FOREST STAND IMPROVEMENT IN EASTERN AND BOTTOMLAND HARDWOODS

CONSERVATION JOB SHEET - Forestry Series **666-EBH**

Natural Resources Conservation Service

Michigan

DEFINITION

Forest stand improvement (sometimes called timber stand improvement, or TSI) is the manipulation of species composition, stand structure, and stocking by cutting or killing selected trees. **Crop tree management** is a simple, efficient, and effective way to apply forest stand improvement, especially in Eastern Hardwoods (oak, hickory, etc.) and Bottomland Hardwoods (elm, ash, cottonwood, silver maple, red maple, etc.). A crop tree is any tree that has been identified as desirable and worth retaining. Crop trees may have value for such purposes as wildlife habitat, visual quality, water quality, timber, or a combination of two or more purposes. Crop tree management is the selective removal of less desirable trees that compete with crop trees. Removing adjacent competing trees assures the survival and increased growth of crop trees. Focusing management attention on only the highest value trees reduces the time and cost of performing forest stand improvement, compared to area-wide thinning. This job sheet is intended for use in Eastern Hardwoods and Bottomland Hardwoods, two of the more common forest types in the Southern Lower Peninsula. Another job sheet is available for Northern Hardwoods (sugar maple) and Pines, which are more common in the Northern Lower Peninsula and the Upper Peninsula. See Michigan Technical Note Forestry #25 in References for more information.

APPLICATION

Depending upon producer objectives, the following **criteria** may be **used to select crop trees:**

Wildlife Habitat

Mast-producing[1] species:

- full sun on crown (dominant tree)
- large healthy crown
- favor hard mast producers
- expected longevity[2] > 20 years

Cavity trees:

- expected longevity[2] > 10 years

Timber

- full sun on crown (dominant tree)
- large healthy crown
- no forks or large branches low on main stem
- high value commercial species
- expected longevity[2] > 10 years

Water Quality

- full sun on crown (dominant tree)
- healthy crown and root system
- tolerant of flooding[3]/suited to the site[3]
- high growth/nutrient accumulation potential
- expected longevity[2] > 20 years

Visual Quality

- attractive flowers and/or foliage color
- expected longevity[2] > 20 years
- unusual species and/or tree form
- visible from house, road, or trail
- desirable form/appearance

[1] Mast is the fruit of trees, which may be hard (acorns, walnut, hickory nuts) or soft (black cherry, maple, hackberry, mulberry, hawthorn, crabapple).

[2] Expected longevity is estimated by observing the size and condition of the tree, especially any evidence of injury or decay.

[3] See Conservation Tree/Shrub Suitability Groups, NRCS-MI eFOTG Section II, I. Forestry Information.

Crop Tree Data Collection

Crop trees may be selected and released when they reach a height of 25 feet or diameter at breast height (DBH) of 4 inches. A crop tree is considered released when competing trees have been cut or killed on at least 3 out of 4 quadrants or sides (see Crop Tree Management Quick Reference). Use the Crop Tree Tally Sheet to inventory and analyze potential crop trees. Locate at least one plot in a representative portion of each identifiable stand of trees or soil map unit. One plot will often yield enough data to plan future treatments. A 1/5-acre plot is recommended, with a radius of 53 feet. Flag the plot boundaries at the four cardinal directions. Using different colored flagging, flag crop trees and trees to be cut or killed ("cut trees") to help the producer visualize the treatment. It should be emphasized that this is sample marking, for planning purposes only. Further instructions appear on the Tally Sheet. The average number of crop trees per acre and cut trees per acre, and the characteristics of these trees, will help the producer or forestry contractor plan future treatments. In most cases, 20-75 crop trees will be released per acre (4-15 crop trees per 1/5-acre plot). Residual basal area is not as critical as in northern hardwoods and pines and will often be 60 to 75 square feet per acre.

Methods of Removing Unwanted Trees

Determine whether trees to be cut constitute a marketable volume of timber. Landowners planning to sell timber should obtain the services of a professional forester, know the amount of timber to be sold through an inventory, receive sealed bids, obtain a signed contract, receive full payment before cutting begins, and supervise harvest operations. For further information and sample contracts see Michigan State University Extension Publications (http://www.for.msu.edu/pages/extension_pub.html) and Timber Sales Contracts in References.

Best results are often obtained by retaining the services of a professional forester to conduct forestry practices, particularly the sale of timber, see Michigan Consulting Foresters in References.

If a timber sale is undesirable or not feasible, unwanted trees, shrubs, and vines may be killed by any of the following means; cutting, girdling, frilling, stem injection, or basal bark spray. For specific information about techniques for killing trees, including recommended herbicides, see Controlling Undesirable Trees, Shrubs, and Vines in Your Woodland and Herbicides for Forest Management in References.

Operation and Maintenance

Crop tree release cutting may be repeated at 5 to 15 year intervals depending on site type and site quality.

References

Controlling Undesirable Trees, Shrubs, and Vines in your Woodland. Ohio State University Extension Publication F-45. http://ohioline.osu.edu/for-fact/0045.html

Crop Tree Management: A Tool to Help You Achieve Your Woodland Goals. Ohio State University Extension Publication F-50-02, 2002. http://ohioline.osu.edu/for-fact/0050.html

Crop Tree Management in Eastern Hardwoods. Perkey, A.W., B.L. Wilkins, and H.C. Smith, USDA-Forest Service, NE Area S&PF, Pub. NA-TP-19-93, 1994. http://www.fs.fed.us/na/morgantown/frm/perkey/ctm/ctm_index.html

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Forest Stand Improvement, Michigan Technical Note Forestry #25, USDA-NRCS, eFOTG Section I. Forestry.

Herbicides for Forest Management, Wisconsin Department of Natural Resources. http://www.dnr.state.wi.us/org/land/Forestry/Fh/weeds/herbicides.htm

Improving Hardwood Timber Stands. Kidd, R.P. and M.R. Koelling, 1991. Michigan State University Extension Bulletin E-1578.

Managers Handbook for Oaks in the North Central States. Gen. Tech. Rep. NC-37, 1977. USDA-FS, No. Cent. For Experiment Station. http://www.ncrs.fs.fed.us/pubs/viewpub.asp?key=102

Michigan Consulting Foresters at http://forestry.msu.edu/extension/extdocs/consulfor/consult.htm

Timber Sales Contracts. Timber Marketing Handbook, Michigan State University Extension. http://www.kbs.msu.edu/extension/marketing/Contracts.html