

Uneven-Aged Management Project

UAMP

Field Sampling Protocol

August 2009

Field Sampling Protocols: Uneven-Aged Management Project (UAMP)

(Revision 8/23/2009 -Rost)

TABLE OF CONTENTS

<u>Subject</u>	<u>Page</u>
I. Introduction	2
II. Field Data Forms-Overview	3
III. Field Re-Measurement/Marking Protocol	4
Plot Layout—Diagram	5
IV. Special Rules/Procedures for Collecting Data	6
V. FORM DESCRIPTIONS	7
A. <u>FORM 1-Tree/Snag Data-General</u>	<u>7</u>
1. UAMP Codes List	8
2. Specific Code Explanations	9
3. FORM 1 EXPLANATION	12
Column #1-Tag #	12
Column #2-Tree/Snag Azimuth	14
Column #3-Species	14
<u>UAMP Code List-Trees</u>	<u>22</u>
Column #4-New Dbh	15
Column #5-Past Dbh	22
Column #6- Live Tree Height	22
Column #7- Crown Base Height	23
Column #6-Snag Decay Class	24
Column #8-Crown Class	25
Column #9-Snag Height/Snag Top	24
Column #10--Snag Decay Class (New Data)	30
Column #12-Species (Past Data)	31
Column #13-Snag Decay Class (Past Data)	31
Column #14-Azimuth (Past Data)	31
Column #15-Comments	31
B. <u>FORM 2,4, 5 General Explanation</u>	<u>32</u>
General-Transect Line Layout and Description	32
C. <u>FORM 2-MicroPlot % Cover Estimates</u>	<u>36</u>
Special Notes	36
Column #1-Species	36
Column #2-MicroPlot Cover Percent (%)	37
Column #3-Comments	38
Ground Surface Features	38
.2 x .5 Meter Frame Percentages	40
D. <u>FORM 3-Whole Plot Species List</u>	<u>40</u>

Column #1-Species	41
Column #2-Comments	41

TABLE OF CONTENTS (Continued)

<u>Subject</u>	<u>Page</u>
<u>E. FORM 4-Transect Line-Planar Intersect</u>	<u>41</u>
Special Notes	41
Column #1-Species	44
Column #2-Sequence #	44
Column #3-Start Point	44
Column #4-End Point	44
Column #5-Comments	44
<u>F. FORM 5-Seedling/Sapling Tally</u>	<u>45</u>
Column #1-Species	46
Column #2-Count/Total	46
Column #3-Comments	46
<u>G. FORM 6-Overstory Closure % Cover/Plot Narrative</u>	<u>46</u>
Special Notes	46
Column #1-#5-Percent Cover	47
Comments	47
Plot Narrative	47
Data Forms Checklist	47
UAMP Posted Tac Locations	48

APPENDIX--See Paper Copies in File Cabinet & Electronic Copies in USFS "O" Drive

Plot Diagram
 GPS Values-Each TAC/Plot
 TAC/Plot Requirements
 Transect Line Directions
 Height Measurement Techniques
 Plant Species List 8A
 UAMP Blank Forms
 UAMP Forms Filled Out-Examples
 Percent Cover Square
 UAMP Codes List
 DBH Examples
 Form Examples Filled Out

I. INTRODUCTION

The Uneven-Aged Management Project (UAMP) is a long term silviculture study on the HJ Andrews Experimental Forest. As a collaborative effort, implementation and data collection are performed by McKenzie River Ranger District personnel. The Pacific Northwest Research Station provides study oversight, data analysis and reporting. Paul Anderson is the Principal Investigator.

The objective of UAMP is to evaluate different silvicultural approaches to converting young, even-aged Douglas-fir plantations to a more complex, uneven-aged condition, and to assess the effects of alternative conversion regimes on tree growth and stand development, understory vegetation, down wood, and snags.

UAMP was implemented by the Willamette NF as the THIN WITHIN sale. Monitoring of vegetation and site responses consists of data collection from permanent plots at 2 to 5 year intervals.

The study consists of 16 treatment units – stands ranging in size from 7 to 11 ha – within the H.J. Andrews Experimental Forest. Each unit is has assigned one of four alternative thinning regimes – unthinned (Control), light thin with patch openings (GAP), light thin (Light) or heavy thin (Heavy),. The stands are to be managed under these alternative regimes over several harvest cycles as the experiment evaluates alternative thinning regimes to convert uniform, even-aged stands, to structurally heterogeneous uneven-aged structure.

Each thinning unit is labeled as a TAC= Treatment Activity Code. TAC's are classified by 4 experimental treatments: Control, Gap, Heavy and Light.

TAC 1-Control	TAC 9-Control
TAC 2-Gap	TAC 10-Gap
TAC 3-Heavy	TAC 11-Heavy
TAC 4-Light	TAC 12-Light
TAC 5-Control	TAC 13-Control
TAC 6-Gap	TAC 14-Gap
TAC 7-Heavy	TAC 15-Heavy
TAC 8-Light	TAC 16-Light

II. FIELD DATA FORMS-OVERVIEW

Data collection is organized by Form; each Form corresponds to a specific suite of measured vegetation or site attributes.

The UAMP Field Data Forms are:

- Form 1 - Tree and Snag Data
- Form 2 – MicroPlot % Cover Estimate (Vegetation and Ground Surface Features)
- Form 3 – Whole Plot Species
- Form 4 – Transect Line Intercept (Tall Shrubs and Trees <5cm Dbh)
- Form 5 – Seedling and Sapling Tally
- Form 6 – Overstory Closure (%) Cover Estimates and Plot Narrative/Edit Checklist

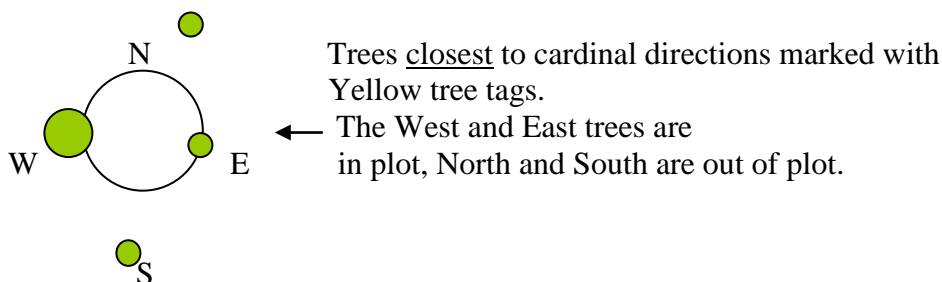
III. FIELD RE-MEASUREMENT PROTOCOL

Project Area and Plot Location Maps- See APPENDIX “Study Maps” in “O” drive.

SAMPLE PLOT LAYOUT – 0.1-ha Sample Plot

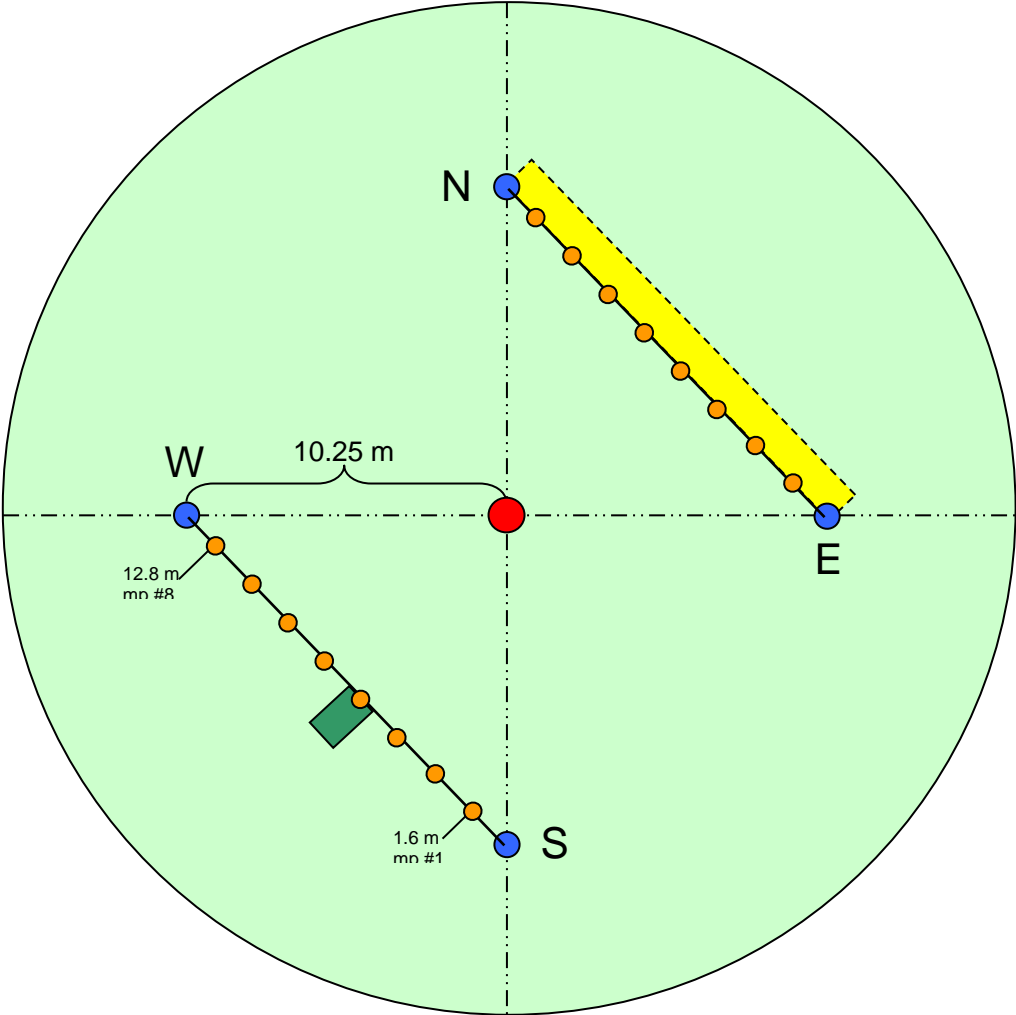
- Plot Size: 17.84 meter radius; 0.10 ha circular plot
- Plot Perimeter Delineation-Yellow paint on trees at plot-circle boundary. Two yellow plastic Square Tags are affixed to trees (facing toward and away from plot center) at cardinal directions N, S, E, and W from plot center. Distance to boundary tree from Plot center is labeled on each tag. (Some yellow tagged boundary trees are “in”, some are “out” of the plot).

EXAMPLE:



- Plot center and transect start/end points are monumented with 3/8” rebar, topped with orange or yellow survey caps. TAC/Plot # should be written on each survey cap. Plot center and transect start/end points should also be flagged with orange and blue ribbon, and also marked with 3/8” x 4’ white fiberglass rods. TAC/Plot # is written on each stake w/ permanent pen (Preferably TerraTech stock # GFS-3615). The 4.8 and 9.6 meter point on each transect are also marked with a fiberglass stake. Each plot also has a metal “racetrack” tag pinned on plot center with TAC and Plot # etched on the surface.
- Transect start/end points are located 10.25 meters (horizontal distance) from plot center in each of the 4 cardinal directions (N, S, E, W). See Plot diagram, Page 5.
- Transect-line Azimuth Directions (for Forms 2, 4, 5) ALWAYS run compass-clockwise from start to end points. (N →E, E →S, S →W, W →N). Each TAC/Plot has a specific, set direction for collecting data on these transects. See APPENDIX “Transect Line Directions in “O” drive for chart showing directions for each plot.
- **RECOMMENDATION:** Copy transect direction table as a tatum aid for field use.
- **Rebar Replacement-** To replace missing/damaged rebar points, plot center rebar must be re-located. Any one of the 5 rebar points established and still present will aid in re-establishing missing rebar points. Distance from plot center rebar to any of the 4 cardinal direction rebar points is 10.25 m horizontal distance. See plot diagram, Pp 5.
- **NOTE:** “Freshen Up” all orange and blue flagging and white fiberglass rod markers each measurement visit to ease future plot re-location. Re-label all yellow/orange plastic rebar caps with TAC and Plot #, as well as re-label the white fiberglass rods. Replace/repair/re-label yellow tree boundary marker tags if missing/damaged.

FIGURE: 1
Sample Plot Layout



- Plot center
- Cardinal points
- Transect sample
- Transect
- 0.5 m x 0.2 m Micro-
- ▨ 14.5 m x 1.5 m Strip-

○ 17.8 m radius

NOTE: Micro Plot and Strip Plot on BOTH transects: NE/SW & WN/ES

IV. SPECIAL RULES/PROCEDURES FOR COLLECTING DATA

- It is **imperative** that transect line data collected for the MicroPlot (%) Cover Estimates, Transect Line Planar Intercept, and Seedling/Sapling Tally (Forms 2, 4 and 5) be collected first, to avoid altering or destroying the herb, shrub, and/or seedling layer by trampling the area. Remember to walk on the plot-center side of the transect line while laying out the metric tapes for each transect.
- Tree/Snag data must be collected in a compass-clockwise direction, starting at North (0/360 degrees) from plot center. NOTE: distance from plot center to trees andsnags is not measured or recorded, as of 2009, unless it is uncertain that the stem lies inside the plot.
- All measurements shall be measured and recorded in metric units to the first or second decimal point, depending on FORM and data type.
- Fill in all appropriate alpha and numeric codes required for each column tally. Codes indicating required character and decimal placement are shown at the top of each data field column: (A)=alpha, (XX.x)=numeric. This convention also shows the required number of digits/decimal places for each field. EXAMPLE: (XX.x)=38.5, (AAAA#)=MANE2.
- If a field is blank, leave blank. EXAMPLE: Do not line out (--), color in, or place an “NA”, “X”, etc in the blank data field.
- All alpha codes are CAPITALIZED. EXAMPLE: TSHE, RHMA3, etc.
- All numeric codes with a decimal must have a period, followed by a number or a 0. EXAMPLE: 37.2 or 15.0
- All Numeric codes with a value <10 must have a leading zero if the header placement asks for it. EXAMPLE: (XX.x) = 06.5 NOT 6.5!
- Each data form header must be filled out COMPLETELY and ACCURATELY.
- Each form has a Page number field, independent of all other forms, followed by a total number of Pages for that Form. EXAMPLE: Page 01 of 01, or 02 of 03, etc.
- Each form header denotes a recorder and measurer. Use the four letter acronym for each carbon-based, data gathering humanoid unit, patterned after the plant naming convention. First two letters of first name, first two letters of the last name. EXAMPLE: SMBE=Smokey Bear, WOOW=Woodsy Owl.
- FIRMLY press recorded data/information onto Page with a 0.7 or 0.9 mm pencil.
- WRITE LEGIBLY!!!! Forms will be photocopied at the end of the field season.

