



COLORADO STATE UNIVERSITY



COLORADO CLIMATE CENTER

Providing information and expertise on Colorado's complex climate

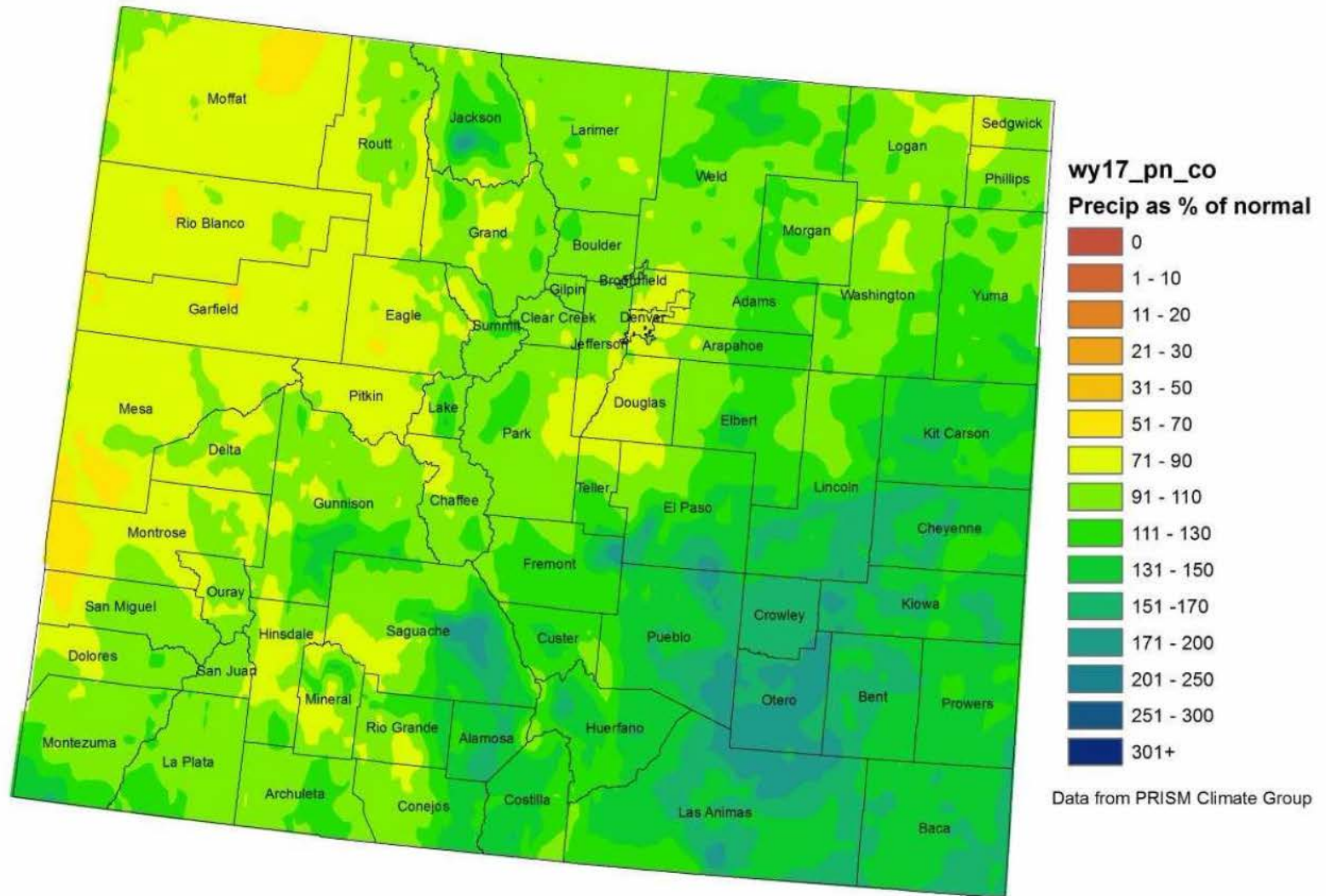
A Reflection on Water Year 2017

Peter Goble

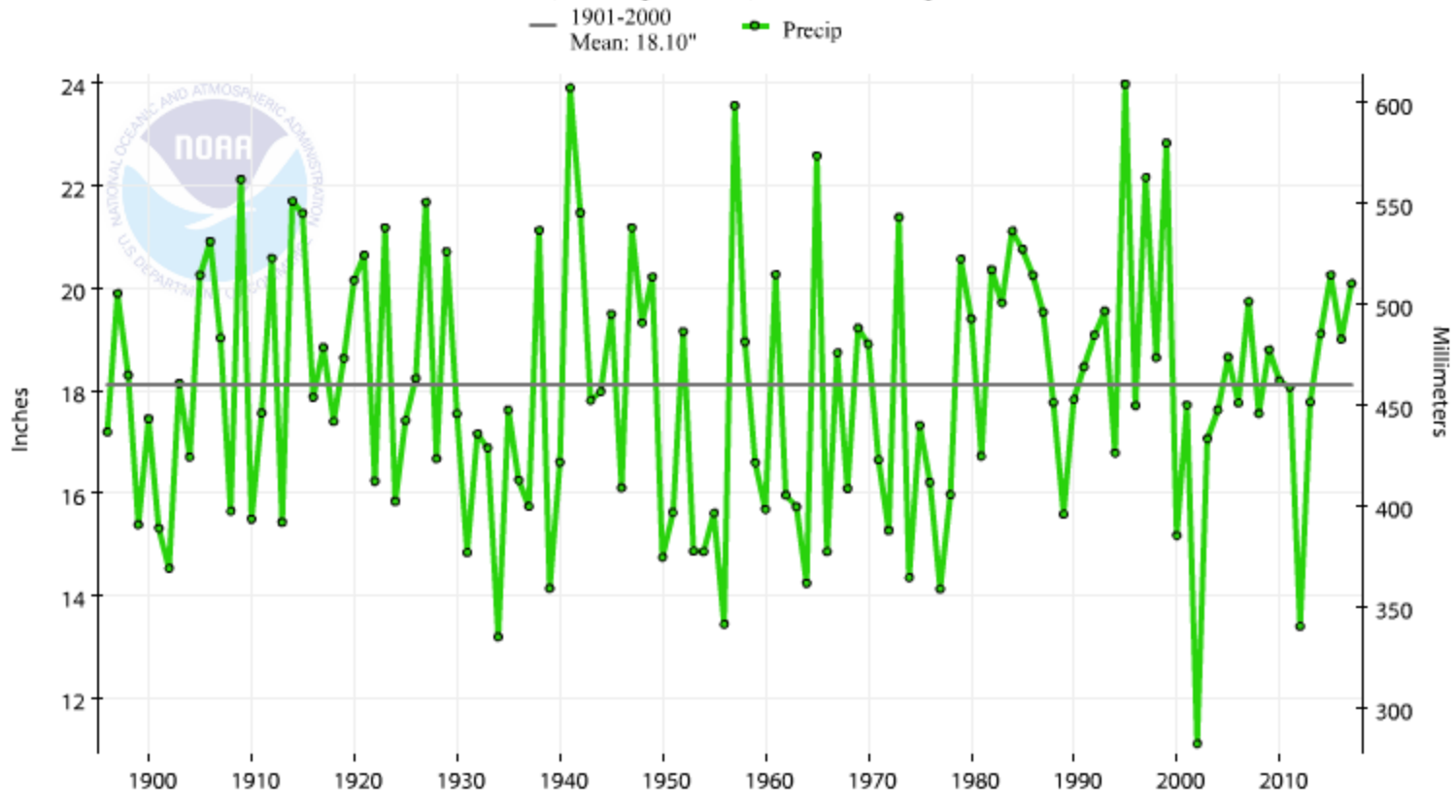
Today's Roadmap

- The story of WY 2017 as told by data
- Climate Change and Variability and WY 2017
- Major weather events and fun facts from WY 2017
- A quick look ahead

Colorado Water Year 2017 Precipitation

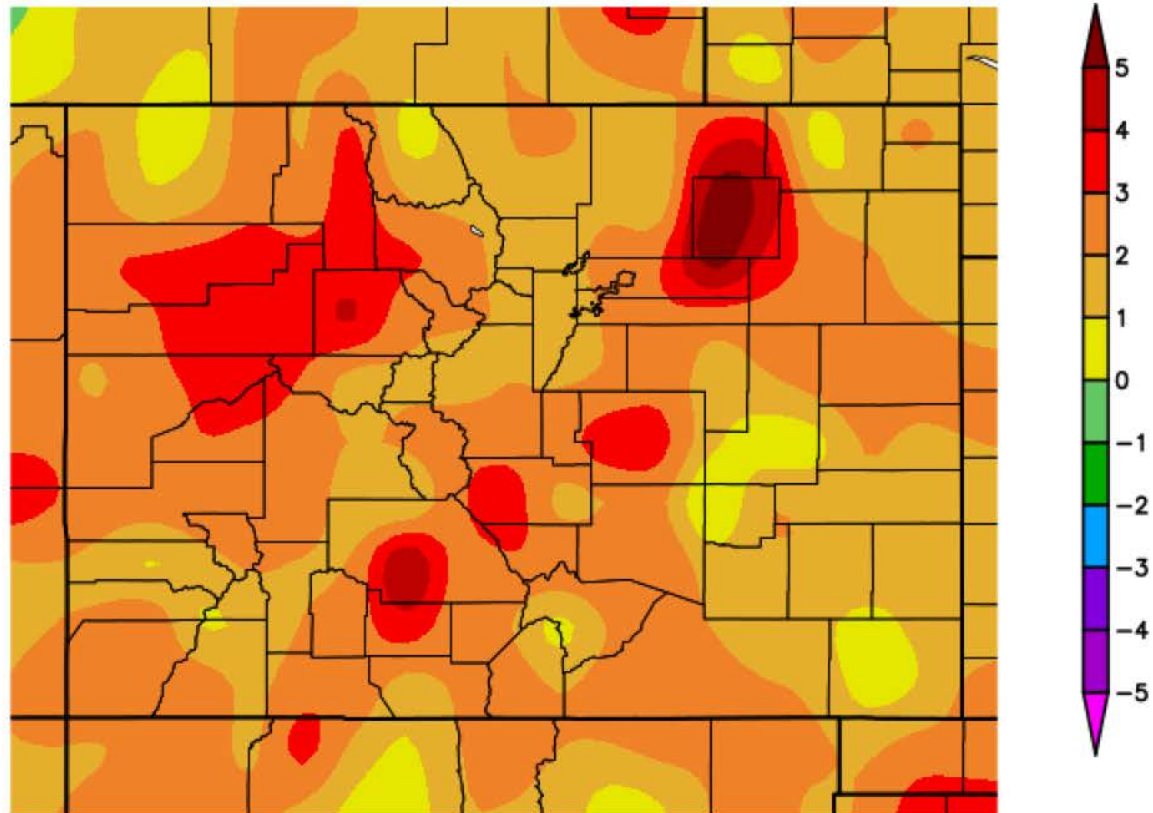


Colorado, Precipitation, October-September



Water Year Colorado Average: 20.09" (1.99" above normal)

Departure from Normal Temperature (F) 10/1/2016 – 9/30/2017

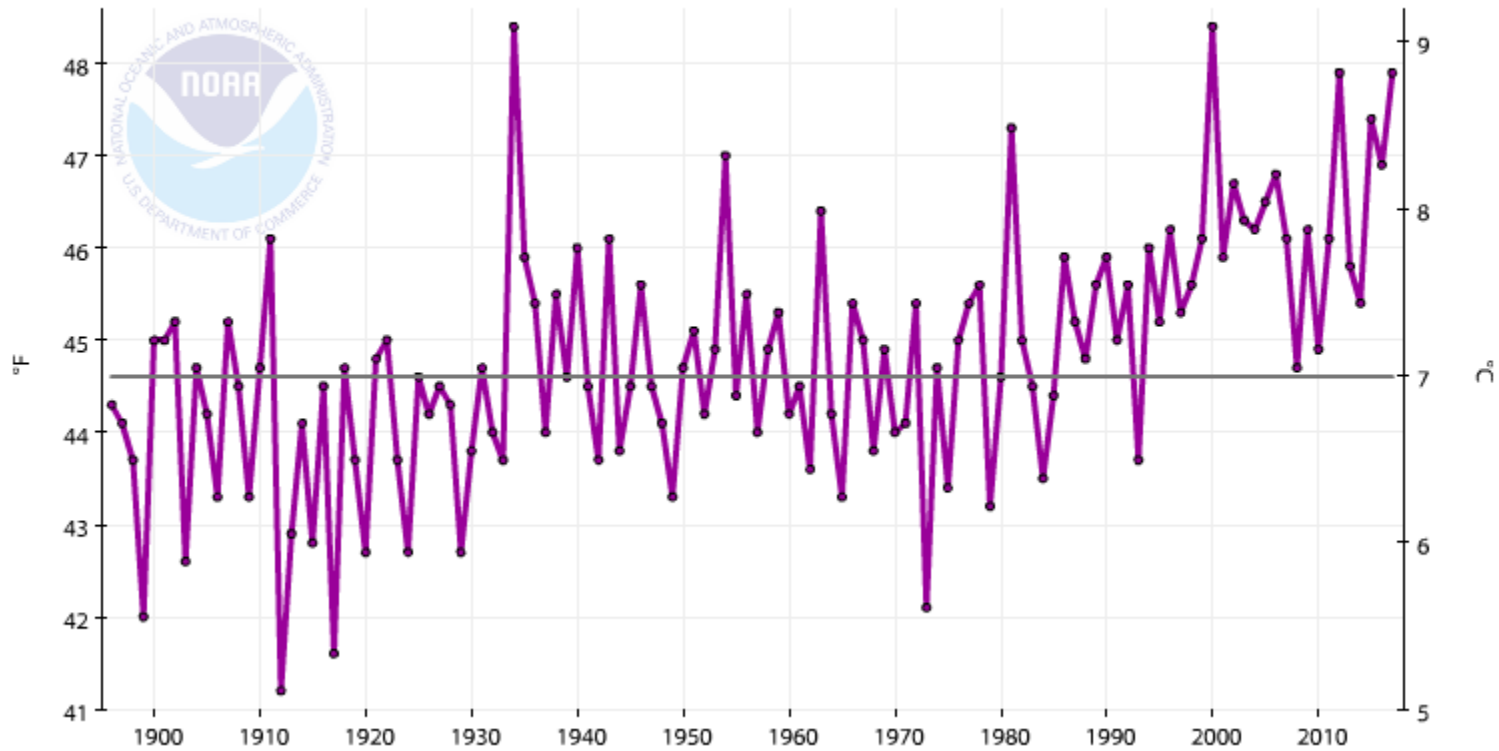


Generated 10/20/2017 at HPRCC using provisional data.

NOAA Regional Climate Centers

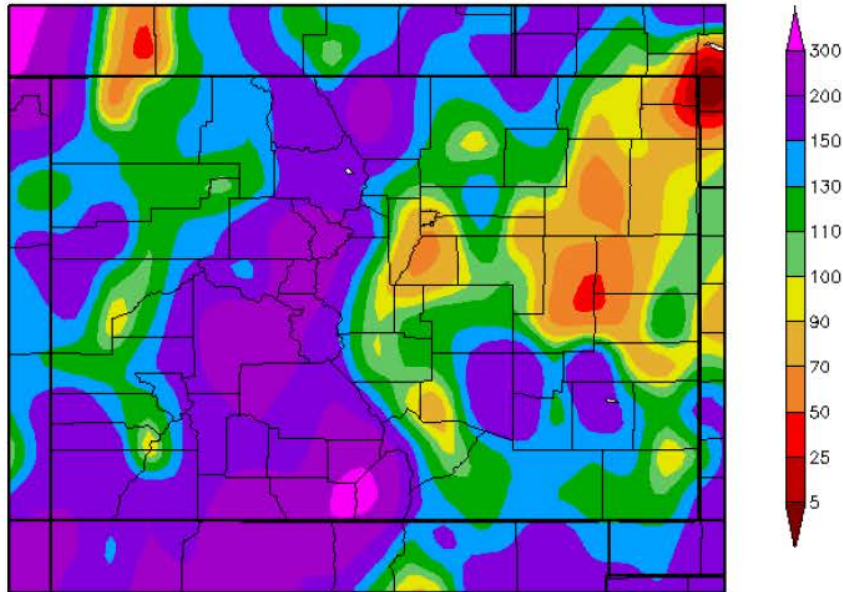
Colorado, Average Temperature, October-September

— 1901-2000 Mean: 44.6°F ■ Avg Temperature

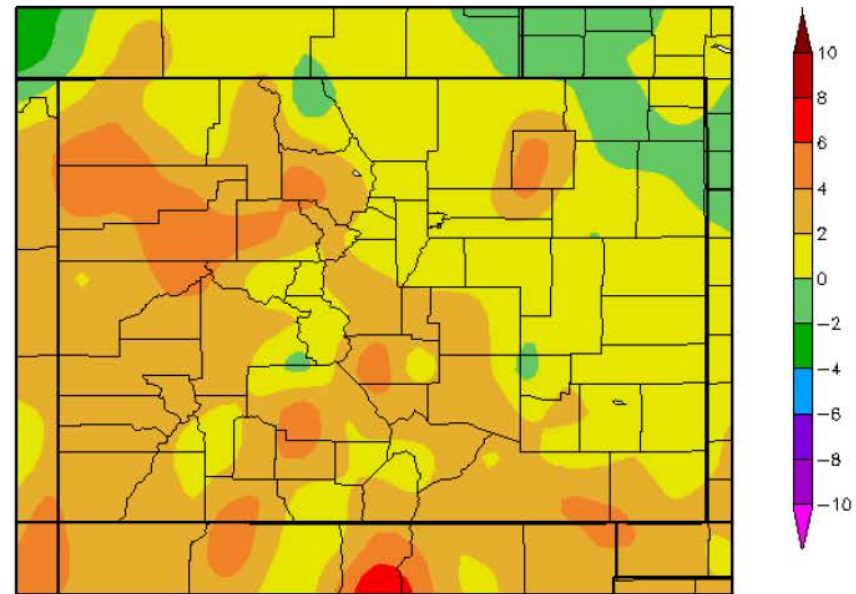


Water Year Colorado Average: 47.9 F (3.3 F above normal)

Percent of Normal Precipitation (%)
12/1/2016 - 2/28/2017



Departure from Normal Temperature (F)
12/1/2016 - 2/28/2017



Generated 3/11/2017 at HPRCC using provisional data.

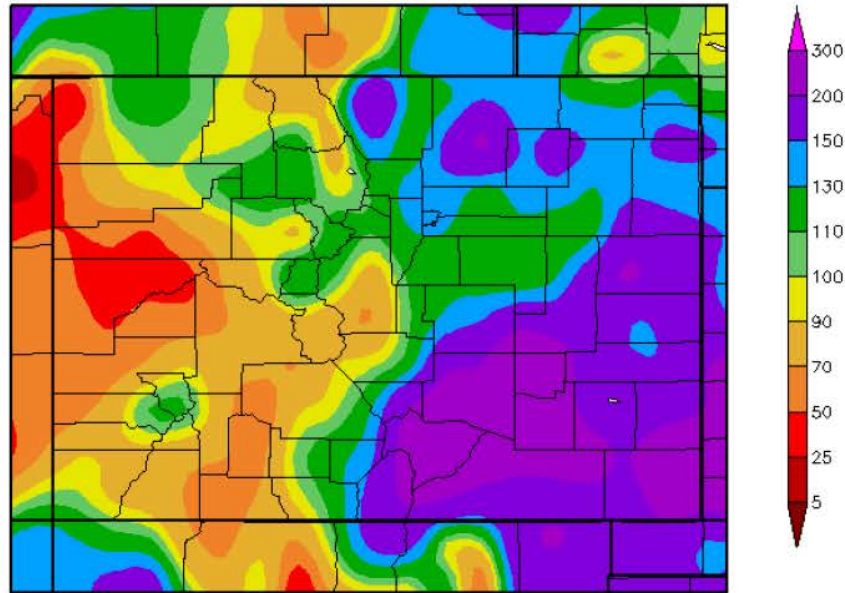
Regional Climate Centers



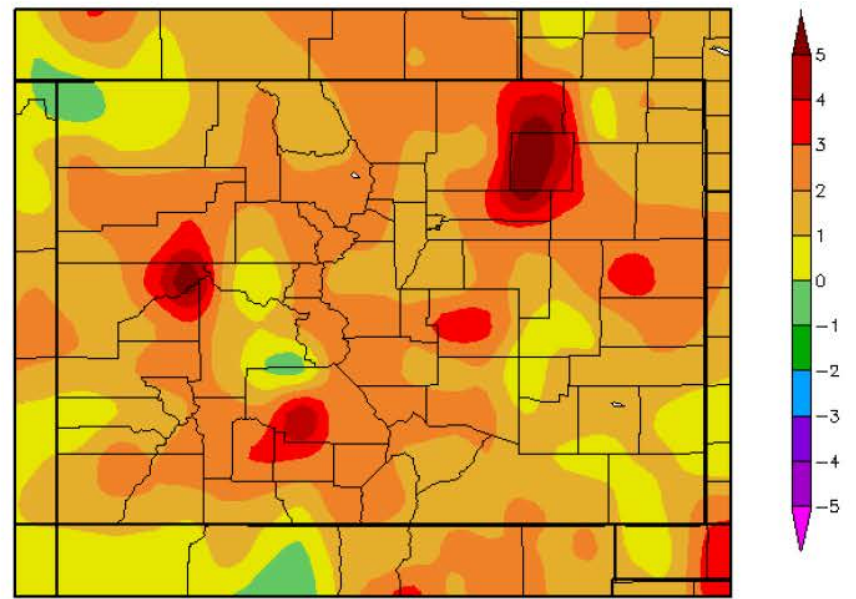
Generated 3/11/2017 at HPRCC using provisional data.

Regional Climate Centers

Percent of Normal Precipitation (%) 3/1/2017 - 5/31/2017



Departure from Normal Temperature (F) 3/1/2017 - 5/31/2017



Generated 6/11/2017 at HPRCC using provisional data.

