

Water Year 2024 in Review

Russ Schumacher, State Climatologist

Peter Goble, Assistant State Climatologist

Kristie Davis, CoAgMET Tech/Analyst

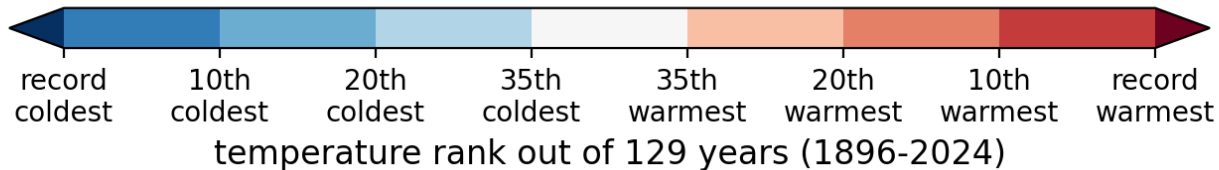
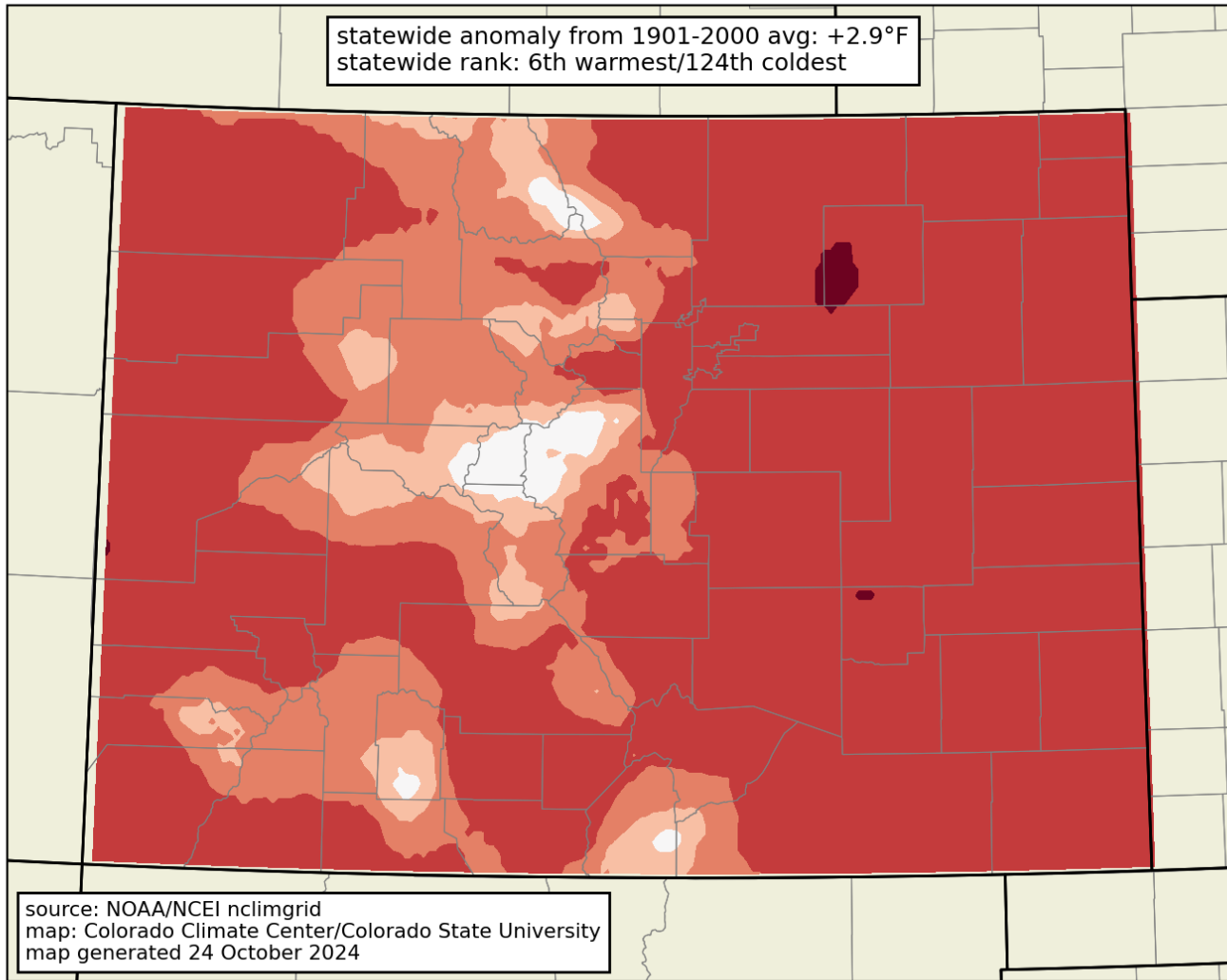


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ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY

average temperature rank: 12 months ending September 2024 (Oct-Sep)



Average of 47.5 °F

Mild winter and hot summer

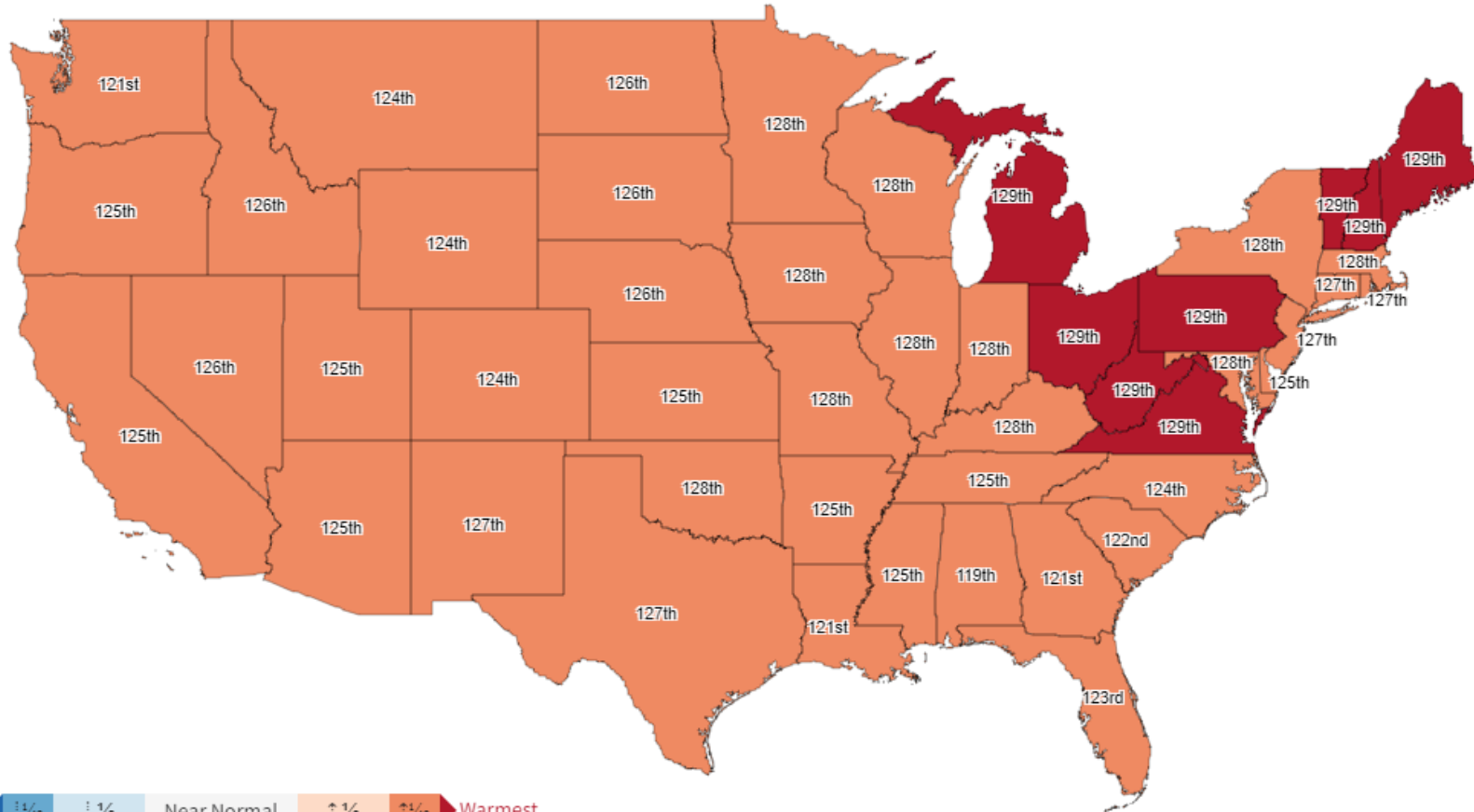
Top 10 warm year for our lower elevations

Tied for 6th warmest in last 130 years (tied with 2022)

Warmest since 2022

Statewide Average Temperature Rank (129 years)

October 2023 - September 2024



Warmest water year in 129 years of records for CONUS

Nearly every state in the nation had one of the top 10 warmest water years on record



Coldest $\downarrow \frac{1}{10}$ $\downarrow \frac{1}{5}$ Near Normal $\uparrow \frac{1}{5}$ $\uparrow \frac{1}{10}$ Warmest

Contiguous U.S. (Hover over a State)

Temp: 55.32°F

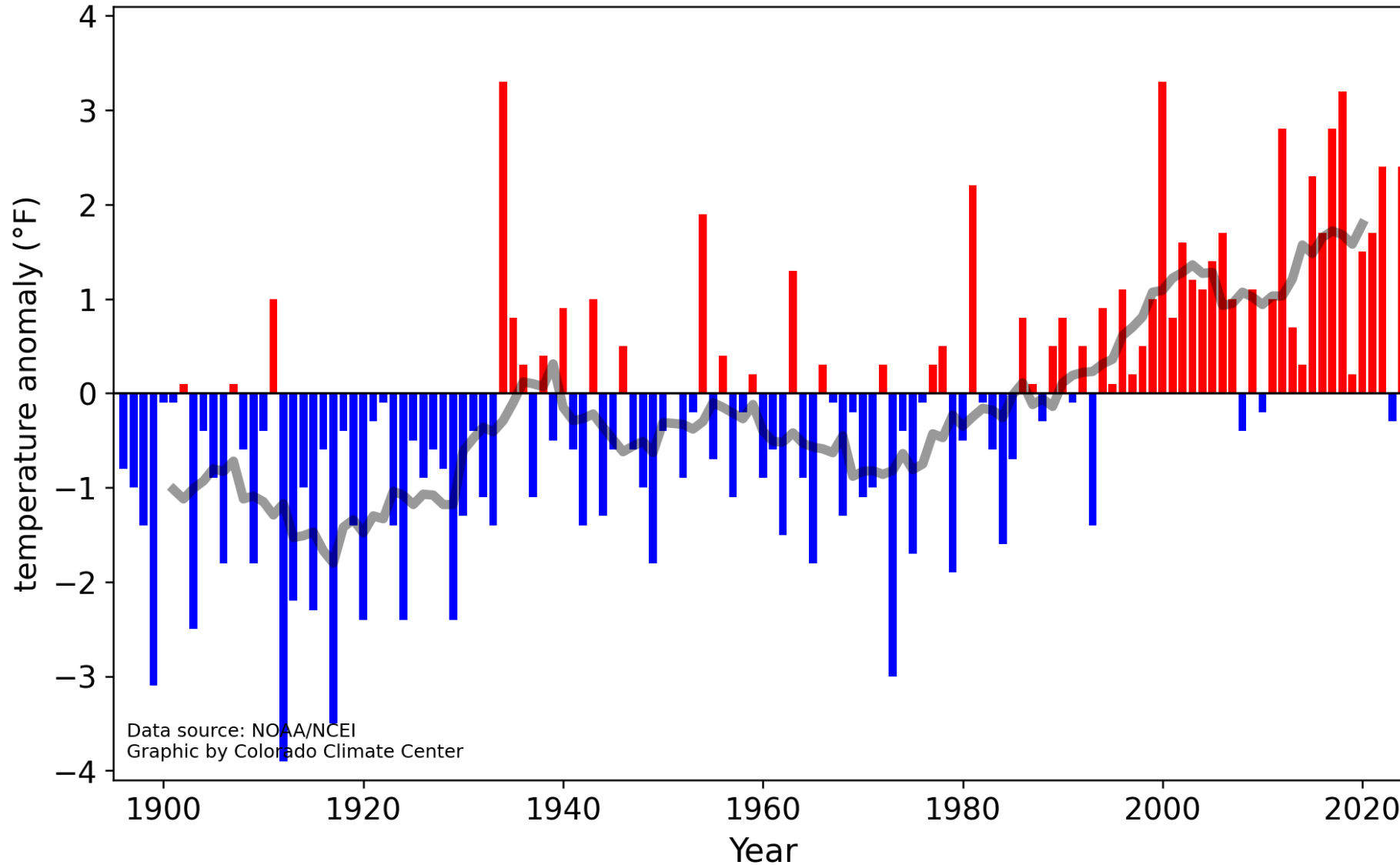
Anomaly: 3.30°F

Rank: Warmest

Mean: 52.02°F



Colorado statewide water year temperature anomaly (°F), with respect to 1971-2000 average

