

TAHOE:
**STATE
OF THE
LAKE**
REPORT
2023

METEOROLOGY

Air temperature - smoothed daily maximum and minimum

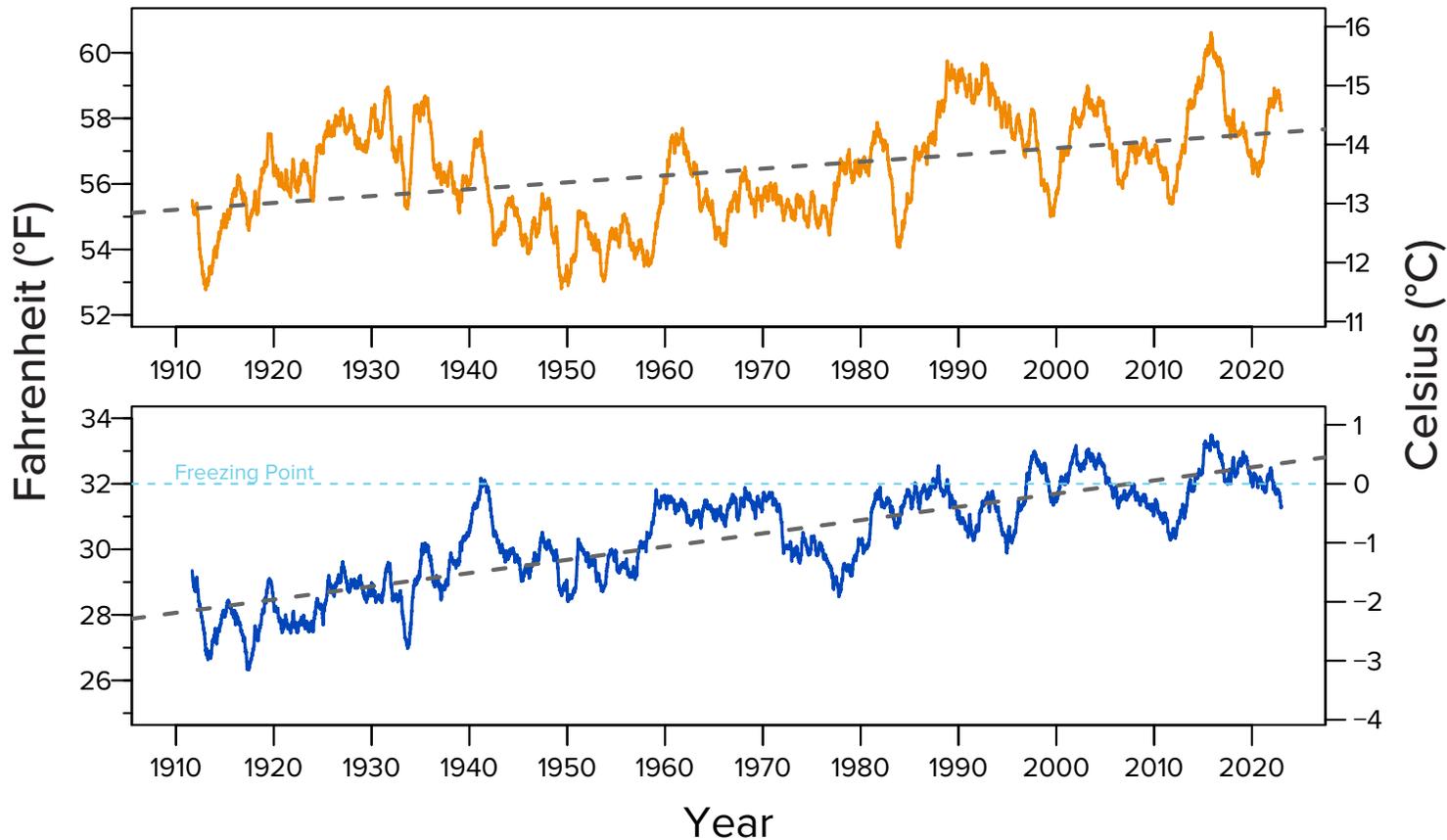
Daily since 1911

Over the last 111 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 2.33 °F (1.29

°C). The trend line for the minimum air temperature has exceeded the freezing point of water for the last 17 years, contributing to generally 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.

