

INFORMATION ITEM

Lead Scientist Report

Summary

This month's Lead Scientist Report summarizes a recent publication describing OpenET, an important new tool to quantify evapotranspiration (ET) that estimates water losses from plants (transpiration) and evaporation processes. This tool is particularly valuable for water managers in California, where water conservation is becoming increasingly important due to climate change. Findings from this study give farmers and water managers increased confidence in using OpenET data to make precise decisions about water usage. By incorporating monthly ET data into calculations, water managers could potentially create more accurate water budgets, support conservation programs, and develop smarter water management strategies.

Assessing the accuracy of OpenET satellite-based evapotranspiration data to support water resource and land management applications

*Volk, J.M., Huntington, J.L., Melton, F.S. et al. Assessing the accuracy of OpenET satellite-based evapotranspiration data to support water resource and land management applications. Nat Water 2, 193–205 (2024).
<https://doi.org/10.1038/s44221-023-00181-7>*

Satellite-based evapotranspiration (ET) data, known as OpenET, is an invaluable tool for water managers, especially in places like California where water conservation is becoming increasingly important due to climate change and droughts. The journal article "Assessing the accuracy of OpenET satellite-based evapotranspiration data to support water resource and land management applications (Volk, J. et al. 2024, Nature Water 2:193-205) evaluates the accuracy of OpenET by comparing the satellite data with real-world measurements of evapotranspiration from 152 field stations across the United States. Evapotranspiration is the combined process of

water evaporating from soil and plants releasing water vapor into the air. This information helps us understand how much water plants are using, which is essential for managing water resources effectively. Previously, it has been difficult to accurately measure water usage, referred to as “consumptive use,” on individual fields over large areas, but with access to OpenET, detailed spatial and temporal water use data can be obtained. OpenET data is easily accessible through an online tool, allowing users to explore specific areas. Additionally, OpenET can help with carbon and climate modeling by providing data about ecosystem health. The system uses six automated models to process over 100,000 satellite images, providing fast and accurate data on ET across 23 western U.S. states.

The study compared OpenET’s data with measurements from ground stations, mostly using devices called eddy covariance towers, which track how much water, carbon dioxide, and other gases are moving between the land and air. Researchers found that OpenET was highly accurate and unbiased (>90% accuracy) in measuring ET for farmlands, but less accurate for natural ecosystems like wetlands, shrublands, and forests. High accuracy for annual crops (e.g., corn, rice, and soy) and for perennial crops (e.g., orchards and vineyards) suggests the suite of models used in OpenET provide a robust assessment for various agricultural fields, regardless of shading and denseness. Certain models had higher accuracy depending on broad crop type, the timescale ET was analyzed at, and the climate region. These details are beneficial as they help identify best practices for using OpenET information. Additionally, the researchers also found that data was most accurate in summer, which is critical as it is also the peak time for irrigation. Interestingly, while the tool is applied nationally, OpenET worked especially well in dry regions like California, where water is scarce.

These findings give California farmers and water managers increased confidence in using OpenET data to make precise decisions about how much water a particular crop field may need, which could lead to better water conservation and cost savings. By incorporating monthly ET data into calculations, water managers could potentially create more accurate water budgets, support conservation programs, and develop smarter water management strategies. For farmers, this means optimizing irrigation and reducing costs associated with water and fertilizer.

At the Delta Stewardship Council, the Planning Division is exploring the use of OpenET data to quantify daily, monthly, and annual ET across different land use types in the Delta and Suisun Marsh to gain a better understanding of consumptive water use in open water and wetlands compared to cultivated crops.

Delta Science Program Activities

Research Funding and Fellowships

Update on the 2025 Delta Research Awards

The 2025 Delta Research Awards Solicitation period is now closed! In partnership with CA Sea Grant, the Delta Science Program solicited up to \$6 million in research projects that advance the 2022-2026 Science Action Agenda. This solicitation incentivized social science proposals and encouraged co-produced research, where information is produced by both the researchers and the communities affected by the research. Sixty-six applications requesting over 60 million dollars were submitted prior to the August 26, 2024 deadline and are now undergoing independent review. Award of projects, which may be up to three-years in duration, is anticipated to be announced at the February 2025 Council meeting and successful projects are anticipated to begin as early as April 1, 2025. Additional information about this opportunity can be found at:

<https://caseagrants.ucsd.edu/funding/2025-delta-research-awards-proposal-solicitation>

Update on the 2025 Delta Science Fellowships

The Delta Science Program and California Sea Grant are excited to again partner to support a 13th cohort of Delta Science Fellowships for the 2025-2026 academic years. This fellowship opportunity funds research projects of up to two years in duration that will advance the state of knowledge underlying high priority science issues that affect the Sacramento-San Joaquin Delta and its management as an integrated socio-ecological system. Eligible applicants include postdoctoral researchers, Ph.D. students, and master's students. Twenty-three applications were received by the August 26, 2024 deadline and are now undergoing review. Announcements of funding awards are anticipated to be released at the January 2025 Council meeting.

