NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

HERBACEOUS WIND BARRIERS

(Ft.)

CODE 603

DEFINITION

Herbaceous vegetation established in rows or narrow strips in the field across the prevailing wind direction.

PURPOSE

- Reduce soil erosion from wind.
- Reduce soil particulate emissions to the air.
- Protect growing crops from damage by wind or wind-borne soil particles
- Enhance snow deposition to increase plant-available moisture.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to lands where crops or forages are grown.

CRITERIA

General Criteria Applicable to All Purposes

Design herbaceous barriers to reduce wind velocities to meet purposes and resource objectives.

Vegetation. Herbaceous wind barriers may be composed of perennial or annual vegetation, living or dead. Select plant materials with the following characteristics:

- Adaptation to local soil and climate conditions.
- Stiff, erect non-spreading growth habit.
- Resistance to lodging.
- Good leaf retention.
- Tolerance to soil deposition
- Minimum competition with adjacent crops.

Barrier Direction, Spacing and Composition. Design the barrier direction, spacing, and composition needed to achieve the desired purpose using the currently approved wind erosion prediction model.

Number of Rows. Barriers may consist of one row of plants, providing the required porosity can be achieved with a single row that contains no gaps. When two or more rows are required to achieve the required porosity and to avoid gaps, space the rows no more than 36 inches apart.

Additional Criteria to Reduce Soil Erosion and/or Particulate Generation from Wind

Barrier Height: Minimum expected height of 1.5 feet during the wind erosion period.

Barrier Porosity: 40-50 percent.

Barrier Direction and Spacing. Use the prevailing wind erosion direction to measure the spacing between barriers. Do not space barriers greater than 10 times the expected height plus any additional width if permitted by soil loss tolerance (T). Account for the effects of other associated practices.

Additional Criteria to Protect Growing Crops from Damage from Wind or Wind-borne Soil Particles

Barrier design must ensure that wind erosion does not exceed crop tolerance during periods when wind sensitive crops are susceptible to damage as specified in the National Agronomy Manual (Part 502), or other accepted reference. Account for the effects of other associated practices.

Barrier Height: Minimum expected height of 0.5 feet during those periods when growing crops are susceptible to damage. The designed

height of the barrier will depend on the distance between the barrier and the crop being protected.

Barrier Porosity: 40-50 percent during the period when growing crops are to be protected.

Barrier Direction and Spacing. Measure the spacing between barriers along the prevailing wind erosion direction. Do not space barriers greater than 10 times the expected height plus any additional width permitted by the crop tolerance to damage from wind erosion as specified in the National Agronomy Manual (Part 502), or other accepted technical references. Account for effects of other associated practices.

Additional Criteria to Enhance Snow Deposition to Increase Plant-Available Moisture

Barrier Height: Minimum expected height of 1.5 feet during period of snow cover. Select vegetation to achieve appropriate barrier height to manage snowdrift depth and length for manipulation of snow storage.

Barrier Porosity: 60-75 percent during periods of expected snow cover. Select appropriate vegetation and density to provide needed barrier porosity to account for local conditions and desired snowdrift and depth.

Barrier Direction and Spacing. Measure the spacing between barriers along the prevailing wind erosion direction. For uniform distribution of the drifting snow, do not exceed 12 times the expected height of the barrier.

CONSIDERATIONS

Transport of wind-borne sediment and sediment-borne contaminants offsite are reduced by this practice when used in a resource management system. Consider need for other practices in combination with herbaceous wind barriers to meet the resource objectives.

Herbaceous wind barriers are more suitable than field windbreaks for use under center pivot and linear move irrigation systems due to height considerations. Windbreaks may be located outside the windward edge of the system.

Spacing between barriers may be adjusted, within the limits of the criteria above, to accommodate widths of farm equipment to minimize partial or incomplete passes.

Selection of plants for use in barriers should favor species or varieties tolerant to herbicides used on adjacent crops.

Certain plants may be alternate hosts for pests that may cause injury to adjacent crops and may not be satisfactory for use in barriers.

Consider plants that serve as a habitat for beneficial insects, as well as pollinating insects. When enhancement of insect pollinator habitat is a secondary objective, diversity of flowering plant species and season of flowering should be encouraged.

Consider planning barriers to attract undesirable insects away from crops.

Where compatible with the primary purposes of the practice, priority should be given to plant species that will also provide food and cover for wildlife. The selected species should be adapted to the site and meet the needs of the targeted wildlife species.

In addition, when enhancement of wildlife habitat is a secondary objective, plant species diversity should be encouraged. Barriers that result in multiple structural levels of vegetation within the barrier will maximize wildlife use.

If the barrier is also designed to provide escape or nesting cover for wildlife, locate barriers where they connect areas of existing perennial vegetation whenever possible and include plants that will have a minimum expected height that provides adequate cover for the targeted species. Barriers that connect areas such as woody draws often provide additional escape and travel cover. Two or more rows are often more effective than one row, with a minimum width of two feet between rows. Stiff stems are important in providing cover during severe winter storms.

Where damage to barriers by grazing animals is a concern, selection of plant species less palatable to animals may reduce damage.

Where water erosion from melting snow, accumulated within the barrier system, is a concern, supporting erosion control practices such as residue management can reduce the hazard. Where feasible, aligning barriers across the slope can enhance moisture infiltration and reduce erosion from runoff.

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Encourage the use of adapted native plant materials whenever possible.

Avoid use of invasive species.

Consider using species of plants that sequester more carbon and/or increasing the width of the herbaceous barrier to improve carbon sequestration.

Consider barriers to enhance the micro-environment for plant growth.

PLANS AND SPECIFICATIONS

Include the following documentation for establishment and maintenance of this practice:

1. Purpose
2. For individual barriers
    a. Vegetation type (annual or perennial)
    b. Species
    c. Number of rows per barrier
    d. Distance between barrier rows
    e. Seeding/planting rate
    f. Seeding/planting depth
    g. Planned effective barrier height
    h. Barrier width
3. For a barrier system
    a. Number of barriers in system
    b. Distance between barriers
    c. Total area in barriers
    d. Total amount of seed/number of plants required
4. Site preparation requirements
5. Method of seeding/establishment
6. Fertilizer and soil amendments needed
7. Mulch material (if required)

Record the above using the approved job sheet/practice requirements.

Include in the plan a sketch map or photograph of the field showing the approximate location of the barriers.

OPERATION AND MAINTENANCE

Re-established annual barriers each year by planting at recommended dates, leaving rows standing and maintained throughout the critical period for which the barrier was designed.

Replant gaps in perennial barriers as soon as practical to maintain barrier effectiveness.

Fertilize as needed.

Weeds shall be controlled by cultivation, spot treatment when using chemicals, or other acceptable methods.

Remove wind-deposited sediment from the barrier as needed and redistribute over the surface of the field.

Re-established or relocate barriers as needed.

Barriers designed to also enhance wildlife habitat should not be mowed unless their height or width exceeds that required to achieve the barrier purpose, or they become competitive with the adjoining land use. When mowing of vegetation or prescribed burning is necessary, it should be done outside the primary nesting season for grass-nesting birds.

Manage the grazing, harvest of hay or seed, burning, or mowing for weed control to allow regrowth to the planned height before periods when wind erosion, crop damage, or drifting snow are expected to occur.

REFERENCES

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