

# Colorado Climate Center – *WATF Climate Update*

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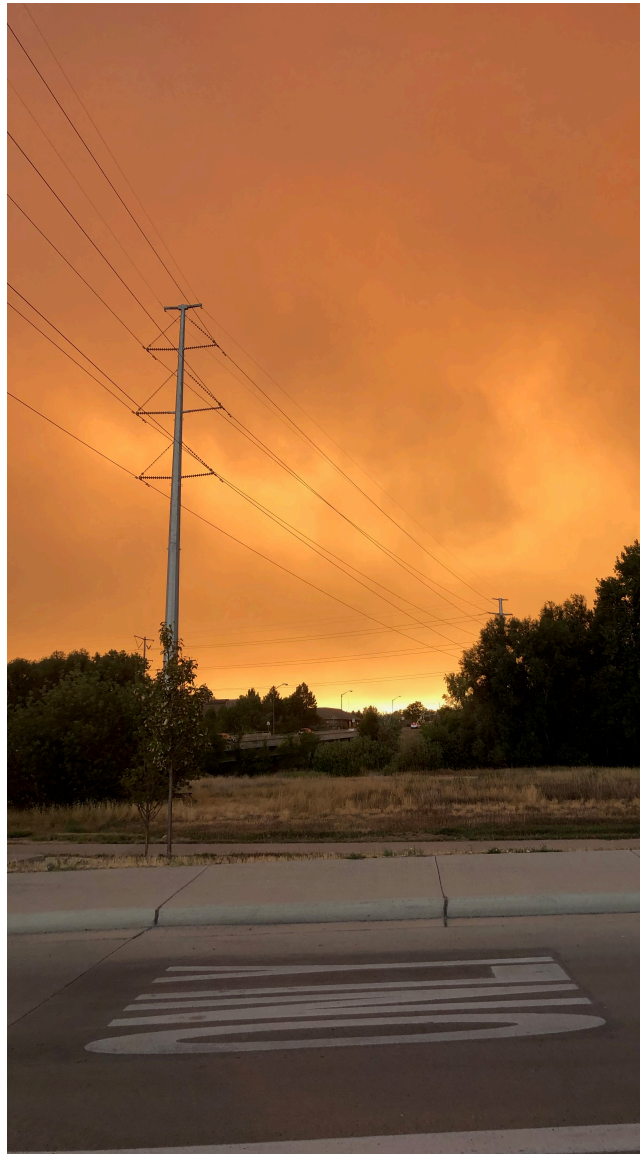
**Becky Bolinger, Assistant State Climatologist**

**Water Availability Task Force**

**September 22, 2020**



**ATMOSPHERIC SCIENCE**  
**COLORADO STATE UNIVERSITY**



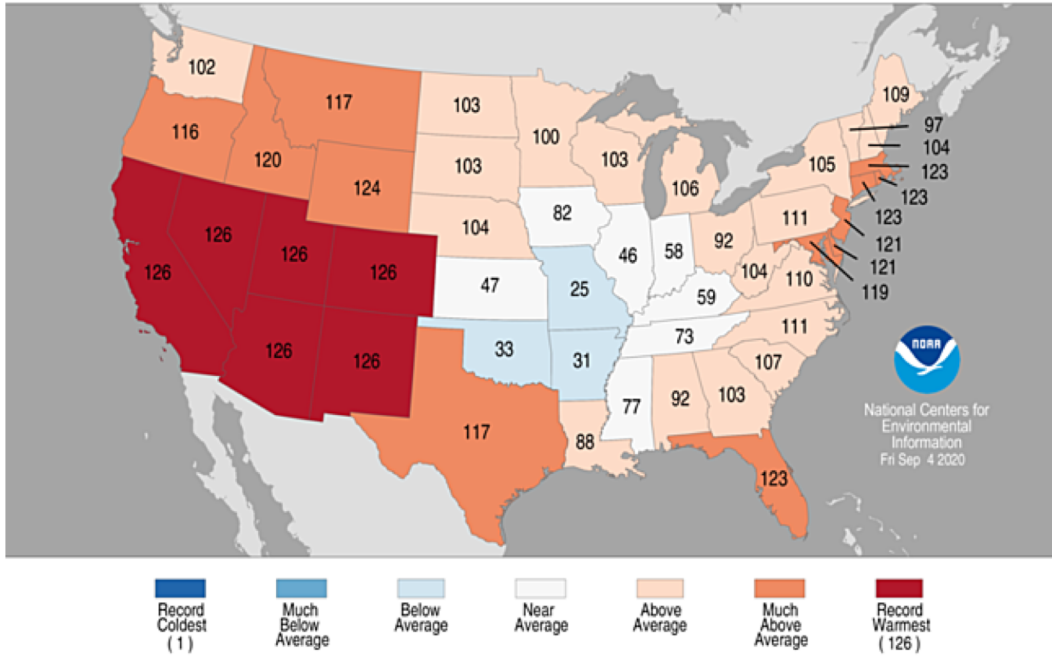
## 2020 Water Year To Date

Extreme August  
Extreme September



## Statewide Average Temperature Ranks

August 2020  
Period: 1895–2020

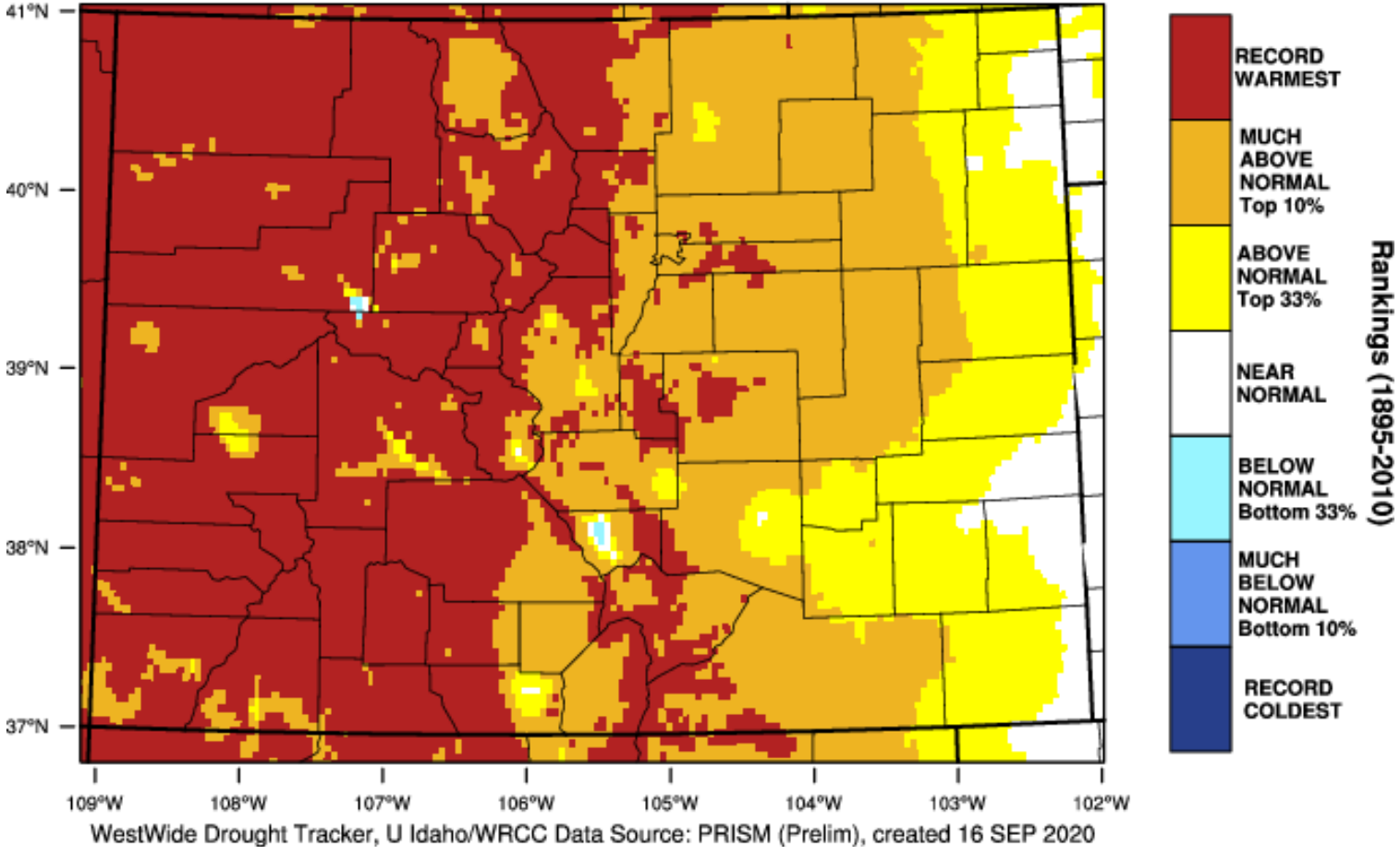


Also: 3<sup>rd</sup> warmest summer on record

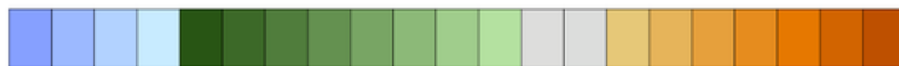
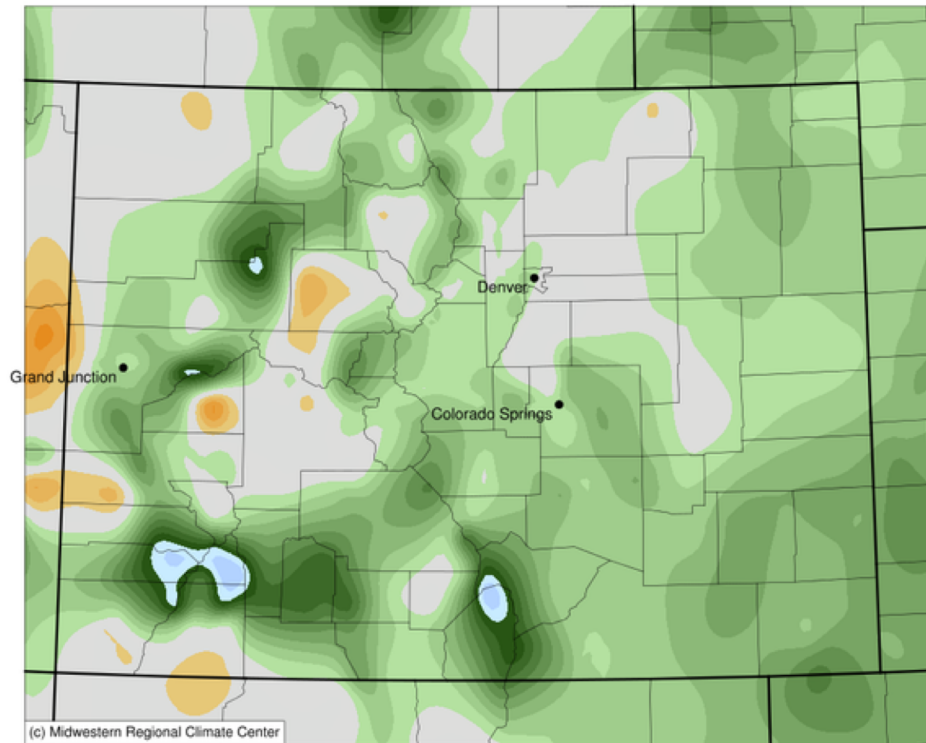
Month	T Rank (of 126 years)	Above, below, or near avg?
Oct	3 <sup>rd</sup> coolest	much below
Nov	39 <sup>th</sup> warmest	above
Dec	25 <sup>th</sup> warmest	above
Jan	25 <sup>th</sup> warmest	above
Feb	51 <sup>st</sup> coolest	near avg
Mar	14 <sup>th</sup> warmest	above
Apr	58 <sup>th</sup> warmest	near avg
May	4 <sup>th</sup> warmest	much above
June	15 <sup>th</sup> warmest	above
July	20 <sup>th</sup> warmest	above
August	1 <sup>st</sup> warmest	record



