CALIFORNIA LAKE MANAGEMENT SOCIETY

40th Annual Conference

Conference Program & Abstracts

Thursday, October 1, 2026 | UC Davis ARC Conference Center, Davis, California

Lake Management Through Thick (Blooms) & Thin (Budgets)

Thursday at a Glance

Every session, meal and break. Teal page links are clickable.

8:00 - 8:45 am	**Breakfast & Registration**	
8:45 - 8:55 am	**Welcome to Davis** Byran Fuhrmann, CALMS President	
8:55 - 10:10 am	**Invited Presentations** Stephanie Hampton | Brandi McKuin | John Spranza	page 2
10:10 - 10:50 am	**Sponsor Popups & Short Break**	
10:50 - 10:55 am	**Student Introduction** Deena Hannoun	
10:55 - 11:44 am	**Student Scholarship Talks** Seven seven-minute talks from this year's scholarship winners	page 3
11:44 am - noon	**Student Scholarship Awards & Pictures** Deena Hannoun	page 3
noon - 1:30 pm	**Lunch** CALMS Business Meeting 12:30 - 1:30 pm	
1:30 - 2:50 pm	**Presentation Set 1** Clear Lake 1 | Invasive Mussels | Oligotrophic Lakes	page 4
2:50 - 3:10 pm	**Break with Snacks**	
3:10 - 4:10 pm	**Presentation Set 2** Clear Lake 2 | Sediment | Adaptive Management	page 5
4:10 - 4:30 pm	**Break with Snacks**	
4:30 - 5:30 pm	**Presentation Set 3** HABs | Watersheds | Misc Lake Management	page 6
6:30 - 9:00 pm	**Dinner Reception at Sudwerk** Dinner, drinks and live music from Mo' Waters	

Full Abstracts

Every student and afternoon talk in this program carries a "Read full abstract" link. Abstracts are grouped by session and each one links back to its place in the program.

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Morning Program 8:00 am to noon

Before the talks
Breakfast & Registration 8:00 - 8:45 am | Welcome to Davis 8:45 - 8:55 am, Byran Fuhrmann, CALMS President

Invited Presentation 1 | 8:55-9:20 am

Lake Tahoe and TERC Research: More than 50 Years of Secchi Disk Data



Dr. Stephanie Hampton
Director, Tahoe Environmental Research Center, UC Davis

Invited Presentation 2 | 9:20-9:45 am

Project Nexus: Solar Panel Canal Coverage for Power Generation and Reduced Evaporation



Dr. Brandi McKuin
University of California, Merced

Invited Presentation 3 | 9:45-10:10 am

The Sites Reservoir Project: A Large Multi-Benefit Water Storage Project for California



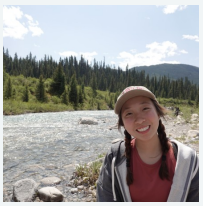
John Spranza
HDR

Sponsor Popups & Short Break
10:10 - 10:50 am | Student Introduction 10:50 - 10:55 am, Deena Hannoun | Student talks begin at 10:55 am

Student Scholarship Talks 10:55 am to noon

10:55-11:02 am

Updating the Lake Tahoe food web using metabarcoding analysis to resolve zooplankton diet composition

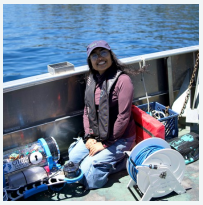


Angela Y. Zhu
University of California, Davis
PhD student in Ecology | Jerry Goad Memorial Scholarship

Read full abstract (p. 7)

11:02-11:09 am

Application of autonomous underwater vehicles (AUVs) to studying oxygen dynamics and mixing processes in Lake Tahoe



Aditi Anand
University of California, Davis
BS student in Environmental Engineering | LakeTech Scholarship

Read full abstract (p. 7)

11:09-11:16 am

The broader implications of solar panels across the Turlock canals



Thalia Lizarraga
University of California, Merced
MS student in Environmental Systems

Read full abstract (p. 7)

11:16-11:23 am

Influence of Selenium Speciation and Concentration on Mercury Methylation in Sediments



Comfort Chukwuere
University of California, Davis
PhD student in Agricultural and Environmental Chemistry

Read full abstract (p. 7)

11:23-11:30 am

Characterizing the volatility of California's climate and its implications for water storage and ecosystem resilience



Kristofer G. Gonzalez
California State University, Los Angeles
MS student in Environmental Science | Imad Hannoun Memorial Scholarship

Read full abstract (p. 7)

11:30-11:37 am

How land use and seasonal hydrology influence microbial communities and ARG distribution in the Tuolumne River watershed



Priscilla Garcia
California State University, Stanislaus
MS student in Biological Sciences

Read full abstract (p. 7)

11:37-11:44 am

Distribution of overwintering cyanobacteria populations in a Southern California reservoir



Benjamin Tiso
Cal Poly Pomona
BS student in Biotechnology | Clean Lakes Scholarship

Read full abstract (p. 7)

11:44 am-noon

Student Scholarship Awards and Pictures



Deena Hannoun
Southern Nevada Water Authority
Scholarship winners join Deena for awards and photos

Lunch | noon - 1:30 pm
CALMS Business Meeting 12:30 - 1:30 pm | Afternoon sessions begin at 1:30 pm in Ballroom A, Ballroom B and ARC Meeting Room 1

Afternoon Presentation Set 1 1:30 to 2:50 pm

A1 Clear Lake 1
Ballroom A

1:30-1:50 pm

8 Years of Collaboration in Clear Lake!



Sam Magill
Sacramento State University

Read full abstract (p. 8)

1:50-2:10 pm

Understanding Water Quality Impairment: Cyanotoxins, Fish Die-Offs, and Public Awareness



Sarah Ryan
Big Valley Band of Pomo Indians

Read full abstract (p. 8)

2:10-2:30 pm

Manning Creek Improvements as part of The Kuhlanapo Wetland Preserve Restoration Project on Clear Lake, CA



Angela De Palma-Dow
Lake County Land Trust

Read full abstract (p. 9)

2:30-2:50 pm

Form & Function: Multi-Objective Restoration Design in Clearlake Oaks



Anna Kladzyk Constantino
McMillen

Christopher DiVittorio
Pinecrest Environmental

Read full abstract (p. 9)

B1 Invasive Mussels
Ballroom B

1:30-1:50 pm

Golden Mussels: From Arrival to Action



Austin Poole
Clean Lakes, Inc.

Read full abstract (p. 8)

1:50-2:10 pm

Valley Water's Golden Mussel Prevention Framework and Mitigation Strategies



Atlasi Daneshvar
Valley Water, San Jose, CA

Read full abstract (p. 8)

2:10-2:30 pm

Success Stories Battling Golden Mussel in California



David Hammond
SePRO Corporation

Read full abstract (p. 9)

2:30-2:50 pm

To Shield or to Contain: Matching AIS Prevention Strategy to the Waterbody



Jacob Utrie
CD3 Systems

Read full abstract (p. 9)

C1 Oligotrophic Lakes
ARC Meeting Room 1

1:30-1:50 pm

Coupled ecosystem process models for managing interconnected ecosystems

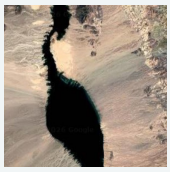


Ceara Talbot
UC Davis, Tahoe Environmental Research Center

Read full abstract (p. 8)

1:50-2:10 pm

Why is Toxin-Producing Microcystis Increasing in Oligotrophic Lake Mohave?



