

Colorado Climate Center – *WATF Climate Update*

Zach Schwalbe
Colorado Climate Center

Water Availability Task Force
September 11, 2018



Colorado State University



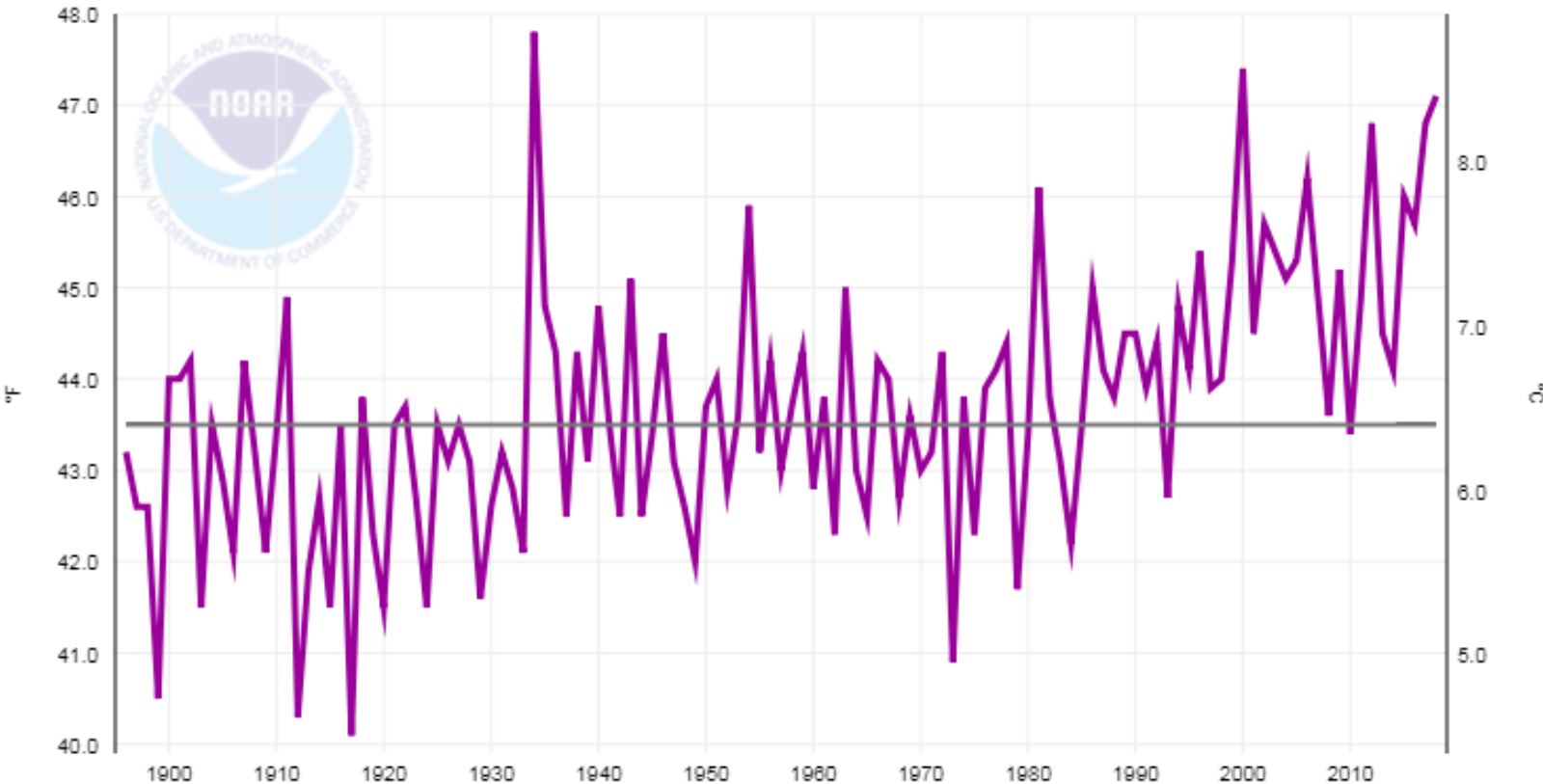
Water Year 2018 – Temperature



3rd warmest in 123-year record (only WY 1934 and 2000 warmer);
 +3.6°F above 47.1°F average

Colorado, Average Temperature, October-August

— Avg Temperature — 1901-2000 Mean: 43.5°F

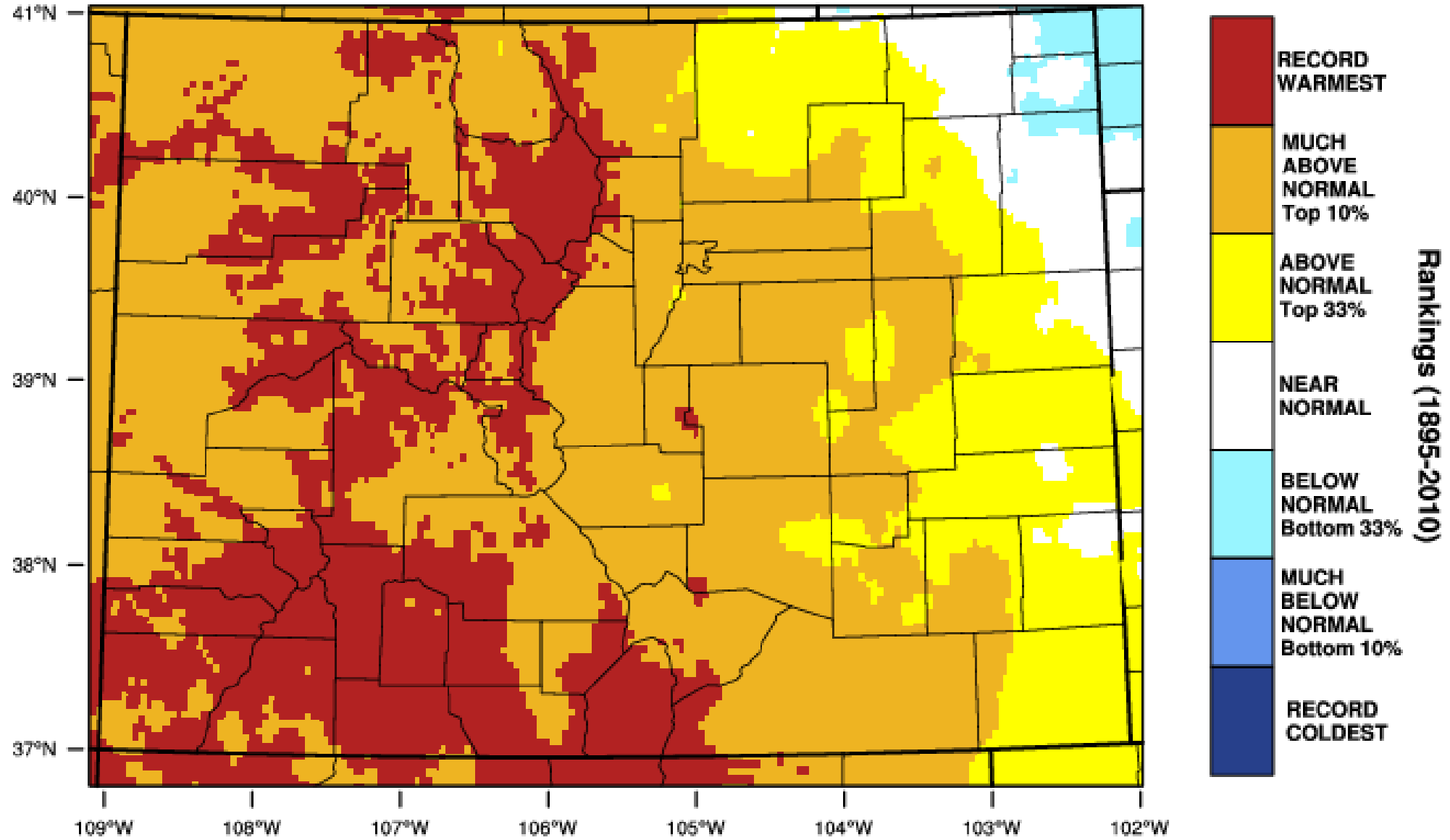


MONTH	RANK
Oct 2017	near average
Nov 2017	1 st warmest
Dec 2017	8 th warmest
Jan 2018	8 th warmest
Feb 2018	near average
Mar 2018	25 th warmest
Apr 2018	near average
May 2018	2 nd warmest
Jun 2018	3 rd warmest
Jul 2018	10 th warmest
Aug 2018	33 rd warmest



Colorado - Mean Temperature

October-August 2018 Percentile

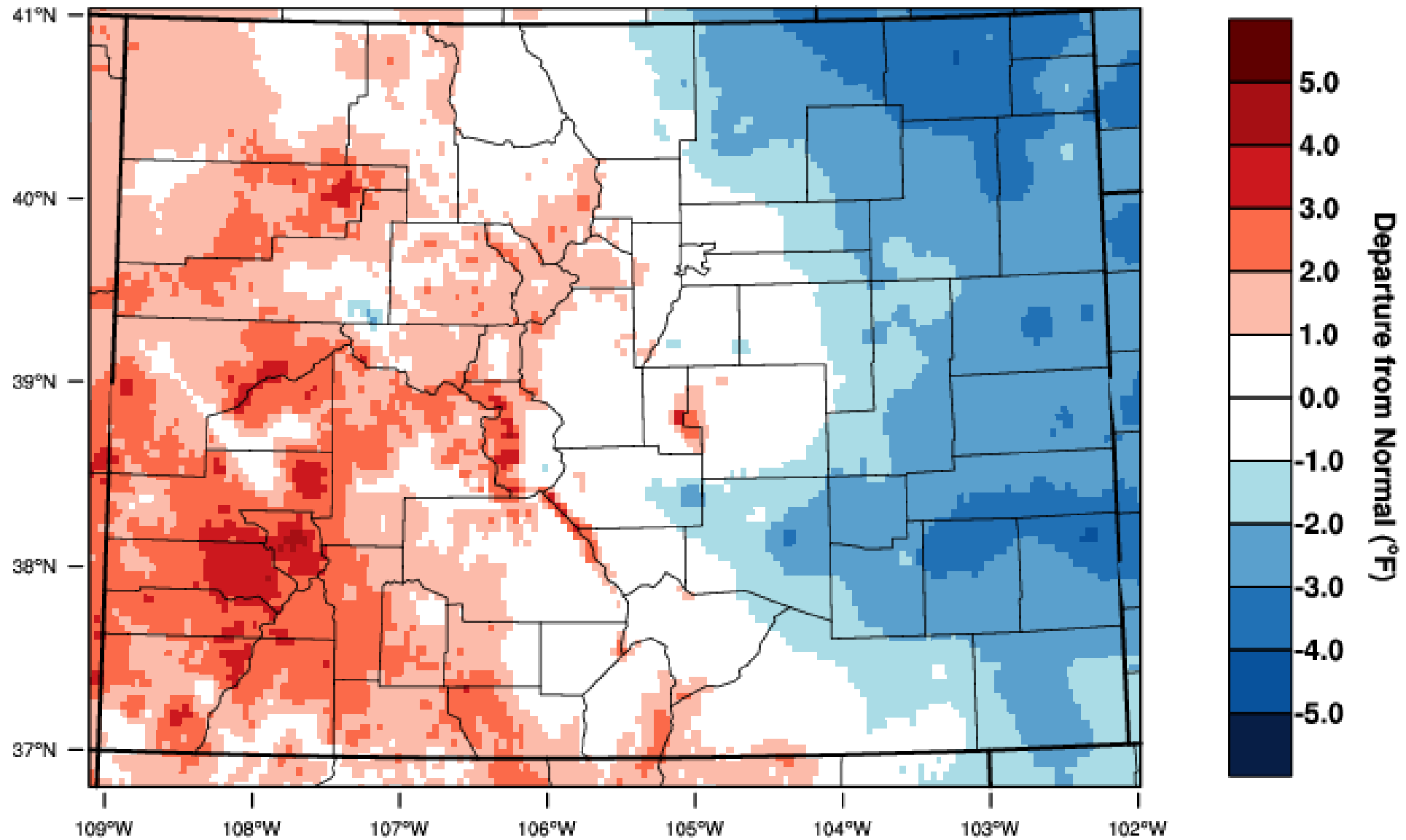


WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 7 SEP 2018



Colorado - Mean Temperature

August 2018 Departure from 1981-2010 Normal

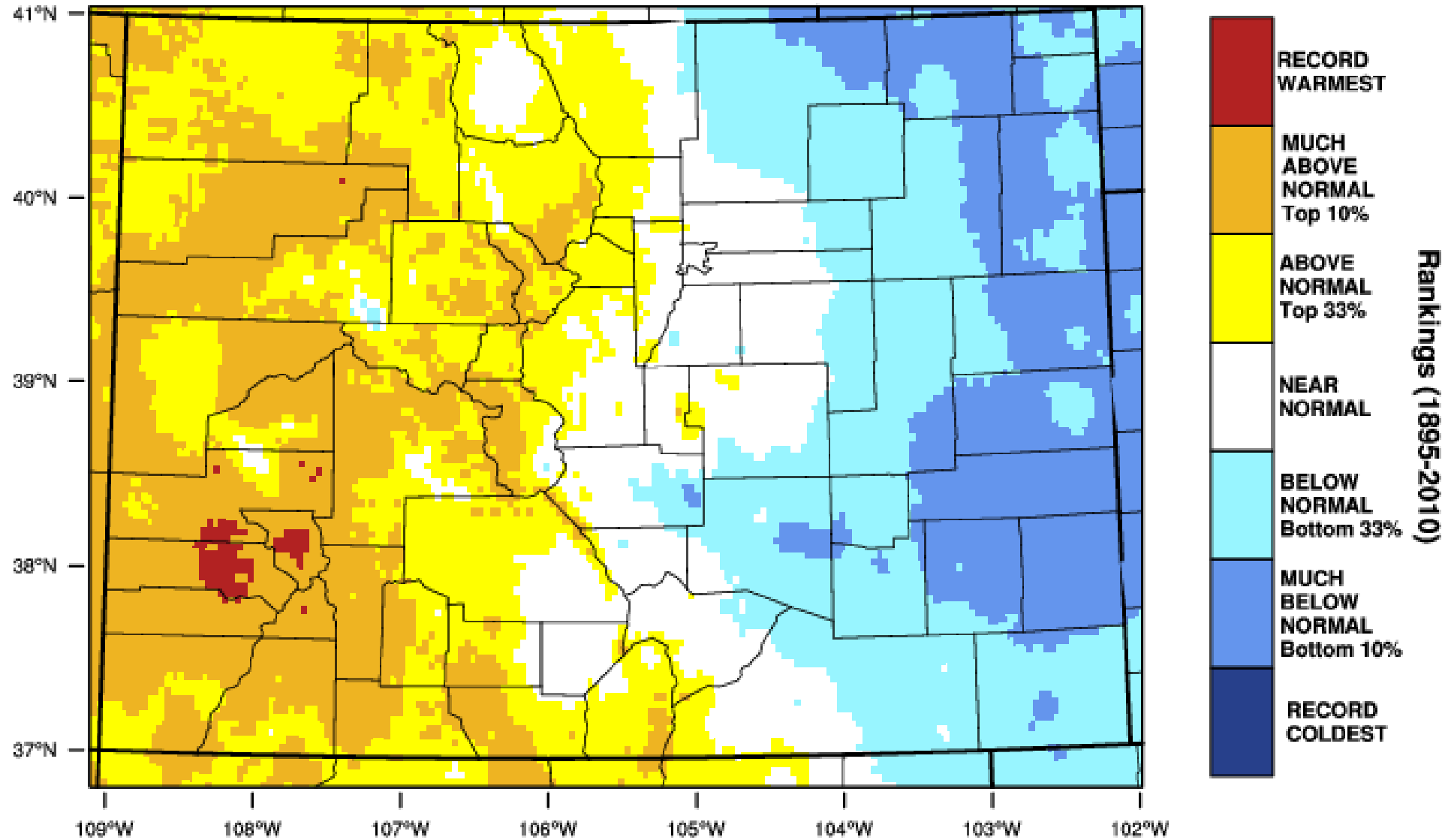


WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 7 SEP 2018



Colorado - Mean Temperature

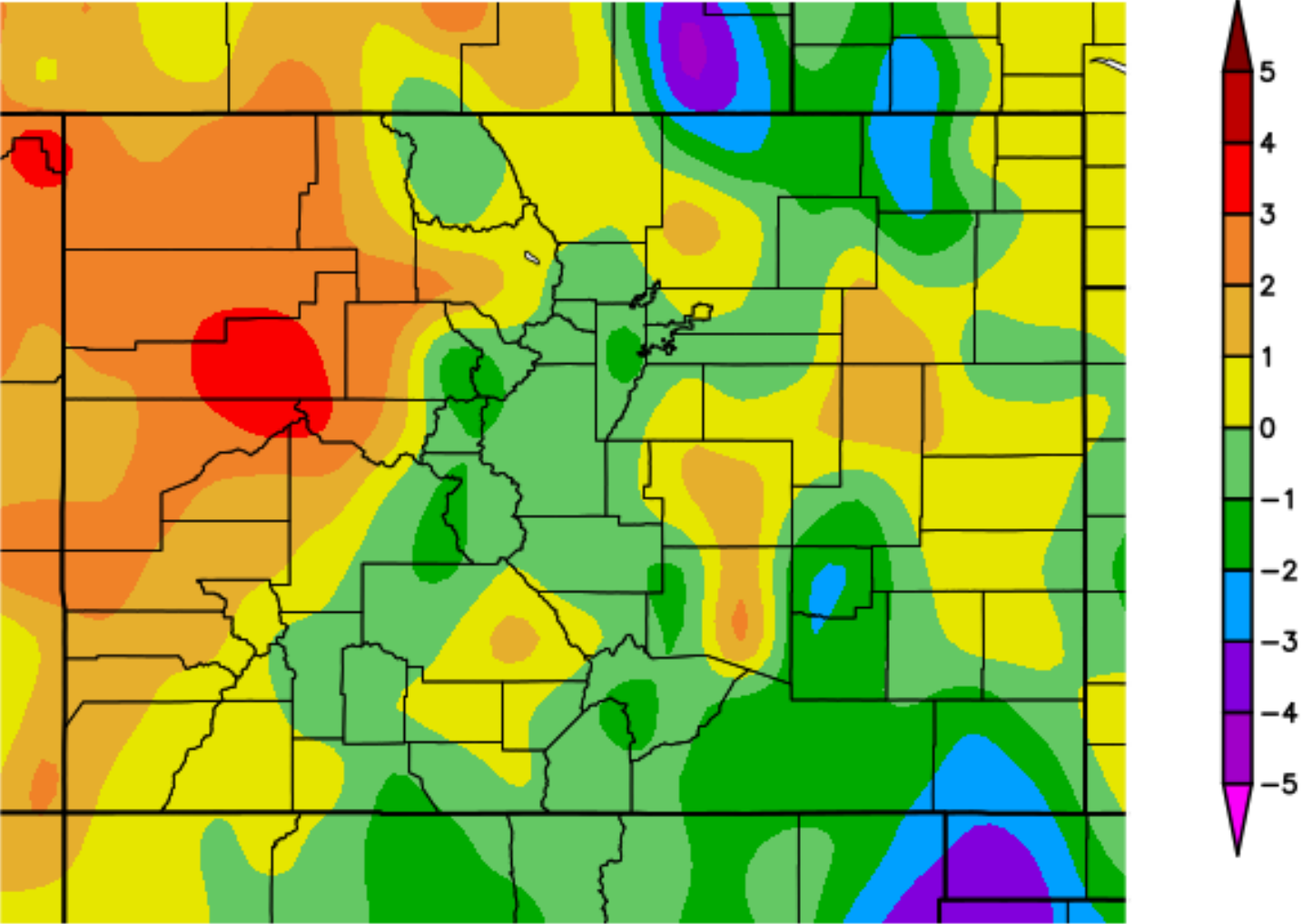
August 2018 Percentile



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 7 SEP 2018



Departure from Normal Temperature (F) 9/1/2018 - 9/9/2018



Generated 9/10/2018 at HPRCC using provisional data.

NOAA Regional Climate Centers





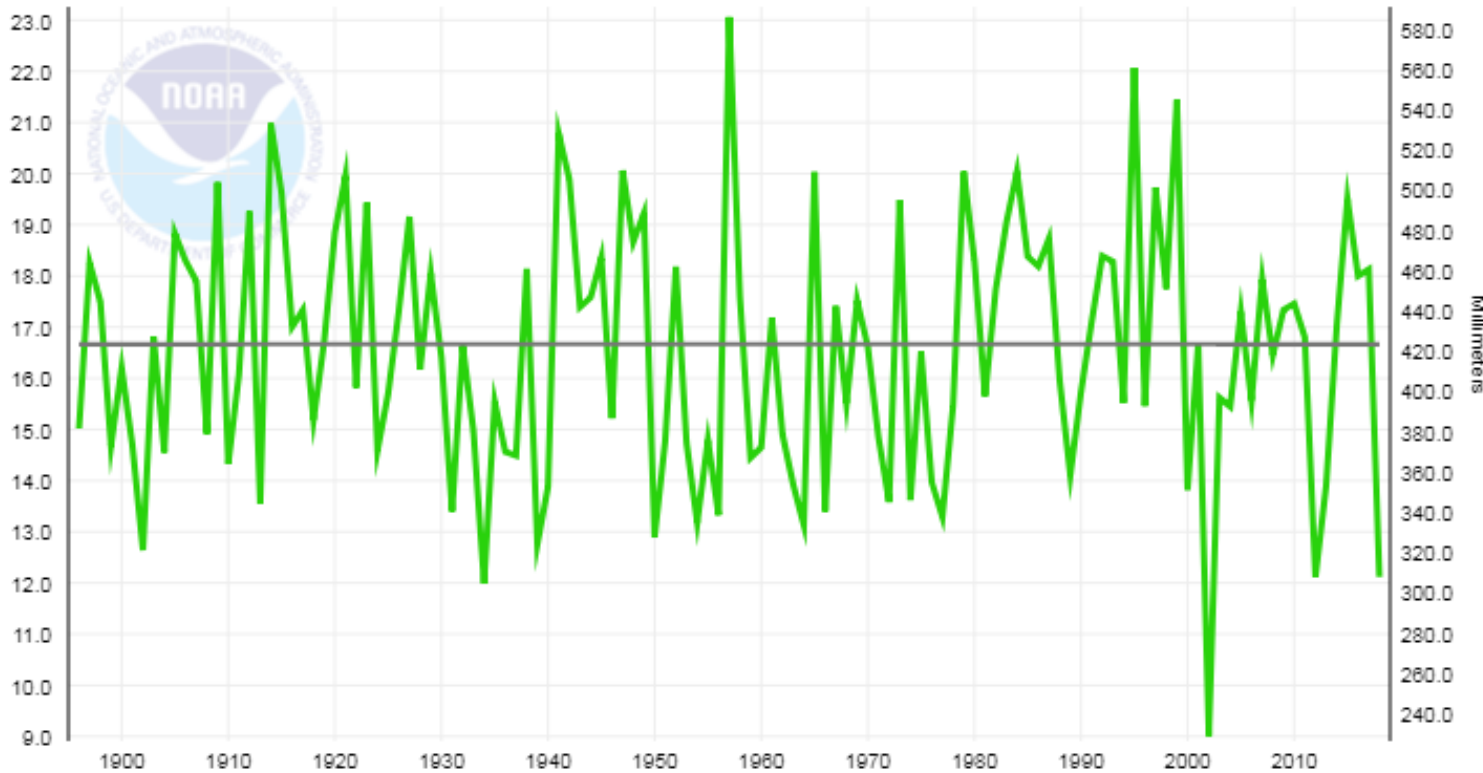
Water Year 2018 – Precipitation



4th driest in 123-year record (behind WY 2002, WY 1934, WY 2012)
 -4.55" below 16.67" average

Colorado, Precipitation, October-August

Precip 1901-2000 Mean: 16.67"

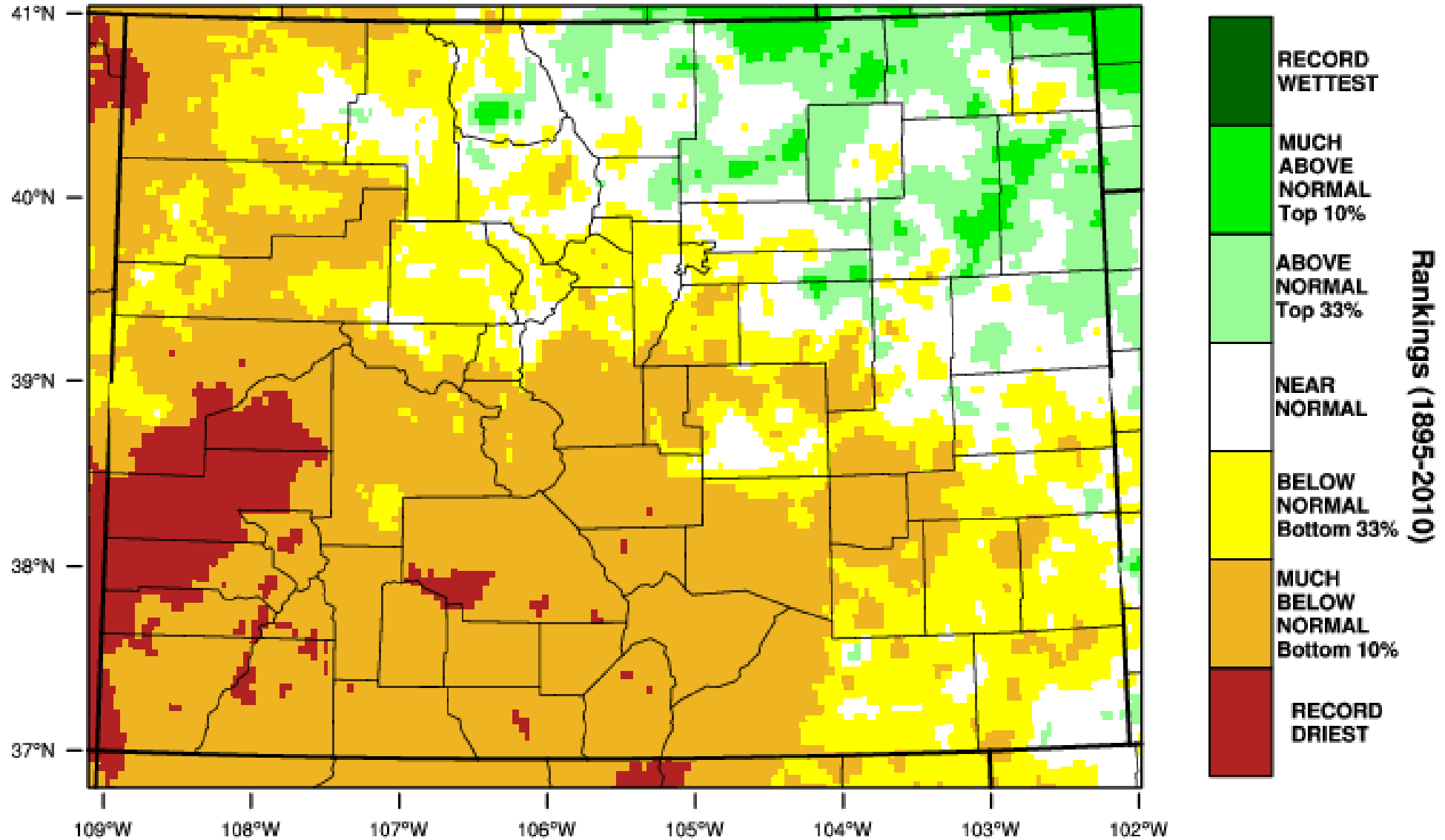


MONTH	RANK
Oct 2017	37 th driest
Nov 2017	18 th driest
Dec 2017	7 th driest
Jan 2018	37 th driest
Feb 2018	near average
Mar 2018	26 th driest
Apr 2018	34 th driest
May 2018	38 th driest
Jun 2018	26 th driest
Jul 2018	near average
Aug 2018	25 th driest



