

The climate of Colorado

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Assistant State Climatologist

A lunchtime chat

June 8, 2022



ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY

Let's chat about Colorado's climate!

what's typical

We'll take a look at the historical climate and long-term averages

where are we now

Next, we'll look at the current conditions

what's coming

We'll wrap up with what we're expecting to see in our future climate

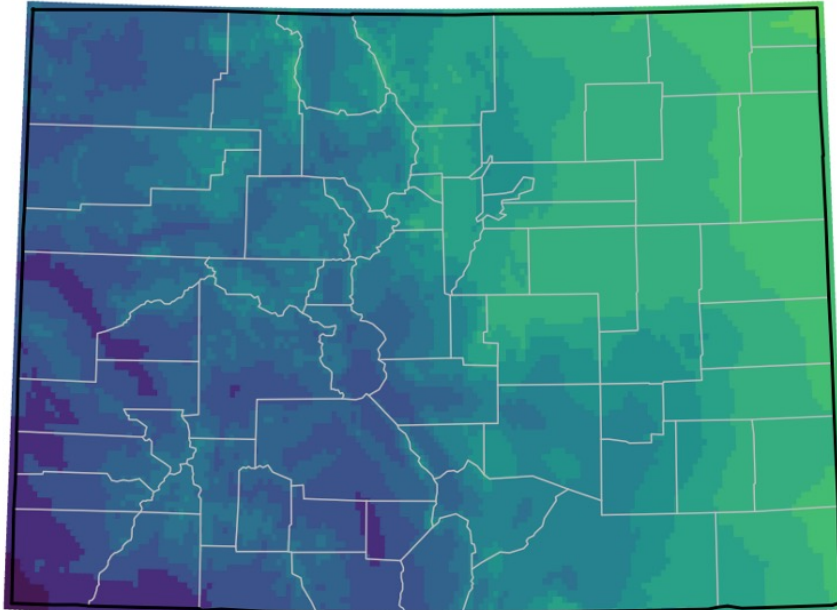


what's typical

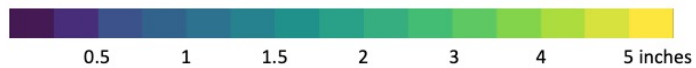
where are we now

what's coming

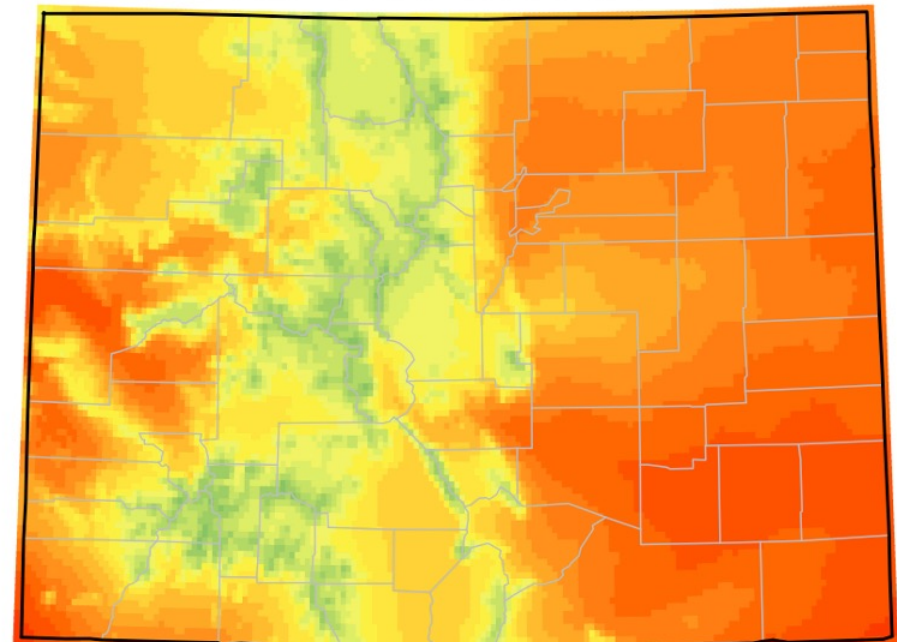
average monthly precipitation - June



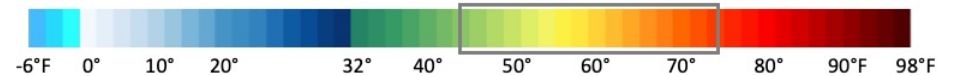
Map by Colorado Climate Center, NOAA NCEI Gridded Normals, 1991-2020



average monthly temperature - June



Map by Colorado Climate Center, NOAA NCEI Gridded Normals, 1991-2020



Updated 1991-2020 normals data
for temperature and precipitation

https://climate.colostate.edu/normals_maps.html



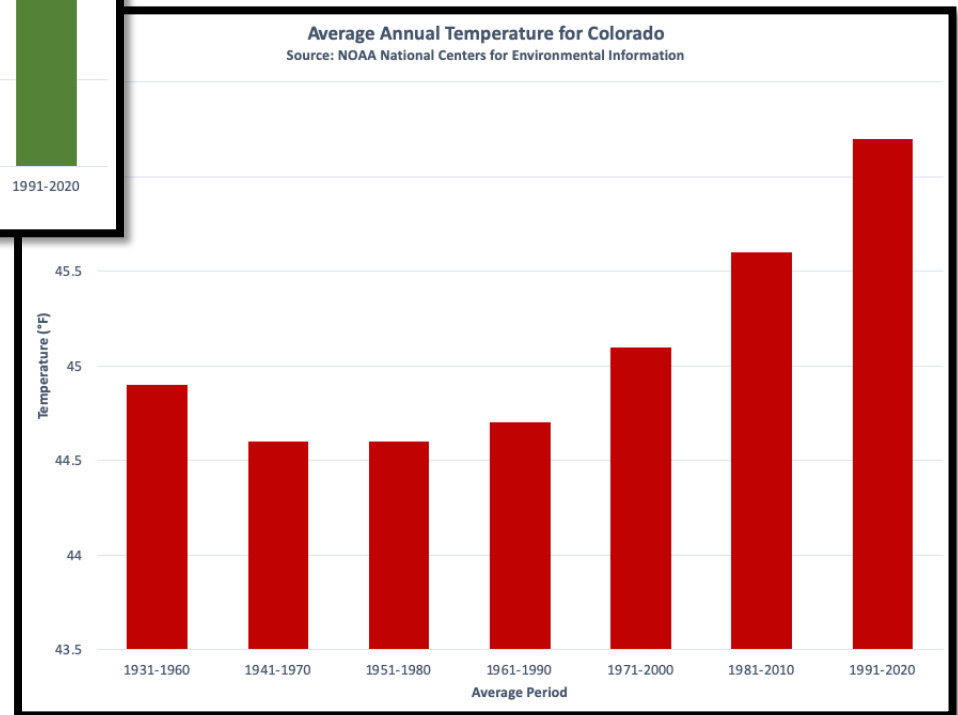
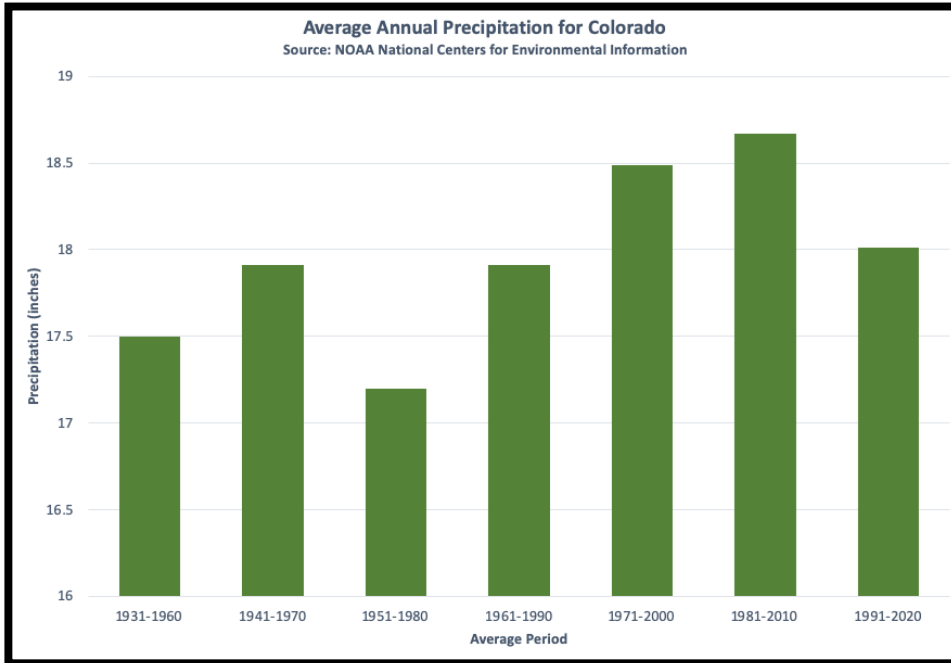
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what's typical

where are we now

what's coming



Precipitation has been variable over the past 100 years, but temperatures have undeniably warmed