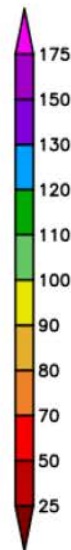
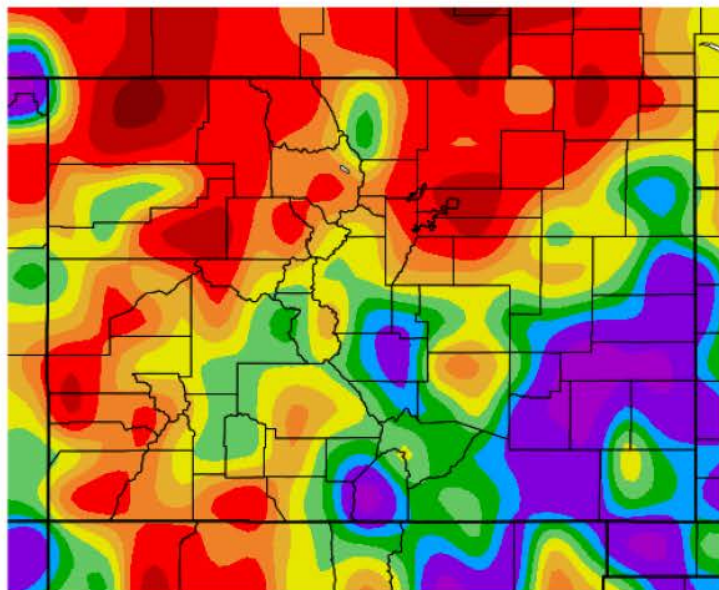
Regional Climate Centers

Generated 6/11/2017 at HPRCC using provisional data.

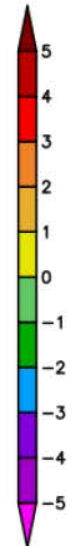
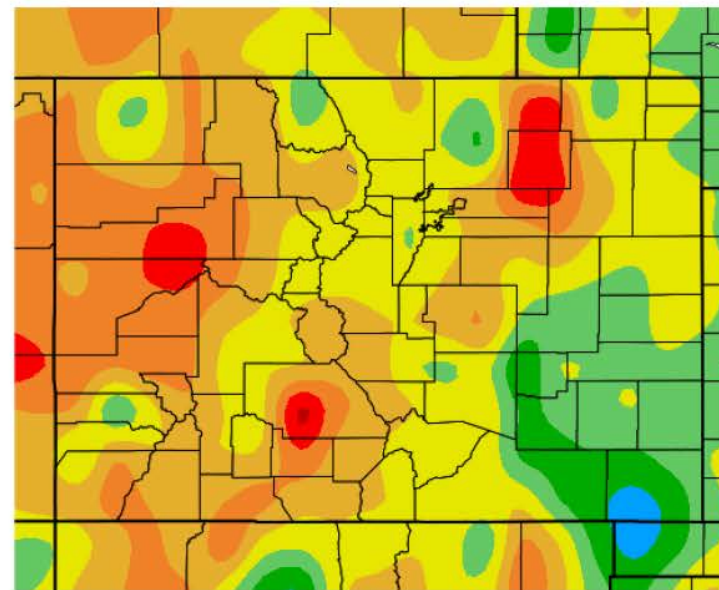
Regional Climate Centers



Percent of Normal Precipitation (%) 6/1/2017 – 8/31/2017



Departure from Normal Temperature (F) 6/1/2017 – 8/31/2017



Generated 10/12/2017 at HPRCC using provisional data.

NOAA Regional Climate Centers

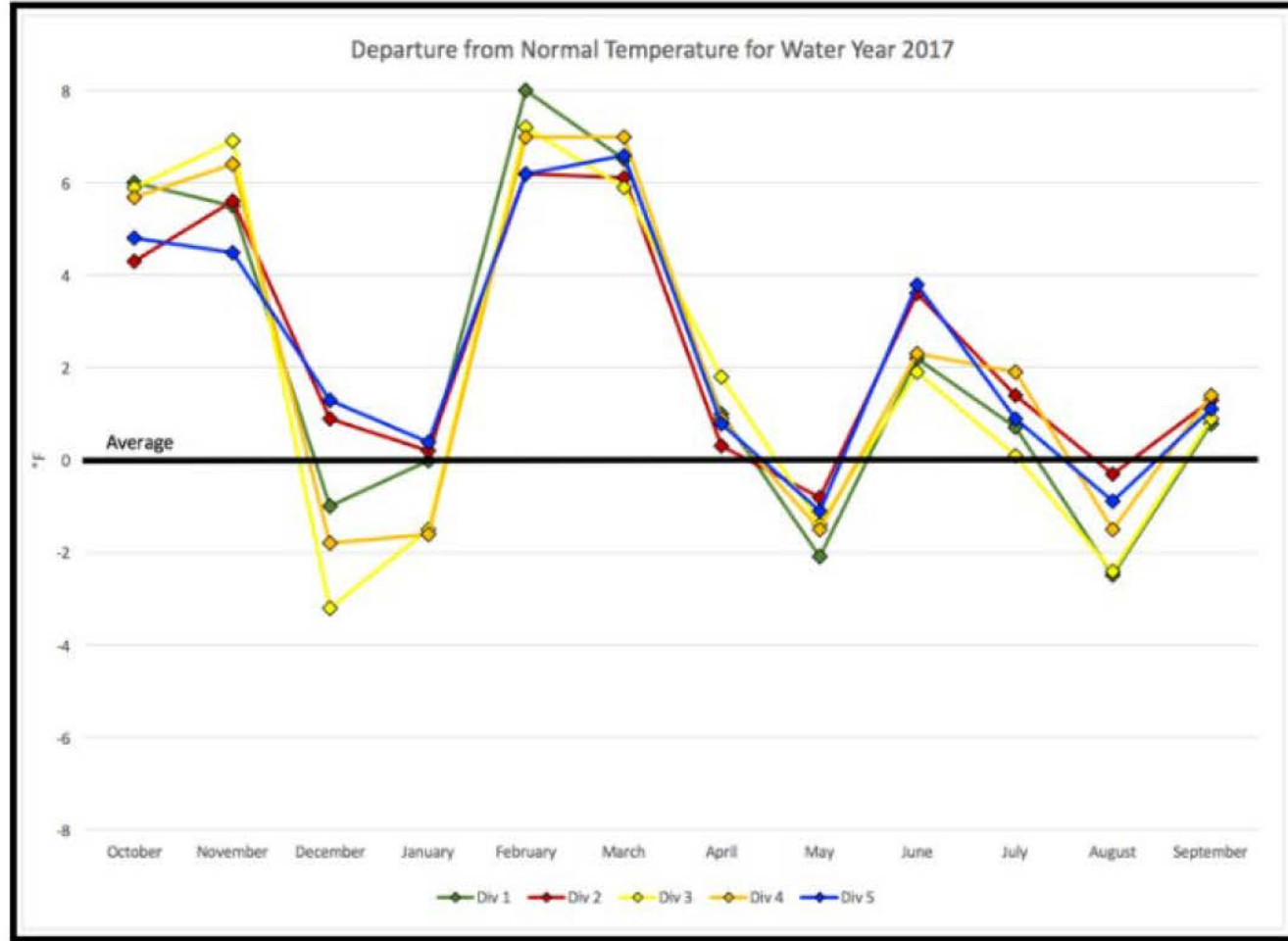


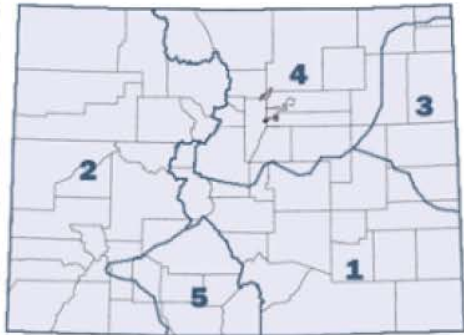
Generated 10/12/2017 at HPRCC using provisional data.

NOAA Regional Climate Centers

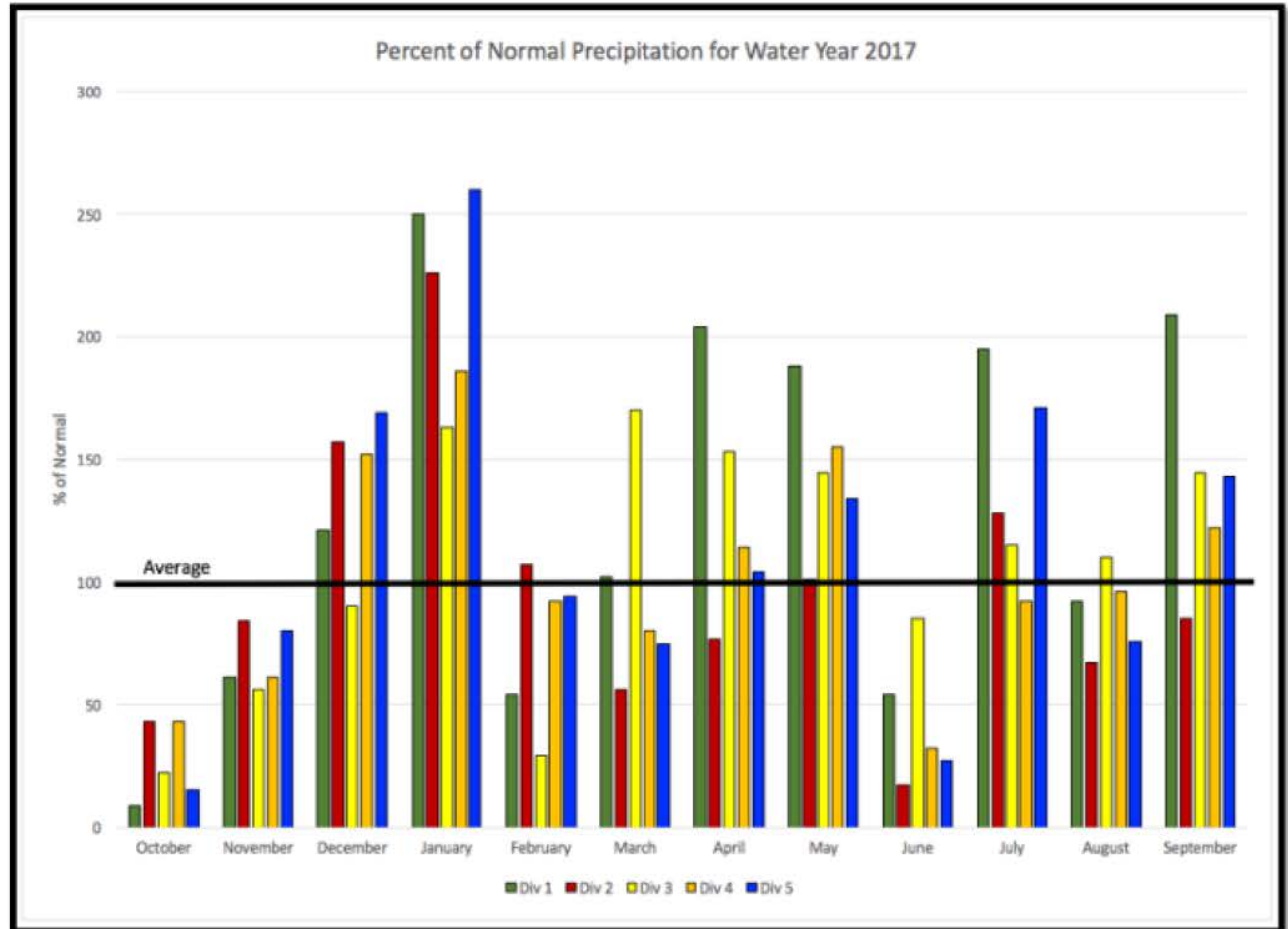


Colorado Climate Divisions





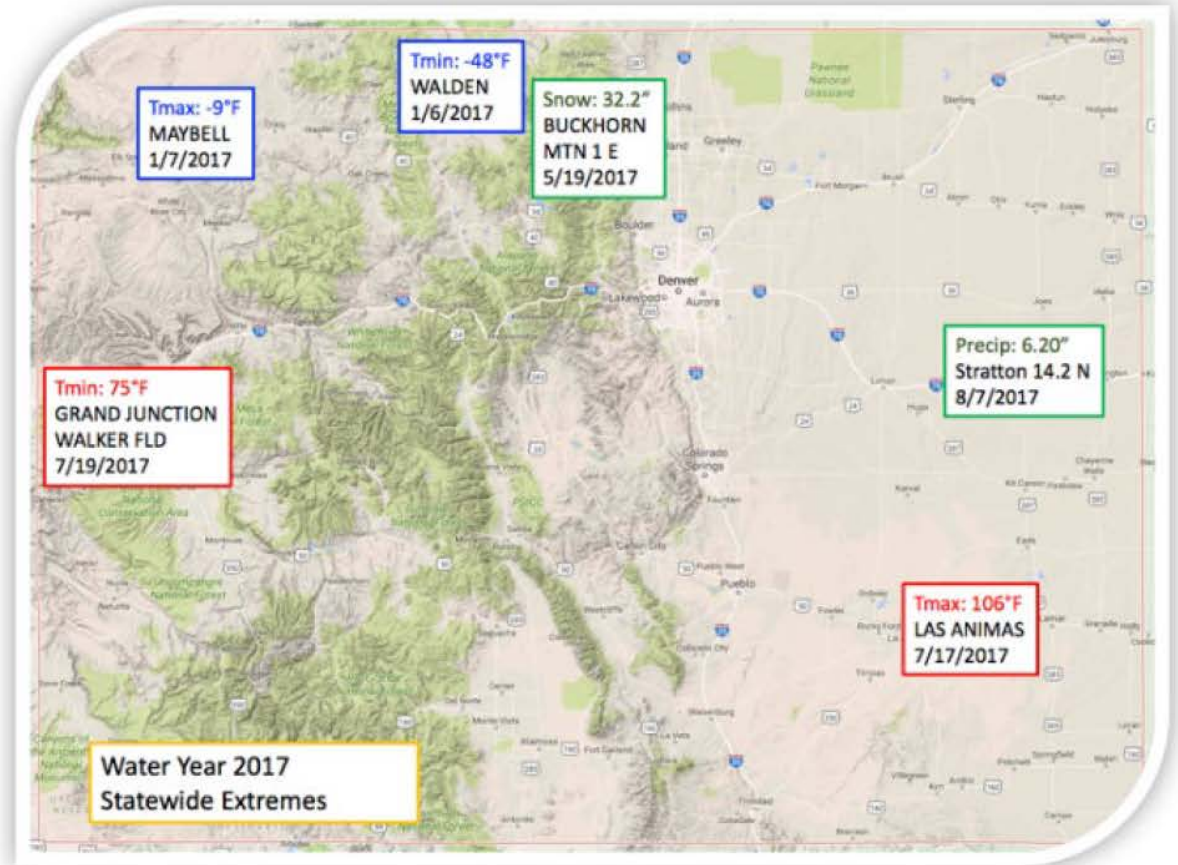
Colorado Climate Divisions



Colorado Records

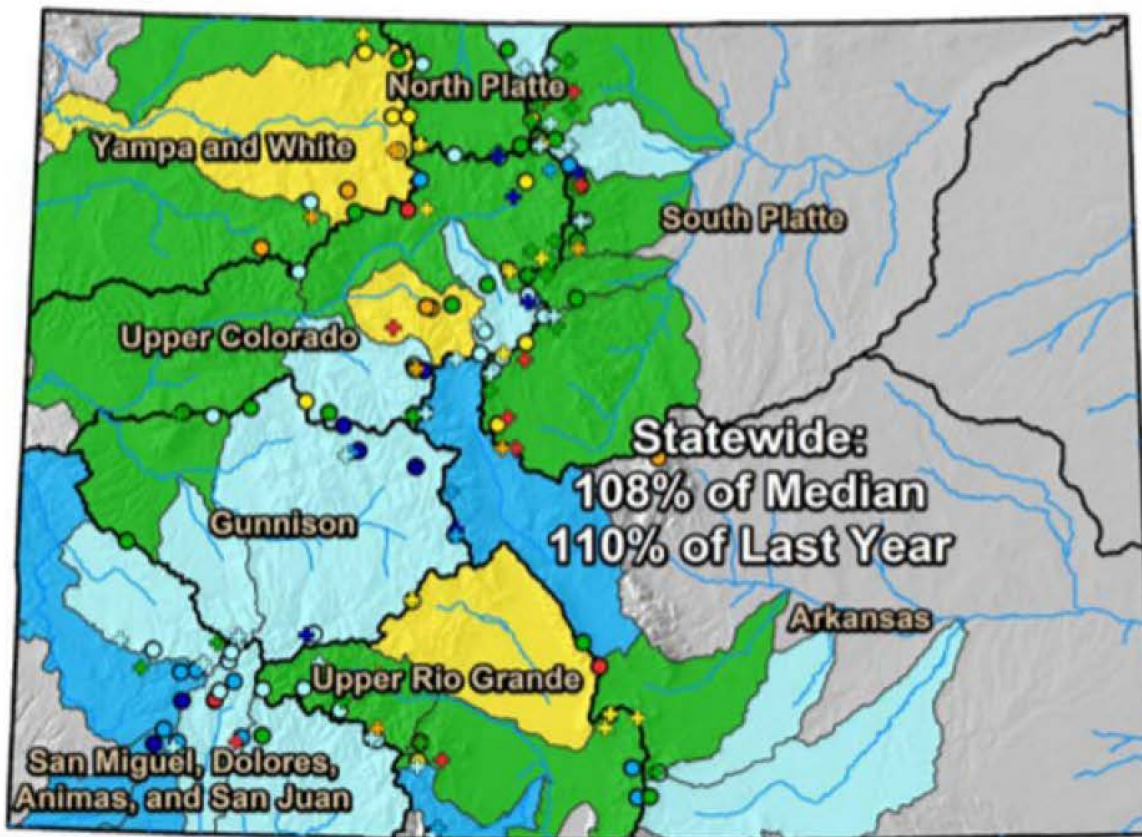
by the numbers...

| Weather Record Broken | Record broken for a day | Record broken for a month |
|-------------------------|-------------------------|---------------------------|
| Highest Max Temperature | 1,047 | 44 |
| Highest Min Temperature | 2,357 | 113 |
| Lowest Max Temperature | 613 | 2 |
| Lowest Min Temperature | 357 | 5 |
| Highest Precipitation | 1,152 | 35 |
| Highest Snowfall | 338 | 9 |



