

Lake Tahoe Clarity Report Mixed for 2019

Converging Threats Challenge Lake Restoration

The clarity of Lake Tahoe has long been one of the most important indicators of the changing condition of this iconic water body. In 2019, Lake Tahoe's clarity decreased nearly 8 feet from the previous year's dramatic 10-foot improvement. The average annual value in 2019 was 62.7 feet. The lowest value was recorded in 2017, when clarity was 60 feet.

Such year-to-year and even day-to-day fluctuations are common. A truer picture of the clarity is often indicated by a five-year running mean, which shows a mean clarity of 67.3 feet, according to the data released by the [UC Davis Tahoe Environmental Research Center](#).

Clarity is measured as the depth to which a 10-inch white disk, called a Secchi disk, remains visible when lowered into the water. In 2019, scientists took 28 individual readings at the long-term index station maintained by UC Davis.

Many factors combined

Unlike previous years, when scientists could point to a dominant factor affecting lake clarity, a range of factors all exerted influences in determining clarity in 2019: precipitation, lake mixing, sediment, algae and climate warming.

- The two previous years were average to well above average for precipitation, and 2019 was also a higher-than-average precipitation year.
- In February, the lake mixed all the way to the bottom for the first time in 8 years, bringing accumulated nutrients to the surface, where they aided algal growth in the spring.
- Higher than average loads of particles washed in from the surrounding watershed.
- In May, the presence of the tiny algal cell *Cyclotella* produced the lowest value of the year, a disappointing 36 feet of clarity.
- The warming lake surface waters kept fine particles entering from the watershed afloat near the lake surface in June and July, clouding transparency in the summer.

By contrast, the high clarity value of 112 feet was recorded on February 19, 2019. This was the result of the lake mixing to the bottom. When deep mixing occurs, it brings clear, deep water to the surface to immediately improve clarity, but the nutrients that are also moved can produce algal blooms later in the year.

Seasonal differences

In the past two decades, scientists have observed a divergence in winter and summer clarity. In the winter months, lake clarity tends to gradually improve while in summer,

clarity continues to decline. The reasons for the divergence is a focus of a bi-state committee of scientists led by the Tahoe Science Advisory Council.

The average summer Secchi depth was 53 feet, based on 10 readings between June and September 2019. This is the fourth lowest summer value, with 2008 being 51 feet, and 2010 and 2011 being 52 feet.

The trend in winter values slightly improved. Average winter Secchi depth was 81 feet, based on eight readings between December 2018 and March 2019. This is only slightly below the long -term mean of 84 feet. Scientists are evaluating the extent to which regulatory programs within the basin have contributed to improved winter clarity.

Working on solutions

More than 80 organizations, including government agencies and research institutions, are working in collaboration to address environmental impacts to Lake Tahoe's fragile ecosystem.

State, local and federal agencies, together with the private sector and other stakeholders, are working collaboratively with scientists to improve Lake Tahoe's water clarity and ecological health under a bi-state clarity restoration program and the basin's Environmental Improvement Program. While the impacts of climate change and watershed contaminants have long been focal points of research, new research is exploring the impacts of the invasive [Mysis shrimp](#) on the native foodweb.

"With lake warming impacting the recovery of Lake Tahoe's clarity, we're looking for ways that can mitigate climate impacts. Approaches such as the removal of the invasive Mysis shrimp are showing great promise for clarity improvement in the next few years," said Geoffrey Schladow, director of the UC Davis Tahoe Environmental Research Center. "The environmental services that the natural Tahoe ecosystem provided are now being better recognized."

UC Davis has conducted continuous monitoring of Lake Tahoe since 1968, when a Secchi disc could still be seen a full 102 feet below the surface. This research has informed policymakers and stakeholders on management strategies to protect the lake and stabilize its decline in clarity.

"Understanding why summer clarity continues to decline is our highest priority, and we continue to work closely with the science community to understand how to reverse that decline," said Joanne S. Marchetta, executive director of the Tahoe Regional Planning Agency, which funds the clarity report. "We remain committed to the lake's restoration in the face of the urgent threats of climate change and invasive species."

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Media Resources

Press kit of graphs and images.