The minimum temperature dropped back below the freezing point in 2022.

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



Air temperature - annual average maximum and minimum

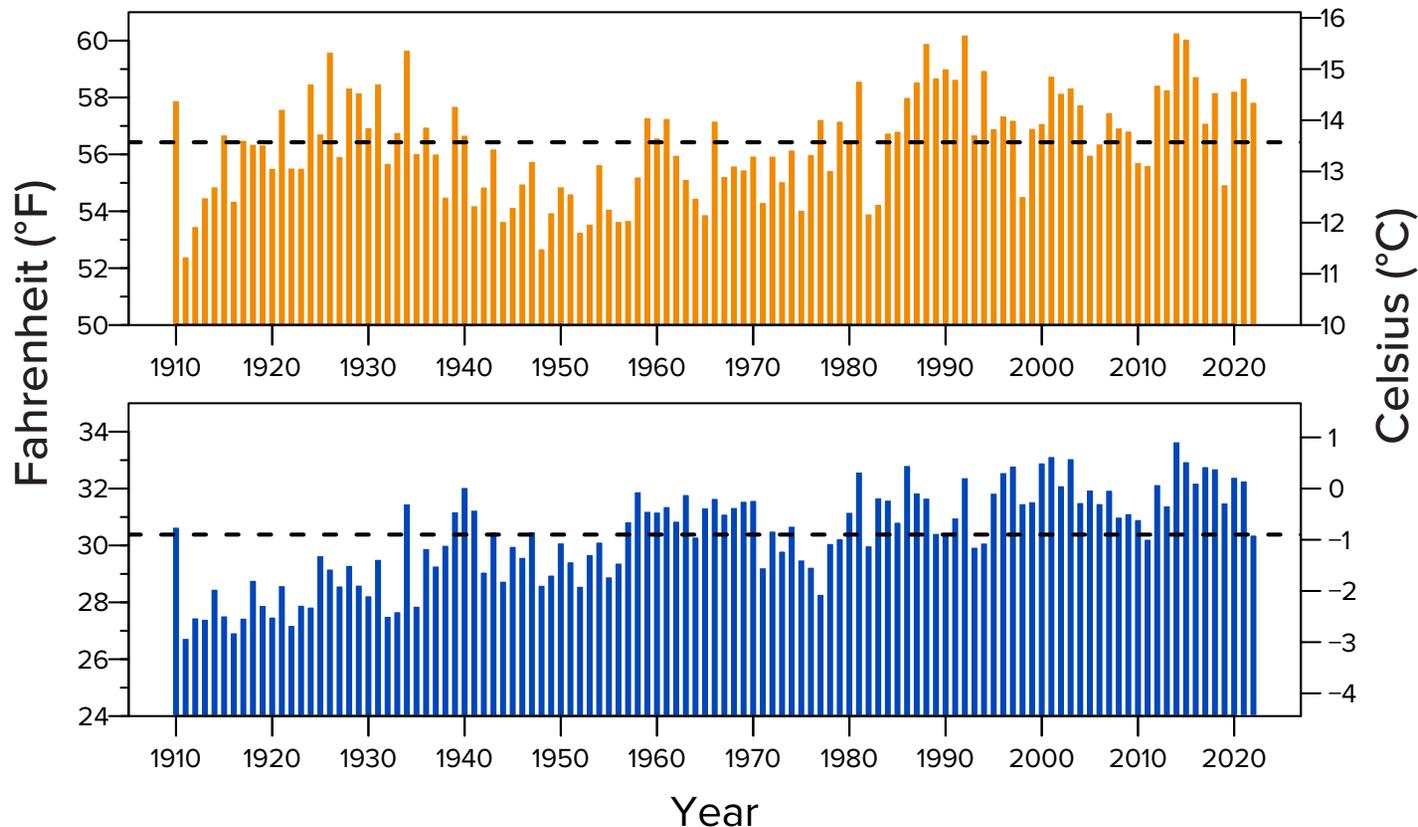
Since 1910

Annual average maximum (upper figure) air temperatures in 2022 was similar to the previous year and above the long-term average (dashed line) air temperature. Annual average minimum (lower figure) air temperatures in 2022 was distinctly lower than the previous year and coincided with the long-term average

