

Colorado Climate Update for WATF

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COLORADO
CLIMATE
CENTER

Water Availability Task Force meeting
February 2019



ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY

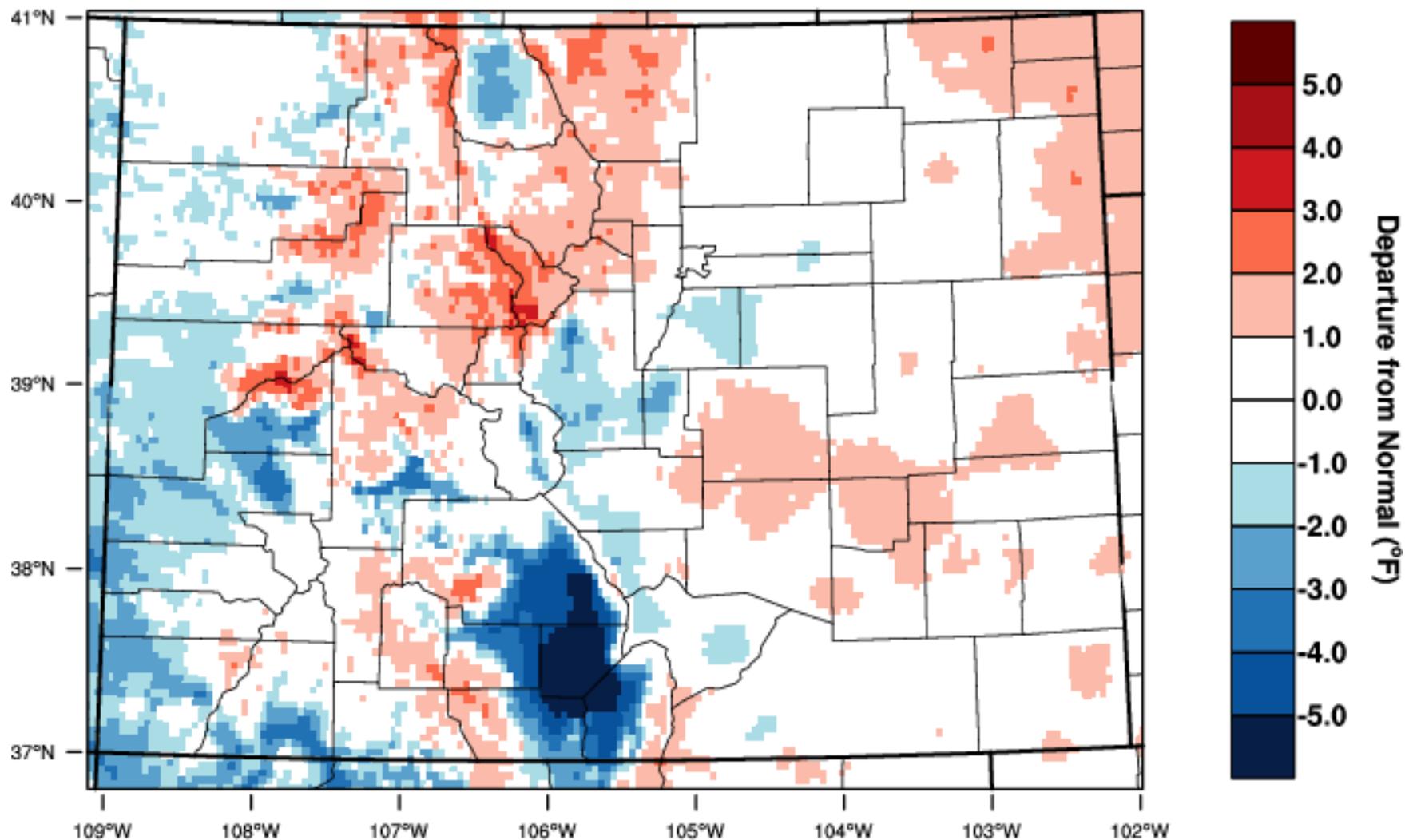


Water Year 2019 – Temperature



Colorado - Mean Temperature

January 2019 Departure from 1981-2010 Normal

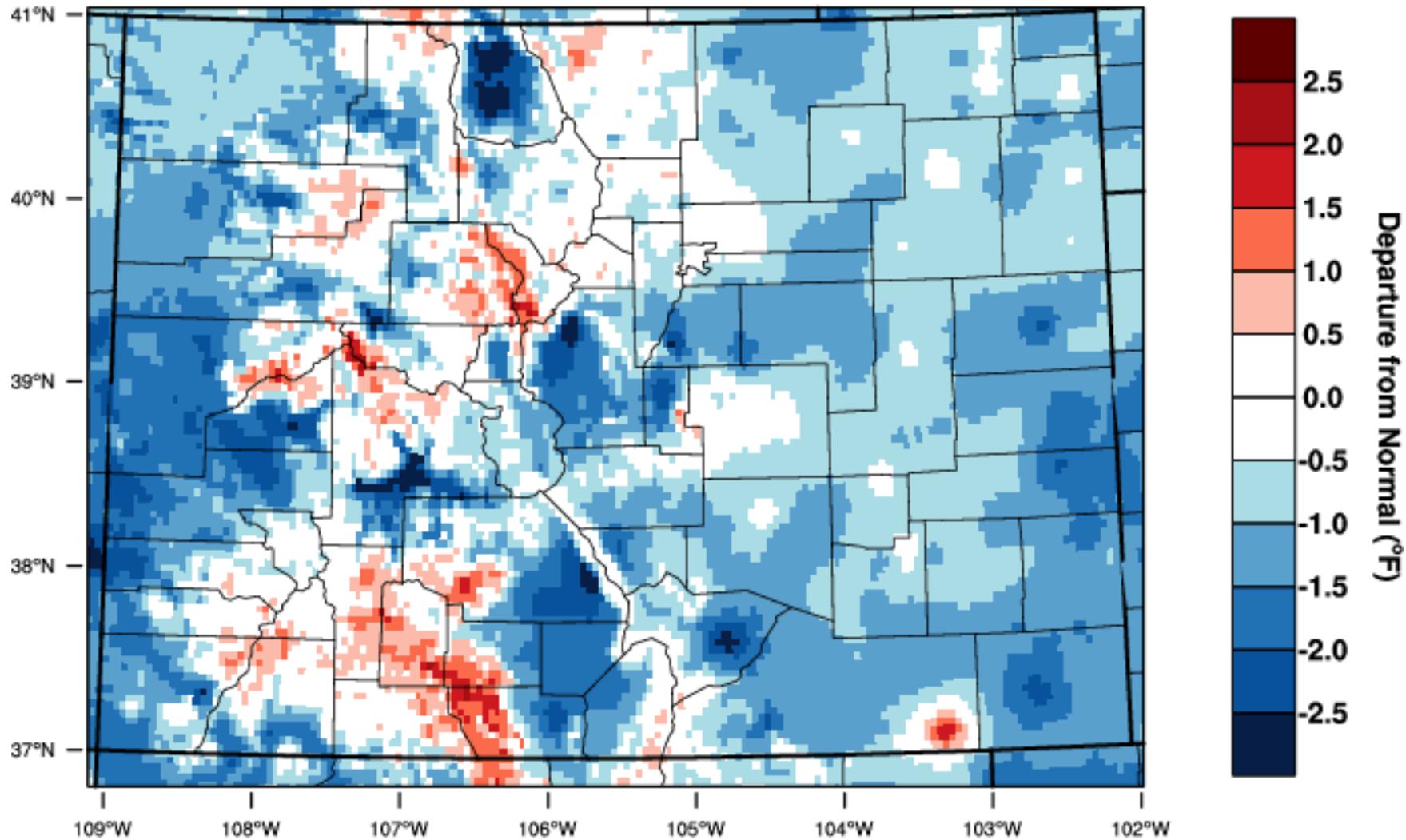


WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 FEB 2019



Colorado - Mean Temperature

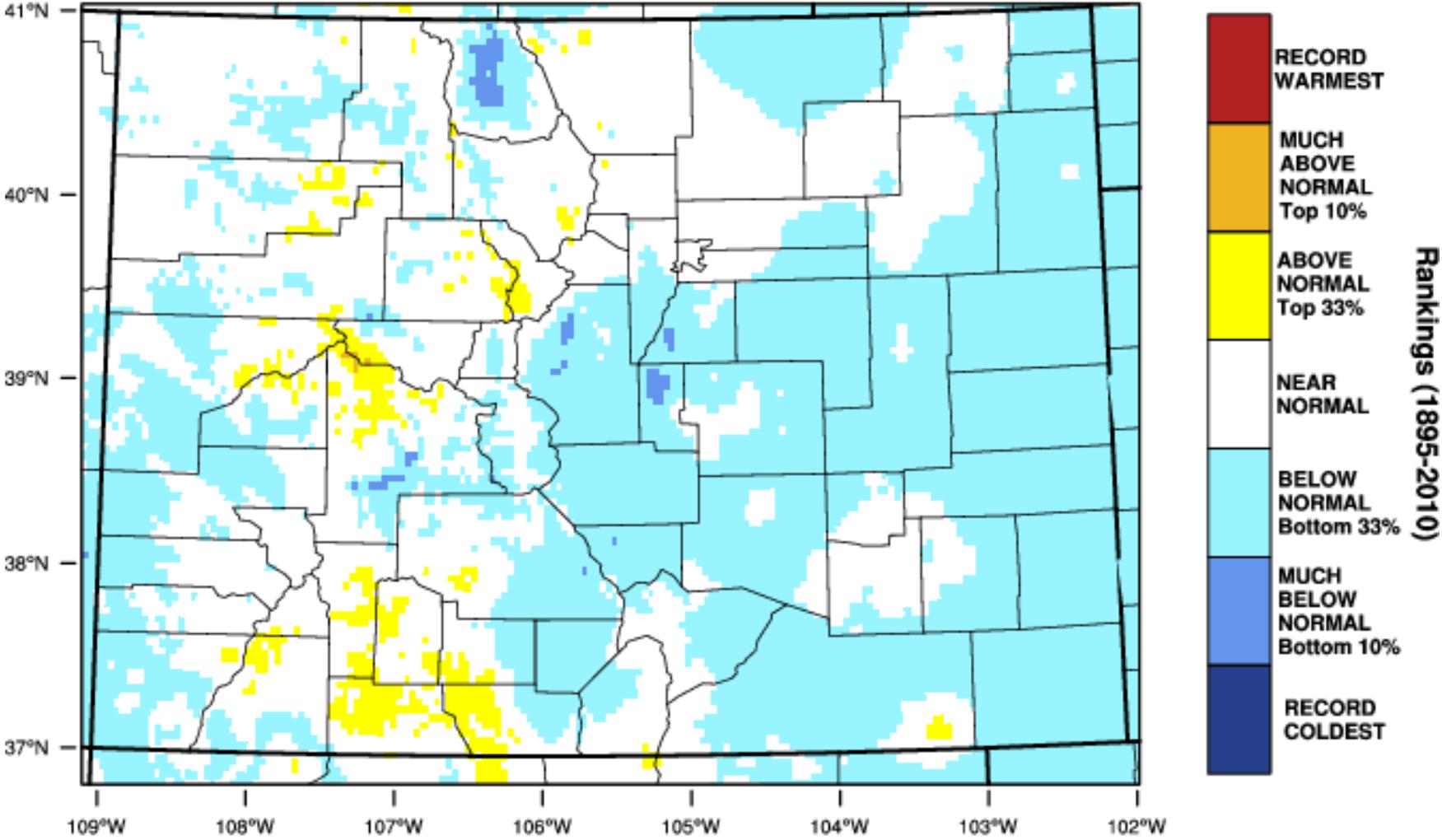
October-January 2019 Departure from 1981-2010 Normal



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



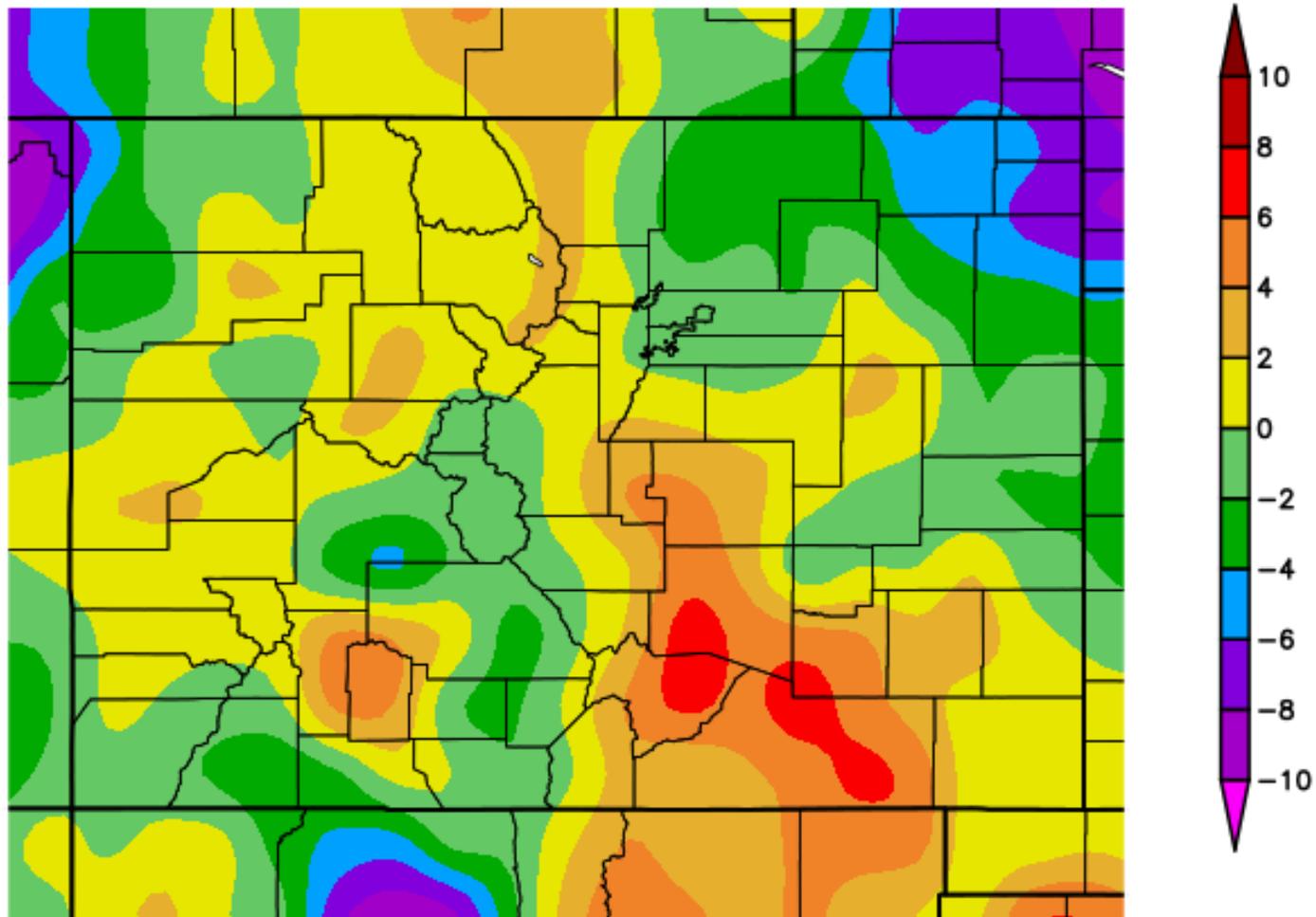
Colorado - Mean Temperature October-January 2019 Percentile



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



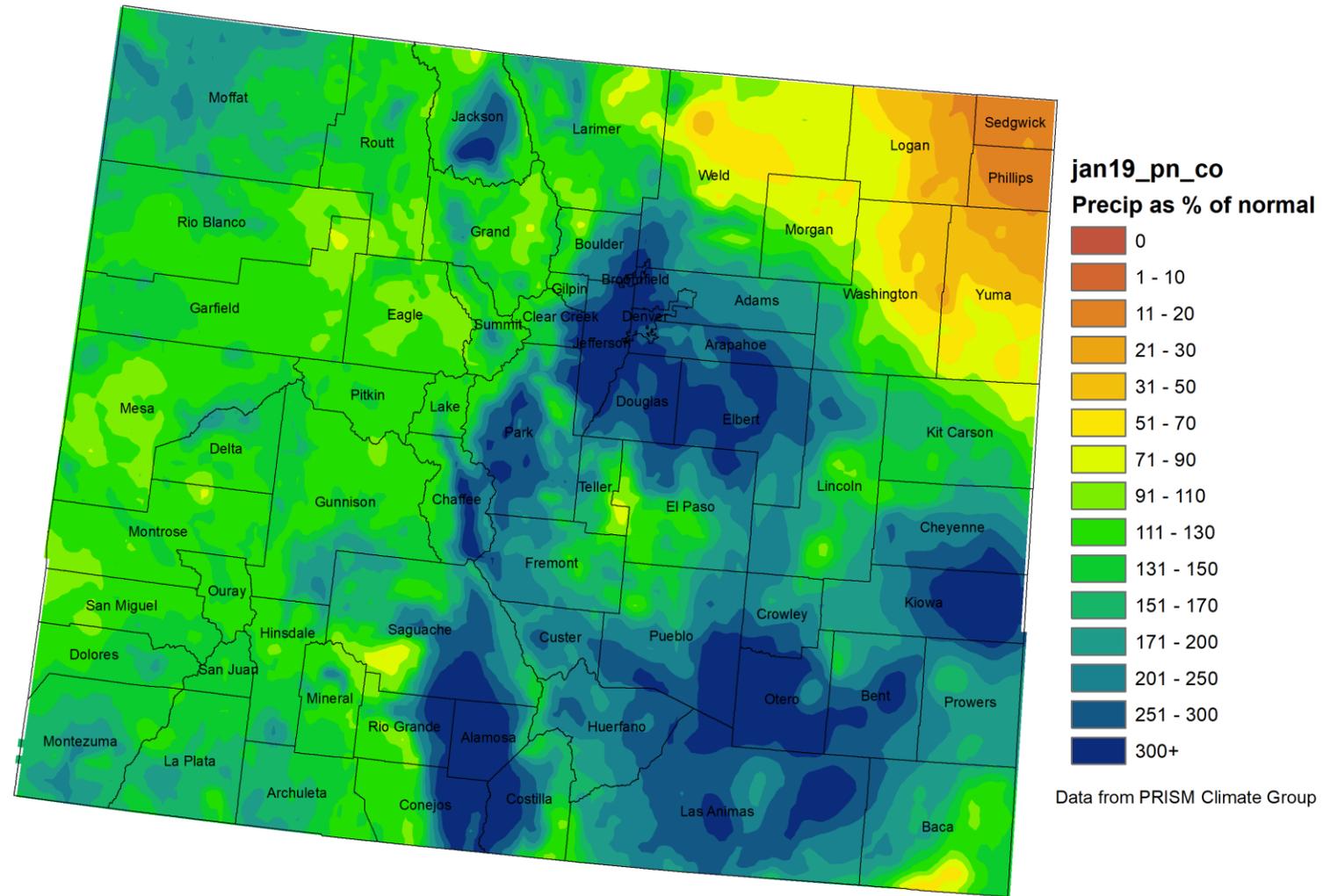


Water Year 2019 – Precipitation

(credit: Durango Herald)

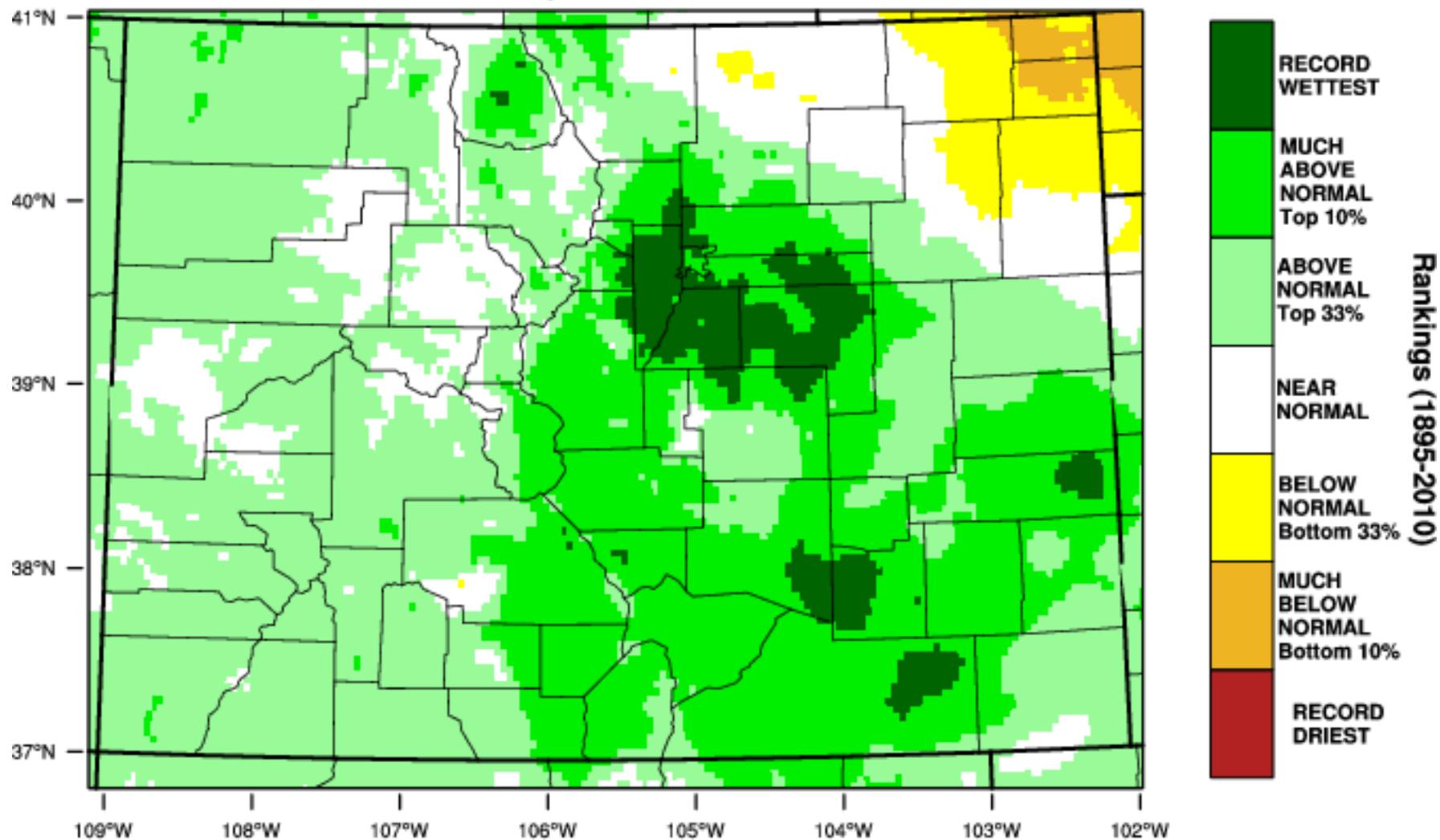


Colorado January 2019 Precipitation as a Percentage of Normal



Colorado - Precipitation

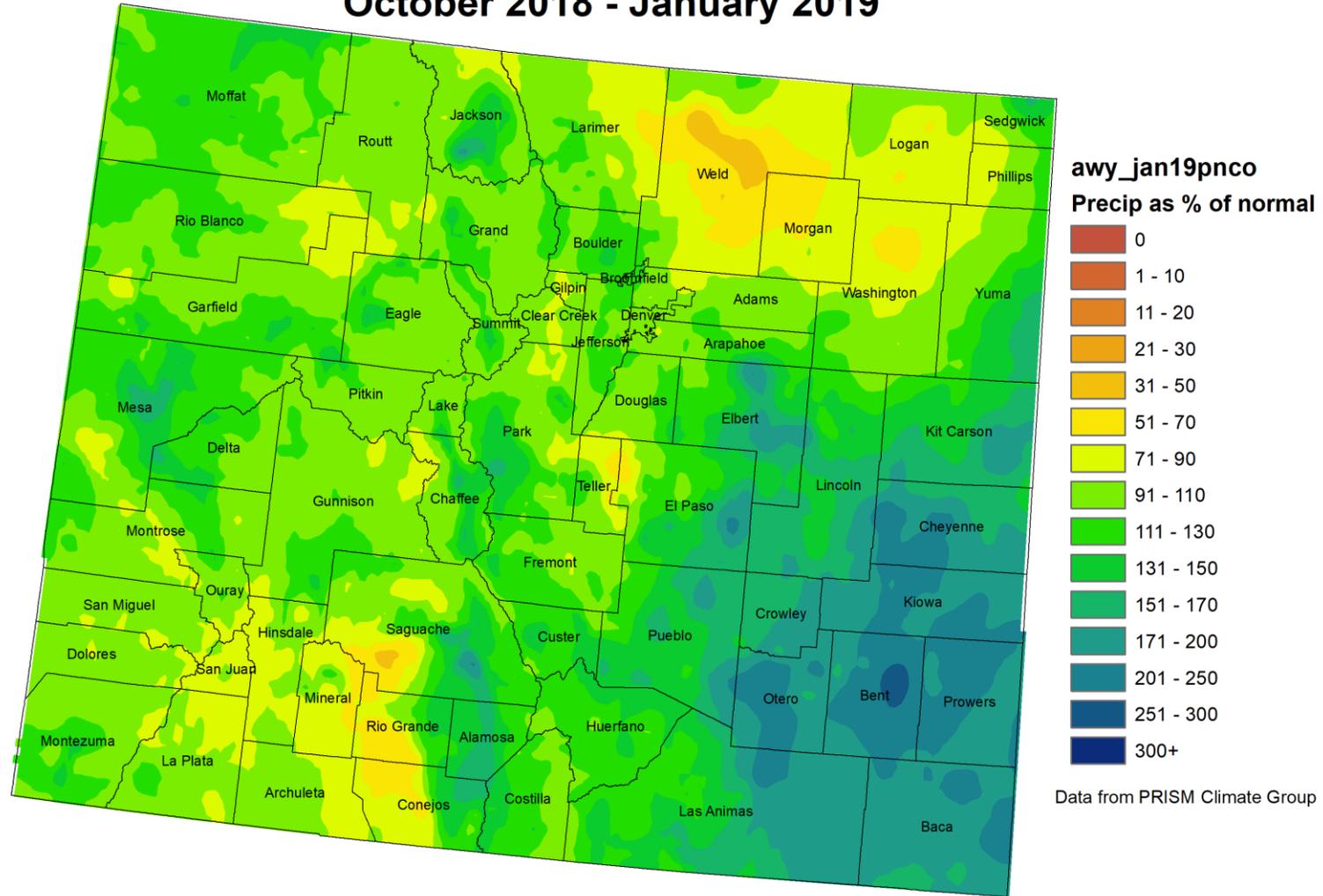
January 2019 Percentile



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

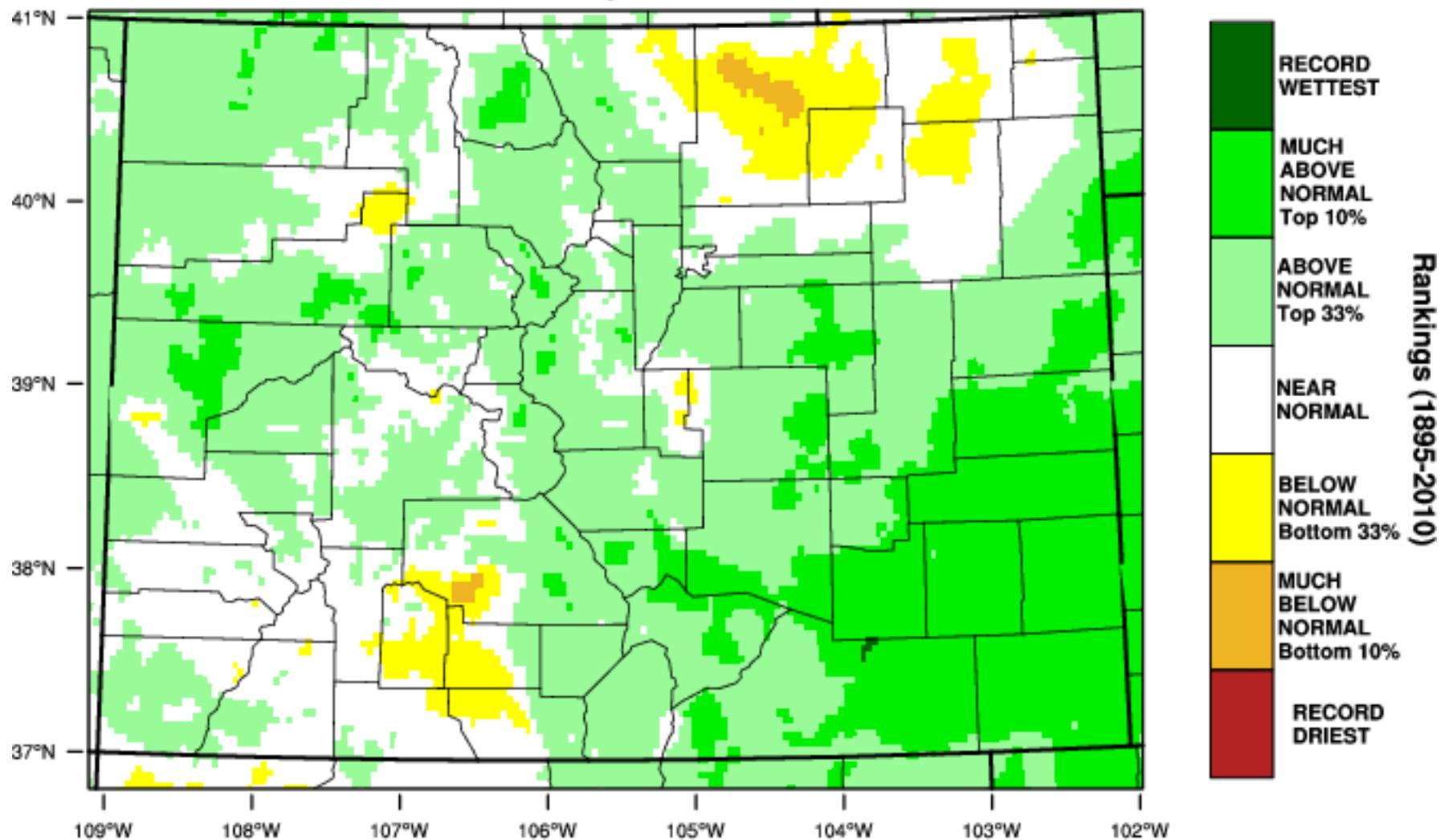


Colorado Water Year 2019 Precipitation as a Percentage of Normal October 2018 - January 2019



