

Colorado CoCoRaHS Newsletter

Fall 2020

Zeros, Fires, and New Normals

Peter Goble

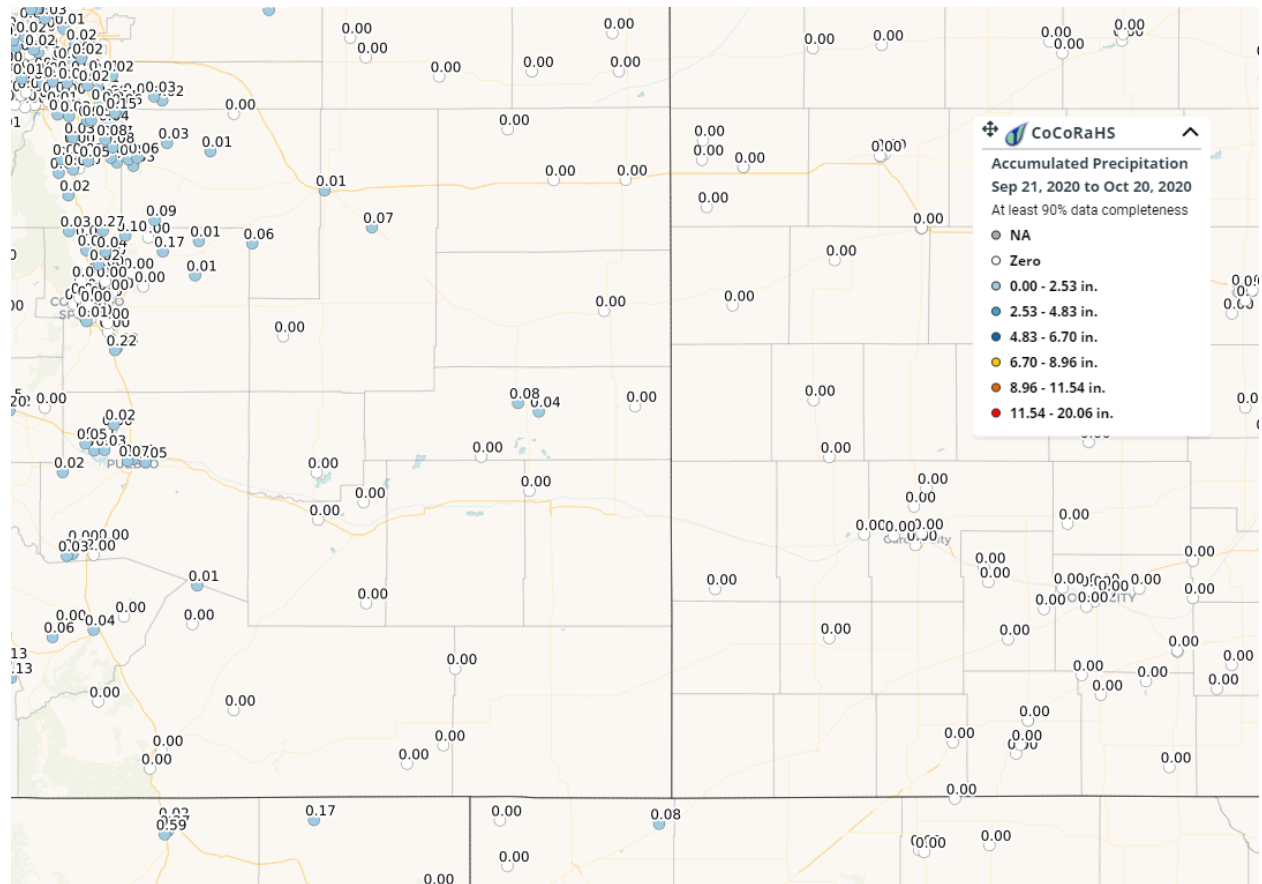
CoCoRaHS State Coordinator



A friendly hello, from your CoCoRaHS neighbor! I hope you all are hanging in there amidst new viruses and crazy fires. It has been one heck of a year.

