

1 Climate Report for Carter County

2 Historical Climate Trends for Carter County

Climate has changed over the last 50 years in Carter County. In this analysis, we use [GridMet](#) meteorology to look at trends in climate in Carter County since 1979. We do this analysis for precipitation, max. relative humidity, and reference et in the section below.

2.1 Historical Trends in Precipitation in Carter County

Between 1979 and 2020, there has been a statistically significant change in precipitation of 1.36 inches per decade at an annual timescale. When looking at monthly data, there have been significant changes in precipitation in February (0.1 inches per decade) and August (0.2 inches per decade). Below, annual trends in precipitation are plotted for the GridMet period of record.

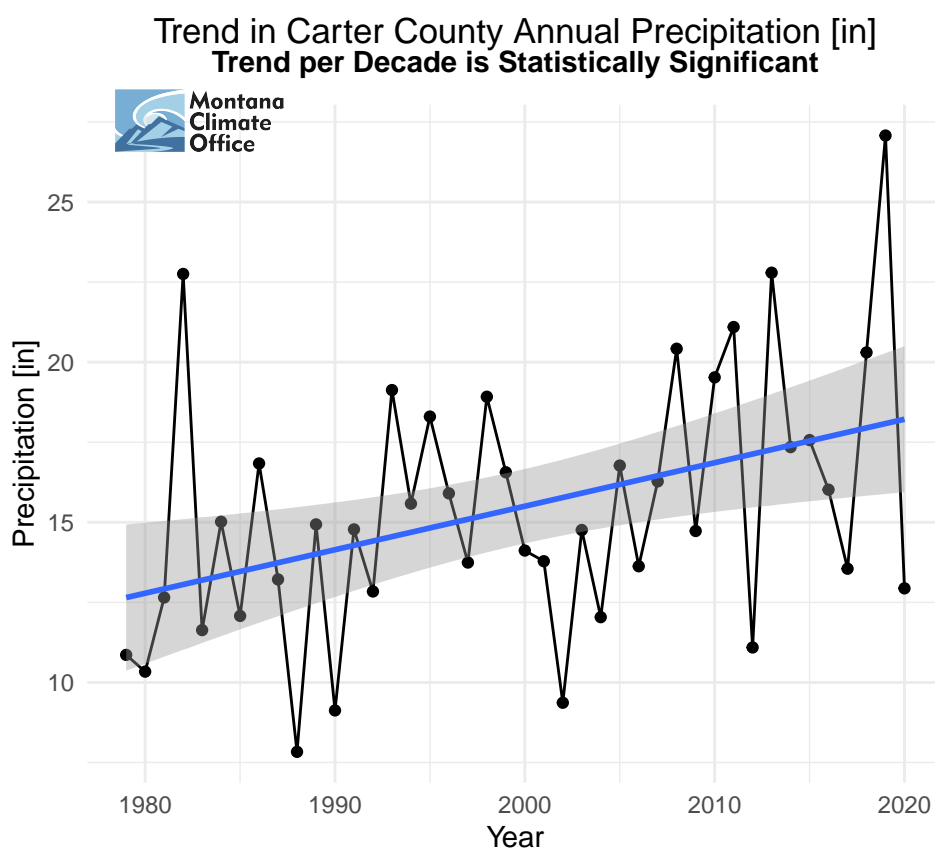


Figure 1: Historical Annual Precipitation Trends Across Carter County

2.2 Historical Trends in Max. Relative Humidity in Carter County

Between 1979 and 2020, there has been no statistically significant change in max. relative humidity in Carter County at an annual timescale. When looking at monthly data, there have been significant changes in max. relative humidity in March (-1.49 percent per decade), August (-1.51 percent per decade), and November (-1.1 percent per decade). Below, annual trends in max. relative humidity are plotted for the GridMet period of record.

