

Field Office Technical Guide - Section I – Erosion Prediction

**Frozen or Constant Universal Soil Loss Equation (USLE) C-Factors for use with 1985 Food Security Act Highly
Erodible Land (HEL) Conservation Compliance Plans
(Factors in Place as of January 1, 1990)**

C Factors for Grain Corn; Crop Residue Left on the Soil Surface; Spring Tillage

Stage in Rotation:	Conventional Tillage Spring Plow and Disk		Reduced Tillage Spring Chisel or Disk								No-Till							
	No Cover Crop	With Cover Crop	No Cover Crop Percent Cover				With Cover Crop Percent Cover				Percent Cover							
			10	30	50	70	10	30	50	70	30	50	70	90				
After Hay																		
First Year	.16	.14	.14	.10	.07	.05	.12	.09	.06	.04	.01	.01	.01	.01				
Second Year	.29	.26	.26	.17	.12	.08	.24	.15	.10	.07	.11	.08	.05	.01				
Third Year ¹	.32	.29	.29	.19	.13	.09	.26	.16	.10	.07	.14	.09	.06	.01				
After Small Grain²	.29	.28																
After Small Grain³			.28	.23	.17	.09	.26	.18	.15	.07	.20	.14	.09					
After Small Grain⁴	.35	.32																
After Soybeans	.40	.36	.36	.32	.225	.125	.34	.28	.185	.085	.22	.14	.09					
After Vegetables	.42	.35	.35	.33	.235	.135	.33	.29	.195	.095	.22	.14	.09					
After Sweet Corn	.34	.31	.31	.19	.13	.09	.29	.16	.10	.07	.14	.09	.06					

¹ For more than three years after hay or continuous corn, use factors for third year after hay

² Straw not removed.

³ Only one value -Use appropriate percent cover If straw Is left on the field or removed.

⁴ Straw removed; stubble remains.

⁵ Values to be used only where mulch or manure has been added to obtain percent cover.

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C Factors for Grain Corn; Crop Residue Removed ⁶ or Reduced⁷ in the Fall after Harvest

Stage in Rotation:	Conventional Tillage		Reduced Tillage			
	Spring Plow ⁸	Fall Plow	Percent Cover			
			10	30	50	70
After Hay						
First Year	.17	.21	.19	.11	.09	.07
Second Year	.31	.40	.33	.21	.16	.12
Third Year ³	.34	.41	.36	.23	.17	.12
After Small Grain	.35	.41	.37	.23	.17	.12
After Soybeans	.41	.42	.41	.34	.10	.10
After Vegetables	.42	.45	.42	.34	.10	.10
After Sweet Corn	.36	.42	.36	.23	.17	.12

⁶ Residue removed by baling or chopping stover for bedding.

⁷ Residue reduced by fall tillage.

⁸ If cover crop follows removing stover, Use "Spring Conventional Tillage -With Cover Crop" from Table 3-1.

⁹ For more than three years after hay or continuous corn, use factors for third year after hay.

¹⁰ Condition does not exist in the field.

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C Factors for: Corn Silage; Conventional and Reduced Tillage

Stage in Rotation:	Conventional Tillage			Reduced Tillage										
	No Cover Crop	With Cover Crop	Fall Plow	Spring Tillage				Fall Tillage						
				No Cover Crop Percent Cover		With Cover Crop Percent Cover		No Cover Crop Percent Cover		With Cover Crop Percent Cover		All		
			10	30	50	70	10	30	50	70				
After Hay														
First Year	.21	.17	.29	.21	.14	.10	.06	.15	.10	.07	.05		.18	
Second Year	.42	.30	.47	.35	.25	.16	.10	.27	.17	.11	.08		.35	
Third Year ¹¹	.46	.30	.50	.38	.26	.17	.10	.30	.19	.12	.08		.41	
After Small Grains	.42	.30	.51	.38	.27	.18	.10	.30	.20	.13	.08		.40	
After Soybeans	.46	.34	.47	.44	.37	.26 ¹²		.20 ¹²	.34	.28			.23 ¹²	.18 ¹²
	.40													
After Vegetables	.46	.34	.50	.44	.37	.26 ¹³		.20 ¹³	.34	.28			.23 ¹³	.18 ¹³
	.41													

¹¹ For more than three years after hay or continuous corn, use factors for third year after hay.

¹² Assumes soybeans were followed with cover crop.