# Colorado - Mean Temperature August 2020 Percentile



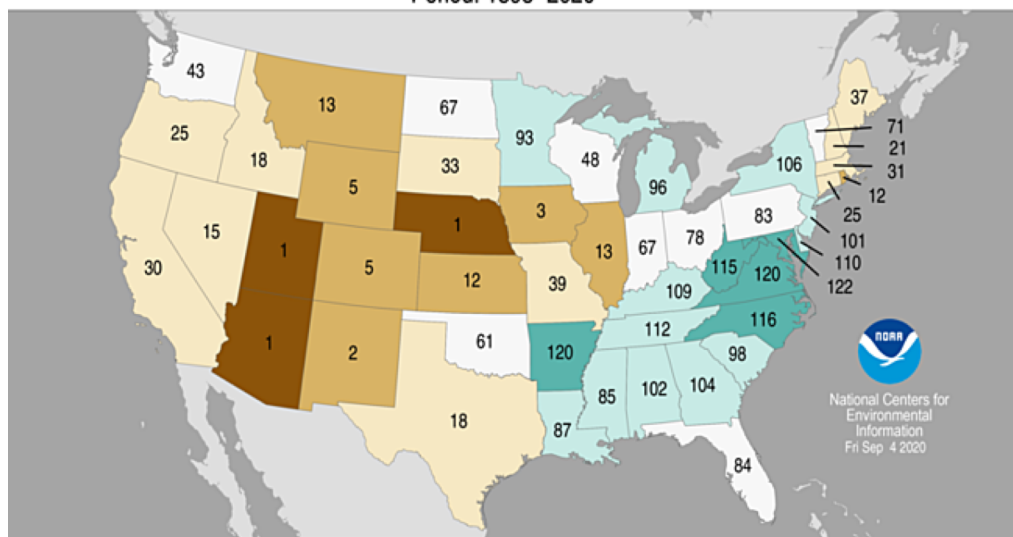
**Average Temperature (°F): Departure from 1981-2010 Normals**  
September 01, 2020 to September 21, 2020



-12                      -7                      -2                      3

Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CoCoRaHS, WMO, ICAO, NWSLI, Midwestern Regional Climate Center  
cli-MATE: MRCC Application Tools Environment  
Generated at: 9/21/2020 3:30:42 PM CDT

Statewide Precipitation Ranks  
 August 2020  
 Period: 1895–2020

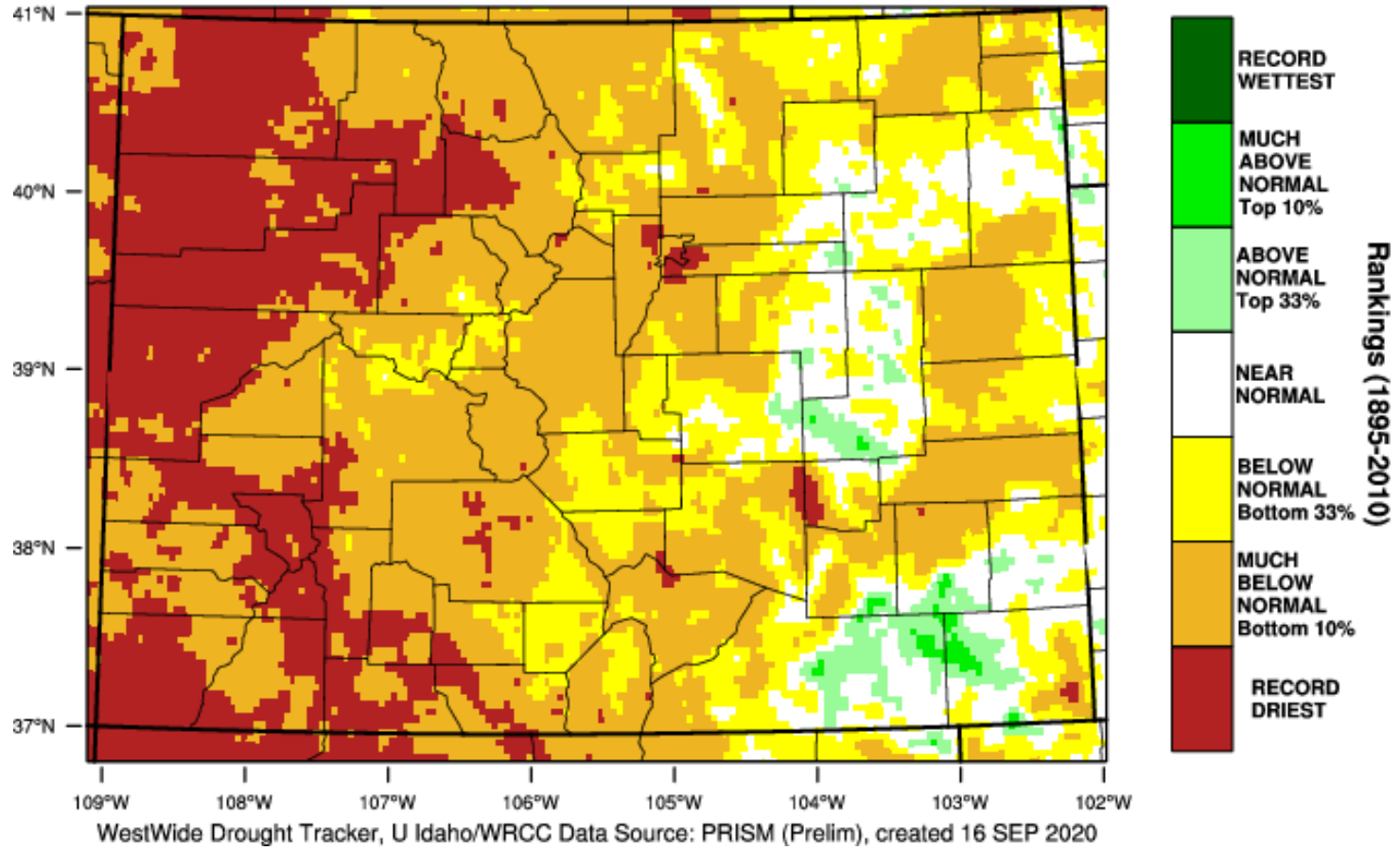


Also: 7<sup>th</sup> driest summer on record  
 2<sup>nd</sup> driest 12-month Sep-Aug on record

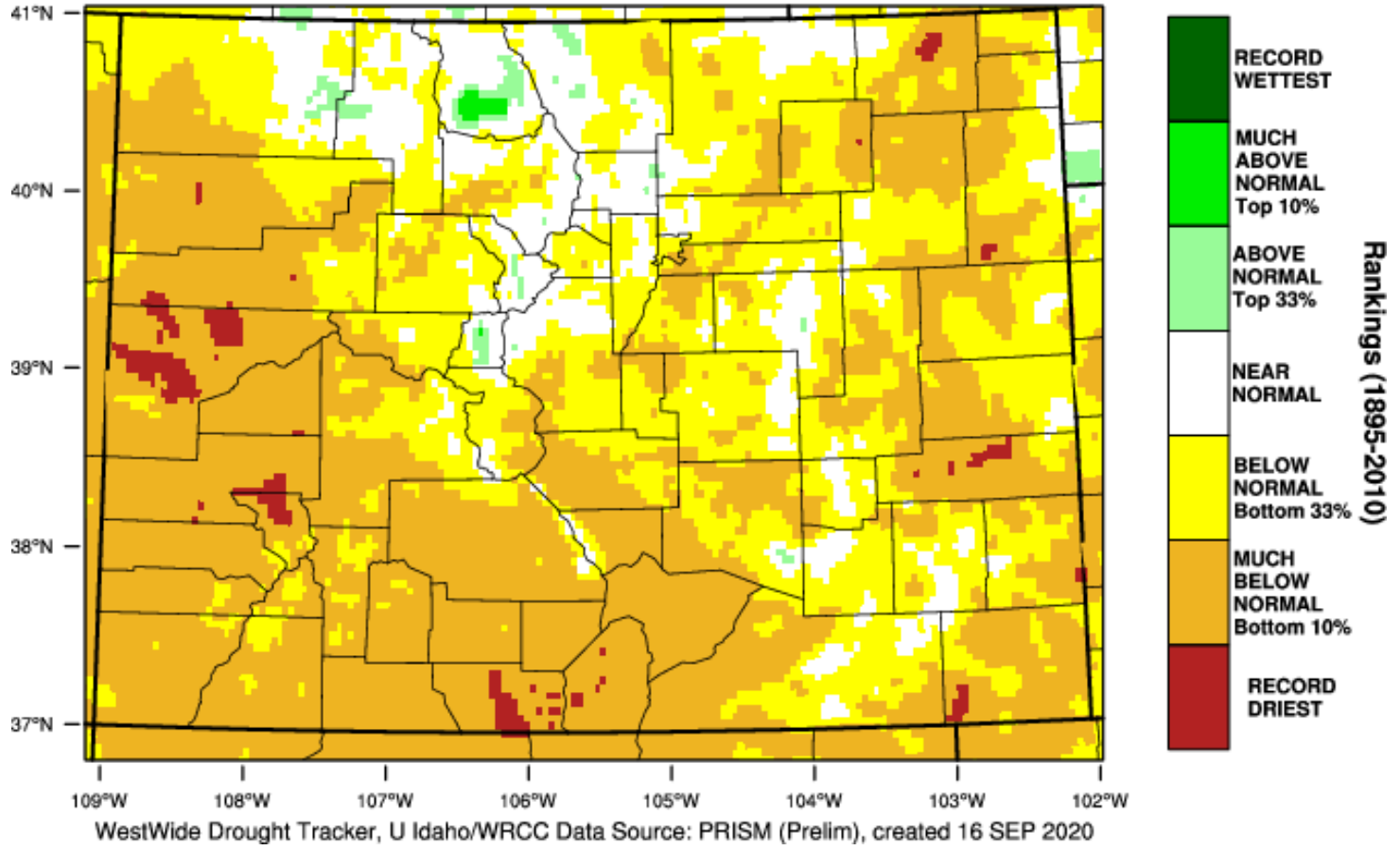
Month	P Rank (of 126 years)	Above, below, or near avg?
Oct	40 <sup>th</sup> driest	below
Nov	52 <sup>nd</sup> wettest	near avg
Dec	41 <sup>st</sup> wettest	above
Jan	34 <sup>th</sup> driest	below
Feb	58 <sup>th</sup> wettest	near avg
Mar	55 <sup>th</sup> driest	near avg
Apr	7 <sup>th</sup> driest	much below
May	18 <sup>th</sup> driest	below
June	43 <sup>rd</sup> driest	near avg
July	41 <sup>st</sup> driest	below
August	5 <sup>th</sup> driest	much below



### Colorado - Precipitation August 2020 Percentile

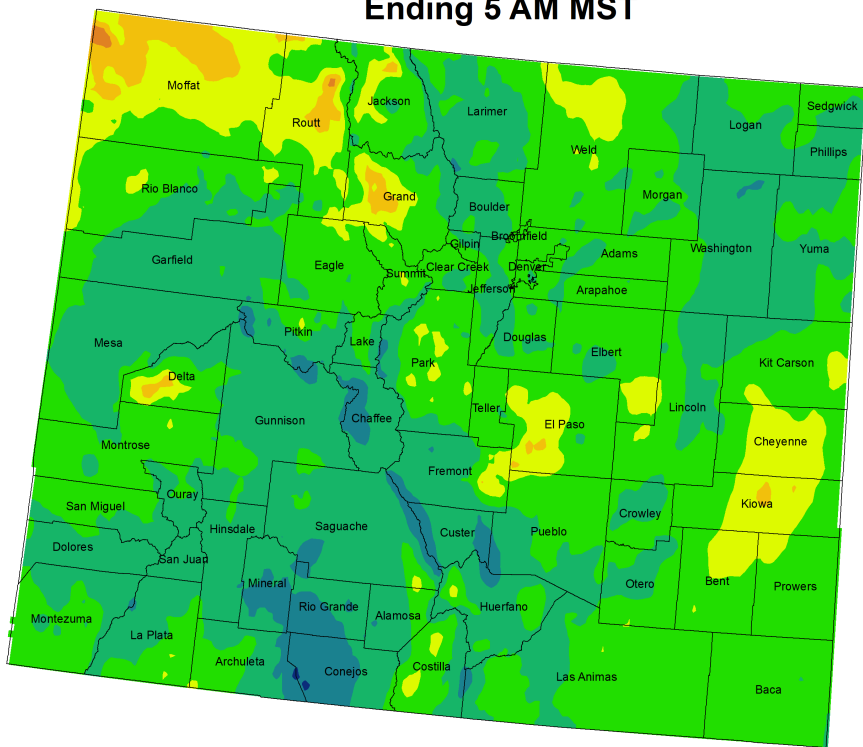


### Colorado - Precipitation October-August 2020 Percentile

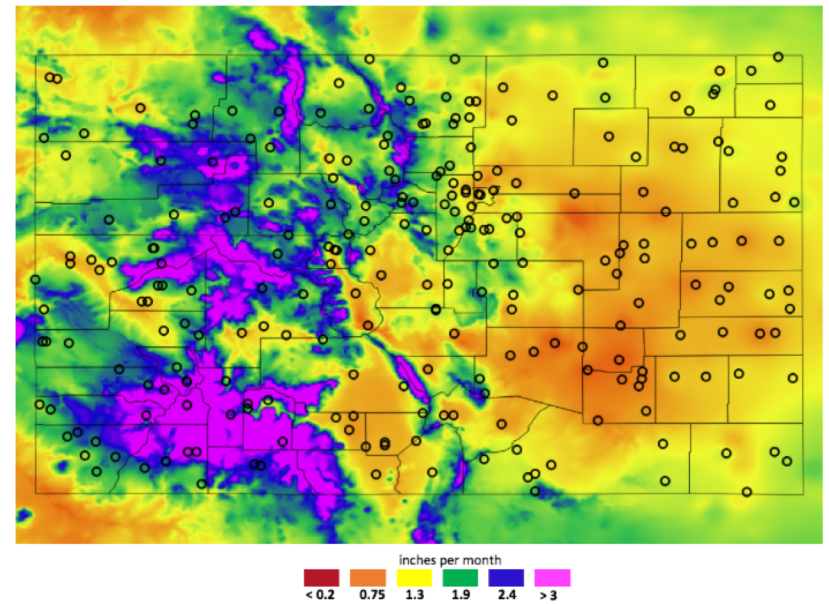




**Colorado Month to Date Precipitation  
1 - 21 September 2020  
Ending 5 AM MST**



**September Average**



[https://climate.colostate.edu/normals/p\\_sep\\_norm.html](https://climate.colostate.edu/normals/p_sep_norm.html)



Let's say we follow the hottest August on record with a record early September snow!



