

# Colorado Climate Center – *WATF Climate Update*

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Becky Bolinger, Assistant State Climatologist

Water Availability Task Force

September 23, 2021



ATMOSPHERIC SCIENCE  
COLORADO STATE UNIVERSITY



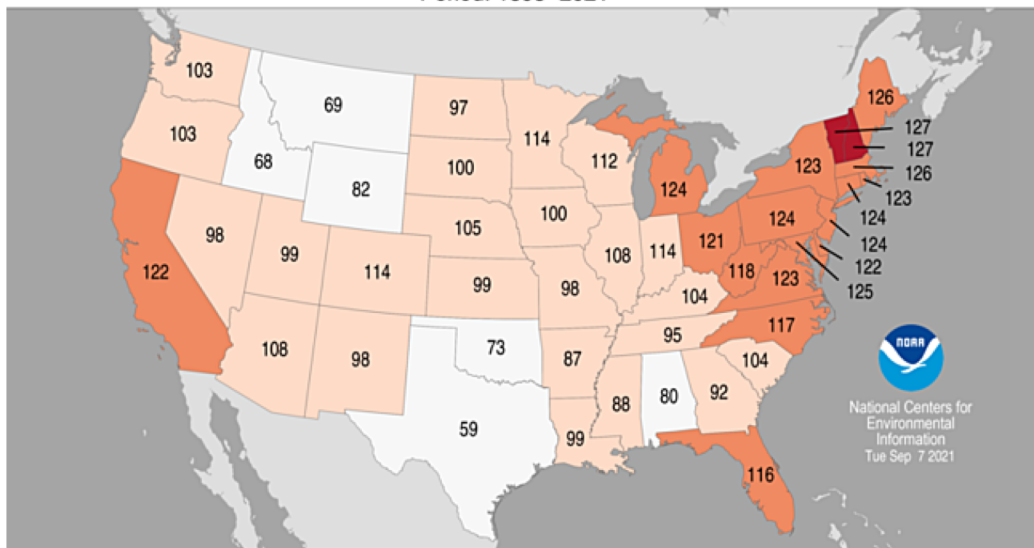
## 2021 Water Year To Date

temperature, precipitation,  
evaporative demand



## Statewide Average Temperature Ranks

August 2021  
Period: 1895–2021



Summer 2021 was Colorado's 4th warmest in the 127 year record, and second warmest for minimum temperatures.

Month	T Rank (of 127 years)	Above, below, or near avg?
Oct	52nd warmest	average
Nov	7 <sup>th</sup> warmest	much above
Dec	42nd warmest	above
Jan	32nd warmest	above
Feb	26th coolest	below
Mar	46th warmest	average
Apr	62nd coolest	average
May	50th warmest	average
Jun	6 <sup>th</sup> warmest	much above
Jul	11 <sup>th</sup> warmest	much above
Aug	14 <sup>th</sup> warmest	much above
Sep		