- DO NOT write on the bottom of the Page or outside the data field column/line/boxes. Start another page and number accordingly. (02 of 02, etc).
- Edit all data IN FIELD, BEFORE PULLING TRANSECT TAPES. Ensure that all data forms are completely filled; check for proper TAC and Plot identification and for completeness, consistency, accuracy, and legibility of recorded information. Editing of forms prior to removing tape-lines will save much transect re-establishment effort should errors be discovered in editing.
- Ideally, the editor for each Form should be a crew member other than the data recorder.

V. FORM DESCRIPTIONS

A. FORM 1- Tree and Snag Data - General

NOTE: There are 2 different versions of FORM 1. Starting in 2010, we will use the full FORM 1 once again. Before starting field re-measurement work, contact the Principal Investigator (currently Paul Anderson, 541-758-7786), and have previous year's data copied onto a FORM 1 for field use. These forms are created on an EXCEL spreadsheet, found in the Project Records (O drive.) for this project. Having this historic data will allow field crews to assess the consistency or accuracy of the data they collect.

Use code system as outlined on page 8 to explain tree/snag condition or status. Many examples of these codes and their proper use are explained in the following text. **RECOMMENDATION:** Make a laminated tatum aid comprised of tree/snag codes, plant codes, and % cover example squares to carry in tatum for field work.

1. UAMP Codes List

The following is the complete list of UAMP codes to use for coding trees/snags, etc.

NOTE: the “OBSERVED CODES” are used only in Column-4, “NEW DBH”, to describe tree/snag conditions.” NOT in COMMENTS.

The EXPLANATION CODES are used only in Column 15-“COMMENTS” to further describe tree/snag condition.

PLEASE KEEP CODES IN CORRECT LOCATION.

Observed Codes (Column 3-“NEW Dbh”)

Each tree should have one of these codes

<u>DBH CODE</u>	<u>DEFINITION</u>
XX.x	Actual Dbh measured – all live trees, all snags
TNF	Live tree, not found.
X	Previously Dead stem < 10 cm, still standing DROP the use of X as a code. DD Dead Down. See a tag, know-Dead Down
DS	Dead Standing. <10cm. Was live, now dead
XNF	Snag not found. Was a snag-Cannot find tree
OP	Outside Plot. Check distance. (Note “Distance Confirmed” if measured. “Dist .Not Conf.” if not measured)
NF	Not Found. Tree not found. Inadequate data history to make sense of situation.

Explanation Codes: See Next Page

Explanation Codes (Column 15-“COMMENTS”)

(Used to explain Observed codes, page previous. Use more than once code if necessary.)

<u>COMMENT</u>	<u>DEFINITION</u>
<u>CODE</u>	
NA	Presumed DD or cut. (Tree not found/not enough info-assess situation)
TNM	New Live Tree-Previously missed. Record #, AZ, Dbh, crown class.
TNI	New Live Tree-In-growth. Was too small, now >5 cm Dbh. Record #, Az. Dbh, CC.
XNM	New Snag-Previously missed(was a snag before). Record Az, #, Dbh, Ht., top, Dcl.
XND	New Snag-Recently dead (green last entry-now a snag) Record Dbh, Ht, top, Dcl.
TR	Tag Replaced-Lost or damaged, etc.
TC	Tag Confirmed- # or presence confirmed (2 trees-same tag #)
PC	“OP” Distance Confirmed-Tree within/outside plot (Note-distance)
LC	Live Confirmed-Previous tally=dead, now alive (“Miracle Tree”) Record CC.
SC	Species Confirmed-Prior identification was wrong; Record correct species in Column 3.
AC	Azimuth Confirmed(circle value); If previously wrong or Missing put correct azimuth in Column 2.
DC	DBH Confirmed (circle value) Tree “shrank” or prior dbh was wrong. Put correct dbh in column 4
DM	DBH Measurement location corrected (dbh nail moved up/down)
LL	Live Leaner-Live tree > 45degree-vertical (<u>FIGURE 3</u> , Page 11)
LD	Live Down-Living but not self supporting (<u>FIGURE 3</u> , Page 11)

2. Specific Code Explanations:

“X”- Snag Previously. Still a Snag. – If tree was a snag during past entries into the stand, place an X in the “New Dbh” column-#3, to designate that tree was a snag previously. This can be confirmed by viewing prior year data, as well as indicated by a value of 1-5 in the previous year’s “Decay Class” (DCL), Column- #13 on FORM 1.

NOTE: Change for 2010. **ALL** snags shall have the following data recorded: **Dbh, Decay Class, Condition (I/B), to track changes over time.** If prior snag dbh was ≥ 10 cm measure it, even if currently < 10 cm dbh.

“AC”-Azimuth Confirmed -Occasionally check tree azimuths from plot center to center point of tree. If incorrect, circle past azimuth value in column 14, write correct azimuth in Column 2 “Tree/Snag Azimuth”, and code “AC” in COMMENTS column.

“DC”- DBH Confirmed -After measuring tree Dbh, compare the new measured Dbh value to previous year’s Dbh value, Column 5, checking to make sure tree has not “shrunk.”

If new Dbh is smaller, re-measure tree once more, and if second, re-measured value remains smaller... circle the Dbh value in NEW DBH:-Column 4, and code “DC” in COMMENTS.

“X” –Was a Snag, Still a Snag- We are measuring Dbh for ALL snags in 2010. Record snag Dbh in Column 4 “New Dbh”. Record snag condition (broken or intact) in Column 10 and decay class in Column 11.

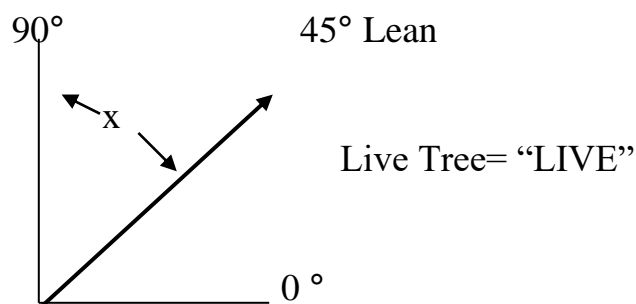
“XND”- New Snag, Recently Dead. You will occasionally find “new” snags. Either a dead tree missed in the last entry or a green tree that has died since the last field visit. Look at the past codes as well as the tree condition, to determine the facts of the situation. **IF:** the tree was obviously alive in the last entry of data gathering, and is now dead, (no past data entry code of decay Class (DCL), and presence of a live tree Dbh value, AND/OR in-field viewing of the tree suggests recent mortality)-the tree is measured for DBH, and the value placed in NEW DBH-Column 4. Place a code XND (New Snag-Recent Dead) in COMMENTS-Column 15.

“XNM”- New Snag, Previously Missed **IF:** the tree was obviously dead in the last entry, but was missed by the last entry of data gathering, tally the Dbh in Column 4, and code XNM in COMMENTS-Column 15.

LIVE TREE: a live tree, is a self-supporting tree, **5cm Dbh or greater**, with any green foliage.

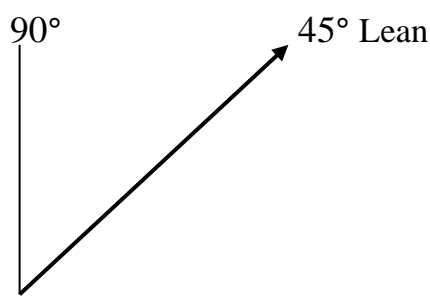
To be self supporting, the tree must **NOT** have a lean greater than 45 degrees (X) from vertical. See Figure 2 below.

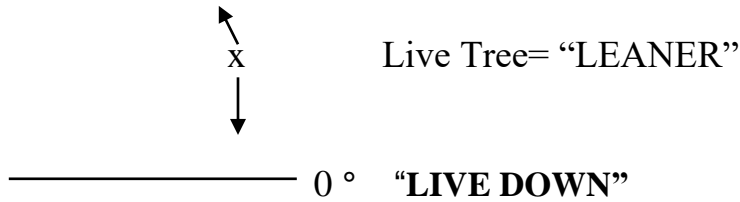
FIGURE 2:



LEANER: Live green trees that are self supporting, but leaning between 45 degrees from vertical and horizontal on the ground, shall be coded as a “LEANER” in COMMENTS, Column 15. No new height measurements shall be recorded. See Figure 3 below.

FIGURE 3:





LIVE DOWN: Any tree that is alive, is not self supporting, and is lying on the ground, is a Live Down Tree. Tree is at 0 degree point in above Figure 3. Write "LIVE DOWN" in Comments column-15.

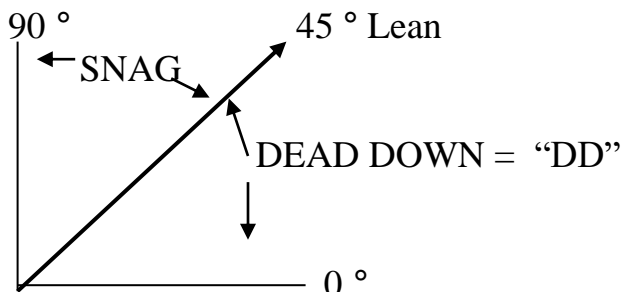
SNAG: A snag is a dead tree with a **Dbh of 10 cm or greater**, is self supporting, and completely free of any green foliage, and is NOT leaning greater than 45 degrees from vertical.

NOTE: As of 2010, Snag diameters, decay class, and condition (intact or broken) should be recorded for all snags in 2010, to capture change from start of study. Record snag information for those snags that may have decreased in diameter below the 10 cm threshold.

NOTE: Snag height MINIMUM is 2.0 meters tall.

A snag leaning greater than 45 degrees from vertical, whether self supporting or not, will be considered DEAD and DOWN. Code DD in the "NEW DBH" Column-4. Dead trees on the ground with a tag are coded as DD as well.

FIGURE 4: SNAG



3. FORM # 1 EXPLANTATION

Column # 1-Tag Number

- Record all trees/snags in compass-clockwise direction.
- Ideally, all trees and snags should be in sequential order-tallied clockwise, starting at North from plot center. In reality, many trees will be out of azimuth order.
- If a tree number tag is missing, or a new tree 5cm Dbh or greater has grown in, a new tree tag must be created:
 1. IF the number tag is missing, but the tree is obviously a previously recorded tree...attempt to discern the correct tree number from the tree data form, utilizing azimuth, species, etc. If you are able to determine correct tree number from previous years' data, etch the original number on a blank aluminum "racetrack" tag, utilizing a ball point pen, or the carbide tipped etching tool-now fondly known as the "Mr.Scratchee".
 2. IF you cannot discern the previously assigned tree number, or the tree is a new tally due to in-growth (TNI) or a previously missed tree (live-TNM, snag-XND, XNM), assign a new tree tag number that is unique to the plot. Choose a number well outside the range of numbers utilized on the plot. EXAMPLE: if the plot tree numbers are between 100-300, choose a tag number 400 or above to assign to new trees. Verify that duplicate numbers are not assigned.
- Place all "new" trees on a separate Form 1 sheet, as detailed in APPENDIX in "O" drive, under UAMP DATA FORMS. Record Tag #, Azimuth, Species, Dbh, Live Tree Height, Crown Base Height, Crown Class, and pertinent comments. Distance to new trees is NOT recorded as of 2010.

- String all new aluminum “racetrack” tags on plastic cable ties (“rat tails”), and attach to the bole of a live tree (snags-use a nail only) with an aluminum nail, inserted through the “ladders” of the tie at the tapered end. Place the **nail**, not the tag, at the Dbh height (1.37 meters) of the tree. Firmly affix nail, but leave approximately 1/4” of nail exposed. NOTE: Use the SMALLER (.10 inch diameter, 2.5 inch long aluminum) nails for rat tails. Larger nails will tear out the holes in the rat tails.
- Place tag on tree facing plot center-if the slope is not too steep. If too steep, place tag on uphill side of tree.
- NOTE: When placing tag facing plot center, and plot center is downhill from tree- MEASURE DBH HEIGHT ON BOLE (trunk) OF TREE FROM THE GROUND ON THE UPHILL SIDE OF THE TREE. Not 1.37 meters from the downhill side of the tree. The nail will appear to be too far above Dbh when viewed from below the tree, but will be at the correct, true Dbh location.
- For examples of Dbh location and rat tail/tag configuration, see FIGURE 5 and 6 below..

