



Forest Stand Improvement for Cerulean Warbler WV Job Sheet – Code 666
Pre-commercial treatment in immature stands

Definition

The manipulation of species composition, stand structure, or stand density by cutting or killing selected trees or understory vegetation to achieve desired forest conditions or obtain ecosystem services.

Purpose

Enhance forest habitat for Cerulean Warblers (Figure 1) and other forest wildlife species by creating openings in the canopy and promoting the growth and regeneration of preferred tree species.



Figure 1. Male Cerulean Warbler, Monongahela National Forest, Randolph County, West Virginia; Photo: Matt Shumar

Condition Where Practice Applies

All land where the quantity and quality of trees can be enhanced.

Characteristics of forest stands pre-treatment:

- ridge-top or upper slope topography
- ≥80% forest cover within a 1.5-mile radius around the centroid of the stand
- within a contiguous deciduous forest stand ≥60 acres
- uniform and closed-canopy structure
- 70% of pole-size (4"-10") stand consists of preferred tree species (white oak, chestnut oak, hickory, sugar maple, cucumber magnolia, tulip poplar, black locust, or black cherry)
- grapevines present in or around the stand



Figure 2. With proper treatment, young deciduous forest stands like this one may become Cerulean Warbler habitat in the future; Photo: Brian Lockhart



Post-treatment Specifications

Residual Trees

In general, residual trees should be of sufficient quality that they will survive to meet landowner objectives for the stand, whether that includes a future harvest or wildlife habitat. Residual tree characteristics include:

- optimally white and chestnut oak, but hickory, sugar maple, cucumber magnolia, tulip poplar, black locust, and black cherry also preferred
- ≥25' tall
- healthy crowns that are large in relation to DBH
- no dead branches in upper crown
- either low-origin stump sprouts (<6" at groundline) or seedling-origin stems are acceptable
- U-shaped connections are acceptable; avoid V-shaped connections
- no low forks, cankers, insect damage, or other visible indications of poor survivability

Grapevine retention

Cerulean Warblers use grapevines for nest construction and nest and fledgling cover. Nest sites usually have about two times as many grapevines (3-4 vines/0.1 acre) as random locations in the surrounding stand (1-2 vines/0.1 acre). Retain as many grapevines as possible while ensuring residual tree health and safe working conditions.

Silvicultural Systems

A silvicultural system is a planned series of treatments for tending, harvesting, and re-establishing a forest stand. The type of silvicultural system selected depends on many factors. These may include the owner's objectives for the woodlot, the environmental conditions, the age class of the stand, and the tree species present and desired for the future. Different types of pre-commercial treatments could encourage future development of conditions that are suitable for Cerulean Warblers (40-90 ft² per acre, optimally 50-60 ft²). The following silvicultural practices are ordered by their potential to benefit Cerulean Warblers.

Group selection

Target RBA: 60-80 ft² per acre

Group selection (Figure 4) as part of an uneven-aged system can improve Cerulean Warbler habitat and would likely remain suitable longer than single-tree selection. The small group openings provide for diverse canopy structure and understory development. This approach advances stands toward late successional structure beneficial to many avian species. Many stands contain natural groups of trees that lend themselves to group selection. To benefit Cerulean Warblers, consider harvesting groups of non-preferred, diseased, or damaged trees. If possible, remove groups of trees adjacent to retained grapevine arbors. Although Cerulean Warblers prefer canopy gaps of 400-1,000 ft², groups approximately 0.15 acres in size are acceptable because the surrounding canopy will fill gaps quickly.

Single-tree selection

Target RBA: 75-90 ft² per acre

Single-tree selection treatments are less effective in increasing Cerulean Warbler numbers and rapid canopy closure may limit the duration of suitable habitat. Single-tree selection with RBA above ~90 ft² per acre also lead to lesser nest success than harvests with lesser RBA. However, if single-tree treatment is favored by a landowner for providing income, Cerulean Warbler densities will still be maintained particularly if non-preferred tree species are removed and preferred species are retained. Select non-preferred trees that will result in canopy gaps of 400-1,000 ft², the size preferred by Cerulean Warblers. Again, select trees adjacent to natural grapevine arbors because grapevines provide a favored source of nest material and cover.

Crop-tree release

Crop-tree release is a practice that is used to accelerate development of crop-trees on higher quality sites. The practice is typically applied in 15 to 20 year-old stands with a red oak site index ≥60 and having dominant or codominant trees ≥25 feet tall. It can allow for earlier canopy differentiation by accelerating



growth of dominant stems. Impact on habitat suitability for Cerulean Warblers will not be immediate, but benefits should be seen as the stand develops and where earlier entry into the stand for commercial harvest is made possible.

Crop-tree release should focus on releasing individual trees that will eventually provide the preferred structure for Cerulean Warblers (white oak, chestnut oak, hickory, sugar maple, cucumber magnolia, tulip poplar, black locust, and black cherry). Select a maximum of 50 of the best dominant or codominant trees per acre. Remove all trees whose crowns are touching the crown of the selected crop tree.

