TAHOE: STATE OF THE LAKE REPORT 2014

CLARITY

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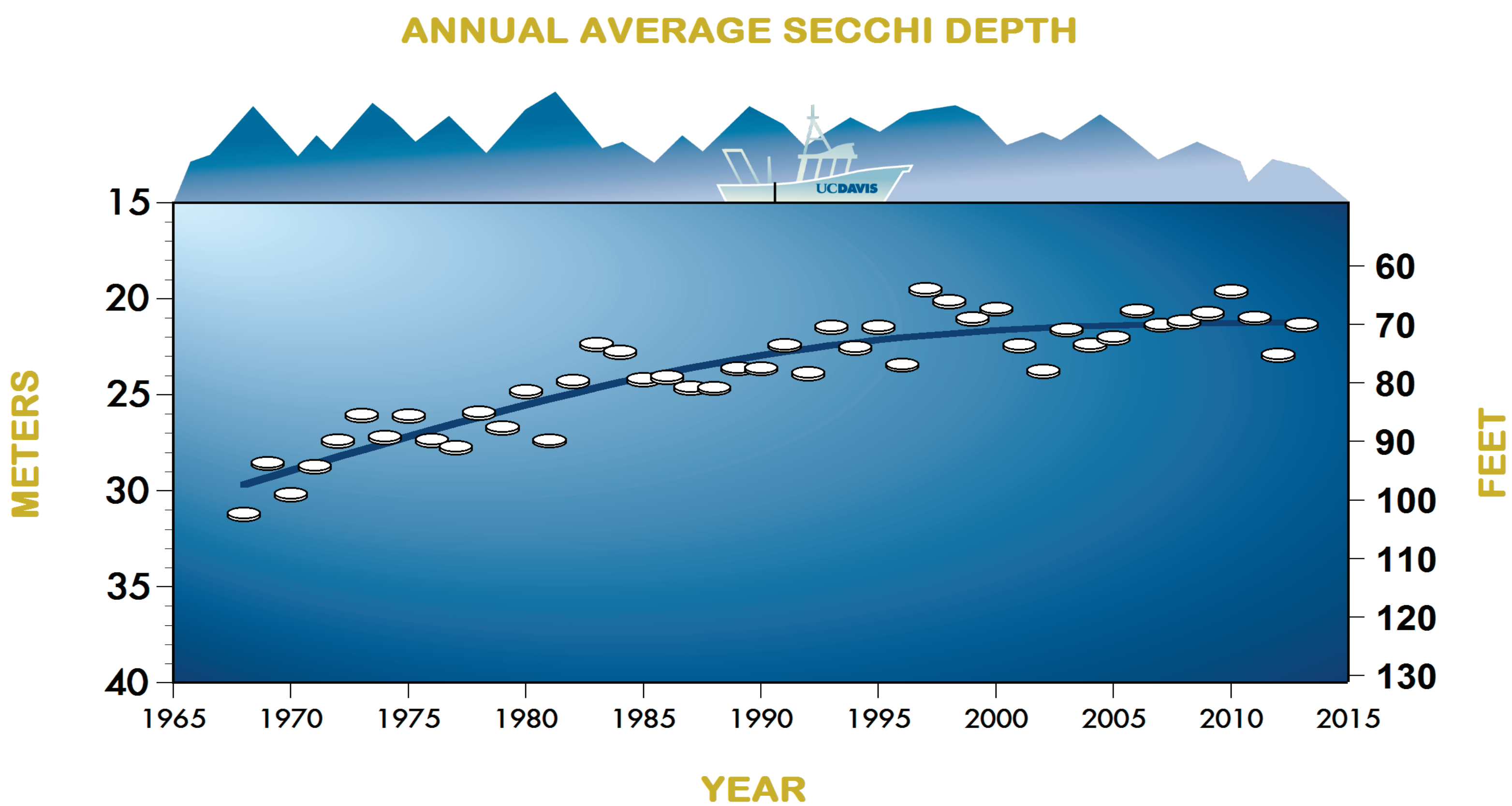
CLARITY

Annual average Secchi depth

Yearly since 1968

In 2013 the annual average Secchi depth was 70.1 feet (21.4 m), a decrease of 5 feet over the previous year, but still well above the lowest value recorded in 1997 of 64.1 feet (19.5 m). The annual average clarity in the past decade has been better than the prior decade. From 2004-2013 the average clarity was 70.0 feet (21.3 m). The clarity level is the average of 25 individual readings taken throughout the year. The highest individual value recorded in 2013 was 90.2 feet (27.5 m) on March 25, and the lowest was 49.2 feet (15.0 m) on July 12. It is important to understand the causes behind clarity change and to evaluate past actions and future investments.



