

The Tahoe Environmental Research Center (TERC) is dedicated to interdisciplinary research and education to advance the knowledge of aquatic and terrestrial ecosystems and their interactions within natural and developed Earth systems, and to communicate science-informed solutions worldwide.

TERC educates the next generation of leaders and inspires environmental stewardship in thousands of students, community members, and visitors annually through its outreach centers.

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Acoustic Doppler Current Profiler (ADCP) used to measure currents in Clear Lake and to evaluate exchange between the three basins of this lake.

## RESEARCH UPDATES

### UPDATE ON THE CLEAR LAKE REHABILITATION PROJECT

By Alicia Cortes, Ph.D.

Clear Lake is the largest freshwater lake located completely in California. Situated in Lake County, one of the poorest counties in the state, it is vital for the local economy, yet the lake is highly impaired. Clear Lake is essential for the cultural activities and economies of seven Native American

Tribes living around the lake, a vital source of drinking water for local communities, a niche for several endangered fish species, and crucial for tourism and recreational activities such as fishing, swimming, and boating. However, the lake is affected by multiple environmental challenges that are compromising these beneficial uses, such as mercury contamination which causes fish consumption advisories, and seasonally frequent and intense harmful algal blooms (HABs) that produce toxins threatening the drinking water supply, pet and human health.

## RESEARCH UPDATES *(Continued from Page 1)*

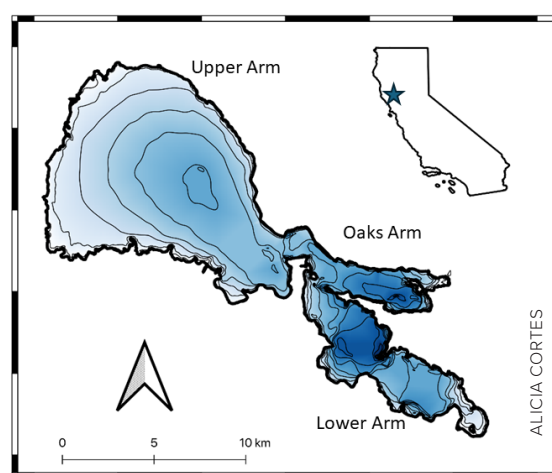
To understand what is causing these issues in Clear Lake, researchers from the Tahoe Environmental Research Center (TERC) conducted an extensive in-lake monitoring (in-situ measurements) and modeling (predictions) program over the last five years. Results from this effort show that periods of low dissolved oxygen (DO) next to the bottom sediments are a major factor driving the poor water quality and impacting ecological health of Clear Lake. These periods of depleted DO occur when the lake thermally stratifies in summer (i.e., the lake surface gets warmer than the bottom). The absence of DO during the summer months leads to the release of sediment-bound phosphorus (internal loading), a major driving factor in the formation of HABs; the production of methylmercury; and the loss of fish habitat, among other issues. The good news is that there is a potential technological solution to Clear Lake's challenges. A Hypolimnetic Oxygenation System (HOS) is a technology that entails the direct injection of pure oxygen into the lake's hypolimnion (the lower stratum of the lake) via a set of diffusers installed at the bottom of the lake from an external oxygen supply onshore. This technology has been used nationwide (and in California) to address periods of depleted DO and avoid the worst outcomes that can impact everyone who depends on the lake.

The California Natural Resources Agency has granted State Funds to TERC for Phase I (planning) of a pilot project to develop a HOS in the Oaks Arm of Clear Lake. The Oaks Arm was selected for this pilot project as it is the smallest basin (14.1 km<sup>2</sup>, 0.125 km<sup>3</sup>) of the lake, is affected by long-term mercury issues, and is the site of many of the largest HAB blooms. Phase I consists of the design, permitting, outreach activities, and real-time baseline monitoring before the HOS



Harmful Algal Bloom (HAB) in Clear Lake.

is installed in the Oaks Arm. Phase II, which has been partially funded by a Community Grant from the U.S. EPA, will include the construction and installation of the HOS by an engineering contractor, its operation (oxygen injection) for one summer (potentially 2026), and post-monitoring to evaluate the success of the technology. We have invited a local water treatment plant (Clearlake Oaks County Water District) and other local entities to participate in this effort. We will collaborate with USGS for the post-monitoring effort to evaluate how the methylmercury production will change after the oxygen injection. Additional funding for Phase II is still being pursued.



Clear Lake bathymetrical map (isobaths every 2 m), showing the three arms or basins in Clear Lake. The insert shows the lake's location in California.



Photo of the liquid oxygen tank installed at Loch Lomond, Santa Cruz, CA, early 2024.



## RESEARCH UPDATES

### SEDIMENT FINGERPRINTING IN CLEAR LAKE

By Aaron Vanderpool

TERC is also working on a comprehensive sediment fingerprinting project (identifying sediment sources) in the Clear Lake drainage basin. Harmful Algal Blooms, or HABs, are a major concern in Clear Lake. Soil erosion is a driving factor, carrying nutrients into the lake and creating the conditions for HABs to occur. The Clear Lake fingerprinting project aims to gain a better understanding of soil erosion and sediment transportation in the Clear Lake basin in order to inform HAB management. This project is in collaboration with the



Aaron Vanderpool with soil samples from Clear Lake.

U.S. Geological Survey (USGS) and in cooperation with the Bureau of Land Management, the University of California, Davis, and the California Natural Resources Agency. TERC research associate Aaron Vanderpool is contributing to this project by using laser diffraction to classify particles according to size from soil samples around the lake. This research helps improve understanding about sediments spatially around Clear Lake and how they affect water clarity, nutrients and food web dynamics.

