Field Instructions
Stand Examination
Region One

Northern Region
Vegetation Mapping Project
(R1-VMP)

Version 1.5
(R1 version 2.03.2003)

2003

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Section 1

Data Collection Requirements

The following tables show the required fields that are to be collected and recorded for the Setting Data, Plot Data, Tree Data, Vegetation Composition Data and Ground Surface Cover Data forms. An "X" in the Extensive or Quick Plot columns indicates the required fields. All remaining fields shall not be collected.

Table 1: Stand Data Form

Field Number	Field Name	Extensive Plot	Data Source
1	**Project Name**	**X**	**Government**
2	**Proclaimed Region**	**X**	**Government**
3	**Proclaimed National Forest**	**X**	**Government**
4	**District**	**X**	**Government**
5	**Location**	**X**	**Government**
6	**Stand Number**	**X**	**Government**
7	**Ownership**	**X**	**Government**
8	**State**	**X**	**Government**
9	**County**	**X**	**Government**
10	**Administrative Forest**	**X**	**Government**
11	**Date**	**X**	**Contractor**
12	Photo ID		
13	**Examination Level**	**X**	**Government**
14	**Exam Purpose**	**X**	**Government**
15	Stratum		
16	Existing Vegetation Cover Type		
17	Potential Vegetation Reference		
18	Potential Vegetation		
19	Structure		
20	Capable Growing Area		
21	Fuel Model		
22	**Elevation**	**X**	**Government**
23	**Aspect**	**X**	**Contractor**
24	**Slope**	**X**	**Contractor**
25	Slope Position		
26	**Acres**	**X**	**Government**
27	Radial Growth Interval		
28	Radial Growth Interval #2		
29	Height Growth Interval		
30	Fuel Photo Reference		
31	**Precision Protocol**	**X**	**Government**
32	**Examiner**	**X**	**Contractor**
33	**Stand Remarks**	**X**	**Contractor**
34	Stand Damage Category		
35	Stand Damage Agent		
36	Stand Damage Severity		
37	Species of Management Interest		
38	Sketch Map and Traverse Notes		

Table 2: Plot Data Form

Field Number	Field Name	Extensive Plot	Data Source
	Header	**X**	**Contractor**
1	**Plot Number**	**X**	**Government**
2	Plot Latitude	Required (using GPS). Not recorded on this form	Contractor
3	Plot Longitude	Required (using GPS) but not recorded on this form	Contractor
4	Capable Growing Area		
5	**Plot Aspect**	**X**	**Contractor**
6	**Plot Slope**	**X**	**Contractor**
7	Slope Position		
8	Slope Horizontal Shape		
9	Slope Vertical Shape		
10	Plot Elevation		
11	Plot Existing Vegetation Composition Type		
12	Plot Potential Vegetation		
13	Plot History		
14	Plot History Date		
15	Fuel Model		
16	Residue Descriptive Code		
17	Distance To Seed Wall		
18	**Plot Remarks**	**When Applicable**	**Contractor**

Table 3: Tree Data Form

Field Number	Field Name	Extensive Plot	Data Source
	Header	**X**	**Contractor**
1	**Plot Number**	**X**	**Government**
2	**Tag ID**	**X**	**Contractor**
3	**Tree Status**	**X**	**Contractor**
4	Site/Growth Trees		
5	**Tree Species**	**X**	**Contractor**
6	**Tree Count**	**X**	**Contractor**
7	DRC Number Of Stems		
8	**DBH**	**X**	**Contractor**
9	**Height**	**Height Sample Trees, trees with broken/missing top and trees < 4.5 ft. tall.**	**Contractor**
10	Height To Crown		
11	Radial Growth		
12	Radial Growth #2		
13	Height Growth		
14	Tree Age		
15	**Crown Ratio**	**X - Live trees only**	**Contractor**
16	**Crown Class**	**X – Live trees only**	**Contractor**
17	Crown Width		
18	Wildlife Use		
19	**Snag Decay**	**X – All standing dead trees**	**Contractor**
20	Cone Serotiny		
21	**Tree Damage Category**	**X**	**Contractor**
22	**Tree Damage Agent**	**For Category 99 - broken, dead or forked tops only (001, 002, 004).**	**Contractor**
23	Tree Damage Part		
24	**Tree Damage Severity**	**X – If Category is recorded Severity is required**	**Contractor**
25	**Tree Remarks**	**When Applicable**	**Contractor**

Table 4: Vegetation Composition Form

Field Number	Field Name	Quick Plot	Data Source
	Header	**X**	**Contractor**
1	**Plot Number**	**X**	**Government**
2	Live/Dead		
3	**Layer**	**X**	**Contractor**
4	**Life Form**	**X**	**Contractor**
5	**Species**	**Tree species only.**	**Contractor**
6	Minimum Layer Height		
7	**Average Layer Height**	**X**	**Contractor**
8	Maximum Layer Height		
9	**Canopy Cover**	**X**	**Contractor**
10	Maturity		
11	Average Diameter		
12	**Vegetation Remarks**	**When Applicable**	**Contractor**
13	User Field		

Table 5: Ground Surface Cover Form

Field Number	Field Name	Quick Plot	Data Source
	Header	**X**	**Contractor**
1	**Plot Number**	**X**	**Government**
2	**Ground Surface Cover Type**	**X**	**Contractor**
3	**Ground Surface Cover Percent**	**X**	**Contractor**
4	**Ground Surface Cover Remarks**	**X**	**Contractor**

Common Stand Examination Instructions.

Common Stand Exams shall be done in accordance with the following guidelines. Specified data shall be collected that is necessary to complete the Setting, Sample Design, Plot Data, Tree Data, Vegetation Composition and Ground Surface Cover records as specified in *Appendix T: Accuracy Standards*.

1. **Fixed Radius Plot Procedure:** Each sample plot consists of three concentric circular fixed radius subplots. Tree data is recorded using the following DBH/height classes and associated fixed plot radius:

DBH/Height Class	Sample Area	Plot Radius
Trees ≥ .5 feet tall to ≤ 4.9 inches DBH	1/300	6.8 feet
Trees 5.0-20.9 inches DBH	1/24	24.0 feet
Trees ≥ 21.0 inches DBH	1/4	58.9 feet

- The 1/300th acre fixed radius subplot tallies all live and dead conifer and deciduous trees .1" DBH to ≤ 4.9" DBH; and all live conifer and deciduous trees 6" tall to < 4.5" tall. Trees less than 0.5 feet in height shall be excluded.

- The 1/24 acre fixed radius subplot tallies all live and dead conifer and deciduous trees ≥ 5.0" DBH and ≤ 20.9" DBH.

- The 1/4 acre fixed radius subplot tallies all live and dead conifer and deciduous trees ≥ 21.0" DBH.

All **dead down** trees shall be excluded from this tally.

a. Tally shall start at 0^{o} azimuth and proceed in a clockwise direction. A slope correction shall be calculated for slopes ≥ 10%. Reference *Appendix J: Fixed Plot Procedures* for instructions and slope correction tables.

b. Trees shall be recorded in the following order:

1. All trees ≤ 4.9" DBH starting a 0° azimuth.
2. All trees ≥ 5.0" DBH starting a 0° azimuth.

If two or more "in" trees are along the starting azimuth line, where the bole of the nearest tree completely obscures the bole of the farthest tree (at breast height 4.5 feet), then the tree nearest the plot center shall be recorded first.

c. Plot center shall be identified with a marker that can be visible from 1 chain. The marker shall extend a minimum of 12 inches above the ground surface with flagging attached. The flagging shall have the stand and plot number written with a permanent marker. Plot center is defined as that point where the marker enters the ground. This point or plum line extension of this point shall be used for all distance measurements taken from plot center.

d. Two pieces of flagging shall be hung near plot center as topography and available vegetation allow. This flagging shall be at least 5 feet above ground surface and 12" long. Write the stand and plot number on the flagging with a permanent marker. Color of flagging shall be determined at the pre work conference.

2. **Sample Design Form:** The Government shall provide the Sample Design. Reference *Exhibit B: Data Forms*. The Sample Design form shall be completed and the "**Number of Plots**" field shall be modified, on the form and in the Exams PC program, to reflect the number of plots installed on the ground, for all form types.

