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Large Increases in Extreme Heat in Boulder and Larimer Counties Projected, Depend on Future Levels of Heat-Trapping Emissions

Louisville – The Rocky Mountain Climate Organization (RMCO) today released projections showing large increases in the frequency and extent of extremely hot days in Boulder and Larimer counties, with the extent depending on whether global heat-trapping emissions continue on a high trajectory or are reduced.

“On our current path of steadily increasing heat-trapping emissions, Boulder by the middle of the century is projected to average 38 days a year 95° or hotter. By late in the century, an average of two and a half months of 95°-plus days are projected—75 a year. For Fort Collins, the projections are for 24 days by mid-century and 58 days late in the century. For either place, this would be fundamentally different from the climate we know here,” said Stephen Saunders, president of RMCO.

The projections also address future precipitation extremes. Although projections for precipitation are more uncertain than for temperature, the models suggest that heavy storms may become more frequent.

“This shows why we need preparedness actions to address the impacts we could face, from more wildfires and possibly more floods to more heat waves that can threaten people’s health and even lives,” Saunders said. “It also powerfully illustrates how important it is to reduce future emissions to keep the extent of climate change within manageable limits.”

The following projections show the medians of the projections from multiple climate models, based on two possible levels of future heat-trapping emissions—continued high increases as in recent years, reflecting a business-as-usual approach, and very low increases, reflecting rapid and sustained global reductions in emissions. The projections are shown for mid-century (2050–2059) and late in the century (2080–2099). The full

report, however, analyzes two other medium-level emissions scenarios, and two other time periods, 2020–2039 and 2060 – 2079.

Boulder County projections

Days per year with high temperatures of **95° or hotter**:

- In 1970 – 1999, averaged five occurrences per year.
- With high continued growth in global heat-trapping emissions, in mid-century (2040 – 2059) are projected to average 38 times per year and by late in the century (2080 – 2099) to average 75 days per year.
- With very low emissions instead, are projected to average 20 times in mid-century and 18 times late in the century.

Days with high temperatures of **100° or hotter**:

- In 1970 – 1999, averaged less than one occurrence per year.
- With high emissions, in mid-century are projected to average 8 times per year and by late in the century 35 times per year.
- With very low emissions instead, are projected instead to average twice a year in both time periods.

The average temperature of the **30 hottest days in a year**:

- In 1970 – 1999, averaged 93°.
- With high emissions, in mid-century is projected to average 99°, and late in the century 104°.
- With very low emissions, is projected instead to average 97° in both time periods.

Storms with less than a quarter-inch of precipitation in a day are projected to have little change in their frequency, regardless of emissions levels. **Storms of a half-inch of precipitation or more** in a day:

- With high emissions, are projected by mid-century to become 16 percent more frequent, and by late in the century 36 percent more frequent.
- With very low emissions instead, are projected to average 22 percent more frequent by mid-century and 19 percent more by late in the century.

Larimer County projections

Days per year with high temperatures of **95° or hotter**:

- In 1970 – 1999, averaged two occurrences per year.

- With high continued growth in global heat-trapping emissions, in mid-century (2040 – 2059) are projected to average 24 times per year and by late in the century (2080 – 2099) to average 58 times per year.
- With very low emissions instead, are projected to average 10 times in both time periods.

Days with high temperatures of **100° or hotter**:

- In 1970 – 1999, averaged less than one occurrence per year.
- With high emissions, in mid-century are projected to average 4 times per year and by late in the century 23 times per year.
- With very low emissions instead, are projected instead to average once a year in both time periods.

The average temperature of the **30 hottest days in a year**:

- In 1970 – 1999, averaged 91°.
- With high emissions, in mid-century is projected to average 98°, and late in the century 103°.
- With very low emissions, is projected instead to average 95° in both time periods.

For precipitation in Larimer County mountains, storms with less than a quarter-inch of precipitation in a day are projected to have little change in their frequency, regardless of emissions levels. **Storms of a half-inch of precipitation or more** in a day:

- With high emissions, are projected by mid-century to become 12 percent more frequent, and by late in the century 33 percent more frequent.
- With very low emissions instead, are projected to average 21 percent more frequent by mid-century and 15 percent more by late in the century.

RMCO analyzed 44 million individual projections for daily temperature and precipitation values for four locations: Boulder and vicinity, Boulder County mountains, Fort Collins and vicinity, and Larimer County mountains. The projections are from the latest generation of downscaled global climate models. A projection for an individual day does not have any particular value, but enough of them over a sufficient period of time enables analysis of how often particular conditions are projected to occur in that period.

