Colorado climate update

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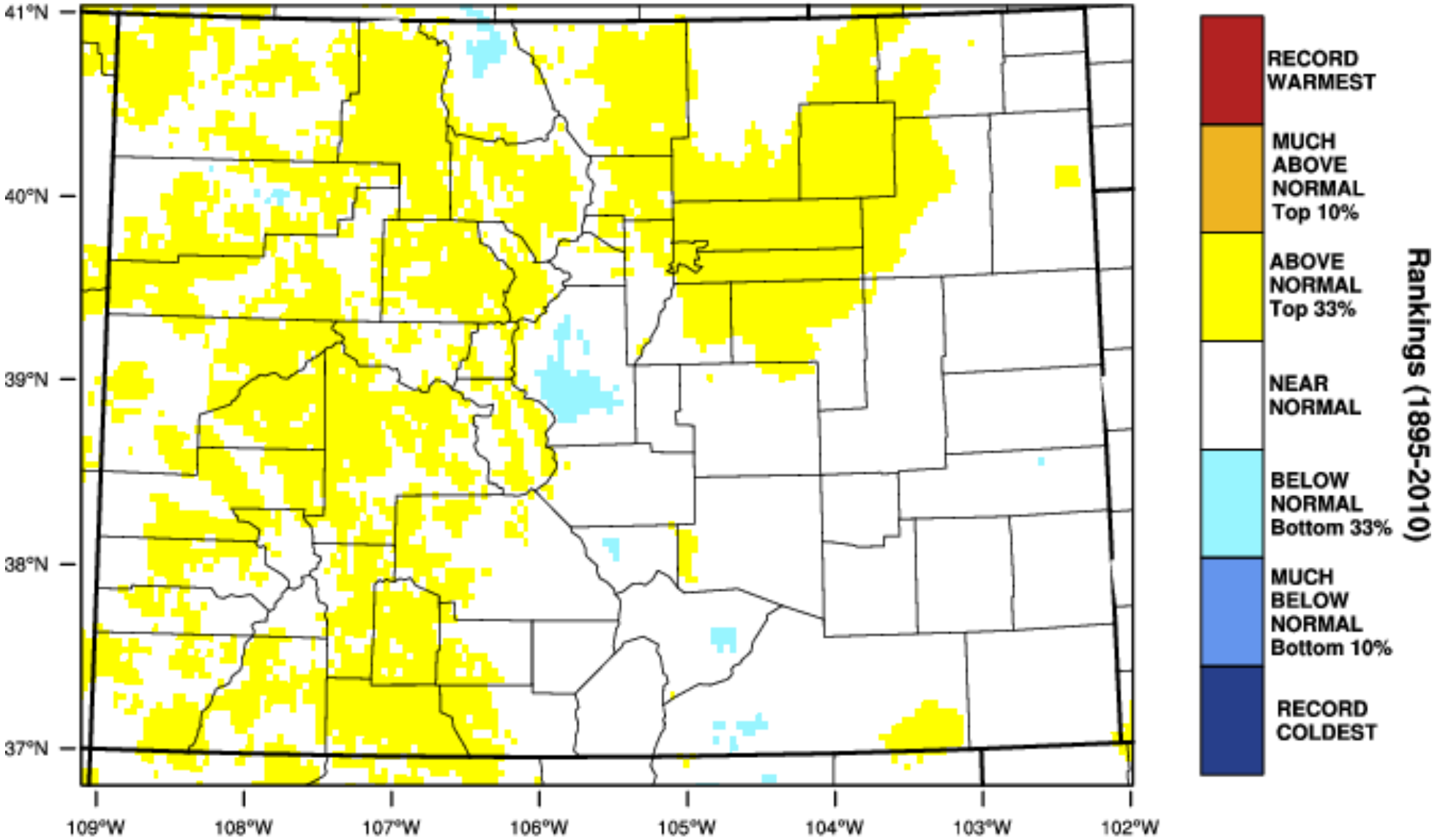
COLORADO CLIMATE CENTER

Colorado Water Congress
February 2021

ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY

Colorado - Mean Temperature

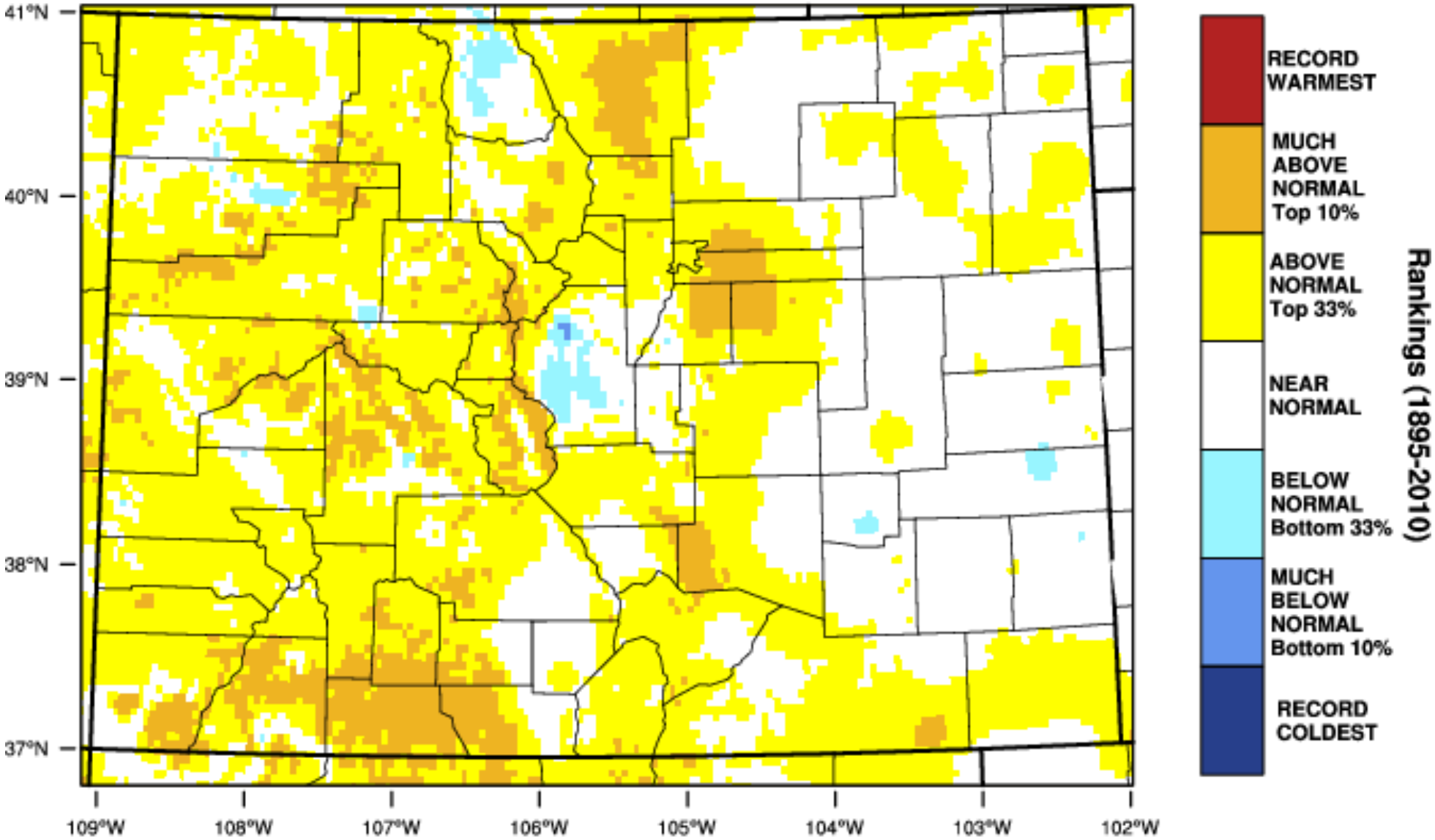
January 2021 Percentile



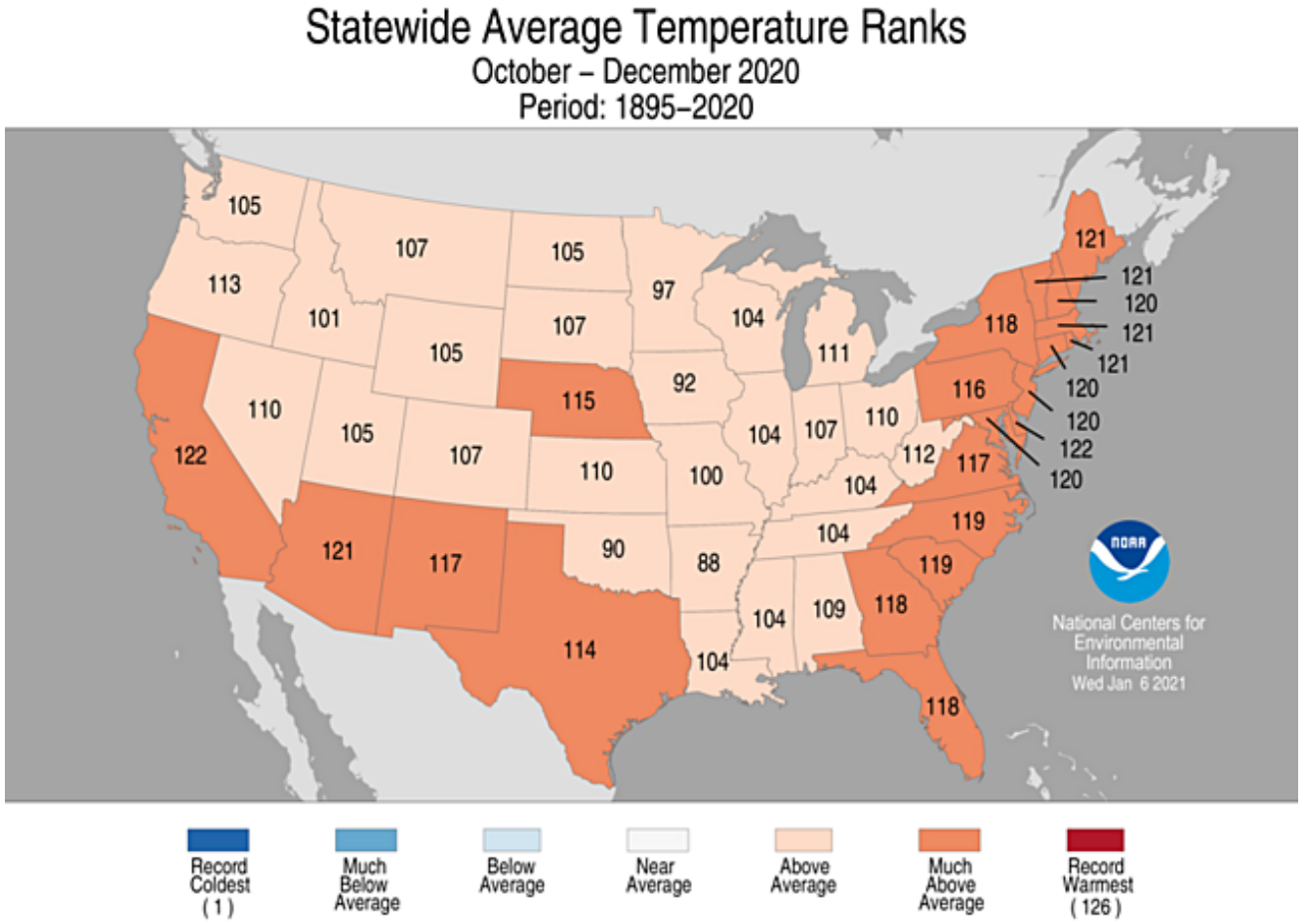
WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 2 FEB 2021

Colorado - Mean Temperature

October-January 2021 Percentile



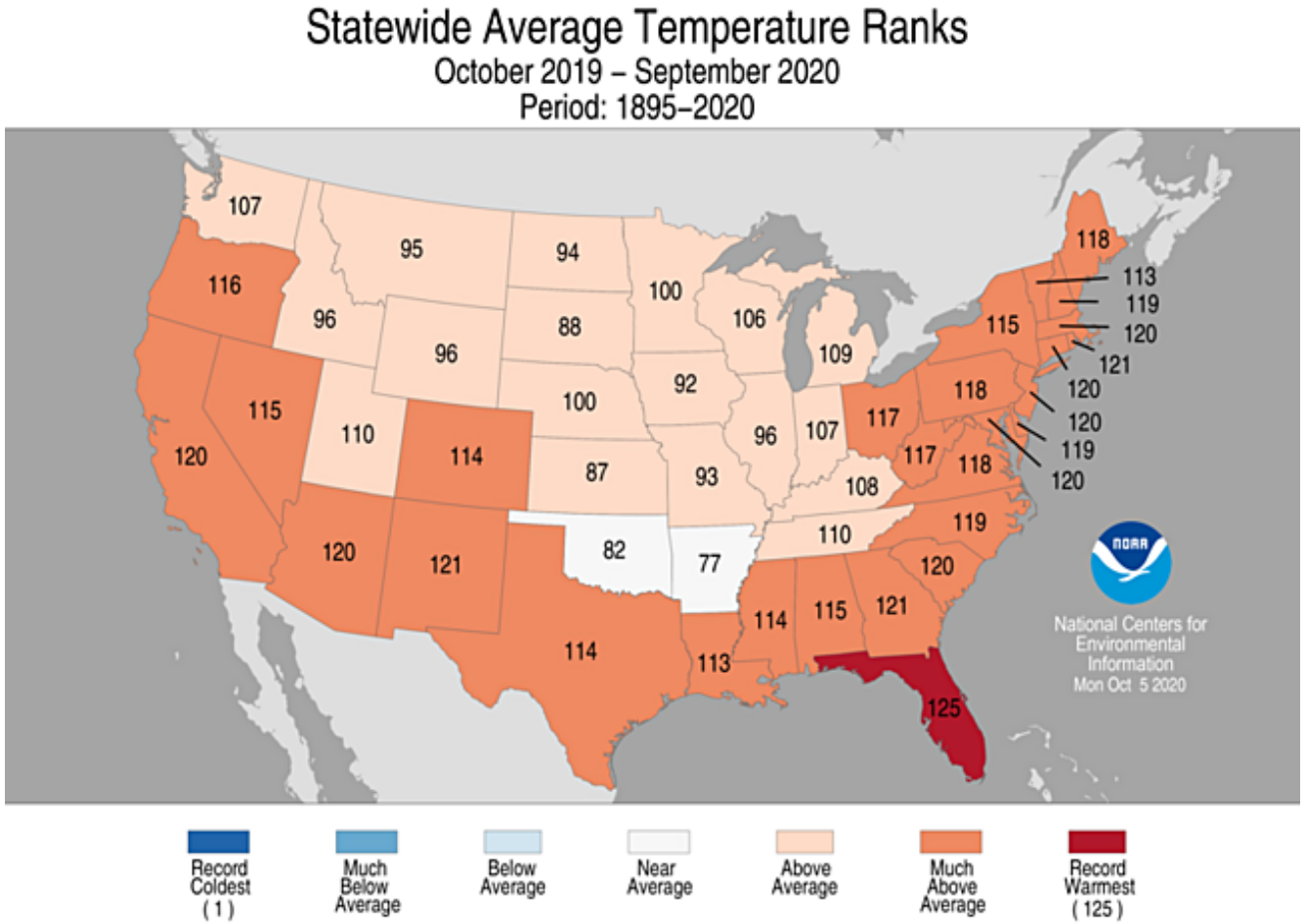
WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 2 FEB 2021



Statewide: 20th warmest October - December

Month	T Rank (of 126 years)	Above, below, or near avg?
Oct	54th warmest	near avg
Nov	7th warmest	much above
Dec	46th warmest	near avg

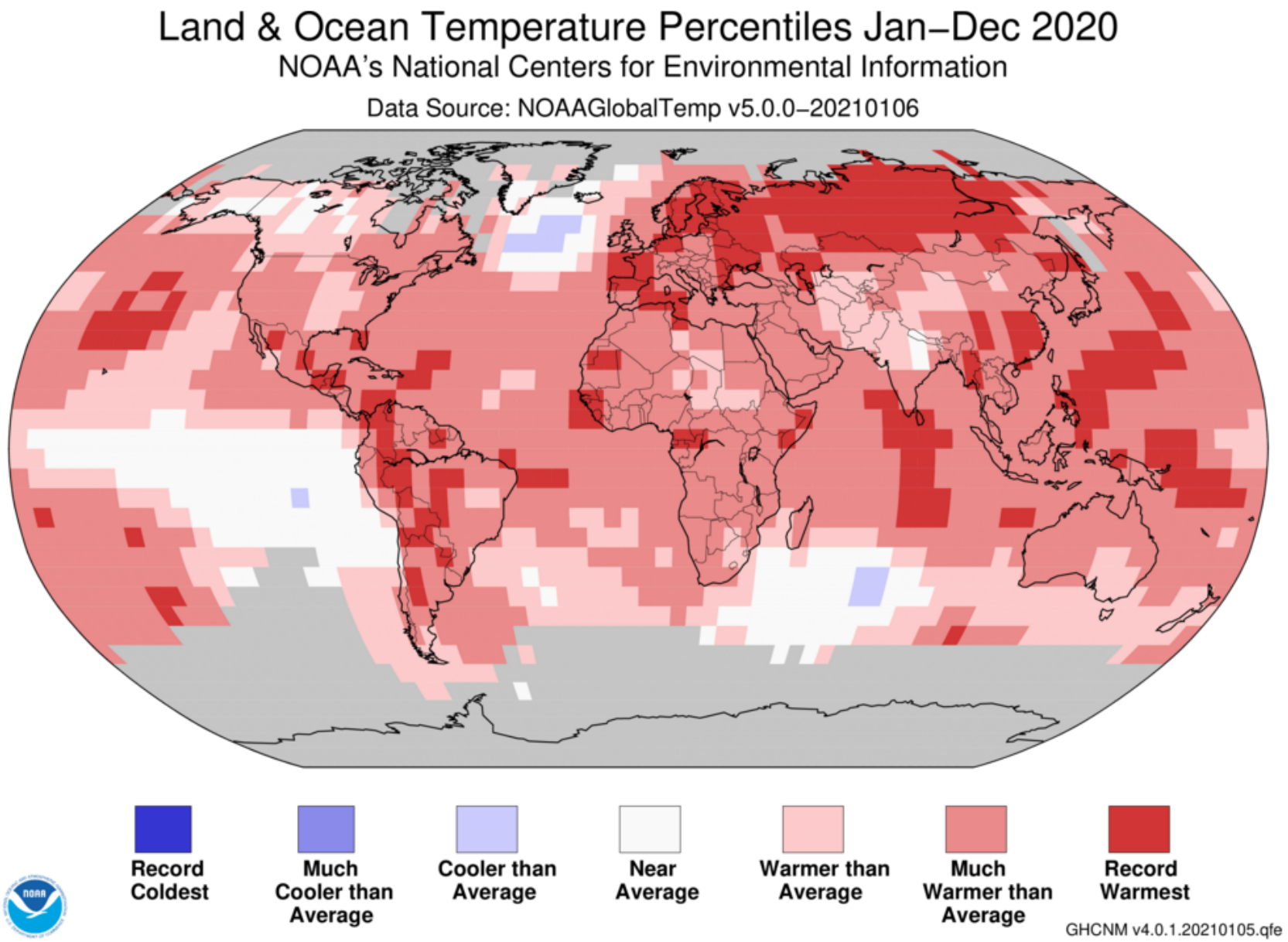
Although the numbers show it, you can't really call October 2020 a near-average month!



