

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

FOREST STAND IMPROVEMENT

(Acre)
CODE 666

DEFINITION

To manipulate species composition and stocking by cutting or killing selected trees and understory vegetation.

PURPOSE

- To improve or sustain timber production.
- To improve understory aesthetics, wildlife habitat, or recreation.
- To harvest forest products.
- To facilitate forest stand regeneration.

CONDITION WHERE PRACTICE APPLIES

On forest land where competing vegetation hinders development and stocking of preferred species.

CRITERIA

General Criteria Applicable to All Purposes.

All management decisions shall be based on a woodland inventory.

Soil erosion, displacement, hydrologic impact, and damage to remaining vegetation will not exceed acceptable levels. Minimize disturbances such as rutting, soil compaction, excessive disturbance of the litter layer, and the addition of fill material.

Limit damage to the site by:

- using directional felling;
- aligning cut boles for efficient skidding;
- cutting out forks and large branches;
- limiting trails to less than 15 percent of the site;
- logging when the soil is dry or frozen;
- using smallest size equipment possible; and
- using well-organized access trails.

The method, felling direction, and timing of tree cutting shall facilitate efficient and safe tree removal.

Slash, debris, and vegetative material left on the site after treatment will not interfere with the intended purpose and will present minimal pest and fire hazards.

Mechanical cutting or girdling may need to be followed by a suitable herbicide application to increase mortality and reduce stump sprouting.

Kill unwanted trees, shrubs, and vines by any of the following means:

- cutting
- girdling
- frilling
- stem injection
- basal bark spray

When choosing herbicides, review leaching, runoff potential, setback requirements, persistence, and toxicity ratings of chemical formulations. Use the safest available herbicide.

Pesticides used improperly can be injurious to people, animals, and plants.

Follow all label directions and label precautions.

Section II-(iii)-C, Forest Land Interpretations of the Field Office Technical Guide should be used in determining desirable tree species estimating potential site productivity.

Protect the area from grazing.

Protect riparian zones and other unique areas. Leave a strip of existing woody vegetation, a minimum 50 feet wide, along streams to protect water quality. Some light forest stand improvement work can be done in this strip.

Where riparian protection is needed, follow Riparian Forest Buffer (391).

Release cuttings should be done as soon as the need becomes apparent. Cut or deaden: 1/

- cull and "wolf" trees (may be retained for wildlife)
- undesirable species
- damaged trees
- diseased trees
- surplus sprouts

1/ Note: Do not fell large damaged or undesirable trees on woodland areas south of US Hwy 30, between May 1 and September 30 in order to protect maternity roost trees of the Indiana Bat, a federally listed endangered species
Comply with applicable laws and regulations.

Additional Criteria to Improve or Sustain Timber Production.

All stands: Thin at 10-15 year intervals, up until three-fourths of the rotation age is reached.

Keep improvement cuttings light enough (maintain at least 60 percent stocking) to restrict the growth of any undesirable species, to maintain full site utilization, to reduce sunscald damage, and to reduce epicormic (*a shoot sprouting from a dormant bud on the stem of a tree*) branching and basal sprouting.

Base thinning choices on:

- relative tree position
- crown position
- crown condition
- tree health
- bole quality
- species

With all thinning, provide three to five feet of crown growing space on two or three sides of selected trees (5 to 10 feet for black walnut). For optimum response, thinning around crop trees should release on all four sides if possible.

Strip or row thinning is possible in plantations with straight rows. Remove enough rows to achieve the desired stocking.

Prescribed fire may be used to:

- remove undesirable hardwoods,
- reduce fuel build-up,
- expose mineral soil for improved germination, and
- improve wildlife habitat.

Refer to Prescribed Burning (338) for additional guidance. A prescribed burn plan shall be prepared.

Additional Criteria to Improve Wildlife Habitat.

Rotate forest stand improvements through a stand so that various stages of plant succession will be established.

Primary Objective

If wildlife enhancement is a primary objective, do the following:

Perform heavier thinning (less than 60 percent stocking) to encourage fuller crown development, earlier seed production, and heavier herbaceous plant development.

Favor hard-mast producers (oak, hickory, pecan, and walnut) and conifers.

Leave or establish five snags and five den trees per acre, ranging in size from 6 to 20 inches DBH.

Create three to four brush piles per acre with material removed during improvement work. Hinged, partially cut "living" brushpiles may be included to provide longer-lived shelter.

Low intensity prescribed fires may be used to improve/increase green browse for wildlife. Refer to Prescribed Burning (338) for additional guidance. A prescribed burn plan shall be prepared.

For additional management guidelines refer to Upland Wildlife Habitat Management (645).

Secondary Objective

If wildlife enhancement is a secondary objective, do the following:

Leave or establish two snags and two den trees per acre, ranging in size from 6 to 20 inches DBH.

Create two or three brush piles per acre with material from forest stand improvement work.

Additional Criteria to Improve Aesthetics and Recreation.

This activity is strongly influenced by subjective values and interests. Direct forest stand improvements toward:

- opening vistas
- installing trails
- increasing vegetation diversity (shape, texture, color, and size)
- removing safety hazards near pedestrian use areas (snags, large dead limbs, etc.)
- creating visual screens

CONSIDERATIONS

These specifications are intended to help identify and determine basic forest stand improvement activities. Consult a professional forester for assistance in field implementation of complex sites.

Forested wildlife corridors can minimize habitat fragmentation.

Forest stand improvement activity for timber production is most effective on better sites (site index > 55), but can improve yield and quality on nearly all site conditions.

If chemicals are used to control vegetation, the potential for surface and/or ground water contamination exists. Follow all label directions and seek guidance from experienced pesticide advisors such as university extension or certified crop specialists.

PLANS AND SPECIFICATIONS

Specifications for applying this practice shall be prepared for each site and recorded using approved specification

sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation.

OPERATION AND MAINTENANCE

Operation and maintenance requirements are not applicable for this practice.

REFERENCES

Forestry Handbook, Second Edition, Society of American Foresters, 1984.

Increased Woodland Products through Timber Stand Improvement, Agricultural Guide 5150, University of Missouri Extension Division, 1984.

Managers Handbook for Oaks in the North Central States, General Technical Report NC-37, North Central Forest Experiment Station, Forest Service, USDA, 1977.

Managers Handbook for Black Walnut, General Technical Report NC-38, North Central Forest Experiment Station, Forest Service, USDA, 1977.

Managing Shortleaf Pine in Missouri, Station Bulletin 875, Agricultural Experiment Station, University of Missouri, 1969.

Managing Forests to Maintain Populations of Gray and Fox Squirrels, Technical Bulletin 5, Illinois Department of Conservation, 1987.

The Practice of Silviculture, David M. Smith, John Wiley & Sons, Eighth Edition, 1986.

Snag and Den Tree Management, Timber and Wildlife Benefits on Private Land - No. 5, Missouri Conservation Commission, 1985.

Working with Your Woodland - A Landowner's Guide, Beattis, Thompson,

and Levin, University Press of New England, 1983.

Central Hardwood Notes, Jay Hutchinson, Editor, USDA Forest Service, North Central Forest Experiment Station, 1989.