

USGS Western Geographic Science Center Guest “Brown Bag” Seminar

Sept 17th at Noon (12PM MST/PDT)

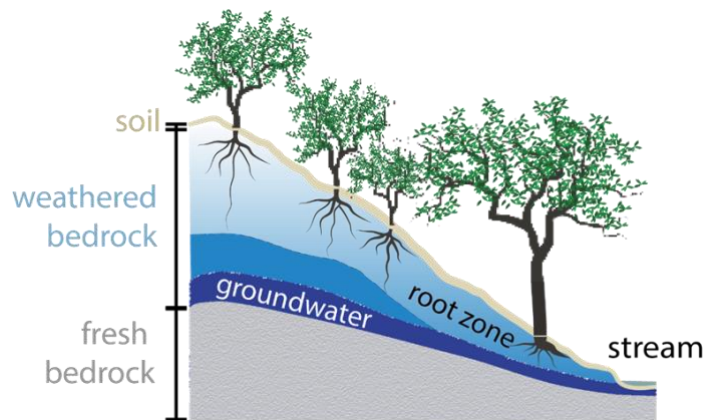
In-Person at ENRB1, Catalina Room (2nd floor), 520 N. Park Ave, Tucson, AZ 85719

Or Online via [Microsoft Teams](#), Meeting ID: 264 654 106 452, Passcode: wkVtRV

Title: **The root zone as a reservoir for plants and streams**

Speaker: **Dr. Dana A Lapides**, Research Hydrologist, USDA-ARS Southwest Watershed Research Center in Tucson, Arizona

Abstract: The frequency and intensity of droughts has increased over the past couple of decades, challenging our ability to forecast and manage water resources. Forecasting challenges were brought to public attention in 2021 when California’s estimated spring runoff was nearly double the amount of water that actually arrived in reservoirs. In this seminar, we will take a closer look at the primary driver of this forecasting anomaly: plants. As the climate warms and increases atmospheric demand for transpiration, where plants get their



water from and when is becoming an increasingly central question for water and land management. We will start with a close look at water dynamics in the root zone using data from a vadose zone monitoring system (VMS) installed on a hillslope in Northern California (Rivendell). The VMS enables water sampling and continuous water content measurements at 1.4 m intervals from the ground surface to the water table about 12 m below the surface. From these data, we are able to explore the spatiotemporal dynamics of plant water use and drainage in a hillslope with resolution and depth coverage that has not previously been possible. Based on these and other direct observations of root-zone moisture dynamics, we develop a model for how plant behavior drives water availability in streams and use what we learned to improve both simple statistical and complex numerical hydrological models. These root zone dynamics are essential in headwater catchments and hillslopes, but once streamflow arrives in channels, the dynamics of surface water availability are driven by different processes. We will review the drivers of surface water availability in streams and preview new tools under development for observing wet/dry dynamics from satellite imagery in near-real-time.

Speaker Bio: Dr. Dana A Lapides studies the mechanistic drivers of water availability, how human interventions impact landscape-scale hydrology, and the limitations of conventional management tools. In her work, she develops and applies analytical models, numerical models, remote sensing tools, and targeted field campaigns. She completed a PhD at UC Berkeley in May 2020 with Professors Sally Thompson and Michael Manga and holds a B.S. in Mathematics from Lafayette College. She was a Wisconsin Water Resources Science-Policy Postdoctoral Fellow in 2020 with the Wisconsin Department of Water Resources and worked as an ORISE Postdoctoral Scholar with David Dralle (USDA Forest Service), W Jesse Hahm (Simon Fraser University), and Daniella Rempe (University of Texas, Austin). Since 2023, she has been a Research Hydrologist with the USDA-ARS Southwest Watershed Research Center in Tucson, Arizona. Website: www.danalapides.com

Questions? In person, contact Laura Norman (lnorman@usgs.gov) or online Jason Kreitler (jkreitler@usgs.gov).