(dashed line) air temperature. The annual average maximum temperature was 57.9 °F (14.4 °C), which was 0.7 °F cooler than the previous year. The 2022 annual average minimum was 30.4 °F (-0.9 °C), which was 1.9 °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

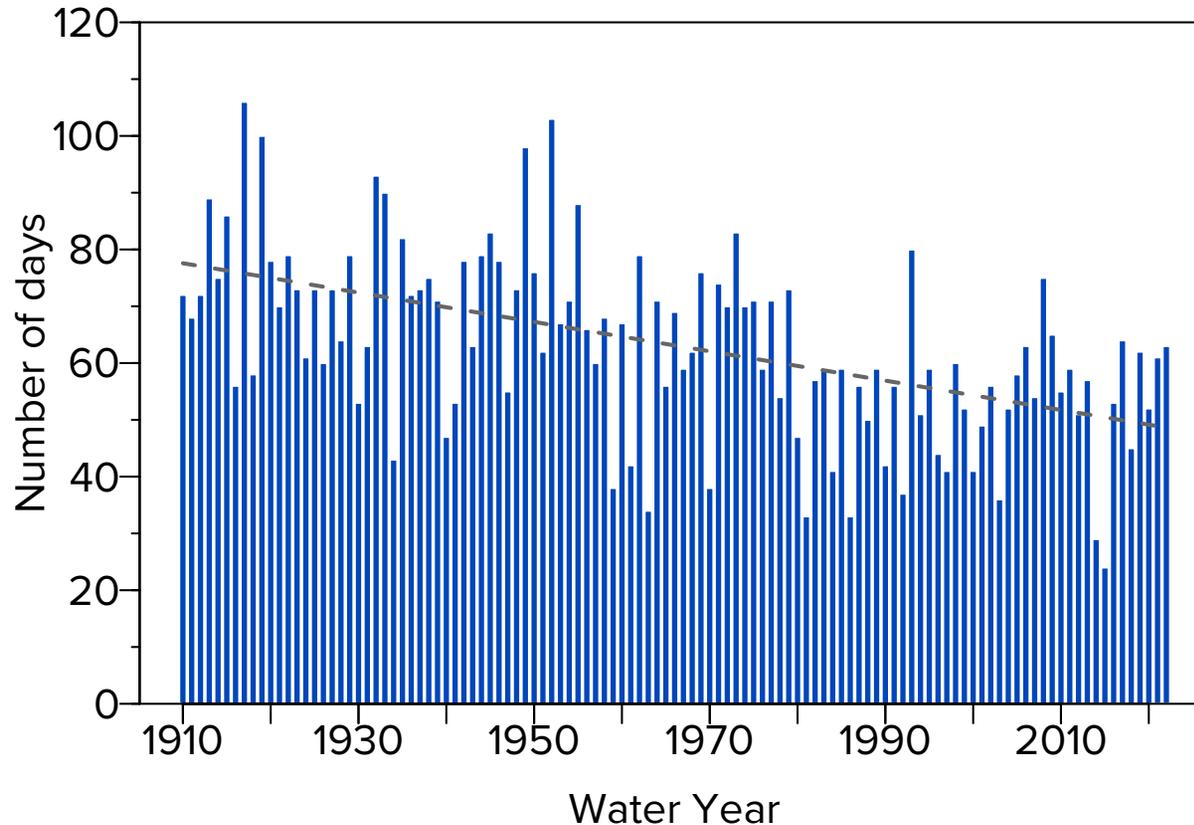
Yearly since 1910

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 2022, the number of freezing days was 63, above the declining long-term trend line. This is consistent with the measured air temperatures in 2022.