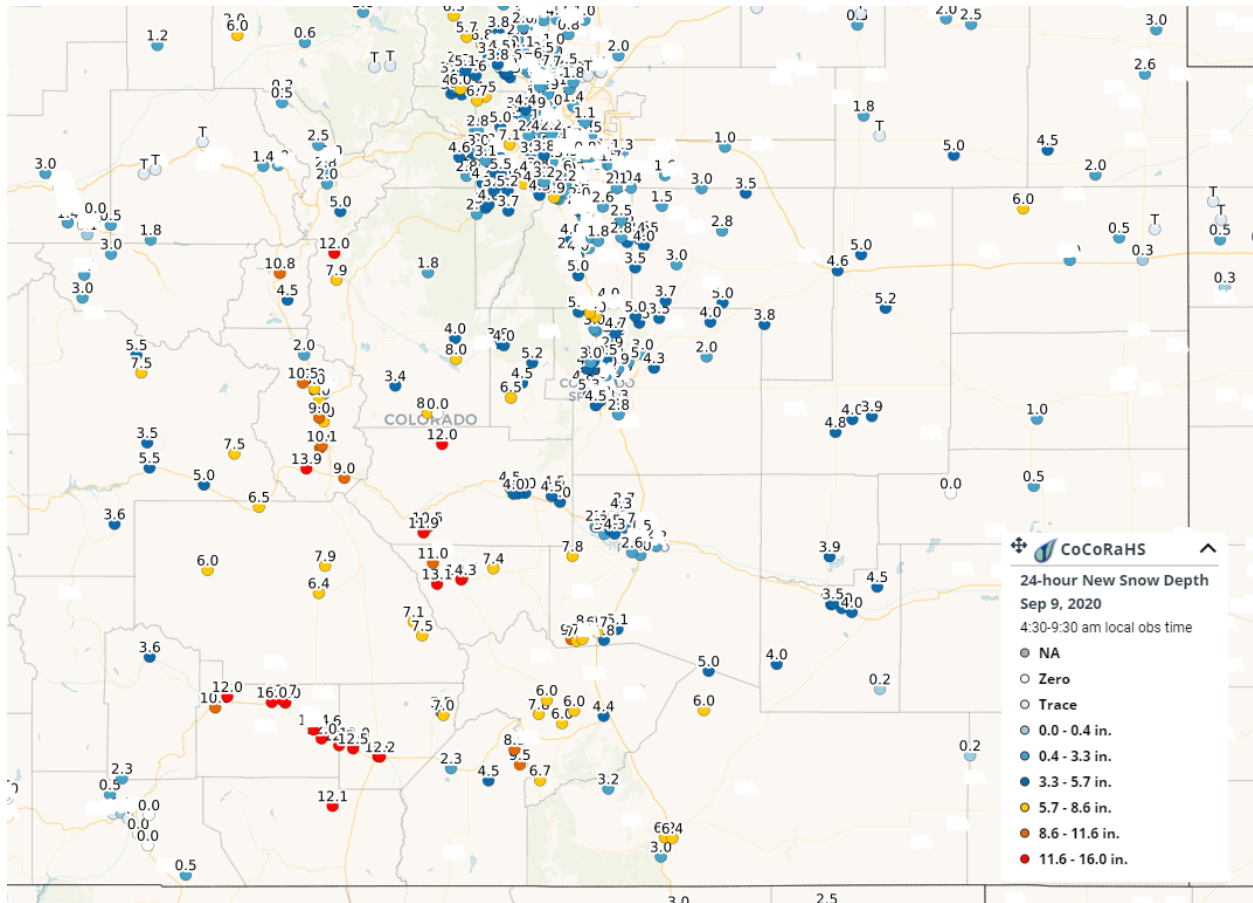
Reporting Zeros: Have you spent any time with our new CoCoRaHS maps (released in August)? They're fun! You can map multi-day accumulations, scroll seamlessly across the landscape, and adjust to your preferred colors. The problem? Too many dang zeros! Take a look at the map below showing 30-day precipitation accumulation from September 21st – October 20th. Much of eastern Colorado and western Kansas has been entirely skunked for moisture over the last month. This area is the winter wheat belt of the country, and late September/early October is planting time. With no moisture, the wheat has to be drilled into the ground. The winds we have faced can sweep away the seeds nonetheless.