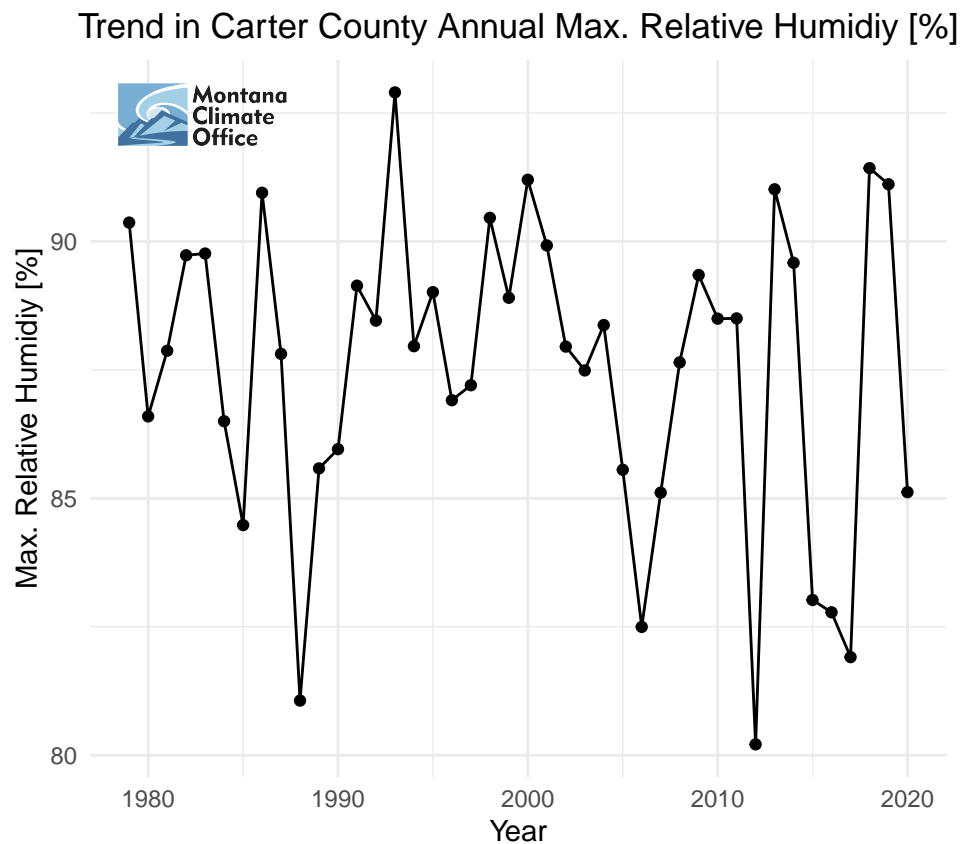


Figure 2: Historical Annual Max. Relative Humidity Trends Across Carter County

2.3 Historical Trends in Reference ET in Carter County

Between 1979 and 2020, there has been no statistically significant change in reference et in Carter County at an annual timescale. When looking at monthly data, there has also been no significant trend in reference et across the same time period. Below, annual trends in reference et are plotted for the GridMet period of record.