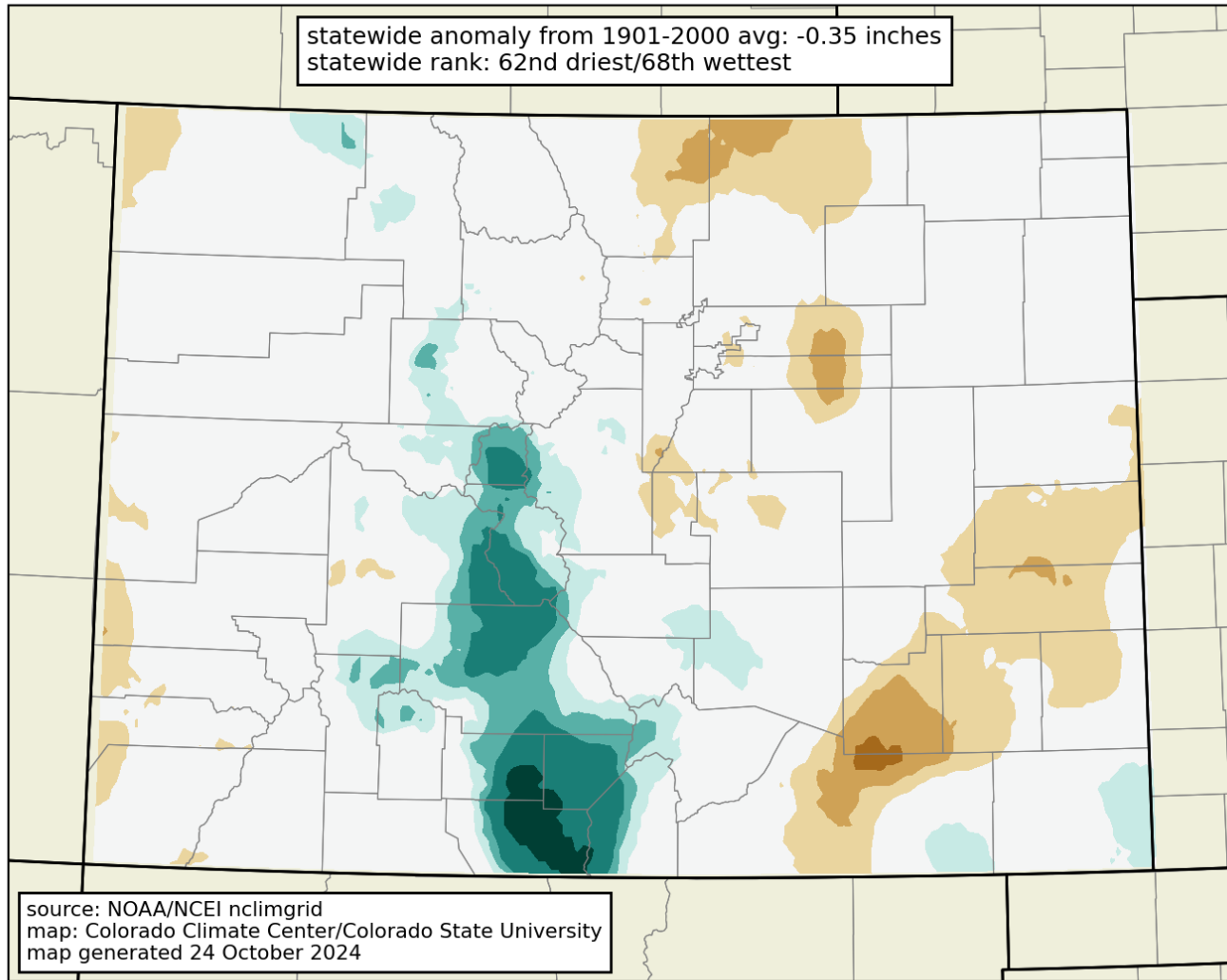


Data source: NOAA/NCEI
Graphic by Colorado Climate Center

Tied for 6th warmest since 1896. 7 of the 8 warmest water years have been since 2000; the other is 1934 which is tied with 2000 for the warmest water year



precipitation rank: 12 months ending September 2024 (Oct-Sep)



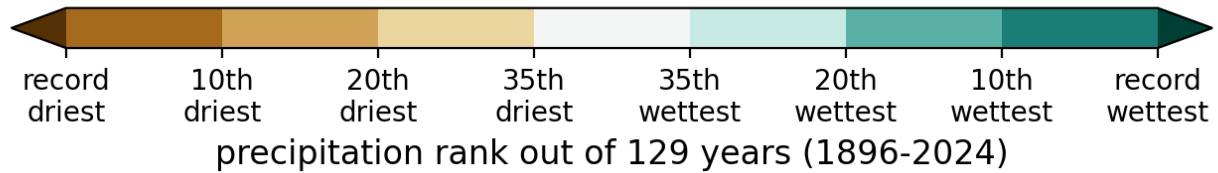
Statewide precipitation very close to average

Average: 18.10”
2024: 17.75”

Most average year since 2008

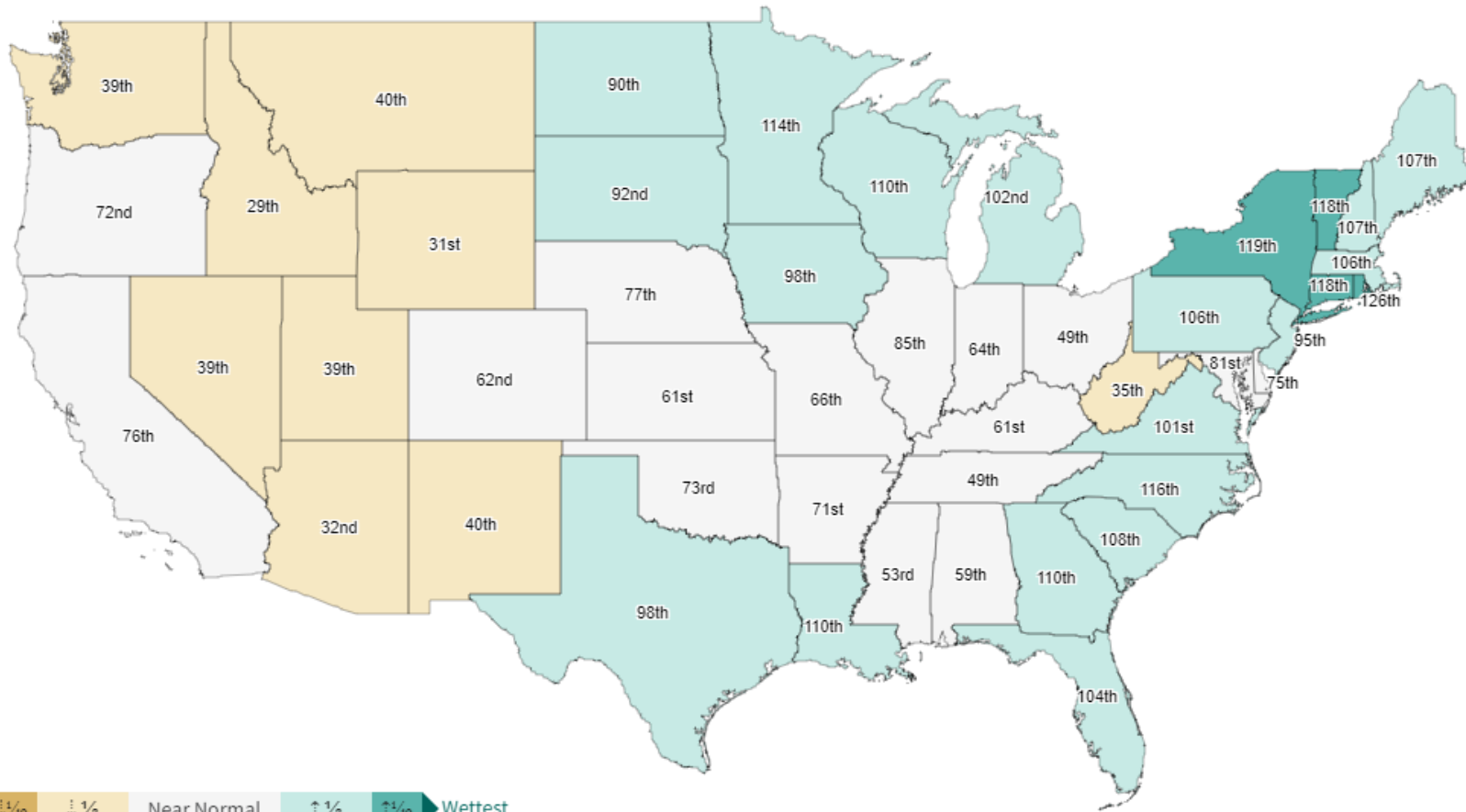
One of the driest summers on record in and around the Denver metro area

More precipitation in the San Luis Valley this year than Fort Collins



Statewide Precipitation Rank (129 years)

October 2023 - September 2024



East of the Rockies was warmer and wetter than normal in WY2024; the west was hot and dry.

Colorado was much warmer than normal and slightly drier than normal

Major wet anomalies in the Upper Midwest and New England



Driest $\downarrow \frac{1}{10}$ $\downarrow \frac{1}{2}$ Near Normal $\uparrow \frac{1}{2}$ $\uparrow \frac{1}{10}$ Wettest

Contiguous U.S. (Hover over a State)

Precip: 31.32in

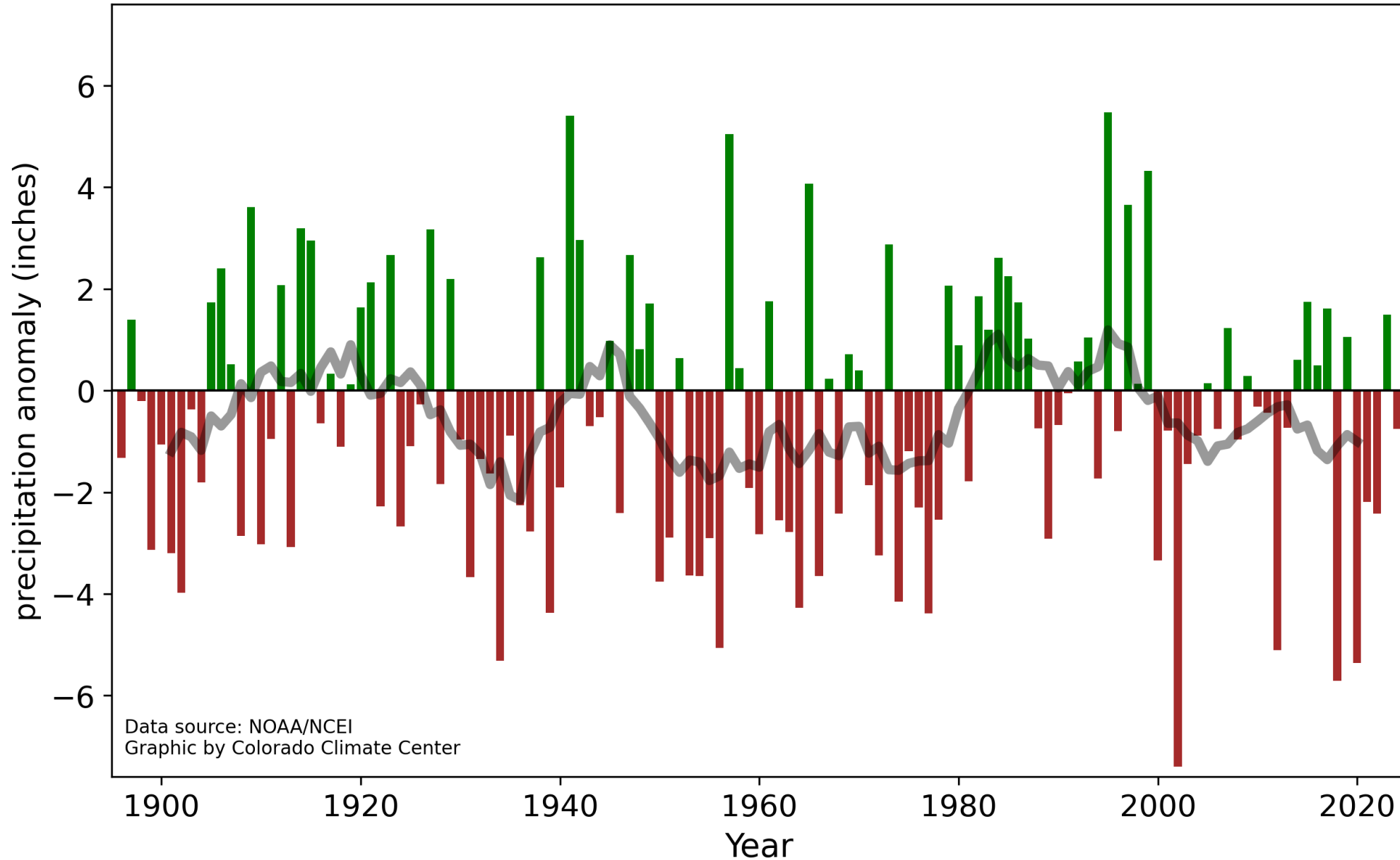
Anomaly: 1.40in

Rank: 41st Wettest

Mean: 29.92in



Colorado statewide water year precipitation anomaly (inches), with respect to 1971-2000 average



