2026 DARCY LECTURE

University of Wisconsin-Madison

Steven Loheide, Ph.D.

Host: EPOC & Bordeaux INP - ENSEGID

Date: Monday March, 16th

Time: 2PM

Location: ENSEGID
1 allée F. Daguin
33600 Pessac

https://maps.app.goo.gl/QN8HwURtUh4Vtjdj8

Tram B François Bordes

Dr. Steven Loheide is the Distinguished Professor of Water Resources Engineering in Civil and Environmental Engineering, Geological Engineering, Freshwater and Marine Sciences and Water Resource Management at the University of Wisconsin – Madison. He received his BS in Environmental Chemistry and Geology from the University of Northern Iowa MS in Geology from Indiana University. and PhD in Hydrogeology from Stanford University. As an ecohydrologist, Loheide's research focuses on the interactions between ecological and hydrological processes in natural and built systems with special attention to the role of groundwater.

Trees are Groundwater Stakeholders Too

Groundwater dependent ecosystems depend on groundwater to thrive. Groundwater dependent ecosystems include wetlands and riparian forests that border streams and are well recognized in arid regions where lush vegetation may only exist where shallow groundwater is accessible to plant roots. However, in humid, temperate regions it's often assumed that forests do not rely on groundwater because precipitation is typically sufficient to meet the plant water demand. We tested this assumption by quantifying groundwater's influence on tree growth and transpiration in northern humid forests with sandy soils. Time-series of groundwater levels show that groundwater levels fall during the daylight hours when transpiration occurs and recover during nighttime periods in some of the observation wells we monitored. We used these diurnal groundwater fluctuations to quantify groundwater consumption and found that northern Wisconsin's forests consume groundwater when and where it is within 3m of the land surface. Furthermore, we analyzed tree growth response by coring trees and measuring annual tree ring increments. We found that trees in regions with shallow groundwater had up to twice as much growth as indicated by tree rings compared to regions where groundwater was deeper than 5m. Finally, we employed remote sensing techniques that compared vegetation indices during wet and dry periods and mapped the degree of groundwater influence across the study area. Counter to conventional wisdom, this research demonstrates that shallow groundwater subsidizes evapotranspiration even in humid forests and enhances forest productivity. Recognition of forests as groundwater users is important in guiding sustainable water and forest management decisions in the region.

For more information, visit groundwater.org/darcy

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