

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

WINDBREAK/SHELTERBELT RENOVATION

(Ft)

Code 650

DEFINITION

Replacing, releasing, and/or removing selected trees and shrubs or rows within an existing windbreak or shelterbelt, adding rows to the windbreak or shelterbelt or removing selected tree and shrub branches.

PURPOSES

Restoring or enhancing the original planned function of existing windbreaks or shelterbelts.

CONDITIONS WHERE PRACTICE APPLIES

In any windbreak or shelterbelt that is no longer functioning properly for the intended purpose.

Extending the length of an existing windbreak is handled under conservation practice standard WINDBREAK/SHELTERBELT ESTABLISHMENT (Practice Code – 380). For normal and periodic pruning, refer to conservation practice standard TREE/SHRUB PRUNING (Practice Code – 660).

CRITERIA

General Criteria Applicable to All Applications

Before beginning renovation, conduct an inventory and evaluation of the existing windbreak or shelterbelt to determine the probable causes of decline in function. Items to document and evaluate include:

1. Species composition, age, vigor, density and height
2. Length, configuration and spacing
3. Competition
4. Insect, disease, and/or herbicide damage
5. Soils and species adaptability
6. Animal and/or weather damage
7. Natural regeneration of woody plants
8. Erosion or drainage issues

The following action(s) will be used individually or in combination to restore or enhance the performance of a partially functioning or non-functioning windbreak or shelterbelt:

- Thin trees or shrubs to reduce plant competition or alter the density of the planting.
- Prune or shear the trees or shrubs to remove diseased branches or alter the density of the planting.
- Remove entire or partial rows of trees or shrubs to release adjacent rows.
- Determine coppice capability of trees or shrubs and cut close to the ground to improve density and/or vigor of trees or shrubs in decline.
- Control competing herbaceous vegetation mechanically and/or chemically to improve the growth and vigor of trees and shrubs.

- Add rows of trees or shrubs adjacent to or within an existing windbreak or shelterbelt to improve windbreak or shelterbelt density.

Existing growing space, shade level and root competition will be evaluated and determined to be at acceptable levels to permit unimpeded growth to new plantings.

Residual plants will be protected during the renovation.

Comply with applicable federal, state and local laws and regulations during the installation, operation and maintenance of the practice.

Appropriate cultural resources review will be conducted before beginning any tree planting or root pruning practice.

Trees and/or shrubs will not be planted where they will interfere with structures and/or above or below ground utilities.

Trees or shrubs will be established without compromising the integrity of property lines, fences, utilities, roads, legal drains, easements or rights of way. Maintain at least a 16-foot maintenance strip from the outside row of trees or shrubs to adjacent property lines or contrasting land use areas.

Species will be adapted to the soils, climate and site conditions, for recommendations see IL-FOTG, Section II, E. Conservation Tree/Shrub Suitability Groups.

Additional Criteria for Thinning Applications

Windbreak or Shelterbelt thinning is the removal of trees and/or shrubs with no intent to replace the removed woody plants.

Entire rows or individuals within a row may be removed to provide growing space for adjacent trees and/or shrubs or rows of trees and/or shrubs.

Individual plants or rows will be clearly identified and marked for removal to reduce competition, alter the density of the planting and/or maintain or improve the growth and form of the remaining plants.

Select weak, diseased, overtopped or damaged plants first. Next select alternating plants, do not thin adjacent plants.

Thin from the leeward row toward the windward row. Conduct thinning over an extended period, several years if possible, to allow residual trees or shrubs to respond and fill in gaps. Thin the windward row only after one or more leeward rows have filled in.

Refer to plant spacing guidelines within conservation practice standard WINDBREAK/SHELTERBELT ESTABLISHMENT (Practice Code – 380) to determine planned configuration for the renovation.

Additional Criteria for Pruning Applications

Branch Pruning is the precise removal of selected branches from trees or shrubs.

Prune or shear trees or shrubs to remove diseased branches or alter the density of the windbreak or shelterbelt.

Prune in accordance with conservation practice standard TREE/SHRUB PRUNING (Practice Code – 660).

Root Pruning is the severing of underground roots to reduce competition with adjacent crops or desired woody plants.

Check for buried cables, pipelines, and other utilities before beginning root pruning operations.

Root Prune in accordance with conservation practice standard TREE/SHRUB PRUNING (Practice Code – 660).

