

# RUSLE2 vs. RUSLE1

Differences



# RUSLE1 DOS Based Worksheet

Data from look up tables



MS-DOS Rusle.exe

File Exit Help Screen

< RUSLE SWCS1.05 >

Conservation Planning Alternatives - Soil Loss Computation Worksheet

filename	R	x	K	x	LS	x	C	x	P	=	A
T-804-1	*75		*0.32		*0.27		*0.161		*1.00	=	1
T-804-2	*75		*0.37		*0.29		*0.161		*1.00	=	1.3
T-804-3	*75		*0.37		*0.29		*0.161		*1.00	=	1.3
T-804-4	*75		*0.17		*0.36		*0.161		*1.00	=	0.74
T-804-5	*\$75		*0.32		0.42		*0.161		*\$1.00	=	1.6
T-804-7	*75		*0.28		*0.27		*0.161		*1.00	=	0.91
T-804-8	*75		*0.28		*0.27		*0.161		*1.00	=	0.91
T-804-10	*\$75		*0.37		0.44		*0.161		*\$1.00	=	2
T-804-11	*75		*0.37		*0.44		*0.161		*1.00	=	2
T-804-12	*75		*0.32		*0.44		*0.161		*1.00	=	1.7

NOTES: \* value entered directly or file was saved elsewhere  
\$ the field slope for this factor is not current

< F4 Calls Factor, Esc Returns to RUSLE Main Menu >

Tab Esc F1 F2 F4 F9  
FUNC esc help clr call info

# RUSLE1 DOS Based Worksheet

- You had to look up lots of data from tables to enter into the worksheet, including:
  - R Factor (rainfall factor)
  - C Factor (cropping factor)
  - K Factor (erodibility of the soil)
  - P Factor (supporting practices)
- Following slides show the old look-up tables...



