2018 Valley-wide Tree Measuring Protocol:

Upon arrival at the plot:

WITNESS TREE CHECK: Has its own data sheet. Each plot has two witness trees in the plot notes. Please make certain that these trees are still alive. If one or both are dead, then please designate the next closest live tagged tree to the center and record tree tag number, the distance and bearing from the plot center stake such that each plot maintains two live witness trees.

PLOT NOTE CHECK: Has its own data sheet. Past descriptions of the plot: Note any changes in canopy openings, disturbances, etc.

In the YELLOW NOTEBOOK:

SCANS: Upon arrival at the plot, all crew members should scan the plot area for at least 30 person minutes (10 minutes for 3 person crew / 6 minutes for 5 person crew, etc.) and avoid trampling of the following: **POOP:** Make a note of how many moose and deer poop piles, respectively, are seen in the plot area. **OAKS:** Make a note of any unmarked oak seedlings and mark with an orange numbered flag. **ORCHIDS:** Make a note of any unmarked orchids and mark with pink flag.

Make certain to note any of these items: *moved or missing plot markers*, *lost trees* (tags that could not be found), and *missed trees* in the original survey (i.e., untagged tree in the plot ≥ 14 cm dbh). In cases where the markers are moved or missing, we relocate the marker by the two witness trees. For "missed" trees it is very important to note how far they are from the center stake and any reason as to 'why' they might have been missed. Also, *make notes on trees snapped or uprooted*, especially in windstorm area. Note any instrumentation in or near the plot.

RECRUITS: All live trees that have grown into the 10 cm diameter class and have not been previously tagged need to be tagged and added to the database as "recruits". For all tagged trees, we record: dbh to the nearest 0.1 cm, species, vigor, and canopy class. Record the recruits in yellow notebook with other plot notes. **Make sure to confirm any plots without recruits in writing**.

SWEEPS: The understory tree composition of each plot is measured in a 2-m wide transect on the N-S diameter of the plot (25.24m centered at 12.62m). Tree saplings, 2 ≤ dbh <10 cm dbh, need **dbh** to 0.1cm, **species**, **Can (mainly S, sometimes I), Vigor**, and, if a beech: **BBD rating**.

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On the Main Tagged Tree sheets:

TAGGED TREES: All live trees ≥10 cm at breast height (1.37 m) were permanently tagged and measured for **SPECIES, CANOPY POSITION, VIGOR** and **DBH** during the original survey of 12.62m-radius plots. DBH (diameter at breast height; 1.37m) is measured to the nearest 0.1 cm. We use a DBH pole to keep height on the tree consistent and always position the DBH pole on the uphill side of the tree. **Data should be called out to the recorder in a consistent order**, eg.: "sugar maple, CODOM 1, 42.3, slight wound, measured above". And the recorder should repeat the data back as it is recorded. This avoids errors from hearing mistakes. Any changes in SPECIES, VIGOR or CANOPY POSITION should be checked by recorder and measurer for accuracy before recording and a note put about change in "tree notes".

VIGOR categories (ALL TREES):
1) alive and healthy;
2) alive but obvious signs of damage/decline;
3) alive but dying;
4) standing dead with most branches and main stem intact;
5) standing dead with most of its branches missing and/or >1/3 of its stem missing;
6) a downed* dead tree including any dead tree that is broken or detached below dbh.
** downed* = > 45 degrees from vertical. **All VIG 6 need to be designated: a) down with TAG; b) probable, no tag or c) not found (see below).**
For dead and downed trees we only record vigor. *The distinction between LIVE (0-3) and DEAD (4-6) is the most critical, any "resurrected" trees need a note.*

For all trees newly down (VIG6 – especially if not previously dead) or "lost" **use the following categories in tree notes**:
• **Down with the tag:** tag confirmed in association with tree
• **Probable tree**: tree in the right location, approximately the correct size and species
• **Not found**: we never found a probable tree after 15 person-minutes of dedicated searching (3 people searching for 5 minutes each or 1 person searching for 15 minutes)

BBD rating (for all beech trees) in BBD column:
0 = no signs of BBD, bark smooth
1 = BBD present, but does not affect DBH measurement; lower bole mostly uncankered
2 = BBD present:1-3 cankers affect DBH measurement
3 = BBD present: 3+ cankers distorts DBH measurement
4 = Cankers have coalesced and trunk is completely disfigured; usually with canopy dieback

For all BBD rating 2 and higher, we will also record canker detail. **S** = sunken in and **B** = bulging out.

C**anopy position classes**: *Note any trees influenced by gaps.*

Dominant (**D**): the top of the tree is above its neighbors + unobstructed light from above and >50% from the sides of its crown.