CoCoRaHS reports always mean a lot to us, but at times like these I'm so grateful for everyone who continues to enter their data despite the lack of moisture. We know precipitation does not fall the same on all of us, and we know that if you don't mark a zero we cannot be 100% confident that nothing fell. Continuing to track zeros through times of drought is key when it comes to understanding drought conditions. Every observer with a dot on this map had to file reports on 90% or more of the days covered.



CoCoRaHS Precipitation Accumulation Measurements: September 21st – October 20th.

Early Snow: For those who are new, you may have been blindsided by snow in the second week of September! Many of us squeezed out our earliest snow on record somehow in the midst of largely prevailing hot, dry conditions. As we can see in the map below, the snowfall was perhaps most extreme in the San Luis Valley. Bregman Field Airport in Alamosa recorded 15.2” of snowfall in two days. Not only was this the earliest snowstorm on record, it was a top-5 two-day accumulation all time.



24-hr snowfall totals in southern Colorado. September 9th, 2020.

For those who are new, the snowfall may have come as a bit of a shock from a measurement standpoint as well. I have linked some snow measurement training materials at the bottom of this newsletter.

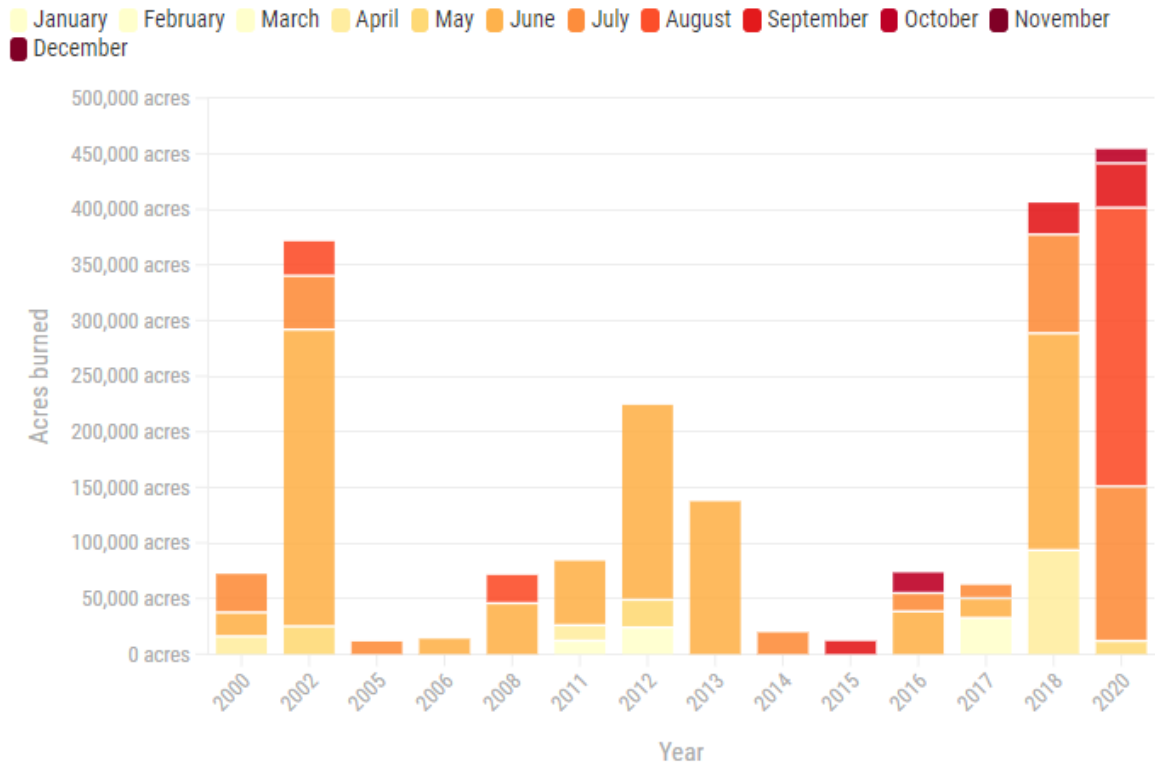
Wildfires: 2020 has become the largest wildfire season in Colorado history. My thoughts and prayers go out to any of you who may have experienced personal loss as a result. As recently as the late 1980's the largest fire we had ever measured in the state was the "I Do" fire. It burned less than 15,000 acres. We have been breathing smoke from the Cameron Peak Fire on the northern Front Range for two months now, and it's not going away. As of this afternoon, Cameron Peak Fire has consumed 205,004 acres and counting. It is roughly 1.5x larger than any other fire in Colorado history, and over 10x the size of the a "I do" fire.

