Extension Circular 51

October, 1942

# THE FUEL SITUATION

**Donald J. Haibach, Acting Extension Forester**

Every fuel survey conducted in the Pacific Northwest has shown there will be shortages of some or all fuels for both domestic and industrial uses this winter and that these shortages will be increasingly felt in succeeding war years. Wood is the most plentiful and most available fuel. Washington has a million and a half acres of farm woodlands and on nearly every acre there are some poor quality trees suitable for fuelwood. If people freeze in winter, with the wood right at the back door it will be more tragic than funny.

## WOOD AS A FUEL

Wood is clean and free from disagreeable dust and produces little smoke or soot when properly burned. It ignites readily and provides a large volume of heat quickly. Wood leaves little ash, which in itself has fertilizer value.

## Heat Value of Northwestern Woods

(Assuming 1 ton of coal has 100 heat units, each cord of wood has the indicated number of heat units.)

| | Seasoned | Green | | Seasoned | Green |
|---|---|---|---|---|---|
| Douglas-fir (Coast) | 68 | 67 | Engleman Spruce | 46 | 40 |
| Douglas-fir (Rocky Mt.) | 60 | 58 | Sitka Spruce | 52 | 49 |
| Ponderosa Pine | 58 | 50 | Red Alder | 57 | 50 |
| Western White Pine | 60 | 56 | Oregon White Oak | 97 | 90 |
| Lodgepole Pine | 58 | 53 | Oregon Ash | 76 | 73 |
| Western Larch | 74 | 69 | Quaking Aspen | 54 | 47 |
| Western Hemlock | 58 | 52 | Black Cottowood | 49 | 40 |
| | | | Black Locust | 102 | 98 |
| | | | True Firs (ave.) | 56 | 49 |

## THE CORD

Stacked wood occupying 128 cubic feet of space makes up one cord usually considered as a pile 4 feet high, 4 feet wide and 8 feet long. The content of solid wood in a cord varies considerably depending on the length, size, and form of the individual sticks as well as the care exercised in fitting them together. Besides being sold in the standard cord of 4-foot sticks, wood is often sold in face cords or ricks composed of 12, 16, or 24-inch lengths. These short lengths are usually sold on the basis of the amount produced from a standard cord of 4-foot wood. Three such piles of 16-inch wood contains somewhat more than one pile of 4-foot wood. This fact plus the extra time and labor to cut 4-foot wood into smaller lengths accounts for the relatively higher price of short length wood.


**Number of Douglas-fir (Second Growth) Trees of Different Sizes Needed to Make A Cord of Wood. (Approximate figures, not exact for every stand.)**

| Diameter of Trees at Breast Height (4½ ft.) | Number of Trees per Cord | Diameter of Trees at Breast Height (4½ ft.) | Number of Trees per Cord |
|---|---|---|---|
| 4 | 43 | 14 | 1⅓ |
| 6 | 18 | 16 | 1 |
| 8 | 7½ | 18 | 1 |
| 10 | 3¾ | 20 | ⅔ |
| 11 | 3 | 22 | ½ |
| 12 | 2½ | 24 | ⅓ |

## SEASON OF CUTTING

Generally wood is cut in winter for use the following winter. In any case it is best to cut it during slack periods on the farm or anytime when labor can be found to do the job.

## STEPS IN FUELWOOD PRODUCTION

The usual procedure is to fell the tree, limb, measure and cut it into 4-foot lengths, split, pile, let season and then haul to road, farm, or nearby market.


1. Select the tree to be cut. (See Improving the Woodland).

2. Decide the direction of fall. Trees should generally be felled along the contour or occasionally uphill on steep slopes. Consider how to avoid damage to neighboring trees.

3. Brush out sufficient space to swing the axe and pull the saw safely.

4. Notch the tree (⅙ to ⅓ of diameter) near the ground on the side you want the tree to fall. Cut stumps as low as possible to gain extra wood.