Codominant (**C**): crown extends into the canopy + some direct sunlight from top but <50% sunlight from the sides.

Intermediate (**I**): tree top reaches main forest canopy but light is largely blocked above.

Suppressed (**S**): crown below main canopy and no direct light (i.e., most sweep trees).

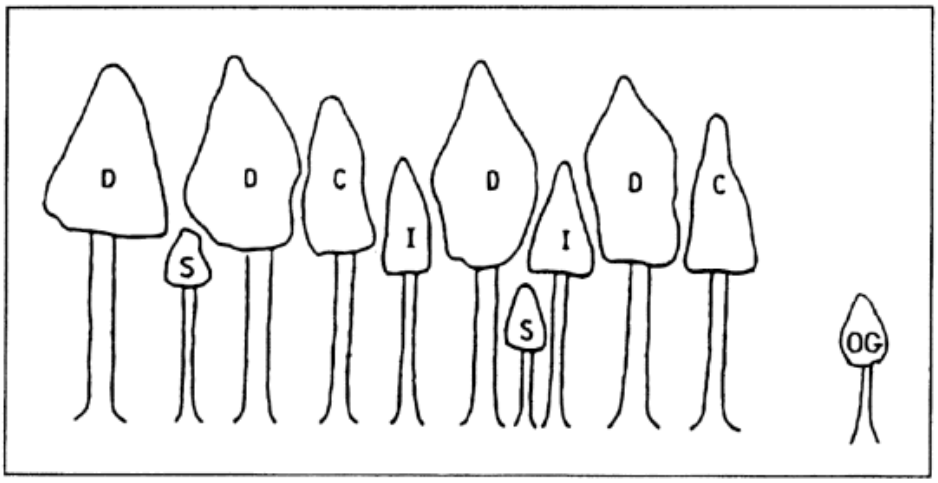
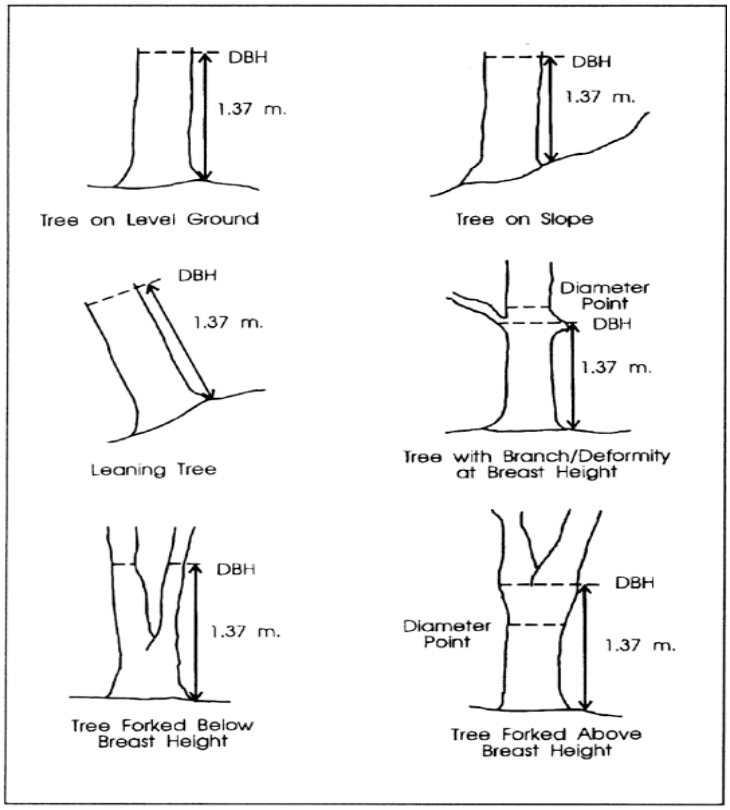


Figure 1—Crown Position Classes: D = dominant, C = co-dominant, I = intermediate, S = suppressed, OG = open in gap.

STRANGE TREES (see right): clumped, split, or wounded trees follow these rules: If more than one stem originated from the same root system, each stem ≥10-cm is measured separately and given a unique tag. Split trees are counted as two trees if split below breast height, but only as one tree if split above. Trees wounded at breast height are either measured directly above or below the wound, depending on which would give the most representative measure of the tree's volume. Note in the tree notes.



CHECKS: Data recorders should check changes in diameter growth > 3 cm increment or negative growth. The tree measurer should check the measurement and then asked to report any abnormalities (e.g., peeling bark, bulge in trunk). The second measurement is recorded along with any abnormalities in the stem that may influence dbh.

Carry out trash on ground when possible (flagging, bits of broken unused stuff, etc.).