When it comes to Colorado wildfires, 2020 has rewritten the script. We used to inform folks each year that our peak fire season is June, and we are most vulnerable when snow melts early. We seemed to have a good understanding of why. Rainfall averages dip in the early summer over much of our forested terrain, temperatures rise, and sunshine intensity peaks. This combination of factors creates a window for wildfires to form. By mid-July, the North American Monsoon kicks in, replenishing high elevation soil moisture. Beyond that, the sun hangs lower in the sky, and temperatures cool.

The 2020 fire season is unusually late

Large wildfires started later in 2020

Acres burned per year by the month in which the fire started



Source: [Rocky Mountain Area Coordination Center](#)

A Flourish chart

Colorado wildfire acreage burned by year and start month.

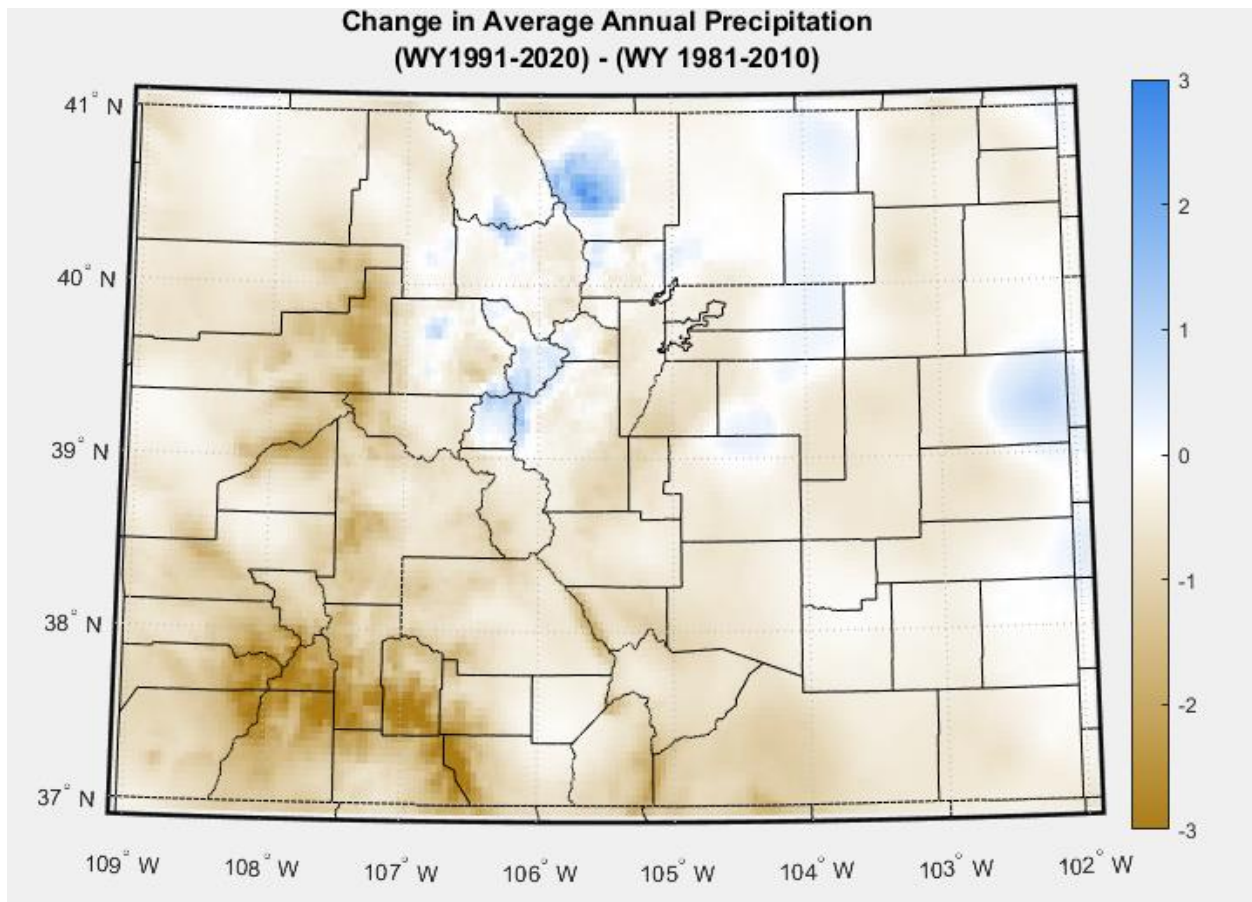
We did experience an early snowmelt this year, but June was relatively benign from a wildfire standpoint. Even as rainfall accumulations failed to reach normal values in July, no fires were started until the last day of the month. Then came July 31st, 2020. A lightning bolt struck the Pine Gulch area 18 miles north of Grand Junction. It was off to the races. By the end of August, it was the largest wildfire in Colorado history at 139,007 acres burned.

