

Colorado Climate Center

WATF Climate Update

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Water Availability Task Force

September 22, 2020



ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY



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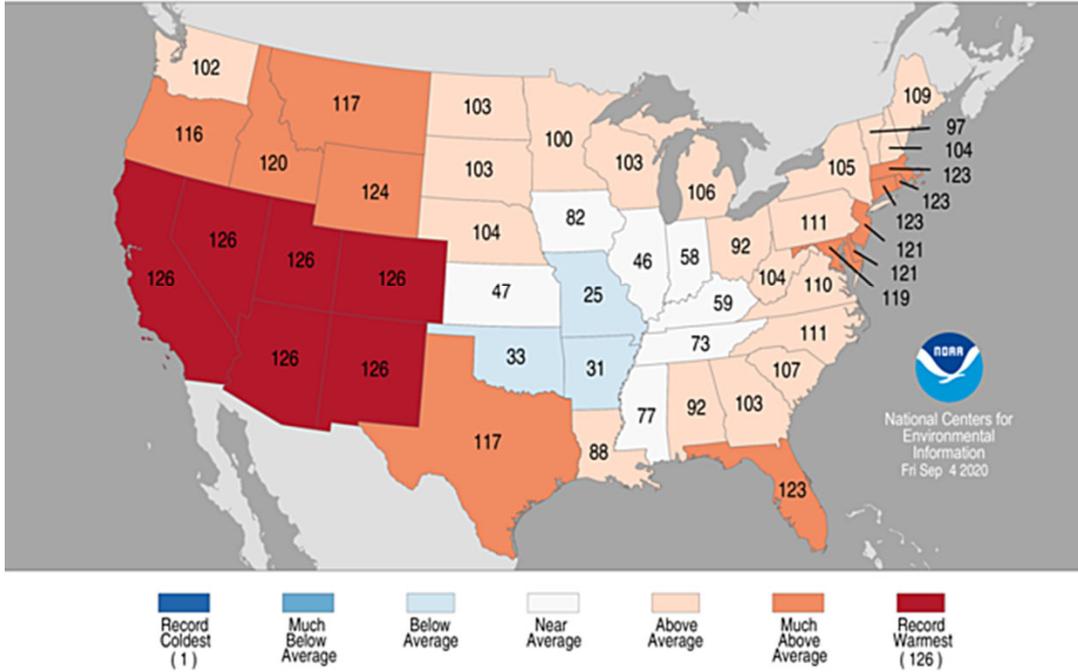
2020 Water Year To Date

