

Colorado Climate Center – *WATF Climate Update*

Becky Bolinger, Assistant State Climatologist

Water Availability Task Force

June 24, 2021



ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY

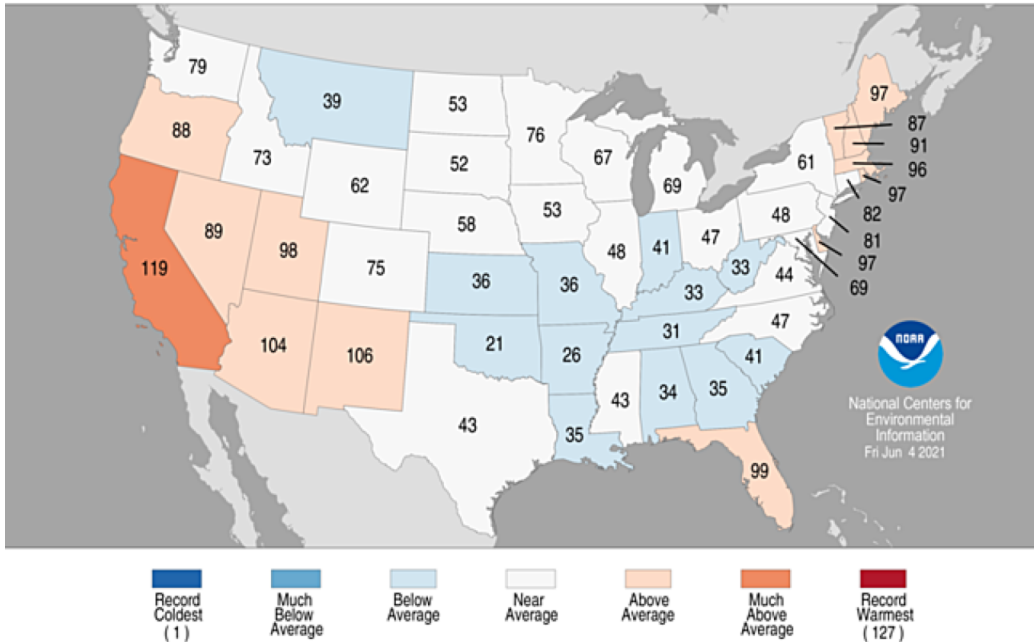
2021 Water Year To Date

temperature, precipitation,
evaporative demand



Statewide Average Temperature Ranks

May 2021
Period: 1895–2021



Month	T Rank (of 127 years)	Above, below, or near avg?
Oct	52 nd warmest	average
Nov	7 th warmest	much above
Dec	42 nd warmest	above
Jan	32 nd warmest	above
Feb	28 th coolest	below
Mar	46 th warmest	average
Apr	62 nd coolest	average
May	53 rd warmest	average
June		
July		
August		

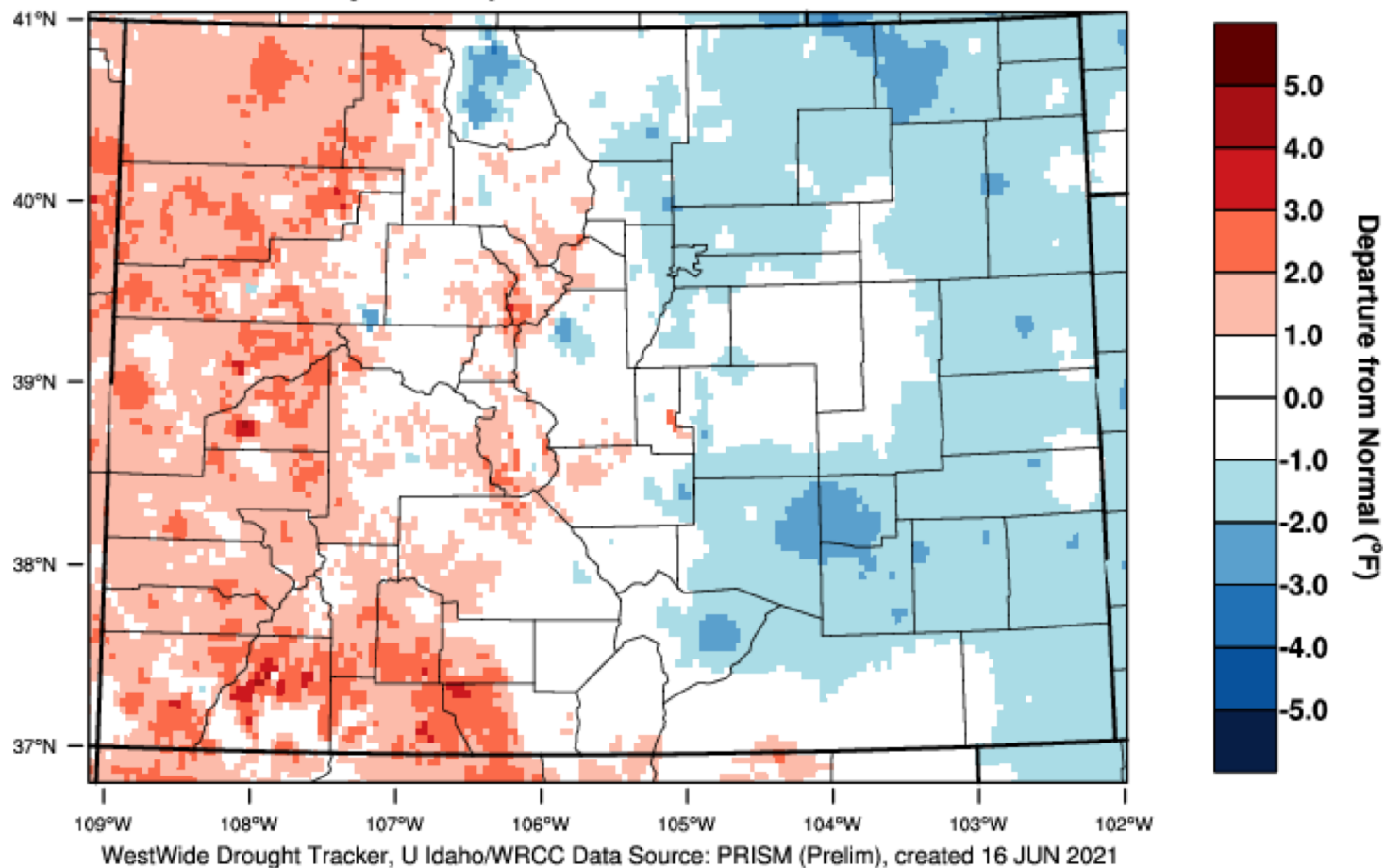
<https://www.ncdc.noaa.gov/cag>



Colorado - Mean Temperature

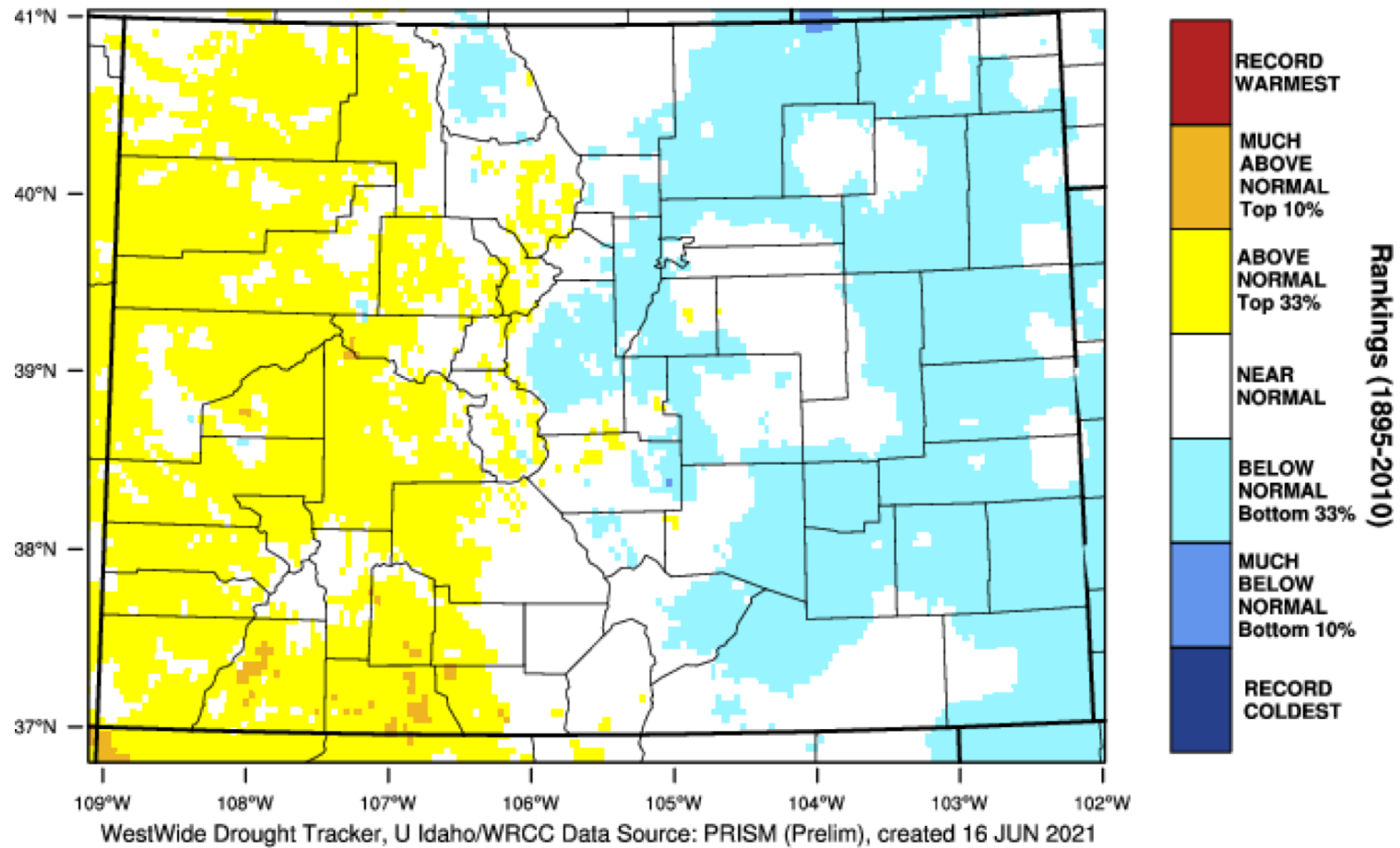
<https://wrcc.dri.edu/wwdt/index.php?region=co>

