**A Spatial and Temporal Analysis of Sediment Yields for a Temperate Forest/Agriculturally Dominated Watershed**

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Various biophysical factors can have a significant influence on watershed sediment yields in temperate climate zones. Soil erosion will typically be limited to steeper slopes and/or more erodible soils during the peak growing season when denser vegetation stands protect the ground cover. As vegetation cover senesces, post-harvest and during cooler conditions across fall and winter, the potential for soil erosion and subsequent sediment yields increases, particularly during wetter periods. Focusing on the Upper Floyds Fork watershed, Kentucky, we applied the GIS-based hydrological/soil erosion model ArcSWAT to identify areas within the watershed acting as significant sediment contributors over a single growing season. We obtained daily hydro-meteorological data including runoff, max/min air temperature, precipitation, relative humidity, wind speed and solar radiation. Spatial and temporal vegetation changes were estimated from MODIS Leaf Area Index (LAI) imagery. ArcSWAT modeled the sediment yields using the modified Universal Soil Loss Equation (MUSLE) developed from a series of rasters to represent the soil erodibility (K), topographic (LS) and land cover/vegetation (C) factors across the watershed. To calibrate the model output we generated our own daily sediment yield dataset by deploying a turbidity sensor at the watershed outlet in situ with a USGS streamflow gage. From this we constructed a statistical relationship between turbidity and suspended sediment samples obtained for a range of flow conditions. Our results indicated that watershed sediment yields were strongly influenced by various biophysical factors, including changing vegetation cover and precipitation distribution across the growing season.