Colorado Monthly Snowpack Summary

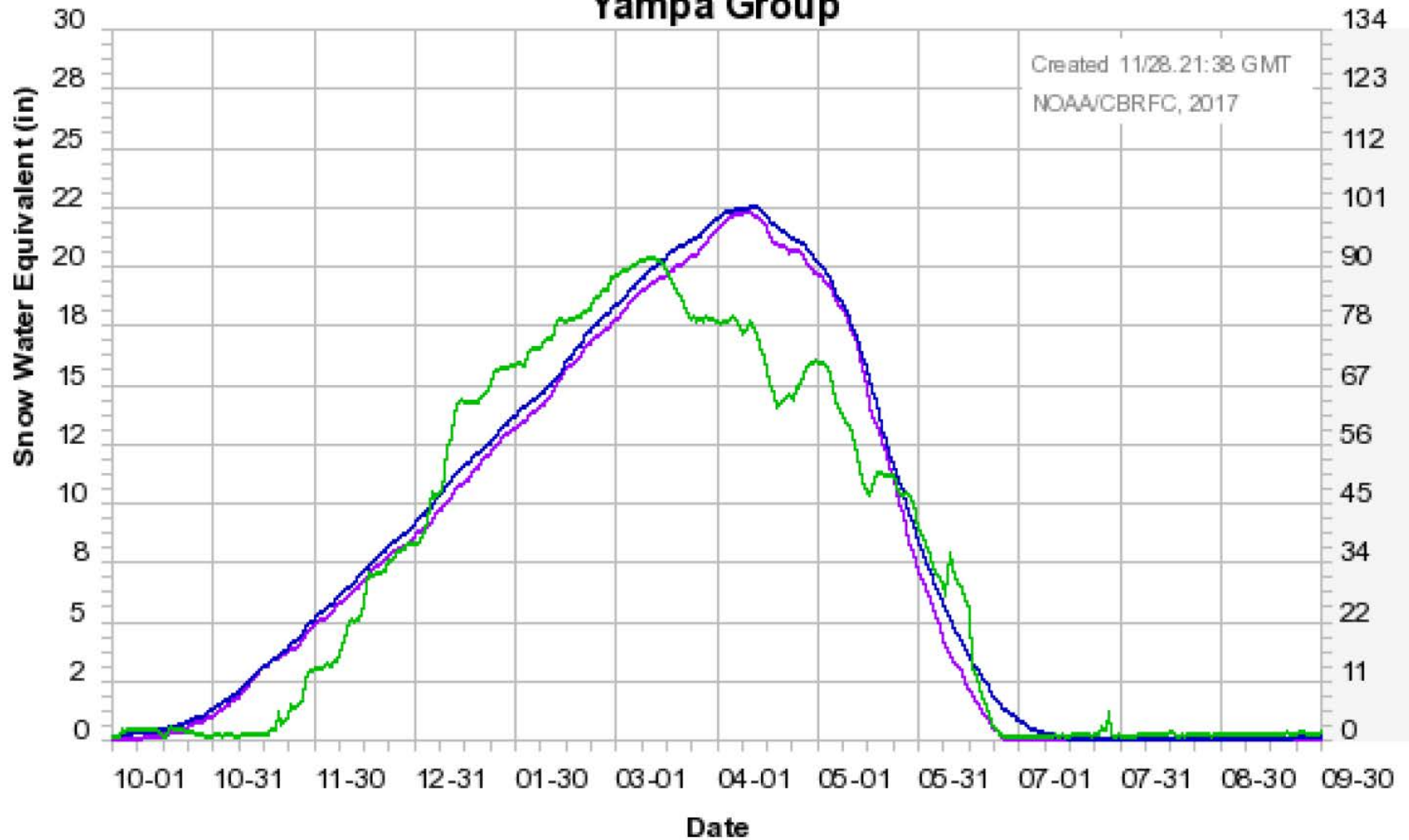
April 1, 2017



United States Department of Agriculture

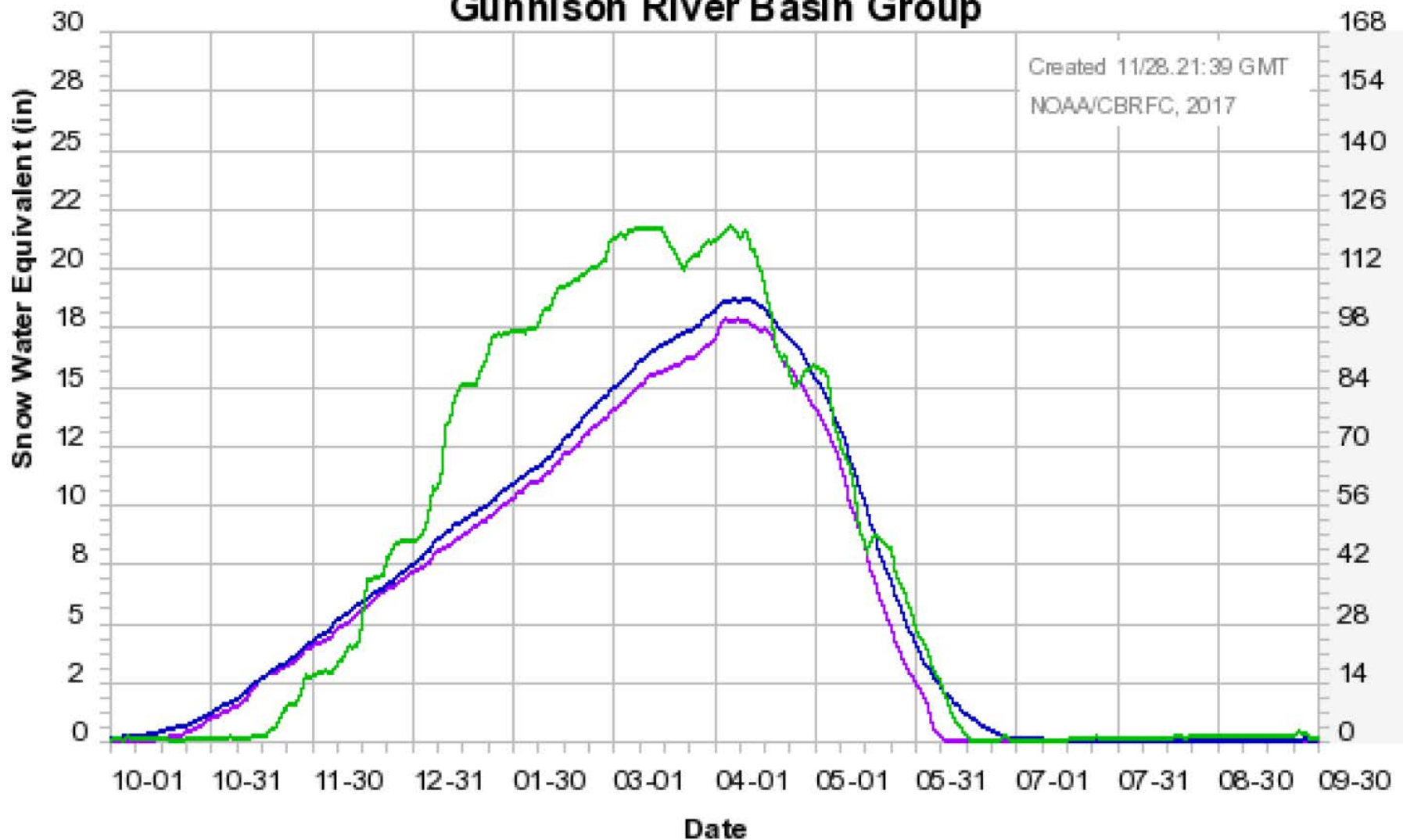
Natural Resources Conservation Service

Colorado Basin River Forecast Center Yampa Group



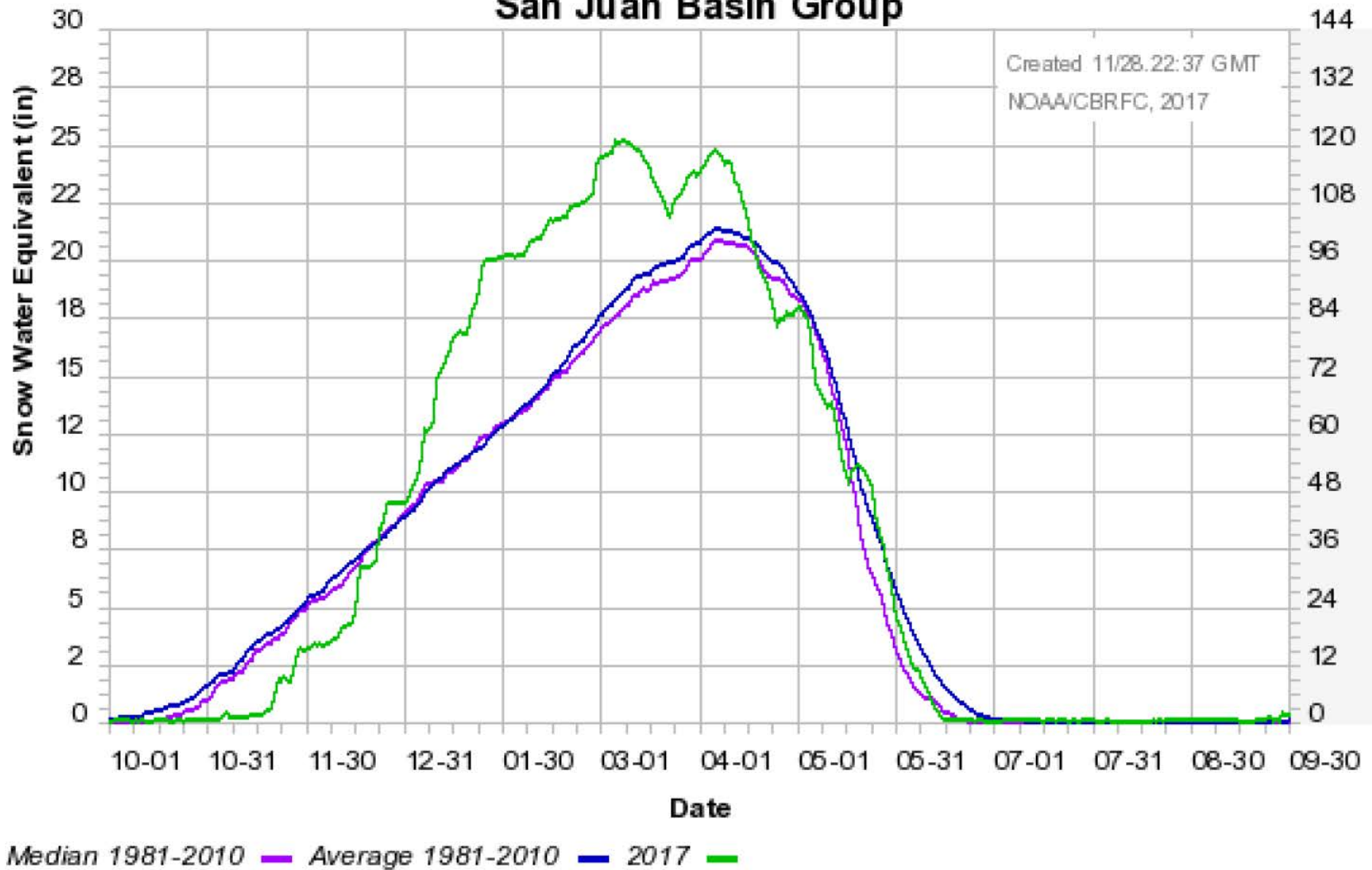
Median 1981-2010 Average 1981-2010 2017

Colorado Basin River Forecast Center Gunnison River Basin Group

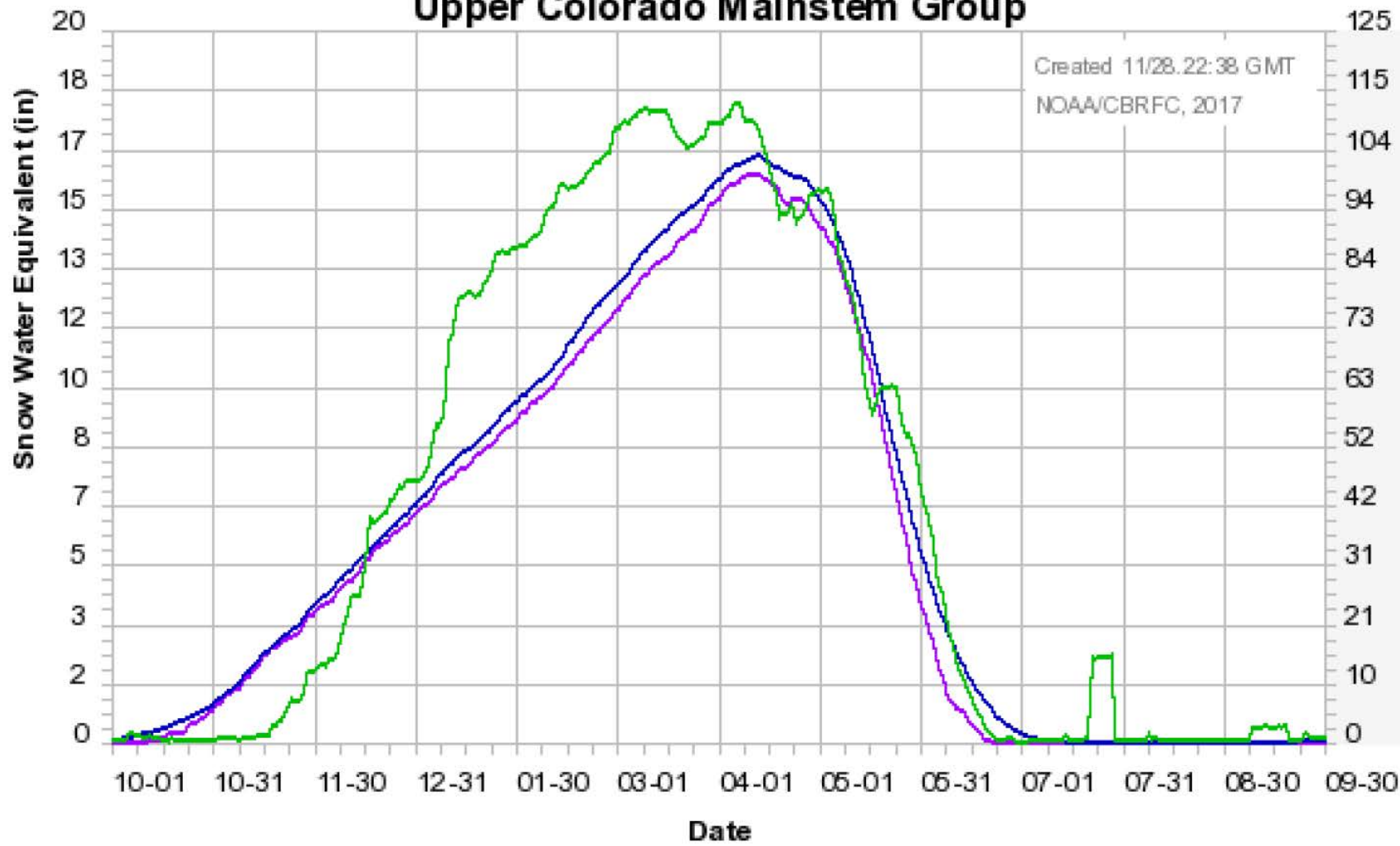


Median 1981-2010 Average 1981-2010 2017

Colorado Basin River Forecast Center San Juan Basin Group



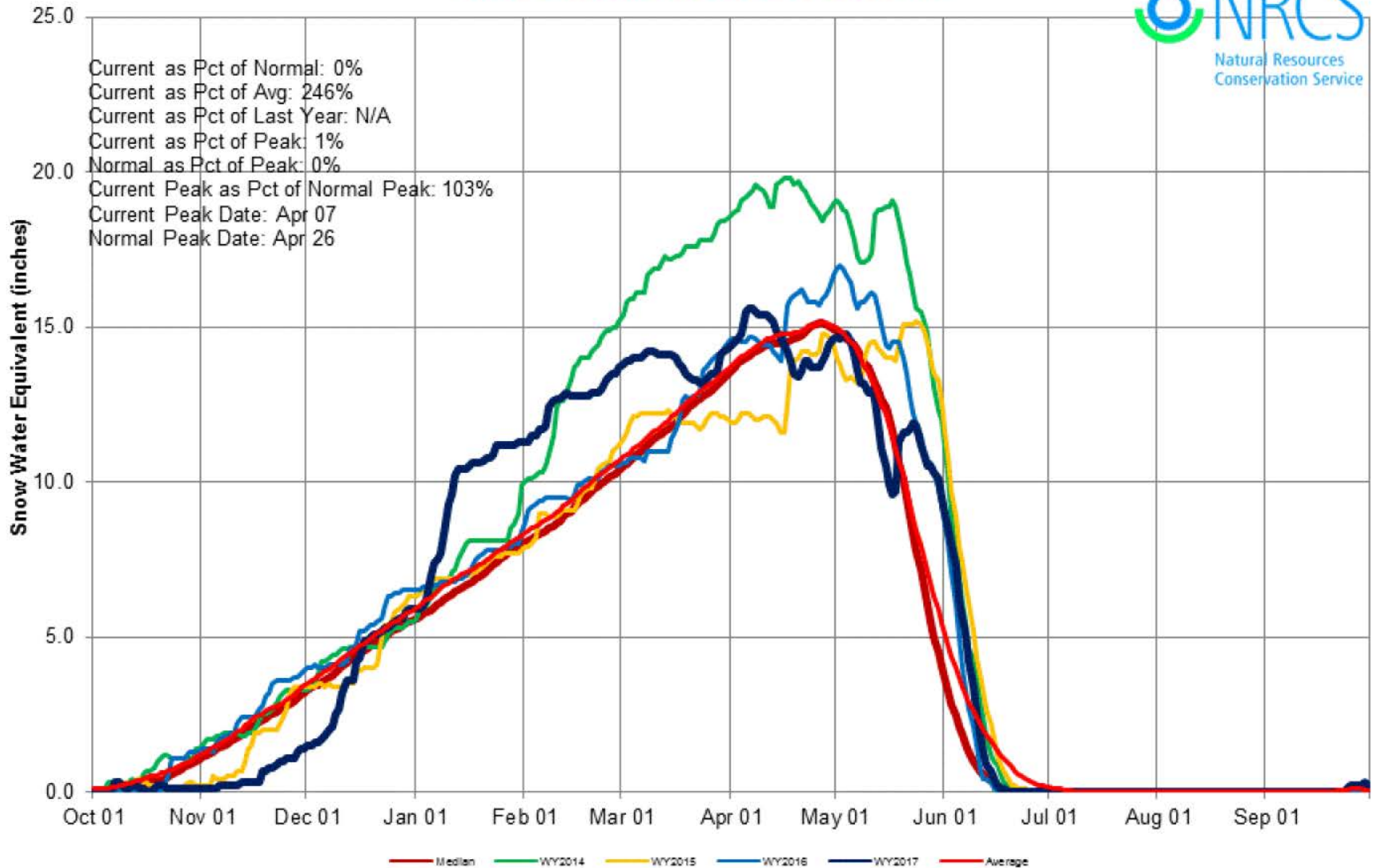
Colorado Basin River Forecast Center Upper Colorado Mainstem Group



Median 1981-2010 Average 1981-2010 2017

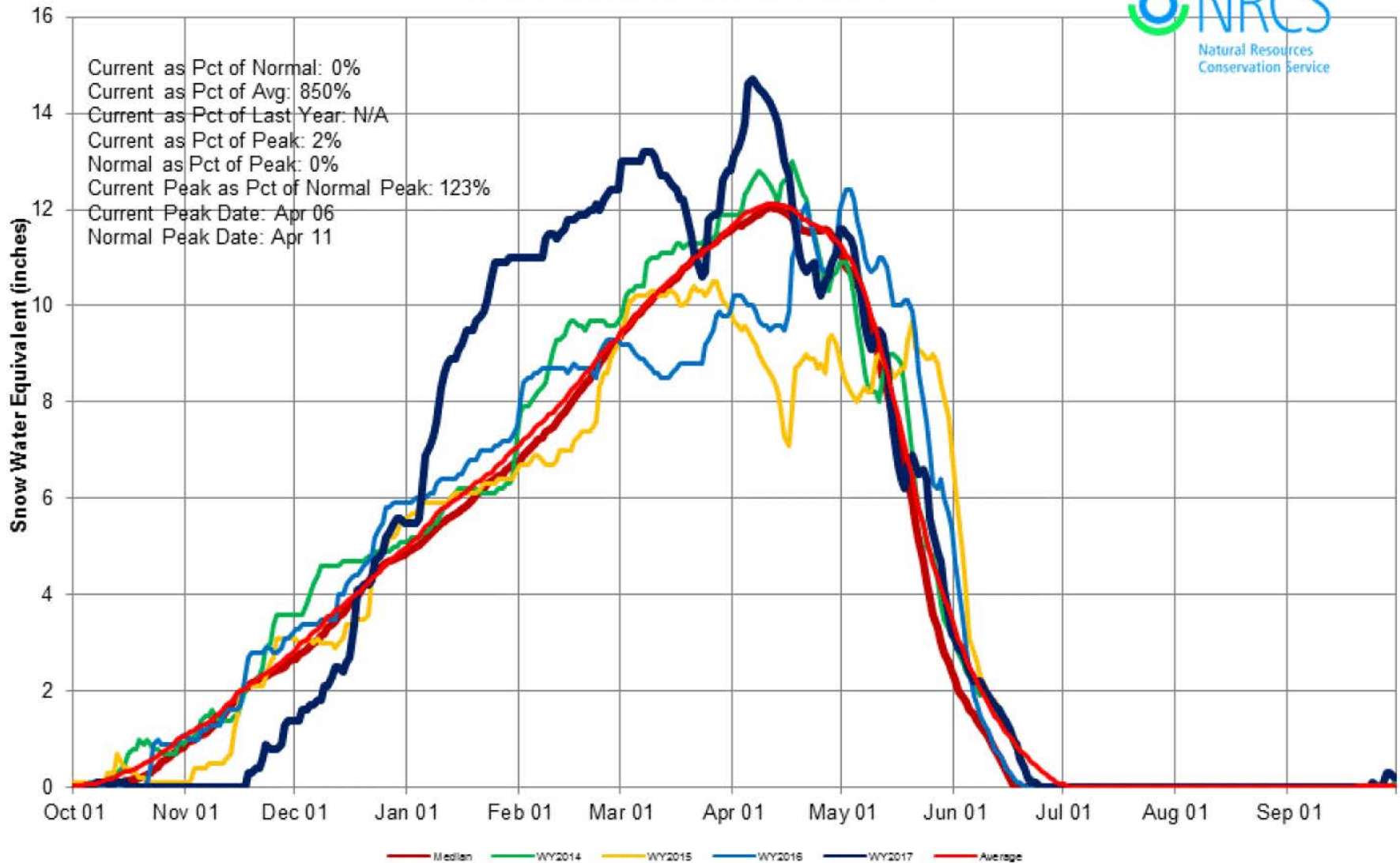
South Platte River Basin Time Series Snowpack Summary

Based on Provisional SNOTEL data as of Sep 30, 2017



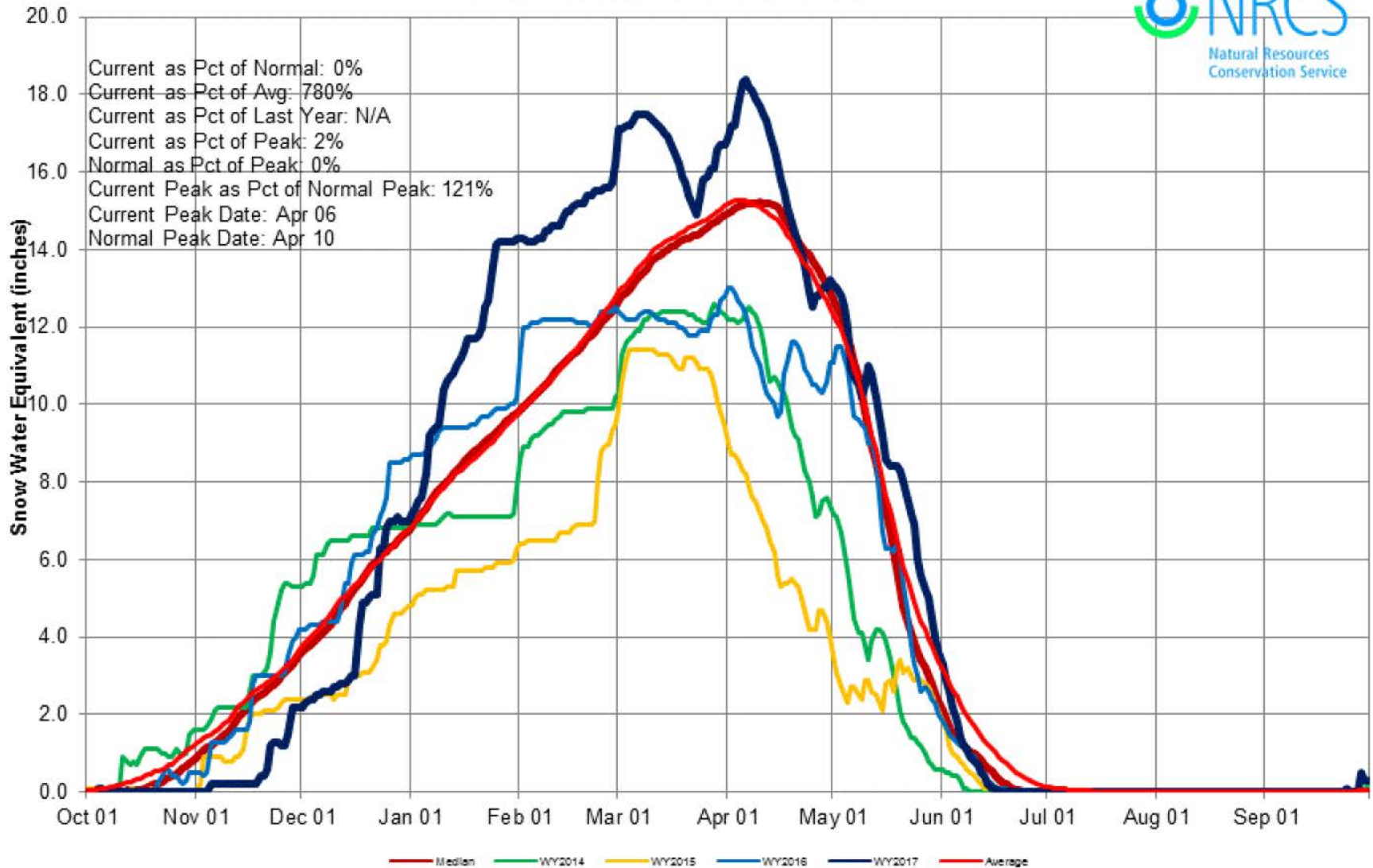
Arkansas River Basin Time Series Snowpack Summary

