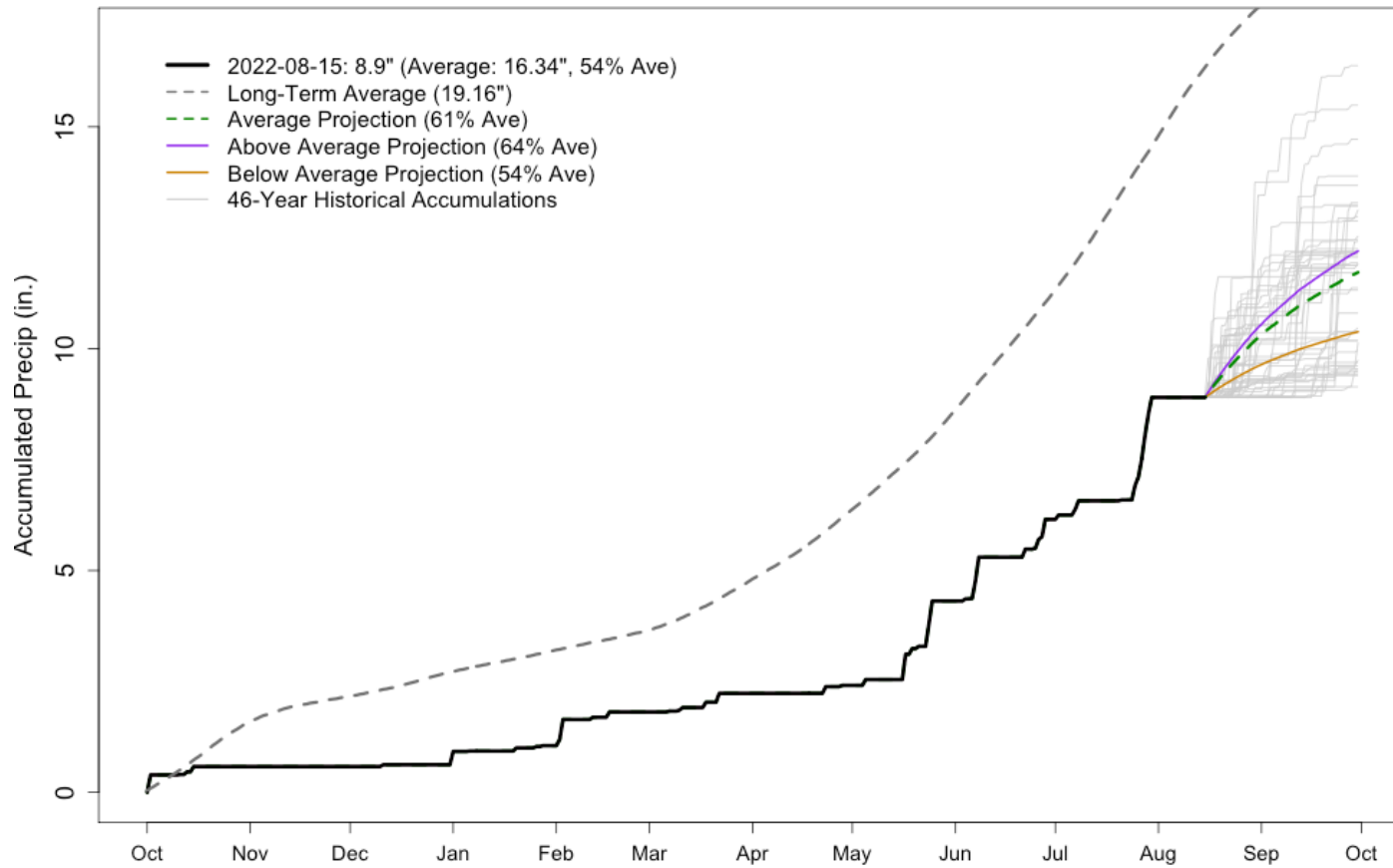
Pueblo

PUEBLO MEMORIAL AIRPORT WY2022 Precipitation Projections



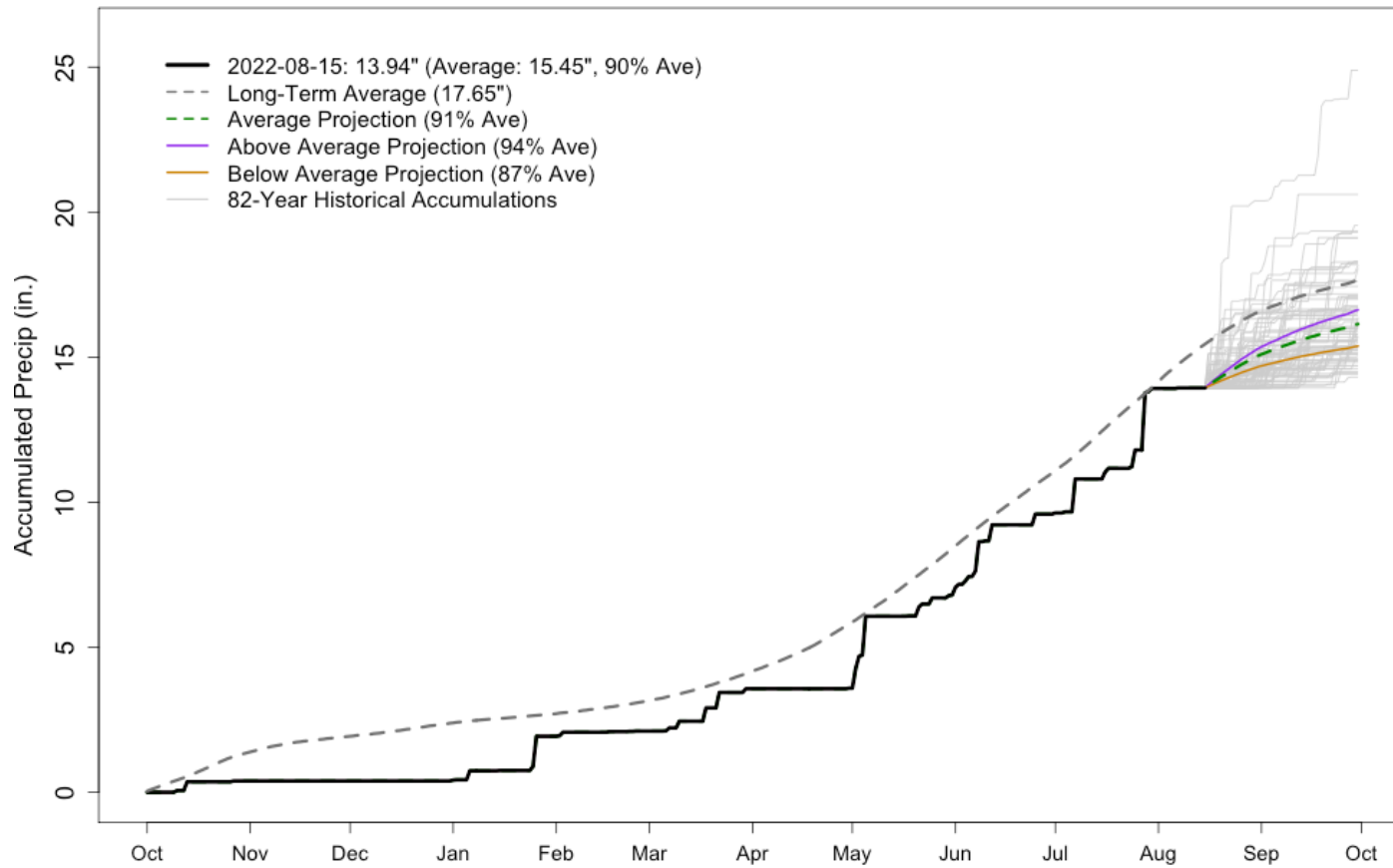
Walsh

WALSH 1 W WY2022 Precipitation Projections



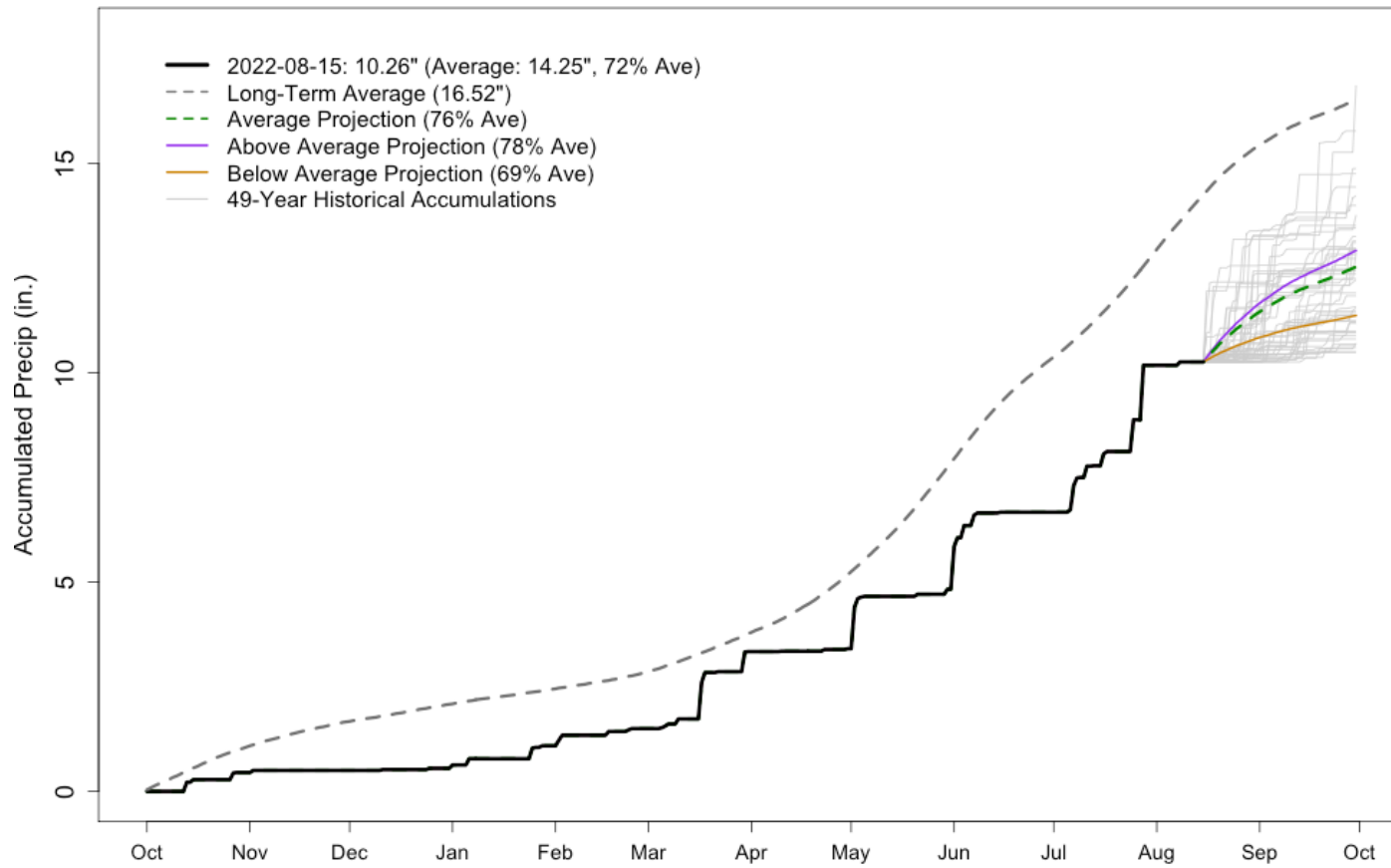
Burlington

BURLINGTON WY2022 Precipitation Projections



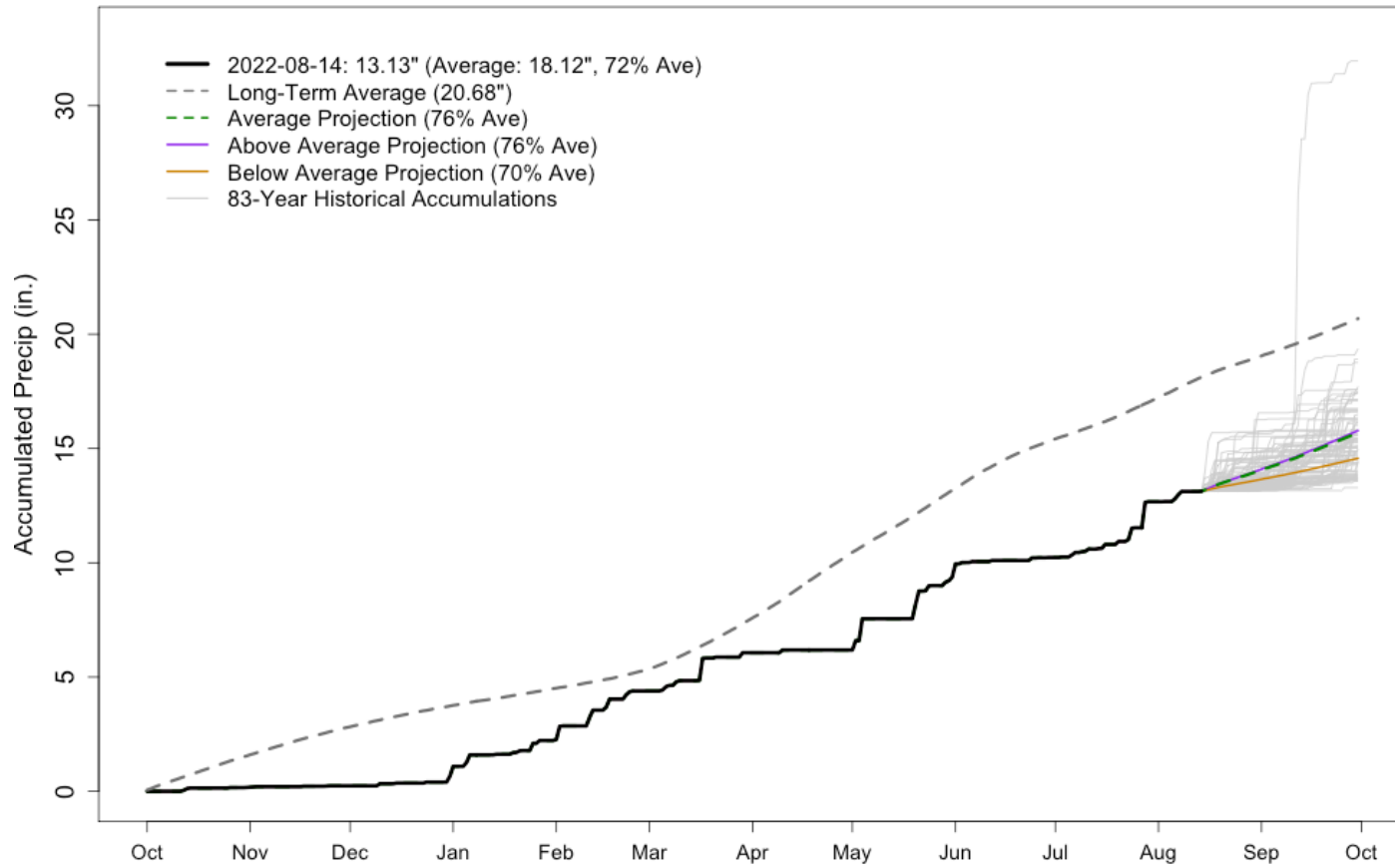
Akron

AKRON 4 E WY2022 Precipitation Projections



