

TAHOE:  
**STATE  
OF THE  
LAKE**  
REPORT  
**2021**

**METEOROLOGY**

## Air temperature - smoothed daily maximum and minimum

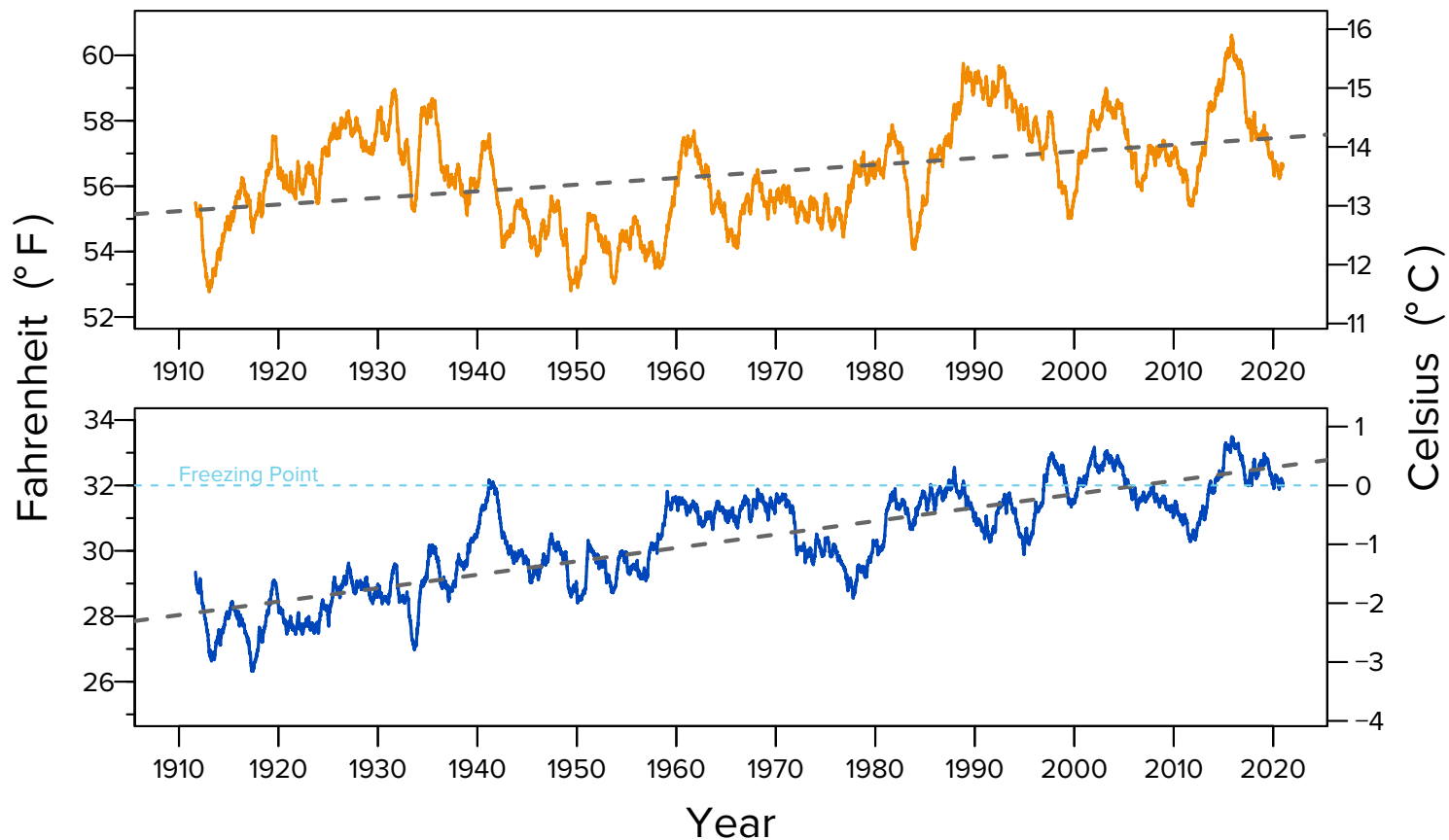
Daily since 1911

Over the last 109 years, daily air temperatures measured at Tahoe City have increased. The long-term trend in average daily minimum temperature (bottom figure) has increased by 4.49 °F (2.49 °C) and the long-term trend in average daily maximum temperature

(upper figure) has risen by 2.22 °F (1.23 °C). The trend line for the minimum air temperature has exceeded the freezing temperature of water for the last 15 years, leading to more rain and less snow as well as earlier snowmelt at Lake Tahoe. These data are smoothed using a two-

year running average to remove daily and seasonal fluctuations.