Colorado - Precipitation

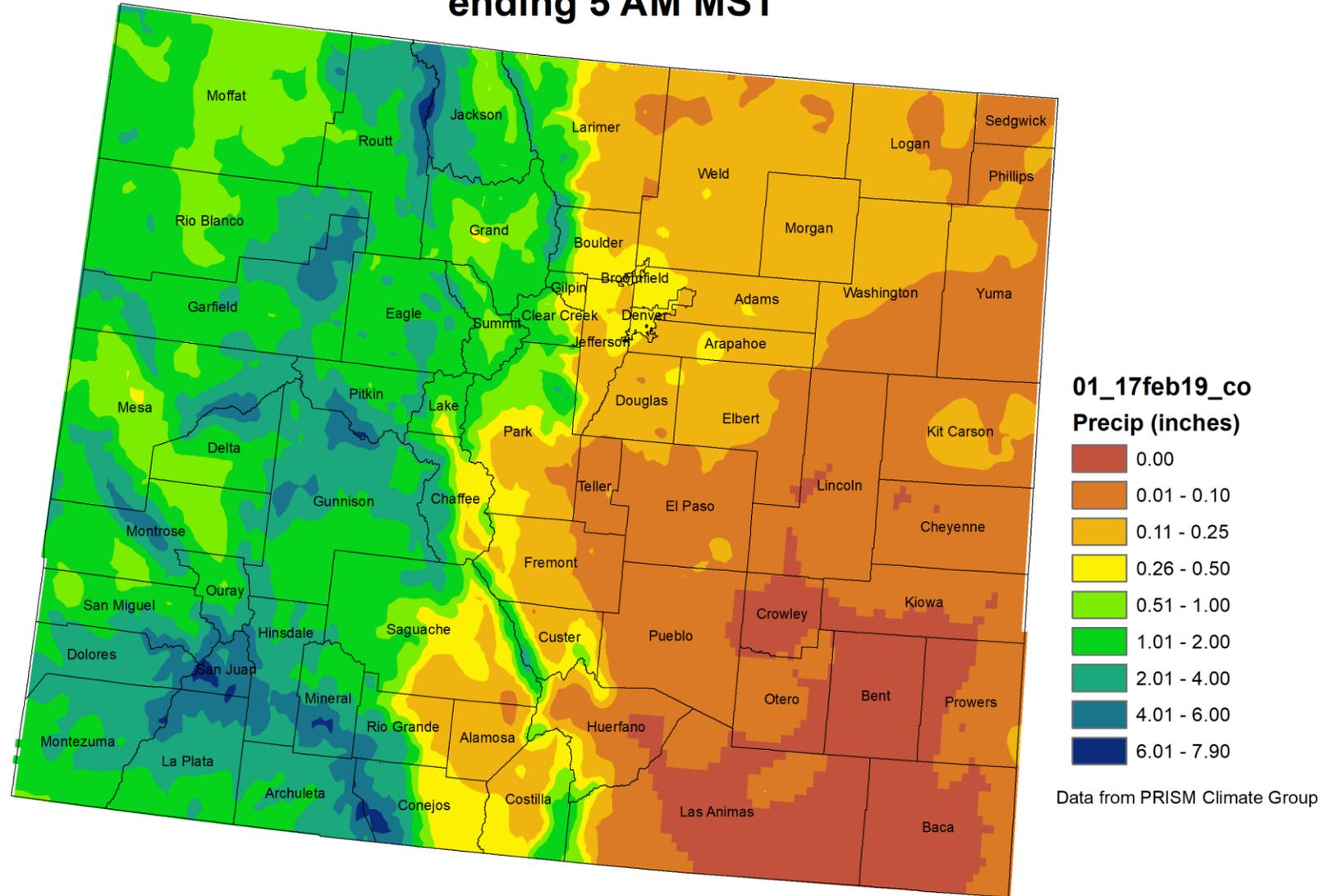
October-January 2019 Percentile



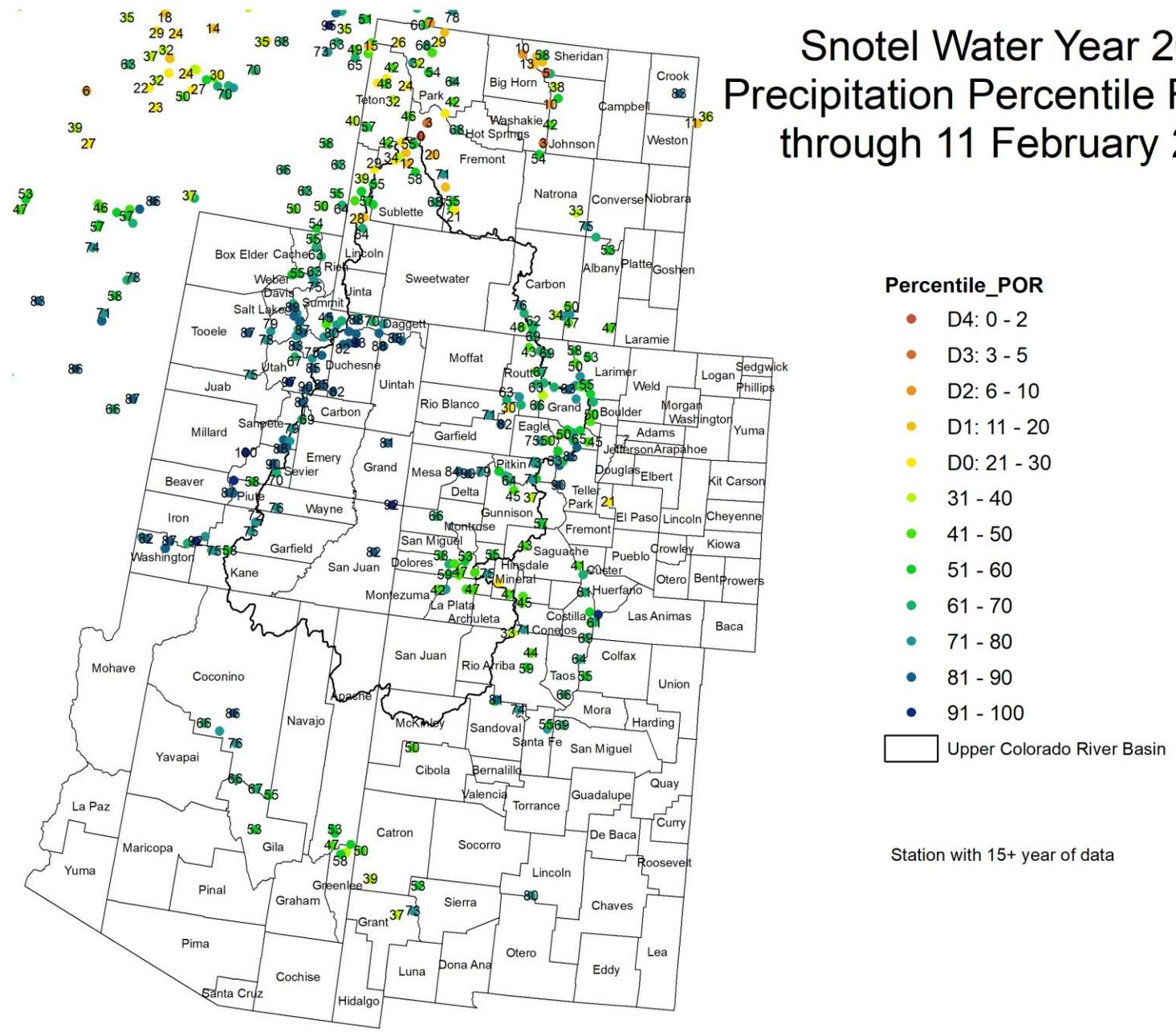
WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 FEB 2019

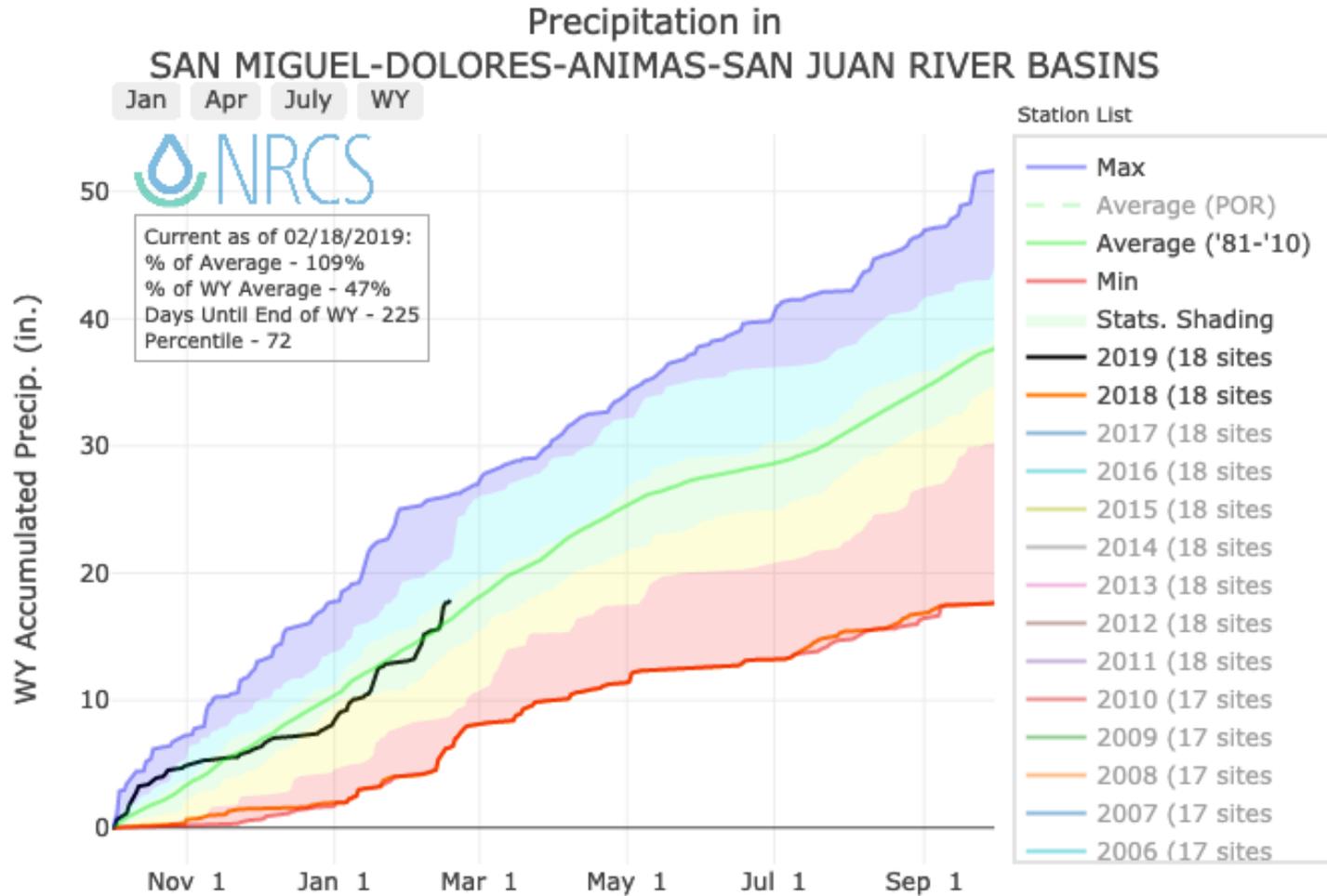


Colorado Month to Date Precipitation 1 - 17 February 2019 ending 5 AM MST



Snotel Water Year 2019 Precipitation Percentile Ranking through 11 February 2019





Basin average of 4.8" in February thus far

17.9" since October 1

Last year: 17.6" for the entire water year

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

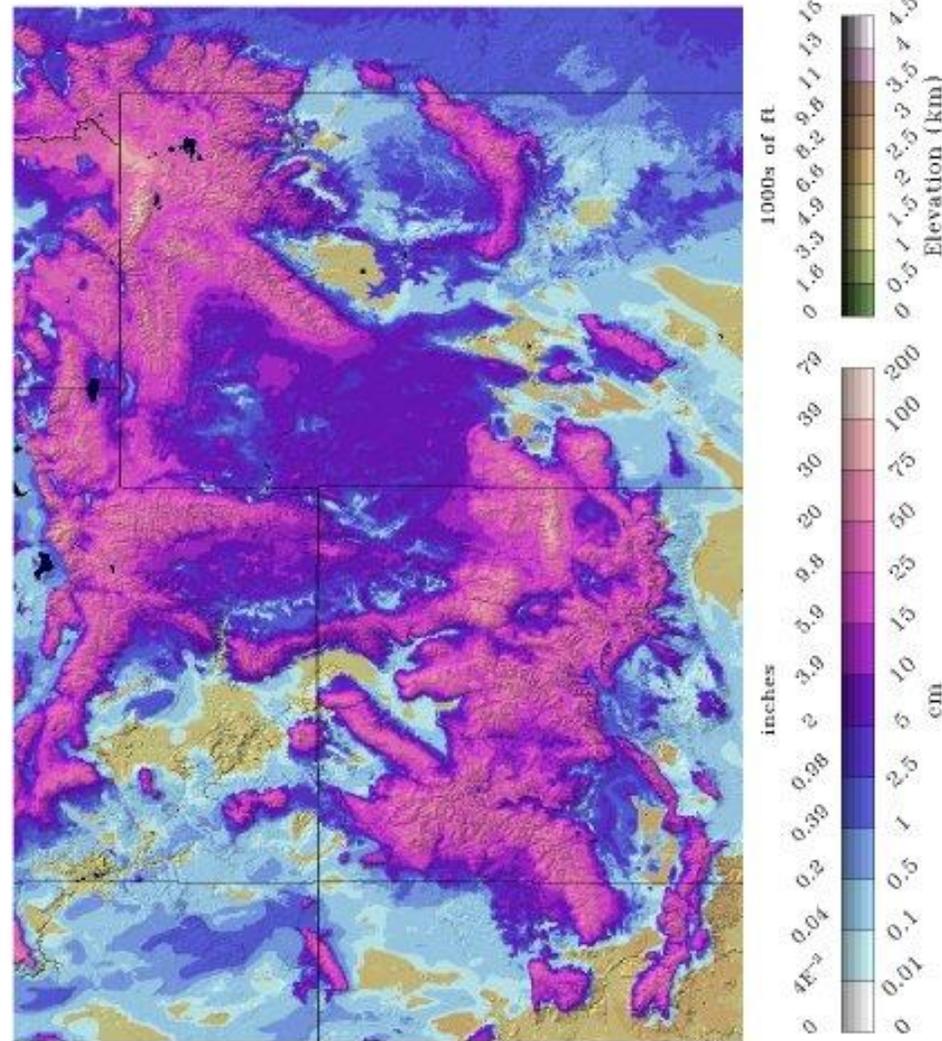
For more information visit: [30 year normals calculation description.](#)

Snow Water Equivalent

2019-02-18 06 UTC



NOHRSC snow analysis: Feb 2019



OWP OFFICE OF
WATER
PREDICTION

National Snow 2018-
Analysis 2019

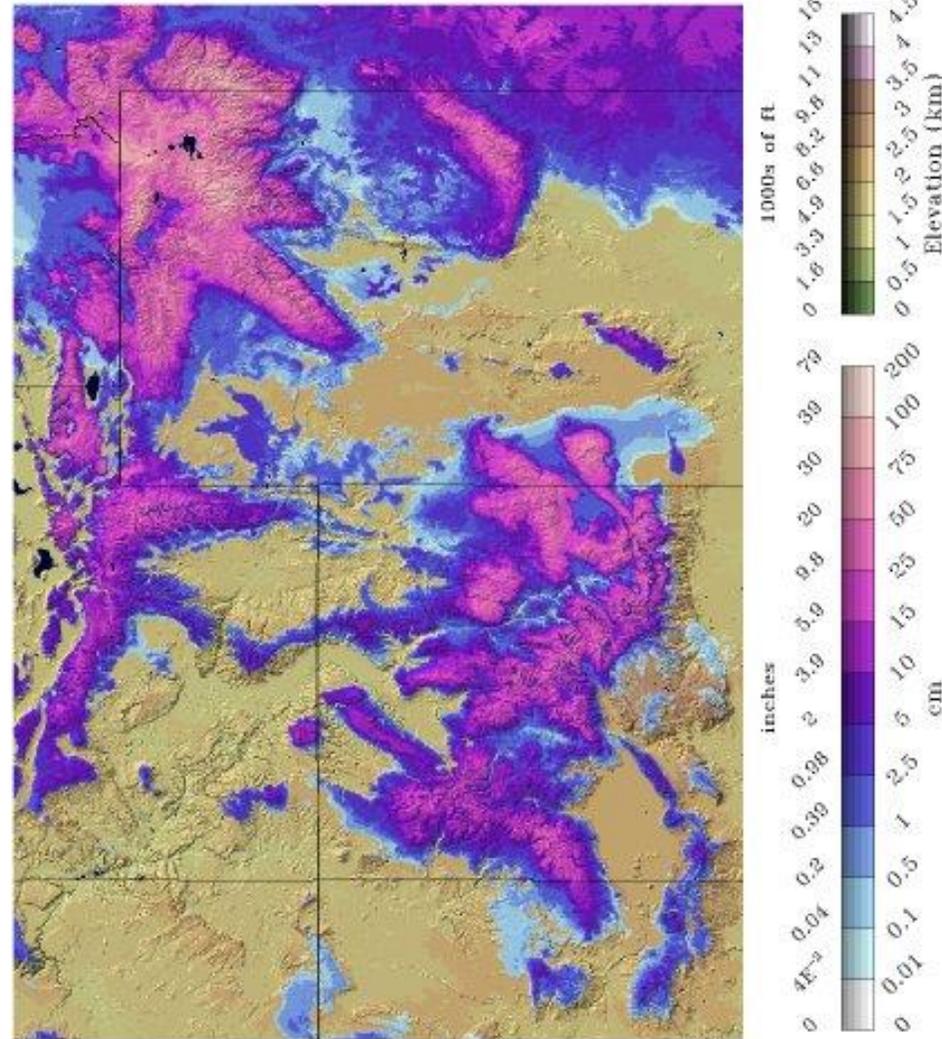


Snow Water Equivalent

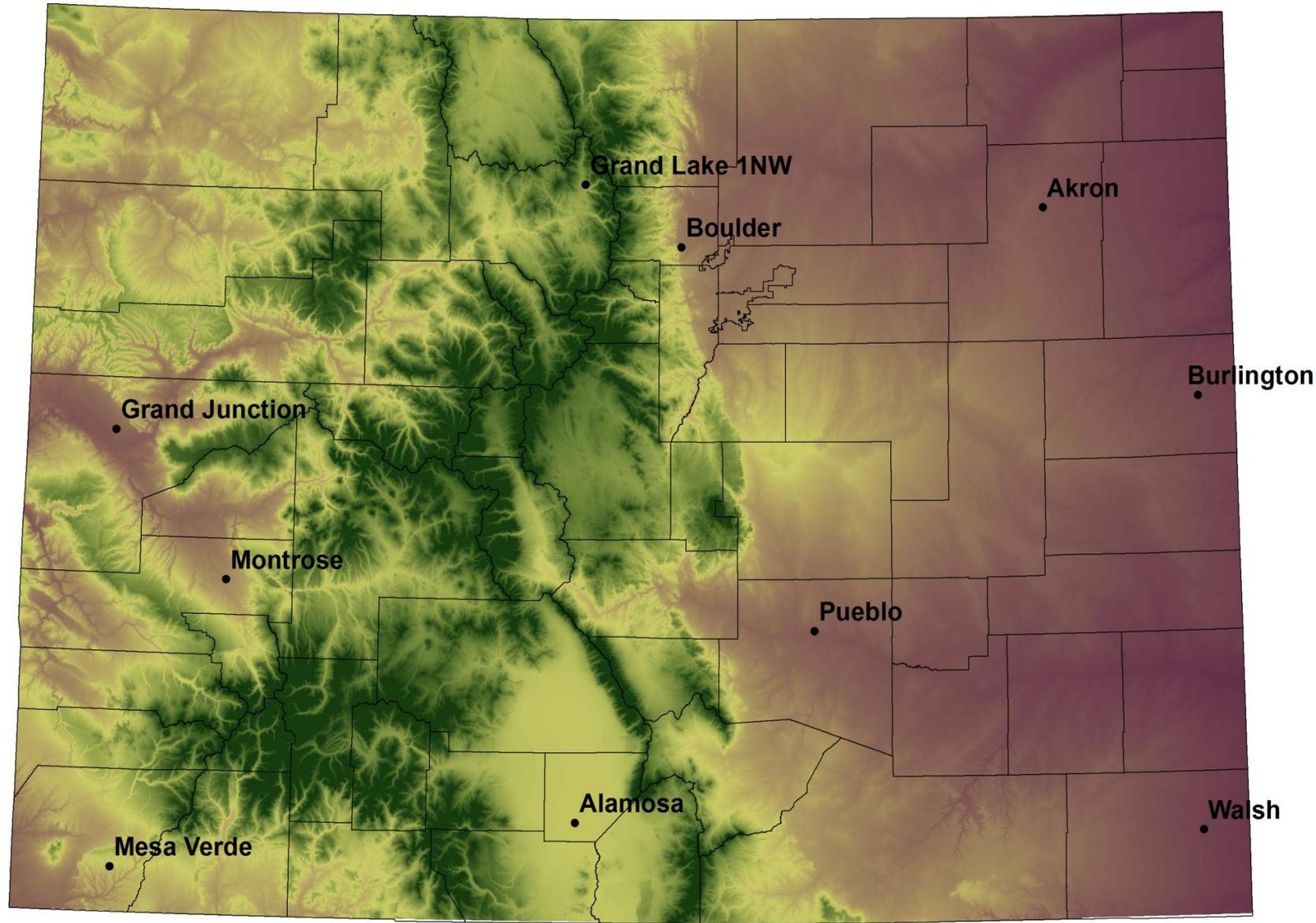
2018-02-18 06 UTC



NOHRSC snow analysis: Feb 2018 (last year)



NWS Cooperative Stations for WATF

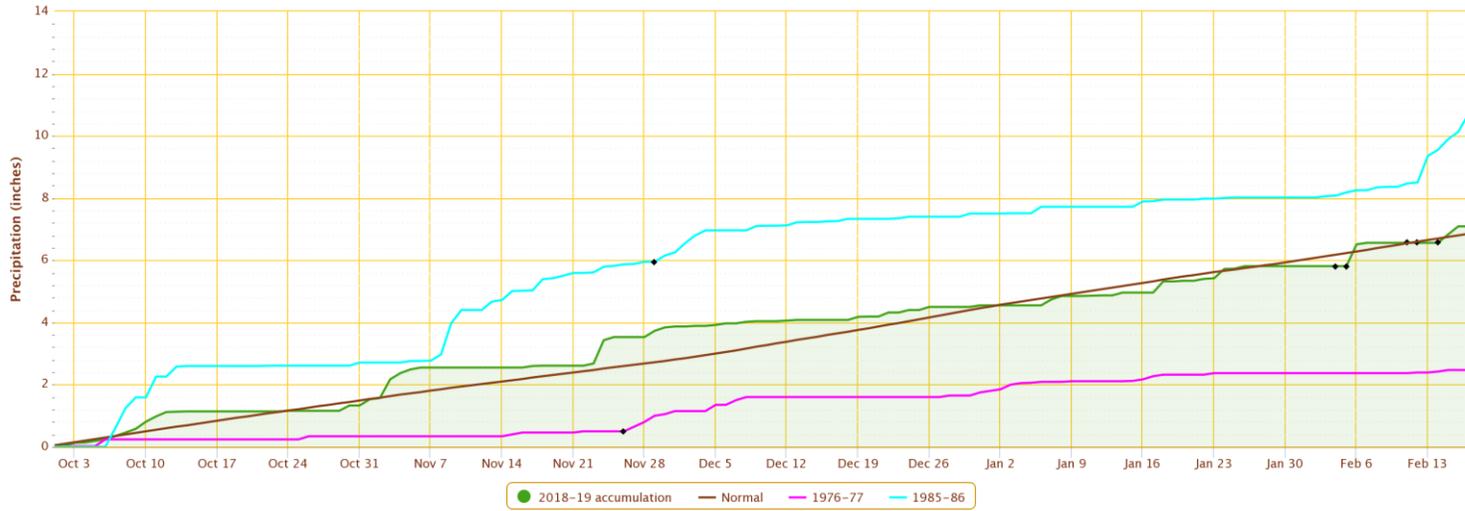


Water Year 2019 – Station Updates



Accumulated Precipitation – GRAND LAKE 1 NW, CO

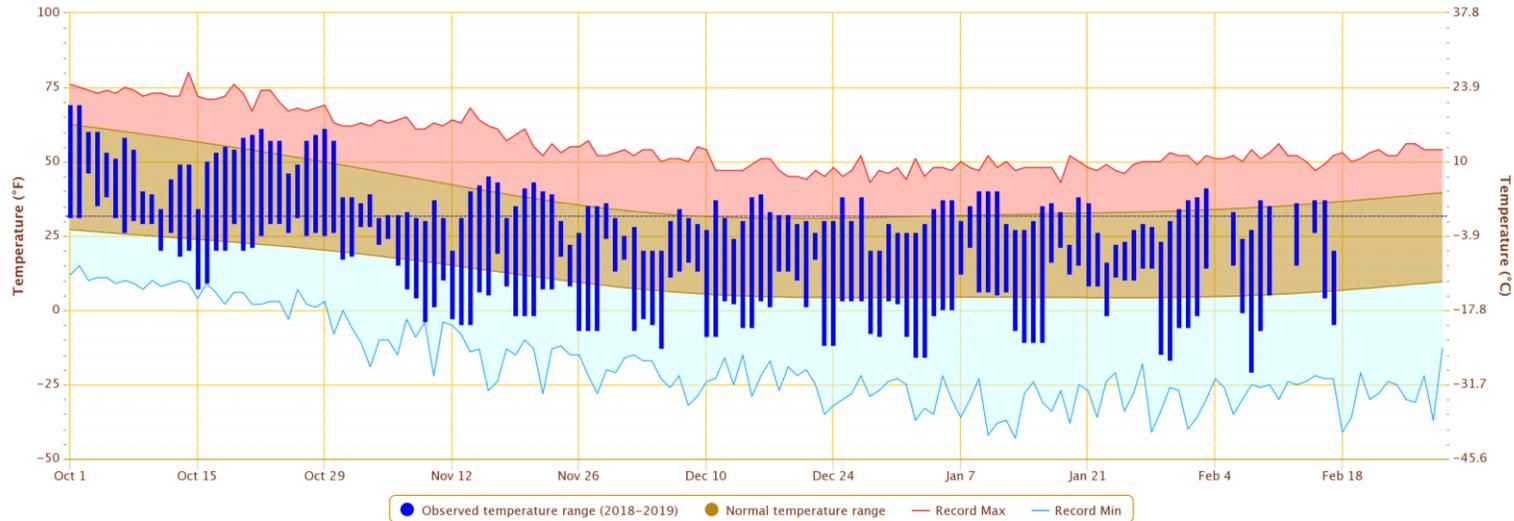
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