Statewide: 12th warmest water year (out of 125)
3rd warmest summer

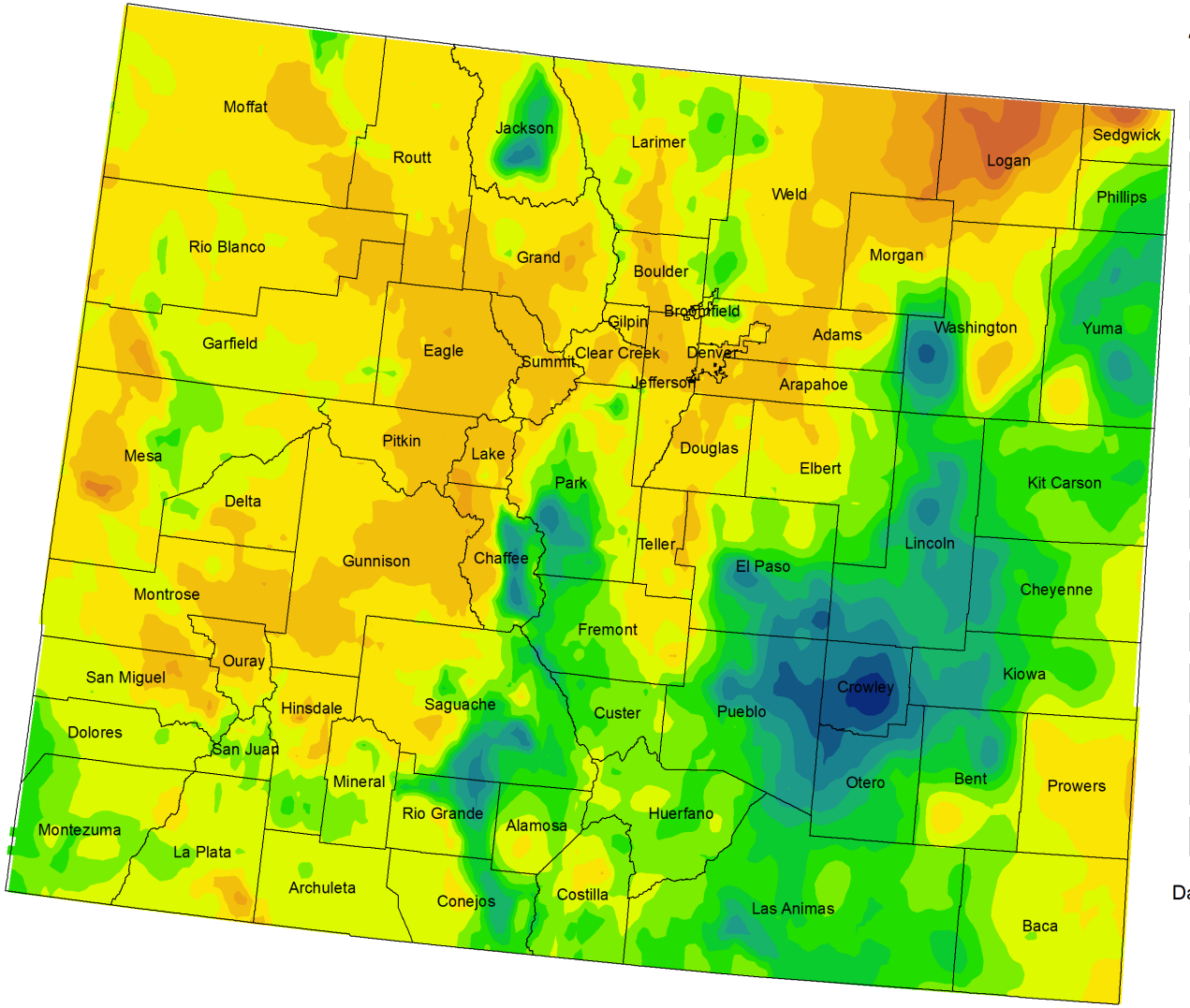
Calendar year 2020 was tied for the 7th warmest on record. 6 of the 8 warmest calendar years have been since 2012

Month	T Rank (of 126 years)	Above, below, or near avg?
Oct	3rd coolest	much below
Nov	39th warmest	above
Dec	25th warmest	above
Jan	25th warmest	above
Feb	51st coolest	near avg
Mar	14th warmest	above
Apr	58th warmest	near avg
May	4th warmest	much above
June	15th warmest	above
July	20th warmest	above
August	1st warmest	record
September	40th warmest	above



Globally, 2020 was the 2nd warmest year on record, trailing only 2016

Colorado January 2021 Precipitation as a Percentage of Normal



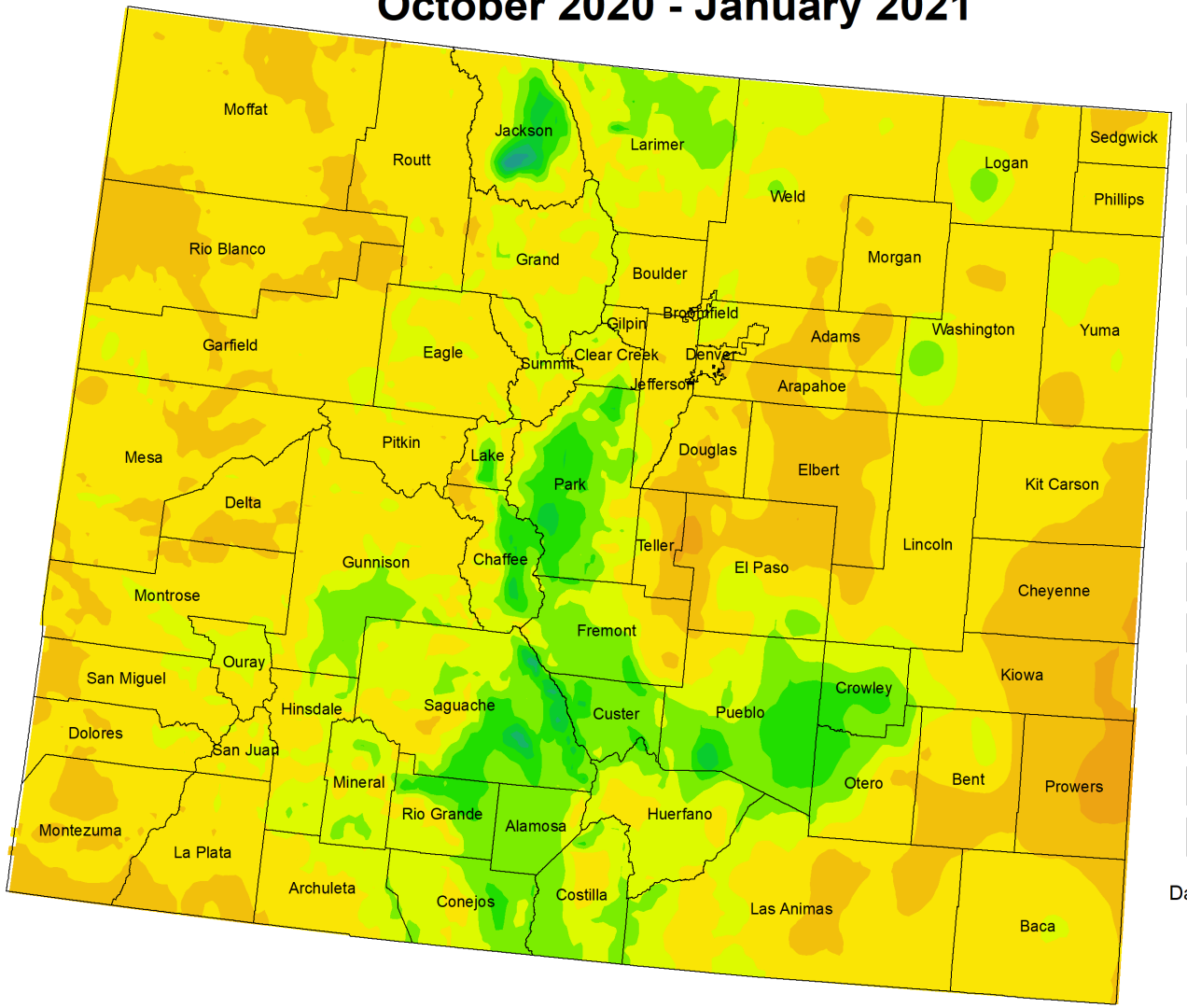
jan21_pn

Precip as % normal

- 0
- 0 - 10
- 11 - 20
- 21 - 30
- 31 - 50
- 51 - 70
- 71 - 90
- 91 - 110
- 111 - 130
- 131 - 150
- 151 - 170
- 171 - 200
- 201 - 250
- 251 - 300
- 300+

Data from PRISM Climate Group

Colorado Water Year 2021 Precipitation as a Percentage of Normal October 2020 - January 2021

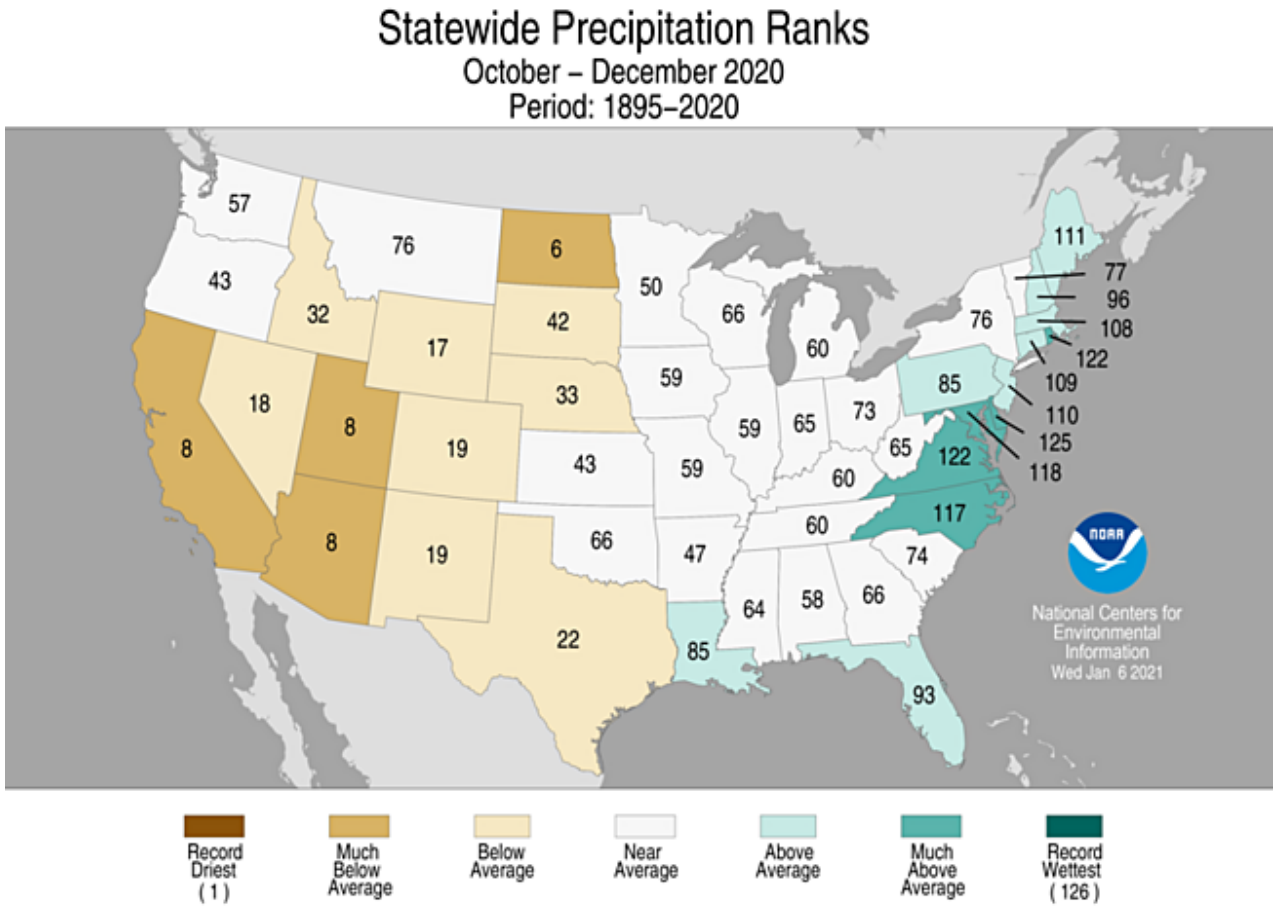


awy_jan20_pn

Precip as % normal

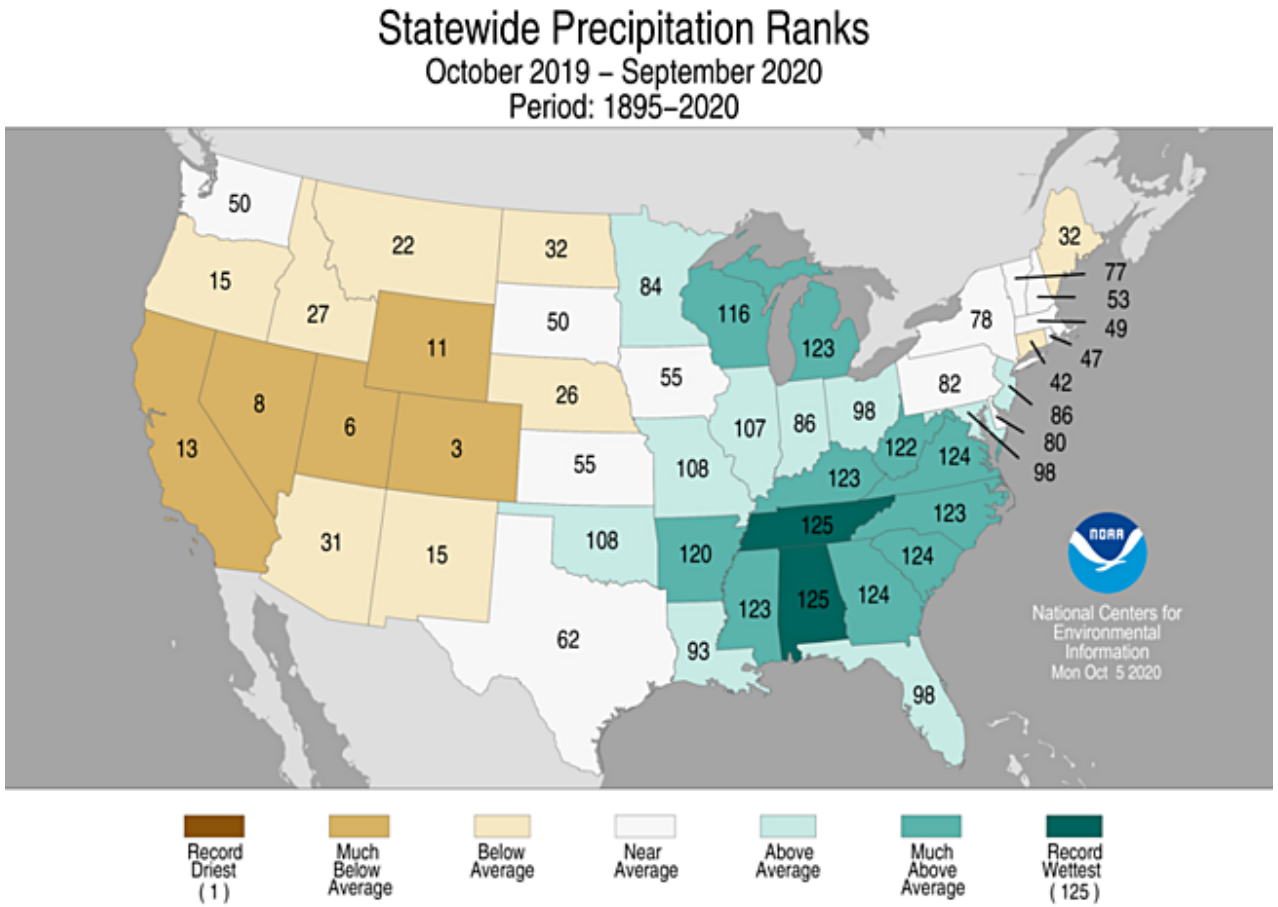
- 0
- 0 - 10
- 11 - 20
- 21 - 30
- 31 - 50
- 51 - 70
- 71 - 90
- 91 - 110
- 111 - 130
- 131 - 150
- 151 - 170
- 171 - 200
- 201 - 250
- 251 - 300
- 300+

Data from PRISM Climate Group



Statewide: 19th driest October-December

Month	P Rank (of 126 years)	Above, below, or near avg?
Oct	16th driest	below
Nov	44th driest	near avg
Dec	56th driest	near avg

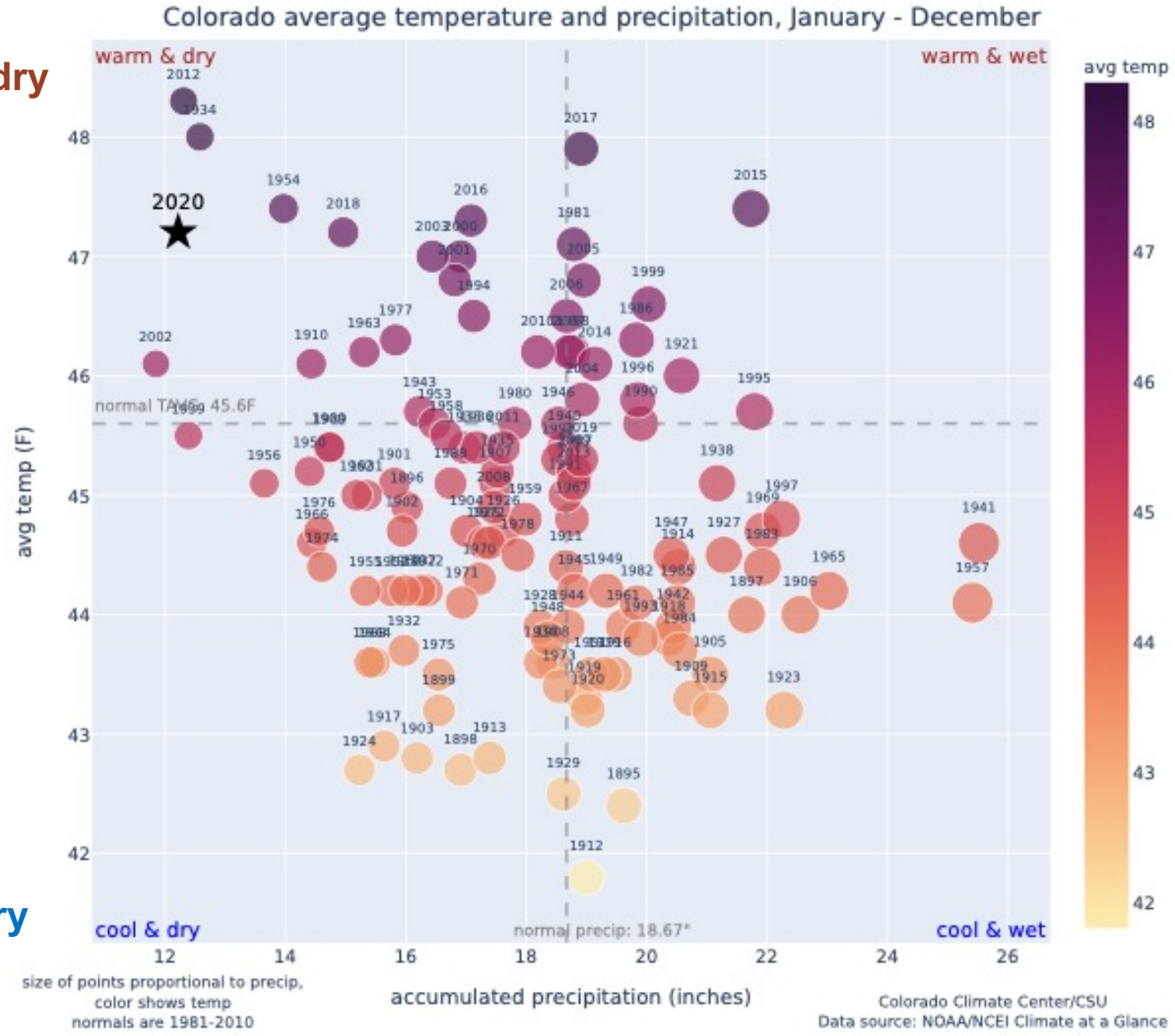


Statewide: 2020 was 3rd driest water year (out of 125), only 2002 and 2018 drier

Month	P Rank (of 126 years)	Above, below, or near avg?
Oct	40th driest	below
Nov	52nd wettest	near avg
Dec	41st wettest	above
Jan	34th driest	below
Feb	58th wettest	near avg
Mar	55th driest	near avg
Apr	7th driest	much below
May	18th driest	below
June	43rd driest	near avg
July	41st driest	below
August	5th driest	much below
Sept	39th driest	below

