



2009 CSREES National Water Conference; St. Louis, MO

Implementation of the Revised Universal Soil Loss Equation within a GIS Framework

Austin J. Bontrager*, Nathan O. Nelson, and Mark J. Davis
Kansas State University; *abontra1@ksu.edu

Abstract:

Eutrophication of surface water occurs when excess nutrients, such as phosphorus, cause algal blooms in lakes and streams. This can cause serious water quality problems for cities which rely on surface water for their municipal water supply such as Wichita's reliance on Cheney Reservoir. Best Management Practices (BMPs) such as no-till farming and cover crops can be implemented to reduce sediment and associated phosphorus loss from high-risk agricultural fields.

The objective of this study is to use the Revised Universal Soil Loss Equation (RUSLE) within a GIS framework to predict field-scale soil erosion and target fields for BMP practices in the Red Rock Creek watershed, a subwatershed of the Cheney Reservoir watershed. While this method has been demonstrated in the past, the inputs which are often used are simplified approximations or based on poor spatial resolution. The variable inputs for the equation will be determined using as much detail as is available using both publically available spatial data and manual field observations.

The topography factors are calculated using a ten meter Digital Elevation Models (DEM). Rainfall intensity is interpolated using CoCoRaHS rainfall data. The cover and practices factors are determined by manual observation of ground cover and use of the RUSLE2.0 windows interface. The SSURGO database is used to determine the soil erodability factor.

By using the best sources of information for RUSLE inputs a thorough evaluation of the accuracy and practicality of the method can be made. Comparing the results of this implementation of RUSLE with past estimates will allow us to judge the adequacy of using simpler calculations to determine field level targeting for BMPs.

Impact Statement:

This study is an attempt to spatially implement the Revised Universal Soil Loss Equation in as detailed a fashion as possible. The flexibility of the current RUSLE2 and earlier forms of the equation allow for many broad generalizations to be used in place of more detailed methods for calculating the many factors involved in soil erosion. By maximizing the detail and accuracy of the inputs we are able to judge how well approximations of certain factors are able to achieve acceptable results. Certain factors, such as landuse/crop cover may require a great deal of manual observations and input of data to be modeled with the best accuracy. This study will help determine if similar results can be obtained with less work.

Category: CEAP

Type of Presentation: Poster Presentation