Conducting a Simple Timber Inventory

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Timber inventories are the main tool used to determine the volume and value of standing trees on a forested tract. A timber inventory, like any inventory, involves taking stock of how much material is available. While timber inventories have traditionally been performed to place a value on a stand before sale, they are also useful for providing information for the development of management strategies, estate planning, tax basis, or litigation. A timber inventory will establish two key pieces of information: 1) the number of *trees per acre* (tpa) on a forested tract, and 2) the *volume per acre* of wood that could be extracted from those trees.

The two most common products of a timber harvest are *saw timber* and *pulpwood*. Saw timber is generally more valuable than pulpwood. The volumes of standing trees designated as saw timber are typically estimated *in board feet* (bf). The volumes of standing trees designated as pulpwood are often estimated in *cubic feet* (cu. ft.), *cords*, or *tons*.

To estimate volume, a professional forester will normally use a diameter tape (d-tape) or Biltmore stick to measure *diameter at breast height* (DBH). *Merchantable height* is also measured and is the number of logs that a tree will be sawn into when harvested. Professional foresters will generally use a clinometer or Merritt hypsometer to measure merchantable heights. Merchantable heights are measured to a minimum top tree diameter. The minimum top diameter depends on whether the tree represents pulpwood or saw timber. Minimum top diameters can differ by market, so check with local mills for limits in your area.

Once you have measured the DBH and height of a tree, you are ready to determine the tree's volume. Saw timber volumes for each combination of height and diameter can be found in a volume table. There are a number of available volume tables, each differing in how they estimate the volume that could be extracted from a standing tree.

There are different types of inventory. This is too involved to discuss in detail here, but the types are: 1) 100 percent tally, 2) fixed radius plot sampling, and 3) variable radius plot sampling. The sampling methods have some error because the entire tract is not being measured.

The boundaries of your forested tract should be clearly marked before undertaking any sampling to avoid accidentally sampling outside the tract of interest. In many cases, boundaries are obvious, but in cases where there might be some confusion, flagging or paint can be applied to boundary trees.

Often there will be considerable variation in the size, distribution, and species of trees across a forested tract. These variations can result from previous land use, soil conditions, slope, etc. To maximize the accuracy and utility of your inventory results, prior to collecting field data it is best to map your tract into stands that are similar in the size and species of trees present. For instance, a forest stand that originated following abandonment of row cropping would have different attributes than a stand that had been continuously forested. By mapping the forest into different stands and collecting and summarizing data for each of those stands, you can gain valuable insight into which stands would be best to harvest and what treatments may be necessary to increase the value of other stands.

One way to help ensure a successful timber inventory is to plan properly before you start measuring trees. Good preparation will increase your efficiency in the field and increase the accuracy of your final estimates. You should be comfortable finding your way around the forest. Before you begin an inventory, it is important that you understand how to measure tree DBH and merchantable height, as well as how to navigate in the woods using compass and pacing. Foresters rely on a hand-held compass for direction determination and on pacing for distance determination. The use of both are necessary for determining the location of plots.

Timber inventory can be a very complex and subjective process, and this article is a very brief introduction to the terminology and methodology. Even trained professional foresters and experienced loggers often arrive at differing volumes and values when inventorying timber. Because most private forest landowners are not comfortable with inventorying their own timber, professional assistance is highly recommended. This is particularly the case when decisions related to timber value have lasting consequences.

Editor's Note: For more information, refer to Conducting a Simple Timber Inventory *by Jason Henning and David Mercker, 2009. PB 1780. The University of Tennessee Extension.* ***https://utextension.tennessee.edu/publications/Documents/PB1780.pdf***