



Climate Update



Peter Goble
Colorado Climate Center

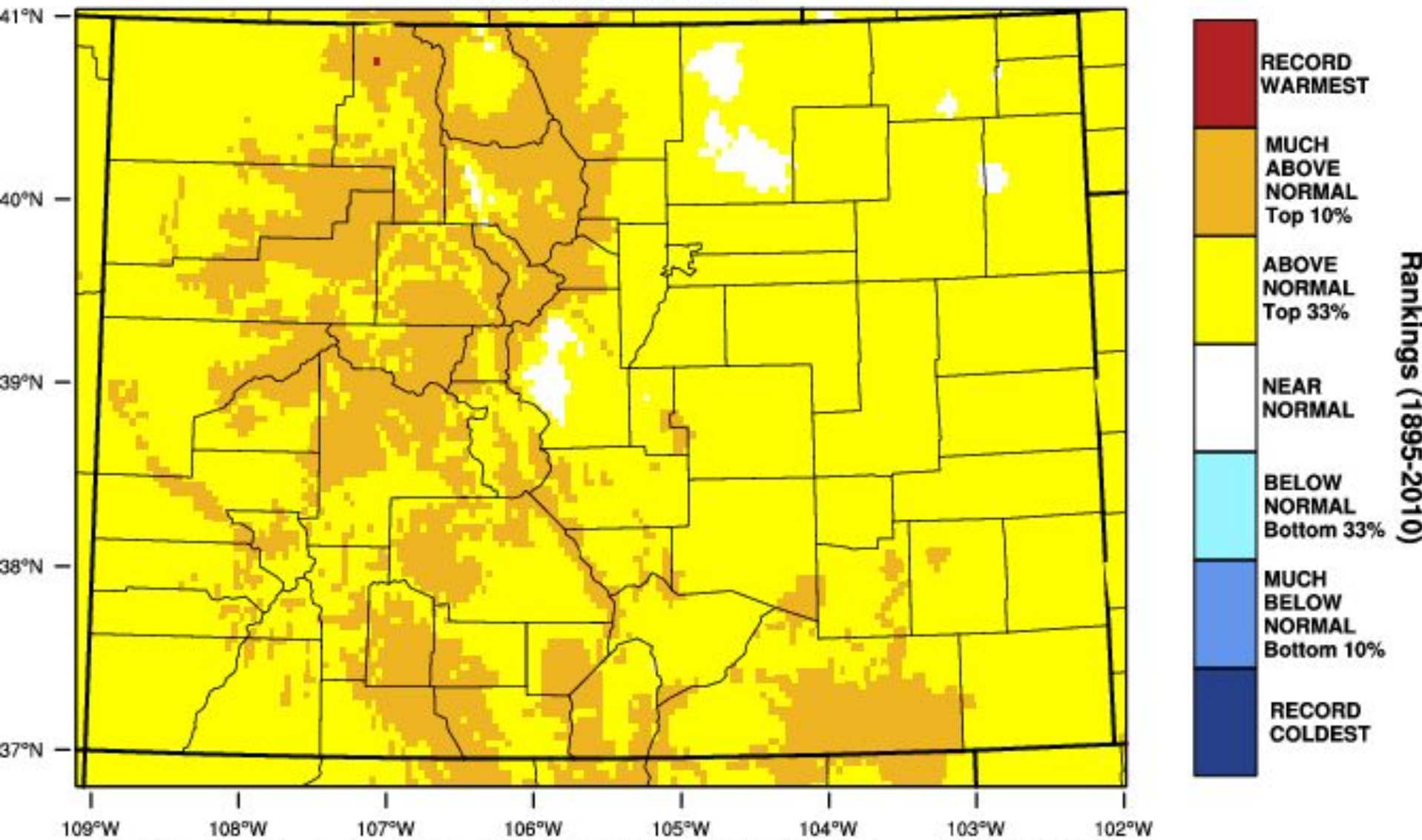
**Presented to
Water Availability Task Force
April 21, 2020
Denver, CO**

Agenda

- Current seasonal climate conditions update
- A little on snow
- Soils and drought update
- Seasonal Forecast info (are we done with snow?)

Colorado - Mean Temperature

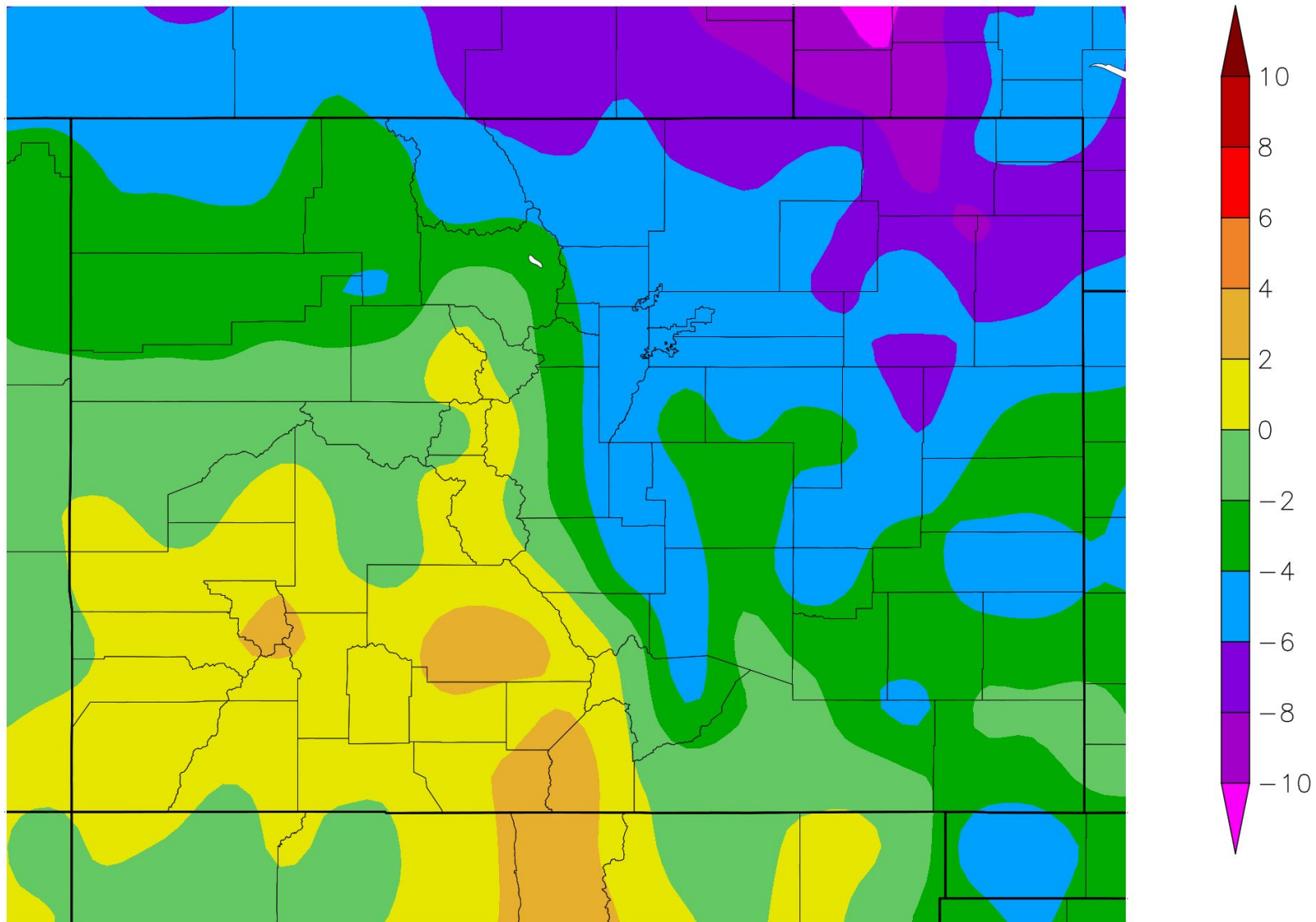
March 2020 Percentile



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 APR 2020

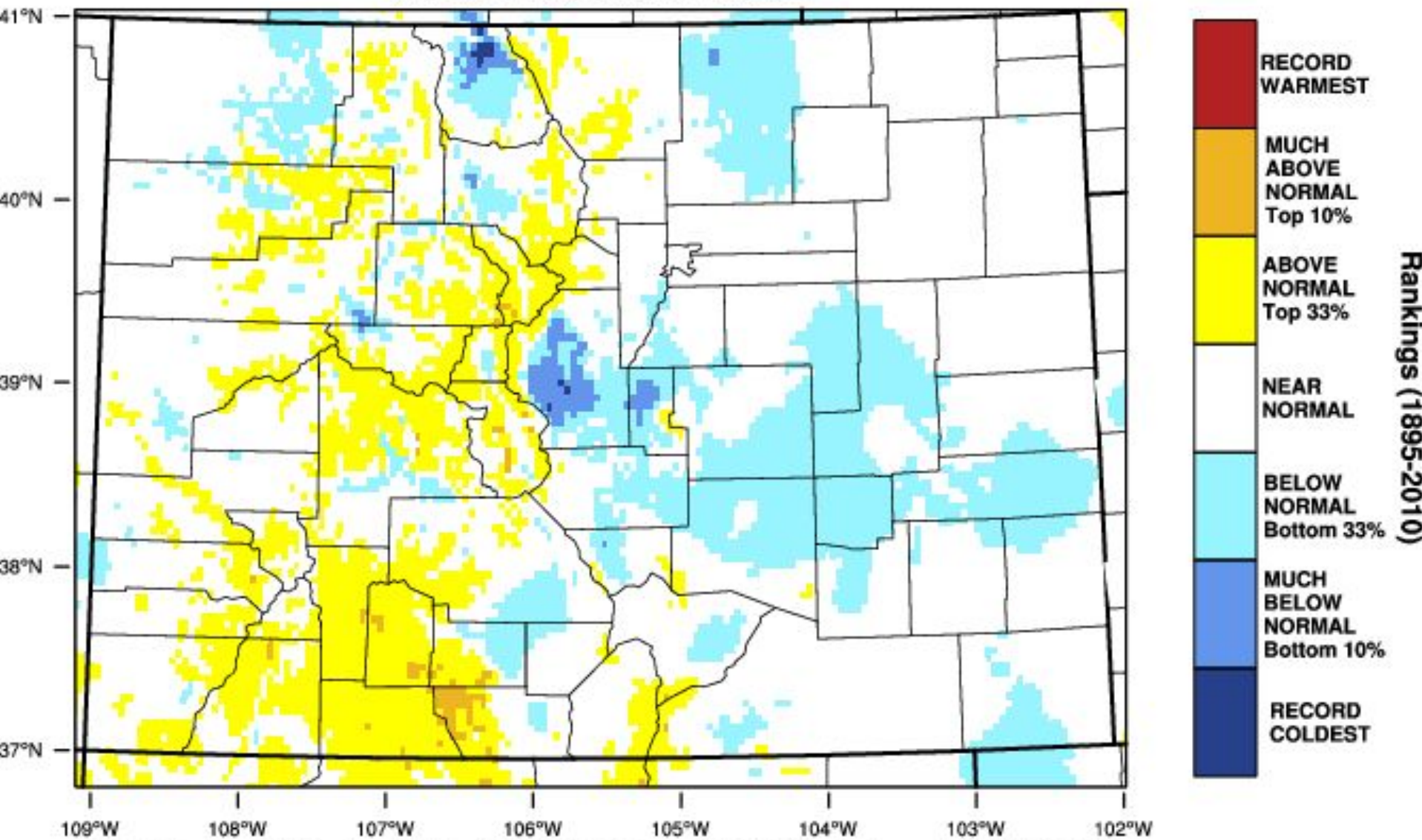
Departure from Normal Temperature (F)

4/1/2020 - 4/18/2020



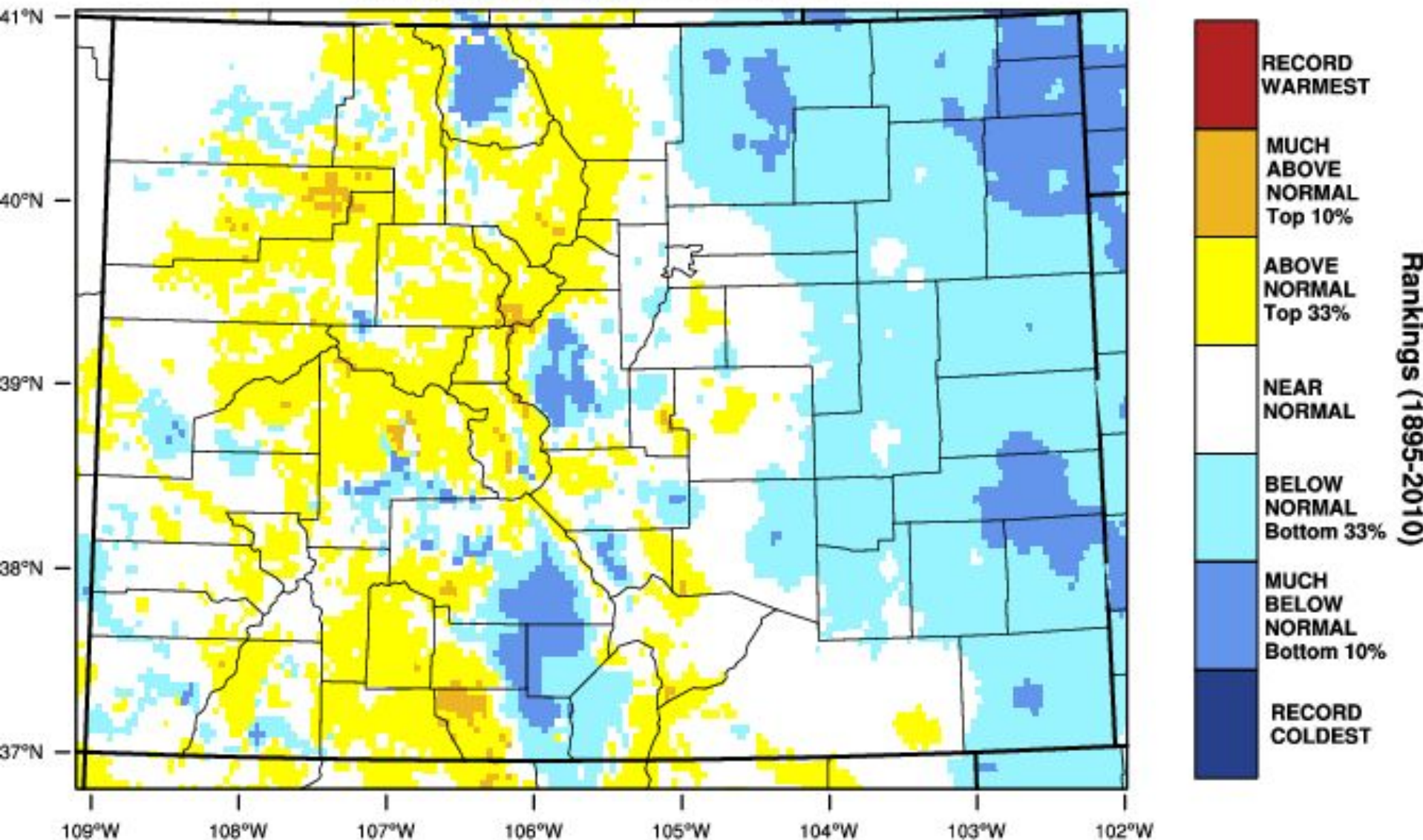
Colorado - Mean Temperature

October-March 2020 Percentile



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 APR 2020

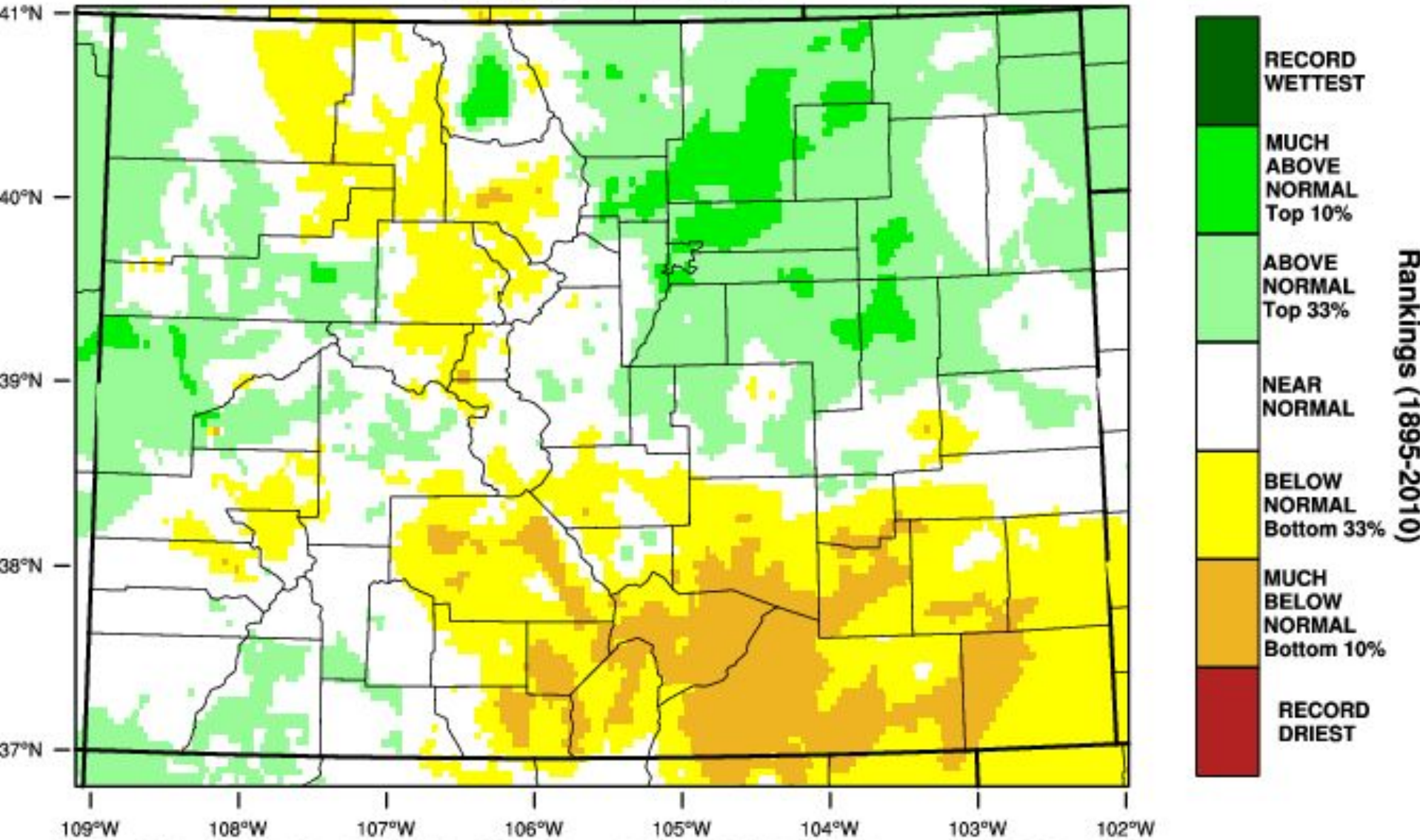
Colorado - Mean Temperature January-December 2019 Percentile



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 5 JAN 2020

Colorado - Precipitation

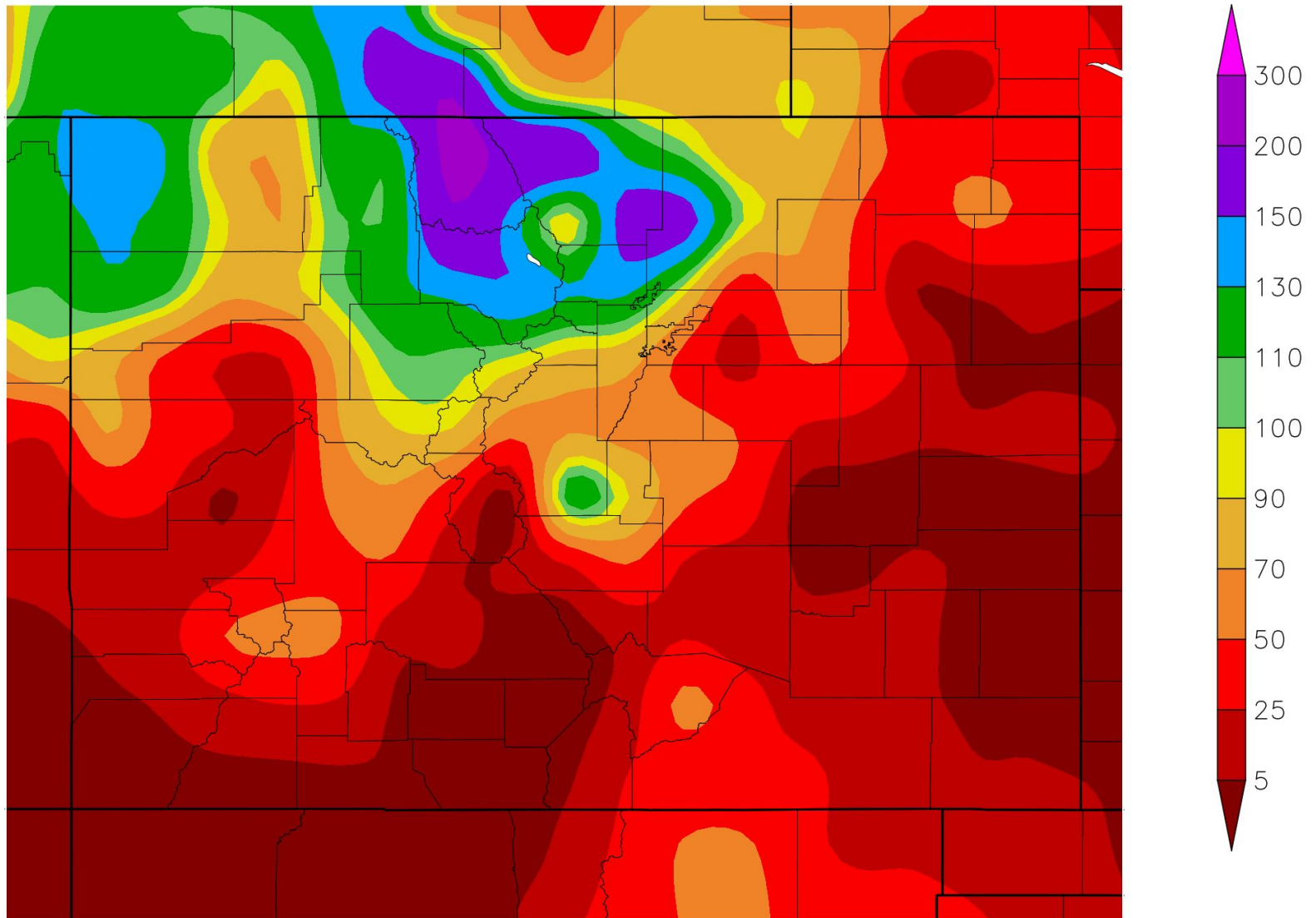
March 2020 Percentile



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 APR 2020

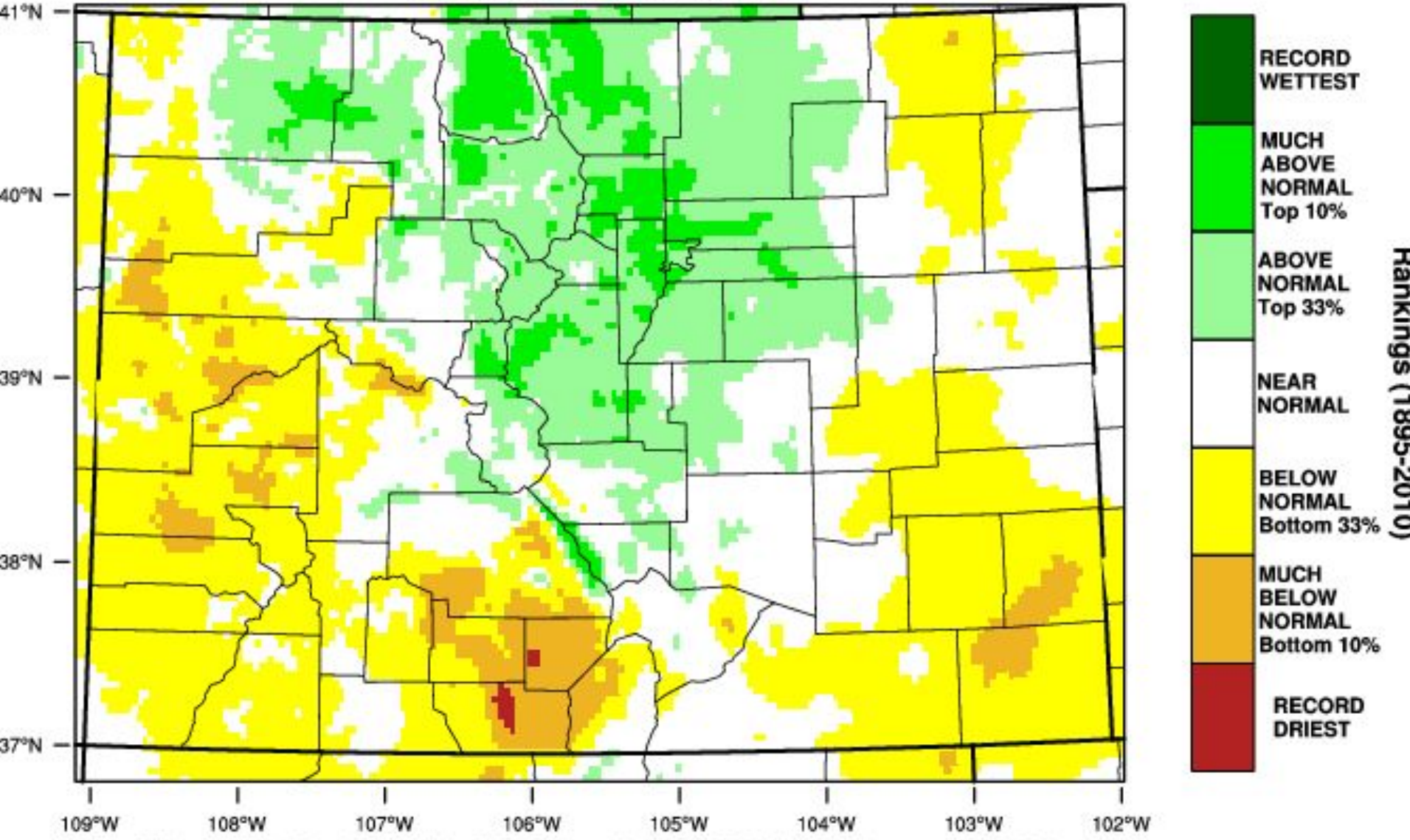
Percent of Normal Precipitation (%)

