

## *Summary*

# CLIMATE PROJECTIONS *in* SUMMIT COUNTY COLORADO



This report to Summit County, the Town of Breckenridge, the Town of Frisco, and the Northwest Colorado COG Water Quality/Quantity Committee identifies how different the local climate could be with different future levels of heat-trapping emissions. It is based on an analysis of 24 million individual projections from 20 climate models and four emission scenarios.

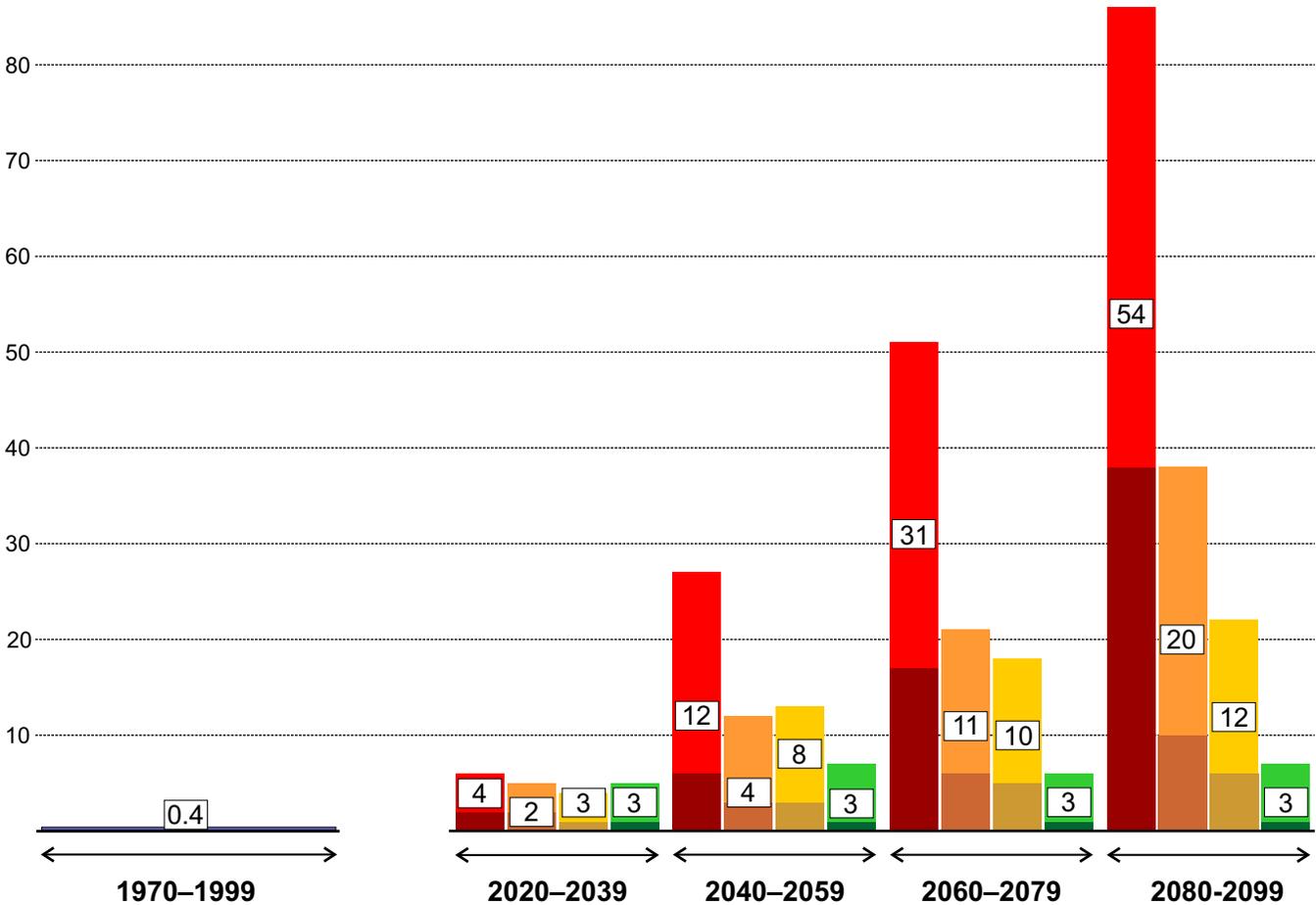
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*Organization*

August 2021

## Hotter Summers in Summit County

Climate models project that hot days could become much more frequent, depending on future heat-trapping emissions. High emissions (the red columns below) could push the Frisco/Dillon Reservoir to an average of 12 days a year 80° or hotter in mid-century, and 54 days late in the century. Reducing emissions to low levels (the green columns), though, would head off future increases. This shows both what Summit County has at stake and how much difference climate protection actions can make.