Carissa Wilkerson
Southern Nevada Water Authority, Las Vegas, NV

Read full abstract (p. 8)

2:10-2:30 pm

LNU Lightning Complex Fire and Recovery at Lake Berryessa



Jennifer Onufer
USBR, Lake Berryessa

Read full abstract (p. 9)

2:30-2:50 pm STUDENT

Using eDNA to Better Inform Invasive Species Management in the Sierra Nevada



Grace Rosburg-Francot
UC Davis Tahoe Environmental Research Center and UC Davis Genomic Variation Laboratory

Read full abstract (p. 9)

Afternoon Presentation Set 2 3:10 to 4:10 pm

A2 Clear Lake 2
Ballroom A

3:10-3:30 pm

Hypolimnetic Oxygenation Plans for the Hypereutrophic, Polymictic Clear Lake, California



Stephen McCord
UC Davis, Tahoe Environmental Research Center

Read full abstract (p. 10)

3:30-3:50 pm

Lake-wide Sediment Assessment and Phosphorus Sequestration Demonstration in Clear Lake, CA



Ryan Van Goethem
EutroPHIX

Read full abstract (p. 10)

3:50-4:10 pm

Pilot oxygen-ozone nanobubble treatment in Clear Lake, CA



Denise Devotta
Moleaer

Read full abstract (p. 11)

B2 Sediment
Ballroom B

3:10-3:30 pm **STUDENT**

Species Turnover and Distinct Communities in Alpine Ponds



Mia Ashby
UC Riverside

Read full abstract (p. 10)

3:30-3:50 pm

High-Resolution Monitoring of Water Quality Response After a Lanthanum-Modified Bentonite Application



Alexis Fischer
EutroPHIX

Read full abstract (p. 11)

3:50-4:10 pm

Internal Medicine for Lakes: Modifying the Sediment for Improved Water Quality



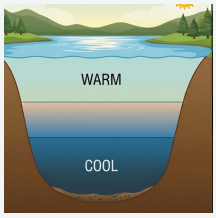
Byran Fuhrmann
Clean Water Help

Read full abstract (p. 11)

C2 Adaptive Management
ARC Meeting Room 1

3:10-3:30 pm

Modeling reservoir destratification timing to support Hetch Hetchy Regional water system operations



Noah Hume
Stillwater Sciences

Read full abstract (p. 10)

3:30-3:50 pm

Team Monet vs Team Trump: a sustainable solution to the Washington Memorial Reflecting Pool Algae Problem



Alex Horne
University of California, Berkeley

Read full abstract (p. 11)

3:50-4:10 pm

Managing an Urban Lake: Lessons from Mountain Lake's Restoration and Ongoing Ecological Monitoring



Phoebe Parker-Shames
Presidio Trust

Read full abstract (p. 11)

Afternoon Presentation Set 3 4:30 to 5:30 pm

A3 HABs
Ballroom A

4:30-4:50 pm

Harmful Algal Bloom Management in Lake Elsinore: the Importance of Cyanobacteria Grazing for Improved Water Quality



Maia Singer
Stillwater Sciences

Read full abstract (p. 12)

4:50-5:10 pm

Overlooked Drivers of California Algae Blooms



Byran Fuhrmann
Clean Water Help

Read full abstract (p. 12)

5:10-5:30 pm

Water Column Nutrient Loading Driving Fall Cyanobacteria and Taste and Odor Blooms



Naivy Dennise Rodal Morales
Stillwater Sciences

Read full abstract (p. 13)

B3 Watersheds
Ballroom B

4:30-4:50 pm **STUDENT**

A low-cost, nature-based treatment alternative: the unit process open-water wetland (UPOWW)



Scarlet-Marie Kilpatrick
UC Berkeley

Read full abstract (p. 12)

4:50-5:10 pm

Legacy Mercury, Modern Risks: Identifying Methylmercury Sources & Processes in an Impaired California Reservoir



Virginia Krause
University of California, Davis

Read full abstract (p. 12)

5:10-5:30 pm

Watershed Restoration in Collaboration, Lessons from Lake County



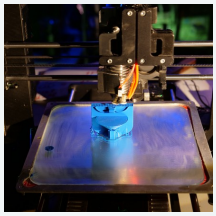
Jerrod Sellers
WRA, Inc.

Read full abstract (p. 13)

C3 Misc Lake Management
ARC Meeting Room 1

4:30-4:50 pm

Utilizing 3D printing for specialized sampling tools (no more duct tape!)



Tommy Ly
Metropolitan Water District of Southern California

Read full abstract (p. 12)

4:50-5:10 pm

A modern web-based decision support tool to deliver forecast-informed operational guidance for the management of College Lake in Watsonville, California



Jade Hinson
Verdantas, Santa Cruz, CA

Read full abstract (p. 12)

5:10-5:30 pm

Making the Most in Lean Times: A Pilot Study in Two Kokanee Waters



Rachel Fichman
California Department of Fish and Wildlife, West Sacramento, CA

Read full abstract (p. 13)

Dinner Reception at Sudwerk Brewing | 6:30 - 9:00 pm
Dinner, drinks and live music from Mo' Waters

Full Abstracts Student & afternoon presentations

Student Scholarship Talks

Morning Program | 10:55 - 11:44 am

10:55-11:02 am

Updating the Lake Tahoe food web using metabarcoding analysis to resolve zooplankton diet composition

Angela Y. Zhu, *University of California, Davis*
PhD student in Ecology | Jerry Goad Memorial Scholarship

Angela Zhu's summer 2026 research explores how microbial communities contribute to energy flow and ecosystem stability in Lake Tahoe. Traditional lake food webs have focused primarily on visible organisms such as phytoplankton, zooplankton, and fish, while often overlooking the important role of microbes in nutrient cycling and carbon transfer. Angela's work seeks to update the Lake Tahoe food web by incorporating these microbial pathways using advanced genetic techniques. Her project uses metabarcoding analysis to identify the diet composition of zooplankton at a much finer resolution than traditional methods such as gut content analysis or stable isotope studies. During summer fieldwork, Angela will collect zooplankton and water samples from Lake Tahoe and perform genetic sequencing using bacterial and eukaryotic markers to determine which microorganisms and prey items are supporting higher trophic levels within the lake ecosystem. This research will improve understanding of how carbon and nutrients move through Lake Tahoe's food web and how these pathways may respond to environmental change. The findings could help managers better predict the ecological impacts of invasive species, changing lake conditions, and other stressors that influence water quality and ecosystem function.

Back to program (p. 3)

11:02-11:09 am

Application of autonomous underwater vehicles (AUVs) to studying oxygen dynamics and mixing processes in Lake Tahoe

Aditi Anand, *University of California, Davis*
BS student in Environmental Engineering | LakeTech Scholarship

Aditi Anand will spend summer 2026 conducting limnological research through the Internship for Scholars program at the UC Davis Tahoe Environmental Research Center. Her project combines environmental science, engineering, and robotics to better understand changing lake conditions in Lake Tahoe. As an Environmental Fluid Mechanics intern, Aditi will use autonomous underwater vehicles (AUVs) equipped with temperature and dissolved oxygen sensors to study oxygen dynamics and mixing processes throughout the lake's water column. By collecting and analyzing high-resolution data, she will investigate deep-water oxygen depletion and evaluate how climate-driven changes in thermal stratification may contribute to the formation of low-oxygen or anoxic zones in the lake. Her summer work will include field deployments of TERC's AUV glider fleet and research vessels, as well as data analysis and visualization using MATLAB. The project will also integrate long-term monitoring datasets to identify trends and anomalies in lake oxygenation.

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11:09-11:16 am

The broader implications of solar panels across the Turlock canals

Thalia Lizarraga, *University of California, Merced*
MS student in Environmental Systems

Thalia Lizarraga's summer 2026 research explores how solar panels installed over irrigation canals could improve both water management and renewable energy production in California's Central Valley. Working with faculty and students at University of California, Merced, her project focuses on canal systems within the Turlock Irrigation District Canal System and investigates the broader "water-energy nexus" created by combining solar infrastructure with water conveyance systems. Using the U.S. EPA's QUAL2K stream water quality model, Thalia is evaluating how canal shading from solar panels may influence evaporation, water temperature, algae growth, and overall water quality. The research also examines potential renewable energy generation, reduced aquatic weed growth, and possible operational efficiencies associated with canal-spanning solar arrays. Building on earlier proof-of-concept modeling completed in 2025, Thalia's summer work will further analyze how phytoplankton, benthic algae, and environmental conditions respond to solar panel coverage. Her research contributes to the development of sustainable infrastructure strategies that simultaneously address water conservation, clean energy production, and water quality protection in California's managed water systems.