Extreme August

Extreme September



Statewide Average Temperature Ranks
 August 2020
 Period: 1895–2020

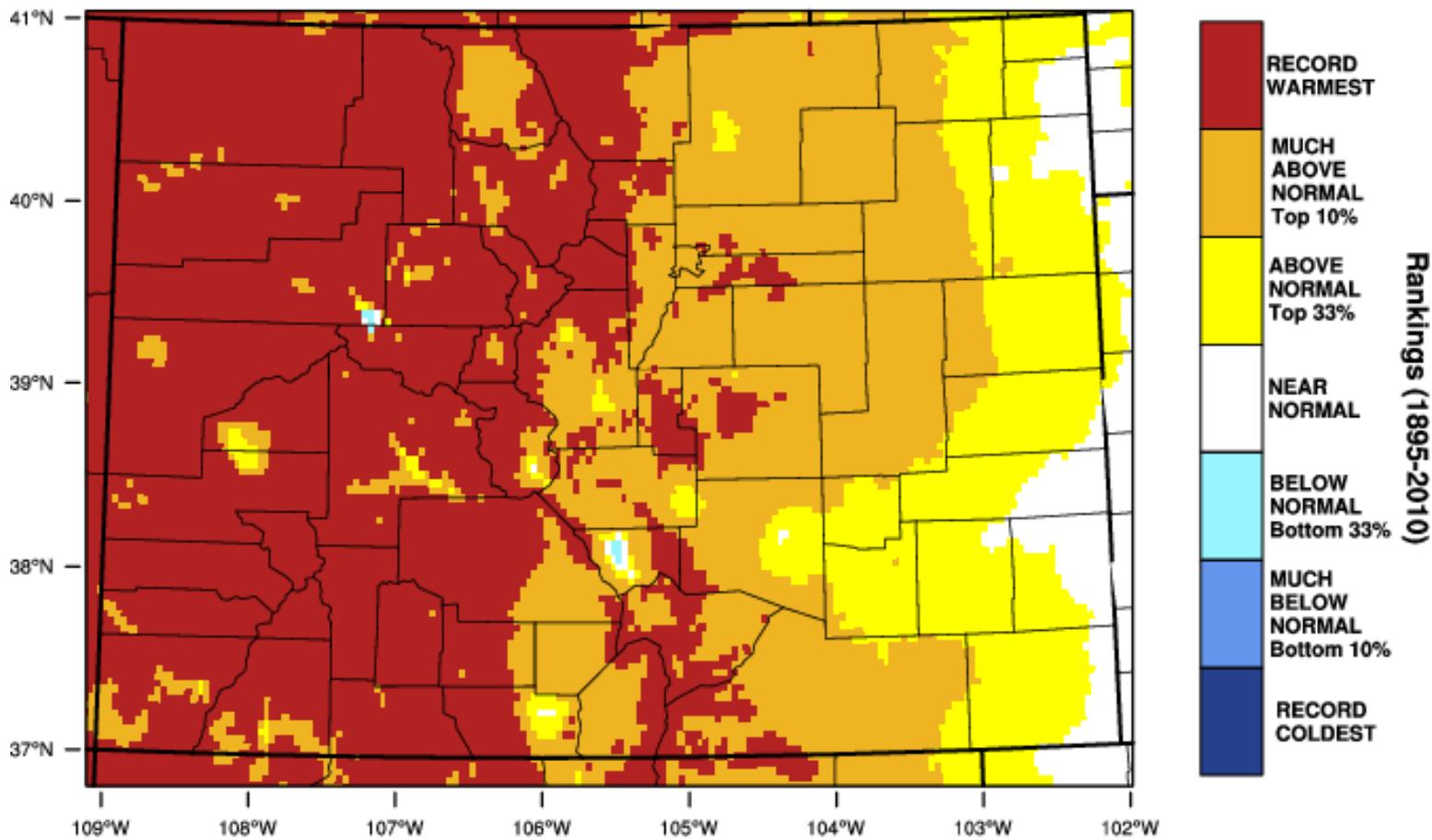


Also: 3rd warmest summer on record

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



Colorado - Mean Temperature August 2020 Percentile

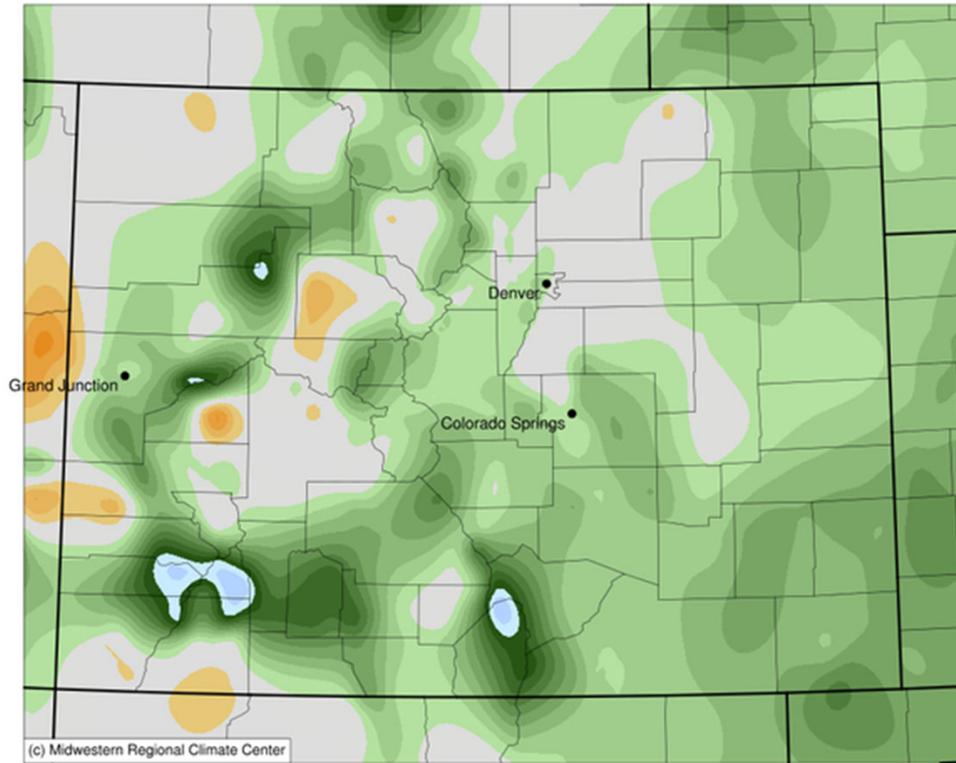


WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 SEP 2020



Average Temperature (°F): Departure from 1981-2010 Normals

September 01, 2020 to September 21, 2020



-12

-7

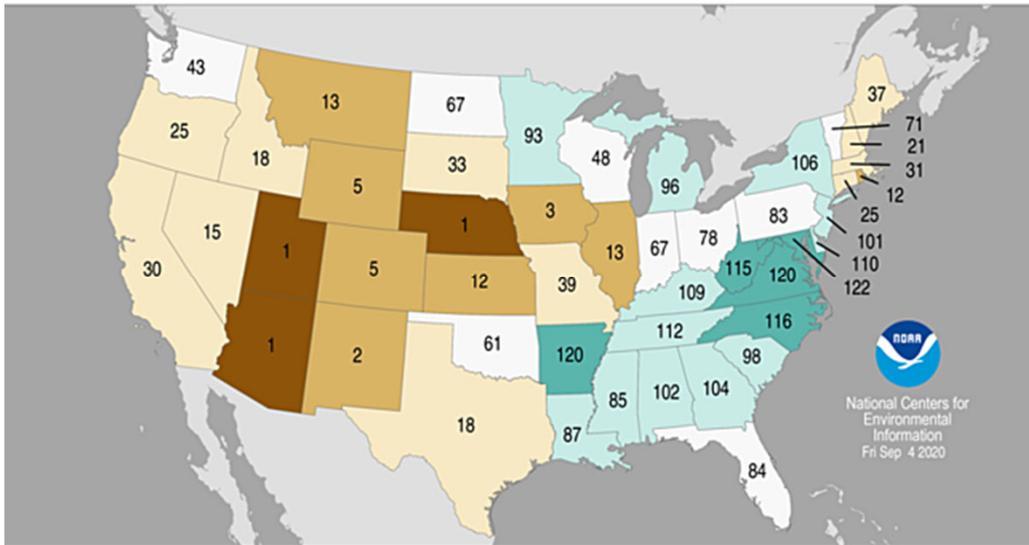
-2

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

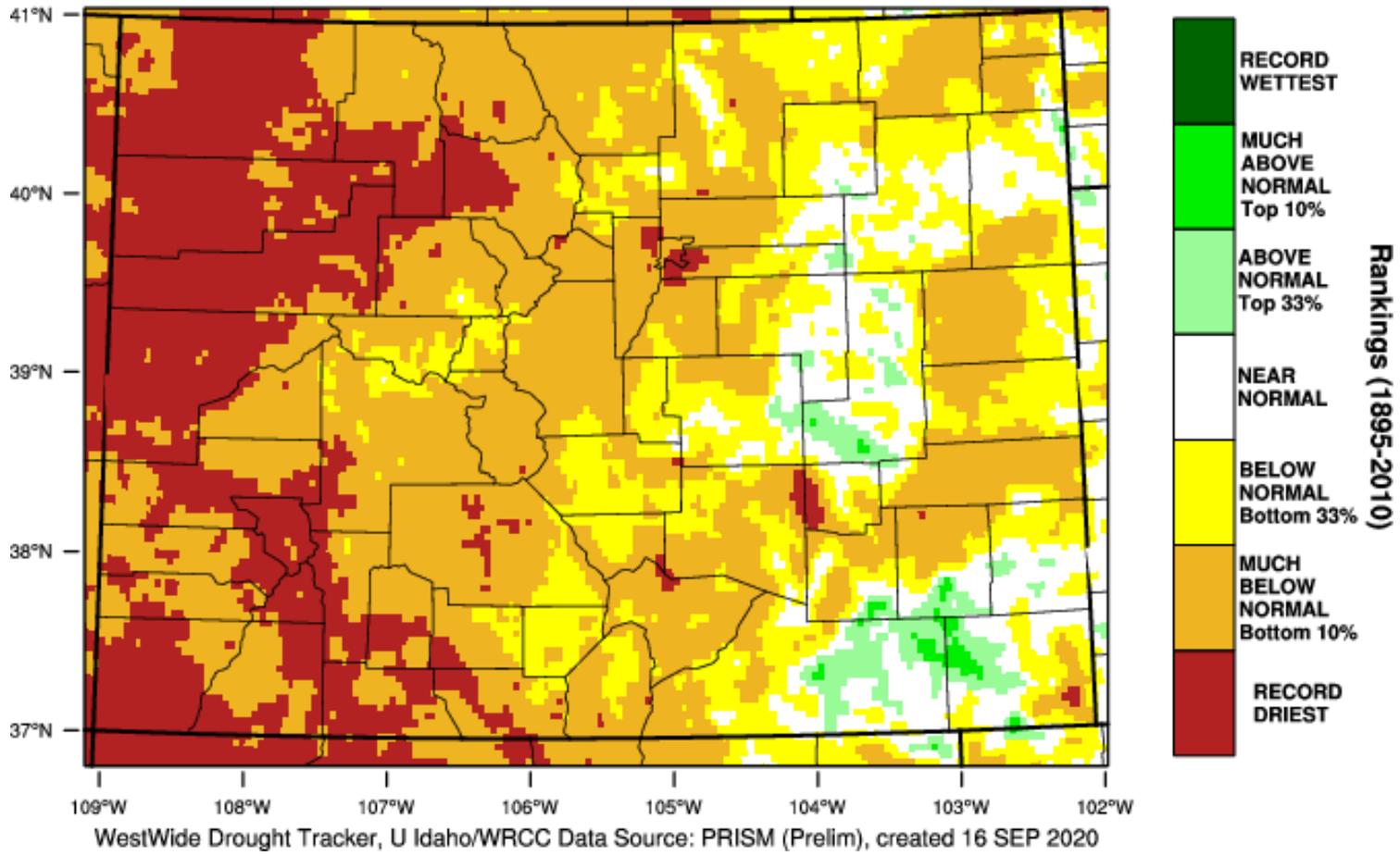


Also: 7th driest summer on record
 2nd driest 12-month Sep-Aug on record

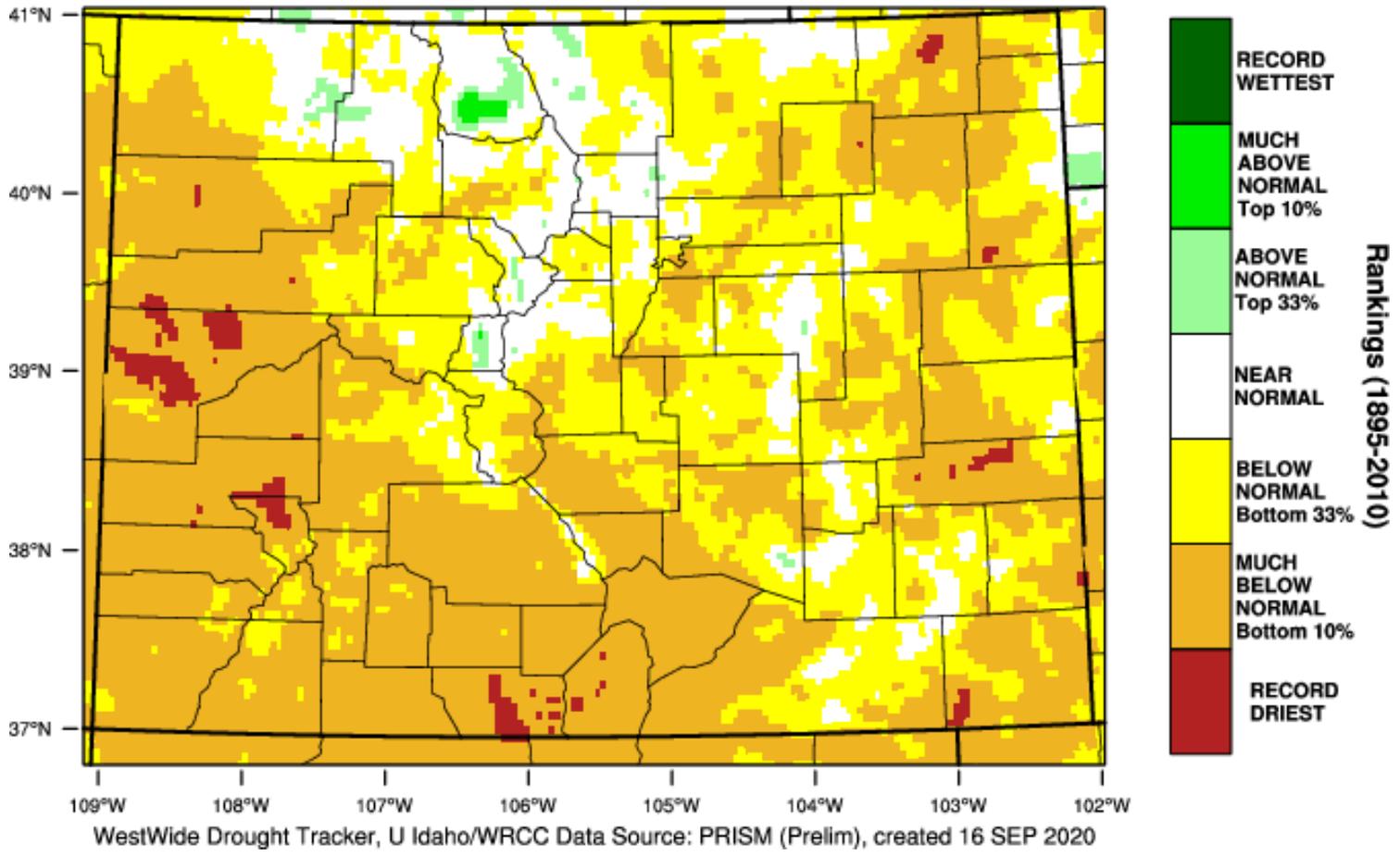
Month	P Rank (of 126 years)	Above, below, or near avg?
Oct	40 th driest	below
Nov	52 nd wettest	near avg
Dec	41 st wettest	above
Jan	34 th driest	below
Feb	58 th wettest	near avg
Mar	55 th driest	near avg
Apr	7 th driest	much below
May	18 th driest	below
June	43 rd driest	near avg
July	41 st driest	below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



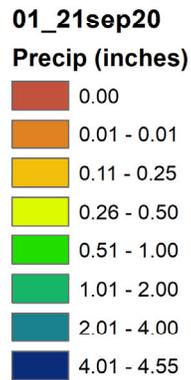
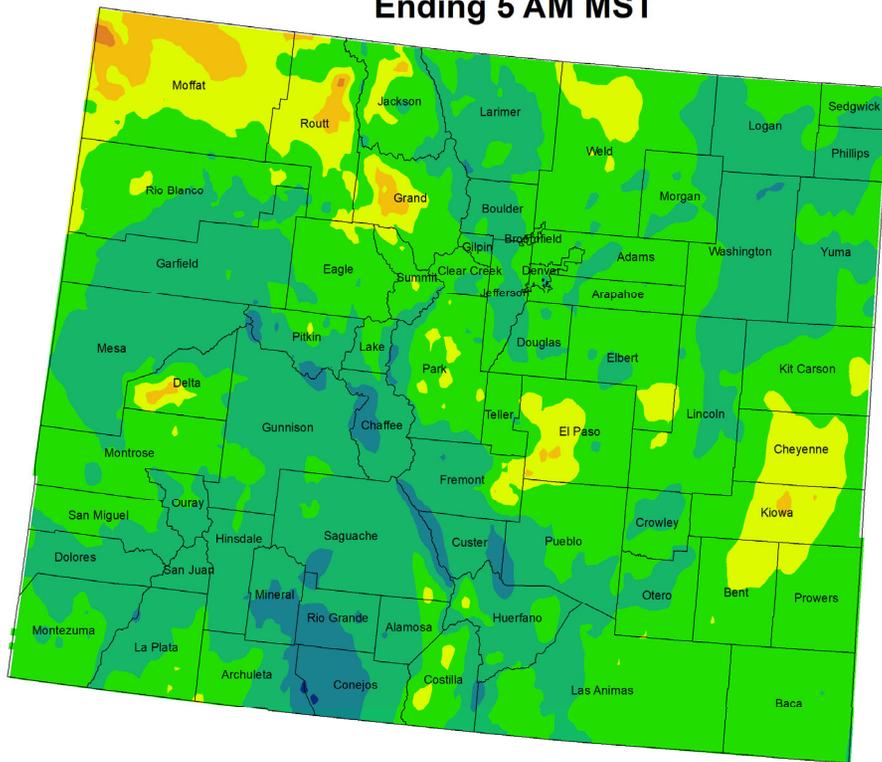
Colorado - Precipitation August 2020 Percentile



Colorado - Precipitation October-August 2020 Percentile

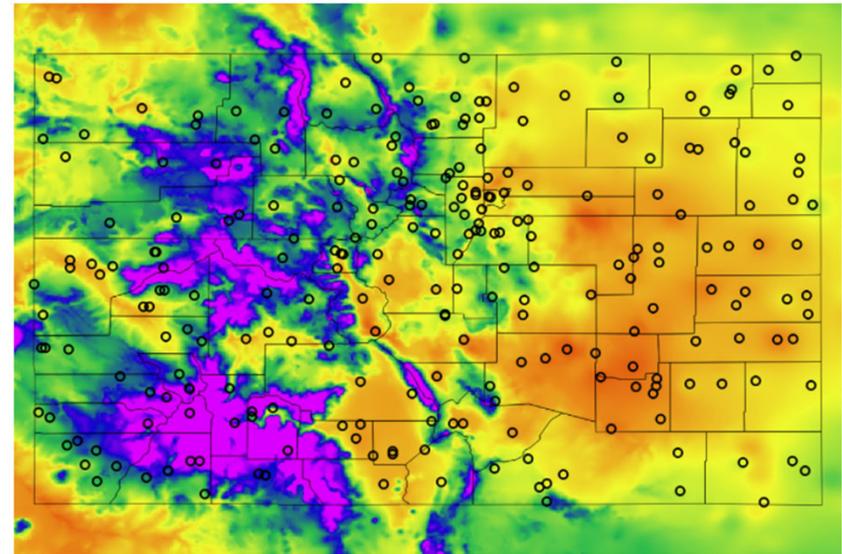


**Colorado Month to Date Precipitation
1 - 21 September 2020
Ending 5 AM MST**



Data from PRISM Climate Group

September Average



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



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.

