

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

HEDGEROW PLANTING

(Ft.)

CODE 422

DEFINITION

Establishment of dense vegetation in a linear design to achieve a natural resource conservation purpose.

PURPOSE

Providing at least one of the following conservation functions:

- Habitat, including food, cover, and corridors for terrestrial wildlife.
- To enhance pollen, nectar, and nesting habitat for pollinators.
- Food, cover, and shade for aquatic organisms that live in adjacent streams or watercourses.
- To provide substrate for predaceous and beneficial invertebrates as a component of integrated pest management.
- To intercept airborne particulate matter.
- To reduce chemical drift and odor movement.
- Screens and barriers to noise and dust
- To increase carbon storage in biomass and soils.
- Living fences
- Boundary delineation and contour guidelines
- Improvement of landscape appearance

CONDITIONS WHERE PRACTICE APPLIES:

This practice applies wherever it will accomplish at least one of the purposes stated above.

GENERAL CRITERIA

Hedgerows shall be established using woody plants producing erect stems attaining average heights of at least 3 feet persisting over winter.

No minimum width beyond a single row is required except where wildlife food and cover **or pollinators** is an objective.

Other component practices may be required to establish hedgerows. These practices may include but are not limited to:

- ***Access Control (472)***
- ***Tree and Shrub Establishment (612)***
- ***Forest Site Preparation (490)***

Site prep and planting methods used will be designed to protect the soil from erosion.

Site preparation, establishment, planting dates, methods and care in handling and planting of stock shall be in accordance with the criteria of WV Practice Standards 612, Tree/Shrub Establishment and (490) Forest Site Preparation.

Necessary site preparation and planting shall be done at a time and manner to ensure survival and growth of selected species.

Only viable, high quality and adapted planting stock will be used. Seed/stock viability will be determined prior to planting. Site preparation shall be

sufficient for establishment and growth of selected species and performed in a manner that does not compromise the intended purpose.

Planting rates will vary with intended purpose and species but shall be adequate to accomplish the planned purpose.

Plants selected must be suited and adapted to the soils, climate and conservation purpose.

No plant listed by the state as a noxious weed shall be established in a hedgerow.

Native plant materials will be used whenever possible.

The practice shall be protected from livestock grazing and trampling to the extent necessary to ensure that it will perform the intended purpose(s).

Undesirable vegetation shall be controlled until the hedgerow becomes established. Control shall continue beyond the establishment period, if necessary.

All planned work shall comply with federal, state and local laws and regulations.

The method of planting hedgerows shall include hand or machine planting techniques and be suited to achieving proper depths and placement of planting stock roots.

Selection of plants and spacing depend on purpose. Multiple rows should be used where feasible and plants should be staggered between rows. If necessary, spacing between rows should allow enough room for maintenance equipment.

The planned plant species will be tolerant of any nutrient, pesticide, mine drainage or other chemical loading, where such loading cannot be corrected.

For selection of species to be encouraged through natural succession or those that may be planted, refer to the list of Trees and Shrubs Suitable for Establishment in West Virginia (MOATSL). Other species may also be suitable for use in hedgerow planting. Consult the NRCS state staff

biologist or NRCS forester to determine suitability.

Plant densities for trees and shrubs will depend on their potential height at 20 years of age. Heights may be estimated based on any of the following:

- 1) documented performance of the individual species on adjacent or nearby areas on similar sites under similar conditions;**
- 2) documented heights in the USDA Plants Database for a particular species and use;**
- 3) "20-year" and "mature" heights listed in the list of Trees and Shrubs Suitable for Establishment in West Virginia (MOATSL). Located under tools in Section IV of the FOTG**

Methods to protect plantings when livestock have access to the area shall be designed and installed according to WV conservation practice standards (472) Access Control and/or (382) Fence.

In most instances, other exclusionary measures will be necessary to protect plantings from browse by wildlife at least during the establishment period. These devices should be identified in the (612) Tree/Shrub Establishment specification (i.e. tree tubes).

Species shall be selected that do not host pests or diseases that could pose a risk to nearby crops.

Additional Criteria for Living Fences

Selected plants shall attain a size and density adequate to create a barrier to contain livestock or humans, as needed.

