

How Big Should a White Pine Be Before We Cut It?

By Bob Seymour

In my 40-year career teaching and researching white pine silviculture, a central question has been: how big should we grow pine sawtimber trees? Many pine sawmills are now limited to logs no larger than 36 inches at the stump end. Trees over 30 inches, diameter at breast height (dbh), are thus considered “oversized.” Cut-to-length harvesters have difficulty with stumps over 24 inches.

As landowners and foresters, we should respect sawmill constraints, but the decision when to cut a pine tree should be a silvicultural one, based on future growth and earning potential – the crucial, but too-often overlooked, concept of retaining quality *growing stock*. We recently completed a large-scale harvest on our Wicopy Woods Tree Farm in Sebec, a Forest Stewards Guild model forest previously owned and managed for 40 years by forester Ron Locke. When marking a 13-acre stand of large white pine, we had to decide the fate of dozens of trees approaching 30 inches, dbh. After much deliberation, we marked about 24 trees to harvest – too large for the Ponsse cut-to-length system that did such a fine job elsewhere.

In a little over a day, these trees were skillfully hand-felled, bucked, and forwarded. Working on the log pile (See photo), we scaled the diameter inside bark on the top ends of the 10 largest butt logs, then measured tree rings for back to 1987 – 30 years ago. We subtracted these radial growth measurements, at five-year intervals, from the log’s current size to reconstruct previous scaling diameters, then determine board-foot volumes. Simple subtraction tells us how these logs have grown and earned us money since 1987. Averages for all 10 trees are summarized in the graphics on the next page as (top) historical diameters at breast height and butt log scaling diameter; (middle) historical value per tree and per acre; (lower) annual growth in value per tree and per acre.

To illustrate, let’s trace the growth and earning power of one tree over a 30-year period between 1987 and 2017. Diameter at 16 feet when cut was 23.7 inches. Assuming a Girard form class of 80%, the dbh would be 29.6. This tree was of lower quality than others left standing, and its stump diameter was 37 inches. The 16-foot butt log has 413 board feet, worth \$66 at our average log-run stumpage value, \$160 per thousand board feet. If the log had graded select, it would be



Sawlogs from the Wicopy Woods harvest, with Jessica Leahy and Cori, the woods dog.

worth nearly twice as much.

In 1987, the tree was 17.3 inches dbh. It grew one inch in diameter every three years. In 1997, when Ron thinned this stand, the tree was 20.6, the size many log buyers and some foresters now believe should be cut. Ron must have believed otherwise and released this tree, because its growth increased, and was still growing vigorously when cut by us. Over 30 years the butt log grew from \$21 to \$66 in value, still growing at an annual rate of \$1.69, and it wasn’t slowing down.

Much research on pine silviculture suggests a fully stocked stand of such large trees would have a density of 30 trees per acre. The actual density of this stand was 28.7 white pines per acre 16 inches dbh and larger; it’s neither pure pine nor is it fully stocked everywhere. A stand of such trees, each averaging \$1.33 per year would thus earn us \$40 per acre per year, a value which causes disbelief in some timber investors earning one-fifth of this. And remember, we’re using average stumpage prices. If such a stand had butt logs graded select (which our residual stand now does), we would be making nearly \$100 per acre per year. Including the top logs would add at least 50%. Remarkable, but true.

We can strengthen this argument by looking at what this pine stand has averaged over its entire life (what foresters call “mean annual increment”) and compare this benchmark to current growth. If growth

exceeds the long-term average, we should let the tree or stand grow longer. This stand, which originated on an old field in the 1920s, is now worth \$1,727 per acre, or \$19 per acre per year over its 90-year life. Its current growth (\$40 per year) is over twice the long-term average, so it's clearly a no-brainer for us to keep it growing for many decades as we transition into shelterwood regeneration.

If your goal is maximizing annual earnings, cutting good quality white pine at 18-20 inches dbh is sheer folly. A complete analysis, however, must consider that maintaining such large trees and stocking represents substantial investment and risk. Landowners always have the option of turning trees into cash and putting the money in something earning higher rates. How do our large pines perform? Quite predictably, the rate of return dropped from 4.6% during the 1987-92 period to 2.5% currently, even as annual growth rose from \$1.04 to \$1.33 per tree. This seeming paradox results from a relatively constant value increment occurring on a steadily rising base value (the tree itself as growing stock).

This example also illustrates why – in the cold-blooded world of pure financial analysis that sadly drives timber investors with no interest in long-term stewardship – no trees are allowed to get very big. Such investors pride themselves on a high rate of return, yet seem oblivious to the irony that they're not actually making any real money. You still need to manage; pruning and thinning can pay big dividends, but most woodlot owners try to practice these techniques.

Once you decide you're not going to liquidate your pine sawtimber stand, rate-of-return analysis becomes largely irrelevant. Jessica and I are holding onto growing stock that will continue to build wealth. We find a 3% real rate of return just fine. It's inflation-proof, and will occur even when the stock market is declining. It's comforting to know that growth of one large, decent-quality pine will pay taxes on the whole acre. And perhaps best of all, we are honoring Ron Locke's legacy of conservative, forward-looking stewardship of thinning and pruning by growing the trees longer. Like us, you too can resist the pressure to harvest prematurely, building wealth for you and your heirs, confident that you are good land stewards in every sense.

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