

Colorado weather and climate update: halfway through the water year

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



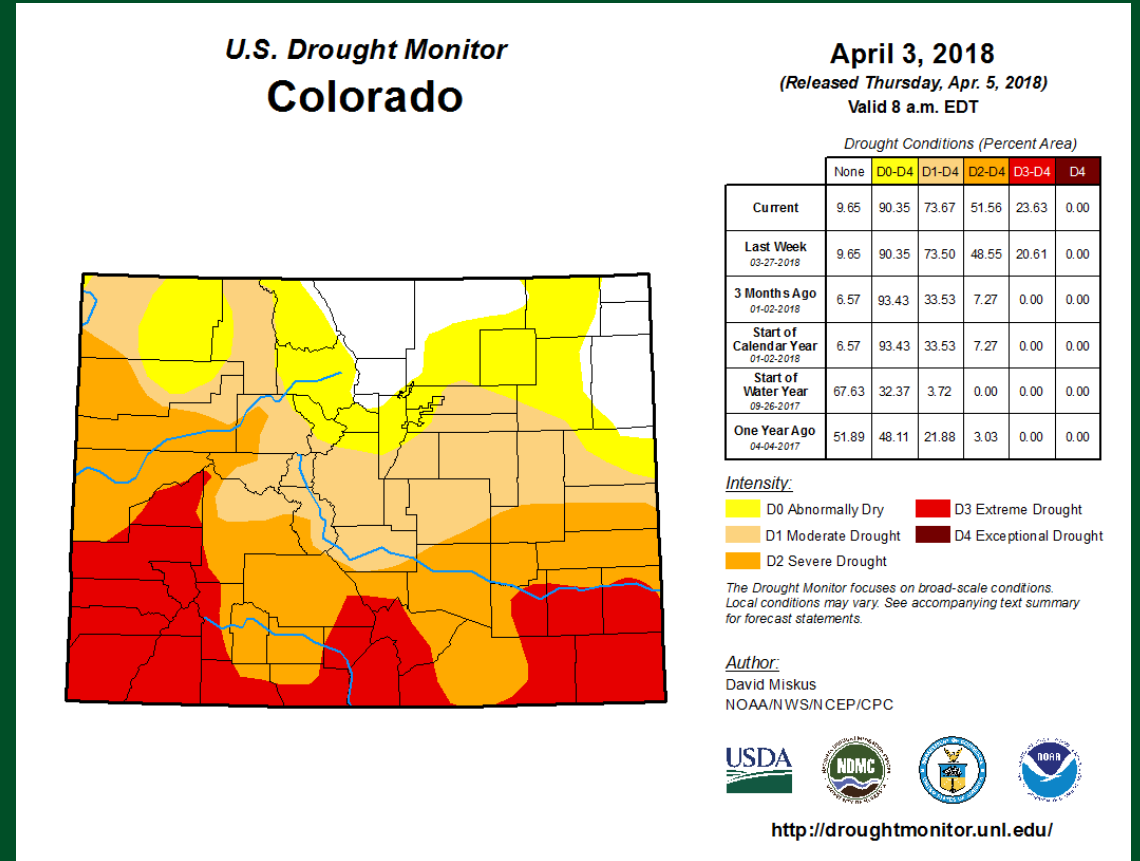
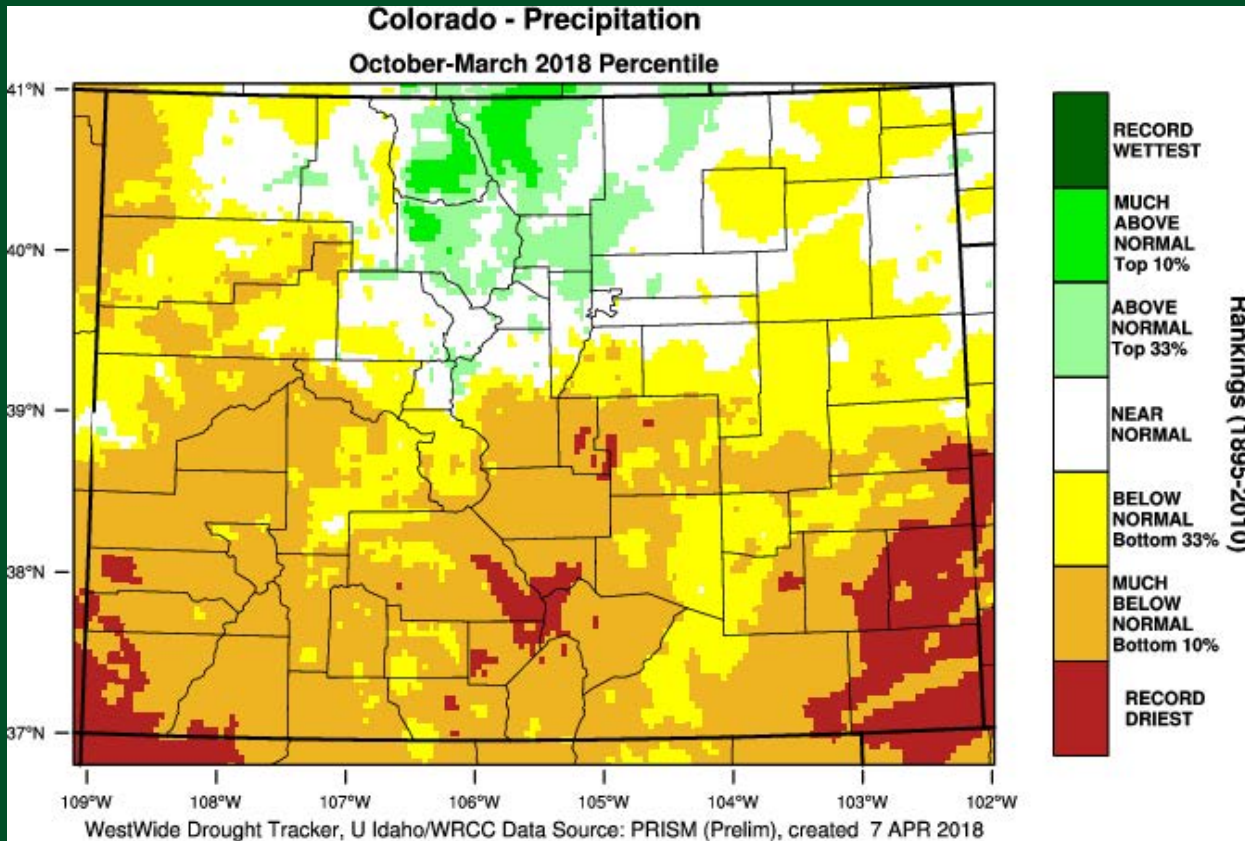
ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY



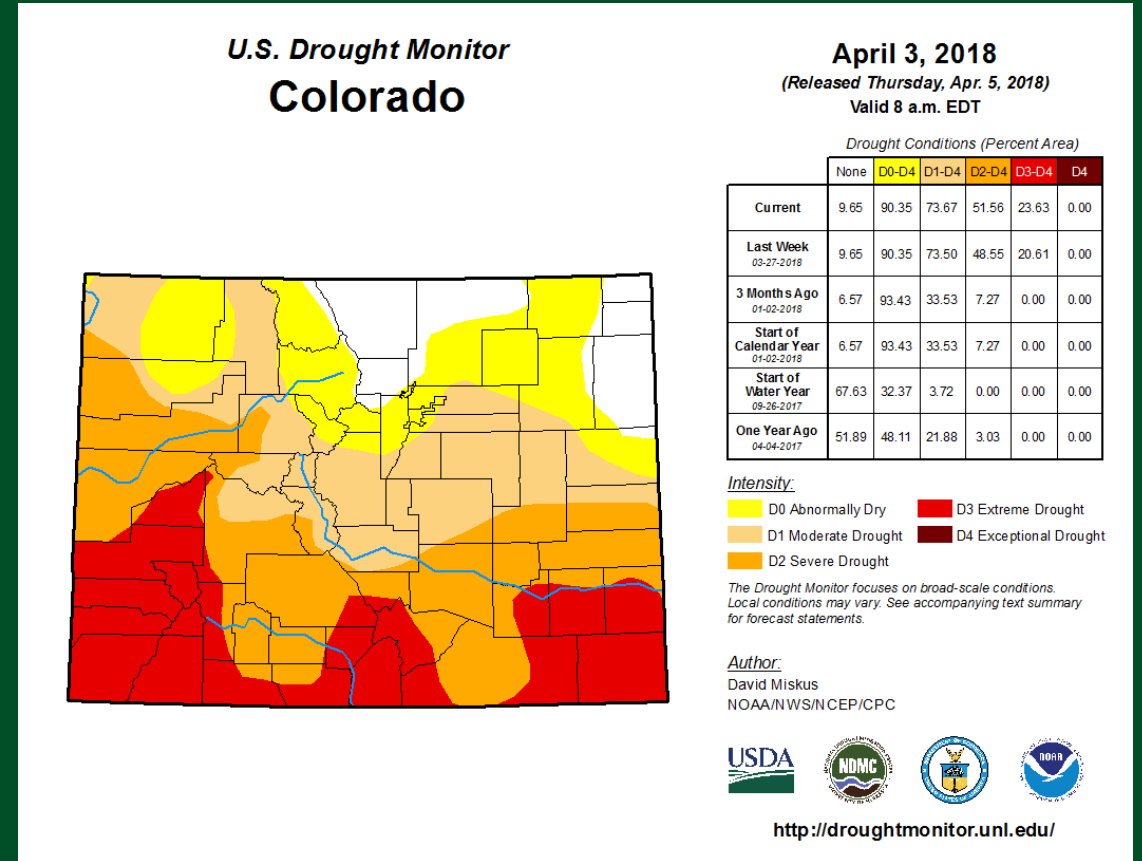
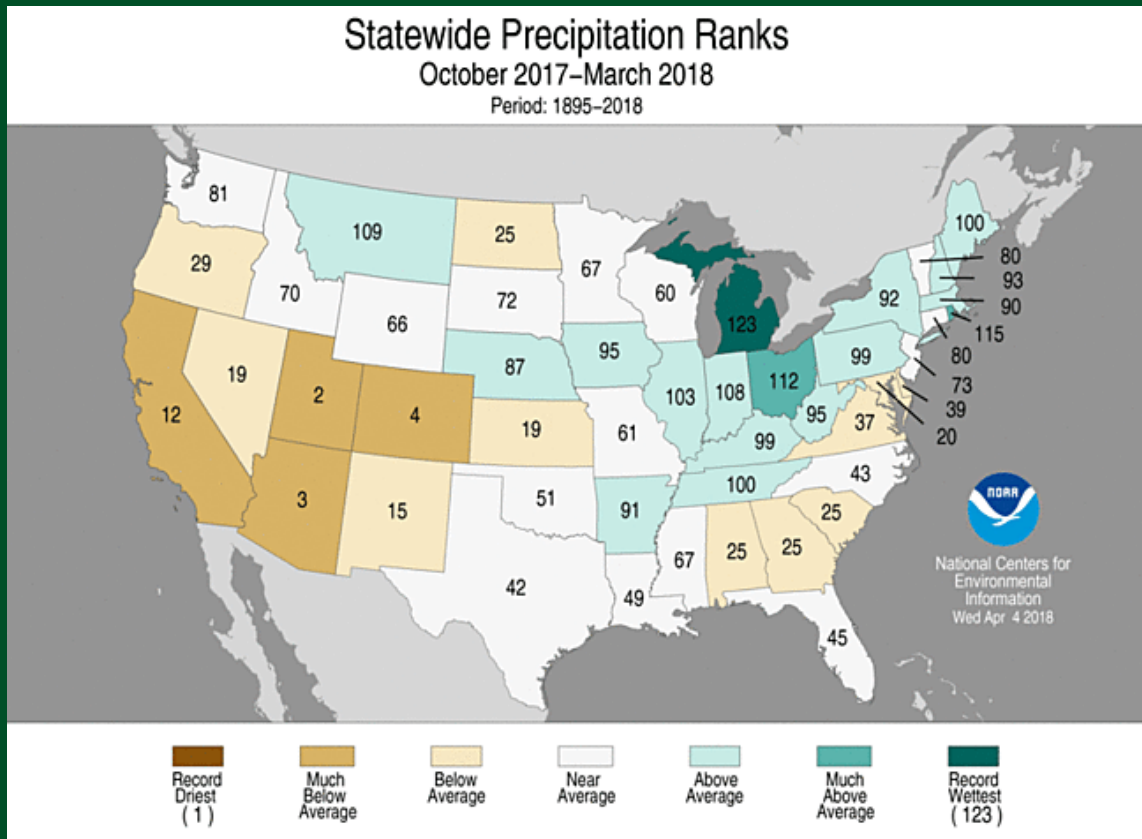
COLORADO CLIMATE CENTER
Providing information and expertise on Colorado's complex climate

Arkansas Basin Water Forum, April 2018

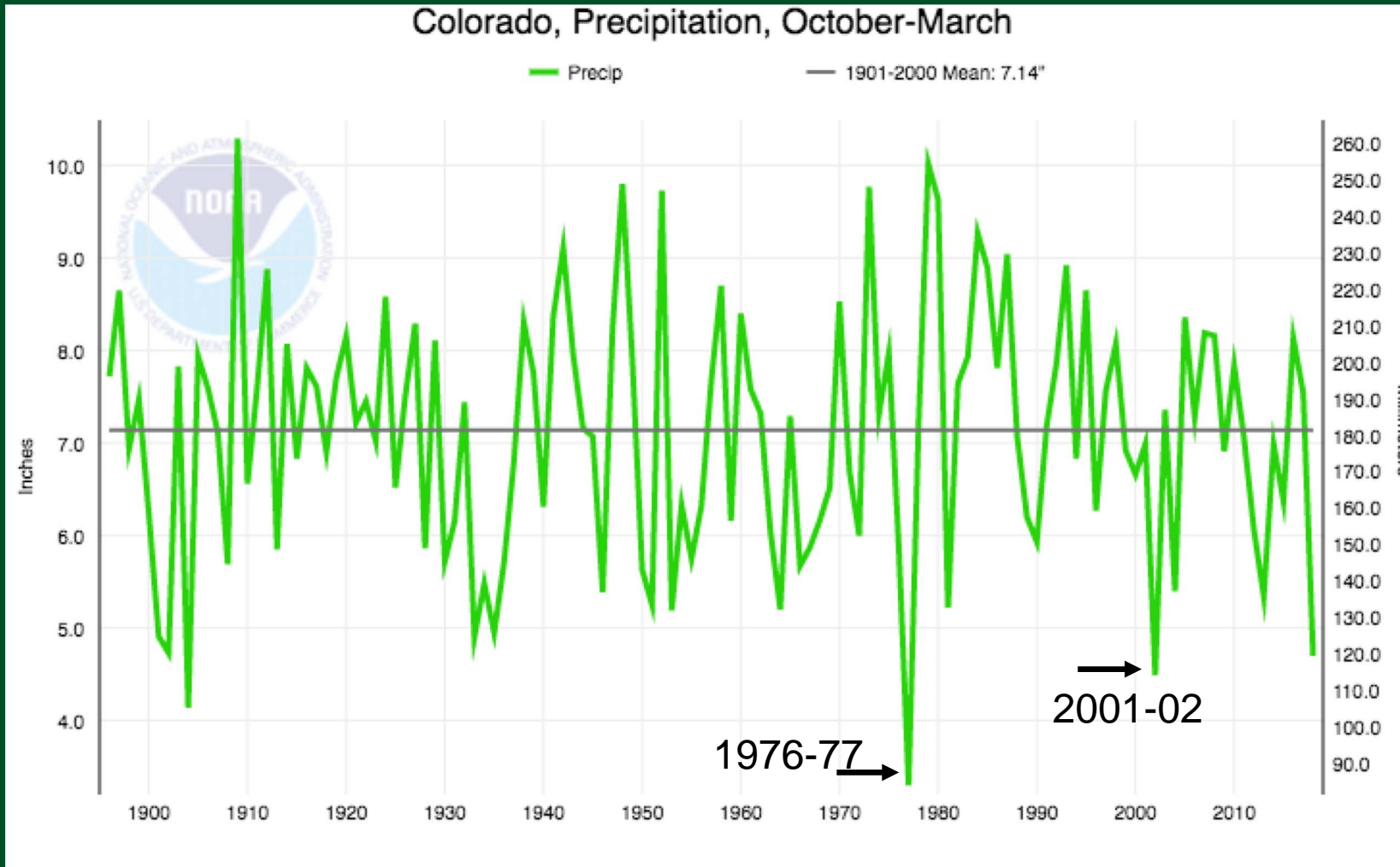
At the halfway point of the water year:



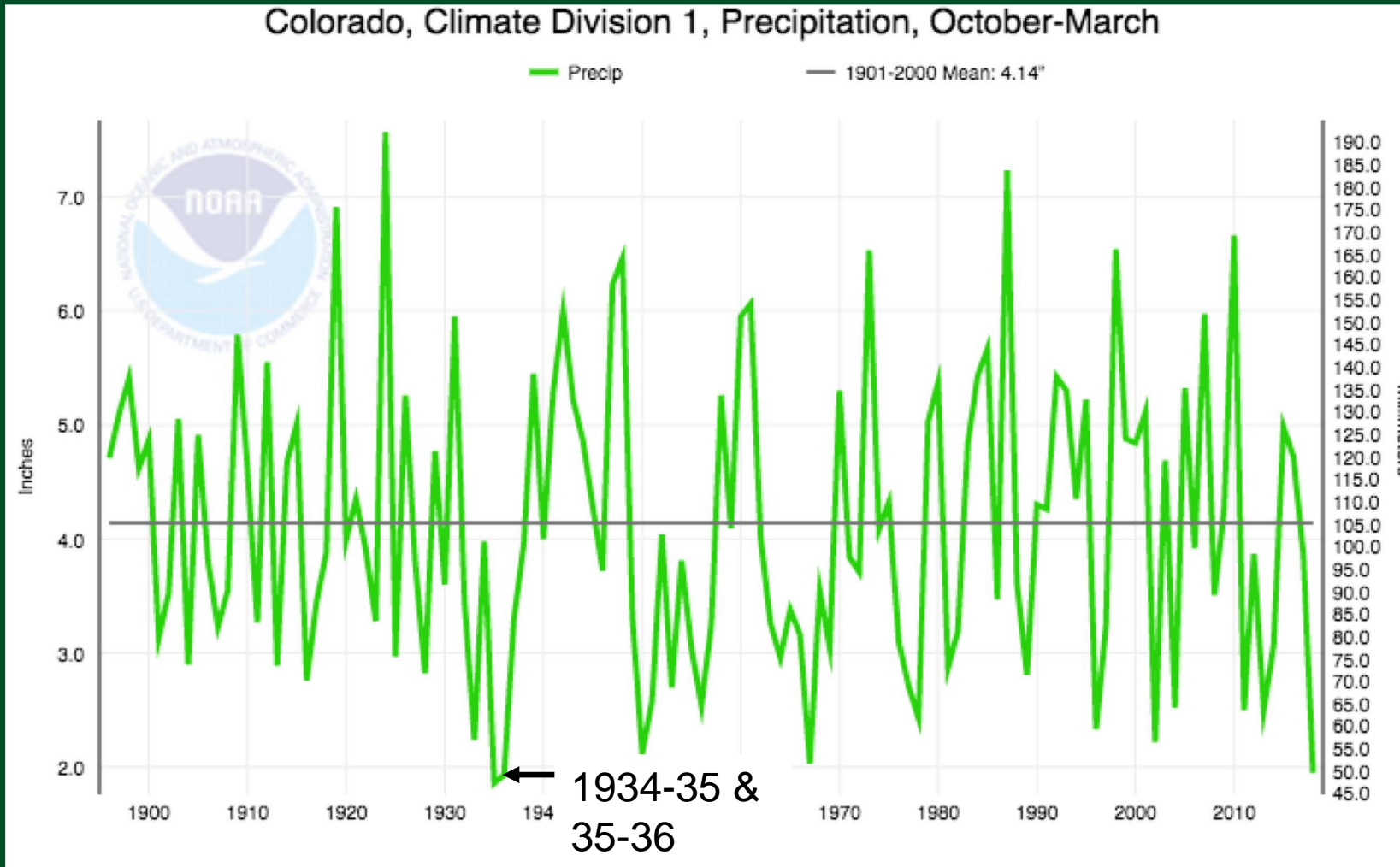
At the halfway point of the water year:



Statewide precipitation, October - March

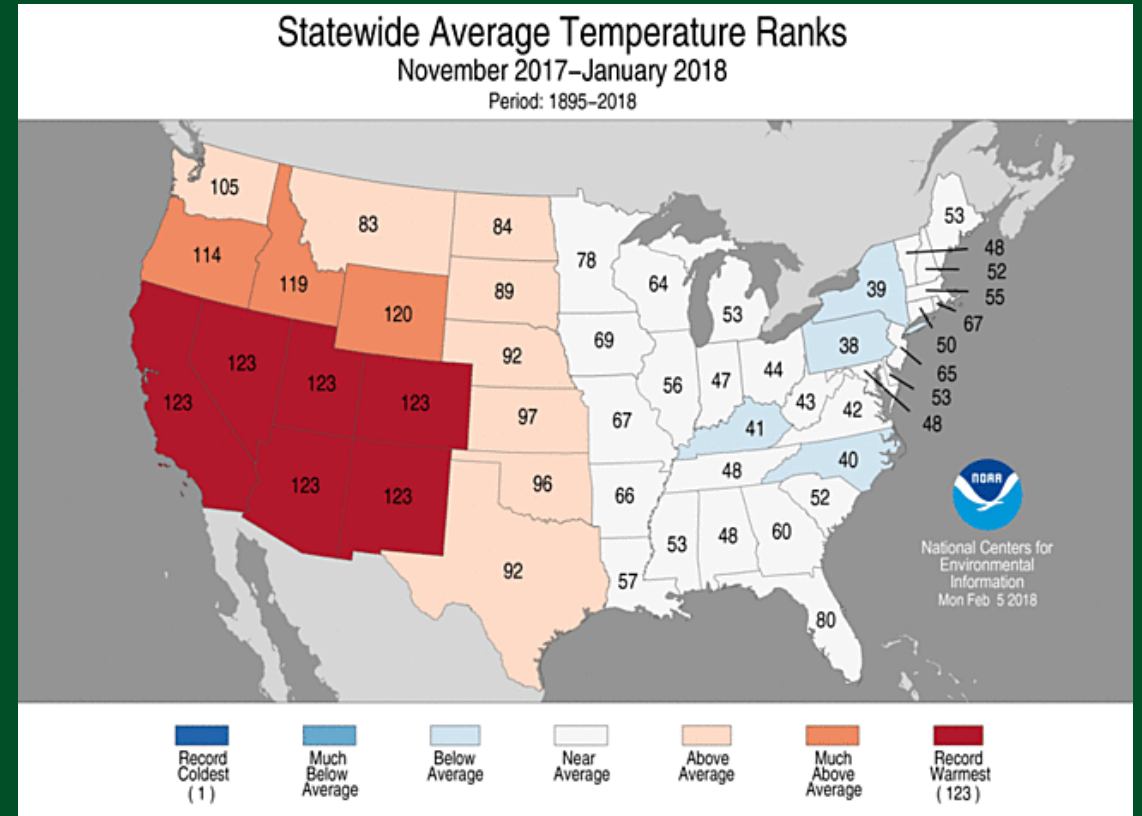
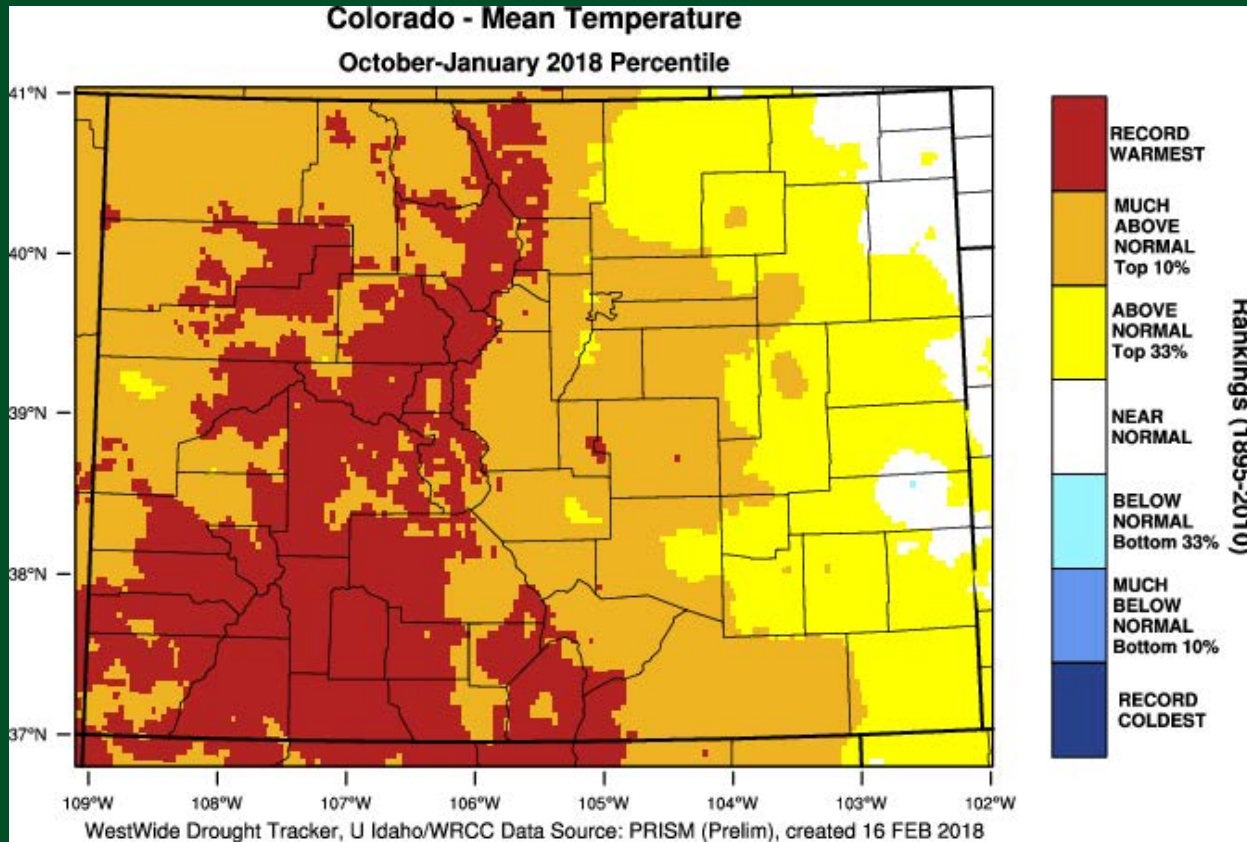