If the purpose is to contain livestock, selected plants shall not be poisonous or hazardous to the animals.

Selected plants shall attain a size adequate to create a barrier to contain livestock or humans, as needed. **Refer to those species listed in list of Trees and Shrubs Suitable for Establishment in West Virginia (MOATSL) and the heights listed for 20 years and maturity.**

If the purpose is to contain livestock, selected plants shall not be poisonous or hazardous to the animals.

Additional Criteria for Screens and Barriers to Noise and Dust

If screening or tight thickets are desired, spacing of plants should be closer to the minimum range shown in list of Trees and Shrubs Suitable for Establishment in West Virginia (MOATSL). Spacing should be adequate to allow crown closure at maturity for the selected species.

Species selection criteria may be based upon improved aesthetics, seasonal foliage color, showy flowers, foliage texture, form, and branching habit. The layout and design shall be appropriate for the setting as determined by adjacent land uses, landowner objectives and purpose.

Additional Criteria for Screens and Noise Barriers

Screening hedgerows provide privacy, hide unsightly areas from view or reduce noise.

Hedgerows shall be located where they most completely obstruct a line of sight or offensive sound.

Selected plants shall attain a height and fullness sufficient to break the line of sight or baffle sound.

Species selection criteria may be based upon improved aesthetics, seasonal foliage color, showy flowers, foliage texture, form, and branching habit. The layout and design shall be appropriate for the setting as determined by adjacent land uses, landowner objectives and purpose.

Additional Criteria for Wildlife Food, Cover and Corridors

Establish at least two compatible species of native ***trees and/or shrubs***. Multiple species increase food and habitat diversity while reducing pest and disease risk.

Selected plants shall provide cover and/or food to support the landowner's wildlife objectives.

Minimum hedgerow width, at maturity, shall be 15 feet. This may necessitate the establishment of more than one row of plants.

Selected plants shall provide cover and/or food to support the landowner's wildlife objectives.

In plantings adjacent to small watercourses, the plantings shall be site-adapted, large enough at maturity and installed close enough to shade the watercourse.

Species and spacing suitable to provide wildlife food and/or cover will be selected from list of Trees and Shrubs Suitable for Establishment in West Virginia (MOATSL) or the West Virginia Pollinator Handbook contains lists of trees and shrubs suitable for establishment. Utilize it as appropriate.

If tree/shrub fruit production is desired to provide a wildlife food source, the spacing of plants should be closer to the maximum range shown in the list of Trees and Shrubs Suitable for Establishment in West Virginia (MOATSL); allowing for maximum crown development at maturity.

Wildlife habitat requirements may be obtained from those species listed in the West Virginia Wildlife Habitat Evaluation Technique (WVWHET).

If the hedgerow is intended to provide winter protective cover, at least 25 percent of the total area of the hedgerow shall contain evergreen species. Sections may be distributed within the hedgerow as needed to provide wildlife with ready access to winter cover.

Wildlife corridors (travel lanes) are linear plantings that provide cover and food for wildlife, while allowing ease and safety of movement through areas lacking these attributes. Hedgerows that are intended to serve primarily as wildlife corridors shall be a minimum of 25 feet wide. The height, width, and location of these corridors shall be designed so that they connect two or more habitat areas, and provide protective cover and dispersal networks for the desired animal species.

If planting is required, corridors should consist of a minimum of three staggered

rows of trees and/or shrubs. Plant species should consist of both hard and soft mast producers where feasible.

Species suitable for wildlife corridors will be selected and spaced according to the list of Trees and Shrubs Suitable for Establishment in West Virginia (MOATSL).

Additional Criteria for Pollinator Habitat

The minimum width for hedgerows where the principle purpose is to provide pollinator habitat shall be 25 feet.

Hedgerow plants must provide abundant pollen and nectar resources.

Multiple species with different blooming periods shall be included in the planting. The actual number of species is dependent upon the availability of adjacent flowering plants. Plants that bloom during the same period as adjacent insect-pollinated crops can be excluded.

In the absence of this information utilize a minimum of six species of trees and/or shrubs. This mixture shall consist of at least two woody species in each of the following bloom periods:

- **March to April = Very Early Season**
- **March through May = Early Season**
- **May through July = Mid Season**

Because woody species stop blooming earlier in the growing season and the floral resources are not available, it is not advisable to depend solely upon woody species to provide pollinator resources. For this reason, it is acceptable to utilize bloom periods of very early, early and mid-season. Late season blooming species may be utilized if they are available.