### DRONE WORKSHOP WITH THE CALIFORNIA CONSERVATION CORPS

By Aaron Vanderpool

This July, TERC hosted a drone workshop, led by Sean Hogan (University of California, Davis in the Division of Agriculture and Natural Resources), as part of the TERC Forest & Conservation Biology lab's CalFire project – Climate Resilient Forest Restoration. This project



A presentation at the drone workshop at the Tahoe City Field Station.

is partnering with the California Conservation Corps (CCC) to train a diverse workforce in forestry, restoration, conservation, and other forest health-related careers by giving CCC Corpsmembers applied experience in areas such as reforestation, geographic information systems (GIS) science, drone technology, and plant sciences. The weeklong drone workshop introduced Corps members to drone and GIS technology and provided the opportunity to learn about careers not only in forestry but other environmental stewardship and science-related professions.



Members of the California Conservation Corps (CCC) operate a drone.

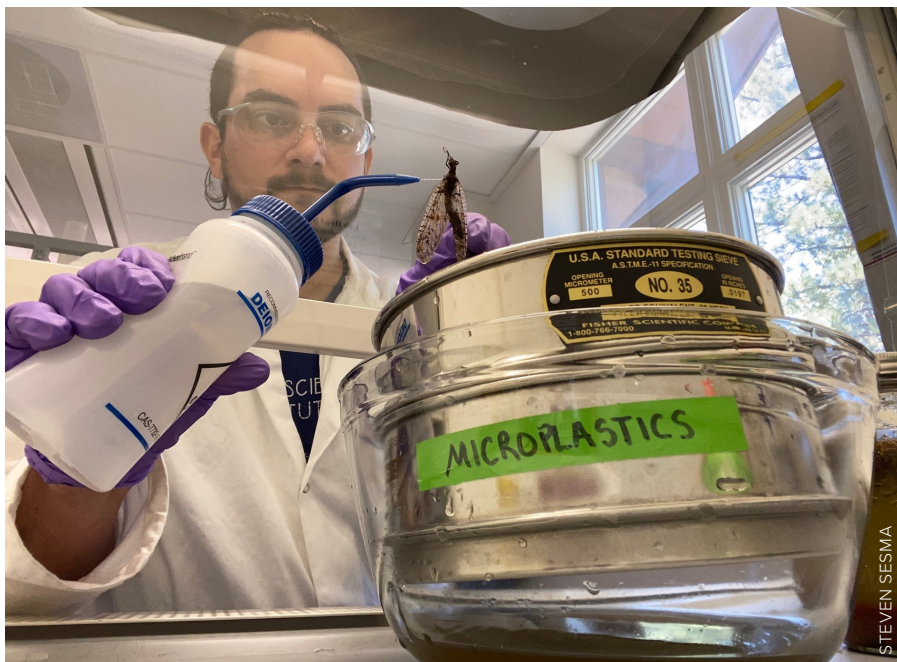
## RESEARCH UPDATES

### MICROPLASTICS ANALYSIS

By Steven Sesma

TERC continues to conduct leading research on microplastics in freshwater environments and Steven Sesma, one of TERC's resident chemists, is a critical part of the effort. In order to hunt for microplastics, lake samples are collected with a manta trawl (a net dragged at the lake's surface) by the TERC field team and brought to Sesma for analyses. Sesma begins the process by sieving microplastics from other debris, then manually collects plastic particles attached to small insects. Then corrosive chemicals are added to the sample to remove any organic matter from the plastic particles in the sample. Density separation funnels are then filled with a solution that causes the lighter, less dense plastic particles to float to the surface. Finally, the plastic particles are filtered out and individually picked out by hand, noting the size, shape, and color of each particle. These samples are then sent to UC Davis' main campus where the particles are spectrally analyzed to identify the type of plastic as well as the size, shape (fragment, fiber, bead, etc.), and color of each particle.

Throughout Sesma's microplastic analysis, he uses primarily glass and metal equipment to prevent plastic contamination. He also wears plastic-free clothing (i.e., non-synthetic, cotton) and takes special measures when cleaning work surfaces. This meticulous attention to detail is what allows TERC's labs to produce high quality data and lead cutting-edge microplastic research.



Steven Sesma sieves microplastics from a sample collected by Manta Trawl in Lake Tahoe.



Steven Sesma analyzes microplastic particles under the microscope.



## RESEARCH UPDATES

### SUGAR PINE GENETICS STUDY UPDATES

By Patricia Maloney, Ph.D.

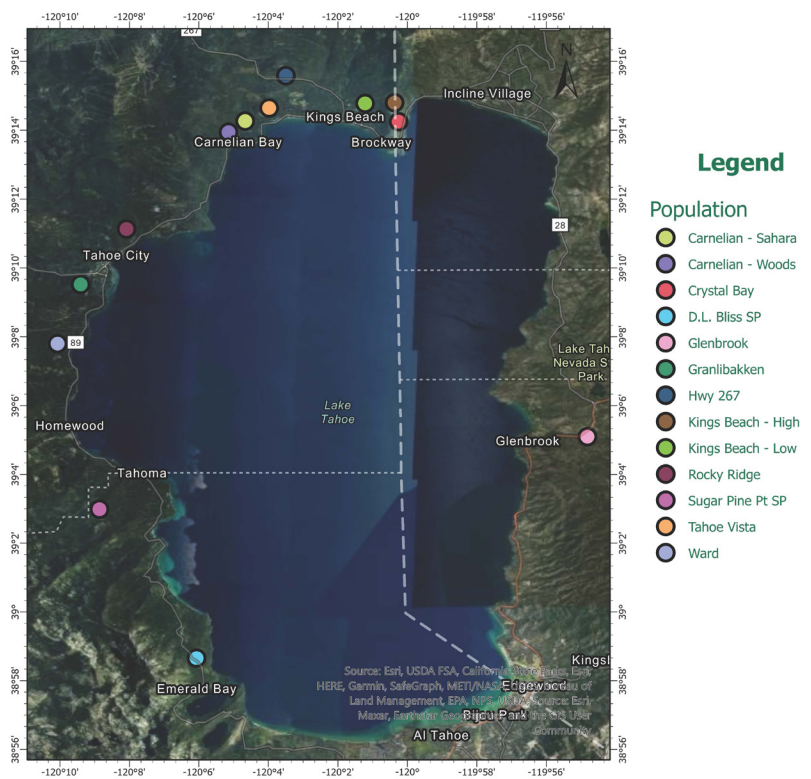
The TERC Forest and Conservation Biology Lab's recently completed an ecological and genetic study of drought surviving sugar pine trees provides strong evidence that using local and diverse "survivor" seed sources can promote and amplify forest resiliency and should be prioritized for seed collection. The drought stress experiment in this study revealed strong patterns between water-use efficiency and host chemistry against bark