Based on Provisional SNOTEL data as of Sep 30, 2017

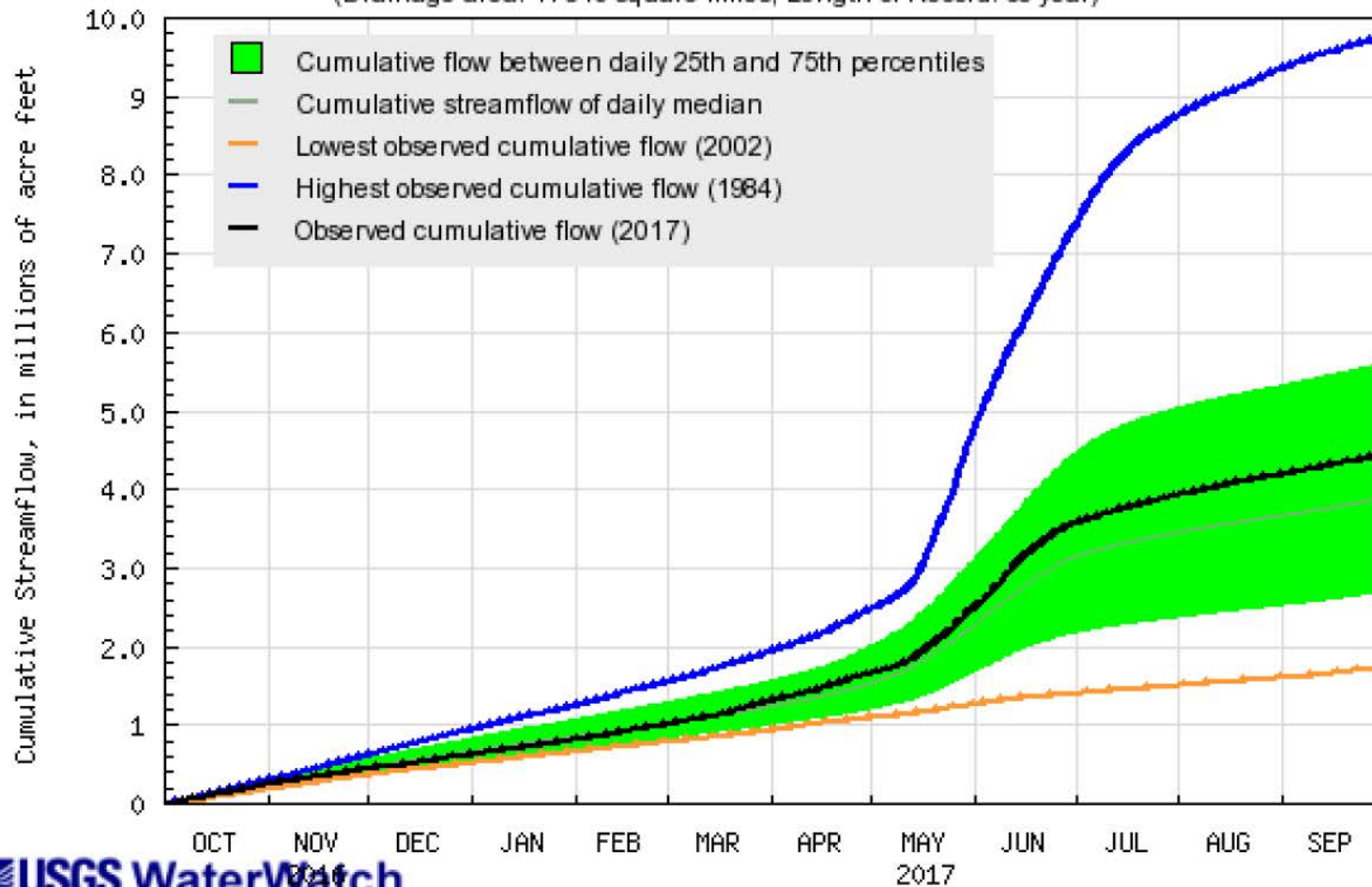


Upper Rio Grande Basin Time Series Snowpack Summary

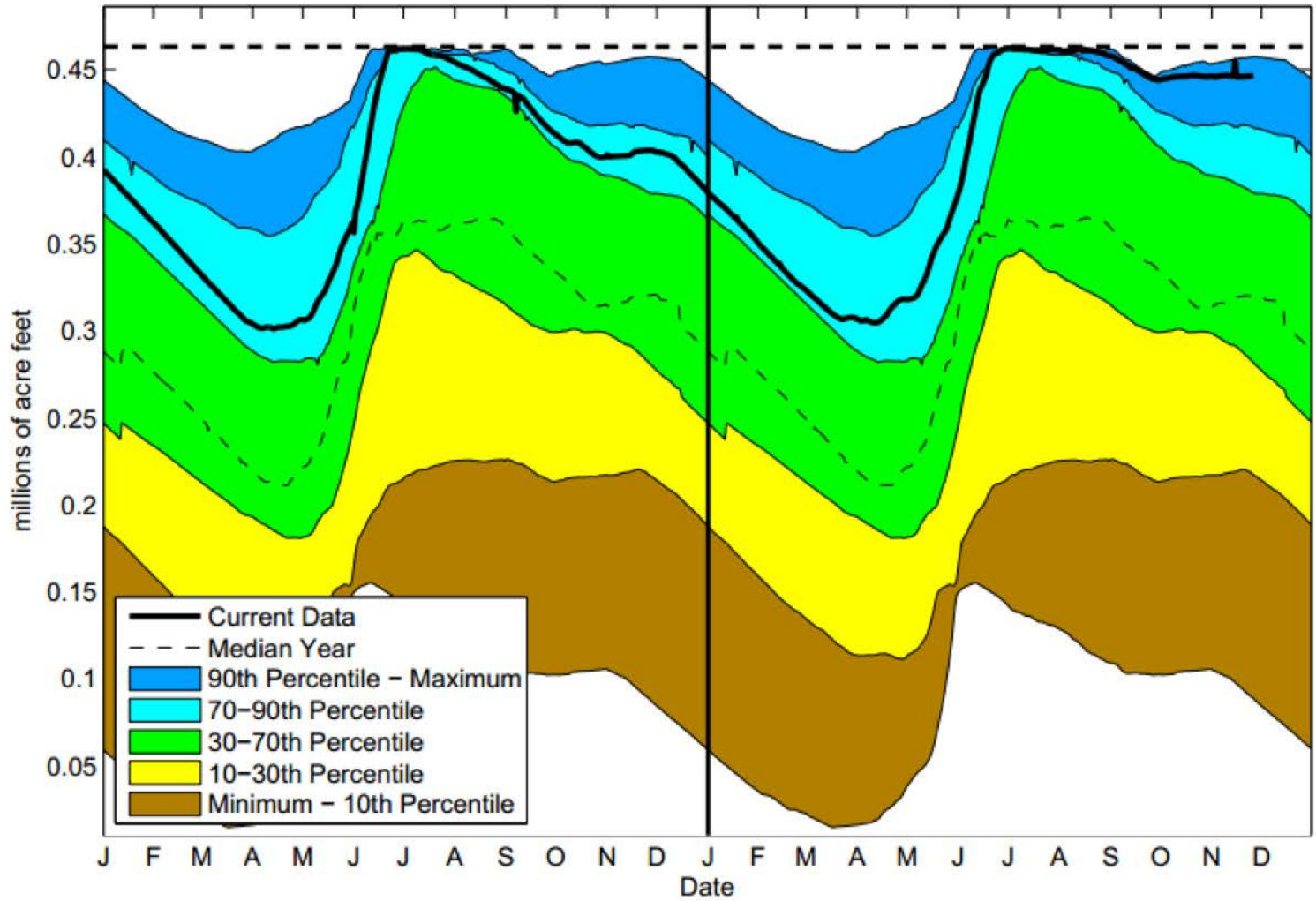
Based on Provisional SNOTEL data as of Sep 30, 2017



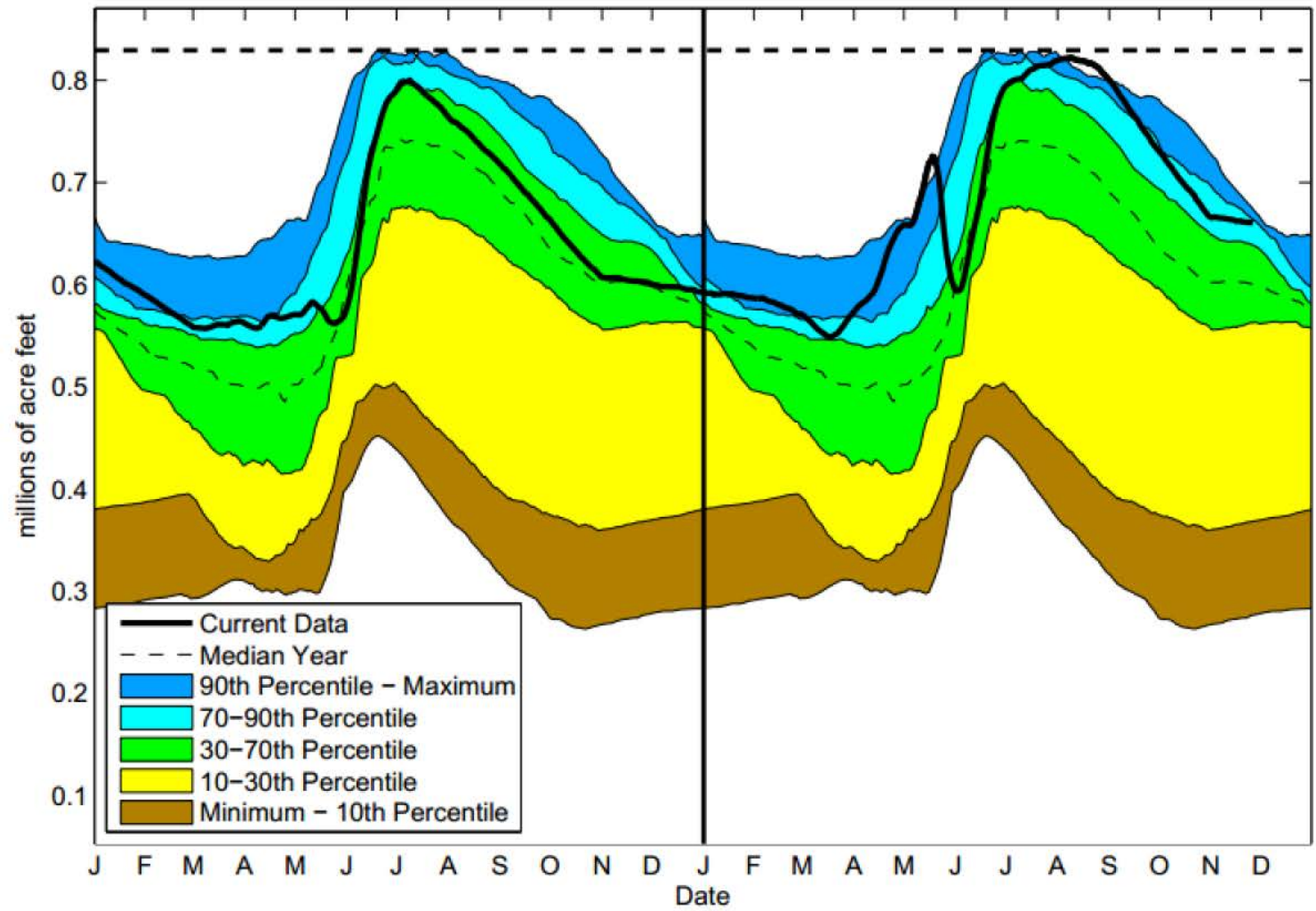
USGS 09163500 COLORADO RIVER NEAR COLORADO-UTAH STATE LINE
(Drainage area: 17849 square miles, Length of Record: 65 year)



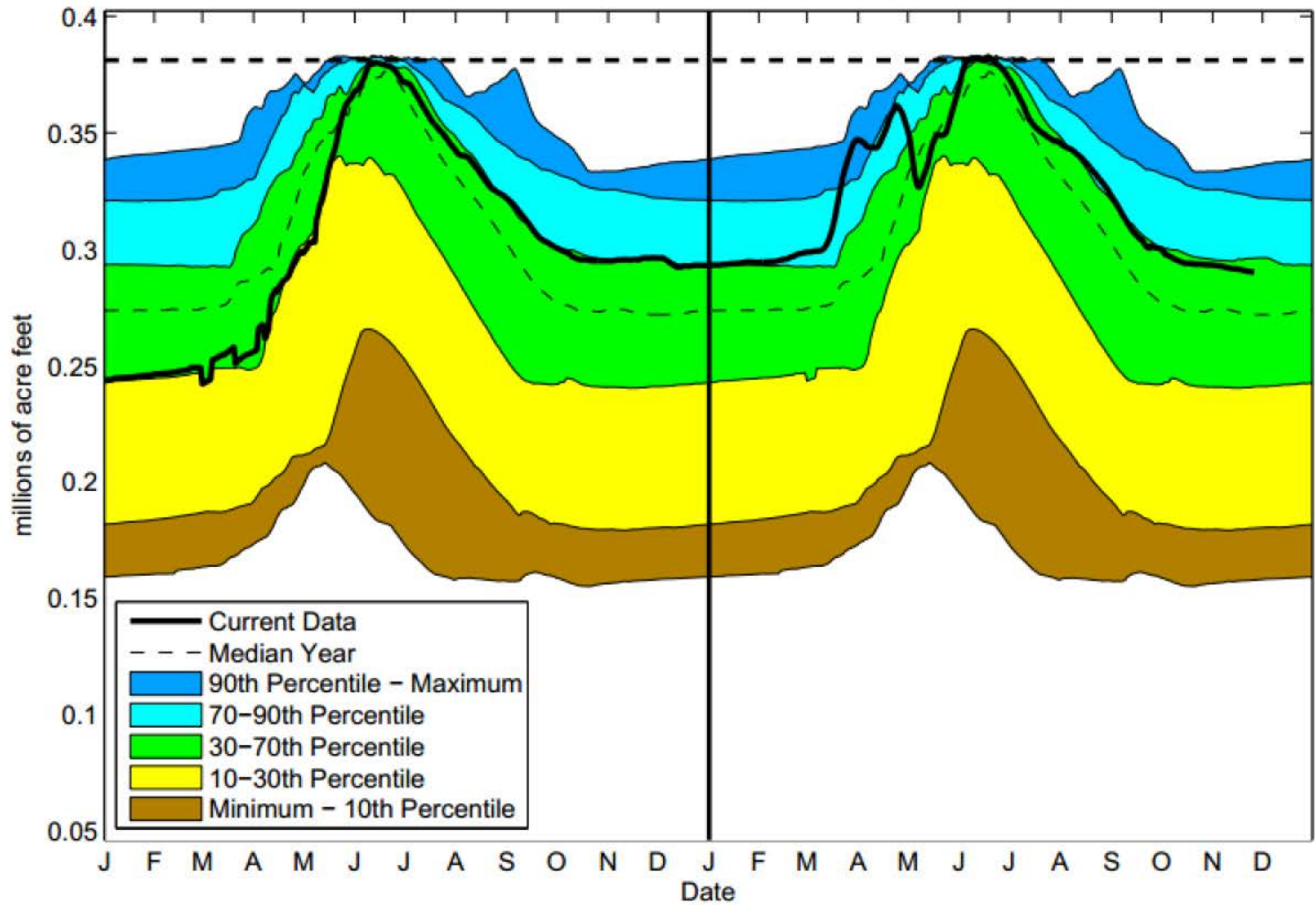
Lake Granby Reservoir Level 11/26/2017
138 Percent of 2000-2015 Average



Blue Mesa Reservoir Level 11/26/2017
116 Percent of 1985-2015 Average

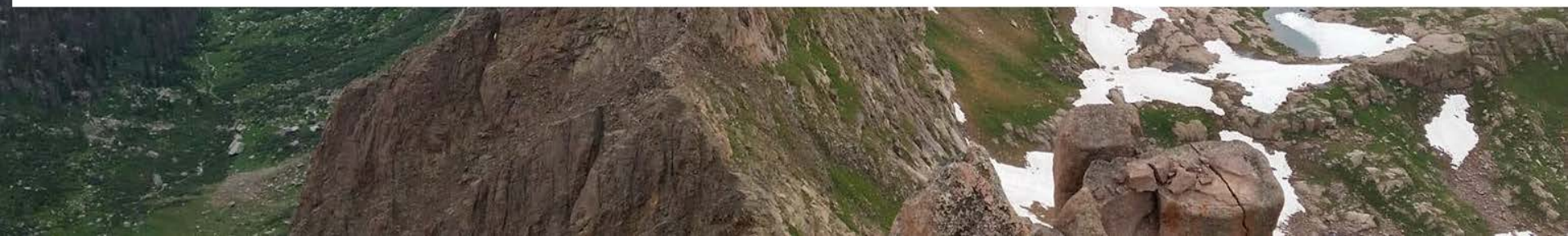
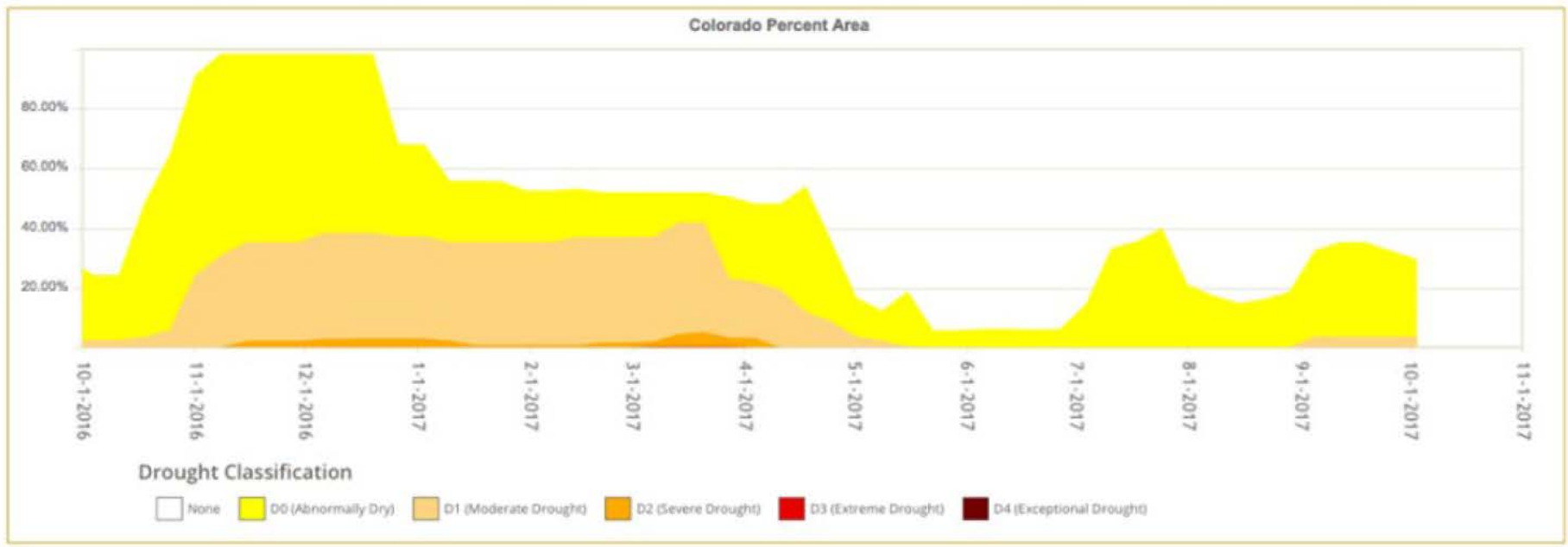


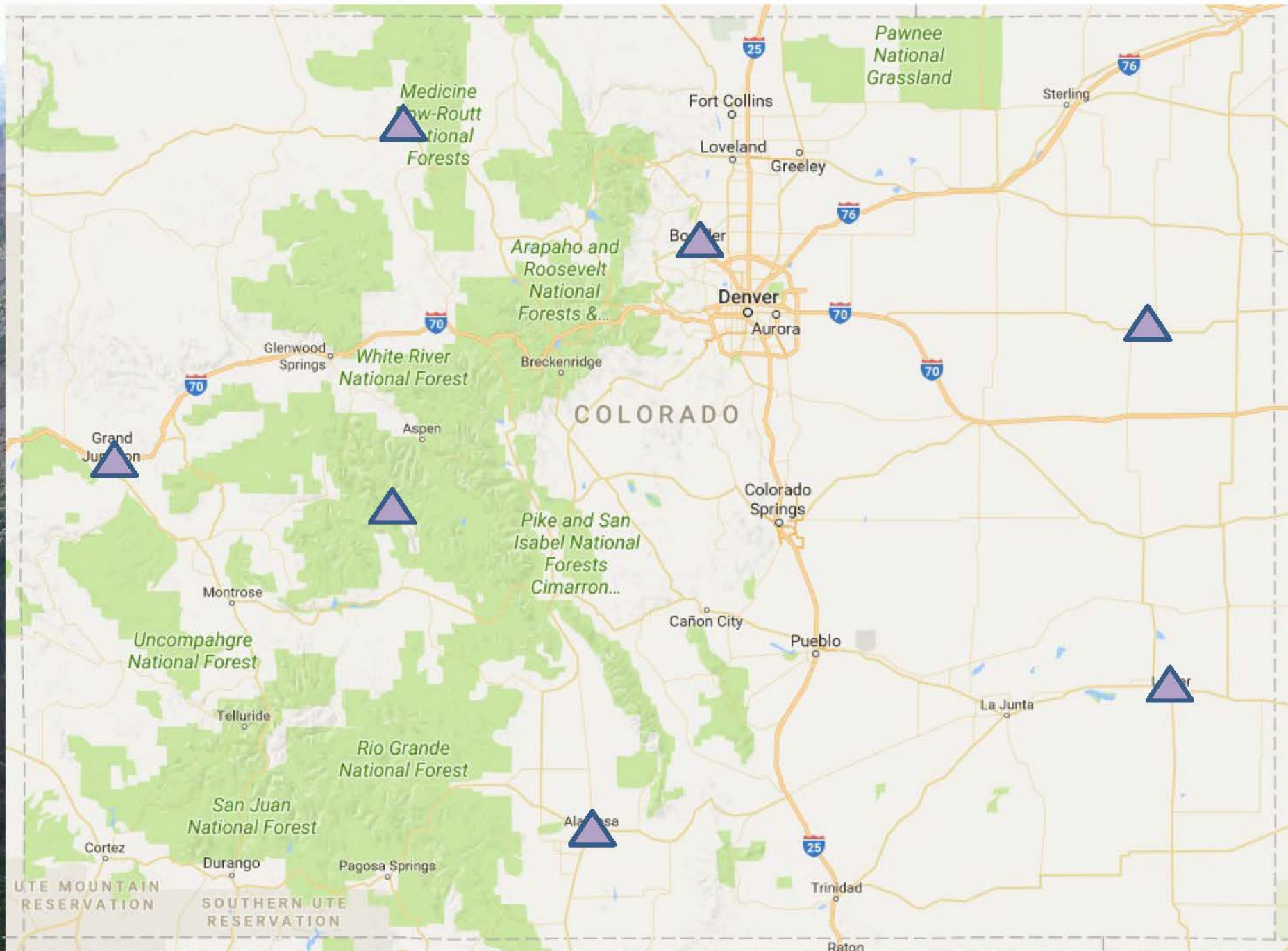
McPhee Reservoir Level 11/26/2017
111 Percent of 1985-2015 Average