Powered by ACIS

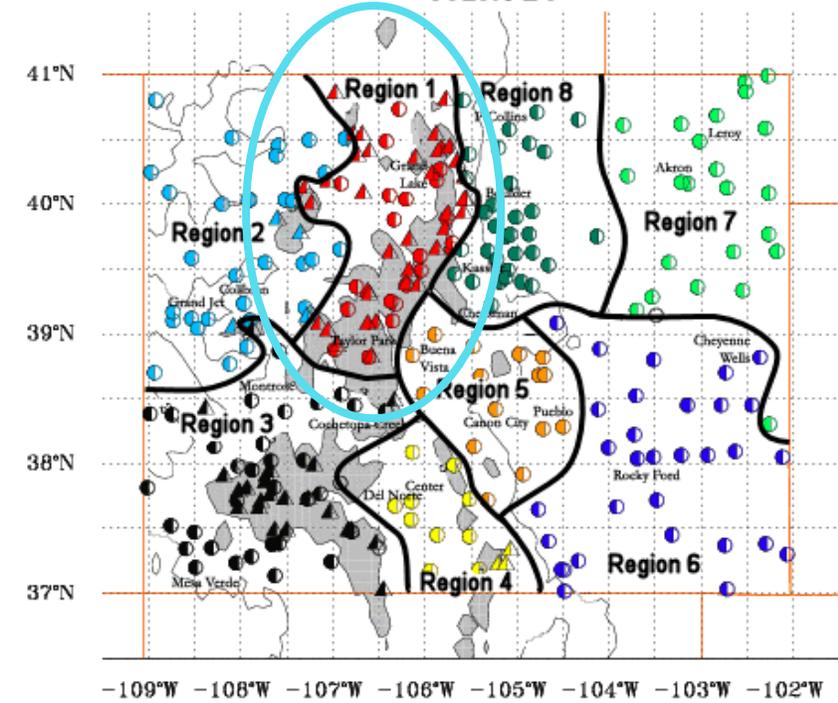
Daily Temperature Data – GRAND LAKE 1 NW, CO

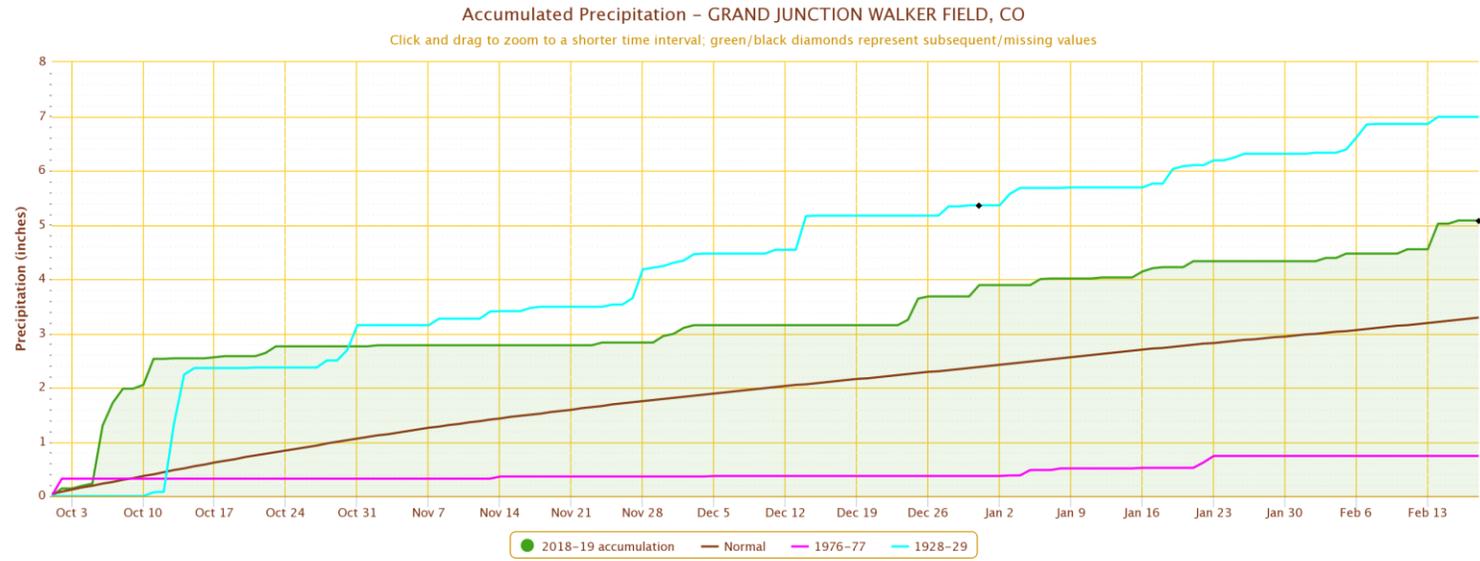
Period of Record – 1939-10-01 to 2019-02-17. Normals period: 1981-2010. Click and drag to zoom chart.



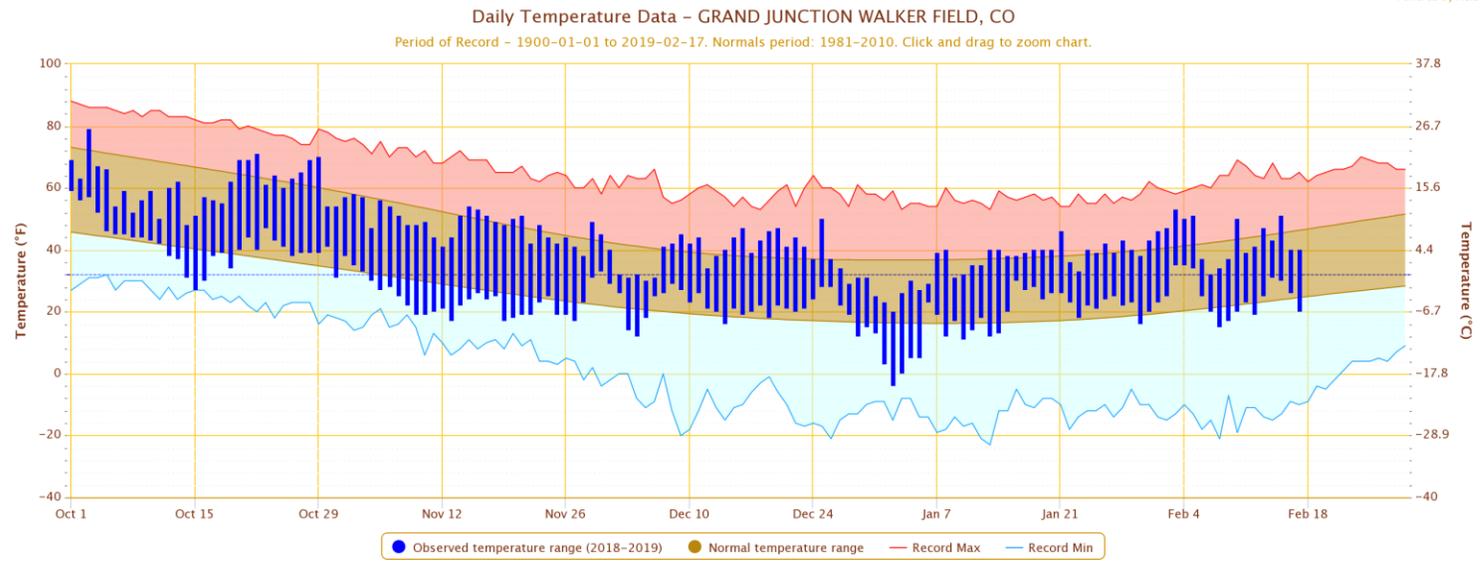
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COLORADO

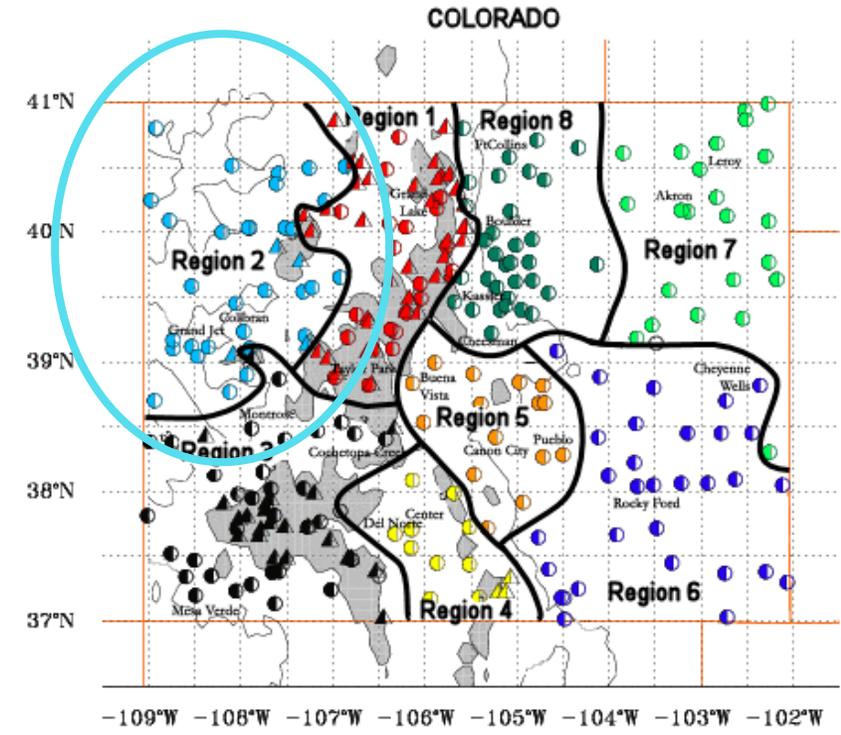




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ColoClimateCenter

@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

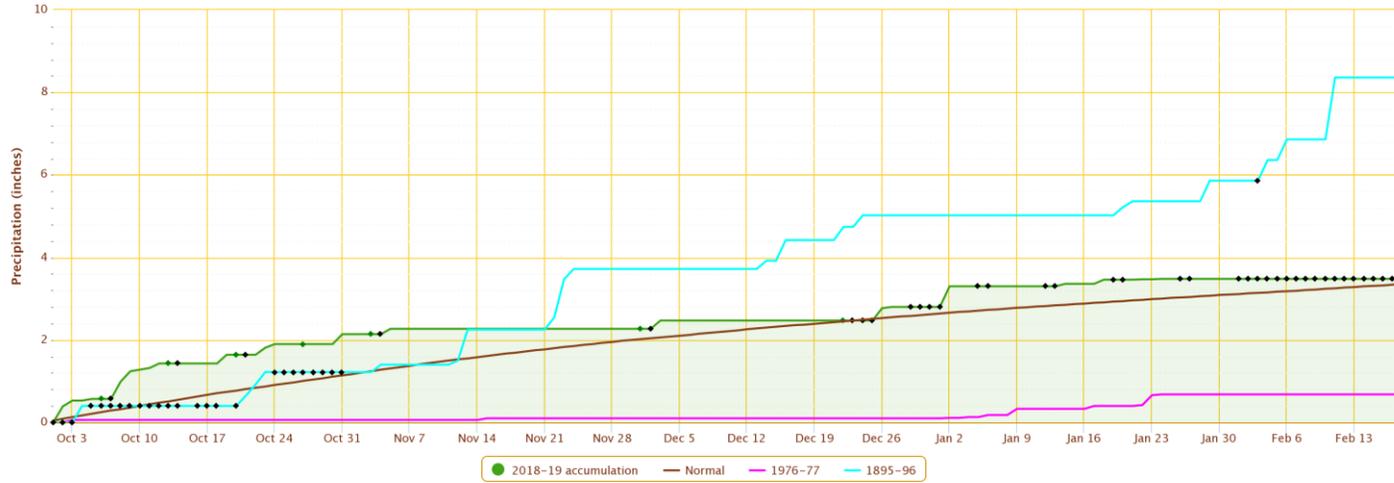


14



Accumulated Precipitation – MONTROSE NO 2, CO

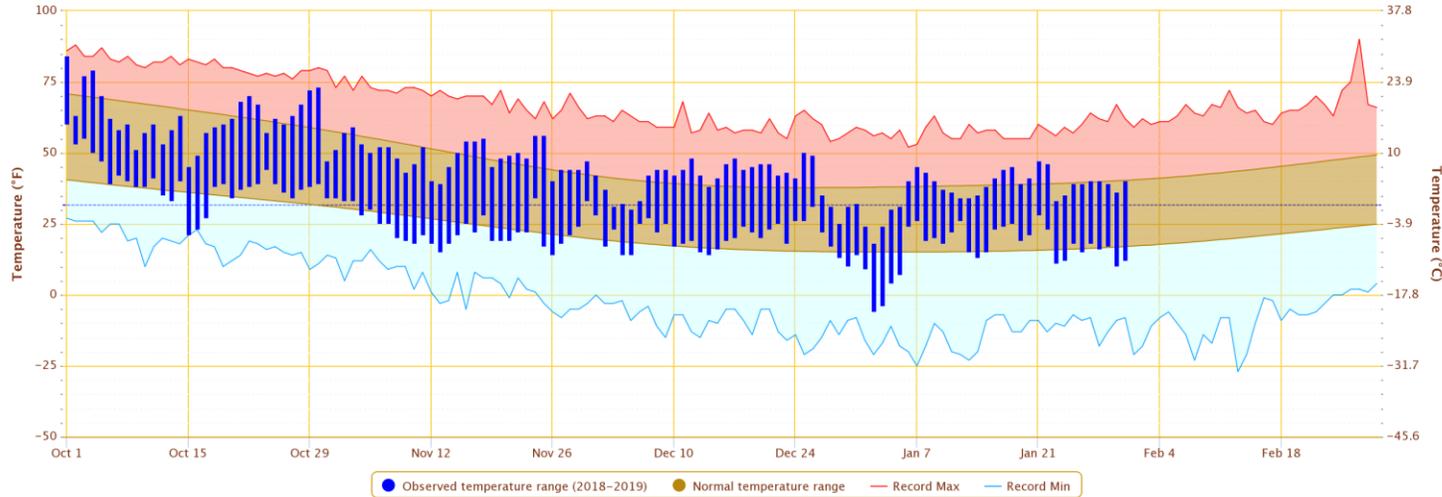
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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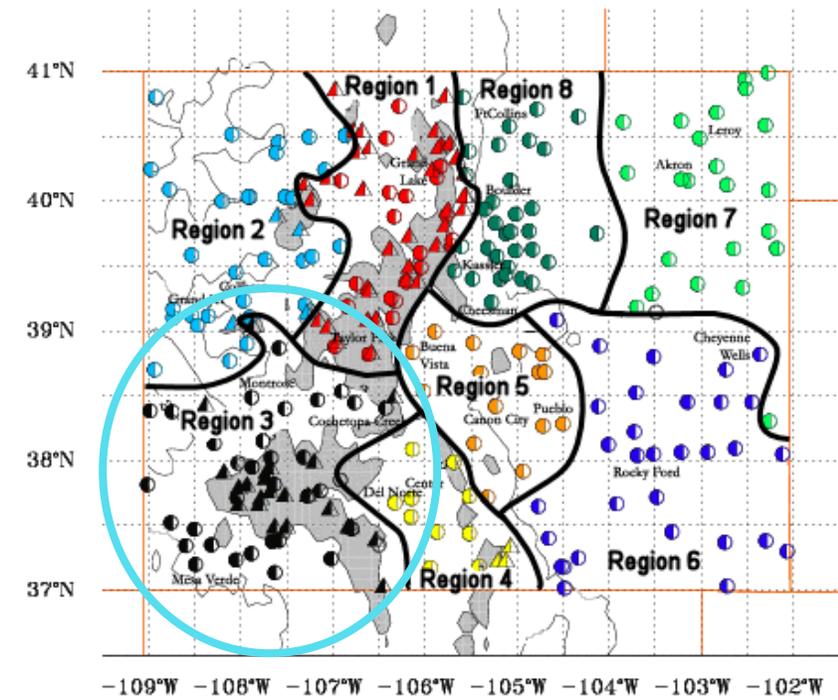
Daily Temperature Data – MONTROSE NO 2, CO

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



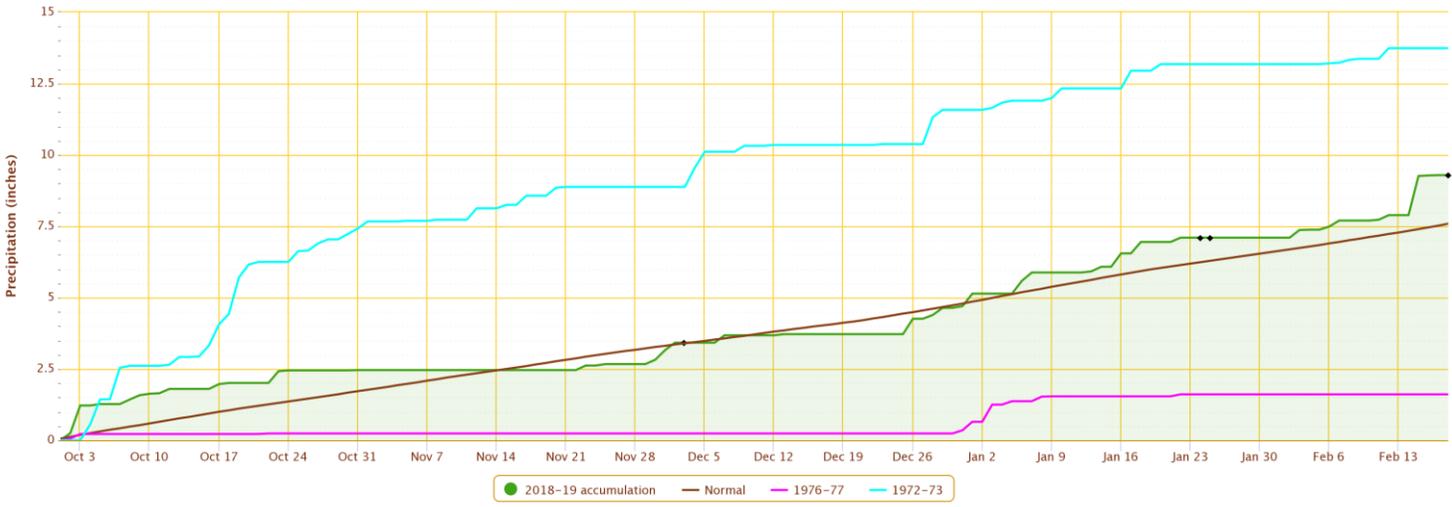
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Accumulated Precipitation – MESA VERDE NP, CO

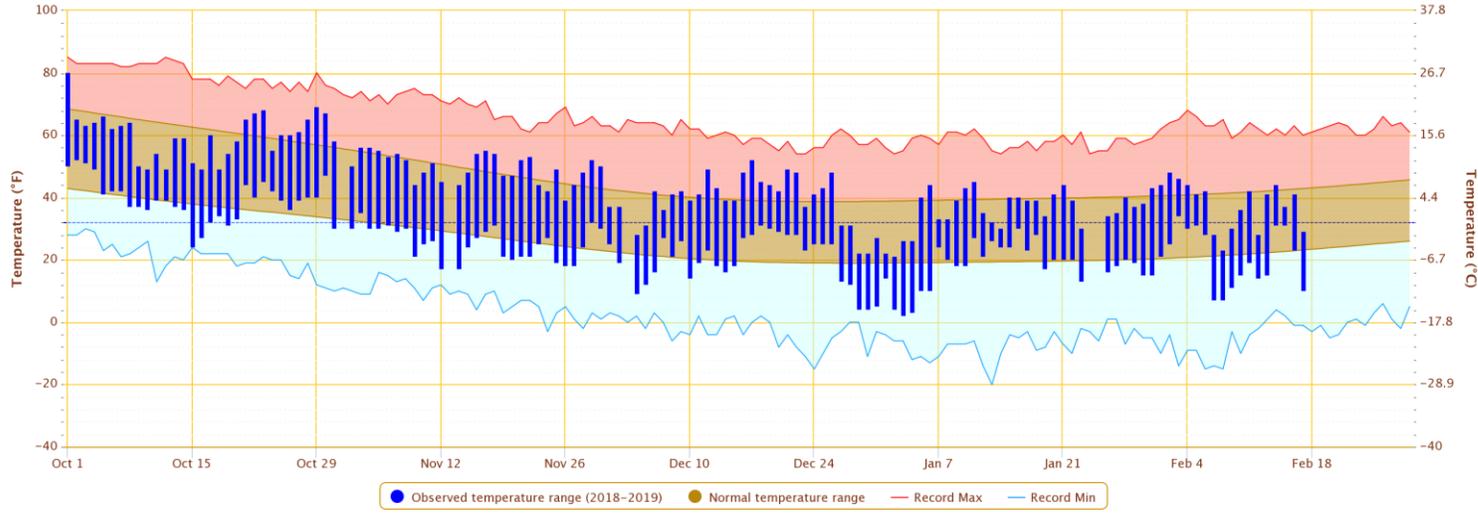
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



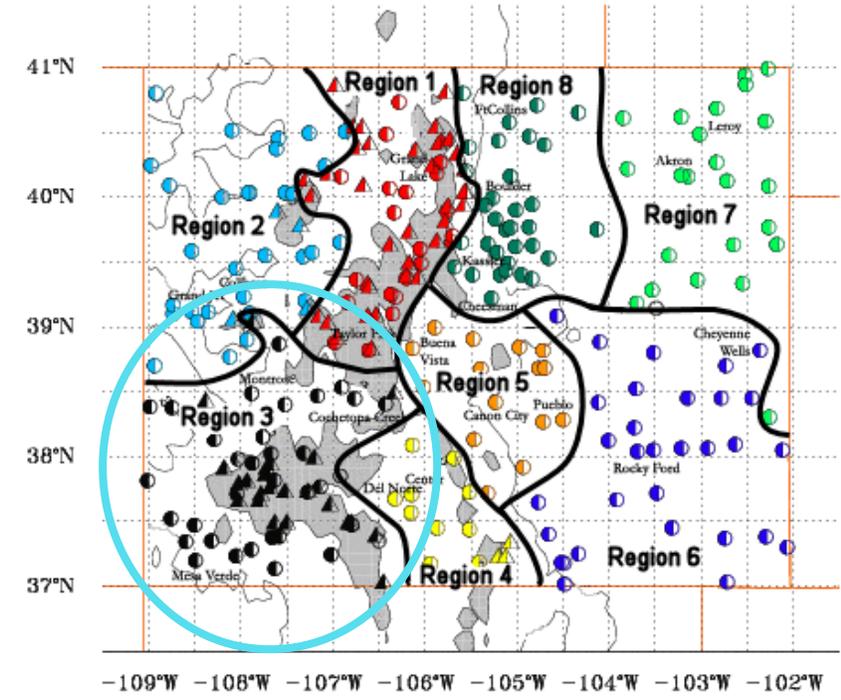
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Daily Temperature Data – MESA VERDE NP, CO

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



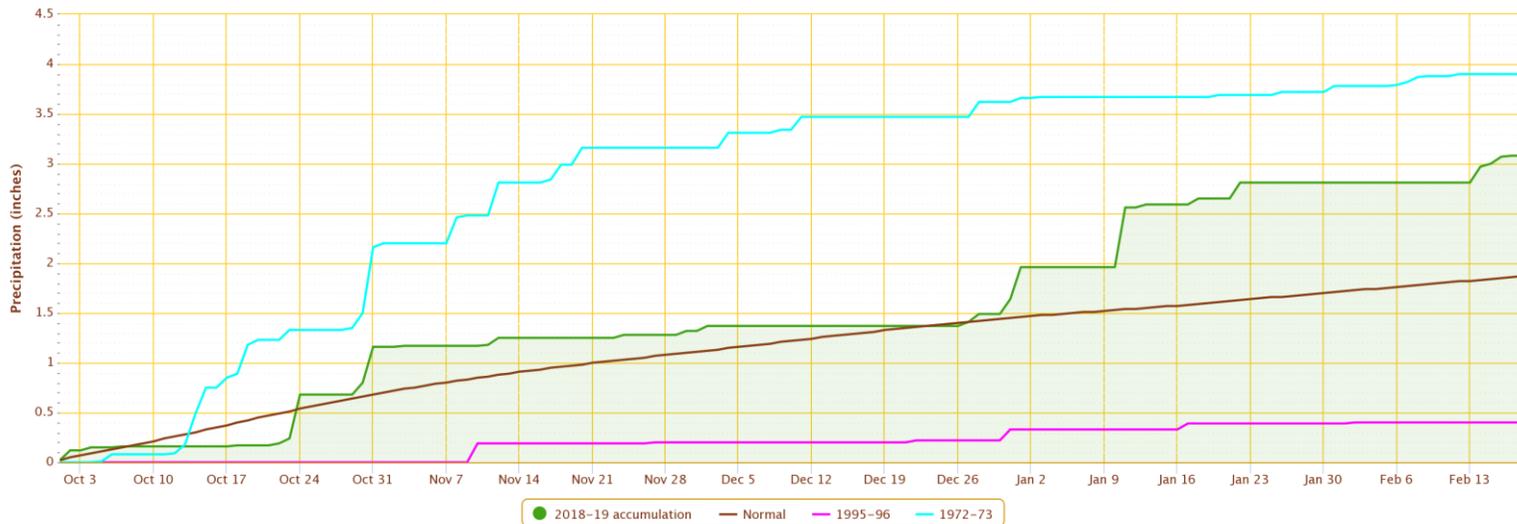
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Mesa Verde has also surpassed their precip from all of last water year (9.29" through Feb 17; 8.06" all of WY2018)

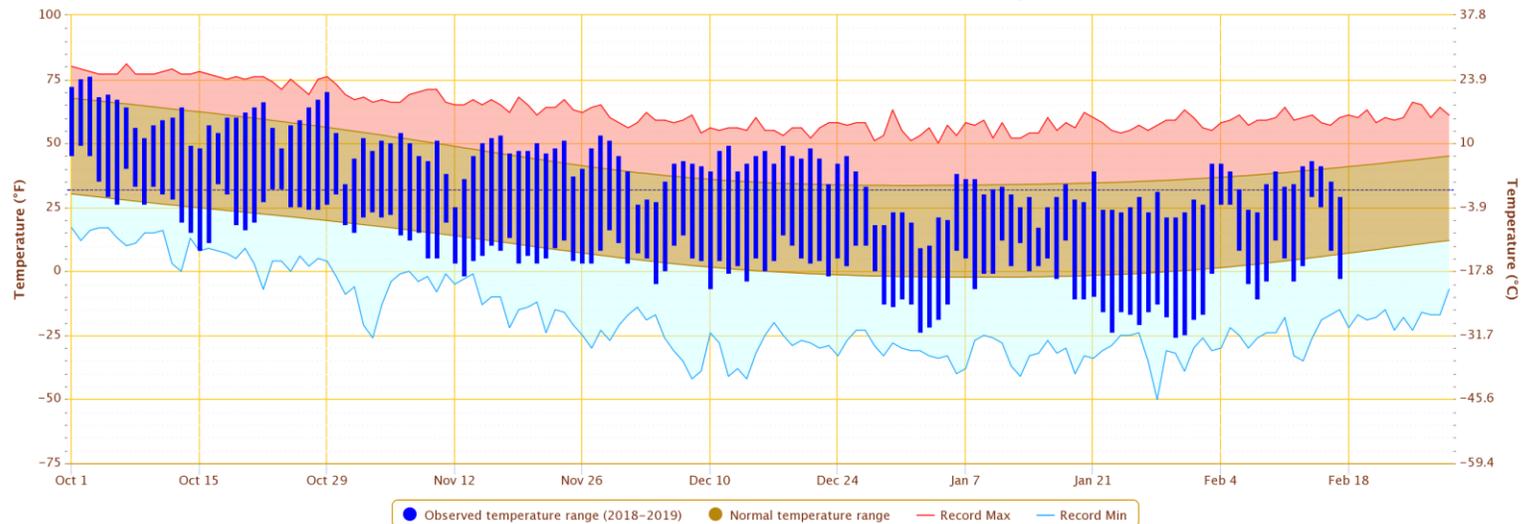


Accumulated Precipitation – ALAMOSA SAN LUIS VALLEY REGIONAL AP, CO
 Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



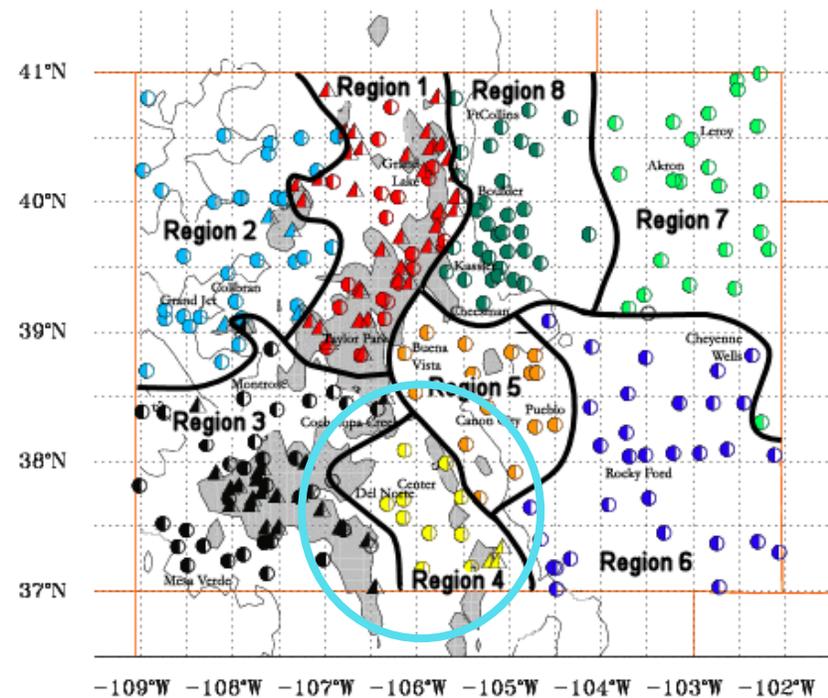
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Daily Temperature Data – ALAMOSA SAN LUIS VALLEY REGIONAL AP, CO
 Period of Record – 1948-01-01 to 2019-02-17. Normals period: 1981-2010. Click and drag to zoom chart.