[giphy.com](https://giphy.com)



## Records Set

### Heat

- Record high of 101°F set on 9/5. Highest temperature ever recorded in September, and latest data of 100° reading.
- Record high of 97° set on 9/6.

### Cold

- Tied earliest freeze on record (Previously set September 8th, 1962)
- Tied record low on 9/8 (31°F, last set 1962)
- Tied record low on 9/9 (31°F, last set 1962)
- Record coldest maximum temperature on 9/9 (43°F). Previous record was 53°F set in 1989.
- Tied record low on 9/10 (35°F, last set 1898)
- Largest 2 calendar day temperature drop in September (62°F drop). Previous record was 59°F set in 1993.

### Snow

- Tied the second earliest snowfall on record for Denver (9/8). Earliest snowfall on record is 9/3/1961.
- Daily snowfall record set for 9/8 (1.0 inch fell). Previous record was 0.7" in 1962.
- Daily snowfall record tied for 9/9 (Trace). Previous record was a Trace in 1962.
- Snapped a streak of 19 consecutive years without September snow in Denver.

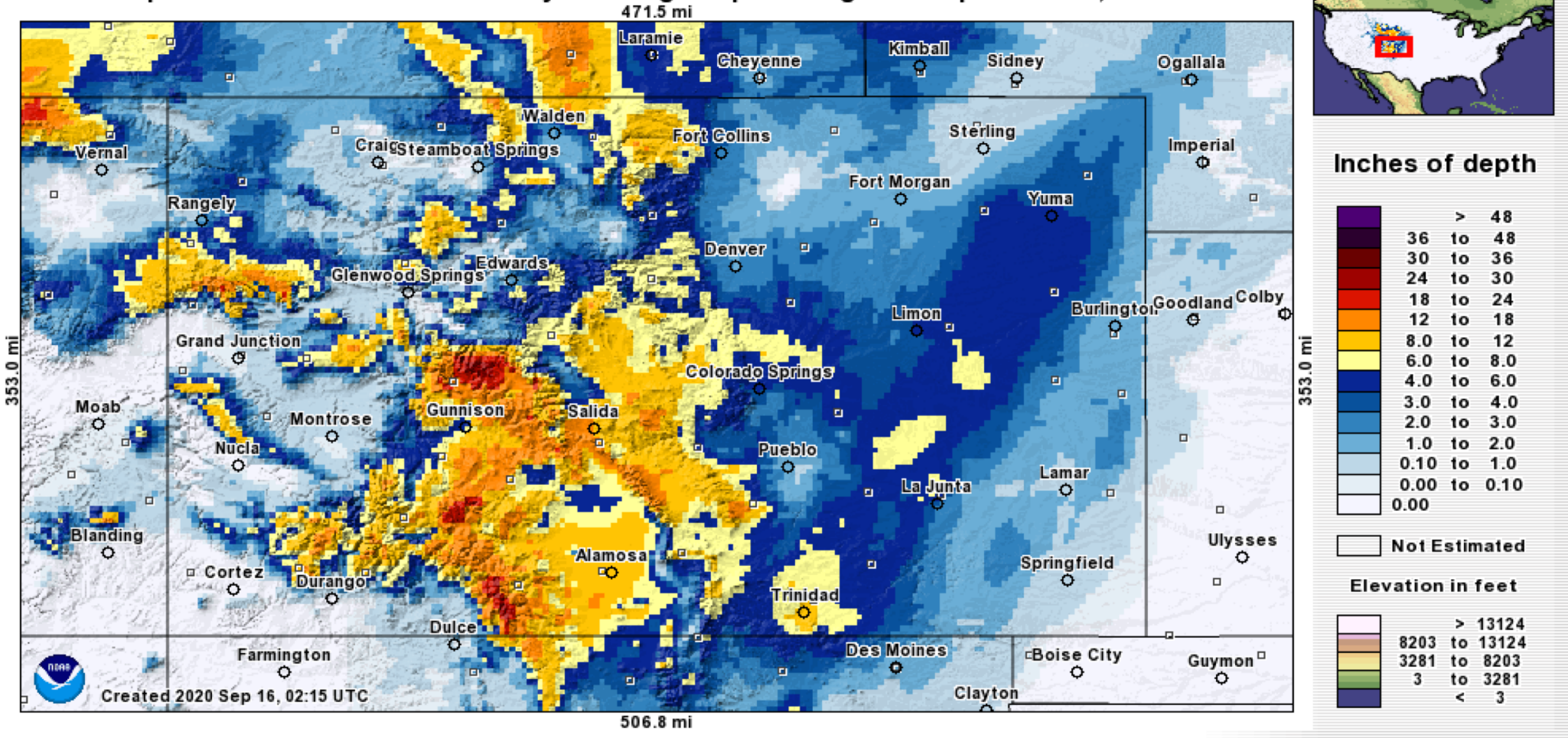
### Other Notable Records

- Warmest temperature ever recorded the day before a measurable snowfall (93°F on 9/7). Previous high was 92°F on September 12, 1993.
- Shortest number of days between a 100 degree day and measurable snowfall (3). Previous record was 38 days in 2019.
- Number of days (2) between a record high and record low in Denver (September 6 to September 8). Ties previous record from August 15 -17 in 1960.

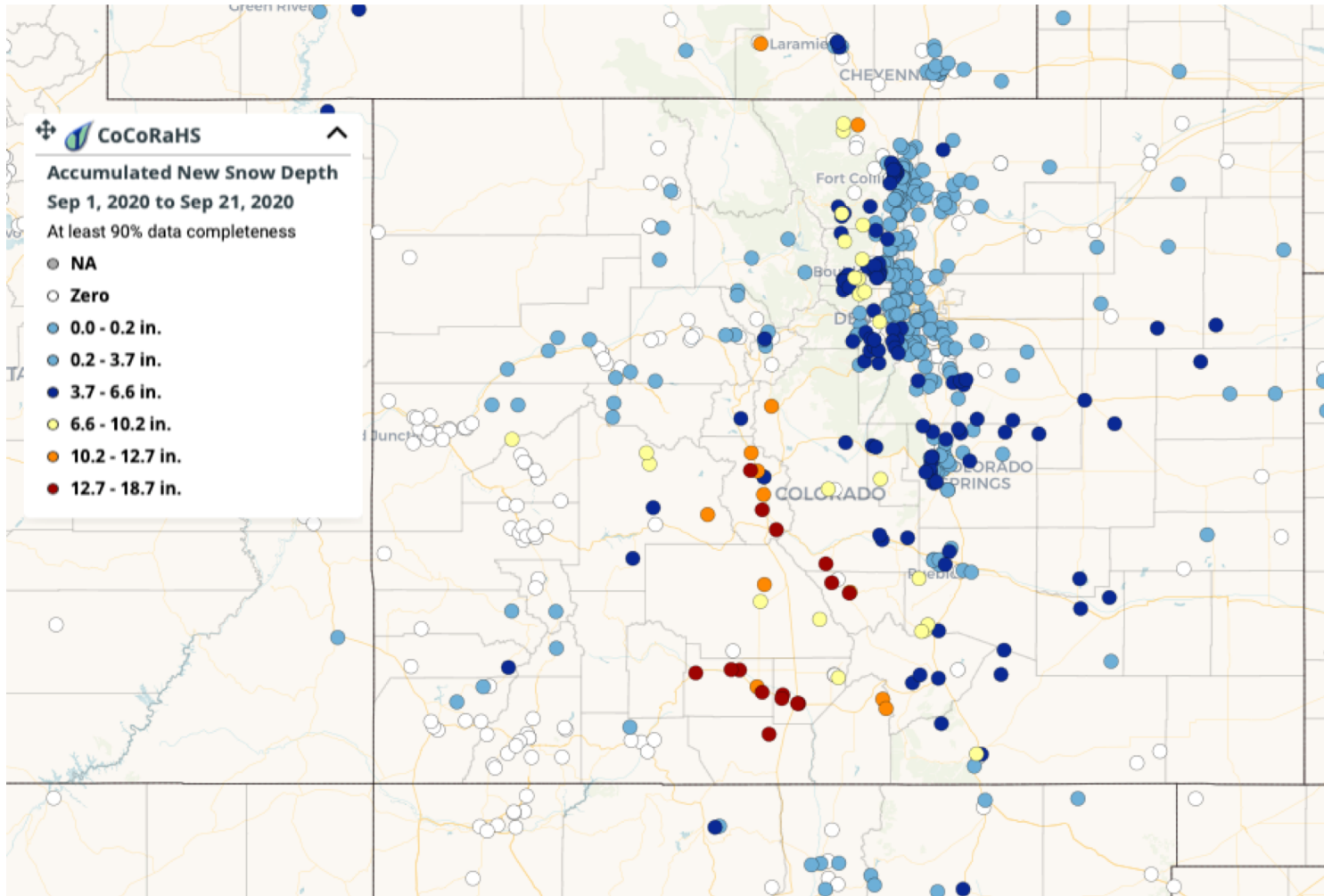
<https://www.weather.gov/bou/Sept2020EarlySnow>



# Interpolated Observed Snowfall Analysis during 72h preceding 2020 September 11, 0:00 UTC



<https://www.nohrsc.noaa.gov/interactive/html/map.html>



[maps.cocorahs.org](https://maps.cocorahs.org)

# September's Memorable Extremes

- La Junta Municipal AP recorded the hottest September temperature for the state with 108° on September 6.
- Earliest snow on record for Fort Collins with 2.3" on September 8. Previous earliest snow was September 12.
- Denver, Colorado Springs, and Pueblo have all had the most 90° days recorded in 2020.
- Monte Vista reported 14 inches of snow in 2 days, toppling all September records and even counting as one of the top ranked snowiest events in all months.
- Two stations tied national record for shortest period between 100° and snowfall
  - La Junta: 101° September 7, 3.4" September 9
  - Ordway 1 ENE: 104° September 7, 3.9" September 9
- According to NOAA NCEI records, 28 stations have set records for highest September temperature.