Colorado - Precipitation

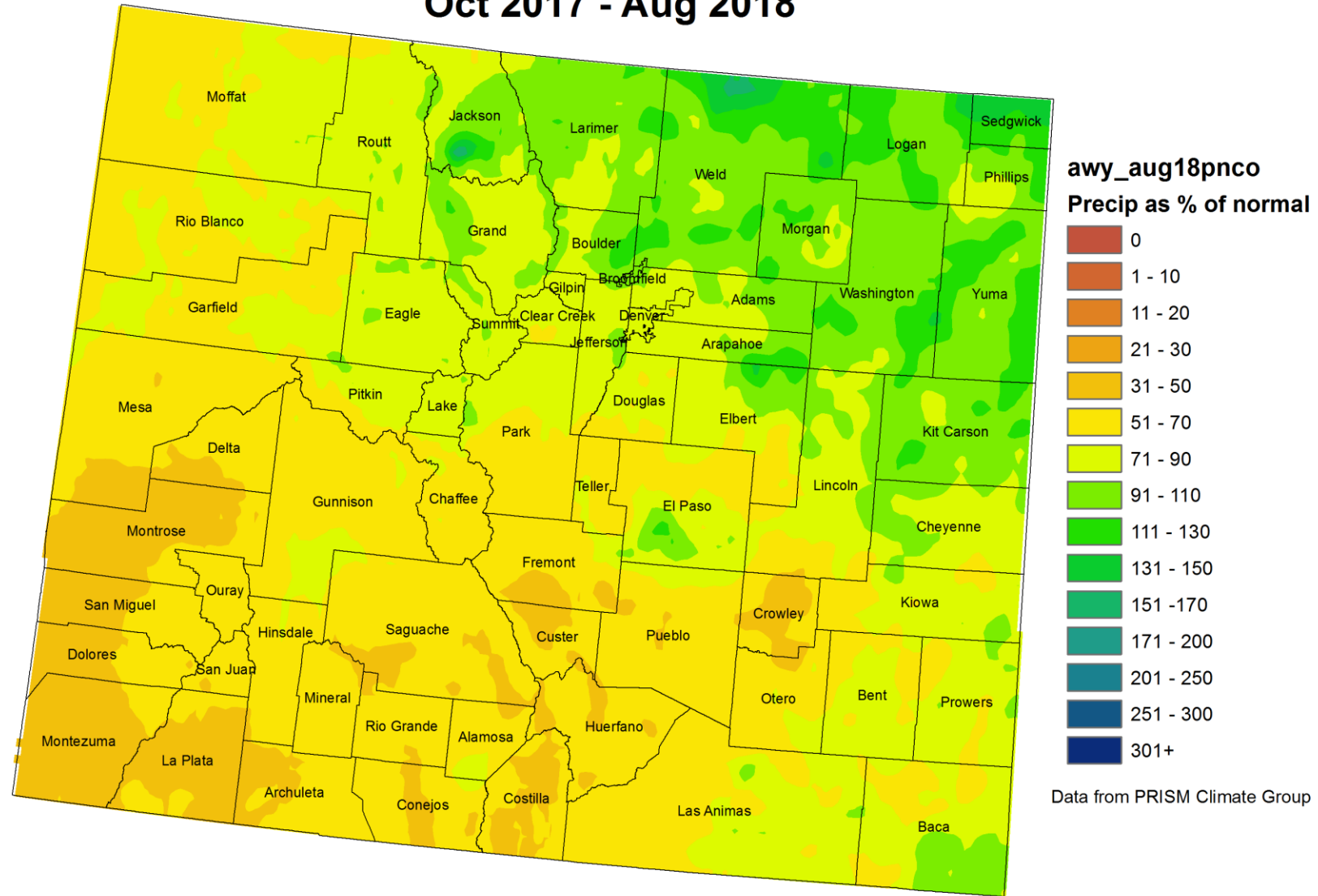
October-August 2018 Percentile



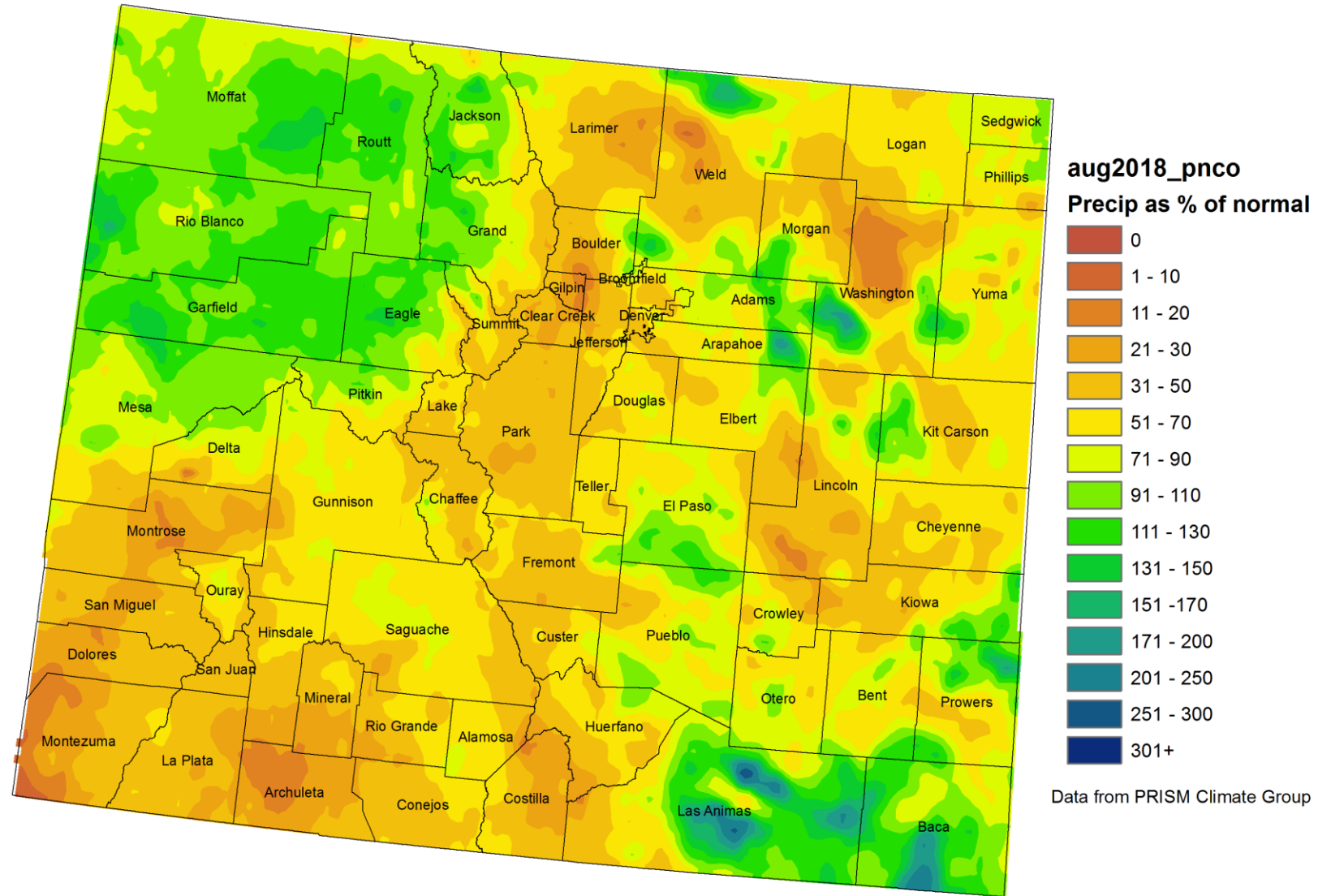
WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 7 SEP 2018



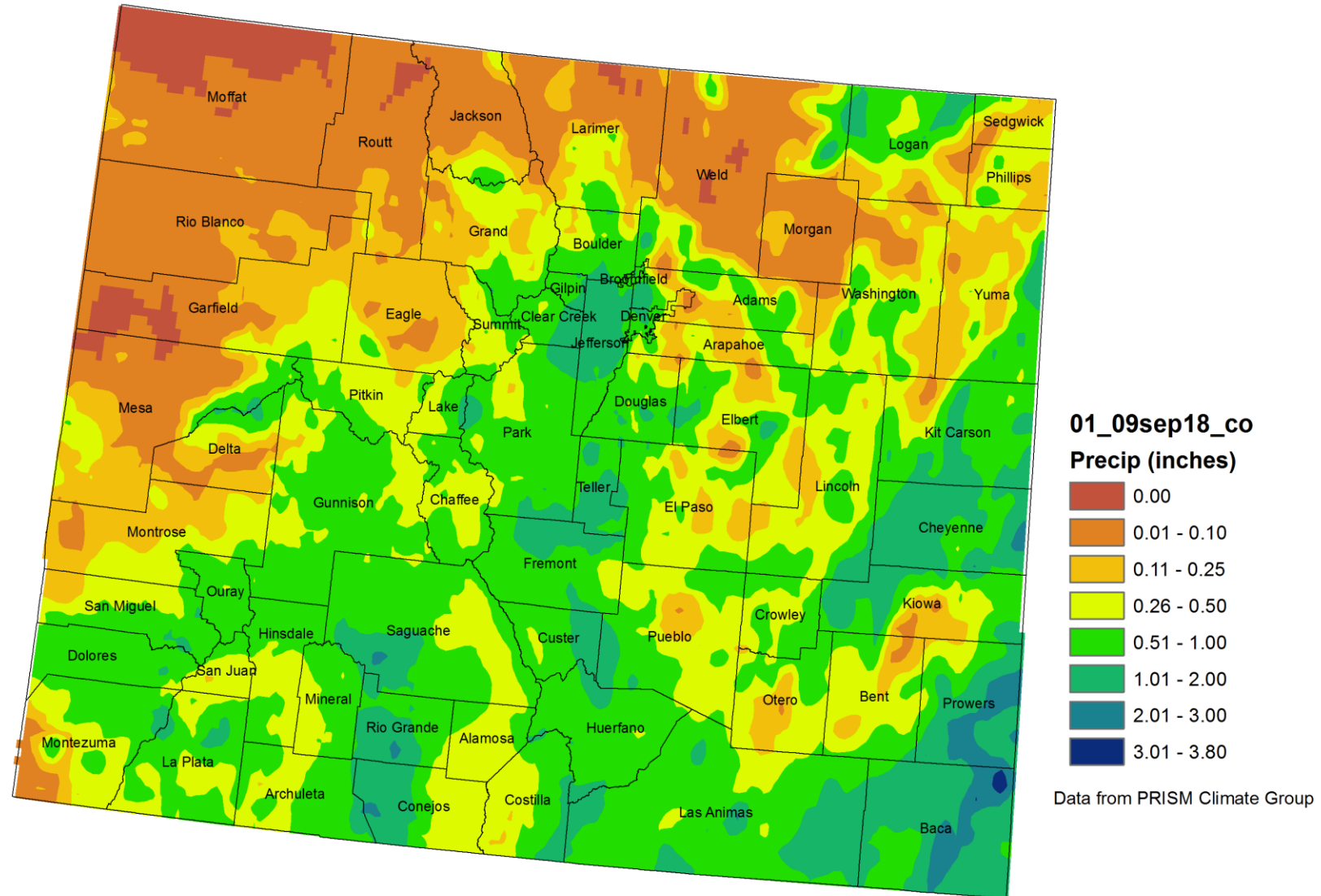
Colorado Water Year 2018 Precipitation as a Percentage of Normal Oct 2017 - Aug 2018



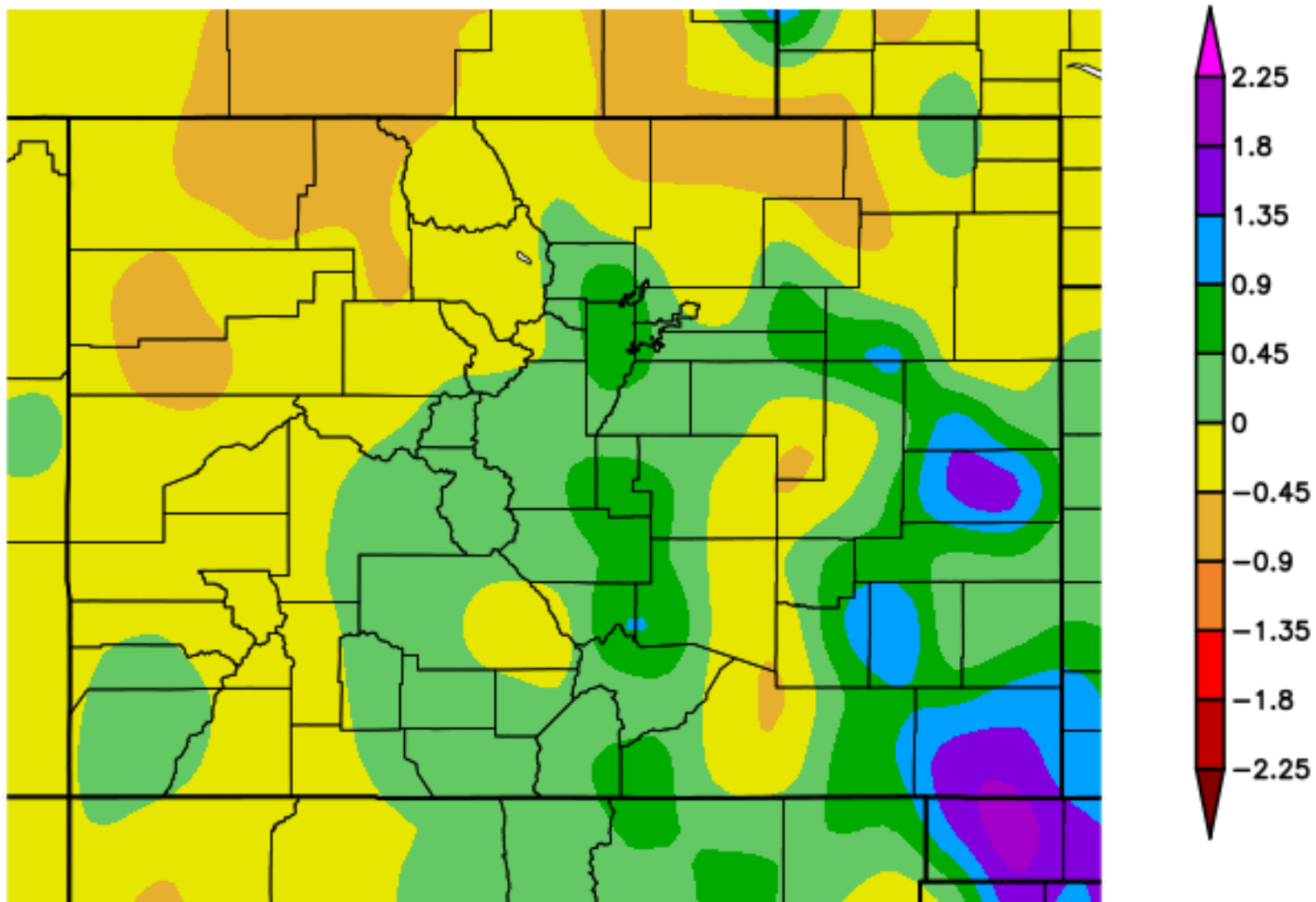
Colorado August 2018 Precipitation as a Percentage of Normal



Colorado Month to Date Precipitation 1 - 9 September 2018



Departure from Normal Precipitation (in) 9/1/2018 - 9/9/2018

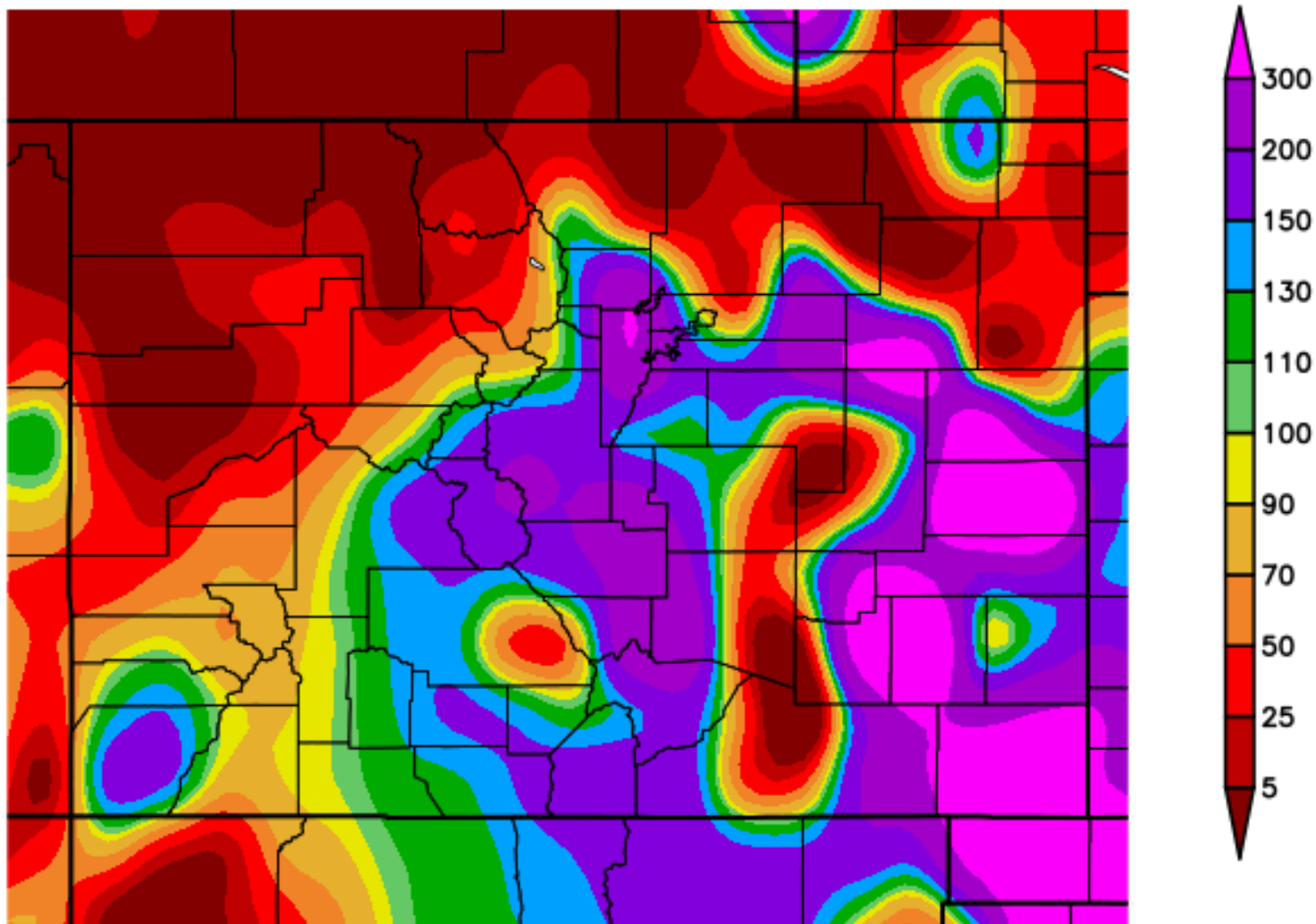


Generated 9/10/2018 at HPRCC using provisional data.

NOAA Regional Climate Centers



Percent of Normal Precipitation (%) 9/1/2018 - 9/9/2018

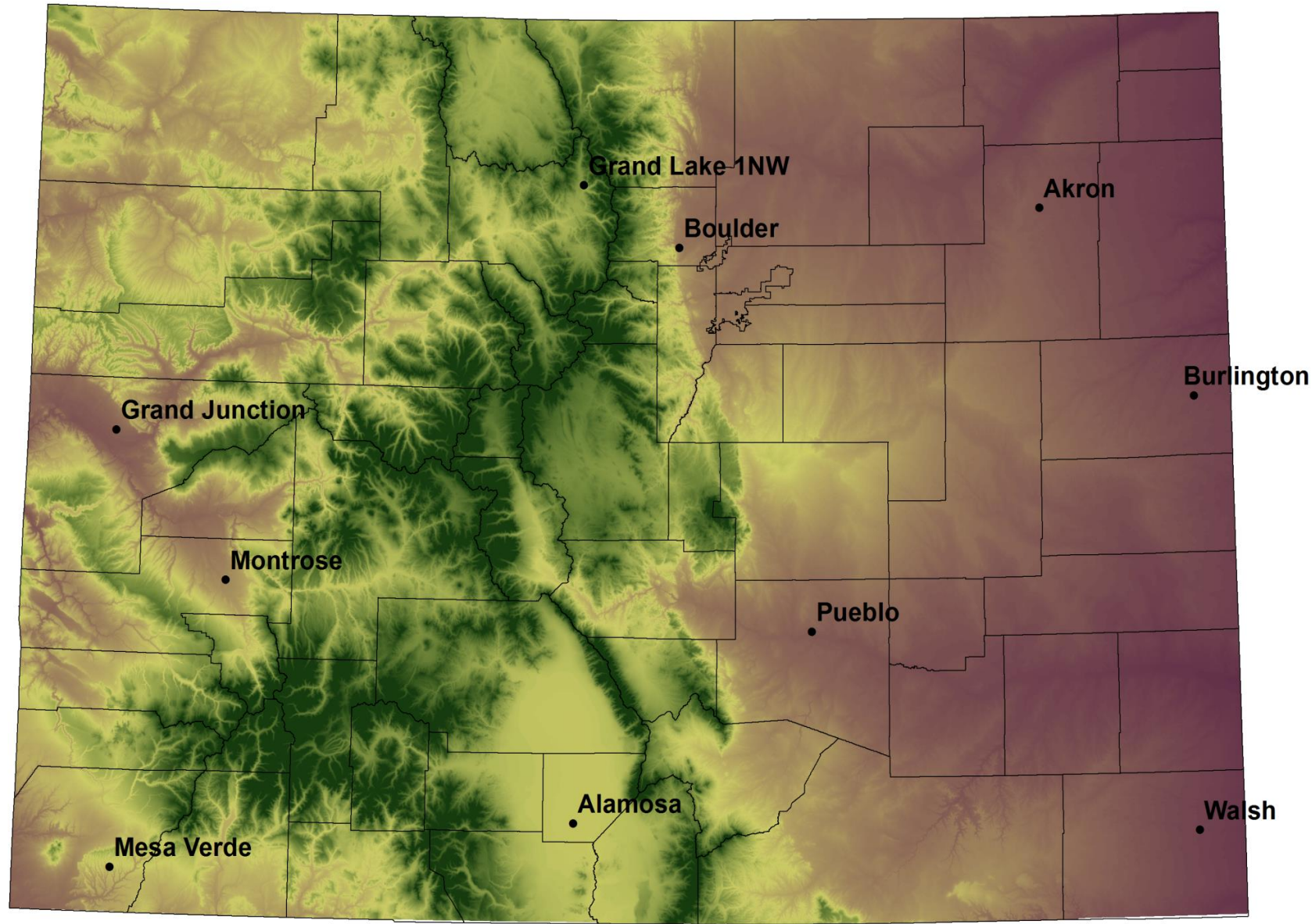


Generated 9/10/2018 at HPRCC using provisional data.

NOAA Regional Climate Centers



NWS Cooperative Stations for WATF

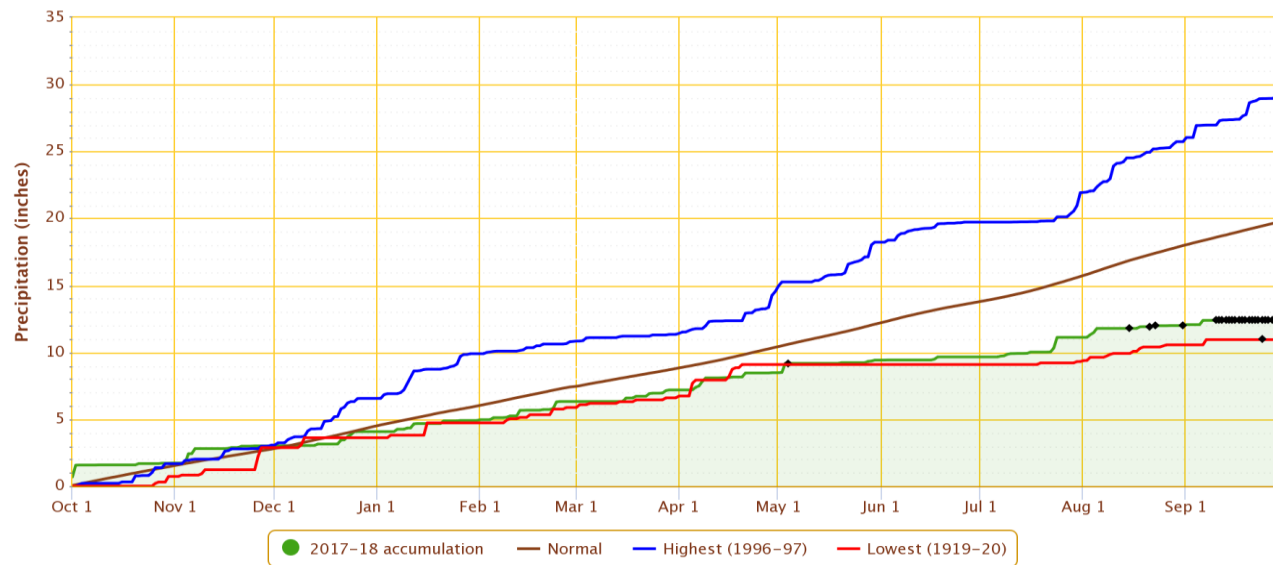


Water Year 2018 – Station Updates



Accumulated Precipitation – GRAND LAKE 1 NW, CO

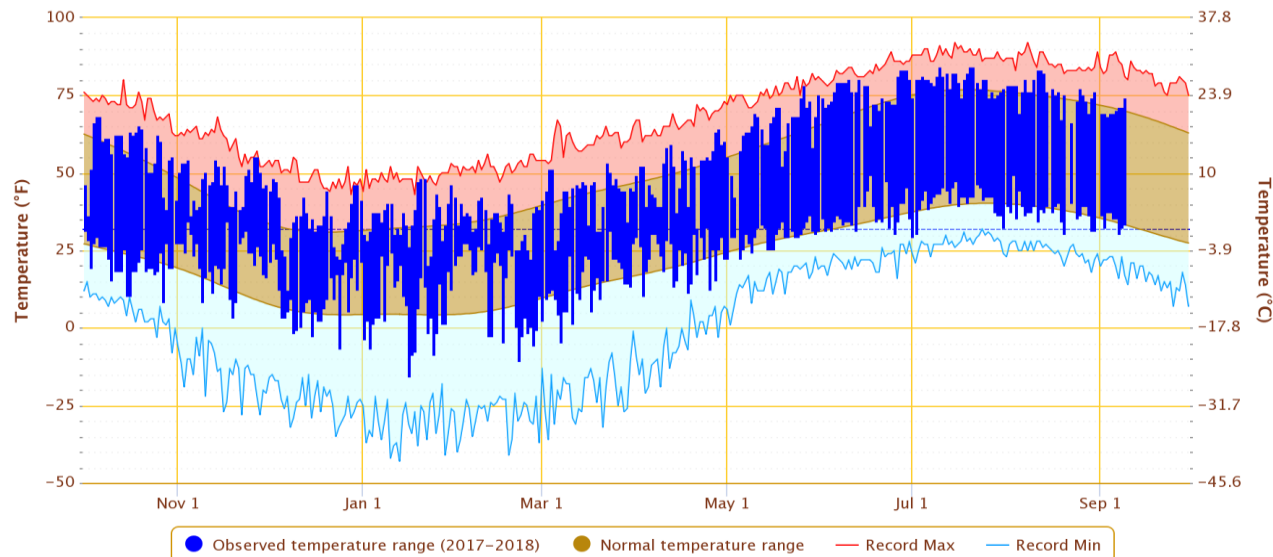
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



Powered by ACIS

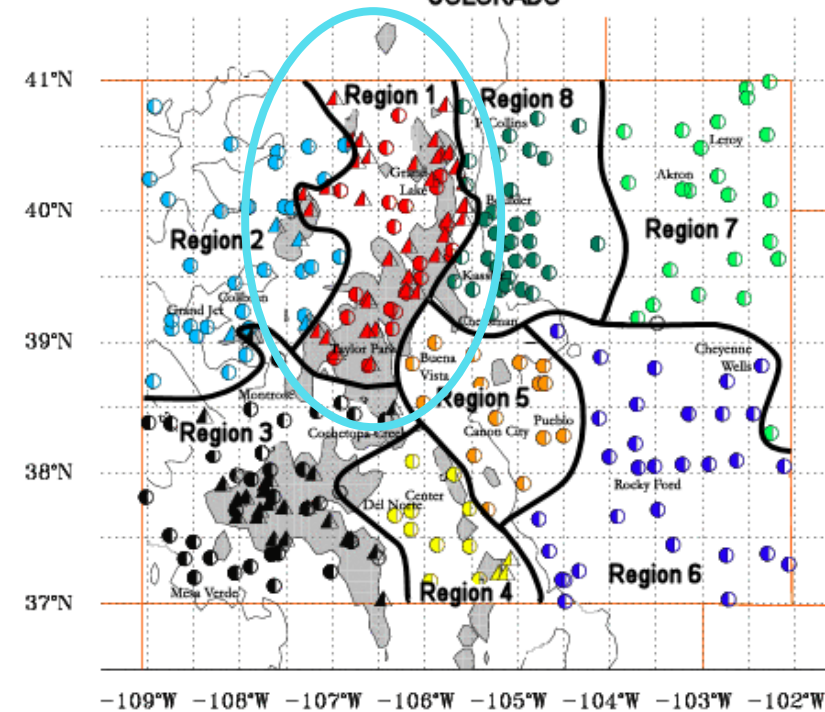
Daily Temperature Data – GRAND LAKE 1 NW, CO

Period of Record – 1939-10-01 to 2018-09-09. Normals period: 1981-2010. Click and drag to zoom chart.