4/1/2020 – 4/18/2020



Colorado - Precipitation

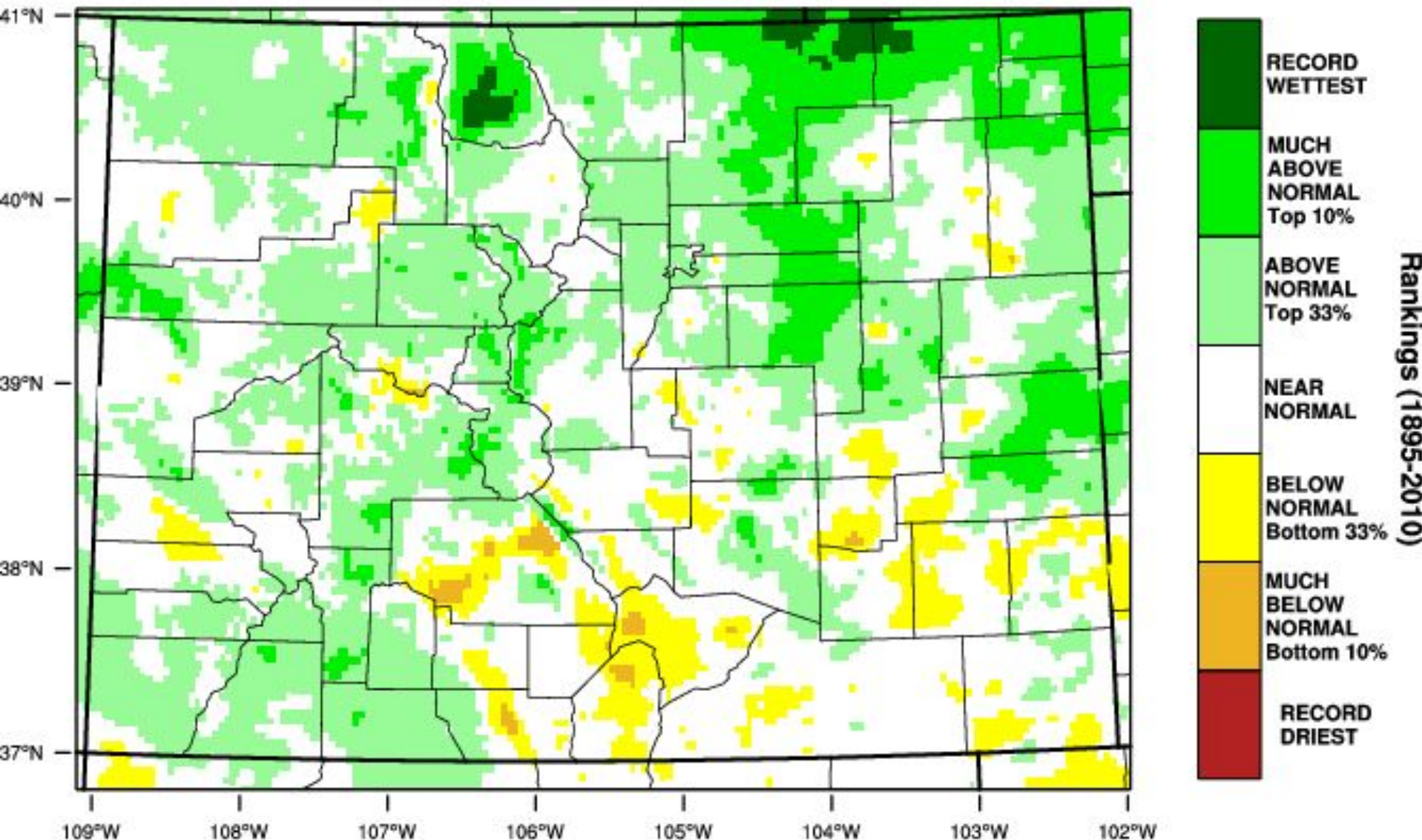
October-March 2020 Percentile



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 APR 2020

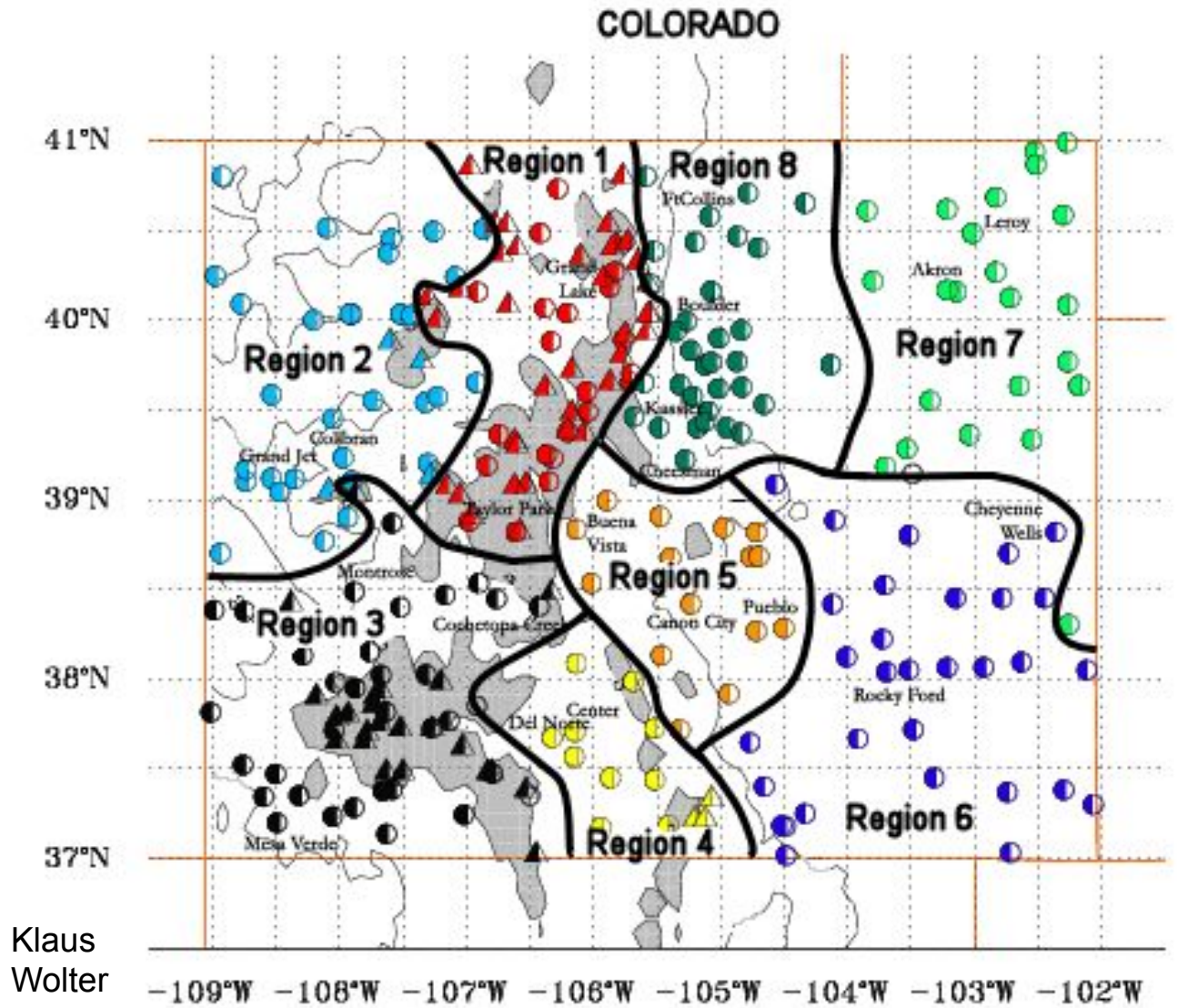
Colorado - Precipitation

January-December 2019 Percentile



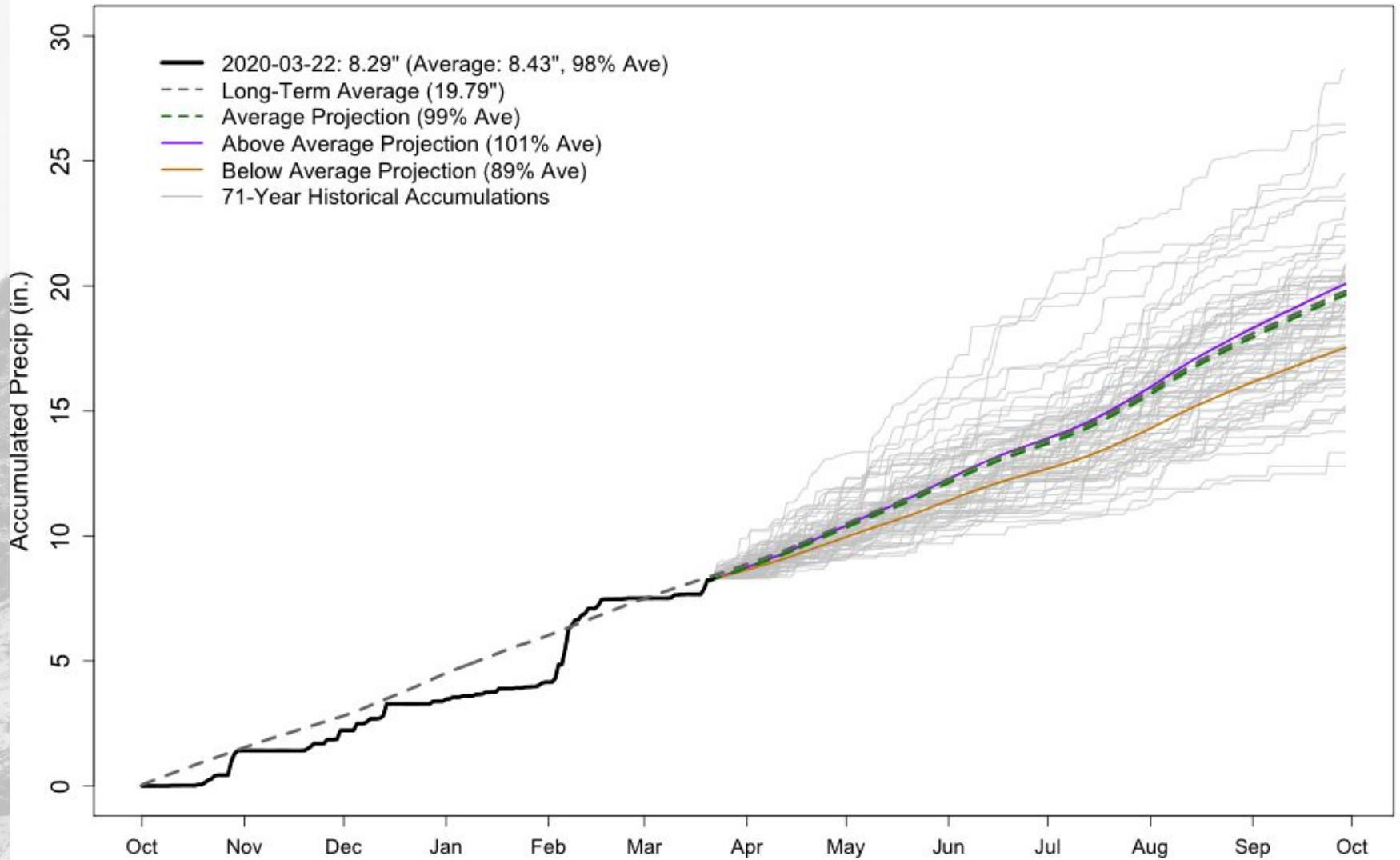
WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 5 JAN 2020

Climate divisions defined by Dr. Klaus Wolter of NOAA's Climate Diagnostic Center in Boulder, CO

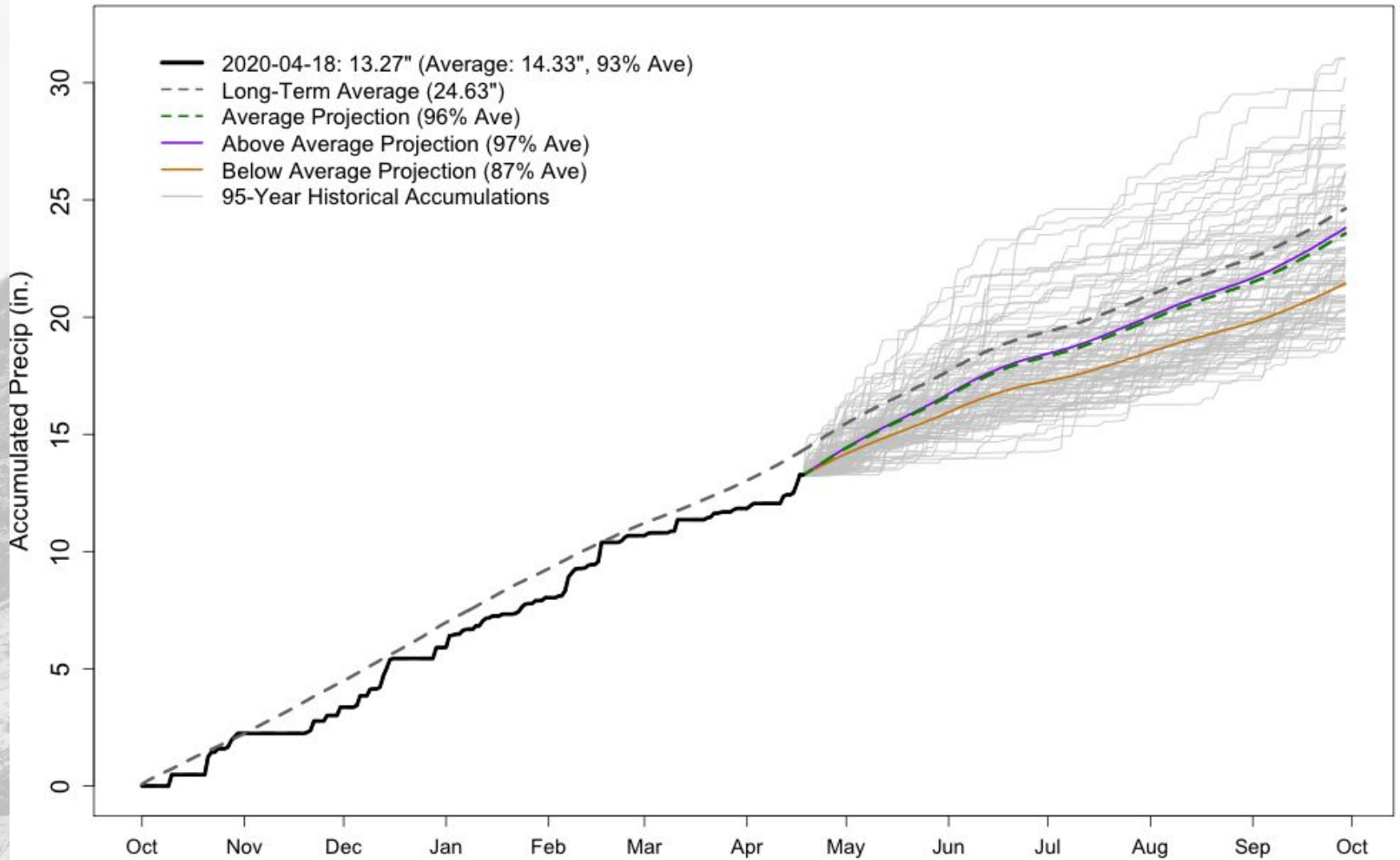


Klaus
Wolter

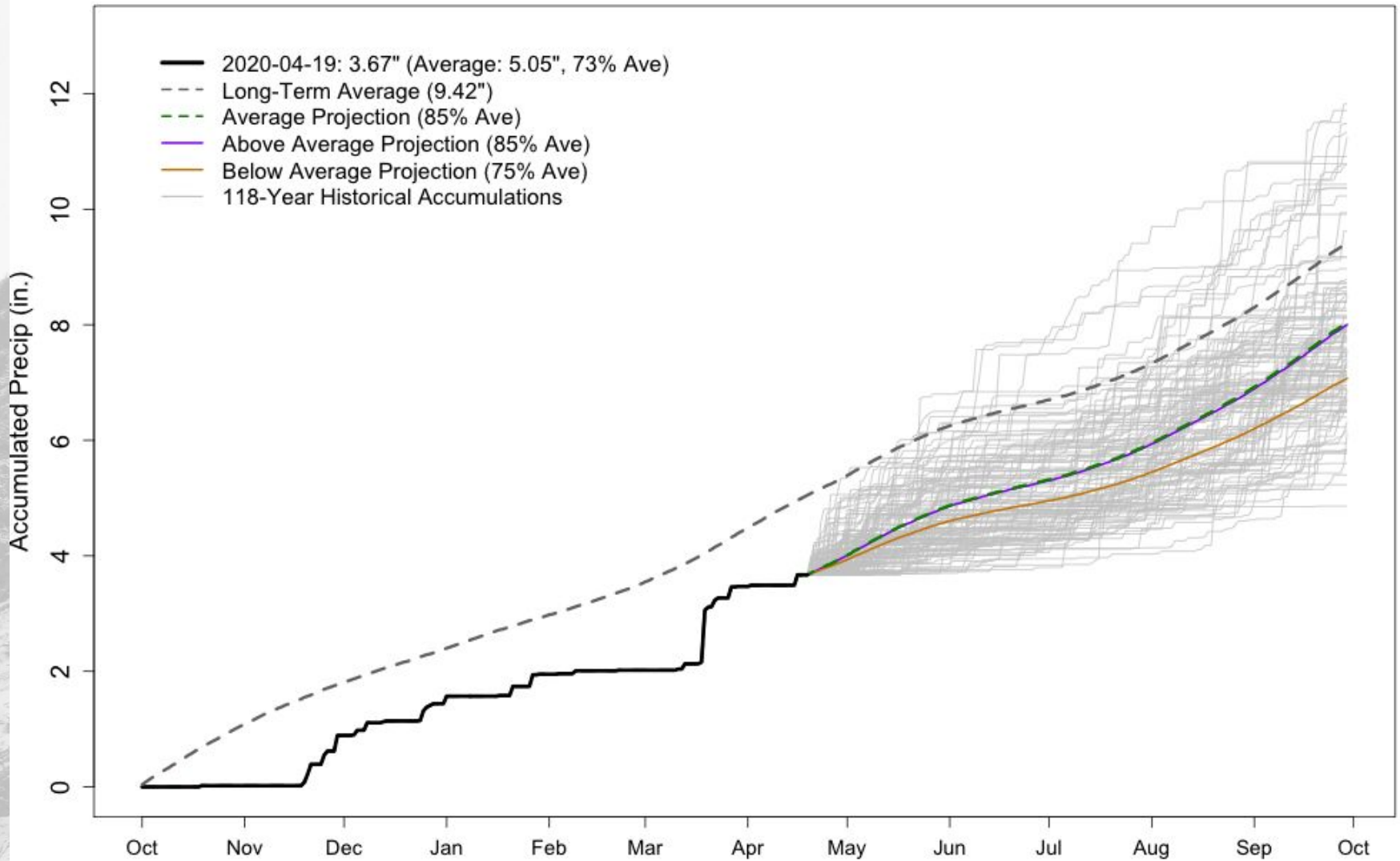
GRAND LAKE 1 NW WY2020 Precipitation Projections



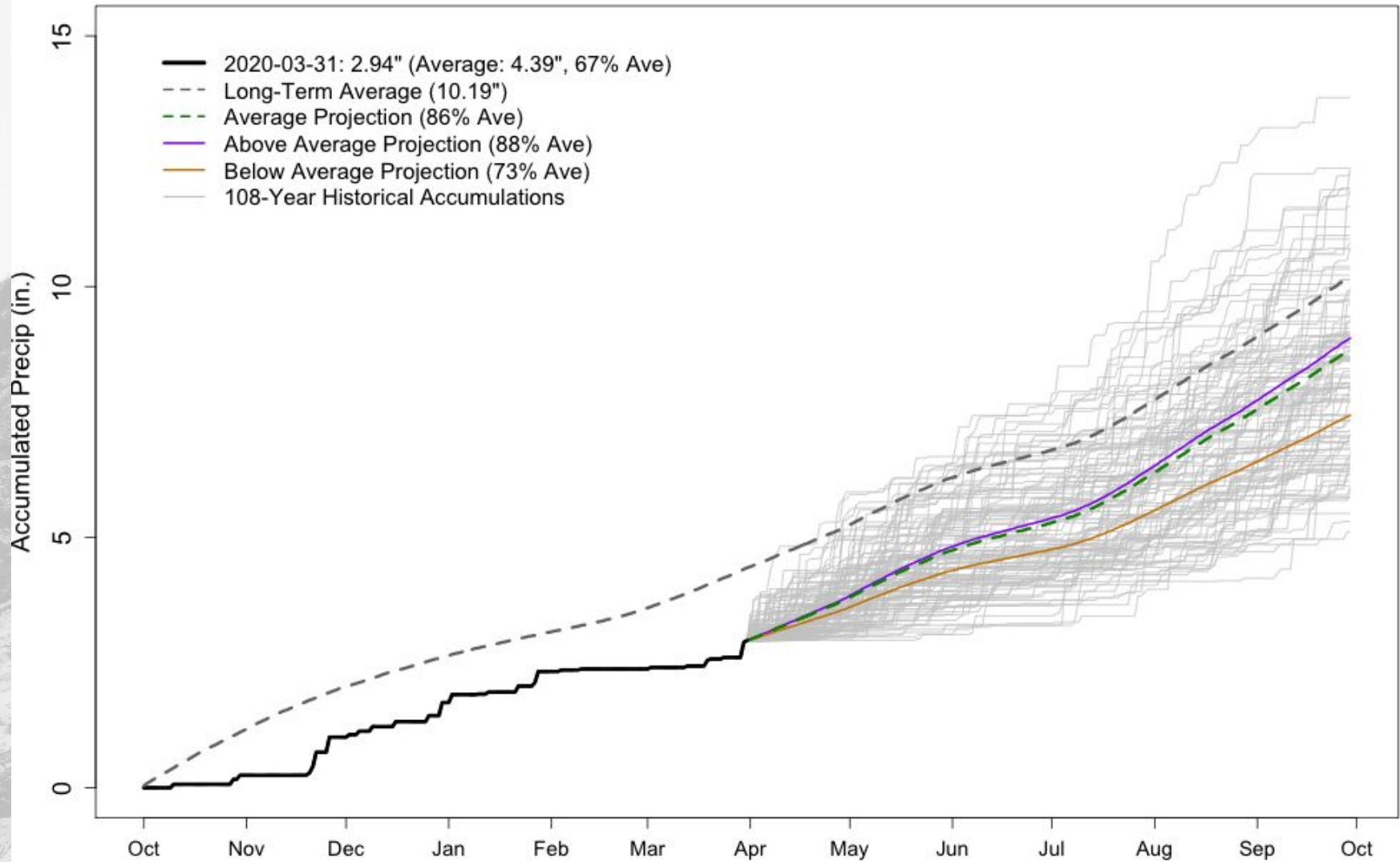
STEAMBOAT SPRINGS WY2020 Precipitation Projections