Additional Criteria for Control of Competing Vegetation Applications

Control of competing vegetation is the treatment and management of herbaceous weeds, particularly sod-forming grasses, to reduce the stress on windbreak or shelterbelt plants.

Tillage may be used to destroy grass sod adjacent to tree or shrub rows. Till between rows no deeper than 3 inches and no closer

than 2 feet from the base of woody plants. The optimum time is midsummer or early fall.

For chemical weed control see conservation practice standard TREE/SHRUB SITE PREPARATION (Practice Code – 490).

Additional Criteria for Coppicing Applications

Coppicing is the cutting of appropriate deciduous trees or shrubs at their base to encourage re-sprouting and can be used in order to improve and restore the form and function of windbreak or shelterbelt plants.

Identified rows of tree or shrubs in decline will be cut to the plant type specifications below to allow sprouting (coppicing) and improve form, density and vigor. A healthy and viable root system is necessary to establish coppice regeneration. See Table 1 for species with coppicing/re-sprouting potential, all recommendations assume healthy root stock.

Cut during the dormant season of the target plant.

Trees:

- Cut to a height of 1 to 6 inches to encourage a strongly attached sprout from the root collar.
- Select and cut to a single apically dominant, well formed, well attached sprout 3 to 4 years after initial coppicing applications.
- Do not treat stumps of surplus sprouts with chemical.

Shrubs:

- Where deciduous shrubs and shrub rows have become leggy and a denser shrub row is desirable, cut back to within 4 to 8 inches above the ground.
- Do not use rotary mowers for coppicing.

Additional Criteria for Reinforcement Planting Applications

Underplanting or Interplanting

Plant approximately midway between the rows of an existing windbreak or shelterbelt where the majority of trees or shrubs in two or more

adjacent rows are missing, dead, or in poor condition.

The replacement species selected must be at least intermediately shade tolerant to thrive in the reduced light conditions that are likely to exist between tree rows. Refer to Table 1. for shade tolerant windbreak species.

Weed control and root and/or branch pruning of existing windbreak trees may be necessary to reduce competition for establishing plants.

Refer to conservation practice standards TREE/SHRUB SITE PREPARATION (Practice Code – 490) for weed control information and TREE/SHRUB PRUNING (Practice Code – 660) for pruning information.

Row Removal and Supplemental (or Enlargement) Plantings

Supplemental row plantings may be planted to the windward or leeward sides of an existing windbreak, or to replace an internal row that has been removed.

Supplemental rows will not be planted closer than 30 feet from an existing windbreak row unless:

- The existing row will not compete with the new planting for light or moisture due to poor condition.
- The existing row will be removed within 2 years.

Entire or partial rows of trees or shrubs will be clearly marked and identified for removal to allow rows of new trees or shrubs to be planted.

Removal of woody material may be accomplished by any means that does not damage the trees and shrubs to be retained or cause adverse offsite impacts.

Disposal of woody material (including burning) will be done in compliance with local and state regulations.

Multiple interior row removals will be restored with one less row than was removed to avoid repeated decline from the remaining mature rows.

CONSIDERATIONS

Renovation may be accomplished over a period of years to minimize reductions in functionality.

Debris that may cause insect, disease, fire, or operability problems should be removed from the site and disposed of properly.

Vegetation removed during renovation can be burned as specified by conservation practice standard PRESCRIBED BURNING (Practice Code – 338).

Debris and other vegetation removed during renovation may be used to produce energy. Consider the energy balance of the renovation action.

Erosion control may be needed during the renovation process.

Wildlife and pollinator needs should be considered when selecting tree or shrub species to add or remove.

Species diversity and use of native species should be considered for site adaptability and to reduce impacts from existing and new diseases and pests.

Refer to conservation practice standard TREE/SHRUB ESTABLISHMENT (Practice Code – 612) for further guidance on planting trees and shrubs.

Release of natural reproduction can be performed in rows to conform to a windbreak design or be promoted in an existing windbreak to supplement deficiencies and improve function.

When planting additional trees and/or shrubs, consider woody root pruning of adjacent established rows of woody plants to reduce competition with newly planted materials. See conservation practice standard TREE/SHRUB PRUNING (Practice Code – 660).

PLANS AND SPECIFICATIONS

Specifications for applying the renovation practice shall be prepared for each site and recorded using approved specification sheets, job sheets, technical notes, and narrative

statements in the conservation plan, or other acceptable documentation.

