UC DAVIS

TAHOE: STATE OF THE LAKE REPORT 2026

Tahoe Environmental Research Center

DEDICATED TO THE *RESEARCH VESSEL JOHN LECONTE*

THANK YOU FOR 50 YEARS OF SERVICE.

Brandon Berry, UC Davis TERC

FUNDING TO ASSEMBLE AND DISTRIBUTE THIS REPORT WAS PROVIDED BY THE FOLLOWING SPONSORS:

$5,000 and above

California Tahoe Conservancy

California Water Boards Lahontan - R6

Tahoe Fund — Together Creating a Legacy

Tahoe Lakefront Owners' Association

Tahoe Regional Planning Agency

$4,999 and under

Incline Village Waste Not

Keep Tahoe Blue — Protecting Tahoe Since 1957

Nevada Division of Environmental Protection

Tahoe Community Foundation (formerly parasol)

Tahoe Water Suppliers Association — Protect the Source

TABLE OF CONTENTS

(CONTINUED ON NEXT PAGE)

TABLE OF CONTENTS, CONTINUED

INTRODUCTION

The University of California, Davis has conducted continuous monitoring of Lake Tahoe and its watershed 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 processes and human activity in the watershed and beyond are affecting the lake's clarity, physics, chemistry, and biology. We also present a portion of recently collected data — presenting all of it would be overwhelming. While Lake Tahoe is unique, the forces and processes that shape it are similar to those acting in most natural ecosystems. As such, Lake Tahoe is an indicator for other systems both in the western United States and worldwide.

Our goal is to understand the lake's complexity and to use that knowledge to provide the scientific underpinnings for ecosystem restoration and management actions. Choosing among those options and implementing them is the role of management agencies that also need to account for and balance a host of other considerations.

This annual report is intended to inform non-scientists about the factors that affect lake health. One indicator of Lake Tahoe's health status, the annual clarity, is reported earlier each year. In this report, we publish many other environmental and water quality factors that serve as other indicators of the lake's condition and help explain the lake's changing clarity. This report sets the context for understanding the year-to-year changes as well as those that are observed over many decades.

Part of this report describes research and education taking place independently of the long-term monitoring. These updates highlight some of the most exciting and promising findings of work that is still in progress. The insights being gained through this research will help keep Lake Tahoe at the cutting edge of science for years to come. Many of the sections explore new ideas and approaches to address the ever-evolving challenges at Lake Tahoe.

The data we present are the result of efforts by a great many scientists, engineers, students, technicians, and educators who have worked at Lake Tahoe throughout the decades since monitoring commenced. I would, however, like to acknowledge (in alphabetical order) the contributions to this year's report by Maggie Anderson, Brandon Berry, Isaiah Bluestein, Mike Bruno, Tom Burt, Abigail Cain, Samantha Campisi, Michael Cane, Dante Capone, Bob Coats, Corrin Clemons, Troy Corliss, Alicia Cortés, Daniel Crownover, Randy Dahlgren, Lily Dailey, Mike Deas, Alex Forrest, Fatima Garcia, Scott Hackley, Tina Hammell, Brenna Hatch, Simon Hook, Jack Hopping, Mahren Hudson, Camille Jensen, Colby Kalasardo, Eckhardt Karsten, Hannah Kench, Jackelyn Lang, Kenneth Larrieu, Mui Lay, Shannon Lynch, Patricia Maloney, Keeley Martinez, Claire Moats, Antonina Myshyakova, Keeler Nelson, Holly Oldroyd, Cameron Penn, Kanarat Pinkanjananavee (Job), Wesley Radford, Soffia Ramsey, Gerardo Rivera, Grace Rosburg-Francot, Steven Sadro, Geoffrey Schladow, Heather Segale, Oscar Sepúlveda Steiner, Steven Sesma, Roland Shaw, Noah Slon, David Smith, Adrianne Smits, Lidia Tanaka, Raph Townsend, Alison Toy, Susan Ustin, Sergio Valbuena, Aaron Vanderpool, Rachel Vanette, Lindsay Vaughan, Jonathan Walter, and Shohei Watanabe. In particular, Shohei Watanabe was responsible for the majority of the data analysis, Cara Hollis led the effort to write the Retrospective on the *Research Vessel John LeConte* and New Era of Research, and Heather Segale and Alison Toy led the compilation and editing of the final report. We would also like to thank all of the members of the UC Davis TERC Advisory Board.

Funding for 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, Tahoe Regional Planning Agency, U.S. Geological Survey, and UC Davis.

Funders for current projects include the following: Bass Pro Shops and Cabela's Outdoor Fund, CalFire, California Delta Stewardship Council, California Natural Resources Agency, California Tahoe Conservancy, East Bay Municipal Utility District, U.S. Environmental Protection Agency, Incline Village General Improvement District, NASA Jet Propulsion Laboratory, the National Park Service, National Science Foundation, Nevada Department of Tourism and Cultural Affairs, Nevada Division of Environmental Protection, Nevada Division of State Lands, North Lake Tahoe Resort Association, Tahoe Community Foundation, Santa Clara Valley Water District, Sacramento Valley Settlement Contractors, Tahoe Resource Conservation District, Tahoe Truckee Community Foundation, Tahoe Water Suppliers Association, Bureau of Reclamation (USBR), USDA Forest Service, and U.S. Embassy, Chile.

Our monitoring is frequently done in collaboration with other research institutions and agencies. In particular, we would like to acknowledge our collaborators at UC Davis, California Conservation Corps (CCC), Desert Research Institute (DRI), National Aeronautics and Space Administration (NASA), National Oceanographic and Atmospheric Administration (NOAA), Tahoe Resource Conservation District (TRCD), U.S. Forest Service, (USFS), U.S. Geological Survey, and University of Nevada, Reno (UNR).

We are very proud to recognize the funding support for actual production of this annual report from the following organizations: California Tahoe Conservancy, Incline Village General Improvement District Waste Not Program, Lahontan Regional Water Quality Control Board, Nevada Division of Environmental Protection, Tahoe Community Foundation, Tahoe Fund, Tahoe Lakefront Owners' Association, Keep Tahoe Blue, Tahoe Regional Planning Agency, and Tahoe Water Suppliers Association. We sincerely thank these organizations for their dedication in supporting science to save the lake.

Sincerely,

Stephanie Hampton, Director
UC Davis Tahoe Environmental Research Center
201 Country Club Drive
Incline Village, NV 89451
sehampton@ucdavis.edu

EXECUTIVE SUMMARY

The University of California, Davis has conducted foundational research in the Lake Tahoe Basin since the late 1950s, establishing continuous monitoring of Lake Tahoe and its watershed in 1968. Over nearly six decades, this long-term commitment has built a unique record of environmental change for one of the world's most iconic and vulnerable lakes, while cultivating a robust network of partners who together turn data into knowledge and knowledge into action. Each year, the State of the Lake Report synthesizes these scientific findings in the context of historical trends to foster a holistic understanding of the Basin's ecological health, resilience, and emerging environmental challenges. This year is especially meaningful as we celebrate the 50th birthday of our flagship research vessel, the *R/V John LeConte*, which has facilitated nearly all of the in-lake research described in this report. The UC Davis long-term program offers the perspective to see beneficial changes that have occurred as coordinated environmental protection has grown over the past half century, while also recognizing substantial new challenges as human activity and climate change have altered conditions in the watershed.

Long-term daily meteorological records maintained at Tahoe City reveal steadily increasing air temperatures. Notably, the long-term trend in average daily minimum temperature has risen by 4.31°F (2.4°C) over the past 114 years. This long-term trend of warming minimum air temperature is especially important because air temperature governs whether precipitation falls as rain or snow in the winter. The number of days when air temperatures averaged below freezing has declined by 26 days since records began in 1911, contributing to a broader shift towards more rain, less snow, and earlier spring snowmelt.

Total precipitation varies significantly from year to year without an overarching annual trend, maintaining a long-term average of 31.61 inches at Tahoe City, and WY 2025 was slightly below average in total precipitation (30.43 inches). While snow has historically declined as a fraction of total precipitation, WY 2025 experienced anomalous winter conditions where snow comprised 50.6 percent of total precipitation, placing it well above the current trendline. Sierra snowpack readings taken on April 2, 2025, at the Lake Lucille Snow Course Station recorded a depth of 148 inches, just exceeding the historical baseline.

Driven by stream inflows, direct precipitation, evaporation, and managed outflows via the Truckee River dam at Tahoe City, lake surface levels vary continuously throughout the year. In 2025, average precipitation rates prevented the lake from reaching its near-maximum legal limit of 6,229.1

(CONTINUED ON NEXT PAGE)

"Previous year" for some parameters means data collated in terms of the water year, which runs from October 1 throught September 30; for other parameters, it means data for the calendar year, January 1 through December 31. Therefore, for this 2025 report, Water Year data are from October 1, 2024 through September 30, 2025. Calendar year data are from January 1, 2025 through December 31, 2025.

EXECUTIVE SUMMARY

(CONTINUED FROM PAGE 2.1)

feet as occurred in 2024. The highest recorded level was 6,228.56 feet on June 8, 2025, following spring snowmelt, before gradually dropping due to outflows and evaporation to a seasonal low of 6,226.62 feet on November 9, 11, and 12, 2025. Rapid lake-level increases at the end of 2025 were driven by large winter storms. The lake has not fallen below its natural rim of 6,223 feet since late 2022, maintaining normal river outflows at the Truckee River.

Since 1970, the volume-averaged temperature of Lake Tahoe has increased by approximately 1.1°F (0.6°C), climbing at an annual rate of 0.21°F per decade. The 2025 annual average water temperature of 42.4°F (5.78°C) fell below the long-term trendline but remained on par with 2024. Surface water temperatures (measured at a 5-foot depth) are warming more rapidly than the full volume of the lake, at 0.39°F per decade. In 2025, the annual average surface temperature was 53.2°F (11.8°C), just above the long-term trend line. TERC's nearshore monitoring network (comprising 10 active stations) captures dynamics nearshore. These data show consistent trends in that the eastern shore tends to be warmer than the western shore due to southwestern winds pushing warm surface water eastward, while the southern shore exhibits higher temperatures due to its shallow water column and broad, shallow shelf which allows for nearshore heating.

In 2025, deep water temperatures ranged from 40.98°F to 41.05°F, and the lake experienced only a partial mixing event. Over the long-term record, deep water temperatures at 1,320 feet exhibit gradual warming punctuated by sharp drops (of less than 0.3°F) during complete vertical mixing events, which allow large amounts of heat to escape the lake. Between the deep mixing events of 2011 and 2019, the bottom waters warmed at a rate of 0.07°F per year. The last full vertical mixing event occurred in 2023, causing deep water temperatures to drop by 0.4°F. Due to insufficient winter cooling in WY 2025, the lake did not experience deepwater mixing. The estimated mixing depth in 2025 was 745 feet (227 m) on March 18, 2025. In years without deep mixing, the deep water receives limited oxygen renewal and nutrients build up in the deep water.

The lake's resistance to vertical mixing — measured via the lake stability index — has increased by 15.1 percent over the past 57 years as the density difference between the warm surface layer (epilimnion) and the cold deep layer (hypolimnion) increases. In addition, the length of time that the lake is stratified has lengthened by 31 days since 1968. In 2025, the stratified season lasted 210 days (above the long-term trend). Furthermore, the onset of the stream snowmelt pulse has shifted earlier by over 16 days since 1961, occurring on April 2 in 2025. The timing of spring snowmelt relative

(CONTINUED ON NEXT PAGE)

EXECUTIVE SUMMARY

(CONTINUED FROM PAGE 2.2)

to the onset of stratification carries major implications for water clarity, as cold snowmelt carrying nutrients and sediments may plunge or float when it enters the lake, depending on the temperature and the stratification of the lake.

Managing the influx of nutrients and fine particulate material forms the cornerstone of regional restoration strategies, notably the Lake Tahoe Total Maximum Daily Load (TMDL) Program.

In 2013, a detailed Lake Tahoe study indicated that atmospheric deposition is the primary source of total nitrogen (57%), while phosphorus enters primarily through non-urban (47%) and urban (18%) watersheds. Total fine particles (0.5–16 µm) are heavily driven by urban areas (67%), with contributions of 16% from atmospheric deposition and 12% from non-urban watersheds. The Lake Tahoe Interagency Monitoring Program (LTIMP) tracks inputs from seven of the basin's 63 streams. In 2025, the Upper Truckee River contributed the majority of stream phosphorus, nitrogen, and suspended sediments, which is typical given it provides roughly 25% of inflowing water. However, similar to 2024, this past year the Upper Truckee River's loading values fell well below long-term means.

Wildfires generate significant external loading, as seen during the 2021 Caldor Fire when atmospheric total nitrogen peaked near 6,000 g/hectare and total phosphorus reached 333.6 g/hectare. By 2025, atmospheric deposition had returned to a lower baseline, measuring around 3,000 g/hectare for total nitrogen (near the long-term average of 1,922 g/hectare) and closer to the long-term average of 119.0 g/hectare for total phosphorus. This normalization aligns with satellite data showing that annual "smoke days" meeting the EPA's Moderate or higher thresholds returned to baseline levels after the record fire year of 2021. New analyses of smoke day data provide a good reminder that smoke and ash from wildfires frequently reach the Tahoe Basin even when fires are far away.

Within the lake itself, nutrients display complex patterns. Volume-weighted annual average nitrate concentrations increased between 2014 and 2023, driven by shallow mixing and wildfire ash deposition, but concentrations in 2024 and 2025 dropped well below this trend. In 2025, the in-lake nitrate concentration was 17.1 micrograms per liter, similar to pre-2014 levels. Total hydrolyzable phosphorus (THP), which is particularly important for phytoplankton growth in Tahoe's phosphorus-limited system, has declined since its 1980s highs (>4 µg/L) in concert with TMDL management, though it has trended upward over the last 18 years. In 2025, the annual volume-weighted THP concentration was 1.91 µg/L.

(CONTINUED ON NEXT PAGE)

EXECUTIVE SUMMARY

(CONTINUED FROM PAGE 2.3)

Water clarity in Lake Tahoe is strongly driven by fine suspended particles (1–6 µm), which are highly effective at scattering light. These particles settle slowly, affecting clarity until they sink. Sinking can occur more quickly when they stick together and form larger aggregates. In 2025, despite slightly below average precipitation and lower external loading from streams and fires, the annual fine particle concentration was close to 6 million particles per liter — the second-highest level on record. Monthly tracking reveals that fine particle concentrations peaked in June and July 2025 in the upper 50 meters of the water column, coinciding with a substantial bloom of the small diatom *Cyclotella* (typically 2–4 µm). This co-occurrence suggests that organic particles may have been a primary driver of the spike. Resolving particle identity and the effects on clarity constitute a crucial focus of ongoing research.

Open-water clarity is measured continuously using a standard 10-inch Secchi disk. A white disk is lowered into the water, and the "Secchi depth" measures how far below the surface the disk can be seen. The long-term record indicates that rapid clarity declines were successfully halted in the late 1990s, and now annual average clarity has plateaued around 70 feet. In 2025, Lake Tahoe's annual average Secchi depth was 69.2 feet (21.1 m), a value that does not statistically differ from the previous year, highlighting the persistence of the current plateau. The official clarity restoration target is 97.4 feet (29.7 m), to be reached by the year 2076, with an interim goal of 78 feet by 2031.

The overarching water clarity trend is characterized by a stark seasonal divide between winter and summer. Winter clarity remained stable relative to the recent past winter measurements, averaging 78.4 feet (23.9 m) in 2025. Individual winter readings ranged from a high of 94.3 feet (28.8 m) on February 25, 2025, to a low of 60.7 feet (18.5 m) on December 18, 2024. Winter trends have generally stabilized or improved over the broader record.

Conversely, summer clarity continues to exhibit long-term degradation and high variability, acting as the primary bottleneck to overall clarity recovery. The 2025 annual summer average was 60.4 feet (18.4 m), with individual summer readings reaching their lowest value of 47.6 feet (14.5 m) on July 11 and peaking at 78.1 feet (23.8 m) on September 16. This structural divergence underscores the need to investigate changing particle dynamics; in 2026, TERC will deploy new imaging technologies to visualize particle aggregation and examine the impact of the smallest phytoplankton, the picoplankton.

Biological monitoring across the open water and nearshore

(CONTINUED ON NEXT PAGE)

EXECUTIVE SUMMARY

(CONTINUED FROM PAGE 2.4)

zones highlights stable long-term ecological baselines alongside some shifts in community structure. The taxonomic composition of phytoplankton in 2025 was characteristically diverse, with no single group dominating. As usual, diatoms (Bacillariophyta) dominated the total biovolume throughout most of the year, although their relative abundance proportion was lower than in historical years. Notably, the tiny diatom *Cyclotella* was very abundant from June through August. Although it does not contribute much to biomass, its tiny size allows these numerous cells to effectively scatter light, known to have a strong impact on clarity. Very small cyanobacteria have maintained a strong presence since 2021; while they represented the largest group by numerical cell count in 2025, their small size meant they contributed little to total biovolume.

TERC monitors nearshore water quality across 10 active sensor stations and tracks nearshore algal blooms using drone photography and SCUBA diver assessments. Periphyton are algae that are attached to rocks, sand, or other substrates, and they are usually seen nearshore. In 2025, maximum periphyton biomass at fixed sites near Incline Village, Pineland, and Rubicon was consistent with long-term averages. Spatial monitoring across eight nearshore sites showed that periphyton biomass was highest on the western shore at Tahoe City (peaking in February/March) and Pineland (peaking in April/May), while eastern and northwestern shores exhibited relatively low growth. Metaphyton are unattached clumps of algae and can form bright green mats over sandy substrates during summer and autumn peaks. In 2025, metaphyton biomass peaked from July through September along southern shore sites (Lakeside, Regan, and Kiva Beach).

Notably, we are aware that periphyton and metaphyton present a special challenge for nearshore monitoring. These blooms literally present a moving target for monitoring across the 75-mile extent of shoreline; periphyton mats may die and get washed away seasonally, without returning to the same location, and metaphyton are not attached to the substrate, so they may float across various locations. Accordingly, we have developed methods for aerial image capture, using helicopter-mounted imaging to collect data across the full shoreline, which should revolutionize our ability to track the extent and change of periphyton and metaphyton in the lake.

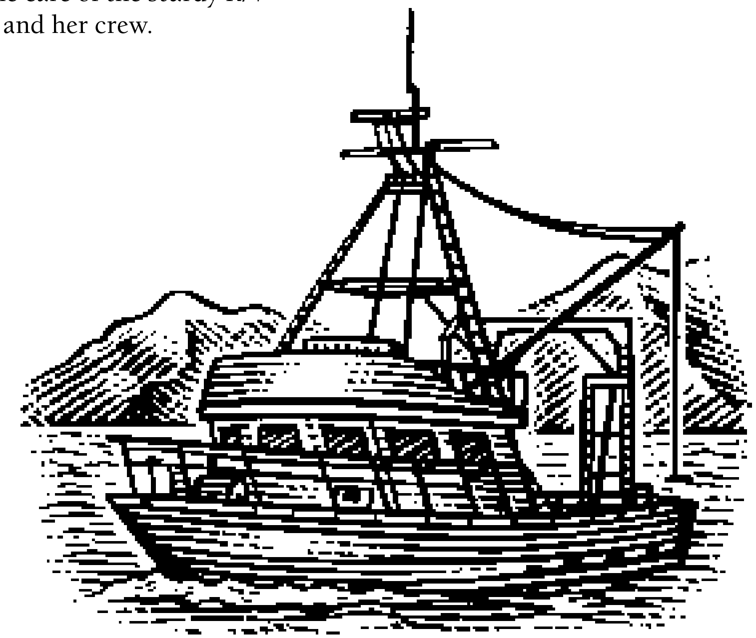
Education and public outreach form a cornerstone of TERC's engagement in the basin, connecting our ever-evolving scientific and engineering advances with environmental stewardship. In 2025, TERC interacted with 7,957 visitors through public tours, school programs, lectures, and

EXECUTIVE SUMMARY

(CONTINUED FROM PAGE 2.5)

interactive exhibits. However, maintaining this outreach infrastructure demands ongoing adaptability from TERC and its regional network. The nationwide termination of AmeriCorps funding in April 2025 deeply impacted TERC's 2025 educational capacity. Fortunately, TERC's enduring network of local supporters and partners has been instrumental in buffering these funding gaps, collectively amplifying the reach of environmental stewardship education across the north, west, east, and south shores of the lake.

Reflecting on Lake Tahoe's multi-decade environmental record provides an important opportunity to celebrate stewardship successes, such as the TMDL-motivated programs that protect the lake from historical patterns of degradation. At the same time, it highlights the urgent need for continued progress and investment to face compounding environmental challenges. Rising temperatures are fundamentally altering environmental dynamics, drawing larger crowds from warm lowland regions into the cooler Tahoe Basin, while shifting precipitation patterns, wildfire activity, invasive species pressures, and pollutants threaten ecosystem stability. Cultivating community resilience and reinforcing the basin's monitoring infrastructure are critical to protecting Lake Tahoe — continuing a legacy of knowledge amassed by scientists, engineers, and educators over decades, one day at a time under the care of the sturdy *R/V LeConte* and her crew.



ABOUT THE UC DAVIS TAHOE ENVIRONMENTAL RESEARCH CENTER (TERC)

The UC Davis Tahoe Environmental Research Center (TERC) is a world leader in research, education, and public outreach on lakes and watersheds, providing critical scientific information to help understand, restore, and sustain the Lake Tahoe Basin and other systems worldwide. Since 1968, UC Davis has conducted continuous, year-round scientific monitoring of Lake Tahoe, creating the foundation on which restoration and stewardship efforts can be based.

TERC's activities are conducted out of permanent research facilities in the Tahoe Basin and at the University's main campus in Davis, California, about 100 miles west of the lake.

Our main laboratories and offices are in Incline Village, Nevada, on the third floor of the Tahoe Center for Environmental Sciences building (top image). On the first floor, we operate the Tahoe Science Center™, an educational resource for K-12 students and learners of all ages, that is open to the public.

In Tahoe City, California, we operate a field station (housed in a fully renovated, former state fish hatchery, middle image) and the Eriksson Education Center. The field station also houses the CITRIS Environmental Robotics Lab @ Tahoe. Tahoe City is homebase for our research vessels, the *R/V John LeConte* (bottom image) and the *R/V Bob Richards*. The *R/V Ted Frantz* operates out of Clear Lake, California and the *R/V Tom* and the *R/V Martini* are currently based in Davis, California. Malyj Manor, a 4-bedroom house in Tahoe City, provides short term housing for students and visiting researchers.

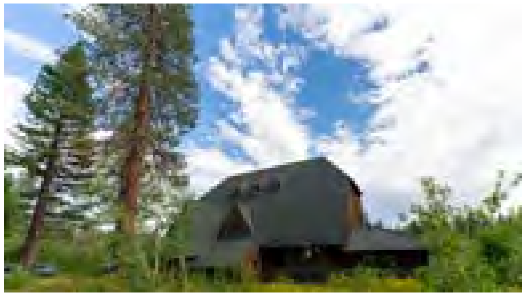
Additional laboratories and offices are located on the UC Davis campus at the Center for Watershed Sciences, Ghausi Hall and in Wickson Hall.

At locations throughout the basin, we have sensors continuously reporting on the health and well-being of the lake and its environs, creating a robust infrastructure for understanding and increasing resilience of the Tahoe Basin. Data are published in the Environmental Data Initiative (EDI) repository (https://edirepository.org/) and are available by searching for "UC Davis Tahoe Environmental Research Center."

Our UC Davis TERC website (https://tahoe.ucdavis.edu) has more information about our programs, including:

- Information for potential students, staff, faculty, research collaborators, and visitors;
- Access to near-real-time data sensors;
- TERC research publications;
- Exhibits and events at the education centers; and
- Information about supporting our research and learning programs.

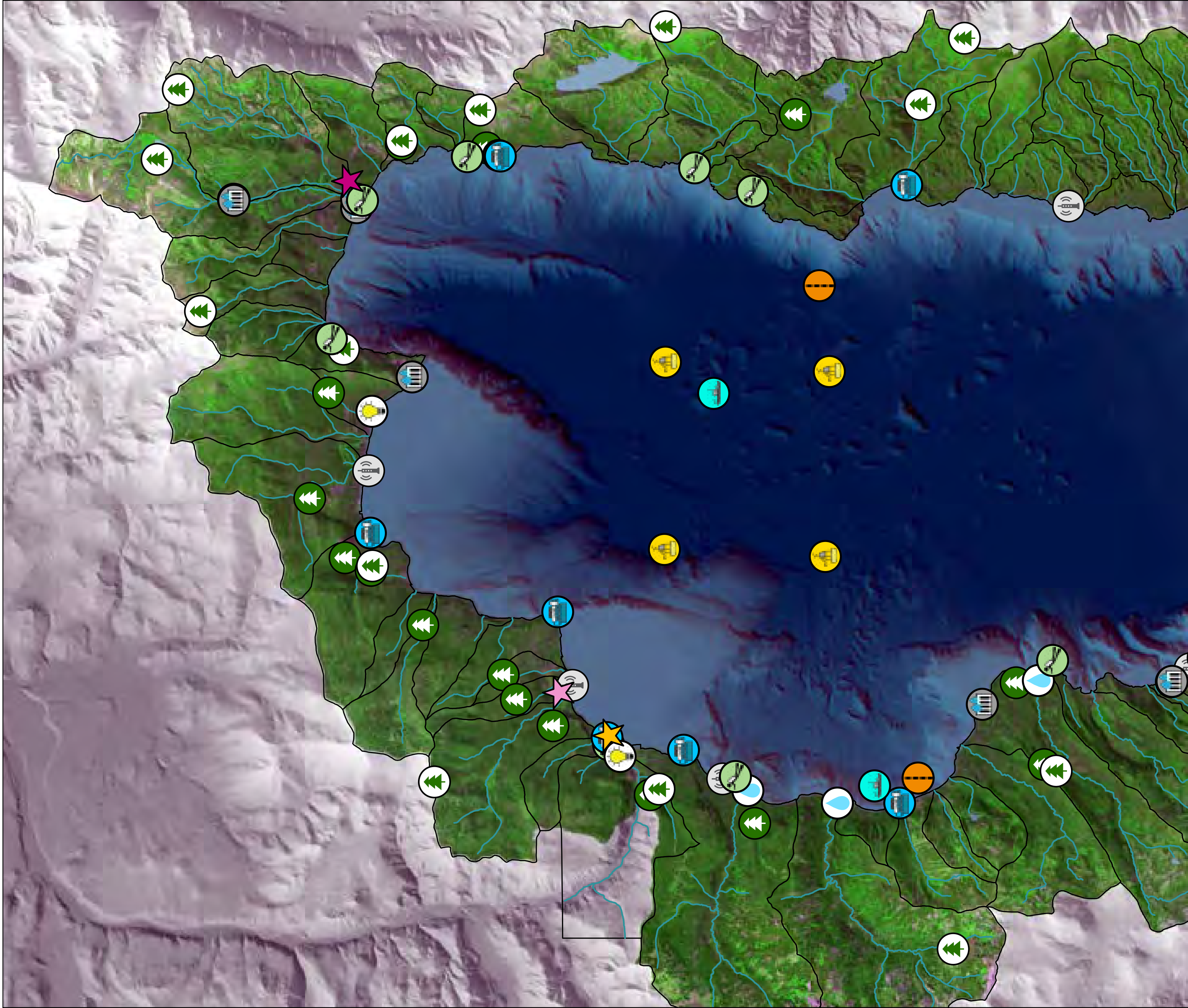
Alison Toy, UC Davis TERC

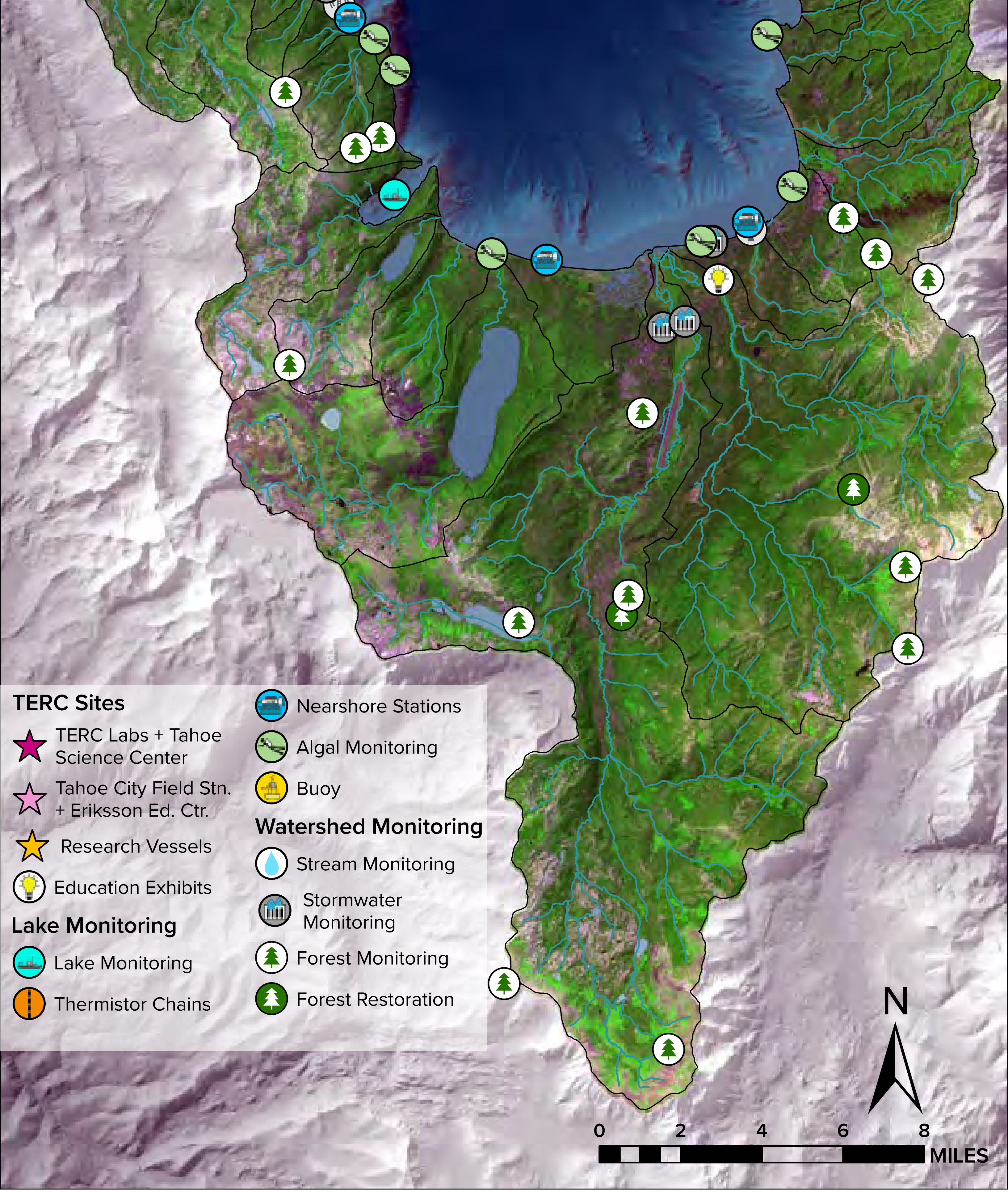


Courtesy of North Tahoe Community Alliance

Brandon Berry, UC Davis TERC

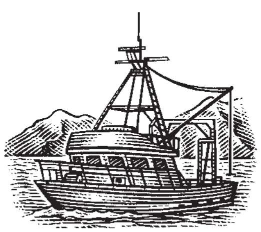
TAHOE BASIN DATA COLLECTION SITES





UC DAVIS
Tahoe Environmental Research Center

TAHOE:
STATE
OF THE
LAKE
REPORT
2026



THE RESEARCH VESSEL JOHN LECONTE

UC DAVIS
Tahoe Environmental
Research Center

tahoe.ucdavis.edu

50 Years of Science - The Research Vessel John LeConte

For more than 60 years, UC Davis has been studying and guiding the fundamental science of Lake Tahoe. In her 50th year of active service on the lake, the *Research Vessel John LeConte* has been at the heart of that work. As she nears her retirement, we thought it fitting to look back at her contributions and legacy.

A constant presence on the lake, the *R/V LeConte* has supported the research, education, and stewardship of first the UC Davis Tahoe Research Group, founded by Charles Goldman, PhD, and today the Tahoe Environmental Research Center, led by Stephanie Hampton, PhD. In the process, the vessel has helped produce one of the world's longest-running and most comprehensive freshwater datasets, providing the foundation for decades of scientific discovery and informed stewardship.

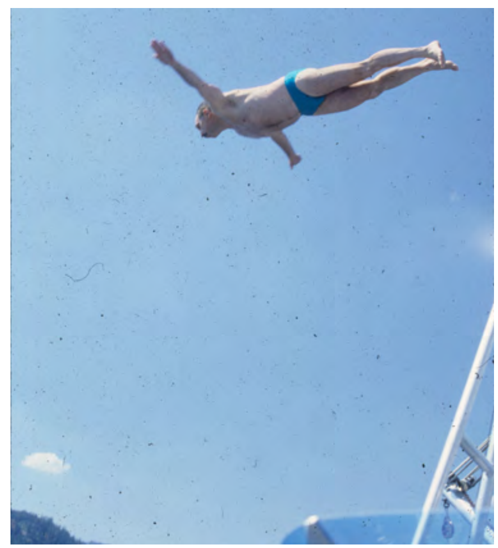
Ironically, the *R/V LeConte* owes its existence to a setback. Goldman had secured a $100,000 National Science Foundation (NSF) grant to build a laboratory at Lake Tahoe. The land was ready and the plans were complete when the project was unexpectedly denied a building permit.

"It was the end of the fiscal year, and I had to either spend the money or send it back," Goldman recalls. After NSF denied his request for an extension, he asked one simple question: "Can I buy a boat?"

The answer was yes.

Goldman immediately contacted the Freeman Boat Company in Gold Beach, Oregon. For $97,000, they built the vessel that would become the *R/V LeConte* — and with it, one of the most enduring scientific legacies on Lake Tahoe was launched.

Scanned copies of newspaper articles celebrating the christening of the R/V LeConte that took place over the fourth of July weekend in 1976.



Charles Goldman swan-dives from the top deck of the R/V LeConte in 1991. (UC Davis TERC)

One of the Most Extensive and Continuous Datasets on a Lake

The *R/V LeConte's* impact on Lake Tahoe is impossible to fully capture in a single story. But after 50 years of service, one thing is clear: both the lake's scientific legacy and our understanding of its remarkable complexity have been shaped by this unassuming research vessel.

The *R/V LeConte* has played a role in nearly every major scientific milestone at Lake Tahoe. She supported Goldman's work with Keep Tahoe Blue to prevent treated effluent from being pumped into the lake, helped collect the scientific data that informed the landmark Total Maximum Daily Load regulations to reduce sediment and nutrient pollution, deployed the lake's first weather stations and thermistor chains, and continues to maintain the four offshore buoys operated with NASA that monitor weather and water conditions while helping calibrate climate-observing satellites.

Perhaps her greatest contribution, however, has been consistency.

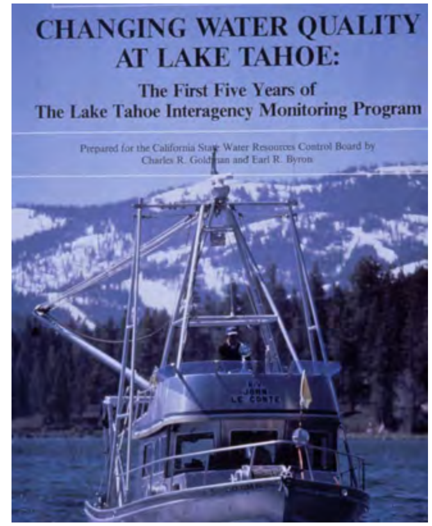
Month after month, year after year, the *R/V LeConte* carried countless scientists over 500 meters of water to the Lake Tahoe Profile station near Homewood and the Mid-Lake Profile station to collect the long-term measurements that form the foundation of one of the world's most comprehensive freshwater datasets. These surveys track water clarity, temperature, conductivity, nutrients, particle size, plankton, and primary productivity, while supporting long-running nearshore algae studies and countless other monitoring efforts. Together, they provide the continuous record that allows researchers to understand how Lake Tahoe is changing — and why.

Allison Gamble, PhD, now a Senior Research Analyst Specialist for the Minnesota Pollution Control Agency, came to Lake Tahoe as a postdoctoral researcher studying invasive species, including *Mysis* shrimp. Although much of her fieldwork took her around the lake on smaller boats, she says the *R/V LeConte's* greatest contribution was the decades of consistent data it had already collected.

"The thing the *R/V LeConte* made possible was this immense long-term dataset," Gamble says. "Having a consistently collected, multi-trophic dataset like that is exceptionally rare in ecology."

Rather than wondering whether changes in nutrients, productivity, or other environmental factors might explain her findings, Gamble could test those ideas directly because the data already existed.

"The *R/V LeConte* made that possible — not just for my work, but for virtually everything we've done at Tahoe."



Gracing the cover of the 1986 report "Changing Water Quality at Lake Tahoe."

Allison Gamble conducts night searches for Mysis shrimp aboard the R/V LeConte. (Credit UC Davis TERC)

One of the Most Extensive and Continuous Datasets on a Lake, continued

The *R/V LeConte* also helped turn Lake Tahoe into a testing ground for invasive species management, whose lessons reached far beyond the Sierra.

As a postdoctoral researcher, Marion Wittmann, PhD, now the Program Officer of the Wildfire Resilience Initiative at the Gordon and Betty Moore Foundation, studied invasive Asian clams and Eurasian watermilfoil using the *R/V LeConte* to deploy heavy equipment for large-scale experiments, including bottom barriers designed to smother invasive plants and clams.

"We used the *R/V LeConte* for the heavy work and the *R/V Bob Richards* for speed," Wittmann says. "She was a major workhorse for us."

This research conducted on Tahoe went on to inform invasive species management nationwide. Wittmann later applied the same science-based approach in the Great Lakes, helping agencies evaluate the risks posed by invasive species and invest in solutions based on sound scientific evidence.

"That guiding principle," she says, "became the heartbeat of my work in the Great Lakes."

While the *R/V LeConte* is often associated with Lake Tahoe's long-term biological monitoring, its contributions to understanding the lake's physical dynamics have been just as significant.

When Geoff Schladow, PhD (TERC Director, 2004–2024) recognized that understanding the lake's biology required first understanding how the lake itself moves. In 1995, the *R/V LeConte* helped deploy the first temperature loggers in Lake Tahoe, providing scientists with a continuous record of how heat moved through the water column and revealing the timing and extent of the lake's annual mixing.

That work quickly expanded. The *R/V LeConte* deployed the lake's first network of weather stations, allowing researchers to connect changing winds and weather patterns with conditions on the water. Scientists then released drifting instruments across the lake to map currents, showing for the first time how water circulates through Tahoe's deep basin. Those efforts eventually grew into a network of ten real-time nearshore monitoring stations that continue to track water quality and physical conditions around the lake.

Marion Wittmann dives above a bed of invasive clams during her postdoctoral work at TERC. (UC Davis TERC)

One of the Most Extensive and Continuous Datasets on a Lake, continued

Together, these observations transformed researchers' understanding of Lake Tahoe. Rather than behaving like a typical alpine lake, Tahoe's immense size and depth create complex circulation patterns driven by wind, temperature, and seasonal mixing. Water masses move across the lake, internal waves slosh beneath the surface, and currents transport nutrients, sediments, and organisms over great distances.

In many ways, Lake Tahoe behaves less like a lake and rather like a small inland ocean.

That realization changed more than just how researchers viewed the lake's physics; it also changed how they thought about its biology.

During her postdoctoral research at Tahoe, Monika Winder, PhD, now a professor in Marine Ecology at Stockholm University, began studying picoplankton — microscopic organisms now suspected to play a key role in the lake's stubbornly slow clarity recovery.

"I realized that much of the literature on alpine lakes didn't really apply to Tahoe because it is such a unique lake," Winder says. "The literature on subtropical oligotrophic oceans was actually more relevant. Since picoplankton are abundant in the ocean, they must be abundant in Lake Tahoe."

