

Modeling Hydrologic Variables and Terrain Features for Strategically Locating Riparian Buffers

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Abstract

Vegetated riparian buffers and constructed wetlands can reduce the amount of sediment, nutrients, and pesticides entering streams if they are located to intercept water moving from agricultural land toward streams. Hydrologic factors control processes that affect water quality making it critical to consider these factors in the design and location of riparian buffers if water quality benefits are to be realized. Three areas with differing terrain and hydrology are being used to develop methods to locate riparian areas with the greatest potential to affect water quality. A 30-meter DEM was used to model the distribution of hydrologic and landscape features to identify where runoff, infiltration, and groundwater flow can be influenced by riparian management. In a loess-dominated watershed with natural drainage, steep slopes and significant erosion, riparian buffers located along first order streams would intercept the largest portion of the water flowing to the stream, thus have a greater effect on water quality. In a third-order, clay-till dominated watershed with extensive artificial drainage, areas best suited for buffers occupy generally less than 300 m of stream reach and are widely distributed throughout the basin. In a third basin, several sites meeting criteria for constructed wetlands have been mapped using Hydrologic and terrain features. These findings will be useful to support the application of conservation practices to reduce nutrient contamination of streams over broad areas.

Keywords: terrain analysis, riparian, buffers, wetlands

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