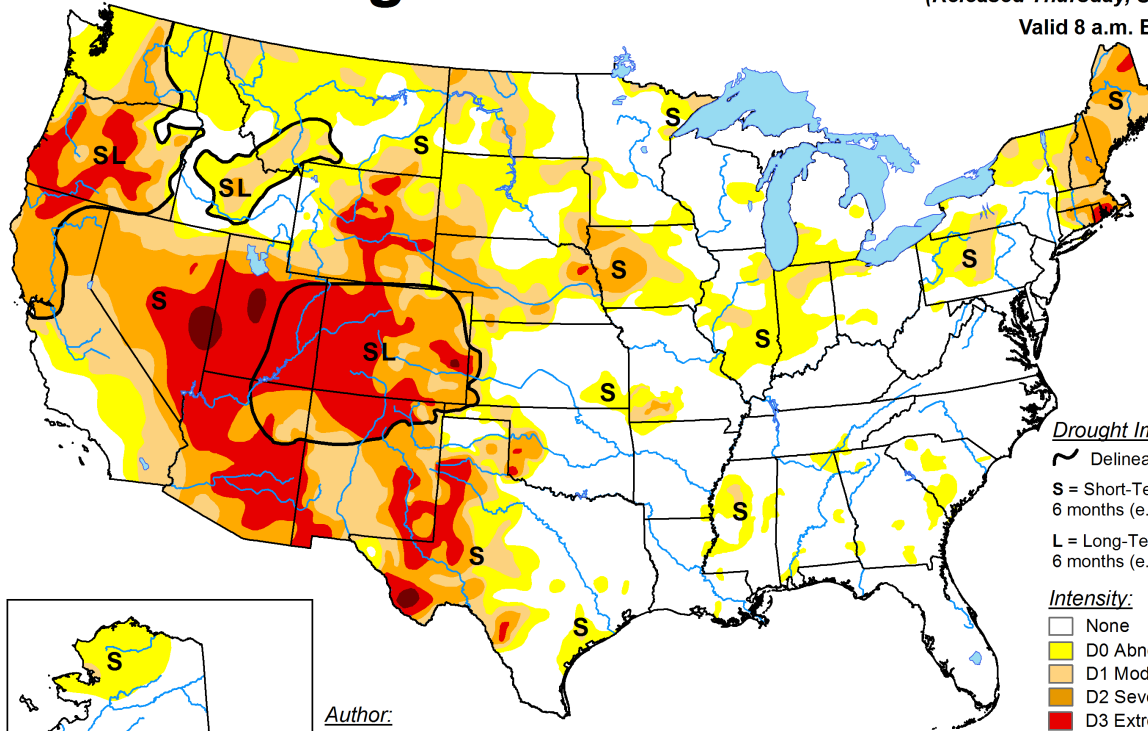


## Drought Conditions



# U.S. Drought Monitor

September 15, 2020  
 (Released Thursday, Sep. 17, 2020)  
 Valid 8 a.m. EDT

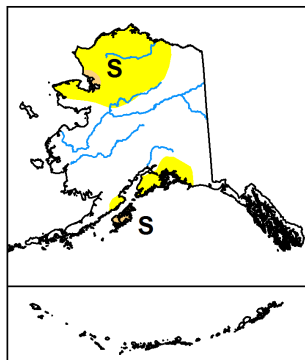


**Drought Impact Types:**

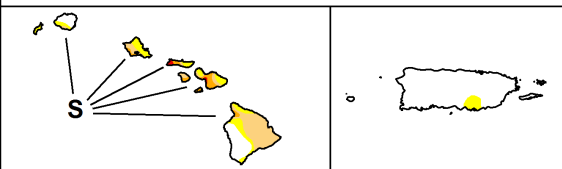
- ~ Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

**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>



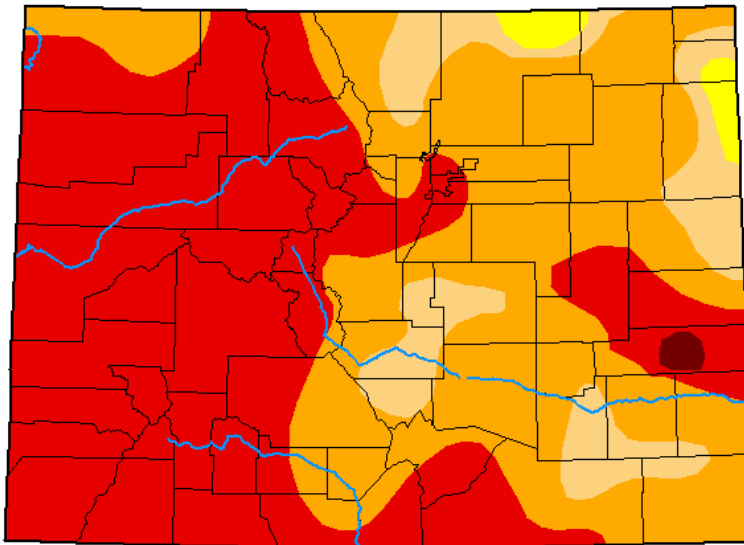
[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)





# U.S. Drought Monitor Colorado

**September 15, 2020**  
(Released Thursday, Sep. 17, 2020)  
Valid 8 a.m. EDT



*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	0.00	100.00	98.60	88.89	50.10	0.38
<b>Last Week</b> <i>09-08-2020</i>	0.00	100.00	98.83	92.27	54.82	0.38
<b>3 Months Ago</b> <i>06-16-2020</i>	18.40	81.60	65.91	55.41	32.96	0.00
<b>Start of Calendar Year</b> <i>12-31-2019</i>	31.72	68.28	51.19	20.11	0.00	0.00
<b>Start of Water Year</b> <i>10-01-2019</i>	30.14	69.86	27.53	0.00	0.00	0.00
<b>One Year Ago</b> <i>09-17-2019</i>	50.45	49.55	6.68	0.00	0.00	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:

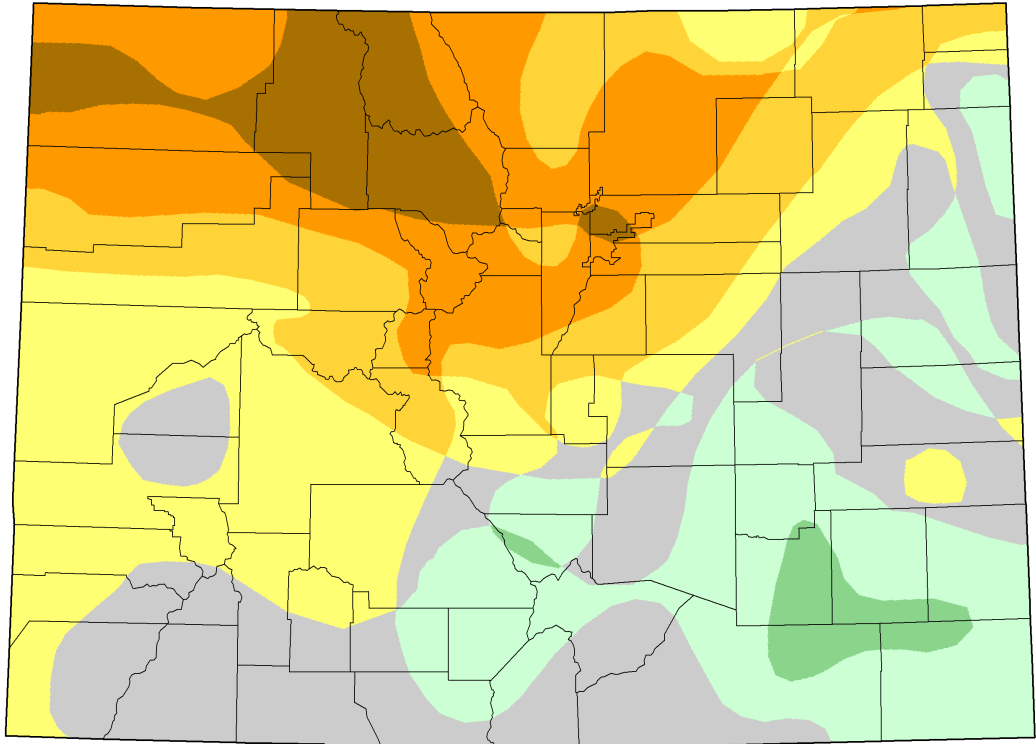
Brad Rippey  
U.S. Department of Agriculture



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



### U.S. Drought Monitor Class Change - Colorado 3 Months



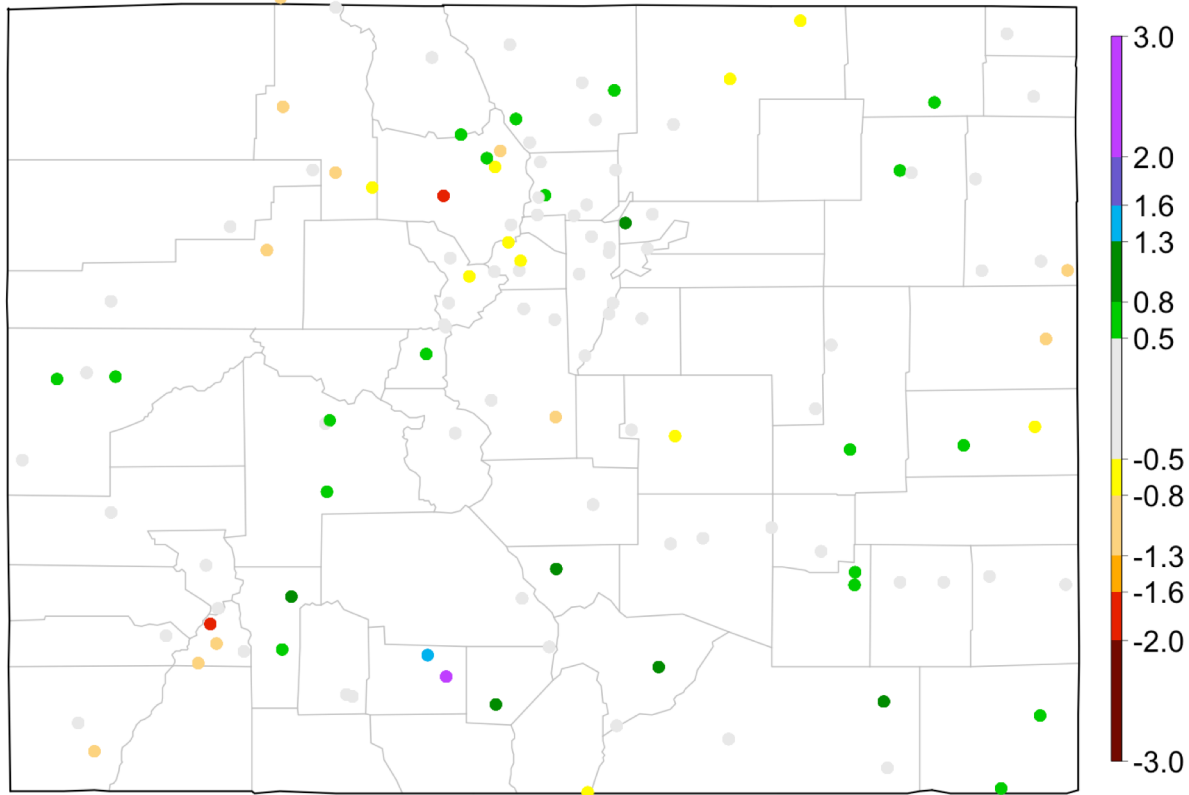
September 15, 2020  
compared to  
June 23, 2020