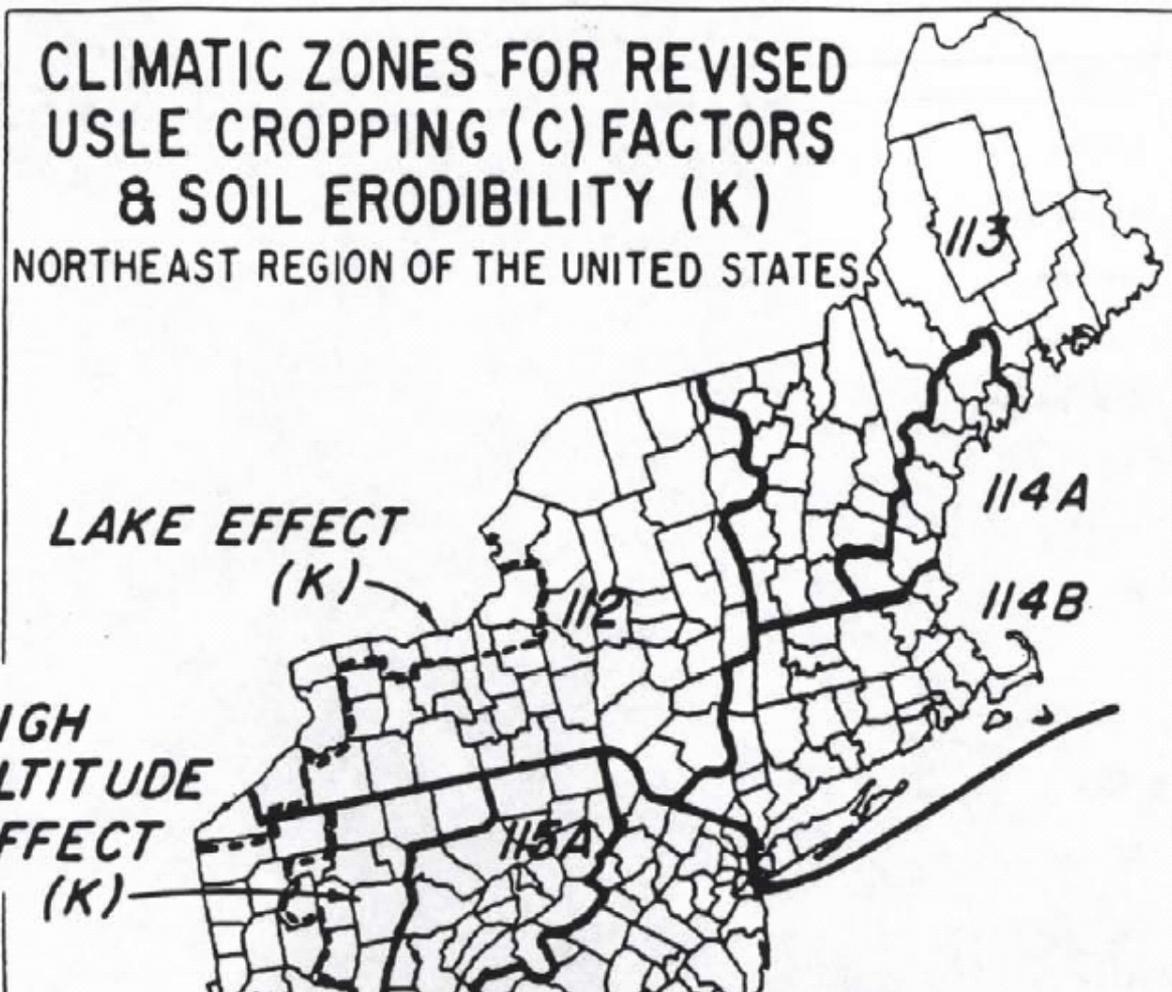
### TABLE RUSLE R R FACTOR VALUE

County	"R" FactorValue (I)
Addison	80
Bennington	100
Caledonia	75
Chittenden	80
Essex	75
Franklin	75
Grand Isle	75
Lamoille	75
Orleans	80
Orange	75
Rutland	90
Washington	80
Windham	100
Windsor	90



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Figure 1



Bookmarks  
Thumbnails  
Signatures



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**TABLE RUSLE K**  
**AVERAGE ANNUAL K FACTORS**  
RUSLE Version 1.04

Climatic Zone: 113

<b>K</b>	<b>Average Annual K</b>
.02	.02
.05	.05
.10	.08
.15	.12
.17	.15
.20	.17
.24	.20
.28	.24
.32	.26
.37	.30
.43	.35
.49	.40
.55	.46
.64	.52

The Average Annual K factors from this table are to be used only for hand calculations prior to the use of the computerized version of RUSLE in FOCS.

Procedure:

1. Obtain K for each cell from the K Factor Table in the Estimating Guide. Table 1.1.



Bookmarks  
Thumbnails  
Signatures

VTTC Section I Erosion Prediction

Vermont

Values for topographic factor, LS, for moderate ratio of rill to interrill erosion. <sup>1</sup>														
Horizontal slope length (ft)														
Slope %	<3	6	9	12	15	25	50	75	100	150	200	250	300	400
0.2	0.05	0.50	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
0.5	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.10
1.0	0.11	0.11	0.11	0.11	0.11	0.12	0.13	0.14	0.14	0.15	0.16	0.17	0.17	0.18
2.0	0.17	0.17	0.17	0.17	0.17	0.19	0.22	0.25	0.27	0.29	0.31	0.33	0.35	0.37
3.0	0.22	0.22	0.22	0.22	0.22	0.25	0.32	0.36	0.39	0.44	0.48	0.52	0.55	0.60
4.0	0.26	0.26	0.26	0.26	0.26	0.31	0.40	0.47	0.52	0.60	0.67	0.72	0.77	0.86
5.0	0.30	0.30	0.30	0.30	0.30	0.37	0.49	0.58	0.65	0.76	0.85	0.93	1.01	1.13
6.0	0.34	0.34	0.34	0.34	0.34	0.43	0.58	0.69	0.78	0.93	1.05	1.16	1.25	1.42
8.0	0.42	0.42	0.42	0.42	0.42	0.53	0.74	0.91	1.04	1.26	1.45	1.62	1.77	2.03
10.0	0.46	0.48	0.50	0.51	0.52	0.67	0.97	1.19	1.38	1.71	1.98	2.22	2.44	2.84
12.0	0.47	0.53	0.58	0.61	0.64	0.84	1.23	1.53	1.79	2.23	2.61	2.95	3.26	3.81
14.0	0.48	0.58	0.65	0.70	0.75	1.00	1.48	1.86	2.19	2.76	3.25	3.69	4.09	4.82
16.0	0.49	0.63	0.72	0.79	0.85	1.15	1.73	2.20	2.60	3.30	3.90	4.45	4.95	5.86
20.0	0.52	0.71	0.85	0.96	1.08	1.45	2.22	2.85	3.40	4.36	5.21	5.97	6.68	7.97
25.0	0.56	0.80	1.00	1.16	1.30	1.81	2.82	3.65	4.39	5.69	6.83	7.88	8.86	10.65
30.0	0.59	0.89	1.13	1.34	1.53	2.15	3.39	4.42	5.34	6.98	8.43	9.76	11.01	13.30
40.0	0.65	1.05	1.38	1.68	1.95	2.77	4.45	5.87	7.14	9.43	11.47	13.37	15.14	18.43
50.0	0.71	1.18	1.59	1.97	2.32	3.32	5.40	7.17	8.78	11.66	14.26	16.67	18.94	23.17
60.0	0.76	1.30	1.78	2.23	2.65	3.81	6.24	8.33	10.23	13.65	16.76	19.64	22.36	27.45

TABLE RUSLE LS

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<sup>1</sup> Such as for row-cropped agricultural and other moderately consolidated soil conditions with little-to-moderate cover (not applicable to thawing soil) Reference: Agricultural Handbook No. XXX, Chapter 4, p 128

April 1995

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**TABLE RUSLE C-1**  
**"C" Values for EI Distribution Zone 113**

Refers to Current Crop	Previous Crop											
	Small Grain				Row Crops					Hay		
	SP	FP	10%	30%	SP	FP	10%	30%	MA	SP	FP	
<b>Current Crop</b>												
<b>BEANS &amp; W/C</b>	.23 --	.28 --	-- --	-- --	.31 .28	.40 .32	-- --	-- --	-- --	.21 --	.26 --	
<b>GRAIN CORN</b>	.21	.28	.15	.08	.18	.24	.10	.07	.13	.11	.18	
<b>SILAGE CORN &amp; W/C</b>	.30 .26	.33 --	.23 --	.12 --	.30 .24	.34 --	.21 .17	.17 --	.24 .16	.18 .18	.20 --	
<b>POTATOES &amp; W/I</b>	.36 .29	.29 --	.36 --	.20 --	.44 .31	.43 --	.36 --	-- --	-- --	.16 .17	.22 .20	

1. Average annual "C" values or rotations are determined by adding individual "C" values and dividing by number of years in rotation. For example: The average annual "C" value for a rotation of potatoes, oats, underseeded with 10% cover left after planting potatoes is  $.32 + .12 = .44 + 2 = .2$ .
2. Manure assumes 2-3 ton/acre dry matter applied in spring

**(TABLE 1) COVER MANAGEMENT CONDITIONS**

Select the cover management condition that best describes the condition during the 1/4 of the year when rainfall and runoff are most erosive and the soil is most susceptible to erosion. Since the P factor effects are approximate, no provision is made for varying the cover-management condition class during the year.

Description of cropland cover-management conditions used in RUSLE for estimating P-factor values.

