

# Colorado Climate Update for WATF

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Along with: Zach Schwalbe, Becky Bolinger, Peter Goble, Dani Talmadge, Nolan Doesken



Water Availability Task Force meeting  
February 2019



ATMOSPHERIC SCIENCE  
COLORADO STATE UNIVERSITY

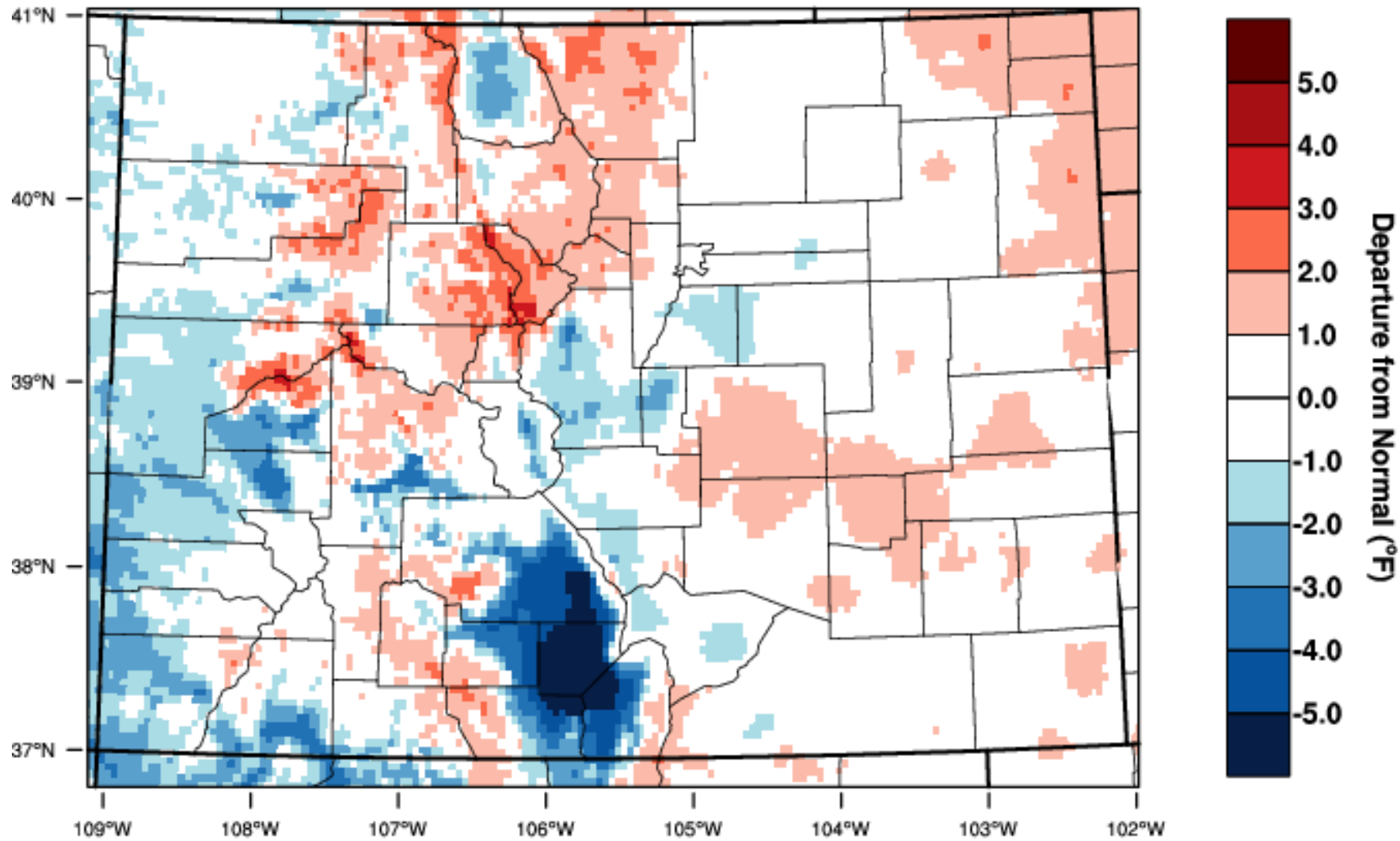


# Water Year 2019 – Temperature



# Colorado - Mean Temperature

## January 2019 Departure from 1981-2010 Normal

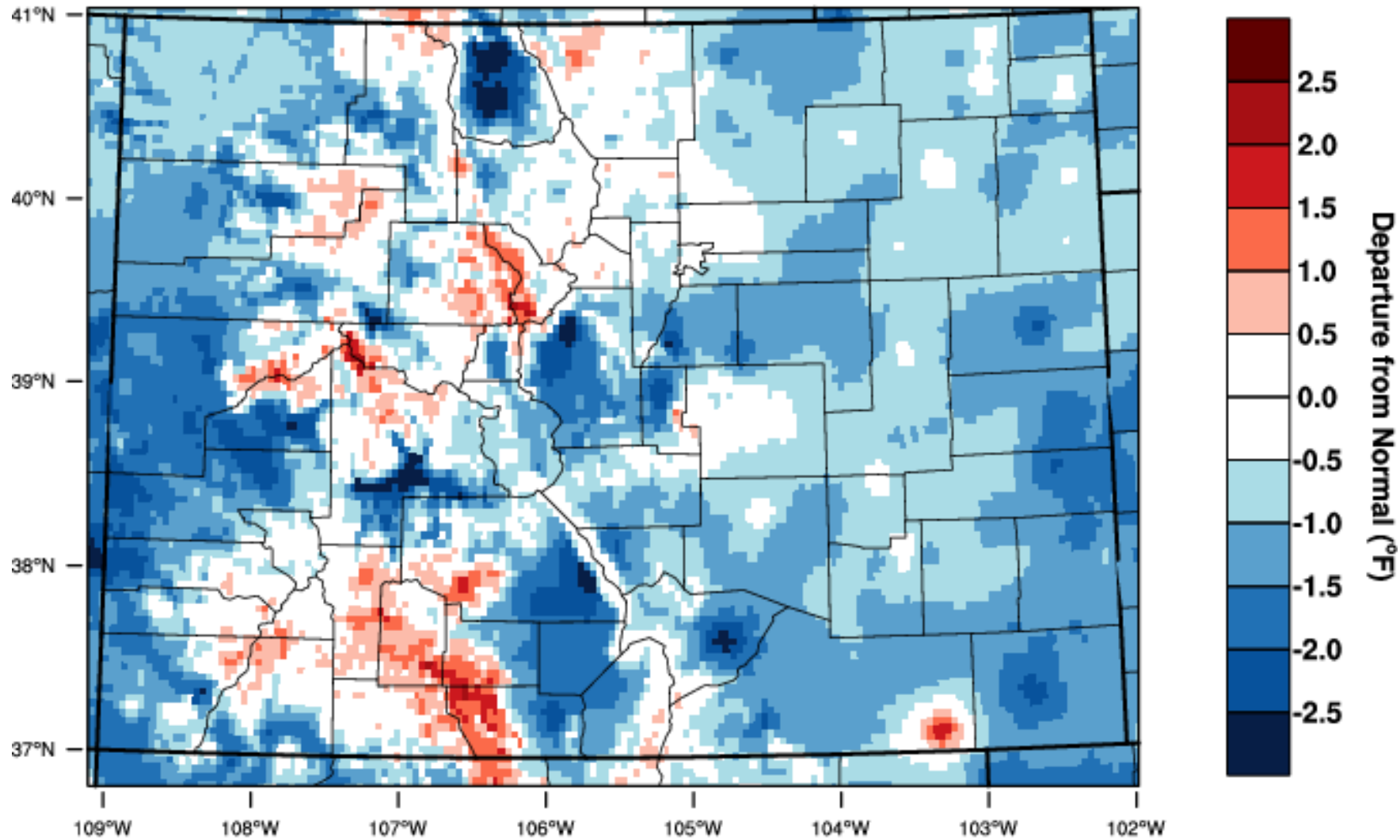


WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 FEB 2019



# Colorado - Mean Temperature

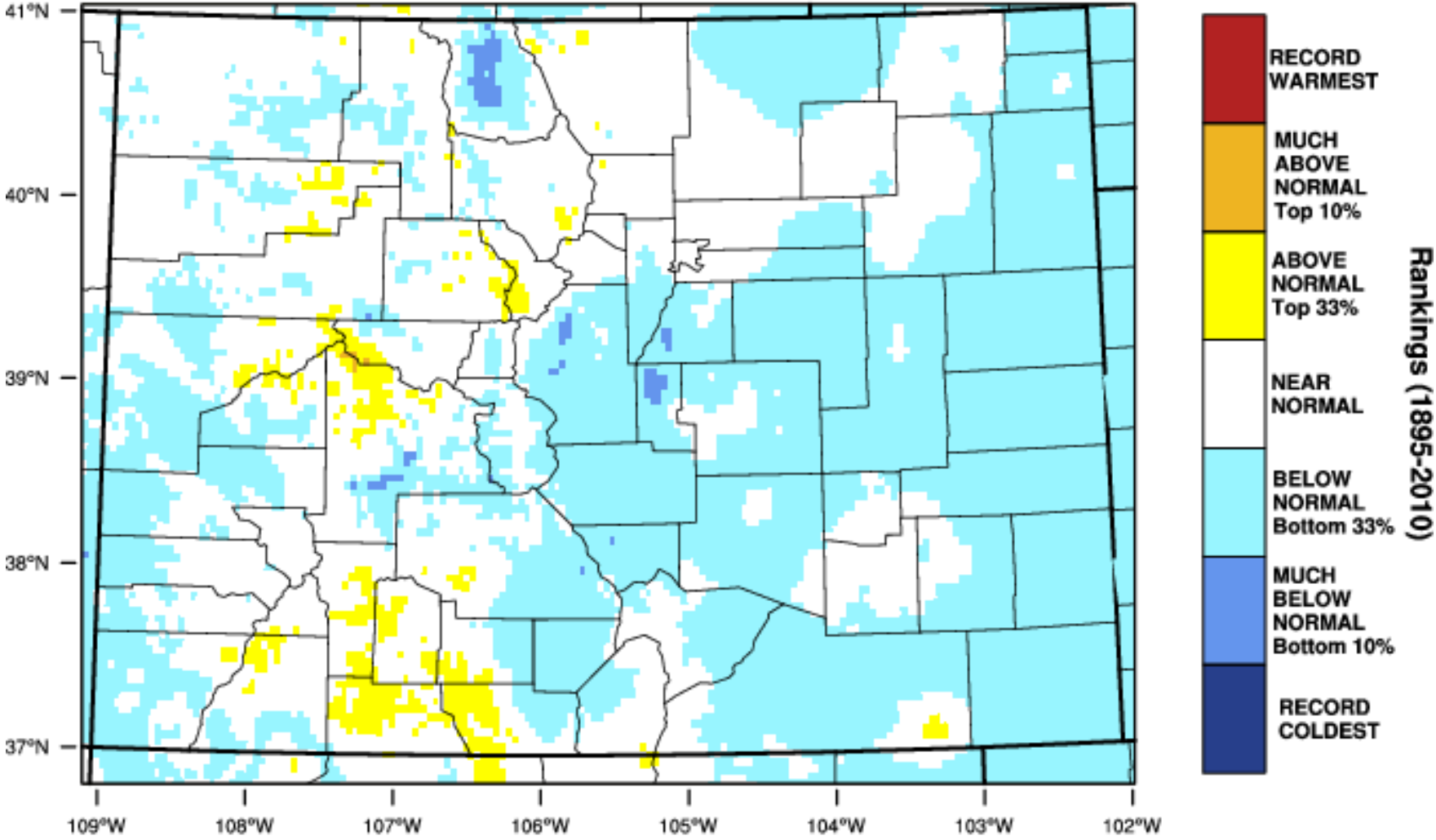
October-January 2019 Departure from 1981-2010 Normal



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 FEB 2019



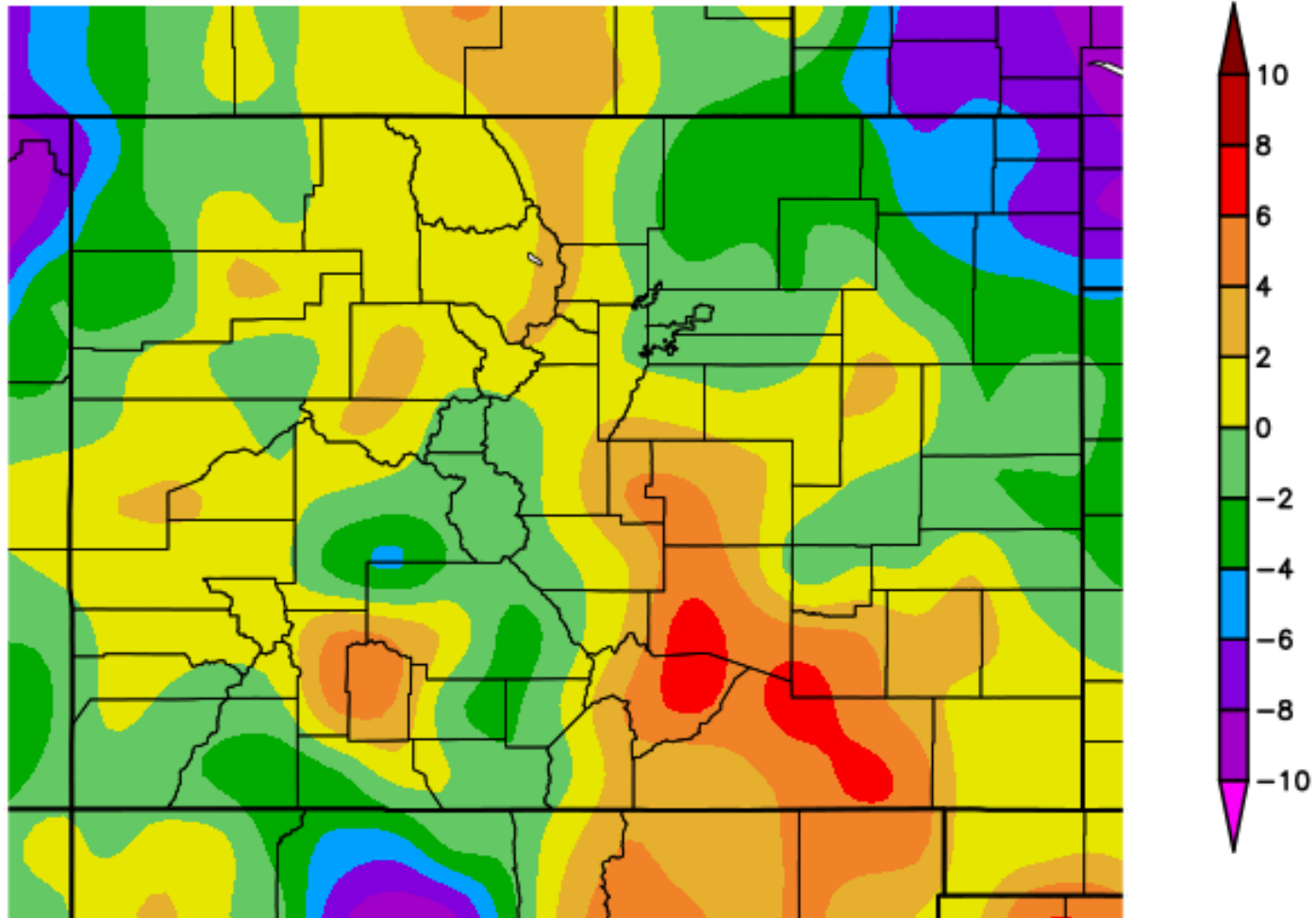
# Colorado - Mean Temperature October-January 2019 Percentile



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 FEB 2019



# Departure from Normal Temperature (F) 2/1/2019 - 2/17/2019



Generated 2/18/2019 at HPRCC using provisional data.

NOAA Regional Climate Centers



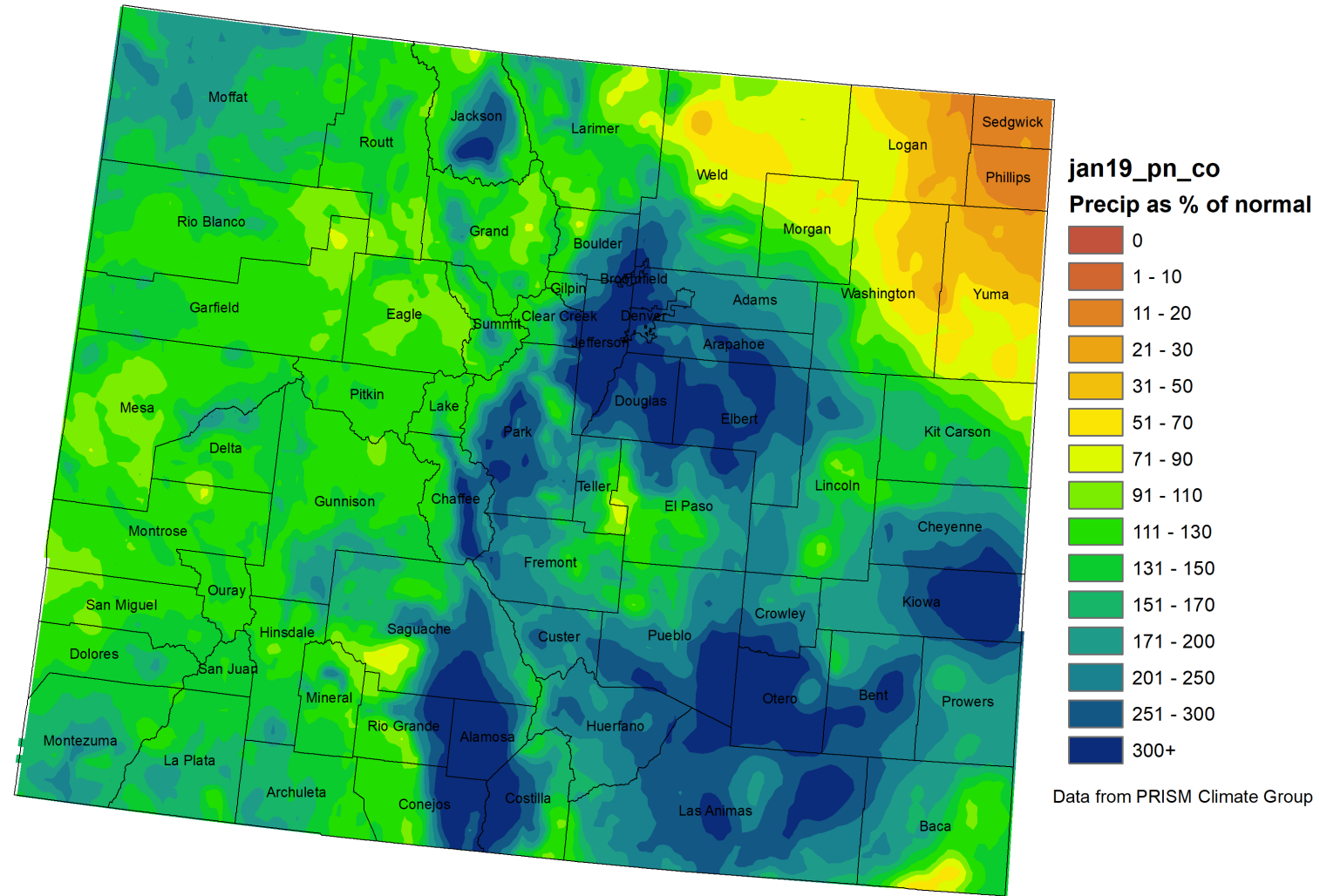


## Water Year 2019 – Precipitation

(credit: Durango Herald)

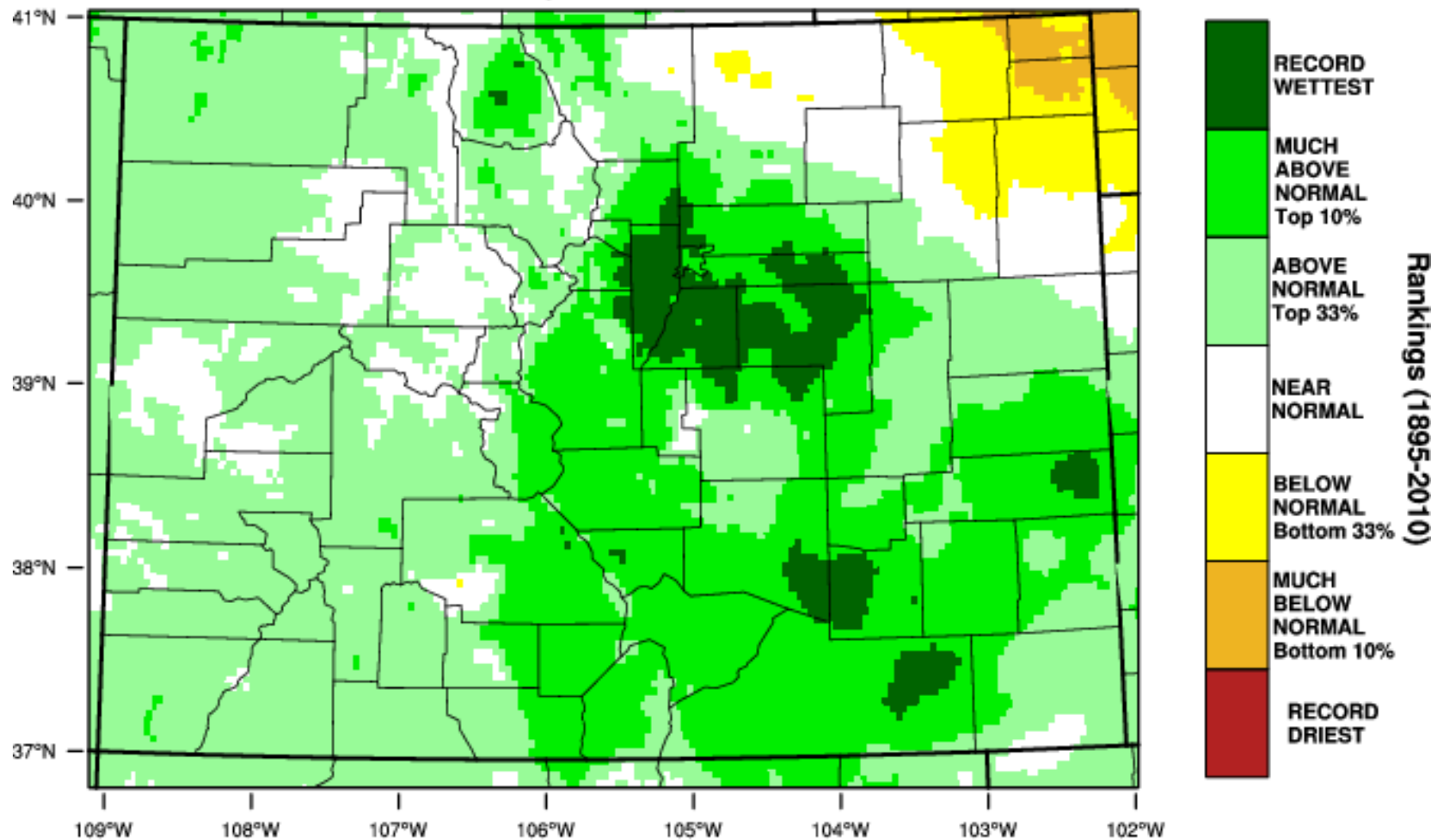


# Colorado January 2019 Precipitation as a Percentage of Normal





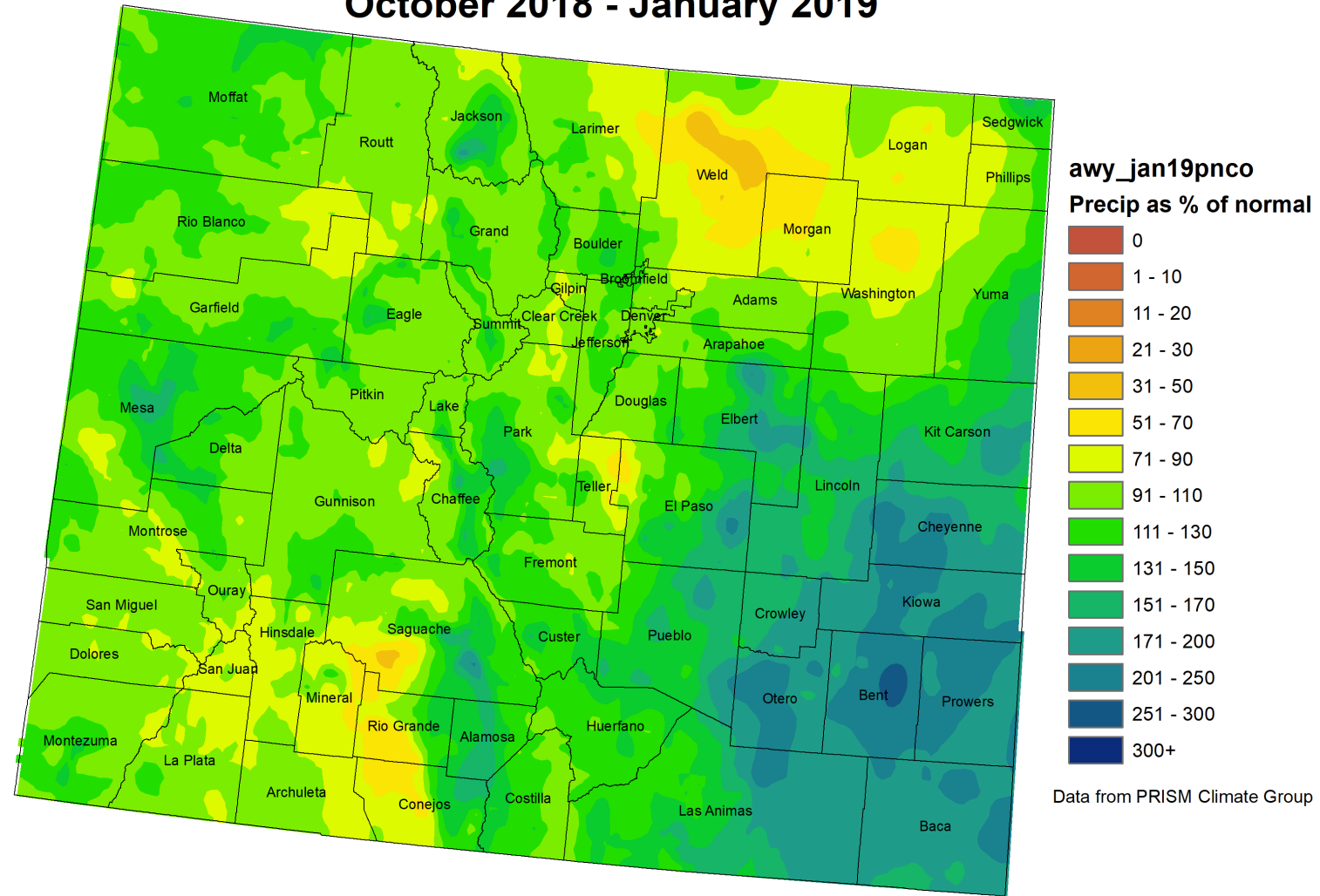
# Colorado - Precipitation January 2019 Percentile