Boulder

BOULDER WY2022 Precipitation Projections



Drought conditions

Evaporative demand, soil
moisture, vegetation

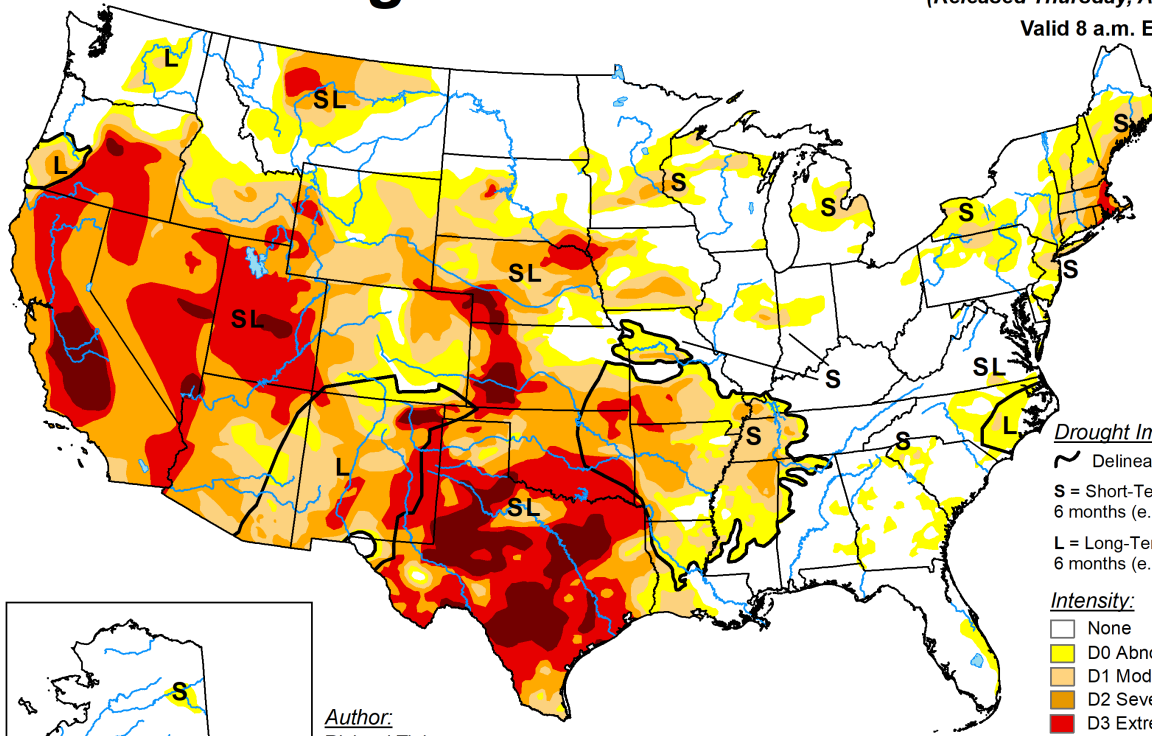


August 10, Phillips County near Amherst



U.S. Drought Monitor

August 9, 2022
 (Released Thursday, Aug. 11, 2022)
 Valid 8 a.m. EDT

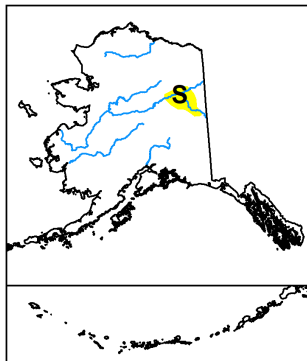


Drought Impact Types:

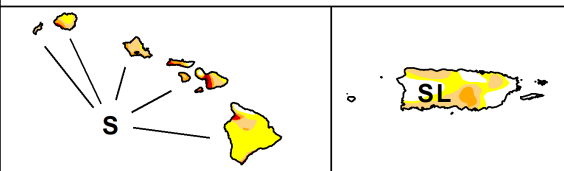
- ~ Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

Intensity:

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



Author:
 Richard Tinker
 CPC/NOAA/NWS/NCEP



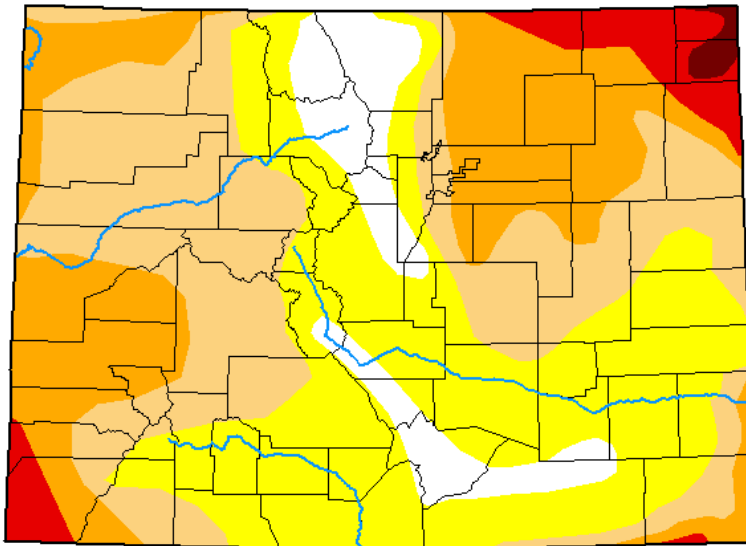
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>



droughtmonitor.unl.edu



U.S. Drought Monitor Colorado



August 9, 2022
(Released Thursday, Aug. 11, 2022)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	8.24	91.76	58.22	26.92	4.98	0.58
Last Week <i>08-02-2022</i>	3.27	96.73	61.57	30.50	4.95	0.00
3 Months Ago <i>05-10-2022</i>	0.00	100.00	91.50	57.44	5.81	1.20
Start of Calendar Year <i>01-04-2022</i>	0.00	100.00	95.49	67.08	22.25	0.00
Start of Water Year <i>09-28-2021</i>	12.72	87.28	46.42	26.30	15.05	3.91
One Year Ago <i>08-10-2021</i>	53.18	46.82	34.43	28.04	20.37	6.38

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:

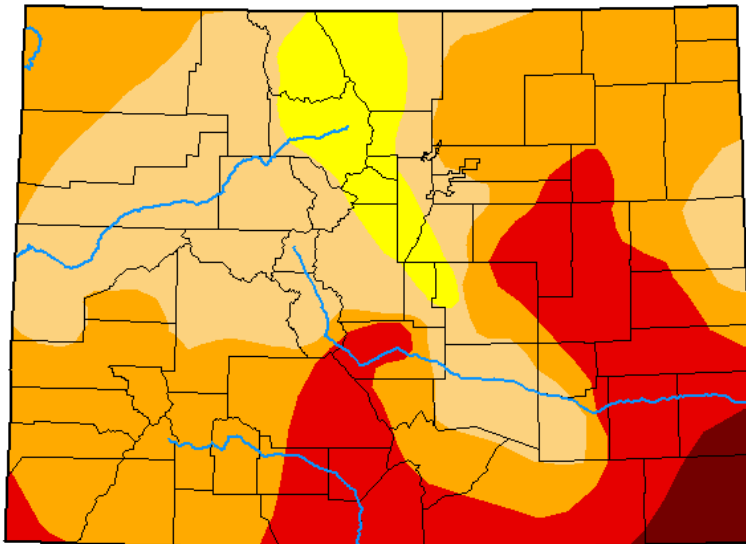
Richard Tinker
CPC/NOAA/NWS/NCEP



droughtmonitor.unl.edu

U.S. Drought Monitor Colorado

May 17, 2022
(Released Thursday, May. 19, 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	93.46	63.89	22.98	2.61
Last Week <i>05-10-2022</i>	0.00	100.00	91.50	57.44	5.81	1.20
3 Months Ago <i>02-15-2022</i>	0.00	100.00	90.41	59.81	8.55	0.00
Start of Calendar Year <i>01-04-2022</i>	0.00	100.00	95.49	67.08	22.25	0.00
Start of Water Year <i>09-28-2021</i>	12.72	87.28	46.42	26.30	15.05	3.91
One Year Ago <i>05-18-2021</i>	23.30	76.70	51.80	39.29	28.96	16.39

Intensity:

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

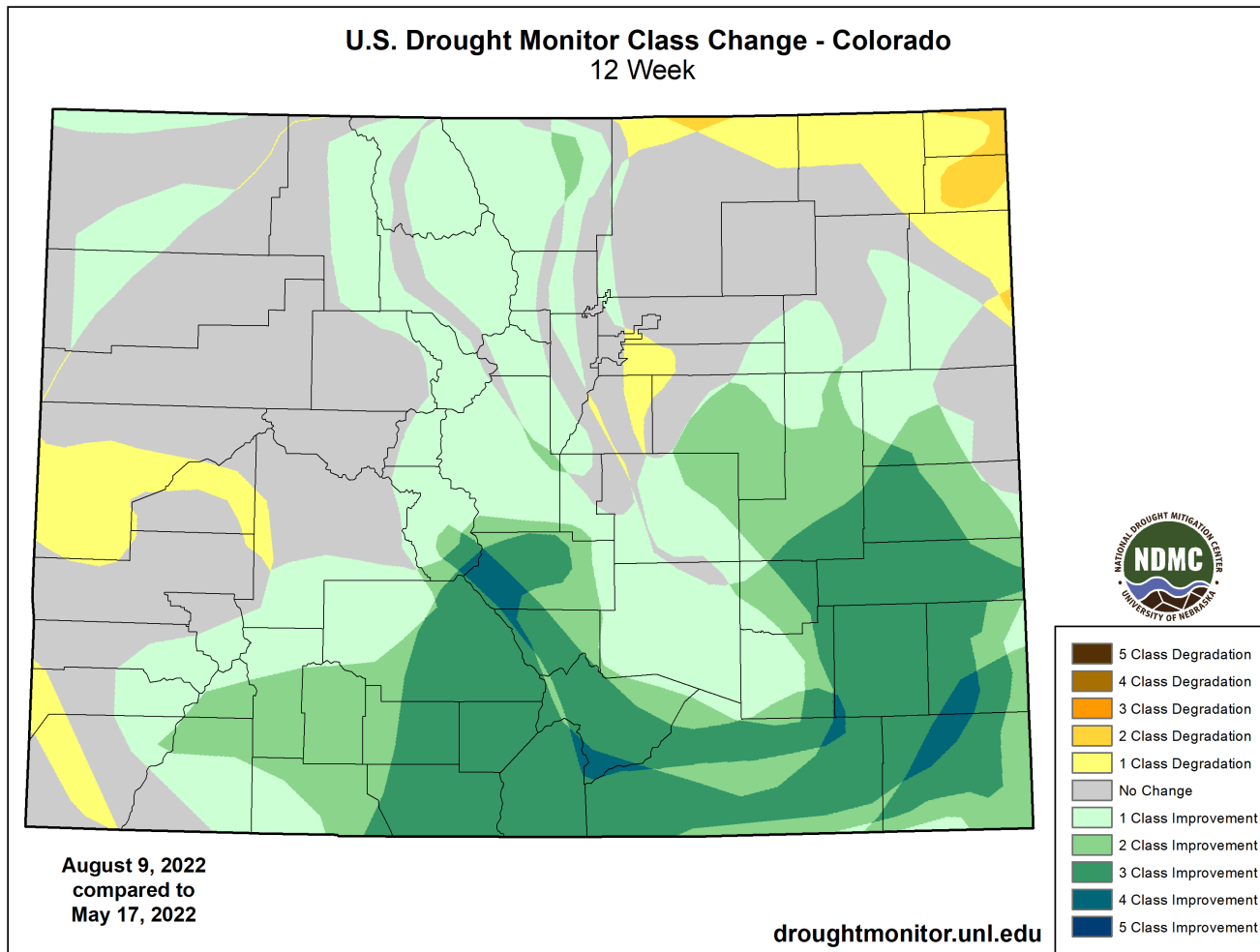
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:
Richard Heim
NCEI/NOAA

