



COLORADO STATE UNIVERSITY



COLORADO CLIMATE CENTER

Providing information and expertise on Colorado's complex climate

A Reflection on Water Year 2018

Peter Goble

Colorado Climate Center

Climate.colostate.edu

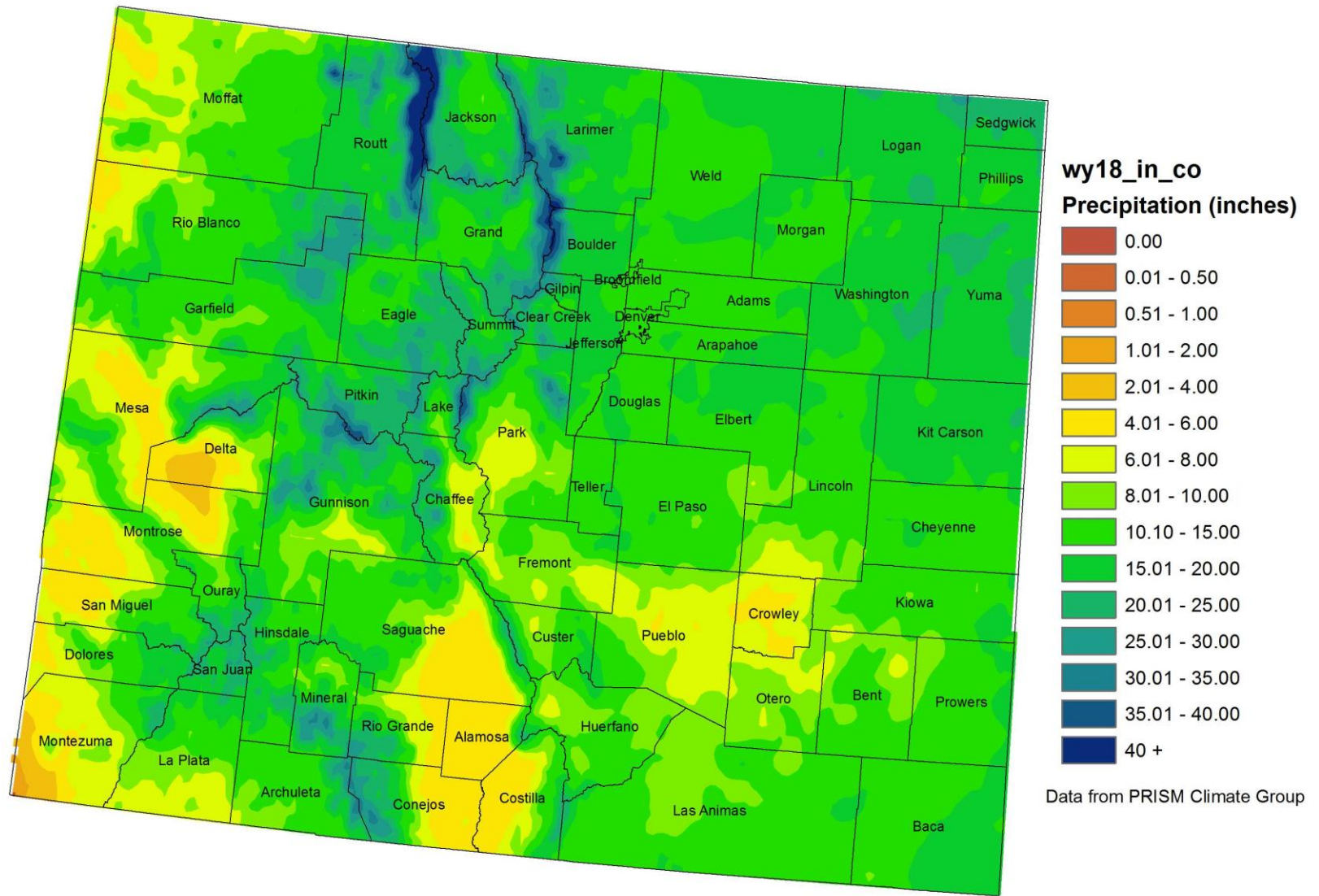
Today's Roadmap

- The story of WY 2018 from stats (drought, drought, hail, and drought)
- Spatial and seasonal trends
- Follow the water
- Reason to hope? How is WY 2019 shaping up?

Part I: Statewide Statistics

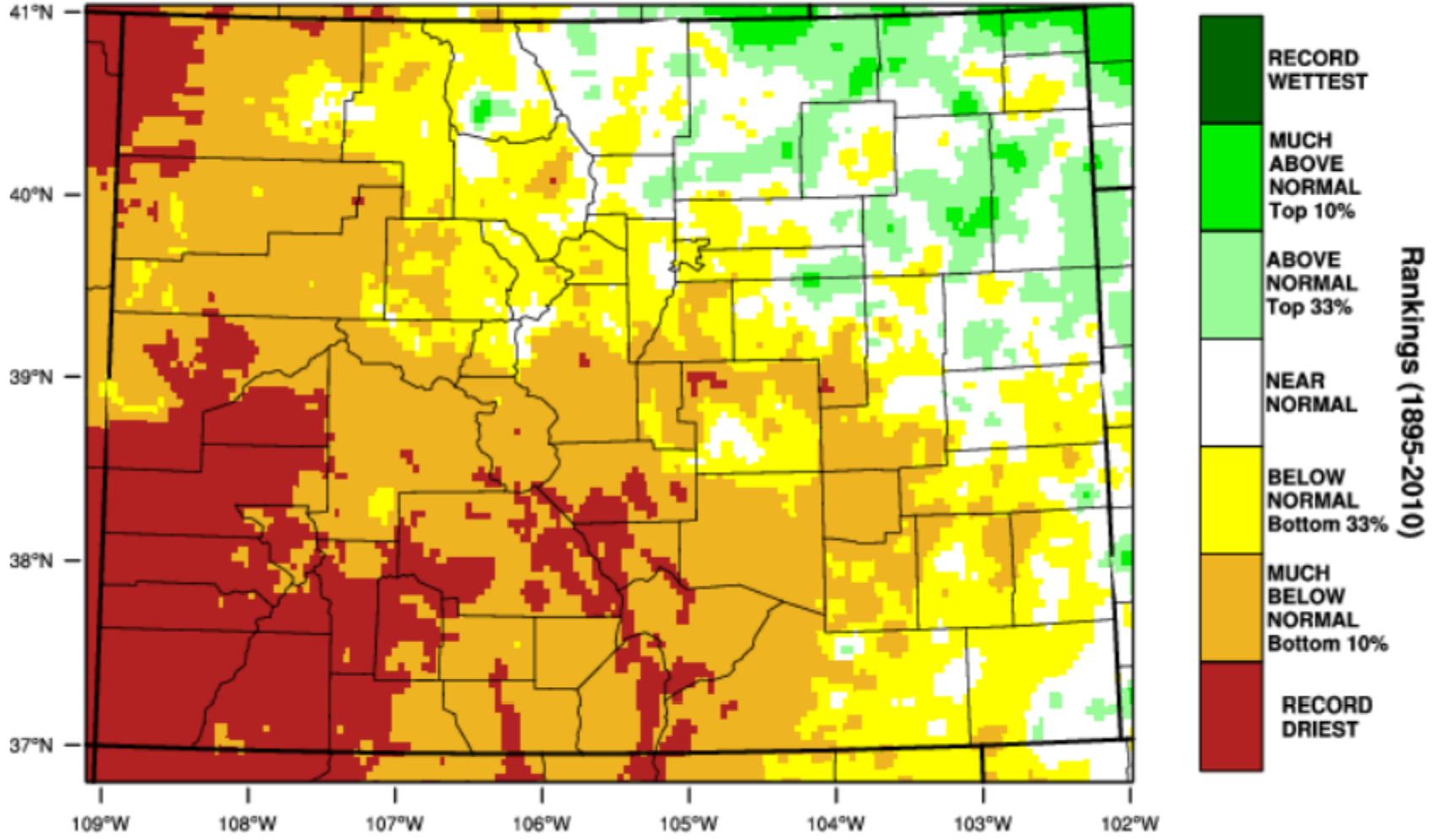


Colorado Water Year 2018 Precipitation in Inches

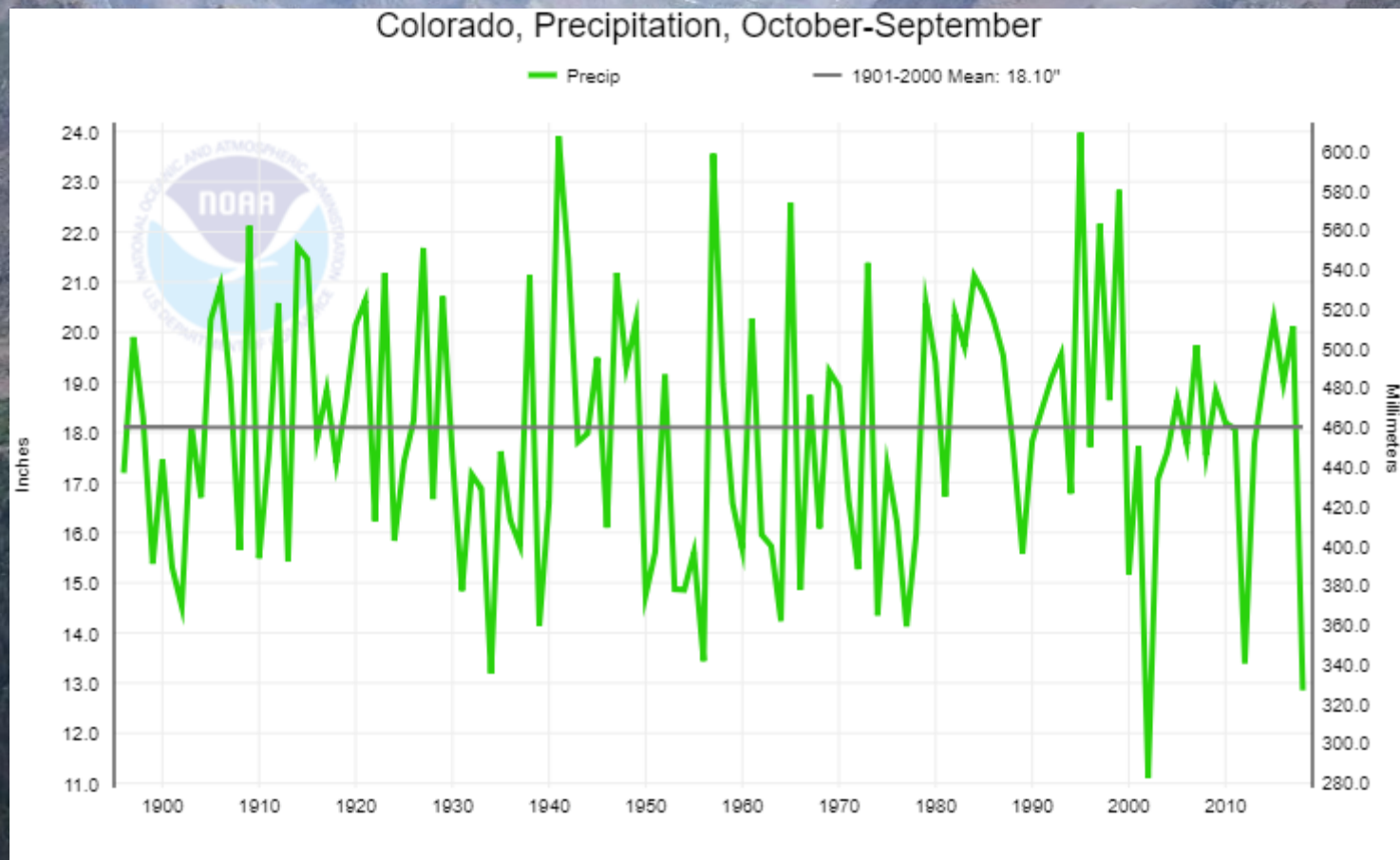


Colorado - Precipitation

October-September 2018 Percentile

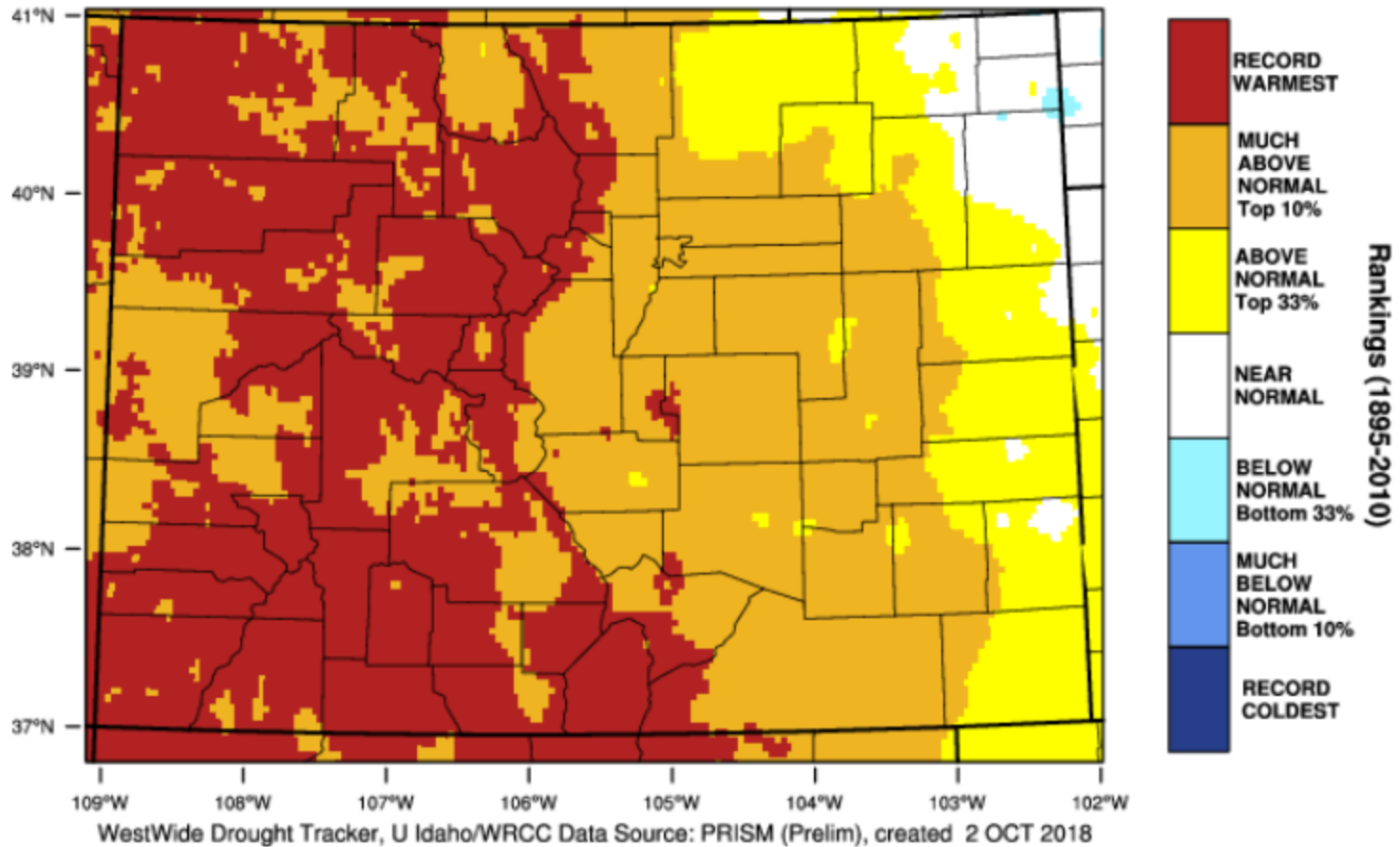


WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 2 OCT 2018

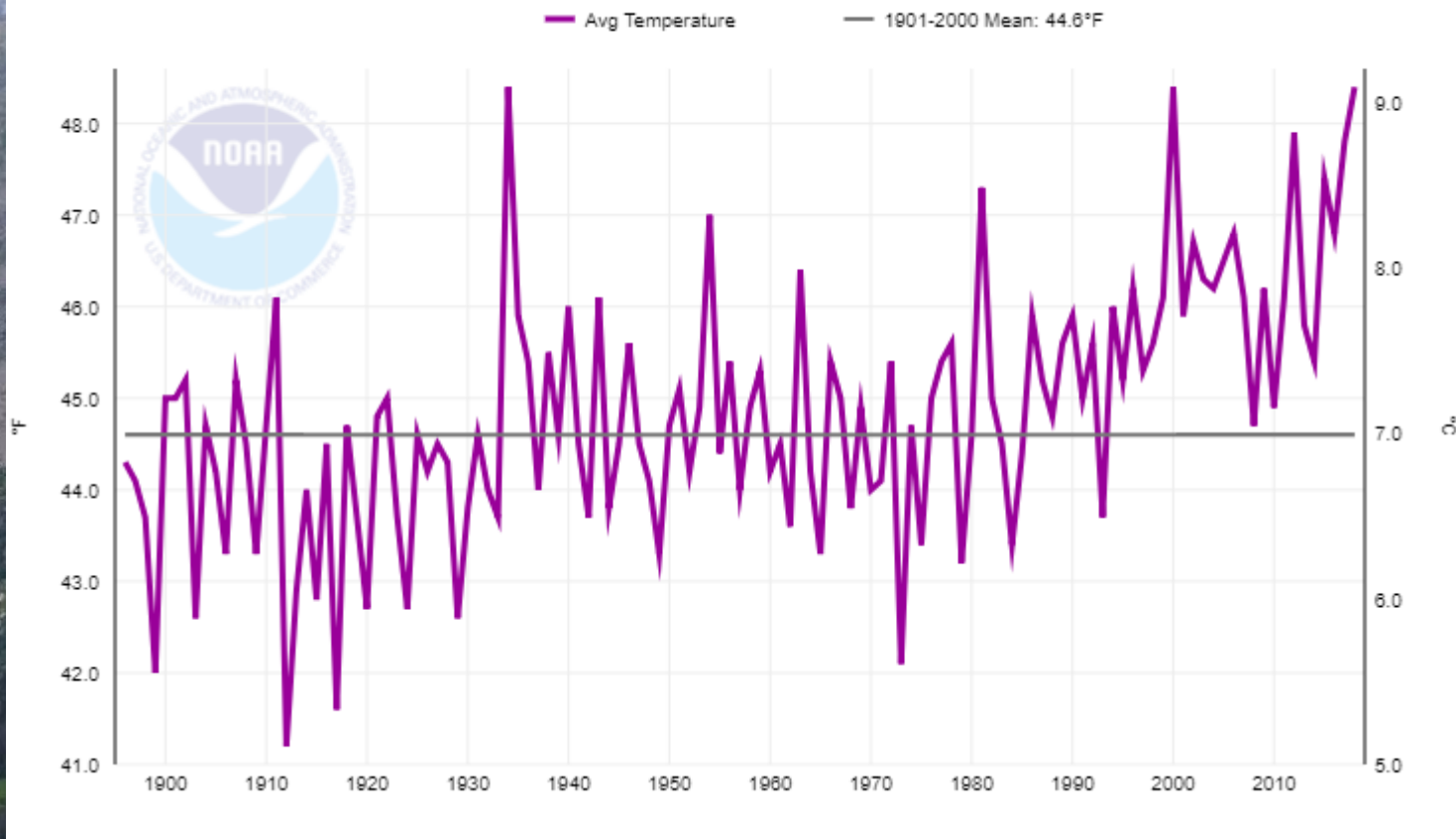


Water Year Colorado Average: 12.85" (5.25" below 20th century average)
 Second driest on record (1st was WY 2002)

Colorado - Mean Temperature October-September 2018 Percentile



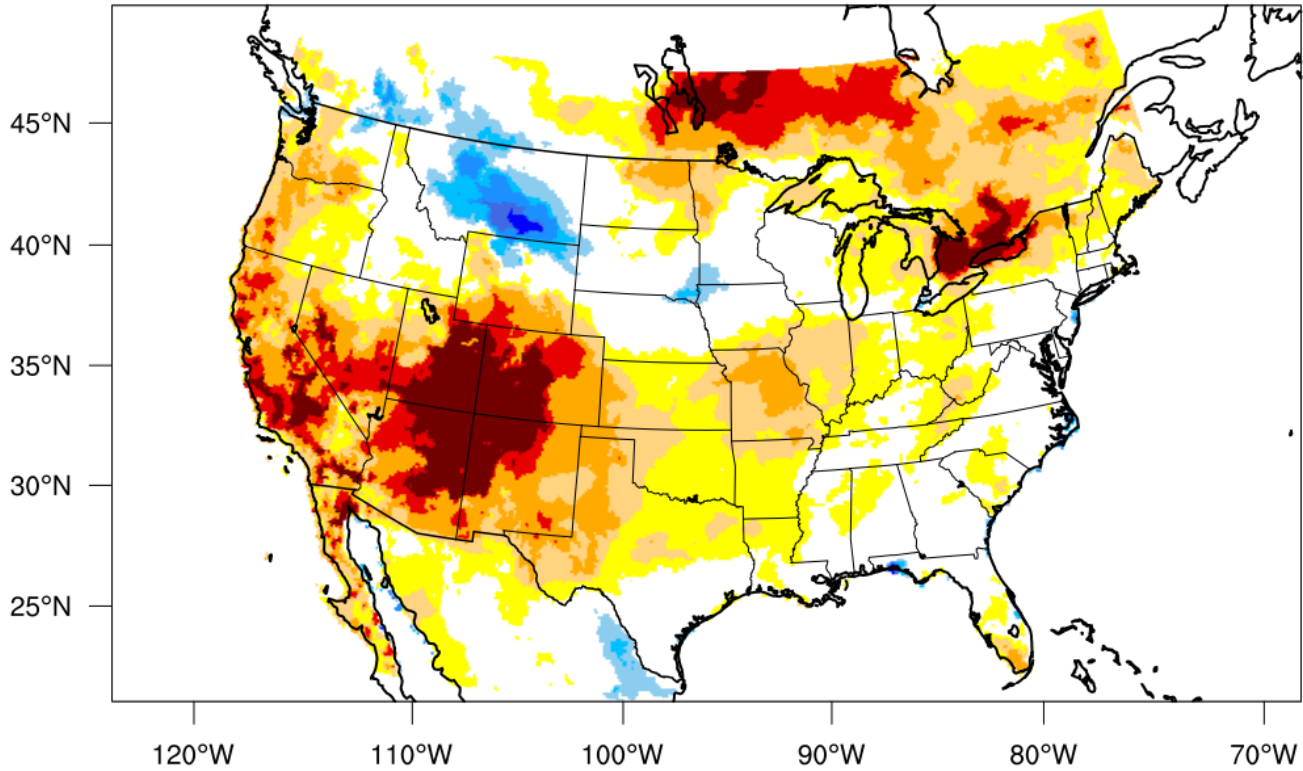
Colorado, Average Temperature, October-September



