

A Slow “Goodbye” to Our Mountain Snow

Colorado CoCoRaHS Summer Newsletter 2019



Howdy folks,

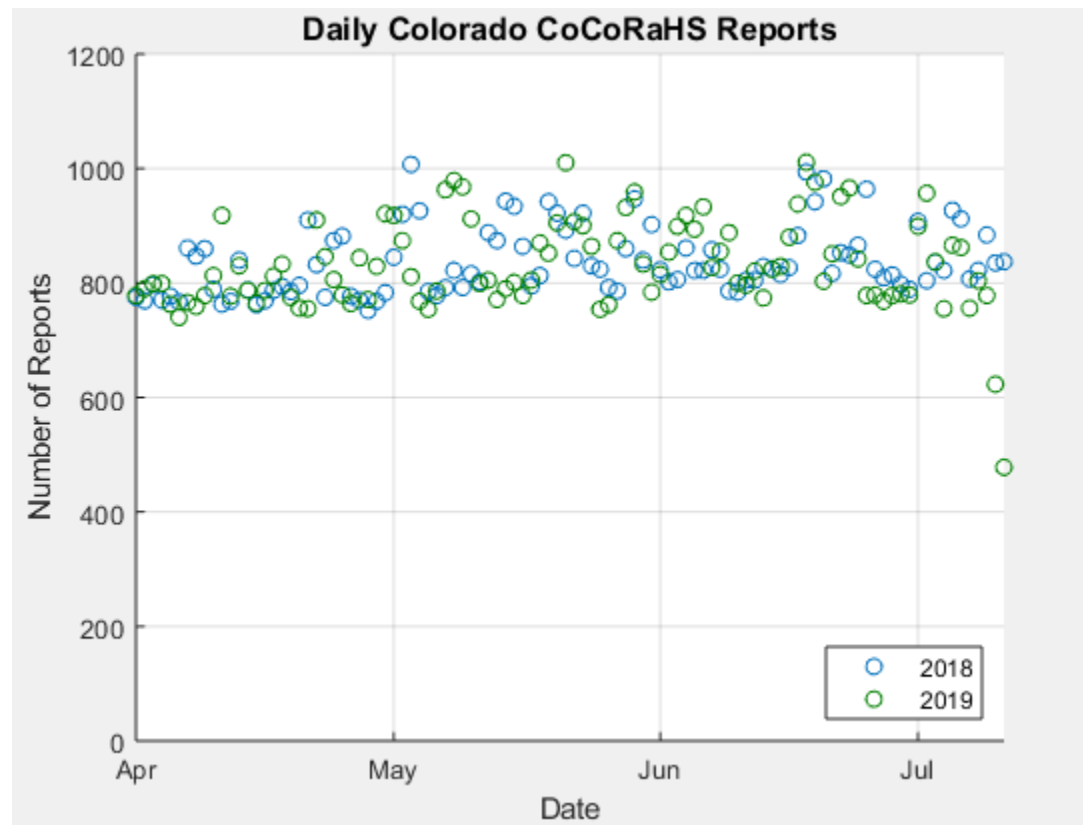
It's been beautiful across Colorado the last month. We have seen more naturally green vegetation conditions than usual. It's always special to see the foothills areas looking lush as opposed to their more typical earthy tones. It has stayed green because the rains have continued to come, and the temperatures, until recently, have stayed down. Living in a steppe (semi-arid) climate, we are grateful for the green grasses when and while we have them.

The clouds in the picture above are called “mammatus” clouds. These often form on the underside of thunderstorms. They are often indicative of... Hail! This picture was taken on the fourth of July, and it did hail about 15 minutes prior.

Reporting Stats

Firstly, hats off to all of you! We have reached 1000 observations on several occasions already this year. At this time last year, we had yet to reach the 1000 mark. Overall, total reports are about the same as at this time last year. I suspect we'll see this year's numbers shoot up a little more once folks have time to enter backlogged data. There's virtually no such thing as too many observers when the thunderstorms

hit. Please continue to share your CoCoRaHS stories with friends and family who may share your proclivities for observing nature.



Number of Colorado CoCoRaHS reports/day for April through mid-July in 2018 (blue) and 2019 (green).

For the first time in my life I have a yard! I've taken weather observations for the official Fort Collins weather station for years, but this is the first summer I have actually been able to pull my weight with CoCoRaHS. My station number is CO-LR-1200; keep me honest. The dog likes to help me check our gauge right after the morning walk.