Cover-Management Condition	Description
Code 1. Established meadow.	In this condition, the grass is dense and runoff is very slow, about the slowest under any vegetative condition. When mowed and baled, this condition is condition 2.
Code 2. 1st year meadow, hay.	In this condition, the hay is a mixture of grass and legume just before cutting. The meadow is a good stand of grass that is nearing the end of the first year. When mowed and baled, this condition becomes a condition 4 for a short time.
Code 3. Heavy cover and/or very rough.	Ground cover for this condition is about 75 to 95%. Roughness would be like that left by a high clearance moldboard plow on a heavy textured soil. Roughness depressions would have the appearance of being 7 inches deep and deeper. Vegetative hydraulic roughness would be like that from a good legume forage crop, such as alfalfa, that has not been mowed.

Bookmarks  
Thumbnails  
Signatures

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**TEN-YEAR FREQUENCY SINGLE-STORM EROSION  
INDEX VALUES FOR VERMONT**

ADDISON	- 50
BENNINGTON	- 50
CALEDONIA	- 50
CHITTENDEN	- 50
ESSEX	- 50
FRANKLIN	- 50
GRAND ISLE	- 50
LAMOILLE	- 50
ORANGE	- 60
ORLEANS	- 50
RUTLAND	- 50
WASHINGTON	- 50
WINDHAM	- 50
WINDSOR	- 60

