

Nebraska Ephemeral Gully Modeling Tool Version Notes

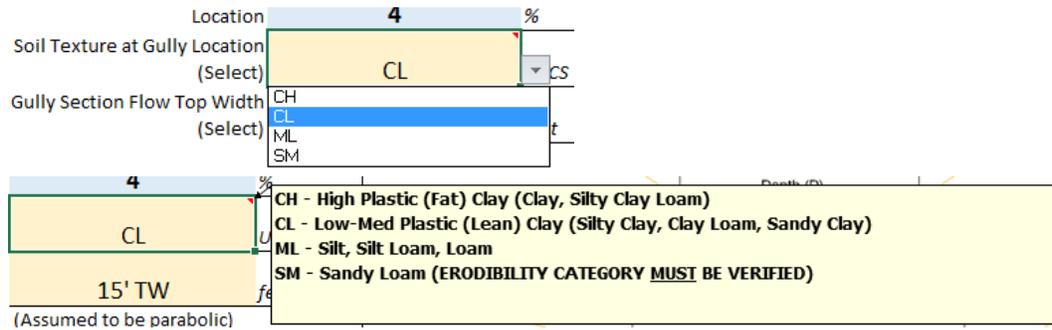
Version 2, dated 8-21-17

1. Removed soil textural/USCS classification selection dropdown and comment popup (4 choices – “CH”, “CL”, “ML” or “SM”), and replaced with soil erodibility category selection dropdown (4 choices, see below). There are too many instances of CL/ML silt loams being “erosion resistant” and CL silty clay loams being “erodible”.

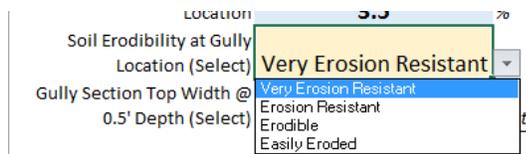
“Very Erosion Resistant” soils are evaluated as “Erosion Resistant” soils (because this is a conservative estimation “TOOL”, NOT a design aid).

The “Very Erosion Resistant” category is only applicable when performing actual design of conservation practices that utilize permanent vegetation, and even then should be used with caution.

Removed this:



Replaced it with this:



And added “...or Very Erosion Resistant...” to the output table headings accordingly:

Erosion Resistant or Very Erosion Resistant Soil in Flow Area <i>(Max. Soil Stress = 0.05 psf)</i>

Users need to refer to NE Amendment 45 of the NEH-650, Engineering Field Handbook, Chapter 7, Grassed Waterways, “Soil Erodibility Categories for Nebraska Soils”, available via the eFOTG, Section I, Reference Lists, Engineering, NEH-650 (EFH) Amendments Index, or at this link:

https://efotg.sc.egov.usda.gov/references/public/NE/Erosion_Category_for_Nebraska_Soils.pdf

The amendment explains step-by-step how to use Web Soil Survey to generate a county-wide list of soil erodibility categories for all soils in the county.

2. The tool does not evaluate “Easily Eroded” soils, so added a comment cell that pops up when “Easily Eroded” is selected:

Easily Eroded	<i>This tool does not evaluate Easily Eroded soils. A field visit and on site evaluation must be completed to determine the appropriate level of planning for concentrated flow erosion.</i>
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Selection of “Easily Eroded” will also cause maximum bed slope to become “N/A!” and all table data disappears.

Watershed Cropping System (Select)	High Res. No-Till					
Maximum Allowable Bed Slope	N/A!					

- Removed all references to variable flow depths in the flow area, which were dependent on top width and roughness conditions and often confusing; all measurements of flow area top width should be taken at a depth of 0.5 feet (6 inches).

Gully Section Top Width @
0.5' Depth (Select) 15' TW feet

(Assumed to be parabolic)
Measure flow depth and top width of concentrated flow area as though gully were NOT present.

The instructions page reflects this change in depth measurement.

- Made the following edits to the instructions page:

The appropriate maximum slope results for the site being evaluated depend on the soil erodibility category within the concentrated flow area. Refer to the NEH 650 EFH Chapter 7 Amendment – “Soil Erodibility Categories for Nebraska Soils”. Clays with USCS classification of CL or CH (Low Plastic or High Plastic Clays) **are typically considered** “Erosion Resistant” soils (with an allowable maximum soil stress of 0.05 lbs/sq.ft.). Silt Loams and Sandy Loams with USCS classification of ML or SM **are typically considered** “Erodible” soils (with an allowable maximum soil stress of 0.03 lbs/sq.ft.). Soils that are categorized as “Very Erosion Resistant” should be conservatively analyzed as “Erosion Resistant”. **There are instances of silt loam soils falling into the “Erosion Resistant” category and silty clay loams falling into the “Erodible” category, which is why the erodibility category must be verified. The tool should not be used for sands categorized as “Easily Eroded”.**

If, on a given treatment unit, the site conditions clearly do not reflect the assumptions used in the tool, **then a site-specific analysis should be performed using the appropriate methodology and software programs and inputs (i.e. EFH Chapter 2 formulas/figures, EFH-2 software, EFH Chapter 7 formulas/tables, Engineering Field Tools Waterway Wizard, etc.).**

- When the county is selected for the field worksheet, all tables throughout the workbook (Cover Crop, Conventional Tillage, Mulch Tillage, No-Till) reflect that county selection. The user doesn’t have to remember to select/update the county for each table. The runoff curve number, watershed acres and average watershed slope can still be edited.

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6. Added conditional formatting to the field worksheet that highlights/clarifies and “grays out” portions of the bed slope results tables depending on user selections for watershed treatment, gully treatment, top width and soil erodibility.

Gully Treatment Option (Select)	Cover Crop	<i>Cover crop stem height = 6 inches; Cover crop stem density = 30 stems per square foot; Vegetal Cover Factor = 0.5 (representative of typical annual crop stubble)</i>						
Watershed Cropping System (from Above)	High Res. No-Till							
Watershed Peak Discharge into Gully	11.9	<i>cfs</i>						
Maximum Allowable Bed Slope	3.5 %	Gully Treatment may be adequate to control ephemeral gully erosion.						
Gully Treatment	Peak Discharge	Maximum Allowable Gully Bed Slope, (percent)						
		Erosion Resistant or Very Erosion Resistant Soil in Flow Area <i>(Max. Soil Stress = 0.05 psf)</i>			Erodible Soil in Flow Area <i>(Max. Soil Stress = 0.03 psf)</i>			
		<i>cfs</i>	10' TW	15' TW	20' TW	10' TW	15' TW	20' TW
Clean Till	11.9	- %	- %	- %	- %	- %	- %	
Conventional Till	11.9	0.2 %	0.3 %	0.4 %	- %	- %	0.2 %	
Mulch Till / Low Res. No-Till	11.9	0.6 %	0.9 %	1.1 %	0.3 %	0.4 %	0.5 %	
High Res. No-Till	11.9	1.4 %	2.0 %	2.6 %	0.7 %	1.0 %	1.2 %	
Cover Crop	11.9	2.0 %	3.5 %	5.5 %	0.9 %	1.8 %	2.8 %	