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Hunter R. Evans
Eastern Kentucky University

Reid E. Buskirk
Eastern Kentucky University

Walter S. Borowski
Eastern Kentucky University

Jonathan M. Malzone
Eastern Kentucky University

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GEOLOGY

Dissolved phosphate concentrations in surface water and groundwater at EKU's Meadowbrook Farm, Madison County, Kentucky. HUNTER R. EVANS, REID E. BUSKIRK, WALTER S. BOROWSKI, and JONATHAN M. MALZONE, Department of Geosciences, Eastern Kentucky University, Richmond, KY 40475.

Farms are non-point sources for nutrient contaminants that drain into watersheds and contribute to eutrophication and other environmental problems. EKU's Meadowbrook Farm raises both crops and livestock, causing dissolved phosphorus in the form of orthophosphate (PO_4^{3-}) to enter surface and subsurface waters, eventually flowing into the Muddy Creek watershed. We sampled springs, French drains, surface water from the farm, and Muddy Creek waters from May through August 2016. Typically 1 to 2 days after sampling, we measured orthophosphate concentration using the established ascorbic acid method and a UV-VIS spectrophotometer with general accuracy and precision of ~ 0.1 mg/L, or ppm.

Phosphate concentrations are generally low when compared to nitrate usually ranging from 0 to 0.2 mg/L P- PO_4 with higher concentrations of 0.5 to 2.7 mg/L P- PO_4 occurring sporadically. With minor exceptions, we saw little difference in phosphate concentration between different sample sources whether spring water, water from subsurface drains, surface waters flowing over the Farm, or Muddy Creek waters. For example, one sub-watershed draining the Farm had increased levels of phosphate on 24 May (2.7 mg/L) and on 24 June (0.5 mg/L), immediately following a significant rain event. However, overall patterns of phosphate concentration were similar whether sampling during periods with little or no rainfall, or periods following rain events. In summary, phosphate export from the Farm is apparently low, but more systematic sampling in the future may reveal heretofore unrecognized patterns.

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