5. Saw on opposite side of notch and just above it. Drive a wedge into the cut if the saw pinches, yell "Timber-r-r," remove saw quickly, and stand well away from tree as it starts to fall.

6. Lop off all limbs flush with the trunk. Cut from the underside, not into the crotch.

7. Measure and cut into 4-foot lengths all wood including limbs 2 inches and over in diameter. Small sized wood can be used at home when it is not possible to sell it.

8. Sticks over 6 inches in diameter are usually split in two and those over 10 inches are quartered or requartered as required.

9. Pile in cord units on bed pieces if wood is to be left in the woods to season any length of time (See Seasoning).

10. Allow to dry (season) for at least 3 months, but preferably 6 months to a year. (See Seasoning).

11. Haul to trucking road, farm, or nearby market for further seasoning and/or sale.

## SPEEDING UP PRODUCTION

Fuelwood can also be cut in 8, 12, or 16-foot lengths which can be more readily handled. In some cases it may be easier to skid logs or full length trees to a road or to the farmyard and there cut, split, and pile it. Cutting can best be done with the use of a power saw. Where this method is used, enough logs or trees should be yarded at one locality to make the volume sufficient to warrant the use of a power saw. Several wood-cutters can team up to make the desired volume if one cannot do it alone. Power felling and bucking saws and exploding wedges will speed up production where a large enough volume warrants their use.

## SEASONING

Drying the wood for a short time is better than not drying it at all. If air is allowed to circulate freely about the wood for 3 months in reasonably dry weather, seasoning will be about half complete and the fuel value will then be closer to that of thoroughly air-dried wood. How-

ever, 6 months to a year is usually required for thorough seasoning. Wood should be stacked outdoors where it is exposed to sun and wind. Skids or bed pieces can be used to keep the wood off the ground. This aids in keeping the wood dry thus retarding rot and insuring better air circulation. The top layer of sticks can be piled closely and slanted so as to prevent rain from reaching the interior of the pile.

To speed up seasoning the sticks can be piled "log cabin" style. If wood is cut during the summer, seasoning can be speeded up by allowing the felled trees to lay two or three weeks with their branches intact. Thus considerable moisture is given off through the leaves.

Under emergency conditions it may be desirable to cut fuelwood for use within a very short time. In this case cut the following species as they are improved comparatively little by seasoning.

| | |
|---|---|
| Douglas-fir | Noble Fir |
| Lodgepole Pine | Alpine Fir |
| Western Larch | Oregon Ash |
| Sitka Spruce | Black Locust |

## TOOLS AND EQUIPMENT

A woodsman is known by the way he treats his tools. For safety and efficiency — keep 'em sharp.


**AXE**—The axe should weigh 3 to 4 pounds, have a 28 to 34-inch handle, double bit, and be of good quality. Axe weight and handle length depend on the size and strength of the user and the size of the timber encountered. A narrow axe with a thin blade is best for hardwoods and a wide axe with a thicker blade for softwoods. A double-bit axe can have one blade thin for clean, fast cutting and the other thicker for rough work.

**SAW**—One-man cross-cut saws 3 to 5 feet long will serve the purpose depending on the timber size. Two-man saws 5½ to 6 feet long with 4 cutting teeth for each raker are about right for the ordinary run of timber. For small timber a narrow saw blade with a concave back makes wedging easier. For trees 10 inches and less a frame or bow saw (a stronger form of a buck saw) will prove efficient. Power saws for falling and bucking are on the market at prices ranging from about $140 to $210. Drag and buzz attachments to tractors having power take-offs are sold for about $35 and up. For those having electricity, instructions for building a small electrically operated cross-cut saw may be obtained at any County Extension Office.

**WEDGES**—The best wedge for felling and splitting weighs from 4 to 8 pounds and is made of steel. For splitting, wedges are best used in pairs. Exploding wedges can be obtained at prices ranging from $3.50 to $7.00.

**MAUL**—The Oregon-type splitting maul combining sledge hammer and blade is handy for splitting.

**KEROSENE BOTTLE**—A small stoppered bottle containing kerosene will prove handy for sprinkling on the saw to prevent binding when cutting resinous woods.

