

UC ANR Water Webinar



Frontiers in Sustainable Management of Groundwater

By: Dr. Thomas Harter, Professor and Robert M. Hagan Endowed Chair in Water Management and Policy, Department of Land, Air, and Water Resources, University of California, Davis

Day/Time: Friday 5/21, 3 - 4 PM

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Speaker Bio: Dr. Thomas Harter holds a joint appointment as Professor and Cooperative Extension Specialist in the Department of Land, Air, and Water Resources, University of California Davis. He is currently chair of the Hydrologic Sciences Graduate Group, and, as Associate Director of the Center for Watershed Sciences, is a team partner for the World Water Center. Dr. Harter's research and extension emphasizes the nexus between groundwater and agriculture. His research group focuses on nonpoint-source pollution of groundwater, sustainable groundwater management, groundwater and vadose zone modeling, groundwater resources evaluation under uncertainty, groundwater-surface water interaction, and on contaminant transport. His work uses a range of numerical, statistical, and stochastic modeling approaches, often with field research, to evaluate the impacts of agriculture and human activity on groundwater flow and contaminant transport in complex aquifer and soil systems, and to support development of tools needed in agriculture and by decision- and policy makers to effectively address sustainable groundwater management and water quality issues in agricultural regions.

Abstract: California's 1969 Water Quality Control Act (WQCA) requires dischargers to groundwater and surface water bodies to go through a permitting process to ensure that future water quality does not compromise beneficial uses of these water resources. In 2002, exemptions for agriculture were removed by the California legislature. Regional Water Boards are establishing regulatory programs to control nitrate and salinity pollution of groundwater. In 2014, the Sustainable Groundwater Management Act (SGMA) tasked newly created local Groundwater Sustainability Agencies to address groundwater overdraft, seawater intrusion, land subsidence, groundwater quality degradation, and depletion of interconnected surface water. This presentation highlights some challenges and misconceptions in implementing these programs in irrigated agricultural regions of central and northern California. The first example considers the mandate for monitoring the health of groundwater basins as a basis for evaluating whether the basin is managed sustainably. While water levels, seawater intrusion, and land subsidence can be measured directly, depletion of surface water requires a more complex set of measurements in conjunction with models that act effectively as a monitoring device. The Scott Valley Integrated Hydrologic Model is an example of developing a sustainability indicator based on integrated modeling rather than field measurements. The second example outlines the challenges that northern California basins are facing with respect to declining water levels, despite the fact that they are not in overdraft, and some of the consequence for the design of sustainability plans. The third example reviews the challenges in developing "sustainability criteria" for nitrate emissions to groundwater, linking them to agricultural practices, and developing tools that assess long-term benefits to groundwater users. It is also another example that relies on models rather than direct field measurements to measure sustainability. Model transparency and credibility, collaboration with stakeholders and outreach are critical to succeed in the use of such "measurement devices".

Host: Saeed Khan & Ellen Bruno, CE Specialists UC ANR