

TAHOE:
**STATE
OF THE
LAKE**
REPORT
2022

METEOROLOGY

Air temperature - smoothed daily maximum and minimum

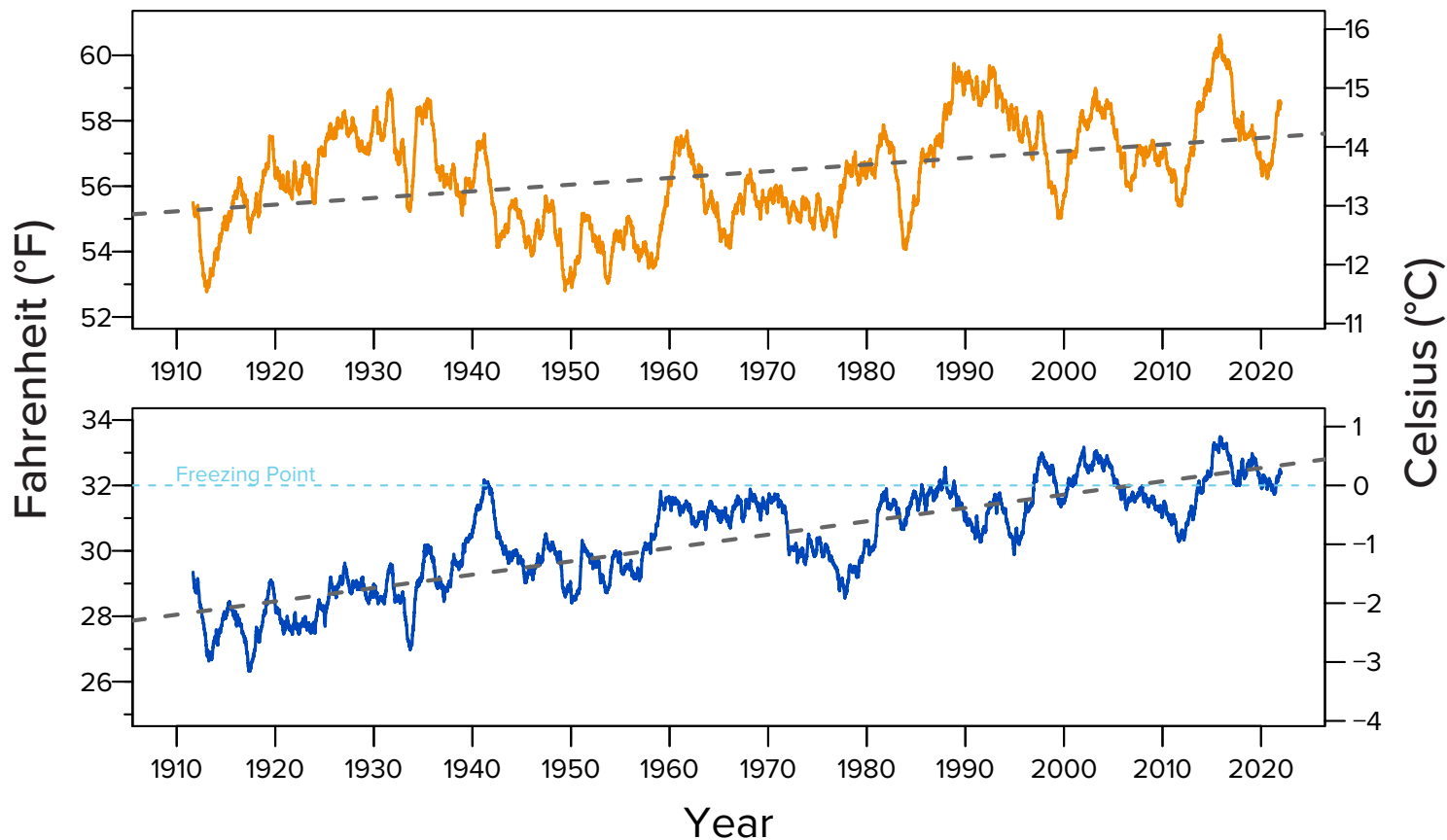
Daily since 1911

Over the last 110 years, daily air temperatures measured at Tahoe City have increased. The long-term trend in average daily minimum temperature (bottom figure) has increased by 4.50 °F (2.50 °C) and the long-term trend in average daily maximum temperature

(upper figure) has risen by 2.25 °F (1.25 °C). The trend line for the minimum air temperature has exceeded the freezing temperature of water for the last 16 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.