3. **Setting Data Form:** A setting (stand) is a delineated area in which the examinations are being conducted. The Setting Data form shall be completed and the following fields shall be assessed and recorded as specified below. Reference *Exhibit B: Data Forms.*

Field 1: Project Name. Record **"VMP"** for Vegetation Mapping Project**.**

Field 2: Proclaimed Region. Record **"01"** for Region 1.

Field 3: Proclaimed National Forest. Record the appropriate National Forest.

03	Bitterroot	10	Flathead	17	Nezperce
04	Idaho Panhandle	14	Kootenai		
05	Clearwater	16	Lolo		

Field 4: District. Record the appropriate District.

Bitterroot NF	**Flathead NF**	**Lolo NF**
01 Stevensville	01 Swan Lake	03 Missoula
02 Darby	02 Condon	04 Ninemile
03 Sula	04 Spotted Bear	05 Plains
04 West Fork	06 Hungry Horse	06 Seeley Lake
	07 Glacier View	07 Superior
Idaho Panhandle NF	08 Tally Lake	08 Thompson Falls
01 Wallace		
02 St. Joe (Avery)	**Kootenai NF**	**Nezperce NF**
03 Fernan	01 Rexford	01 Salmon River
04 St. Joe (St. Maries)	03 Fortine	03 Slate Creek
06 Sandpoint	04 Three Rivers	04 Clearwater
07 Bonners Ferry	05 Libby	05 Red River
08 Priest Lake	07 Cabinet	06 Moose Creek
		07 Selway
Clearwater NF		08 Elk City
01 Pierce		
02 Palouse		
03 North Fork		
05 Lochsa		
06 Powell		

Field 5: Location. Location Number shall be provided at prework.

Field 6: Stand Number. Stand Number shall be provided at prework.

Field 7: Ownership. Record "USFS" for United States Forest Service.

Field 8: State. Record the appropriate state code.

Code	Description
ID	Idaho
MT	Montana
WA	Washington

Field 9: County. Record the appropriate County code.

Idaho		
009 Benewah	035 Clearwater	057 Latah
017 Bonner	049 Idaho	079 Shoshone
021 Boundary	055 Kootenai	
Montana		
029 Flathead	053 Lincoln	081 Ravalli
039 Granite	061 Mineral	089 Sanders
047 Lake	063 Missoula	
049 Lewis And Clark	077 Powell	
Washington		
051 Pend Oreille		

Field 10: Administrative Forest. The Administrative Forest shall be the same forest as recorded in Field 3 – Proclaimed Forest.

03	Bitterroot	14	Kootenai
04	Idaho Panhandle	16	Lolo
05	Clearwater	17	Nezperce
10	Flathead		

Field 11: Date. Record the calendar month, day, and year the stand examination was completed. (MMDDYYYY)

Field 13: Examination Level. Record **"2101"**.

Field 14: Exam Purpose. Record an **"SE"** for stand exam protocols**.**

Field 22: Elevation. Record the median stand elevation, in feet.

Field 23: Aspect. Record the predominant stand aspect in degrees, 1° to 360°. Stand aspect is the predominant direction, which the stand faces.

0	Flat
360	360°
999	Indeterminate/No predominant aspect/Undulating

Field 24: Slope. Record the average stand slope, in percent.

Field 26: Acres. Record the total stand acres.

Field 31: Precision Protocol. Record **"UNIVMP".** This indicates that the exam for the Vegetation Mapping Project was not taken from the current Forest stand layer.

Field 32: Examiner. Record the individual(s) responsible for data collection. **Do not use reserved characters such as +, /, -, or * in this field.**

Field 33: Stand Remarks. Record observations that describe the stand's characteristics and evaluations that prove important to the stand's description. Include characteristics such as tree species composition, distribution, size and stand density. Discribe the relative differences in crown cover and trees per acre between contrasting conditions.

4. Plot Data Form: The Plot Data form shall be completed and the following fields shall be assessed and recorded as specified below. Reference *Exhibit B: Data Forms.*

Field 1: Plot Number. Record the plot number for each plot.

Field 5: Plot Aspect. Record the aspect, in degrees. Aspect is the direction the plot faces and shall be determined by taking a compass reading directly downslope from plot center.

0	Flat
183	183°
360	360°
999	Indeterminate/No predominant aspect/Undulating

Field 6: Plot Slope. Record the slope, in percent. Average the downslope and upslope measurements from plot center. Slope is defined as the ratio of vertical rise divided by the horizontal distance.

Field 18: Plot Remarks. Enter remarks relevant to the plot.

5. Tree Data Form: The Tree Data form shall be completed and the following fields shall be assessed and recorded as specified below. Reference *Exhibit B: Data Forms.*

Field 1: Plot Number. Record the plot number for each line of tree data. Plot numbers should be unique within a setting.

Field 2: Tag ID Number. Record the tag ID number for each tree data line. Tag ID number is the consecutive numbering of the tree data lines for each plot beginning with "01". The numbering sequence is repeated on each plot. Each Tag ID Number is associated with a tree or a group of trees.

Field 3: Tree Status. Record one of the following codes for each tree or group of trees.

Code	Tree Status	Description
L	**Live**	Standing trees that have at least one green point of growth. Includes deciduous trees that have lost their foliage for the season and trees that have recently lost their leaves to defoliators, but will reflush. (Includes all live trees that are leaning more than 45º from vertical. The tree must have root contact with the soil, but the main stem may be lying on the ground or supported by branch wood.)
D	**Dead**	Standing trees 4.5 feet or taller without a green point of growth. (Includes all dead trees that are leaning more than 45º from vertical. The tree must have root contact with the soil, but the main stem may be lying on the ground or supported by branch wood.) A snag decay class is required.

Field 5: Tree Species. Record the species for every tallied tree. See *Appendix H: List of Tree Species* for common tree species codes.

Field 6: Tree Count. Record the number of sampled trees represented by each line of tree data. Height sample trees and trees ≥ 3.0 inches DBH shall be recorded individually. Reference *Field 9: Height* for definition of Height Sample Tree.

All other sample trees < 3.0 inches DBH shall be grouped by tree status, species, damage and the height class categories listed below. The actual total number of trees is recorded for each group. Select the median tree to sample tree characteristics. Record the average tree characteristics, such as average DBH, height, crown ratio, etc.

- 0.5 - 4.9 feet
- 5.0 - 12.9 feet
- 13 + feet

Field 8: DBH. Record the Diameter at Breast Height (DBH) for each tree or group of trees. Reference *Appendices L and M: Measuring Diameter and Point of Measurement for DBH* for detailed instructions and examples of DBH measurement procedures. Do not record values for trees < 4.5 feet tall. Measure DBH to the nearest tenth inch (always round down).

Code	Description
blank	Germinants: seedlings < 4.5' tall
.3	0.3 inches diameter
9.5	9.5 inches diameter
18.7	18.76 inches diameter

DBH is outside bark diameter at 4.5 feet above the forest floor on the uphill side of the tree. To determine breast height, the forest floor includes the duff layer that may be present, but does not include unincorporated woody debris that may rise above the ground line. If a dead tree (snag) is missing bark, measure the DBH without the bark and record that measurement. Do not attempt to estimate the bark thickness into the DBH measurement. For trees with bole irregularities, reference *Appendix M: Point of Measurement for DBH.*

Field 9: Height. Tree height is required for all height sample trees, all trees (live or dead) with broken or missing tops, grouped trees < 3.0 inches DBH and trees less than 4½ feet tall.

The height sample tree is defined as the first live standing sample tree of each species encountered on the plot when moving clockwise from 0 degrees azimuth in each of the following size classes: (If the first tree of the size class has a broken or dead top, select the second or next tree.)

DBH Class	Height Class	Provision
<3.0 inches	.6 – 4.9 feet	Tree has a live, undamaged terminal leader.
	5.0 – 12.9 feet	
	13.0+	
3.0 – 4.9 inches		
5.0 – 8.9 inches		
9.0 – 14.9 inches		
First tree ≥ 15.0 inches		
Largest tree ≥ 15.0 inches		

Record tree height, in feet, from ground line on the uphill side to the uppermost tip of the tree. If the top is broken, record the height to the break, and record a tree damage of "broken top". Reference *Appendix P: Measuring Height* for detailed instructions and examples.