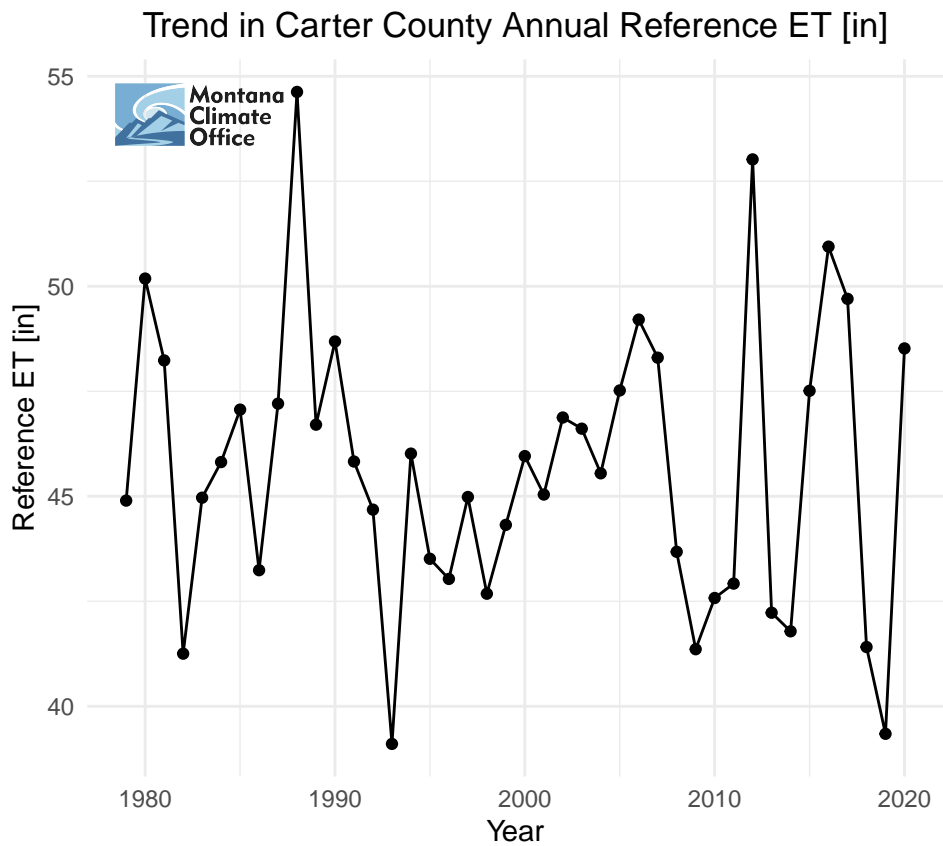


Figure 3: Historical Annual Reference Et Trends Across Carter County

3 Future Climate Projection for Carter County

3.1 Projected Annual Changes in Reference ET in Carter County

Between 1950 and 2099, it is projected that under the middle of the road emissions scenario, reference et will increase at a rate of 0.41 inches per decade and under the high emissions emissions scenario, reference et will increase at a rate of 0.41 inches per decade. Below, a timeseries plot shows projected changes in reference et under these different emission scenarios.