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 FEB 2019

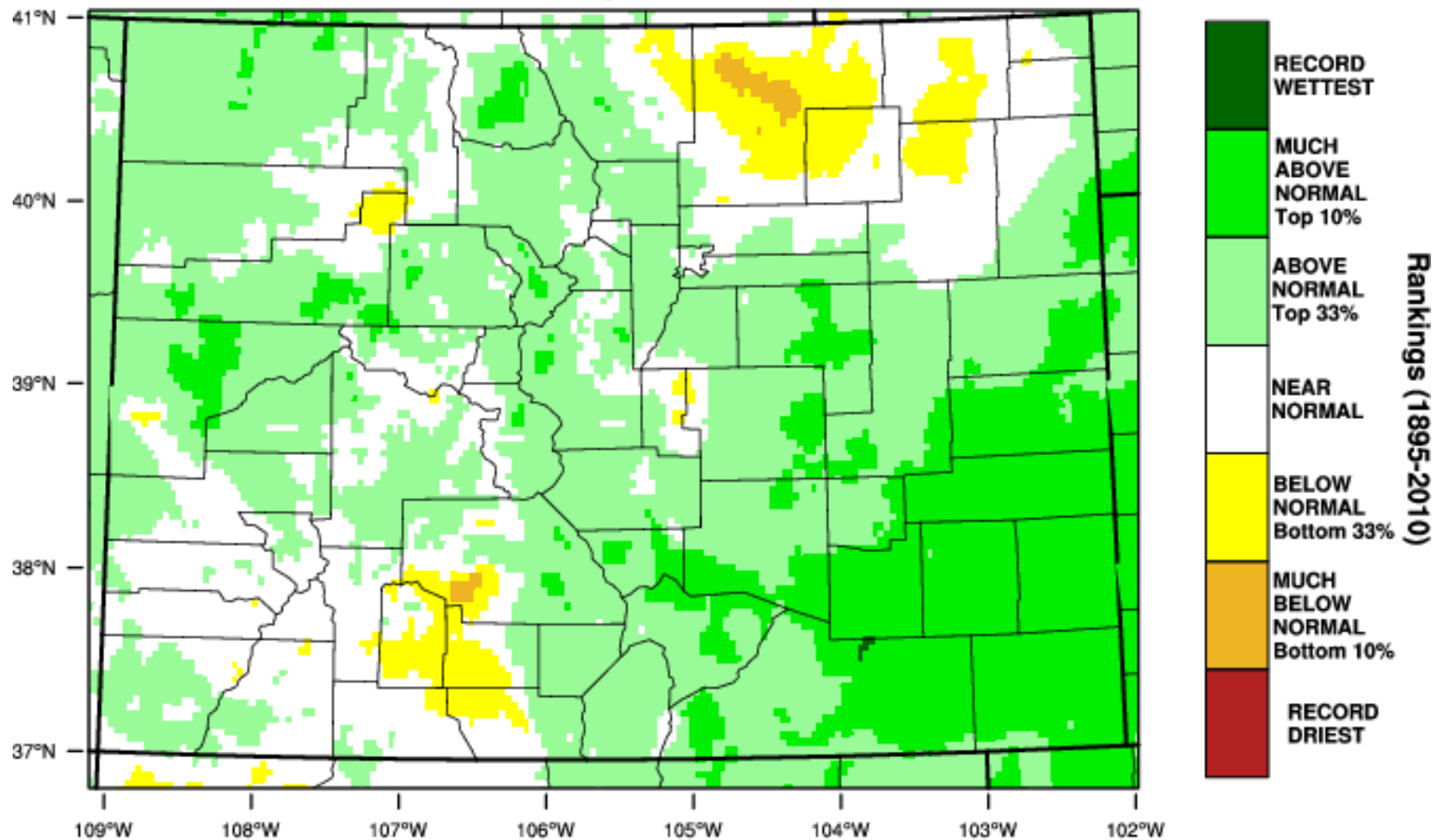


# Colorado Water Year 2019 Precipitation as a Percentage of Normal October 2018 - January 2019



# Colorado - Precipitation

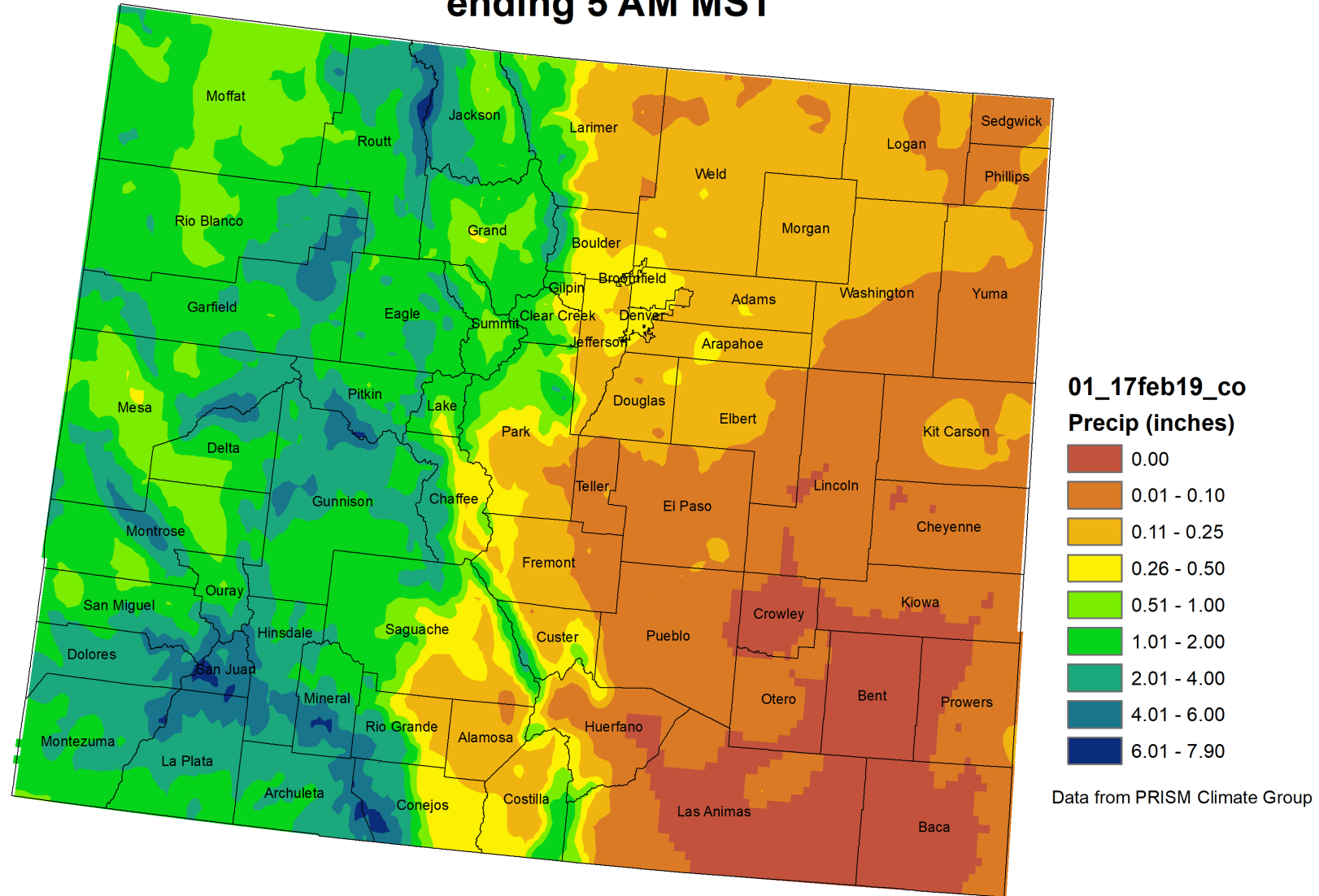
## October-January 2019 Percentile



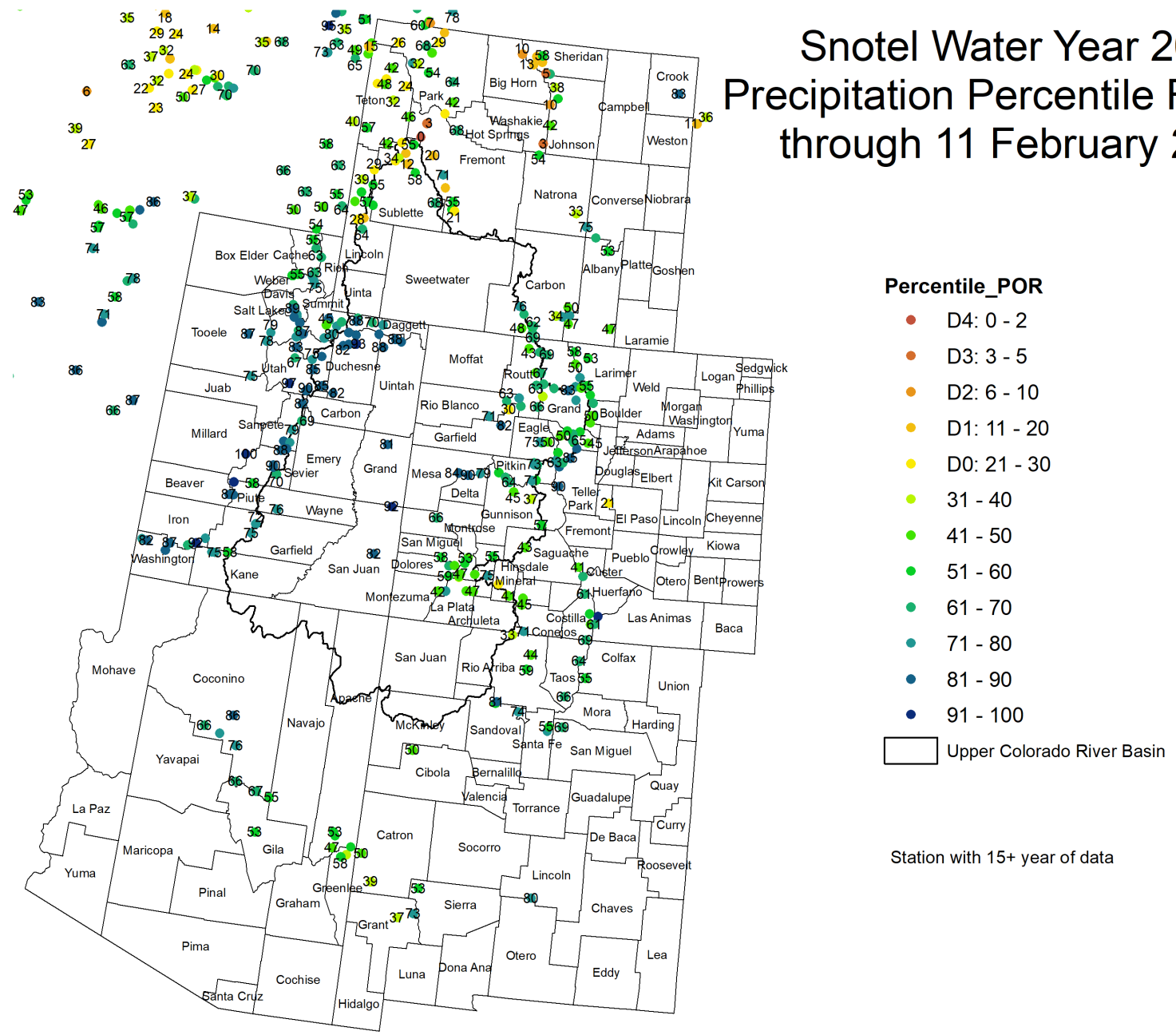
WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 FEB 2019

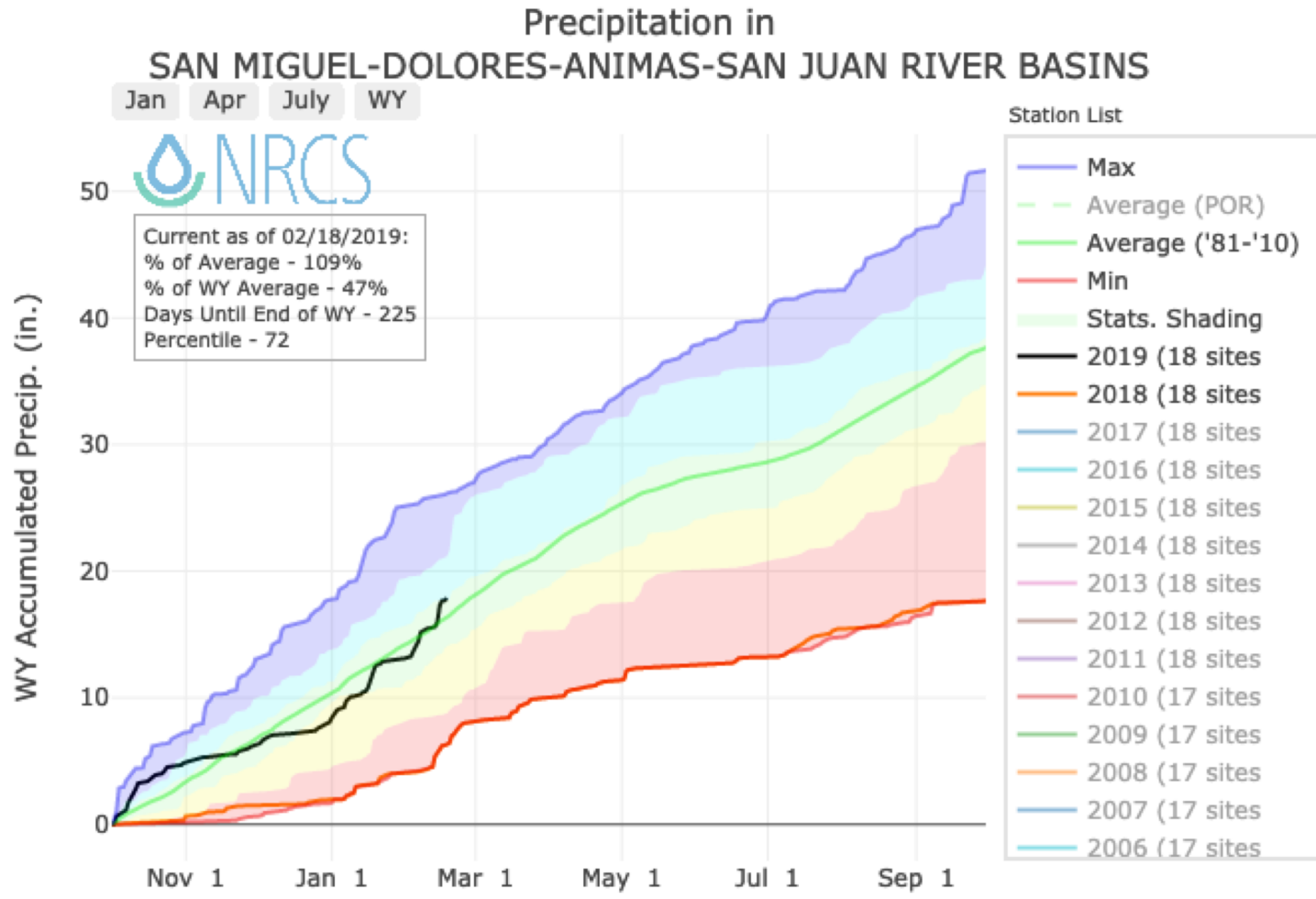


# Colorado Month to Date Precipitation 1 - 17 February 2019 ending 5 AM MST



# Snotel Water Year 2019 Precipitation Percentile Ranking through 11 February 2019





Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th Percentiles.

For more information visit: [30 year normals calculation description.](#)

Basin average of 4.8" in February thus far

17.9" since October 1

Last year: 17.6" for the entire water year

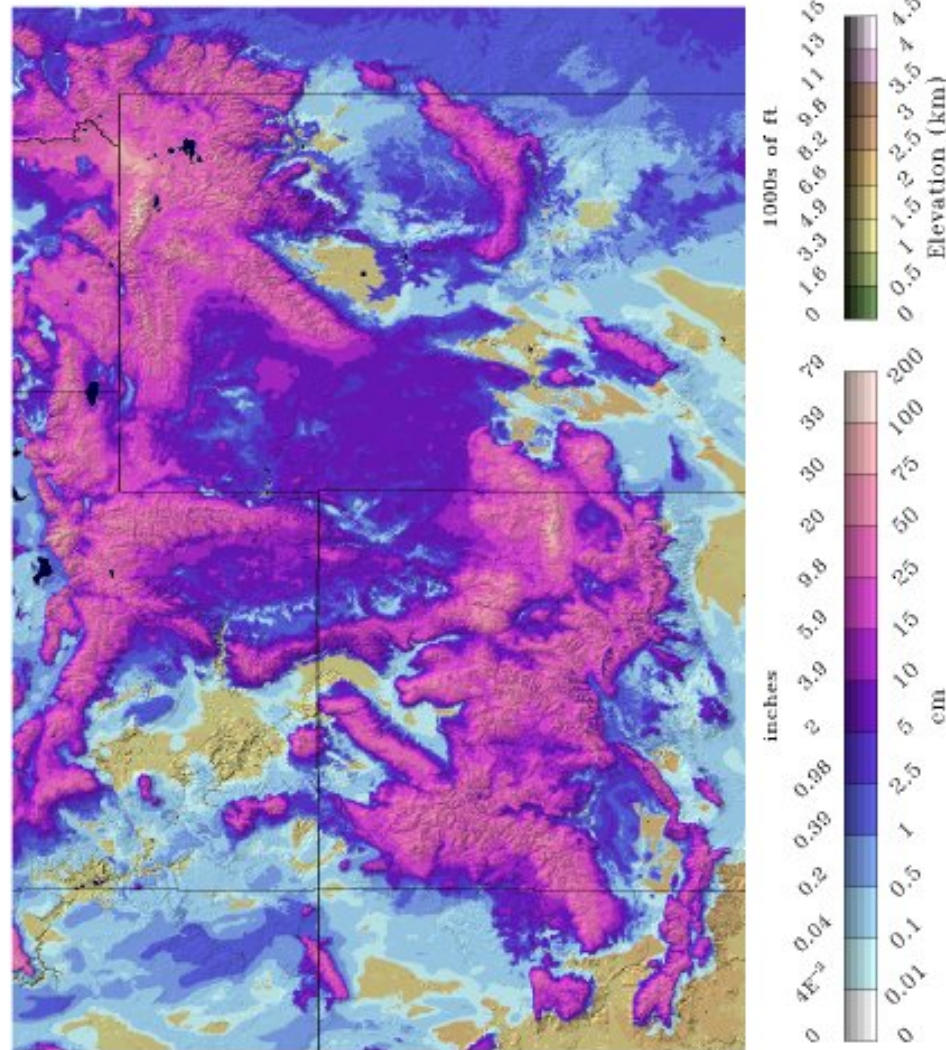


# Snow Water Equivalent

2019-02-18 06 UTC



## NOHRSC snow analysis: Feb 2019

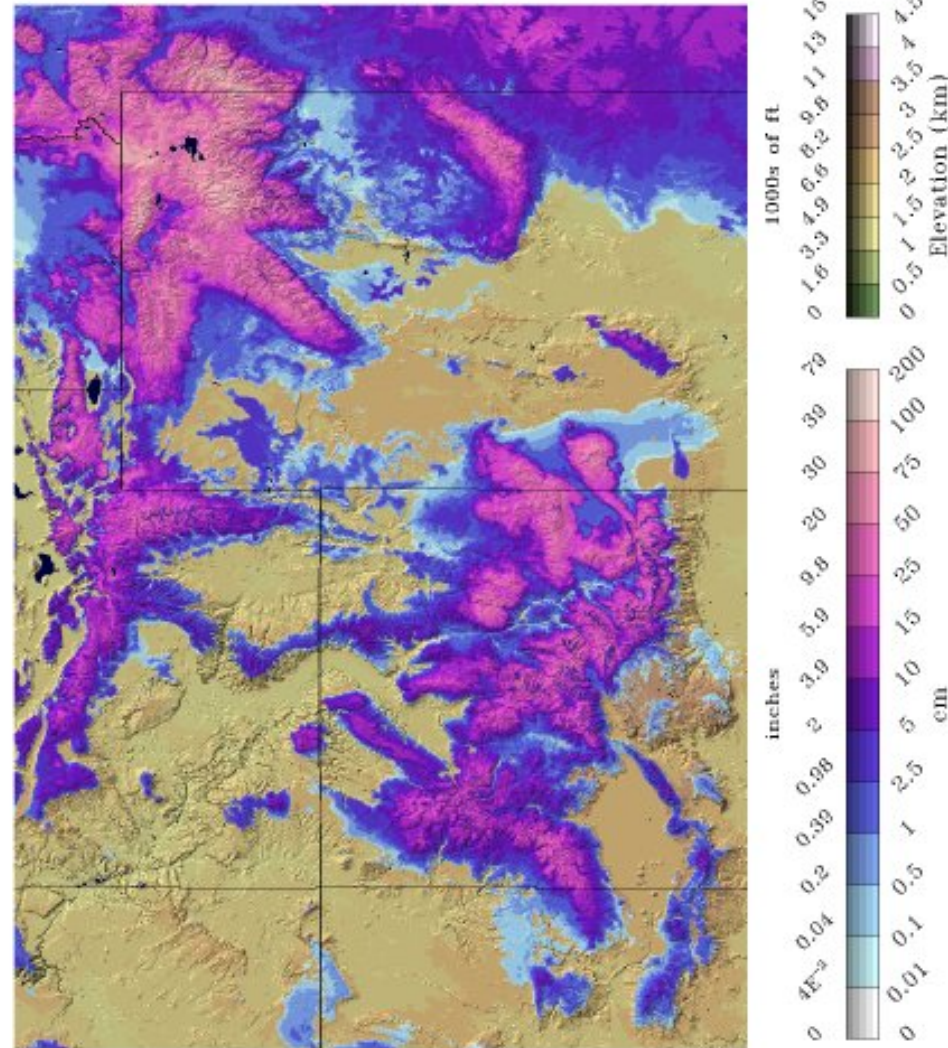


# Snow Water Equivalent

2018-02-18 06 UTC

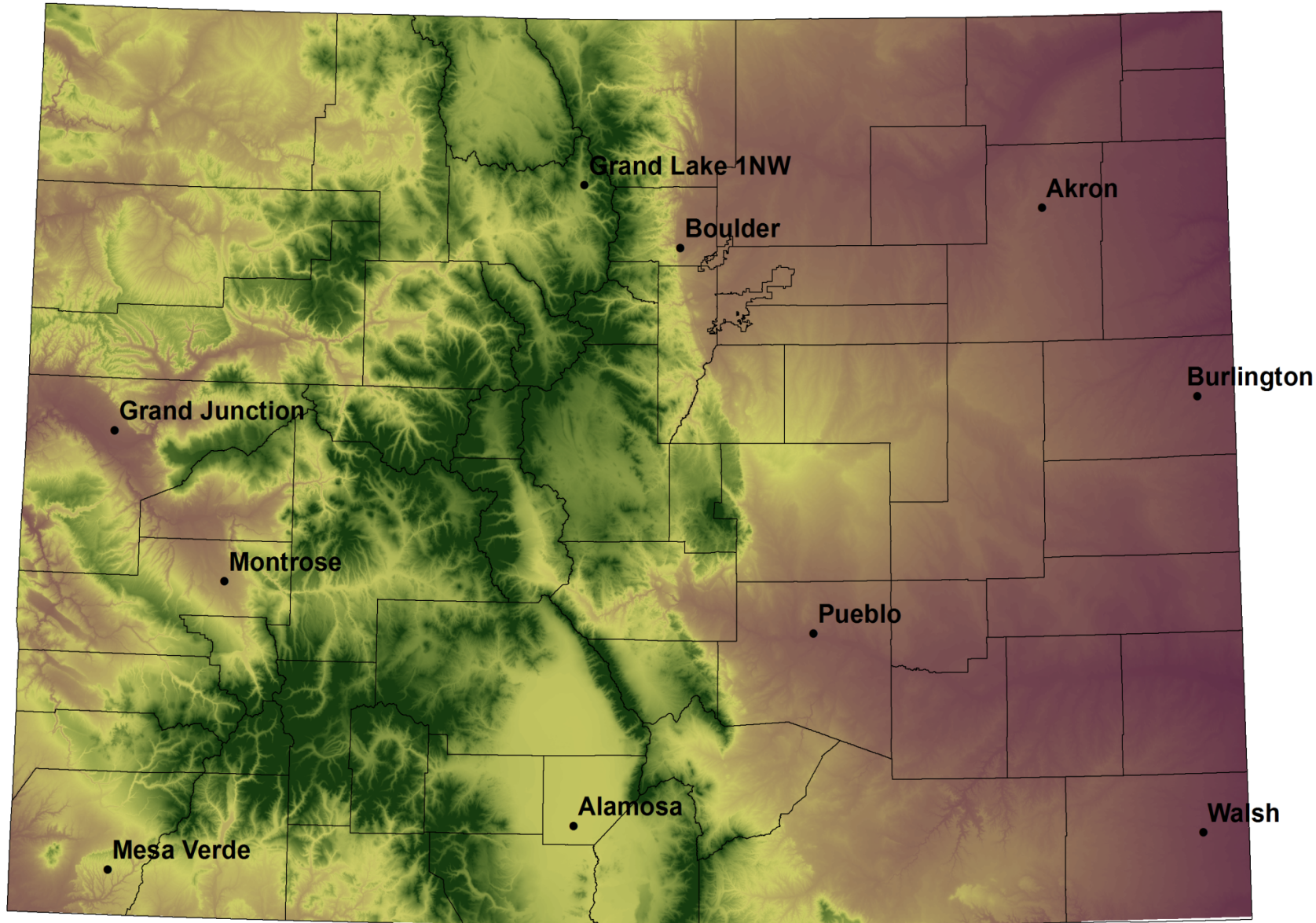


## NOHRSC snow analysis: Feb 2018 (last year)



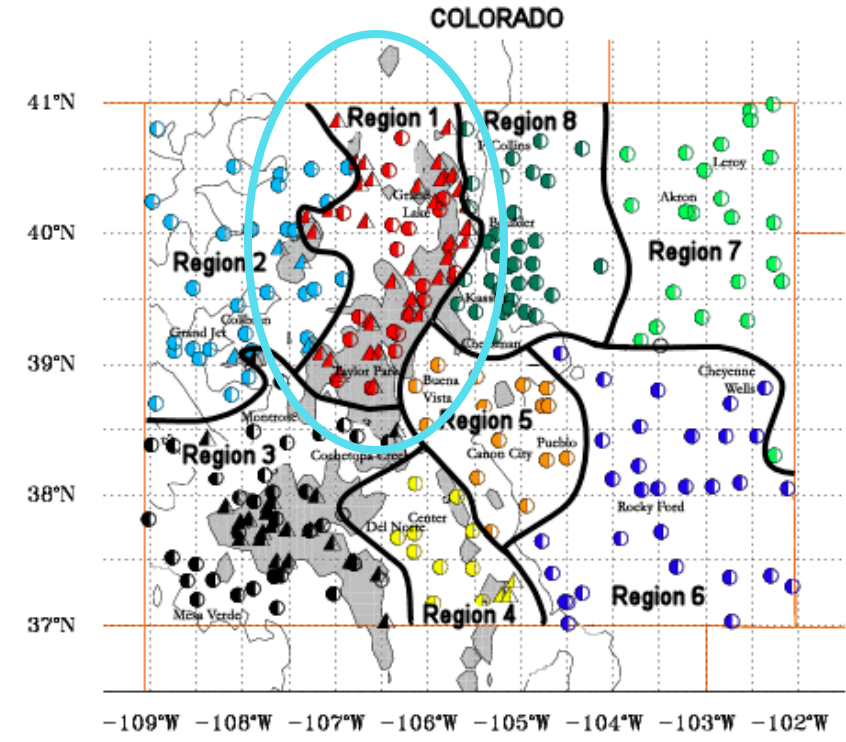
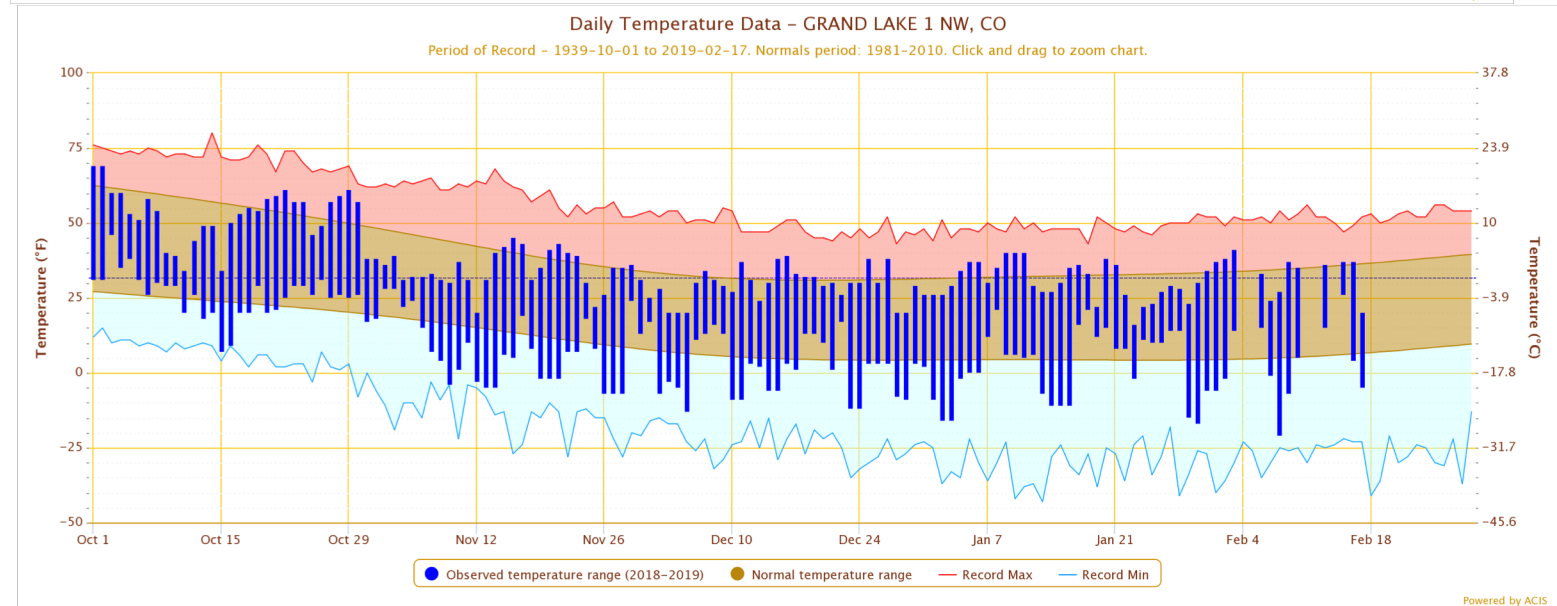
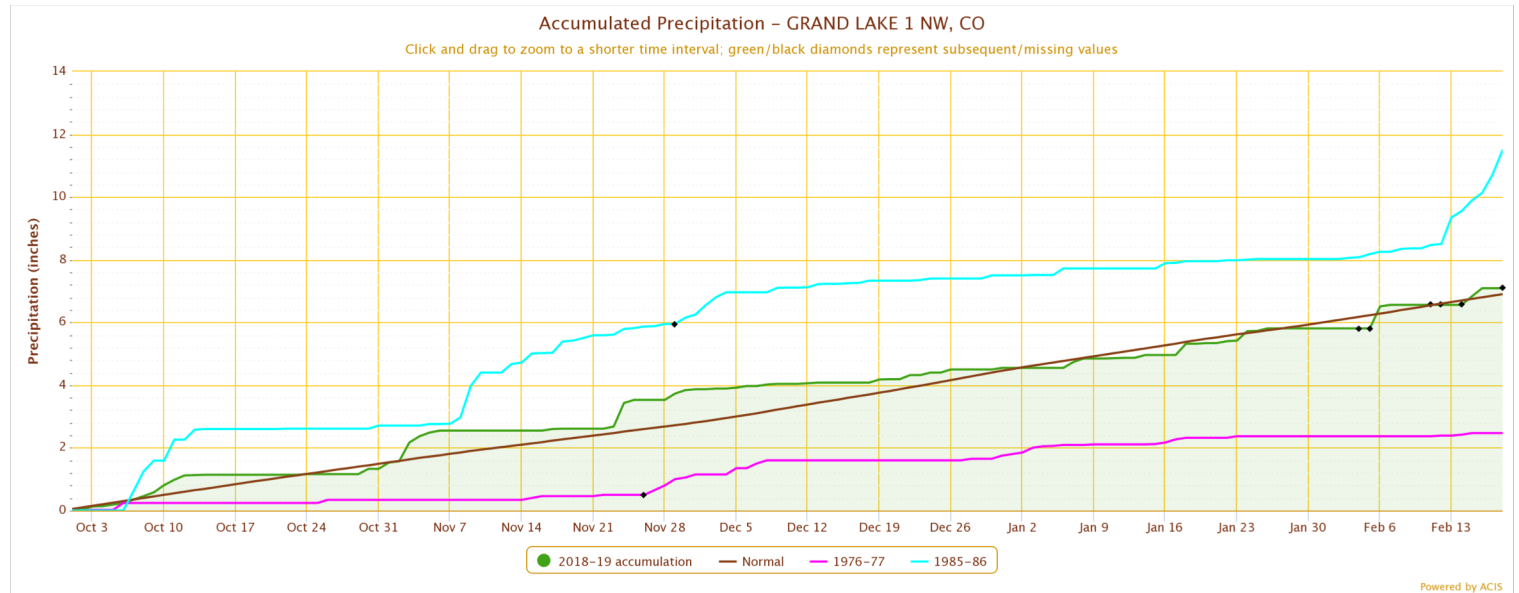