Code	Description
1	0.5 - 1.4 feet tall
23	22.5 - 23.4 feet tall
151	150.5 - 151.4 feet tall

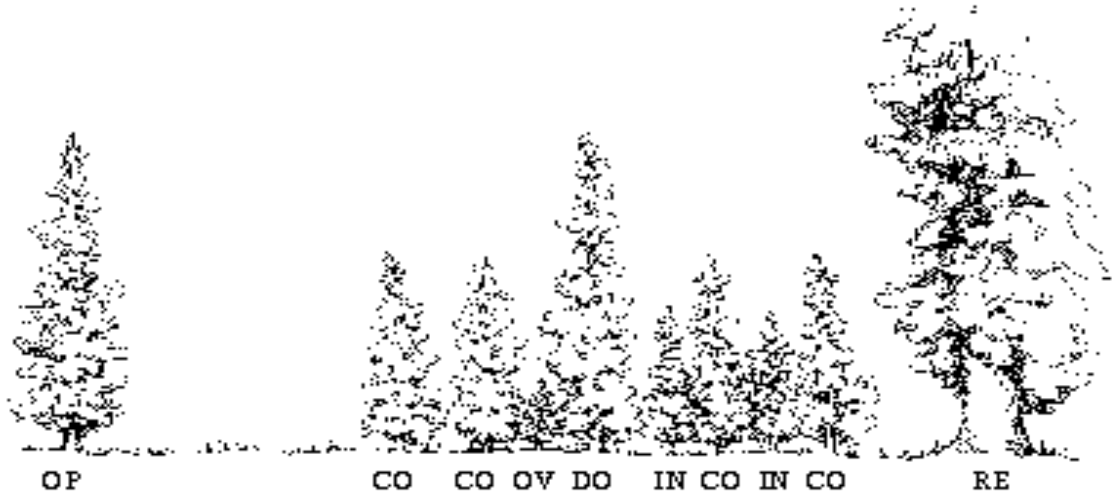
Field 15: Crown Ratio. Record crown ratio, in percent, as the length of the live crown divided by tree height. Live crown length is assessed from the uppermost live leader or branch to the lowest live branch. Visually adjust large openings in the crown or lopsided crowns by transferring lower branches to fill in the holes. Compressing the live crown length because the crown appears "sparse" or contains "unhealthy" foliage is not appropriate. Reference *Appendix Q: Measuring Crowns* for detailed instructions.

Code	Description
25	25%
77	77%

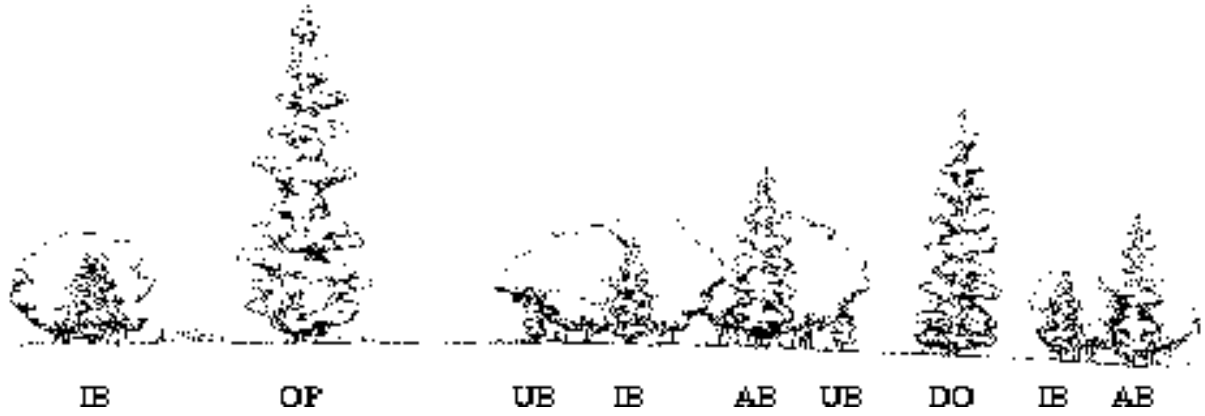
Field 16: Crown Class. Record the crown class for all live trees. Crown class is the description of the relative position of the tree crown with respect to competing vegetation surrounding the tree. Crown Class is determined in the context of its immediate environment, trees or shrubs that are competing for sunlight or moisture with the subject tree. Crown class codes are as follows:

Code	Name	Description
		Used when competing vegetation is TREES.
OP	**Open-grown or Isolated**	Tree crowns receive full light from above and from all sides. In even-aged stands, these trees have their crowns well above the general canopy.
DO	**Dominant**	Tree crowns receive full light from above and partly from the sides. Crowns extend above the general level of the crown cover of others of the same stratum and are not physically restricted from above, although possibly somewhat crowded by other trees on the sides.
CO	**Codominant**	Tree crowns receive full light from above, but comparatively little from the sides. Crowns form a general level of crown stratum, are not physically restricted from above and are crowded by other trees from the sides.
IN	**Intermediate**	Tree crowns occupy a definitely subordinate position and are subject to strong lateral competition from crowns of dominants and codominants. They receive little direct light from above through small holes in the canopy, but no light from the sides.
OV	**Overtopped**	Tree crowns receive no direct light from above or from the sides and are entirely below the general level of dominant and codominant trees.
RE	**Remnant**	Trees that remain from a previous management activity or catastrophic event. The tree is significantly older than the surrounding vegetation. Remnant trees do not form a canopy layer and are usually isolated individuals or small clumps. This definition is from the Region 6 Inventory and Monitoring System field procedures for the Current Vegetation Survey.
		Used when competing vegetation is SHRUBS.
AB	**Leader Above Brush**	The terminal leader of the tree is above the surrounding brush while the middle or lower crown may be within the brush canopy.
IB	**Leader Within Brush**	The terminal leader and upper crown of the tree is within the brush canopy.
UB	**Leader Overtopped by Brush**	The crown of the tree is completely overtopped by the surrounding brush. Brush cover crown classes only apply to isolated or dominant trees with brush competition; therefore, brush cover crown class codes are used as modifiers for open-grown or dominant trees. Competition from adjacent trees is more important than competition from shrubs if they both occur. Generally, brush cover crown codes are used in stands where overstory tree competition is absent.

Crown Class Illustration



Brush Cover Crown Class Illustration

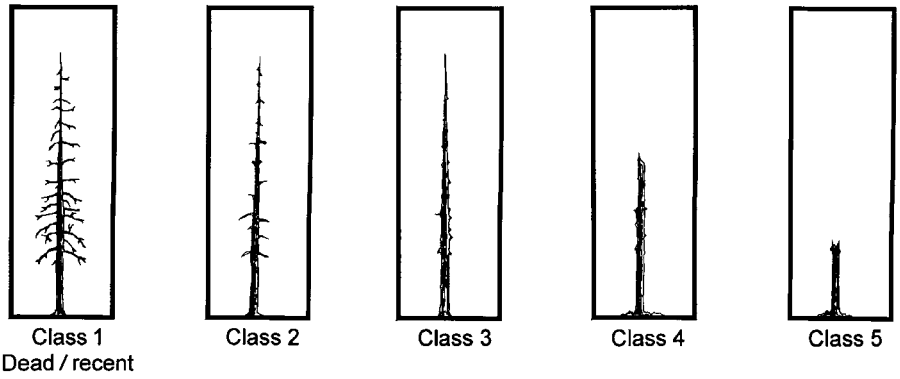


Field 19: Snag Decay. Record the condition of a standing dead tree. The pictures and descriptions below are adapted from "Wildlife Habitats in Managed Forests of the Blue Mountains of Oregon and Washington" by Jack Ward Thomas, Agriculture Handbook No. 553, USDA Forest Service, September, 1979.