May 2021 Departure from 1981-2010 Normal



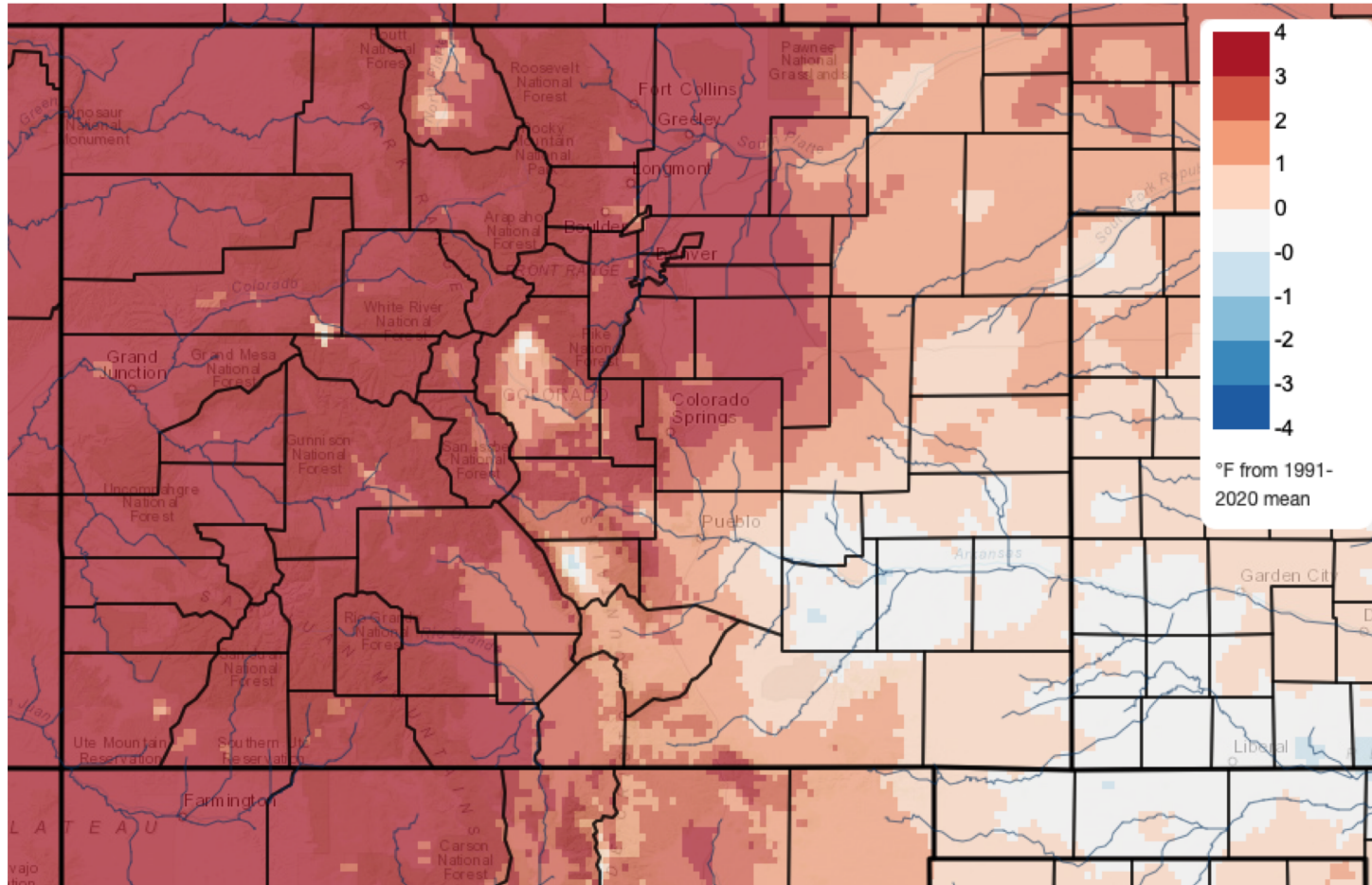
Colorado - Mean Temperature March-May 2021 Percentile

<https://wrcc.dri.edu/wwdt/index.php?region=co>



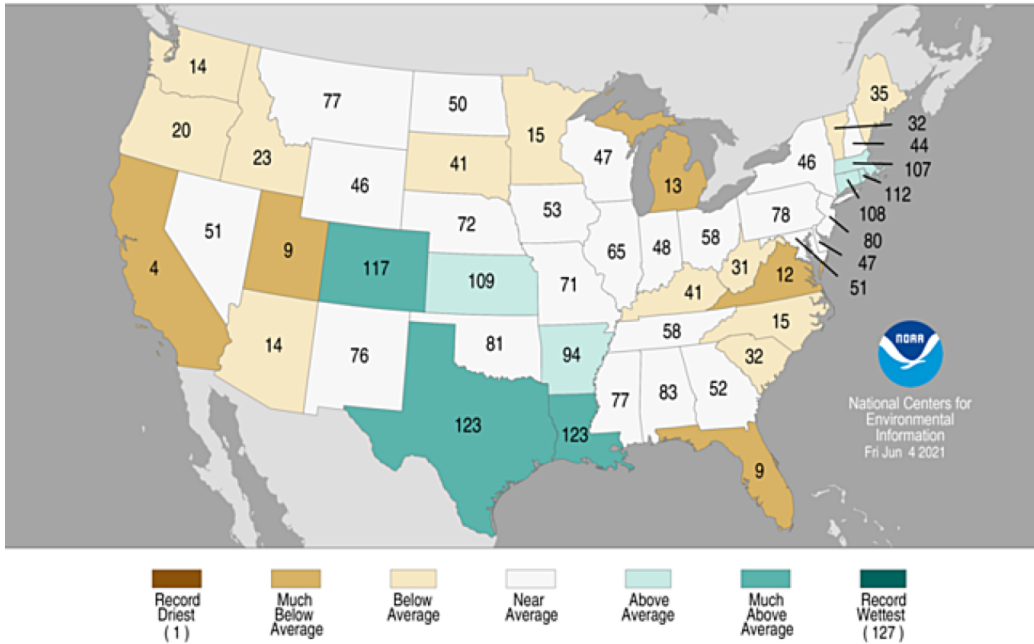
Mean Daily Temperature Anomaly, Last 30 Days

2021/05/24 - 2021/06/22



Statewide Precipitation Ranks

May 2021
Period: 1895–2021



Wettest May since 2015

<https://www.ncdc.noaa.gov/cag>

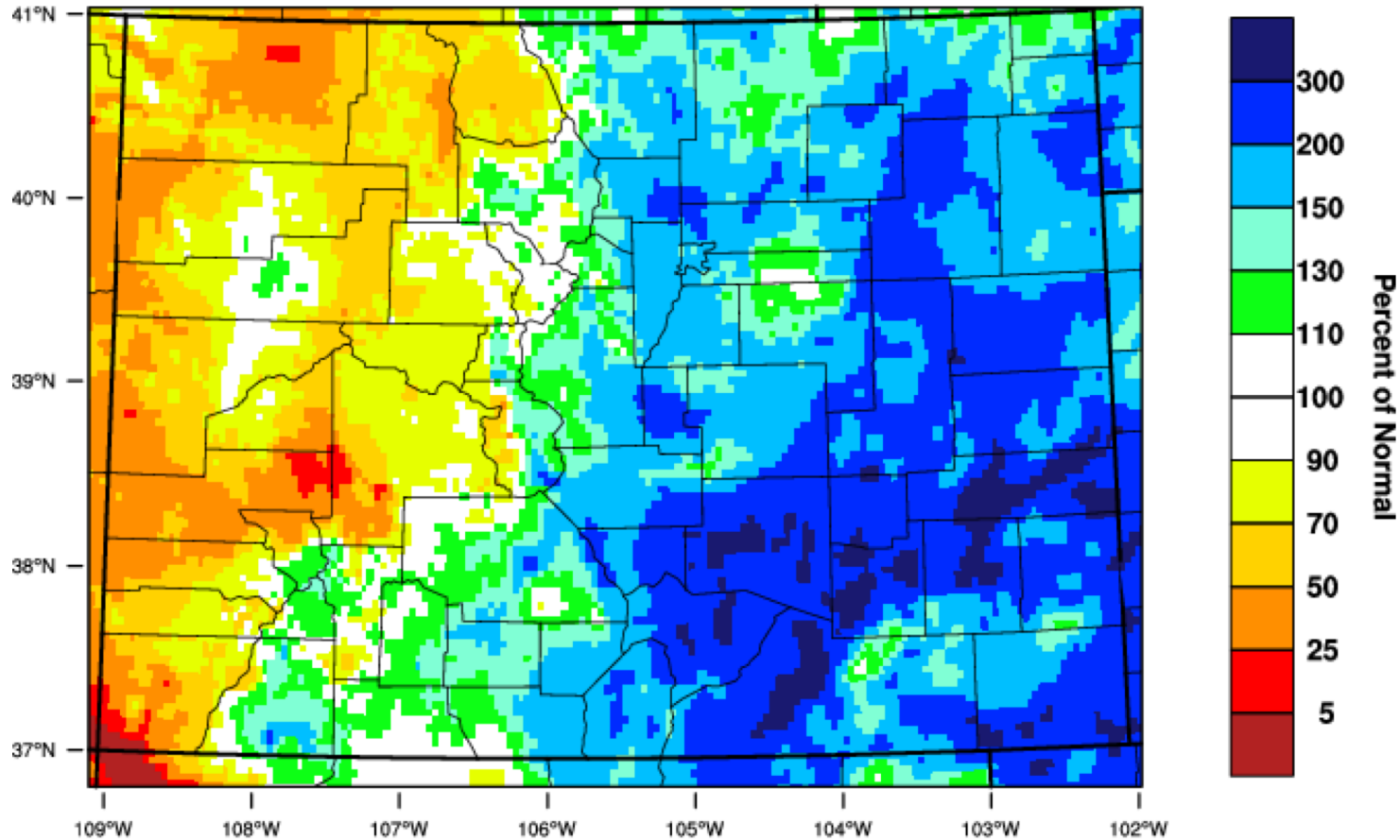
Month	P Rank (of 127 years)	Above, below, or near avg?
Oct	16 th driest	below
Nov	44 th driest	average
Dec	60 th driest	average
Jan	38 th driest	below
Feb	58 th wettest	average
Mar	20 th wettest	above
Apr	18 th driest	below
May	11 th wettest	much abv
June		
July		
August		