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

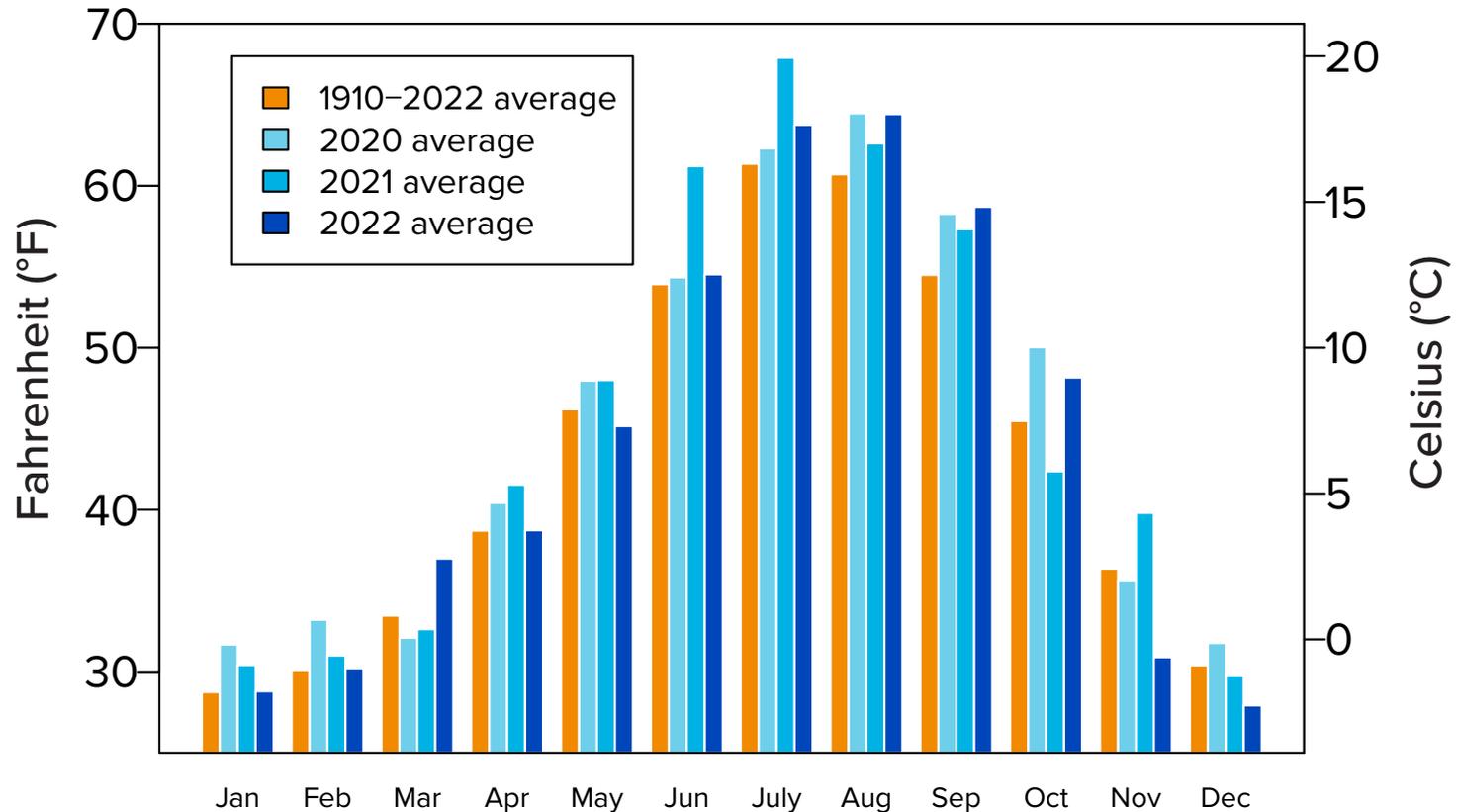
2020, 2021, 2022 and 1910 to 2022

In 2022, monthly air temperatures were similar to 2020 and 2021. However, for the months of November and December, temperatures were distinctly colder than the previous two years and the long-term average. The November mean temperatures were the third coldest on record after 1994 and 1931, while in

December temperatures were the 22nd coldest.

