B. EPHEMERAL EROSION

Ephemeral erosion, or ephemeral gully erosion, is described in the attached sheet "Ephemeral Gully Erosion: Definitions. It is important to note that ephemeral erosion occurs only on cropland.

The Ephemeral Gully Erosion Model (EGEM) was developed in 1992, but is still undergoing testing and development. As an interim solution we have developed a procedure which uses a portion of the sheet and rill erosion to account for ephemeral erosion. The following restrictions apply to using this procedure:

1. It should be used only on Classes IIIe, IVe, and VIe cropland. In Land Resource Area 72 and 73, ephemeral erosion should also be computed on Class II and land with slope lengths greater than 800 ft.

2. At present, only the following conservation practices are considered to reduce ephemeral erosion:

Contour Farming (within slope limits, see Sec. IV, Contour Farming (330)), Terrace, Diversion,
Stripcropping.

Credit for reduction or elimination of ephemeral erosion can also be taken when converting cropland to pasture or range by seeding to grass.

For computing ephemeral erosion, refer to Table 3 below and map (FOTG SECTION I – Erosion Prediction), "Ephemeral Erosion Codes."

1. Use the map to determine the correct code for your county.

2. Match the code number for your county with the correct values in Table 3. For instance, Buffalo County is in a Code 3 area, which has a value from Table 3 of 30 percent for untreated land and 5 percent for treated.

3. Compute the RUSLE value for sheet and rill erosion on all Class IIIe, IVe, and VIe land in your problem area.

4. Multiply the RUSLE value just computed times the percentages from Table 3 to arrive figures for ephemeral erosion in before and after situations.

Table 3 1/ Percentage of Class IIIe, IVe, and VIe cropland sheet & rill erosion to use in computing ephemeral erosion.

EECM*	Untreated Land	After Treatment
1	10	0
2	20	0
3	30	5
4	40	10

* - Ephemeral Erosion Code Map

1/ The appropriate value from Table 3 should be multiplied by the RUSLE value for erosion from the IIIe, IVe, or VIe cropland.

Example: An 80-acre field in Otoe County is having conservation measures installed, which will include a terrace system. Examination of the soil survey shows a 15-acre patch of IIIe soil on the area to be terraced.

1. Checking the "Ephemeral Erosion Codes" map, Otoe County is in Code area 4.

2. For purposes of this example, RUSLE factors are assumed on the 15-acre patch of IIIe soil, which will equal an erosion rate of 20 tons per acre. That means total annual erosion for this patch is:

20 tons/year x 15 acres = 300 tons/year.

3. From erosion Code 4, on untreated land the ephemeral erosion is 40 percent of sheet and rill. Therefore,

300 t/yr x 40% = 120 tons/year of ephemeral erosion on the untreated land

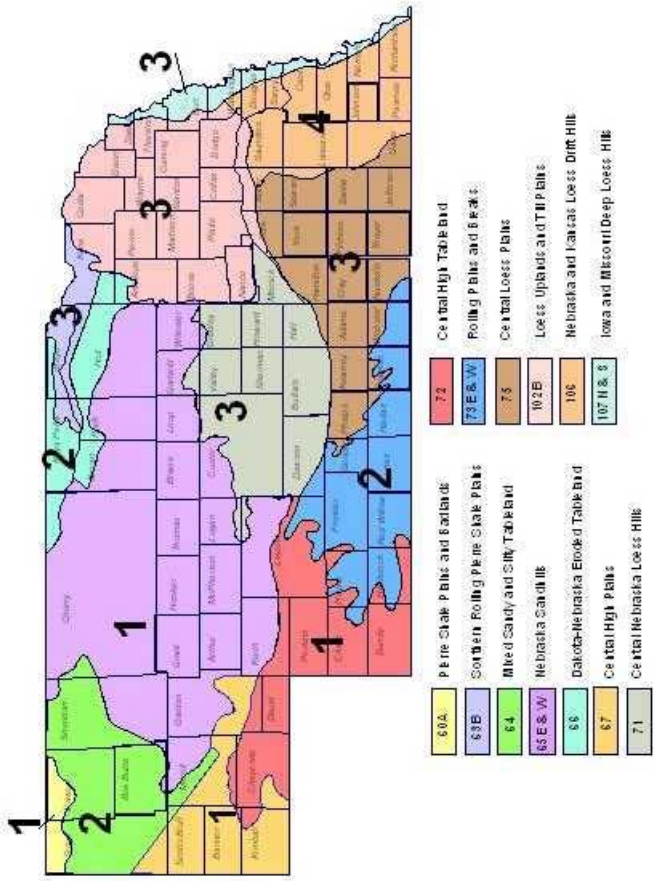
4. Table 3 shows erosion "after treatment" of 10 percent in Code 4. Recompute the RUSLE (with any changed factors) for the IIIe land after terracing. Determine sheet and rill erosion, multiply times the area, and then multiply the result times the 10 percent remaining.