Warm & dry

Warm & wet

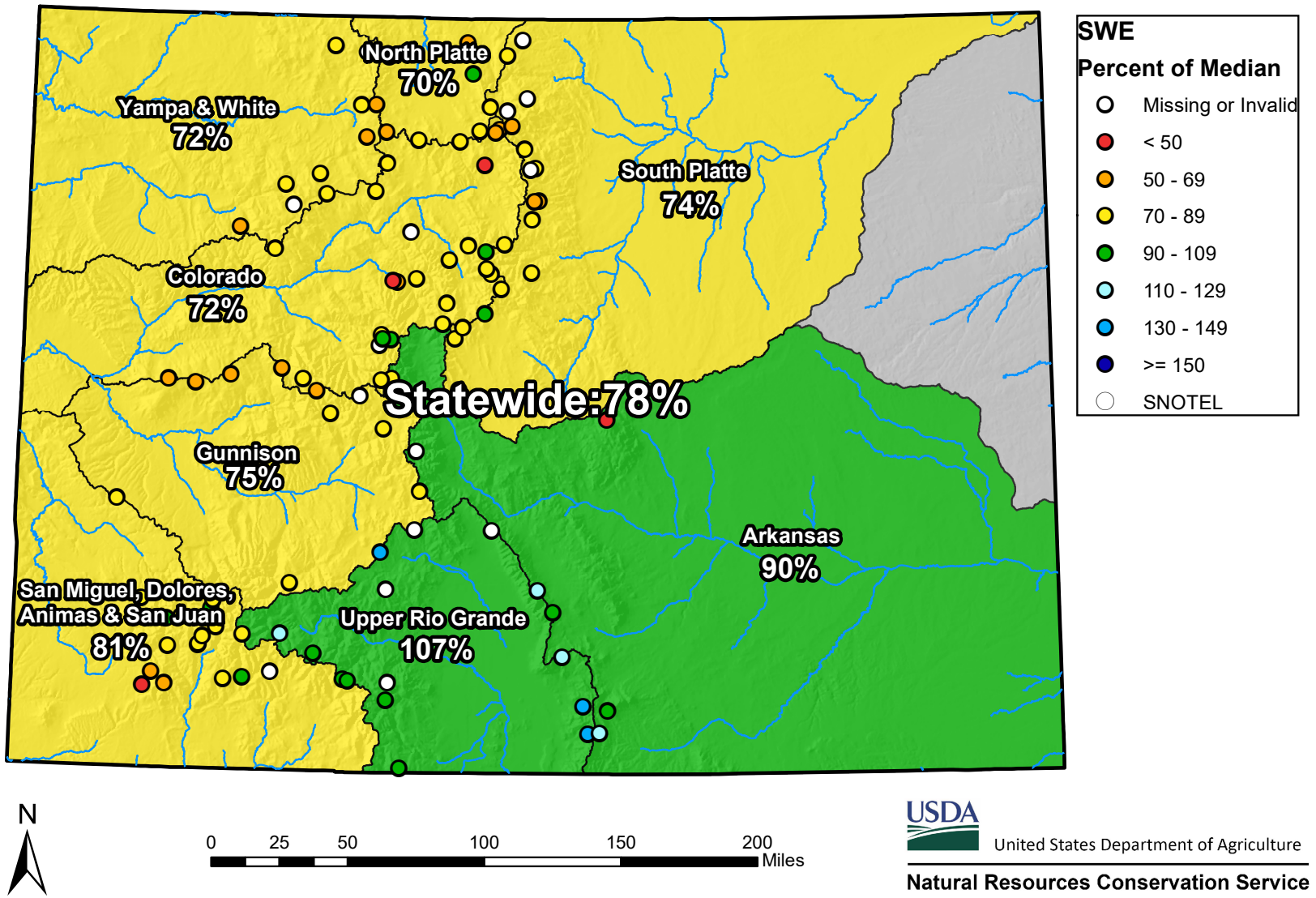


Cool & dry

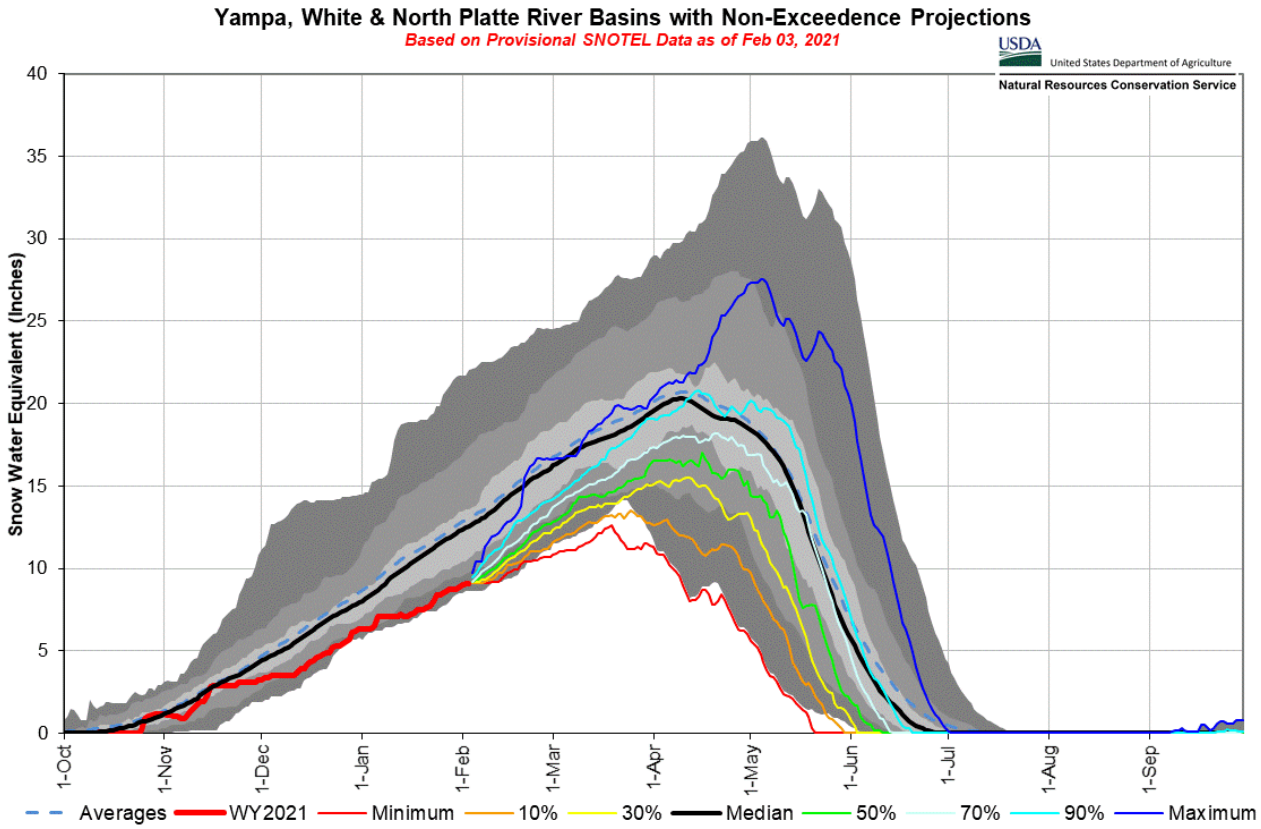
Cool & wet

Colorado SNOTEL Snow Water Equivalent (SWE) Update Map with Site Data

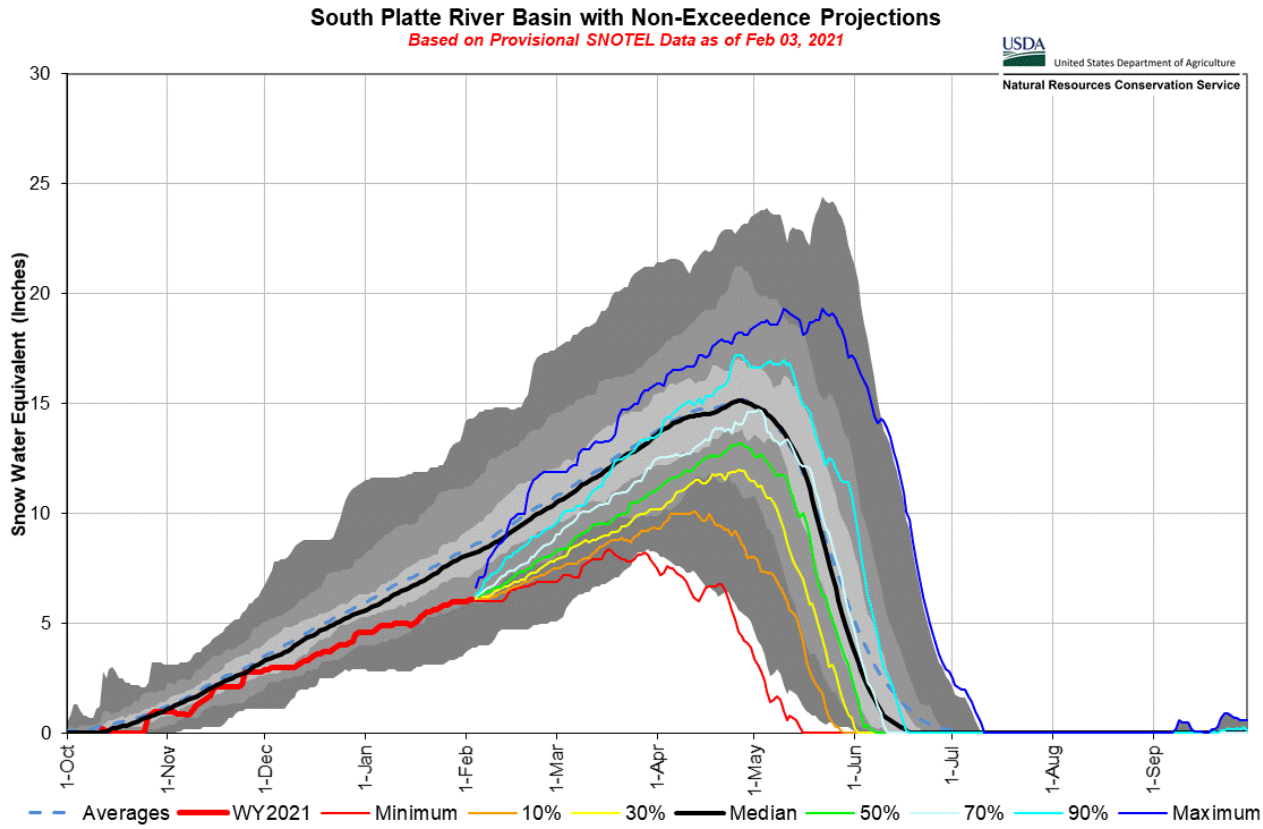
Current as of Feb 03, 2021



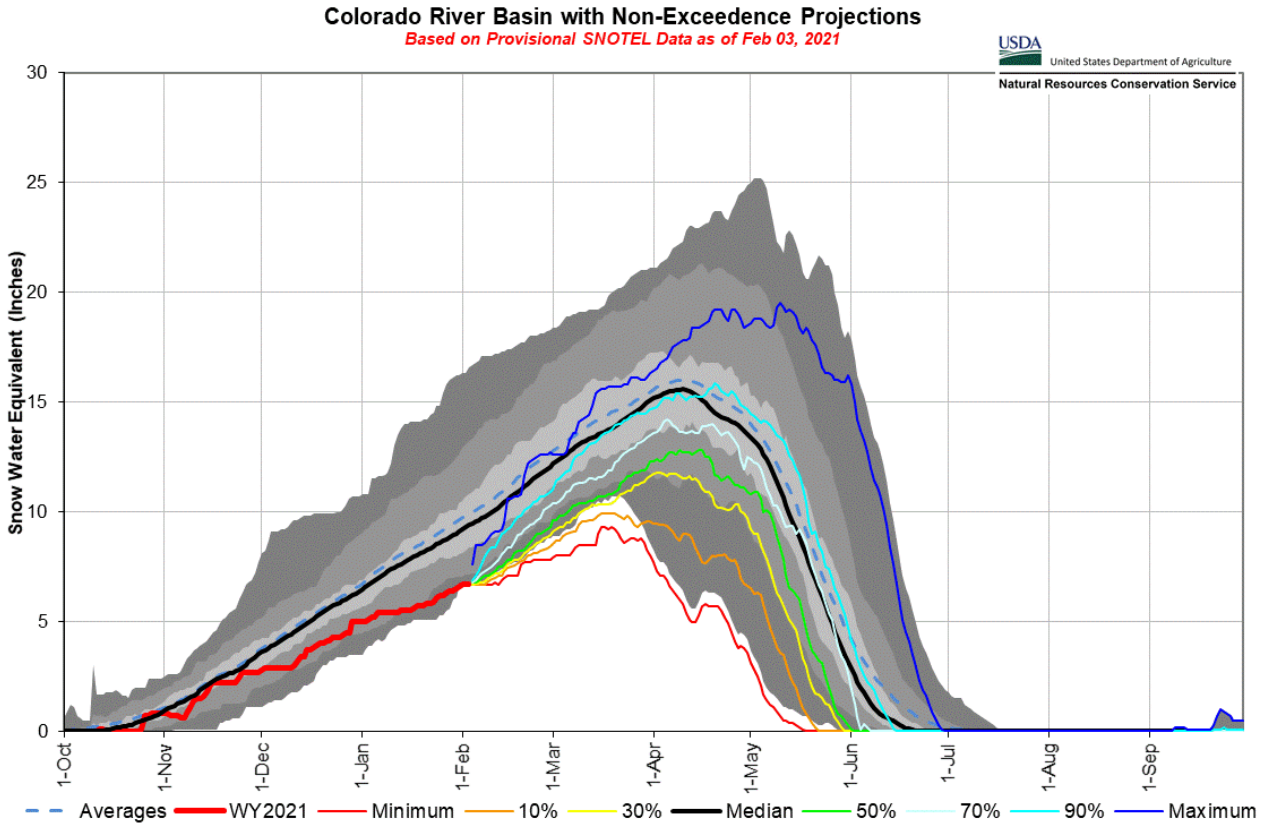
Yampa/White



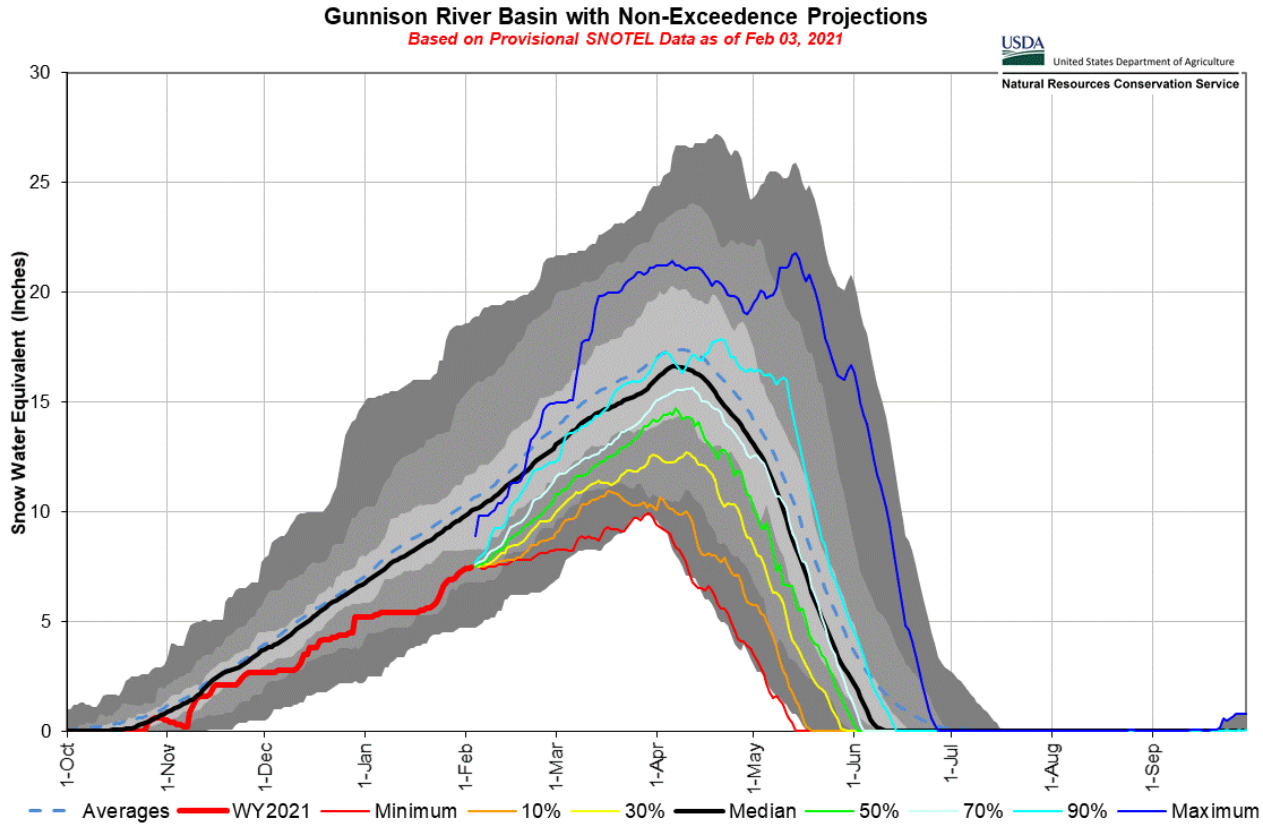
South Platte



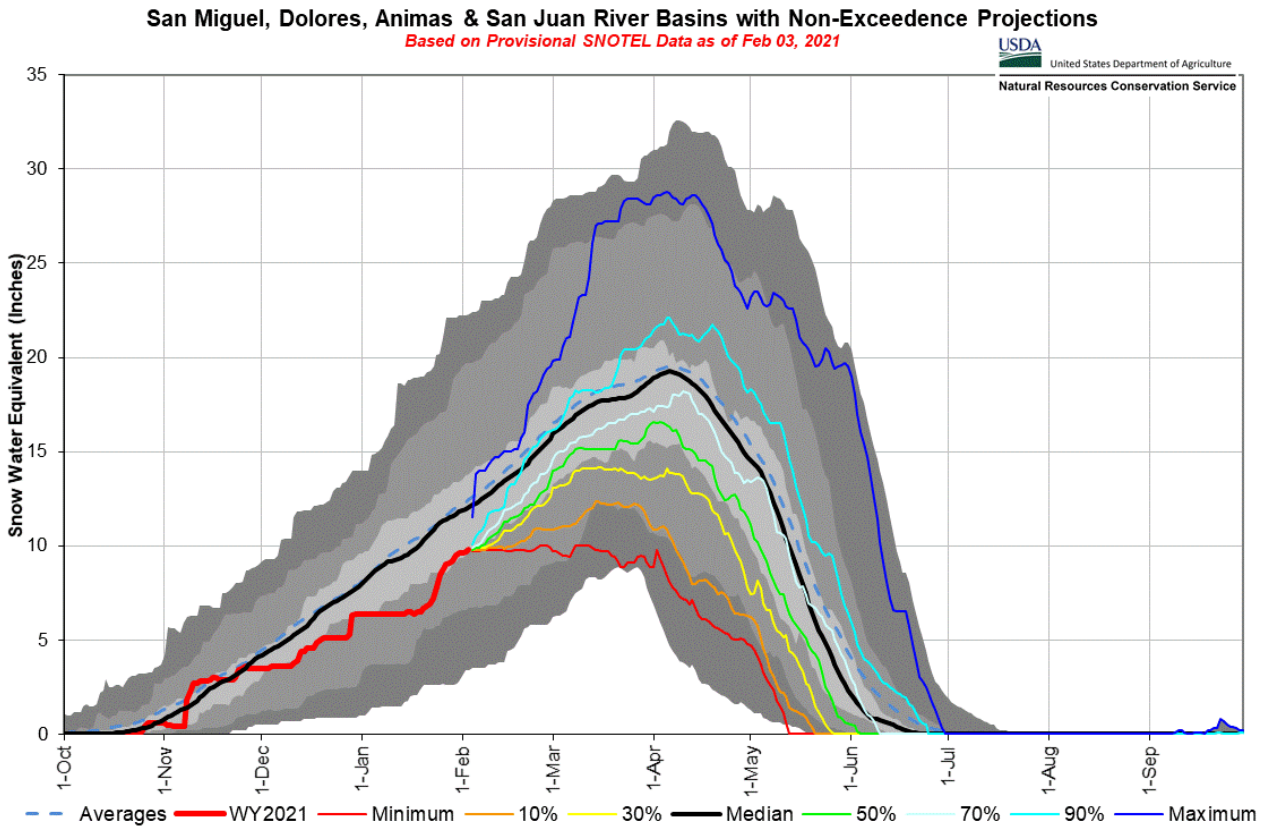
Colorado headwaters



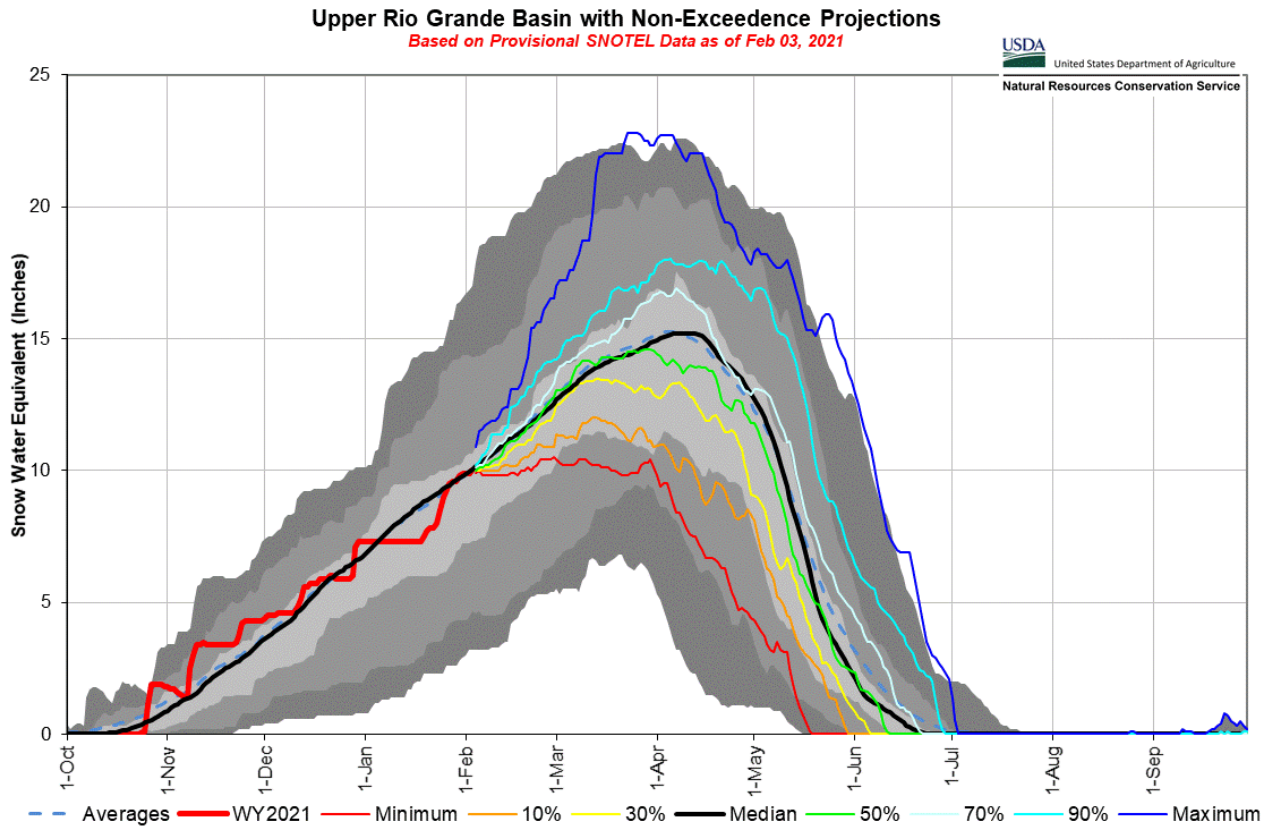
Gunnison



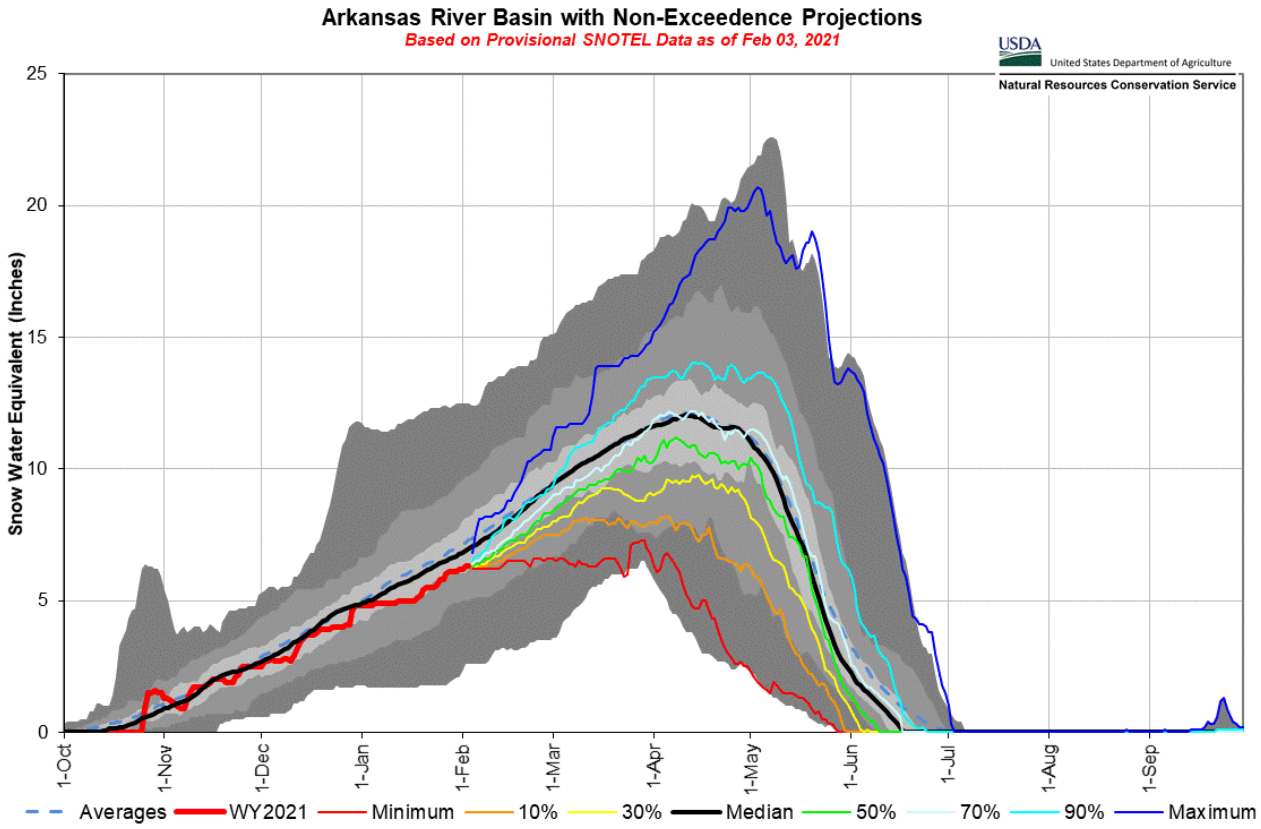
Southwest basins