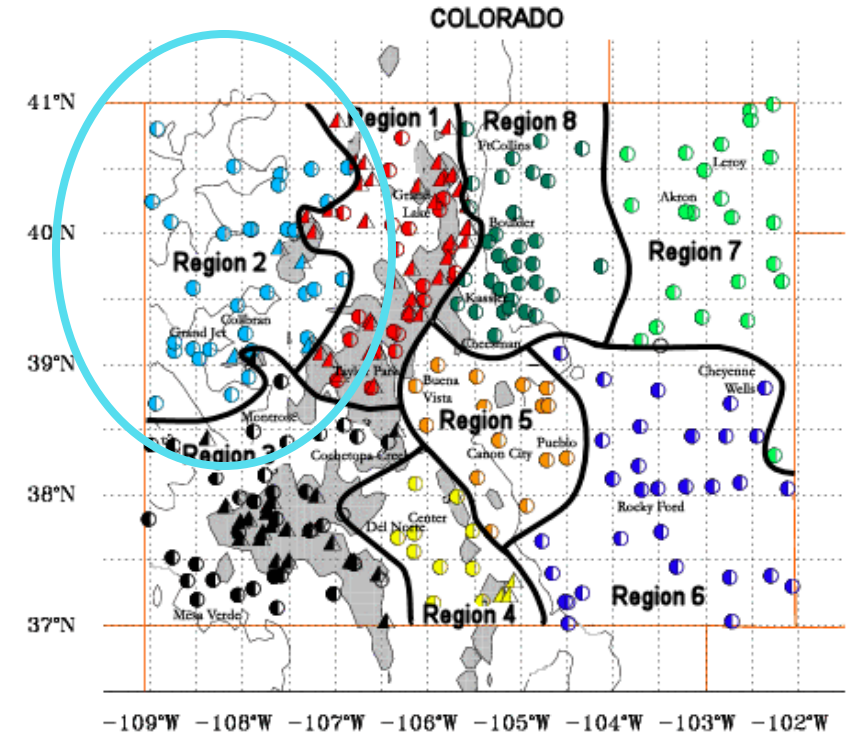
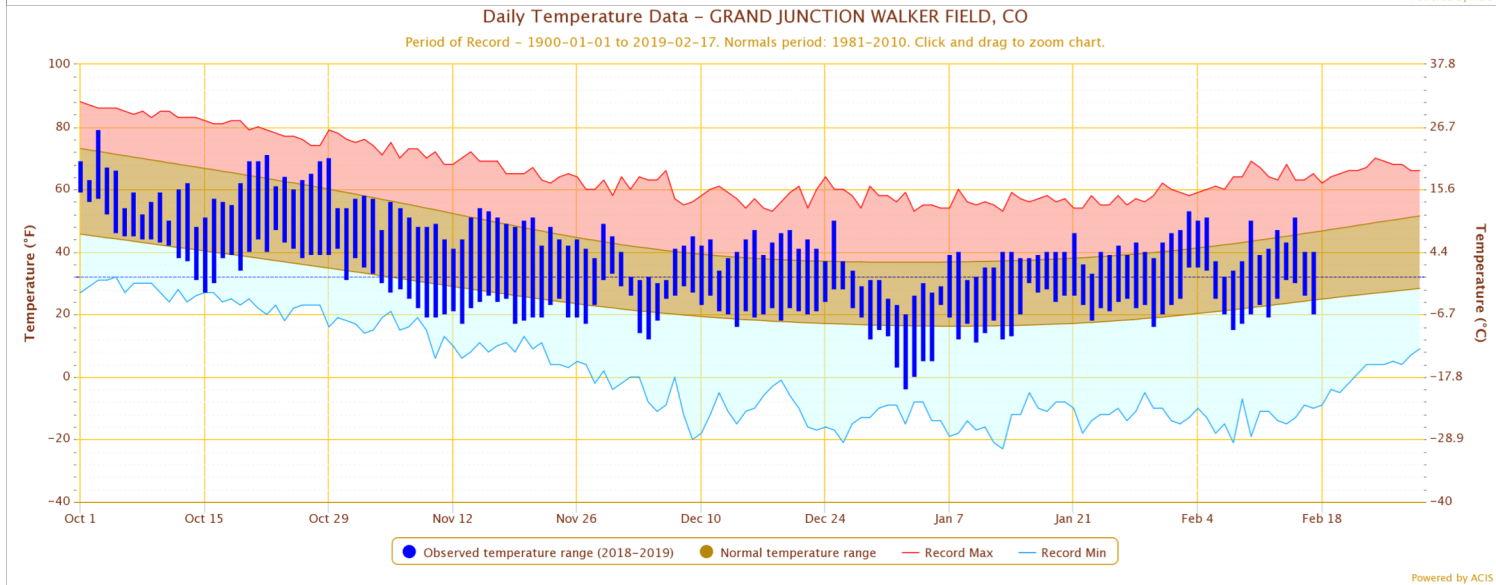
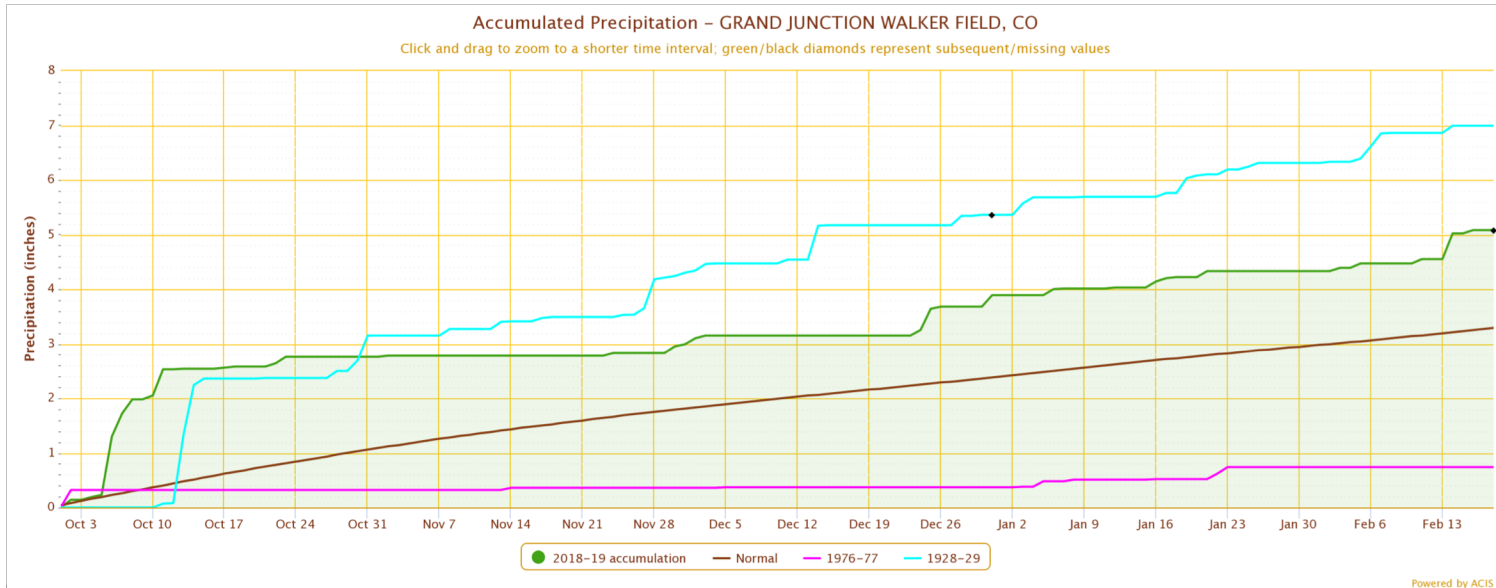
# NWS Cooperative Stations for WATF



## Water Year 2019 – Station Updates









**ColoClimateCenter**  
@ColoradoClimate

Following



In addition to the daily record, there was another precipitation milestone at Grand Junction yesterday: they now have more precipitation through 4.5 months of this water year than in the \*entire\* 2018 water year. 5.02" since October 1; only 4.65" from Oct 2017-Sep 2018. [#cowx](#)



**NWS Grand Junction** @NWSGJT

Grand Junction broke the daily record rainfall amount yesterday with 0.47 inches of #rain. This breaks the old #record of 0.43 inches of rain set back in 1942 (Records go back to 1893)! #COwx

11:27 AM - 15 Feb 2019

4 Retweets 14 Likes



4

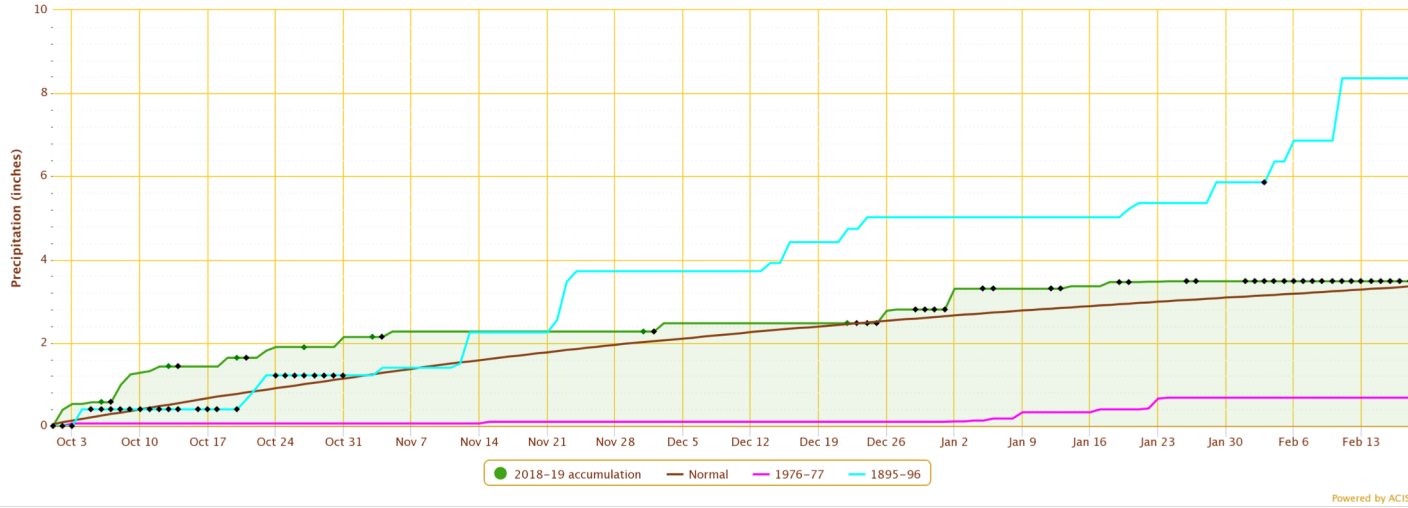


14



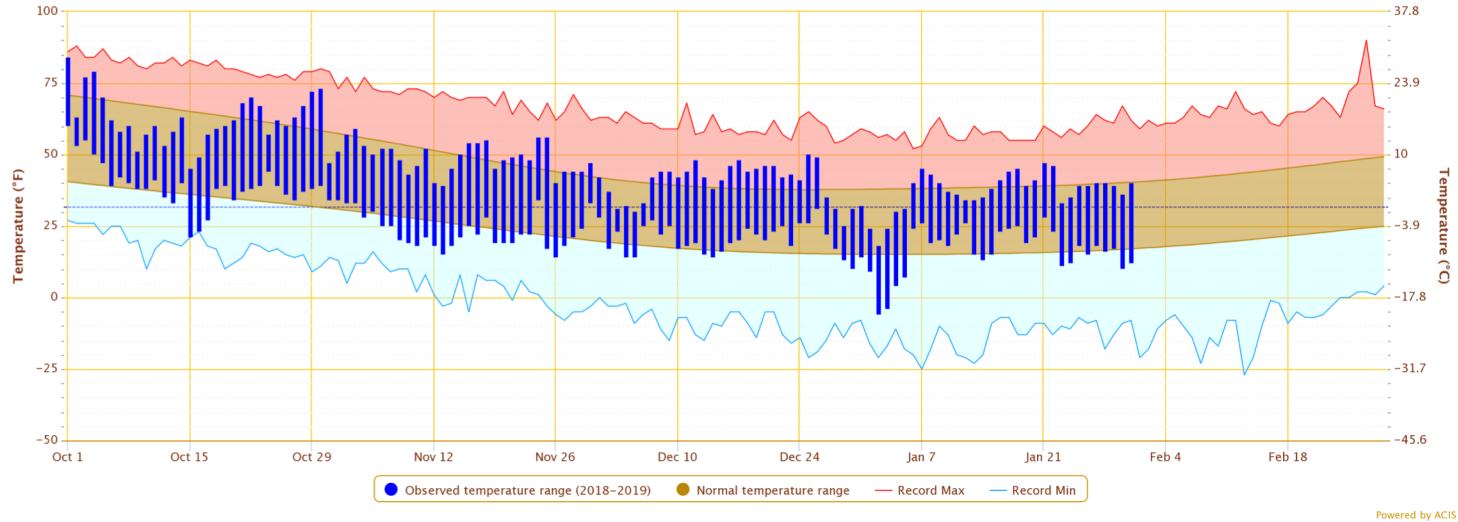
### Accumulated Precipitation – MONTROSE NO 2, CO

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

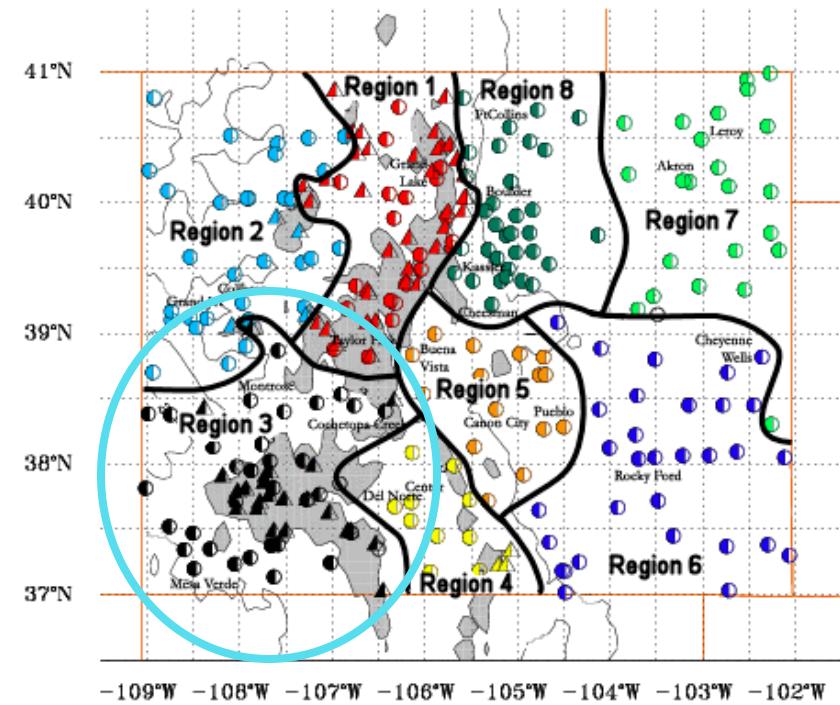


### Daily Temperature Data – MONTROSE NO 2, CO

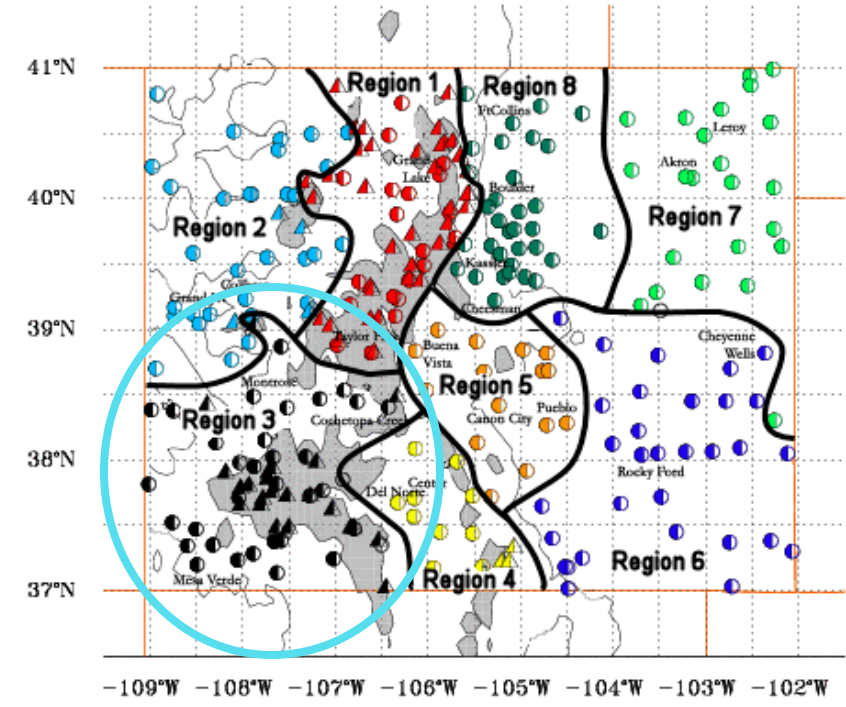
Period of Record – 1895-10-01 to 2019-01-31. Normals period: 1981-2010. Click and drag to zoom chart.



### COLORADO



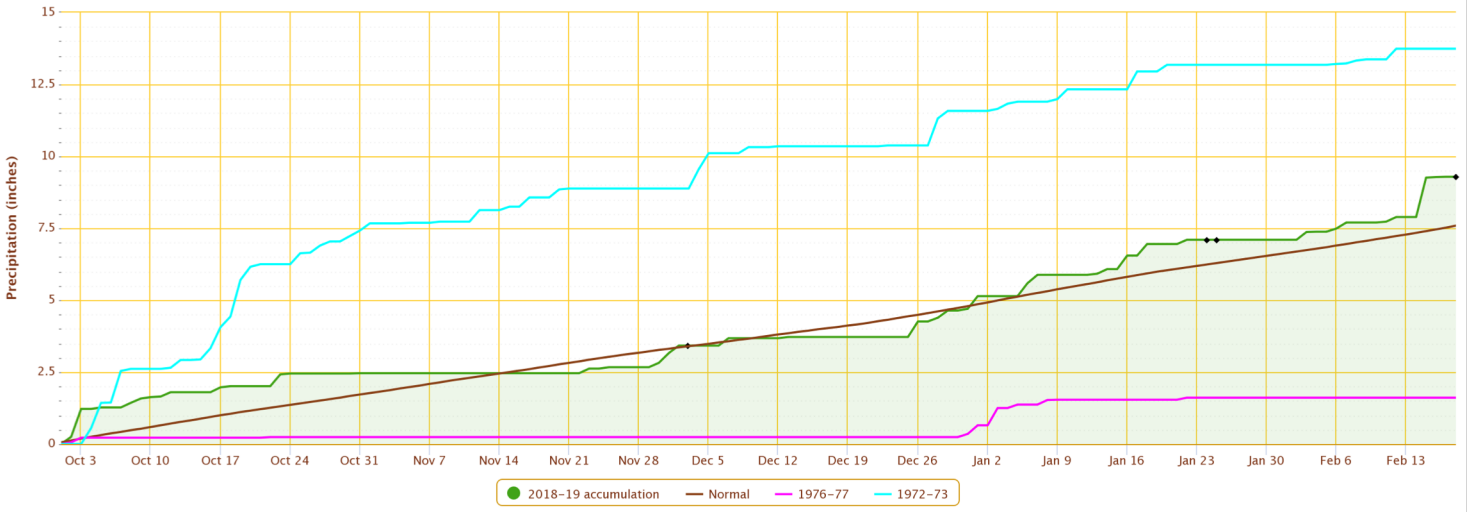
COLORADO



Mesa Verde has also surpassed their precip from all of last water year (9.29" through Feb 17; 8.06" all of WY2018)

Accumulated Precipitation – MESA VERDE NP, CO

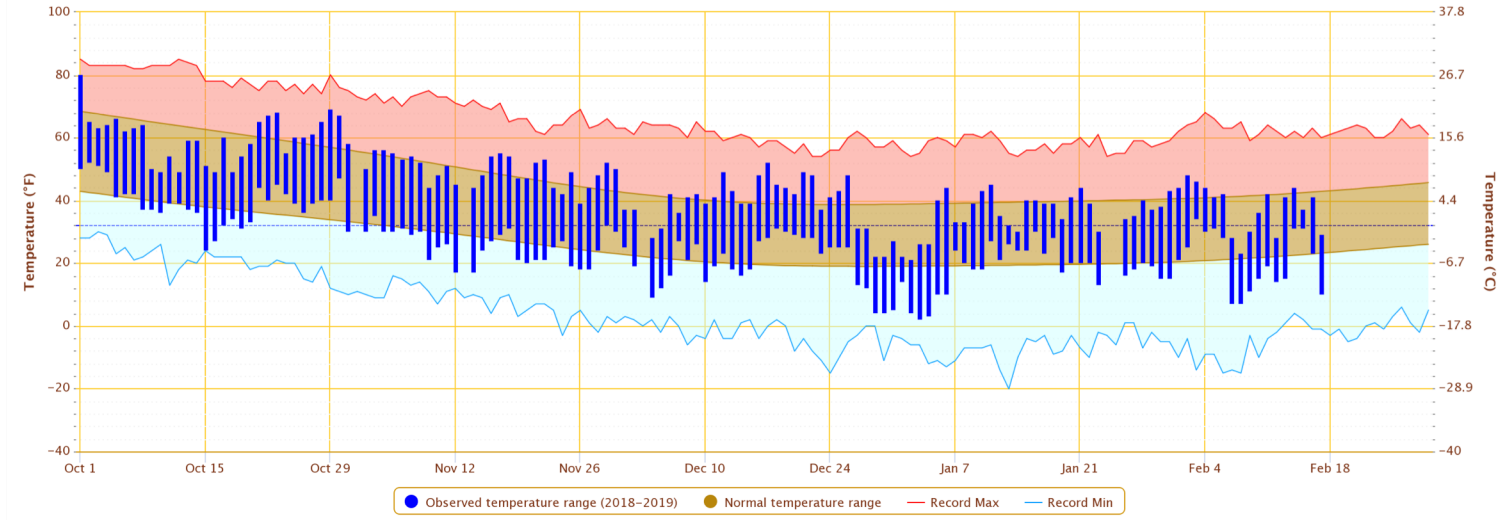
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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Daily Temperature Data – MESA VERDE NP, CO

Period of Record – 1922-02-16 to 2019-02-17. Normals period: 1981-2010. Click and drag to zoom chart.

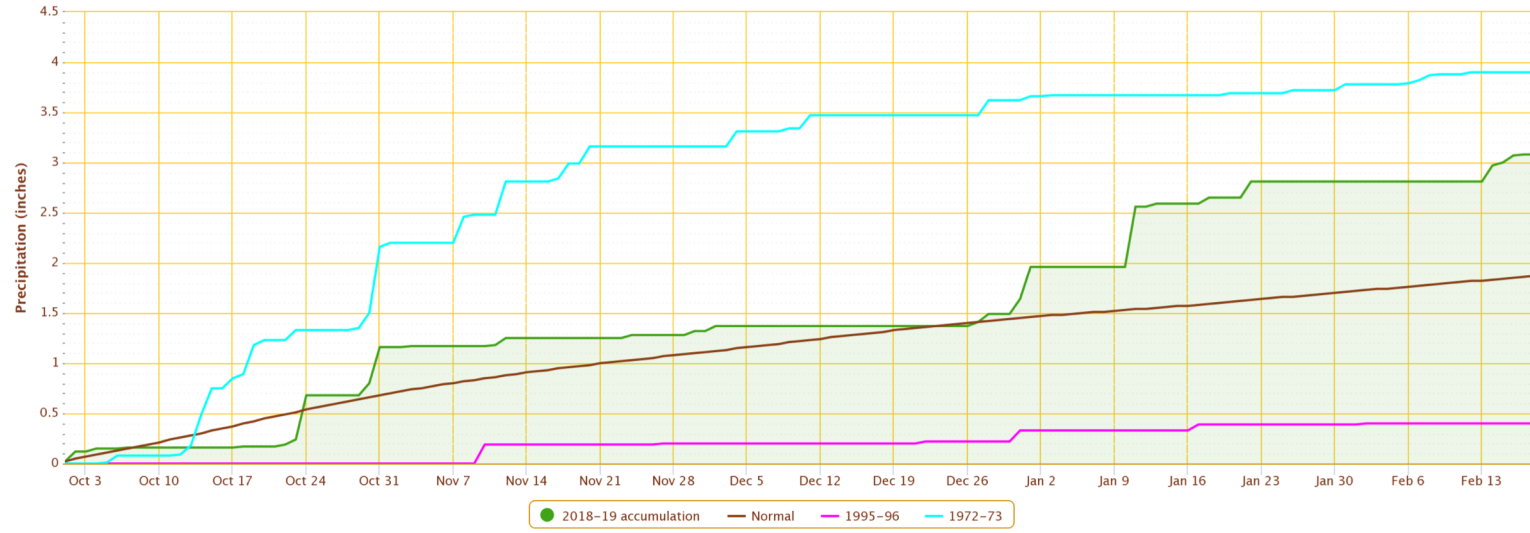


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### Accumulated Precipitation – ALAMOSA SAN LUIS VALLEY REGIONAL AP, CO

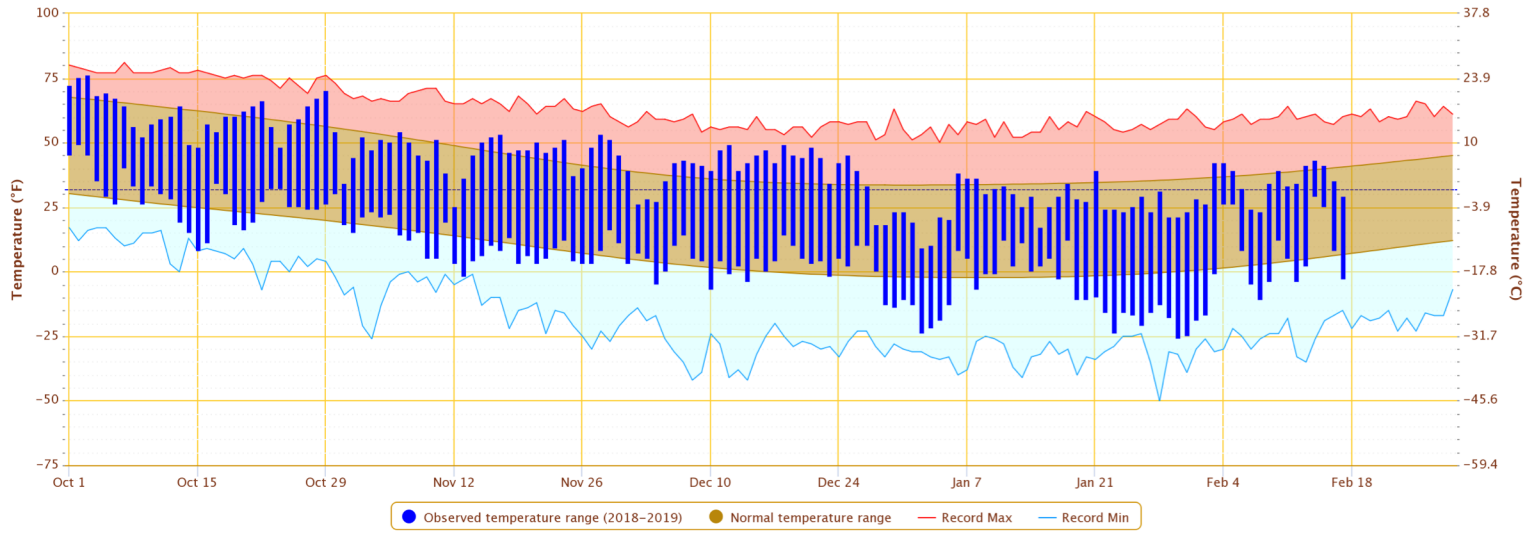
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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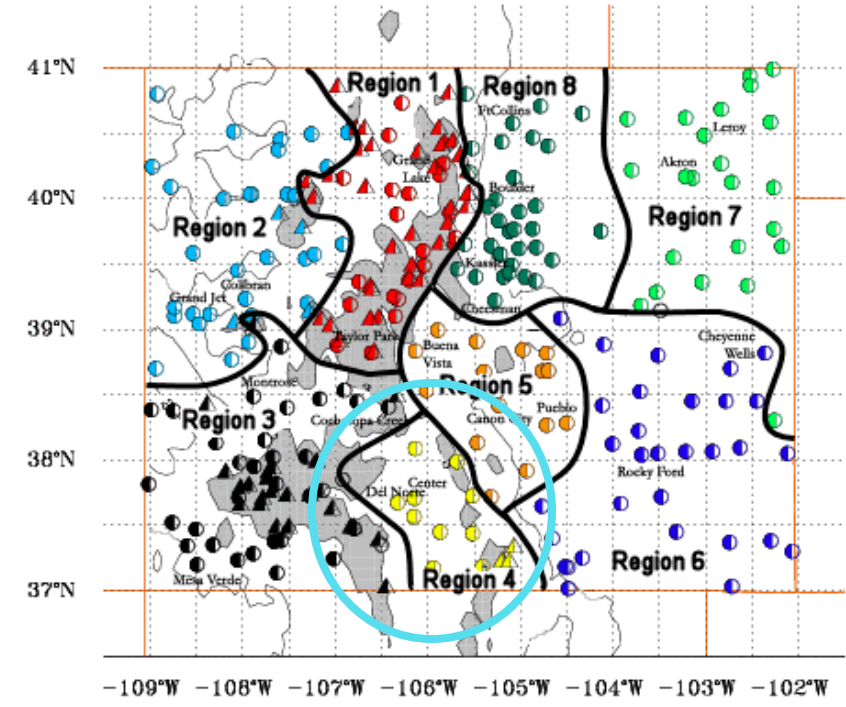
### Daily Temperature Data – ALAMOSA SAN LUIS VALLEY REGIONAL AP, CO

