PRODUCING FUELWOOD

FOREST STEWARDSHIP MANAGEMENT NOTE #19

There are two spiritual dangers in not owning a farm. One is the danger of supposing that breakfast comes from the grocery, and the other that heat comes from the furnace.

-Aldo Leopold

INTRODUCTION

A supply of fuelwood is one of the benefits woodland owners are most commonly interested in. In most cases, however, fuelwood should be viewed as one of several benefits to be obtained from an overall woodland management program rather than as the main product.

This Note summarizes information about, the nature of wood as a fuel, selecting trees for fuelwood, estimating fuelwood volume, and selling fuelwood.

THE NATURE OF WOOD AS A FUEL

Wood has been called the most polluting of our common heating fuels. However, if it is well-seasoned and properly burned in an efficient combustion unit, wood can be one of the most environmentally acceptable fuels (#1). The actual heat value obtainable from different trees will vary depending on species, moisture content, wood density, and growth rate.

1. SPECIES DIFFERENCES - The energy content of some species is twice that of other species, so species differences are worth considering. Consult Reference #2 for energy values and gas/oil equivalents of Michigan tree species. Note that hardwoods generally have higher heat values than conifers and that heat value is closely related to wood density.

2. MOISTURE CONTENT - It is important that fuelwood be well-seasoned (dried) before use for two reasons (#3). First, up to 50% of the heat value can be lost in the process of converting wood moisture to steam and spewing it up the chimney. Second, moist wood results in greater creosote build-up and consequent chimney fire danger. Moist wood is also a lot heavier to carry. For best results, wood should be cut to stove length, split, and allowed to dry in a sunny, well ventilated area for a year before burning. Six months is the recommended minimum curing time.

3. ECONOMIC CONSIDERATIONS - The economics of wood as a fuel should also be considered before putting much time or money into fuelwood production. A handy, manual calculator is available with which you can compare the worth of firewood with various types of purchased fuels (#9). A procedure for calculating what it really costs to cut your own firewood is also available (#3).

SELECTING TREES FOR FUELWOOD

1. FUELWOOD AS A BY-PRODUCT - If more than about 10 acres of mature hardwood forest are available, landowners should generally be able to sustain an adequate supply of fuelwood for household use by managing for timber production with fuelwood as a by-product (#4). Guidelines for this type of management are given in Reference #5 and in Management Note #16 "Timber Stand Improvement".

2. FUELWOOD AS THE MAIN PRODUCT - If less than 10 acres or so of mature hardwood forest are available, landowners will generally need to manage specifically for fuelwood, rather than timber, to be

able to sustain an adequate supply of fuelwood for household use. Little research has been conducted on this topic, but the following suggestions can be offered:

(1) Concentrate on species that sprout vigorously. By taking advantage of their well-established root systems, such species are able to produce wood more rapidly than are trees that start from seeds. If they are not cut too often, many species thrive with repeated cutting. All hardwoods species sprout to some degree, but the best sprouters in Michigan are: aspen, ash, oak, basswood, red maple, black cherry, tulip-poplar, honeylocust, and black locust. Conifers ("softwoods") sprout very little, if at all.

(2) Concentrate on species that are fast growing. Although such species tend to have lower heat values than denser, slower-growing species, they are desirable because their fast growth tends to result in greater total energy content. However, the advantage of more total energy must be compared to the increased need to fill the stove. With the exceptions of ashes and oaks, vigorous sprouting species are also rapid growers.

(3) When harvesting, cut all trees in a given area, including those too small to burn if they are of non-preferred species. This modified clearcutting method will encourage the preferred, fast-growing, vigorous-sprouting species as these species generally require abundant sunlight to compete well.

(4) In areas that will not be completely harvested for several years, thin around future crop trees of the preferred species to give them growing room (see Management Note #16 "Timber Stand Improvement"), but otherwise aim for dense stands. The deep shade in such stands produces trees with fewer branches, making felling, bucking, splitting, and stacking easier.

3. FUELWOOD PLANTATIONS - It is usually better to manage natural stands for fuelwood if any are available, but if none are, fuelwood plantations can be established (#3, #6). For plantation management also consult other numbers in this series (FSMN #8,10,12-14).

4. WILDLIFE CONSIDERATIONS - Whatever the method of producing fuelwood, most landowners will want to make provisions in the stand for wildlife habitat (FSMN #24-29).

ESTIMATING FUELWOOD VOLUME (CORDAGE)

1. HOW MANY TREES MAKE A CORD? The following table can be used to estimate the approximate number of trees needed to yield a standard cord (128 cubic ft.) of wood from various diameter trees (#3):

Diameter at Breast Height (DBH) in inches:	5	6	7	8	9	10	11	12	14	16	22
Approx. No. of Trees per cord:	46	21	15	10	8	6	5	4	3	2	1

2. HOW MANY CORDS IN A TREE? The following table can be used to estimate the approximate number of standard cords (128 cubic ft.) obtainable from trees of various diameters and usable heights (#7):

TREE VOLUME IN CORDS

Diameter Breast High (DBH) in inches	Usable Tree Height 1-stick 8 ft	2-stick 16 ft	3-stick 24 ft	4-stick 32 ft	5-stick 40 ft	6-stick 48 ft
6	.02	.03	.04	.06		
8	.03	.05	.07	.09	.12	.14
10	.05	.07	.10	.13	.17	.20
12	.07	.10	.14	.18	.22	.27
14	.10	.13	.18	.23	.29	.35
16	.12	.17	.22	.29	.36	.44

A handy, manual calculator is available that gives estimated firewood volumes (topwood cords and total cords) obtainable from hardwood or softwood trees of various diameters and heights (#8).

SELLING FUELWOOD

If you want to sell fuelwood stumpage, be sure the wood is not more valuable for other uses (FSMN #15) and be sure that the terms of the sale agreement are carefully considered and put in writing (FSMN #18). In some areas there is a fuelwood market for tops and damaged trees following commercial timber harvests.

If you are interested in processing and selling firewood by the cord as business, consult Reference #3 for a discussion of the various aspects of firewood enterprises.

REFERENCES

FSMN #'s refer to other Forest Stewardship Management Notes in this series.

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#3 Fazio, J.R. 1987. The woodland steward. The Woodland Press.
#4 Beattie, M., et al. 1983. Working with your woodland. A landowner's guide. University Press of New England.
#5 Koelling, M.R. and D.I. Dickmann. 1983. Woodlot management for fuelwood. MSU Extension Bulletin E-1486.
#6 Dickmann, D.I. and M.R. Koelling. 1982. Establishing fuelwood plantations in Michigan. MSU Extension Bulletin E-1572.
#7 Wickman, A. (ed.) 1982. The forest management digest. Forestree Farmers of Minnesota, Inc.
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CITATION: Burnett, Christopher D. 1994. Producing fuelwood. Michigan Forest Stewardship Management Note #19. Michigan Department of Natural Resources, Forest Management Division.

ACKNOWLEDGEMENTS: This project was supported, in part, by a grant from the Michigan Department of Natural Resources and the USDA Forest Service.