



Registry Rules and Measuring Procedures

Tree Index

Trees of the same species are compared using a *tree index* formula: trunk circumference (in inches) + total height (in feet) + $\frac{1}{4}$ of the average crown spread (in feet) = **tree index score**, rounded to the nearest whole number (i.e. 147.5 points becomes 148 points for the registry). Trees within five points of one another are considered co-champions.

Five-Year Rule

For national champions, trees must be re-measured every 5 years to maintain their “champion” status.

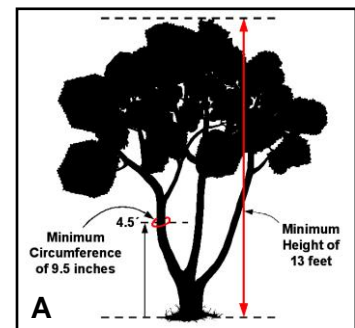
Recorded Values

All recorded measurements should be rounded down to the nearest whole number (i.e. 48.9 feet is recorded as 48 feet, or 132.6 inches is recorded as 132 inches).

What Is A Tree?

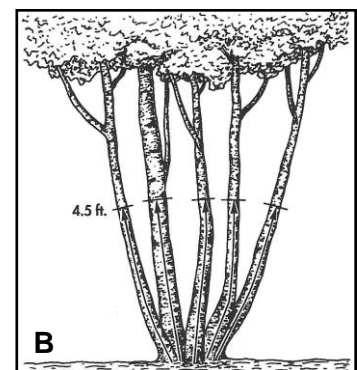
Each specimen nominated for the Texas Big Tree Registry must meet the following definition: **“Trees are woody plants, having one erect perennial stem or trunk at least three inches in diameter at breast height (DBH, or 4½ feet), a more or less definitely formed crown of foliage, and a height of at least 13 feet”** (Little, 1979).

For low-forking or multi-trunked specimens, this means that at least one of the stems must exceed 9½ inches in circumference at 4½ feet to qualify (see diagram **A**).



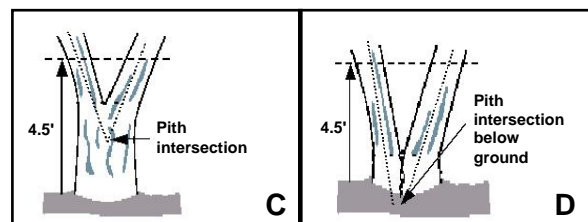
One Tree or Two (or More)?

In practice, it must be determined if a specimen has one trunk or if it represents two or more stems growing very close to one another. Trunks that meet at or above 4½ feet should be measured as a single stem, according to the circumference rules on page 2. Trunks that meet below 4½ feet must be evaluated further.



For multiple separate trunks that join above ground several approaches are possible. The “combined area” method is a series of calculations that takes circumference measurements of each trunk at 4½ feet, combines them into a single cross-section value and then derives a single circumference value at 4½ feet (diagram **B**). This is compared against the smallest circumference *below* the forks; the smaller of the two values may be used as the circumference value for the specimen.

Another consideration is the “pith intersection” of the stems (diagrams **C** & **D**). If junction is at or below the ground line, trunks are considered separate specimens.



Measurement Rules & Methods

Circumference: Measure and record the *smallest* trunk circumference between the DBH point (4½ feet) and the ground, but below the lowest fork (diagrams E & F). Also record the height above ground, in inches, where measurement was taken.

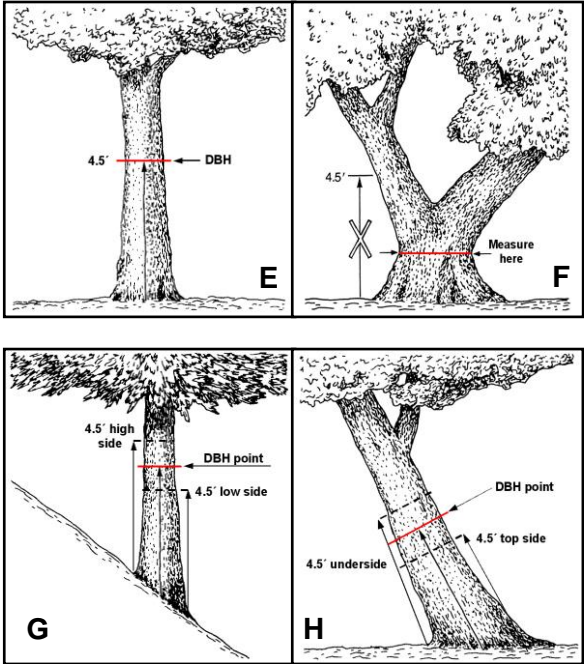
Special Circumstances

Tree on Slope: Measure up 4½ feet along the axis of the trunk on high and low sides; DBH point is midway between these two planes (G).

Leaning Tree: Measure 4½ feet along both the top side and underside of the trunk; DBH point is midway between these two planes (H).

