

Glossary

Aboveground weight – Fresh or dry weight of aboveground tree components – stem, branches, foliage, seeds, etc. – excluding roots. Some uses – more appropriately termed “above stump” – exclude the stump component.

Allometry – Relationship between sizes or weights of various parts of an organism. In particular, the volume or weight of a tree in relation to some readily-observable attribute such as dbh or height.

Bark – Outermost layer of woody plant stems or roots, as distinguished from wood. In many applications bark only refers to that around the tree’s main stem, which may be more appropriately termed “stem bark” to distinguish it from bark surrounding branches, i.e. “branch bark.” See also **wood**.

Bark fraction – Bark volume or weight expressed as a unitless proportion of the wood and bark volume or weight taken together for a tree stem or section. In formula form, bark fraction = bark weight / (bark weight + wood weight), alternatively, bark fraction = bark volume / (bark vol. + wood vol.). Care must be taken when communicating bark fractions to include the basis, either weight or volume, of the measurement. See also **bark volume**.

Bark thickness – Dimensional measurement of bark made radially from the inner (cambium) layer to the exterior of the bark layer, usually measured at breast height unless otherwise specified. See also **double bark thickness**.

Bark volume – Volume, often in ft³, of space occupied by bark, either while attached to the wood of a tree or after being removed. Bark volume may be determined either by dimensional measurements or by water displacement, two measures that are not equivalent. Dimensional-based bark volumes include the space occupied by air in fissures or gaps common in the bark of many tree species, whereas water displacement only measures the volume of solid bark tissue.

Basic density – Oven-dry weight per unit of green volume of wood and/or bark. Basic density is a somewhat nonstandard term derived from basic specific gravity (SG) noting that multiplying basic SG by the density of water gives a value referred to as “basic density.” (American Journal of Botany 97(3): 519–524. 2010)

Basic specific gravity – Oven-dry weight per unit of green volume of wood and/or bark expressed as a proportion of the density of water. In formula form, basic specific gravity = oven dry weight / green volume / density of water. (note: the density of water is approximately 62.4 lb/ft³ at room temperature)

Belowground weight – Fresh or dry weight of belowground tree components, primarily roots.

Biomass – The oven-dry weight of living or dead tissue in any or all components of standing live or dead trees, or in some cases the contents of downed woody material. Biomass is measured following oven drying – usually at 221° F (105° C) for wood and bark tissue and 140° - 150° F (60° - 65° C) for foliage tissue – to the point where additional drying time will not result in additional weight loss from water. See also: **green weight**; **oven-dry weight**.

Bole – Another word for the main stem or trunk of a standing tree, especially when considering the merchantable contents of the stem. Often the term bole is intended to exclude the stump left after cutting and the tip or portion of the stem above some minimum diameter size if it will not be harvested or used. See also: **bole length; stem; merchantable top diameter.**

Bole length – Length of a tree bole from where it is cut on the stump to a specified top diameter (outside bark), often 4 inches but may be larger when knots or other limits to merchantability cause the usable portion of the stem to be terminated below the 4-inch diameter point. (cf. Scott, C.T., 1981, Northeastern forest survey revised cubic-foot volume equations. Broomall, PA: USDA Forest Service, Northeastern Forest Experiment Station. 3 p.)

Bolt – Section of roundwood, typically cut from the main stem of a tree and distinguished from a log by its intended use in producing pulpwood fiber rather than sawn lumber. No universal standard bolt length exists, but local standards such as 4 ft, 5 ft, 8 ft, or 100 in are commonly understood. Bolts are generally considered to be shorter than logs. See also: **log; roundwood.**

Bone-dry weight – same as oven-dry weight.

Branch – A woody structural segment connected to but not part of the main stem of a tree. Also, a secondary division of a tree trunk. See also: **fork; limb; twig.**

Component – A portion of a tree based on tissue type, e.g., foliage, wood, bark, or fruit, or its structure, e.g., stem, branch, crown, or root.

Crown - Branches, leaves, and reproductive structures extending from the trunk or main stem of a tree, excluding the stem itself. Some definitions include the portion of the main stem above a certain diameter size. See also: **tip; top.**

Crown class – Categorization of trees based on their crowns' position in the canopy relative to other adjacent trees. Categories may include: emergent; dominant; codominant; intermediate; suppressed; or open-grown.

Cubic foot – U.S. customary volumetric measure of solid wood – with or without bark – in standing trees, roundwood, or solid wood products. Equivalent to a cube having sides one foot in length.

Cull – Portion of a tree stem unusable due to poor form or unsoundness of wood from decay or internal defects.

Dbh – same as **diameter at breast height.**

Density – Weight of wood per unit of volume, typically expressed in lb/ft³. See also **density basis.**

Density basis – The weight and volume moisture conditions established for a wood density determination. In forestry biomass applications, density is typically measured on a bone-dry weight, green-volume basis to reflect the conditions in which volume and weight are measured. Volume basis is generally specified as either green or dry, to distinguish between materials that have undergone

shrinkage due to cavitation or not. Weight basis is also specified as either green or dry, but other moisture bases are used, including water-saturated, green (also fresh), 12%, or bone dry.