[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

30-day SPI: 2020/08/21 - 2020/09/19

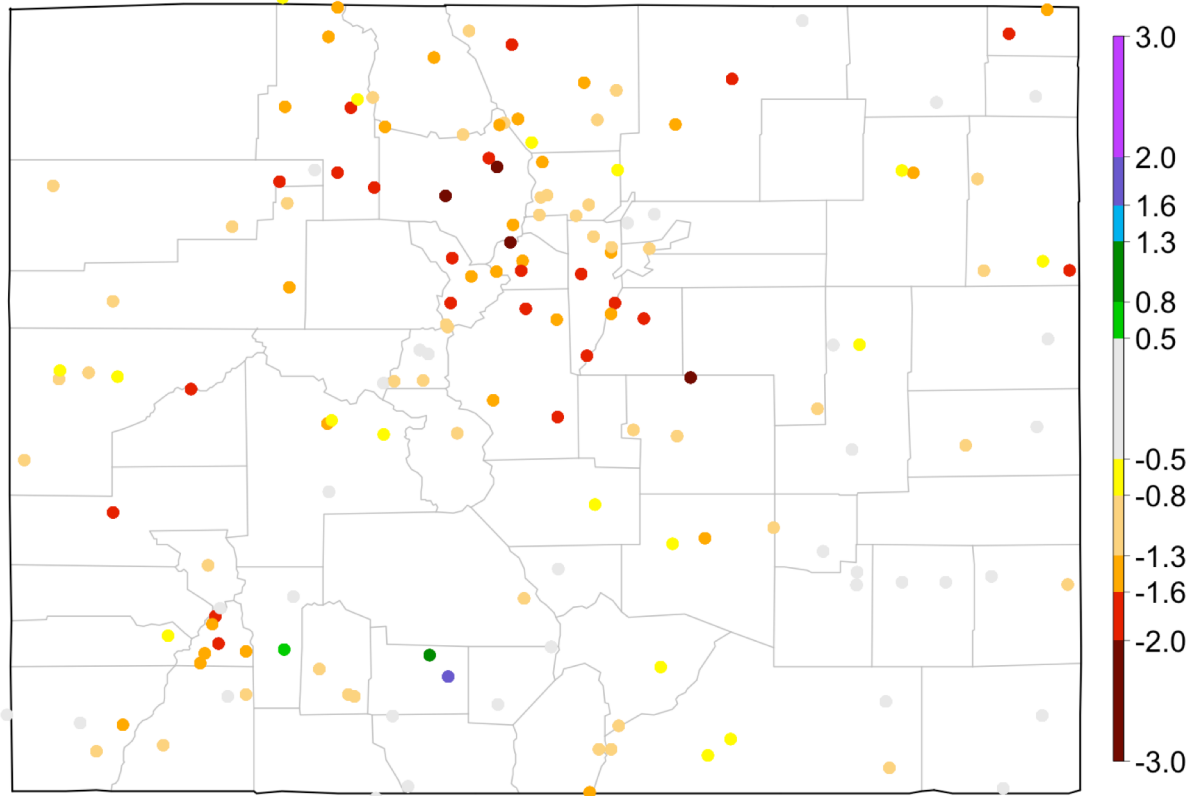


Data from High Plains Regional Climate Center and ACIS

<http://climate.colostate.edu/drought/spi.html>



90-day SPI: 2020/06/22 - 2020/09/19

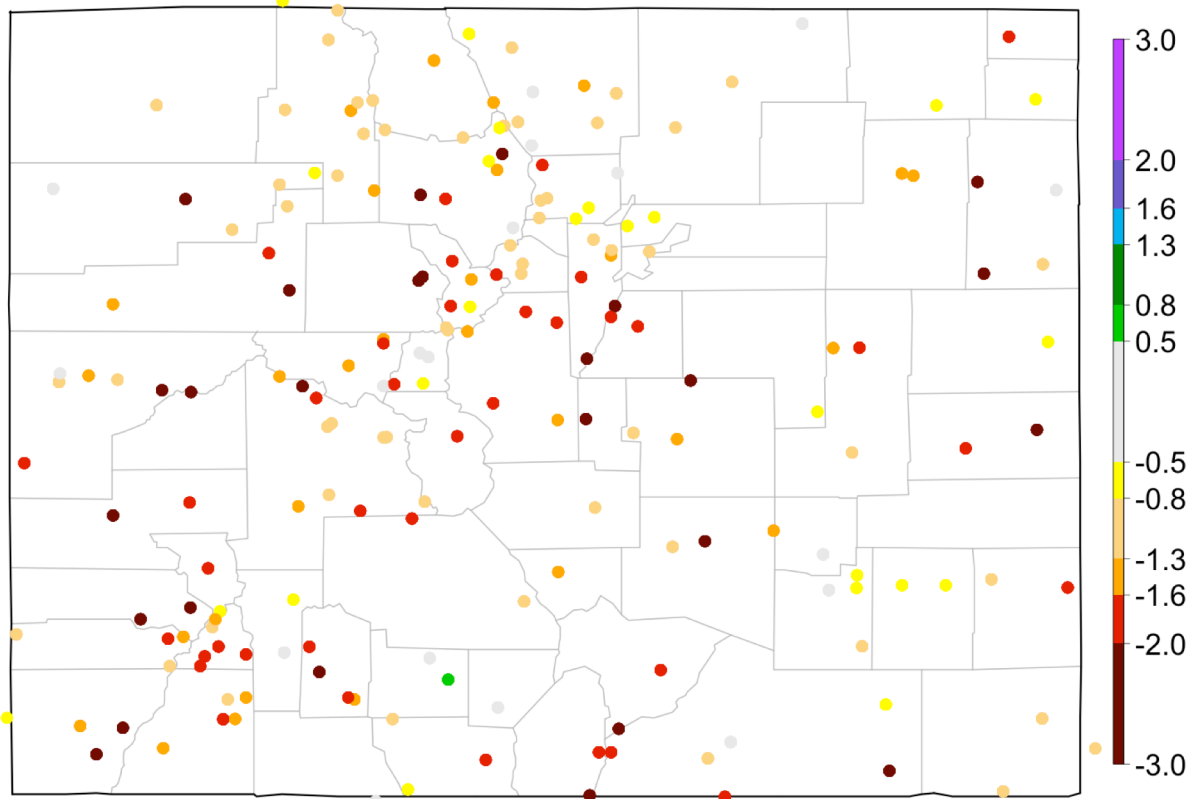


Data from High Plains Regional Climate Center and ACIS

<http://climate.colostate.edu/drought/spi.html>



6-month SPI: 2020/03/20 - 2020/09/19

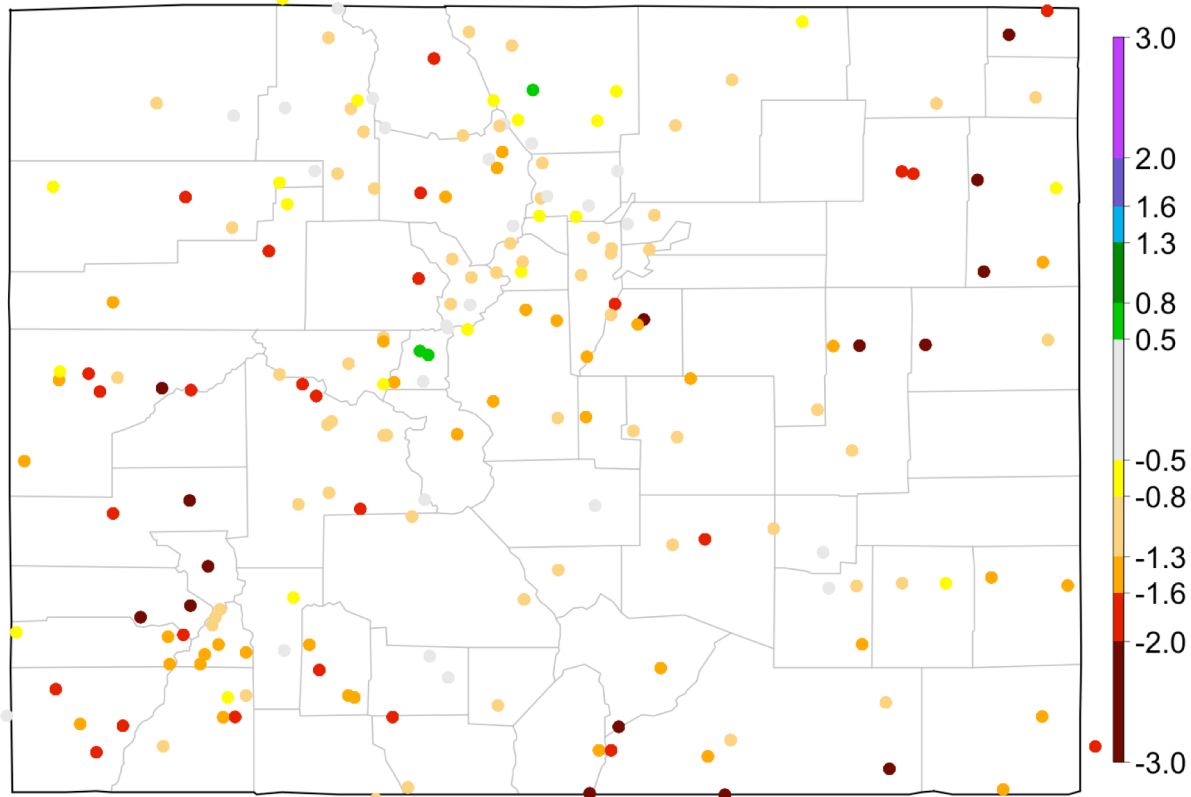


Data from High Plains Regional Climate Center and ACIS

<http://climate.colostate.edu/drought/spi.html>



12-month SPI: 2019/09/20 - 2020/09/19

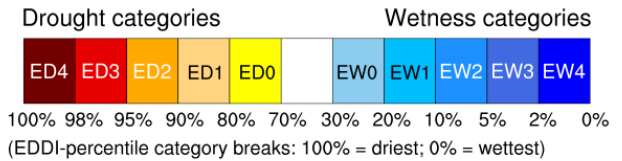
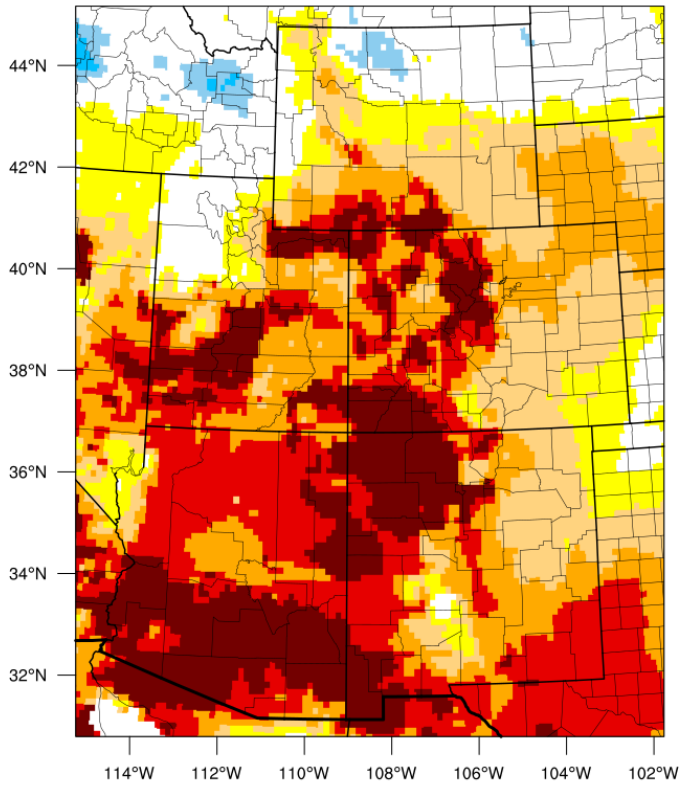


