

## 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 2013. 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 clearly indicate 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 the diatom *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 management organizations that need to account for 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 indications 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 is the drought 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, Fabian

Bombardelli, Janet Brewster, Andrea Buxton, Sudeep Chandra, Bob Coats, Michael Dettinger, Angie Elliot, Kristen Fauria, Bill Fleenor, Alex Forrest, Allison Gamble, Charles Goldman, Scott Hackley, Tina Hammell, Bruce Hargreaves, Alan Heyvaert, Simon Hook, Andrea Hoyer, Debbie Hunter, Peter Hunter, Camille Jensen, Darren Kramer, Anne Liston, Patricia Maloney, George Malyj, Tom Mathis, Patricia Moreno, Mark O'Berry, Faye-Marie Pekar, Kristin Reardon, John Reuter, Bob Richards, Gerardo Rivera, Dave Rizzo, Derek Roberts, Francisco Rueda, Goloka Sahoo, Heather Segale, Heather Sprague, Raph Townsend, Alison Toy, Shohei Watanabe and Katie Webb to this year's report.

Funding for the actual data collection and analysis has come from many sources over the decades. While many additional water quality variables could be tracked, funding ultimately limits what we measure and report on. 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. 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 (USFS). 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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