

TAHOE:
STATE
OF THE
LAKE
REPORT
2012

**PHYSICAL
PROPERTIES**

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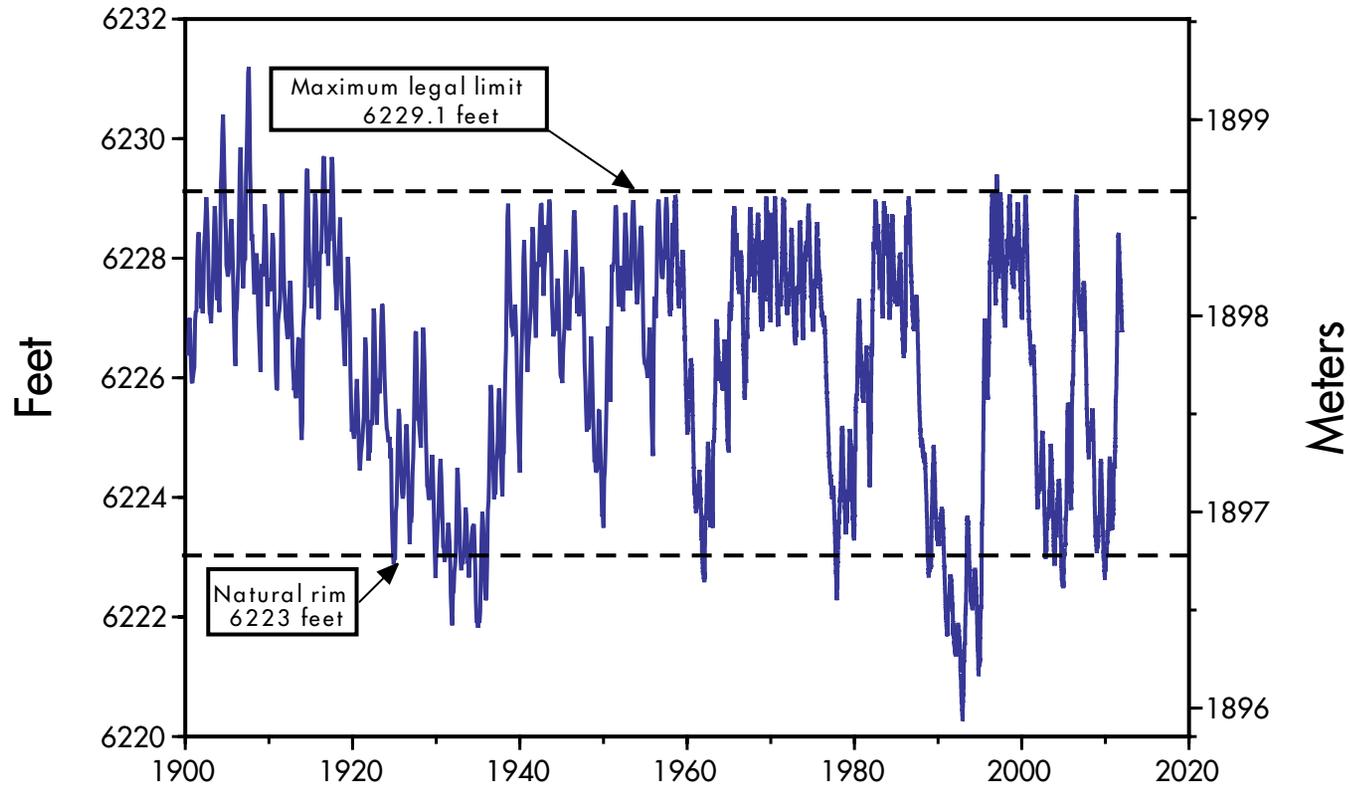
Lake surface level

Daily since 1900

Lake surface level varies throughout the year. It rises due to high stream inflow, groundwater inflow and precipitation directly onto the lake surface. It falls due to evaporation,

in-basin water withdrawals, groundwater outflows, and outflow via the Truckee River at Tahoe City. With the above-average precipitation, lake level rose rapidly in 2011. In 2011,

the lake level rose by 3.9 feet during snowmelt. The highest lake level was 6228.42 feet on July 30, and the lowest was 6224.48 feet on February 15.