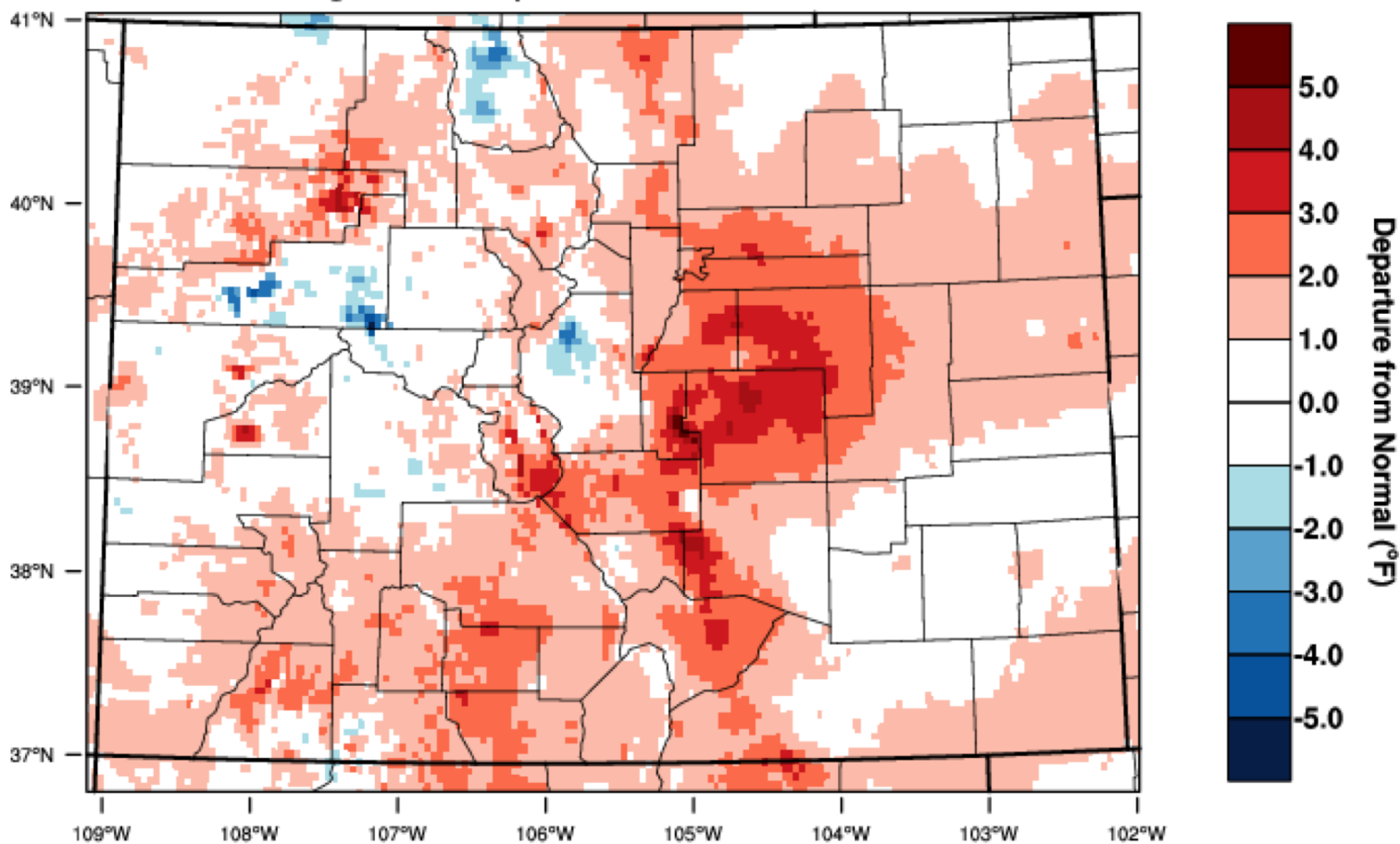
<https://www.ncdc.noaa.gov/cag>



# Colorado - Mean Temperature

## August 2021 Departure from 1981-2010 Normal

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

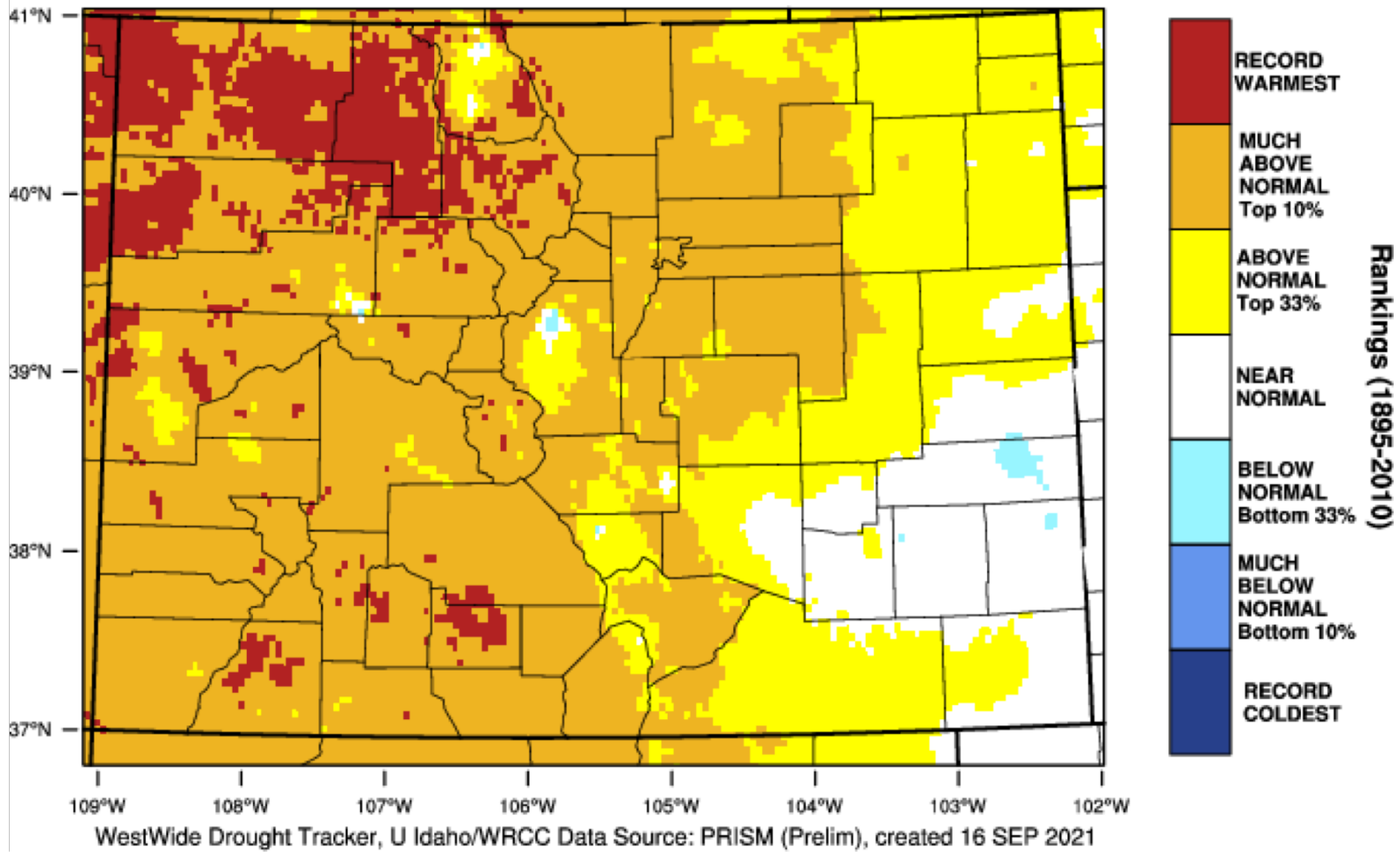


WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 SEP 2021

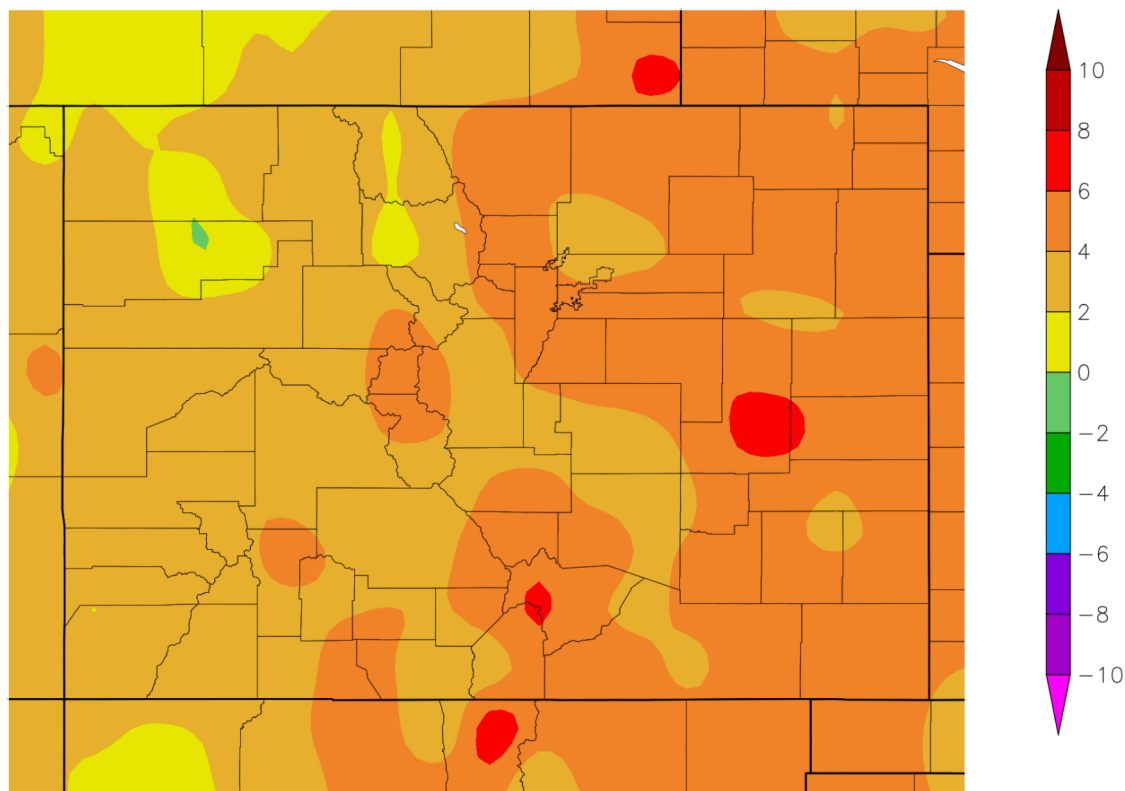


# Colorado - Mean Temperature June-August 2021 Percentile

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



# Departure from Normal Temperature (F) 9/1/2021 - 9/21/2021



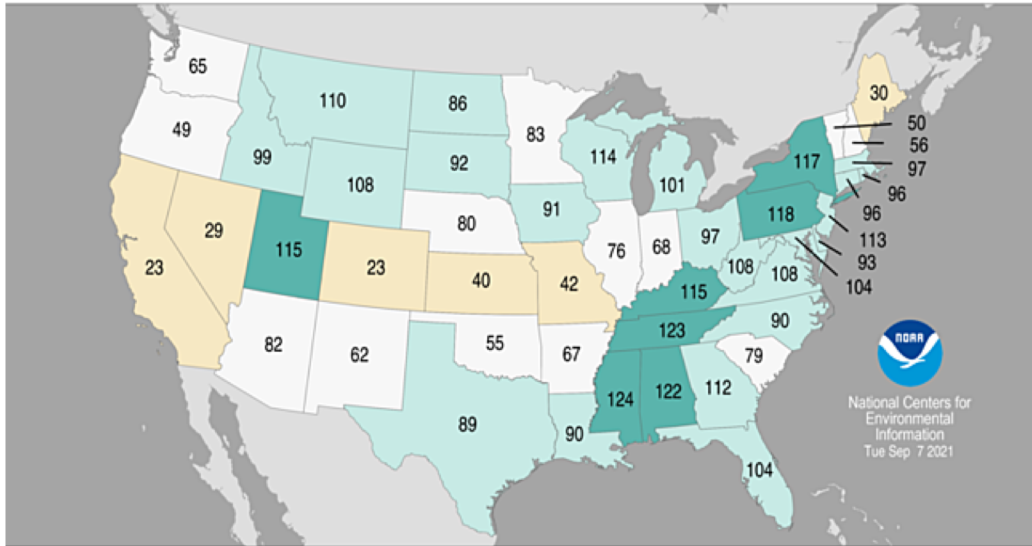
Generated 9/22/2021 at HPRCC using provisional data.

NOAA Regional Climate Centers



## Statewide Precipitation Ranks

August 2021  
Period: 1895–2021



Month	P Rank (of 127 years)	Above, below, or near avg?
Oct	16th driest	below
Nov	44th driest	average
Dec	59th driest	average
Jan	38th driest	below
Feb	58th wettest	average
Mar	20th wettest	above
Apr	18th driest	below
May	11th wettest	much above
Jun	44th driest	average
Jul	66th driest	average
Aug	23rd driest	below
Sep		

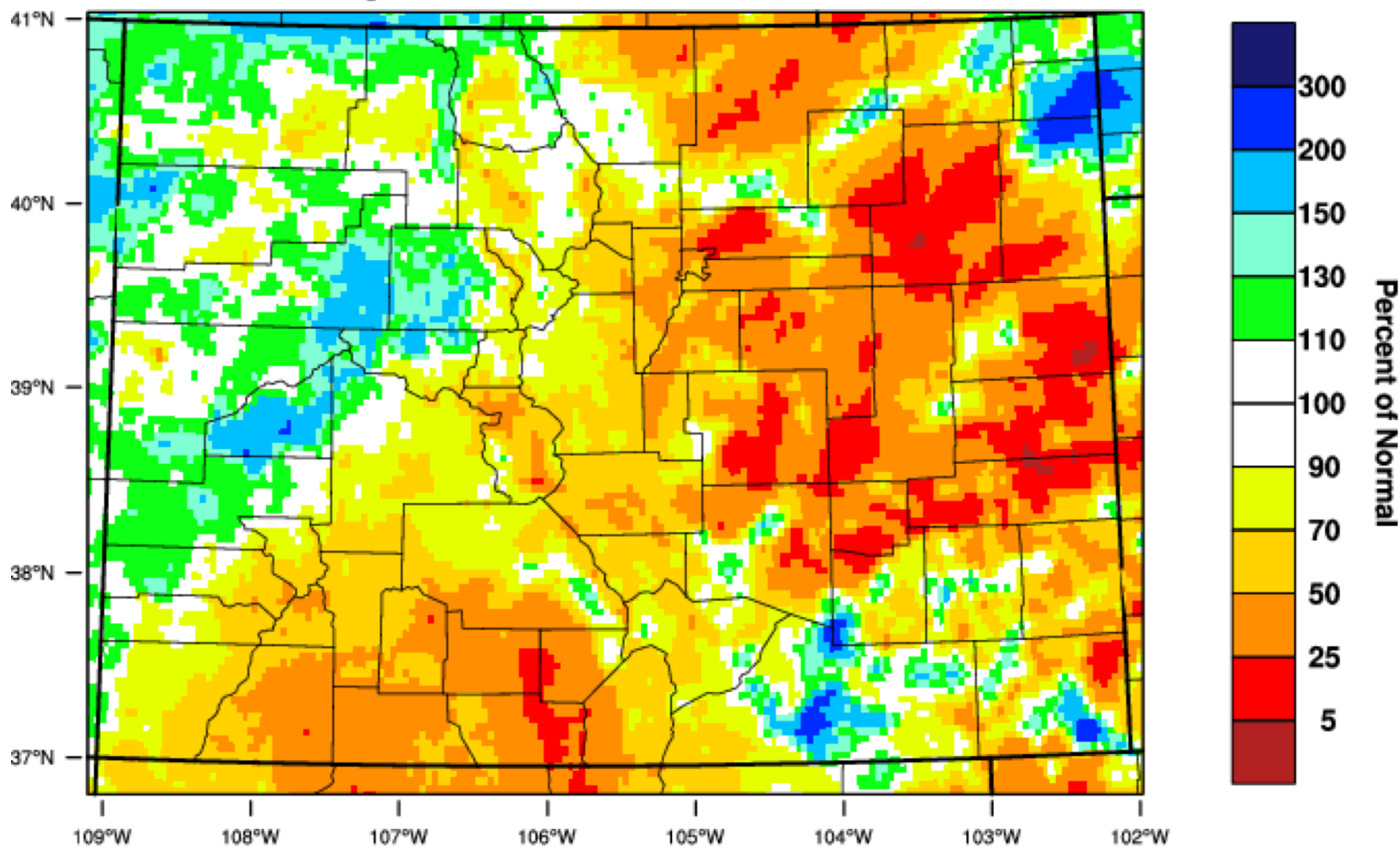
<https://www.ncdc.noaa.gov/cag>



## Colorado - Precipitation

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

### August 2021 Percent of 1981-2010 Normal



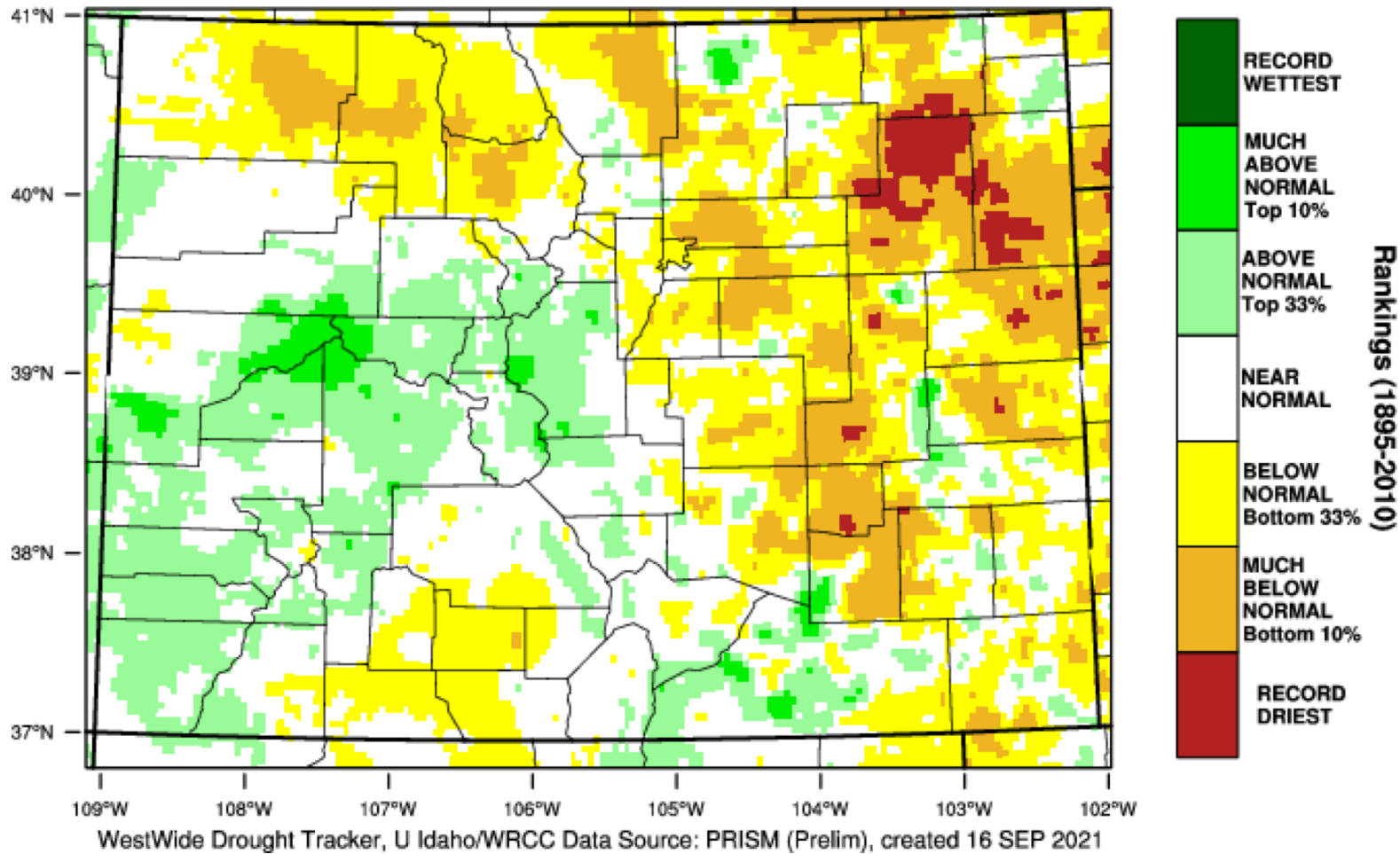
WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 SEP 2021