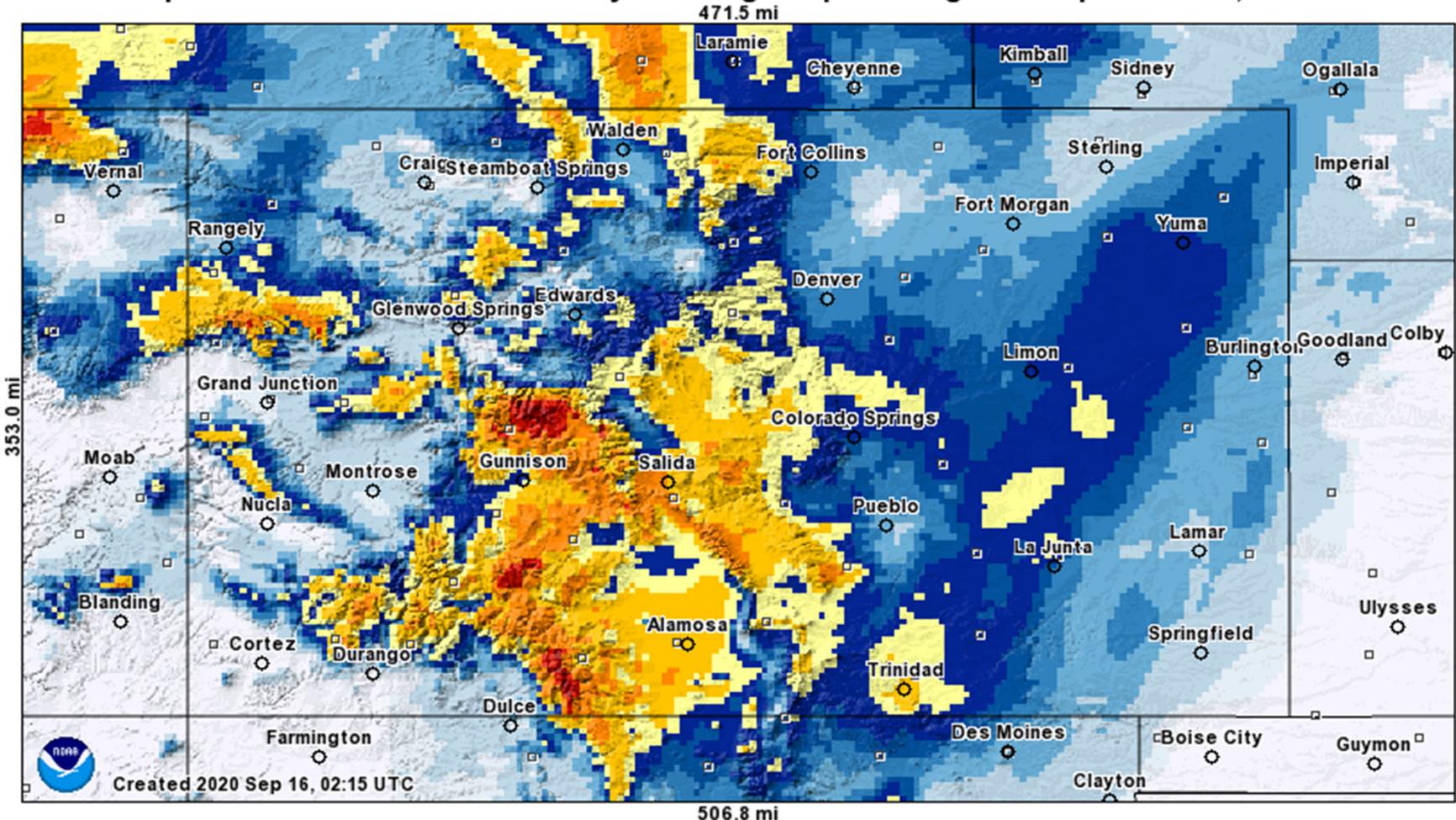
Other Notable Records

- 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.

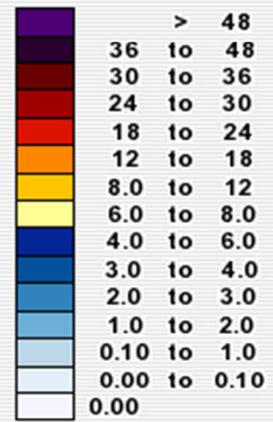
<https://www.weather.gov/bou/Sept2020EarlySnow>



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



Inches of depth

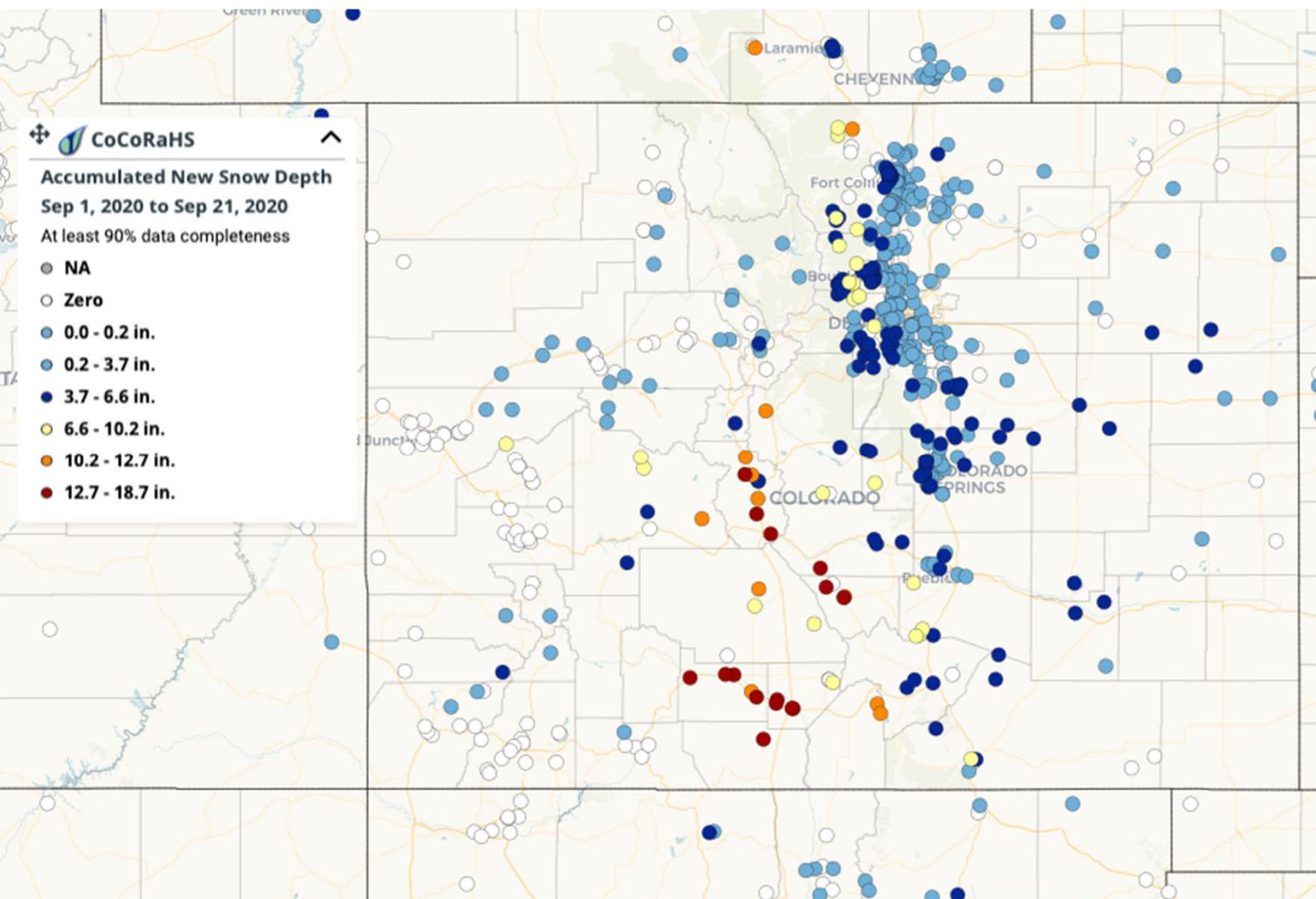


Not Estimated

Elevation in feet



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



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.



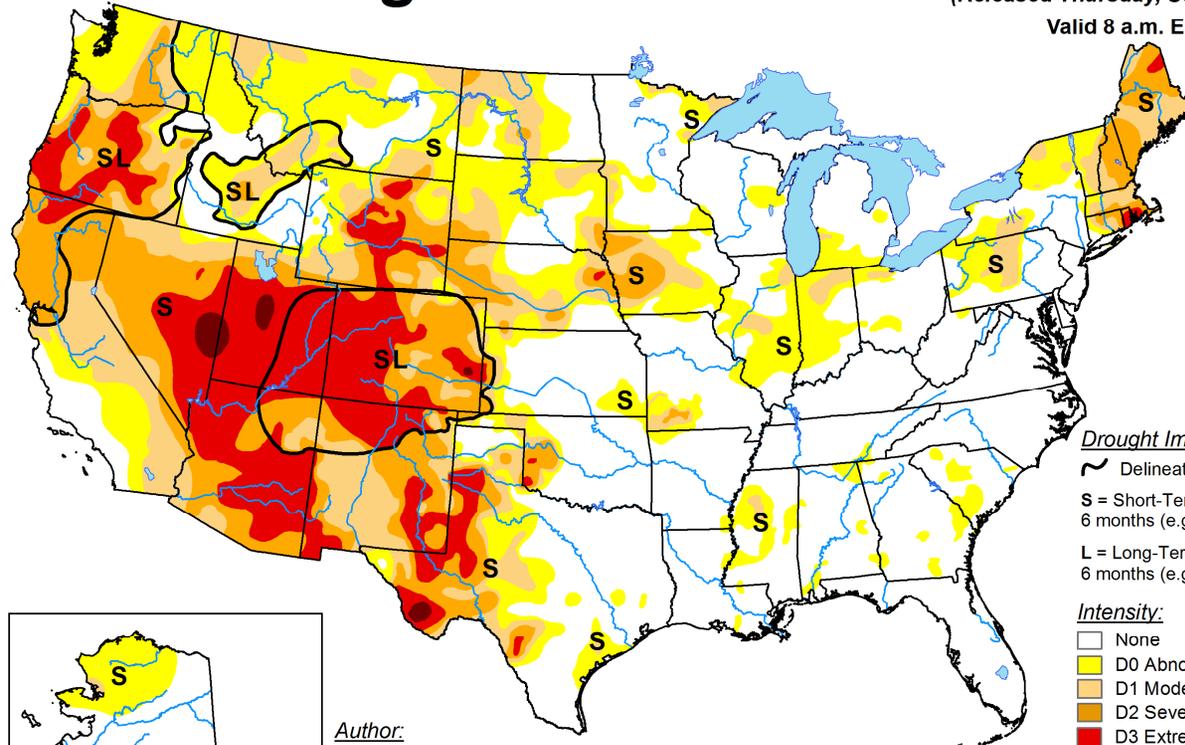


Drought Conditions



U.S. Drought Monitor

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

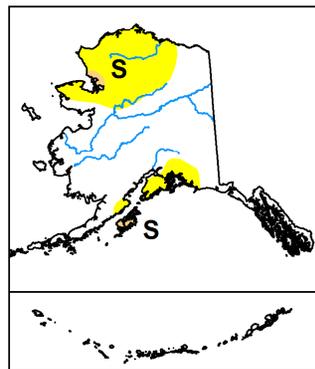


Drought Impact Types:

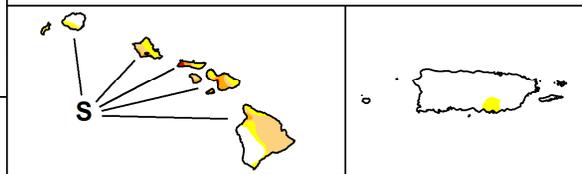
- ~ Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

