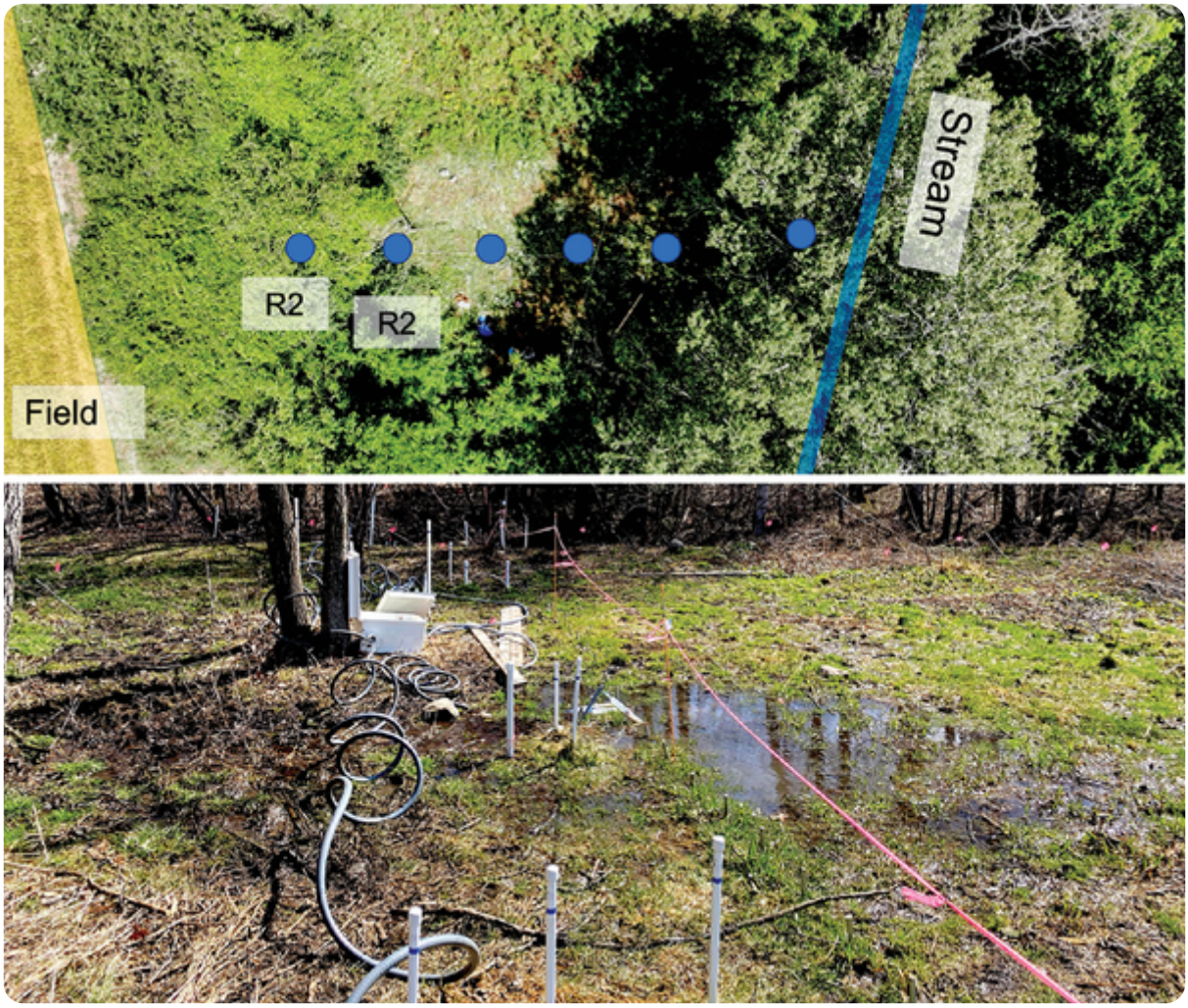
Science Societies

Effectiveness of Riparian Zones for Retaining Phosphorus

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Top: Aerial image of a monitoring transect between an agricultural field and stream to examine the fate of phosphorus in the subsurface of a riparian zone. Bottom: Field

equipment transect across a riparian zone in Kintore Creek, Ontario, to monitor phosphorus release and retention in the shallow aquifer. Photos by Shuyang Wang, Western University.

High phosphorus inputs to fresh surface waters can lead to harmful algal blooms and deterioration of aquatic ecosystems. Vegetated riparian zones are widely promoted to reduce pollutants, including phosphorus (P), from entering streams by trapping sediments and promoting uptake of nutrients by plants. But it is still unclear how effective these zones are because P that gets trapped may later be released and transported to the stream.

To explore the role of the shallow aquifer in retaining and releasing P from riparian zones, researchers from Western University and Environment Climate Change Canada conducted a 19-month field study that measured P concentrations and potential controlling factors in a shallow riparian aquifer. Results showed infrequent high concentrations of P that appeared random and short lived (referred to as hot moments) without any one dominant controlling factor. This illustrates the complexity of P behavior in riparian groundwater and shows that caution is needed in assessing the impacts of groundwater on stream water quality when monitoring locations are distant to the stream.

The findings will help scientists and managers draw more informed conclusions from monitoring data on the effectiveness of these best management practices.

Adapted from

Wang, S., Roy, J. W., Power, C., & Robinson, C. E. (2024). Spatiotemporal investigation of geochemical and hydrological controls on release of soluble reactive phosphorus from the shallow aquifer of a riparian zone. Journal of Environmental Quality, 53, 456–469. https://doi. org/10.1002/jeq2.20585

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