Arkansas basin precipitation, October - March



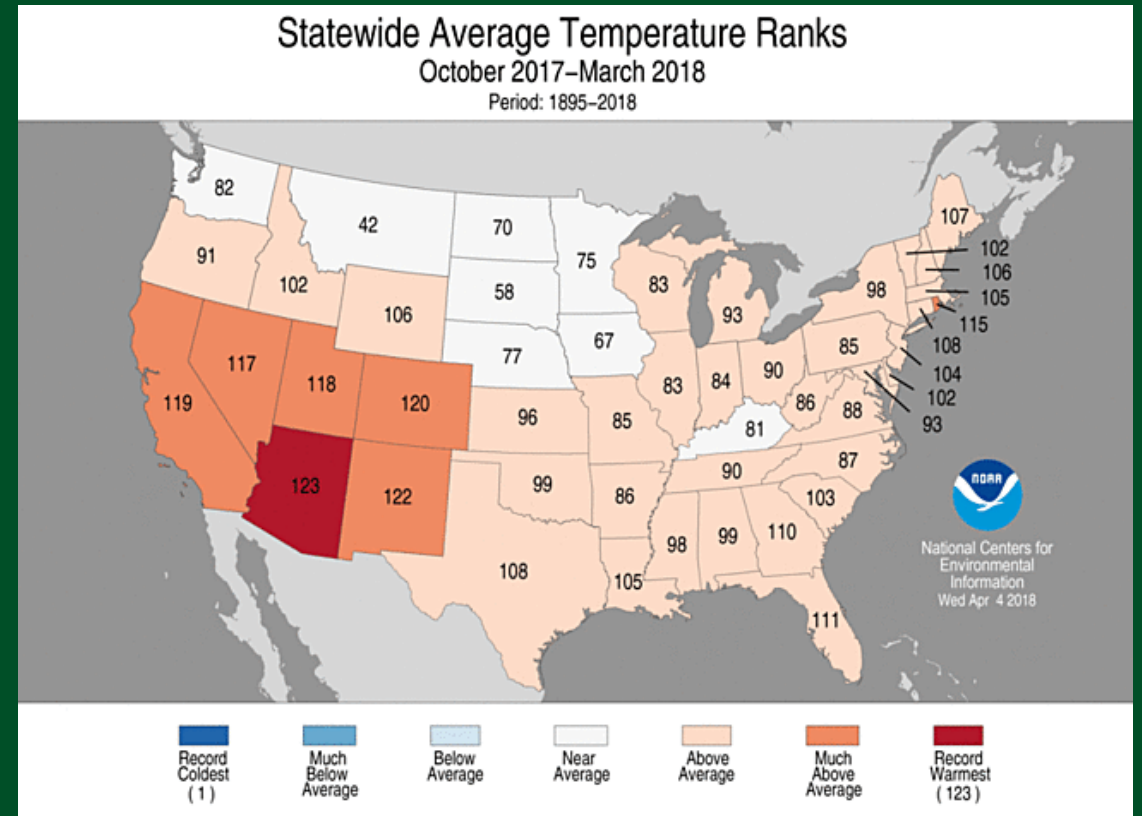
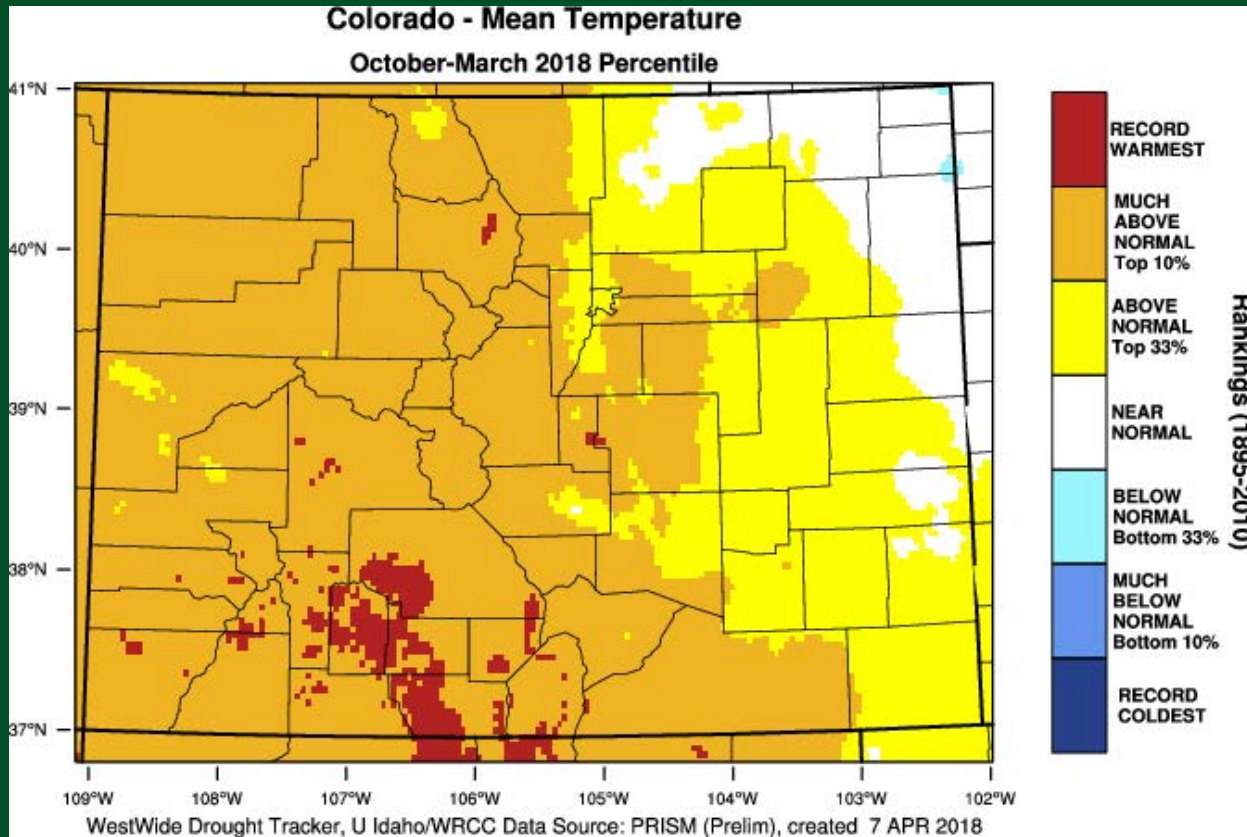
Third-driest Oct-March on record for Ark basin

And to make matters worse, it's been very warm!



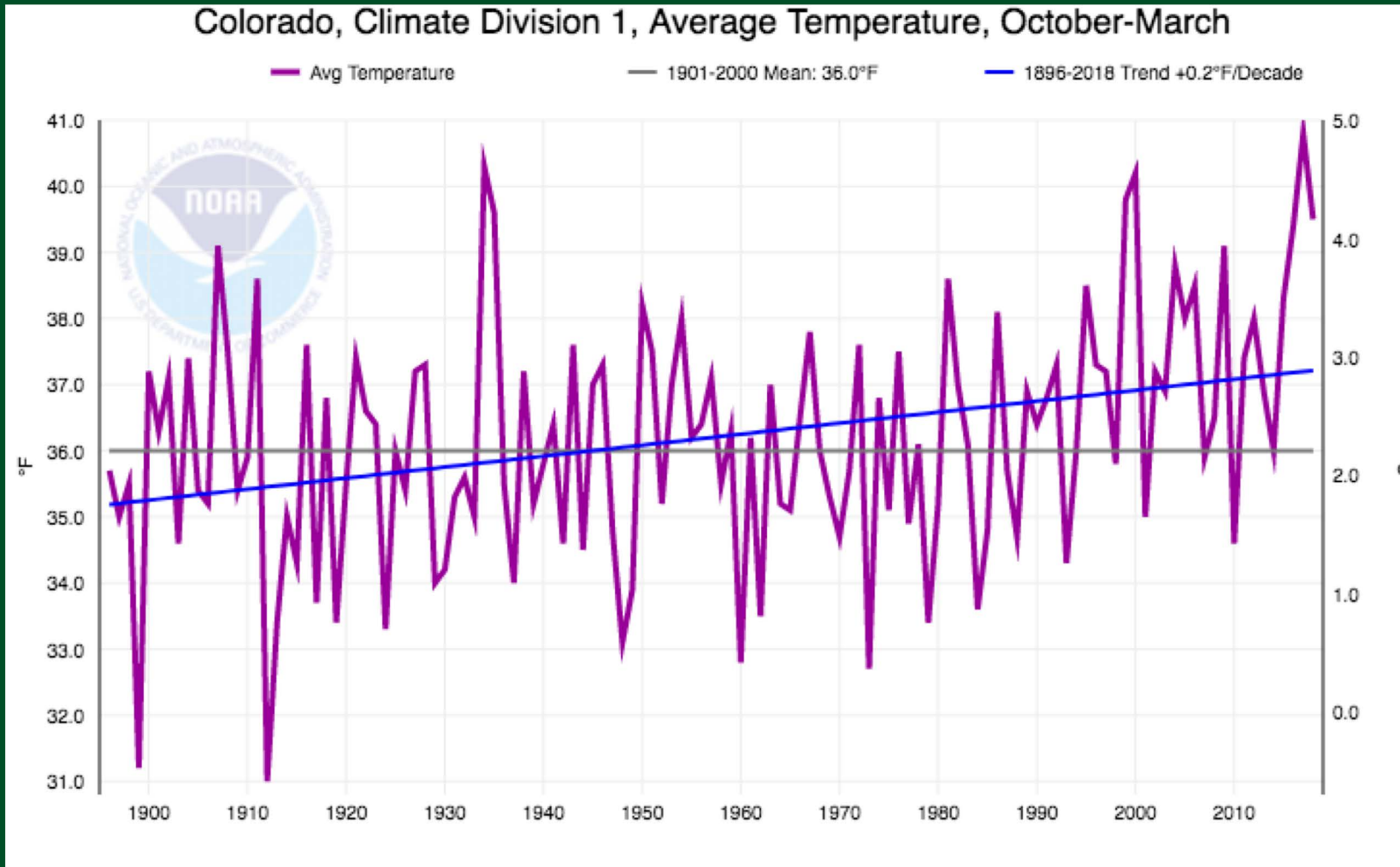
Warmest Nov-Jan on record for all of the southwestern states

And to make matters worse, it's been very warm!



February (especially) was closer to normal for temperature, so now only the 4th warmest Oct-March period statewide

Arkansas basin temperature, October - March



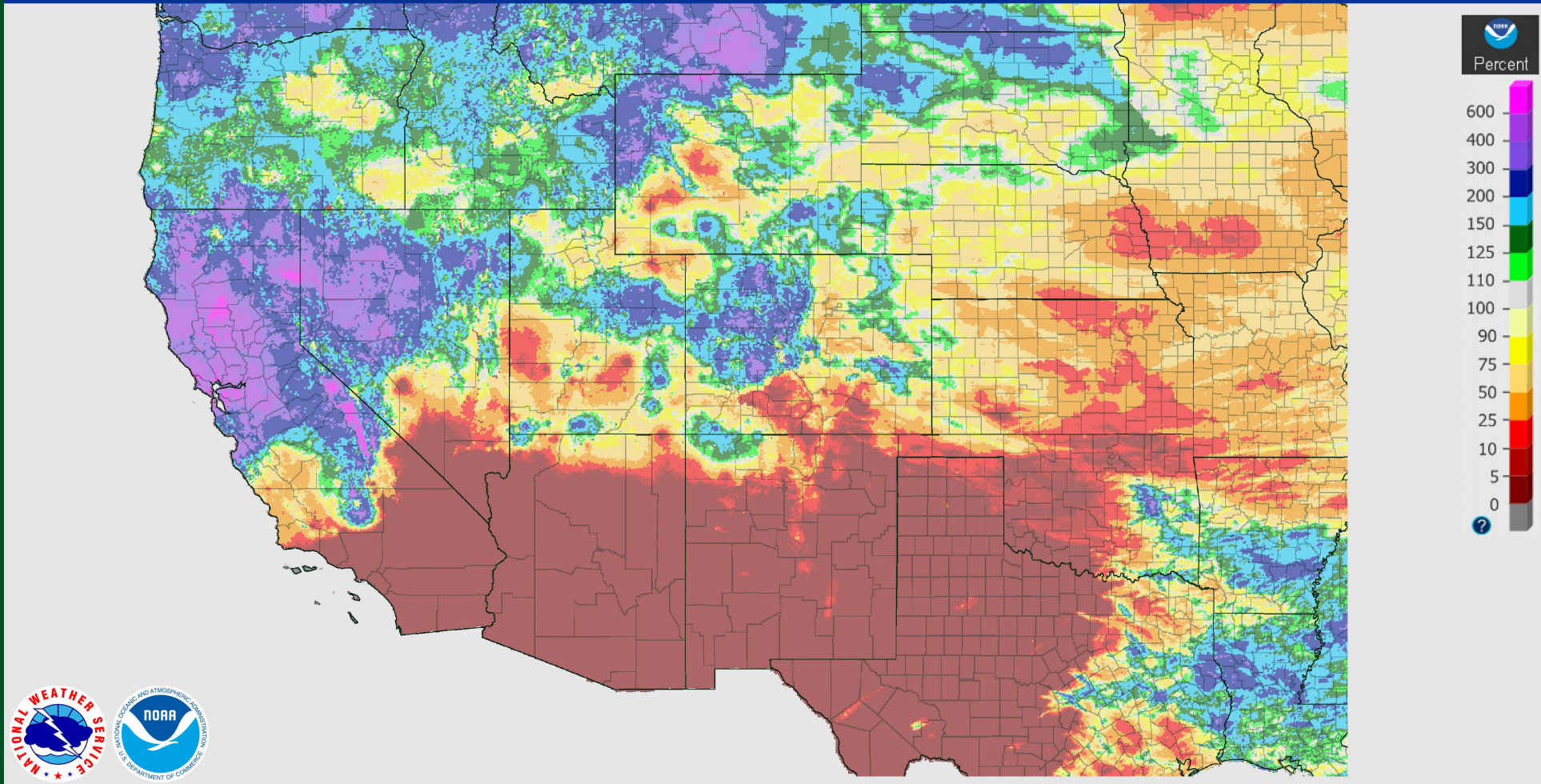
Sixth-warmest Oct-March on record for Ark basin
Last year was warmest

April precipitation thus far (percent of normal)

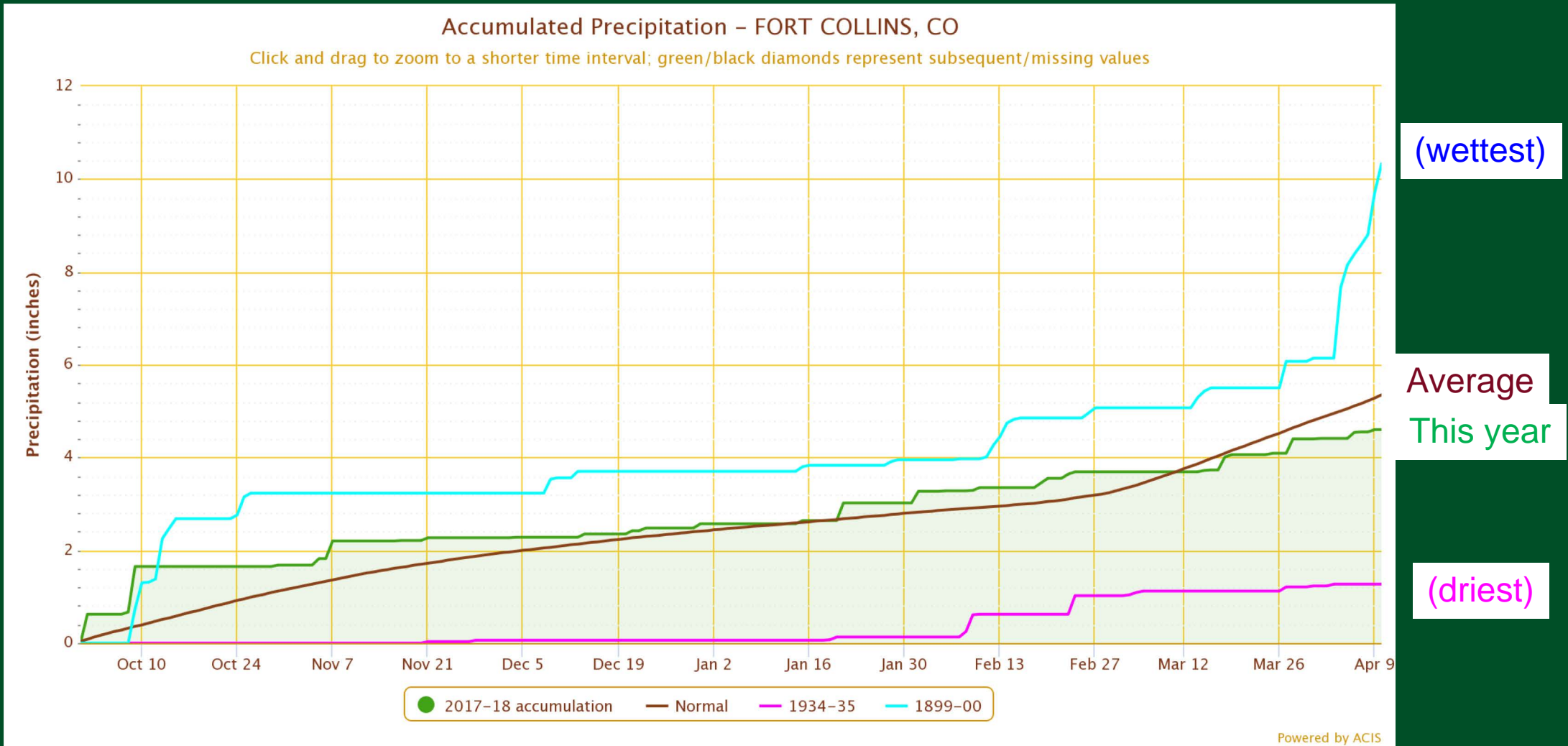
April 10, 2018 Month to Date Percent Precipitation

Created on: April 10, 2018 - 15:39 UTC

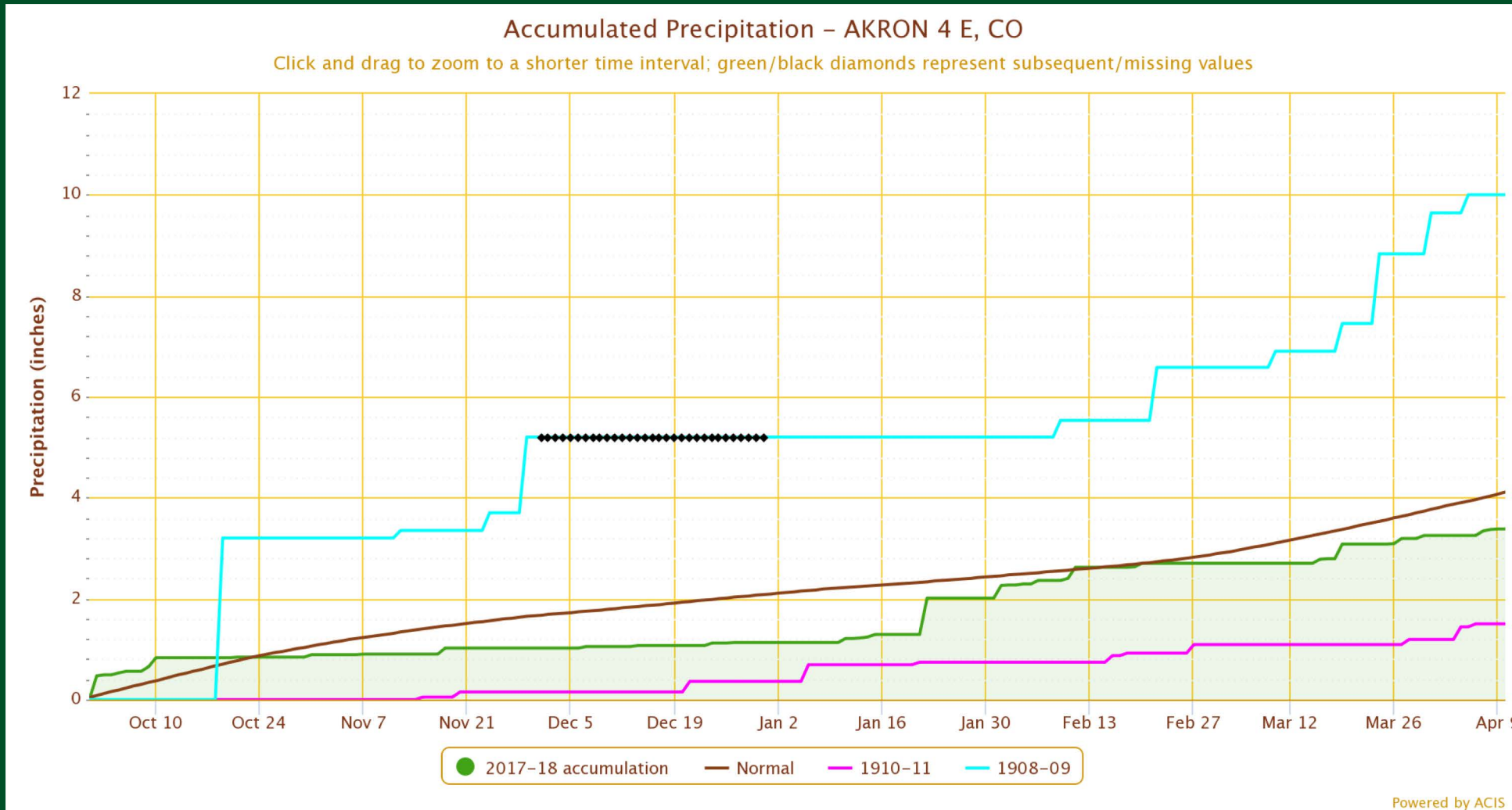
Valid on: April 10, 2018 12:00 UTC



Water-year precip: Fort Collins



Water-year precip: Akron

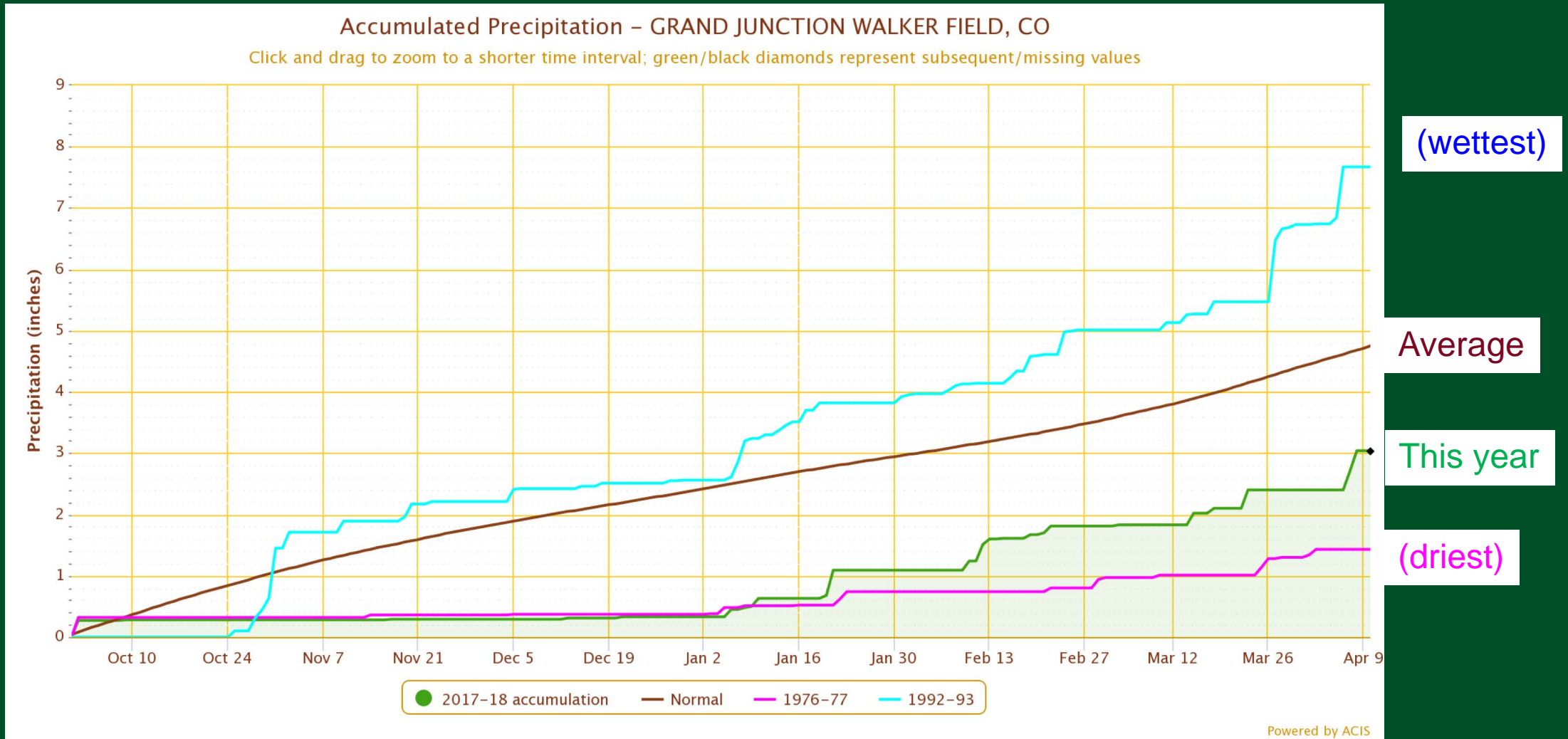


(wettest)