For nine months of the year, monthly air temperatures were equal to or greater than the long-term average air temperature (since 2010). Most of this was due to an increase in daytime maxima.

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



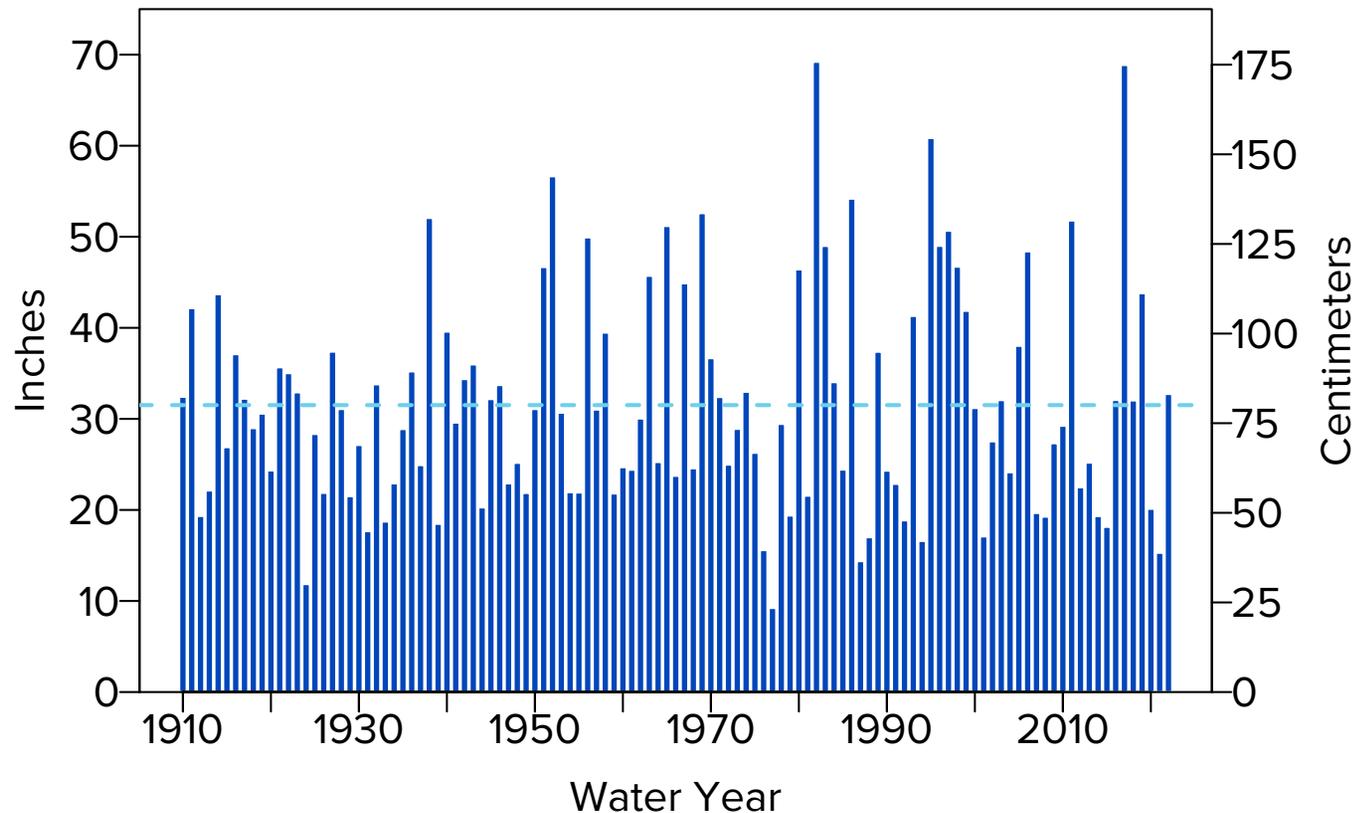
Annual precipitation

Yearly since 1910

From 1910 to 2022, average annual precipitation (water equivalent of rain and snow) measured 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 32.7 inches, 2022 was 1.2 inches above the long-term average (shown by the dashed line). 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