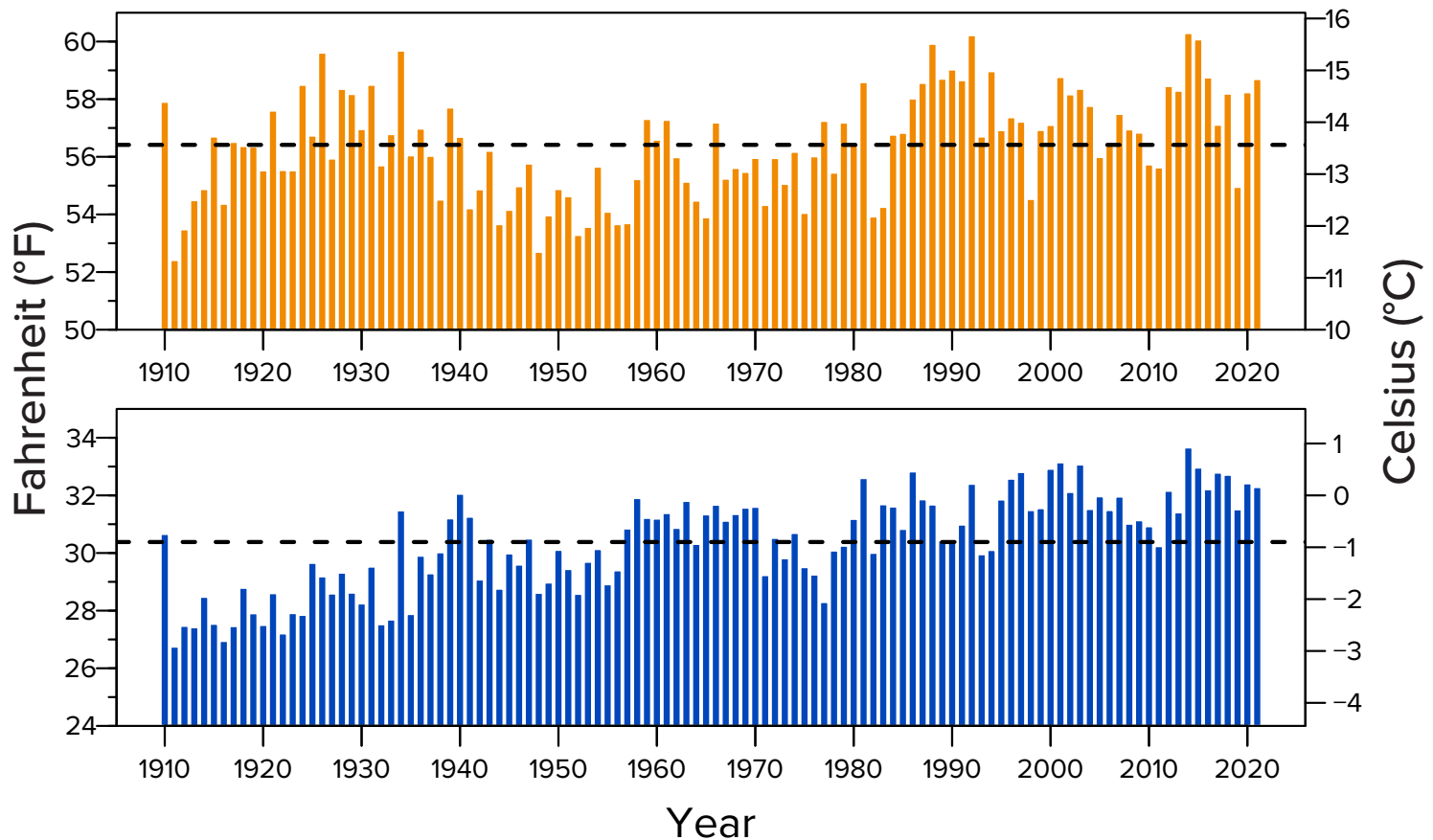
Air temperature - annual average maximum and minimum