Her research confirmed exactly that. Winder showed that picoplankton may account for as much as 40 percent of the lake's biomass. Today, that work forms the foundation of TERC's newest research into why the lake's clarity has plateaued despite decades of successful efforts to reduce nutrient and sediment pollution.

For Winder, however, the *R/V LeConte's* legacy extends beyond science.

"What made it so special to work on the *R/V LeConte* was the crew," she says. "They were always helpful, flexible, patient, and supportive. That always makes a boat very special."

The *R/V LeConte* has carried not only the instruments that revealed Lake Tahoe's secrets, but also the generations of scientists whose discoveries continue to shape how we understand and protect this extraordinary lake.

Monika Winder collects zooplankton samples off the back deck of the R/V LeConte during her postdoctoral work at TERC. (UC Davis TERC)

The Crew

A research vessel is only as good as the people who operate it, and over the past 50 years, The *R/V LeConte* has been crewed by generations of dedicated field scientists. Few embodied that commitment more than Brant Allen, who spent 35 years helping make Lake Tahoe science possible.

"The long-term monitoring built the datasets," Allen says. "But my real mission was helping graduate students and visiting researchers succeed."

That mission supported hundreds of research projects, but it also created an unexpected advantage. Because the *R/V LeConte* was on the water almost daily, its crew became Lake Tahoe's constant observers.

"We had eyes on the lake that few others did," Allen says. "Being out there every day meant we noticed changes as they happened, and those observations often became the next research questions."

Whether it was discovering dense mats of metaphyton algae growing above invasive Asian clam beds or noticing improved clarity in Emerald Bay after the collapse of the *Mysis* shrimp population, many important scientific questions began with simple observations made from the deck of the *R/V LeConte.*

Just as importantly, the vessel gave UC Davis capabilities few research institutions could match. Its hydraulic equipment and ability to work in one of the world's deepest alpine lakes attracted scientists from around the globe, enabling everything from deep sediment coring to the deployment of sophisticated instruments hundreds of meters below the surface.

From the back of the R/V LeConte, Brant Allen reaches for the Secchi disc after taking one of thousands of clarity measurements over the course of his career. (Michael Okimoto, UC Davis)

Science research doesn't stop because of cold temperatures, and neither does Brant Allen or the R/V LeConte. (Ben Scholes, California Surveying and Drafting Supply)

The Crew, continued

No history of the *Research Vessel LeConte* would be complete without mention of Bob Richards, one of the longest-serving researchers on Lake Tahoe and the man for whom the *R/V Bob Richards* is named. Few people have spent more time aboard the *R/V LeConte* or contributed more to the success of the science conducted from her decks. For decades, Richards was a constant presence on the lake, mentoring generations of students, technicians, and researchers — not only in how to operate the *R/V LeConte*, but also in how to understand Lake Tahoe itself.

Although health issues prevented him from contributing to this story, those who worked alongside him speak of him with remarkable consistency. He was revered for his encyclopedic knowledge, quiet wisdom, and seemingly endless patience. Whether explaining the lake to an international media crew or spending a long day on the water collecting samples, Richards approached every task with humility. There was never any ego. For Richards, it was always about the lake. Even in retirement, Richards' commitment to Lake Tahoe never wavered. He became a volunteer docent at the Tahoe Science Center™, sharing his firsthand experience and hard-earned wisdom with residents, visitors, and students alike. It is difficult to imagine a more qualified guide to the story of Lake Tahoe than someone who had spent a lifetime helping to write it.

For 50 years, the *R/V LeConte* has been far more than a research vessel. She has been a classroom, a laboratory, and a launchpad for generations of scientists. But her greatest strength has always been the people who stepped aboard — crews whose knowledge, dedication, and curiosity transformed observations into discoveries and discoveries into the science to action that protects Lake Tahoe today. Their names may not appear on every publication or report, but their fingerprints are on nearly every major advance in our understanding of the lake. The *R/V LeConte* may have carried the instruments, but it was her crews who carried the mission forward.

The TERC legend, Bob Richards, holds a Van Dorn water sampler on the back of the R/V LeConte. (UC Davis TERC)

Geoff Schladow (left) poised for data collection with Bob Richards (right) on the back deck of the R/V LeConte. (UC Davis TERC)

Keep Her Running

Raph Townsend's official title is Development Technician, but around TERC he's simply the person who can fix — or build — just about anything. For the past 25 years, that has meant keeping the *R/V LeConte* running.

"It's a simple machine," Townsend says. "Keep the fluids topped off, and she's happy."

Of course, it's never quite that simple.

Over the years, Townsend has rebuilt hydraulic cylinders, overhauled the power take-off that drives the vessel's hydraulic system, fabricated custom mounts for sonar and sampling equipment, rebuilt countless components, and even removed the A-frame so the *R/V LeConte* could be transported to Sparks. Whatever the job, his goal has always been the same: keep the *R/V LeConte* working.

"Fortunately," he jokes, "when something is super slow, it doesn't self-destruct."

Has she always been slow?

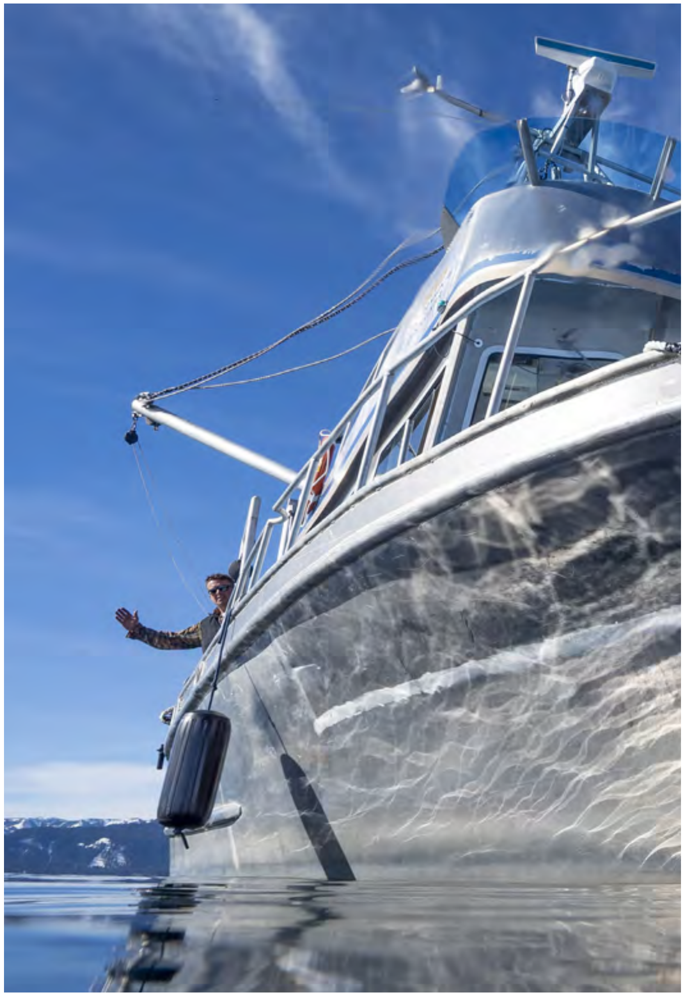
"Always," he laughs. "We even installed a new Cummins engine about 10 years ago that was supposed to give us 25% more horsepower. But the cooling system couldn't keep up, so we ended up right back where we started."

Speed was never the *R/V LeConte's* greatest strength, but reliability was.

For half a century, she carried scientists safely through storms, long days, and thousands of hours of fieldwork. After spending a quarter-century keeping her alive, Townsend speaks about the boat the way a lifelong mechanic talks about a favorite truck.

"It's a super-slow, bulletproof old girl that's been good to us," he says. "She's got a great heart, and she will be missed."

Fifty years on Lake Tahoe have given the *R/V LeConte* more than a scientific legacy — they've also produced plenty of unforgettable stories. We can't tell them all here, but these are a few of our favorites.



Raph Townsend happily waves after getting the R/V LeConte sea [lake] worthy again. (Brandon Berry, UC Davis TERC)

The Stories

The Big Bang

Deploying the NASA buoys required placing massive anchors on the lake bottom — repurposed train car wheels chained together and transported aboard the *R/V LeConte*.

"You can't lower them," explains Deret Kehlet, engineer in the Civil and Environmental Engineering department at UC Davis who deployed some of the original equipment to monitor physical dynamics in Lake Tahoe. "Once they're on the bottom, there's no way to disconnect the line. Instead, you pay out all the mooring line first, then drop the anchors."

Kehlet retells the story that during one deployment, Bob Richards used the *R/V LeConte's* winch to lift a pallet of chained train car wheels and slide them into the water. As the first anchor slipped off, it whipped the second around with tremendous force.

"Bob told me it slammed into the bottom of the *R/V LeConte* so hard he was certain it had punched a hole through the hull," Kehlet recalls. "The first thing he did was open the hatches, expecting water to come pouring in. He thought he'd sunk the *R/V LeConte* in one of the deepest parts of the lake."

But the water never came.

Back at the marina, Allen inspected the damage from below. The only casualty was an aluminum guard protecting the propeller from fishing nets.

The *R/V LeConte* has earned a reputation for being as tough as the science she supports — and perhaps just a little lucky, too.

Brant Allen changes out an atmospheric bucket from one of four NASA buoys that were all installed and transported by the R/V LeConte. (Brandon Berry, UC Davis TERC)

The Stories, continued

SOS from Emerald Bay

Following Allison Gamble's early work on *Mysis* shrimp, the TERC team set out to test whether removing enough of the invasive shrimp could improve Lake Tahoe's clarity. Emerald Bay became the proving ground, which meant long nights on the water when the shrimp were most active.

Then, at 3 a.m., the *R/V LeConte* quit.

"We had just finished trawling and were pulling in the last net when she suddenly died in the middle of Emerald Bay," recalls Brandon Berry, boat captain and senior research associate. "The *Bob* had just left to take our mechanic, Raph Townsend, back to South Lake, so we had to call them to turn around and rescue us."

It took three hours for the smaller *R/V Bob Richards* to tow the much larger *R/V LeConte* back to Tahoe City. Getting her into the slip proved to be the final challenge. With little room to maneuver, the R/V Richards built up as much speed as possible before using the tow line to slingshot the *R/V LeConte* neatly into her berth.

"It was 6 a.m., no one had slept, and we got it in on the first try," Berry says.

The R/V LeConte snug in her Tahoe City Marina slip, shows the small margin of error allowed if forced to sling her in. (Michael Cane, UC Davis TERC)

Brandon Berry prevents the line for the zooplankton net from tangling during a regular trawl for zooplankton. (UC Davis TERC)

The Stories, continued

Out of Fuel

Allen was taking a team from Scripps Institution of Oceanography onto the lake to deploy ocean-bottom seismometers. Their goal was to compare how seismic waves travel through Lake Tahoe's bedrock versus its deep lake sediments. One seismometer was placed onshore and another at a depth of 500 meters so both instruments could record the same earthquakes.

As the team approached the deployment site near the Incline Fault, the *R/V LeConte* suddenly ran out of fuel.

Normally, switching to the second fuel tank was a simple task. The *R/V LeConte* has separate port and starboard tanks that run independently, and changing between them requires opening a small access hatch. Unfortunately, that hatch was directly beneath the 800-pound seismometer assembly sitting on the back deck.

With the engine off, the hydraulics had no power, making it impossible to lift the instrument out of the way. Stranded on the lake, the crew spent the next two hours carefully disassembling the massive seismometer just to reach the fuel selector and switch tanks.

After an unexpected delay — and a memorable lesson in field logistics — they restarted the engine, reassembled the instrument, and successfully completed the deployment.

Thunderstorms

The *R/V LeConte* has never been known for speed, which means outrunning a Sierra thunderstorm isn't an option. And because she's made of aluminum, being caught on the lake during lightning is about the last place anyone wants to be.

That became painfully clear when a $20,000 thermistor chain disappeared into 500 meters of water. Assuming the surface buoy had failed, Geoff Schladow, Bob Richards, and a Remotely Operated Vehicle (ROV) crew spent five hours searching the lake bottom.

It was a typical summer afternoon. Thunderheads were building, distant lightning echoed across the lake, and Bob was growing increasingly anxious. Then, just as the storm approached, the ROV found the missing instrument.

Unfortunately, it couldn't grab it to bring it to the surface.

The only option was to haul the line up by hand — a process that takes about an hour. After nearly reaching the surface, with only about 50 meters left to go, the line snapped, sending the entire thermistor chain back to the bottom.

Now empty-handed and in the middle of an approaching thunderstorm, the crew headed for shore. Bob steered with a wooden broomstick rather than touching the metal wheel, while everyone else stood on rubber mats to minimize the risk of lightning strikes.

The next morning, they returned under calm skies and recovered the thermistor chain without incident.

Sometimes, field science rewards persistence. Sometimes, it also rewards knowing when to come back tomorrow.

A Public Relations Icon

The *R/V LeConte's* unmistakable silhouette — with its distinctive working profile that has become instantly recognizable to anyone familiar with Lake Tahoe — made her more than a research vessel; she is an ambassador that became one of the lake's most enduring and iconic visual symbols, and there was simply no better place to tell the story of Lake Tahoe than from her deck.

The *R/V LeConte* welcomed a remarkable cross-section of visitors to the lake, from students and community members to some of the nation's most influential decision-makers. Presidents, governors, members of Congress, agency leaders, and philanthropists all experienced Lake Tahoe from the same working platform used by scientists every day. Among the most notable visitors were President Bill Clinton and Vice President Al Gore, who toured the lake during the 1997 Lake Tahoe Presidential Forum, as well as California Senator Dianne Feinstein and California Governors Gray Davis and Gavin Newsom and Senator Adam Schiff.

The vessel also became a familiar platform for journalists. National Geographic crews documented TERC's pioneering nearshore algae research from the *R/V LeConte*, helping introduce Lake Tahoe's environmental challenges — and the science addressing them — to audiences around the world. Countless newspaper, television, and documentary crews have stepped aboard, using the vessel as a front-row seat to the story of Tahoe.

Perhaps nowhere was the *R/V LeConte's* influence greater than in fundraising. Long before the UC Davis-owned Tahoe Center for Environmental Sciences facility became home to the Tahoe Environmental Research Center and the Tahoe Science Center™, the *R/V LeConte* helped convince donors that the vision was worth investing in.

"A lot of people we took out as donors had faster, fancier boats," recalls Geoff Schladow, PhD. "But the *R/V LeConte* is the real deal. This is where it happens."

Charles Goldman agrees. He estimates he took hundreds of prospective donors onto the lake while raising the $14.5 million needed to build what would become the Tahoe Center for Environmental Sciences today.

"People really felt attached to Tahoe research when they were out on the boat," Goldman says.

That was the *R/V LeConte's* unique gift. Whether carrying presidents, journalists, or philanthropists, she didn't just show people Lake Tahoe; she immersed them in the science behind its protection. More than once, a few hours aboard the *R/V LeConte* turned curiosity into commitment, helping build the partnerships, public support, and investment that continue to sustain Tahoe science today.

Then President Bill Clinton and Vice President Al Gore on the R/V LeConte with Charles Goldman in 1997. The visit resulted in a multi-million-dollar commitment to restore and protect water quality and the surrounding forests. (UC Davis TERC)

A 1990 National Geographic magazine showing Stan Loeb installing sensors to monitor water conditions for pioneering algae studies with the R/V LeConte in the background. (National Geographic)

The Legacy of TERC's Research Vessel LeConte

The legacy of the *Research Vessel LeConte* cannot be measured in years alone. It is measured in the discoveries she made possible, the careers she launched, the partnerships she fostered, and the enduring record she helped create.

"Without the *R/V LeConte*, we could not have achieved what we did in lake science — pure and simple," says Charles Goldman.

For five decades, the *R/V LeConte* was far more than a boat. She was the constant in a changing world. Researchers, students, directors, and crews came and went, but month after month, year after year, the *R/V LeConte* returned to the same sampling stations, helping build one of the world's longest and most comprehensive freshwater datasets. That uninterrupted record now provides scientists with something increasingly rare: a window into the state of an iconic ecosystem before and during a changing climate.

"Without her, the 50-year dataset doesn't happen," says Brandon Berry. "Staff have come and gone, but the *R/V LeConte* has been on every single long-term monitoring trip."

That data became the foundation for hundreds of scientific papers, graduate theses, dissertations, and careers. They attracted researchers from around the world, enabled collaborations that would have been impossible elsewhere, and transformed Lake Tahoe into one of the most intensively studied lakes on Earth.

"It is the data that underpins dozens and dozens of theses, dissertations, and papers," says Geoff Schladow, PhD. "There is no single piece of equipment that has done as much as that boat has."

The *R/V LeConte* also became a symbol of the kind of science practiced at Lake Tahoe — not glamorous, but persistent. Day after day, through calm mornings, snowstorms, and long nights, she carried scientists into an environment that demanded patience, resilience, and hard work.

It epitomizes the hard slog," Schladow says. "The work was difficult — long days on a cold metal deck — but that made the discoveries all the more rewarding."

To Brant Allen, who spent 35 years aboard her, the *R/V LeConte* was the dependable old workhorse that exceeded every expectation.

"She wasn't pretty," he says, "but I wouldn't have changed her for anything. Everybody knew her. She worked better than anyone expected, lasted longer than anyone expected, and just quietly did her job for 50 years."

That quiet reliability is what many remember most. The *R/V LeConte* was built to work, not impress. Her weathered hull bears the scars of half a century of deploying anchors, recovering instruments, and hauling equipment from one of the world's deepest alpine lakes.

"There was nothing too heavy for her," says Daret Kehlet. "She has battle scars, but every one of them came from doing the work."

The Legacy of TERC's Research Vessel LeConte, continued

And perhaps that is her greatest legacy. The *R/V LeConte* became more than a research vessel. She became the face of TERC, a symbol recognized by the public and embraced by the scientific community. Generations of students learned aboard her. Countless visitors left inspired by her. Scientists built careers because of her. Together, they created a body of knowledge that continues to guide the protection of Lake Tahoe.

Long after the *R/V LeConte* makes her final trip, that legacy will continue — not in the boat herself, but in the science she enabled, the people she inspired, and the lake she helped generations of researchers to understand and protect.

Senator Adam Schiff, his wife Eve, and TERC Boat Captain Michael Cane wave from the top deck of the R/V LeConte. Also aboard were UC Davis Chancellor Gary May and his wife, LeSchelle May, along with other UC Davis staff and faculty. (Gregory M Urquiaga, UC Davis)

Our majestic R/V LeConte basking in the last rays of sunlight with a full moon behind her. A picture truly befitting of her status as an icon. (UC Davis TERC)

TAHOE: STATE OF THE LAKE REPORT 2026

THE NEXT ERA

UC DAVIS
Tahoe Environmental Research Center

tahoe.ucdavis.edu

The Next Chapter of Tahoe Science

For close to 60 years, TERC researchers have been observing, documenting, and researching how Lake Tahoe is changing, building one of the world's longest and most comprehensive records of a freshwater ecosystem. That knowledge has guided restoration efforts and played a significant role in helping to stabilize the lake's famous clarity after several decades of decline.

Today, the Lake Tahoe Basin is facing new challenges. Climate warming, larger and more frequent regional wildfires, invasive species, and shifting nutrient cycles are changing the lake and its watershed in ways that are interconnected.

To meet these challenges, Tahoe science is evolving. Our researchers are moving beyond measuring change to understanding the biological, chemical, and physical processes that drive it. New technologies now allow our scientists to study everything from microscopic organisms that influence water clarity to assessing the impacts of wildfire particles that settle onto the lake, revealing connections that were previously impossible to observe.

Together, these studies represent the next chapter in Lake Tahoe science — one focused on understanding how the lake functions today so managers can better protect it for the future.

At sunrise, Stephanie Hampton and Eckhardt Karsten direct field team members in deploying new sensors to study factors influencing nearshore algal growth that are affected by day-night cycles. (Michael Cane, UC Davis TERC)

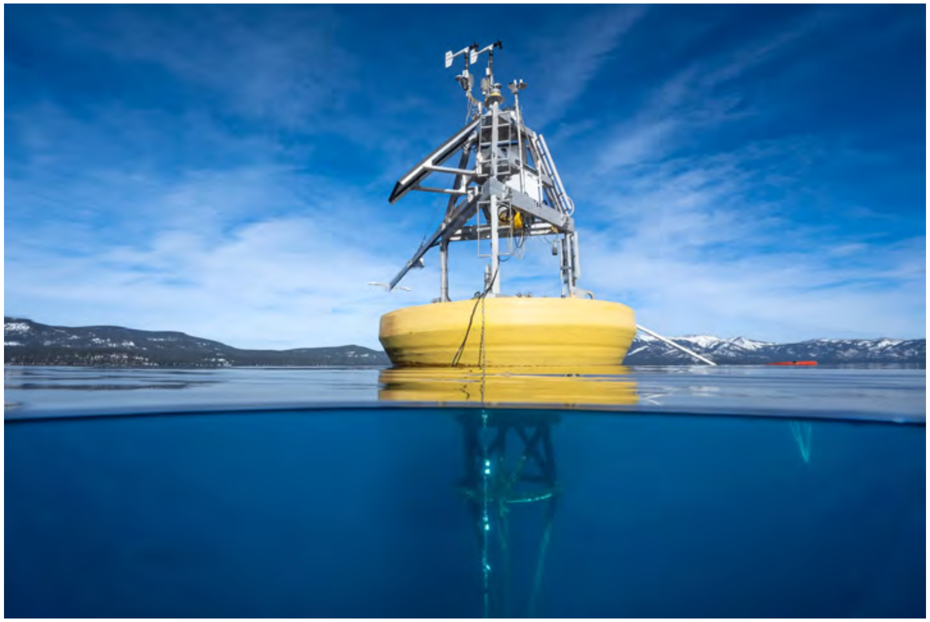
Rethinking Lake Tahoe's Clarity

For almost six decades, UC Davis has been monitoring changes in the lake's clarity. Decades of restoration and management have aimed to reduce the amount of fine sediment entering the lake, and clarity has stabilized after years of decline.

That plateau in clarity has led to an important new question: If less sediment is reaching the lake, why isn't clarity improving?

To answer it, scientists are looking beyond sediment alone.

Clarity depends on tiny particles suspended in the water that scatter sunlight. While fine sediment has long been recognized as a major contributor to clarity reduction, researchers are now investigating the extent to which those particles are living organisms and what role they play throughout the year.



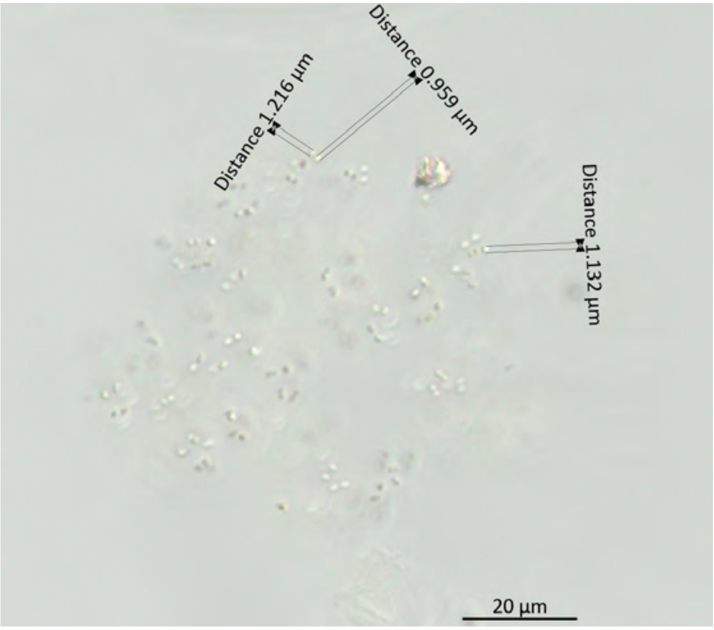
A permanently moored research buoy bobs along Lake Tahoe's northwest shore. It is operated jointly by NASA Jet Propulsion Laboratory and UC Davis Tahoe Environmental Research Center. (Brandon Berry, UC Davis TERC)

Rethinking Lake Tahoe's Clarity

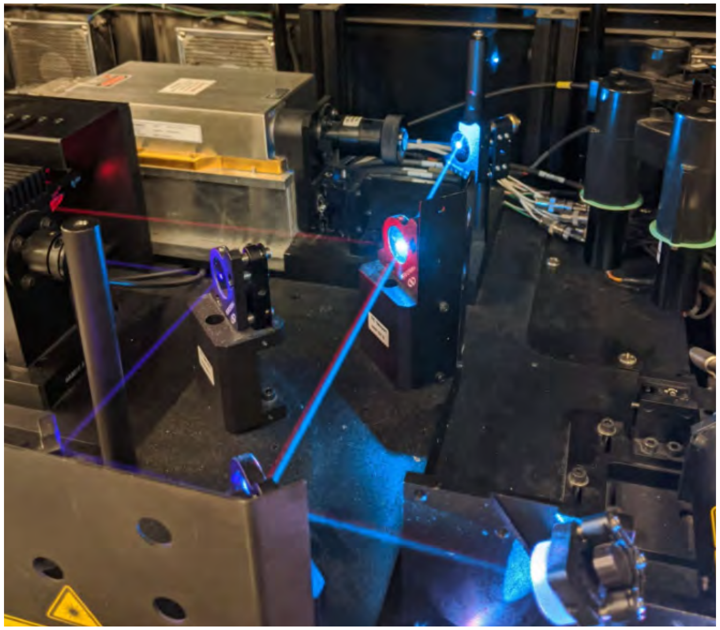
Picoplankton

One focus is picoplankton — microscopic photosynthetic organisms smaller than a human red blood cell. Although they were first identified in Lake Tahoe more than 40 years ago, new research suggests they may play a much larger role in the lake's ecosystem than previously recognized. Their tiny size also makes them highly effective at scattering light, raising the possibility that changes in their abundance could influence water clarity.

Until recently, these organisms were extremely difficult to study. Now, thanks to an innovative collaboration with UC Davis Comprehensive Cancer Center and its Flow Cytometry Shared Resource, researchers are adapting a laboratory technique called flow cytometry, which is commonly used in medicine to study individual cells. The technology uses lasers to count and characterize tiny particles suspended in a liquid. Combined with more than four decades of historical observations, these measurements will allow scientists to determine whether changes in picoplankton populations help explain why clarity has remained relatively stable despite significant sediment management actions.



Even at 400x magnification, the challenge of capturing the full extent of picoplankton communities is apparent, they are simply too small. For comparison, the average width of a human hair is approximately 70 µm. Sample collected by Brant Allen. (Lidia Tanaka, UC Davis TERC)



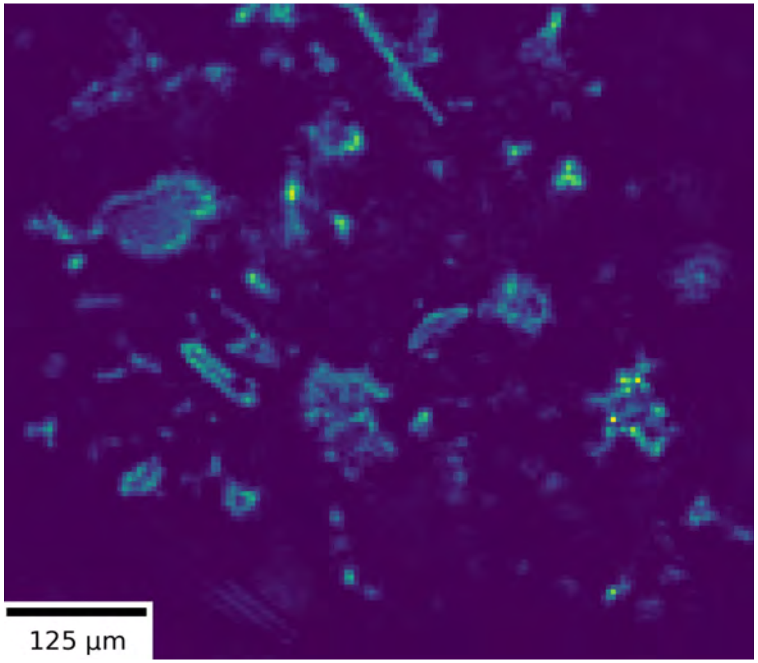
A flow cytometer uses multiple wavelengths of light to identify and quantify individual cells and particles, enabling TERC to characterize picoplankton and other microscopic organisms with high speed and precision. (UC Davis Comprehensive Cancer Center)

Rethinking Lake Tahoe's Clarity

Particle Aggregation

Researchers are also investigating what happens to sediments after they enter the lake. Tiny particles constantly collide and stick together, potentially forming larger aggregates that eventually become heavy enough to sink below the surface, where they no longer influence clarity in the upper surface waters. Understanding what controls this process — and how it changes with biological activity and environmental conditions — is becoming an important new area of research. New underwater imaging technologies now allow scientists to observe these fragile particle aggregates directly, without disturbing them during sampling. Sensors mounted on Autonomous Underwater Vehicles map the environmental conditions that affect particle formation and trajectories.

Together, these studies represent the next generation of Lake Tahoe clarity science. Building on more than half a century of continuous monitoring, researchers are moving beyond documenting changes in clarity to understanding the biological and physical processes that control it. That knowledge will help guide future management strategies to protect — and ultimately improve — Lake Tahoe's iconic blue waters.



A holographic image of particles aggregated together by transparent exopolymers (TEP) in Lake Tahoe. This aggregation becomes "lake snow" and will drift to the bottom of the lake. (UC Davis TERC)

PhD candidate Kenneth Larrieu (right) and chemistry manager Steven Sesma (left) spent 11 hours finalizing a new procedure to identify TEP in the lab setting. (Alex Forrest, UC Davis TERC)

Understanding the Nearshore

While Lake Tahoe's famous clarity reflects the health of the open lake, some of the clearest signs of change appear much closer to shore.

For more than 50 years, our researchers have monitored the algae growing on rocks along Tahoe's shoreline, creating one of the world's longest records of nearshore conditions. That record has documented how algae have changed over time — but today, researchers are redoubling efforts to answer a longstanding question: What drives algae growth in the first place?

Part of the answer begins with seeing the shoreline in a new way. Using imagery from drones and helicopters, researchers can now map the entire nearshore, identifying where algae are growing and tracking how those patterns change throughout the year. New research is now directed toward the potential to scale up the use of remote sensing from satellites. This bird's-eye view provides a level of detail that was once impossible to achieve through traditional field surveys alone.

But understanding where algae grow is only part of the story.

Researchers are now turning their attention below the surface, where the chemistry of the nearshore changes dramatically over the course of a day. As algae grow, they alter oxygen levels and nutrient concentrations in the surrounding water. At night, those processes reverse, and nutrients stored in lake sediments may be released back into the water — creating conditions that can promote additional algal growth.

These daily cycles have largely gone unnoticed because traditional water sampling often captures only a single moment in time during the daytime. New measurement techniques to track these changes reveal how nutrients move between lake sediments and the overlying water and how algae respond.

By combining decades of observations with new tools in the air and in the water, our researchers are moving beyond mapping algae to understanding the biological and chemical processes that control their growth. This knowledge will help managers better protect Lake Tahoe's shoreline as the lake responds to a changing climate and other environmental pressures.

Field team member Noah Slon points to where the new nearshore sensors, intended to monitor changes in chemistry from day to night, are being tested. (Michael Cane, UC Davis TERC)

Field team members (left to right) Colby Kalasardo, Aaron Vanderpool, and Brandon Berry train with a new drone that is expanding TERC's ability to monitor comprehensive algal growth from the skies. (Alison Toy, UC Davis TERC)

Exploring Tahoe's Invisible Ecosystem

Some of Lake Tahoe's most important residents are too small to see.

Every drop of lake water contains millions of microscopic organisms that recycle nutrients, support the food web, and help regulate the lake's biological and chemical processes. Yet, despite decades of research, this invisible ecosystem remains one of the least understood parts of Lake Tahoe.

That is beginning to change.

New DNA and RNA sequencing technologies are allowing scientists to explore Tahoe's microbiome — the community of microscopic life that inhabits the lake — with unprecedented detail. Researchers can now identify organisms from tiny traces of genetic material in a water sample, determine the roles they play in the ecosystem, and even see how they respond to changing conditions in real time.

These new tools are helping answer some of Lake Tahoe's biggest questions. Which invasive species have entered the lake, and where? How do microbial communities respond to warming temperatures, wildfire smoke and ash, or invasive species? How do they influence nutrient cycling, water quality, and the lake's famous clarity? And could changes in these microscopic communities provide some of the earliest signs that the ecosystem is under stress?

By combining molecular tools with Lake Tahoe's long-term monitoring program, researchers are revealing the hidden biological processes that connect the lake's chemistry, ecology, and water quality. Understanding these invisible communities will help scientists better anticipate how Lake Tahoe responds to a changing climate and guide future efforts to protect one of the world's most remarkable alpine lakes.

Grace Rosburg-Francot collects water samples for her graduate research project investigating whether metagenomic techniques can be applied to identify the DNA of aquatic invasive species in Lake Tahoe. (Colby Kalasardo, UC Davis TERC)

Dante Capone uses fragile, specialized filters to collect DNA from lake samples to study the lake's microbiome. Collecting data while the air is clear will establish baseline data to better understand future wildfire smoke impacts. (Cara Hollis, UC Davis TERC)

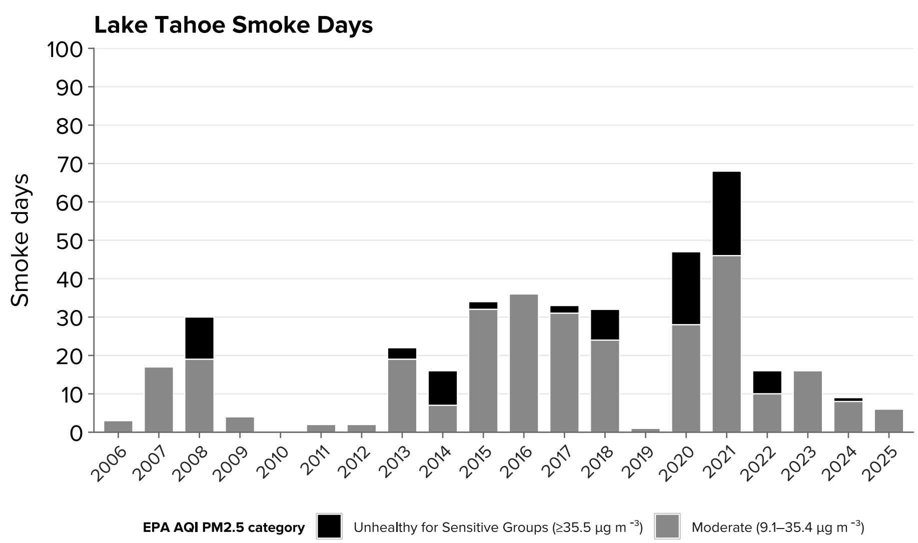
Where There's Smoke

Wildfires have become an increasingly common part of life around Lake Tahoe. While the smoke eventually clears, scientists are discovering that some of its impacts remain long after the skies turn blue.

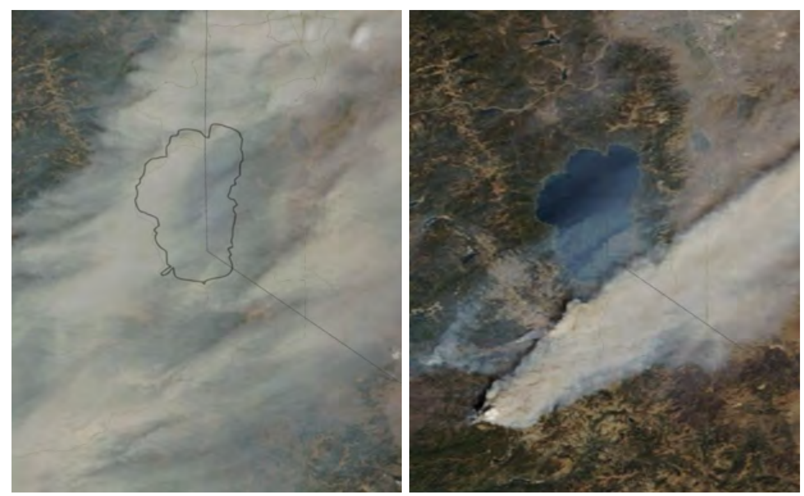
Tiny particles carried in wildfire smoke settle onto the lake, bringing nutrients, metals, and other compounds that can influence water quality and aquatic life. Yet researchers still know surprisingly little about what reaches the lake, where it comes from, or what happens after it enters the water.

To answer these questions, TERC researchers are expanding monitoring at Lake Tahoe's mid-lake research buoy and partnering with experts across the UC Davis campus in atmospheric chemistry and trace-metal science. Together, they are identifying the chemical fingerprints of wildfire smoke, distinguishing it from other airborne pollutants, and tracking how these materials move through the lake.

The research will help scientists determine the extent to which wildfire-derived particles alter nutrient cycling, stimulate the growth of algae and microorganisms, or influence Lake Tahoe's famed clarity. It will also provide one of the first comprehensive assessments of how wildfire smoke affects the lake as fires become larger and more frequent across the Sierra Nevada.



A 20-year record of the annual number of wildfire smoke days in the Lake Tahoe Basin reaching Moderate or higher EPA Air Quality Index (AQI), with the most number of days occuring during the 2021 Caldor and Dixie fires. (Dante Capone, UC Davis TERC)



Smoke can be seen shrouding the Tahoe Basin during the 2020 Lightning Fire (left) and the 2021 Caldor Fire (right). The baseline data collected on clear days will be compared to data collected during smoke days to help researchers better understand changes induced by wildfire smoke. (NASA Worldview)

Conclusion

By combining TERC's long-term monitoring with expertise from across UC Davis, researchers are uncovering how wildfire, human activity, Lake Tahoe science is entering a new era. For close to 60 years, TERC's long-term lake monitoring has documented how the lake has changed. Beyond the lake, a 20-year record of forest monitoring is providing equally valuable insight into the health and resilience of the surrounding watershed. Building on this foundation, forest researchers are advancing whitebark pine restoration efforts while launching new studies of white pine blister rust to better understand disease risk, identify resilient seed sources, and guide future forest restoration.

Today, these unparalleled long-term records are powering a new generation of research. By combining decades of observations with cutting-edge technologies and collaborations across UC Davis, scientists are moving beyond documenting change to understanding the processes that drive it. Together, these studies are revealing how wildfire, human activity, climate change, forests, and water quality are interconnected, providing the knowledge needed to guide the restoration and stewardship of the entire Lake Tahoe Basin.

Much of this next generation of research will soon be carried out aboard a new, yet-to-be-named research vessel scheduled for delivery in late 2026 or early 2027. Although the vessel itself is just three years old, it is currently undergoing an extensive retrofit to transform it into a state-of-the-art floating laboratory designed specifically to support the diverse scientific missions planned for Lake Tahoe. Equipped to advance everything from long-term monitoring to cutting-edge molecular, chemical, and nearshore research, the new vessel will build on the extraordinary legacy of the *R/V John LeConte* while providing the capabilities needed to answer the emerging questions facing Lake Tahoe in a changing world. As TERC enters this exciting new chapter, the vessel will serve as both a platform for discovery and a symbol of our continued commitment to protecting Lake Tahoe through science, engineering, and education.

