



VALUATION AND APPRAISAL OF TIMBER

Determining the value of timber requires not only the careful and scientifically conducted measurement of trees, but also the thorough analysis of timber markets and how value will be recognized in the measured timber. At **fountains**, we apply equal care to both aspects of timber valuation. The objective is not merely to put a value to a measured volume of timber, but to truly appraise the market value of the timber as it stands on the land.

The value of timber as it stands uncut is referred to as stumpage and is essentially the price paid at the mill less the cost of logging and transportation; this figure is then applied to the volume of standing timber.

Volumes on a tract of land vary according to the history of land use as well as a variety of biological factors. Prices vary according to market demand and production costs.

Mill prices tend to be competitive with each other and driven by the market and the price of lumber. Mills buy timber according to species and grade. Grades are based on the quality and size of individual stems. Most mill price levels are based on the availability of timber and the market for the final product.

Logging costs tend to be more variable and are related to the specific property situation, and include felling the timber, removing it from the woods, and delivering it to the mill. Logging costs can vary tremendously according to the type of equipment used; the distance from the mill; the size and distribution of the timber to be cut; the topographic features of the land; and the condition of both internal and external access.

Determining Volumes

Except on very small tracts or where value is extraordinary, it is prohibitively expensive to measure every tree. Timber appraisals therefore rely on a statistical sample, commonly called a timber cruise, that approximates actual volumes within acceptable levels of error. The inherent error of statistical samples is driven by the variability of the data collected. Mixed stands with many species, products, and size classes will require a more intensive sample than plantations or natural stands with few species. On larger tracts of land, samples can be more widely spaced than on smaller tracts and still achieve the same accuracy.

The accuracy of a timber cruise is stated in terms of standard error and confidence interval. Usually given as a percentage, the standard error is a range around a median value within which the true value is likely to be. The smaller the standard error, the more accurate the data. An example might be a total volume of 100 cords +/- 10%, meaning the data indicates the actual volume is likely between 90 and 110 cords.

In any sample, there is always risk that the actual value will be outside the range of the standard error. This risk is quantified in terms of a confidence interval and usually given as a percent, with 100% representing total confidence. Therefore, if the total volume is 100 cords with a standard error of 10% and a confidence interval is 95%, you can be confident that 95 times out of 100 such samples the actual volume is between 90 and 110 cords.

For appraisal purposes, a sampling accuracy on total sawtimber volume where standard error is less than 10% at the 95% confidence interval is generally considered a reasonable result; however, even this may be inadequate when unit values are exceptionally high. It is important to remember, though, that it often takes a very significant increase in sampling intensity and cost to gain even a modest reduction in sampling error.

In addition to statistical error, the accuracy of the sample is dependent upon the professional skill and experience of the forester conducting the sample in determining what products can likely be sawn out of the tree at the mill, and how surface defects on the tree may affect the invisible interior wood. Each tree contains elements of several possible products, and accurate assessment of the correct utilization of each tree is required during the sampling process.

At **fountains**, all data collectors are fully trained to recognize the relevant tree characteristics, and data collection follows rigid and specific procedures to assure data integrity. Field data is further independently audited to assure the data meets the inventory objectives for accuracy.

Determining Unit Values

Once volumes have been reasonably determined, the timber is then appraised using standard appraisal techniques, including an income and comparable sales approach.

The income approach starts with published mill delivered prices (usually by grade) and then backs out all costs impacting the achievement of that income, leaving a residual value, or stumpage by grade. All mills within a reasonable geographic region are surveyed for published prices and specifications. Distance to these mills from the forest is then determined and a reasonable trucking cost is estimated. The mill price less trucking costs produces a "roadside" value of the timber. Based on the physical characteristics of the property, including terrain and access, and based on the distribution, quality, and size of the timber, a logging cost is determined and subtracted from the roadside price to produce a range of stumpage values by grade from a variety of mills. From this range of values and an analysis of the grade mix and diameter distributions as determined by the inventory, a reasonable average unit value can be determined.

In addition to this income-based approach, considerable weight is given to comparable timber sales. Actual timber sales are examined and weighted according to how directly comparable they are to the subject property in terms of a variety of factors, including but not limited to terrain, distance to the road, logging chance (size, quality, and distribution of the timber), type of cut (thinning versus clearcut), and distance to mills.

Finally, any independent source of comparable stumpage price data is also examined. This is often in the form of a published report that is statistically weak, but it does help to frame value ranges.

Final determination of unit values is then a weighted and measured opinion of both the prices indicated by the income approach and prices indicated by comparable sales. As with volume determination, the unit values developed represent a likely range within which the true value falls.

This approach, with emphasis on objectively collected data to determine not only the volumes but also the unit prices, is designed to provide clients appraisal-level confidence in the value of their timber.