Refer to the West Virginia Pollinator Handbook for a list of shrub species suitable for use in hedgerows and the corresponding bloom periods.

Pollinator hedgerows will be protected from pesticides that may harm pollinators. If pest control is required, only non-blooming plants will be treated, and/or only pesticides non-toxic to pollinators shall be used.

Renovation or maintenance events shall be limited to one-third of a hedgerow's length or width to prevent sudden elimination of the practice's wildlife habitat function.

Additional Criteria for Boundary Delineation

Hedgerows shall be aligned along boundaries of fields, or forestlands to differentiate land management units.

Additional Criteria for Contour Guidelines

Hedgerows shall be aligned so they provide permanent contour markers supporting implementation of Contour Farming (330) or Stripcropping (585). Refer to those conservation practice standards for alignment criteria.

Additional Criteria for Improvement of Landscape Appearance

The hedgerow design shall meet the aesthetic objectives of the landowner.

Species selection criteria may be based upon improved aesthetics, seasonal foliage color, showy flowers, foliage texture, form, and branching habit. The layout and design shall be appropriate for the setting as determined by adjacent land uses, landowner objectives and purpose.

Species and spacing suitable for this purpose will be selected from the list of Trees and Shrubs Suitable for Establishment in West Virginia (MOATSL).

Additional Criteria for Reducing Particulate Matter Movement

The hedgerow will be oriented as close to perpendicular to the prevailing wind direction as possible.

Hedgerow density on the upwind side shall be at least 50% at maturity.

Hedgerow density adjacent to the particulate source shall be at least 65% at maturity.

Refer to WV conservation practice standard Windbreak (380) for more information regarding the placement and positioning of plants for this purpose.

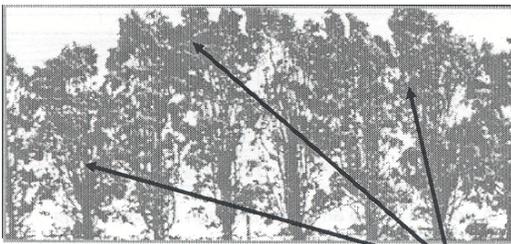
Species and spacing suitable for this purpose will be selected from the list of Trees and Shrubs Suitable for Establishment in West Virginia (MOATSL).

Additional Criteria to Reduce Odor Movement and/or Chemical Drift

Orientation of the hedgerow shall be as close to perpendicular to the prevailing wind direction during the period of concern, and between the source of the odor or chemical drift and the sensitive and the sensitive areas.

Hedgerows shall be located upwind of the odor producing area and the chemical application area.

Tree and shrub species used shall have foliar and structural characteristics that optimize interception, adsorption and absorption of airborne chemicals or odors. **For the most part, vegetative species should be tolerant of the chemicals they are intercepting.**



Density is the percentage of the solid portion of the hedgerow to the total area of the hedgerow.

Hedgerow density on the upwind side shall be at least 50% at maturity.

Hedgerow density adjacent to the source shall be at least 65% at maturity.

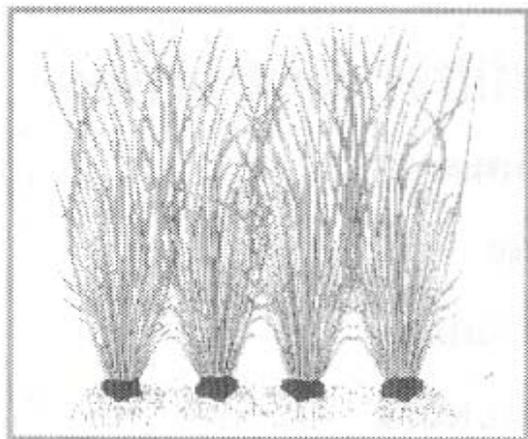


Illustration of 50-60% density.

Species and spacing suitable for this purpose will be selected from list of Trees and Shrubs Suitable for Establishment in West Virginia (MOATSL).