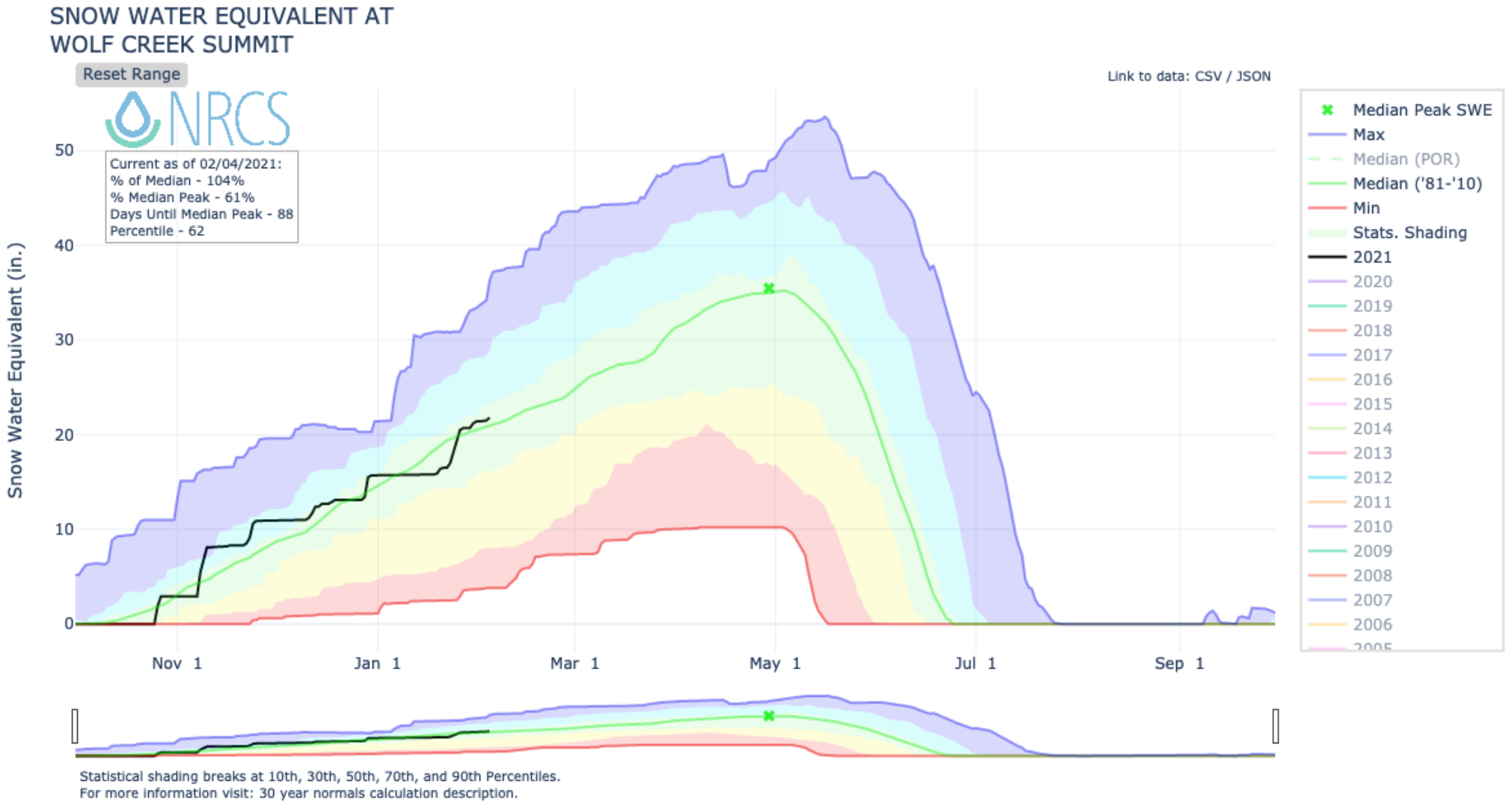


Upper Rio Grande

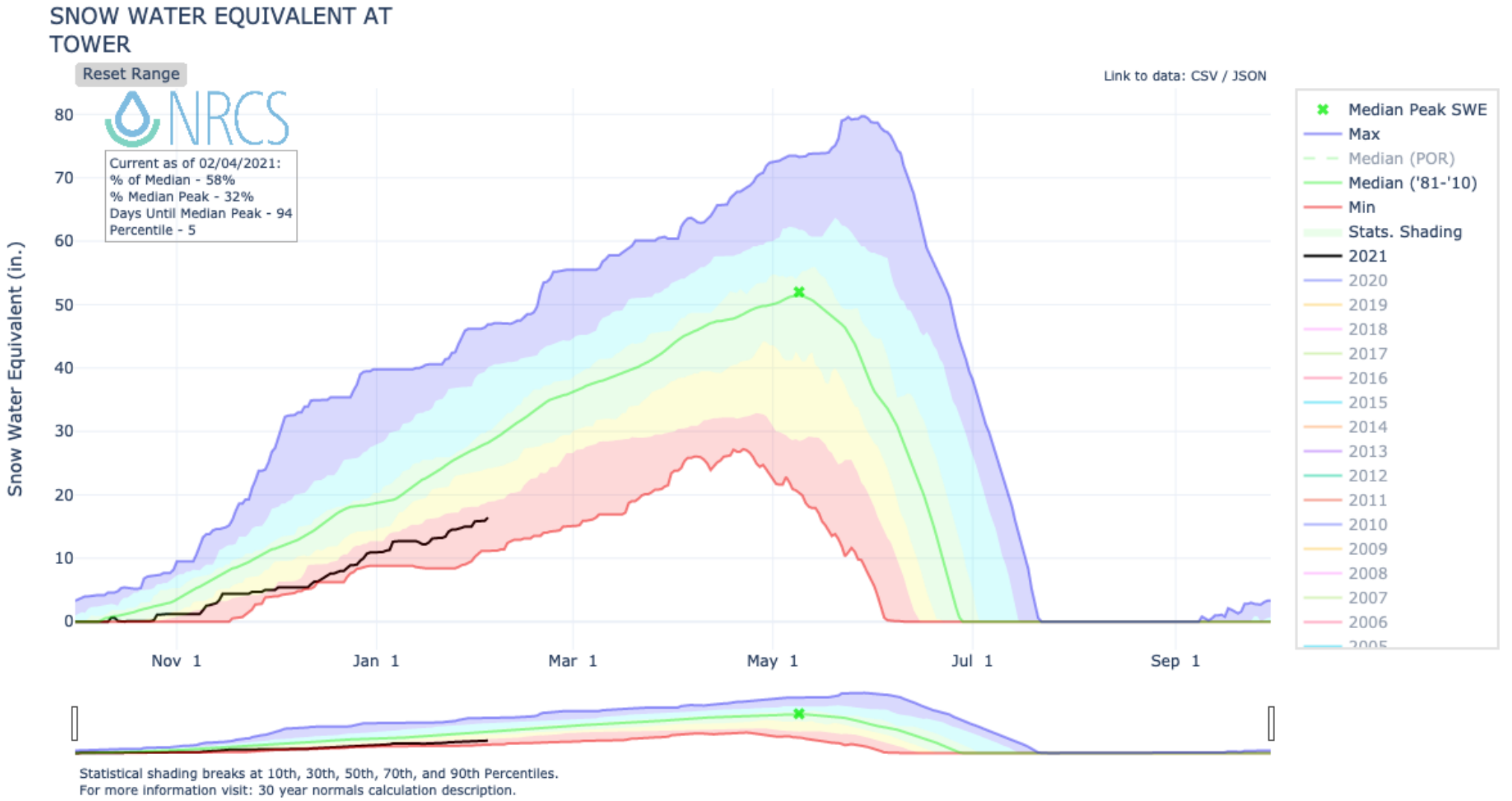


Arkansas


Arkansas River Basin with Non-Exceedence Projections
Based on Provisional SNOTEL Data as of Feb 03, 2021
USDA
United States Department of Agriculture
Natural Resources Conservation Service
Snow Water Equivalent (Inches)
25
20
15
10
5
0
1-Oct
1-Nov
1-Dec
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
Averages
WY2021
Minimum
10%
30%
Median
50%
70%
90%
Maximum



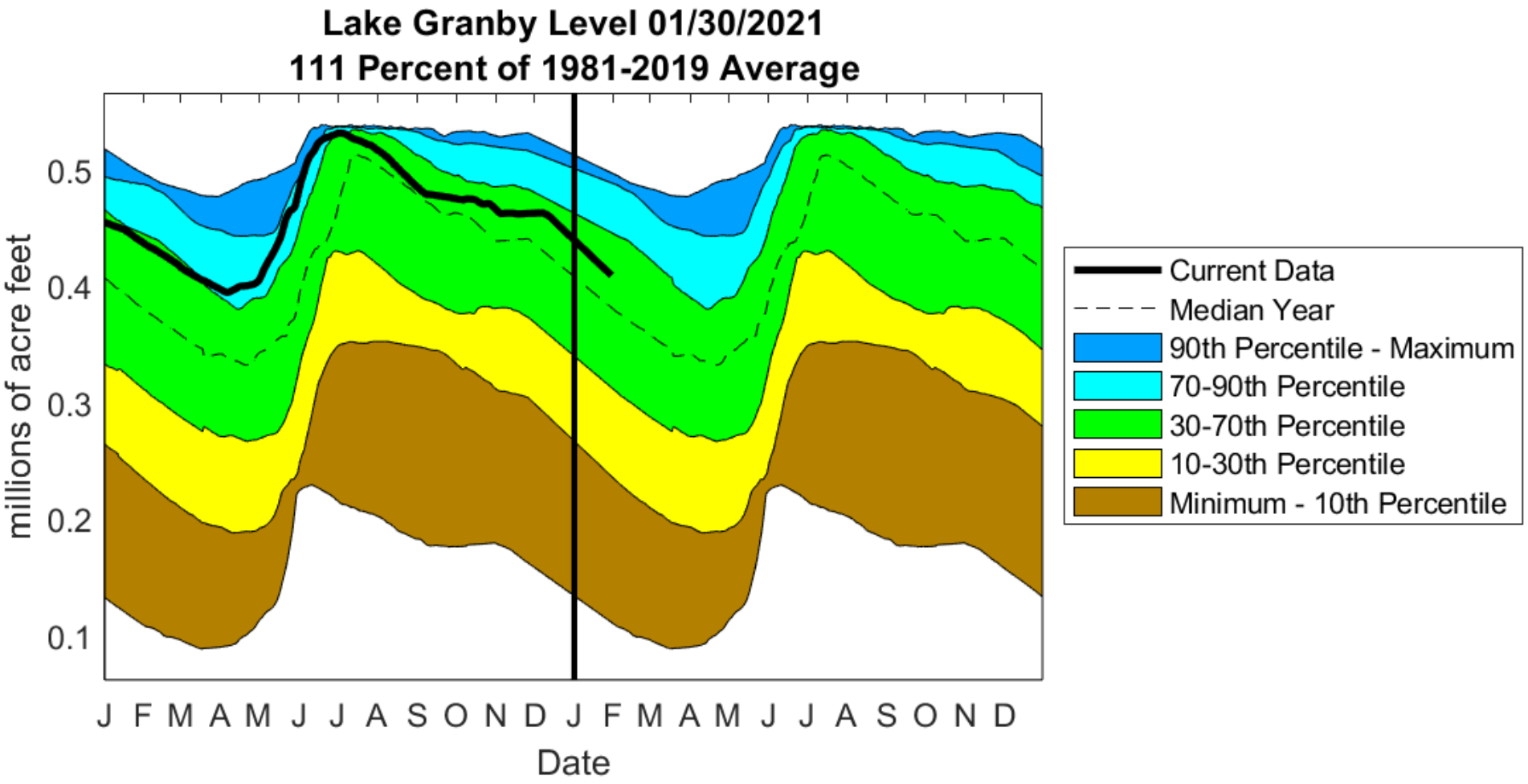
Wolf Creek Summit SNOTEL site: 104% of average