Since 1910

Annual average maximum (upper figure) and minimum (lower figure) air temperatures in 2021 were both very similar to the previous year and above the long-term average (dashed line) temperature. The annual average maximum temperature was 58.7 °F

(14.8°C), which was 0.4 °F warmer than the previous year. The 2021 annual average minimum was 32.3 °F (+0.2 °C), which was 0.1 °F cooler than the previous year. The long-term averages for the maximum and the minimum are 56.4 °F (13.6 °C) and 30.4 °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

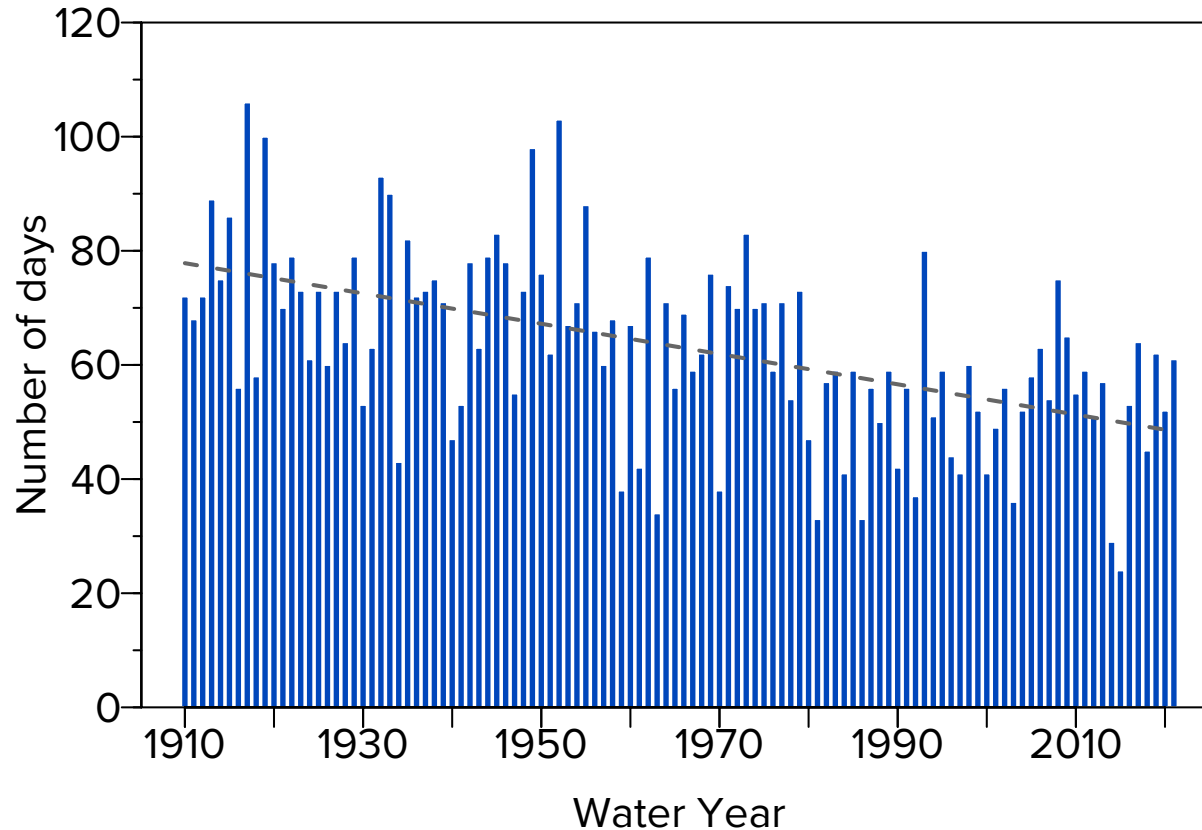
Yearly since 1910

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 over 29 days since 1911. In WY 2021, the number of freezing days was 61, above the declining long-term trend line. This is consistent with the measured air temperatures in 2021.

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.