Emerging whitebark pine seedlings a year after inital reforestation efforts of Trimmer Peak in the Caldor Fire burn scar. (Aaron Vanderpool, UC Davis TERC)

The R/V LeConte once shiny and new with the original Tahoe Research Group name on her side is slated for retirement by 2027. (UC Davis TERC)

Education and Outreach Director Heather Segale inspires the next generation of scientists at Tahoe through water quality monitoring activities. (Alison Toy, UC Davis TERC)

TAHOE: STATE OF THE LAKE REPORT 2026

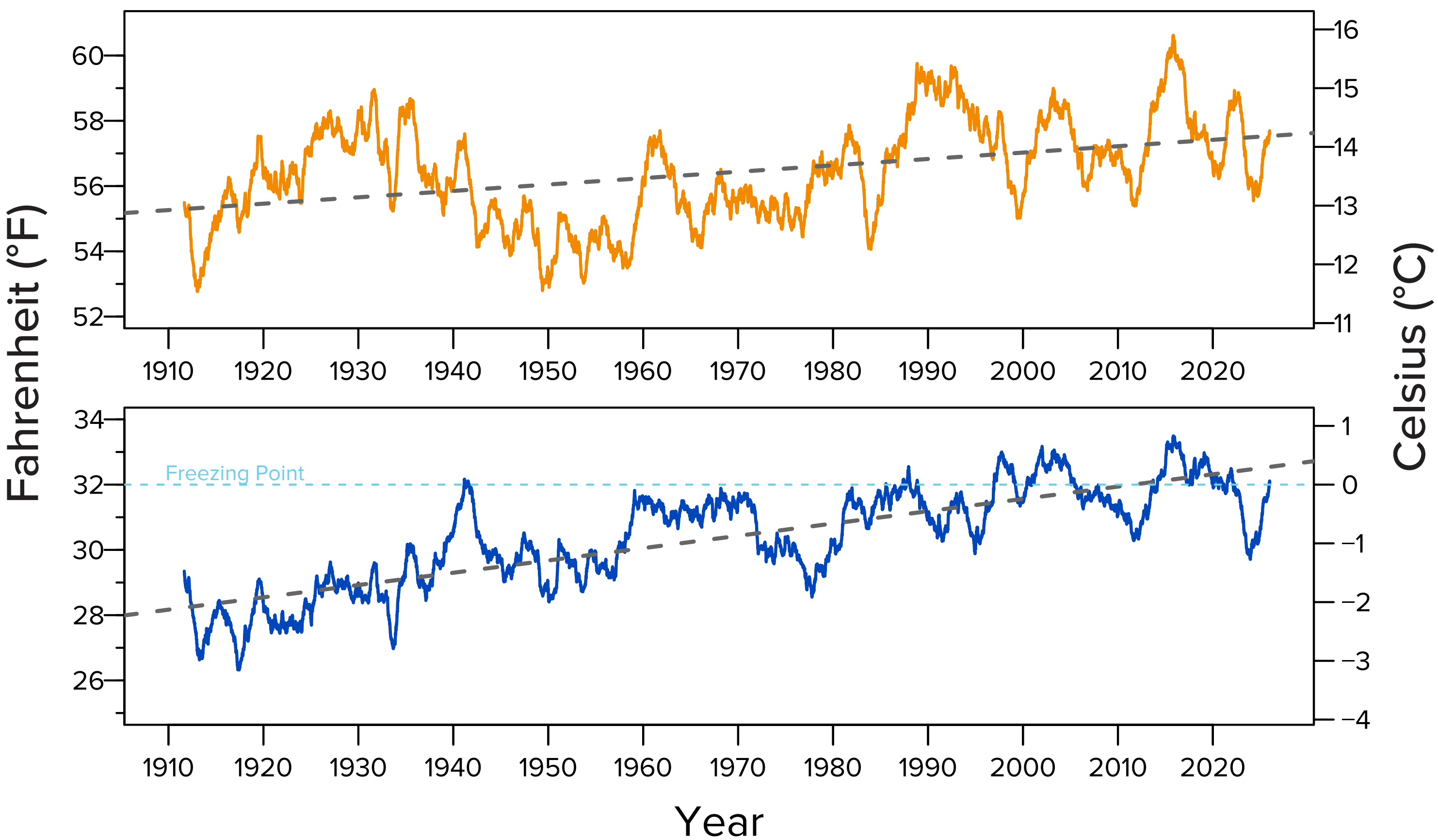
METEOROLOGY

Air temperature - smoothed daily maximum and minimum

Daily since 1911

Over the last 114 years, daily air temperatures measured at Tahoe City have increased. The long-term trend in average daily minimum temperature (lower figure) has increased by 4.31°F (2.4°C) and the long-term trend in average daily maximum temperature (upper figure) has risen by 2.24°F (1.24°C). The trend line for the minimum air temperature has exceeded the freezing temperature of water for the last 15 years, contributing to generally more rain and less snow as well as earlier snowmelt at Lake Tahoe. These data are smoothed using a two-year running average to remove daily and seasonal fluctuations.

Data source: Long-term NOAA daily maximum and minimum temperatures data set.

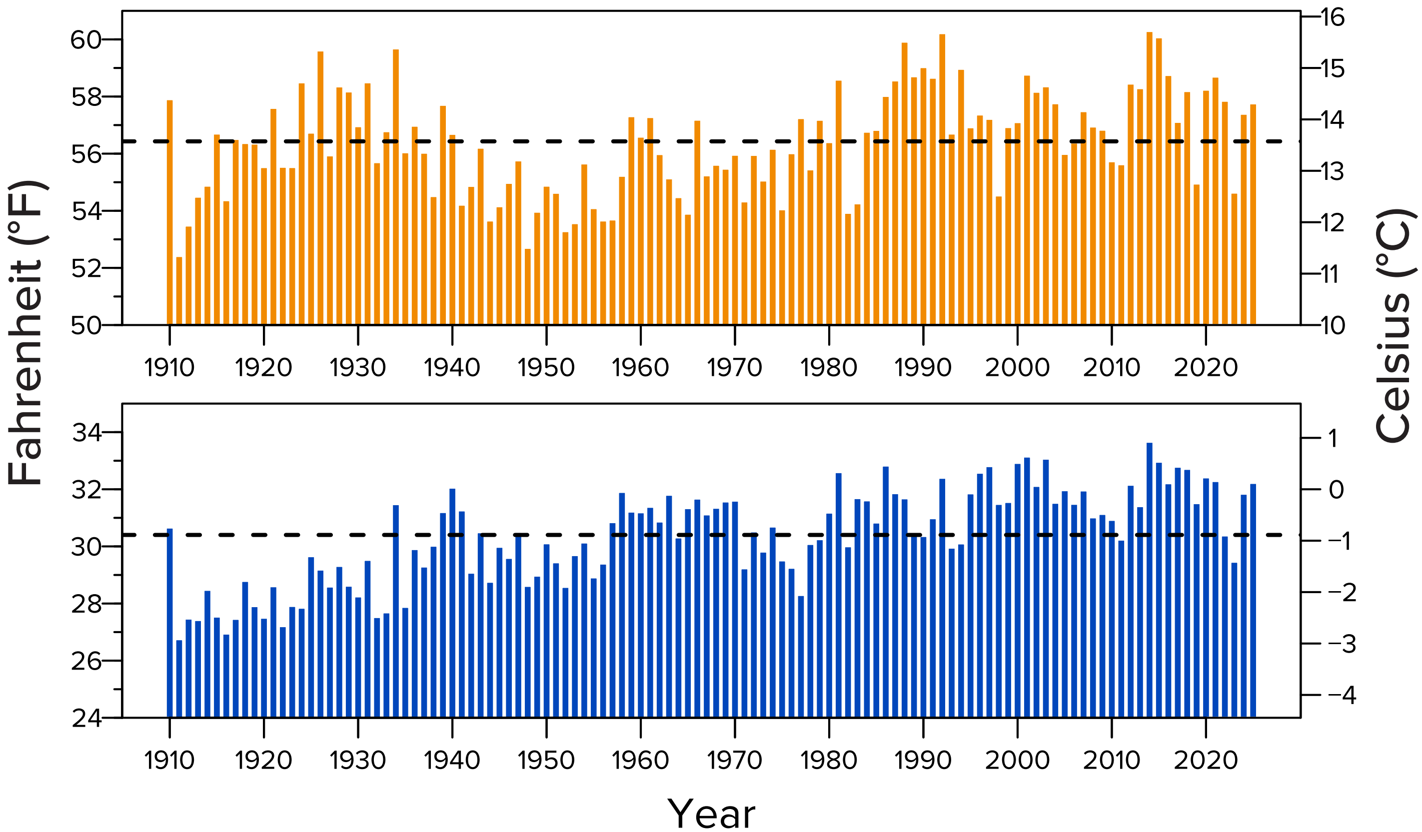


Air temperature - annual average maximum and minimum

Since 1910

The annual average maximum (upper figure) air temperature in 2025 was 57.8°F (14.3°C), which was above the long-term average (dashed line) air temperature. The 2025 annual average minimum (lower figure) was 32.2°F (0.1°C), which was slightly higher than the long-term average (dashed line) air temperature. The long-term averages for the maximum and the minimum are 56.4°F (13.6°C) and 30.4°F (-0.9°C), respectively.

Data source: Long-term NOAA daily maximum and minimum temperatures data set measured at Tahoe City.



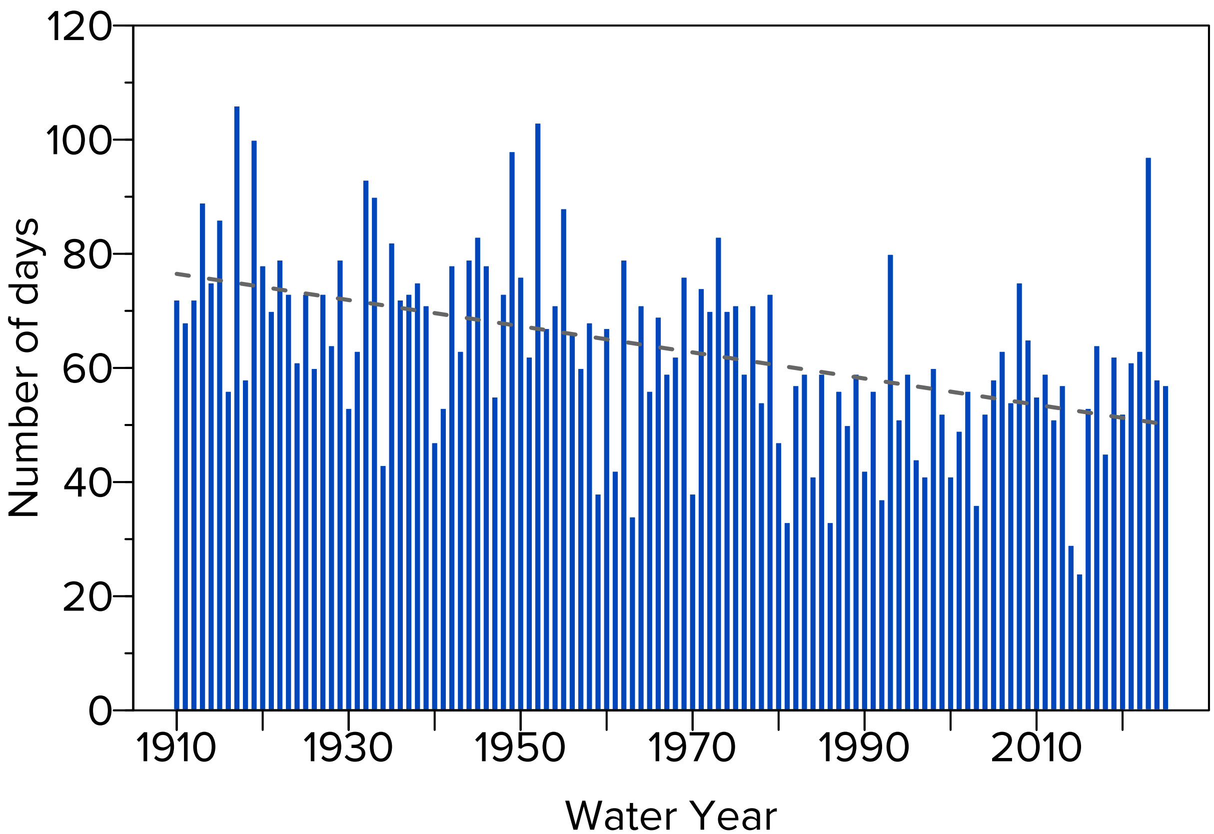
Below-freezing air temperatures

Yearly since 1910

The method used for this analysis sums the number of days with daily average temperatures below freezing between December 1 and March 31 for each Water Year (WY). Although year-to-year variability is high, the number of days when air temperatures averaged below-freezing has declined by 26 days since 1911. In WY 2025, the number of freezing days was 57, just above the declining long-term trend line. This amount is consistent with the measured air temperatures for 2025.

Data source: Long-term NOAA daily maximum and minimum temperatures data set measured at Tahoe City.

Note: The Water Year extends from October 1 through September 30.

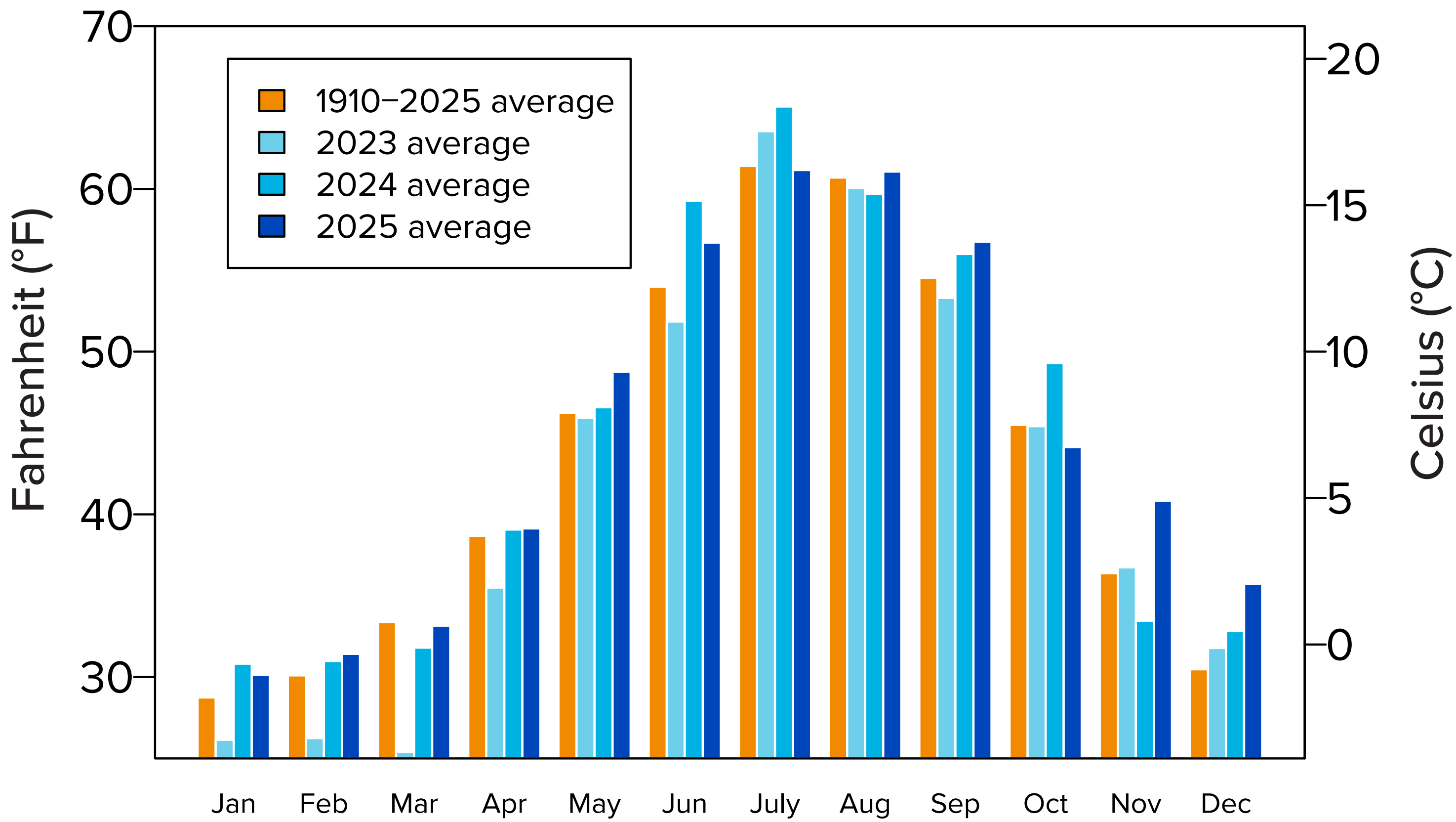


Monthly air temperature

2023. 2024, 2025 and 1910 to 2025

In 2025, monthly daily average air temperatures were higher than the long-term average for 9 of the months of the year and distinctly (greater than 2 °F) warmer during the months of May, June, September, November, and December.

Data source: Long-term NOAA daily maximum and minimum temperatures data set.

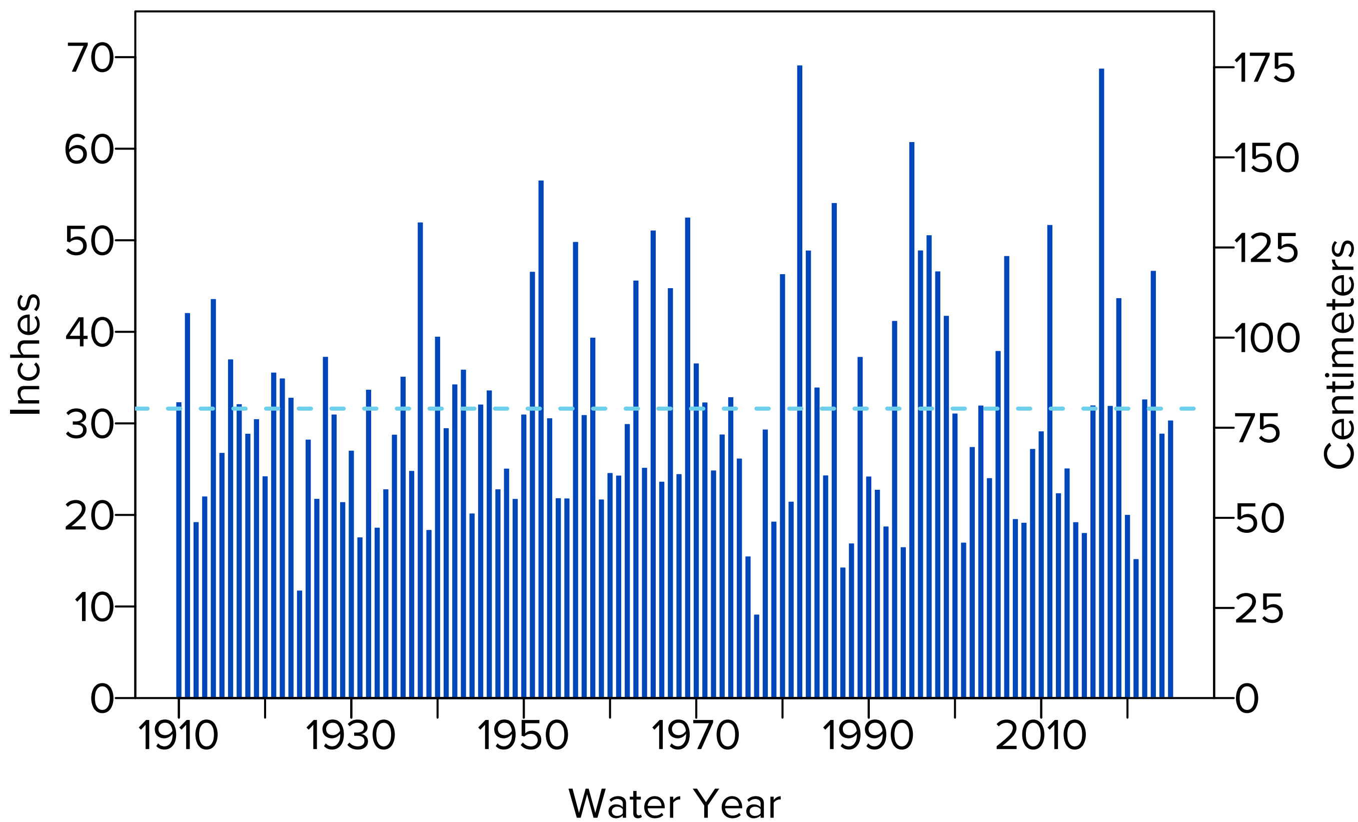


Annual precipitation

Yearly since 1910

From 1910 to 2025, average annual precipitation (water equivalent of rain and snow) measured at Tahoe City was 30.43 inches. The maximum recorded was 69.2 inches in 1982. The minimum recorded was 9.2 inches in 1977. At 31.61 inches, 2025 was only 1.2 inches below the long-term average (shown by the dashed line). Generally, there is a gradient in precipitation from west to east across Lake Tahoe, with almost twice as much precipitation falling on the west side of the lake. There is also an increase in precipitation with elevation in the Tahoe basin. Precipitation is summed over the Water Year, which extends from October 1 through September 30.

Data source: Long-term NOAA daily precipitation data set.

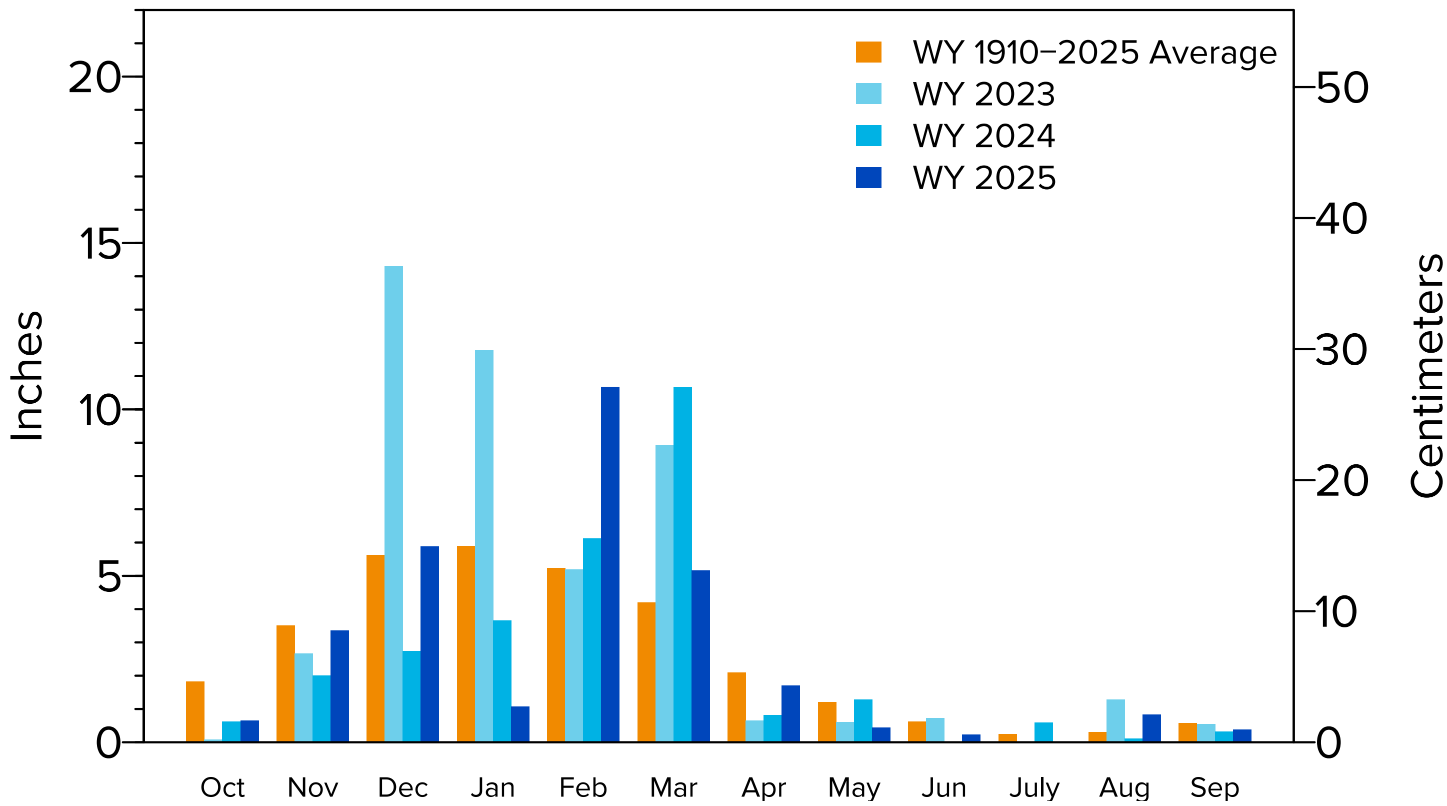


Monthly precipitation

2023, 2024, 2025 and 1910 to 2025

The 2025 Water Year had an annual average of 30.43 inches of precipitation, slightly below the long-term average of annual precipitation of 31.3 inches at Tahoe City. Precipitation in October, November, January, April, May, June, July, and September (8 months) of the 2025 Water Year was below the long-term averages for those months. January of 2025 was especially low and February was especially high compared to the average for 1910–2025. The 2025 Water Year extends from October 1, 2024, through September 30, 2025.

Data source: Long-term NOAA daily precipitation data set.

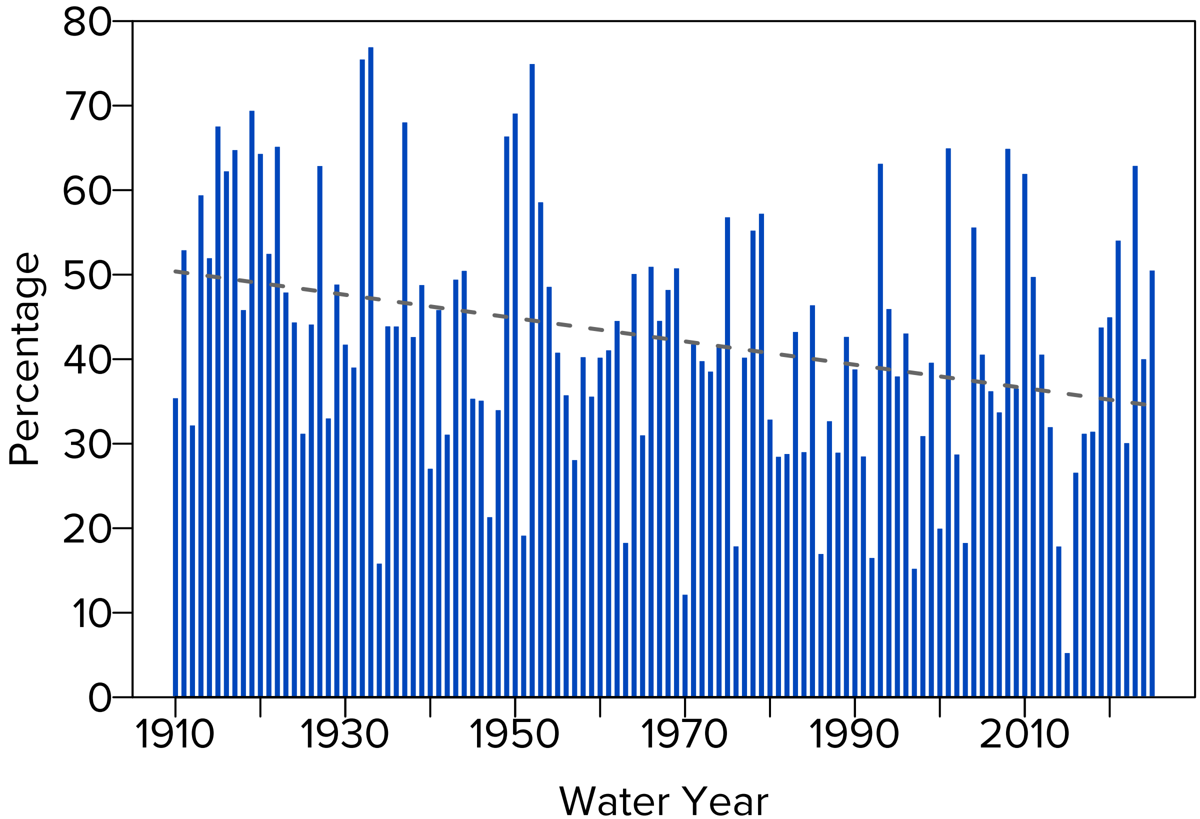


Snow as a fraction of annual precipitation

Yearly since 1910

Snow has declined as a fraction of total precipitation from an average of 50.4 percent in 1910 to 34.5 percent in 2025. In Tahoe City, snow represented 50.6 percent of the 2025 total precipitation, well above the trendline. These data are calculated based on the assumption that precipitation falls as snow whenever the average daily temperature (the average of the daily maximum and minimum temperatures) is below freezing. Precipitation is summed over the Water Year, which extends from October 1 through September 30.

Data source: Long-term NOAA daily air temperature and precipitation data sets.



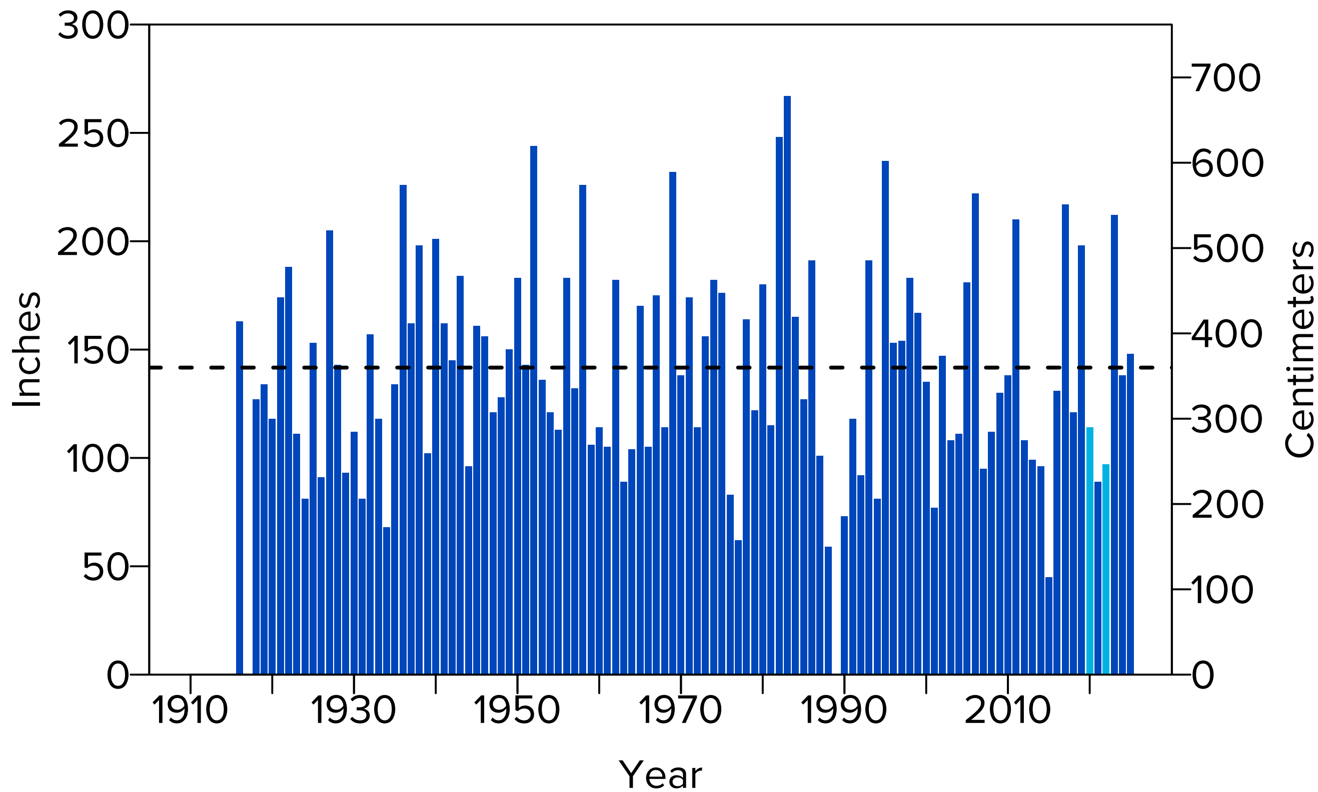
April snowpack

Since 1916

The depth of the snowpack is measured over the year at multiple locations throughout the Sierra. Shown here are the readings taken on approximately April 1 since 1916 at the Lake Lucille Snow Course Station (located in Desolation Wilderness, elevation 8,188 feet (Lat. 38.86 deg. Long. -120.11 deg.). In 2020 and in 2022, the April snowpack readings at Lake Lucille were not made due to storm conditions. Instead, the values were estimated by correlation with values made at the Rubicon #1 snow course. The correlation estimates are shown with the lighter blue columns. For April 2, 2025, the value was 148 inches, just above the long-term average. The largest amount on record was 267 inches on April 5, 1983. The average snow depth (shown by the dotted line) over the period 1916–2025 was 142.3 inches.

Note: April snow depth data are not available for 1917 and 1989.

Data source: USDA Natural Resources Conservation Service, California Monthly Snow Data.

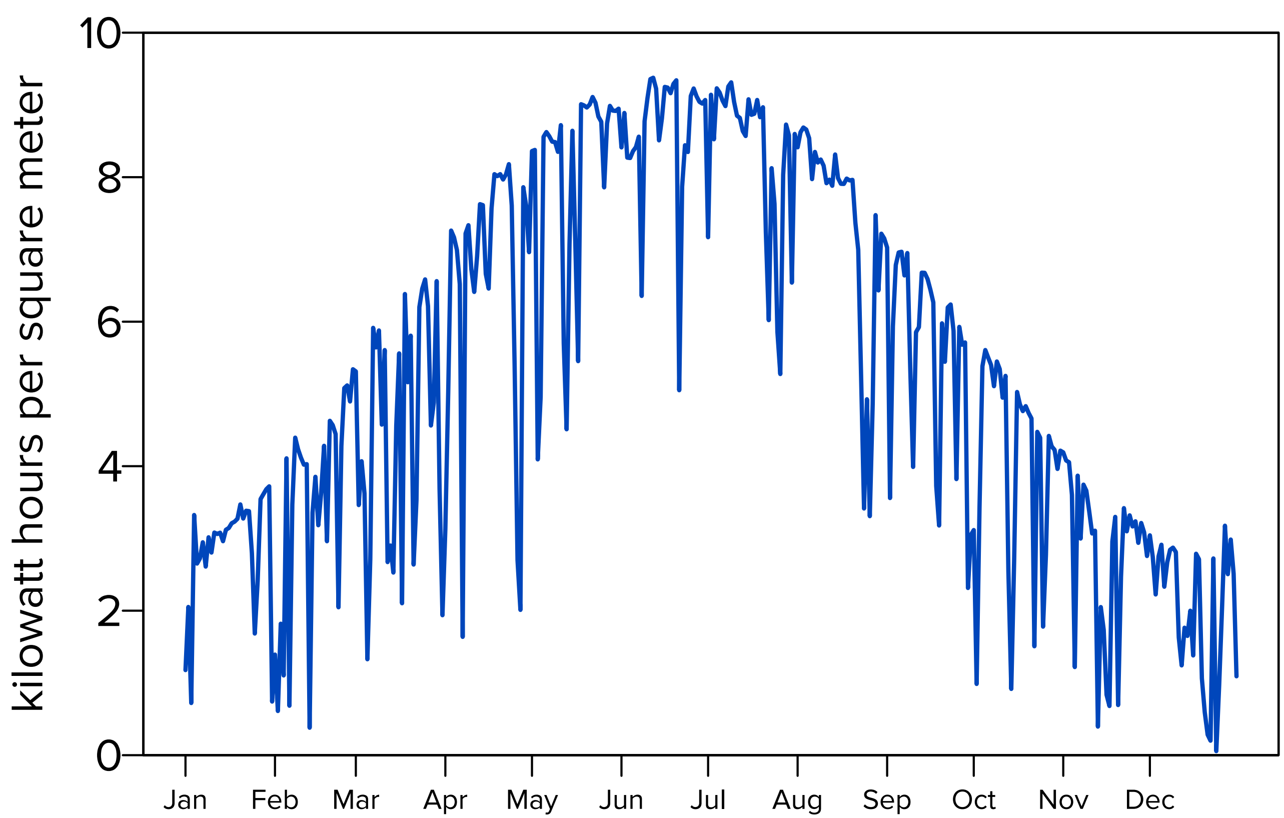


Daily solar radiation

In 2025

In 2025, Solar radiation showed the typical annual pattern of sunlight, peaking one day before the summer solstice on June 20. Dips in daily solar radiation are primarily due to cloud coverage. Smoke and other atmospheric constituents play a smaller role. It is worth noting that solar radiation on a cloudless day in mid-winter can exceed that of a cloudy or smokey day in mid-summer.

The TERC meteorological station where these data are collected is located on the U.S. Coast Guard dock at Tahoe City.



TAHOE:
STATE
OF THE
LAKE
REPORT
2026

PHYSICAL PROPERTIES

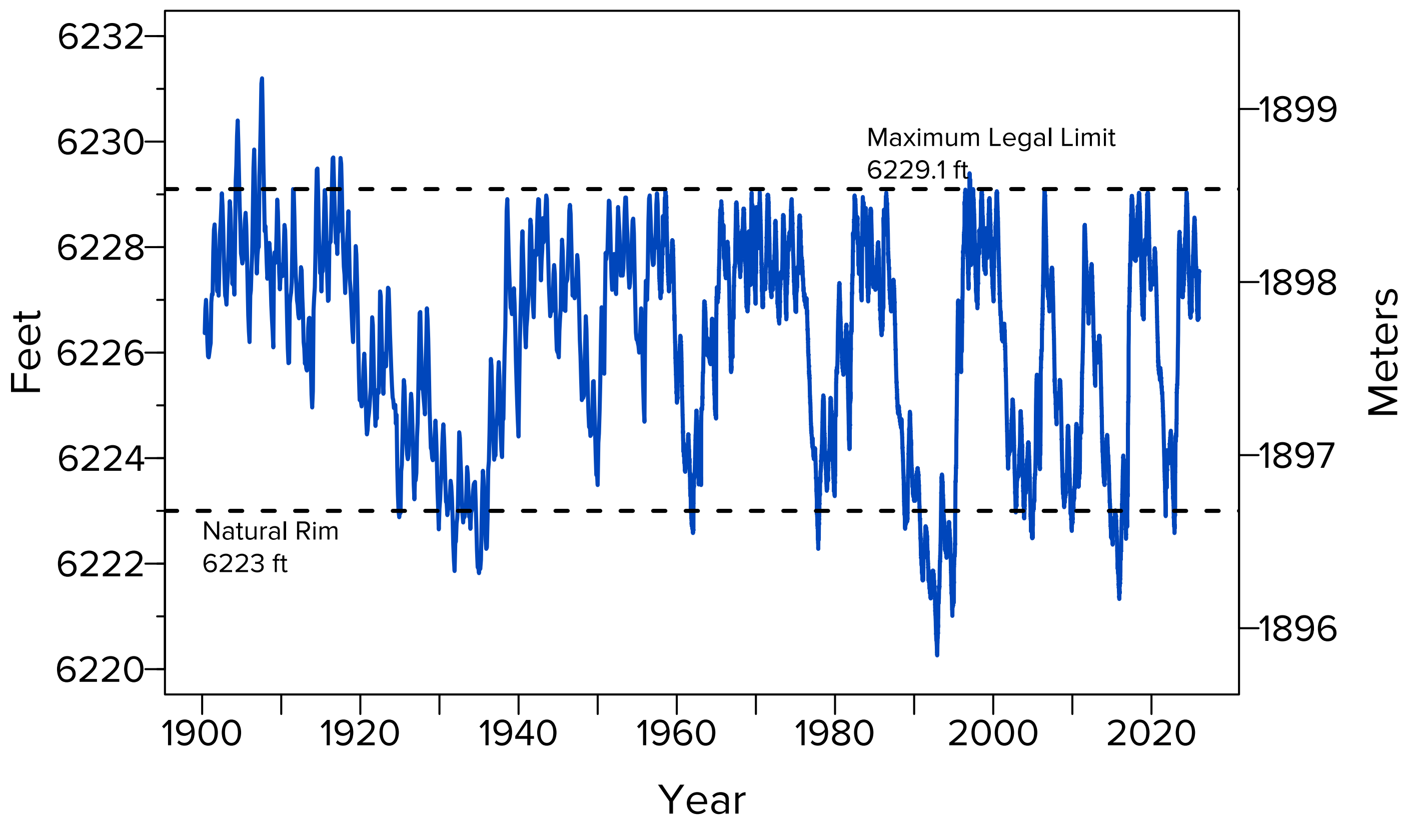
UC DAVIS
Tahoe Environmental
Research Center

Lake surface level

Daily since 1900

Lake surface levels vary throughout the year. Lake levels rise due to high stream inflow, groundwater inflow, and precipitation of rain and snow directly onto the lake surface. It falls due to evaporation, in-basin water withdrawals, groundwater outflows, and outflows via the Truckee River at Tahoe City. In 2025, the highest lake level was 6,228.56 feet on June 8, and the lowest was 6,226.62 feet on November 13, 2025, more than three feet higher than the natural rim of the lake. The natural rim of the lake is at an elevation of 6,223 feet. Lake Tahoe has not fallen below the natural rim since late 2022. When the lake was below its rim, outflows via the Truckee River ceased. Several episodes of lake level falling below the natural rim are evident in the last 114 years of the record. When lake level is high, shore zone erosion likely occurs, contributing sediments and nutrients into the lake; however, previous studies have determined that these contributions are a relatively small proportion of the total loading to the lake.