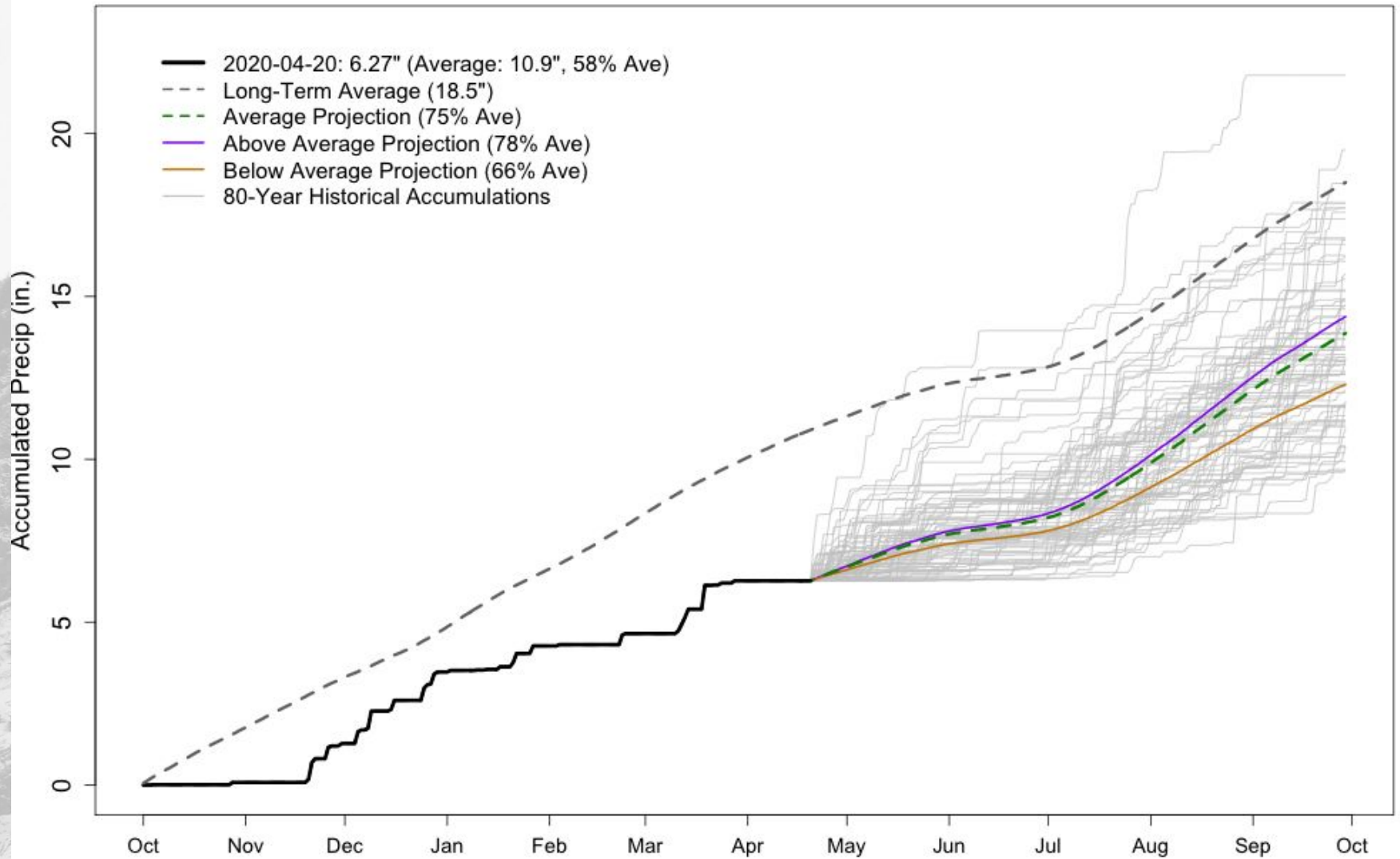
GRAND JUNCTION WALKER FIELD WY2020 Precipitation Projections



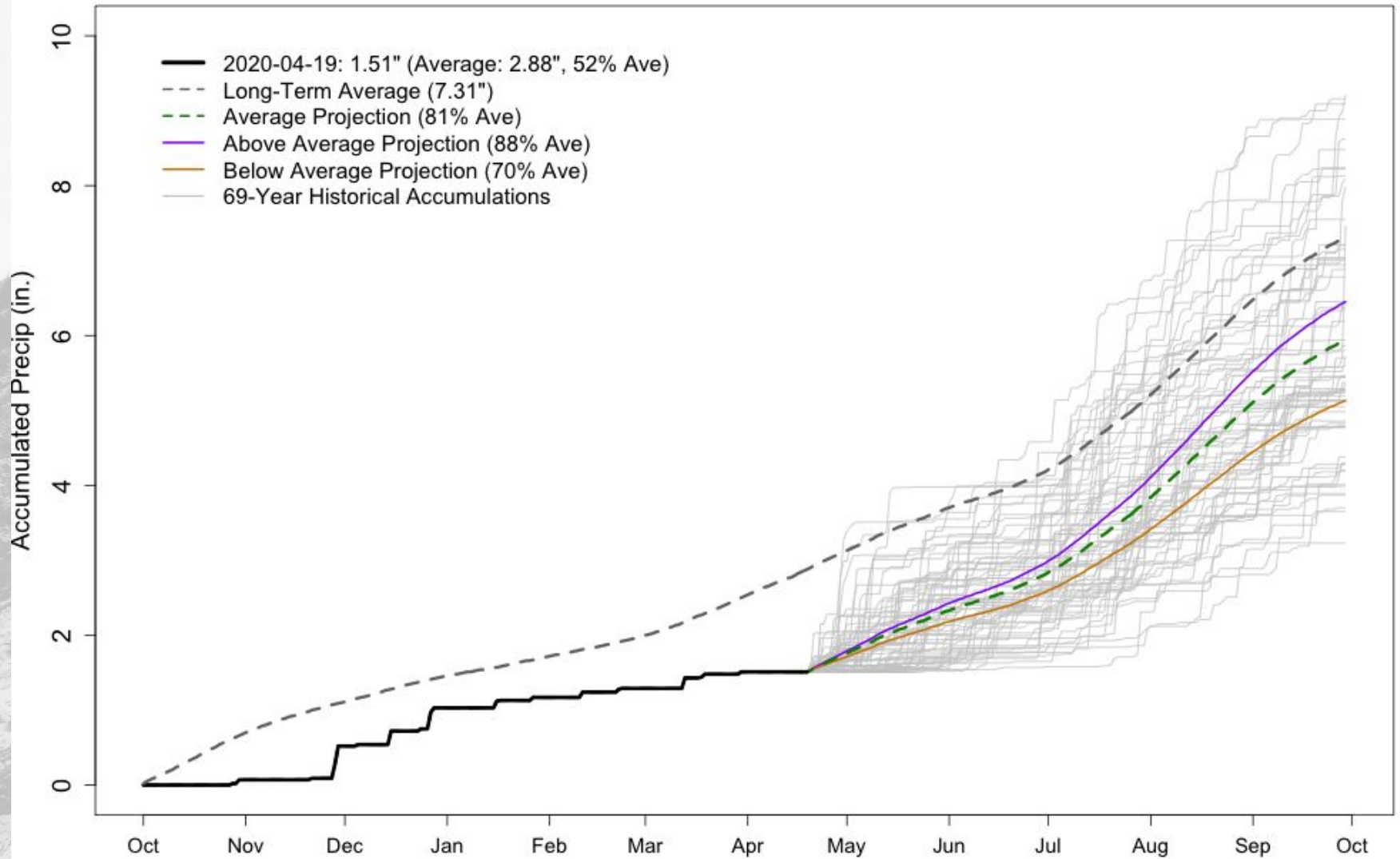
MONTROSE NO 2 WY2020 Precipitation Projections



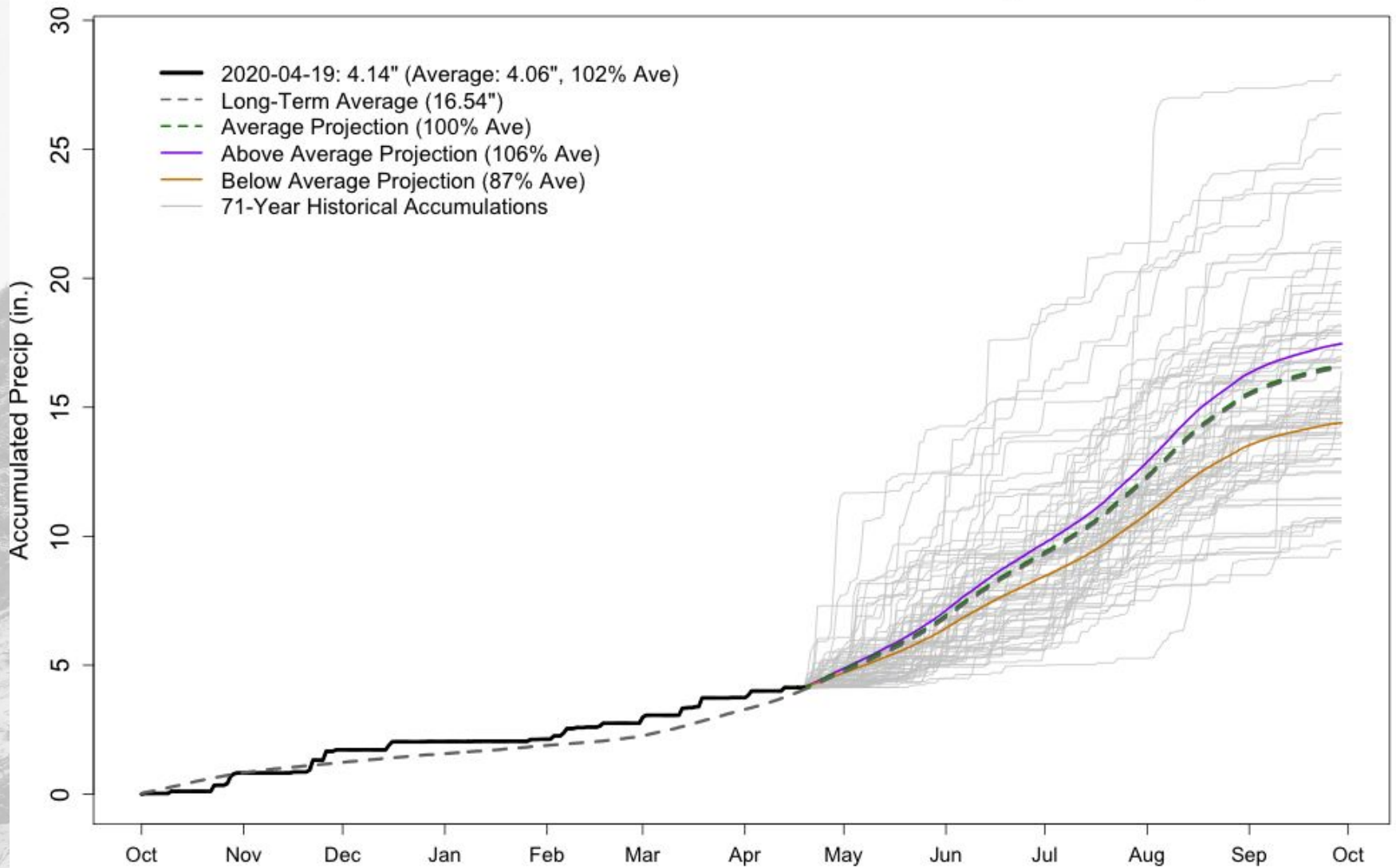
MESA VERDE NP WY2020 Precipitation Projections



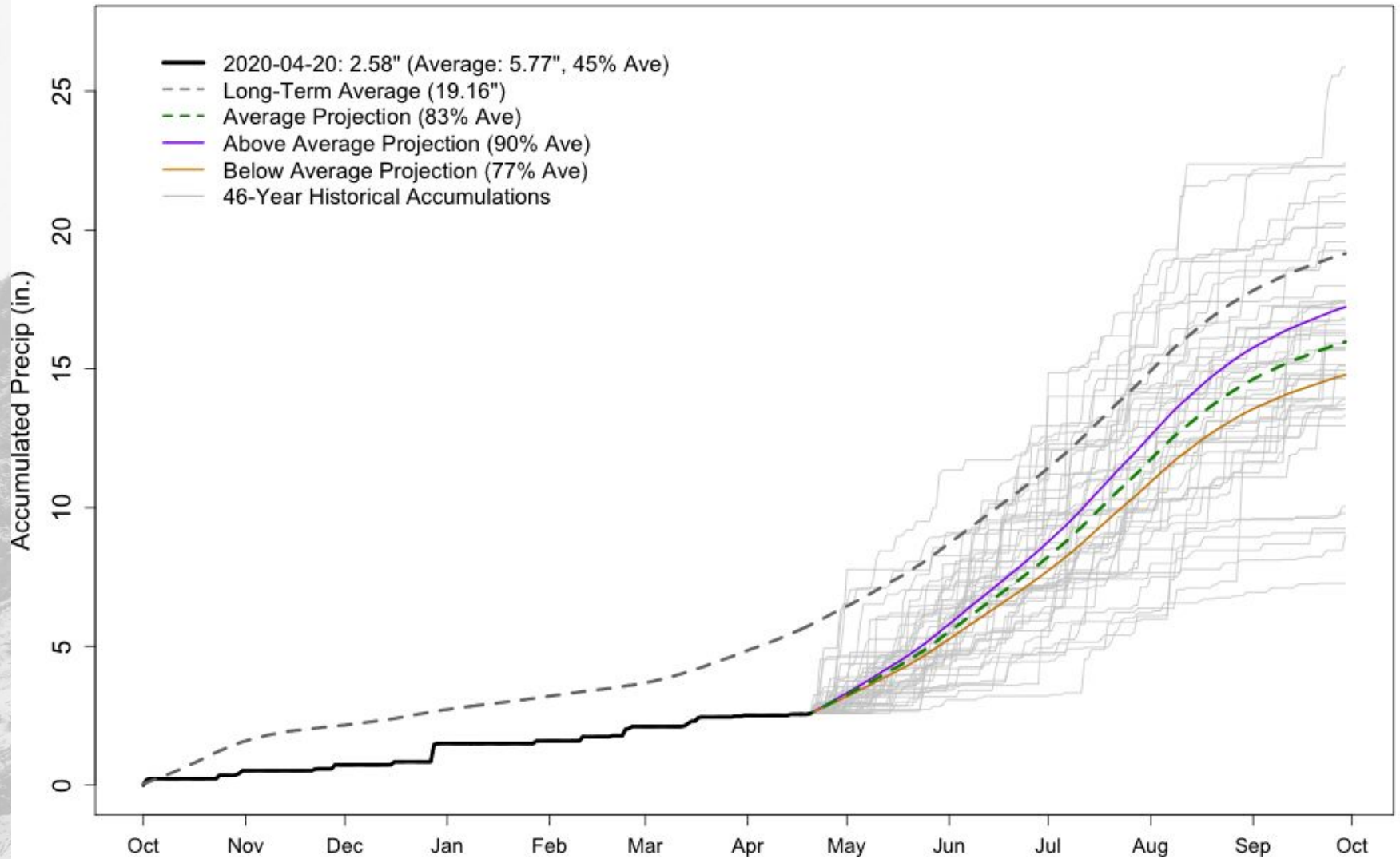
ALAMOSA SAN LUIS VALLEY REGIONAL AP WY2020 Precipitation Projections



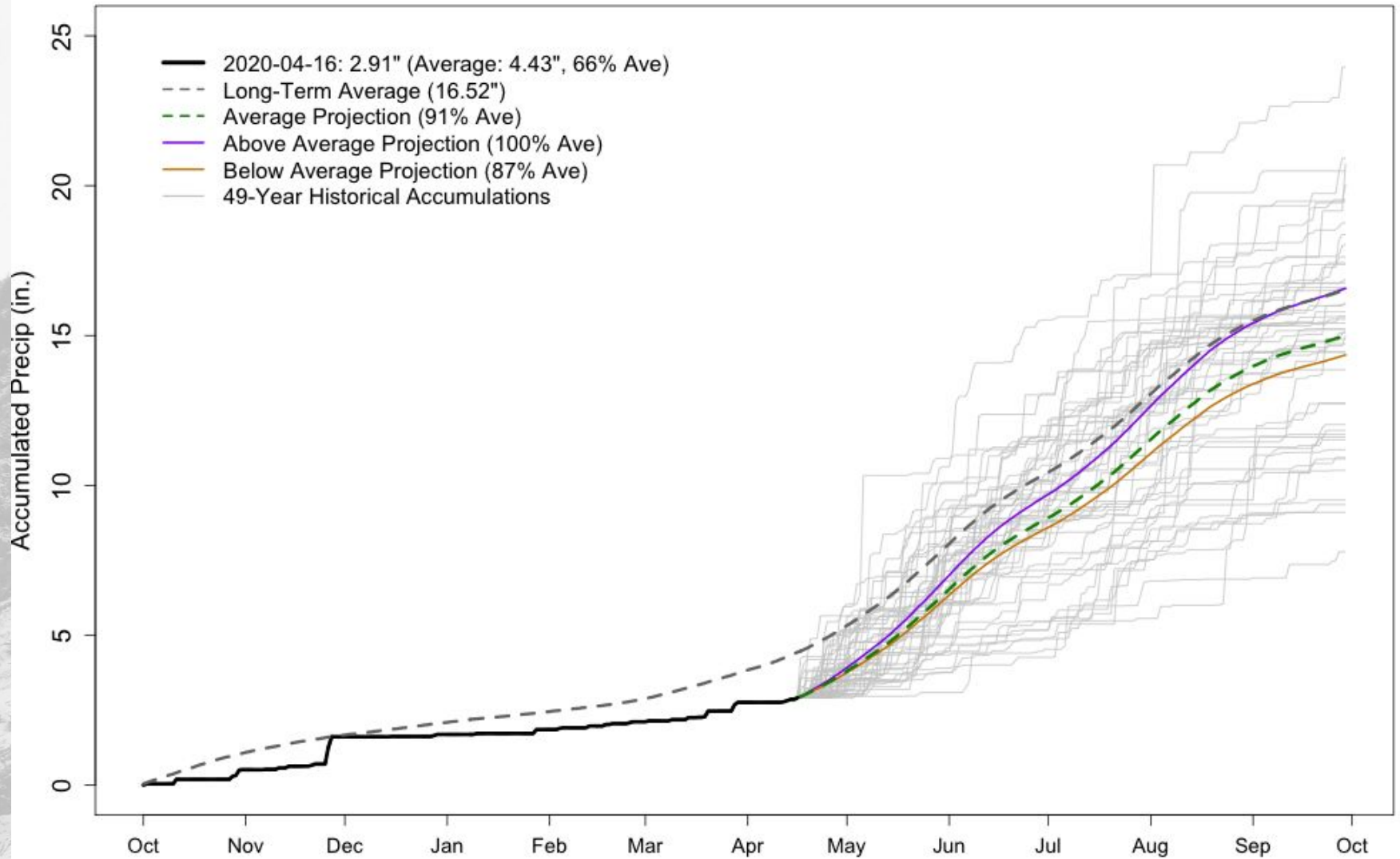
COLORADO SPRINGS MUNICIPAL AP WY2020 Precipitation Projections



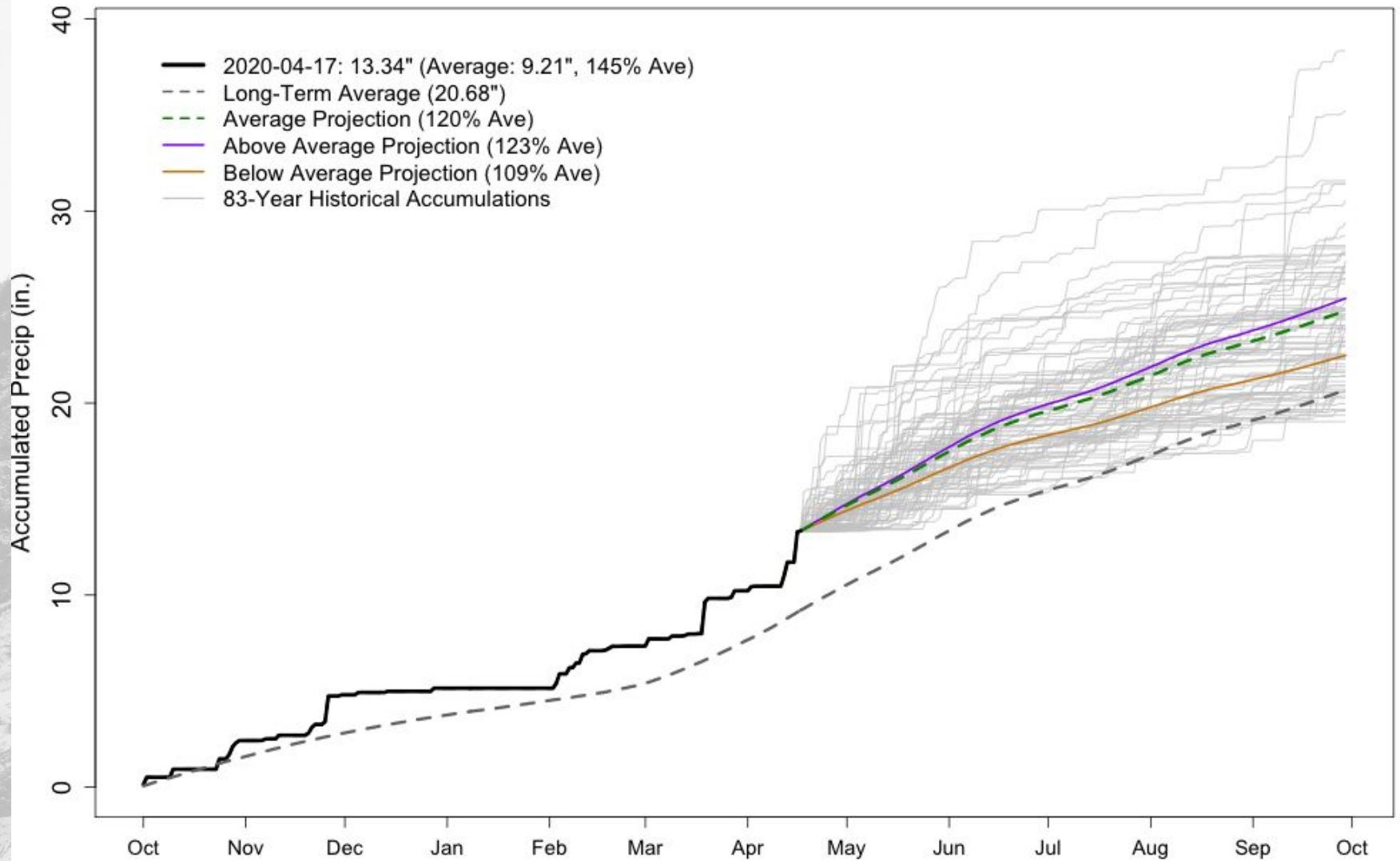
WALSH 1 W WY2020 Precipitation Projections