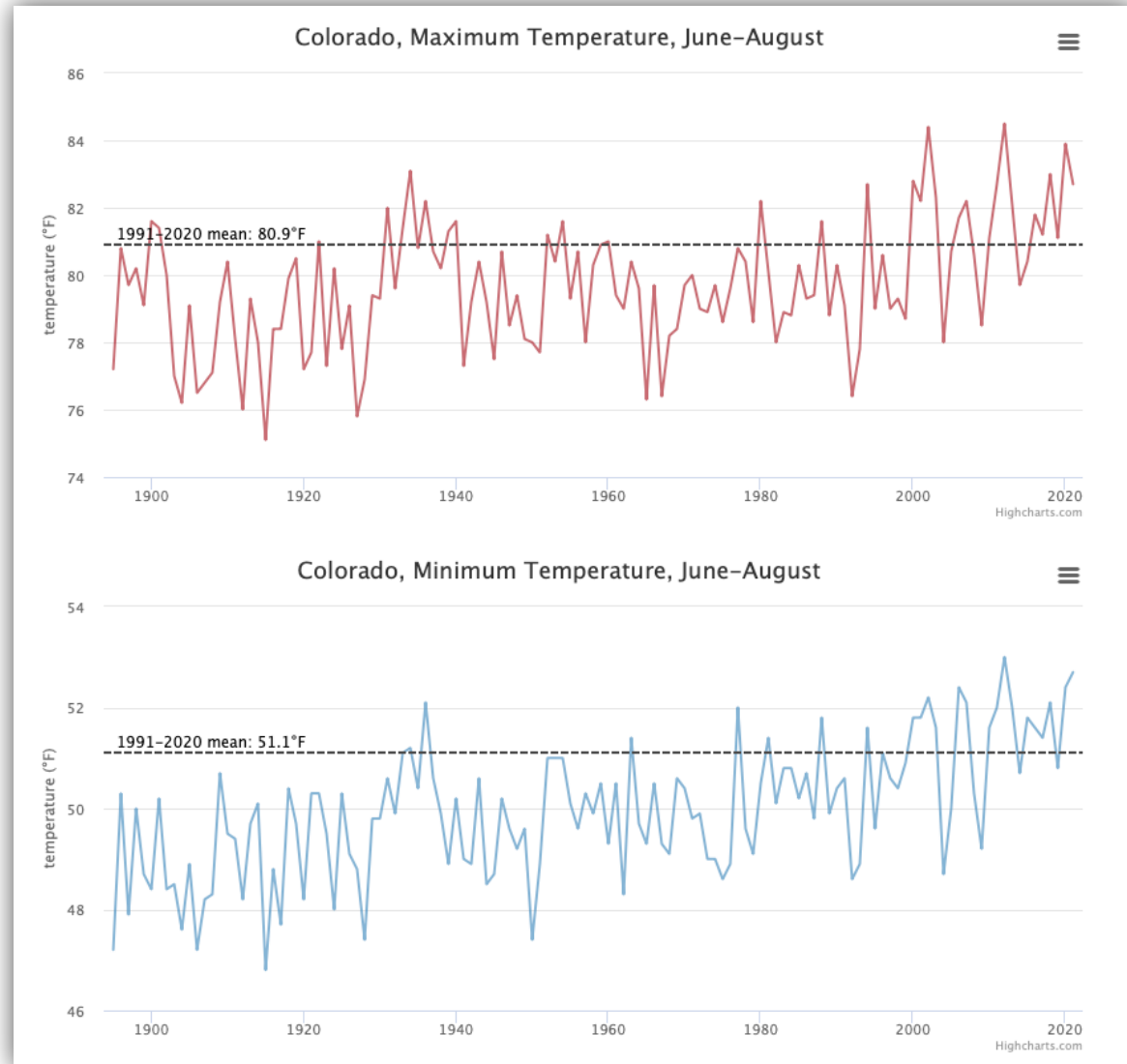
what's typical

where are we now

what's coming

In many seasons, we've experienced a significant shift to warmer temperatures

What's "normal" now was well beyond record warm 100 years ago.



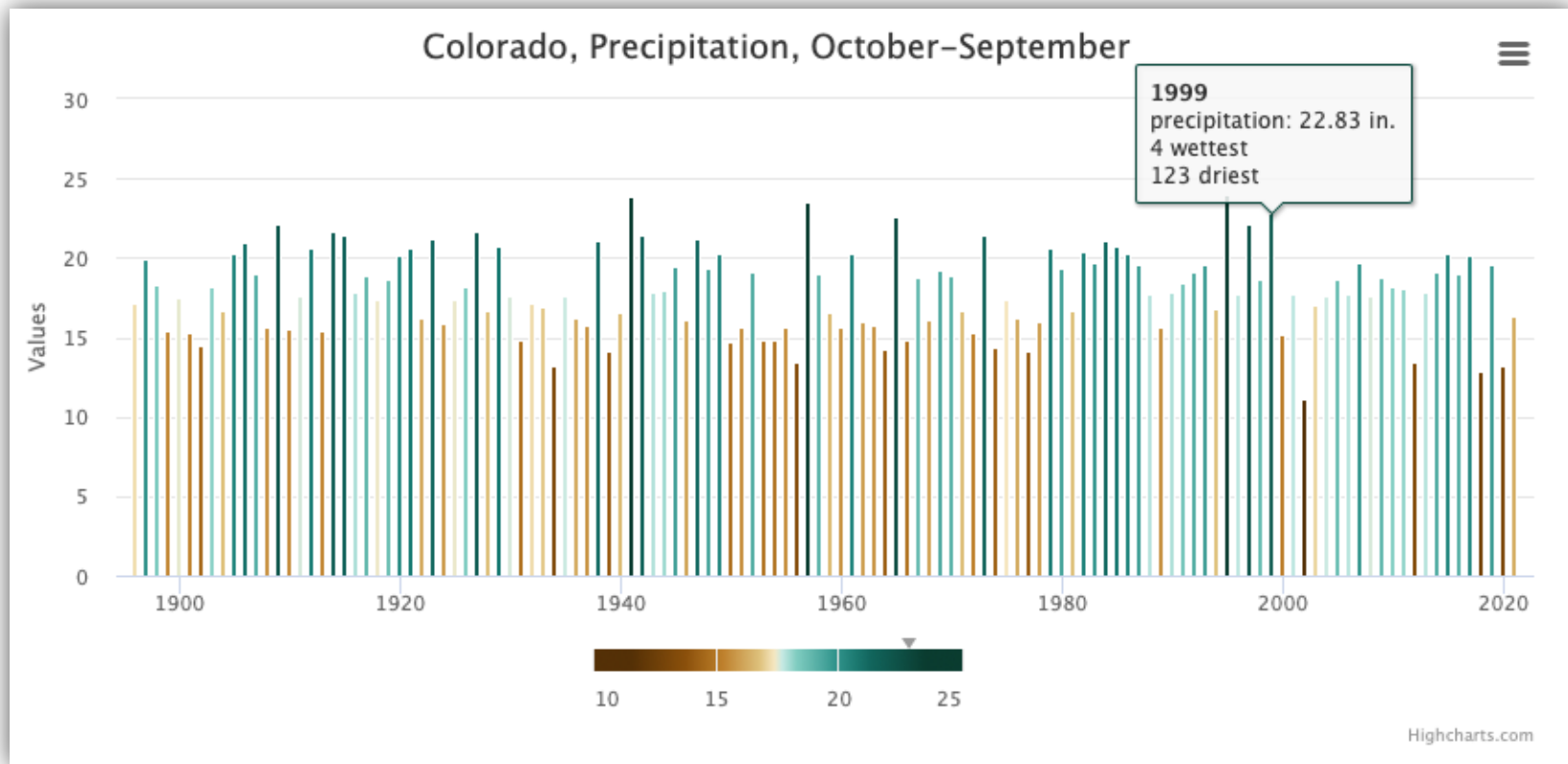
https://climate.colostate.edu/co_cag/



what's typical

where are we now

what's coming



Precipitation remains variable, although recently, our wet anomalies are not as wet. And, four of our five driest water years have occurred in the last 20 years.