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>

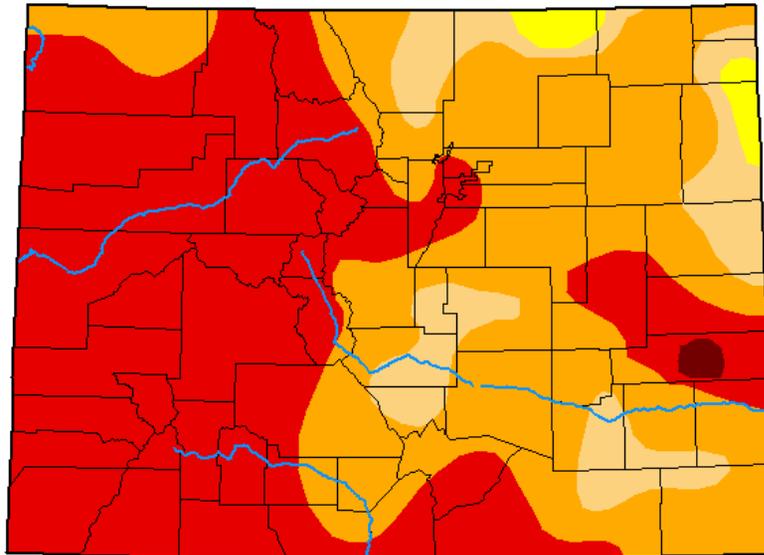


droughtmonitor.unl.edu



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
Current	0.00	100.00	98.60	88.89	50.10	0.38
Last Week 09-08-2020	0.00	100.00	98.83	92.27	54.82	0.38
3 Months Ago 06-16-2020	18.40	81.60	65.91	55.41	32.96	0.00
Start of Calendar Year 12-31-2019	31.72	68.28	51.19	20.11	0.00	0.00
Start of Water Year 10-01-2019	30.14	69.86	27.53	0.00	0.00	0.00
One Year Ago 09-17-2019	50.45	49.55	6.68	0.00	0.00	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
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- D4 Exceptional Drought

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Author:

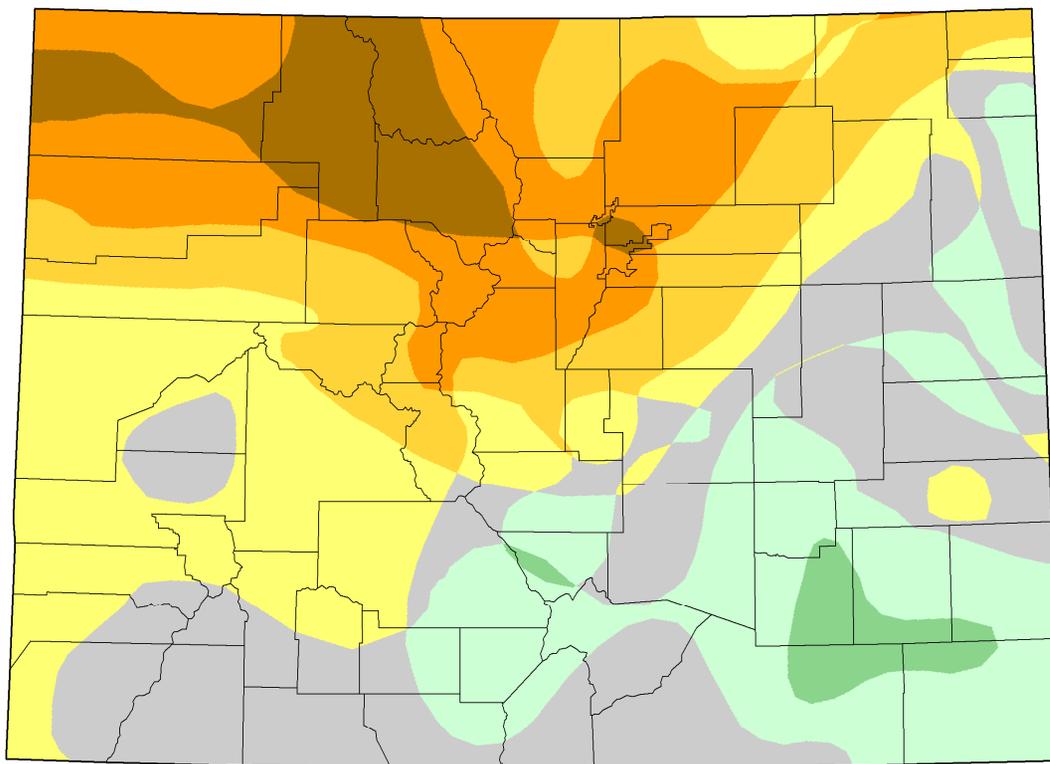
Brad Rippey
U. S. Department of Agriculture