¹³ Assumes either cover crop after vegetable crop or mulch remains on the surface.

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(Factors in Place as of January 1, 1990)

C Factors for Silage Corn; No-Till Systems

Stage in Rotation:	No-Till										
	No Cover Crop Percent Cover				With Cover Crop Percent Cover						
	10	14	30	50	70	10	14	30	50	70	
After Hay											
First Year	.01	.01	.01	.01		.01	.01	.01	.01		
Second Year	.14	.13	.09	.06		.10	.09	.07	.05		
Third Year ¹⁵	.37	.22	.15	.10		.29	.17	.12	.09		
After Small Grains	N/A	.23	.16	.10		N/A	.18	.13	.09		
After Soybeans	.33	.26	.16	.16	N/A	.26	.22	.13	.17	N/A	
After Vegetables	.33	.26	.16	.17	.10	.26	.22	.13	.18	.10	

Note: N/A = Not Applicable.

¹⁴ Assumes corn stubble only, or poor production of soybeans, or low mulch vegetables.

¹⁵ For more than three years after hay or continuous corn use factors for third year after hay.

¹⁸ Assumes soybeans were followed with cover crop.

¹⁷ Assumes either cover crop after vegetable crop or mulch remains on the surface.

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(Factors in Place as of January 1, 1990)

C Factors for Corn - Grain or Silage, Ridged

	Grain Corn	Silage Corn
Stage in Rotation:		
First Year after Meadow		
Spring Plow, June Ridged	.12	.17
Fall Plow, June Ridged	.17	.24
Second Year after Meadow		
Ridges Maintained	.06	.17
Third Year or More after Meadow		
Continuous Corn, Ridges Maintained	.07	.20

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C Factors for Sweet Corn; All Tillage Conditions; Spring and Fall Plow

	Conventional Tillage		Reduced Tillage		No-Till		
	Spring	Fall	Spring	Fall	Percent Cover		
	Plow	Plow	Chisel/Disk	Chisel/Disk	30	50	70
Stage in Rotation:							
First Year after Hay							
No Cover Crop	.19	.24	N/A	N/A	.01	.01	.01
With Cover Crop	.16	N/A	N/A	N/A	.01	.01	.01
Second Year after Hay							
No Cover Crop	.34	.41	.16	.15	.19	.12	.07
With Cover Crop	.29	N/A	.14	.15	.11	.08	.05
Third Year after Hay¹⁸							
No Cover Crop	.36	.43	.17	.15	.22	.15	.08
With Cover Crop	.32	N/A	.15	.15	.14	.13	.08
After Small Grain							
No Cover Crop	.34	.41	.16	.15	.19	.12	.07
With Cover Crop	.29	N/A	.14	.15	.11	.08	.05
After Soybeans							
No Cover Crop	.46	.50	.38	.38	.29	N/A	N/A
With Cover Crop	.39	N/A	.25	.25	.24	N/A	N/A

Note: N/A= Not Applicable.

¹⁸ Use this line for sweet corn following grain, silage, or sweet corn. Use appropriate percent cover if no-till is used.

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C Factors for Fall Seeded Small Grains -Winter Wheat, Barley, and Rye

Stage in Rotation:	Conventional Tillage		Reduced Tillage		No-Till	
	Fall ¹⁹ Plow	Fall ²⁰ Plow	Fall	Fall	Fall	Fall
After Hay						
First Year	.12	.18	N/A		.01 ²¹	
Second Year	.18	.25	.10		.05	
Third Year or More	.23	.28	.15		.08	
After Small Grain	.12	.27	.18 ²²	.25 ²³	.10 ²²	.15 ²³
After Corn	.12	.26	.18 ²²	.25 ²³	.10 ²²	.24 ²³
After Vegetables	.23	.34	.25		.19	
After Soybeans	.23	.34	.25		.19	

¹⁹ Fall plow to establish small grain; small grain straw removed after grain harvest; stubble remains until next crop year (approximately 18months without tillage).

²⁰ Fall plow to establish small grain; fall plowed after grain harvest.

²¹ 90% cover.