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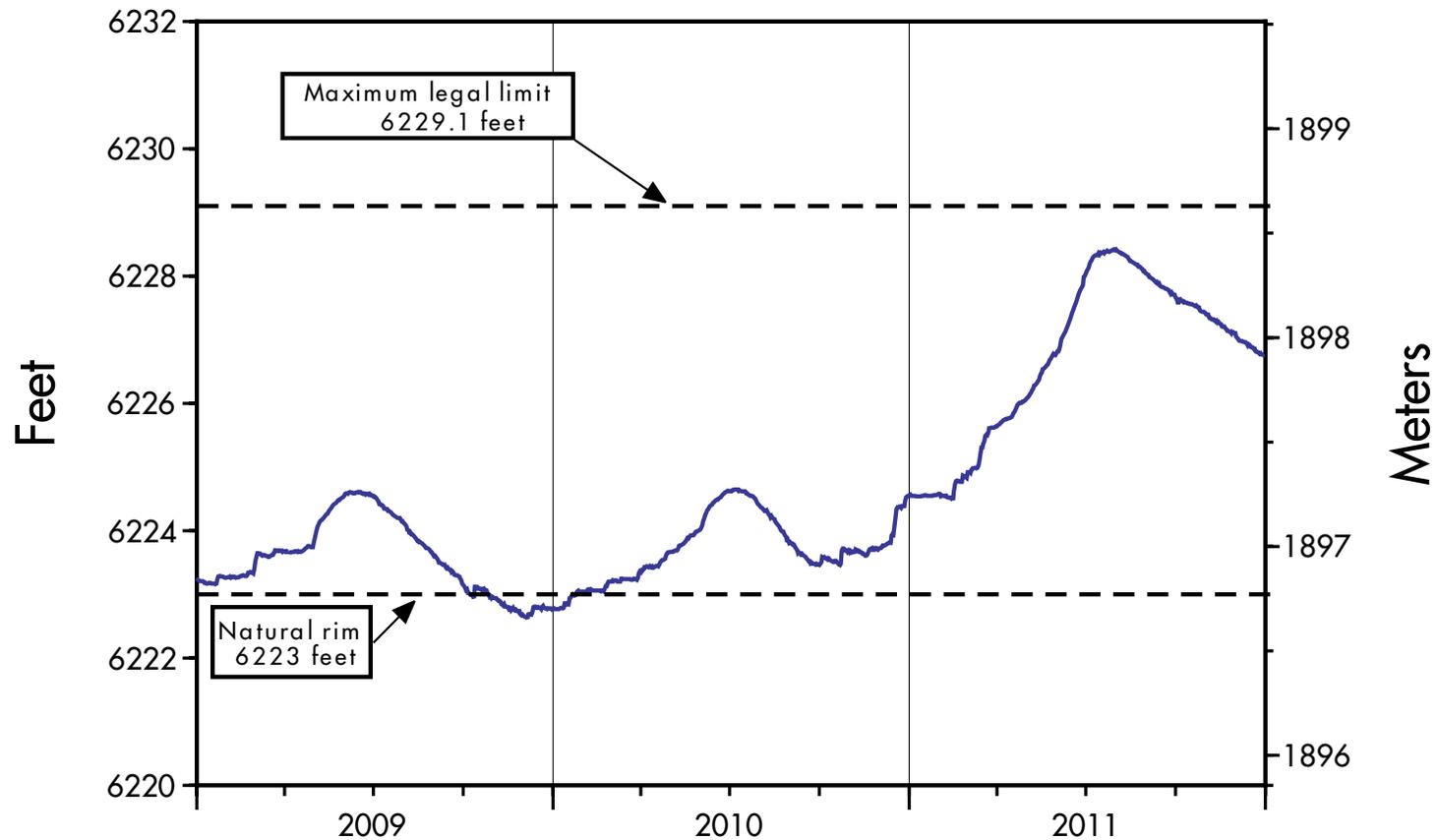
Lake surface level

Daily since 2009

Identical data as used on page 8.1 except the period displayed is shortened to 2009-2011. This more time resolved presentation of recent

lake level data allows us to see the seasonal patterns in higher definition. Data clearly show the lake level below the natural rim at the end of 2009 and

early 2010 as well as the annual periods of highest lake level. That follows the annual spring snowmelt.