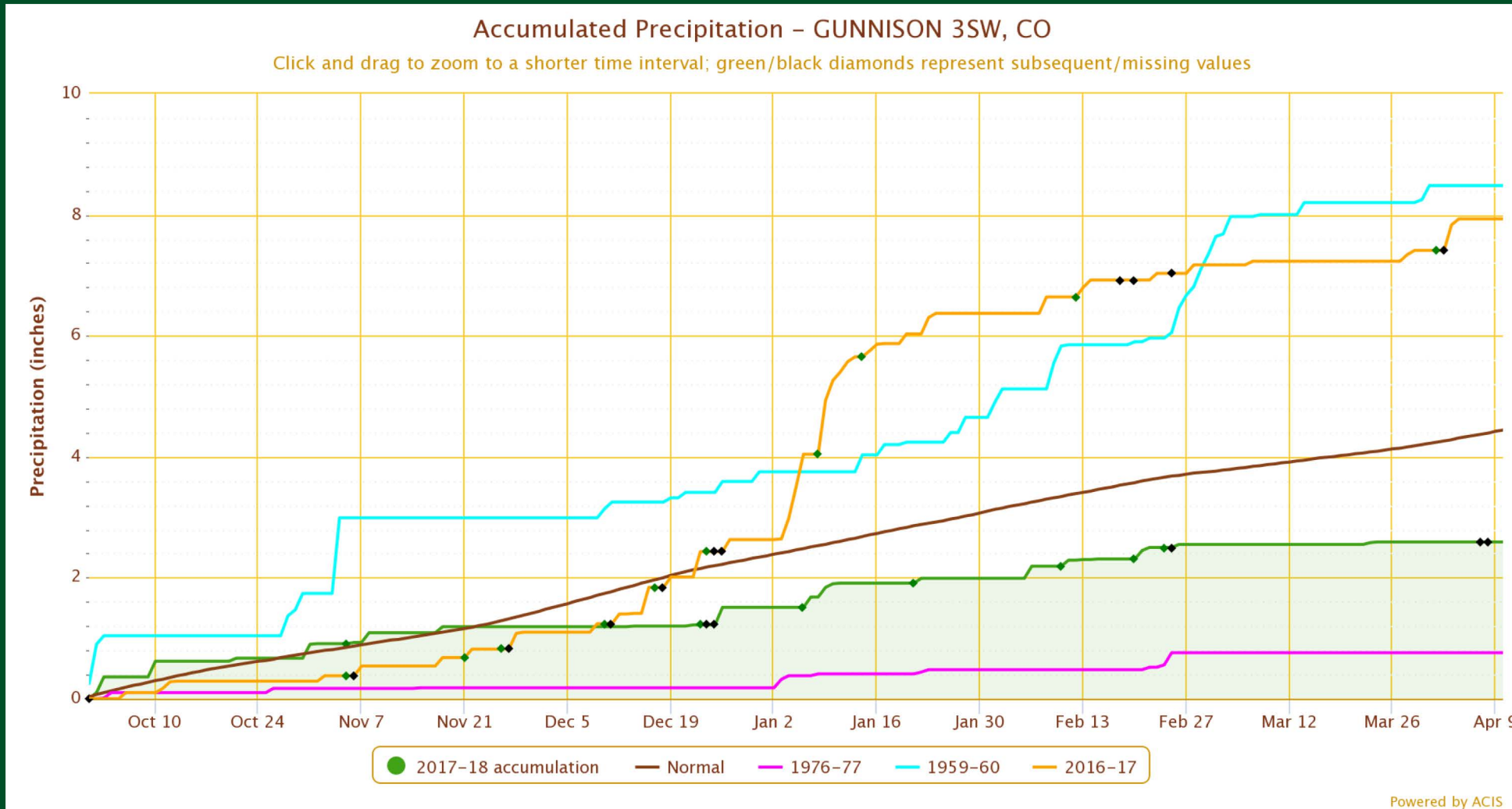
Average
This year

(driest)

Water-year precip: Grand Junction



Water-year precip: Gunnison



(wettest)

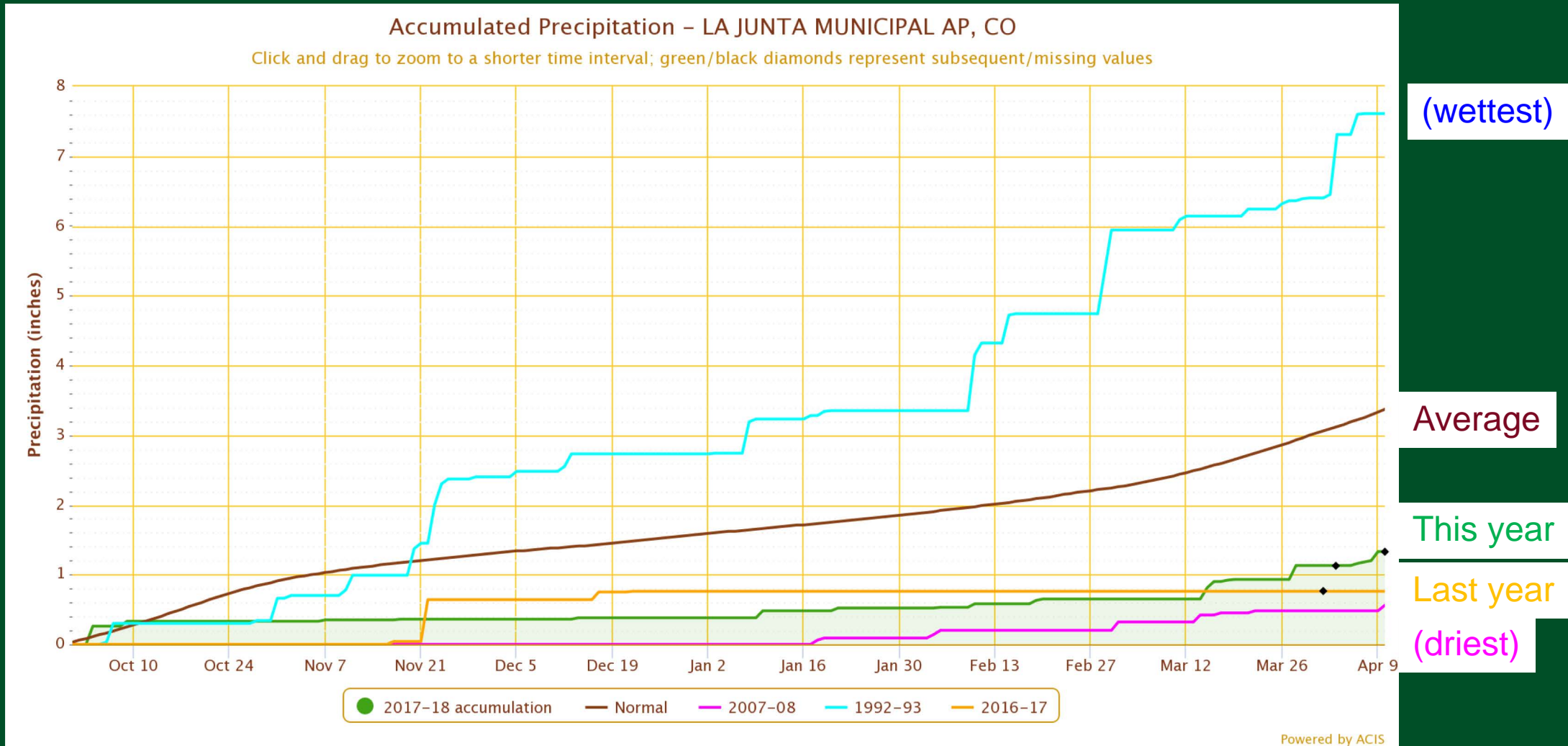
Last year

Average

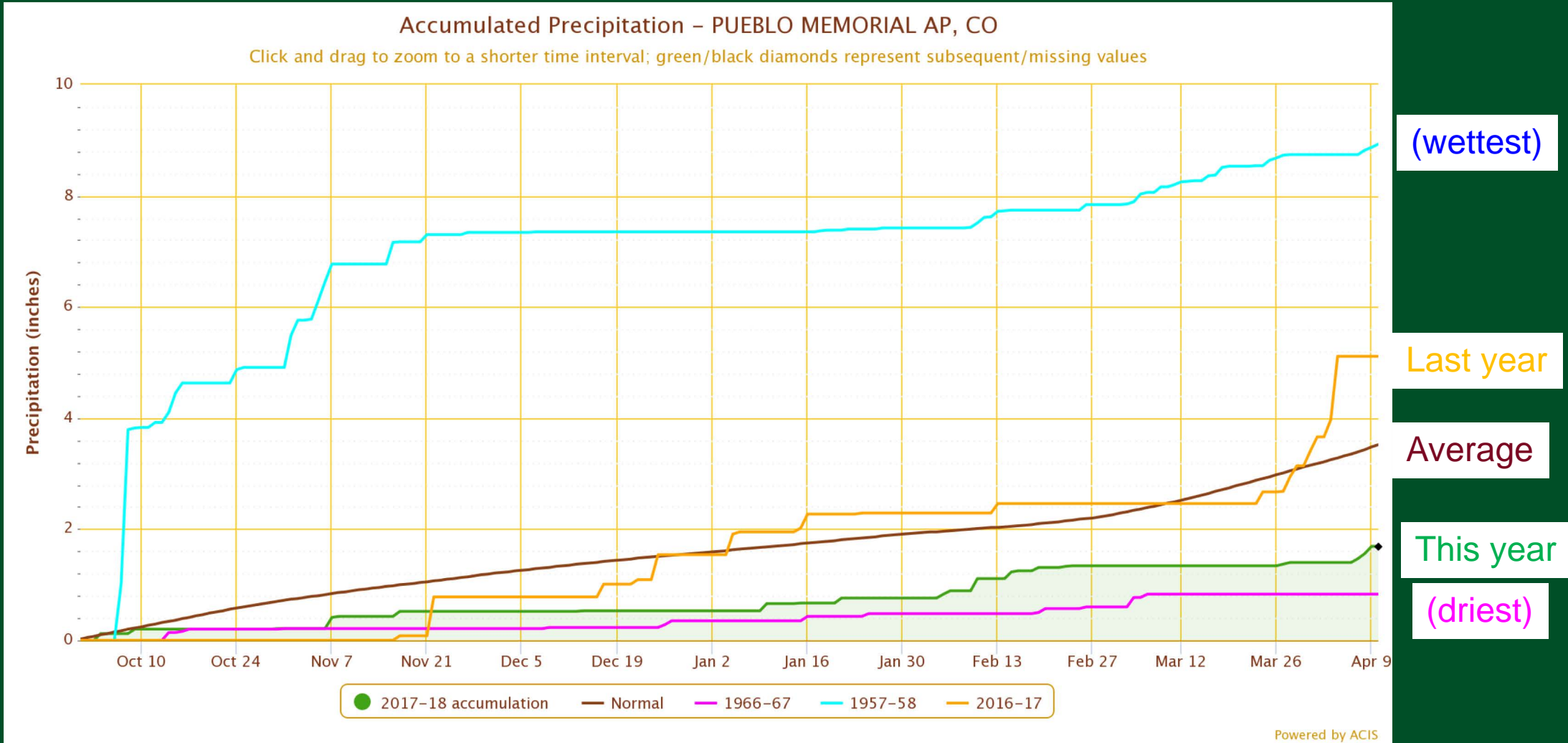
This year

(driest)

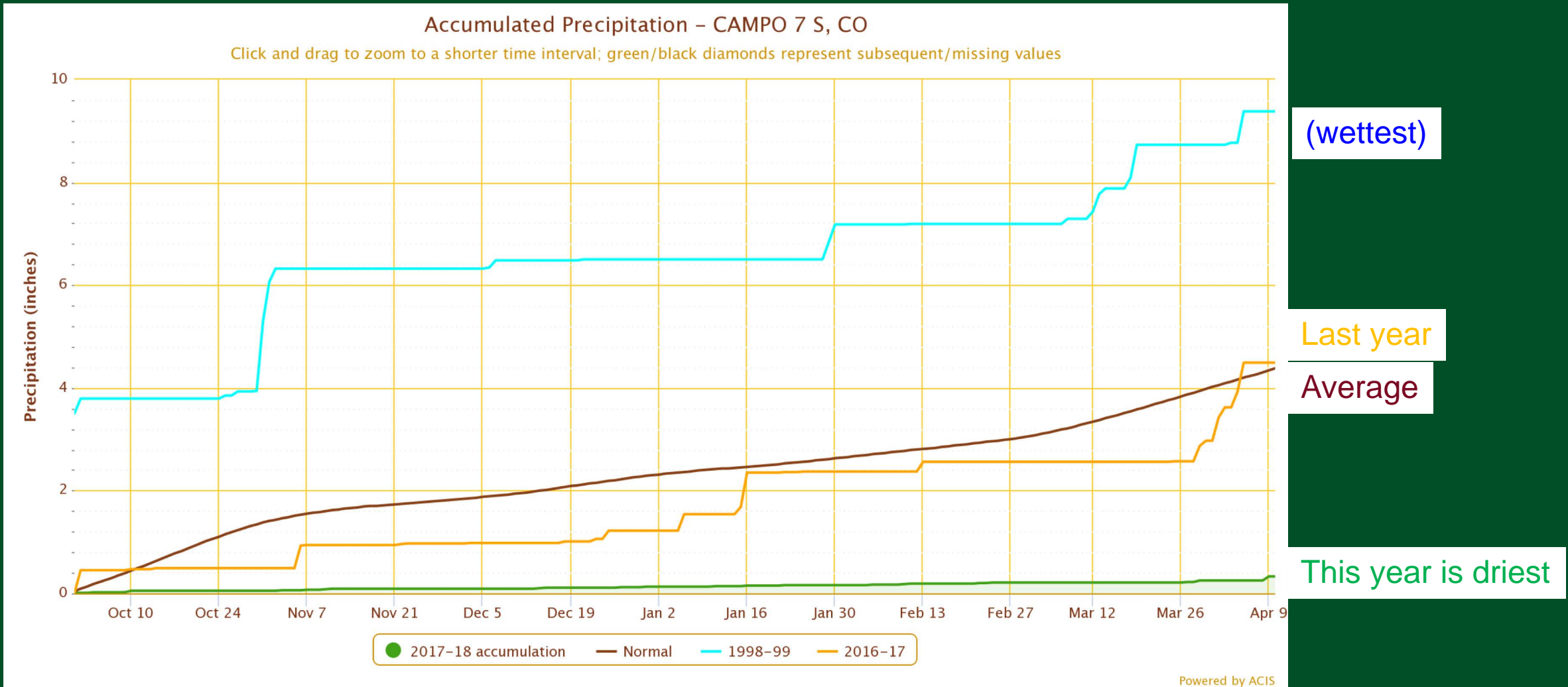
Water-year precip: La Junta



Water-year precip: Pueblo



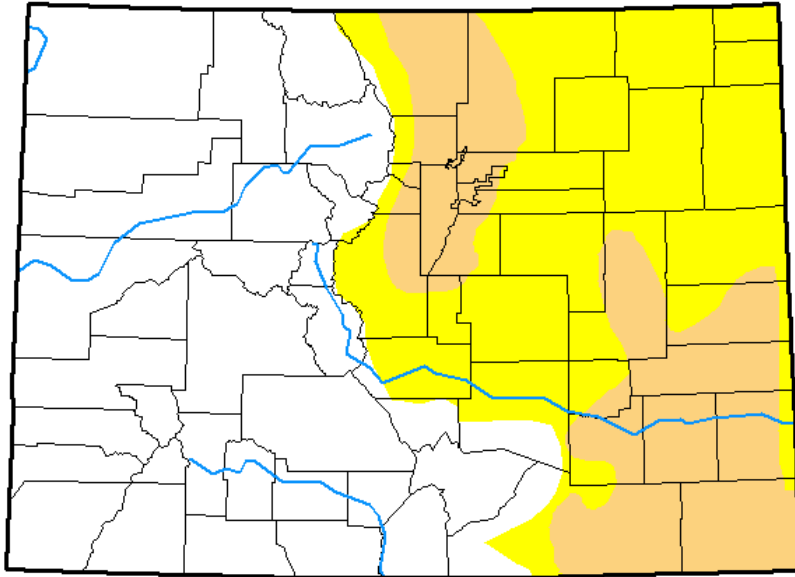
Water-year precip: Campo



Do you remember that we were in drought last year at this time too?

U.S. Drought Monitor Colorado

April 11, 2017
(Released Thursday, Apr. 13, 2017)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	51.89	48.11	19.46	0.00	0.00	0.00
Last Week <i>04-04-2017</i>	51.89	48.11	21.88	3.03	0.00	0.00
3 Months Ago <i>01-10-2017</i>	44.17	55.83	35.34	2.28	0.00	0.00
Start of Calendar Year <i>01-03-2017</i>	31.88	68.12	37.21	2.88	0.00	0.00
Start of Water Year <i>09-27-2016</i>	70.49	29.51	2.45	0.00	0.00	0.00
One Year Ago <i>04-12-2016</i>	70.41	29.59	7.75	0.35	0.00	0.00

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

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

Author:
Anthony Artusa
NOAA/NWS/NCEP/CPC



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

(this year)

U.S. Drought Monitor Colorado

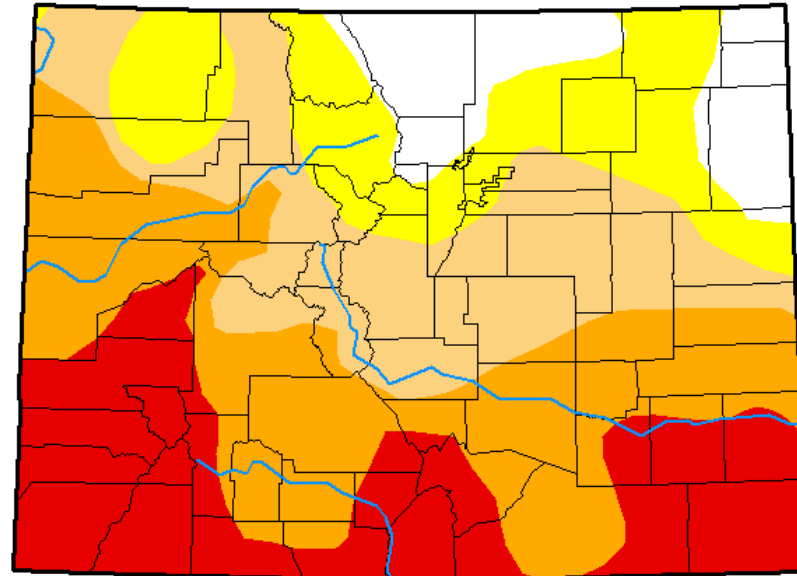
April 3, 2018

(Released Thursday, Apr. 5, 2018)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	9.65	90.35	73.67	51.56	23.63	0.00
Last Week <i>03-27-2018</i>	9.65	90.35	73.50	48.55	20.61	0.00
3 Months Ago <i>01-02-2018</i>	6.57	93.43	33.53	7.27	0.00	0.00
Start of Calendar Year <i>01-02-2018</i>	6.57	93.43	33.53	7.27	0.00	0.00
Start of Water Year <i>09-26-2017</i>	67.63	32.37	3.72	0.00	0.00	0.00
One Year Ago <i>04-04-2017</i>	51.89	48.11	21.88	3.03	0.00	0.00



Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
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The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

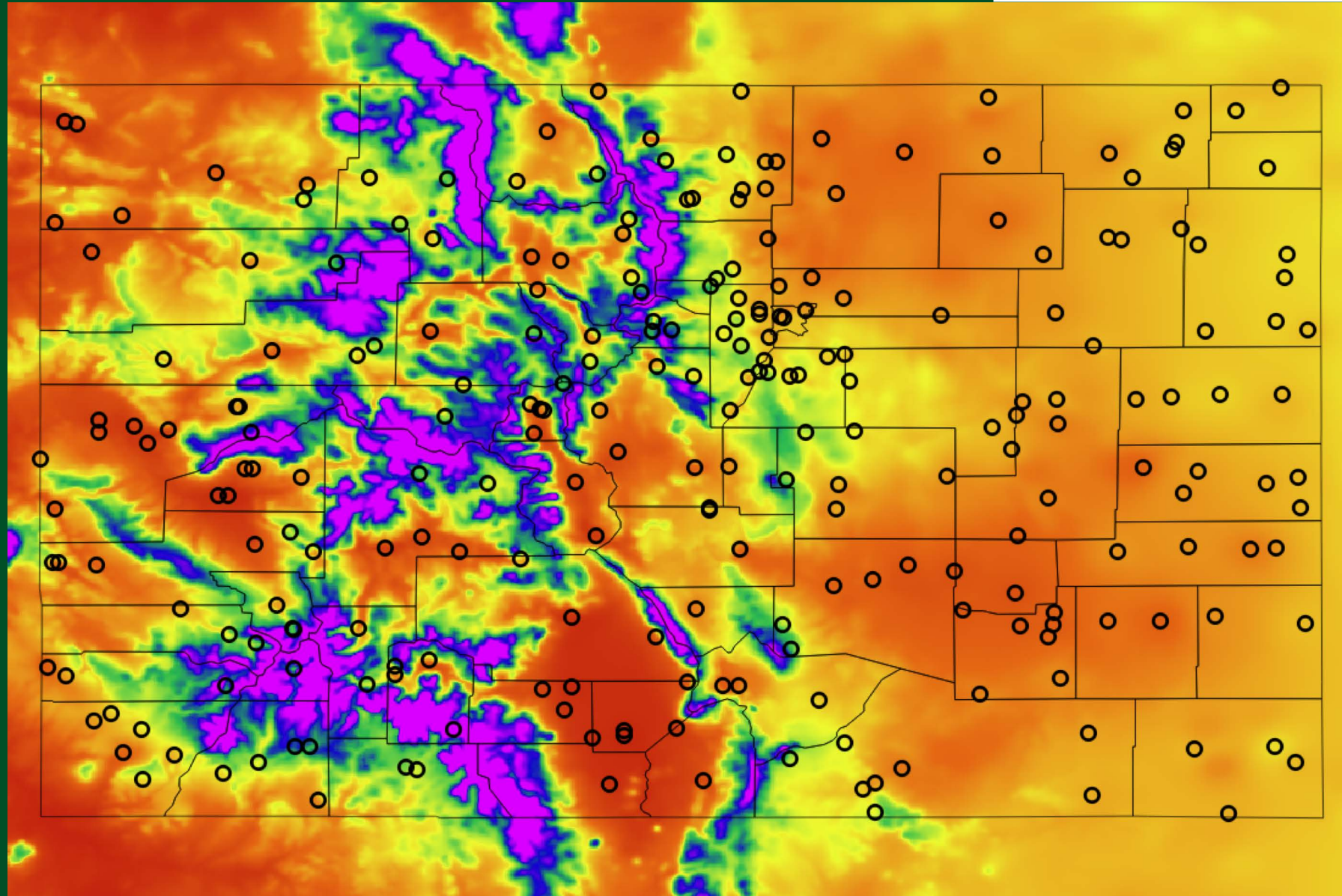
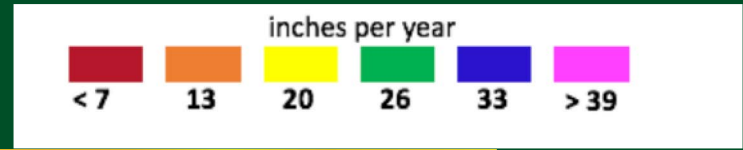
Author:

David Miskus
NOAA/NWS/NCEP/CPC



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

Annual average precipitation



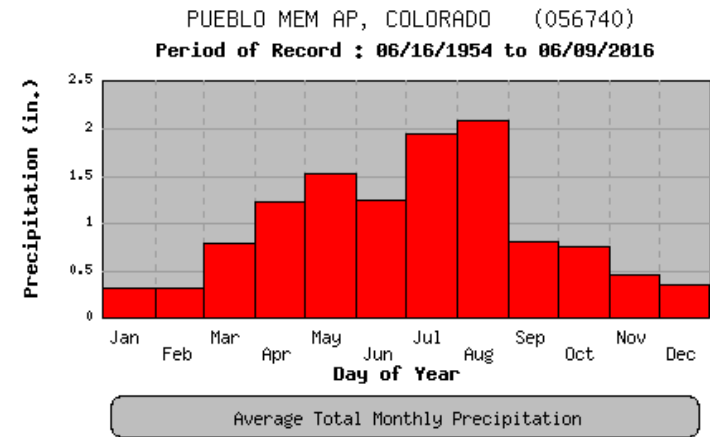
Climatology in southern/southeast Colorado

Monthly average precipitation

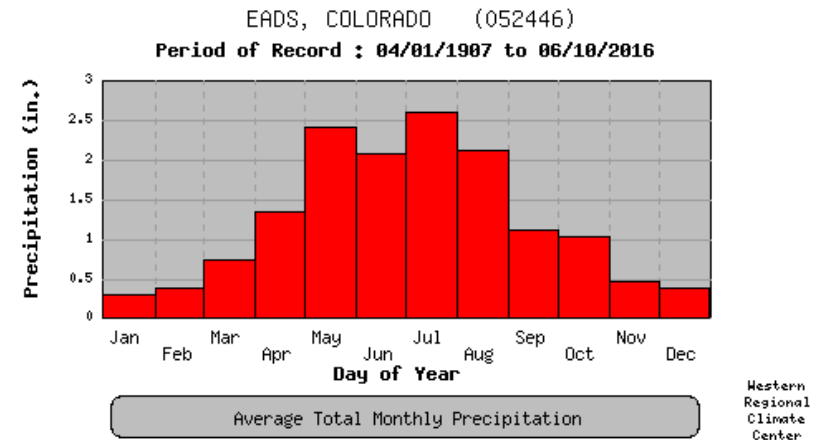
Winters tend to be very dry

The summer monsoon is most important, with spring storms also crucial

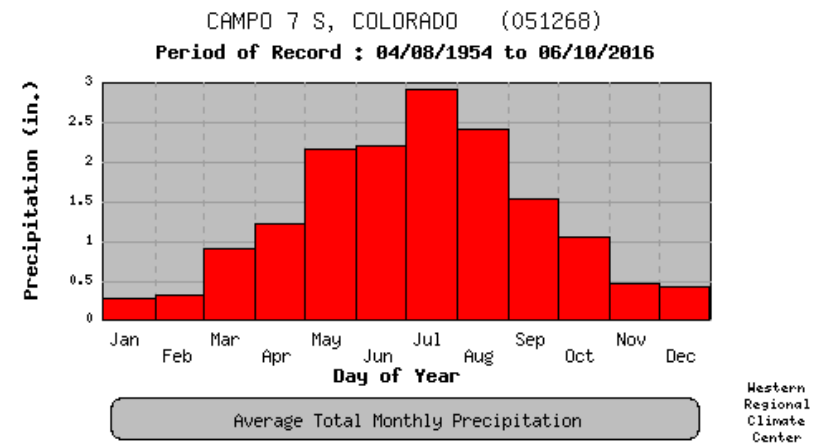
Pueblo



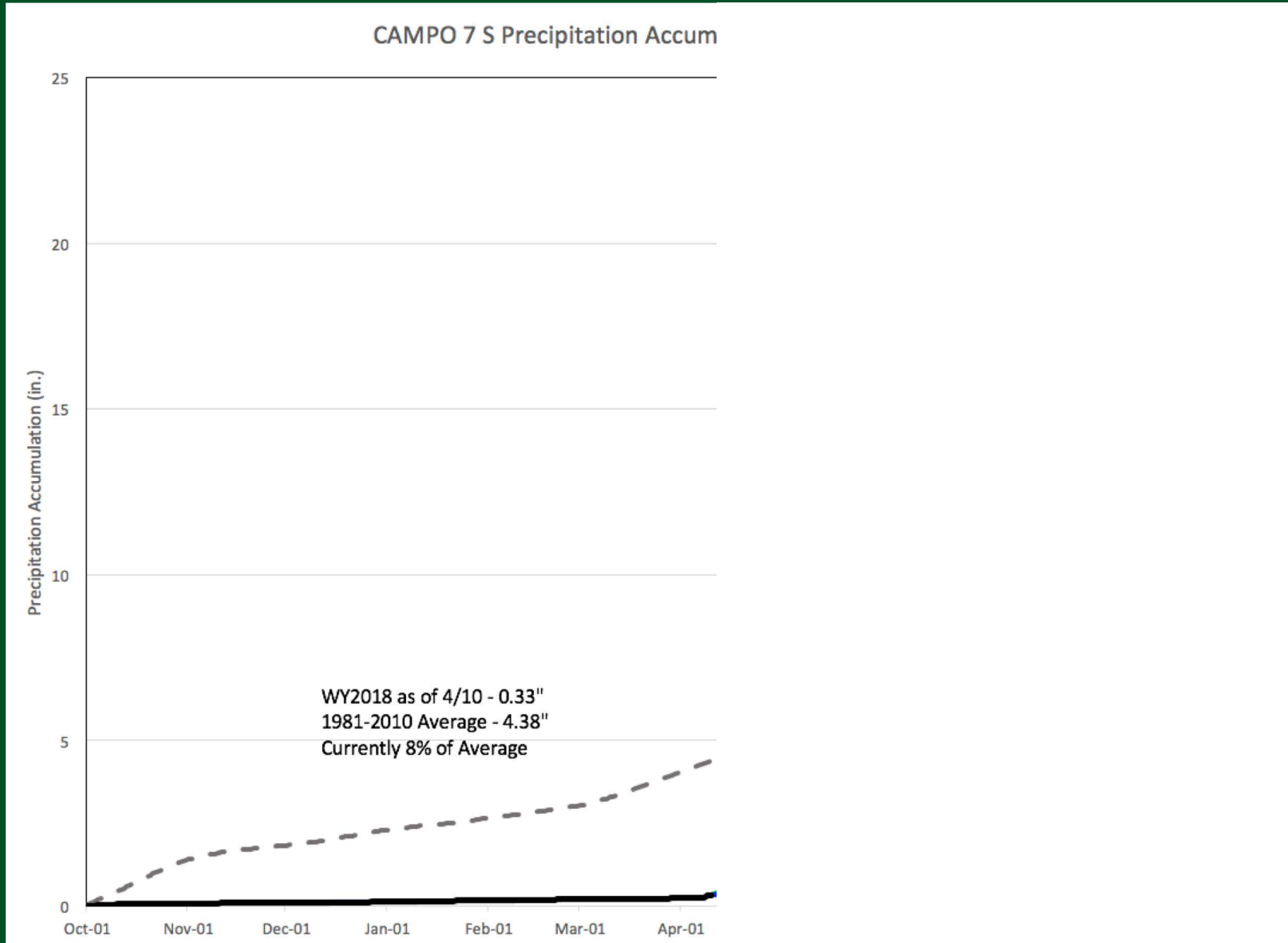
Eads



Campo

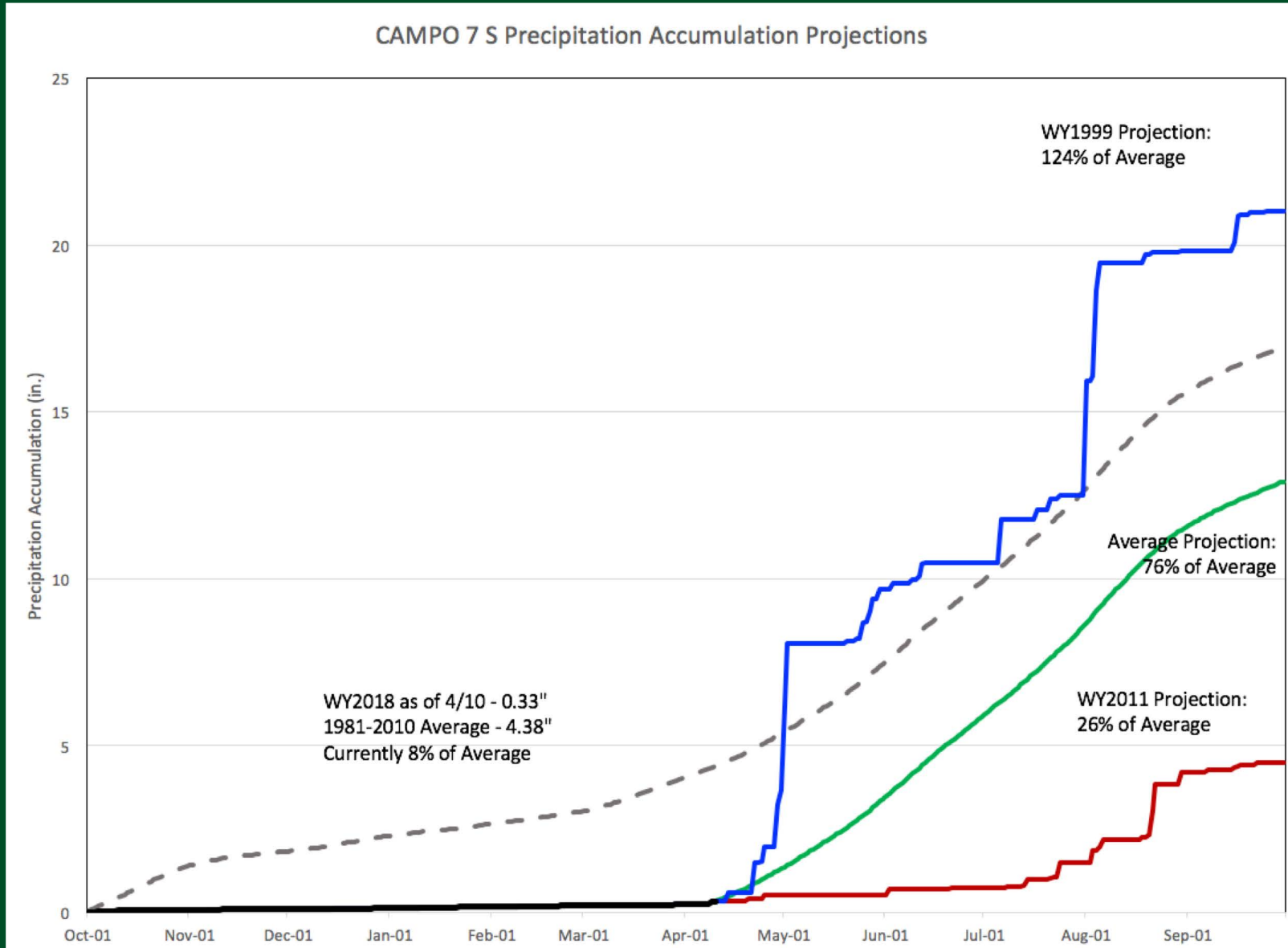


Possible scenarios for the rest of the water year...



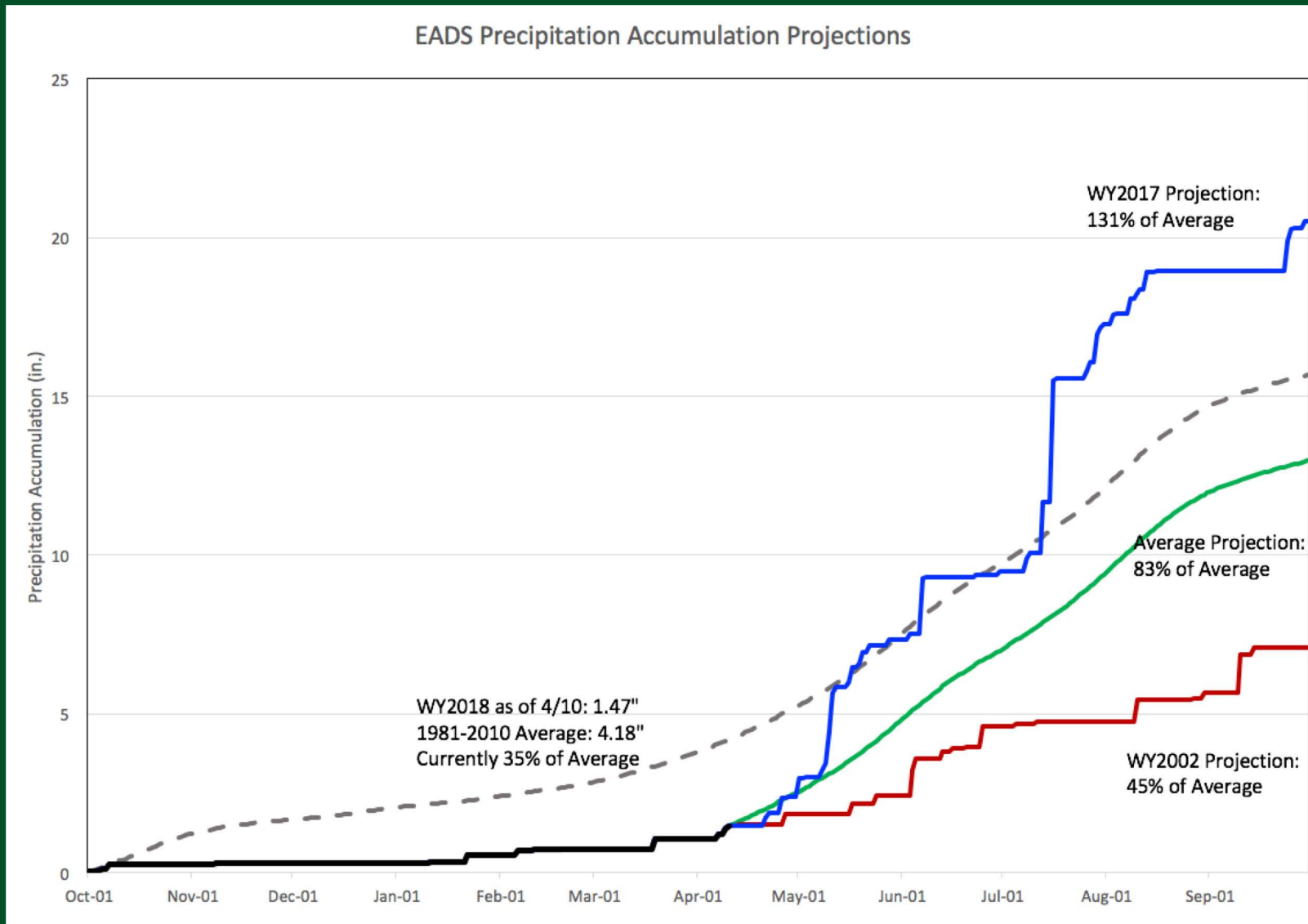
Campo

Possible scenarios for the rest of the water year...



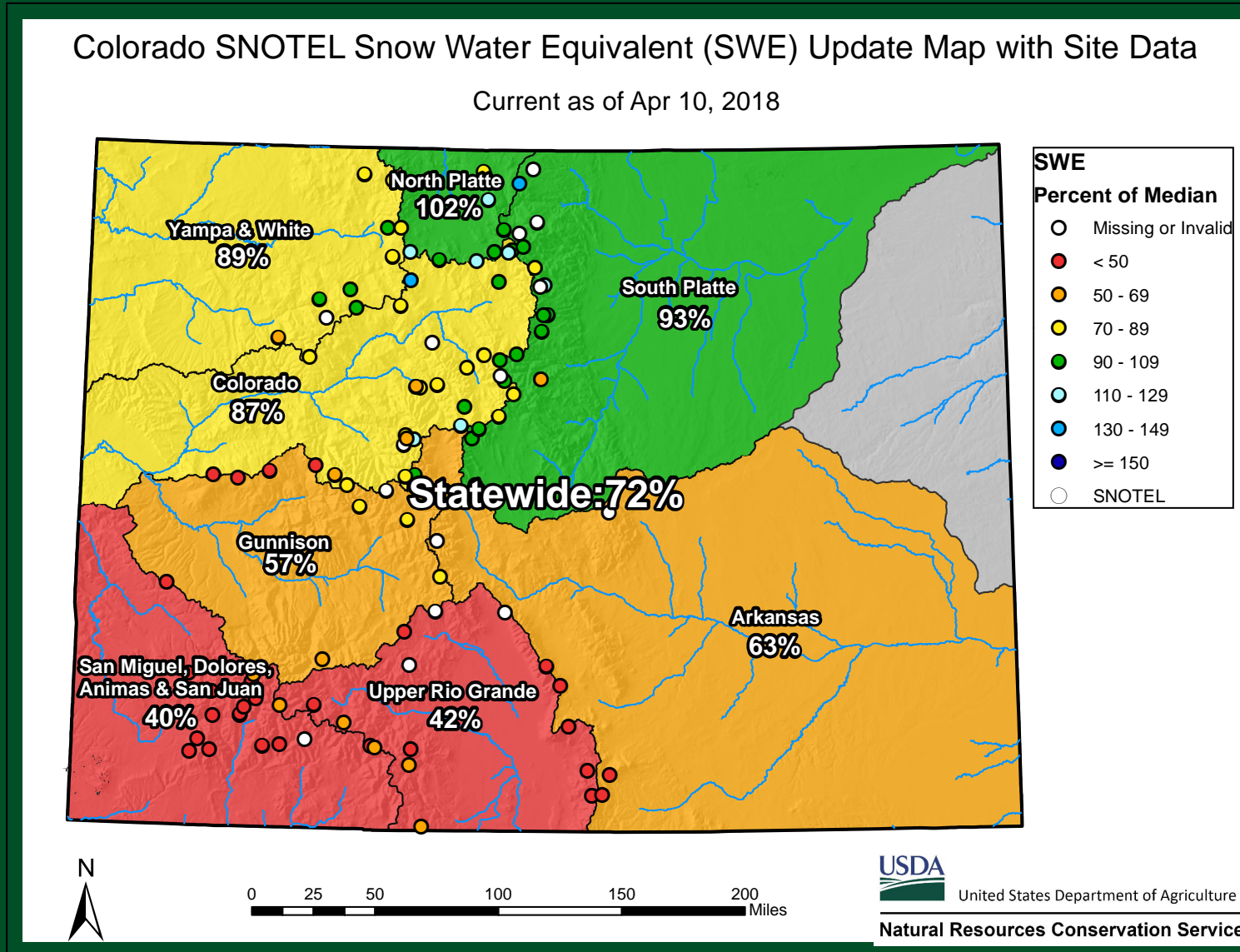
Campo

Possible scenarios for the rest of the water year...



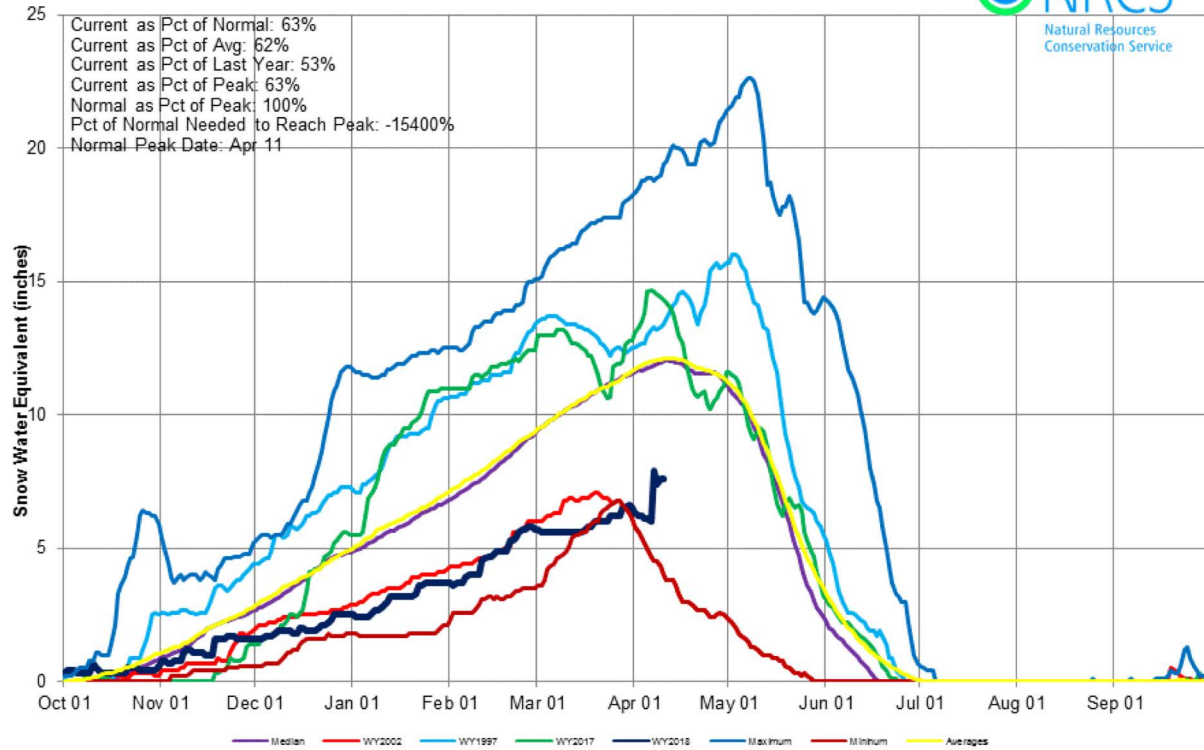
Eads

Snowpack: a tale of two halves of the state...