Data source: U.S. Geological Survey level recorder in Tahoe City.

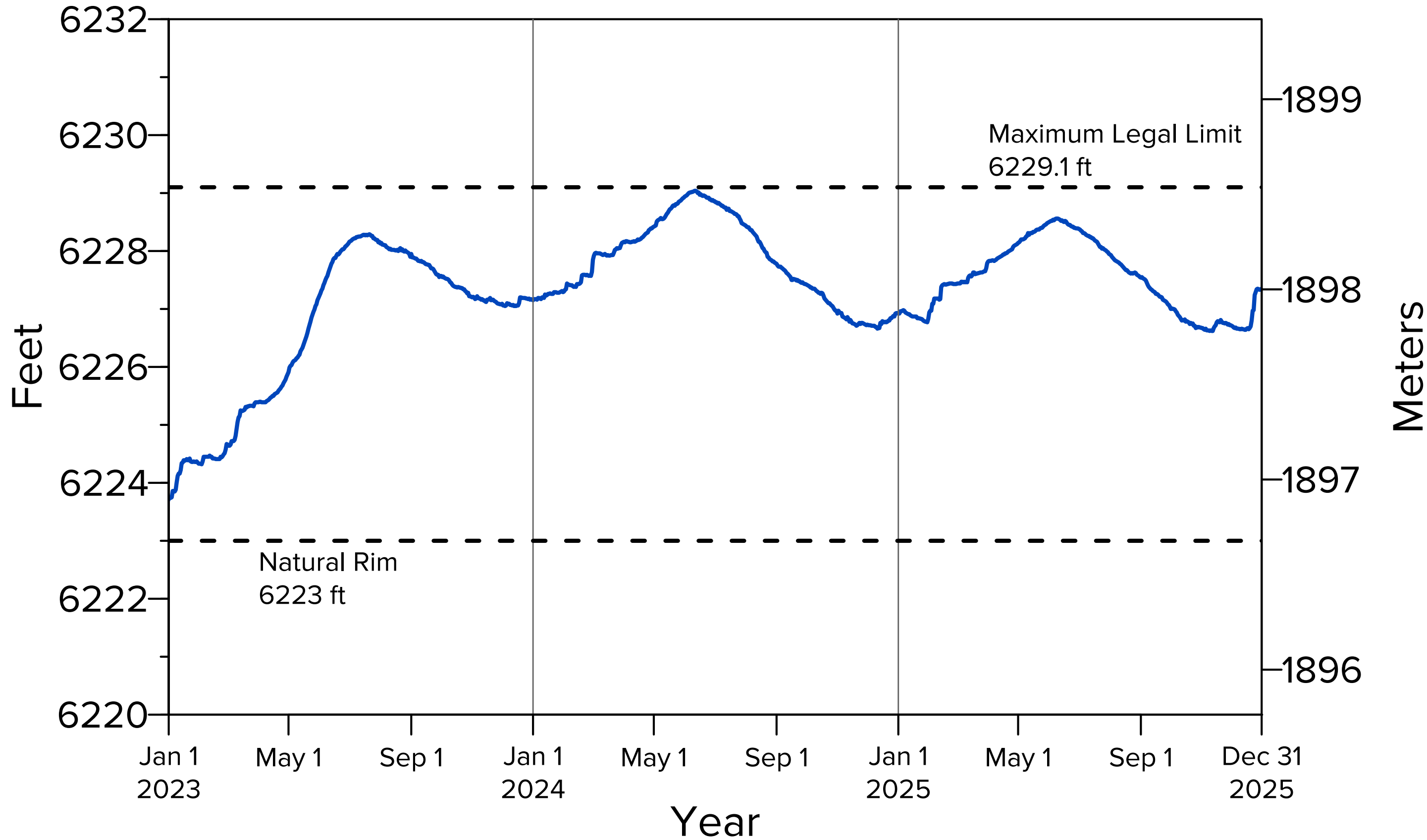


Lake surface level

Daily in 2023, 2024, and 2025

The subset of lake surface data is extracted from the same data as the previous lake surface level figure for the most recent three years from 2023–2025. This more time-restricted presentation of recent lake level data better displays the annual patterns of rising and falling lake level in greater detail. For example, the rapid increases in water level directly result from storm events (e.g. both January and December of 2025). In 2025, on account of the average precipitation rates, rises in lake level are evident although not reaching the maximum legal limit (6,229.1 ft) of the lake as occurred in 2024. Snowmelt in spring continued the rise in lake level, but after June 11, the water level slowly fell as a result of outflow and evaporation from the lake. Rapid increases at the end of 2025 were a result of winter precipitation coming in the form of large storms.

Data source: U.S. Geological Survey level recorder in Tahoe City.



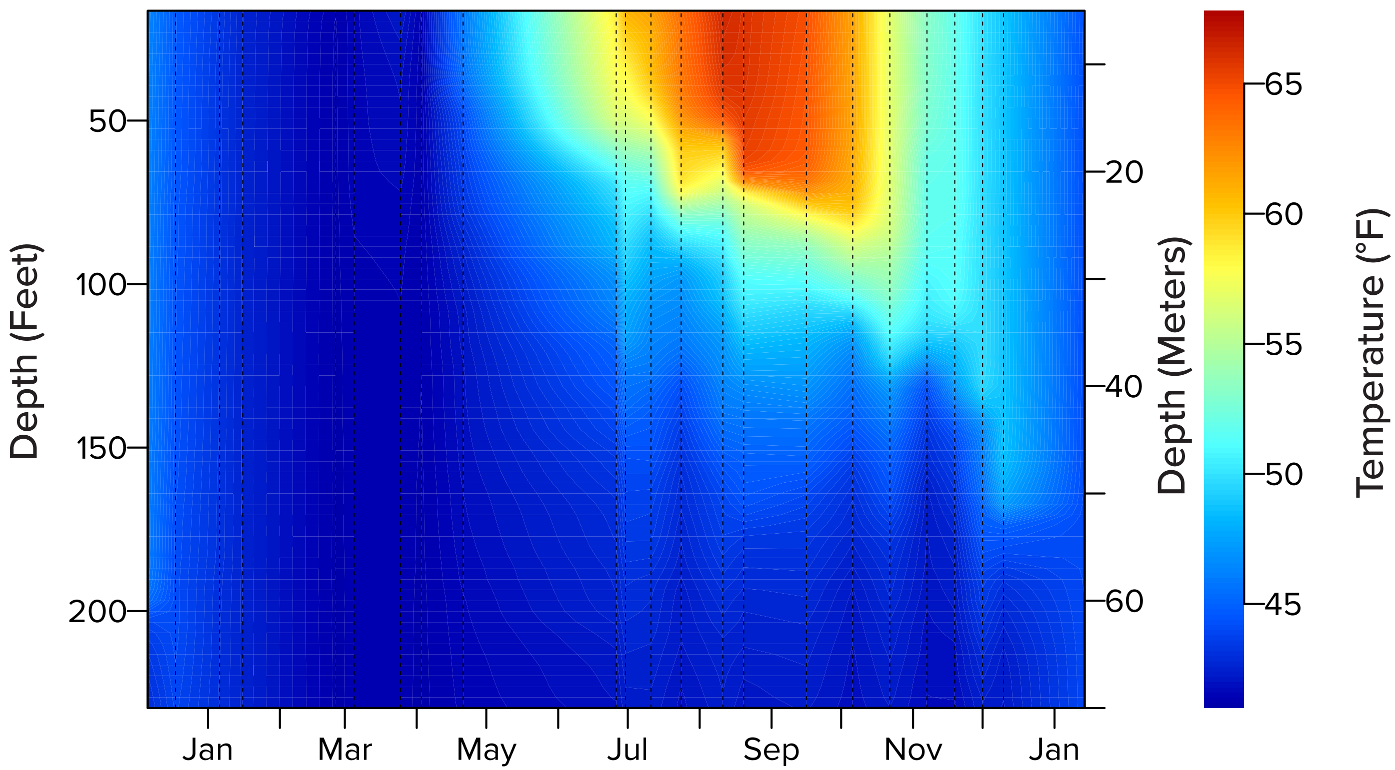
Water temperature profile

In 2025

Water temperature profiles are measured in the lake using a CTD (conductivity, temperature, depth) profiler on the days indicated by the dashed vertical lines (20 sampling events in 2025). The measured temperature is accurate to within 0.005°F. The vertical distribution of water temperature is a very important lake attribute as it is directly related with water density within the lake. Water density is a key determinant of stratification and mixing.

During the summer months, the warmer, lighter water (warmer colors) remains suspended at the lake surface above the thermocline in the region known as the epilimnion. The temperature in the upper 230 feet (70 m) of Lake Tahoe is displayed as a color contour plot. In the early part of 2025, the lake temperature followed the typical seasonal pattern. In February and March, the lake surface was at its coldest, while it was at its warmest in August before fall cooling took place.

Data source: TERC lake monitoring.

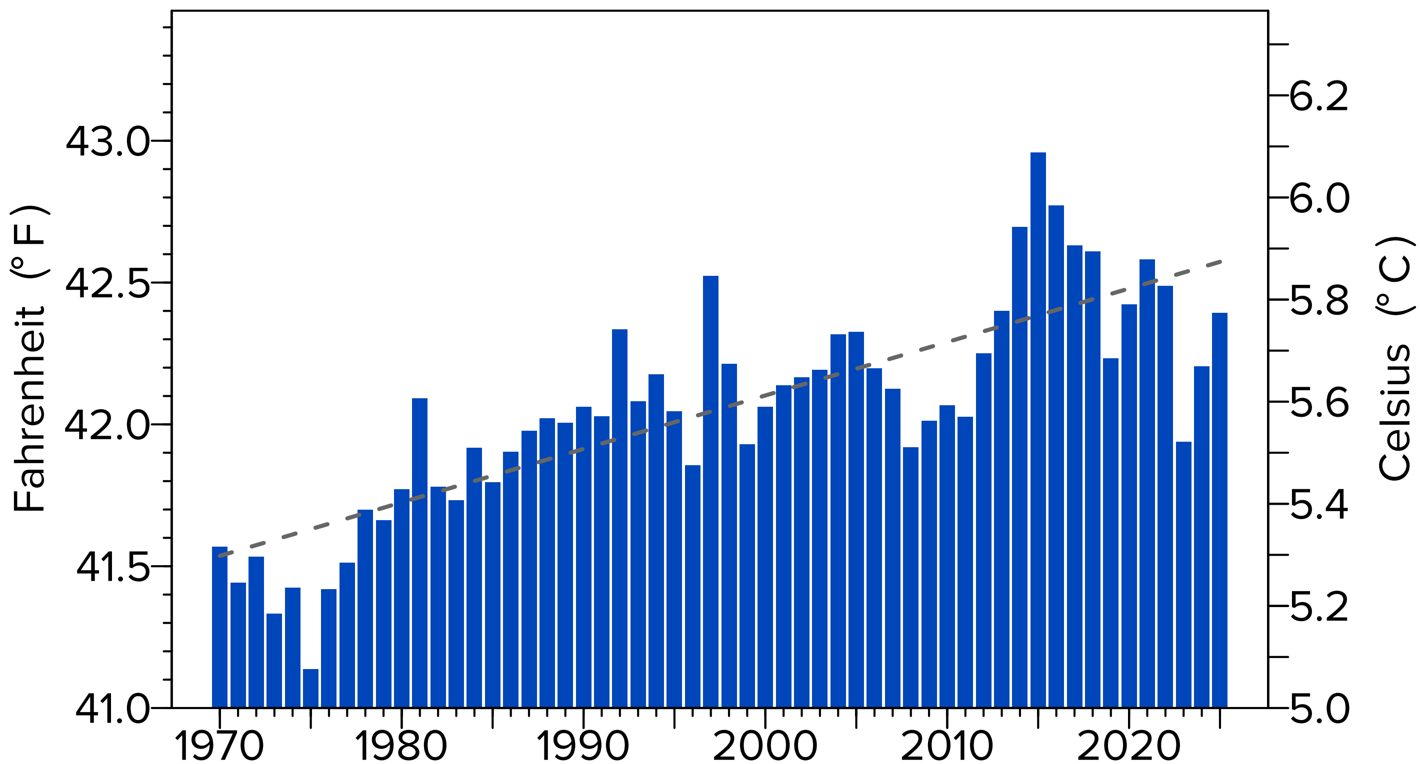


Annual average water temperature

Since 1970

The volume-averaged temperature of the lake for each year since 1970 is shown in the figure below. Under the assumption of a linear relationship, the trend line indicates that water temperature has increased by approximately 1.1°F (0.6°C) since 1970. The annual rate of warming is 0.21 °F/decade (0.12°C/decade). The monthly temperature profile data from the top to the bottom of the lake has been smoothed, and any seasonal influences were removed to best show the long-term trend. The 2025 annual average water temperature of 42.4°F (5.77°C) fell below the trendline but on par with 2024. Note that these averages include the vast volume of Lake Tahoe's deep, cold waters (hypolimnion), which is why these numbers are so much lower than the surface temperatures.

Data source: TERC lake monitoring.

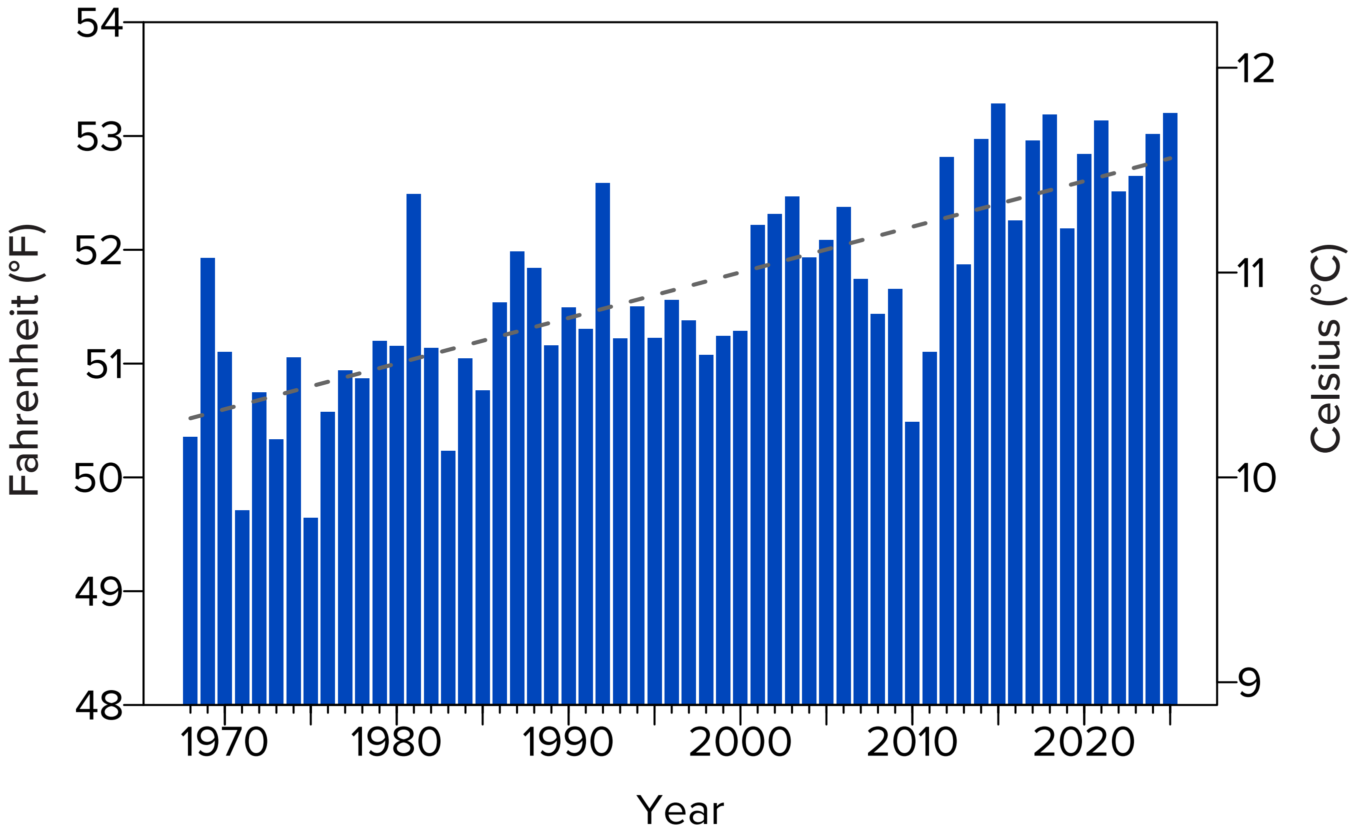


Annual surface water temperature

Yearly since 1968

Surface water temperatures (measured at a depth of 5 feet) have been recorded monthly at the Mid-lake and Index stations from TERC's research vessels since 1968 and from four research buoys since 2007. Despite year-to-year and longer cyclical variability, the annual average surface water temperatures continue to show a linear upwards trend, which has significant potential implications for the ecology of the lake. The average temperature in 1968 was 50.4°F (10.2°C). For 2025, the average surface water temperature was 53.2°F (11.8°C), just above the long-term trend, under the assumption of a linear regression. The overall rate of warming given from this regression of the lake surface is 0.40°F (0.22°C) per decade.

Data source: TERC lake monitoring.



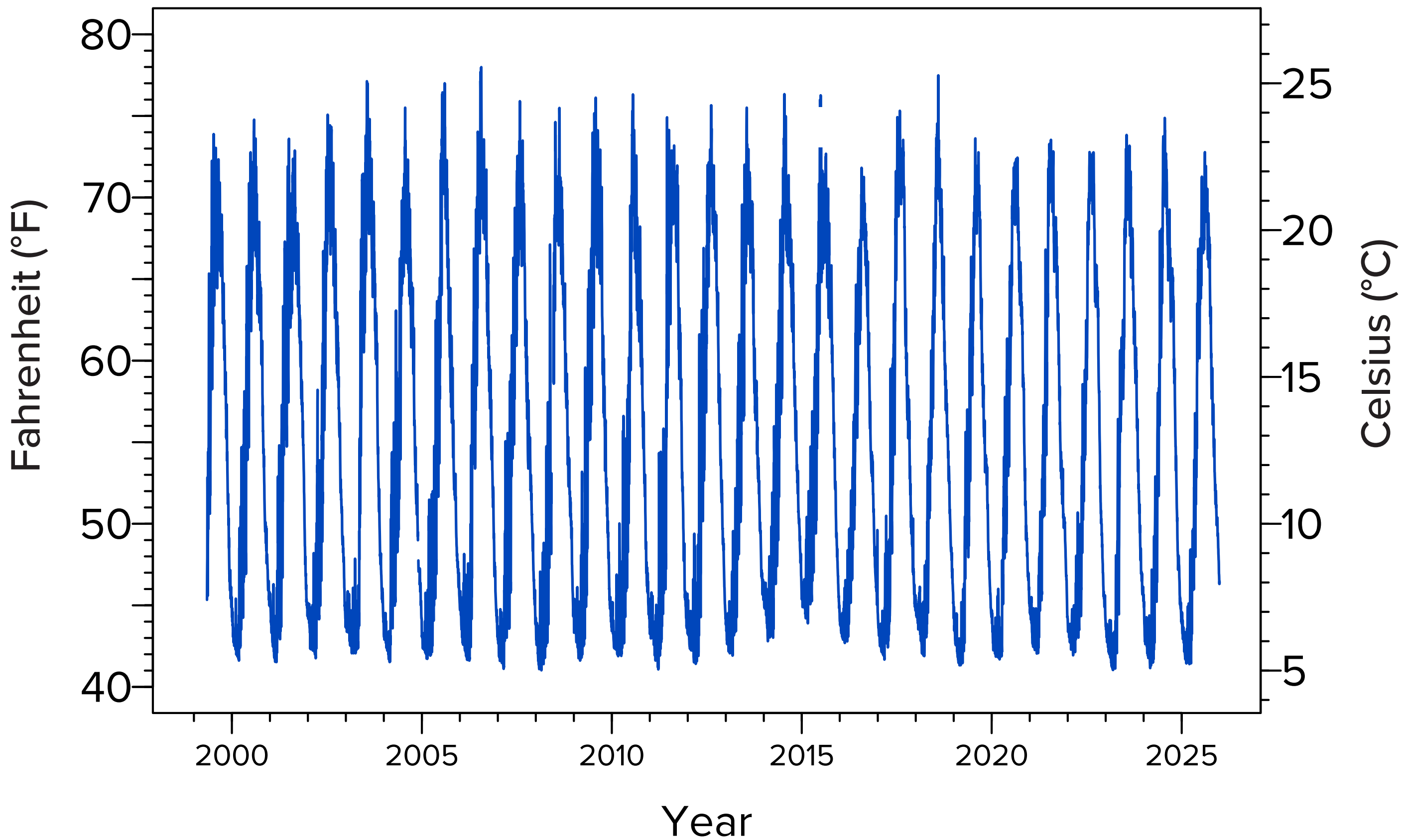
Maximum daily surface water temperature

Surface temperature measured since 1999 every 2 minutes

The maximum daily surface water temperature follows a sinusoidal pattern, with the temperature responding to the air temperature and other meteorological variables. In 2025, the highest maximum daily surface water temperature (summer) was 72.8°F (22.67°C), recorded on August 12. The lowest maximum daily surface water temperature (winter) was 41.4°F (5.2°C), which was recorded on March 16. This was still relatively warm, due in part to the absence of deep mixing.

These data are collected from thermistors at a depth of 5 feet (1.5 m) that are attached to four research buoys located over the deepest parts of the lake. The highest daily value from among the four buoys is considered as the daily maximum.

Data source: TERC lake monitoring.



Maximum annual nearshore water temperature

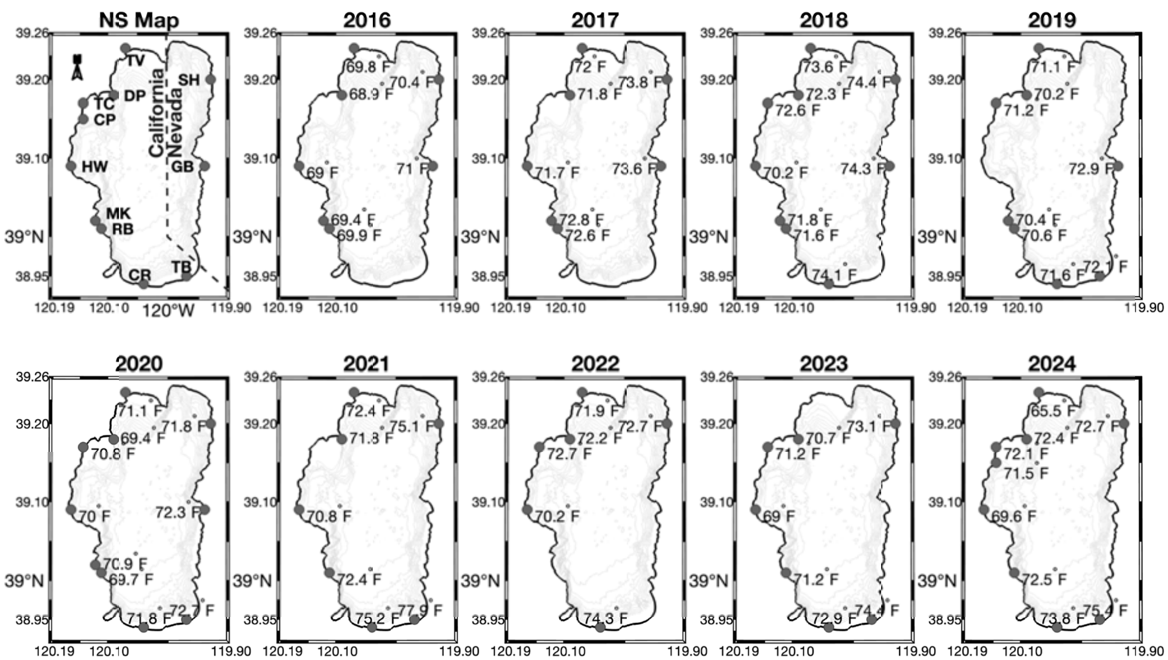
Surface temperature measured by nearshore sensors

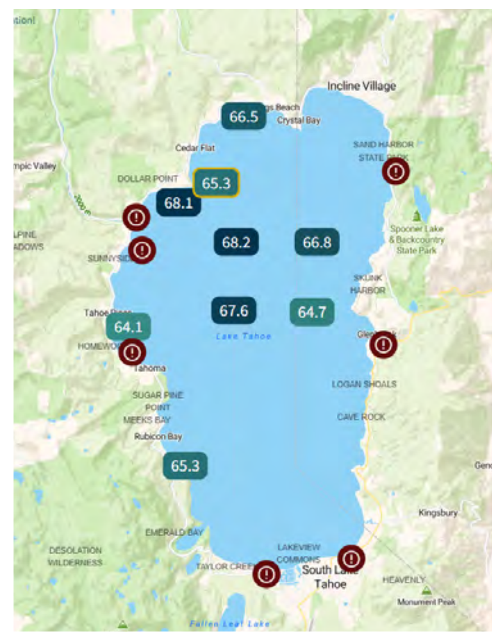
In 2014, TERC began installing a network of nearshore water quality monitoring stations around the perimeter of Lake Tahoe to improve understanding of water quality variability in the nearshore zone. In 2025, after 10 years of service, the real-time monitoring network entered a renewal phase to maintain the high standards of continuous nearshore monitoring. As part of this transition, several stations were removed and are scheduled to be replaced with a new generation of scientific monitoring technology.

Each station is equipped with optical sensors that measure turbidity (water clarity), chlorophyll-*a*, dissolved organic matter, and dissolved oxygen, as well as a Conductivity-Temperature-Depth (CTD) sensor that measures conductivity, water temperature, water depth, and wave height. An underwater cable provides shore power and internet connectivity, allowing the stations to transmit high-resolution data every 30 seconds in real time.

The nearshore sensor stations (clockwise from the top of the figure) are Tahoe Vista (TV), Sand Harbor (SH), Glenbrook (GB), Timber Cove (TB), Camp Richardson (CR), Rubicon Bay (RB), Meeks Bay (MK), Homewood (HW), Sunnyside (SS), Tahoe City (TC), and Dollar Point (DP). Real-time data from these stations are available on the TERC Real-Time Conditions webpage (https://tahoe.ucdavis.edu/real-time-conditions). Conditions reported in the middle of the lake are measured by TERC's moored buoys, which also provide real-time observations (described in the following section). In the second figure, stations shown with an exclamation mark were being serviced and updated and are not currently reporting data. (July 14, 2026).

Data source: TERC lake monitoring.



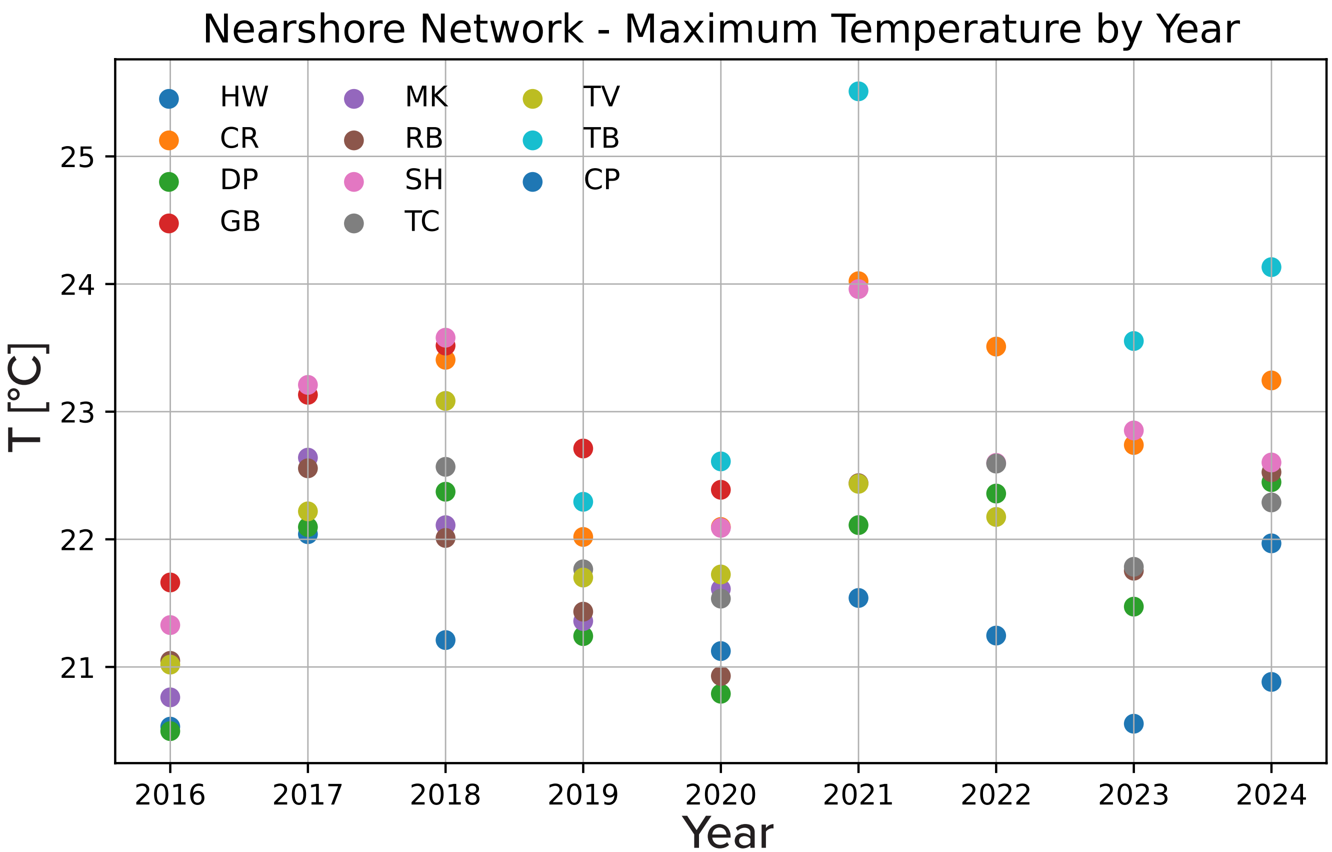


Maximum annual nearshore water temperature, continued

Surface temperature measured by nearshore sensors

The strategic locations of the nearshore sensor network allow us to characterize the spatial heterogeneity of Lake Tahoe's nearshore while identifying the lake locations that tend to exhibit warmer temperatures as well as the locations with the most striking impact from the wind. The figure below shows water temperature at all sites [Tahoe Vista (TV), Sand Harbor (SH), Glenbrook (GB), Timbercove (TB), Camp Richardson (CR), Rubicon Bay (RB), Meeks Bay (MK), Homewood (HW), Sunnyside (SS), Tahoe City (TC), and Dollar Point (DP)] since 2016. The eastern shore tends to be warmer than the western shore because of the usual southwestern winds (the wind pushes the warmer surface water towards the east). The southern shore's higher temperatures are likely due to the broad sediment shelf and shallow water column.

Data source: TERC lake monitoring.

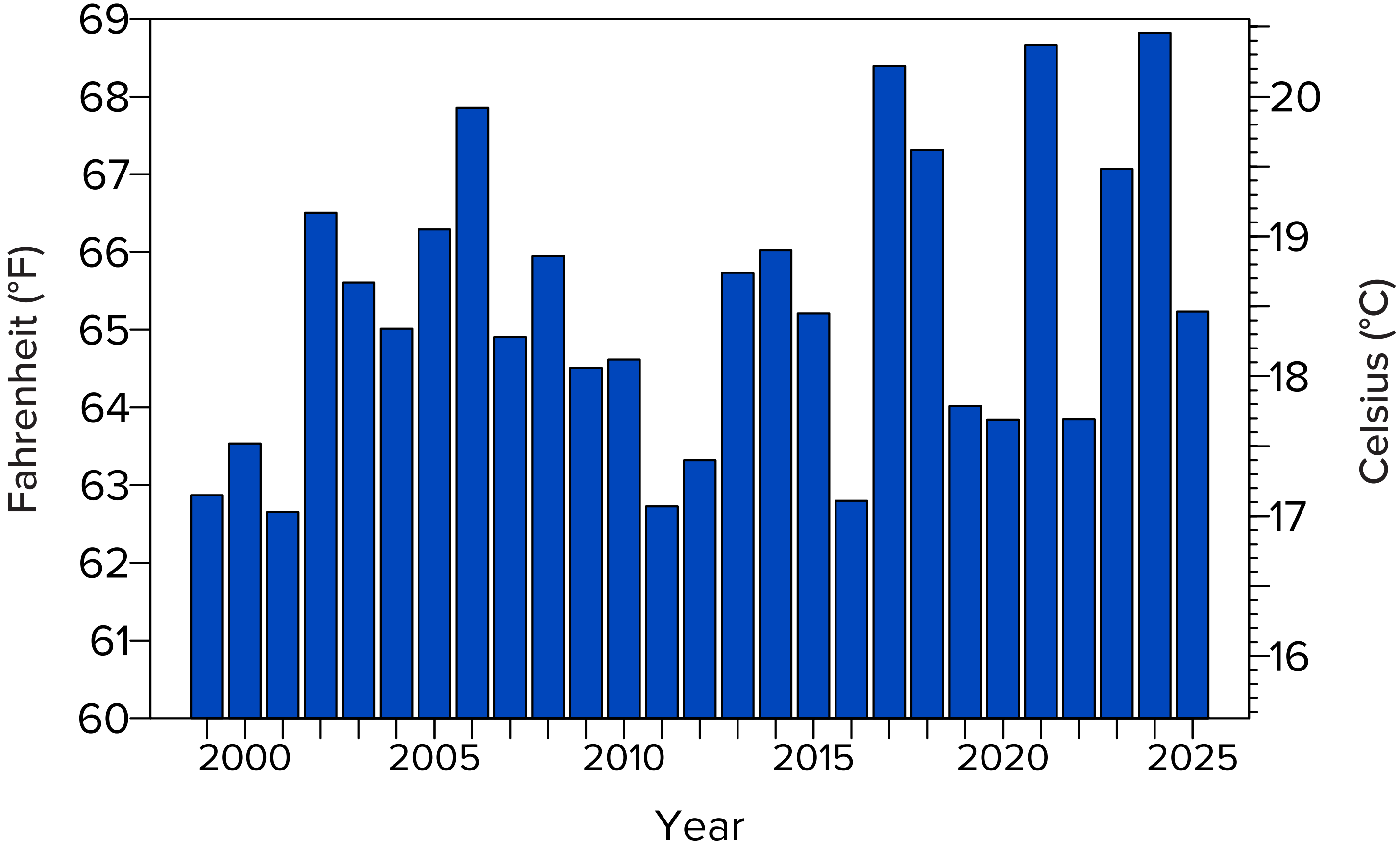


July average surface water temperature

Measured since 1999 every 2 minutes

Surface water temperature has been continuously recorded since 1999 from four NASA/UC Davis buoys in the center of the lake. Shown here are 25 years of average surface water temperatures in the month of July when water temperatures are typically at their warmest and the greatest number of people are recreating on the lake. In 2025, July surface water temperature was near the average. It averaged 65.2°F (18.46°C). This was close to the long-term trend of our observation record. The long-term average is 65.3°F (18.5°C) for the 26-year period of record. These data are collected from thermistors at a depth of 5 feet (1.52 m) attached to four buoys located over the deepest portions of the lake. The data can also be accessed from our real-time data page. (https://tahoe.ucdavis.edu/real-time-conditions)

Data source: TERC lake monitoring.



Deep water temperature

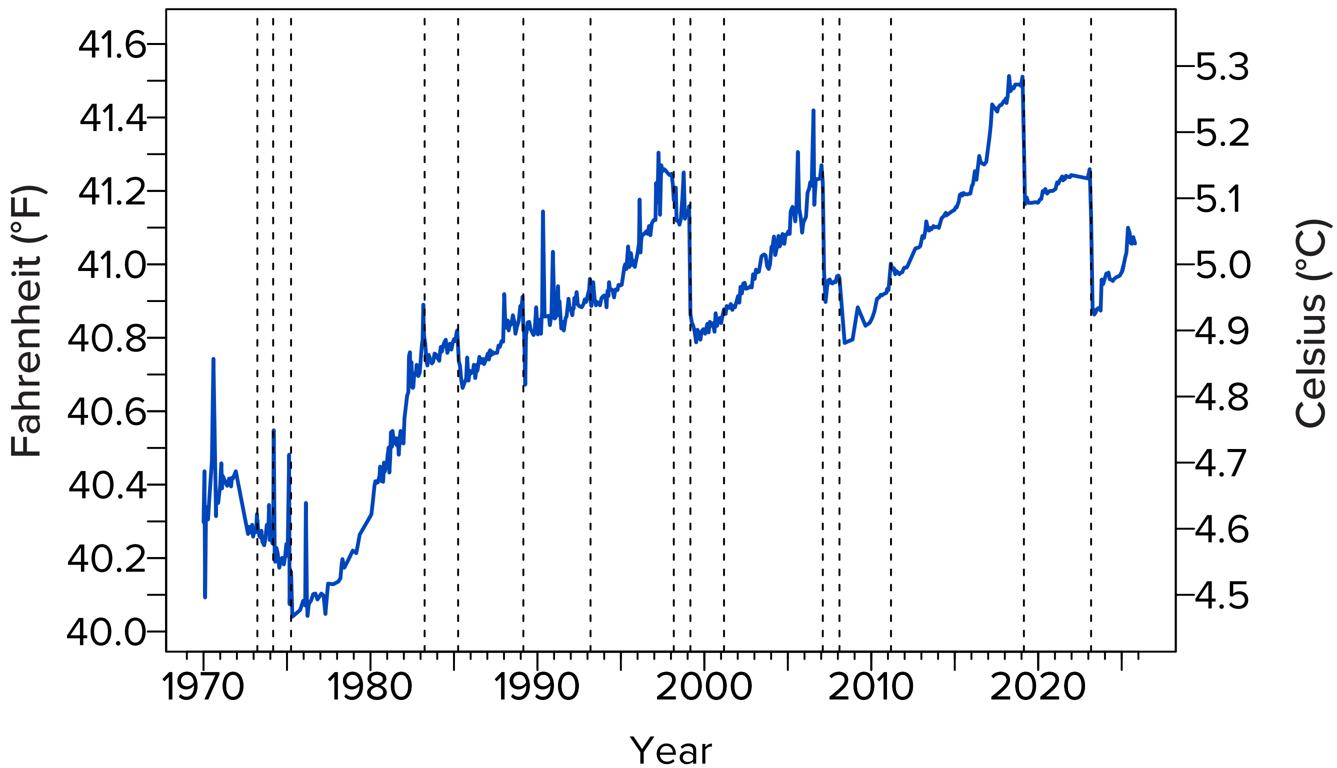
Monthly since 1970

The water temperature at a depth of 1,320 feet (400 m) is indicative of conditions in the deeper waters (hypolimnion) of Lake Tahoe. The deep-water temperatures remain extremely cold throughout the year, but they do show a complex pattern of warming and sudden cooling within this cold range of 40°F to 41.5°F. During deep mixing events (the dashed vertical lines), the temperature can drop "precipitously" over a short period of time, although these drops are generally less than 0.3°F. The last time one of these deep mixing events occurred was in 2023. The heating of the bottom water along with the fluctuations in temperature when deep mixing does not occur is an area of current research.

In general, bottom temperatures are warming. Complete vertical mixing is an event that allows a large amount of heat to escape from the lake. In 2023, there was deep mixing (see the next figure) and water temperatures dropped by 0.4°F from 41.26°F to 40.86 °F. Between the last two deep mixing events in 2011 and 2019, the rate of water warming was 0.07°F/yr.

In 2025, the deep water temperature ranged from 40.98°F to 41.05°F (just over 5°C).

Data source: TERC lake monitoring.