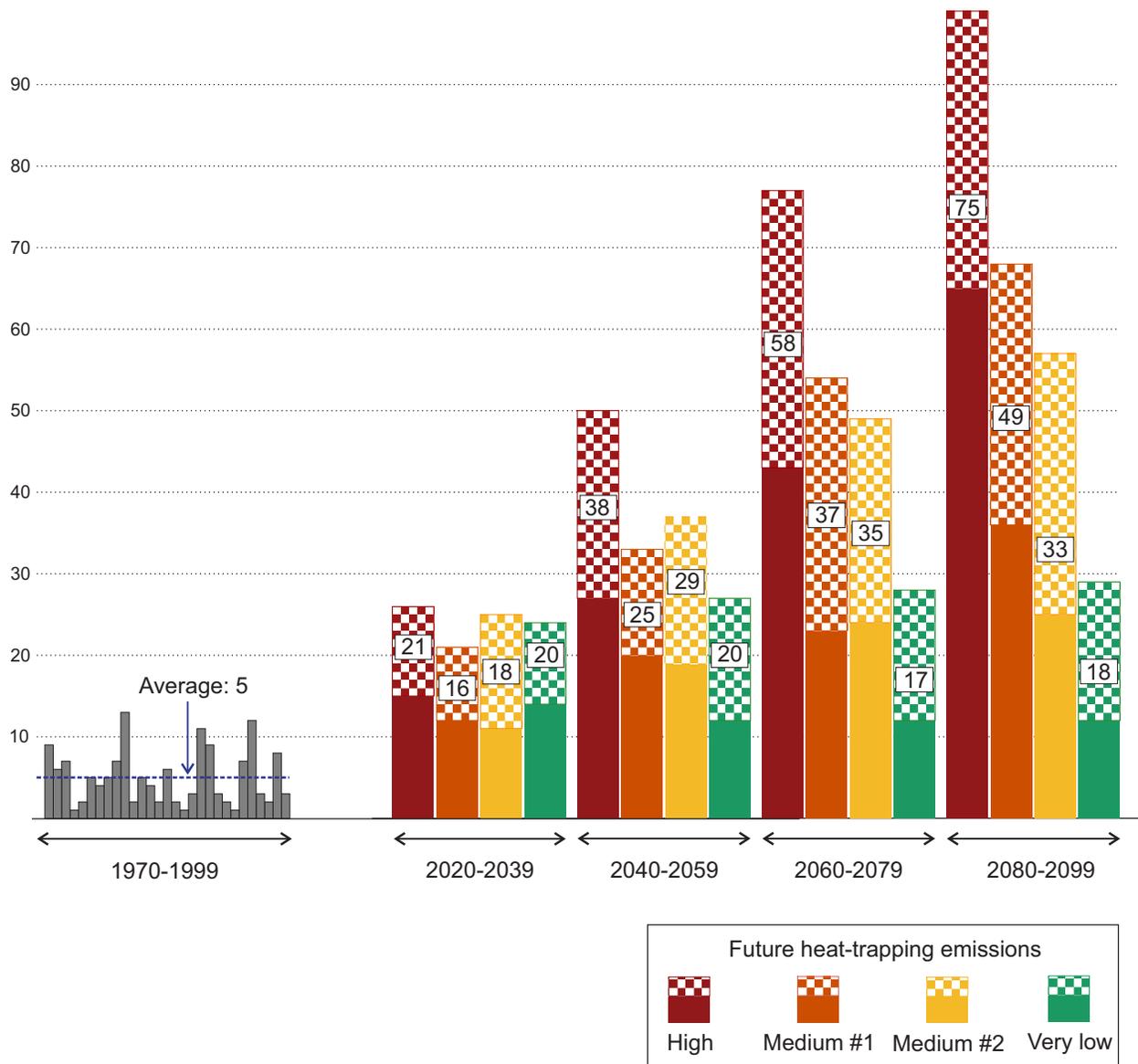
The reports were funded by the Colorado Department of Local Affairs, using Community Development Block Grant—Disaster Recovery funding through the Resilience Planning Program. Boulder and Larimer counties were heavily affected by the High Park wildfire in 2012 and the September 2013 flooding that led to federal disaster designations. The purpose of the reports is to help local governments in these two counties better

understand and prepare for the increased risks of wildfire and flooding expected to come with further climate change.

Copies of the reports and additional information are available at www.rockymountainclimate.org/extremes/boulder.htm and www.rockymountainclimate.org/extremes/larimer.htm.

Below is a figure from the Boulder County report.

Boulder and vicinity: Number of 95°-plus days per year



Explanation: The number of days per year with daily highs of 95° and hotter in Boulder and vicinity. The left side of the figure shows actual values for 1970–1999. The right side of the

figure shows projections for four 20-year periods, and within each time period by four different scenarios with varying assumptions for future levels of heat-trapping emissions, from high to very low. In each projection column, the median of all projections is shown numerically, the checkered portion shows the range from the 10th to the 90th percentile of the projections, and so the top of the solid portion shows the number of days projected by 90 percent of all the models.