Water Year Colorado Average: 48.4 F (3.8 F above 20th century average)

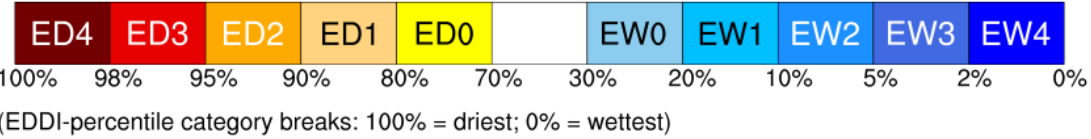
Tied for warmest ever (with WY 2000 and WY 1934)

12-month EDDI categories for September 30, 2018



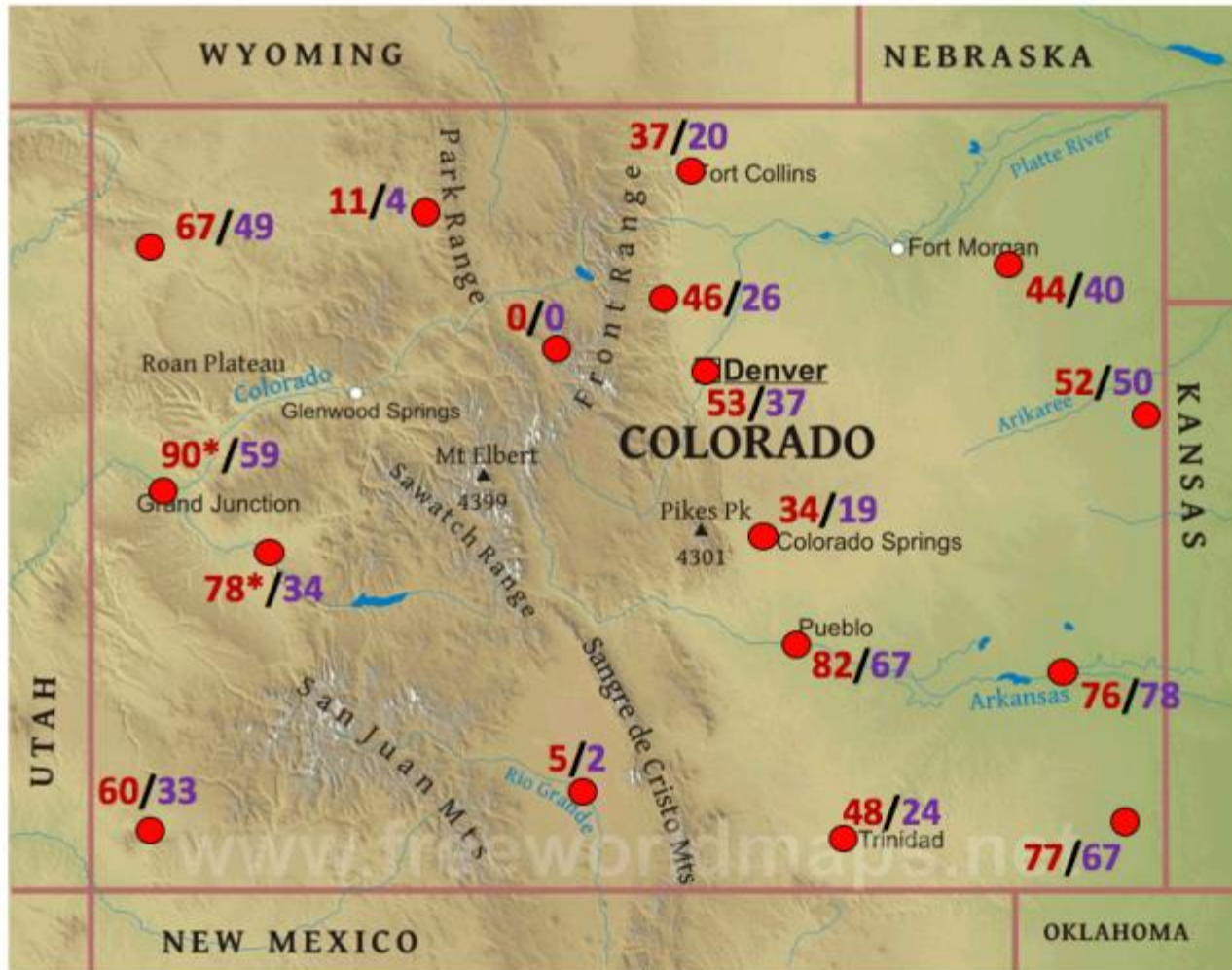
Drought categories

Wetness categories



Generated by NOAA/ESRL/Physical Sciences Division

Number of 90 Degree Days



2018



Long-term Average

* = Record

CO STATEWIDE RANKING in 124-YEAR RECORD

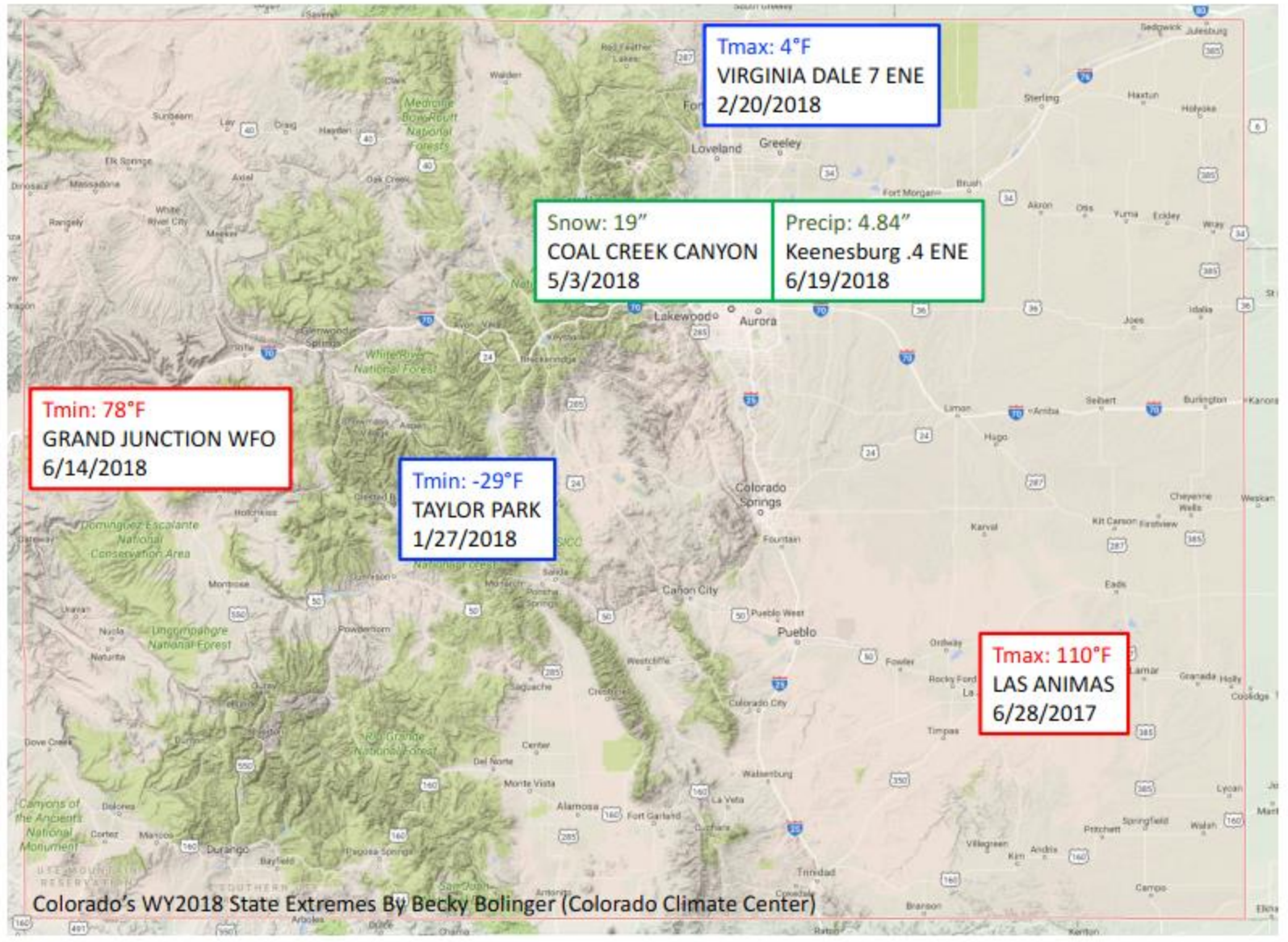
MONTH	T RANK	P RANK
Oct 2017	near average	37 th driest
Nov 2017	record warmest	18 th driest
Dec 2017	8 th warmest	7 th driest
Jan 2018	8 th warmest	37 th driest
Feb 2018	near average	near average
Mar 2018	25 th warmest	26 th driest
Apr 2018	near average	34 th driest
May 2018	2 nd warmest	38 th driest
Jun 2018	3 rd warmest	26 th driest
Jul 2018	10 th warmest	near average
Aug 2018	33 rd warmest	25 th driest
Sep 2018	3 rd warmest	19 th driest
Water Year	record warmest	2 nd driest

From NOAA NCEI's National Temperature and Precipitation Rank Maps:
www.ncdc.noaa.gov/sotc/national

NUMBER OF DAILY AND MONTHLY STATION RECORDS BROKEN in CO

Weather Record Broken	Record broken for a day	Record broken for a month
Highest Max Temperature	1,696	22
Highest Min Temperature	2,971	100
Lowest Max Temperature	560	0
Lowest Min Temperature	292	0
Highest Precipitation	786	17
Highest Snowfall	196	2

From NOAA NCEI's Select U.S. Records: www.ncdc.noaa.gov/extremes/records



Tmax: 4°F
VIRGINIA DALE 7 ENE
2/20/2018

Snow: 19"
COAL CREEK CANYON
5/3/2018

Precip: 4.84"
Keenesburg .4 ENE
6/19/2018

Tmin: 78°F
GRAND JUNCTION WFO
6/14/2018

Tmin: -29°F
TAYLOR PARK
1/27/2018

Tmax: 110°F
LAS ANIMAS
6/28/2017

Colorado's WY2018 State Extremes By Becky Bolinger (Colorado Climate Center)

WY2018 Noteworthy Events By Becky Bolinger (Colorado Climate Center)



For the first time ever, a call was placed on the Yampa River on August 22, when flows at Deerlodge Park were a meager 19 cubic feet per second.

*photo courtesy Becky Bolinger

A severe hailstorm battered Colorado Springs on August 6. Baseball-sized hail fell at the Cheyenne Mountain Zoo, killing 5 zoo animals and injuring 14 people. This was one of many large hail events in a very active season.

*photo courtesy Emma Pinell (Facebook)

Two tornadoes were reported in Park County over the summer, taking their total number of tornadoes ever recorded in the county to 7.

*photo courtesy CBS Denver



The Spring Creek Fire and 416 Fire burned a combined 162,000 acres in southern CO. The Spring Creek Fire was human caused on June 27 and the suspect charged with 141 counts of arson. It grew to over 100,000 acres to become the state's 3rd largest wildfire on record.

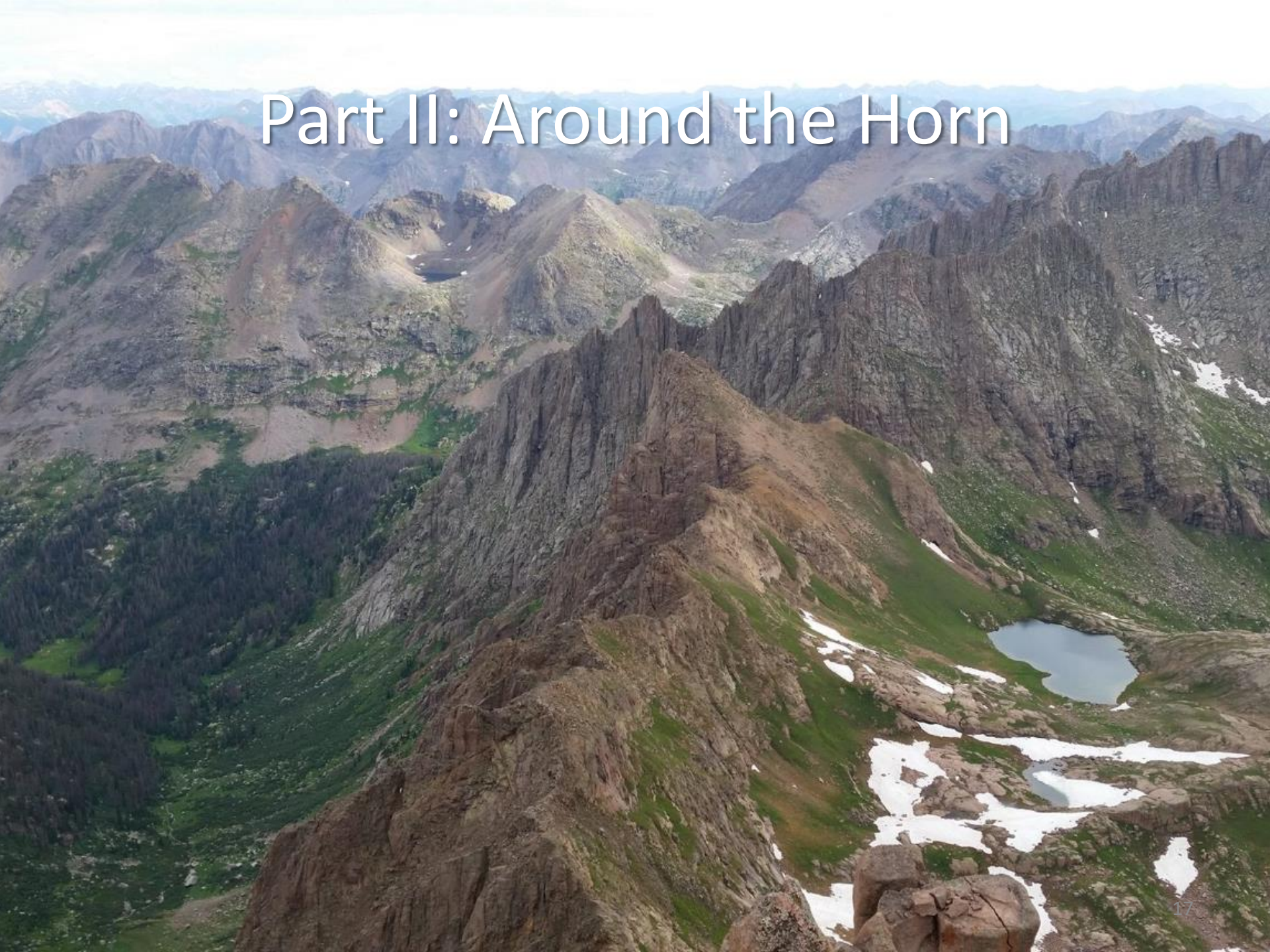
*photo courtesy Tomi Price (Facebook)

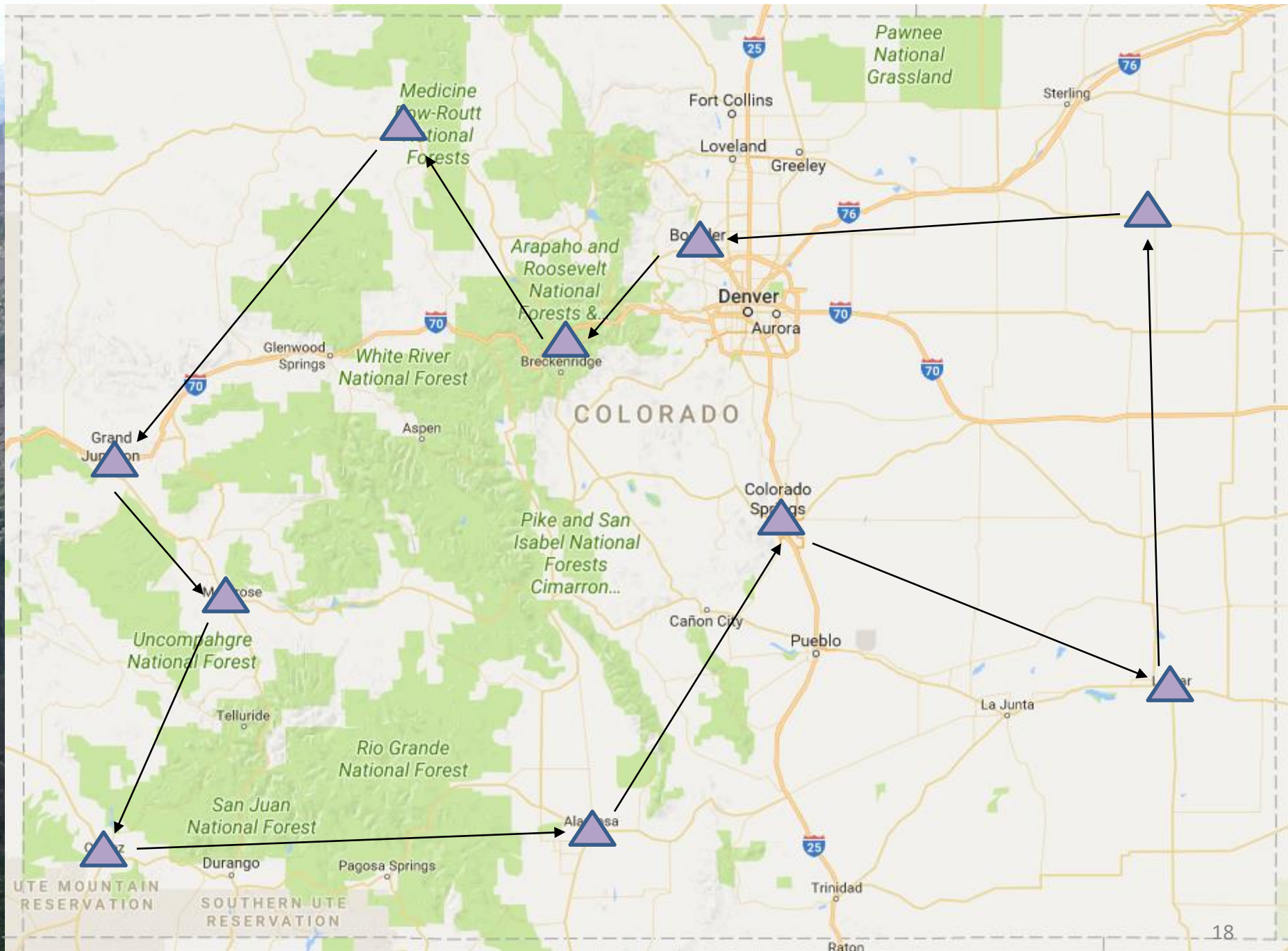


On April 17, a cold front brought significant winds. Extensive damage was reported from the Front Range across the eastern plains where gusts were 70-90mph. Wind was blamed for shutting down DIA runways and starting the Badger Hole Fire in Baca County, which burned more than 30,000 acres.

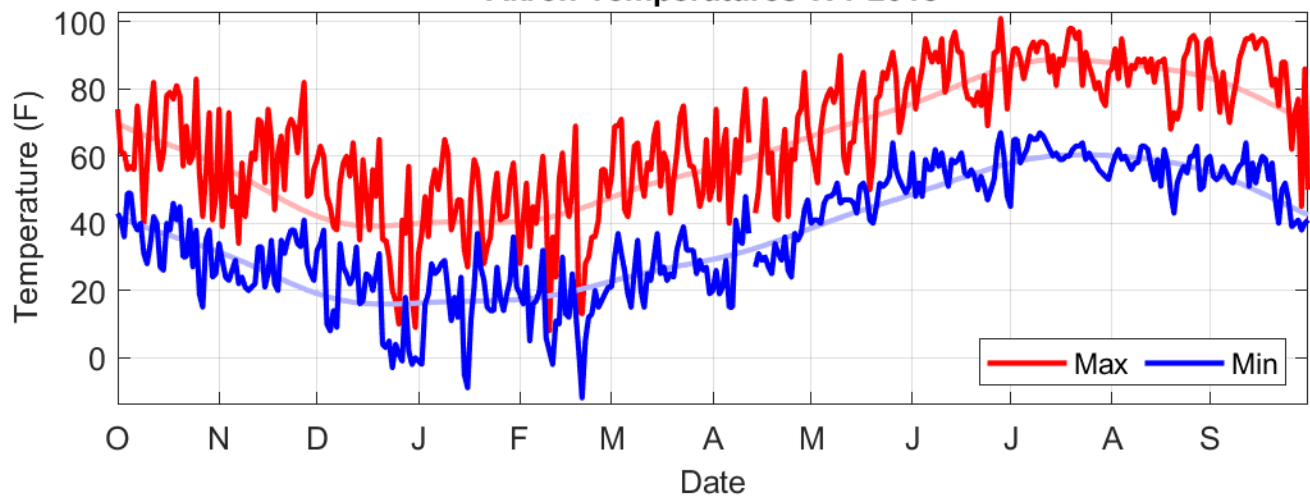
*photo courtesy Jeremiah Bellile (Twitter)