### Days 80° or hotter in the Frisco/Dillon Reservoir grid Typical years: Averages for each 20-year period



Four scenarios, from high to low emissions, illustrate possible futures with different levels of change to the climate. Which one turns out closest to reality depends on future public and private actions.

#### How the figures represent projections

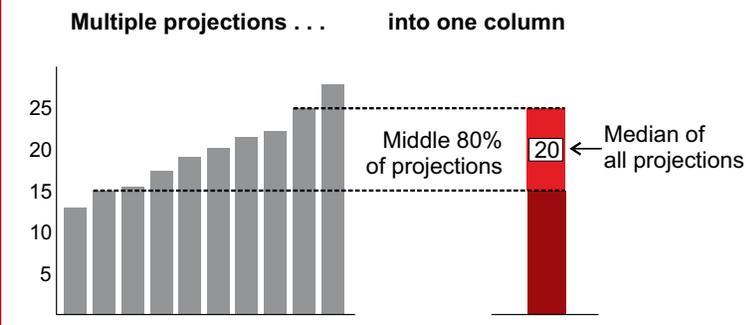


Figure 1, above: Projections are for 20-year periods, and in each for four scenarios: red columns, high heat-trapping emissions; orange and gold, medium levels; and green, low emissions.

Figure 2, left: For these figures, multiple model projections are combined into one column, with the top 10 percent and bottom 10 percent not shown. The bright color shows the range of the middle 80 percent. The mid-point of all projections is labeled.

