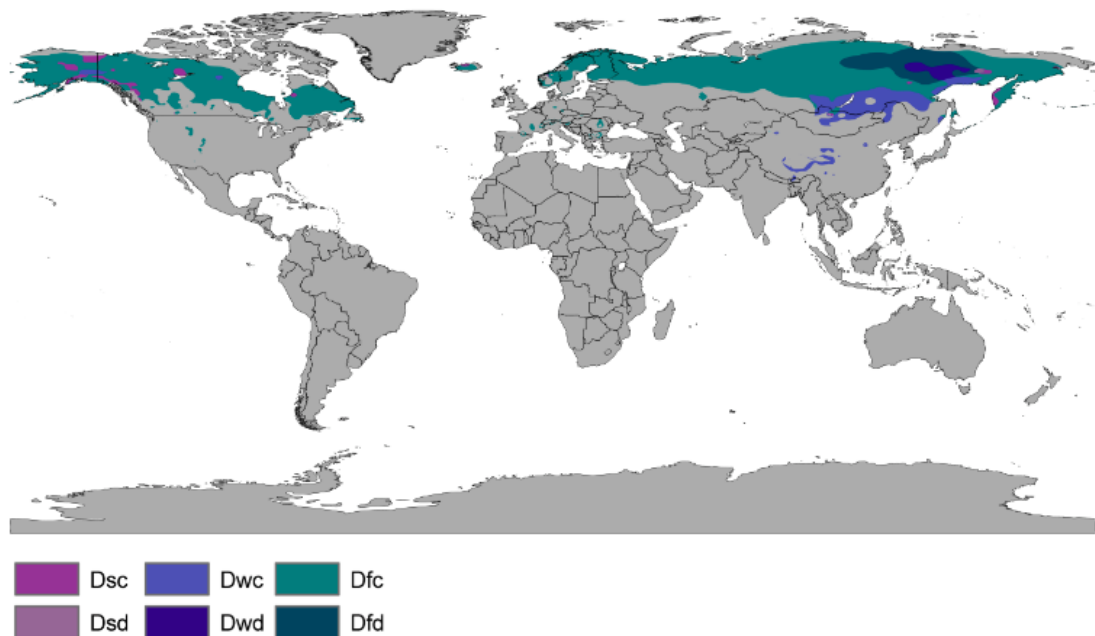


## 11.0 RULE 6.4.11: EXHIBIT K-CLIMATE

### 11.1 CLIMATE TYPE

Leadville is the southern-most region with an alpine subarctic climate (Dfc) with cold winters and mild summers, bordering on a cold semi-arid climate (Bsk). See **Figure 11-1**. The subarctic climate (also called subpolar climate, or boreal climate) is a climate with long, cold (often very cold) winters, and short, warm to cool summers. It is found on large landmasses, often away from the moderating effects of an ocean, generally at latitudes from 50° to 70°N, poleward of the humid continental climates. Subarctic or boreal climates are the source regions for the cold air that affects temperate latitudes to the South in winter. These climates represent Köppen climate classification Dfc, Dwc, Dsc, Dfd, Dwd and Dsd.

**Figure 11-1: Global Dfe Climate Areas**



In the most common subarctic climate Dfc, the coldest month averages below 0°C and 1–3 months average above 10°C. There is no significant precipitation difference between seasons. These are generally dry climates but there is little evaporation due to the cold temperatures.

## 11.2 PRECIPITATION

Average annual precipitation is 13.35in (339.1mm). As shown in **Table 11-1**, the average precipitation from Jan 2018 to Jun 2023 is 14.72in (373.9mm). The wettest calendar year was 2014 (see **Figure 11-2**) with 18.08in (459.2mm) and the driest 1994 with 8.27in (210.1mm). The most precipitation in one month was 4.83in (122.7mm) in January 1996. The most precipitation in 24 hours was 1.70in (43.2mm) on February 13, 1986. Average annual snowfall is 156.9in (3.99m). The most snowfall in one year was 247.9in (6.30m) in 1996. The most snowfall in one month was 64.1in (1.63m) in April 1995.