Part II: Around the Horn

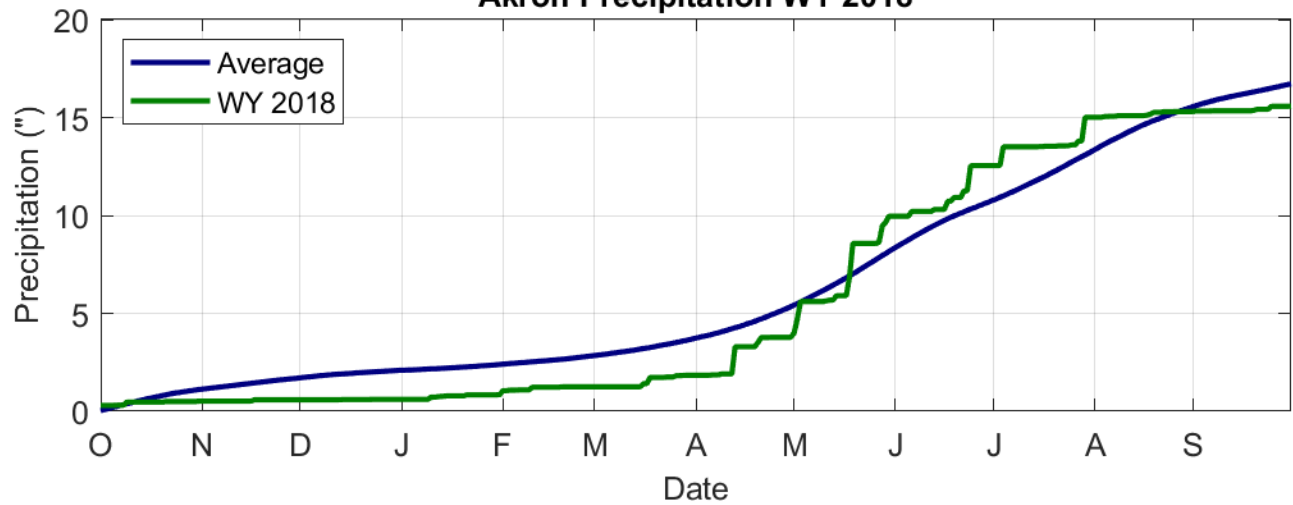


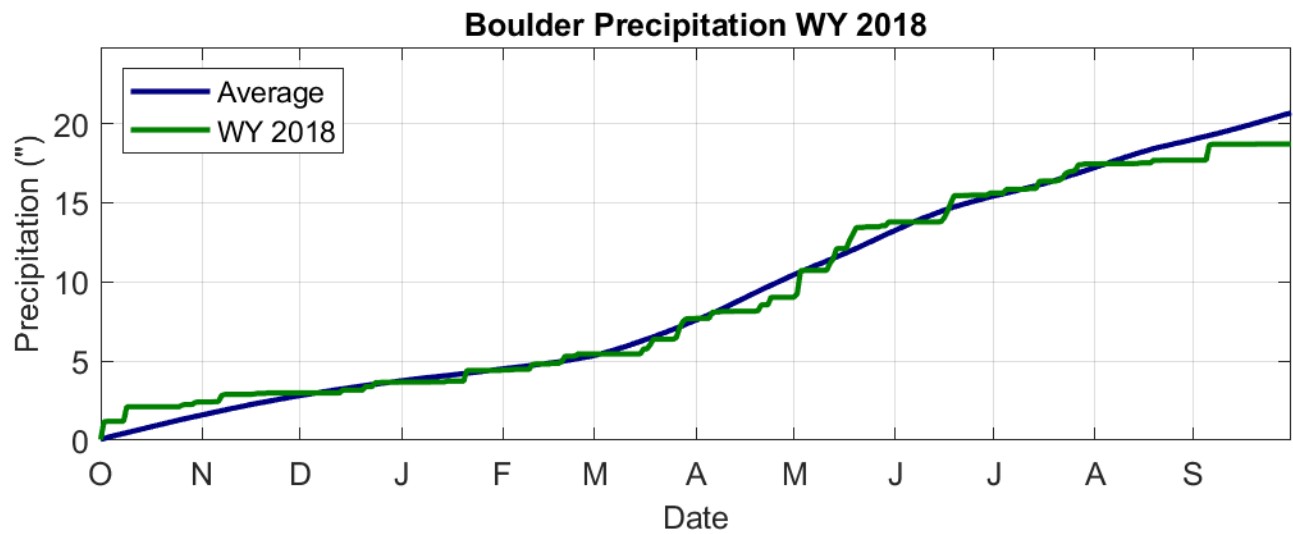
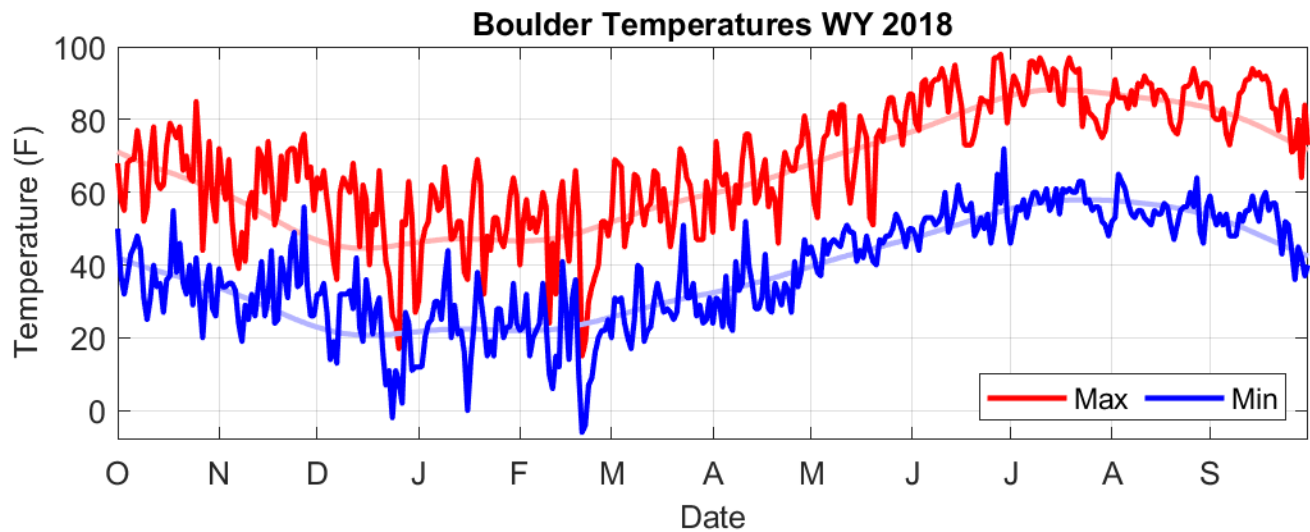


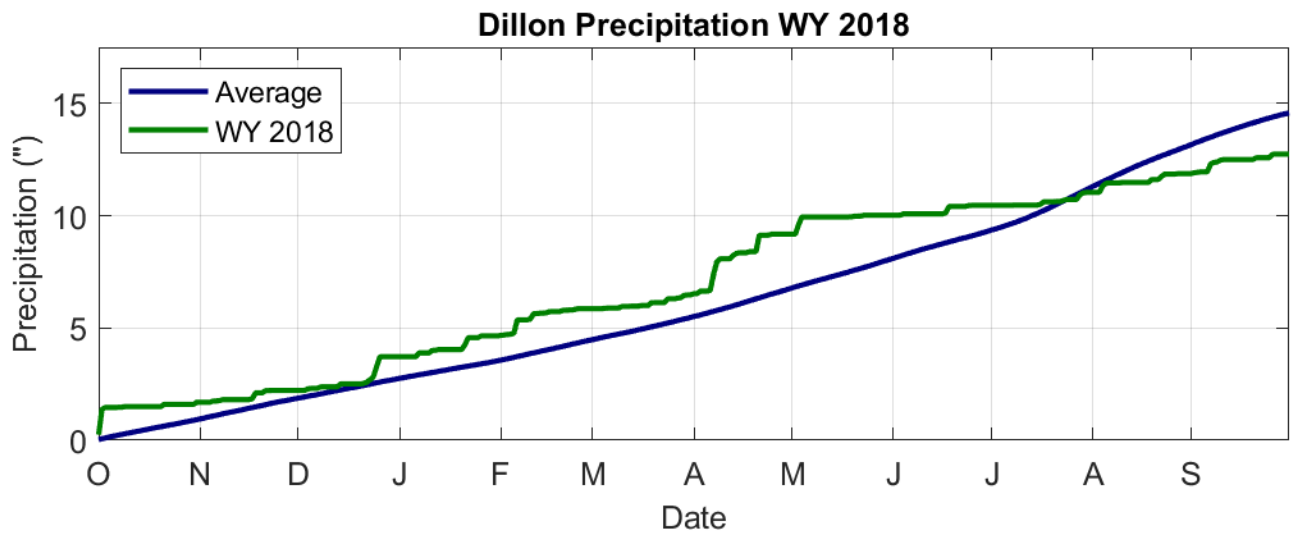
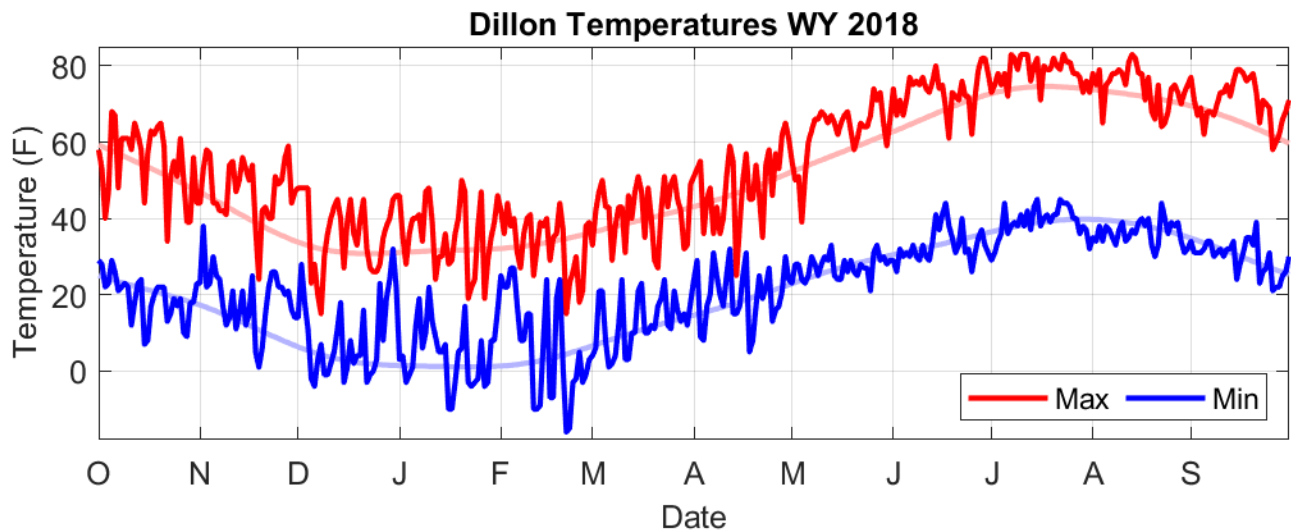
Akron Temperatures WY 2018

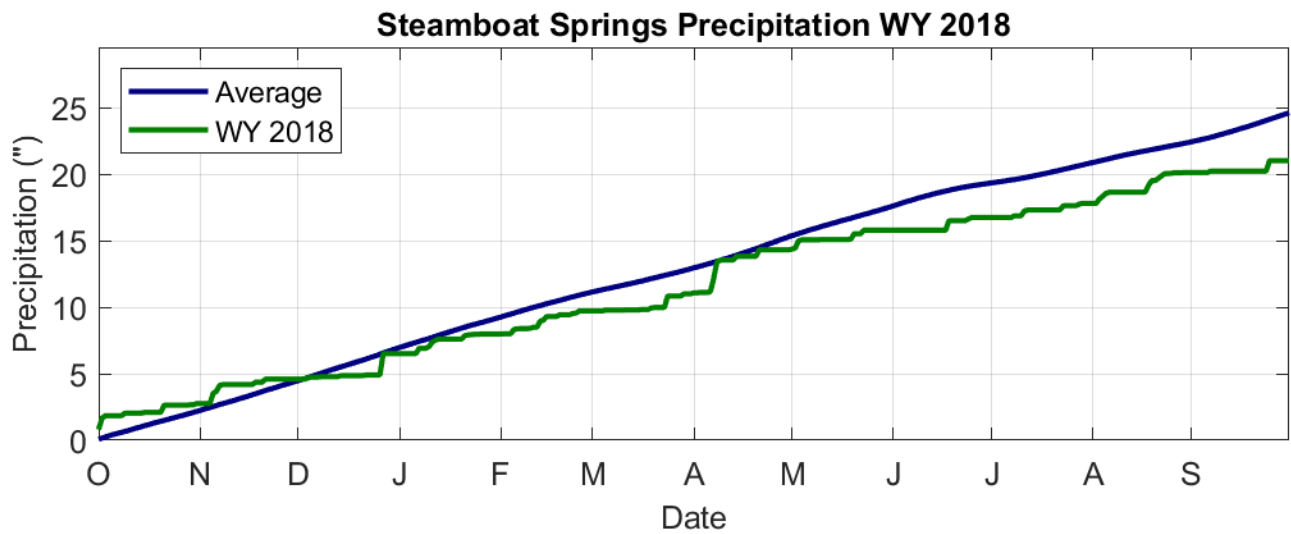
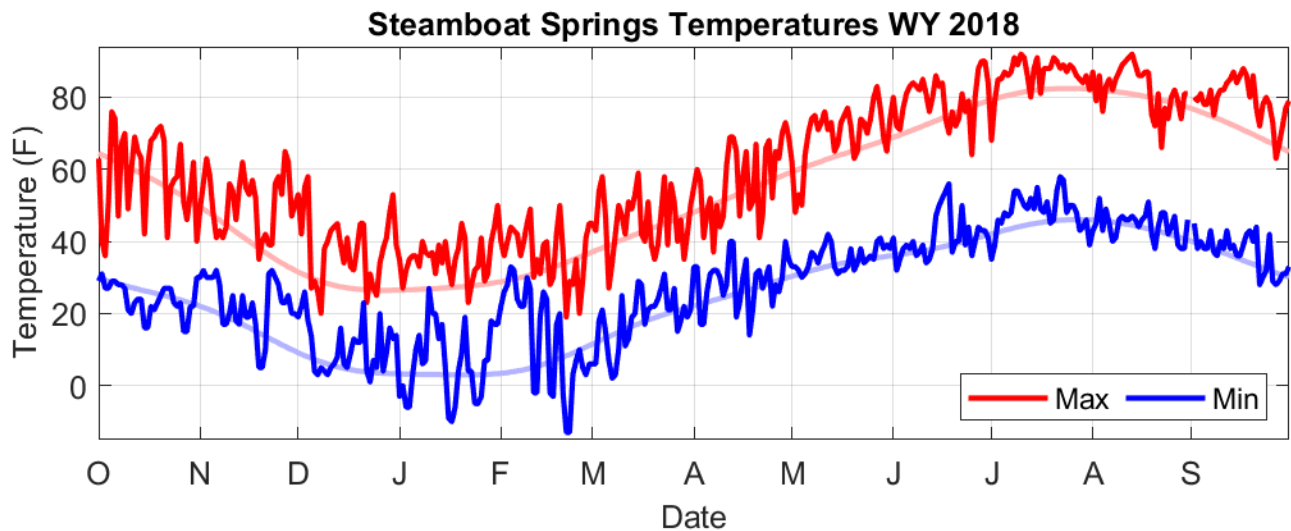


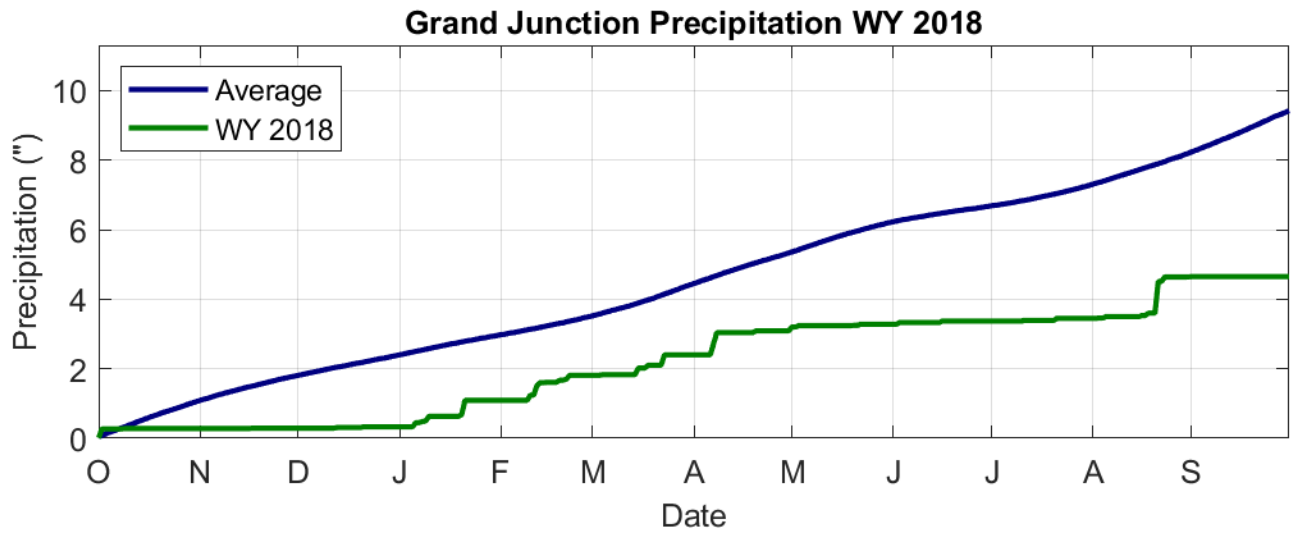
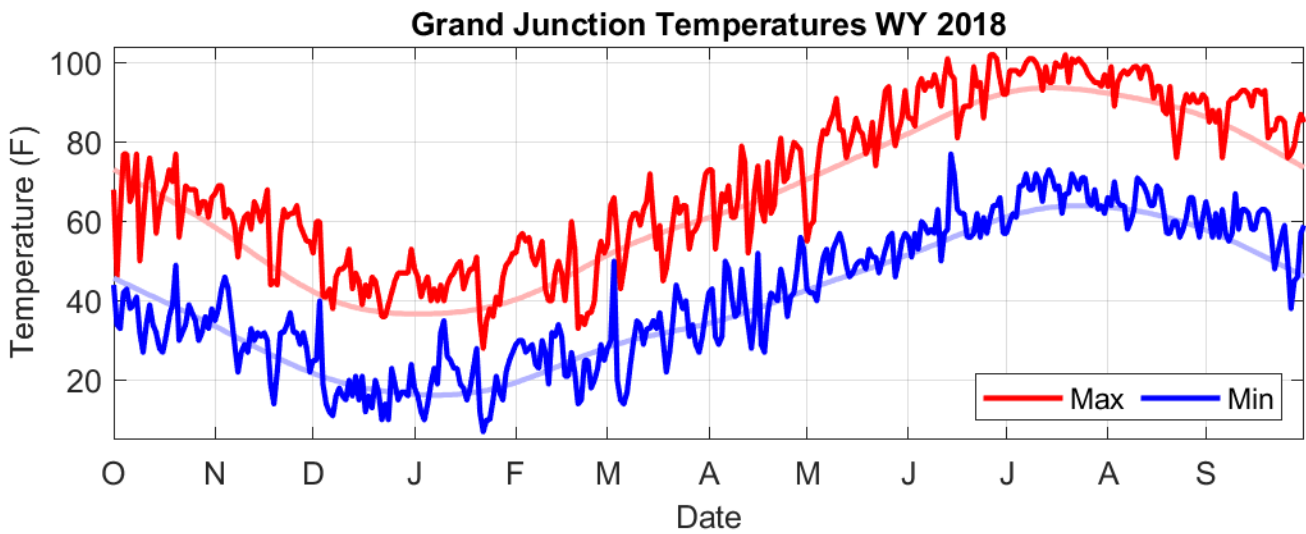
Akron Precipitation WY 2018

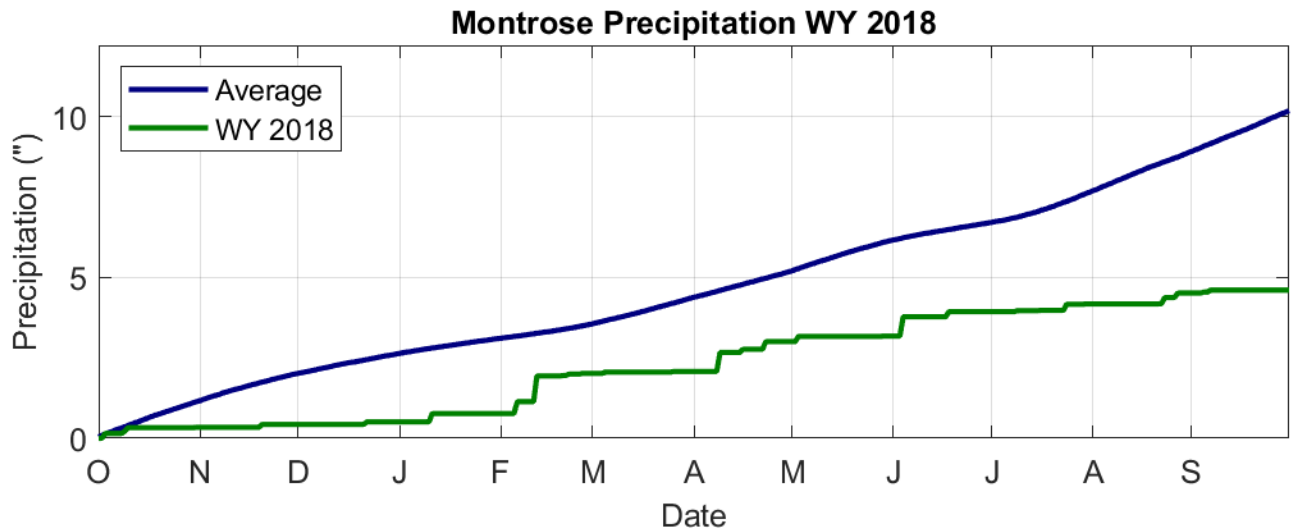
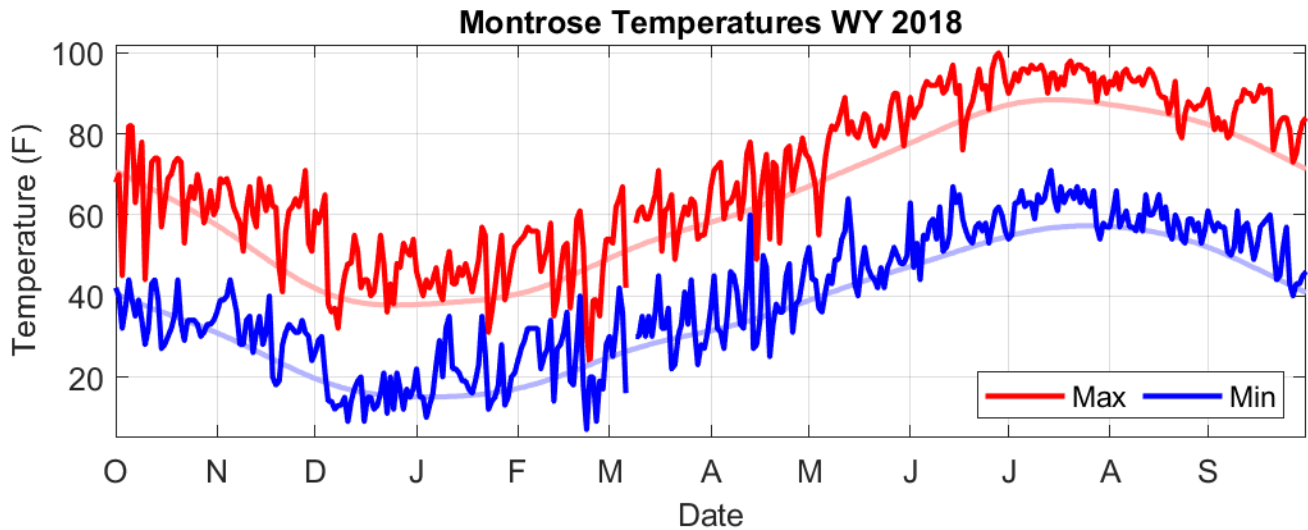