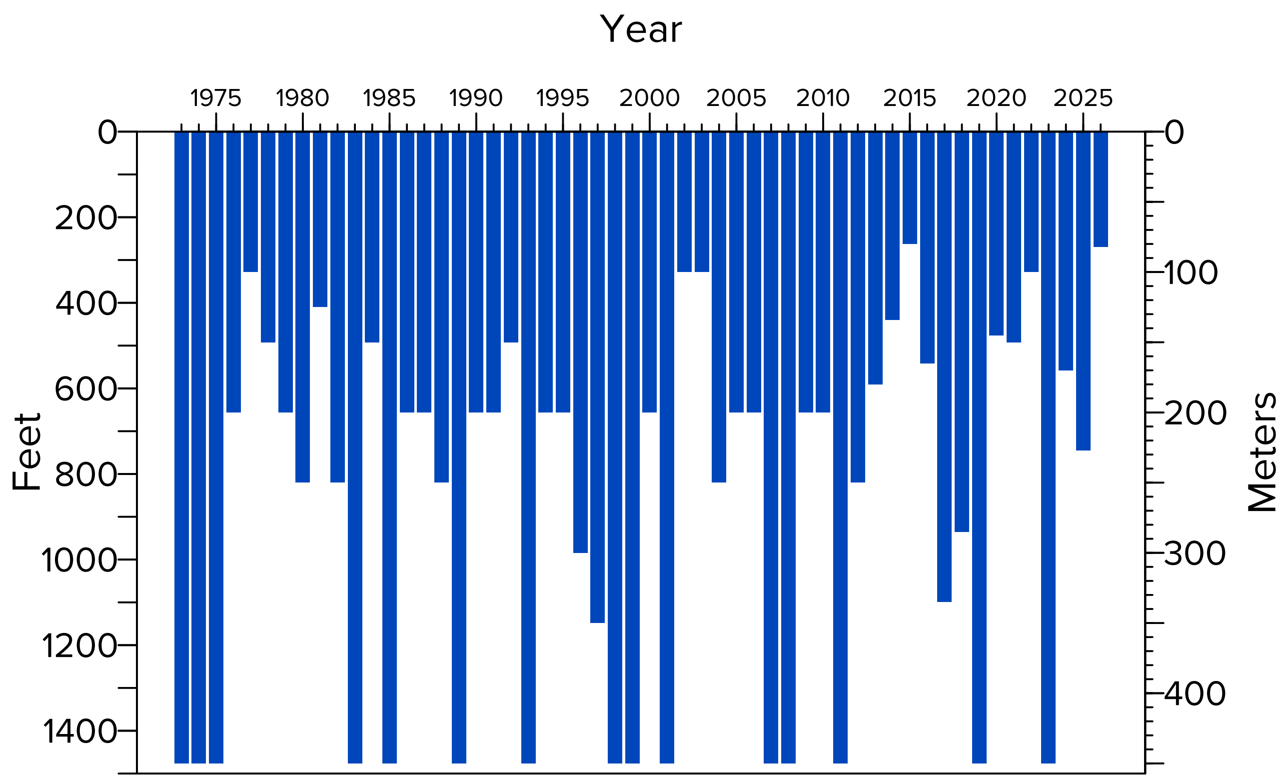
Depth of mixing

Yearly since 1973

The water of Lake Tahoe vertically mixes each winter as surface waters cool and sink downward. In a lake as deep as Tahoe, the intensity of cooling in winter determines how deep the lake mixes vertically with the full mixing event reaching the deepest areas of the lake. Mixing depth has profound impacts on lake ecology and water quality. Deep mixing brings nutrients to the surface, which promote algal growth. It also carries oxygen downward to deep waters, promoting aquatic life throughout the water column.

The deepest mixing typically occurs between February and March. Unlike 2023 when a deep mixing event occurred, 2025 only had a partial mixing event. On March 18, 2025, Lake Tahoe was observed to have mixed fully to a depth of 745 feet (227 m). Deeper mixing did not occur because there was not enough cooling to trigger a deep mixing event. On January 13, 2026, the lake only mixed to 269 feet (82 m). Continuous temperature measurements off Glenbrook provided additional confirmation data.

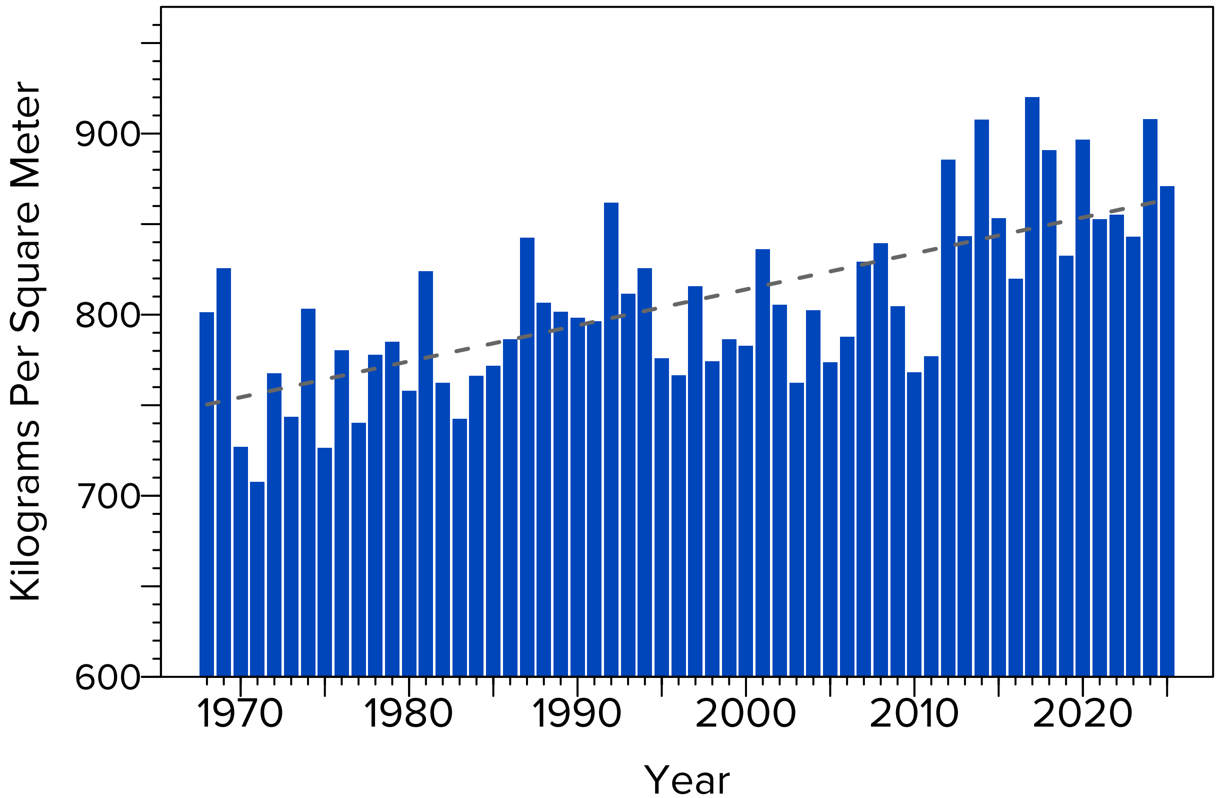
Data source: TERC lake monitoring.



Lake stability index

Since 1968

Increasing stability poses a potential threat to all lakes. When the lake has a vertical distribution of temperature, it has a corresponding distribution of density. Warmer and lighter water remains at the surface (known as the epilimnion) above the colder and denser water below (known as the hypolimnion). As the temperature difference between top and bottom increases, the lake is said to become more stable (i.e. greater resistance to mixing). The stability index is a measure of the energy required to vertically mix the lake when it is density stratified. The average stability index for the upper 330 feet (100 m) of Lake Tahoe is plotted for the period of May through October each year. The values are derived from temperature profiles taken at the Index Station (LTP) at approximately 10- to 20-day intervals. There has been an overall increase in lake stability by 15.1 percent in the last 57 years. In years where full deepwater mixing does not take place, oxygen renewal to the hypolimnion will not take place. While not as high as the highest value observed on record (2017), observations from 2025 continue the stability trend of the lake. Data source: TERC lake monitoring.

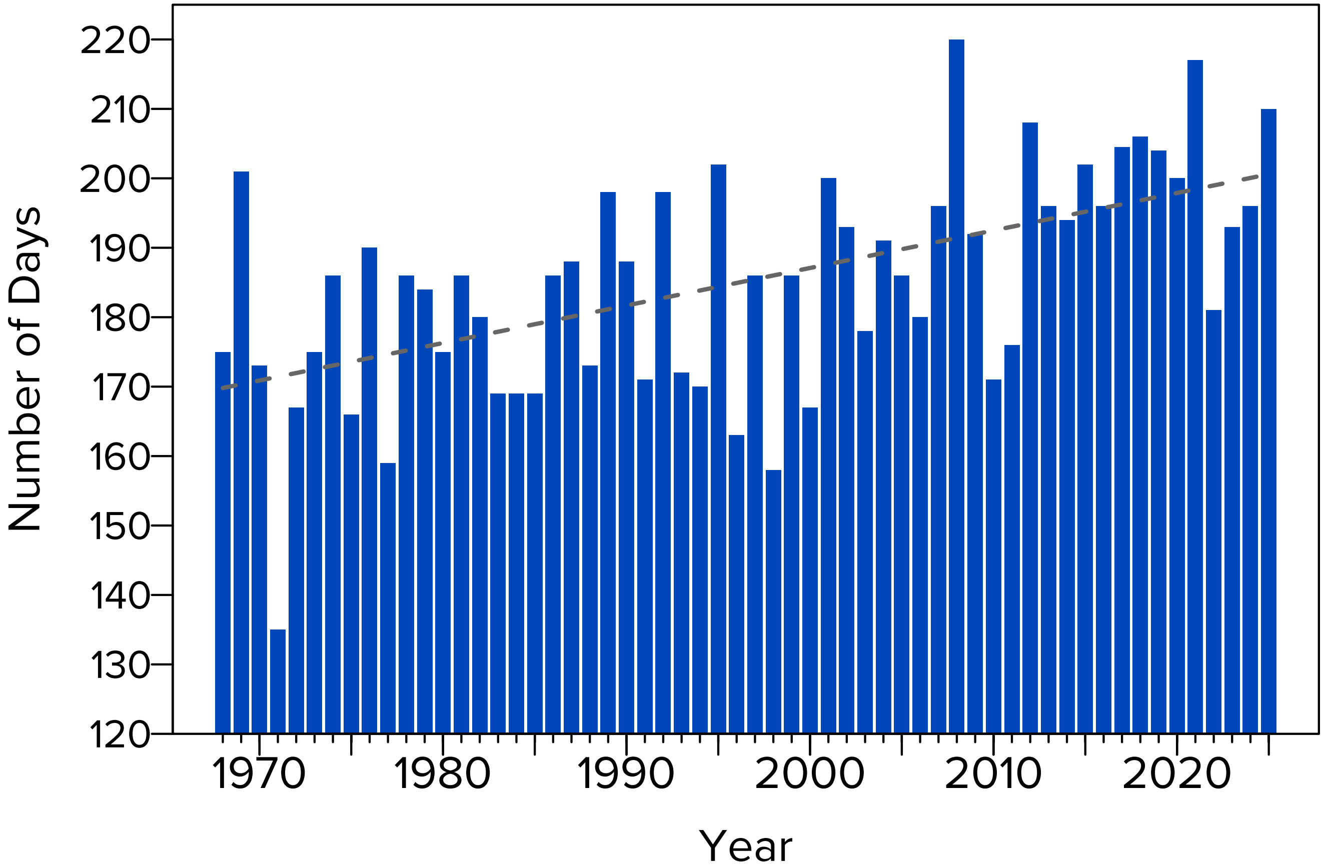


Stratified season length

Since 1968

The stability index is a measure of the energy required to vertically mix the lake that can be evaluated for every day of the year. We define the stratification season as the number of days when the stratification index exceeds a value of 600 kilograms per square meter. Since 1968, the length of the stratification season has increased by 31 days, albeit with considerable year-to-year variation. In 2025, the length of the stratified season was 210 days and was above the long-term linear regression. As the stratification season lengthens, the potential for deep mixing events decreases.

Data source: TERC lake monitoring.

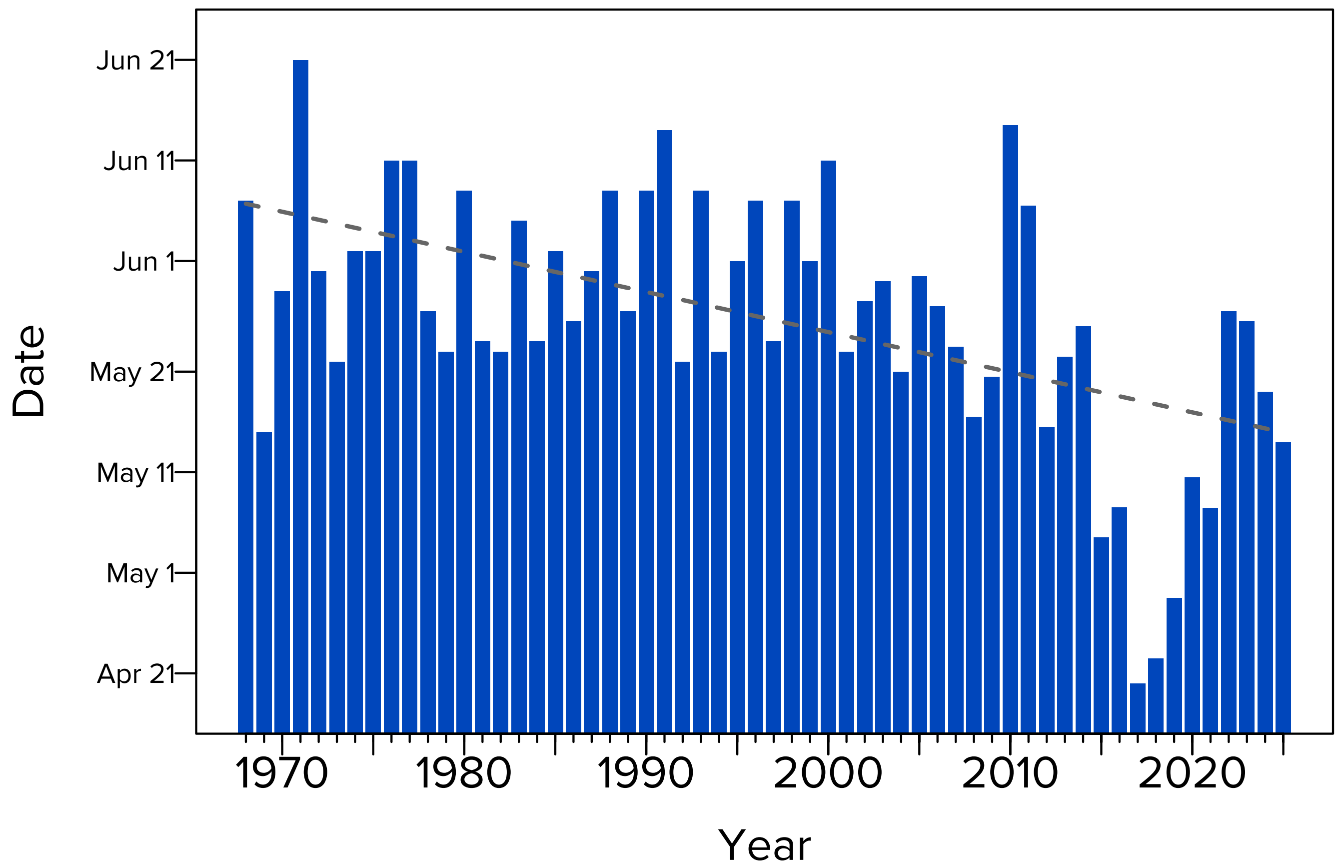


Beginning of the stratification season

Since 1968

The amount of time that Lake Tahoe is stratified has been increasing since 1968. One reason for this is the increasingly early arrival of spring as evidenced by the earlier commencement of stratification. In 2025, the stratification commenced on May 14 (Day 134). The timing of the start of stratification and how it interacts with the snow melt run-off is important for the water clarity of the lake. Cold stream water entering the lake with sediments and nutrients may either float or plunge, depending on whether it is colder (more dense) or warmer (less dense) than the lake.

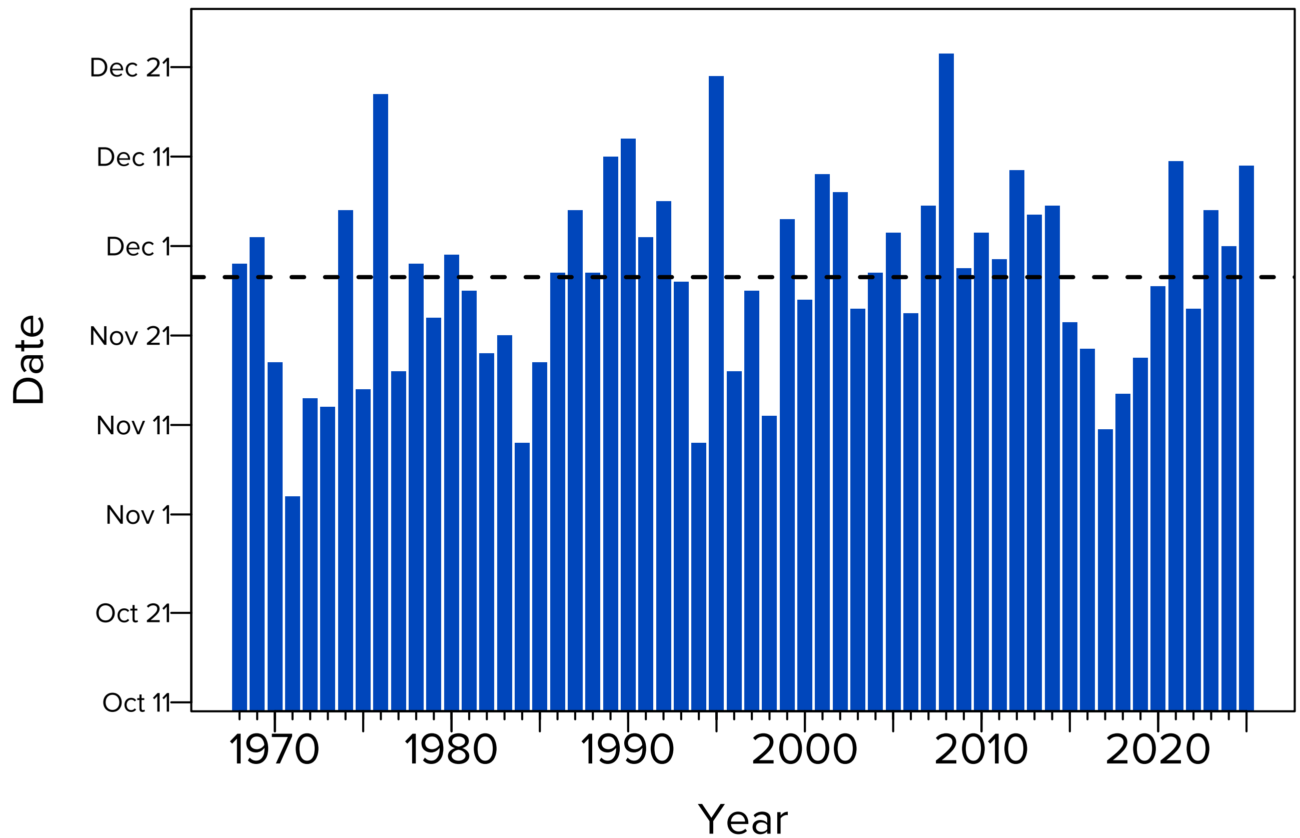
Data source: TERC lake monitoring.



End of stratification season

Since 1968

The amount of time that Lake Tahoe is stratified appears to have increased by almost a month since 1968 (described in the previous figure). The end of the stratification season has been extended, but has not changed as much as the onset of stratification. Over the 56-year record, the end of stratification appears to have been extended by approximately one week. Although the trend is not statistically significant, extended duration of stratification can have important implications for lake mixing and water quality, such as the buildup of nitrate at the bottom of the lake and the timing of deep-water mixing events. The dashed black line indicates the long-term mean for the end of stratification date. In 2025, the end of stratification was slightly above the long-term mean.
Data source: TERC lake monitoring.

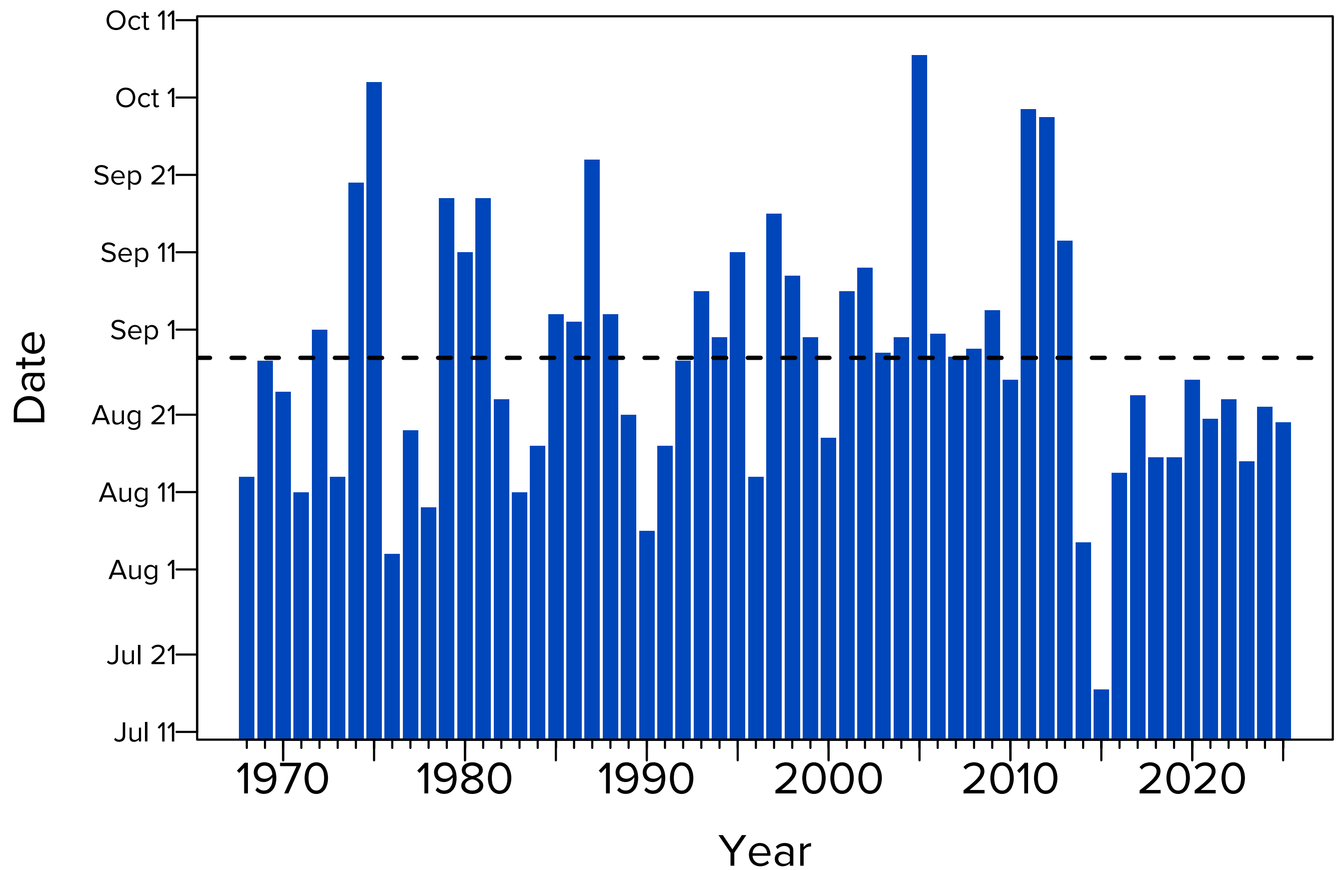


Peak of stratification season

Since 1968

Over the last eleven years the occurrence of the peak of stratification has been earlier than the long term mean date. The day of the year when lake stratification reaches its maximum value is the peak of stratification season. There is considerable year-to-year variation, but over time there has been no statistically significant change in when the peak occurs. The dashed line shows the long-term mean. In 2025, the peak occurred on August 20 and is slightly earlier than the long-term average (August 28).

Data source: TERC lake monitoring.

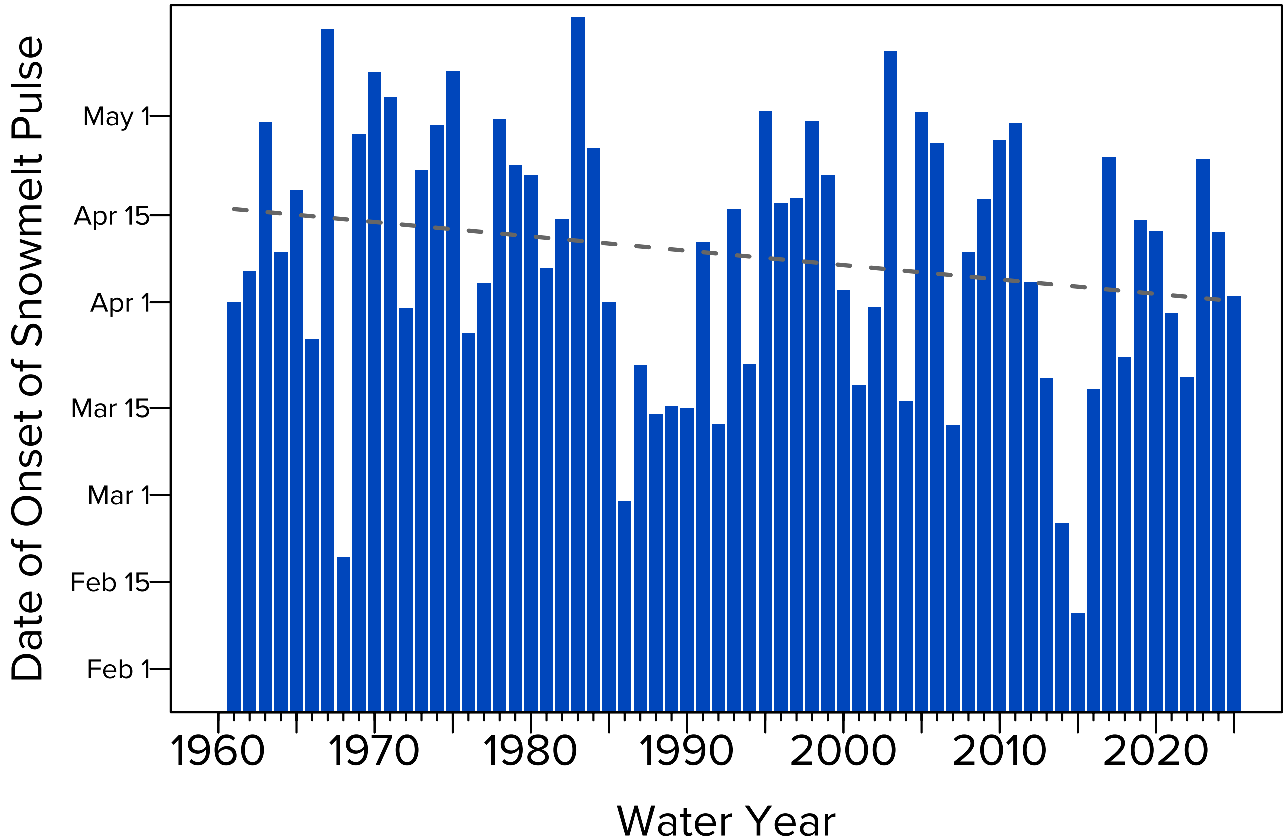


Onset of snowmelt pulse

Yearly since 1961

Although the date on which the onset of snowmelt commences varies from year to year, since 1961 it has shifted earlier by an average of over 16 days. The snowmelt pulse is calculated and averaged for five streams — the Upper Truckee River, Trout Creek, Ward Creek, Blackwood Creek, and Third Creek. This shift is statistically significant and is one effect of climate change at Lake Tahoe. In 2025, the onset of snowmelt pulse occurred on April 2, three days after the predicted regression line. The onset of the pulse is calculated as the mean flow for the period January 1 to July 15. In the past, the peak of the stream hydrograph was used to estimate this metric. The later snowmelt pulses arrive, the more likely the receiving water will be stratified and prevent the water from reaching the hypolimnion.

Data source: U.S. Geological Survey stream monitoring.



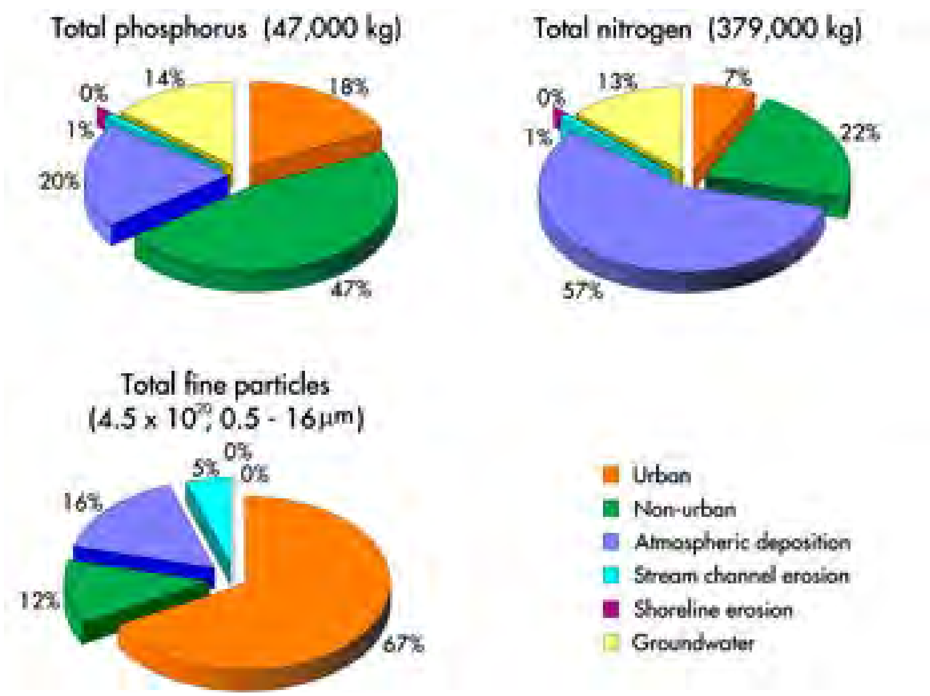
TAHOE: STATE OF THE LAKE REPORT 2026

NUTRIENTS AND PARTICLES

Sources of clarity-reducing and blueness-reducing pollutants

Research has quantified the primary sources of nutrients (nitrogen and phosphorus) and fine particulate material that are contributing to Lake Tahoe losing clarity and blueness in its upper waters. One of the primary contributors to clarity decline is extremely fine particles (in the size range of approximately 1–6 µm) in stormwater that originate from both the urbanized watersheds and the streams that drain the majority of the basin's land area. For nitrogen, atmospheric deposition is the major source (57%). Phosphorus is primarily introduced by the urban (18%) and non-urban (47%) watersheds. This categorization of sediment and nutrient sources form the basis of a strategy to restore Lake Tahoe's open-water clarity by management agencies, known as the Lake Tahoe Total Maximum Daily Load (TMDL) Program. Reviewing these relative contributions is an area of active research for TERC.

Data source: Sahoo et al., 2013. https://doi.org/10.1016/j.scitotenv.2012.12.019



Pollutant loads from seven watersheds

In 2025

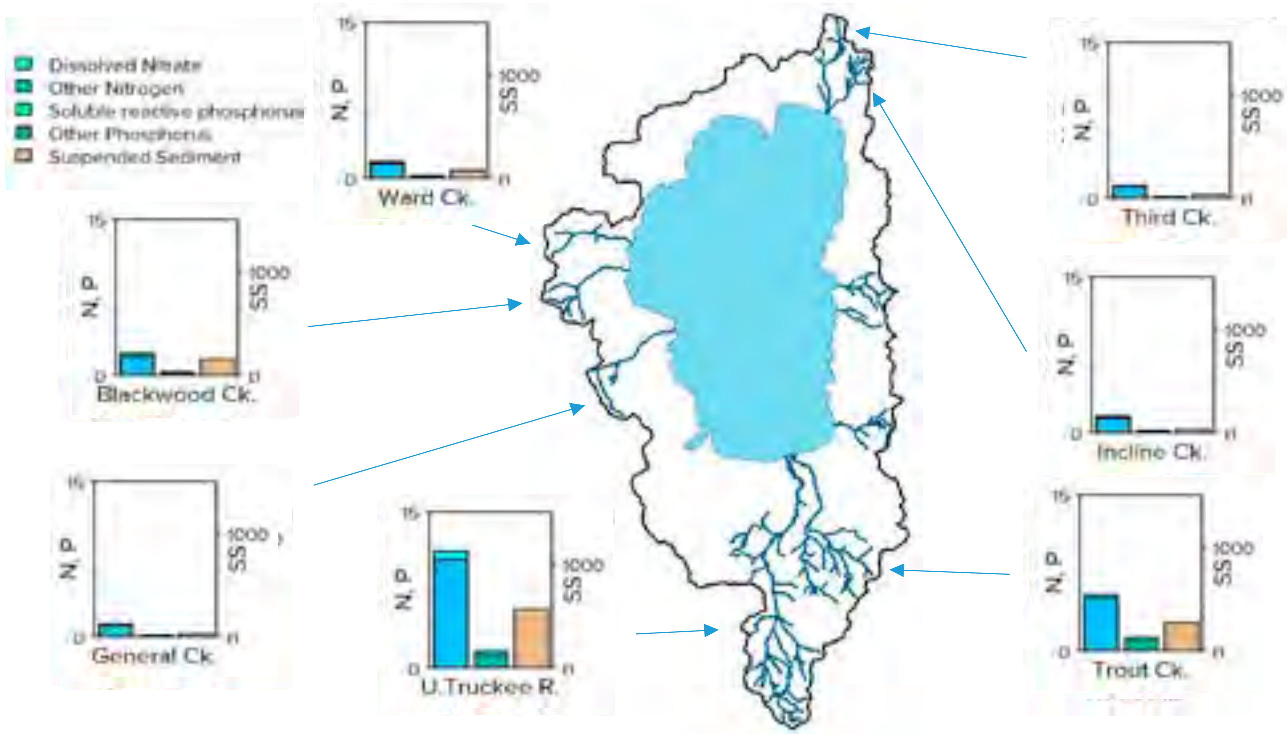
The Lake Tahoe Interagency Monitoring Program (LTIMP) measures nutrient and sediment input from seven of the 63 watershed streams and inflows.

The streams and inflows are the Upper Truckee River, Trout Creek, Incline Creek, Third Creek, Ward Creek, Blackwood Creek, and General Creek.

In 2025, the majority of stream phosphorus and nitrogen, as well as suspended sediments, came from the Upper Truckee River. This is often the case, but in some years, smaller streams, such as Ward Creek and Blackwood Creek, can also be significant contributors depending on streamflow. In 2025, Trout Creek also provided substantial loading.

It should be noted that suspended sediment, as represented in these data, is measured by weight and includes all sediment sizes. For water clarity observed in the lake, the number of fine particles (in the range of 1–6 µm) is most important due to their high effectiveness in light scattering. These particles make up a very small fraction of the suspended sediment but largely control lake clarity.

The LTIMP stream water quality program is supported by the Lahontan Regional Water Quality Control Board, the Tahoe Regional Planning Agency, the U.S. Geological Survey, and UC Davis TERC. TERC and the U.S. Geological Survey jointly collect and analyze the stream data.



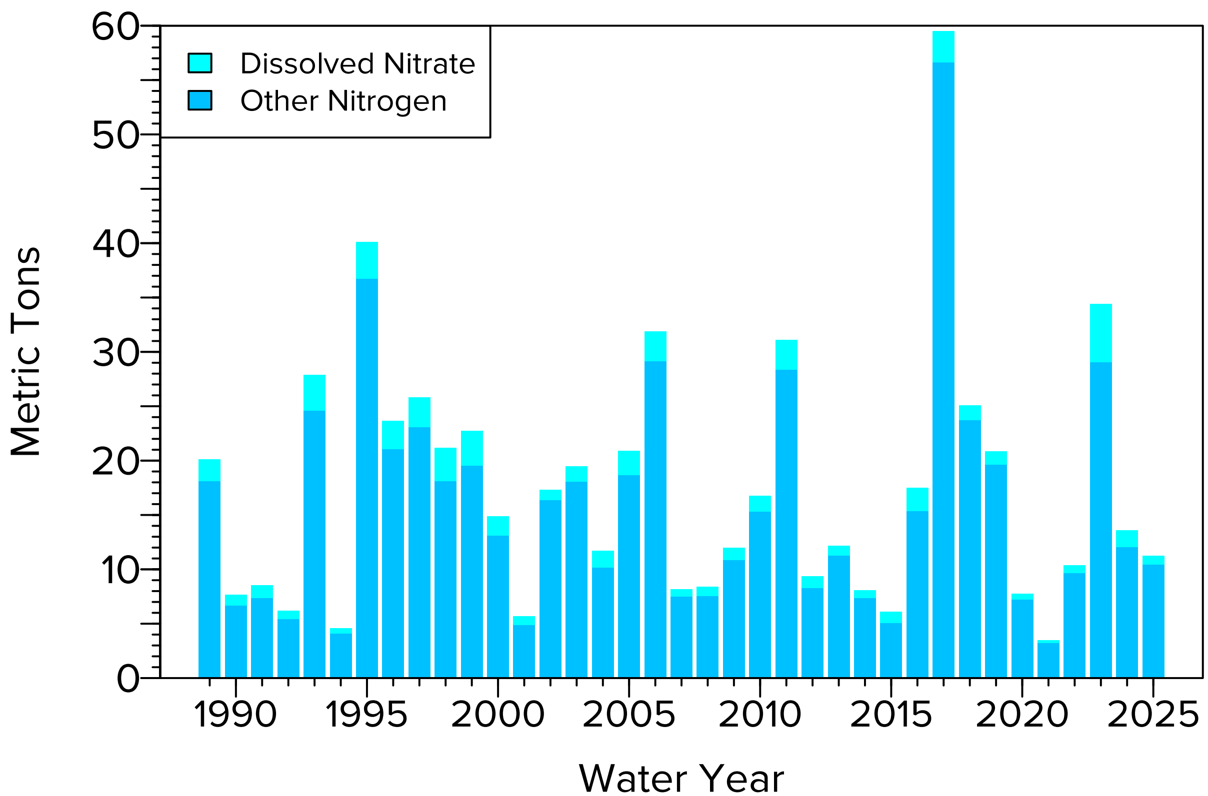
Nitrogen contribution by Upper Truckee River

Yearly since 1989

Nitrogen (N) is important because it, along with phosphorus (P), stimulates algal growth. The Upper Truckee River is the largest of 63 streams and inflows that enter Lake Tahoe, contributing about 25 percent of the inflowing water. The river's estimated contribution of dissolved nitrate and the remainder of the total nitrogen load are shown below. Over the 37 years of record, the percentage of nitrate to total nitrogen has been in the range of 5–17 percent. The year-to-year variations primarily reflect changes in precipitation. For example, 1994 had 16.6 inches of precipitation and a low total nitrogen load of 4.6 MT, while 2017 had 68.9 inches of precipitation and a record high total nitrogen load of 59.5 MT.

In 2025, there were 29.0 inches of precipitation and a total nitrogen load from the Upper Truckee River of 11.2 MT. Nitrate load was estimated at 0.8 MT, which is below the long-term average. The long-term mean annual total nitrogen load is 17.8 MT per year, while for nitrate it is 1.7 MT. (One metric ton (MT) = 2,205 pounds.)

Data source: TERC and U.S. Geological Survey stream monitoring.