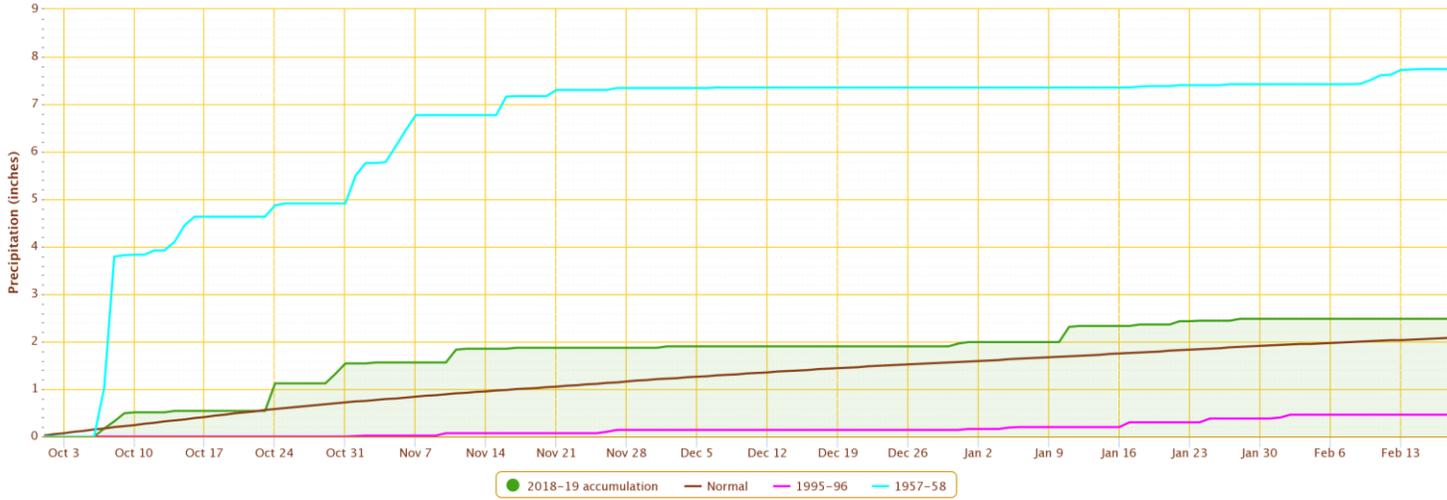
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Accumulated Precipitation – PUEBLO MEMORIAL AP, CO

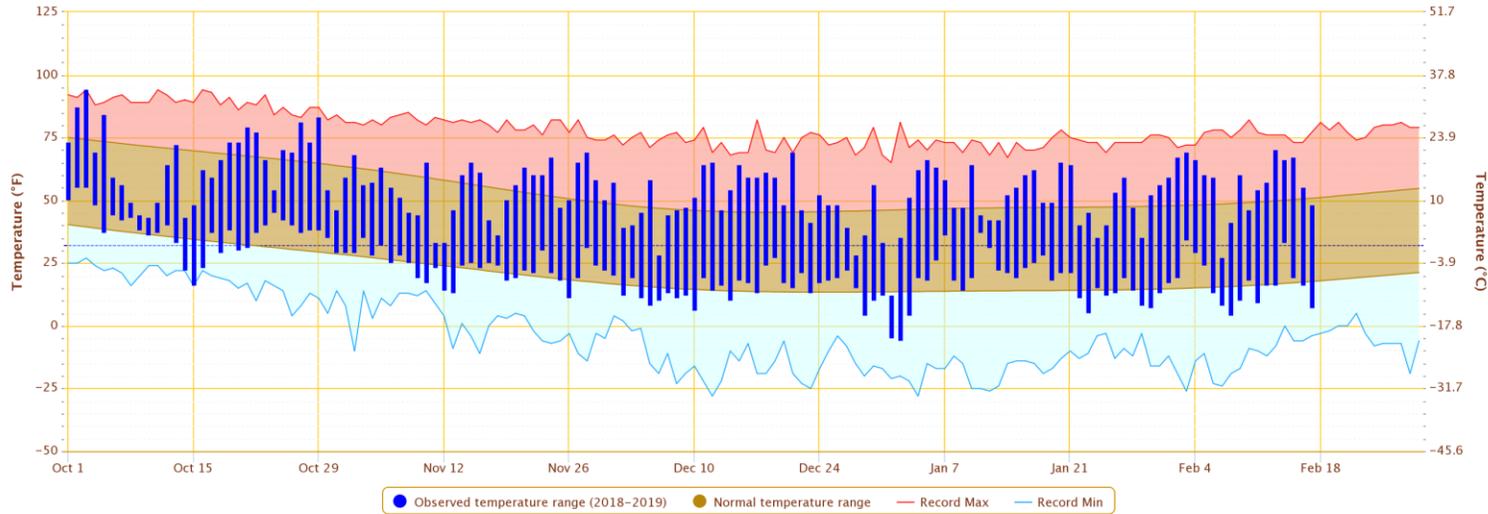
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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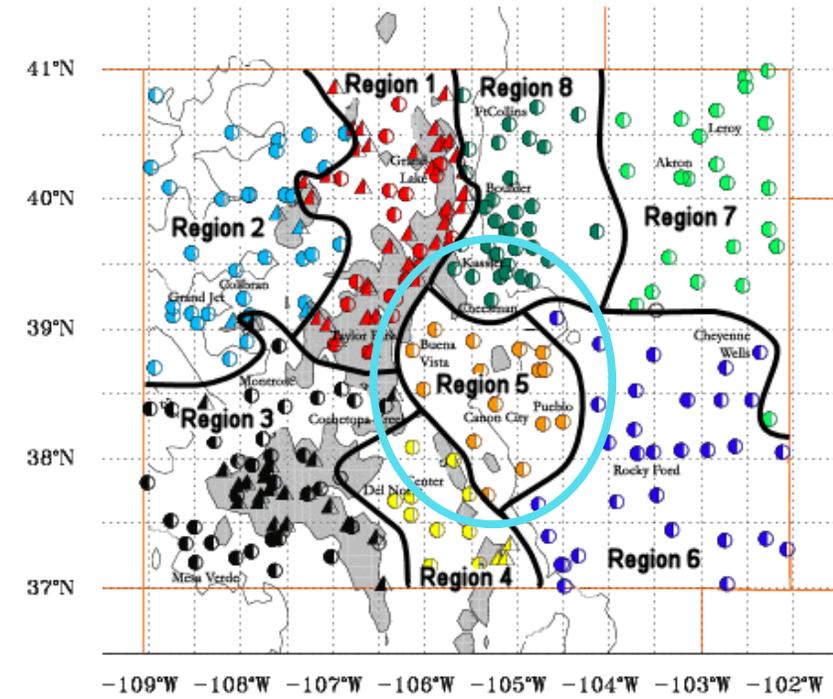
Daily Temperature Data – PUEBLO MEMORIAL AP, CO

Period of Record – 1954-06-16 to 2019-02-17. Normals period: 1981-2010. Click and drag to zoom chart.



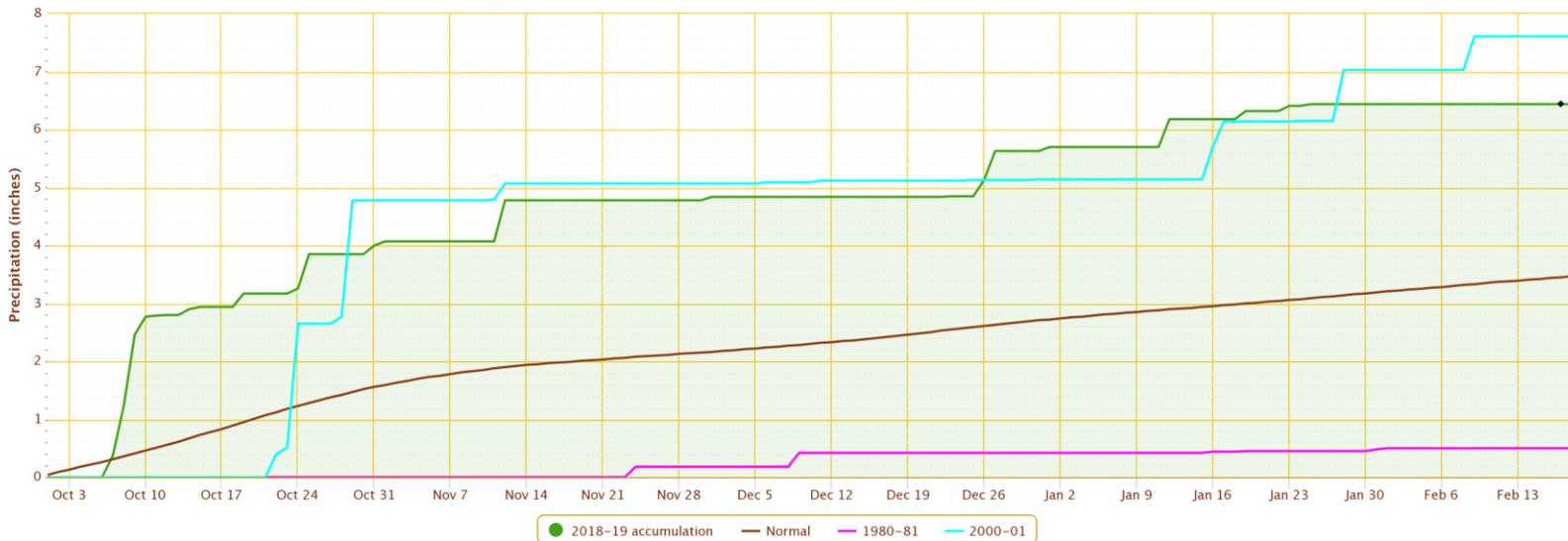
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Accumulated Precipitation - WALSH 1 W, CO

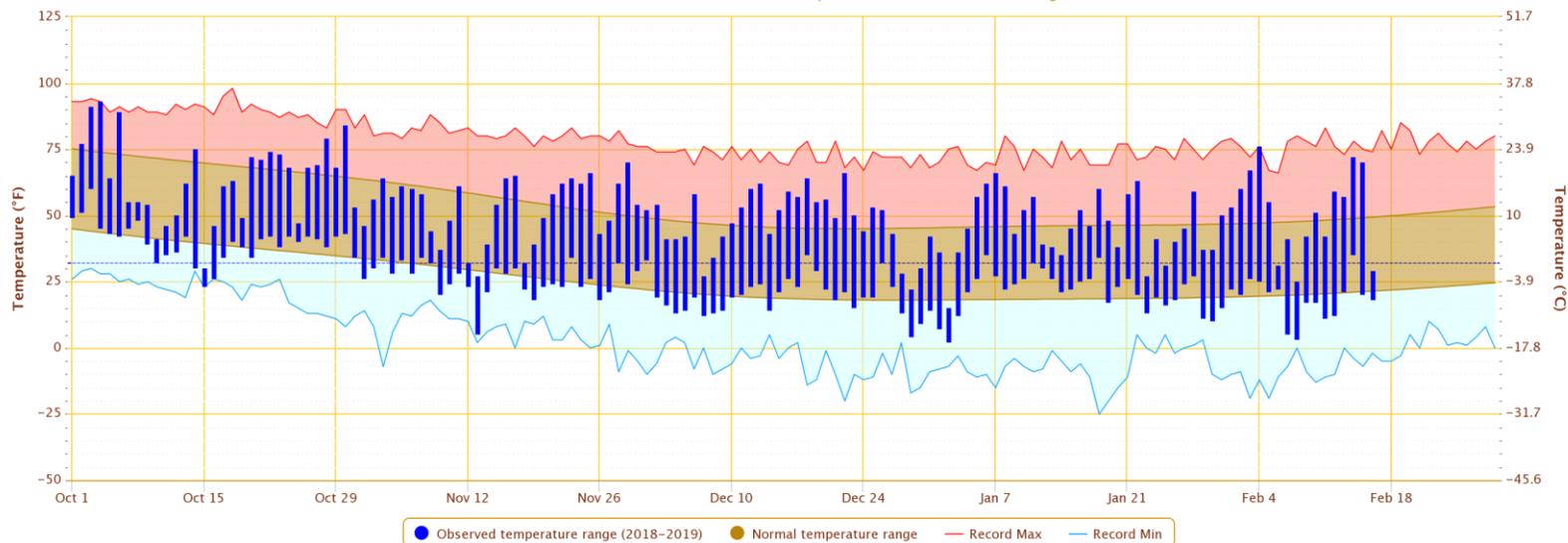
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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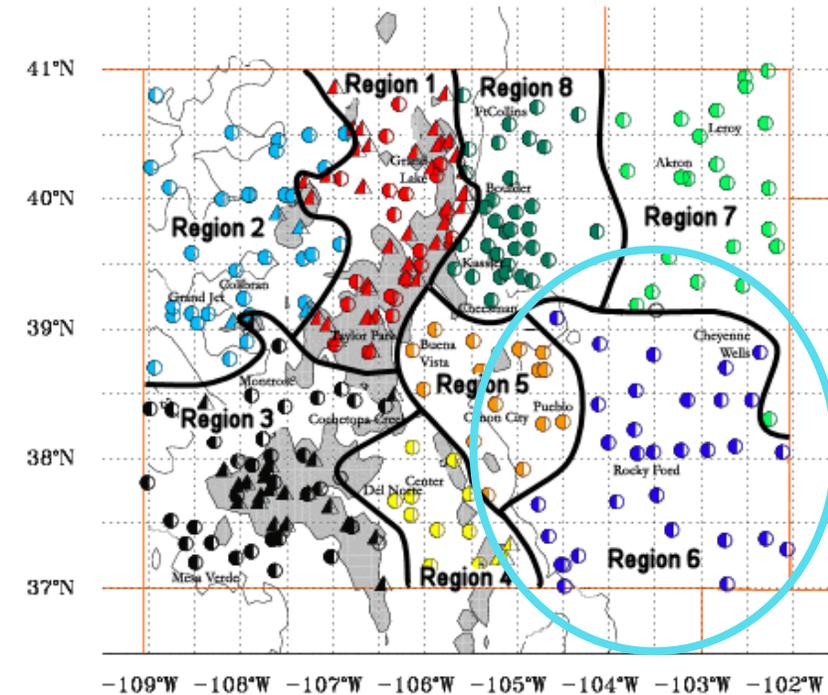
Daily Temperature Data - WALSH 1 W, CO

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



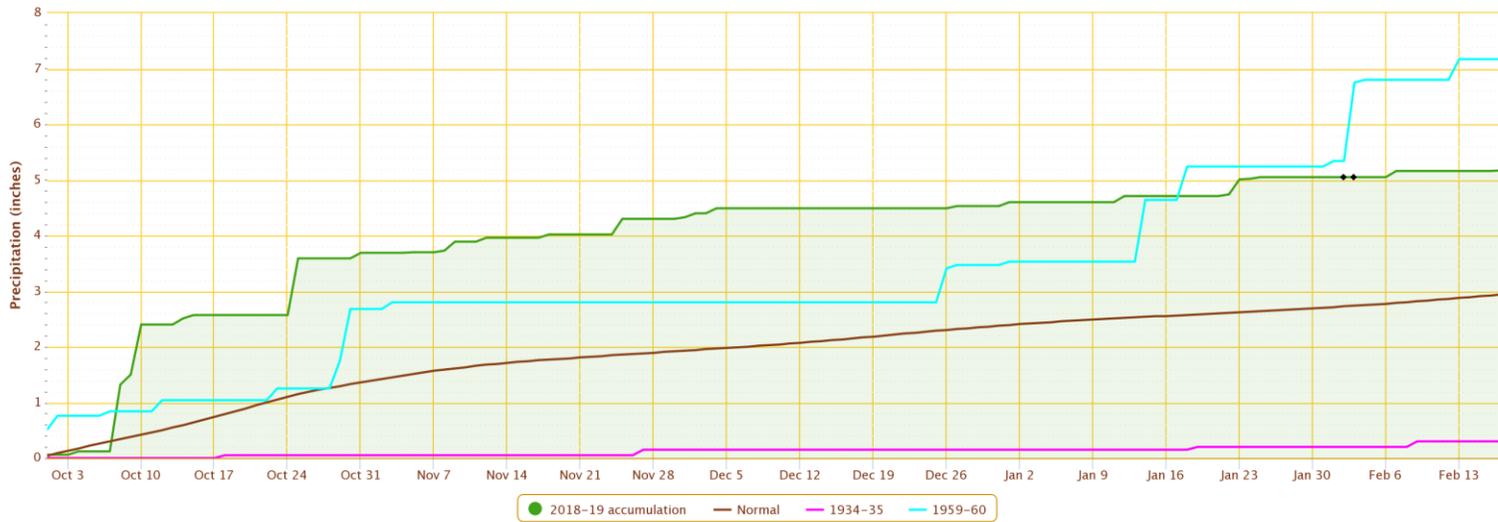
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Accumulated Precipitation – BURLINGTON, CO

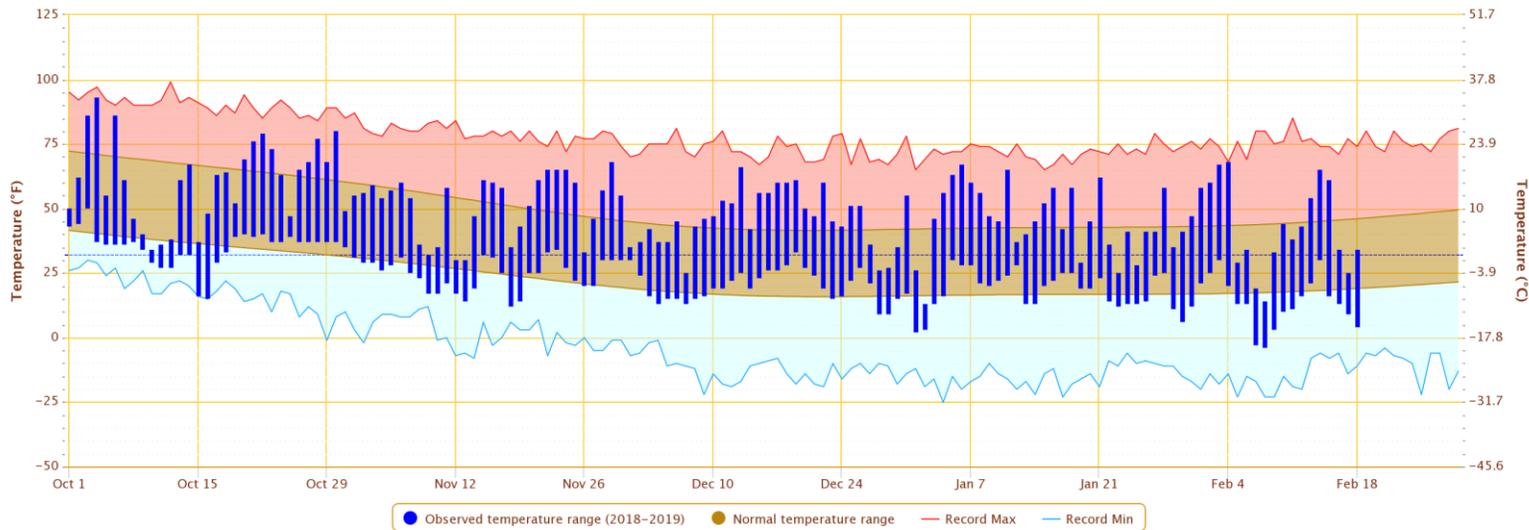
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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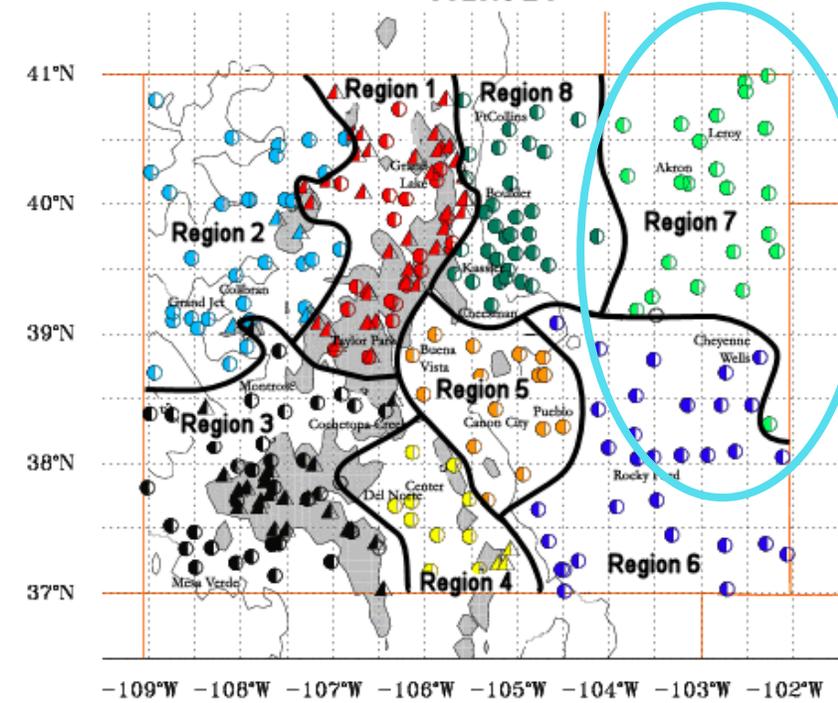
Daily Temperature Data – BURLINGTON, CO

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



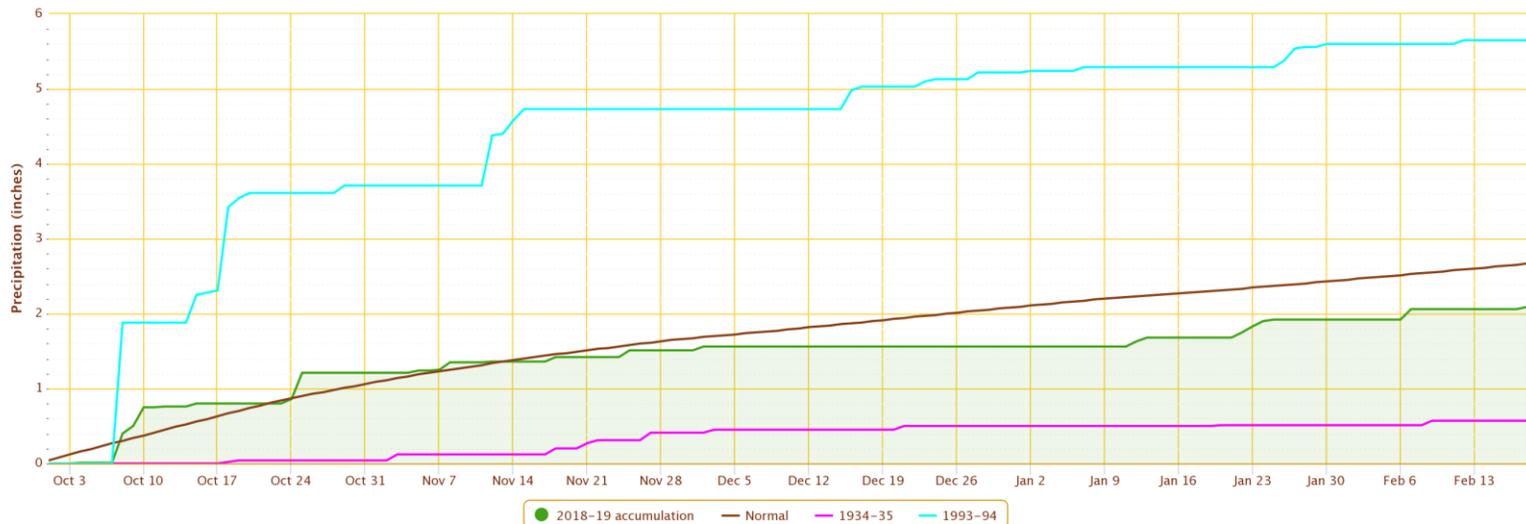
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Accumulated Precipitation – AKRON 4 E, CO