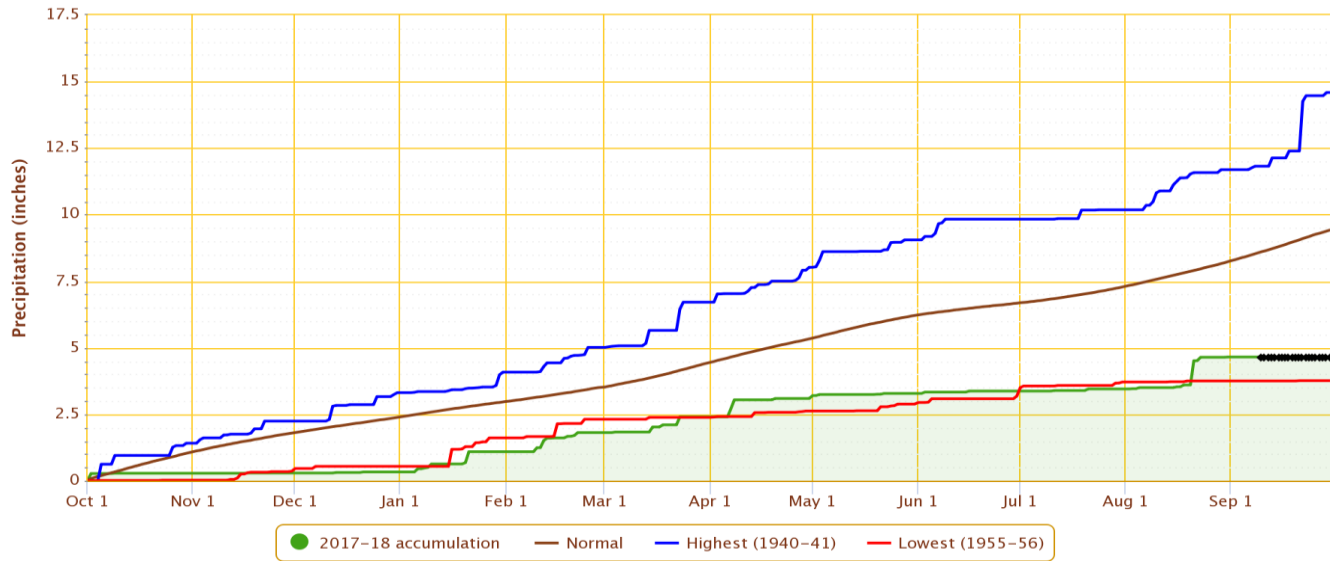
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Accumulated Precipitation – GRAND JUNCTION WALKER FIELD, CO

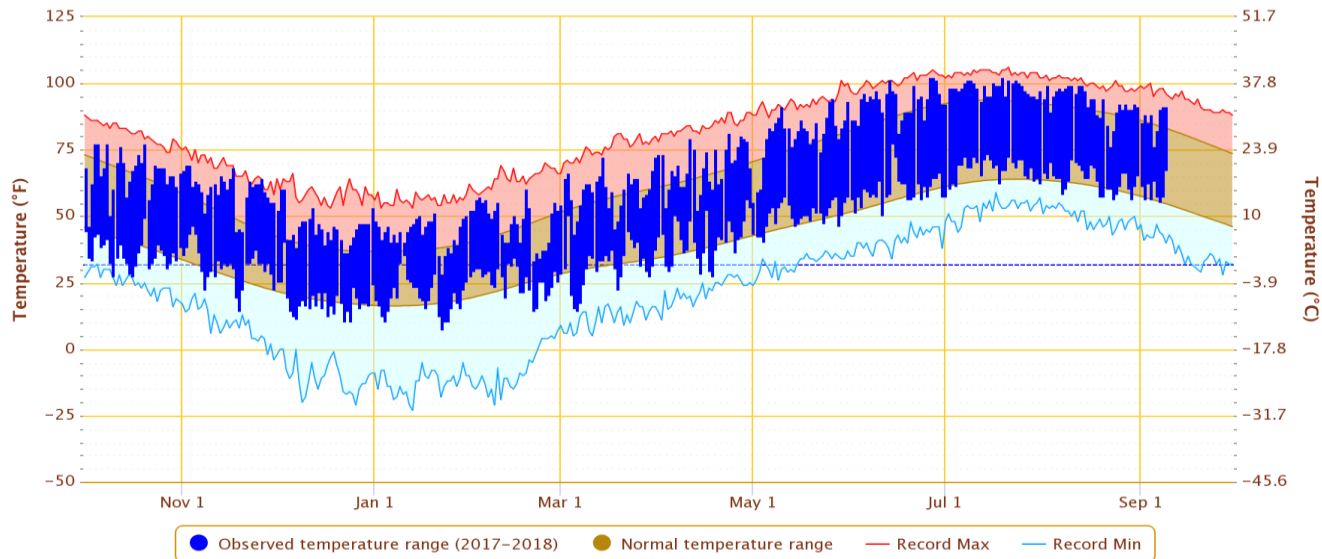
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



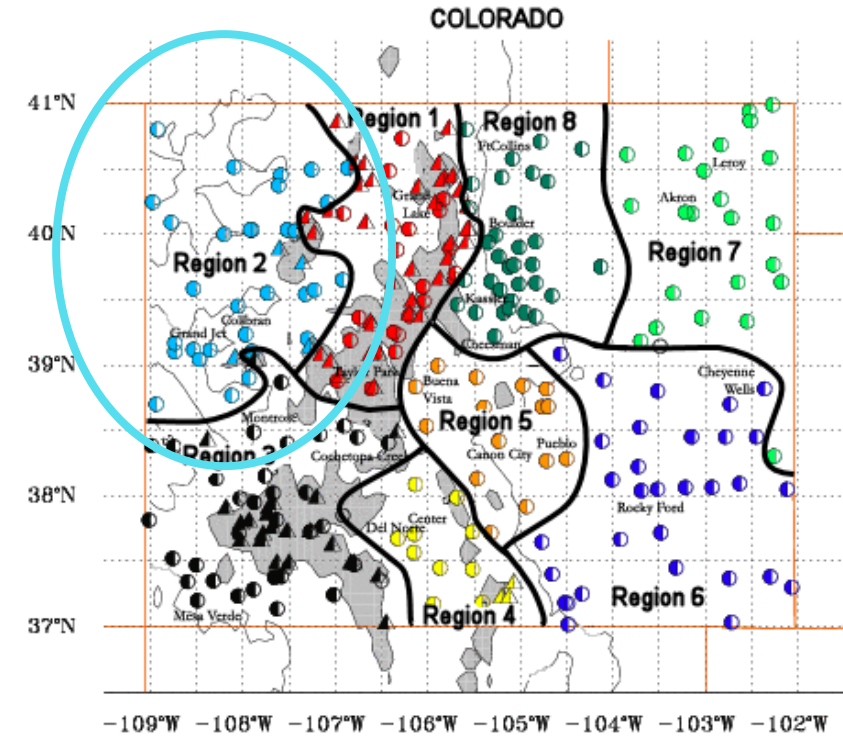
Powered by ACIS

Daily Temperature Data – GRAND JUNCTION WALKER FIELD, CO

Period of Record – 1900-01-01 to 2018-09-09. Normals period: 1981-2010. Click and drag to zoom chart.

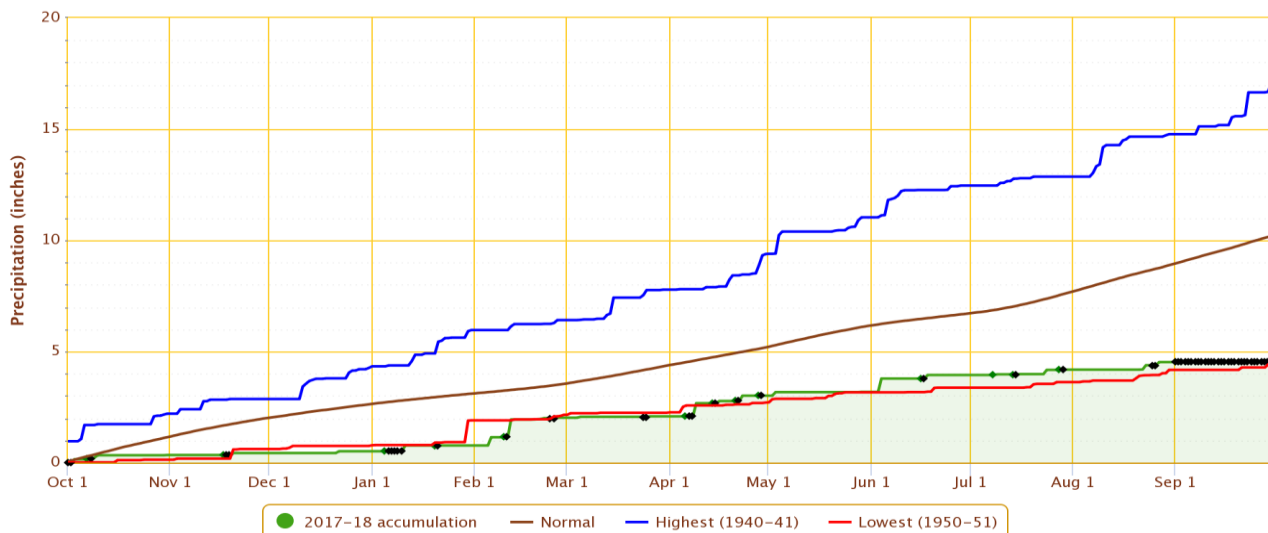


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Accumulated Precipitation – MONTROSE NO 2, CO

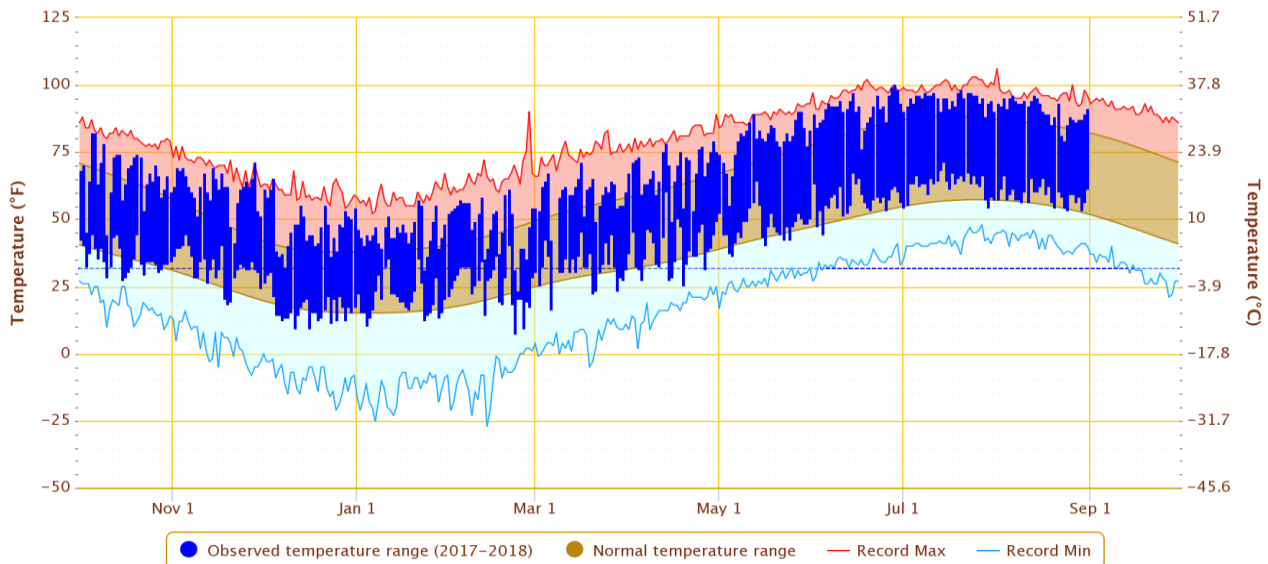
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



Powered by ACIS

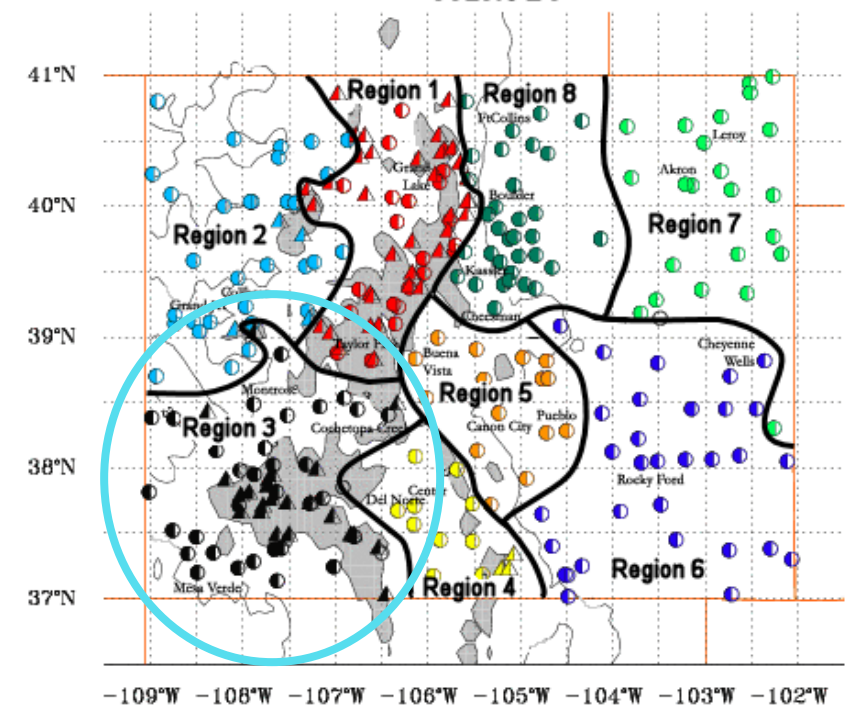
Daily Temperature Data – MONTROSE NO 2, CO

Period of Record - 1895-10-01 to 2018-08-31. Normals period: 1981-2010. Click and drag to zoom chart.



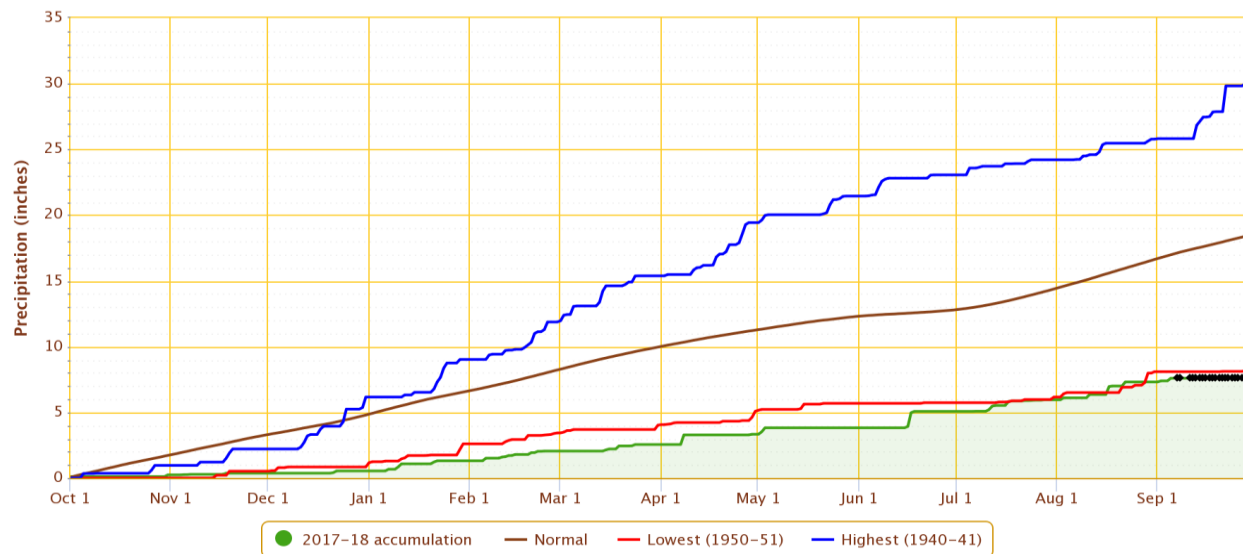
Powered by ACIS

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Accumulated Precipitation – MESA VERDE NP, CO

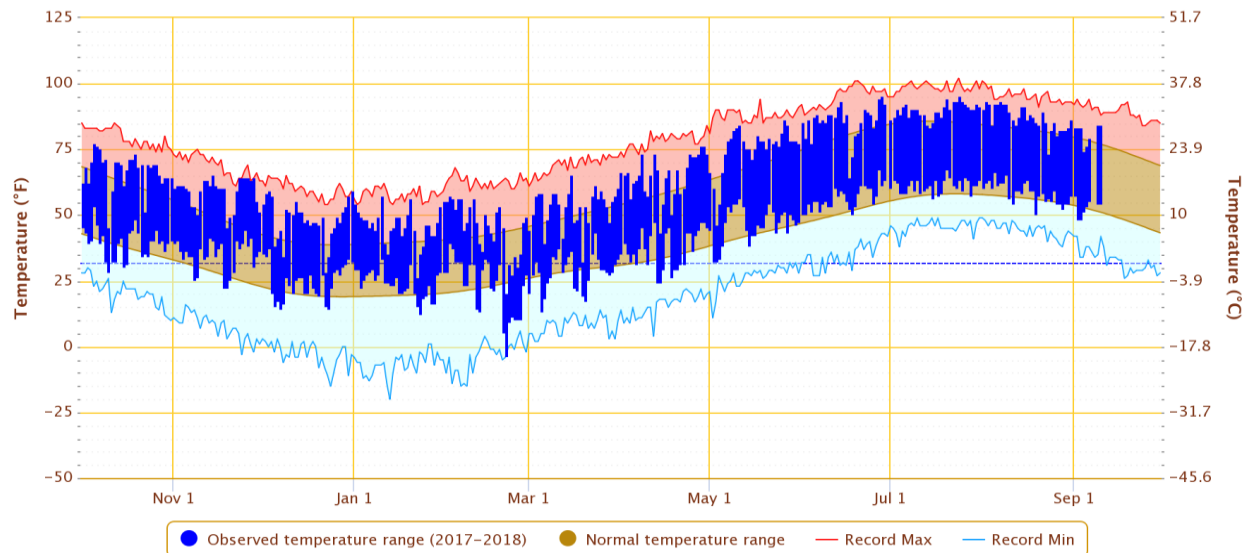
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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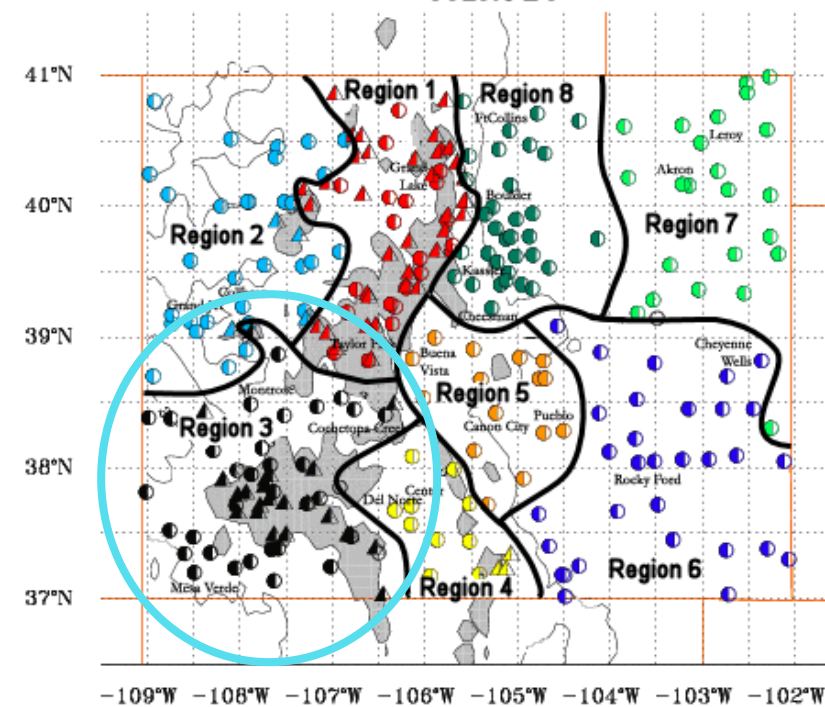
Daily Temperature Data – MESA VERDE NP, CO

Period of Record – 1922-02-16 to 2018-09-10. Normals period: 1981-2010. Click and drag to zoom chart.



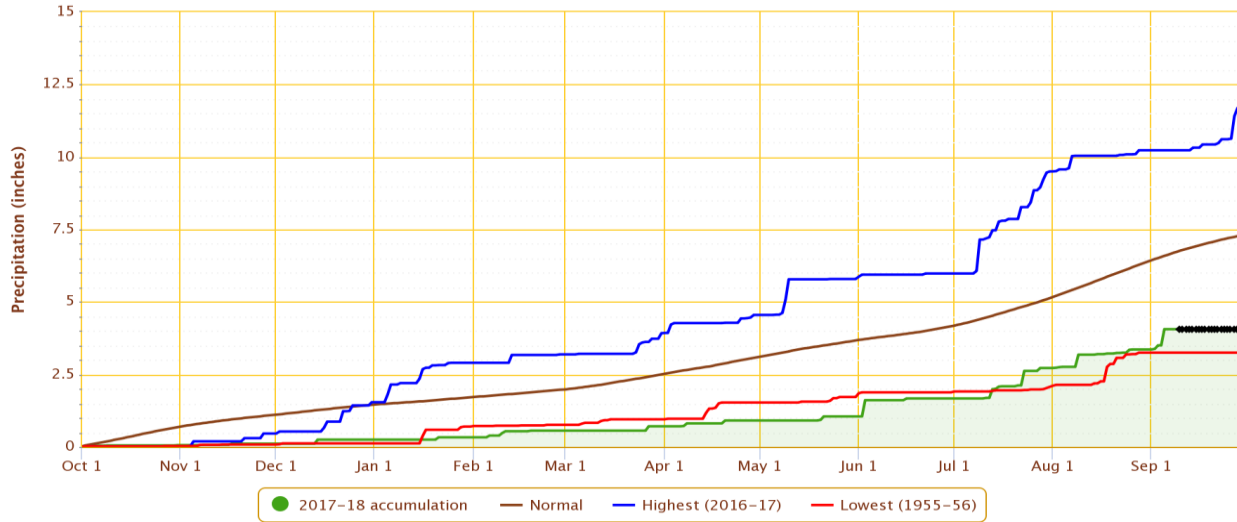
Powered by ACIS

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Accumulated Precipitation – ALAMOSA SAN LUIS VALLEY REGIONAL AP, CO

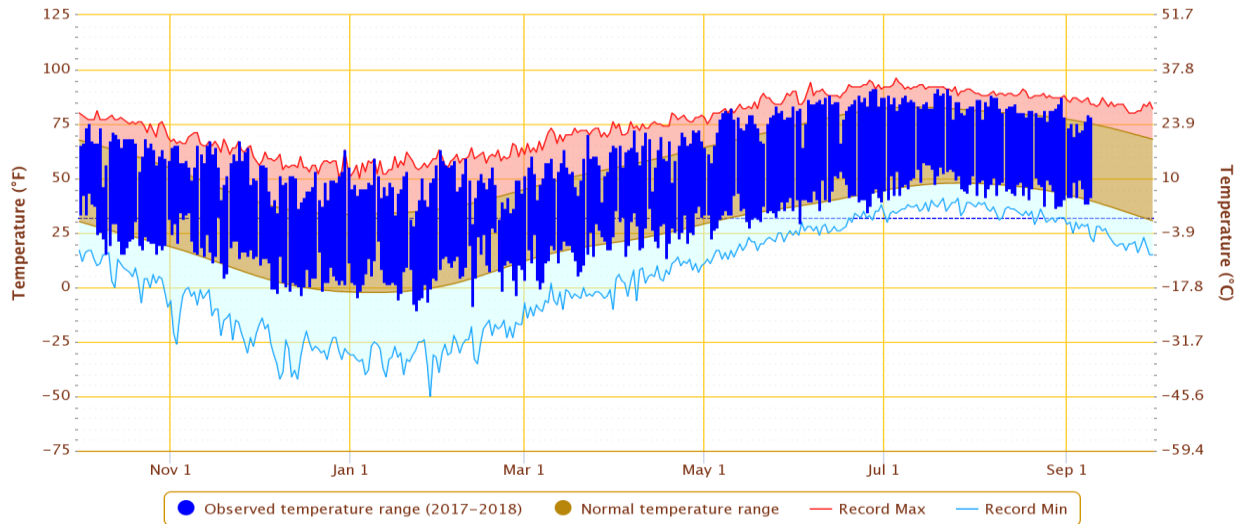
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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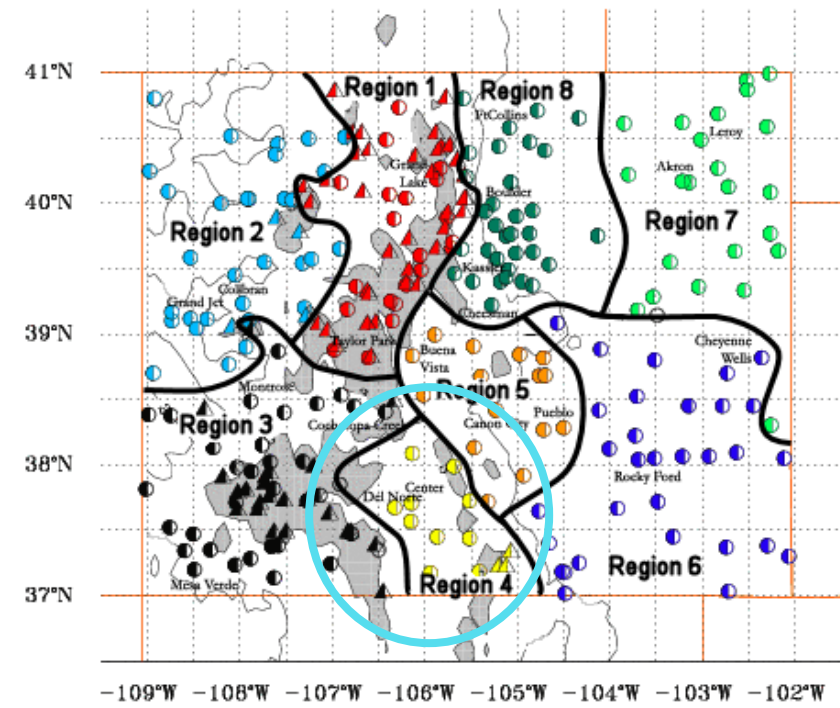
Daily Temperature Data – ALAMOSA SAN LUIS VALLEY REGIONAL AP, CO

Period of Record – 1948-01-01 to 2018-09-09. Normals period: 1981-2010. Click and drag to zoom chart.