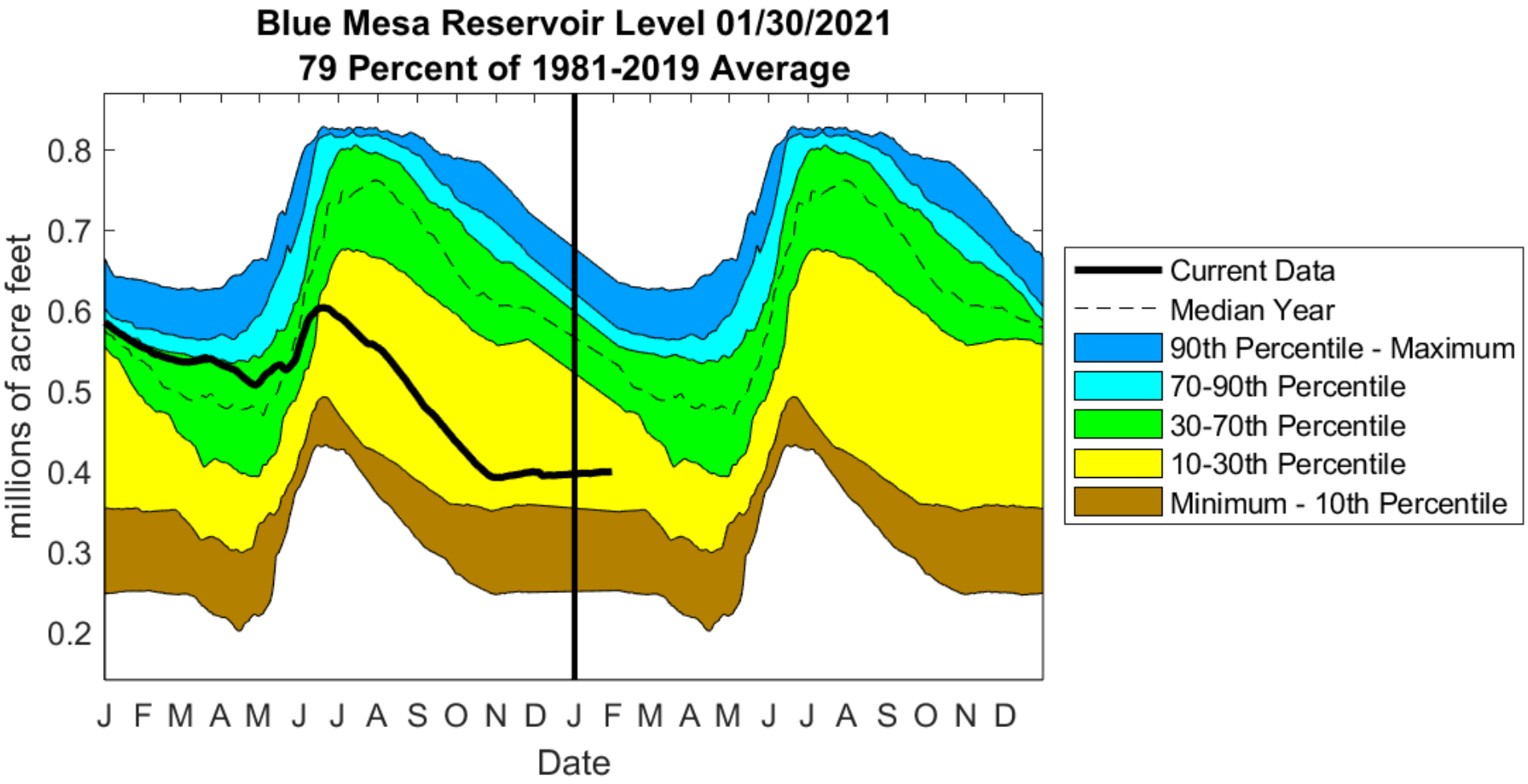


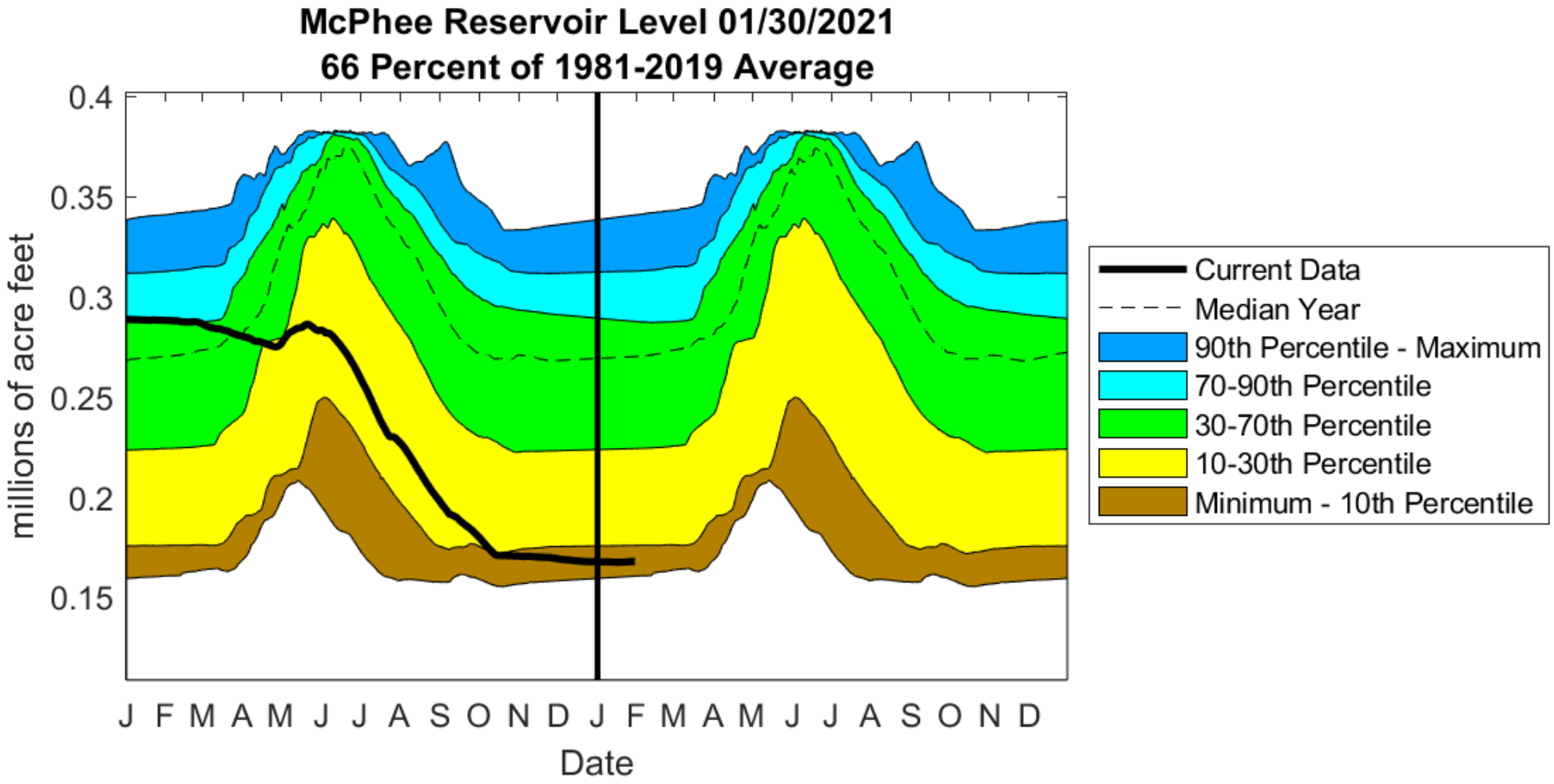
Tower (Routt county) SNOTEL site: worst since 1981 for early February (on par with 2012), about a 12” deficit in SWE

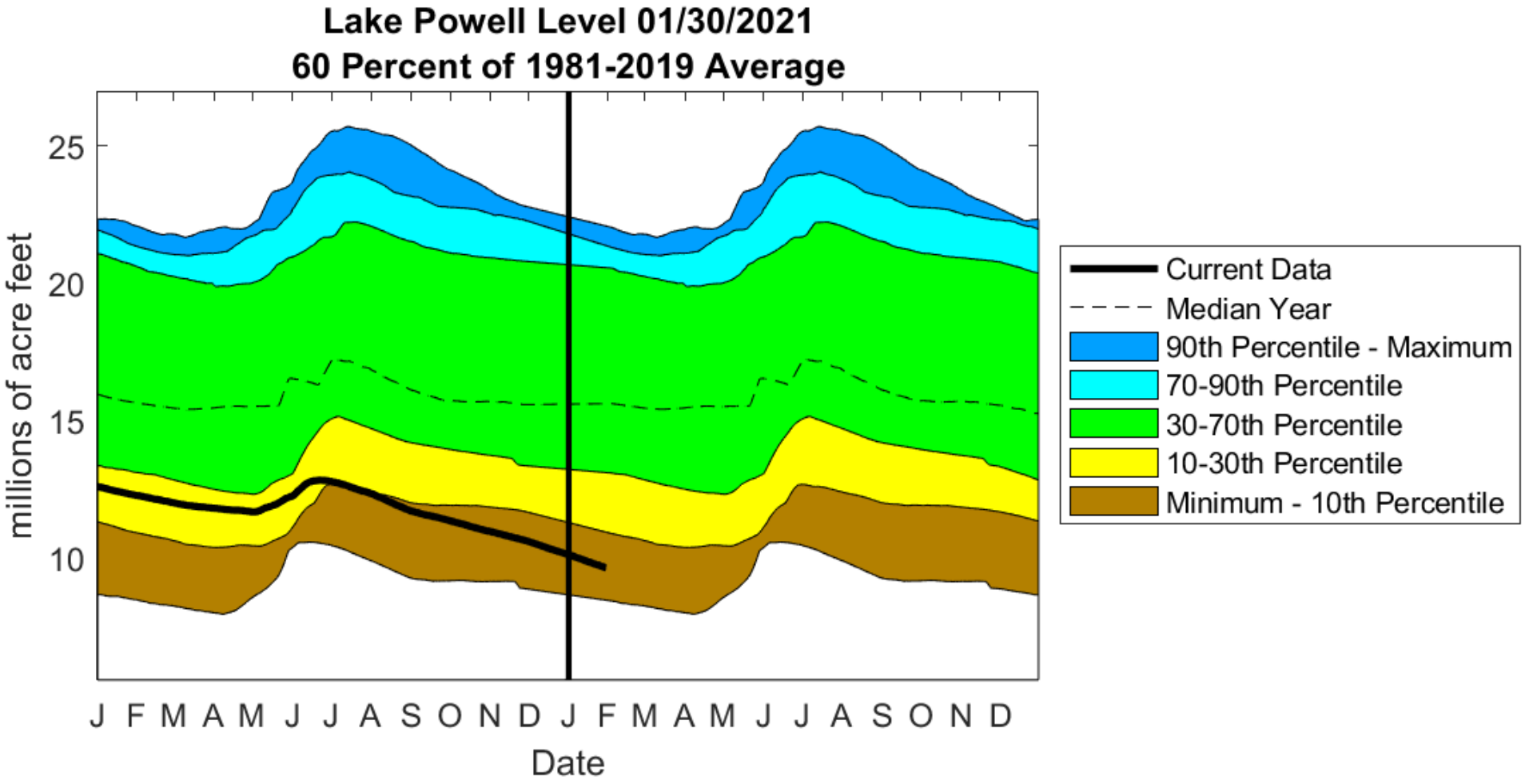
Reservoirs


Idaho
Wyoming
Nevada
Utah
Colorado
0
50
100 miles
Salt Lake City
Cheyenne
Denver
Fontenelle Dam
Flaming Gorge Dam
Upper Basin
Aspinall Unit
Glen Canyon Dam (Lake Powell)
Lees Ferry
Las Vegas
Navajo Dam
N. Platte
S. Platte
Little Snake
Duchesne
Yampa
White
Green
San Rafael
Colorado
Gunnison
Dolores
Paria
Virgin
San Juan
Arkansas


Lake Granby Level 01/30/2021
111 Percent of 1981-2019 Average
millions of acre feet
0.5
0.4
0.3
0.2
0.1
J F M A M J J A S O N D J F M A M J J A S O N D
Date
Current Data
Median Year
90th Percentile - Maximum
70-90th Percentile
30-70th Percentile
10-30th Percentile
Minimum - 10th Percentile

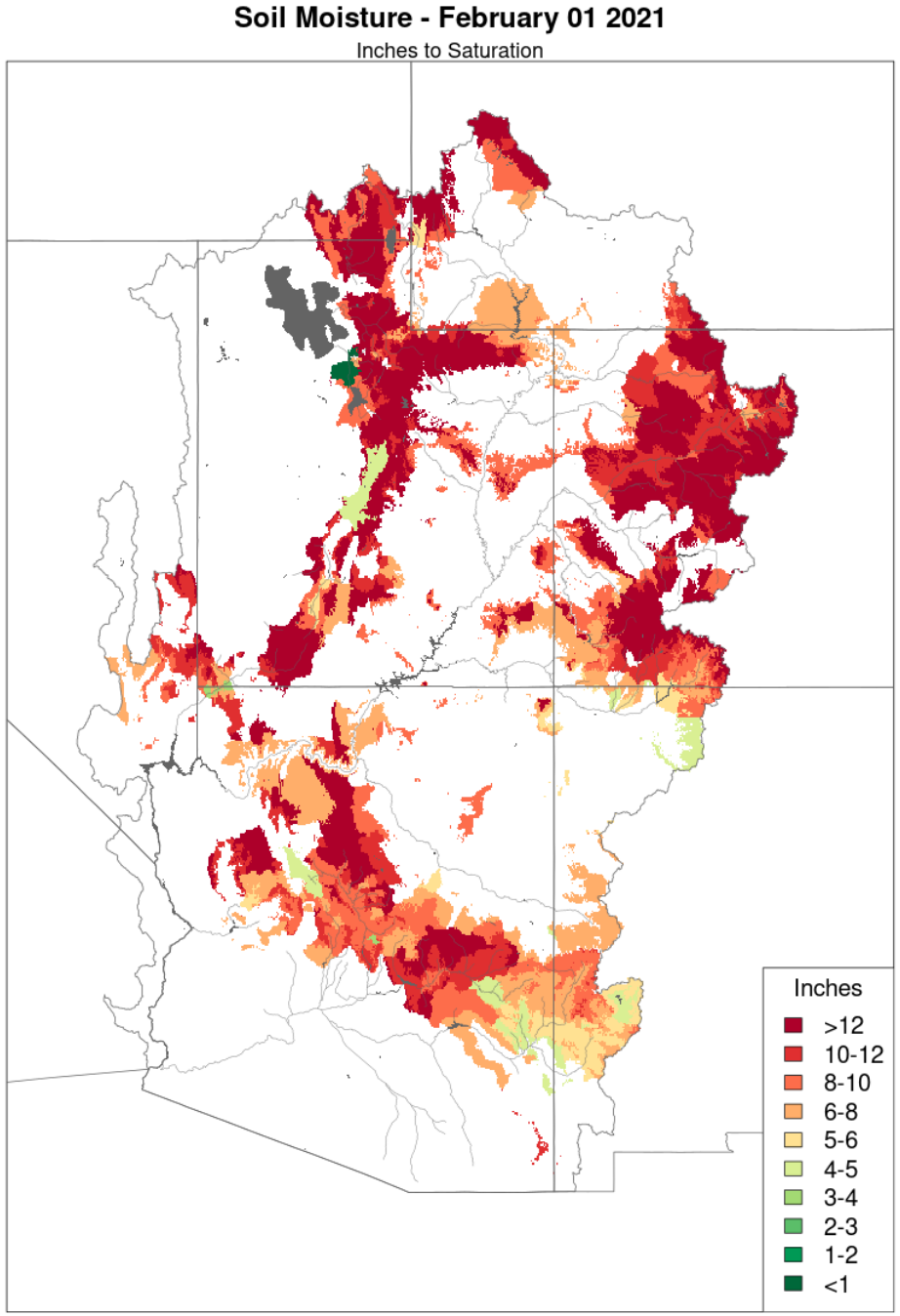

Blue Mesa Reservoir Level 01/30/2021
79 Percent of 1981-2019 Average
millions of acre feet
0.8
0.7
0.6
0.5
0.4
0.3
0.2
J F M A M J J A S O N D J F M A M J J A S O N D
Date
Current Data
Median Year
90th Percentile - Maximum
70-90th Percentile
30-70th Percentile
10-30th Percentile
Minimum - 10th Percentile


McPhee Reservoir Level 01/30/2021
66 Percent of 1981-2019 Average
millions of acre feet
0.4
0.35
0.3
0.25
0.2
0.15
J F M A M J J A S O N D J F M A M J J A S O N D
Date
Current Data
Median Year
90th Percentile - Maximum
70-90th Percentile
30-70th Percentile
10-30th Percentile
Minimum - 10th Percentile

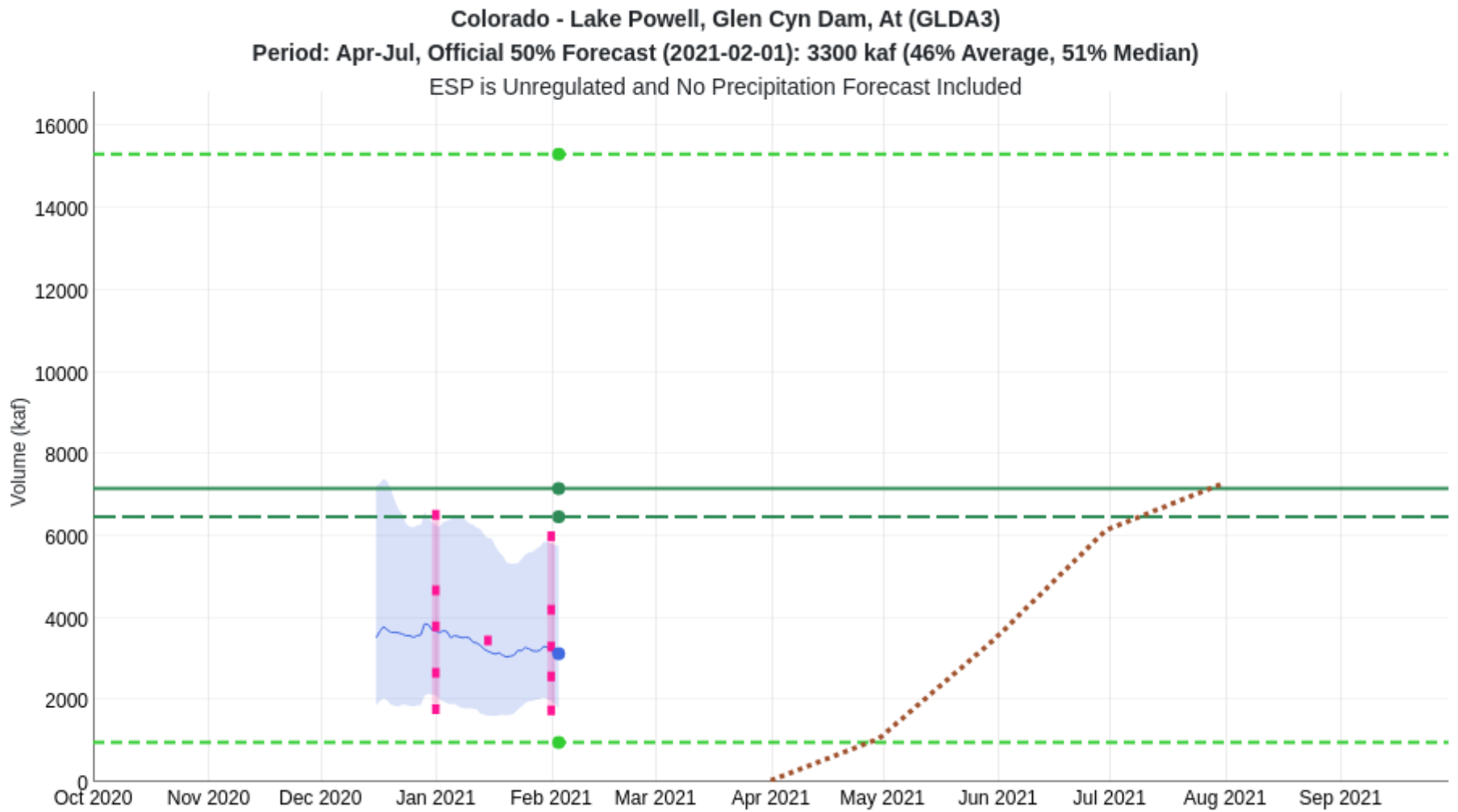

Lake Powell Level 01/30/2021
60 Percent of 1981-2019 Average
millions of acre feet
25
20
15
10
J F M A M J J A S O N D J F M A M J J A S O N D
Date
Current Data
Median Year
90th Percentile - Maximum
70-90th Percentile
30-70th Percentile
10-30th Percentile
Minimum - 10th Percentile

CBRFC soil moisture: inches to saturation

10+ inches across much of the Colorado River Basin



CBRFC February 1 forecast: 46% of average April-July flow into Lake Powell



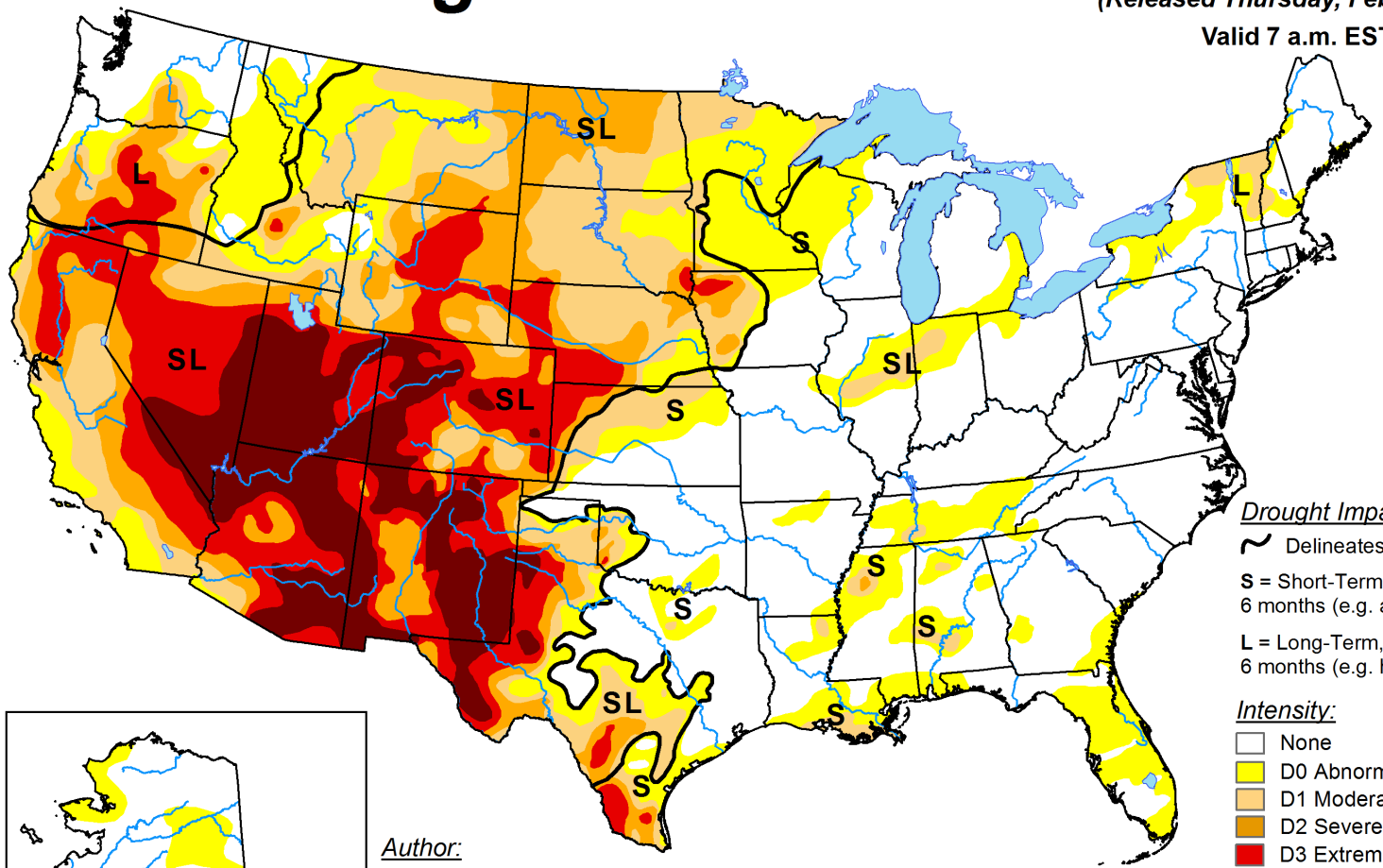
2021/02/03:
Max 1984: 15316.11
Min 2002: 963.96
Average: 7160
Median: 6470
ESP: 3130