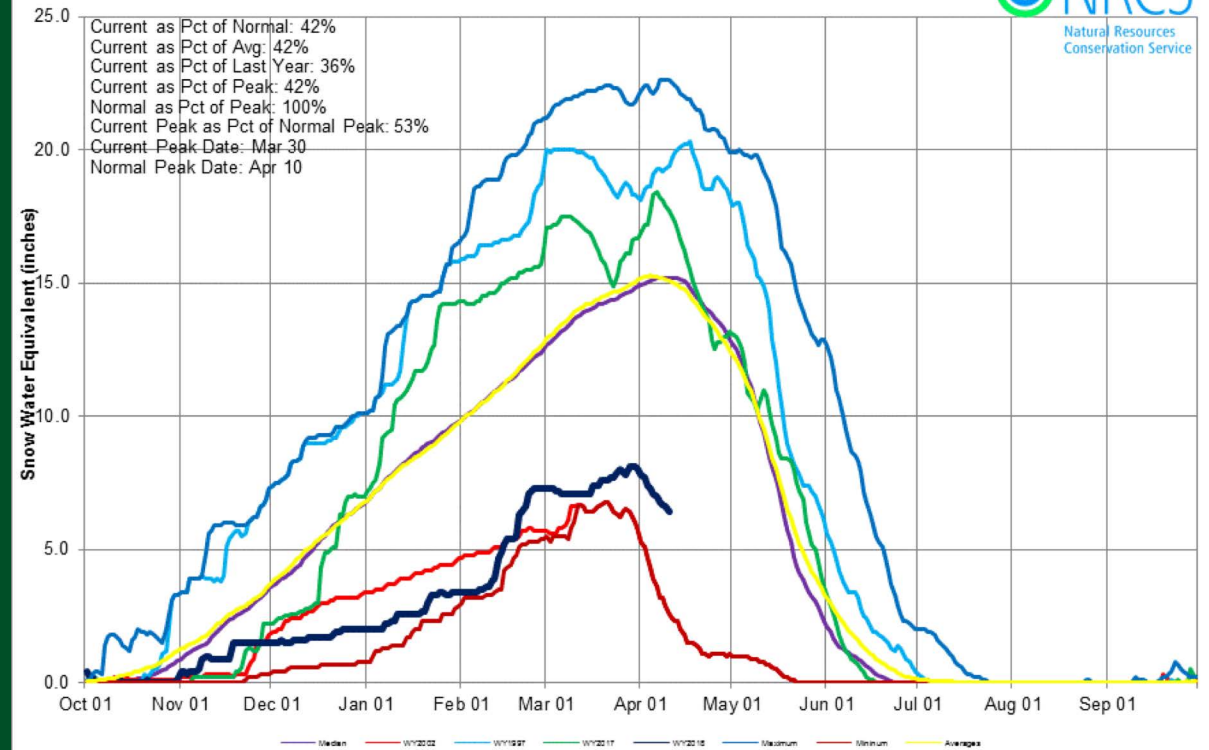
Arkansas River basin

Arkansas River Basin High/Low Snowpack Summary
Based on Provisional SNOTEL data as of Apr 10, 2018



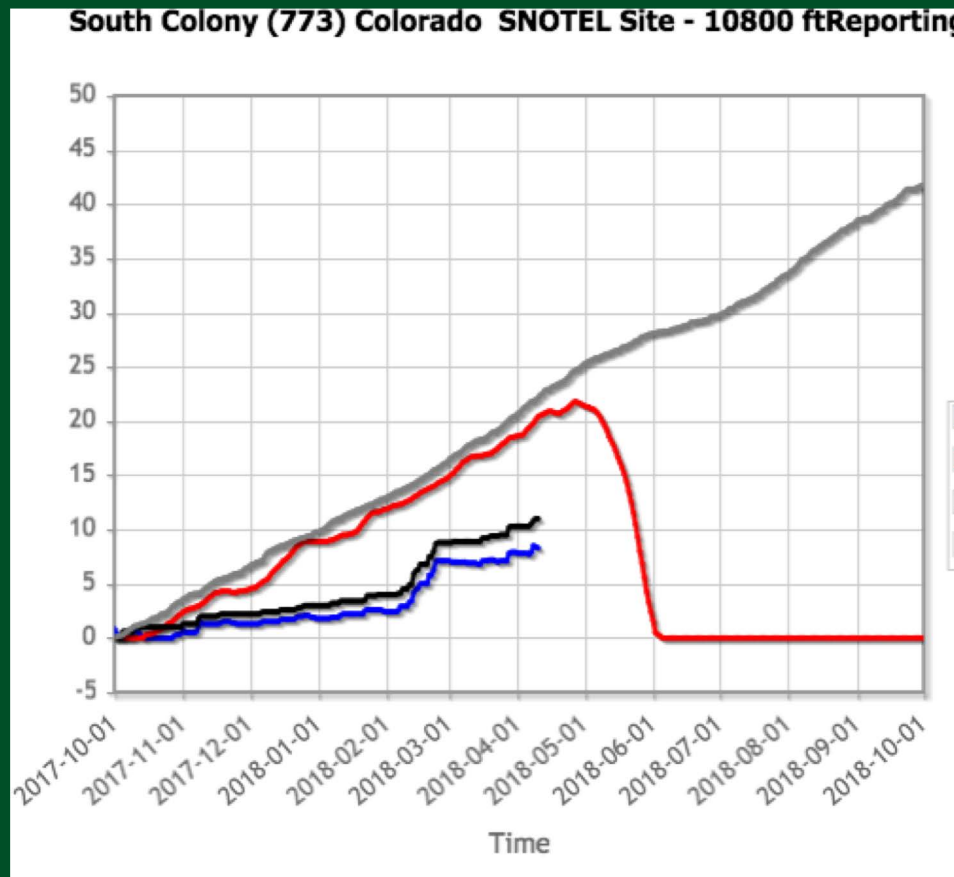
San Miguel/Dolores/Animas/San Juan

Upper Rio Grande Basin High/Low Snowpack Summary
Based on Provisional SNOTEL data as of Apr 10, 2018

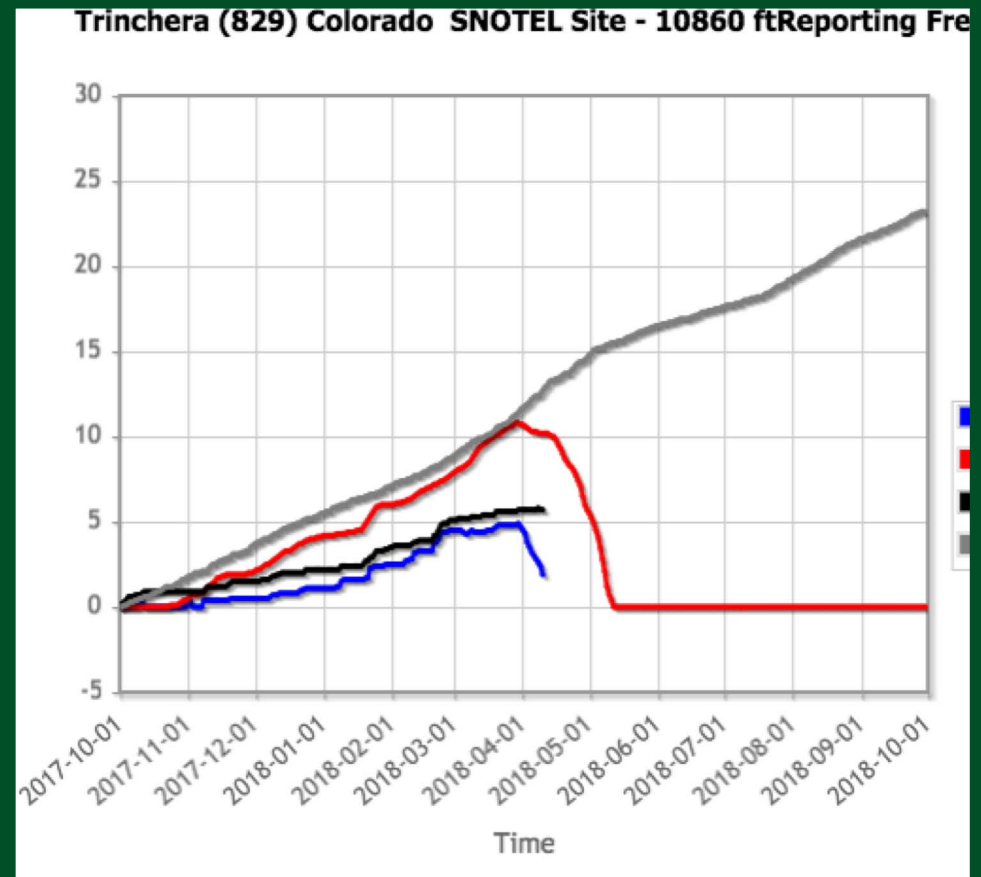


Barely hanging on above 2002...

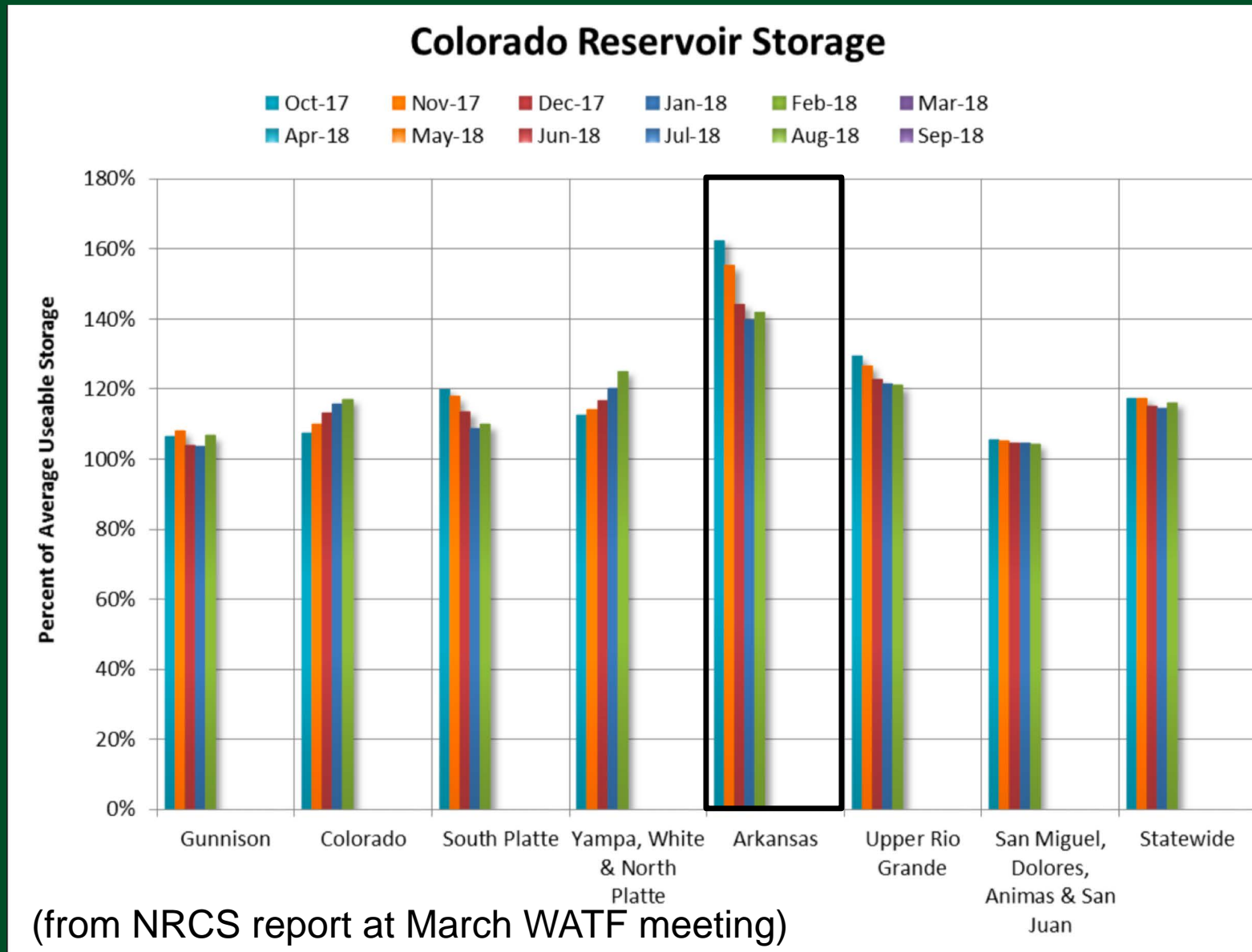
South Colony SNOTEL



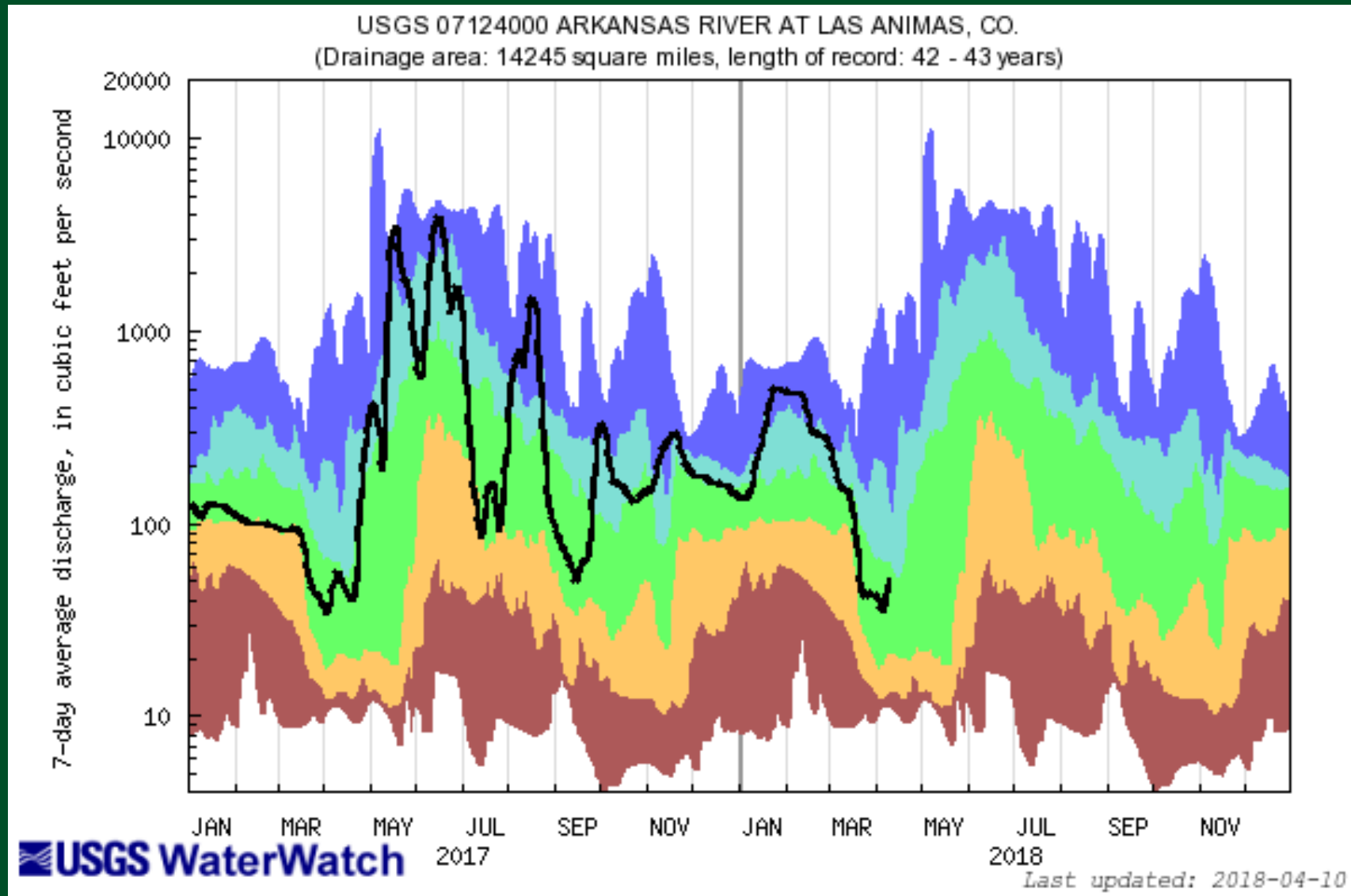
Trinchera SNOTEL



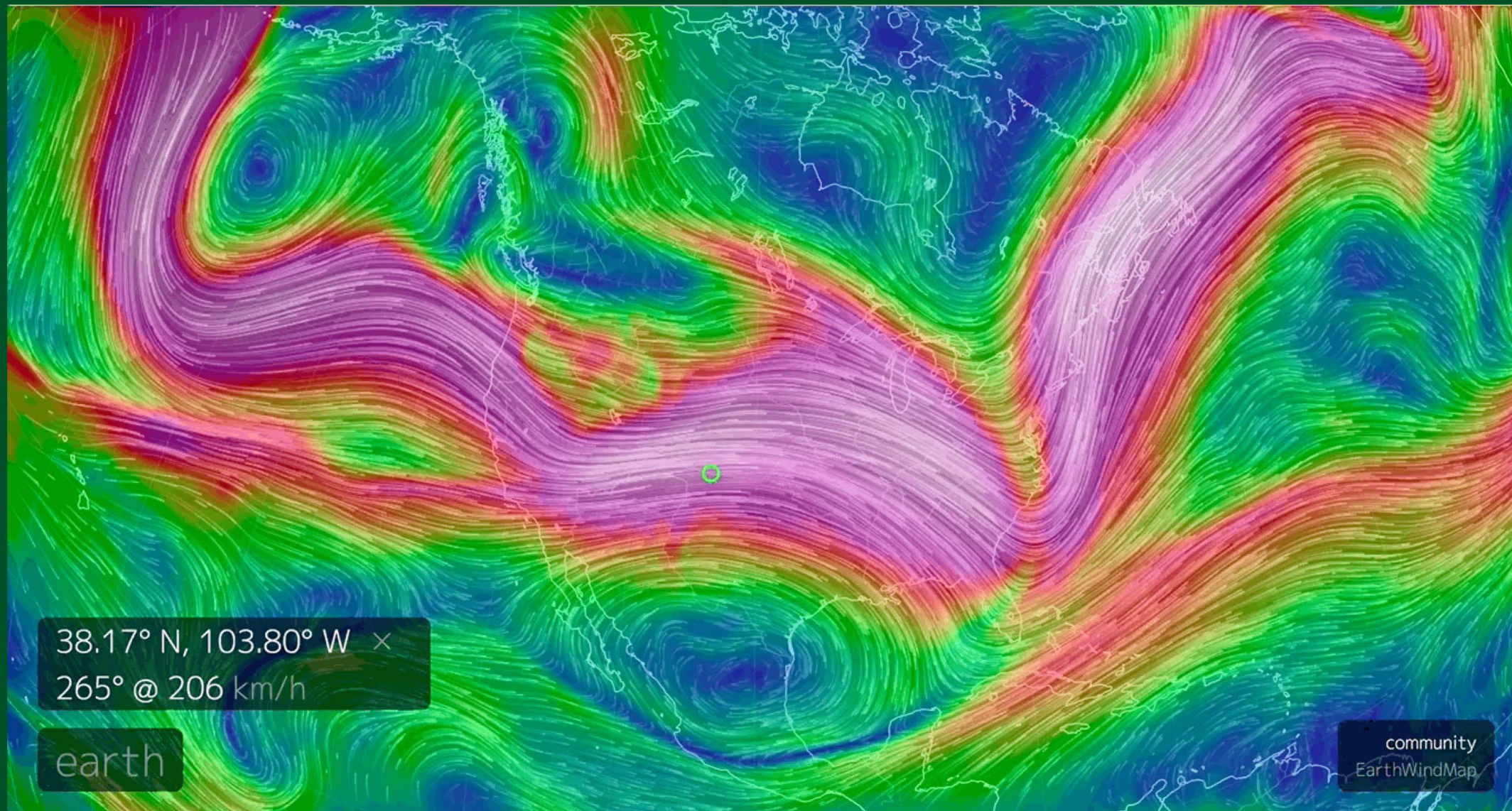
Good news is reservoirs are in fine shape



Arkansas River streamflow (at Las Animas)



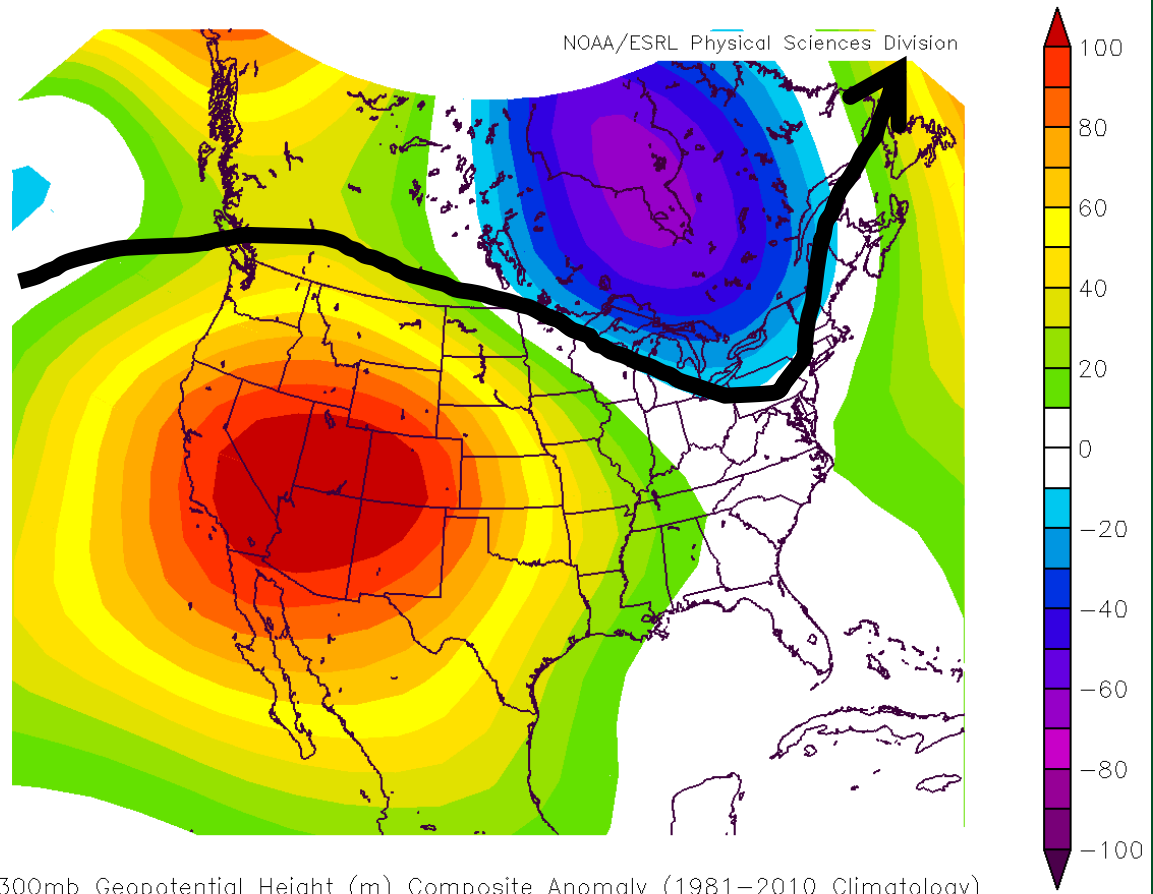
The jet stream: a big driver of weather!



ENSO (El Niño / Southern Oscillation)

- One of the biggest drivers of seasonal climate over North America is ENSO, the periodic variation of ocean temperatures in the Pacific Ocean
- Its effect is to shift where the jet stream tends to be, how wavy it is, etc.
- This year, we have been in **La Niña** conditions: cool ocean near South America, warm in the western Pacific
- Typically, this brings warm and dry conditions to southern CO, and cool and (relatively) wet conditions to northern CO, and that's what we've seen
- La Niña conditions are expected to wane this spring, returning to near neutral (but forecasts of ENSO in the spring aren't as good as they are in the fall/winter)

Jet stream-level, November through January



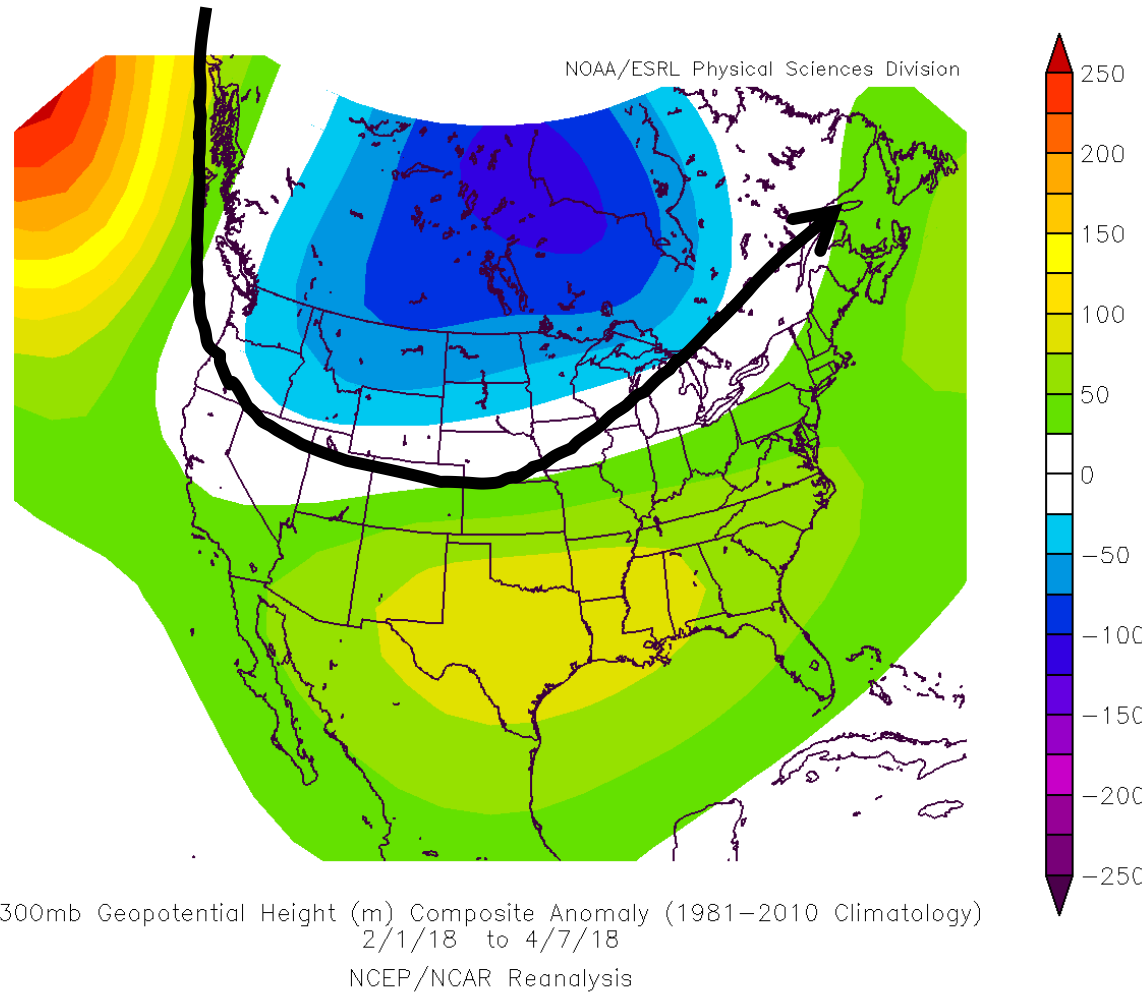
300mb Geopotential Height (m) Composite Anomaly (1981-2010 Climatology)
11/1/17 to 1/31/18
NCEP/NCAR Reanalysis

Was the pressure at jet-stream level above or below normal for Nov-Jan?

