

# Tahoe's rising water temp concerns scientists

By Linda Fine Conaboy

INCLINE VILLAGE – It's been said that Lake Tahoe is a complex body that man may never understand. That is true; however, UC Davis and Geoff Schladow, the director of the UC Davis Tahoe Environmental Research Center housed at Sierra Nevada College, are doing their best to prove that statement wrong—well, maybe, just a little bit wrong.

It seems that when experts think they've finally arrived at data that absolutely cannot be questioned, that same data is put into conflict with the patterns of human action and natural forces. In fact, a document provided by UC Davis, states that, "These patterns make clear that Lake Tahoe is a complex ecosystem, behaving in ways we don't always expect."

Unfortunately, despite all human effort to the contrary, 2015 was the warmest year ever recorded. In fact, 15 of the 16 warmest years have occurred since 2001, Schladow told his audience at the annual State of the Lake briefing on July 28.

"Climate change is affecting a lot of processes," Schladow said. But how, is the big question.



While Lake Tahoe may look pristine, clarity is getting worse. Photo/Linda Fine Conaboy

The answer lies in addressing numerous factors that influence the clarity and ecology of the lake. Such as night time air temperatures, which, according to Schladow, are drastically decreasing. In 1910, 80 days were below freezing; in 2015, only 24 days hit that mark.

Precipitation has remained fairly constant since 1910, Schladow said, but unfortunately, in 2015, only 6.5 percent of it fell as snow—this is the lowest number ever recorded. When precipitation comes from mostly rain, it is warmer and as it flows into the lake it brings with it silt and other detritus not conducive to a pristine body of water.

Schladow said that precipitation amounts in 2015 were devastatingly low leading to a dramatic 9-inch reduction in lake level. “Water normally fluctuates between a maximum level

and the lake's natural rim," he said. "At the end of 2015, levels were well below that and are now just creeping above the natural rim."

Research shows that the current drought is not really a long one, based on the study of trees still standing well below the surface of the Tahoe's deep waters. However, Schladow cautioned, this could be the beginning of a 100-year drought.

As if these facts are not startling enough, there's more to consider. Lake temperature continues to rise at the fastest rate ever. In 1970, the water averaged 42 degrees Fahrenheit; in 2015, it rose to 42.5 degrees. While this may not seem startling, Schladow said it takes a lot of energy to raise water temperatures even one-half degree. "That's 15 times greater than long-term normal," he said.

In addition, winter is now coming later in the year and spring is arriving sooner. Perhaps this is the reason that in the winter of 1975 colder water mixed all the way to the bottom of the lake; in 2015, the mix occurred at only a depth of 215 feet. Considering that at its deepest Lake Tahoe is 1,645 feet deep, this is alarming to scientists.

There is even more disquieting data regarding the state of the lake.

Consider that in 1965, a Secchi disk, a white, round object mounted on a pole or line lowered into the water and used to measure clarity, could be seen at a depth of more than 104 feet. In 2015, that distance had diminished to no more than 69 feet.

Think about the fact that there are no more Lahontan cutthroat trout in Lake Tahoe; the water's too warm now.

Periphyton grows here now (white algae that coats rock around the shore). In the early days, the rocks were always clean. However, in 2015, there was not much periphyton growth, but

Schladow holds little hope that this trend will continue.

Invasive species have made their way to Tahoe in the form of certain types of destructive shell fish and fast-growing non-native plants.

It is proven that the lake is definitely heating up and due to these warmer temperatures, in 2015 its waters did not mix to maximum depth—for the fourth year running. This lack of deep mixing accounts for the highest nitrogen-nitrate levels on record.

While the details are dismal, Schladow smiled as he related details of a partnership between UC Davis and the Desert Research Institute in Reno, a project that hopefully will reveal valuable information to researchers and enable them to begin to chip away at the negative processes affecting Lake Tahoe.

The Nearshore Network represents the initial collaborative step between the science community and the resource management agencies, aimed at developing a comprehensive approach for assessing and managing the nearshore ecology and aesthetics of Lake Tahoe. In lay-person's lingo, that means that the environment of the shallower parts of the lake reveal myriad important data that are helpful to solving the evolving environmental quagmire facing all of us.

With seven water quality instruments strategically located around the lake, the hope is to obtain a more comprehensive look at the causes of Tahoe's degradation and perhaps enough information to guide experts in the restoration of Lake Tahoe.

Unlike the deep part of the lake, the nearshore is the area in which lots of people recreate and it is subject to sudden changes in water quality because of storms, inflows from streams (which can have huge impacts on the turbidity of the water), storm drains and erosion.

“We need to know if it’s getting better or worse,” Schadow said. “With these sensitive instruments, we can measure temperature, clarity, turbidity, wave height, wind speed and a host of other factors. We are monitoring trends. We know if it’s getting better or worse, but we also need to know why—hence the nearshore monitoring.”

As he closed his talk, Schadow said, “We may have reached the point where climate induced effects are similar in magnitude to the traditional effects from land use change and urbanization.”