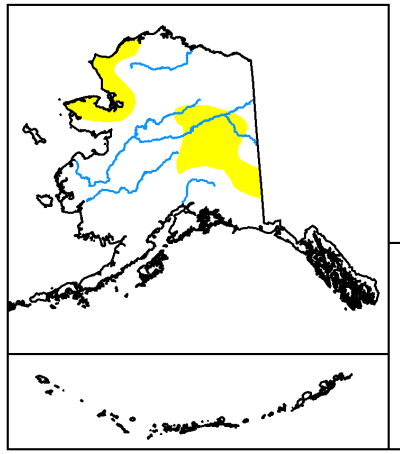
U.S. Drought Monitor

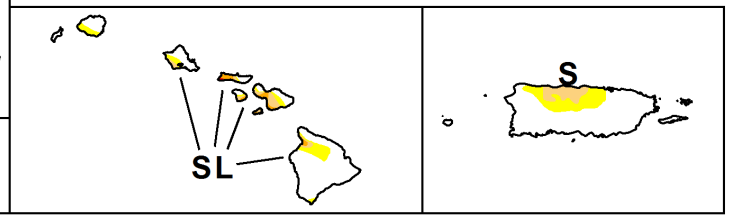
February 2, 2021

(Released Thursday, Feb. 4, 2021)

Valid 7 a.m. EST







Drought Impact Types:

Delineates dominant impacts

S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)

L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

Intensity:

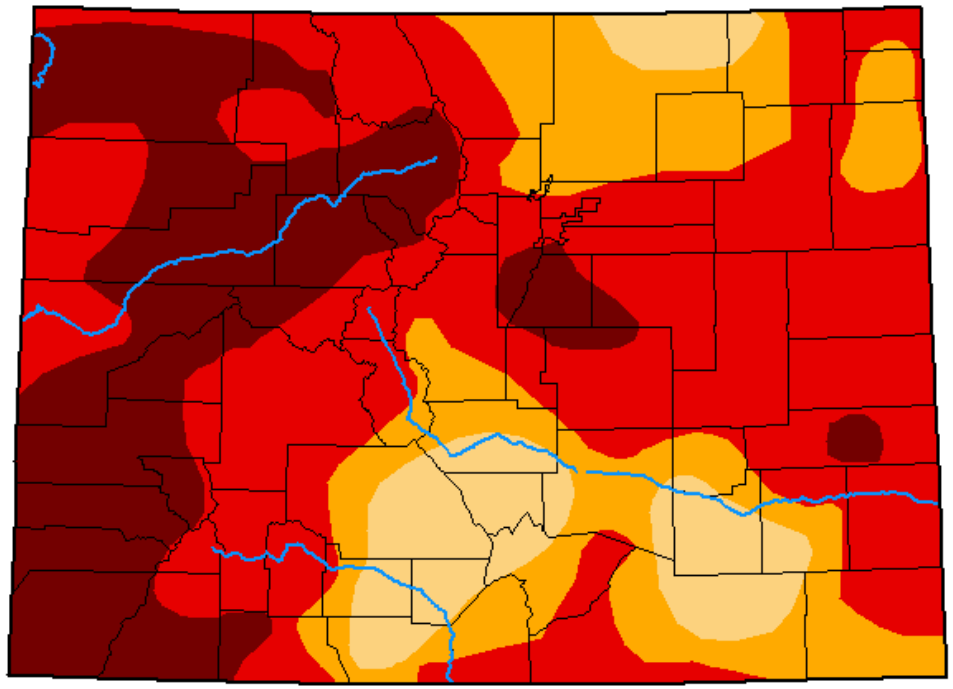
- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

Author:
Brad Rippey
U.S. Department of Agriculture

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

droughtmonitor.unl.edu

U.S. Drought Monitor
Colorado



February 2, 2021
(Released Thursday, Feb. 4, 2021)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	90.24	70.73	24.79
Last Week *01-26-2021*	0.00	100.00	100.00	90.65	73.11	24.91
3 Months Ago *11-03-2020*	0.00	100.00	100.00	93.71	74.08	24.39
Start of Calendar Year *12-29-2020*	0.00	100.00	100.00	93.73	76.17	27.60
Start of Water Year *09-29-2020*	0.00	100.00	99.29	89.35	52.88	2.64
One Year Ago *02-04-2020*	22.39	77.61	51.12	3.30	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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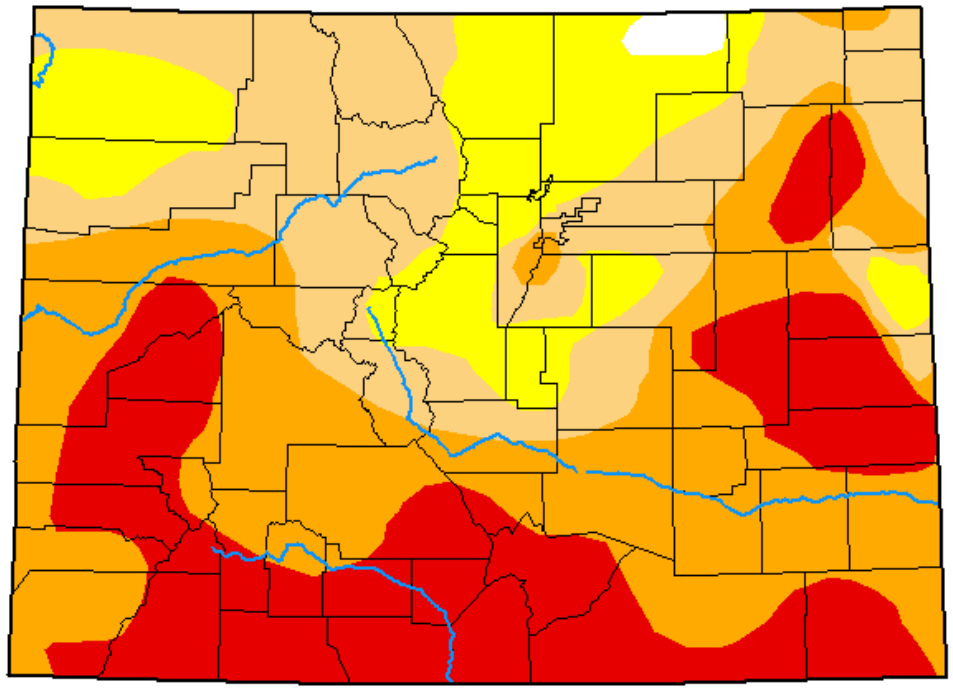
droughtmonitor.unl.edu

Six months ago

U.S. Drought Monitor
Colorado



July 28, 2020
(Released Thursday, Jul. 30, 2020)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.65	99.35	83.72	58.79	26.64	0.00
Last Week *07-21-2020*	2.95	97.05	73.99	60.34	31.77	0.00
3 Months Ago *04-28-2020*	24.47	75.53	56.64	32.72	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 *07-30-2019*	95.32	4.68	0.00	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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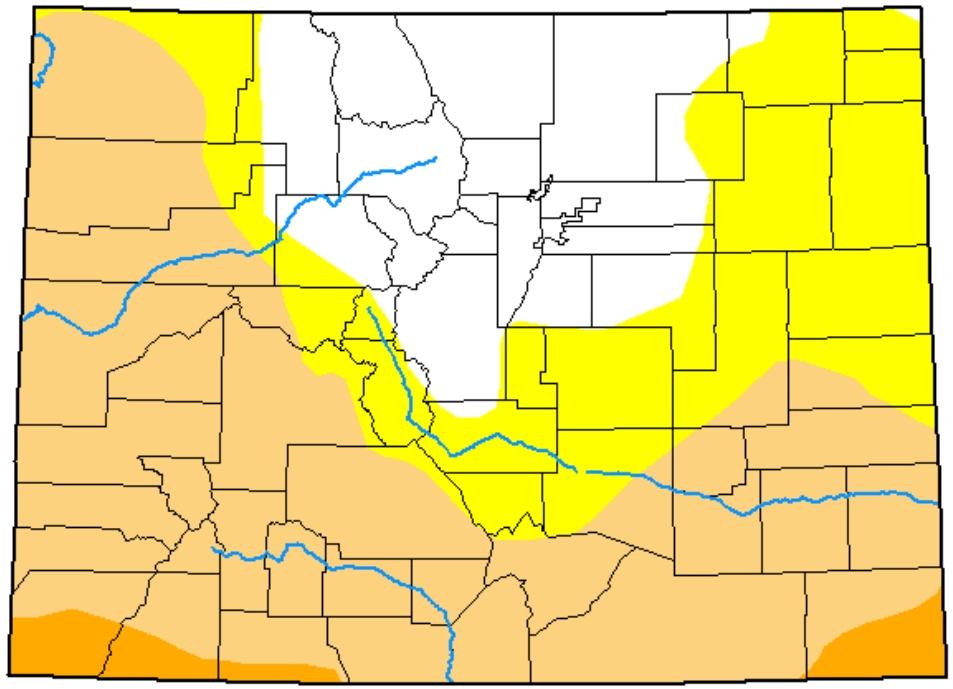
NCEI/NOAA

droughtmonitor.unl.edu

One year ago

U.S. Drought Monitor
Colorado



January 28, 2020
(Released Thursday, Jan. 30, 2020)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	22.39	77.61	51.19	3.30	0.00	0.00
Last Week *01-21-2020*	22.39	77.61	51.19	13.84	0.00	0.00
3 Months Ago *10-29-2019*	18.73	81.27	58.24	27.41	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 *01-29-2019*	15.91	84.09	66.35	41.02	22.04	2.79

Intensity:

- None
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- D1 Moderate Drought
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- D4 Exceptional Drought

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NCEI/NOAA

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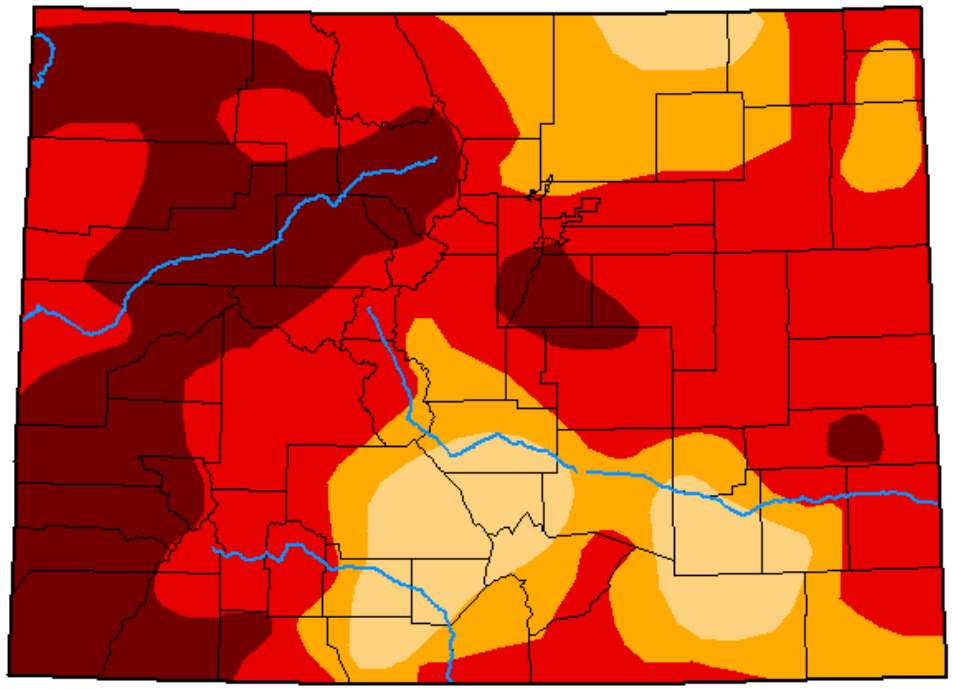
U.S. Drought Monitor
Colorado



February 2, 2021
(Released Thursday, Feb. 4, 2021)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	90.24	70.73	24.79
Last Week *01-26-2021*	0.00	100.00	100.00	90.65	73.11	24.91
3 Months Ago *11-03-2020*	0.00	100.00	100.00	93.71	74.08	24.39
Start of Calendar Year *12-29-2020*	0.00	100.00	100.00	93.73	76.17	27.60
Start of Water Year *09-29-2020*	0.00	100.00	99.29	89.35	52.88	2.64
One Year Ago *02-04-2020*	22.39	77.61	51.12	3.30	0.00	0.00

Intensity:

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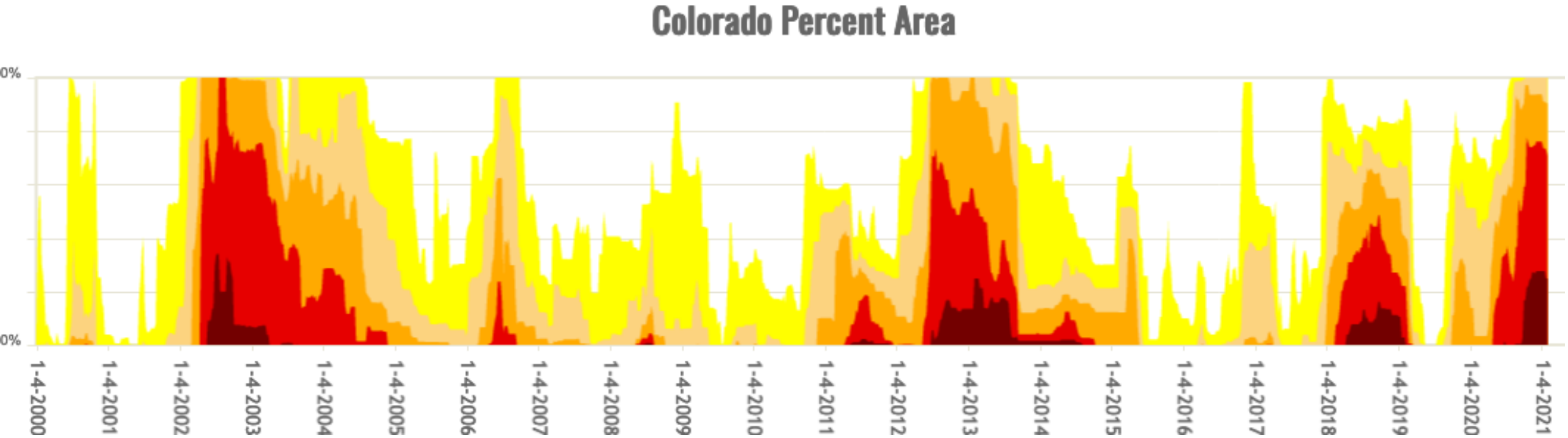
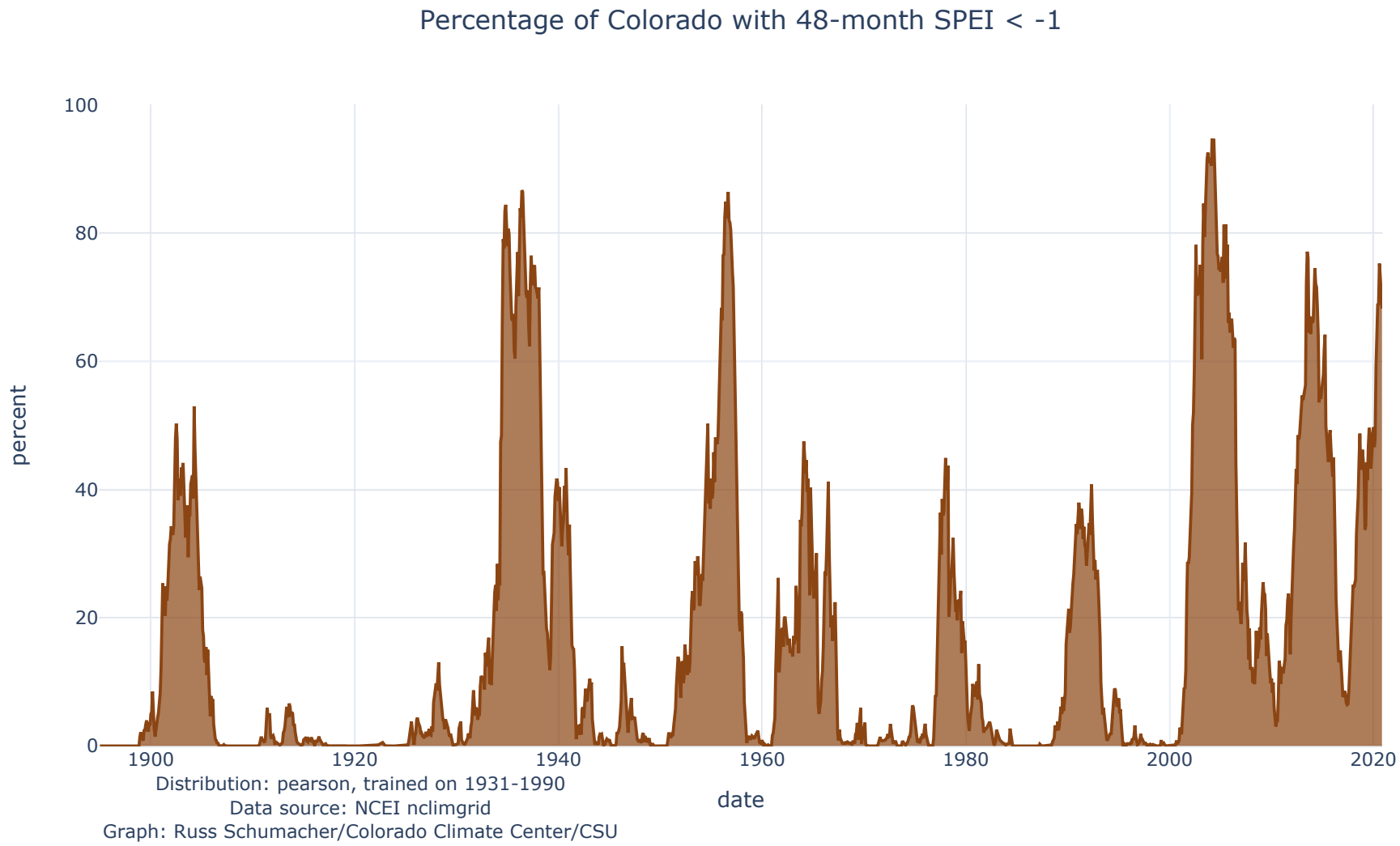
U.S. Department of Agriculture

