



Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

HEDGEROW PLANTING

CODE 422

(ft)

DEFINITION

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

PURPOSE

This practice is used to accomplish one or more of the following purposes–

- Provide habitat including food, cover, shelter or habitat connectivity for terrestrial or aquatic wildlife.
- Provide food or cover for beneficial organisms as a component of pest management.
- Filter, intercept, or adsorb airborne particulate matter, chemical drift, or odors.
- Provide visual or physical screens and barriers.
- Increase carbon storage in biomass and soils.

CONDITIONS WHERE PRACTICE APPLIES

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

Linear plantings to treat erosion, to reduce nutrient transport, or to reduce sediment transport should use Conservation Practice Standard (CPS) Windbreak/Shelterbelt Establishment (Code 380), CPS Riparian Forest Buffer (Code 391), CPS Filter Strip (Code 393), CPS Vegetative Barrier (Code 601), CPS Cross Wind Trap Strips (Code 589C), or CPS Alley Cropping (Code 311).

CRITERIA

General Criteria Applicable to All Purposes

Hedgerows must retain sufficient vertical structure throughout the year to achieve the desired function. In all cases, the width of the hedgerow must be sufficient to achieve the stated purpose. This may necessitate the establishment of more than one row of plants.

Select plants that are suited and adapted to soil and site conditions, climate, and conservation purpose.

Select species that do not host pests or diseases that pose a known risk to nearby crops or other desirable plant communities.

Protect hedgerows to the extent necessary to ensure that they will achieve the intended purpose(s) during plant establishment and where grazing, browsing, or trampling could affect plant vigor or survival. .

Control competing vegetation until the hedgerow becomes established.

Additional Criteria for Wildlife Habitat

Establish hedgerows using at least one row of woody plants.

NRCS reviews and periodically updates conservation practice standards. To obtain the current version of this standard, contact your Natural Resources Conservation Service State office or visit the Field Office Technical Guide online by going to the NRCS website at <https://www.nrcs.usda.gov/> and type FOTG in the search field.

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Hedgerows will not be established using bunch grasses when addressing a wildlife habitat purpose.

The hedgerow size, arrangement, and species composition must be sufficient to support the landowner's wildlife objectives, as determined by state-approved habitat assessments or technical guidance (e.g., review by a biologist, wildlife habitat evaluation guide, etc.).

If target wildlife are pollinators, the hedgerow may be one row wide, but the selected plants must provide abundant pollen and nectar sources.

- Include multiple species with different blooming periods (i.e., early spring through late summer) in the planting. The actual number of species is dependent on the availability of adjacent flowering plants. Plants that bloom during the same period as adjacent insect-pollinated crops can be excluded. Use CPS Wildlife Habitat Planting (Code 420) to achieve the necessary bloom diversity if it cannot be achieved with the hedgerow alone.
- Protect hedgerows that support pollinators or beneficial insects from pesticide drift that may harm them. Follow Agronomy Technical Note 9 to determine appropriate mitigation measures when pesticides will be applied near the hedgerow.

Additional Criteria for Beneficial Invertebrates as a Component of Pest Management

Establish hedgerows using at least one row of woody plants, bunch grasses, or both.

The selected plants, whether woody plants or bunch grasses, must support the identified beneficial organisms.

Create suitable soil conditions, including elevation, drainage, and depth when establishing beetle banks or for targeted burrowing invertebrates.

Additional Criteria for Filtering and Intercepting Airborne Particulate Matter, Odors, or Chemical Drift

Establish hedgerows using at least one row of woody plants, bunch grasses, or both.

Grasses used in the hedgerow for filtering purposes must persist at 3 feet of height throughout the year.

Orient the hedgerow as close to perpendicular to the prevailing wind direction as feasible for the time period(s) of greatest concern. A single hedgerow will treat an area beginning 2 times its mature height (2h) upwind to 10h downwind from the hedgerow. When installing multiple hedgerows, the downwind hedgerows must be no more than 12feet from the upwind hedgerow.