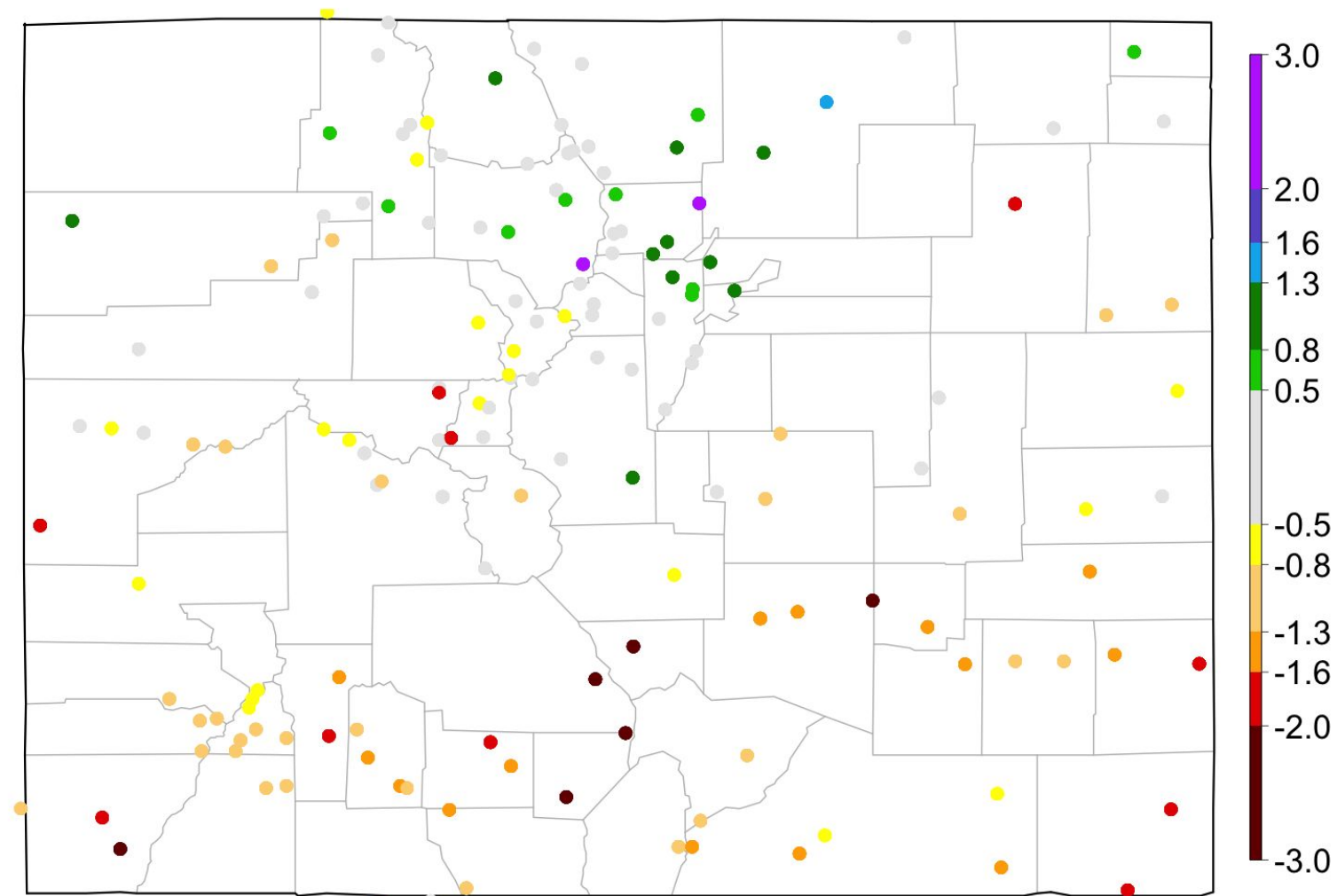
AKRON 4 E WY2020 Precipitation Projections



BOULDER WY2020 Precipitation Projections

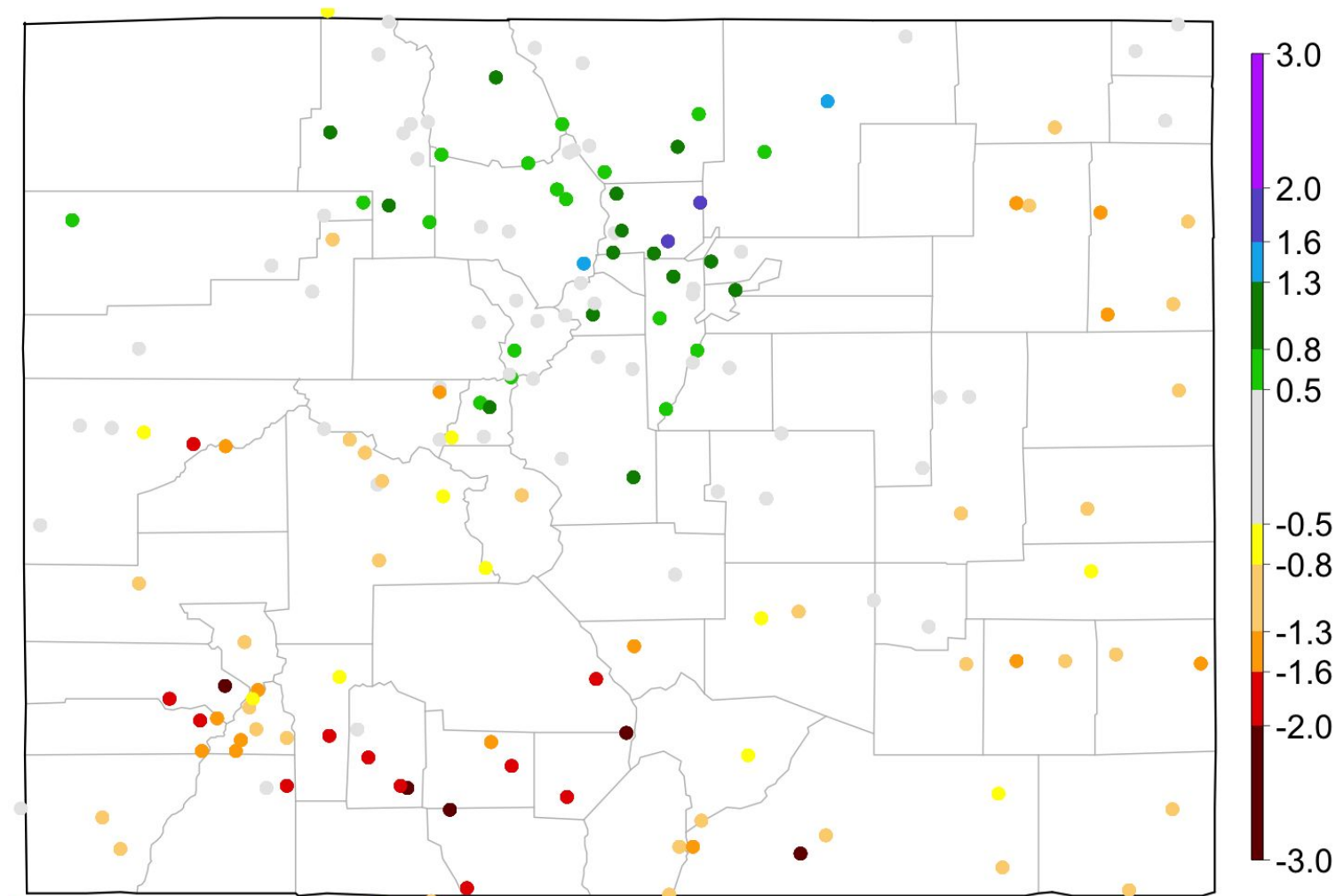


30-day SPI: 2020/03/20 - 2020/04/18



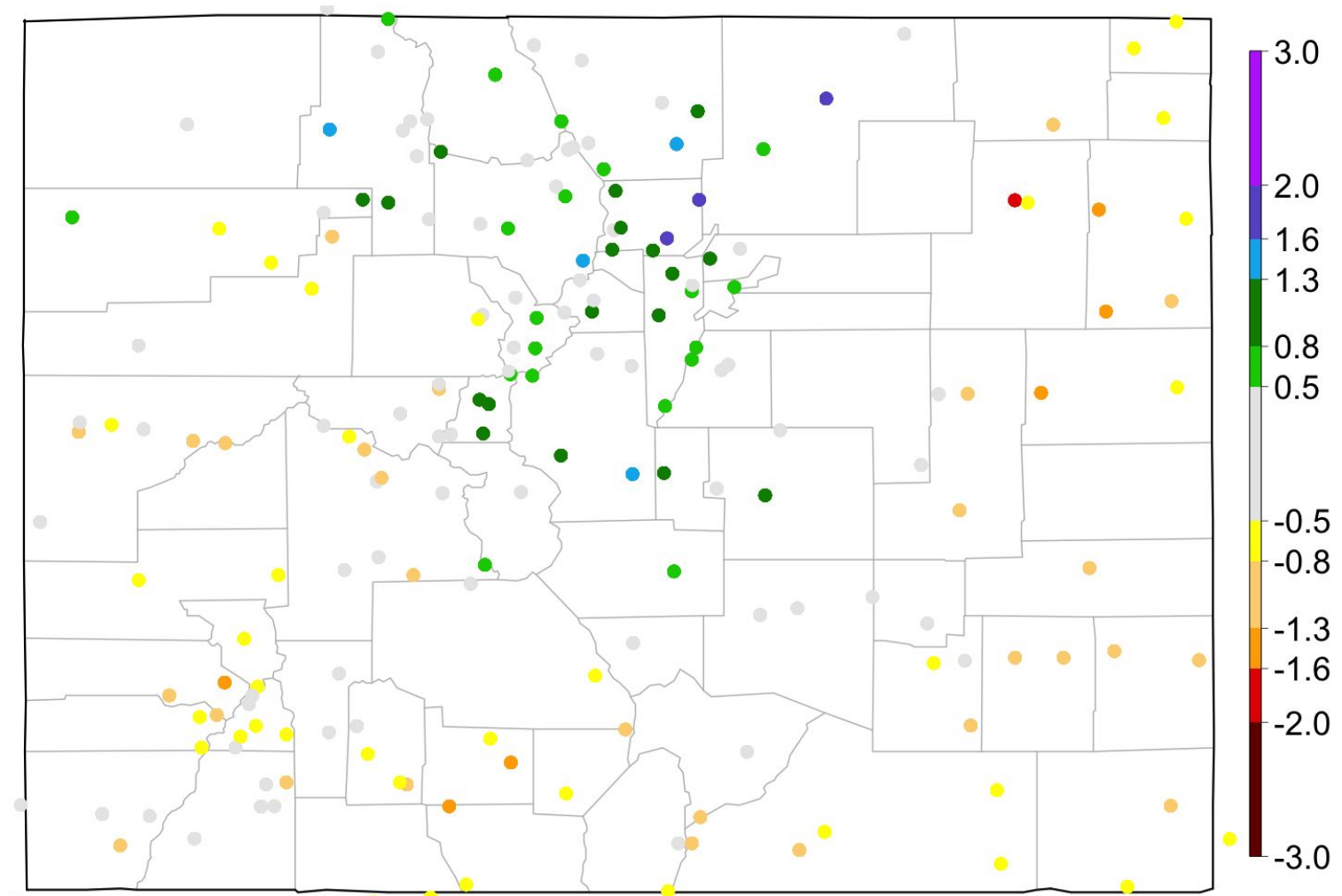
Data from High Plains Regional Climate Center and ACIS

90-day SPI: 2020/01/19 - 2020/04/18



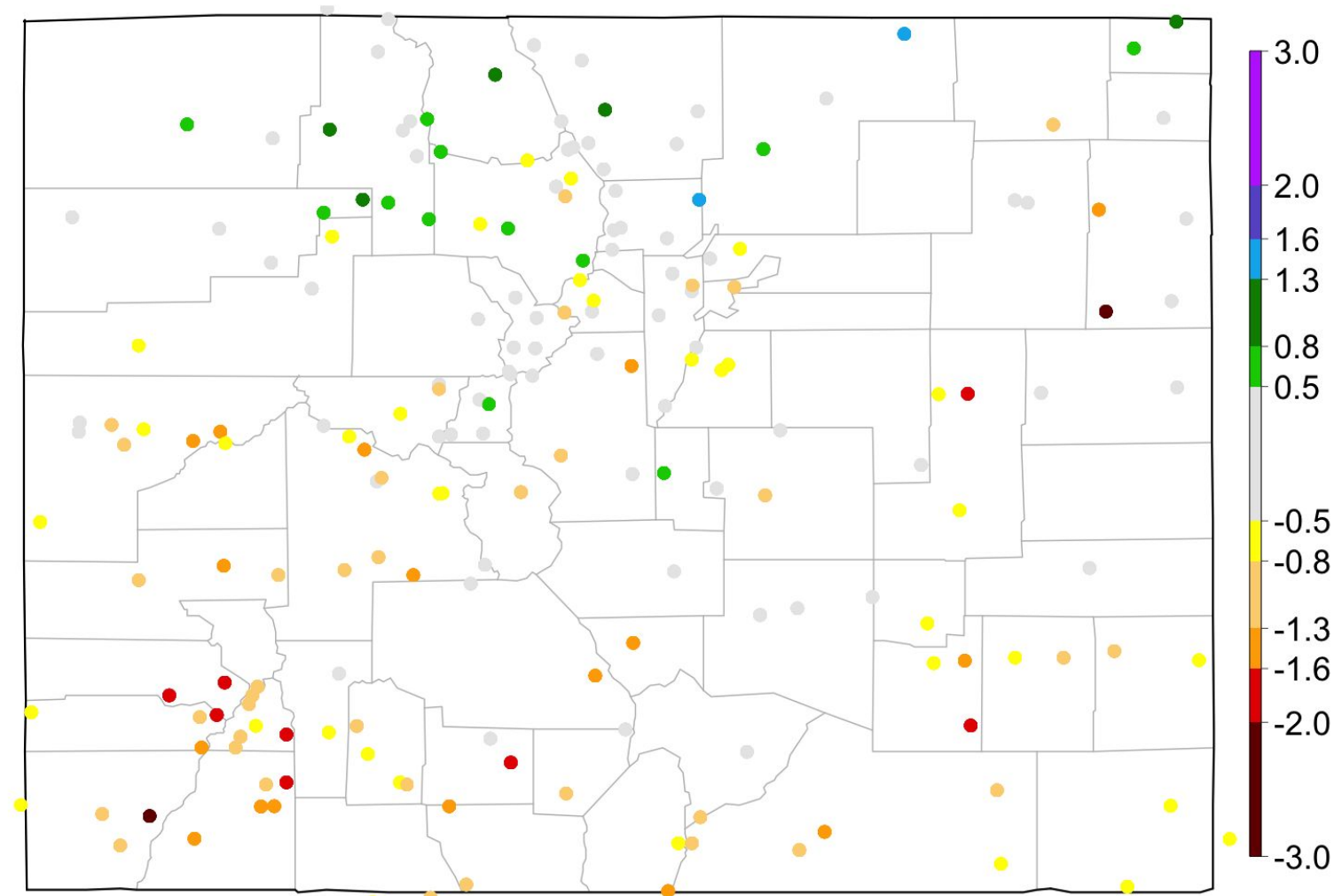
Data from High Plains Regional Climate Center and ACIS

6-month SPI: 2019/10/19 - 2020/04/18



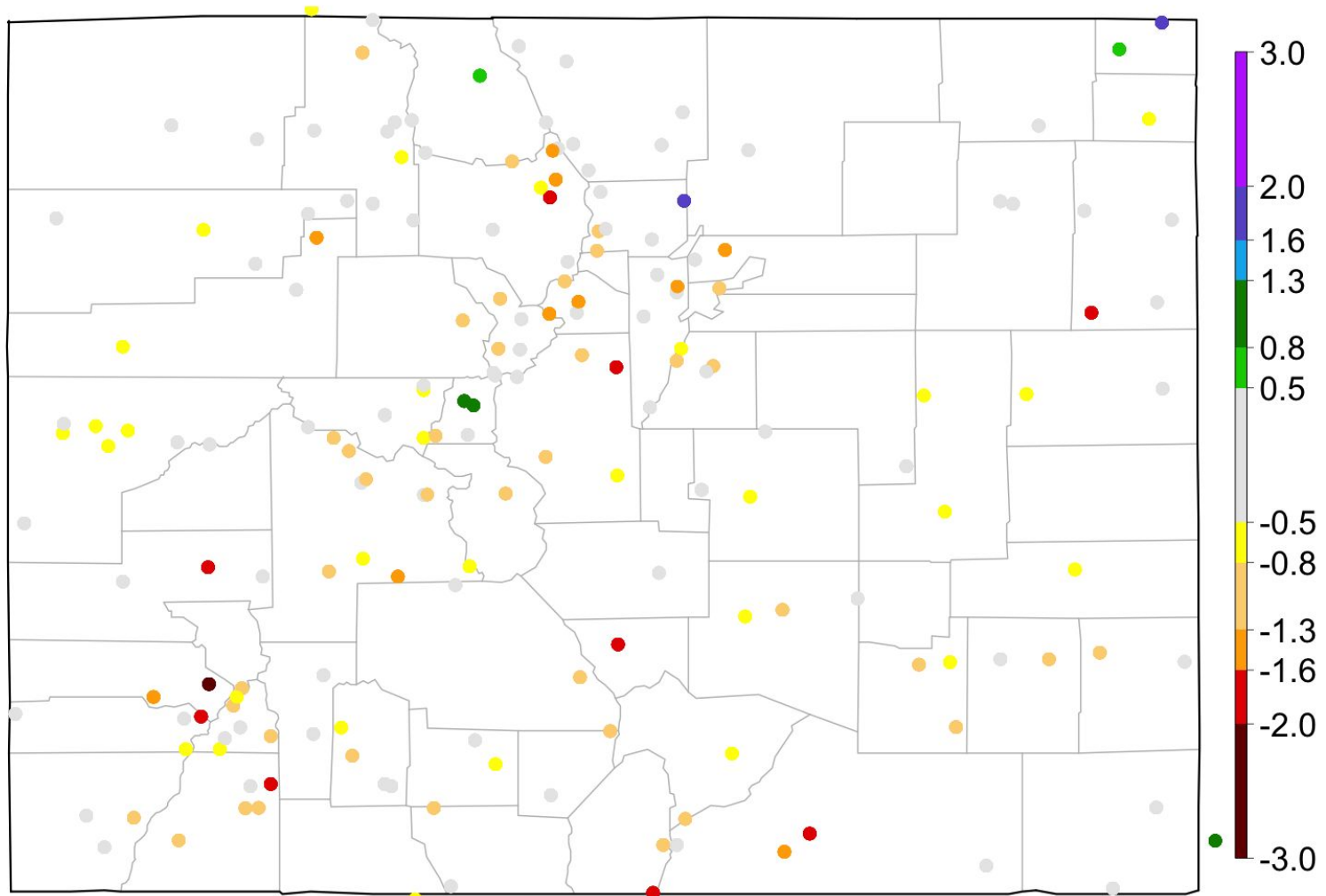
Data from High Plains Regional Climate Center and ACIS