https://climate.colostate.edu/co_cag/



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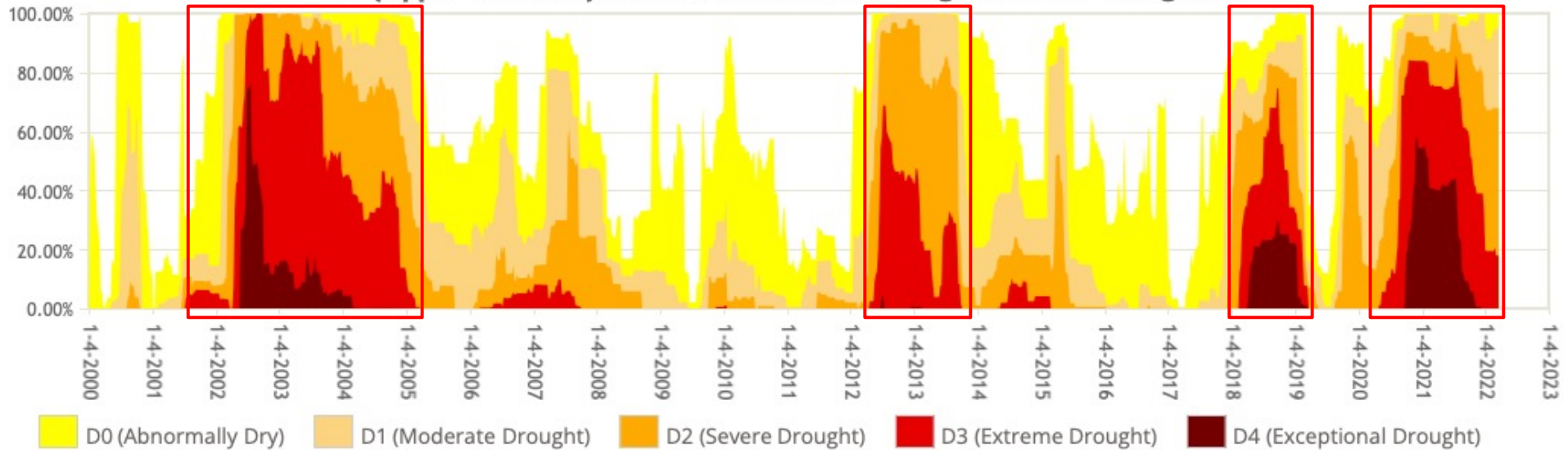


what's typical

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14 (Upper Colorado) Percent Area in U.S. Drought Monitor Categories



D3 is a 1-in-20 to 1-in-50 year extreme event

D4 is a 1-in-50 to 1-in-100 year extreme event

The Upper Colorado River Basin has experienced 4 significant drought events in 20 years

<https://droughtmonitor.unl.edu>



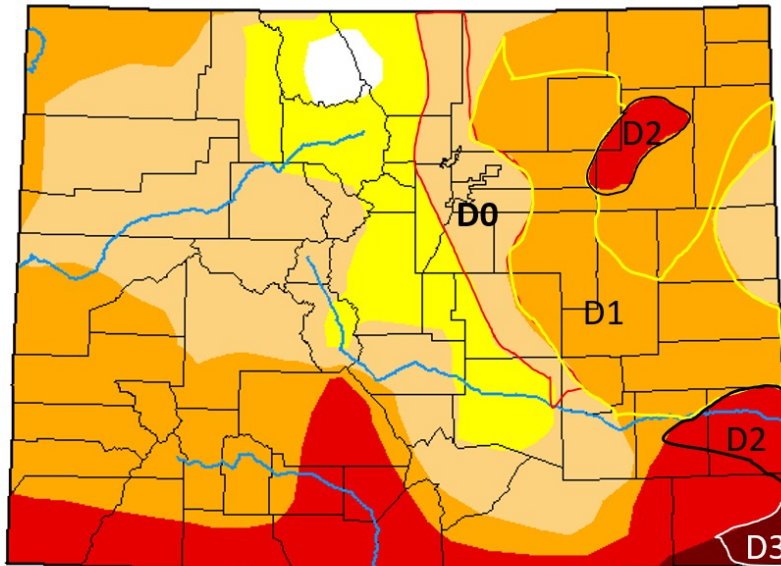
what's typical

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U.S. Drought Monitor Colorado

May 31, 2022
(Released Thursday, Jun. 2, 2022)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	1.09	98.91	87.50	57.03	15.50	0.99
Last Week 05-24-2022	0.00	100.00	89.73	59.61	18.12	2.61
3 Months Ago 03-01-2022	0.00	100.00	91.57	57.26	8.27	0.09
Start of Calendar Year 01-04-2022	0.00	100.00	95.49	67.08	22.25	0.00
Start of Water Year 09-28-2021	12.72	87.28	46.42	26.30	15.05	3.91
One Year Ago 06-01-2021	51.10	48.90	43.36	35.53	29.15	16.39

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

sneak peek!



droughtmonitor.unl.edu



what's typical

where are we now

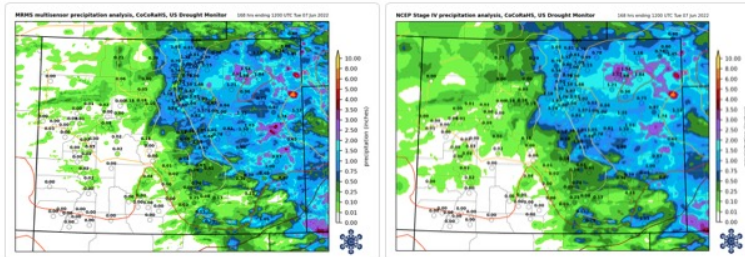
what's coming

Colorado Drought Update

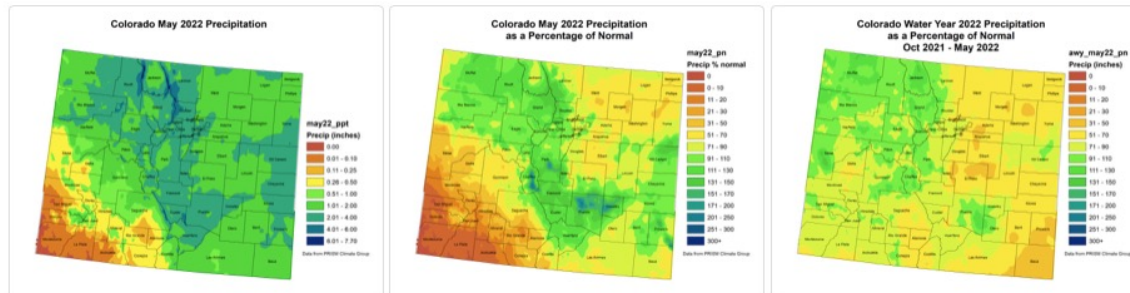


precipitation

this week's USDM period



recent precipitation



Snotel Water Year 2022
Precipitation Percentile Ranking
Through 6 June 2022

climate.colostate.edu/drought



- Home
- Precipitation
- Snowpack
- Temperature
- Soil & Vegetation
- Evaporative Demand
- Streamflow
- Reservoirs
- Outlook
- US Drought Monitor

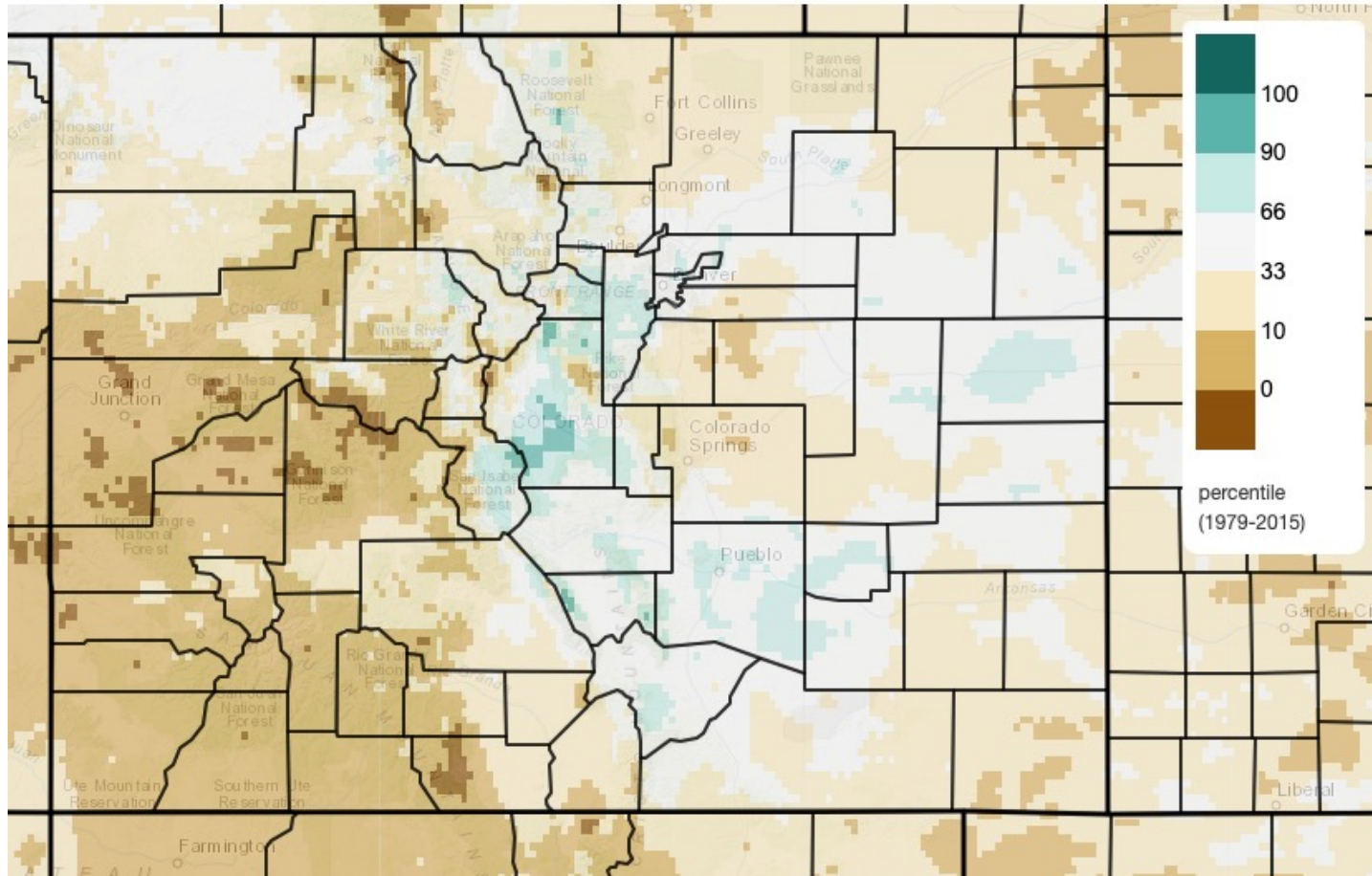
what's typical

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Total Precipitation Percentile, Since Jan 1st