Data source: Long-term NOAA daily maximum and minimum temperatures data set.



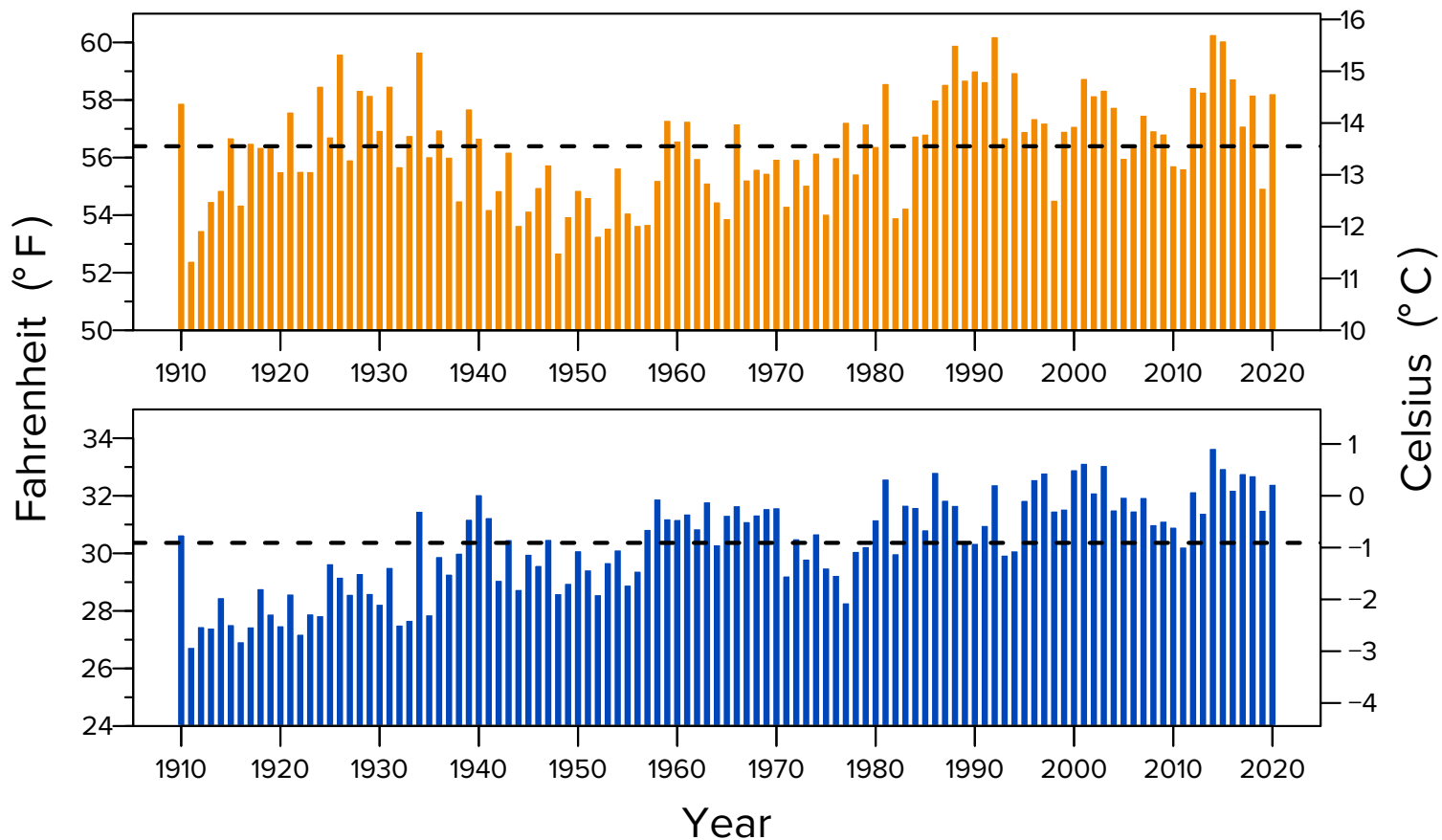
## Air temperature - annual average maximum and minimum

Since 1910

Annual average maximum (upper figure) and minimum (lower figure) air temperatures in 2020 were both warmer than the previous year and above the long-term average (dashed line) temperature. The annual average maximum temperature was 58.2 °F

(14.6°C), an increase of 3.2 °F from the previous year. The 2020 annual average minimum was 32.4 °F (+0.2 °C), which was 0.9 °F warmer than the previous year. The long-term averages for the maximum and the minimum are 56.4 °F (13.6 °C) and 30.34 °F (-0.9 °C), respectively.