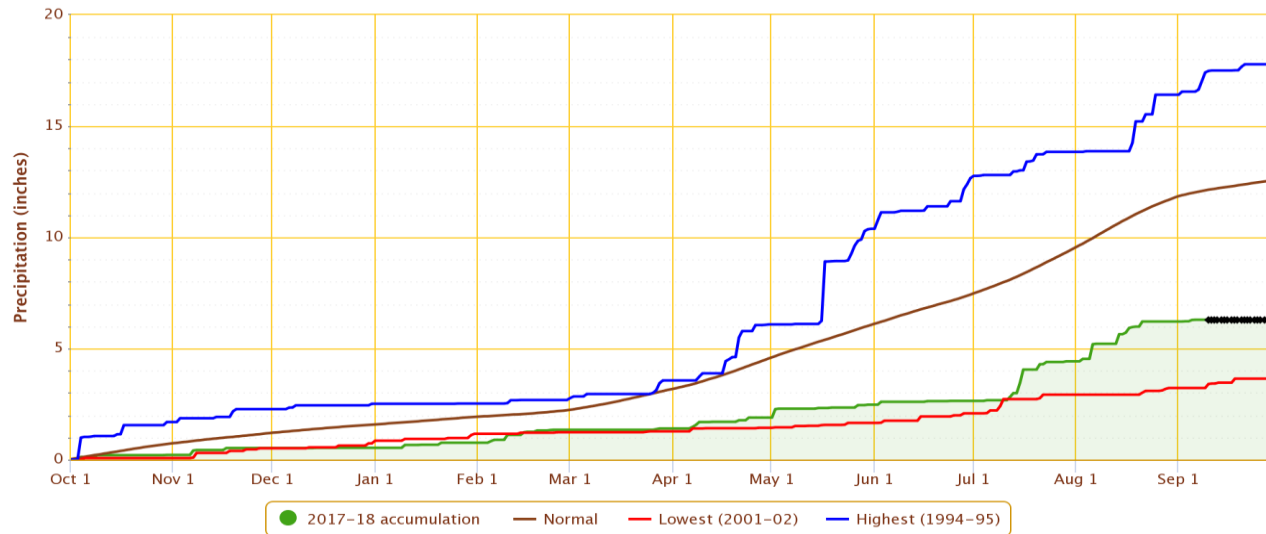
Powered by ACIS

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Accumulated Precipitation – PUEBLO MEMORIAL AP, CO

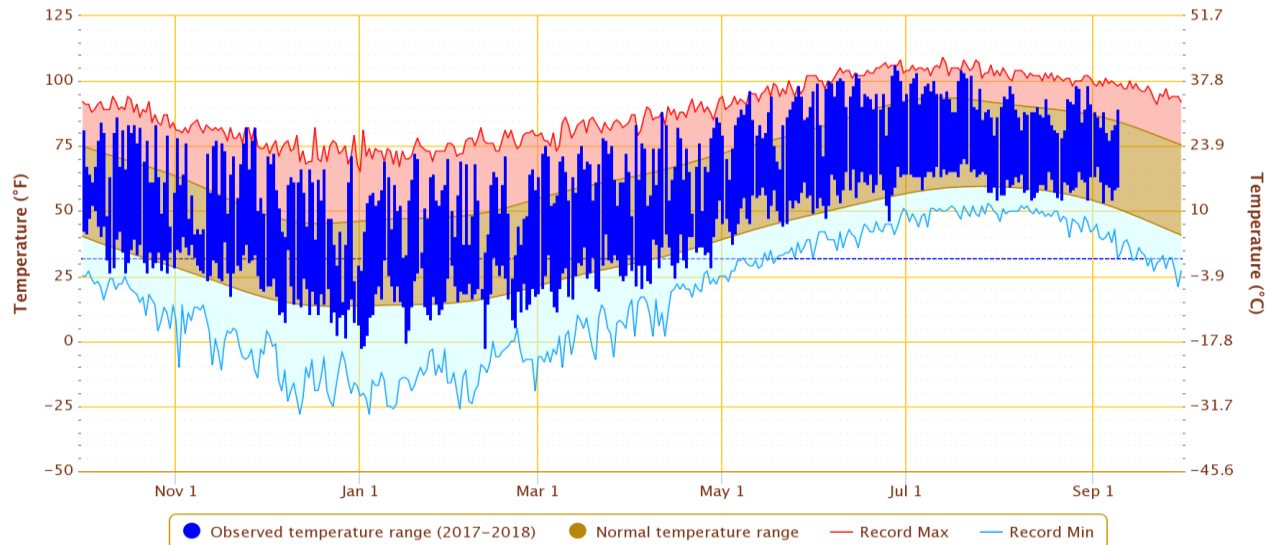
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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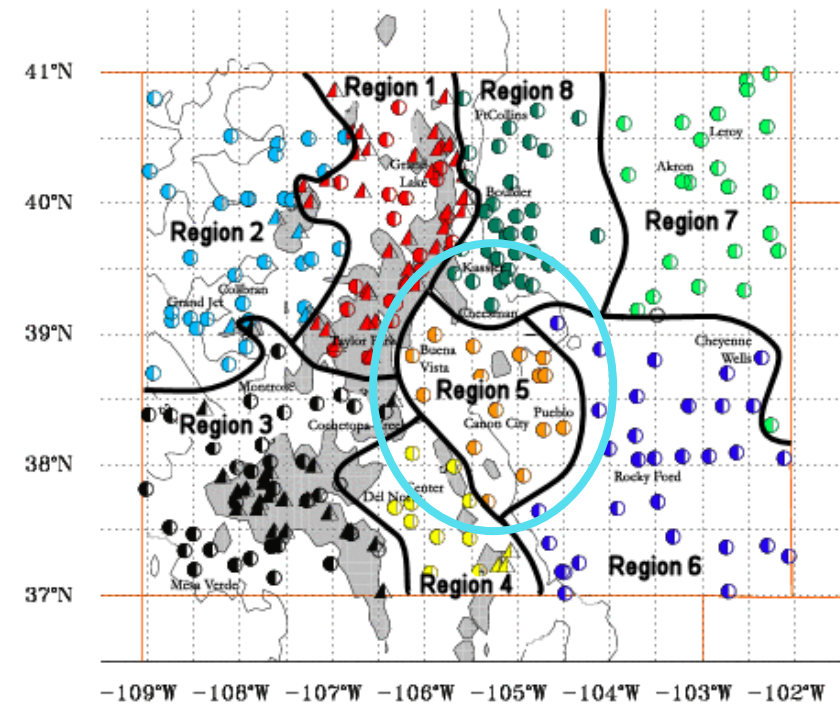
Daily Temperature Data – PUEBLO MEMORIAL AP, CO

Period of Record – 1954-06-16 to 2018-09-09. Normals period: 1981-2010. Click and drag to zoom chart.



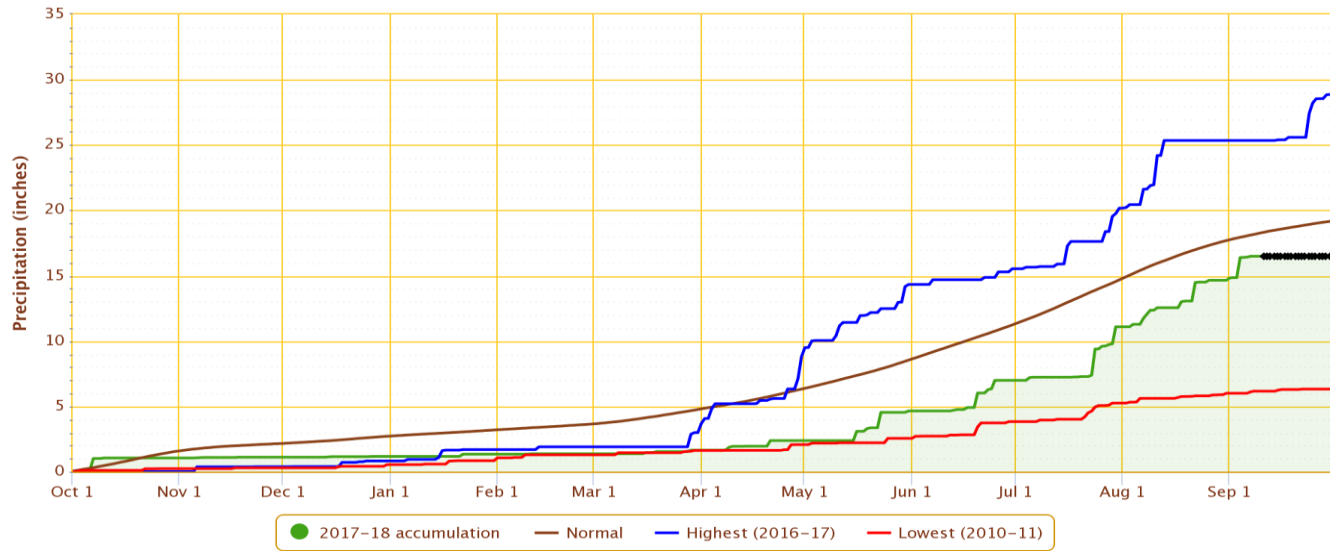
Powered by ACIS

COLORADO



Accumulated Precipitation – WALSH 1 W, CO

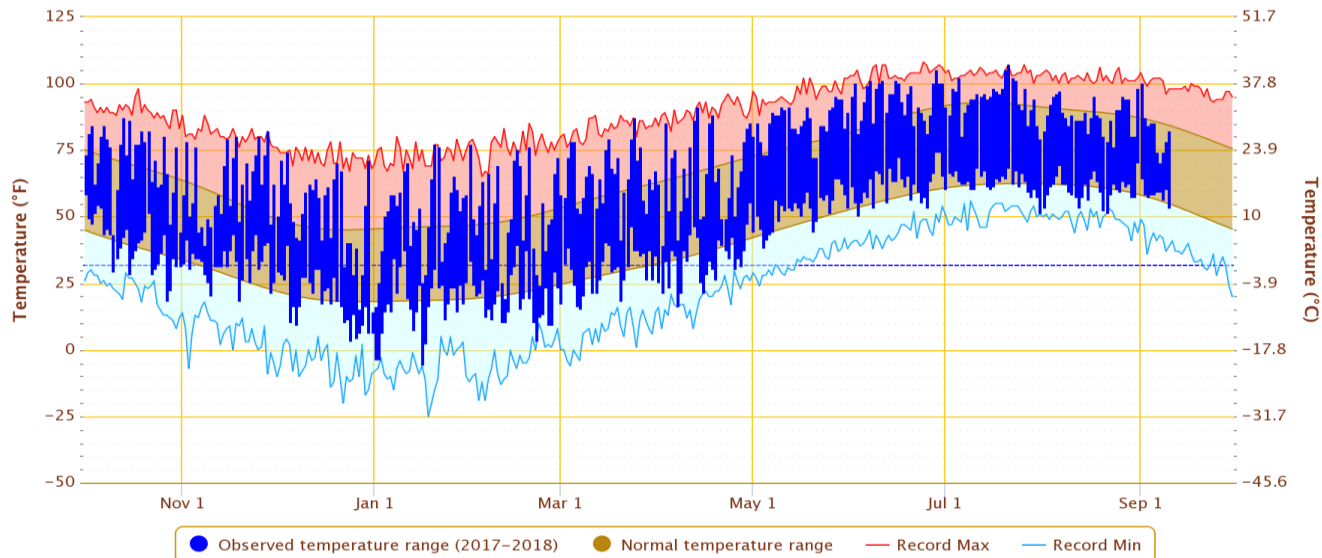
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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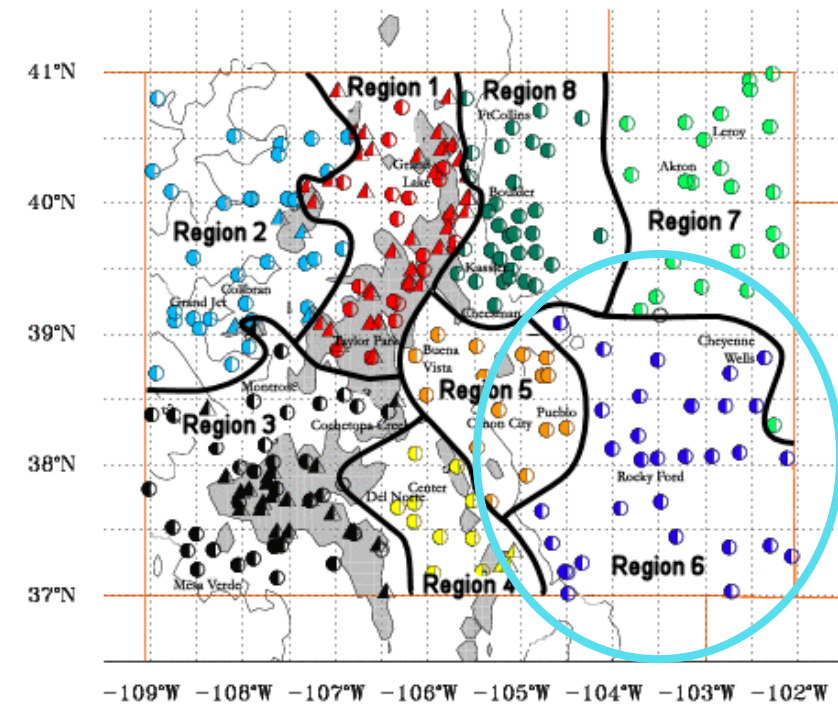
Daily Temperature Data – WALSH 1 W, CO

Period of Record – 1967-09-01 to 2018-09-10. Normals period: 1981-2010. Click and drag to zoom chart.



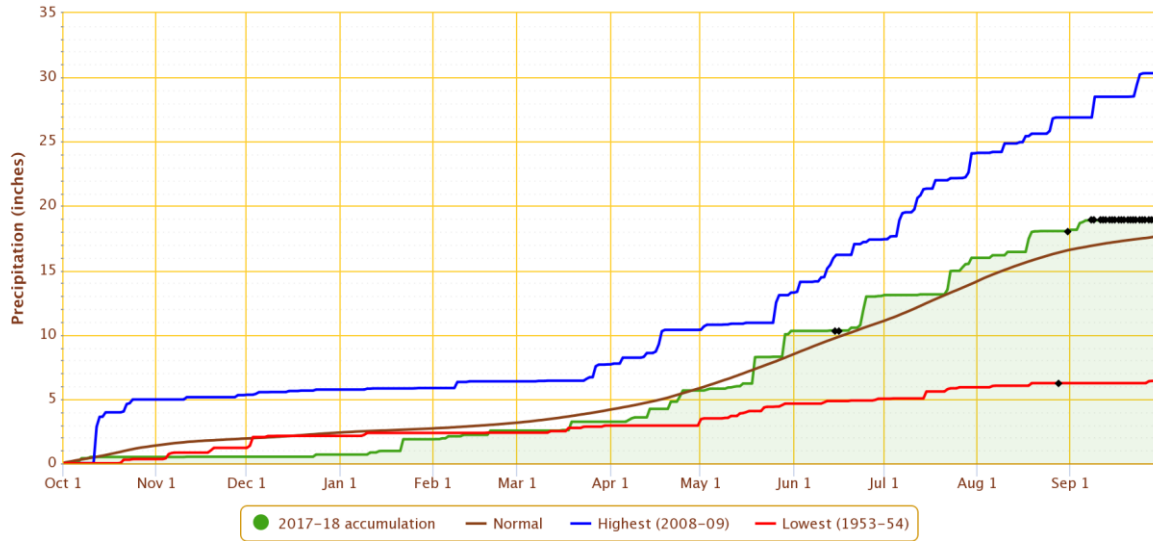
Powered by ACIS

COLORADO



Accumulated Precipitation – BURLINGTON, CO

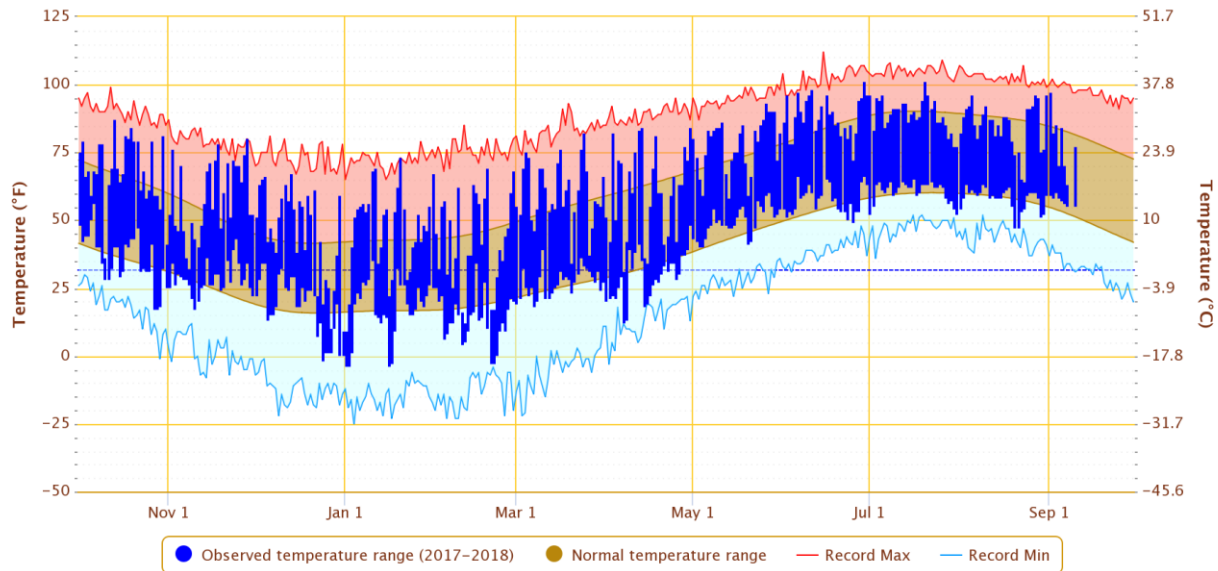
Click and drag to zoom to a shorter time interval, green/black diamonds represent subsequent/missing values



Powered by ACIS

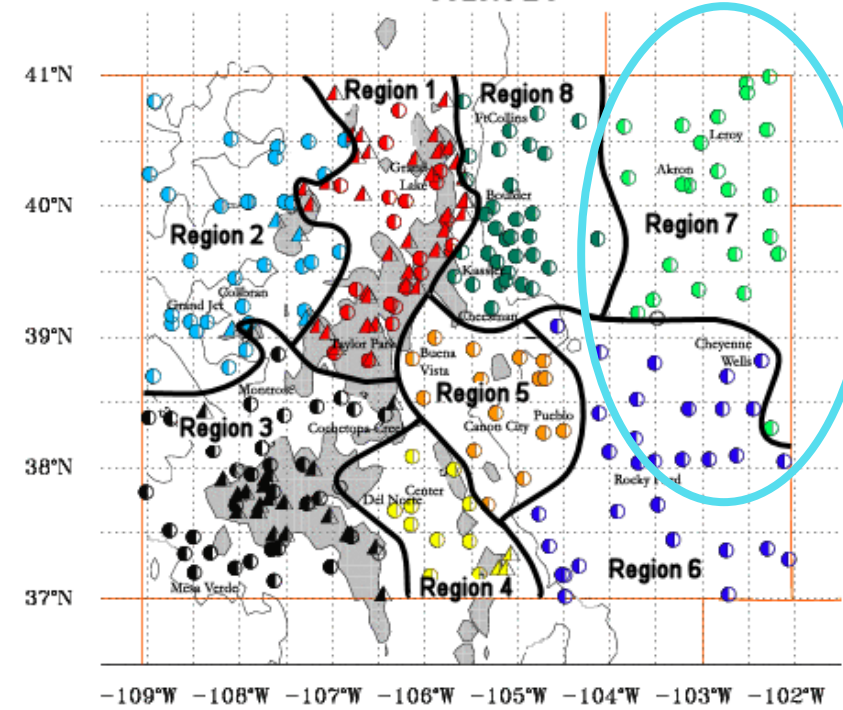
Daily Temperature Data – BURLINGTON, CO

Period of Record – 1903-12-01 to 2018-09-10. Normals period: 1981-2010. Click and drag to zoom chart.



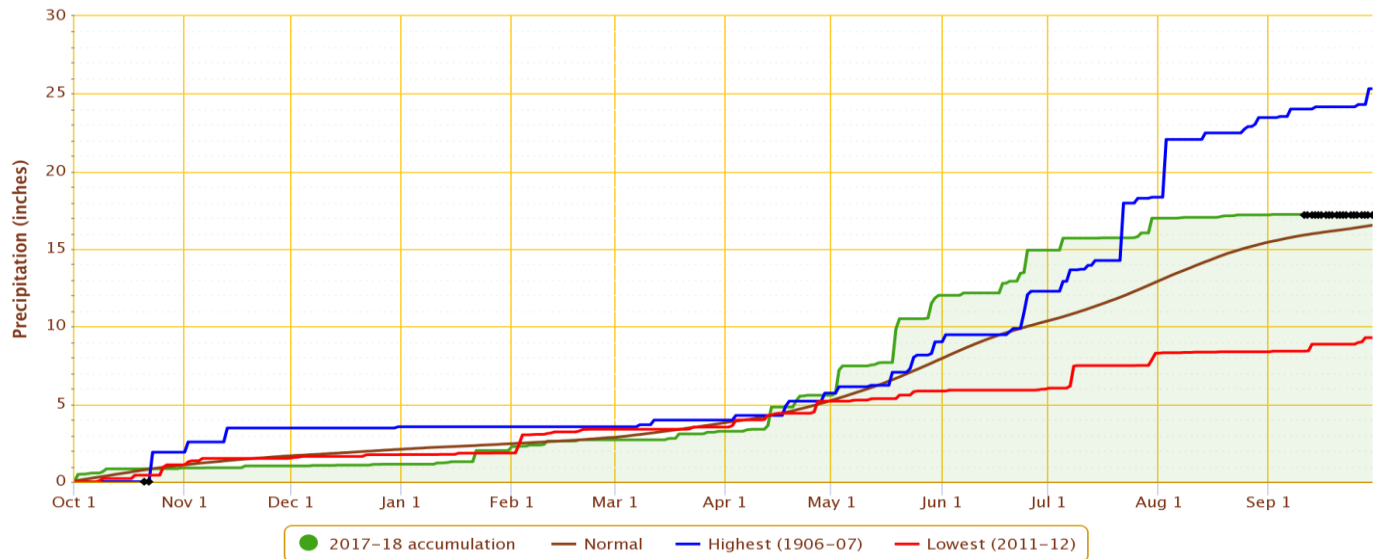
Powered by ACIS

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Accumulated Precipitation – AKRON 4 E, CO

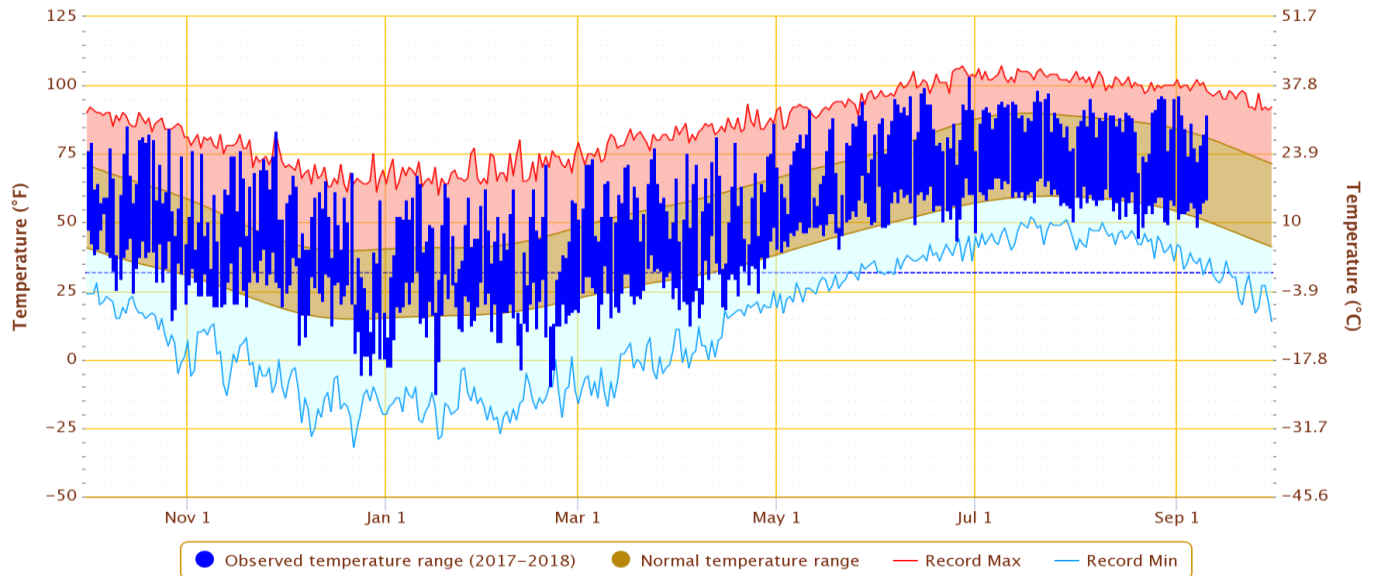
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



Powered by ACIS

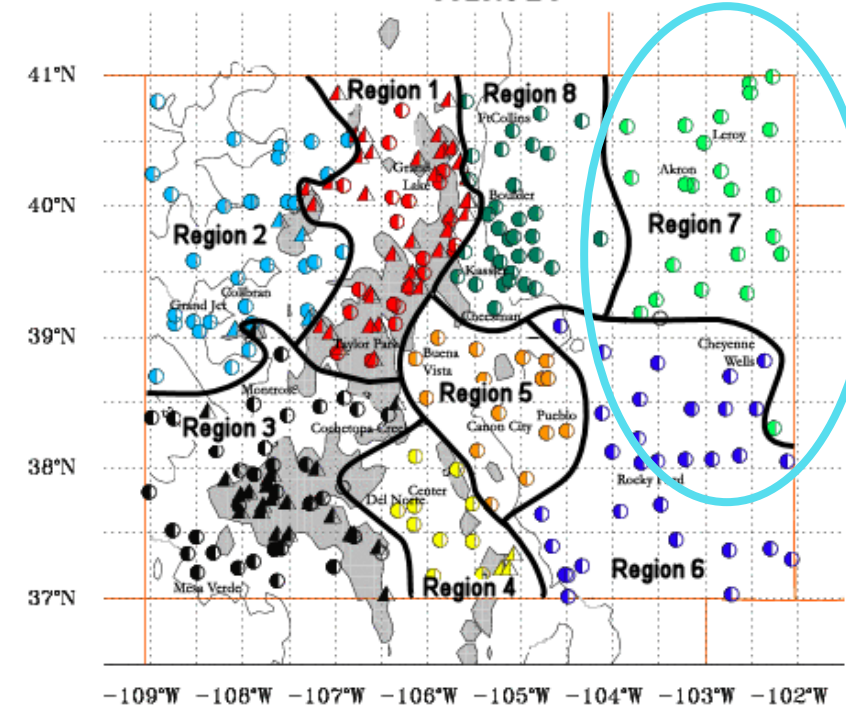
Daily Temperature Data – AKRON 4 E, CO

Period of Record – 1893-06-01 to 2018-09-10. Normals period: 1981-2010. Click and drag to zoom chart.