2022/01/01 - 2022/06/06



<https://climatetoolbox.org/tool/Climate-Mapper>



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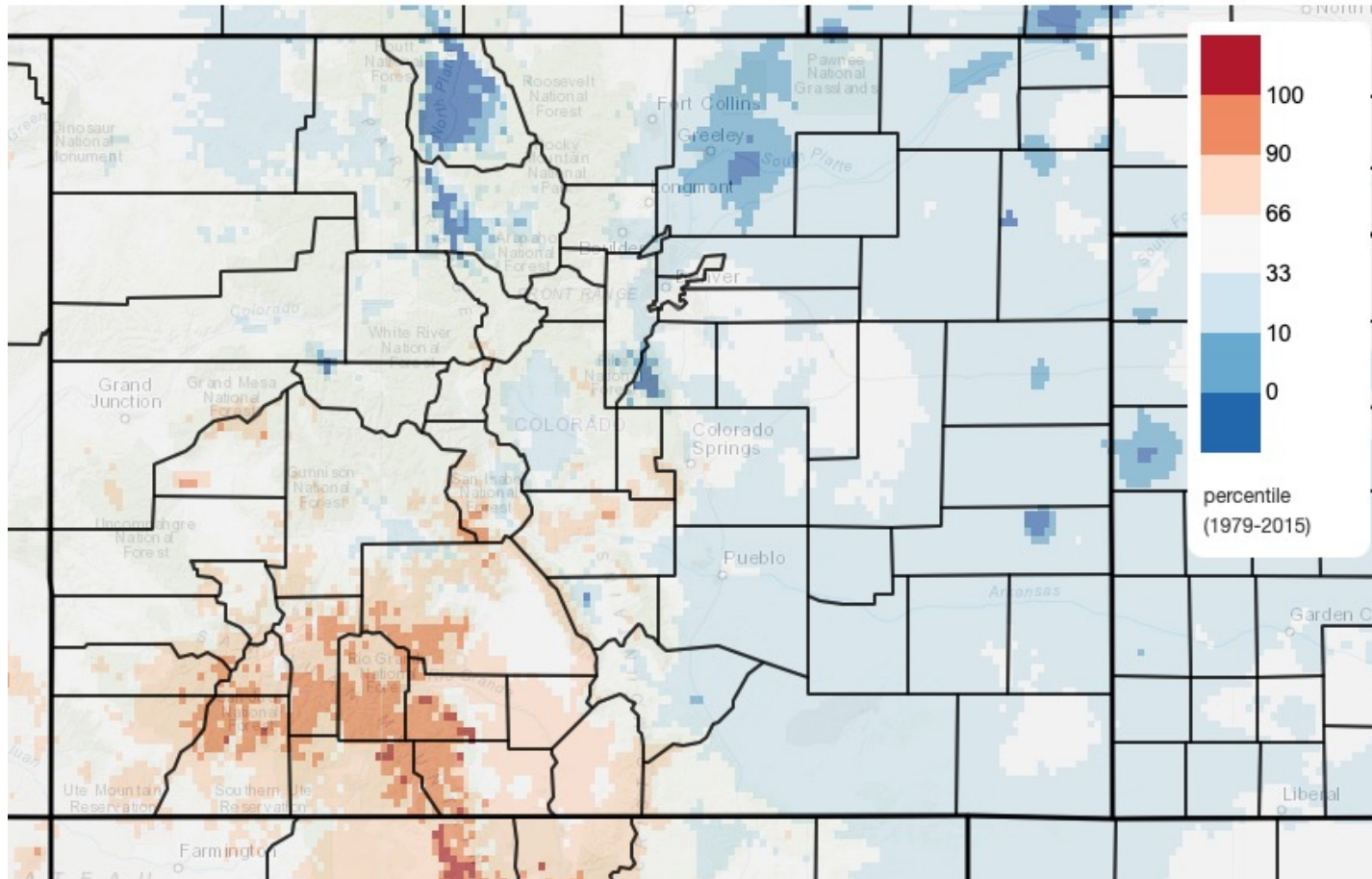
what's typical

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Mean Daily Temperature Percentile, Since Jan 1st

2022/01/01 - 2022/06/06



<https://climatetoolbox.org/tool/Climate-Mapper>



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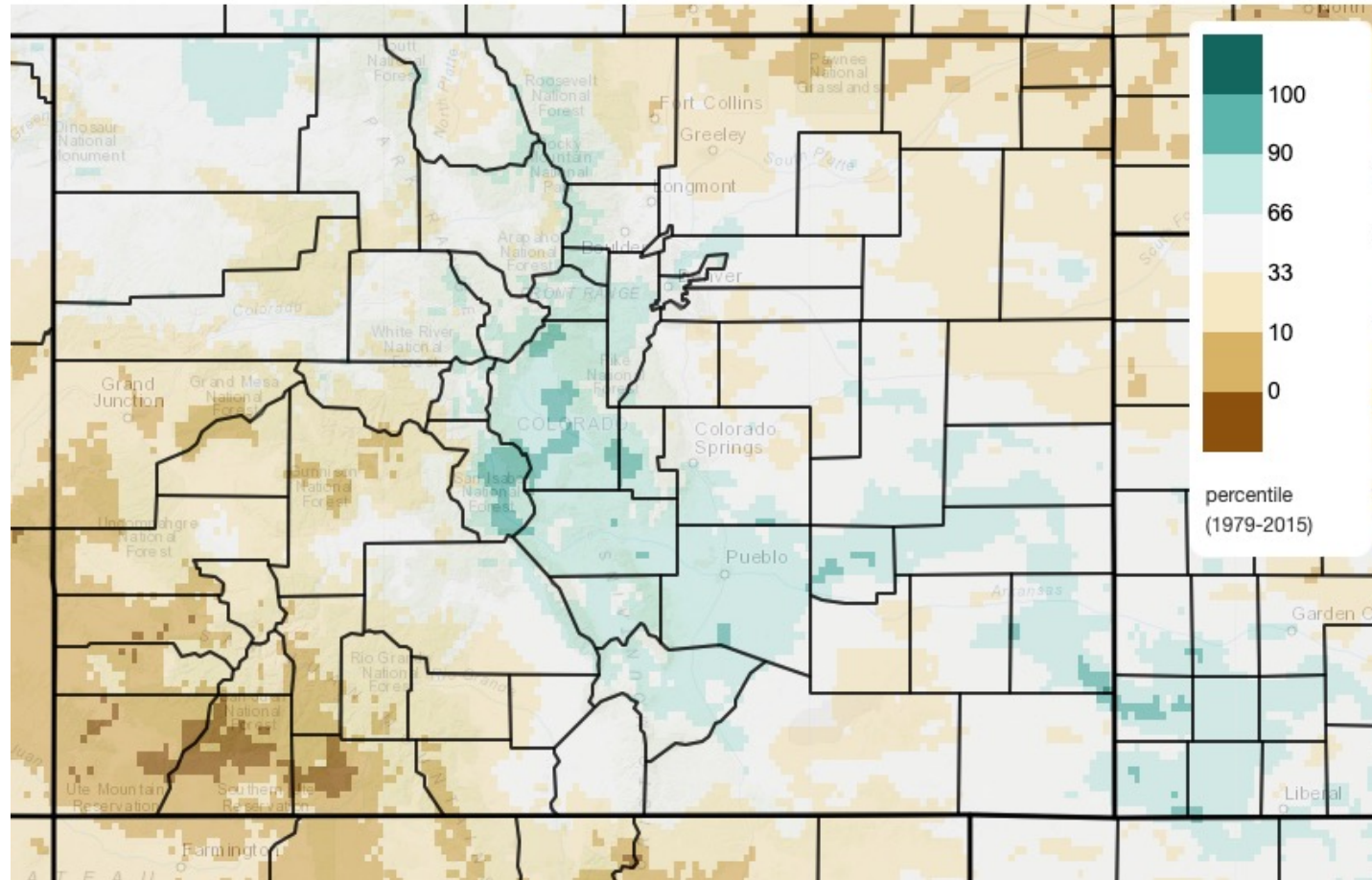
what's typical

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Total Precipitation Percentile, Last 30 Days