12-month SPI: 2019/04/19 - 2020/04/18



Data from High Plains Regional Climate Center and ACIS

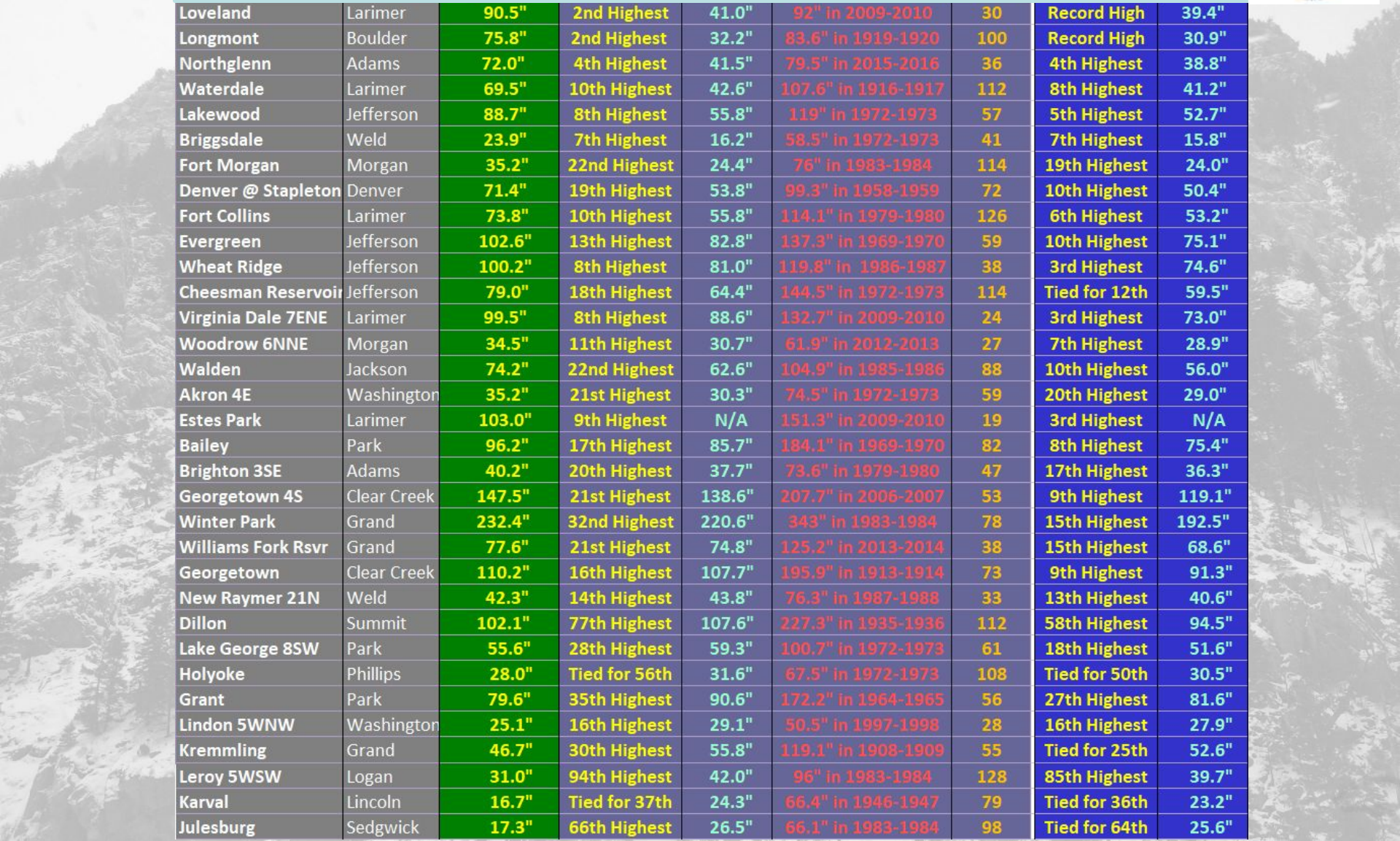
24-month SPI: 2018/04/19 - 2020/04/18



Data from High Plains Regional Climate Center and ACIS

Northern Colorado Snow

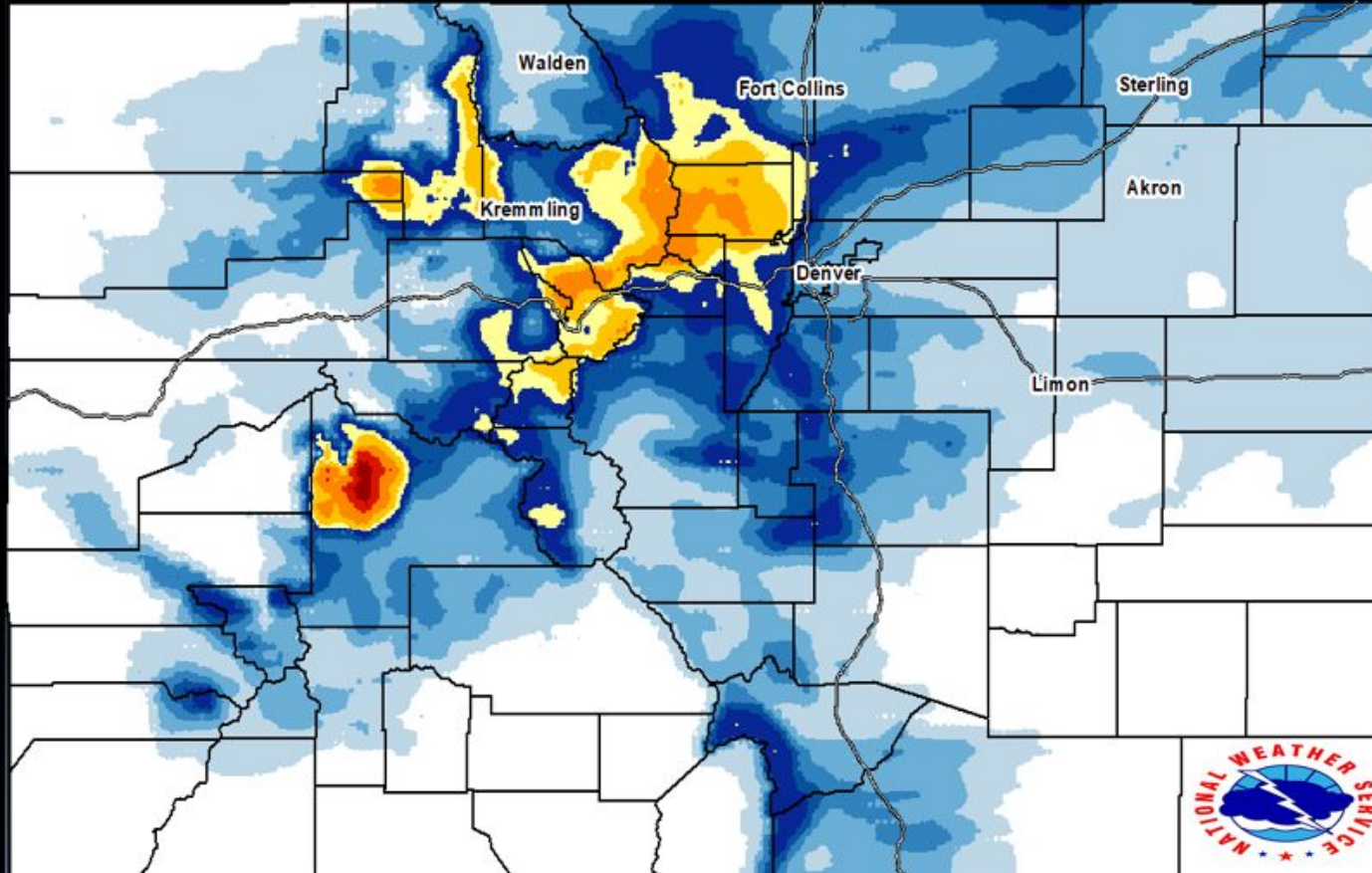
Location	County	Seasonal Snowfall so far 2019-2020	Ranking Seasonal Snowfall	Normal Seasonal Snowfall	Record Seasonal Snowfall	Years of Record	Ranking Snowfall thru mid-April	Normal Snowfall mid-April
Boulder	Boulder	151.2"	Record High	88.3"	142.9" in 1908-1909	122	Record High	83.6"
Loveland	Larimer	90.5"	2nd Highest	41.0"	92" in 2009-2010	30	Record High	39.4"
Longmont	Boulder	75.8"	2nd Highest	32.2"	83.6" in 1919-1920	100	Record High	30.9"
Northglenn	Adams	72.0"	4th Highest	41.5"	79.5" in 2015-2016	36	4th Highest	38.8"
Waterdale	Larimer	69.5"	10th Highest	42.6"	107.6" in 1916-1917	112	8th Highest	41.2"
Lakewood	Jefferson	88.7"	8th Highest	55.8"	119" in 1972-1973	57	5th Highest	52.7"
Briggsdale	Weld	23.9"	7th Highest	16.2"	58.5" in 1972-1973	41	7th Highest	15.8"
Fort Morgan	Morgan	35.2"	22nd Highest	24.4"	76" in 1983-1984	114	19th Highest	24.0"
Denver @ Stapleton	Denver	71.4"	19th Highest	53.8"	99.3" in 1958-1959	72	10th Highest	50.4"
Fort Collins	Larimer	73.8"	10th Highest	55.8"	114.1" in 1979-1980	126	6th Highest	53.2"
Evergreen	Jefferson	102.6"	13th Highest	82.8"	137.3" in 1969-1970	59	10th Highest	75.1"
Wheat Ridge	Jefferson	100.2"	8th Highest	81.0"	119.8" in 1986-1987	38	3rd Highest	74.6"
Cheesman Reservoir	Jefferson	79.0"	18th Highest	64.4"	144.5" in 1972-1973	114	Tied for 12th	59.5"
Virginia Dale 7ENE	Larimer	99.5"	8th Highest	88.6"	132.7" in 2009-2010	24	3rd Highest	73.0"
Woodrow 6NNE	Morgan	34.5"	11th Highest	30.7"	61.9" in 2012-2013	27	7th Highest	28.9"
Walden	Jackson	74.2"	22nd Highest	62.6"	104.9" in 1985-1986	88	10th Highest	56.0"
Akron 4E	Washington	35.2"	21st Highest	30.3"	74.5" in 1972-1973	59	20th Highest	29.0"
Estes Park	Larimer	103.0"	9th Highest	N/A	151.3" in 2009-2010	19	3rd Highest	N/A
Bailey	Park	96.2"	17th Highest	85.7"	184.1" in 1969-1970	82	8th Highest	75.4"
Brighton 3SE	Adams	40.2"	20th Highest	37.7"	73.6" in 1979-1980	47	17th Highest	36.3"
Georgetown 4S	Clear Creek	147.5"	21st Highest	138.6"	207.7" in 2006-2007	53	9th Highest	119.1"
Winter Park	Grand	232.4"	32nd Highest	220.6"	343" in 1983-1984	78	15th Highest	192.5"
Williams Fork Rsvr	Grand	77.6"	21st Highest	74.8"	125.2" in 2013-2014	38	15th Highest	68.6"
Georgetown	Clear Creek	110.2"	16th Highest	107.7"	195.9" in 1913-1914	73	9th Highest	91.3"
New Raymer 21N	Weld	42.3"	14th Highest	43.8"	76.3" in 1987-1988	33	13th Highest	40.6"
Dillon	Summit	102.1"	77th Highest	107.6"	227.3" in 1935-1936	112	58th Highest	94.5"
Lake George 8SW	Park	55.6"	28th Highest	59.3"	100.7" in 1972-1973	61	18th Highest	51.6"
Holyoke	Phillips	28.0"	Tied for 56th	31.6"	67.5" in 1972-1973	108	Tied for 50th	30.5"
Grant	Park	79.6"	35th Highest	90.6"	172.2" in 1964-1965	56	27th Highest	81.6"
Lindon 5WNW	Washington	25.1"	16th Highest	29.1"	50.5" in 1997-1998	28	16th Highest	27.9"
Kremmling	Grand	46.7"	30th Highest	55.8"	119.1" in 1908-1909	55	Tied for 25th	52.6"
Leroy 5SW	Logan	31.0"	94th Highest	42.0"	96" in 1983-1984	128	85th Highest	39.7"
Karval	Lincoln	16.7"	Tied for 37th	24.3"	66.4" in 1946-1947	79	Tied for 36th	23.2"
Julesburg	Sedgwick	17.3"	66th Highest	26.5"	66.1" in 1983-1984	98	Tied for 64th	25.6"



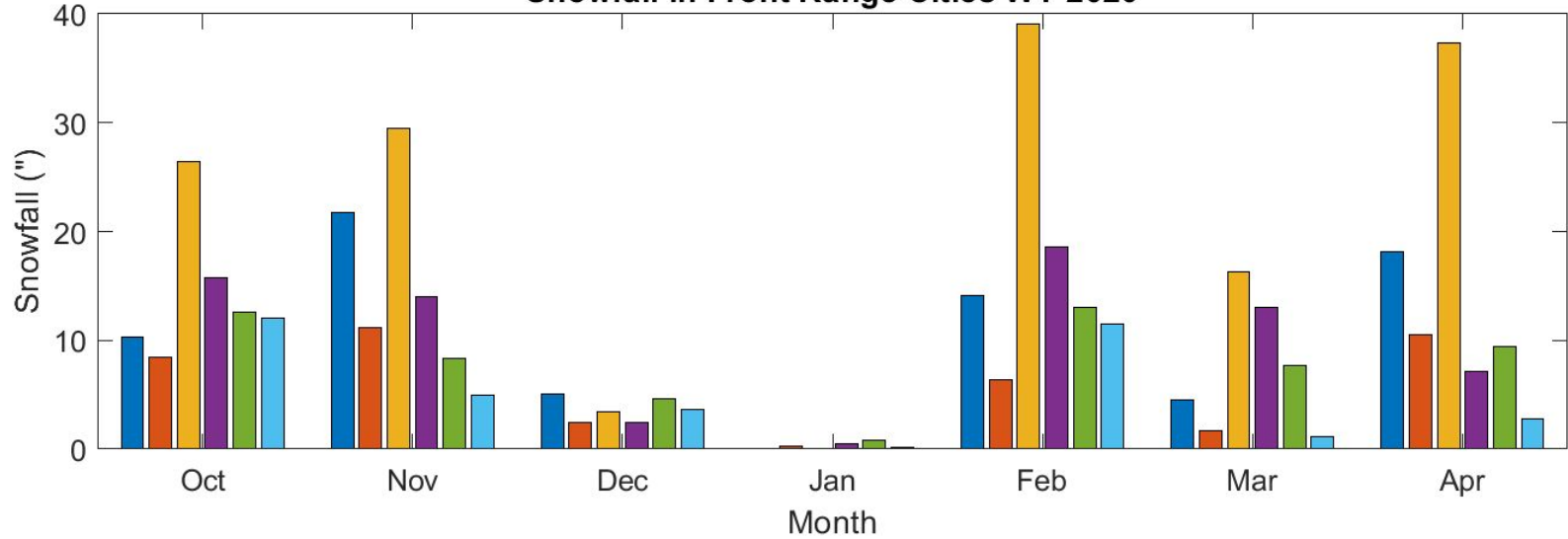
CoCoRaHS Snowfall Reports 4/13/2020

NWS Boulder/Denver Snow Analysis
36 Hour Snow Totals
6 pm Saturday until 6 am Monday
Local Observations/NOHRSC

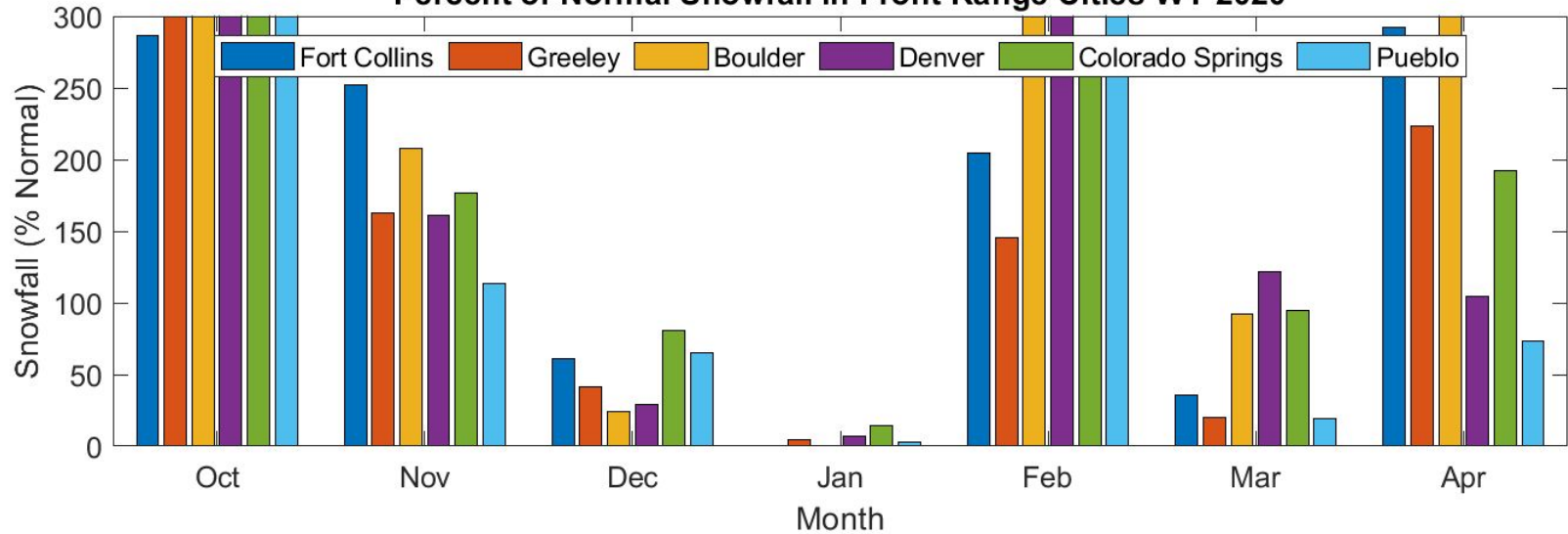
Snowfall Analysis 0" - 100"



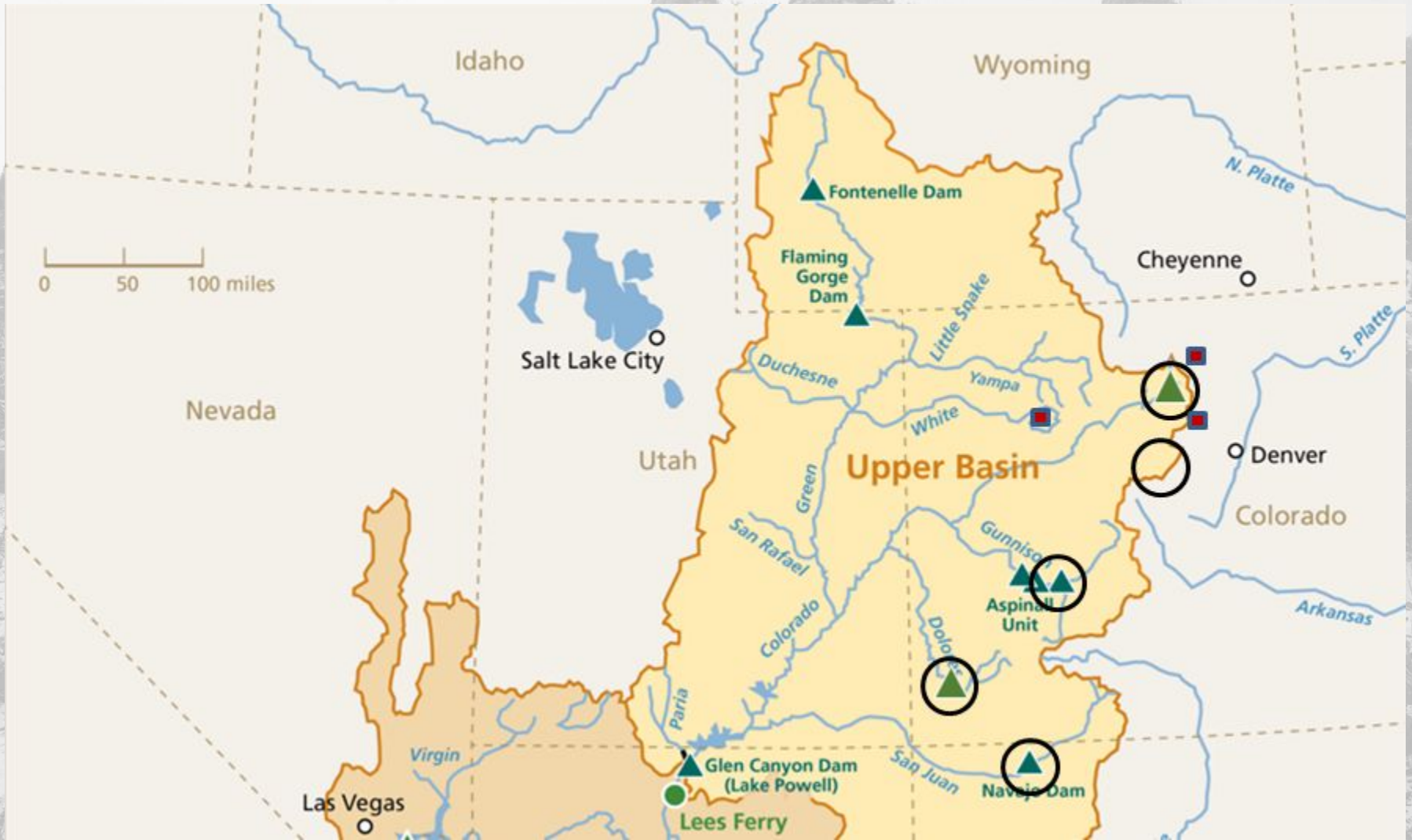
Snowfall in Front Range Cities WY 2020



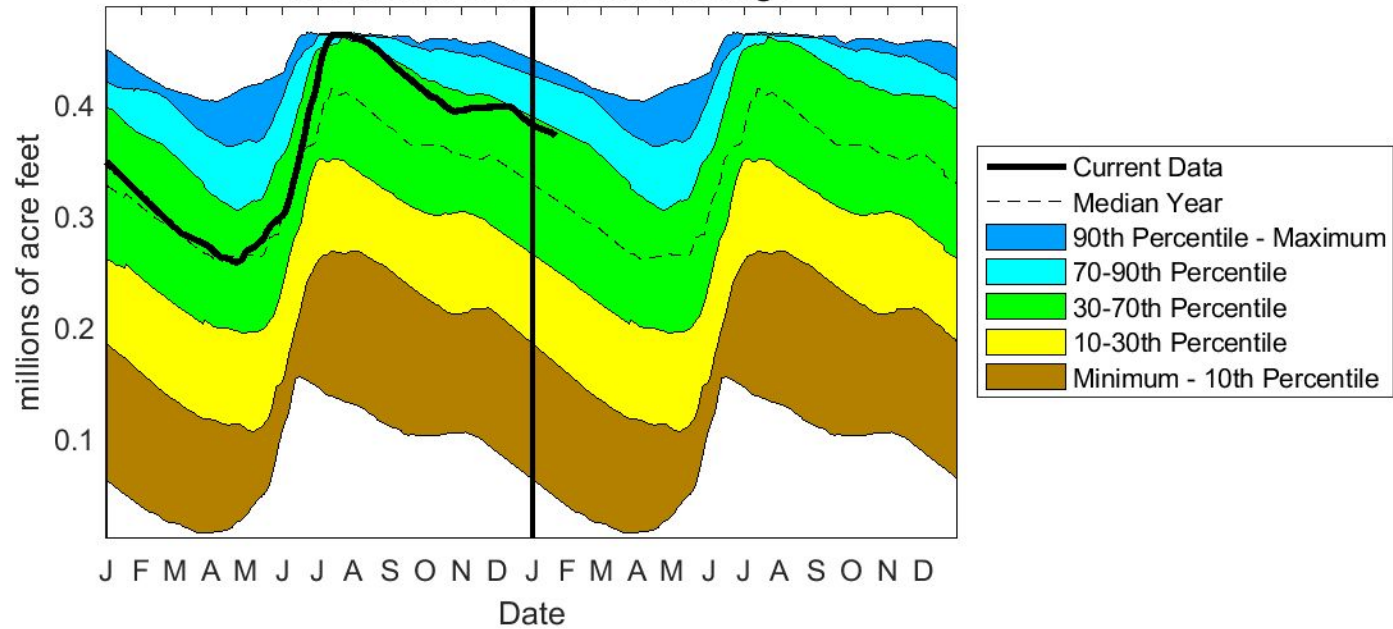
Percent of Normal Snowfall in Front Range Cities WY 2020



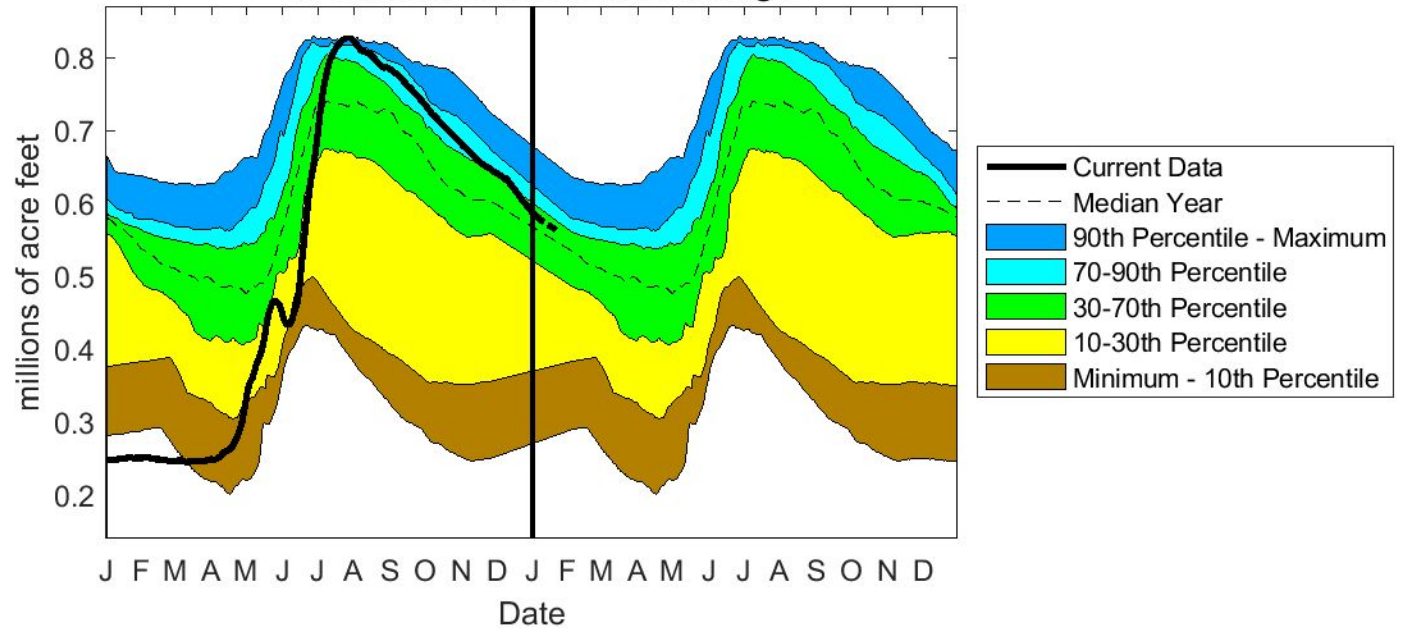
Reservoir and Soils Update



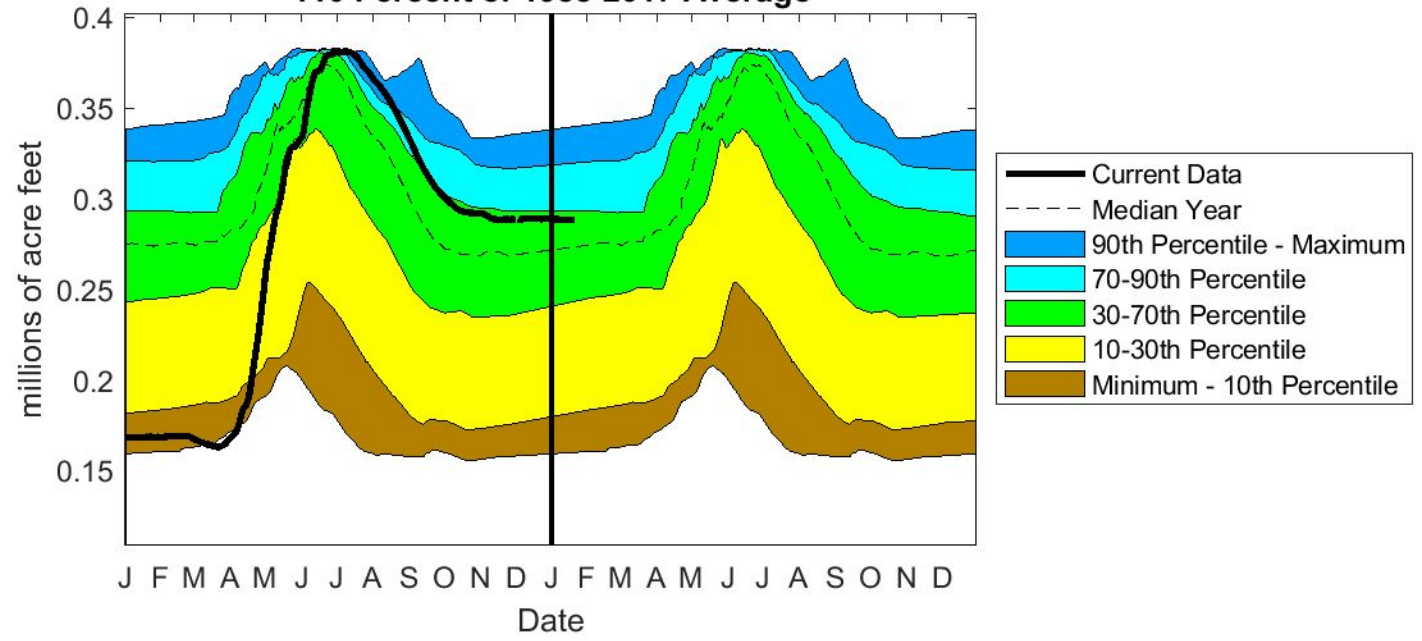
Lake Granby Level 2020-01-21 123 Percent of 1986-2017 Average



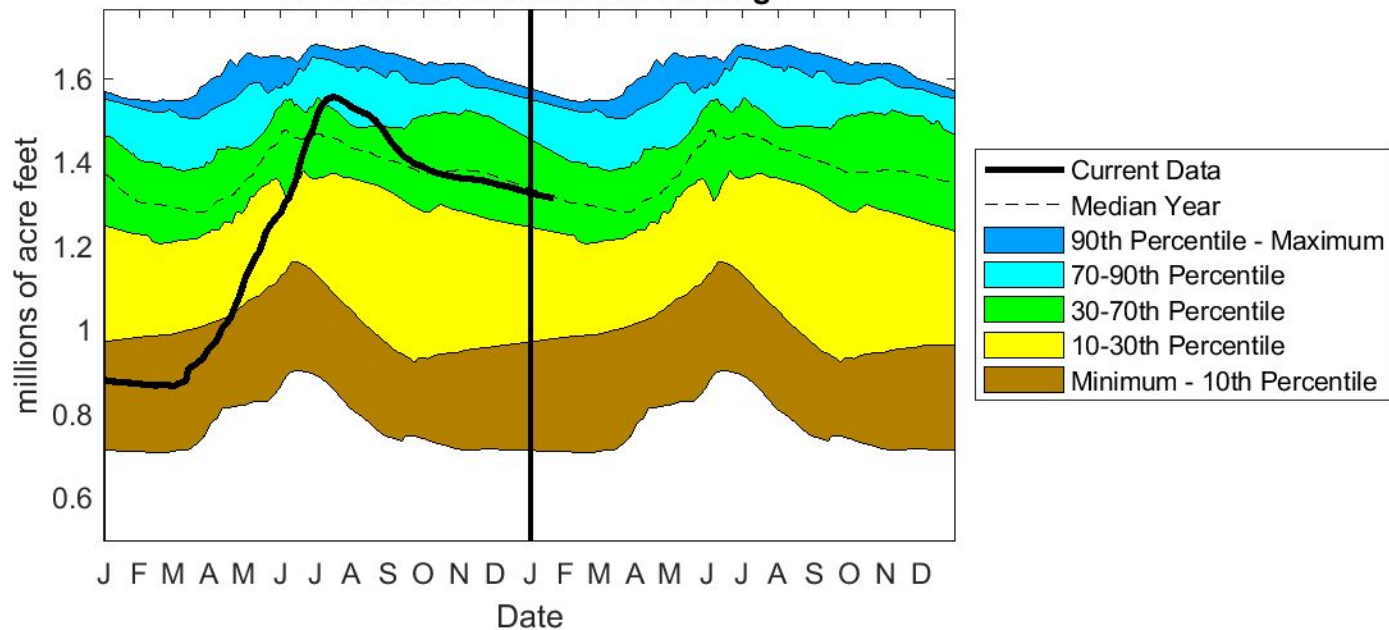
Blue Mesa Reservoir Level 2020-01-21
107 Percent of 1981-2017 Average