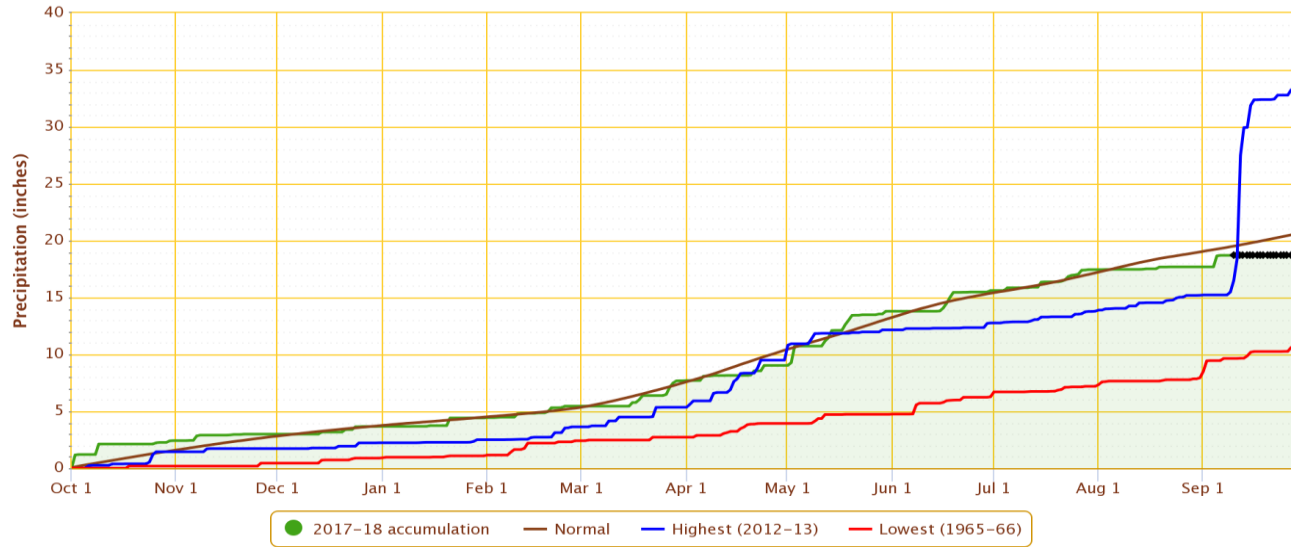
Powered by ACIS

COLORADO



Accumulated Precipitation – BOULDER, CO

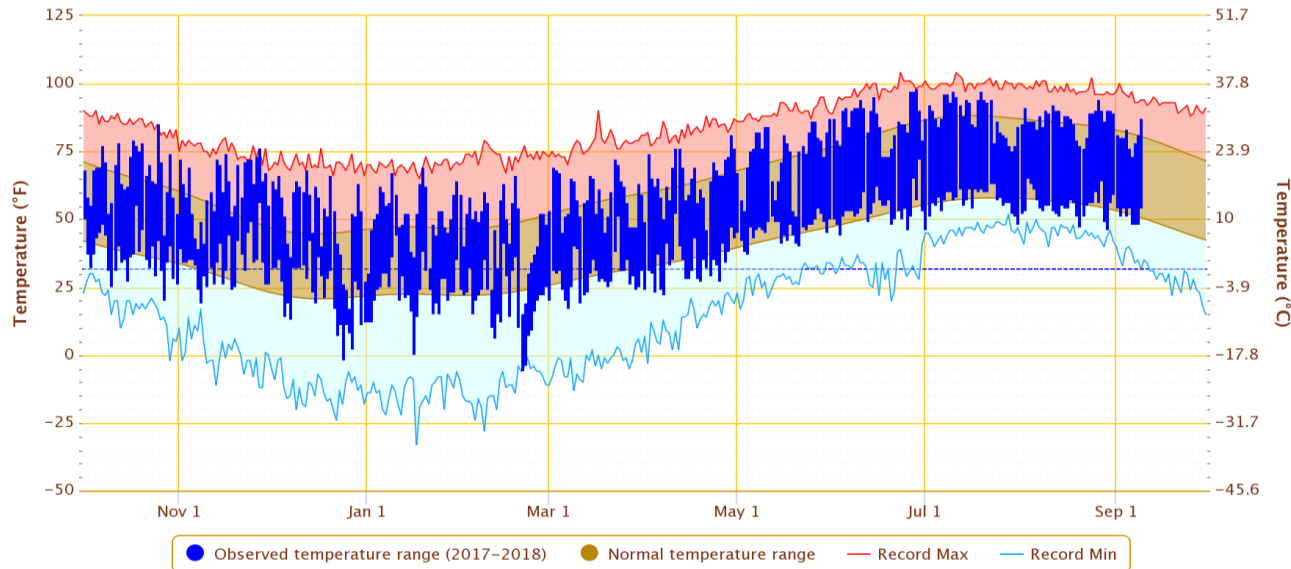
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



Powered by ACIS

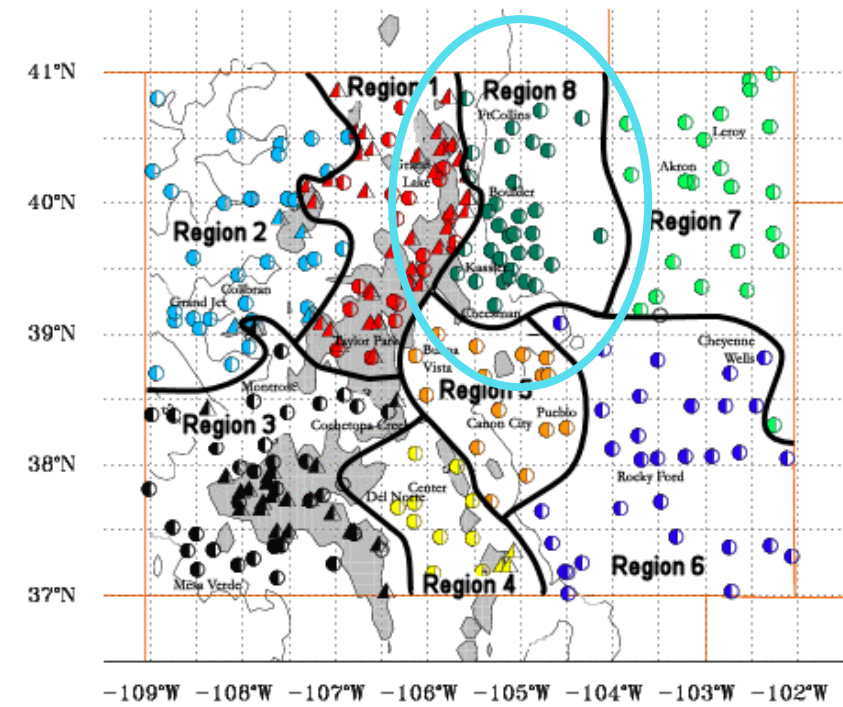
Daily Temperature Data – BOULDER, CO

Period of Record – 1893-10-01 to 2018-09-09. Normals period: 1981-2010. Click and drag to zoom chart.

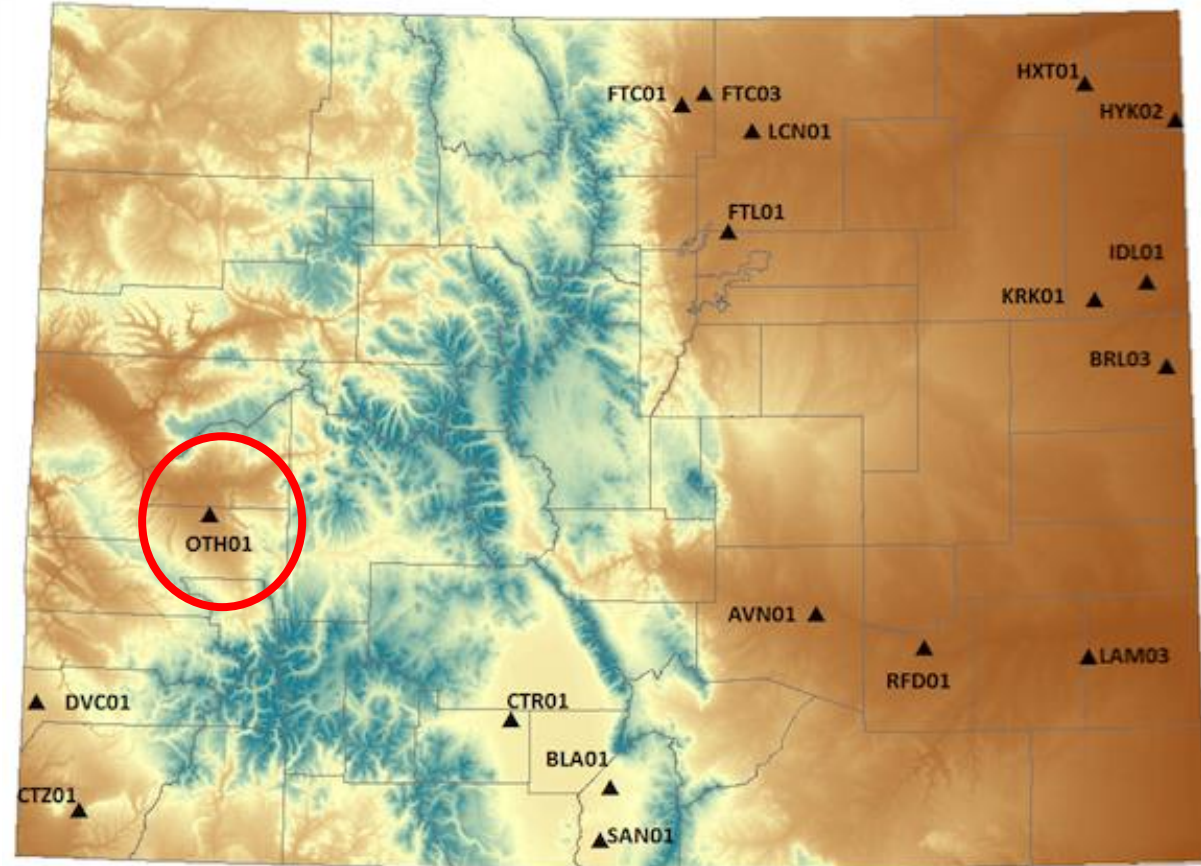
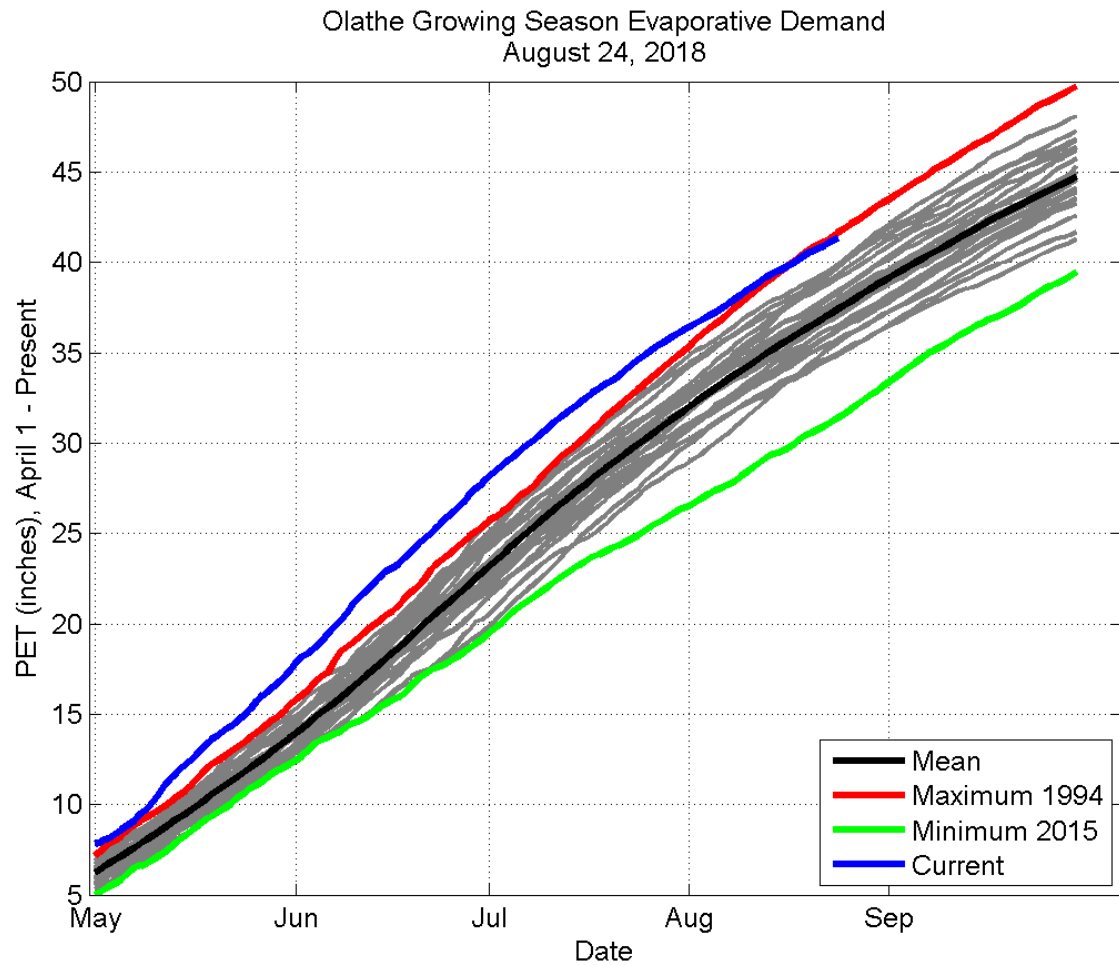


Powered by ACIS

COLORADO

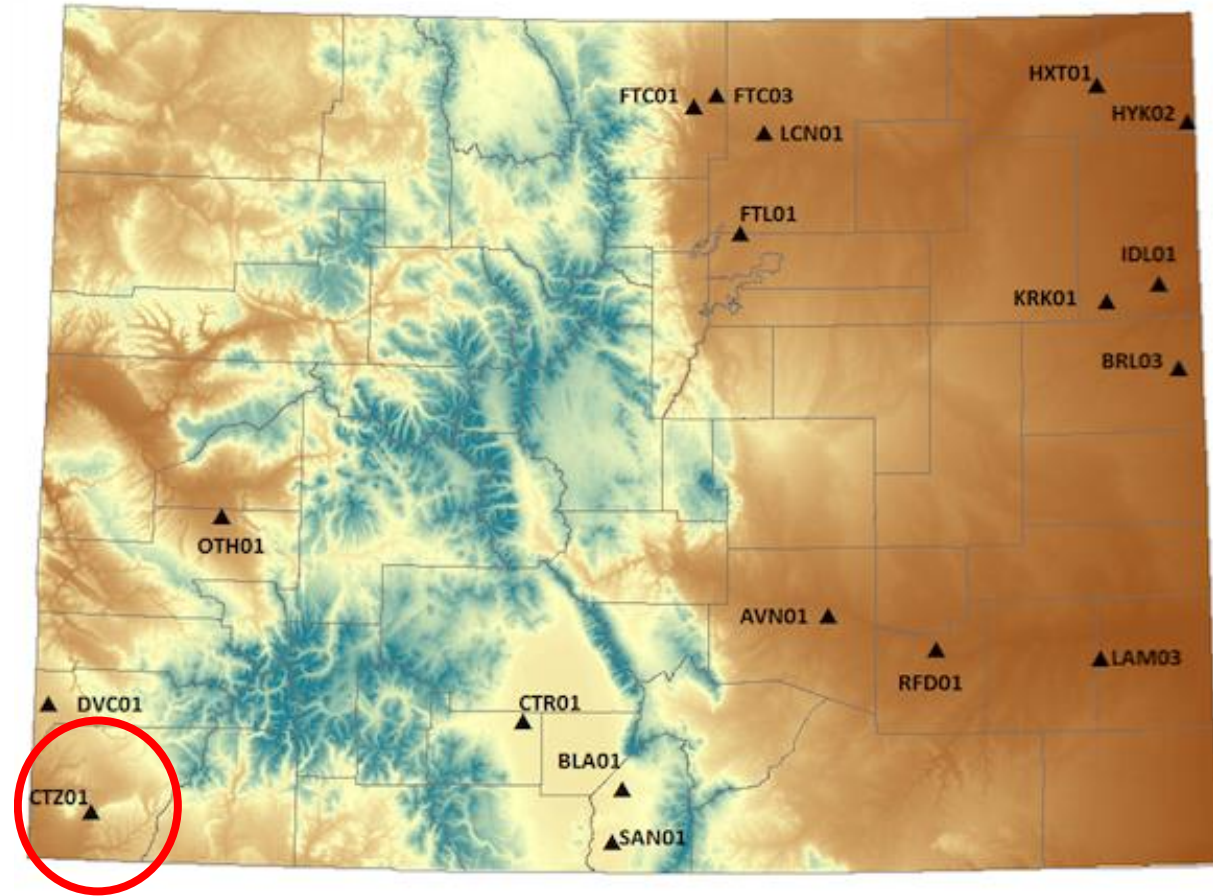
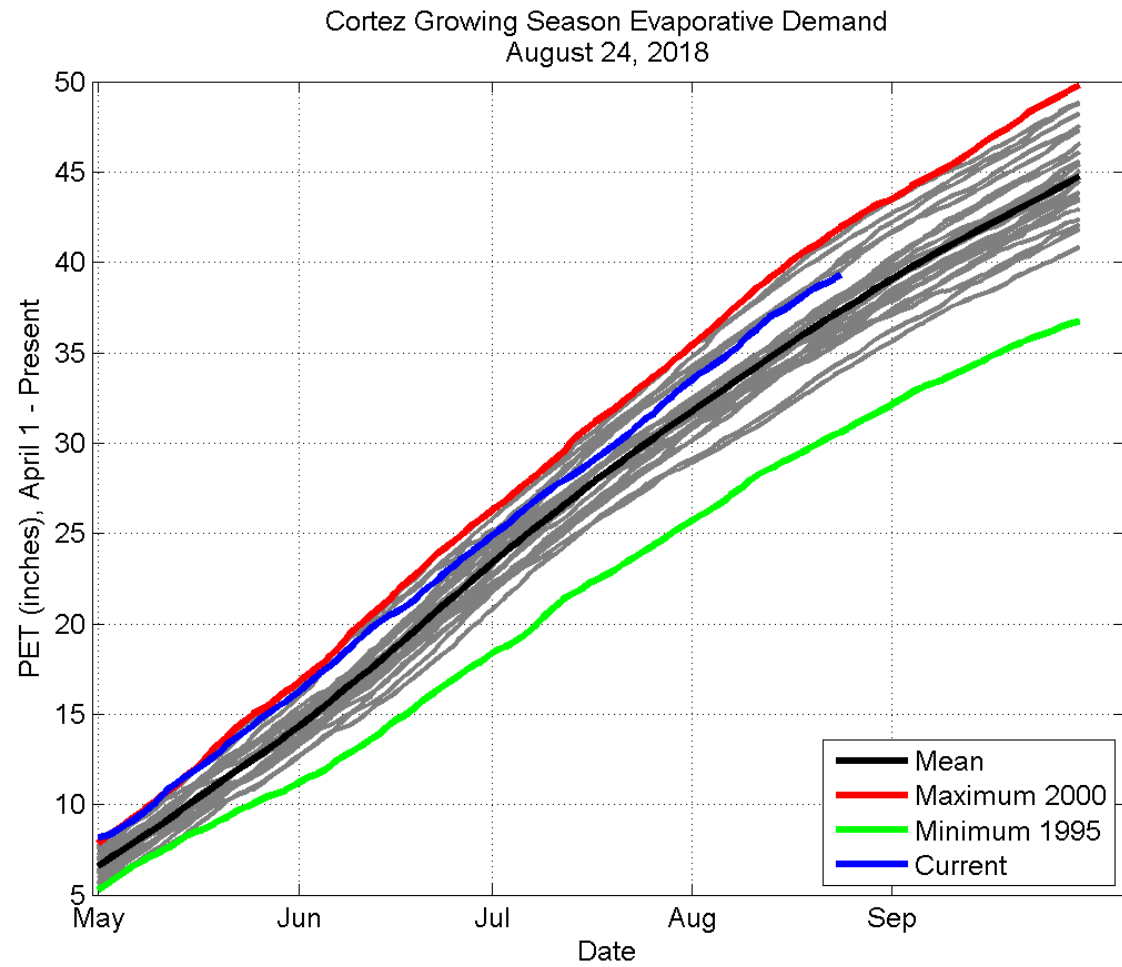


Evaporative demand from CoAgMET

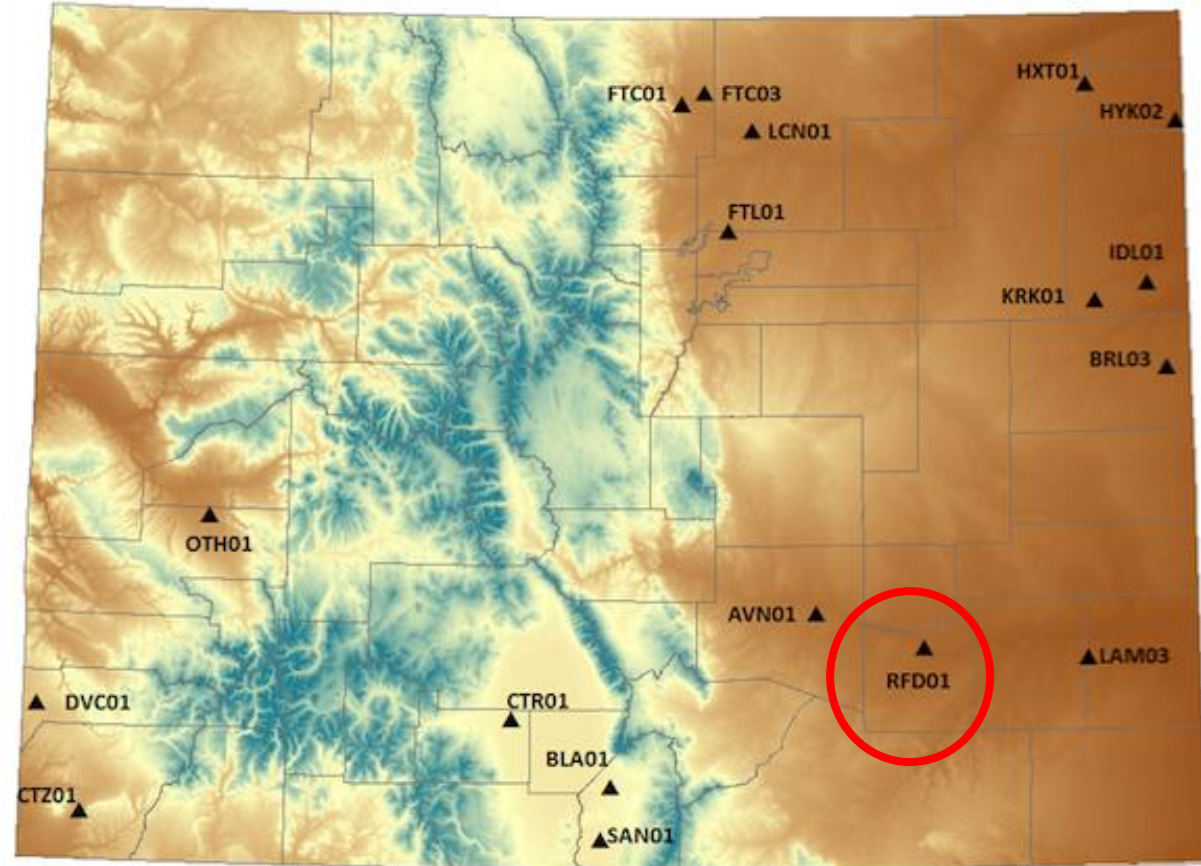
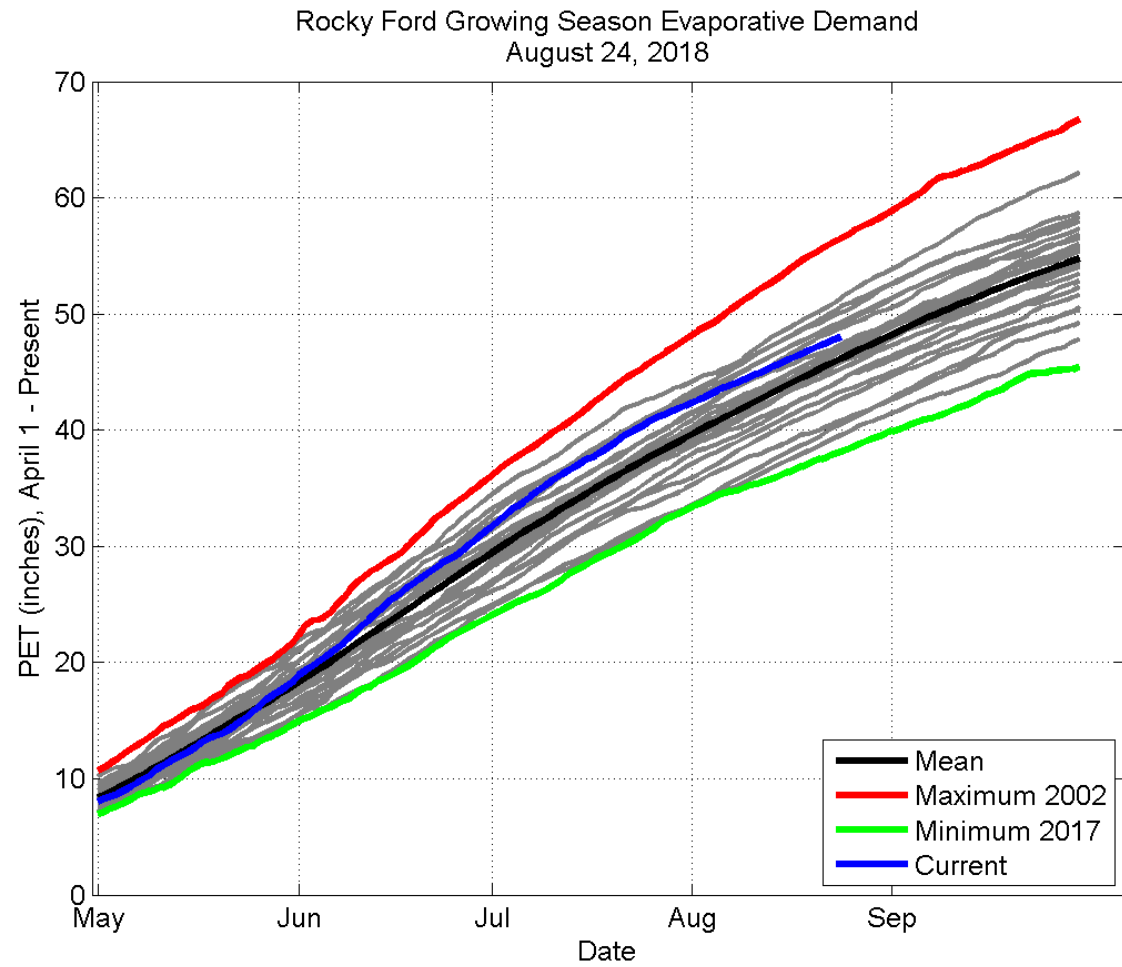


Above average = atmosphere has been “thirsty”
(warm, windy, sunny conditions)