droughtmonitor.unl.edu



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



September 15, 2020
compared to
June 23, 2020

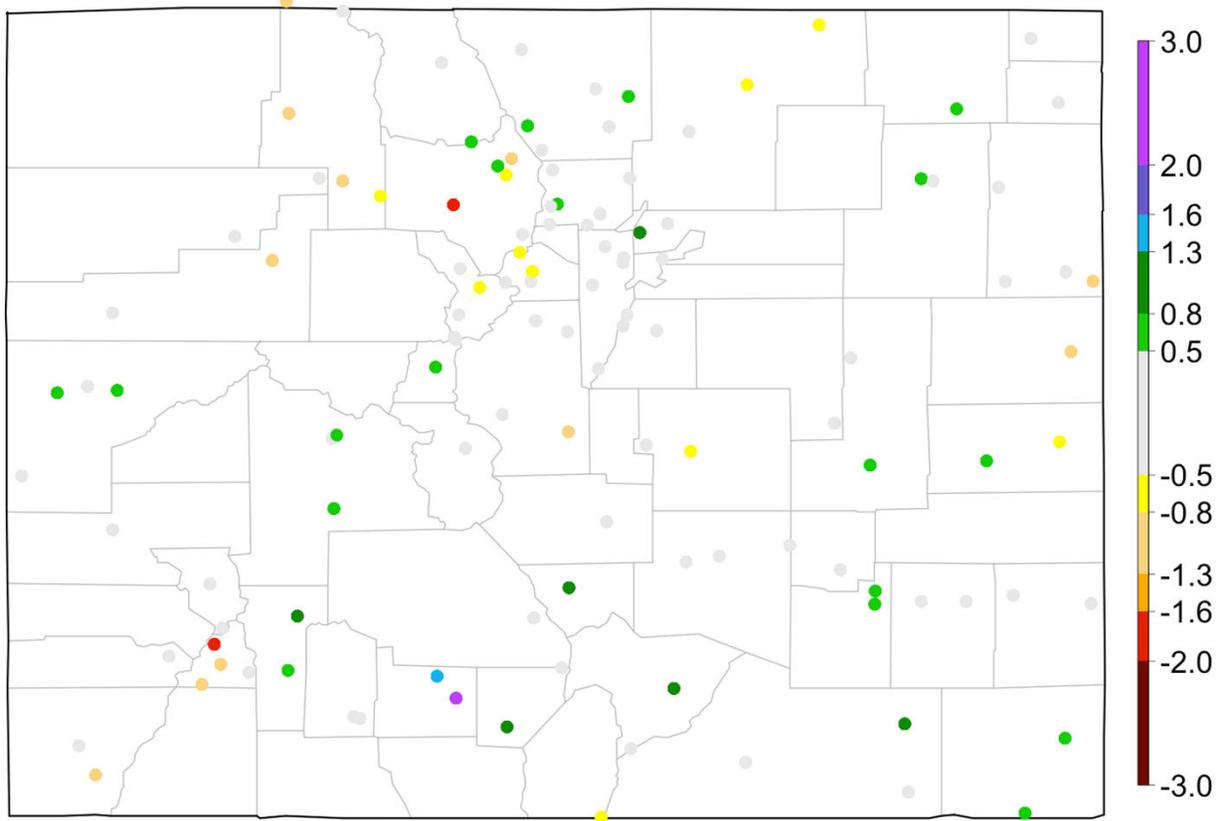
droughtmonitor.unl.edu



- 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

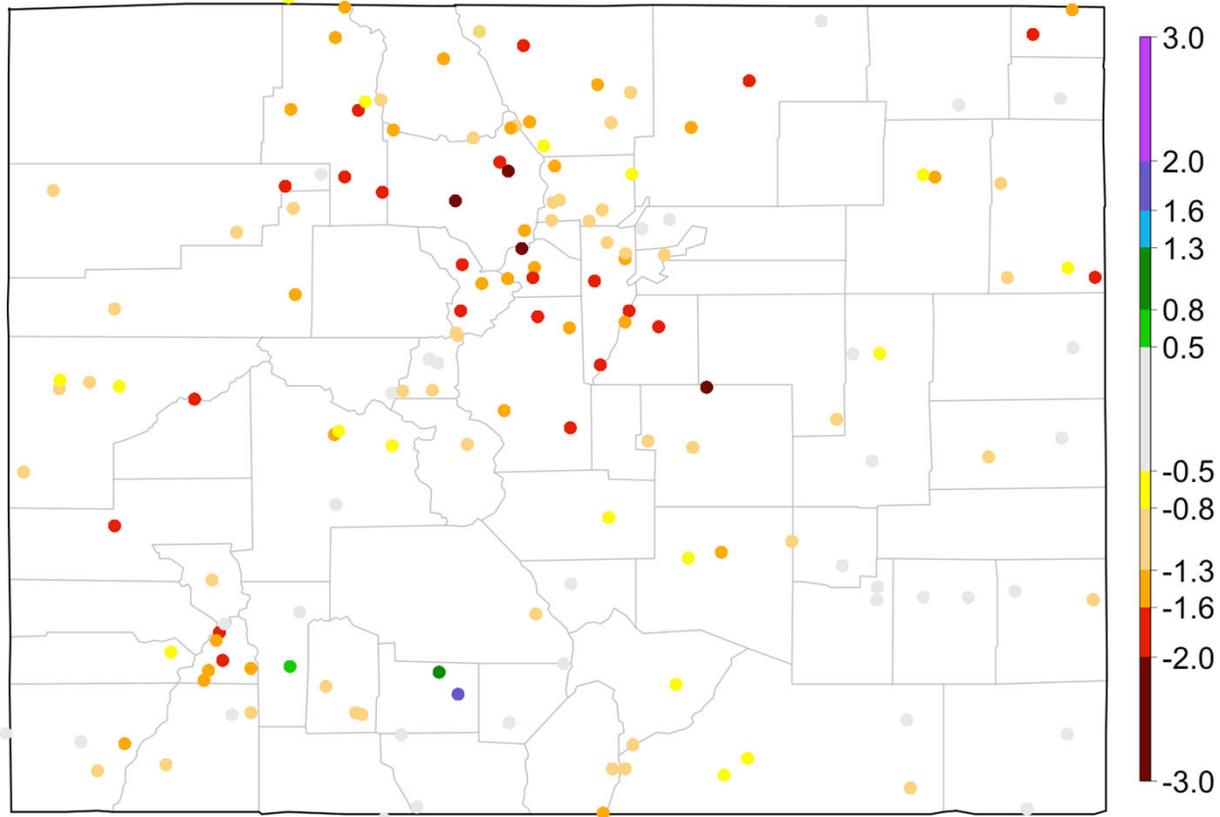


Data from High Plains Regional Climate Center and ACIS

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



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

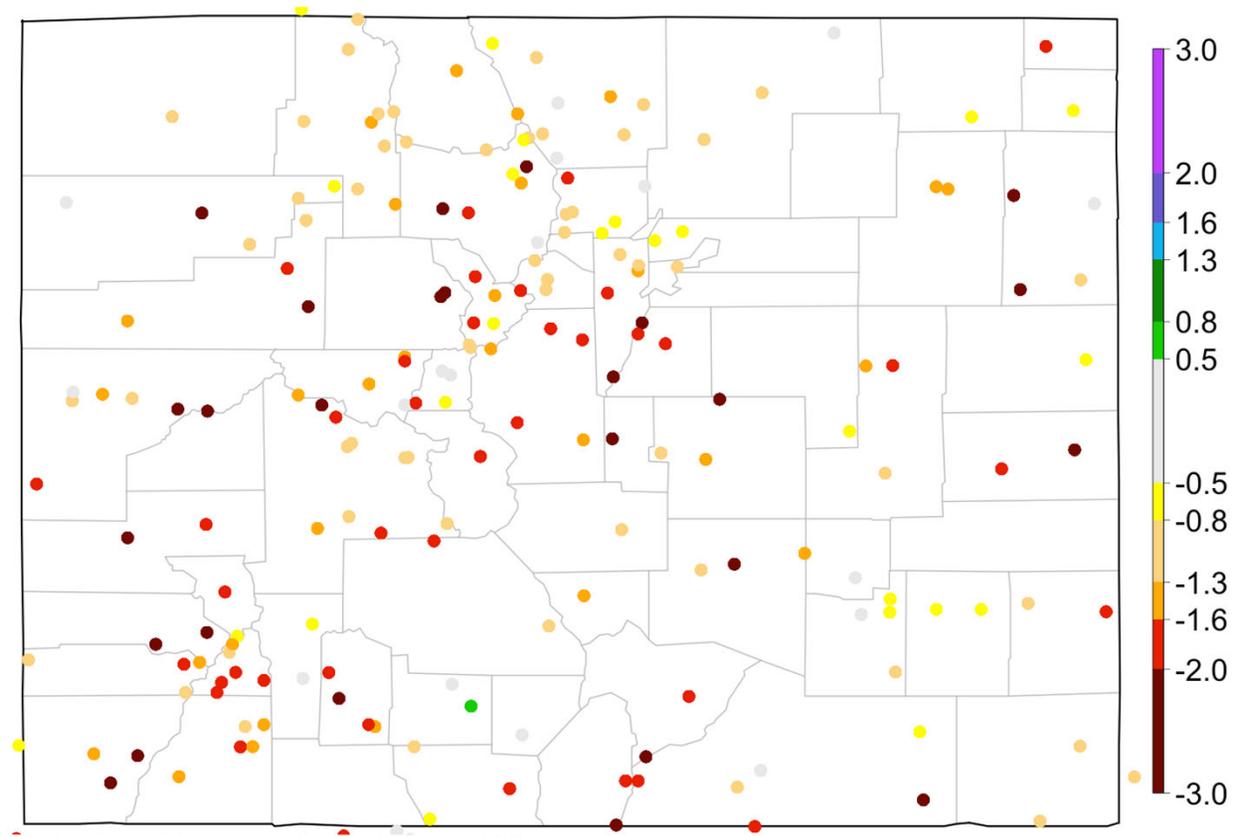


Data from High Plains Regional Climate Center and ACIS

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



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

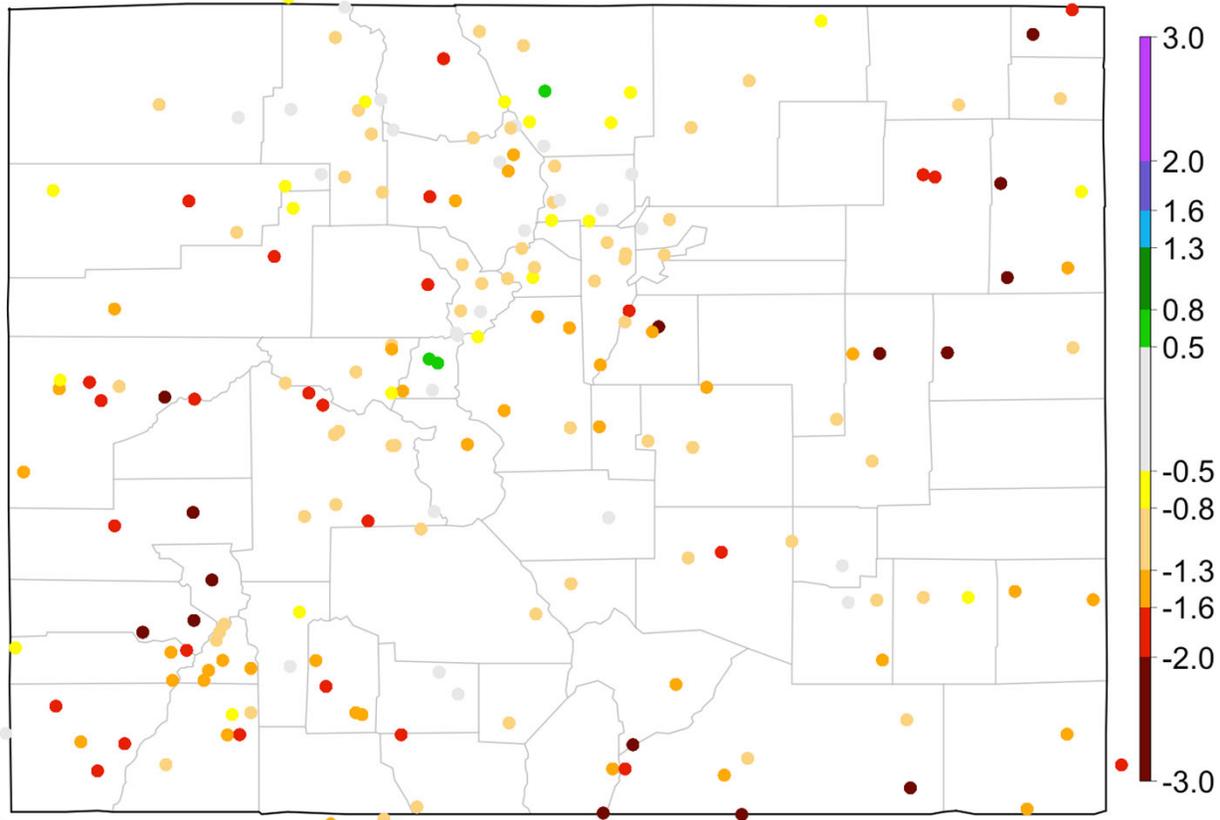


Data from High Plains Regional Climate Center and ACIS

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



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

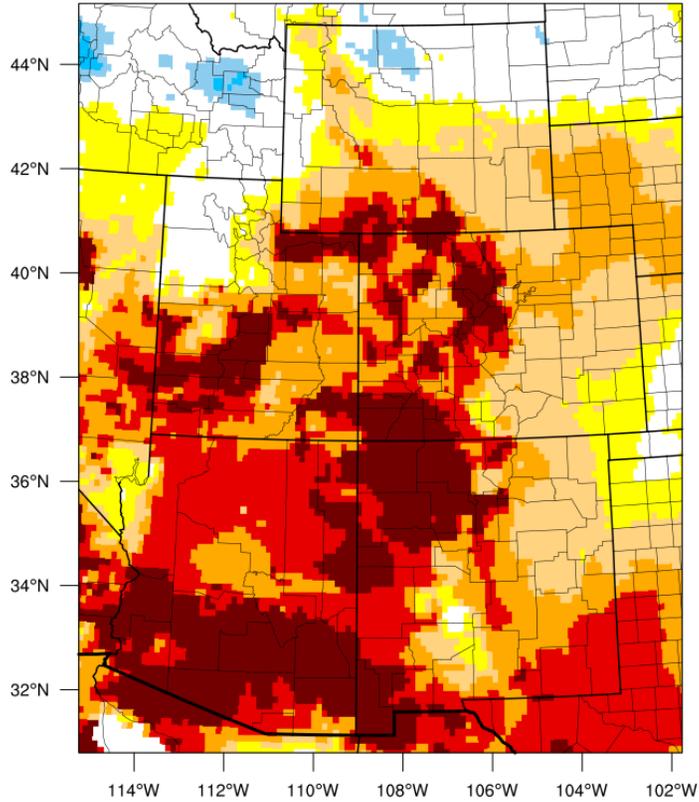


Data from High Plains Regional Climate Center and ACIS

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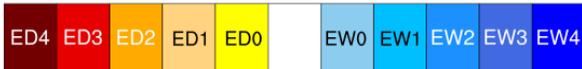


3-month EDDI categories for September 17, 2020



Drought categories

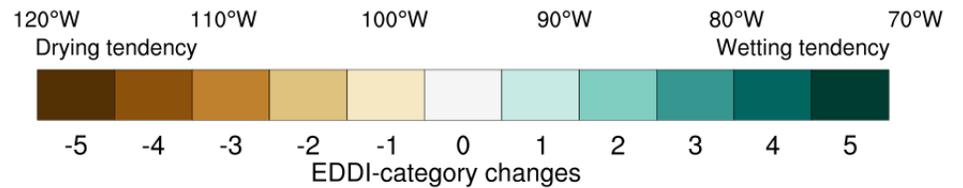
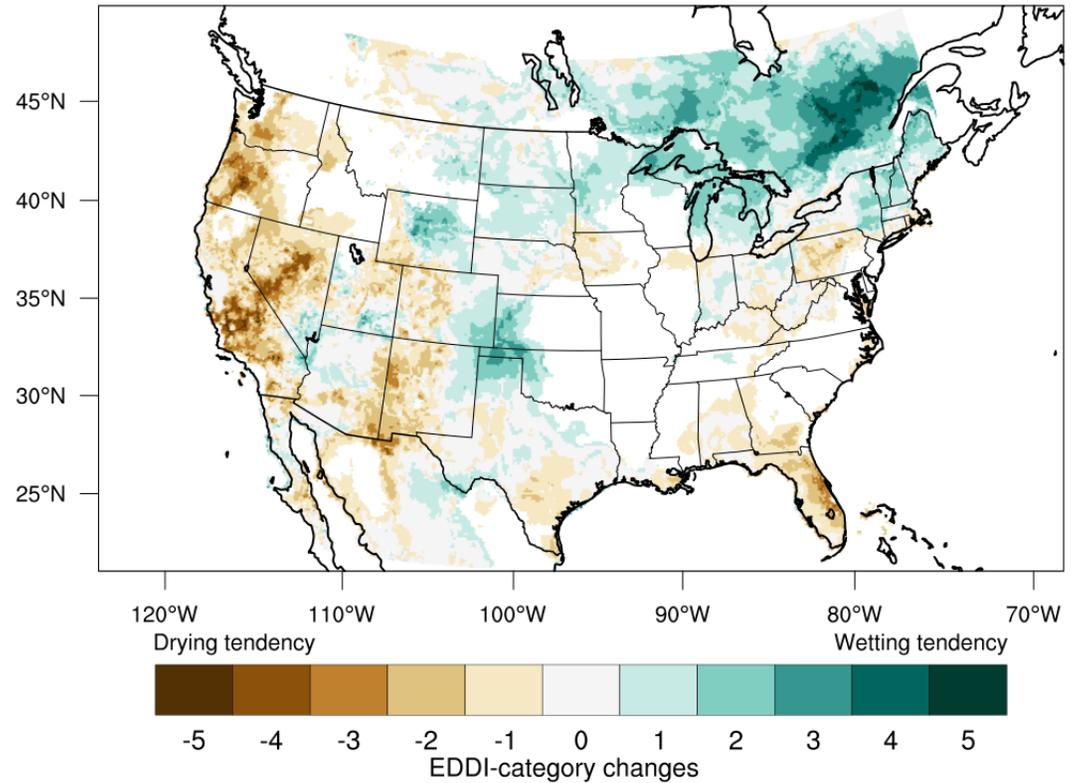
Wetness categories



100% 98% 95% 90% 80% 70% 30% 20% 10% 5% 2% 0%
 (EDDI-percentile category breaks: 100% = driest; 0% = wettest)

Generated by NOAA/ESRL/Physical Sciences Laboratory

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



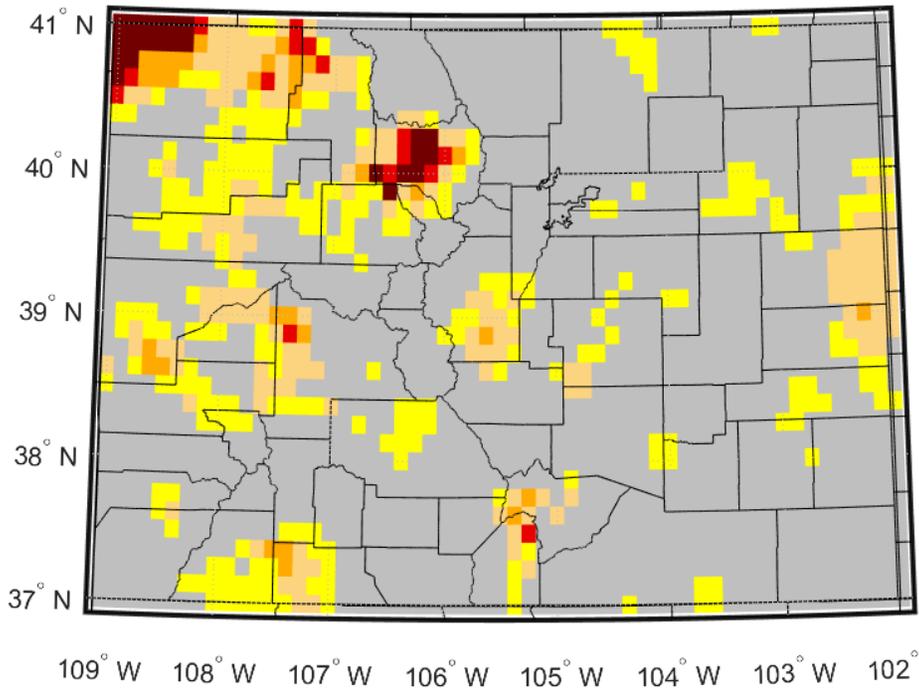
Only regions that start or end above the 70th percentile (i.e., ED0-ED4) are shown.