## SOME GOOD SAFETY RULES

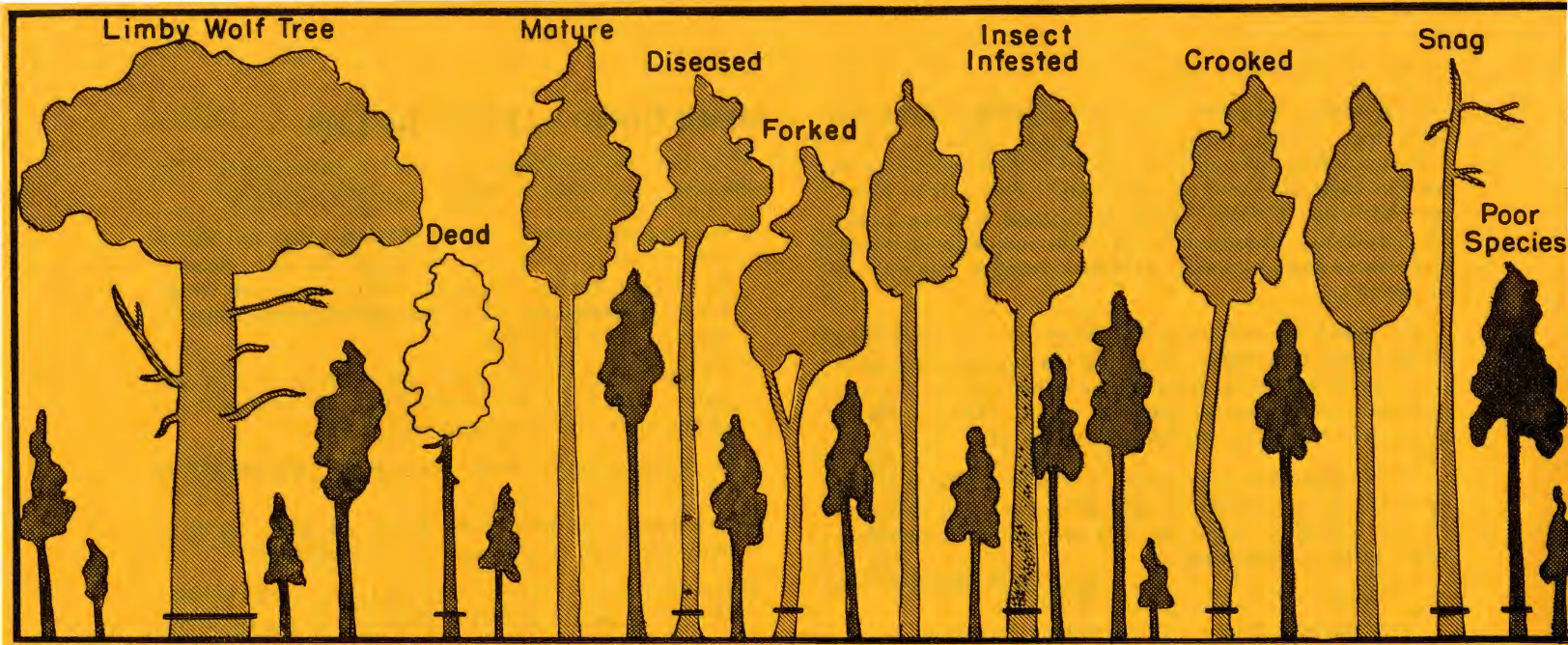
Most woods accidents are due to carelessness. The following suggestions should be carefully observed:

1. Never chop or saw without making sure you have a clear circle to swing the axe or pull the saw. Remove all vines, branches, brush, etc., that are within range. Look especially over your head for branches that may catch or deflect the axe.
2. Be sure other workmen are not in range of your axe swing. After being sure of swinging space keep your eye on the mark. Do not crowd your work.
3. In chopping keep a solid grip with the hand uppermost on the handle.
4. Avoid chopping into knots. Swing the axe away from body and legs. A glancing axe is dangerous.
5. Never throw the axe or leave it lying on the ground. When not in use drive the blade into a log or stump.
6. If you fall, throw the axe from you as quickly, and as far as you can.
7. Never carry a double-bitted axe on your shoulder in rough country. Grasp the handle close to the head with the bit at right angles to the ground.
8. Never carry a saw under the arm, but always carry it balanced on the shoulder with the teeth pointing outwards.