2022/05/08 - 2022/06/06



<https://climatetoolbox.org/tool/Climate-Mapper>



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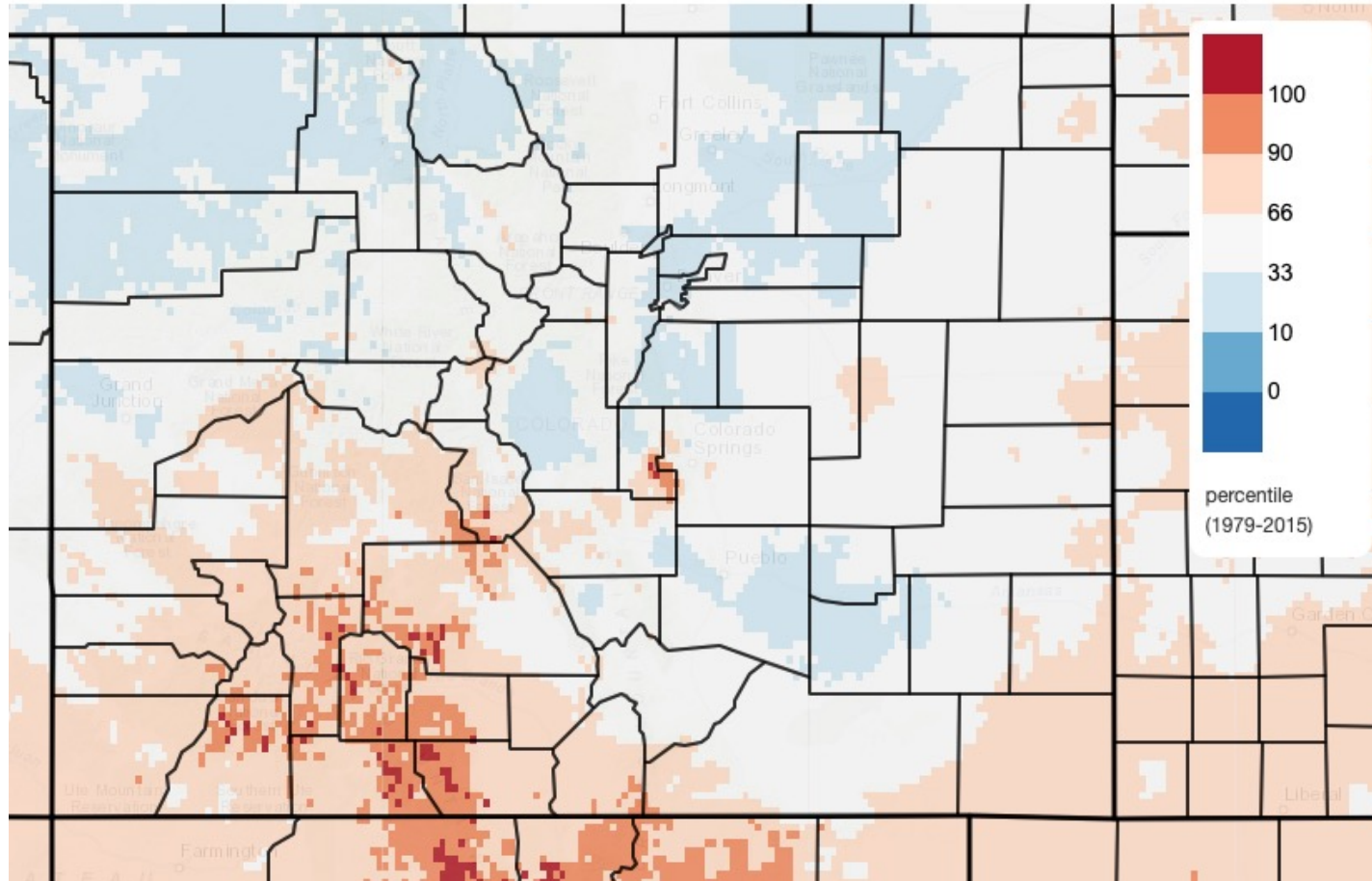
what's typical

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Mean Daily Temperature Percentile, Last 30 Days

2022/05/08 - 2022/06/06



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what's typical

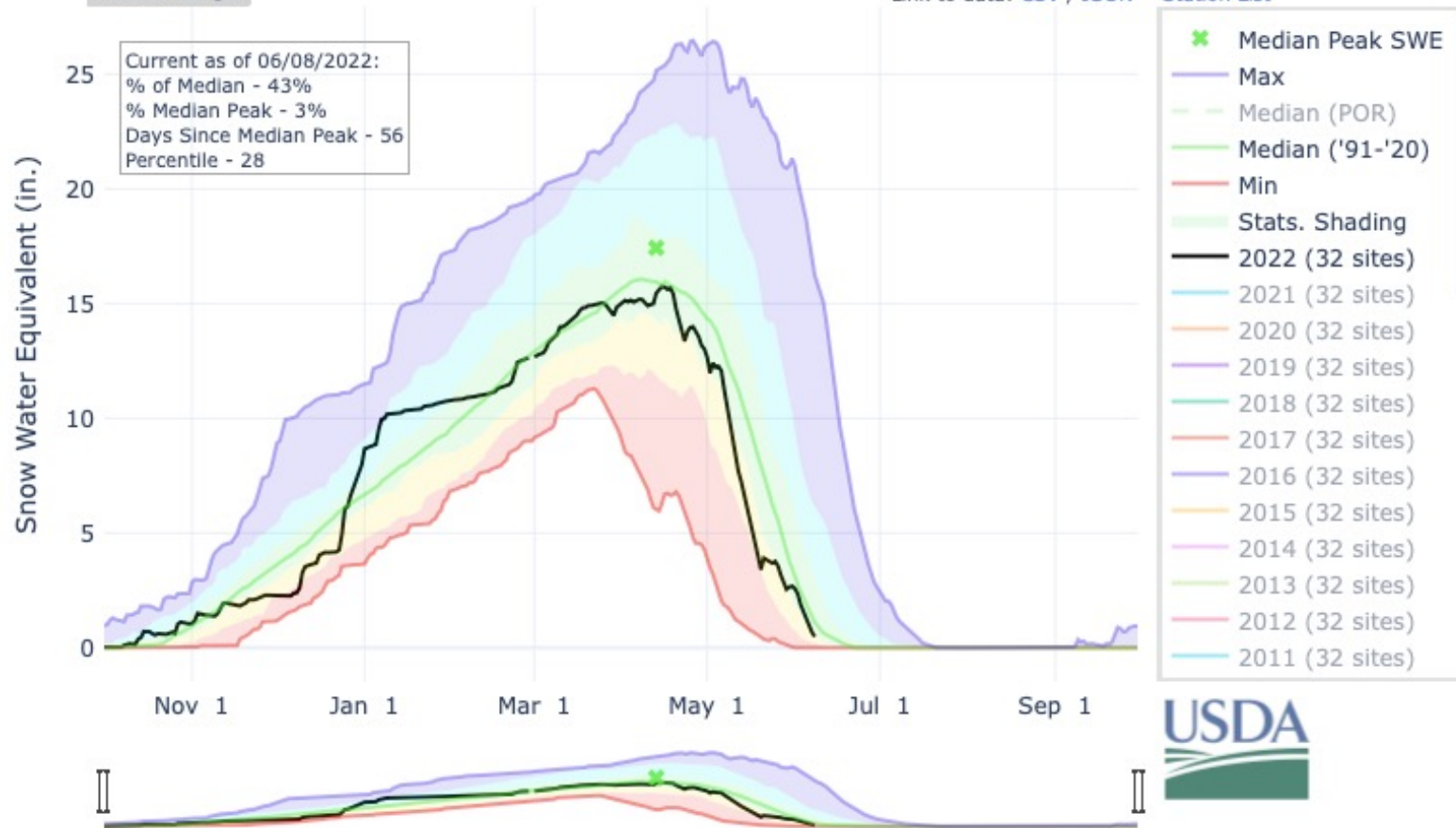
where are we now

what's coming

SNOW WATER EQUIVALENT IN COLORADO HEADWATERS

Reset Range

Link to data: [CSV](#) / [JSON](#) [Station List](#)