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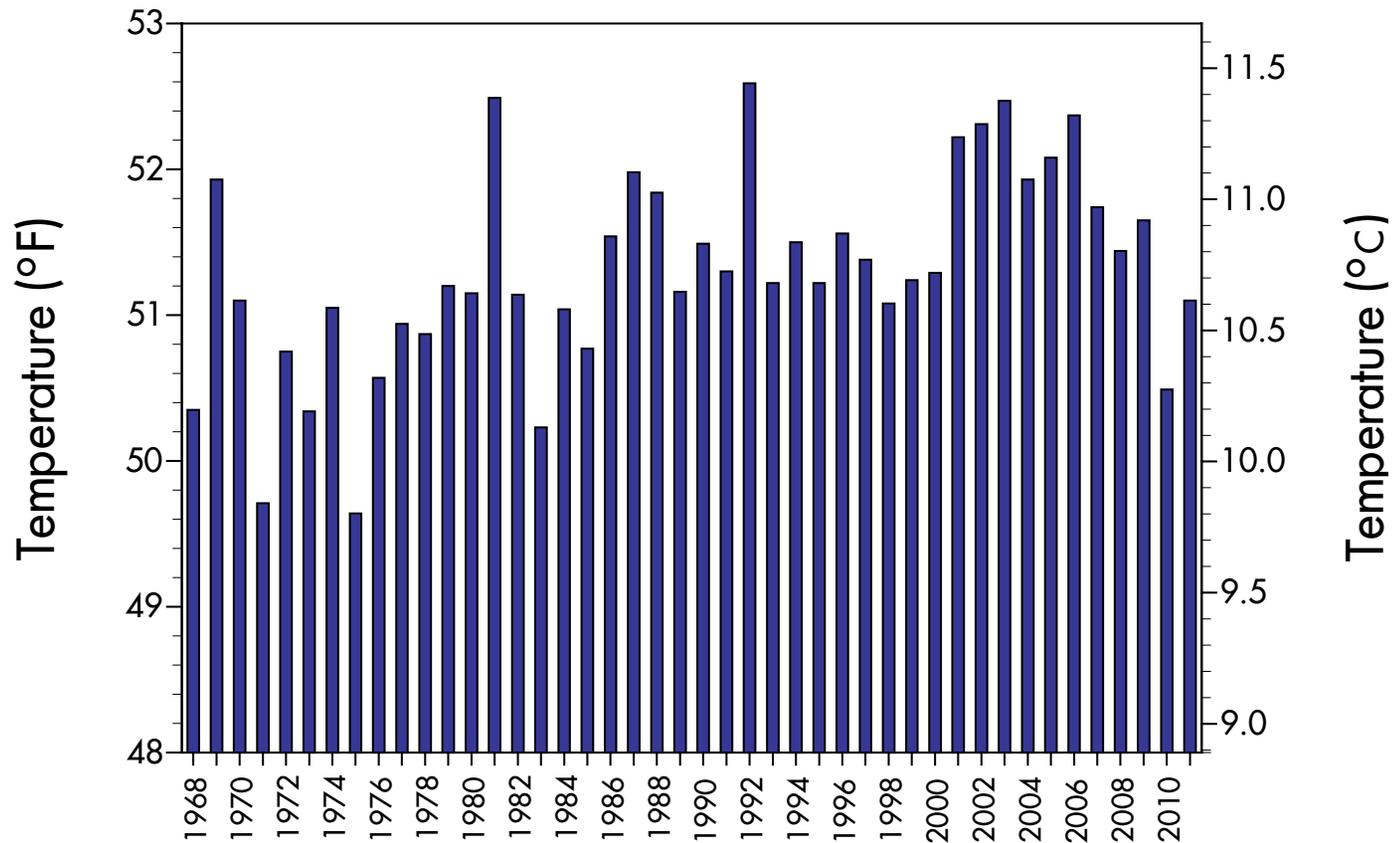
Surface water temperature

Yearly since 1968

Surface water temperatures have been recorded at the mid-lake station since 1968. Despite year-to-year

variability, water temperatures show an increasing trend. The average temperature in 1968 was 50.3 degrees

F. For 2011, the average surface water temperature was 51.1 degrees F, an increase of 0.6 degrees F over 2010.



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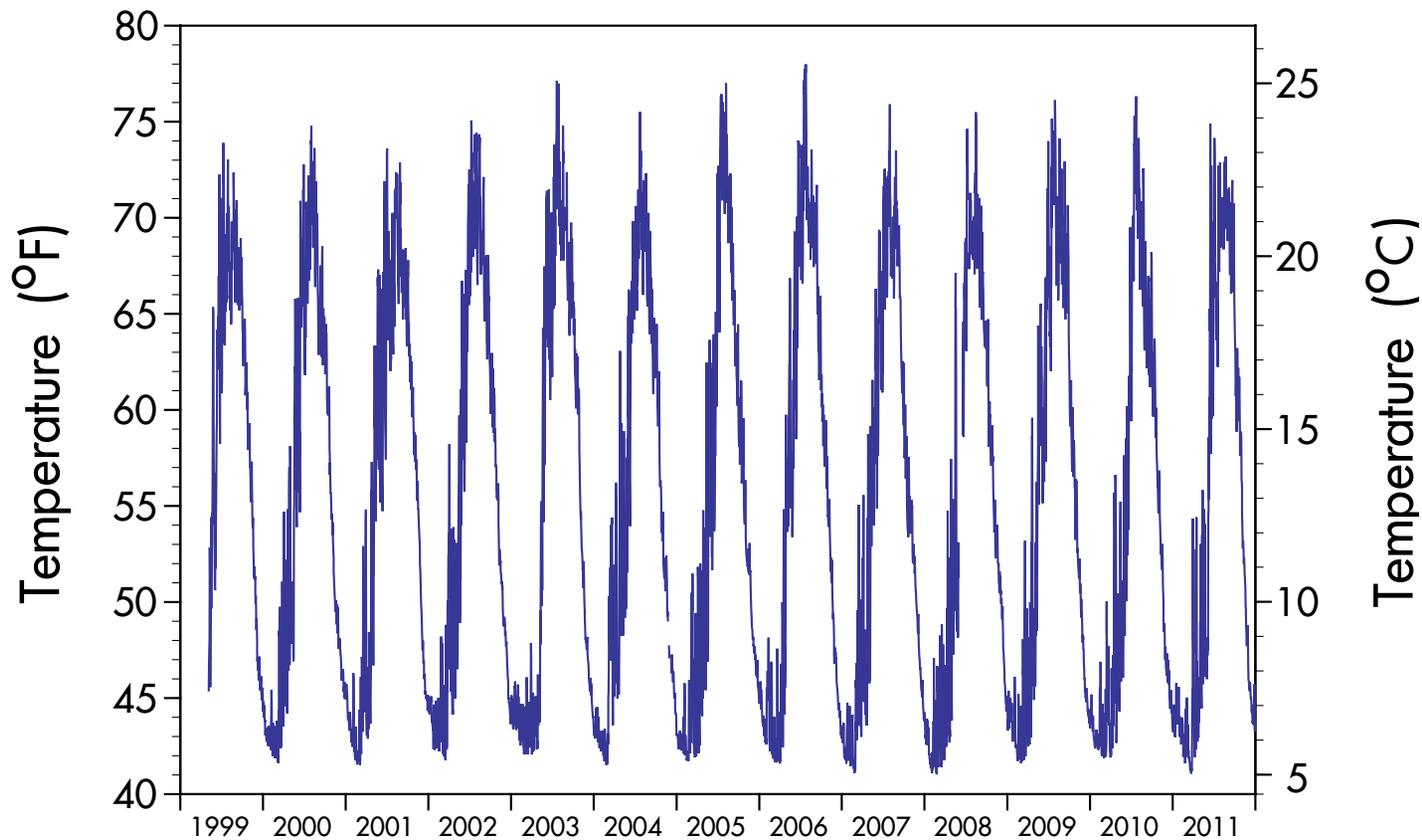
Maximum daily surface water temperature