FIGURE 5:

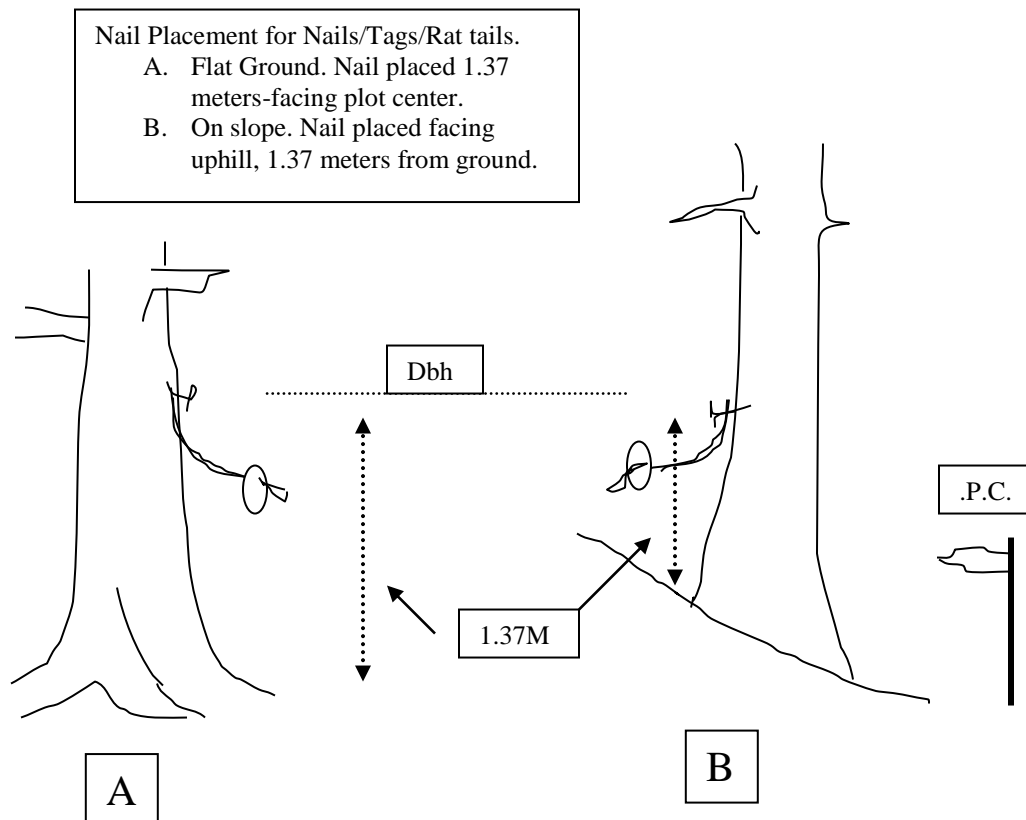
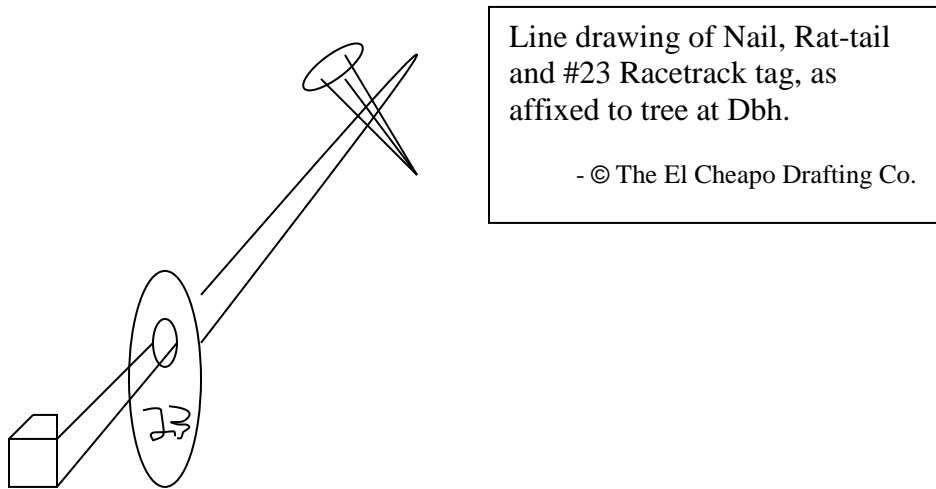


FIGURE 6:



Line drawing of Nail, Rat-tail
and #23 Racetrack tag, as
affixed to tree at Dbh.

- © The El Cheapo Drafting Co.

Column #2-Tree/Snag Azimuth

- Record appropriate numeric code for azimuth (XXX). **RECORD AZIMUTH FOR ALL “NEW” TREES/SNAGS -OR ESTABLISHED TREES/SNAGS MISSING AZIMUTH VALUE.** NOTE: There should be an azimuth for every tree on the plot. Spot check every few trees to make sure the azimuth is correct. If azimuth is incorrect, circle the incorrect azimuth value in Column 2, place a code: “AC” (azimuth confirmed) in “COMMENTS” Column-15, and write the correct azimuth in “COMMENTS” column in the form. **EXAMPLE:** 275 °.
- To measure azimuth: hold compass vertically over plot center, and read Azimuth from plot center to the center of the bole of the tree in question. (Where tree is rooted.) Start at North from plot center, and record trees in clockwise direction, staying in azimuth order. Distance to tree/snag is NOT recorded at this time.

Column #3-Species

Identify the species and record appropriate alpha code (AAAA#) for each tree. The four letter acronym is written in CAPS, representing the first letters of the Genus and species. Codes assigned in prior observation will be on the data form; check prior identification for accuracy and correct as described in text above.

EXAMPLE: *Pseudotsuga menziesii* (Douglas Fir) is written as PSME. **Change as above**

Column #4-New Dbh

This is the new, measured Dbh for this data-entry season.

Record appropriate numeric code (XX.x) in cm.

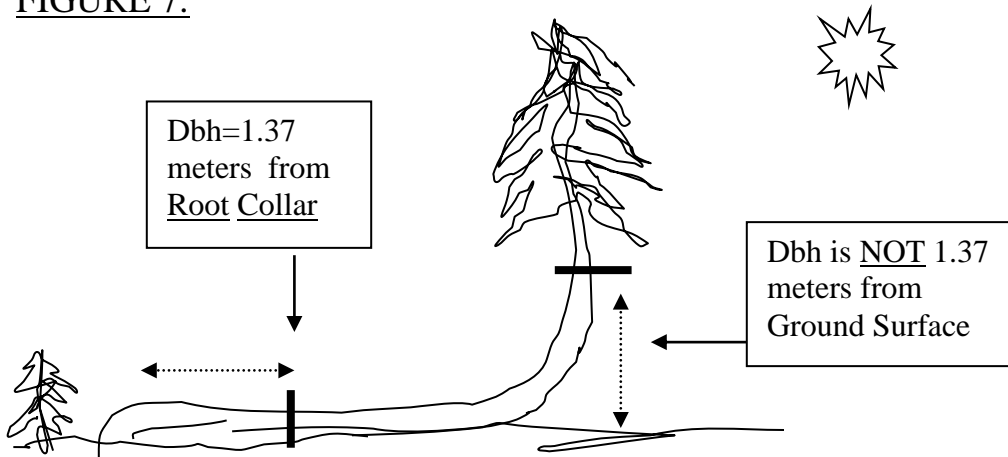
Measuring Dbh:

- Diameter breast height (Dbh) is defined as the diameter of the tree/snag bole at 1.37 meters above ground level on the uphill side of the tree/snag. Measure Dbh at existing nail entry point. **NOTE:** if nail is “off” the Dbh point by a considerable amount, move nail to appropriate location, and code DM in comment line for that tree/snag. (DM= “Dbh measurement location corrected (nail moved up/down).”)
- Make sure Dbh tape is straight and level.
- Record Dbh in centimeters to first decimal point. (+/- 1mm, or 1/10 cm).
- If current Dbh is inconsistent (smaller) than previous year’s measurement, circle new Dbh value on data sheet and write DC (“Dbh Confirmed”) in comments column for that tree.
- For diameter irregularities, see Diagrams below, pages 17-22.

NOTE: Change for 2010. Record Dbh for ALL snags and live trees. For Snags, also measure DECAY CLASS, and CONDITION (Intact or Broken), so snag data can be compared to past year’s data.

- Check each new FORM 1 printed from P.I. (containing the previous field entries of data) against previous year’s data in file cabinet. Make sure all trees with a code ‘DCL’ in the past have an ‘X’ in the Dbh column. Do not assume a snag with ‘DCL’ codes in past data has had all required data collected. When a snag has no ‘X’ in Dbh, and there is a ‘DCL’ code in past year’s data...CHECK PREVIOUS YEAR’S @XEROX’d DATA BEFORE GOING OUT TO COLLECT FIELD DATA-Check to see if Dbh, Height, and I/B were recorded in the past. Data may be missing! Collect Dbh, Height, I/B whenever missing on these past ‘DCL’ coded trees.
- If a previously recorded tree/snag cannot be found, place an NF in Dbh column for that tree.
- Live Down (LD) Trees: when a tree is lying on the ground, yet is still alive, record Dbh at the location marked by the nail/tag. If there is no tag or nail, locate the area on the tree bole that is 1.37 m from the Root Collar, and measure Dbh at this location. Cedars typically will grow along the ground, then push up into the canopy. See FIGURE_7 below.

FIGURE 7:

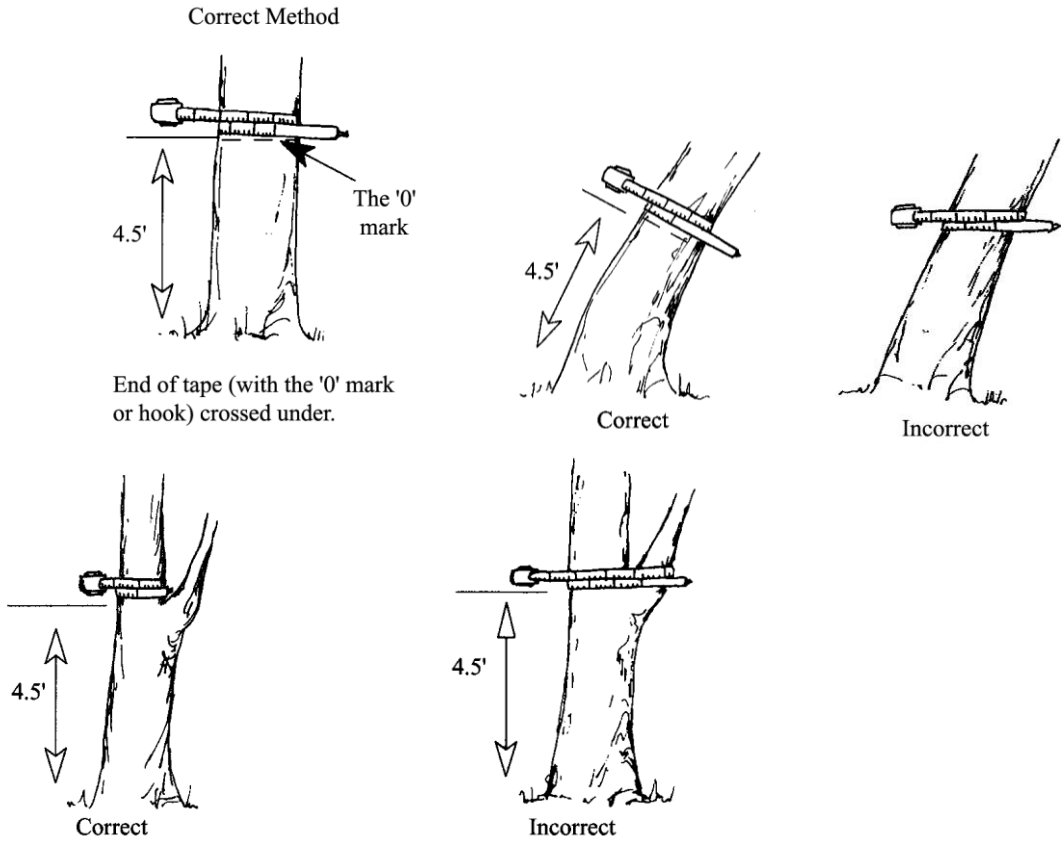


Where to measure Dbh for trees (particularly cedars) that have grown back up into the canopy, after falling to the ground.

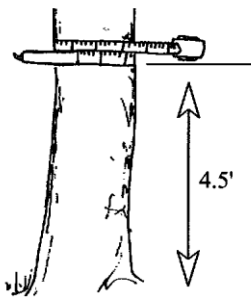
FIGURE 8:

Proper Use of a Diameter Tape and Dbh Ir-regularities.

Note: Diameter Breast Height shown in following diagrams as English=4.5 ft. The UAMP study utilizes metric measurements. Dbh=1.37 meters from ground surface. (1.37 M = 4.5 Ft.)



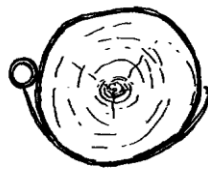
Optional method if left handed



Technique Not Recommended unless you have a bit of experience with Dbh tree measurement.

End of tape crossed under.
(Be careful - reading will be made from upside down d-tape marks.)

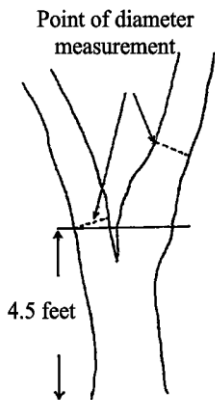
Press the tape firmly against the tree. Do not pull it out at a tangent to the tree at the point of measurement.



Correct

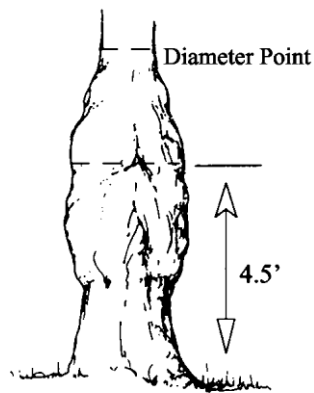


Incorrect

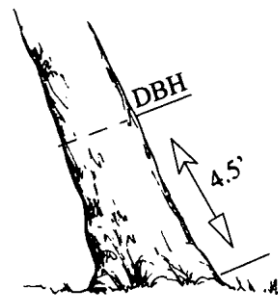


Measuring abnormal diameters on forked trees

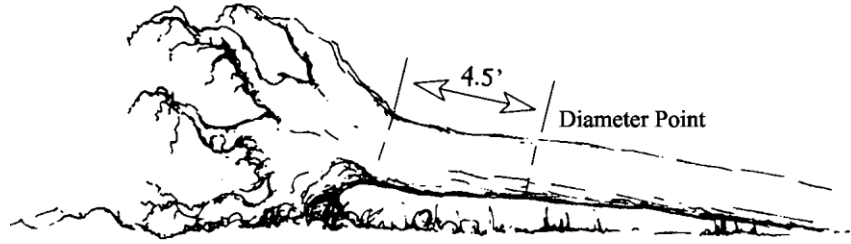
Diameter on abnormal fork



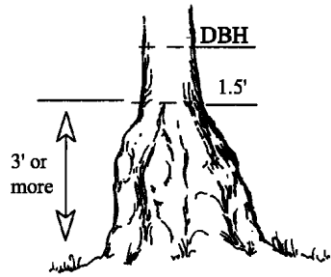
Tree deformed at DBH by swelling or crook. Take DBH above deformation.