Reporting Reminders

You've probably heard it before: "be a hero, report your zero!" It can be easy to forget about CoCoRaHS when there's no rain to report, but even when it seems obvious, we really appreciate the confirmation that nothing fell. The more complete your data record is, the more valuable it is.

Have summer plans? That's okay. You can't always be there to check the gauge. Don't forget that you have the option to report a "multi-day accumulation" total. If you are away for a stretch of time, you can easily catch up. Just login to the website, and click on "Multi-day Accumulation" in the "Enter My New Reports" section of the website. This allows you to specify the start and end date.

Got hail? We hope to avoid hail damage, but it's Colorado, and it happens. My parents will be replacing their roof for the third time in a decade after getting smacked by ping-pong ball-sized hail this summer. When you're home to witness a hail event, please consider submitting a hail report online. There is a link titled "Hail" in the "Enter My New Reports" section of the website that will walk you through the

process. Also, if you have good hail photos or videos, I would love to see them. It's not a good summer newsletter without one good hail photo. I picked this one because this hail was generated by the same storm that produced the mammatus clouds above.



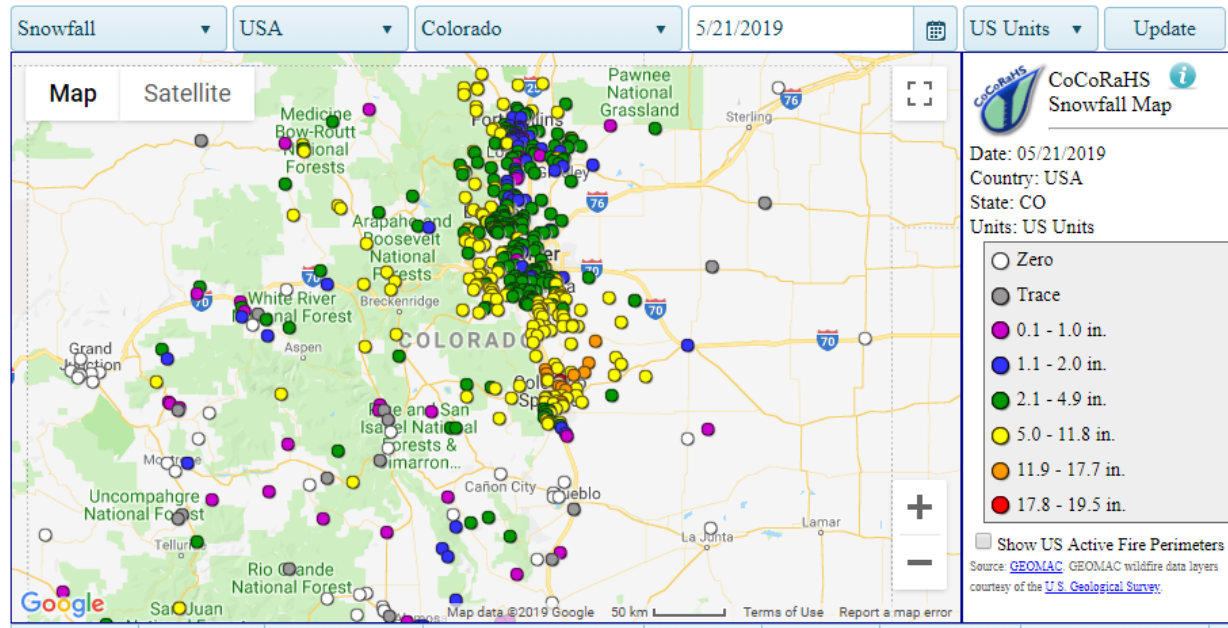
Photo credit: Becky Bolinger.

Have questions? I'm always here to help!