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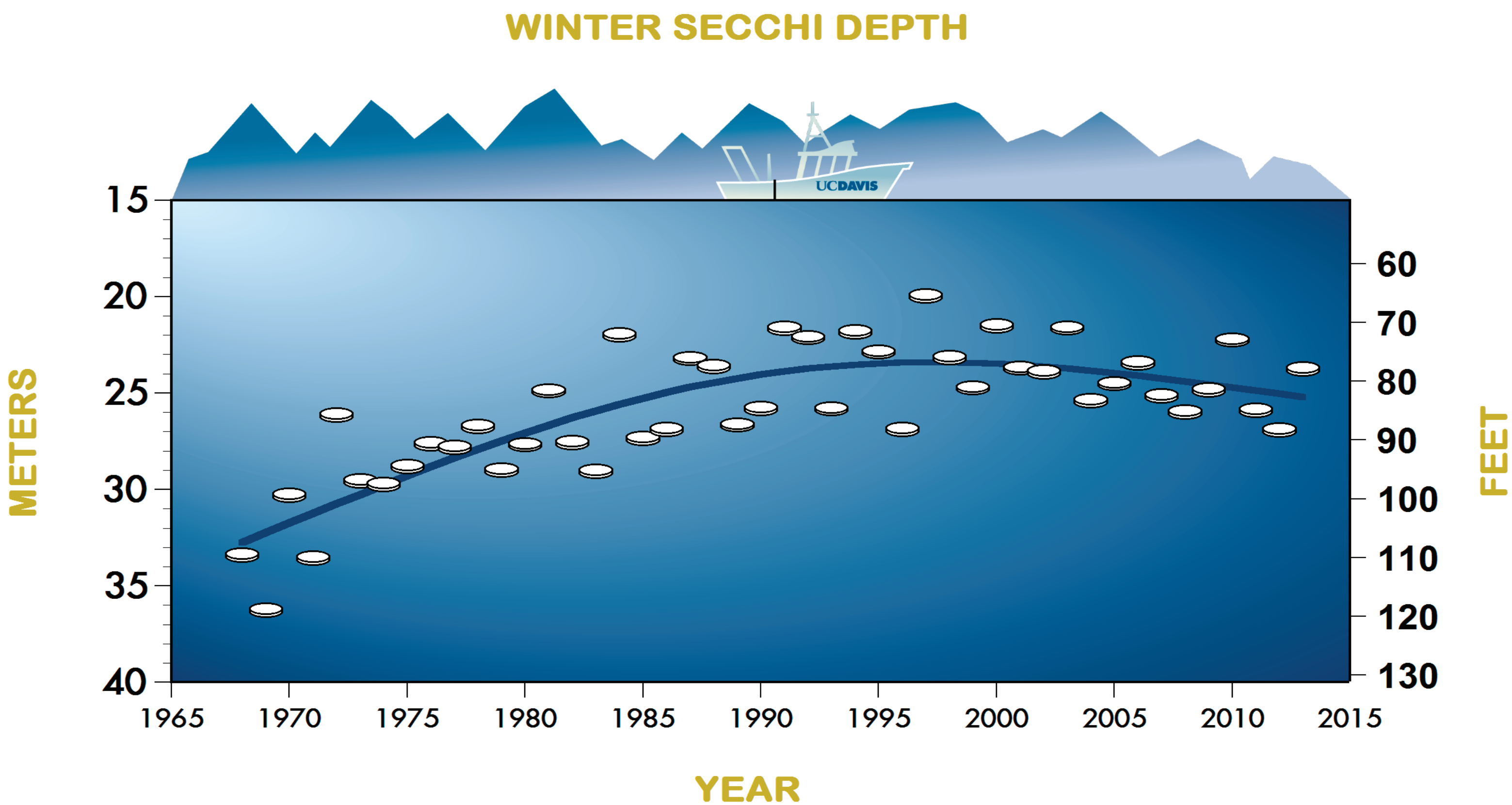
Winter Secchi depth

Yearly since 1968

Annual winter (December-March) Secchi depth measurements from 1968 to the present indicate that winter clarity at Lake Tahoe is showing definite improvement. In 2013, although 10 feet less than the previous year, the winter clarity was 77.9 feet (23.7 m). This is well above the lowest reading, seen in 1997. Large stream inflows in winter of 2012/2013 were mainly responsible for the decrease. The reasons behind the overall improvement in winter clarity are not fully understood, but are possibly tied to reductions in the quantity of fine particles from urban stormwater.