²² Straw or corn stover from previous crop is removed. (Minimum of 30% cover)

²³ Straw or corn stover from previous crop is removed. (Lessthan30% cover)

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Stage in Rotation:	C Factors for Spring Seeded Small Grains					
	Conventional Tillage		Reduced Tillage			No-Till
	Spring Plow	Fall Plow	Percent Cover			Percent Cover
			30 ²⁴	50	70	> 50 ²⁵
After Meadow						
First Year	.10	.24	.12	.10	.08	.01
Second Year	.17	.27	.14	.12	.09	.03
Third Year	.18	.28	.18	.14	.10	.05
After Small Grain	.21	.31	.18	.14	.08	.05
After Corn						
Silage or Grain	.21	.31	.18	.13	.10	.05
After Soybeans	.35	.41	.23	.18	.17	.15
After Vegetables	.35	.41	.23	.18	.17	.15

²⁴ If less than 30% cover exists after tillage, use Spring Plow column.

²⁵ If percent cover is less than 50%, use values in 50% Percent Cover Column under Reduced Tillage.

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C Factors for Spring Seeding of Legumes, Grasses or Grass-Legume Mixtures with a Companion Crop

Stage in Rotation:	Conventional Tillage		Reduced Tillage		No-Till	
	Spring	Fall	30% or Less	>30%	30% or Less	>30%
After Sod	.08	.10	.08	.03	.04	.01
After Corn						
Grain	.12	.15	.10	.06	.05	.05
Silage	.17	.19	.14	N/A	.09	.05
After Small Grain	.12	.15	.10	.06	.09	.05
After Vegetables	.35	.40	.28	N/A	.28	N/A
After Soybeans	.35	.40	.28	N/A	.28	N/A

Note: N/A = Not Applicable

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(Factors in Place as of January 1, 1990)

Yield (Tons/Acre)	C Factors for Established Hay	
	Grass/Legume	Legume Only
1-2	.010	.010
2-3	.006	.010
3-5	.004	.008

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C Factors for Spring Seeding of Legumes, Grasses or Grass-Legume Mixtures without a Companion Crop

Stage in Rotation:	Conventional Tillage		Reduced Tillage			No-Till		
	Spring	Fall	30 ²⁶	50	70	30	50	70
After Sod	.09	.10	N/A	N/A	N/A	.03	.02	.004
After Corn								
Grain	.13	.28	.11	.06	.05	.11	.02	.004
Silage	.23	.28	.11	N/A	N/A	.11	N/A	N/A
After Small Grain	.13	.28	.11	.06	.05	.11	.02	.004
After Vegetables	.35	.40	.28	N/A	N/A	.28	N/A	N/A
After Soybeans	.35	.40	.28	N/A	N/A	.28	N/A	N/A

Note: N/A = Not Applicable.

²⁶ If less than 30% cover remains after tillage, use Spring Column under Conventional Tillage.

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C Factors for August Seeding of Legumes, Grasses, or Grass-Legume Mixtures without a Companion Crop

Stage in Rotation:	Conventional Tillage	Reduced Tillage			No-Till		
	Plow -Disk	30 ²⁷	50	70	30	50	70
After Sod	.18	N/A	N/A	N/A	.03	.02	.004
After Corn							
Grain	.23	.11	.06	.05	.11	.06	.004
Silage	.27	.11	.06	.05	.11	N/A	N/A
After Small Grain	.23	.11	.06	.05	.11	.06	.004
After Vegetables	.27	.27	N/A	N/A	.27	N/A	N/A
After Soybeans	.27	.27	N/A	N/A	.27	N/A	N/A

Note: N/A = Not Applicable.

²⁷ If less than 30% cover remains after tillage, use Plow-Disk Column under Conventional Tillage.

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C Factors for Soybeans and Dry Beans Planted In the Spring, May-June

Stage in Rotation:	Conventional Tillage Spring Plow		Fall Plow	Reduced Tillage Spring or Fall				No-Till Spring		
	No Cover Crop	With Cover Crop		Percent Cover				Percent Cover		
				10	30	50	70	30	50	70
After Sod	.32				.20			.20	.12	.05
After Corn	.44	.36	.51	.44	.25	.15	.07	.24	.12	.05
After Small Grain	.44	.36	.51	.44	.25	.15	.07	.24	.12	.05
After Vegetables	.56	.50	.60	.56	.25	.20 ²⁸ , 10 ²⁸		.24	.15 ²⁸	.09 ²⁸
After Beans	.56	.50	.60	.56	.25	.20 ²⁸ , 10 ²⁸		.24	.19 ²⁸	.09 ²⁸

²⁸ Use only when mulch or cover crop residue is on the soil surface.