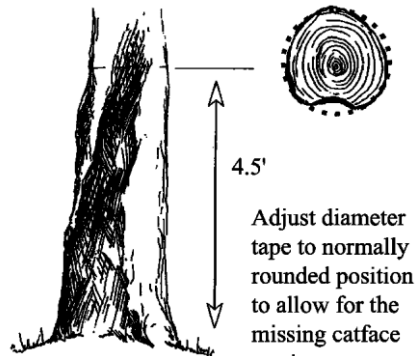
Leaning tree



Windthrown tree

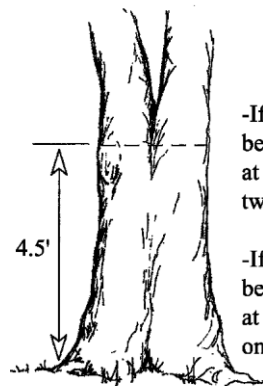


Bottleneck tree



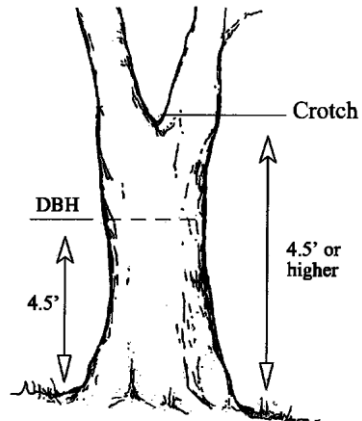
Tree with a catface

Adjust diameter tape to normally rounded position to allow for the missing catface portion

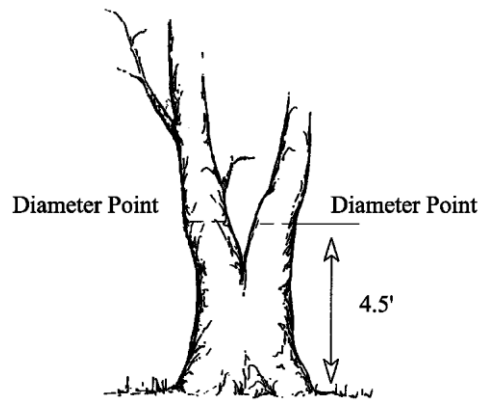


-If you can see light between the two stems, at DBH, measure as two separate trees.

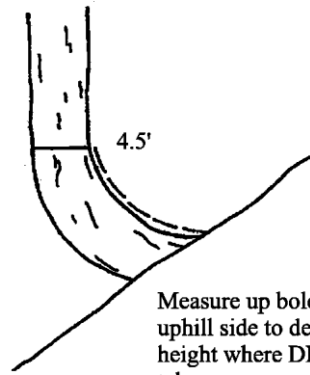
-If you cannot see light between the two stems, at DBH, measure as one tree.



Tree forked at 4.5 feet or higher. Record as one tree and consider only the main fork. Take DBH below the swell of the fork.

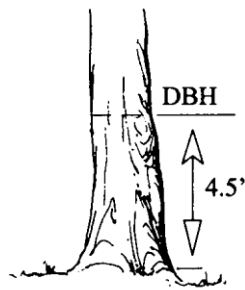


Tree forked below 4.5 feet.
Record each fork that is "in" as a separate tree. Measure diameter at 4.5 feet.

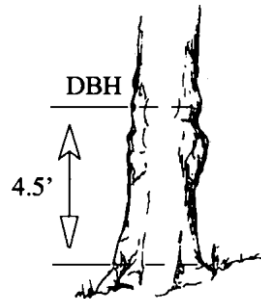


Measure up bole of tree on uphill side to determine height where DBH should be taken

Diameter on pistol butt tree

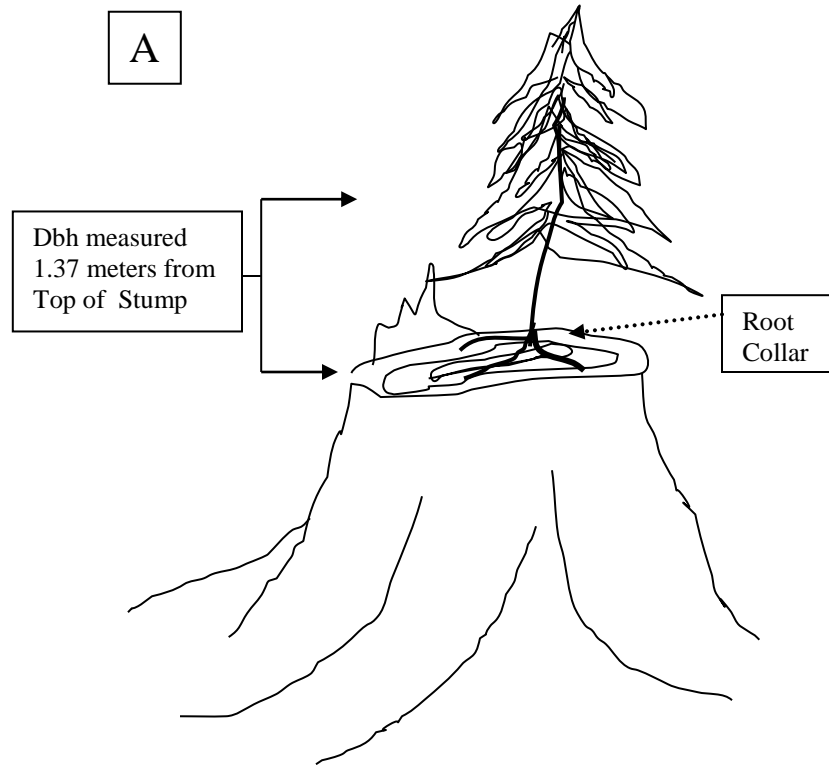


Tree on level ground

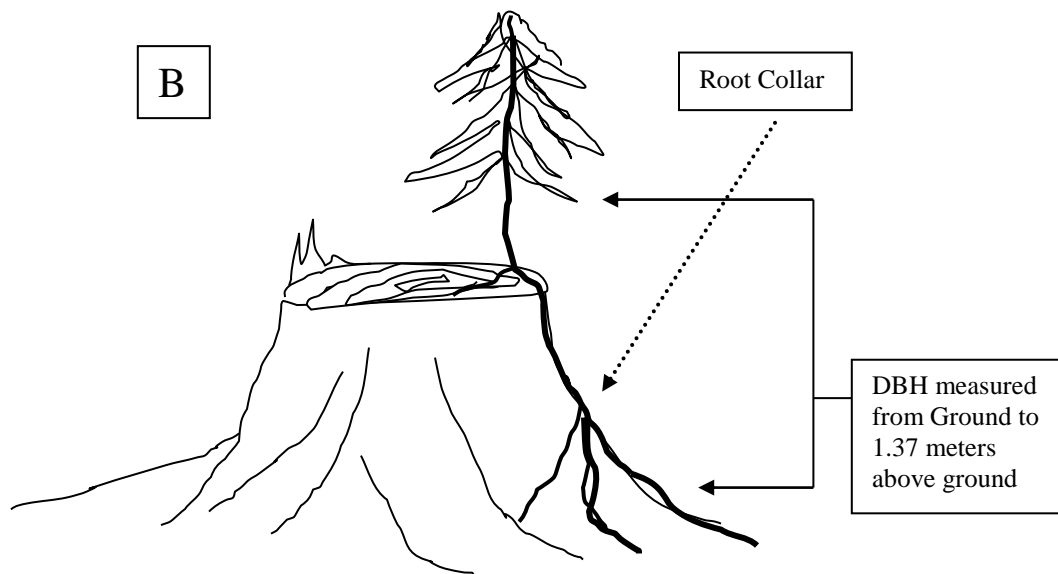


Tree on slope

FIGURE 9:



Measurement of Dbh when tree is rooted on top of a stump.



Measurement of Dbh when tree growing on stump is rooted to the ground.
(Note differing location of Root Collar)

As discussed previously, utilize the following codes and requisite information for trees/snags as appropriate:

UAMP Codes List

Observed Codes (Column 4-“NEW Dbh”)

Each tree should have one of these codes

<u>Code</u>	<u>Definition</u>
XX.x	Actual Dbh measured
TNF	Live tree, not found.
X	Snag previously. Still a snag.
DD	Dead Down. See a tag, know-Dead Down
DS	Dead Standing. <10cm. Was live, now dead
XNF	Snag not found. Was a snag-Cannot find tree
OP	Outside Plot. Check distance. (Note “Distance Confirmed” if measured. “Dist .Not Conf.” if not measured)
NF	Not Found. Tree not found. Inadequate data history to make sense of situation.

NOTE: DS=Dead Standing. The Dbh breakpoint for a live tree is 5.0 cm+. The Dbh breakpoint for a snag is 10 cm+. When a tree that was alive has died and is now a snag, it is now too small for the 10cm classification for snags. Code any tree 5.0 cm to 9.9 cm Dbh that was alive but is now dead, as DS = “Dead Standing”.

Column #5-Past Dbh

This is the previous data entry season’s Dbh measurement for each tree/snag, gathered during the last field season. Compare new value to this value, and correct as previously described, if incorrect.

Column #6-Live Tree Height

Starting in 2010, specific trees on each plot will be selected by the Principal Investigator (presently Paul Anderson, 541-758-7786) at the beginning of each season. Approximately 40 overstory Douglas Fir trees/TAC will be selected for height measurement, as well as a sampling of understory Hemlock trees/TAC. Record tree height for selected trees utilizing appropriate numeric code (XX.x m). Measure the tree from ground base (uphill side) to terminal leader (top tip of tree).

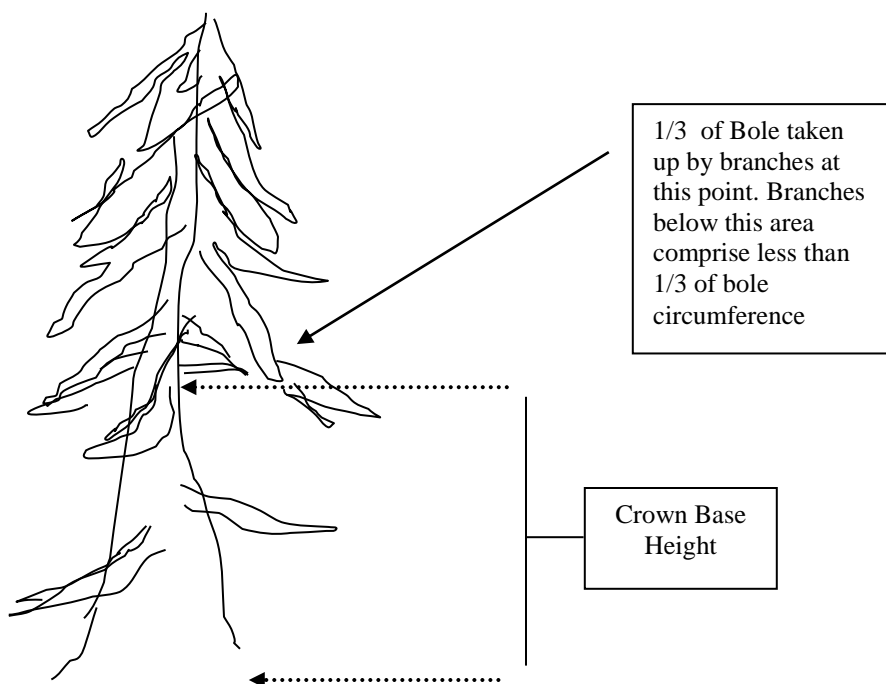
NOTE: It is preferable to use a Laser Rangefinder (Example: Lasertech 200) for accurate tree height measurements, as these devices correct for slope distance from tree. Other methods may be utilized, such as a clinometer and distance tape, though this method requires manual slope correction for distance from tree, if measurement taken on a slope > 5%. Slope correction tables are available in the APPENDIX in the “O” drive. If pre-selected height tree leans by more than 15% from vertical, has broken top, or has died, then do not measure. Can skip one tree per plot for these reasons. If a second tree (or more) also fails to meet condition criteria, then replace it with an unselected tree of the same species and 5-cm diameter class.

See **“Methods of Height Measurement for Trees and Snags”**, page 24-27, below for methodologies in measuring tree/snag height.

Column #7- Crown Base Height

Record appropriate numeric code (XX.x m) for crown base height. Measure crown base from ground (uphill side) to crown base. Crown base is defined as the lowest point of live green branches or limbs that comprise one-third or greater of the bole's circumference (as seen from above.) Measure at the point where the branches attach to bole, not the point where branches hang down. See FIGURE 10 below.

FIGURE 10:
Crown Base Height



Column #8-Crown Class

APPLIES TO NEW TREES ONLY and NOT TO PREVIOUSLY TALLIED TREES.

NOTE TO P.I.: Do we want to re-record Crown Class in 2010, to track changes over time? Stick with limiting this to new trees

Record appropriate Alpha (A) code for crown class in CAPS.

Codes: D=Dominant C=Co-Dominant I=Intermediate O=Overtopped.

- Dominant-Crown emerges from the general canopy layer and receives light from the top and all sides.
- Co-Dominant-Crown extends to the top of the general canopy layer and receives light from the top, but not as much from the sides.
- Intermediate-Crown extends into the lower portion of the general canopy layer and receives mostly filtered light from the top and sides.

Overtopped-Crown completely beneath the general canopy.

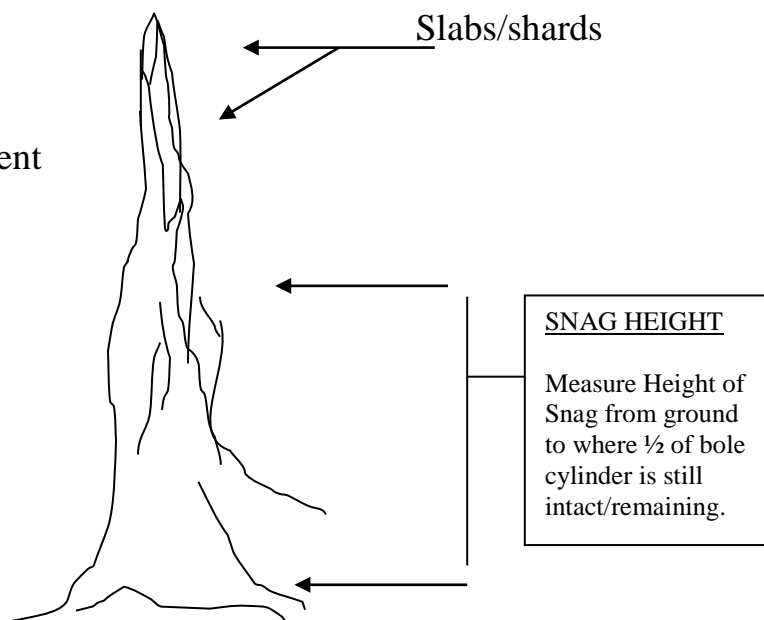
Column #9-Snag Height/Snag Top

APPLIES TO NEW SNAGS ONLY and or To SNAGS with Broken Tops Record appropriate numeric code (XX.x) in meters, for snag height. As discussed earlier, a SNAG is defined as any tree that is **10 cm or greater in Dbh**, is self-supporting, is completely free of any green foliage, and is NOT leaning greater than 45 degrees (°) from vertical. A snag that is leaning greater than 45 degrees from vertical, is considered Dead and Down (DD), and coded appropriately in the Dbh column for that snag. No actual Dbh is recorded.