Large ridge of high pressure over the west, leading to the record warm and dry conditions

Jet stream even farther north than usual for La Niña

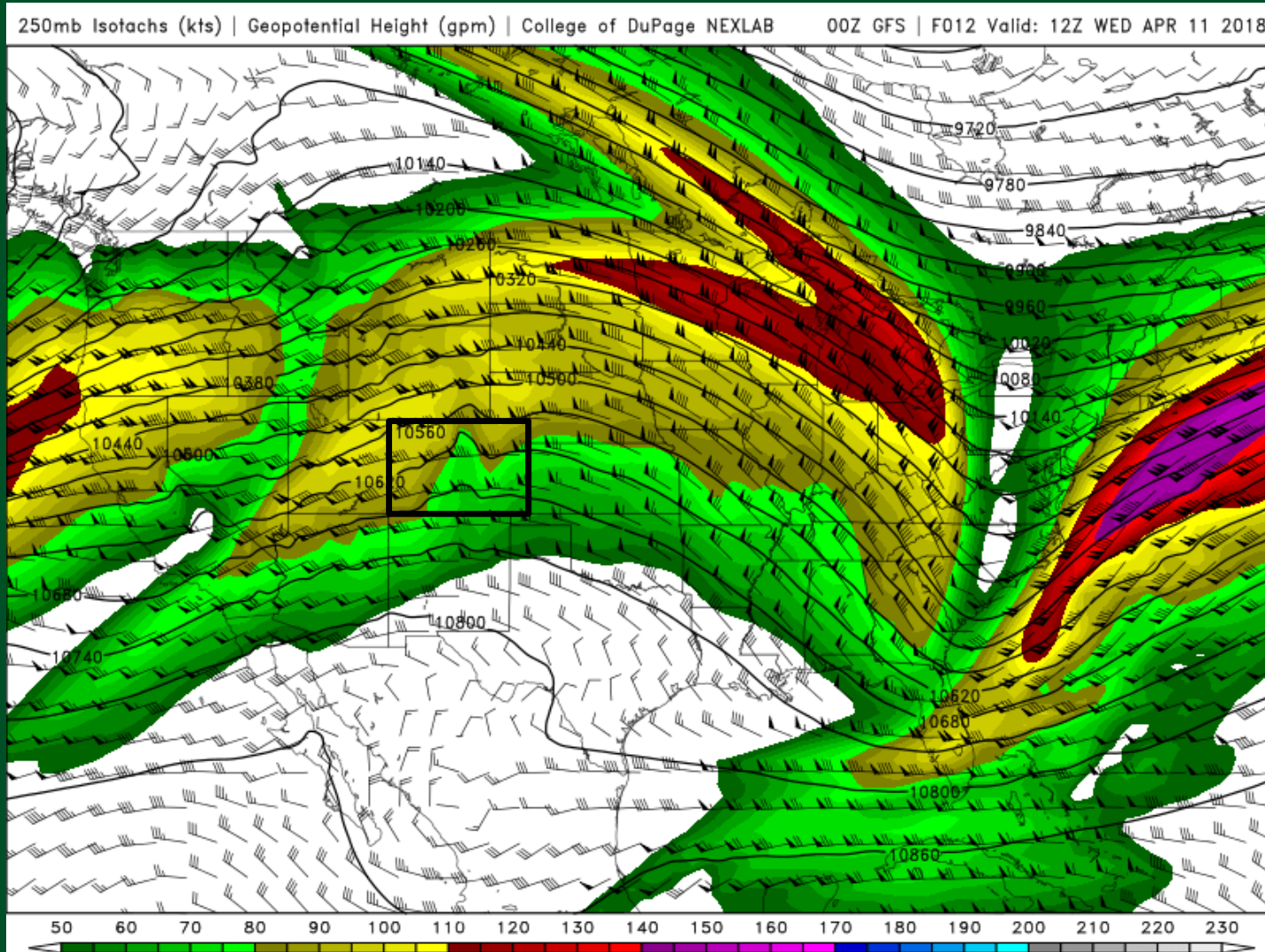
Jet stream-level, February-April so far



More typical of La Niña, favoring northern mountains, with high pressure over southern Colorado

Jet stream over the US this week

Jet stream today

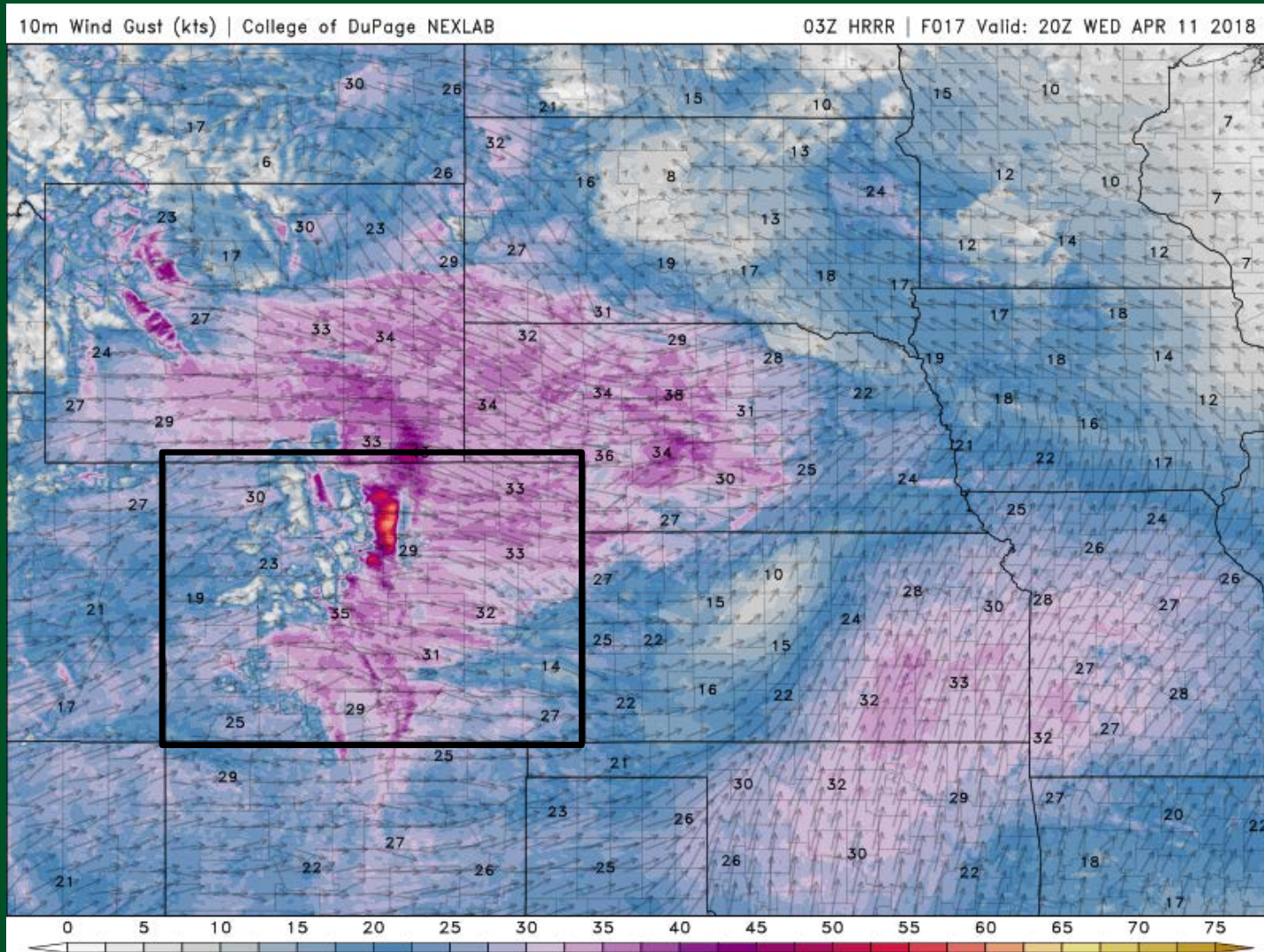


Ridge of high pressure building over western US

We'll have a big warmup, but also a lot of wind and high fire danger...

Surface wind gusts today, 2pm

Surface wind gusts, 2pm today

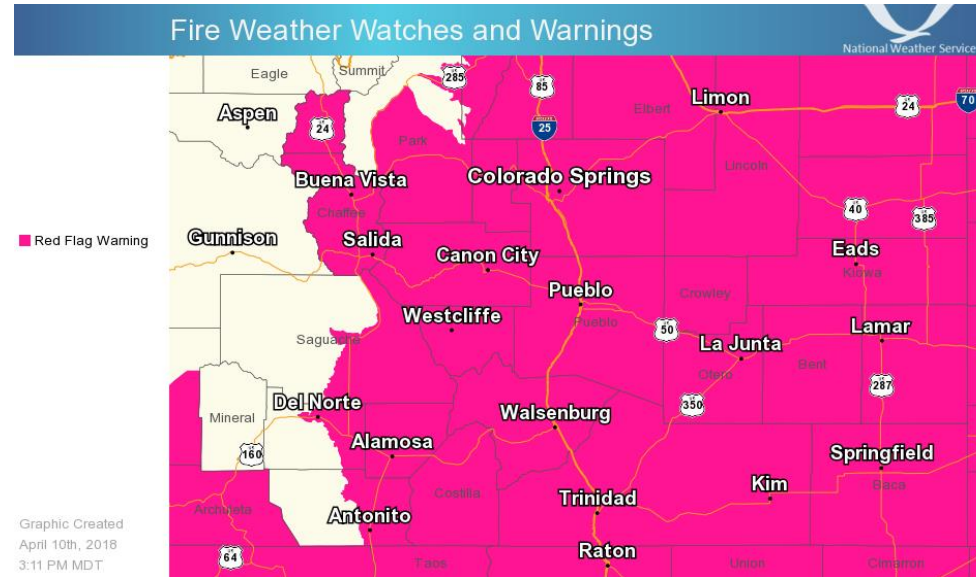


Ridge of high pressure building over western US

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High Fire Danger Wednesday and Thursday



Weather Message of the Day:



Strong winds and low humidity will lead to high fire danger for Wednesday and Thursday across much of southern Colorado. Thursday will be the most volatile day as west winds gust to around 50 mph during the afternoon.

Important Forecast Changes

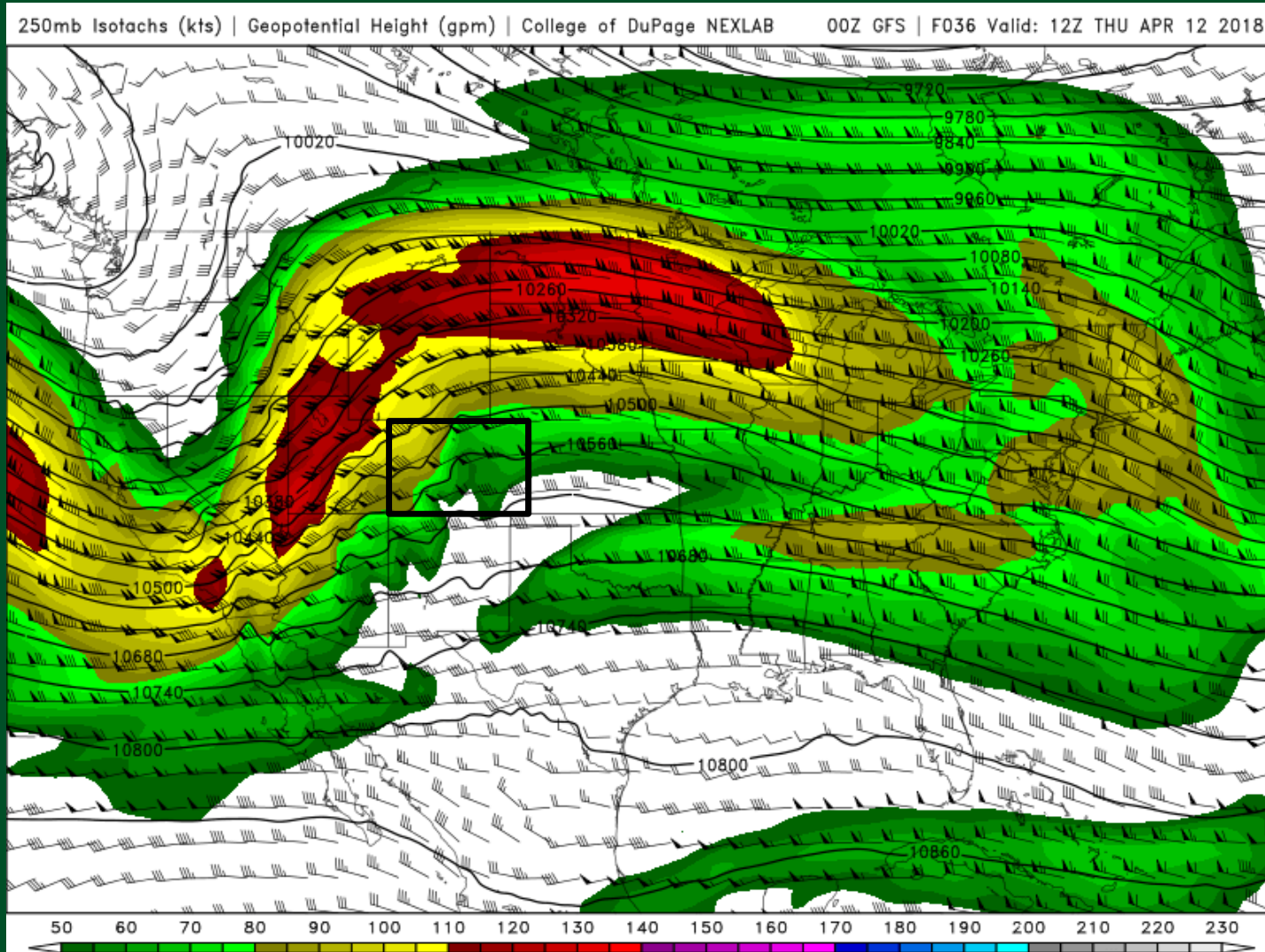


Red Flag Warnings are in effect for both Wednesday and Thursday.

<https://www.weather.gov/media/pub/sitreport/SitReport1.pdf>

Good news: the jet stream will remain across Colorado for several days

Jet stream
Thursday

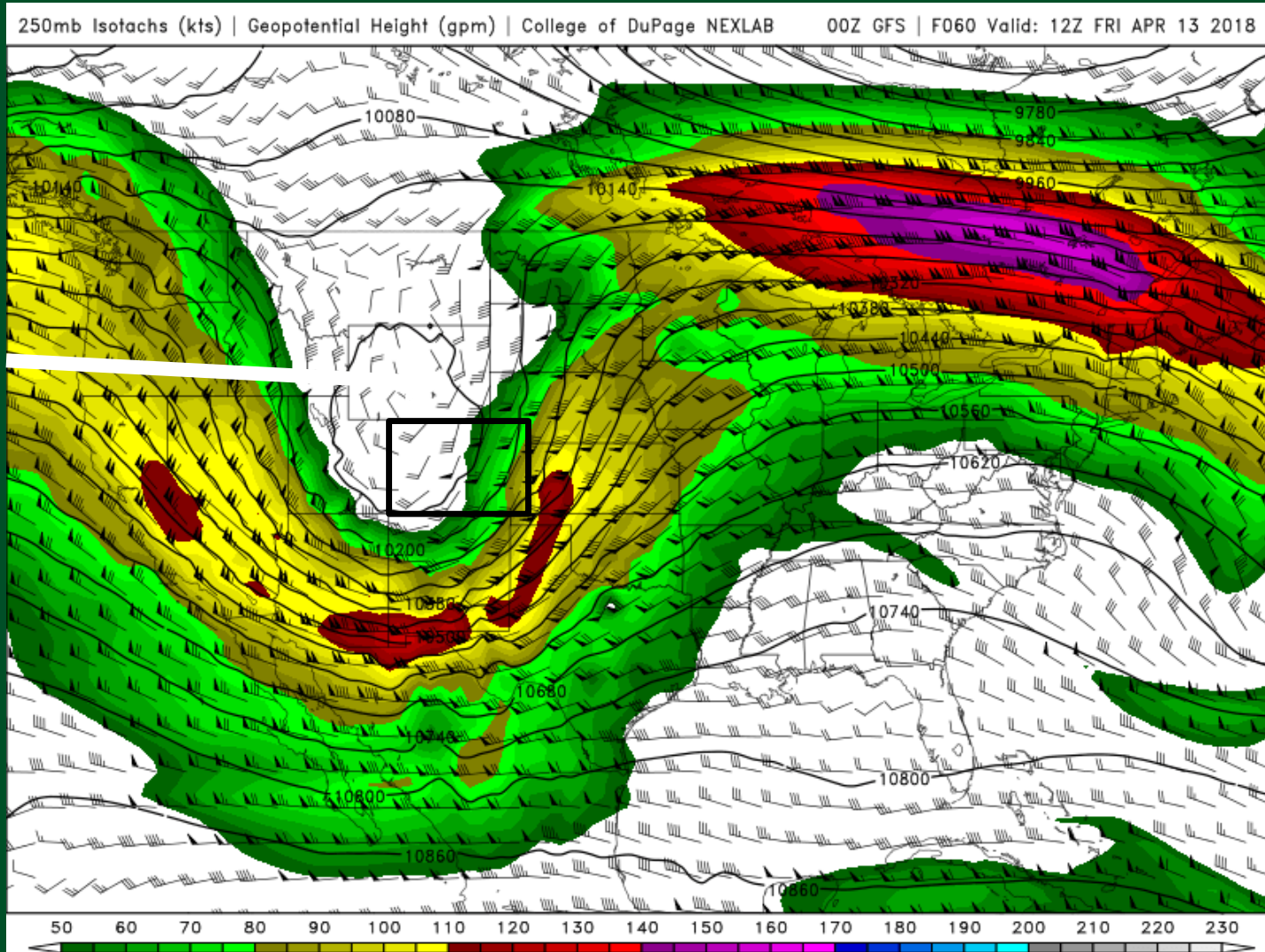


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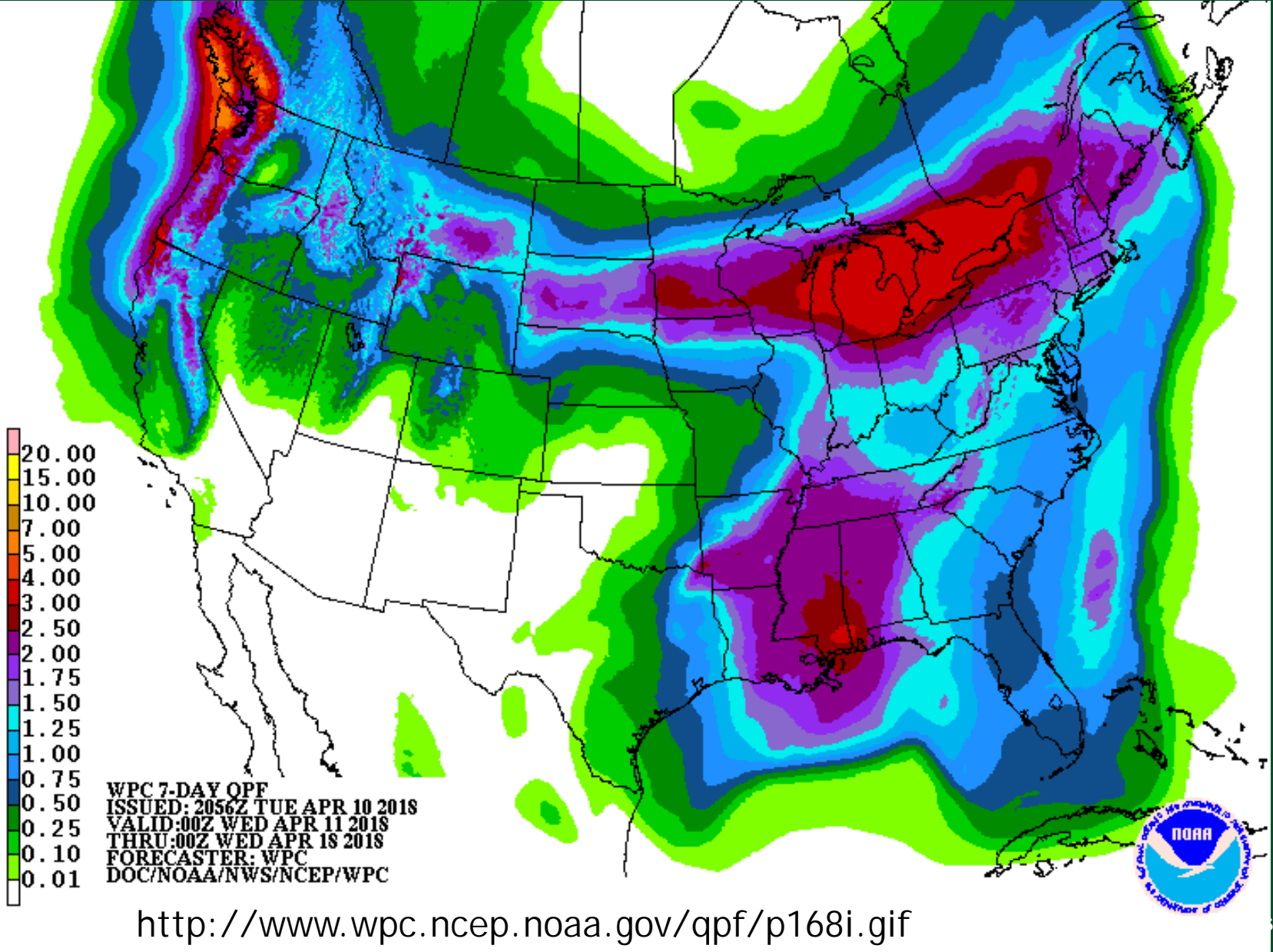
A big change on Friday-Saturday

Jet stream forecast
Friday



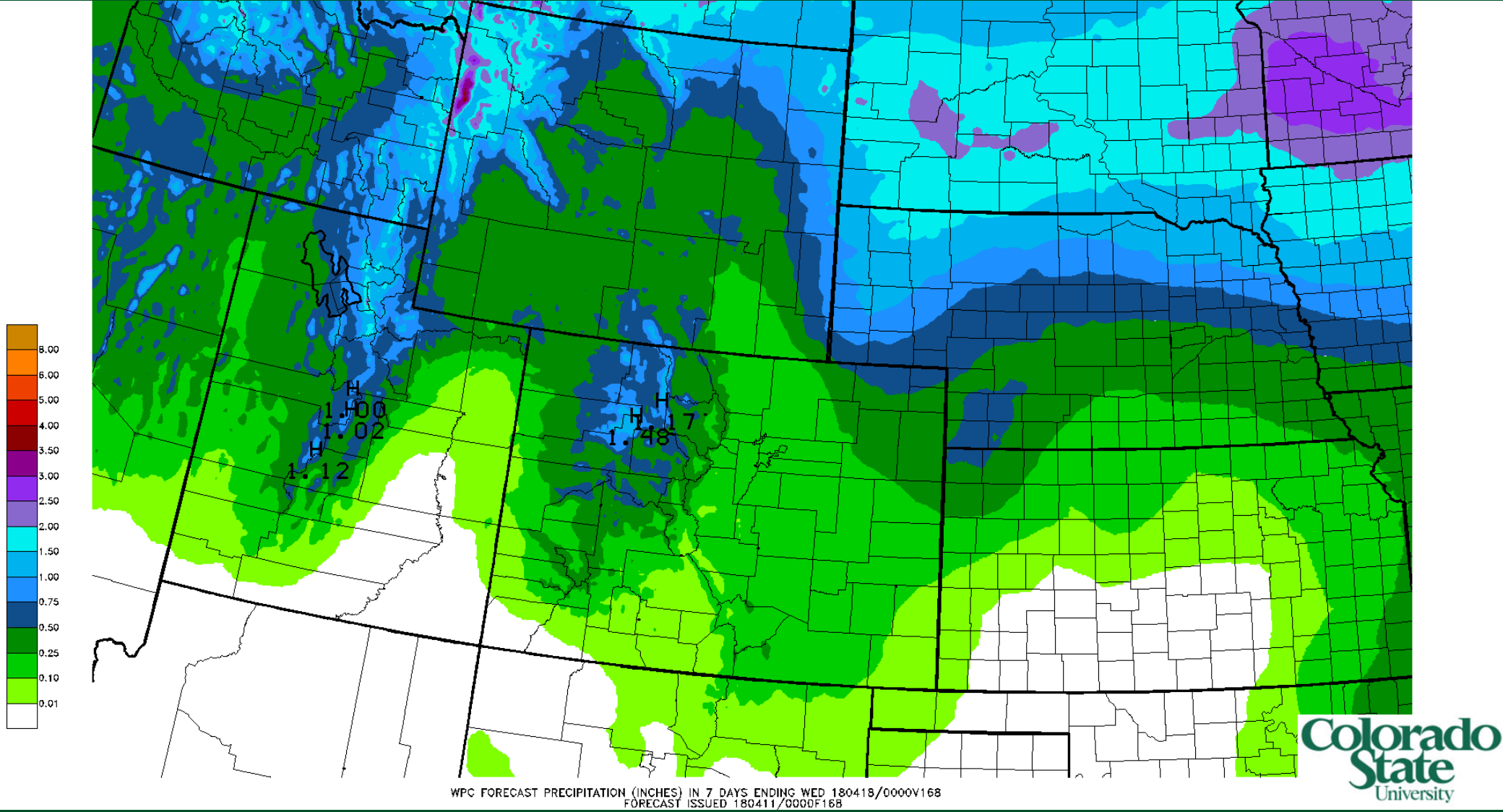
A large trough of low pressure is moving in on Friday...but will it bring any precipitation?