beetles, with drought tolerant individuals producing significantly less chemicals (e.g., terpenoid-based oleoresins and phenolics) that facilitate attraction and signal a tree's vulnerability. Whereas drought intolerant individuals produced significantly higher levels of terpenoid-based oleoresins and phenolics that signal a suitable stressed host to mountain beetle attack.

The lab has outplanted many of the seed sources in the abovementioned sugar pine genetics study in TERC's Forest & Conservation Biology labs CalFire

project "Climate Resilient Forest Restoration." To learn more, visit the StoryMap on the [Forest & Conservation Lab page](#) of the TERC website.

A near-term priority of the lab is to complete a peer-reviewed publication of sugar pine genetics study titled "Emergent traits of drought survivors in a climate-driven outbreak by mountain pine beetle". Authored by: Shannon C. Lynch (UCD), Lora A. Richards (UNR), Casey Philbin (UNR), Aaron Vanderpool (UCD), Camille E. Jensen (UCD), Jade Magana (UNR), and Patricia E. Maloney (UCD).



Seedlings from local and diverse "survivor" sugar pine seed sources were outplanted on the north shore of Kings Beach in fall 2023 (left) and other locations throughout the Lake Tahoe Basine (right). The experimental study provides evidence for using locally adapted seed sources that can promote and amplify forest resiliency to future drought and bark beetle outbreaks.

## RESEARCH UPDATES

### FOOD SAFETY FOR BEES AND FLOWERS: WHAT CHEMICALS REDUCE MICROBIAL GROWTH IN NECTAR?

By Rachel Vannette, Ph.D.

Pollinator-plant relationships are important for biodiversity conservation, particularly in the face of a changing climate. Dr. Rachel Vannette is a Chancellor's Fellow with the UC Davis Department of Entomology and Nematology researching solitary and social bees and their basic biology and life history including their diet of nectar and pollen. Nearly all bees rely on nectar, the sugary secretion produced by flowers, as a key source of nutrition. They consume nectar directly and store it for developing bees. Yet spoilage microbes are a constant threat to developing bees and their growth in flowers can also

deter visitation by bees, reducing plant fitness. One of Dr. Vannette's projects seeks to better understand the chemical composition of plant nectar, specifically how certain flowers reduce the growth of spoilage microbes and pathogens in their nectar. Understanding the mechanism of these properties could play a critical role in informing plant breeding, sustainable pest management, and pollinator conservation.

To determine nectar chemistry, nectar is first extracted from flowers. Flowers including paintbrush, bog orchid, and scarlet gilia are collected and nectar is extracted using pipettes—a step Dr. Vannette's 6-year-old son enjoys assisting with. Then nectar chemistry is assessed in multiple ways to determine the concentrations of various compounds. Nectar is assessed for peroxides (a known antimicrobial compound, one of

the components of bleach!) using a test strip. To characterize other compounds, nectar is analyzed using a method called untargeted metabolomics. The nectar samples are sent to collaborators at U.S. Department of Agriculture (USDA) in Gainesville, FL for analysis. Dr. Vannette and her collaborators are learning that nectar contains complex chemical mixtures that are unique to each plant species. They have also found that some plants produce high concentrations of peroxide within their nectar, which reduces the growth of microbes that could spoil nectar or be pathogenic to plants or pollinators. Interestingly, when bees make honey, they add hydrogen peroxide through their digestive enzymes, which confers antimicrobial properties. Understanding nectar chemistry, including how plants and bees control microbial growth may provide new insights into food safety, plant physiology, and bee nutrition.



*Castilleja* sp. (paintbrush)



*Platanthera* sp. (bog orchid)



*Ipomopsis aggregata* (scarlet gilia)



## SCIENCE TO INFORM POLICY

### SPECIAL GUESTS VISIT TERC

#### CALIFORNIA GOVERNOR GAVIN NEWSOM

California Governor Gavin Newsom took time during the 2024 Annual Meeting of Western Governors' Association in June to meet with TERC researchers to discuss the impacts of climate change and approaches to preserve the delicate and ever-changing ecosystem. Governor Newsom and other state officials went aboard the Research Vessel John LeConte to visit one of TERC's and NASA's research buoys and learn about TERC's long-term monitoring of Lake Tahoe.

#### MANDELA WASHINGTON FELLOWS

On July 17, Mandela Washington Fellows visited the Tahoe Science Center to learn about TERC's research and conservation in the Tahoe Basin. The Mandela Washington Fellowship for Young African Leaders is the flagship program of the U.S. Government's Young African Leaders Initiative (YALI). The Fellows are accomplished leaders from Sub-Saharan Africa who have established records of promoting innovation and positive impact in their communities and countries.

#### IDAHO WATER RESOURCES RESEARCH INSTITUTE

On July 17, researchers from the Idaho Water Resources Research Institute (IWWRI) at the University of Idaho Coeur d'Alene visited the Tahoe Science Center to exchange ideas.