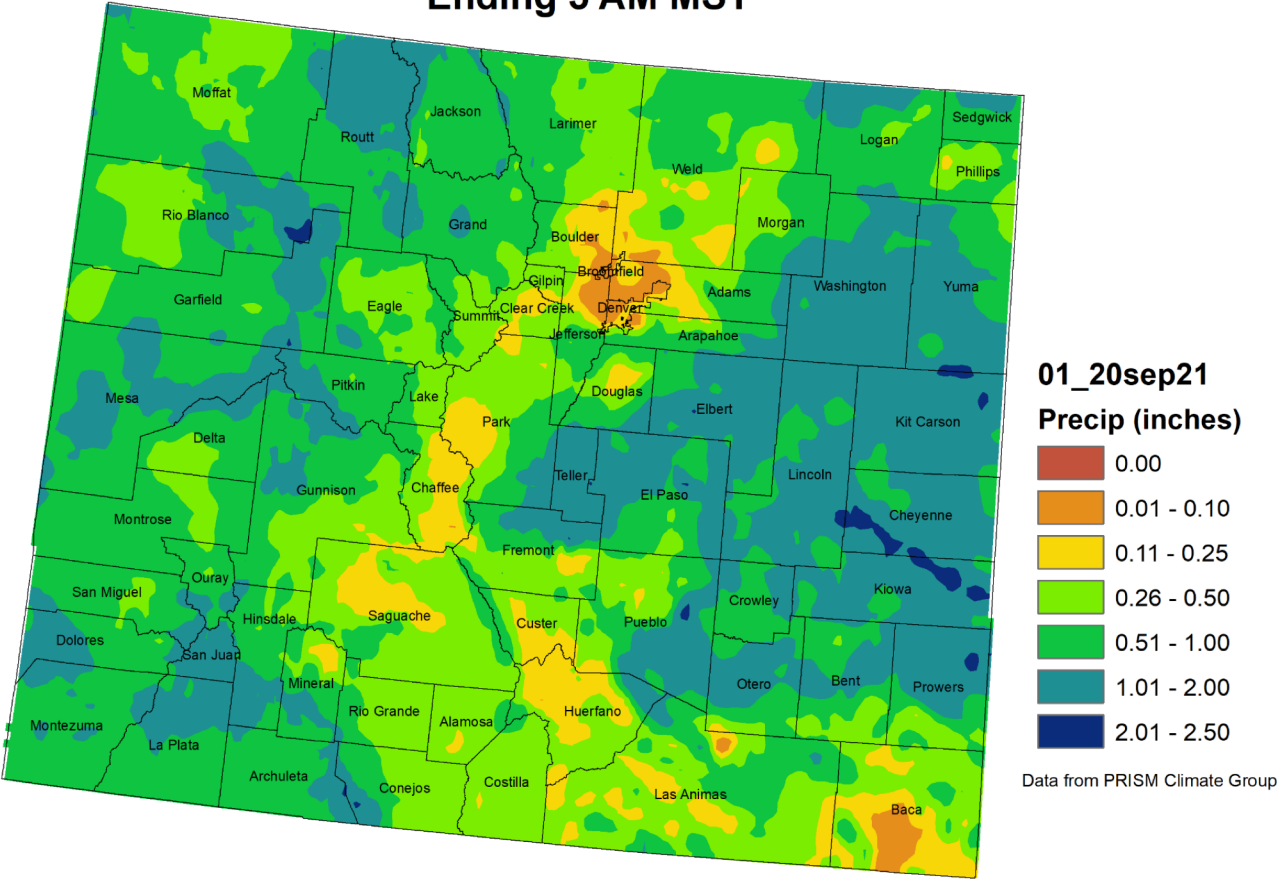


# Colorado - Precipitation June-August 2021 Percentile

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

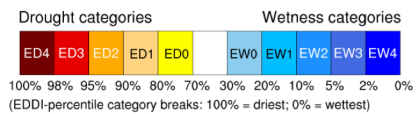
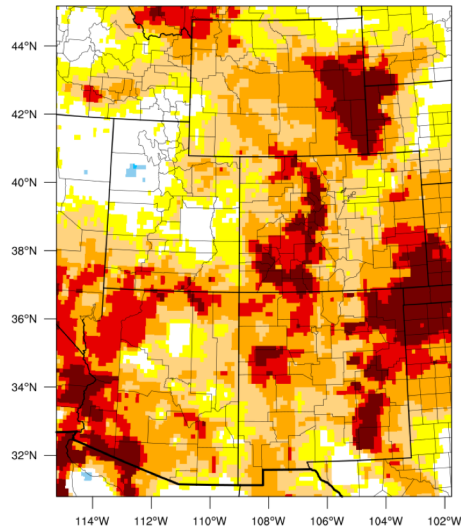


# Colorado Month to Date Precipitation 1 - 20 September 2021 Ending 5 AM MST



# Evaporative Demand

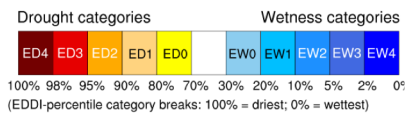
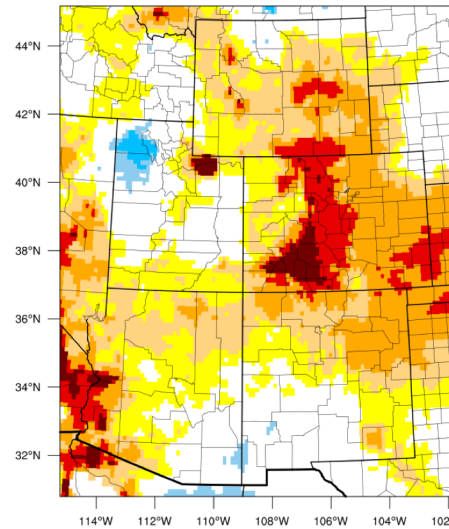
1-week EDDI categories for September 17, 2021



Generated by NOAA/ESRL/Physical Sciences Laboratory

1 week

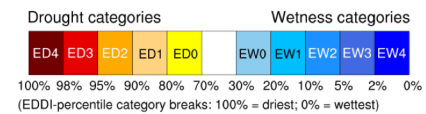
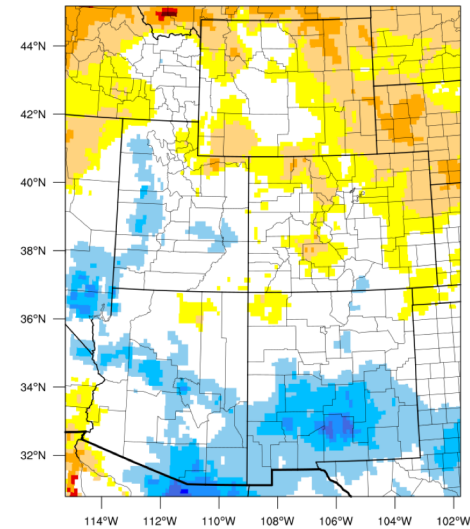
1-month EDDI categories for September 17, 2021



Generated by NOAA/ESRL/Physical Sciences Laborat

1 month

3-month EDDI categories for September 17, 2021



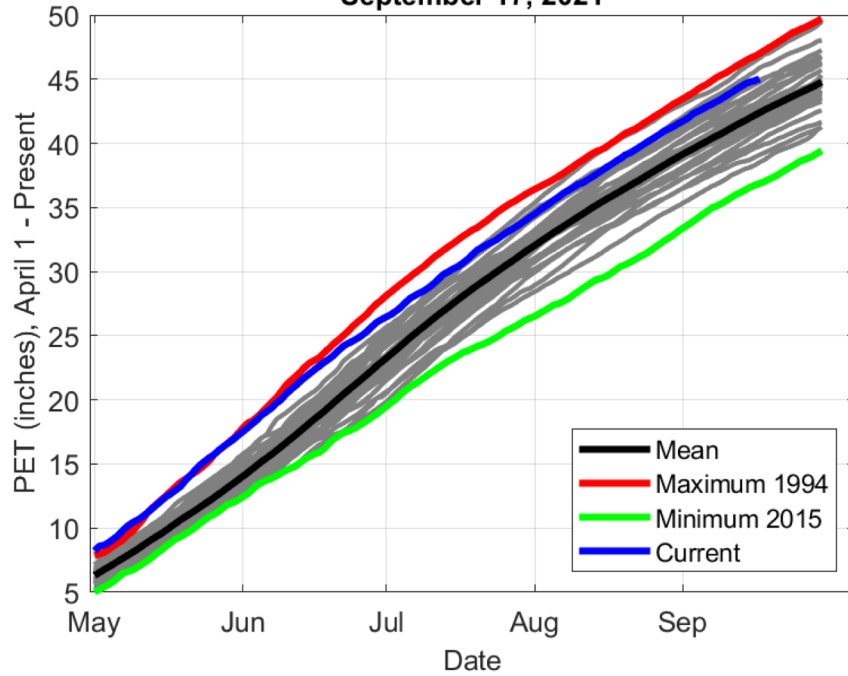
Generated by NOAA/ESRL/Physical Sciences Laboratory

3 months

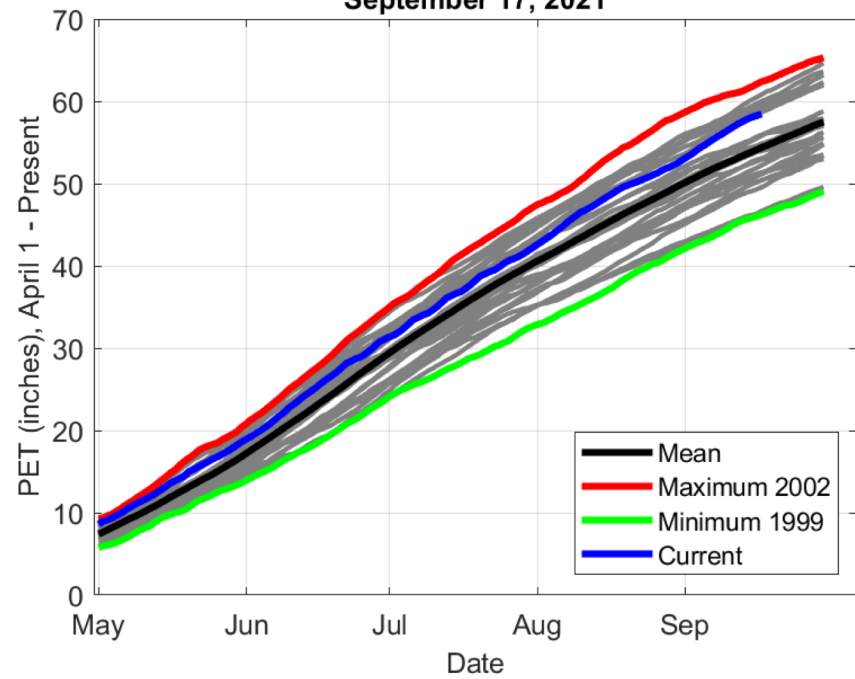
<https://psl.noaa.gov/eddi/>



**Olathe Growing Season Evaporative Demand  
September 17, 2021**



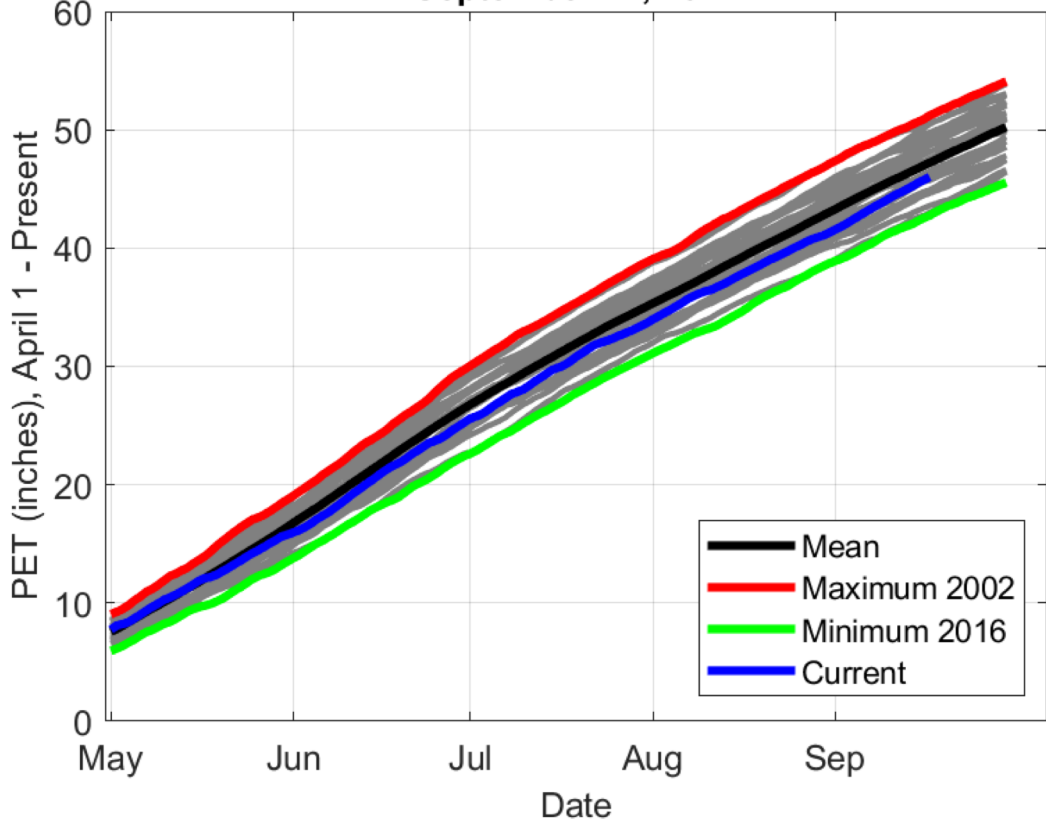
**Dove Creek Growing Season Evaporative Demand  
September 17, 2021**



