



FORESTRY EXTENSION NOTES

FIREWOOD PRODUCTION AND USE

Managing Existing Woodlands

Most existing woodlands in Iowa should be managed to produce lumber or veneer logs as the primary product. Improving stands for quantity and quality production of logs may provide an opportunity for a secondary crop of firewood. Trees need room to grow. Overcrowding results in reduced growth rate due to competition for light, water, and nutrients. Periodic thinning of a well-stocked woodland permits the best trees to grow faster and thinned materials can be used as firewood.

One of the best ways to thin a young pole stand involves using the *crop-tree selection* method. Under this method, the best trees are selected for the final crop of sawlogs and veneer logs. Trees adjacent to the crop trees that interfere with crown development should be removed and used for firewood.

Undesirable species and crooked or damaged trees can be harvested during the thinning operation and used for firewood. *Wolf trees* (large crowned, low quality trees that take lots of growing space) can also provide lots of firewood. Dead or dying trees are also candidates for processing into firewood. However, if providing wildlife habitat is important, maintain some wolf trees for acorn or nut production, and retain a small number of dead trees per acre for cavity development. Do not overcut stands when harvesting firewood. Maintain full tree cover on the

land to optimize production. Salvage tops and low quality material for firewood following a sawlog timber sale.

Natural woodlands may also be managed primarily for fuelwood production. A well-stocked five to ten acre stand of young trees composed of species that grow fast and sprout after harvest can provide a continuous supply of wood sufficient to heat most well-insulated homes. Trees less than 10 inches in diameter are typically good sprouters.

Energy Plantations

An *energy plantation* involves planting selected species of trees on bare land with the main objective of firewood production. For an individual landowner interested in heating a home with wood, 5 to 10 acres may be the most appropriate size. A yield of one half to two cords per acre per year can be realized from such plantings.

Select species that have good potential for high yield of Btu's per acre per year and are able to regenerate readily by sprouting. Cottonwood, hybrid poplars, sycamore, silver maple, and green ash are among the species that are good energy producers and sprout well. Higher density species such as oak or hickory produce more heat energy per unit volume of wood, but, because they grow more slowly, usually produce fewer Btu's each year

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on a given land area. Use a mix of three to five species that are well adapted to the planting site. Diversity reduces the potential for loss due to diseases or insects and promotes continuity of production.

Spacing of the planting may vary depending on how the plantation is to be maintained; for example, equipment used to control weeds may dictate a minimum spacing between rows of trees. In many situations, a 6-foot by 6-foot spacing may be close to optimum; this spacing will allow the site to be fully occupied and production will be at the maximum in three to five years. For continuous yield of firewood, plant about one-tenth to one-fifth of the area each year until the plantation is established. Because of differences in growth rate, plant each species in separate rows or small blocks to reduce any negative effects of competition.

For fast-growing species, harvesting can begin in five to seven years; at this age, the trees should be four to six inches in diameter. Harvest in the autumn after leaf fall has occurred; at this time, the food reserves in the root system are high which will promote successful sprouting. Remove all material in blocks; this will allow the trees to resprout and grow without excessive shade. Expect the new sprouts to grow even faster than the original planting because of the already established root system.

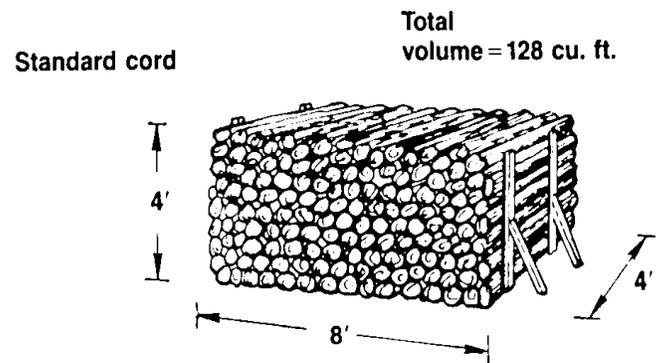
Harvesting Firewood

Cutting standing trees requires skill and experience; observe appropriate safety precautions when logging. Learn proper felling procedures. Know how to operate and maintain your chain saw before going to the woods; always follow safe operating rules recommended by the manufacturer. Wear tight-fitting clothes, steel-toed shoes, a hard hat, safety goggles, leather gloves, and ear protectors. Always inspect trees carefully for loose limbs, rot, or other hazards before

felling. Never cut above shoulder height with a chain saw. Start the chain saw on a solid surface on the ground. Always run the chain saw at full throttle when cutting; use both hands to operate the saw. Shut off the saw when moving from place to place; cover the saw blade with a plastic or wooden guard when not in use.

Measuring Firewood

The traditional unit of measurement for firewood is the *standard cord* which is a stack of wood that contains 128 cubic feet of wood plus air spaces. A standard cord is often portrayed as 4-foot bolts in a stack four feet high and eight feet long. The actual solid content of wood in a cord may range from 60 to 110 cubic feet; a solid content of 80 cubic feet of solid wood per cord is often assumed for hardwoods three to eight inches in diameter. Firewood cut into lengths shorter than four feet, but still piled four feet high and eight feet long, generates a unit called a *face cord*. The volume of a particular unit obviously depends upon the length of the pieces; for example, a face cord with 2-foot long pieces has half the volume of a standard cord.