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C Factors for Potatoes						
Stage in Rotation:	First Year		Second Year		Third Year or More	
	No Cover Crop	With Cover Crop	No Cover Crop	With Cover Crop	No Cover Crop	With Cover Crop
<u>Conventional Tillage</u>						
After Meadow	.38	.32	.49	.42	.60	.51
After Small Grain	.49	.42	.55	.47	.60	.51
After Vegetables	.55	.47	.60	.51	.60	.51
After Grain Corn	.40	.34	.45	.38	.50	.42
<u>Reduced Tillage</u>						
30% or More Residue	.21	.18	.20	.17	.20	.17

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C Factors for Vegetables and Other Crops			
Stage in Rotation:	First Year	Second Year	Third Year or More
Conventional Tillage			
Spinach/Beans (clean crops)	.55 - .60	.35 - .40	
Spinach/Beans (with cover crop)	.35 - .40		
Sunflower (chisel following clover)	.25		
Corn (following sod)	.32	.42	
Squash / Pumpkins / Cucumbers	.55		
Asparagus	.50		
Buckwheat (Spring or spring oats)	.15		
Jerusalem Artichokes	.10		
Reduced Tillage²⁹			
Without Cover Crop	.21	.20	.20
With Cover Crop	.18	.17	.17
Canola			
After Silage Corn	.40		
After Grain Corn	.35		
After Vegetables	.40		
After Small Grain	.35		

²⁹ 30%residue or more.

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C Factors for Sweet Garden Peas

Stage in Rotation:	First Year	Second Year	Third Year or More
Conventional Tillage			
After Sod			
50% residue	.14	.23	.26
20% residue	.31	.50	.55
Followed by no-till forage seedings	.10	.20	.24
After Corn			
Silage	.55	.55	.55
Grain	.26	.26	.26
No -Tillage			
No-Till into Killed Rye Cover Crop or Small Grain Stubble	.08	.08	.08

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C Factors for Sudan or Sorghum Sudan

Condition:

Seeded as a row crop (20" or wider rows)

Harvested as silage

Use C -Factors for Corn Silage

Harvested as grain

Use C -Factors for Corn Grain

Broadcast seeded or drilled (10" or less rows)

Use C -Factors for Small Grain

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C Factors for Vineyards (Except Long Island) and Raspberries

Condition:

Clean cultivation

1 -2 lbs. pruning weight	.62
3 -4 lbs. pruning weight	.43

Winter cover cropped

1 -2 lbs. pruning weight	.50
3 -4 lbs. pruning weight	.15

Permanent cover

With grass, grass-legume, or hay mulch	.05
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Weeds

Dandelions, plantain, occasional grass clump	.10
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Raspberries	.08
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C Factors for Christmas Trees; 8 Year Values

Condition³⁰:

Clean tilled

Cultivated bare ground	.63
Cultivated strip(2'wide)balance in sod (5'wide)	.09

Sod aisles

Across slope (2' -3'wide)	.40
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No-till

Trees Into killed sod	.04
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³⁰ All values based on: 6 foot x 7 foot tree spacing; Fertilized, pruned, marketable trees In 8 years; Average vertical growth rates of 8 Inches and a horizontal growth rate of 6 Inches.

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Stage in Rotation:	C Factors for Strawberries	
	Spring	Fall
Strawberries³¹		
1st year (after~ any clean tilled field crop)	.55	.60
2nd year.	.30	
3rd year.	.15	

³¹ Assumes use of straw mulch between rows.

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Stage in Rotation:	C Factors for Vegetables	
	Spring	Fall
Continuous vegetables³²		
Without cover crop	.56	.60
With cover crop	.50	
Continuous vegetables		
1st year out of sod	.32	
2nd year out of sod	.42	
3rd year out of sod (without cover crop)		.56
Continuous vegetables		
With black plastic mulch ³³	.37 - .30	
With straw 1woven fabric ³⁴		.32 - .30

³² Tomatoes, squash, peppers, eggplant.

³³ Assumes mulch to cover 1/2 - 2/3 of field. Mulch is photo-degradable.

³⁴ Degradable. Life span is 6 months or less.

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C Factors for Permanent Pasture and Idle Land

Condition:

Fallow

0 -30% Cover	1.00
30 70% Cover	.50
> 70% Cover	.20

Grazed

Overgrazed	.05
Good Cover (75%Cover)	.005
Goldenrod / mixed grasses / shrubs /trees	.001