California Governor Newsom and state officials including Senior Advisor on Climate Lauren Sanchez, Secretary for Environmental Protection Yana Garcia, Secretary for Natural Resources Wade Crowfoot, Director of the Department of Water Resources Karla Nemeth and Chair of the State Water Resources Board Joaquin Esquivel aboard the R/V John LeConte.



## TERC TEAM UPDATES

### NEW STAFF: LILY DAILEY, STAFF RESEARCH ASSOCIATE

In May of this year, TERC welcomed a new Chemist, Lillian Dailey. Dailey graduated in 2021 from the University of Nevada Reno with a Bachelor of Science in Geography and a specialization in Climate, Water, and Ecosystems, with a minor in painting. She spent that summer researching microplastic levels in the Atlantic Ocean near the Florida Straits sailing on the *MV Endurance* with her dad, Captain Morgan Dailey, for the Desert Research Institute. She was a chemistry analyst for the Western Environmental Testing Laboratory in Reno, NV for over 2 years. She has four cats, loves to swim and spend time with her friends and family.



Lily Dailey, new Staff Research Associate with the chemistry team.

### WELCOME MAISY TOY MCMAHON

TERC Education Program Manager Alison Toy and her husband Nick McMahon welcomed their first baby, Maisy Toy McMahon, on March 26 at 4:39am. Maisy is the first new TERC member of 2024, not to mention the cutest! Four other TERC staff members also recently had babies or are expecting in the near future, making 2024 the year of the TERC baby boom.



From top to bottom: Maisy Toy McMahon, Maisy with her older brother Pepper, and Maisy with her mother Alison Toy.



## EVENTS

### TERC ALL-STAFF MEETING

On Friday, May 31 TERC hosted an all-staff meeting at the Tahoe Yacht Club in Tahoe City. This brought together not just staff, but faculty, post-graduates, and graduate students that contribute to TERC science locally and globally. This provided the rare great opportunity for everyone to meet each other in person, share their work, and discuss future projects.

### STATE OF THE LAKE PRESENTATION

The Tahoe State of the Lake report informs nonscientists about important factors affecting the health of Lake Tahoe. It provides the scientific underpinnings for restoration and management decisions within the Lake Tahoe Basin.

The 2023 report summarizes data collected during 2023 in the context of the long-term research record at Lake Tahoe. UC Davis researchers have continuously monitored the lake since 1968. On August 8th, TERC Interim Director Alex Forrest, Associate Professor of civil and environmental engineering at UC Davis, shared report highlights during a simultaneous live presentation and webinar for an informative and lively interpretation of the most recent data.

A panel of water experts discussed lake clarity and health. Panelists included Monica Arienzo, microplastics expert with the Desert Research Institute, Alex Forrest, Interim Director of the Tahoe Environmental Research Center, and Dan Segán, Chief Science and Policy Advisor at Tahoe Regional Planning Agency.



Group photo of the TERC team at the all-staff meeting, held at the Tahoe Yacht Club.



Interim Director Alex Forrest presents at the 2024 State of the Lake at Granlibakken Tahoe.



## EVENTS

### TAHOE SUMMIT

The 28th Tahoe Federal Summit was held on Wednesday, August 14. This annual summit is a chance for everyone to come together to discuss ways to improve the environment of the Tahoe Basin. Each year, the Summit highlights progress made to protect and restore this national treasure, and looks ahead at the challenges that Lake Tahoe and the surrounding communities face. This year's event was hosted by U.S. Senator Catherine Cortez Masto and the theme is "Connecting Tahoe: Investing in Transit, Trails, and Technology for the Future." The keynote speech was given by the U.S. Secretary of Transportation, Pete Buttigieg.



U.S. Senator Catherine Cortez Masto hosts the 28th Tahoe Federal Summit at Round Hill Pines Beach Resort, in Zephyr Cove, NV.



TERC Education and Outreach Director Heather Segale holds the 2024 State of the Lake Report behind a demonstration glider.



From left to right: Penelope Holland, Logan Witt, Sofia Nawaz, Sarah Harry, and Maddy Mouw help with the TERC booth at the Tahoe Summit.

### UPCOMING EVENTS

**September 12, 2024:** Sustainable Oysters (with Tasting!) in Changing Marine Ecosystems, with Dr. Tessa Hill, UC Davis Professor and author of *At Every Depth*, and Dr. Gary Fleener, Science, Sustainability, and Farm Education Manager at Hog Island Oyster Co.

**October 10, 2024:** Why We Remember: The Science of Memory and How it Shapes Us, with UC Davis Professor and author of *Why We Remember*, Dr. Charan Ranganath

**October 24, 2024:** Forest is a Verb: A Landscape Lens on Climate, with author of *The Reindeer Chronicles*, *Cows Save the Planet*, and an essay in *All We Can Save*, Judith Schwartz

**For more information:** <https://tahoe.ucdavis.edu/events/>



## EDUCATION AND OUTREACH

### WHAT IT MEANS TO BE A DOCENT

By Charlene Mattos

Being a docent was never my intention. It all started last year with a wonderful educational opportunity to learn more about the work of the TERC. I attended the UC Davis Summer Session at Lake Tahoe, where topics included ongoing research, geology, environmental history, water clarity, invasive species, and even a field trip on the TERC research vessel! While my journey began with wanting to learn more about the science of Lake Tahoe and its surrounding environment, being a docent has meant so much more. First, there's the educational component, learning about the environment and its issues and how science can help us understand how we can better care for it. There's also the opportunity to connect with others who are interested in learning more about Lake Tahoe. And finally, touring the Tahoe Science Center reminds us all that we have a part in preserving and protecting the fragile yet resilient land and water around us.