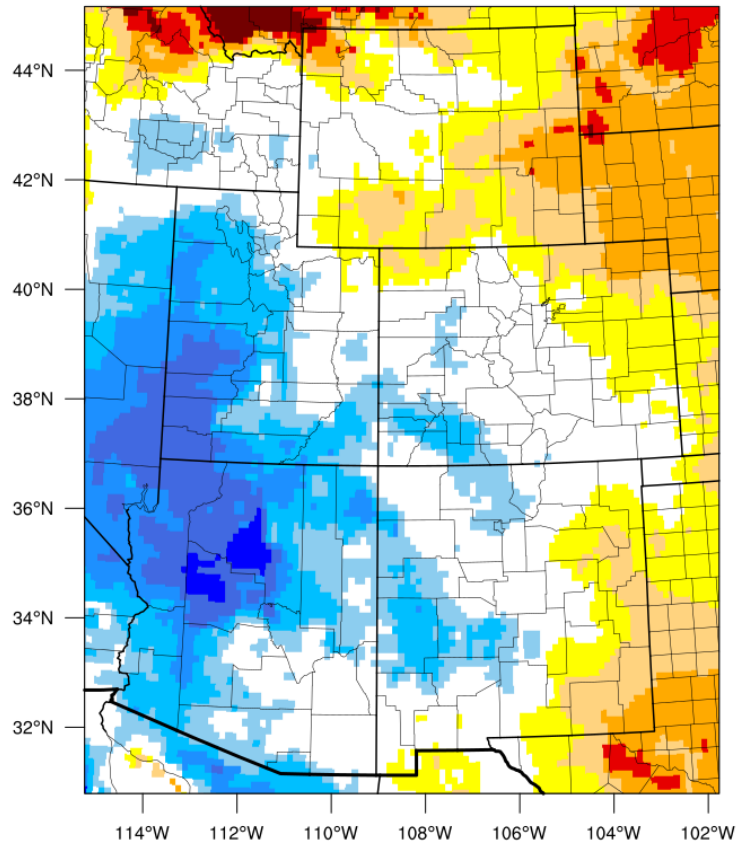


droughtmonitor.unl.edu

Change over 12 weeks

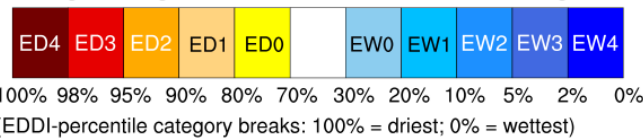


1-month EDDI categories for August 11, 2022



Drought categories

Wetness categories



Generated by NOAA/ESRL/Physical Sciences Laboratory

Evaporative Demand Drought Index

An active North American Monsoon with cloudy, humid conditions reduced evaporative demand across much of Colorado in the last month – the exception being the northeast corner

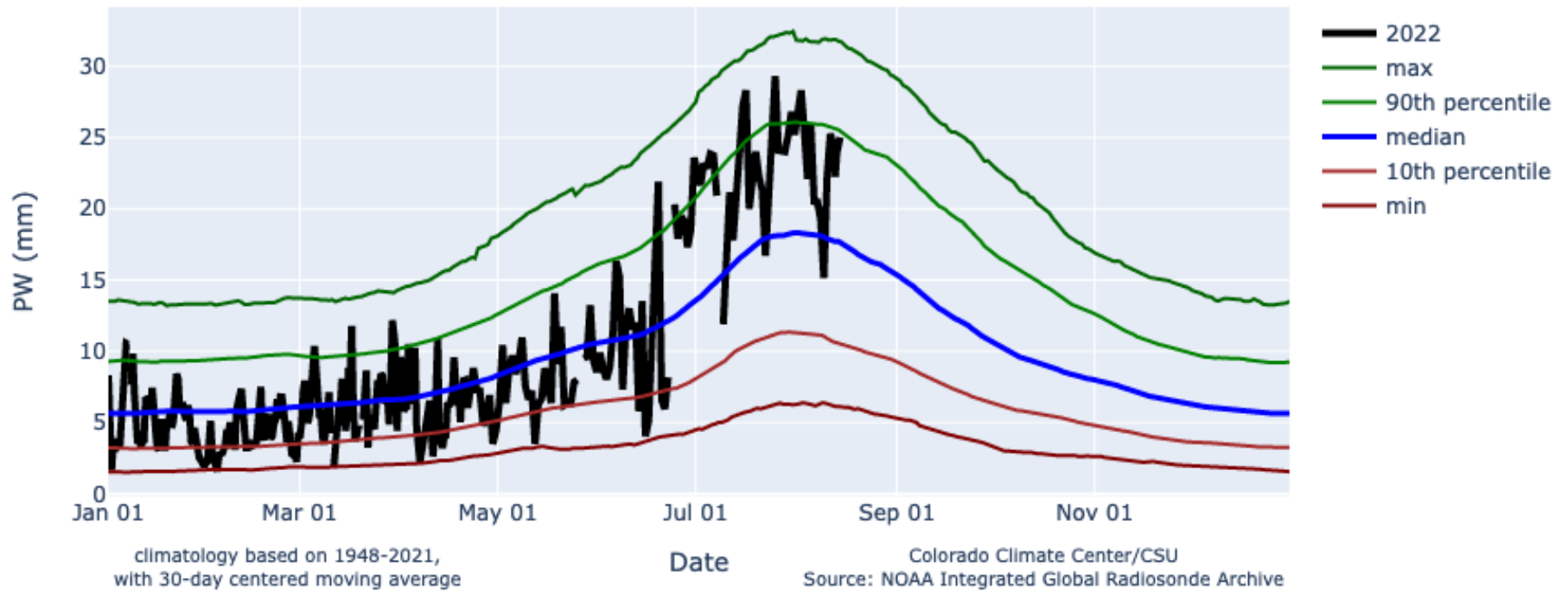


Precipitable water: water vapor added up through the depth of the atmosphere

select year:

2022 ▼

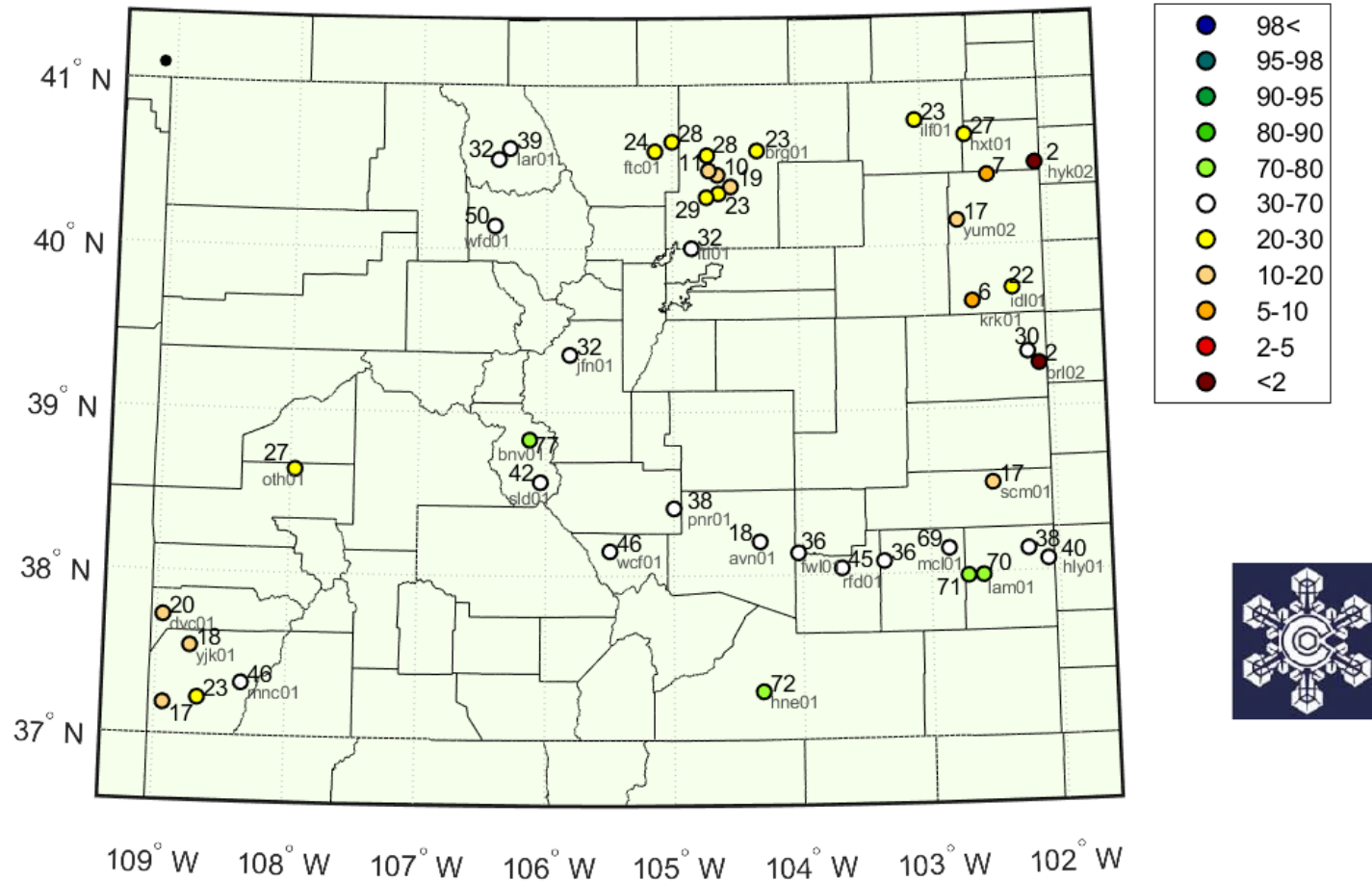
Grand Junction precipitable water climatology and selected year data