what's typical

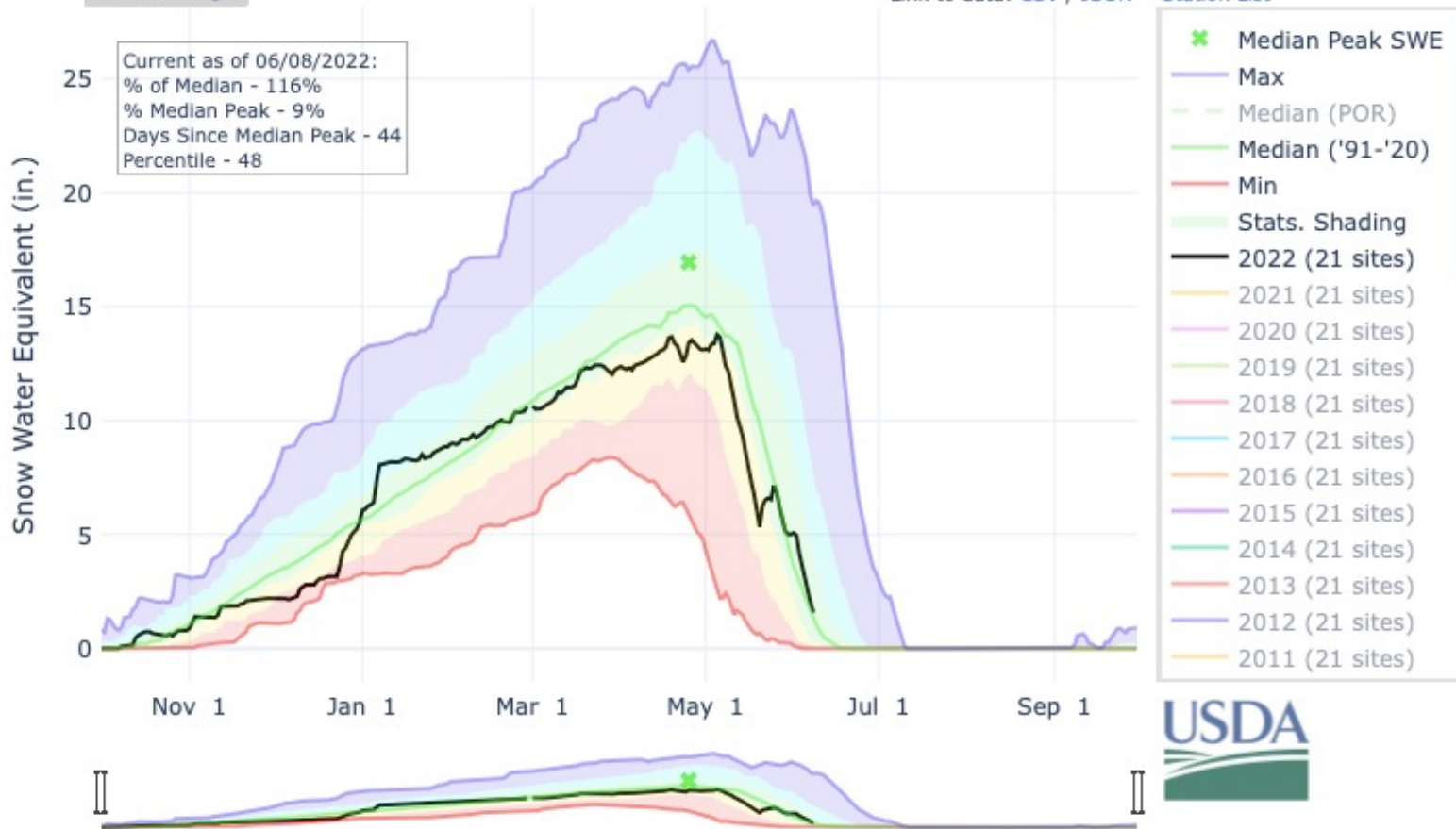
where are we now

what's coming

SNOW WATER EQUIVALENT IN SOUTH PLATTE

Reset Range

Link to data: [CSV](#) / [JSON](#) [Station List](#)



what's typical

where are we now

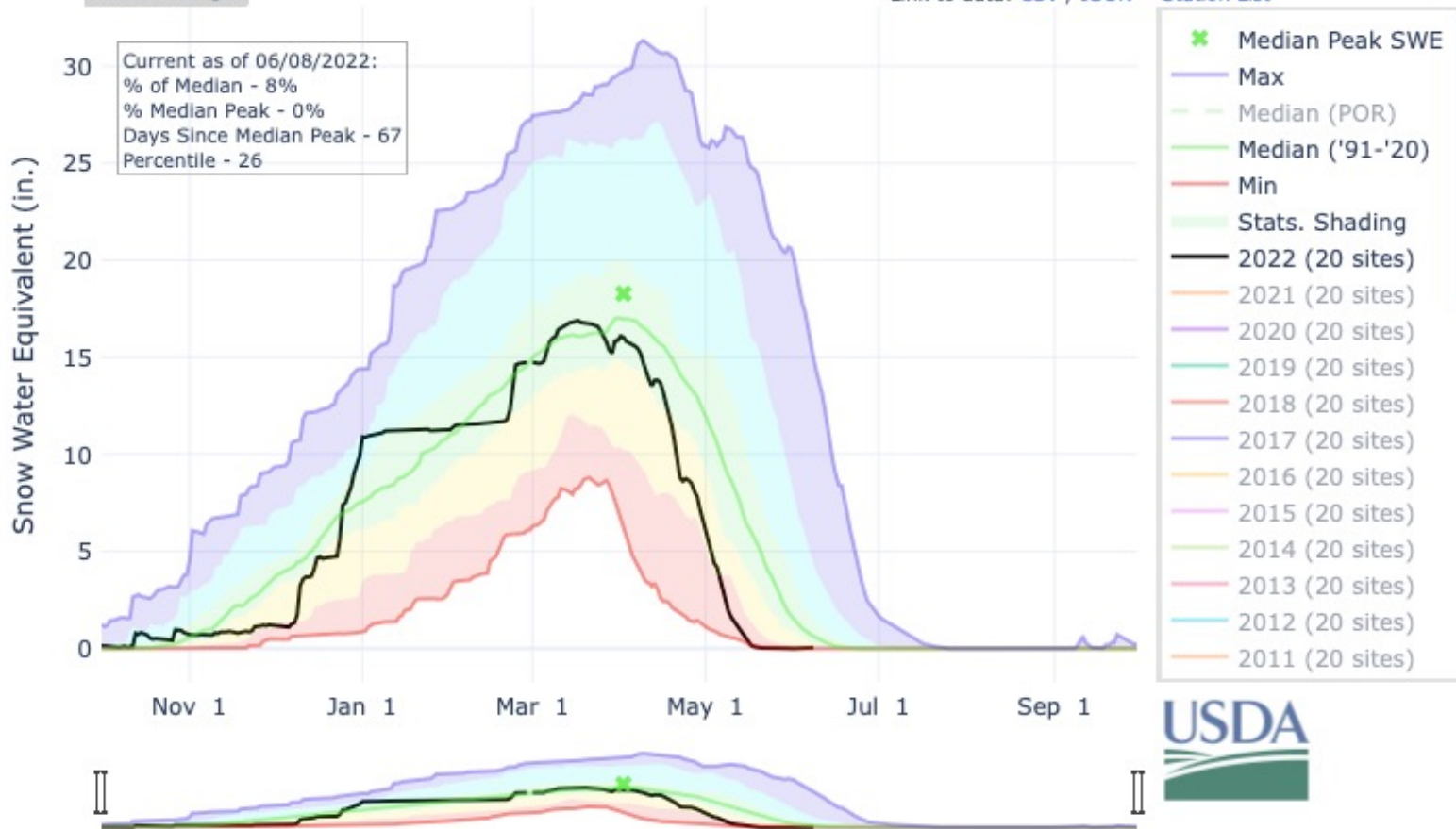
what's coming

SNOW WATER EQUIVALENT IN SAN MIGUEL-DOLORES-ANIMAS-SAN JUAN

Reset Range

Link to data: [CSV](#) / [JSON](#)

Station List



what's typical

where are we now

what's coming

Want more updates on our current conditions?

Check out our monthly climate summaries:

https://climate.colostate.edu/monthly_summary.html

Join us for our monthly climate and drought webinars:

https://climate.colostate.edu/webinar_registration.html



what's typical

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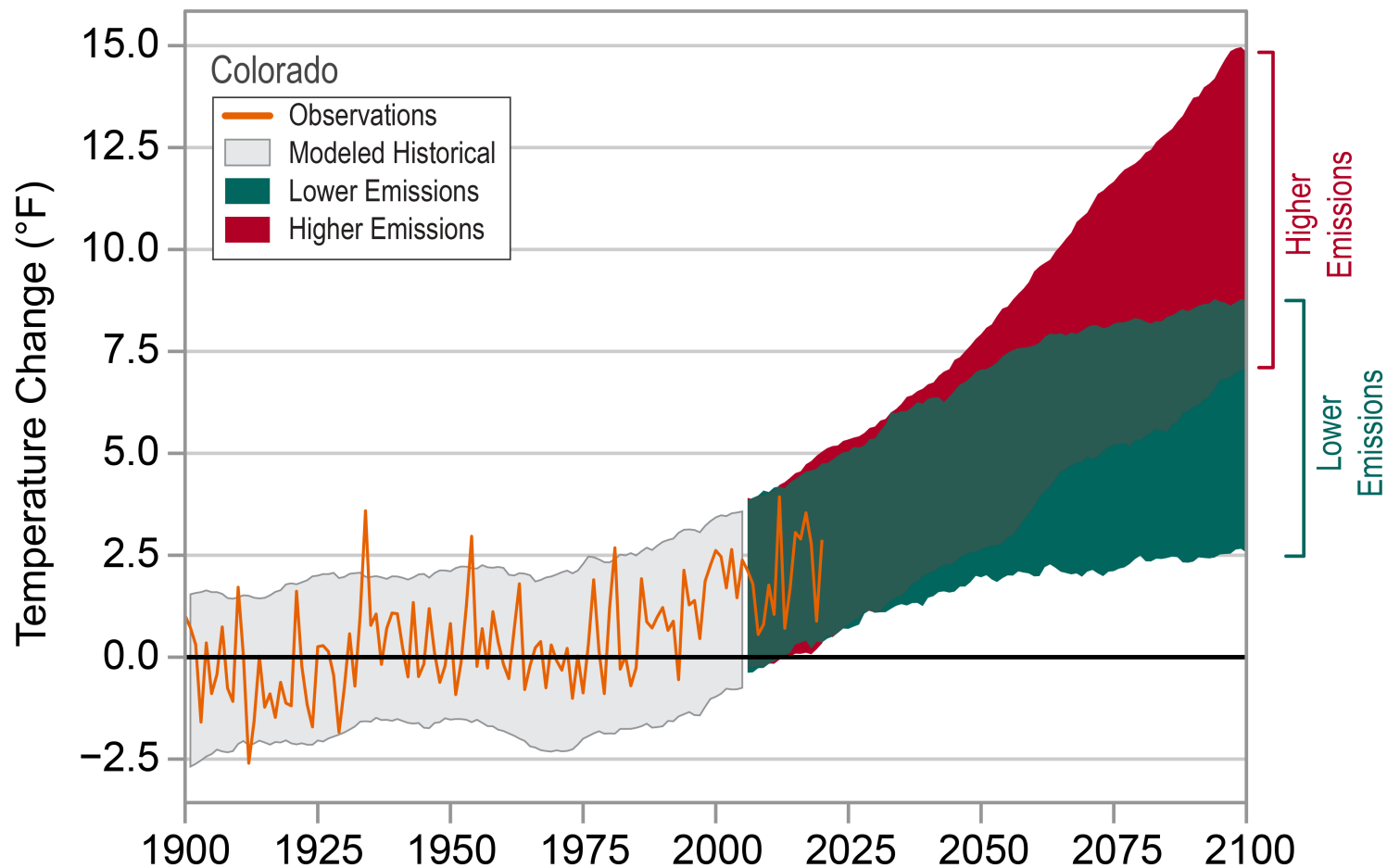