Education is the glue that holds societies together. It's about changing and growing, becoming smarter and better at making decisions, and much more. Teaching young people to become life-long learners has been an implicit goal in education for many years, taking naturally interested and inquisitive children and inspiring them to ask questions, seek answers, think critically, and ask more questions...not just in school but in life! That's exactly what happens at the Tahoe Science Center. Visitors (including school groups) take an inquiry-based tour with guiding questions throughout. For example, "What makes Lake Tahoe unique?" The hands-on exhibits and videos are rich in factual information as well as interesting ideas. Visitors can't help but learn answers to these guiding questions and then naturally ask more questions!

Of course, the focus of the TERC is science. What visitors learn about and ask more questions about is science, specifically science and research as

it relates to the environment around us...why Lake Tahoe's water clarity is important, how geology and forests, food webs and food chains, climate and weather, as well as humans now and throughout history have impacted, and continue to influence changes on the lake and its surroundings. All of these factors are intricately connected in both simple and complex ways.

Being a docent is also about connections. As we learn, our brains naturally want to make connections. In nature, these connections are already there and embedded in the science center exhibits—how the geology of the Lake Tahoe Basin contributes to water clarity, how invasive species can alter food webs and affect water clarity, and how human development can cause or prevent erosion.

However, being a docent isn't just about the connections in nature or the connections our brains make with the information we learn. It's about the connections we make with one another. It's about the people who visit the science center. Local residents as well as visitors from around the state and around the country and around the world spend time with one another, learning something about each other as well as something about the environment. It's about school children on field trips connecting with TERC educators who provide a positive and fun learning experience outside the classroom setting. It's about the connections among and between the staff, scientists, AmeriCorps fellows, and docents who are deeply committed to their cause and their community. And finally, it's about all of us connecting more with this place we call home. When visitors leave the Tahoe Science Center they take with them a greater appreciation for our lakes and rivers, our forests and meadows, our mountains and valleys, and better understanding of the impact we have on the natural world around us wherever we might be.

So although being a docent was never part of my plan, it has been a wonderful opportunity for me to learn and grow, to connect with people and with our

planet, and to strive to make a positive impact. In the words of Chief Seattle, a leader of the Northwest Nations in the 1850s:

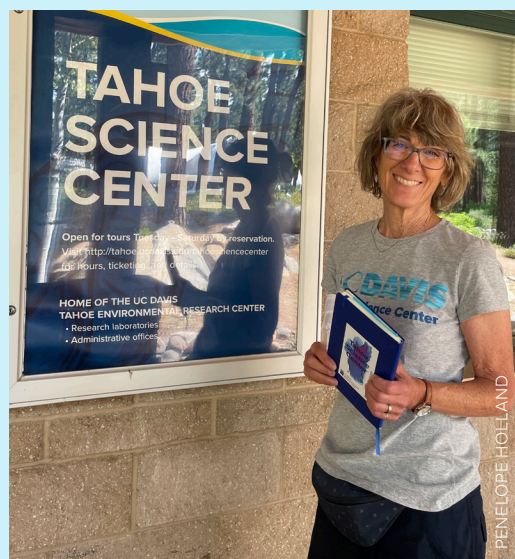
"We are a part of the earth and it is part of us..."

We did not weave the web of life,

We are merely a strand in it.

Whatever we do to the web, we do to ourselves."

—Brother Eagle Sister Sky, A  
Message from Chief Seattle



**Above:** Volunteer docent Charlene Mattos stands outside the Tahoe Science Center  
**Below:** Charlene gives a guided Science Center tour

## EDUCATION AND OUTREACH

### SCIENCE EXPO 2024

On May 23-24, 2024 we held our annual Science Expo at Incline High School. The Science Expo is a program that engages local elementary students in STEM education through hands-on science activities. The event also increases science communication and literacy among local high school students, who facilitate these activities for the elementary students. This year's Expo theme was Physical Science, and featured activities related to properties of matter, forces and motion, and energy. Across two days, over 400 students participated in over 30 activities and demonstrations. Some crowd-favorites included playing with non-Newtonian fluid (or oobleck), watching static electricity

make pie pans "fly" using a Van de Graaff generator, and exploring light and color in a special dark room. One enthusiastic young participant told TERC Education Outreach Director Heather Segale that at every station he went to, he learned something new!

### GROW YOUR OWN FESTIVAL

On Friday, May 31, 2024, we hosted the Grow Your Own high-elevation gardening festival at TERC's Tahoe City Field Station. With over 200 people in attendance participants could purchase seedlings selected for the Tahoe Truckee area, take home all the compost they could carry, learn tips for high-elevation and watershed-friendly gardening,

and participate in fun garden-themed activities. The event was in partnership with the Lake Tahoe Master Gardeners and Slow Food Lake Tahoe, and featured compost donated by Full Circle Soils and Compost as well as beverages from Tahoe National Brewing Company. The TERC education team also attended the other two Grow Your Own festivals in Truckee and South Lake, hosted by Slow Food Lake Tahoe and the Great Basin Institute, respectively. We look forward to another great festival next year!



Elementary students attending the 2024 Science Expo enjoy the popular "Slime Time" oobleck station.



