

Climate change taking toll on clarity of Lake Tahoe water

May 22 2017, by Scott Sonner



In this April 4, 2017 photo provided by UC Davis Tahoe Environmental Research Center, Scott Hackly, a researcher at the University of California, Davis, collects algae samples from a boulder in Lake Tahoe just south of Lake Tahoe Nevada State Park's Sand Harbor in Incline Village, Nev. Algae growth fueled by air pollution and contaminants in storm-water runoff have contributed to the loss of the lake's historic clarity. (Brant Allen, UC Davis Tahoe Environmental Research Center via AP)

Climate change is causing Lake Tahoe to warm sooner in the spring than it has historically, disrupting the normal mixing of shallow and deep water and undercutting gains made in reversing the loss of clarity of the cobalt mountain lake, scientists say.

"Climate change is impacting not only Lake Tahoe's water quality, but also the health of its forests and its recreation-based economy," said Joanne Marchetta, executive director of the Tahoe Regional Planning Agency, which regulates the lake covering 191 square miles (495 sq. kilometers) along the Nevada-California border.

Until recently, the climatological cycles affecting Tahoe's clarity had remained fairly constant since 1968, when experts first dropped a white disk into the lake to measure how far down it remained visible. Back then, it was more than 102 feet (31 meters) compared to an average of about 69 feet (21 meters) now.

Dry years resulted in clearer water. Storm-water runoff carrying soils and contaminants during wet years made it worse.

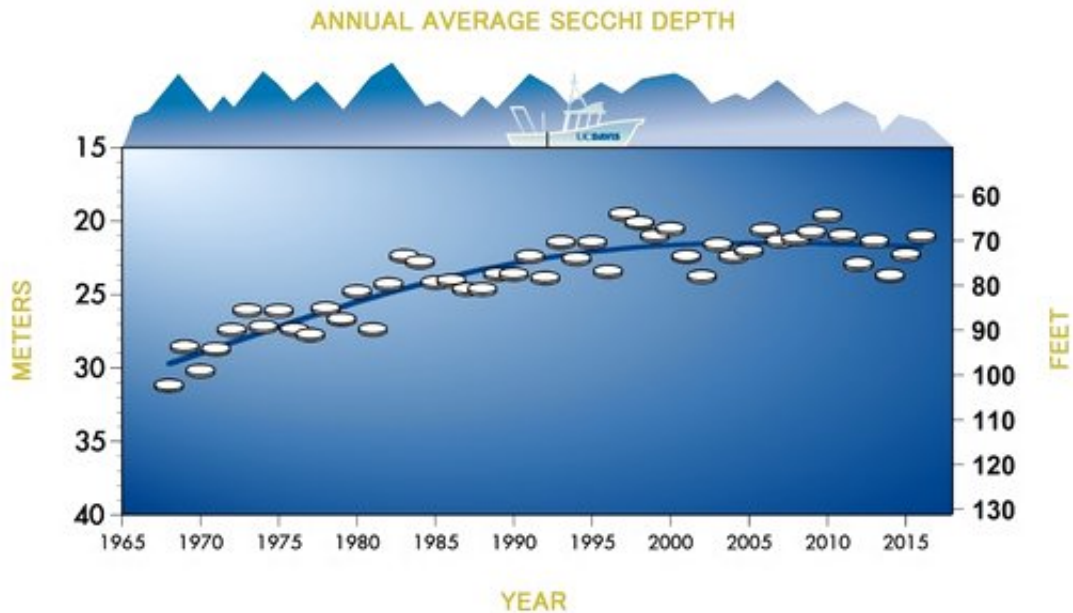
" You didn't need a Ph.D. to understand it," said Geoff Schladow, director of the University of California Davis Tahoe Environmental Research Center.

But the pattern seems to be breaking down, he said.

"What we are learning is that climate change isn't just a one-size-fits-all thing," he said in an interview. "It's not just warmer air temperatures or more extreme winters or droughts. It's a combination of all of these things."

Average annual clarity for 2016 was about 4 feet (1.2 meters) worse than the 73 feet (22 meters) recorded in 2015, but better than the worst-

recorded average of 64 feet (19 meters) in 1997.



This Thursday, May 18, 2017 graph produced by the University of California, Davis, Tahoe Environmental Research Center, depicts the clarity of Lake Tahoe based on how deep a white, dinner plate-sized "Secchi" disk lowered into the water is visible from the surface. The depth was more than 102 feet when scientists first took samples in 1968. It averaged 69 feet in 2016 - about 4 feet worse than the 73 feet recorded in 2015, but 5 feet better than the worst-recorded average of 64 feet in 1997. (University of California, Davis, Tahoe Environmental Research Center via AP)

Marchetta says the improvements are a testament to the more than \$1 billion spent by federal, state and local entities the past two decades to slow the flow of pollutants into the lake and restore shoreline marshes

and wetlands.

But for the second year in a row, on the heels of a five-year drought, the data show continuation of the worrisome trend that started eight years ago.

The 2015 data showed that Tahoe's average surface temperature had risen faster over the previous four years than any time on record—15 times faster than the long-term warming rate over the past half century.

In 2016, the temperature was again at record levels, and the lake stratified—or separated into distinct layers—at close to the earliest time of year ever.

"We get less mixing of the lake in the summer," Schladow said.

Less mixing means tiny particles of algae remain near the surface longer, gathering sunlight and collecting nutrients that spur their growth and reduce clarity. As a result, the 2016 numbers tell a tale of two lakes.

Average winter clarity was 83 feet (25.3 meters), the clearest since 2012. But summer clarity averaged 56 feet (17 meters), about 16 feet (4.9 meters) worse than 2015. The summer declines were so big they outweighed the winter improvements—something scientists didn't anticipate.

Despite 2016's decline, the data indicate Tahoe's long-term trend of clarity loss ended about 15 years ago. Since then, it's hovered around 71 feet (22 meters) but with significant variability. In fact last Jan. 25, the disk was visible at an "astounding" 95 feet (29 meters), Schladow said.

"The exciting thing is this is confirming that the bottom of the lake—probably 90 percent of the water in the lake—is still crystal

clear."

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