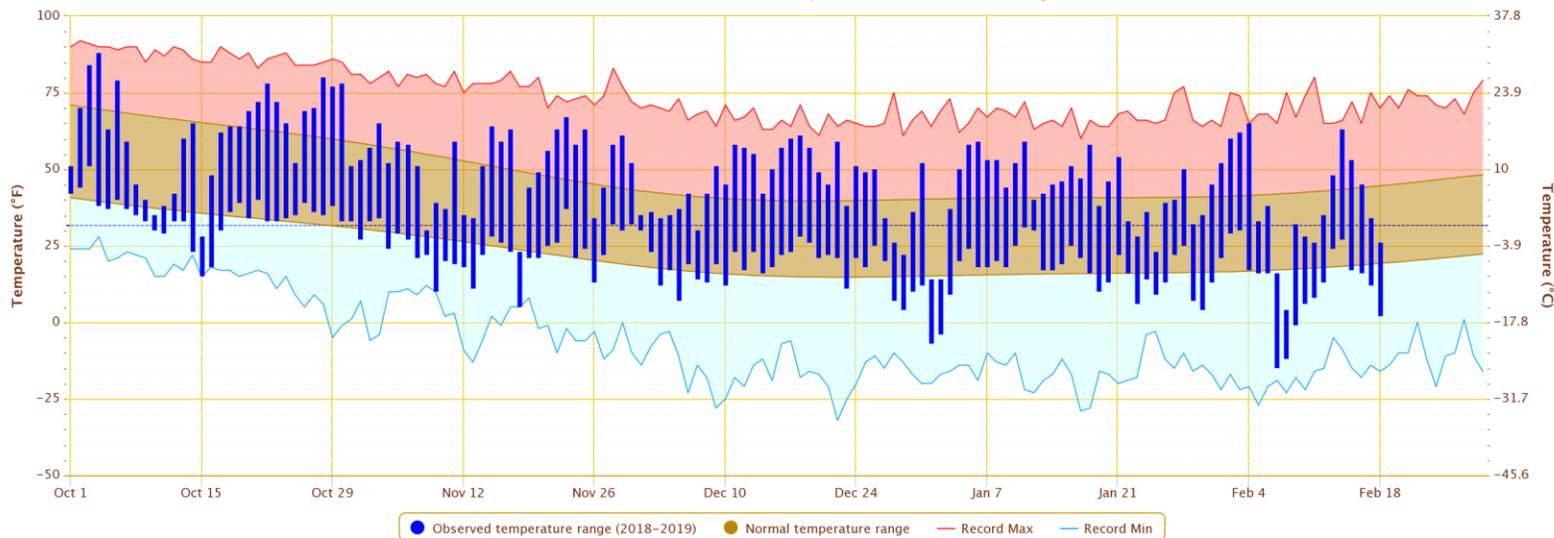
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



Powered by ACIS

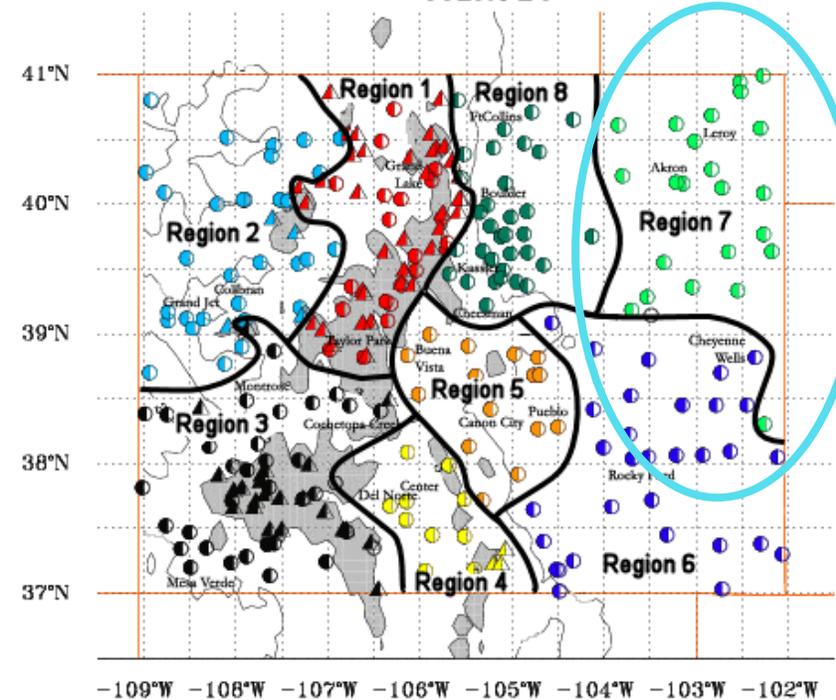
Daily Temperature Data – AKRON 4 E, CO

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



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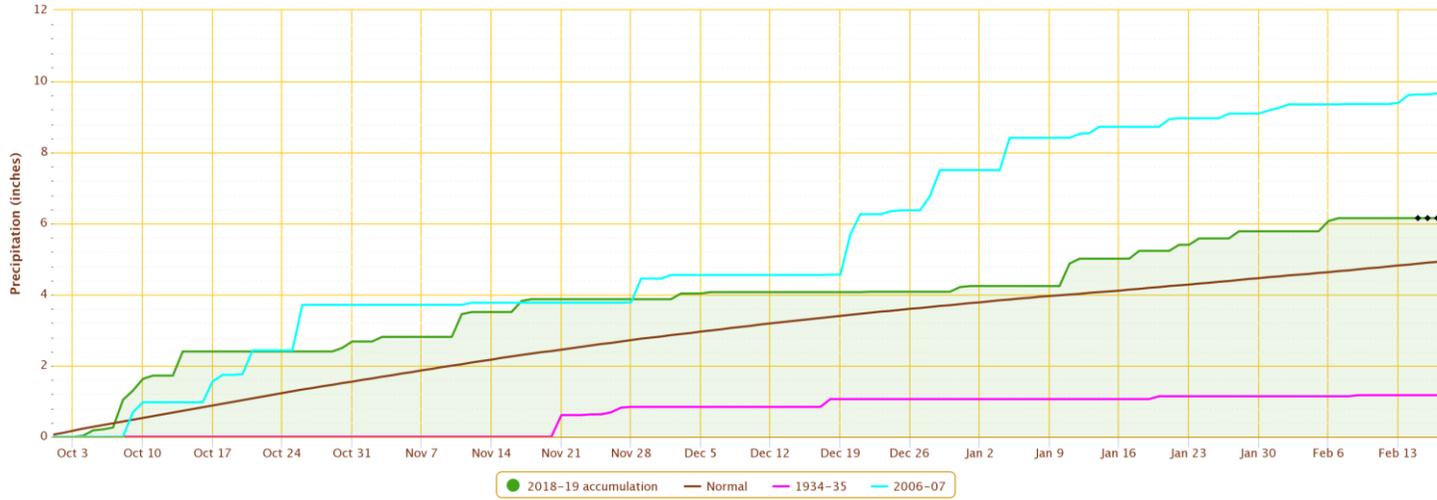


-109°W -108°W -107°W -106°W -105°W -104°W -103°W -102°W



Accumulated Precipitation – BOULDER, CO

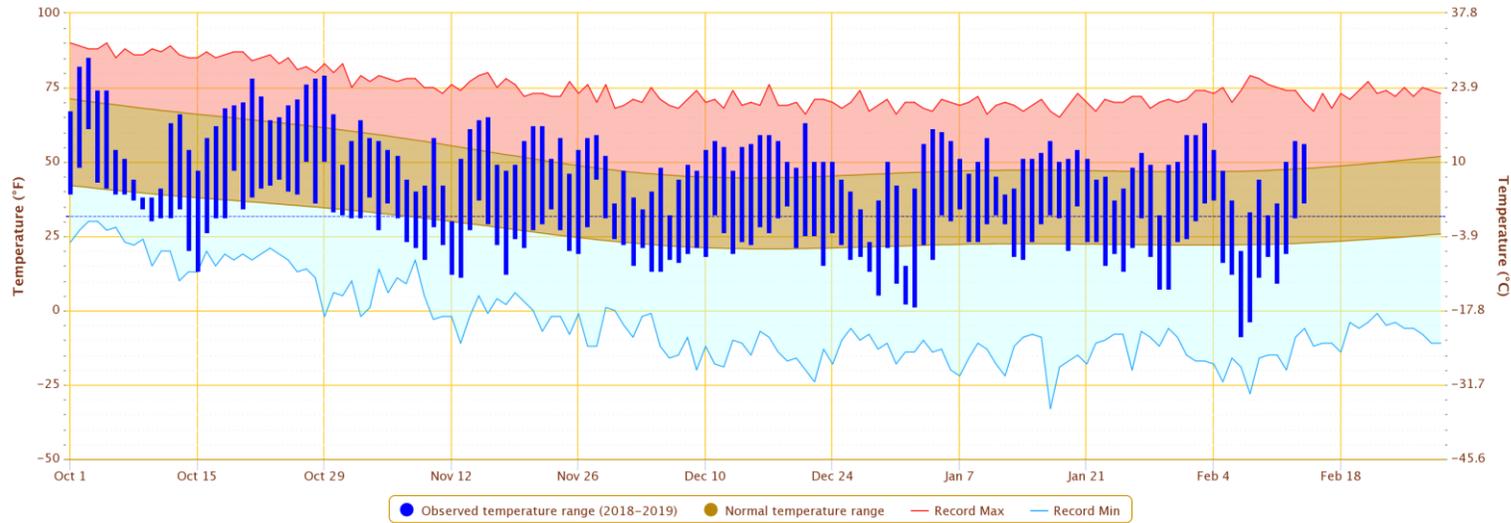
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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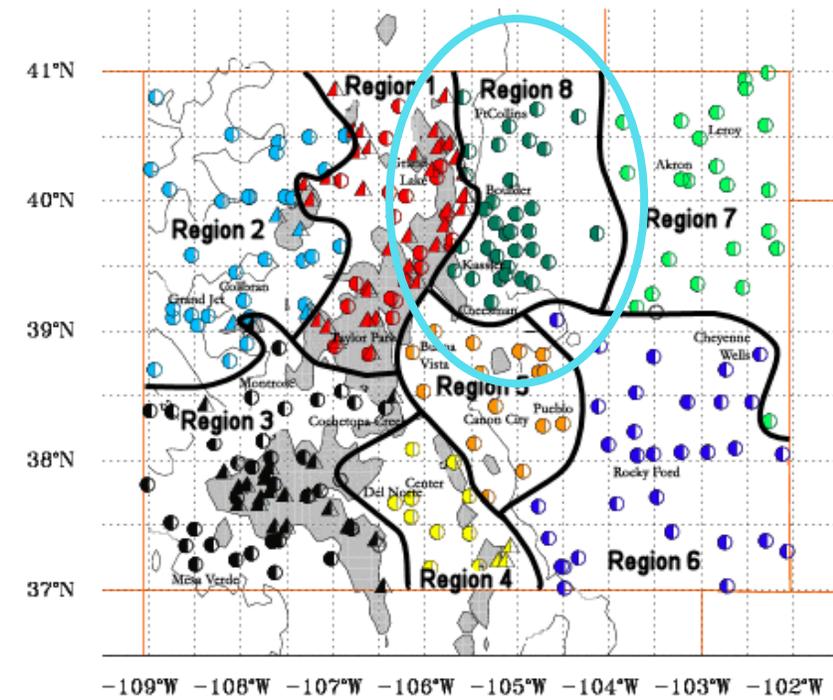
Daily Temperature Data – BOULDER, CO

Period of Record - 1893-10-01 to 2019-02-14. Normals period: 1981-2010. Click and drag to zoom chart.



Powered by ACIS

COLORADO

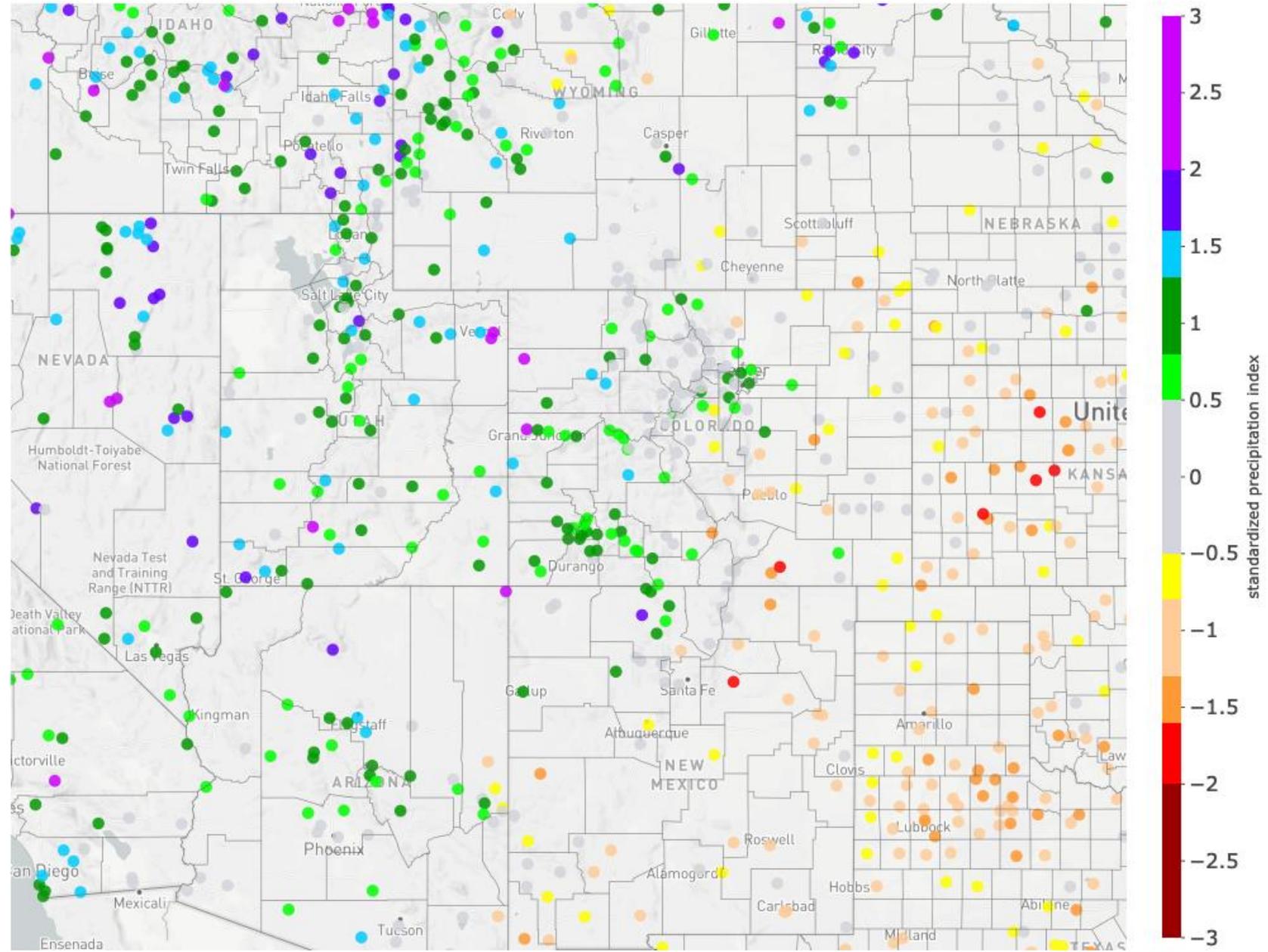




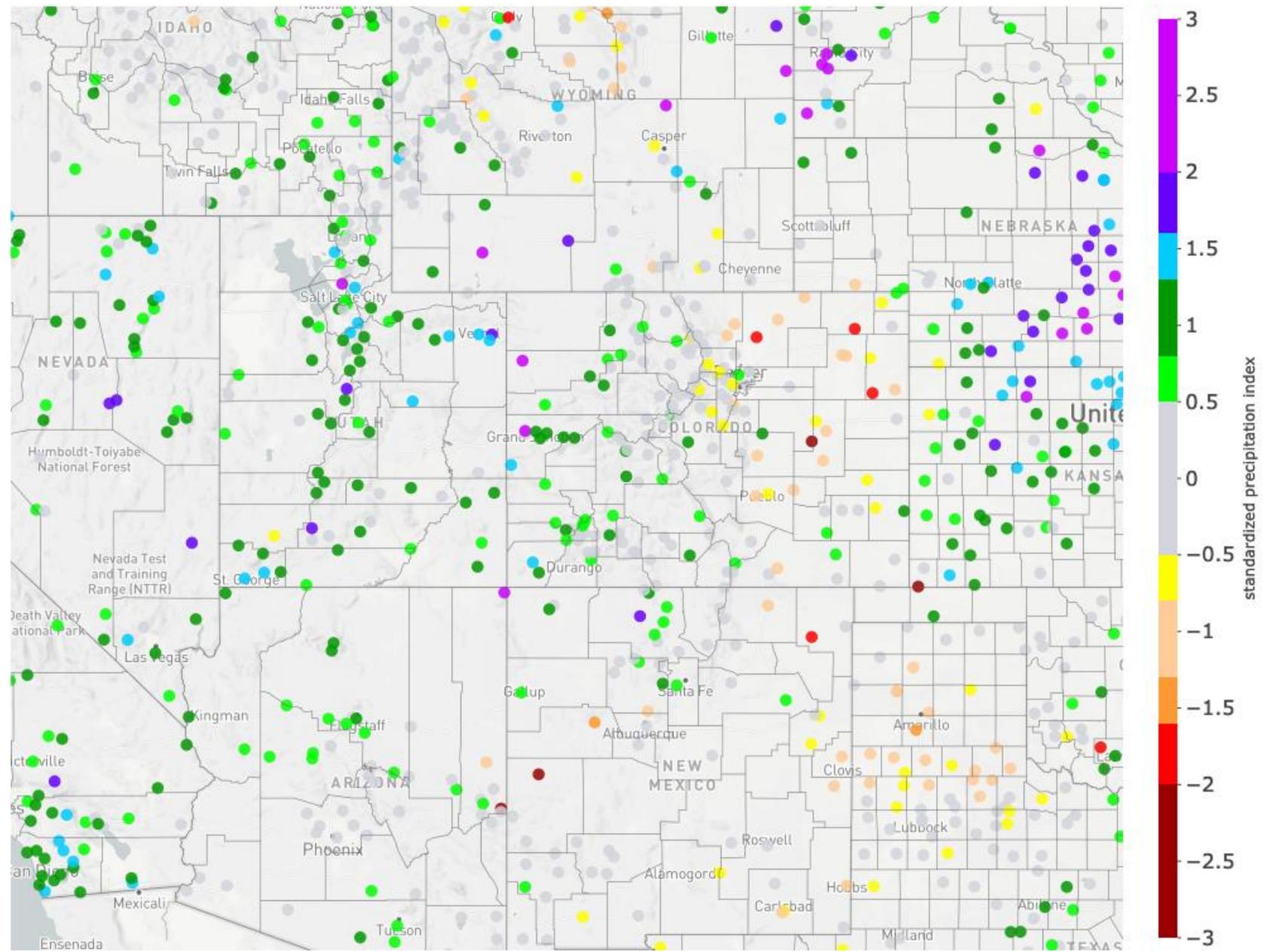
Colorado Drought



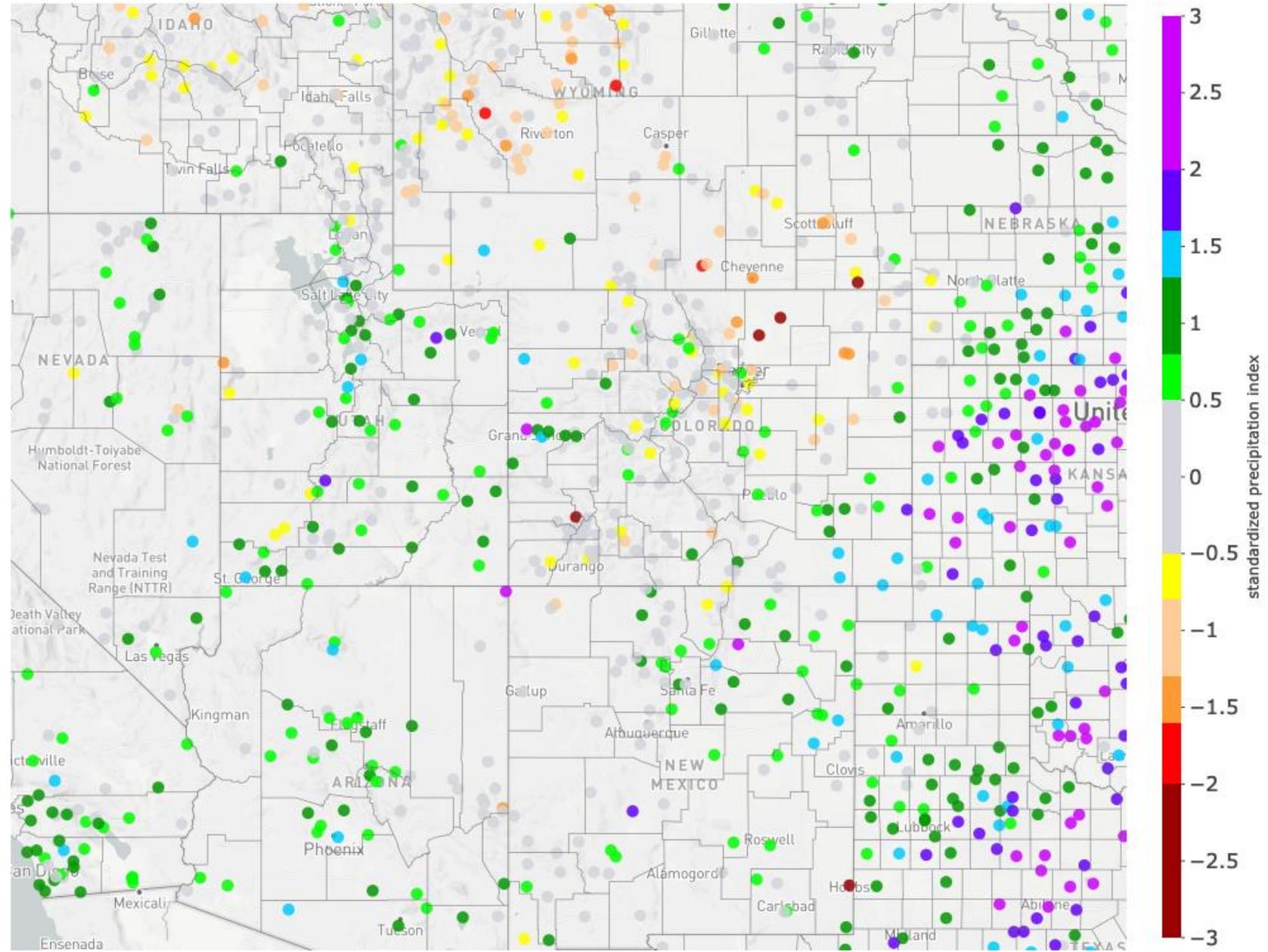
30-day Standardized Precipitation Index: 1/19/2019 - 2/17/2019



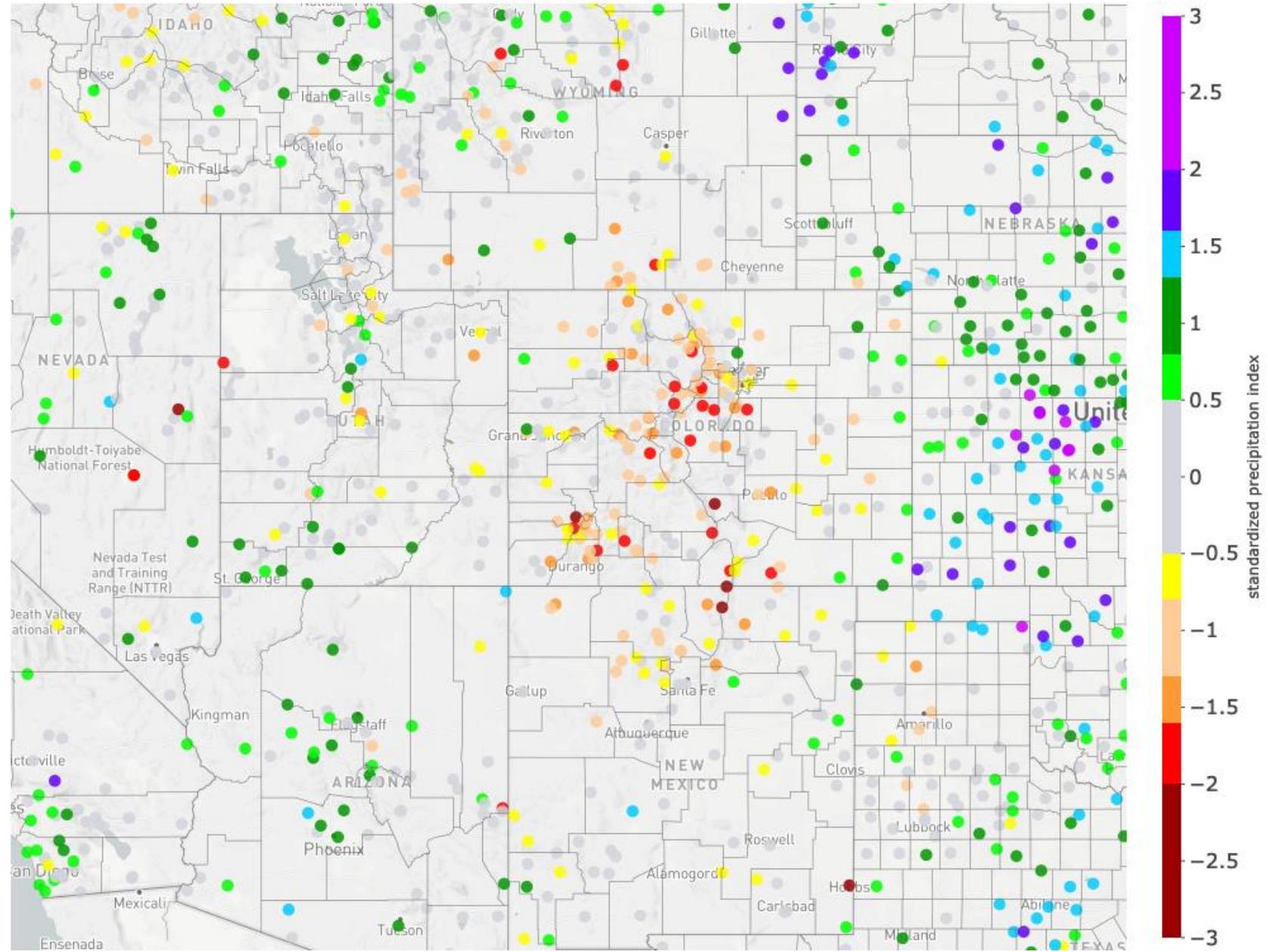
90-day Standardized Precipitation Index: 11/20/2018 - 2/17/2019



