

California Water Institute



Director's Message

As we enter a new year, I am excited to highlight the important work being done at the California Water Institute (CWI) and celebrate the collaborations that continue to strengthen our impact. Over the

past few months, we have launched two education initiatives that reflect our commitment to elevating water knowledge and fostering informed discussions within our communities.

The first is *California Water Collaborations: Stories of Shared Success*, a blog series on LinkedIn, that showcases real-world examples of multiple water users working together to develop solutions. Through these stories, we aim to highlight how partnerships—between farmers, urban planners, environmental groups, and researchers—are successfully addressing water management challenges across California. By sharing these case studies, we hope to inspire new collaborations and provide a resource for those seeking innovative water solutions. If you haven't already, I encourage you to explore these stories and share them with your networks.

The second initiative is *Weekly Water Insights*, a radio segment designed to provide accessible, science-based water information to the public. In Partnership with KMJ's Farm Report with Don York, each week, this segment breaks down complex water issues into practical and engaging discussions, ensuring that listeners gain a deeper understanding of the water challenges and opportunities that impact their daily lives. By reaching a broad audience, we are working to bridge the gap between research, policy, and community awareness.

Beyond these new initiatives, this issue of our newsletter highlights several impactful projects and partnerships. Our work with Fresno State's civil engineering department is providing students with hands-on experience in groundwater recharge project design, preparing them to enter the workforce with real-world knowledge. We are also excited about our collaboration with Sustainable Conservation to study on-farm groundwater recharge in pistachio orchards, an effort that could contribute significantly to sustainable water management in agriculture.

Additionally, this issue features research from Fresno State faculty proposing new methods for more accurate groundwater estimation—an innovation that could enhance water management across California and beyond. Our Employee Spotlight shines on Kaylie Rogers, whose leadership in coordinating events and operations ensures that CWI continues to thrive.

Looking ahead, we invite you to join us on March 21 for World Water Day at Fresno State, where we will engage in discussions and activities focused on the importance of sustainable freshwater management.

Thank you for your continued support as we work together to advance water education, research, and collaboration. I look forward to seeing the positive impact of these initiatives unfold in the months ahead.

Laura Ramos Director, California Water Institute

CWI Projects Help Train Fresno State Student on Real-World Project



The California Water Institute is giving Fresno State students a chance to get hands-on training with real-world projects outside of a classroom setting. Last spring, CWI formed a partnership with Fresno State lecturer Henry Liang in the civil engineering department to evaluate groundwater recharge facilities. Liang incorporated the project into his senior project design class, splitting students into two groups to survey improvements needed for the sites to become groundwater recharge facilities.

“Whenever we have the opportunity to partner with a real project, then I’m always all for it. And this one was especially interesting to me just because my specialty is water resources,” said Liang, who has planned and designed recharge facilities in his role as a principal engineer at MKN & Associates, a water resources engineering firm. Liang said implementing the project into his curriculum was streamlined with CWI doing all the initial work to set up the project with clients and locations.

Students learned how to plan and design the facilities, calculate project costs and determine permitting requirements. Students involved in the project also highlighted other skills they learned, including how to interact with colleagues, property owners and other professionals outside of the classroom.

In addition to learning about planning and design, another valuable training experience for students was it required them to make connections with professionals in water districts and utility companies and private property owners. Carson Hatmaker was one of the students in Liang’s class. He noted some of the most beneficial things he learned were soft skills that taught him how to interact with colleagues and work with different people outside of a classroom.

“The opportunity to work with people outside of the academic field; namely with other engineers and consultants is super beneficial and actually leads them to gain some hands-on experience before jumping into the real world,” Hatmaker said.

After graduating from Fresno State, Hatmaker was hired as an assistant engineer at MKN Associates and continues to work with his former professor Henry Liang. Hatmaker credits his work in his senior project design class with helping him to land his current job.



California Water Institute Partners with Sustainable Conservation to Study On-farm Recharge

The California Water Institute is partnering with the nonprofit [Sustainable Conservation](#) on a grant-funded program to study

the effects of on-farm recharge on pistachio orchards. This will be the first formal partnership between CWI and Sustainable Conservation, an organization that works to solve California’s environmental challenges through collaboration. On-farm recharge is the practice of applying surface water to farm fields to recharge aquifers, allowing growers to contribute to groundwater replenishment. “This funding will allow us to further our collective knowledge about on-farm

recharge's potential as a sustainable water management tool," said Sarah Castle, senior scientist for Sustainable Conservation.