Even as the calendar rolled into September this year did not look like 2020 was going to rival 2002 and 2018 fire seasons. Even with a new largest fire on record in Pine Gulch, and Cameron Peak gaining steam in the Never Summer and Mummy Ranges, there really had not been very many fires in 2020. Besides, it was almost fall.

Of course the rest was history. Cameron Peak grew in large, stepwise chunks every time the wind picked up. A foot of September snow did not kill the blaze. It traveled all the way from the Continental Divide to

the doorstep of Colorado's Urban Corridor. The fire single-handedly burned over 10% of Larimer County. It is just 51% contained as of October 20th.

Is This the New Normal? "New normal" is a common phrase in the current zeitgeist due to COVID-19. It is bandied about quite a bit in weather and climate as well. Why? Well, "climate normals" are averages calculated using the most recent three complete decades. In January 2021 we will literally have new normals! These normals are typically computed using a typical calendar (January-December), but I jumped the gun and took a look at how things may change using the water year calendar (October-September). Here is a look at how our precipitation normals change when we kick out the 1980's and add the 2010's.

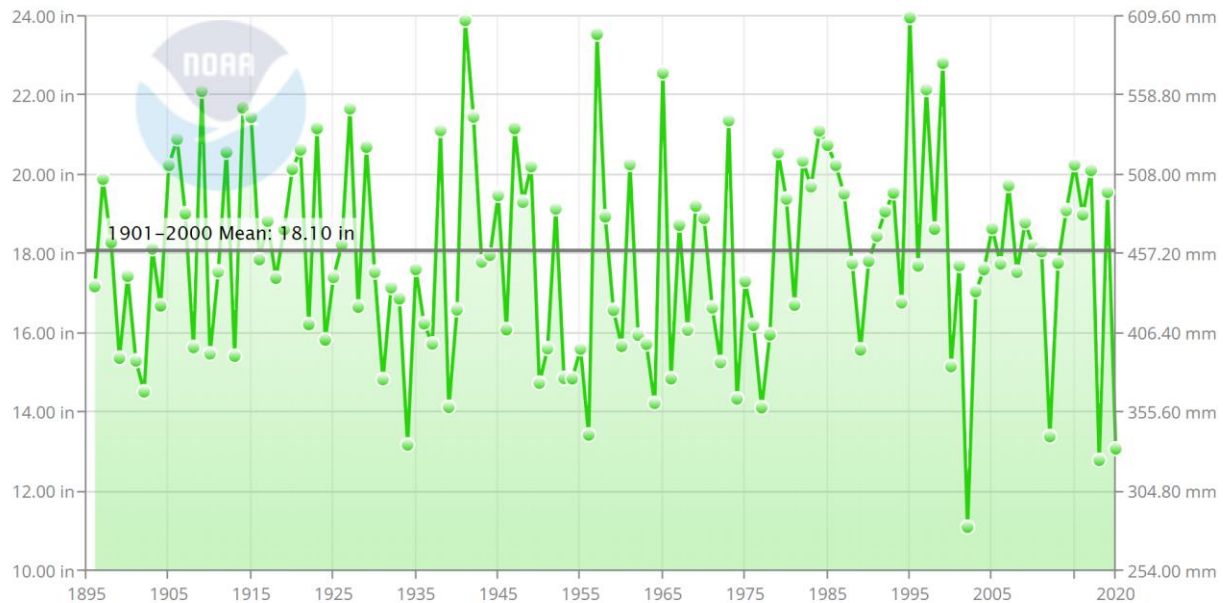


Difference in "Climate Normals" from 1981-2010 to 1991-2020. Source: nClimGrid.

Colorado experienced a relatively wet decade in the 1980's and a relatively dry decade in the 2010's, so it is unsurprising to see our normals drop. Meanwhile, much of the country will have wetter new normals. The last eight years have been wetter than normal CONUS-wide.

Changes in normals are as much about the decade you kick out as the one you usher in. 2015 was the wettest water year of the most recent decade in Colorado with a statewide average of 20.26" of precipitation. The 1980s had 4 years wetter than this, and a fifth only one hundredth of an inch behind.

Colorado Precipitation October–September



Colorado aerially-averaged precipitation by water year. Source: NOAA Climate at a Glance.