- Snag height **minimum** is 2.0 meters.
- Record snag top condition with alpha code in CAPS: I=Intact, B=Broken.
- Measure total height of intact snag (I) from ground (uphill side) to existing top. For snags with broken tops (B), measure height from the ground (uphill side) to the portion of the snag that has at least ½ or greater of original bole diameter still present at the break point. Ie: slabs and splinters do not count in height measurement. See FIGURE 11 below.
- Measure snag height utilizing “**Methods of Height Measurement for Trees and Snags**”, page 25-28.

FIGURE 11:

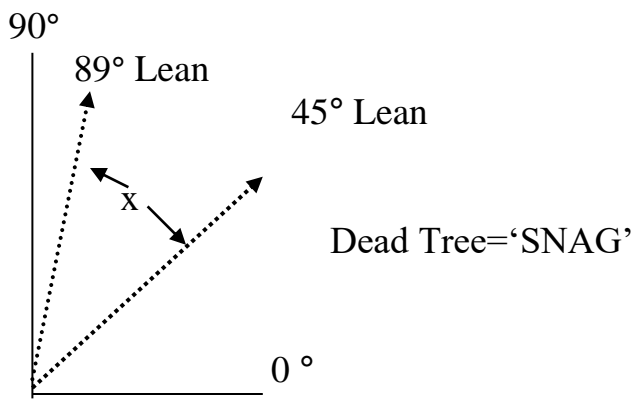
Broken Snag Height Measurement



Measuring a Leaning Snag Height

If a snag is leaning between 45 degrees and 89 degrees from the ground, as in FIGURE 11 below, measure height as described in “Methods of Height Measurement for Trees and Snags”, pages 27-28.

FIGURE 12: (←.....) = SNAG



Methods of Height Measurement for Trees and Snags

(Taken from Young Stand Thinning and Diversity Study, K. Puettmann)

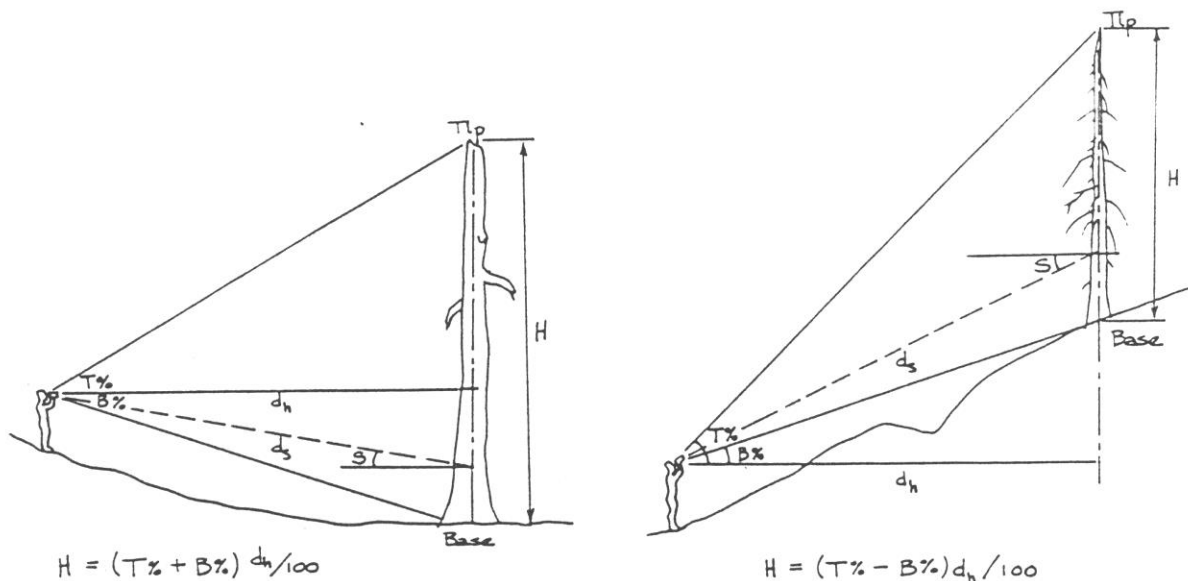
Topographic % Method

In this method, the sampler positions themselves at a known distance from the tree/snag to be measured, using logger's tape or EDM. This distance must be slope-corrected, as necessary.

Clinometer readings are made to the top and base of the tree/snag, using the % (right side) scale of the clinometer. If the eye-level of the sampler is between the top and base of the tree/snag, the readings of the top and base are added together; if the eye-level of the sampler is below the base of the tree/snag, the reading for the base is subtracted from the reading for the top (see illustration).

After addition or subtraction, the clinometer reading is multiplied by the distance between the sampler and the tree/snag, and that product is divided by 100, to obtain the height of the tree/snag (see illustration). If the combined clinometer reading is X %, then the height of the tree/snag is X% of the horizontal distance between the sampler and the tree/snag.

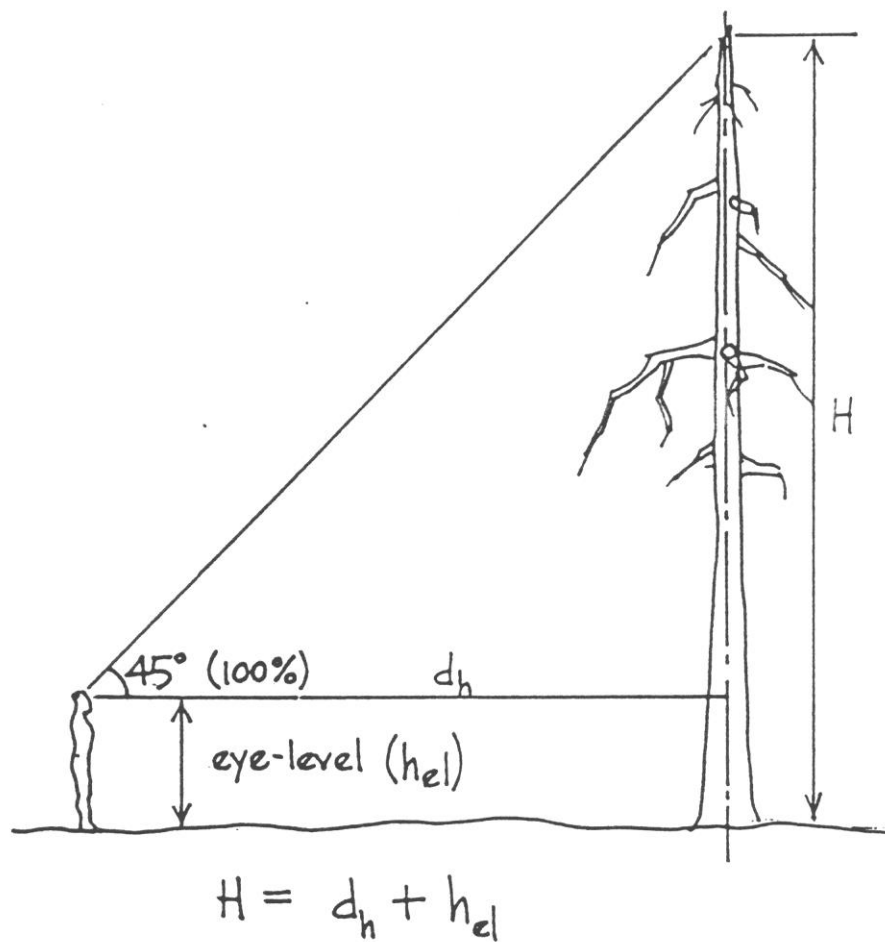
Note that the height of the tree/snag is in the same units used for the distance measurement (the % clinometer readings are unitless).



4S-Degree (100%) Method

In this method, the sampler positions themselves at a distance from the tree/snag to be measured so that the clinometer reading to the top is 45- (left-side scale) or 100% (right-side scale). It is necessary that the feet of the sampler be at the same level as the base of the tree/snag. On sloping terrain, this means that the sampler must go out side-hill from the tree/snag to be measured.

When the top clinometer reading of 45- is obtained, the distance from the sampler to the tree/snag equals the height of the tree/snag minus the height-to-eye-level of the sampler (see illustration). The sampler then adds their eye-level height to the distance figure to obtain the height of the tree/snag.



Cosine Method

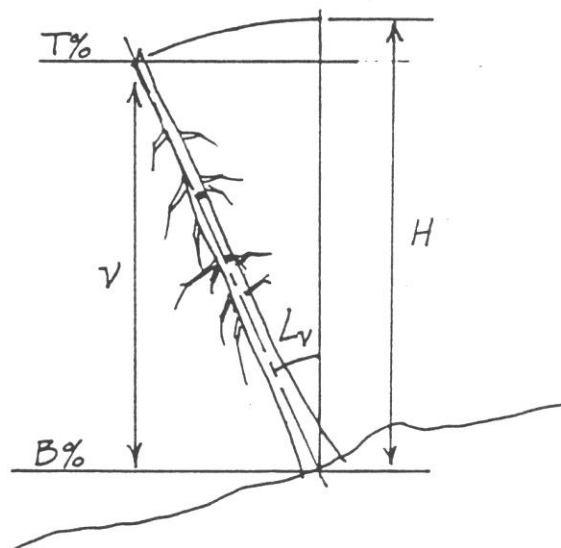
This method involves a slight modification of the topographic % method, in order to obtain the actual height of leaning trees or snags. Follow these steps:

- Determine the angle between the tree/snag and the *vertical* (L_v degrees).
- Moving away from the tree/snag, use the clinometer to sight to the base and tip, as usual. Multiply the difference between base and tip readings by the horizontal distance from the tree/snag and divide by 100, as usual. The resulting value will be referred to as v (see illustration).
- Enter v in the following formula:

$$H = v / \cos L_v$$

where, H = height of tree/snag
 v = vertical component of H (T% - B %)
 L_v = angle between tree/snag and the vertical

- Enter H in the data sheet, notate "1" under type2.



The cosine method is generally the preferred method due to its ease and simplicity. However, under some circumstances, the Isosceles method might be preferred. Examples of such cases might include:

- strongly leaning tree/snags ($L_v > 45, 50^\circ$).
- tree/snags leaning side-hill on steep slopes.

Isosceles Triangle Method

This method is used when the tree/snag is leaning significantly enough (?) that the methods described above cannot be applied.

Measure the lean of the snag in *degrees from the horizontal* (L_h).

Measure the ground slope (S) from the base of the snag to a point approximately under its tip. If ground slopes upward from the base of the snag to the tip, S is *positive*; if the ground slopes downward from the base of the snag to the tip, S is *negative* (see illustration).

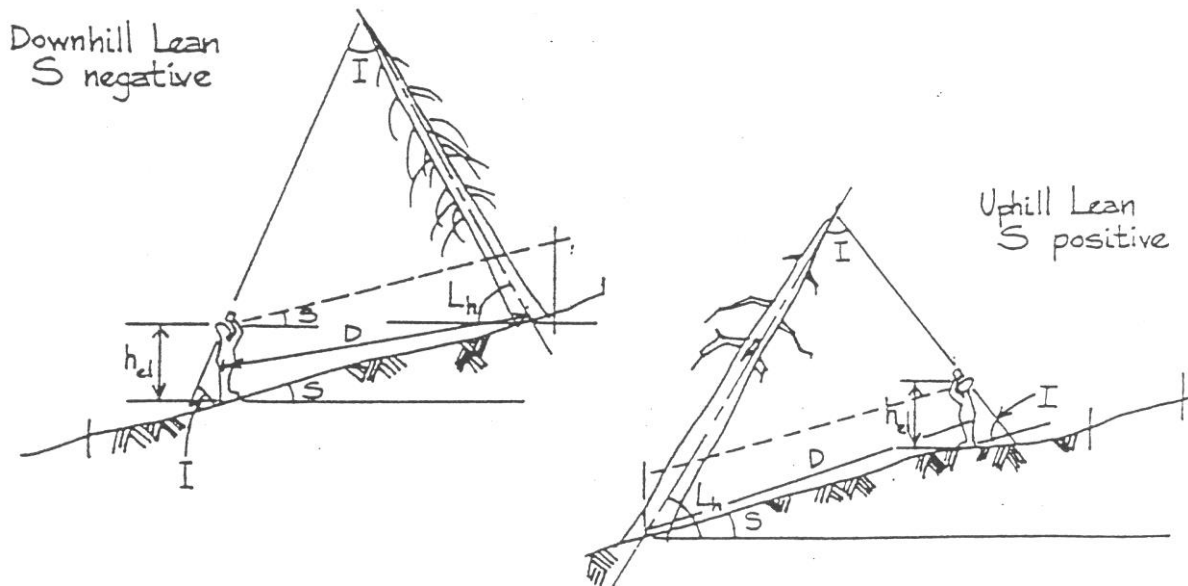
Calculate the value of $1/2(180 - L_h - S)$. This equals the Isosceles angle I .

Attach a logger's tape at the base of the tree! snag and walk out under the snag along its length.

The sampler positions themselves under the tree/snag at the point at which a clinometer reading to the top or end of the tree! snag equals the Isosceles angle r . This location is termed the - Isosceles position-.

The following data are recorded:

- The lean of the tree/snag from the horizontal (L_h , degrees).
- The ground slope from the base of the tree/snag to the Isosceles position (S , degrees).
- The distance from the base of the tree/snag to the Isosceles position (D , dm).
- The height to eye-level of the sampler (bet, dm).



Columns #10 Snag Decay Class (New Data)

New decay class for snags. This is a new assessment of snags' present decay class, based on/compared to data collected in years past. The year is identified at the top of the column. If a snag has a decay class code of 1-5 in column 13, the tree was a snag in past entries. Record new DECAY CLASS in column 10. ALSO: record a NEW DBH for the snag in column 4, and SNAG TOP (I/B) in column 9. **PAUL: ARE WE COLLECTING A NEW HEIGHT FOR SNAGS in 2010???** Yes for snags that have broken tops Check old data in files before going to field for completeness.