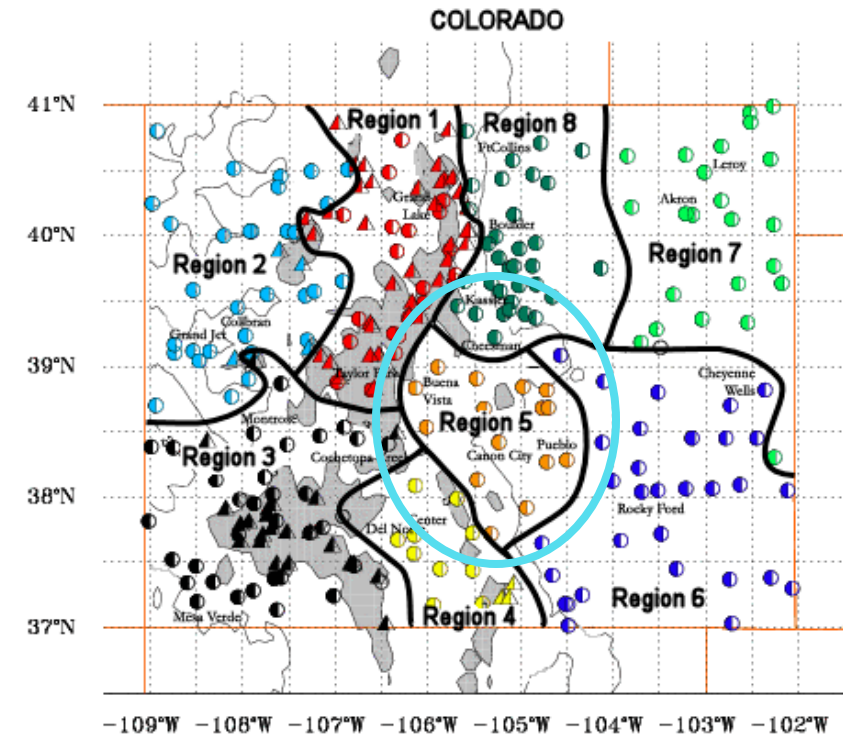
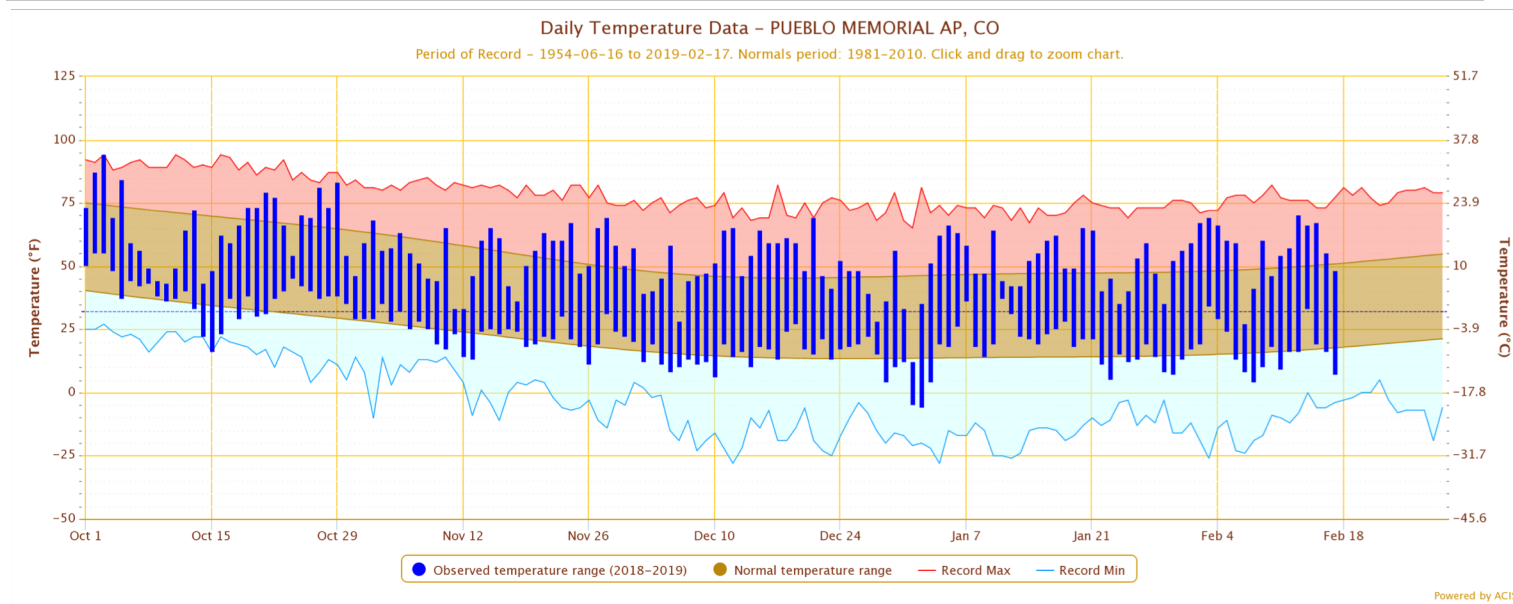
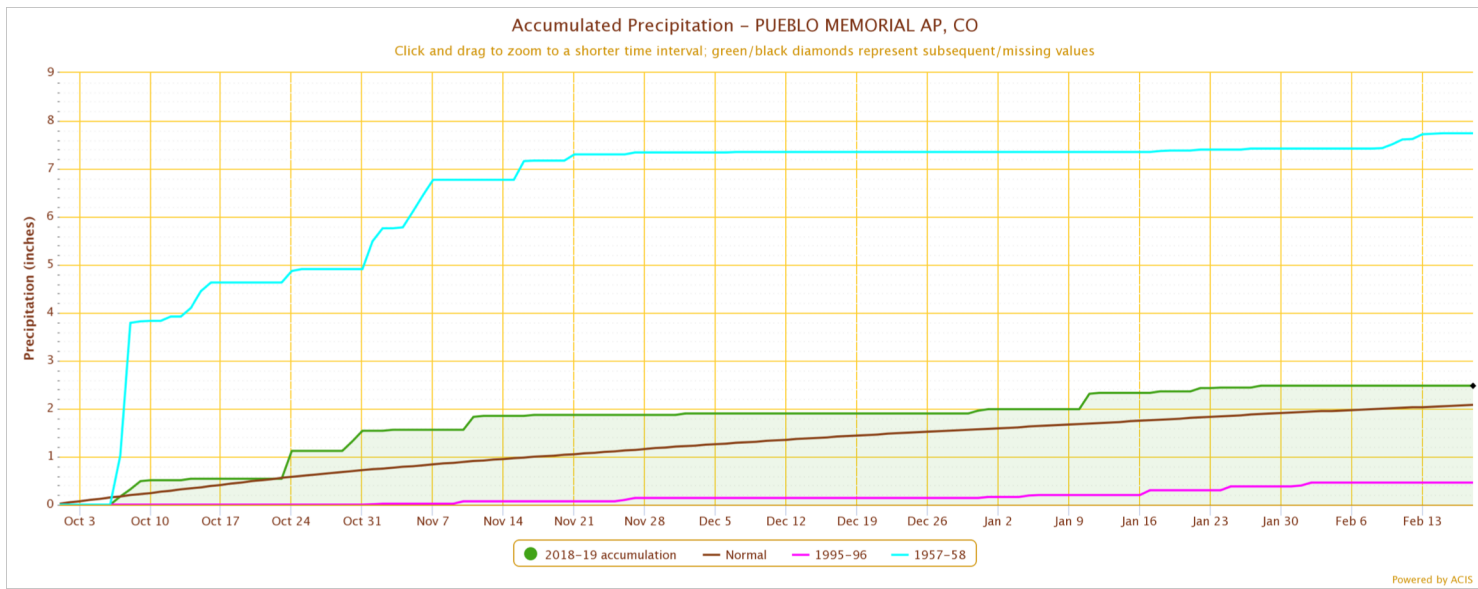
Period of Record – 1948-01-01 to 2019-02-17. Normals period: 1981-2010. Click and drag to zoom chart.



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### COLORADO

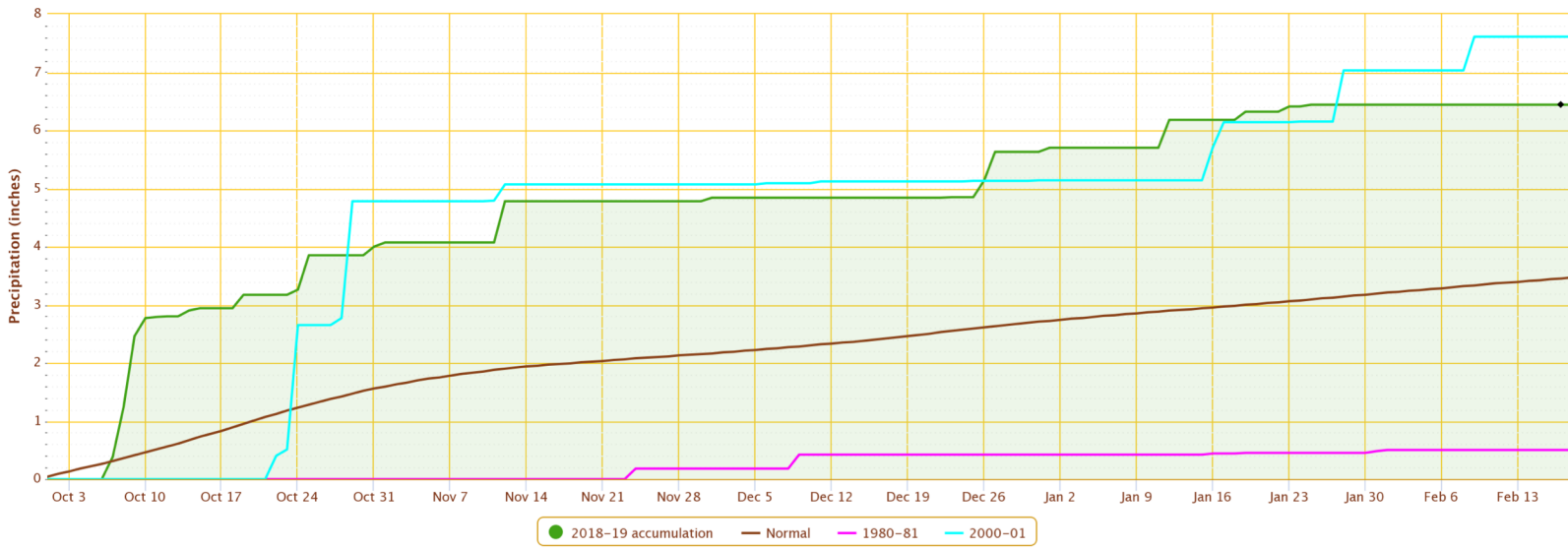






### Accumulated Precipitation - WALSH 1 W, CO

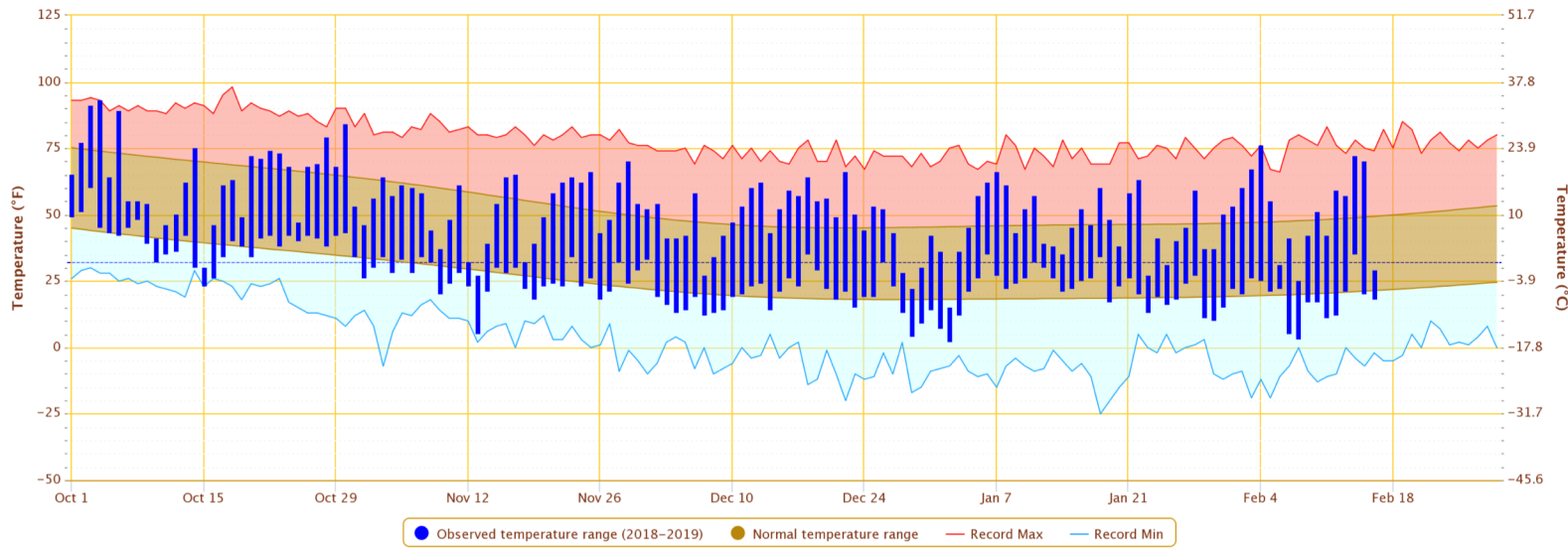
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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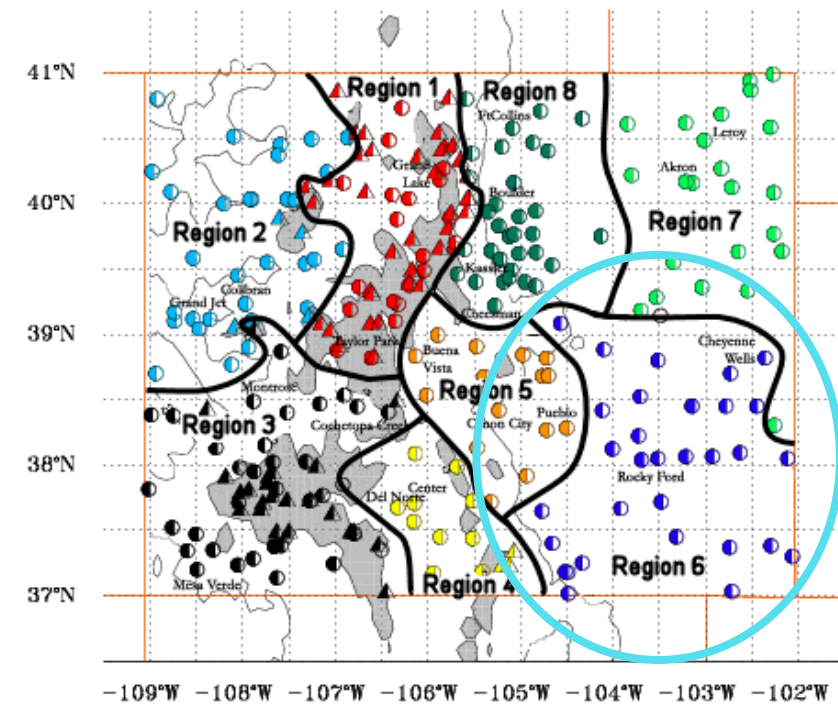
### Daily Temperature Data - WALSH 1 W, CO

Period of Record - 1967-09-01 to 2019-02-16. Normals period: 1981-2010. Click and drag to zoom chart.



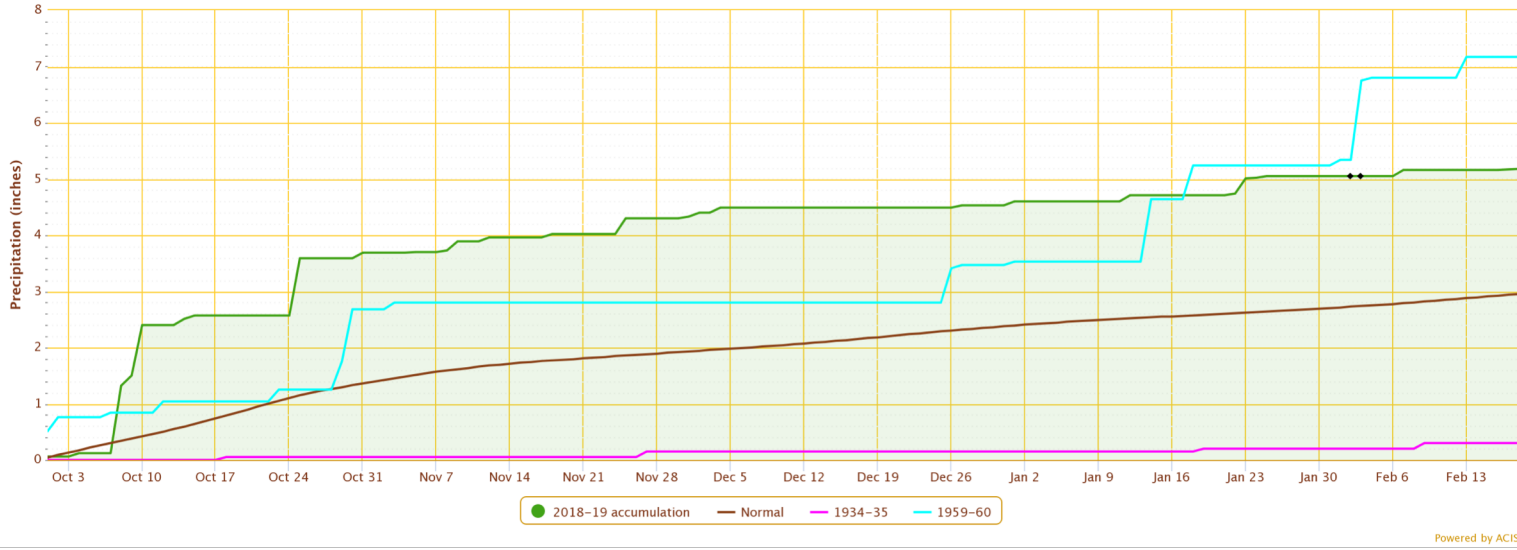
Powered by ACIS

### COLORADO



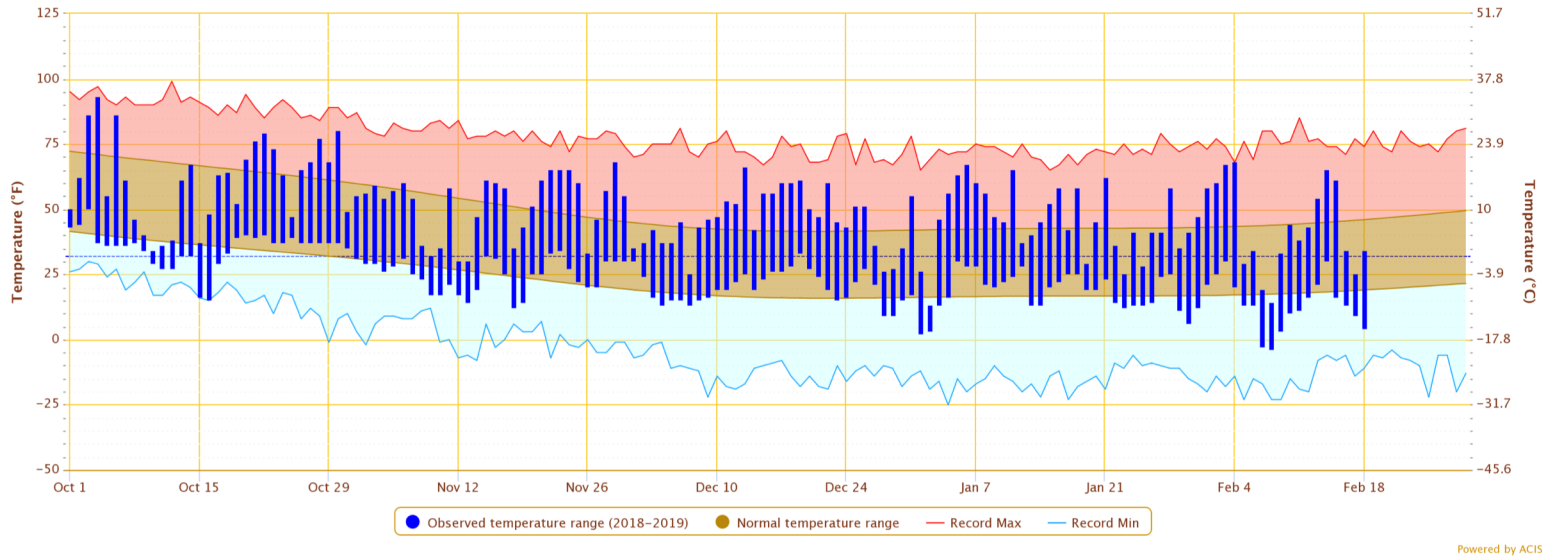
### Accumulated Precipitation – BURLINGTON, CO

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

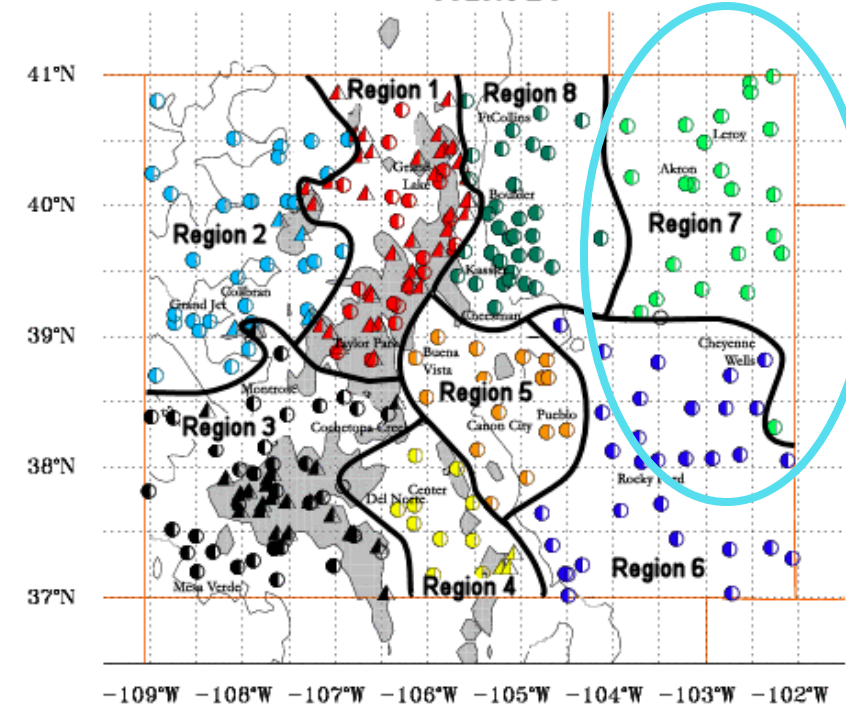


### Daily Temperature Data – BURLINGTON, CO

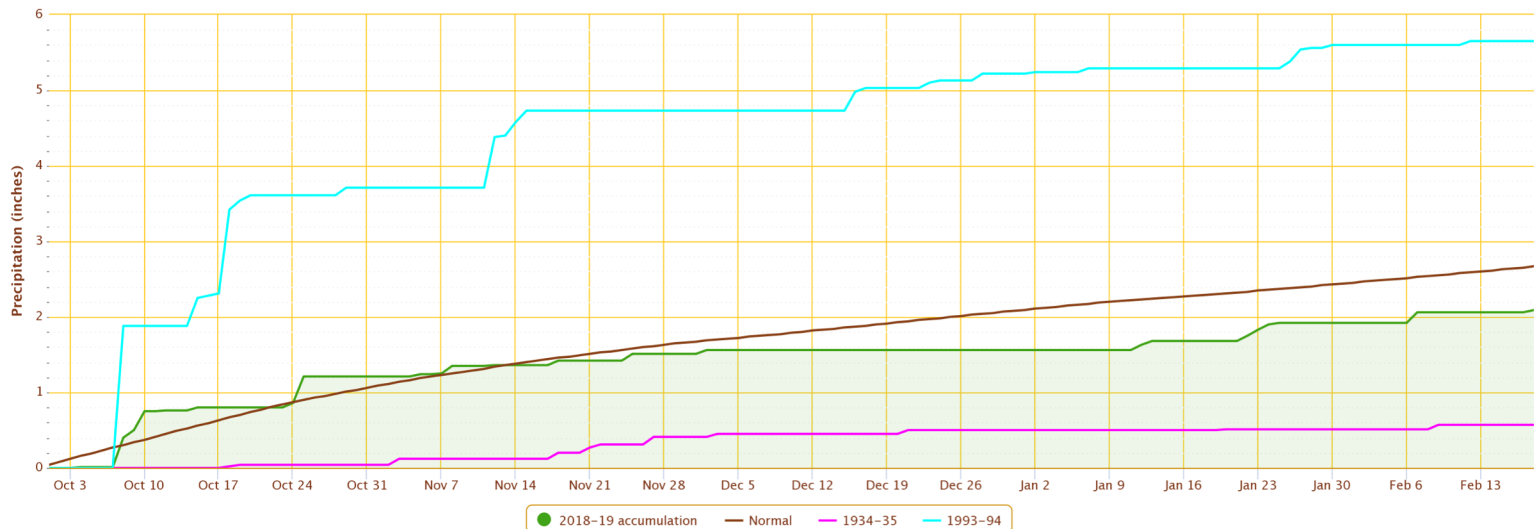
Period of Record – 1903-12-01 to 2019-02-18. Normals period: 1981-2010. Click and drag to zoom chart.