Data from High Plains Regional Climate Center and ACIS

<http://climate.colostate.edu/drought/spi.html>

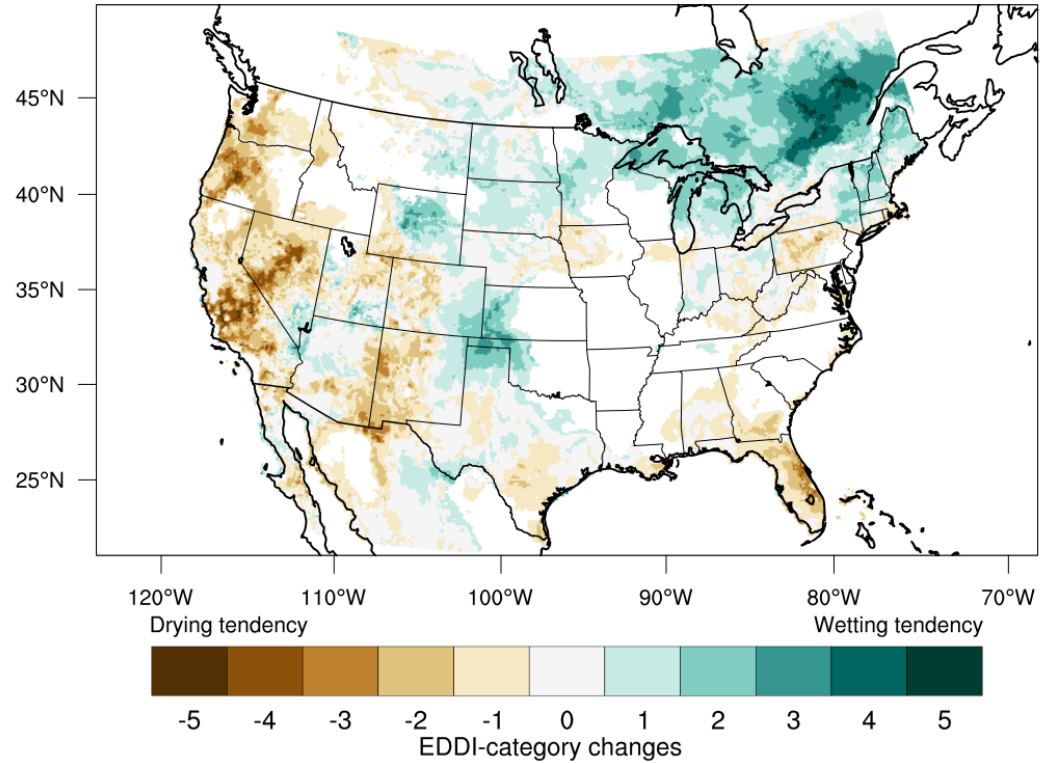


3-month EDDI categories for September 17, 2020



Generated by NOAA/ESRL/Physical Sciences Laboratory

3-month EDDI: Changes during the 30 days ending on September 17, 2020



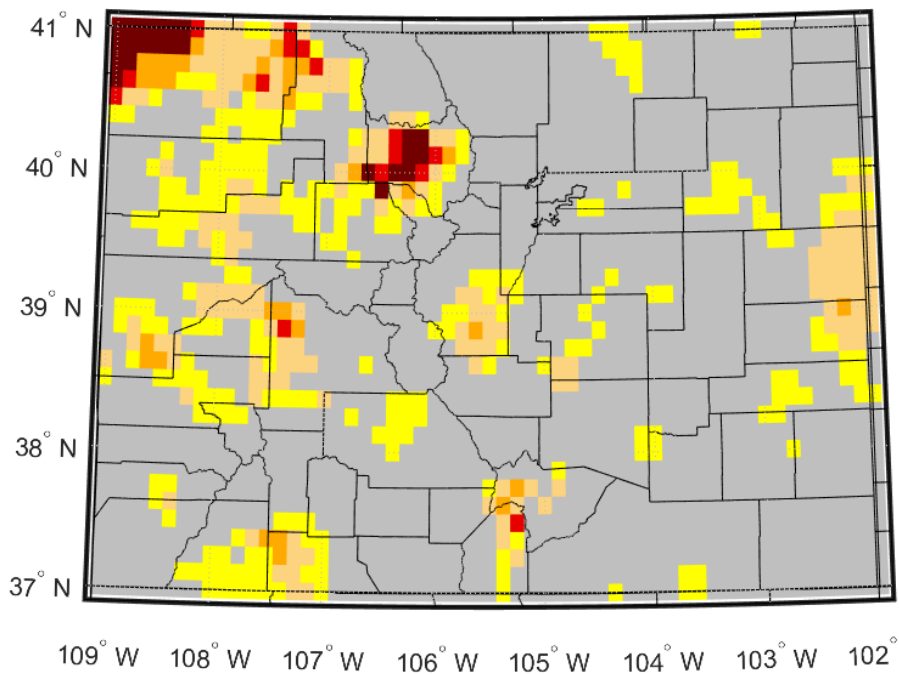
Only regions that start or end above the 70th percentile (i.e., ED0-ED4) are shown.

Generated by NOAA/ESRL/Physical Sciences Laboratory

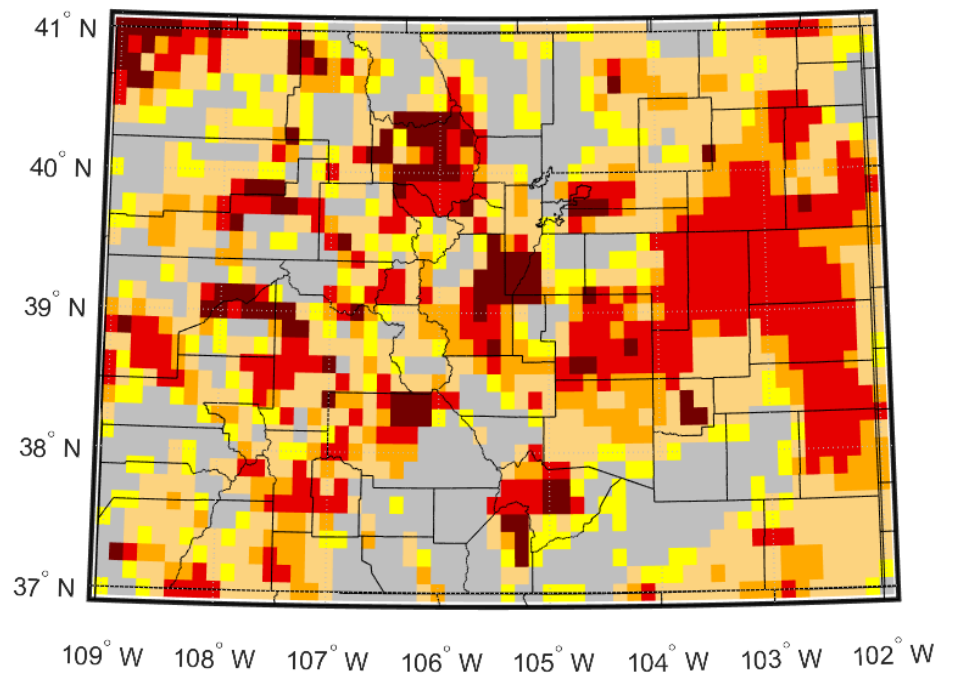
<https://psl.noaa.gov/eddi/>



**Top 10cm Soil Moisture Drought Category**  
**09/16/2020**

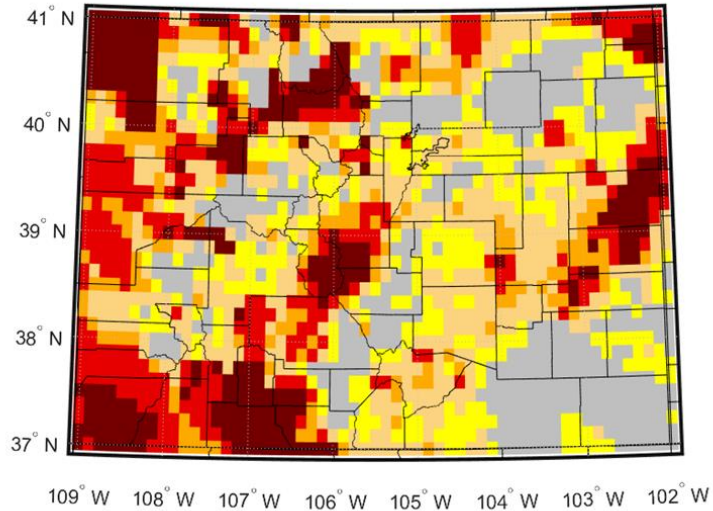


**Top Meter Soil Moisture Drought Category**  
**09/16/2020**

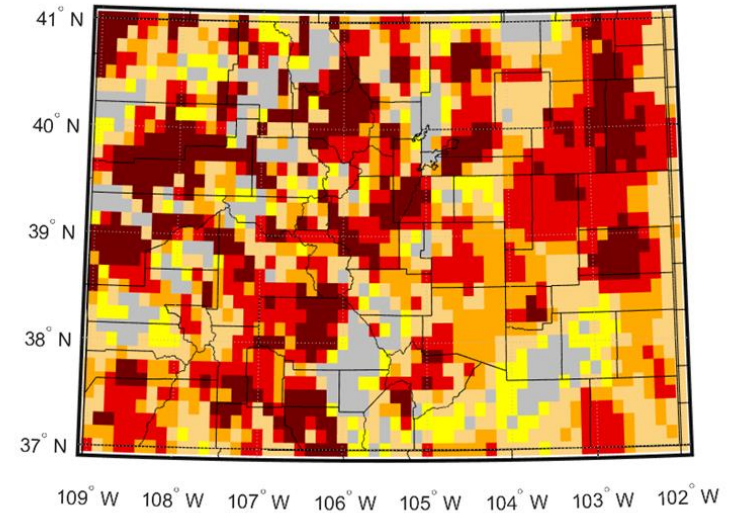




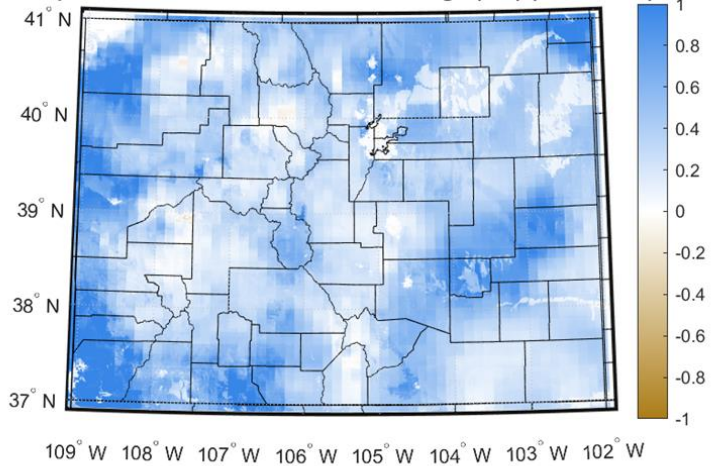
**Top 10cm Soil Moisture Drought Category**  
09/06/2020



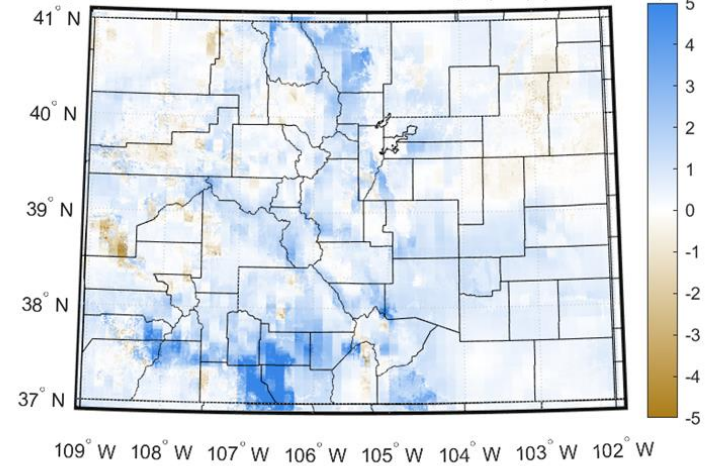
**Top Meter Soil Moisture Drought Category**  
09/06/2020



**Top 10cm Plant Available Water Change (cm) (9/16 - 9/06)**



**Top Meter Plant Available Water Change (cm) (9/16 - 9/06)**



## Outlook

Next 7 days

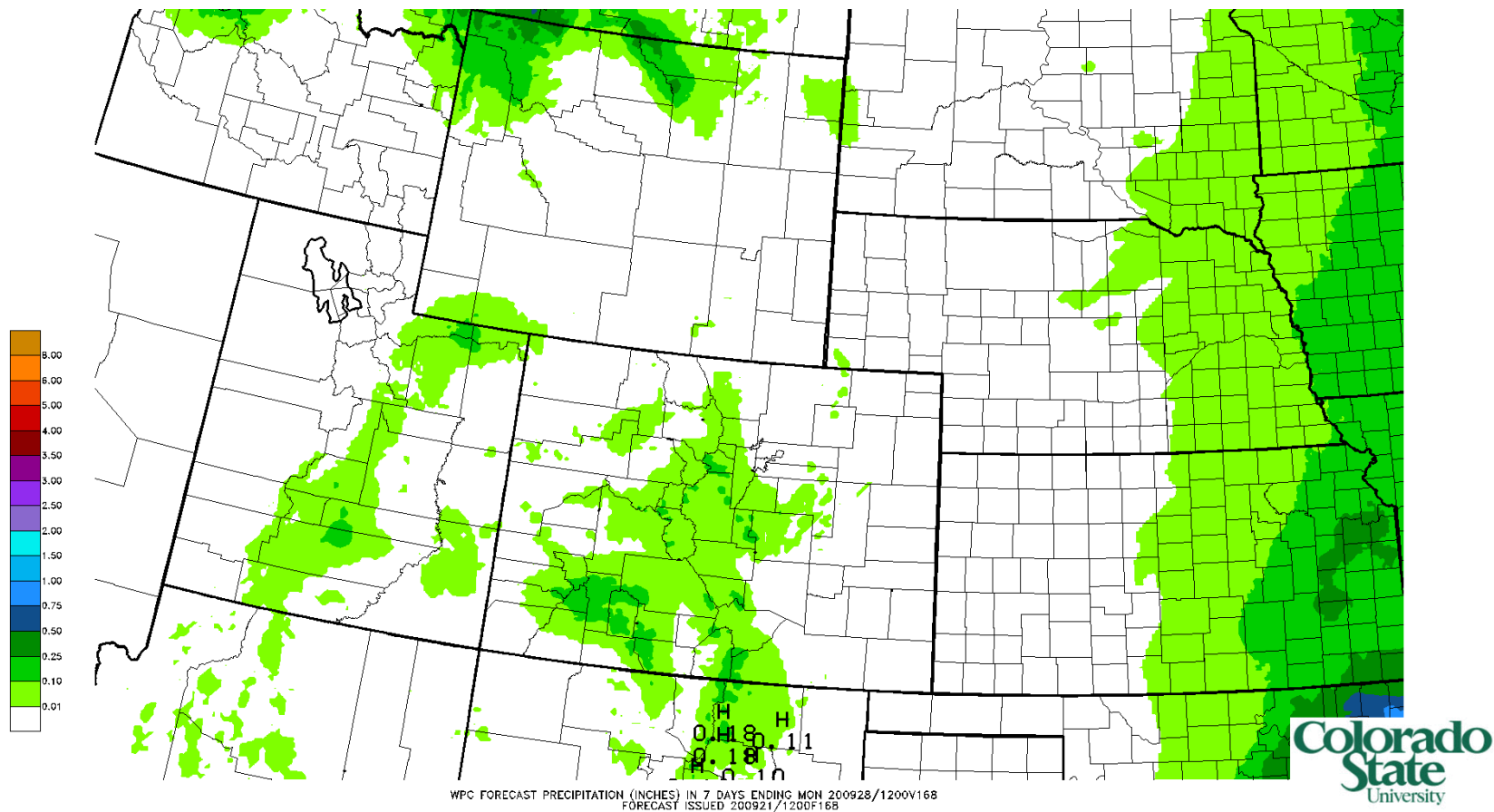
CPC Outlooks

What is happening with El Niño?

