650.806 Terrace Spacing

(a) Terrace spacing based on erosion prediction tools

The Revised Universal Soil Loss Equation, Version 2, (RUSLE2) can be used to determine terrace spacing for site specific designs. However, use of the tool for this purpose can be complex due to the large amount of variables including types of crops, crop rotations, tillage operations, soil types, rainfall factors, topography, etc. Results can vary significantly with relatively small changes in one or more of the variables.

In addition to helping control sheet and rill erosion, terraces are an effective practice to control ephemeral gully erosion. RUSLE2 does not provide a method for calculating ephemeral gully erosion; therefore, terrace spacing criteria for controlling ephemeral gullies was estimated based on soil type, land slope, and experience.

To facilitate the design of terrace systems, charts have been developed to provide maximum terrace spacings based on RUSLE2 and the criteria for ephemeral gully control. Following are the steps to use the charts:

1. Select the appropriate chart to use for a specific county based on the R (Rainfall Factor) value.
2. For counties which have level terraces, select whether the terrace will be a 1) level terrace, or 2) storage or gradient terrace.
3. Determine the type of terrace cross section.
4. Select a soil K value based on the soil type. If the actual K value is not shown, use the value in the chart closest to the actual K value.
5. Select the applicable slope range.
6. From the chart, read the maximum spacing allowed.

Rainfall Factors - R

County	R		County	R		County	R
Adair	180		Grundy	170		Plymouth	130
Adams	190		Guthrie	170		Pocahontas	150
Allamakee	140		Hamilton	160		Polk	170
Appanoose	190		Hancock	150		Pottawattamie	160
Audubon	160		Hardin	170		Poweshiek	180
Benton	170		Harrison	150		Ringgold	190
Black Hawk	170		Henry	190		Sac	150
Boone	170		Howard	150		Scott	170
Bremer	160		Humboldt	160		Shelby	160
Buchanan	170		Ida	150		Sioux	130
Buena Vista	150		Iowa	180		Story	170
Butler	170		Jackson	160		Tama	170
Calhoun	160		Jasper	170		Taylor	190
Carroll	160		Jefferson	180		Union	180
Cass	170		Johnson	180		Van Buren	190
Cedar	170		Jones	170		Wapello	180
Cerro Gordo	160		Keokuk	180		Warren	180
Cherokee	140		Kossuth	150		Washington	180
Chickasaw	160		Lee	190		Wayne	200
Clarke	190		Linn	170		Webster	160
Clay	140		Louisa	180		Winnebago	150
Clayton	150		Lucas	190		Winneshiek	150
Clinton	170		Lyon	120		Woodbury	130
Crawford	150		Madison	180		Worth	150
Dallas	170		Mahaska	180		Wright	160
Davis	190		Marion	180			
Decatur	190		Marshall	170			
Delaware	170		Mills	170			
Des Moines	180		Mitchell	160			
Dickinson	140		Monona	140			
Dubuque	160		Monroe	190			
Emmet	140		Montgomery	180			
Fayette	160		Muscatine	180			
Floyd	160		O'Brien	140			
Franklin	170		Osceola	130			
Fremont	170		Page	190			
Greene	160		Palo Alto	140			

Maximum Terrace Spacings for R = 120 and 130

Slope	Grassed-Back, Farmable Front Slope				Narrow-Base			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	350	350	400	400	350	350	400	400
5-6	250	300	350	350	250	300	350	350
7-8	250	300	350	350	200	300	350	350
9-10	180	300	350	350	130	300	300	350
11-12	150	250	270	300	120	220	220	300
13-14	150	240	240	300	120	180	180	300
15-16	150	200	200	270	120	140	140	220
17-18	120	190	190	250	120	120	130	200

Slope	Broadbase				Grassed Front, Farmable Backslope			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	350	350	400	400	350	350	400	400
5-6	250	300	350	350	250	300	350	350
7-18	Not Allowed							