### COLORADO



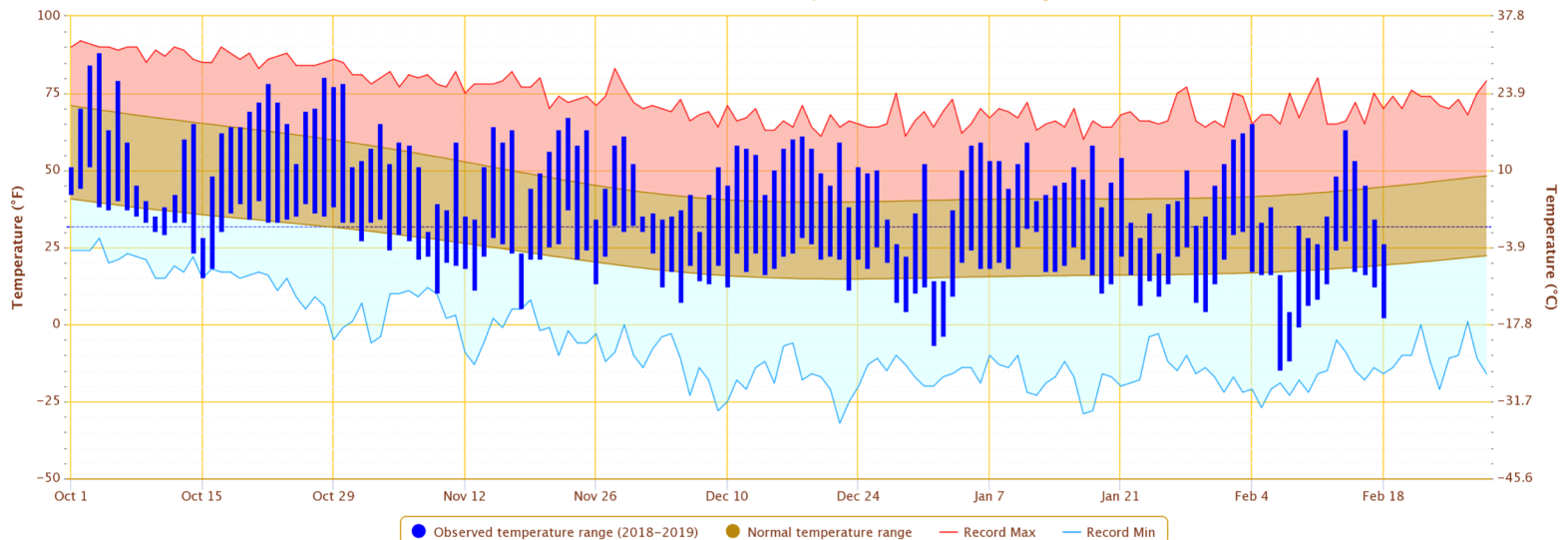
Accumulated Precipitation – AKRON 4 E, CO  
 Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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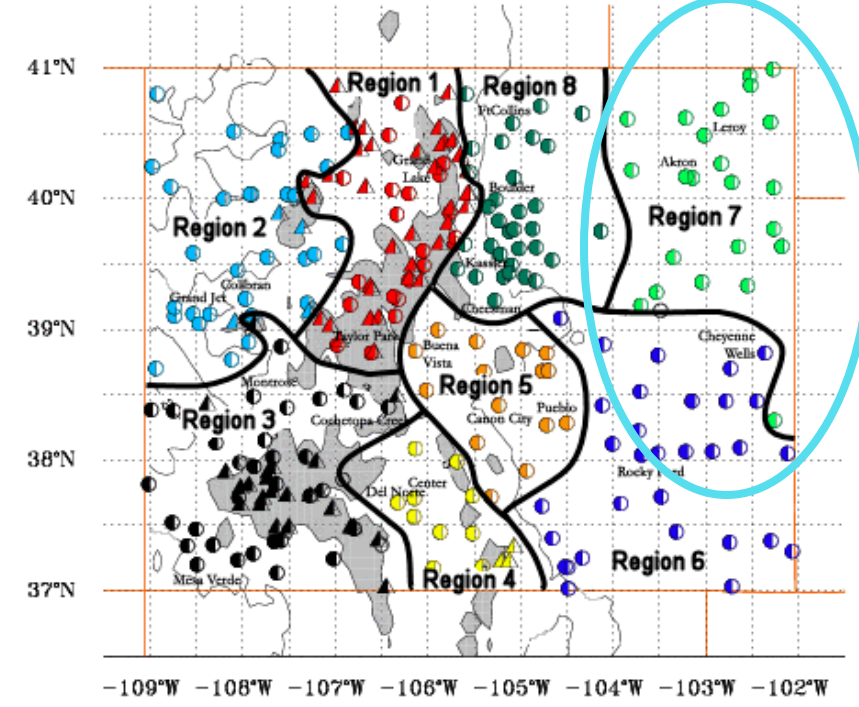
Daily Temperature Data – AKRON 4 E, CO

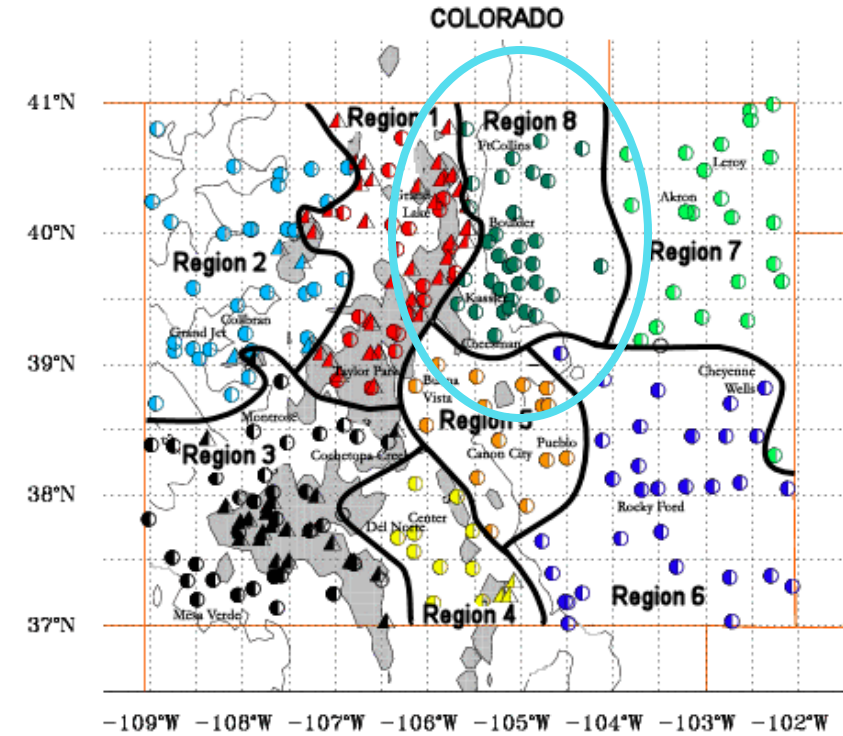
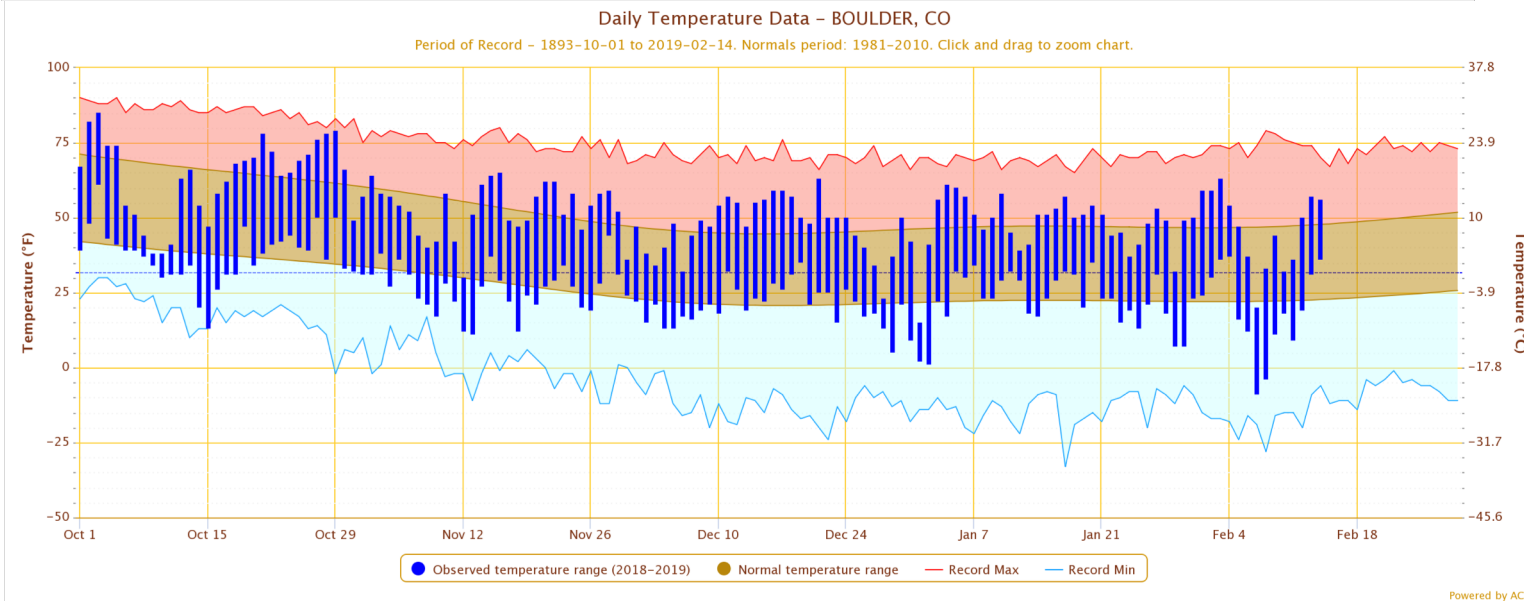
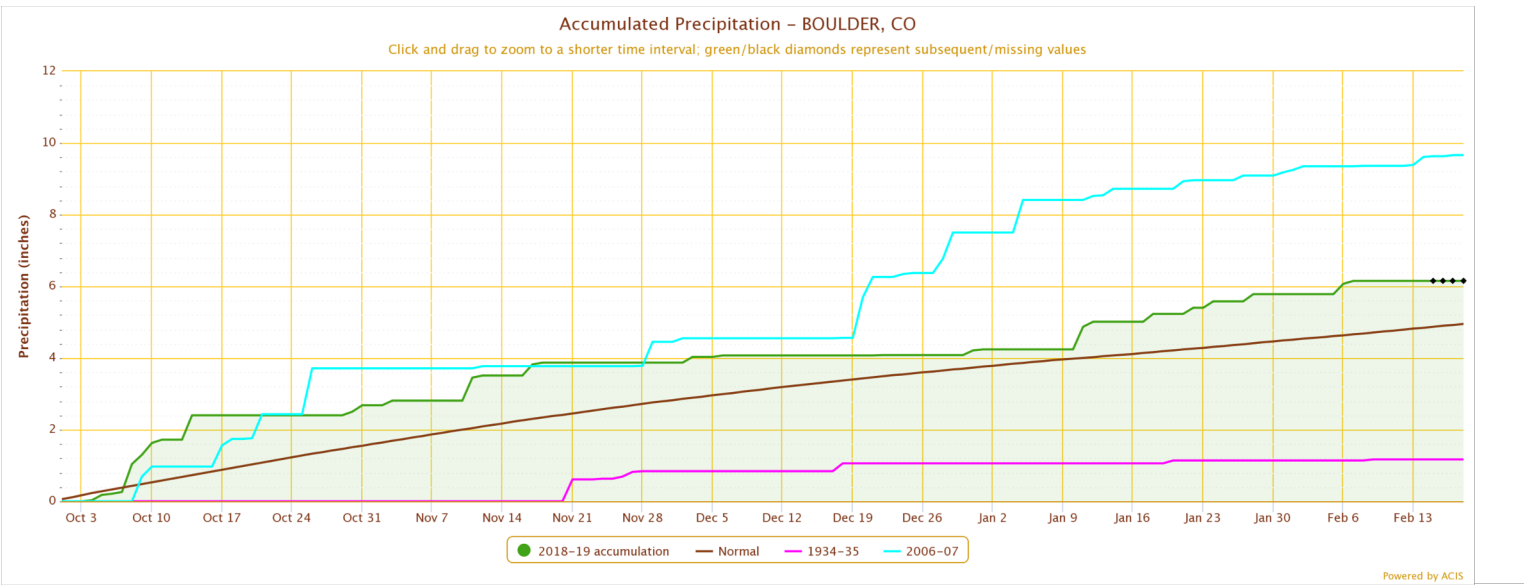
Period of Record – 1893-06-01 to 2019-02-18. Normals period: 1981-2010. Click and drag to zoom chart.



Powered by ACIS

COLORADO



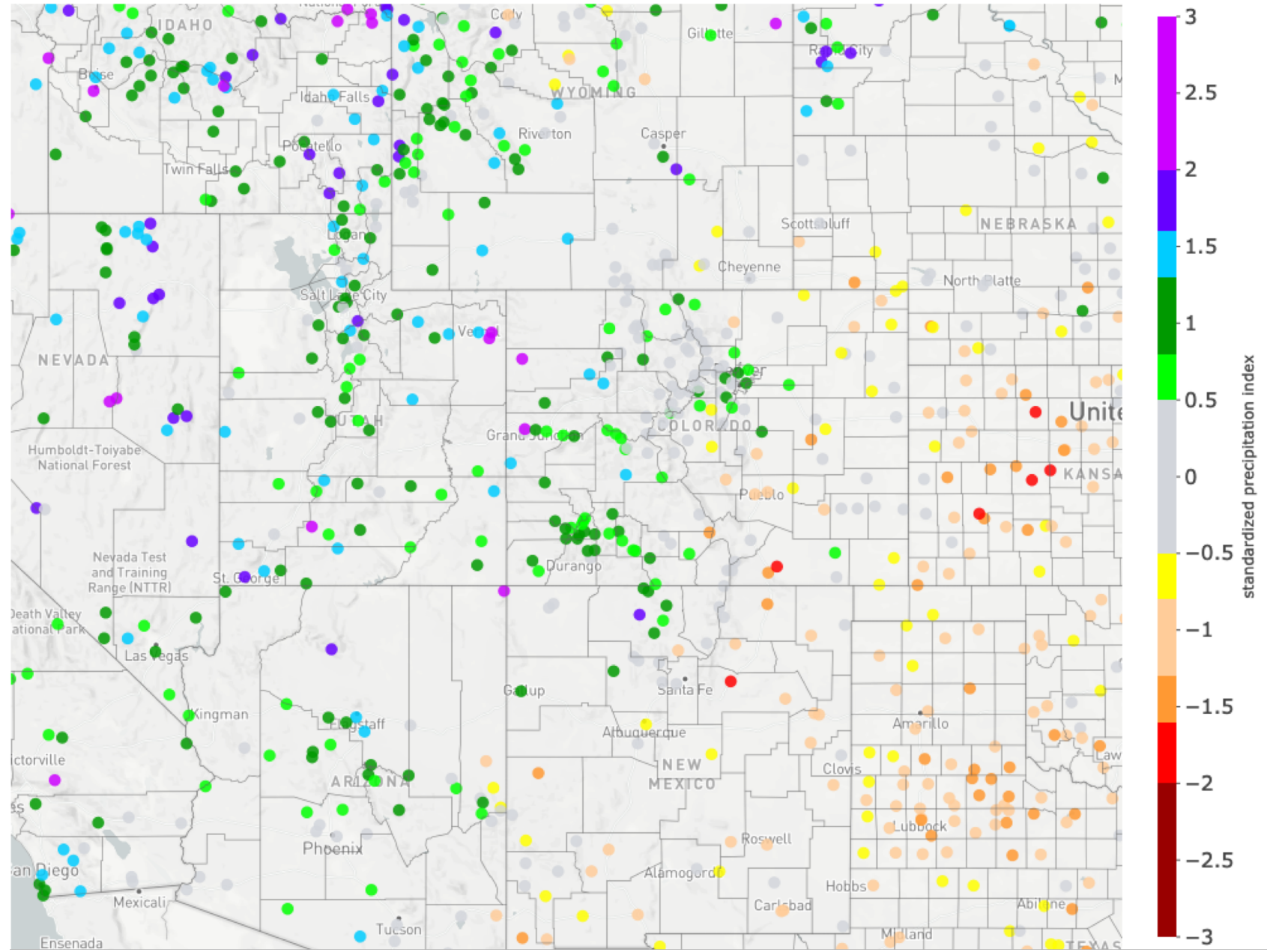




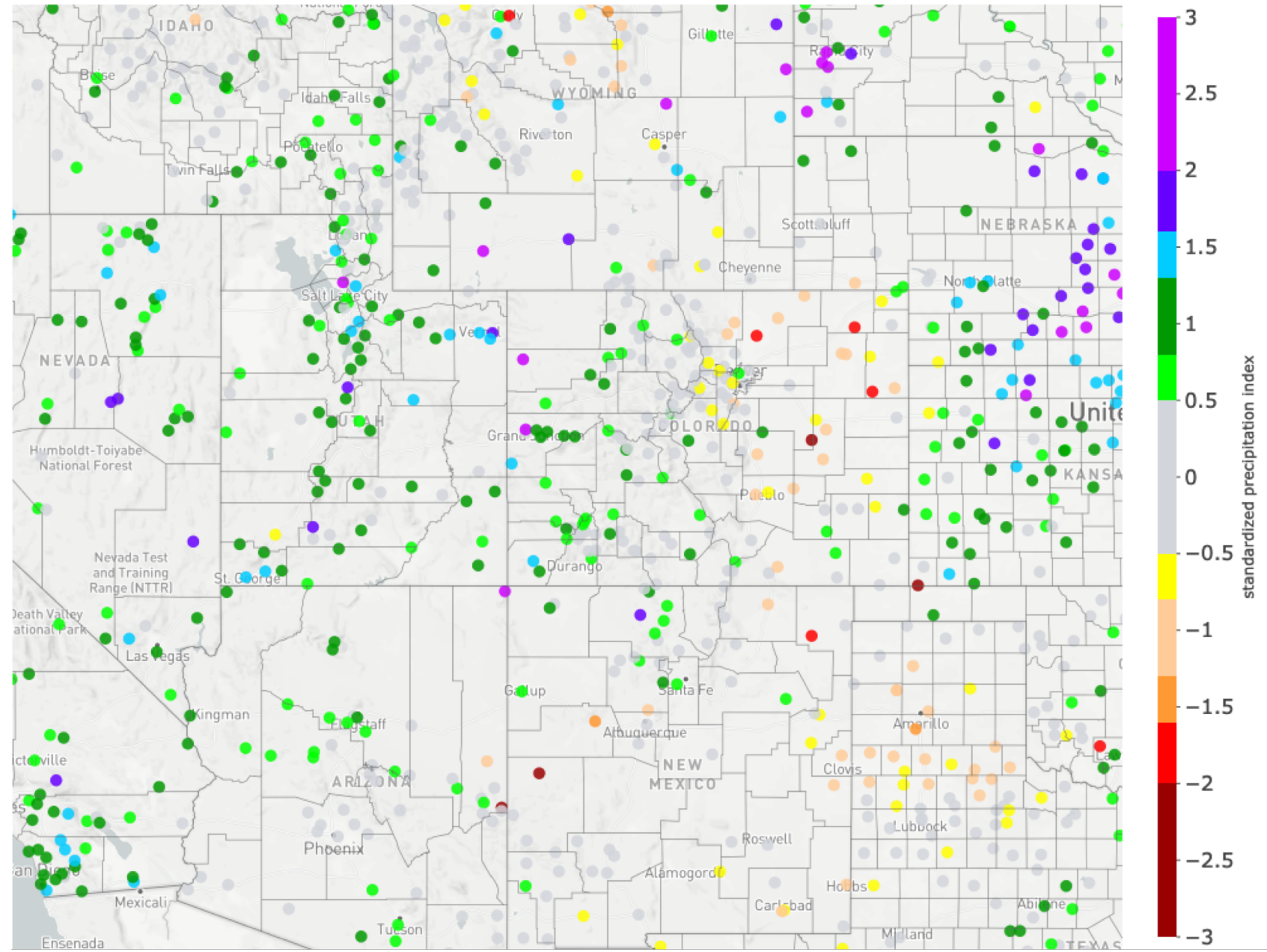
# Colorado Drought



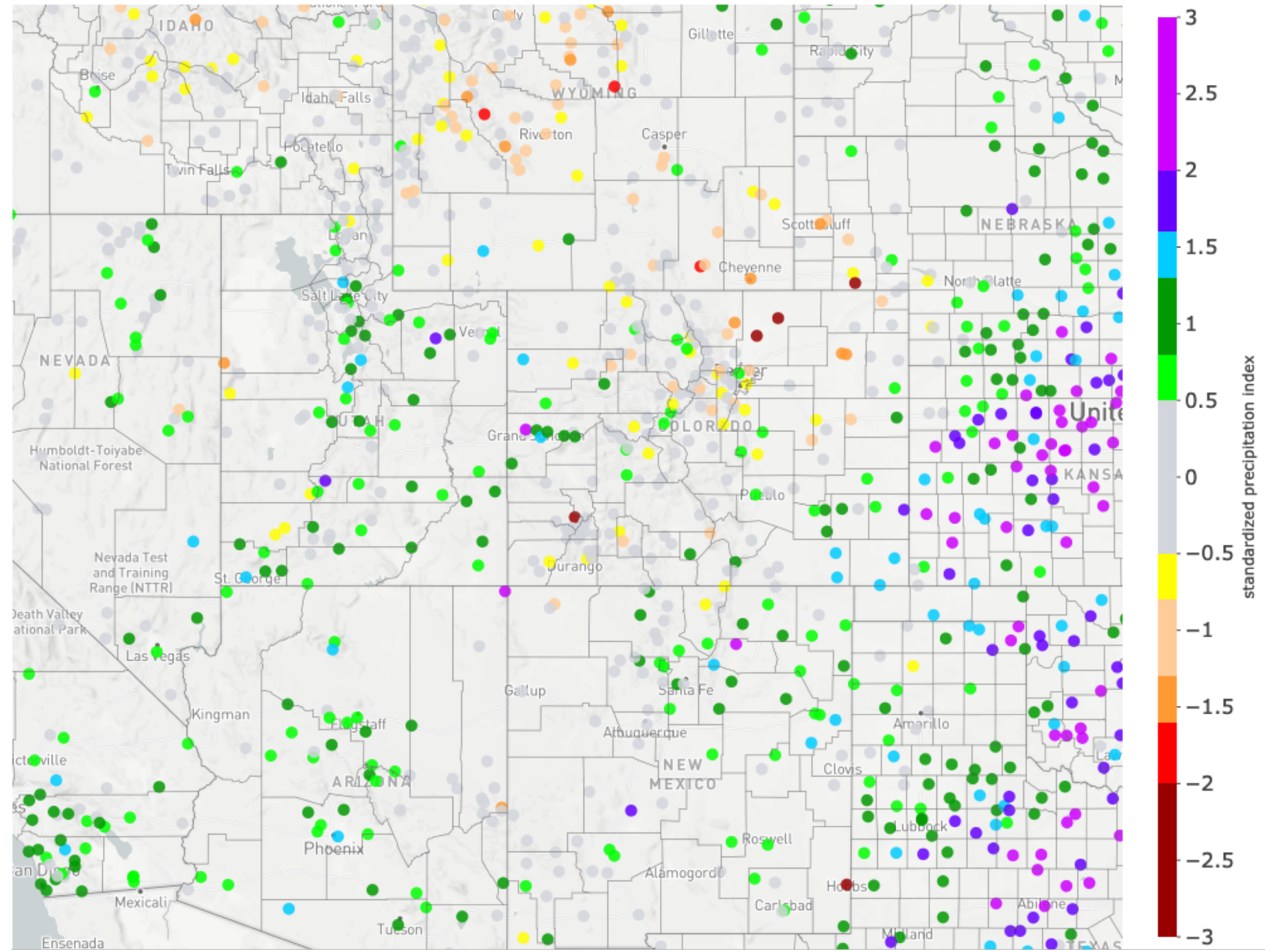
# 30-day Standardized Precipitation Index: 1/19/2019 - 2/17/2019