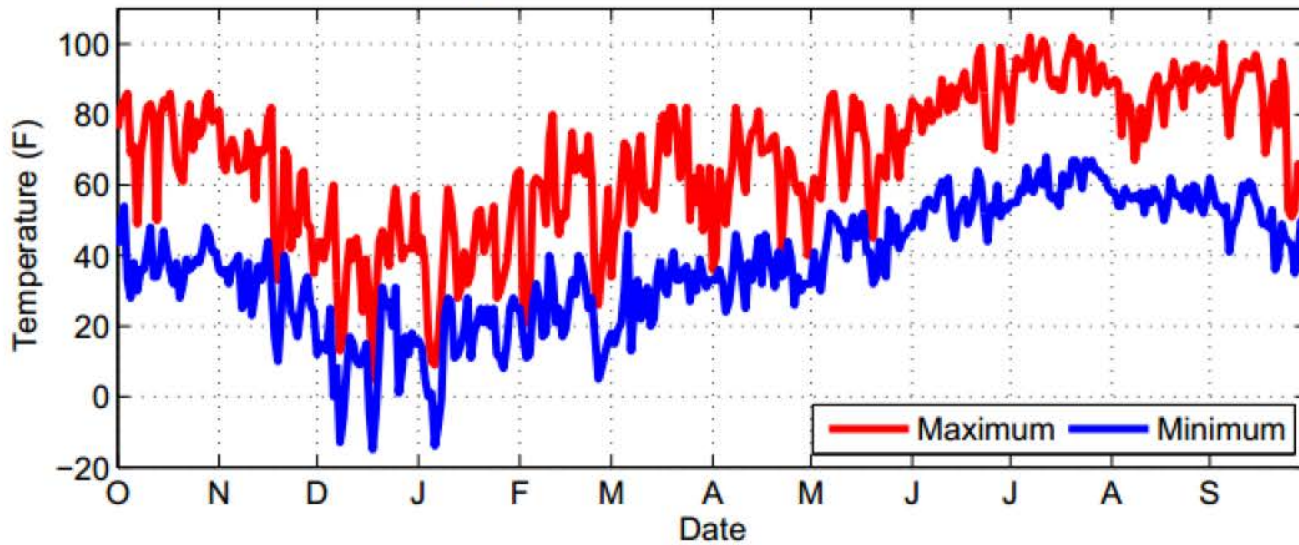


Drought in WY2017 over Colorado

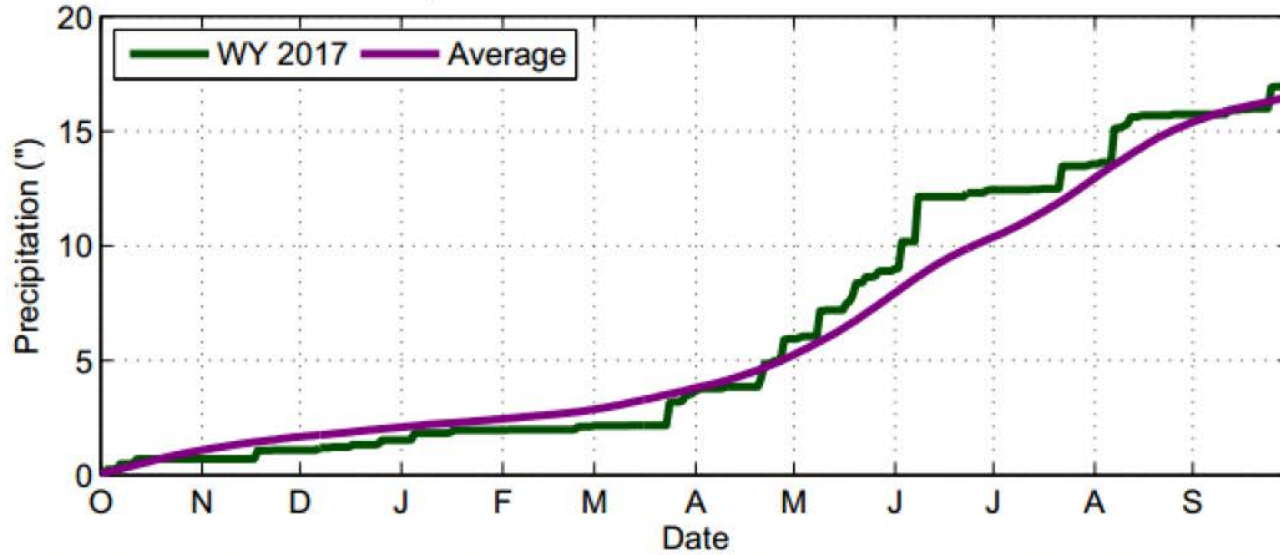




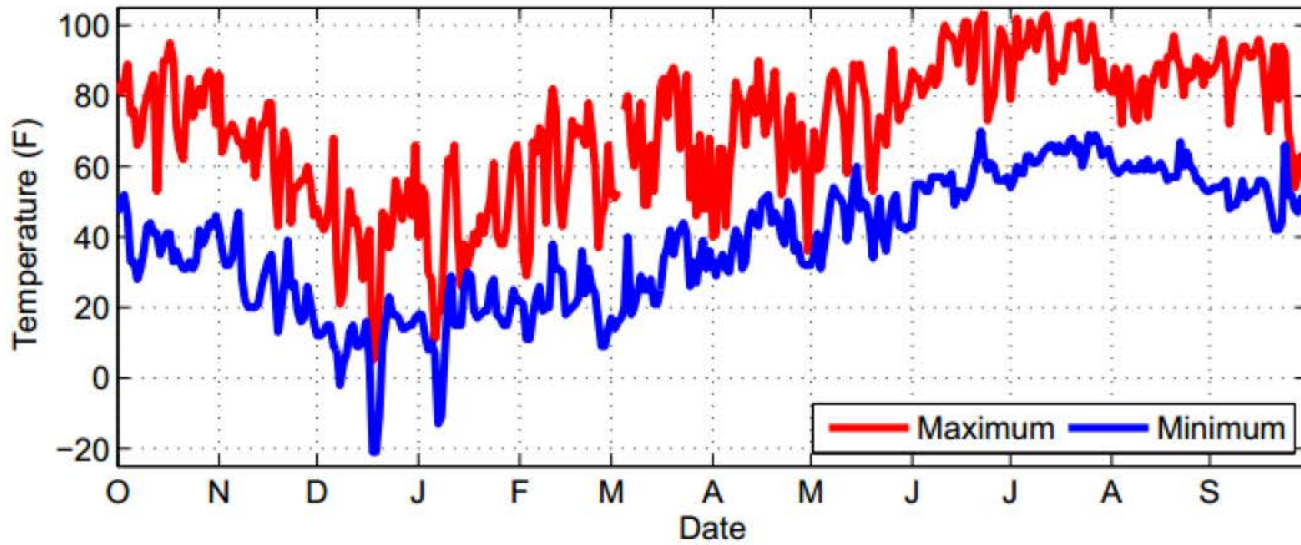
Daily Temperatures at Akron WY 2017



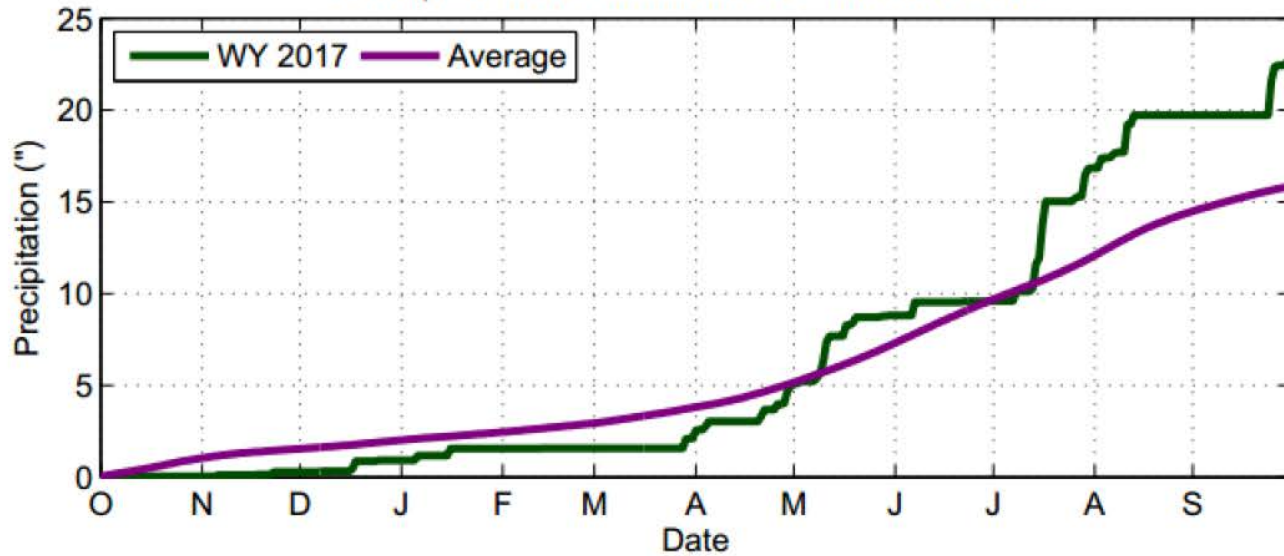
Precipitation Accumulation at Akron WY 2017



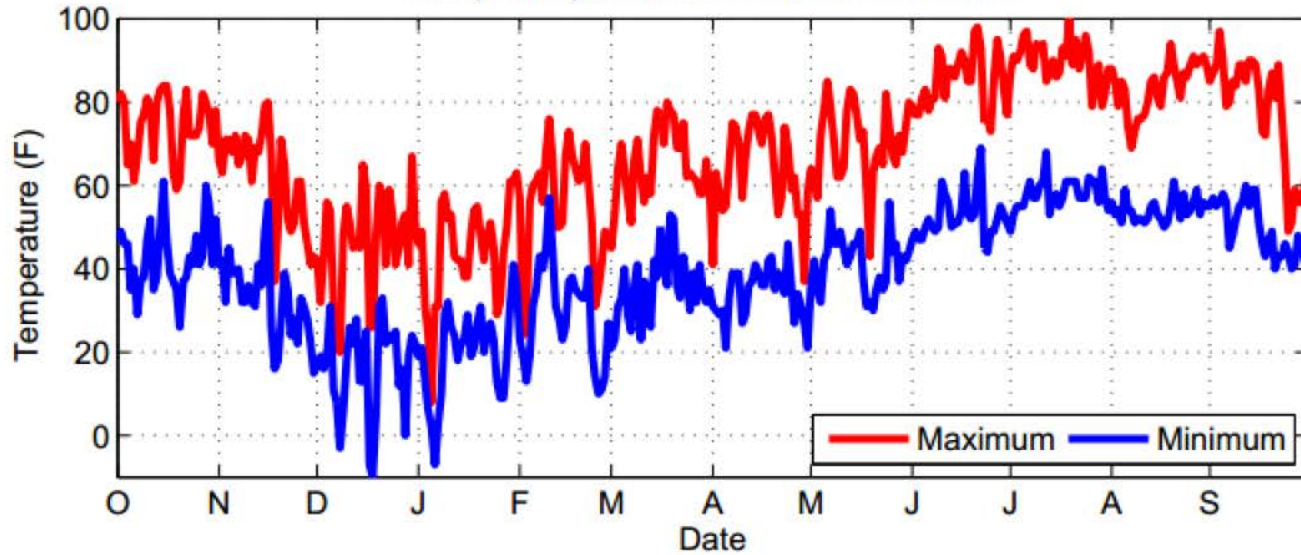
Daily Temperatures at Lamar WY 2017



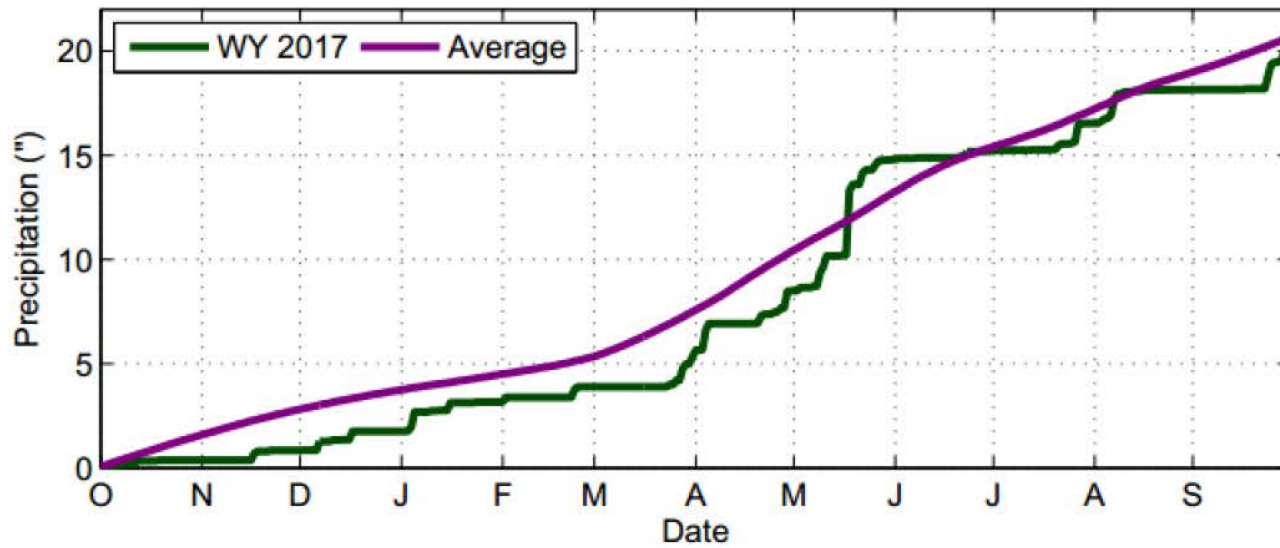
Precipitation Accumulation at Lamar WY 2017



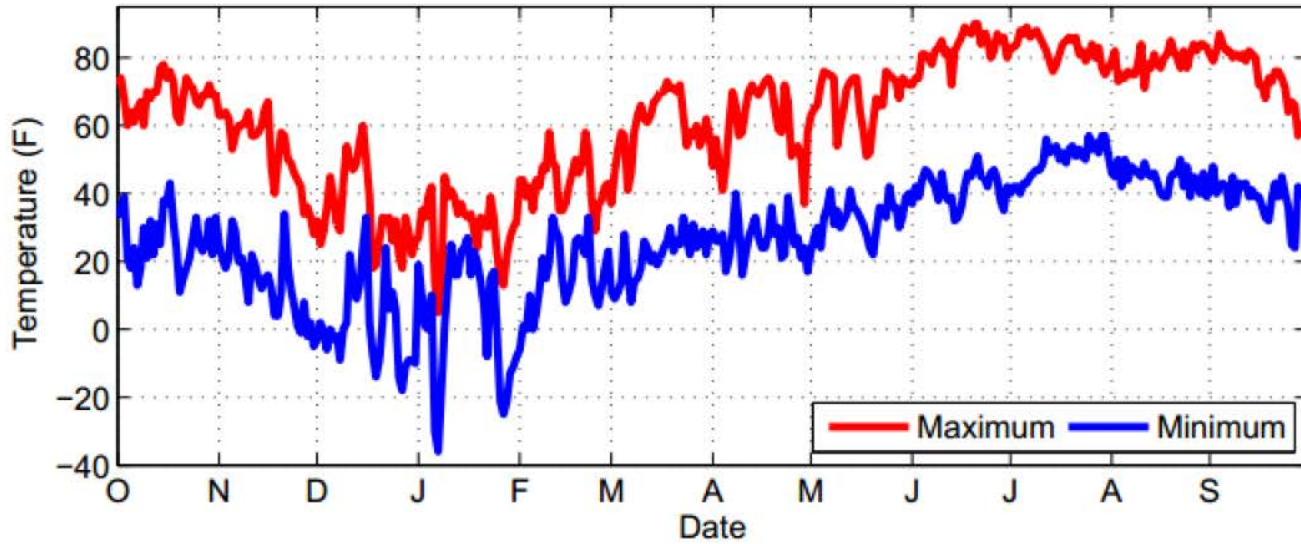
Daily Temperatures at Boulder WY 2017



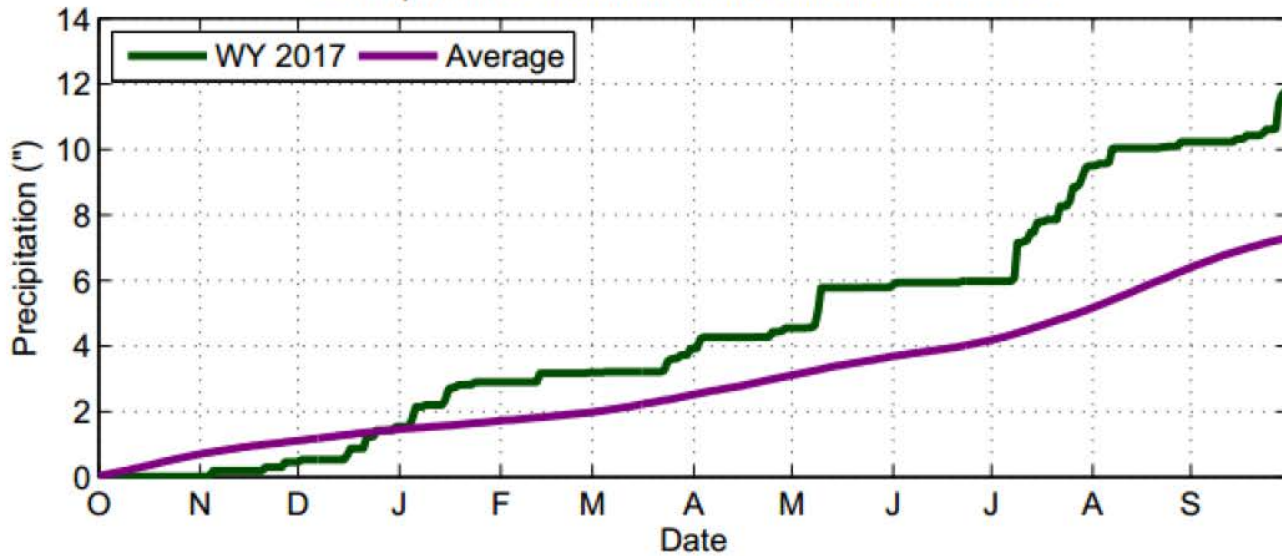
Precipitation Accumulation at Boulder WY 2017



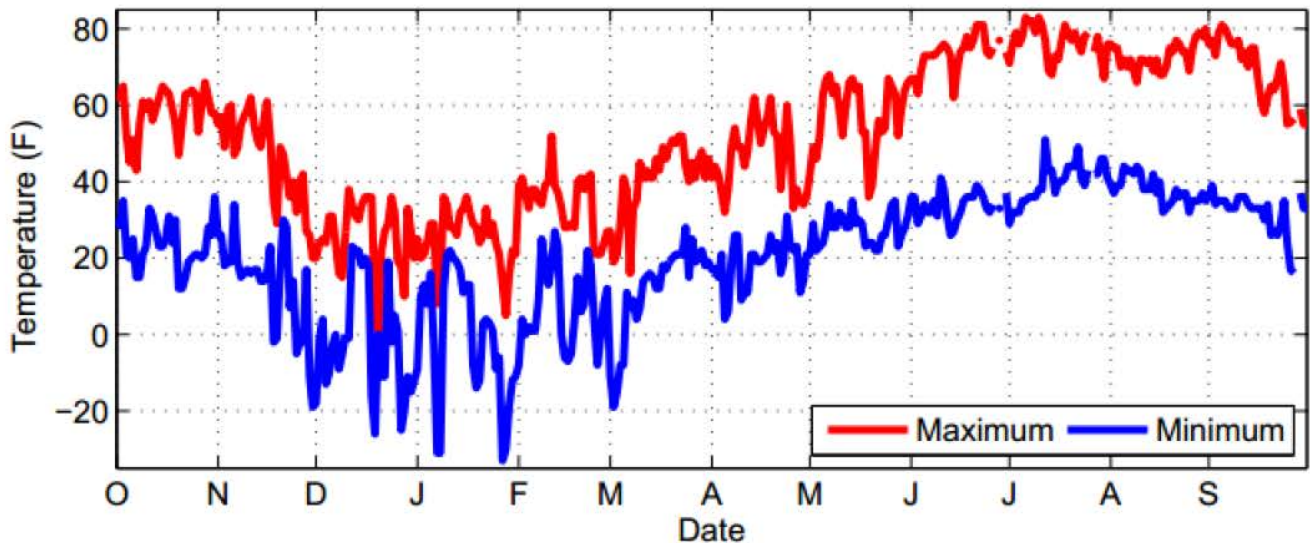
Daily Temperatures at Alamosa WY 2017



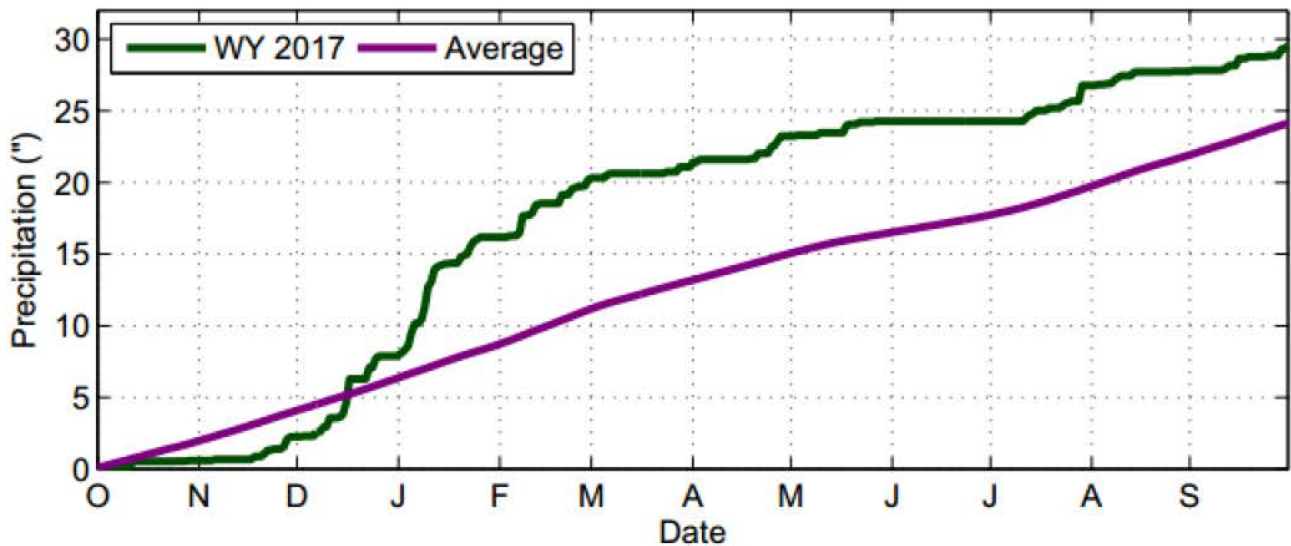
Precipitation Accumulation at Alamosa WY 2017