Every 15 minutes since 1999

Maximum daily surface water temperatures were generally cooler in 2011. The lowest maximum daily surface water temperature was 41.07

degrees F, which was recorded on March 24, 2011. This was the second lowest temperature recorded in this 13 year record. The lowest was 41.02

degrees F on February 24, 2008. These data are collected by NASA and UC Davis from a buoy located near the center of the lake.



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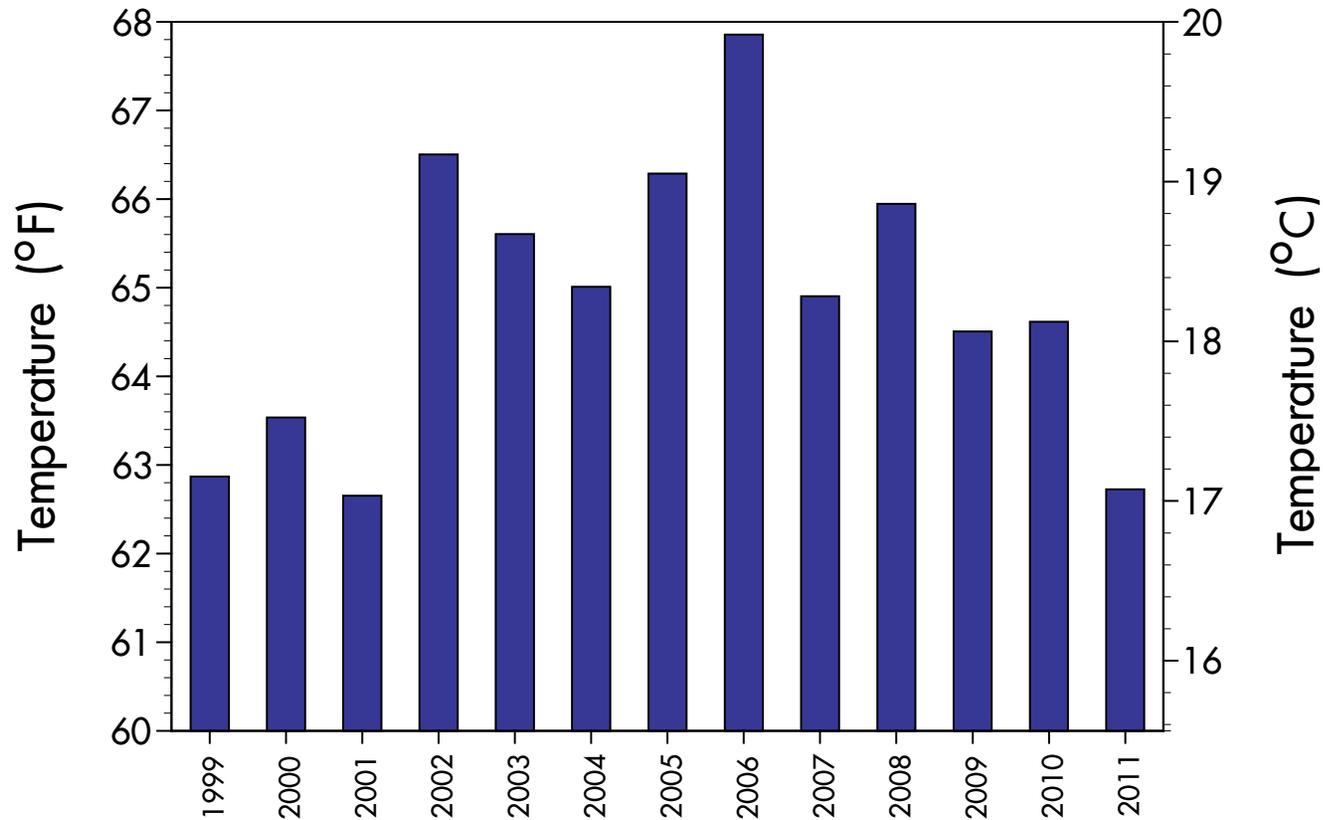
July average surface water temperature

Since 1999

Since 1999, surface water temperature has been recorded every two minutes from four NASA/UC Davis buoys. Shown here are 13 years of average surface water temperatures

in the month of July when water temperatures are typically warmest. In 2011, July surface water temperature averaged 62.7 degrees F, compared with 64.6 degrees F in 2010. This was

the second coolest July for the 13 year record, surpassed slightly by 2001. Both of those years had deep lake mixing, an event that cools the surface layers of the lake.