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

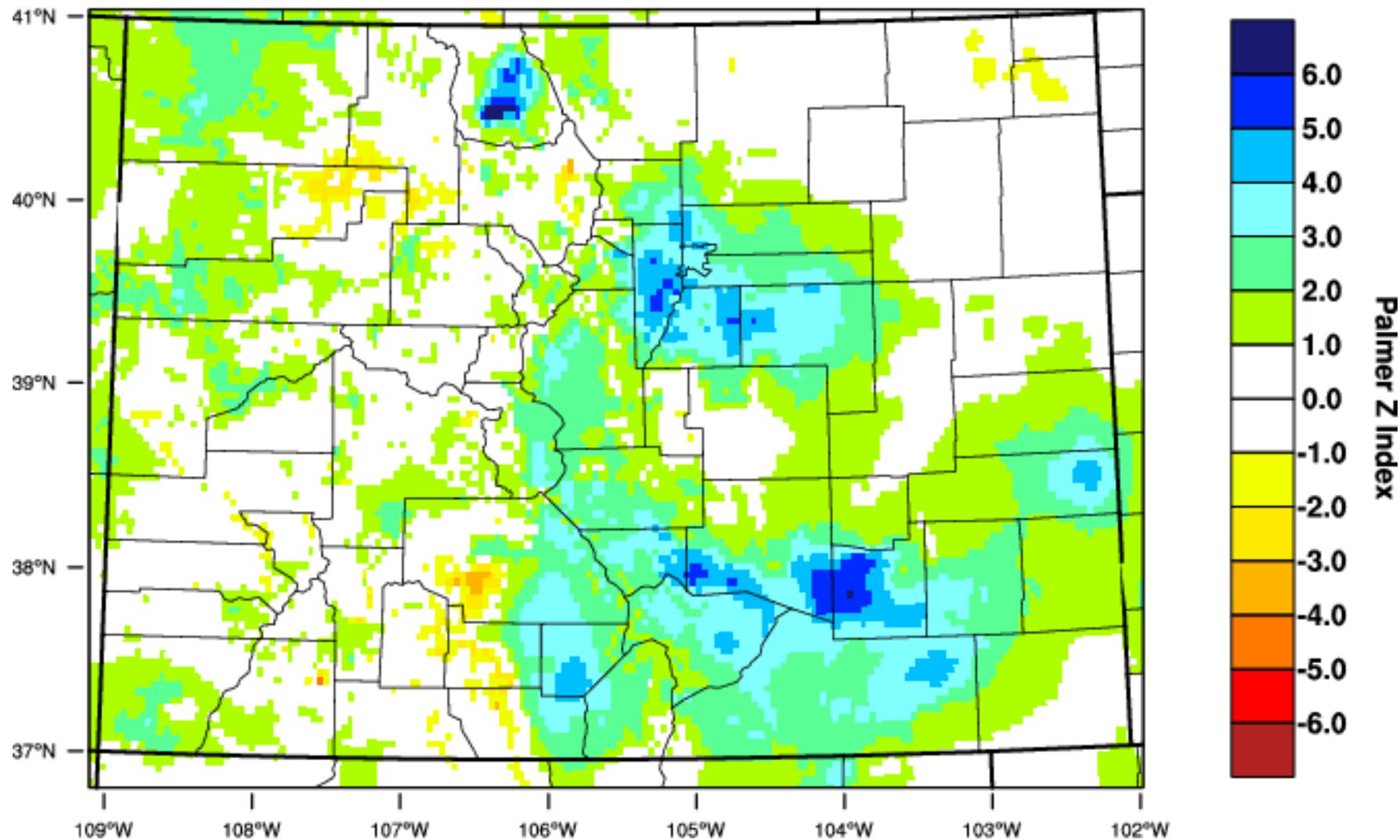


12-month Standardized Precipitation Index: 2/18/2018 - 2/17/2019



Colorado - Palmer Z-Index

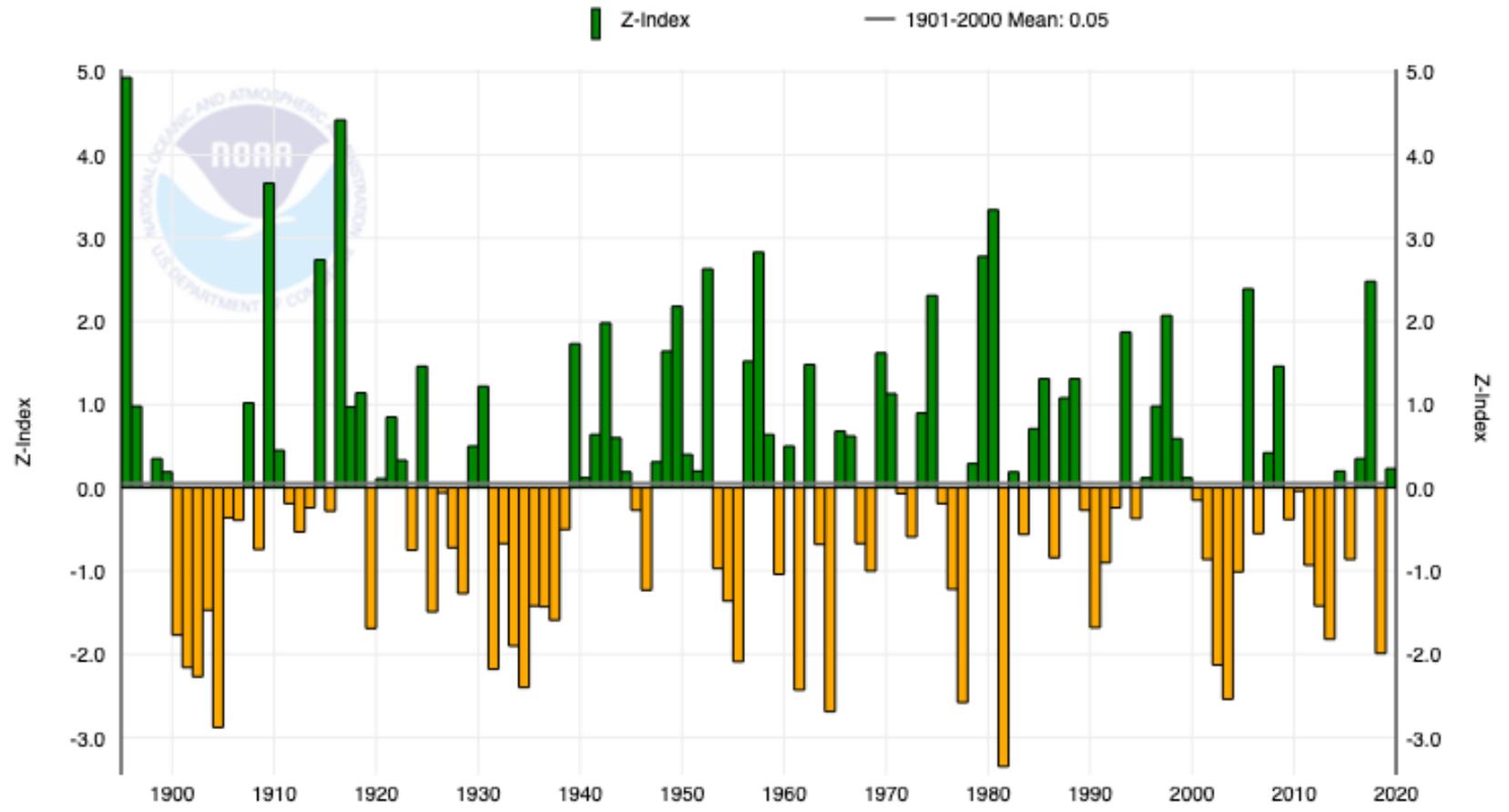
January 2019



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



Colorado, Palmer Z-Index, January

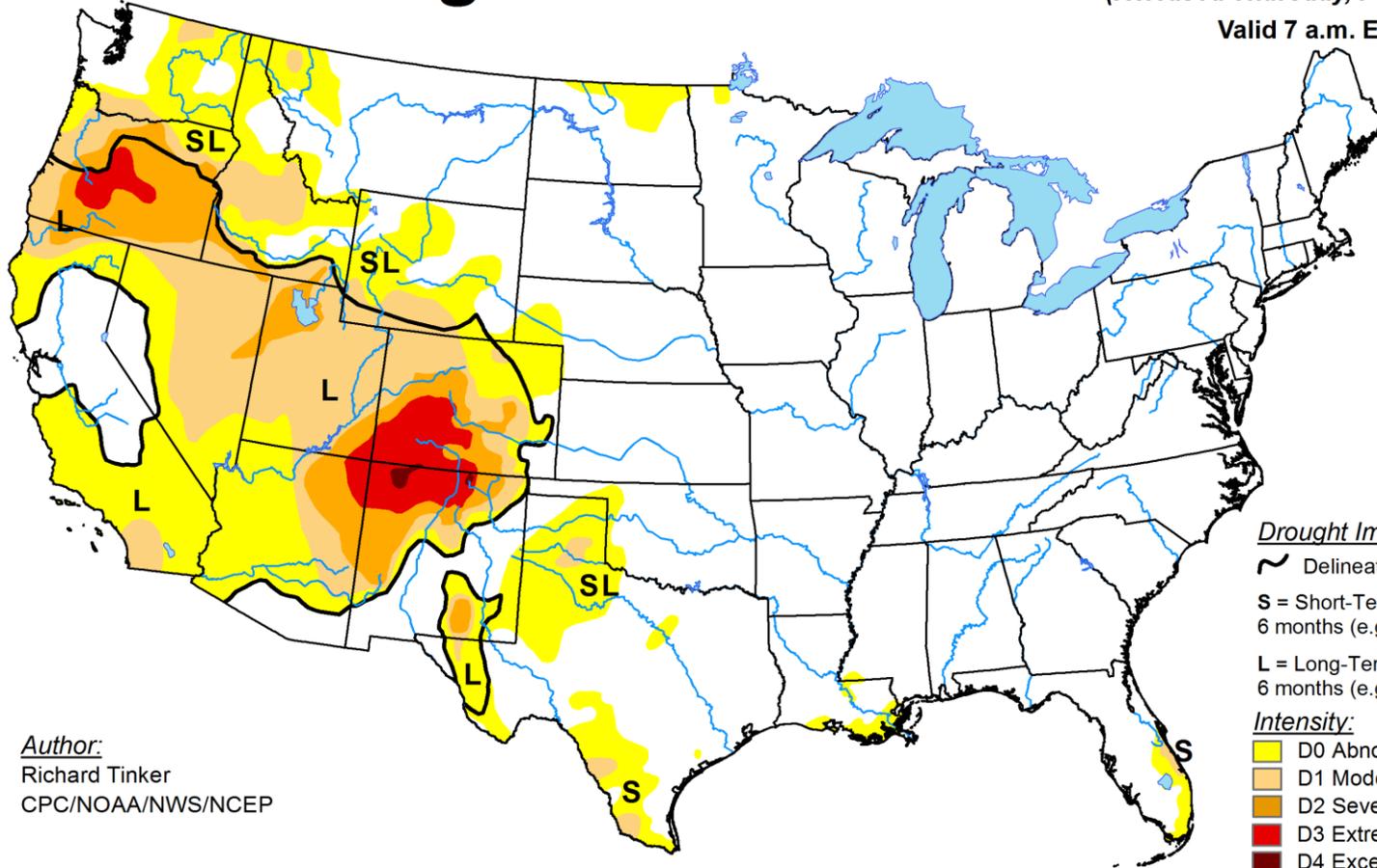


U.S. Drought Monitor

February 12, 2019

(Released Thursday, Feb. 14, 2019)

Valid 7 a.m. EST



Author:
Richard Tinker
CPC/NOAA/NWS/NCEP

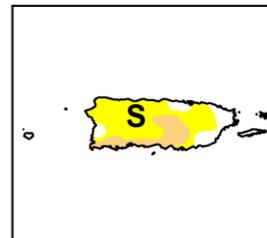
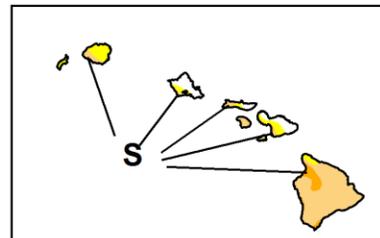
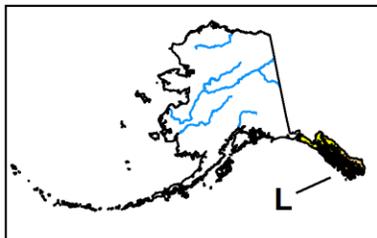
Drought Impact Types:

- ~ 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:

- Yellow: D0 Abnormally Dry
- Light Orange: D1 Moderate Drought
- Orange: D2 Severe Drought
- Red: D3 Extreme Drought
- Dark Red: D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.



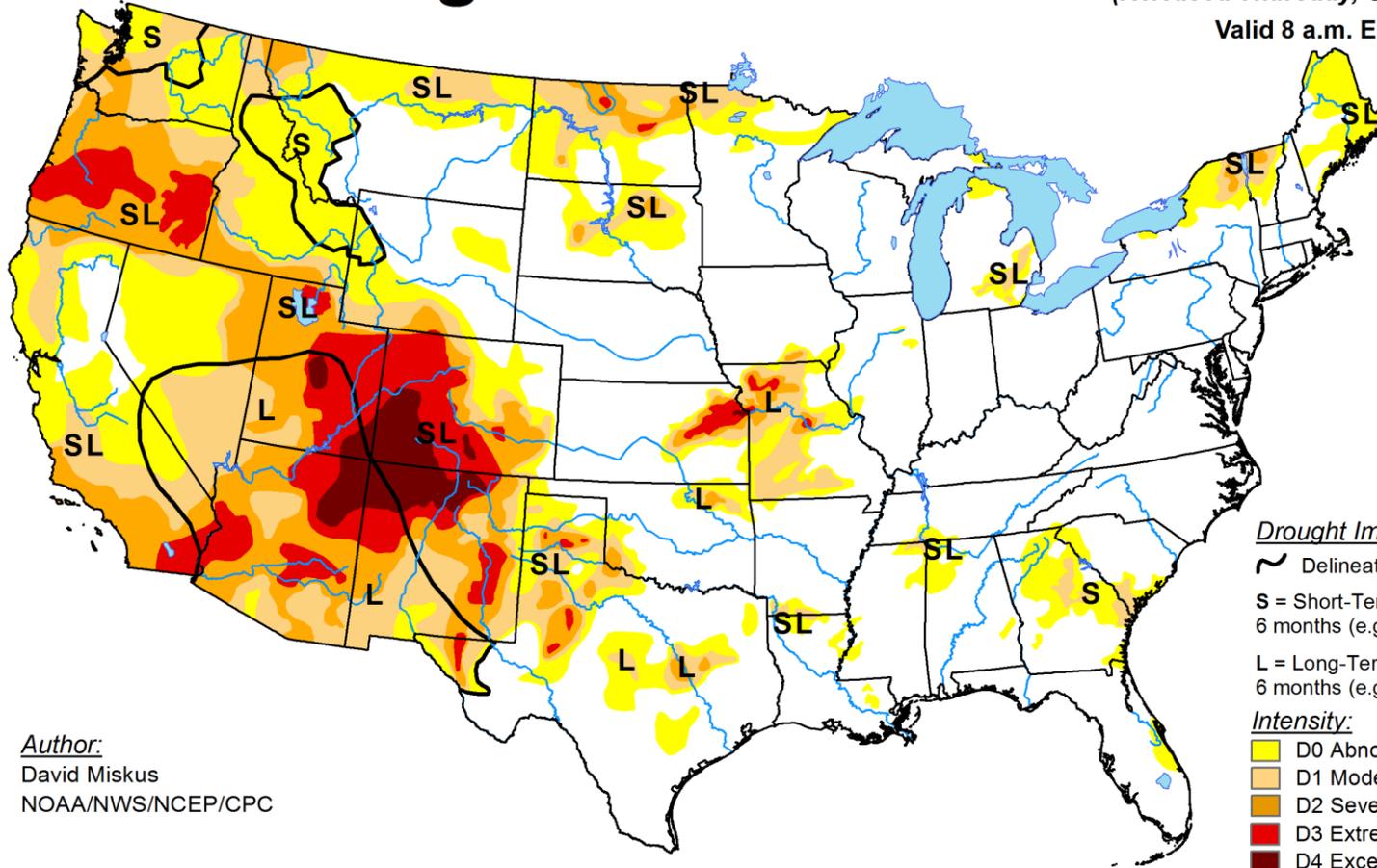
<http://droughtmonitor.unl.edu/>



U.S. Drought Monitor

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

Valid 8 a.m. EDT



Author:
David Miskus
NOAA/NWS/NCEP/CPC

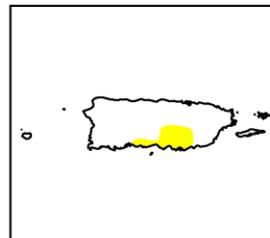
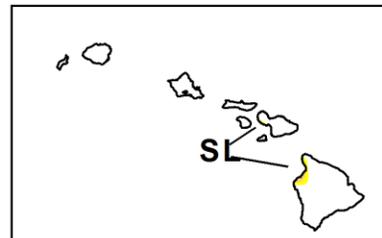
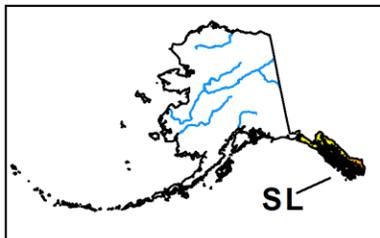
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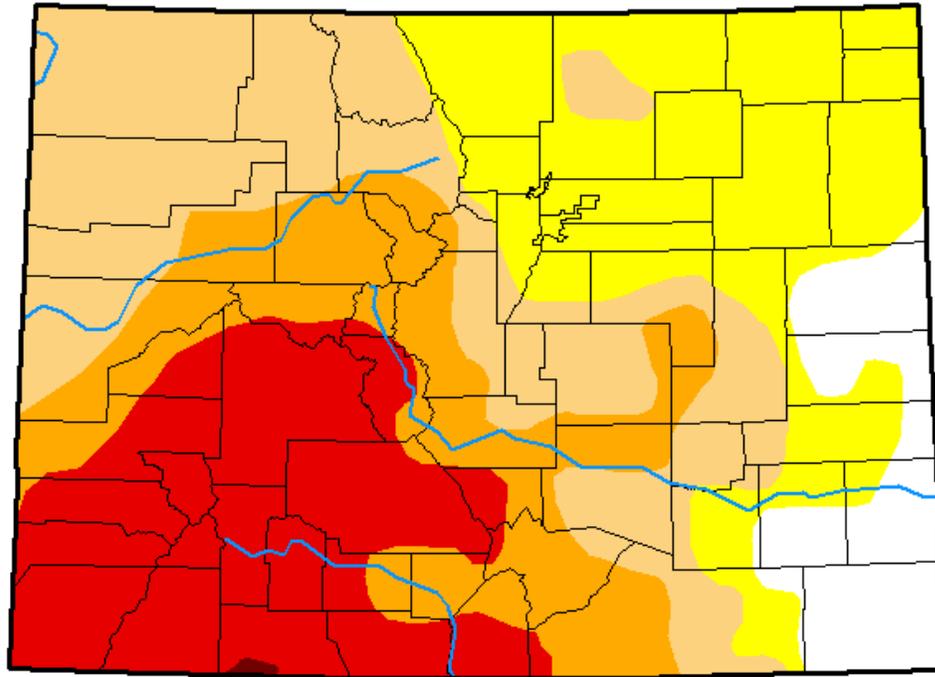


<http://droughtmonitor.unl.edu/>



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
Current	8.15	91.85	67.16	39.69	21.84	0.11
Last Week <i>02-05-2019</i>	8.14	91.86	67.16	40.83	22.05	2.96
3 Months Ago <i>11-13-2018</i>	16.64	83.36	66.26	54.82	34.13	13.35
Start of Calendar Year <i>01-01-2019</i>	17.94	82.06	66.26	54.91	27.11	11.22
Start of Water Year <i>09-25-2018</i>	14.19	85.81	72.30	64.41	48.47	16.21
One Year Ago <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

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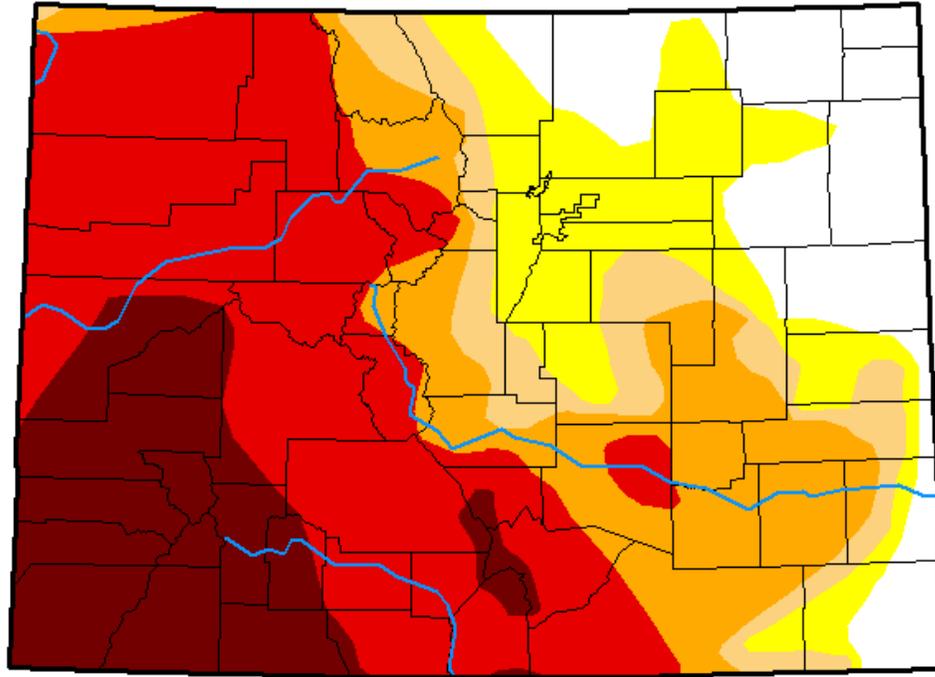


<http://droughtmonitor.unl.edu/>



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
Current	14.19	85.81	72.30	64.41	48.47	16.21
Last Week 09-25-2018	14.19	85.81	72.30	64.41	48.47	16.21
3 Months Ago 07-03-2018	20.46	79.54	67.30	52.31	36.46	8.81
Start of Calendar Year 01-02-2018	6.57	93.43	33.53	7.27	0.00	0.00
Start of Water Year 09-25-2018	14.19	85.81	72.30	64.41	48.47	16.21
One Year Ago 10-03-2017	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:

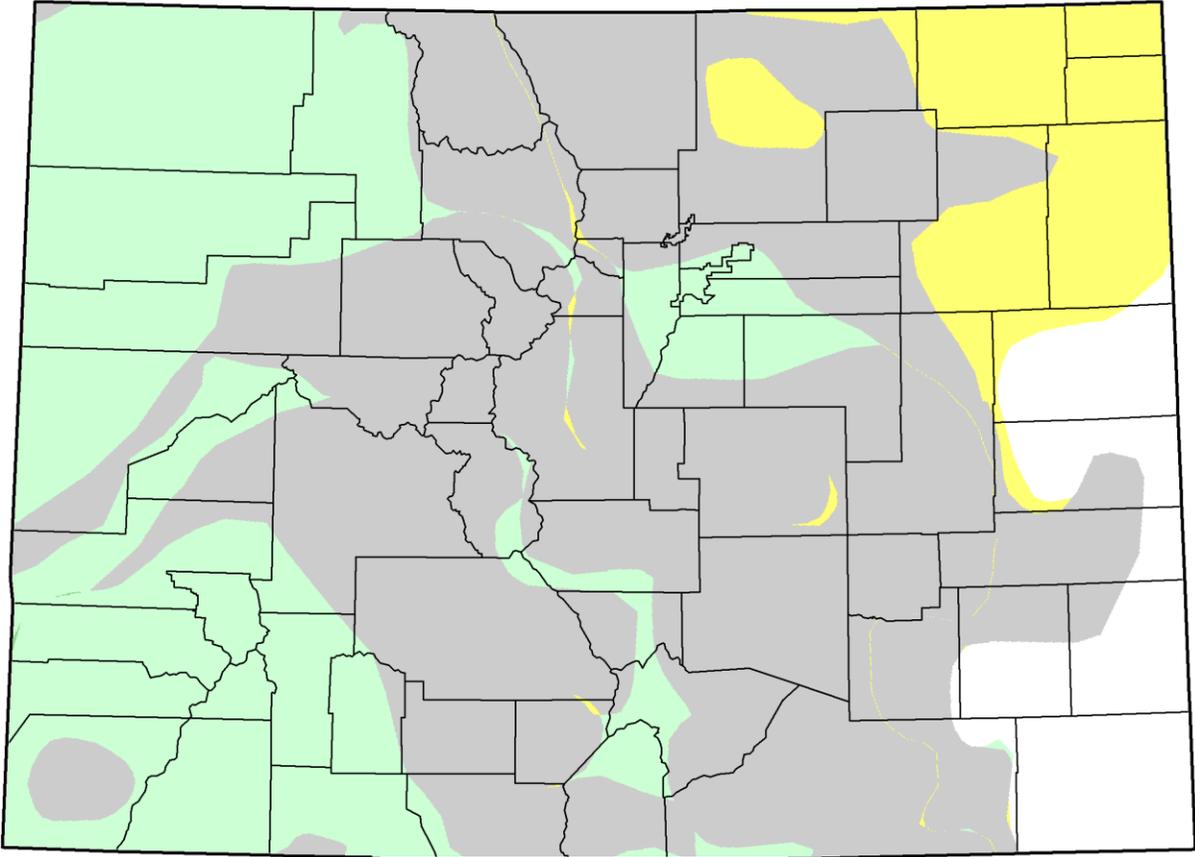
David Miskus
NOAA/NWS/NCEP/CPC



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



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

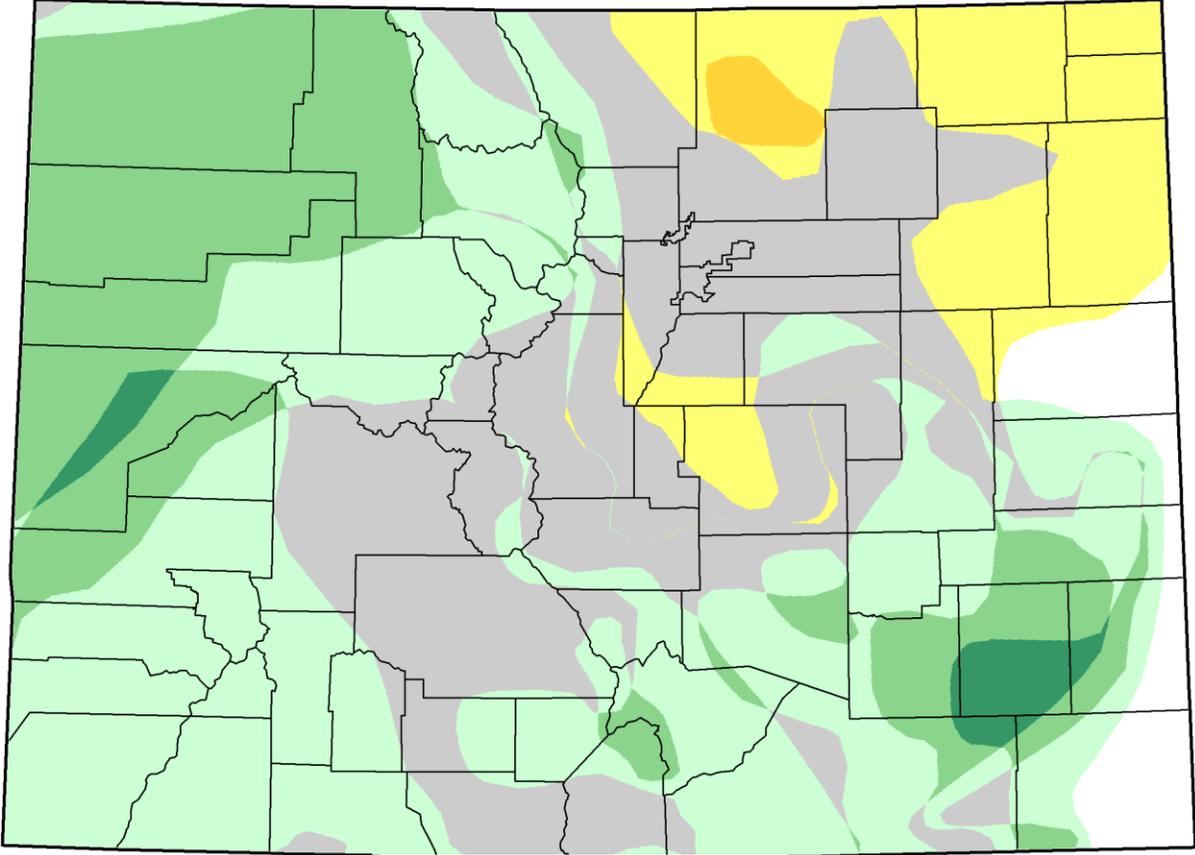


February 12, 2019
compared to
January 15, 2019

<http://droughtmonitor.unl.edu>



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



February 12, 2019
compared to
September 25, 2018

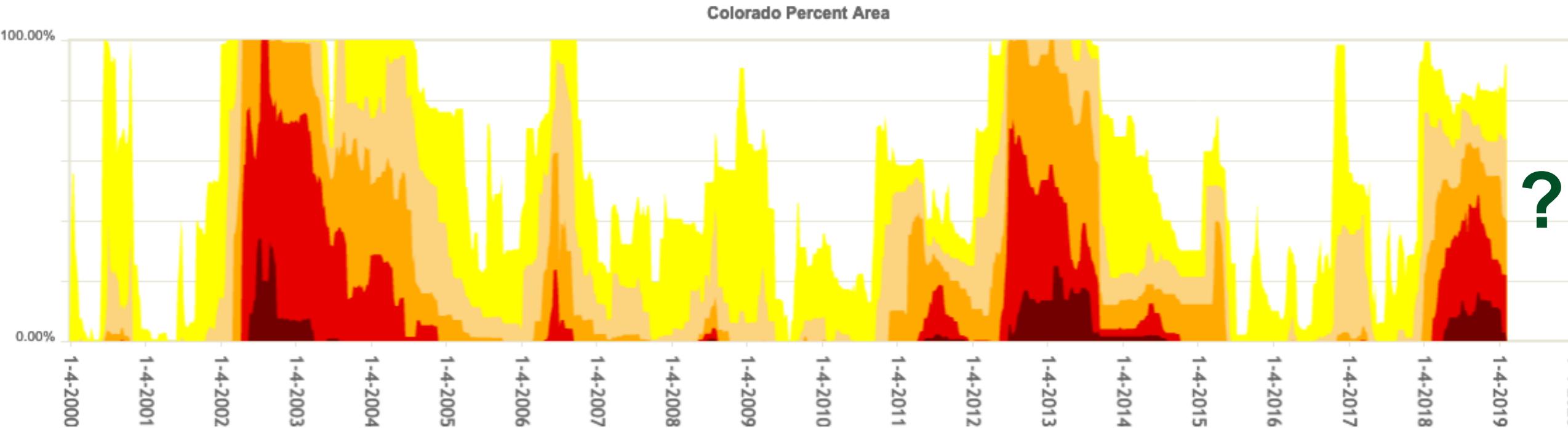
<http://droughtmonitor.unl.edu>



	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



US Drought Monitor: Colorado

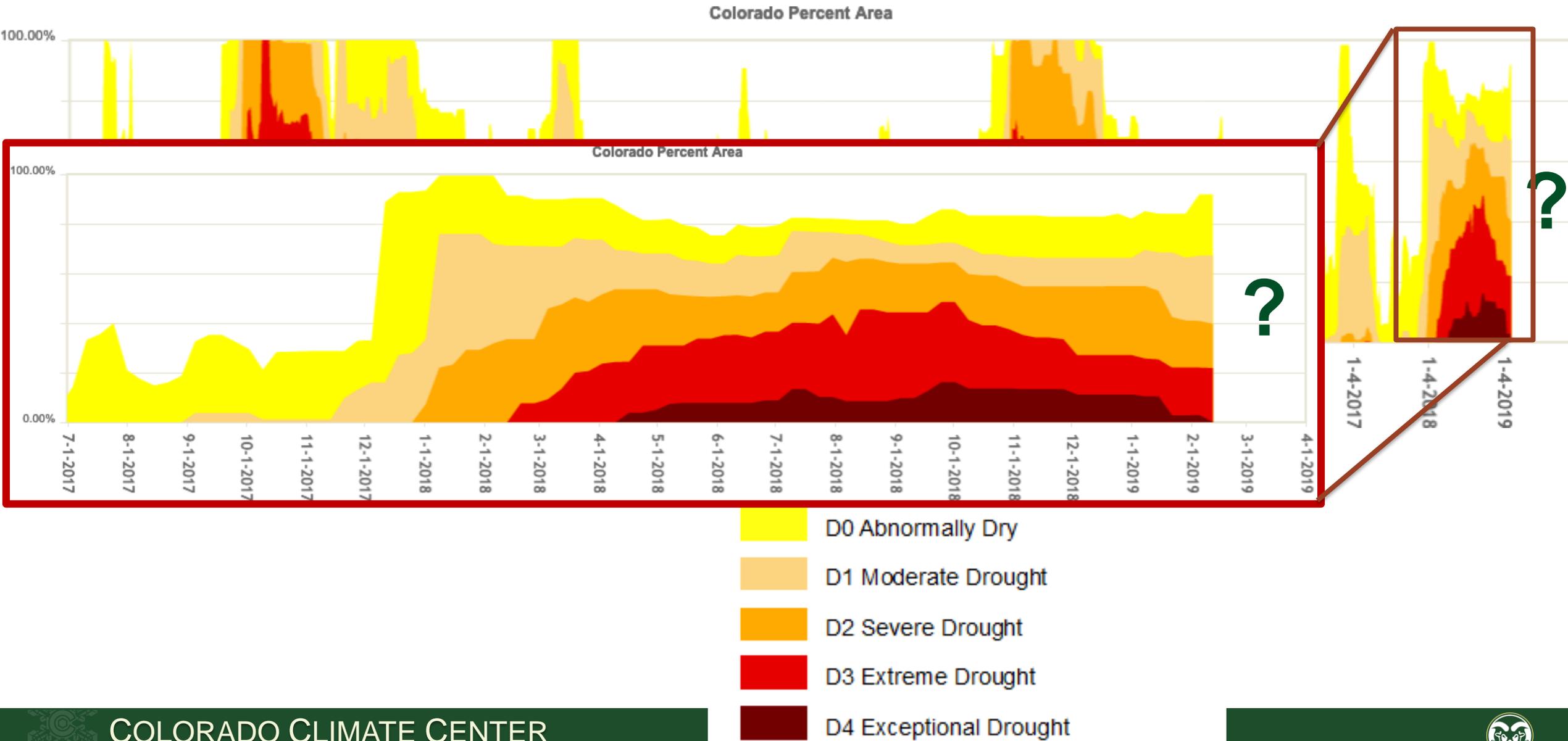


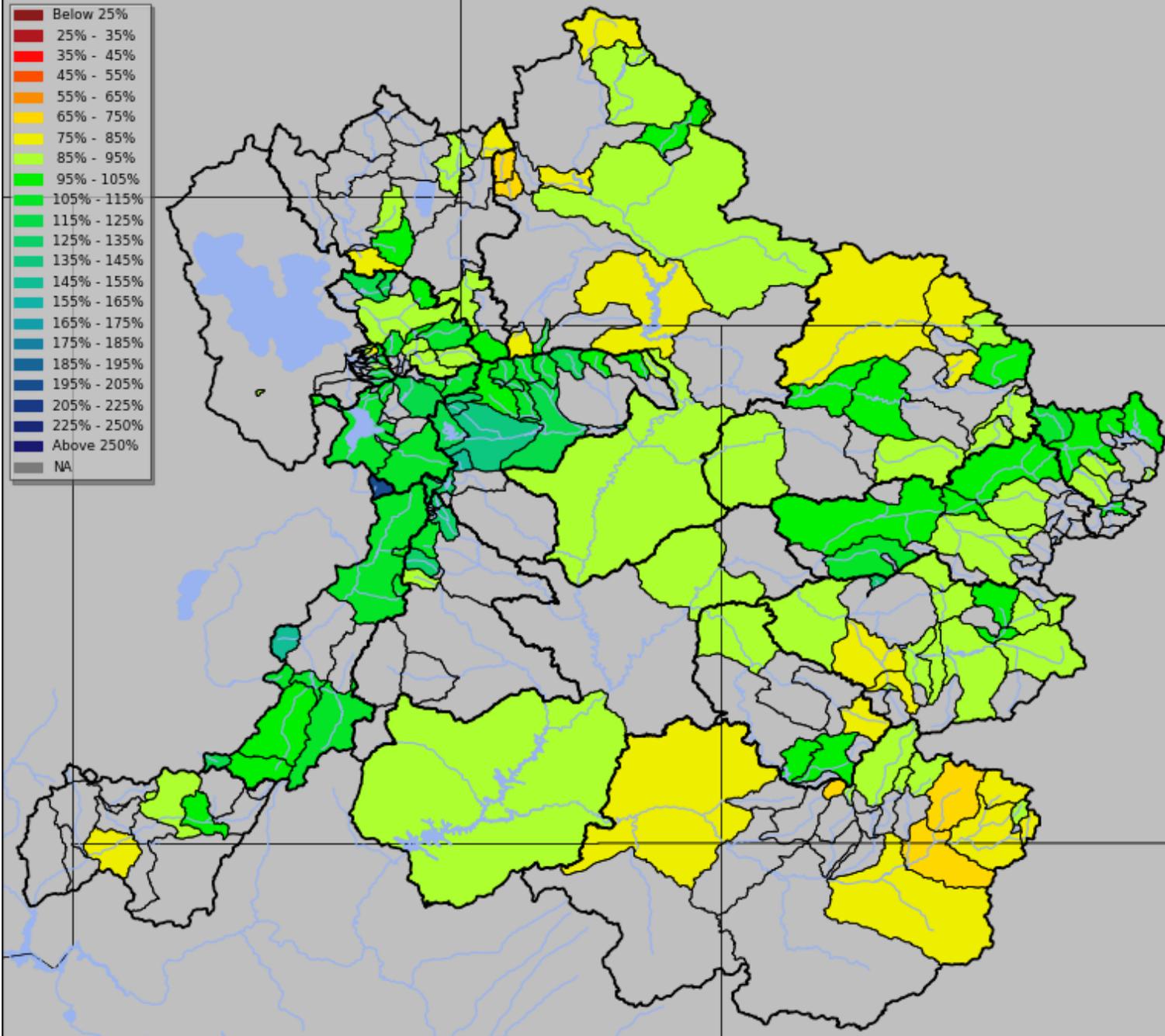
Intensity:

-  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

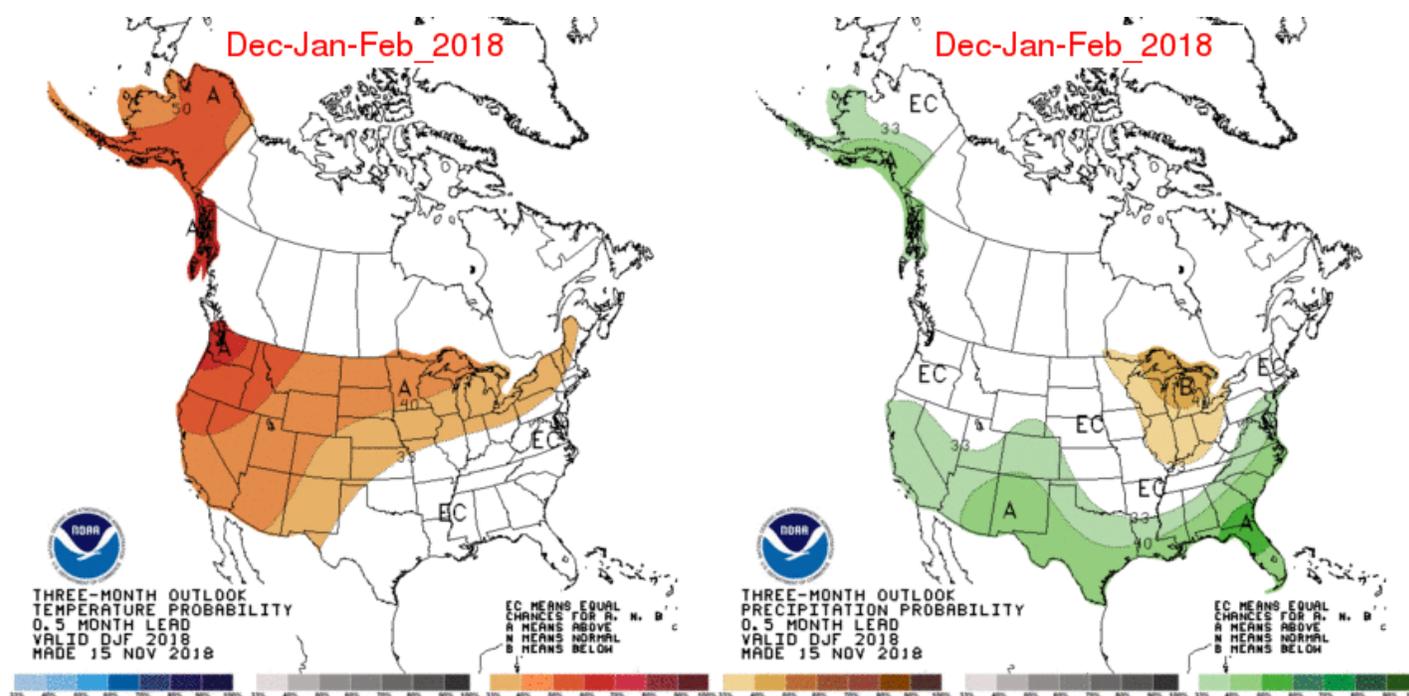




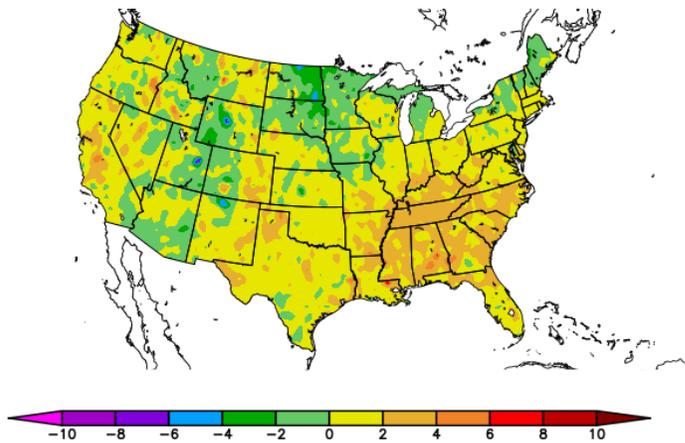
Outlook



Looking back...

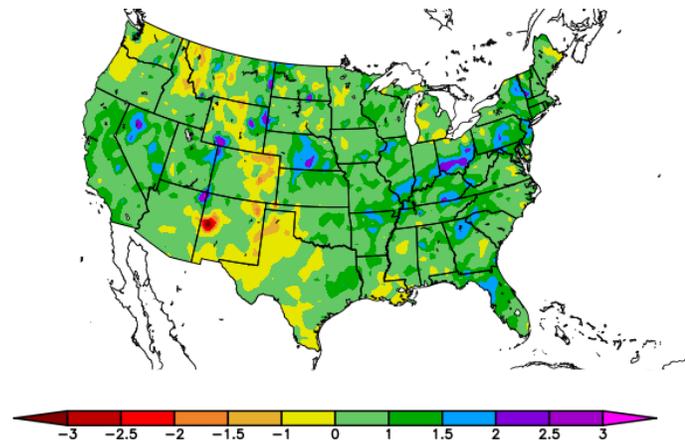


Departure from Normal Temperature (F)
11/20/2018 - 2/17/2019



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

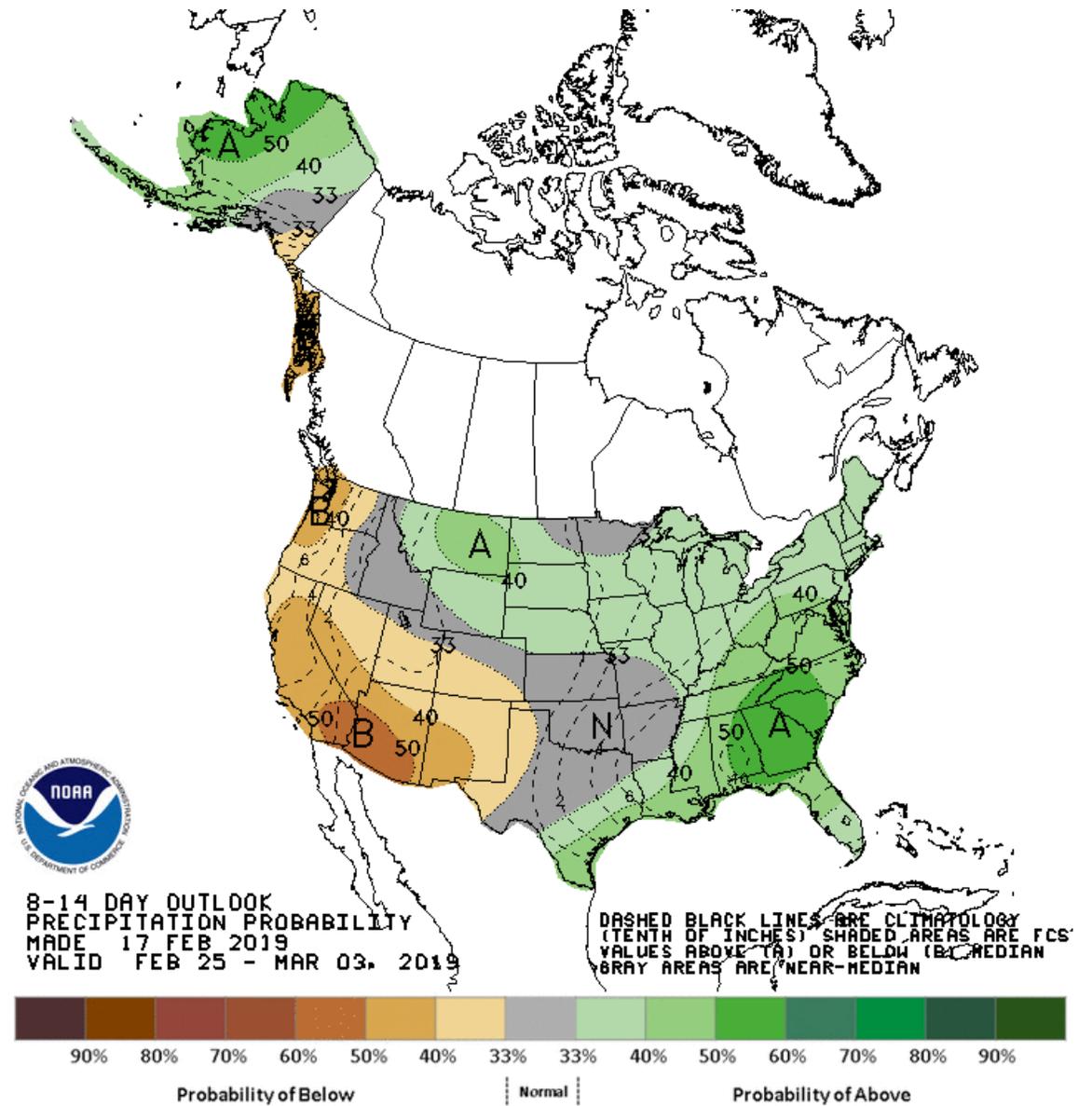
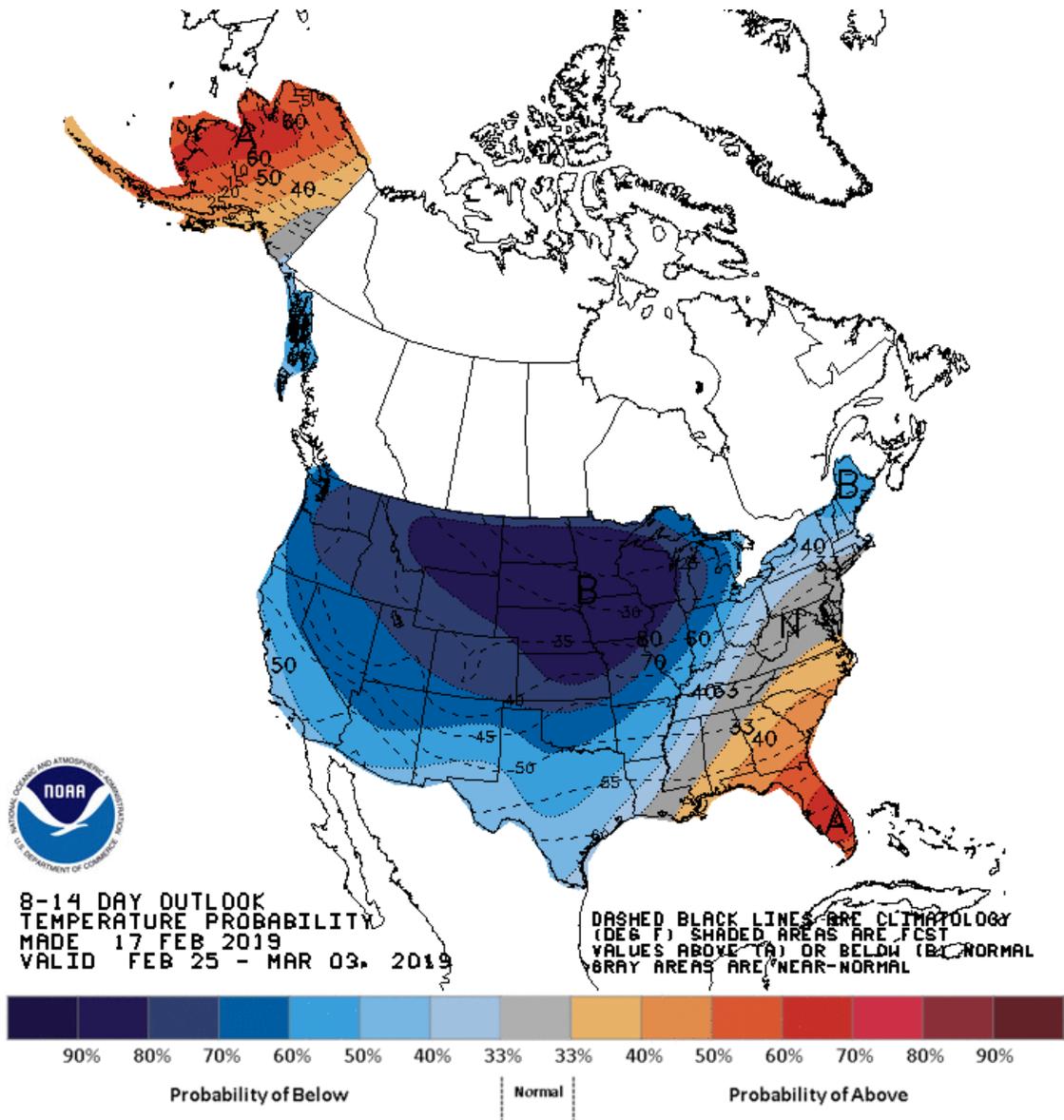
90 Day SPI
11/19/2018 - 2/16/2019



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

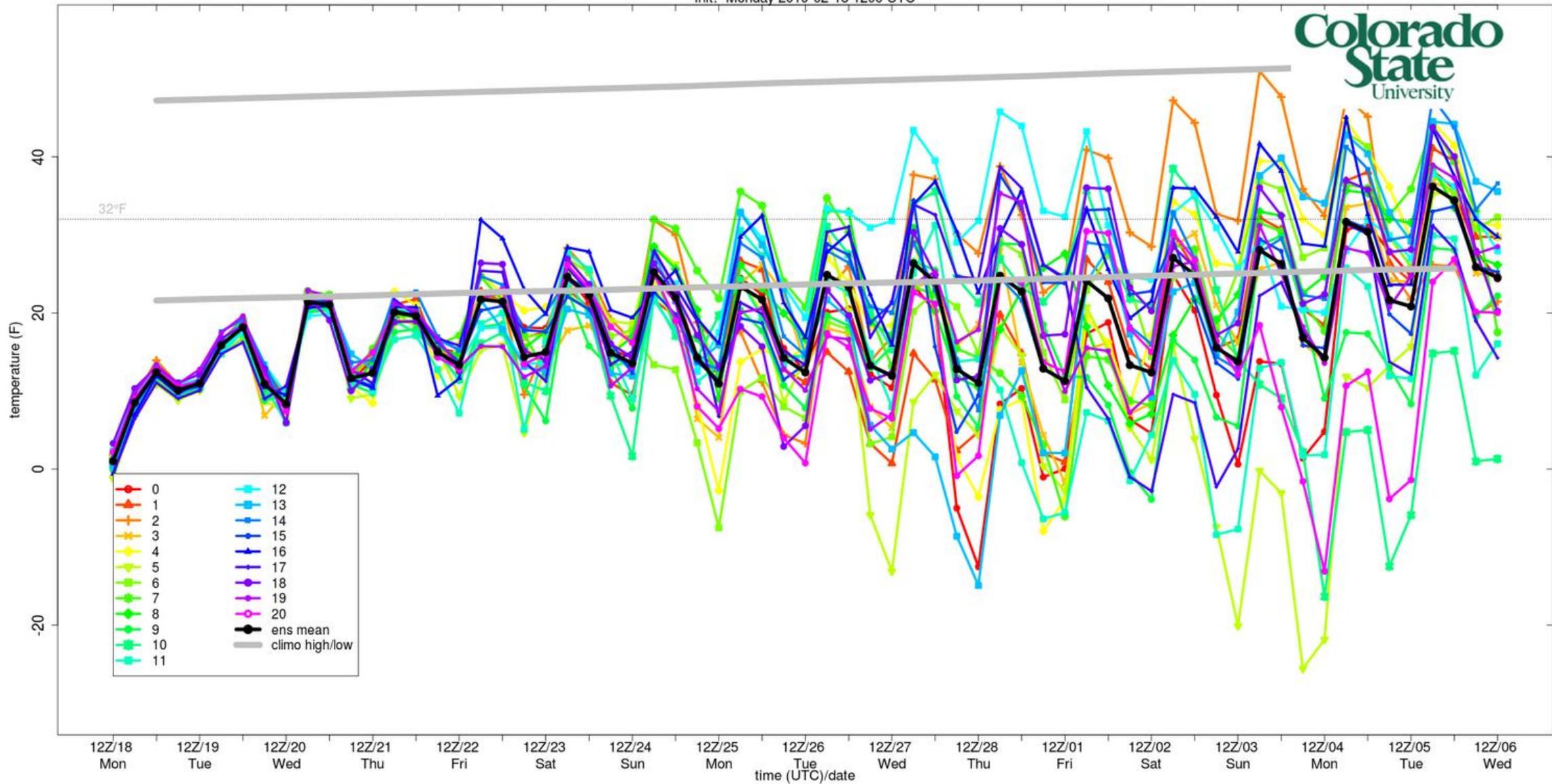
NOAA Regional Climate Centers





NCEP GEFS 2-m temperature at Fort Collins

init: Monday 2019-02-18 1200 UTC



(March 6)

