

## INTRODUCTION

The University of California, Davis, has conducted continuous monitoring of Lake Tahoe since 1968, amassing a unique record of change for one of the world's most beautiful and vulnerable lakes.

In the UC Davis Tahoe: State of the Lake Report, we summarize how natural variability, long term change and human activity have affected the lake's clarity, physics, chemistry and biology over that period. We also present the data collected in 2012. The data shown reveal a unique record of trends and patterns – the result of natural forces and human actions that operate at time scales ranging from minutes to decades. These patterns make clear that Lake Tahoe is a complex ecosystem, behaving in ways we don't always expect. This was exemplified this year by the decrease in the abundance of *Cyclotella* in the lake, and the corresponding increase in summer clarity. While Lake Tahoe is unique, the forces and processes that shape it are the same as those acting in all natural ecosystems. As such, Lake Tahoe is an analog for other systems both in the western U.S. and worldwide.

Our role is to explore this complexity and to use our advancing knowledge to suggest options for ecosystem restoration and management. Choosing among those options and implementing them

is the role of those outside the scientific community and needs to take account of a host of other considerations. This annual report is intended to inform non-scientists about some of the variables that affect lake health. Until recently, only one indicator of Lake Tahoe's health status was widely reported: the annual clarity (often called the Secchi depth, after the instrument used to collect the clarity data). In this report we publish many other environmental and water quality factors that all provide indicators of the lake's condition.

This report sets the context for understanding the changes that are seen from year to year and those that are observed over a time scale of decades: Was Lake Tahoe warmer or cooler than the historical record last year? Are the inputs of algal nutrients to the lake declining? How much are invasive species affecting Lake Tahoe? And, of course, how do all these changes affect the lake's famous clarity?

The data we present are the result of efforts by a great many scientists, engineers, students and technicians who have worked at Lake Tahoe throughout the decades since sampling commenced. I would, however, like to acknowledge (in alphabetical order) the contributions of Brant Allen, Veronica Alumbaugh, Nancy Alvarez, Patty Arneson, Janet

Brewster, Sudeep Chandra, Bob Coats, Mariza Costa-Cabral, Michael Dettinger, Angie Elliot, Kristin Fauria, Bill Fleenor, Alex Forrest, Allison Gamble, Alfredo Gimenez, Charles Goldman, Gyembo Gyeltshen, Scott Hackley, Tina Hammell, Bruce Hargreaves, Alan Heyvaert, Simon Hook, Andrea Hoyer, Debbie Hunter, Peter Hunter, Camille Jensen, Anne Liston, George Malyj, Parker Martin, Tom Mathis, Kristin Reardon, John Reuter, Bob Richards, John Riverson, Dave Rizzo, Goloka Sahoo, Heather Segale, Todd Steissberg, Raph Townsend, Alison Toy, Josh Viers, Shohei Watanabe, Katie Webb, and Brent Wolfe to this year's report.

Funding for the actual data collection and analysis comes from many sources. While many additional water quality variables could be tracked, funding ultimately limits what we measure. Current funding for the long-term monitoring and analysis is provided by the Lahontan Regional Water Quality Control Board, the Tahoe Regional Planning Agency, the U.S. Forest Service, the U.S. Geological Survey and UC Davis. Our monitoring is frequently done in collaboration with other research institutions and agencies. We are grateful for the participation of our colleagues in the Tahoe Science Consortium. In particular we would like to acknowledge the U.S. Geological Survey (USGS), the

Desert Research Institute (DRI), the University of Nevada, Reno (UNR), the National Aeronautics and Space Administration (NASA), and the U.S. Forest Service. Some data are also collected as part of research projects funded through a variety of sources. Without these data there are many questions that could not even be asked let alone answered.

This year we are presenting updates on some recent research, as well as providing updates on the lake monitoring efforts. These new research results highlight some of the most exciting findings of work that is still in progress, and will be reported on fully in the months and years to come.

Sincerely,



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