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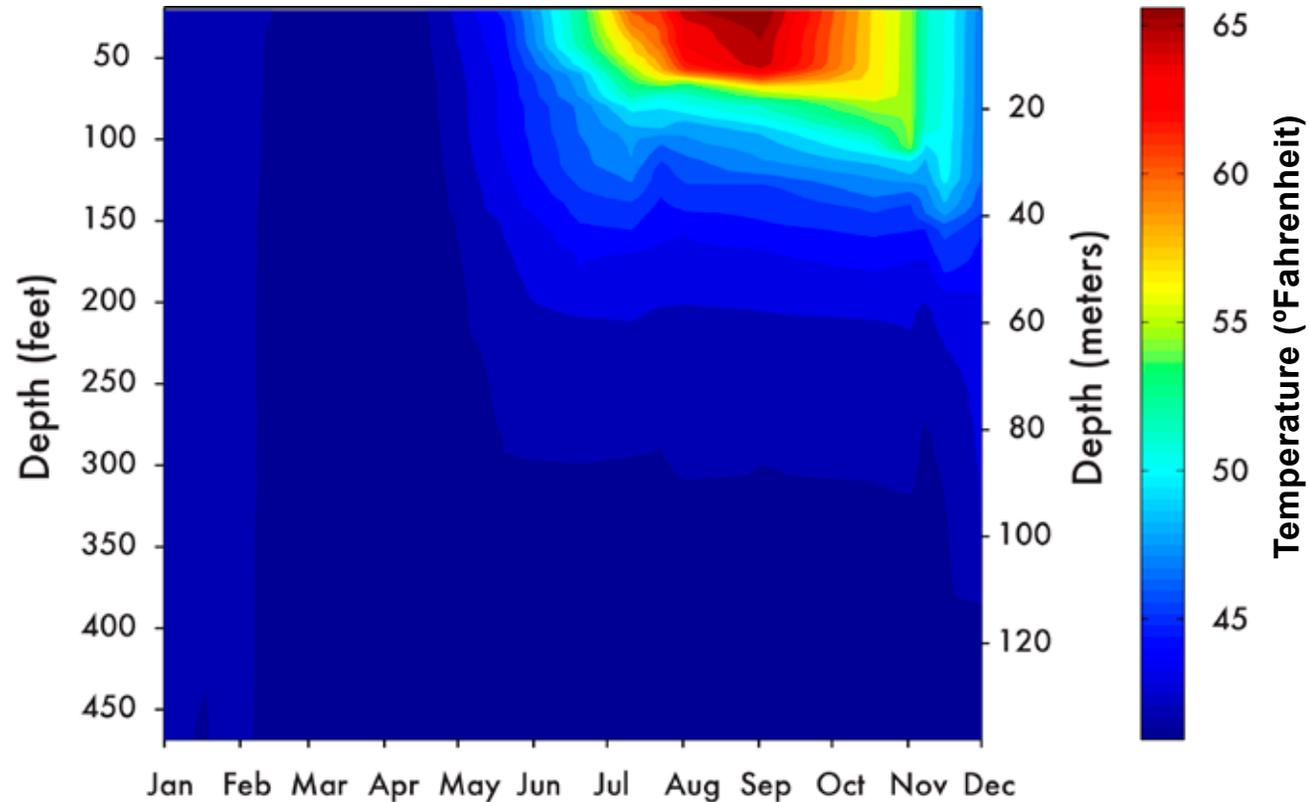
Water temperature profile

In 2011

Water temperature profiles are measured in the lake at 10 day intervals using a Seabird CTD. The temperature is accurate to within 0.005 degrees F. Here the temperature in the upper 500 feet is displayed

as a color contour plot. In 2011, the lake temperature followed a typical seasonal pattern. In late March, the lake surface was at its coldest and complete vertical mixing occurred. The beginning of the 2011-2012

winter mixing is evident at the end of the plot, with the surface layer both cooling and deepening. By the end of 2011, mixing had proceeded to 425 feet.