Data source: Long-term NOAA daily maximum and minimum temperatures data set measured at Tahoe City.



## Below-freezing air temperatures

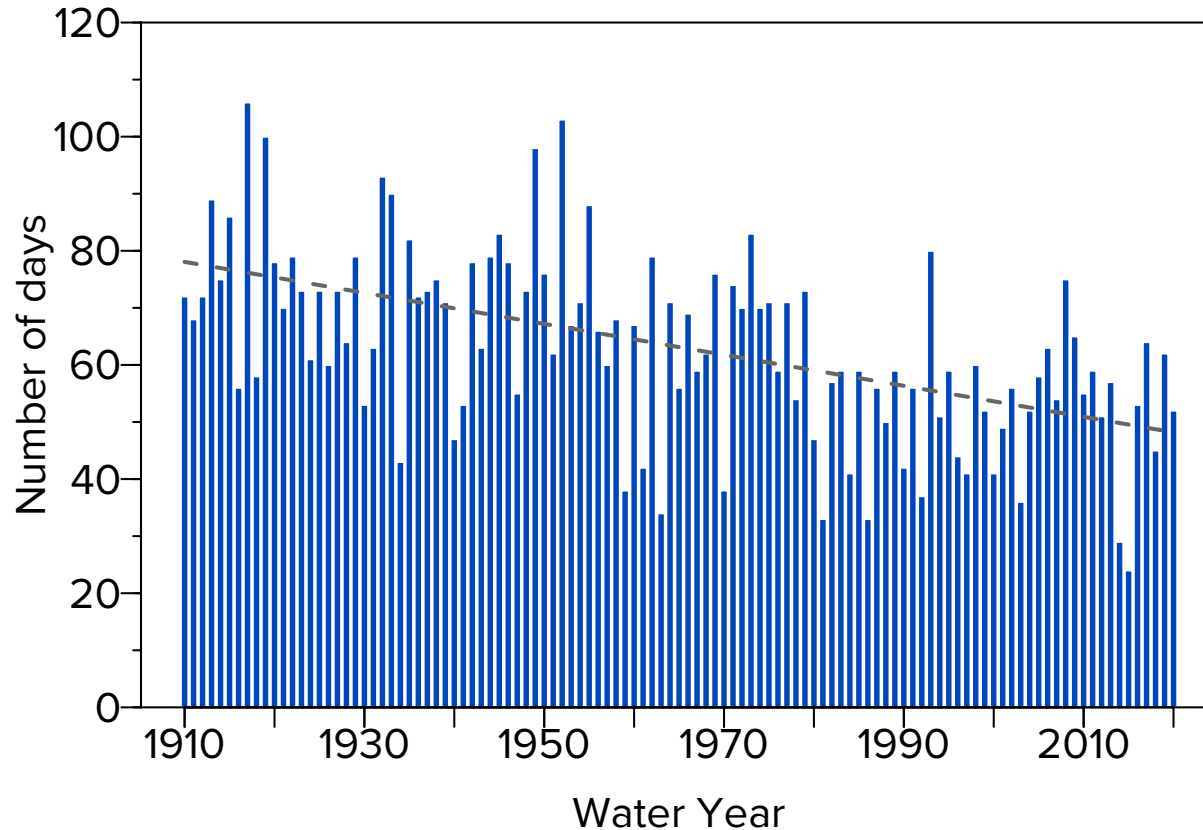
Yearly since 1910

The method used for this analysis sums the number of days with daily average temperatures below freezing between December 1 and March 31 for each Water Year (WY). Although year-to-year variability is high, the number of days when air temperatures averaged below-

freezing has declined by almost 30 days since 1911. In WY 2020, the number of freezing days was 52, above the declining long-term trend line. This is consistent with the measured air temperatures in 2020.

Data source: Long-term NOAA daily maximum and minimum temperatures data set measured at Tahoe City.

Note: The Water Year extends from October 1 through September 30.