Colorado - Precipitation

<https://wrcc.dri.edu/wwdt/index.php?region=co>

May 2021 Percent of 1981-2010 Normal

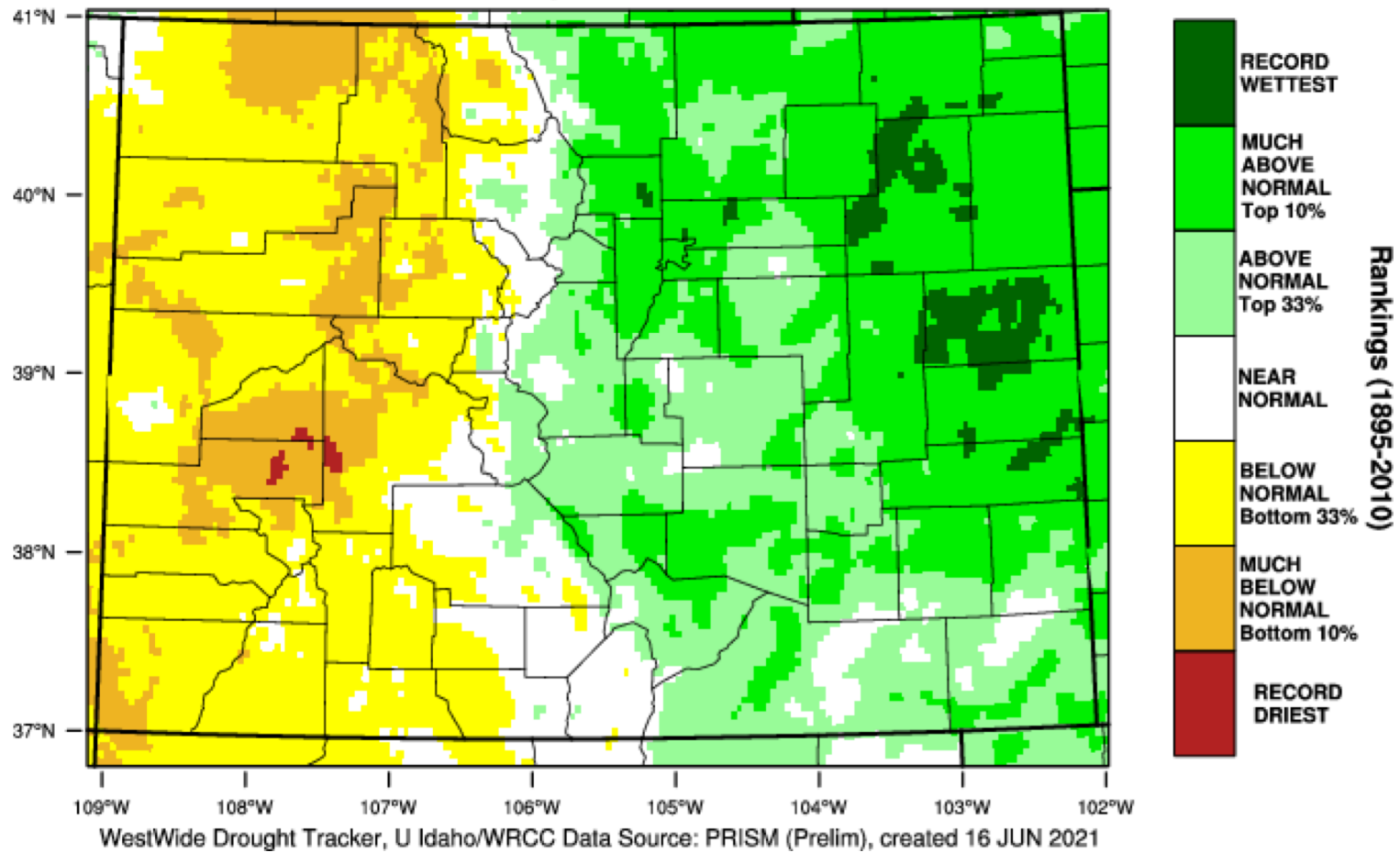


WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 JUN 2021

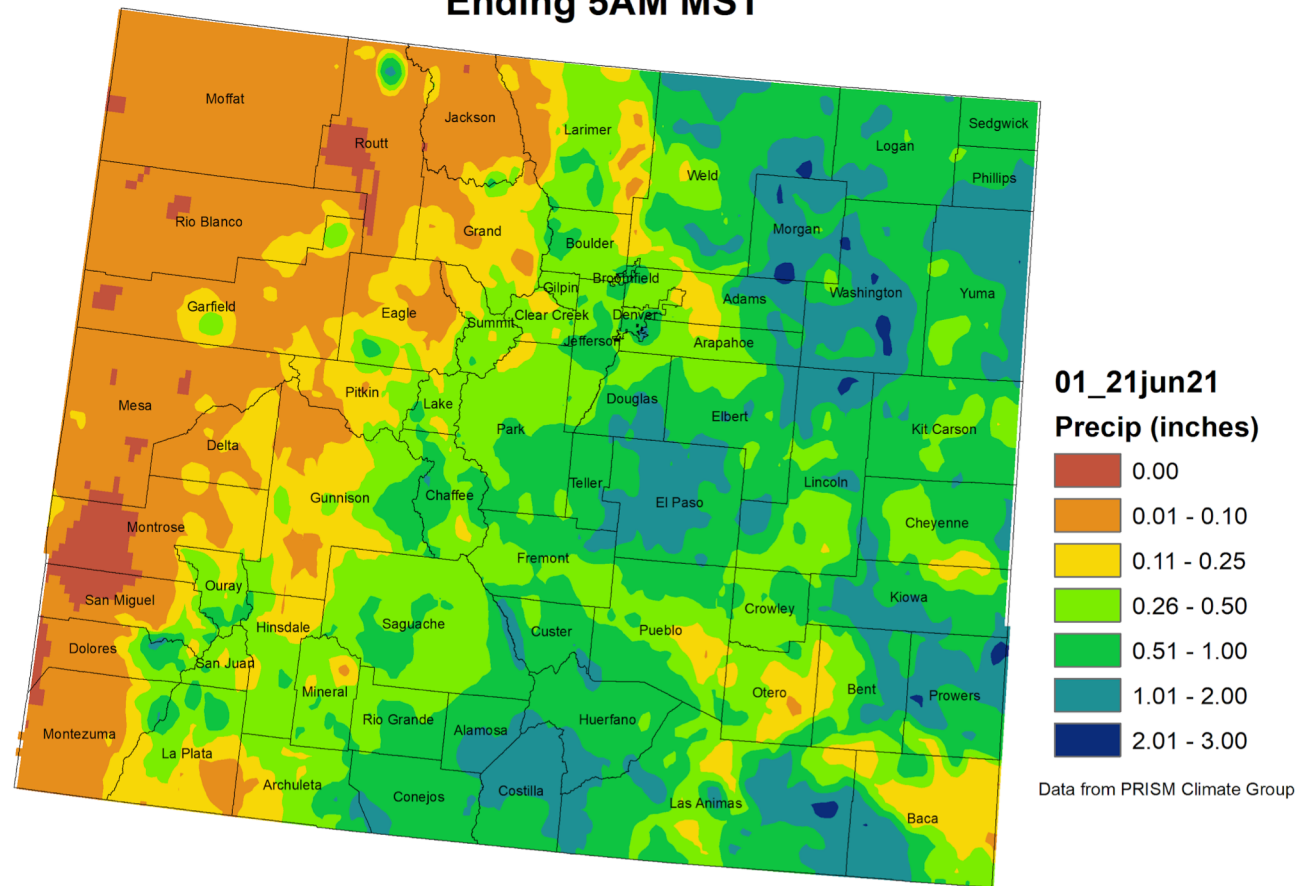


Colorado - Precipitation March-May 2021 Percentile

<https://wrcc.dri.edu/wwdt/index.php?region=co>

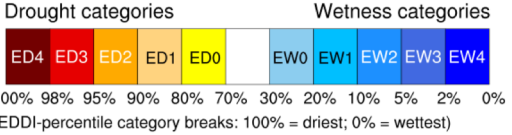
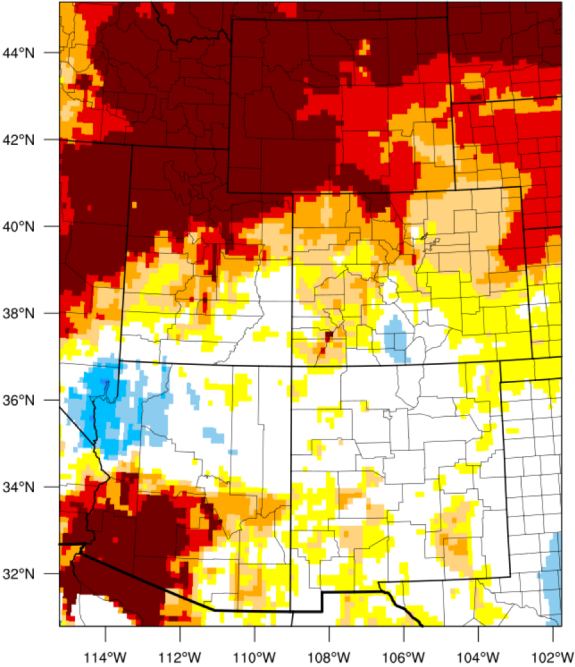


Colorado Month to Date Precipitation 1 - 21 June 2021 Ending 5AM MST



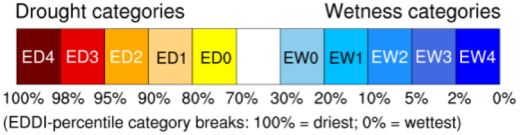
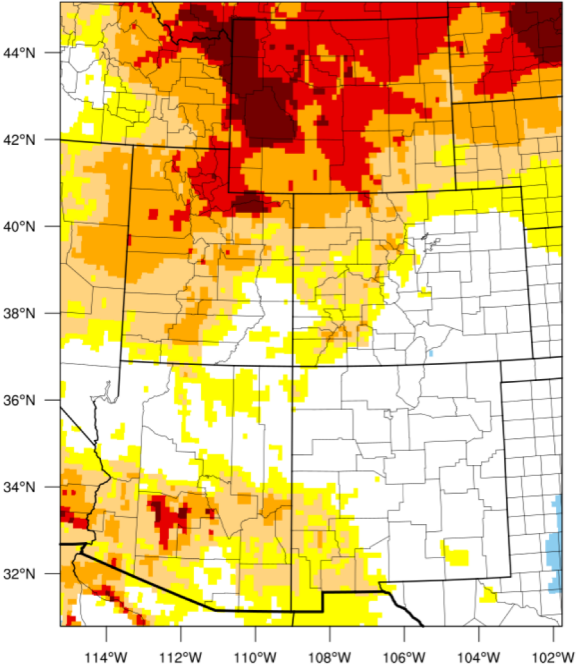
Evaporative Demand

1-week EDDI categories for June 19, 2021



Generated by NOAA/ESRL/Physical Sciences Laboratory

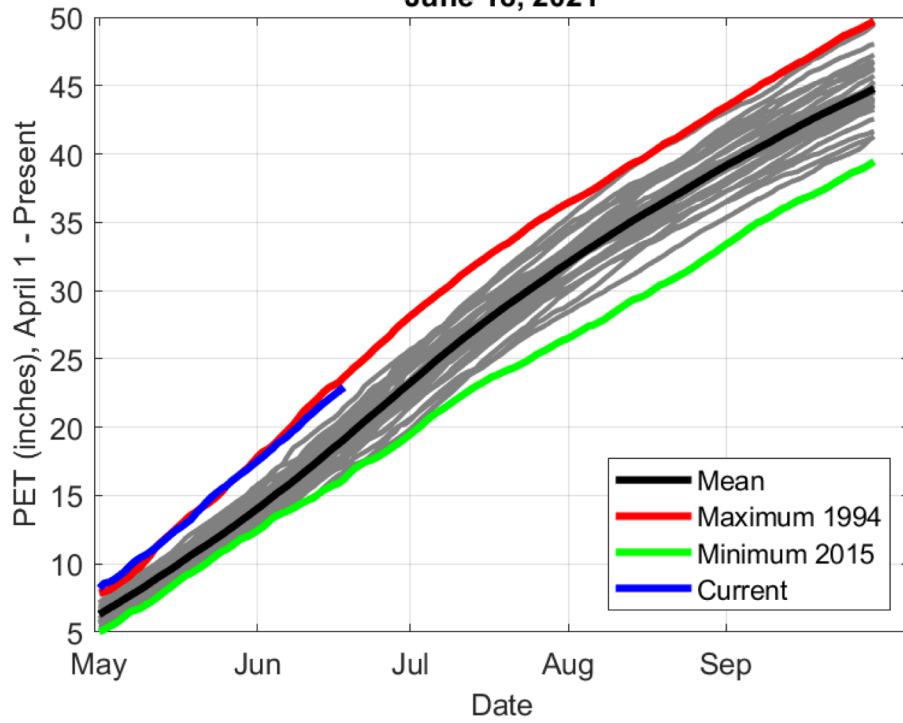
1-month EDDI categories for June 19, 2021