<https://coagmet.colostate.edu/drought/index.html#evap>

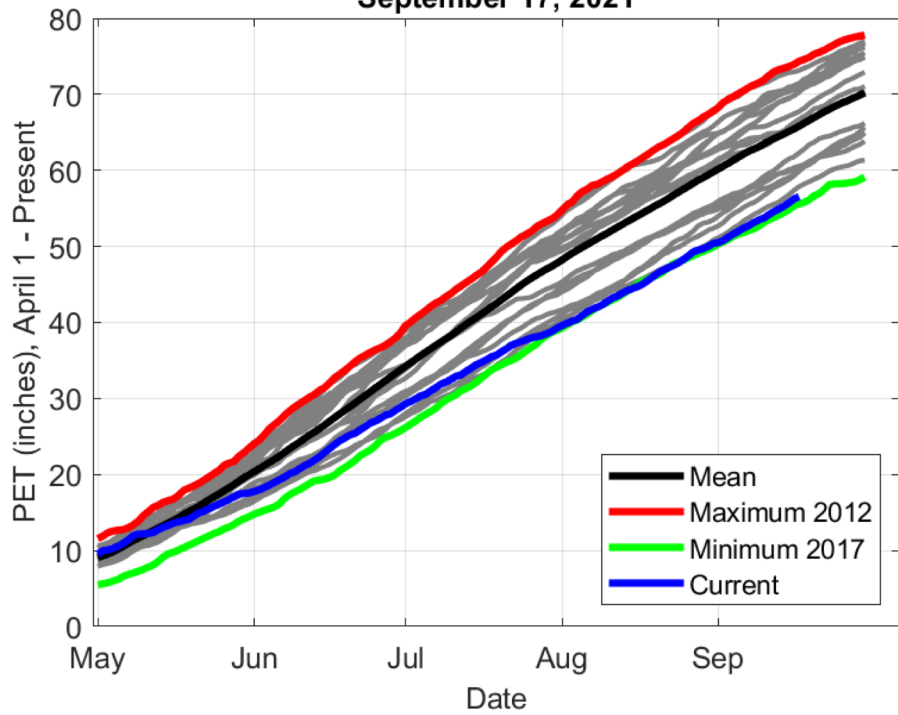


### Center Growing Season Evaporative Demand September 17, 2021

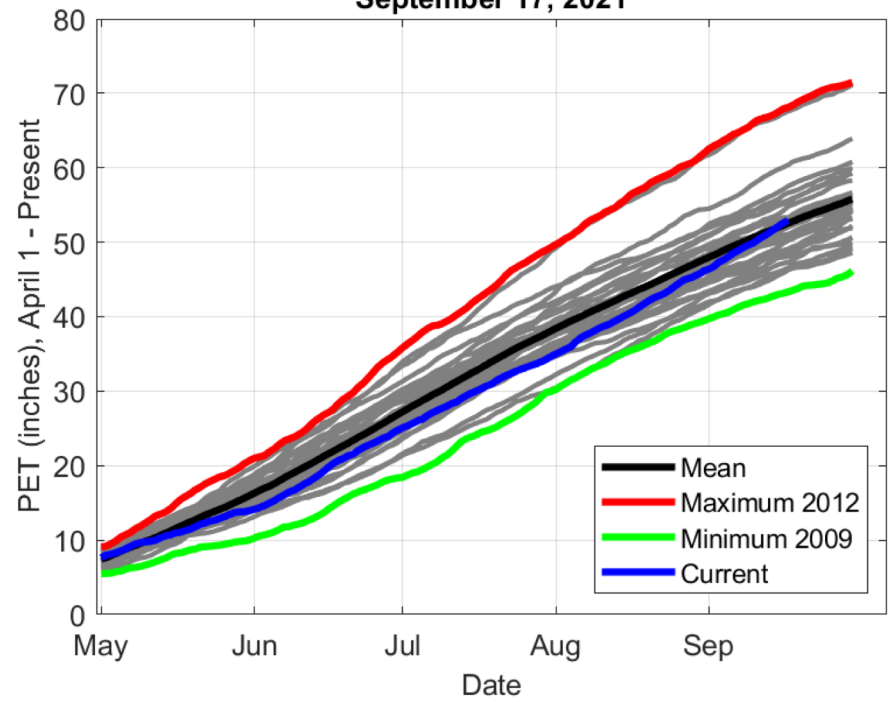


<https://coagmet.colostate.edu/drought/index.html#evap>

Lamar Growing Season Evaporative Demand  
September 17, 2021



Idalia Growing Season Evaporative Demand  
September 17, 2021

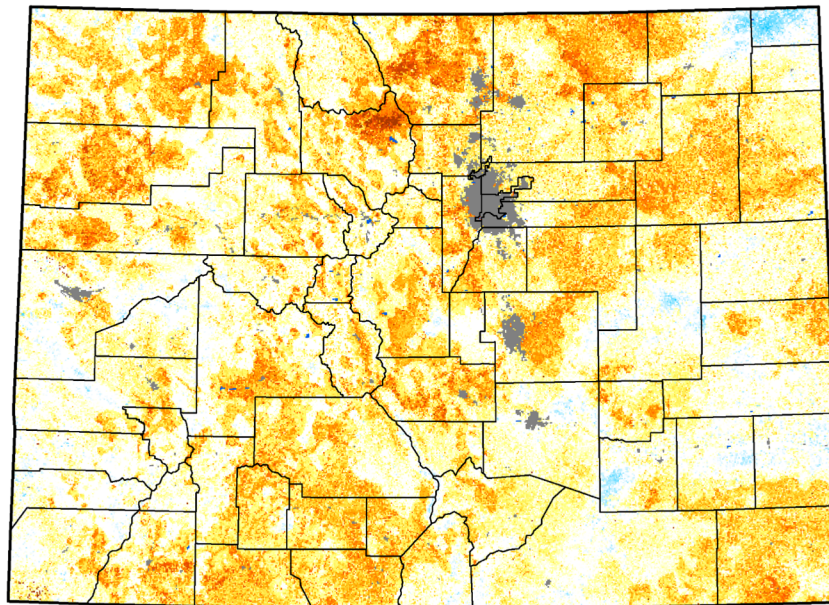


<https://coagmet.colostate.edu/drought/index.html#evap>

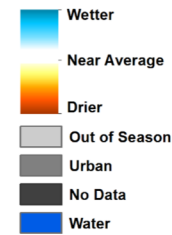


# Quick Drought Response Index Colorado

September 19, 2021  
(Week 38)



Conditions Relative to  
4-Week Historical Average



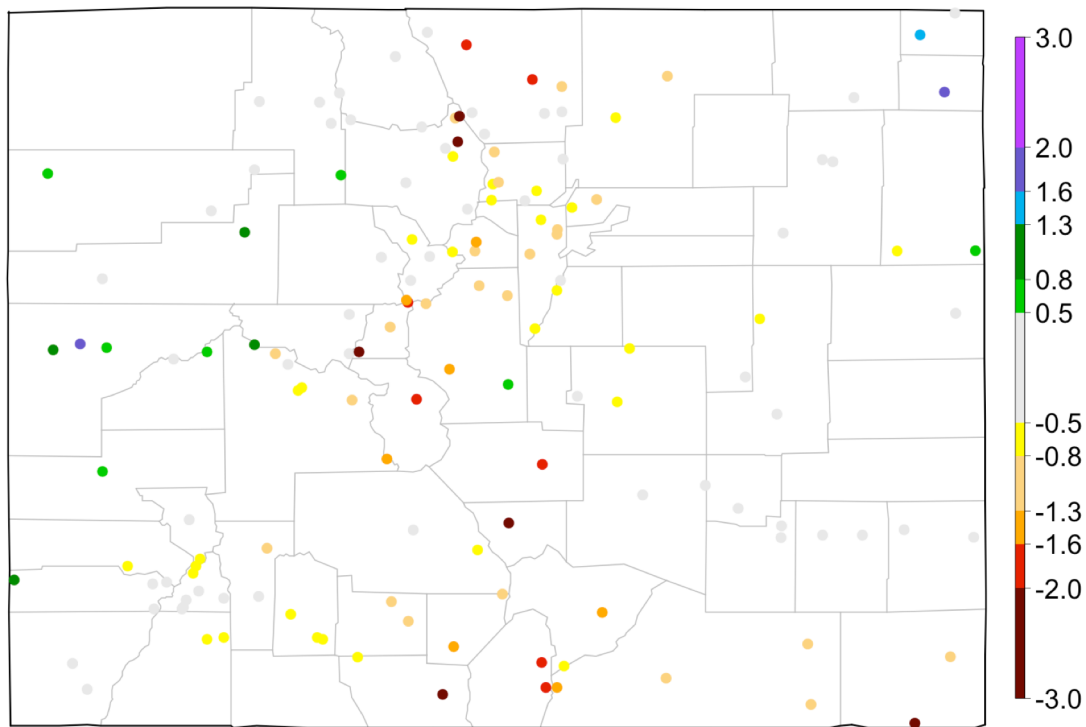
**CALMIT**  
University of Nebraska - Lincoln  
Center for Advanced Land Management Information Technologies



<https://quickdri.unl.edu/State.aspx?CO>



30-day SPI: 2021/08/21 - 2021/09/19



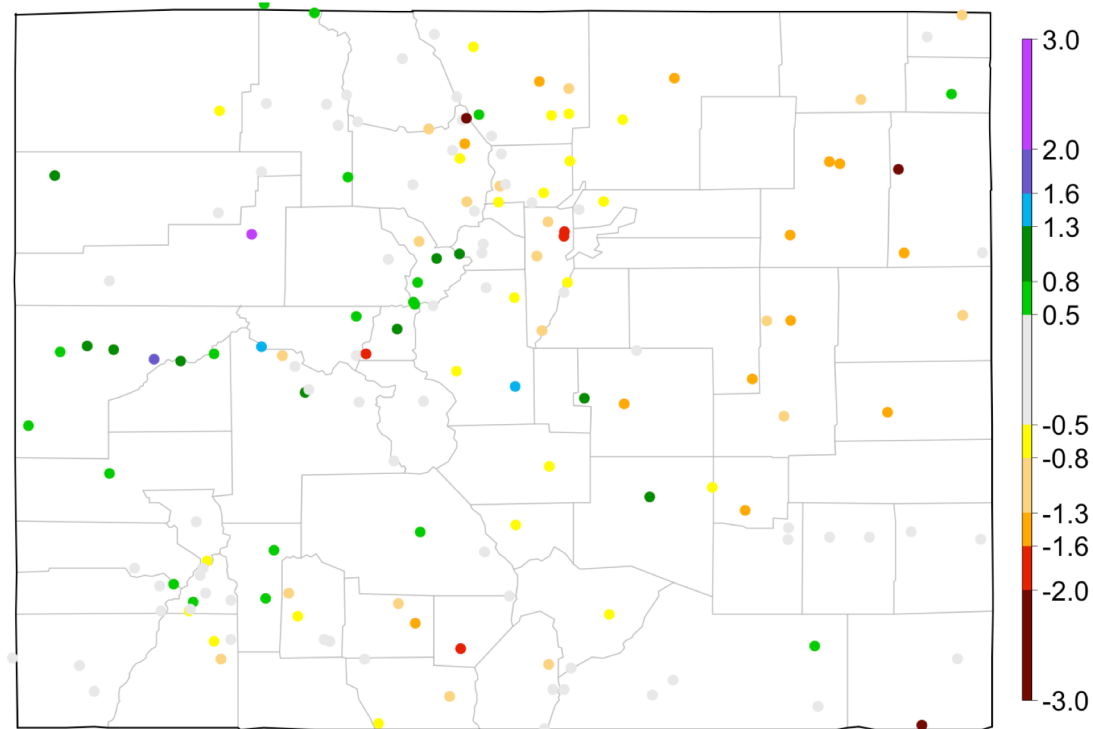
Data from High Plains Regional Climate Center and ACIS