The agreement with California Sea Grant that provides funding to support these fellowships was approved by the Council at the September 2023 meeting. Information about this funding opportunity can be found at <https://caseagrants.ucsd.edu/funding/delta-science-fellowship>.

2024 California Water and Environmental Modeling Forum (CWEMF) Annual Meeting

The 2024 California Water and Environmental Modeling Forum (CWEMF) Annual Meeting was held at the Lake Natoma Inn in Folsom, CA on September 23-25, 2024. The Delta Science Program organized a session on the last day of the meeting to share information and foster conversation about the idea of building a “Collaboratory” to support model integration and collaborative data science initiatives focused on supporting decision-making in the Bay-Delta system. The session included short presentations and a moderated panel discussion of the importance and usefulness of “Collaboratory approaches,” the Delta Science Program’s role in facilitating and coordinating community members, and how pilot efforts (“use-cases”) and topic-specific challenges can be used as potential pathways to building core collaboratory elements such as cyberinfrastructure, human resources, best practices, and leadership elements.

CWEMF is a non-profit, non-partisan organization whose mission is to increase the usefulness of models for analyzing California’s water & environment related problems. The CWEMF Annual Meeting supports that mission by bringing together modelers and decision-makers to discuss a wide variety of modeling issues and solutions. For more information about the annual meeting and to view the full program, please visit the CWEMF website (<https://cwemf.org/wp/services/annualmeeting/>).

On Your Radar

2024 Bay Delta Science Conference

Next week, the 2024 Bay-Delta Science Conference will be held at the SAFE Credit Union Convention Center (1401 K Street, Sacramento, CA 95814) on September 30 to October 2, 2024. The conference will be the first in-person event of this nature

for the Bay-Delta region since 2018. This year's theme - "Cultivating Connections in a Dynamically Changing Environment" - recognizes the need for diverse perspectives to confront the multiple challenges in a dynamically changing environment such as the Sacramento-San Joaquin Delta. To cultivate this more holistic approach for conservation, the conference will include talks and sessions that encompass a wide variety of disciplines such as the use of traditional knowledge, identifying contaminants within and around the watershed, identifying needs of a variety of taxa, and exploring ways to mitigate climate change impacts, among other topics. In addition, the Bay-Delta Science Conference will feature artwork relating to the estuary and/or the conference theme.

Visit the conference website for more event details, including the full event program (<https://www.baydeltascienceconference.com/>).

Delta Science Tracker Webinar

The Delta Science Program will host an informational webinar to share information about the Delta Science Tracker at 12:00-1:00 pm on October 8, 2024. The Delta Science Tracker provides a comprehensive platform for tracking, summarizing, and communicating about scientific research and monitoring activities in the Bay-Delta (<https://sciencetracker.deltacouncil.ca.gov/>). The webinar will provide an opportunity for Delta Science Program staff to highlight the tool's key features and demonstrate various uses and applications, including how the tool is being used by Delta Science Program staff to summarize implementation of the 2022-2026 Science Action Agenda. Whether you are a researcher, resource manager, or just generally interested in science-related activities in the Delta, the webinar will provide valuable insights into how the Delta Science Tracker can be used to discover the latest research insights, track funding sources and expenditures on various science and management topics, and make connections with other members of the Delta science community. Information about the webinar can be found on the Council website, and you can register to attend at <https://rebrand.ly/61e532>.

By the Numbers

Science Program staff will summarize current numbers related to Delta water and environmental management. The summary (Attachment 2) will inform the Council

of recent counts, measurements, and monitoring figures driving water and environmental management issues.

List of Attachments

Attachment 1: Visual Summary of Article

Attachment 2: By the Numbers

Contact

Dr. Lisamarie Windham-Myers

Delta Lead Scientist

Phone: (916) 275-6888