9. When the axe and saw are not in use, or when carrying them to and from the job, fasten a piece of split fire hose over the bits and teeth as a guard.
10. Warn other workmen of falling trees by calling "Timber-r-r."
11. Stand a safe distance away from a falling tree. Never stand directly behind as it may "kick back" over the newly made stump.
12. Use extreme caution in felling a rotten tree. It is impossible to tell just when or in what direction the tree will fall.
13. When felling a tree having some dead limbs or a spike (dead) top, keep watch for the falling of these "widow-makers."

## CUTTING CAN IMPROVE WOODLAND

Fuelwood is probably the lowest valued forest product and thus takes the lower quality trees. This permits the woodland owner to obtain some payment for his poorer trees by their removal and allows him to improve the woodland for continuous production of higher valued products. Remove for fuel only the dead, diseased, insect-riddled, crooked, limby, suppressed, crowded, and otherwise unthrifty trees. (See diagram). Leave the straight, fast-growing trees for more valuable forest products such as saw timber, piling, poles, etc. The practice of using tops and large limbs for fuelwood may prove profitable on a saw timber or piling operation.




**AN ALL-AGE STAND**—Cut the poor trees for fuelwood. Good quality mature trees should be made into higher valued products.

Generally, cutting small trees that are sound and well-formed is not profitable. However, even-aged young stands (approximately the same age, height and diameter) often reach a condition which makes the removal of some trees advisable. By crowding at the beginning, trees of high commercial quality are produced but if crowding is allowed to continue it will cause stagnation both in diameter and height growth. The presence of dead or dying trees in the stand, a dense interlocking of the tree crowns, stems very slender in proportion to their height, or a stagnation in the height growth indicate that a thinning is needed.

The tendency always is to cut too heavily. As a rule the trees having the least prospective value should be removed. Therefore in thinning an even-aged stand of young trees cut those likely to be crowded out, in addition to all dead and defective trees.

## IF YOU HAVE NO WOODLAND

Ask your County Extension Agent for the location of woodlands where cutting can be done. Under Department of Agriculture regulations free use of wood from National Forests can be granted bona-fide residents and settlers. Free-use permits are obtained from local forest rangers who will designate where the fuelwood can be cut.

## ADDITIONAL INFORMATION

For further information and help in selecting trees to be cut consult your County Extension Agent or the Extension Forester in Pullman.

## LIST OF REFERENCES


Farmers Bulletin 1912 Wood Fuel in Wartime

Farmers Bulletin 1907 Equipment and Methods for Harvesting Farm Woodland Products.

Farmers Bulletin 1210 Measuring and Marketing Farm Timber

Leaflet 29 The Farm Woods: A Savings Bank Paying Interest.

Small Electrically Operated Cross-cut Saw



Published and distributed in furtherance of the Act of May 8, 1914 by the State College of Washington, Extension Service, J. C. Knott, Director, and U. S. Department of Agriculture cooperating.

To the Reader:

This is a guide for fuelwood cutters. It is published by the Extension Service of the State College of Washington to show that the farm woodland is an important part of farm economy if it is handled properly.

By following approved practices it can be made to produce its maximum of high valued forest products in addition to badly needed fuelwood.

Very truly yours,

County Extension Agent

U. S. DEPARTMENT OF AGRICULTURE
EXTENSION SERVICE
DIVISION OF COOPERATIVE EXTENSION
WASHINGTON, D. C.

OFFICIAL BUSINESS