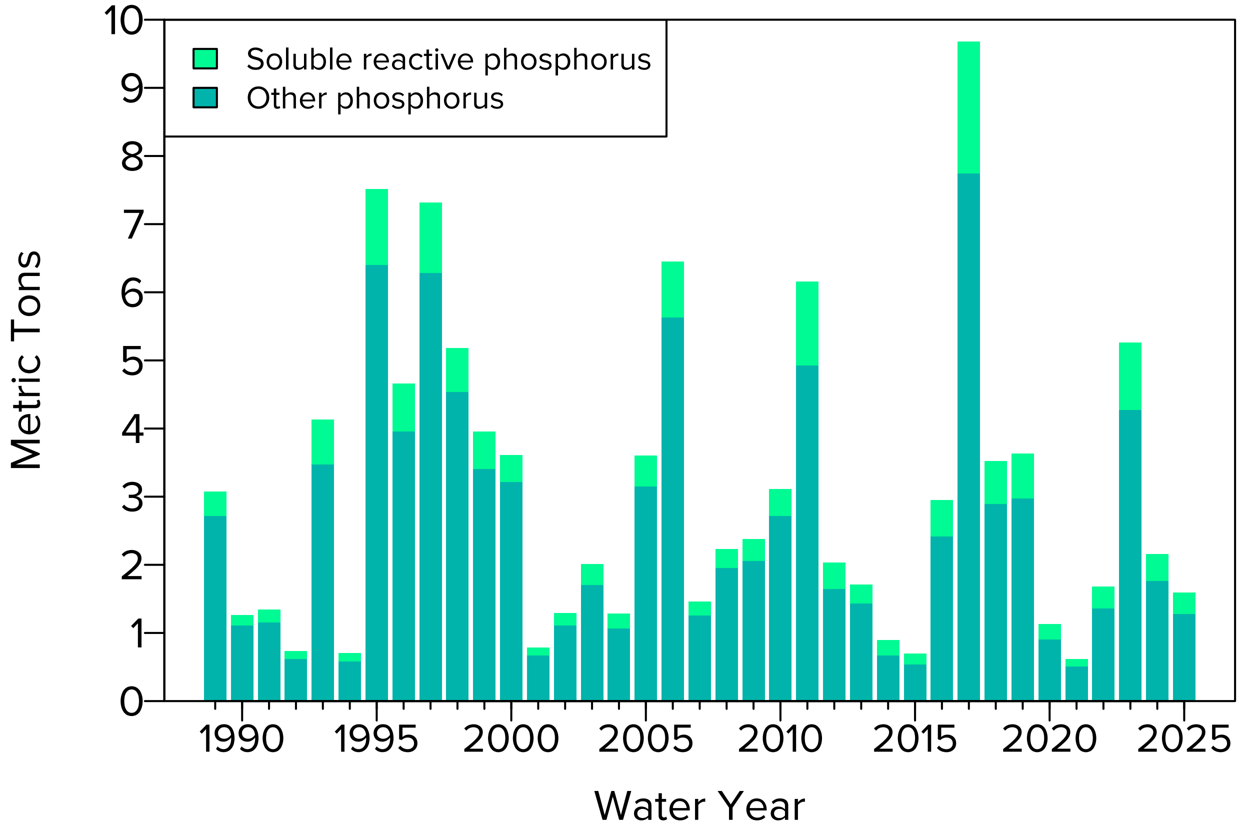


Phosphorus contribution by Upper Truckee River

Yearly since 1989

Soluble reactive phosphorus (SRP) is the fraction of total phosphorus immediately available for algal growth. As with the "Nitrogen contribution by Upper Truckee River" figure, the year-to-year variation in estimated loads largely reflects the changes in precipitation. Slightly below-average precipitation in 2025 resulted in below-average values for total phosphorus load of 1.59 MT and an SRP load of 0.31 MT. These compare with the long-term averages of 3.09 and 0.48 MT, respectively. Over the 35 years of record, the percentage of SRP to total phosphorus load has been in the range of 11–25 percent. Decreasing nutrient inputs are fundamental to restoring Lake Tahoe's iconic blueness. Total phosphorus is the sum of SRP and other phosphorus, which includes organic phosphorus and phosphorus associated with particles. (One metric ton (MT) = 2,205 pounds.)

Data source: TERC and U.S. Geological Survey stream monitoring.



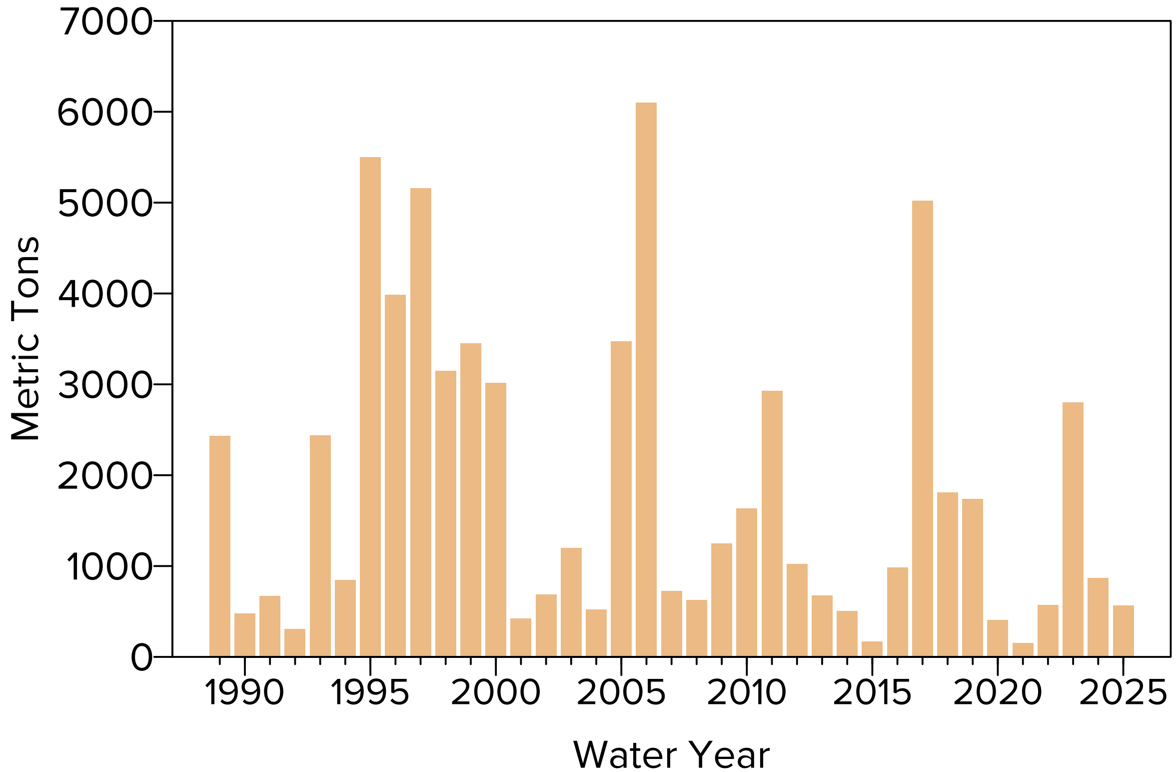
Suspended sediment contribution by Upper Truckee River

Yearly since 1989

Similar to the nutrient loading of phosphorus and nitrogen, the load of total suspended sediment delivered to the lake by the Upper Truckee River is related to landscape condition and erosion as well as to precipitation and stream flow. Inter-annual variation in sediment load over shorter time scales is mostly related to precipitation and streamflow. Plans to restore lake clarity emphasize reducing loads of very fine suspended sediment (in the size range of 1–6 µm in diameter) from urbanized areas. By contrast, efforts to restore natural stream function, watershed condition, and habitat for plants and wildlife focus on reducing loads of total sediment regardless of size.

In 2025, the estimated suspended sediment load from the Upper Truckee River was 564 MT. The highest load ever recorded was 6,100 MT in 2006. The average annual load is 1,909 MT. (One metric ton (MT) = 2,205 pounds.)

Data source: TERC and U.S. Geological Survey stream monitoring.



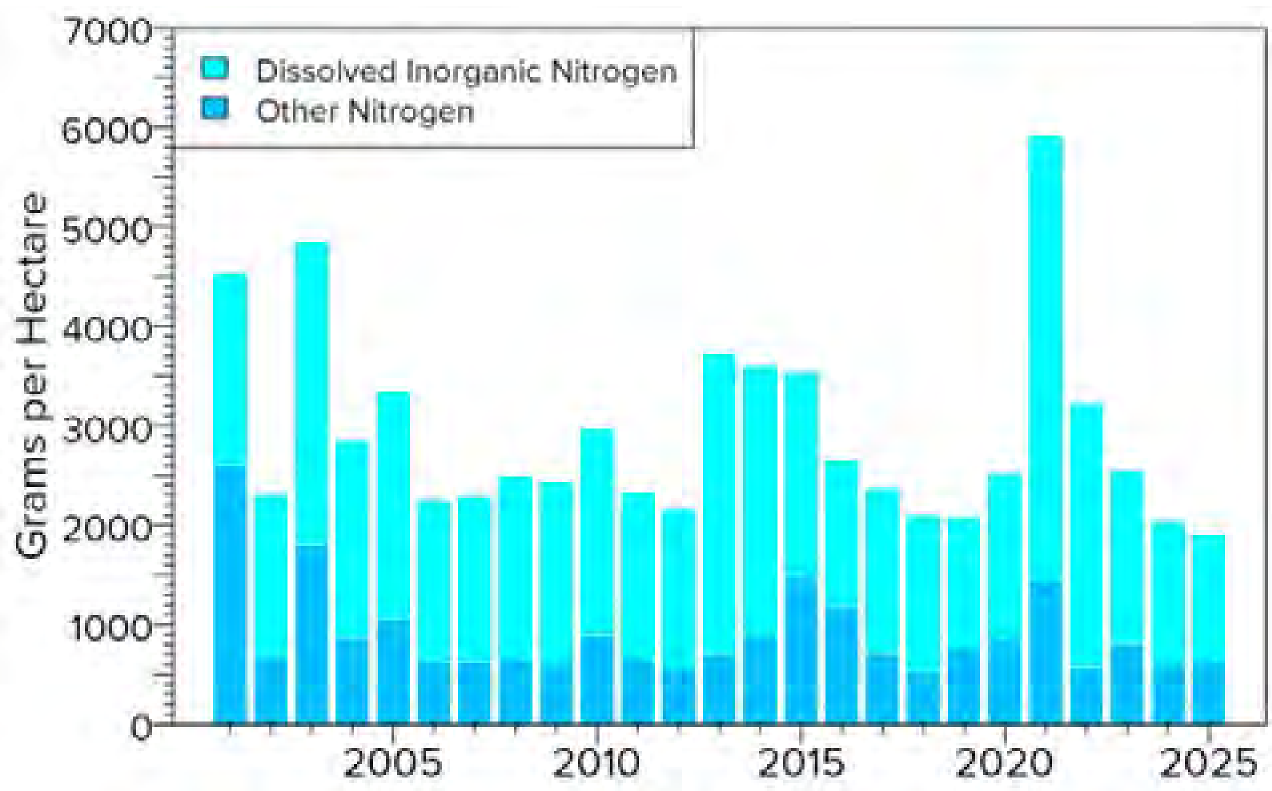
Atmospheric nitrogen contribution

Yearly since 2001

Nitrogen (N) is important because it, along with phosphorus (P), stimulates algal growth. The relative contributions of atmospheric deposition are significantly less as compared to river and stream loading but can play a role in surface loading of both dissolved inorganic and other forms of nitrogen. This loading can lead to increased productivity of the epilimnion and is a known impact of wildfires, which generate significant atmospheric nitrogen loading.

For example, in 2021, total atmospheric nitrogen loading reached a peak of nearly 6,000 g/hectare because of the Caldor Fire within the Tahoe Basin. Since that time, conditions have returned to a lower baseline condition of approximately 3,000 g/hectare, which is comparable to the long-term average of total nitrogen of 2,922 g/hectare. The long-term average of dissolved inorganic nitrogen is 2,005 g/hectare.

Data source: TERC lake monitoring. Samples taken from a TERC monitoring buoy.



Atmospheric phosphorus contribution

Yearly since 1989

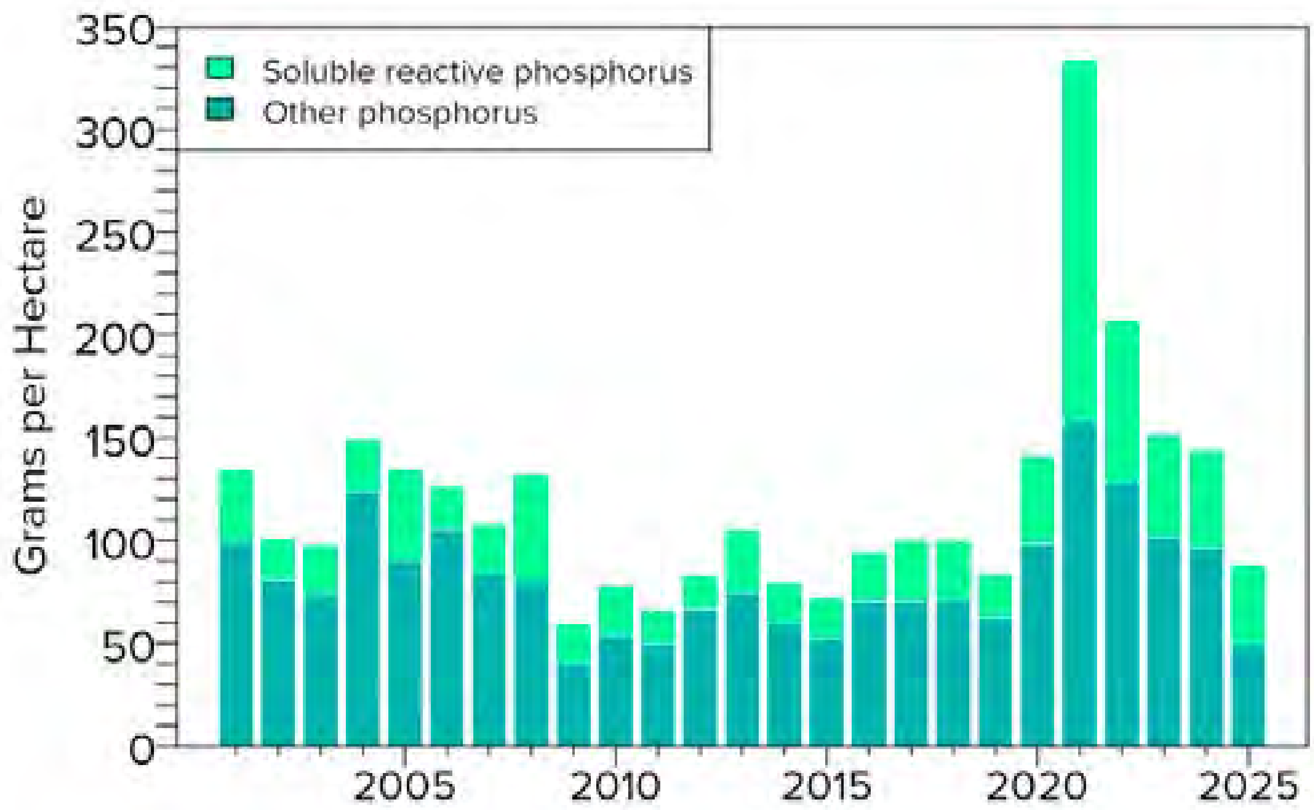
Soluble reactive phosphorus (SRP) is the fraction of total phosphorus immediately available for algal growth.

As with atmospheric nitrogen contribution, the year-to-year variation in estimated loads largely reflects localized impacts of wildfire particulates, which generate external loading to the system.

For example, the peak loading observed in 2021 during the Caldor Fire event of SRP was 175 g/hectare and for total phosphorus was 333.6 g/hectare.

Since that time, the loads have returned to values closer to the long-term average of 119.0 g/hectare and 37.1 g/hectare for total phosphorus and SRP, respectively. Total phosphorus is the sum of SRP and other phosphorus, which includes organic phosphorus and phosphorus associated with particles.

Data source: TERC lake monitoring. Samples taken from a TERC monitoring buoy.

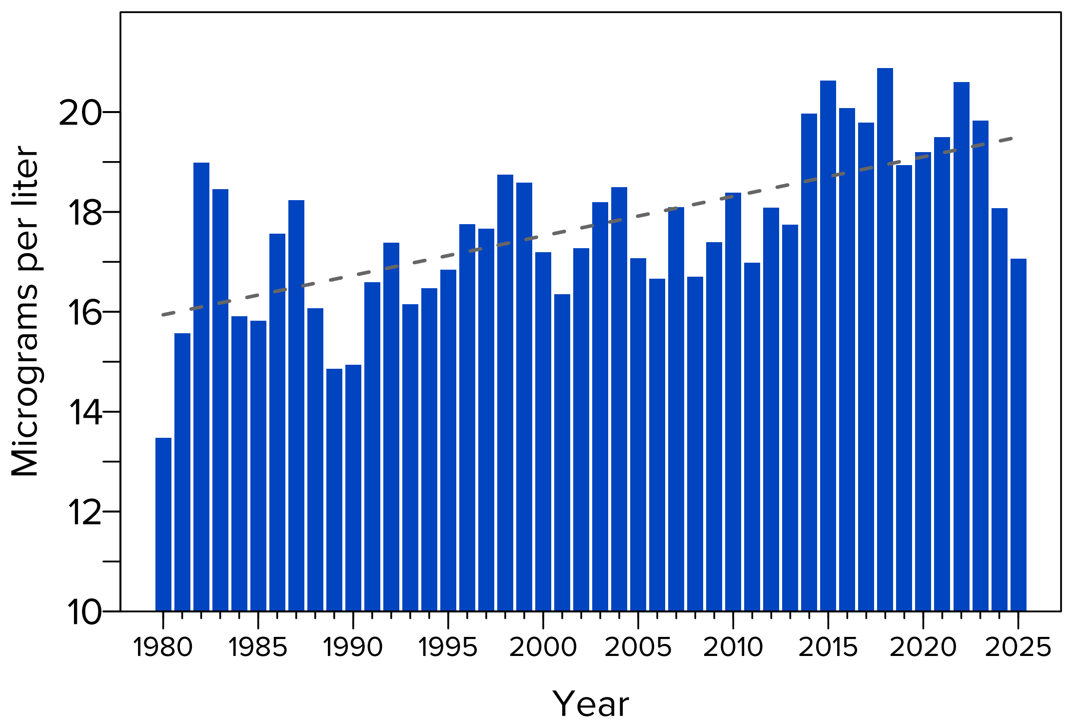


Lake nitrate concentration

Yearly since 1980

Until 2012, the volume-weighted annual average concentration of nitrate-nitrogen had remained relatively constant year to year, ranging between 13–19 micrograms per liter. However, from 2014–2023, the lake's nitrate concentration appears to have been increasing, as is evident in the trend line produced with a Generalized Additive Model (GAM). Although, in 2024 and 2025, the numbers have been well below the trend. In 2025, the volume-weighted annual average concentration of nitrate-nitrogen was 17.1 micrograms per liter. These values are closer in line with pre-2014 levels. There is not enough data at this point to understand if this is a return to a long-term trend or an anomaly. In years with only shallow mixing, nitrate recommences accumulating and results in the increasing in-lake nitrate concentration. Another factor in the last several years is the additional atmospheric nutrient loading due to wildfire smoke engulfing the region. The impact of the 2021 Caldor wildfires and other fires of the past several years is the subject of a continuing analysis, but it has been well documented that ash and smoke deposition contribute to nitrogen deposition in natural water bodies.

Data source: TERC lake monitoring. Water samples are taken at the Mid-lake station at 11 depths from the surface to 1,480 feet.



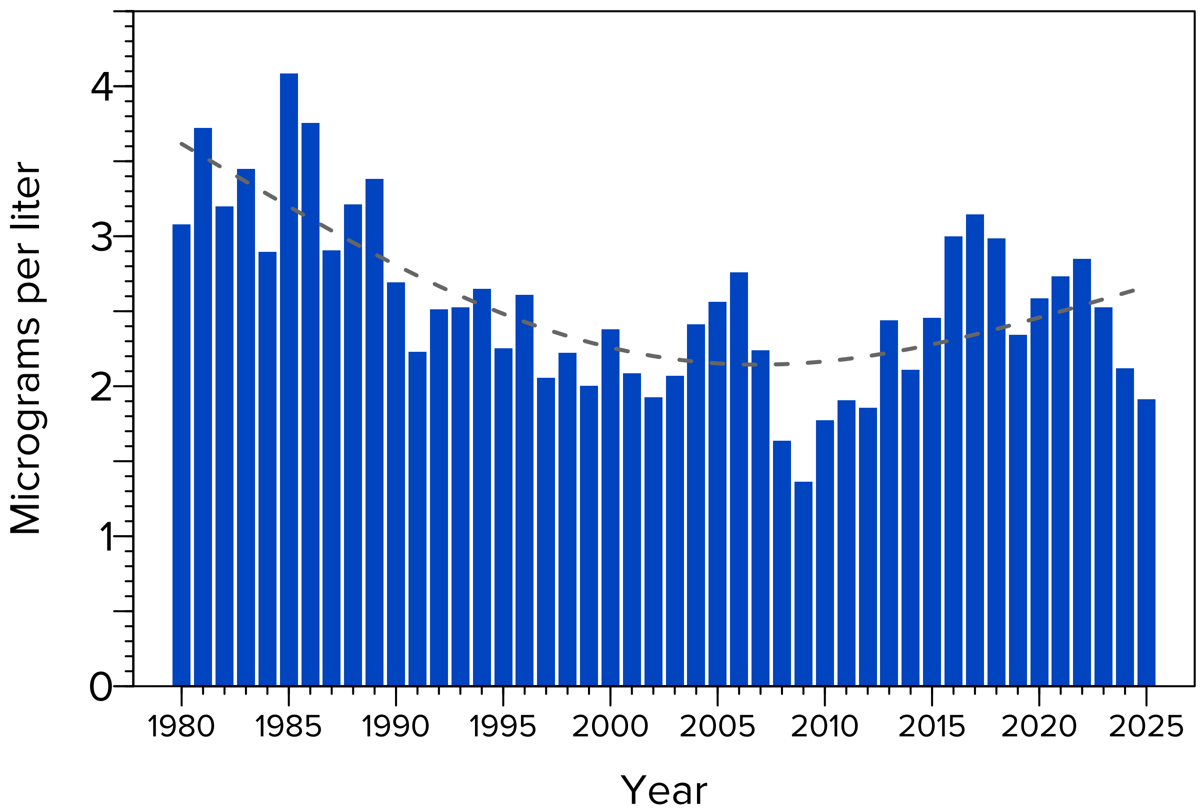
Lake total hydrolyzable phosphorus concentration

Yearly since 1980

Phosphorus naturally occurs in Tahoe Basin soils — and in soils generally — and enter the lake from soil disturbance and erosion. Total hydrolyzable phosphorus (THP) is a measure of the fraction of phosphorus that algae can use to grow. It is similar to the SRP that is measured in streams. Since 1980, THP has declined, although in the last 18 years the values have been increasing with a similar trend observed in the nitrate values since 2014 with matching trends in 2023 and 2024.

In 2025, the volume-weighted annual average concentration of THP was 1.91 micrograms per liter. As the lake is a naturally phosphorus-limited system, THP is important as a driver of algal growth. The efforts taken through the TMDL program play a critical role in bringing the numbers down from their early highs of >4 µg/L observed in the 1980s.

Data source: TERC lake monitoring. Water samples are taken at the Mid-lake station at 11 depths from the surface to 1,480 feet.



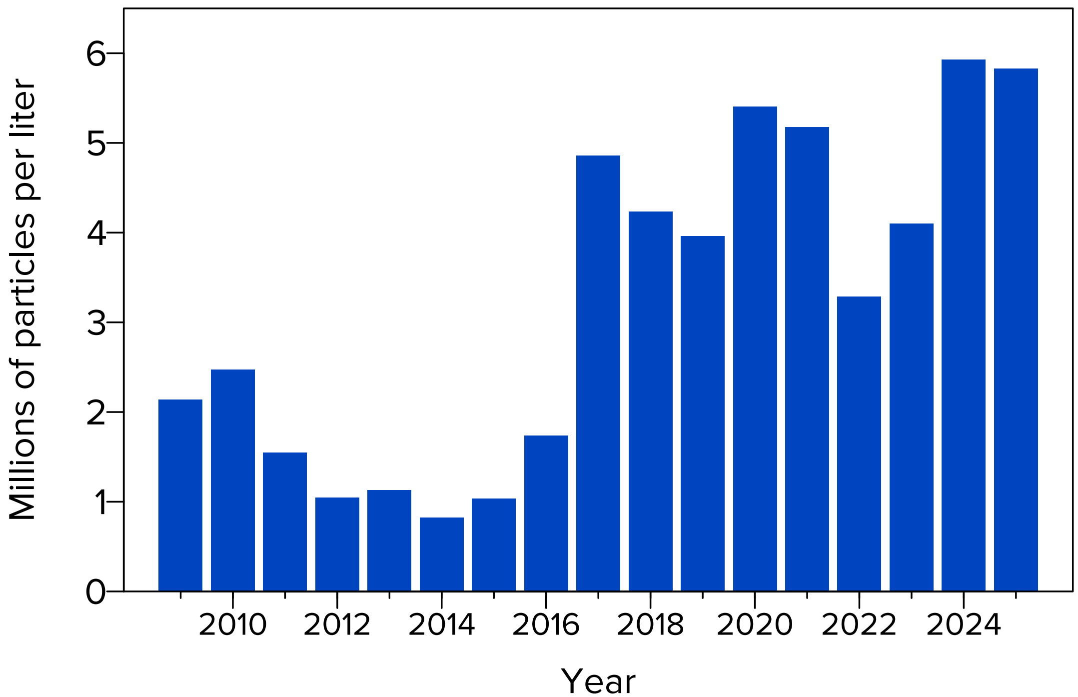
Lake fine particle concentration

Yearly since 2009

Fine particles in the size range of approximately 1–6 µm in the upper 50 m are principally responsible for the attenuation of visible light and the consequent loss of lake clarity. These particles can be inorganic (e.g., clay and silt) or organic (e.g., phytoplankton). As particles in this size range settle slowly, their removal from the lake depends in large part on their aggregation into larger particles. The settling rate of a particle depends on the square of its diameter. Larger, aggregated particles will settle disproportionately faster.

2017 being an extremely wet year, there was a large increase in fine particles delivered to Lake Tahoe from the streams in the watershed. This would account for the step change in concentration evident between 2016 and 2017. The continued high average concentration since that time is difficult to explain. The years 2020 and 2021 were low precipitation years, yet they displayed an increase in particle concentration beyond the 2017 level. In 2025, observed values slightly less than 6 million particles per liter were the second highest that have been measured on record. The causes of these increases are an ongoing source of research as the conditions were average during this time and loading of particles from wildfires and streams were lower in both 2024 and 2025. A preliminary analysis comparing rates of aggregation of lake particles suggests that aggregation rates have not changed significantly over the period of the record. Understanding the aggregation rates at different depths in the lake is a source of ongoing research.

Data source: TERC lake monitoring. Water samples are taken at the Mid-lake station at 11 depths from the surface to 1,480 feet.



Lake fine particle concentration

Monthly since 2015

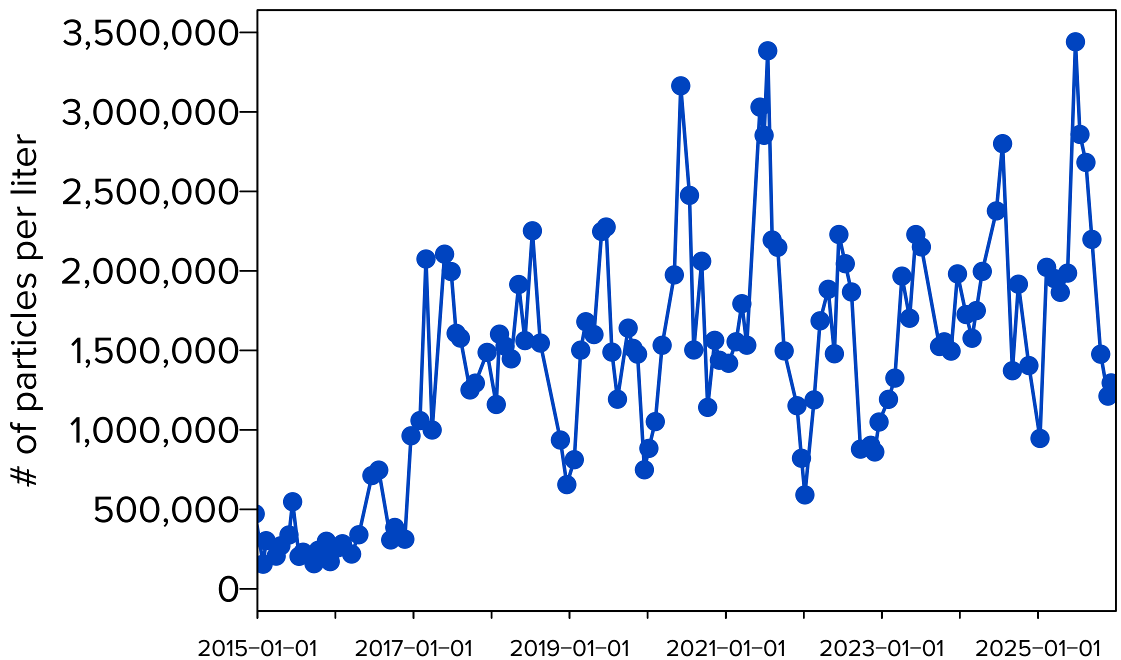
Fine particles in the size range of approximately 1–6 µm in the upper 50 m are principally responsible for the attenuation of visible light and the consequent loss of lake clarity. These particles can be inorganic (e.g., clay and silt) or organic (e.g., phytoplankton).

Typically, the annual increase of fine particles at mid-year is due to a combination of particle influx from spring snowmelt and phytoplankton growth. In 2017, an extremely wet year, there was a large increase in fine particles delivered to Lake Tahoe from the streams in the watershed. This would account for the step change in concentration evident between 2016 and 2017. The continued high average concentration since that time is difficult to explain. According to the UC Berkeley Central Sierra Snow Lab, 2022–23 had the second greatest amount of snowfall that was recorded since 1946. This large amount of snow potentially resulted in an astonishing large particle concentration that is twice the amount that had been seen since 2009.

In 2025, with average to below-average precipitation, the values were the highest that have been observed on record, with fine particle concentrations peaking in June and July 2025. Many of these particles may have been the phytoplankton *Cyclotella*. Resolving particle identity is an area of ongoing research that is fundamental to understanding clarity.

Water samples are taken monthly at the MLTP (mid-lake) station at 11 depths from the surface to 1,480 feet. Here, data from 0 m, 10 m, and 50 m were utilized.

Data source: TERC lake monitoring.

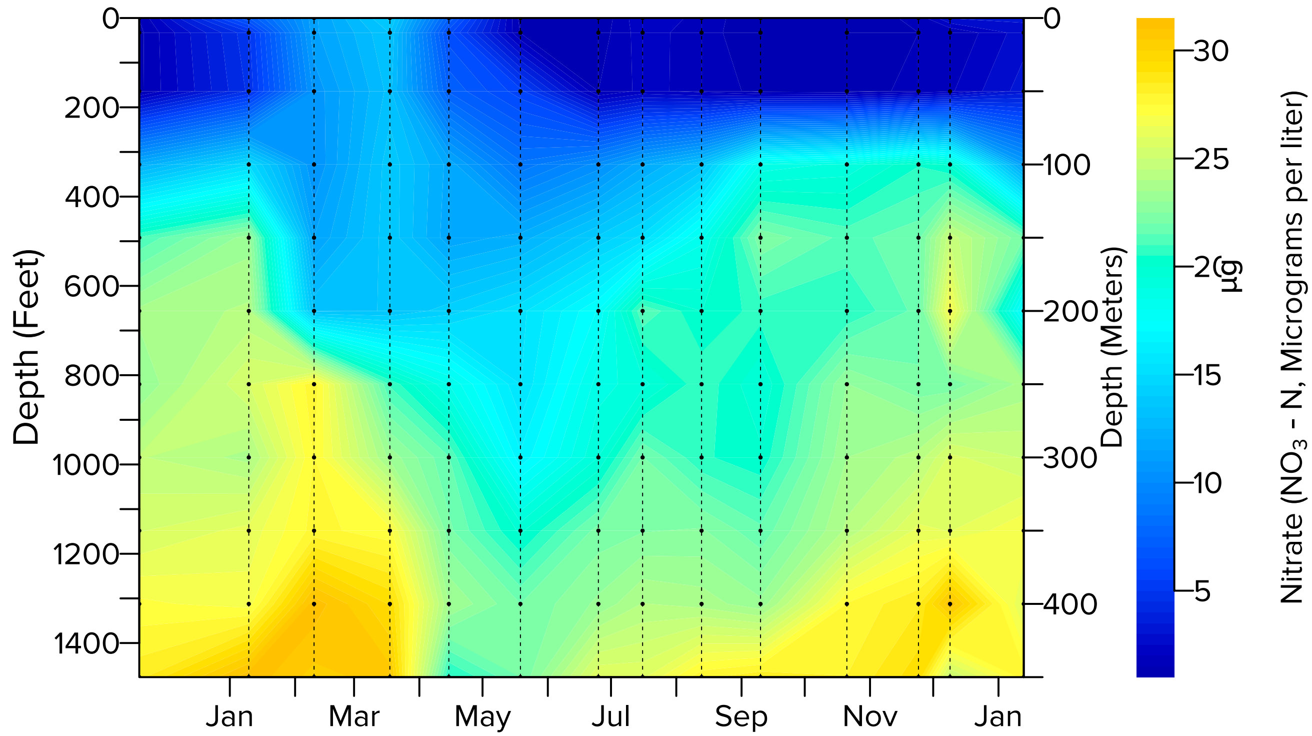


Nitrate distribution

In 2025

Water samples are collected approximately every month (on dates indicated by the dashed lines) at 11 depths (indicated by the dots) at the MLTP station in the middle of the lake. These samples are then processed and analyzed in the TERC laboratory for nutrient concentrations. TERC chemists specialize in the low-concentration chemistry necessary for Lake Tahoe's oligotrophic water. Here the nitrate concentration is shown in the form of color contours. Relatively uniform annual conditions are observed with low concentrations in the surface waters and higher concentrations in the bottom waters. In later winter/early spring, a redistribution of the nutrients can be observed during the period when the lake mixed to the deepest depth for the year. Although most of the "new" nitrate enters at the surface through atmospheric deposition, it is rapidly taken up by the algae, and surface concentrations remain generally low. As algae sink and decompose, the nitrate they consumed reappears deep in the lake. At these depths, however, there is insufficient light for algae to grow and to use these nutrients, so they tend to build up in dark, deep water.

Data source: TERC lake monitoring.



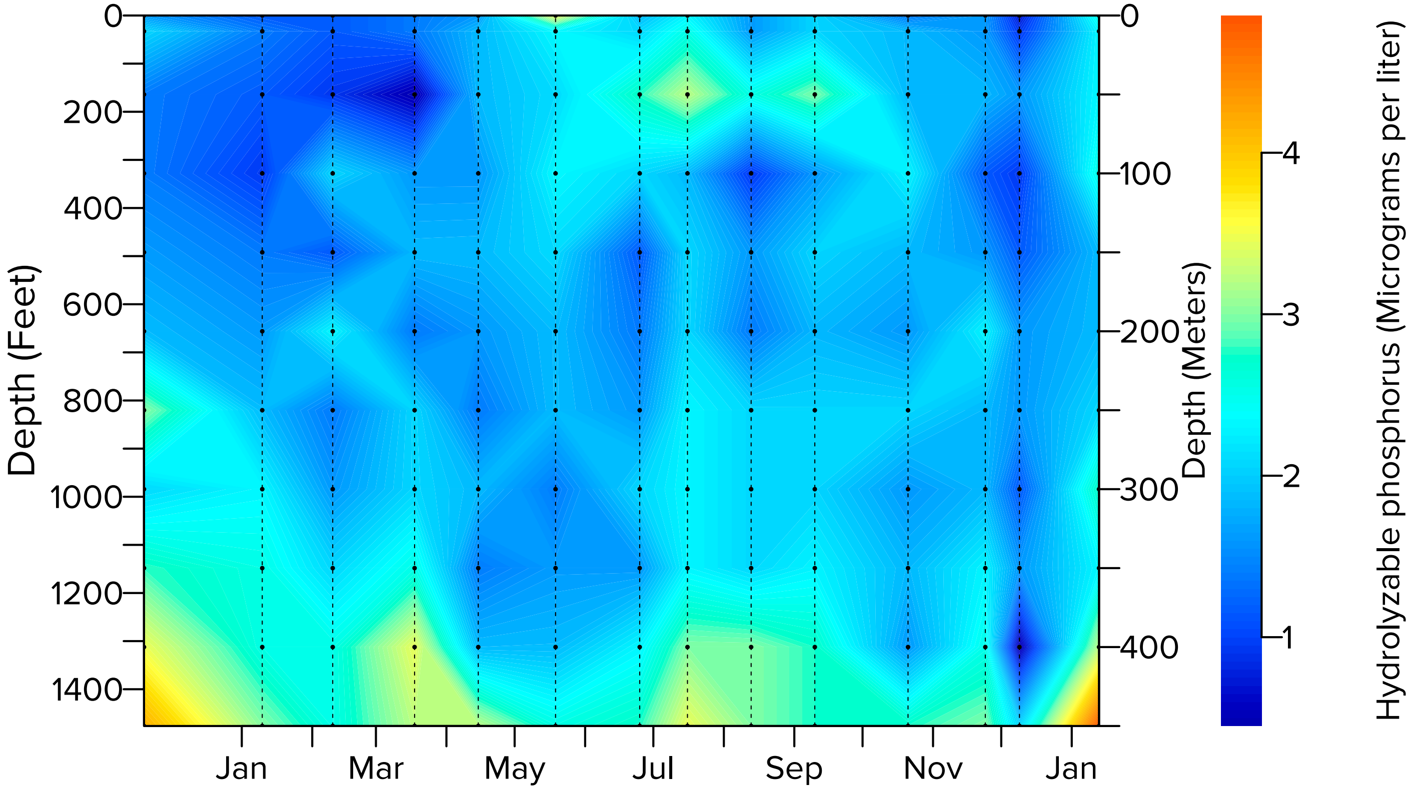
Total hydrolyzable phosphorus distribution

In 2025

Water samples are collected approximately every month (on dates indicated by the dashed lines) at 11 depths (indicated by the dots) at the MLTP station in the middle of the lake and analyzed in the TERC laboratory for nutrient concentrations. Here the total hydrolyzable phosphorus (THP) concentration, the fraction of phosphorus that can be readily used by algae, is shown in the form of color contours.

Phosphorus mainly entered the lake in association with fine particles during streamflow and runoff events in May through June. This flow can plunge down to depth, which is one source of THP in the bottom waters. Another THP source in deep water is the re-release of sediment-bound phosphorus, which gradually accumulates in the hypolimnion. This phosphorus then gets redistributed in later winter/early spring as mixing occurs, which can be seen in the figure as the colors become more uniform throughout the season.

Data source: TERC lake monitoring.



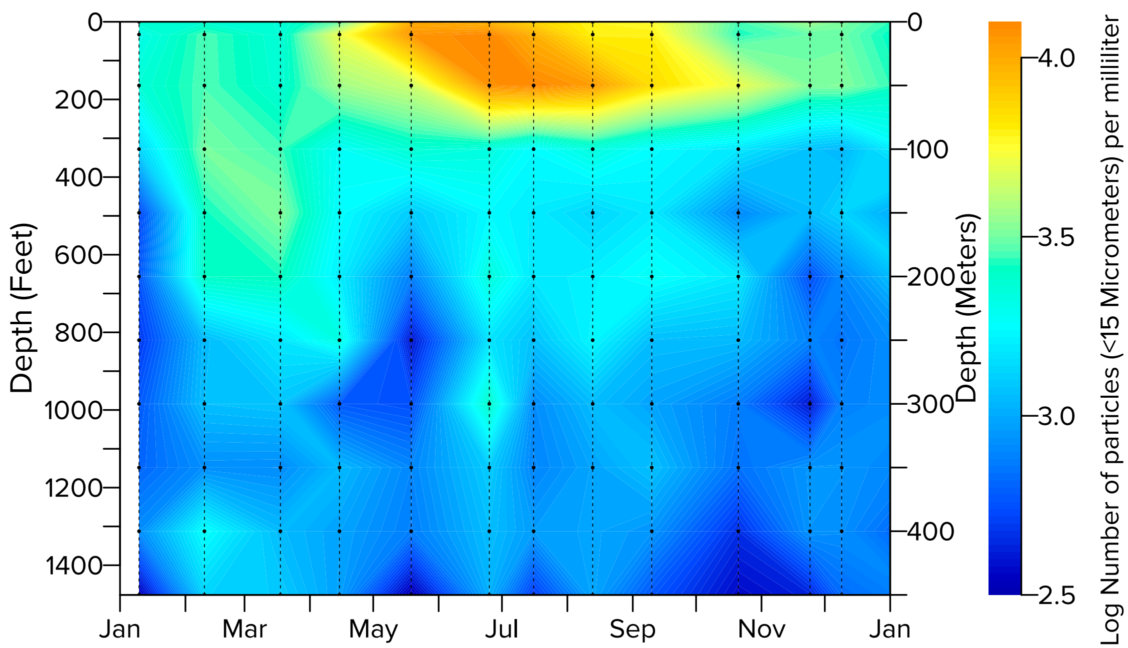
Fine particle distribution

In 2025

Water samples are collected approximately monthly (on dates indicated by the dashed lines) at 11 depths (indicated by the dots) at the MLTP station. These samples are analyzed in the TERC laboratory for concentrations of fine particles in 15 different bin sizes. The distributions of fine particles (in the size range of 1–6 µm) are shown in the form of color contours. Particles can be inorganic, such as clay or silt, or organic particles, such as very small phytoplankton.