NWS 7-day precipitation forecast

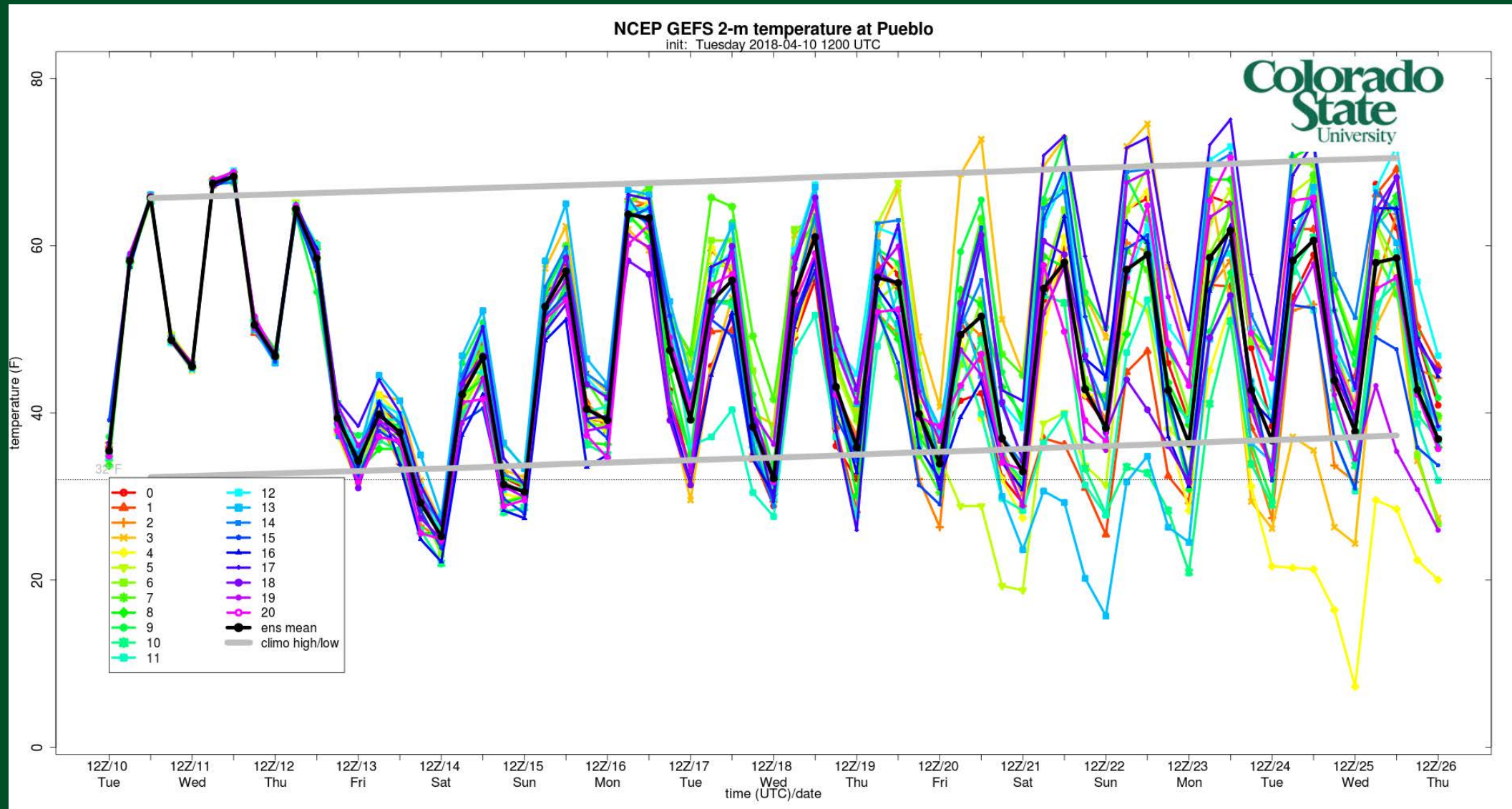


<http://www.wpc.ncep.noaa.gov/qpf/p168i.gif>

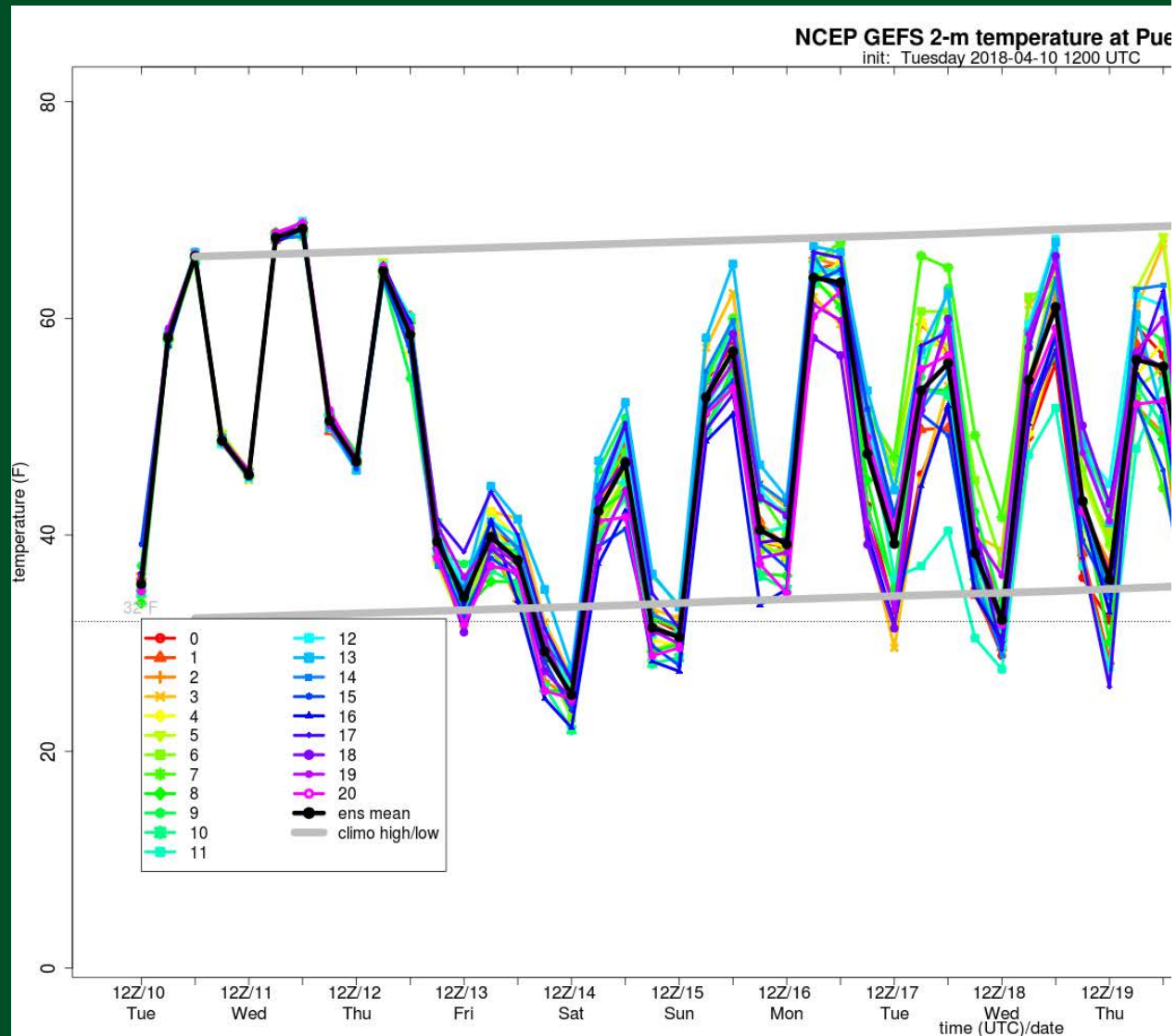
NWS 7-day precipitation forecast



“Ensemble” weather forecasts

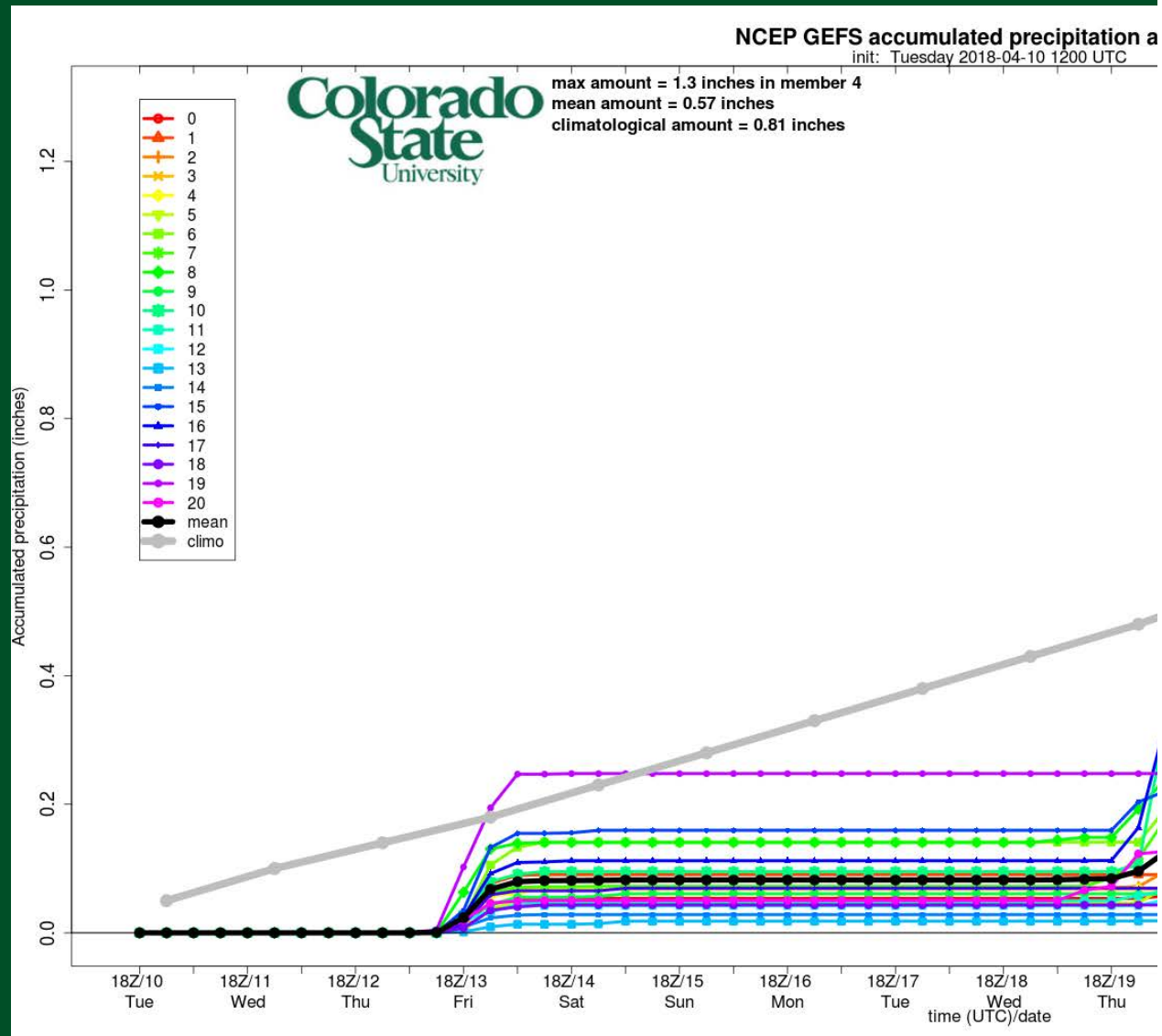


“Ensemble” weather forecasts



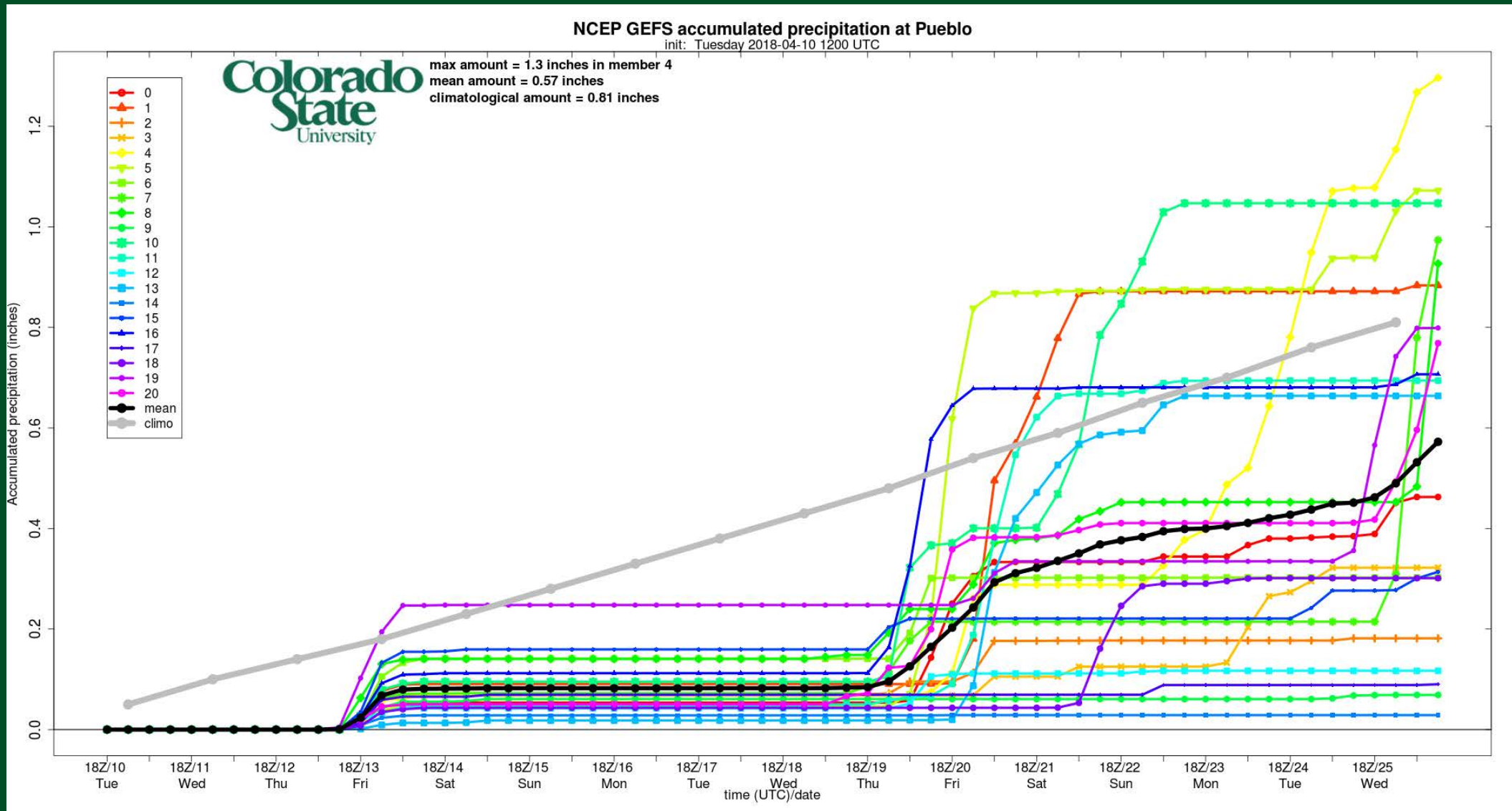
Beyond 10 days, probably don't pay too much attention...the models will generally just revert to near the average conditions for the time of year

“Ensemble” weather forecasts

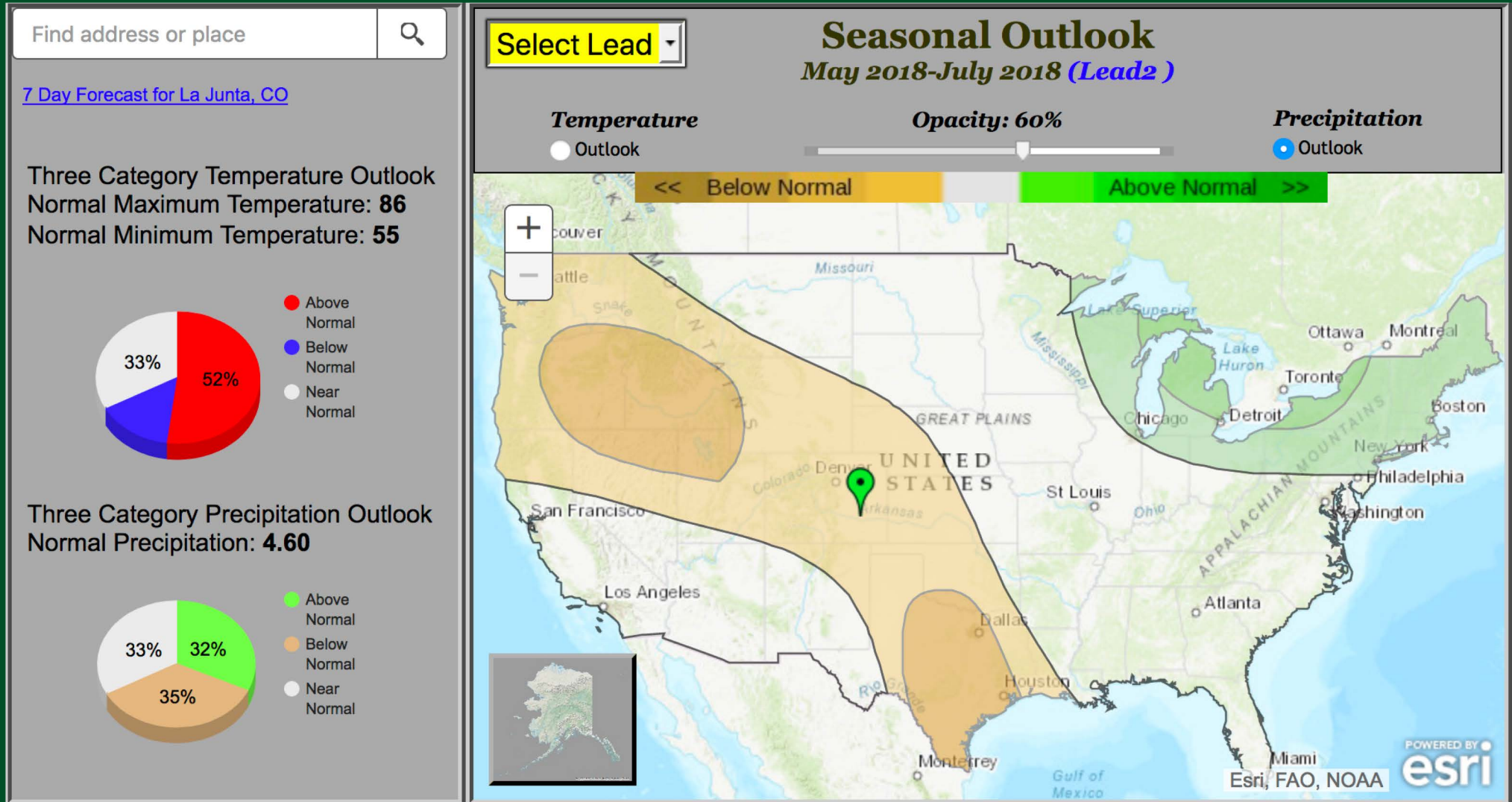


Beyond 10 days, probably don't pay too much attention...the models will generally just revert to near the average conditions for the time of year...beyond this, the best we can hope for is 'above', 'near', or 'below' normal

“Ensemble” weather forecasts



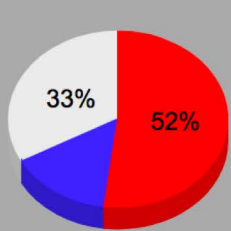
May-June-July outlook



May-June-July outlook

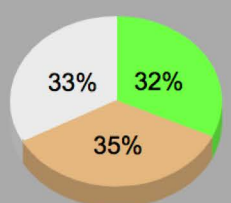
[7 Day Forecast for La Junta, CO](#)

Three Category Temperature Outlook
Normal Maximum Temperature: **86**
Normal Minimum Temperature: **55**



- Above Normal
- Below Normal
- Near Normal

Three Category Precipitation Outlook
Normal Precipitation: **4.60**



- Above Normal
- Below Normal
- Near Normal

Select Lead ▾

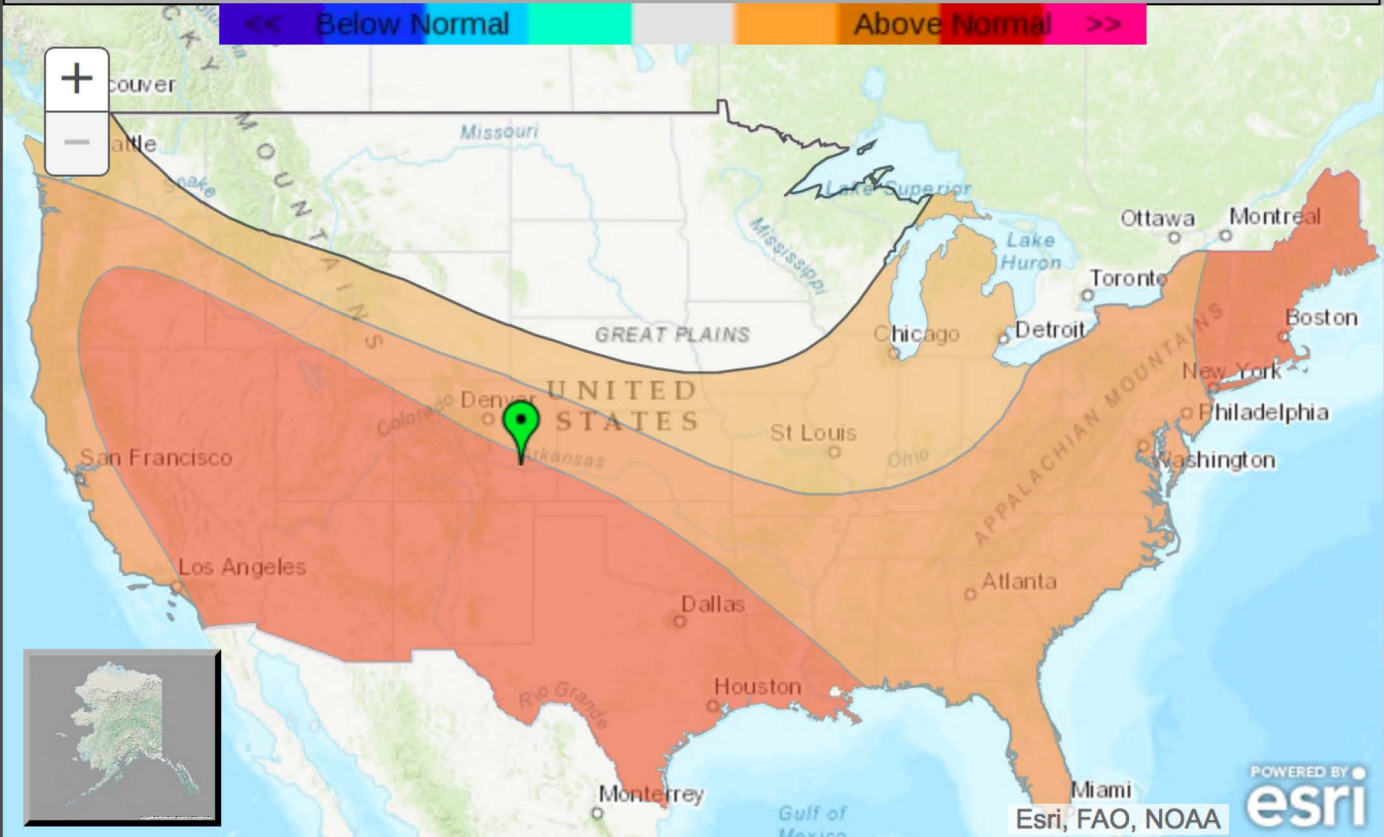
Seasonal Outlook

May 2018-July 2018 (Lead2)

Temperature **Opacity: 60%** **Precipitation**

● Outlook ● Outlook

◀◀ Below Normal Above Normal ▶▶



Map of the United States showing seasonal outlook for May-July 2018. A red pin is placed over La Junta, CO. The map shows a large area of 'Above Normal' precipitation (orange/red) covering most of the US, and 'Below Normal' (blue) in the West. Major cities and geographical features are labeled.