Table 6: Snag Decay

Code	Bark	Heartwood Decay	Sapwood Decay	Limbs	Top Breakage	Bole Form	Time Since Death
1	Tight, intact	Minor	None to incipient	Mostly Present	May be present	Intact	1-5 years
2	50% loose or missing	None to advanced	None to incipient	Small limbs missing	May be present	Intact	>5 years
3	75% missing	Incipient to advanced	None to 25%	Few remain	Approx. 1/3	Mostly intact	>5 years
4	75% missing	Incipient to advanced	25%+	Few remain	Approx. 1/3 to ½	Losing form, soft	>5 years
5	75%+ missing	Advanced to crunbly	50%+ advanced	Absent	Approx. ½+	Form mostly lost	>5 years

Snag Decay Class Illustration.



Field 21: Tree Damage Category. Record the tree damage category code for both live and dead trees, based on physical evidence. If category is recorded, severity is required. Multiple damage codes may be recorded for each tree. Reference *Appendix R: Damage Categories, Agents and Severity Ratings* for a complete listing of codes.

Field 22: Tree Damage Agent. Agent is only recorded for Tree Damage Category 99 (Physical Effects). Record only damage agents broken, dead or forked topped (001, 002 and 004).

Field 24: Tree Damage Severity. Record the tree damage severity using the key in *Appendix R: Damage Categories, Agents and Severity Ratings.* If Tree Damage Category is recorded severity is required.

Field 25: Tree Remarks. Information unique to each tree shall be recoded. Describe any reason that a deviation is made from established procedures.

7. <u>Vegetation Composition Form</u>: The Vegetation Composition form is used to collect ocular estimates of height layering and cover of trees, shrubs, forbs, and grass species within the 1/24th acre fixed radius plot. Complete the Vegetation Composition form and record the required fields for all life forms within a layer that has ≥ 5% canopy cover. Reference *Exhibit B: Data Forms*.

Field 1: Plot Number. Record the plot number for each line of Vegetation Composition Data.

Field 3: Layer. Record the layer that describes structural information about the plot. To specify layers, group individuals by life form or tree species into one or more layers (up to a maximum of three). When life form is not accompanied by a species code, a layer shall not be duplicated. A layer shall not be duplicated within any tree species. There must be at least 15% cover in the layer to be considered a separate layer. Record the layers based on height as follows:

Layer	Height Range
1	0.0 – 1.5 feet
2	1.6 – 6.0 feet
3	6.1+ feet

Field 4: Life Form. Assess and record all life forms listed below. Mosses and lichens are described as being in the air (aerial) and not in contact with the ground. Ground mosses and lichens are recorded on the Ground Surface Cover form. Record each life form by layer.

Table 7: Life Form Codes

Code	Description	Code	Description
AL	Algae	SH	Woody Shrub
FB	Herbaceous Forb/ Herb	SS	Woody Subshrub
LC	Lichen	TR	Woody Tree
FU	Fungus	VI	Herbaceous Vine
GR	Herbaceous Graminoid	NP	Nonvascular Plant
LI	Woody Liana	UN	Unknown

Field 5: Species. Record for life form "TR" (Woody Tree) only. Tree species having ≥ 5% canopy cover shall be identified to species. When individual tree species in a layer do not have ≥ 5% canopy cover all species within that layer shall be grouped and the species shall be left blank. Tree species that are recorded individually shall not be included in any other count. For species codes reference *Appendix H: List of Tree Species*. For all other life forms, the species field shall be left blank.

Field 7: Average Layer Height. Record the average height, in feet, by layer for each recorded life form. This value represents the average height of all individuals within the layer. Height is the distance from the base of the plant on the up hillside at ground level to the tip of the plant.

Field 9: Canopy Cover. Record the estimated canopy cover, in whole percent, for each recorded life form or tree species by layer. Canopy cover is the percent of the horizontal area that is covered by the sum of the vertical, downward projection of the live foliar area (crown) of all the individuals of that life form. The sum of these coverage's for all life forms may be much greater than 100% since portions of the subplot may be covered by several life forms and would therefore be counted several times.

Field 12: Vegetation Remarks. Enter comments relevant to each line of data.

8. <u>Ground Surface Cover Form:</u> The Ground Surface Cover Form collects data that is not a specific PLANT species. Complete the Ground Surface Cover form and record the ground surface cover codes for all cover types that have ≥ 1% cover at the soil surface plane on a $1/24^{th}$ acre fixed radius plot. Reference *Exhibit B: Data Forms*.

Field 1: Plot Number. Record the plot number for each line of Ground Surface Cover Data.

Field 2: Ground Surface Cover Type. Assess and record the following ground surface cover types having ≥ 1% ground surface cover. Mosses and lichens are describes as being in contact with the ground.

Table 8: Ground Surface Cover Codes

Code	Description	Definition
ASH	Ash (organic, from fire)	Remaining residue after all combustible material has been burned off.
BARE	Bare soil (soil particles < 2 mm)	Bare soil, not covered by rock, cryptograms or organic material. Does not include any part of a road (see definition of road).
BAVE	Basal vegetation	Basal vegetation is the soil surface occupied by live basal or root crown portion of vascular plants. This includes live trees. This is not the foliar cover of plants. Typical plant cover ranges between 3-7%; 15% is very high and rarely encountered.
DEVP	Developed land	Surface area occupied or covered by any man-made structure other than a road, such as a building, dam, parking lot, electronic site/structure.
LICH	Lichen	Lichens: an organism generally recognized as a single plant that consists of a fungus and an alga or cyanobacterium living in a symbiotic association.
LITT	Litter and Duff	Leaf and needle litter, and duff not yet incorporated into the decomposed top humus layer. Non-continuous litter is not included (for example, scattered needles over soils is classified as BARE).
MOSS	Moss	Nonvascular, terrestrial green plants including mosses, hornworts and liverworts- always herbaceous.
ROAD	Road	Improved roads, paved roads, gravel roads, improved dirt roads and off-road vehicle trails regularly maintained or in long-term continuing use. Generally constructed using machinery. Includes cut banks and fills.
ROCK	Rock	Relatively hard, naturally formed mineral or petrified matter > 1/8 inch in dia. Appearing on soil surface as small to large fragments or as real large bodies, cliffs, outcrops or peaks. Includes bedrock.
WATE	Water	Where the water table is above the ground surface during the growing season, such as streams, bogs, swamps, marshes and ponds.
WOOD	Wood	Woody material, slash and debris; any woody material, small and large woody debris, regardless of depth. Litter and non-continuous litter are not included (for example, scattered needles over soil is classified as BARE).

Field 3: Ground Surface Cover Percent. Record the whole percent ground cover at the soil surface plane, as seen from above, for each ground surface cover type. Cover is defined as the portion of the horizontal surface layer intersected by ground surface features. Total surface cover of all features **must equal 100%.** Foliar canopy cover above the soil surface plane is not considered ground surface cover.