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11:16-11:23 am

Influence of Selenium Speciation and Concentration on Mercury Methylation in Sediments

Comfort Chukwuere, *University of California, Davis*
PhD student in Agricultural and Environmental Chemistry

Comfort Chukwuere's summer 2026 research examines how selenium chemistry influences the production of toxic methylmercury in aquatic sediments. Mercury contamination remains a major environmental and public health concern because microorganisms can convert inorganic mercury into methylmercury, a neurotoxin that accumulates in fish and aquatic food webs. Her project explores whether selenium, an essential micronutrient that may reduce mercury toxicity, can also influence the microbial processes responsible for mercury methylation. Using sediment cores collected from the Yolo Bypass, Comfort will conduct controlled laboratory incubations to evaluate how different selenium forms and varying concentrations affect mercury methylation under environmentally relevant conditions. The study will use mercury isotope tracers and anaerobic sediment experiments to quantify changes in total mercury and methylmercury production across a wide range of selenium concentrations, from natural background levels to concentrations observed in contaminated aquatic systems such as Kesterson Reservoir. This research will provide important mechanistic insight into selenium-mercury interactions in freshwater sediments and improve understanding of how selenium may influence mercury toxicity and bioaccumulation.

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11:23-11:30 am

Characterizing the volatility of California's climate and its implications for water storage and ecosystem resilience

Kristofer G. Gonzalez, *California State University, Los Angeles*
MS student in Environmental Science | Imad Hannoun Memorial Scholarship

Kristofer Gonzalez's summer 2026 research examines how increasingly volatile climate patterns are reshaping California's water systems. His project focuses on "hydroclimatic whiplash," the rapid transition between extreme drought and extreme wet conditions that can dramatically alter the physical and chemical dynamics of lakes, reservoirs, and rivers across the state. Using more than 130 years of precipitation data from the PRISM climate database, Kristofer is analyzing changes in the intensity and frequency of extreme wet and dry events from 1895 through 2026. His work divides California into four distinct hydroclimatic regions, Northern California, the Central Coast, Central Mountainous regions, and Southern California, to better capture the state's diverse hydrologic conditions. By evaluating long-term historical trends, the project seeks to determine whether precipitation whiplash events are becoming more frequent and severe. The research has important implications for water resource and lake management. Rapid shifts from drought to extreme rainfall can dramatically increase reservoir inflows, alter lake residence times, and transport large pulses of sediment and nutrients that contribute to harmful algal blooms and oxygen depletion. Kristofer's findings will provide a historical framework to help water managers anticipate and adapt to increasingly variable climate conditions.

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11:30-11:37 am

How land use and seasonal hydrology influence microbial communities and ARG distribution in the Tuolumne River watershed

Priscilla Garcia, *California State University, Stanislaus*
MS student in Biological Sciences

Priscilla Garcia's summer 2026 research investigates how land use and seasonal hydrology influence the movement of microbial contaminants and antibiotic resistance genes (ARGs) in freshwater systems. Her work focuses on the Tuolumne River Watershed, including both mainstem river sites and tributary locations such as Dry Creek, to better understand how storm-driven runoff transports contaminants through interconnected waterways. Antibiotic resistance genes and microbial pollution are growing concerns in watersheds affected by agriculture, urbanization, and wastewater inputs. During summer 2026, Priscilla will conduct field sampling across 10 monitoring sites under varying hydrologic conditions. She will perform laboratory filtration, DNA extraction, and quantitative PCR analyses to measure ARGs and microbial source tracking markers in water samples. A subset of samples will also undergo genetic sequencing to characterize microbial community composition and contaminant sources throughout the watershed. This research will help identify how seasonal flushing events and tributary inputs influence the transport of microbial contaminants into downstream rivers, reservoirs, and lakes.

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11:37-11:44 am

Distribution of overwintering cyanobacteria populations in a Southern California reservoir

Benjamin Tiso, *Cal Poly Pomona*
BS student in Biotechnology | Clean Lakes, Inc.

Benjamin Tiso's summer 2026 research investigates how overwintering cyanobacteria populations contribute to harmful algal blooms in Diamond Valley Lake, one of Southern California's largest drinking water reservoirs. Operated by Metropolitan Water District of Southern California, the reservoir has experienced increasing cyanotoxin events that have prompted recreational advisories and closures, highlighting the need for more effective bloom management strategies. Many cyanobacteria survive unfavorable winter conditions by entering dormant states and settling into lake sediments, where they may later reseed blooms when environmental conditions improve. Benjamin's project examines the distribution, abundance, and species composition of these overwintering populations to determine whether targeted winter sediment treatments could provide a more effective and economical alternative to traditional large-scale surface water algaecide applications. His work includes sediment sampling across multiple lake depths and locations, laboratory identification of cyanobacterial species, cyanotoxin analysis, and evaluation of historical phytoplankton monitoring data. Factors such as wind patterns, bathymetry, sediment type, and lake elevation are being considered to better understand where dormant populations accumulate within the reservoir. Benjamin's research aims to support improved reservoir management approaches for harmful algal bloom prevention in large drinking water systems.

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Full Abstracts Student & afternoon presentations

A1 Clear Lake 1

Set 1, 1:30 - 2:50 pm | Ballroom A (cap 80) | Mod: Stephen McCord

1:30-1:50 pm

8 Years of Collaboration in Clear Lake!

***Sam Magill**, Sacramento State University*

Established in 2018, the Blue Ribbon Committee for the Rehabilitation of Clear Lake has been successful in unlocking more than $20 million in direct investments to help address some of Clear Lake's most vexing environmental challenges. In 2026 and 2027, a range of large-scale pilot projects will roll out to mitigate harmful algal blooms in the Lower, Oaks, and Upper Arms of the Lake. The key to this success? Collaboration between Tribes, local government, state agencies, legislative members, and academics. It takes time and shared desire to protect this crown jewel of California's aquatic environments, but by working together all of the Committee's partners there's nothing we can't accomplish!

Back to program (p. 4)

1:50-2:10 pm

Understanding Water Quality Impairment: Cyanotoxins, Fish Die-Offs, and Public Awareness

***Sarah Ryan**, Big Valley Band of Pomo Indians*

Clear Lake (Xabatin) in Lake County, California, is a vital resource supporting recreation, wildlife, and Tribal cultural practices. However, the lake continues to face water quality challenges, including harmful algal blooms (HABs), cyanotoxins, periodic fish die-offs, and other impairments. These issues are driven by excess nutrients, warming water temperatures, and legacy impacts such as mercury contamination. Harmful algal blooms can produce toxins that pose risks to people, pets, and wildlife. Exposure during bloom events may cause skin irritation, illness, or more serious health effects. Fish die-offs, often linked to low oxygen levels and high temperatures, are another visible indicator of ecological stress. Over the past decade, Clear Lake Tribes and local governments have worked to increase public awareness of these risks and how to recognize and respond to them. Improving public understanding is essential for protecting community health and supporting the lake's long-term resilience. Clear, timely communication about current conditions, paired with practical guidance for safe water use, helps people make informed decisions. Strengthening public awareness also fosters community stewardship. By connecting scientific information to everyday experiences, outreach efforts can empower residents, Tribal communities, and visitors to actively support the protection and restoration of Clear Lake for future generations. This has led to support of mitigation and restoration activities through the Blue Ribbon Committee for the Rehabilitation of Clear Lake, creating a positive feedback loop of science, policy, funding, and awareness.

