Tree Diameter Measurement

New York State Department of Environmental Conservation

Urban and Community Forestry Grant Program Round 15

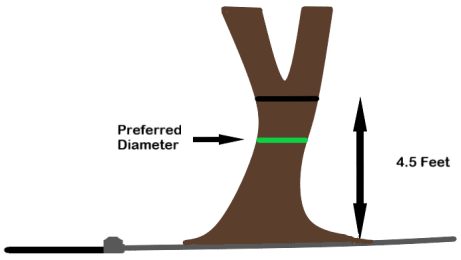
Guidelines for Awardees and Consultants

The purpose of this document is to provide consistency regarding how a tree diameter is measured for Department of Environmental Conservation (DEC) Urban and Community Forestry (UCF) grant projects.

Tree diameter is usually measured at 4.5 feet (ft) above ground level. Measurement at this height is referred to as diameter at breast height or DBH. DBH can be measured with a specially calibrated tape measure called a diameter tape (d-tape) available from most arborist or forestry supply dealers. For a tree with a clear gradually tapering trunk, measuring DBH is straightforward, but there are several circumstances in which questions arise about how to measure DBH.

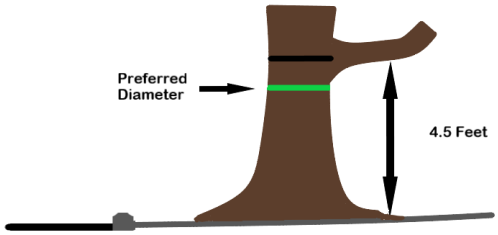
This guide can be used to solve some of the more common complications when measuring a tree's DBH. Communities can use this guide when developing their Scope of Work for consultants and it will be used by DEC regional staff for grant inspections. We have generally used the simplest and most widely accepted methods recommended in other sources such as the US Forest Service (USFS), International Society of Arboriculture (ISA) and the Federal Emergency Management Administration (FEMA).

Abnormal Trunk Taper



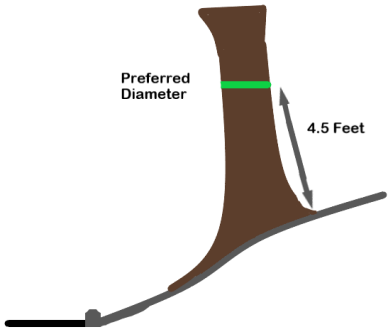
The tree tapers in such a way that the diameter at a point below 4.5 ft is actually smaller than the diameter at 4.5 ft. Measure the diameter at the smallest point and record the height at which diameter was measured on the data sheet.

Branches and Bumps at DBH



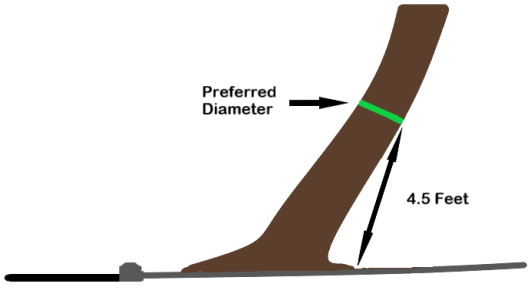
Tree has branches or bumps which interfere with DBH measurement. Measure DBH below the branch or bump. The USFS measures DBH immediately above point where bumps or branches cease to affect diameter of the stem. The underlying concept is to measure the diameter that would be closest to the expected DBH if branches or other irregularities were not present. Record the height at which the diameter measured.

Trees on Slopes



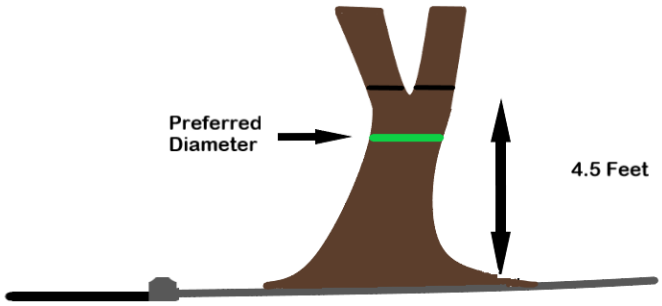
When measuring trees on slopes, measure the diameter 4.5 ft from the ground on the upper side of the slope. This method is commonly used, easier, and less subject to error than other options.

Trees with Lean



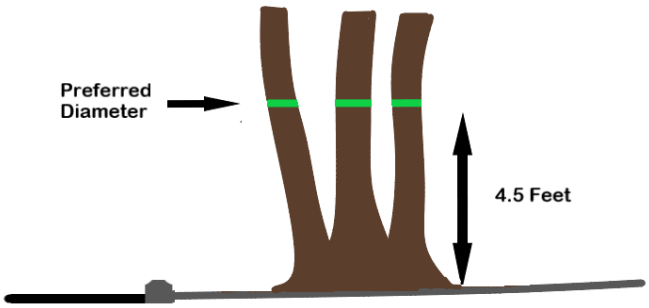
Trees that are leaning should be measured 4.5 ft up the stem in the direction of the lean.

Tree forks at or below DBH



Tree that forks below DBH or near DBH. The measurement is recorded at the narrowest part of the main stem below the fork. The height of the DBH measurement and the fork should be noted (e.g., 3 ft diameter @ 2 ft [Forks @ 4 ft]).

Multi-stems 6" or higher above ground level



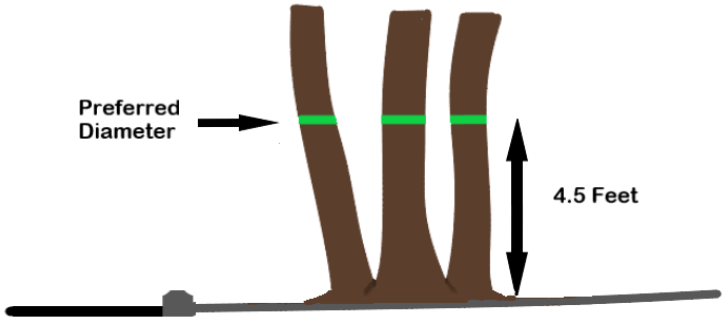
For trees that split into several trunks higher than 6" above ground level there are three acceptable methods to determine DBH. Whichever method is used should be detailed in the Scope of Work.

Method 1- Measure the DBH of each trunk. The DBH for the tree is found by taking the square root of the sum of all squared stem DBHs rounding to the nearest whole number. Example: You have three stems that measure 5", 6" and 8" so the DBH would be $\sqrt{(5^2+6^2+8^2)} = \sqrt{(25+36+64)} = \sqrt{125} = 11$". It should be noted in the comments that it is a multi-stem tree.

Method 2- Measure the DBH of each trunk and find the average number. (5+6+8)/ 3= 6". It should be noted in the comments that it is a multi-stem tree.

Method 3- Measure DBH of each trunk separately, using the principals shown above. Add the DBHs together for the total and list that number in the DBH column and list the individual DBHs in the "Comments." *This is the least preferred and has caused some confusion when the larger total DBH number is used for benefits calculations and analysis since these are not "large trees" like the number would indicate.*

Multi-stems within 6” of ground level



Trees that fork at or within 6” of grade are treated as multiple trees. This method is consistent with the USFS and FEMA. It should be noted in the comments that they are part of a cluster.