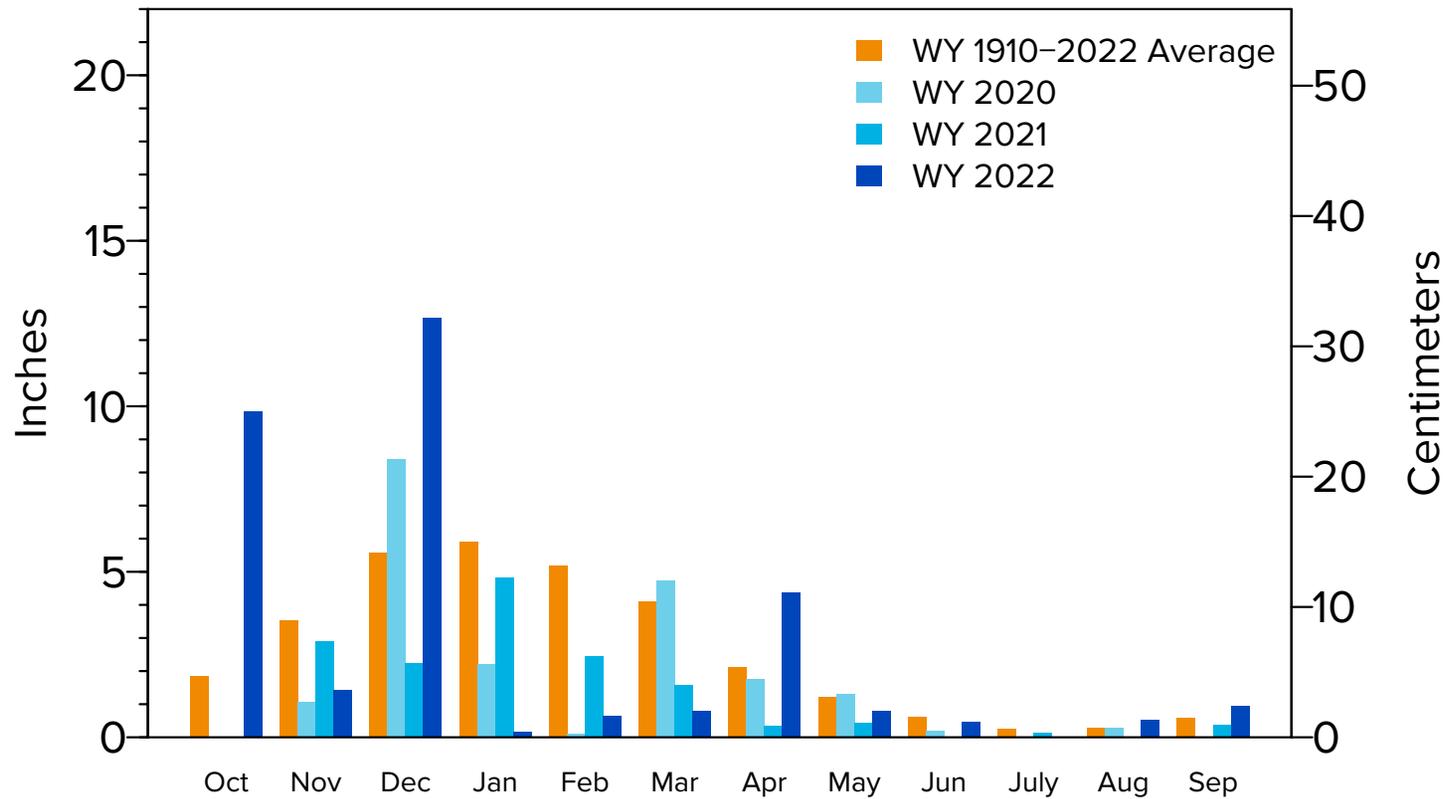
2020, 2021, 2022 and 1910 to 2022

The 2022 Water Year had an annual average of 32.7 inches of precipitation, slightly above the long-term average of annual precipitation of 31.5 inches at Tahoe City. Precipitation in October,

December and April for the 2022 Water Year was well-above the long-term average for those months. In all other months it was generally lower than the long-term average. The 2022 Water Year

extends from October 1, 2021 through September 30, 2022.