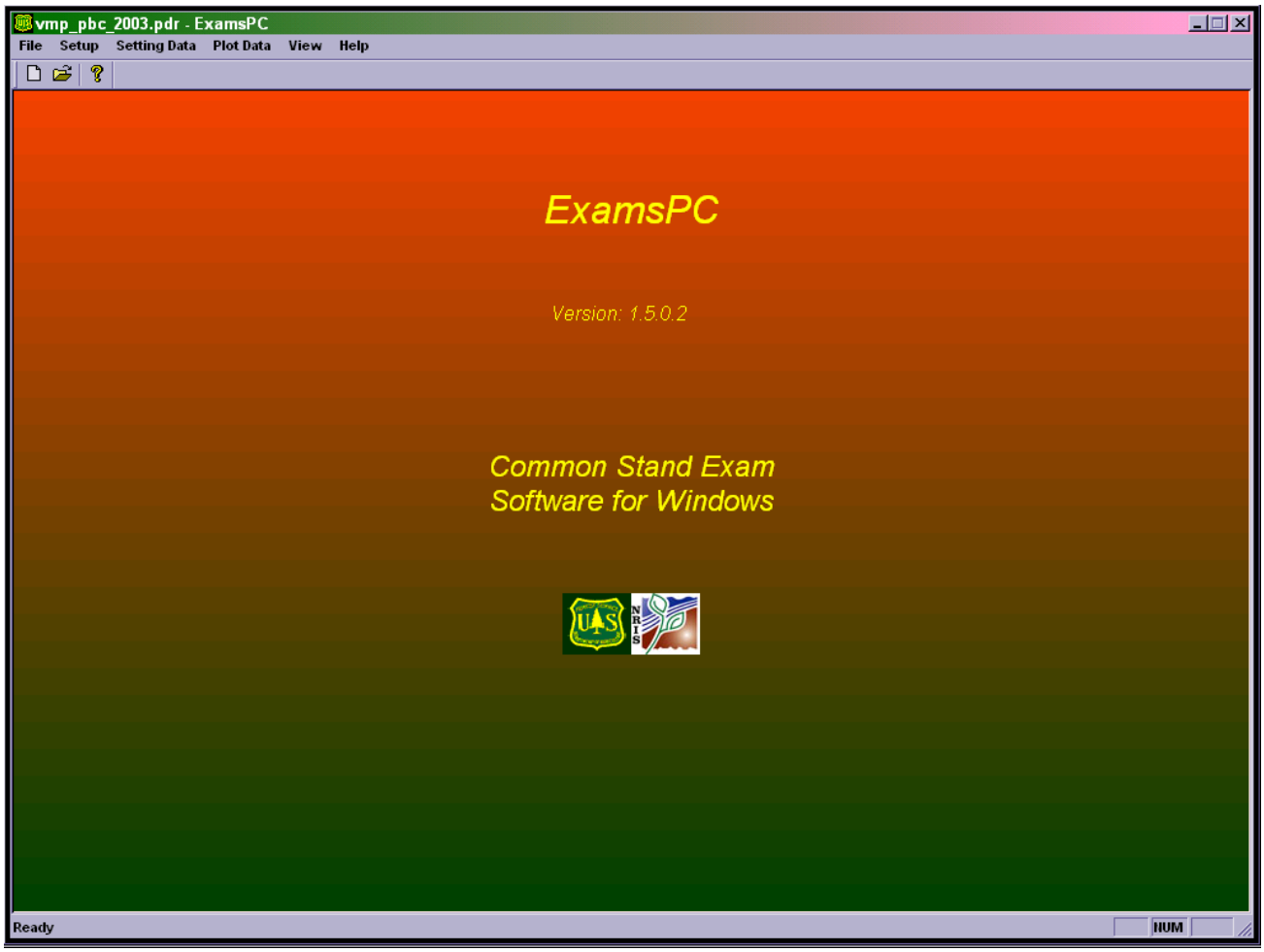
Field 4: Ground Surface Cover Remarks. Enter remarks about the ground surface cover relevant to each plot.

Section 2

Data Entry Procedure

INSTALLING AND APPLYING "EXAMSPC" SOFTWARE

EXECUTING EXAMSPC SOFTWARE.



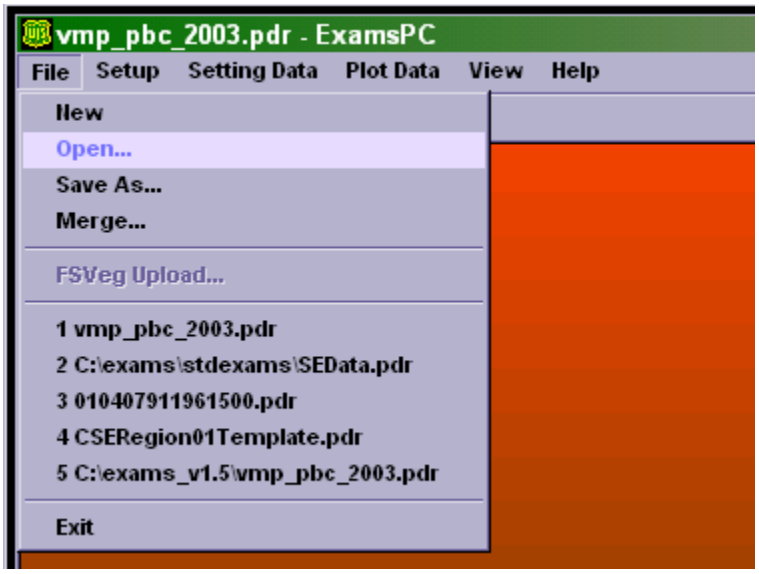
Step	Process
1	Double click on the "**My Computer**" icon on your desktop.
2	Double click on "**Local Disk (C:)**"
3	Double click on the "**exams**" folder.
4	Double click on "**ExamsPC.exe**."

SETTING UP THE SOFTWARE.

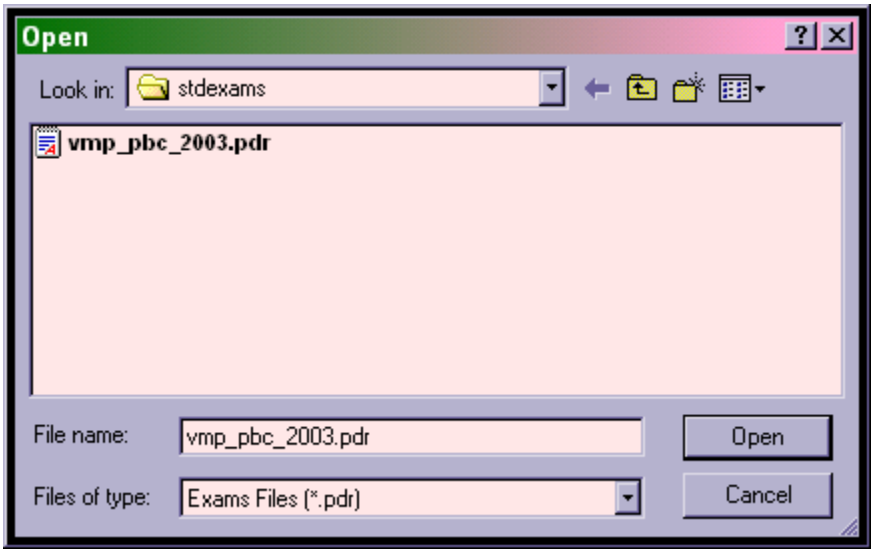
The setup process defines the user definitions, field selections, and the sample design. The setup file **vmp_pbc_2003.pdr** contains all definitions and defaults provided for the *Field Instructions Stand Examination Region One Northern Region Vegetation Mapping Project (R1-VMP) Handbook.*

File.

From the **"ExamsPC"** main menu, select "**File/Open**".

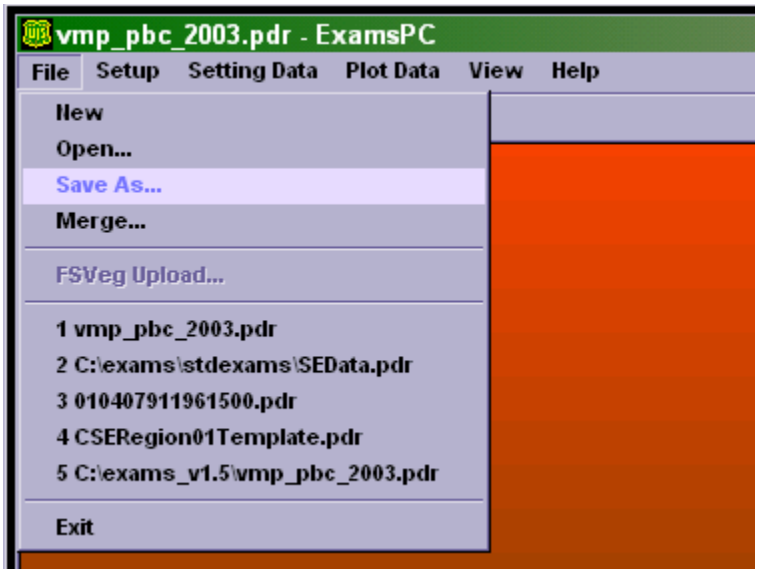


Navigate to **"STDExams"** folder and select the file **vmp_pbc_2003.pdr**. This is the master template that houses all the codes and defaults.

