KANSAS FOREST SERVICE
KANSAS STATE UNIVERSITY

Managing Your Woodland for Firewood

Indiscriminate cutting, even occasional firewood removals, can be detrimental to the health and vigor of a woodland. Most woodlands could be producing a much greater quantity and quality of firewood and other benefits than they achieve under current management. Selective cutting and selective planting are the most productive activities in proper management for firewood in most woodlands.

Management starts with a look at forest health. The healthiest trees will have large, well-developed live tops. Unhealthy trees will often have thin foliage and dead limbs in the upper part of their tops. Growth rate can be checked by cutting a few sample trees and looking at growth ring widths on the stumps. Wide growth rings mean fast growth rate, and closely spaced growth rings mean slow growth.

After checking for woodland health, decide which species will produce the desired quality and quantity of firewood. Table 1 compares heat value, growth rate, and site tolerance of common species. Use this information to decide which species to favor on your site.

Potential Yield

Most Kansas woodlands are producing an estimated 1/3 to 1/2 cord of wood per acre per year. A standard cord is a stack of wood 4 feet high, 4 feet wide, and 8 feet long. Fast-growing trees such as cottonwood, silver maple, and willow produce about twice as much volume per year as osage-orange, black locust, and hickory. However, they produce only about half as much heat per unit volume of wood (Table 1).

Table 2 shows expected cord volume for trees by height and diameter.

Harvesting

Harvesting is often key to a management program. Common objectives are:

1. To recover as much usable firewood as possible.
2. To remove undesirable species.
3. To promote regeneration of desirable species.
4. To provide for other woodland uses.

Before doing any cutting, mark all trees to be cut in the first harvest. It is easy to make a bad decision while operating a chain saw. Trees can be marked with a spot of paint. Mark trees in the following priority:

1. *Dead trees that are not wanted for wildlife habitat.* Leaving two to four dead trees per acre will provide valuable wildlife habitat.
2. *Poor firewood species to make space for better species.* If sprouts of undesirable species are left for temporary food and cover for wildlife, they should be cut before they get large enough to produce seed.
3. *Full-grown trees of good firewood species.* Removing full-grown trees allows space for young, healthy, fast growing trees.

Table 1. *Relative Heat Value, Growth Rate, and Tolerance of Selected Site Characteristics for Common Kansas Species.*

	Million BTUs Green cord	Growth rate	Tolerance				
			Shade	Wet site	Dry site	Light, sandy soil	Heavy clay soil
Osage-orange	32.6	L	M	L	H	M	H
Black locust	28.3	M	L	L	M	M	M
Hickory	27.4	M	M	H	M	L	H
Post oak	25.6	L	L	L	H	H	L
Pecan	25.6	M	L	H	M	M	H
Honeylocust	25.6	M	L	M	H	H	H
Mulberry	25.3	M	M	M	H	H	H
Bur oak	24.9	L	L	M	M	M	H
Red oak	24.0	M	M	M	M	M	M
Sugar maple	24.0	L	H	M	L	L	M
Green ash	22.8	M	L	H	M	M	H
Black walnut	21.8	M	L	L	L	M	L
Kent. coffeetree	21.4	M	L	L	L	L	M
Hackberry	21.0	M	H	M	M	M	M
Red elm	20.6	M	M	M	M	M	M
American elm	19.8	M	M	M	M	M	M
Sycamore	19.8	H	L	H	L	L	H
Red cedar	18.9	M	M	L	H	H	H
Silver maple	18.9	H	M	H	L	M	H
Catalpa	16.3	M	L	M	H	M	M
Cottonwood	15.9	H	L	H	L	H	M
Willow	15.5	H	L	H	L	H	M

L = Low M = Medium H = High

Table 2. *Cord volume of trees, based on tree height and diameter.*

Tree Ht. (feet)	Inches DBH 6	7	10	12	14	16	18	20	22	24
10	.02	.03	—	—	—	—	—	—	—	—
20	.03	.05	.08	—	—	—	—	—	—	—
30	.05	.08	.12	.17	.22	—	—	—	—	—
40	.06	.10	.15	.22	.29	.38	.47	.58	.69	.81
50	.07	.12	.18	.27	.36	.46	.58	.71	.85	1.00
60	.09	.14	.21	.32	.43	.55	.69	.84	1.01	1.20
70	—	.16	.25	.37	.50	.64	.80	.98	1.17	1.38
80	—	.19	.28	.42	.56	.73	.91	1.11	1.33	1.57
90	—	—	.31	.47	.63	.81	1.02	1.24	1.49	1.76

DBH = Diameter outside bark in inches at breast height (4½ feet above ground).

4. *Young trees to be thinned.* Thin young trees to increase diameter growth on fewer trees. After thinning, the remaining trees should have clearance on three sides of their tops approximately equal in feet to the diameter at breast height (DBH) of the tree in inches.
5. *Subsequent harvests.* Begin cutting when the trees suit your size requirements.

Regeneration

Three methods of regeneration may be used to ensure trees for future firewood crops: natural seeding, sprouting, and planting. Natural regeneration often occurs following harvest. The new stand of trees, however, may not be the preferred species. Natural regeneration of desired species can be enhanced by leaving seed trees. For species with windblown seed (i.e., ash and maple), leave 10 trees per acre. Unless new seedlings are already established at time of harvest, species with seeds too heavy to be scattered by wind (i.e., oak and hickory) will require sprout management or planting to ensure a new stand of desired trees.

Some species, such as black locust and green ash, sprout vigorously after cutting and may be used to produce future firewood crops. Harvest firewood trees during the dormant season (November through March) to promote vigorous sprouting the following spring. Allow all sprouts to grow the first year after cutting to preserve root systems. Sprouts may be thinned to one to three per stump in subsequent years to allow fast diameter growth on the remaining stems. Larger trees (10 inches or more DBH) of some species often produce few stump sprouts.

Supplemental planting or "interplanting" should be done in poorly stocked areas. Species that do not grow well in shade should be planted in openings at least ¼ acre in size. Species that are shade-tolerant may be planted in small openings or adjacent to existing trees.

If the woodland is too small to furnish the amount of wood desired, and threre is space, plant more trees. General site suitability for a number of Kansas species can be estimated using Table 1. If your land is erodible, use approved chemicals to control competing vegetation. Till planting strips, spots, or the entire area if erosion is not a problem. Control competing weeds and grasses for 3 years.

Trees should be planted on a 10 × 10 foot spacing (435 trees per acre) and thinned as the tops touch and form a closed canopy. Use the removed trees for firewood.

Wildlife Considerations

Wildlife can either help or damage a woodland. Mice, rats, rabbits, and deer gnaw on new seedlings and succulent stump sprouts of some species. Deer sometimes browse the tops off young trees or peel bark and break branches with their antlers. Dead trees left as "observation towers" for hawks and owls will help control the population of small animals. Dead trees also provide nesting sites for woodpeckers, which help control insects. Generally, the benefits of wildlife are greater than any negative impacts.

Cutting firewood "opens up" your woodland and increases habitat diversity and availability for many species of wildlife. Building brush piles from top wood (tree parts too small in diameter for firewood) also provides good cover for wildlife.

Other Woodland Uses

Most woodlands in Kansas can be managed primarily for high-value wood products, with firewood as a by-product. Properly managed woodlands will provide enhanced wildlife habitat, recreation, erosion control, commercial timber, water quality, natural beauty, environment enhancement — and a lot of firewood.

Publications on tree planting and woodland management are available from your local K-State Research and Extension office or the State Forester's office.

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