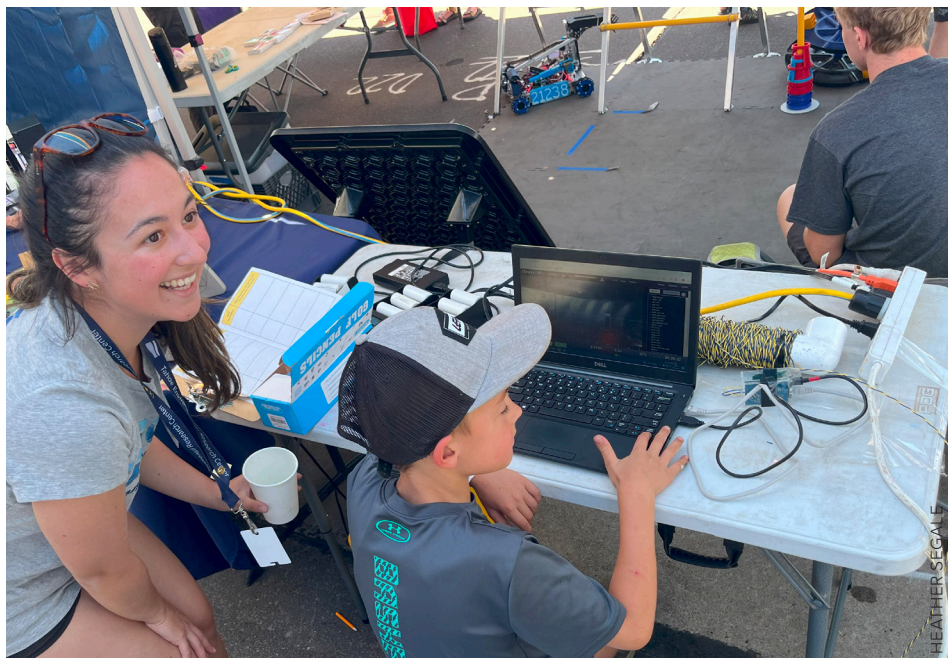
A volunteer with the Lake Tahoe Master Gardeners ready to offer tips for growing edible flowers.



## EDUCATION AND OUTREACH

### MAKER SHOW

TERC attended the Maker Show at the Truckee Roundhouse for the first time on June 6, 2024. In keeping with the show's robotics theme, we brought a remotely operated vehicle (ROV) donated by the UC Davis Environmental Dynamics Lab to teach the public about some of the technology TERC uses to conduct research on the lake and other aquatic environments. Maker Show attendees had the opportunity to participate in a ROV underwater scavenger hunt, navigating the ROV around in a covered tub of water in search of hidden objects commonly found in the lake. Young attendees also enjoyed learning about circuits as they created their own LED light-up name tags.



Education Programs Associate Penelope Holland helps a young Maker Show attendee operate an ROV to complete an underwater scavenger hunt.

### UC DAVIS SUMMER SESSION AT LAKE TAHOE

During the second week of June, we hosted the annual UC Davis Summer Session at Lake Tahoe. Participants toured TERC facilities and attended lectures on a variety of topics relating to Lake Tahoe, including its ecology, history, and geology. This year's summer session also included a special lecture from renowned limnologist and Tahoe Research Group founder Dr. Charles Goldman, who shared stories of his adventures in limnology and discussed the challenges facing freshwater around the world. Many summer session participants also joined our community of docents, and are already giving fantastic tours of our Tahoe Science Center.



The newest group of TERC docents take a trip on the Research Vessel John LeConte as part of the 2024 UC Davis Summer Session at Lake Tahoe.

## EDUCATION AND OUTREACH

### SUMMER INTERNSHIP PROGRAM

The TERC internship program has returned for its second year, featuring six bright undergraduates and recent graduates working on a variety of exciting projects. In addition to their projects, interns participate in weekly group sessions where they have the opportunity to hear from professionals in the environmental field as well as present their work to each other. Over the course of their 8-week internship, they heard presentations on topics ranging from aquatic invasive species management to science communication.

The interns gave poster presentations during the cocktail hour preceding the State of the Lake Report, on Thursday August 8th at Granlibakken Tahoe. We are thrilled to have had such a fantastic group of interns this year and are excited for this program to grow even more next year. Read on to meet the 2024 TERC summer intern cohort!

#### PETER WEBSTER

Peter Webster is a third-year undergraduate student at UC Davis studying mechanical engineering. Peter is heavily invested in the mission of deepening our understanding of underwater environments by means of cutting-edge technology. At TERC, he is working as a field intern focusing on underwater instrumentation and data collection. He will be surveying and compiling a bathymetric map of Donner Lake providing stakeholders an updated understanding of the

shape and volume of the lake. Peter is an avid robotics enthusiast and surfer who seeks to combine his love for the ocean with his affinity towards engineering. At UC Davis, Peter founded and is currently Co-President of Cyclone RoboSub, a student design team building autonomous underwater robots for an international competition. He is passionate about exposing more students to opportunities in STEM and prioritizes his time mentoring high school students in competitive robotics. Peter hopes to continue to make a positive impact by supporting underwater environmental research and bringing more well-rounded, critical thinkers to STEM disciplines.



**Peter Webster, field team intern.**

#### MADDY MOUW

Maddy Mouw is an Environmental Earth and Soil Science major at California Polytechnic San Luis Obispo with a concentration in Hydrology. Before transferring to Cal Poly, she spent the last 8 years living in South Lake Tahoe attending Lake Tahoe Community College where she earned an associates of science degree in

When asked to describe their internship experience in a word or short phrase, we received the following responses from our interns:

Thought-provoking

Growth and learning

Excited and proud to be a part of TERC

Community-building

Learn more at <https://tahoe.ucdavis.edu/>

Geology. Her internship project aids in the monitoring efforts that TERC has already begun in keeping an eye on algae growth around Lake Tahoe. She is also promoting and educating the community about the Citizen Science Tahoe app. Overall, her projects aim to bridge the gap between the community and the TERC researchers about what is going on around the health of the lake's nearshore.

Some fun facts about Maddy is that she loves rockhounding! She analyzes geologic maps to guess where she might find certain minerals and then overlays it to a google map. It becomes a real life treasure hunt!