Back to program (p. 4)

B1 Invasive Mussels

Set 1, 1:30 - 2:50 pm | Ballroom B (cap 40) | Mod: Ben Chen

1:30-1:50 pm

Golden Mussels: From Arrival to Action

***Austin Poole**, Clean Lakes, Inc.*

Golden mussels reached Stockton in October 2024, the first detection in North America, and pose an unprecedented threat to California water infrastructure. Their biology explains why: they reproduce prolifically, tolerate conditions that constrain quagga and zebra mussels, and disperse through an invisible veliger stage. For most California lake managers, the window for prevention is closing or is already closed. This presentation briefly covers what still works at the prevention stage, then turns to the harder question: what to do once they arrive. Drawing on Clean Lakes' field experience, case examples illustrate how copper-based control works in practice, where Clean Lakes has succeeded in supporting suppression. Examples show different implementations of golden mussel control methods, including control in power plants, control in agricultural water equipment, and control in forebays and canals. The talk closes with what long-term management looks like when eradication is off the table. Attendees will leave able to assess their own risk and set realistic expectations for what control efforts look like and what can be achieved based on field trials to date in California.

Back to program (p. 4)

1:50-2:10 pm

Valley Water's Golden Mussel Prevention Framework and Mitigation Strategies

***Atlasi Daneshvar**, Valley Water, San Jose, CA*

The golden mussel, an invasive freshwater bivalve native to Asia, was first detected in North America in October 2024 in California's Sacramento-San Joaquin Delta and has since spread southward. The species poses significant ecological and operational challenges due to its rapid reproduction, ability to colonize infrastructure, and potential to alter aquatic ecosystems. Fouling of intakes, screens, pipelines, and conveyance facilities can increase maintenance costs and threaten water supply reliability. In response, Valley Water has developed a comprehensive management framework that integrates early detection, infrastructure protection, and long-term operational resilience. The framework includes short-, mid-, and long-term strategies to limit the spread of golden mussels while safeguarding critical water infrastructure. Short-term actions focus on early detection and risk reduction through traditional plankton surveys, environmental DNA monitoring, restrictions on transfers from infested water sources, enhanced vessel inspections, and expanded public outreach and education. Mid-term strategies emphasize infrastructure adaptation. Planned measures include periodic hot-water treatment of cooling water systems and evaluation of filtration and ultraviolet disinfection technologies for service water and HVAC systems to reduce colonization risks and maintain operational reliability. Long-term efforts prioritize system-wide resilience through targeted upstream chemical treatment, engineering assessments to identify vulnerable assets, and redundancy planning to ensure uninterrupted water delivery under invasive pressure. By integrating prevention, monitoring, infrastructure adaptation, and stakeholder engagement, Valley Water is implementing a proactive, multi-layered defense against golden mussels. This approach provides a practical model for utilities seeking to protect critical infrastructure and maintain reliable operations in the face of emerging invasive species threats.

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C1 Oligotrophic Lakes

Set 1, 1:30 - 2:50 pm | ARC Meeting Room 1 (cap 30) | Mod: Byran Fuhrmann

1:30-1:50 pm

Coupled ecosystem process models for managing interconnected ecosystems

***Ceara Talbot**, UC Davis, Tahoe Environmental Research Center*

Water quality responds to a variety of direct (e.g., point source loading, weather) and indirect drivers (e.g., diffuse lateral flow, biogeochemical cycling on land). Concurrent changes in terrestrial watersheds and their embedded freshwater ecosystems may obscure causal relationships between management actions taken to improve water quality and outcomes. Process models that simultaneously simulate watershed and lake dynamics ("coupled ecosystem models") can disentangle the relative contributions of direct and indirect drivers of water quality. We discuss an existing coupled ecosystem model that simultaneously simulates lake and watershed carbon and water cycling, potential model applications in management decisions, and how managers and modelers can engage with each other to make existing process models into accessible tools for managers. While we created the model with basic science in mind, we are looking forward to the potential for direct management application, which will strengthen model performance in environments experiencing direct anthropogenic influences (e.g., water withdrawal, point source loading), which represent a large portion of the landscape.

Back to program (p. 4)

1:50-2:10 pm

Why is Toxin-Producing Microcystis Increasing in Oligotrophic Lake Mohave?

***Carissa Wilkerson**, Southern Nevada Water Authority, Las Vegas, NV*

Lake Mohave is a flow-regulating reservoir located in the Lower Colorado River Basin on the border of Nevada and Arizona. The reservoir sits within Lake Mead National Recreation Area and is managed by the National Park Service, but reservoir levels are regulated by the U.S. Bureau of Reclamation at Davis Dam. Lake Mohave is a historically oligotrophic system but has been experiencing elevated levels of toxin-producing cyanobacteria, primarily of the genus Microcystis, in recent years. Elevated toxin levels have led to multiple recreation advisories by the Nevada Division of Environmental Protection. The Southern Nevada Water Authority (SNWA) monitors Lake Mohave water quality monthly and has begun exploring the cause of the perceived increase in Microcystis in the system. This talk will address current efforts by SNWA including a nutrient enrichment mesocosm study and machine learning analysis of the long-term dataset. The mesocosm study aims to identify cyanobacterial changes along a nutrient gradient for phosphorus and nitrogen independently, while machine learning is being employed to identify potential drivers of change throughout the whole system. Approaching the Microcystis problem from both an experimental and statistical angle will increase the chances of uncovering important relationships or causes, which will enhance our ability to manage the system and protect public health.

Back to program (p. 4)

Full Abstracts Student & afternoon presentations

A1 Clear Lake 1 (continued)

Set 1, 1:30 - 2:50 pm | Ballroom A (cap 80) | Mod: Stephen McCord

2:10-2:30 pm

Manning Creek Improvements as part of The Kuhlanapo Wetland Preserve Restoration Project on Clear Lake, CA

***Angela De Palma-Dow**, Lake County Land Trust*

The purpose of this Project funded by CDFW is to develop and permit a design to restore the 287-acre Kuhlanapo Wetland Preserve (Preserve) including restoring Manning Creek, an important spawning stream for the endemic Clear Lake hitch. This Project is on the ancestral lands of the Kuhlanapo ('water lily people'). The Big Valley Band of Pomo Indians and Lake County Land Trust have created a Memorandum of Understanding for the co-management and stewardship of the Preserve, as well as the development of the Project. Over the next three years, the project partners will create a fully engineered and permitted restoration design that will demonstrate how the hydromodified lower Manning Creek will be reshaped and the adjacent wetland enhanced to restore hydrologic connection and increase native vegetation communities. The concept design, when implemented, will restore the lower historic Manning Creek flow path to the lake, avoid a fish passage obstacle, and improve a secondary overflow channel which will enhance and increase suitable stream and wetland habitat. Wetland restoration will enhance water quality by filtering runoff sourced from within the 8,960-acre Manning Creek Watershed thus reducing sediment-bound phosphorus from entering the lake and contributing to cyanobacteria blooms in Clear Lake. While this project is currently in the design phase, it is one of the largest wetland restoration projects in the Clear Lake basin that is being completed with state, tribal, local, private, and nonprofit partners and will serve as a model for future restoration projects within Clear Lake and beyond.

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2:30-2:50 pm

Form & Function: Multi-Objective Restoration Design in Clearlake Oaks

***Anna Kladzyk Constantino**, McMillen*
***Christopher DiVittorio**, Pinecrest Environmental*

The Revitalizing Clearlake Oaks Initiative aims to restore the ecological form and function of Schindler Creek and the Clear Lake Keys, located in Clear Lake, California. Clear Lake is the oldest lake in North America, the largest natural freshwater lake within California, and is home to the endemic, potamodromous, CESA-listed minnow species the Clear Lake hitch (Lavinia exilicauda chi). Schindler Creek originates in High Valley, cuts through a steep gorge, and then passes through a lower gradient reach before discharging into the Clear Lake Keys housing development at the lake shore. Prior to settler colonialism in the region, the lower portion of Schindler Creek meandered out from the gorge reach, forming a deltaic lobe that supported substantial marshland along the lake edge. The lower reach of the creek was originally straightened and channelized in the 1920s, and further modified throughout the 20th century and into the early 2000s. The Clear Lake Keys were built in the 1960s over the former marsh and includes ~6.2 miles of canal network. The canals provide a sheltered, low-energy environment for residential docks, however canal geometry limits water circulation. This presentation will share findings from the existing conditions assessment of the site, as well as conceptual design elements to: 1) restore and connect habitat along Schindler Creek, with a particular focus on habitat for the Clear Lake hitch, 2) restore traditional Tribal access and use, 3) improve flood protection along Schindler Creek, 4) improve water quality in the Clear Lake Keys canals, 5) support recreation, education, and environmental stewardship related to the Schindler Creek watershed and Clear Lake Keys site.