Precipitation Projections

Any word on the monsoon?

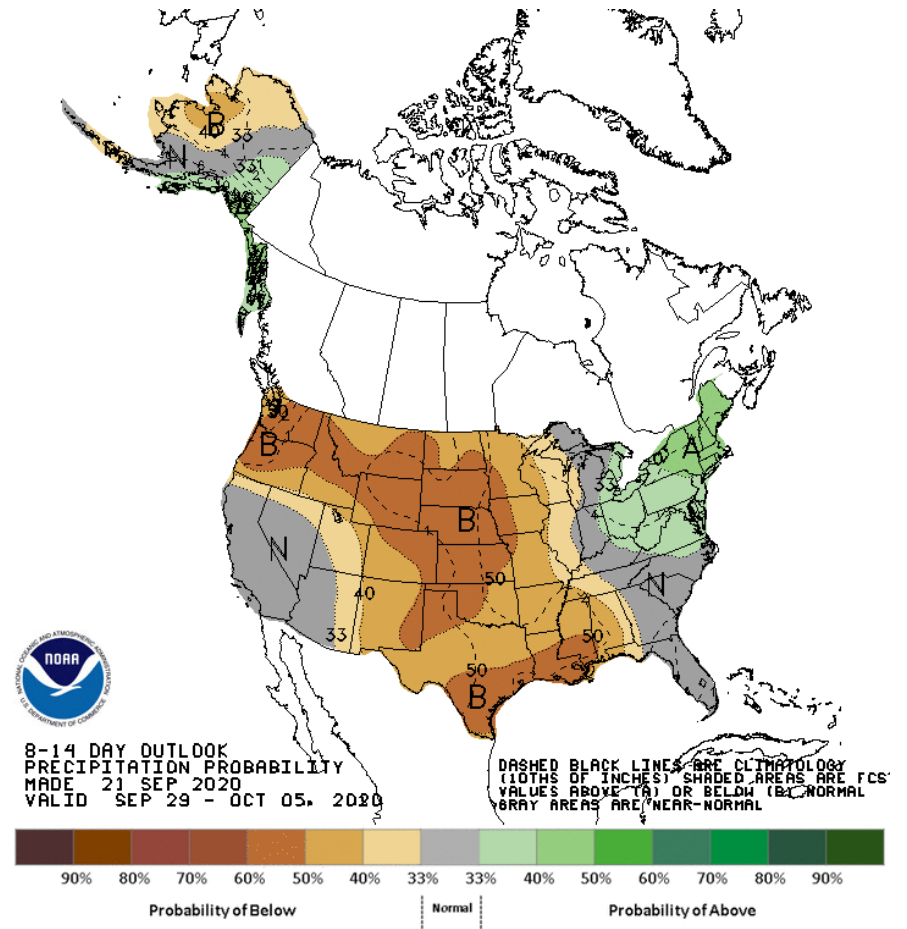
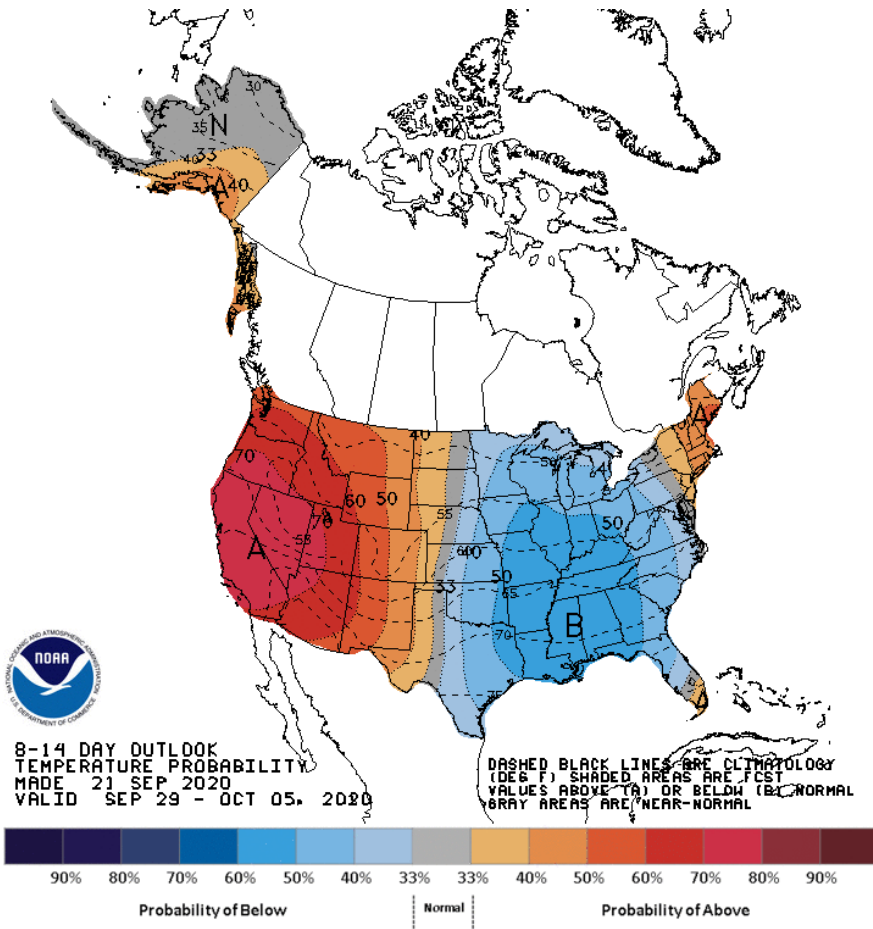




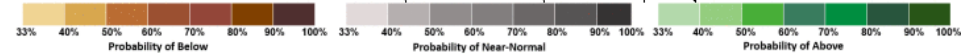
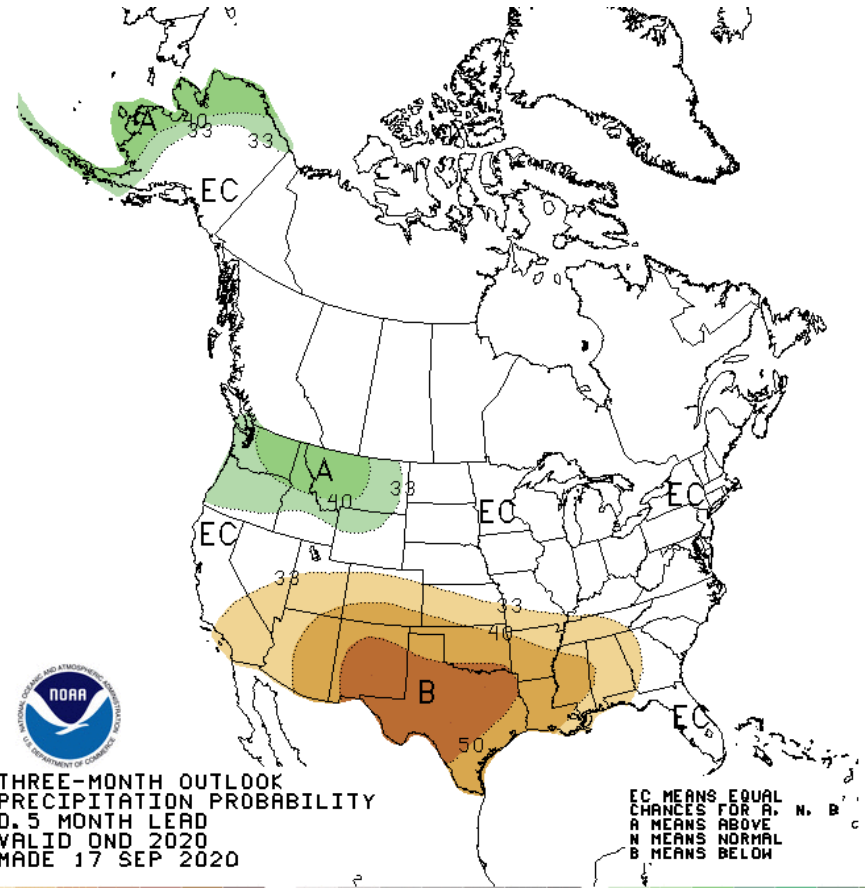
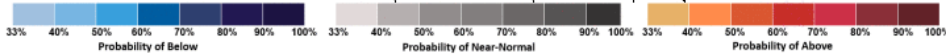
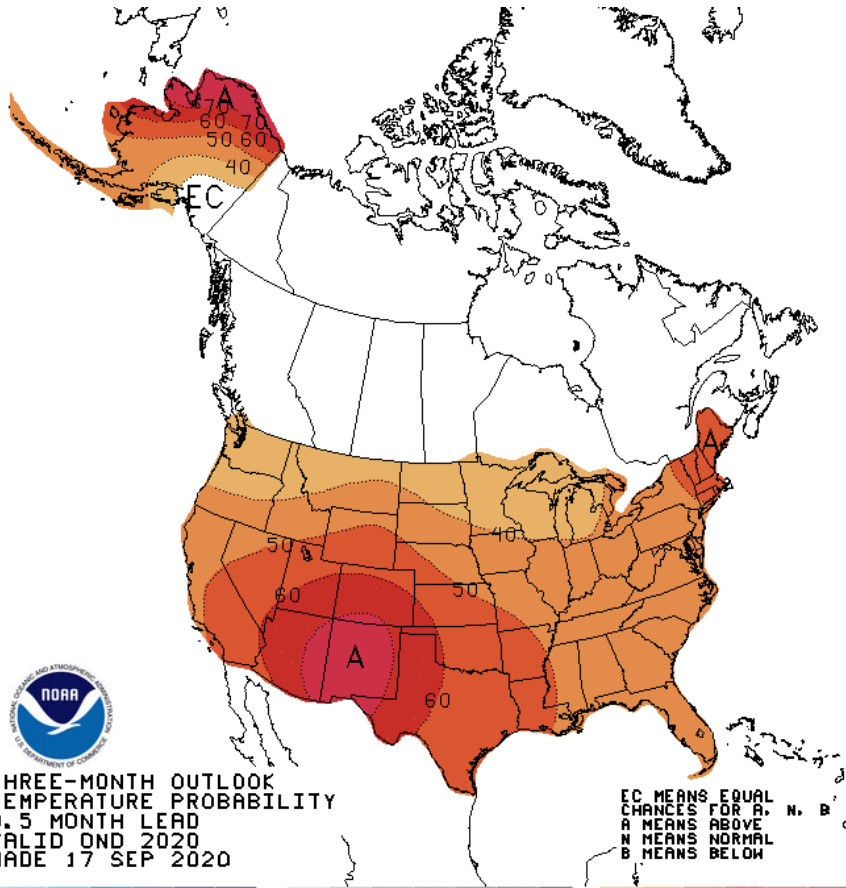
# NOAA 7-day precip forecast

[http://schumacher.atmos.colostate.edu/weather/real\\_time/hpc\\_qpf\\_168h\\_fnl/hpc\\_qpf\\_168h\\_fnl.gif](http://schumacher.atmos.colostate.edu/weather/real_time/hpc_qpf_168h_fnl/hpc_qpf_168h_fnl.gif)