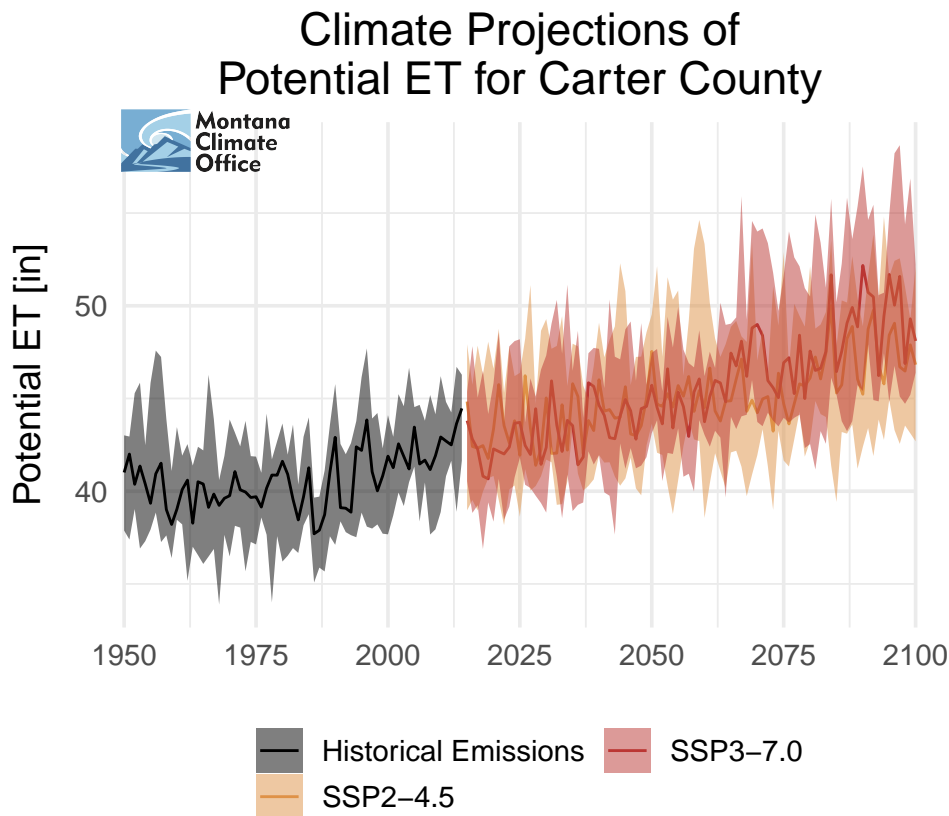


Figure 4: Projected Timeseries Of Annual Reference Et In Carter County

Table 1: Projected Monthly Reference Et Changes In Carter County

| Month | SSP2-4.5 | SSP3-7.0 |
|-----------------------------------|----------|----------|
| Mid Century (2040-2069) | | |
| Jan | 0.07 | 0.06 |
| Feb | 0.07 | 0.10 |
| Mar | 0.13 | 0.11 |
| Apr | 0.16 | 0.16 |
| May | 0.29 | 0.20 |
| Jun | 0.42 | 0.37 |
| Jul | 0.42 | 0.35 |
| Aug | 0.52 | 0.53 |
| Sep | 0.36 | 0.45 |
| Oct | 0.26 | 0.30 |
| Nov | 0.07 | 0.10 |
| Dec | 0.06 | 0.09 |
| End-of-Century (2070-2099) | | |
| Jan | 0.16 | 0.06 |
| Feb | 0.27 | 0.16 |
| Mar | 0.29 | 0.49 |
| Apr | 0.21 | 0.40 |
| May | 0.50 | 0.79 |
| Jun | 0.81 | 0.72 |
| Jul | 0.72 | 0.99 |
| Aug | 0.66 | 1.36 |
| Sep | 0.81 | 1.31 |
| Oct | 0.38 | 0.79 |
| Nov | 0.07 | 0.14 |
| Dec | 0.00 | 0.09 |

3.2 Projected Monthly Changes in Reference ET in Carter County

In addition to changing at annual time scales, reference et is also projected to change at the monthly scale. By mid century (2040-2069), Aug is projected to see the largest increase in reference et (0.52 inches) under the ssp2-4.5 scenario relative to the 1991 - 2020 baseline and Aug is projected to see the largest increase in reference et (0.53 inches) under the ssp3-7.0 scenario relative to the 1991 - 2020 baseline. By end-of-century (2070-2099), Jun is projected to see the largest increase in reference et (0.81 inches) under the ssp2-4.5 scenario relative to the 1991 - 2020 baseline and Aug is projected to see the largest increase in reference et (1.36 inches) under the ssp3-7.0 scenario relative to the 1991 - 2020 baseline.. Below, a table and graph showing changes in reference et for the SSP2-4.5 and SSP3-7.0 scenarios is provided to give a monthly breakdown of projected changes.