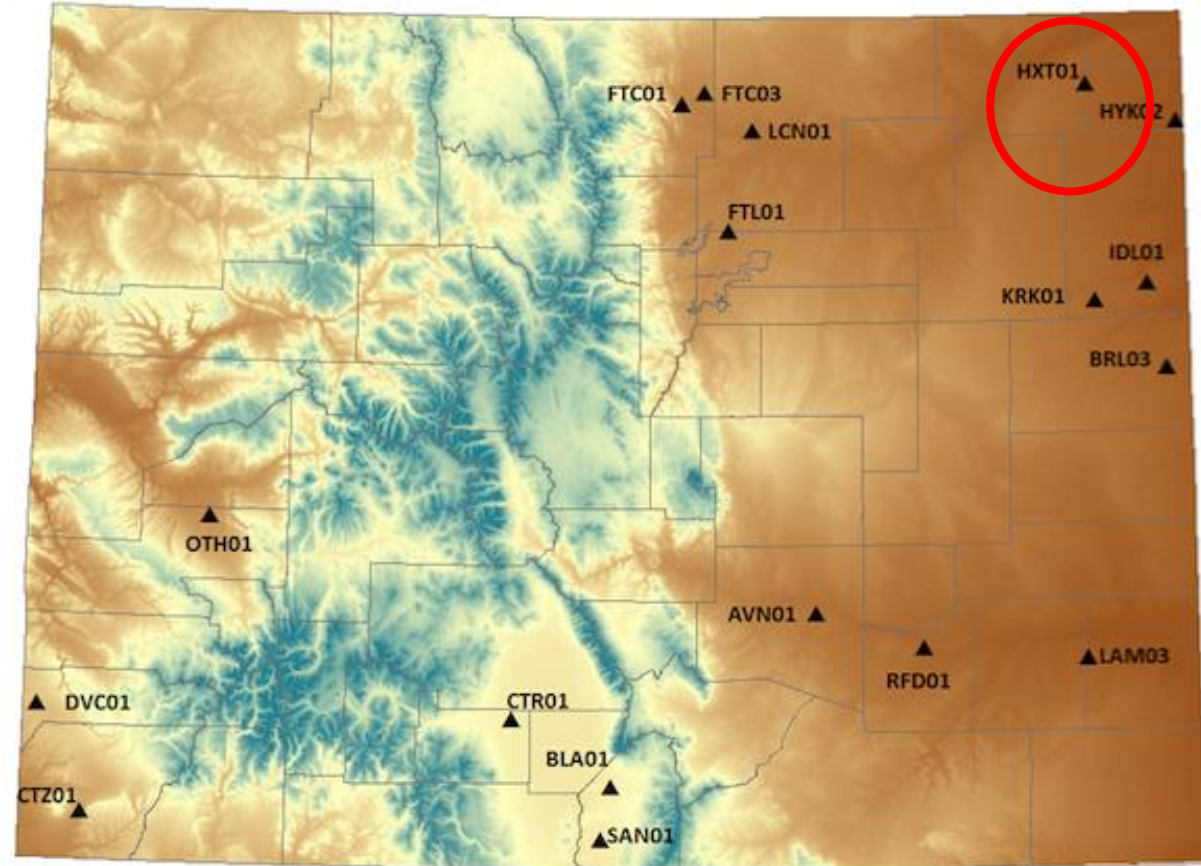
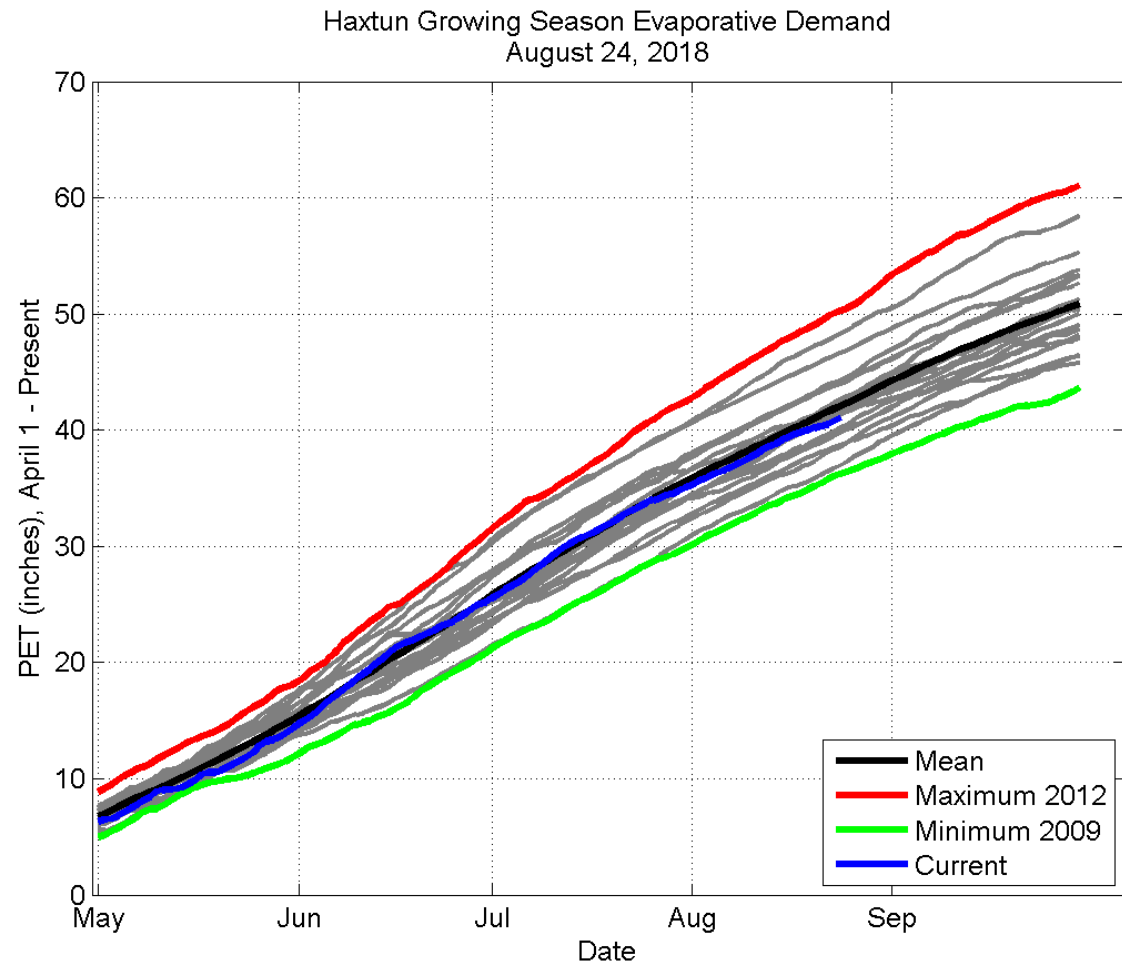
Evaporative demand from CoAgMET



Evaporative demand from CoAgMET



Evaporative demand from CoAgMET

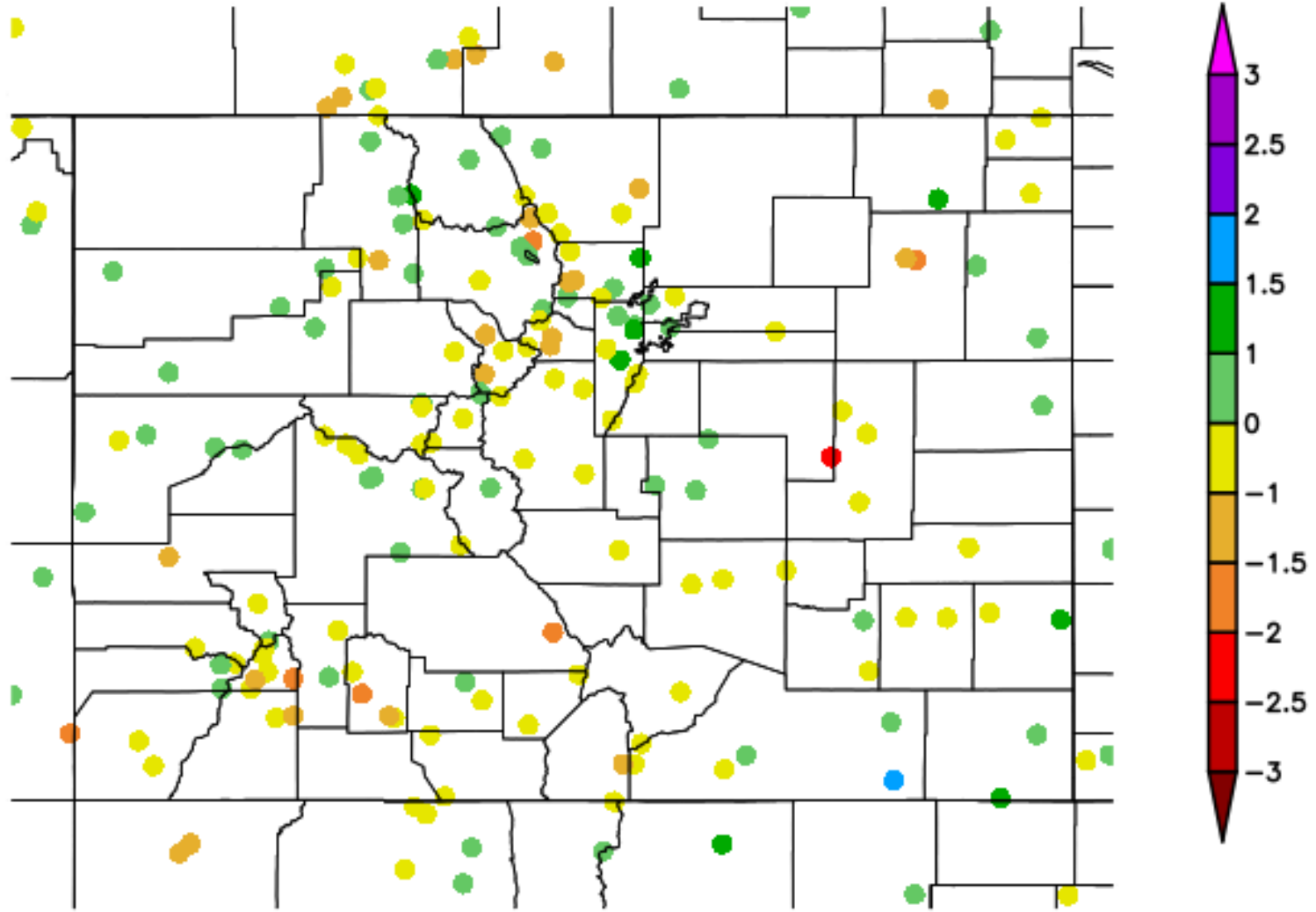




Colorado Drought



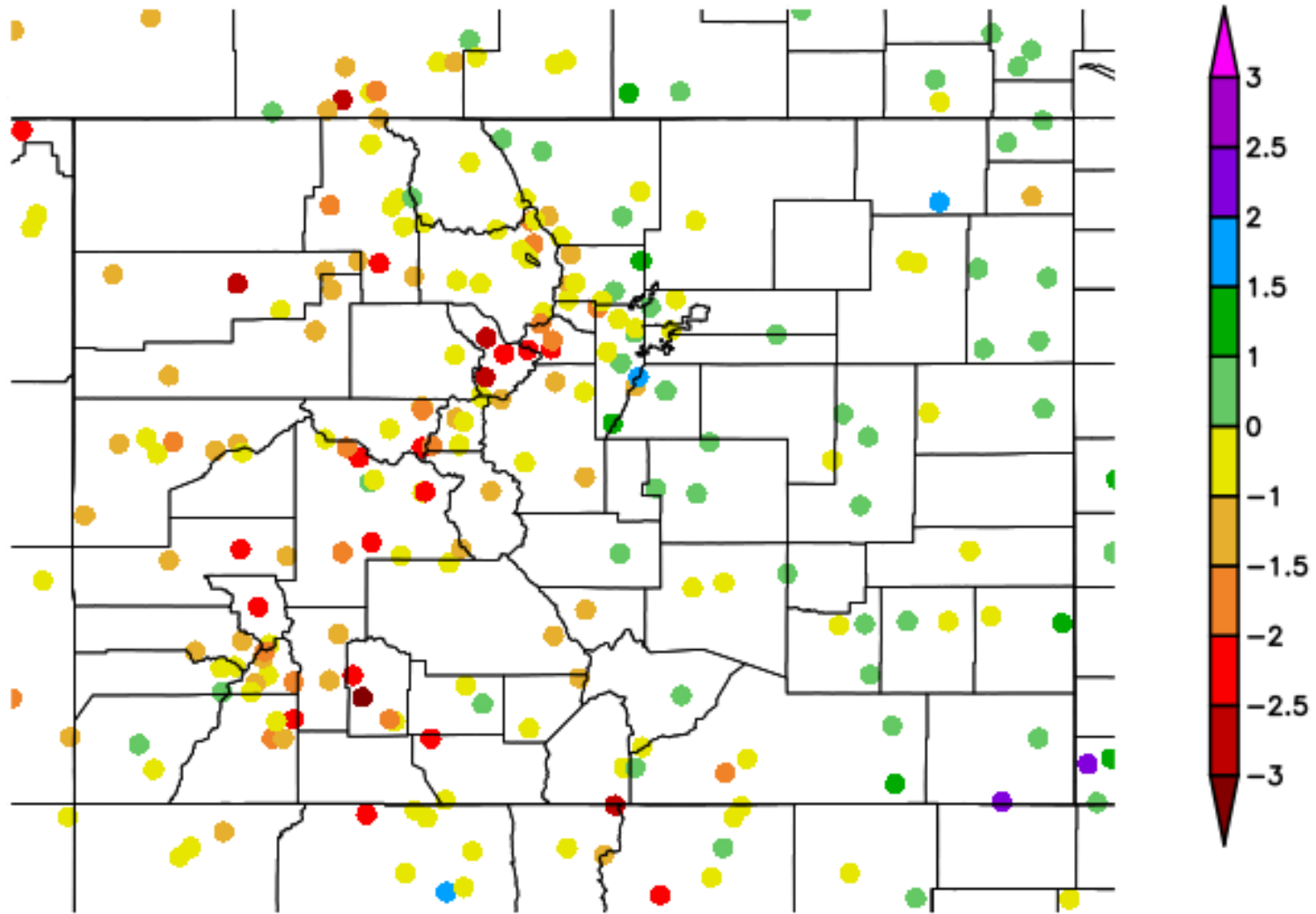
30 Day SPI 8/11/2018 - 9/9/2018



Generated 9/10/2018 at HPRCC using provisional data.

NOAA Regional Climate Centers

90 Day SPI 6/12/2018 - 9/9/2018

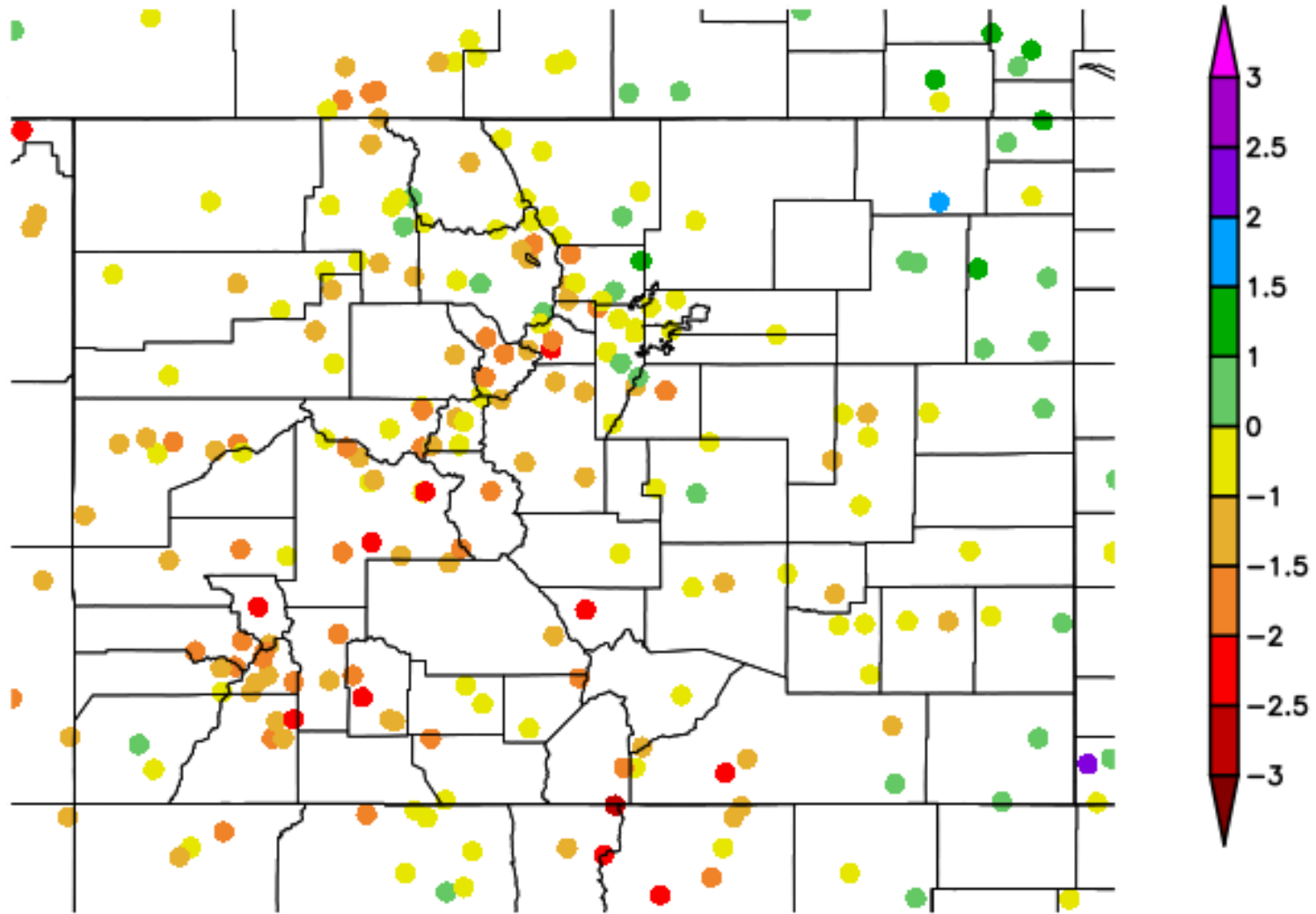


Generated 9/10/2018 at HPRCC using provisional data.

NOAA Regional Climate Centers



6 Month SPI 3/10/2018 - 9/9/2018

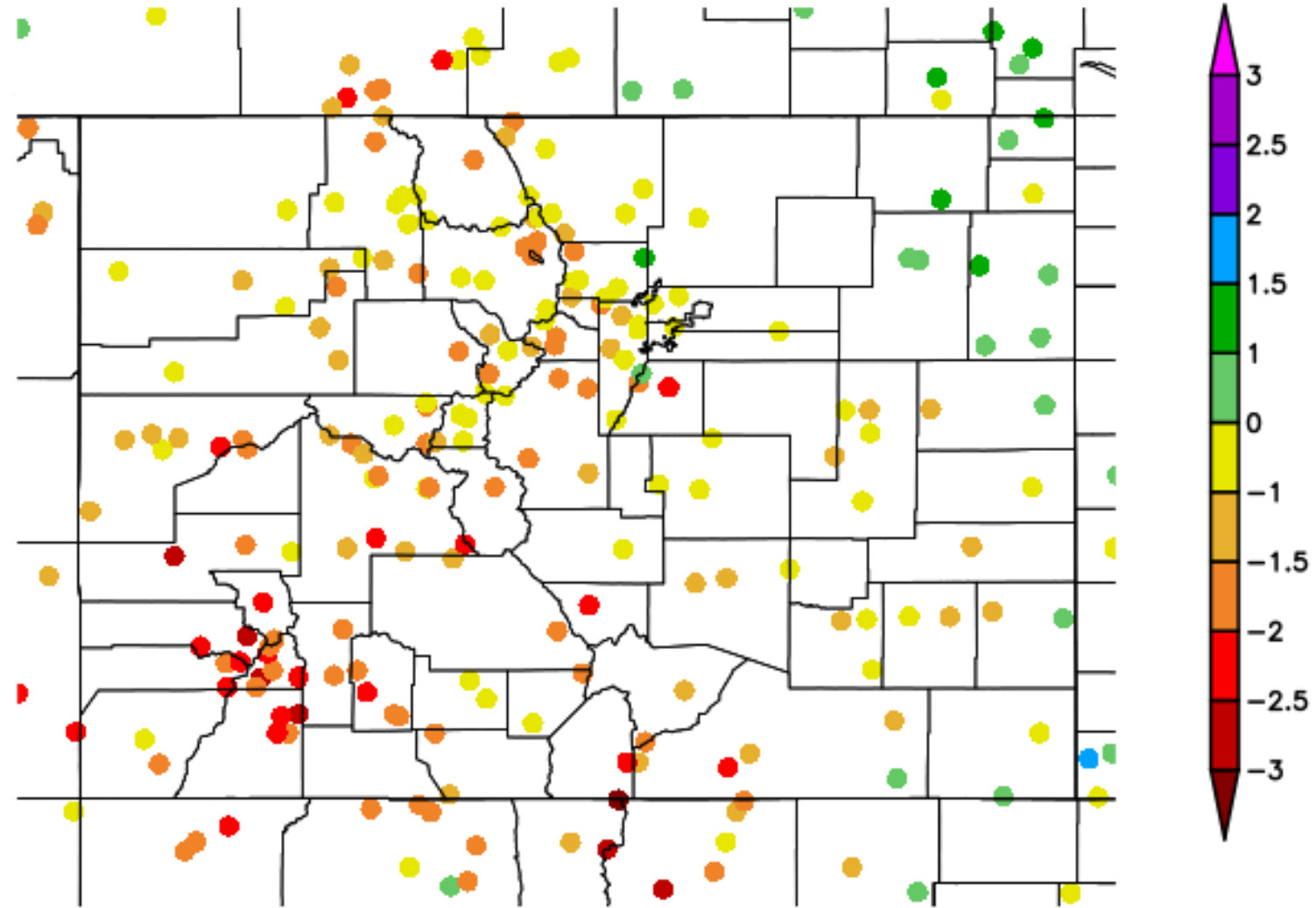


Generated 9/10/2018 at HPRCC using provisional data.

NOAA Regional Climate Centers



9 Month SPI 12/10/2017 - 9/9/2018



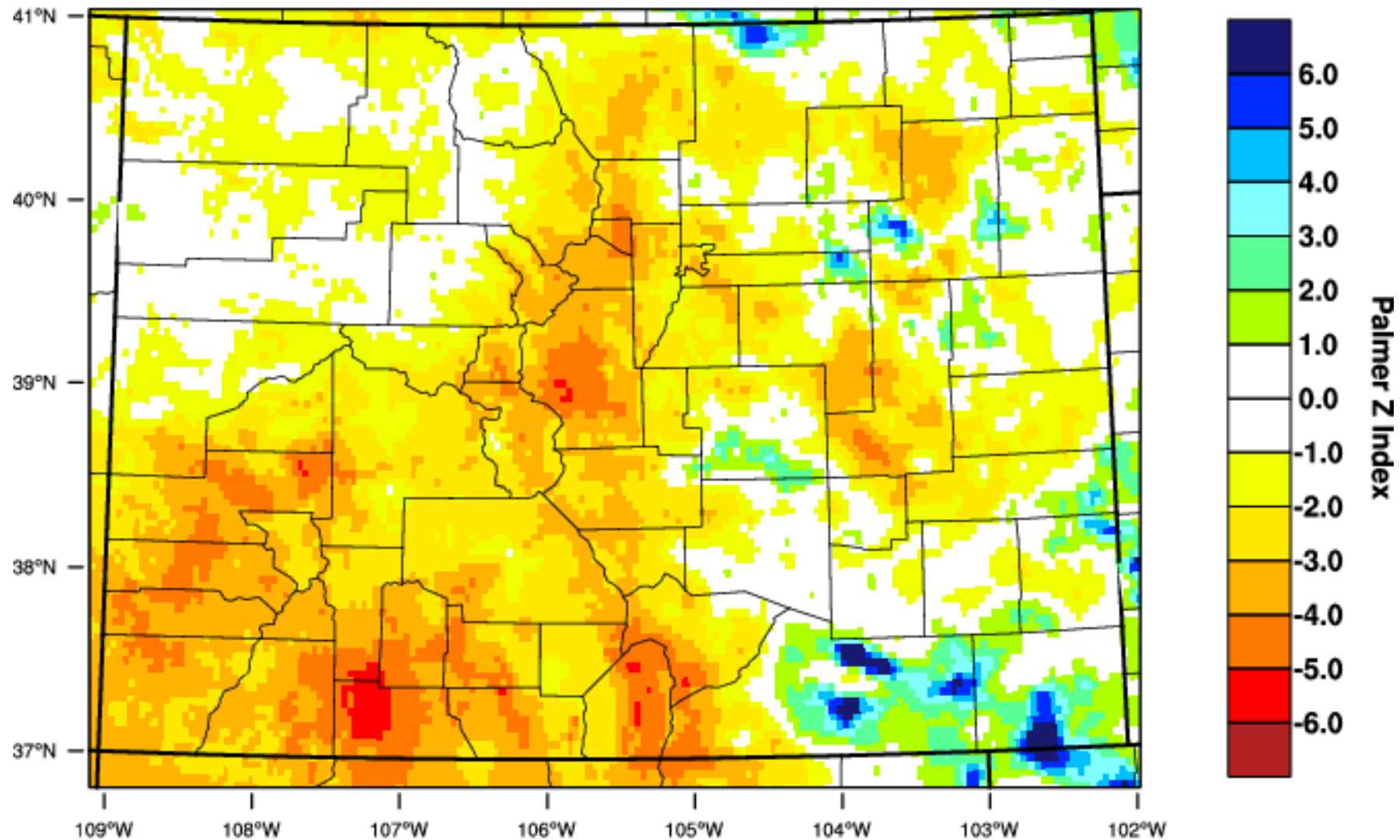
Generated 9/10/2018 at HPRCC using provisional data.