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B1 Invasive Mussels (continued)

Set 1, 1:30 - 2:50 pm | Ballroom B (cap 40) | Mod: Ben Chen

2:10-2:30 pm

Success Stories Battling Golden Mussel in California

***David Hammond**, SePRO Corporation*

In the short, busy year since golden mussels (Limnoperna fortunei) started appearing in agricultural irrigation waters of California's Central Valley, their spread and impacts have stunned even the most experienced invasive species experts. Utilities, irrigation districts, and some of the largest farmers in the country have scrambled to find practical and affordable strategies to keep the water moving in support of services and resources critical to humans, animals, and food production. Liquid ionic copper has emerged as the most efficient, cost-effective, and widely adopted option for most water delivery systems, proving effective at protecting intakes, pipelines, screens, pumps, irrigation lines, and more. Fortunately, copper products also help to control algae, and some formulations are even NSF-certified for use in drinking water, providing valuable ancillary benefits to mussel control. This presentation will share some successful strategies and case studies treating for golden mussel, from initial bench-scale studies in Brazil and California, to full-scale operations protecting massive water infrastructure. Examples include scenarios where severe infestations must be cleared, and others where a low, maintenance dose rate can prevent mussels from ever gaining a foothold. The lessons learned during this initial phase of treatment in a wide variety of locations and conditions are paving the way for a future where management of this aggressive invasive mussel will be manageable and eventually routine.

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2:30-2:50 pm

To Shield or to Contain: Matching AIS Prevention Strategy to the Waterbody

***Jacob Utrie**, CD3 Systems*

Preventing the spread of aquatic invasive species (AIS) usually comes down to two strategies: shielding, which protects uninfested waters from new introductions, and containment, which slows the spread of AIS already established in a waterbody. The shielding case, in the Columbia River Basin, brought together federal, state, tribal, and non-profit stakeholders to build cleaning capacity, supported by the Bipartisan Infrastructure Bill. The containment case, in Minnesota, responded to Starry Stonewort by giving boaters the tools to clean, drain, and dry at accesses on infested lakes. This presentation will outline both case studies and their preliminary results, offering a practical framework for deciding when to shield, when to contain, and how to prioritize limited resources.

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C1 Oligotrophic Lakes (continued)

Set 1, 1:30 - 2:50 pm | ARC Meeting Room 1 (cap 30) | Mod: Byran Fuhrmann

2:10-2:30 pm

LNU Lightning Complex Fire and Recovery at Lake Berryessa

***Jennifer Onufer**, USBR, Lake Berryessa*

In August of 2020, a series of spot fires ignited and converged to form the LNU Lightning Complex Fire which burned the northern-most 400 acres of the former Lake Berryessa Wildlife Area as well as 60% of the Solano Project Lands around Lake Berryessa. Several time-consuming employee and public safety projects were needed in the months following the fire. Staff utilized resources including La Cooperativa Campesina de California crew, U.S. Federal Highways resources, and Federal Disaster Relief funds to initiate several recovery projects.

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2:30-2:50 pm STUDENT

Using eDNA to Better Inform Invasive Species Management in the Sierra Nevada

***Grace Rosburg-Francot**, UC Davis Tahoe Environmental Research Center and UC Davis Genomic Variation Laboratory*

High-elevation aquatic communities are more susceptible than ever to invasive species establishment as temperature constraints on invasive species become reduced at upper-elevation range limits. The Sierra Nevada range contains many alpine lakes and reservoirs with varying elevations, providing a useful setting to gain more insight on how elevational gradients may influence the establishment of aquatic invasive species (AIS). The Sierra Nevada is also home to a diverse array of native aquatic species, providing an opportunity to simultaneously assess how the distributions of these species vary along elevational gradients and in relation to AIS presence. Our aim is to use environmental DNA (eDNA) sampling to assess how elevation influences AIS establishment in Sierra Nevada reservoirs, while also demonstrating the potential for cost effective, consistent monitoring of aquatic species across the region. We will utilize the natural elevation gradient present in 42 similarly-sized Sierra Nevada reservoirs, all with active public boat ramps, to evaluate patterns of aquatic native and invasive species presence by using eDNA samples collected from each reservoir. In addition to gaining better insight on the composition of aquatic species communities throughout the Sierra Nevada range, these data can act as a baseline dataset to compare future community compositions to as species distributions shift. This project will also act as a clear roadmap for continued eDNA monitoring of lakes and reservoirs throughout the Sierra Nevada range that would benefit greatly from more consistent, reliable, and affordable AIS monitoring.

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A2 Clear Lake 2

Set 2, 3:10 - 4:10 pm | Ballroom A (cap 80) | Mod: Angela De Palma-Dow

3:10-3:30 pm

Hypolimnetic Oxygenation Plans for the Hypereutrophic, Polymictic Clear Lake, California

***Stephen McCord**, UC Davis, Tahoe Environmental Research Center*

Clear Lake is the largest freshwater lake by surface area completely within California (about 150 km2), the second oldest lake in North America (about 2 million years), and vital for the local culture and economy of Lake County. Although rated the nation's best bass sportfishing lake, lake uses are impacted by occasional massive cyanobacteria blooms, fish kills, and mercury bioaccumulation. Despite its polymictic nature, bottom waters frequently exhibit low dissolved oxygen levels during intermittent thermally stratified periods in summer and fall. During such periods of hypoxia, the sediment bed releases soluble nutrients (particularly phosphorus) and produces methylmercury, conditions which drive harmful algae blooms and mercury bioaccumulation, respectively. This presentation will first describe the extensive, collaborative monitoring program (continuous in-lake sensors, weather stations, mercury, cyanotoxins, and more) and its findings about the lake's extreme oxygen-related conditions. That background will lead to an overview of the oxygenation system design (a pair of mile-long diffuser lines for an arm of the lake), operation plans to optimize liquid oxygen dosing, and administrative aspects (contracting, permitting, funding, engaging stakeholders). These activities are leading to construction and operation in 2027.

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3:30-3:50 pm

Lake-wide Sediment Assessment and Phosphorus Sequestration Demonstration in Clear Lake, CA

***Ryan Van Goethem**, EutroPHIX*

Internal phosphorus (P) loading dominates the nutrient budget of Clear Lake, a 44,000-acre shallow, polymictic, hypereutrophic lake in northern California experiencing recurrent harmful algal blooms. Harmful algal blooms are fueled by excess nutrient availability from both external watershed inputs and internal sediment release, with internal sources accounting for more than 70% of the annual P budget and very high internal release rates relative to other lakes. Despite recognition of this internal loading dominance, lake-wide spatial patterns of sediment P speciation and mobile P pools remain unquantified. Reducing internal loading in large shallow polymictic systems also provides additional challenges for implementing water quality management at scale. To address these knowledge gaps, we conducted a comprehensive sediment assessment and phosphorus sequestration demonstration in spring 2026. Surficial sediments were collected at 66 sites distributed across Clear Lake's three basins and additional sectioned cores were obtained for depth profiling. Sediments were analyzed for P fractionation via sequential extraction, organic matter content, and key elements involved in P-binding, including Fe, Al, Ca, and La. The phosphorus sequestration demonstration utilized EutroSORB G (10% lanthanum-modified bentonite) applied over a 400-acre plot with the changes in sediment chemistry tracked through time. Initial project results from this demonstration will be discussed. Quantifying the spatial distribution of mobile sediment P in the lake and better understanding of phosphorus sequestration in site-specific conditions is providing critical information for evaluating restoration alternatives and predicting lake-scale responses to management interventions in Clear Lake.

