POST-FIRE EROSION POTENTIAL

COVERAGE NAME: perod04_1 (formerly ruslepost04_1)

FEATURE TYPE: pixel

SOURCE: STATSGO (k-factor), Teale 90 m DEM (DEM9099_1) (to calculate length-slope), NOAA (2-year, 6-hour rainfall intensity), RUSLE - http://www.sedlab.olemiss.edu/rusle1new/description106.html

MINIMUM MAPPING UNIT: 90 m cell, derived from mix of input data ranging from 1:100,000 to 1:1,000,000 scale

AREAL EXTENT: statewide

DATE OF LAST UPDATE: Oct. 21, 2004 - revision to LS calculation, new rainfall
Feb. 6, 2003 by S. Saving - creation

INFO ITEMS: pixel

ITEM NAME	INPUT WIDTH	OUTPUT WIDTH	DATA TYPE	DECIMALS	DESCRIPTION
VALUE	4	10	B	-	
COUNT	4	10	B	-	
EST_TONS	4	10	B	-	Estimated tons of soil loss/acre/year
EROS_CLASS	1	1	I	-	Erosion potential class

ITEM NAME: EST_TONS and EROS_CLASS

EST_TONS represents roughly the tons/acre/year of soil potentially lost after a wildfire. '-1' represents areas (excluding Water and Urban) that do not have a Fuel Rank. '0' represents areas of Water or Urban that are outside the scope of this analysis. All positive values have been rounded to the nearest whole number except those between 0 and .5 which have been rounded up to '1'. Nevertheless, the raw values are very rough and should not be used directly. Rather, they should be viewed as a relative index.

VALUE	EROS_CLASS	DESCRIPTION
-1	-1	Areas without a Fuel Rank (generally Ag or Barren)
0	0	Water and Urban areas outside scope of analysis
1 - 8	1	Low
9 - 50	2	Moderate
> 50	3	High

NOTES:

This data represents FRAP's best estimate of the Revised Universal Soil Loss Equation (RUSLE) in a post-wildfire environment. The RUSLE is an empirical equation designed for the computation of average soil loss

in agricultural fields. This equation was developed for detachment capacity limited erosion in fields with negligible curvature and no deposition. It represents soil loss averaged over time and total area. The equation has the following form (Wischmeier and Smith 1978, Renard et al. 1991)

$$A = R * K * L * S * C * P$$

where,
A [ton/acre/year] is estimate average soil loss,
R [Erosion Index units/year] is rainfall-runoff erosivity factor,
K [tons/acre/unit R] is soil erodibility factor (source data STATSGO)
LS [dimensionless] is topographic (length-slope) factor (Moore and Burch 1986, Van Remortel et al. 2001),
C [dimensionless] is coverage factor, and
P [dimensionless] is prevention practices factor.

FRAP estimated the coverage factor (C) for post fire conditions by examining the relationship of major land cover types (WHR10NAME) and WHR density classes (WHRDENSITY) from the FRAP Multi-source Land Cover data set (v02_2) crossed with wildfire fuel rank (FUEL_RANK) from the FRAP Fire Threat (v04_1) data set. For example, areas with low vegetative cover and high fuel rank (high fuel rank indicates intense fires that can remove a large proportion of the cover) receive higher values. Areas of high cover and low fuel rank receive lower values, because after fire, a higher proportion of their original cover will remain.

FRAP did not include prevention practices (P) in the calculation of post-fire erosion potential.

Because the RUSLE was developed for use in agricultural fields it has not been as extensively tested in natural land cover landscapes. FRAP found that the coverage factor (C) had the greatest influence on the total erosion value so slight variations in C can produce very different results. FRAP researched the literature to find the best empirical measures of C in undisturbed and disturbed landscapes yet the values of C used in this model are still no better than rough estimates (Lopez et al. 1998, Dissmeyer and Foster 1981, 1980)

Rainfall intensity data (R) is the 2-year, 6-hour amount and comes from the NOAA Atlas 14, Volume 1, Version 3 estimates for Southeastern California (sa2yr06ha) and Atlas 2, Volume XI for the rest of the State (na2_ca_2yr6hr) (see http://www.nws.noaa.gov/oh/hdsc). These two datasets did not align properly and a ArcInfo GRID NIBBLE process was used to fill the gaps.

Soil erodibility (K) is derived from the STATSGO soil dataset attribute KMEAN.

We calculated the topographic length-slope factor (LS) using Van Remortel, Hamilton and Hickey's (2001) algorithm (rusle_ls_4_unix.aml,ver. 4, 12/18/2003) (see http://www.yogibob.com/slope/slope.html) on the elevation data set DEM9099_1.

Caution is also urged because this model does not reflect many other sources of erosion in the landscape, such as roads, agricultural practices, or other disturbances that expose bare ground to the effects of rainfall. These data can only be used to indicate the portion of erosion potential that comes from the direct effects of wildland fire on the landscape, and not any other factors.

REFERENCES

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Moore, I. and G. Burch. 1986. Physical basis of the length-slope factor in the universal soil loss equation. Soil Science Society of America Journal Vol. 50:1294-1298.

Renard, K.G., Foster, G.R., Weesies, G.A. and Porter, J.P. 1991. RUSLE: Revised Universal Soil Loss Equation. J. Soil and Water Conservation Vol. 46(1):30-33

Van Remortel, R., M. Hamilton, and R. Hickey. 2001. Estimating the LS factor for RUSLE through iterative slope length processing of DEM elevation data. Cartography. Vol. 30(1):27-35.

Wischmeier, W.H. and D.D. Smith. 1978. Predicting rainfall erosion losses--a guide to conservation planning. Agricultural Handbook Number 537. Washington DC: U.S. Department of Agriculture.

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COORDINATE SYSTEM DESCRIPTION

Projection	ALBERS		
Datum	NAD27		
Units	METERS	Spheroid	CLARKE1866
Parameters:			
1st standard parallel			34 0 0.000
2nd standard parallel			40 30 0.000
central meridian			-120 0 0.00
latitude of projection's origin			0 0 0.000
false easting (meters)			0.00000
false northing (meters)			-4000000.0000