Weight per standard cord of air-dry common hardwoods varies from 2,000 to almost 5,000 pounds depending upon the species and density. The following table gives the weight per cord at 20 percent moisture content (air-

dry) and the total heat content for 23 different hardwood species.

Weight per air dry cord and total heat content of different hardwoods

Species of wood	Weight per cord ¹	Total heat per cord (million Btu's)
Osage-orange	4,800	33.5
Black locust	4,200	29.3
Shagbark hickory	4,100	28.6
Ironwood	4,100	28.6
White or bur oak	3,800	26.5
Honey locust	3,800	26.5
Red or black oak	3,500	24.4
White ash	3,500	24.4
Mulberry	3,500	24.4
Hard maple	3,400	23.7
Green ash	3,300	23.0
Black walnut	3,200	22.3
Larch	3,200	22.3
Red elm	3,000	20.9
Sycamore	2,900	20.2
American elm	2,900	20.2
Black cherry	2,900	20.2
Silver maple	2,800	19.5
Boxelder	2,600	18.1
Alder	2,500	17.5
Cottonwood	2,300	16.1
Willow	2,300	16.1
Basswood	2,000	14.0

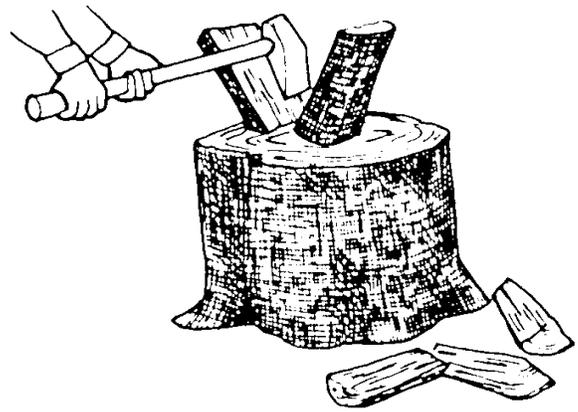
¹Assumes a cord of wood contains 80 cu. ft of solid wood

Splitting Firewood

Roundwood more than six inches in diameter may need to be split for use in many wood-burning units. Splitting is generally easier when the wood is green. Many hardwoods are easy to split; however, a few species, such as American elm and sycamore, may be difficult because of particular grain patterns. Pieces containing knots are typically more difficult to split than clear wood.

Splitting may be done by hand or by using some type of mechanical splitter. A heavy splitting maul used alone or in combination with wedges is usually best for hand split-

ting. Use a chopping block to provide a stable base and reduce tool damage. If a large amount of splitting is anticipated, mechanical splitters are available for purchase or rental. The most common type



involves using a hydraulic cylinder to force a wedge into the end of the piece of firewood.

Drying Firewood

Proper seasoning of firewood is very important. Dry firewood has a higher heat value per pound, is easier to ignite and maintain, is less prone to throw sparks, and is less likely to promote creosote accumulation in the chimney. Green material should be dried for one full year before burning; most drying will occur during late spring, summer, and early fall. Split firewood before drying.

Stack firewood for air drying in an open area where there is good natural air circulation. Use treated posts or timbers to form a foundation for the pile of firewood; keep the first course of material at least four to six inches above the ground. Stack the firewood loosely to promote good air circulation. Provide a roof to protect the top of the pile, or store in an open shed.

Store seasoned firewood under cover in an outside shed near the house. Avoid storing large quantities in the house, warm garage,

or basement; the warm temperature may activate fungi or insects. Insects in firewood can be an annoyance, but very seldom cause any serious problem. Do not spray firewood with an insecticide because such action will not be effective and may pose health problems when the wood is burned. Plan your burning so that wood that has been stored the longest is used first; provide limited storage inside near the burning unit for easy access.

Selecting Firewood

Many native hardwoods are well suited for use as firewood. Relative ratings for ease of splitting, ease of starting, rate of burn, and tendency to throw sparks are given for 22 different species in the following table. Use this information in combination with the heat content data when evaluating different types of firewood.

Ratings for hardwood firewood

Species	Ease of splitting	Ease of starting	Rate of burn	Sparks
Ash	easy	fair	slow	few
Aspen	easy	easy	fast	few
Basswood	easy	easy	fast	few
Birch	easy	easy	medium	some
Boxelder	easy	easy	fast	many
Cherry	easy	difficult	medium	few
Cottonwood	easy	easy	fast	some
Elm, American	difficult	fair	medium	few
Elm, Slippery	moderate	easy	slow	few
Locust, Black	difficult	difficult	slow	few
Locust, Honey	moderate	fair	slow	some
Maple, Hard	moderate	difficult	slow	few
Maple, Soft	moderate	fair	medium	few
Hickory	moderate	fair	slow	some
Ironwood	difficult	difficult	slow	few
Mulberry	moderate	fair	medium	some
Oak, White	moderate	difficult	slow	few
Oak, Red	easy	difficult	slow	few
Osage-Orange	difficult	difficult	slow	some
Sycamore	difficult	fair	medium	few
Walnut	moderate	fair	medium	few
Willow	easy	fair	fast	some

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