Level Terraces - Maximum Terrace Spacings for R = 120 and 130

Slope	Grassed-Back, Farmable Front Slope				Narrow-Base			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	350	350	400	400	350	350	400	400
5-6	250	300	350	350	250	300	350	350
7-8	250	300	350	350	250	300	350	350
9-10	250	300	350	350	250	300	350	350
11-12	150	250	300	300	200	250	300	300
13-14	150	250	300	300	160	250	300	300
15-16	150	250	280	300	140	230	230	300
17-18	150	250	250	300	130	200	200	290

Slope	Broadbase				Grassed Front, Farmable Backslope			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	350	350	400	400	350	350	400	400
5-6	250	300	350	350	250	300	350	350
7-18	Not Allowed							

Maximum Terrace Spacings for R = 140

Slope	Grassed-Back, Farmable Front Slope				Narrow-Base			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	350	350	400	400	350	350	400	400
5-6	250	300	350	350	250	300	350	350
7-8	180	300	350	350	130	300	350	350
9-10	140	230	260	350	120	150	210	350
11-12	120	200	220	300	120	130	170	280
13-14	120	170	200	280	120	120	150	210
15-16	120	170	170	190	120	120	120	140
17-18	120	160	170	180	120	120	120	130

Slope	Broadbase				Grassed Front, Farmable Backslope			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	350	350	400	400	350	350	400	400
5-6	220	300	350	350	220	300	350	350
7-18	Not Allowed							

Level Terraces - Maximum Terrace Spacings for R = 140 Level Terraces

Slope	Grassed-Back, Farmable Front Slope				Narrow-Base			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	350	350	400	400	350	350	400	400
5-6	250	300	350	350	250	300	350	350
7-8	250	300	350	350	250	300	350	350
9-10	210	300	350	350	150	300	350	350
11-12	150	250	300	300	120	250	280	300
13-14	150	250	270	300	120	200	220	300
15-16	150	210	220	250	120	150	160	180
17-18	150	190	190	220	120	140	140	150

Slope	Broadbase				Grassed Front, Farmable Backslope			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	350	350	400	400	350	350	400	400
5-6	250	300	350	350	250	300	350	350
7-18	Not Allowed							

Maximum Terrace Spacings for R = 150

Slope	Grassed-Back, Farmable Front Slope				Narrow-Base			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	350	350	400	400	350	350	400	400
5-6	250	300	350	350	220	300	350	350
7-8	170	300	350	350	120	300	350	350
9-10	130	230	240	350	120	180	180	350
11-12	120	200	200	300	120	150	140	250
13-14	120	170	190	240	120	120	120	190
15-16	120	170	170	190	120	120	120	140
17-18	120	160	170	180	120	120	120	120

Slope	Broadbase				Grassed Front, Farmable Backslope			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	300	350	400	400	300	350	400	400
5-6	160	300	350	350	200	300	350	350
7-18	Not Allowed							

Level Terraces - Maximum Terrace Spacings for R = 150

Slope	Grassed-Back, Farmable Front Slope				Narrow-Base			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	350	350	400	400	350	350	400	400
5-6	250	300	350	350	250	300	350	350
7-8	250	300	350	350	230	300	350	350
9-10	190	300	350	350	140	300	350	350
11-12	150	250	300	300	120	210	280	300
13-14	150	240	270	300	120	170	220	300
15-16	150	200	220	250	120	130	170	220
17-18	150	180	180	220	120	120	130	190

Slope	Broadbase				Grassed Front, Farmable Backslope			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	350	350	400	400	350	350	400	400
5-6	250	300	350	350	250	300	350	350
7-18	Not Allowed							

Maximum Terrace Spacings for R = 160

Slope	Grassed-Back, Farmable Front Slope				Narrow-Base			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	x	300	350	350	x	300	350	350
5-6	230	250	300	300	180	250	300	300
7-8	150	250	300	300	120	250	300	300
9-10	120	210	240	290	120	170	190	240
11-12	120	170	200	230	120	130	150	180
13-14	120	160	180	200	120	120	130	150
15-16	120	150	160	170	120	120	120	120
17-18	120	120	160	170	120	120	120	120

Slope	Broadbase				Grassed Front, Farmable Backslope			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	x	300	350	350	x	300	350	350
5-6	140	250	300	300	190	250	300	300
7-18	Not Allowed							