Hedgerow plantings must be spaced such that density on the windward/protective side of the problem source will be at least 50% at maturity.

Hedgerow density adjacent to the downwind/filtering side of the problem source must be at least 65% at maturity.

Use tree and shrub species with foliar and structural characteristics that optimize interception, adsorption and absorption of airborne particulates, odors, or chemicals. Select plant species that are tolerant of anticipated chemical exposure.

Exclude plants attractive to pollinators and beneficial insects that could pose negative effects due to airborne chemical absorption.

Additional Criteria for Visual or Physical Screens and Barriers

Establish hedgerows using at least one row of woody plants, bunch grasses, or both.

Align screening hedgerows to provide privacy, hide areas from view, or reduce noise.

Locate hedgerows where they most effectively improve the viewshed or attenuate offensive noises or odors.

Noise screens must be at least 65% dense during the time of the year when noise is a problem and as tall as, and as close to, the noise source as practicable.

The length of the noise screen shall be twice as long as the distance from the noise source to the receiver.

For high-speed traffic noise, the barrier must be at least 65 feet wide. For moderate speed traffic noise, the barrier width must be at least 20 feet wide.

Species selected will be tolerant to noxious emissions, sand, gravel depositions, or salt spray from traffic areas.

For living fences, select plants that will attain a size and density adequate to create a barrier to contain livestock or humans, as needed.

Select plants that are not palatable, poisonous, or hazardous to animals when using living fences to restrict animal movements.

CONSIDERATIONS

General Considerations

Installation of other practices such as CPS Tree and Shrub Site Preparation (Code 490), CPS Irrigation System Microirrigation (Code 441) and CPS Mulching (Code 484) may be necessary to establish a hedgerow.

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.

Plant hedgerows along land contours to create meandering lines on the landscape, produce a natural appearance and increase the availability of "edge" wildlife habitats.

A mixture of native shrubs and small trees will often provide greater environmental benefits, while planting non-natives may negatively impact surrounding native plant communities.

Planting bareroot seedlings, potted plants, or plugs will accelerate hedgerow development as compared to starting from seed. This may necessitate irrigation or periodic hand watering to ensure seedling survival.

Shading from a mature hedgerow may impact growth of adjacent plants.

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

Plants that spread by suckers may expand beyond the desired treatment area.

Hedgerows may benefit adjacent water bodies by shading and cooling small water courses.

Hedgerows may incidentally trap wind-blown snow or soil. Consider hedgerow alignments that prevent undesirable trapping and accumulation of snow or soil on farmsteads, roads, or other similar areas. Refer to CPS Windbreak/Shelterbelt (Code 380) when snow or soil trapping is a primary conservation purpose.

Additional Considerations When Providing Habitat for Wildlife

Hedgerows provide corridors that allow wildlife to move safely across a landscape.

Generally, wider hedgerows accommodate more wildlife use and offer greater biodiversity.

Hedgerows linking fragmented habitats may increase wildlife use of an area.

Avoid planting hedgerows in grassland ecosystems where they may adversely affect area-sensitive nesting birds by fragmenting habitat patches and increasing the risk of predation.

Thoughtful selection of plantings in hedgerows can complement the availability of naturally-occurring wildlife foods.

Dense or thorny shrub species provide nesting cover and refuge from predators.

When established at sufficient densities, plantings of winter-persistent grasses (using a planting practice such as CPS Wildlife Habitat Planting (Code 420)) and evergreen plants can provide year-round concealment and thermal cover for wildlife.

Planting species-rich vegetation adjacent to hedgerows with CPS Wildlife Habitat Planting (Code 420) can enhance the wildlife value of hedgerows, including providing additional nectar and pollen resources for pollinators.

Installation of artificial nest boxes under CPS Wildlife Structures (Code 649) within or adjacent to hedgerows may encourage use by cavity-nesting birds and small mammals.