droughtmonitor.unl.edu

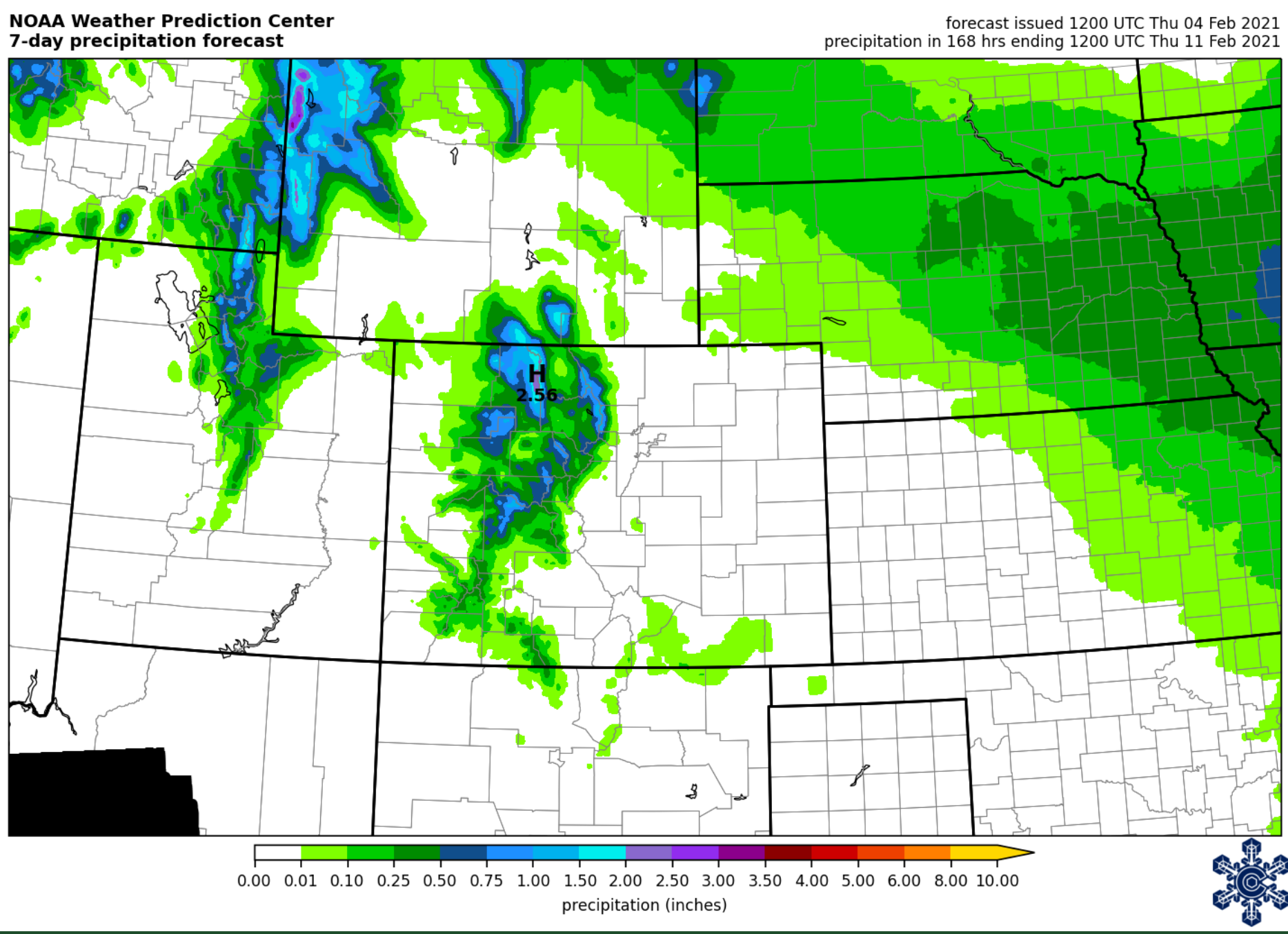
Percent of Colorado in drought (since 2000)



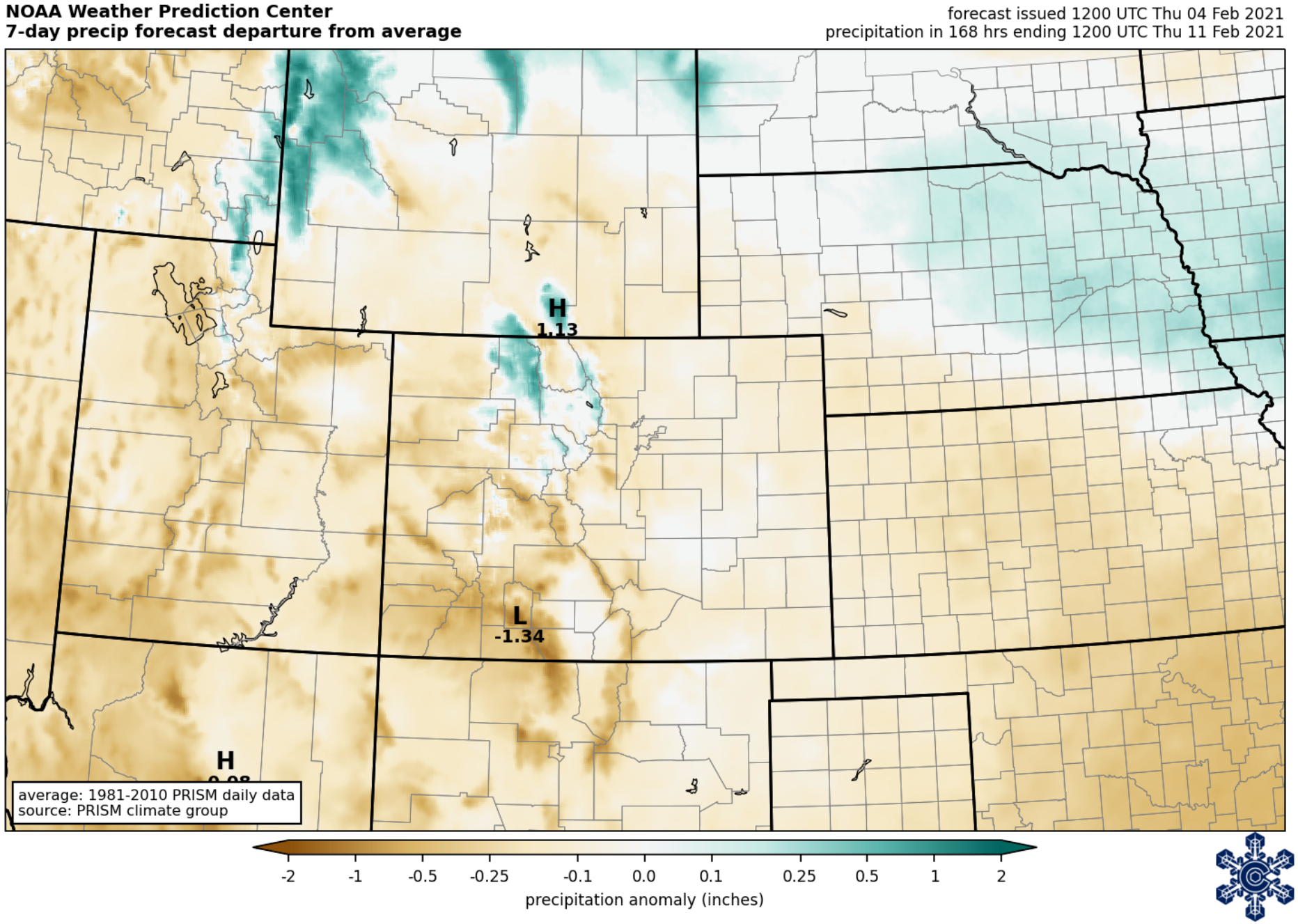
Percent of Colorado in long-term drought (since 1895)



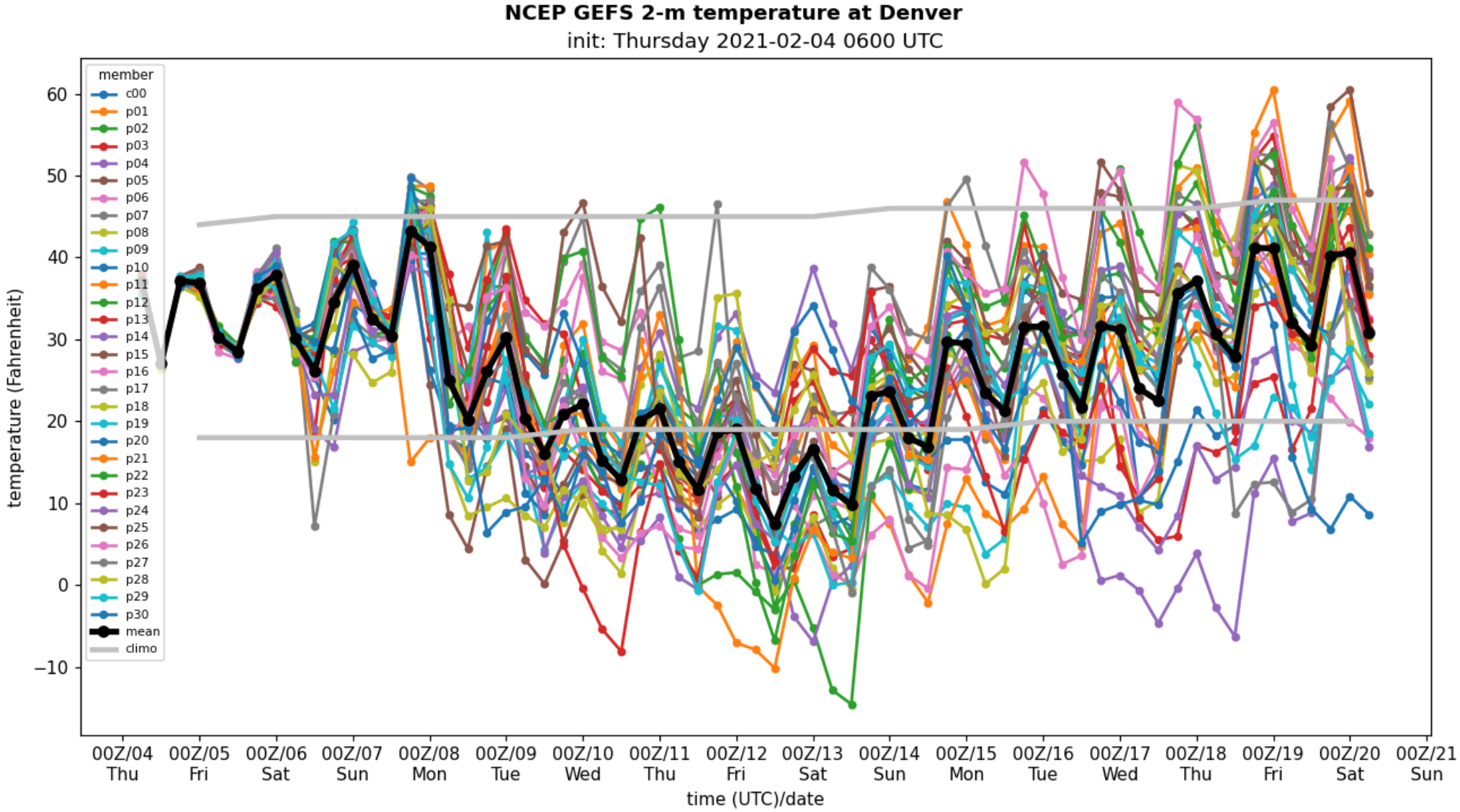
NOAA 7-day precipitation forecast



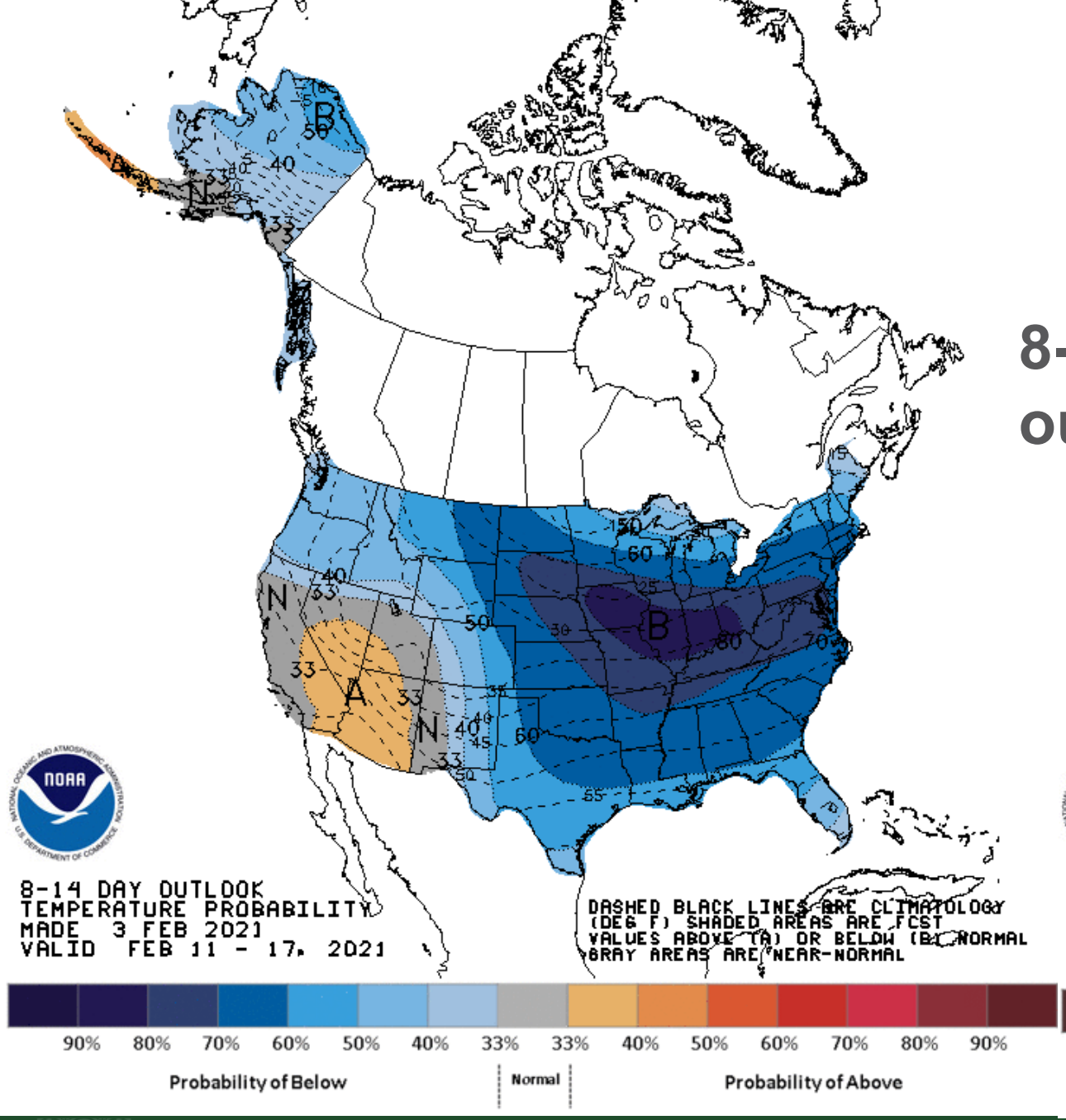
NOAA 7-day precipitation forecast (difference from average)

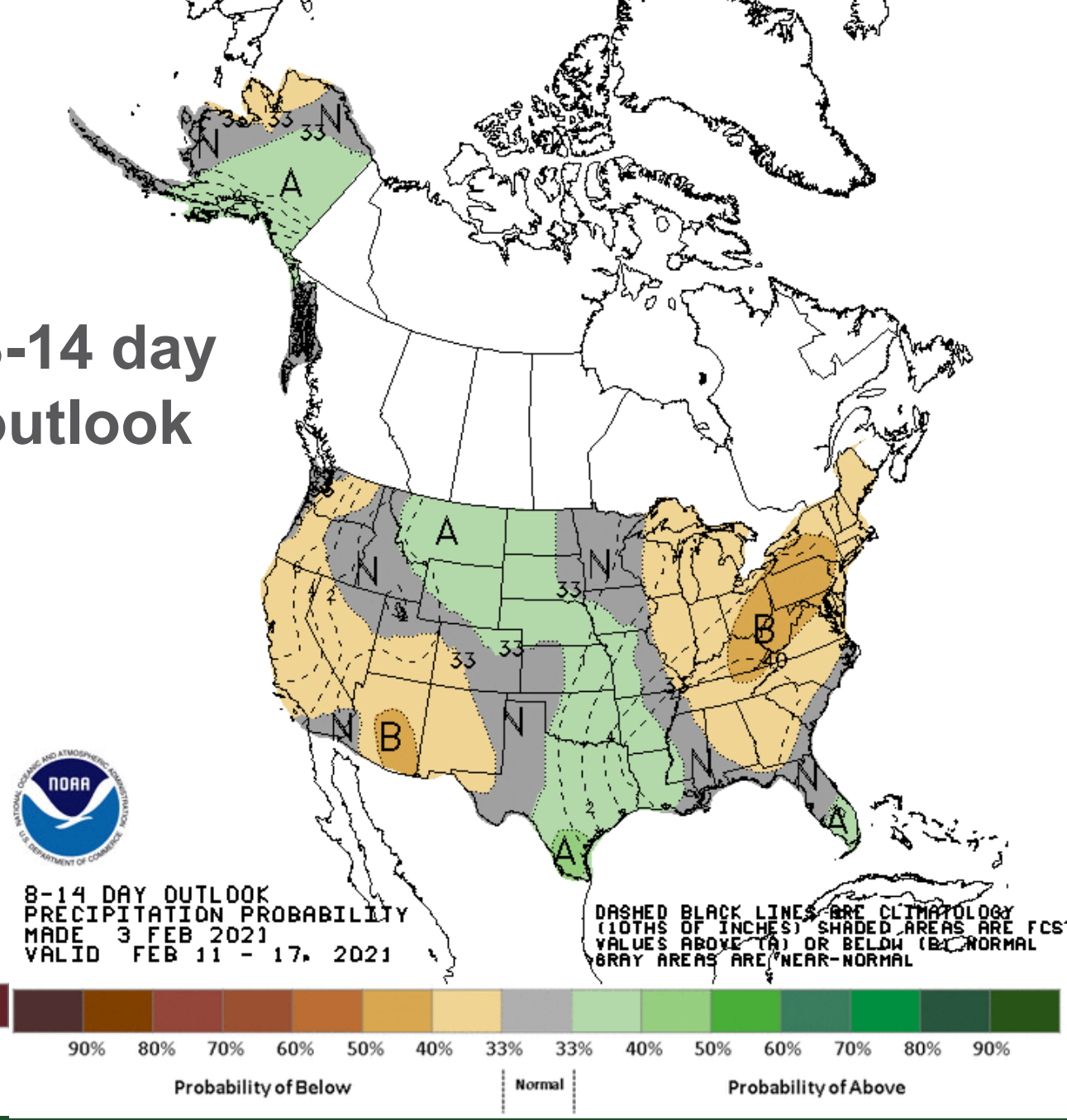


Looks to stay cold through next week; active in the northern mountains but dry on the plains