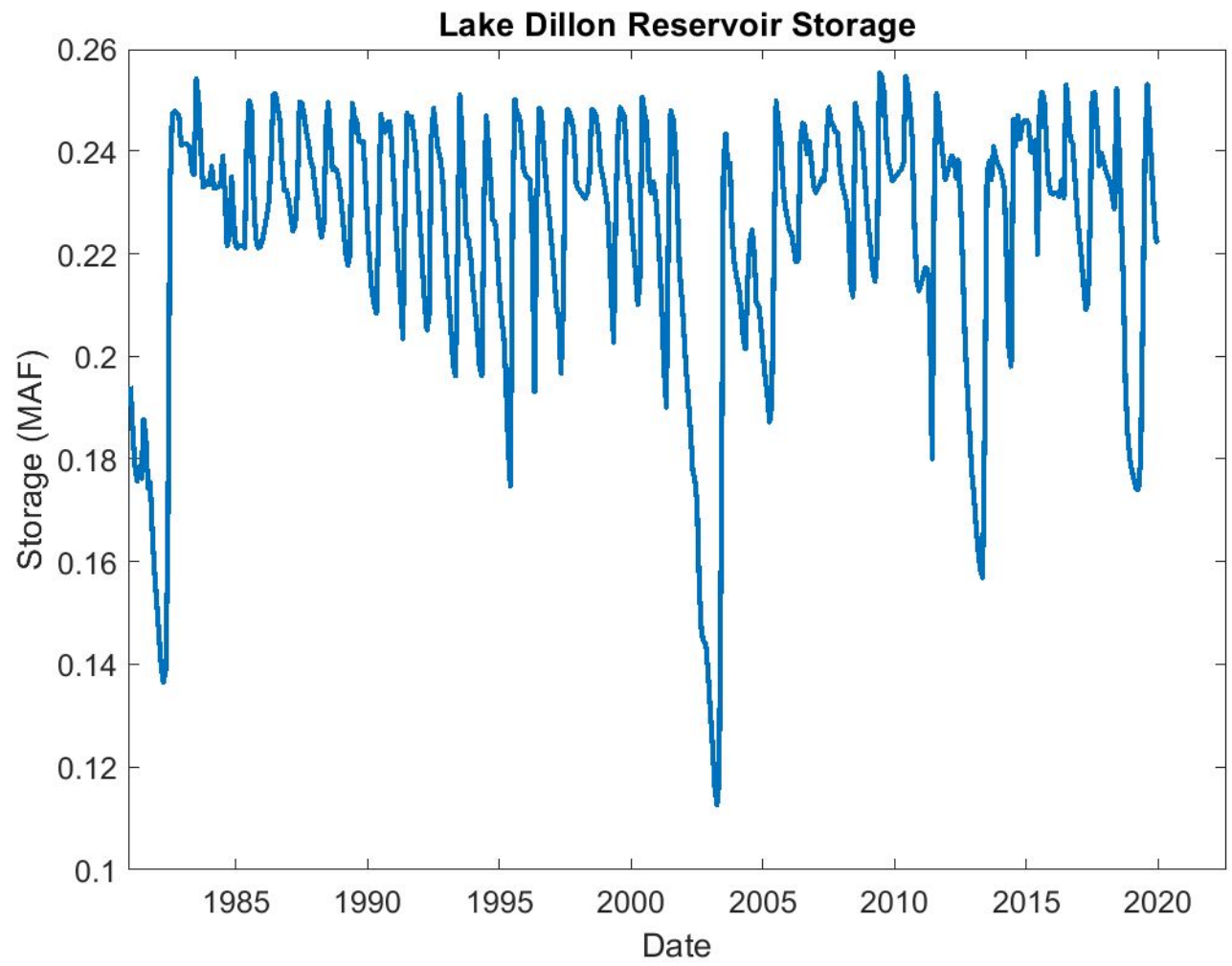


McPhee Reservoir Level 2020-01-21 110 Percent of 1988-2017 Average

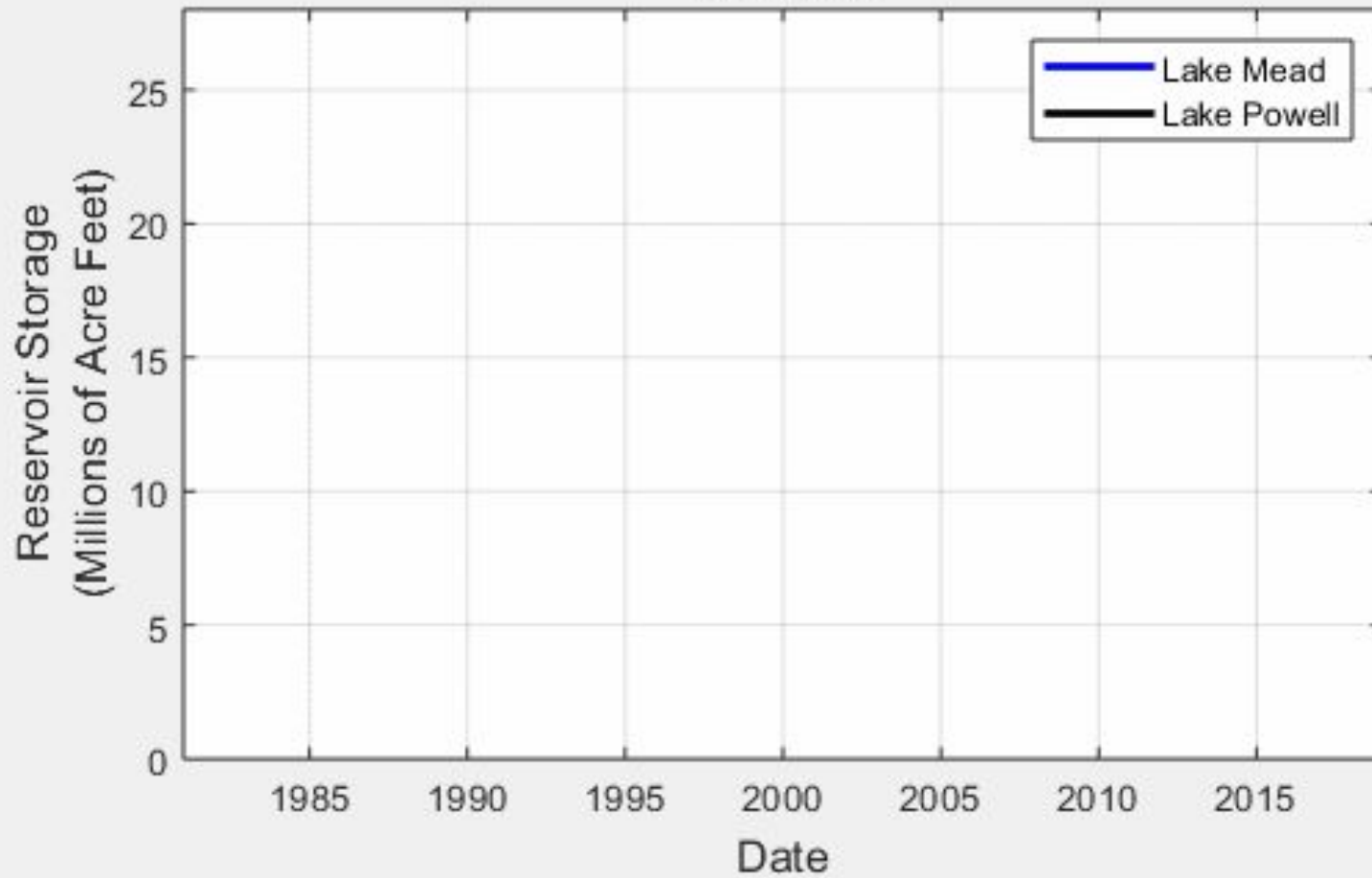


Navajo Reservoir Level 2020-01-21 101 Percent of 1981-2017 Average

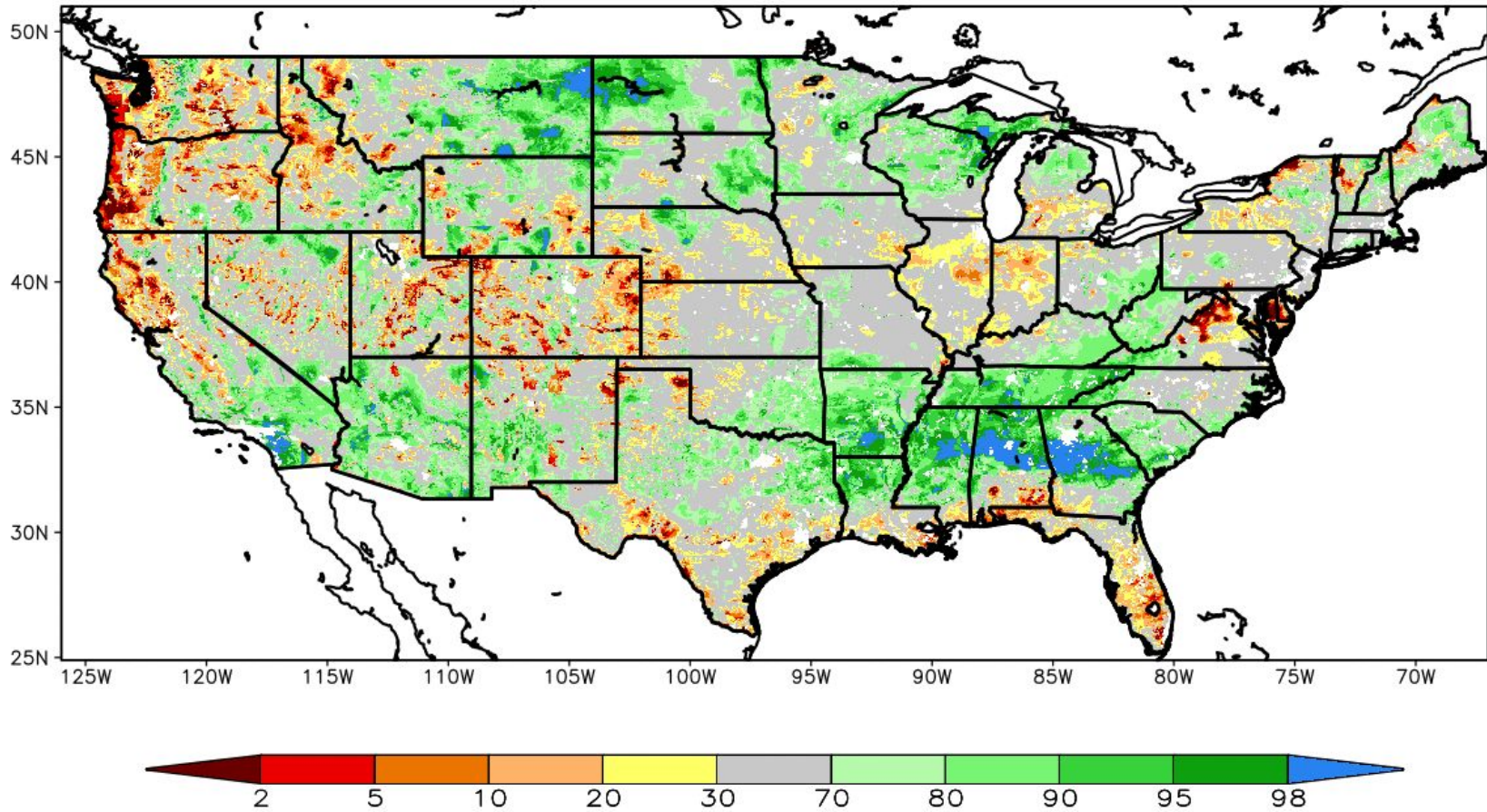




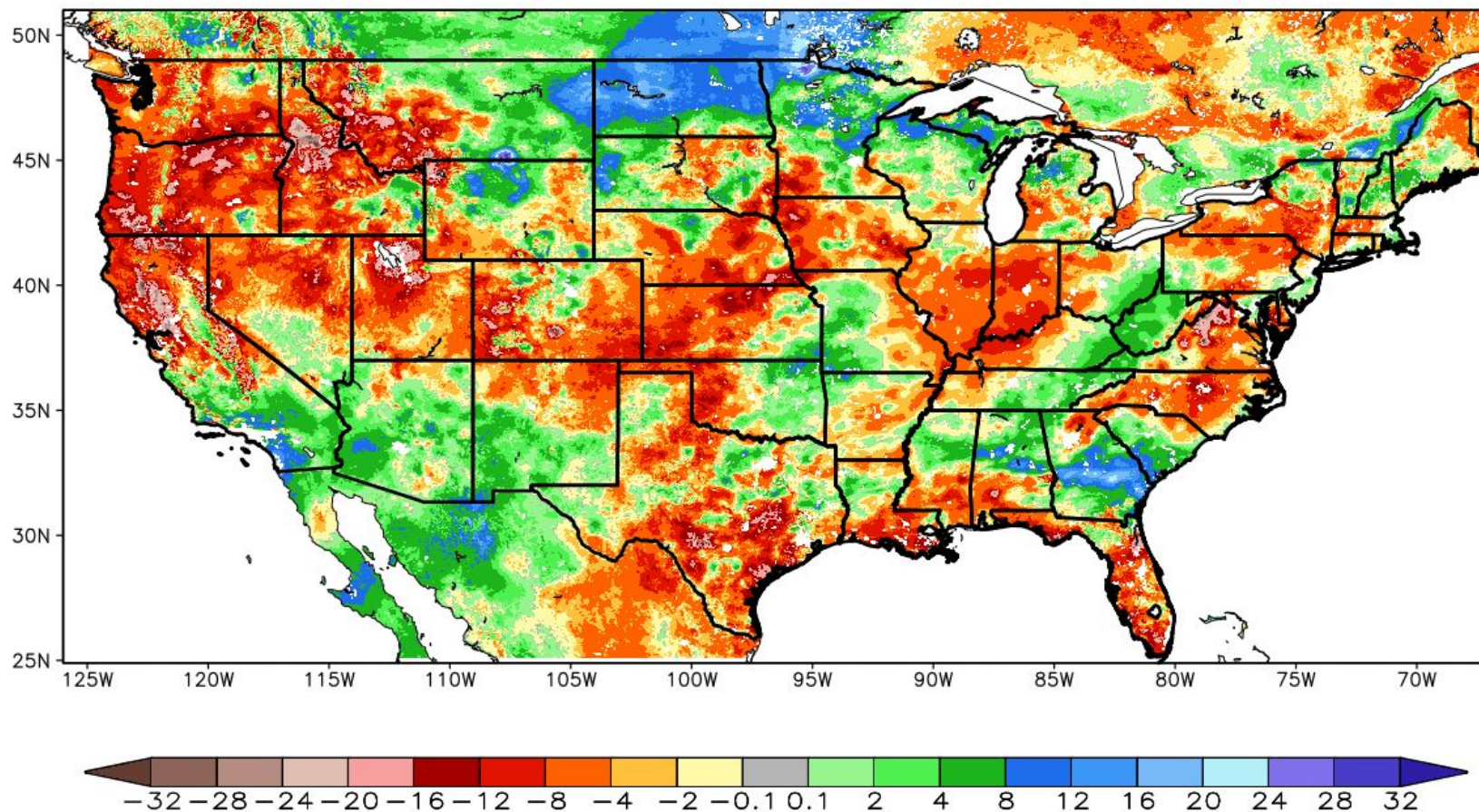
Reservoir Levels on the Colorado River Jan 1981



SPoRT-LIS 0-2 m RSM percentile valid 20 Apr 2020



1-Year Difference in Column Relative Soil Moisture (%) valid 12z 20 Apr 2020

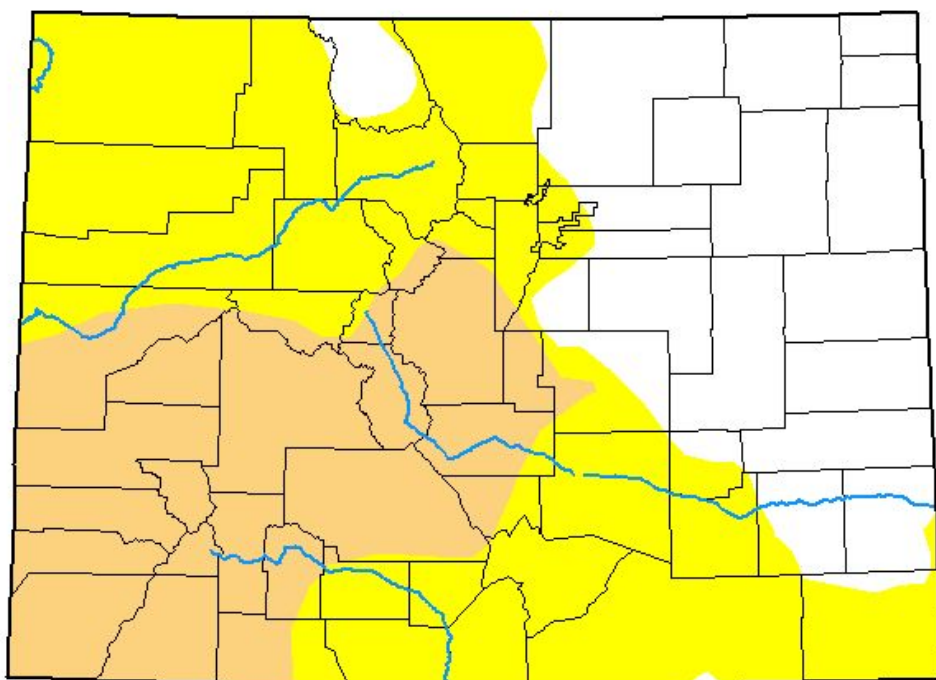


U.S. Drought Monitor Colorado

October 1, 2019
(Released Thursday, Oct. 3, 2019)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	30.14	69.86	27.53	0.00	0.00	0.00
Last Week <i>09-24-2019</i>	34.06	65.94	10.81	0.00	0.00	0.00
3 Months Ago <i>07-02-2019</i>	100.00	0.00	0.00	0.00	0.00	0.00
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>10-01-2019</i>	30.14	69.86	27.53	0.00	0.00	0.00
One Year Ago <i>10-02-2018</i>	14.19	85.81	72.30	64.41	48.47	16.21



Intensity:

- None
- 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:

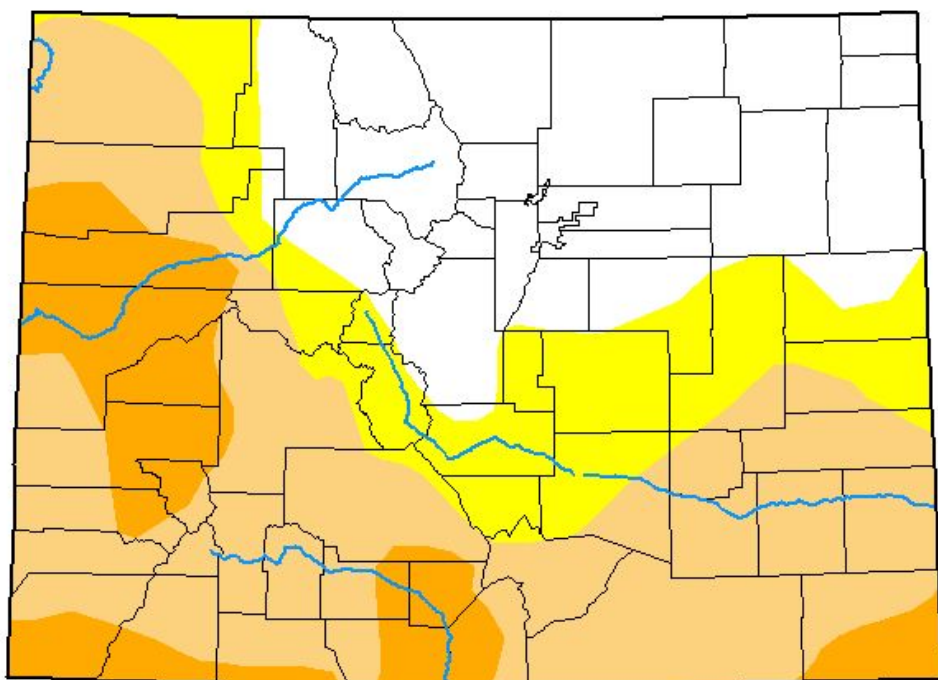
Brian Fuchs
National Drought Mitigation Center



droughtmonitor.unl.edu

U.S. Drought Monitor Colorado

January 14, 2020
(Released Thursday, Jan. 16, 2020)
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	31.72	68.28	51.19	13.84	0.00	0.00
Last Week <i>01-07-2020</i>	31.72	68.28	51.19	13.84	0.00	0.00
3 Months Ago <i>10-15-2019</i>	25.44	74.56	37.01	11.23	0.00	0.00
Start of Calendar Year <i>12-31-2019</i>	31.72	68.28	51.19	20.11	0.00	0.00
Start of Water Year <i>10-01-2019</i>	30.14	69.86	27.53	0.00	0.00	0.00
One Year Ago <i>01-15-2019</i>	15.91	84.09	68.49	53.00	25.35	10.51

Intensity:

- None
- 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. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Curtis Riganti
National Drought Mitigation Center



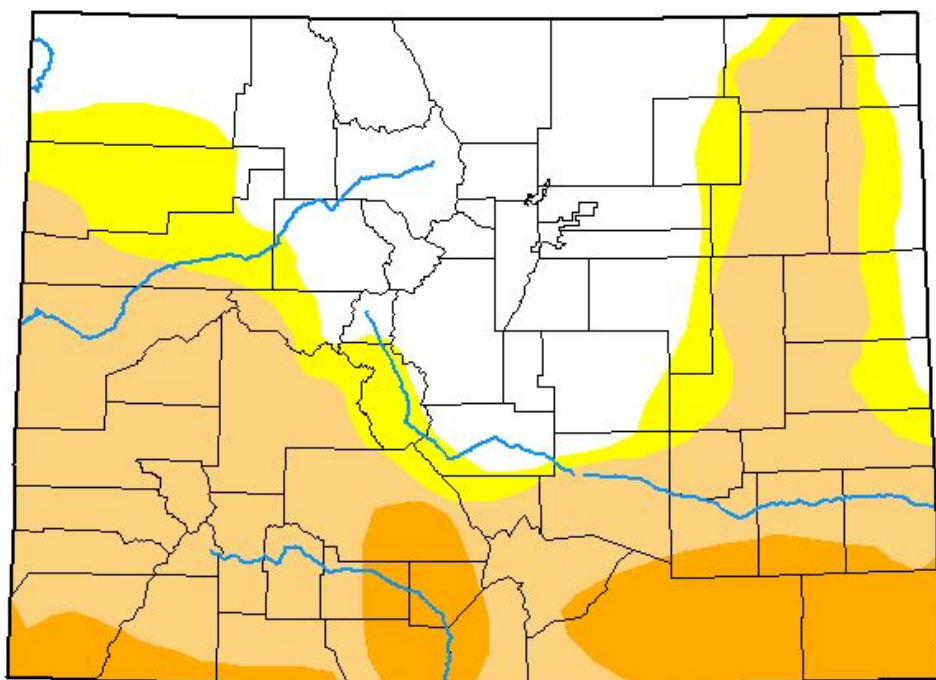
droughtmonitor.unl.edu

U.S. Drought Monitor Colorado

April 14, 2020
(Released Thursday, Apr. 16, 2020)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	33.26	66.74	53.23	12.88	0.00	0.00
Last Week <i>04-07-2020</i>	35.36	64.64	47.33	6.50	0.00	0.00
3 Months Ago <i>01-14-2020</i>	31.72	68.28	51.19	13.84	0.00	0.00
Start of Calendar Year <i>12-31-2019</i>	31.72	68.28	51.19	20.11	0.00	0.00
Start of Water Year <i>10-01-2019</i>	30.14	69.86	27.53	0.00	0.00	0.00
One Year Ago <i>04-16-2019</i>	78.01	21.99	4.74	0.00	0.00	0.00



Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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Author:

Brian Fuchs
National Drought Mitigation Center

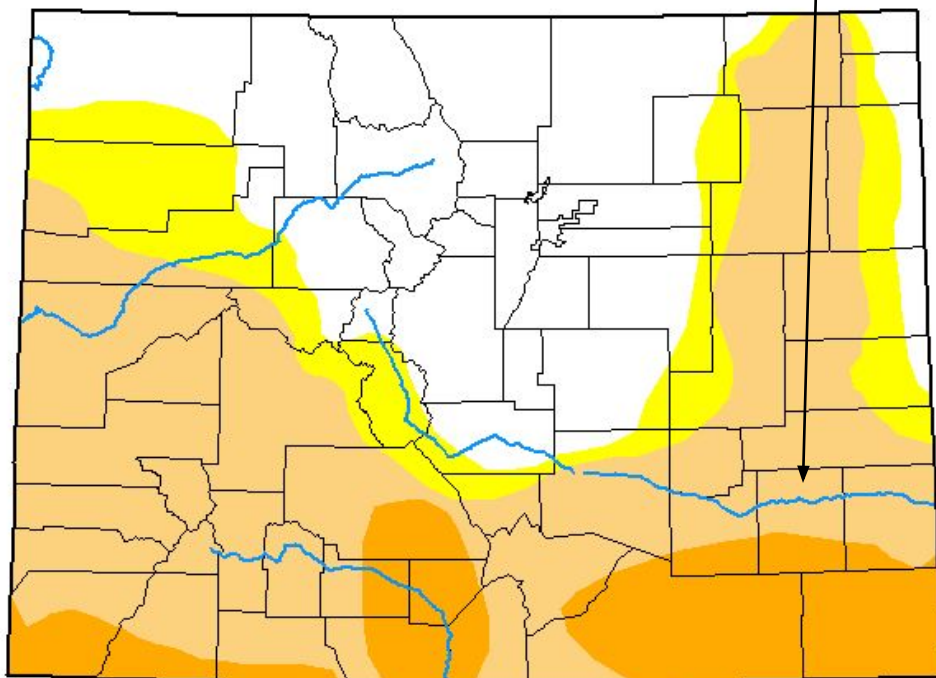


droughtmonitor.unl.edu

U.S. Drought Monitor Colorado

April 14, 2020
(Released Thursday, Apr. 16, 2020)
Valid 8 a.m. EDT

Worsening
Conditions in SE
CO



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	33.26	66.74	53.23	12.88	0.00	0.00
Last Week 04-07-2020	35.36	64.64	47.33	6.50	0.00	0.00
3 Months Ago 01-14-2020	31.72	68.28	51.19	13.84	0.00	0.00
Start of Calendar Year 12-31-2019	31.72	68.28	51.19	20.11	0.00	0.00
Start of Water Year 10-01-2019	30.14	69.86	27.53	0.00	0.00	0.00
One Year Ago 04-16-2019	78.01	21.99	4.74	0.00	0.00	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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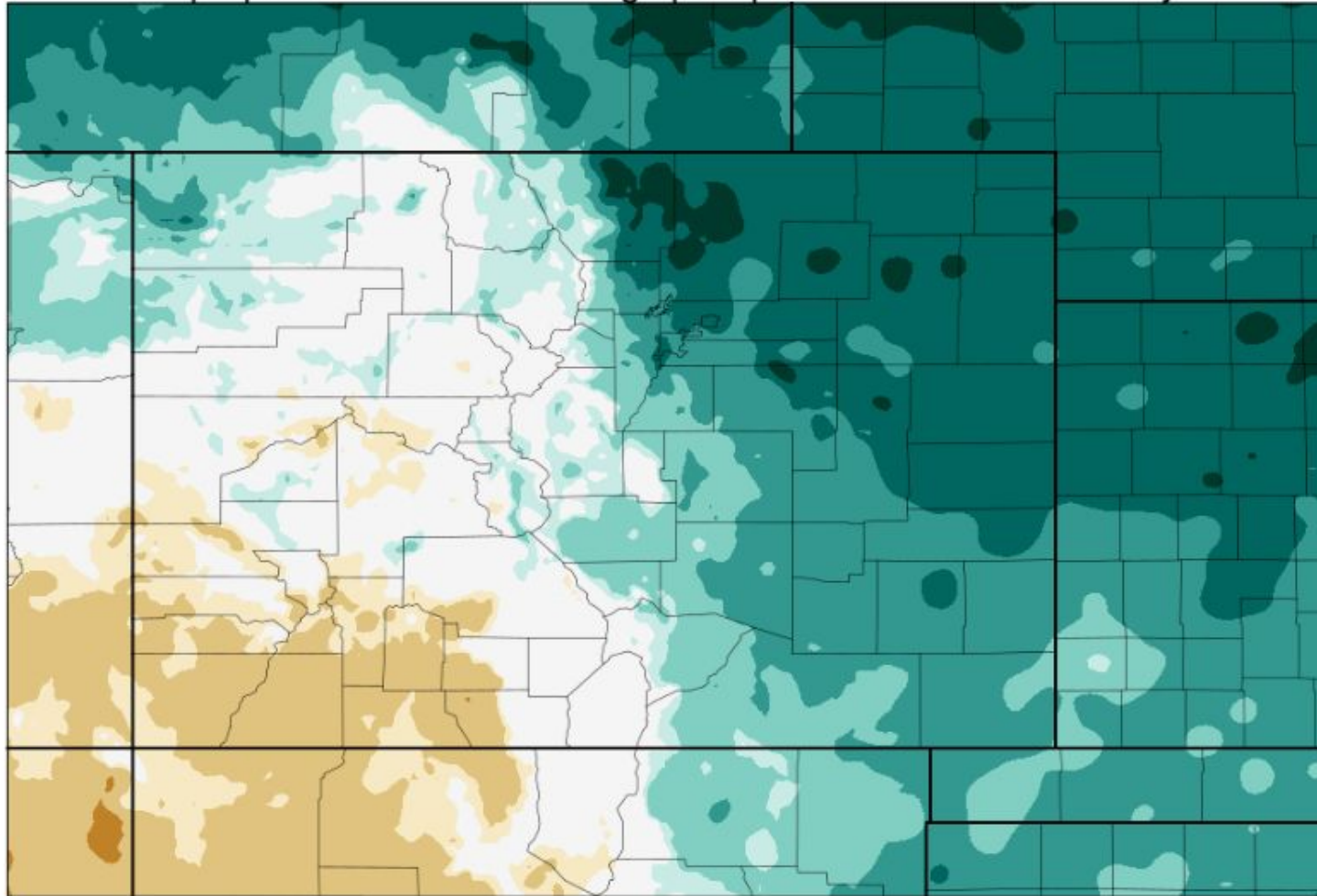
Brian Fuchs
National Drought Mitigation Center



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Seasonal Outlook

PRISM proportion of annual average precipitation in this month: May



0.1 0.25 0.5 0.75 0.85 1.15 1.25 1.5 1.75 2

Proportion of precip relative to 1/12th

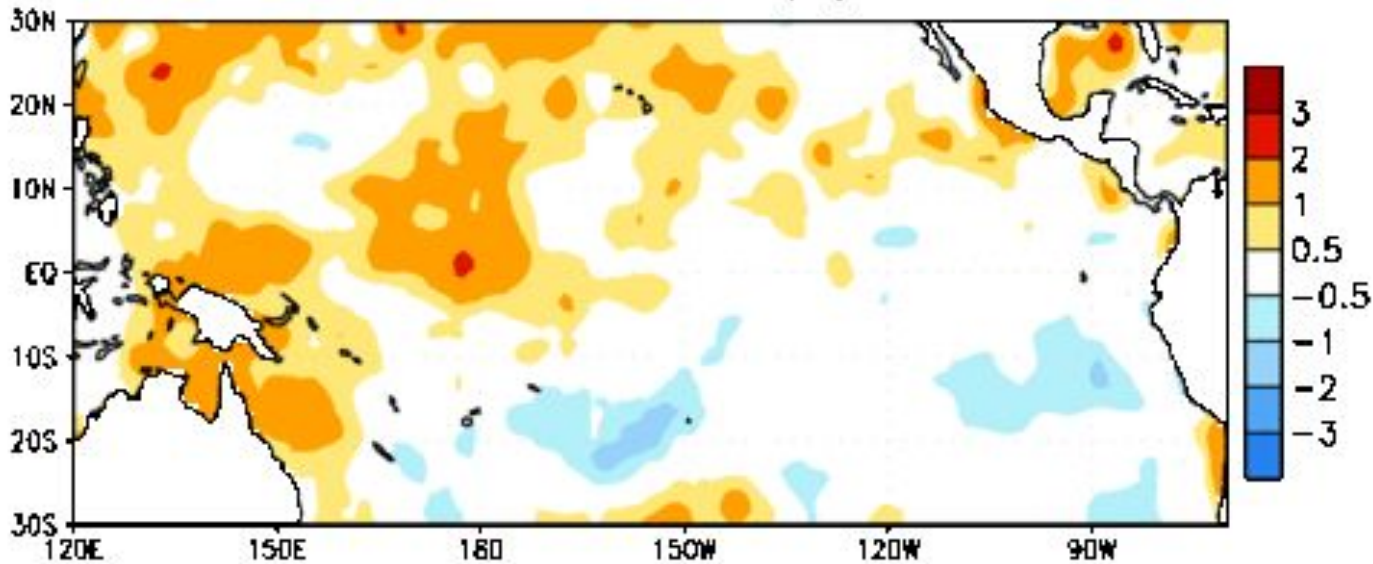
Russ Schumacher/Colorado Climate Center

The wet season is mostly over for the high country. We now wait to see how temperatures impact demand

The wet season is just beginning for the eastern plains. Next six weeks are critical

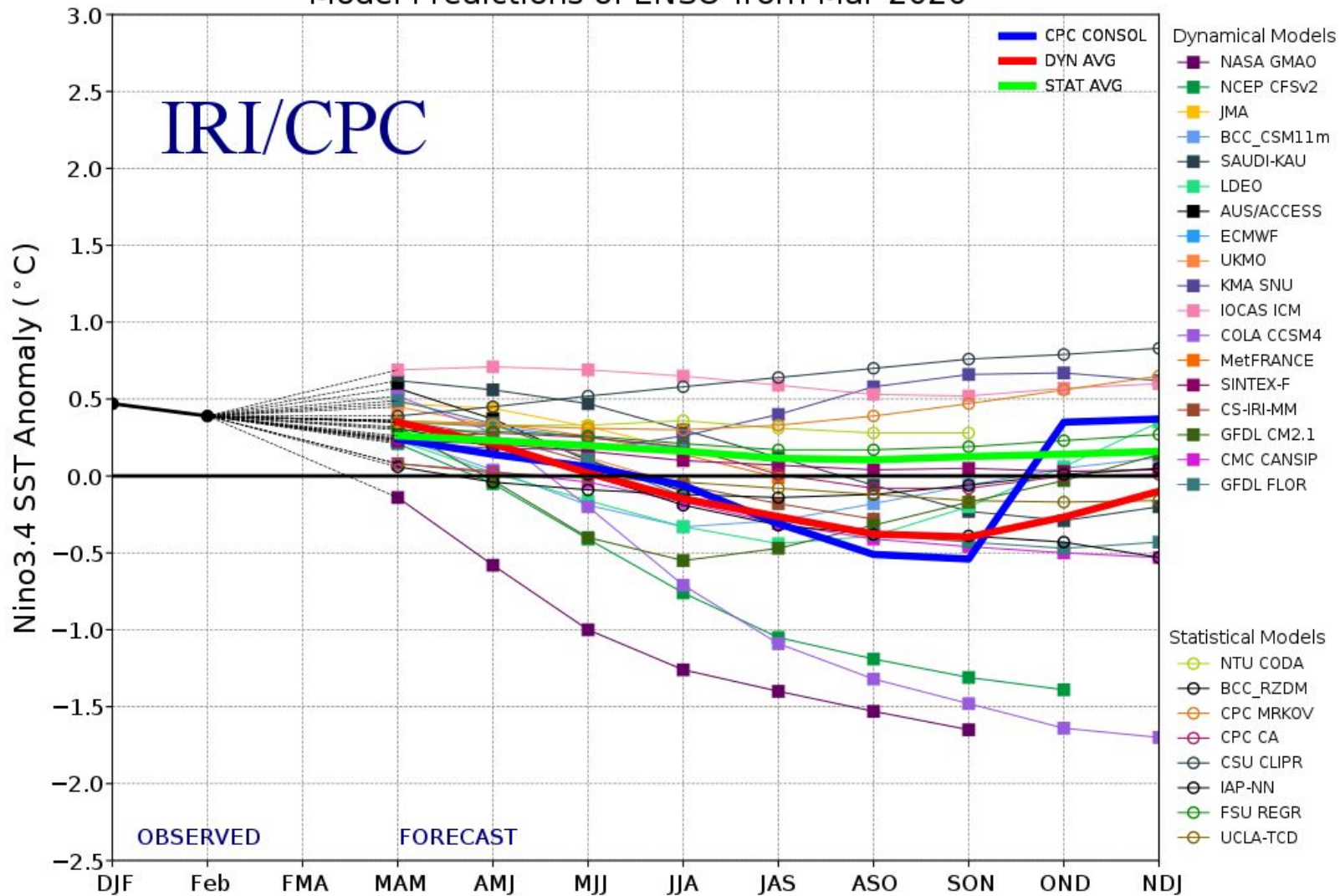
Current Sea Surface Temperature Pattern

Week centered on 22 JAN 2020
SST Anomalies (°C)

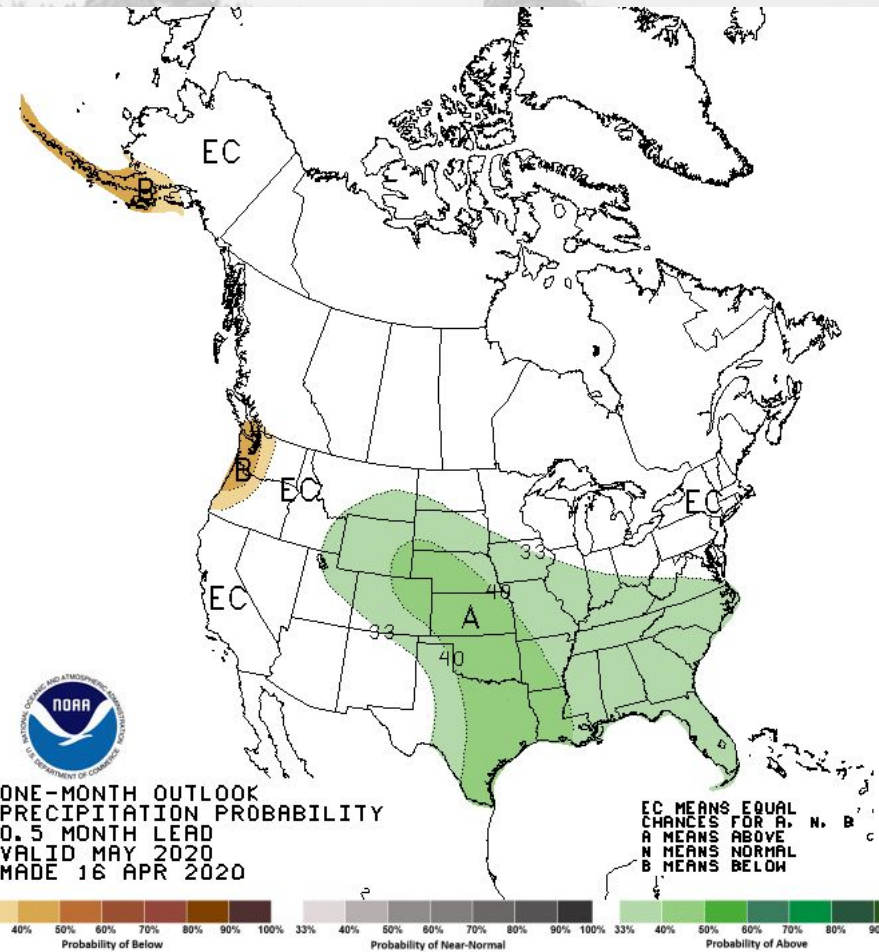
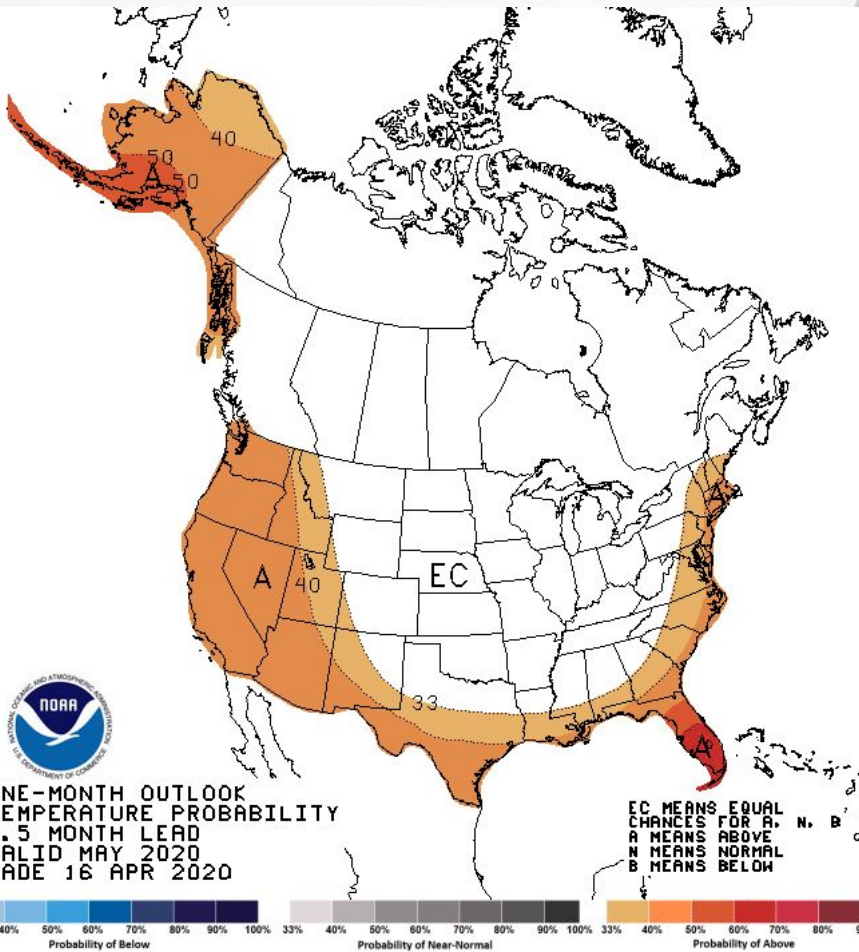


- Warm signal in Central Pacific continues to erode
- Neutral conditions likely for summer
- Slight chance of diving into La Niña this fall

Model Predictions of ENSO from Mar 2020

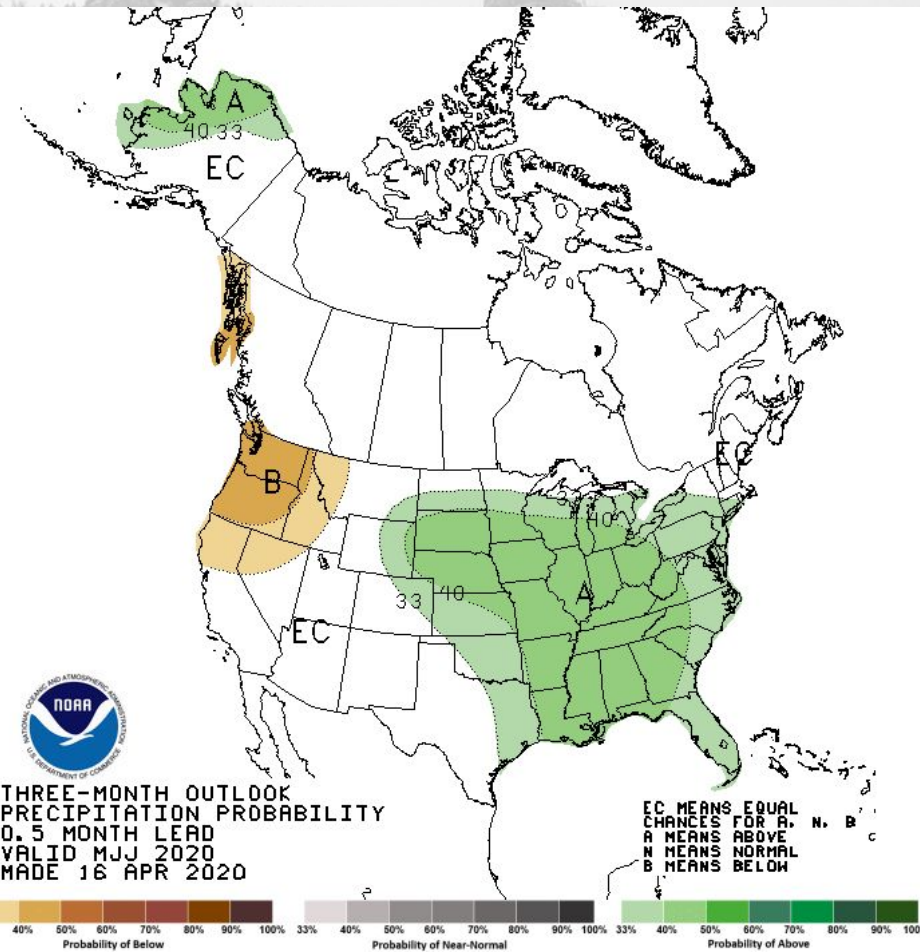
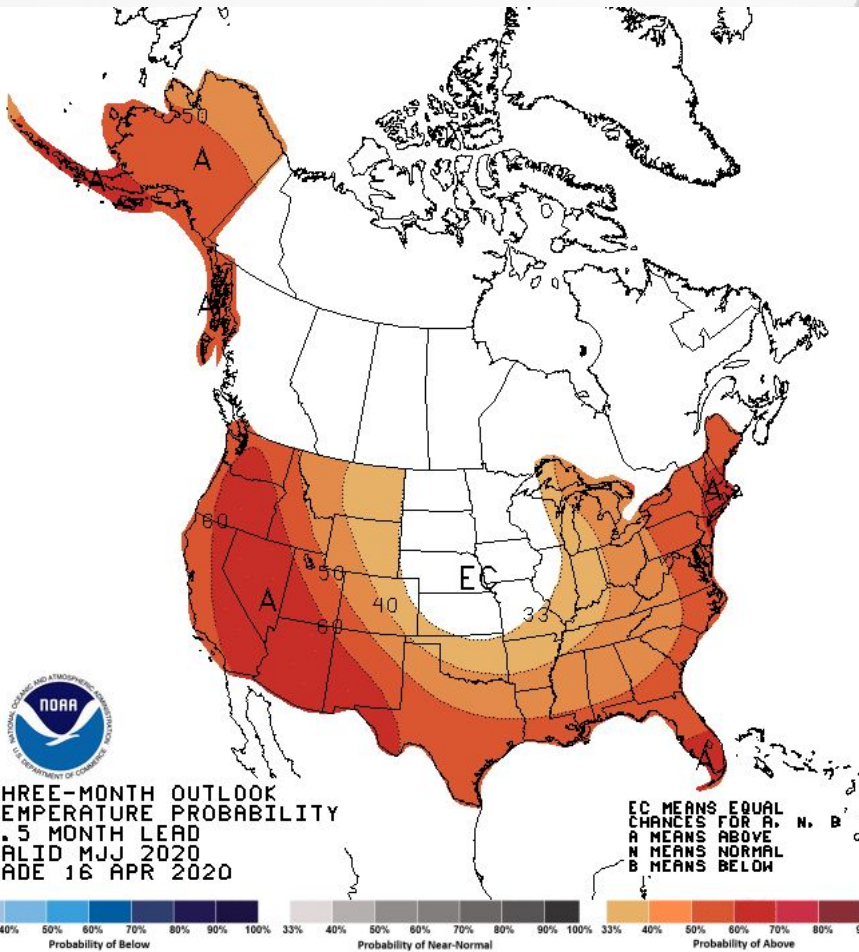