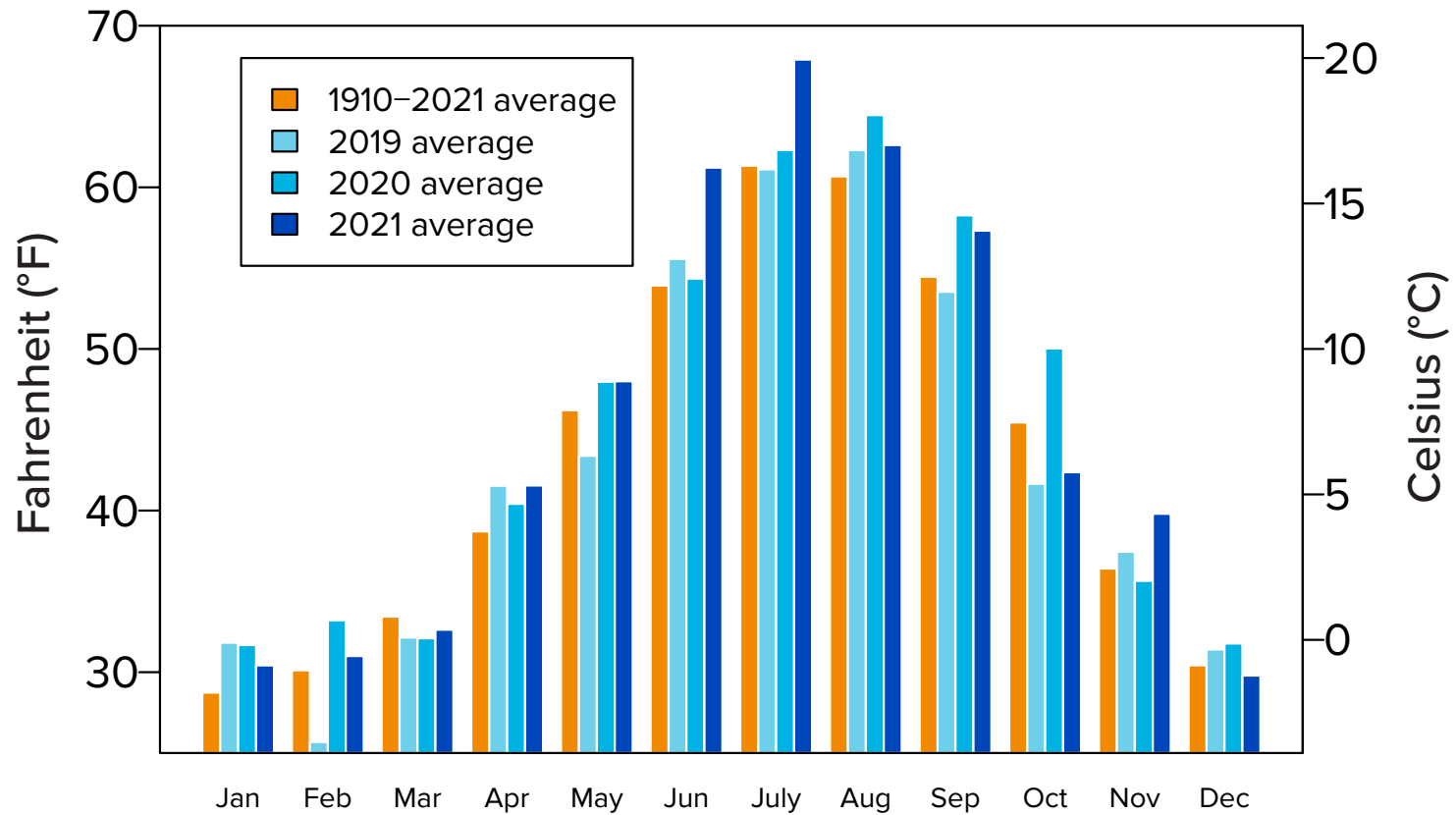
Monthly air temperature

2019, 2020, 2021 and 1910 to 2021

In 2021, monthly air temperatures were similar to 2019 and 2020. However, for the period from March through July, temperatures were warmer than the previous two years and the long-

term average. The monthly average air temperatures for June and July were the warmest ever recorded (since 2010). Most of this was due to an increase in nighttime minima.