Specifications will include, but are not limited to, the following:

- Map showing location of windbreak to be renovated
- Species to be treated, planted or regenerated
- Number of trees and/or shrubs to be treated, planted or regenerated
- Treatment method(s)
- Timing of treatment
- Type of equipment to be used
- Site preparation needed
- Mitigation measures (e.g., slash and debris disposal) to minimize wildfire or pest hazards and planting impedance.

OPERATION AND MAINTENANCE

The following actions shall be carried out to insure the renovation practice functions as intended throughout the expected life. Actions include normal repetitive activities in the application and use of the practice (operation), and repair and upkeep of the practice (maintenance):

- Replacement of dead trees or shrubs in new plantings or rows will be continued until the windbreak or shelterbelt function is restored.
- For the life of the practice, at least 85% of plants will be surviving with no two adjacent plants missing.
- A weed-free area at least 2 feet in all directions from newly planted or seeded trees and/or shrubs will be maintained for at least the first 2 years after planting.
- Competitive vegetation including invasive and exotic species will be controlled when they inhibit the renewed growth and vigor of the windbreak or shelterbelt and/or impede functionality.

- Trees and shrubs will be inspected semi-annually and following severe storms to ensure the windbreak is functioning properly and to identify and mitigate any adverse impacts including insects, diseases and/or competing vegetation.
- Trees and shrubs will be protected from fire and damage by livestock or wildlife.
- Additional thinning, pruning, or coppicing may be needed in the future to maintain function.
- Supplemental water or weed barrier fabric will be provided as needed.

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

REFERENCES

Windbreak Renovation. University of Nebraska Extension, EC 98-1777-X. 1998.

Windbreak Maintenance and Renovation. Univ. of NE Exten. Pub. G89-923-A. 1996

The Economics of Windbreak Renovation. Univ. of MN Exten. Ag. Econ. Newsletter, Spring 2000.

USDA Plants Database
<http://plants.usda.gov/java/>

Table 1. Tree and Shrub Characteristics (Partial List)

SPECIES	20 YR HEIGHT⁽¹⁾	MATURE HEIGHT⁽¹⁾	SHADE TOLERANCE⁽²⁾	COPPICE/SPROUTING POTENTIAL⁽³⁾
Gray dogwood	<8	10	Tolerant	Yes
Common serviceberry	8-15	36	Tolerant	Yes
Buttonbush	8-15	15	Tolerant	Yes
Highbush blueberry	8-15	12	Tolerant	Yes
Blackhaw	8-15	16	Tolerant	Yes
Pawpaw	16-25	25	Tolerant	Yes
Southern arrowwood	8-15	15	Tolerant	No
Downy arrowwood	<8	6	Intermediate	Yes
American hazelnut	8-15	10	Intermediate	No
Coralberry	<8	2	Intermediate	Yes
Common chokeberry	<8	5	Intermediate	No
American cranberrybush	<8	6	Intermediate	No
Redosier dogwood	8-15	12	Intermediate	Yes
American witchhazel	8-15	20	Intermediate	Yes
Persimmon	16-25	55	Tolerant	Yes
Red maple	26-35	68	Tolerant	Yes
Sugar maple	16-25	100	Tolerant	Moderate
Blackgum	26-35	95	Tolerant	Yes
Colorado blue spruce	16-25	100	Intermediate	No
Norway spruce	26-35	>100	Intermediate	No
Eastern red cedar	16-25	50	Intermediate	No
Arborvitae	16-25	50	Intermediate	No
Bald cypress	>35	>100	Intermediate	Yes
Swamp white oak	26-35	100	Intermediate	Yes
Bur oak	16-25	100	Intermediate	Moderate
Overcup oak	26-35	80	Intermediate	Moderate
Northern red oak	>35	81	Intermediate	Yes
Common hackberry	26-35	60	Tolerant	Moderate

⁽¹⁾Mature and 20YR height (feet) is an estimate and may vary dependent upon site (USDA Plants Database)

⁽²⁾Partial list of species that exhibit tolerance towards shade (USDA Plants Database)

⁽³⁾Partial list of species that exhibit ability for Coppice and/or Re-sprouting (USDA Plants Database)

Refer to Section II eFOTG for additional species and site adaptability

USDA Plants Database: <http://plants.usda.gov/java/>

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of the standard, contact your Natural Resources Conservation Service [State Office](#) or visit the [Field Office Technical Guide](#).

NRCS – Illinois
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