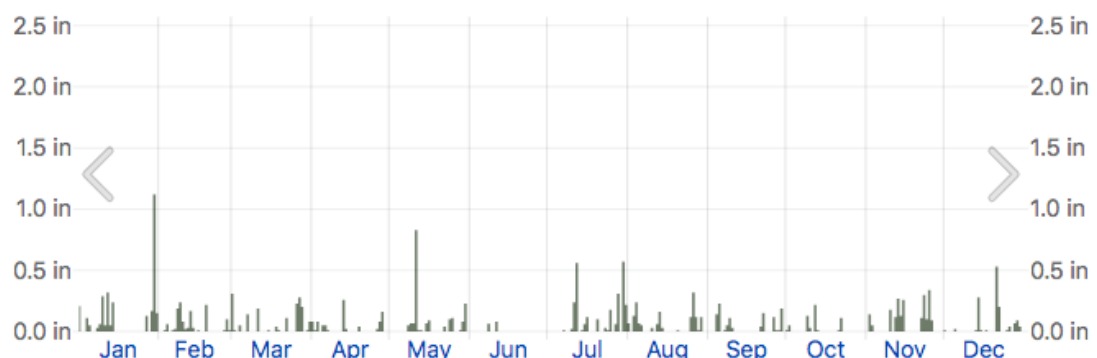
Average annual precipitation in the high mountainous regions generally exceeds 40in per year Leadville average rainfall precipitation is approximately 12in whereas snow fall averages over 140in. Average annual lake evaporation for Leadville ranges between 35 and 45in per year.

**TABLE 11-1: AVERAGE ANNUAL PRECIPITATION (INCHES) (JAN 2018 – JUN 2023)**

Description	Annual Total	Annual Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Normal	13.35	1.11	0.99	0.91	1.02	1.36	1.06	0.82	1.72	1.70	1.13	0.90	0.86	0.88
Avg 2018-2023	14.72	1.23	0.77	1.31	1.51	1.46	1.38	0.95	2.03	1.36	0.76	0.95	1.14	1.11
2018	12.31	1.03	0.84	0.94	0.54	2.09	0.37	0.77	1.30	0.91	0.75	1.38	1.93	0.49
2019	16.41	1.37	1.11	1.01	3.57	1.78	2.85	0.89	0.50	0.83	0.31	1.21	0.95	1.40
2020	15.13	1.26	0.79	2.93	1.18	1.18	1.20	1.07	1.88	0.93	0.97	0.43	1.31	1.26
2021	15.42	1.29	0.40	1.29	1.50	1.22	1.23	0.93	3.64	1.70	0.46	0.60	0.77	1.68
2022	15.27	1.27	0.72	1.08	0.96	1.08	1.30	1.00	2.81	2.42	1.32	1.15	0.72	0.71
2023	6.43	1.07	0.73	0.63	1.32	1.38	1.31	1.06	NO DATA					