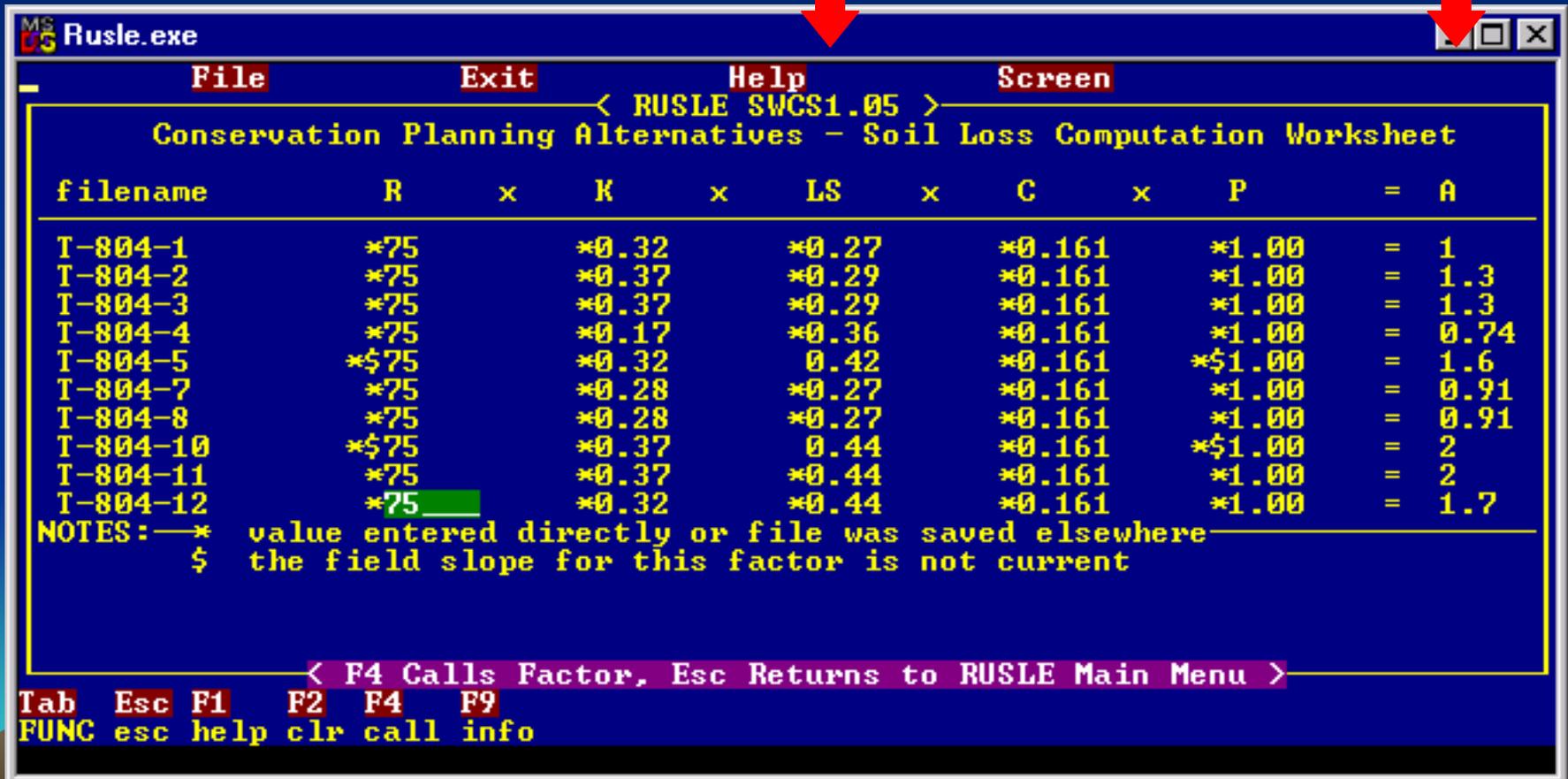
# RUSLE1 DOS Based Worksheet

- You entered slope length and percent into the worksheet, and the program would calculate LS (length/slope) factor, and the estimated soil erosion rate (average tons/acre/year) based on the data entered (A).



# RUSLE1 DOS Based Worksheet

## Computer Generated Numbers



MS-DOS Rusle.exe

File Exit Help Screen

< RUSLE SWCS1.05 >

Conservation Planning Alternatives - Soil Loss Computation Worksheet

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Tab Esc F1 F2 F4 F9  
FUNC esc help clr call info

# RUSLE2 is an entirely Windows Based Environment No More Hard-Copy Look Up Tables!

STEP 1: Choose location to set climate: Location

STEP 2: Choose soil type: Soil

STEP 3: Set slope topography: Slope length (along slope)  Avg. slope steepness, %

STEP 4a: Select base management Base management

STEP 4b: Modify/build man. sequence if desired: Management sequence

Man.	Management	Starting date, m/d/y	Ending date, m/d/y	Correct dates by:
+ -				
1	default	1/1/1	1/1/1	==>

STEP 4c: adjust management inputs if desired:

Adjust yields

General yield level

Adjust res. burial level

Adjust ext. res. additions

Rock cover, %

Examine irrigation

Apply rot. builder manag

Save temp. management as perman

STEP 5: Set supporting practices:

Contouring  Actual row grade, %  Crit. slope length, ft

Strips/barriers

Diversion/terrace, sediment basin

Subsurface drainage

Results Additional Results

Soil loss for cons. plan, t/ac/yr	<input type="text" value="0"/>	Info <input type="text"/>
T value, t/ac/yr	<input type="text" value="3.0"/>	
Surf. res. cov. values	<input type="text" value="open"/>	
Soil conditioning index	<input type="text" value="Soil conditioning index"/>	

# RUSLE2 *Historical*

- USLE - developed in 1950's
- RUSLE1 started in 1985
- RUSLE1 released in 1993
- RUSLE2 started in 1998
- Is a Major revision of RUSLE1
- Most RUSLE1 relationships are revised
- All calculations in RUSLE2 are made within a computer environment.
- RUSLE2 contains a new graphical interface



# Validation of RUSLE2

- 10,000 plot-years of data from natural runoff plots
- 2000 plot-years of rainfall simulator data
- Proven by more than 4 decades of worldwide use by its predecessors, USLE and RUSLE1
- Developed & tested by experienced and nationally recognized erosion scientists and conservationists.



# RUSLE2 FACTORS

Daily Soil Loss

$$a = r k l s c p$$

**Average annual soil loss = sum of daily soil loss values**  
***Different formulation from USLE and RUSLE1***

- r- erosivity factor - rainfall/runoff
- k- soil erodibility factor
- l- slope length factor
- s- slope steepness factor
- c- cover-management factor
- p- supporting practices factor