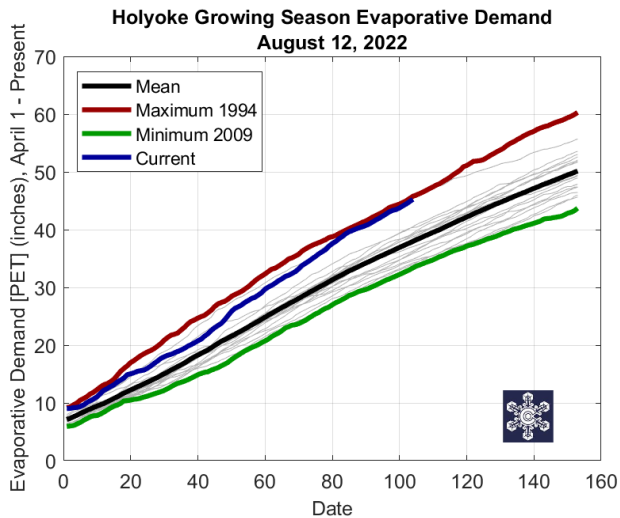
<https://climate.colostate.edu/pw.html>



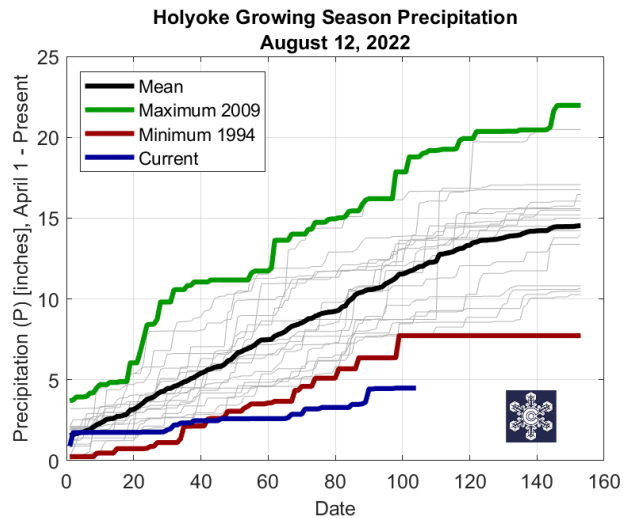
Growing Season Water Balance (P/PET) Percentiles August 12, 2022



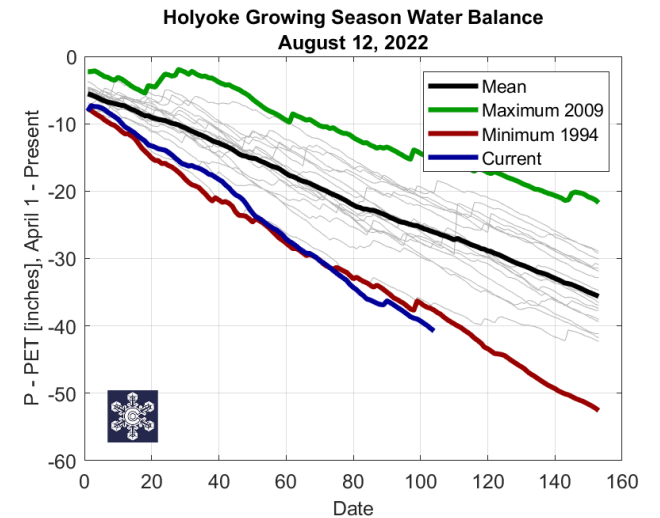
Holyoke CoAgMET station, since April 1



Near-record evaporative demand



Record-low precipitation

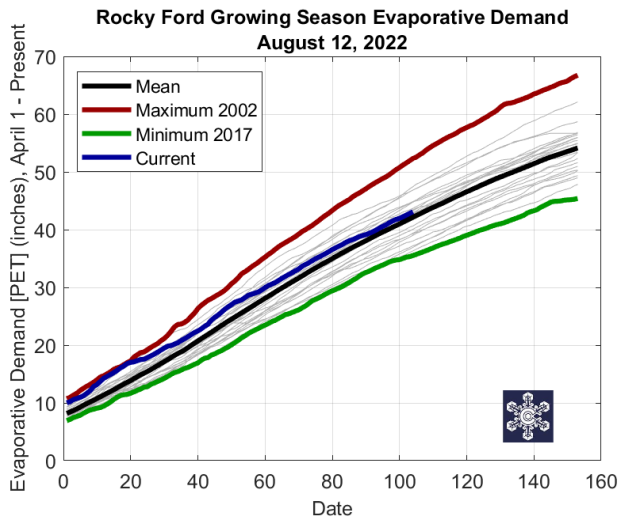


Record-low water balance

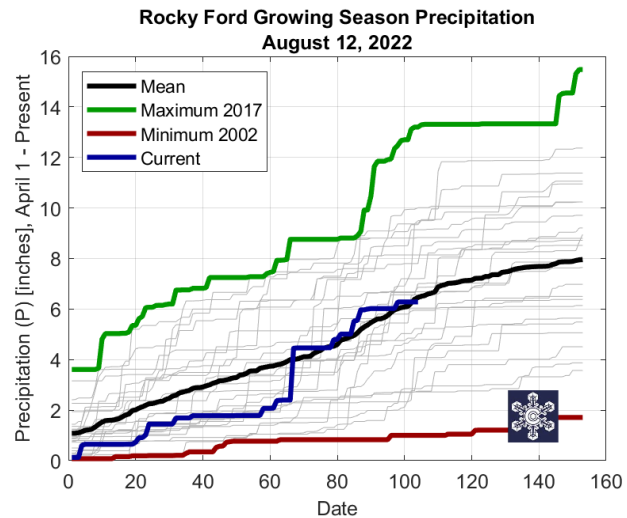
Data since 1992 at this station



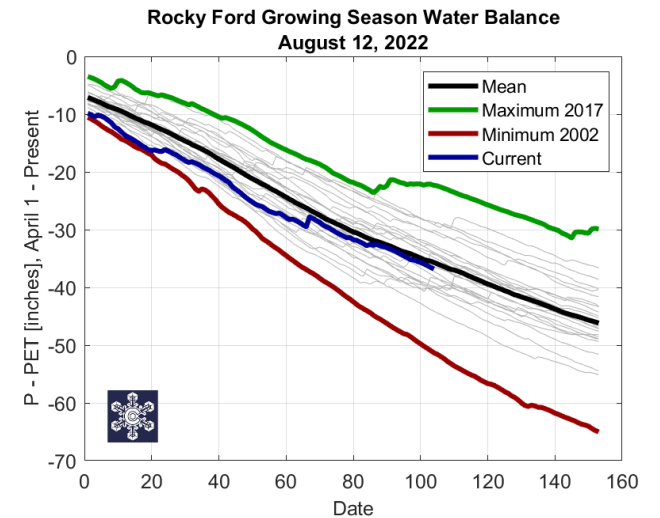
Rocky Ford CoAgMET station, since April 1



Near-record evaporative demand



Record-low precipitation

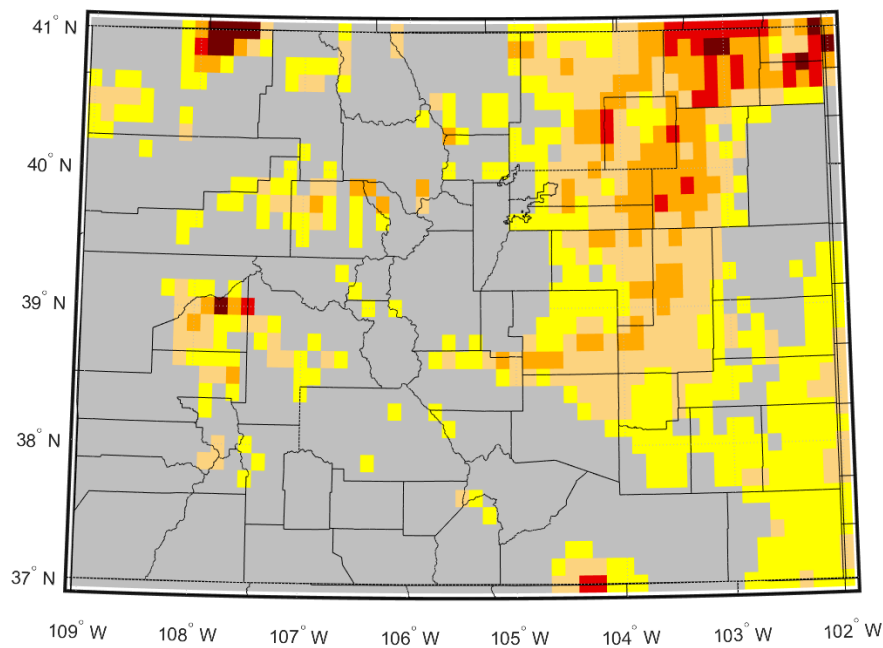


Record-low water balance

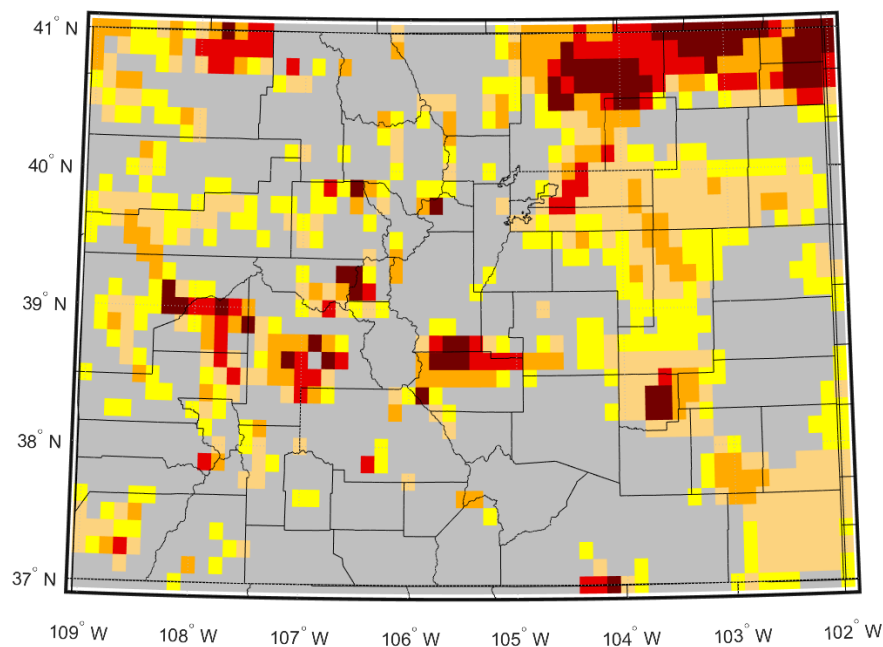
Data since 1992 at this station



Top 10cm Soil Moisture Percentile
08/06/2022



Top Meter Soil Moisture Percentile
08/06/2022



Both shallow and deep soil moisture remains poor in much of northeast Colorado; conditions have improved across much of southern Colorado; some dry pockets on the western slope.