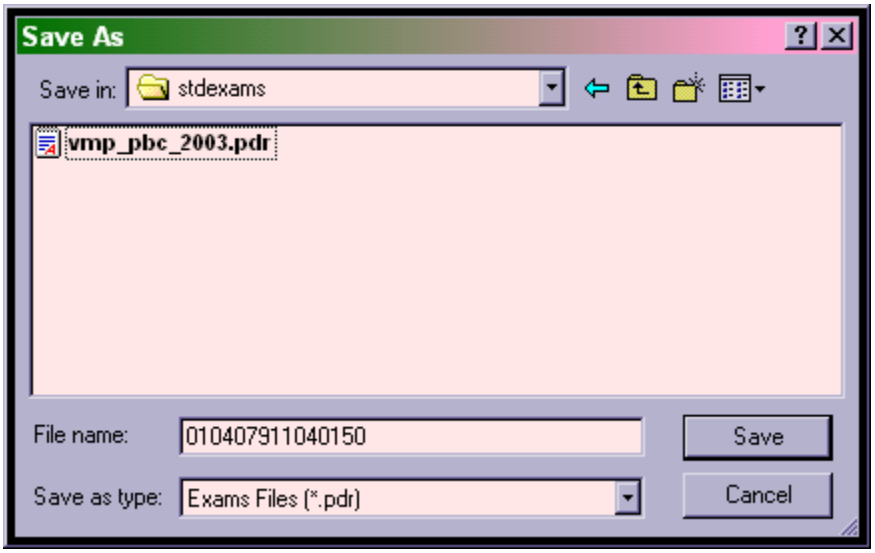


Step	Process
1	From **"ExamsPC"** main menu, select "**File/Open**".
2	Navigate to **"STDExams"** folder and select the file **vmp_pbc_2003.pdr**.
3	The "**Look in**" window shall be the "stdexams" folder.
4	The **"File name"** shall be **"vmp_pbc_2003.pdr"**.
5	The "**Files of type**" window shall specify "**Exams Files (*.pdr)**."
6	Click the "**Open**" button.

From the **"ExamsPC"** main menu, select "**File/Save As**".



Navigate to **"STDExams"** folder and name the file Proclaimed Region XX, Proclaimed National Forest XX, District XX, Location XXXXX and Stand Number XXXX, 010407911040150, and **Save**.



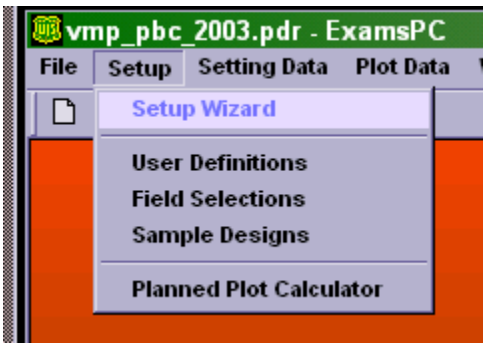
Step	Process
7	From **"ExamsPC"** main menu, select "**File/Save As**".
8	Navigate to **"STDExams"** folder.
9	The "**Save in**" window shall be the "stdexams" folder.
10	The **"File name"** shall be the Proclaimed Region (01), Proclaimed National Forest (04), District (07), Location (91104) and Stand Number (0150).
11	The "**Save as type**" window shall specify "**Exams Files (*.pdr)**."
12	Click the "**Save**" button.

SETUP.

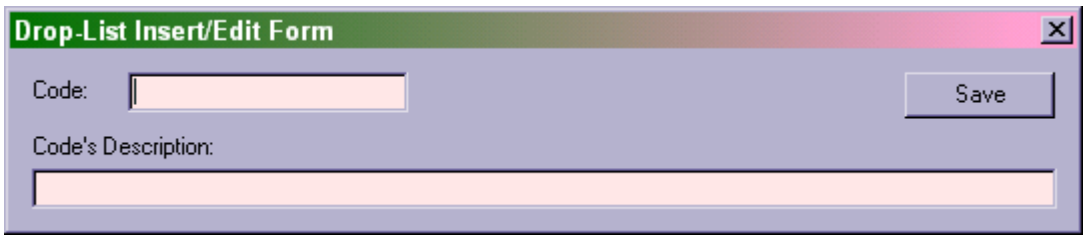
Setup Wizard.

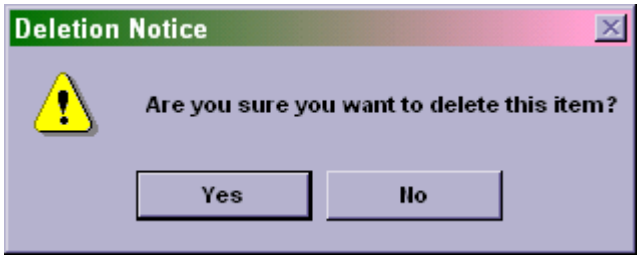
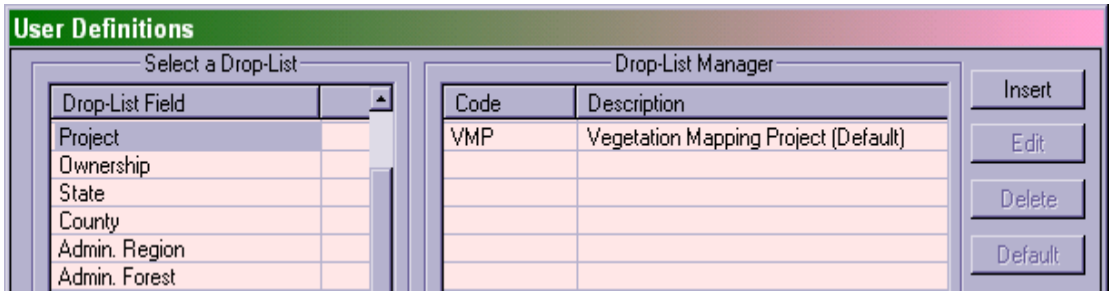
The "Setup Wizard" provides access to all the setup screens; "User Definitions", "Field Selections" and "Sample Design" by selecting the "Next" button.

From the **"ExamsPC"** main menu, select **"Setup"/"Setup Wizard"**.

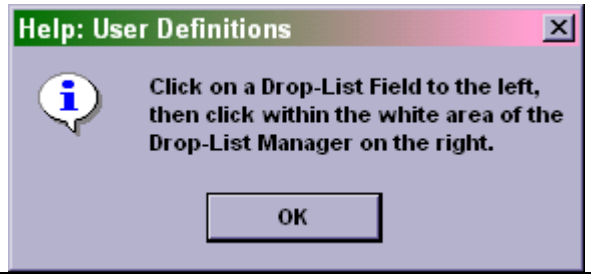


The buttons to the far right of the User Definition screen have the following function:

Insert	Insert a new code and description into the drop list. 

Edit	Edit an existing code or description in the drop list. Select the code first, and then select "**Edit**." 
Delete	Delete an existing code and description from the drop list. Select the code first, and then select "**Delete**." 
Default	Select a code in the drop list to be the default, and then click the Default button. 

The buttons along the bottom of the User Definition screen have the following function:

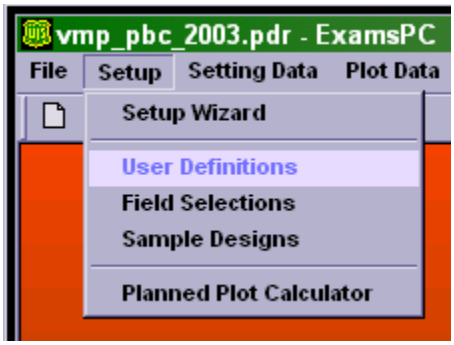
Help	Produce a helpful hint depending on which screen the cursor is in. 

Options/Refresh	Deletes any changes since the last "**Save**" request.
Options/Restore	Deletes **ALL** changes, restores all drop down lists to the original list that accompanied the software. The original software contains all the data collection fields and codes for Region 1. A warning message is **NOT** displayed.
Back	Inactive from this window.
Next	Jumps to the Field Selection Screens and the Sample Design Screens.
Cancel	Delete all changes, restore all drop down lists to the original list that accompanied the software. A warning message is displayed. 
Save	Inactive from this window.
Finish	Finish and save all changes and return to the main menu.

User Definitions.