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B2 Sediment

Set 2, 3:10 - 4:10 pm | Ballroom B (cap 40) | Mod: Greg Ford

3:10-3:30 pm STUDENT

Species Turnover and Distinct Communities in Alpine Ponds: Implications for Freshwater Management

***Mia Ashby**, UC Riverside*

Alpine ponds are sensitive freshwater ecosystems that remain largely overlooked in monitoring and management despite their vulnerability to climate change. While alpine lakes are increasingly recognized as sentinels of environmental change, smaller ponds may contain distinct biological communities that are not captured by lake-focused approaches. Understanding how biodiversity varies among alpine ponds is therefore critical for developing effective monitoring and conservation strategies under a changing climate. I sampled 29 alpine ponds in the Colorado Rocky Mountains to establish baseline patterns of macroinvertebrate biodiversity and evaluate how community composition varies across space and time. Macroinvertebrate communities were assessed alongside water chemistry and physical habitat characteristics to identify patterns of community differentiation and their environmental associations. I found high beta-diversity among ponds, driven primarily by species turnover rather than nestedness, indicating that ponds supported substantially different macroinvertebrate assemblages rather than simply representing species-poor versions of the same community. Hierarchical clustering identified six distinct community groups and nine significant indicator taxa, while environmental conditions differed significantly among groups. Community membership explained 15.9–20.4% of the variation in measured environmental conditions. These findings demonstrate that substantial biodiversity variation occurs among alpine ponds across relatively small spatial scales and is associated with differences in environmental conditions. From a management perspective, high species turnover suggests that monitoring a limited number of ponds may fail to capture regional biodiversity and could overlook ecologically distinct communities. Incorporating ponds spanning environmental gradients into monitoring programs may therefore improve biodiversity assessments and increase the ability to detect ecological responses to climate-driven changes in temperature, snowmelt timing, and hydrologic conditions. Establishing baseline community patterns provides an important foundation for integrating alpine ponds into broader freshwater monitoring and management frameworks.

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C2 Adaptive Management

Set 2, 3:10 - 4:10 pm | ARC Meeting Room 1 (cap 30) | Mod: Karie Holtermann

3:10-3:30 pm

Modeling reservoir destratification timing to support Hetch Hetchy Regional water system operations

***Noah Hume**, Stillwater Sciences*

Planned outages of the City and County of San Francisco's Hetch Hetchy Aqueduct increase reliance on local Bay Area reservoirs, where late-season algal blooms and associated taste-and-odor (T&O) compounds can constrain water supply operations. Because T&O concentrations generally decline after fall turnover, forecasting the timing of reservoir destratification can help identify lower-risk windows for inspections, maintenance shutdowns, and contingency operations. This study used the Schmidt Stability Index to estimate destratification timing in Calaveras and San Antonio Reservoirs using long-term bathymetric data and biweekly water temperature profiles over approximately 30 years of monitoring data. Peak summer stability values were used to characterize annual stratification strength, while fall profile data were used to estimate the remaining time until full mixing. Fall stability index values provided more precise operational forecasts than peak summer stability alone. Both reservoirs were typically fully mixed when Schmidt Stability Index values declined to approximately 50 J/m2, particularly as surface cooling accelerated and the water column approached turnover during late fall. The approach also highlighted reservoir-specific differences: stronger stratification in Calaveras Reservoir can prolong the period of elevated stability, whereas weaker stratification in San Antonio Reservoir can allow earlier or more variable mixing. By converting routinely collected temperature profiles into estimates of destratification timing, this modeling framework provides a transparent decision-support tool for coordinating outage timing with periods of reduced bloom and T&O risk. When paired with algae, nutrient, and T&O monitoring, the approach can improve reservoir management as well as operational planning of the Hetch Hetchy Regional Water System.

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A2 Clear Lake 2 (continued)

Set 2, 3:10 - 4:10 pm | Ballroom A (cap 80) | Mod: Angela De Palma-Dow

3:50-4:10 pm

Pilot oxygen-ozone nanobubble treatment in Clear Lake, CA

***Denise Devotta**, Moleaer*

Moleaer's pilot oxygen-ozone nanobubble (NB) treatment is a project recommended for funding by Clear Lake's Blue Ribbon Committee (BRC) for implementation in 2028. Sponsored by the Lake County Watershed Protection District (LCWPD), this project aims to mitigate cyanobacterial harmful algal bloom (cHAB) initiation in a 350-acre area in Soda Bay, by alleviating seasonal hypoxia at the sediment-water interface (SWI) and related internal phosphorus (P) loading. In Clear Lake, Soda Bay is within the area of cHAB initiation and danger advisory levels of microcystin. This pilot will deploy a barge-mounted NB treatment unit, supplying oxygen and low-dose ozone NB treatment that will provide efficient, persistent oxygenation at the SWI, reducing internal P and mercury release, and cHABs. Treatment placement and monitoring will be co-designed, and data interpretation will be conducted with Tribal communities. In addition to partnering with LCWPD on community engagement, Moleaer seeks to collaborate with UC Davis, the Central Valley Regional Water Quality Control Board, and LCWPD officials on project design, monitoring, scenario testing and modelling, and implementation plans. This project is expected to reduce health risks arising from cyanotoxin prevalence and taste-and-odor issues, and improve recreational, tourism, and fishing opportunities in Lake County. This presentation will summarize key components of Moleaer's proposed pilot treatment in Clear Lake, including project design, objectives, success indicators, plans for community and Tribal engagement, plans to leverage ongoing monitoring efforts, past and current research outcomes, and Moleaer's experience on similar projects.

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B2 Sediment (continued)

Set 2, 3:10 - 4:10 pm | Ballroom B (cap 40) | Mod: Greg Ford

3:30-3:50 pm

High-Resolution Monitoring of Water Quality Response After a Lanthanum-Modified Bentonite Application

***Alexis Fischer**, EutroPHIX*

Water quality management is often evaluated with limited pre- and post-treatment sampling, making it difficult to determine when and how nutrient availability, algal biomass, and community composition respond to management actions. In spring 2026, EutroSORB G, a 10% lanthanum-modified bentonite, was applied to a Utah waterbody during an active cyanobacteria bloom, creating a rare opportunity to track treatment response under real-world conditions. This presentation will share results from our most intensively monitored EutroSORB G application to date. The monitoring program paired monthly grab samples with a floating NuLAB buoy prototype that collected automated surface and bottom nutrient measurements approximately every six hours, along with co-located sonde data, including temperature, dissolved oxygen, pH, and algal fluorescence. These in-water measurements were also compared with historical satellite imagery to evaluate changes in bloom intensity and timing. Early results from the first two months show a clear improvement in water quality conditions. Total phosphorus and orthophosphate declined at both the surface and bottom, algal biomass decreased, and the algal community shifted from cyanobacteria dominance toward a green algae-dominated assemblage. The NuLAB buoy data helped capture the timing of the response between monthly grab sampling events. Water quality improvements occurred as water temperatures warmed into summer, when bloom activity would typically be expected to increase. By the time of the conference, the project will include approximately five months of post-application monitoring, allowing a more complete evaluation of treatment response, nutrient dynamics, and algal community changes.

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3:50-4:10 pm

Internal Medicine for Lakes: Modifying the Sediment for Improved Water Quality

***Byran Fuhrmann**, Clean Water Help*

Nature requires millions of years for excessive phosphorus to accumulate in lake sediments, but industrialization has managed to make this happen in decades. And once lake sediments are saturated with phosphorus, no amount of watershed management can save your lake from perpetual harmful algal blooms. Most of the eutrophication you deal with today is a legacy problem you inherited, not one you created. Even though you didn't start the fire, you can be the one to put it out! So what exactly are your options? This presentation focuses on internal medicine for your lake: chemical modification of the sediment-water interface. We won't be discussing "novel" technology or unproven "all-natural" gimmicks. Instead, we will dive into the most practical and scientifically validated approaches to managing sediment phosphorus to improve water quality. I will synthesize the pros, cons, and specific use cases for oxygenation, lanthanum-based products, and aluminum treatments. We will also cover combination treatments and synergies. At the end, you will receive a set of decision-based criteria to help you determine exactly which approach fits your lake's unique chemistry.