Source: NOAA, 2023

**Figure 11-2: 2014 Daily Precipitation**

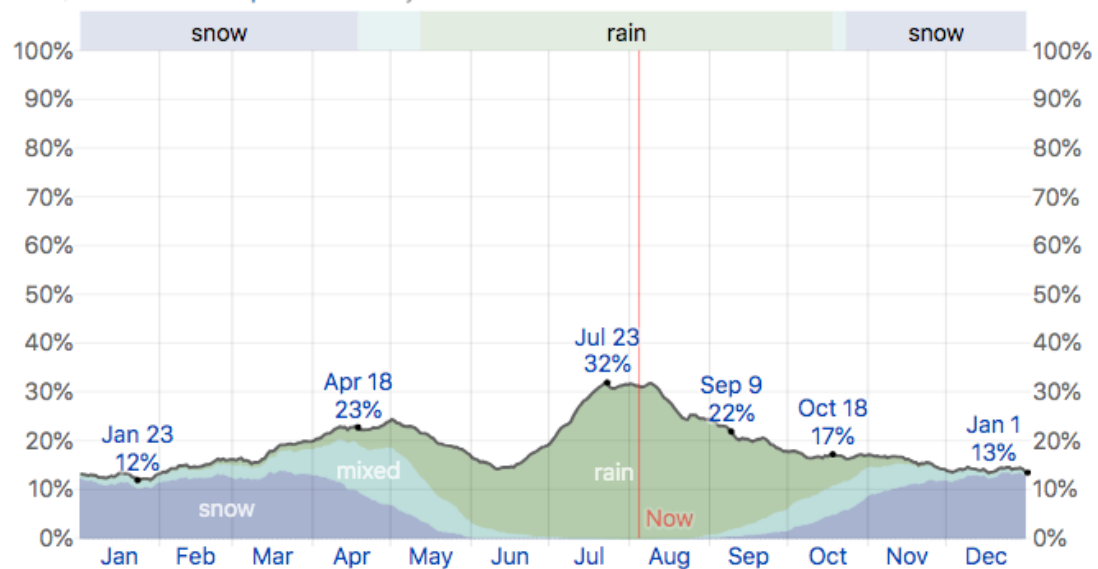


Daily measured quantity of liquid or liquid-equivalent precipitation.

Source: weatherspark.com, 2023

A wet day is one with at least 0.04in of liquid or liquid-equivalent precipitation. The chance of wet days in Leadville shown in **Figure 11-3** varies throughout the year. The wetter season lasts 5.0 months, from April 8 to September 9, with a greater than 22% chance of a given day being a wet day.

**Figure 11-3: Daily Chance of Precipitation**



Source: weatherspark.com, 2023

The month with the most wet days in Leadville is July, with an average of 8.7 days with at least 0.04in of precipitation. The drier season lasts 7.0 months, from September 9 to April 8. The month with the fewest wet days in Leadville is January, with an average of 3.9 days with at least 0.04in of precipitation. The most common form of precipitation in Leadville North changes throughout the year.

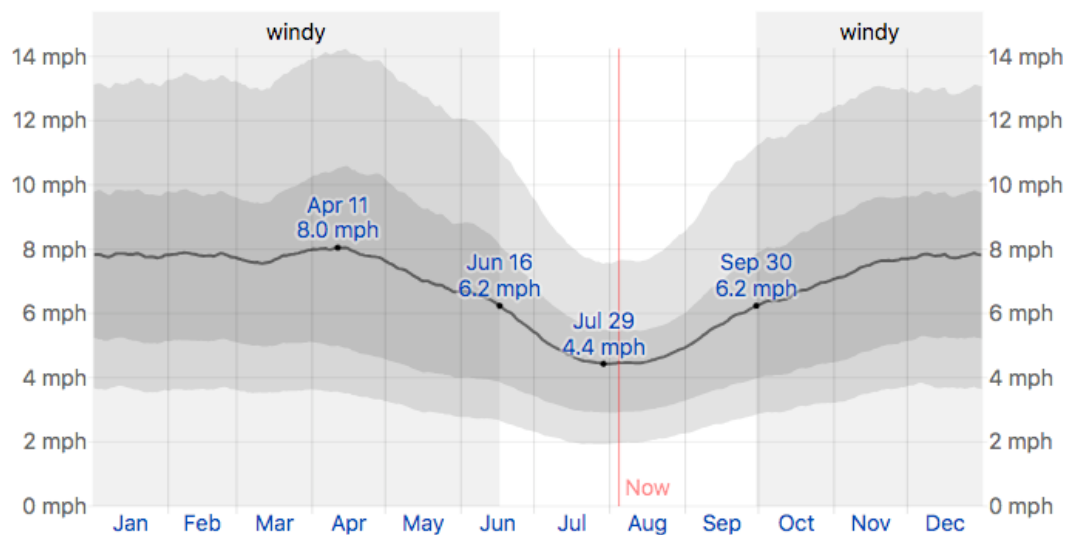
Snow alone is the most common for 5.8 months, from October 23 to April 18. The month with the most days of snow alone in Leadville is March, with an average of 4.0 days. Rain alone is the most common for 5.2 months, from May 12 to October 18. The month with the most days of rain alone in Leadville is July, with an average of 8.6 days. Mixed snow and rain is the most common for 4.1 weeks, from April 18 to May 12 and from October 18 to October 23. The month with the most days of mixed snow and rain in Leadville is April, with an average of 2.8 days.