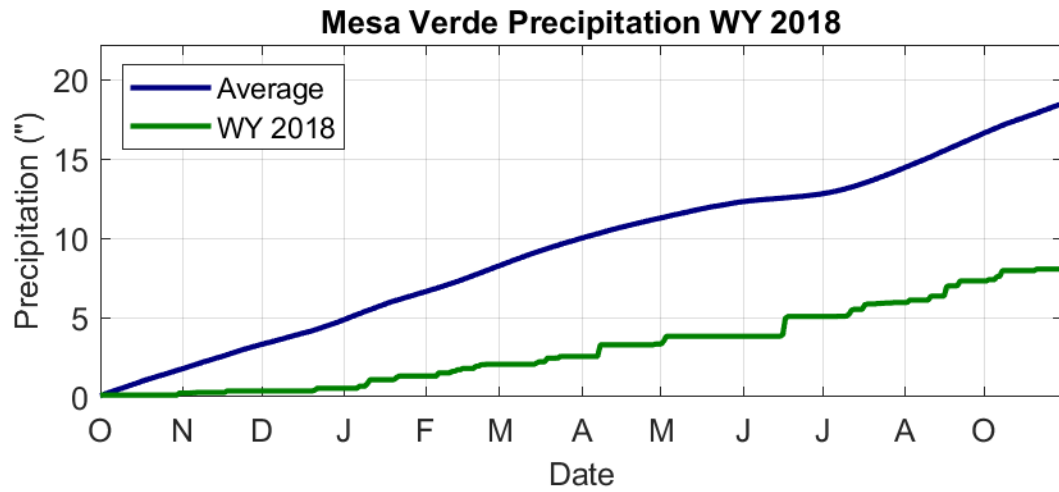
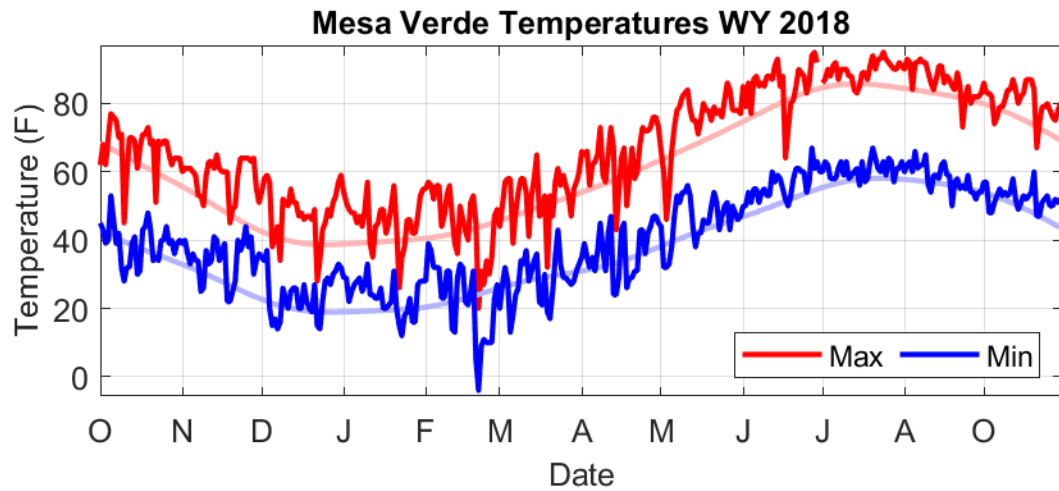


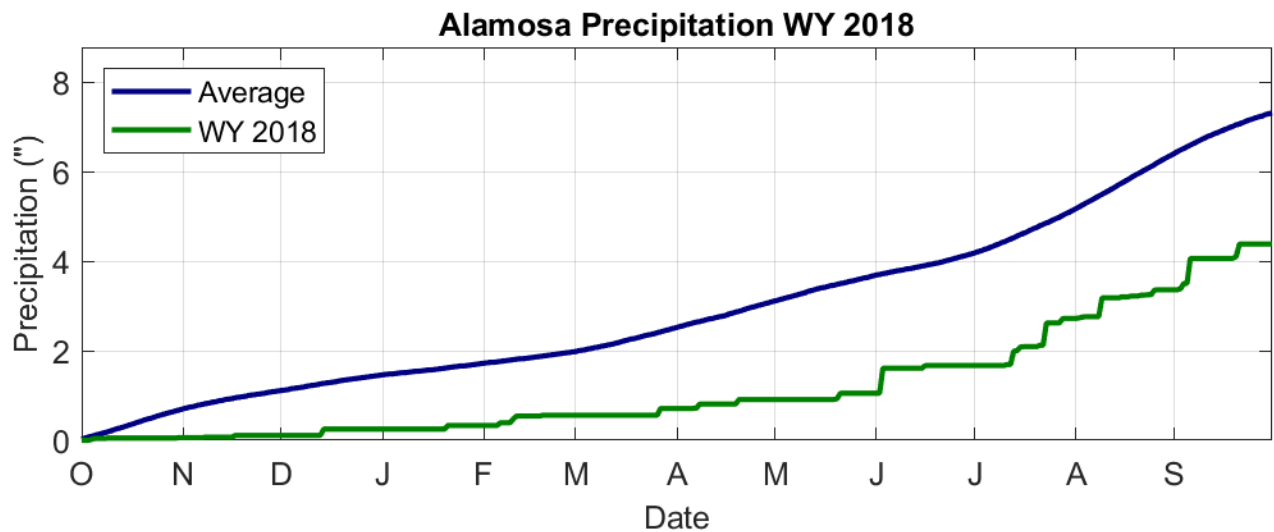
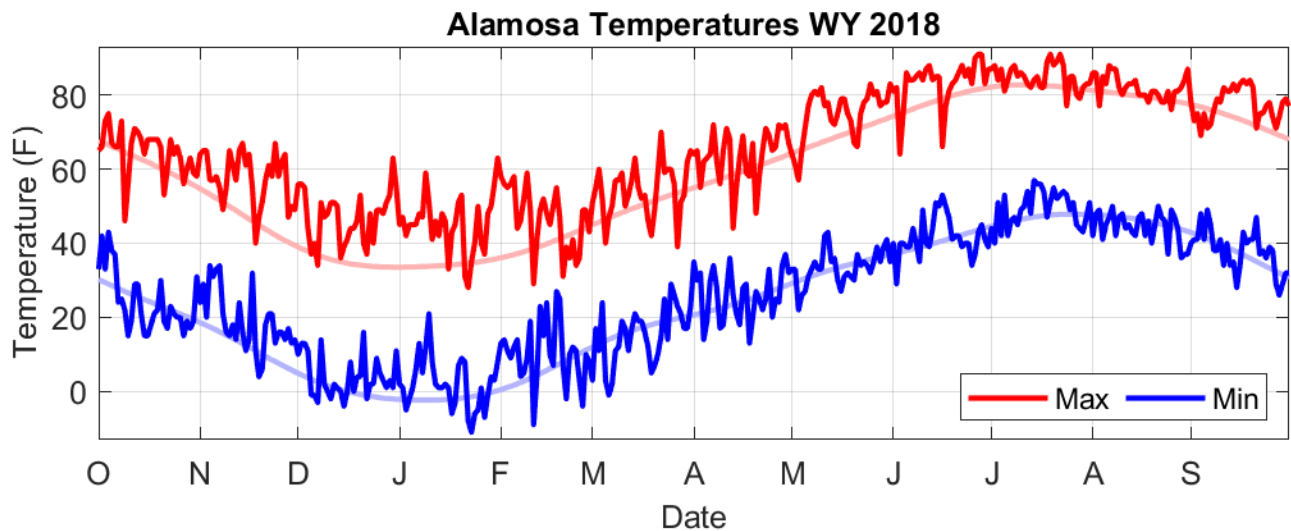


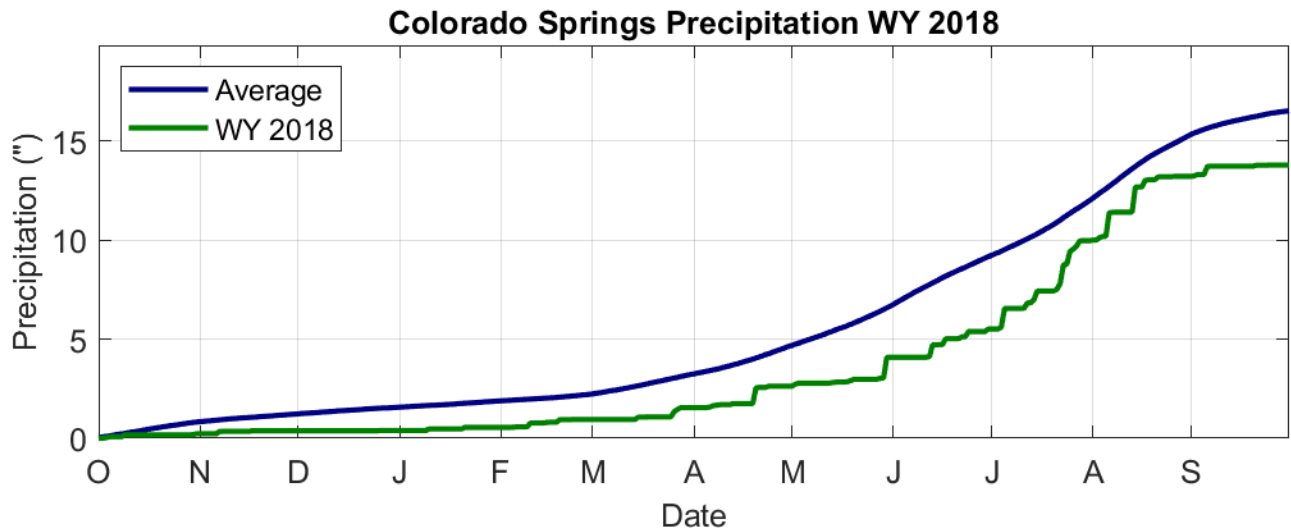
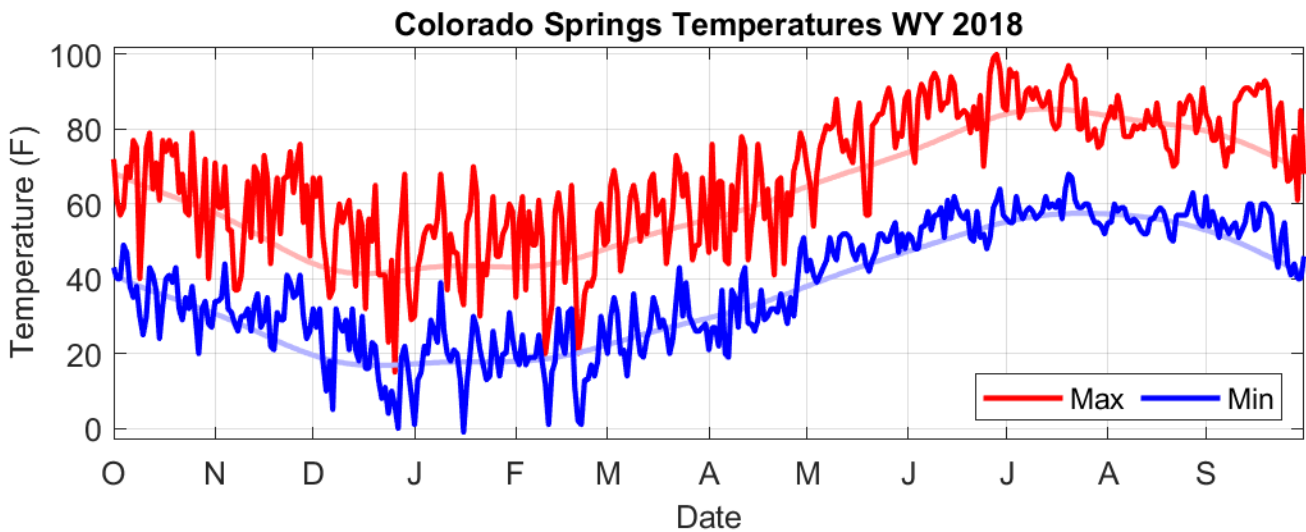




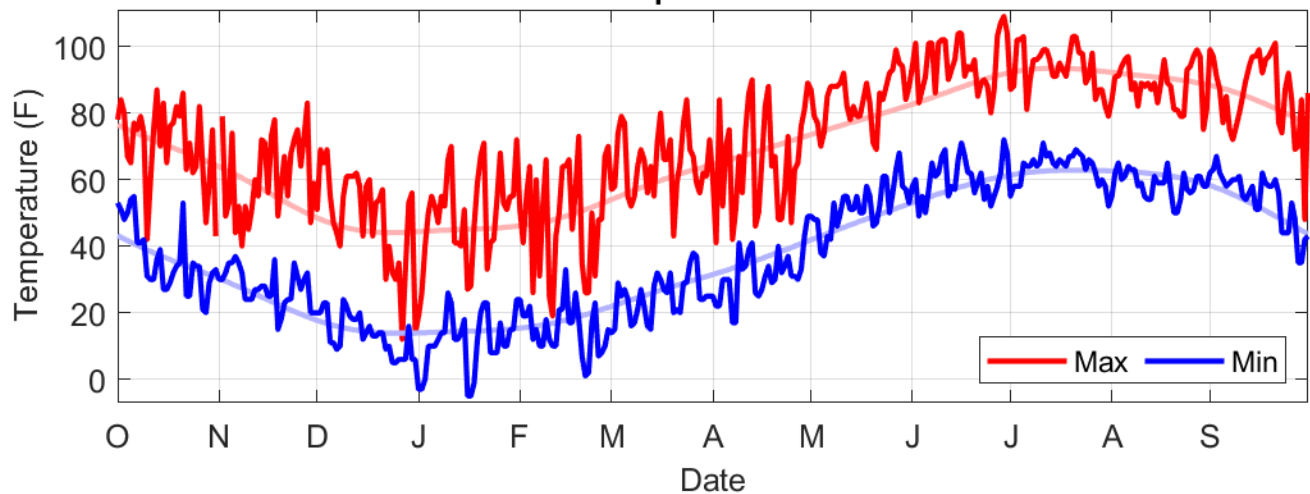




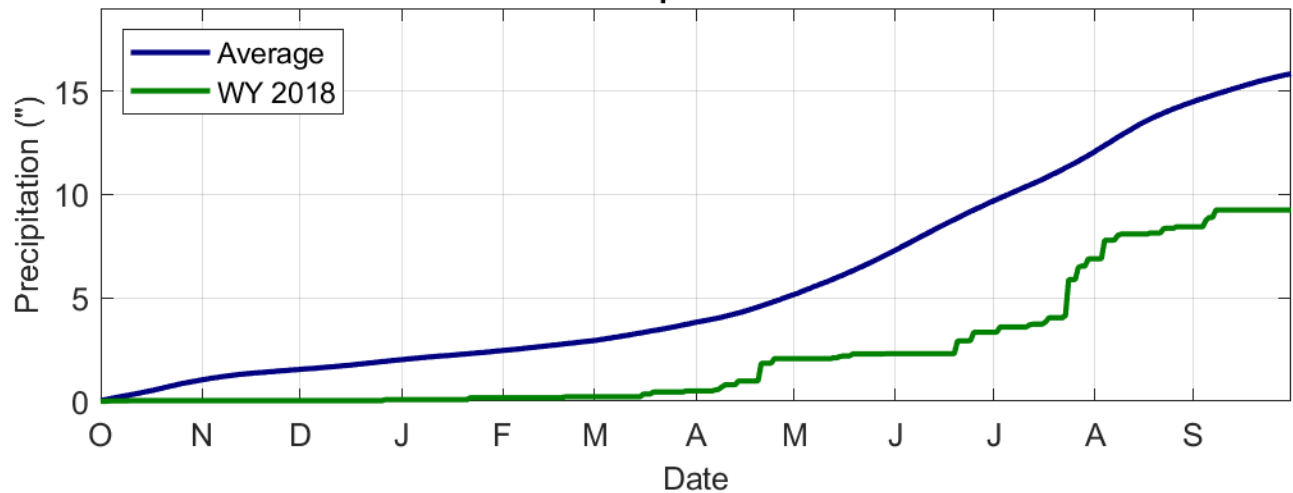




Lamar Temperatures WY 2018



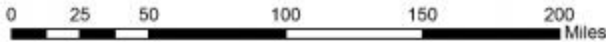
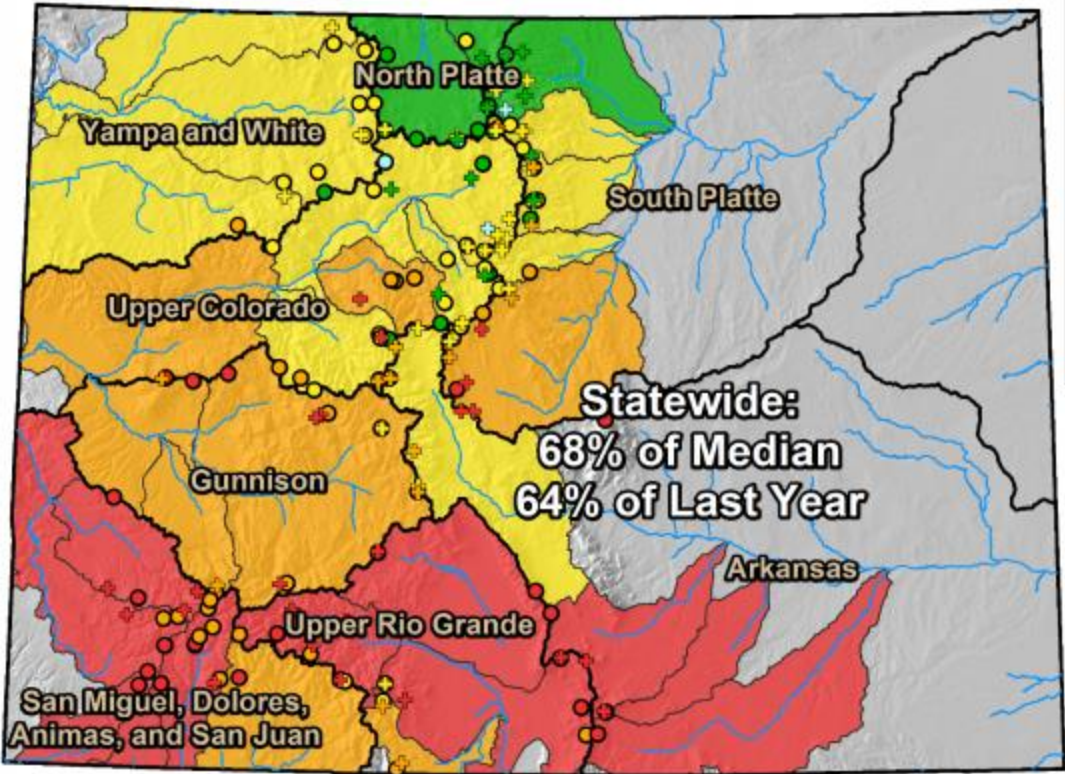
Lamar Precipitation WY 2018



Part III: Follow the Water (or lack thereof)