POWERED BY **esri**
Esri, FAO, NOAA

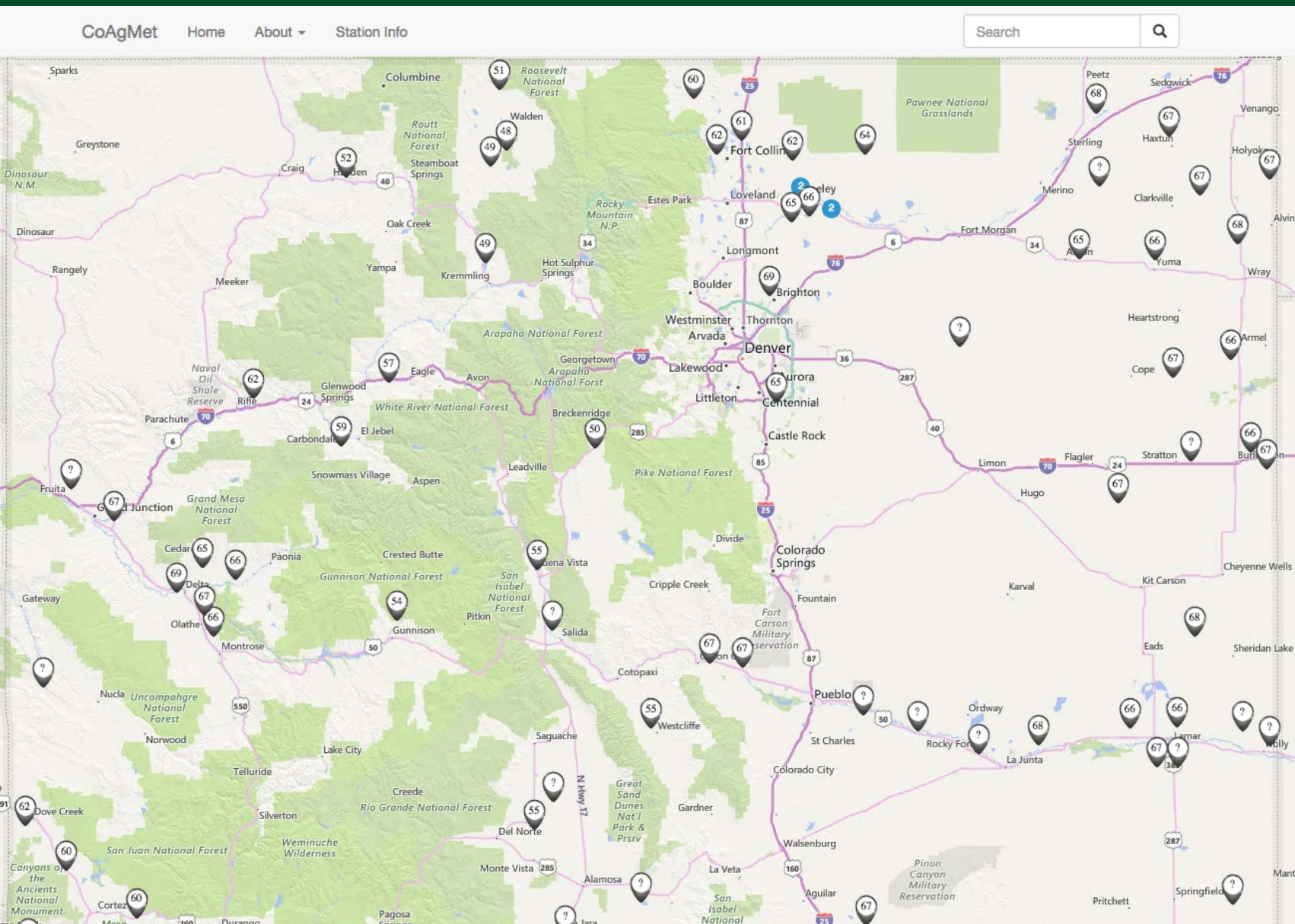
Remember: even in dry years, there can also be flash floods!

From Colorado Springs, 2 weeks apart in 2012...



From <https://www.youtube.com/watch?v=eQHpVThHwsY>

<https://upload.wikimedia.org/wikipedia/commons/0/03/Waldocanyon.jpg>

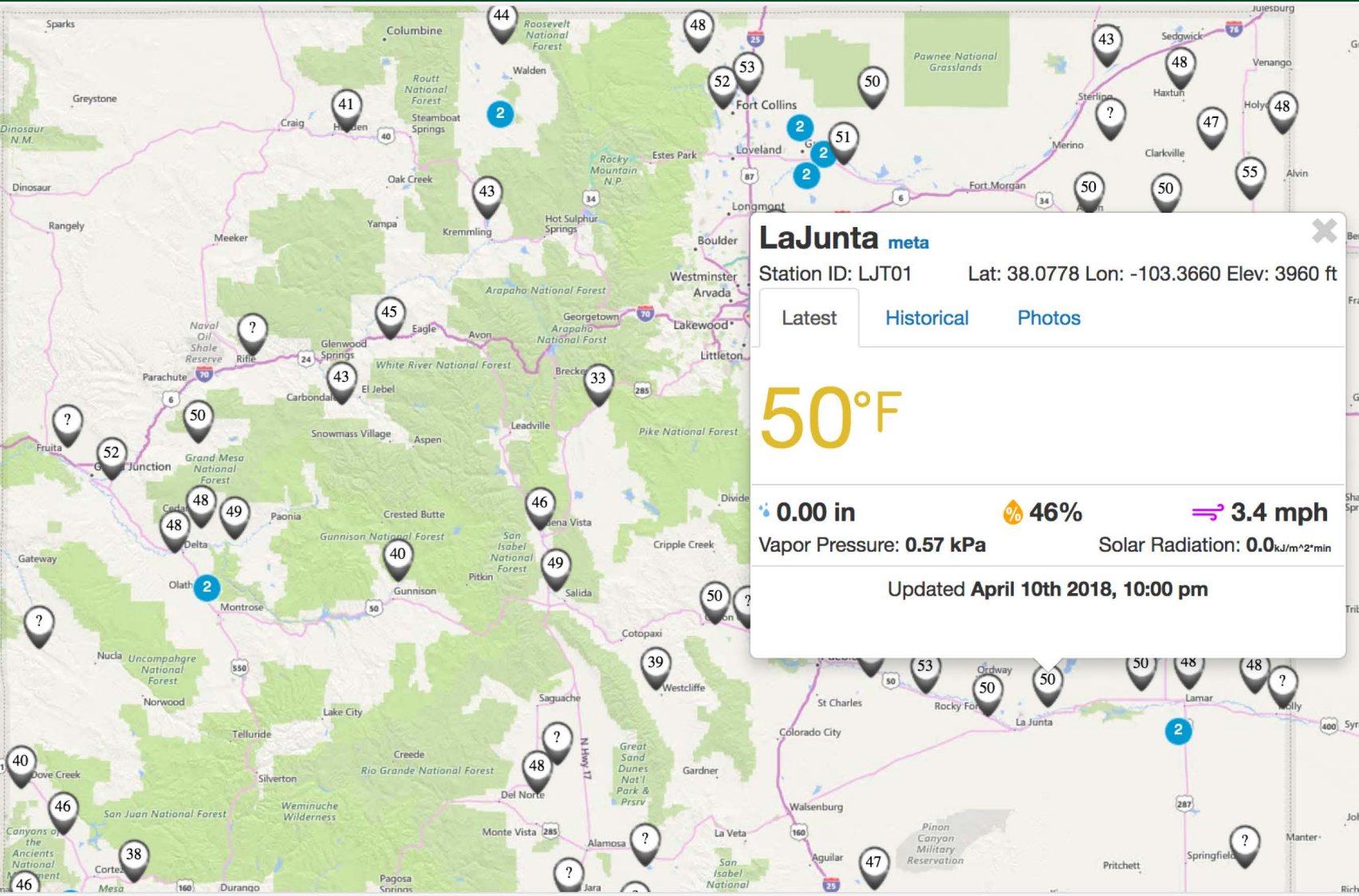


CoAgMET

- ☐ 75 stations
- ☐ 10 coming soon on west slope
- ☐ 44 5-minute stations
- ☐ interactive mapping through eRAMS
- ☐ includes
 - ☐ time series charts
 - ☐ site photos

coagmet.colostate.edu

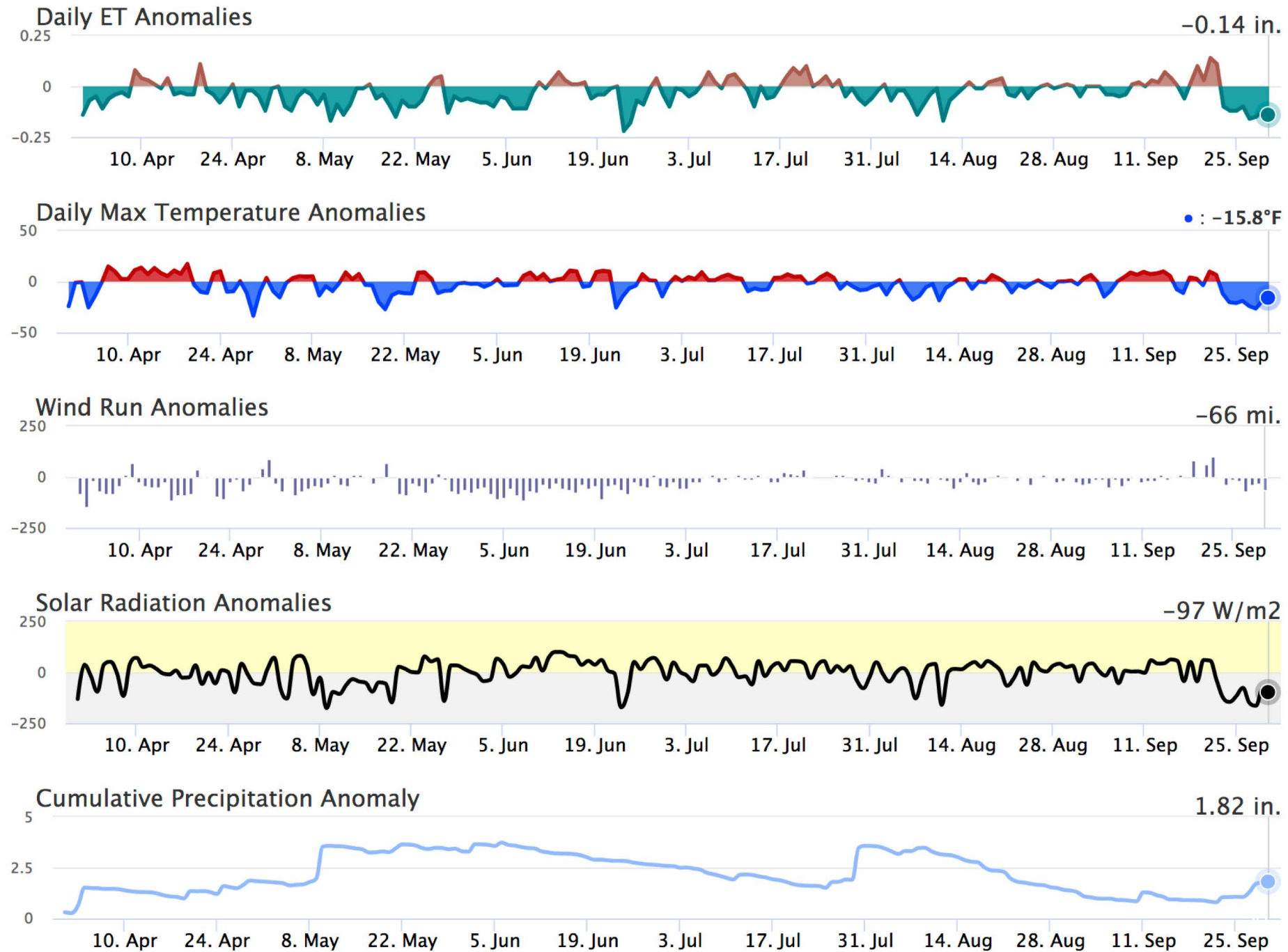
CoAgMET



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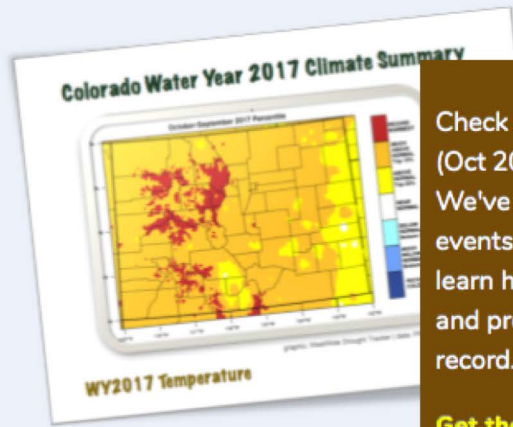
coagmet.colostate.edu

Growing season summaries at long-term stations: Avondale (2017)



http://climate.colostate.edu/2017ET/et_summary_avn_anom.html

- General Info ▾
- Colorado's Climate ▾
- Data Access
- Climate Maps
- Normals and Extremes ▾
- Drought ▾
- Tools ▾



Check out our Water Year summary (Oct 2016 - Sep 2017) for Colorado. We've compiled a list of significant events and water year records. Also learn how our water year temperature and precipitation ranks in the historic record.

Get the 2017 Water Year Report!

Previous | Next

Current Conditions

Fort Collins, CO

33.8°F

Last Updated on November 8, 5:25 PM MST

Wind: Calm
Dewpoint: 33°F
Humidity: 98%

Zip Code Local Conditions

News Feeds

Colorado Climate Ce...
Liked 738 likes

Colorado Climate Center 7 hours ago

Fog along the Front Range this morning - check out this magical time-lapse looking south over Lyons. Colorado:

new website features at climate.colostate.edu

- Data Access
- Climate Maps (coming soon)
- Climate Normals
- Climate Extremes
- Tools

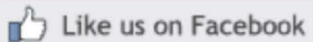
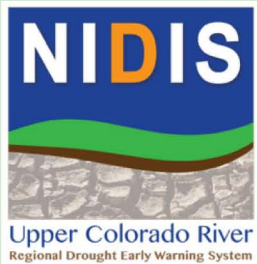




INTERMOUNTAIN WEST DROUGHT EARLY WARNING SYSTEM



WEBINAR SPONSORS



Join Our Mailing List!

[US Drought Monitor](#)

Greetings,

Please join us tomorrow morning, **Tuesday, January 16th at 10:00AM MST** for our monthly "Climate, Water and Drought Assessment" Webinar.

To register go to the Colorado Climate Center website at: http://climate.colostate.edu/webinar_registration.html.

A toll-free 800 number is provided for calling-in. Our webinars are brief (usually less than 30 minutes) and provide updated information assessing climate, water and drought for the Intermountain West.

Intermountain West Drought Early Warning System Webinars are being brought to you by the Colorado Climate Center at Colorado State University with support from the National Integrated Drought Information System (NIDIS). For more information on NIDIS please visit: <https://www.drought.gov/drought/what-nidis>

Sincerely,

The Colorado Climate Center Team

Intermountain West drought early warning system

We lead monthly webinars on the drought situation in the intermountain west (might become every 2 weeks if drought worsens)...next one on April 10

Register at http://climate.colostate.edu/webinar_registration.html

See graphics at <http://climate.colostate.edu/~drought/>

**And finally, the all-important
question:
“Do you have a rain gauge?”**

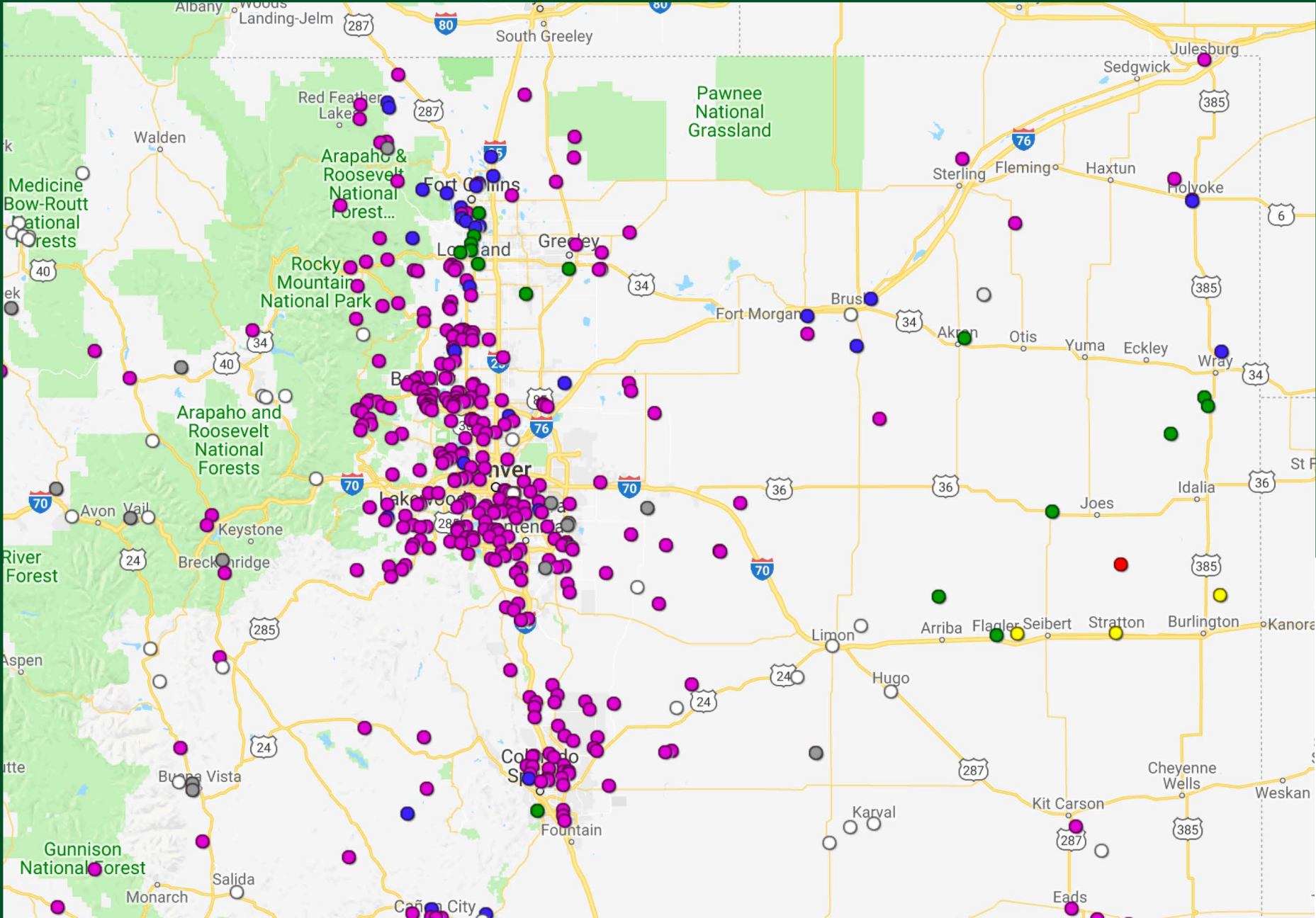




If you are interested in weather and the variations in precipitation, please join the Community Collaborative Rain, Hail and Snow Network

<http://www.cocorahhs.org>

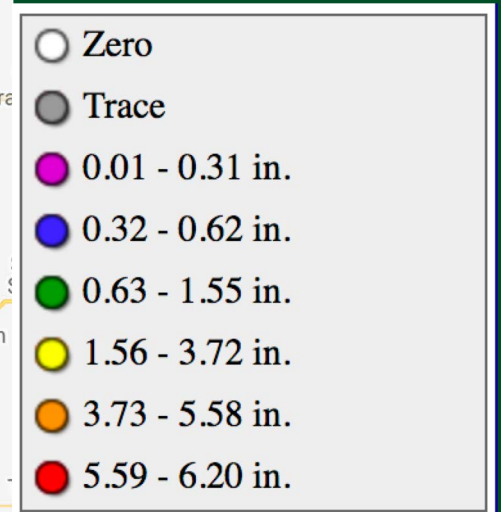
or see me today



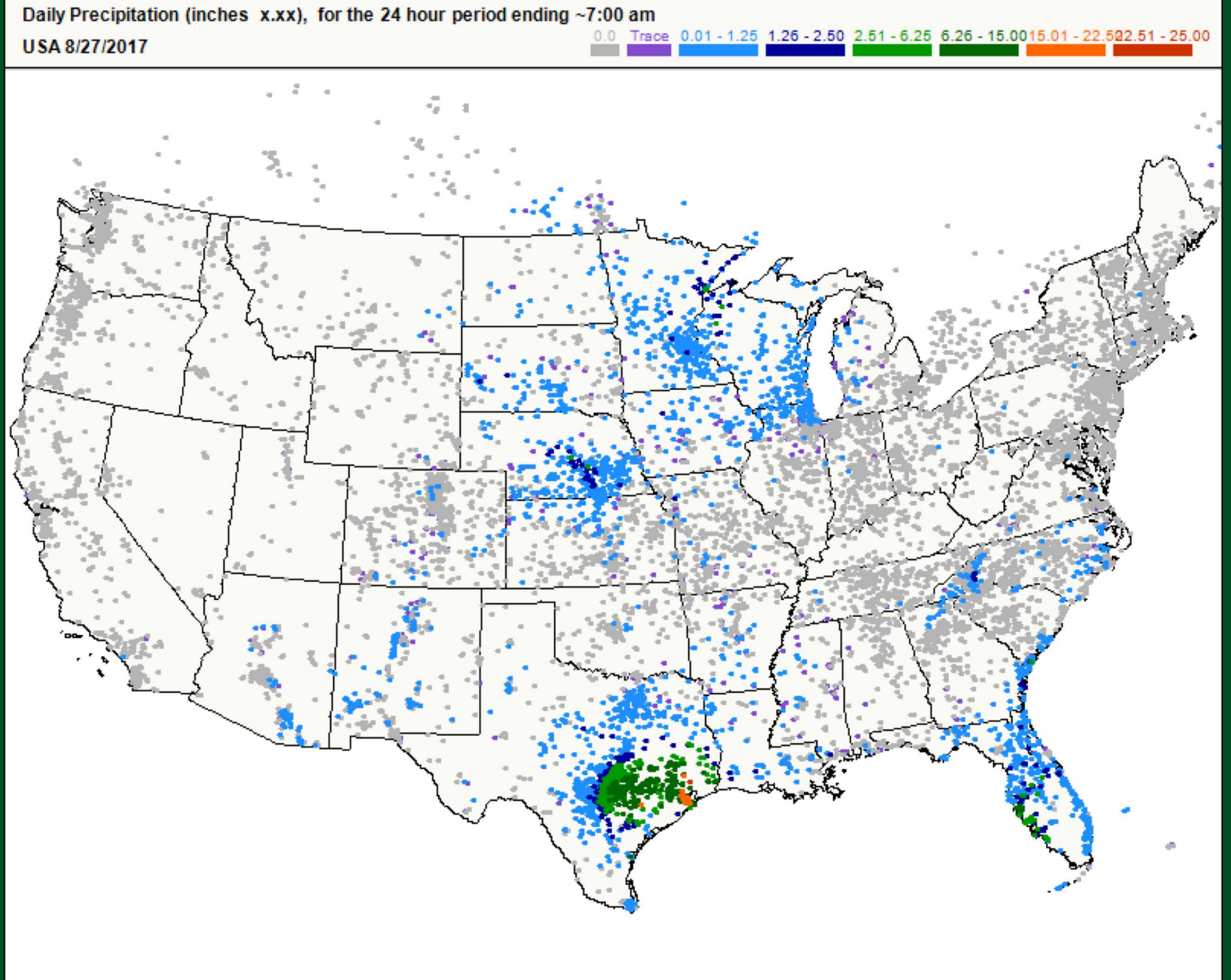
CoCoRaHS data, 7 August 2017

Over 6" north of Stratton, almost nothing north of Yuma

We always need more observers!



CoCoRaHS data in Hurricane Harvey, August 2017



Thank you!

<http://climate.colostate.edu/>

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