VegDRI: longer-term vegetation condition

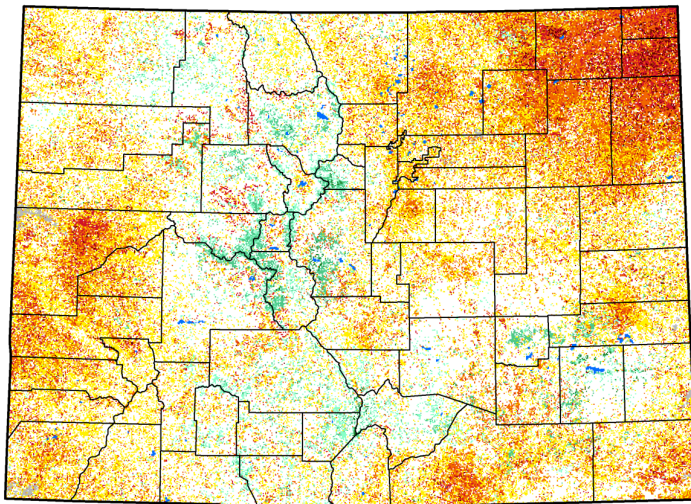
QuickDRI: shorter-term vegetation response

Vegetation Drought Response Index Complete: Colorado

July 31, 2022

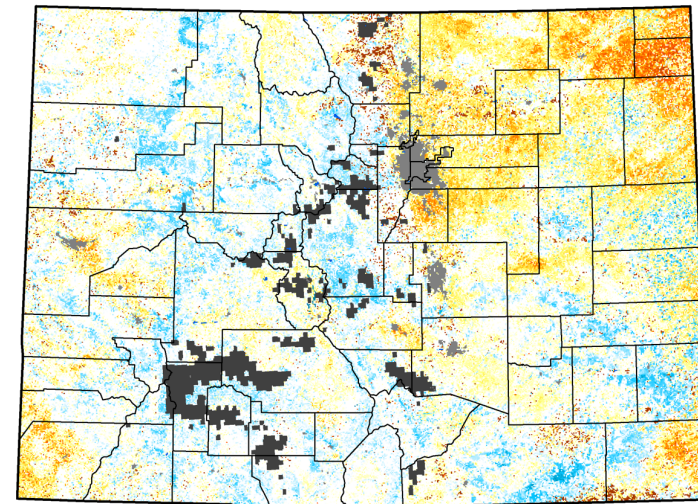
Quick Drought Response Index Colorado

July 31, 2022
(Week 31)



Vegetation Condition

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



Conditions Relative to 4-Week Historical Average

- Wetter
- Near Average
- Drier
- Out of Season
- Urban
- No Data
- Water





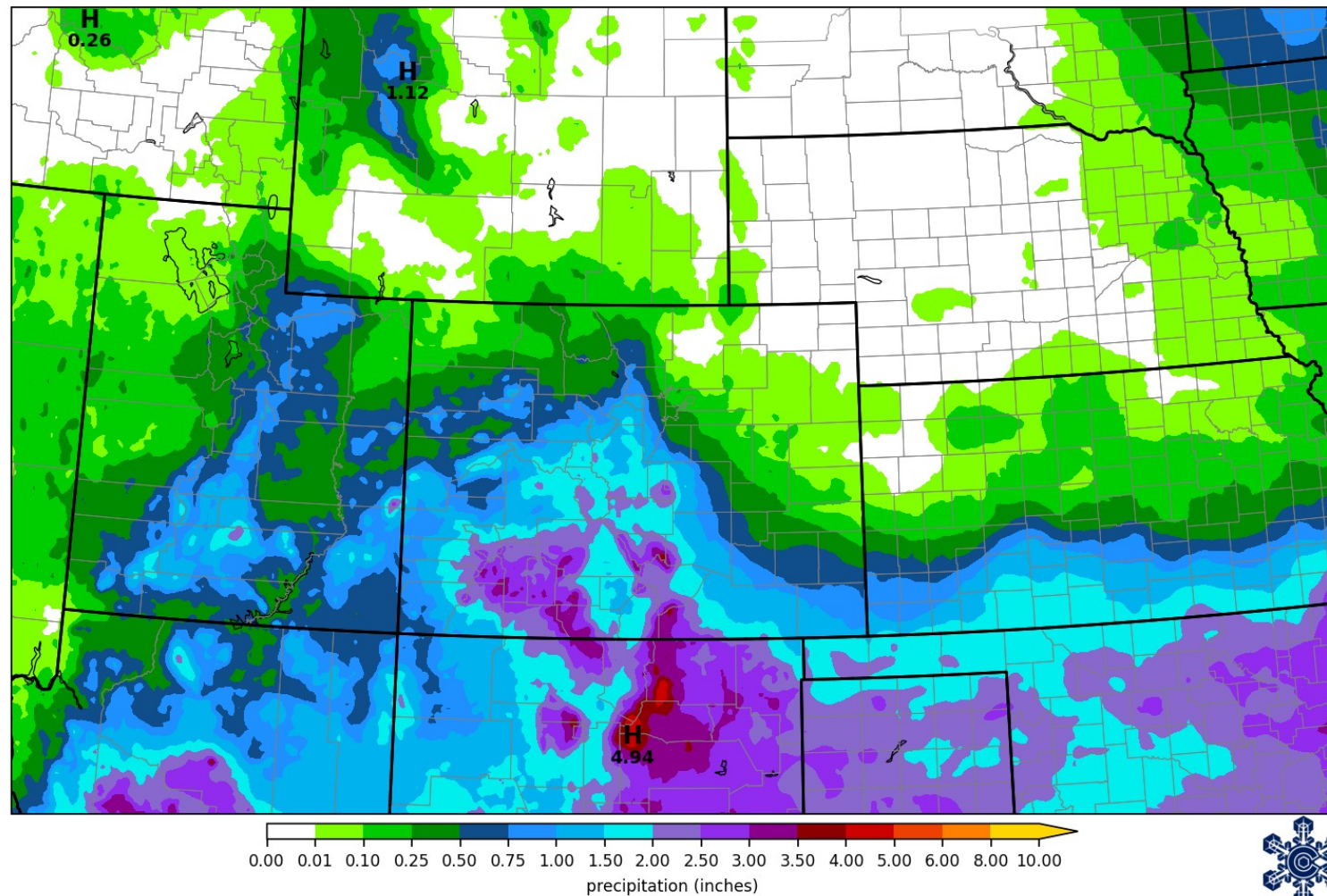
Outlook



NOAA 7-day precipitation forecast

NOAA Weather Prediction Center
7-day precipitation forecast

forecast issued 1200 UTC Tue 16 Aug 2022
precipitation in 168 hrs ending 1200 UTC Tue 23 Aug 2022



