**Hydrograph Separation of Storm Flows in a Landscape with Thin Soil, Meadowbrook Farm, KY**

Laura L. Kelley, Sophia Chan, Jonathan M. Malzone, Walter S. Borowski

 It was our objective to quantify the contributions of groundwater and runoff to the outflow of a watershed on Eastern Kentucky University’s Meadowbrook Farm in order to understand how rainfall leads to nutrient transport. Meadowbrook Farm, like many farms in Kentucky, has a shallow soil over bedrock. The thin soils tend to be compact and generate large runoff amounts during precipitation. We used a simple end member mixing analysis to separate “old water” and “new water” contributions to watershed runoff. In this case “old water” is water that is sourced from groundwater and “new water” is water that runs off soon after precipitation. Water with longer residence times will dissolve bedrock and thus have high concentrations of dissolved Mg, Ca, and HCO3. Conversely, water quickly running off the surface will not have time to dissolve these constituents. Therefore the primary process when new and old waters mix is dilution. During times of low flow, “old water” is the only water in the system. We collected baseline data during low flow in order to define the “old water” end member for the mixing analysis. Mg, Ca, and HCO3 were quantified with titration methods. Then, we sampled runoff during periods of rainfall. Assuming dilution between end members, the analysis yields the amount of water contributed from overland flow and groundwater. Our results showed two different kinds of runoff responses: 1.) responses that were~50% “old water” and 50% “new water” and 2.) Response that were 80% “new water”.