Diameter at breast height (dbh) - Stem diameter measured outside the bark of a standing tree at a height – known as “breast height” – of 4.5’ above ground level.

Dib – Same as **diameter inside bark**.

Dob – Same as **diameter outside bark**.

Double bark thickness – Bark thickness multiplied by two. May be obtained by subtracting dib from dob. See also: **bark thickness; dib; dob**.

Dry weight – Same as **oven-dry weight**.

Foliage – The collective leaves or needles of a plant.

Fork – Division of the main stem of a tree into two or more large stem-like structures, often where the distinction of one as the main stem and others as side branches is made difficult due to a lack of obvious differentiation of the divided stems’ diameters or inclination angles.

Fresh weight – Same as **green weight**.

Green weight – The weight of the organic material in standing or recently cut trees, including the weight of any moisture content.

Hardwoods – Trees ranked in the taxonomic class angiosperm, typically including broad-leaved species.

Increment core – A cylindrical wood specimen, usually collected from the main stem of a standing tree, extracted by drilling a hollow bit-like tool (an increment borer) through the bark toward the stem pith, i.e. radially.

Limb – A branch, typically one that is large in comparison to others on a tree. See also: **branch; twig**.

Log - Section of roundwood cut from the main stem of a tree and distinguished by its intended use in producing sawn lumber. No standard log length exists, but multiples of 8 ft are common in the U.S. See also: **bole; bolt**.

Merchantability – Standards that define minimum diameter and length of roundwood that may be economically harvested from standing trees. Merchantability standards are often established based on tree size

Merchantable height – The height of a tree measured to a fixed point on the stem, usually with respect to the stem diameter, e.g., the height to a 4” stem diameter.

Merchantable top diameter – Stem diameter below which no usable volume of roundwood can be economically extracted. Often 3” or 4” for pulpwood stems, but larger for stems marketed for other uses, e.g., sawtimber or veneer logs.

Merchantable volume – The portion of a tree stem suitable for extracting some marketable product or raw material. Unusable contents typically include stump, top, and cull material.

Moisture content - The percentage of water in a substance. The moisture content of wood is normally calculated as a percentage of oven-dry weight (DW) for solid wood products using the measured green weight (GW) and DW of a specimen according to the following formula:

$$MC \% = \frac{GW - DW}{DW} \times 100$$

Moisture content is sometimes calculated as a percentage of total or green weight for paper or wood fuel products, which is not typical in biomass applications.

Oven-dry weight – The weight of a specimen after drying at elevated temperatures until no appreciable additional loss of water is possible. By convention drying takes place at 212° - 221° F (100° - 105° C) for wood and bark, and 140° - 150° F (60 - 65° C) for leaves and foliage – the lower temperature for leaves is used to prevent volatilization of organic compounds in foliage.

Roundwood – length of cut tree stem, with or without bark, generally round in cross section, otherwise minimally processed. See also: **log**; **bolt**.

Sawtimber – Trees having sufficient size and form to be used as raw material for milling solid wood lumber.

Section – Same as **bolt** or **log**.

Softwoods – Trees ranked in the taxonomic class gymnosperm, typically limited to conifers having needle-shaped or scale-like leaves.

Specific gravity – Ratio of wood or bark dry weight to the weight of the water displaced by the wood or bark at specified moisture content.

Stem – Contents of the main axis of a tree, including both wood and bark, and distinct from secondary axes or branches.

Stem bark – Bark surrounding stem wood tissue, excluding branches or roots. See also **stem wood**.

Stem profile – Quantitative description of stem diameter versus height. Often a mathematical equation with diameter = $f(\text{height})$, or a series of paired diameter and height measurements collected at various points along the stem. See also **taper**.

Stem wood - The wood contents, excluding bark, of the a tree's main stem, as distinguished from the other components such as branches, stump, or roots. See also **stem bark**.

Stump – The tapered base of a tree stem above the ground line or root collar to the height where the tree is cut for felling.

Taper – The decrease in diameter from the base to the tip of a tree's main stem. May also be applied to secondary stems or branches. See also **stem profile**.

Tip – The highest section of the main stem of a tree where it reaches its apex. See also **Top**.

Top – Part of the main stem of a tree that lies above a usable diameter limit, often 8-10" for sawtimber and 4" for pulpwood trees. Topwood may also include branches that are smaller than a usable diameter limit. See also: **tip; merchantable top diameter**.

Total tree height – The height of a tree from the ground-line to the tip (the highest live branch or leaf).

Twig – All or part of a branch that is small in comparison to other branches on a tree. See also: **branch; limb**.

Volume – Measure of solid contents contained in tree stems or branches – typically wood, bark, or both – often stated in terms of the amount of a usable product that can be recovered through harvesting and processing of roundwood. Typical units include cubic foot, board-foot, and cord. Volumes may also be determined for a portion of stems, such as that above the stump. See also: **merchantability; merchantable volume**.

Wood – Structural material produced in the stems, branches, and roots of trees and other woody plants. See also **bark**.