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





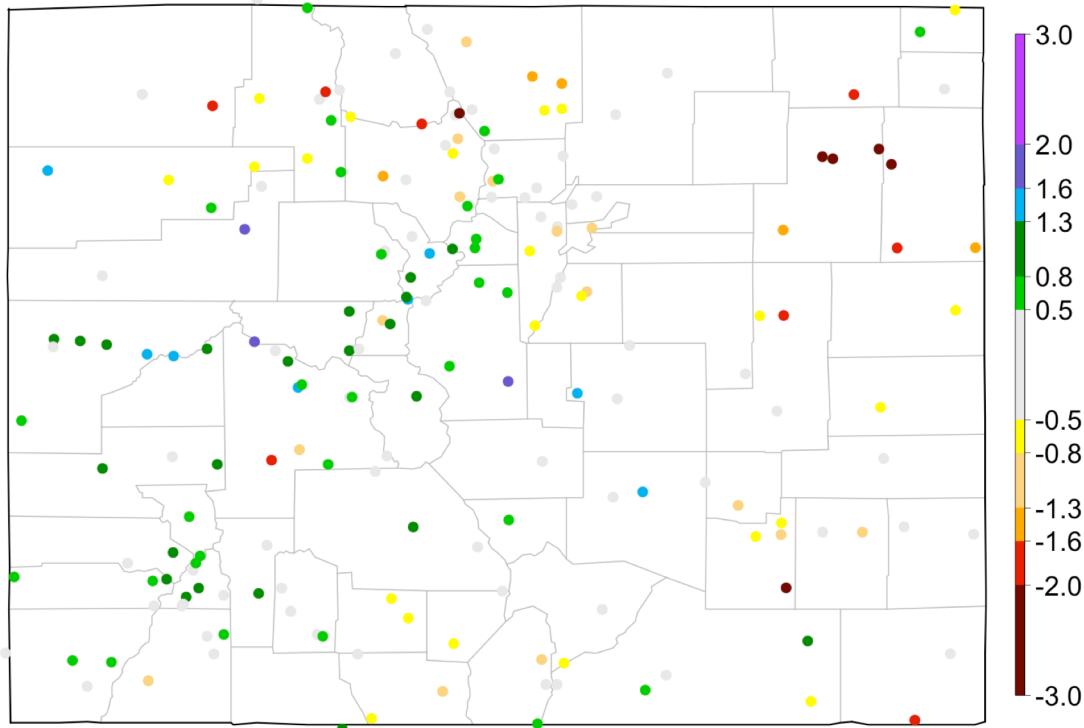
60-day SPI: 2021/07/22 - 2021/09/19



Data from High Plains Regional Climate Center and ACIS

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

90-day SPI: 2021/06/22 - 2021/09/19

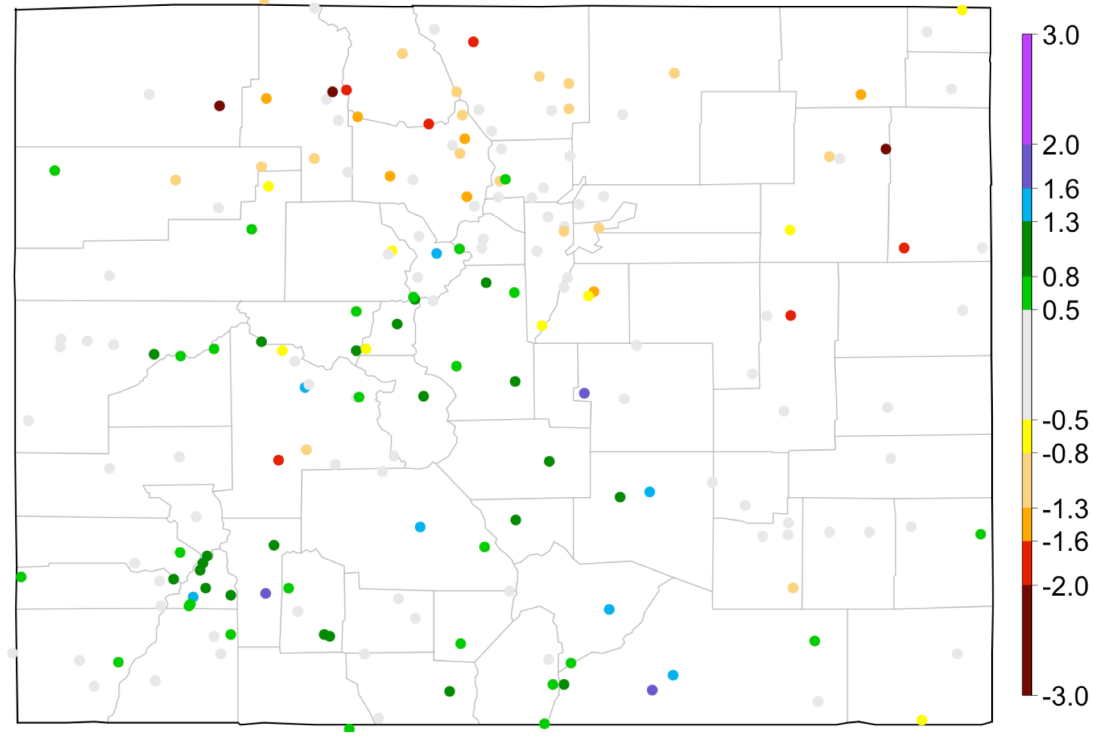


Data from High Plains Regional Climate Center and ACIS

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



120-day SPI: 2021/05/23 - 2021/09/19

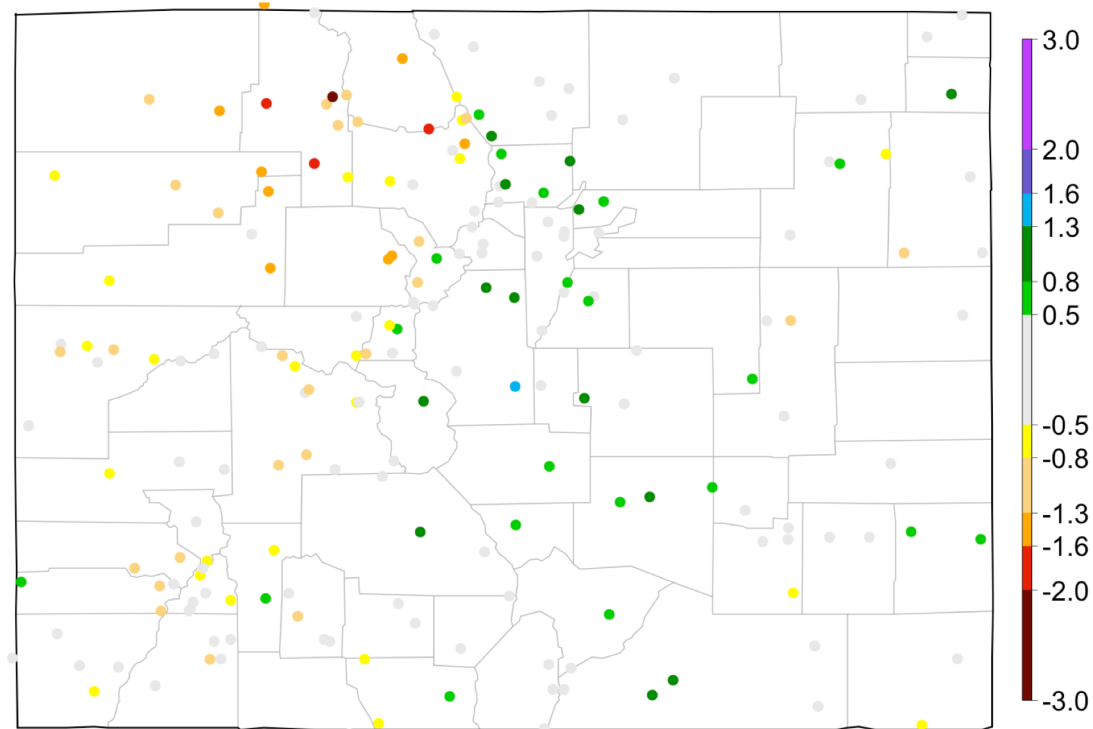


Data from High Plains Regional Climate Center and ACIS

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



9-month SPI: 2020/12/19 - 2021/09/19

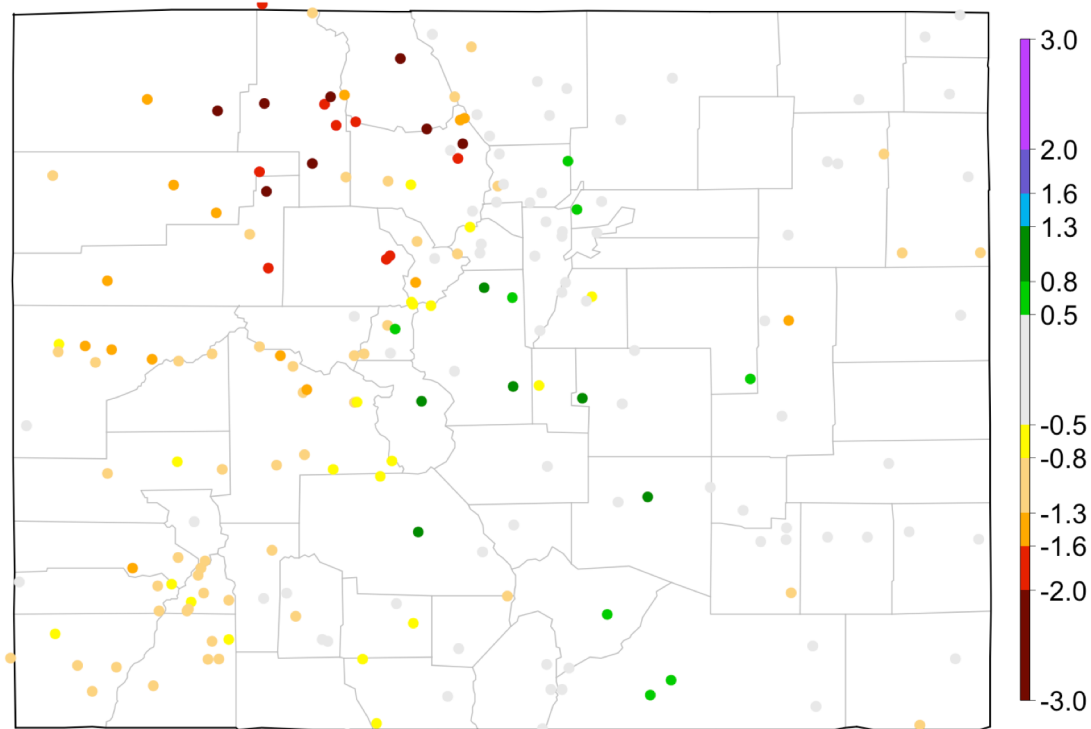


Data from High Plains Regional Climate Center and ACIS

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



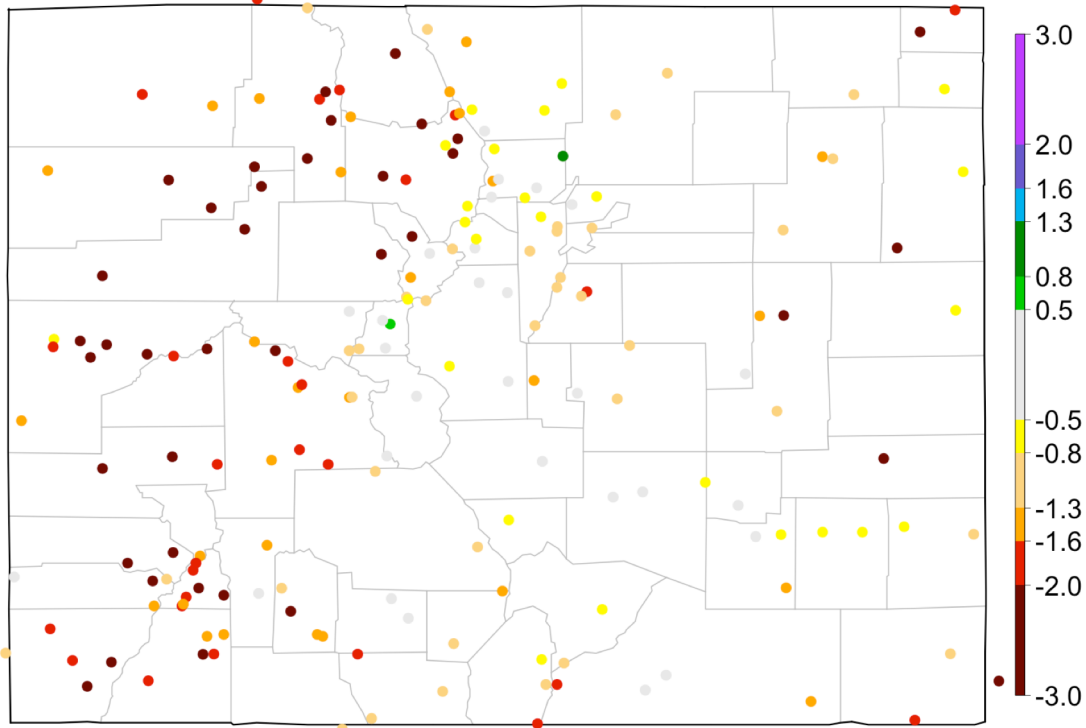
12-month SPI: 2020/09/20 - 2021/09/19



Data from High Plains Regional Climate Center and ACIS

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

24-month SPI: 2019/09/20 - 2021/09/19



Data from High Plains Regional Climate Center and ACIS

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



# Drought

National Drought

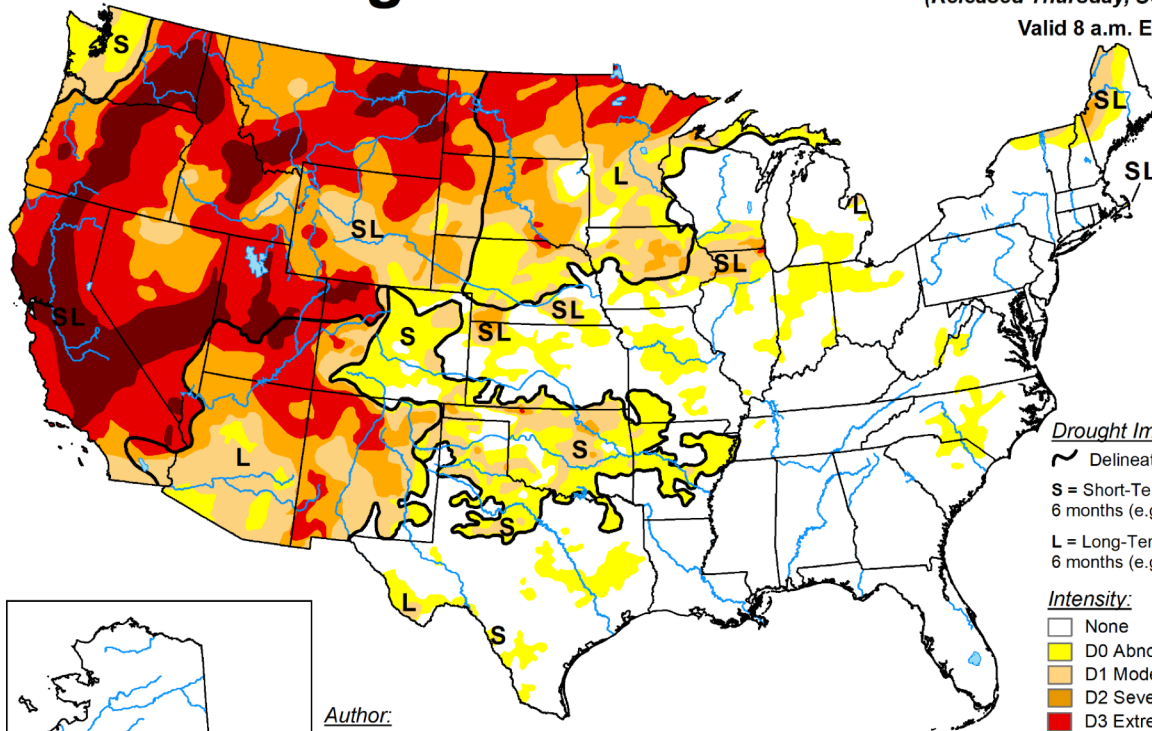
Colorado Drought

Colorado Drought Facts



# U.S. Drought Monitor

September 21, 2021  
 (Released Thursday, Sep. 23, 2021)  
 Valid 8 a.m. EDT

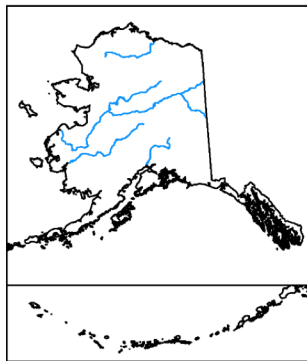


**Drought Impact Types:**

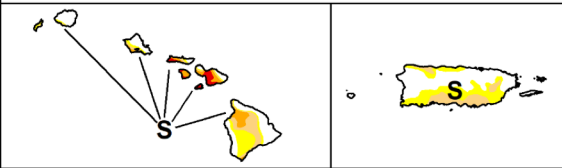
- ~ Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

**Intensity:**

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



*Author:*  
 Brad Rippey  
 U.S. Department of Agriculture



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>