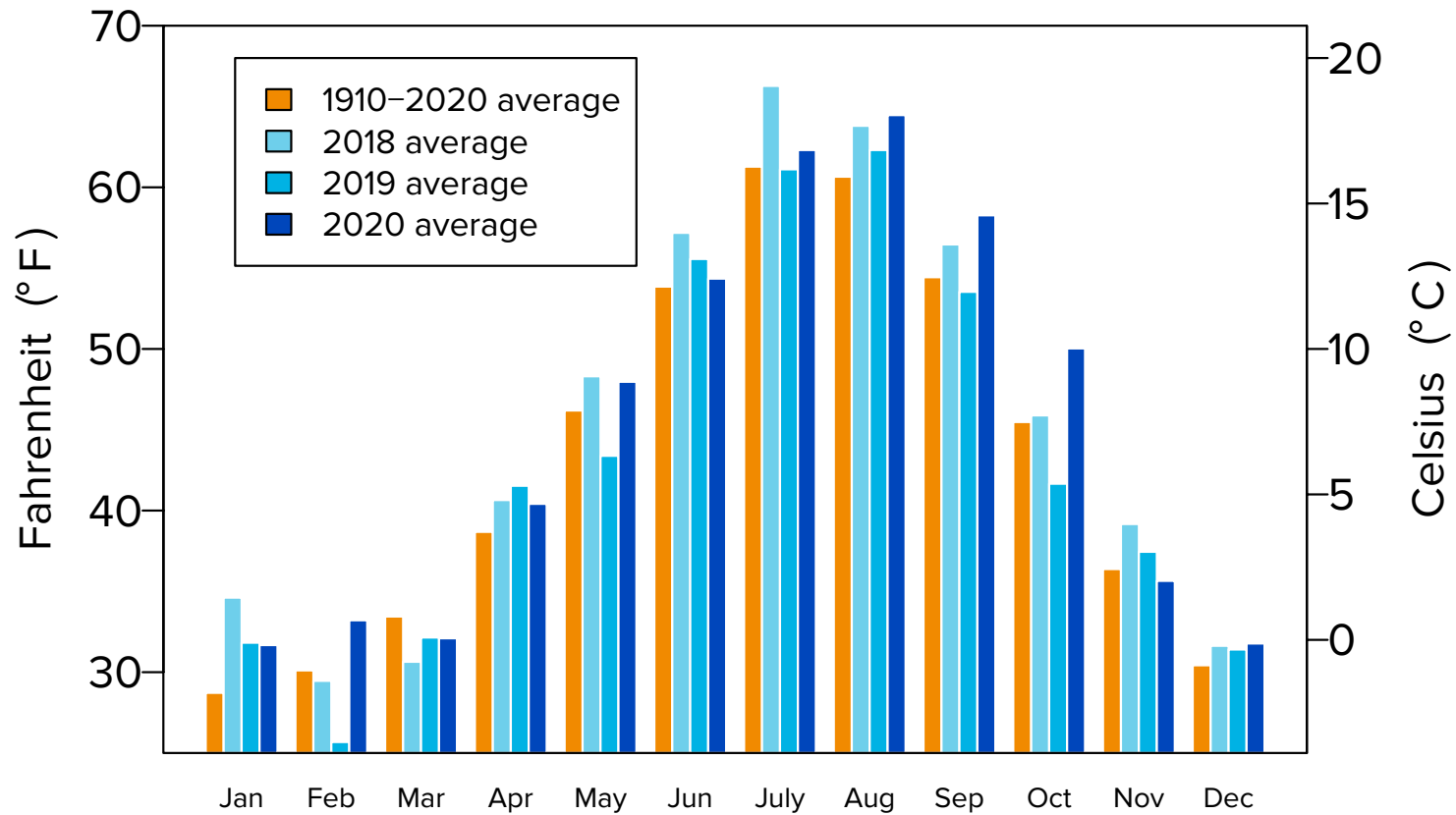
## Monthly air temperature

2018, 2019, 2020 and 1910 to 2020

In 2020, monthly air temperatures were generally similar to 2018 and 2019. However, for the months of February, August, September, and October, temperatures were warmer than the

previous two years (and the long-term average). This the warmest September since 1956, and the eighth warmest on record.

Data source: Long-term NOAA daily maximum and minimum temperatures data set.