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C2 Adaptive Management (continued)

Set 2, 3:10 - 4:10 pm | ARC Meeting Room 1 (cap 30) | Mod: Karie Holtermann

3:30-3:50 pm

Team Monet vs Team Trump: a sustainable solution to the Washington Memorial Reflecting Pool Algae Problem

***Alex Horne**, University of California, Berkeley*

To celebrate the USA's 250th birthday, it would have been nice to have the quarter mile-long pool reflecting both Washington's towering monument and CALMS/NALMS's lake management techniques. However, this did not occur. For the next celebration I propose looking back 128 years to Giverny, France and Monet's paintings of his lily pool. Both pools reflect well but Monet's does not need algaecides or a blue pond liner. My estimates of chlorophyll a in Monet's pool exceed those in the Washington pool, but there are no algae scums. President Trump's teams wanted a clear, sterile pool, fighting the sun and nutrients. In contrast, Monet's team of gardeners created a clear but living, sustainable pool where the energy and nutrients were parried away from planktonic algae into floating lilies and leafy submerged macrophytes with their periphyton cover, and ubiquitous bdelloid rotifers, while also providing cover for large Daphnia which excel at eating planktonic algae. A simple back garden bucket example may prove the point.

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3:50-4:10 pm

Managing an Urban Lake: Lessons from Mountain Lake's Restoration and Ongoing Ecological Monitoring

***Phoebe Parker-Shames**, Presidio Trust*

Mountain Lake in the Presidio of San Francisco has undergone a dramatic transformation from a degraded, highly altered system to a managed freshwater ecosystem of local ecological importance. Following extensive restoration, including dredging, invasive species removal, native species reintroduction, watershed improvements, and installation of aeration and vertical epilimnion mixing (VEM), water quality and habitat conditions improved substantially, with increased dissolved oxygen, reduced nutrients, and decreased algal biomass. Building on these outcomes, current management is focused on long-term ecological function and adaptive stewardship. This presentation highlights ongoing management challenges, monitoring, and preliminary findings for key indicator species, including freshwater mussels (Anodonta californiensis) and western pond turtles (Actinemys marmorata), which serve as measures of habitat quality and ecosystem health. We discuss monitoring plans and preliminary findings, as well as the role of these species in supporting water clarity, nutrient cycling, and biodiversity. In addition, we outline our approach to linking water quality, biological communities, and management actions to inform adaptive decision-making. This case study demonstrates how intensive restoration, coupled with targeted biological monitoring, can guide ongoing management of urban freshwater systems in California.

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A3 HABs

Set 3, 4:30 - 5:30 pm | Ballroom A (cap 80) | Mod: Doug Crowl

4:30-4:50 pm

Harmful Algal Bloom Management in Lake Elsinore: the Importance of Cyanobacteria Grazing for Improved Water Quality

***Maia Singer**, Stillwater Sciences*

Historically, Lake Elsinore has exhibited persistent seasonal anoxia in bottom waters, driving high internal loading of ammonium and soluble reactive phosphorus and supporting high chlorophyll-a concentrations and cyanobacteria blooms in this large, relatively shallow southern California lake. Long-term monitoring shows that artificial aeration mixing (since about 2010) has partially improved bottom water dissolved oxygen and reduced internal nutrient loading relative to pre-aeration baseline years (2002-2006), but it has remained insufficient to consistently suppress anoxia, associated nutrient pulses, and harmful algal bloom occurrences. A pronounced deviation from historical patterns occurred in spring 2024, when the lake experienced an unusual spring clear water phase, driven primarily by intense zooplankton (notably Daphnia) grazing. While supplemental oxygenation later in 2024 and 2025 appears to have contributed to reduced internal nutrient loading in the lake, including suppression of late-fall ammonium pulses and reduced chlorophyll-a, the most dramatic water quality improvements of late were associated with periods of intense zooplankton grazing. Despite moderate levels of supplemental oxygenation, episodic bottom water anoxia persisted in 2025, underscoring that sustained improvements in internal nutrient control will require more effective delivery of oxygen to the sediment-water interface, and improving grazing conditions for large zooplankton should be considered as part of any future water quality control strategy.

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4:50-5:10 pm

Overlooked Drivers of California Algae Blooms

***Byran Fuhrmann**, Clean Water Help*

Battling algae blooms is the most exhausting part of lake management, largely because so many blooms seem to ignore the rules of limnology. We watch for heatwaves and low oxygen, but the water turns green when we least expect it. We run ecosystem models that backcast perfectly but fail to forecast blooms. This unpredictability makes proactive management feel impossible. But what if we have been overthinking the complexity? What if just a handful of drivers could explain the majority of these events? This presentation provides a framework that classifies CA lakes and reservoirs into a few different distinct groups based on their characteristics and the seasonality of the algae blooms. This framework highlights what I argue is the single most frequently overlooked driver of algae blooms in CA lakes and reservoirs. And this presentation doesn't just stop in theory-land. The framework provides insight into how to use cost-effective, modern technology to definitively identify the root causes of algal blooms and regain control of your water quality. Key takeaways: (1) Categorize your lake into one of six predictable bloom scenarios. (2) Identify the "hidden villain" driving unexpected summer blooms. (3) Use automated tools to verify key drivers of algae blooms in your lake or reservoir.

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B3 Watersheds

Set 3, 4:30 - 5:30 pm | Ballroom B (cap 40) | Mod: Alex Forrest

4:30-4:50 pm **STUDENT**

A low-cost, nature-based treatment alternative: the unit process open-water wetland (UPOWW)

***Scarlet-Marie Kilpatrick**, UC Berkeley*

Scarlet-Marie Kilpatrick's doctoral research focuses on developing low-cost, nature-based treatment systems to reduce nutrient pollution and harmful algal blooms (HABs) in freshwater ecosystems. Her work investigates unit-process open-water wetlands (UPOWWs), shallow flow-through basins that use naturally occurring microorganisms to remove contaminants from agricultural runoff and wastewater effluent. These systems offer a promising and affordable alternative for rural and underserved communities that often lack access to expensive treatment technologies. Scarlet-Marie is studying how diatoms can directly remove and store both nitrogen and phosphorus. This approach could improve nutrient removal efficiency while reducing eutrophication risks in lakes and reservoirs vulnerable to HAB development. During summer 2026, Scarlet-Marie will conduct laboratory analyses to evaluate nutrient sequestration within wetland biomats and develop a statewide framework to identify California lakes where these systems may be environmentally and economically viable. By integrating water quality data, satellite-derived chlorophyll indicators, and land-use information, her work aims to support practical, sustainable treatment strategies that improve water quality and expand access to environmentally friendly remediation technologies across California.

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4:50-5:10 pm

Legacy Mercury, Modern Risks: Identifying Methylmercury Sources & Processes in an Impaired California Reservoir

***Virginia Krause**, University of California, Davis*

Mercury contamination from historic mines and atmospheric deposition continues to threaten local California watersheds, with 131 reservoirs listed as mercury-impaired and in need of remediation (e.g., Guadalupe Reservoir). Various remediation strategies are being considered to limit the production of methylmercury in reservoirs, the neurotoxic form of mercury that bioaccumulates in aquatic food webs. The success of remediation actions, however, is contingent upon a complete understanding of the locations and controls of methylmercury production. We conducted two years of extensive water column measurements and experimentation to identify seasonal watershed inputs (e.g., dissolved organic carbon, filter-passing inorganic mercury) and in-reservoir processes (e.g., microbial activity, in-situ methylation) that govern methylmercury production and speciation. Our findings indicate that filter-passing inorganic mercury is primarily sourced from watershed inputs delivered to the reservoir during spring flows, rather than from direct local inputs such as mine-impacted sediments within the reservoir. Our analysis also highlights active in-situ production of filter-passing methylmercury during thermally stratified periods, coincident with anaerobic reservoir processes. In contrast, particulate-bound methylmercury did not show clear seasonality and was governed by sediment resuspension events rather than internal production. These findings support that the inorganic mercury being methylated in the reservoir is from the upgradient watershed. The observations on in-reservoir methylmercury seasonal dynamics will be interpreted with results from kinetic methylation rate experiments and microbial metagenomic analyses that aim to isolate the biogeochemical and microbial controls on water column and sediment methylation, ultimately informing targeted remediation to assist in state regulatory actions.