Generated by NOAA/ESRL/Physical Sciences Laboratory

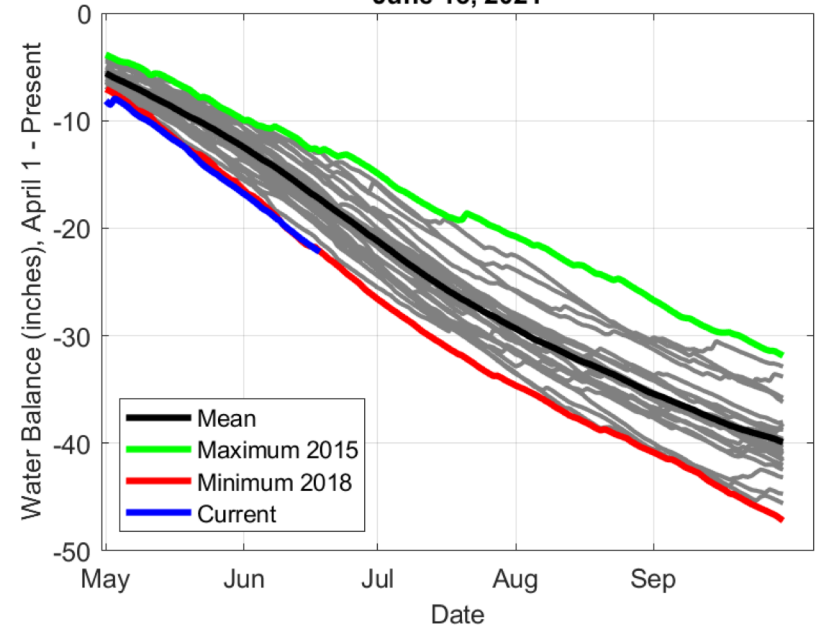
<https://psl.noaa.gov/eddi/>

**Olathe Growing Season Evaporative Demand
June 18, 2021**

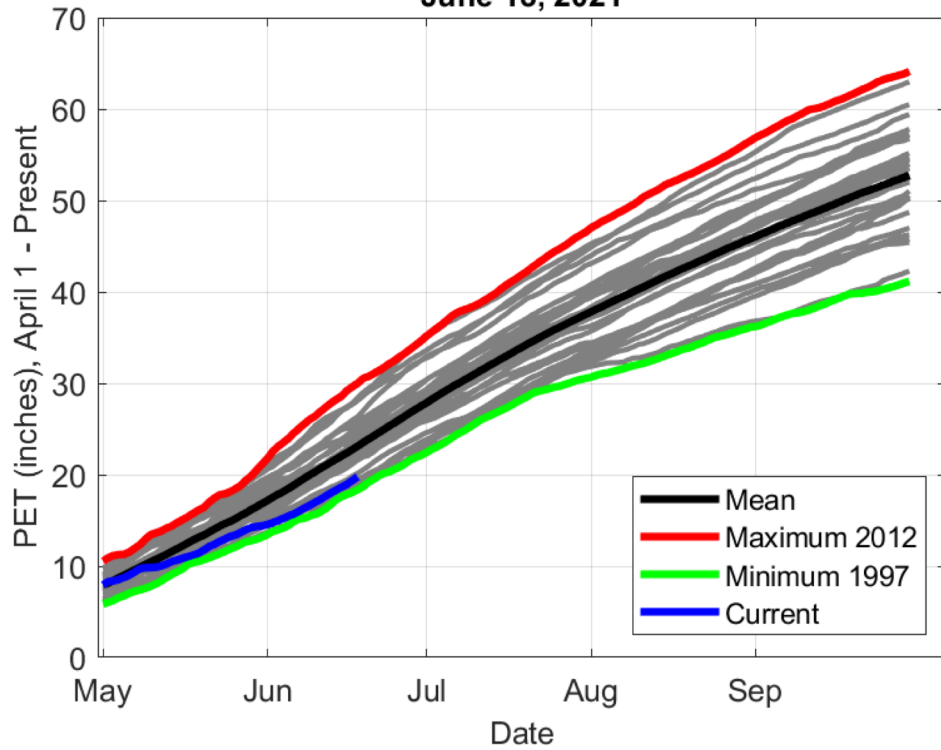


https://coagmet.colostate.edu/station/oth01_main.html

**Olathe Growing Season Water Balance
June 18, 2021**

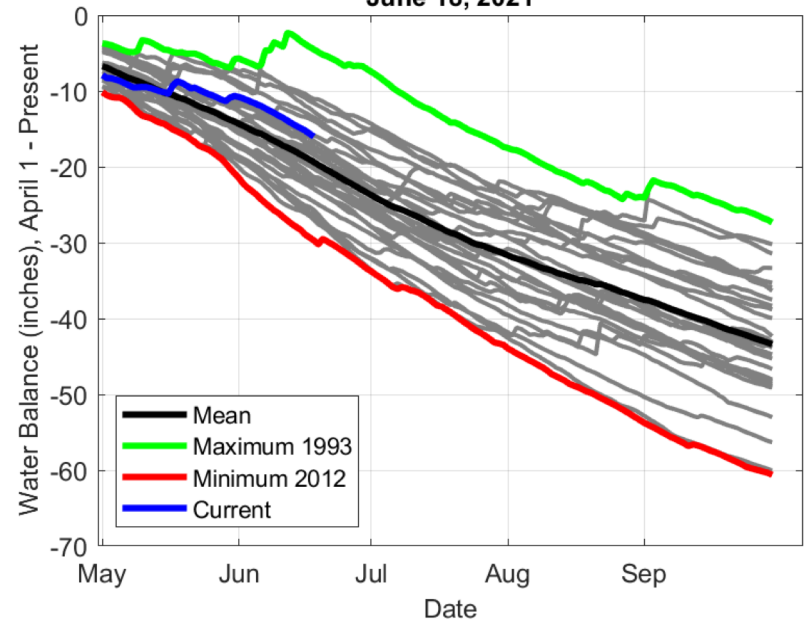


Avondale Growing Season Evaporative Demand June 18, 2021



https://coagmet.colostate.edu/station/avn01_main.html

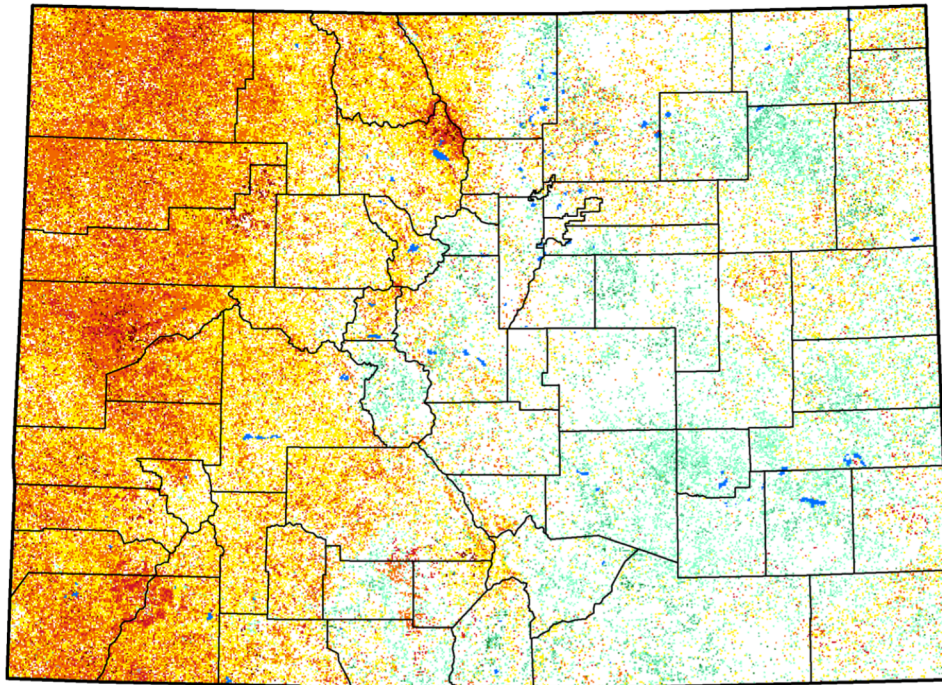
Avondale Growing Season Water Balance June 18, 2021



Vegetation Drought Response Index

Complete: Colorado

June 20, 2021



Vegetation Condition

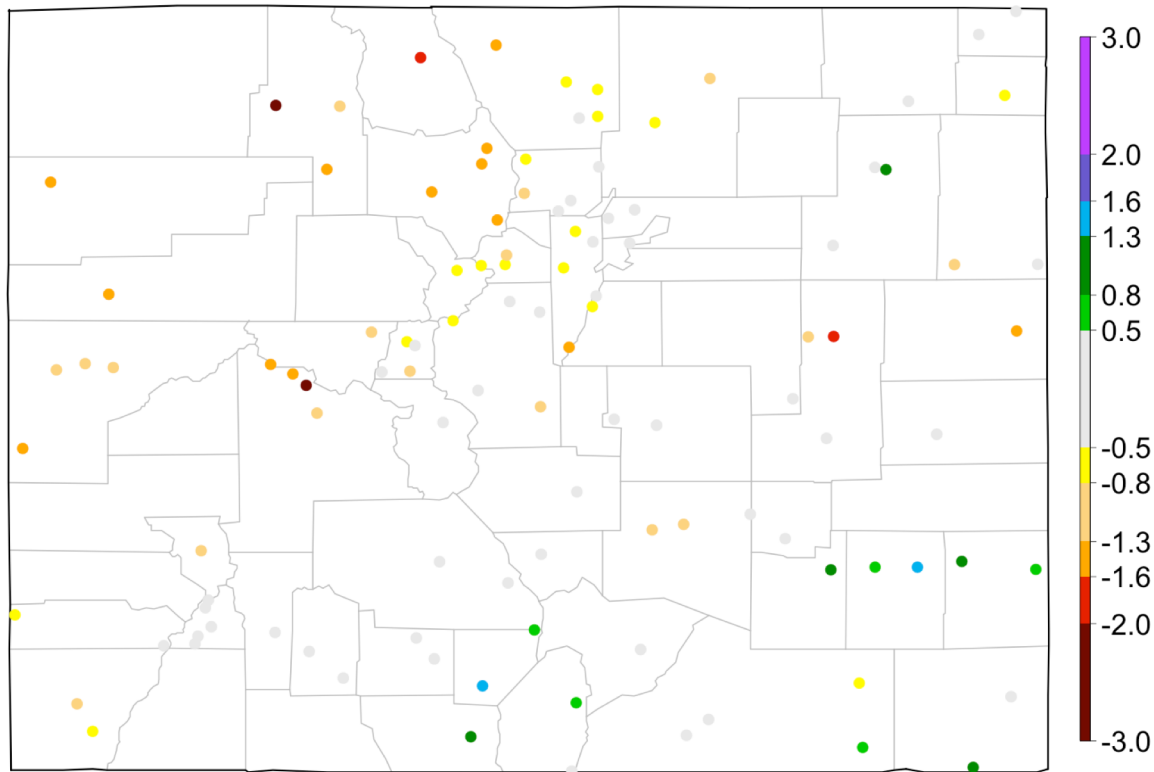
- Extreme Drought
- Severe Drought
- Moderate Drought
- Pre-drought stress
- Near Normal
- Unusually Moist
- Very Moist
- Extreme Moist
- Out of Season
- Water