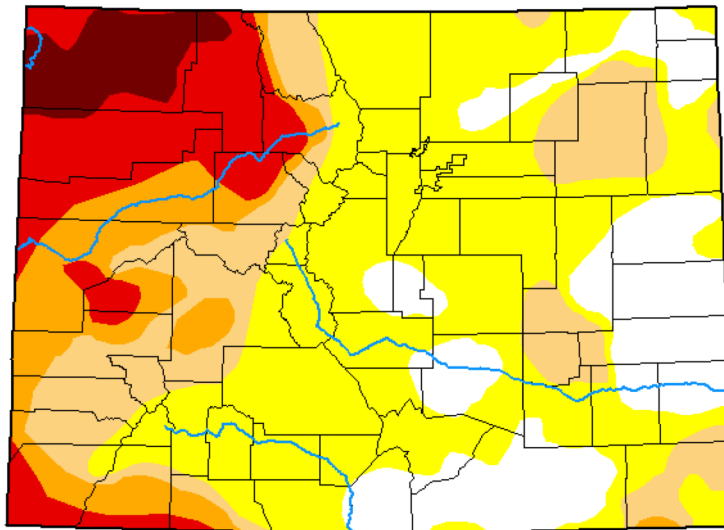
[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)





# U.S. Drought Monitor Colorado

**September 21, 2021**  
(Released Thursday, Sep. 23, 2021)  
Valid 8 a.m. EDT



*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	16.92	83.08	40.94	24.58	15.05	3.91
<b>Last Week</b> <i>09-14-2021</i>	34.60	65.40	37.06	24.48	15.05	3.91
<b>3 Months Ago</b> <i>06-22-2021</i>	54.41	45.59	41.62	36.37	30.35	17.73
<b>Start of Calendar Year</b> <i>12-29-2020</i>	0.00	100.00	100.00	93.73	76.17	27.60
<b>Start of Water Year</b> <i>09-29-2020</i>	0.00	100.00	99.29	89.35	52.88	2.64
<b>One Year Ago</b> <i>09-22-2020</i>	0.00	100.00	98.61	87.77	50.10	0.38

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:

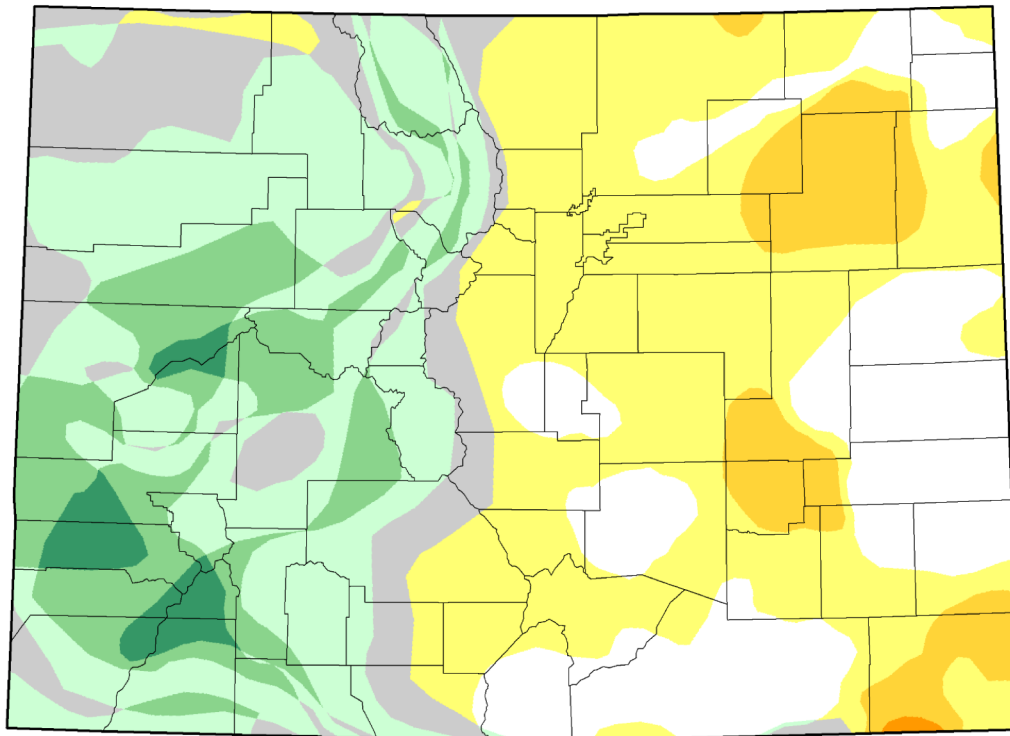
Brad Rippey  
U.S. Department of Agriculture



[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)



### U.S. Drought Monitor Class Change - Colorado 12 Week



September 21, 2021  
compared to  
June 29, 2021

[droughtmonitor.unl.edu](http://droughtmonitor.unl.edu)



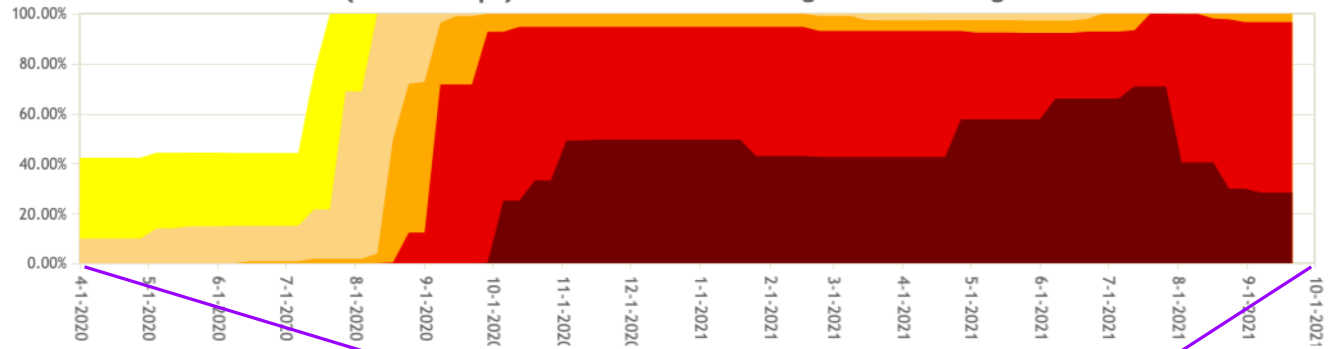
- 5 Class Degradation
- 4 Class Degradation
- 3 Class Degradation
- 2 Class Degradation
- 1 Class Degradation
- No Change
- 1 Class Improvement
- 2 Class Improvement
- 3 Class Improvement
- 4 Class Improvement
- 5 Class Improvement



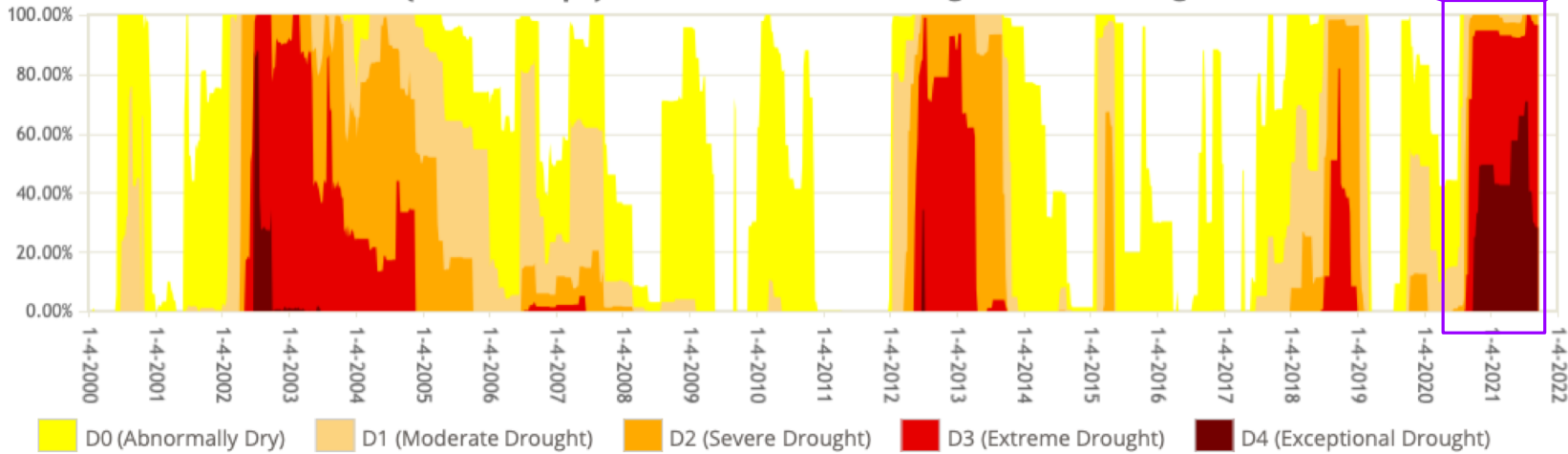
28% of the Yampa-White Basin is still in D4 drought.

Coming up on 52 consecutive weeks of D4 drought.

1405 (White-Yampa) Percent Area in U.S. Drought Monitor Categories



1405 (White-Yampa) Percent Area in U.S. Drought Monitor Categories



## Outlook

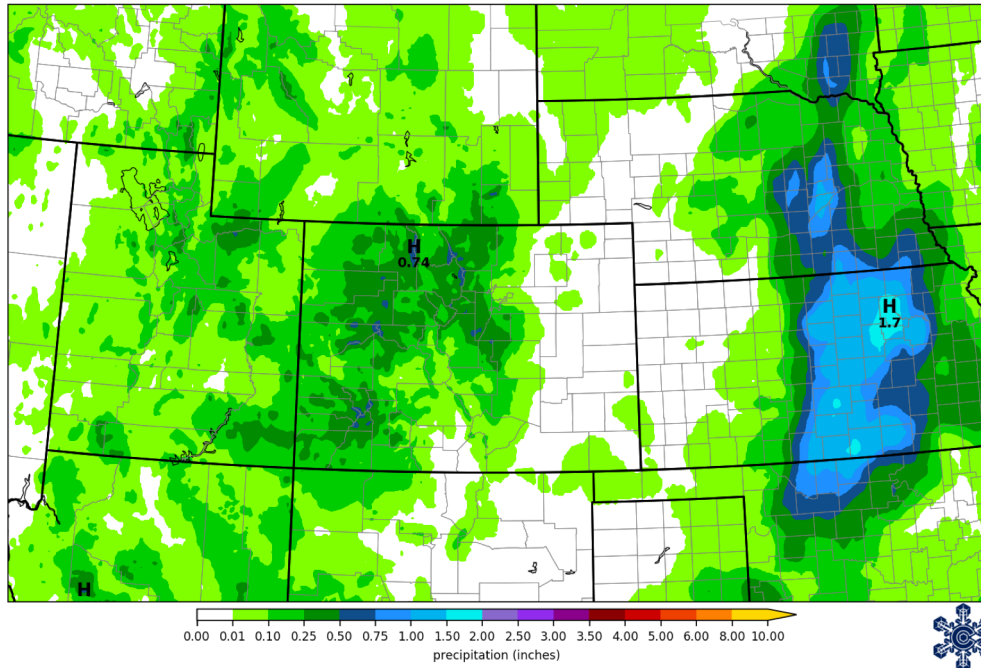
- Next 7 days
- 8-14 day Outlook
- CPC Outlooks
- ENSO Neutral
- Monsoon???