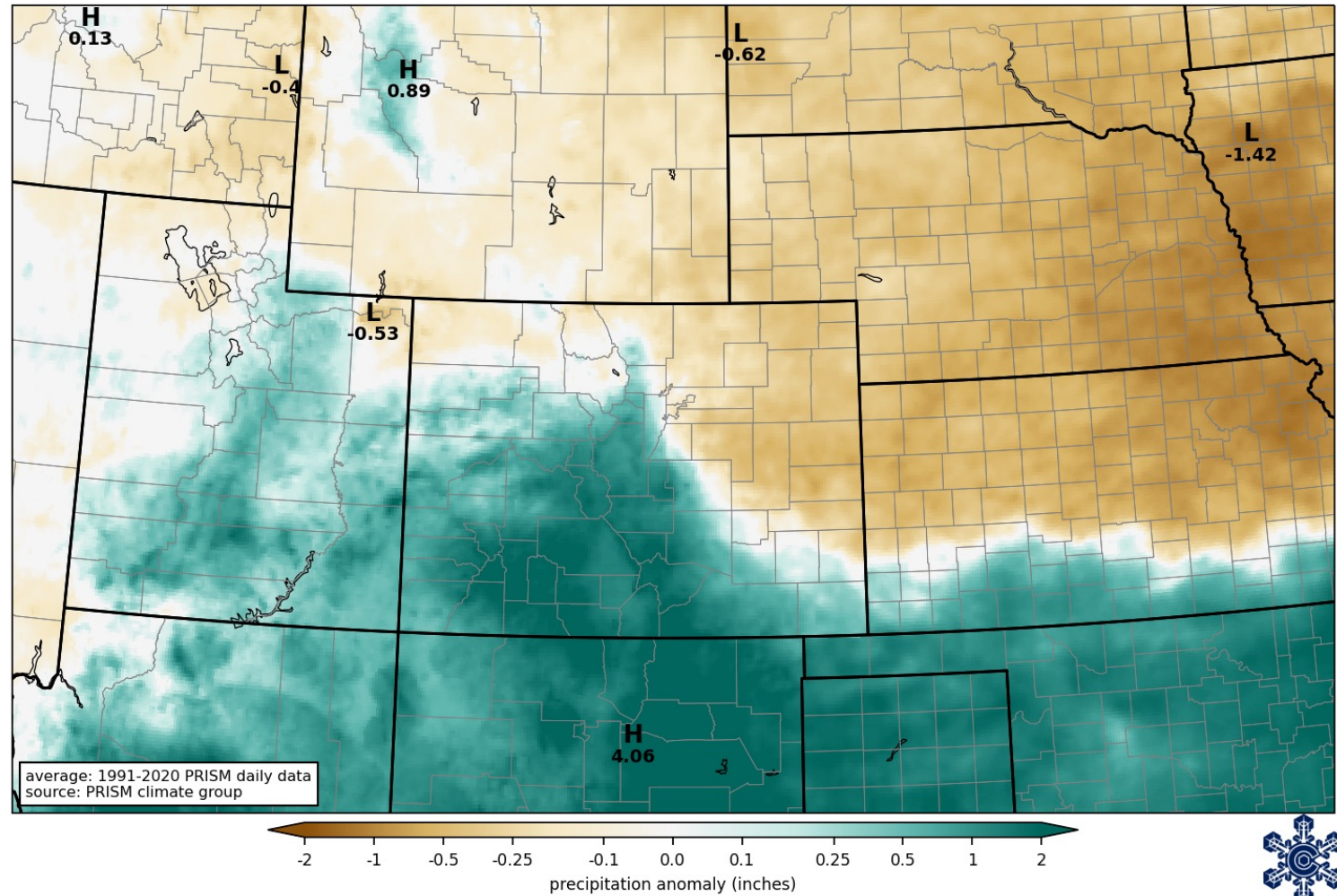
COLORADO CLIMATE CENTER



NOAA 7-day precipitation forecast (difference from average)

NOAA Weather Prediction Center
7-day precip forecast departure from average

forecast issued 1200 UTC Tue 16 Aug 2022
precipitation in 168 hrs ending 1200 UTC Tue 23 Aug 2022



COLORADO CLIMATE CENTER



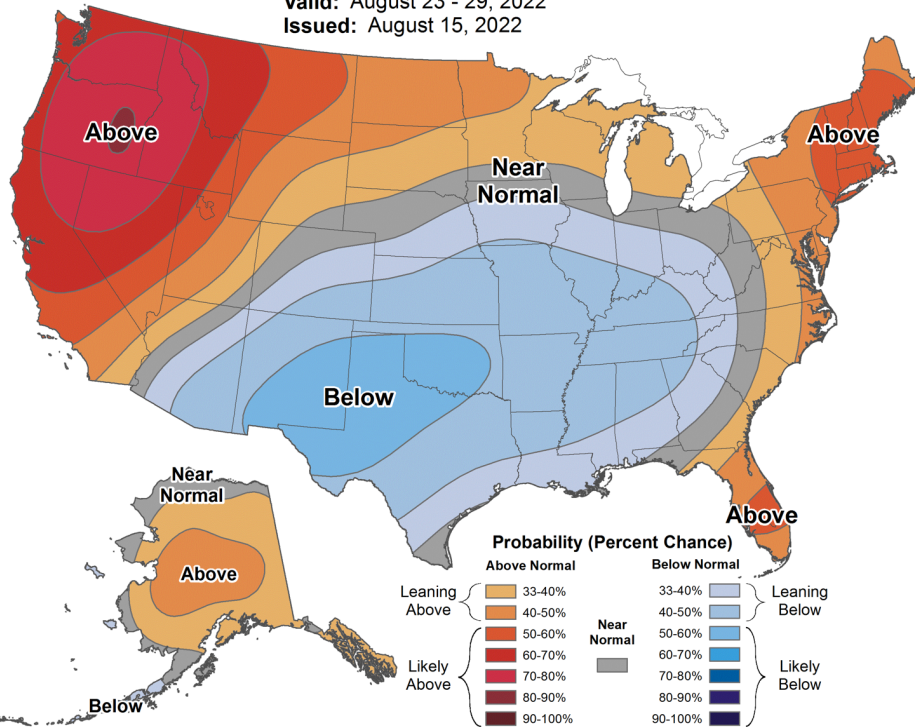
Cooler, wetter than average conditions projected to continue through end of August



8-14 Day Temperature Outlook



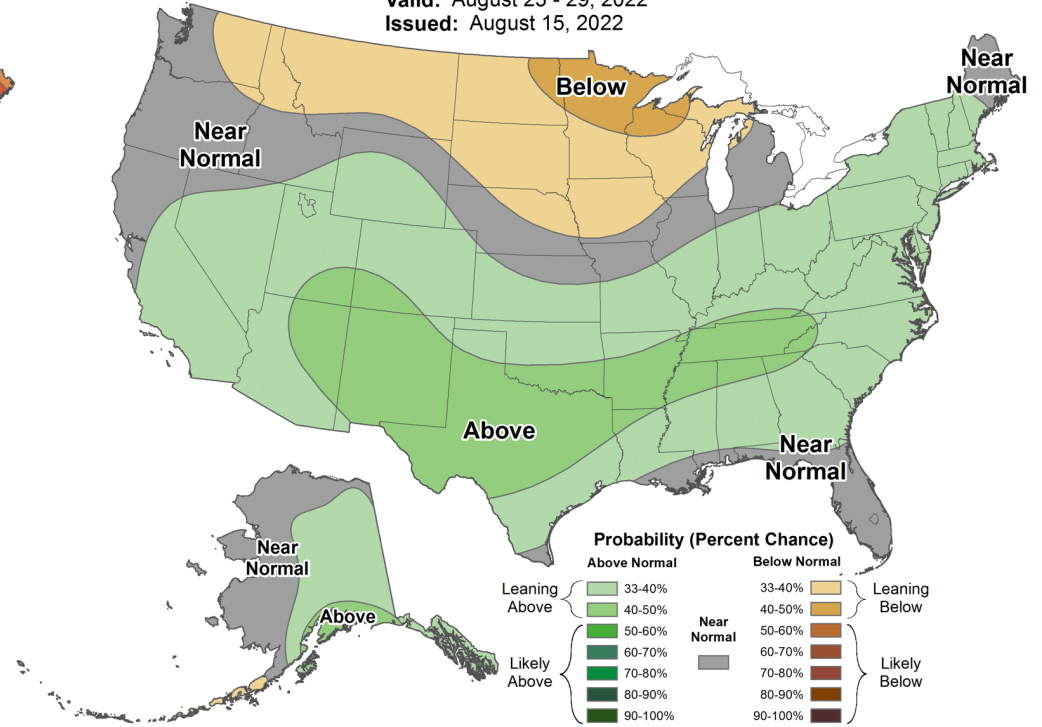
Valid: August 23 - 29, 2022
Issued: August 15, 2022



8-14 Day Precipitation Outlook



Valid: August 23 - 29, 2022
Issued: August 15, 2022



Strong La Niña to continue at least through fall

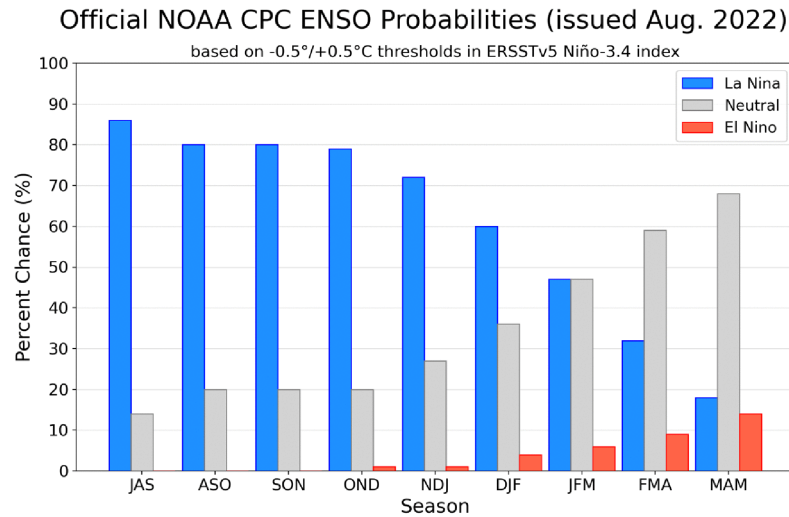


Figure 7. Official ENSO probabilities for the Niño 3.4 sea surface temperature index (5°N - 5°S , 120°W - 170°W). Figure updated 11 August 2022.