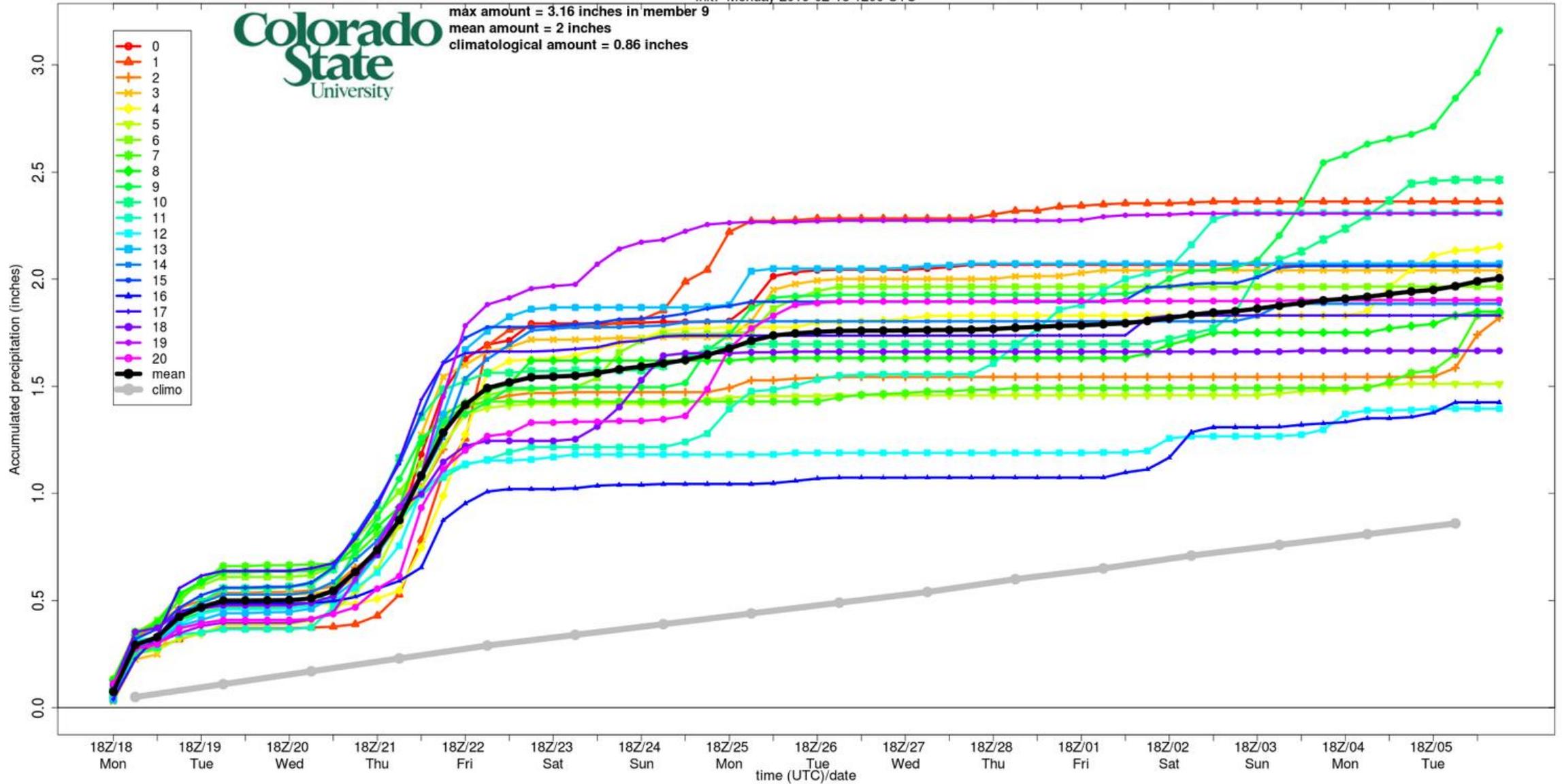


NCEP GEFS accumulated precipitation at Durango

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)

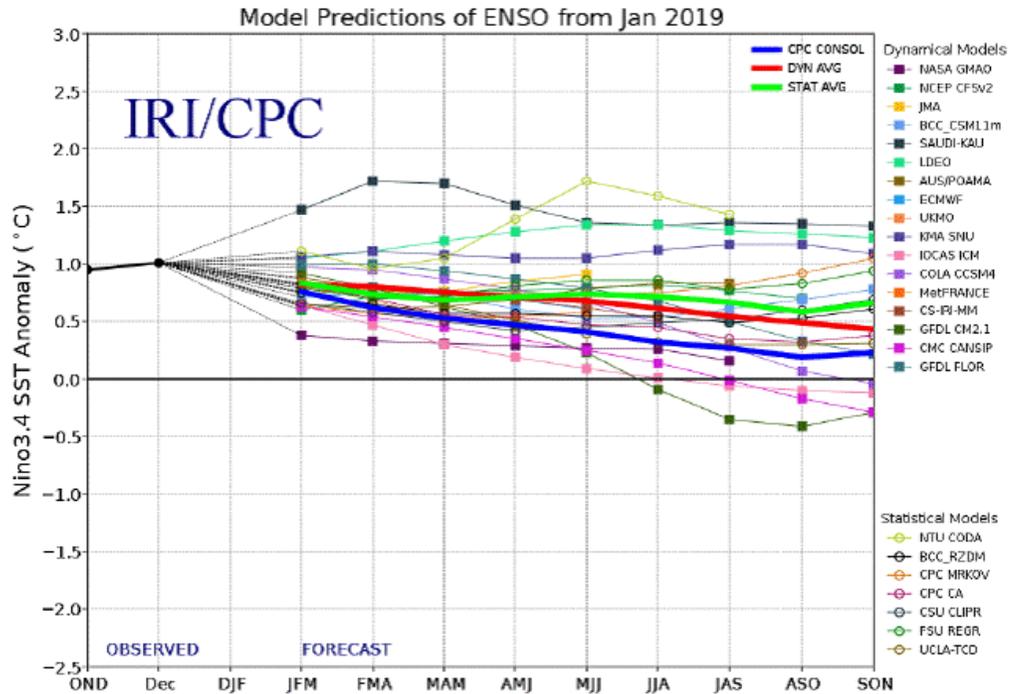
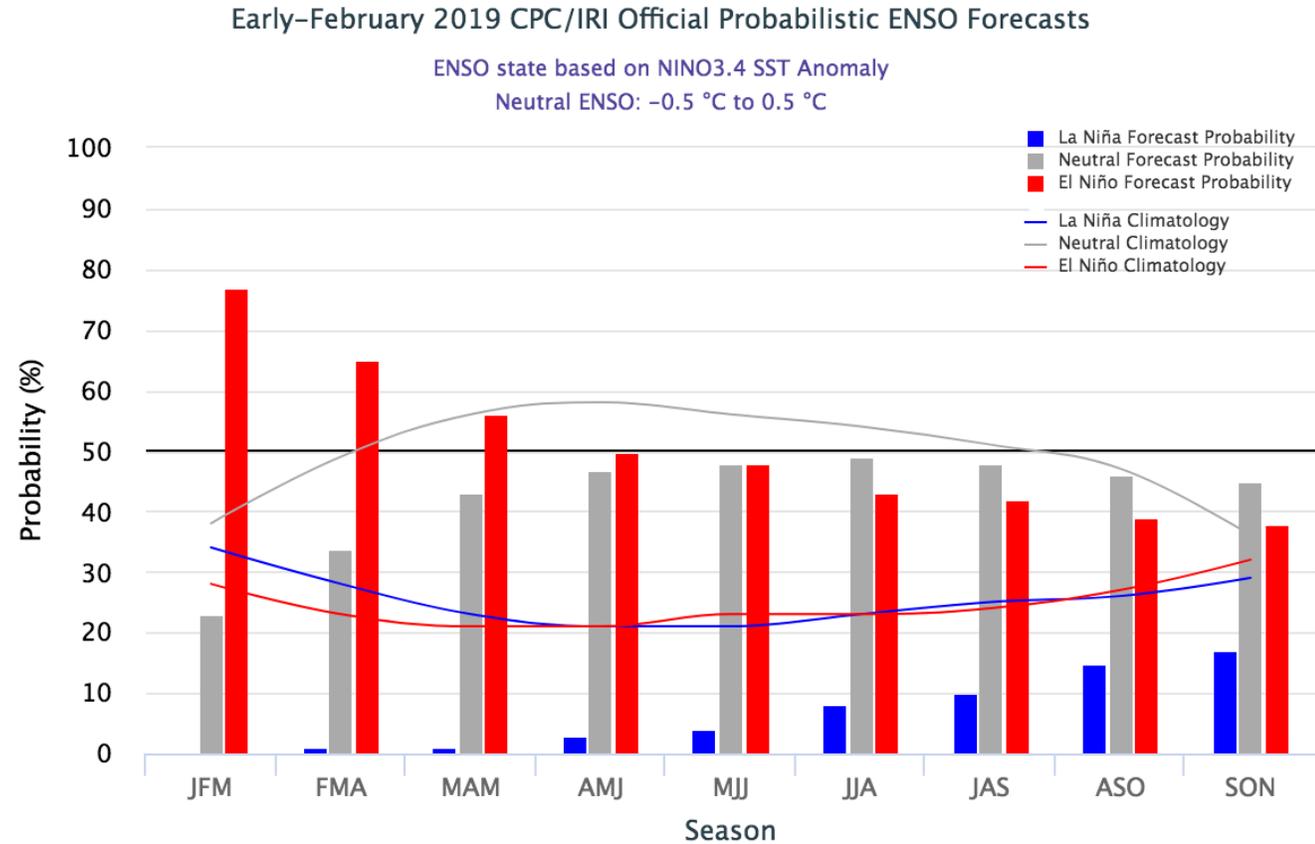


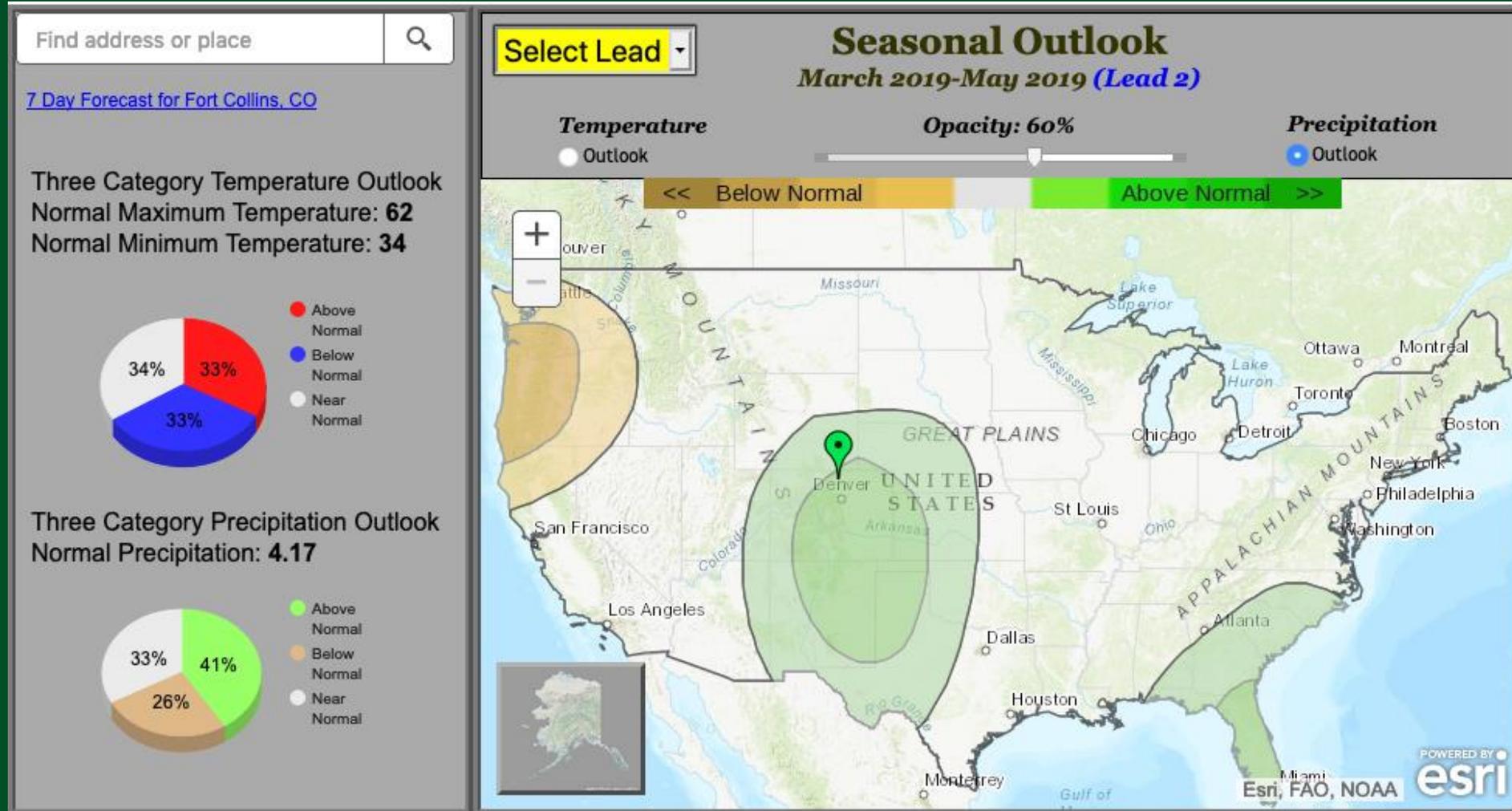
Figure 6. Forecasts of sea surface temperature (SST) anomalies for the Niño 3.4 region (5°N-5°S, 120°W-170°W). Figure updated 19 January 2019.



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

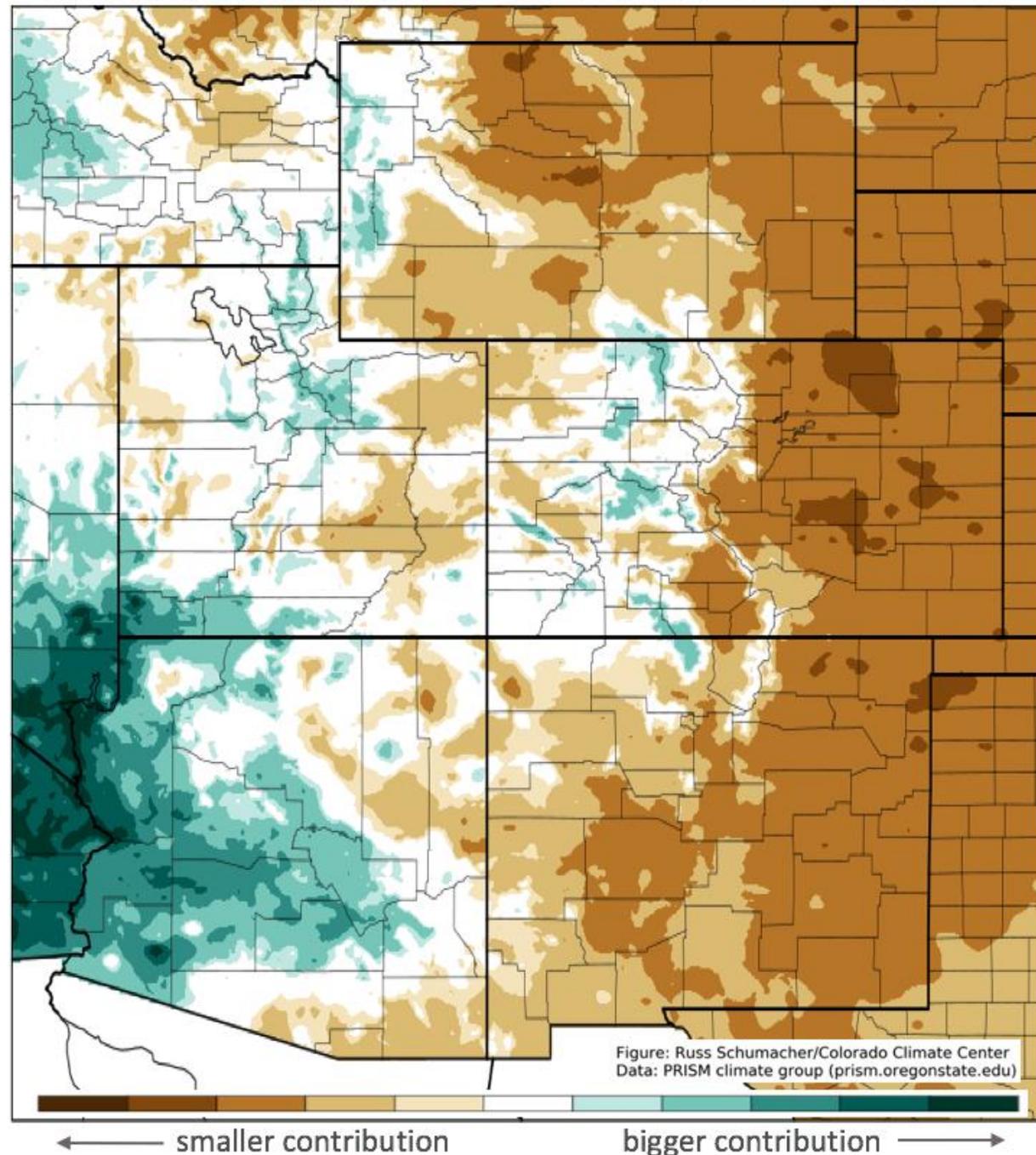


How important are the
spring months to the total
annual average
precipitation?

February

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

February climatological contribution to annual average precipitation

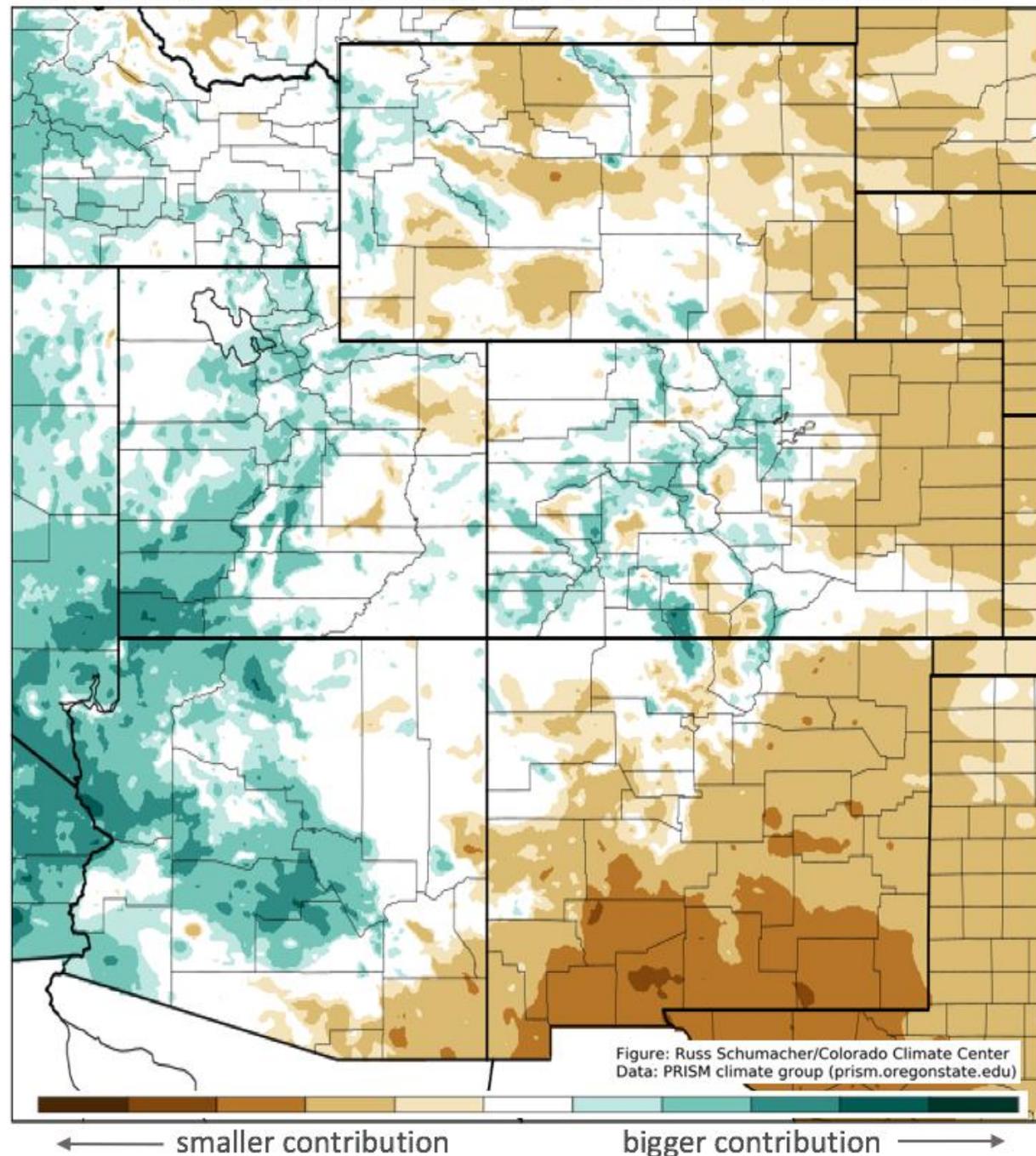


How important are the
spring months to the total
annual average
precipitation?

March

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

March climatological contribution to annual average precipitation

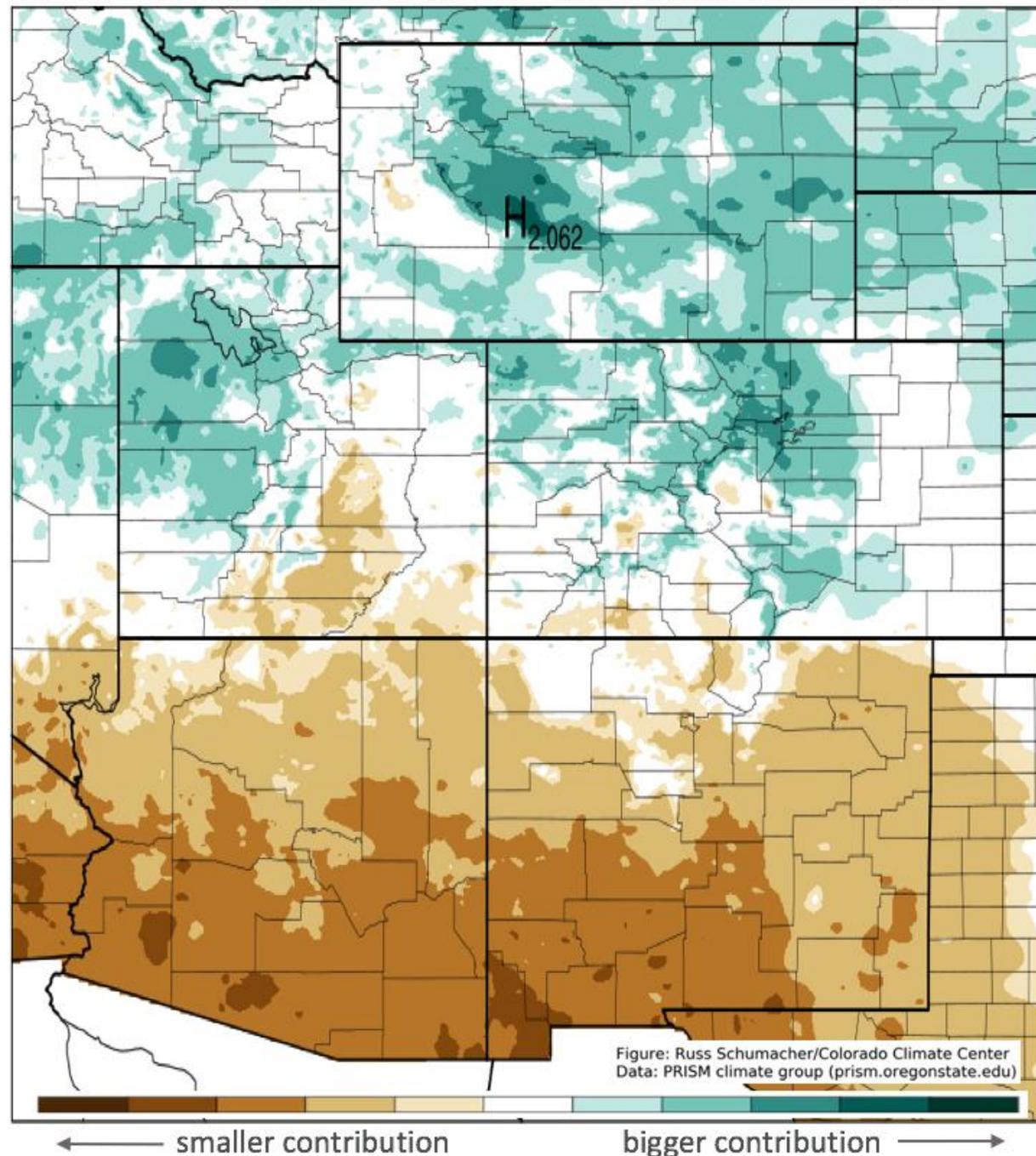


How important are the
spring months to the total
annual average
precipitation?

April

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

April climatological contribution to annual average precipitation

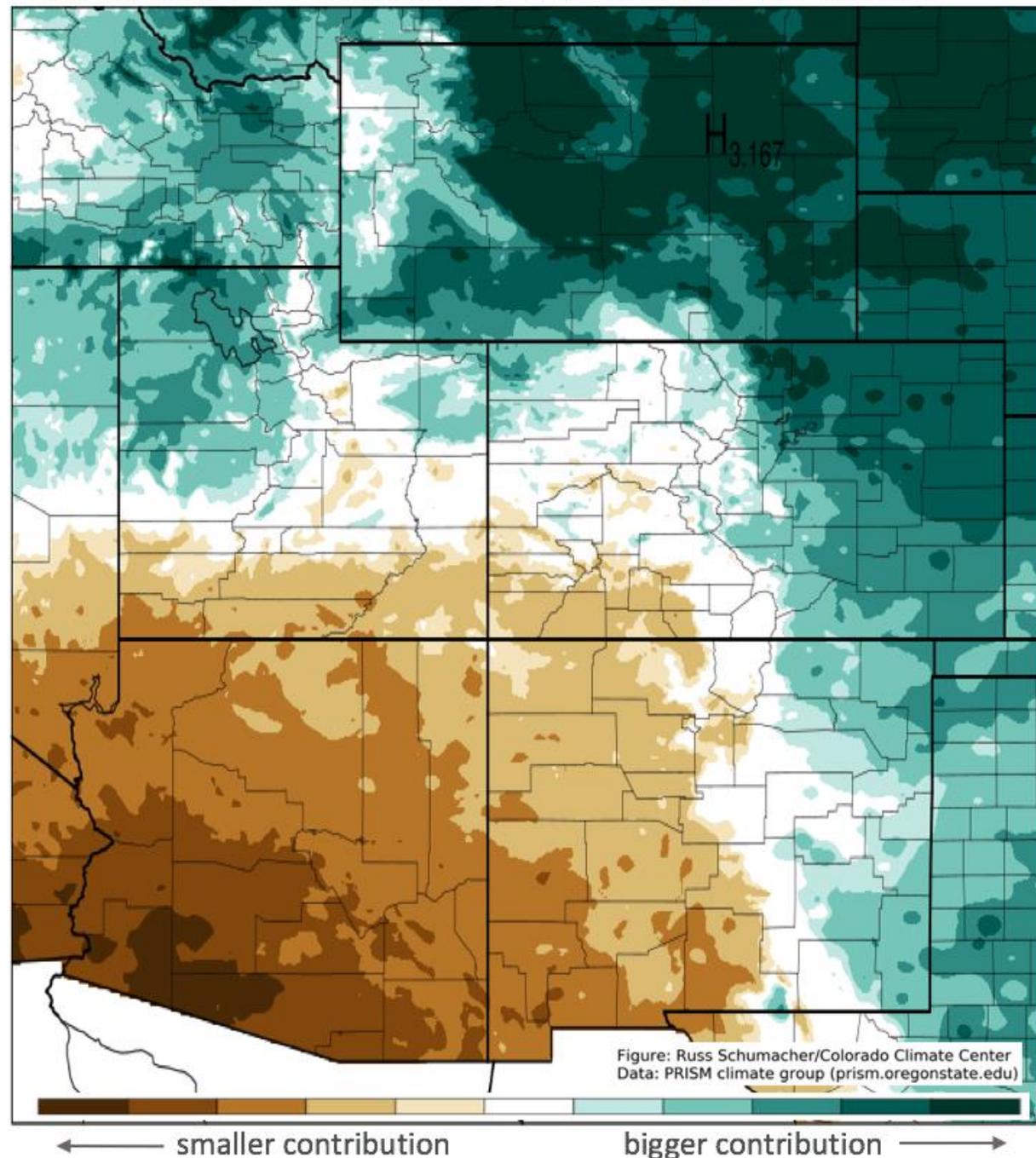


How important are the spring months to the total annual average precipitation?

May

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

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



russ.schumacher@colostate.edu

Thank you!

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