

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 Wind Barriers to decrease 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 for 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

Refer to Colorado Critical Area Planting, 342, or Cover Crop, 340, Conservation Practice Standards for planting criteria for perennial and annual species, respectively.

For perennial plant suitability and seeding rates, refer to Colorado Plant Materials Technical Note No. 59, Plant Suitability and Seeding Rates for Conservation Plantings in Colorado, 2002.

Barrier Direction, Spacing and Composition

Design the barrier direction, spacing and composition needed to achieve the desired purpose using currently approved wind erosion prediction technology.

Number of Rows

Barriers may consist of one row of plants if the single row provides the required porosity and meets the previous criteria. When two or more rows are required to achieve the required porosity and to avoid gaps, the rows shall be spaced no more than 36 inches apart.

Additional Criteria to Reduce Soil Erosion from Wind and Soil Particulate Emissions to the Air

Barrier Height

Barriers designed for this purpose shall have a minimum expected height of 1.5 feet during predicted wind erosion periods.

Barrier Porosity

Design barriers established for this purpose to achieve a porosity of 40-50 percent.

Barrier Direction and Spacing

Measure the spacing between barriers along the prevailing wind erosion direction during predicted critical wind erosion period(s). The barrier spacing shall not exceed 10 times the expected height of the barrier plus additional width permitted by the soil loss tolerance (T), or other planned soil loss objective. Calculations shall account for the effects of other practices in the conservation system.

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

During those periods when wind sensitive crops are susceptible to damage by wind and wind-borne soil particles, wind erosion shall not exceed the crop tolerance as specified in the National Agronomy Manual Table 502-4, other accepted references or other planned crop protection objectives. Assessments shall account for the effects of other practices in the resource management system.

Barrier Height

Barriers designed for this purpose shall have a minimum expected height of 0.5 feet during those periods when growing crops are susceptible to damage by wind or wind-borne soil particles. The designed height of the barrier will depend on the distance between the barrier and the susceptible crop.

Barrier Porosity

Barriers designed for this purpose shall achieve a porosity of 40-50 percent during periods when growing crops need protection.

Barrier Direction and Spacing

Measure the spacing between barriers along the prevailing wind erosion direction during those periods when sensitive crops are susceptible to damage by wind and wind-borne soil particles. Spacing shall not exceed 10 times the expected height of the barrier and additional width permitted by the crop tolerance to damage from wind erosion as specified in the National Agronomy Manual Table 502-4, applicable Field Office Technical Guides, other accepted technical references or other planned crop protection objectives.

Calculations shall account for the effects of other practices in the resource management system.

Additional Criteria to Enhance Snow Deposition to Increase Plant-Available Moisture**Barrier Height**

Barriers designed for this purpose shall have a minimum expected height of 1.5 feet during periods of expected snow cover. Select vegetation to achieve appropriate barrier height to manage snowdrift depth, and length for manipulation of snow storage.

Barrier Porosity

Design barriers established for this to achieve a porosity of 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 effective spacing along the prevailing wind erosion direction during periods of expected snow cover. For uniform distribution of the drifting snow, spacing shall not exceed 12 times the expected height of the barrier.

CONSIDERATIONS

This practice can decrease the transport of wind-borne sediment and sediment-borne contaminants when planned as part of a resource management system. Consider the 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.

Adjust the spacing between barriers 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, pest-eating insects or parasitizing insects, as well as pollinating insects. When enhancement of insect pollinator habitat is a secondary objective, diversity of flowering plant species should be encouraged.

Consider planning barriers to attract undesirable insects away from crops.

Where compatible with the primary purposes of the practice, select 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, encourage plant species diversity. Barriers that result in multiple structural levels of vegetation within the barrier will maximize wildlife use.

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 and consistent with wind erosion criteria, aligning barriers across the slope can enhance moisture infiltration and reduce erosion from runoff.

Encourage the use of adapted native plant materials whenever possible.

Avoid the 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 microenvironment for plant growth.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for the establishment and maintenance of this practice for each field or treatment unit according to the Criteria and Operation and Maintenance sections of this standard. Specifications shall describe the requirements for applying this practice to meet the intended purpose.

Record practice specifications on the Colorado Herbaceous Wind Barrier, 603 Job Sheet, and include a sketch map or photo of the field that shows the approximate barrier location(s).

Plans and specifications for this practice shall include the following components.

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)

OPERATION AND MAINTENANCE

Re-establish annual barriers each year by planting at recommended dates, leaving rows standing throughout the critical wind erosion period(s).

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

After establishment, fertilize perennial barriers as needed according to a current soil test. Manage weeds with cultivation, spot treatment when using chemicals, or other acceptable methods according to a weed management plan.

Remove wind-borne sediment accumulated in barriers, and distribute over the surface of the field as needed.

Re-established or relocate barriers as needed.

For barriers composed of perennial vegetation to enhance wildlife habitat, do not mow unless the height or width of the barrier exceeds that required to achieve the wind erosion purpose. When mowing of vegetation or prescribed burning is necessary, conduct operations outside the primary nesting season for grass-nesting birds.

Harvest of hay or seed from perennial barriers, grazing, burning, or mowing for weed control, shall be managed to allow regrowth to the planned height before periods when wind erosion, crop damage, or drifting snow are expected to occur. Manage annual barriers so they are of sufficient height and condition to meet the intended purpose.

REFERENCES

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