Data source: NOAA/NCEI
Graphic by Colorado Climate Center

Statewide average: 17.75". Driest water year since 2022



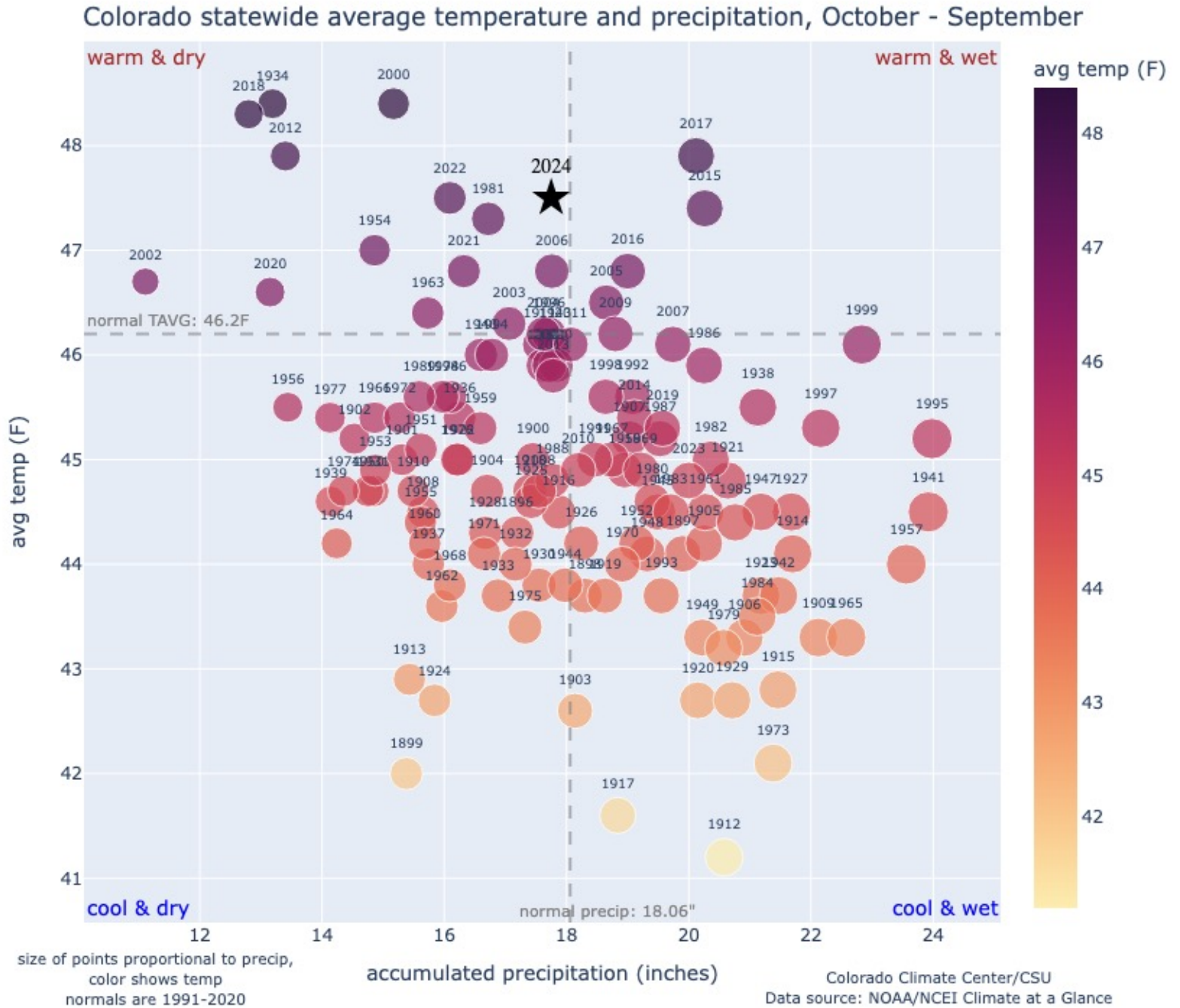
Back in the warm and dry
“quadrant”

Comparable years: 2006, 2016,
2017

An improvement over 2020-2022

1.3 °F above 1991-2020 normal

0.35” below normal precipitation



Month	T Rank (of 129 years)	Above, below, or near 20 th century avg?
Oct	27 th warmest	above
Nov	22 nd warmest	above
Dec	9 th warmest	much above
Jan	57 th warmest	average
Feb	14 th warmest	above
Mar	39 th warmest	above
Apr	20 th warmest	above
May	47 th coolest	average
Jun	3 rd warmest	much above
Jul	45 th warmest	average
Aug	14 th warmest	above
Sep	7 th warmest	much above

Month	P Rank (of 129 years)	Above, below, or near 20 th century avg?
Oct	53 rd driest	average
Nov	23 rd driest	below
Dec	64 th driest	average
Jan	47 th wettest	average
Feb	15 th wettest	above
Mar	29 th wettest	above
Apr	43 rd driest	average
May	58 th driest	average
Jun	38 th wettest	above
Jul	29 th driest	below
Aug	13 th wettest	above
Sep	41 st driest	average



Water Year 2024 Records Tied and Broken

	Max(T_{max})		Min(T_{max})		Max(T_{min})		Min(T_{min})		Precip		Snowfall	
	Tied	Broken	Tied	Broken	Tied	Broken	Tied	Broken	Tied	Broken	Tied	Broken
October	39	77	5	12	35	131	7	23	22	71	3	6
November	29	41	6	12	24	100	1	5	10	30	8	13
December	44	168	2	5	29	111	2	6	11	80	3	24
January	14	34	173	189	15	54	105	117	43	118	8	46
February	8	10	2	3	30	152	1	0	27	122	10	23
March	2	1	6	11	12	27	2	6	22	116	12	68
April	11	11	9	58	17	73	4	6	19	85	6	18
May	0	0	18	202	3	14	32	127	30	63	2	15
June	53	78	5	16	67	220	6	4	36	147	0	0
July	43	61	6	24	42	118	14	39	22	55	0	0
August	73	211	15	77	94	194	1	5	53	123	0	0
September	86	147	3	18	40	141	2	5	12	78	0	0
Total	402	839	250	627	408	1335	177	343	307	1088	52	213

2.1 warm records for every cool record in WY2024

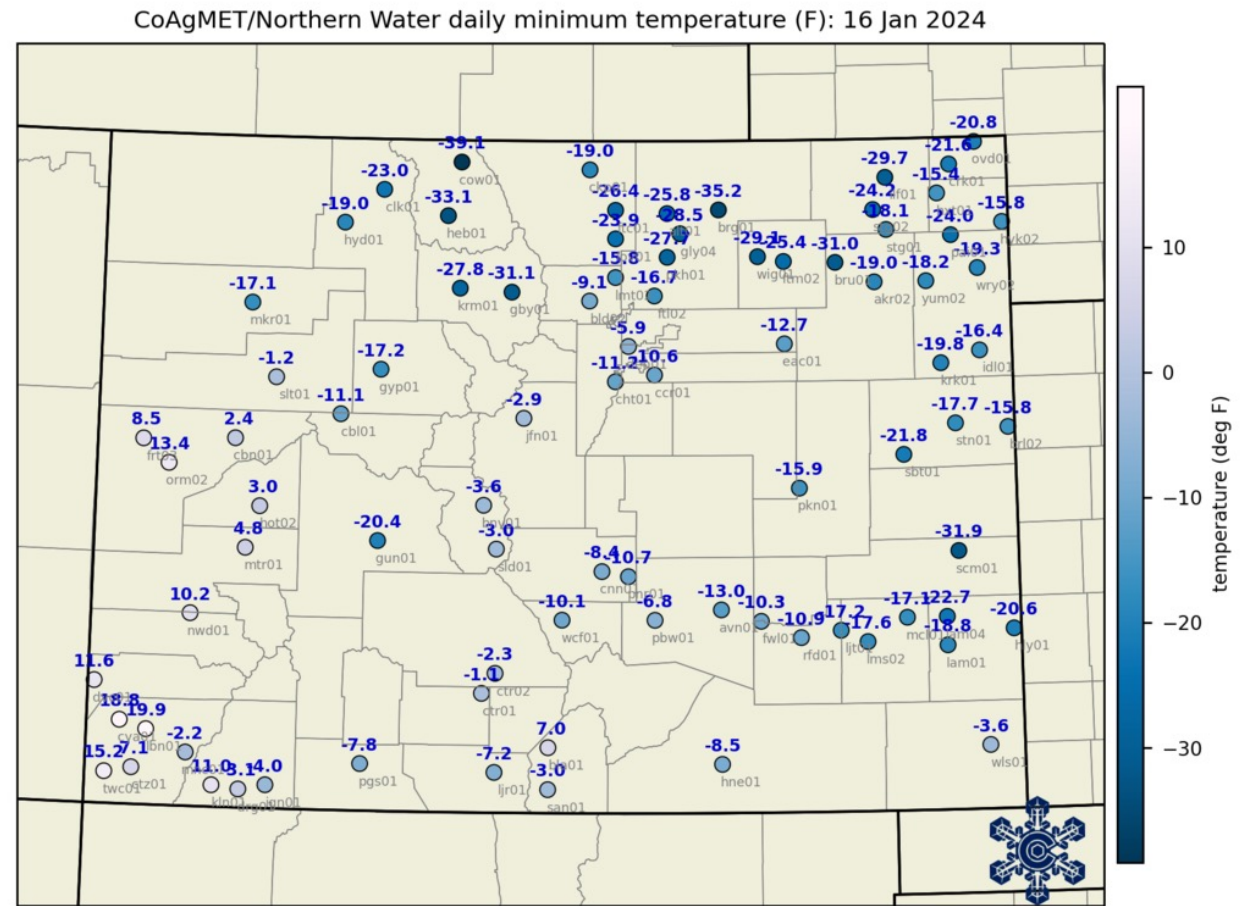


Significant events in Water Year 2024



Mid-January Arctic blast

While the beginning and end of January were warm, an intense cold wave swept through eastern Colorado mid-month. On the morning of the 16th, it reached -39°F at Cowdrey in North Park, -35°F at Briggsdale in Weld County, and -30°F at the Limon airport, the lowest temperature on record for that station, with data back to 1948. This was a top-10 cold wave for northeast and southeast Colorado; read more details on [our blog!](#)



Daily minimum temperatures ($^{\circ}\text{F}$) for 16 January 2024 from the CoAgMET network. See current and archived maps like this [here](#)

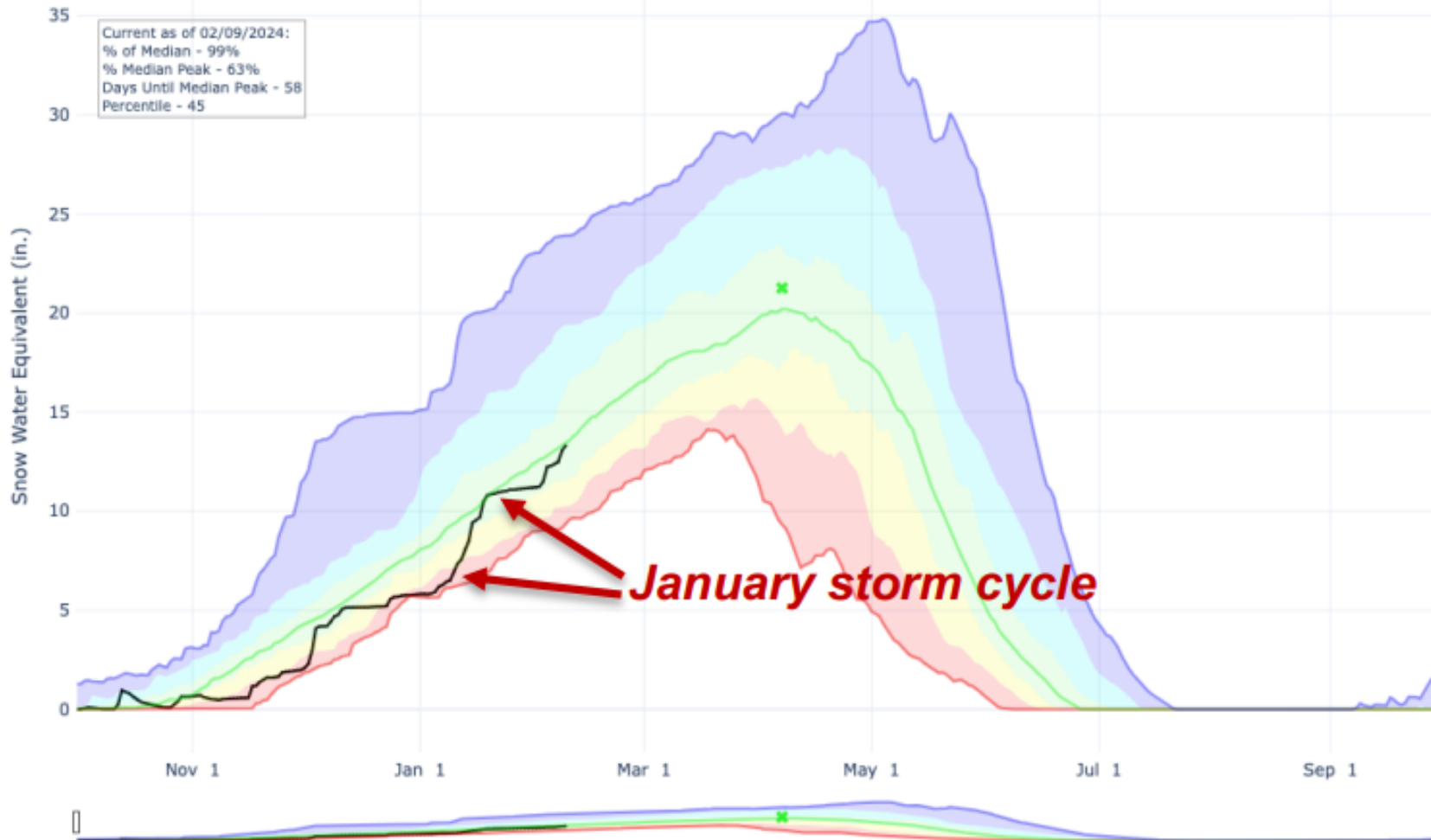


Major mountain storm cycle

SNOW WATER EQUIVALENT IN YAMPA-WHITE-LITTLE SNAKE

Reset Range

Link to data: CSV / JSON



Snowpack in the Yampa-White Basin, showing a big boost in January. Source: [USDA/NRCS](#)