### 11.3 WIND

The wind experienced at any given location is highly dependent on local topography and other factors, and instantaneous wind speed and direction vary more widely than hourly averages.

The average hourly wind speed in Leadville as shown in **Figure 11-4** experiences significant seasonal variation over the course of the year.

**Figure 11-4: Average Wind Speed**



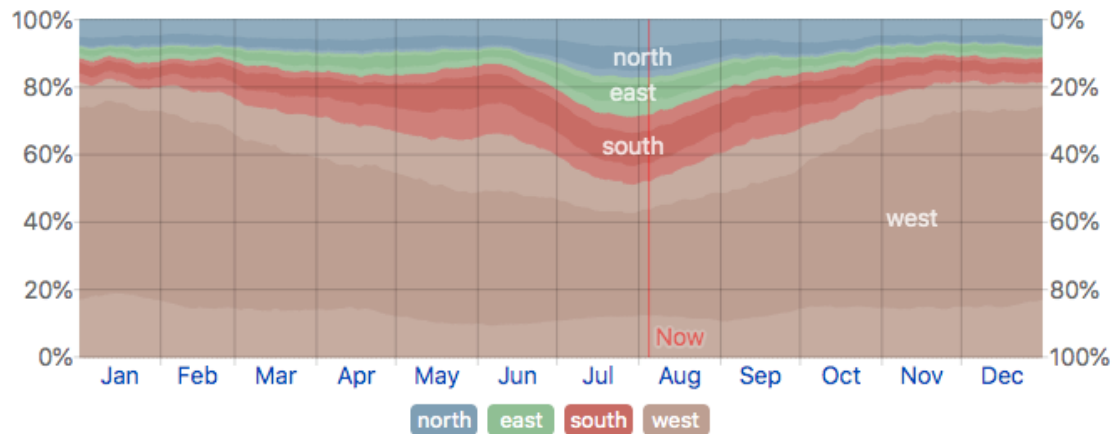
Source: weatherspark.com, 2023

The windier part of the year lasts for 8.6 months, from September 30 to June 16, with average wind speeds of more than 6.2 miles per hour. The windiest month of the year in Leadville is April, with an average hourly wind speed of 7.9 miles per hour.

The calmer time of year lasts for 3.4 months, from June 16 to September 30. The calmest month of the year in Leadville is August, with an average hourly wind speed of 4.6 miles per hour.

The predominant average hourly wind direction in Leadville is from the West throughout the year. See **Figure 11-5**. The percentage of hours in which the mean wind direction is from each of the four cardinal wind directions, excluding hours in which the mean wind speed is less than 1.0 mph. The lightly tinted areas at the boundaries are the percentage of hours spent in the implied intermediate directions (northeast, southeast, southwest, and northwest).

**Figure 11-5: Wind Direction**



Source: weatherspark.com, 2023

## 11.4 TEMPERATURE

The average January temperatures are a maximum of 29.5°F (-1.4°C) and a minimum of 4.6°F (15.2°C). The average July temperatures are a maximum of 71.0°F (21.7°C) and a minimum of 39.2°F (4.0°C). There is an average of 271.7 mornings annually with freezing temperatures, which can occur in any month of the year. The record high temperature was 86°F (30.0°C) on July 17, 2023. The record low temperature was -38°F (-38.9 °C) on February 1, 1985.

Average temperatures from January 2018 to June 2023 are shown in **Table 11-2** and average 34.9°F annually compared to that average annual normal temperature of 34.6°F.