**Maddy Mouw, education and outreach intern.**



## EDUCATION AND OUTREACH *(Continued from Page 13)*

### SOFFIA RAMSEY

Soffia Ramsey recently graduated from the University of California, Irvine with a B.S. in Ecology and Evolutionary Biology. Her background in research includes undergraduate positions studying climate change impacts on southern California intertidal ecosystems, as well as monitoring water quality and zooplankton communities of Eastern Sierra Nevada alpine lake ecosystems. In her current role as a limnology intern with TERC this summer, she is assisting with microplastic, periphyton, and long term lake monitoring. She is also working on an independent project locating and surveying existing populations of the western pearlshell mussel, a native freshwater mussel species to the Truckee River. The western pearlshell mussel plays an important role in improving water quality for Lake Tahoe, though its populations are currently under threat of decline by human disturbance and competition with the invasive zebra mussel. This work will help TERC better understand the vulnerability of current existing western pearlshell mussel populations, and help inform potential management practices as part of TERC's greater effort to maintain a resilient natural ecosystem. Outside of her research interests, Soffia also enjoys traveling, baking, hiking, and kayaking!



**Soffia Ramsey, field team intern.**

### INGRID PETERS

Ingrid Peters is a chemistry laboratory, data analysis and education summer intern at TERC. Her project is focused on analyzing Lake Tahoe water quality data, working in the laboratory and developing methods to communicate the work done by TERC's chemistry team. Ingrid's background is in microbiology, environmental health and water resources. She earned a B.A. in Environmental Studies & Water Resources in 2023 and will complete her B.S. in Microbiology in 2025 from Montana State University. She is a seasonal alpine ski instructor, is passionate about exploring the outdoors and can be found trail running in her free time.



**Ingrid Peters, chemistry and education and outreach intern.**

### MEERA PUTZ

Meera Putz's research interests are broadly human-environmental interactions, with an emphasis on restoration ecology, forestry, and native-invasive species relationships.

She is currently an undergraduate student at UC Davis studying Environmental Science and Management and is part of two research projects on California grassland plants in the Department of Plant Sciences. Meera is also passionate about California native plants and environmental education and is co-president of a student-run native plant restoration club, the Rewilding Society, at UC Davis. As a summer forest ecology intern at TERC, Meera contributes to the Forest and Conservation Lab's ongoing research on climate-resilient sugar pine restoration. Her research project is a vegetation survey at sugar pine planting sites along Tahoe's north shore. Her data will elucidate correlations between sugar pine seedling survival and plant communities and help contribute to improving five-needle white pine restoration strategies. In her free time, Meera enjoys hiking, rock climbing, sharing her love of plants with others, and wandering amongst the redwoods near her hometown.



**Meera Putz, forest conservation intern.**

## EDUCATION AND OUTREACH *(Continued from Page 14)*

SOFIA NAWAZ

Sofia Nawaz is an Educational Outreach Intern at TERC. She just graduated from UC Los Angeles with a degree in history and geography/environmental studies. She will be pursuing a Masters in Science from Johns Hopkins University in Environmental Science and Policy this fall. She is currently working on a community-wide project that seeks to establish consistent participation and action for Lake Tahoe's conservation and environmental health. By doing so, she aims to raise environmental education awareness and connect locals through a greater effort to keep Lake Tahoe healthy.



**Sofia Nawaz, education and outreach intern.**

## NEW EXHIBITS AT THE TAHOE CITY AND KINGS BEACH VISITOR CENTERS

You can now find four TERC exhibits on display at the Tahoe City Visitor Center! The North Tahoe Community Alliance hosted a soft opening of the new exhibits on February 15, 2024 and an official grand opening on March 7. This collaboration with the North Tahoe Community Alliance will allow us to expand the reach of our educational programing and encourage more visitors to practice environmental stewardship while in Tahoe. The exhibits now in Tahoe City include the popular augmented reality “Shaping Watersheds” sandbox, Tahoe’s Plastic Problem, the Lake Tahoe In depth touchscreen, and a Tahoe Science Center Annex movie theatre. On August 15, 2024 the Lake Tahoe In depth touchscreens and a Tahoe Science Center Annex movie theatre were also unveiled at the new Kings Beach Visitor Information Center.



Our augmented reality sandbox now has a counterpart in Tahoe City! One of our most popular exhibits, this sandbox allows visitors to create their own watershed and watch the projected topographic map change in real time. Visitors can even make it rain (virtually) and see how water flows through a watershed like the Tahoe Basin.



Follow single-use plastics on their journey to becoming microplastics and discover why recycling isn't the silver-bullet solution it's been depicted as with this new hands-on exhibit.



Check out real-time and historical data on all things Tahoe. Learn about the activities you can do in each season or check conditions before heading out on the lake!



Can't make it to the Tahoe Science Center? Visit virtually from Tahoe City by watching videos from our research vessel exhibit and virtual laboratory, as well as our popular Lake Tahoe in Depth movie.



## DONORS AND FUNDRAISING

### DONOR SPOTLIGHT: DAVID AND DIANA LOURY

David and Dana Loury, residents and champions of Lake Tahoe, have pledged a capital equipment gift of \$400,000 from their private foundation to help advance the capacity of the UC Davis Tahoe Environmental Research Center (TERC). The funds, which will be distributed over a four-year period, will greatly advance TERC's mission, and continue to set TERC apart as a leader in the field of limnology worldwide.

The initial installment of Dana and David's gift is being used toward the purchase of a "Wirewalker System". The Wirewalker is an autonomous, lake monitoring instrument. It will be installed in the lake to replace one of TERC's aging lake buoys. Using power generated solely by waves on Lake Tahoe's surface, the Wirewalker will "walk" down a vertical wire to the bottom the lake every 20 minutes, and then slowly ascend to the surface taking measurements of water temperature, clarity, algal concentration, dissolved oxygen and more. Each time the instrument approaches the surface, the data will be transferred optically to the buoy. These measurements will be made day and night, providing TERC scientists and students with

an unprecedented view of how conditions in the lake are changing.

The Wirewalker represents a major advance in our data collection capabilities that will in turn strengthen the understanding that TERC can glean about the environmental processes within the lake. For example, the formation of algal blooms can take place within a matter of a few days and our scientists will be able to track such occurrences as they evolve.