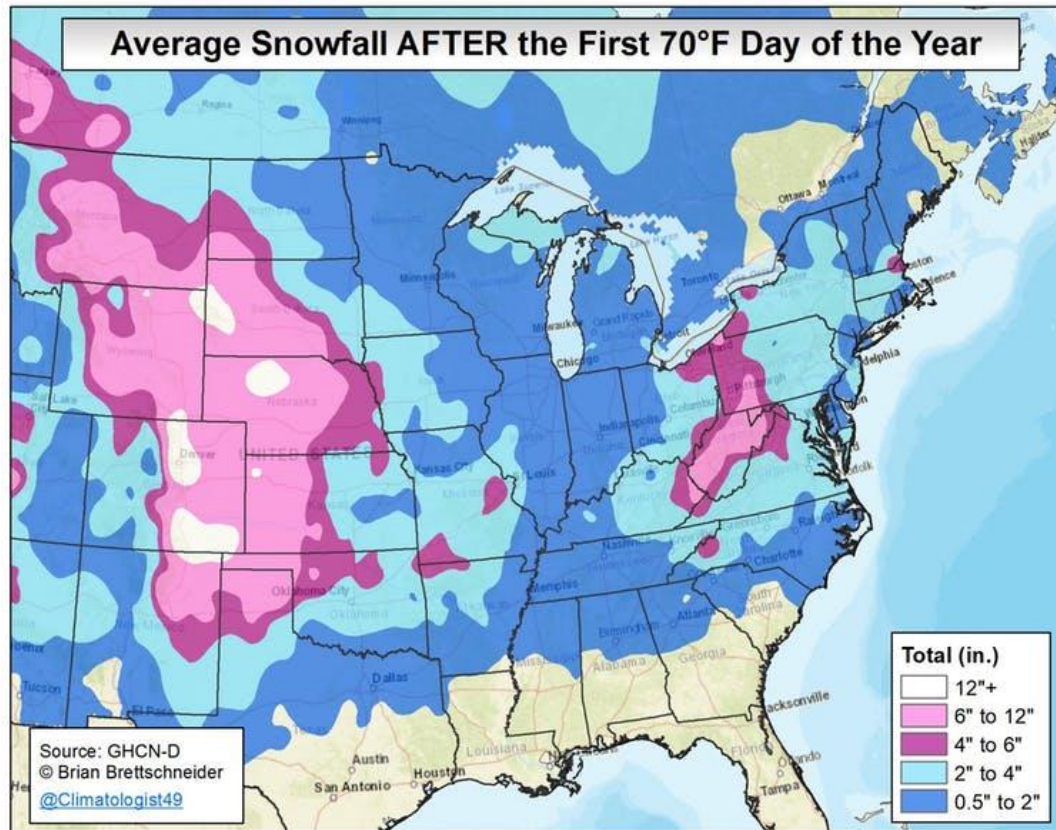
Weather Recap

Snowpack: When I last wrote, the snow was piling up in our mountains. We had a great snowpack year across much of the state. It was about as good a scenario as one could concoct for bailing ourselves out of the 2018 drought situation. Of course the big snows came with their own slew of challenges: avalanches, old dams bursting, washed out roads, and a later than normal start to the mountain summer recreation season. Maybe now you can finally start planning your 14er hikes.

A Cold May: If you were like me, you became a little annoyed with how long it took to retire the winter gear for the season. Colorado had its coldest May on record since 1995, and its 5th coldest May since 1895. Delayed summer frustration was heightened during the snow event on May 20th and 21st, one of the latest events ever for many of us on the Front Range.



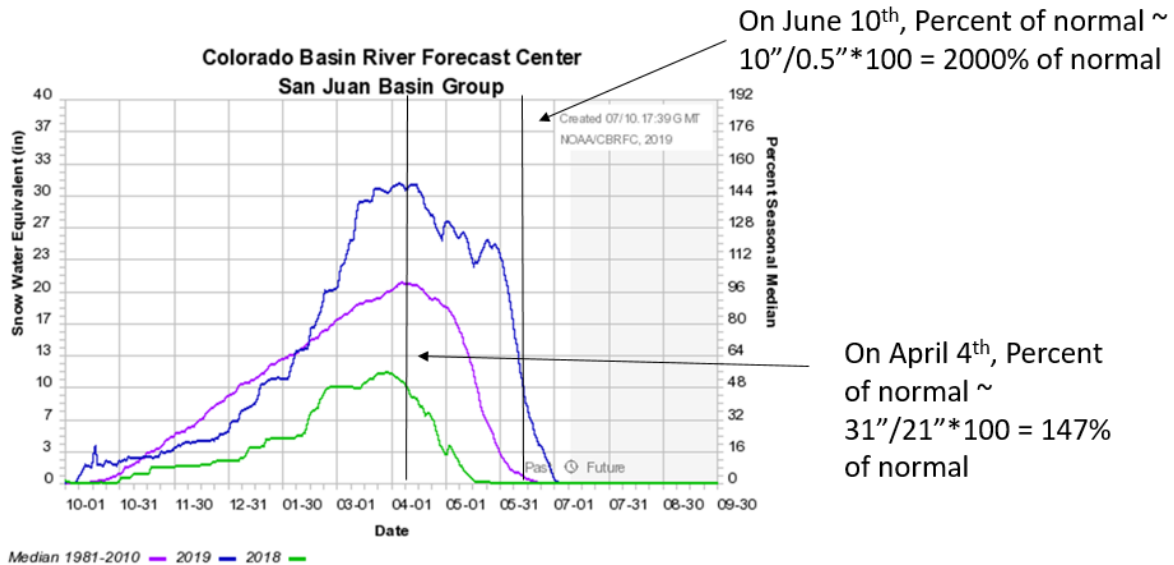
If you're new to Colorado, no. That event was not exactly normal. However, because we are at higher elevation, and because our wet season kicks off in April and May, you might want to get used to seeing snow until about Mother's Day. We do have plenty of beautiful spring weather, but winter fights back for a long time before it finally stays warm (late May through mid-September). If you live in the Denver Metro area, you see over a foot of snow after the first 70-degree day in an AVERAGE year. Our shoulder seasons are an adventure.