Colorado Monthly Snowpack Summary April 1, 2018

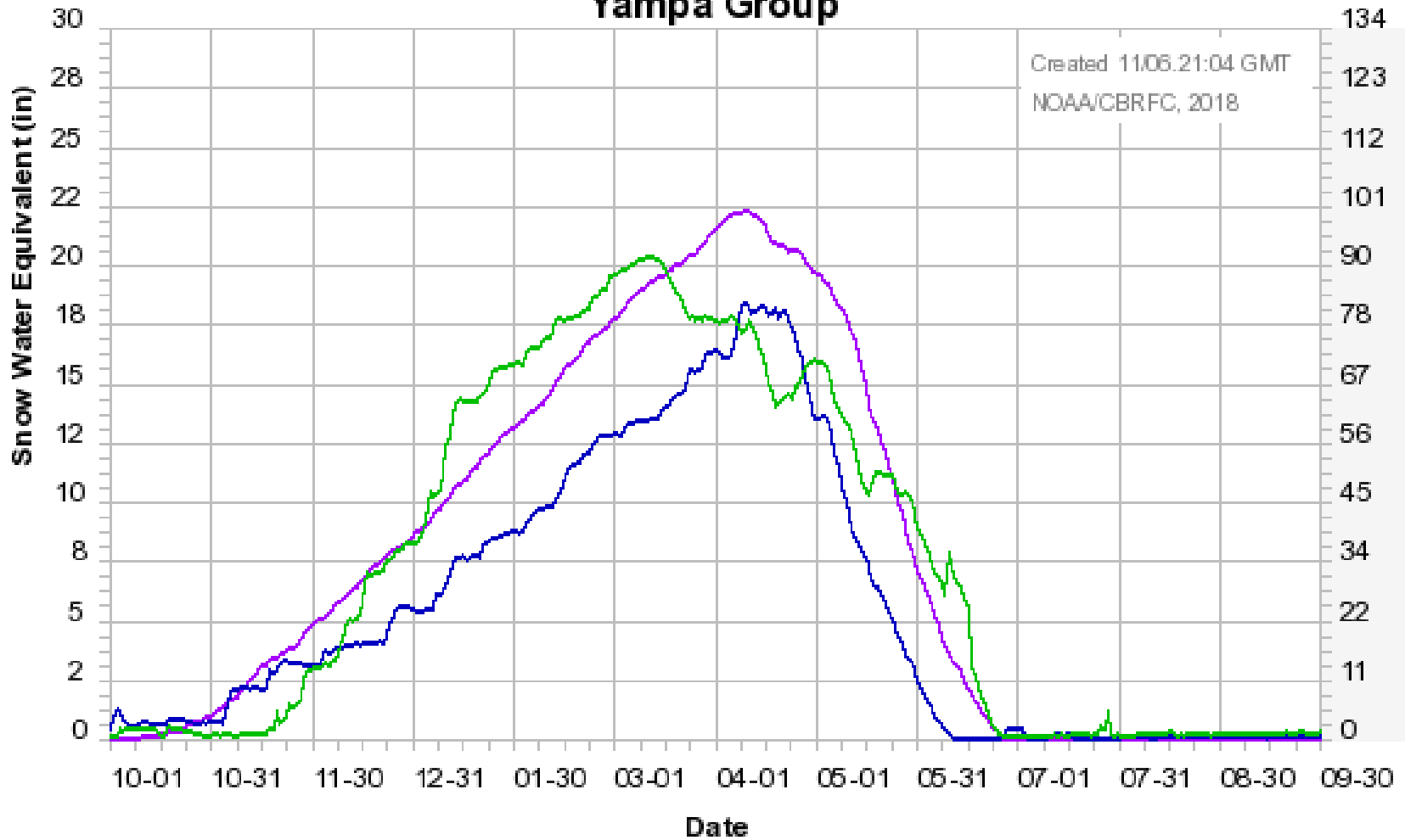


United States Department of Agriculture

Natural Resources Conservation Service

Colorado Basin River Forecast Center Yampa Group

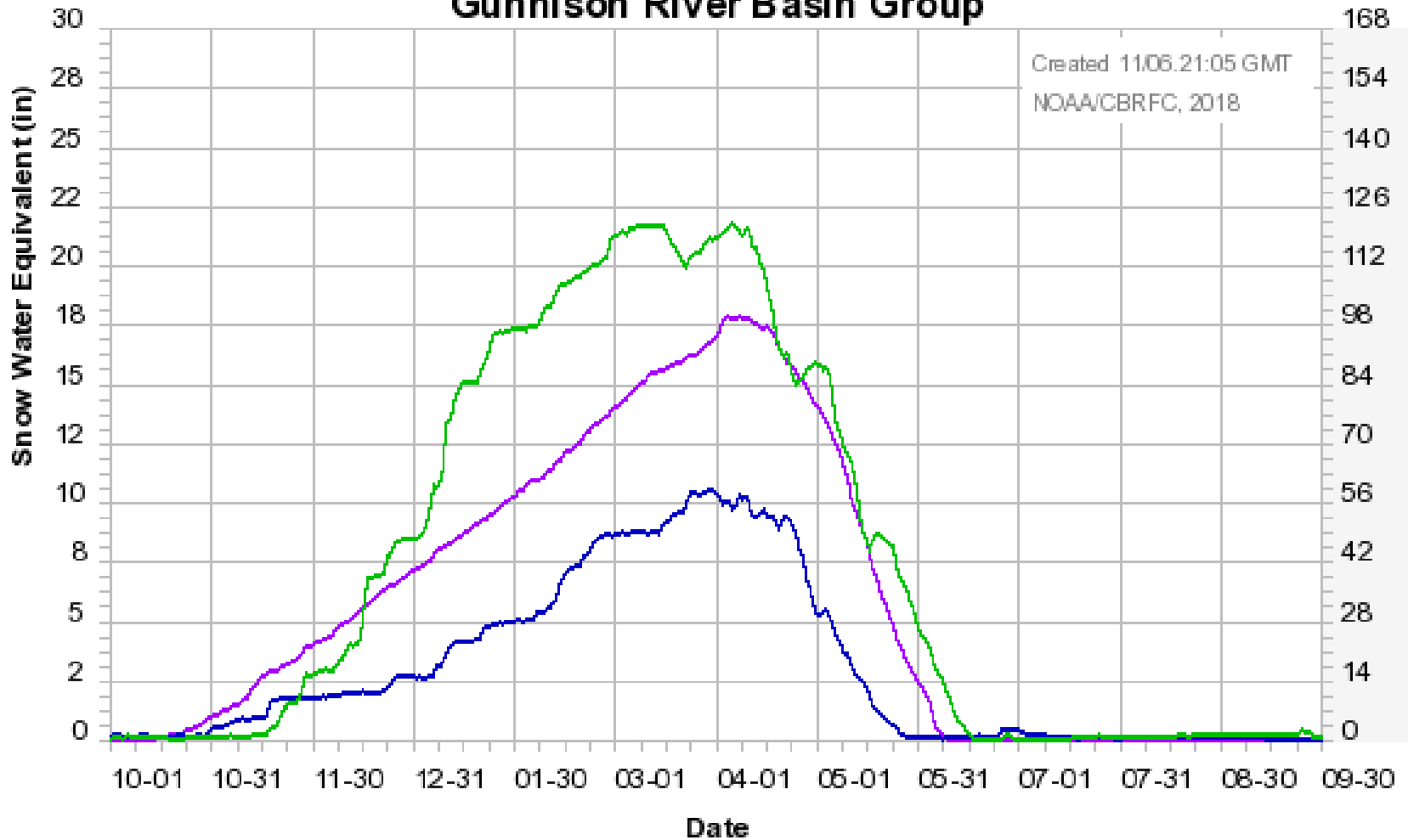
Created 11/06.21:04 GMT
NOAA/CBRFC, 2018



Median 1981-2010 2018 2017

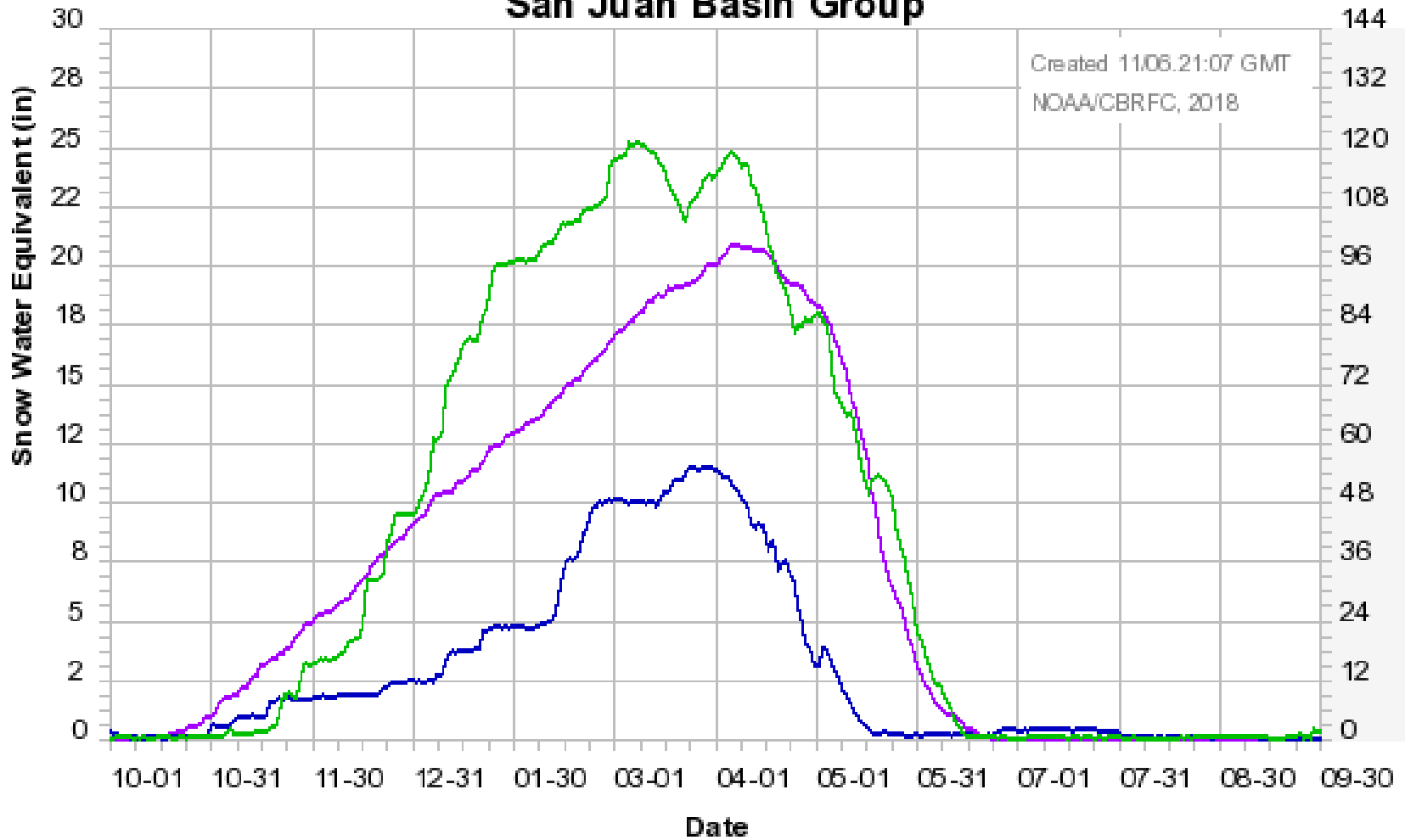
Colorado Basin River Forecast Center Gunnison River Basin Group

Created 11/06.21:05 GMT
NOAA/CBRFC, 2018



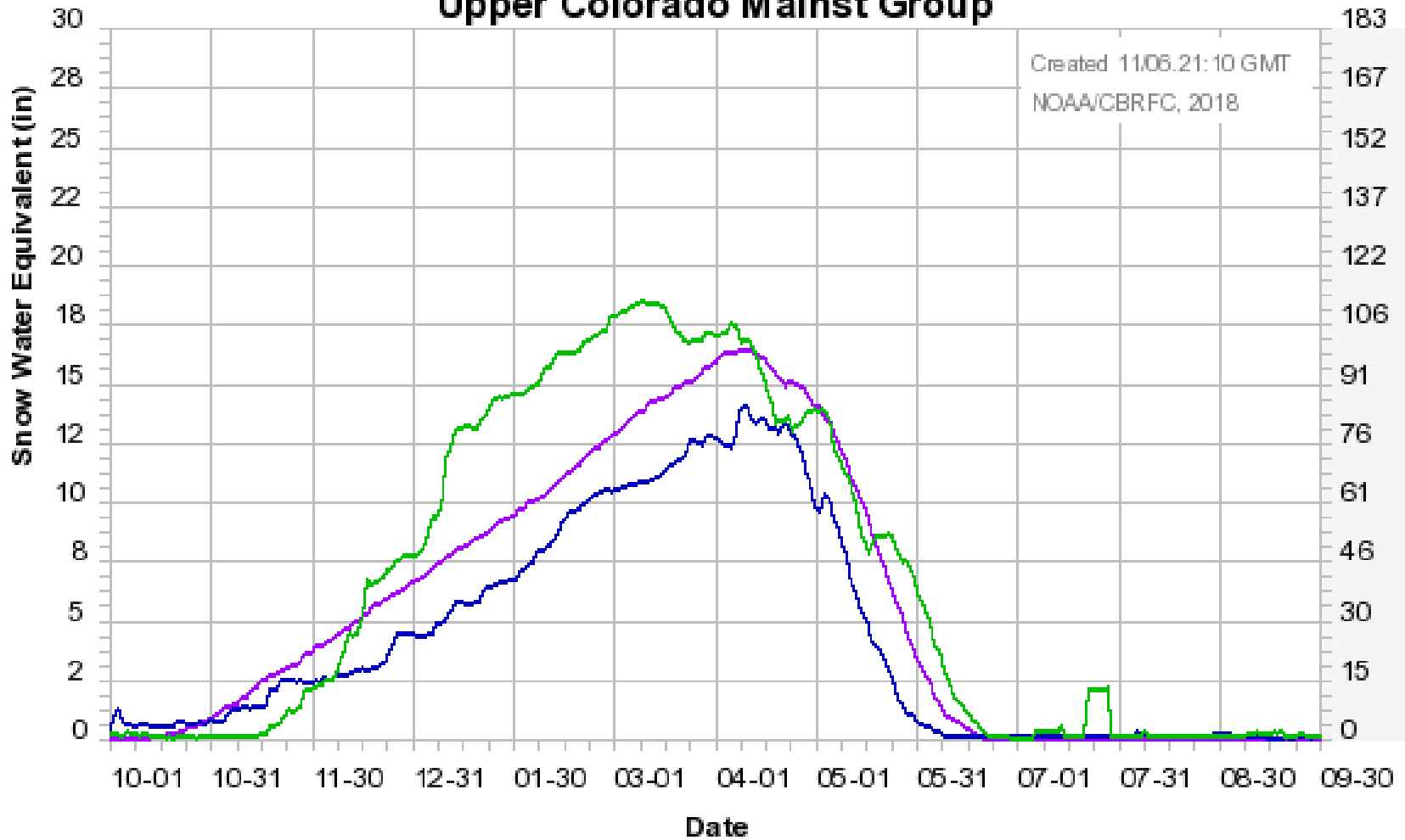
Median 1981-2010 2018 2017

Colorado Basin River Forecast Center San Juan Basin Group



Median 1981-2010 2018 2017

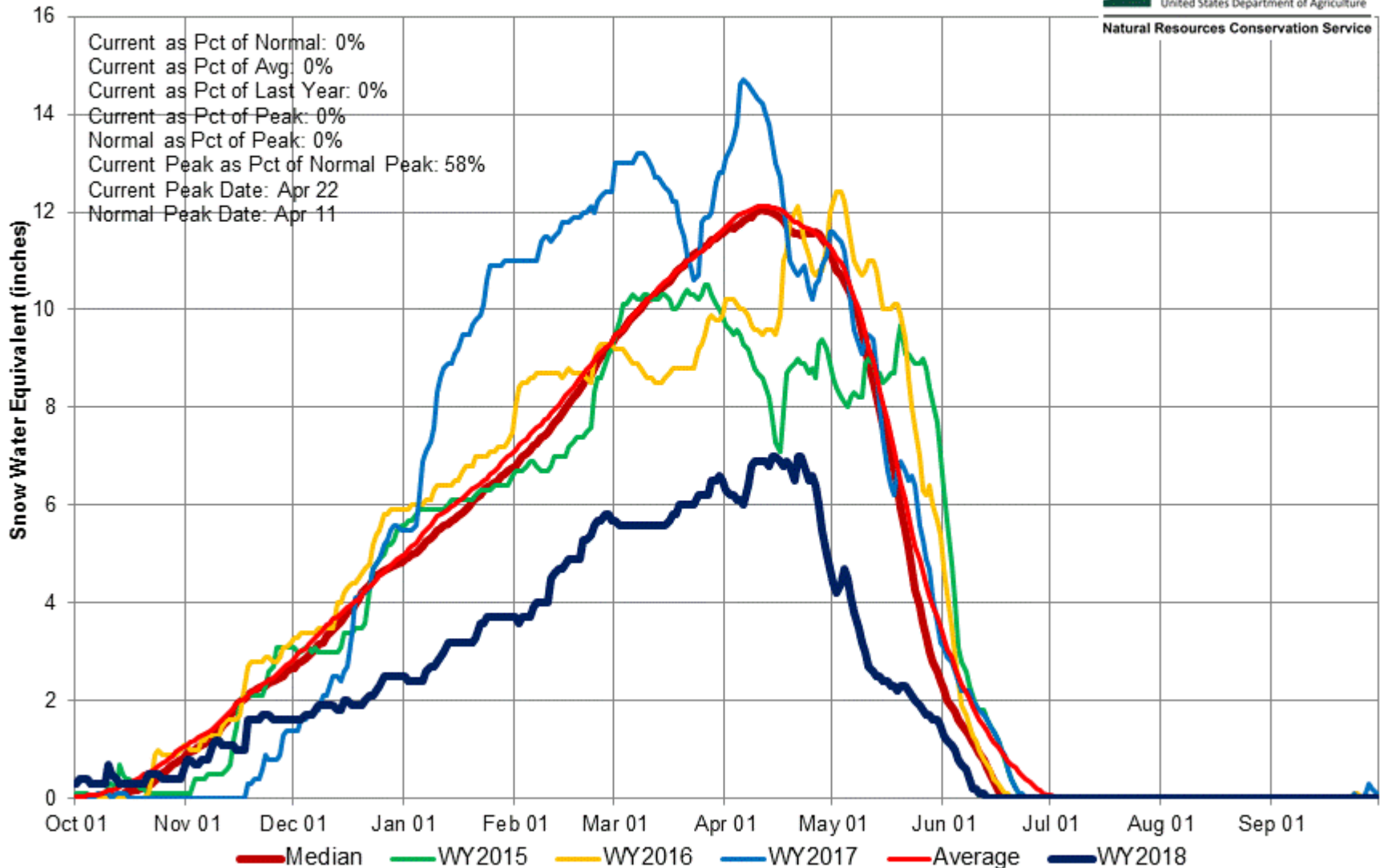
Colorado Basin River Forecast Center Upper Colorado Mainst Group



Median 1981-2010 2018 2017

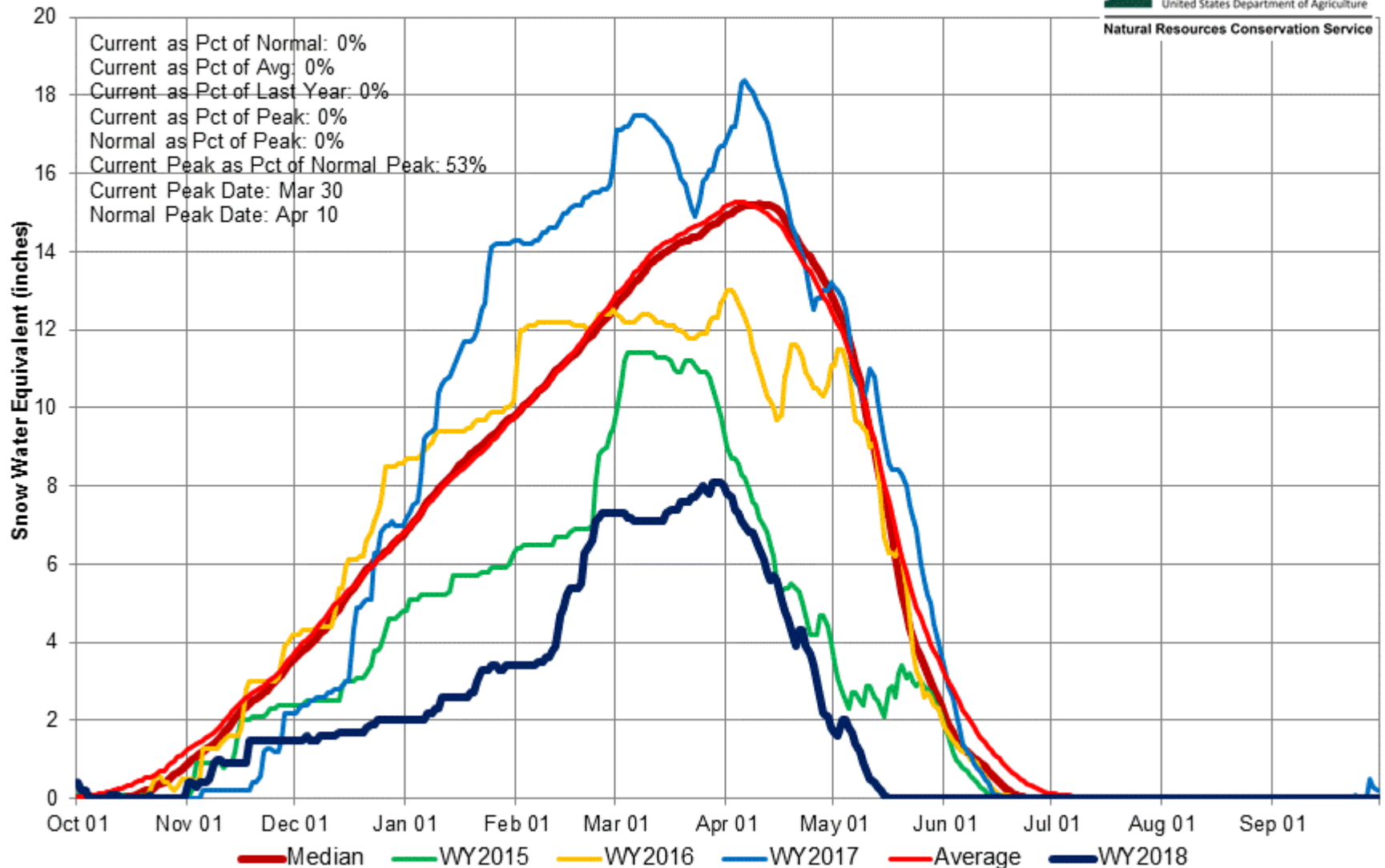
Arkansas River Basin Time Series Snowpack Summary

Based on Provisional SNOTEL data as of Sep 30, 2018



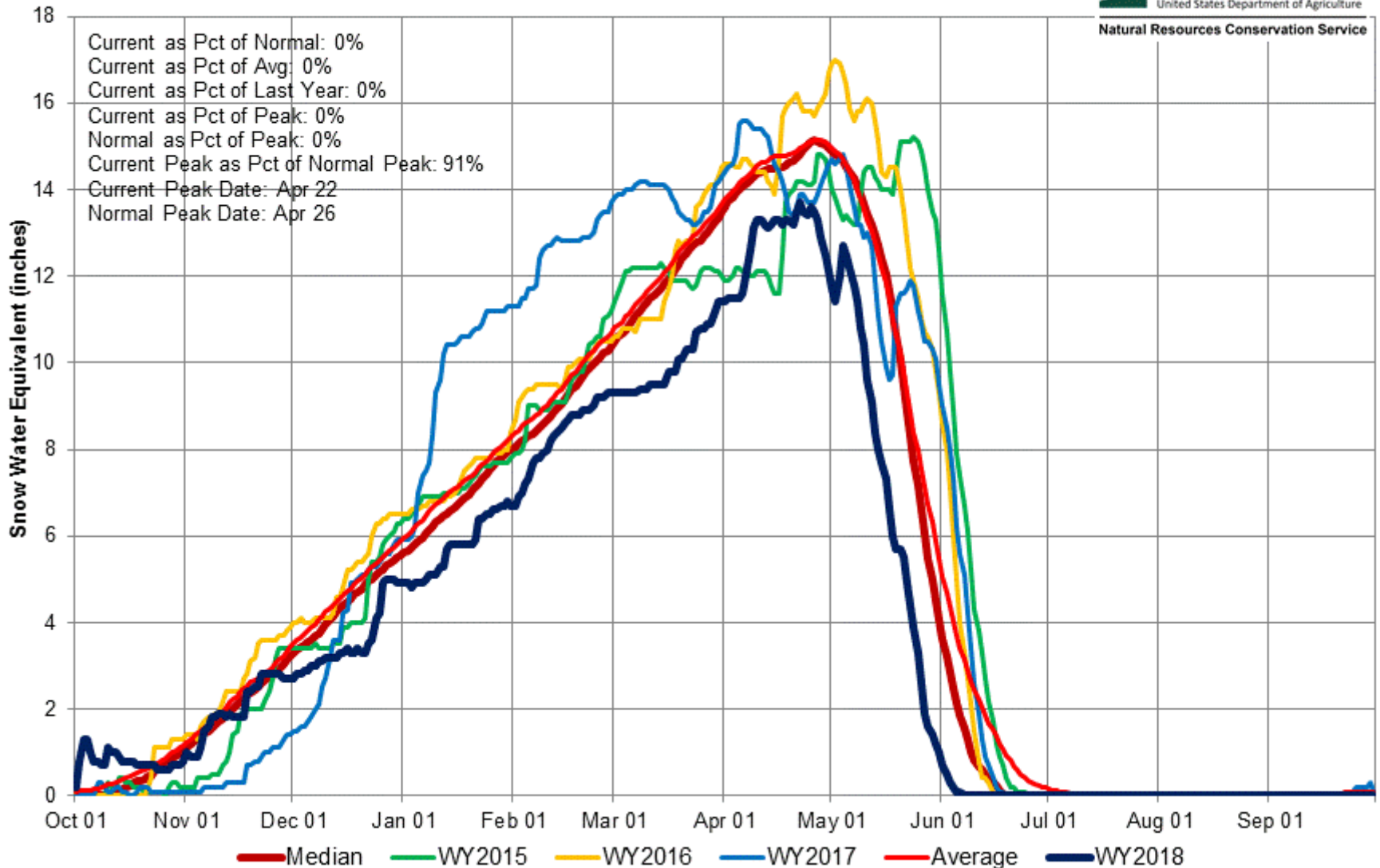
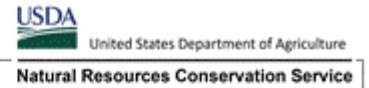
Upper Rio Grande River Basin Time Series Snowpack Summary