**TABLE 11-2: AVERAGE ANNUAL TEMPERATURE °F (JAN 2018 – JUN 2023)**

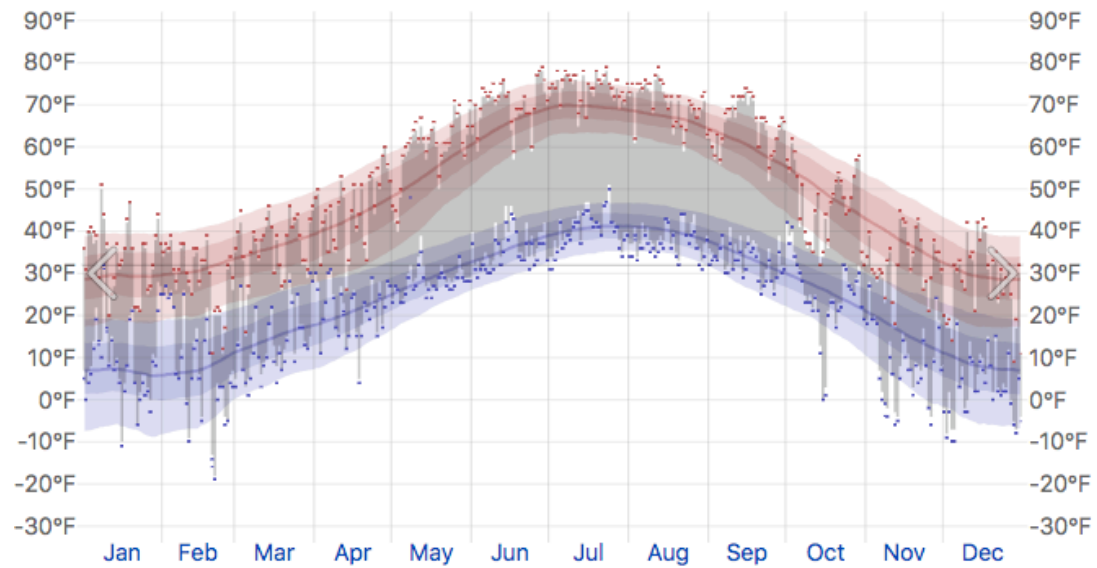
Description		Annual Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Normal		34.6	17.1	18.1	24.6	31.1	40.9	50.1	55.1	53.1	46.5	36.7	24.8	17.1
Average 2018-2023	Max	49.2	30.6	28.7	35.2	43.5	55.4	67.7	72.9	71.3	66.1	49.2	38.2	30.4
	Mean	34.9	17.6	16.2	22.5	31.4	41.1	51.0	55.9	54.6	48.9	35.7	25.1	17.4
	Min	20.5	4.6	3.7	10.0	19.1	26.8	34.4	39.5	36.2	32.1	21.3	11.9	4.4
2018	Max	49.7	34.5	29.6	37.0	45.6	60.6	70.7	74.0	70.0	65.9	46.6	33.0	28.3
	Mean	35.4	21.5	18.4	25.3	33.3	44.0	52.8	55.6	53.8	48.9	35.5	20.4	15.3
	Min	21.2	8.5	7.1	13.5	21.0	27.4	34.8	39.9	36.0	31.6	24.4	7.8	2.2
2019	Max	47.8	29.7	27.0	34.6	44.1	47.2	64.0	73.0	72.0	67.0	45.9	39.0	30.2
	Mean	33.8	17.0	15.5	22.5	32.9	35.0	48.3	55.4	55.1	50.1	31.4	26.1	16.6
	Min	19.3	4.3	4.0	10.5	21.5	22.9	33.0	37.8	31.0	34.0	16.9	13.0	3.0
2020	Max	49.9	28.6	28.6	37.0	42.9	58.8	67.2	71.8	74.3	62.9	54.8	40.8	30.8
	Mean	35.1	16.4	16.2	24.8	31.1	43.1	50.5	54.9	55.9	46.2	39.2	26.4	16.2
	Min	20.3	4.2	3.9	13.0	19.2	27.4	33.8	38.0	37.5	29.5	23.6	12.0	1.5
2021	Max	49.9	30.2	27.5	35.5	44.1	53.9	70.9	73.8	69.8	67.0	48.1	43.5	34.3
	Mean	35.8	17.0	16.4	22.1	31.3	40.4	52.9	57.3	53.2	49.0	36.3	31.3	22.0
	Min	21.4	3.9	5.3	8.7	18.4	26.8	34.9	41.1	36.6	32.4	19.8	19.1	9.8
2022	Max	49.0	33.4	29.2	36.1	42.5	55.1	67.9	72.0	70.3	67.5	50.7	34.7	28.5
	Mean	34.5	18.1	14.8	22.3	30.6	41.2	51.5	56.3	55.1	50.2	36.3	21.2	16.9
	Min	20.1	2.9	0.4	8.5	18.6	27.3	35.0	40.5	40.0	32.9	21.8	7.6	5.3
2023	Max	NA	27.1	30.2	31.0	41.9	56.8	65.7	NO DATA					
	Mean	NA	15.3	16.0	18.2	28.9	42.8	50.2						
	Min	NA	3.5	1.7	5.5	15.8	28.8	34.6						