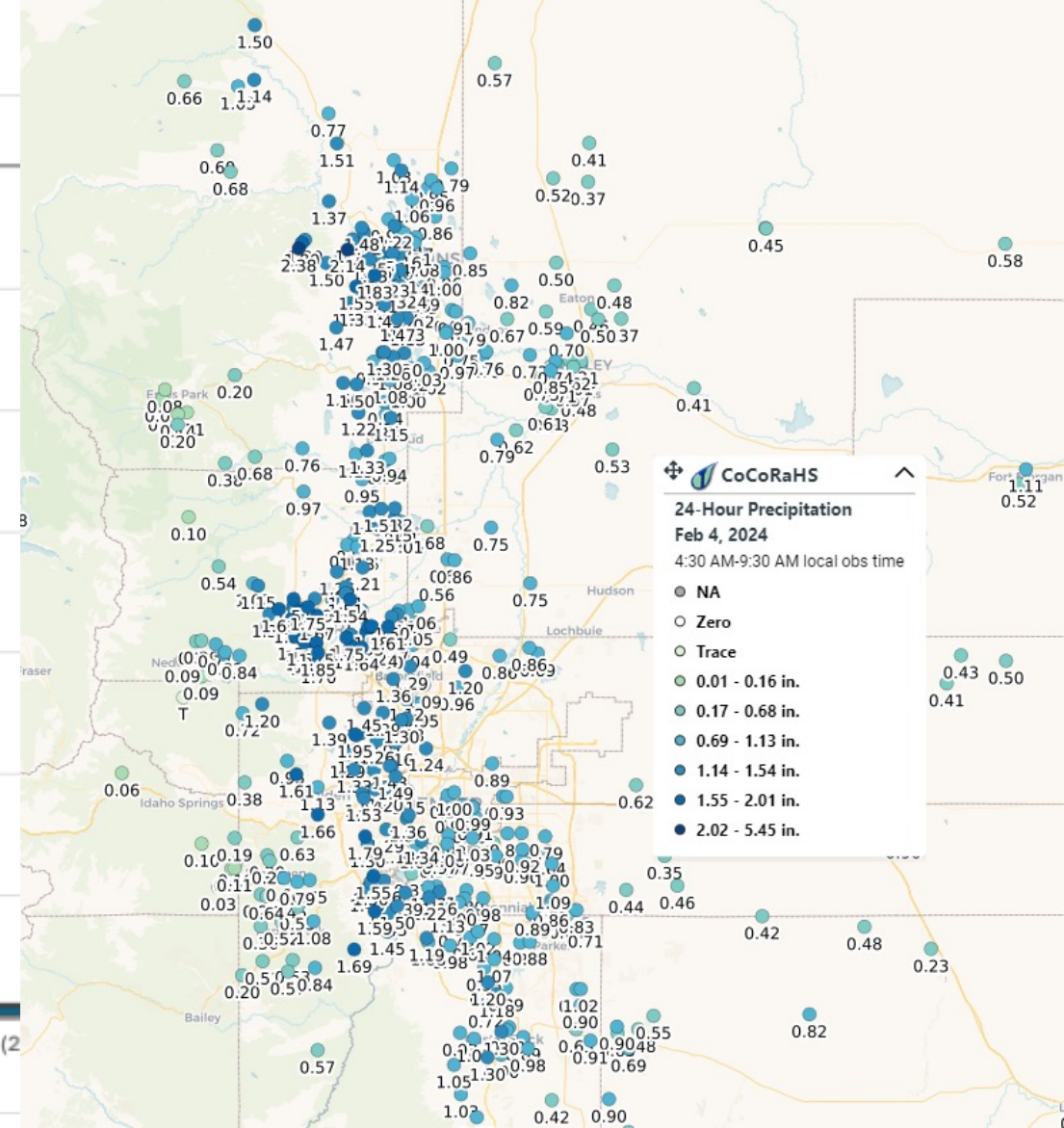
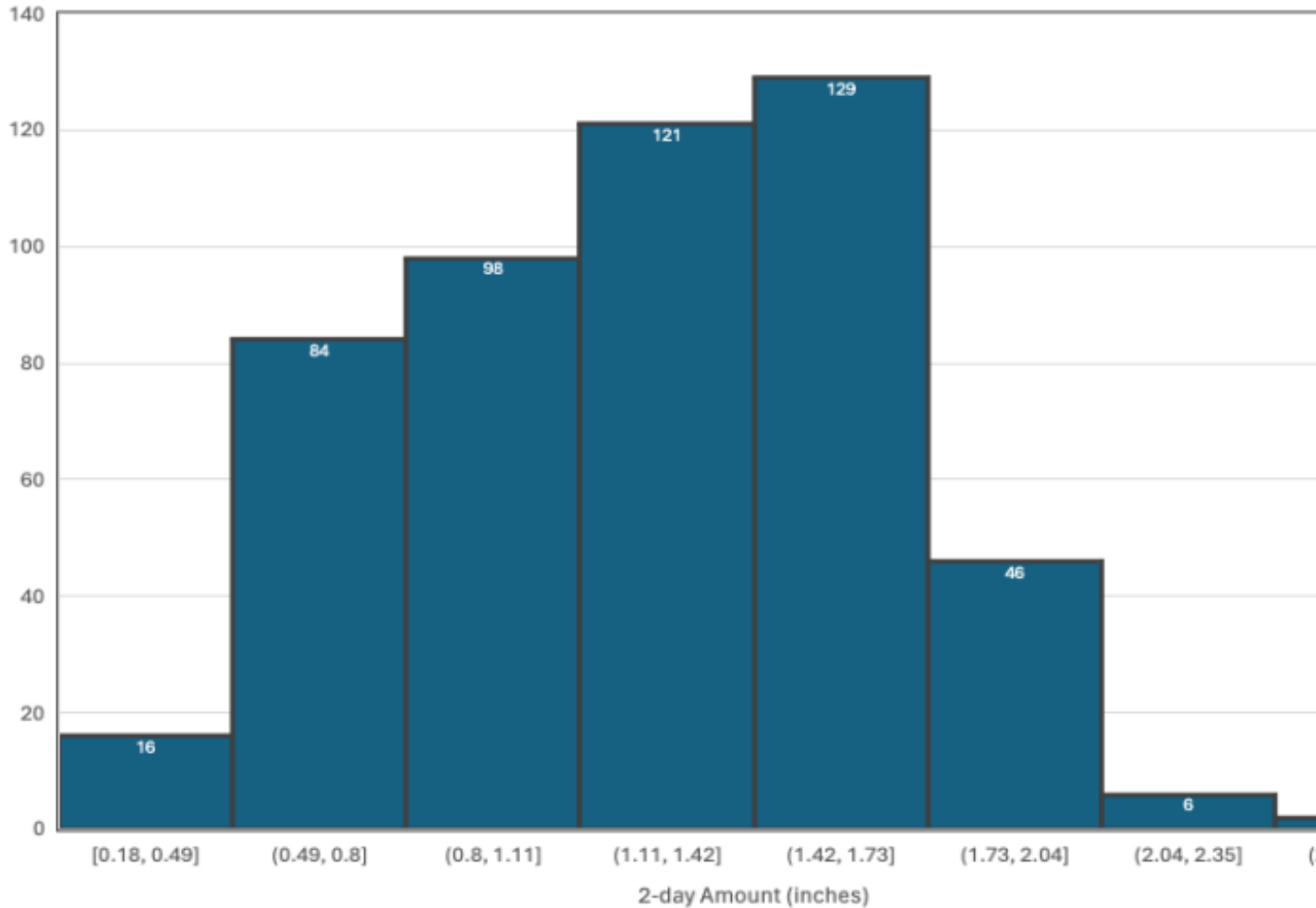
The mountains benefited from a huge storm cycle in January. Snowpack in the northern mountains was near-record-low at the start of January, but reached back to near average with a series of snowstorms between January 9-18.

significant events

A wet winter storm!

In early February, a storm with lots of moisture brought rain and snow to much of the state. While February snow is very common, February rain isn't quite as common. And precipitation totals in excess of 1.5 – 2" with a significant portion falling as rain is almost unheard of in Colorado!