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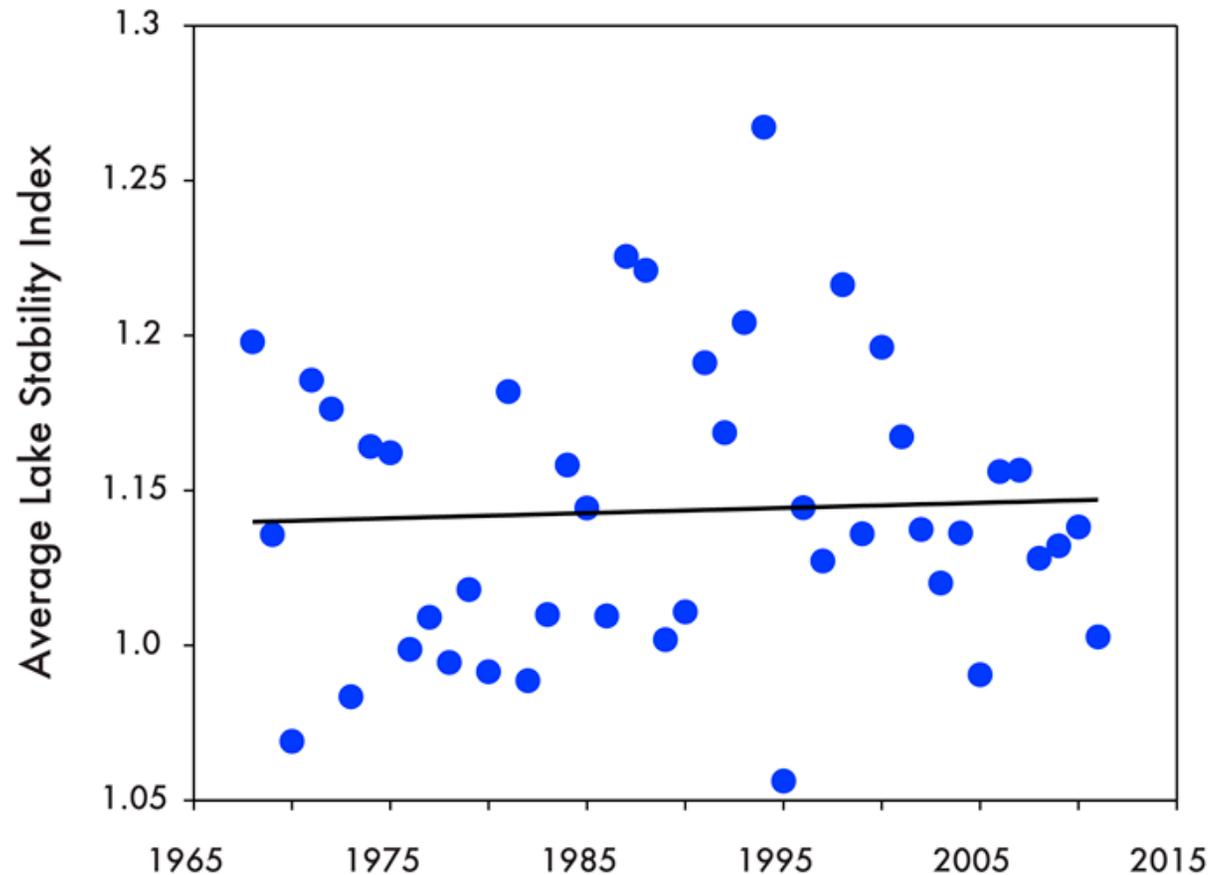
Lake stability

Since 1968

Lake stability is a measure of the energy required to fully mix the lake when its density is stratified. Plotted here is the average annual

stability for water in the upper 100 meters (330 feet) of Lake Tahoe. The values are derived from temperature profiles taken at the Index Station at

approximately 10 day intervals. The flatness of the line indicates that the stability of the upper 100 meters has not increased very much since 1968.