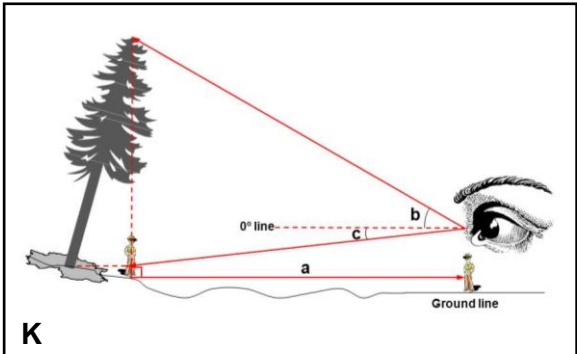
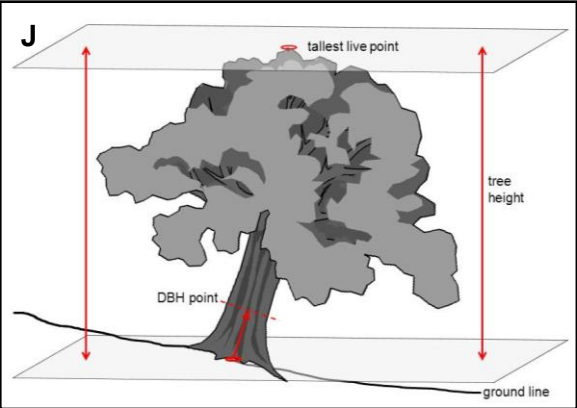
Low Branches: When determining where on the trunk to measure circumference, ignore portions that do not form part of the tree's crown, such as dead branches or forks, and epicormic sprouts.

Obstruction at DBH: If there is a bump, burl, branch, or other obstruction at the DBH point, measure circumference above and below the obstruction and record the smaller value. A buttress that forms between trunk and root system as a natural feature of the species (e.g.—baldcypress, water tupelo) should not be considered an obstruction.



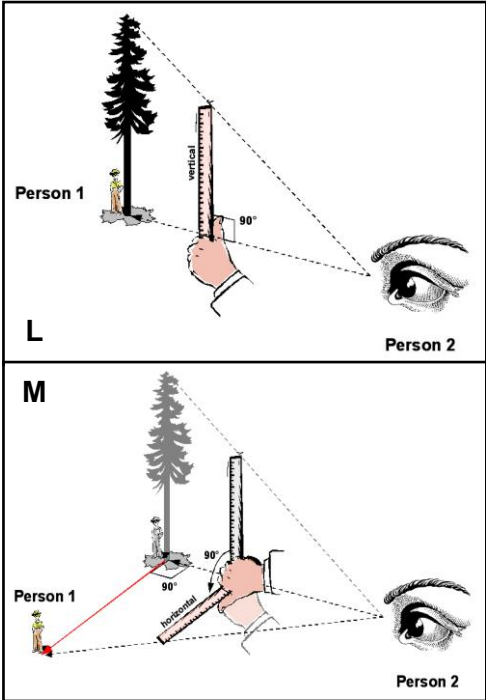
Height: Record the vertical distance between the ground line and the tallest part of the *live* crown, in feet (J). Also record the method used to determine this values. (Choices include: direct measurement [telescoping pole, climbing], clinometer, hypsometer, laser rangefinder [w/ or w/o internal clinometer], stick method, pencil method, comparison, and wild guess.)

“Horizontal Distance” Method: Common height measuring tools use trigonometry to calculate tree height from measurements of horizontal distance from the target and sight angles to the top and base of the tree (a, b & c in diagram K). The key factor with all of these tools is to locate the point on the ground directly underneath the tallest point on the tree and then measure horizontal distance (100 feet is often an appropriate distance). Measuring horizontal distance from the trunk of the tree is *only* appropriate when the tree top is directly over the base of the tree. If the starting point is higher or lower than the base of the tree, be sure to sight to a point on the ground that will adjust for this difference.



“Ruler” Method: There are many tools that can be used to estimate the height of a tree, but the simplest way uses little more than a ruler or pencil, good eyesight, and a friend!

One person stands near the trunk of the tree and the second person stands at a distance where both Person 1 and the top of the tree are visible. Person 2 holds a ruler (or pencil) upright at arms length and (carefully!) walks forward or backward until the entire length of their ruler covers the tree from base to top (L). Still holding the ruler at arms length, Person 2 turns their wrist right or left so that the ruler is now horizontal, with one end sighting the base of the tree. Now Person 2 instructs Person 1 to move away from the trunk in the direction the ruler is pointed (at a 90 degree angle) until they are standing where the end of the ruler points (M). Person 1 is now standing roughly the same distance from the trunk as the tree is tall. Use a tape measure to record this distance, in feet.



Note: for leaning trees, height is not measured along the length of trunk from base to tip.

Crown Spread: Along the *drip line* of the tree (N), two measurements of the crown width are taken and recorded (in feet), at right angles to one another. The first is the *widest crown spread* (O), which is the greatest distance between any two points along the drip line. Once the widest spread has been found, turn the axis of measurement 90 degrees and find the widest crown spread *in this plane* (P). The two perpendicular crown spread measurements are averaged for use in the tree index formula.

Drip line: This is the outline on the ground of the outermost leaves of the crown (J). Only live portions of the crown are included.