Generated by NOAA/ESRL/Physical Sciences Laboratory

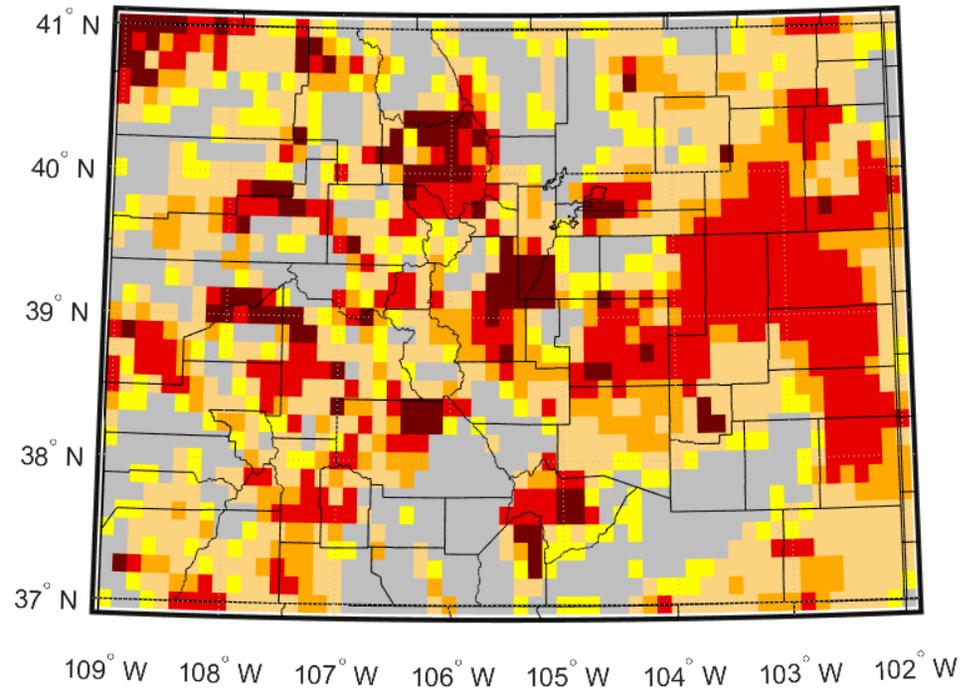
<https://psl.noaa.gov/eddi/>



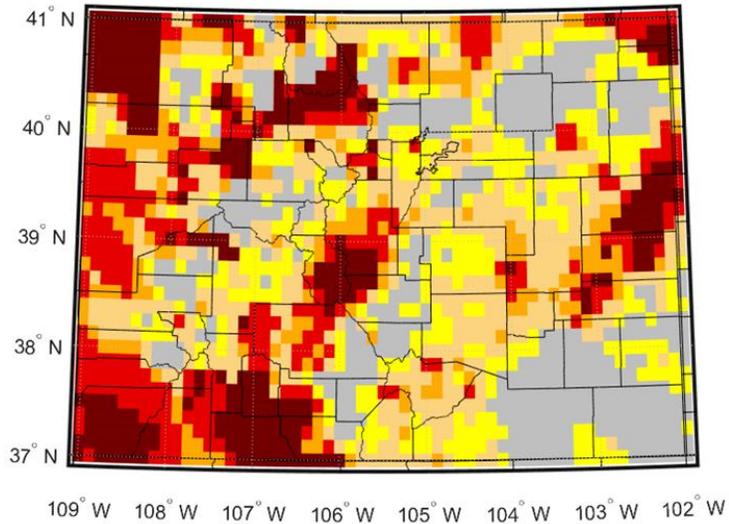
Top 10cm Soil Moisture Drought Category
09/16/2020



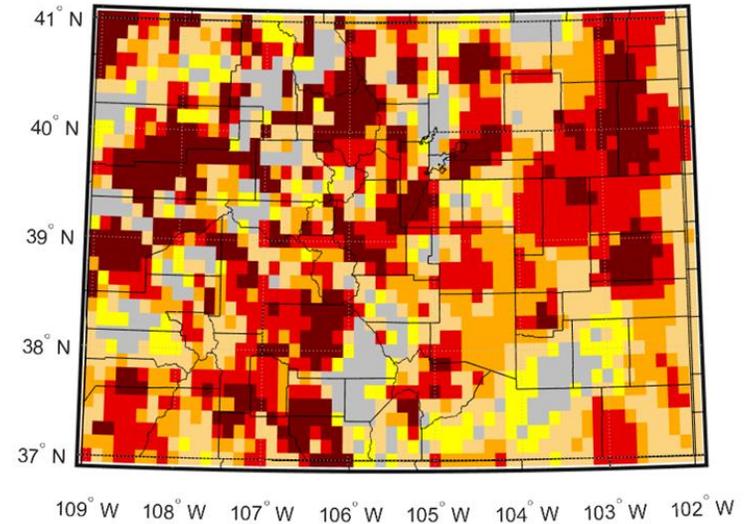
Top Meter Soil Moisture Drought Category
09/16/2020



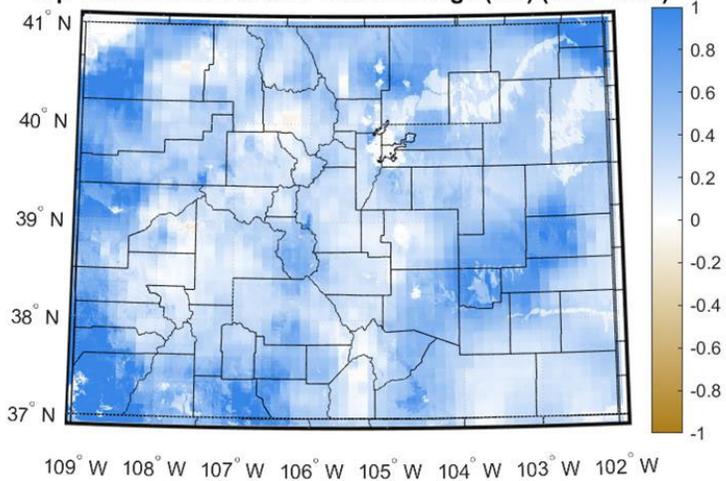
Top 10cm Soil Moisture Drought Category
09/06/2020



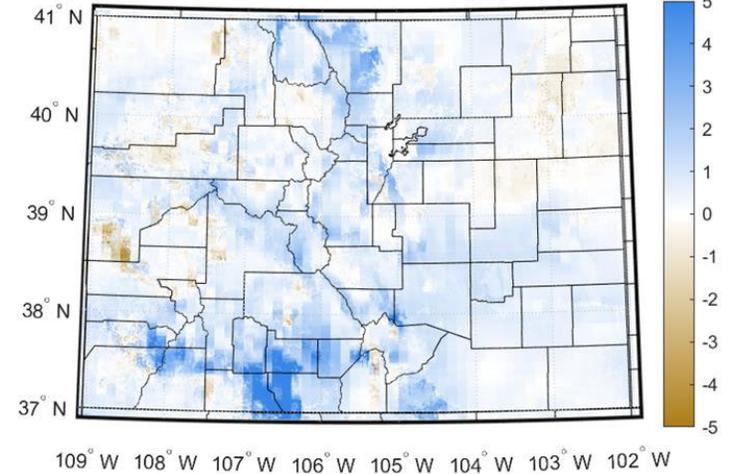
Top Meter Soil Moisture Drought Category
09/06/2020



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

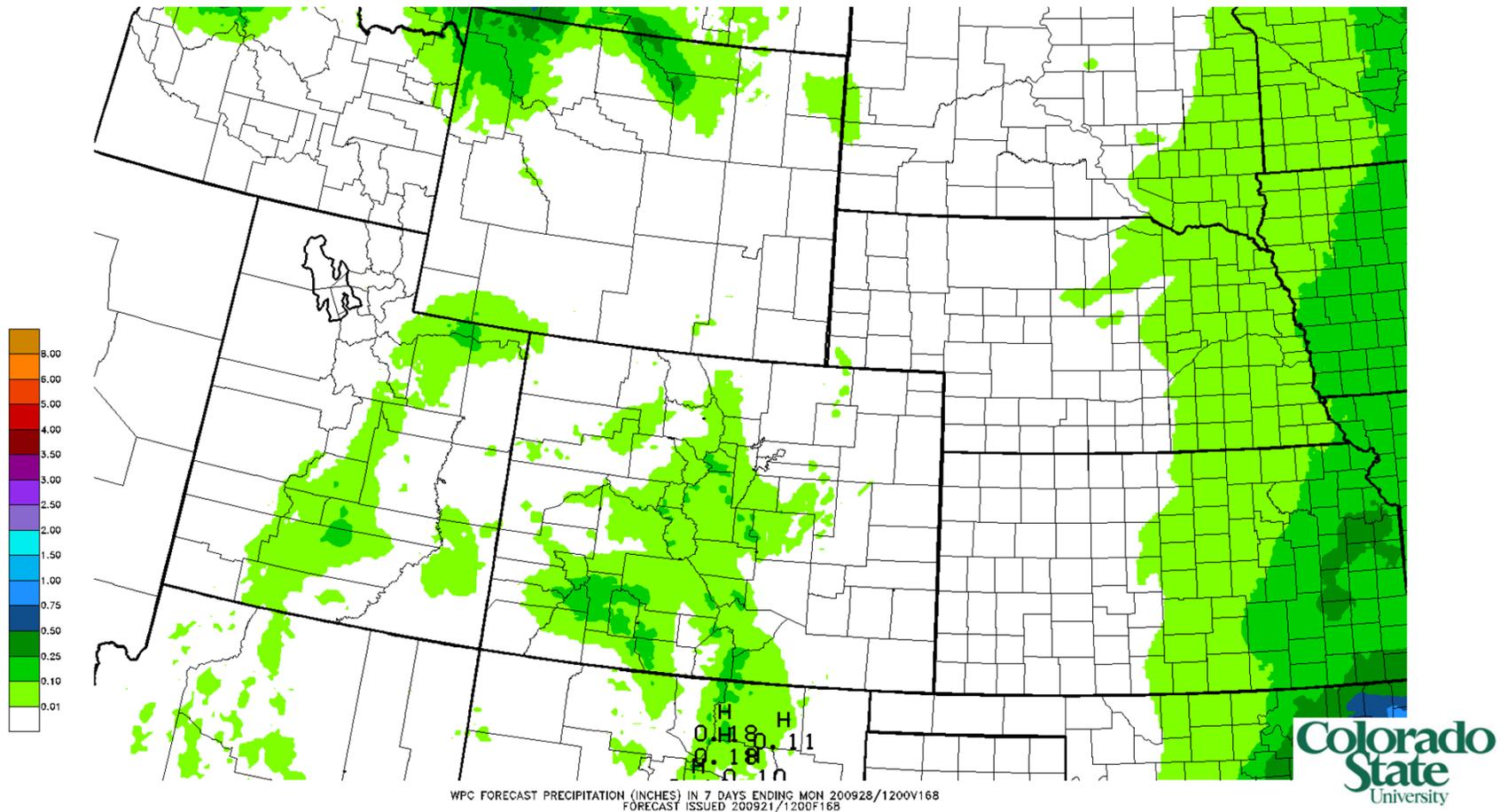
CPC Outlooks

What is happening with El Niño?