<https://veg dri.unl.edu/Home/StateVegDRI.aspx?CO>



30-day SPI: 2021/05/23 - 2021/06/21

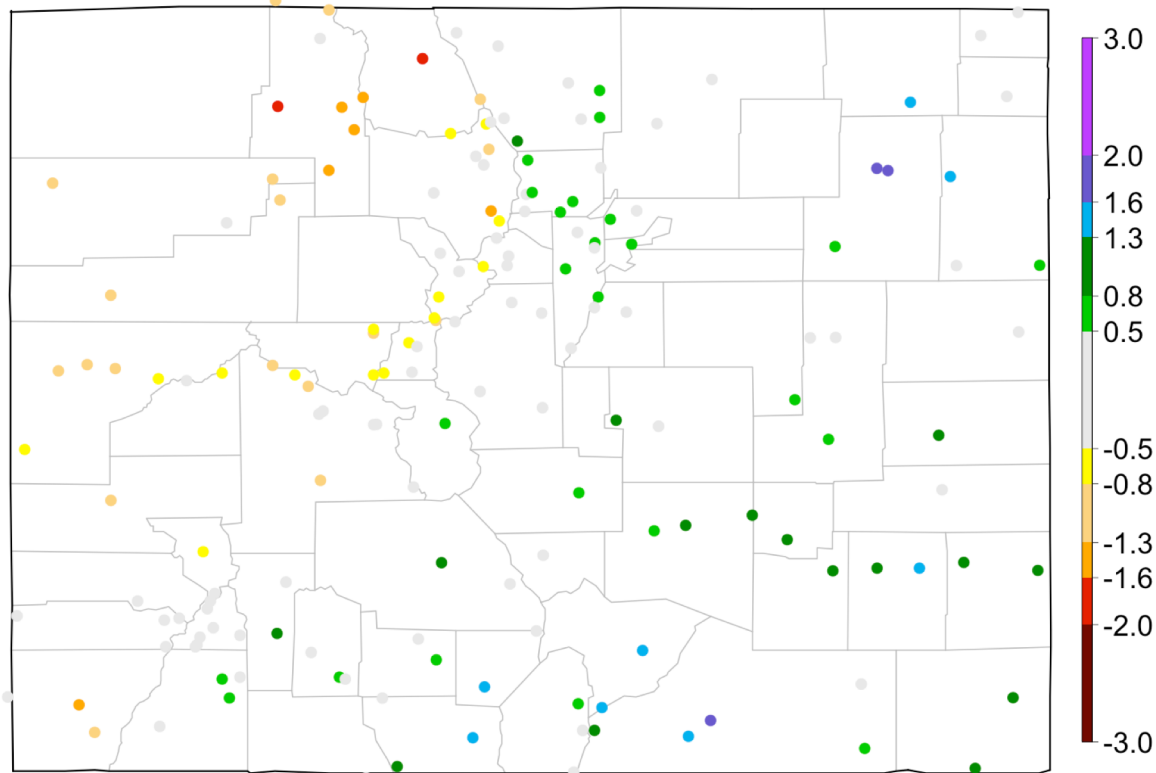


Data from High Plains Regional Climate Center and ACIS

<https://climate.colostate.edu/drought/>



60-day SPI: 2021/04/23 - 2021/06/21



Data from High Plains Regional Climate Center and ACIS

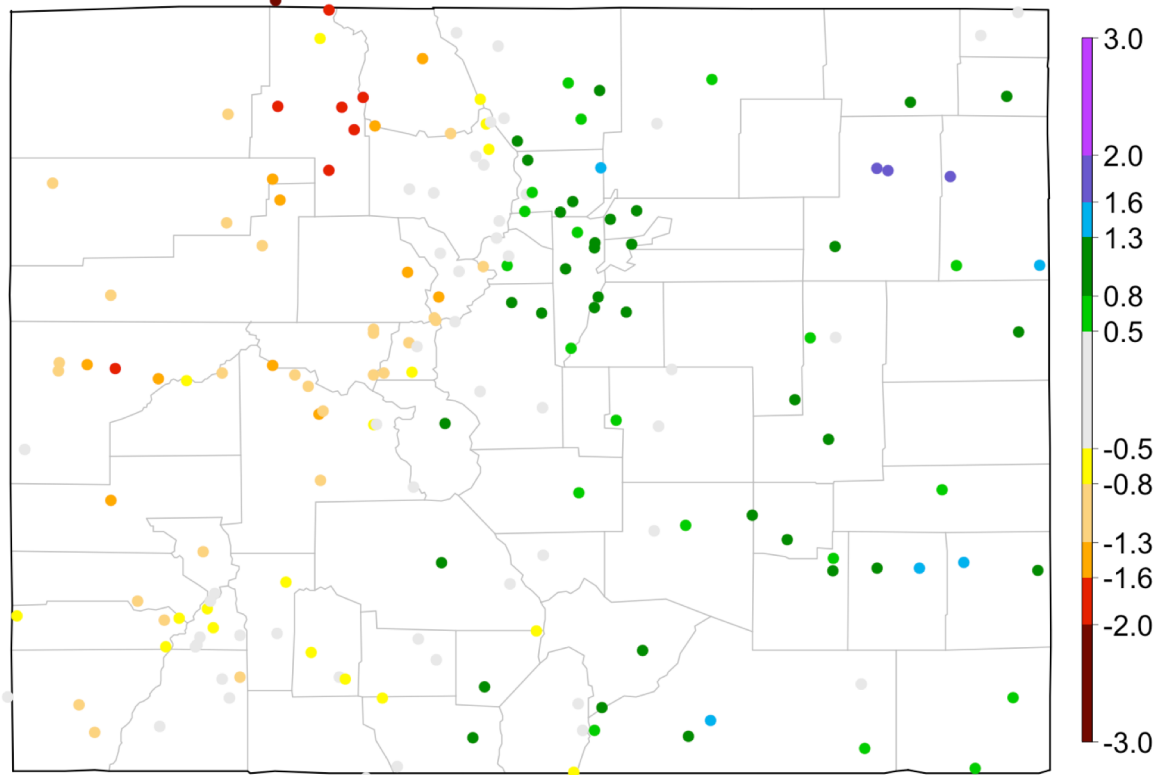
<https://climate.colostate.edu/drought/>



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120-day SPI: 2021/02/21 - 2021/06/21

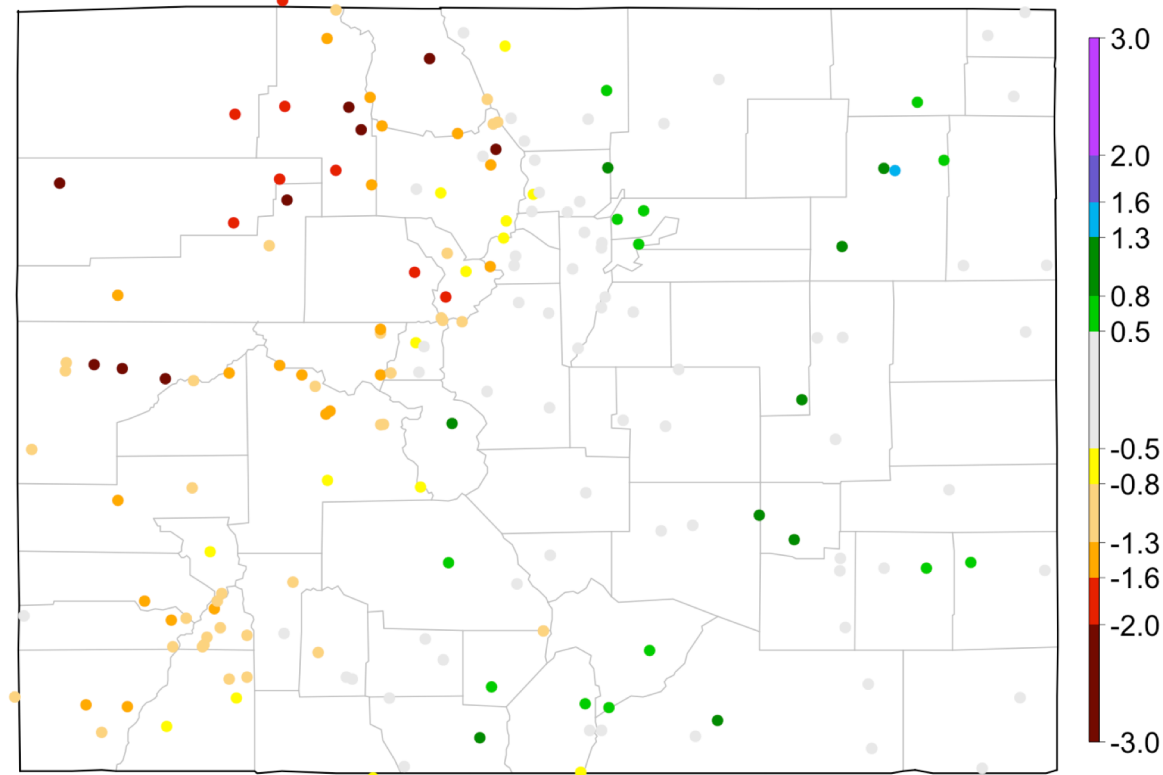


Data from High Plains Regional Climate Center and ACIS

<https://climate.colostate.edu/drought/>



9-month SPI: 2020/09/22 - 2021/06/21

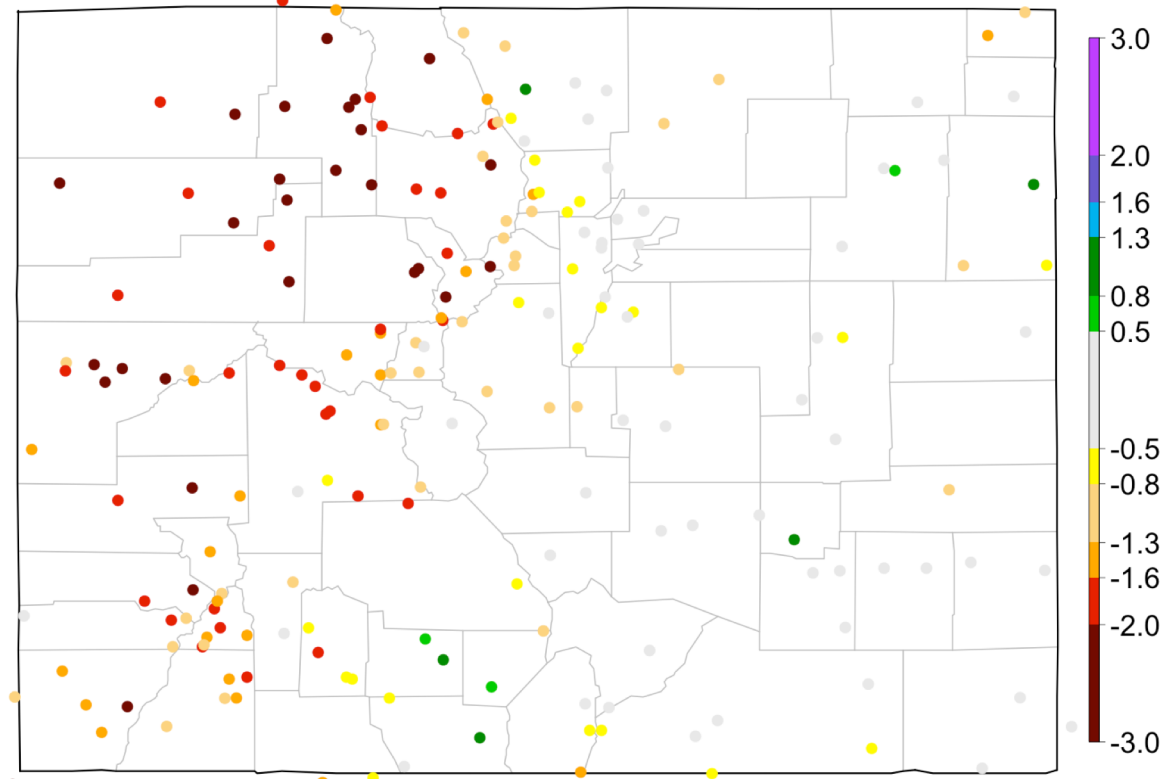


Data from High Plains Regional Climate Center and ACIS

<https://climate.colostate.edu/drought/>



12-month SPI: 2020/06/22 - 2021/06/21



Data from High Plains Regional Climate Center and ACIS

<https://climate.colostate.edu/drought/>



Drought

National Drought

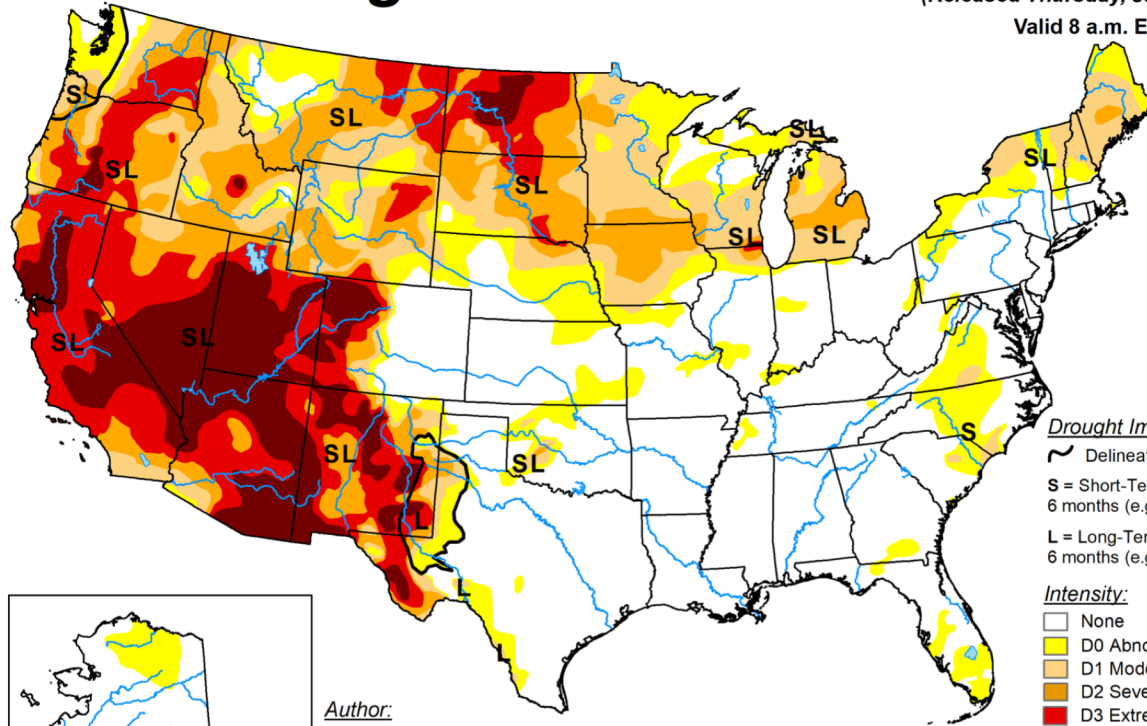
Colorado Drought

Colorado Drought Facts



U.S. Drought Monitor

June 22, 2021
 (Released Thursday, Jun. 24, 2021)
 Valid 8 a.m. EDT

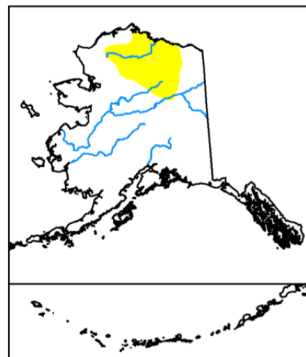


Drought Impact Types:

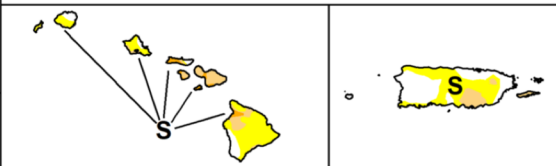
- ~ Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

Intensity:

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



Author:
 Curtis Riganti
 National Drought Mitigation Center



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

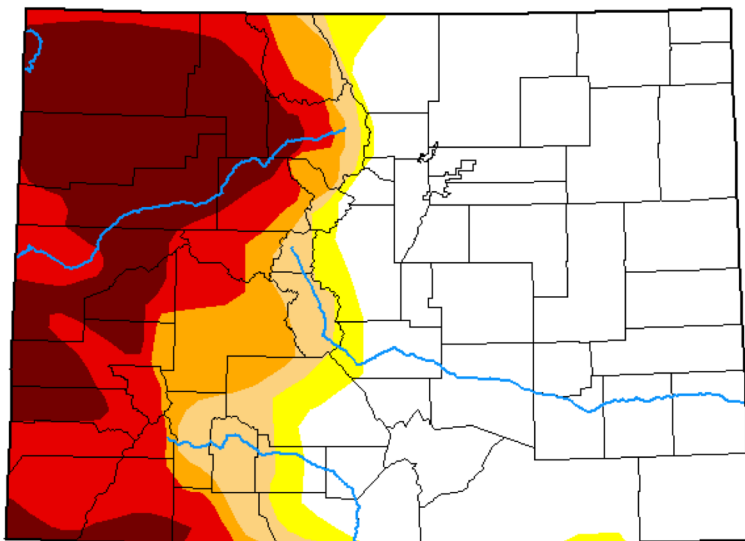


U.S. Drought Monitor Colorado

June 22, 2021

(Released Thursday, Jun. 24, 2021)

Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	54.41	45.59	41.62	36.37	30.35	17.73
Last Week 06-15-2021	54.98	45.02	41.42	35.54	29.86	17.53
3 Months Ago 03-23-2021	0.00	100.00	92.62	62.13	32.13	15.10
Start of Calendar Year 12-29-2020	0.00	100.00	100.00	93.73	76.17	27.60
Start of Water Year 09-29-2020	0.00	100.00	99.29	89.35	52.88	2.64
One Year Ago 06-23-2020	17.21	82.79	67.96	56.23	32.96	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:

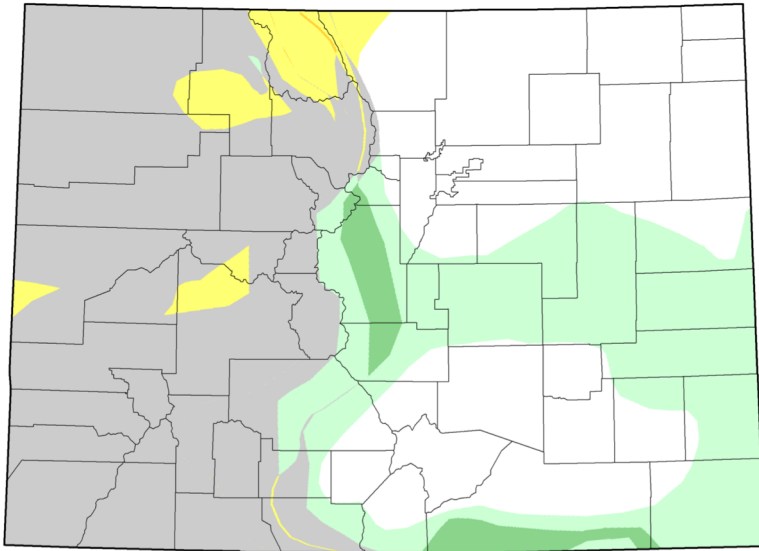
Curtis Riganti
National Drought Mitigation Center



droughtmonitor.unl.edu



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

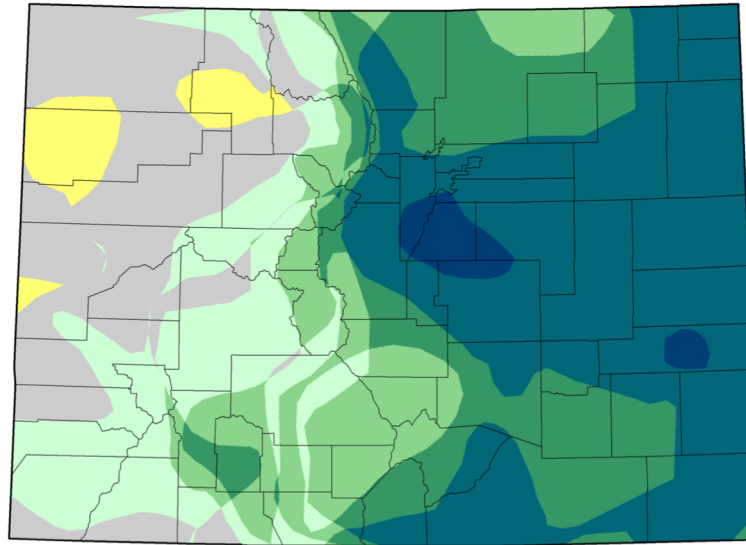


- 5 Class Degradation
- 4 Class Degradation
- 3 Class Degradation
- 2 Class Degradation
- 1 Class Degradation
- No Change
- 1 Class Improvement
- 2 Class Improvement
- 3 Class Improvement
- 4 Class Improvement
- 5 Class Improvement

June 22, 2021
compared to
May 25, 2021

droughtmonitor.unl.edu

U.S. Drought Monitor Class Change - Colorado
Start of Calendar Year



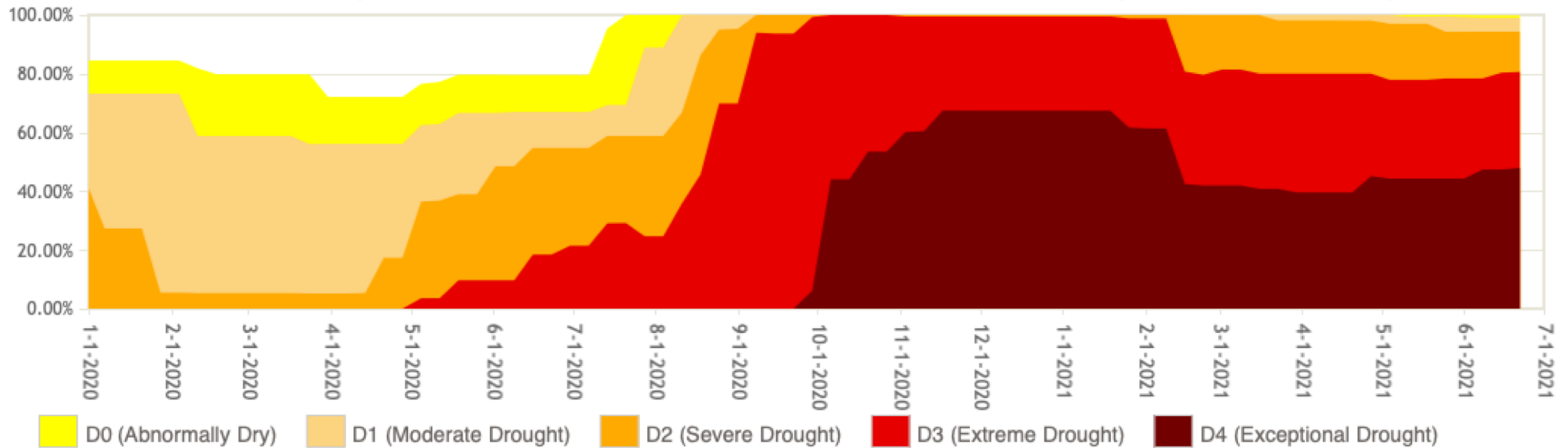
- 5 Class Degradation
- 4 Class Degradation
- 3 Class Degradation
- 2 Class Degradation
- 1 Class Degradation
- No Change
- 1 Class Improvement
- 2 Class Improvement
- 3 Class Improvement
- 4 Class Improvement
- 5 Class Improvement

June 22, 2021
compared to
December 29, 2020

droughtmonitor.unl.edu



Colorado Drainage Basin, CO (0502) Percent Area in U.S. Drought Monitor Categories



D4 entered western CO on September 29, 2021. There have now been 38 consecutive weeks with D4 drought in western CO.

80% of western CO is in D3/D4



Outlook

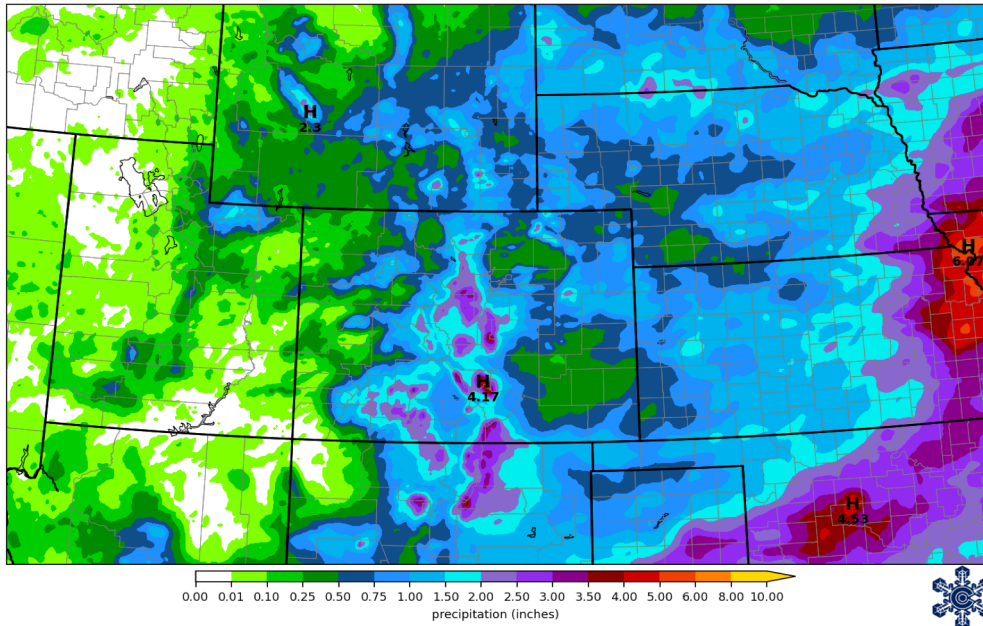
- Next 7 days
- 8-14 day Outlook
- CPC Outlooks
- ENSO Neutral
- Monsoon???



