

FOREST STAND IMPROVEMENT IN NORTHERN HARDWOODS AND PINES

CONSERVATION JOB SHEET - Forestry Series

666-NHP



Natural Resources Conservation Service

Michigan



DEFINITION

Forest stand improvement (FSI, sometimes also called timber stand improvement, or TSI) is the manipulation of species composition, stand structure, and stocking by cutting or killing selected trees. This job sheet is intended for use in Northern Hardwoods (sugar maple, basswood, yellow birch, etc.) and Pines (red and/or white), which are more common in the Northern Lower Peninsula and the Upper Peninsula. Another job sheet is available for Eastern and Bottomland Hardwoods, which are more common in the Southern Lower Peninsula. In northern hardwoods and pines, it is important to maintain adequate tree stocking or density per acre to fully utilize the site and create optimum growing conditions for these tree species. These forest types are among the most commercially valuable in North America and the services of a

consulting forester should be obtained if a landowner is serious about timber management.

APPLICATION – Timber Objective

Northern Hardwoods: FSI is called for when basal area (BA) reaches about 130+ sq. ft. on better sites (sugar/red maple site index > 55) and 110+ sq. ft. on poorer sites (sugar/red maple site index < 55). If timber production is the primary objective, maintain about 90 sq. ft. on better sites and about 70 on poorer sites. Do not remove more than about one-third of the BA at a time. After determining “excess” BA, select “cut trees” that will release the best crop trees and result in uniform between-tree spacing of residual trees. See “FSI in Eastern & Bottomland Hardwoods,” MI Job Sheet - 666-EBH for more information on crop tree selection.

Pines: FSI is called for when crowns approach one-third of the total tree height OR when BA reaches 140-180 sq.ft., whichever comes first. The first FSI treatment in red pine will be a row thinning. Remove every third row or, if wider access is needed, cut 2 rows, leave 3. In white pine, rather than row thinning, selectively remove weevil and blister rust damaged trees. In subsequent FSI treatments, reduce the BA to about 120 sq. ft. but do not remove more than about one-third of the BA at a time. After determining “excess” BA, select “cut trees” that will release the best crop trees and/or result in uniform between-tree spacing of residual trees.

APPLICATION – Wildlife Objective

Northern Hardwoods: If mast or catkin producing species are present (oak, cherry, hickory, beech, birch), identify the healthiest of these trees as crop trees and release them from competition for light by cutting or killing adjacent trees (see MI Job Sheet 666-EBH). Release mast producing crop trees on at least 3 sides and preferably all 4 sides. This will promote the survival and increased seed production of mast producing species and maintain or increase tree and understory species diversity. Bear in mind, however, that considerable sugar maple timber value may be sacrificed if basal area drops below the minimum for timber production of 70-90 sq. ft. per acre.

Pines: Shrubs and hardwood trees will often gradually appear in pine plantations as FSI is carried out for timber. This diversification process often increases the number of mast producers and other plant species beneficial to wildlife and it can be greatly accelerated by removing more trees than called for above under the timber management objective. When row thinning, remove every other row rather than every third row. In subsequent treatments, reduce basal area to about 80 sq. ft. per acre. Remove up to about half of the basal area with each cut. Bear in mind, however, that considerable timber value may be sacrificed.

Self pruning of lower branches will not occur and potential high value utility pole and sawlog timber will likely not develop.

DATA COLLECTION

Use the Basal Area Data Sheet (eFOTG, Section IV, MI Cons. Sheets) to gather data for FSI in northern hardwoods and pines. Locate at least one plot in each identifiable stand of trees or soil map unit. A short transect, consisting of 3 or more plots, through a representative portion of a forest stand will yield enough data for planning purposes. There should be at least 150 feet between plot centers. “Cut trees” may be sample marked with flagging on the sample plots, but it should be emphasized that this is sample marking, for planning purposes only. Further instructions appear on the Data Sheet.

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 Sale 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, References.

If selling timber 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

Forest Stand Improvement 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>

Forest Stand Improvement, Michigan Technical Note Forestry #25, USDA-Natural Resources Conservation Service, electronic Field Office Technical Guide (eFOTG), Section I, Forestry.

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<http://www.dnr.state.wi.us/org/land/Forestry/Fh/weeds/herbicides.htm>

How to Manage Eastern White Pine to Minimize Damage from Blister Rust and White Pine Weevil. Katovich, S. and M. Mielke, 1993. USDA-Forest Service, NE Area S&PF, NA-FR-01-93.
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Improving Hardwood Timber Stands. Kidd, R.P. and M.R. Koelling, 1991. Michigan State University Extension Bulletin E-1578.

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Manager's Handbook for Red Pine in the North Central States. Benzie, J.W., 1977. USDA-Forest Service, Gen. Tech. Rep. NC-33.

Managing Red Pine Plantations for Utility Poles. Dickmann, D.I. and M.R. Koelling, 1997. Michigan State University Extension Bulletin E-2612.

Michigan Consulting Foresters at
<http://forestry.msu.edu/extension/extdocs/consultfor/consult.htm>

Northern Hardwood Forest Management. Neumann, D. and G. Peterson, 2001. Michigan State University Extension Bulletin E2769.

Thinning Planted Red Pine in Michigan. Rudolph, V.J., et. al., 1984. Michigan State University Research Report 461.

Some Guidelines for Improving Northern Hardwood Timber Stands. Koelling, M.R. and D.L. Dickmann, 1983. Michigan State University Extension Bulletin E-722.

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

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