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



Annual precipitation

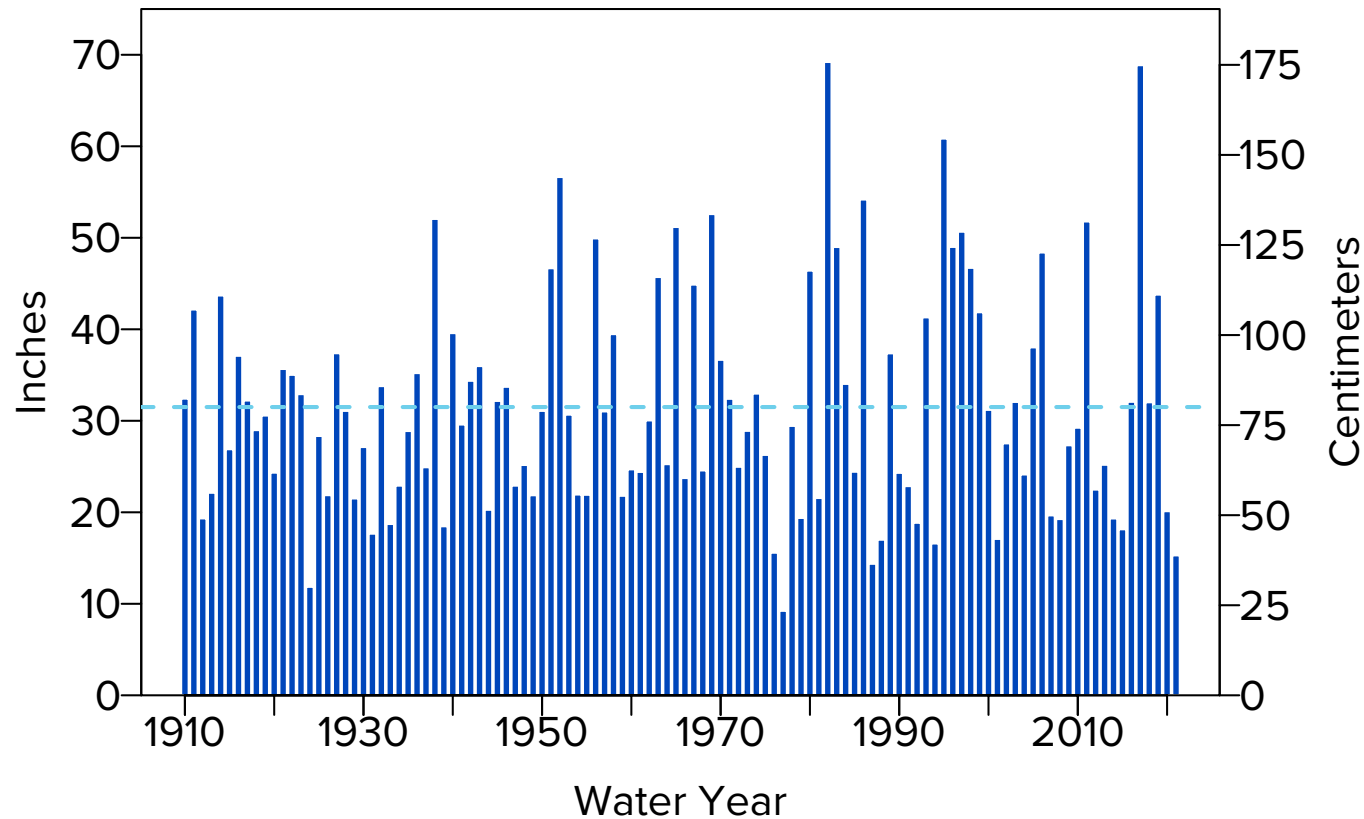
Yearly since 1910

From 1910 to 2021, average annual precipitation (water equivalent of rain and snow) at Tahoe City was 31.5 inches. The maximum recorded was 69.2 inches in 1982. The minimum recorded was 9.2 inches in 1977. At 15.3 inches, 2021 was less than half the long-term average (shown by the dashed line) and the third driest year on record. Eight of the last

ten years had precipitation at or below the long-term average. This, combined with the low precipitation of winter 2022, highlights the long-term drought our region is experiencing. 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.