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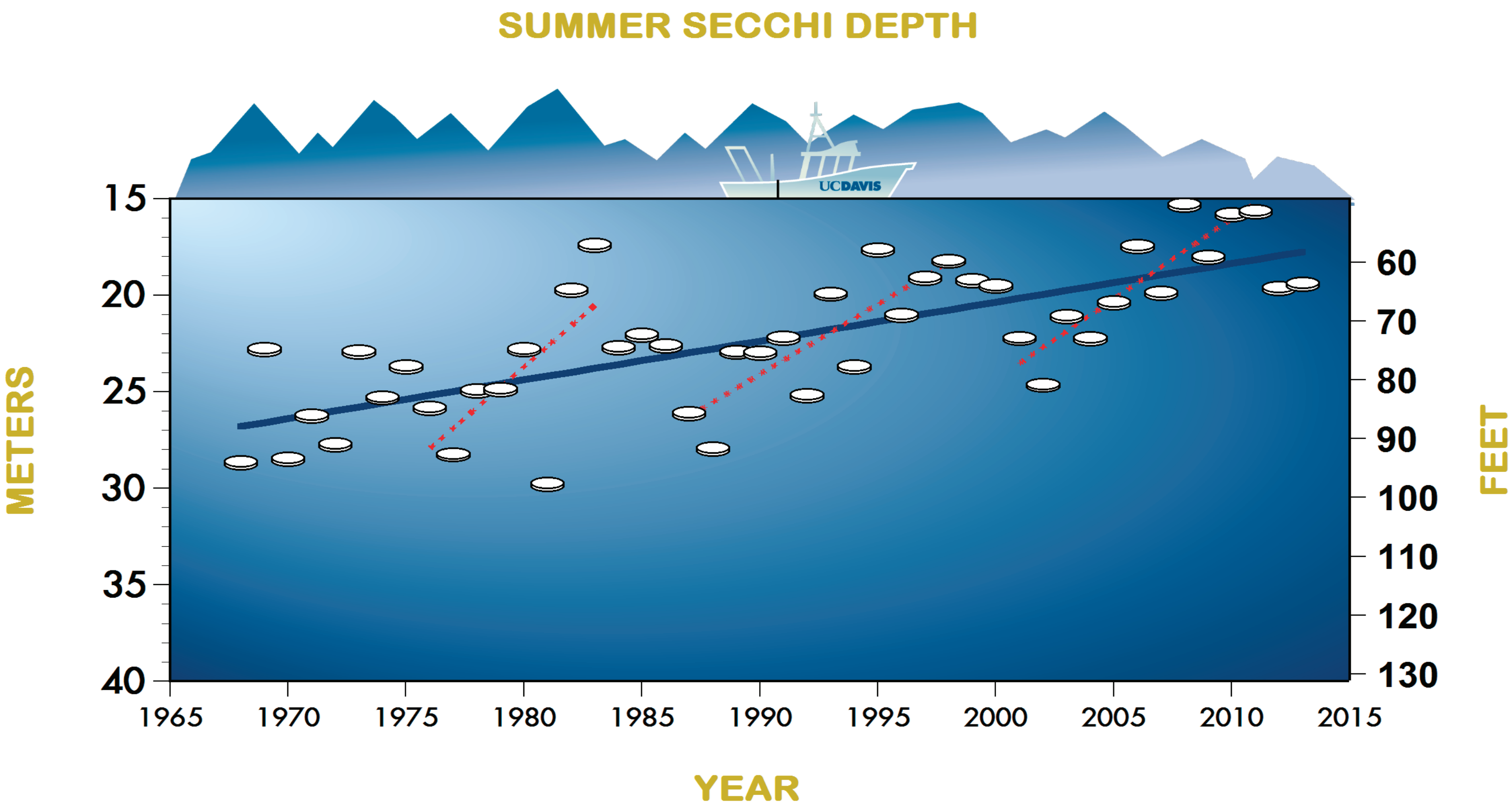
Summer Secchi depth

Yearly since 1968

Summer (June-September) clarity in Lake Tahoe in 2013 was 63.8 feet (19.4 m), almost identical to the value from 2012. This coincided with a decline in the concentration of small algal cells in 2013. Despite this improvement, the summer trend is dominated by a consistent long-term degradation but with a noticeable 10-15 year cyclic pattern. The red dashed lines are linear regressions for the periods: a) 1976 to 1983, b) 1987-1998, and c) 2001 to 2011. The most recent improvement may be a continuation of this cyclical trend. The reasons behind this periodicity are being investigated.