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Stratified Season Length

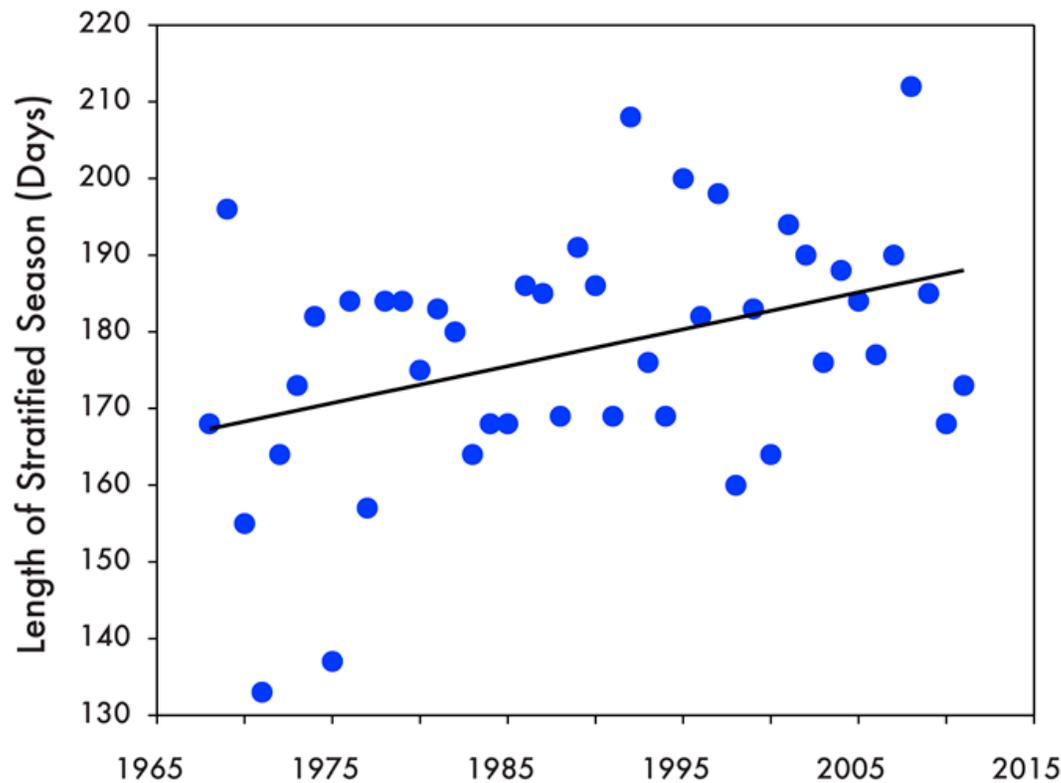
Since 1968

During the year the lake's stability varies from low values in winter to high values in summer. Defining the stratified season as being when the Stability Index exceeds a critical value it is possible to calculate the length of the stratified season for each year.

Despite considerable interannual variability, it can be seen that this period has increased in length by almost 20 days since 1968.

The greater the length of the stratified season, the less time there is for mixing

to occur. The long term increase in the length of the stratified season is believed to be due to climate change. Because 2011 was such a cold year, the length of the stratified season was considerably shorter than the long term trend.



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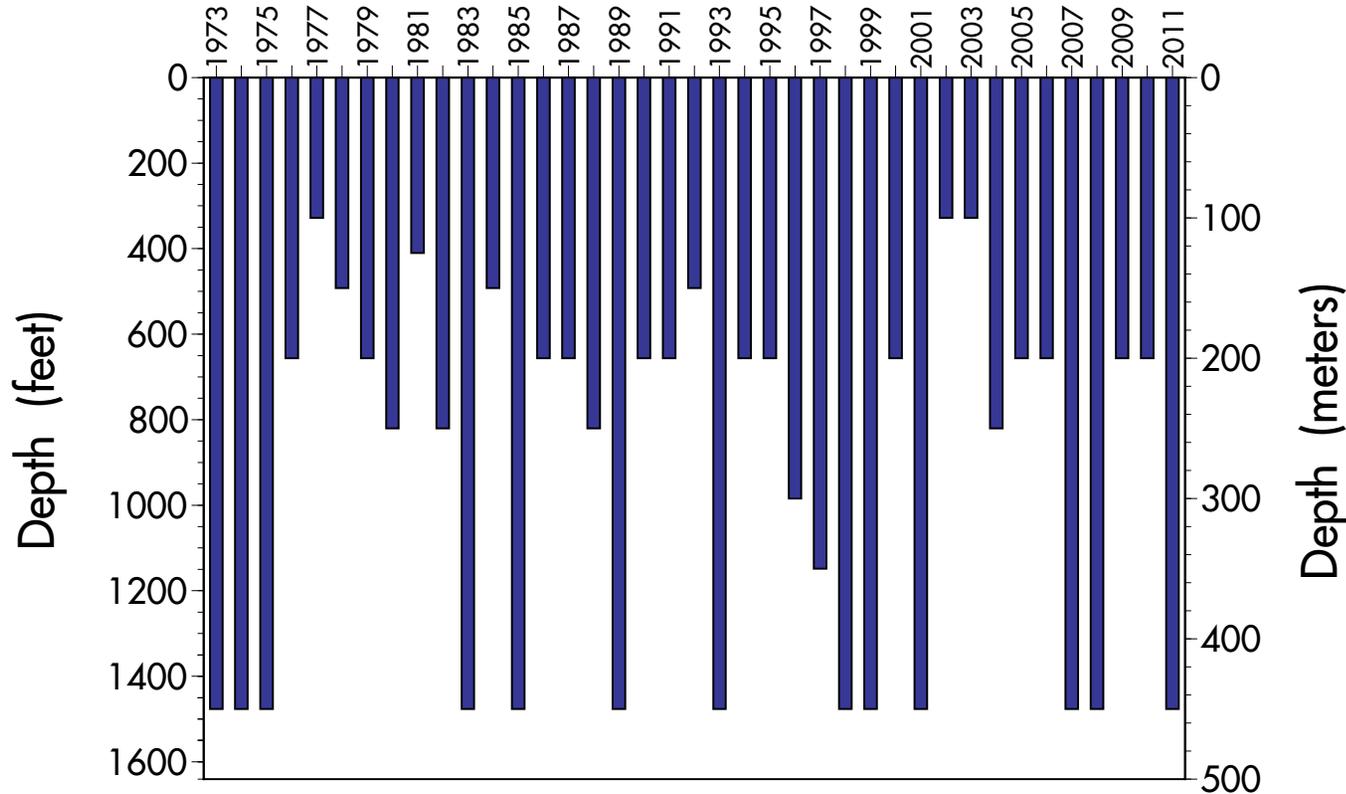
Depth of mixing

Yearly since 1973

Lake Tahoe mixes each winter as surface waters cool and sink downward. In a lake as deep as Tahoe, the wind energy and intense cooling of winter storms helps to determine how deeply the lake mixes. Mixing depth

has profound impacts on lake ecology and water quality. Deep mixing brings nutrients to the surface, where they promote algae growth. It also moves oxygen to deep waters, promoting aquatic life throughout the water

column. The deepest mixing typically occurs in February to March. In 2011, Lake Tahoe mixed all the way to the bottom, owing to the very cold and long winter.