Distribution of record 2-day event totals February 3-5, 2024



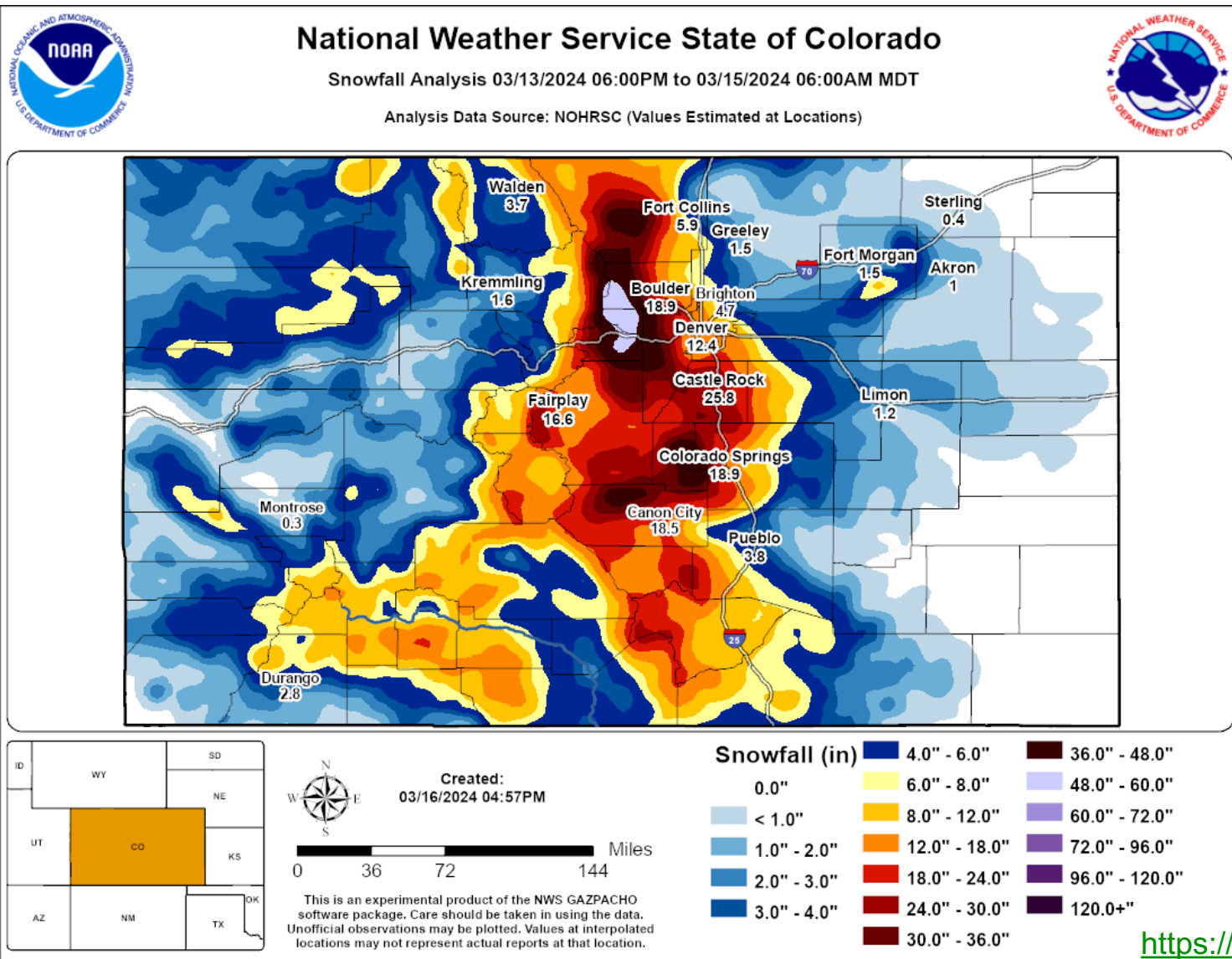
“Pi Day Redux”: March 14, 2024



Photo: CDOT via Colorado Sun



“Pi Day Redux”: March 14, 2024



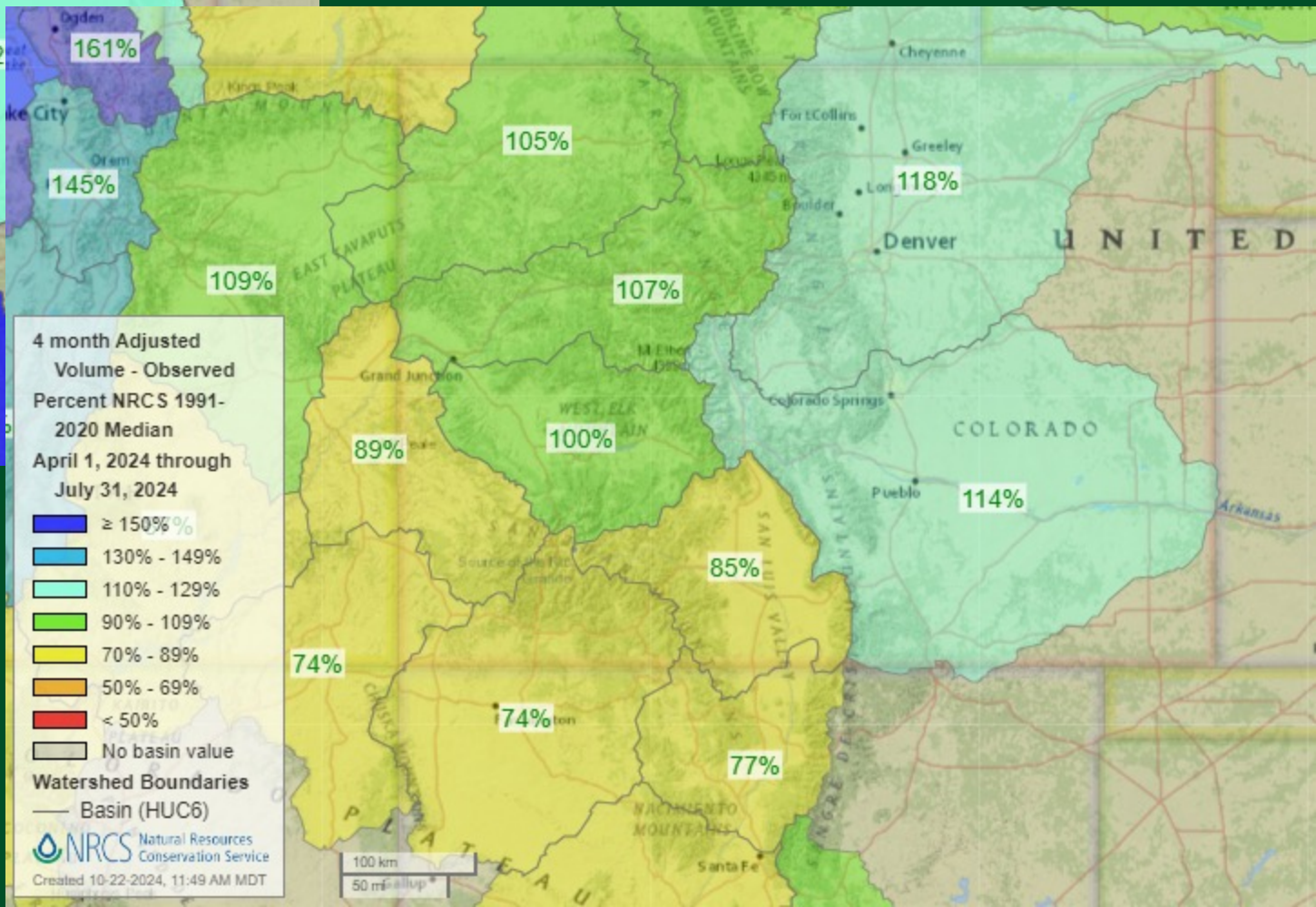
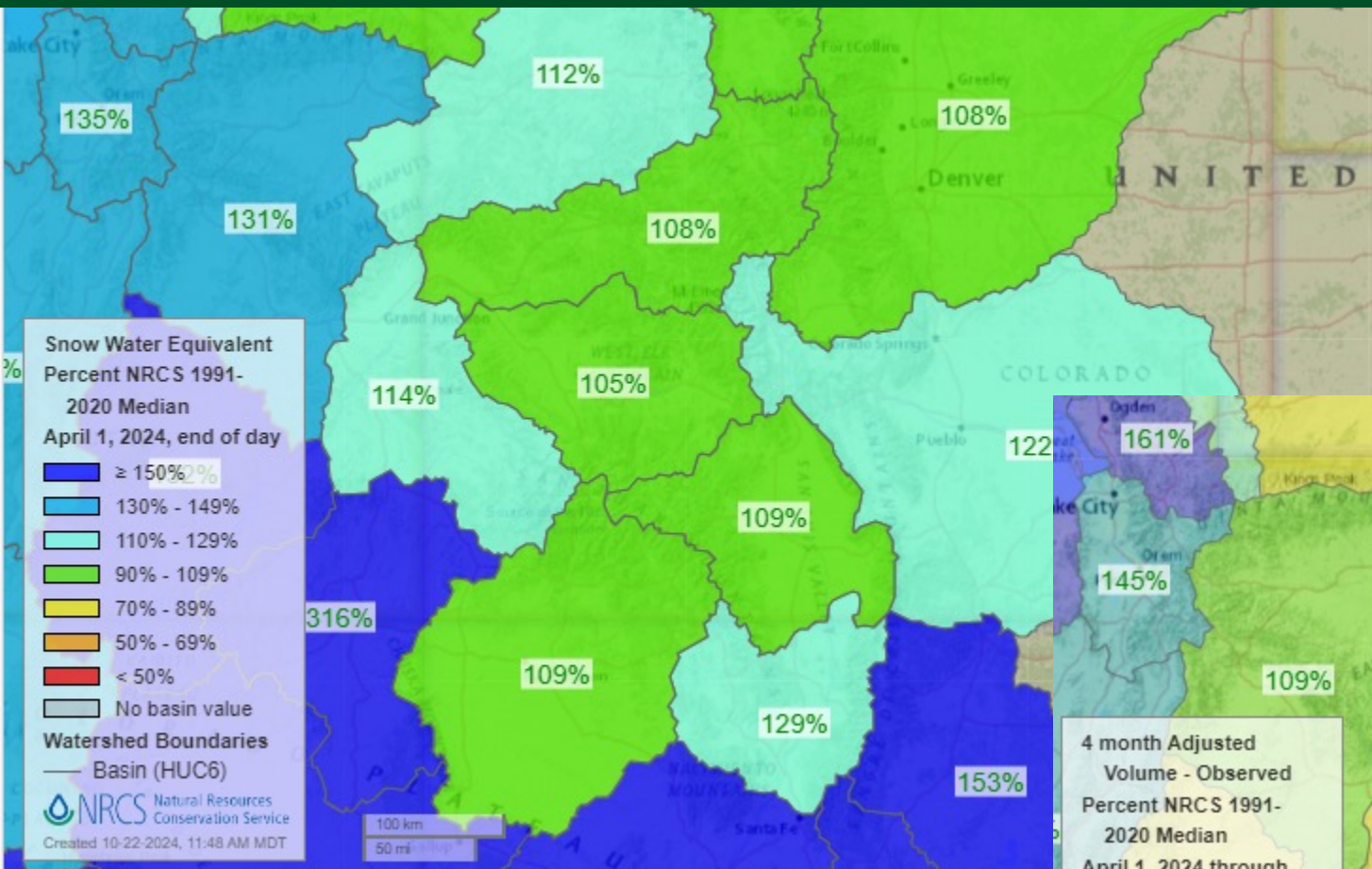
List of highest Snowfall Reports (>= 36")

County	Location	Snowfall
Gilpin	Aspen Springs	61.5
Clear Creek	Evergreen 5.4 NW	61.0
Gilpin	1 W Aspen Springs	57.0
Gilpin	Rollinsville 1.1 SSW	54.4
Clear Creek	Idaho Springs 4.7 SSE	53.7
Boulder	4 ENE Nederland	53.0
Gilpin	Rollinsville 0.1 WNW	50.7
Jefferson	4 SSE Pinecliffe	50.7
Boulder	Pinecliffe 2.5 WNW	48.1
Boulder	Nederland 4.3 ENE	47.5
Boulder	1 WSW Eldora	46.0
Boulder	Ward 4.6 NE	45.9
Jefferson	1 NNW Genesee	45.7
Boulder	3 W Jamestown	45.5
Boulder	Nederland 2.8 NE	45.1
Jefferson	Aspen Park 1.9 ENE	45.0