CONSIDERATIONS

General

Where feasible consider using natural succession to supplement hedgerows. Supplemental planting of beneficial tree/shrub species should be added. An adequate seed source must be nearby or adjacent when using natural succession to establish a hedgerow.

Consider using Plant Guide and Plant Information Sheets for individual species found in the USDA Plants Database (<http://plants.usda.gov>) may be utilized to supplement the material in this standard.

Consider the effects of deer and small mammal browse when establishing vegetation.

Consider shading effects of tall hedgerows on adjacent structures and areas such as cropfields.

Consider associated insect, pest and disease problems when selecting tree and shrub species (e.g. cedar - apple rust)

Consider shade tolerance when selecting tree and shrub species to plant.

Consider the ease of establishment and availability of planting stock when selecting species to plant.

Consider the drainage class and soil type prior to plant selection.

Consider long term heights and effects on adjacent roads and utilities.

Consider the effects of noxious and invasive weeds on establishment and maintenance of hedgerows.

Consider wind direction when determining locations of plantings.

Consider the effects on erosion and the movement of sediment and soluble and

sediment attached substances carried by runoff.

Consider the use of native, warm-season grasses in and adjacent to hedgerows. These bunch grasses provide good nesting sites for ground-nesting birds, and the open spaces between plants allow good feeding habitat for birds and small mammals.

Planting a hedgerow larger than the required length and minimum width will increase the amount of carbon stored in the soil and biomass. Larger and more diverse hedgerows will generally enhance most other resource values.

Hedgerows should be planned in combination with other practices to develop holistic conservation systems that enhance landscape aesthetics, reduce soil erosion, improve sediment trapping, improve water quality and provide wildlife habitat.

Consider alternative water sources, such as tanks, ponds, wells, solar pumps, and ram pumps for livestock water supply needs if necessary.

Hedgerows following land contours create meandering lines on the landscape, produce a natural appearance and increase the availability of "edge" wildlife habitats.

Hedgerows containing a mixture of native shrubs and small trees provide greatest environmental benefits.

Consider adding herbaceous plantings to the hedgerow to increase diversity or habitat functions.

Use of bareroot and containerized seedlings will accelerate hedgerow development.

Consider the amount of shading a hedgerow will provide at maturity. Shading may impact growth of adjacent plants, microclimate and aesthetics.

Periodic root pruning can reduce nutrient and water robbing from adjacent cropland.

Consider avoiding the use of plants that spread by root suckers as hedgerow may expand beyond the desired treatment area.

Wildlife Food, Cover and Corridors

Hedgerows can provide travel lanes, or corridors that allow wildlife to move safely across a landscape.

Consider using this practice to provide food and cover for aquatic organisms that live in watercourses with bank-full width less than 5 feet.

Include forbs and shrubs that provide pollen and nectar during the entire growing season for native bees. Integrate shrubs that provide nesting cover for tunnel nesting bees or provide artificial nesting blocks, and management that provides semi-bare ground and un-mowed herbaceous strips for bumble bees. This practice also can help reduce drift of pesticides onto areas of pollinator habitat.

Generally, wider corridors accommodate more wildlife use.

Linking fragmented habitats may increase wildlife use of an area.

In grassland ecosystems, hedgerows may adversely affect area-sensitive nesting birds by fragmenting habitat patches and increasing the risk of predation.

Hedgerows can complement the availability of naturally occurring wildlife foods.

Hedgerows can provide wildlife with cover for feeding, loafing, nesting and caring for young.

Dense or thorny shrub thickets provide songbirds with important nesting sites and a refuge to escape predators.

Establishment of evergreen plants provides year-round concealment and thermal cover for wildlife.

Establishment of herbaceous vegetation along the edges of a hedgerow can further enhance the habitat functions of a hedgerow.

Installation of artificial nest boxes with predator guards can encourage cavity-nesting birds and small mammals to utilize a hedgerow.

Living Fences

Thorny shrubs and trees can improve a living fence's barrier effect.

Screens and Noise Barriers

From eye-level, hedgerows reduce the line-of-sight across open areas, concealing objects behind them from view.

Consider the design from viewpoints on both sides of the screen.

Locate noise barriers as close to the source of noise as possible.

Combination of shrubs and/or trees can create more effective screens than single species plantings.