Precipitation Projections

Any word on the monsoon?





NOAA 7-day precip forecast

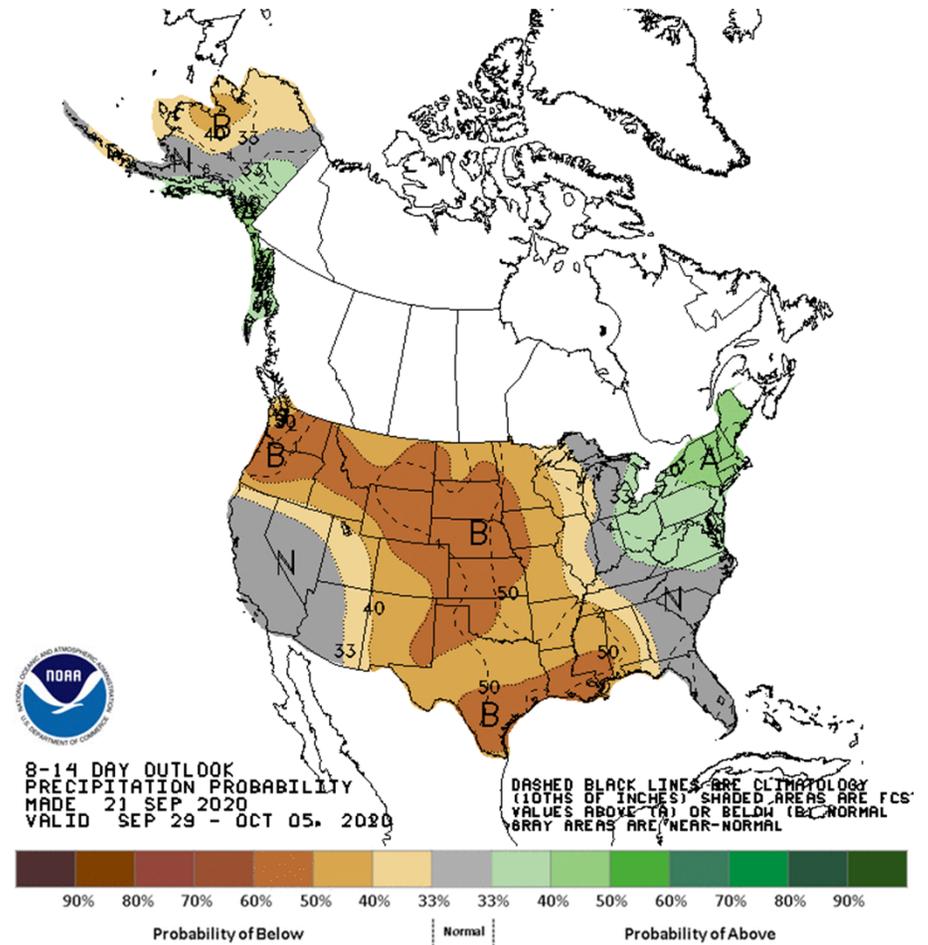
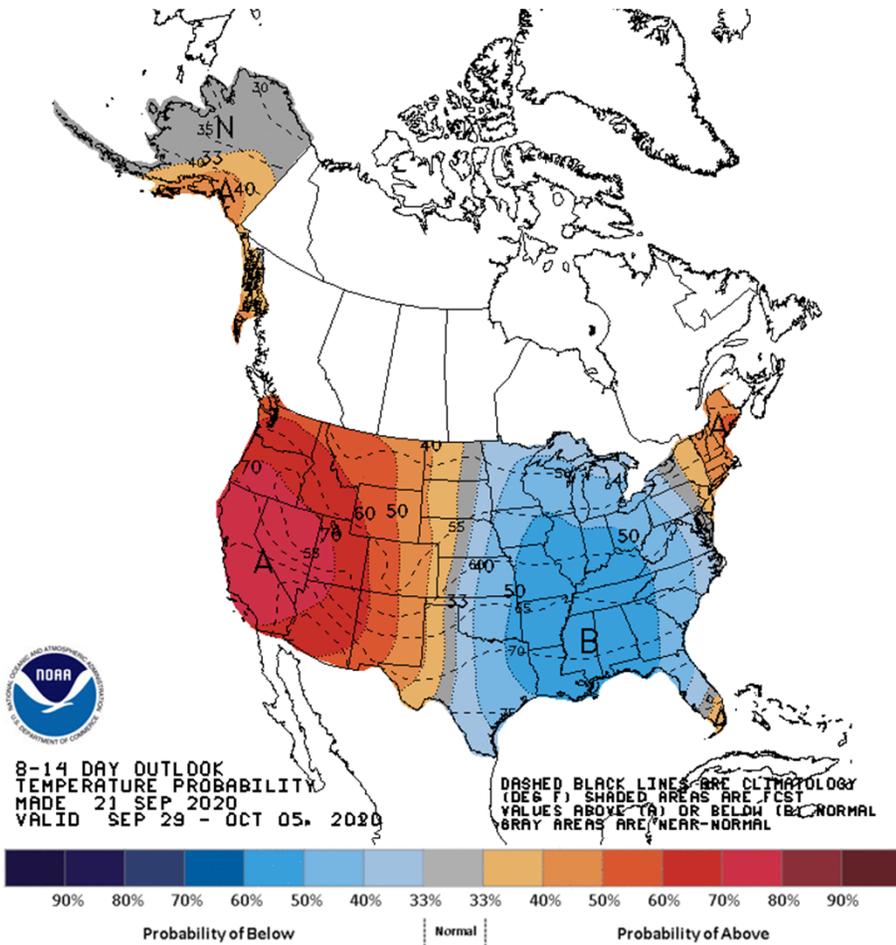
http://schumacher.atmos.colostate.edu/weather/real_time/hpc_qpf_168h_fnl/hpc_qpf_168h_fnl.gif



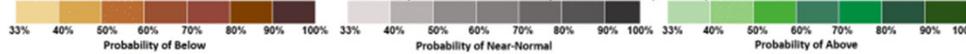
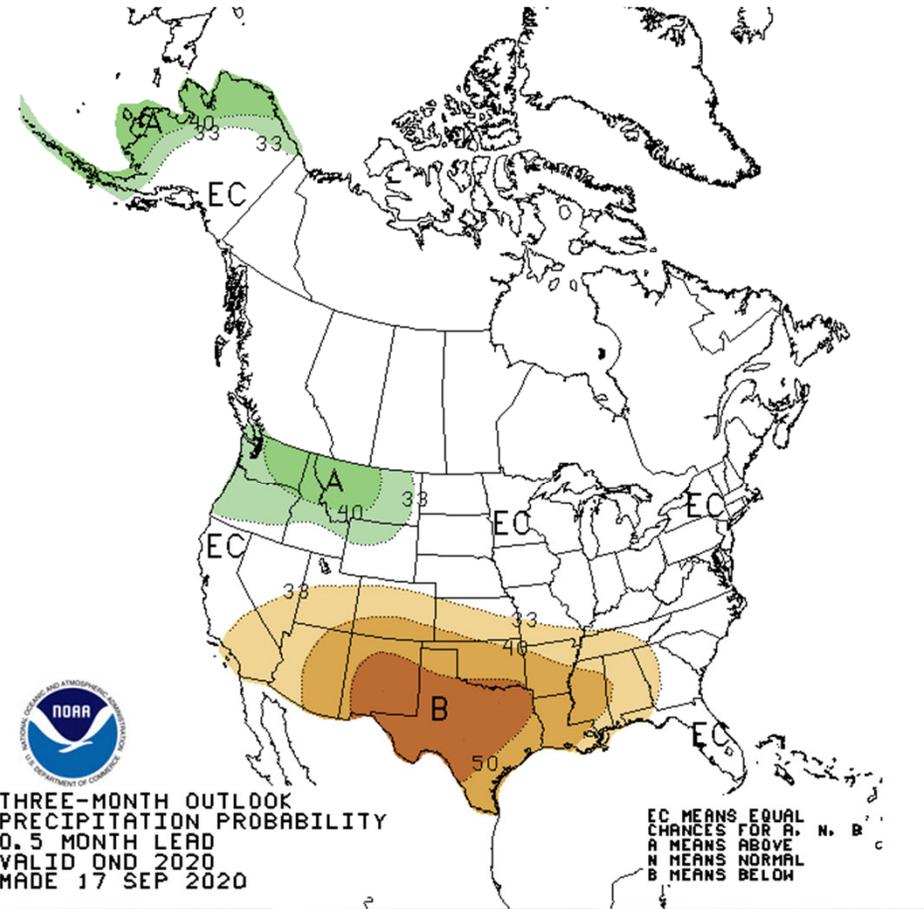
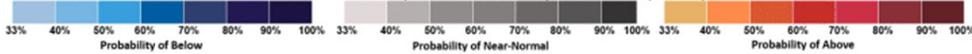
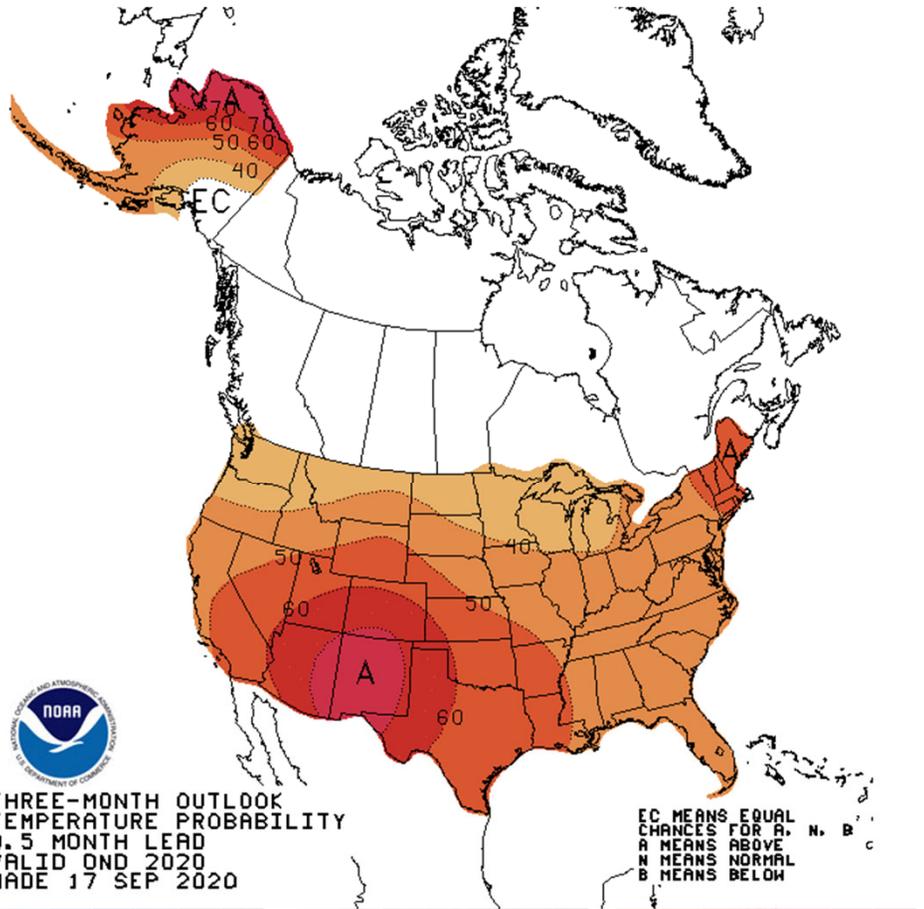
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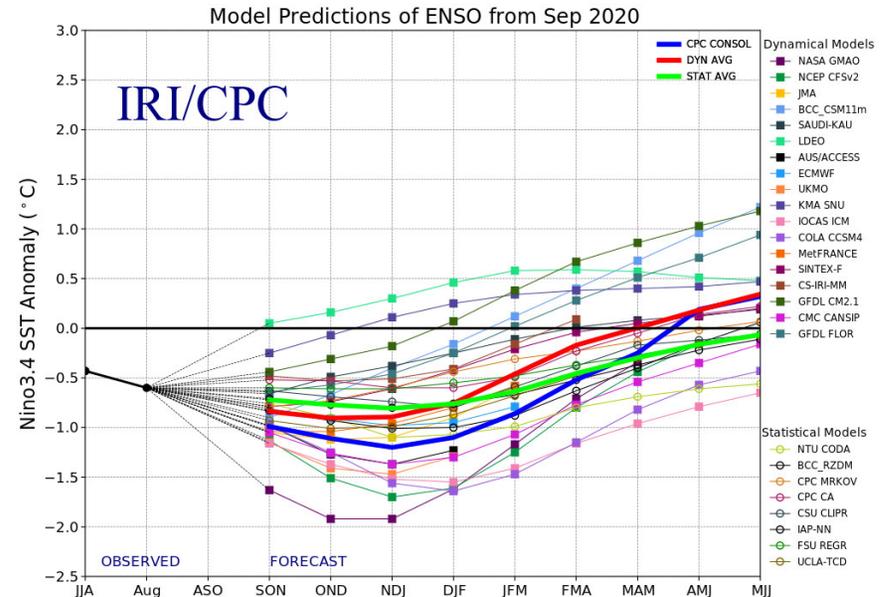
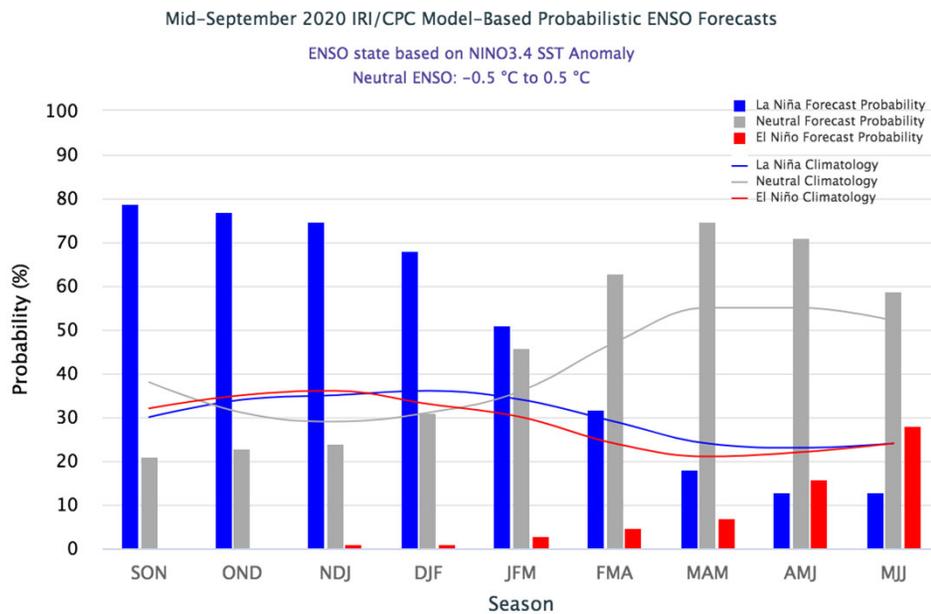
8-14 day outlook



