Boase Seminar Series in Hydrology and Water Resources Engineering

Department of Civil, Environmental and Architectural Engineering



Institutional Capacity for Adaptation to Multiyear Droughts

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Dept. of Environmental Sciences & Engineering Center on Financial Risk in Environmental Systems University of North Carolina, Chapel Hill, NC Wednesday, September 14, 2021 | 11:15 AM | ECCE 1B41 &

Zoom: https://cuboulder.zoom.us/j/95668504496

(passcode: water)

Abstract:

Unprecedented water scarcity across the Western U.S. has provided stakeholders with a glimpse of the challenges created by a non-stationary hydrologic future. Of particular concern is the uncertainty surrounding the length, severity, and magnitude of multi-year droughts. The wide envelope of potential outcomes makes it difficult to generate robust solutions to water supply planning problems in the region. One class of solutions implement an adaptive approach to this problem, employing short-term, reversible decisions (e.g., conservation, water marketing, groundwater banking) until additional observations provide a more resolved picture of future hydrologic conditions that can drive more informed long-term investments (e.g., storage, conveyance, treatment/recycling facilities). Within these pathways, new long-term investments improve the physical capacity of the system to respond to future drought through short-term measures. However, these short-term measures



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also impact the financial capacity of stakeholders (e.g. water districts, ditch companies) to make these investments in a timely and cost-effective manner. Revenue losses and additional costs due to short-term operations can make it more difficult for institutions to borrow money to make long-term investments. Using data from California's Central Valley, we illustrate how different scenarios of climate change could impact the short-term decisions, and as a result finances, of individual water/irrigation districts. We find that the same multi-year droughts that could serve as 'triggers' for more substantial water supply investments also coincide with periods where irrigation districts suffer substantial revenue losses that could impact their ability to borrow to make those investments.

Speaker Bios: Harrison Zeff is a Research Scientist in the Center on Financial Risk in Environmental Systems at the University of North Carolina, Chapel Hill. He develops risk-management solutions to a wide range of environmental issues, including drought impacts on California agriculture, residential flood risk in coastal North Carolina, and flood hazards within the Houston Ship Channel. Prior to his current position at UNC, he spent time as a teaching fellow at Tubingen University, Germany and as a research fellow at the Property and Environment Research Center in Bozeman, Montana. He holds a PhD and an MSEE in environmental science and engineering from the University of North Carolina, Chapel Hill and a BS in civil and environmental engineering from Pennsylvania State University.