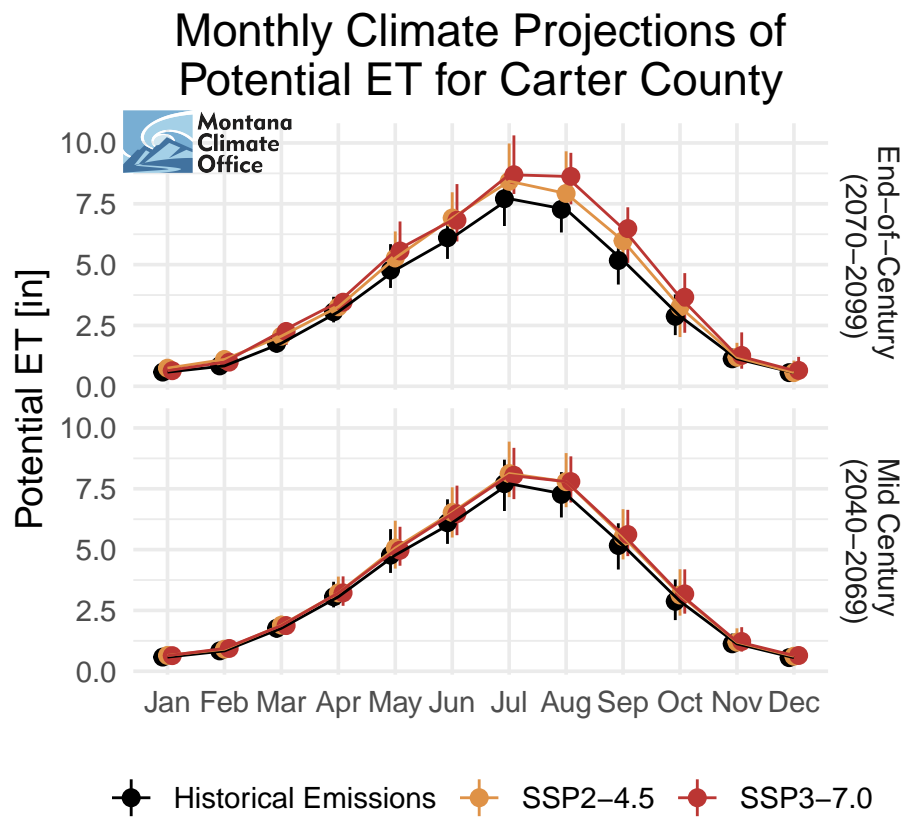


Figure 5: Projected Monthly Reference Et Changes In Carter County

3.3 Projected Annual Changes in Temperature in Carter County

Between 1950 and 2099, it is projected that under the middle of the road emissions scenario, temperature will increase at a rate of 0.36 degF per decade and under the high emissions emissions scenario, temperature will increase at a rate of 0.36 degF per decade. Below, a timeseries plot shows projected changes in temperature under these different emission scenarios.