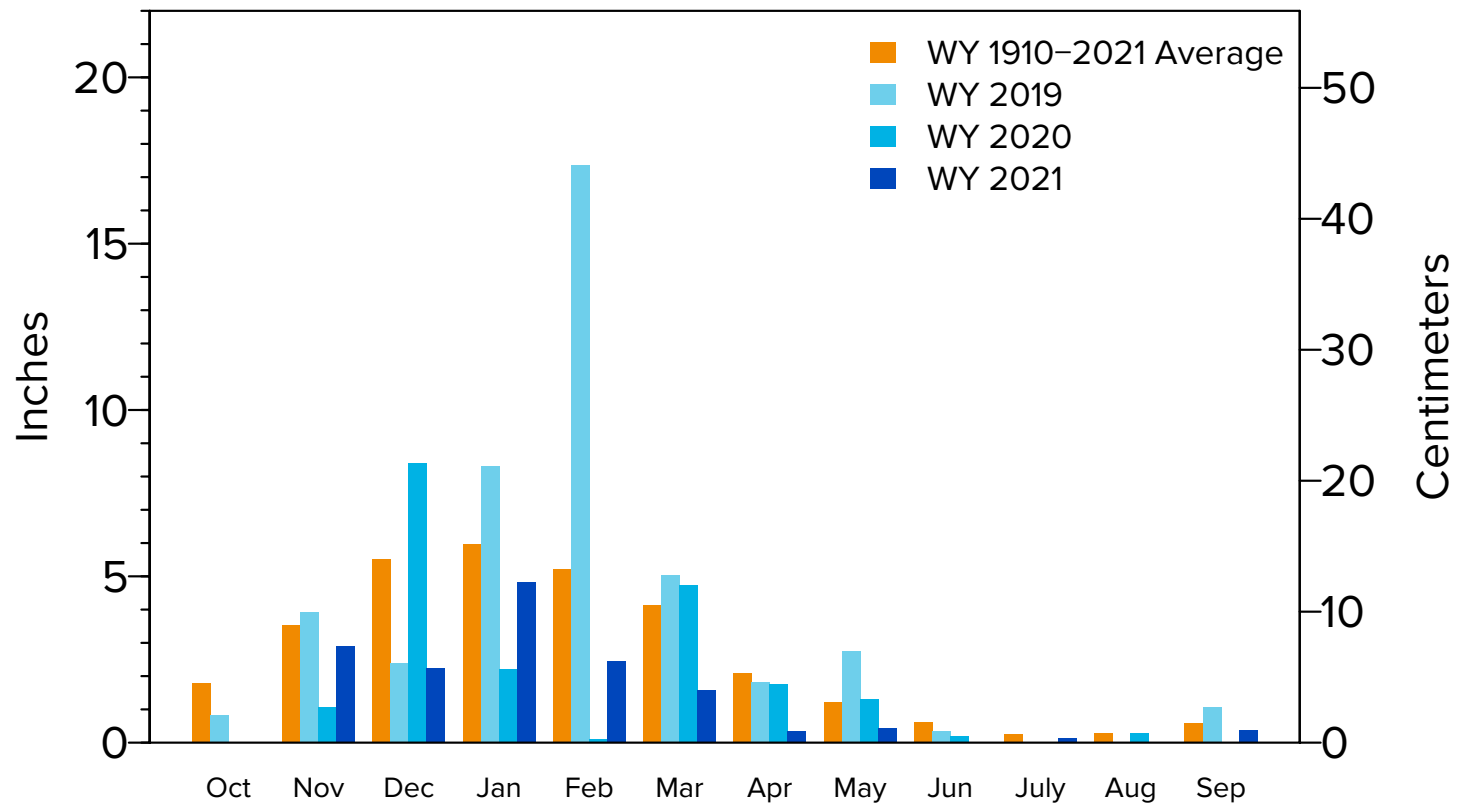
Monthly precipitation

2019, 2020, 2021 and 1910 to 2021

The 2021 Water Year had an annual average of 15.3 inches of precipitation, well below the long-term average of annual precipitation of 31.5 inches at Tahoe City. Precipitation in every month

of the 2021 Water year was below the long-term average. The 2021 Water Year extends from October 1 through September 30.