Area-wide thinning

The area wide thinning practice is a pre-commercial silvicultural treatment applied area wide in established immature stands to regulate stand density and stocking. Its purpose is to accomplish stand specific landowner objectives (primarily timber production) that can be realized by concentrating growth on trees with better form and higher potential value as a timber product. This silvicultural treatment will improve the vigor of the stand and subsequently, the health of the residual stand. The landowner can remove defective trees, limit the number of trees of undesirable species and improve the spacing of the remaining trees. The stand should have a red oak site index ≥ 60 and have dominant and codominant trees that are ≥ 25 feet in height. Remove ≥ 20 ft² of basal area per acre. Crown thinning should generally be used to remove enough from other crown classes to achieve the desired basal area and stocking level. Area-wide thinning should be conducted in poletimber and/or small sawtimber stands (4"–12" DBH).



Figure 3. Immature stands that are thinned may have the structural diversity needed by nesting Cerulean Warblers when some of the residual trees approach preferred size (≥ 16 " DBH); Photo: Brian Lockhart

Cull Tree Removal

Cull tree removal is the practice of felling or deadening non merchantable trees, including wolf trees, deformed trees, and weed trees for the purpose of providing room for the main crop trees to continue and increase their development of the main stand. Cull tree removal should be considered when timber production is the primary objective. A cull tree is any tree ≥ 4 " DBH that contains so little merchantable material because of rot, crook, sweep, and other defects or if of inferior species that it cannot be harvested at a profit and is interfering with the development of the main stand. Cull tree removal is applicable in stands with a red oak site index of ≥ 60 having a high percentage of non-merchantable trees because of defects or undesirable species. Stands must have ≥ 20 crop trees per acre or potential crop trees that will benefit from cull removal. Stocking for uneven aged stands should be ≥ 50 ft² of basal area per acre of trees ≥ 6 " DBH. This practice should be applied ≥ 5 years before or ≥ 2 years after a planned harvest. Culls may be cut or deadened, however, deadening is recommended if felling of trees will cause appreciable damage to residual trees. In some cases, trees that are to be deadened should be treated with herbicide.



The killing of cull trees may be accomplished by girdling with a chainsaw. Best results are usually obtained by the following:

- For trees <6" DBH, fell using care to protect the residual stand. Stump treatment may be considered on certain sites and for certain species.
- For trees ≥6" DBH, a double cut is required at 2"- 4" apart. Each cut must be ≥1" deep into the wood and must completely encircle the tree.
- Two den trees, nut trees, cull, and wolf trees valuable to wildlife can be left.

Precautions

Understory regeneration

Presence of dense understory vegetation is beneficial to Cerulean Warblers. The existing understory condition and composition should be considered during pre-harvest inventories and the ability to regenerate preferred species should be anticipated. This is especially important in areas with an abundance of deer, non-native plant species, or non-preferred tree species. Harvested stands ≥10 acres may overwhelm deer browsing and allow regeneration of preferred species. Leaving logging slash (logging debris and tree tops) and dragging slash over cut stumps (coppicing) may also protect regeneration from deer browsing.

Woodland Protection

It is important for landowners to recognize threats to the health and productivity of their woodlands. Some of these threats, especially those posed by damaging wind, drought, and other weather conditions, cannot be controlled by landowners. However, landowners can participate in the protection of their woodlands from insect pests, diseases, uncontrolled fire, and livestock grazing.

Uncontrolled Fires

Uncontrolled fires, or wildfires, may cause considerable damage to unprotected woodlands. In West Virginia, rapidly spreading and dangerous crown fires that kill mature trees outright are usually rare. However, ground fires are prevalent, especially in early spring before trees have foliated and in the fall after leaves have fallen. Ground fires may kill saplings and damage the bark and trunks of mature trees. Scars, or cat-faces, left on tree trunks by even relatively "cool" fires may significantly reduce the value of timber cut from the trees. Fire damage also reduces tree growth rates and makes trees more susceptible to insects, diseases, and drought.

Livestock Grazing

Livestock grazing may be the most damaging and yet most preventable of all threats to woodland health and productivity. Cattle and other livestock may cause serious immediate damage to seedlings, saplings, and ground vegetation; what is not browsed by livestock will be trampled. In just a few years, the understory may be completely absent or replaced by less valuable species, such as ironwood and hawthorn. At the same time, livestock compact forest soils which in turn damages mature trees. Within 10 years, continued grazing causes weakening and mortality of the trees.

In addition, woodlands make very poor pasture; studies have shown that livestock lose weight when grazed in woodlands. Therefore, grazed woodlands result in loss of both livestock and natural resources values.

Other Concerns

The method, felling direction, and timing of tree cutting should provide a safe work environment and protect sensitive areas such as vernal pools, riparian zones, cultural resources and structures.

Slash and debris left on the site after treatment will not present an unacceptable fire, safety, environmental, or pest hazard. Such remaining material will not interfere with the intended purpose or other management activities.

Potential landowner and operator liability should be assessed before forest stand improvement activities begin.