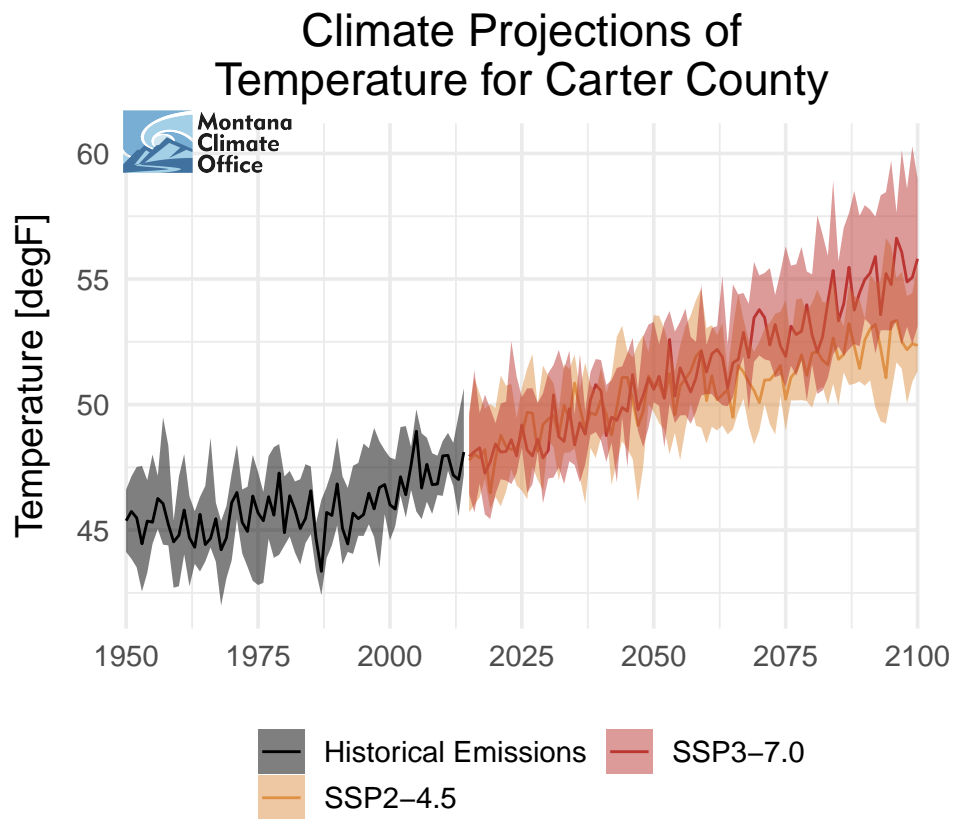


Figure 6: Projected Timeseries Of Annual Temperature In Carter County

3.4 Projected Monthly Changes in Temperature in Carter County

In addition to changing at annual time scales, temperature is also projected to change at the monthly scale. By mid century (2040-2069), Jul is projected to see the largest increase in temperature (4.13 degF) under the ssp2-4.5 scenario relative to the 1991 - 2020 baseline and Aug is projected to see the largest increase in temperature (5.06 degF) under the ssp3-7.0 scenario relative to the 1991 - 2020 baseline. By end-of-century (2070-2099), Sep is projected to see the largest increase in temperature (6.8 degF) under the ssp2-4.5 scenario relative to the 1991 - 2020 baseline and Aug is projected to see the largest increase in temperature (11.9 degF) under the ssp3-7.0 scenario relative to the 1991 - 2020 baseline.. Below, a table and graph showing changes in temperature for the SSP2-4.5 and SSP3-7.0 scenarios is provided to give a monthly breakdown of projected changes.

Table 2: Projected Monthly Temperature Changes In Carter County

| Month | SSP2-4.5 | SSP3-7.0 |
|-----------------------------------|----------|----------|
| Mid Century (2040-2069) | | |
| Jan | 3.93 | 4.43 |
| Feb | 3.17 | 4.64 |
| Mar | 2.07 | 2.67 |
| Apr | 2.59 | 3.05 |
| May | 2.63 | 2.87 |
| Jun | 3.02 | 3.65 |
| Jul | 4.13 | 3.97 |
| Aug | 3.94 | 5.06 |
| Sep | 3.70 | 4.77 |
| Oct | 3.64 | 3.71 |
| Nov | 2.93 | 3.22 |
| Dec | 3.11 | 4.10 |
| End-of-Century (2070-2099) | | |
| Jan | 6.25 | 5.37 |
| Feb | 6.34 | 7.50 |
| Mar | 3.99 | 6.09 |
| Apr | 3.00 | 6.15 |
| May | 4.53 | 7.88 |
| Jun | 3.69 | 7.51 |
| Jul | 5.65 | 9.44 |
| Aug | 6.24 | 11.90 |
| Sep | 6.80 | 11.44 |
| Oct | 6.46 | 7.48 |
| Nov | 4.42 | 6.10 |
| Dec | 4.85 | 8.91 |