https://www.weather.gov/bou/March13_15_2024FrontRangeSnowstorm



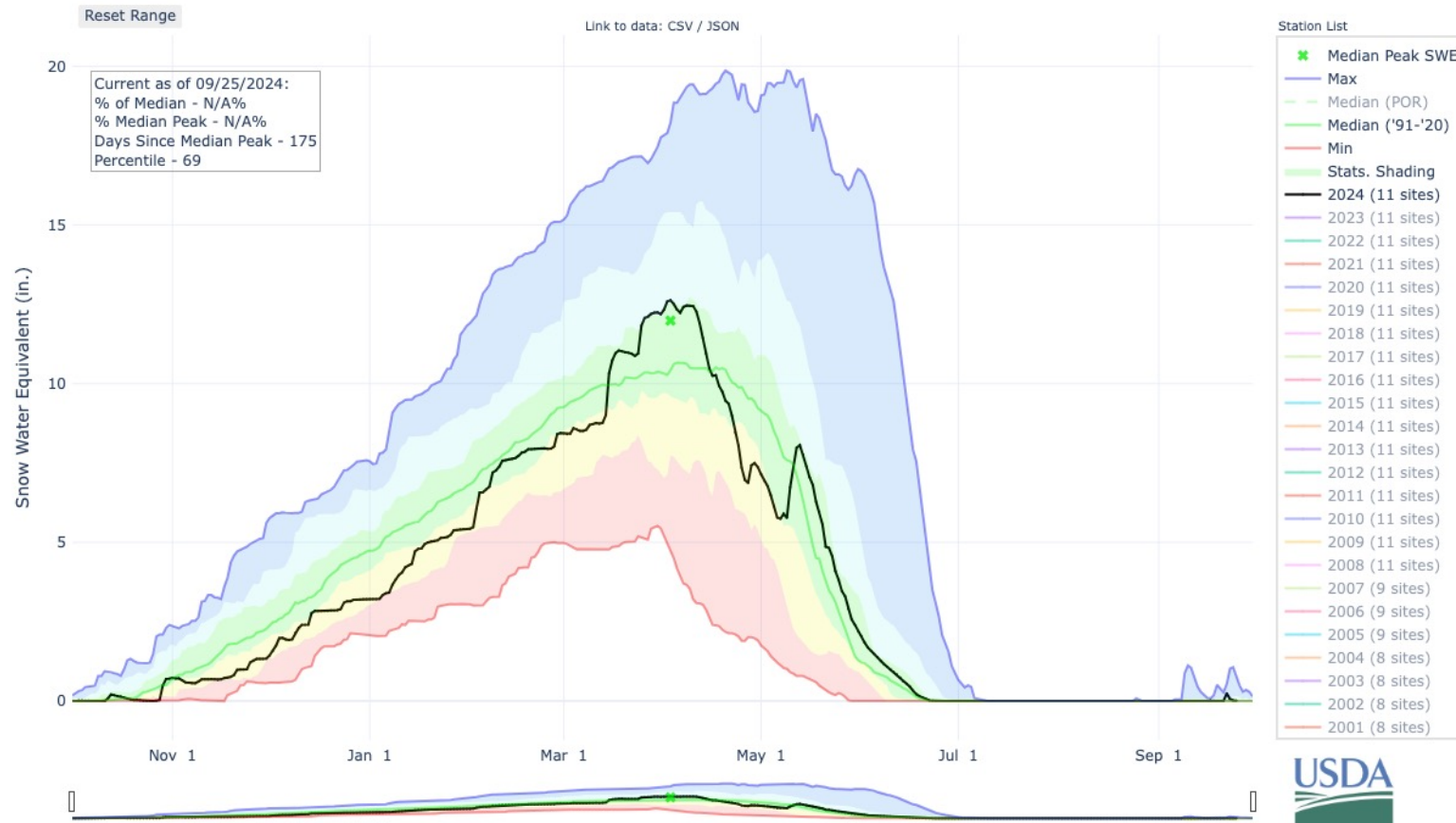
← April 1st Snowpack



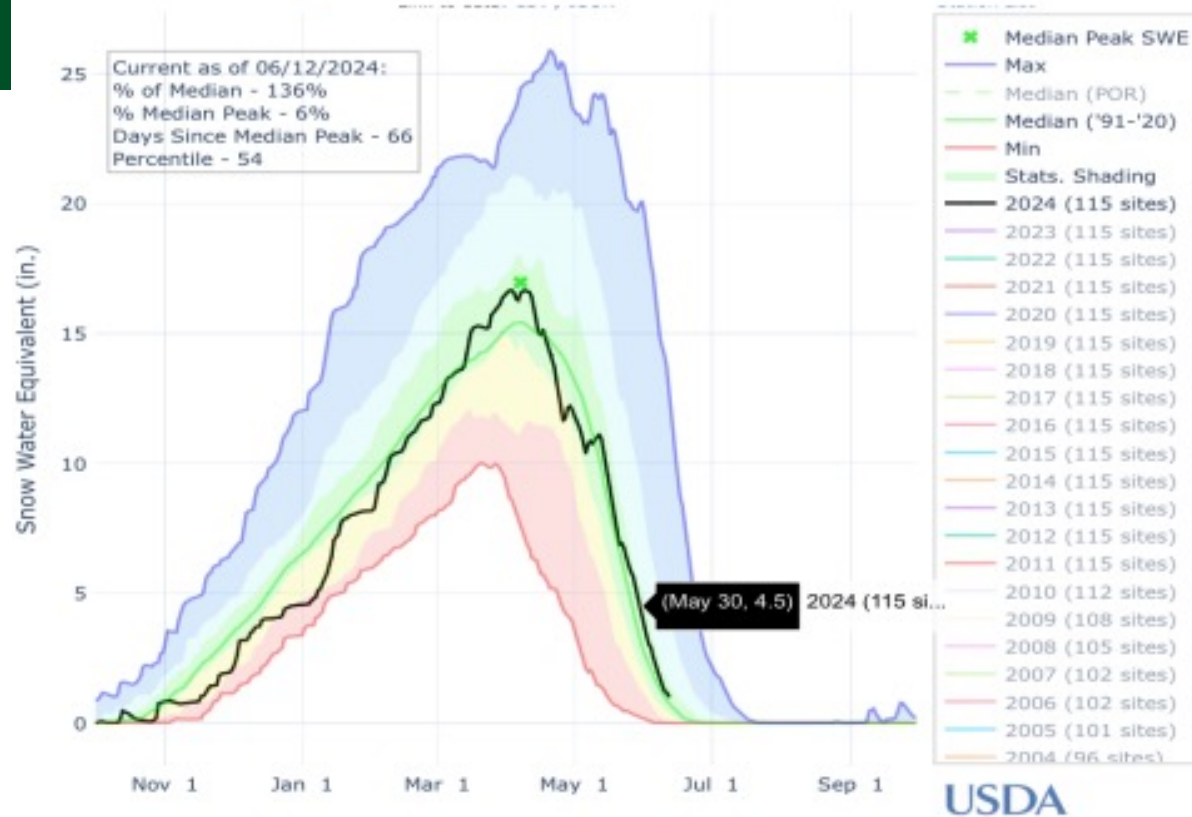
April-July Streamflow ->

Happy Mother's Day in Leadville

- 21" of snow on Mother's Day (May 11) in Leadville
- Arkansas River Basin snowpack was on a rapid decline in late April/early May, but this storm put it back above average, and they ended up with a great runoff



snowpack



After rapid melting of snowpack started in April, melting slowed a bit in May. Cooler temperatures and additional snow events throughout May helped to regulate melting, so that we will likely end the snowpack season on time.



Deep hail accumulation in Yuma on May 20.
From NWS Goodland summary

A mostly average snow year followed by a cool start to May

Once temps warmed up the melt was fast

Much less severe weather than 2023, but not without incident



Summer Heat, Drought, and Fires

Photo Credit: Dawna Weirich

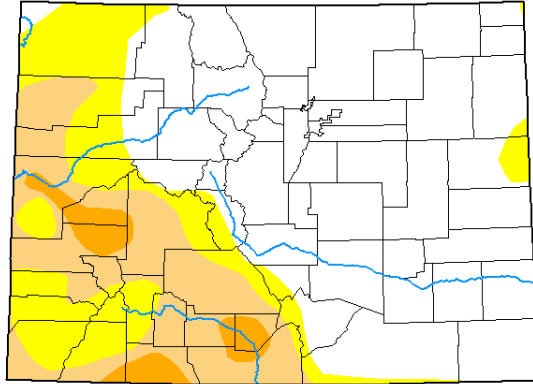


Ranking of the mid-July 2024 heat wave among all 4-day heat waves since 1951



U.S. Drought Monitor Colorado

October 3, 2023
(Released Thursday, Oct. 5, 2023)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	62.37	37.63	20.14	3.54	0.00	0.00
Last Week 09-26-2023	65.71	34.29	17.43	2.77	0.00	0.00
3 Months Ago 07-04-2023	100.00	0.00	0.00	0.00	0.00	0.00
Start of Calendar Year 01-03-2023	39.97	60.03	33.83	12.28	1.91	0.01
Start of Water Year 09-26-2023	65.71	34.29	17.43	2.77	0.00	0.00
One Year Ago 10-04-2022	24.95	75.05	43.62	13.41	3.16	0.57

Intensity:
 None (White) D2 Severe Drought (Orange)
 D0 Abnormally Dry (Yellow) D3 Extreme Drought (Red)
 D1 Moderate Drought (Light Orange) D4 Exceptional Drought (Dark Red)

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>

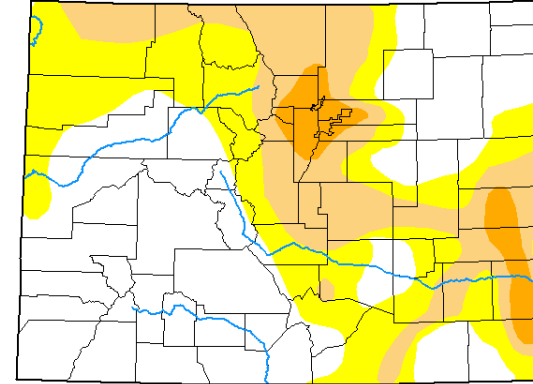
Author:
Brad Pugh
CPC/NOAA



droughtmonitor.unl.edu

U.S. Drought Monitor Colorado

October 1, 2024
(Released Thursday, Oct. 3, 2024)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	48.27	51.73	24.40	4.62	0.00	0.00
Last Week 09-24-2024	56.84	43.16	19.18	3.71	0.00	0.00
3 Months Ago 07-03-2024	67.39	32.61	4.61	0.00	0.00	0.00
Start of Calendar Year 01-03-2024	34.65	65.35	29.59	8.85	2.05	0.00
Start of Water Year 09-26-2023	65.71	34.29	17.43	2.77	0.00	0.00
One Year Ago 10-03-2023	62.37	37.63	20.14	3.54	0.00	0.00

Intensity:
 None (White) D2 Severe Drought (Orange)
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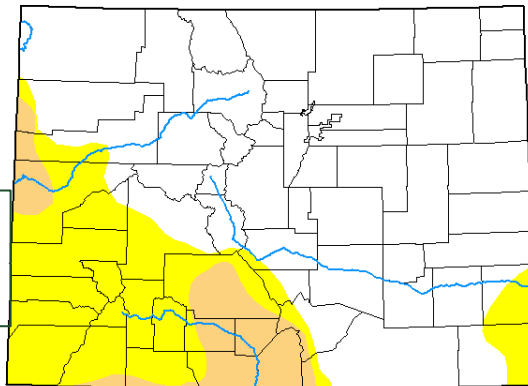
Author:
Richard Tinker
CPC/NOAA/NWS/NCEP



droughtmonitor.unl.edu

U.S. Drought Monitor Colorado

April 2, 2024
(Released Thursday, Apr. 4, 2024)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	70.44	29.56	7.44	0.00	0.00	0.00
Last Week 03-26-2024	65.91	34.09	7.61	0.00	0.00	0.00
3 Months Ago 01-02-2024	34.65	65.35	29.59	8.85	2.05	0.00
Start of Calendar Year 01-03-2024	34.65	65.35	29.59	8.85	2.05	0.00
Start of Water Year 09-26-2023	65.71	34.29	17.43	2.77	0.00	0.00
One Year Ago 04-04-2023	52.49	47.51	37.88	12.75	2.24	0.43

Intensity:
 None (White) D2 Severe Drought (Orange)
 D0 Abnormally Dry (Yellow) D3 Extreme Drought (Red)
 D1 Moderate Drought (Light Orange) D4 Exceptional Drought (Dark Red)

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Author:
Brad Pugh
CPC/NOAA



droughtmonitor.unl.edu

The summer was wet in the west, alleviating drought there, but it was very dry on the Front Range and southeastern Plains, where severe drought emerged as of the end of the water year

At the start of WY2024, drought was entrenched in southwestern Colorado

6 months later, it was still in place in most of the same areas



Heat waves

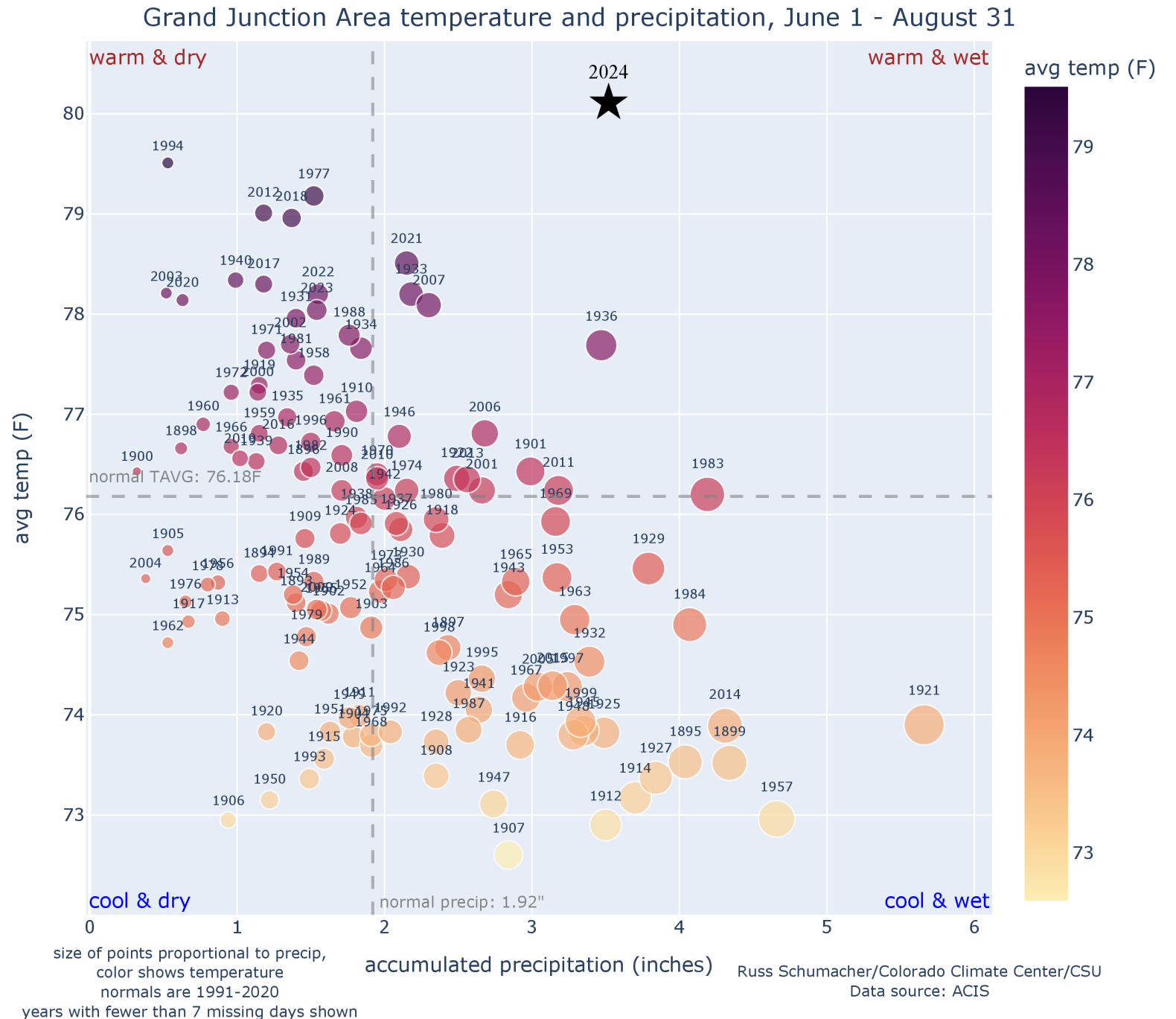
- Averaged across the entire state, there were four 4-day heat waves in summer 2024:
 - June 24-27
 - July 13-16
 - July 30 – August 2
 - August 2-6
- The mid-July heat wave was especially intense, ranking as the 14th hottest 4-day period statewide since 1951
- There was one cold wave in water year 2024, in mid-January (discussed a few pages earlier)