## Annual precipitation

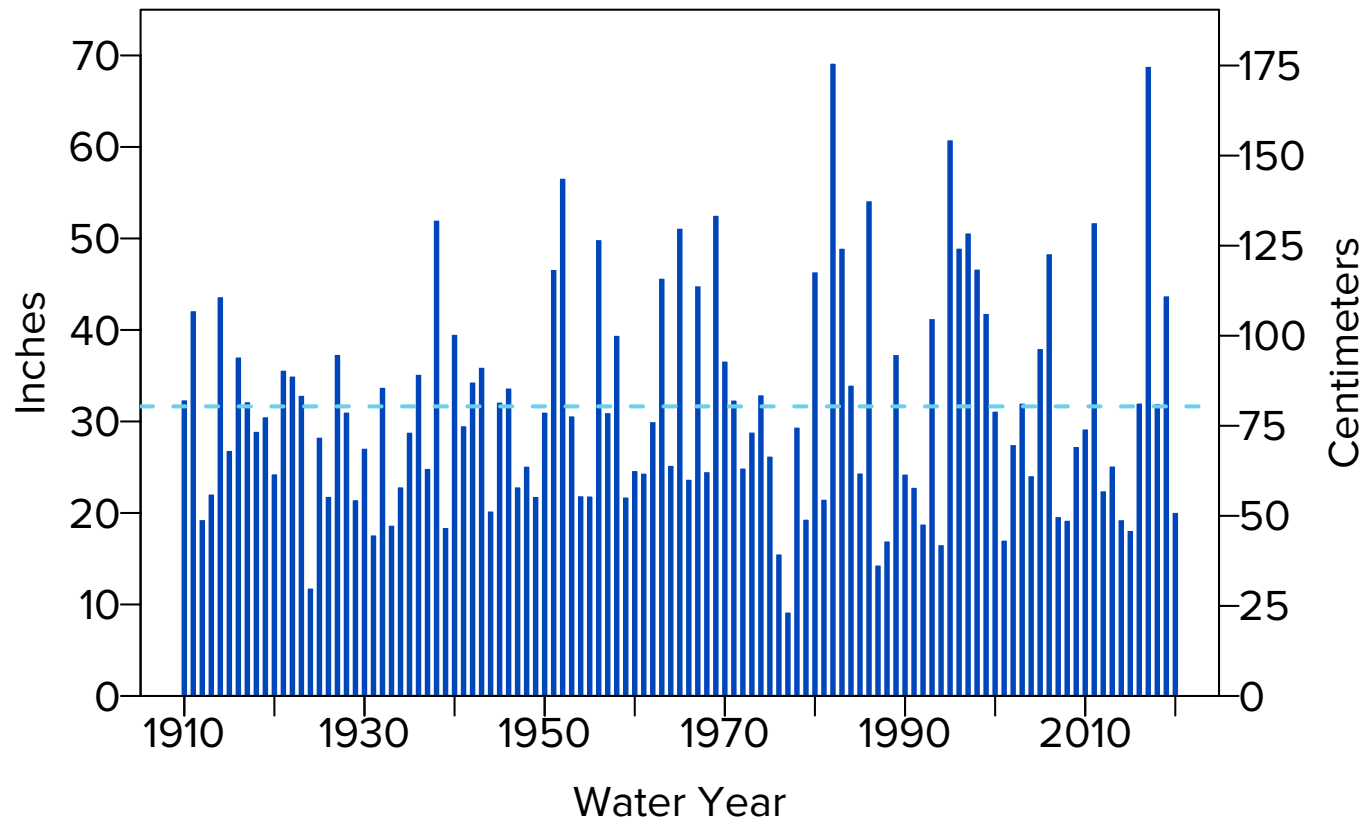
Yearly since 1910

From 1910 to 2020, average annual precipitation (water equivalent of rain and snow) at Tahoe City was 31.4 inches. The maximum recorded was 69.2 inches in 1982. The minimum recorded was 9.2 inches in 1977. At 20.1 inches, 2020 was well below the long-term average (shown by the dashed line). The low values

of 2020 was preceded by four years of average to above-average precipitation. This, combined with the low precipitation of winter 2021, indicates the return of drought conditions. Generally, there is a gradient in precipitation from west to east across Lake Tahoe, with almost twice as much precipitation falling on the west side

of the lake. There is also an increase in precipitation with elevation in the Tahoe basin. Precipitation is summed over the Water Year, which extends from October 1 through September 30.

Data source: Long-term NOAA daily precipitation data set.