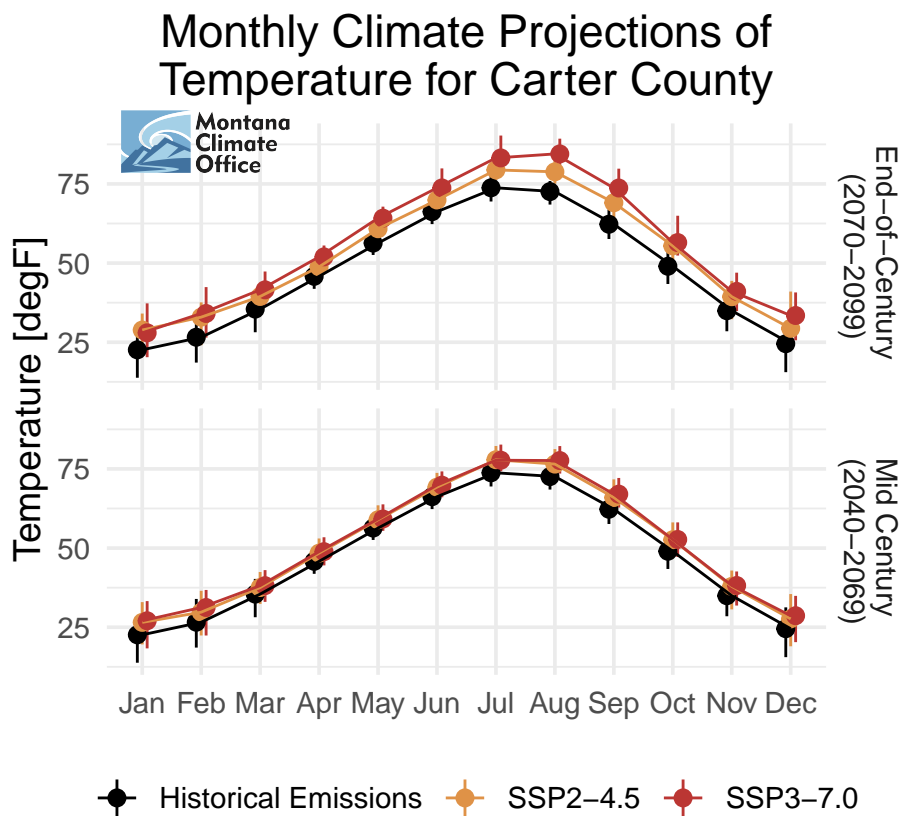


Figure 7: Projected Monthly Temperature Changes In Carter County

3.5 Projected Annual Changes in Max. Temperature in Carter County

Between 1950 and 2099, it is projected that under the middle of the road emissions scenario, max. temperature will increase at a rate of 0.33 degF per decade and under the high emissions emissions scenario, max. temperature will increase at a rate of 0.33 degF per decade. Below, a timeseries plot shows projected changes in max. temperature under these different emission scenarios.