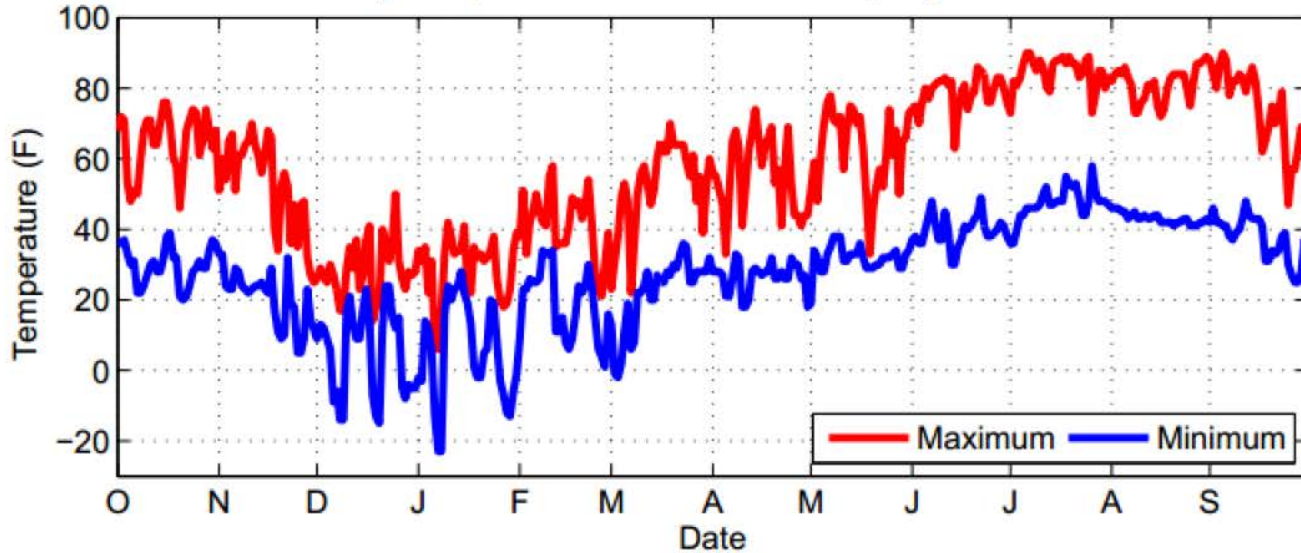
Daily Temperatures at Crested Butte WY 2017



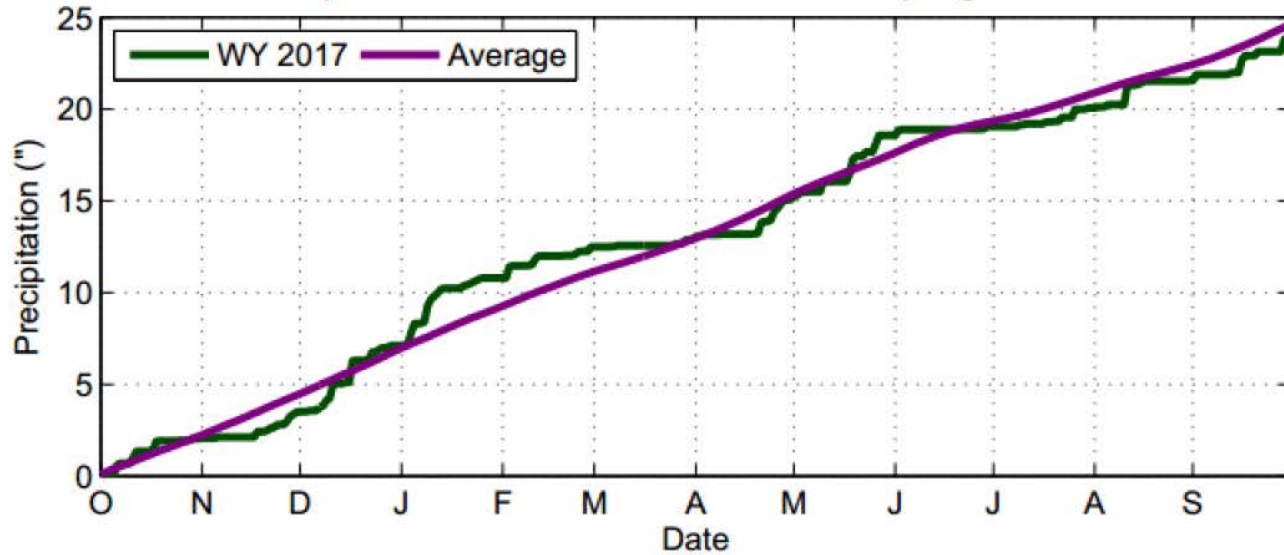
Precipitation Accumulation at Crested Butte WY 2017



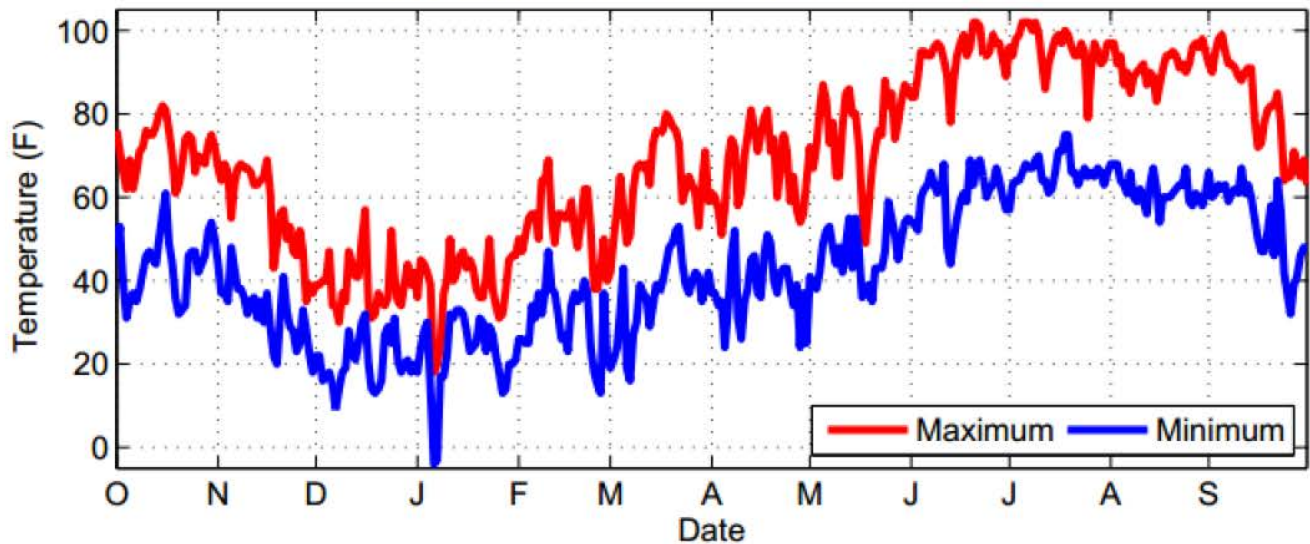
Daily Temperatures at Steamboat Springs WY 2017



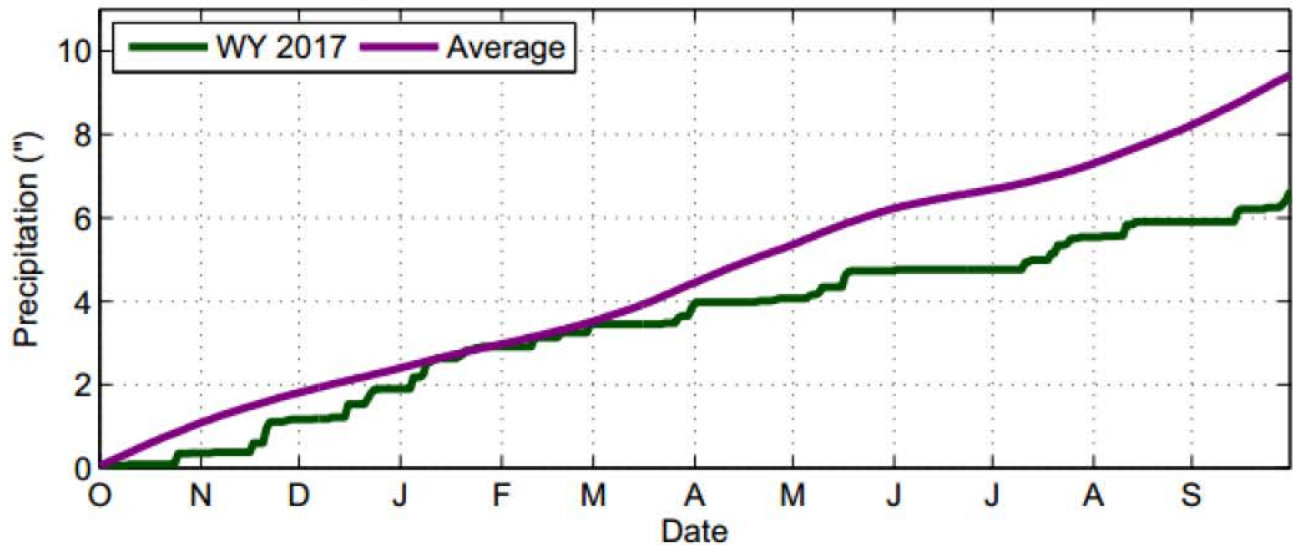
Precipitation Accumulation at Steamboat Springs WY 2017

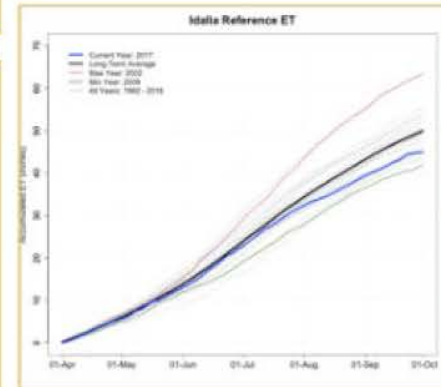
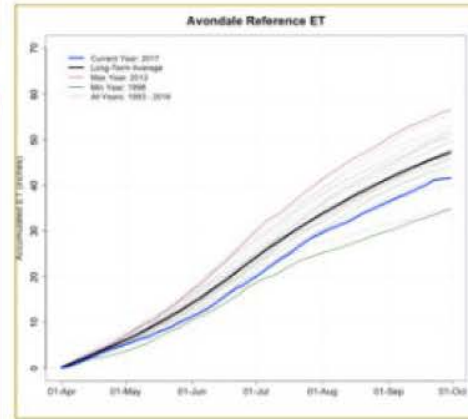
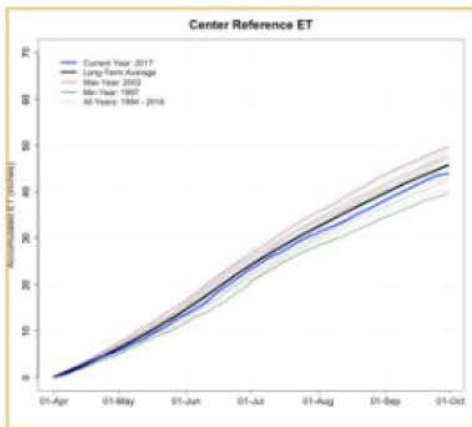
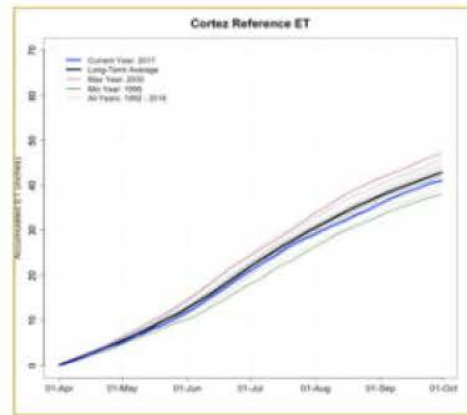
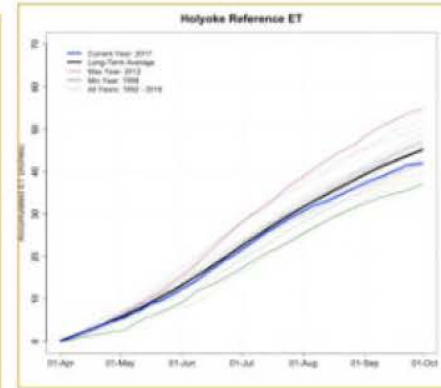
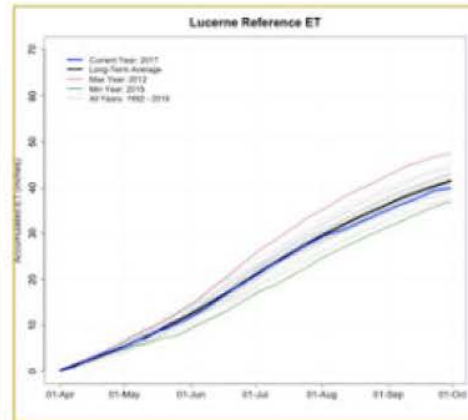
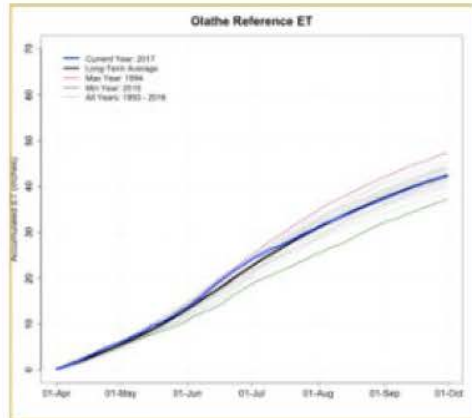


Daily Temperatures at Grand Junction WY 2017



Precipitation Accumulation at Grand Junction WY 2017

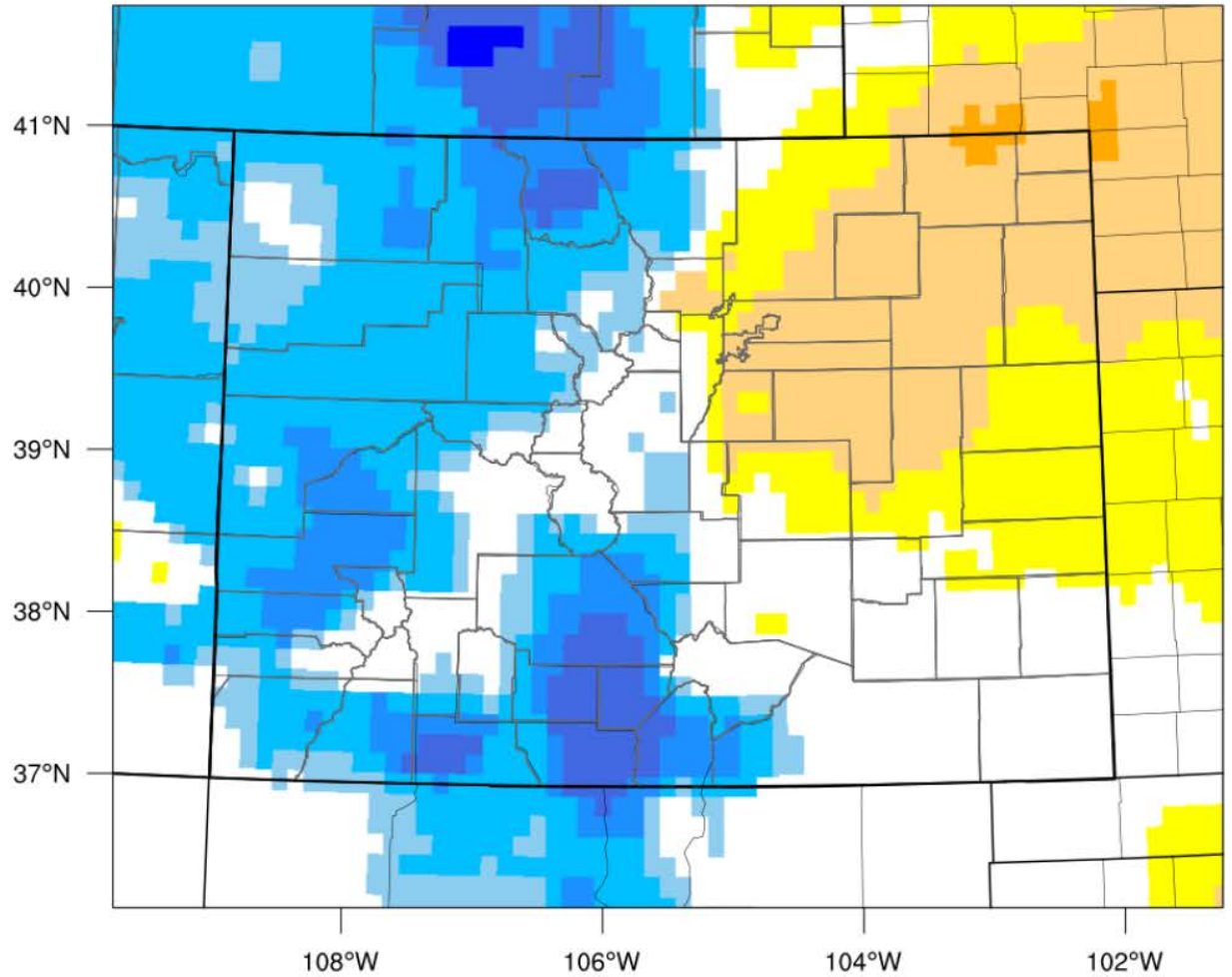




CoAgMET 2017 Accumulated ET



12-month EDDI categories for November 24, 2017



Drought categories

Wetness categories



100% 98% 95% 90% 80% 70% 30% 20% 10% 5% 2% 0%

(EDDI-percentile category breaks: 100% = driest; 0% = wettest)

Fort Collins reports its fifth consecutive May with snow.

Estes Park receives 3 feet of snow in a May snowstorm.

* photo courtesy Adnan Akyuz



39 stations top out over 80°F, and 61 stations report over 70°F in mid-February.

*photo courtesy 9News



After one of the bleakest starts to the snowpack season in recorded history, high elevation snow came on strong in Dec-Jan. Crested Butte recorded 152" of snowfall, 6 feet over their Dec-Jan average!

*Photo courtesy Denver Post



The costliest hailstorm in CO history pummeled the Denver area on May 8. Estimated at over \$1.4 Billion in damage, it closed down the Colorado Mills mall for several months.

*photo courtesy Jerry Bell/KOA



A late season blizzard at the end of April helped relieve drought conditions, but resulted in widespread and devastating livestock casualties.

*photo courtesy Brian Allmer



Water Year 2017 Significant Events



MAKE COLORADO
SNOW AGAIN

NOT MY
SEASON!

