RHEM Equation Summary

Updated: 07/02/2014

Ft (friction factor)

Ft = 10^{−0.109+(1.425*littercover)*+(0.442 **rockcover*)+(1.764*(*basalcover*+ *cryptogams*))+2.068S}

Ke (Green-Ampt Hydraulic Conductivity)

Sand	Keb = 24 * {exp^[0.3483 * (*basalcover* + *littercover*)]}
Loamy Sand	Keb = 10 * {exp^[0.8755 * (*basalcover* + *littercover*)]}
Sandy Loam	Keb = 5 * {exp^[1.1632 * (*basalcover* + *littercover*)]}
Loam	Keb = 2.5 * {exp^[1.5686 * (*basalcover* + *littercover*)]}
Silt Loam	Keb = 1.2 * {exp^[2.0149 * (*basalcover* + *littercover*)]}
Silt	Keb = 1.2 * {exp^[2.0149 * (*basalcover* + *littercover*)]}
Sandy Clay Loam	Keb = 0.80 * {exp^[2.1691 * (*basalcover* + *littercover*)]}
Clay Loam	Keb = 0.50 * {exp^[2.3026 * (*basalcover* + *littercover*)]}
Silty Clay Loam	Keb = 0.40 * {exp^[2.1691 * (*basalcover* + *littercover*)]}
Sandy Clay	Keb = 0.30 * {exp^[2.1203 * (*basalcover* + *littercover*)]}
Silty Clay	Keb = 0.25 * {exp^[1.7918 * (*basalcover* + *littercover*)]}
Clay	Keb = 0.2 * {exp^[1.3218 * (*basalcover* + *littercover*)]}

Shrub Vegetation Community

Ke = Keb * 1.2

Sod Grass Vegetation Community

Ke = Keb * 0.8

Bunch Grass Vegetation Community

Ke = Keb * 1.0

Forbs Vegetation Community

Ke = Keb * 1.0

Kss (Splash and Sheet erosion parameter)

Shrub Vegetation Community

Kss = 2.6 * {10^ [4.00836 - (1.17804 * *rockcover*) - (0.98196 * (*littercover* + *canopycover*))]}

Sod Grass Vegetation Community

Kss = 2.6 * {10^ [3.13334 - (0.20055 * *canopycover*) - (0.50550 * *littercover*)]}

then: Kss = (Kss/1.5)

Bunch Grass Vegetation Community

Kss = 2.6 * {10^ [3.13334 - (0.20055 * *canopycover*) - (0.50550 * *littercover*)]}

Forbs Vegetation Community

Kss = 2.6 * {10^ [3.13334 - (0.20055 * *canopycover*) - (0.50550 * *littercover*)]}

α (degrees) = atan(*slope*)

Slope Steepness Factor = (2.96*(sin(α)^0.79) + 0.56)

Kss for all cases is multiplied by the factors 1.3 and 2.0 (2.6) in order to account for the bias in the log transformation and calibration and for the Slope Steepness factor:

[Duan, Naihua. 1983. Smearing Estimate: A Nonparametric Retransformation Method, *Journal of the American Statistical Association*, Vol., 78, No. 3838. (Sep., 1983), pp. 605-610.]

[Foster,G. R. 1982. Modeling the Erosion Process. In C.T. Haan, H. P. Johnson, D. L. Brakensiek(Eds.), Hydrologic Modeling of Small Watershed (297-380), American Society of Agricultural Engineers, St. Joseph, Michigan.]