# 90-day Standardized Precipitation Index: 11/20/2018 - 2/17/2019

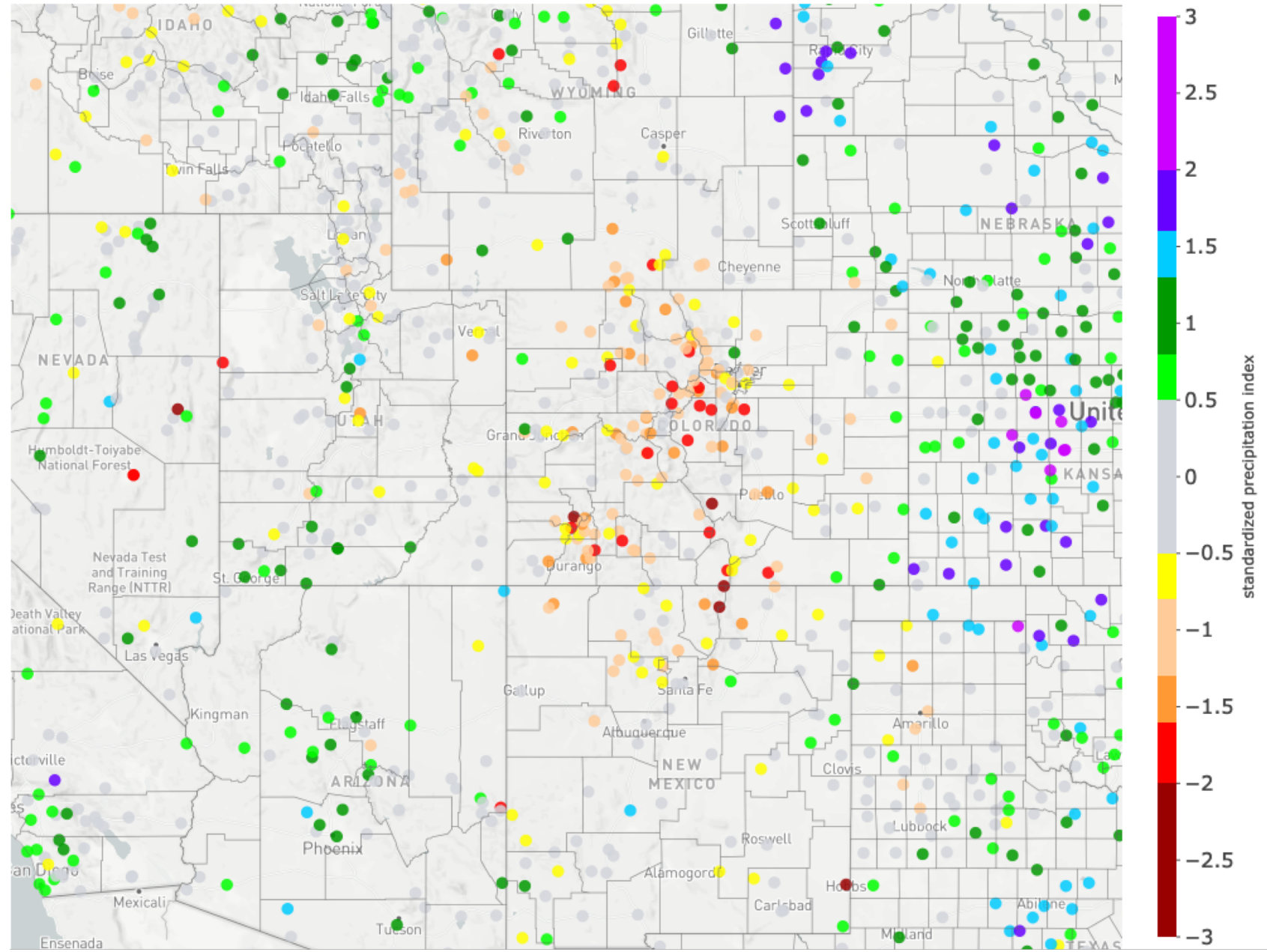


# 6-month Standardized Precipitation Index: 8/18/2018 - 2/17/2019



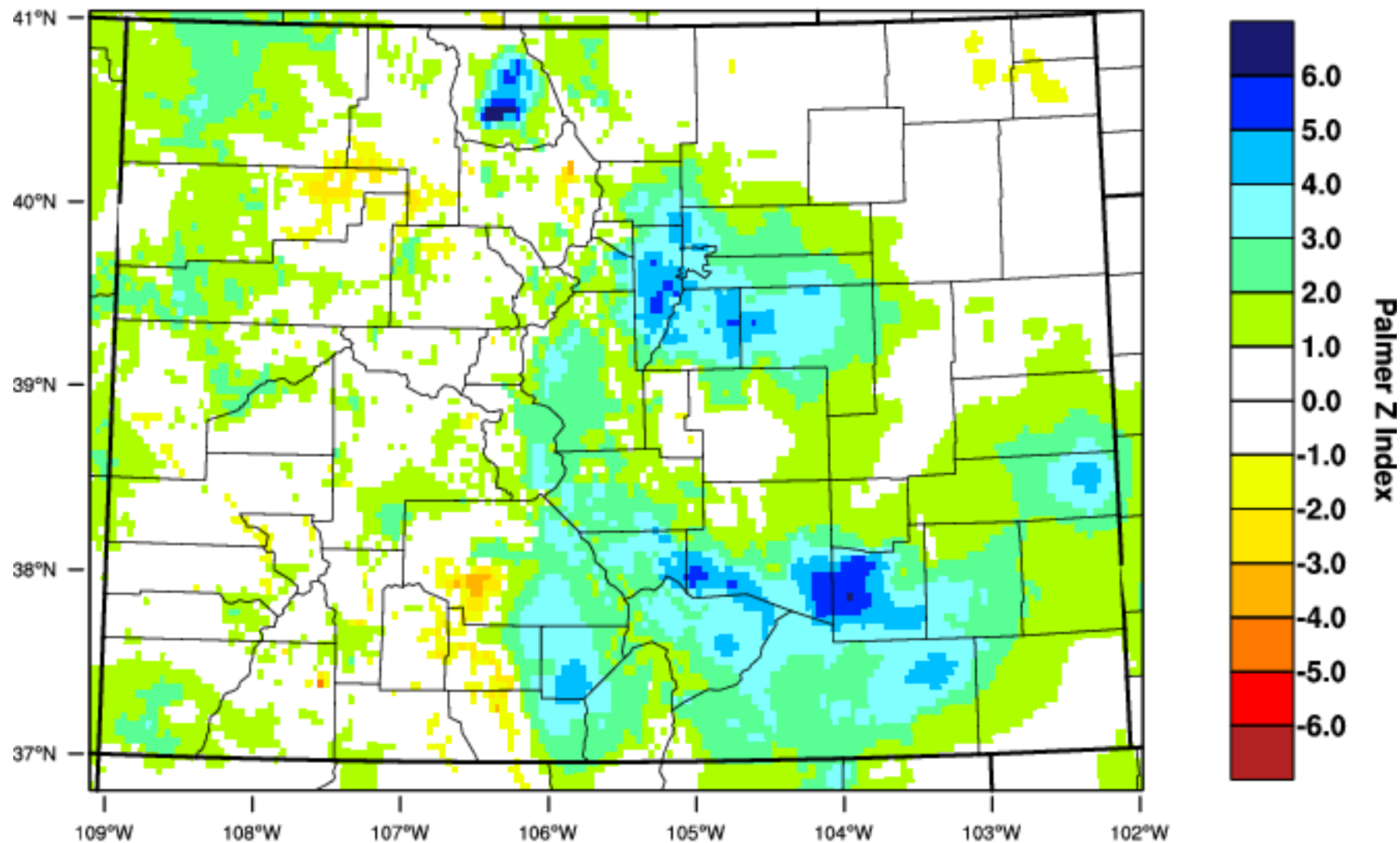


# 12-month Standardized Precipitation Index: 2/18/2018 - 2/17/2019



# Colorado - Palmer Z-Index

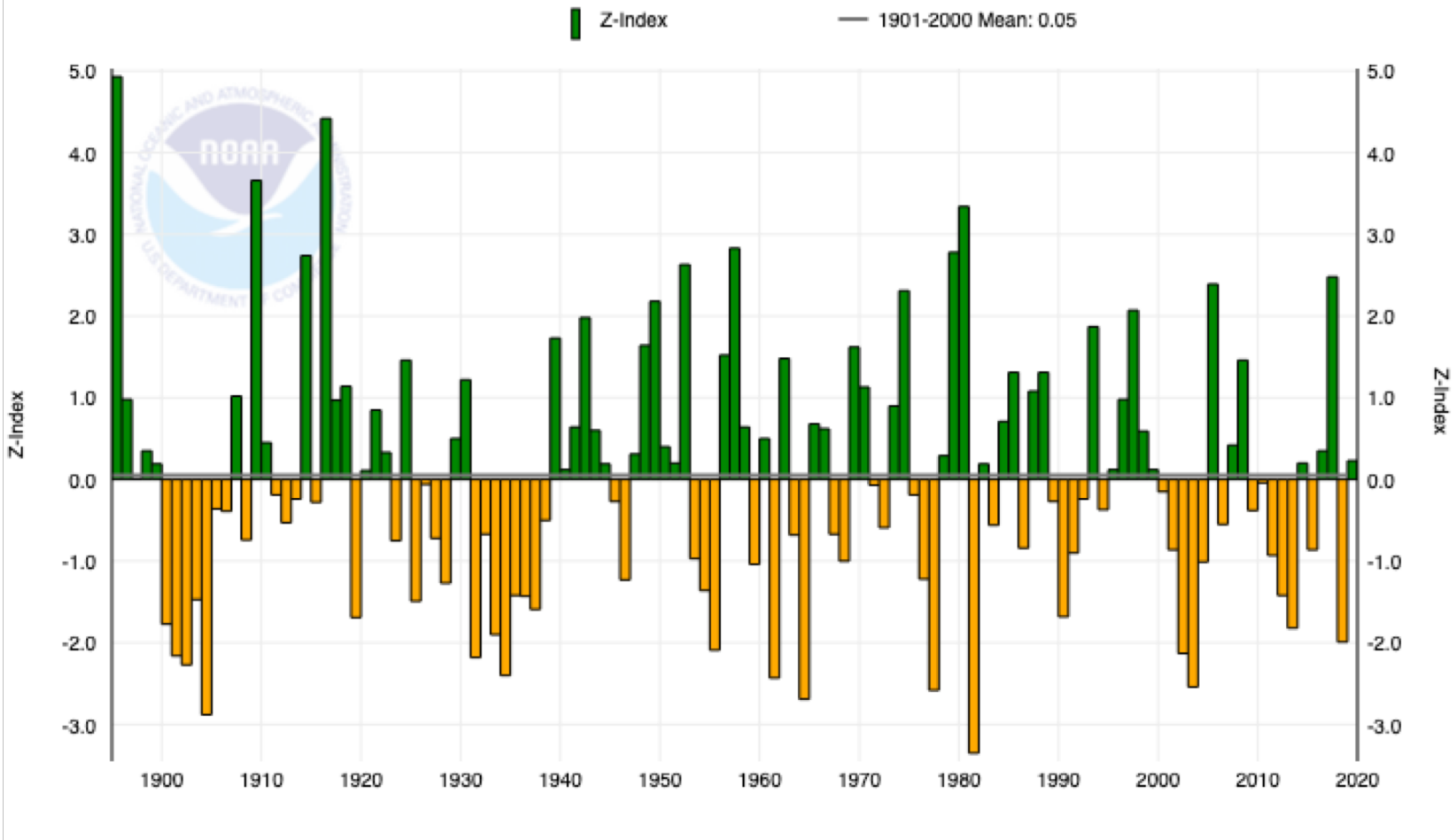
## January 2019



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 FEB 2019



# Colorado, Palmer Z-Index, January

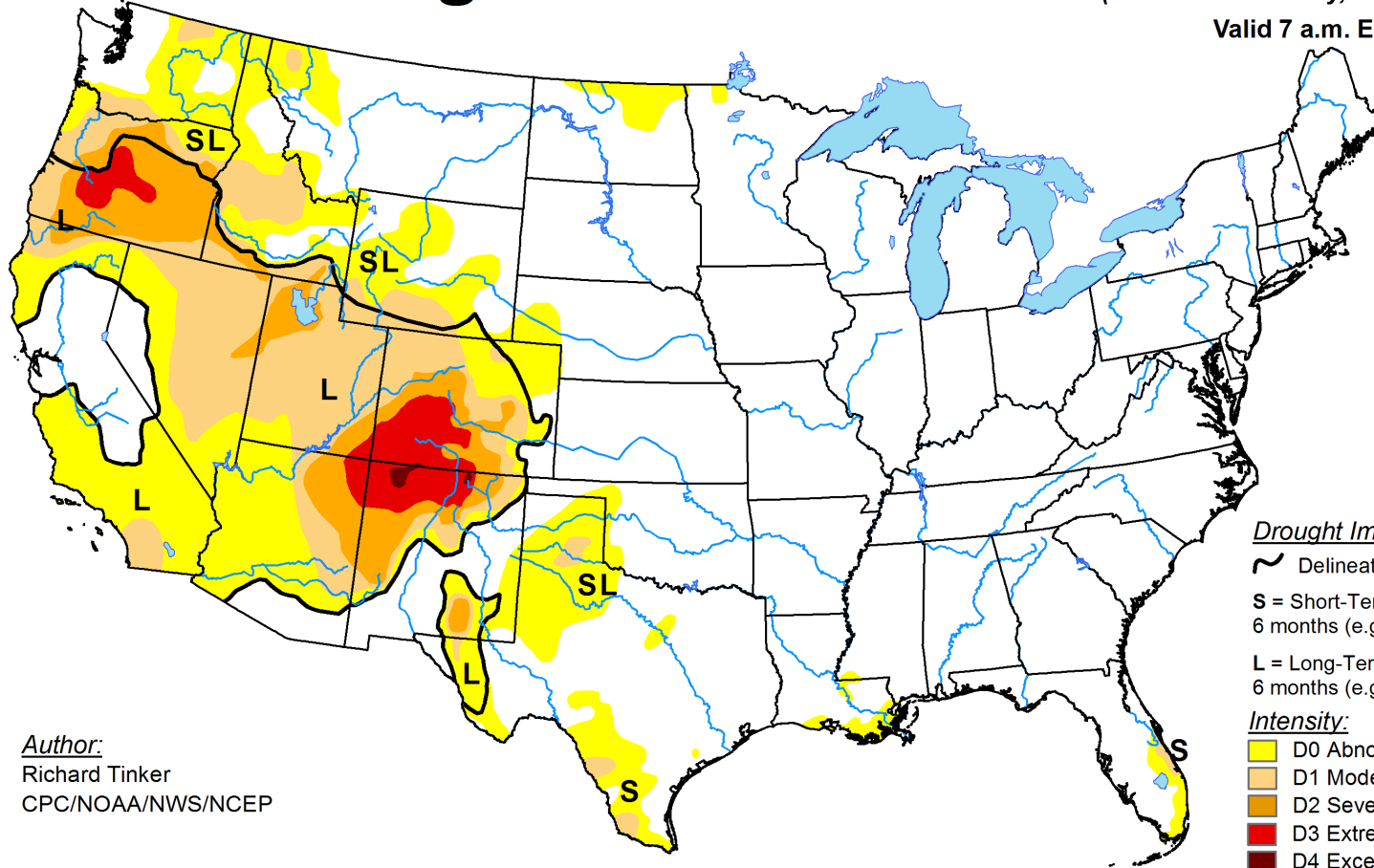


# U.S. Drought Monitor

February 12, 2019

(Released Thursday, Feb. 14, 2019)

Valid 7 a.m. EST



Author:  
Richard Tinker  
CPC/NOAA/NWS/NCEP

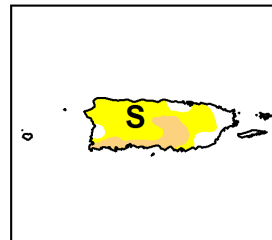
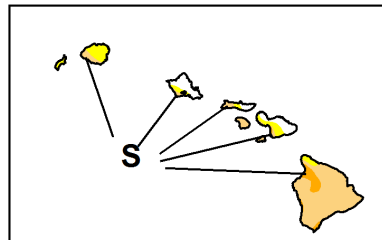
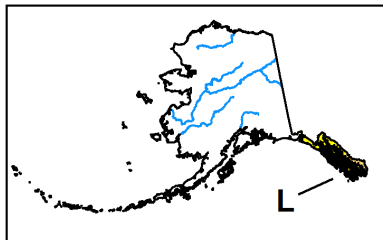
Drought Impact Types:

- ~ 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.



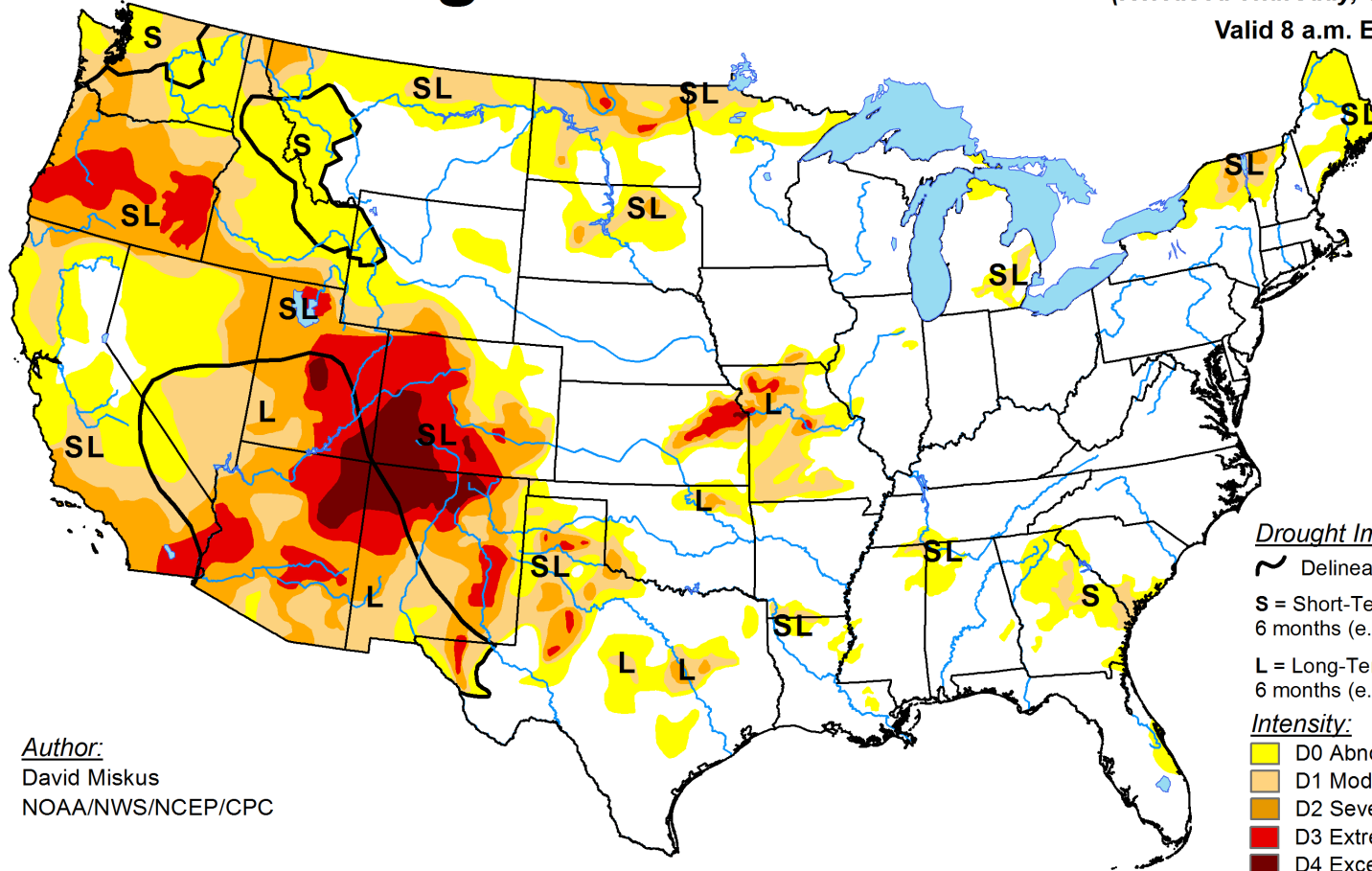
<http://droughtmonitor.unl.edu/>



# U.S. Drought Monitor

October 2, 2018  
(Released Thursday, Oct. 4, 2018)

Valid 8 a.m. EDT



*Author:*  
David Miskus  
NOAA/NWS/NCEP/CPC

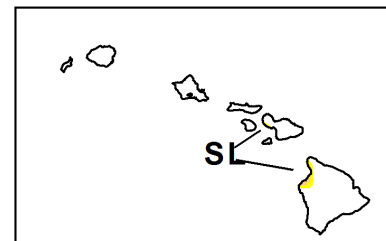
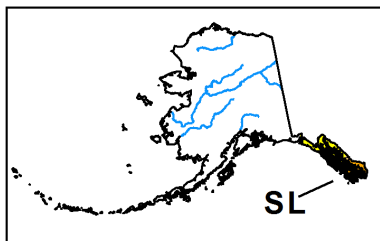
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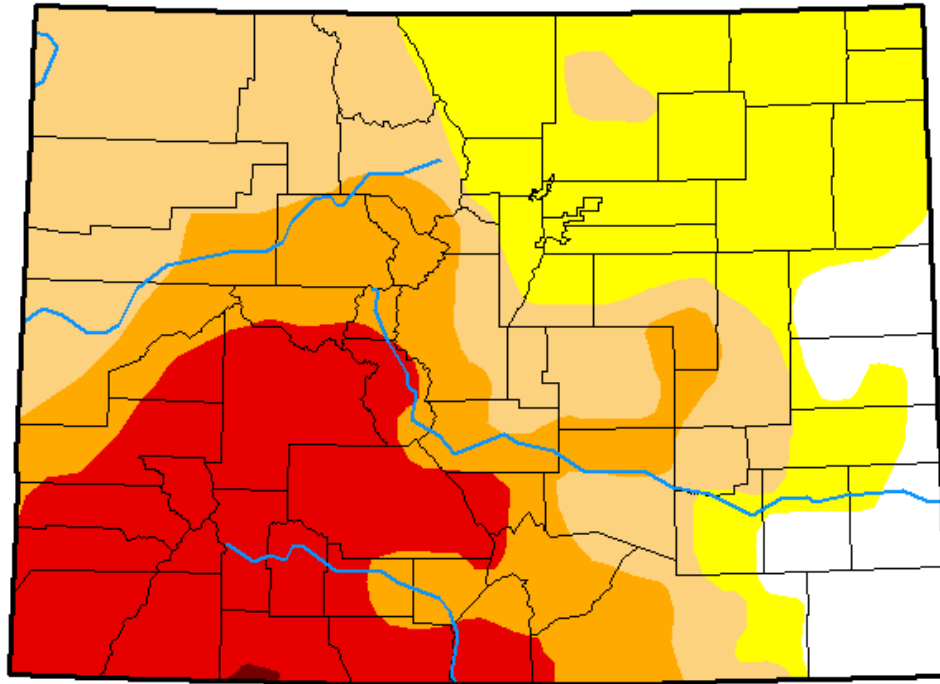


<http://droughtmonitor.unl.edu/>



# U.S. Drought Monitor Colorado

**February 12, 2019**  
(Released Thursday, Feb. 14, 2019)  
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	8.15	91.85	67.16	39.69	21.84	0.11
<b>Last Week</b> <i>02-05-2019</i>	8.14	91.86	67.16	40.83	22.05	2.96
<b>3 Months Ago</b> <i>11-13-2018</i>	16.64	83.36	66.26	54.82	34.13	13.35
<b>Start of Calendar Year</b> <i>01-01-2019</i>	17.94	82.06	66.26	54.91	27.11	11.22
<b>Start of Water Year</b> <i>09-25-2018</i>	14.19	85.81	72.30	64.41	48.47	16.21
<b>One Year Ago</b> <i>02-13-2018</i>	8.59	91.41	71.18	33.51	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:

Richard Tinker  
CPC/NOAA/NWS/NCEP

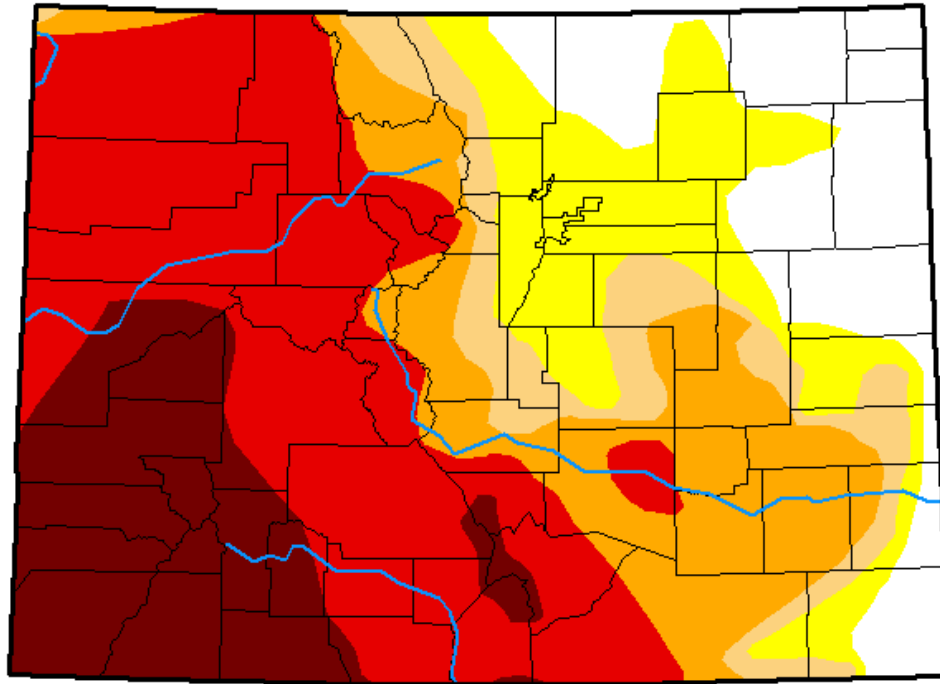


<http://droughtmonitor.unl.edu/>



# U.S. Drought Monitor Colorado

**October 2, 2018**  
(Released Thursday, Oct. 4, 2018)  
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	14.19	85.81	72.30	64.41	48.47	16.21
<b>Last Week</b> <i>09-25-2018</i>	14.19	85.81	72.30	64.41	48.47	16.21
<b>3 Months Ago</b> <i>07-03-2018</i>	20.46	79.54	67.30	52.31	36.46	8.81
<b>Start of Calendar Year</b> <i>01-02-2018</i>	6.57	93.43	33.53	7.27	0.00	0.00
<b>Start of Water Year</b> <i>09-25-2018</i>	14.19	85.81	72.30	64.41	48.47	16.21
<b>One Year Ago</b> <i>10-03-2017</i>	70.54	29.46	3.70	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:

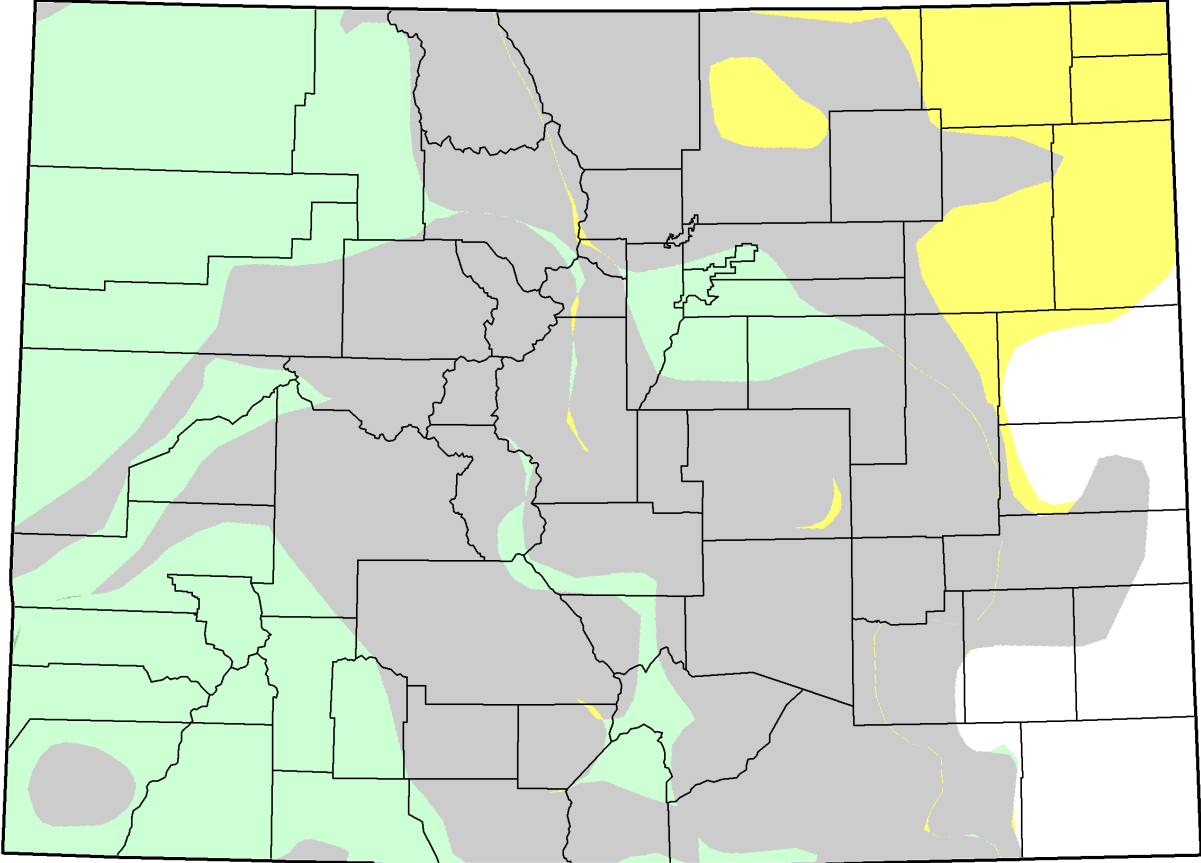
David Miskus  
NOAA/NWS/NCEP/CPC



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



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



February 12, 2019  
compared to  
January 15, 2019

<http://droughtmonitor.unl.edu>

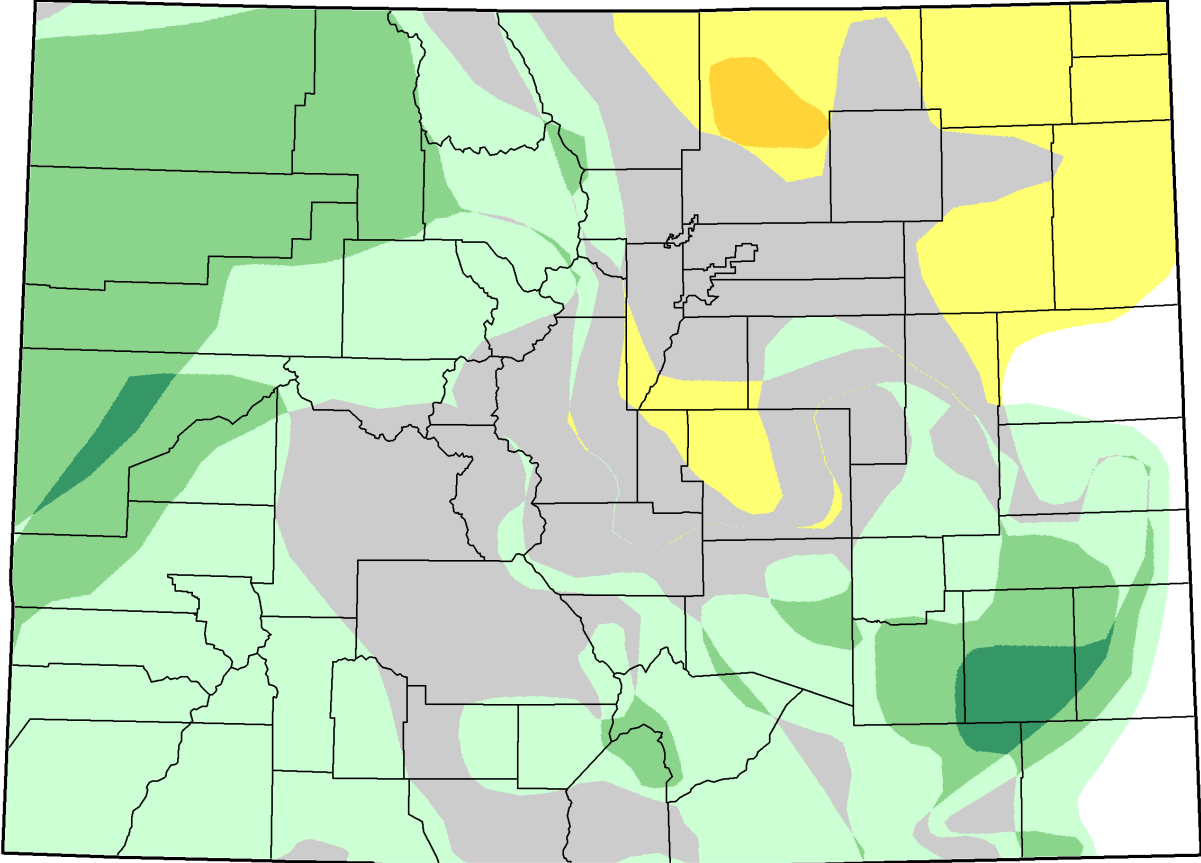


- 5 Class Degradation
- 4 Class Degradation
- 3 Class Degradation
- 2 Class Degradation
- 1 Class Degradation
- No Change
- 1 Class Improvement
- 2 Class Improvement
- 3 Class Improvement
- 4 Class Improvement
- 5 Class Improvement





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



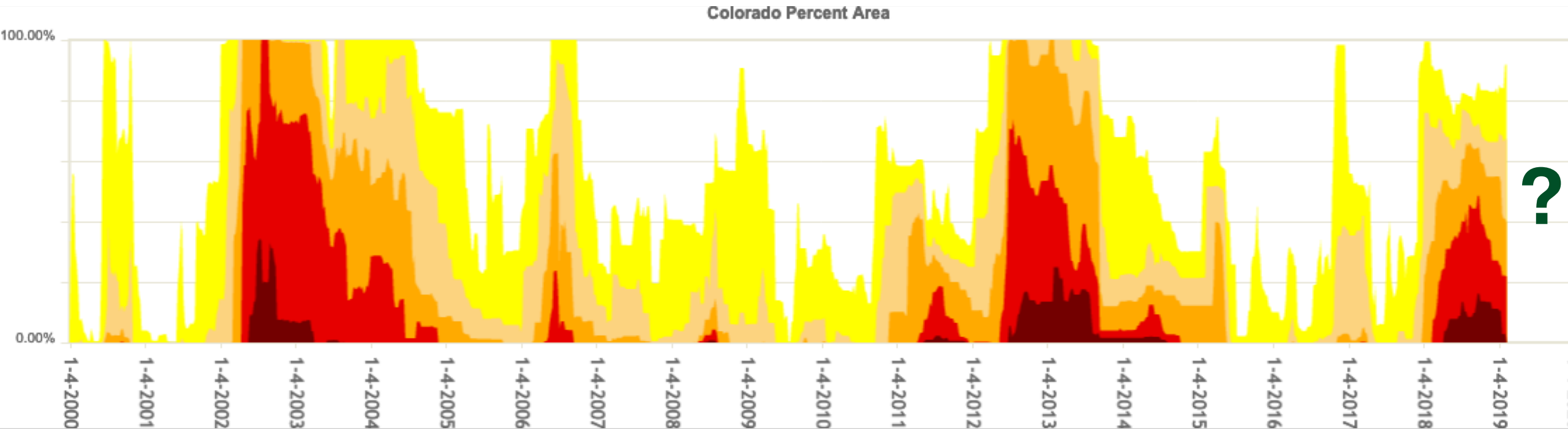
- 5 Class Degradation
- 4 Class Degradation
- 3 Class Degradation
- 2 Class Degradation
- 1 Class Degradation
- No Change
- 1 Class Improvement
- 2 Class Improvement
- 3 Class Improvement
- 4 Class Improvement
- 5 Class Improvement

