

A GIS APPLICATION OF THE UNIVERSAL SOIL LOSS EQUATION  
TO THE WATERSHED OF THE EAST FORK OF  
THE LAMOINE RIVER, MCDONOUGH COUNTY, ILLINOIS

An Applied Project  
Presented to the  
Department of Geography  
Western Illinois University

In Partial Fulfillment  
of the Requirement for the Degree  
Master of Arts

By  
Penroong Bamrungrach  
December 1995

A GIS APPLICATION OF THE UNIVERSAL SOIL LOSS EQUATION  
TO THE WATERSHED OF THE EAST FORK OF  
THE LAMOINE RIVER, MCDONOUGH COUNTY, ILLINOIS

An Abstract of  
An Applied Project  
Presented to the  
Department of Geography  
Western Illinois University

In Partial Fulfillment  
of the Requirement for the Degree  
Master of Arts

By  
Penroong Bamrungrach  
December 1995

The Universal Soil Loss Equation (USLE) has been used by soil conservationists in the United States since about 1940 to predict annual soil erosion rates. In this study, a geographic Information system (GIS) in combination with the USLE and a delivery ratio was used to estimate annual rates of soil erosion and sediment yields for the watershed of the East Fork of the Lamoine River within McDonough County. The model was run four times using four different assumed crop management practices, including tillage, reduced- tillage, no-till, and a combination of reduced-tillage and no-till. This was done to demonstrate the impact of different crop management practices upon the model.

Most data were stored and analyzed in grid format (cell-based). This format lends itself to the use of map algebra and the efficient solution of models such as the USLE.

A comparison of the results from different crop management practices shows that using no-till produced the least erosion and the lowest sediment yields while tillage produced the largest amount of soil loss and sediment loadings. Soil erosion can be reduced approximately forty-five percent compared with tillage by using all no-till.

The patterns of estimated soil erosion and sediment yields coincide closely. High soil erosion and sediment loading areas were found along the river and streams. The flatter upland area, as might be expected, experienced much lower values.

This study has demonstrated the feasibility of using a grid-based GIS with a spatial model to provide estimates of erosion that can be beneficial to those involved in conserving farmland soils. Although the analytic component of projects such as this can be done much more rapidly than with the standard manual method, data collection and preparation can still involve substantial labor inputs.