

NEBRASKA TECHNICAL NOTE

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The attached Agronomy Technical Note is intended to provide guidance to Field Office employees on Controlling Ephemeral Gully Erosion on Highly Erodible Land. The document defines ephemeral gully erosion, cites the requirement in the National Food Security Act Manual that ephemeral gully erosion must be controlled, describes how to evaluate concentrated flow areas to determine if treatment is required, identifies the various treatment options available, and outlines documentation requirements.

[Controlling Ephemeral Gully Erosion on Highly Erodible Land](#)

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What is Ephemeral Erosion?

Simply defined ephemeral means seasonal or temporary. Ephemeral gully erosion is so named because it tends to occur at the same point on the landscape year after year and is obliterated by annual tillage operations only to re-occur following subsequent rainfall events. Ephemeral gully erosion can also occur in fields where no-till is being practiced due to large drainage areas, excessive slopes, poor crop production resulting in low residue levels and/or poor soil quality. Ephemeral gully erosion characteristics and prediction methods are described in the Field Office Technical Guide (FOTG) Section I, Subsection D-2 Water Erosion.

The Highly Erodible Land Conservation Compliance (HELCC) provisions of the Food Security Act of 1985, as amended, require that ephemeral gully erosion be controlled on all highly erodible land used for the production of a commodity crop (NFSAM Sec. 512.0 C).



Typical Ephemeral Gully

Concentrated Flow areas

Concentrated flow areas may require treatment to control gully erosion. This is especially true if they have been de-vegetated due to land shaping or farming operations, or if the existing vegetation or residue cover is not adequate to prevent gully erosion. In all cases where concentrated flow areas are present, it is advisable during the conservation planning process to conduct a field visit in order to determine actual site conditions including

channel slope, cross-section (channel capacity) and drainage area in order to complete the erosion analysis using either the Ephemeral Gully Erosion Prediction Worksheet or the Ephemeral Gully Erosion Look-up Tables which are found in Section IV of the FOTG. Small capacity channels (less than 20 ft top width at one foot of flow depth) are especially vulnerable to gully erosion. Results from the Look-up Tables indicate that gully erosion is likely if drainage areas are greater than 2-5 acres in size using conventional or mulch tillage. Implementing a high residue, continuous no-till system will increase the drainage area tolerance to 8-12 acres depending on your location in the state.

If field measurements are not available, the maximum allowable drainage area based on an average of residue and tillage management systems for steep, small capacity channels are:

- Eastern NE: 5 acres
- Central NE: 5 acres
- Western NE: 7 acres

For any ephemeral channel with drainage area exceeding these values, one or more treatment options to control ephemeral gully erosion must be included in the conservation plan.

Treatment Options

There are several treatment options for controlling ephemeral gully erosion ranging from implementing a continuous no-till system to structural practices such as terraces and waterways. The practices are listed on the back of Nebraska Conservation Planning Sheet 18 and include:

- Cover crops
- Grass Waterways
- Water & Sediment Control Basins
- Terraces
- Diversions
- Contour Buffer Strips



Concentrated flow area treated with a fall seeded cover crop.

Cover Crops

The preferred cover crop for both concentrated flow areas and critical overland flow areas requiring treatment is fall-seeded cereal rye. Annual ryegrass has also been used, but some varieties have proven to be glyphosate resistant. Small grain should be seeded at a rate of 1 bu/ac drilled or 2 bu/ac broadcast no later than September 15 in Vegetative Zones I & II and October 15 in Vegetative Zones III & IV (Refer to the Nebraska Vegetative Zones Map located in Section I of the FOTG). If spring cover seeding is required, oats may be used at the same rate and should be planted as soon as possible following the earthwork, but generally not earlier than March 15.

Cover crops may be chemically destroyed (glyphosate) when they have produced adequate growth to stabilize critical areas (6 - 8 inches is minimal; 12+ inches is optimal). In some cases, it will be necessary to apply the chemical after the spring crop has been planted. Appropriate crop varieties need to be selected to allow for this scenario.

Cover crops are strongly encouraged as part of any crop rotation containing low or fragile residue producing crops such as soybeans to provide additional stability to concentrated flow areas and prevent the necessity of damage repair or maintenance.

Channel Shaping

Channel shaping to produce a broad, shallow flow condition will reduce the potential for ephemeral erosion. Care should be taken during channel shaping operations to retain as much top soil as possible and to minimize fill placement in concentrated flow areas as un-compacted fill will tend to be unstable. Retaining native perennial vegetation or establishing and maintaining grassed waterways in concentrated flow areas is preferable to cropping them for the sake of channel stability; when de-vegetation of concentrated flow areas is necessary, as for channel shaping, a close seeded small grain cover crop should be seeded immediately following earthwork activity. Mulching would be another option.

- Design and installation requirements for structural practices
- Practice operation and maintenance requirements

Maintenance

Annual inspection and maintenance of concentrated flow areas is important.

Where erosion has occurred to the extent that it will hinder planting of the next crop, maintenance should be completed immediately after harvest. This should be done with minimal tillage operations no deeper than the erosion which has occurred and no wider than necessary to make planting possible followed immediately by drilling a cover crop (as described above).

Use of a blade with rubber-tire compaction to shape eroded areas is the preferred method to accomplish repair of damage.

If erosion damage is occurring even as the result of normal rainfall events of 2 – 4 inches, additional conservation treatment is required in order to satisfy the HELC requirements.

Planning Documentation

Planning documentation should include the following:

- RUSLE2 documentation of soil loss, STIR and SCI
- Conservation plan map with critical areas identified
- Conservation plan and/or Planning Sheet 18
- Results of ephemeral gully analysis