Unlike the nutrients in the previous nitrate and total hydrolyzable phosphorus (THP) figures, fine particles are in low concentrations deep in the lake throughout the year. The entry of particles in the upper part of the lake (above 300 feet) associated with spring snowmelt is evident in late May through August. In 2025, increases in fine particles continued to increase during the summer months even though winter values appear to have plateaued. In June and July our phytoplankton enumeration program also showed a big bloom of the small diatom *Cyclotella*, which is known to affect clarity. Determining the identity of the particles is an active area of research since their identity affects our expectations about their long-term drivers and effects on clarity. The particles do not decrease in the upper layer in the same way as nitrogen or phosphorus, as they are not taken up by algal growth. Instead, fine inorganic particles gradually clump together (aggregate), allowing them to settle to the lake bottom more rapidly. Additionally, they can be removed by zooplankton grazing.

Data source: TERC lake monitoring.

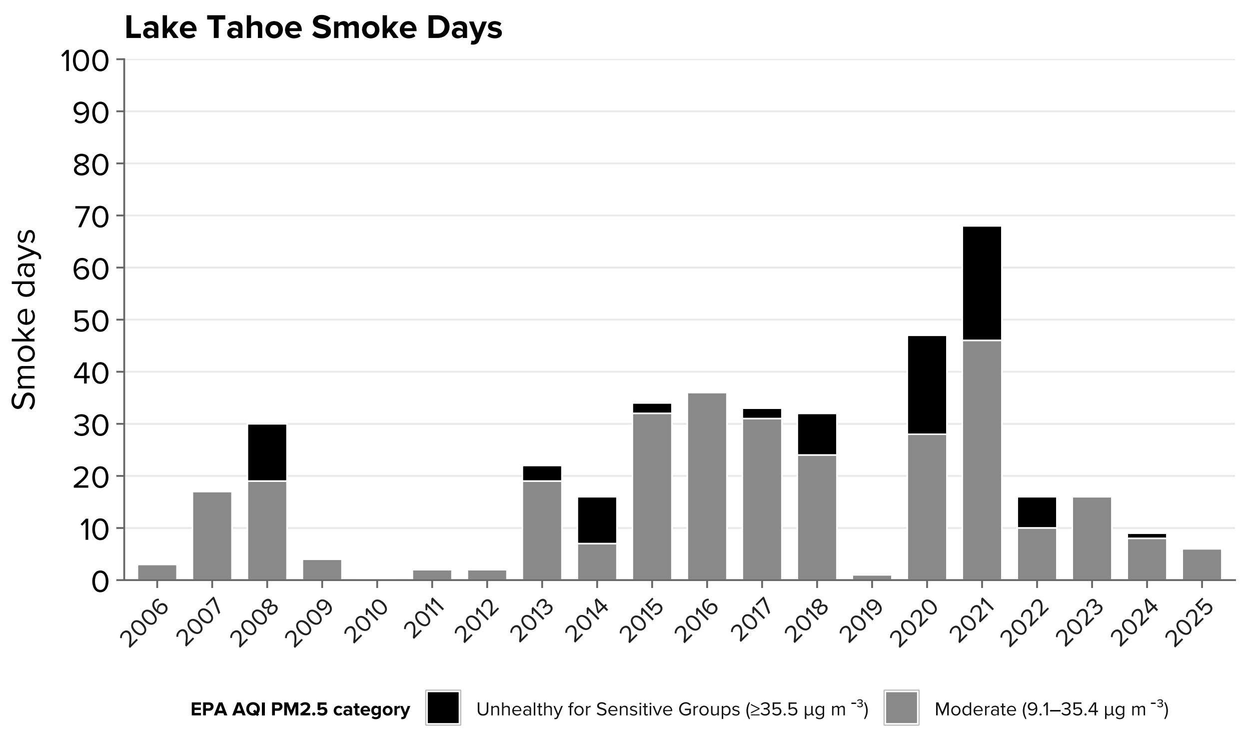


Smoke days

Since 2006

Annual number of smoke days at Lake Tahoe reaching Moderate or higher EPA Air Quality Index (AQI) levels were assessed from 2006 to 2025. Days are included when satellite-detected smoke overlapped the Lake Tahoe Basin and concentrations of particulate matter at the surface level were at or above the EPA Moderate threshold (9.1 µg m^{-3}). Bars are colored by EPA AQI category: Unhealthy for Sensitive Groups (≥35.5 µg m^{-3}, black) and Moderate (9.1–35.4 µg m^{-3}, grey). The record smoke year of 2021 (Caldor and Dixie Fires) produced the highest number of health-relevant smoke days in the 20-year record.

Data source: NOAA Hazard Mapping System and U.S. EPA AirNow monitoring network.



TAHOE: STATE OF THE LAKE REPORT 2026

BIOLOGY

UC DAVIS
Tahoe Environmental
Research Center

tahoe.ucdavis.edu

Algae growth (primary productivity)

Yearly since 1959

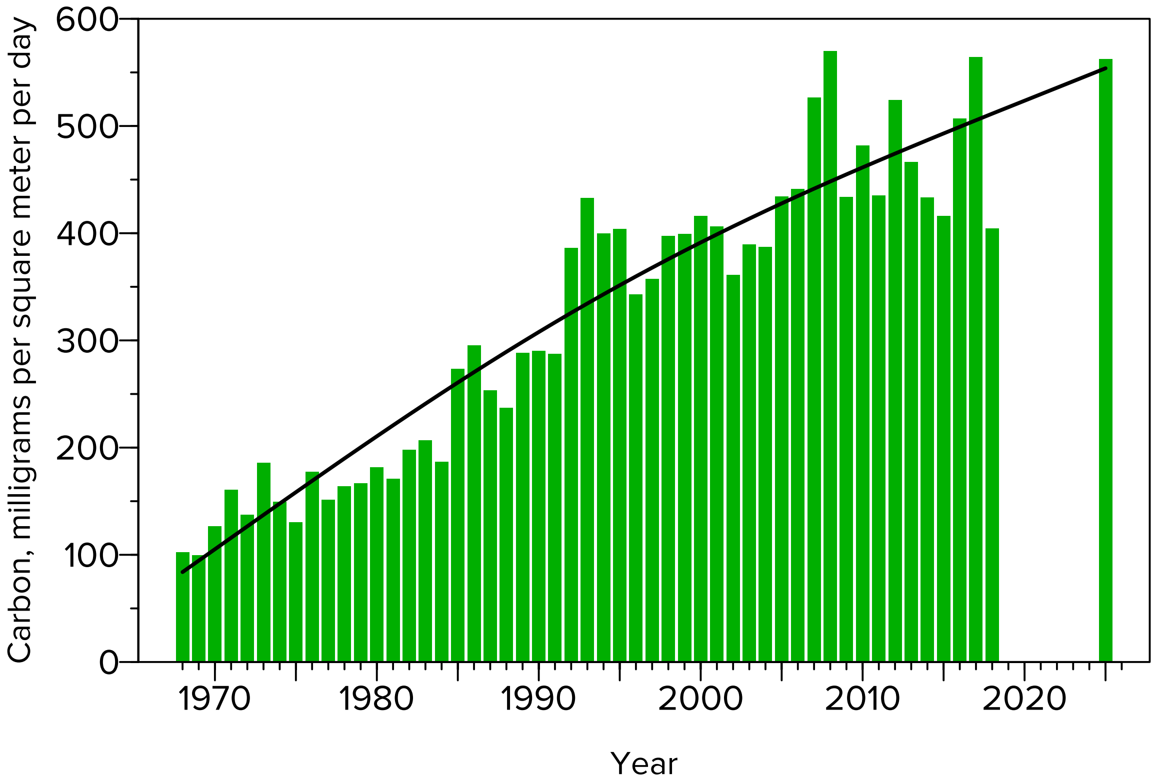
Primary productivity is a measure of the rate at which algae produce biomass (organic carbon) through photosynthesis. It was first measured at Lake Tahoe in 1959 and has been measured continuously since 1968. Supported by complex interactions of many factors such as nutrient loading into the lake, regenerated nutrients, changes in the underwater light environment, variability in thermal conditions (stratification and circulation) and the succession of algal species, the long-term trend shows that primary productivity has increased substantially over this long period.

We are currently in the final stages of resolving recent methodological challenges. Our preliminary findings indicate that the long-term upward trend persisted through 2025, though the growth rate has recently slowed.

Presented below are the summertime (June through September) averages of daily productivity since 1968.

Note: The values presented here are provisional and subject to change upon final review.

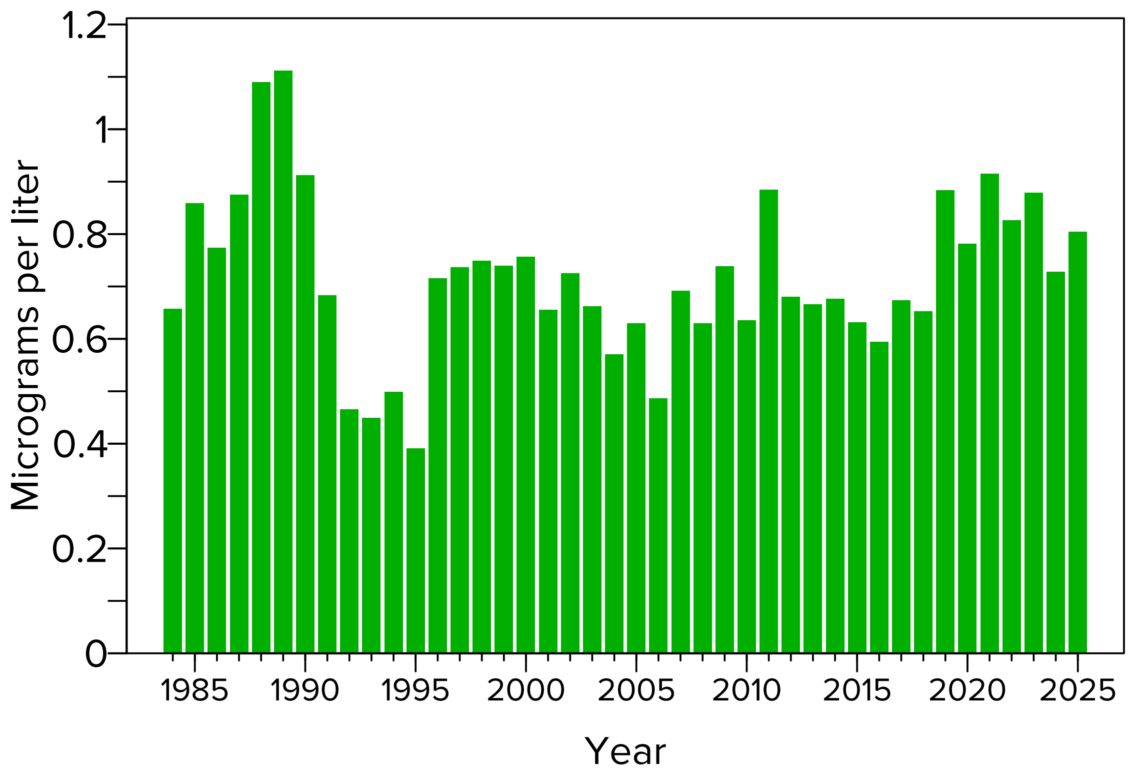
Data source: TERC lake monitoring



Chlorophyll-*a*

Since 1984

Phytoplankton, or free-floating microalgae and photosynthetic bacteria, form the foundation of the Lake Tahoe food web and are essential to the health of the entire ecosystem. Like terrestrial plants, phytoplankton use chlorophyll-*a* to convert sunlight into energy. Because chlorophyll-*a* is found in all algae, it is commonly used as an indicator of algal biomass in lakes and the ocean. As is the case for many scientific tools used over long periods of time, limnologists recognize that chlorophyll-*a* can be more variable in its relationship with algal biomass than initially thought but nevertheless, chlorophyll-*a* remains a valuable metric because of its ease of measurement and its usefulness for comparing present-day conditions with historical records. For more than four decades of monitoring at Lake Tahoe, the average chlorophyll-*a* concentration has maintained relatively stable and 2025 continued this trend. It is increasingly recognized in the scientific literature that chlorophyll-*a* is not a sensitive indicator of phytoplankton biomass in oligotrophic lakes, so it is not surprising that this trend may still be flat in Lake Tahoe even while we see changes in primary productivity or Secchi depth. The average annual concentration for 2025 was 0.8 micrograms of chlorophyll-a per liter, slightly above the long-term average of 0.72 micrograms per liter.

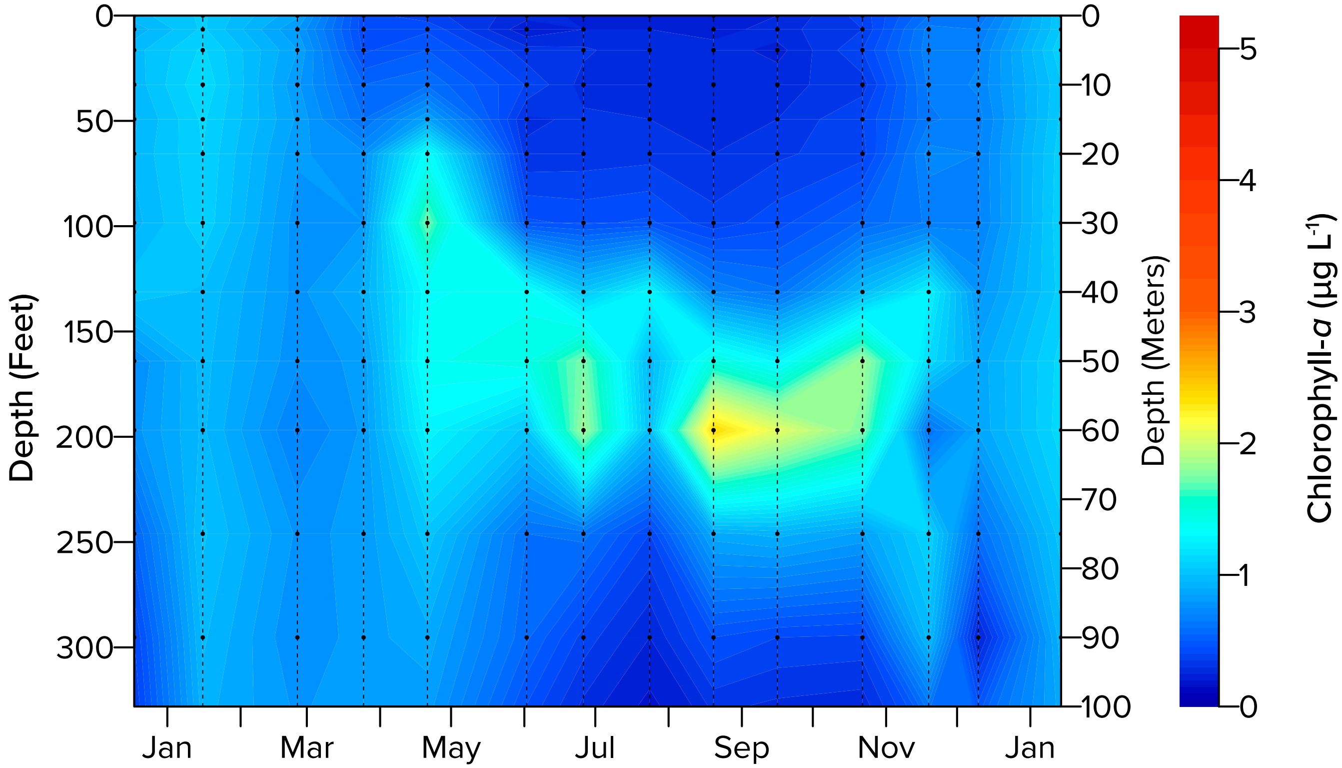


Chlorophyll-*a* spatial distribution

In 2025

This color contours figure illustrates the spatial and temporal distribution of chlorophyll-*a* in Lake Tahoe. Chlorophyll-*a* is typically concentrated at the euphotic zone, which extends to a depth of approximately 350 feet (107 m). Below 350 feet, light is limited and chlorophyll-*a* concentrations approach zero. During the summer months, Lake Tahoe typically exhibit a distinct Deep Chlorophyll Maximum (DCM) typically between 150 to 300 feet (45–90 m), well below the thermocline. At this depth and time, the light and nutrient conditions are most favorable for algae growth.

In 2025, chlorophyll-*a* concentrations ranged from 0.15 to 2.37 µg/L with the greatest concentrations mostly confined to a depth ranging between 165 to 230 feet (50–70 m). This distribution is consistent with the typical depth and seasonal timing of the DCM observed in Lake Tahoe. The highest concentrations of chlorophyll-*a* coincided with the peak stratification in late-August at a depth of about 200 feet (61 m). Like the previous year, chlorophyll-*a* remained low throughout the year below 250 feet (75 m), potentially due to reduced light and nutrient availability.

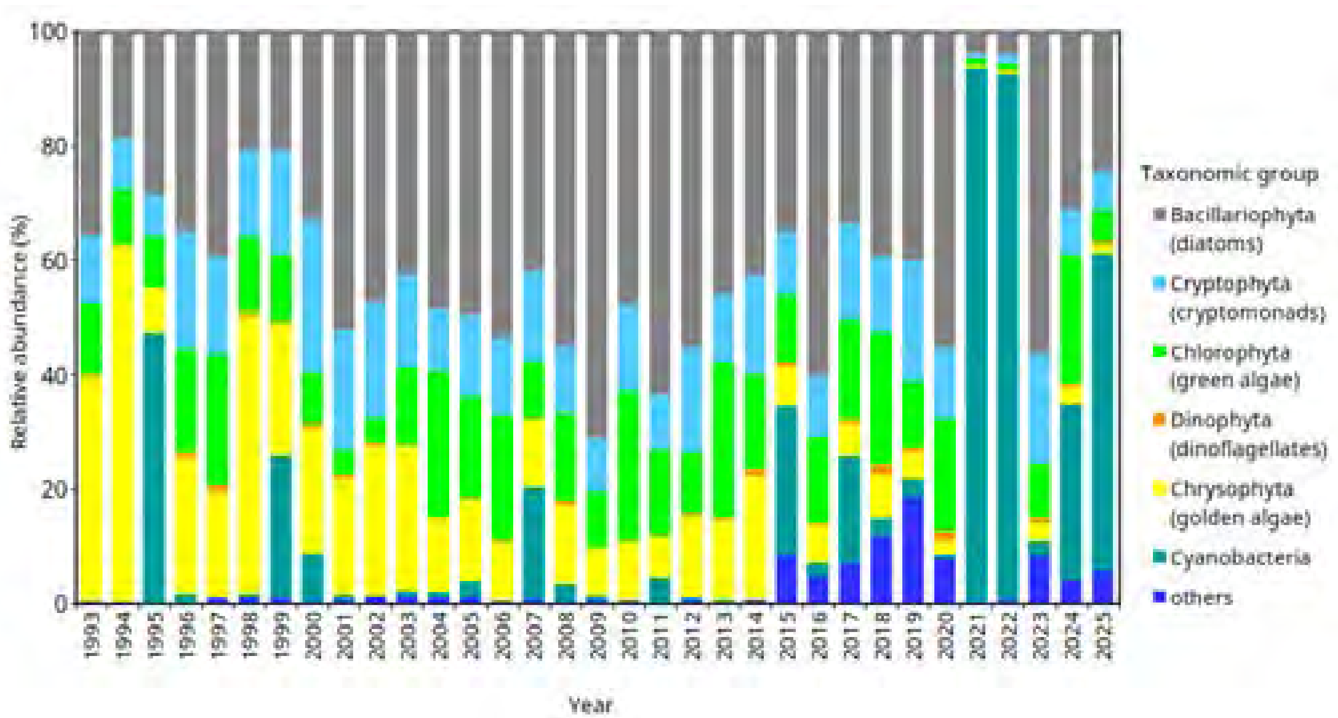


Distribution of algal groups

Yearly since 1993

The phytoplankton community composition in 2025 was broadly consistent with long-term patterns, with no single taxon dominating the community. Across most years, Bacillariophyta (diatoms) clearly dominate the phytoplankton community, however their relative abundance in 2025 has declined. Cyanobacteria represented in dark teal, have maintained a strong presence since 2021. While cyanobacteria represented the largest group in 2025, their abundance remained below the extremely high levels observed in 2021–2022, which were likely influenced by the Caldor Fire. Because cyanobacteria are generally much smaller in size than other phytoplankton groups, they may be numerous but ultimately have a smaller contribution to the total biovolume (Figure 10.5). Cryptophyta and Chlorophyta remained present at moderate levels, while Chrysophyta, Dinoflagellates (Dinophyta), and others contributed minimally. The resurgence of cyanobacteria has been associated with two filamentous genera. During 2021–2022, *Leptolyngbya* was the dominant cyanobacterium, and *Phormidium* also contributed to cyanobacteria abundance. Cyanobacteria are natural components in most bodies of water, and their presence alone does not indicate harmful conditions. However, changes in their abundance may reflect shifting nutrient conditions or climate-driven changes in Lake Tahoe's ecosystem.

Data source: TERC lake monitoring.



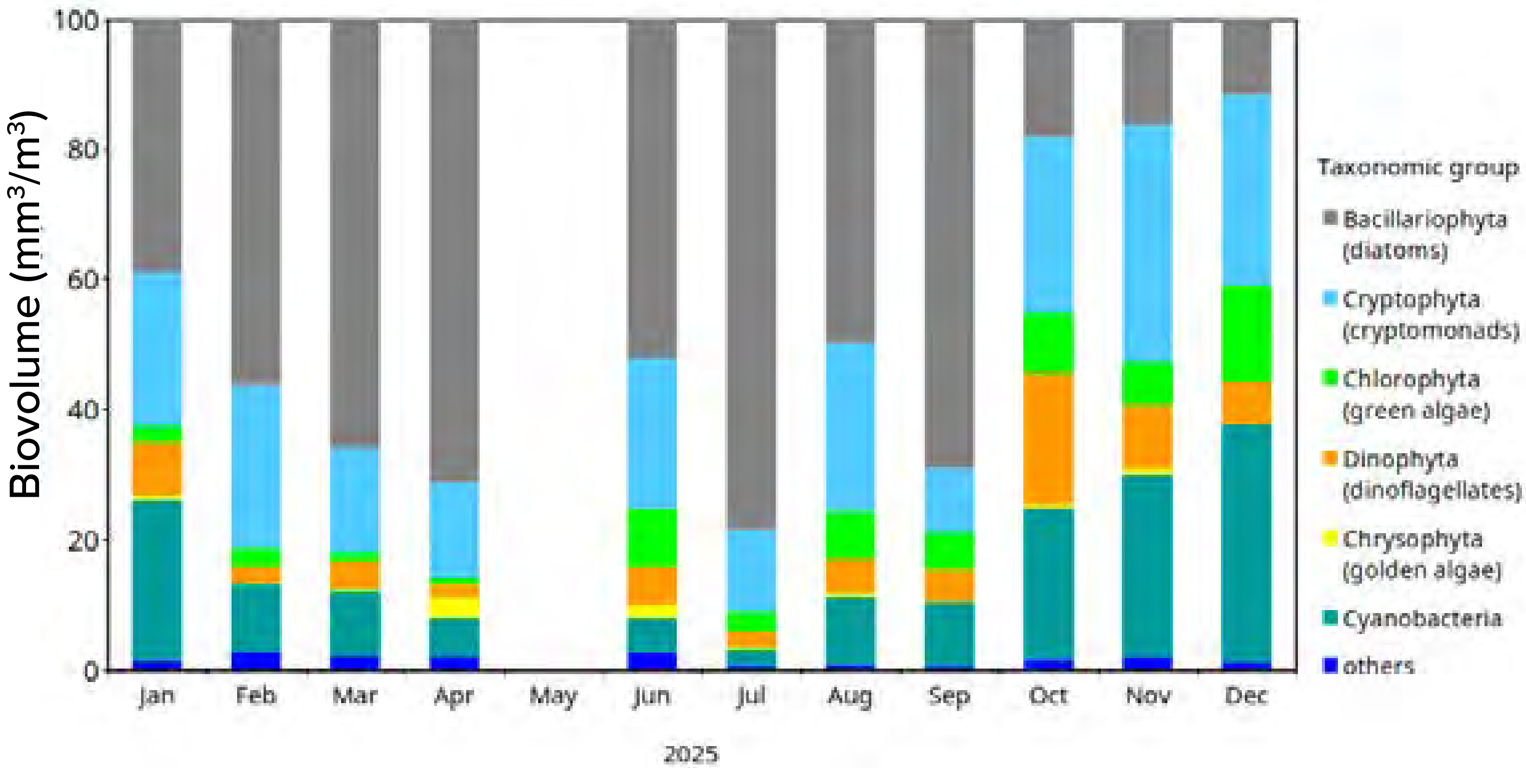
Algal groups as a fraction of total biovolume

Monthly in 2025

Phytoplankton biovolume fluctuates both seasonally and from year to year in response to varying physical, chemical, and biological drivers. In 2025, phytoplankton biovolume in Lake Tahoe exhibited seasonal changes in both abundance and community composition. Bacillariophyta (diatoms) were the dominant algal group in terms of their biovolume and contributed the greatest share of total phytoplankton biovolume throughout most of the year.

Overall, the seasonal succession of algal groups in 2025 was consistent with long-term patterns and representative of typical baseline conditions in Lake Tahoe. No data are shown for May because phytoplankton sampling was not conducted during that month.

Data source: TERC lake monitoring.



Abundance of dominant diatom species

Monthly in 2025

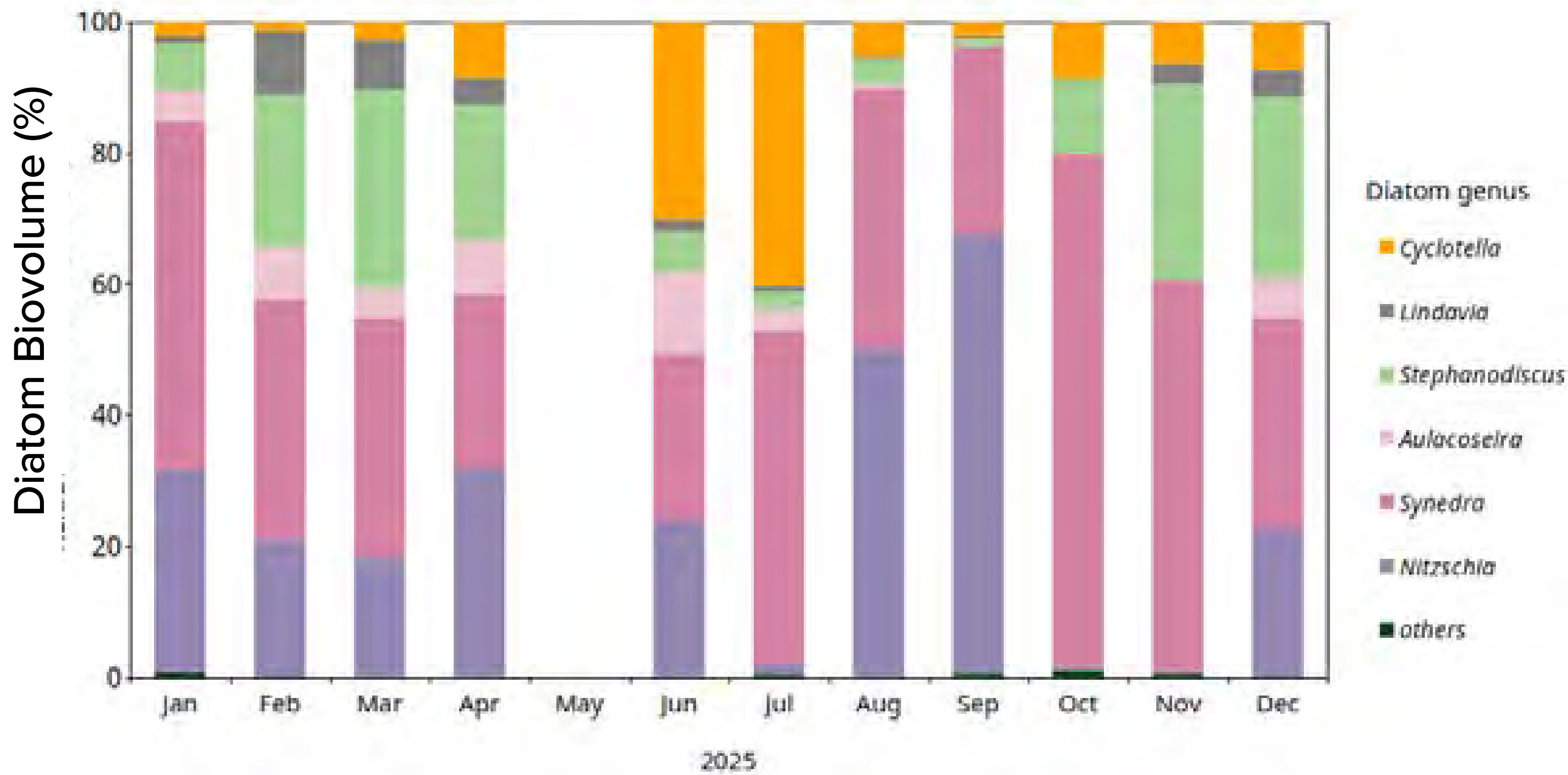
Diatoms are unique among algae because they possess a rigid silica cell wall, called a frustule. They have historically dominated the phytoplankton community in Lake Tahoe, making regular monitoring important for understanding food web, water clarity, and the overall lake dynamics.

The diatom community in 2025 was characterized by the consistent presence of a few key genera (*Cyclotella, Lindavia, Stephanodiscus, Aulacoseira, Synedra* and *Nitzschia*) with seasonal shifts in their relative abundance. *Synedra*, a relatively large and widespread diatom remained abundant throughout the year.

The much smaller diatom *Cyclotella*, which has been associated with reducing water clarity in Lake Tahoe, comprised a relatively large proportion of the community during June and July, coinciding with the lowest water clarity measurements of 2025.

It is important to note that cell abundance does not necessarily reflect biomass. Larger diatoms, such as *Synedra*, may be less abundant than smaller species but can contribute a greater proportion of the total phytoplankton biovolume because of their larger cell size.

Data source: TERC lake monitoring.



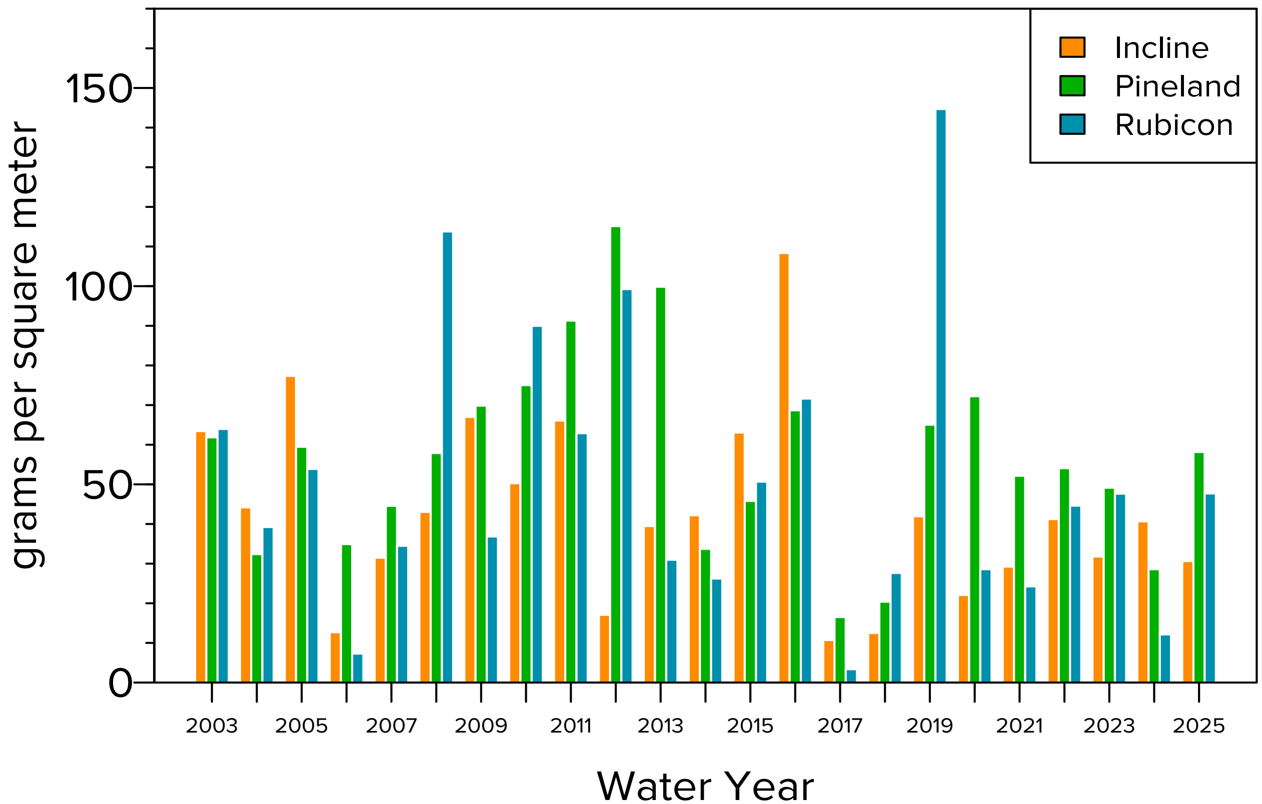
Peak shoreline algae concentrations

Yearly since 2003

Periphyton, or attached algae, makes rocks around the shoreline of Lake Tahoe appear green and slimy, and they can sometimes form a very plush white carpet after being sun-bleached. This graph shows the periphyton maximum biomass measured at 1.5 feet (0.5 m) below the surface at three sites from January to June.

In 2025, the maximum periphyton biomass at the Incline, Pineland, and Rubicon sites was consistent with each site's long-term average. Although these site-specific biomass measurements do not capture the full spatial extent of periphyton blooms around the lake, they maintain a long-term record for comparison with the much more extensive dataset currently being collected.

Data source: TERC lake monitoring.



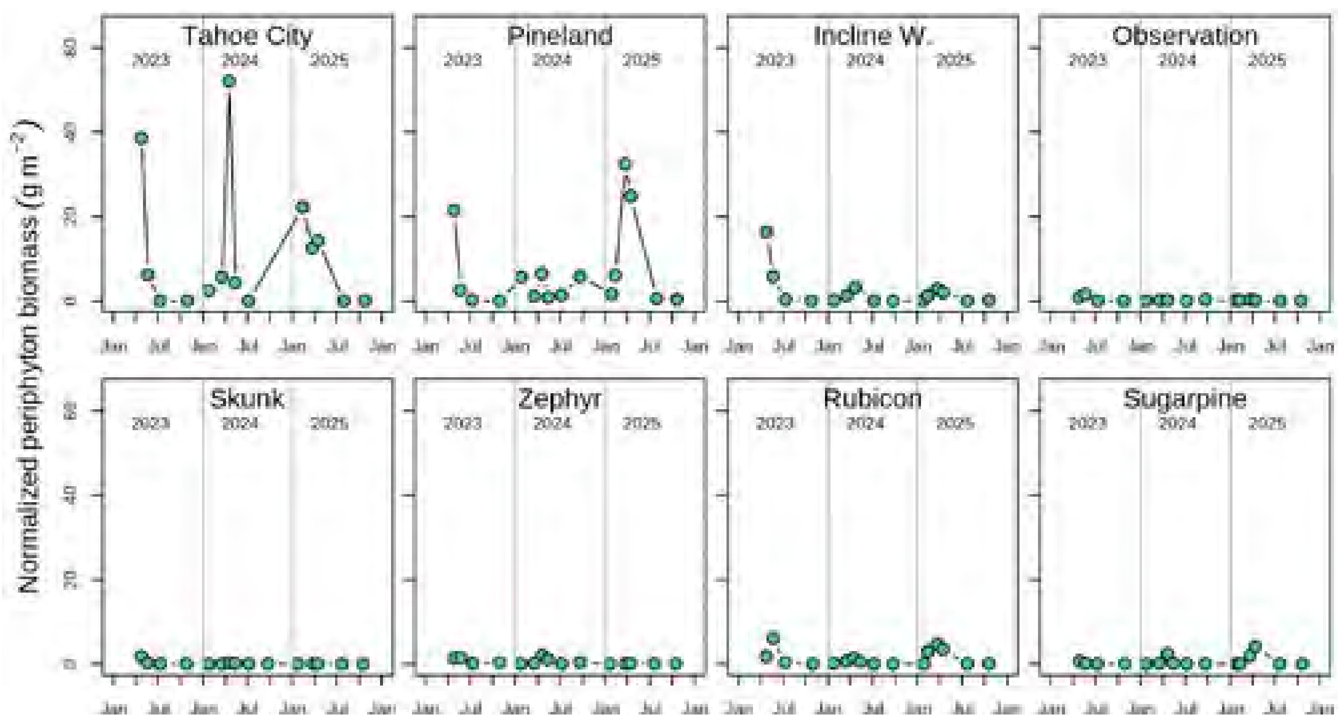
Shoreline algae distribution

Since 2023

Periphyton biomass and areal extent are surveyed monthly at eight strategically located nearshore sites around Lake Tahoe usually from January–May and again in July and September. The goal of this monitoring is to track periphyton growth both spatially and temporally throughout the year. Sampling is most frequent during winter and spring, when periphyton typically reaches its annual maximum. Periphyton biomass is measured by divers at a depth of 1.5 feet (0.5 m) and 5 feet (1.5m), while the areal extent of periphyton growth is quantified by analyzing images collected during drone surveys. Helicopter aerial is also collected providing information on the status of the entire nearshore of Lake Tahoe. Biomass and areal extent are combined into a normalized biomass metric. Normalized ash-free dry weight (AFDW x periphyton area/total site area) is a metric that accounts for both biomass density and areal extent of growth. In 2025, periphyton biomass was highest on the west shore Tahoe City and Pineland sites. The biomass peaked earlier at Tahoe City in February and March compared to Pineland where concentrations peaked in April and May. The east and northwest shore sites in comparison to the west shore sites had relatively low periphyton growth.

These site-specific measurements provide a representative assessment of periphyton growth around the lake. Within each section of shoreline, there may be areas of variability.

Data source: TERC lake monitoring.