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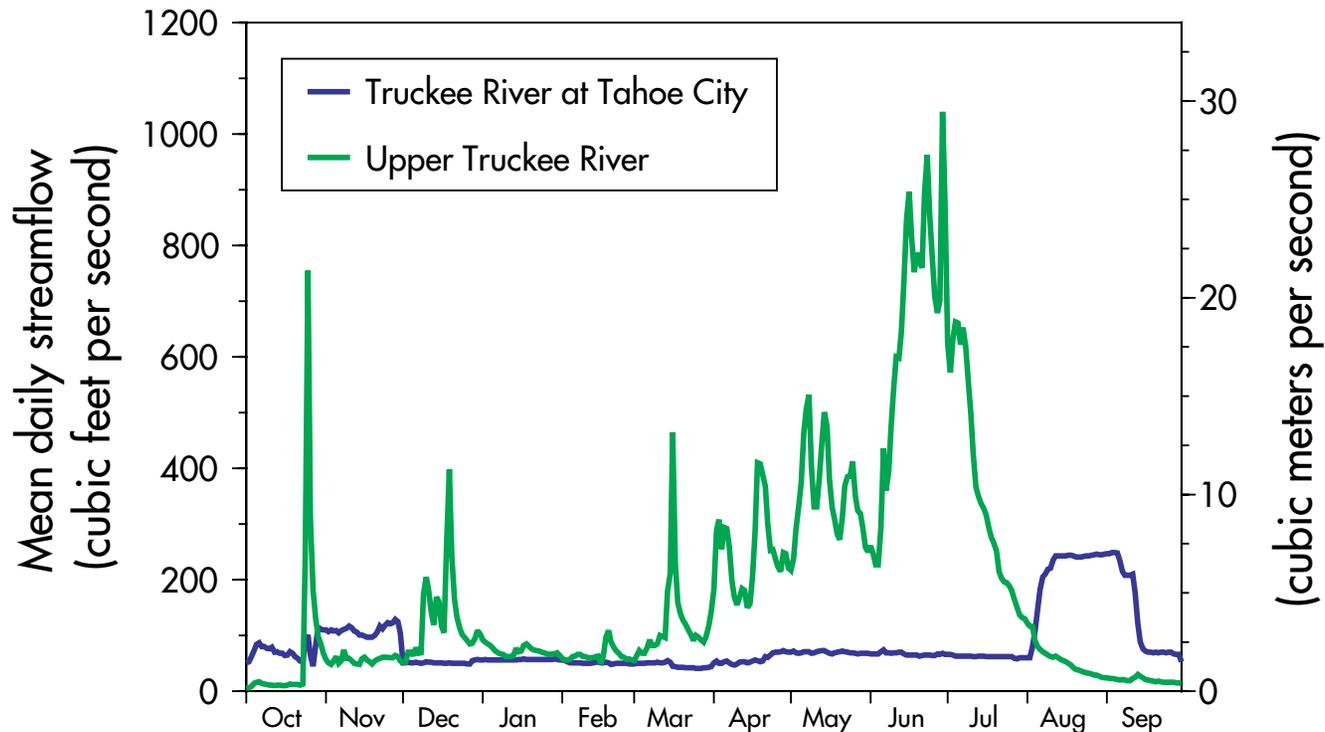
Mean Daily Streamflow of Upper Truckee River vs. Truckee River

Water Year 2011

The Upper Truckee River, the largest stream to flow into Lake Tahoe, has a natural annual hydrograph for a snow-fed stream. The small peaks in the hydrograph represent rain events or short warm periods in winter or spring. The major peak in the hydrograph represents the maximum

spring snowmelt. The peak in 2011 was 1040 cubic feet per second on June 29, well above the median peak of 250 cubic feet per second. The Truckee River is the only outflow from Lake Tahoe. The streamflow in the Truckee River is a regulated flow, with release

quantity controlled by the Federal water master. The release rates are set according to downstream demands for water. The maximum discharge in 2011 was 249 cubic feet per second on September 3. Streamflow data are collected by the Lake Tahoe Interagency Monitoring Program (LTIMP).



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Annual Discharge Volume for Upper Truckee River and Truckee River

Since 1980

Flow into Lake Tahoe (e.g. Upper Truckee River) and discharge out of Lake Tahoe (Truckee River at Tahoe City) have shown considerable variation since 1980. The large peaks in discharge from the lake correspond

to years when precipitation (and therefore total inflow) was the greatest, e.g. 1982-1983, 1986, 1995-1999. Similarly, the drought-like conditions in the early 1990s and the low precipitation years in the

beginning of the 2000s also stand out. Since many of the pollutants of concern for Lake Tahoe's clarity enter along with surface flow, year-to-year changes in clarity are influenced by precipitation and runoff.