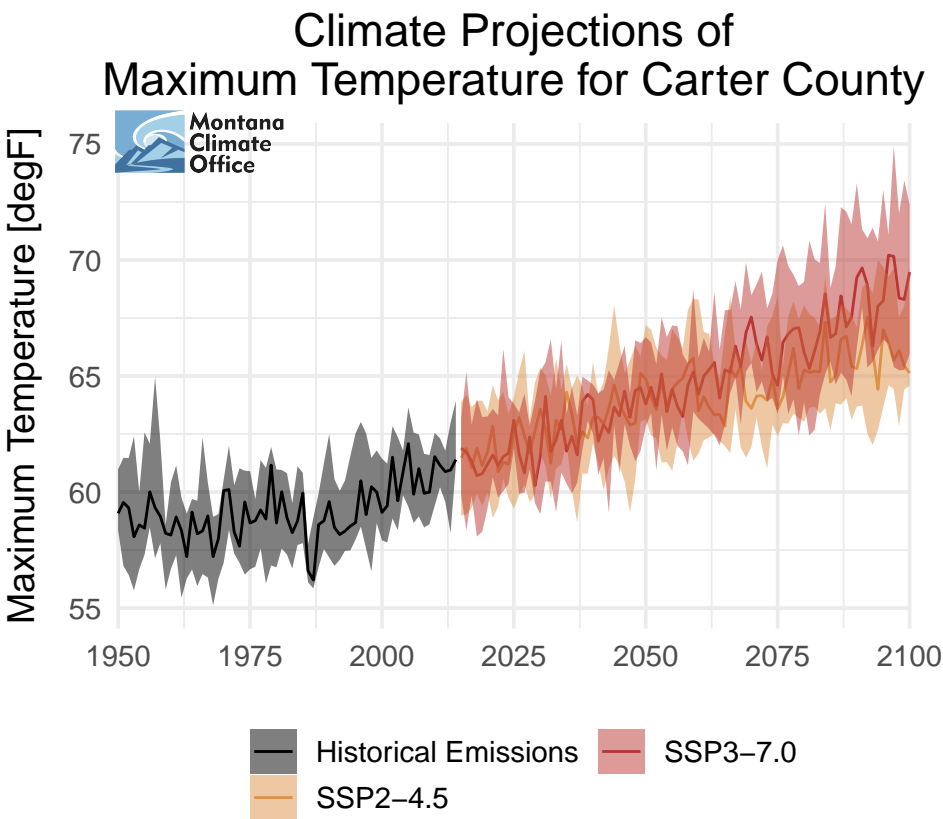


Figure 8: Projected Timeseries Of Annual Max. Temperature In Carter County

Table 3: Projected Monthly Max. Temperature Changes In Carter County

| Month | SSP2-4.5 | SSP3-7.0 |
|-----------------------------------|----------|----------|
| Mid Century (2040-2069) | | |
| Jan | 3.09 | 2.97 |
| Feb | 3.40 | 4.24 |
| Mar | 2.63 | 3.06 |
| Apr | 2.52 | 2.74 |
| May | 3.05 | 2.84 |
| Jun | 3.40 | 3.28 |
| Jul | 3.88 | 3.66 |
| Aug | 4.26 | 4.91 |
| Sep | 3.53 | 4.50 |
| Oct | 3.81 | 3.95 |
| Nov | 4.09 | 4.13 |
| Dec | 3.28 | 3.55 |
| End-of-Century (2070-2099) | | |
| Jan | 5.46 | 3.82 |
| Feb | 7.32 | 7.34 |
| Mar | 5.64 | 6.81 |
| Apr | 2.25 | 5.88 |
| May | 4.72 | 8.69 |
| Jun | 5.48 | 6.85 |
| Jul | 6.01 | 8.84 |
| Aug | 6.46 | 12.33 |
| Sep | 6.91 | 12.28 |
| Oct | 7.86 | 8.25 |
| Nov | 5.77 | 6.73 |
| Dec | 3.06 | 7.32 |

3.6 Projected Monthly Changes in Max. Temperature in Carter County

In addition to changing at annual time scales, max. temperature is also projected to change at the monthly scale. By mid century (2040-2069), Aug is projected to see the largest increase in max. temperature (4.26 degF) under the ssp2-4.5 scenario relative to the 1991 - 2020 baseline and Aug is projected to see the largest increase in max. temperature (4.91 degF) under the ssp3-7.0 scenario relative to the 1991 - 2020 baseline. By end-of-century (2070-2099), Oct is projected to see the largest increase in max. temperature (7.86 degF) under the ssp2-4.5 scenario relative to the 1991 - 2020 baseline and Aug is projected to see the largest increase in max. temperature (12.33 degF) under the ssp3-7.0 scenario relative to the 1991 - 2020 baseline.. Below, a table and graph showing changes in max. temperature for the SSP2-4.5 and SSP3-7.0 scenarios is provided to give a monthly breakdown of projected changes.

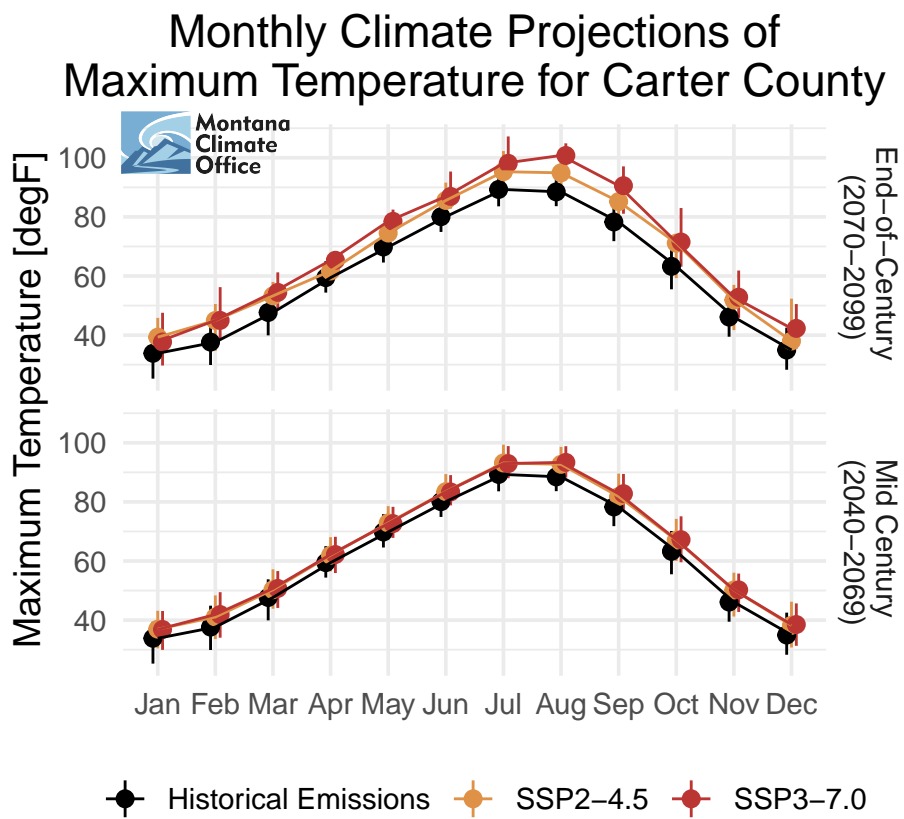


Figure 9: Projected Monthly Max. Temperature Changes In Carter County