## Monthly precipitation

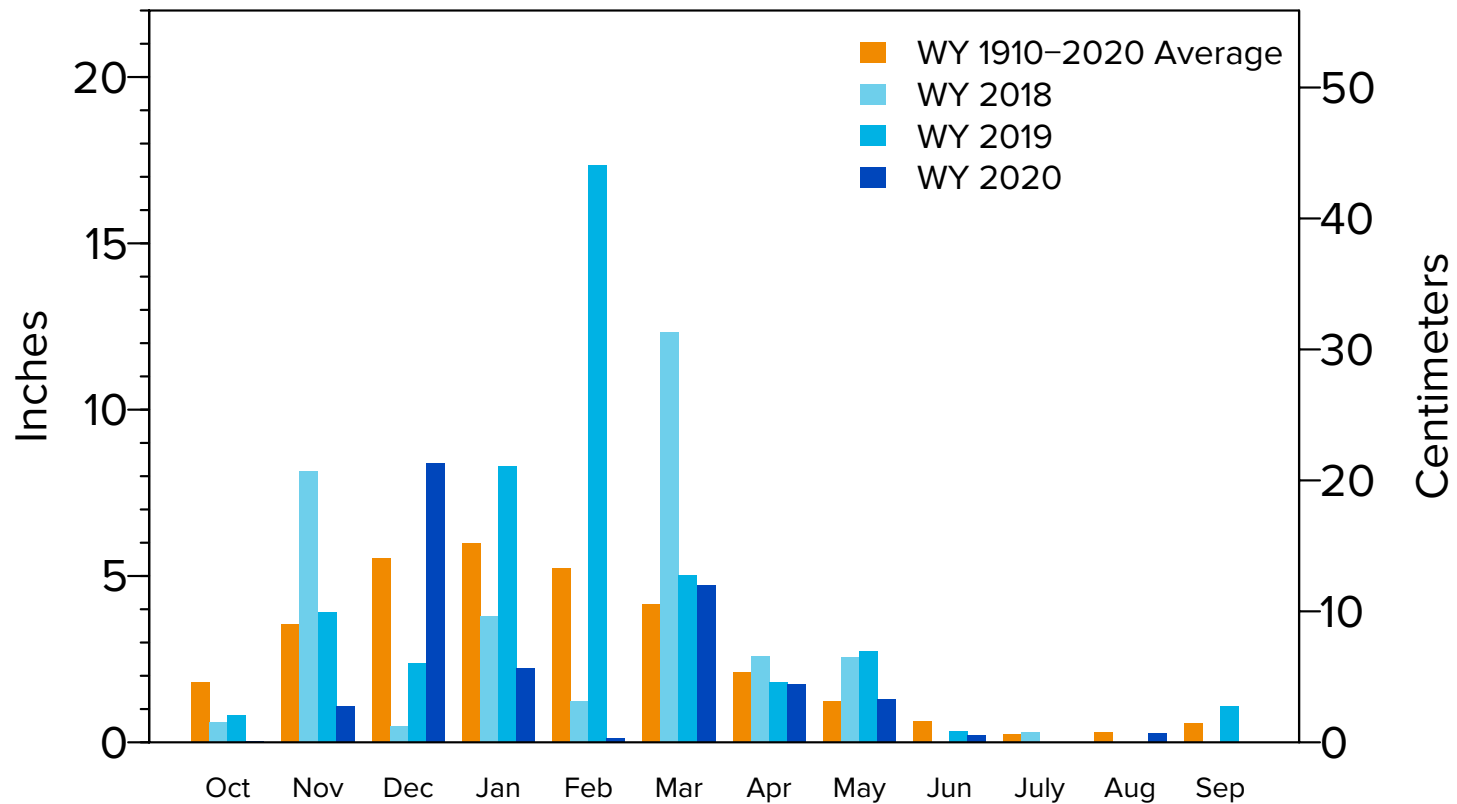
2018, 2019, 2020 and 1910 to 2020

The 2020 Water Year was well below the long-term average in total precipitation at 20.1 inches compared with the long-term average of 31.4 inches. Precipitation in the month of February was only 0.12

inches (snow-water equivalent), the second lowest value on record. This is a stark comparison to the record high February snow of 17.4 inches in 2019. The 2020 Water Year extended from

October 1 through September 30.

Data source: Long-term NOAA daily precipitation data set.