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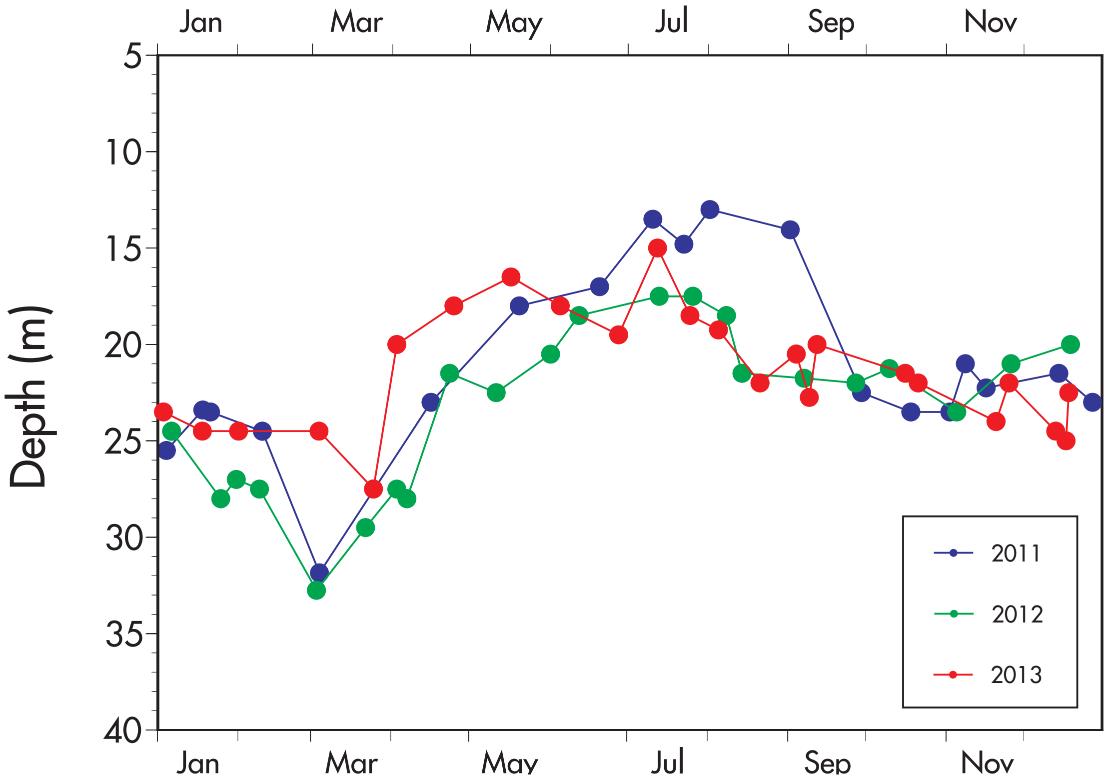
Individual Secchi depths

2011, 2012, 2013

Here the individual Secchi depth readings from the Index station on the west side of the lake for 2011,2012 and 2013 are plotted. For all three years it is evident that there is a distinct seasonality – Secchi depth is generally higher in the fall and winter months, and lowest in the spring and summer. The maximum Secchi depth often occurs around the time of deepest mixing (March). All three years reflected these trends.

2013 was the poorest year for clarity in the winter months. This is believed to be due to high precipitation in the previous December and the subsequent melt-off during the dry months that followed. Summer conditions, however, were very good owing to the small volume of spring snowmelt and the shallow depth of mixing in March.

Secchi values can be seen to sometimes vary considerably over short time intervals. This is evident in early September and early December in 2013. Such short-term variability is common in lakes. In this case the sudden changes are likely due to wind-driven upwellings.



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Light transmission

In 2013

A light transmissometer emits a specific wavelength of light and measures the percentage of that light transmitted over a 10 inch path. Clearer water results in a higher percentage of light transmission. Here, the light transmission measured at every depth in the lake is shown at three times in 2013. The “steps” in transmission at 200 feet, 240 feet, and 550 feet in the profiles indicates the depth of active lake mixing on those dates. It is also evident that the lowest light transmission is in the surface layers where between 93 and 94 percent of light is transmitted. The highest light transmission is in the very deepest parts of the lake where as much as 97 percent of the light can be transmitted. The reason for the improvement in deep water is that fine particles aggregate into larger particles that rapidly settle out in the deep water. Large particles do not scatter light as much as fine particles. The vertical trend in light transmission correspond very well with the distribution of fine particles in Figure 9.12.