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



Snow as a fraction of annual precipitation

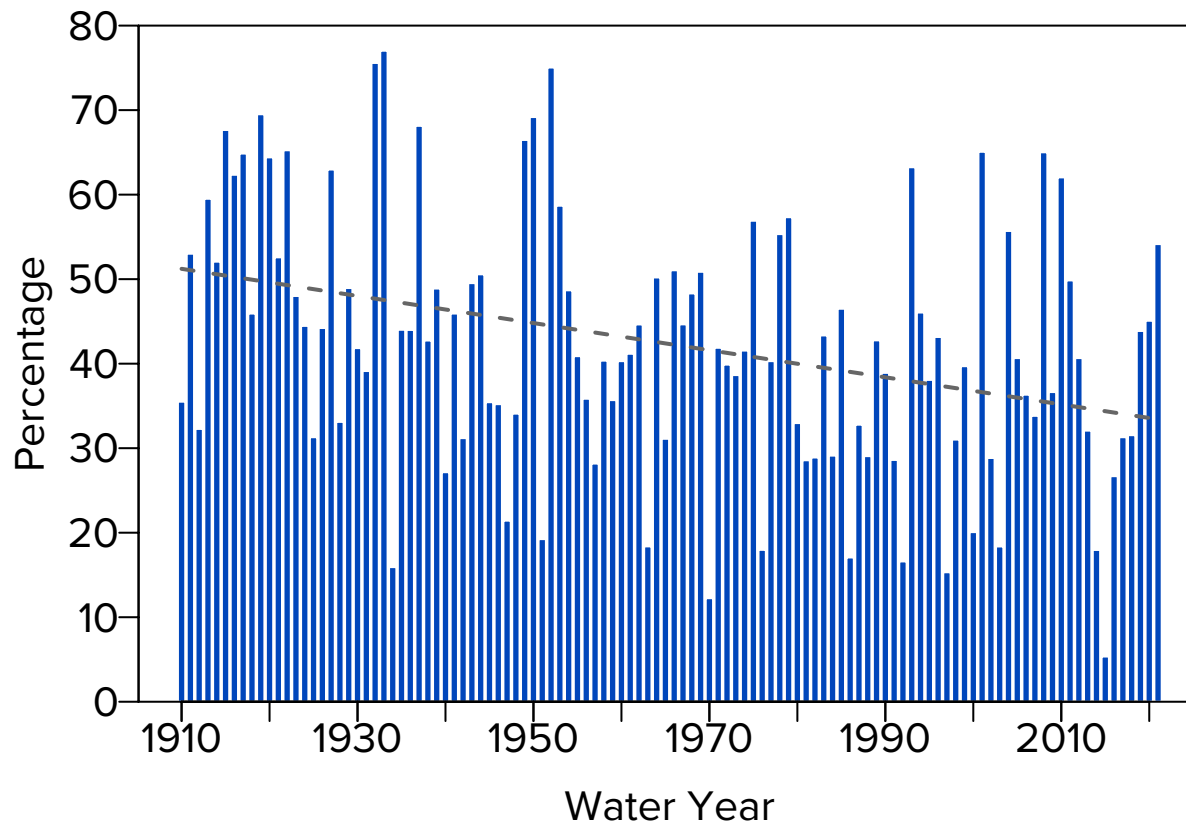
Yearly since 1910

Snow has declined as a fraction of total precipitation, from an average of 52 percent in 1910 to 33 percent in 2021, according to the trend line. In Tahoe City, snow represented 54.2 percent of the 2021 total precipitation, although the extremely low precipitation likely

played a role in that figure, and it should not be interpreted as having long term significance. 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