## Snow as a fraction of annual precipitation

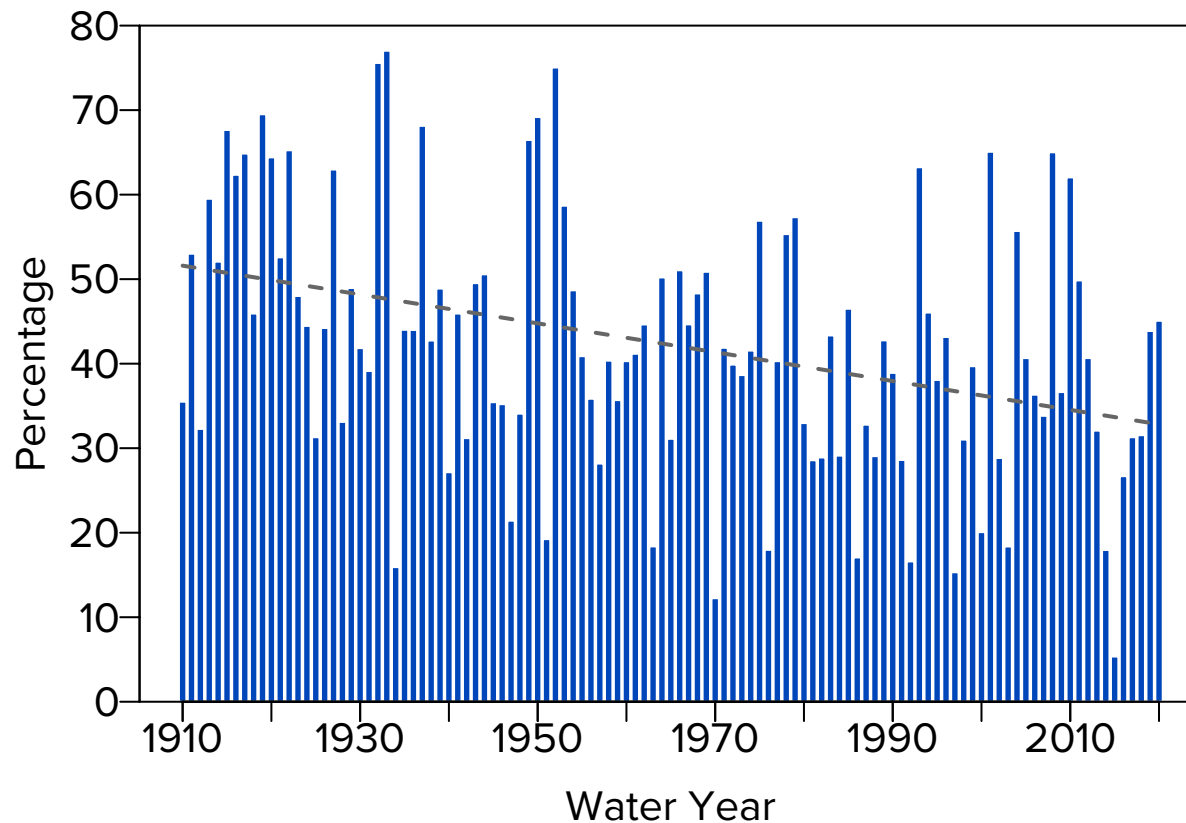
Yearly since 1910

Snow has declined as a fraction of total precipitation, from an average of 52 percent in 1910 to 33 percent in 2020, according to the trend line. In Tahoe City, snow represented 45.1 percent of the 2020 total precipitation. These data are

calculated based on the assumption that precipitation falls as snow whenever the average daily temperature (the average of the daily maximum and minimum temperatures) is below-freezing. Precipitation is summed over the Water

Year, which extends from October 1 through September 30.

Data source: Long-term NOAA daily air temperature and precipitation data sets.