# NOAA 7-day precip forecast

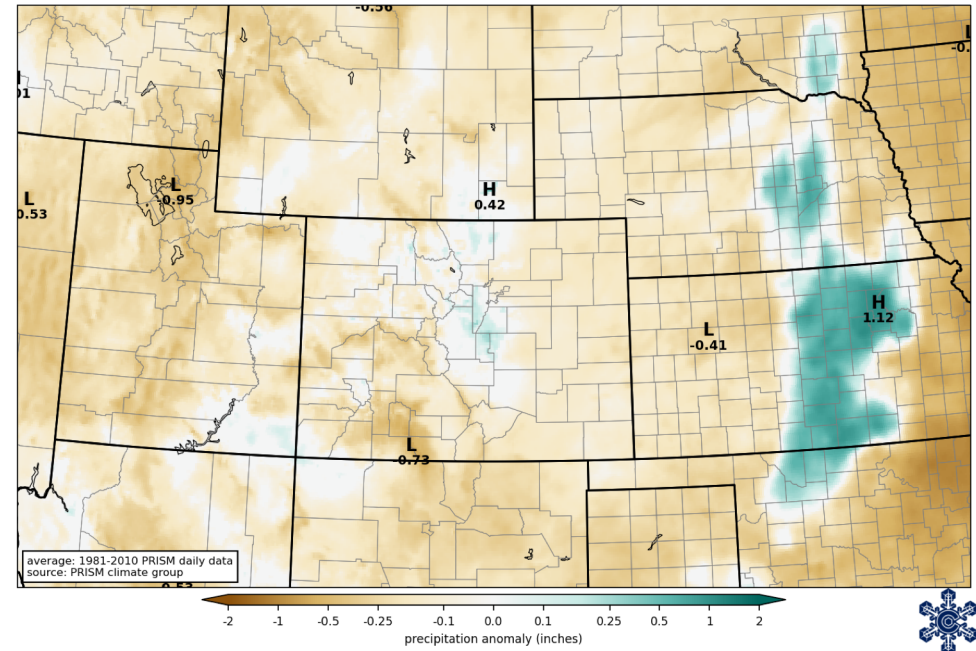
NOAA Weather Prediction Center  
7-day precipitation forecast

forecast issued 1200 UTC Thu 23 Sep 2021  
precipitation in 168 hrs ending 1200 UTC Thu 30 Sep 2021



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

forecast issued 1200 UTC Thu 23 Sep 2021  
precipitation in 168 hrs ending 1200 UTC Thu 30 Sep 2021



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

COLORADO CLIMATE CENTER



# 8-14 day outlook

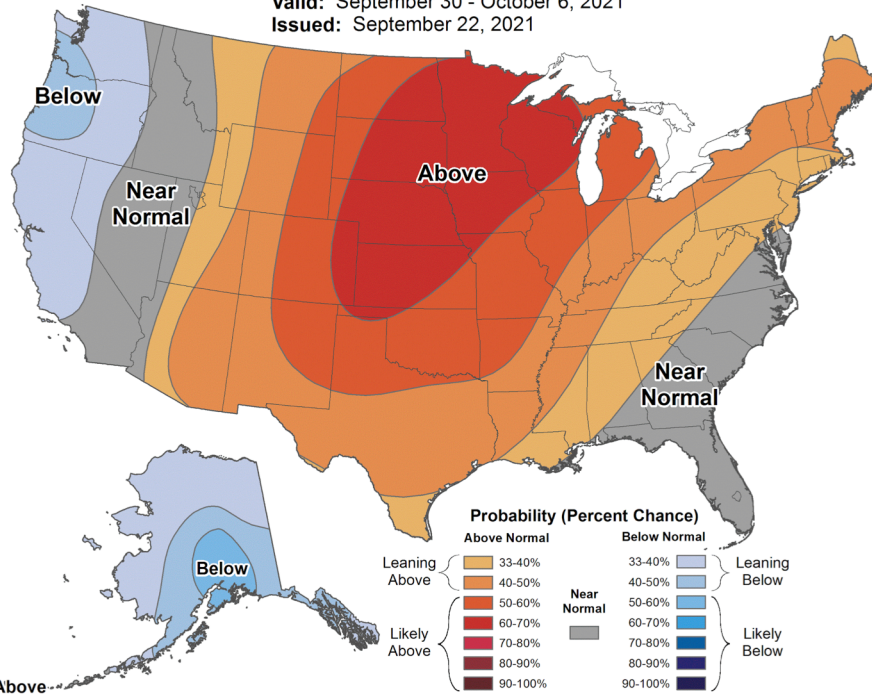
<https://www.cpc.ncep.noaa.gov>



## 8-14 Day Temperature Outlook



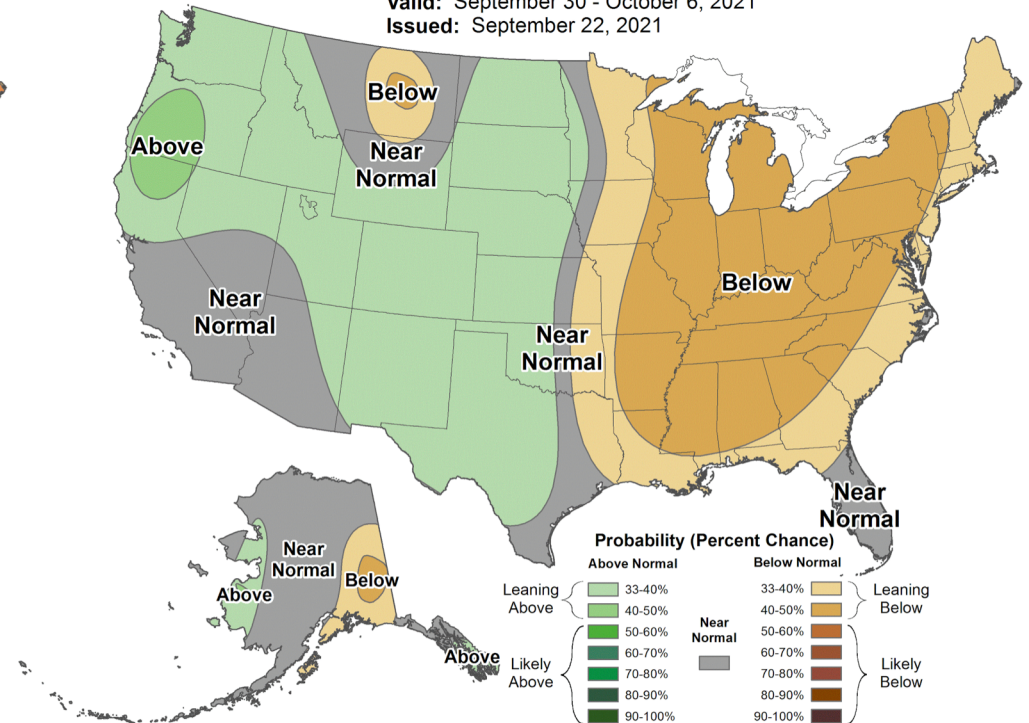
Valid: September 30 - October 6, 2021  
 Issued: September 22, 2021



## 8-14 Day Precipitation Outlook



Valid: September 30 - October 6, 2021  
 Issued: September 22, 2021



# Seasonal outlook

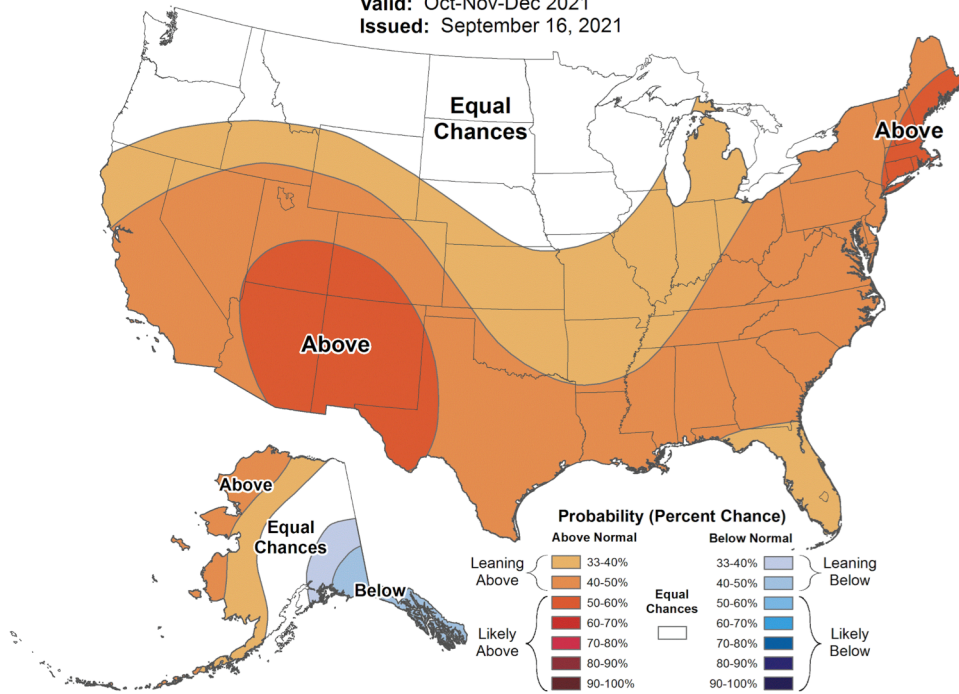
<https://www.cpc.ncep.noaa.gov>



## Seasonal Temperature Outlook



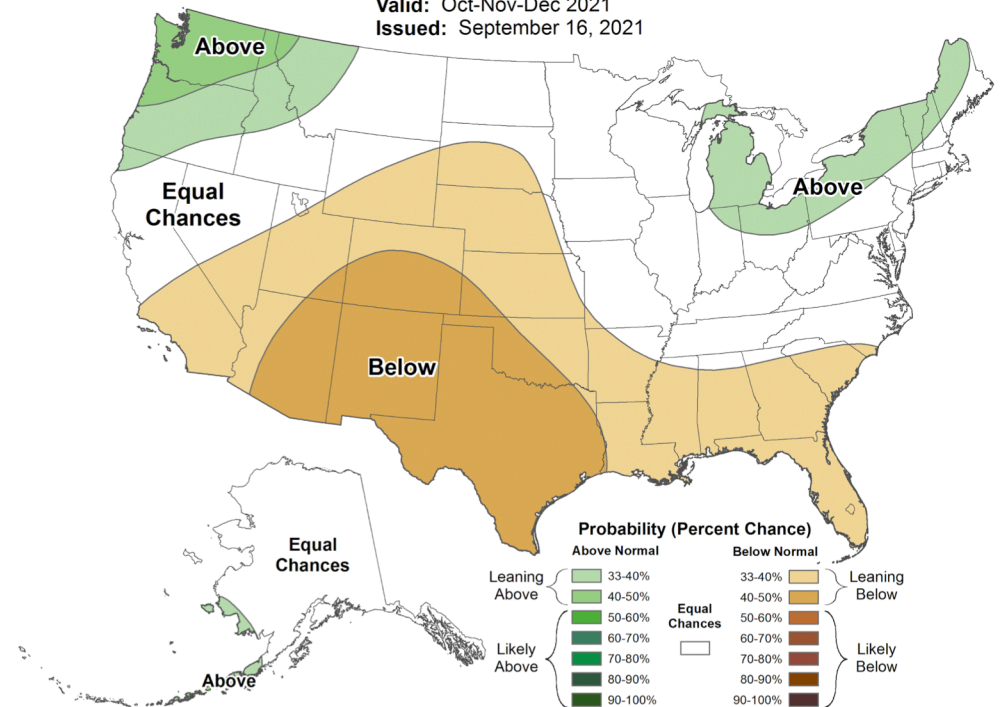
Valid: Oct-Nov-Dec 2021  
 Issued: September 16, 2021