NOAA 7-day precip forecast

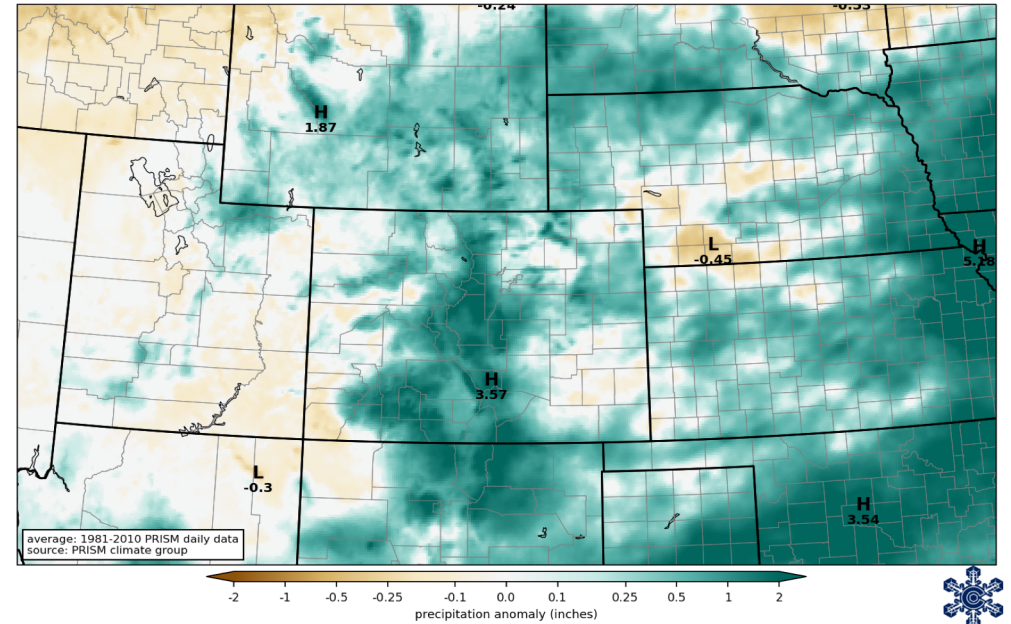
NOAA Weather Prediction Center
7-day precipitation forecast

forecast issued 1200 UTC Thu 24 Jun 2021
precipitation in 168 hrs ending 1200 UTC Thu 01 Jul 2021



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

forecast issued 1200 UTC Thu 24 Jun 2021
precipitation in 168 hrs ending 1200 UTC Thu 01 Jul 2021

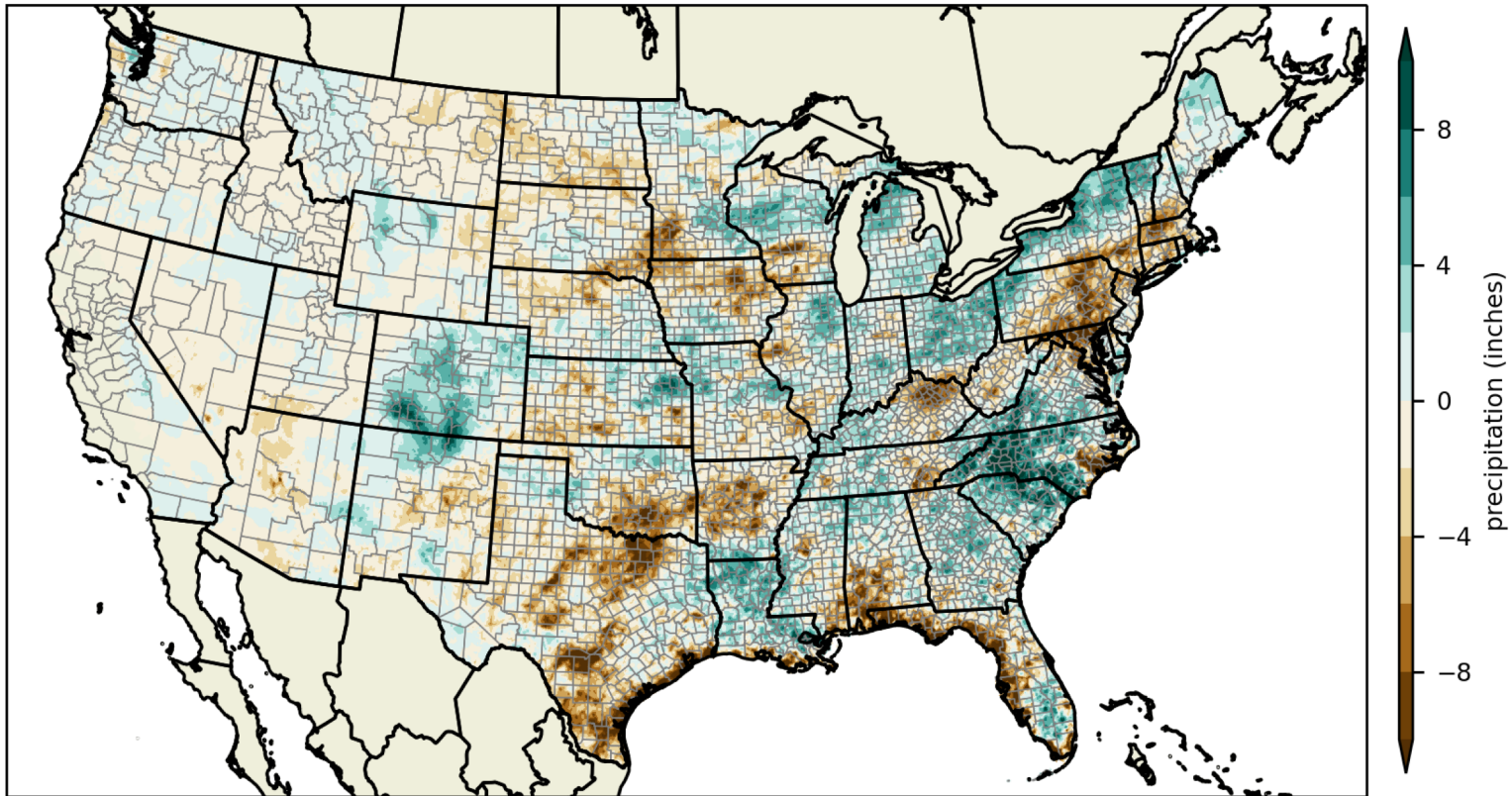


<http://schumacher.atmos.colostate.edu/weather/>

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7-day QPF minus PRISM analysis, 2018 JAS

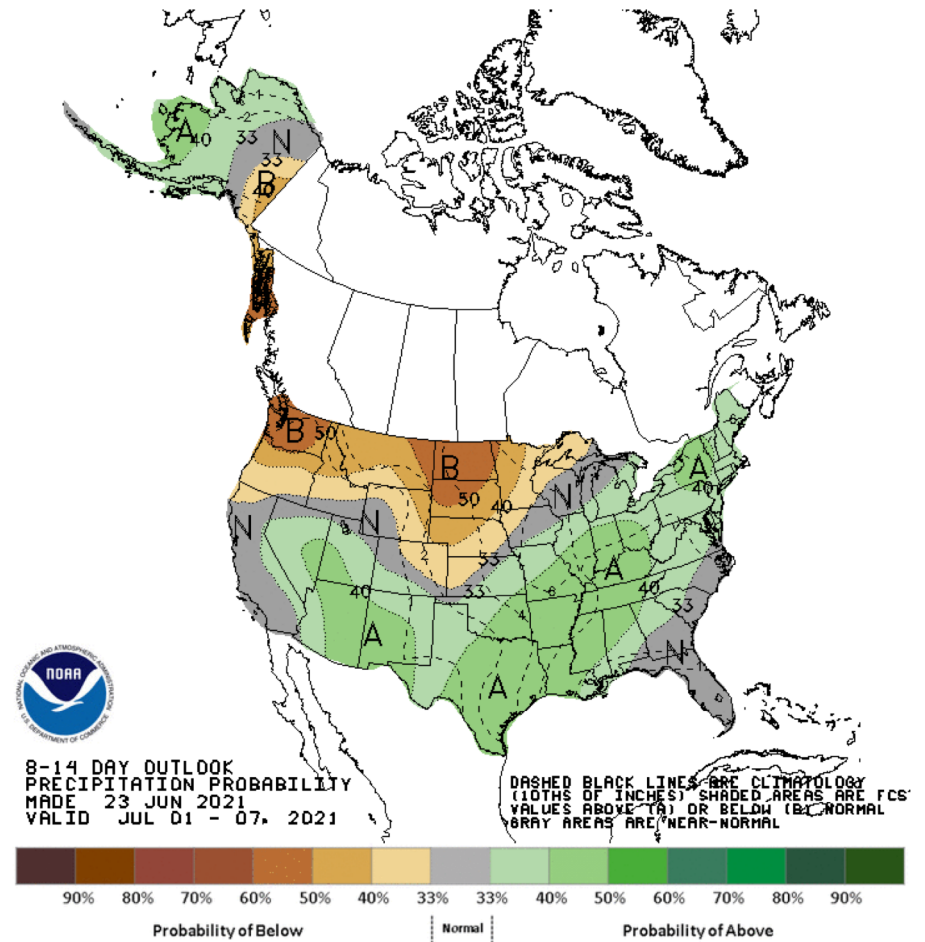
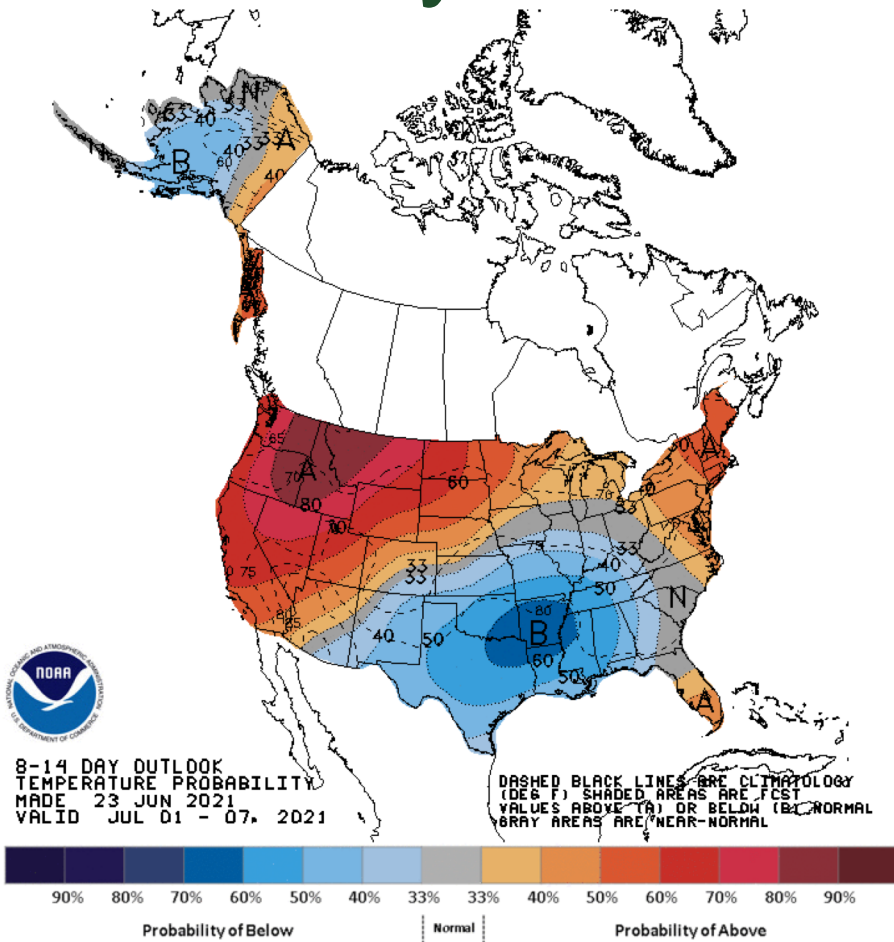


Does the 7-day QPF consistently over-predict precipitation in the summer?
Graphic by Abby Thornton, summer REU intern