Based on Provisional SNOTEL data as of Sep 30, 2018

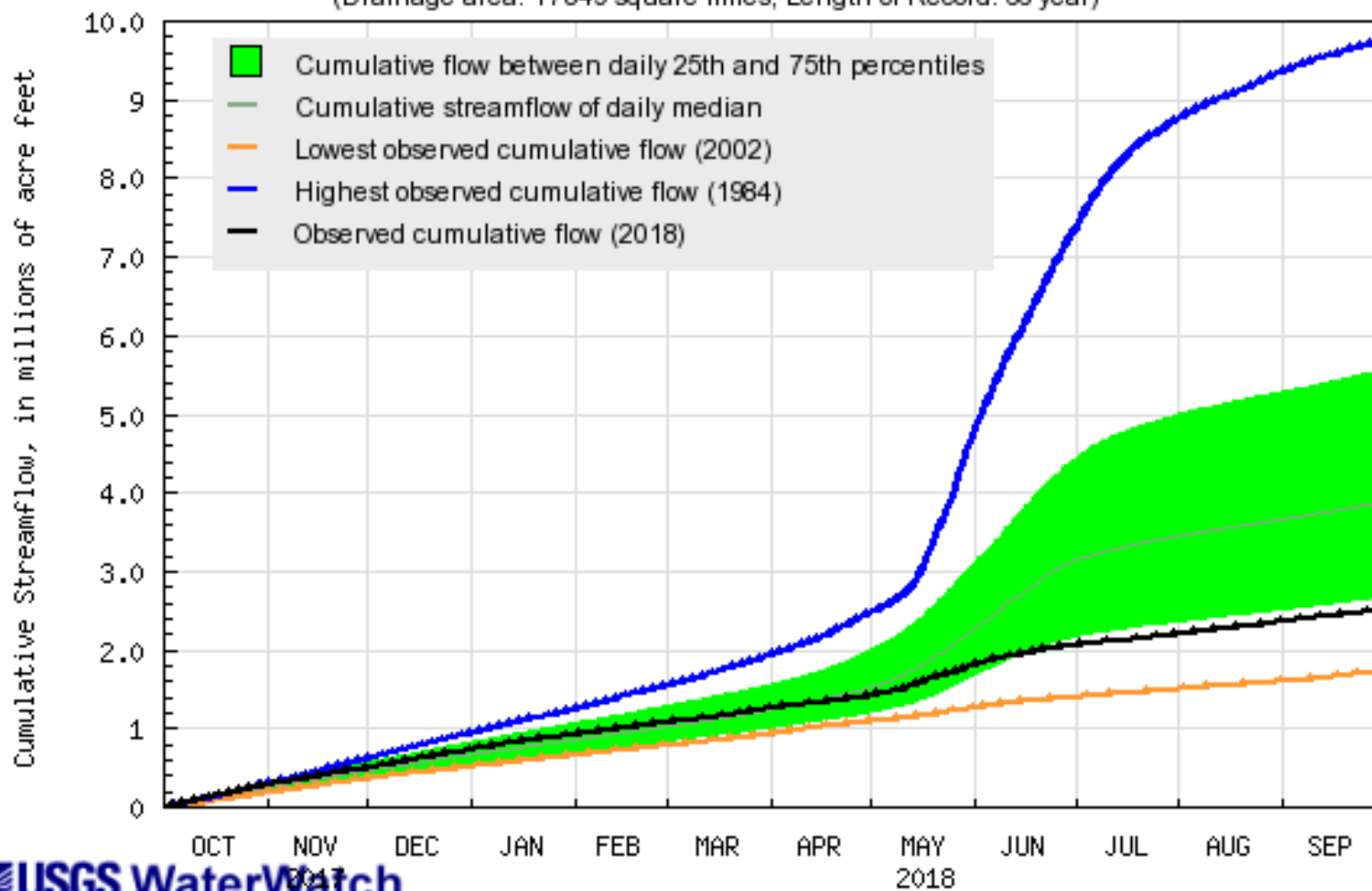


South Platte River Basin Time Series Snowpack Summary

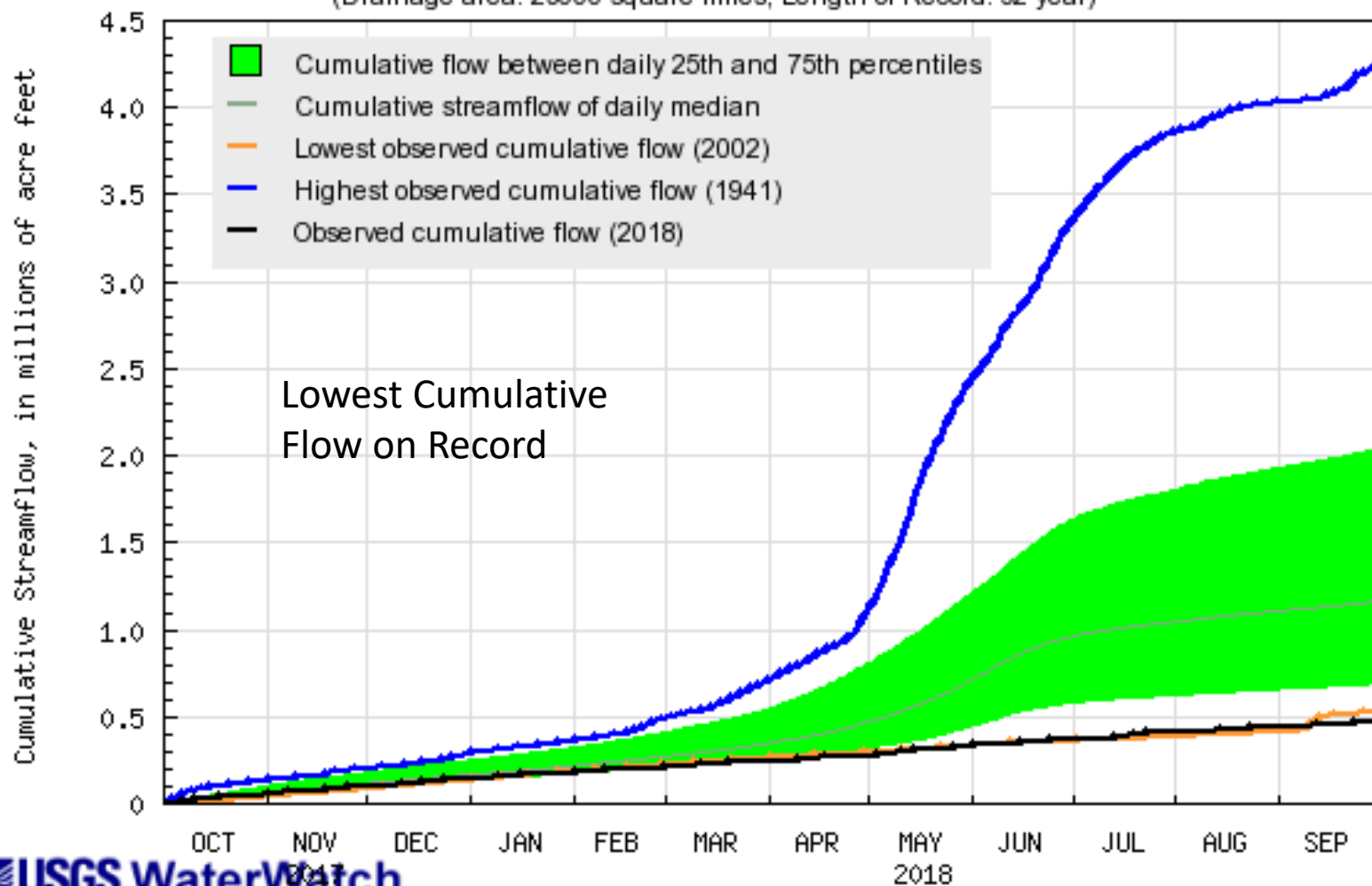
Based on Provisional SNOTEL data as of Sep 30, 2018



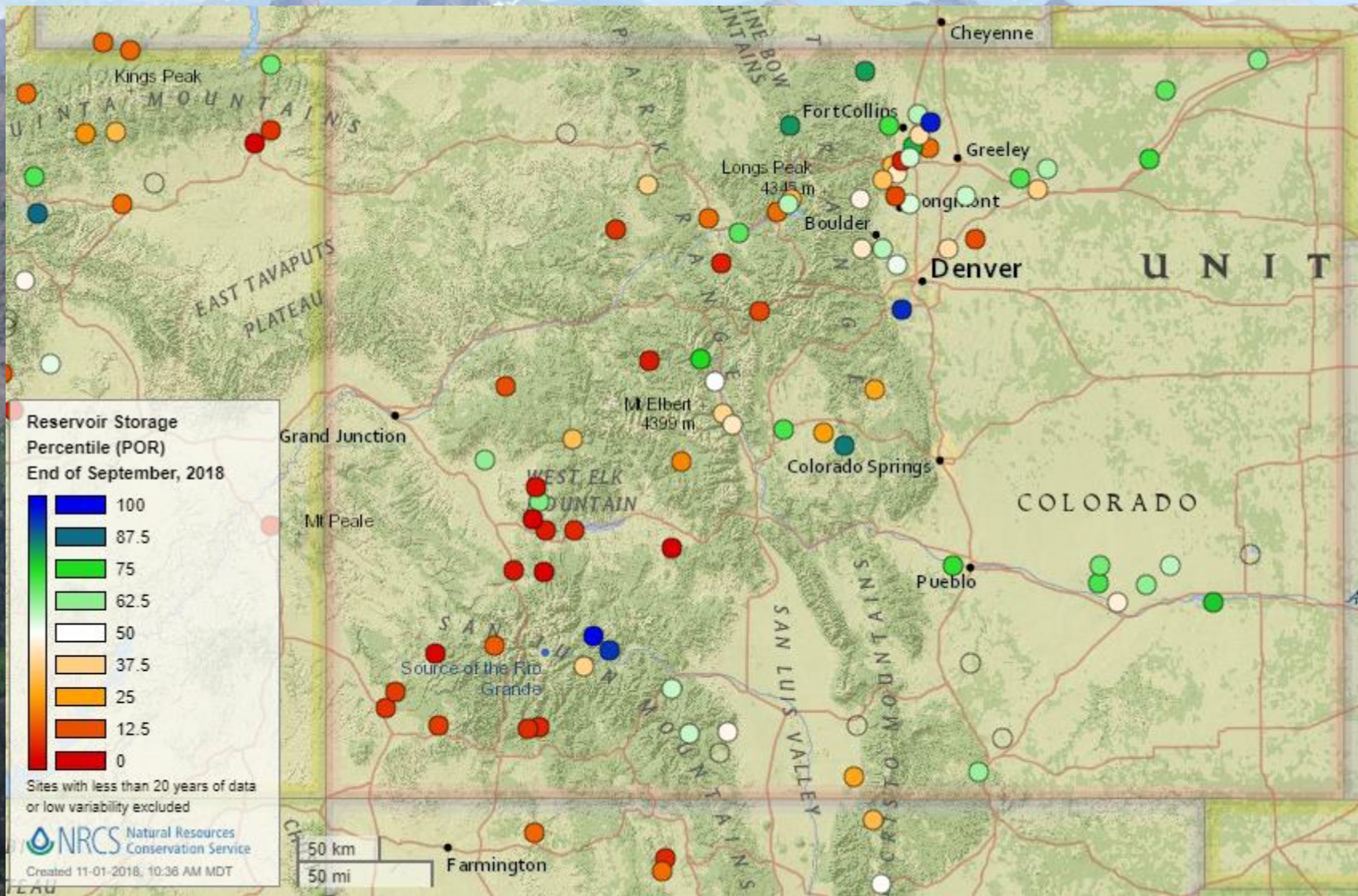
USGS 09163500 COLORADO RIVER NEAR COLORADO-UTAH STATE LINE
(Drainage area: 17849 square miles, Length of Record: 66 year)



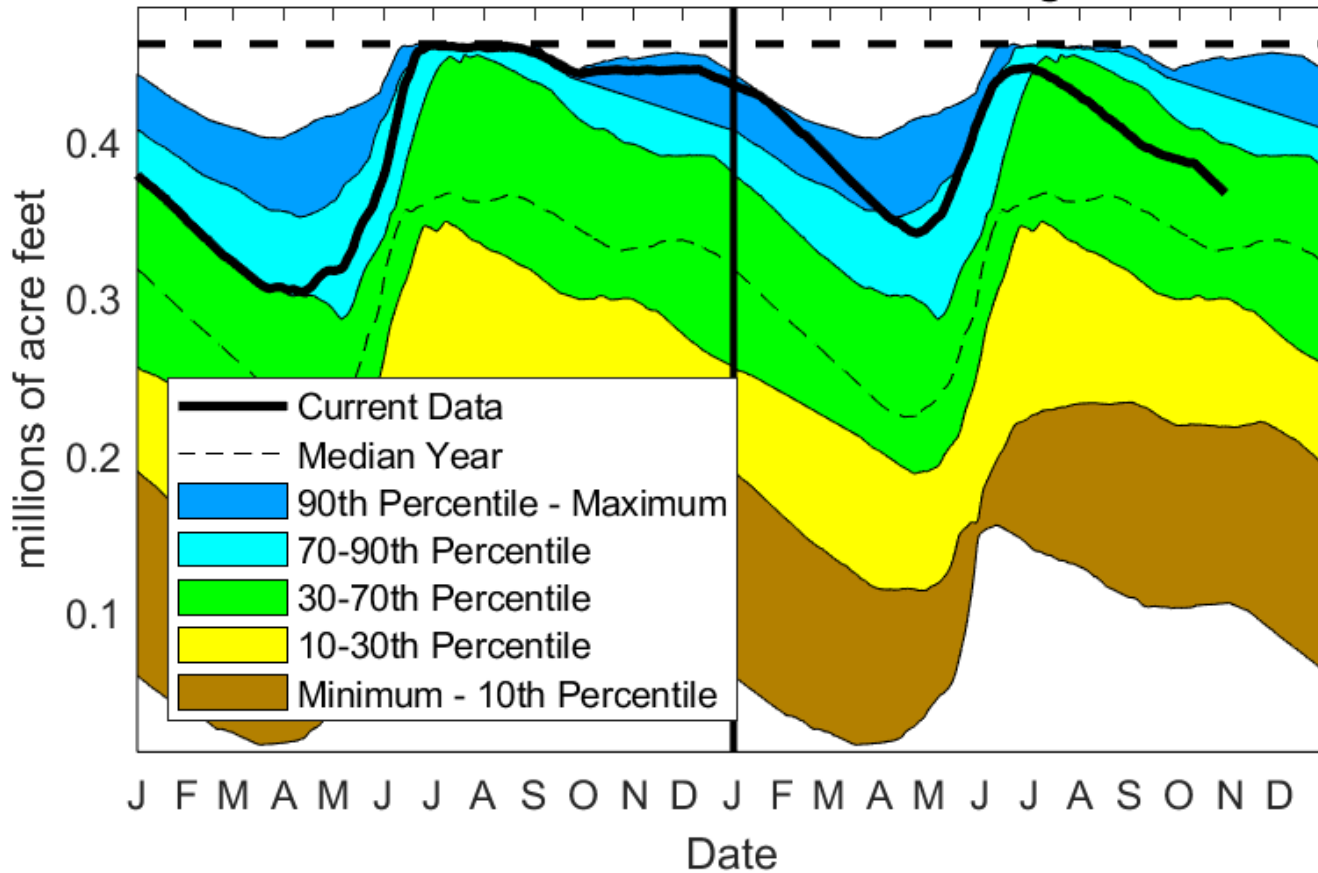
USGS 09379600 SAN JUAN RIVER NEAR BLUFF, UT
(Drainage area: 23000 square miles, Length of Record: 92 year)



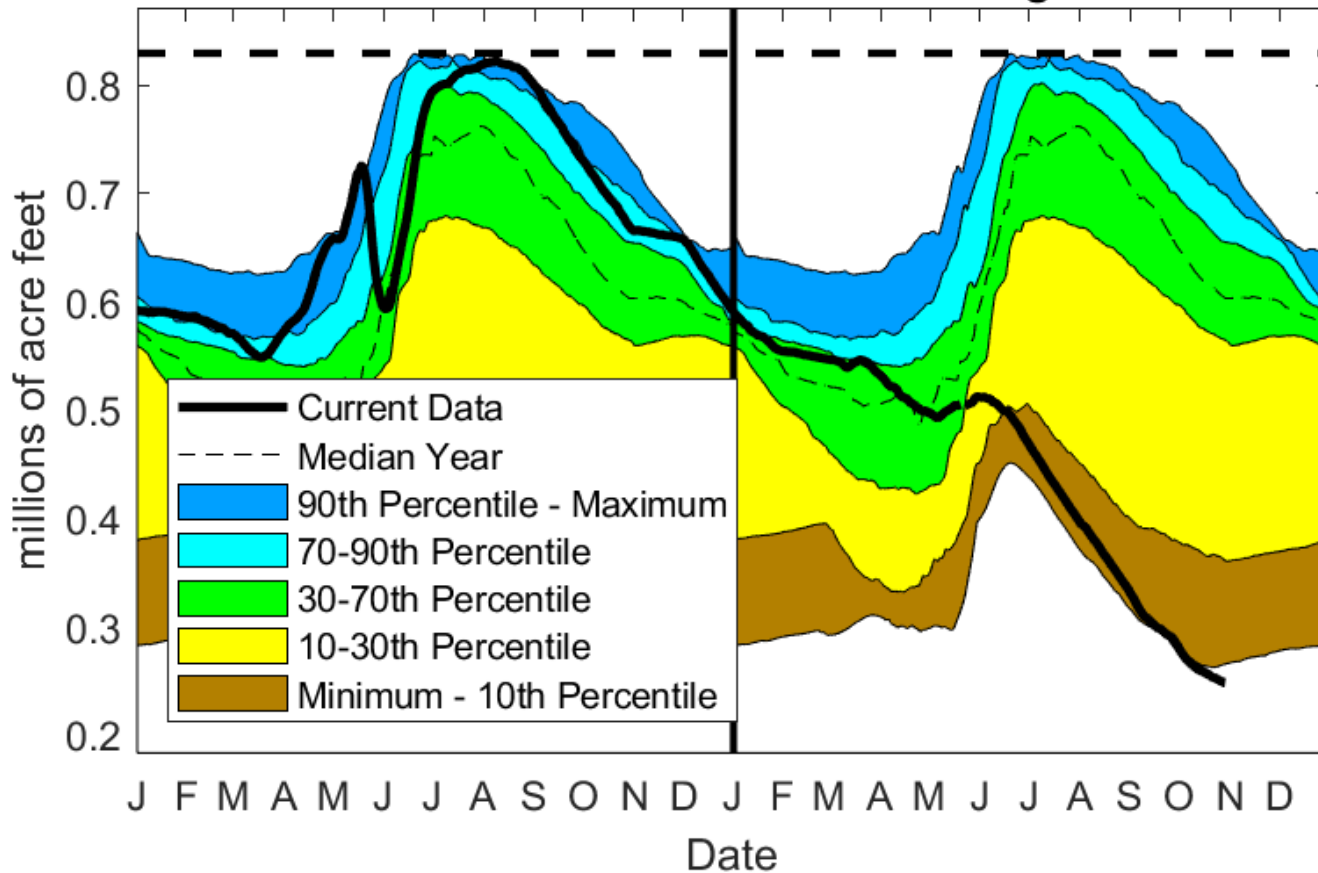
Lowest Cumulative
Flow on Record



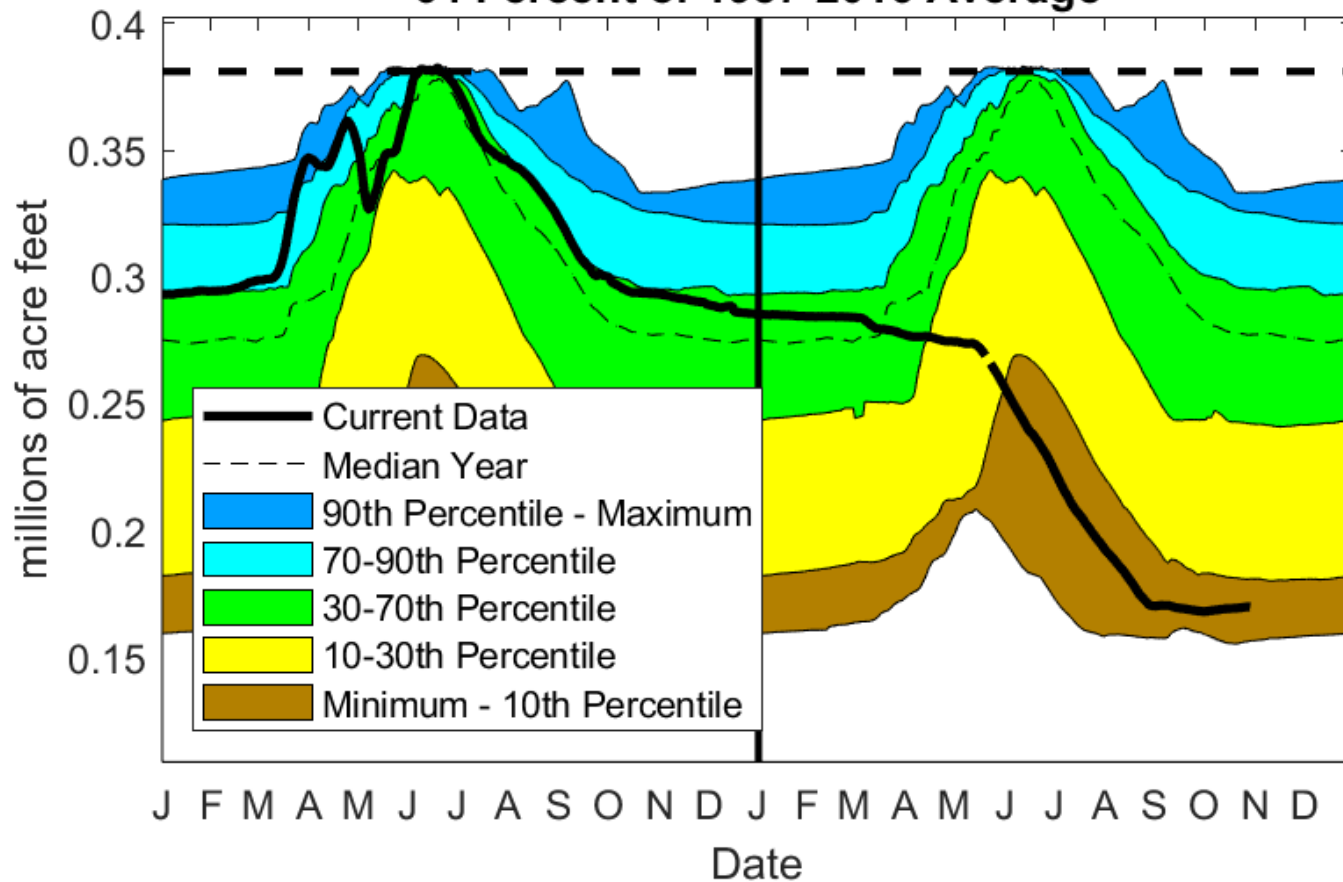
Lake Granby Reservoir Level 10/29/2018 110 Percent of 2000-2016 Average