Calculations based on NOAA's nClimGrid data, and the heat/cold wave definition used in the Climate Change in Colorado report

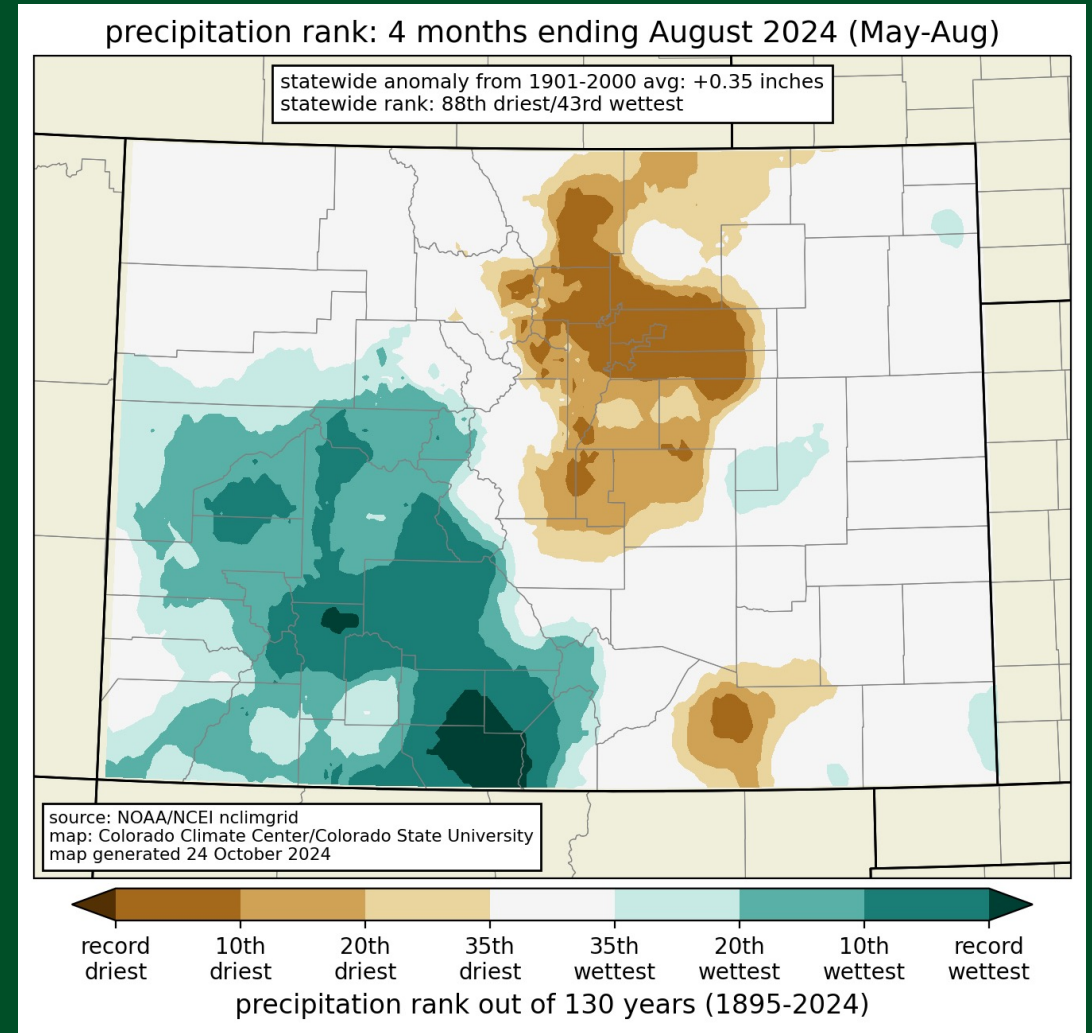
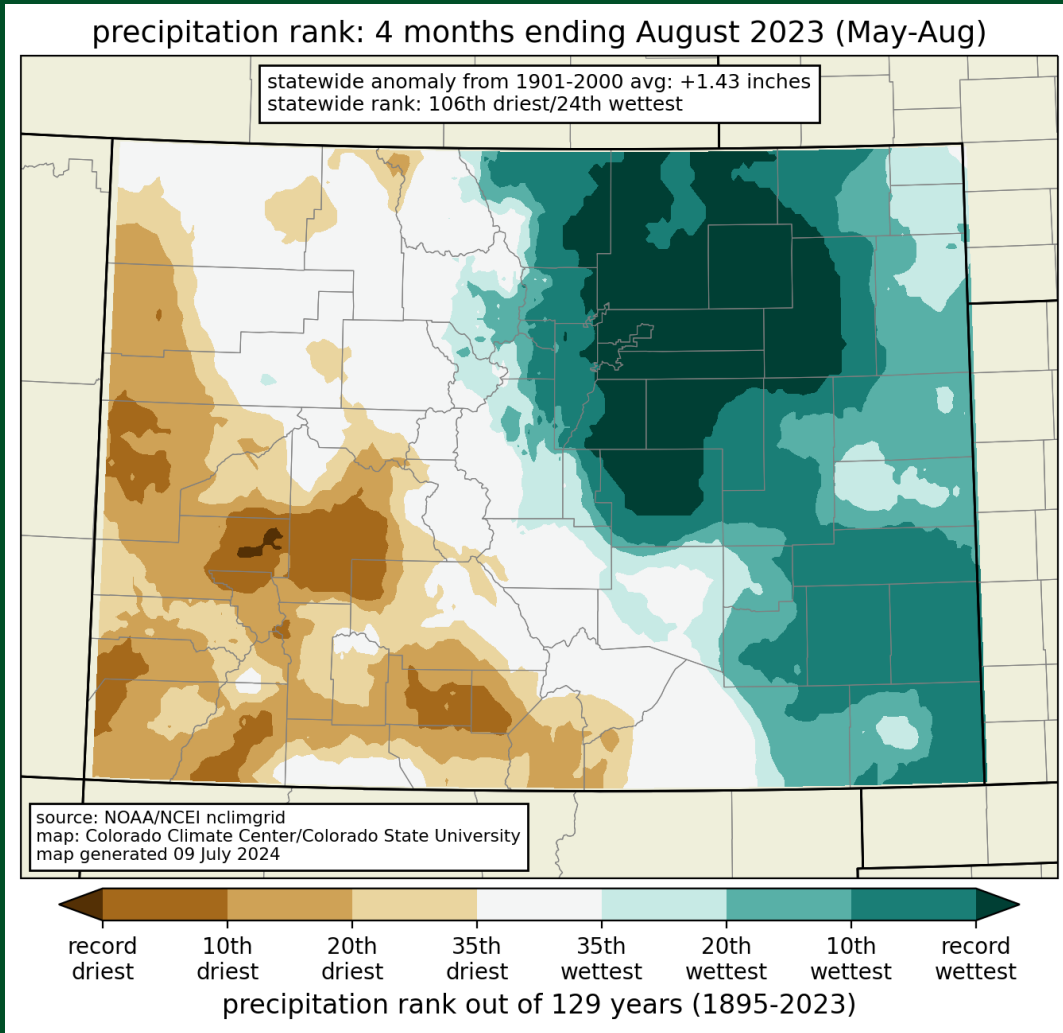


A strange summer in Grand Junction

“In terms of outliers, that one is outstanding”
– Nolan Doesken



Summer rainfall whiplash

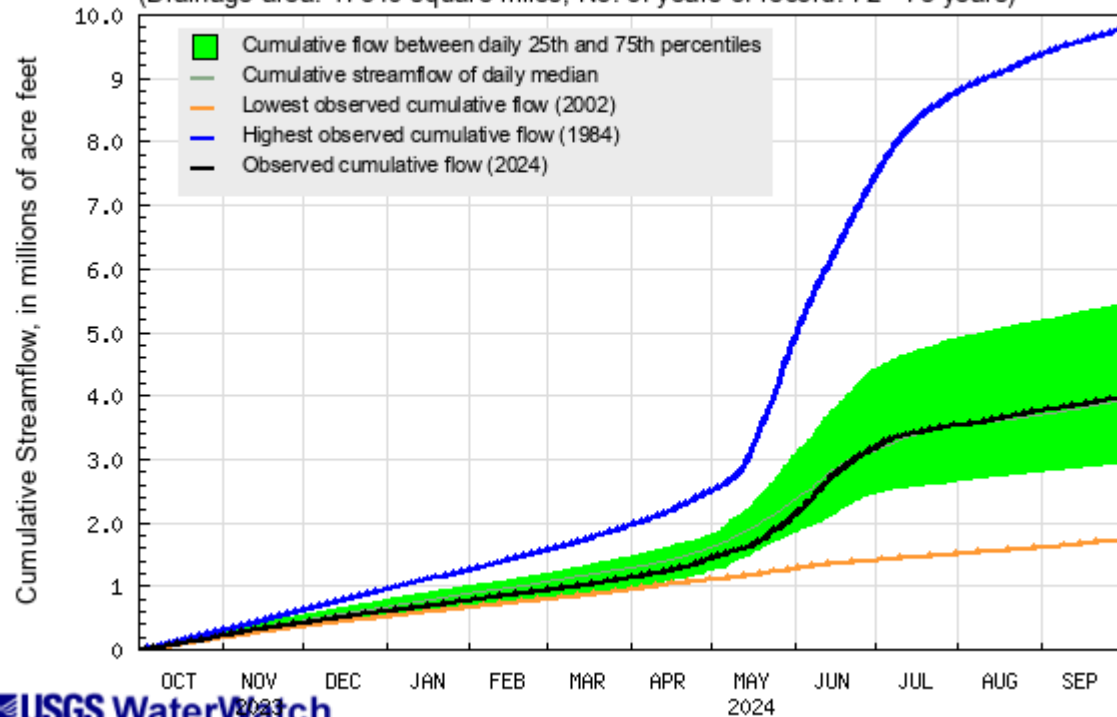


May through August in 2023 was the wettest on record in much of northern Colorado; May-August 2024 was among the top-10 driest. The opposite was true in western Colorado, where summer 2023 was dry but summer 2024 was very wet.