Source: NOAA, 2023

**Figure 11-6 through Figure 11-11** show daily average, maximum and minimum temperatures for years 2018 to 2023 through mid-July 2023.

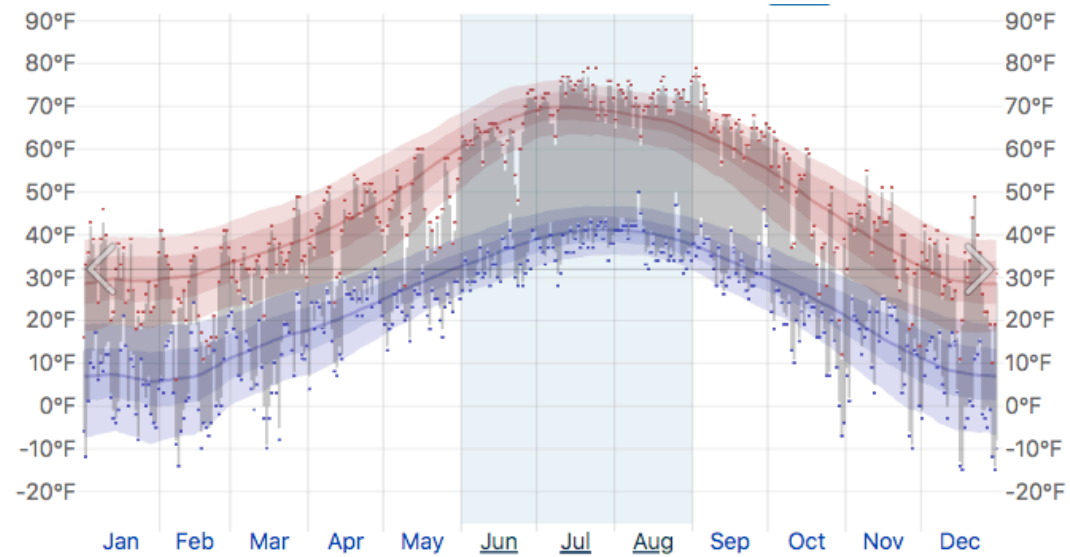
The figures show the daily range of reported temperatures (gray bars) and 24-hour highs (red ticks) and lows (blue ticks), placed over the daily average high (faint red line) and low (faint blue line) temperature, with 25<sup>th</sup> to 75<sup>th</sup> and 10<sup>th</sup> to 90<sup>th</sup> percentile bands.