what's typical

where are we now

what's coming

Observed and Projected Temperature Change



<https://statesummaries.ncics.org/chapter/co/>



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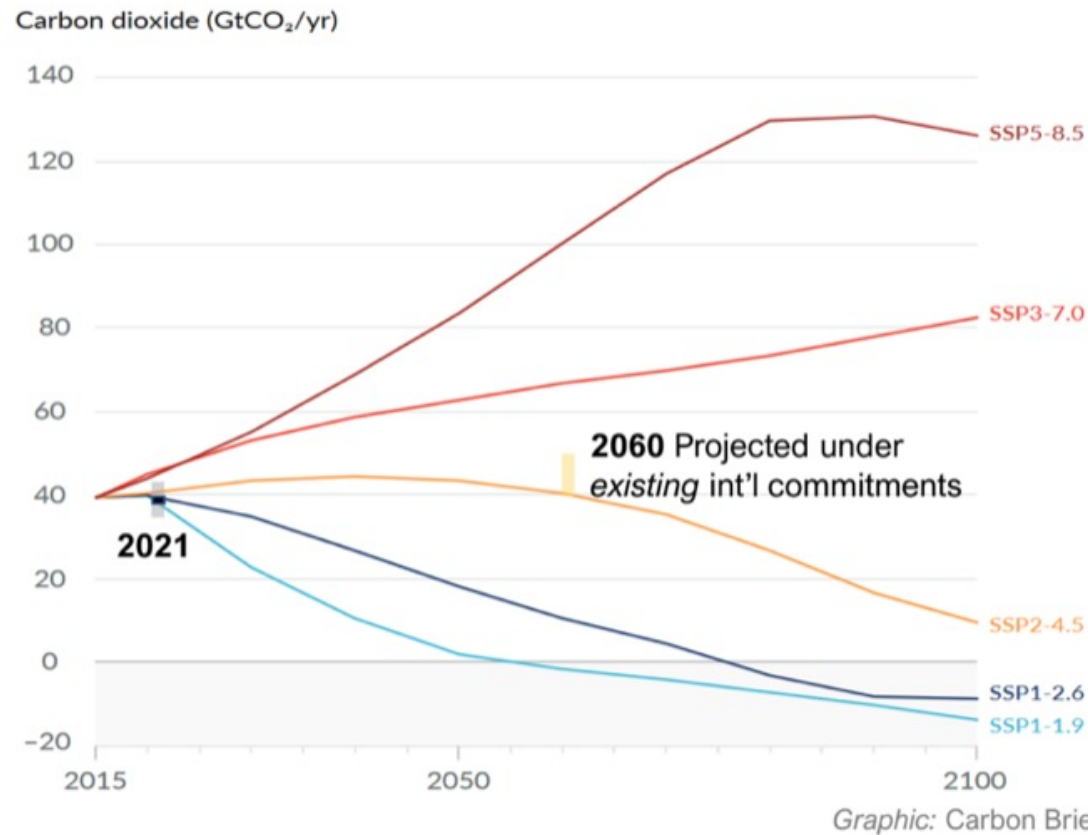


what's typical

where are we now

what's coming

Anthropogenic CO₂ emissions assumed in CMIP6 SSPs, vs. estimated current (2021) and projected (2060)



Take home: SSP2-4.5 (and RCP4.5) are more likely emissions pathways through mid-century; 2.6 and 6.0/7.0 could be used to bracket; 8.5 very unlikely - Jeff Lukas

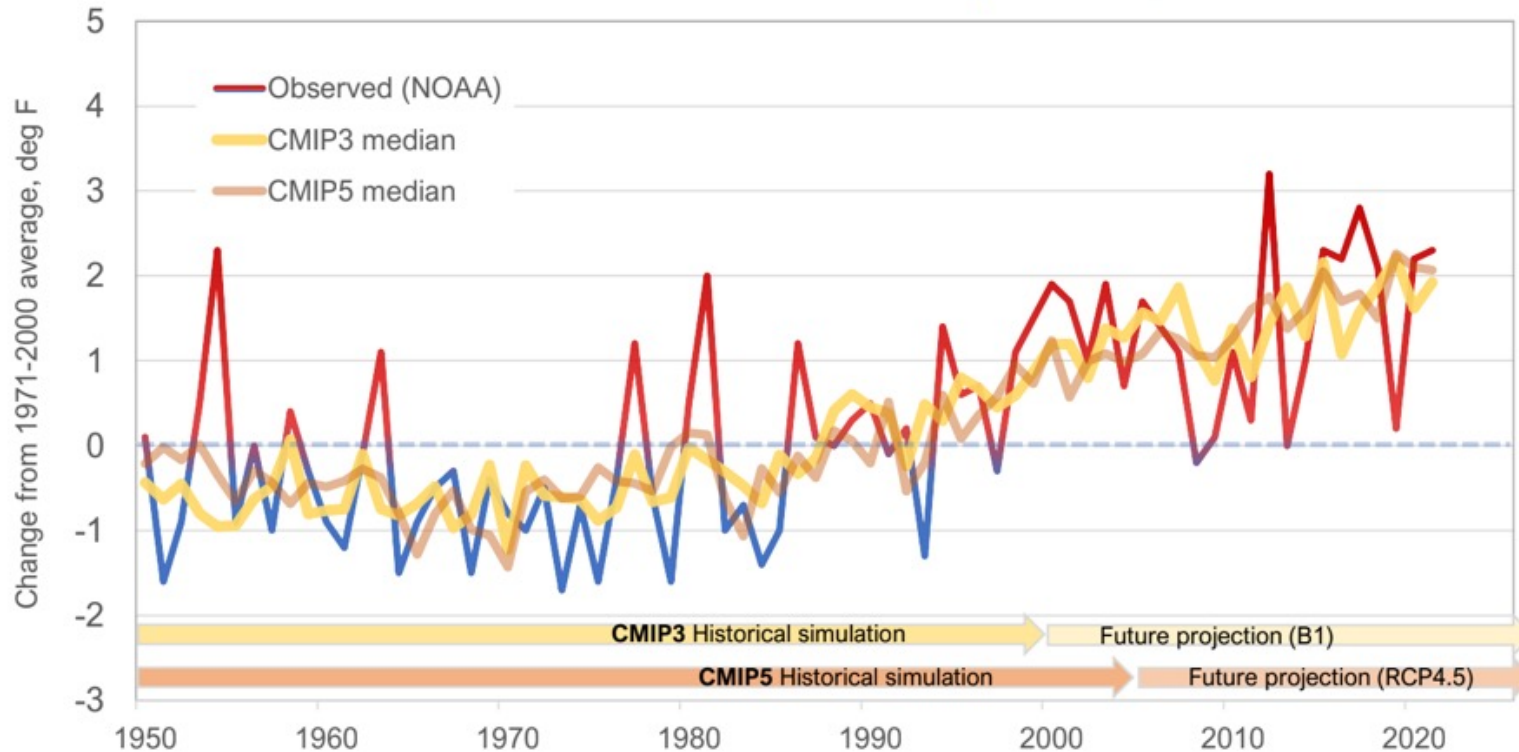


what's typical

where are we now

what's coming

Observed Colorado statewide annual temperatures vs. CMIP3 & CMIP5 modeled historical and future temperatures, 1950-2021



