ESTIMATING SOIL EROSION FROM WATER USING THE REVISED UNIVERSAL SOIL LOSS EQUATION, VERSION 2

The Revised Universal Soil Loss Equation, Version 2 (RUSLE2) is the first fully computerized water erosion model designed for conservation planning and application to inventory erosion rates and estimate sediment delivery. The RUSLE2 model is an upgrade of the text-based RUSLE DOS, Version 1 used to calculate rill and interrill erosion in Missouri from January 1997 to July 2004. This method is the current and official erosion prediction model to be used to estimate rainfall and runoff erosion in Missouri.

RUSLE2 is a computer model containing both empirical and process-based science in a Windows environment that predicts rill and interrill (sheet and rill) erosion by rainfall and runoff. The USDA Agricultural Research Service (ARS) is the lead agency for developing the RUSLE2 model. The ARS, through the University of Tennessee and private contractors, is responsible for developing the science in the model and the model interface.

The official web site for RUSLE2 information is:
http://fargo.nserl.purdue.edu/rusle2_dataweb

RUSLE2 evolved from the science in RUSLE and USLE. USLE was entirely an empirically based equation and was limited in its application to conditions where experimental data was available for deriving the factor values. RUSLE retained the basic structure of USLE with process-based relationships added where empirical data and relationships were inadequate. This major advancement in RUSLE allowed the use of subfactor relationships to compute C-factor values from basic features of the cover-management systems.

While RUSLE2 uses the USLE basic formulation of the unit plot, the calculations are on a daily time-step basis. With the graphical user interface and modern computes, RUSLE2 is extremely powerful in the information that it displays and the types of situations that it can represent. It is a very powerful model yet it uses very simple, easy to obtain inputs.

NRCS users are advised to use the NRCS Simple Templates within the model. These templates generally represent the five steps to be followed in making an erosion estimate as:

Step 1: Identify location of the field by state and county.

Step 2: Select the representative soil for the field.

Step 3: Enter the slope topography features (steepness and length) that represent the field.

Step 4: Develop the cover-management system including dates of operations, farming and use operations, crops and forages grown, irrigation applications, realistic yields, residues either added or removed from the system, etc.

Step 5: Select the supporting practices that have been used on the field to manage runoff or reduce erosion (buffers, terraces, contour farming, diversions, stripcropping, subsurface drainage, etc.). These supporting practices must occur within the slope length selected in Step 3 to have any positive effect on the rill and interrill erosion estimate of the field. Supporting practices installed at the lower edge of a field and not occurring within the slope length merely reduce the amount of sediment leaving the field.

NOTE: Soil erosion rates estimated with the RUSLE2 will not be added to rates estimated with the Wind Erosion Equation (WEQ) or Wind Erosion Prediction System (WEPS) for conservation planning purposes unless the unsheltered distance (L) of the WEQ/WEPS calculation and the slope length (L) of the RUSLE2 calculation are from identical locations with identical L-values within the field. This condition would seldom, if ever occur. RUSLE2 factors will not be used in other water erosion models such as the Revised Universal Soil Loss Equation (RUSLE) or the Universal Soil Loss Equation (USLE).