

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

HERBACEOUS WIND BARRIERS

(Feet)

CODE 603

DEFINITION

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

PURPOSE

- Reduce soil erosion and/or particulate generation from wind
- Protect growing crops from damage by wind-borne soil particles
- Manage snow to increase plant-available moisture
- Provide food and cover for wildlife

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to cropland or other land where crops are grown.

CRITERIA

General Criteria Applicable to All Purposes

Vegetation

Herbaceous wind barriers may be composed of perennial or annual vegetation, growing or dead.

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

For 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.

Select plant materials for the following characteristics:

1. Adaptation to local soil and climate conditions;
2. Stiff, erect non-spreading growth habit;
3. Resistant to lodging;
4. Good leaf retention, and;
5. Minimize competition with adjacent crops.

Number of Rows

Barriers may consist of one row of plants provided the required porosity can be achieved with a single row and the row contains no gaps. Plan more than one row for barriers located on sites, such as sandy soils, that can negatively affect the establishment or survival of the barrier.

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.

Barrier Direction and Spacing

The effective spacing between barriers shall be determined using the Excel WEQ spreadsheet, Colorado Field Version, 2003. When barrier directions deviate from perpendicular to the prevailing wind erosion direction, correspondingly decrease the spacing between barriers. For additional information, see the National Agronomy Manual, 3rd Ed., 2002, Part 502.34 and Tables 502-8 A-E.

Porosity

Select species for Herbaceous Wind Barriers that will have a moderate or dense porosity during the critical wind erosion period, as listed in the USDA Plants Database.

Harvest

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

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

Barrier Height

Barriers shall have a minimum expected height of 1.5 feet during the critical wind erosion period.

Barrier Porosity

Design barriers to achieve a porosity of 40-50 percent.

Barrier Direction and Spacing

Measure the spacing between barriers along the prevailing wind erosion direction during the critical wind erosion period(s). The 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-borne Soil Particles

Barrier Height

Barriers designed for this purpose shall have a minimum expected height of 0.5 feet during 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 growing crop, and the crop height at which it will no longer need the protection of a barrier.

Barrier Porosity

Design barriers to achieve a porosity of 40-50 percent during the period when growing crops are susceptible.

Barrier Direction and Spacing

Measure the spacing between barriers along the prevailing wind erosion direction during those periods when growing crops are susceptible to damage by wind-borne soil particles.

Spacing shall not exceed 10 times the expected height of the barrier plus any additional width permitted by the crop tolerance to damage from wind erosion (*) as specified in The National Agronomy Manual, 3rd Ed., 2002, Table 502-4, other accepted technical references, or other planned crop protection objectives.

*Crop tolerance to damage from wind erosion is the maximum soil erosion that a growing crop can tolerate, from crop emergence to field stabilization, without an economic loss to crop stand, crop yield or crop quality. Calculations shall account for the effects of other practices in the resource management system.

Additional Criteria to Manage Snow to Increase Plant-Available Moisture

Barrier Height

Design barriers to have a minimum expected height of 1.5 feet during periods of expected snow cover.

Barrier Porosity

Design barriers to achieve a porosity of 60-75 percent during periods of expected snow cover.

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.

Additional Criteria to Provide Food and Cover for Wildlife

Vegetation

Design barriers to enhance wildlife habitat in conjunction with one or more other purposes. Select barrier species that are adapted to the site and meet the intended needs of the targeted wildlife species and other stated purposes.

CONSIDERATIONS

Apply this practice in a resource management system to decrease offsite transport of wind-borne sediment and sediment-borne contaminants.

Herbaceous wind barriers are more suitable than field windbreaks for use under center pivot irrigation systems due to height

considerations. Windbreaks may be located outside the windward edge of the circle.

Adjust spacing between barriers within the limits of the criteria stated 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 injurious to adjacent crops and may not be satisfactory for use in barriers. Consider plants that serve as a home for beneficial, pest-eating insects, pollinators and pest predators. Consider planning barriers as trap strips to attract undesirable insects such as virus spreading aphids.

Selection of plant species less palatable to animals may reduce damage to barriers from grazing wildlife.

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 decrease erosion.

Encourage plant species diversity when designing barriers to enhance wildlife habitat. Barriers that result in multiple structural levels of vegetation within the barrier will maximize wildlife use.

When designing barriers 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.

Encourage the use of adapted native plant materials whenever possible.

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

PLANS AND SPECIFICATIONS

Prepare plans and specifications for the establishment and maintenance of this practice for each field or treatment unit according to the Conditions, Criteria, Considerations 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, 2004.

Complete form CO-ECS-5, Grass Seeding Planned and Applied, for each field or treatment unit.

Plan and implement the Nutrient Management, 590 Conservation Practice Standard prior to fertilizer and or amendment applications, as applicable.

Plan and implement the Pest Management, 595 Conservation Practice Standard to control noxious weeds prior to seeding, as applicable

OPERATION AND MAINTENANCE

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

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

After establishment, fertilize perennial barriers according to a soil test. Control weeds by cultivation, spot treatment when using chemicals, or other acceptable methods.

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

Re-established or relocated Barriers as needed.

Do not mow barriers composed of perennial vegetation to enhance wildlife habitat unless the height or width exceeds that required for the barrier purpose, or the barrier has become competitive with the adjoining land use. When mowing is necessary, mow during the non-nesting season.

Delay Prescribed Burning (338) activities to enhance plant vigor until after nesting/resting periods.

REFERENCES

Colorado Field Office Technical Guide, Section IV. Cover Crop 340 Conservation Practice Standard. 2004. USDA, Natural Resources Conservation Service. Lakewood, CO.

<http://efotg.nrcs.usda.gov/references/public/CO/CO340.pdf>

Colorado Field Office Technical Guide, Section IV. Critical Area Planting 342 Conservation Practice Standard. 2004. USDA, Natural Resources Conservation Service. Lakewood, CO.

<http://efotg.nrcs.usda.gov/references/public/CO/CO342.pdf>

Colorado Field Office Technical Guide, Section I. Plant Materials Technical Note No. 59. 2002. Plant Suitability and Seeding Rates for Conservation Plantings in Colorado. USDA, Natural Resources Conservation Service. Lakewood, CO.

http://efotg.nrcs.usda.gov/references/public/CO/COPMTN_59_Text.pdf

Colorado Field Office Technical Guide, Section I, Erosion Prediction, Excel WEQ Colorado Guidance Document. 2003. USDA, Natural Resources Conservation Service. Lakewood, CO.

http://efotg.nrcs.usda.gov/references/public/CO/CO_Excel_WEQ_Guidance.pdf

National Agronomy Manual, 190-V-NAM, 3rd Ed., Table 502-4. Crop Tolerance to Blowing Soil. 2002. USDA, Natural Resources Conservation Service. Washington D.C.

http://policy.nrcs.usda.gov/scripts/lpsiis.dll/M/M_190_NAM.htm

The PLANTS Database, Version 3.5. 2004. National Plant Data Center, USDA, Natural Resources Conservation Service, Baton Rouge, LA 70874-4490 USA.

<http://plants.usda.gov/>