Level Terraces - Maximum Terrace Spacings for R = 160

Slope	Grassed-Back, Farmable Front Slope				Narrow-Base			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	x	300	350	y	x	300	350	y
5-6	200	250	300	y	200	250	300	y
7-8	200	250	300	y	190	250	300	y
9-10	150	250	300	y	120	250	300	y
11-12	140	200	250	y	120	200	220	y
13-14	120	200	230	y	120	160	180	y
15-16	120	180	190	y	120	130	140	y
17-18	120	170	180	y	120	120	130	y

Slope	Broadbase				Grassed Front, Farmable Backslope			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	x	300	350	y	x	300	350	y
5-6	200	250	300	y	200	250	300	y
7-18	Not Allowed							

"x" indicates there are no soils in this category that are commonly terraced

"y" indicates there are no soils in this category that are commonly level terraced

Maximum Terrace Spacings for R = 170

Slope	Grassed-Back, Farmable Front Slope				Narrow-Base			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	x	300	350	350	x	300	350	350
5-6	170	250	300	300	120	250	300	300
7-8	150	250	300	300	120	200	300	300
9-10	120	180	240	240	120	120	190	220
11-12	120	170	200	220	120	120	150	150
13-14	120	160	180	200	120	120	130	130
15-16	120	150	160	160	120	120	120	120
17-18	120	150	150	150	120	120	120	120

Slope	Broadbase				Grassed Front, Farmable Backslope			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	x	300	350	350	x	300	350	350
5-6	120	250	300	300	120	250	300	300
7-18	Not Allowed							

Level Terraces - Maximum Terrace Spacings for R = 170

Slope	Grassed-Back, Farmable Front Slope				Narrow-Base			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	x	300	350	y	x	300	350	y
5-6	200	250	300	y	190	250	300	y
7-8	180	250	300	y	130	250	300	y
9-10	150	220	280	y	120	160	220	y
11-12	120	190	220	y	120	130	150	y
13-14	120	170	190	y	120	120	120	y
15-16	120	160	160	y	120	120	120	y
17-18	120	160	160	y	120	120	120	y

Slope	Broadbase				Grassed Front, Farmable Backslope			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	x	300	350	y	x	300	350	y
5-6	x	250	300	y	x	250	300	y
7-18	Not Allowed							

"x" indicates there are no soils in this category that are commonly terraced

"y" indicates there are no soils in this category that are commonly level terraced

Maximum Terrace Spacings for R = 180

Slope	Grassed-Back, Farmable Front Slope				Narrow-Base			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	x	250	300	300	x	250	300	300
5-6	x	200	250	250	x	200	250	250
7-8	x	200	250	250	x	150	250	220
9-10	x	140	140	140	x	120	120	120
11-12	x	140	140	140	x	120	120	120
13-14	x	140	140	140	x	120	120	120
15-16	x	120	120	120	x	120	120	120
17-18	x	120	120	120	x	120	120	120

Slope	Broadbase				Grassed Front, Farmable Backslope			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	x	250	300	300	x	250	300	300
5-6	x	200	250	250	x	200	250	250
7-18	Not Allowed							

"x" indicates there are no soils within this category that are commonly terraced

Maximum Terrace Spacings for R = 190 and 200

Slope	Grassed-Back, Farmable Front Slope				Narrow-Base			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	x	250	300	300	x	250	300	300
5-6	x	200	250	250	x	200	250	250
7-8	x	160	160	250	x	120	120	220
9-10	x	140	140	140	x	120	120	120
11-12	x	120	120	120	x	120	120	120
13-14	x	120	120	120	x	120	120	120
15-16	x	120	120	120	x	120	120	120
17-18	x	120	120	120	x	120	120	120

Slope	Broadbase				Grassed Front, Farmable Backslope			
	Soil K Value				Soil K Value			
	0.49	0.43	0.37	0.32	0.49	0.43	0.37	0.32
0-4	x	250	300	300	x	250	300	300
5-6	x	140	170	250	x	140	230	250
7-18	Not Allowed							

"x" indicates there are no soils within this category that are commonly terraced