Public Abstract

First Name:Aslan

Middle Name:

Last Name:Aslan

Adviser's First Name:Kathleen

Adviser's Last Name:Trauth

Co-Adviser's First Name:

Co-Adviser's Last Name:

Graduation Term:SS 2009

Department:Civil Engineering

Degree:MS

Title:Development and Application of Vegetative Buffer Width Modeling using Geographic Information Systems

It has been widely accepted that vegetative buffers are effective in removing nonpoint source pollutants. However, problems focusing on vegetated buffers studies remain, especially in technical aspects (i.e., how to design appropriate buffers that can provide maximum performance and beneficial for people and ecosystems). In this research, a buffer width design methodology was successfully developed by transforming a graphical-based solution into a GIS-based solution using raster data models to integrate the physical parameters of slope, surface roughness, and soil. The GIS-based methodology will allow decision makers to move beyond rules-of-thumb for buffer requirements to incorporate site-specific parameters because a site-specific evaluation of performance could potentially require wider or narrower buffer widths in order to meet certain stormwater management criteria. This method was successfully demonstrated within the LaBarque Creek watershed located southwest of St. Louis, Missouri for three different scenarios: (1) utilization of GIS for delineating required buffer widths; (2) utilization of GIS for calculating trapping efficiencies for sediment; and (3) utilization of GIS for determining the volume of infiltrated stormwater per foot width of a buffer strip. The results show that the required widths from a variable buffer delineation respond dynamically to the changes in physical characteristics of the research sites.

Keywords: nonpoint source pollutants; buffer width modeling; physical parameters; GIS