Contour map of average inches of snowfall/season after the first 70 F high temperature.

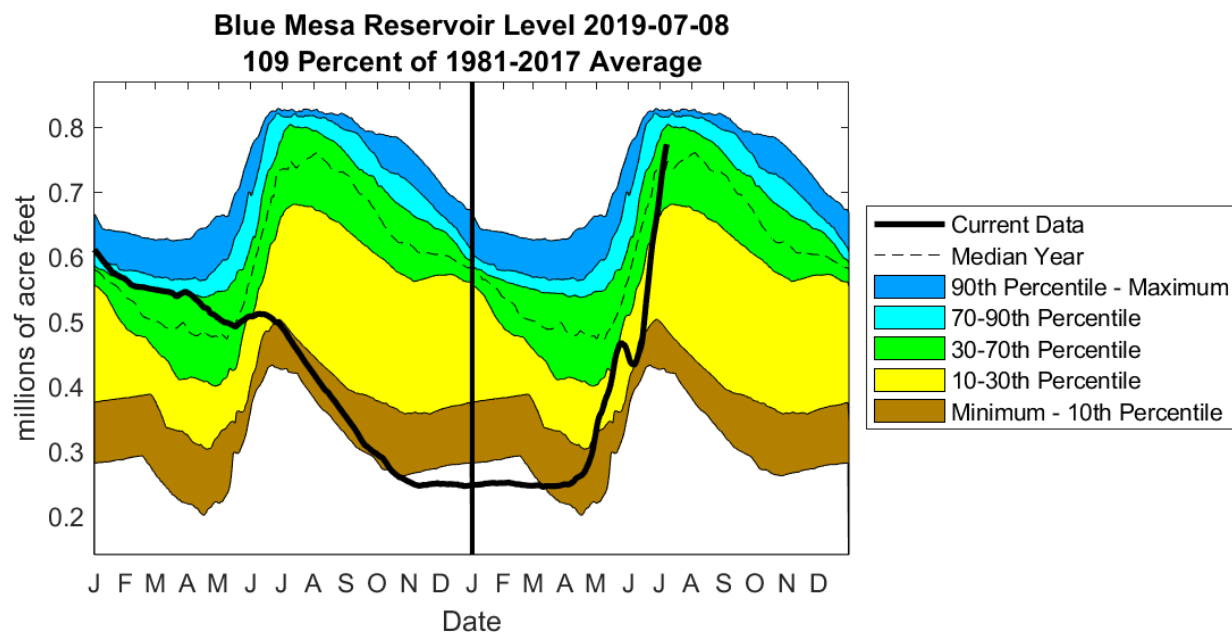
Some Silly Numbers: Did you see the news reports this spring proclaiming things like “5000% of Normal Snowpack?” Seems shocking, doesn’t it? Could that possibly be right? Technically, yes, snowpack was well over 1000% of normal in many places in late May and June. However, those numbers don’t mean what you might think. They’re the result of ignoring our grade school math teachers, and dividing by zero. If a snow measurement station still has 5” of snowpack on June 5th, but normal on June 5th is 0.1” (because it’s usually all melted), then boom! 5000% of normal. Here is how I would think of 2019: “We built a robust snowpack that peaked in April at about 130-150% of the normal peak values. Because of cool weather in May, it stuck around a few weeks longer than normal.”