SNAG AND STUMP
DECAY CLASS CRITERIA

CATEGORY	1	2	3	4	5
COLOR	Original Color	Faded	Faded, gray, light to reddish brown	Reddish to dark brown	Reddish to dark brown
BARK	100% Present	Variable	Variable	Variable	< or = 20%
BRANCH SYSTEM	All Present	No fine branches, few limbs	Limb stubs only	Few or no stubs	None
*SAPWOOD CONDITION	Sound, hard, original color	Decay evident, fibrous, firm to soft	Soft, fibrous	Soft, cubicle. (MAY BE ENCASED IN HARDENED SHELL)	Gone
*HEARTWOOD CONDITION	Sound, hard, original color	Upper bole: incipient decay. Base: sound	Upper bole: advanced decay. Base: incipient decay, hard to firm	Base: advanced decay	Soft, sloughing (May be encased in hard shell)
*PROBE TEST	—	—	Sapwood: passes through. Heartwood: meets firm or hard core.	Sapwood: passes through easily. Heartwood: passes through	Passes through easily.

Adapted from: Cline et al., 1980. J. Wildl. Man. 44(4): 773-786, p. 780

* Represent "key" criteria; other categories represent only "accessory" criteria.

Column #12 –Species (Past Data)

Species recorded for live tree/snag in past data entry(s). Check if correct for live trees and snags. Record correct value in Column 3 if incorrect. ?? IN TO PAUL-ARE WE RE_RECORDING ALL SPECIES FOR EACH TREE IN COLUMN 3, or using some other convention (NA, --, NC (NO CHANGE) to save time.....if species hasn't changed. Record Species codes in column 3 for all trees. The observer needs to look and confirm species of every tree regardless and it is not really faster to record NC than PSME.

Columns #13-Snag Decay Class (Past Data)

Decay class for snags collected in years past. The year is identified at the top of the column. If a snag has a decay class code of 1-5, the tree was a snag in past entries. Record a new DECAY CLASS in Column 10, as well as DBH and SNAG TOP, as described above. Check old data in files before going to field for completeness.

Column #14 -Azimuth (Past Data)

Azimuth for trees/snags collected in years past. Spot check every 3rd tree or so...to determine if Azimuth is correct.

Column #15 –Comments

Record comments specific to column category and identify column (#). EXAMPLE: Problem is in Column 4-NEW DBH. Write: “C-4 :Dbh is on whorl, now measured at 1.47 m.” Also, the COMMENTS column is where the codes are placed to explain status/condition of trees, snags, etc. The codes are explained on pages 8 and 9.

V. FORM DESCRIPTIONS

B. FORM 2, 4 and 5--General Explanations

TRANSECT LINES: Layout and Description

Special Notes:

NOTE: The following information concerning transect line direction pertains to transects for FORM 2, 4 and 5.

- MicroPlot (%) Cover Estimates, Transect Line Planar Intercept and Seedling/Sapling Tally (forms 2, 4, 5) have a “TRANSECT__ __ __ __” field on the header.
- Make sure to fill out the CORRECT transect direction from the direction table found in APPENDIX in “O” drive under “UAMP Transect Line Directions”.
- Record the 2-alpha code letter in CAPS in appropriate field on the header. EXAMPLE: NE SW.
- Each plot has 2 separate transect lines, thus there are two Form 2, 3 and 5’s for each plot. DO NOT record both transect data-lines on one form.
- DO NOT Collect data for forms 2, 3 and 5 in one pass along the transect. Collect each Form Date separately! Otherwise, nasty errors are more than likely.
- DO collect data for Form 2 and 3 in a “0” to “14.5” direction. The form 5 (Seed/Sapling) CAN be done in reverse to assist in data collection, as it is a tally with no directionality required. (Helpful in steep/nasty terrain.)
- Each transect line has a pre-determined starting direction point: N-E, W-N, etc.
- The order of the letters identifies the transect line start point, and the direction to run each transect. EXAMPLE: SW-transect starts at the South rebar and runs to the West rebar.
- The same transect line start/stop direction will be used for the **Form 2-MicroPlot**, **Form 4-Line Intercept** and **Form 5-Seedling/Sapling Tally** sample on each plot. There are 2 transect line directions: (NE/SW or WN/ES)
- Transect line direction (NE/SW or WN/ES) has been pre-determined for each TAC and plot. The transects ALWAYS run in a compass-clockwise direction from start to end point, pivoting from plot center: (N→ E, E →S, S →W, W →N). See APPENDIX in “O” drive under UAMP TRANSECT DIRECTIONS for correct transect directions for each TAC/plot.
- Once you have discerned the correct transect direction for the plot, place the “zero” end of the metric reel-tape at the correct start-point rebar. For example, the NE transect portion of NE/SW would start at the North rebar, and end on the East rebar. The SW transect would start at the South rebar, and end on the West rebar. See plot FIGURE 13 below.
- The overall measured distance from beginning to end of each transect from rebar to rebar (when plots were originally laid out) is 14.50 meters horizontal distance. The reel tape is affixed to the beginning rebar, and then pulled to the ending rebar on a slope distance measure. Do Not Hold Tape Level. Let the tape follow slope, threading through vegetation, around rocks and stumps etc, as best you can, to keep tape as straight as possible in a “line of sight”. This means the ending point of 14.5 M on the tape may not end at the ending rebar. It may end short or long of the ending rebar.

-(CONTINUED)-

- Permanent (theoretically) Pin Flags were originally placed on each transect at 4.8 and 9.6 meters. (The Pin Flags were replaced with 4 foot white fiberglass poles in 2005 on most plots).
- If the tape must be “offset” around obstacles, the pin flags/fiberglass poles remain where they are, as a line of sight measurement.
- NOTE: Pin flags (old) and fiberglass poles (new) found in the field at 4.8 and 9.6 meters on transect lines, are used to align the tape in a horizontal direction--in relation to the rebar points and the straight, visual ‘line of sight’ line of the transect. Align the 4.8 and 9.6 meter point of the tape with the pin-flags/poles in a horizontal direction **ALONG** the tape. **The 4.8 and 9.6 meter mark on the metric tape must line up with the pin flag/fiberglass pole at the 4.8 and 9.6 point on the ground**, even if the tape is shifted to the point that the “0” and/or “14.5” ends of the tape do not line up with the appropriate start/ending rebar. This may mean the beginning (“0” pt.) or end (“14.5” pt.) of the tape may not be directly over the “0” or “14.5” rebar points-once the line is established. See FIGURE 13_below for an example.
- Keep the tape as close to the pin flags/fiberglass poles as possible in the reality of the non-cooperative, brushy forest...while maintaining the tape in a straight line-of-sight line. **DO NOT MOVE THE PIN FLAGS/FIBERGLASS POLES!!**
- If pin flags/poles HAVE fallen out of the ground, replace in exact location where they were originally placed. If original placement cannot be determined, re-measure line with tape, re-establish pin flag/pole location, and note in comments that they were re-established.

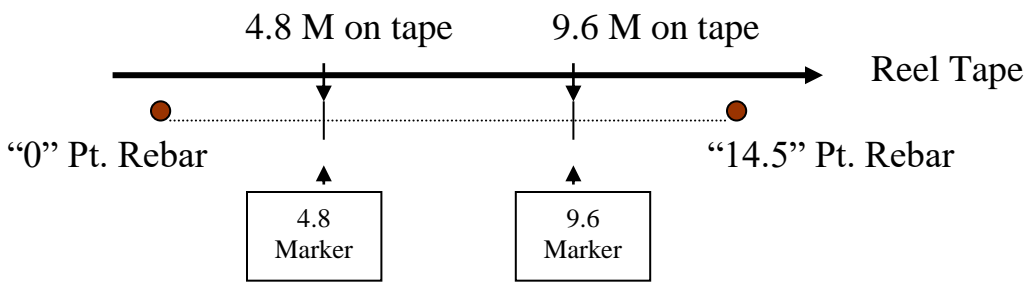
FIGURE 13:

SHIFTING TAPE ALONG TRANSECT LINE

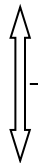
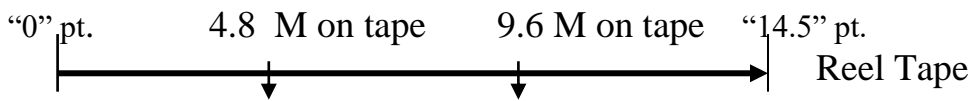
Shift tape in this direction (\leftrightarrow) to align with 4.8 and 9.6 pin-flags/poles on ground.

(..... Line represents imaginary “line of sight” line between rebar)

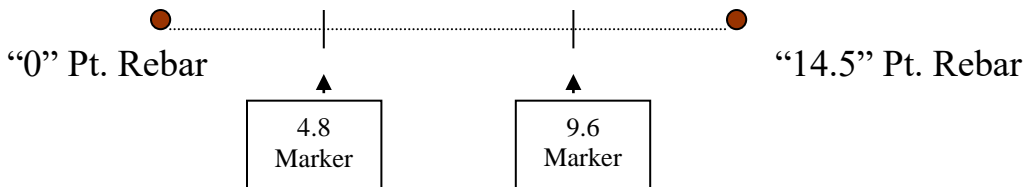
Move tape in this direction (\leftrightarrow) to align tape and poles.



NOTE:



The markers are NOT used to line up the tape in this direction, perpendicular to the rebar “line-of-sight” line

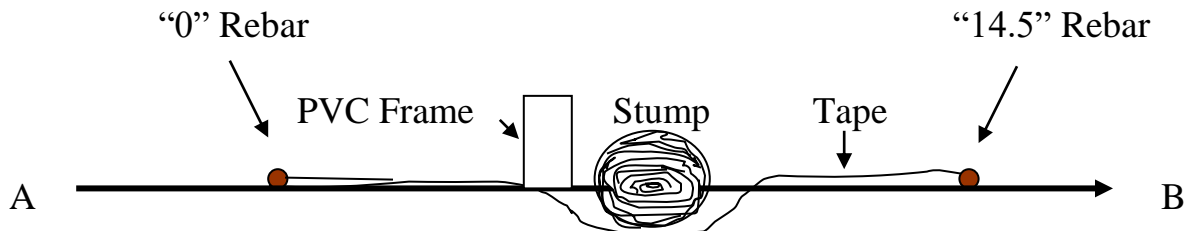


-(CONTINUED)-

- Keep measuring tape “taut” when possible, and position from start to end point (rebar to rebar) at the same distance above the ground, with as straight a “line-of-sight” between “0” and “14.5” rebars as possible.
- When the tape has to circumvent objects (trees, roots, logs, rocks, stumps, etc), offset the PVC frame as necessary to visually maintain a straight “line-of-sight” from transect start to end point (rebar to rebar). A straight “line-of-sight” from rebar to rebar shall ALWAYS be the actual line used for all measurements, regardless of tape line obstacles. In other words, if the tape deviates around a tree/rock/stump, etc, hold frame where tape WOULD BE, if keeping tape straight was possible on “line-of-sight”. (Frames come apart, to be re-assembled around trees, brush, etc.)

FIGURE 14:

(As viewed from above):



Tape deviating around obstacle. A to B is line of sight.
Hold PVC plot-frame at location where actual line of sight WOULD be.

V. FORM DESCRIPTIONS

C. FORM #2- MicroPlot (%) Cover Estimates

Special Notes:

- ALL MicroPlots face to the outside of the transect lines, away from plot center.
- DO NOT walk on the outside of the transect line, until all plotting is finished for each transect. You will trample plants, seedlings, etc.
- Eight (8) MicroPlots are sampled at 1.6 meter intervals, regardless of the length of the transect line. Points of measure are: 1.6, 3.2, 4.8, 6.4, 8.0, 9.6, 11.2, 12.8 meters. See Plot Diagram, Page 5.
- Start at MP #1 located at 1.6 meters and end at MP #8 located at 12.8 meters on the tape. (MP=MicroPlot). THERE ARE NO “0” or “14.5” MP points to record.
- MicroPlot intervals (1.6, 3.2, etc.) on metric reel tapes are marked with duct tape to facilitate measurement. Replenish with tape as needed.
- The device used for sampling the MicroPlot is a PVC frame with inside dimensions of 0.2m x 0.5meters.
- The short side of PVC frame is held at the tape line for measurement. The **center point** of the short side is marked with a black mark. Hold the black mark/center point at the appropriate meter-interval point on the tape for that MicroPlot. (1.6, 3.2, 4.8.....etc)
- Hold frame level above ground, at whatever varying heights are required to view vegetation above and below frame.

ASSUME THEN THAT HEIGHT OF MEASUREMNT DETERMINED BY OBSERVED STATURE OF LOW SHRUBS AND FORBS PRESENT - yep

Column #1-Species

Record appropriate alpha code (AAAA#) for Genus and species for each plant. Use the 4 letter acronym in all CAPS. EXAMPLE: Dwarf Oregon Grape is MANE2.

- Record **HERBS, FERNS and LOW SHRUBS, GRASS and BRYOPHYTES** in MicroPlots. At the very least, attempt to identify grasses into one of 3 categories whenever possible: GRASS, SEDGES and RUSHES. If possible, identify the type of grass to Genus and/or species. See Plant List for a listing of plant names, acronyms and category of plant type, in APPENDIX “O” drive, under “UAMP_Plant Species_LookupTable_FIELD COPY_MANIPULATED from original_NO LOOKUPS ENABLED.xls”. Also, for field use, utilize the copy of “PlantList for Missing Plants.xls” in APPENDIX, to facilitate ID of plants not on original list above.
- **NO TREES or TALL SHRUBS** are collected on Form 2.
- Plants must be alive (green), but can be growing on any surface. Moss is an exception, as it may be brown but still alive. Material that has recently fallen from the canopy, such as lichens, are not included.

- Species that cannot be field identified shall be coded as a unique unknown (Unknown #1, Unknown #2, etc) in COMMENTS, and a sample collected for office identification utilizing the District Botanist or other scientist of world renown.
DO NOT COLLECT PLANT SAMPLES FROM THE MICROPLOT!
Look for the same plant outside the plot-frame area.
- Collect the plant (root, shoot and leaves) and place in a plastic bag. Place a label inside bag with TAC#, plot #, transect line/MP#, and Unknown #X, etc.