Blue Mesa Reservoir Level 10/29/2018 43 Percent of 1985-2016 Average

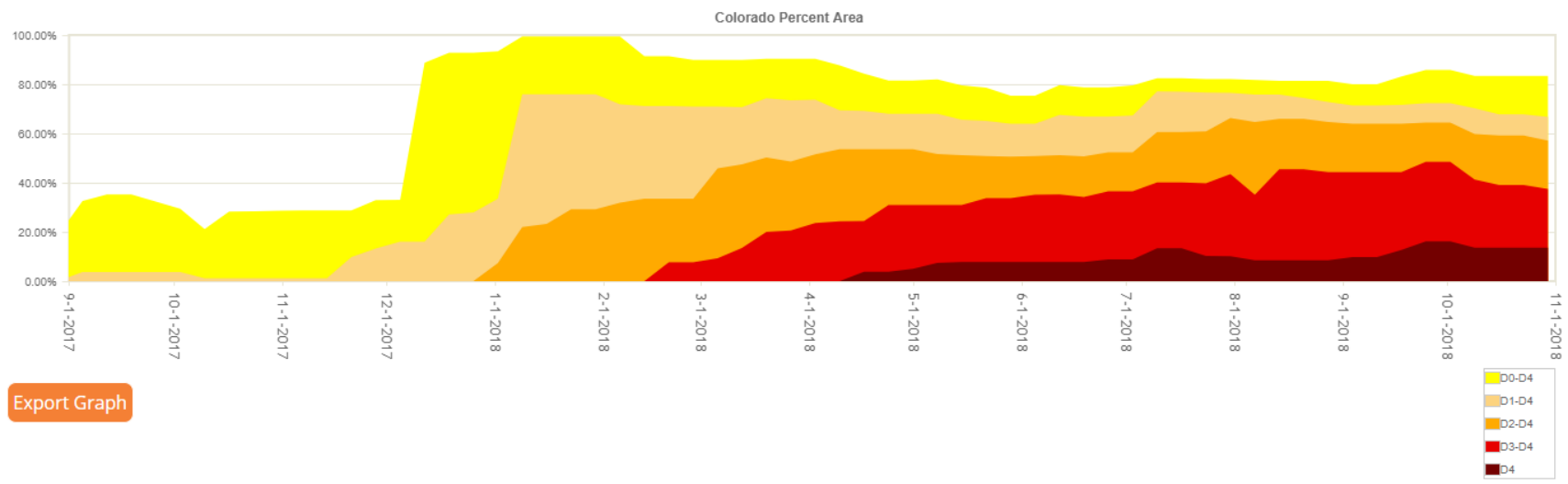


McPhee Reservoir Level 10/29/2018 64 Percent of 1987-2016 Average





Drought Over Colorado WY 2018... Yikes!



Part IV: A Look Forward

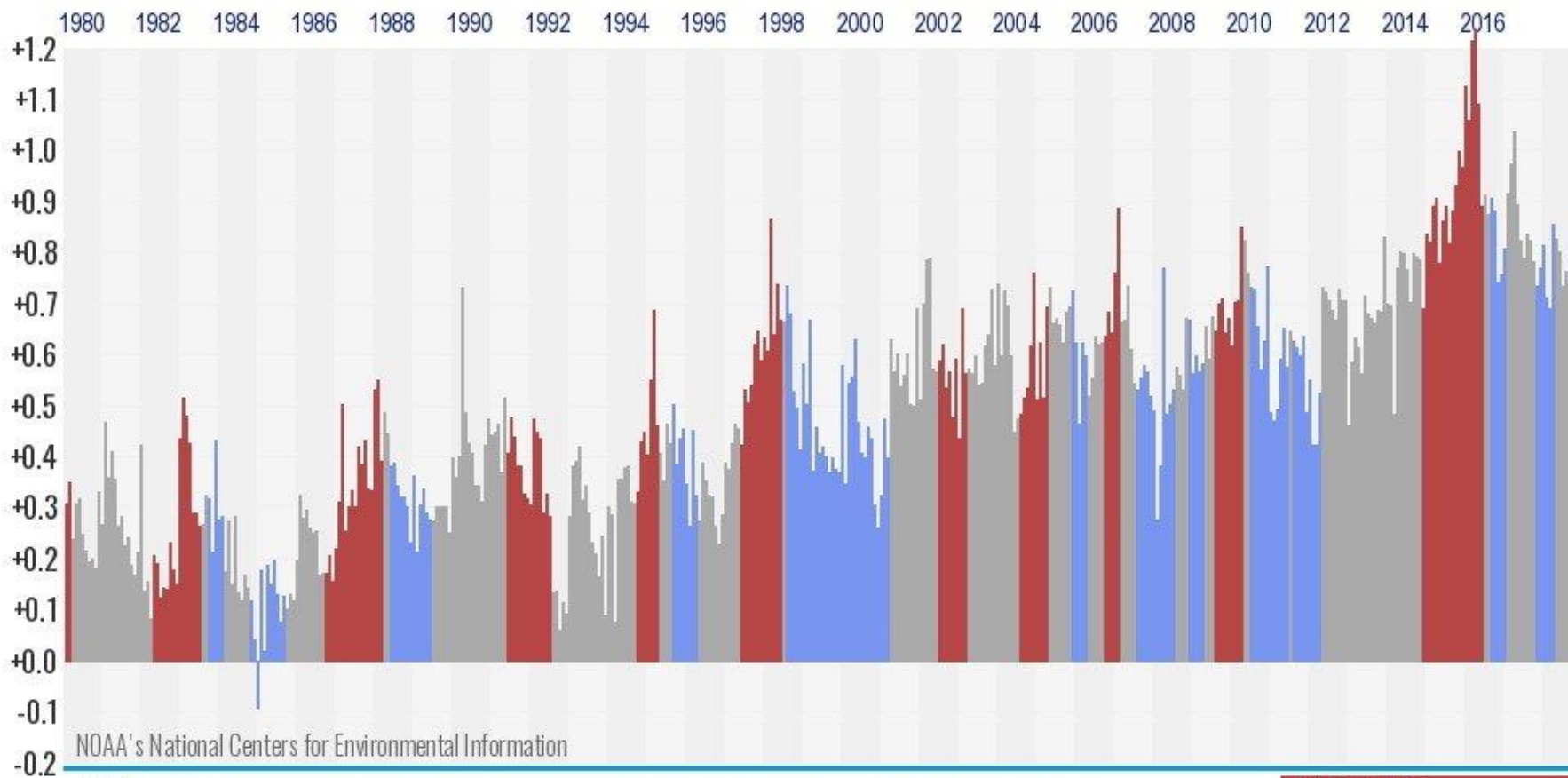


YO SOY EL NIÑO

**THE
WEATHER
CHANNEL**

EL NIÑO

- Whenever an El Niño develops, it brings us lots of questions about the winter. Should we be excited?

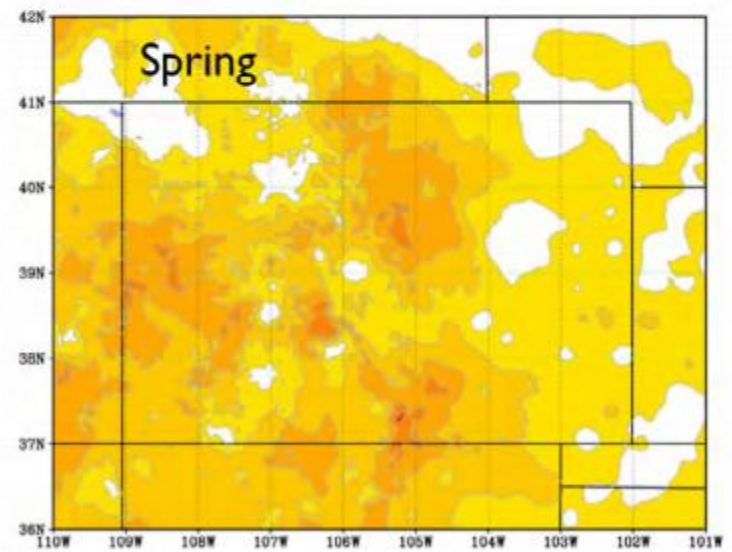
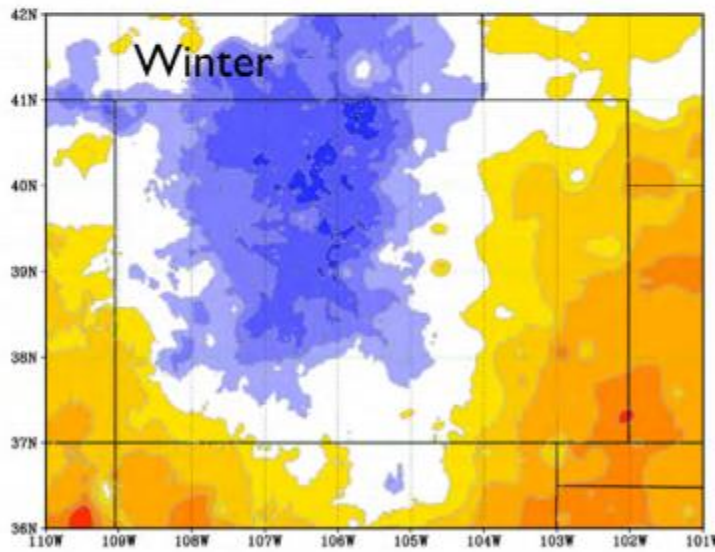
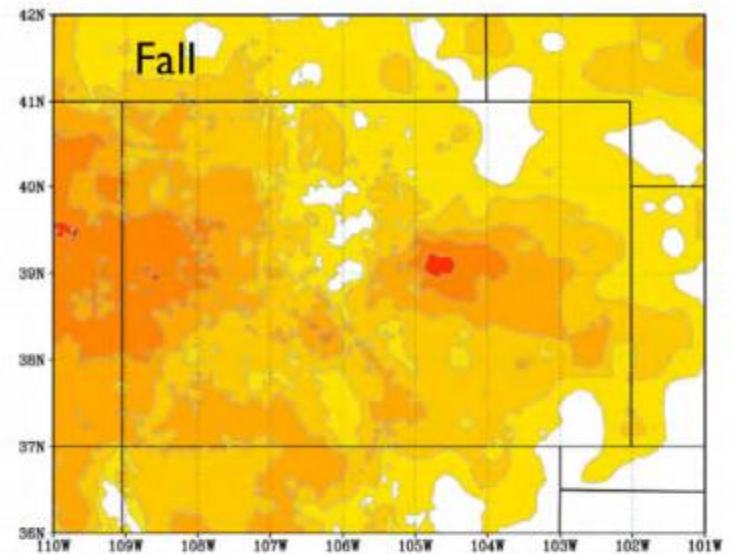
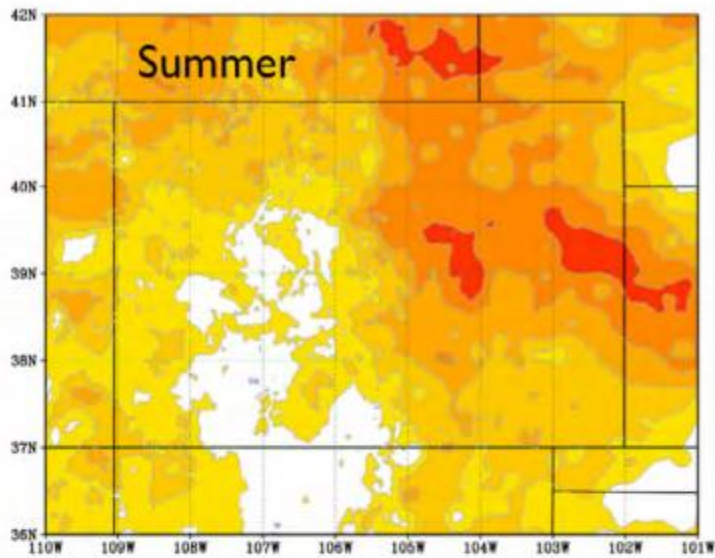


NOAA's National Centers for Environmental Information

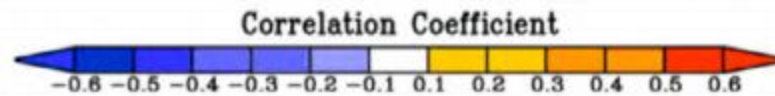


Global Surface Temperature Departures in °C, colored by monthly ENSO values
Jan 1980 through Sep 2018

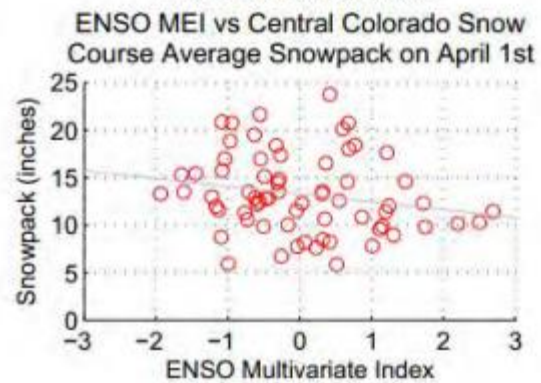
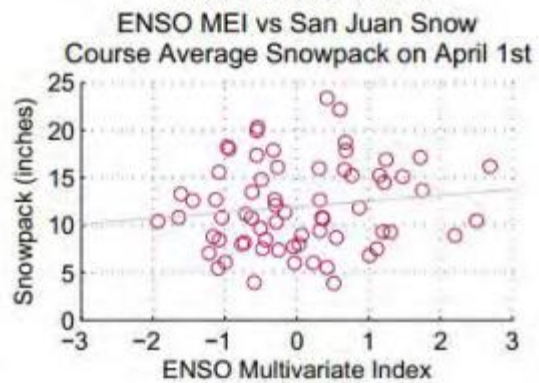
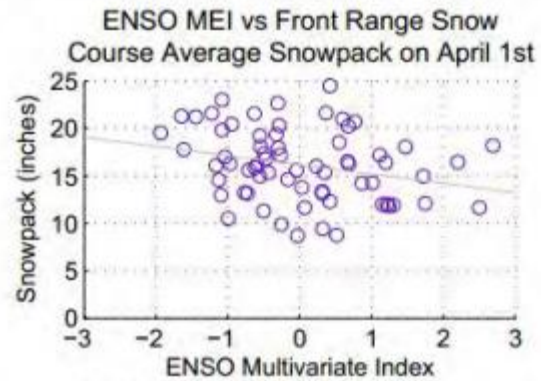
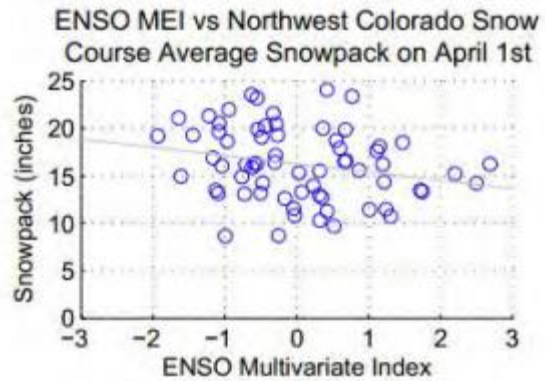
El Niño Months
ENSO Neutral Months
La Niña Months



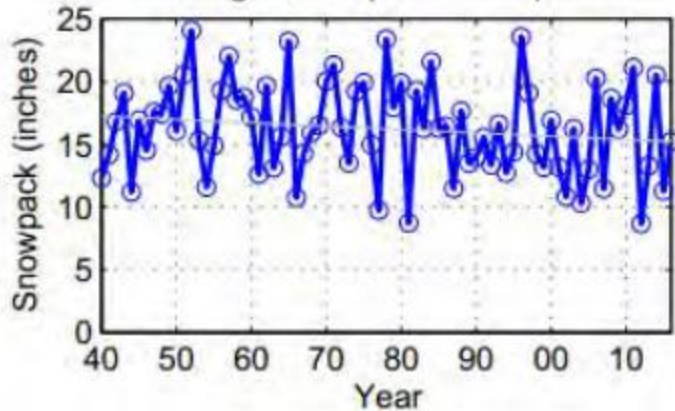
Tends wetter during La Niña



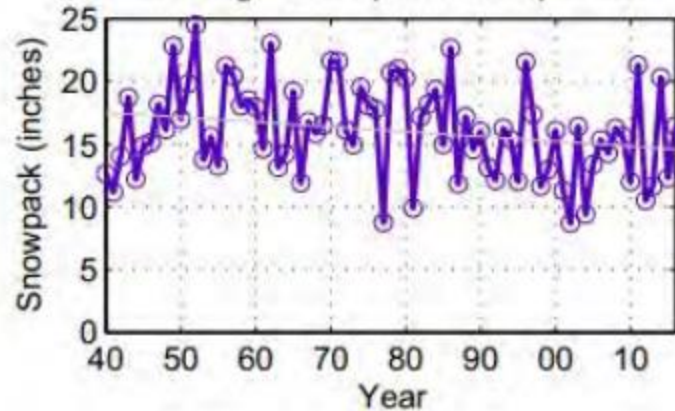
Tends wetter during El Niño



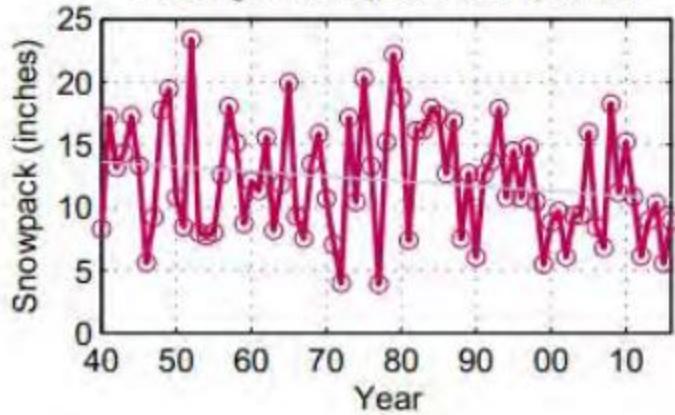
Northwest Colorado Snow Course
Average Snowpack On April 1st



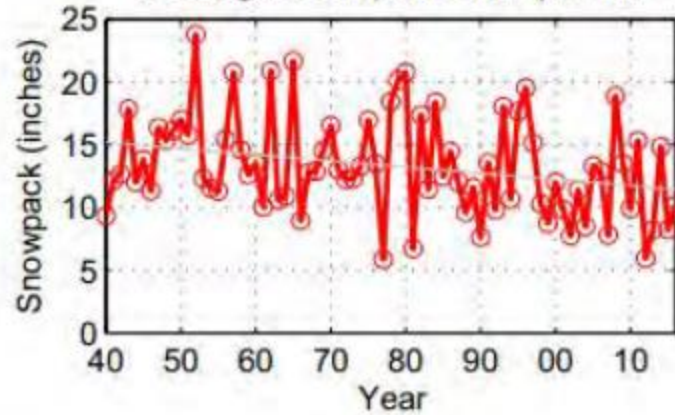
Front Range Snow Course
Average Snowpack On April 1st

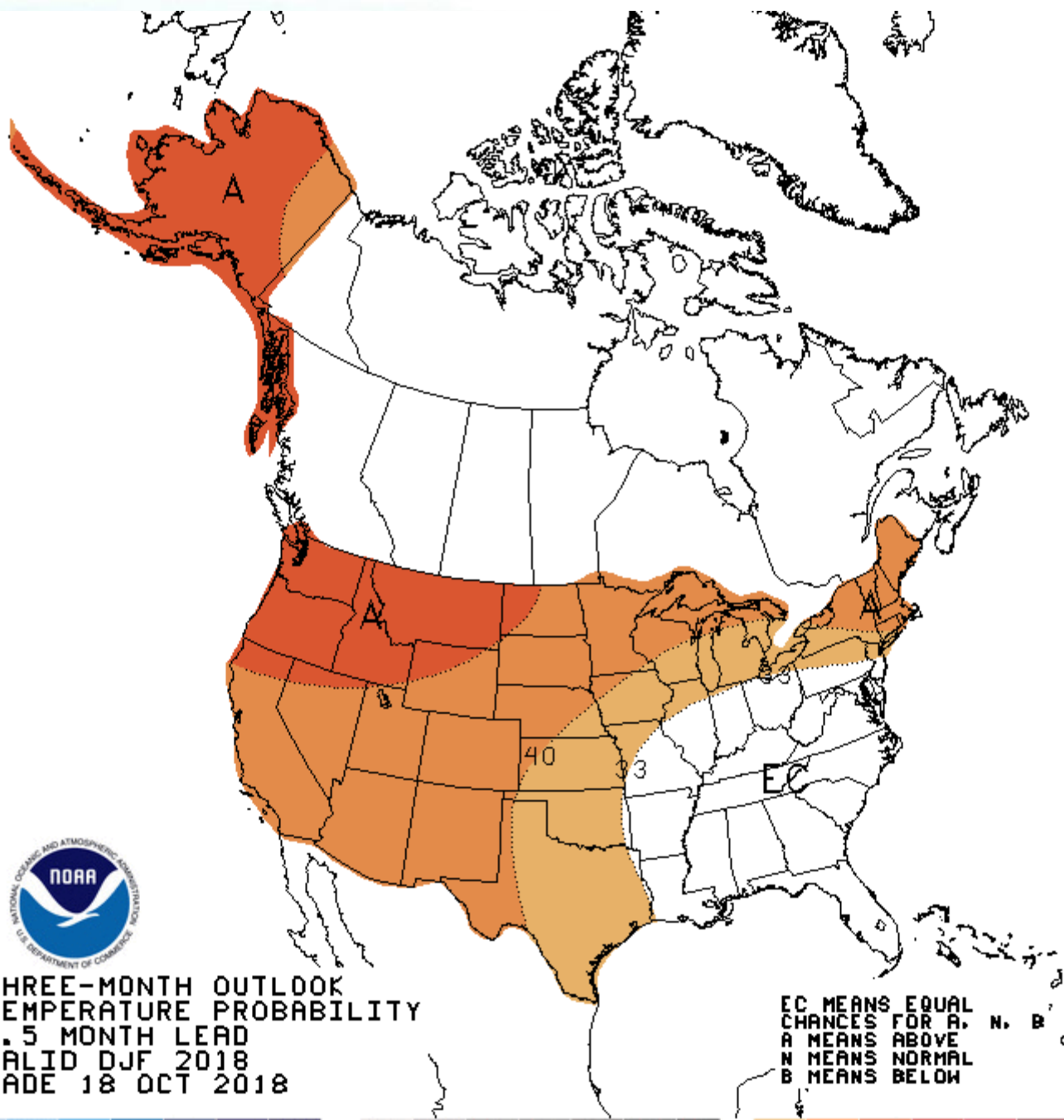


San Juan Snow Course
Average Snowpack On April 1st



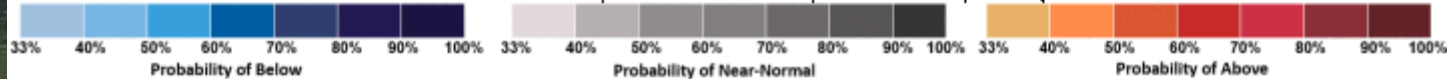
Central Colorado Snow Course
Average Snowpack On April 1st