8-14 day outlook



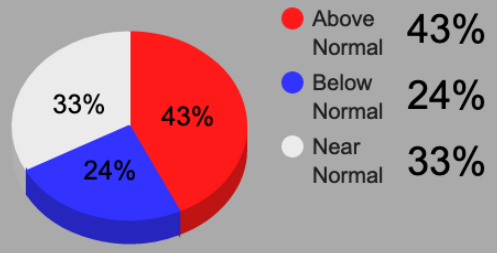


February-March-April outlook

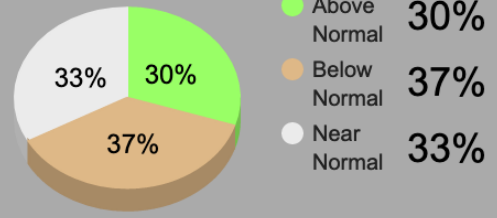
Find address or place

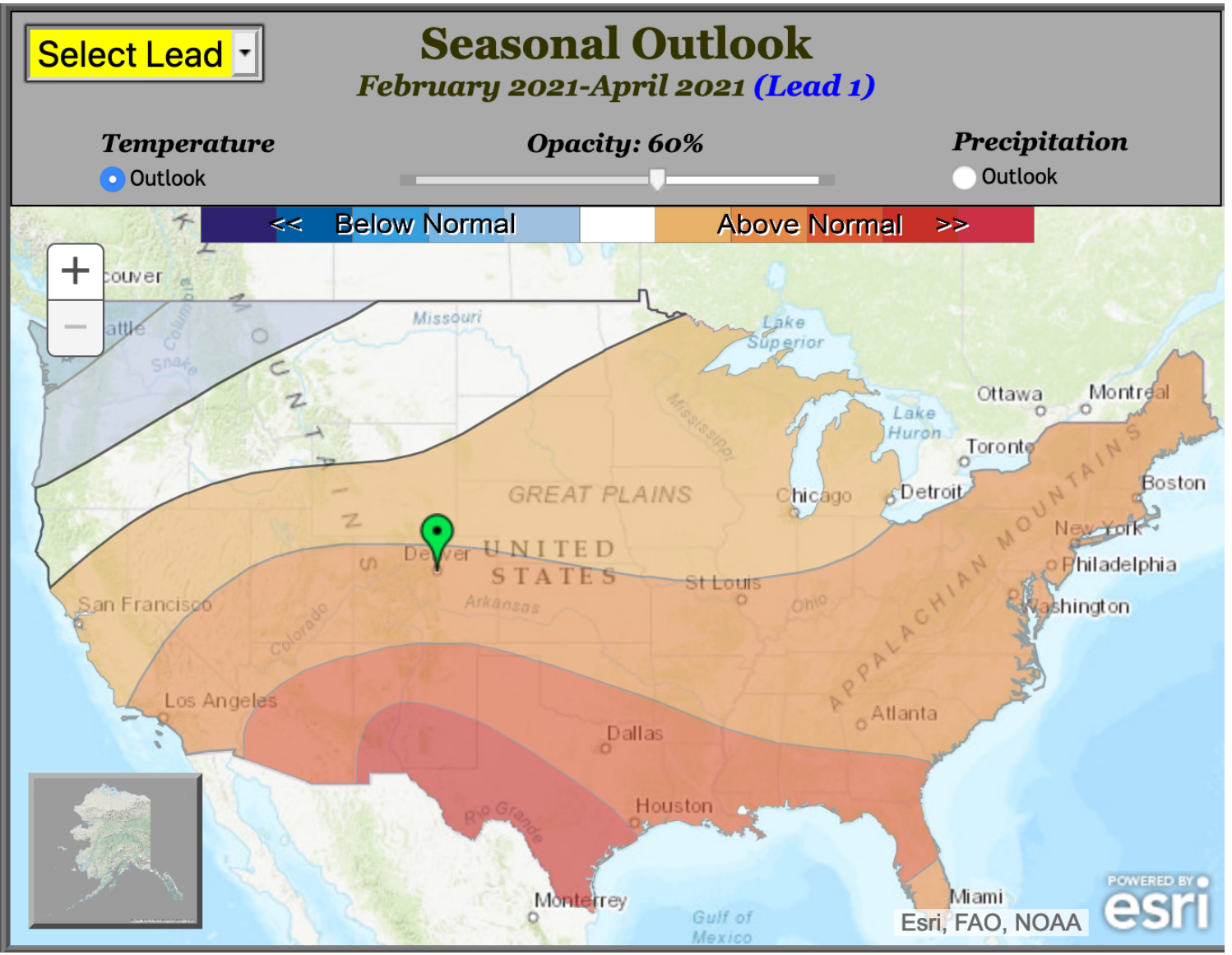
7 Day Forecast for Denver, CO

Three Category Temperature Outlook
Normal Maximum Temperature: **54**
Normal Minimum Temperature: **27**



Three Category Precipitation Outlook
Normal Precipitation: **4.07**





February-March-April outlook

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7 Day Forecast for Denver, CO

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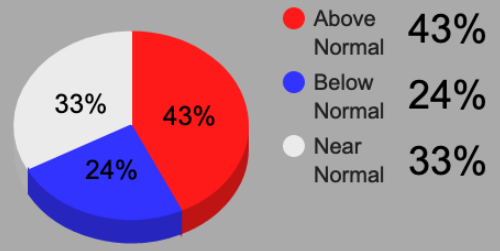
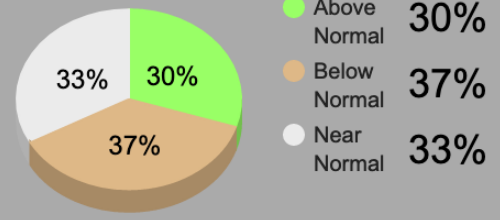
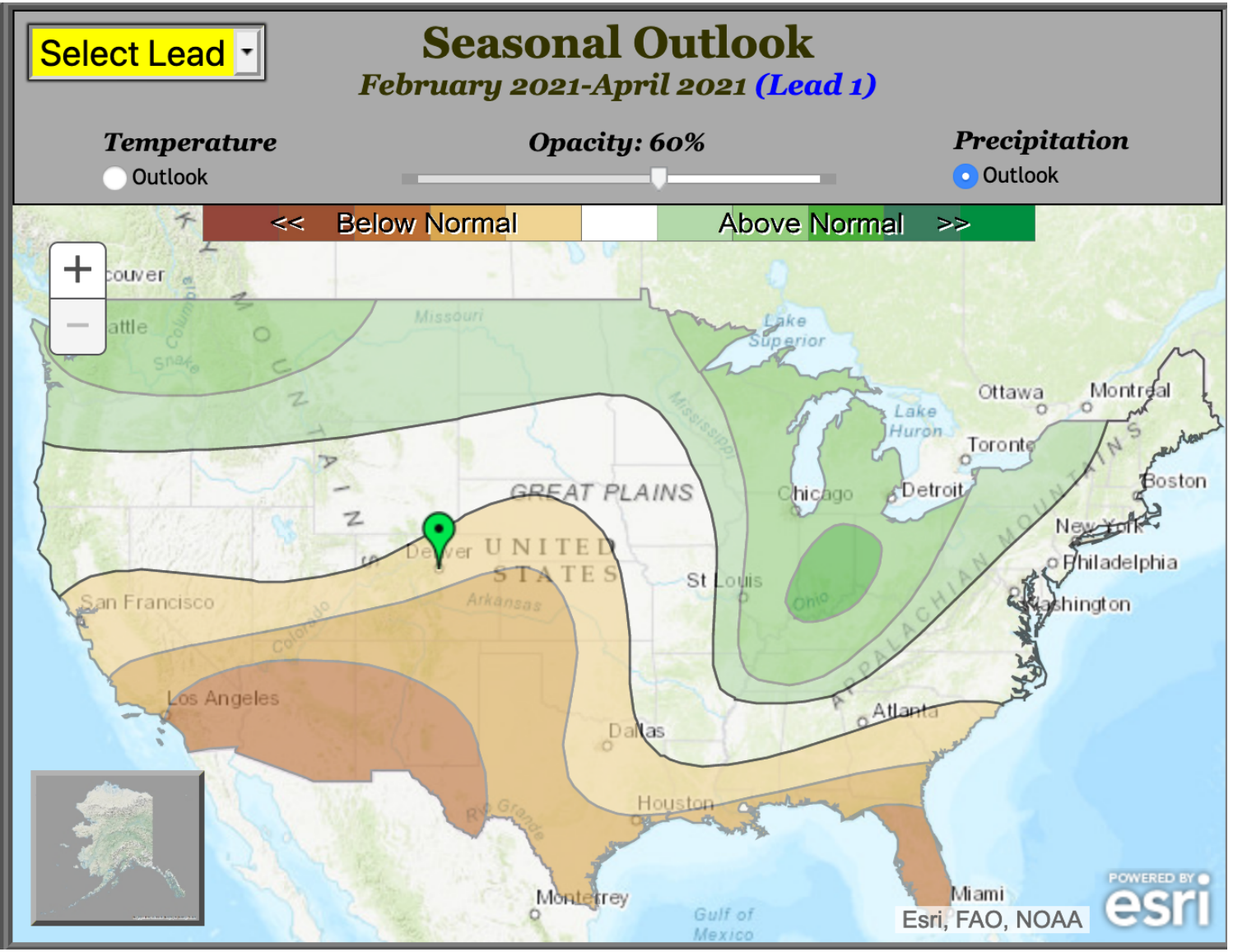
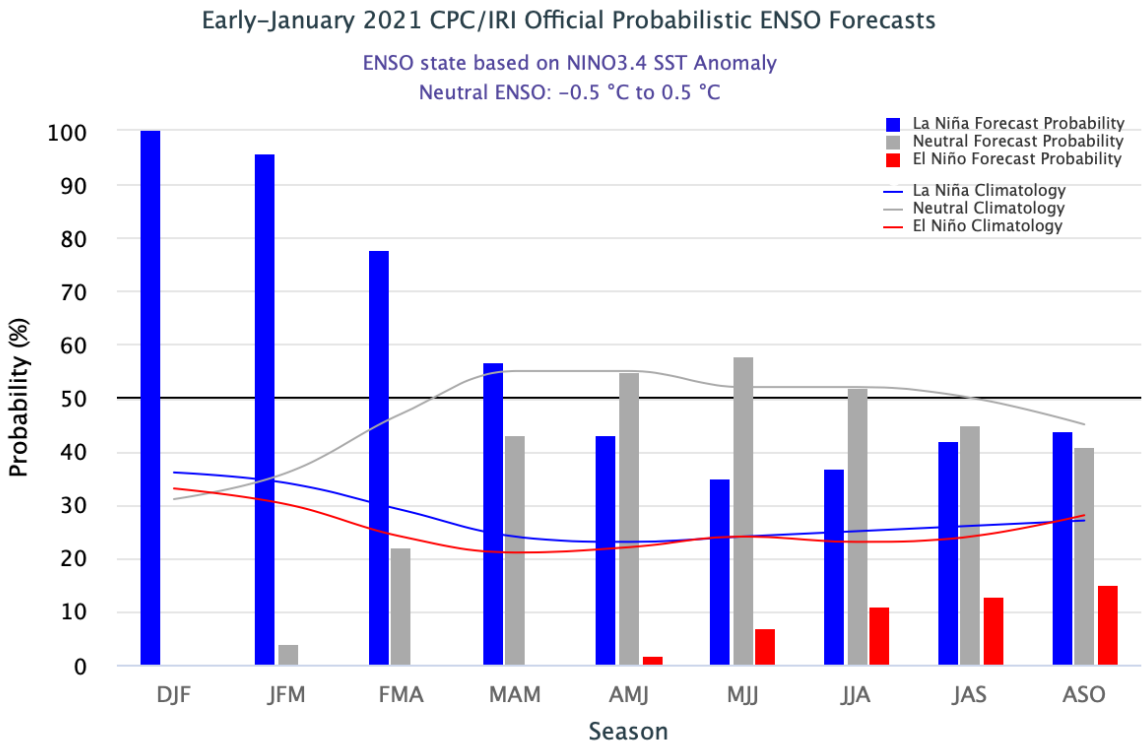


Three Category Precipitation Outlook
Normal Precipitation: **4.07**





La Niña ongoing; may weaken by spring



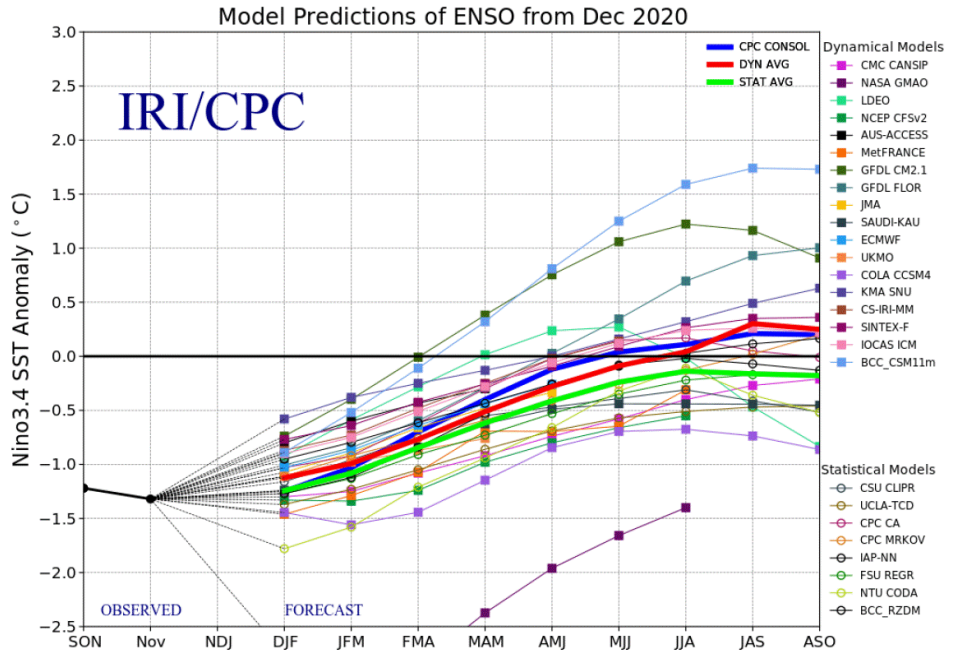
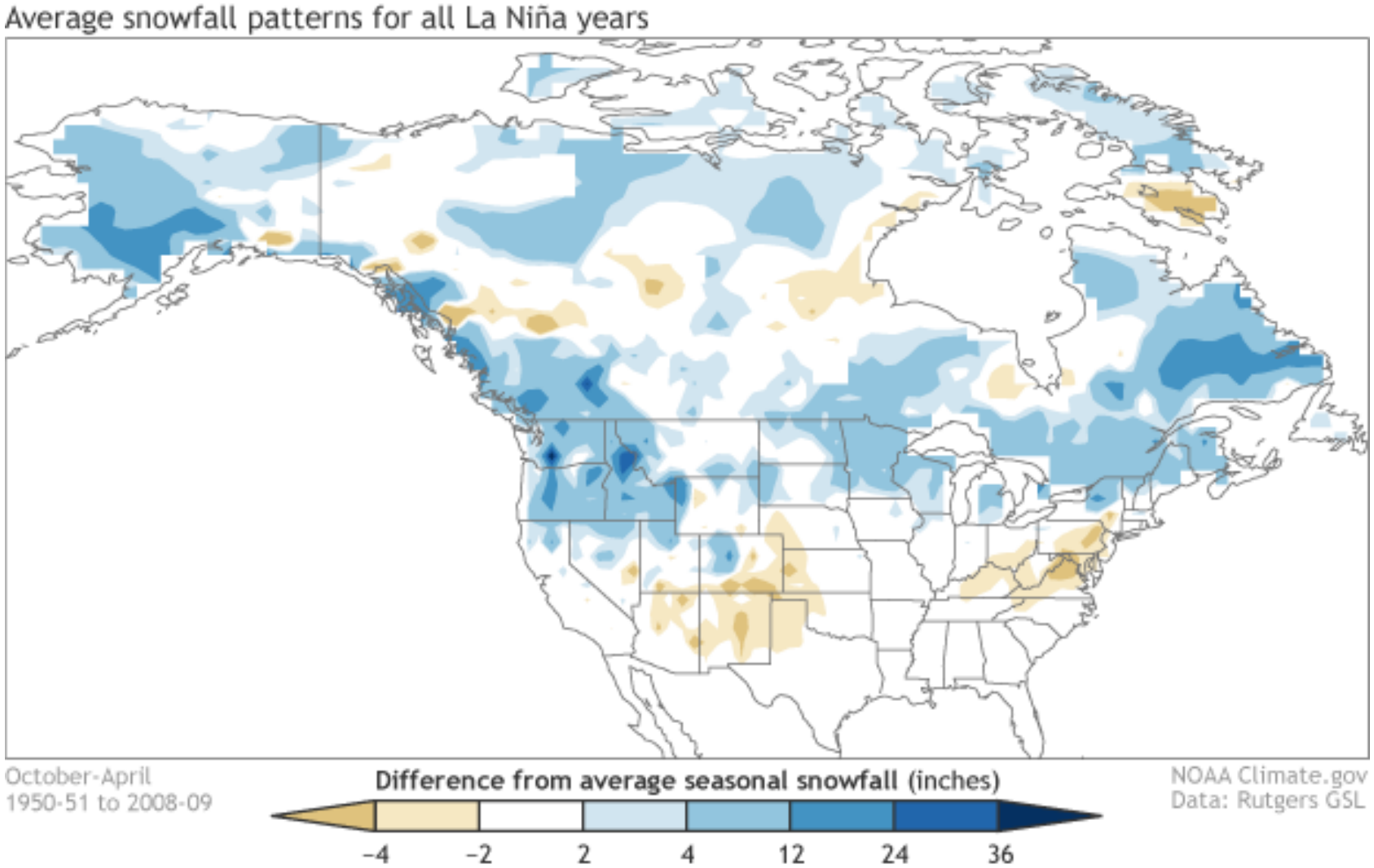


Figure 6. Forecasts of sea surface temperature (SST) anomalies for the Niño 3.4 region (5°N-5°S, 120°W-170°W). Figure updated 19 December 2020.

We're in a La Niña advisory. 95% chance that La Niña conditions will continue through the winter; 55% chance it transitions back to neutral in spring

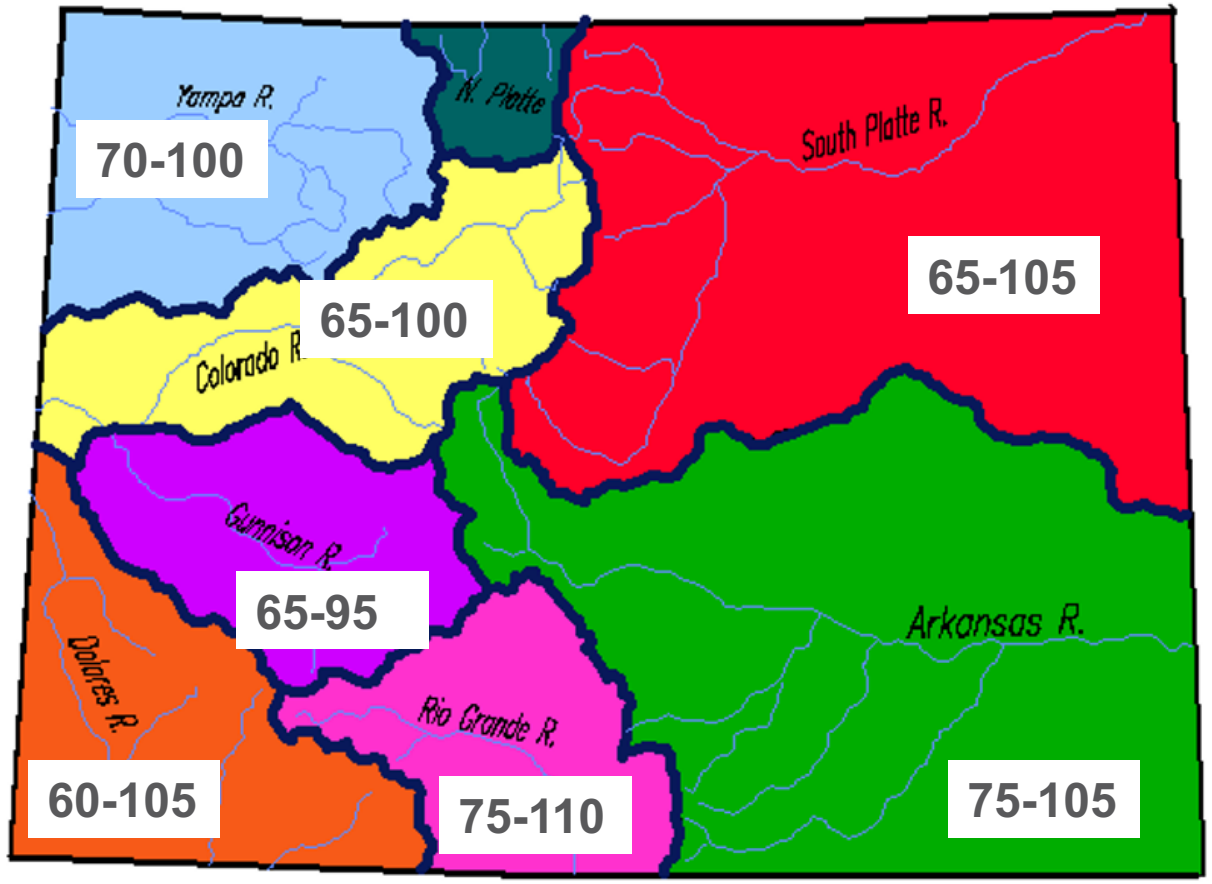
What's La Niña mean for snow?



Not really what we're seeing so far this winter!

https://www.climate.gov/news-features/blogs/enso/what-about-snow-during-la-niña-winters

Peak Snowpack Projection 20-80th percentile range



- Snowpack likely to peak well below normal
- Lots of time left in the mountain snow season, but the seasonal forecast leads us to expect numbers closer to the low end of the range

Takeaways

- Colorado remains firmly in the clutches of drought. Impacts to this point have been largely agricultural and ecological, but the hydrologic impacts may be imminent
- January was warm and dry in the mountains. Current snowpack is well on the low end of normal statewide (the Rio Grande and Ark basins are near normal)
- We remain in a La Niña pattern, but this La Niña has not been typical. La Niña in winter is supposed to be a good thing for NW CO snowpack
- La Niña springs tend to lean dry, and rarely see a wet extreme
- We should be prepared for a low runoff year

Thank you!

http://climate.colostate.edu/

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