NOAA Regional Climate Centers



Colorado - Palmer Z-Index

August 2018

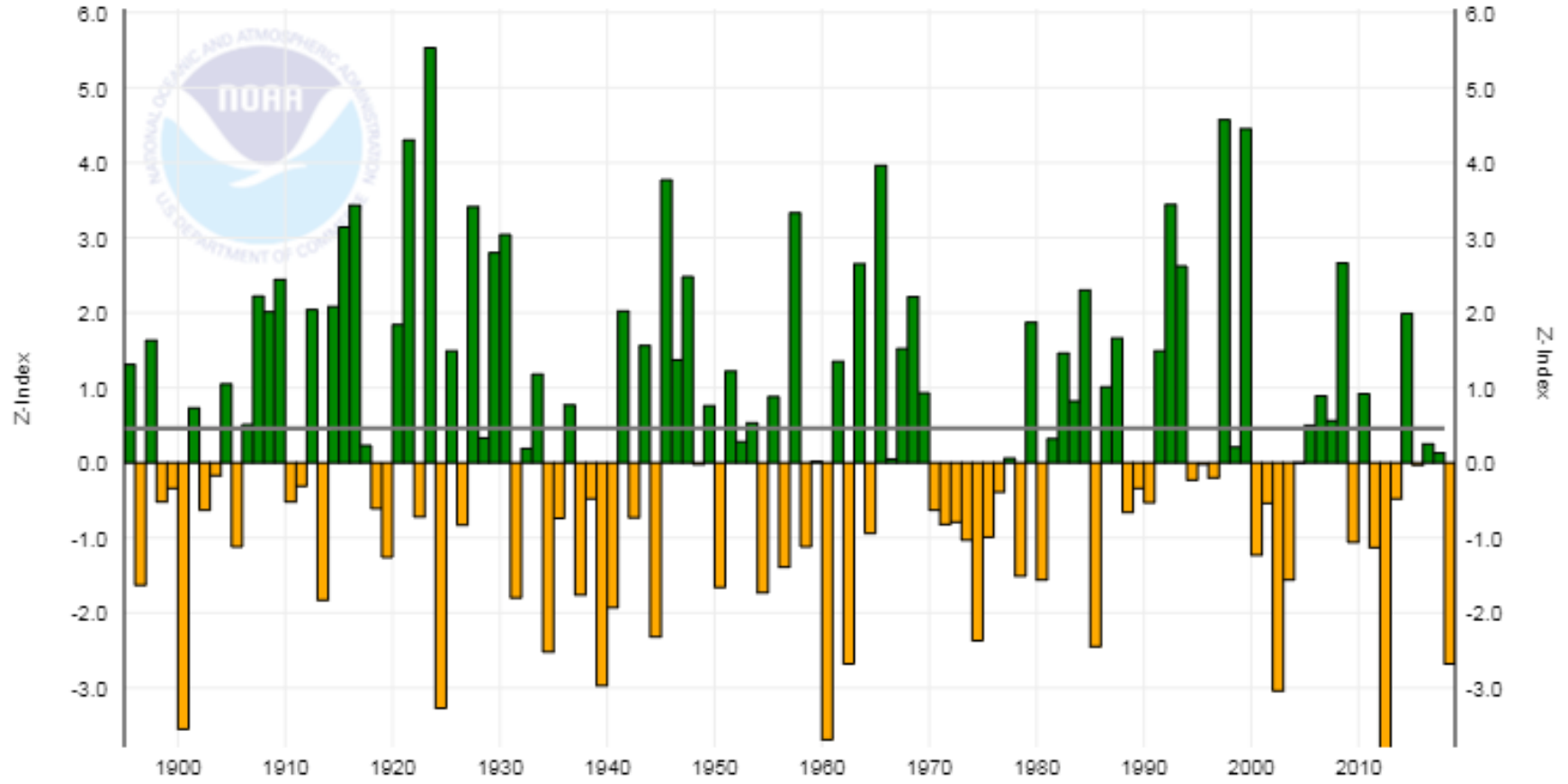


WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 7 SEP 2018



Colorado, Palmer Z-Index, August

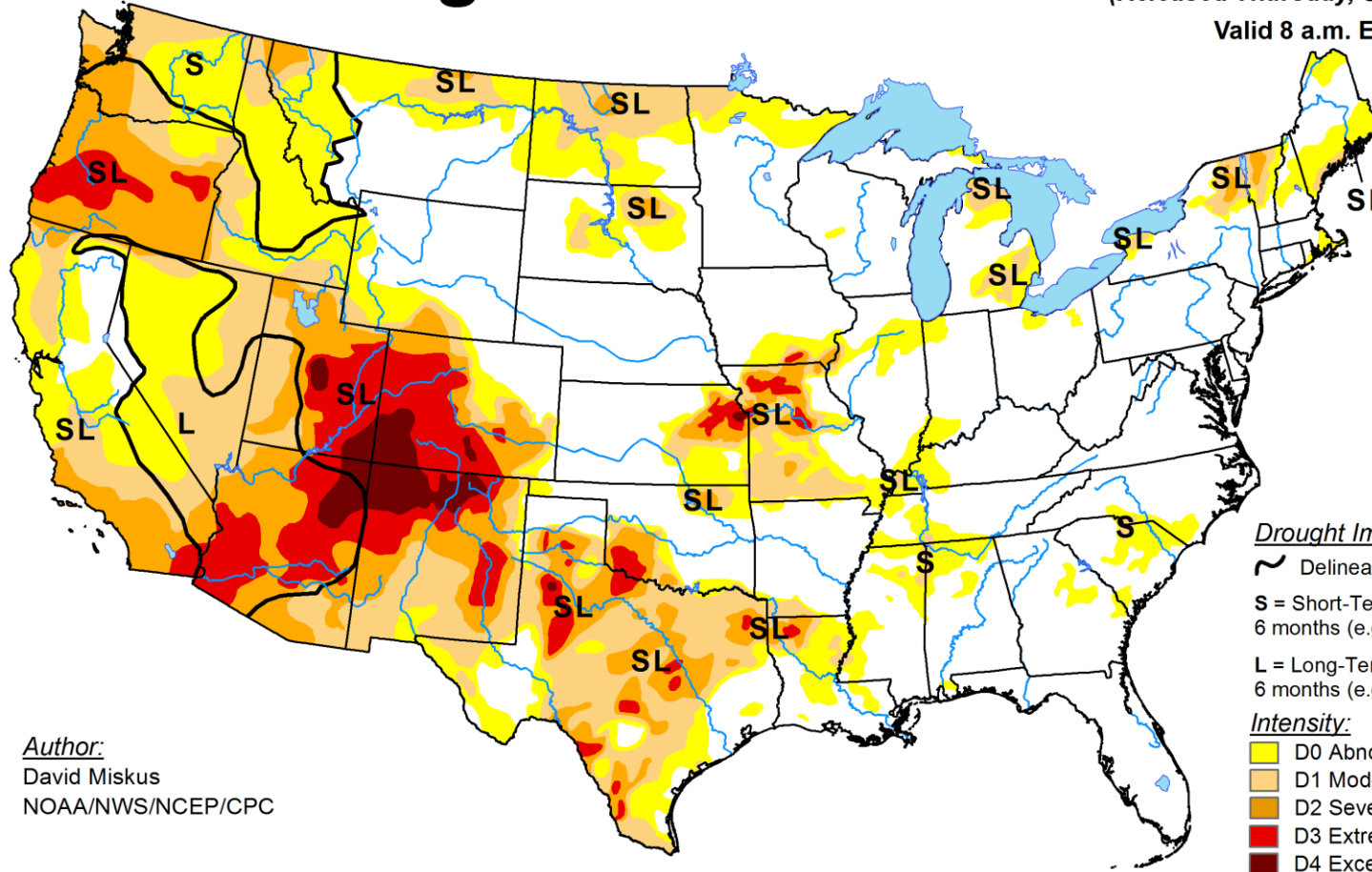
Z-Index 1901-2000 Mean: 0.46



U.S. Drought Monitor

September 4, 2018
(Released Thursday, Sep. 6, 2018)

Valid 8 a.m. EDT



Author:
David Miskus
NOAA/NWS/NCEP/CPC

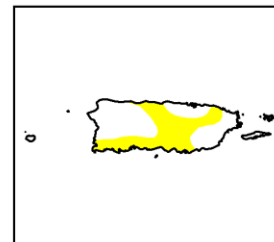
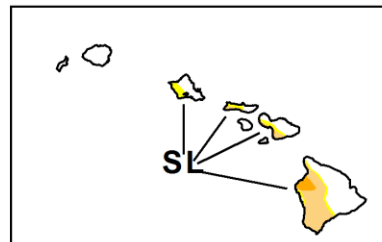
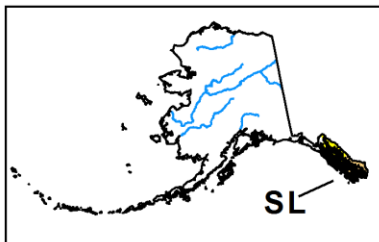
Drought Impact Types:

- ~ 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:

- 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. See accompanying text summary for forecast statements.



<http://droughtmonitor.unl.edu/>



U.S. Drought Monitor Colorado

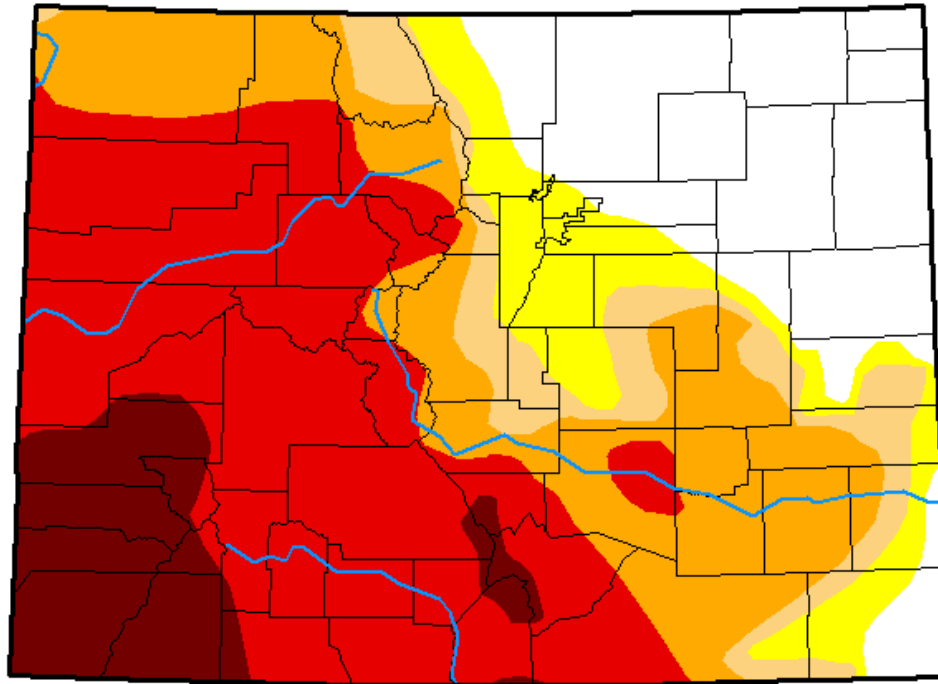
September 4, 2018

(Released Thursday, Sep. 6, 2018)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	19.99	80.01	71.39	63.93	44.30	9.72
Last Week <i>08-28-2018</i>	18.57	81.43	72.80	64.63	44.30	8.50
3 Months Ago <i>06-05-2018</i>	24.69	75.31	63.91	50.80	35.13	7.79
Start of Calendar Year <i>01-02-2018</i>	6.57	93.43	33.53	7.27	0.00	0.00
Start of Water Year <i>09-26-2017</i>	67.63	32.37	3.72	0.00	0.00	0.00
One Year Ago <i>09-05-2017</i>	67.49	32.51	3.72	0.00	0.00	0.00



Intensity:

- 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. See accompanying text summary for forecast statements.

Author:

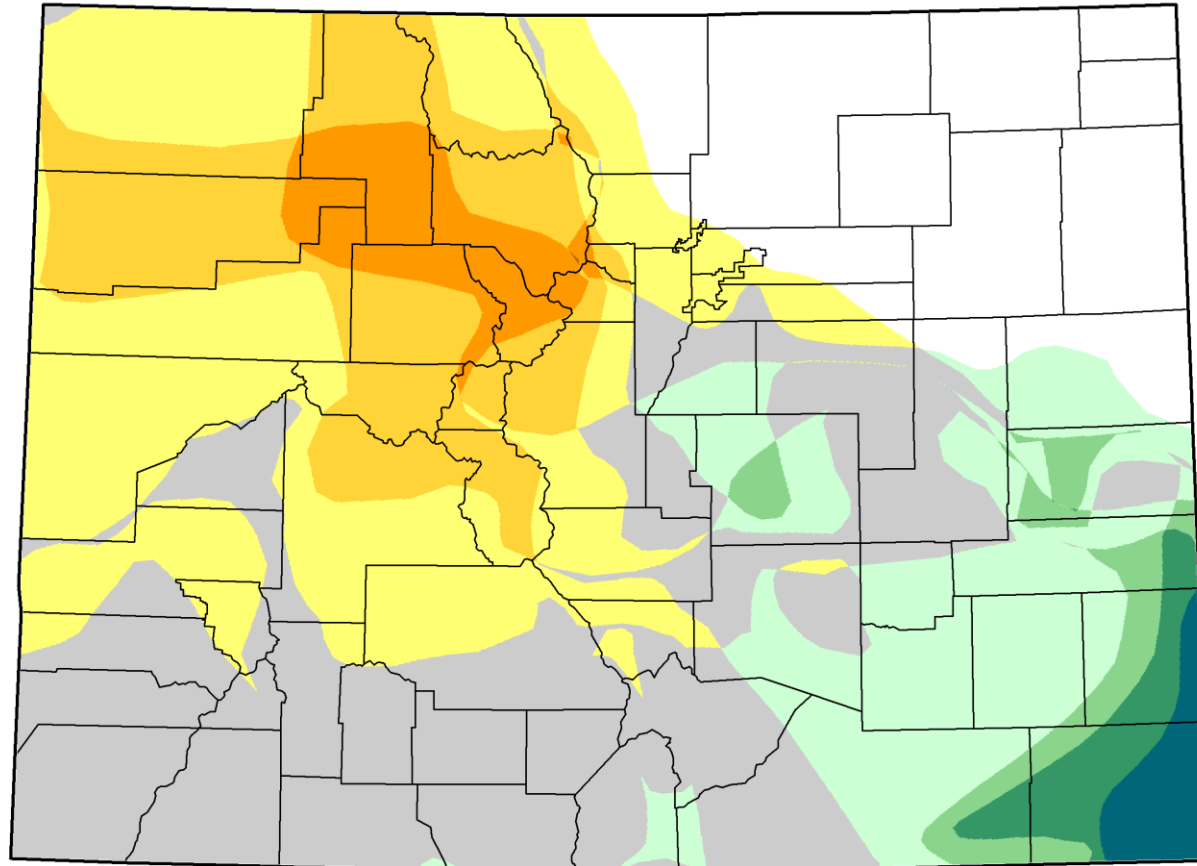
David Miskus
NOAA/NWS/NCEP/CPC



<http://droughtmonitor.unl.edu/>



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



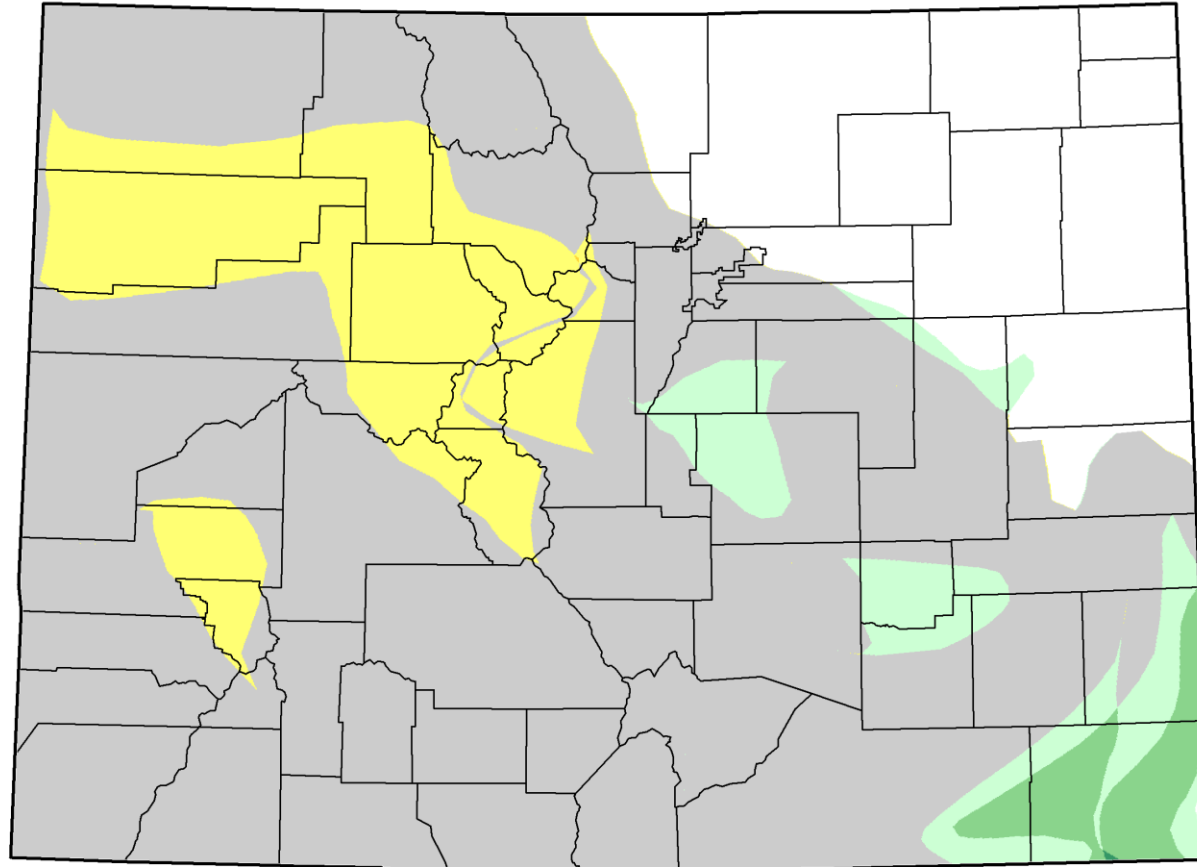
- 5 Class Degradation
- 4 Class Degradation
- 3 Class Degradation
- 2 Class Degradation
- 1 Class Degradation
- No Change
- 1 Class Improvement
- 2 Class Improvement
- 3 Class Improvement
- 4 Class Improvement
- 5 Class Improvement

September 4, 2018
compared to
June 12, 2018

<http://droughtmonitor.unl.edu>



U.S. Drought Monitor Class Change - Colorado 1 Month

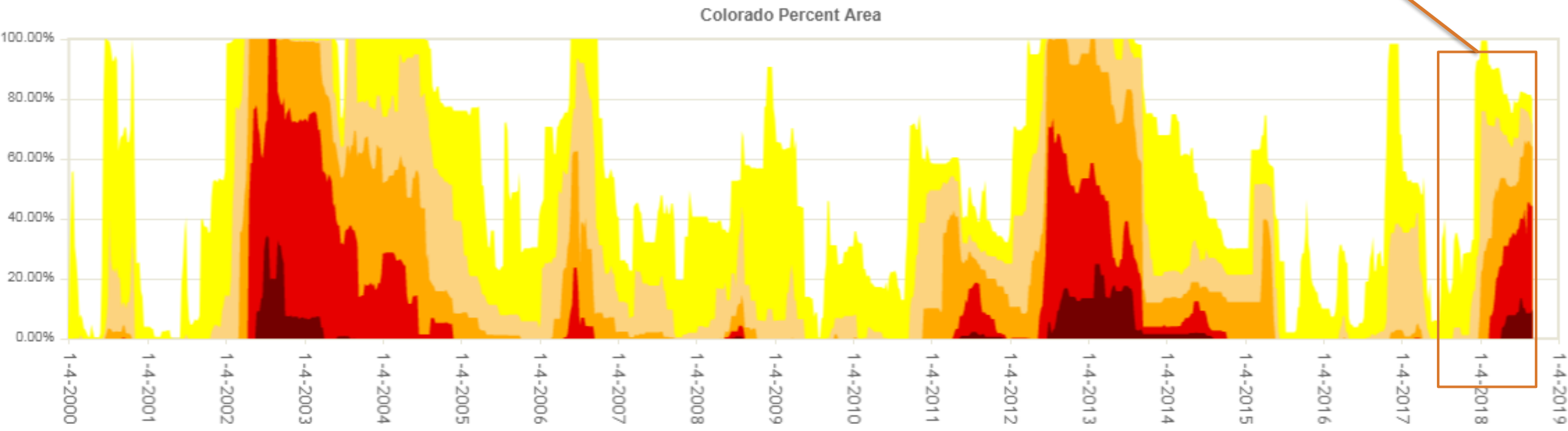
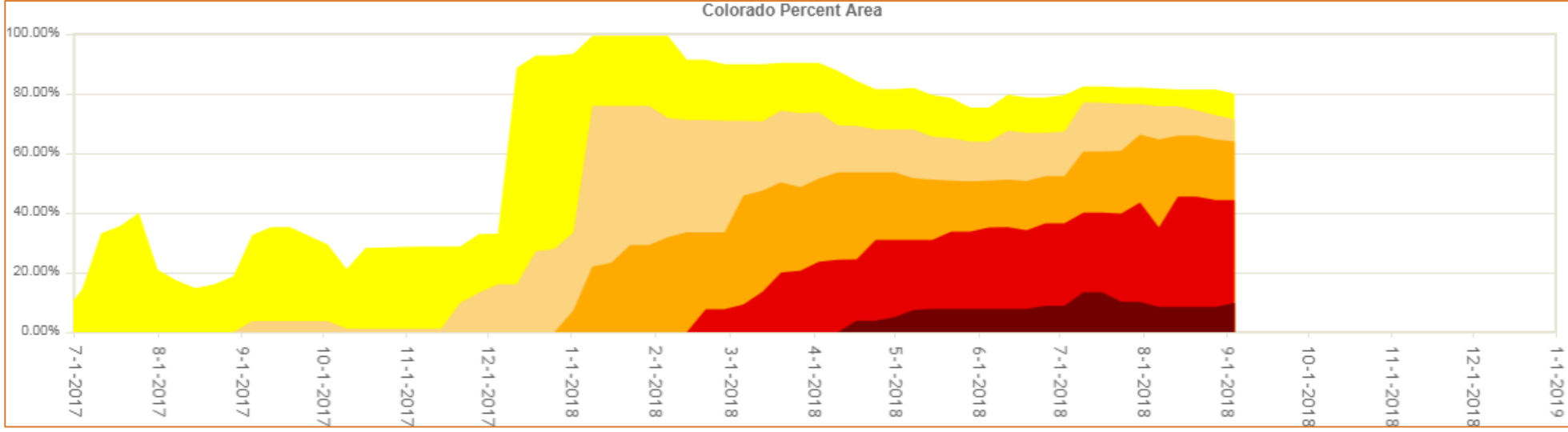


- 5 Class Degradation
- 4 Class Degradation
- 3 Class Degradation
- 2 Class Degradation
- 1 Class Degradation
- No Change
- 1 Class Improvement
- 2 Class Improvement
- 3 Class Improvement
- 4 Class Improvement
- 5 Class Improvement

September 4, 2018
compared to
August 7, 2018

<http://droughtmonitor.unl.edu>



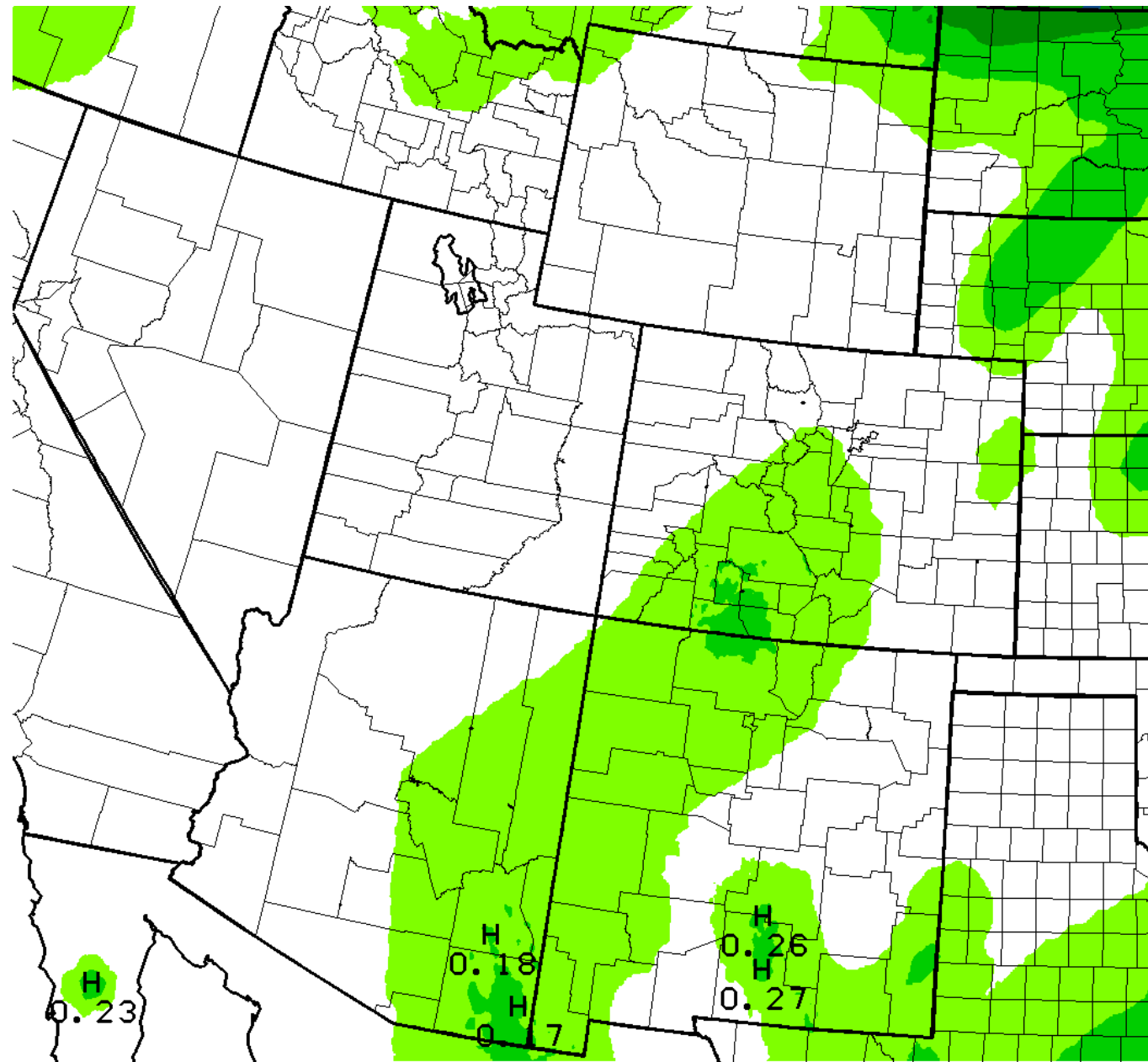
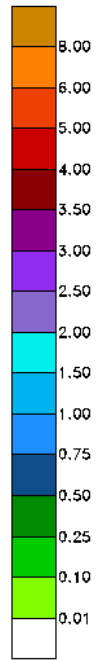