Operation and Maintenance

Prepare an Operation and Maintenance plan for the site and review it with the operator. The plan will describe actions that must be taken to ensure that the practice is applied correctly during its design life. As a minimum, include periodic inspections for assessment of insects, disease, and other pests, storm damage, and damage by trespass. Inspect roads to control erosion on forest roads, skid trails, landings, and adjacent areas by installing/maintaining vegetative and structural practices. Treatments needed for pests—see Additional Criteria to Improve and Sustain Forest Health and Productivity section in this document. Treatments needed for storm damage—use NRCS CPS Code 384, Woody Residue Treatment, to appropriately treat slash and debris. Treatments for damage by trespass: use NRCS CPS Code 472, Access Control, to prevent future damage.

Additional Resources

[Cerulean Warbler Management Guidelines for Enhancing Breeding Habitat in Appalachian Hardwood Forests](http://amjv.org/documents/cerulean_guide_1-pg_layout.pdf). Appalachian Mountains Joint Venture, Blacksburg, VA. http://amjv.org/documents/cerulean_guide_1-pg_layout.pdf

[Enhancing Cerulean Warbler Habitat in the Appalachians: A Guide for Foresters](http://amjv.org/documents/Cerulean_FS_Foresters_Version_Final_(1).pdf). Appalachian Mountains Joint Venture, Blacksburg, VA. [http://amjv.org/documents/Cerulean_FS_Foresters_Version_Final_\(1\).pdf](http://amjv.org/documents/Cerulean_FS_Foresters_Version_Final_(1).pdf)

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Site-specific requirements are listed on the following pages of this job sheet. Specifications are prepared in accordance with the WV NRCS Field Office Technical Guide.

Client:	Farm #:
Field(s):	Tract #:
Designed by:	Location:
WV Registered Professional Forester No.:	Orientation/Aspect:
Date:	Total Acres:

LANDOWNER OBJECTIVES AND EXPECTED OUTCOMES/DESIRED FUTURE CONDITION:

EXISTING CONDITIONS:

PREFERRED TREE AND UNDERSTORY SPECIES:

<input type="checkbox"/> White Oak	<input type="checkbox"/> Chestnut Oak	<input type="checkbox"/> Hickory	<input type="checkbox"/> Sugar Maple
<input type="checkbox"/> Cucumber Magnolia	<input type="checkbox"/> Yellow Poplar	<input type="checkbox"/> Black Cherry	<input type="checkbox"/> Black Locust

TYPE OF TREATMENT

<input type="checkbox"/> Area-wide thinning	<input type="checkbox"/> Crop-tree release	<input type="checkbox"/> Cull-tree removal
<input type="checkbox"/> Group selection	<input type="checkbox"/> Single-tree selection	<input type="checkbox"/> Combination improvement
<input type="checkbox"/> Other (specify):		

TREATMENT SPECIFICATIONS/STOCKING GUIDELINES

Spacing, density, size class, number and amounts of trees and understory species to be retained Stocking guidelines shall contain stocking in terms of basal area, spacing or trees per acre by species and size class distribution. The method, felling direction and timing of tree cutting shall protect residual trees, wetlands, cultural resources, improvements and utilities.

HERBICIDE USE

Herbicide Treatment Needed: YES NO **FOLLOW ALL LABEL DIRECTIONS WHEN USING HERBICIDES.**
If yes, the following is required:

Refer to attached herbicide recommendations Win-PST Risk Assessment (to be completed by NRCS) attached or included

TREATMENT DATES:

OPERATION AD MAINTENANCE

Periodic inspections during and after treatment activities are necessary to ensure that purposes are achieved and resource damage is minimized, e.g., assessment of insects, disease and other pests, storm damage, and damage by trespass. The results of inspections shall determine the need for additional treatment under this practice. This practice is a pre-commercial improvement treatment. A plan for improved harvesting will need to be developed prior to harvesting in this area. Follow-up and ongoing management activities will be needed to obtain the desired results. Always wear protective gear and clothing when working in the woods. A hard hat should be worn at all times. Inspect the area during treatment to check for damage to the residual stand and following treatment to monitor growth rates and overall health of the stand.

ADDITIONAL NOTES AND FUTURE STAND NEEDS

ANTICIPATED HARVEST-REGENERATION STRATEGY

Uneven-aged (e.g. single-tree selection, group selection, etc.) _____

Even-aged (e.g. clear-cut, seed-tree, shelterwood, etc.) _____



If needed, an aerial view or a side view of the practice can be shown below. Other relevant information, complementary practices and measures, and additional specifications may be included.

Questions regarding the planning, application or maintenance of the Forest Stand Improvement (666) practice should be directed to:

Name:

Contact information:

Planner Certification		
This plan meets the requirements of West Virginia NRCS Conservation Practice Standard – Forest Stand Improvement (<i>Code 666</i>).		
Signature_____	Title_____	Date_____
Certification of Practice Completion		
This practice has been completed according to NRCS plans and specifications. (Indicate in Practice Specifications if there were any changes to the planned practice and amount.)		
Signature_____	Title_____	Date_____

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