ANYTHING
BUT
SUMMER

POWDER
TO THE
PEOPLE

MORE
SNOW

Photo Credit: Shannon Lukens

Snowfall Accumulation at Crested Butte WY 2017

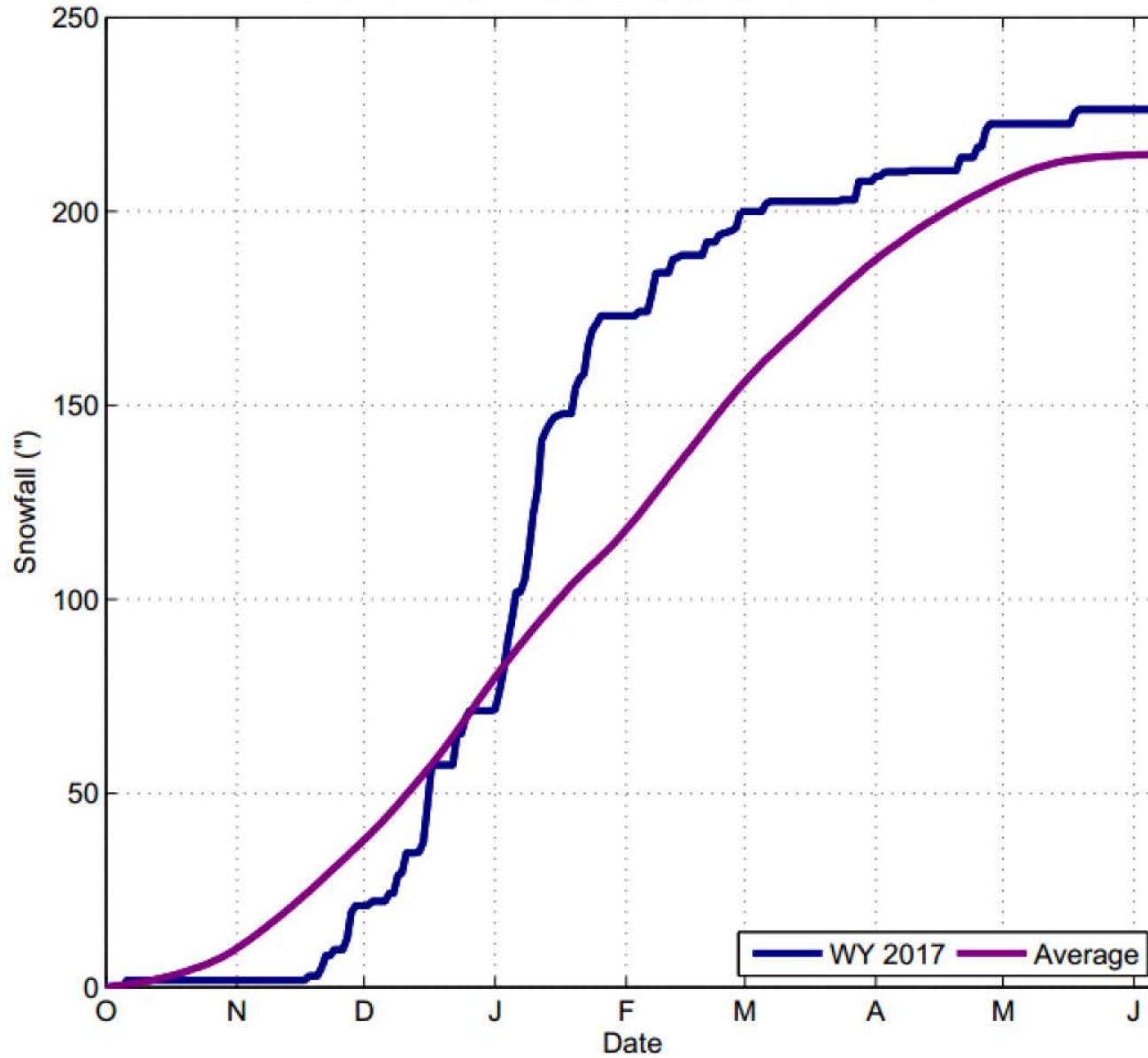




Photo Credit: Helen H.
Richardson Denver Post

Snowfall

USA

Colorado

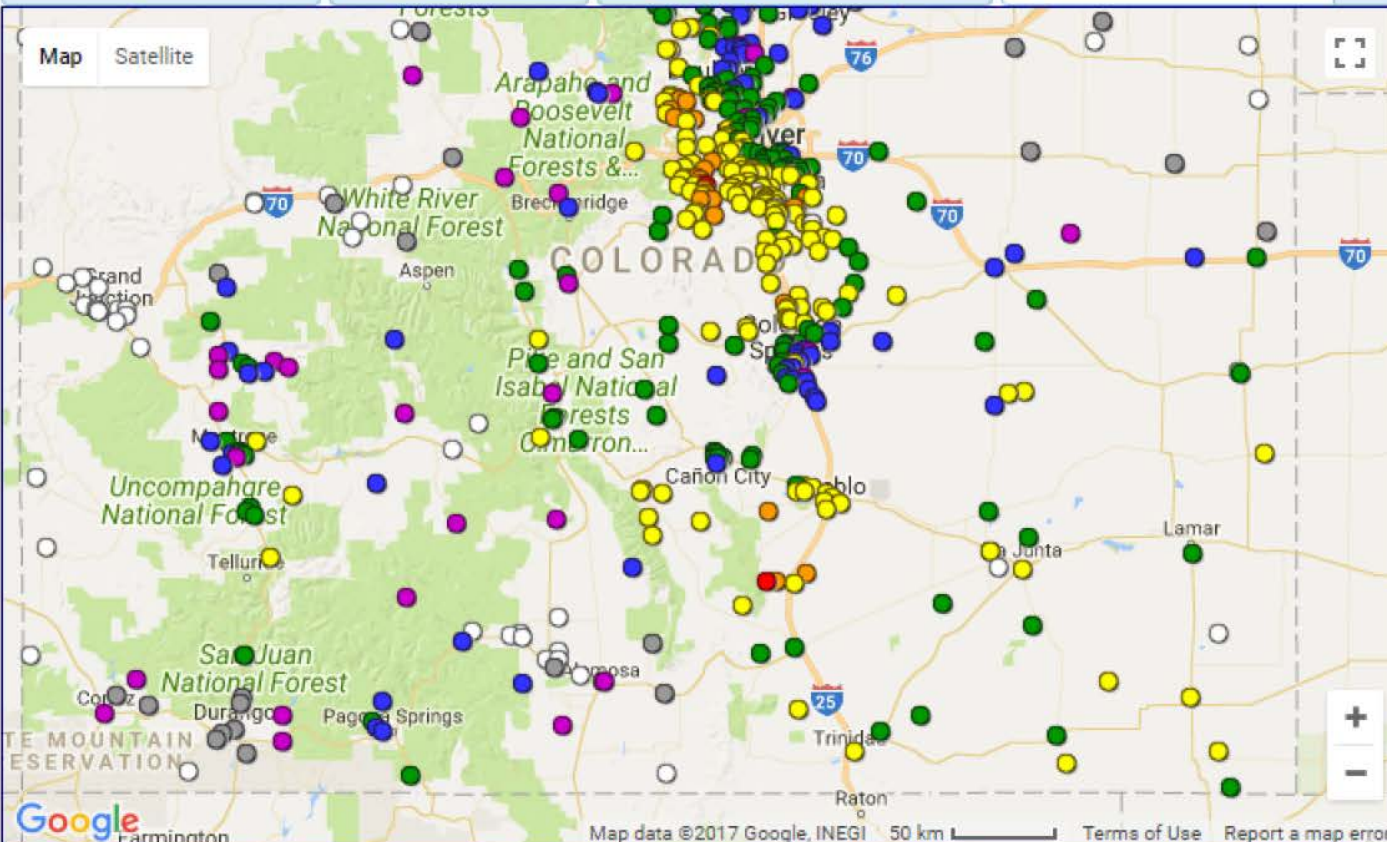
4/29/2017



US Units

Update

Map Satellite



Date: 04/29/2017
 Country: USA
 State: CO
 Units: US Units

- Zero
- Trace
- 0.1 - 0.9 in.
- 1.0 - 1.8 in.
- 1.9 - 4.6 in.
- 4.7 - 11.1 in.
- 11.2 - 16.7 in.
- 16.8 - 18.5 in.

Show US Active Fire Perimeters
 Source: [GEOMAC](#) GEOMAC wildfire data layers courtesy of the [U.S. Geological Survey](#).

Google Farmington

Map data ©2017 Google, INEGI 50 km Terms of Use Report a map error

Tue Apr 30 06:40:09 2013 Exposure: 353
© http://www.abeautifulcolor.com

APRIL SHOWERS



**BRING
MAY FLOW-**

Wed Mar 01 06:22:04 2013 Exposure: 407
© http://www.abeautifulcolor.com

JUST
KIDDING



I'M COLORADO

Snowfall

USA

Colorado

5/19/2017



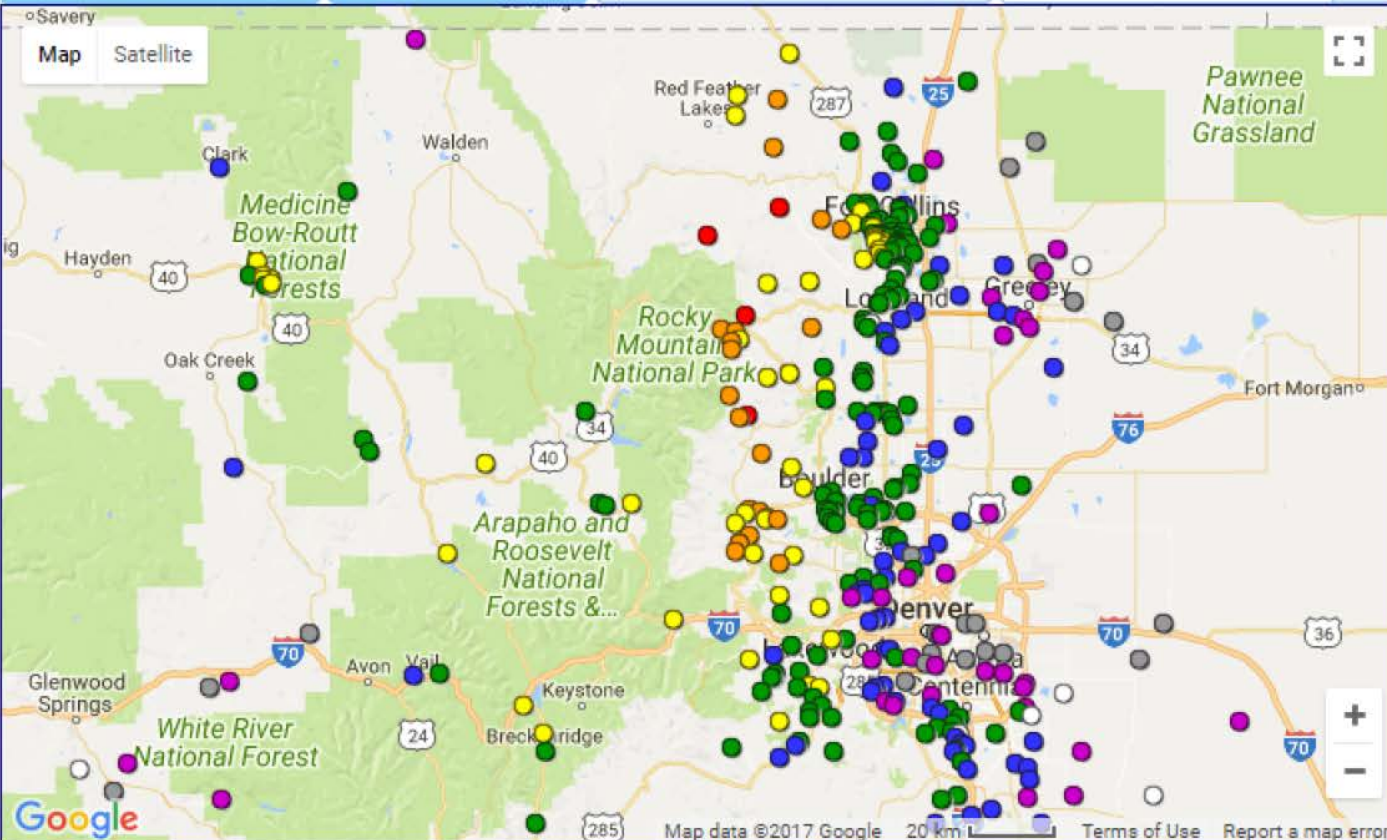
US Units

Update

Savery

Map

Satellite



CoCoRaHS Snowfall Map



Date: 05/19/2017

Country: USA

State: CO

Units: US Units

- Zero
- Trace
- 0.1 - 1.6 in.
- 1.7 - 3.2 in.
- 3.3 - 7.9 in.
- 8.0 - 19.0 in.
- 19.1 - 28.5 in.
- 28.6 - 31.5 in.

Show US Active Fire Perimeters

Source: [GEOMAC](#) GEOMAC wildfire data layers courtesy of the [U.S. Geological Survey](#)



Map data ©2017 Google

20 km

Terms of Use

Report a map error



Photo Credit: Henry Reges
Colorado Climate Center

May 8th Hailstorm causes
\$1.4 Billion in Damage

An estimated 200,000 auto
and homeowners insurance
claims filed.



Photo
Credit: RJ
Sangosti
Denver Post

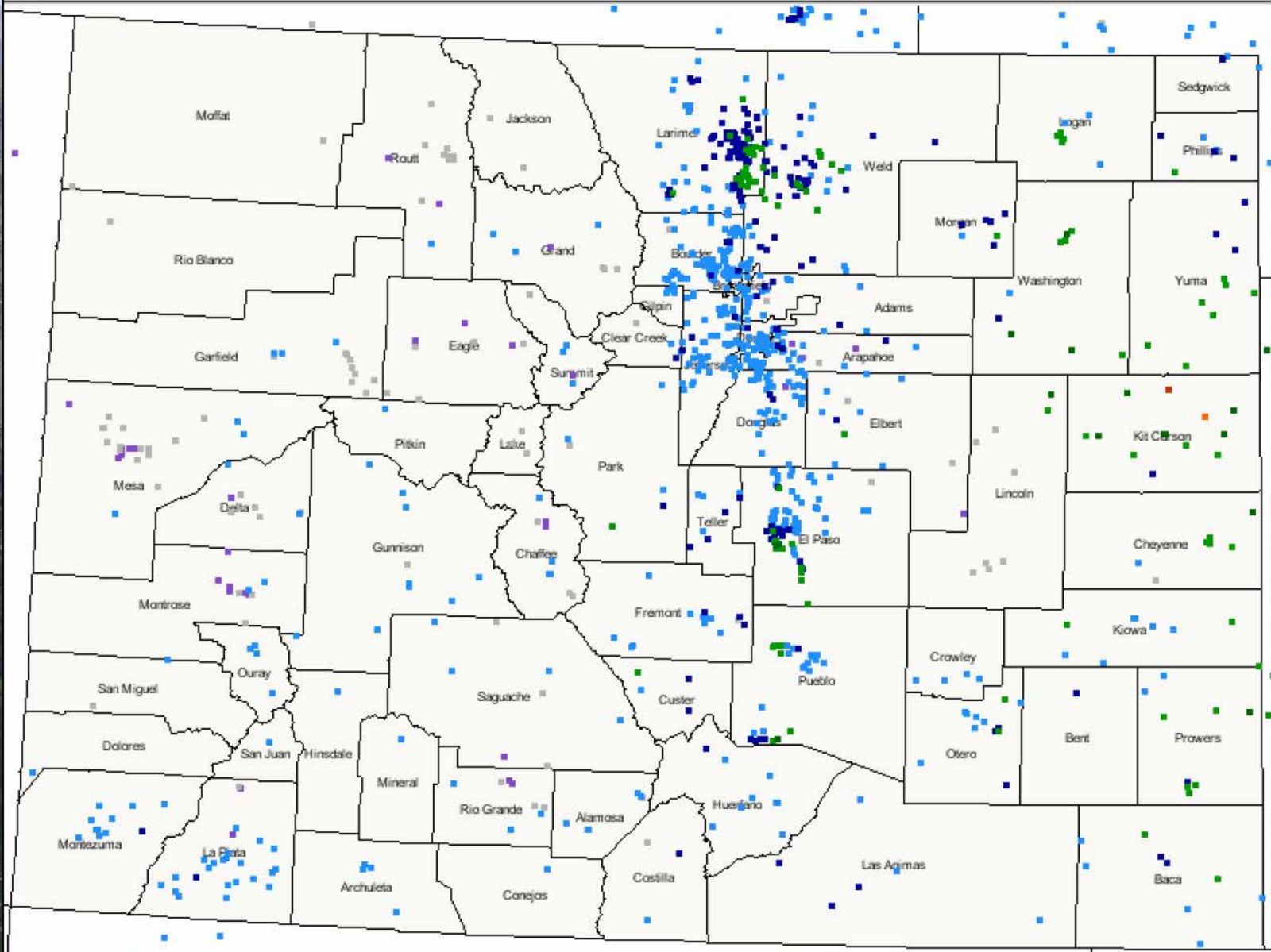
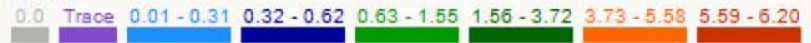




Photo Credit: Chris Slocum
Colorado State Department of Atmospheric Science
PhD

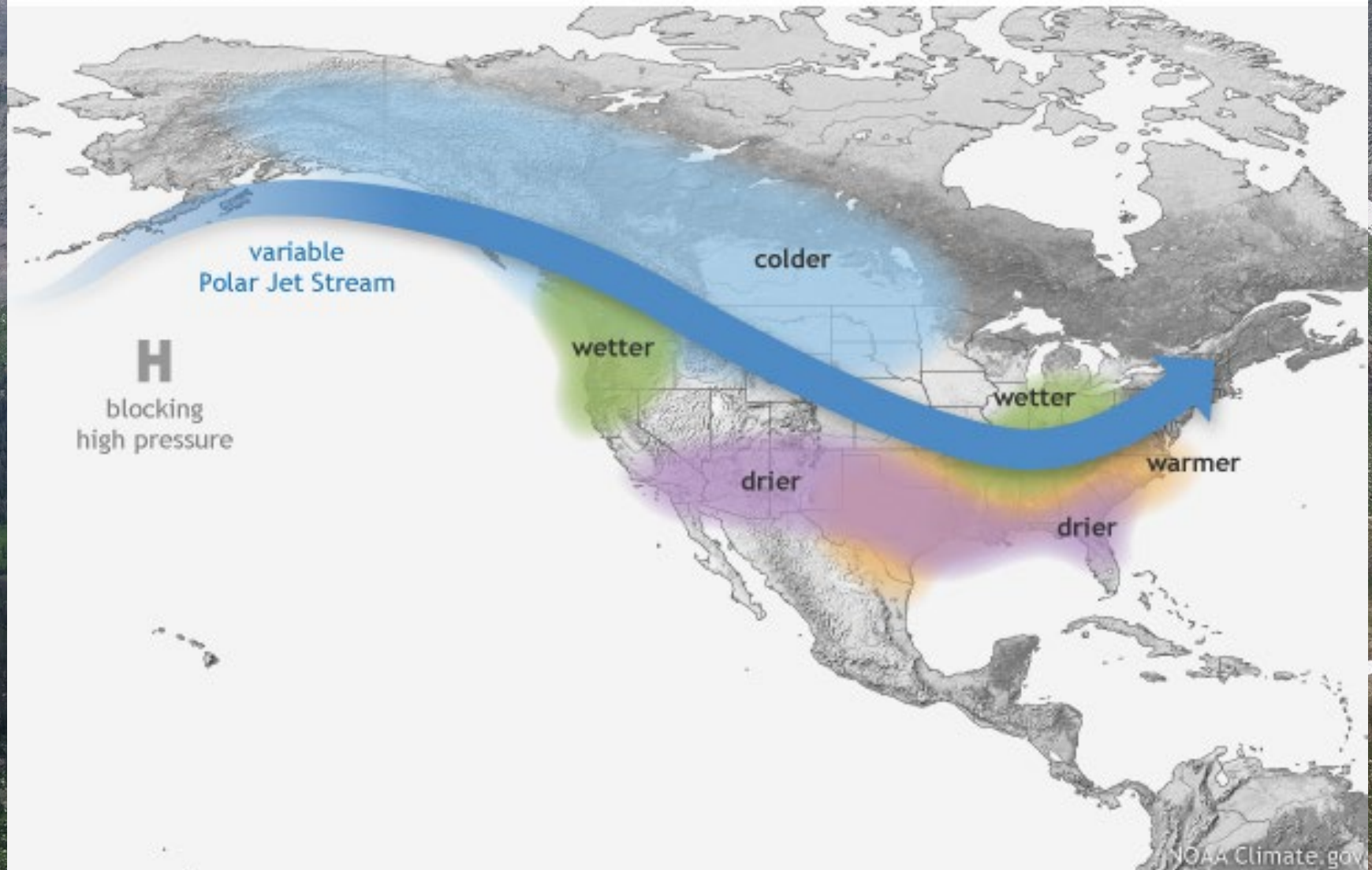
Daily Precipitation (inches x.xx), for the 24 hour period ending ~7:00 am

Colorado 8/7/2017

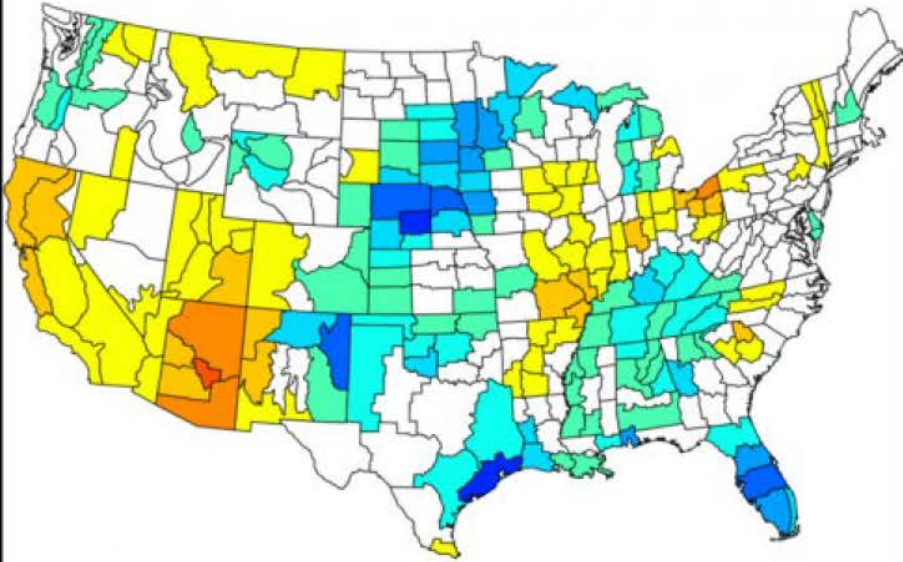


A Quick Look Ahead

Wintertime La Niña pattern



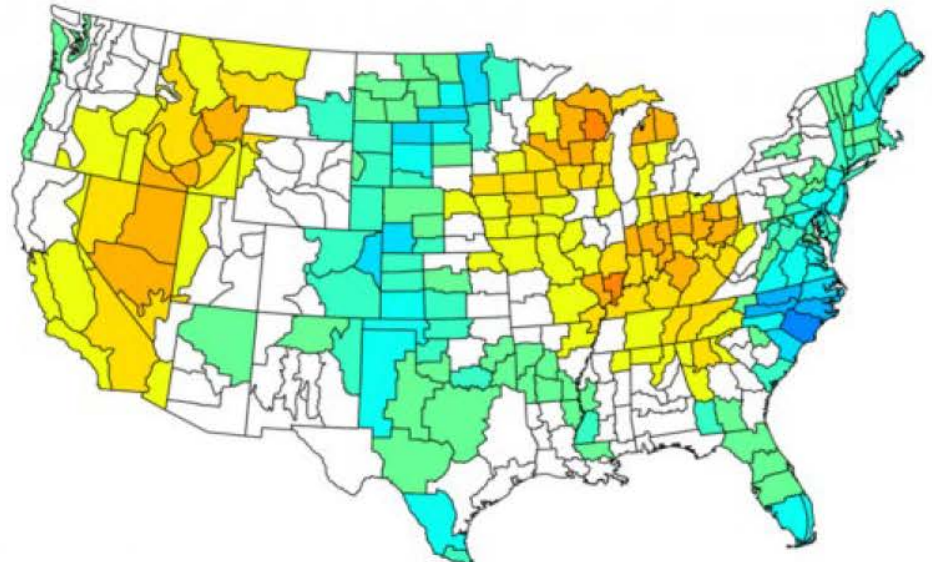
NOAA/NCEI Climate Division Standardized Precipitation Anomalies
Aug to Oct 2017
Versus 1971–2000 Longterm Average



NOAA/ESRL PSD and CIRES-CU

-3.0 -2.0 -1.0 0.0 1.0 2.0 3.0

NOAA/NCEI Climate Division Composite Standardized Precipitation Anomalies
Aug to Oct 1971,1981,1996,1999,2008
Versus 1971–2000 Longterm Average