Outlook



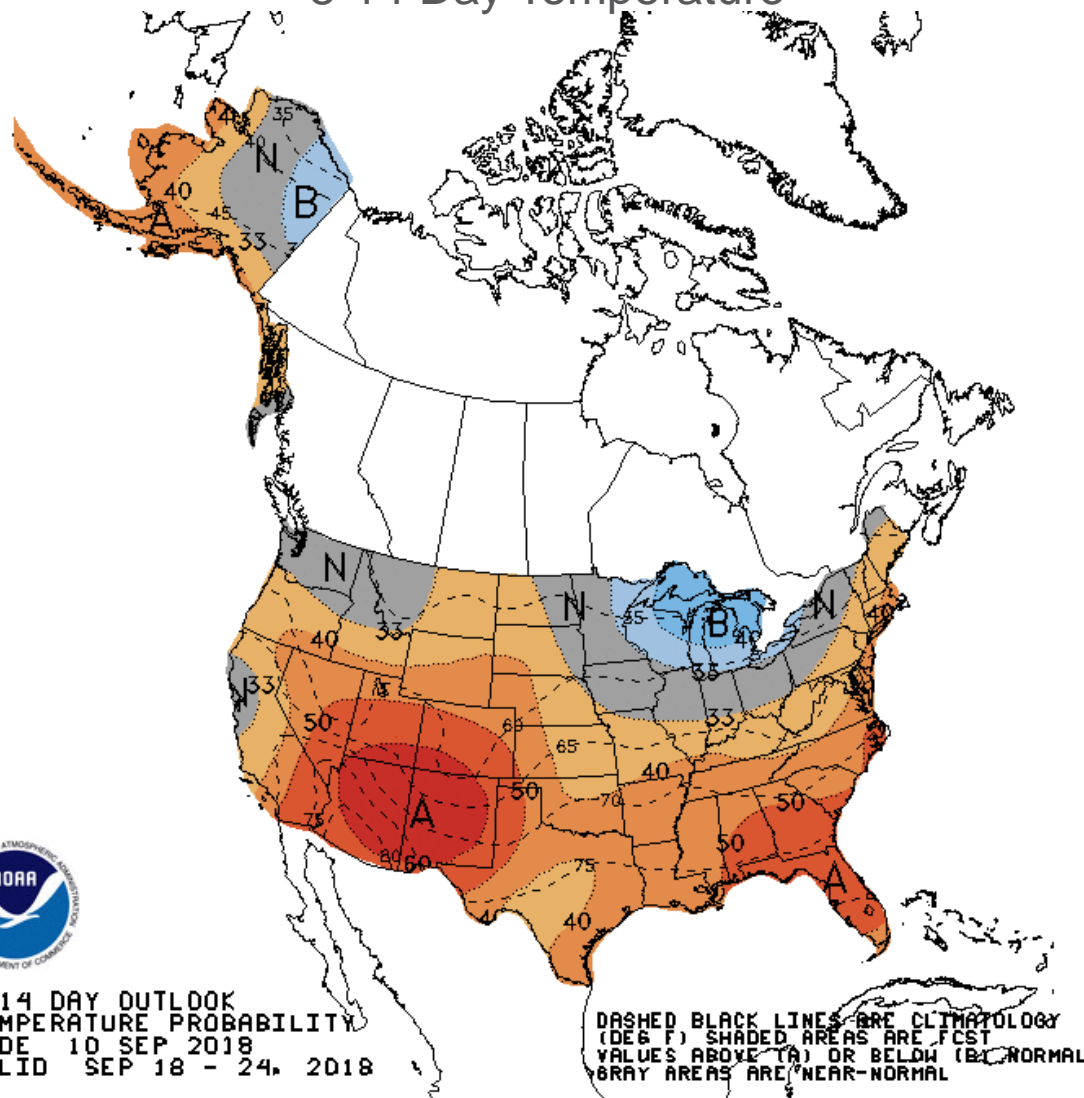
7 Day
Precipitation
Ending 9-17-18



WPC FORECAST PRECIPITATION (INCHES) IN 7 DAYS ENDING MON 180917/1200V168
FORECAST ISSUED 180910/1200F168

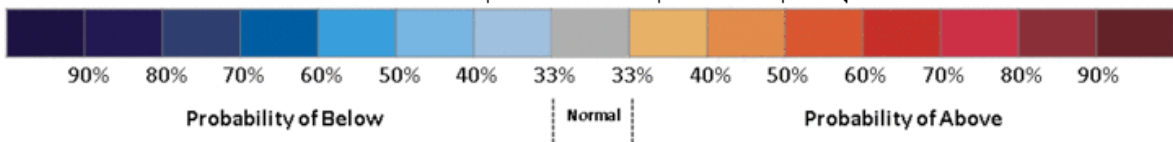


8-14 Day Temperature

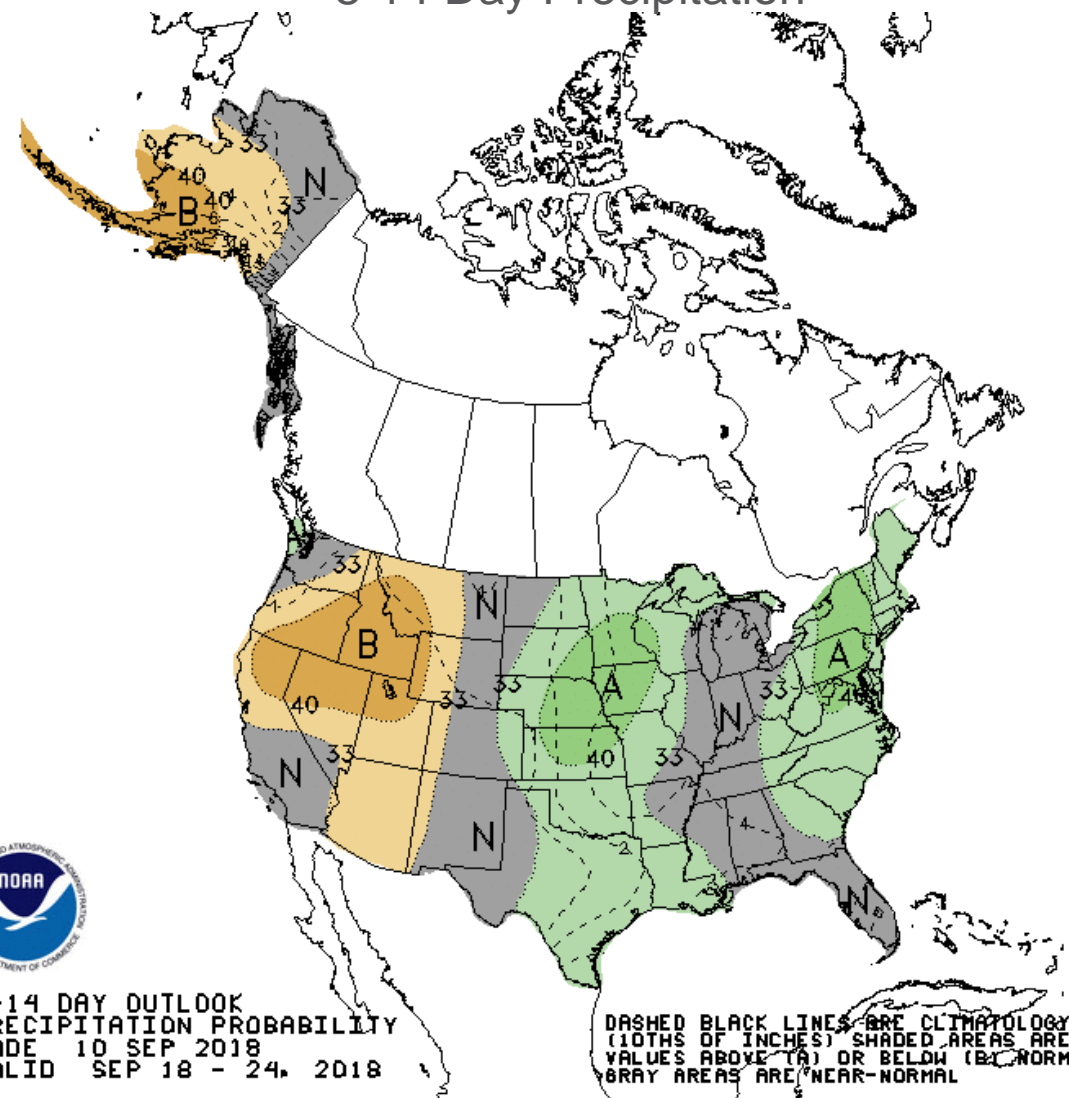


8-14 DAY OUTLOOK
TEMPERATURE PROBABILITY
MADE 10 SEP 2018
VALID SEP 18 - 24, 2018

DASHED BLACK LINES ARE CLIMATOLOGY
(DEG F) SHADED AREAS ARE FCST
VALUES ABOVE (A) OR BELOW (B) NORMAL
GRAY AREAS ARE NEAR-NORMAL

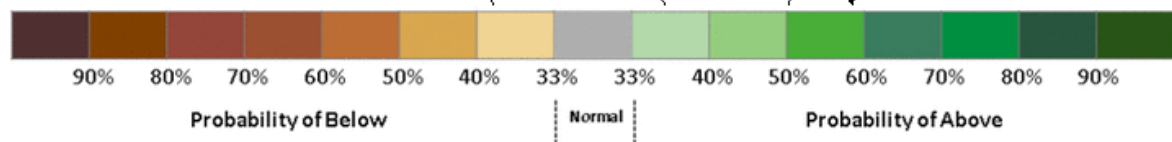


8-14 Day Precipitation

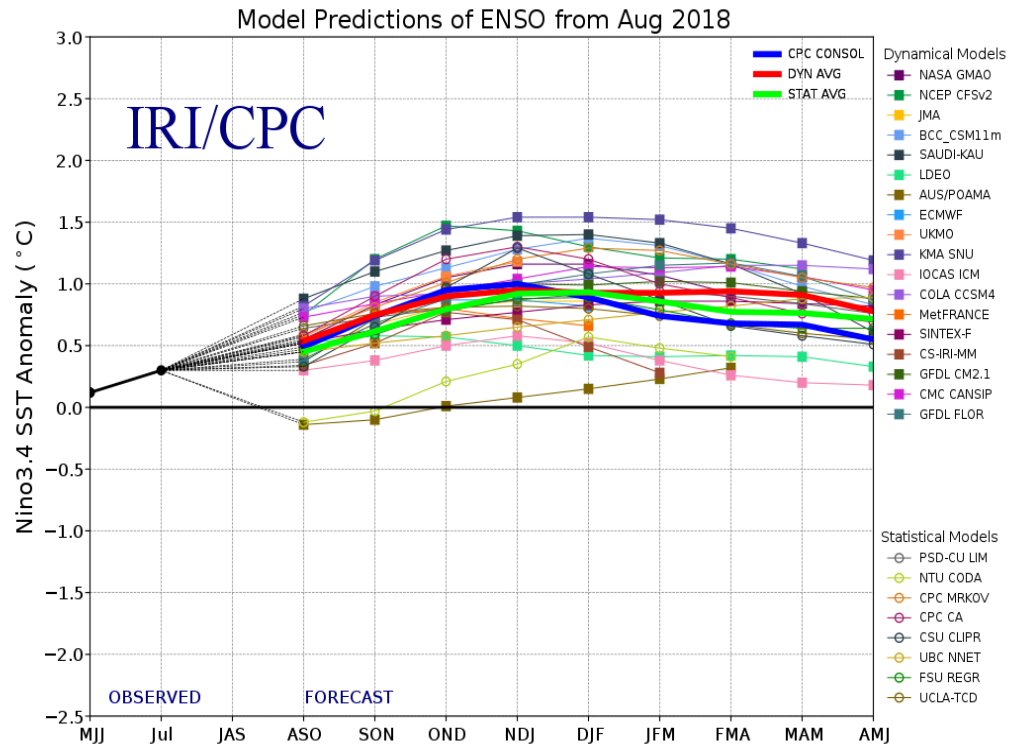


8-14 DAY OUTLOOK
PRECIPITATION PROBABILITY
MADE 10 SEP 2018
VALID SEP 18 - 24, 2018

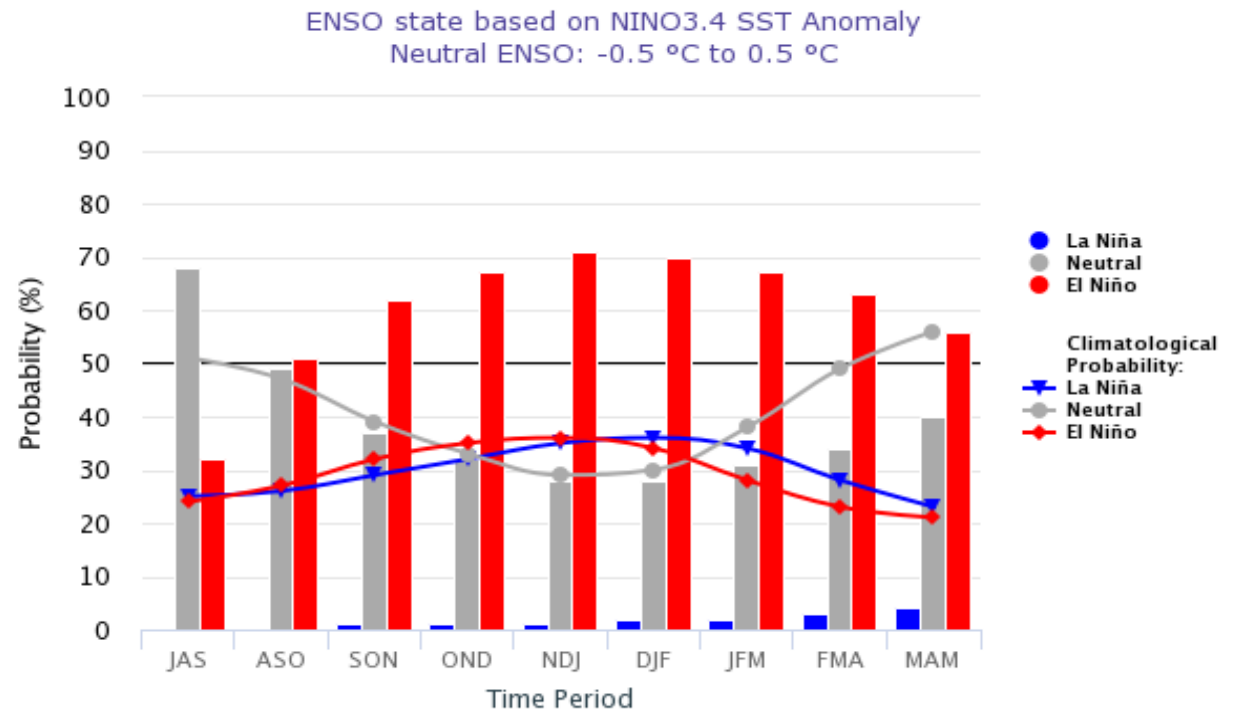
DASHED BLACK LINES ARE CLIMATOLOGY
(10THS OF INCHES) SHADED AREAS ARE FCST
VALUES ABOVE (A) OR BELOW (B) NORMAL
GRAY AREAS ARE NEAR-NORMAL



El Niño-Southern Oscillation (ENSO)

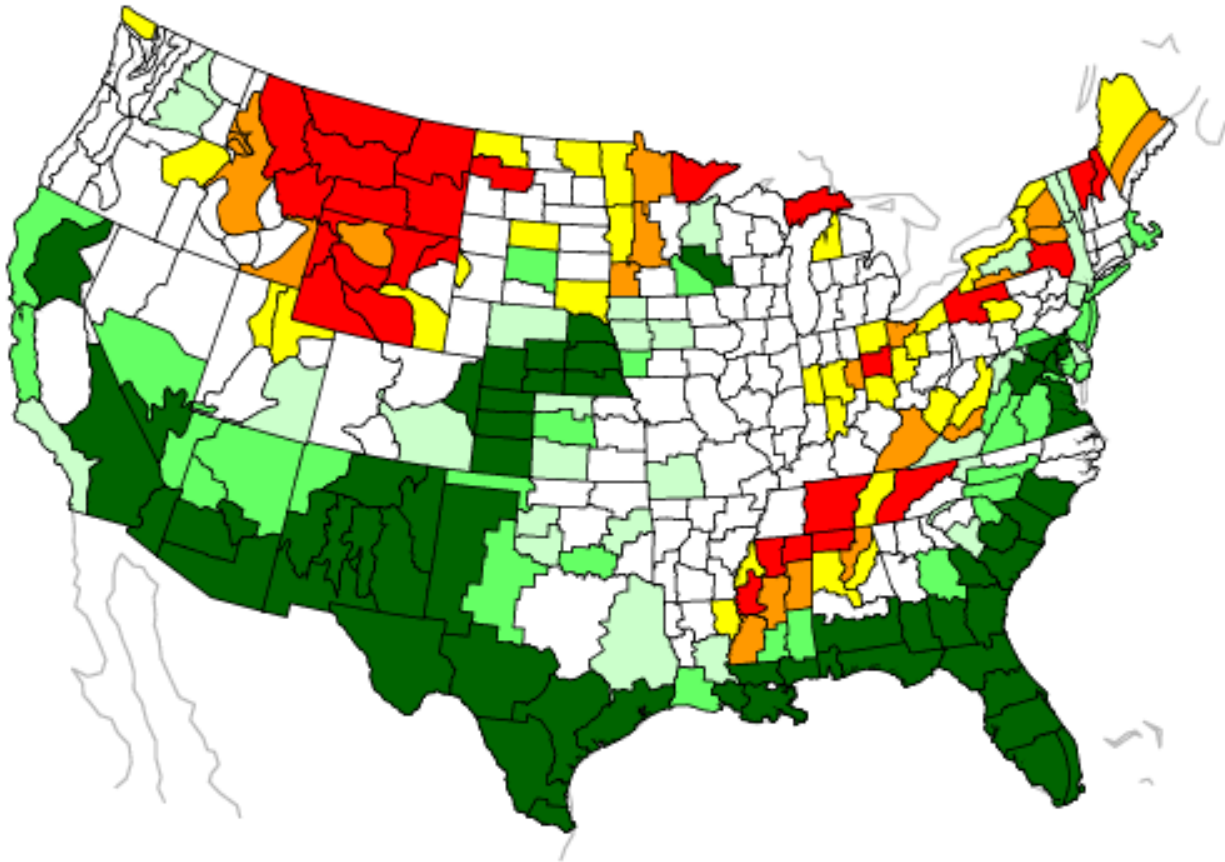


Early-Aug CPC/IRI Official Probabilistic ENSO Forecasts

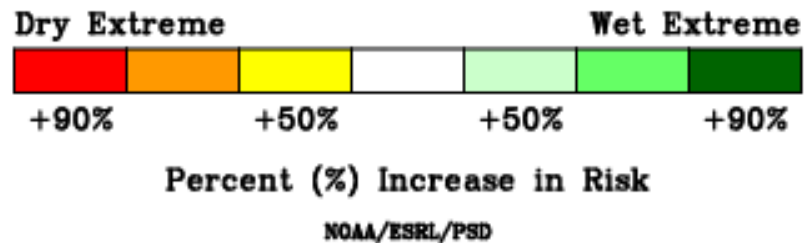


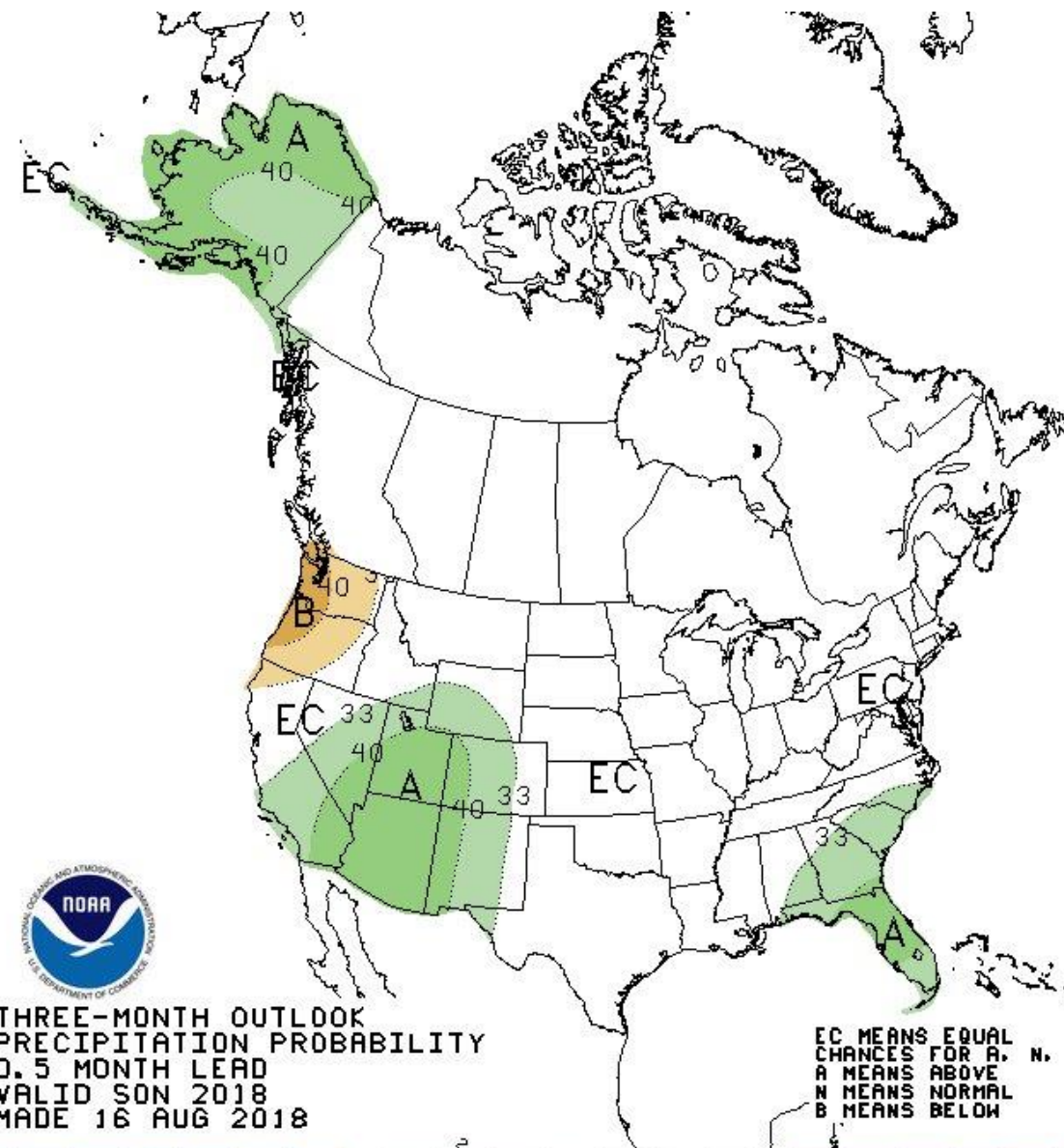
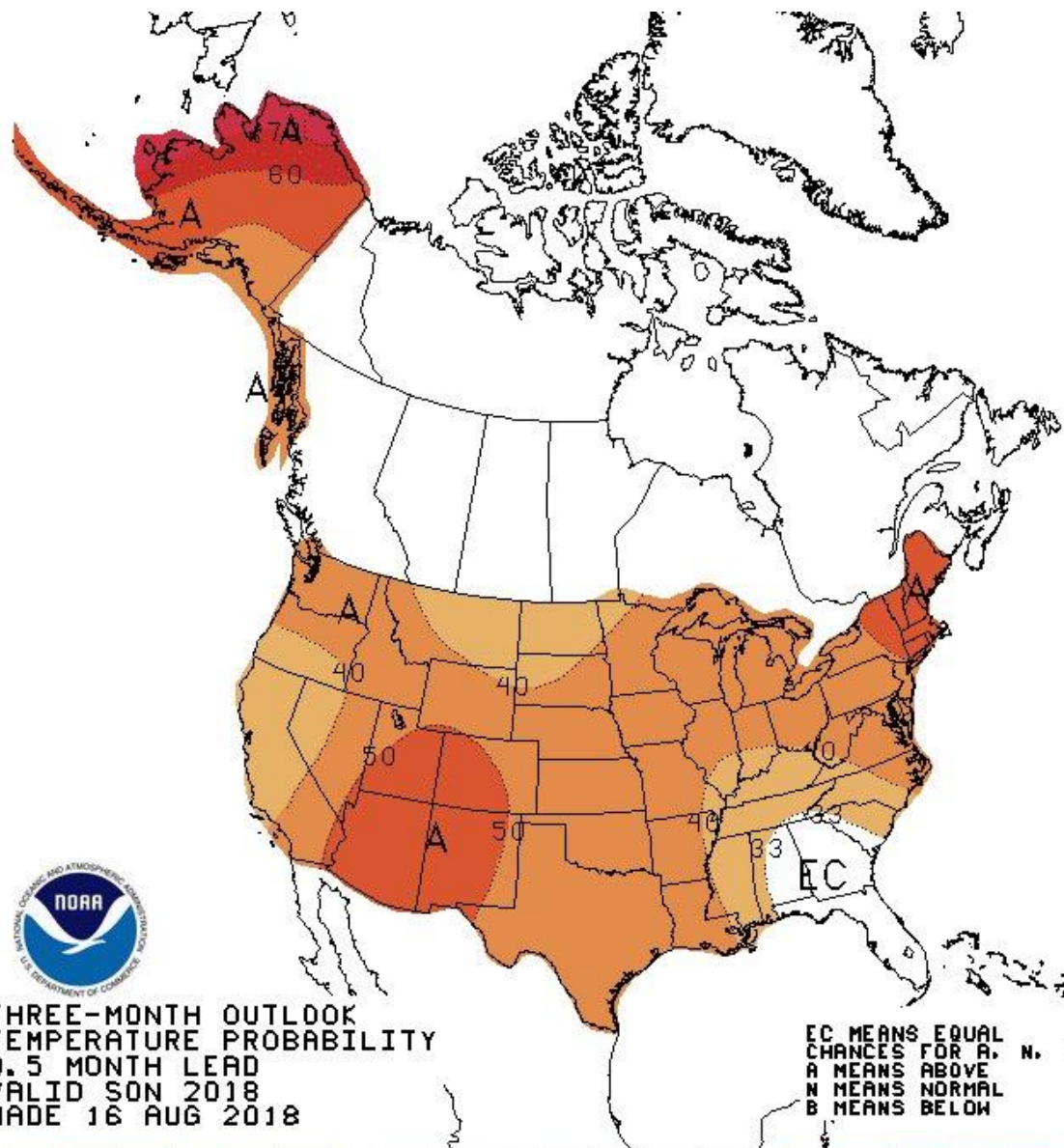
ENSO-neutral is favored through July-September 2018, with El Niño favored thereafter. Chances for El Niño are near 70% during Northern Hemisphere winter 2018-19.

DJF Precipitation During El Nino
Increased Risk of Wet or Dry Extremes



How does El Niño tilt the odds for winter extremes in Colorado?

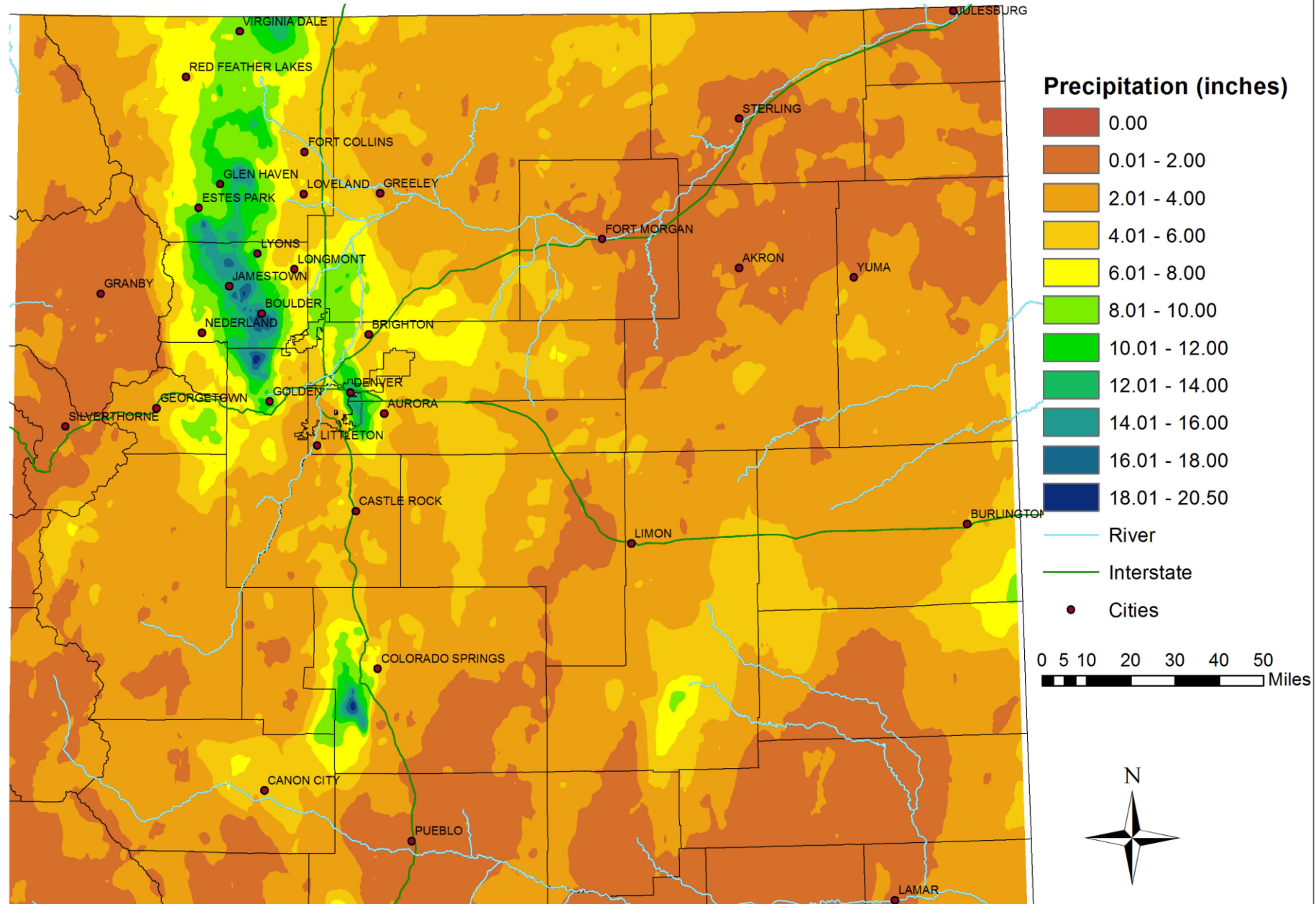




5 Years ago this week
September 9-16, 2013



Precipitation beginning September 8, 2013 ending 7:00 AM MST September 17, 2013



Map created with the Storm Precipitation Analysis System (SPAS) through a collaborative effort by Applied Weather Associates, LLC, MetStat, Inc. and the Colorado Climate Center. Radar data supplied by Weather Decision Technologies, Inc.

zach.Schwalbe@colostate.edu

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Thank you



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Providing information and expertise on Colorado's complex climate



Colorado State University