February 12, 2019  
compared to  
September 25, 2018



<http://droughtmonitor.unl.edu>



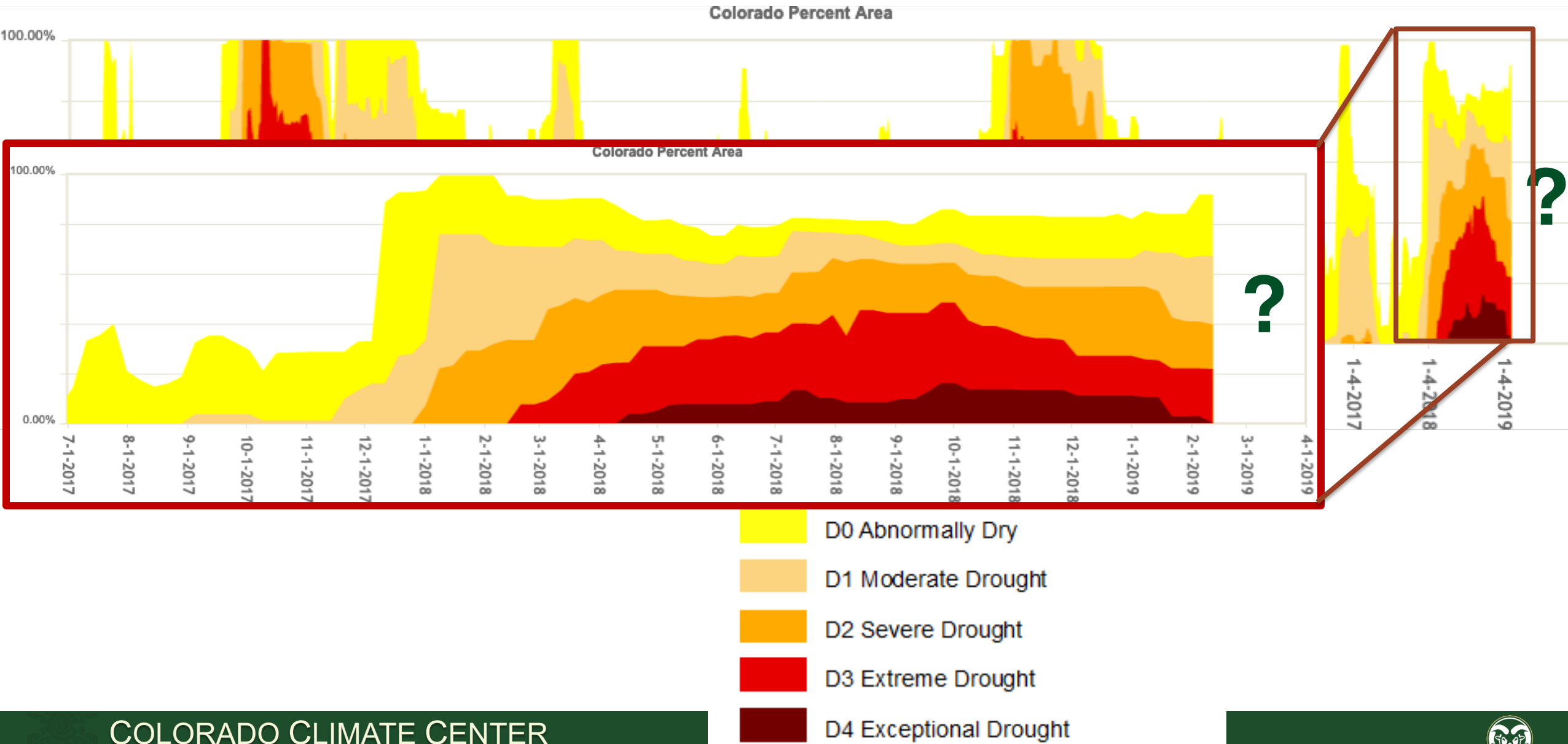
# US Drought Monitor: Colorado

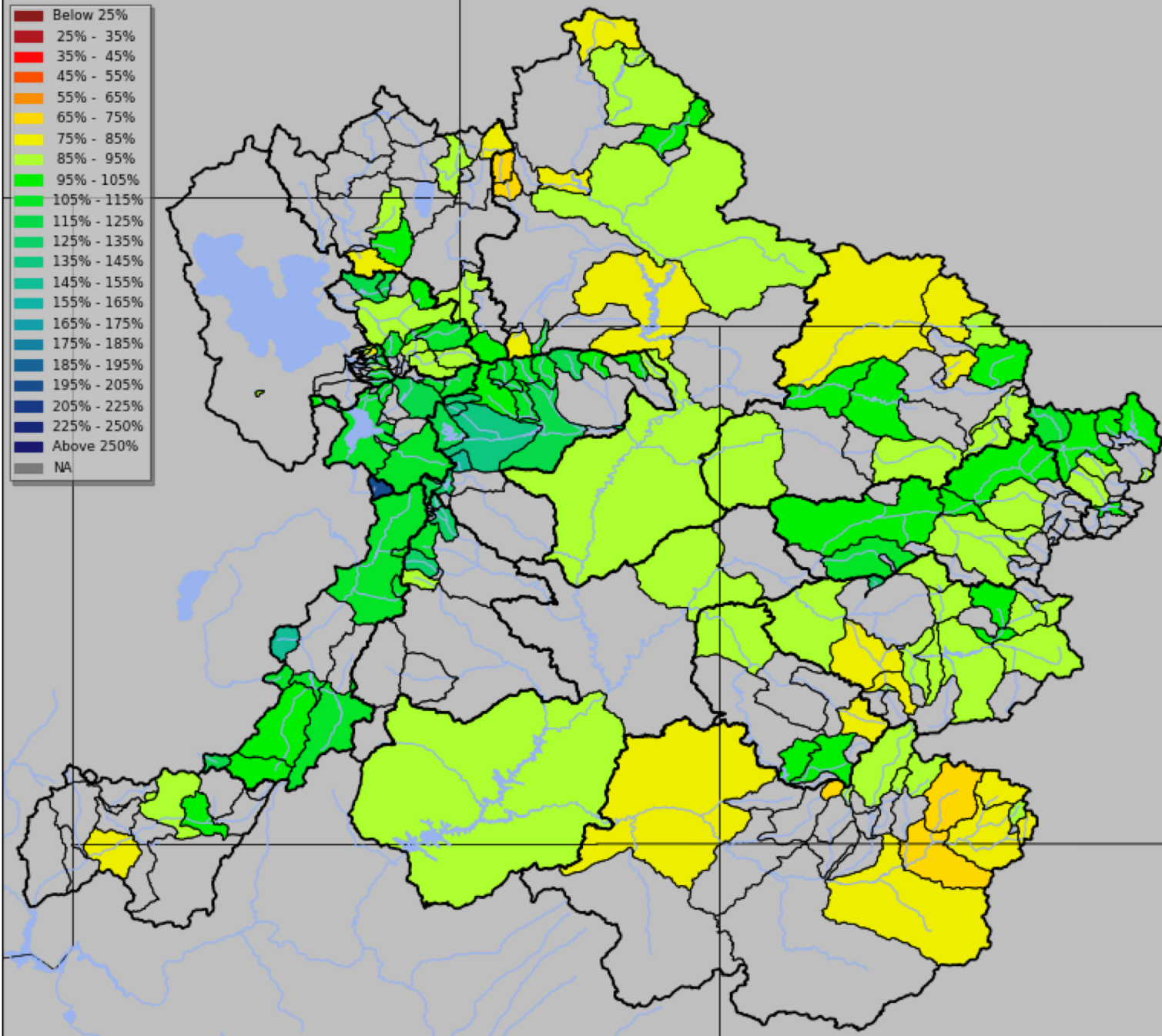


## Intensity:

-  D0 Abnormally Dry
-  D1 Moderate Drought
-  D2 Severe Drought
-  D3 Extreme Drought
-  D4 Exceptional Drought

# US Drought Monitor: Colorado





**CBRFC water supply forecast updated Feb 15**

**April-July water supply as % of average**

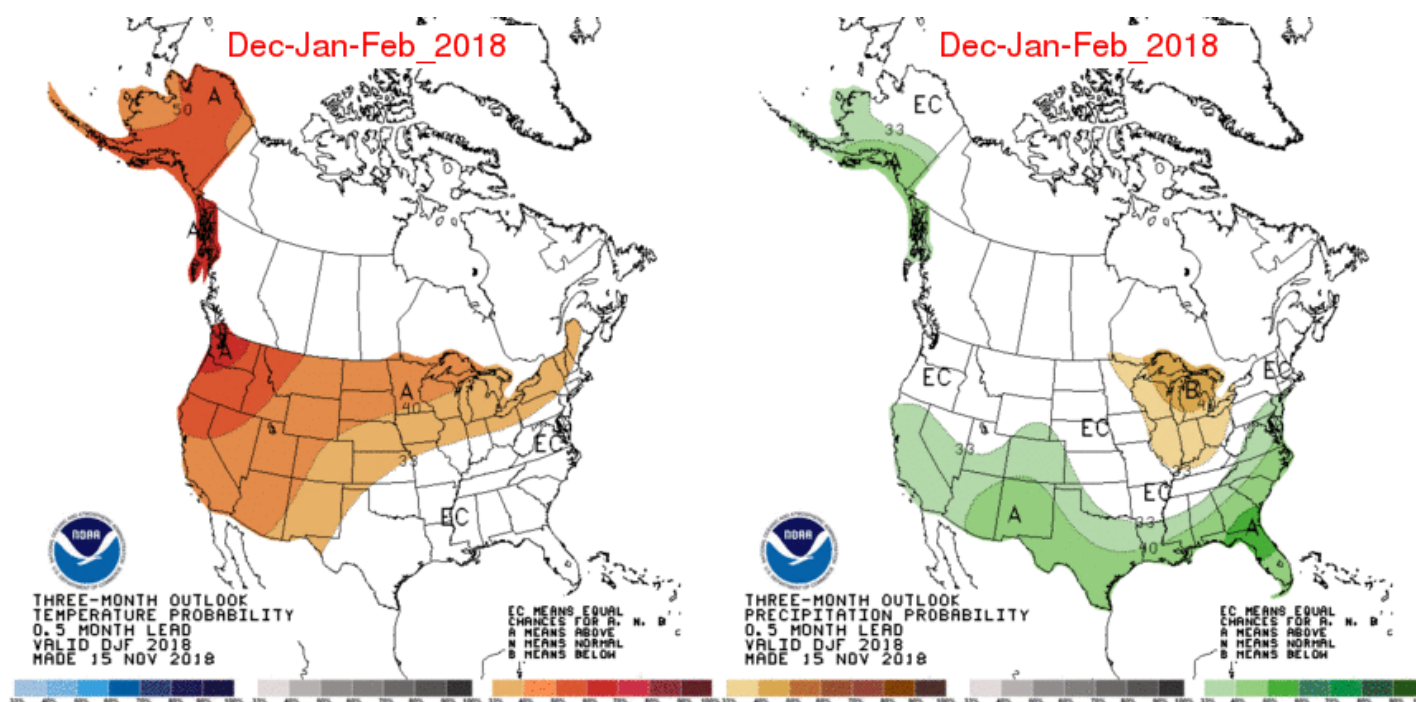
**Forecast inflow into Powell: 84% of average**



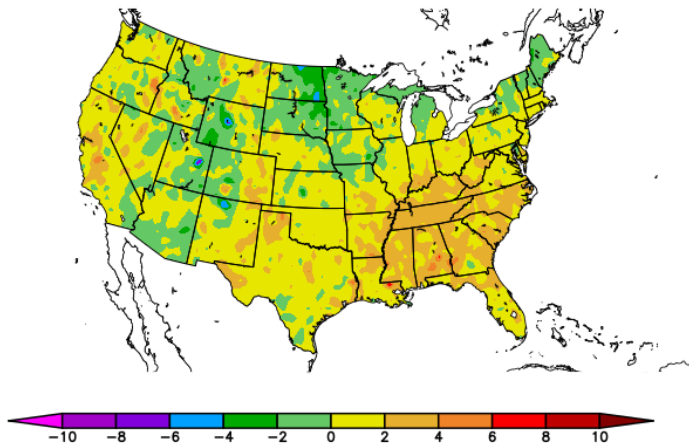
# Outlook



# Looking back...

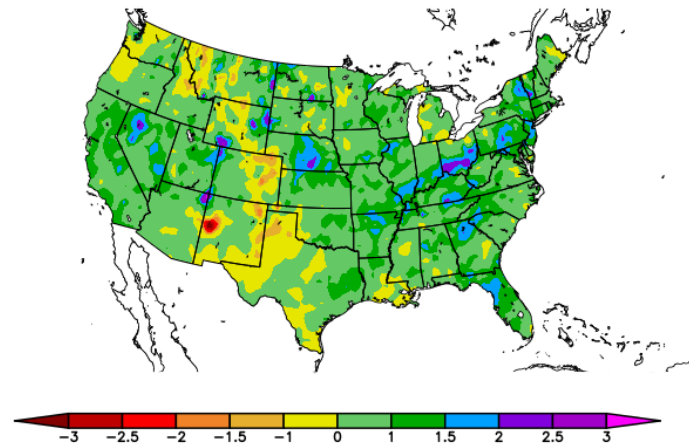


Departure from Normal Temperature (F)  
11/20/2018 - 2/17/2019



Generated 2/18/2019 at HPRCC using provisional data.

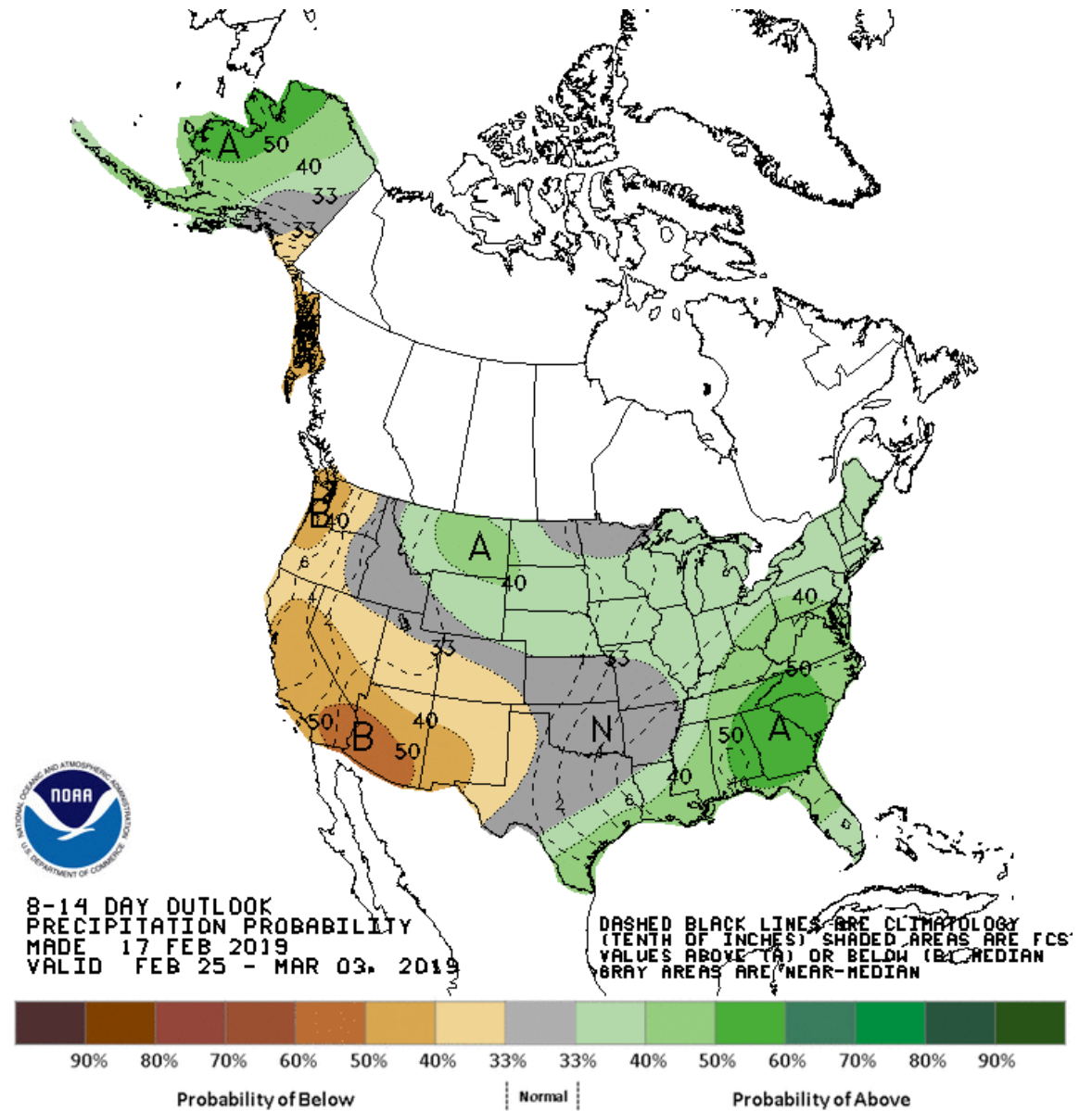
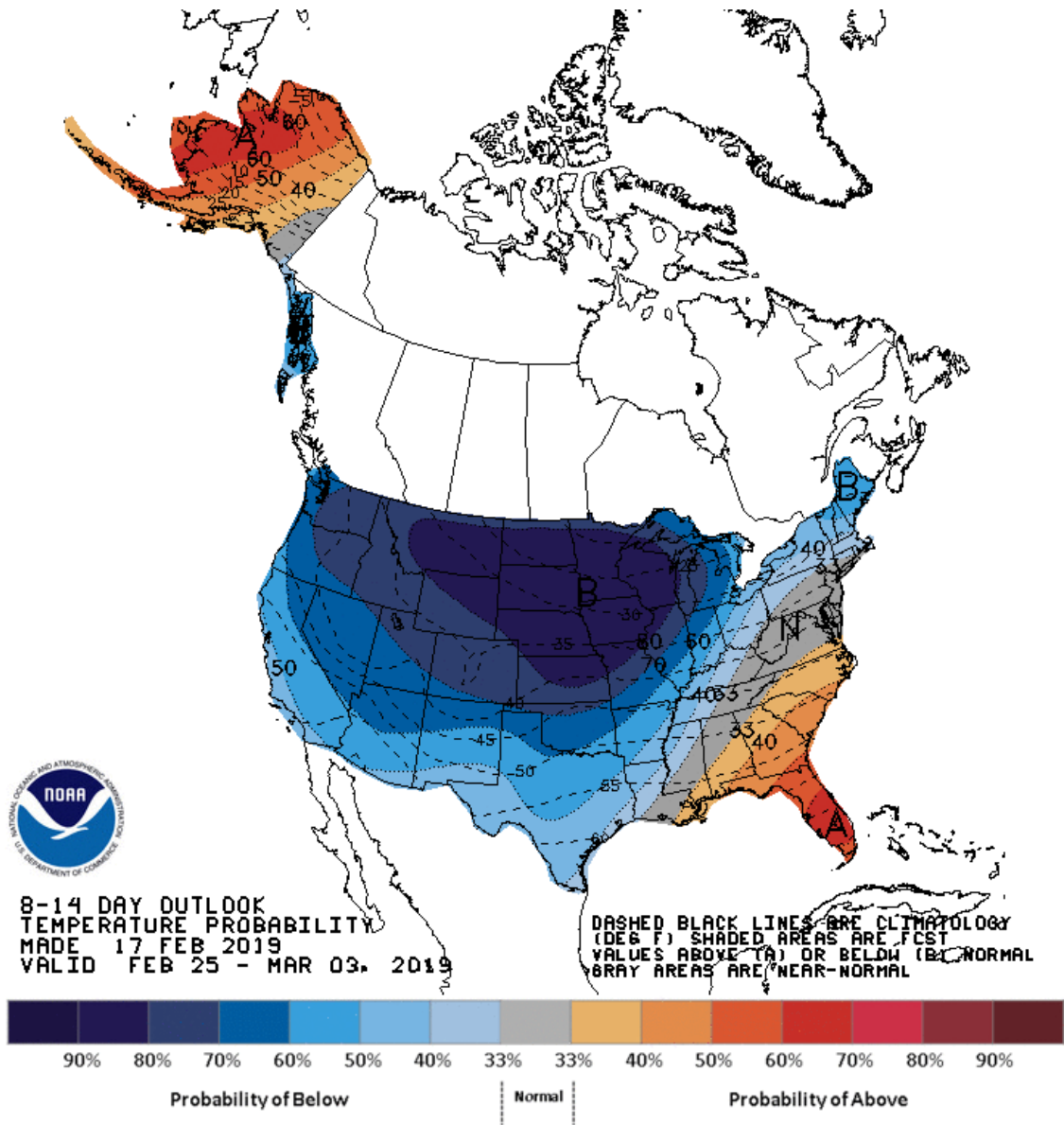
90 Day SPI  
11/19/2018 - 2/16/2019



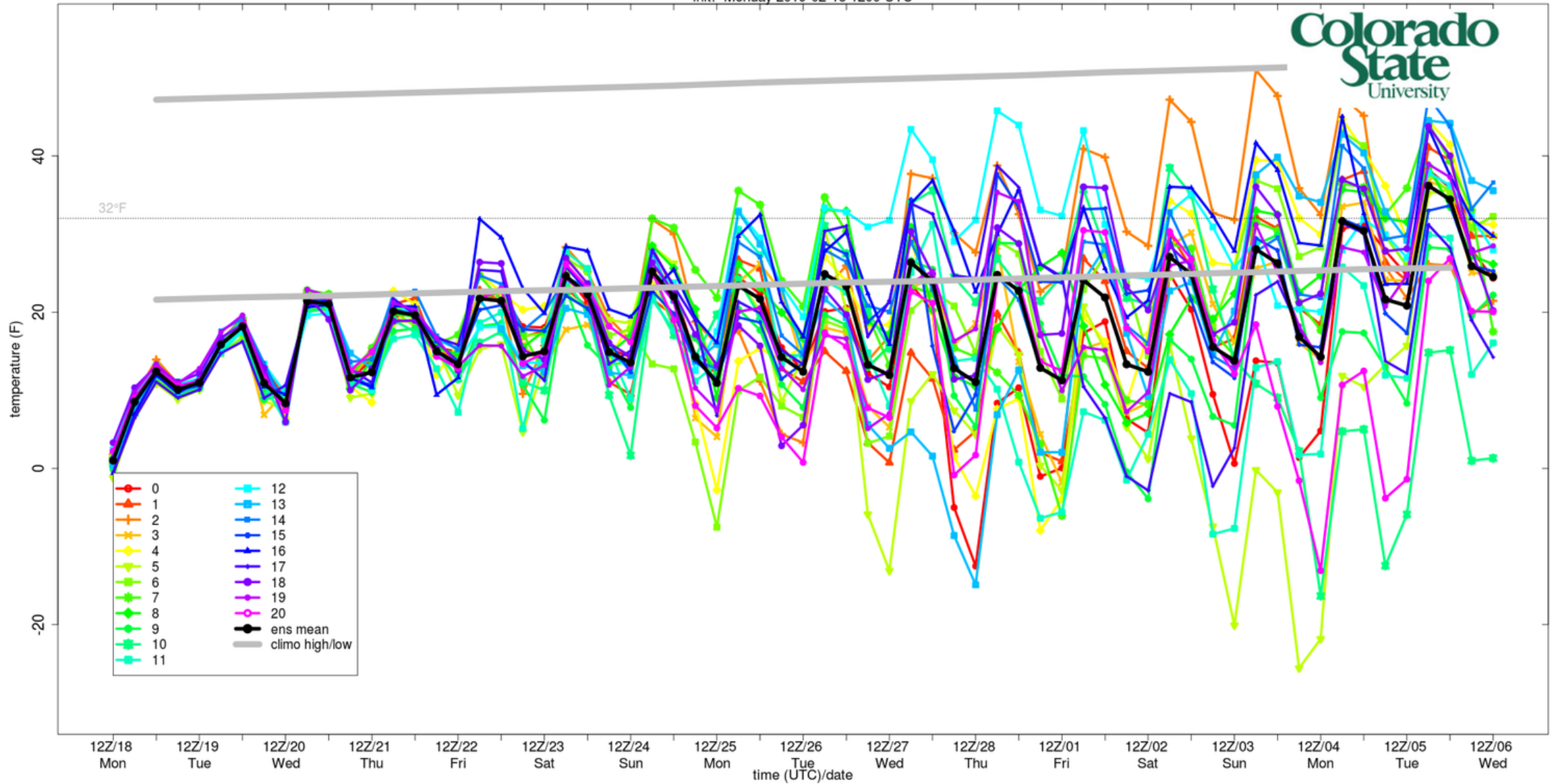
NOAA Regional Climate Center Generated 2/17/2019 at HPRCC using provisional data.

NOAA Regional Climate Centers





NCEP GEFS 2-m temperature at Fort Collins  
init: Monday 2019-02-18 1200 UTC



(March 6)



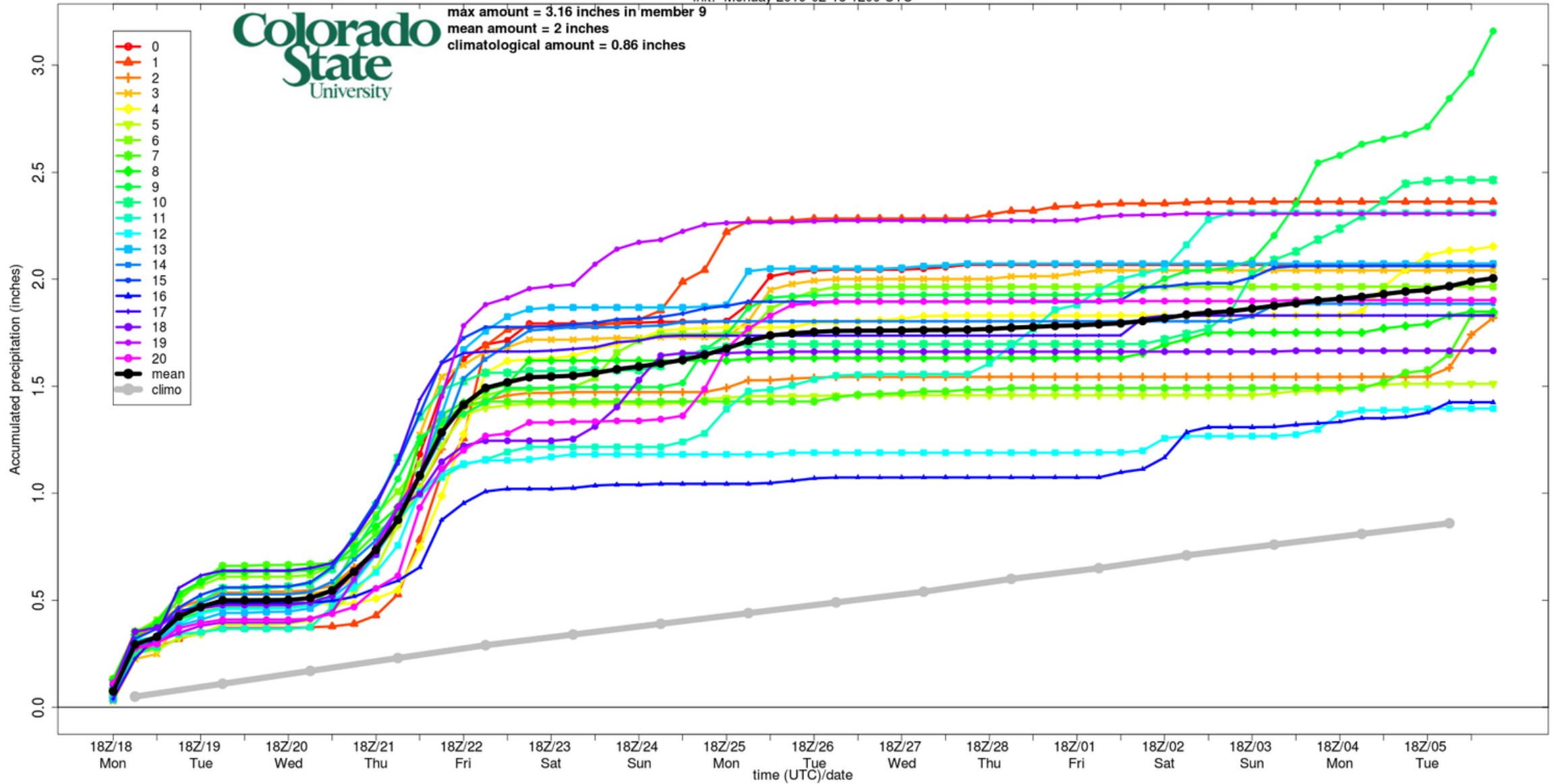


# NCEP GEFS accumulated precipitation at Durango

init: Monday 2019-02-18 1200 UTC



max amount = 3.16 inches in member 9  
mean amount = 2 inches  
climatological amount = 0.86 inches



(March 6)