Evergreens provide foliage that can maintain a screen's year-round effectiveness.

Improving Landscape Appearance

Consider plants' seasonal display of colors on bark, twigs, foliage, flowers and fruit.

Consider plants' growth habits (outline, height and width).

Water Quality and Quantity

Water quality benefits may arise from:

- Arresting sediment movement and trapping sediment-attached substances.
- Infiltration and assimilation of plant nutrients.
- Water cooling effects resulting from reducing the incidence of solar radiation on small watercourses through shading.

A hedgerow will increase surface water infiltration by improving soil structure around its root zone. However, evapotranspiration may reduce groundwater recharge benefits.

Incidental Trapping of Snow or Soil

Although not a primary purpose, hedgerows may incidentally trap windblown snow or soil.

Consider installing hedgerows on alignments that prevent trapping and accumulation of snow and sand on public roads.

Refer to the Windbreak/Shelterbelt Establishment (380) standard for criteria when snow or sand trapping is a primary conservation purpose.

PLANS AND SPECIFICATIONS

Plans and specifications for this practice shall be prepared for each site. Plans and specifications shall be recorded using approved specification sheets, job sheets, or narrative documentation in the conservation plan, or other acceptable documentation.

Other components necessary to implement this practice should be referenced as appropriate (e.g. Tree and Shrub Establishment (612)).

At a minimum the following will be identified in the conservation plan (as appropriate):

- ***The purpose of the hedgerow;***
- ***Hedgerow location;***
- ***Hedgerow length and width;***
- ***Species selected for planting and any supplemental information including USDA Plant Database Plant Guide Sheets or Plant Information Sheets, mixes or layouts from the West Virginia Pollinator Handbook;***
- ***Establishment method(s) and date(s);***
- ***Operation and Maintenance***
- ***A CPA-52 or similar acceptable environmental evaluation***

OPERATION AND MAINTENANCE

Vegetation shall be maintained to ensure continued control of odor movement and chemical drift.

Supplemental planting may be required when survival is too low to produce a continuous hedgerow.

Vegetation shall be protected from unwanted fire and grazing throughout its life span.

Pests shall be monitored and controlled.

The following actions shall be carried out to insure that this practice functions as

intended throughout its expected life. These actions include normal repetitive activities in the application and use of the practice (operation), and repair and upkeep of the practice (maintenance).

Where practical, management activities will be performed outside the primary nesting season March 15 - July 15. An exception may be for mowing or cultivation during the establishment period to control vegetative competition.

Pruning, thinning and removal of plants should be performed at least annually and timed so as not to interfere with the lifecycle of the plants or the intended purpose of the hedgerow.

Removal of diseased plants or limbs shall occur immediately upon detection.

Monitoring and replacement of dead trees or shrubs and control of undesirable vegetative competition will be continued until the hedgerow is fully functional.

The hedgerow will be continuously protected from fire, grazing and trampling. Cultivation for a year or two may be desirable if plant competition becomes a problem.

The hedgerow should be inspected after heavy storm events. Check for areas where water, ice or snow is concentrated and may cause damage to plants and take corrective actions as necessary.

Additional operation and maintenance requirements may be developed on a site-specific basis to assure performance of the practice as intended.

Periodic applications of nutrients may be needed to maintain plant vigor.

Renovation activities shall be scheduled to prevent disturbance during the wildlife nesting season.

REFERENCES

USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Strausbaugh, P.D. and E.L. Core, 1977., Flora of West Virginia., Second Edition, Seneca Books Inc., Morgantown, WV

Wharton, M.E., Barbour, R., 1973. Trees and Shrubs of Kentucky., University Press of Kentucky., Lexington, KY

Little, E.L., 1980., The Audubon Society Field Guide to North American Trees Eastern Region., Chanticleer Press Inc., New York, NY 10022

Hardin, J.W., White, F., 1991., Textbook of Dendrology, Covering the Important Forest Trees of the United States and Canada, McGraw-Hill, Inc., New York, NY 10022

National Biology Handbook, Part 614.4, Conservation Corridor Planning at the Landscape Level, Natural Resources Conservation Service, August 1999.

**** Bold italics indicate changes made or information added to the national standard by West Virginia.***