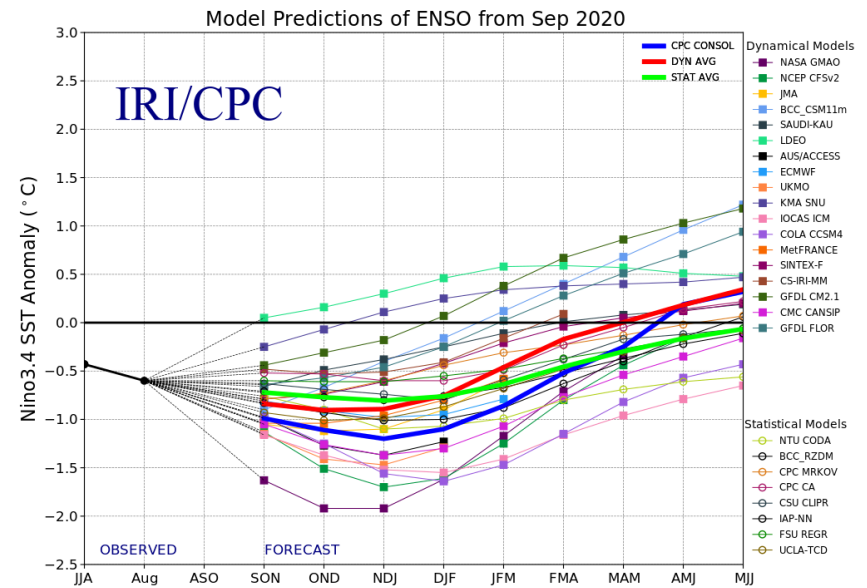
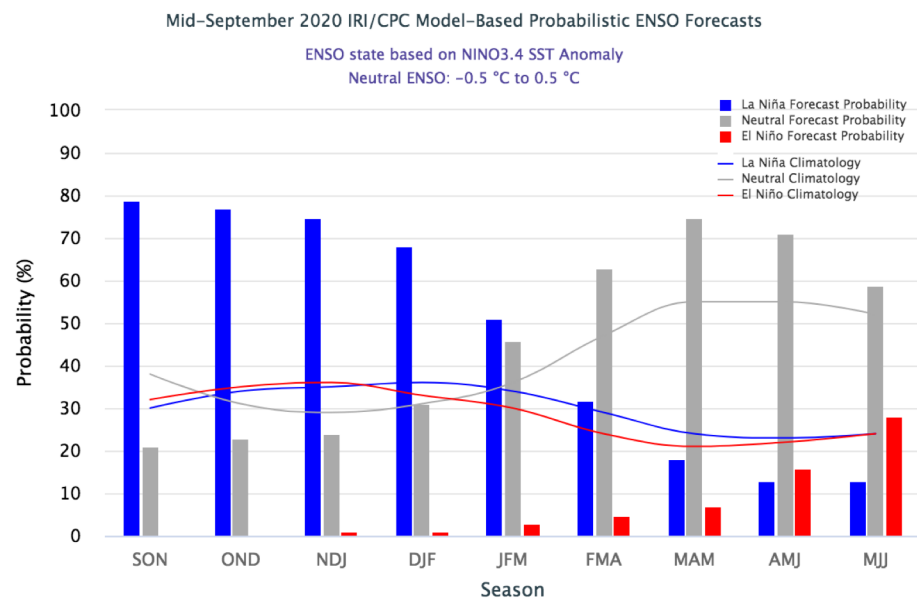
# 8-14 day outlook



# Seasonal outlook



# What's the El Niño forecast?

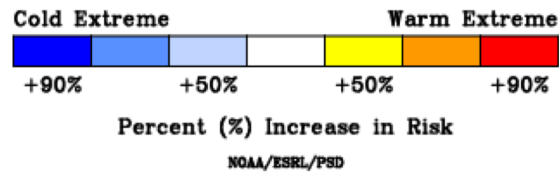
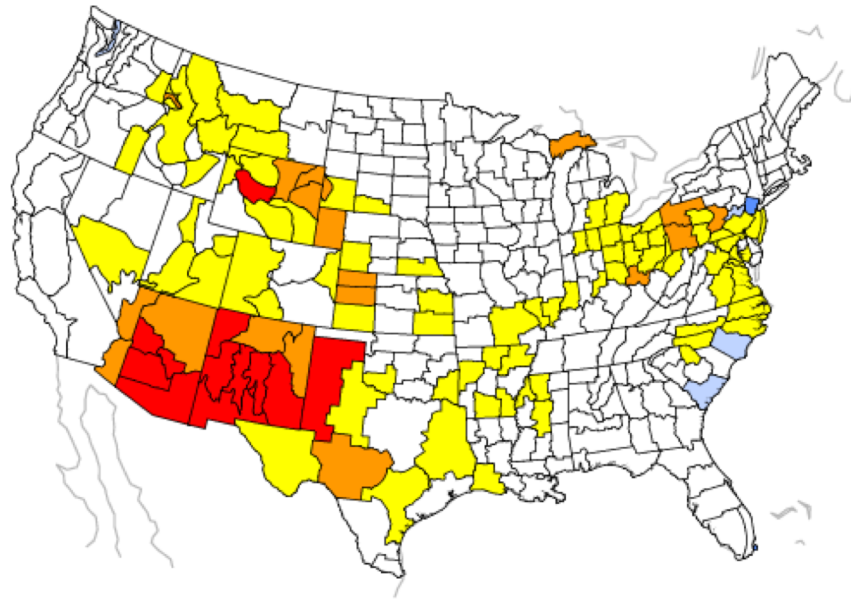


We're in a La Niña advisory. Both sea surface temperatures and atmospheric variables are consistent with La Niña conditions. There is a 75% chance that La Niña conditions will continue through the fall and winter.

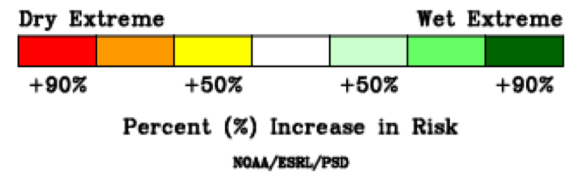
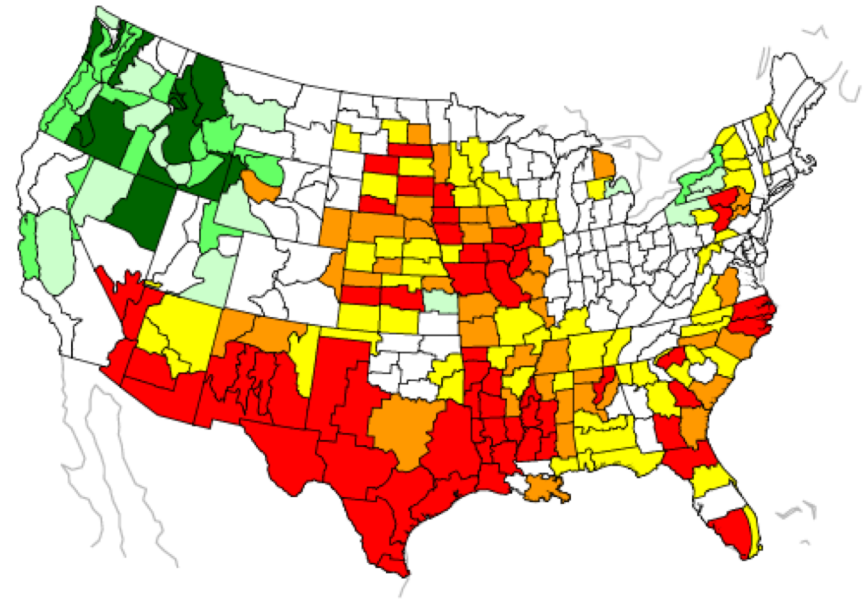


# What's La Niña mean for fall/winter?

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

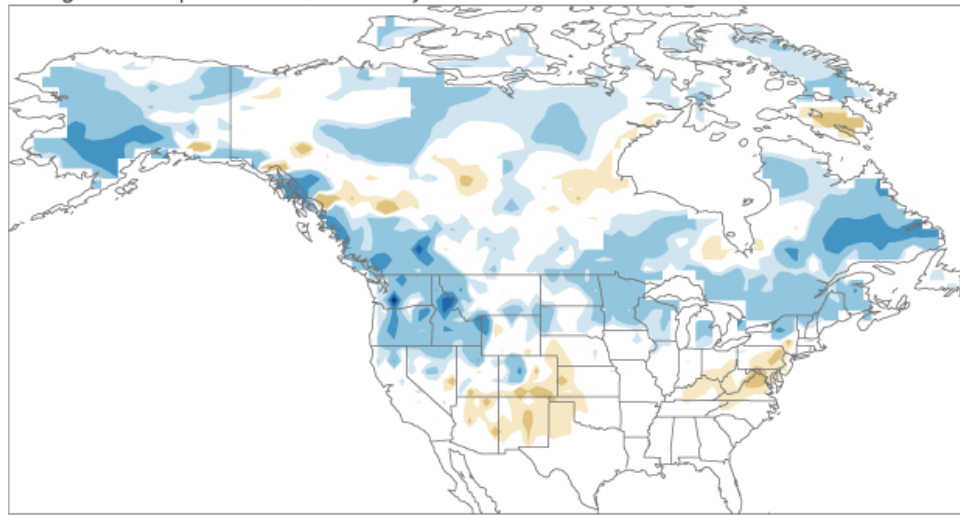


OND Precipitation During La Niña  
Increased Risk of Wet or Dry Extremes

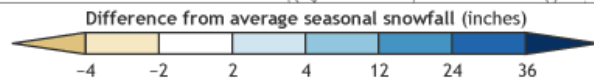


# What's La Niña mean for snow?

Average snowfall patterns for all La Niña years

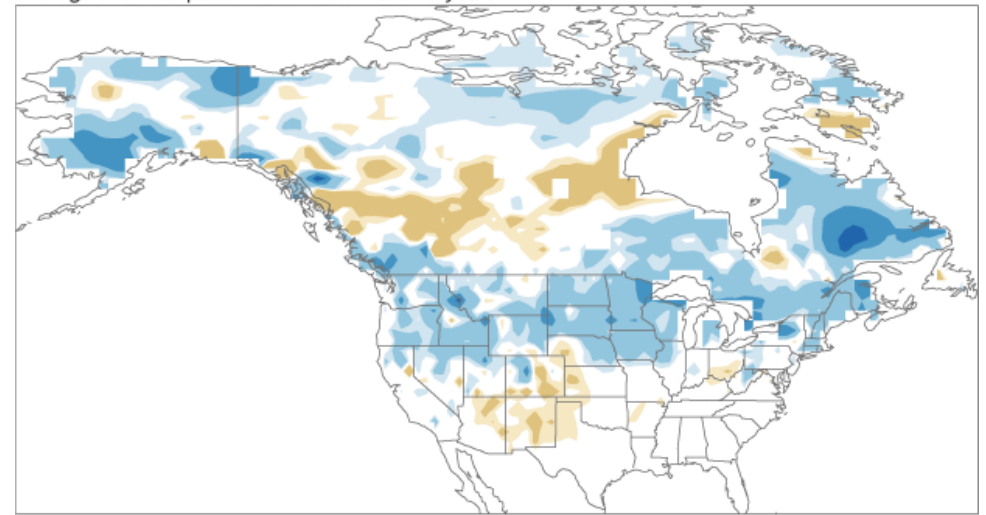


October-April  
1950-51 to 2008-09

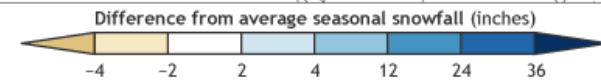


NOAA Climate.gov  
Data: Rutgers GSL

Average snowfall patterns for weak La Niña years



October-April  
1950-51 to 2008-09



NOAA Climate.gov  
Data: Rutgers GSL

<https://www.climate.gov/news-features/blogs/enso/what-about-snow-during-la-niña-winters>





# Summary points

- Very hot and dry August
- Momentary relief from an early September snow
- Quick return to warm and dry
- Warmer and drier than average conditions are more likely for the rest of fall
- We're in a La Niña, which is expected to continue through winter
- We're at an increased risk for warm extremes in a La Niña
- General pattern of wetter to the north and drier to the south sets up
- In a weak La Niña, the northern mountains are favored for more snow, while the plains and southern mountains are likely to have less than average



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

Check out our new Monthly Climate Summaries:  
[https://climate.colostate.edu/monthly\\_summary.html](https://climate.colostate.edu/monthly_summary.html)

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

Thank you!

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ATMOSPHERIC SCIENCE  
COLORADO STATE UNIVERSITY