DEFINITION (RED NATIONAL BLUE STATE)
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
Herbaceous barriers will be designed 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. Plant materials shall be selected 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.

Barrier Direction, Spacing and Composition. The barrier direction, spacing, and composition needed to achieve the desired purpose shall be designed using the currently approved wind erosion technology.

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 and the previous criteria is met. 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.
Protective Barrier

It is recommended that a strip of rye 12-15 feet wide be sown in the fall at the same spacing as the vegetative barrier. It can help prevent the barrier from being “buried” alive from wind erosion deposition during establishment. Also, crop residue, straw bedded manure, or cover crops can be substituted for a rye barrier to prevent barrier burial from wind erosion. All protective barriers should be upwind of the barrier.

Annual barriers need to be re-established each year by planting at the recommended dates. For areas prone to soil erosion by wind, the annual barriers need to achieve the minimum height to protect the crop during the critical erosion period.

Species Selection all purposes: See MI FOTG Appendix A, Seeding specifications, Suitable Plants for Herbaceous Wind Barriers 603.?? Or whatever we call this Ohio style template.

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

<table>
<thead>
<tr>
<th>Barrier Height</th>
<th>Barriers designed for this purpose shall have a minimum expected height of 1.5 feet during the wind erosion period for which the barriers are designed.</th>
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<tbody>
<tr>
<td>Barrier Porosity</td>
<td>Barriers established for this purpose shall be designed to achieve a porosity of 40-50 percent.</td>
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Barrier Direction and Spacing. The spacing between barriers shall be measured along the prevailing wind erosion direction during the critical wind erosion period (s) being planned for the field. Spacing shall not exceed 10 times the expected height of the barrier plus additional width permitted by the soil loss tolerance (T) of the critical or dominate soil, 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 from 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 (Part 502), other accepted references or other planned crop protection objectives. (See Section I Wind Erosion Prediction the MI WEPS USERS GUIDE TABLE 1 pg.5)

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. Some species are more vulnerable at flowering rather than emergence, e.g., tomatoes.

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 crop being protected.

Barrier Porosity. Barriers established for this purpose shall be designed to achieve a porosity of 40-50 percent during the period when growing crops are to be protected.

Barrier Direction and Spacing. The spacing between barriers shall be measured 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 plus additional width permitted by the crop tolerance to damage from wind erosion as specified in the National Agronomy Manual (Part 502), applicable Field Office Technical Guides, other accepted technical references, or other planned crop protection objective. (See Section I Wind Erosion Prediction the MI WEPS USERS GUIDE TABLE 1 pg.5)

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 period of expected snow cover. Select vegetation to achieve appropriate barrier height to manage snow drift depth and length for manipulation of snow storage.

**Barrier Porosity.** Barriers established for this purpose shall be designed 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. This porosity is best, as it helps to achieve more even distribution of snow within the barrier system.

**Barrier Direction and Spacing.** The effective spacing shall be measured 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**

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, 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, 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. Barriers shall consist of two or more rows a minimum of 2 feet.
apart. Plants should have a minimum (typically 18 inches) expected height that provides adequate cover for the targeted wildlife species.

An annual soil trap planting of rye, sorghum, or buckwheat 12-15 feet wide upwind and adjacent to the barrier will improve cover and extended barrier life. Leave a two-foot space between the annual and perennial barrier to prevent competition.

To provide wildlife cover, consider using switch grass, Sudan grass or Tall Wheatgrass.

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.

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.

Cash flow and improved cost-benefit can be improved by using sweet corn or popcorn and harvesting the ears for profit. The stalks must be left standing to retain their designed function for the identified resource concern.

PLANS AND SPECIFICATIONS

Plans and specifications for the establishment and maintenance of this practice shall include:

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 practice specifications using approved specification sheets, job sheets and Implementation Requirement document based on Michigan Seeding Table As of September 2015 Herbaceous Wind Barrier 603 Table 1. The plans shall include a sketch map or photograph of the field showing the approximate location of the barriers.

OPERATION AND MAINTENANCE

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

Gaps in perennial barriers shall be replanted as soon as practical to maintain barrier effectiveness.

After establishment, perennial barriers shall be fertilized as needed. Weeds shall be controlled by cultivation, spot treatment when using chemicals, or other acceptable methods.

Wind-borne sediment accumulated in barriers shall be removed and distributed over the surface of the field as needed.

Barriers shall be re-established or relocated as needed.

Barriers composed of perennial vegetation 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.

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

REFERENCES