Column #2- MicroPlot Cover Percent (%)

Record appropriate numeric code representing the % cover.

EXAMPLE: 0-100%

- Percent cover is determined to nearest whole % for each vegetative species.
- Estimate percent cover of plant within the PVC MicroPlot frame. Utilize % cover examples to assist in determining % plant coverage. See APPENDIX in “O” drive for examples of % breakdown within frames.
- Hold the PVC frame level and align with tape as previously instructed. Look directly through frame at plants above and below.
- Determine % cover of all pertinent plants in all height levels within the vertical plane of the frame.
- Percent cover for any ONE species cannot exceed 100% within one MicroPlot frame. However, the total for ALL species within the frame may add up to greater than 100%, due to overlap (layering) of differing plant species.
- Arrange frame height level as needed to assess all plant % cover within the PVC frame- in a vertical plane-from ground level to vertical “infinity”.
- You may have to move some vegetation above when viewing vegetation in another lower layer...but DO NOT alter arrangement of vegetation when doing so. (i.e. : don’t “pull them out” bend/break, etc, for a “better view”.)
- If frame position is partly or wholly over a tree bole, log, stump, etc, do not physically offset frame. Visually imagine the position of the frame at the appropriate MP interval on the tape as if the transect line tape is straight in “line-of-sight”. (See FIGURE 14, page 37.)
- **CAUTION!** : Make sure you are putting % values in proper MP columns on Form 2. As you move across the Page, there will be blanks in columns and it is easy to place a species % in a blank space from a previous distance measurement along the tape. See example form filled out in APPENDIX under Forms.

Column #3-Comments

Record comments specific to column category and identify column #. For example: “C-1 species is Unknown #1-Looks like a legume. Sample taken to Botanist.”

Example of Comments for Ground Surface Features:

“1.6-Course litter suspended 23%”

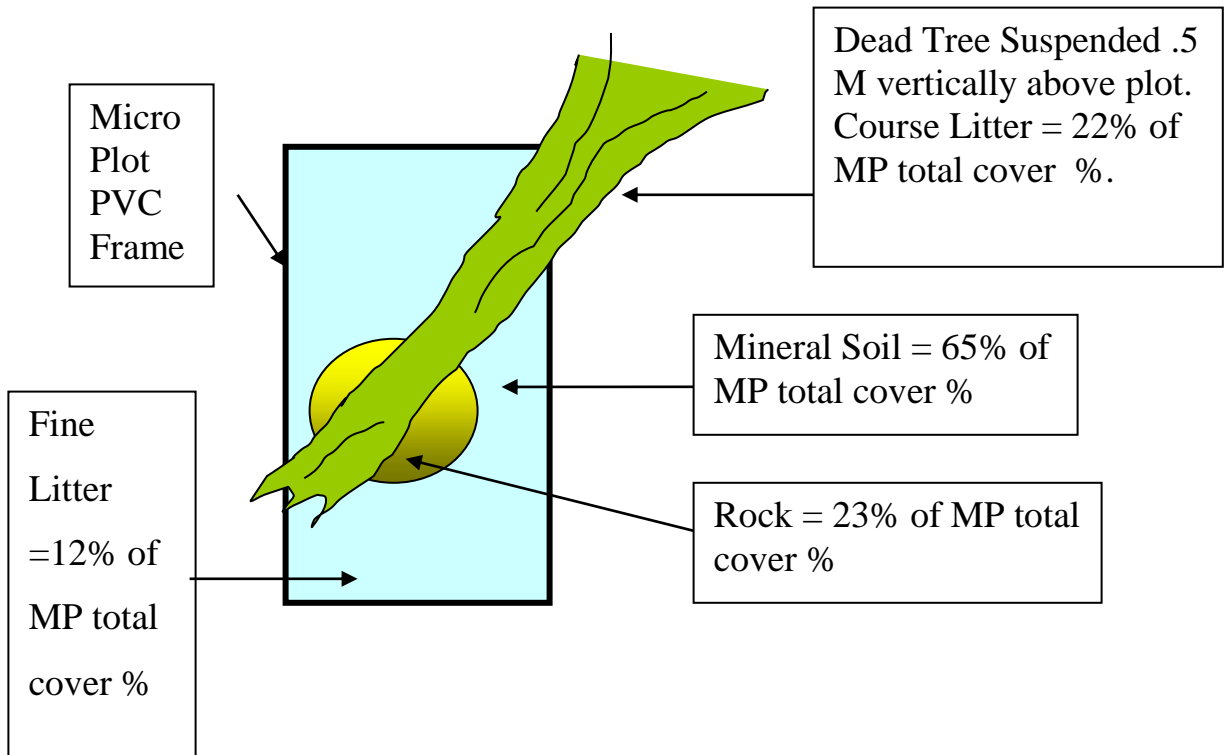
Ground Surface Features

- Ground surface features are listed at the bottom of Column #1 on FORM 2.
- Descriptions for each category are listed at the bottom of FORM #2. Features are: Mineral Soil, Fine Litter, Coarse Woody Material, Stone, Stump, and Tree Base.
- After recording all the plant % coverage’s for each MicroPlot interval on the tape, move the PVC frame as close to the ground surface as possible to record ground surface features. This may require GENTLY re-arranging the vegetation.
- Tally the individual % cover for each feature present. (Features with a 0 % cover leave BLANK.)
- The total % for ALL features added together within each MP frame must equal 100%. There is ONE exception: If a piece of course litter (log, branch >5cm diameter) is suspended, elevated, or broad enough to overhang other features within 1 meter above the ground surface, then a percentage greater than 100% is acceptable. Make a note in “Comments” column #3, noting the distance interval of the MP (1.6, 3.2...etc.) and the feature type and %. See FIGURE 15, next page.

FIGURE 15:

If at interval 6.4 meters there is a log suspended over the plot...the following examples of cover and % are as shown:

Viewed from above:



The percent covers would be as follows:

Fine Litter	=12%	} 100% sub-total
Rock	= 23%	
Mineral Soil	=65%	

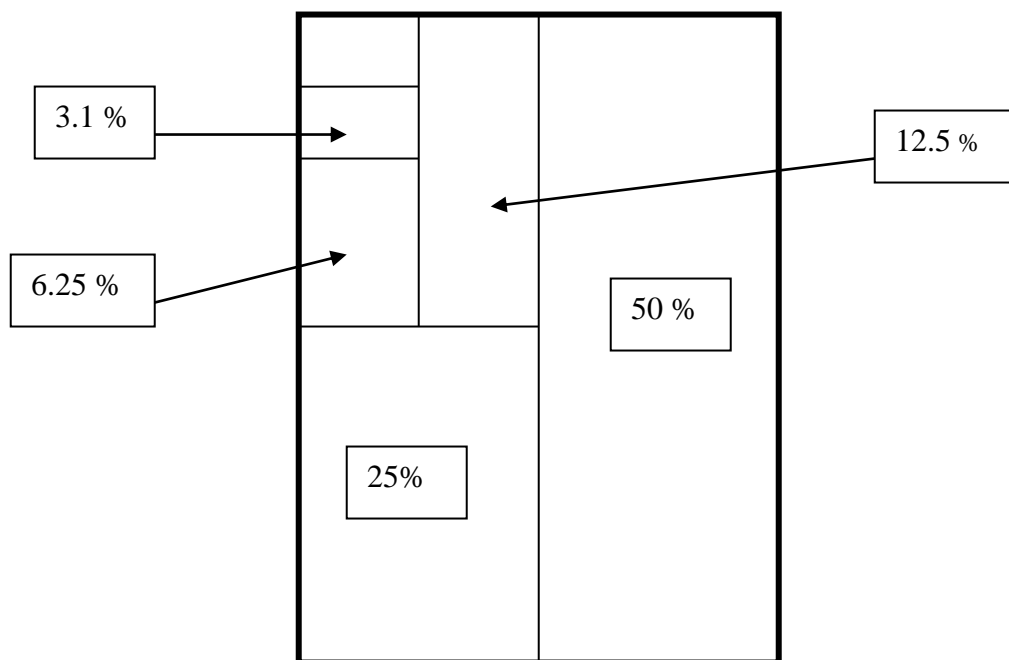
Coarse Litter=22% (Tree)

Total: 122% -Allowed because 22% is suspended above plot.

Written in Comments as: “ MP 6.4=22% Suspended Coarse Litter”

PVC .2 x .5 Meter Frame

Cover percentages--expressed as an approximate portion of rectangular PVC frame.
(Other examples can be found in APPENDIX under UAMP Frame Percentages”.



V. FORM DESCRIPTIONS

D. FORM 3- Whole Plot Species List

Special Notes:

- Record every individual plant species present within the plot boundary (17.84 Meters). Include all herbs, ferns, low shrubs, tall shrubs, trees, and grasses and bryophytes.
- NOTE: Grasses are to be broken down into 3 categories whenever possible: Grasses, Sedges and Rushes. If possible, identify species. Codes are: GRASS, SEDGE, and RUSH. Bryophytes are lumped into one category, called: BRYO.

Column #1-Species

- Record appropriate alpha code (AAAA#) for scientific name. Use the 4 letter acronym, all CAPS. EXAMPLE: TABR2.
- Record all species present within plot perimeter.
- Maintain categories of plant type when listing: Tree, Shrub, Herb, Fern, Grasses and Bryophytes. This will assist in editing, correct spelling, nomenclature, etc.
- If species is unidentifiable in the field: code as UNKNOWN # X in appropriate category on Form 3. Describe pertinent details in Comments for that line. Place plant sample in plastic bag and label with paper/flagging slip inside bag, noting TAC and Plot #. Bring to office for Botanist or other Scientist of specialty to ID.

Column #2-Comments

Record comments specific to column category and identify Column #. EXAMPLE: “UNKNOWN Plant #4-Found in Bog”

V. FORM DESCRIPTIONS

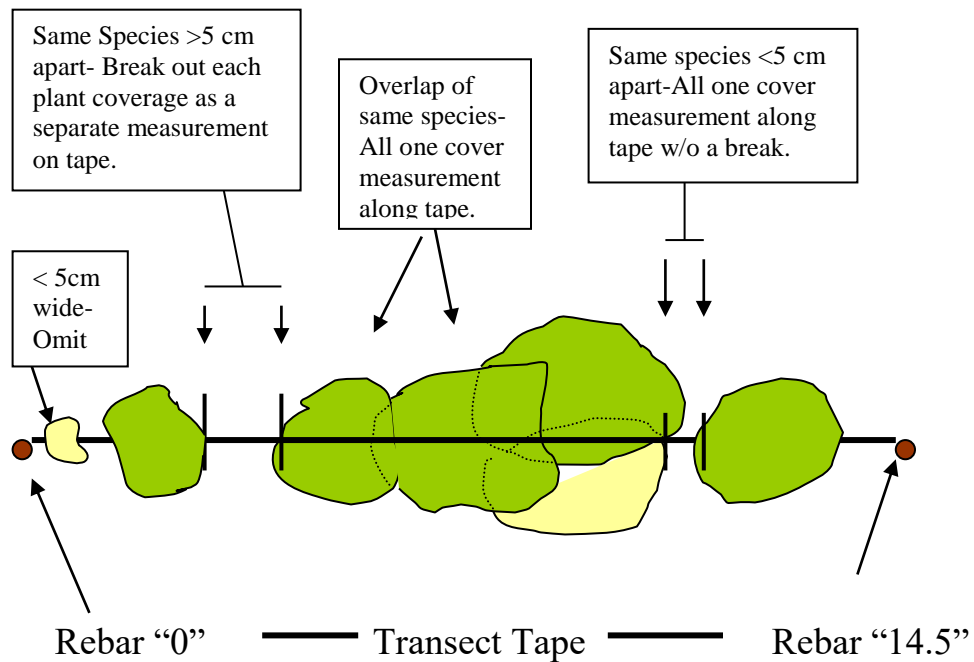
E. FORM 4-Transect Line-Planar Intersect

Special Notes:

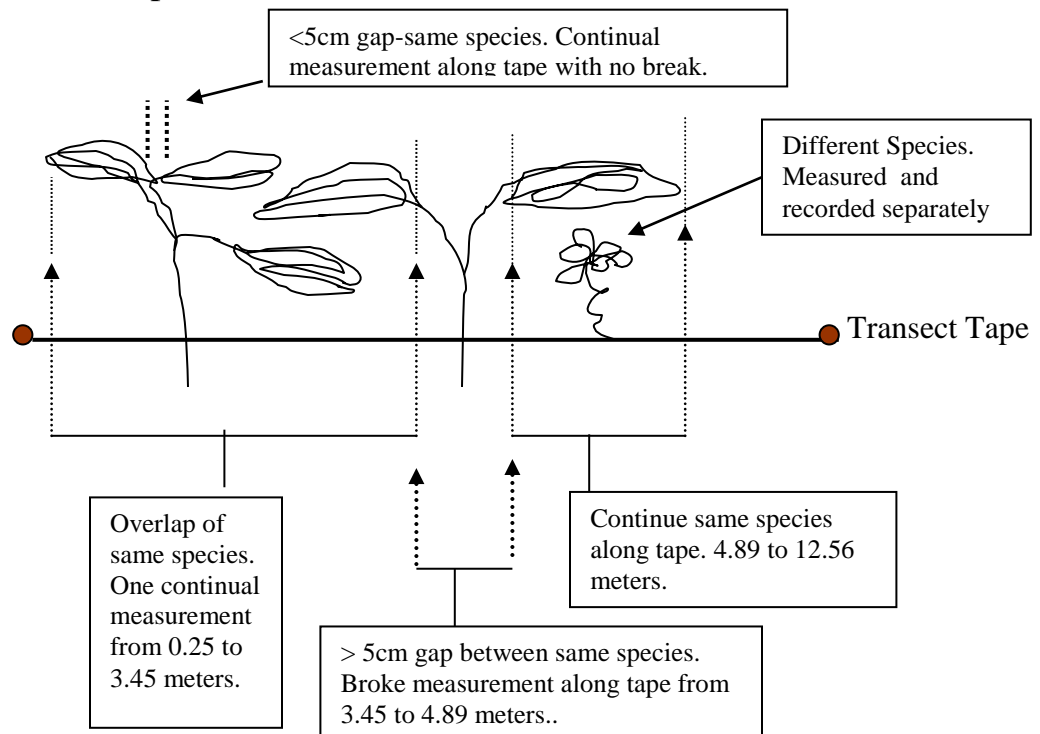
- The Line-Planar Intersect is designed to sample the cover of understory trees (less than 5 cm Dbh) and tall shrubs that intersect the transect line between the rebar points 0 to 14.50 meters (or >, depending on slope distance.) This is a PLANAR intersect, thus there is no limit on vertical height.
- All cover of understory trees (<5cm Dbh) and/or tall shrubs that intersect the transect line are to be tallied whether “rooted” inside or outside the transect plot/line.
- Trees (< 5 cm Dbh) and /or tall shrubs shall be recorded regardless of their vertical height.
- Record each individual plant species ‘start’ and ‘end’ point along the meter tape by projecting the edge of the plant’s canopy cover perpendicularly up or down to the transect tape above/below the plant edge.
- Each individual plant’s canopy coverage must cover 5 cm or greater (horizontally) along the tape from start to finish to be counted. EXAMPLE: See FIGURE 16 below.
- Do not attempt to distinguish between plants of the same species that have gaps less than 5 cm between canopy parts. If a gap of the same species is less than 5 cm, record as one continuous segment along tape. If the gap is greater than 5 cm, record as two separate segments/data entries on FORM 4. See FIGURE 16 below.
- If two or more branches of the same species overlap in a vertical plane, record the ‘start’ and ‘end’ points that represent the species as a whole, not as individual plants. See FIGURE 16 below.
- If a specific species fills an entire line on FORM #4, drop to the next available empty data-recording line on the form with that species code, and continue recording the species, increasing the ‘sequence’ value by one. (Think of ‘sequence’ as a line number for each individual species recorded.)

