



Managing Your Woodland for Firewood

With good management, most woodlands produce a greater quantity and quality of firewood than they achieve with no management.

The first step in good management is to conduct a forest health assessment. Healthy trees have large, well-developed, live tops and no signs of decay around the base. Unhealthy trees often have thin foliage, dead limbs in the upper part of their tops, and/or holes or signs of decay in the main stem.

The second step is to assess forest density. A forest with low density usually has few large-diameter trees per acre (e.g., fewer than 50), which may not provide a continuous supply of firewood over time unless more trees are planted. A forest with high density usually has many small-diameter trees per acre (e.g., more than 200), and the trees grow at a slower rate from competition for light, water, and nutrients.

The third step is to determine growth rate, which is affected by forest density and soil type. Check the growth rate 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.

The fourth step is to determine the soil type on which the woodland is growing. Some soils are droughty and shallow, and consequently trees have a slower growth rate than on soils that are deeper and have higher water availability.

Once this information is gathered, it is easier to determine the management needed to increase the productivity of the woodland for firewood.

Selective Cutting

Selective cutting is key to a good management program. It is easy to make a bad decision while operating a chain saw, so before doing any cutting, mark all trees to be cut 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 provides valuable wildlife habitat.
2. *Unhealthy trees and poor firewood species to make space for planting better species.* Many of the better firewood

species have low to medium tolerance of shade, so removal of undesirable species opens the canopy for sunlight for planted seedlings.

3. *Full-grown trees of good firewood species.* Removing full-grown trees allows space for young, healthy, fast-growing trees that are currently in the understory.
4. *Young trees to be thinned.* Reduce the number (density) of small-diameter trees in the woodland to reduce competition. With less competition, the remaining trees grow faster and are healthier. Select and mark the trees to keep (your crop trees). Then kill or fell any trees that are competing with a crop tree's crown. After thinning, the remaining crop trees should have 3 to 5 feet of clearance on at least three sides of their tops.
5. *Subsequent cutting.* Begin cutting when the trees have grown enough to meet size requirements.

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)	Diameter at Breast Height (inches)									
	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

Regeneration

Three methods of regeneration may be used to ensure trees for future firewood crops: natural seeding, sprouting, and planting. Natural regeneration often occurs after 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 harvest, species with seeds too heavy to be scattered by wind (i.e., oak and hickory) require sprout management or planting to ensure a new stand of desired trees.

Most species sprout from the base of the stump after they are harvested and, if managed correctly, these sprouts make good stems. Allow all sprouts to grow the first year after cutting to preserve root systems. Thin sprouts to one to three per stump in subsequent years to allow fast diameter growth on the remaining stems. Keep sprouts that are growing out of the soil next to the stump. Cut off sprouts growing on the side or top of the stump. Harvest firewood trees during the dormant season (November through March) to promote vigorous sprouting the following spring. Larger trees (20 or more inches diameter) of some species often produce few stump sprouts.

Supplemental planting or “interplanting” should be done in poorly stocked or low-density areas. Species that do not grow well in shade should be planted in openings at least ¼ acre in size. Plant shade-tolerant species in small openings or adjacent to existing trees (see Table 1).

If the woodland is too small to furnish the amount of wood desired, consider planting more trees on adjacent land that was previously cropped or grazed. If the soil has a high clay content,

or if the ground has never been tilled, plow and disk the land before planting, so that it has the consistency of garden soil. If your land is erodible, after disking, plant a ground cover that will not compete with the trees (such as red or white clover) to prevent erosion before planting the trees. Over the next 3 years, control competing weeds and grasses that grow within the rows of trees. Allow 2 feet around each seedling that is completely free from weeds and grasses. If possible, avoid mowing between rows, as mowing stimulates grass growth.

Plant trees on a 10- by 10-foot spacing (435 trees per acre) and thin as the tops touch and form a closed canopy. Use the removed trees for firewood. 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. A standard cord is a stack of wood 4 feet high, 4 feet wide, and 8 feet long.

Wildlife Considerations

Wildlife can either help or damage 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 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 effects.

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 provide quality wildlife habitat, excellent erosion control, high-quality commercial timber, good water quality, natural beauty for recreation, and a lot of firewood.

Publications on tree planting and woodland management are available from your local K-State Extension office or the State Forester’s office. You can also contact your local forester for recommendations specific to your woodland.

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