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A new framework for partitioning tile hydrographs

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Left: Deployment of a YSI EXO 3 sonde in a drainage water management control structure. Right: Researcher at a USDA-ARS edge-of-field monitoring station. Photos courtesy of Saeid Nazari.

Agricultural tile drainage across the Midwestern U.S. has increased nutrient loadings to receiving waterbodies, promoting harmful and nuisance algal blooms. The magnitude of nutrient loadings to tile drains depends on the extent of preferential flows and connectivity to nutrient-rich water sources. Existing methods for partitioning hydrographs into flow pathways and source water compositions during storm events typically involve expensive tracers or complicated numerical models.

In *Vadose Zone Journal*, researchers report on a new framework to partition hydrographs into flow pathway and source water components at the edge of a field through coupling of hydrograph separation techniques that use low-cost specific conductance and flowrate sensors.

The authors applied and evaluated the framework for a tile-drained Midwestern field in Ohio and highlighted the prominence of preferential flows of precipitation and matrix-macropore exchange of near-surface waters, even during periods with limited prior rainfall. The discretized hydrographs that considered both flow pathway and source water connectivity improved prediction of dissolved reactive phosphorus concentration in drainage waters, indicating the utility of the method for improving our understanding of contaminant transport through tile.

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Nazari, S., Ford, W.I., & King, KW. (2021). Quantifying hydrologic pathway and source connectivity dynamics in tile drainage: Implications for phosphorus concentrations. *Vadose Zone Journal*, e20154. **https://doi.org/10.1002/vzj2.20154**

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