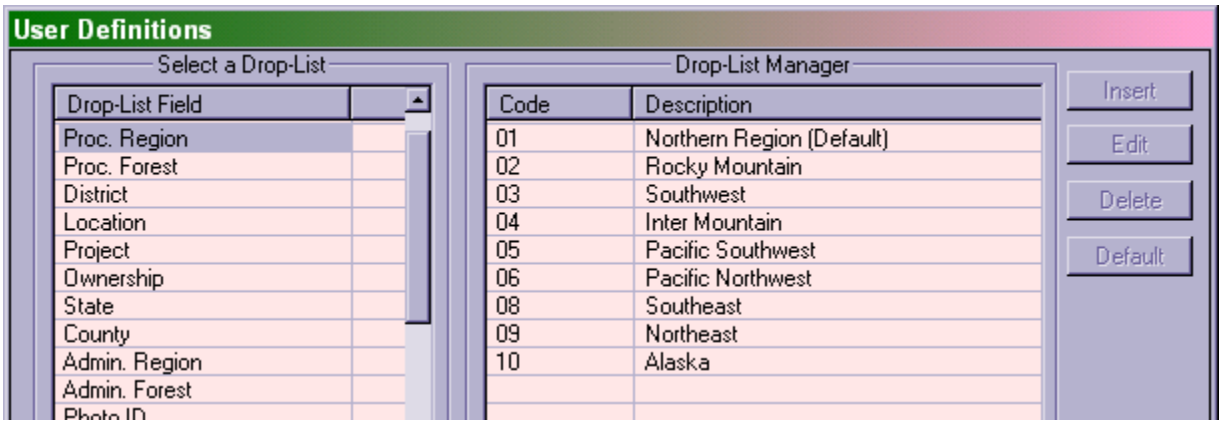
This screen is used to create a customized list of codes for setting data, plot data, tree data and vegetation composition data variables. All "Drop List Fields" and "Drop List Manager" codes shall be provided in **"vmp_pbc_2003.pdr"** and shall reflect the following.

From the **"ExamsPC"** main menu, select **"Setup"/ "User Definitions"**.

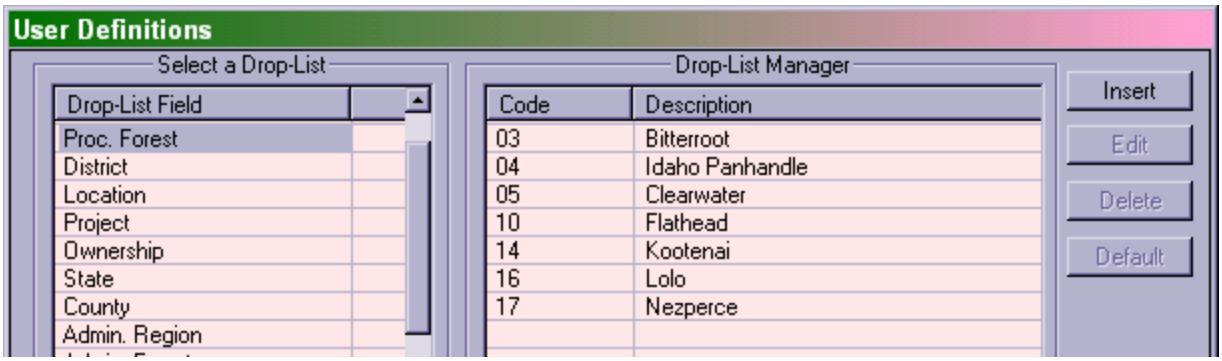


The Drop-List Field contains a list of setting, plot, tree and vegetation variables. The Drop-List Manager contains the customized list of codes and descriptions for each variable.

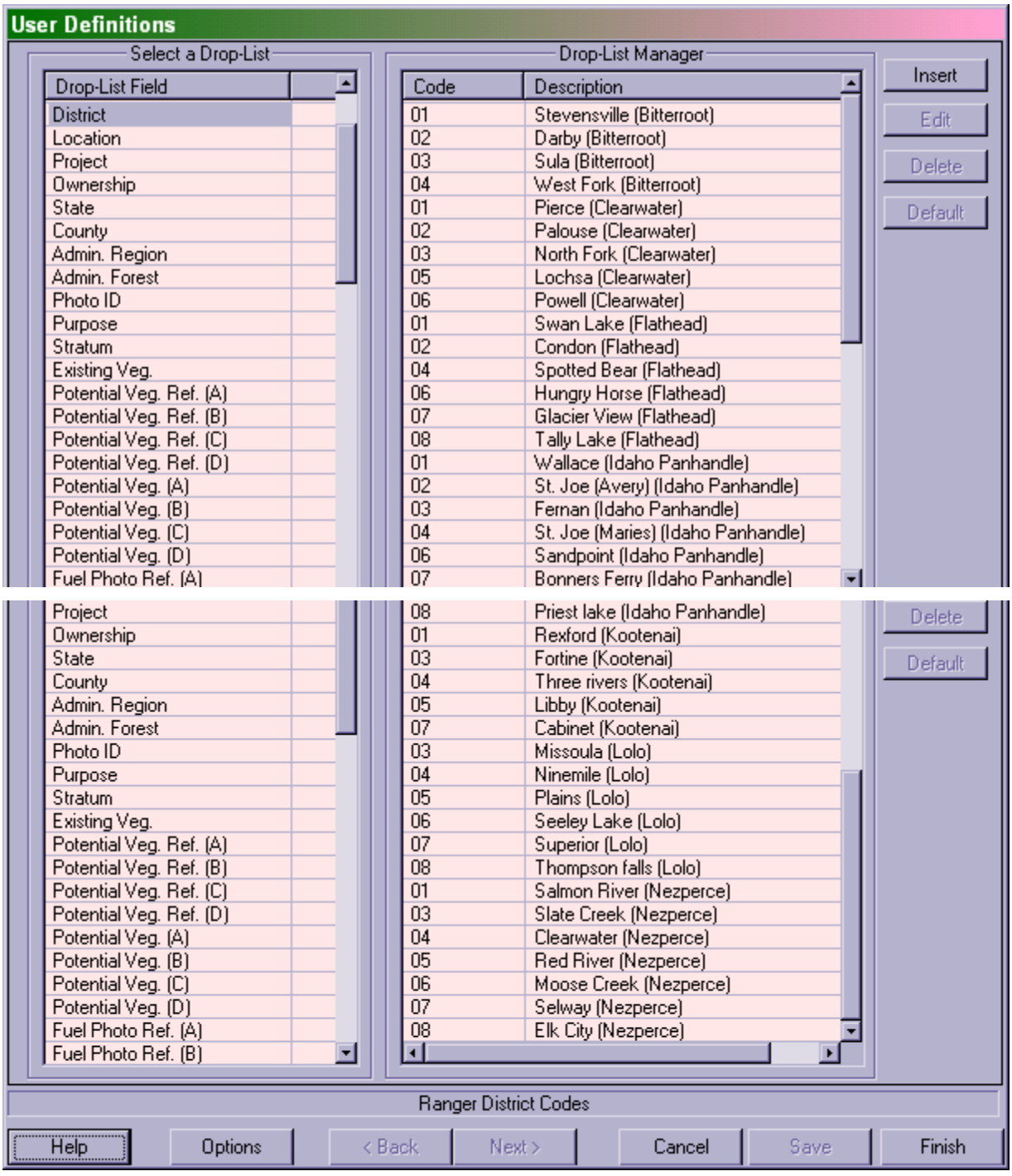
Proclaimed Region.