## Days 80° or hotter in the Frisco/Dillon Reservoir grid

### Extremes: The hottest year in each 20-year period

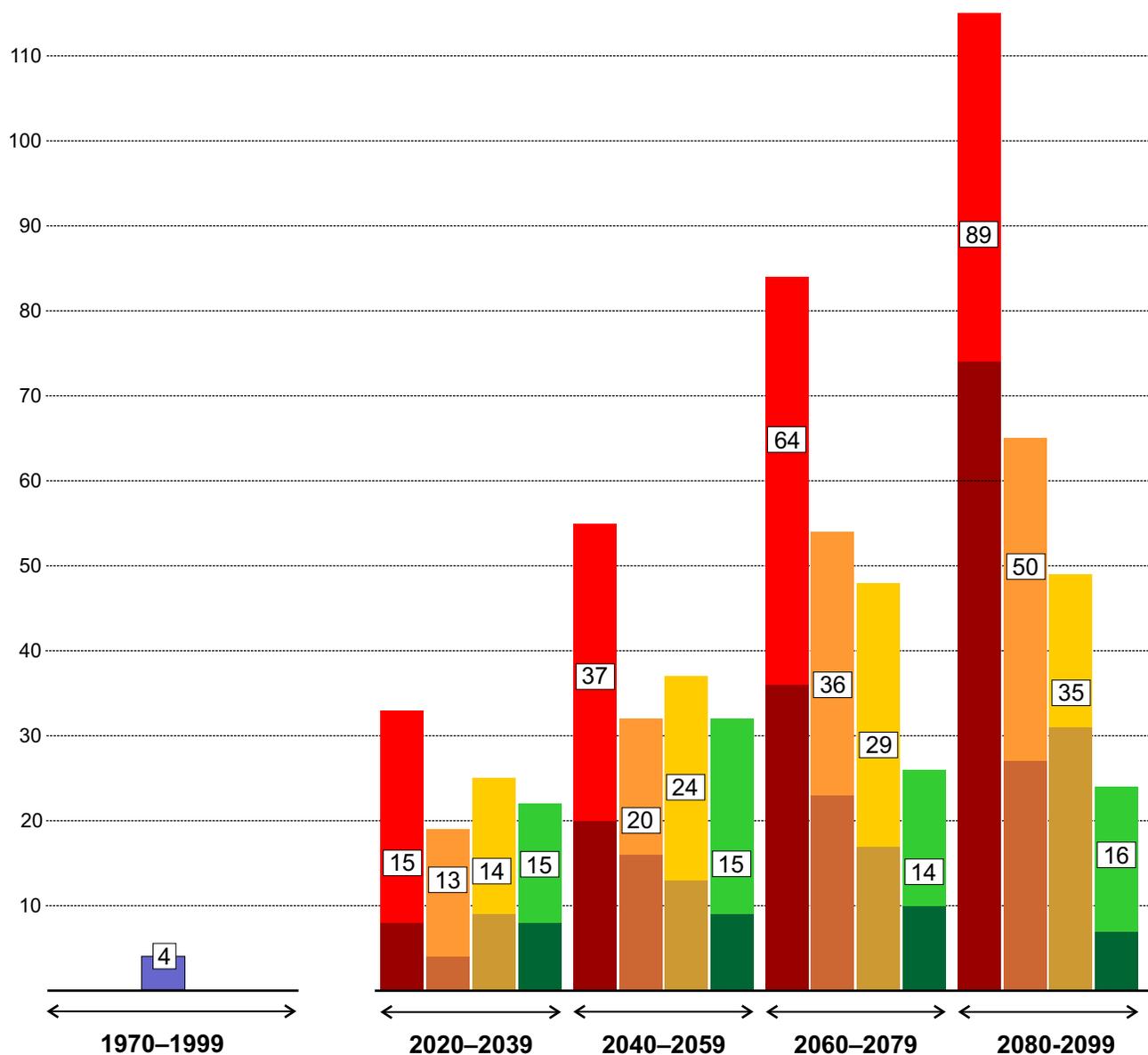


Figure 3. As Figure 1, but for the hottest individual year projected for each 20-year period.

Figure 1 on the previous page shows projections for *typical* years—in other words, the average annual frequency projected for each of four 20-year periods. Figure 3 above shows instead projections for *extreme* years—the hottest individual year in each of those 20-year periods.

With future **high emissions**, the median projection is that in mid-century the hottest year would have 37 days 80° and hotter—compared to four, the highest number in 1970–1999. In late century, the extreme year could have 89 of those days—a full summer's worth.

But instead with **low emissions**, temperatures would not keep climbing after 2020–2039. Typical years (on the previous page) would continue averaging about three 80°-plus days across the full century. Extreme years (above) would have 14 to 16 of those days—more than in 1970–1999, but much less of a change than with either high or medium emissions.

## Hottest days of the year

In the **Frisco/Dillon Reservoir area** with **high emissions**, the **hottest day of the year** (79° in the recent past) could in mid-century typical years average 85°, and in the extreme year be 88°. Late in the century, the average in typical years could be 88° and the extreme year's hottest day be 94°.

Because the town of Frisco is at a lower elevation than the average elevation of the grid (which is 18 miles by 14 miles), the town itself would be about 3° hotter than these projections for the overall grid.

## Warmer winters and earlier springs

In the higher-elevation **Breckenridge/Quandary area** (including the ski resort), the percentage of **days above freezing in the core snow/ski season**, from November 15 through April 15, with **high emissions**:

- In mid-century typical years, could average just over half of those days being above freezing (compared to 38 percent in the recent past); in the hottest year, 69 percent of those days.
- Late-century typical years could average 70 percent, and the extreme year could have 80 percent.

**Spring days 40° or hotter** are warm enough for snowmelt and slushy skiing. For March 16 through April 15, about the last month of the snow/skiing season, they are projected with **high emissions**:

- In mid-century typical years, to be almost half of those days (compared to a historical average of nine out of those 31 days), and in extreme years to be three-quarters of the days.
- Late in the century, typical years could have two-thirds and the extreme year four-fifths of those days that warm.

## More heavy storms

Days with everyday amounts of rain or snow are projected to become less frequent, and heavier storms more frequent. In the **Vail Pass/North Tenmile Creek area** with **high emissions**, in mid-century:

- **Everyday wet days**, with less than 1/4 inch precipitation, are projected to average 4 percent less frequent, compared to the baseline.
- **Storms of 1/4 inch to 1/2 inch**, 15 percent more frequent.
- **Storms of 1/2 inch or more**, in mid-century, 18 percent more frequent.

## Sharp emission reductions halt temperature changes

The good news from this report is that it shows that sharply reducing global emissions can keep climate changes from becoming any more severe than the relatively modest changes projected to occur in the current period of 2020–2039, as illustrated in the figures on the previous two pages.

According to many scientific assessments, the impacts of the potential climate changes, especially with high future emissions, could include more widespread and frequent wildfires, more wildfire smoke, more debris flows from heavy storms falling on burned areas, shorter and slushier ski seasons, reduced water supplies, fewer opportunities for fishing and other outdoor recreation, and more beetle-killed trees. Along with that existing scientific information, these new climate projections show what Summit County communities have at stake—how much the local climate and the local quality of life could change—if heat-trapping emissions are allowed to continue increasing. The projections also underscore how much the local climate can be protected and the worst impacts of climate change prevented, if global emissions are sharply reduced.

Read the full report at  
[www.rockymountainclimate.org/extremes/summit](http://www.rockymountainclimate.org/extremes/summit)