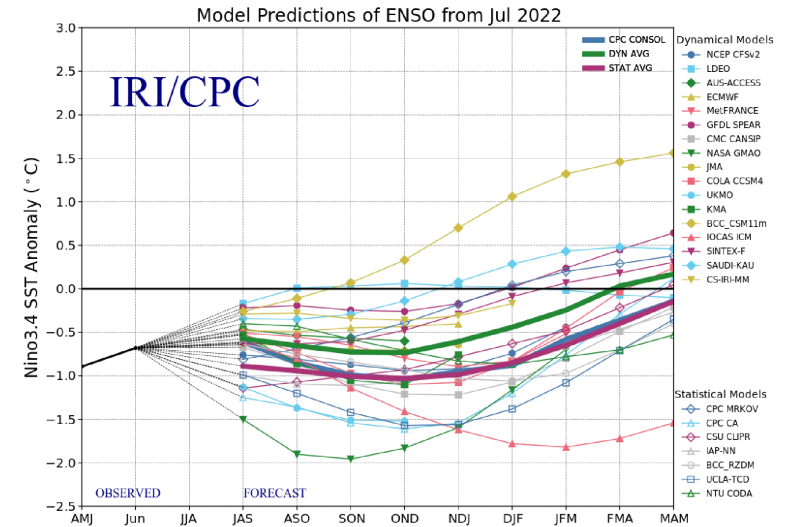
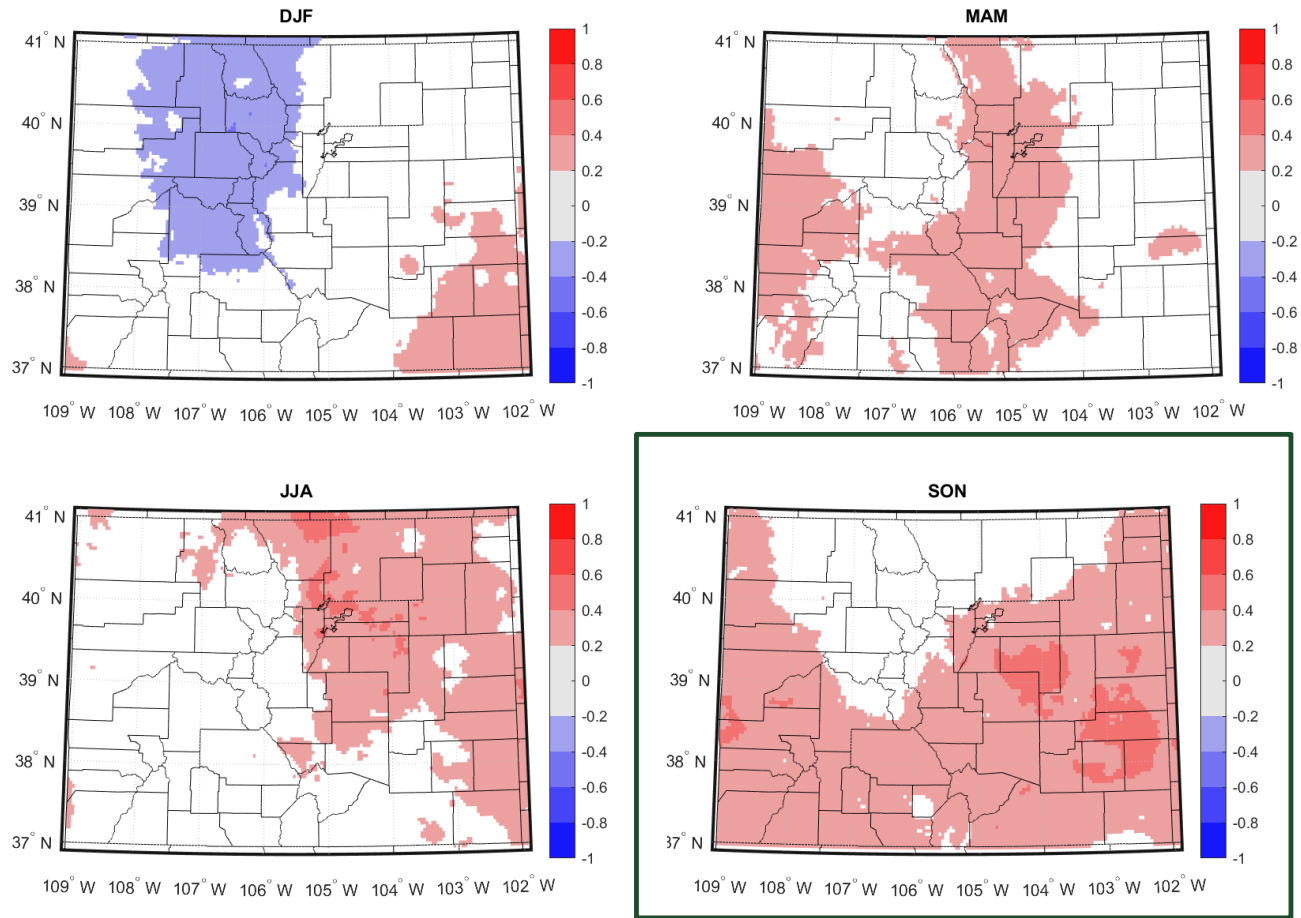


Figure 6. Forecasts of sea surface temperature (SST) anomalies for the Niño 3.4 region (5°N - 5°S , 120°W - 170°W). Figure updated 19 July 2022.

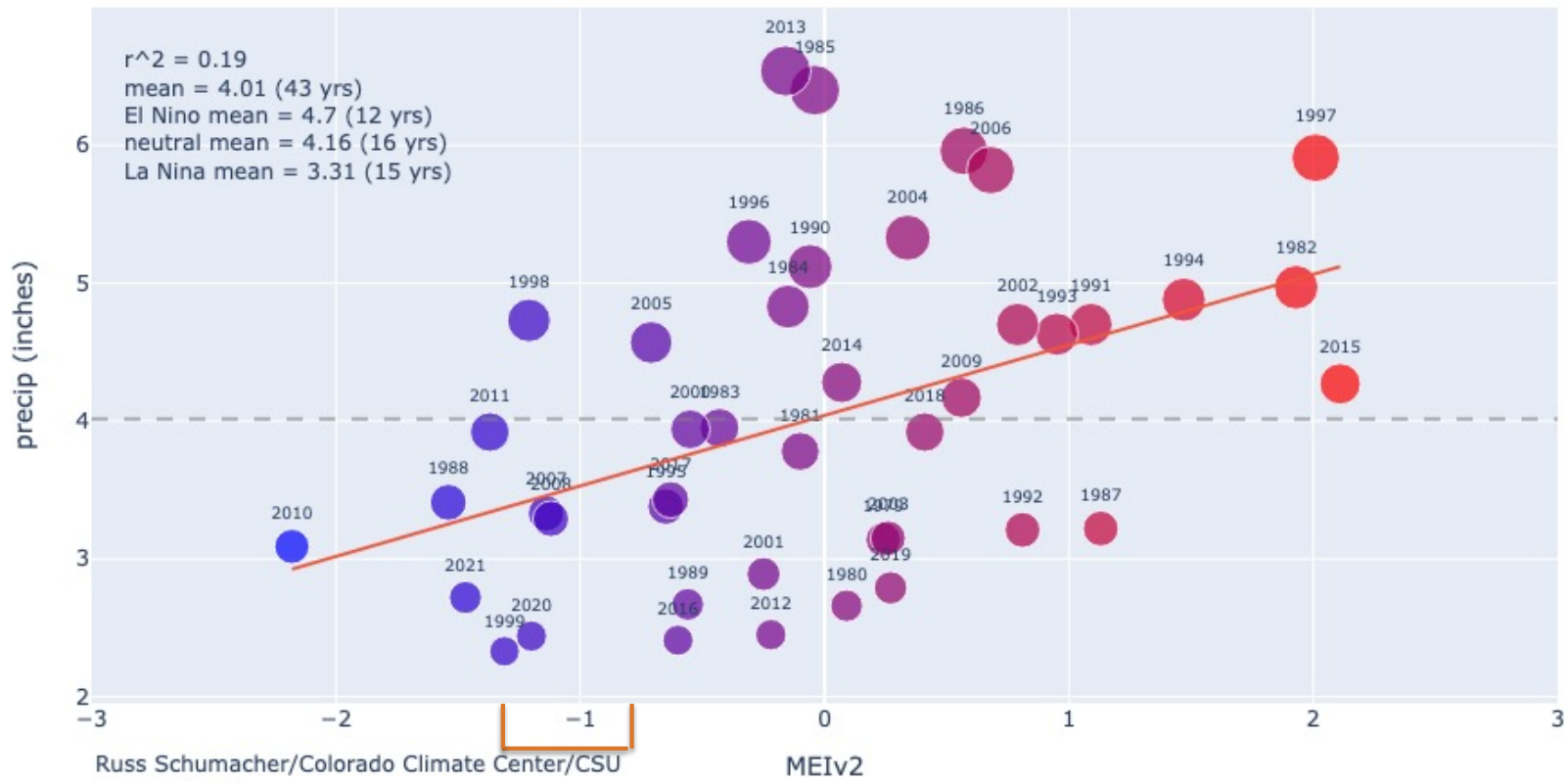
High confidence in persistence of La Niña through fall, weakening through winter



Correlation between ENSO ONI and Colorado Seasonal Precipitation (masked for significance at 95% confidence)



Colorado statewide average precipitation vs multivariate ENSO index, September - November



§ Fall ENSO probably in here

Takeaways

- July was a very warm month: 5th warmest overall, and warmest in terms of minimum temperatures
- An active monsoon has brought substantial drought improvement across southern Colorado and many mountain areas in the last two months
- Drought is persisting on the western slope, and in the northeast and southeast corners of the state
- The first half of August was hot; conditions have cooled and should remain fairly wet through the end of the month
- The “triple-dip” La Niña looks likely at least into fall – La Niña falls tend to be dry. A little too early to say on winter (new NOAA outlooks come out Thurs)



[http://climate.colostate.edu/
russ.schumacher@colostate.edu](http://climate.colostate.edu/russ.schumacher@colostate.edu)

Follow us on Facebook and Twitter!
@ColoradoClimate

Thank you!

Join our monthly webinars!
[https://climate.colostate.edu/webinar_
registration.html](https://climate.colostate.edu/webinar_registration.html)



ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY