NATURE HELPS A TON WHEN MOVING FIREWOOD

Some thoughts on moving and drying wood

By Kirk Dahl

Lifting freshly cut wood is a ton more work than moving dry wood ... literally.

The magic, of course, is all in the evaporation of water. For free, the passive drying process can result in about a 30% reduction in the weight of fresh "green" wood as it dries down to become "seasoned" wood.

For example, a typical full cord (128 cubic feet) of red oak is said to weigh about 5,200 pounds before drying. That number can vary quite a bit, depending upon the season in which the wood is cut, bark thickness, how it is stacked and how crooked it is. But seasoned red oak, air-dried down to about 20% moisture, only weighs somewhere around 3,700 pounds per cord. The weight lost through evaporation is about 1,500 pounds per cord, or about three-quarters of a ton!

The numbers for other species are comparable, as shown in the table on the next page.

Drying time varies considerably, depending mainly upon air temperature, air circulation, humidity, stacking, size of the wood pieces and exposure to direct sunlight. But it takes about 18-24 months for firewood to dry. It may burn OK before that, but it will burn more efficiently when fully dry. Often times the ends of a firewood log will appear dry, but the core of the log may still contain undesirable moisture. Early drying is dominated by evaporation from wood pores and end grain. Later drying of the core is limited to diffusion through cell walls, which takes much longer. This explains why wood may appear dry at the ends but can still be a bit heavy, with moisture remaining near the center. Split wood has less of a central core for holding moisture and more surface area exposed to the ambient air, explaining why split wood dries faster than unsplit wood.

If we say it takes two years to dry wood, that is 104 weeks. That would mean a cord of oak loses, on average, around 15 pounds per week. Humans should be so lucky!

Actually, though, drying occurs much more rapidly in the first few weeks and months than it does later, when it is nearly dry. A common rule of thumb for dense hardwoods like red oak is that about 50%

Photo: Kirk Dahl

Stacking green wood off the ground with a foot or so of space between rows results in faster drying and less nearby humidity.

of the water evaporates away in the first six months, and 75% is lost during the first year. Using those front-loaded figures, the numbers work out to an average of close to 30 pounds of water per cord evaporating away each week of the first six months. To really double down, the rate of evaporation during the very first few weeks is even higher, as much as 10 pounds per day.

The geeky math and science behind this is that each pound of water represents the weight of an immense number of water molecules. There are about 1.5 x 10^{25} molecules per pound of water, which is over 15 septillion molecules. Calculated over a two-year drying time, that is over 700 billion billion molecules — that's 17 zeros — lost from a cord of wood per second.

Humankind has been using fire for around a million years, and one can easily assume that people have always been sitting around fires trying to figure out how to more efficiently manage firewood. Traditions and personal preferences abound regarding how and when to cut and stack wood.

One approach to cutting green firewood is to block it up into fireplace-size lengths, and let it lie there for a few months or more. It will be easier to move later, after some of the drying has occurred. A lot of the green wood I cut is from trees that have fallen over roads or trails. My personal plan for removing an obstructing downed tree is to try to at least open up the roadway, block the wood into 16-inch to 18-inch lengths, roll it aside and let it lay there for a few months. After that, it is far lighter to move when I have time to load it into the truck, unload it, move it onto the splitter and stack it. I enjoy the work, but I am thankful that by then, trillions of molecules of water have already evaporated.

This is not to say, however, that leaving wood on the ground where cut is a good practice long term. Wood will absorb moisture from the ground and may never dry to a usable degree. It collects dirt and damp wood provides ideal habitat for fungi and other growth, eventually leading to rotting and crumbling. In winter, wood doesn't dry well under snow. Firewood can freeze to the ground and often holds on to frozen dirt and leaves when moved, adding to the weight and mess of an already heavy and messy project. Allowing wood to dry in the woods is fine to start, but it becomes counter-productive after a while.

If you do move and split wood while it is still green, stacking that wet firewood can also be problematic. The amount of moisture coming off a wood pile makes a difference. Wood dries poorly when it is stacked tightly, in large quantities, without much room between rows, and especially so when stacked in a shed with poor air flow. Morning dew lingers longer, mold growth risk increases, metal tools and fixtures nearby rust faster. Left outdoors, however, the plume of evaporated molecules dissipates rapidly with even very minimal air circulation. Sunlight greatly shortens drying time.

Practical considerations to improve drying include splitting wood early to increase the surface area exposed to the air, leaving at least six inches between rows of stacked wood, covering only the top of the stack and never the sides, stacking at least 10 feet from the walls of buildings during the first year, aggressively allowing full air flow especially during the first year, and allowing full sunlight exposure where possible.

Many woodland owners take great pleasure and pride in cutting, splitting and stacking their own firewood. It's a time-honored vigorous outdoor project with visible results and a worthy purpose. There is much to be said for handling wood when body and spirit and weather all align to dictate the most suitable time to get to work. Yes, the wood will be lighter after it dries some, but don't overthink it. A handsome stack of split wood and a well-deserved rest are your rewards for doing rather than thinking.

Kirk Dahl, a WWOA member since 1982, owns woodlands in Eau Claire, Trempealeau and Price counties.

If we say it takes two years to dry wood, that is 104 weeks. That would mean a cord of oak loses, on average, around 15 pounds per week. Humans should be so lucky!

Estimated Cord Weights, Green vs. Air Dried

Species	Approx. Green Weight (lb/cord)	Approx. Dry Weight (lb/cord)	% Weight Loss
Red oak	~5,200-6,000	~3,500-4,000	~30-40%
Hard maple/sugar maple	~4,300-5,000	~3,800-4,500	~15-30%
Ash (white/green)	~4,600-5,400	~3,500-4,500	~15-30%
Aspen (poplar)	~3,000-3,800	~1,800-2,400	~30-45%
Yellow birch	~4,600-5,900	~3,500-4,200	~20-35%
White birch	~3,700-4,700	~2,800-3,100	~20-35%
Red maple (soft maple)	~3,900-4,500	~2,800-3,400	~20-35%
Red pine (softwood)	~2,800-3,600	~2,000-2,800	~15-30%
White pine (softwood)	~2,500-3,200	~1,800-2,500	~20-35%
Tamarack/larch (softwood)	~3,800-4,600	~2,800-3,800	~25-30%