## April snowpack

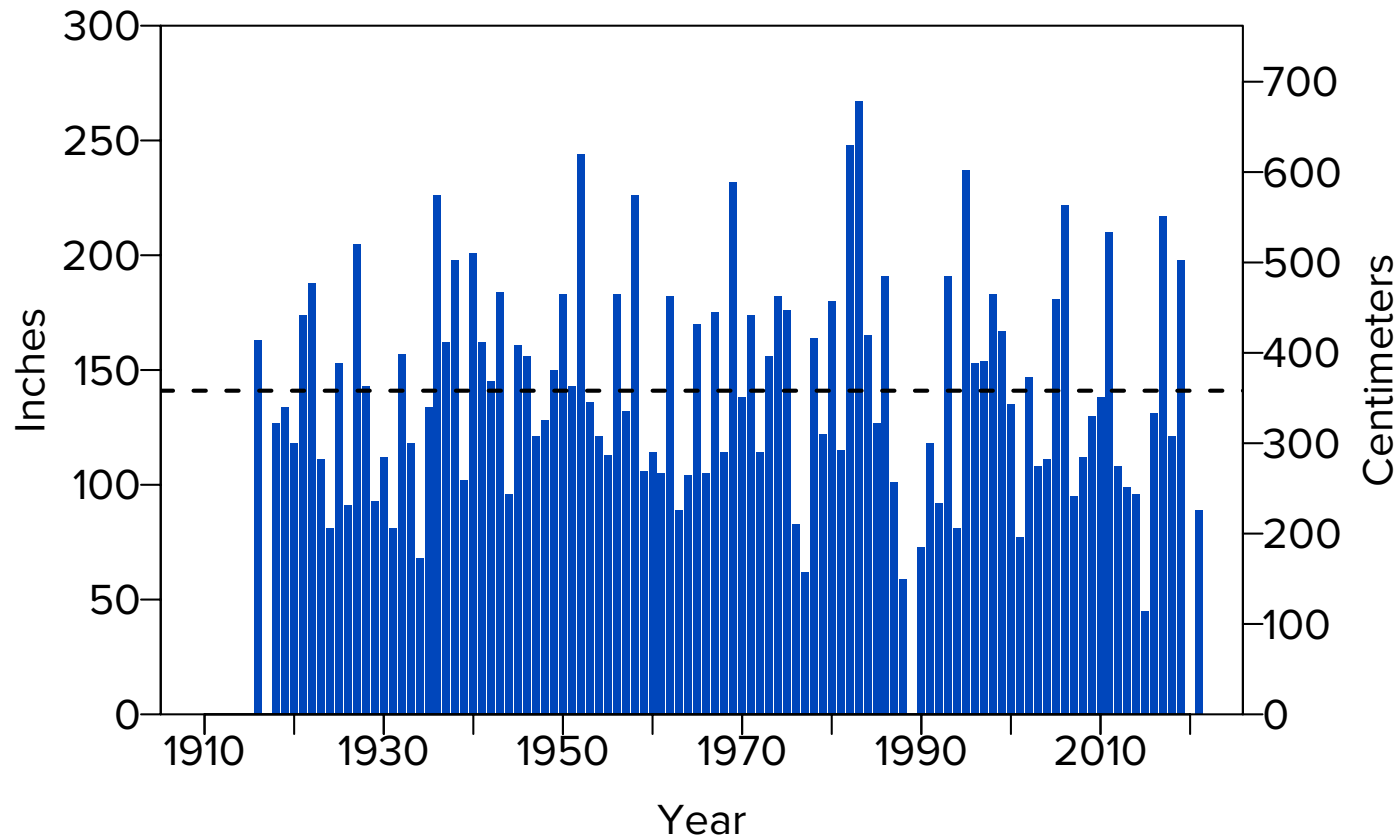
Since 1916

The depth of the snowpack is measured over the year at multiple locations throughout the Sierra. Shown here are the readings taken on approximately April 1 since 1916 at the Lake Lucille Snow Course Station (located in Desolation Wilderness, elevation 8,188 feet (Lat. 38.86 deg. Long. -120.11 deg.).

Note: April snow depth data are not available for 1917 and 1989. In 2020 the April snowpack reading was not taken due to work restrictions imposed by the COVID-19 pandemic. However, for March 29, 2021, the value was 89 inches. The largest amount on record was 267 inches on April 5, 1983. The average snow

depth (shown by the dotted line) over the period 1916–2020 was 142.4 inches.

Data source: USDA Natural Resources Conservation Service, California Monthly Snow Data.



## Daily solar radiation

In 2020

Solar radiation showed the typical annual pattern of sunlight, peaking at the summer solstice on June 21 or 22. Dips in daily solar radiation are primarily due to cloud coverage. Smoke and other atmospheric constituents play a smaller role. It is noteworthy that solar radiation on a clear day in mid-winter can exceed

that of a cloudy day in mid-summer. August 2020 is particularly noteworthy, as the values were consistently below the expected range. This was a month of very intense smoke in the Tahoe Basin. On August 19, 2020, the Air Quality Index (AQI) in South Lake Tahoe was 212, synonymous with a very polluted city.

That was also the lowest solar radiation day for the month of August.

The TERC meteorological station where these data are collected is located on the U.S. Coast Guard dock at Tahoe City.