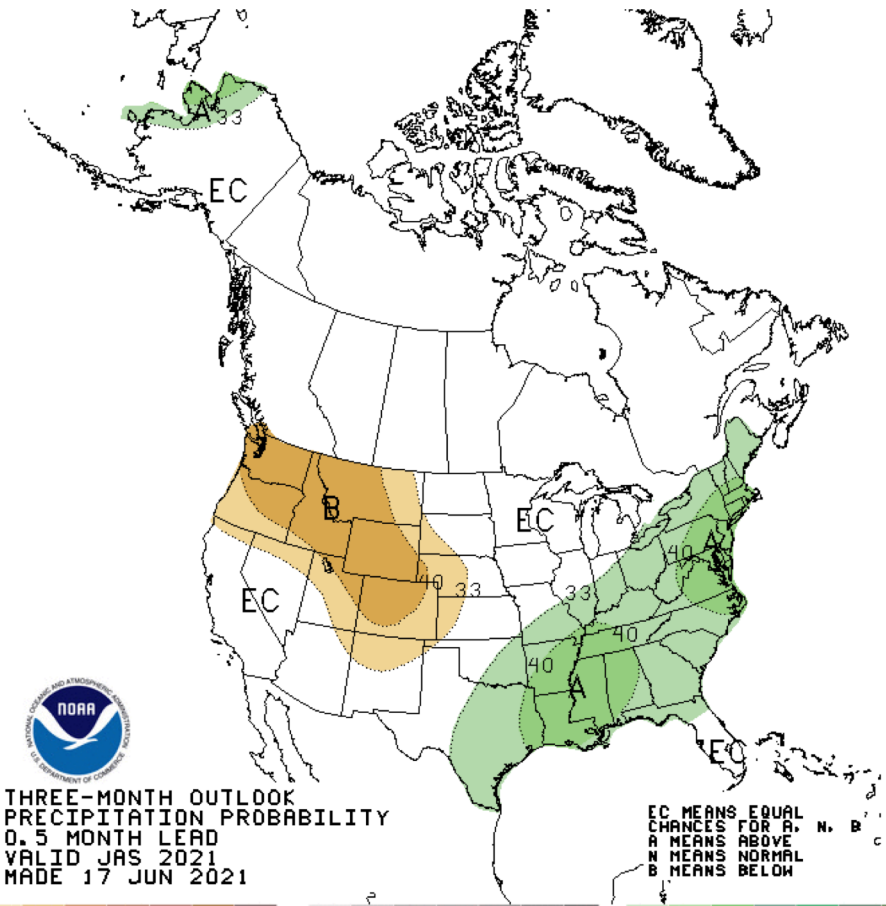
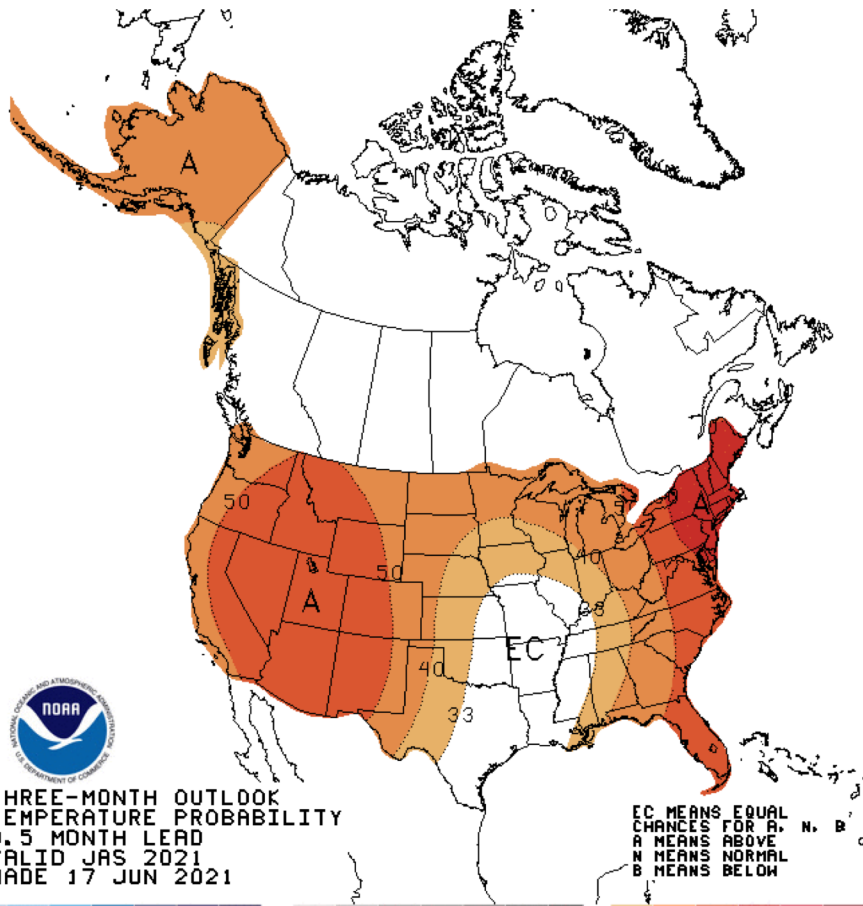
8-14 day outlook

<https://www.cpc.ncep.noaa.gov>



Seasonal outlook

<https://www.cpc.ncep.noaa.gov>



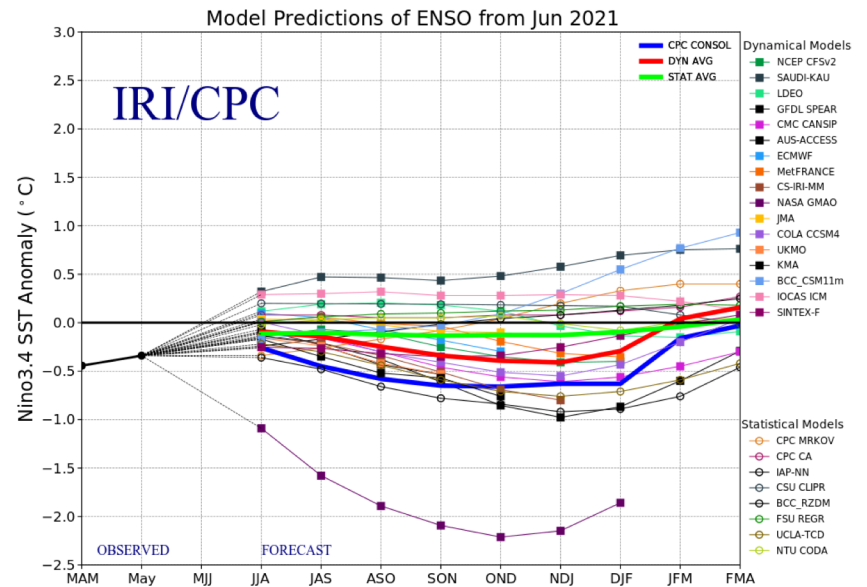
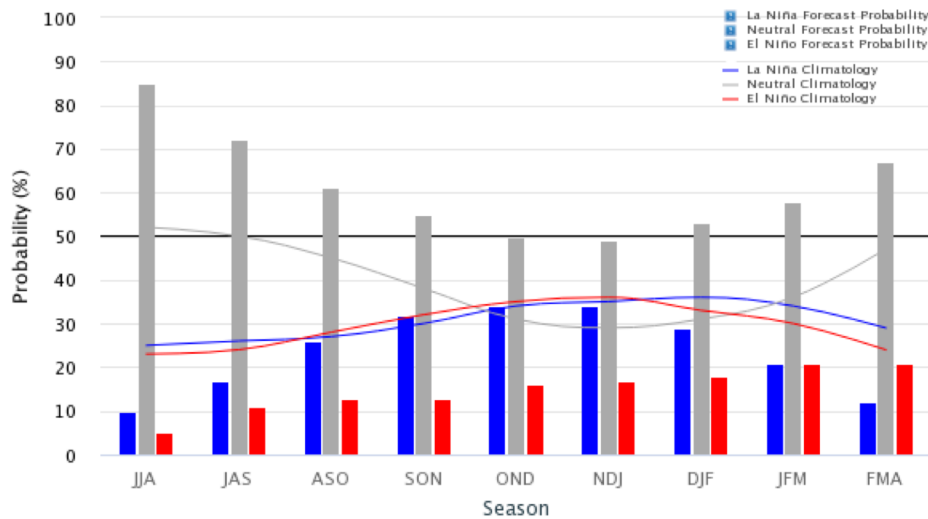
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What's the El Niño forecast?

Mid-June 2021 IRI/CPC Model-Based Probabilistic ENSO Forecasts

ENSO state based on NINO3.4 SST Anomaly
Neutral ENSO: $-0.5\text{ }^{\circ}\text{C}$ to $0.5\text{ }^{\circ}\text{C}$



In mid-June, SSTs in the east-central Pacific are roughly $0.0\text{ }^{\circ}\text{C}$ different from average, and the evolution of most key atmospheric variables are consistent with ENSO-neutral conditions. A large majority of the model forecasts predict SSTs to remain near-normal through boreal summer. Similar to the new official CPC/IRI outlook issued earlier this month this objective outlook calls for ENSO-neutral to persist through at least Aug-Sep-Oct, with greater uncertainty later in the year.

<https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/>

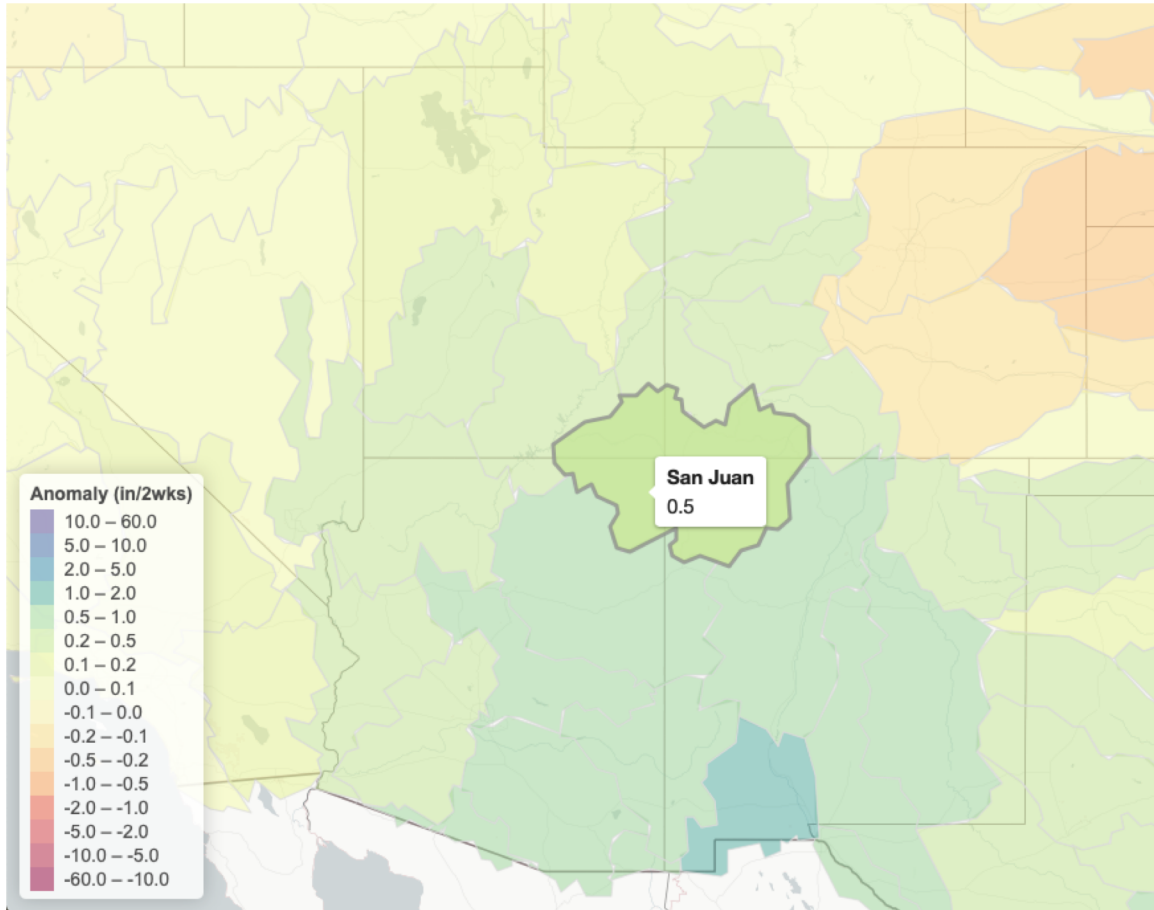


Will we have another “non”-soon?

“Given recent FCH persistence during the past 15 years or so (polar regions are warming at a faster rate than the tropics, weakening the westerlies/polar jet stream) due to climate change, near average precipitation during July, August and September is getting harder to come by in NM.”

<https://www.weather.gov/media/abq/Briefings/2021MonsoonOutlook.pdf>

<https://hydro.rap.ucar.edu/s2s/>



Some models are indicating onset of monsoon moisture in the next couple of weeks.

CFSv2 showing above average moisture out to the 3-4 week time period for the Four Corners region.

The NMME is less confident - some show drier than average for July, some wetter. Ensemble mean is trending towards near average July precipitation.



Summary points

- Continental Divide is the literal divide between cooler and wetter conditions to the east and drier and warmer to the west.
- Evaporative demand is kicking up. This, combined with drought in the west, is resulting in increased fire activity. This will be a continuing concern as summer progresses.
- Many indicators are calling for an increased chance of warmer and drier than average conditions across the state for the rest of the summer.
- Predictive skill for monsoon onset right now is lower. Some models are showing onset is imminent, but some models do indicate drier than average conditions in July. Recent history tells us that the monsoon is not as stable or consistent and it may be harder to get that near average moisture from year-to-year.



To view this and other presentations:
http://climate.colostate.edu/ccc_archive.html

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Thank you!



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