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C3 Misc Lake Management

Set 3, 4:30 - 5:30 pm | ARC Meeting Room 1 (cap 30) | Mod: Denise Devotta

4:30-4:50 pm

Utilizing 3D printing for specialized sampling tools (no more duct tape!)

***Tommy Ly**, Metropolitan Water District of Southern California*

Environmental sampling often requires creativity to make specialized tools to serve one very specific purpose. Often, these tools are created using a conglomeration of parts, held together with zip ties, hose clamps, and duct tape. With the use of 3D printers, these ideas can be more robust and reproduced easily. This presentation will provide examples of 3D printers that are suitable for different levels of users and explain the typical types of filaments. There are many types of printers to choose from, but the easiest to get started on are the filament printers. Some printers are good-to-go right out of the box, while others require tinkering to dial everything in. Next comes the filament, with different types offering levels of chemical and UV resistance, as well as strength and flexibility. With just a 3D printer and filament one can find free online models to upload onto their printer and get started right away. If nothing that meets the necessary specifications is found online, then 3D modeling comes next. There are many free software options available online and paid subscriptions as well. Most demands faced within environmental sampling require some form of custom design. Examples will outline applications of a 3D printer to create custom equipment: (1) a sampling device that mounts onto a Remotely Operated Vehicle (ROV) to allow the scraping of invasive mussels off surfaces, (2) a custom sampling bottle holder, and (3) ergonomic improvements.

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4:50-5:10 pm

A modern web-based decision support tool to deliver forecast-informed operational guidance for the management of College Lake in Watsonville, California

***Jade Hinson**, Verdantas, Santa Cruz, CA*

Effective multi-benefit management of lakes and reservoirs depends on timely operational decisions, often made under uncertainty. During rapidly evolving storm events, operational choices can have significant consequences for public safety, infrastructure, and property. At the same time, managers must balance water-supply objectives with ecological flow requirements that support passage for native migratory fish species such as steelhead. These competing objectives highlight the need for reliable, easily accessible, forecast-informed decision support. To address this need, Verdantas developed a real-time decision support system for the Pajaro Valley Water Management Agency's College Lake Water Supply Project in Watsonville, California. Within the web-based platform, observed meteorological and streamflow data automatically update and calibrate a HEC-HMS hydrologic model, and then multiple NOAA precipitation forecast products are simulated to predict future streamflow conditions. Forecasted flows are then applied as boundary conditions in a HEC-RAS hydraulic model that evaluates a suite of operational scenarios for the College Lake diversion structure and fishway. Resulting flow and water-surface elevation time series are stored in a database and displayed through an interactive web dashboard. As updated precipitation forecasts become available, up to four times daily, the hydrologic and hydraulic models are automatically executed, and the latest results are delivered to decision makers in near real time. The system enables operators to proactively evaluate tradeoffs among reducing flood risk, maximizing water supply, and meeting fish-passage objectives under evolving forecast conditions.

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A3 HABs (continued)

Set 3, 4:30 - 5:30 pm | Ballroom A (cap 80) | Mod: Doug Crowl

5:10-5:30 pm

Water Column Nutrient Loading Driving Fall Cyanobacteria and Taste and Odor Blooms

***Naivy Dennise Rodal Morales**, Stillwater Sciences*

To assess how internal nutrient cycling may contribute to recurring cyanobacterial blooms and taste-and-odor (T&O) events, long-term water quality, algal community, and T&O monitoring data were analyzed for Calaveras and San Antonio reservoirs in the City and County of San Francisco's Alameda system. Although both reservoirs are equipped with hypolimnetic oxygenation systems to reduce sediment-associated internal nutrient loading, recent monitoring indicates that nutrients may also be released within the water column during and after bloom senescence. Decomposition of algal biomass can increase oxygen demand, creating localized low-oxygen zones above the hypolimnion. Elevated orthophosphate concentrations in these zones coincided with peak fall cyanobacterial abundance, suggesting that nutrient recycling from within the water column may help sustain late-season blooms and associated T&O risk. In Calaveras Reservoir, spring cyanobacterial peaks appear to be influenced by prior-year nutrient conditions, while fall blooms may also be affected by within-season algal decay and nutrient recycling. In San Antonio Reservoir, weaker stratification and more frequent vertical exchange may increase the influence of water-column nutrient sources, contributing to more variable algal bloom intensity and T&O events. Occasional geosmin and MIB peaks during periods of relatively low cyanobacteria abundance further suggest that bloom phase, senescence, oxygen depletion, and nutrient recycling are important controls on within-season T&O risk. These findings highlight the importance of evaluating water-column bloom dynamics in future monitoring and reservoir management.

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B3 Watersheds (continued)

Set 3, 4:30 - 5:30 pm | Ballroom B (cap 40) | Mod: Alex Forrest

5:10-5:30 pm

Watershed Restoration in Collaboration, Lessons from Lake County

***Jerrod Sellers**, WRA, Inc.*

Securing funding for watershed restoration has never been easy and shrinking budgets are making it even harder. This panel argues that the path to consistent grant success isn't chasing the money, it's building the right relationships first. Drawing on a decade of restoration work in Lake County, California, panelists will share a replicable framework: first, form a coalition of agencies, tribes, and landowners; second, use that coalition to co-author a shared conservation strategy that identifies regional priorities. Third, only once priorities and relationships are in place, identify specific projects and willing landowners. The result is a "grantable" project, one where institutional alignment makes the need self-evident to funders, because everyone with a stake is already at the table. Panelists will illustrate this framework using Lake County's hitch emergency declaration as a case study: the coalition and shared priorities that existed before the emergency are what allowed the county to move quickly when state funding became available, turning legislative attention into more than $2 million in secured restoration grants, including $1 million through the National Fish Passage Program. Attendees will leave with a concrete, three-step sequence (coalition, priorities, projects) for building grant-winning infrastructure in their own watersheds, regardless of whether their own funding tailwinds look like Lake County's.

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C3 Misc Lake Management (continued)

Set 3, 4:30 - 5:30 pm | ARC Meeting Room 1 (cap 30) | Mod: Denise Devotta

5:10-5:30 pm

Making the Most in Lean Times: A Pilot Study in Two Kokanee Waters

***Rachel Fichman**, California Department of Fish and Wildlife, West Sacramento, CA*

Kokanee salmon (Oncorhynchus nerka) are a landlocked form of Sockeye salmon found in 23 lakes and reservoirs throughout California. Active sampling of Kokanee is often expensive, time consuming, and has high mortality rates due to the sensitivity of the species; specialized nets, sizable boats, and numerous staff are required. With our small team and lean budget, we instead looked to the tiny creatures that keep Kokanee fed (zooplankton) and the surrounding water quality to serve as proxies for Kokanee fishery viability in Lake Berryessa and Stampede Reservoir. In 2024 and 2025, our pilot study used passive, lower-cost methods by utilizing a decade of public reservoir data, sampling water quality (dissolved oxygen, temperature, and depth) and collecting zooplankton on a monthly basis. We found potential signs of oxythermal limitations to Kokanee movement in the hotter, lower elevation lake, while the cooler, high elevation reservoir had high zooplankton biomass and high-quality water metrics for Kokanee. Both waters experienced angler-reported die-off events in the last decade when lake levels were low and thermal stress was evident, highlighting the impact of water management decisions on stocked fishery success and longevity. Monitoring the environmental conditions and food base surrounding a fishery can support more informed fishery management decisions when financial resources are scarce.

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Also This Week

Outside the Thursday program

Wed, Sept 30	**Pre-Conference Workshops**	Invasive Mussels | Lake Management Planning 1:00 - 4:00 pm, UC Davis ARC Conference Center
Wed, Sept 30	**Clean Water Help Fundraiser**	Three Mile Brewing Co., 231 G St. 5:00 - 10:00 pm
Fri, Oct 2	**Field Trips**	Choose one excursion: the Solano Project, or the UC Davis Arboretum