May Forecast



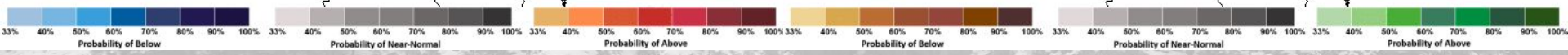
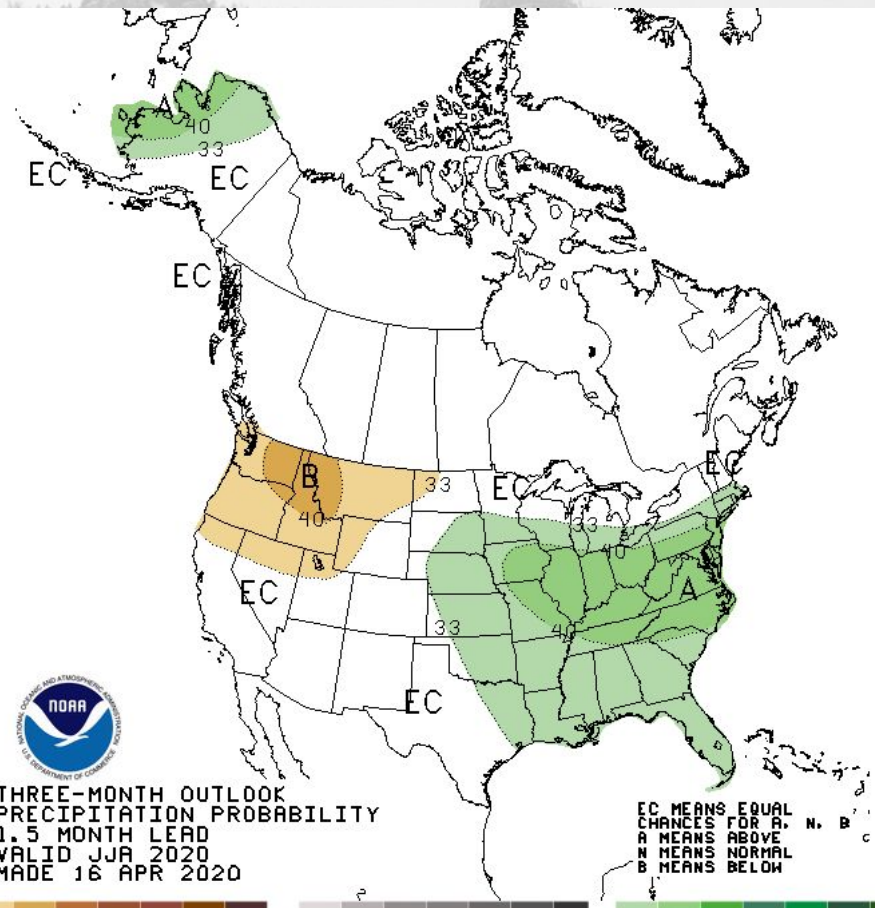
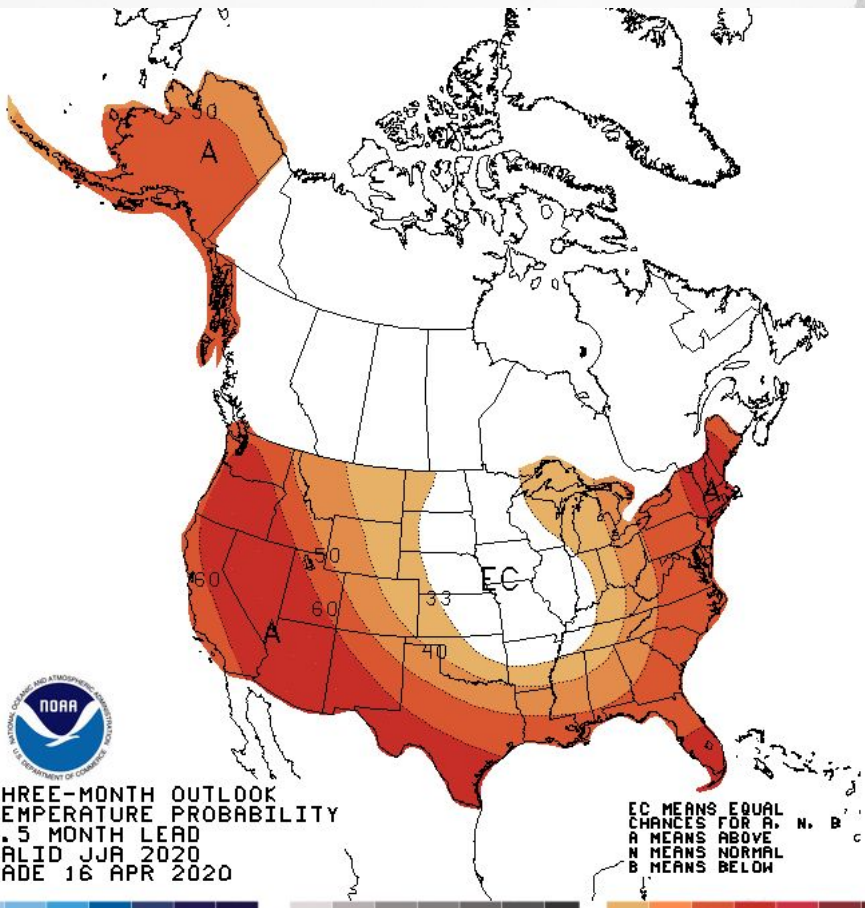
A tilt towards above average moisture is quite promising for NE CO as May marks the beginning of the wet season

CPC May-July Outlook

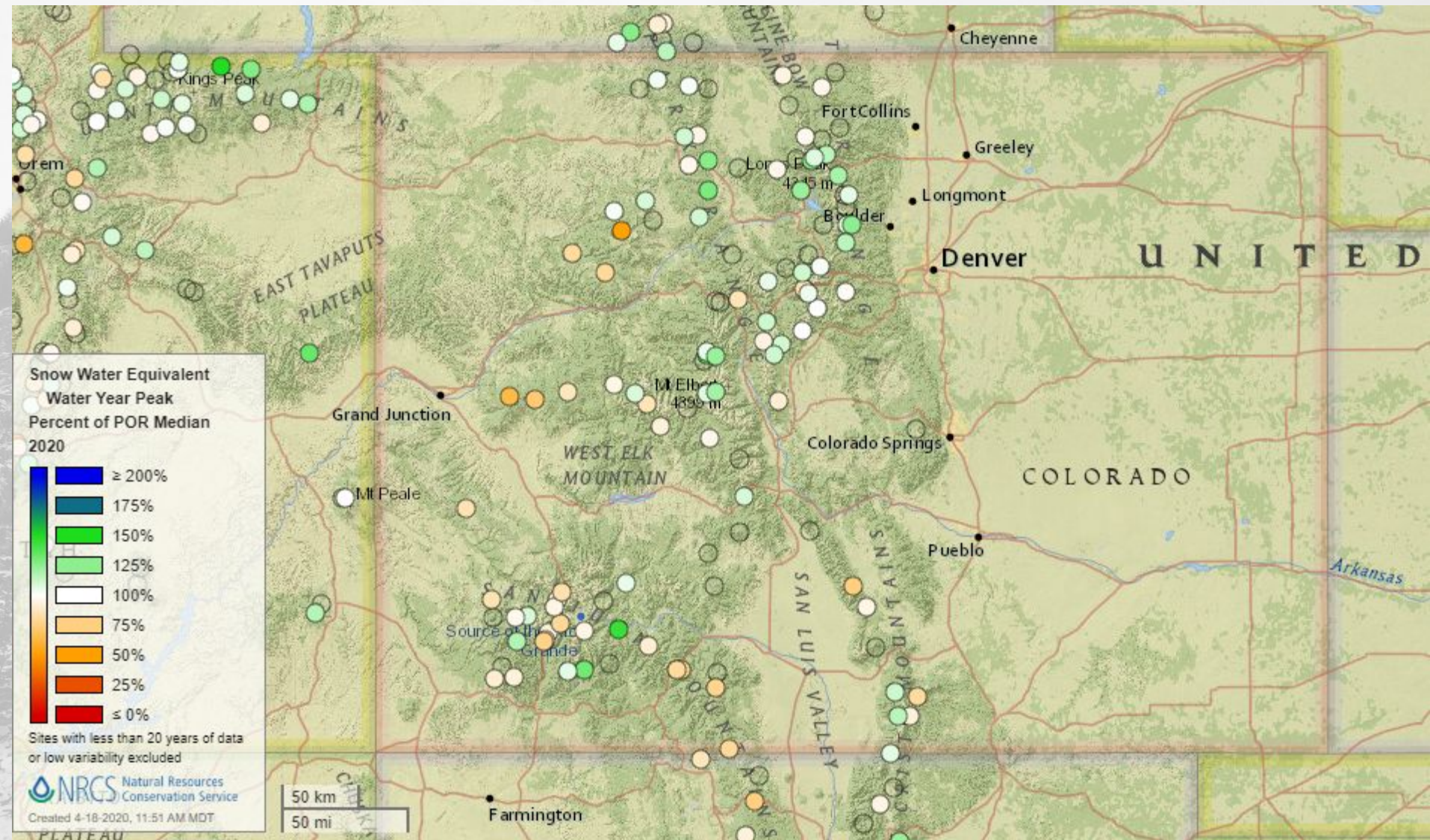


- Our 30-year climate normal are getting long in the teeth given our unstable climate
- The most important factor in these summer forecasts is trend signal:noise ratio

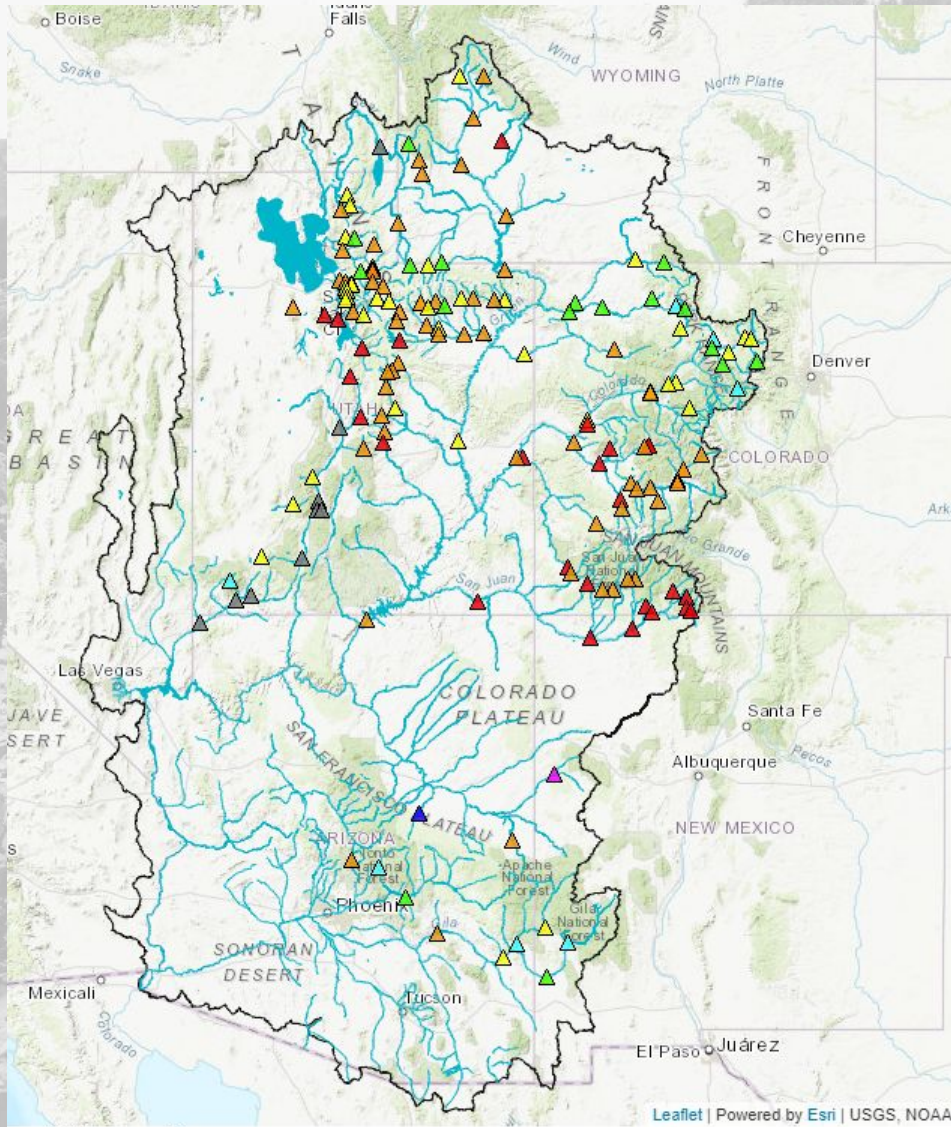
June-August Outlook Influenced Heavily by Trends



2020 Percent of Normal Peak Snowpack



Colorado Basin River Forecast Center Season Water Supply Forecasts

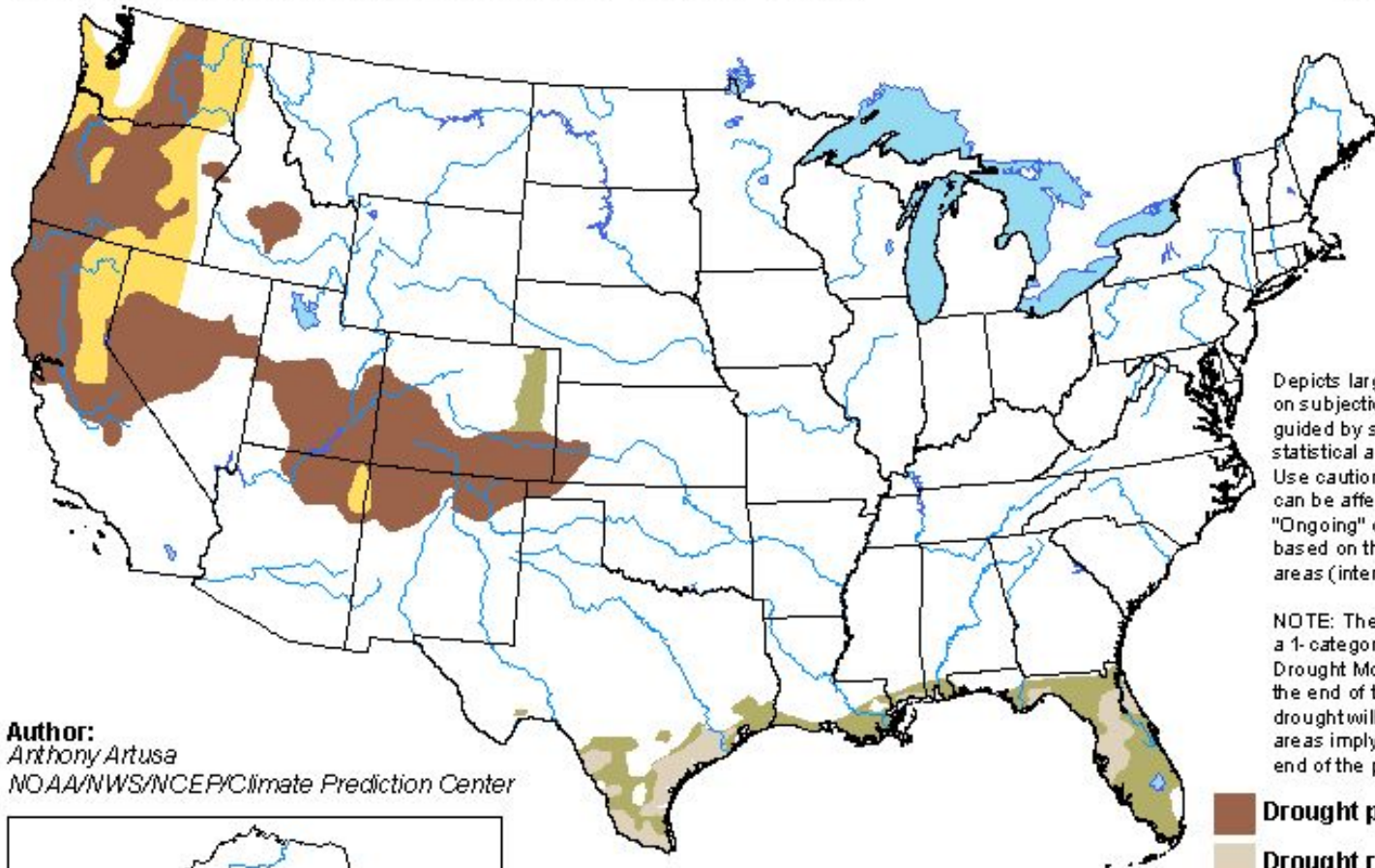


CBRFC favors streamflow reductions based on dry fall soils

U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

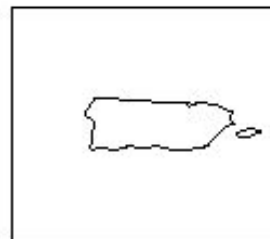
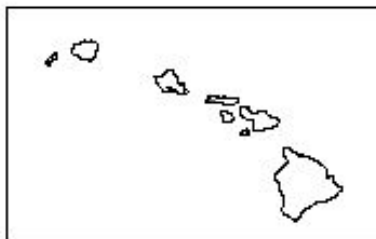
Valid for April 16 - July 31, 2020
Released April 16



Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

Author:
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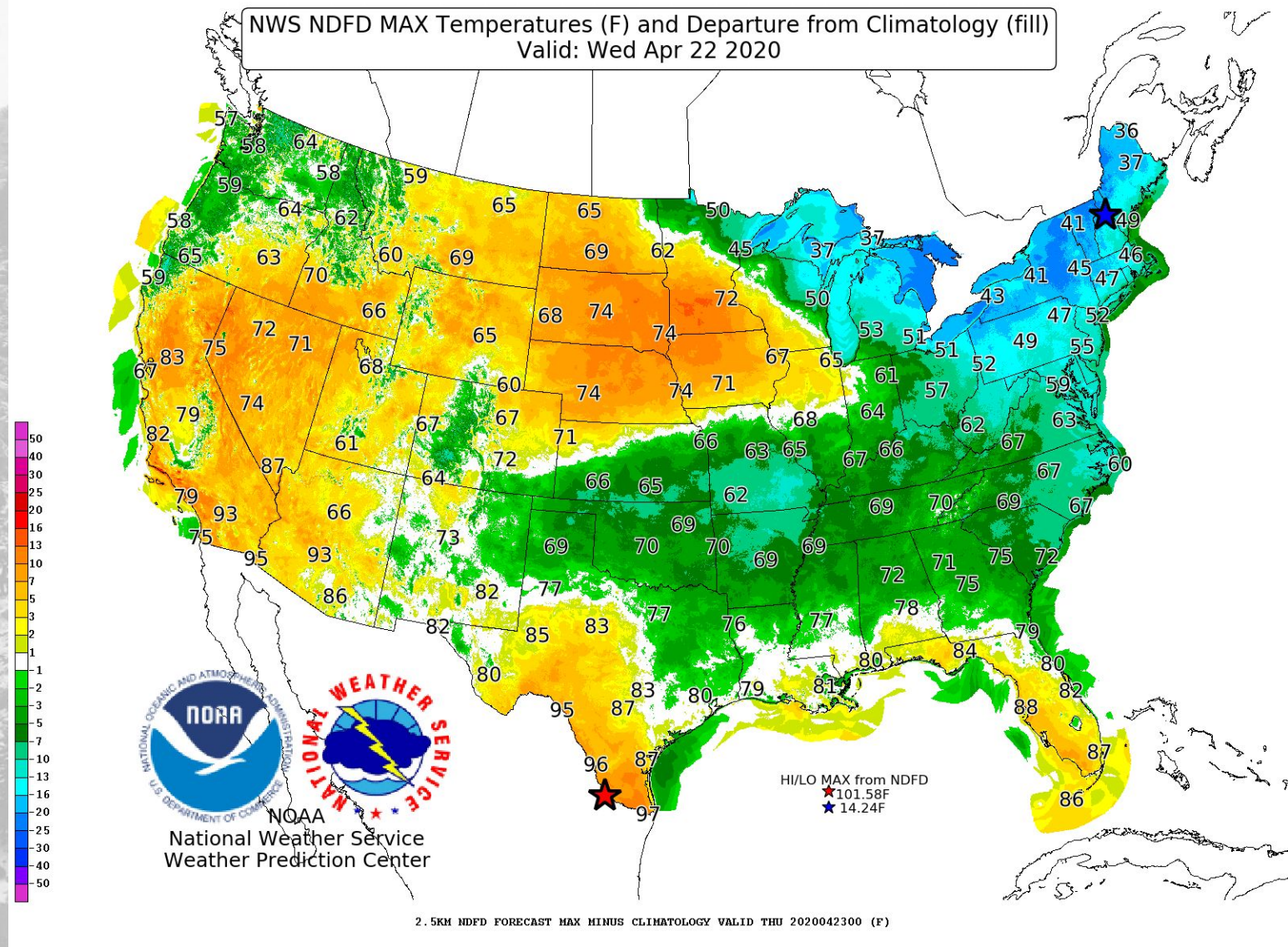


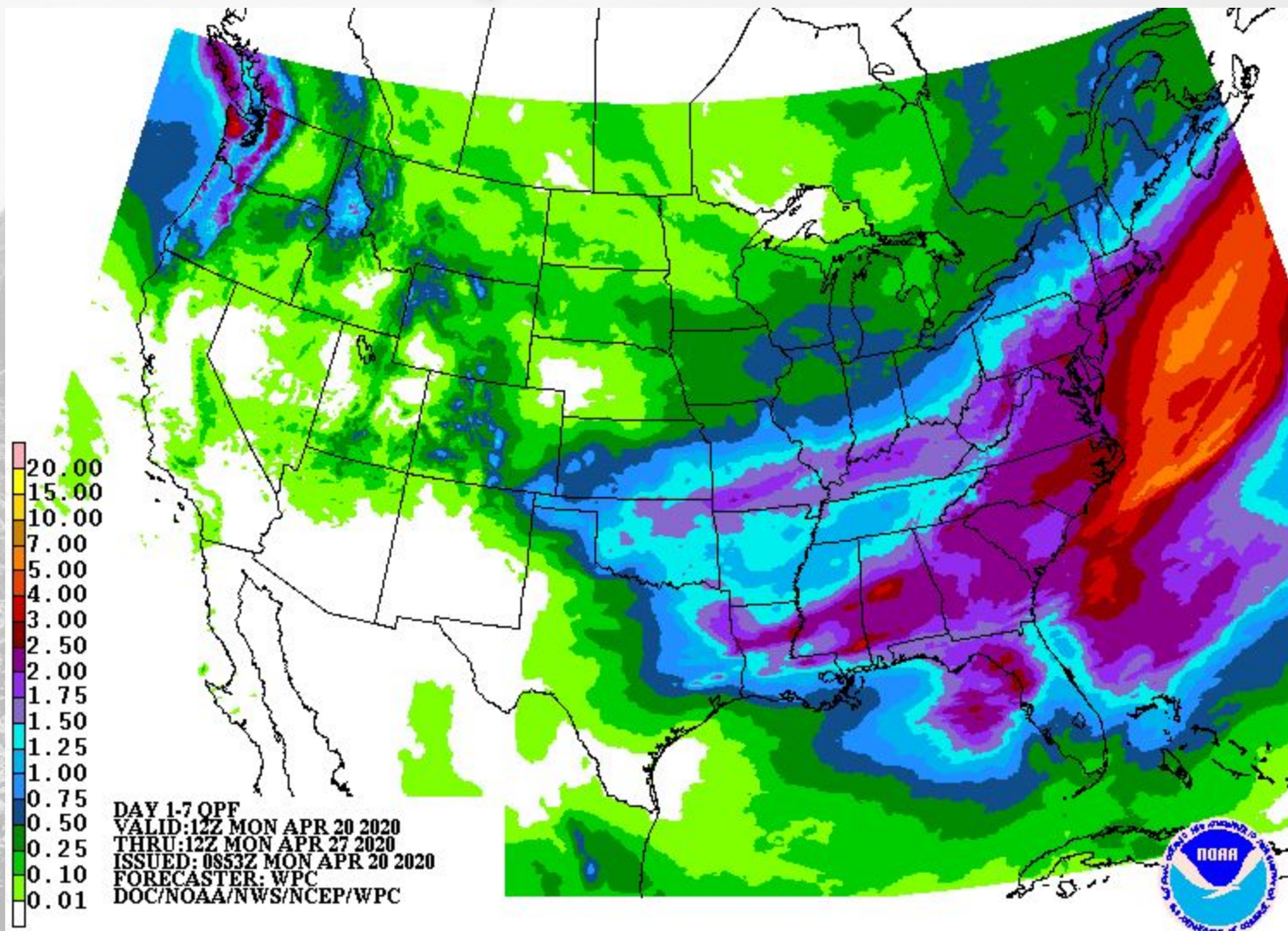
-  Drought persists
-  Drought remains but improves
-  Drought removal likely
-  Drought development likely



<http://go.usa.gov/3eZ73>

The Near-Term Looks Nice!





Takeaways

- North Central Colorado has benefitted from some wonderful snow and moisture over the past month. If only we could share the wealth. SE CO has been bombarded by wind, but not moisture
- While southern Colorado snowpack did peak near normal, due to antecedent conditions, it's not enough for a normal runoff year
- Our summers are getting hotter. The current seasonal forecast is a reflection of this
- The Front Range is in great shape to start the warm season. The hope for 2020 is temperatures stay low enough in Western CO to avoid a big consumptive use season, and heat stress to forests, and that spring precipitation is normal-to-above normal for eastern CO
- At present, drought concerns are highest for the southern portion of the state

Colorado Climate Center

Thanks, and let's keep in touch!

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Viewing this, and previous WATF Briefings:

http://climate.colostate.edu/ccc_archive.html