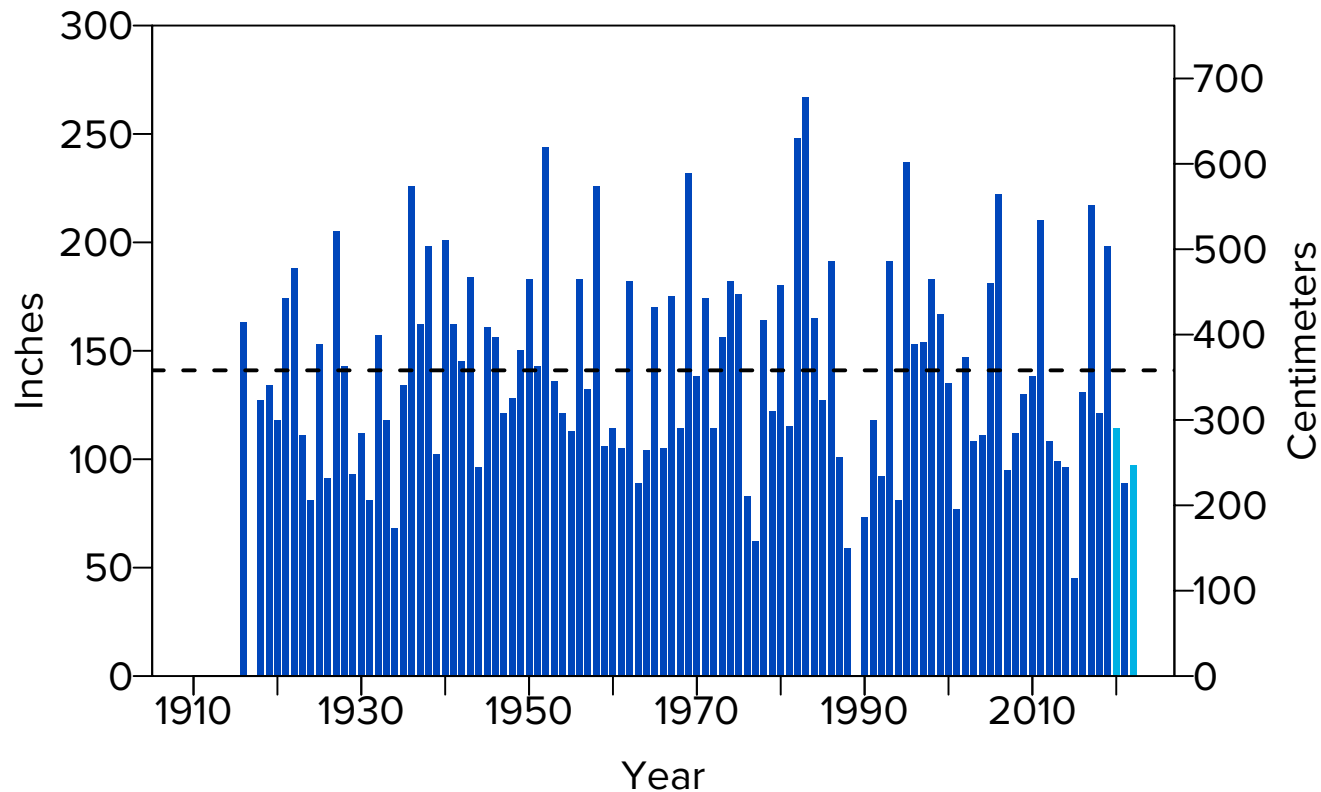
The depth of the snowpack is measured over the year at multiple locations throughout the Sierra. Shown here are the readings taken on approximately April 1 since 1916 at the Lake Lucille Snow Course Station (located in Desolation Wilderness, elevation 8,188 feet (Lat. 38.86 deg. Long. -120.11 deg.)). Note: April snow depth data are not available for 1917 and 1989. In 2020 and

in 2022, the April snowpack readings at Lake Lucille were not made due to storm conditions. Instead, the values were estimated by correlation with values made at the Rubicon #1 snow course. The correlation estimates are shown with the lighter blue columns.

For March 30, 2022, the value was 97 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 1916-2022 was 141.7 inches.

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



Daily solar radiation

In 2021

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 worth noting that solar radiation on a clear day in mid-winter can exceed that of a cloudy or smoky day in mid-summer.

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