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



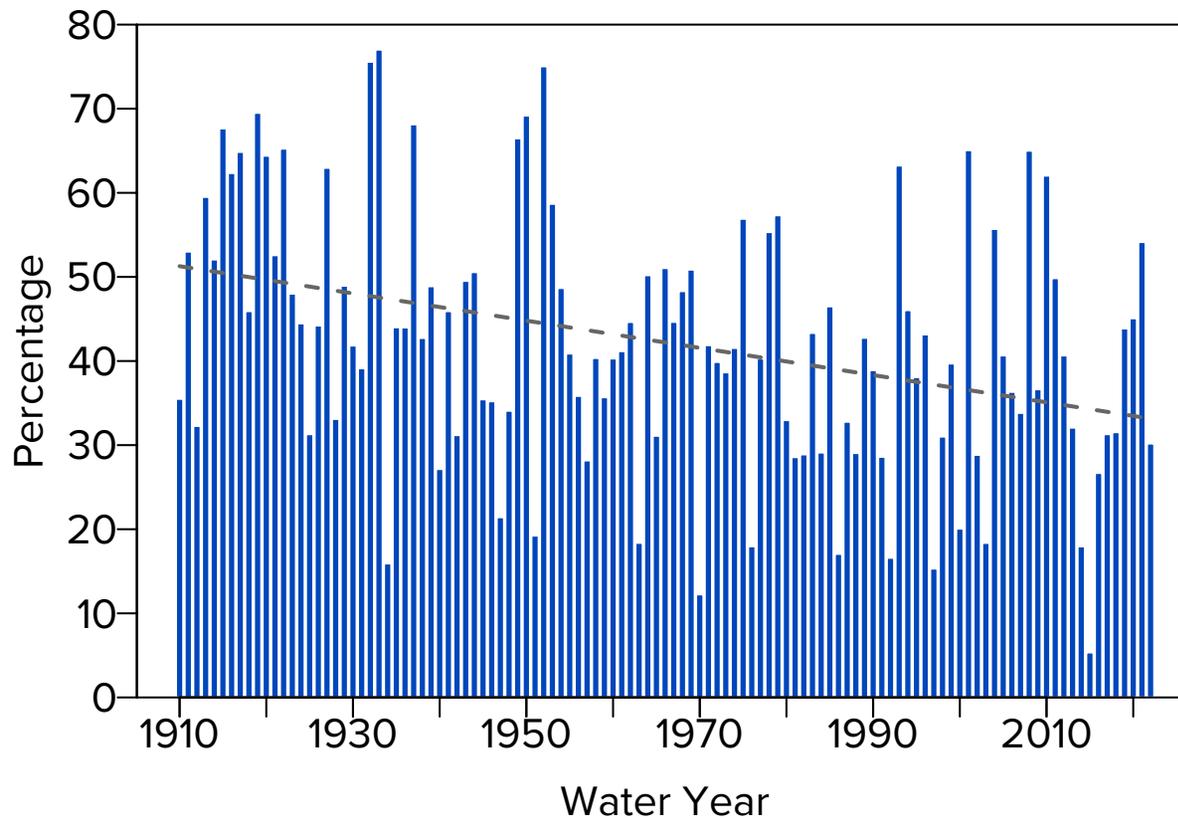
Snow as a fraction of annual precipitation

Yearly since 1910

Snow has declined as a fraction of total precipitation from an average of 52 percent in 1910 to 33 percent in 2022. In Tahoe City, snow represented 30.2 percent of the 2022 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.).