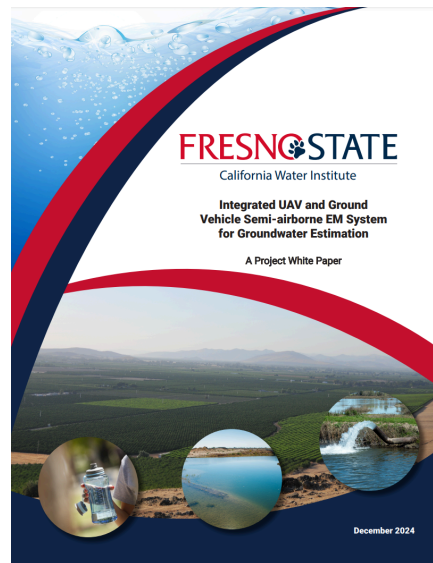
The \$498,423 project approved by the California Department of Food and Agriculture will focus on six pilots at pistachio orchards. Dr. Sangeeta Bansal, assistant professor of soil health at Fresno State and co-principal investigator of the project, will study the effects of cover crops on soil health and the outcomes of on-farm recharge including nutrient cycling and soil hydraulic function. By replenishing groundwater, on-farm recharge helps secure a reliable water supply.

"During the winter of 2023, farmers proactively flooded their dormant fields to mitigate flood impacts and recharge aquifers. However, there is much more to learn about the interactions between recharge, cover cropping, and resulting water quality," said Laura Ramos, director for California Water Institute's Research and Education Division.

This initiative aims to enhance the long-term sustainability of the San Joaquin Valley's specialty crop industry as California faces increasing climate volatility. Researchers hope to better understand how cover cropping and recharge can protect California's water quality, boost agricultural resilience for California's specialty crops and foster environmental sustainability.

Fresno State Professors Propose a New Solution for Accurate Groundwater Estimation

Reliable groundwater is crucial to global food and water security. It constitutes about 35 percent of global water use as both drinking water and irrigation, but climate change and population growth are straining this precious resource. Many dry and semi-dry regions increasingly rely on groundwater, even as worsening droughts and over-extraction threaten the sustainability of aquifers that support large populations and economies around the world. To



better manage this resource, it's critical to understand how much of it is left.

New research from Fresno State highlights the challenges in measuring groundwater and proposes a new solution for effective groundwater management strategy. Dr. Alaeddin Bani Milhim from the Department of Mechanical Engineering and Dr. Hovannes Kulhandjian, associate professor at Fresno State's Department of Electrical and Computer Engineering collaborated on a [white paper](#) that details their research on how to achieve more accurate and timely groundwater estimates.

Long-term groundwater estimates with regular sampling intervals are essential for understanding seasonal variations, long-term trends and the overall condition of groundwater systems. These accurate and timely assessments of groundwater storage changes are urgently needed to promote groundwater sustainability and bolster drought resilience.

The researchers emphasize that the challenge is tracking precise monitoring of groundwater changes over time and at appropriate spatial scales. Diverse techniques such as airborne electromagnetic (EM) surveys, monitoring wells and ground-based resistivity measurement are used, but the task remains

challenging globally when techniques like monitoring wells are expensive to install and often lack comprehensive coverage.

Fresno State's researchers proposed a new system involving airborne electromagnetic (EM) surveys to map an area's groundwater storage. While manned aircraft operations can be expensive and limited in availability, the researchers proposed a semi-airborne system using powerful ground-based transmitters – like a ground vehicle to generate an electromagnetic field below, while a drone tracks and receives the signals above. This allows for a cost-effective, high-resolution solution for groundwater estimation. Fresno State researchers believe the system has a strong potential for commercialization for both its scalability and flexibility that could extend to other industries such as environmental monitoring, resource exploration, and infrastructure development.



Employee Spotlight / Kaylie Rogers

As the office and events coordinator, Kaylie Rogers juggles a lot of ongoing projects at CWI. In addition to making sure things run smoothly with office operations and the staff, she is the point-person for

organizing key community and stakeholder events such as the upcoming World Water Day and the CSU Annual Water Conference.

Rogers is a Fresno State alumna with a Bachelor of Science in food science and a master's degree in human resource management. After graduating, Rogers worked in several industries related to her studies including work at a meat processing plant and at a staffing agency. Rogers found the perfect fit for her background in HR and the sciences at CWI in the summer of 2023. Rogers stays engaged at work with the welcoming team environment and what she calls, room for growth.

“[Director] Laura cares about our professional development and encourages us to continually learn and expand our knowledge beyond our roles,” Rogers says.

When she's not working, the Clovis native enjoys taking care of her house plants and exercising. She also focuses on spending time with her family, especially her three-year-old son who keeps her busy.

Upcoming Events

Coming Up: World Water Day, March 21st

Mark your calendar for World Water Day happening on March 21st. It's an international day to observe the importance of access to freshwater for drinking. Organizations, schools and governments use this day to raise awareness about sustainable management of our freshwater resources. At Fresno State, CWI will organize an event to invite the public to learn about water-related issues and to take part in activities throughout the day.

This year, Fresno State's Departments of Civil Engineering and Earth and Environmental Science will present the winner of an essay contest. Join us for the festivities on Friday, March 21.