

## Ecohydrology of wetlands and agriculture in the midwestern U.S.

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3:30 - 4:30 PM (CST)

Via Zoom, Meeting ID: 995 0056 5246 Passcode: 920171

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**Dr. Amy Hansen, U. Kansas, USA**

### **Abstract:**

Over the past 15 years, cultivation of corn and soybean crops and thus fertilizer inputs has been steadily expanding westward from the traditional Corn Belt into the Great Plains. This talk examines evidence of changes in nitrogen dynamics and surface water quality within the midwestern U.S. and proposes wetlands as appropriate partners to corn-soybean agriculture. First, I will share recent analysis of monitoring data that highlights regional changes in aquatic nitrogen in the Great Plains, and evidence that, although nitrogen storage and transport are fundamentally different between the northern and southern Great Plains, both regions are at a critical junction in time for managing nitrogen. Next, I will use results from a reduced complexity river network model to demonstrate that riparian wetland construction or preservation is a promising approach to reduce nitrogen loads. I will share optimization results that provide generalizable guidance of where to put wetlands and how to size them. Finally, I address the challenging environment of floodplains and use hydraulic model results coupled with biological surveys to show that, although wetland vegetation is adapted to

dynamic water levels, vegetation communities will shift in response to changes in inundation depth and duration. Together these studies illustrate some of the challenges and opportunities for effective wetlandscape design in the context of midwestern U.S. agriculture.

### **Speaker biography:**

Dr. Amy Hansen is an Associate Professor in the Civil, Environmental and Architectural Engineering Department at the University of Kansas. She completed her Ph.D. at University of Minnesota in Civil Engineering with a minor in Ecology. Dr. Hansen's research investigates ecological and hydrological controls on water quality in wetlands, streams and river networks. She uses a combination of field observations, watershed modeling and laboratory experiments to determine how land use and climate change alter ecohydrology and hydro-biogeochemistry from mechanistic to regional scales. Dr. Hansen's research is funded by a combination of state and federal grants including NSF, USDA, and EPA. She received an NSF CAREER award in 2024 to investigate the role of vegetation in controlling exchange and net nitrogen removal in riparian wetlands in the agricultural midwestern U.S.