- When the tape has to circumvent objects (trees, roots, logs, stumps, etc.) continue to tally the intercept data along the imaginary, straight “line-of-sight” line between transect start and end points. Do not physically follow the bend in the tape collecting data. See FIGURE 14, Page 36.
- Record measurements from start point rebar (0) to end point rebar, regardless of the length of the stretched tape. The overall length of the transect from start to end rebar may be longer than 14.5 meters, due to slope distance variation.
- RECORD transect endpoint distance – 14.5 m or other distance as observed from the tape.
- A species that cannot be identified in the field will be collected from **OUTSIDE THE TRANSECT LINE--PLANAR INTERCEPT AREA**, and handled in the same manner as described in the FORM #2 Microplot cover estimate section, page 38.
- Utilize Plant List to determine species names/codes and appropriate category (tree/shrub, etc.) for tally. See APPENDIX as described above for Plant List.

FIGURE 16:
Determining Species Cover Along Transect Line Tape
 (As seen from Above)



Determining Species Cover Along Transect Line Tape
Side View Example:



Column #1-Species

Record appropriate alpha code (AAAA#) from Plant List for each species. Use 4 letter acronym in all CAPS for each Species. See APPENDIX for list of plants and codes.

Column #2-Sequence

Sequence number should be thought of as a line number for each individual species recorded.

Record a single numeric code (1 thru ∞) as a sequence number, for each individual plant species line. If an individual species continues along a transect and requires another line of data because the initial FORM line is full, continue the species code on the next blank line under 'Species', and assign the next highest sequence number to the 'Sequence' column.

Column #3-Start Point

Record appropriate distance for the starting point for each species along transect line. (XX.xx meters).

Column #4-End Point

Record the appropriate distance for the ending point of the same species as in Column 3 above along transect line. (XX.xx meters).

Column #5-Comments

Record comments specific to column category and identify column by number.

V. FORM DESCRIPTIONS

F. FORM 5-Seedling and Sapling Tally

Special Notes:

- Tally **live conifer and hardwood** trees < **5cm Dbh** and **10 cm or greater in height.**
- Tally each tree by species and height class.
- String transect tape from rebar (0) to rebar (end). Measured tape distance may vary from the ideal 14.5 meters, due to slope distance. (Tape should already be strung from measuring data for FORMS 2 and 4.)
- The plot/tally strip is 1.5 meters wide (horizontal distance).
- Tally/plot strip faces **AWAY** from plot center along transect line. See Plot Diagram, Page 5.
- Trees to be tallied **MUST BE ROOTED** inside the tally strip, regardless of where the tree bole or canopy reside.
- A pre-marked PVC pole is used to determine the width of the tally strip, and is calibrated and marked to measure tree height-class.
- Trees are to be measured from ground level on a vertical plane.

Individual trees are tallied by species in the following
6 HEIGHT CLASSES:

<u>Class</u>	<u>Height Range</u>
1	0.1-0.2 m
2	0.2-0.5 m
3	0.5-1.0 m
4	1.0-2.0 m
5	2.0-3.0 m
6	>3.0 m

- Live hardwood stems ‘clumped’ and arising from a common base at ground level (above root collar- for example-stump sprouts) are tallied as a single individual tree with height class tallied accordingly. Average the height of the stems. Record as a “Clump” in COMMENTS column.

Column #1-Species

Record appropriate alpha code (AAAA#) from Plant List for each species. Use 4 letter acronym in all CAPS for each Species. See APPENDIX for list of plants and codes.

Column #2-Count/Total

Record the total count of each species (1, 2, 3...XX) by each Height Class and Species. Column #2 is divided by height class with categories of 'Count' on the top line, and 'Total' on the bottom line for each species. Tally the 'Count' using the 'dot box'(10) method or the 'bar' (5) method. The actual total count for each species in each height class is placed in the second line of data.

Dot Box: Bar Method: 

Column #3-Comments

Record comments specific to each column category and identify with Column #.
EXAMPLE: "C-2, Height of Class 3: Species CHCH7 is a 'clump' of 7 stems."

V. FORM DESCRIPTIONS

G. FORM 6-Overstory Closure (%) Cover Estimates and Plot Narrative/Edit Check.

Special Notes:

- Overstory cover includes: All live foliage, any part of tree bole, limbs, and snags.
- Any tall shrubs or saplings and trees <5cm Dbh viewed through the eye piece are ignored, or if possible, physically pushed out of the way by another person, so that ONLY overstory canopy cover is observed and recorded.
- Overstory trees (Conifer and Hardwood) must have a Dbh of 5 cm or GREATER.
- Overstory density is sampled holding the densiometer ('Moosehorn') over plot center facing North. The densiometer is also held over each of the 4 cardinal direction rebar points (N,E,S,W) while facing PLOT CENTER.
- Position the densiometer directly (vertically) over each rebar point, between 1.5 and 2 meters above ground level. Hold densiometer at eye level. Allow the densiometer to swing freely on the gimbals until it stops moving and the sight position through the eyepiece appears vertical. (It helps to have another crew person view densiometer from the sides-to assure verticality.)
- View overstory canopy through eyepiece and project onto the 25 grid squares that appear super-imposed on the canopy.
- Each square equals 4 % of the canopy cover.

- There are several ways to determine the canopy coverage (CC) from the squares:
 1. Count the number of squares that are completely 'filled' with canopy and tally accordingly. Visually move canopy to 'Fill' other squares that canopy touches, until you have a number of full squares. The # Full Squares x 4 = % Canopy Coverage. 8 squares x 4% = 32% CC.
 2. If there is too much canopy to accurately complete the process above, count the EMPTY squares utilizing the same method, then subtract from 100. [# Empty Squares x 4]-100 = % Canopy Coverage. 9x4%=32. 100-36=64% CC.
 3. If ¼ of one square is filled with tree canopy, count as 1, if half is filled, count as 2, if ¾ is full, count as 3, and if square is entirely filled, count as 4. Accumulate percent counts as all 25 squares are examined. The final sum is the overstory canopy cover in percent. (This method is difficult, as it is hard to hold the 'Moosehorn' in one place, while counting all the square coverage's.)

Column #1-5-Percent Cover

Record appropriate percent cover (0-100%) to the nearest whole percent for each of the 5 rebar points. (Center, North, East, South and West)

Comments

Record comments specific to column category and identify column #.

EXAMPLE: "Column 3-East point has too much shrub cover overhead to measure crown % accurately. Estimated value."

Plot Narrative

The plot narrative is intended to track miscellaneous information including abnormalities on the plot and progress in data collection. If seedling/ sapling density is particularly high due to the presence of a skid trail within the plot, then this should be noted. Other examples: large opening in plot, intermittent stream or other landform such as slump/slide enters the plot area, etc.

Data Forms' Checklist

The Data Form's Checklist is a system designed to track when editing of forms has been completed. Check EACH form for legibility, accuracy of data, consistency and overall completeness BEFORE exiting each plot.

Ideally, the editor is not the person that recorded the data.

Place a Y or N for each form to denote completeness. If incomplete, finish form as needed. The person editing each form should place their Acronymal initials (WOOW=Woodsy Owl) under the "Editor" column, and any comments pertinent to the Form should be written in the Comments field.

UAMP Posted TAC Locations

TAC #1 (Control) L204- Travel Road 1506 to 1507. Tac is posted on the 1507 road at MP 2.65 on left (NW) side of road.

Tac #2 (Gap) L202- Travel road 1506 to 1507. Tac is posted on the 1507 road at MP 2.35 on the left (NE) side of road.

Tac #3 (Heavy) L202- Travel road 1506 to 1507. Tac is posted on the 1507 road at MP 2.2 on the left (W) side of the road.

Tac #4 (Light) L203- Travel road 1506 to 1507. Tac is posted on the 1507 road at MP 2.45 on the left (NW) side of the road.

Tac #5 (Control) L401- Travel road 1506 to 1508. Tac is posted on the 1508 road at MP 0.35 on the left (N) side of the road.

Tac #6 (Gap) L103- Travel road 1506 to 1507. Tac is posted on the 1507 road at MP 0.2 on the right (W) side of the road.

Tac #7 (Heavy) L201- Travel road 1506 to 1507. Tac is posted on the 1507 road at MP 1.0 on the left (N) side of the road and posted at MP 1.6 on the right (NW) side of the road.

Tac #8 (Light) L106- Travel road 1506 to 360 (Rt. Turn). Tac is posted on the 360 road at MP 0.9 on the left (N) side of the road.

Tac #9 (Control) L206- Travel road 1506 to 1507 for 3.2 miles to rd. 470 (Left turn.) Tac is posted on the 470 road at MP 0.15 on the left (NW) side of road. Road is blocked at this point.

Tac #10 (Gap) L521- Travel road 1506 to 320 (Left turn). Then travel 3.5 miles on 320 to road 331 (Right turn). Tac is posted on the 331 road at MP 0.15 on the left (N) side of the road.

Tac #11 (Heavy) L101- Travel road 1506 to MP 1.9 to road 305 (Right turn). Tac is posted on the 305 road at MP 0.05 on the left (E) side of the road. This is closest access to plots. Tac also posted on road 455 at MP 0.3 on the right (W) side of road at top of unit.

Tac #12 (Light) L109- Travel road 1506 to 360 (Right turn). Tac is posted on the 360 road at MP 2.65 on the left (N) side of the road.

Tac #13 (Control) L105- Travel road 1506 to 360 (Right turn). Tac is posted on the 360 road at MP 0.6 on the right (S) side of the road at Jct. of road 363.

UAMP Posted TAC Locations (Continued)

Tac #14 (Gap) L102- Travel road 1506 to 1507. Then travel 1507 for 0.65 miles to road 455 (Right turn). Tac is posted on the 455 road at MP 0.1 on right (N) side of the road.

Tac #15 (Heavy) L702- Travel road 1506 to MP 8.0. Tac is posted on the 1506 road on the left (N) side of the road.

Tac #16 (Light) L108- Travel road 1506 to 360 (Right turn). Tac is posted on the 360 road at MP 2.0 on the left (N) side of the road.

APPENDIX

Uneven Aged Management Study

August 2009

APPENDIX
TABLE OF CONTENTS

	<u>Subject</u>	<u>Page</u>
A.	Field Maps	2
B.	Plot Data Forms--Blank	3
C.	Plot Data Forms—Completed Examples	3
D.	UAMP Code Sheet	6
E.	Transect Directions	7
F.	GPS Plot Coordinates	22
G.	Plant List	

PAGE 10. Specific Code Explanations

[PAUL-is there always data for any tree that has a 1-5 in these columns. That often is all we have out in the field, and it is nice to know if we need to capture missing data for Ht, B/I, DCL, etc. Can we check to see if there is any consistency to the idea-if there is a 1-5 in DCL in previous years, is the data necessarily complete.....?]BUT-EXAMPLE is Tac 3, plot 3, tree 880. There WAS data for Snag Ht and B/I in 2001, and an X was followed in 2003 for DBH. BUT-no decay class was ever written down in 2001 or 2003-so, it is possible by looking at only decay class in 2005 on the FORM 1 copy we use for field use, one COULD miss data. In this case, with no DCL value in 2001, 2003 fields, they collected Snag Ht, B/I and DCL in 2005.-even though they didn't need to. But there is potential to not get needed data. There WAS an MV in DBH column for 2003 for this tree, which suggests missing DBH. There was a DBH value in 2003, so the MV should have been in the DCL column. Can you make sure someone peruses the data for these errors....and can we make sure the MV goes in the column that is needed for the next entry (year).

Table X. Snag decay class criteria.

Parameter	Decay Class				
	1	2	3	4	5
Color	Original Color	Faded	Faded, gray, light to reddish brown	Reddish to dark brown	Reddish to dark brown
Bark	100% Present	Variable	Variable	Variable	< or = 20%
Branch system	All Present	No fine branches, few limbs	Limb stubs only	Few or no stubs	None
Sapwood condition	Sound, hard, original color	Decay evident, fibrous, firm to soft	Soft, fibrous	Soft, cubicle (may be encased in hard shell)	Gone
Heartwood condition	Sound, hard, original color	Upper bole: incipient decay Base: sound	Upper bole: advanced decay Base: incipient decay, hard to firm	Base: advanced decay	Soft, sloughing (may be encased in hard shell)
Probe test	***	***	Sapwood: passes through Heartwood: meets firm or hard core	Sapwood: passes through easily Heartwood: passes through	Passes through easily

Adapted from: Cline et al.,1980. J. Wildl. Man. 44(4): 773-786, p. 780.

Represent “key” criteria; other categories represent only “accessory” criteria.

PVC .2 x .5 Meter Frame

Cover percentages--expressed as an approximate portion of rectangular frame.