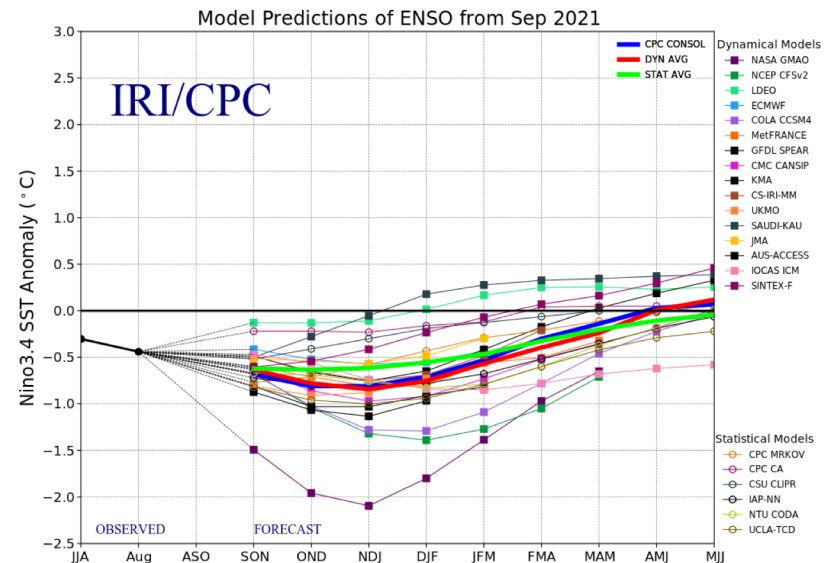
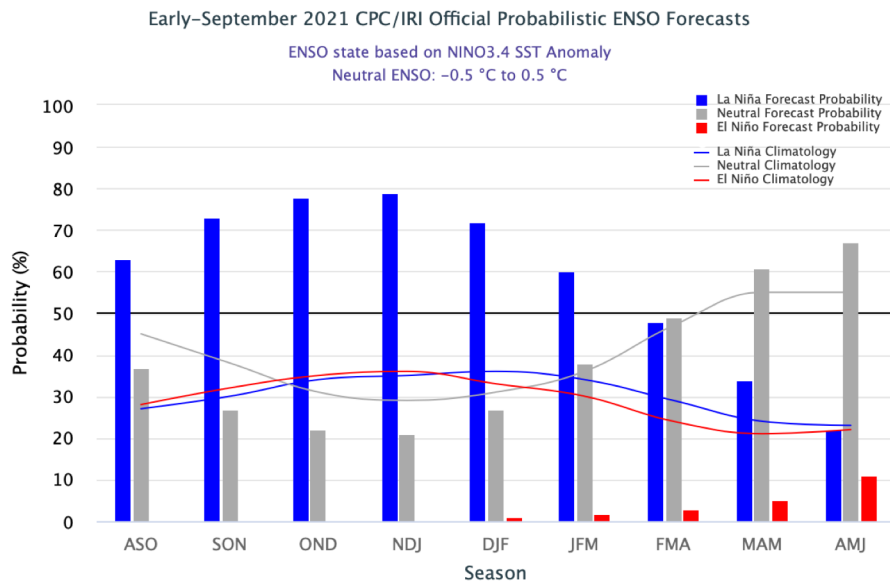
## Seasonal Precipitation Outlook



Valid: Oct-Nov-Dec 2021  
 Issued: September 16, 2021



# What's the ENSO forecast?



In mid-September, SSTs in the east-central Pacific are  $-0.4\text{ }^{\circ}\text{C}$  different from average. The evolution of key atmospheric variables is consistent with ENSO-neutral conditions. However, a La Niña Watch remains in effect for Sep 2021. A large majority of the models predict SSTs to cool further through boreal autumn and winter, and then return to ENSO-neutral levels during late spring months. Similar to, the new official CPC/IRI outlook issued earlier this month, this objective outlook calls for La Niña to emerge during Sep-Nov and persist through winter and early spring, with return to ENSO-neutral in late spring and early summer of 2022.

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

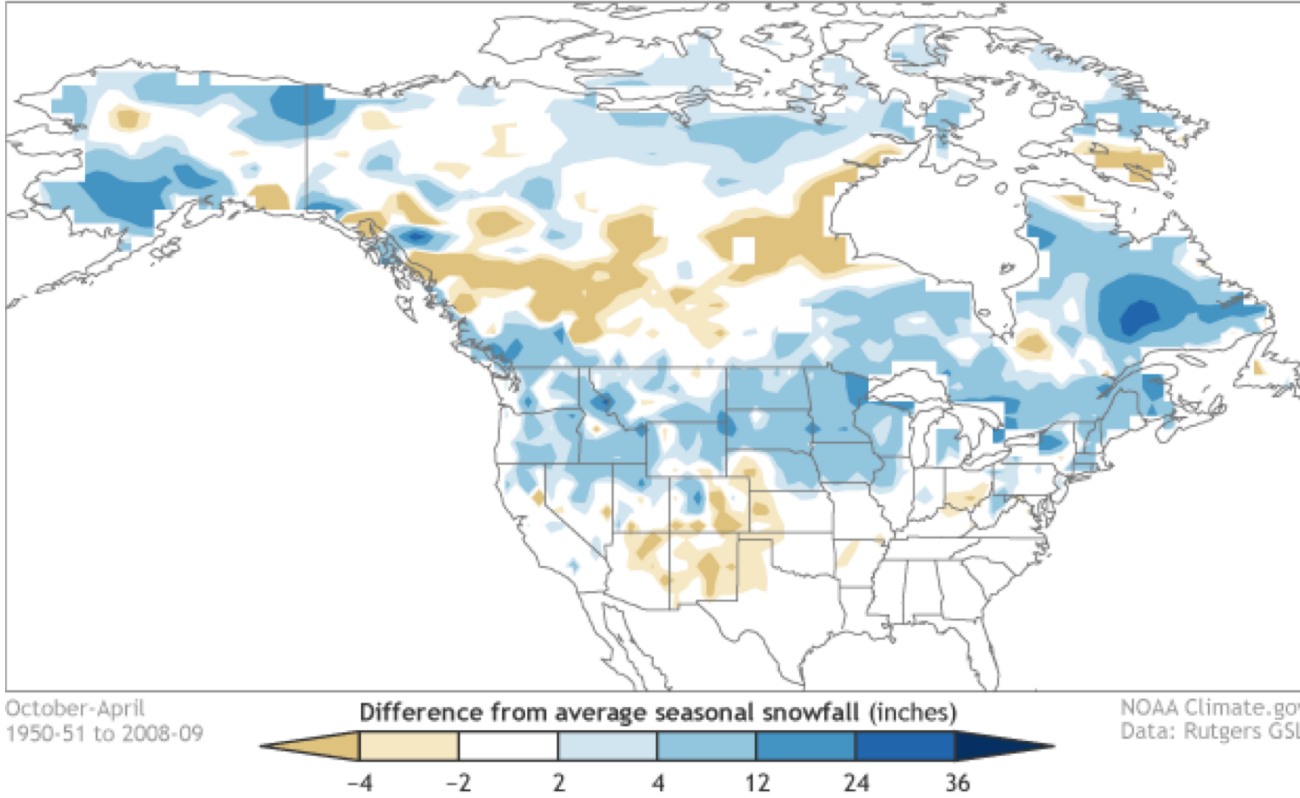






What does La Niña mean for winter?

### Average snowfall patterns for weak La Niña years

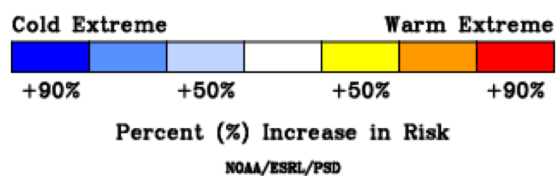
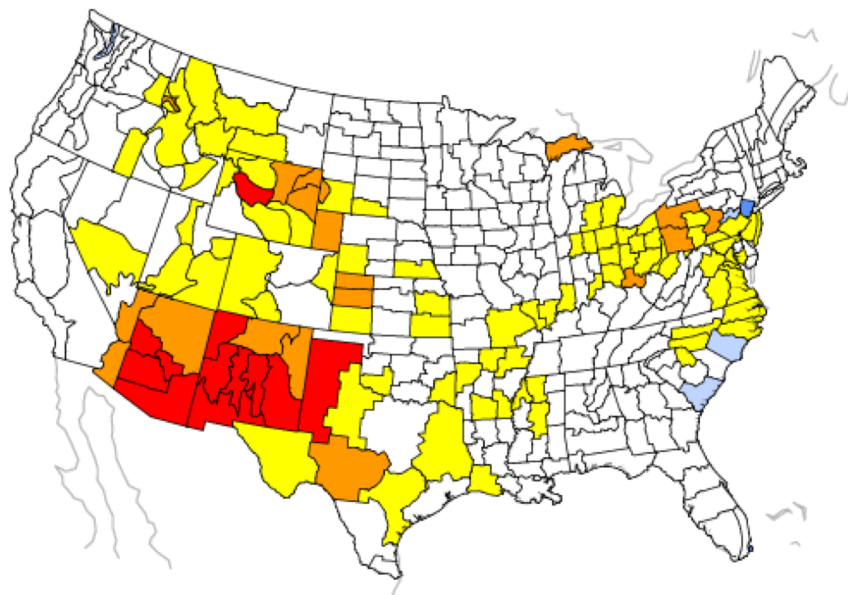


A wetter pattern in the northwest favors more snowfall over our northern mountains.

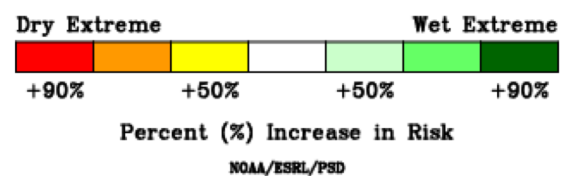
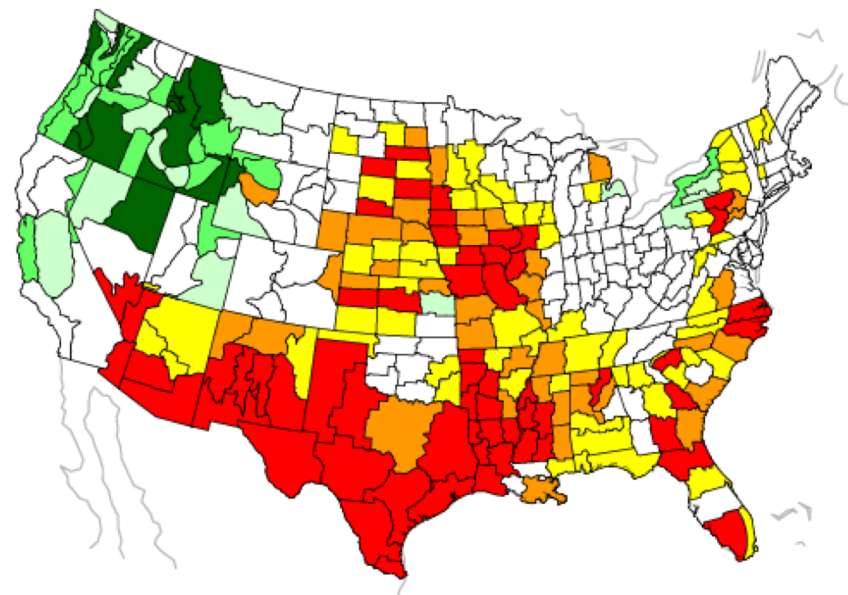
The drier southwest extends northward and favors less snowfall over the Four Corners and eastern plains.

[What about snow during La Niña winters?](#) - ENSO Climate Blog, November 2017

OND Temperature During La Nina  
Increased Risk of Warm or Cold Extremes



OND Precipitation During La Niña  
Increased Risk of Wet or Dry Extremes



Risk of extremes during a La Niña, from <https://psl.noaa.gov/enso/climaterisks/>



# Summary points

- Long-term drought impacts still remain in western CO, but monsoon rains helped with recovery.
- Drought still dominates the Yampa-White basin.
- After a wet spring, eastern CO has experienced a very dry summer, but thankfully evaporative demand was not anomalously high.
- The seasonal outlook leans toward warmer and drier than average conditions for Colorado, especially enhanced over southern CO.
- We are likely going into weak La Niña conditions for the rest of fall and winter.
- Despite the forecast, can't rule out some drought recovery and occasional large winter storm over the northern mountains.



To view this and other presentations:  
[http://climate.colostate.edu/ccc\\_archive.html](http://climate.colostate.edu/ccc_archive.html)

[Becky.Bolinger@colostate.edu](mailto:Becky.Bolinger@colostate.edu)

Thank you!

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ATMOSPHERIC SCIENCE  
COLORADO STATE UNIVERSITY