In 2020 and in 2022, the April snowpack readings at Lake Lucille

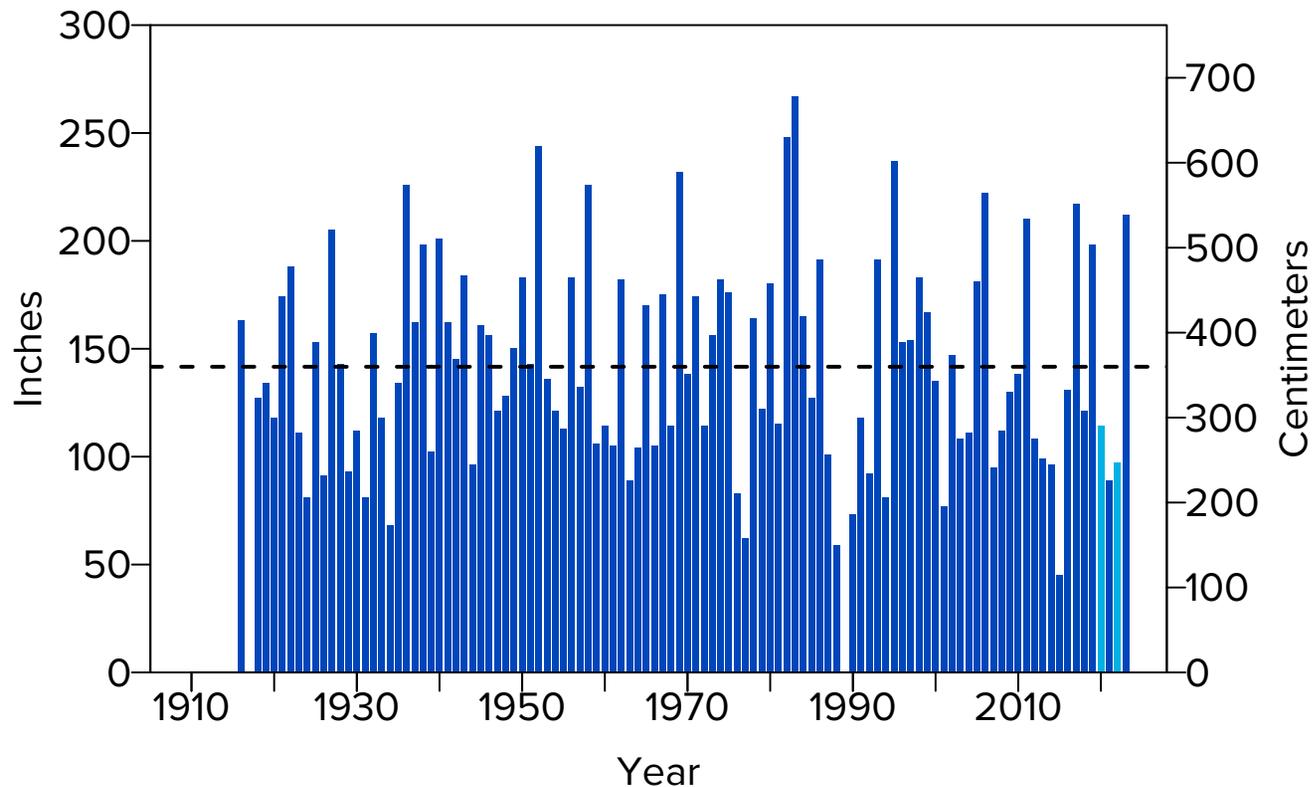
were not made due to storm conditions. Instead, the values were estimated by correlation with values made at the Rubicon #1 snow course. The correlation estimates are shown with the lighter blue columns.

For April 13, 2023, the value was 212 inches, well-above the long-term average. The largest amount on record was 267 inches on April 5, 1983. The

average snow depth (shown by the dotted line) over the period 1916-2023 was 142.3 inches.

Note: April snow depth data are not available for 1917 and 1989.

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



Daily solar radiation

In 2022

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 smokey 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.