This new type of data will be integrated with our long-term monitoring data. Raw data from the Wirewalker system will be transferred in real time to a server, post-processed and quickly be available to TERC's graduate students, research staff and education staff.

Many thanks to the other donors who gave towards the Wirewalker, and to make it a reality in 2024. If you would like to make a gift toward the Wirewalker or other capital equipment projects, please visit <https://tahoe.ucdavis.edu/giving/capital-projects>.

### TERC CIRC 4

A number of kayakers joined TERC for the Fourth Annual Circumnavigate Lake Tahoe fundraiser (TERC CIRC 4) supporting science around the lake and beyond. TERC CIRC 4 took place

over seven days, starting Monday, June 17 and concluding Sunday, June 23, 2024.

Many people have paddled Lake Tahoe, but this event is unique. In addition to each day's spectacular shoreline paddling, kayakers see, share, and learn about Lake Tahoe's ecology, geology, and emerging challenges, as TERC's scientific experts provide daily on-shore and on-water talks illustrating the science being used to restore and protect Lake Tahoe.

Each day's route is set near shore and extends for between six and 13 miles, with halfway rest stops on all but the shortest day. Experienced, professional kayak guides lead the fleet. The odyssey starts at Sand Harbor, Nevada, and proceeds counterclockwise around the lake. Paddlers are shuttled by bus from takeout to put-in each day, to retrieve their cars. Multi-day paddlers are also provided with onshore boat storage at each takeout. On the final day after paddling, there was a gala party where paddlers can help to support TERC—and to bid each other farewell until next year.

## DONORS AND FUNDRAISING *(Continued from Page 16)*



CHRISTINE PARKS

Drone photo of TERC CIRC(umnavigation) 2024.



CHRISTINE PARKS

TERC CIRC participants receive a safety tutorial from one of the kayaking guides.



## UC DAVIS TERC BY THE NUMBERS

**6** **DECADES OF**  
**MONITORING**  
**LAKE HEALTH**



**OVER ONE-HUNDRED FIFTY**



**GRADUATE**  
**STUDENTS**

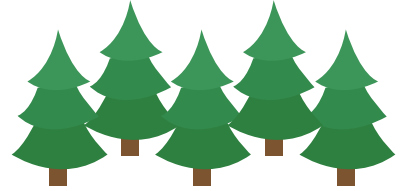
**OVER**

**600**

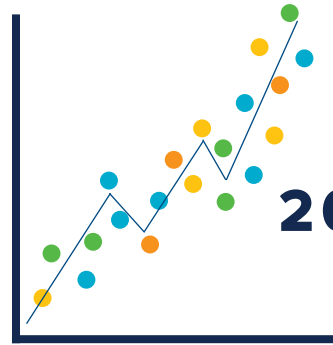


**SCIENTIFIC PUBLICATIONS**

**84**



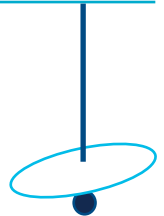
**MONITORED FOREST PLOTS**  
**ARE HELPING US UNDERSTAND**  
**FOREST RESILIENCE**



**ADVANCED**  
**TECHNOLOGIES**  
**COLLECTING**  
**20 MILLION**  
**DATA POINTS**  
**ANNUALLY**

**THOUSANDS**

**OF CLARITY AND WATER QUALITY SAMPLES MEASURED**

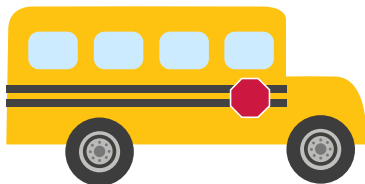


***EIGHTY***

**SCHOOL FIELD**  
**T R I P S**

***FOUR THOUSAND***

**STUDENTS REACHED**  
**A N N U A L L Y**



**198,000**

**PEOPLE REACHED BY**  
**EDUCATIONAL PROGRAMS**



**2 SCIENCE CENTERS AROUND**



Tahoe City, CA



Incline Village, NV

**LAKE TAHOE**

# GIVING TO THE TAHOE ENVIRONMENTAL RESEARCH CENTER

**Private Support** is critical to continuing the Tahoe Environmental Research Center's legacy of groundbreaking work in restoring and sustaining Lake Tahoe. Gifts at every level support research, education and outreach, and give the flexibility to address emerging needs and opportunities. Every gift makes a difference and there are many ways to give. Thank you!

- ☐ **YES**, I wish to support the Tahoe Environmental Research Center with the gift amount shown below.
- ☐ Please contact me about how I can make a deferred or estate gift to UC Davis.
- ☐ I wish this gift to remain anonymous.

Mail to: UC Davis Tahoe Environmental Research Center  
Watershed Sciences Building  
One Shields Avenue  
Davis, CA 95616-8527

All gifts are tax deductible. UC Davis is committed to providing excellent donor stewardship. To learn more about the University's gift policies, please visit <http://giving.ucdavis.edu/ways-to-give/disclosures>.

## Science Sustainer

There are two easy options for giving:

- 1) Make a secure online gift at <https://give.ucdavis.edu/TERC>
- 2) Fill out the information below and mail with a check payable to UC Regents

## Enclosed is my tax-deductible contribution.

Please make checks payable to UC Regents.

Name: \_\_\_\_\_

Spouse/Partner: \_\_\_\_\_

Address: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_

Phone: \_\_\_\_\_

Gift Amount: \_\_\_\_\_

# MAKE A GIFT TAX-FREE WITH AN IRA

- ☒ Do you want to support TERC's science at Lake Tahoe?
- ☒ Are you over 70 ½?
- ☒ Do you need all of your required minimum distribution from retirement assets?

» **Consider a gift via an IRA.** Visit <http://plannedgiving.ucdavis.edu/ira-charitable-rollover> for more details.