



2009 CSREES National Water Conference; St. Louis, MO

Watershed Water Quality Assessment Tools

Phil Barnes*
KANSAS STATE UNIVERSITY
* lbarnes@ksu.edu

Abstract:

Soil erosion is a natural process, but land use change and human activities such as agriculture can significantly increase the rates of erosion, sediment, nutrient and bacterial transport and deposition. Increased erosion and sedimentation can impair water quality, affect stream channel stability, increase flooding, decrease reservoir storage, and cause other environmental damage to terrestrial and aquatic landscapes. Planning and implementation of soil conservation measures is important to minimizing damage caused by erosive disturbances. Planning for large areas is difficult, but geographic information systems (GIS) can provide tools to assess erosion risk and spatially optimize limited resources for implementing conservation measures. We used GIS to assess terrestrial landscapes for erosion potential by calculating a Revised Universal Soil Loss Equation (RUSLE) value on a raster basis (30 m x 30 m). All the variables in the RUSLE equation were readily derived from existing GIS layers using standard techniques, except the length-slope (LS) factor. The LS factor was calculated using a terrain analysis equation developed by Desmet and Grovers (1996) and modified by Mitasova et al. (1996) and a 10 m digital elevation model (DEM). The RUSLEGIS computation was performed for each raster in the analysis area, and the value was assumed to be indicative of net erosion (i.e., transport > detachment capacity; no deposition). A GIS buffer operation for streams identified by the National Hydrography Dataset (NHD) was used to weight erosion values within runoff zones in proximity of streams as having a greater potential for sediment delivery. A tablet PC was used to monitor conservation practices that were implemented in areas with the highest values for erosion risk. These assessment tools will be demonstrated on the Little Arkansas Watershed in south central Kansas.

Impact Statement:

This project has shown a significant reduction in atrazine concentrations and loadings in the Little Arkansas Watershed. But with these successes we continue to see excessive losses of sediment, nutrients and bacteria.

Category: Watershed Assessment and Restoration

Type of Presentation: Oral Presentation