While interesting in its own right, none of this bookkeeping really gets to the heart of the question “is this the new normal?” Most folks who ask such a question are really asking, “will Colorado stay this arid (or worse) in a climate that is expected to warm?” It’s a good question. Drought, while disastrous, is something you ride out. Aridification, or drying over multiple decades, is not something we recover from on timescales useful to human beings. There’s no doubt droughts since the turn of the millennium have been worse than the decades preceding them. However, climate models do not give us any obvious answers about whether Colorado precipitation is expected to rise or fall in a warmer world. They hit at wetter winters. Warmer temperatures mean winter storms can hold more moisture. Summers may be drier, but are a great source of uncertainty.

The larger, more certain concern is that droughts in Colorado are becoming more temperature-driven. In a warmer climate our trees and plants must use water in the soil more rapidly to keep up with atmospheric evaporative demand. A bump in precipitation would be necessary to preserve balance. The area scarred by the Cameron Peak Fire will have wetter climate normals in the coming decade, and actually recorded above normal snowpack just this year.

Snow Continued: I’ve never been more keen on the idea of a white Christmas. Anything that can stop the smoke would be a welcome change of pace. That said, many of you who signed up this year have taken only one snow measurement so far. Measuring snow correctly is a little less straight forward than rain, but not so intimidating once you get the hang of it. If you have any questions about measuring snowfall please feel free to refer to one of several training materials linked here, or just send me an email. It’s always a delight to interact with a fellow CoCoRaHS observer:

YouTube Training Series: https://www.youtube.com/channel/UCaKwzgzBIG2n_nTLuObUtFA

"In-Depth" Snow Measurement PDF:

https://www.cocorahs.org/Content.aspx?page=training_slideshows

That's all for now! Best of wishes staying safe and staying sane through strange times.

Sincerely,

Peter Goble

Colorado CoCoRaHS Coordinator