Take home: Observed temperatures in CO since 1950 track very closely with CMIP3 and CMIP5 simulations/projections; consistent with most or all of CO observed warming being anthropogenic - Jeff Lukas



what's typical

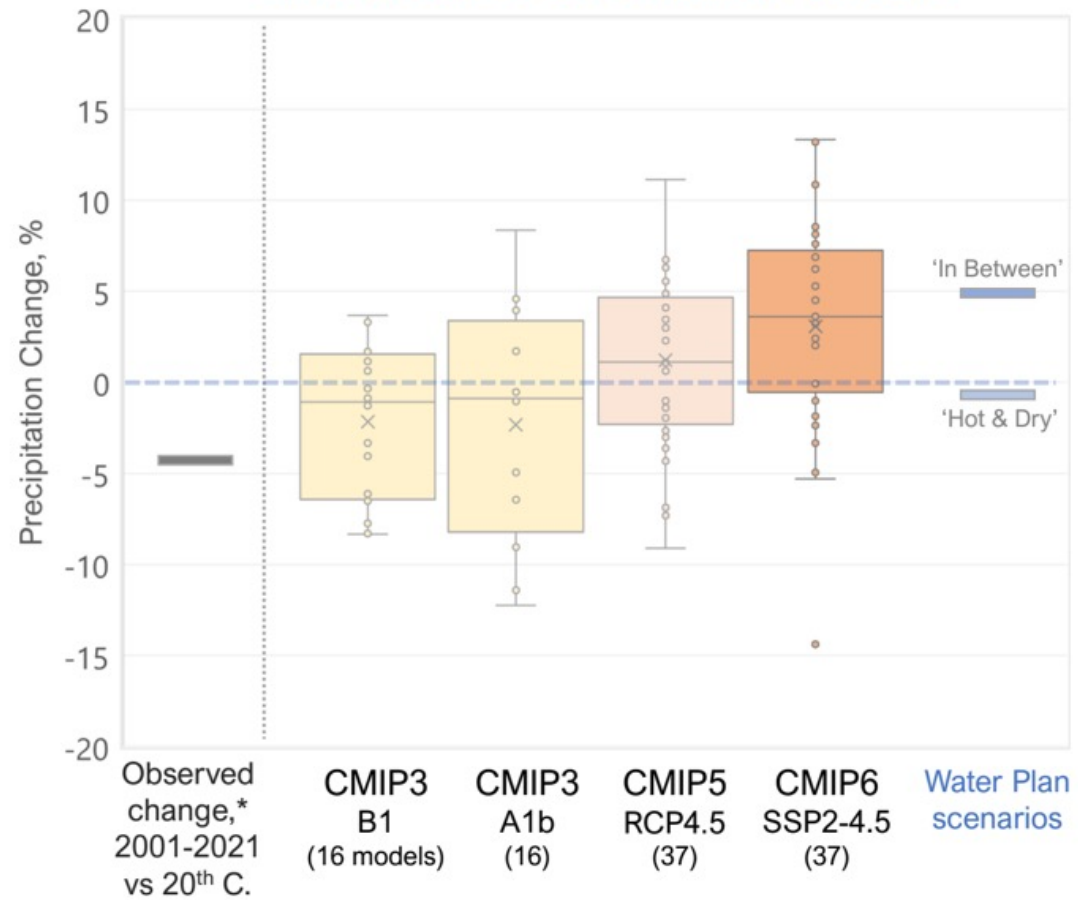
where are we now

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What about precipitation?

Still uncertainty, but
trending wetter

**Colorado Projected Annual Precipitation Change
by mid-century (1971-2000 to 2035-2064)
under moderate-low emissions scenario**



what's typical

where are we now

what's coming

We are updating the Climate Change in Colorado report from 2014!

- ✓ Updated observations
- ✓ Updated model projections
- ✓ Updated impacts information



What does a warmer
future mean?



what's typical

where are we now

what's coming

Warmer temperatures...

Shortens the snow accumulating season

Snowmelt is faster and earlier

Results in a drier atmosphere

Increases evaporative losses

Dries out soils faster



what's typical

where are we now

what's coming

Warmer temperatures...

Shortens the snow accumulating season

Snowmelt is faster and earlier

Results in a drier atmosphere

Increases evaporative losses

Dries out soils faster

*Increases risk for
large and devastating
wildfires*

*Increases frequency and
severity of droughts*

Reduces water supply



what's typical

where are we now

what's coming

What we don't know

- We're unsure how precipitation will change in the future
- We're unsure if a warming climate is impacting the severity and frequency of winter storms/cold snaps
- There is uncertainty on the magnitude of changes in streamflow and snowpack due to a warming climate
- We don't know how climate change is impacting the monsoon's connection with Colorado precipitation



what's typical

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What we do know

- We have observed warming trends and will continue to experience warming
- We are likely to see a continued higher frequency of droughts
- Those droughts are likely to be more severe due to warmer temperatures
- We will see high variability in winter snowpack, but it will be harder to get above average peak snowpack
- It is likely we will continue to see an increase in wildfire activity in our forests

<https://nca2018.globalchange.gov>

<https://interactive-atlas.ipcc.ch>



what's typical

where are we now

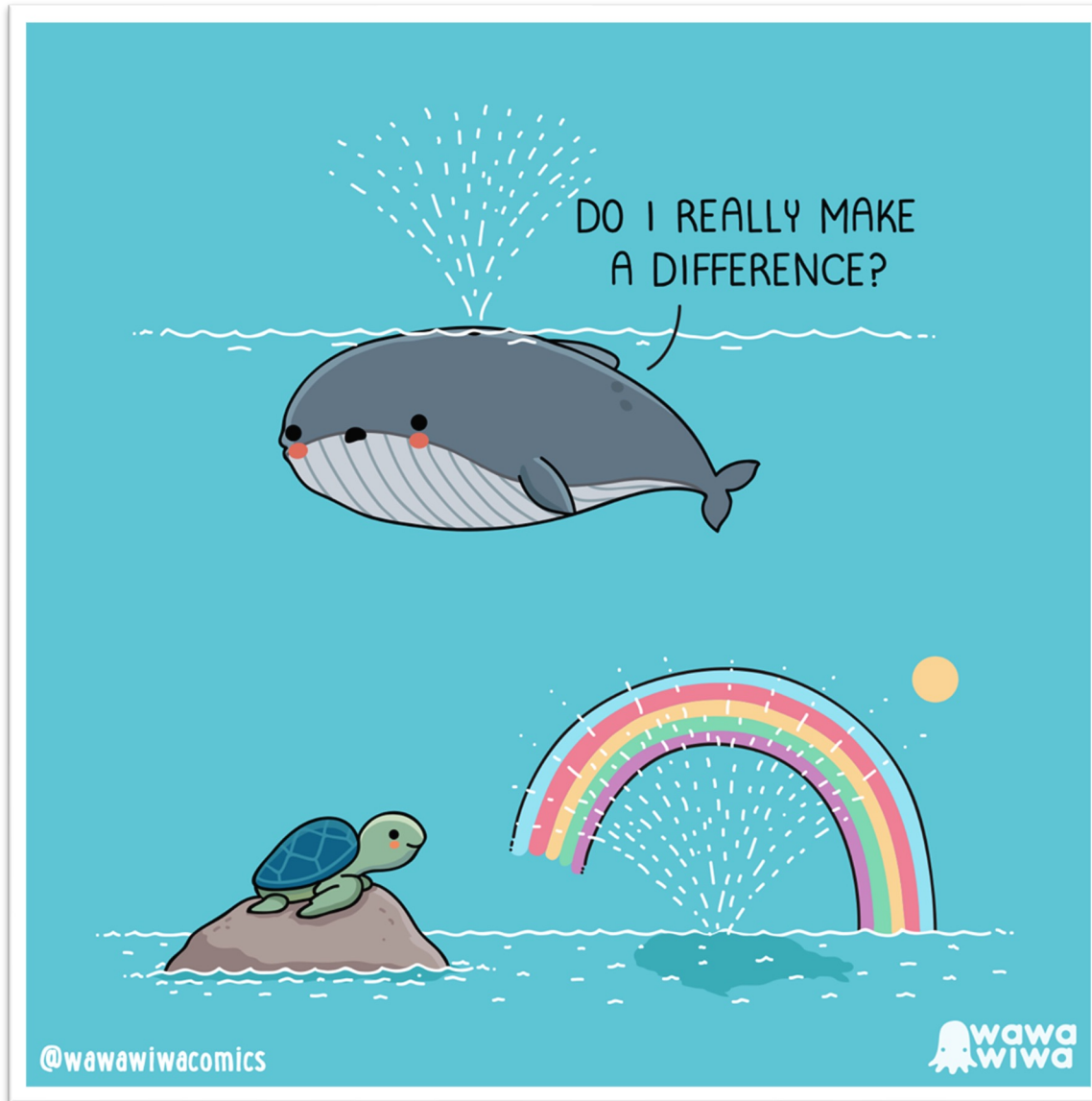
what's coming



what's typical

where are we now

what's coming



But wait!
The good news!

We can make a
difference.

We already are.



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 @ClimateBecky

climate.colostate.edu

Thank you



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