Seasonal outlook



What's the El Niño forecast?

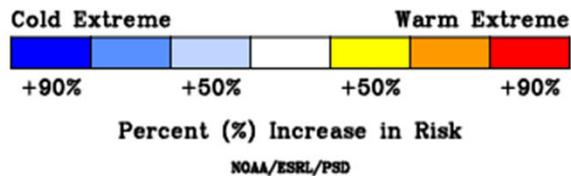
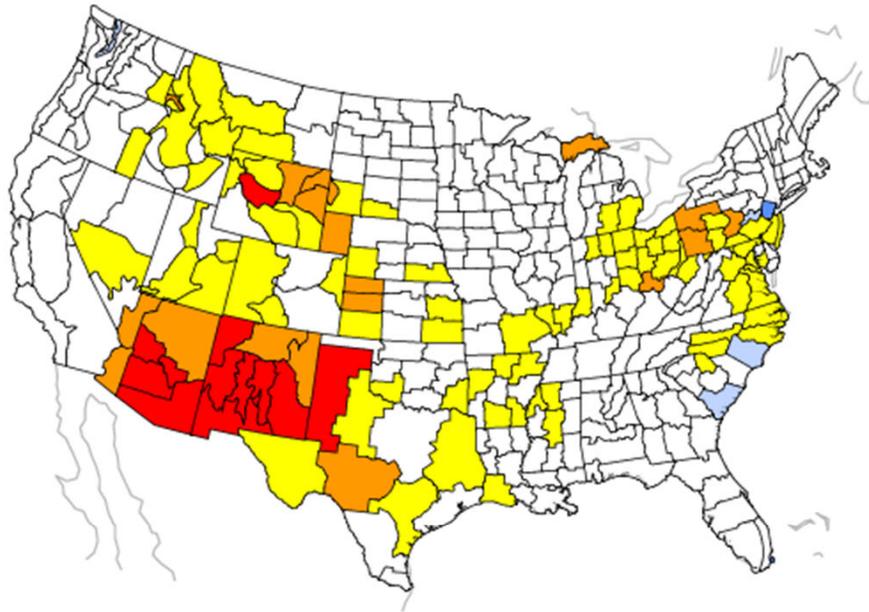


We're in a La Niña advisory. Both sea surface temperatures and atmospheric variables are consistent with La Niña conditions. There is a 75% chance that La Niña conditions will continue through the fall and winter.

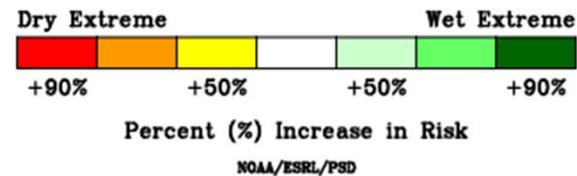
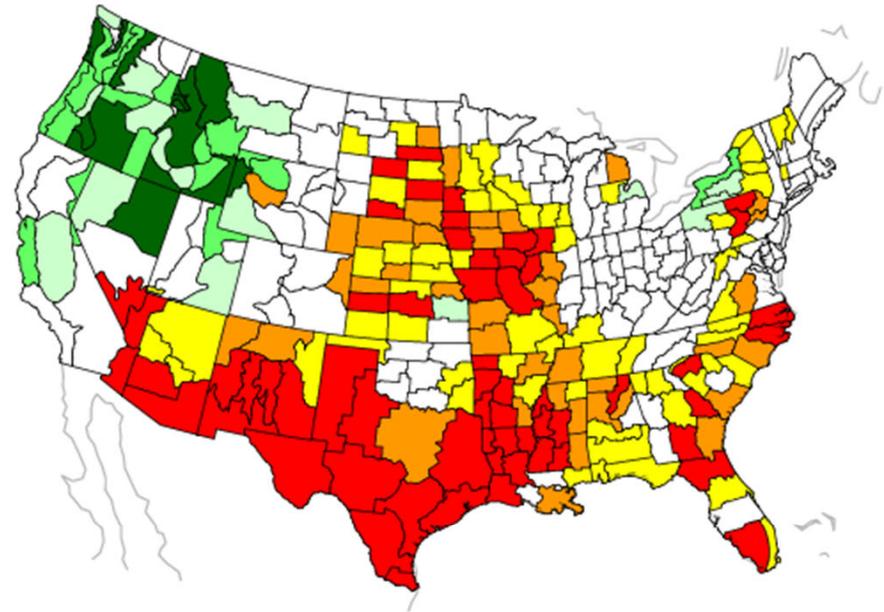


What's La Niña mean for fall/winter?

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

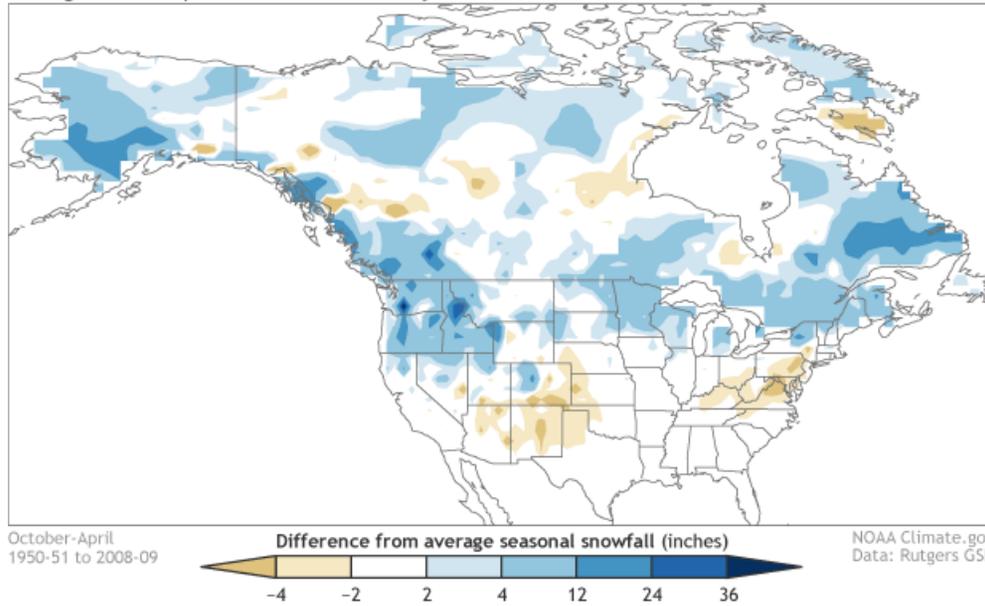


OND Precipitation During La Nina
Increased Risk of Wet or Dry Extremes

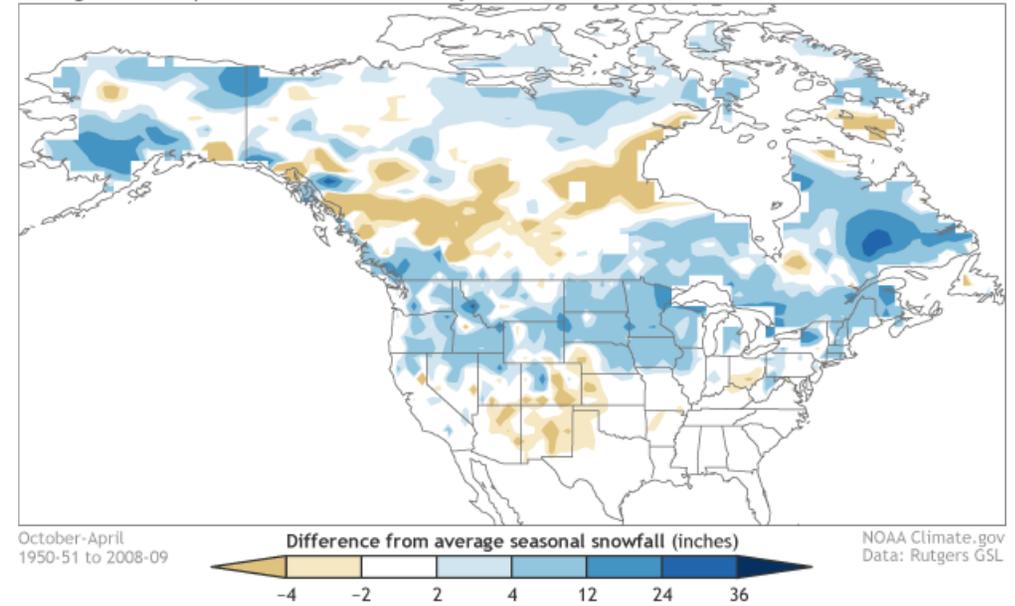


What's La Niña mean for snow?

Average snowfall patterns for all La Niña years



Average snowfall patterns for weak La Niña years



<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

Check out our new Monthly Climate Summaries:
https://climate.colostate.edu/monthly_summary.html

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Thank you!