# El Niño-Southern Oscillation (ENSO)

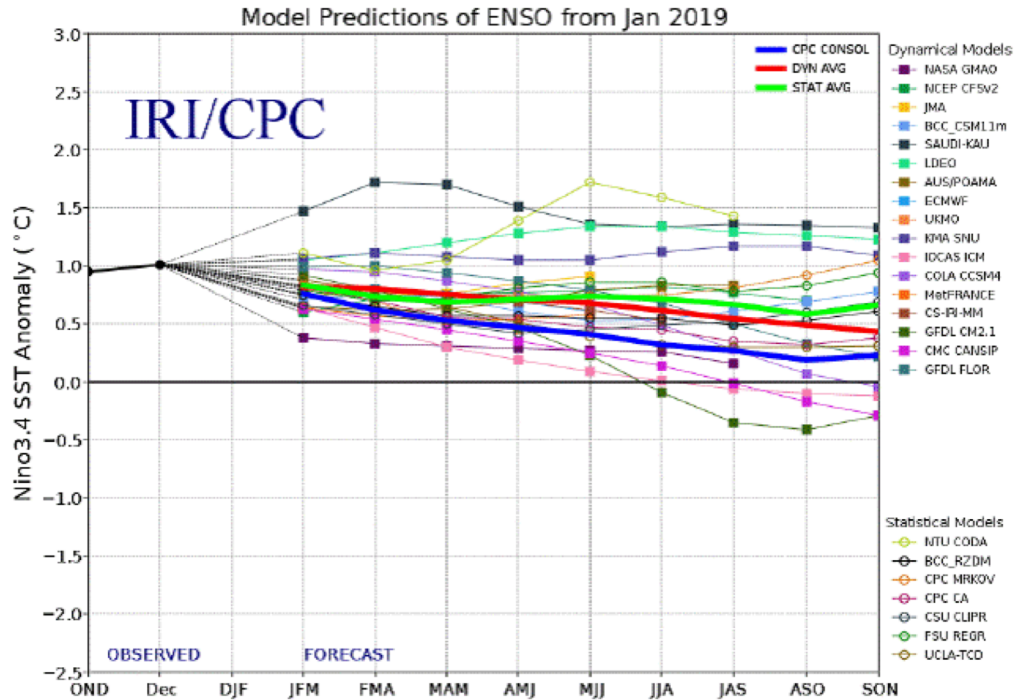
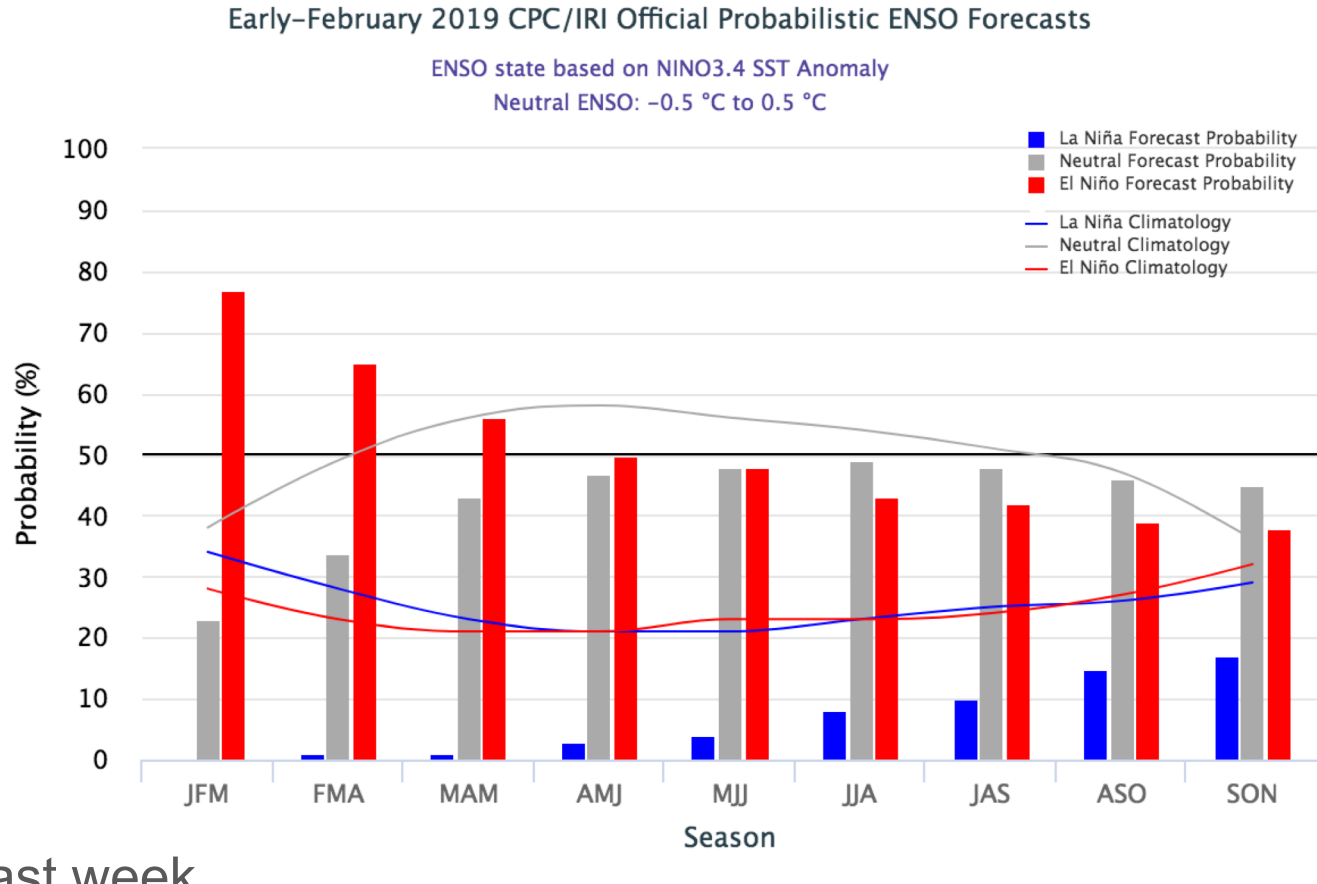


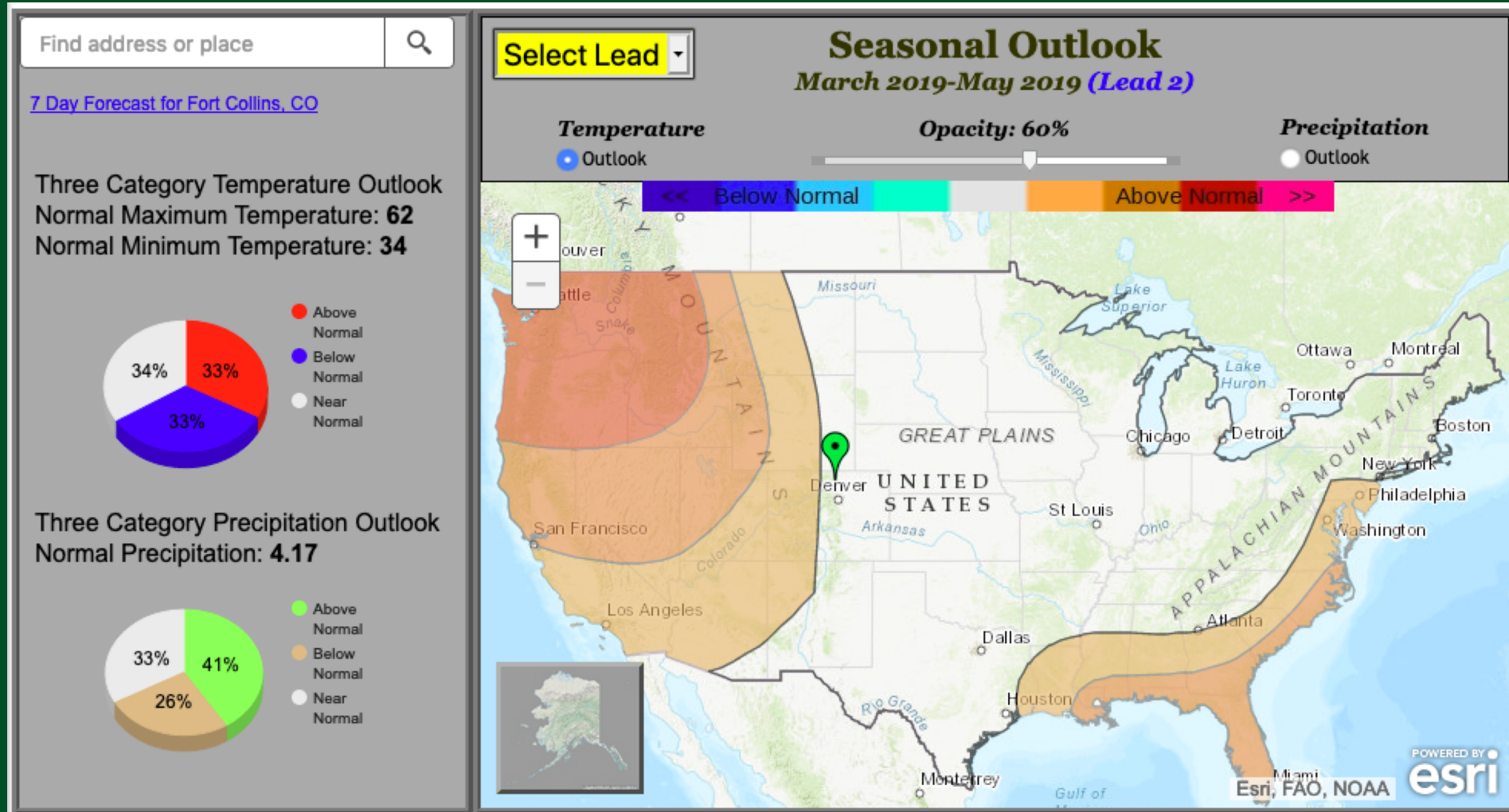
Figure 6. Forecasts of sea surface temperature (SST) anomalies for the Niño 3.4 region (5°N-5°S, 120°W-170°W). Figure updated 19 January 2019.



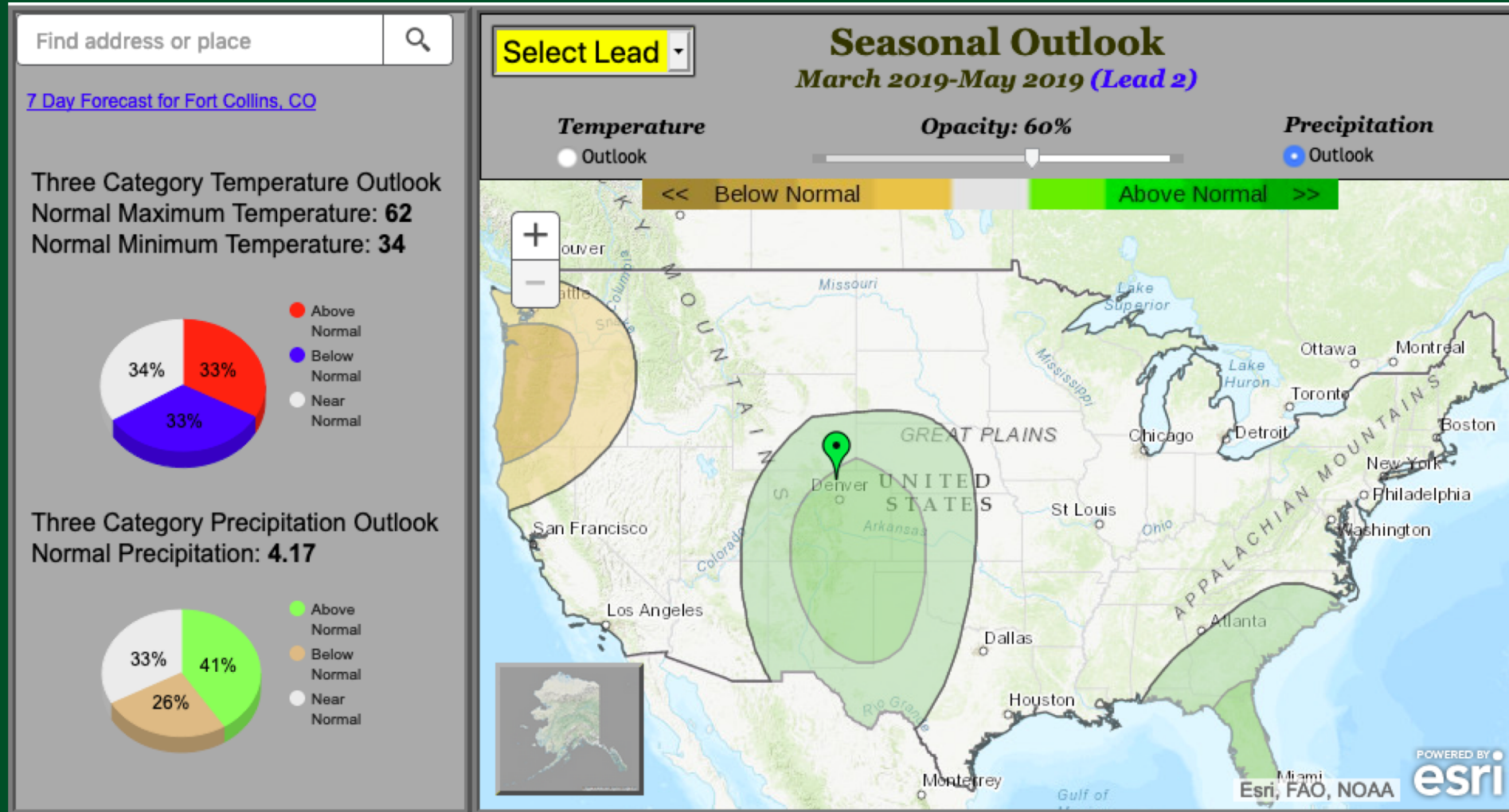
El Niño finally officially arrived last week  
 55% probability that it persists through May  
 Not expected to be strong or have very significant impacts



# Spring (March-April-May) outlook



# Spring (March-April-May) outlook



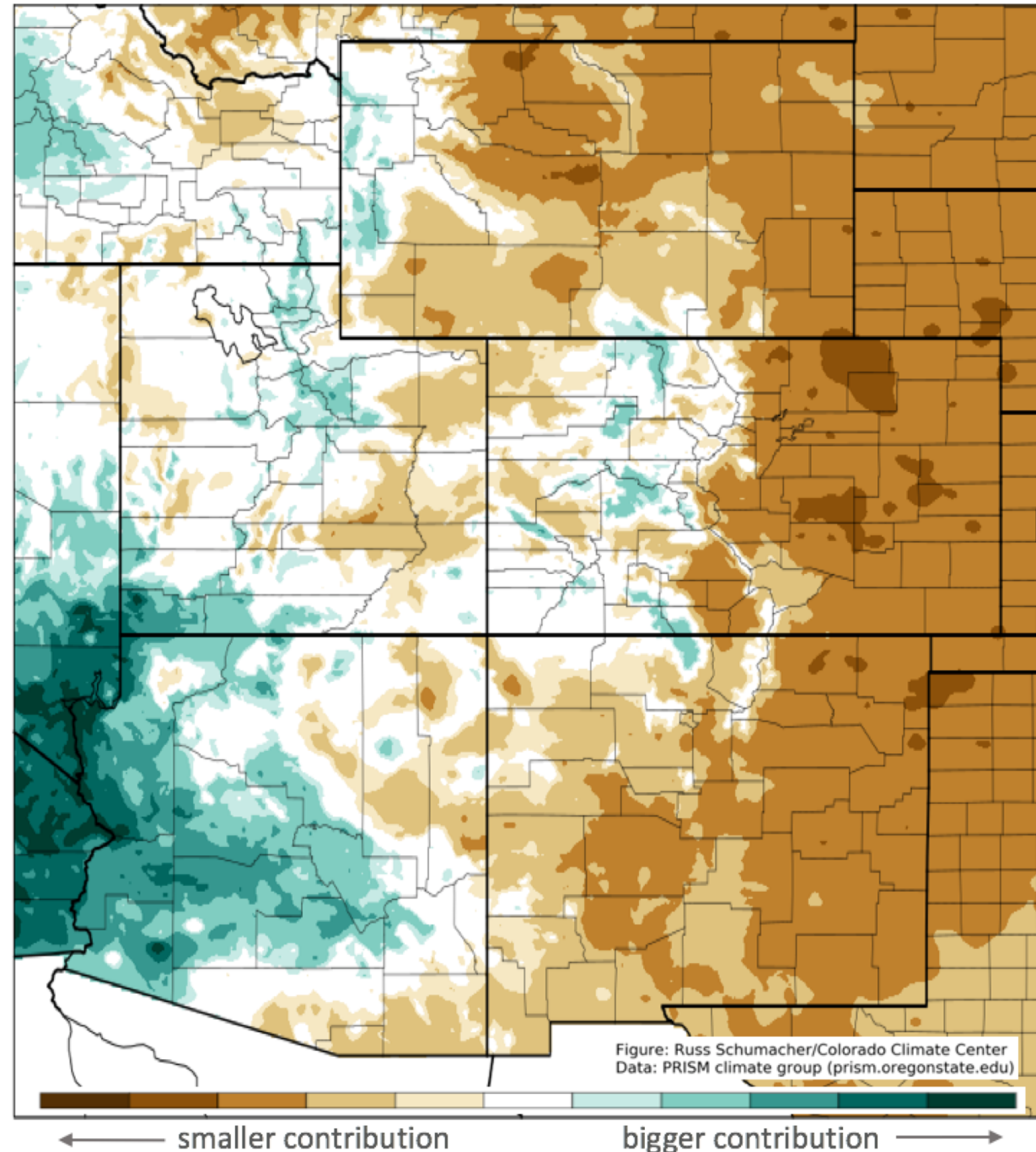
How important are the  
spring months to the total  
annual average  
precipitation?

February

Brown: much less than 1/12<sup>th</sup> of the annual precip  
Green: much more than 1/12<sup>th</sup> of the annual precip

COLORADO CLIMATE CENTER

February climatological contribution to annual average precipitation



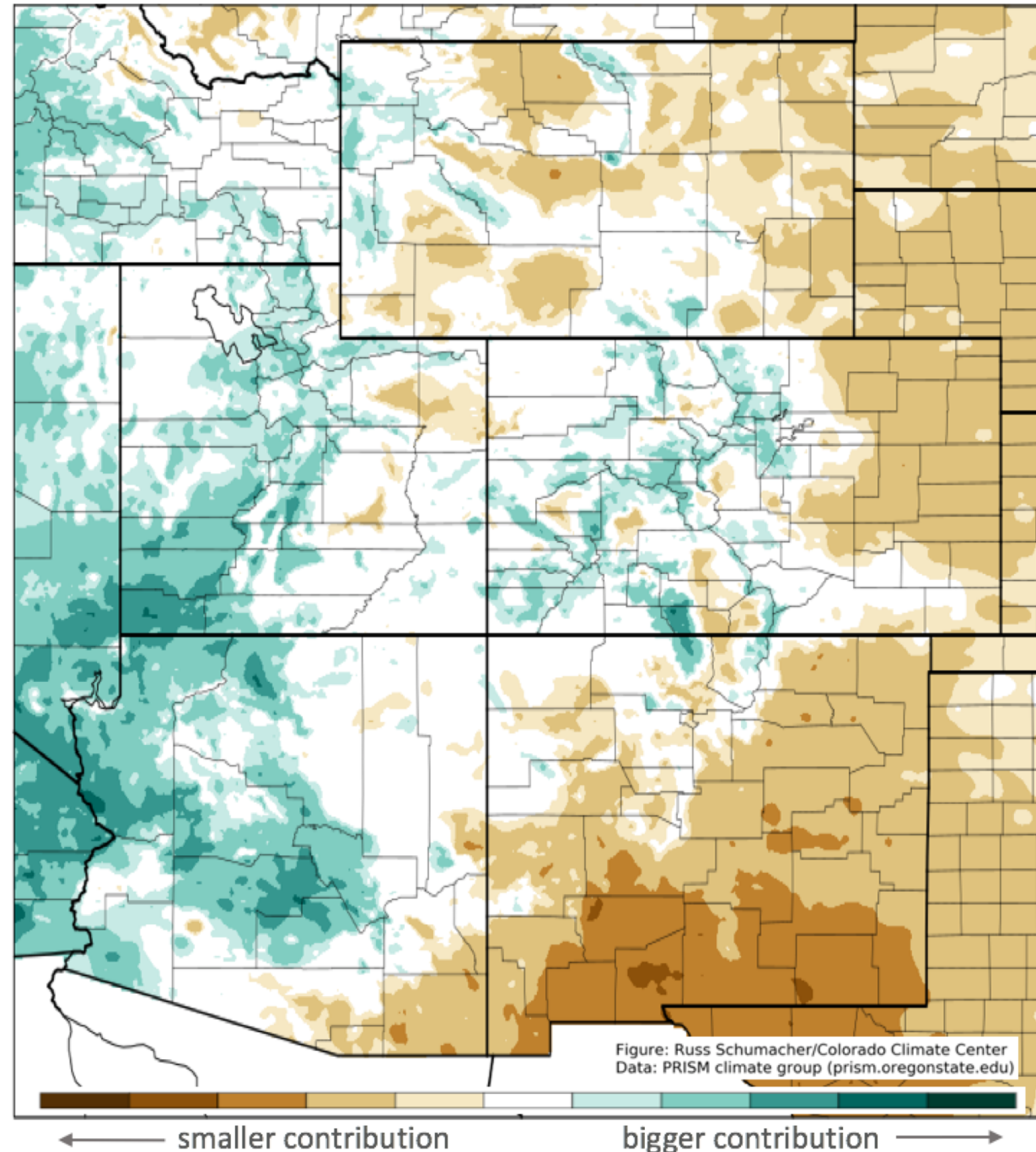
How important are the  
spring months to the total  
annual average  
precipitation?

March

Brown: much less than 1/12<sup>th</sup> of the annual precip  
Green: much more than 1/12<sup>th</sup> of the annual precip

COLORADO CLIMATE CENTER

March climatological contribution to annual average precipitation



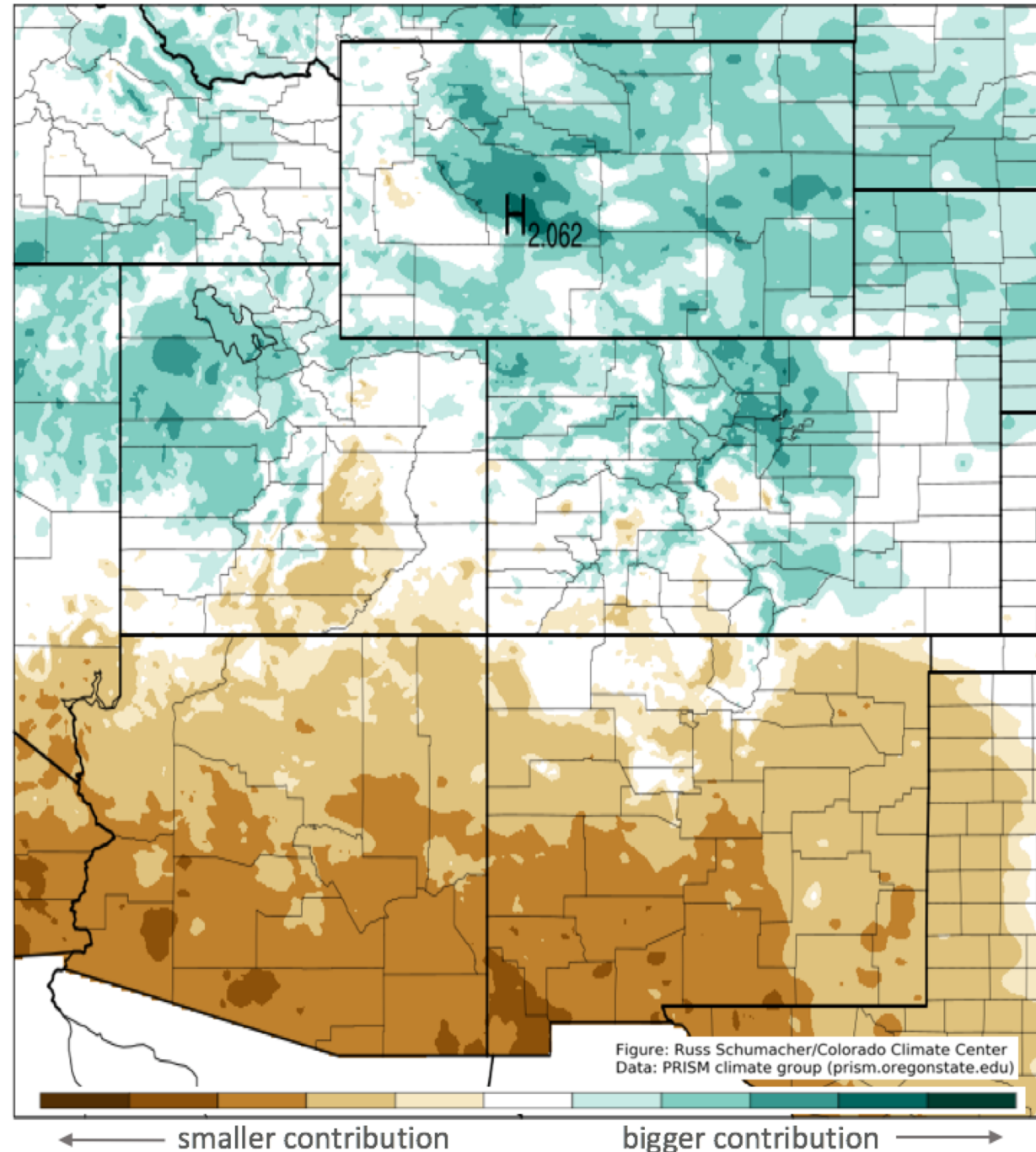
How important are the  
spring months to the total  
annual average  
precipitation?

April

Brown: much less than 1/12<sup>th</sup> of the annual precip  
Green: much more than 1/12<sup>th</sup> of the annual precip

COLORADO CLIMATE CENTER

April climatological contribution to annual average precipitation



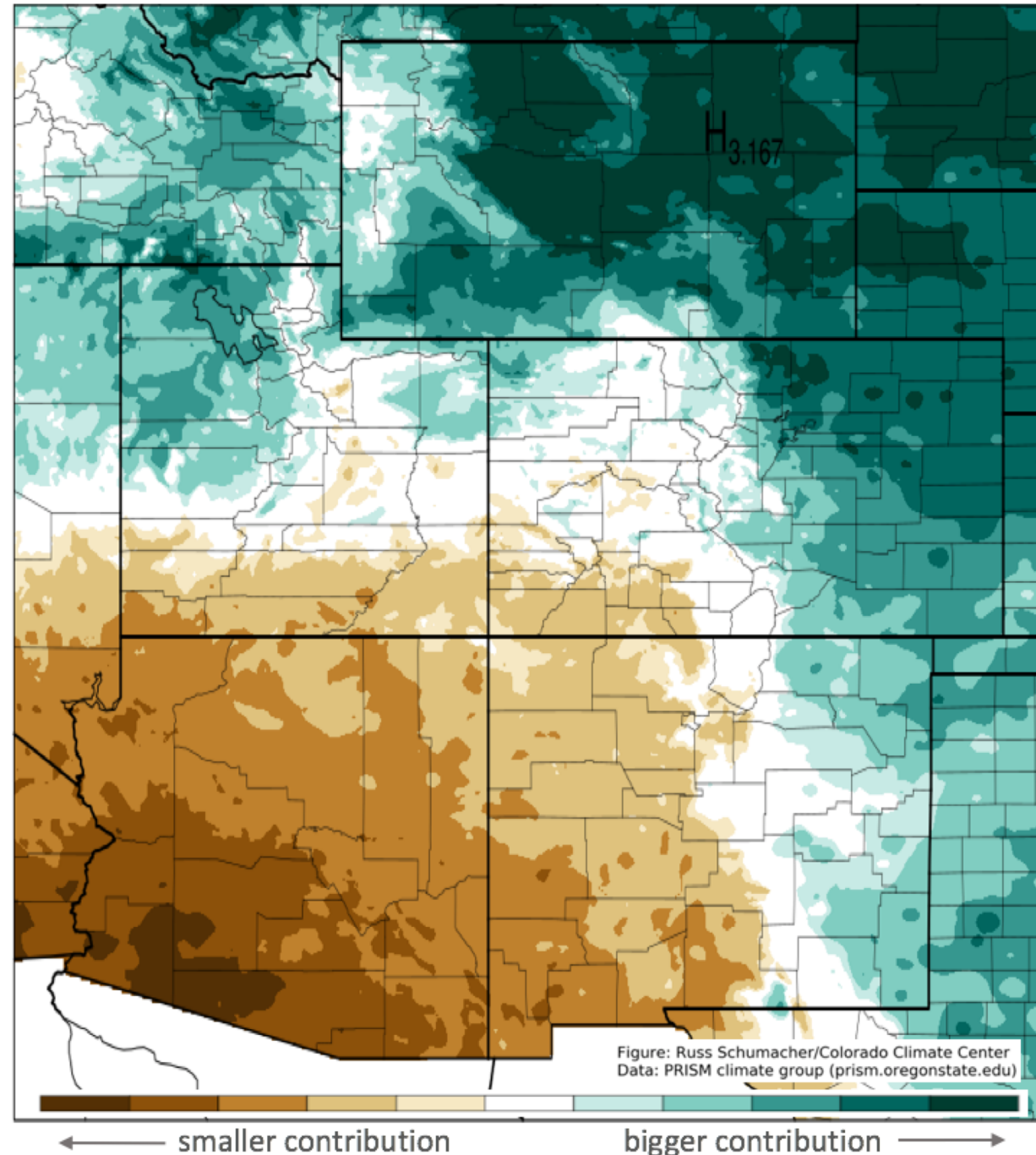
How important are the  
spring months to the total  
annual average  
precipitation?

May

Brown: much less than 1/12<sup>th</sup> of the annual precip  
Green: much more than 1/12<sup>th</sup> of the annual precip

COLORADO CLIMATE CENTER

May climatological contribution to annual average precipitation





# Summary

- February has been a big month for snowfall in the mountains, especially in the San Juans
- Drought conditions have improved considerably – there is now only a small sliver of D4 (exceptional) drought left in Colorado
- Furthermore, temperatures since the beginning of the water year have been near normal to a bit cooler than normal
- But because of long-term water deficits in western Colorado, drought is likely to persist at least until the spring snowmelt/runoff season



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Thank you!

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