Blue line = 2019 Purple line = normal Percent of normal = Blue line/purple line*100



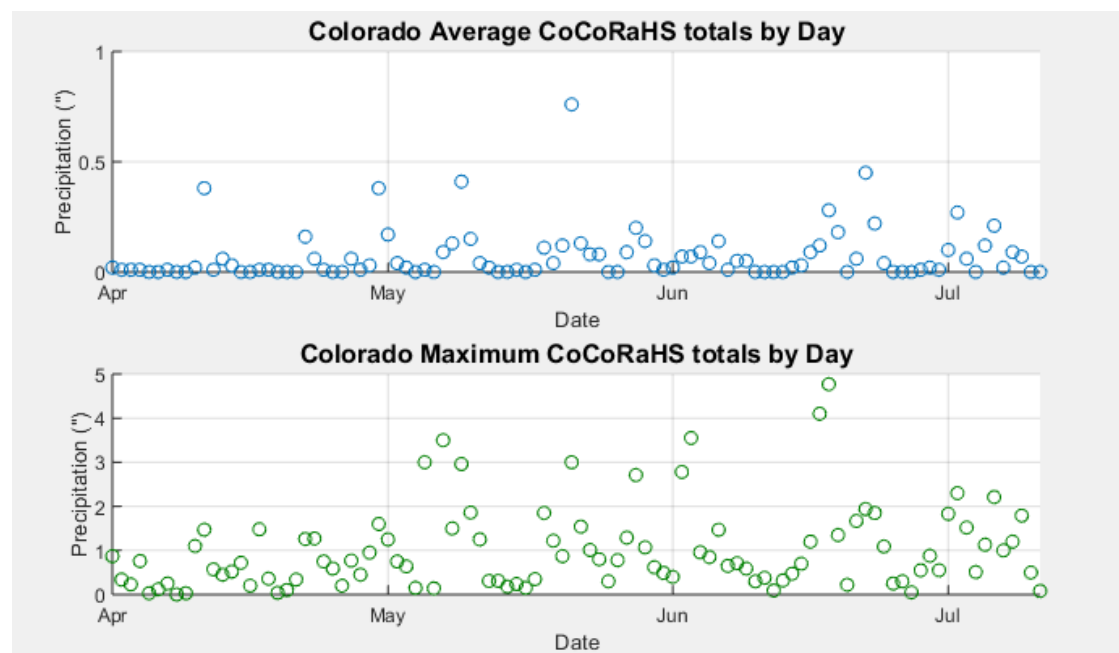
Explanation of silly snowpack % of normal numbers. Average year (purple), 2019 (blue), 2018 (green).

Late Runoff: The rivers have stayed high later into the season than normal. This is again due to the high volume of snowpack we built over the winter, and the cool conditions in May, which delayed melt. Reservoirs have been drinking it all in too. The image below shows Blue Mesa Reservoir levels from January of 2018 – the beginning of July this year. 2018 was a bad drought year for western Colorado, and we were barely able to recharge reservoirs at all during the snowmelt season. This year, Blue Mesa has recovered from record low storage in the winter to being nearly full. Blue Mesa is the largest reservoir in Colorado, so refilling it from critically low levels in one year is evidence of a remarkable turnaround from 2018.



Blue Mesa reservoir levels for 2018 and 2019 (black) with reference to the historical distribution (color-shaded).

Thunderstorms: Congrats to CO-LN-58 for the highest verified 24-hr rainfall report this season! 4.77" is the mark to beat for the summer season so far. This occurred on June 18th, and was part of one of a couple severe weather outbreaks between late May and late June. Last year, the highest report came on June 19th. I made a bet in last summer's newsletter that one of you would have a 5" total before the summer was out; it didn't happen. Over the most recent 10 years, we have had verified totals of 5+" in the second half of summer somewhere in Colorado in 2011, 2013, 2014, 2015, and 2017. Let's go double or nothing! It's interesting, but probably not scientifically meaningful, that it has been all the odd years, and only one of the even years.



