APPENDIX B-2

Estimating Soil Erosion With the Revised Universal Soil Loss Equation (RUSLE2)

Scientific planning for soil erosion reduction requires knowledge of the relations between those factors that cause loss of soil and water and those that help to reduce such losses. The Revised Universal Soil Loss Equation (RUSLE2) is used to estimate the quantity of soil erosion (sheet and rill) caused by water and to design water erosion control systems.

The soil loss predicted by the USLE is that of soil moved off the particular slope segment in sheet and rill erosion. Sheet erosion is defined as the removal of layer of soil from the land surface by the action of rainfall and runoff. It is the first stage in water erosion. This is followed by rill erosion. Rills are small, occur in cropland situations, are removed by normal farming operations, and usually do not reoccur in the same place.

The RUSLE2 does not predict sediment deposition or soil erosion caused by gully, streambank, streambed, mass movement, or wind erosion.

The RUSLE2 equation is:

a = r k l s c p

a is the soil loss in tons per acre per year.

r is the rainfall factor. The R factor value quantifies the raindrop impact effect. Rainfall energy is directly related to rain intensity. The energy of a rainstorm is a function of the amount of rain and of all the storm's component intensities. Median raindrop size increases with rain intensity and the terminal velocity of free-falling waterdrops increase with increased dropsize.

k is the soil erodibility factor. Some soils erode more readily than others even when all other factors are the same.

l,s is the topographic factor. Both the length,the steepnesss and shape of the land slope substantially affect the rate of soil erosion by water.

Slope length is defined as the distance from the point of origin of overland flow of water to the point where either the slope gradient decreases enough that deposition begins, or the runoff water enters a well-defined channel (terrace channel, concentrated flow area, gully, ditch, grass waterway, etc.). It is not the total length or width of the field in most cases.

c is the cover and management factor. C is the ratio of soil loss from land with a specified type and amount of cover to the corresponding loss from a clean tilled, continuous fallow site.

p is the support practice factor. P is the ratio of soil loss with a specific support practice to the corresponding loss with up-and-down slope farming.

Soil Loss Tolerance

The term "soil loss tolerance", sometimes called the "T" value, denotes the maximum level of soil erosion that will permit a high level of crop productivity to be sustained economically and indefinitely. Any cropping and management combination for which the predicted erosion rate is less than the tolerance may be expected to provide satisfactory erosion control. Soil loss tolerances range from 1 to 5 tons/acre/year for soils of the U.S.
acre/year

Water Erosion Prediction Project (WEPP)

The development of a new generation of technology for predicting water erosion is under way by a USDA team in the Water Erosion Prediction Project (WEPP). Working with other agencies and academic institutions, the goal of the WEPP is a process oriented model or family of models that are

conceptually superior to the lumped model RUSLE and are more versatile as to the conditions that can be evaluated. The WEPP technology is expected to replace RUSLE sometime in the future.

Table B-2.1 - Rainfall-Erosion Index Factor "R" Values

County	R	County	R	County	R
Appling	350	Cherokee	300	Fannin	275
Atkinson	325	Clarke	275	Fayette	300
Bacon	350	Clay	375	Floyd	300
Baker	375	Clayton	300	Forsyth	275
Baldwin	275	Clinch	350	Franklin	300
Banks	300	Cobb	300	Fulton	300
Barrow	275	Coffee	325	Gilmer	275
Bartow	300	Colquitt	350	Glascock	250
Ben Hill	325	Columbia	250	Glynn	400
Berrien	350	Cook	350	Gordon	300
Bibb	300	Coweta	325	Grady	400
Bleckley	300	Crawford	300	Greene	250
Brantley	375	Crisp	325	Gwinnett	300
Brooks	375	Dade	275	Habersham	300
Bryan	350	Dawson	275	Hall	275
Bulloch	325	Decatur	425	Hancock	250
Burke	275	DeKalb	300	Haralson	325
Butts	300	Dodge	300	Harris	325
Calhoun	375	Dooly	325	Hart	275
Camden	400	Dougherty	350	Heard	325
Candler	300	Douglas	300	Henry	300
Carroll	325	Early	400	Houston	300
Catoosa	275	Echols	350	Irwin	325
Charlton	375	Effingham	350	Jackson	275
Chatham	350	Elbert	250	Jasper	275
Chattahoochee	350	Emanuel	300	Jeff Davis	325
Chattooga	300	Evans	325	Jefferson	275

County	R	County	R	County	R
Jenkins	300	Paulding	300	Toombs	325
Johnson	300	Peach	300	Towns	300
Jones	275	Pickens	275	Treutlen	300
Lamar	300	Pierce	350	Troup	325
Lanier	350	Pike	325	Turner	325
Laurens	300	Polk	300	Twiggs	300
Lee	350	Pulaski	300	Union	300
Liberty	350	Putnam	275	Upson	325
Lincoln	250	Quitman	375	Walker	275
Long	350	Rabun	300	Walton	275
Lowndes	350	Randolph	350	Ware	350
Lumpkin	275	Richmond	250	Warren	250
McDuffie	250	Rockdale	300	Washington	275
Mclntosh	400	Schley	325	Wayne	375
Macon	325	Screven	300	Webster	350
Madison	275	Seminole	425	Wheeler	300
Marion	325	Spalding	300	White	300
Meriwether	325	Stephens	300	Whitfield	275
Miller	400	Stewart	350	Wilcox	325
Mitchell	375	Sumter	325	Wilkes	250
Monroe	300	Talbot	325	Wilkinson	275
Montgomery	300	Taliaferro	250	Worth	350
Morgan	275	Tattnall	325		
Murray	275	Taylor	325		
Muscogee	325	Telfair	325		
Newton	300	Terrell	350		
Oconee	275	Thomas	400		
Oglethorpe	250	Tift	350		