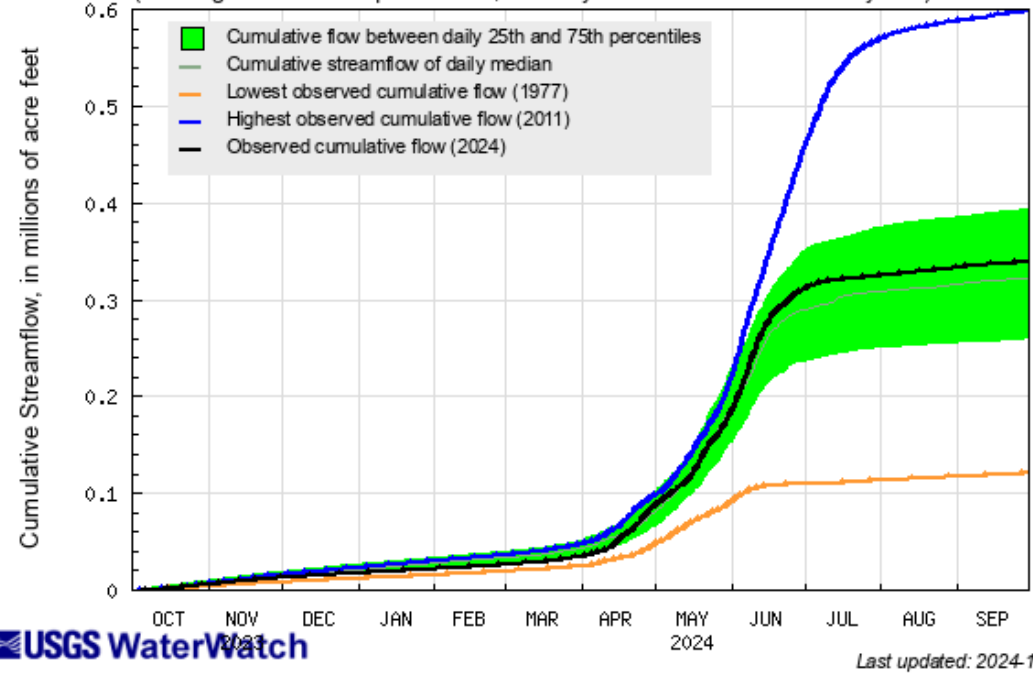


Streamflows around the state

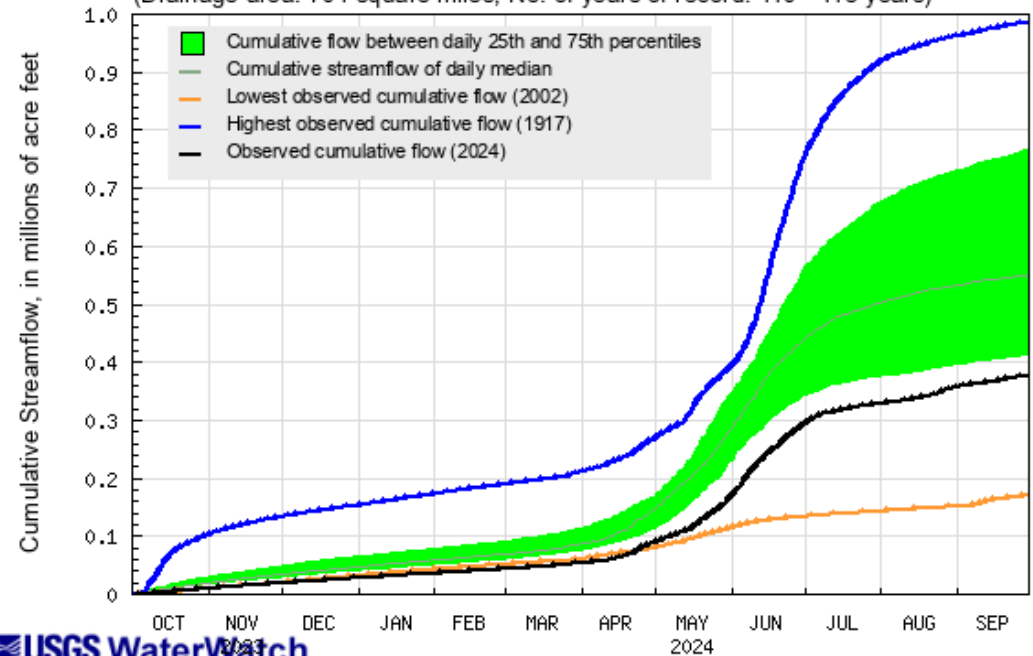
USGS 09163500 COLORADO RIVER NEAR COLORADO-UTAH STATE LINE
(Drainage area: 17849 square miles, No. of years of record: 72 - 73 years)



USGS 09239500 YAMPA RIVER AT STEAMBOAT SPRINGS, CO
(Drainage area: 567 square miles, No. of years of record: 113 - 114 years)



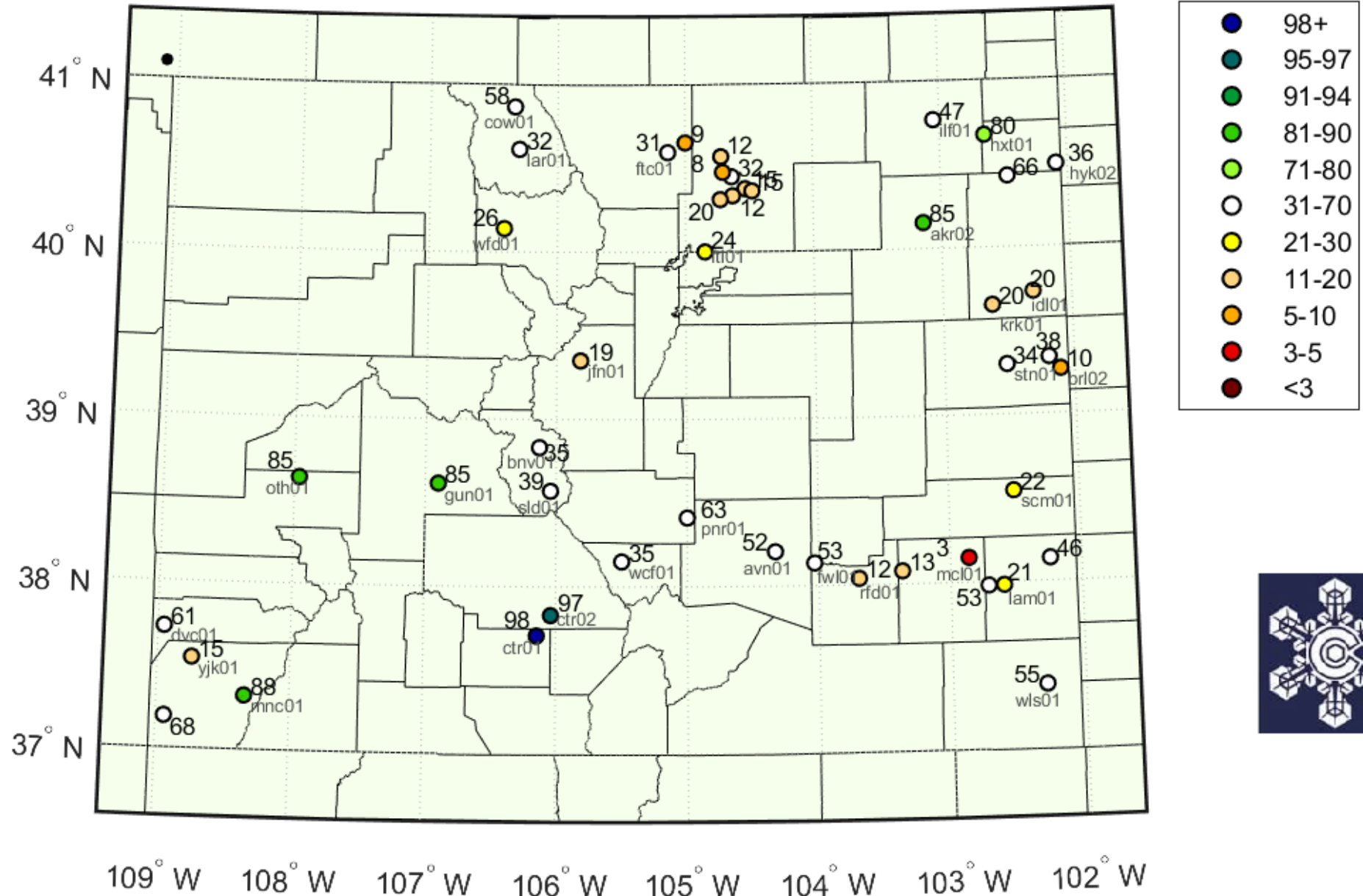
USGS 09361500 ANIMAS RIVER AT DURANGO, CO
(Drainage area: 701 square miles, No. of years of record: 110 - 113 years)



Colorado River flows were almost exactly average in WY2024. The Yampa saw slightly above-average flows, while the Animas was much lower than average

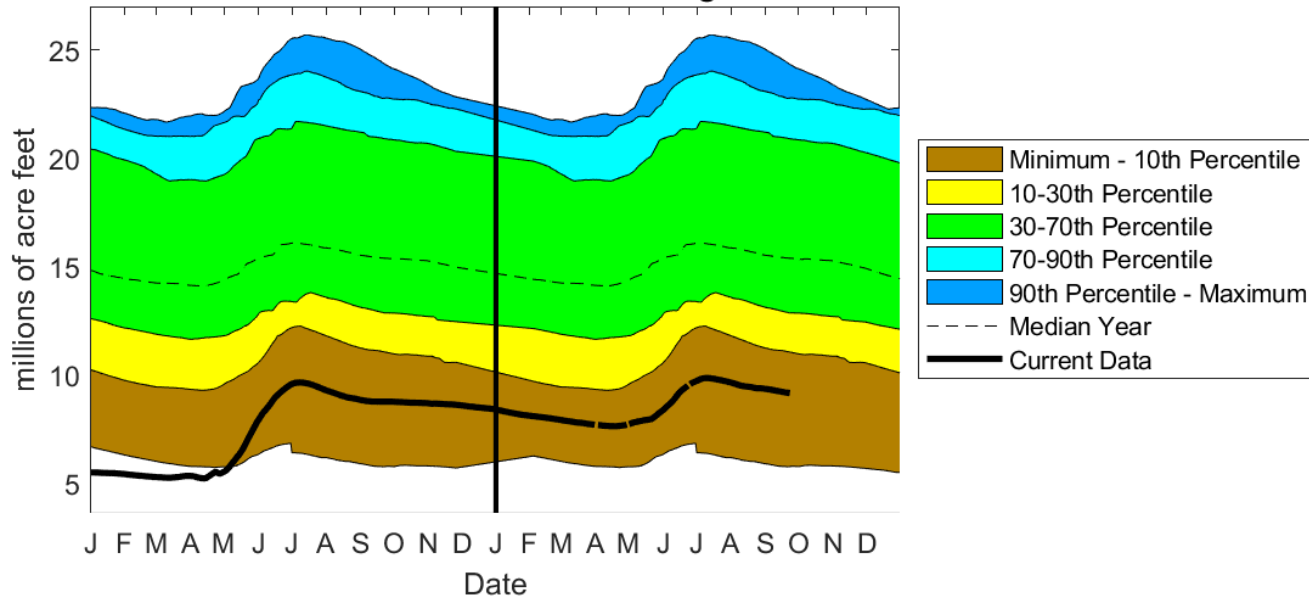
Growing Season Water Balance (P/PET) Percentiles

September 30, 2024

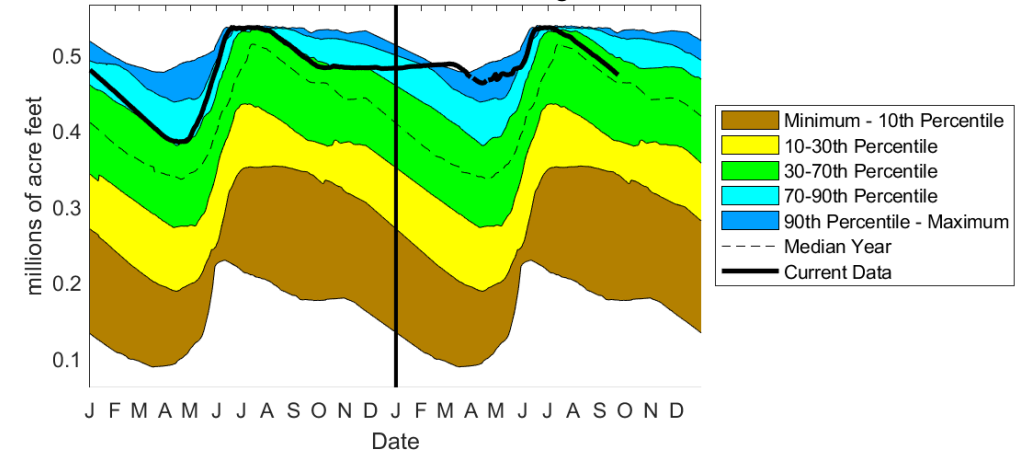


Our Reservoirs

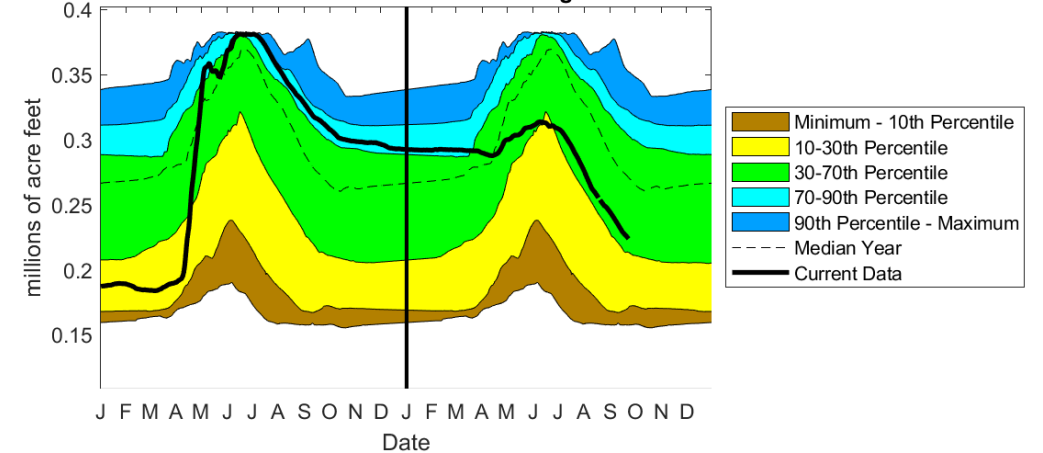
Lake Powell Level 09/22/2024
56 Percent of 1981-2021 Average



Lake Granby Level 09/22/2024
109 Percent of 1981-2021 Average



McPhee Reservoir Level 09/22/2024
87 Percent of 1981-2021 Average





Thanks, and let's keep in touch!

Russ Schumacher – Colorado State Climatologist – russ.schumacher@colostate.edu

Peter Goble – Colorado Assistant State Climatologist – peter.goble@colostate.edu

Lane Simmons – CoAgMET Manager – lane.simmons@colostate.edu

Nolan Doesken – State Climatologist Emeritus – nolan.doesken@colostate.edu

Kristie Davis – CoAgMET Tech/Analyst – kristie.davis@colostate.edu