Recomputed RUSLE (Assumed for this example) = 4 tons/acre/yr. 4 tons/acre x 15 acre = 60 tons/year erosion. 60 tons/year x 10 percent (from Table 3) = 6 tons/year ephemeral erosion after treatment.

For the entire 15-acre patch of land, the amount of soil saved due to reduction of ephemeral erosion is 120 tons/yr -6 tons/yr = 114 tons/yr. This is in addition to any savings realized through reduction of sheet and rill erosion.

Questions on ephemeral erosion and its computation should be directed to the Geologist on the Resource Conservation Staff.

Ephemeral Erosion Codes



Ephemeral Erosion Definitions

Annual soil loss predictions for planning purposes are now made with the Revised Universal Soil Loss Equation (RUSLE), the Wind Erosion Equation (WEQ), or both. An additional value may be included to account for erosion from large gullies. Estimates based on these calculations, however, do not include all cropland erosion. What is lacking is a value for soil loss caused by seasonal, concentrated flow channels, or ephemeral gully erosion. In general, an ephemeral gully is larger than a rill and smaller than a gully. It usually results from the junction of rills that form a dendritic branching or tree-like) pattern of channels. It appears on a cultivated field during the planting or growing season and is erased by cultivation. After an ephemeral gully has been in existence for a few years, the area from which soil has been moved can be lOO-feet wide or more. Within this area, soil deterioration greater than that caused by sheet erosion has taken place; tillage has moved soil into the ephemeral gully. This loose material is readily available for transport by runoff from the next rain. During the next season or after the next rain, the ephemeral gully reappears in approximately the same place and pattern.

Detailed criteria for distinguishing rills, ephemeral gullies, and gullies are given below. Differentiating among them will still require careful judgment. However, this is especially true where an ephemeral gully results from runoff that follows tillage marks rather than natural depressions.

Rills: Rills may be any size, but are usually less than 4 inches deep. Rills have one or more of the following characteristics:

--They are generally parallel on a slope, but may converge.

--They are generally of uniform spacing and dimension.

--They generally appear at different locations on the landscape from year to year.

--They are generally shorter than ephemeral cropland gullies.

--They usually end at a concentrated flow channel, a terrace, or an area where the slope flattens and deposition occurs.

--They are on the same portion of the slope that is used to determine the length of slope factor (L) for the RUSLE.

--Rill erosion is considered in the RUSLE calculations.

Ephemeral Erosion: Ephemeral gullies may be of any size but are usually larger than rills. They have one or more of the following characteristics:

--They are seasonal in nature, occurring on cropland.

--They recur in the same area each time they form rather than randomly at different places on a slope.

--They frequently form in well-defined depressions in natural drainageways.

--They tend to occur in the upper reaches of a drainage network, where average slopes are greater.

--They are usually dendritic, but may have other patterns caused by row alignment or other characteristics of field operations.

--They are generally wider, deeper, and longer than the rills on the field.

--They can occur in depressions into which rows or tillage marks lead.

--They can form along sloping rows or tillage marks.

--They are partially or totally erased and filled by tillage operations. The filling results in soil deterioration over a larger area than the gully itself.

--They can occur on terraced fields where overtopping of the terraces occurs on where piping occurs below the terrace embankment.

--They can occur in the bottom of gradient terraces.

Erosion in ephemeral gullies is not calculated by the RUSLE.

Gullies: Permanent gullies are channels too deep for normal tillage operations to erase. Special operations are required to fill them. Gullies also have one or more of the following characteristics:

--They may grow or enlarge from year to year by head cutting and lateral widening.
--They may also occur in depressions and natural drainageways.
--They may begin as an ephemeral gully that was left in the field and not erased by tillage or other operations.
--They may become partially stabilized by grass, weeds, or woody vegetation.

Erosion from permanent gullies is not calculated by the RUSLE. It is computed by measuring the voided areas caused by head cutting and lateral widening.