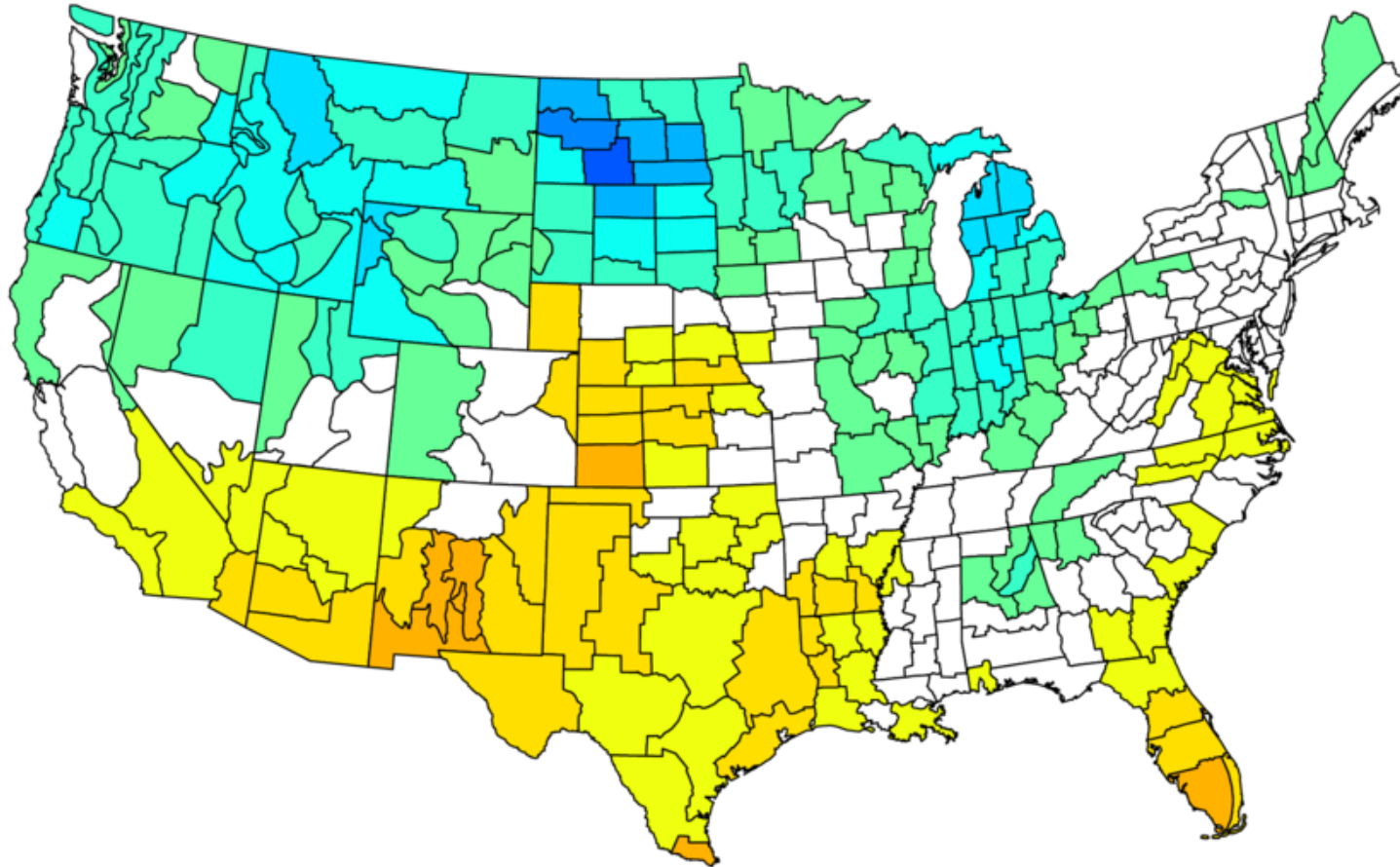


NOAA/ESRL PSD and CIRES-CU

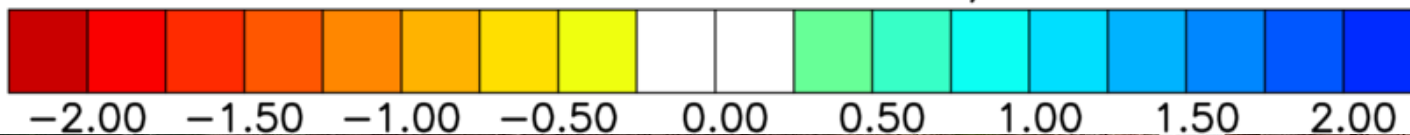
-2.00 -1.50 -1.00 -0.50 0.00 0.50 1.00 1.50 2.00



NOAA/NCEI Climate Division Composite Standardized Precipitation Anomalies
Dec to Feb 1971-72, 1981-82, 1996-97, 1999-00, 2008-09
Versus 1971-2000 Longterm Average



NOAA/ESRL PSD and CIRES-CU



- Years with similar SST patterns and antecedent conditions have given us near normal precipitation

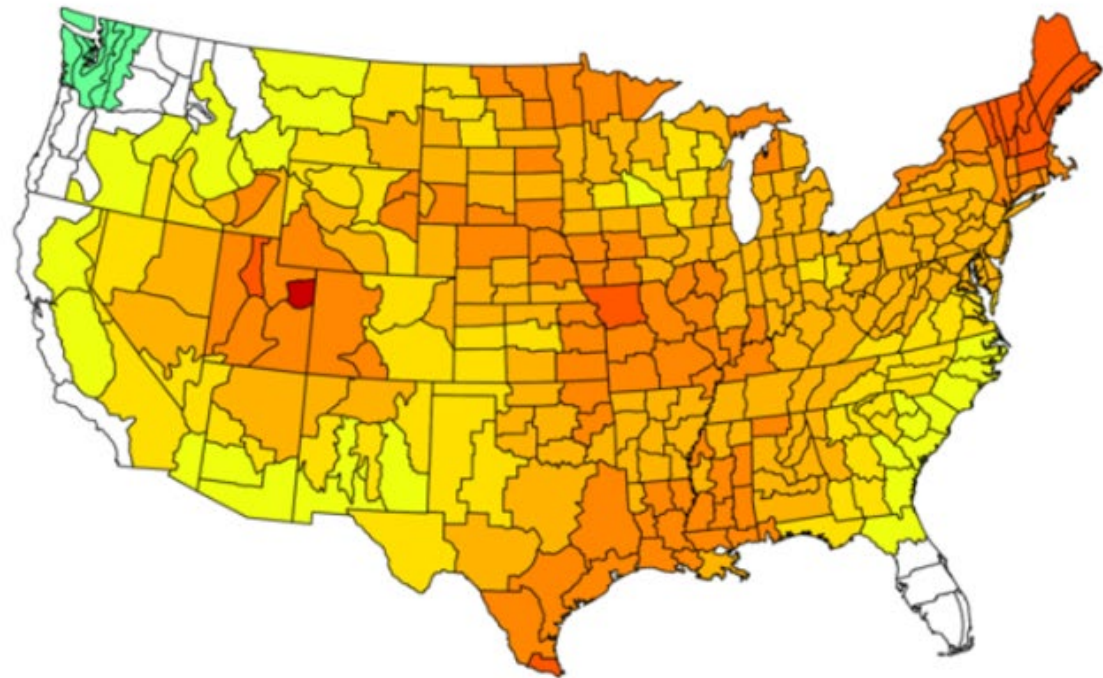


La Niña Impacts

NOAA/NCEI Climate Division Composite Temperature Anomalies (F)
Dec to Feb 1950-51, 1955-56, 1999-00, 2011-12
Versus 1951-2010 Longterm Average

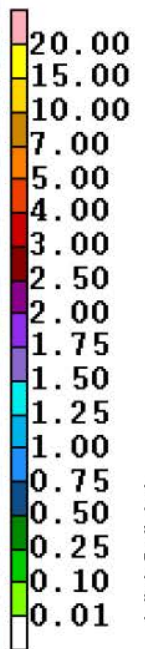
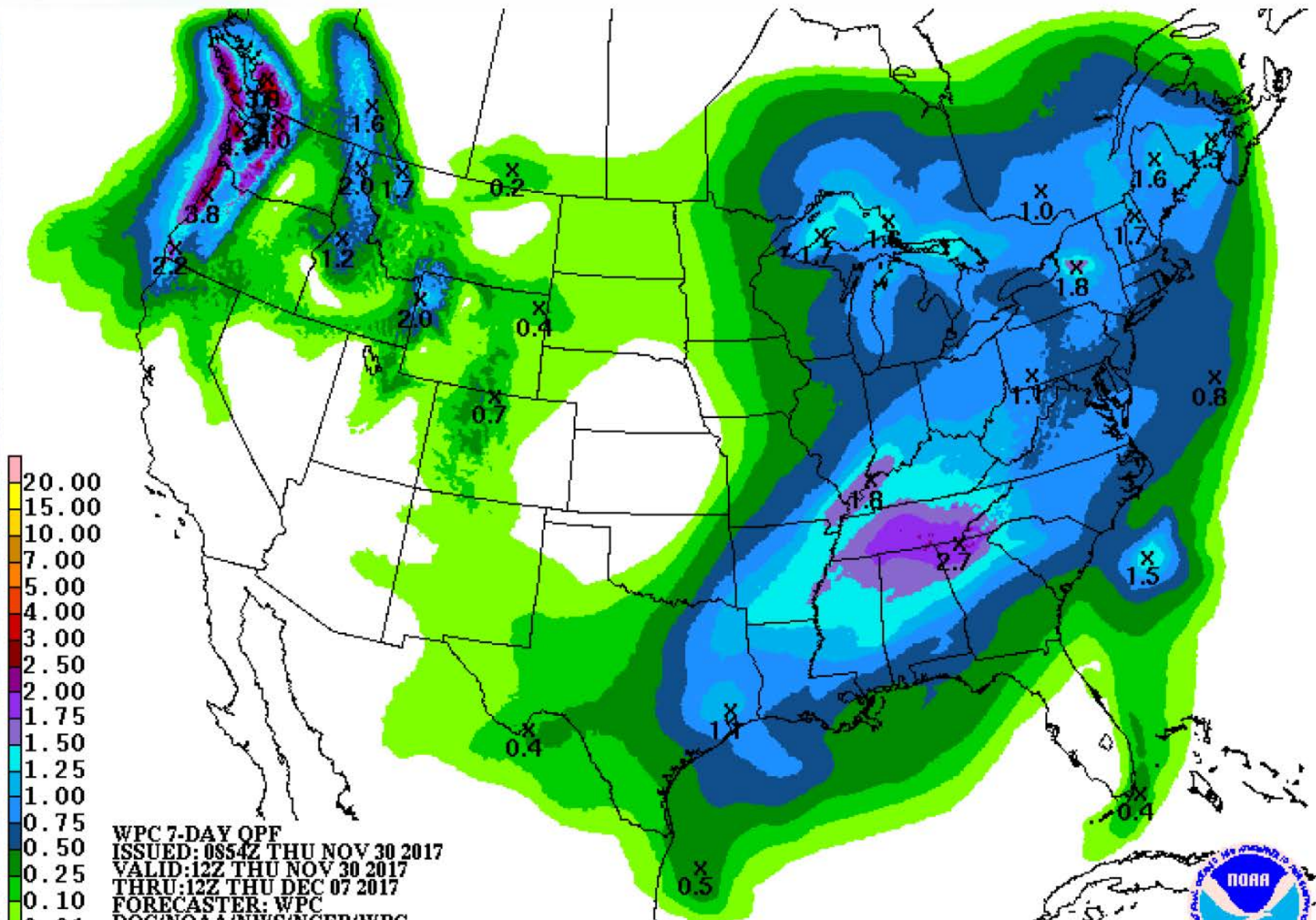
Temperature Anomalies

1951 - 2012 double dip
La Niña 2nd year events
vs. 1951-2010 Average



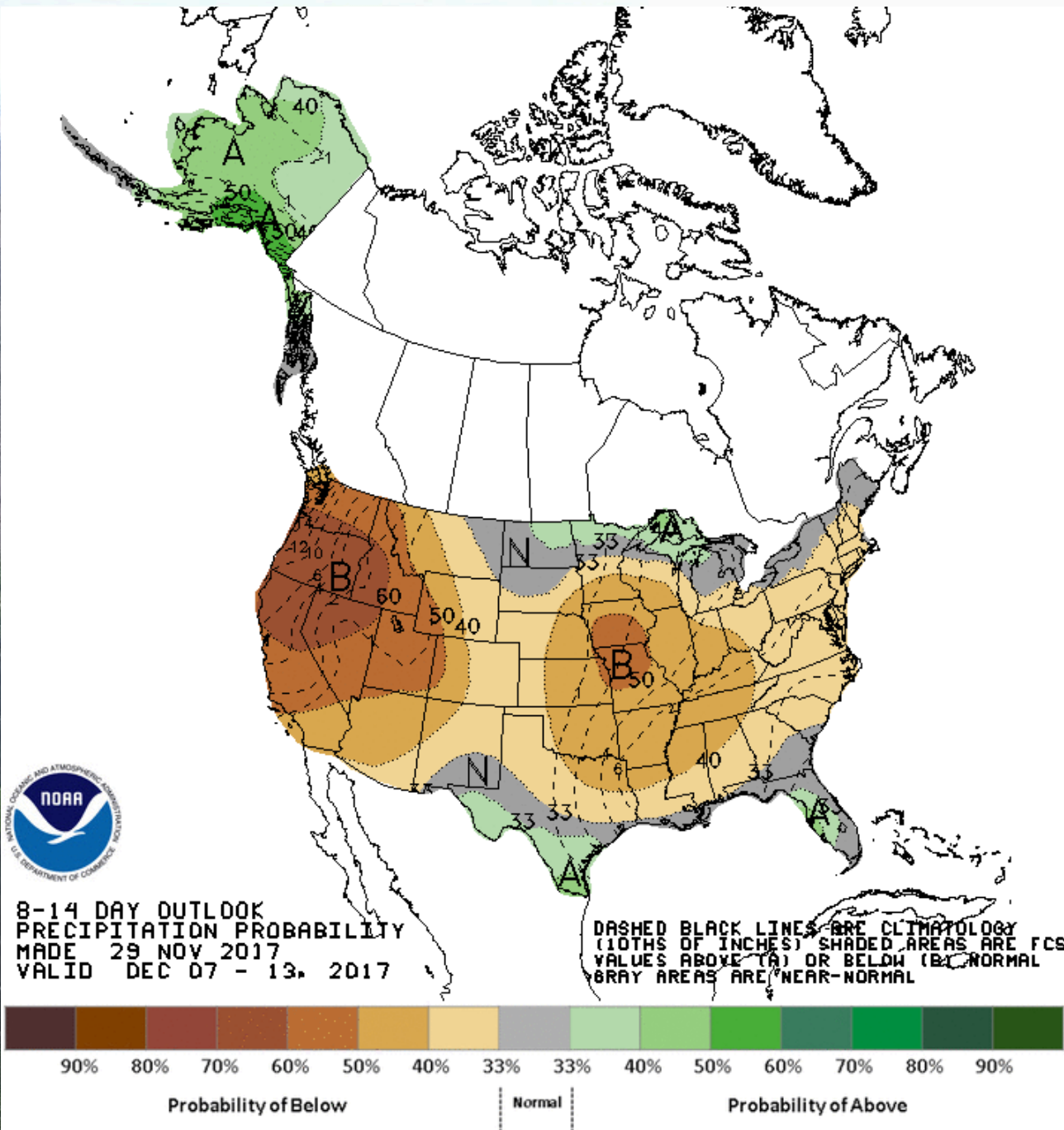
<https://www.esrl.noaa.gov/psd/data/usclimdivs/>

Dr. Becky Bolinger
Colorado Climate Center

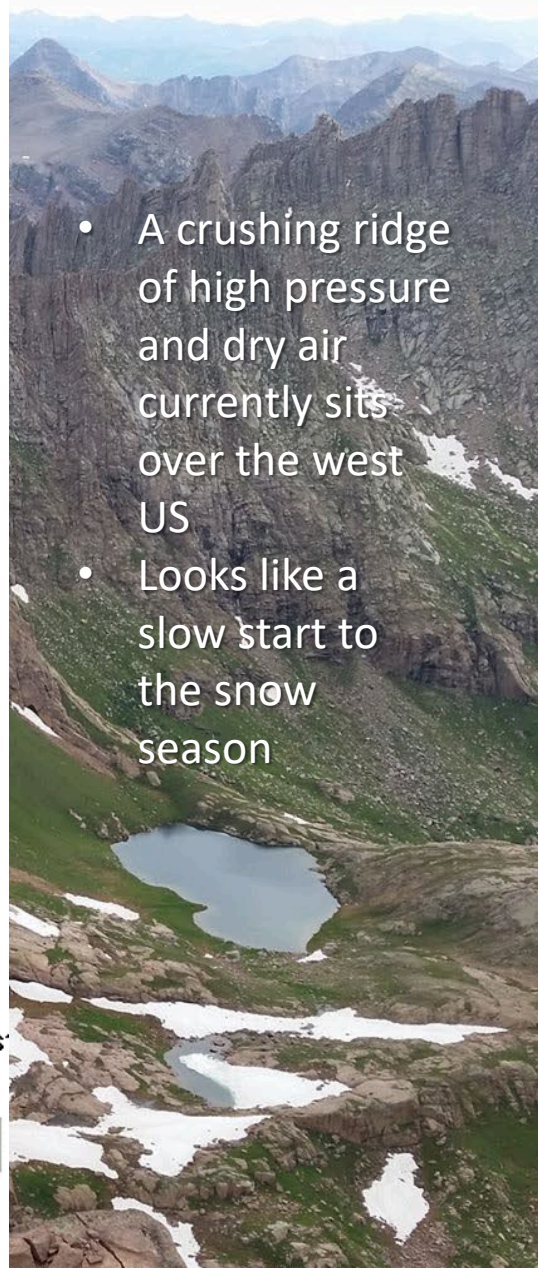


WPC 7-DAY OPF
ISSUED: 0854Z THU NOV 30 2017
VALID:12Z THU NOV 30 2017
THRU:12Z THU DEC 07 2017
FORECASTER: WPC
DOC/NOAA/NWS/NCEP/WPC





- A crushing ridge of high pressure and dry air currently sits over the west US
- Looks like a slow start to the snow season



HRRR

RAP

NAM

NAM NEST

SREF

GFS

GEFS

ECMWF

CFSv2

12Z GFS is 100% complete

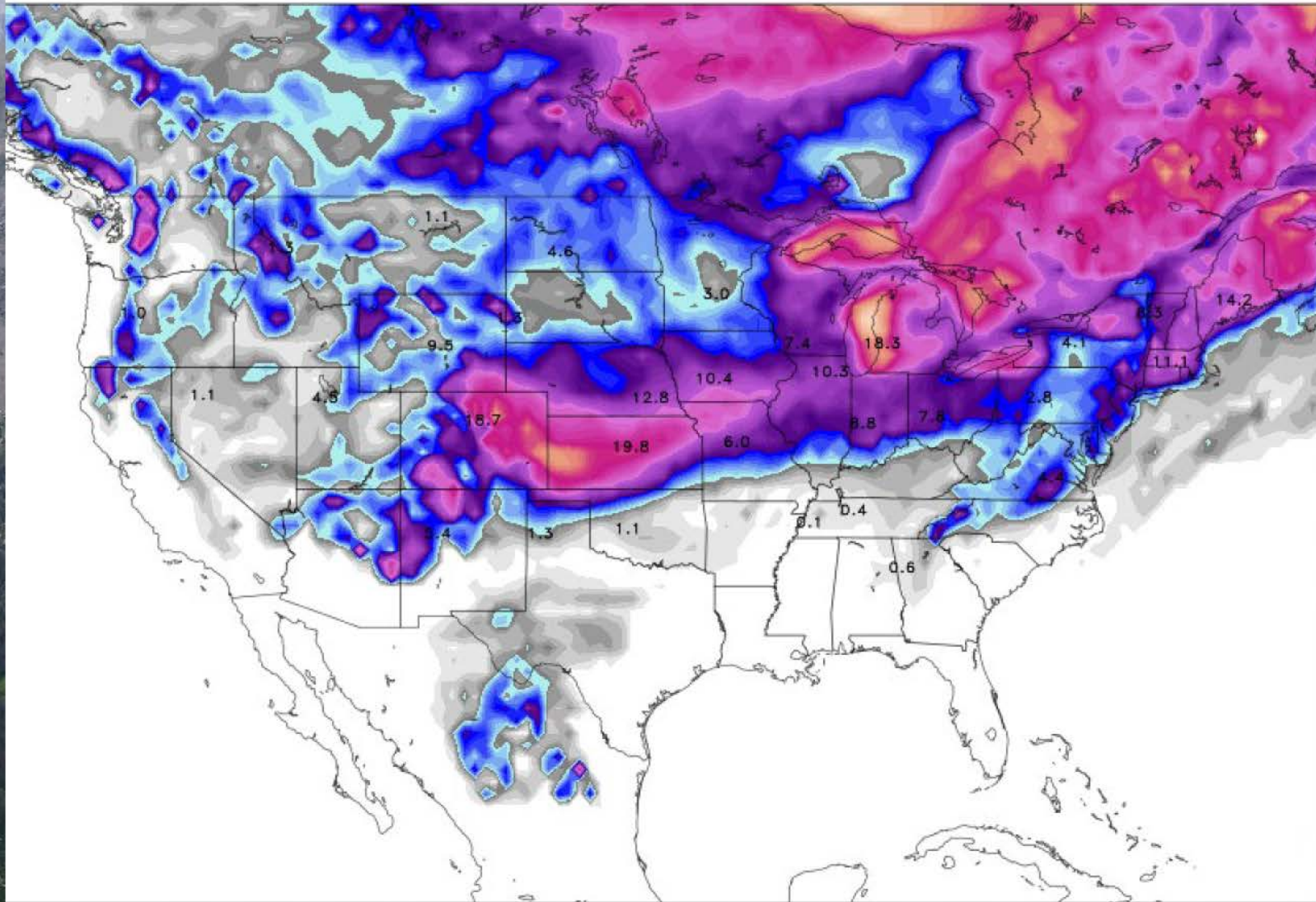
384

Loop

Save

Snowfall Accumulation (AF/Kuchera Method) | College of DuPage NEXLAB

12Z GFS | F384 Valid: 12Z SAT DEC 16 2017



Slider Type: Rollover Draggable

Thanks!