**Figure 11-6: 2018 Daily Leadville Temperatures**



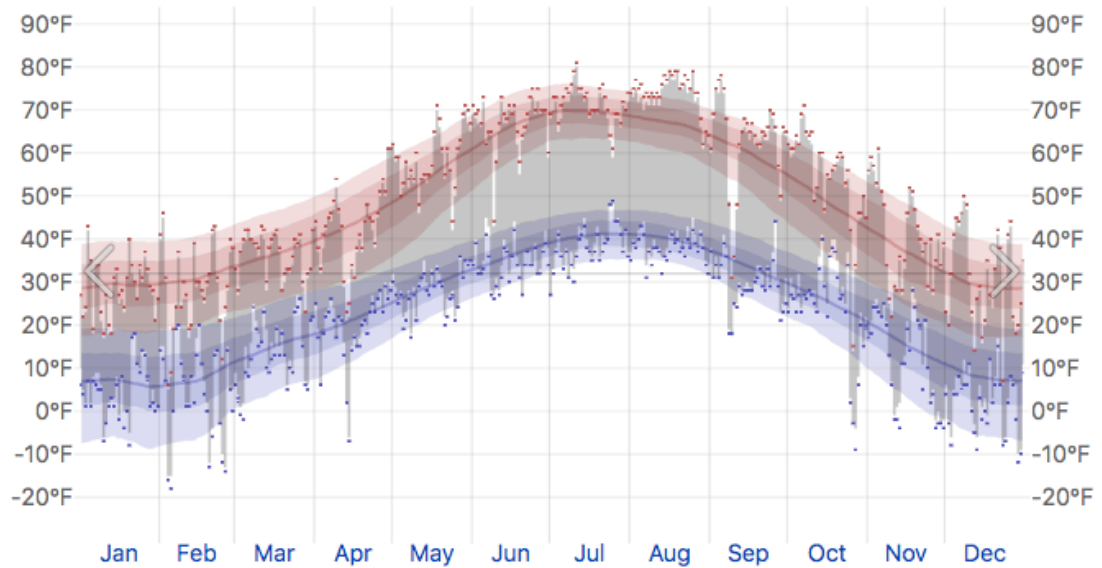
Source: weatherspark.com, 2023

**Figure 11-7: 2019 Daily Leadville Temperatures**



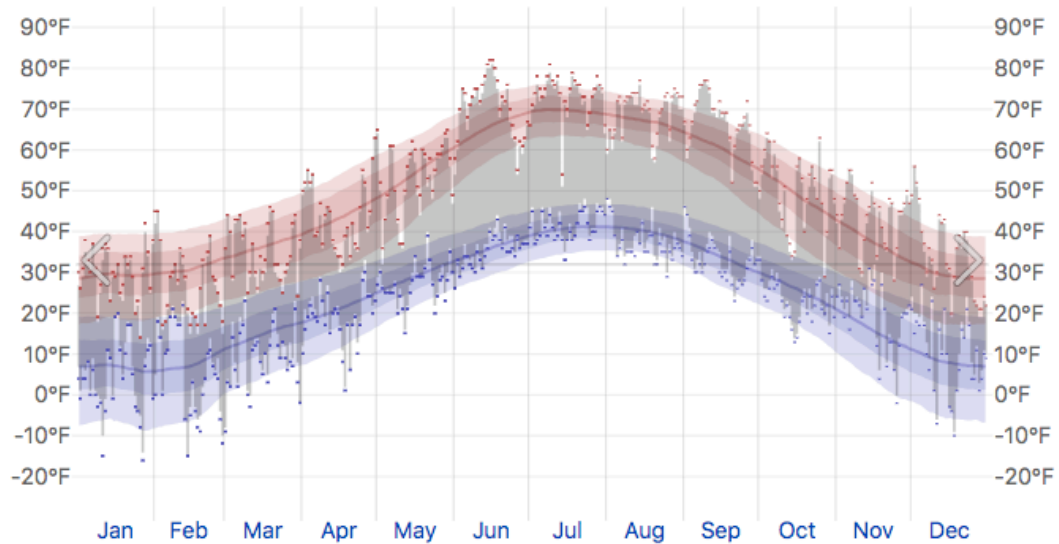
Source: weatherspark.com, 2023

**Figure 11-8: 2020 Daily Leadville Temperatures**



Source: weatherspark.com, 2023

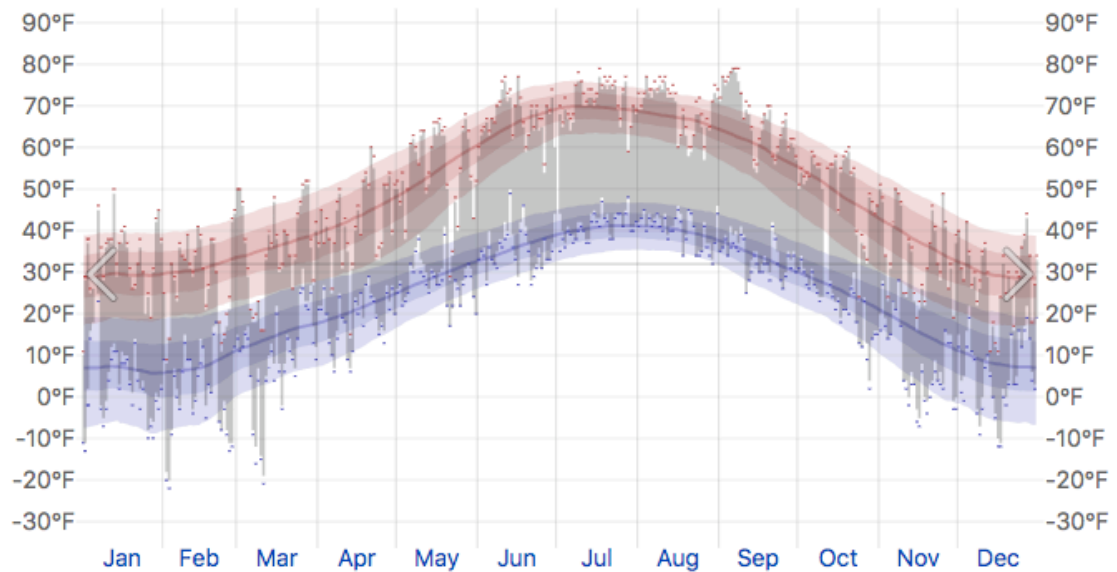
**Figure 11-9: 2021 Daily Leadville Temperatures**



Source: weatherspark.com, 2023

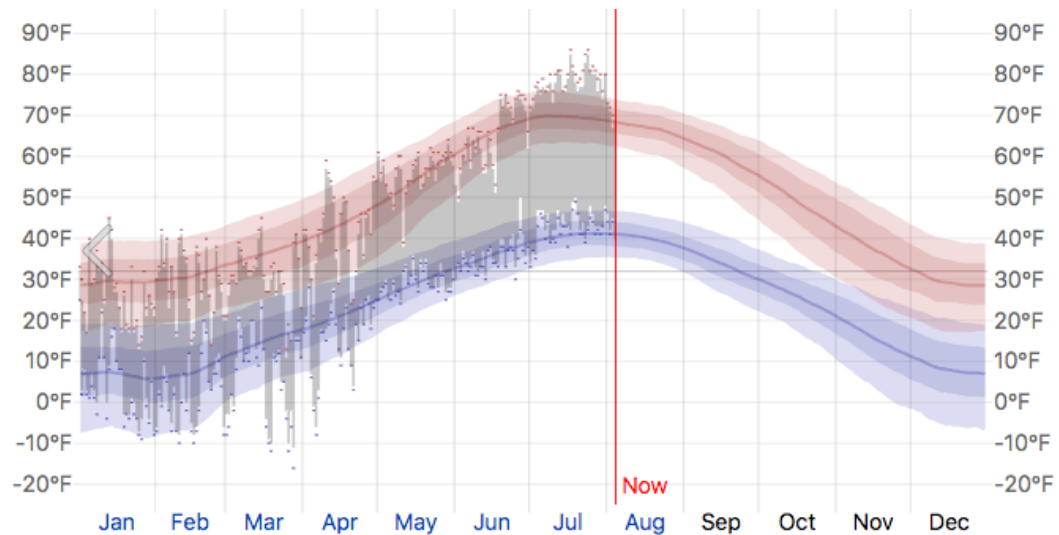


**Figure 11-10: 2022 Daily Leadville Temperatures**



Source: weatherspark.com, 2023

**Figure 11-11: 2023 Daily Leadville Temperatures**



Source: weatherspark.com, 2023

## 11.5 EVAPOTRANSPIRATION

CJK has not measured evaporation or sublimation rates at the site. An internet search did not yield meaningful information on sublimation studies in the Leadville Area.

However, the following information was found with respect to evapotranspiration in the Leadville area.

**TABLE 11-3: EVAPOTRANSPIRATION IN LEADVILLE (30-YR AVERAGE)**

	Unit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ET Rate	mm/hr	0.00	0.00	0.00	0.13	0.16	0.18	0.17	0.15	0.60	0.13	0.00	0.00

Source: [rainmaster.com/historicET.aspx](http://rainmaster.com/historicET.aspx)