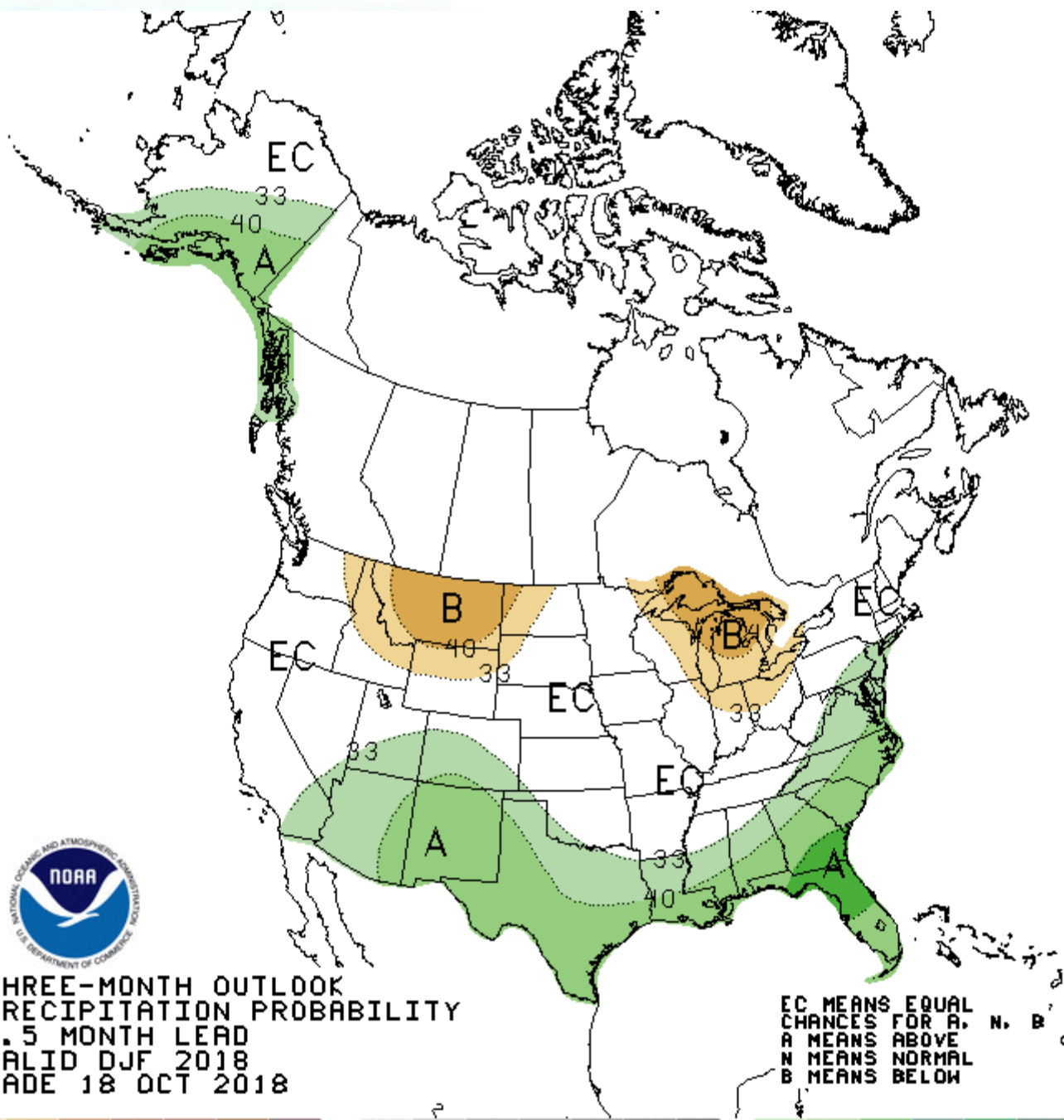




**THREE-MONTH OUTLOOK
 TEMPERATURE PROBABILITY
 1.5 MONTH LEAD
 VALID DJF 2018
 MADE 18 OCT 2018**

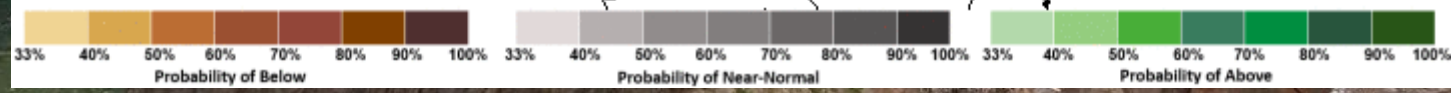
**EC MEANS EQUAL
 CHANCES FOR A, N, B
 A MEANS ABOVE
 N MEANS NORMAL
 B MEANS BELOW**

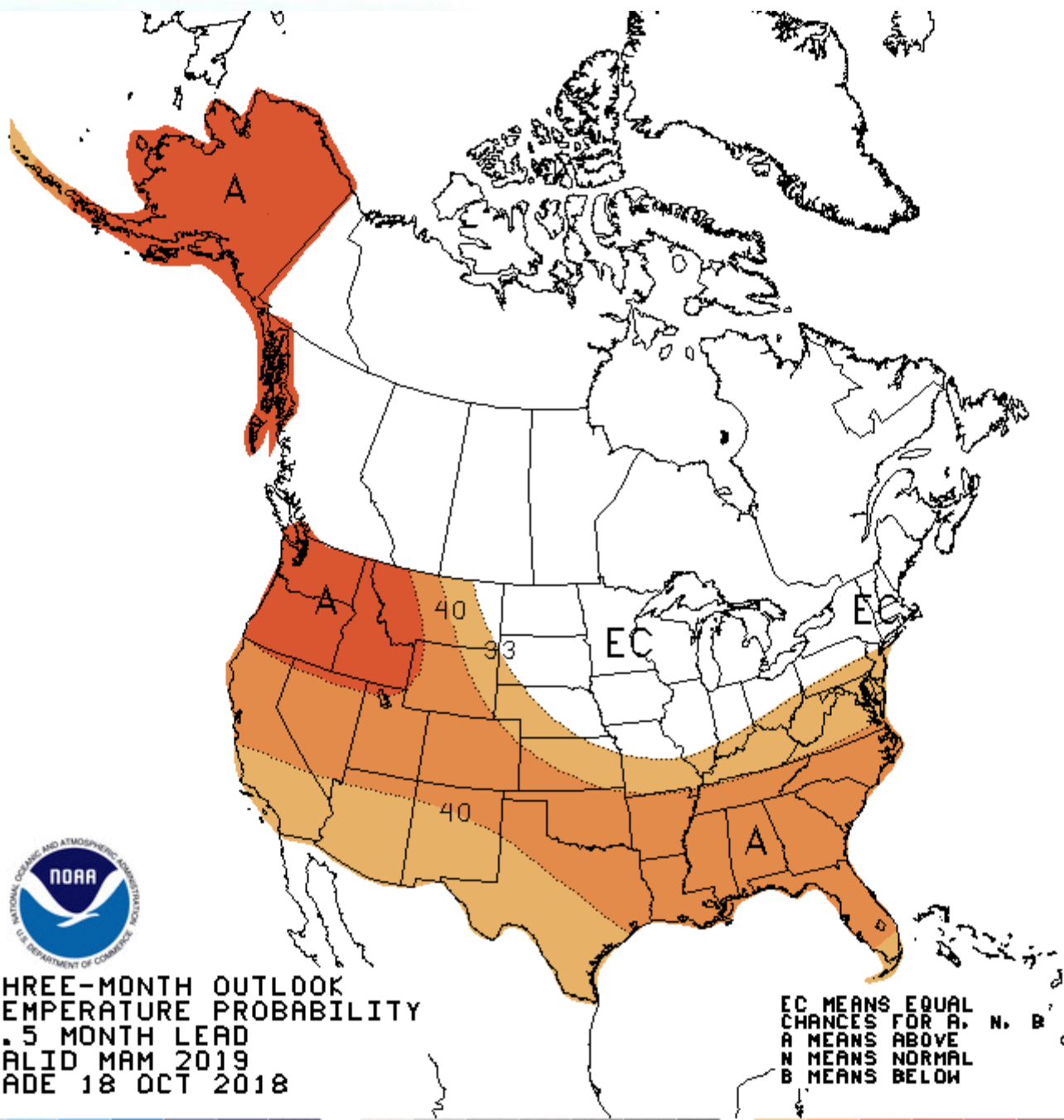




THREE-MONTH OUTLOOK
 PRECIPITATION PROBABILITY
 1.5 MONTH LEAD
 VALID DJF 2018
 MADE 18 OCT 2018

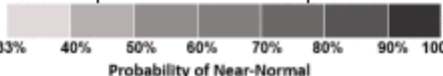
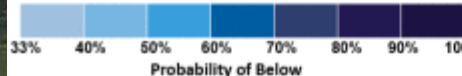
EC MEANS EQUAL
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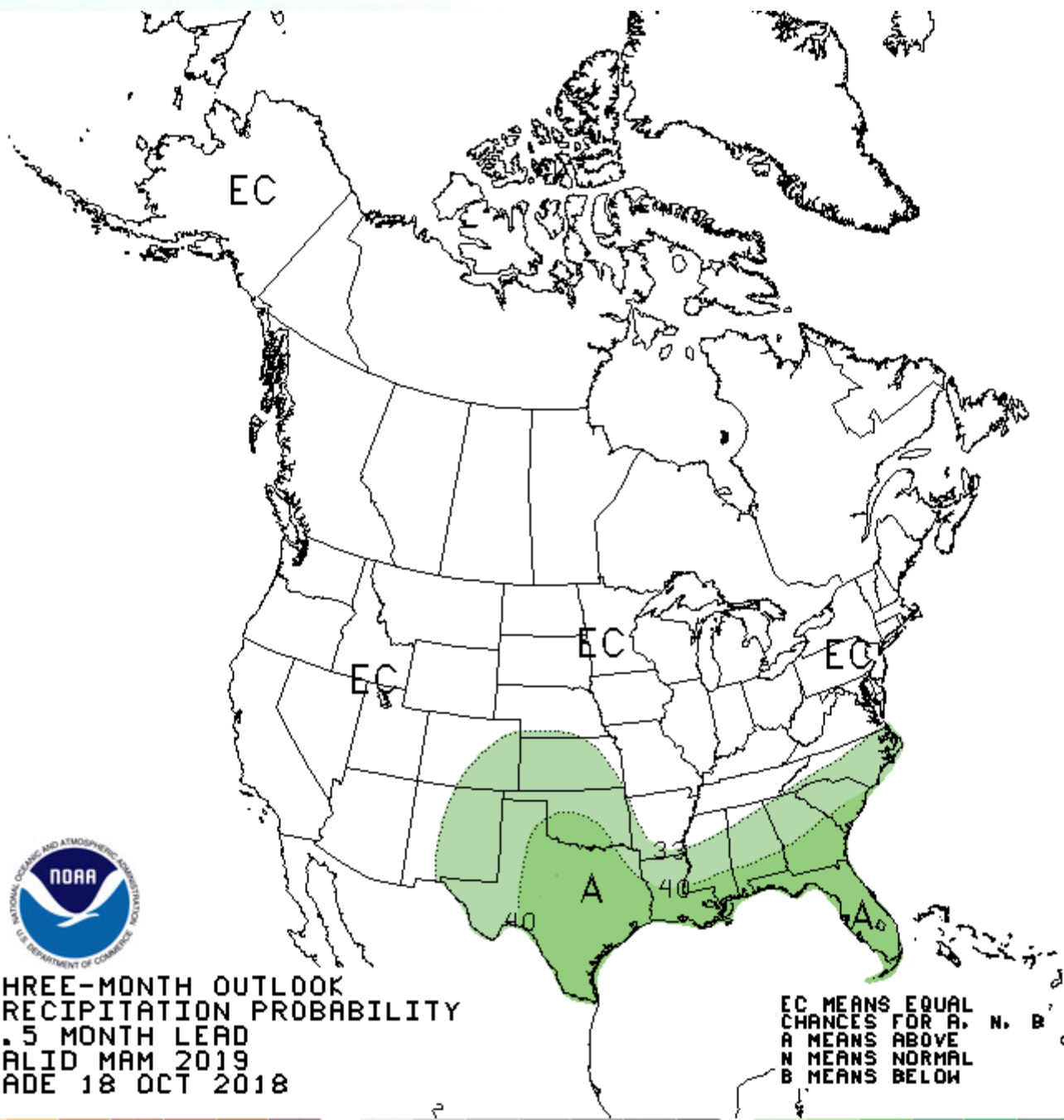




THREE-MONTH OUTLOOK
TEMPERATURE PROBABILITY
4.5 MONTH LEAD
VALID MAM 2019
MADE 18 OCT 2018

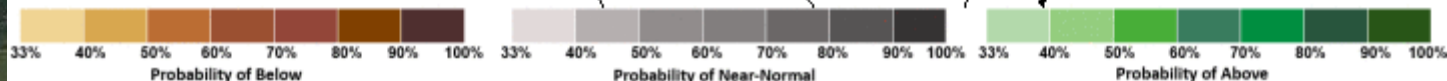
EC MEANS EQUAL
CHANCES FOR A, N, B
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW



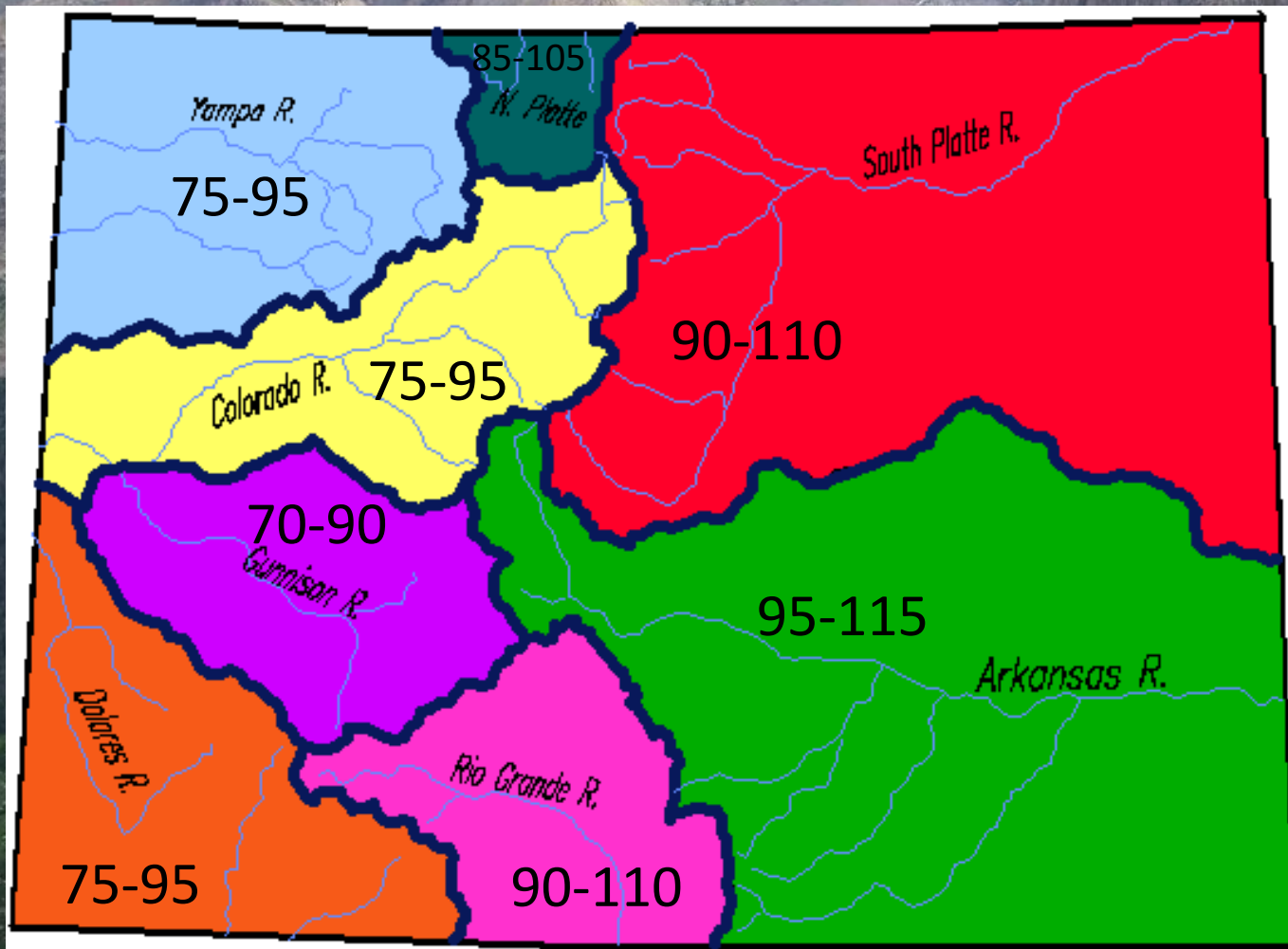


THREE-MONTH OUTLOOK
 PRECIPITATION PROBABILITY
 4.5 MONTH LEAD
 VALID MAM 2019
 MADE 18 OCT 2018

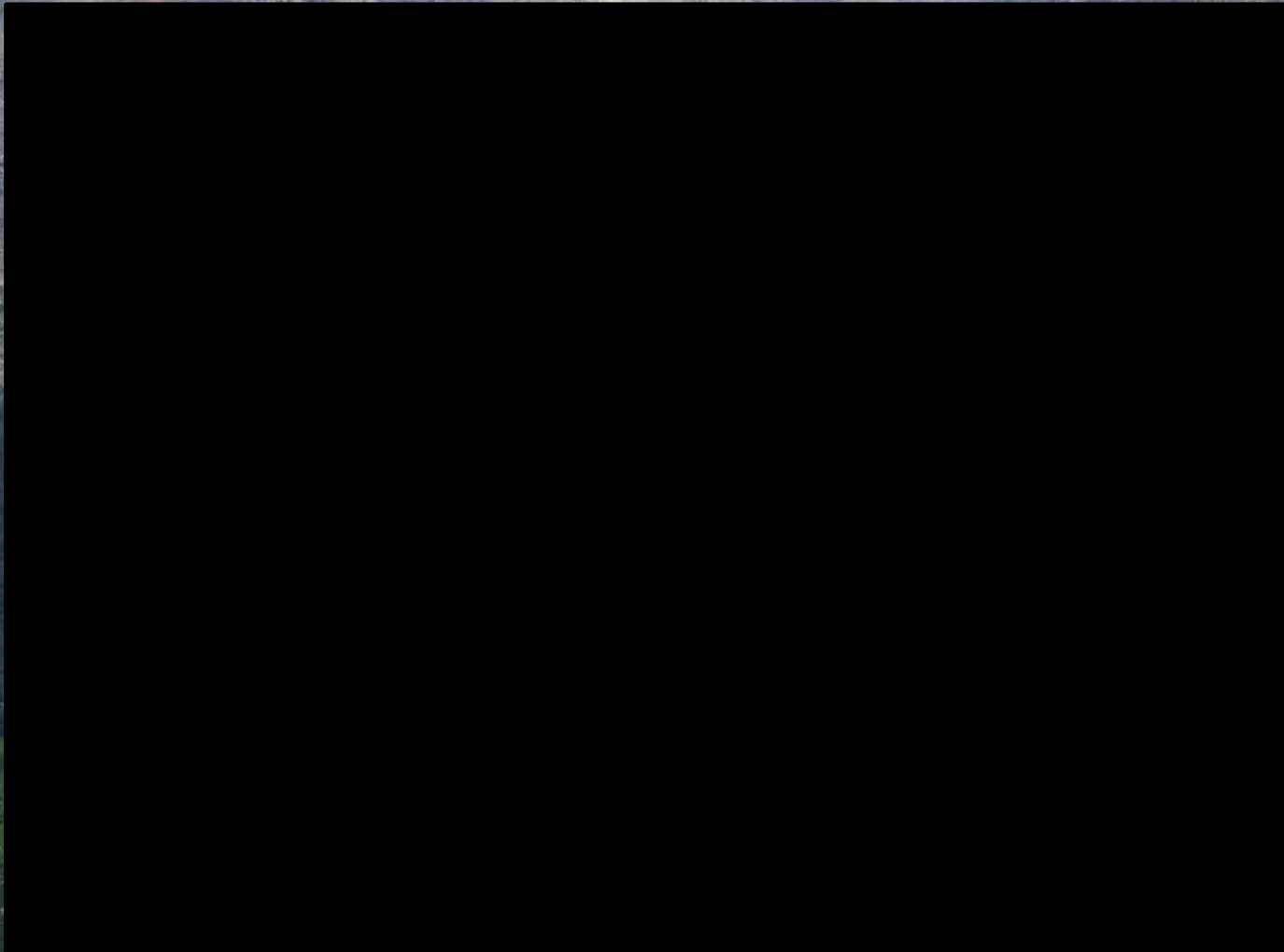
EC MEANS EQUAL
 CHANCES FOR A, N, B
 A MEANS ABOVE
 N MEANS NORMAL
 B MEANS BELOW



Peak Snowpack (My Dart Board Prediction)



Peak Snowpack (My Dart Board Prediction)



Conclusions

- Water Year 2018 was one to remember, and not the kind you want. The warmest, and second driest on record thanks in large part to the area west of the divide. Thank goodness our reservoirs were full
- Snowpack *should* be significantly better than last year, but we should measure our expectations (think 20th – 60th percentile range)
- Holding onto El Niño into the spring and summer could help water supplies



Thanks, and let's keep in touch!

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