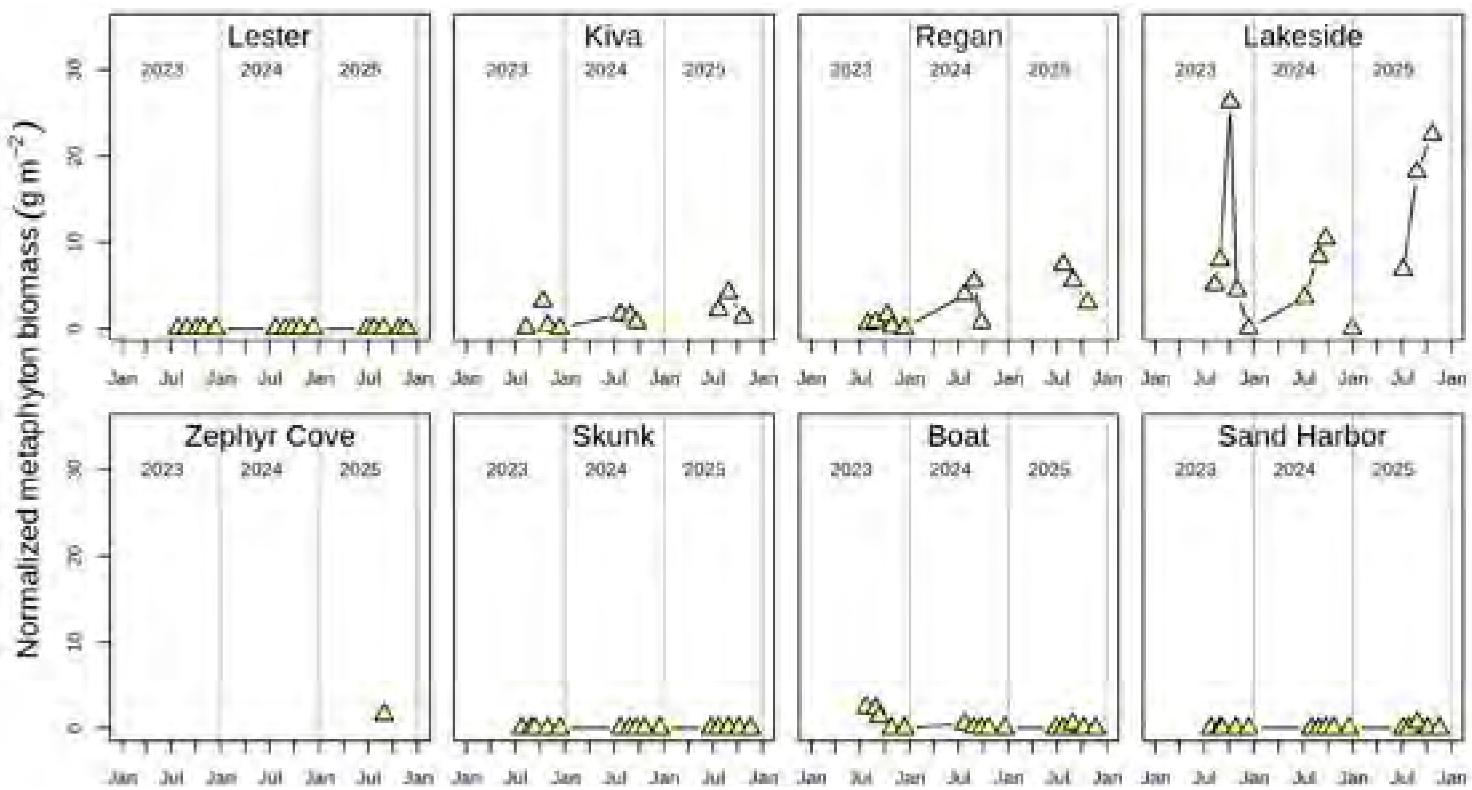


Metaphyton distribution

Since 2023

Metaphyton, or unattached nearshore algae, can form bright green carpets above sandy substrate in Lake Tahoe, and can wash ashore onto beaches. Metaphyton growth is surveyed at eight sites in July, August, September, October, and December. In 2025, the Incline site was replaced by Zephyr Cove due to the consistently observed metaphyton growth at that location. Monitoring is prioritized during summer and autumn, when metaphyton algal growth typically peaks. Like periphyton, TERC collects biomass measurements, conducts drone flights at each metaphyton site to estimate normalized biomass, and collects helicopter imagery of the entire shoreline. In 2025, normalized metaphyton biomass was highest from July through September at south shore sites, including Lakeside Beach, Regan Beach, and Kiva Beach as well as the southeast shore although data is limited at the new Zephyr Cove monitoring site. Metaphyton biomass was very low or not detected at other monitoring sites.

Data source: TERC lake monitoring.

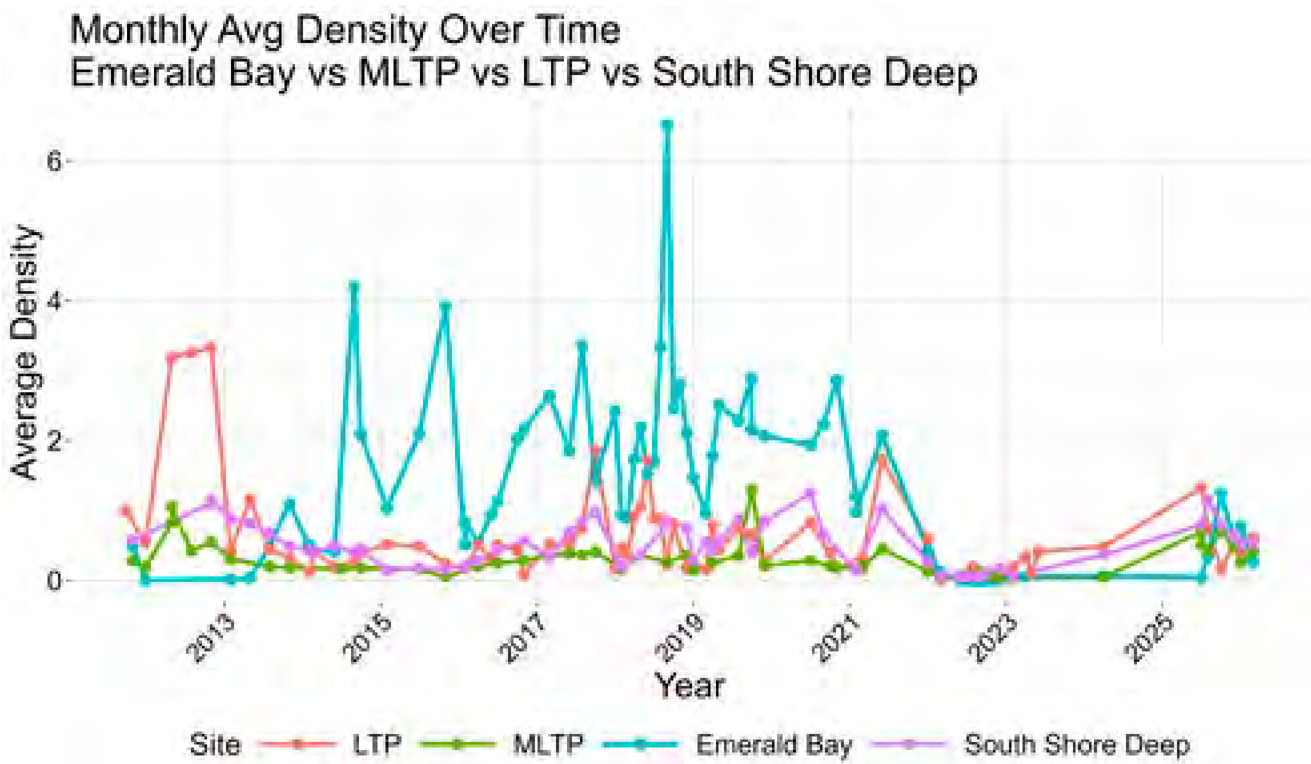


Mysis population

Since 2012

Mysis shrimp were introduced to Lake Tahoe in the 1960s in an attempt to improve the size of game fish in the lake. The intended result did not occur and instead the *Mysis* upset the existing lake food web. Within four years of their introduction, they had decimated the populations of the native zooplankton (*Daphnia* and *Bosmina*) and since that time, these zooplankton are rarely observed. *Daphnia* and *Bosmina* were once an important food source for native minnows, which in turn provided food for kokanee salmon and rainbow trout. Little data collection on mysids occurred from the 1980s until 2012 when TERC has recommenced regular surveys of Lake Tahoe and Emerald Bay. Sampling has been done at South Shore Deep (200 m), LTP Index (100 m), MLTP Index (200 m), and Emerald Bay (60 m). The *Mysis* densities (number of individuals collected divided by the net opening area) in Lake Tahoe show considerable variability but have been relatively low since 2022. By examining long-term patterns alongside physical, chemical, and ecological lake conditions, researchers aim to identify the processes responsible for population fluctuations and evaluate how these changes influence the lake's food web. It is worth noting in last year's report the plot was of raw abundance across each site rather than density.

Data source: TERC lake monitoring.

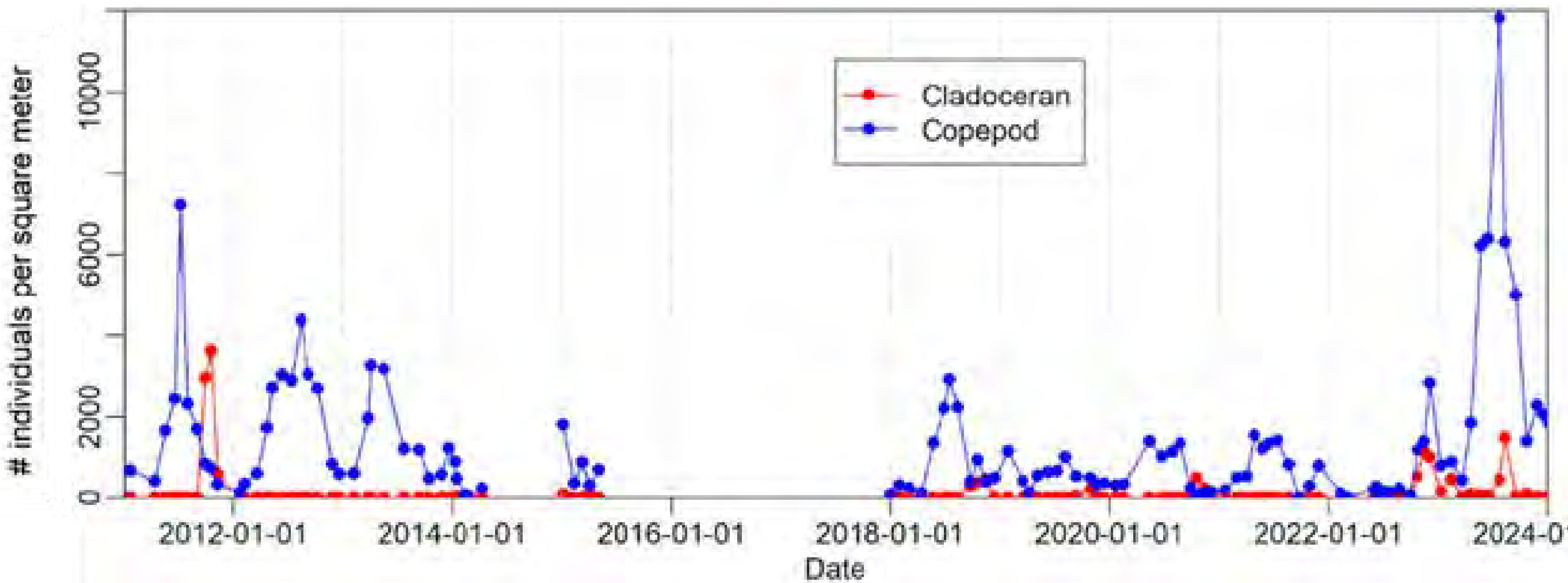


Zooplankton populations

2012 to 2024

Zooplankton are the microscopic animals that eat phytoplankton and bacteria, and provide a link from the base of the food web to larger organisms like mysids and fish that feed on zooplankton. The figure shows two groups of zooplankton — cladocerans (*Daphnia* and *Bosmina*) and copepods (*Epischura* and *Diaptomus*). Zooplankton monitoring in Lake Tahoe has been episodic over the years, since the 1960s, depending on available funding. TERC has not had funds to monitor zooplankton since the end of 2023, and we recently published our zooplankton data (https://doi.org/10.6073/pasta/a3b54599e2066b04819df04a24dc9e34) as part of the Zooplankton International Geospatial collaboration.

Data source: TERC lake monitoring.



TAHOE: STATE OF THE LAKE REPORT 2026

CLARITY

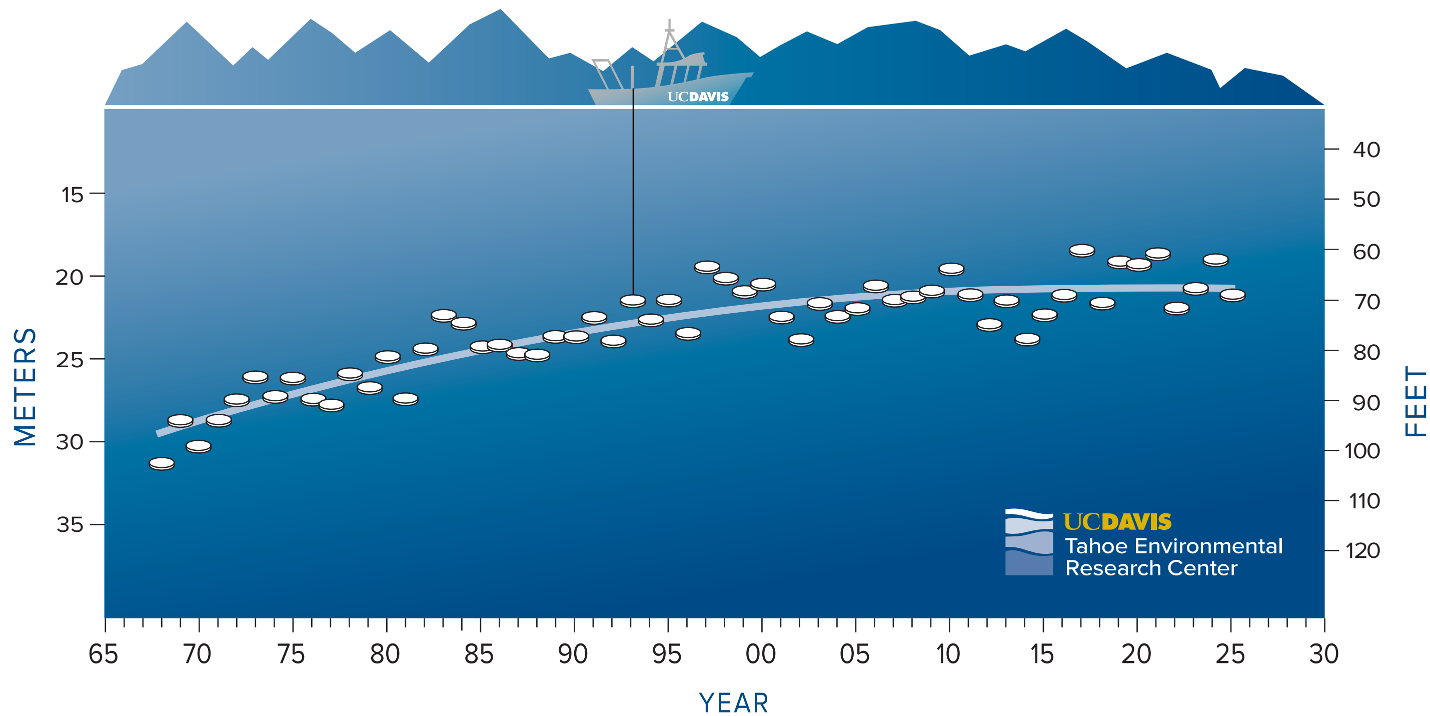
UC DAVIS
Tahoe Environmental
Research Center

Annual average Secchi depth

Yearly since 1968

Lake clarity is measured as the depth at which a 10-inch white disk, called a Secchi disk, remains visible when lowered into the water. In 2025, Lake Tahoe's annual average Secchi depth was 69.2 feet (21.1 m) based on 20 readings at Lake Tahoe's long-term index station and 12 readings from the mid-lake index station taken throughout the year. This value is not statistically different from the previous year, highlighting that water clarity has leveled off around 70 feet since the late 1990s. The highest reading occurred on February 25, reaching 94.5 feet (28.8 m). The lowest clarity of the year was 47.6 feet (14.5 m) recorded on July 11.

While year-to-year fluctuations in clarity are expected due to natural variability, the long-term trend over the past two decades indicates that Lake Tahoe's clarity has plateaued, with no statistically significant improvement or decline. Although this stability represents an important departure from the rapid clarity losses observed during the latter half of the 20th century, it is still far from the clarity restoration target of an annual Secchi depth of 97.4 feet (29.7 m). New approaches are examining the roles of phytoplankton, picoplankton, wildfire ash, particle aggregation, and the lake's physical dynamics using advanced imaging technologies and long-term datasets. These efforts will help identify the processes limiting clarity recovery and guide future restoration strategies. Continued scientific research, coupled with coordinated watershed management, remains essential to protecting and restoring Lake Tahoe's iconic clarity. Data source: TERC lake monitoring.



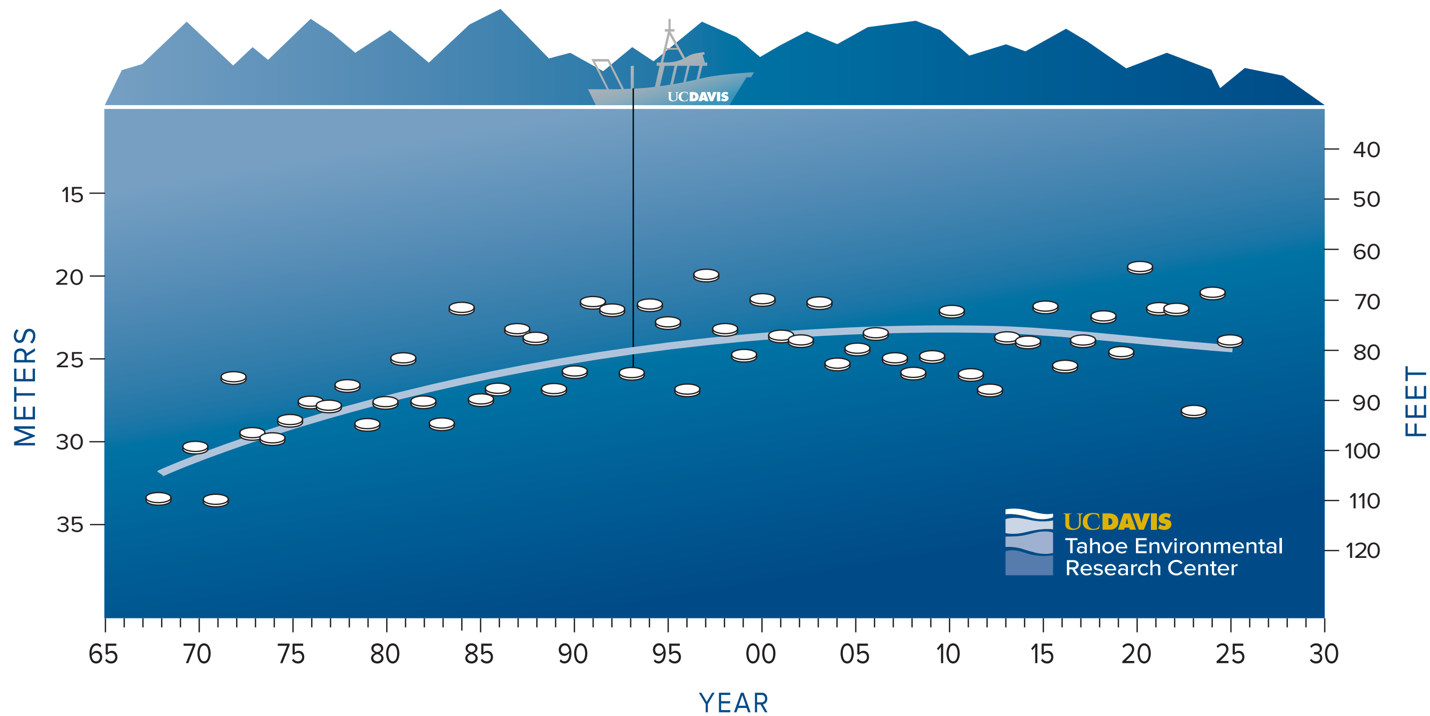
Winter Secchi depth

Yearly since 1968

Winter clarity remained relatively stable in 2025, with an average Secchi depth of 78.4 feet (23.9 m). The greatest individual Secchi depth measured during the winter was 94.3 feet (28.8 m) on February 25, while the lowest reading was 63.3 feet (18.5 m) on December 18, 2024.

The 2025 winter measurements continue to support the long-term pattern of stable winter clarity in contrast to highly variable summer clarity.

Data source: TERC lake monitoring.



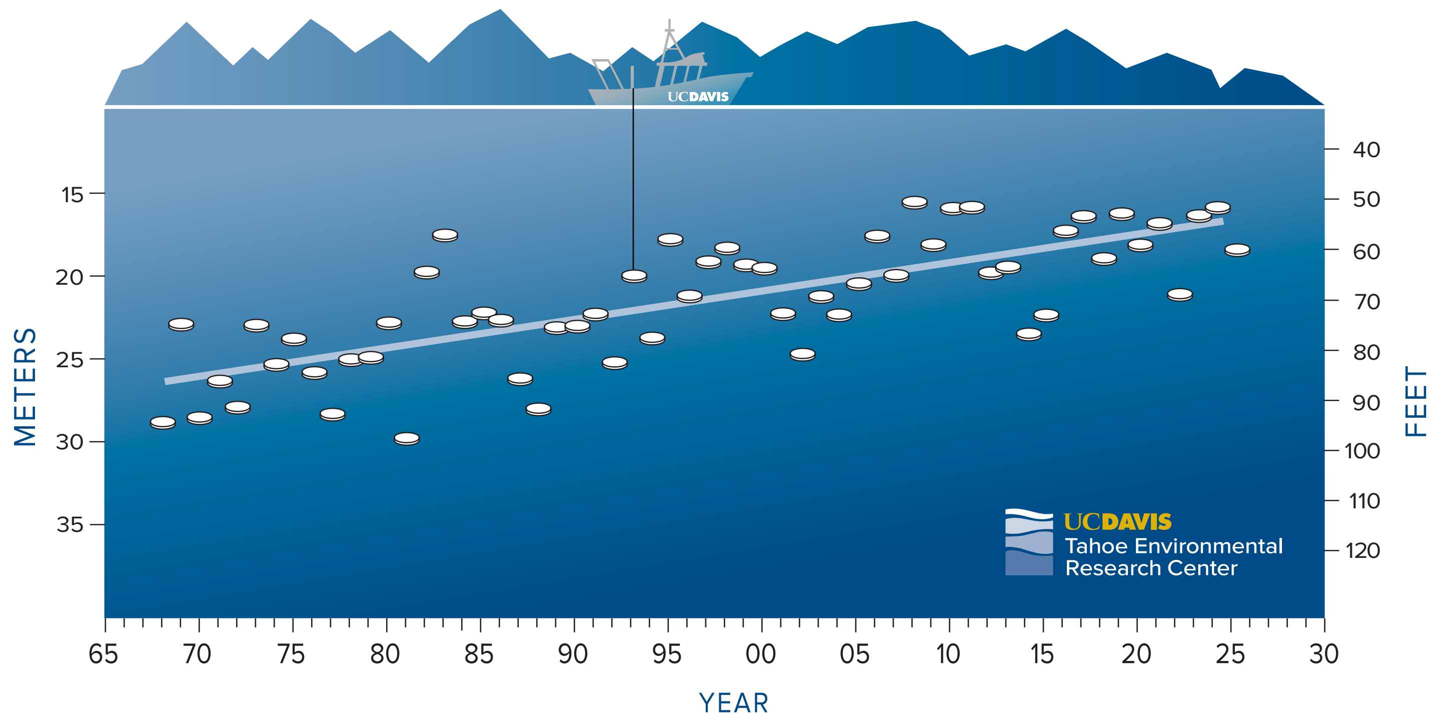
Summer Secchi depth

Yearly since 1968

The annual summer average Secchi depth was 60.4 feet (18.4 m). The greatest individual reading was 78.1 feet (23.8 m) recorded on September 16. The worst summer clarity reading was 47.6 feet (14.5 m) on July 11.

Summer clarity in Lake Tahoe continues to show significant variability and long-term degradation and remains the primary factor limiting improvements in annual average lake clarity. This remains in contrast with stabilization in winter clarity trends and highlights the need to better understand the changing sources and nature of particles that influence water transparency throughout the year. In 2026, TERC will use new techniques to investigate the role of phytoplankton, including their tiniest component — the picoplankton — and deploy new imaging technology to visualize particle aggregation in unprecedented detail. These approaches aim to combine new science and engineering perspectives to understand the interconnected system of Lake Tahoe and help shape the future of clarity research at the lake.

Data source: TERC lake monitoring.



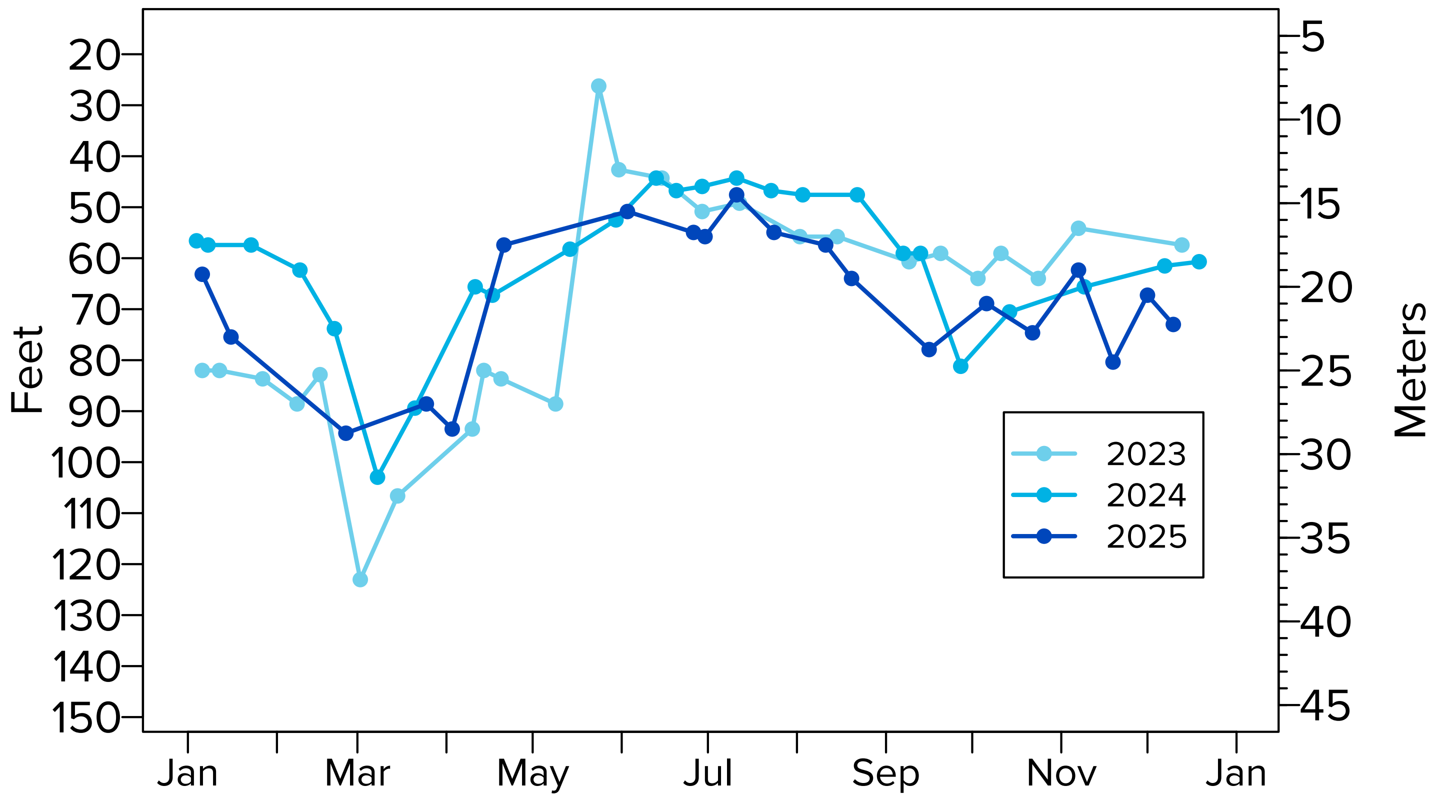
Individual Secchi depths

2023, 2024, and 2025

The individual Secchi depth measurements collected at the Index Station on the west side of the lake for 2023, 2024, and 2025 are shown. Secchi depth can vary substantially over short time periods in response to changing lake conditions. In 2025, the greatest clarity was recorded in late February, when the Secchi depth reached 94.5 feet (28.8 m), likely reflecting the effects of winter mixing. The lowest clarity was observed twice during the summer, when the Secchi disk disappeared at just 47.6 feet (14.5 m).

These short-term fluctuations highlight the importance of consistent, long-term monitoring to distinguish enduring trends in lake clarity from temporary changes driven by weather, seasonal stratification, runoff, and biological activity.

Data source: TERC lake monitoring.



TAHOE:
STATE OF THE LAKE
REPORT
2026

EDUCATION AND OUTREACH

UC DAVIS
Tahoe Environmental Research Center

tahoe.ucdavis.edu

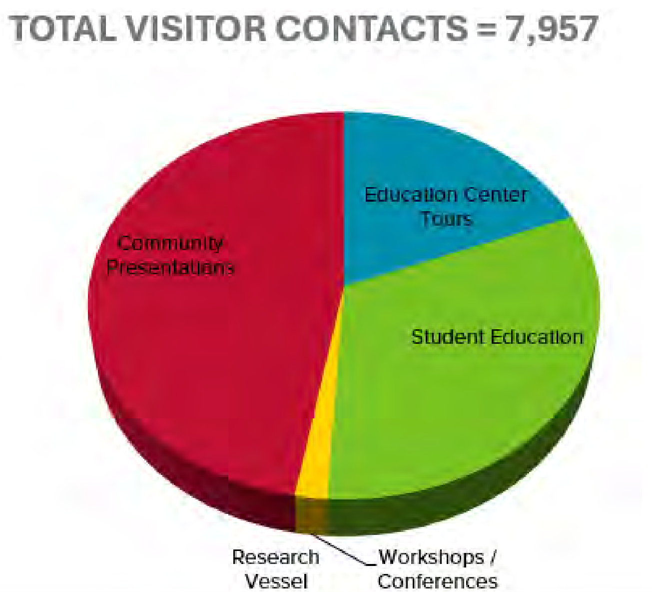
Education and outreach

In 2025

Education and outreach are integral to the mission of the UC Davis Tahoe Environmental Research Center (TERC), translating scientific research into accessible and engaging learning experiences for the public. Educational content is developed directly from technical reports, peer-reviewed publications, and ongoing research, ensuring that the latest science informs tours, school field trips, exhibits, lectures, community outreach, and other educational programs. By making TERC's research more accessible, the education team cultivates an informed community of residents and visitors and fosters thoughtful stewardship and actions that help protect Lake Tahoe for future generations.

In 2025, TERC engaged 7,957 visitors through tours, school programs, lectures, and community outreach activities. The education team provided place-based learning experiences for 2,553 students through field trips focused on lake ecology, climate change, forest health, geology, and stream monitoring. TERC also reached 644 community members through its monthly lecture series, which featured researchers from UC Davis and other institutions.

Although these numbers reflect continued demand for TERC's educational programming, the termination of AmeriCorps funding in May 2025 significantly reduced programming capacity. TERC was able to retain its three education team members at 50 percent time from May through September 2025, and following the transition of Federal AmeriCorps service positions to the California Volunteers program, TERC was eventually able to hire two new full-time AmeriCorps members for education programs beginning in October 2025 through the California-funded SNAP AmeriCorps program. As anticipated in the previous *2025 State of the Lake Report*, the 2025 education and outreach metrics reflect the necessary reduction in programming implemented to align with available staffing while still maintaining the high quality of TERC's educational offerings.



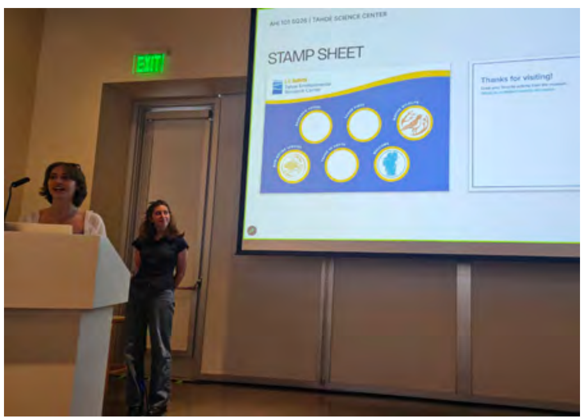
Educational exhibits

In 2025 and 2026

UC Davis TERC continues to expand its educational offerings through new exhibits and public engagement initiatives. In 2026, the TERC education team partnered with Professor Alexandra Sofroniew and the UC Davis Art History 101 course, *Understanding Museum Practices*. Students explored the mission of the Tahoe Science Center™, its administrative structure, the role of volunteer docents, visitor demographics, exhibit branding and design, and opportunities to develop new exhibits or reimagine existing ones. The partnership engaged 81 UC Davis students, who produced 24 exhibit proposals for the Tahoe Science Center. Concepts included a historical timeline of UC Davis research at Lake Tahoe, the formation of Lake Tahoe, freshwater algae, and an interactive discovery stamp activity.

Additional developments included the creation of new field guides to help visitors identify Tahoe's native flora and fauna, new Lahontan Cutthroat Trout for visitors to observe, feed and interact with, and the completion and premiere of the newest version of the award-winning film *Lake Tahoe in Depth*. The updated film incorporates the latest scientific discoveries, retelling the geologic history of Lake Tahoe while highlighting recent UC Davis TERC research.

TERC also welcomed 12 summer interns, five of whom are developing new exhibits for the Tahoe Science Center as part of their internship projects. These exhibits include *Tahoe Takes Action Against Climate Change*, an environmental DNA (eDNA) exhibit, a pollinator exhibit, a wildlife exhibit, and an exhibit highlighting the *Wašiw* language and its connection to the Lake Tahoe Basin.



UC Davis undergraduates Maddy Seeman and Edyn Stepler presented their final project for the Art History 101 course. Their project encouraged visitors to engage with Tahoe Science Center exhibits by collecting colorful stamps on a take-home postcard. The postcard also included a reflection activity to extend the learning experience beyond their visit. (Alison Toy, UC Davis TERC)

The newest version of the award-winning short film Lake Tahoe in Depth premiered at the 11th Tahoe Film Fest at the Crystal Bay Club. The film was featured as the opening short before the sold-out screening of Pressure Drop by Teton Gravity Research, providing an opportunity to showcase UC Davis TERC's research to a large and engaged audience. (Alison Toy, UC Davis TERC)

The Tahoe Science Center™ welcomed two new fish in 2026. These fry, just under a year old, came from the U.S. Fish & Wildlife Service's Lahontan National Fish Hatchery. They serve as living ambassadors, helping visitors learn about changes to Lake Tahoe's aquatic food web and the ongoing efforts to restore native fish populations and improve the lake's ecosystem. (Alison Toy, UC Davis TERC)

Educational programs

In 2026

TERC continues to engage the public through a diverse range of science education opportunities. The Internships for Scholars Program experienced another year of significant growth, with applications increasing by 220 percent and the cohort expanding by 50 percent to 12 students representing universities from across the nation. The program continues to serve as both a workforce development pipeline and a catalyst for advancing TERC's research and education mission.

The popular Science Speaks monthly lecture series continued to draw strong attendance, with presentations on topics including *DNA Detectives: Using DNA in the Environment to Study Fish and Wildlife*, *Plastic Pollution in the Tahoe Basin*, and *Fire Risk, Fire Behavior, and Post-Fire Forest Resilience*. The Ski with a Scientist series expanded capacity by 33% offering eight public sessions that reached 432 people through outreach efforts and engaged 173 participants in on-mountain science education.

The High Elevation Gardening programs continued to evolve in 2026. Through strong community interest and support from the Tahoe City Downtown Association (TCDA), TERC reimagined the program as four gardening events integrated into the TCDA event calendar. Additional new outreach opportunities included two Tahoe SnowFest events, the Nevada Freeheel event, and the Sunnyside Science of Cocktails Luau.

TERC also completed the pilot year of the TAHOE Lab Community Science Program in partnership with regional organizations. The TERC curriculum provided sixth-grade students with hands-on learning experiences centered on watershed health, biodiversity, and water quality monitoring.

Despite ongoing staffing and funding challenges, TERC continues to provide high-quality, place-based science education through lectures, exhibits, field programs, and community partnerships.

AmeriCorps member Abigail Cain shares the latest findings from the TERC Forest and Conservation Lab during the Nevada Nordic Freeheel event as part of the weeklong 2026 Tahoe SnowFest. Visitors learned about efforts to restore whitebark pine in the Caldor Fire burn scar on Trimmer Peak and ongoing research on the impacts of white pine blister rust. (Alison Toy, UC Davis TERC)

PhD candidate Kenny Larrieu chats slopeside with a young, captivated skier during Ski with a Scientist using visuals to highlight cutting-edge lake science. Larrieu described the use of underwater lasers, holographic imaging, and autonomous vehicles to study the tiny particles that form underwater "lake snow" and influence lake clarity. (Alison Toy, UC Davis TERC)

As part of the new TAHOE Lab Outdoor Learning Program, AmeriCorps member Samantha Campisi introduces North Tahoe Middle School students to water quality monitoring through zooplankton sampling and the release of Lahontan cutthroat trout fry, helping students explore food webs, bioindicators, and native fish restoration in Lake Tahoe. (Alison Toy, UC Davis TERC)

Communications: Turning Science into Connection

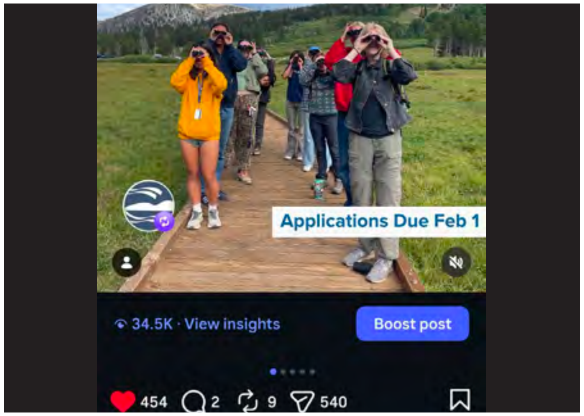
In 2026

Our mission doesn't end with scientific discovery — it includes sharing newfound knowledge with the people who can use it. From residents and visitors to the Tahoe Basin, to local nonprofits and agencies working to protect the lake, to our research collaborators at UC Davis and universities around the world, every audience plays a role in Lake Tahoe's future.

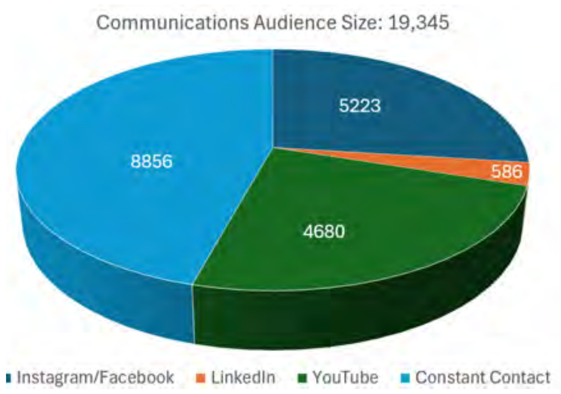
Because these audiences engage with information in different ways, our communications strategy is designed to meet people where they are. Our email newsletters, distributed through Constant Contact, highlight the latest research, education programs, and events. Instagram, Facebook, and LinkedIn provide an authentic look at our scientists in action, bringing followers behind the scenes of fieldwork and research. Our YouTube channel offers recorded lectures and educational programs, making Lake Tahoe science accessible to anyone, anywhere.

Together, these platforms help us build a growing community of people who understand, appreciate, and advocate for Lake Tahoe. As our audience continues to grow, so does our ability to share trusted science, inspire stewardship, and demonstrate the broad impact of our work to research sponsors and funding organizations.

Stay connected! Follow us on Instagram @ucdavistahoe, find us on LinkedIn, and scan the QR code to subscribe to our newsletter and receive the latest Lake Tahoe science, research updates, and event announcements delivered directly to your inbox.



An Instagram post promoting our TERC Internships for Scholars program, helped drive a 220% increase in applications, reaching more than 34,500 views, generating 9 reposts, 454 likes, and 540 shares.



TERC's communications and social media platforms continue to grow, with each channel providing targeted content that engages different audiences and expands the reach of TERC science and educational programs.

The newest version of Lake Tahoe in Depth, following the screening at the 11th Tahoe Film Fest, made it's way to hundreds of thousands of homes on YouTube with 203,000 views and 3,400 likes.