Late July and early August is prime time for flash floods in Colorado, especially southern Colorado as they're most impacted by monsoon season. During the late summer season, channels of warm, moist air are often carried from the south or southeast into our state. With the aid of our sunshine and mountains, this air becomes more buoyant than its surroundings, and is propelled skyward, making thunderstorms. The upper level atmospheric winds often move slower in the late summer than earlier in the season. It is these winds that steer a thunderstorm. When upper level winds are slow, the risk of heavy rain parking over the same location for a long time goes up.

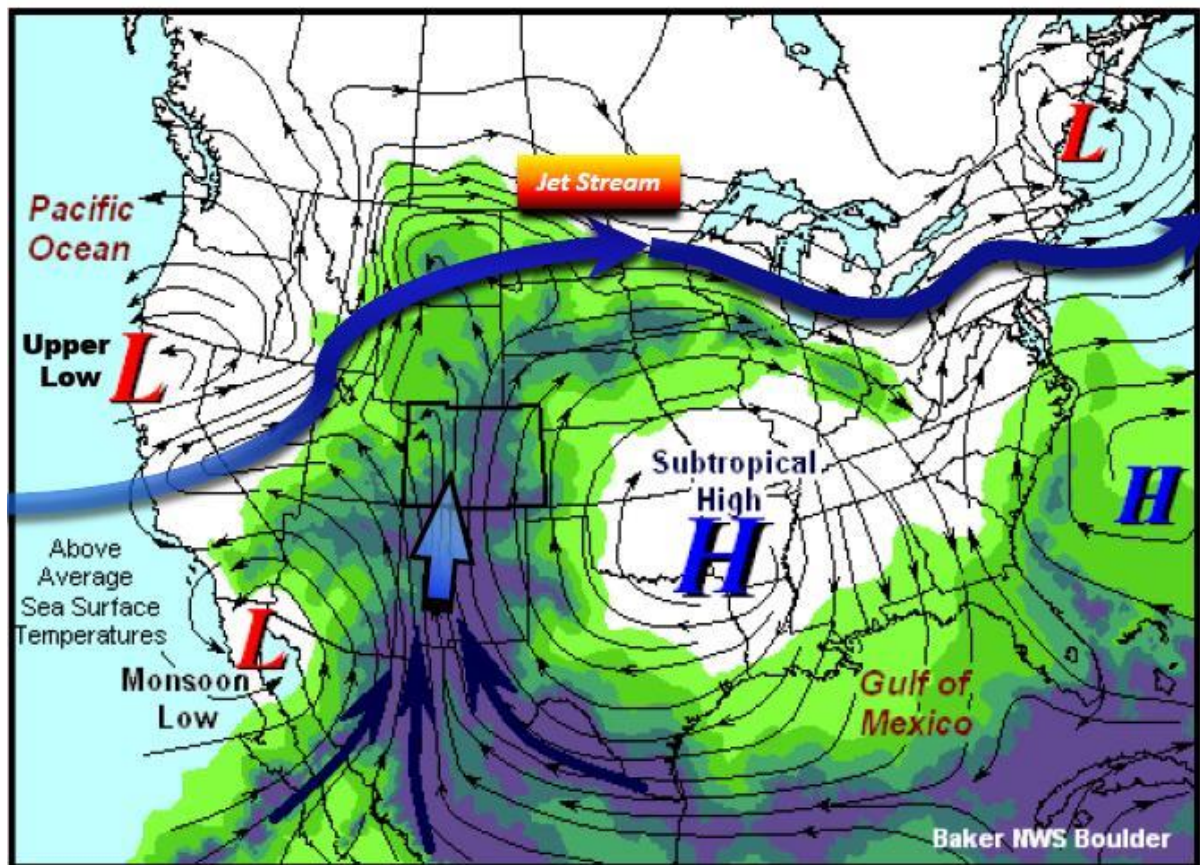


Illustration of a typical summertime monsoon pattern.

90 degree days: The summer heat was delayed, but it seems to have arrived. It took us until June 27th to reach 90 degrees in Fort Collins this year! The last year we had to wait that long for a 90 degree day was 2009 (July 8th). Since then, they've started to pile up. We have had six so far. There are seven more in the seven-day forecast! Remember that when it gets hot you can always retreat uphill. Lake Dillon has never recorded a 90+ degree temperature.

As mentioned above, the grasses in our foothills have been naturally green since coming out of dormancy. This week, they're finally beginning to brown. The warm weather won't help. Here's a photo in memory of a lush June.



Horsetooth Reservoir trail on June 25th, 2019. Photo Credit: Michael Natoli

That's all for now,

Stay cool out there!