Limit renovation events to one-third of a hedgerow's length or width to prevent the sudden elimination of wildlife habitat functions.

[Additional Considerations]

Additional Considerations When Providing Visual or Physical Screens and Barriers

Hedgerows reduce the line-of-sight across open areas from eye-level, concealing objects behind them from view, thereby improving the viewshed.

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

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

Combining shrubs and trees can create more effective screens than single species plantings.

Evergreen or persistent foliage can maintain a screen's year-round effectiveness.

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

Additional Considerations When Filtering, Intercepting, or Adsorbing Airborne Particulate Matter, Chemical Drift, or Odors

Hedgerows designed for this purpose may also slow the spread of some invasive plants by intercepting wind-blown seed.

[Additional Considerations]

[Additional Considerations]

PLANS AND SPECIFICATIONS

Prepare site-specific plans and specifications for this practice. Record plans and specifications using approved specification sheets, implementation requirements, or narrative documentation in the conservation plan, or other acceptable documentation.

Wherever appropriate and practical, plan hedgerows 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.

Design hedgerows in or adjacent to orchards and vineyards to include gaps or other features that allow cold air to drain from cropped areas.

If wildlife or beneficial insects are a purpose, identify the target species and target habitat feature (e.g., food, winter cover, etc.).

OPERATION AND MAINTENANCE

Develop an operation and maintenance schedule that includes the following activities:

- Maintain vegetation 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.
- Protect the hedgerow from unwanted fire and grazing throughout its life span.
- Monitor and control pests and invasive and/or competitive plants that affect the survival and/or function of the hedgerow.
- Periodically apply nutrients as needed to maintain plant vigor. Consider using soil testing to determine nutrient requirements.
- Schedule maintenance and renovation activities to avoid habitat disturbance during wildlife nesting season(s).

REFERENCES

Baudry, J., R.G.H. Bunce and F. Burel. 2000. Hedgerows: An international perspective on their origin, function and management. *Journal of Environmental Management* 60: 7-22.

Bentrop, G. 2008. Conservation buffers: design guidelines for buffers, corridors, and greenways. General Technical Report SRS-109 USDA Forest Service, Southern Research Station.

Besnard, A.G. and J. Secondi. 2014. Hedgerows diminish the value of meadows for grassland birds. Potential conflicts for agri-environment schemes. *Agriculture, Ecosystems, and Environment* 189: 21-27.

Burel, F. and J. Baudry. 2005. Habitat quality and connectivity in agricultural landscapes: The role of land use systems at various scales in time. *Ecological Indicators* 5: 305-313.

Follain, S., C. Walker, A. Legout, B. Lemercier and G. Dutin. 2007. Induced effects of hedgerow networks on soil organic carbon storage within an agricultural landscape. *Geoderma* 12: 80-95.

Lecq, S., A. Loisel, S.J. Mullin and X. Bonnet. 2018. Manipulating hedgerow quality: embankment size influences animal biodiversity in a peri-urban context. *Urban Forestry and Urban Greening* 35: 1-7.

Lin, X.J., S. Barrington, J. Nicell, D. Choiniere and A. Vezine. 2006. Influence of windbreaks on livestock odour dispersion plume in the field. *Agriculture, Ecosystems, and Environment* 116: 263-272.

Pelletier-Guittier, C., J. Theau and J. Dupras. 2020. Use of hedgerows by mammals in an intensive agricultural landscape. *Agriculture, Ecosystems, and Environment* 302: 107079.

Shepherd, M., S. L. Buchmann, M. Vaughan, and S. H. Black. 2003. *Pollinator Conservation Handbook*. Xerces Society. Portland, OR.

Staley, J.T., S.R. Amy, N.P. Adams, R.E. Chapman, J.M. Peyton and R.F. Pywell. 2015. Restructuring hedges: rejuvenation management can improve the long term quality of hedgerow habitats for wildlife. *Biological Conservation* 186: 187-196.