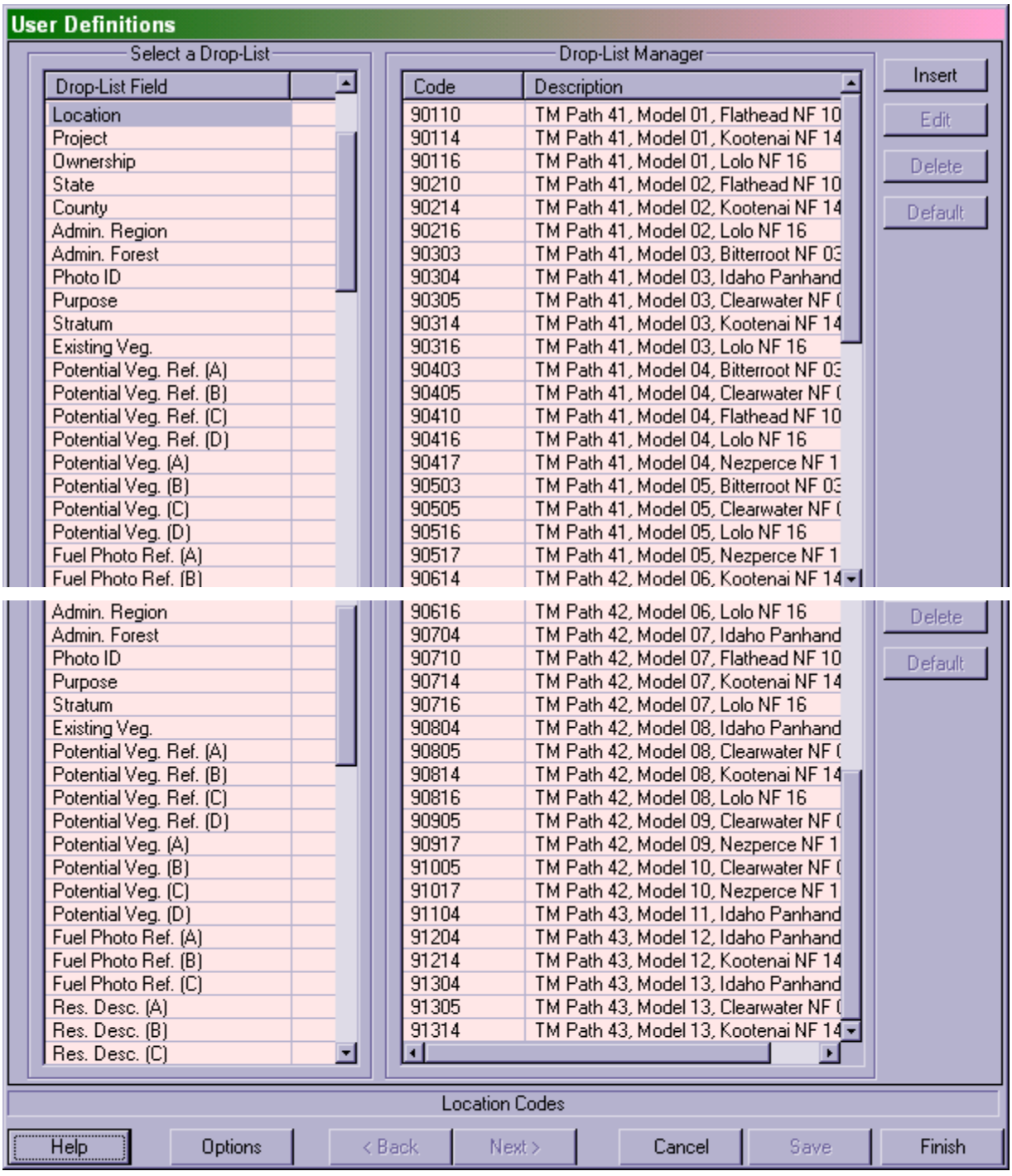
Proclaimed Forest.



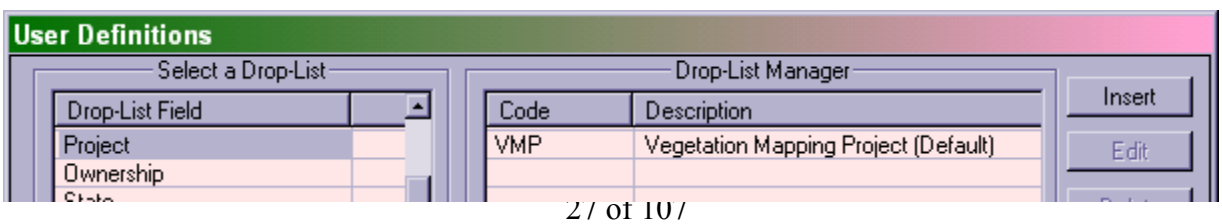
District.


User Definitions
Select a Drop-List
Drop-List Field
District
Location
Project
Ownership
State
County
Admin. Region
Admin. Forest
Photo ID
Purpose
Stratum
Existing Veg.
Potential Veg. Ref. (A)
Potential Veg. Ref. (B)
Potential Veg. Ref. (C)
Potential Veg. Ref. (D)
Potential Veg. (A)
Potential Veg. (B)
Potential Veg. (C)
Potential Veg. (D)
Fuel Photo Ref. (A)
Fuel Photo Ref. (B)
Drop-List Manager
Code
Description
01 Stevensville (Bitterroot)
02 Darby (Bitterroot)
03 Sula (Bitterroot)
04 West Fork (Bitterroot)
01 Pierce (Clearwater)
02 Palouse (Clearwater)
03 North Fork (Clearwater)
05 Lochsa (Clearwater)
06 Powell (Clearwater)
01 Swan Lake (Flathead)
02 Condon (Flathead)
04 Spotted Bear (Flathead)
06 Hungry Horse (Flathead)
07 Glacier View (Flathead)
08 Tally Lake (Flathead)
01 Wallace (Idaho Panhandle)
02 St. Joe (Avery) (Idaho Panhandle)
03 Fernan (Idaho Panhandle)
04 St. Joe (Maries) (Idaho Panhandle)
06 Sandpoint (Idaho Panhandle)
07 Bonners Ferry (Idaho Panhandle)
08 Priest lake (Idaho Panhandle)
01 Rexford (Kootenai)
03 Fortine (Kootenai)
04 Three rivers (Kootenai)
05 Libby (Kootenai)
07 Cabinet (Kootenai)
03 Missoula (Lolo)
04 Ninemile (Lolo)
05 Plains (Lolo)
06 Seeley Lake (Lolo)
07 Superior (Lolo)
08 Thompson falls (Lolo)
01 Salmon River (Nezperce)
03 Slate Creek (Nezperce)
04 Clearwater (Nezperce)
05 Red River (Nezperce)
06 Moose Creek (Nezperce)
07 Selway (Nezperce)
08 Elk City (Nezperce)
Insert
Edit
Delete
Default
Ranger District Codes
Help
Options
< Back
Next >
Cancel
Save
Finish

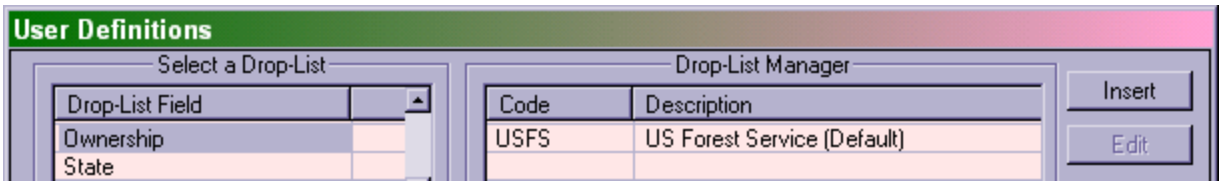
Location.



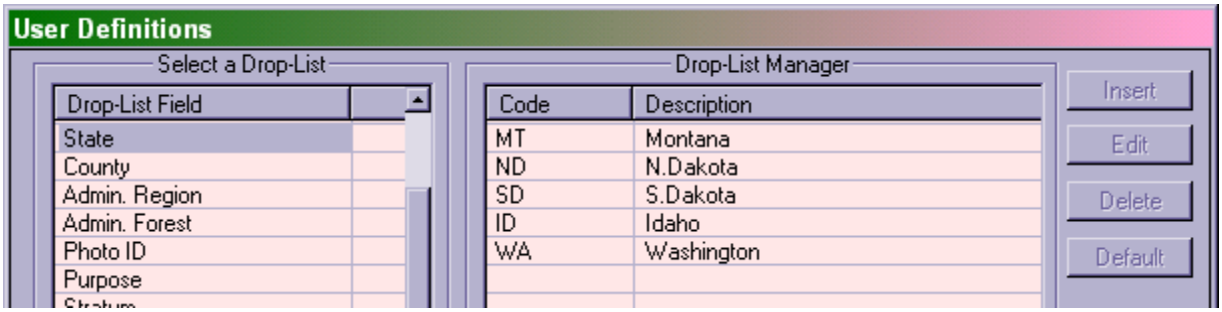
Project.



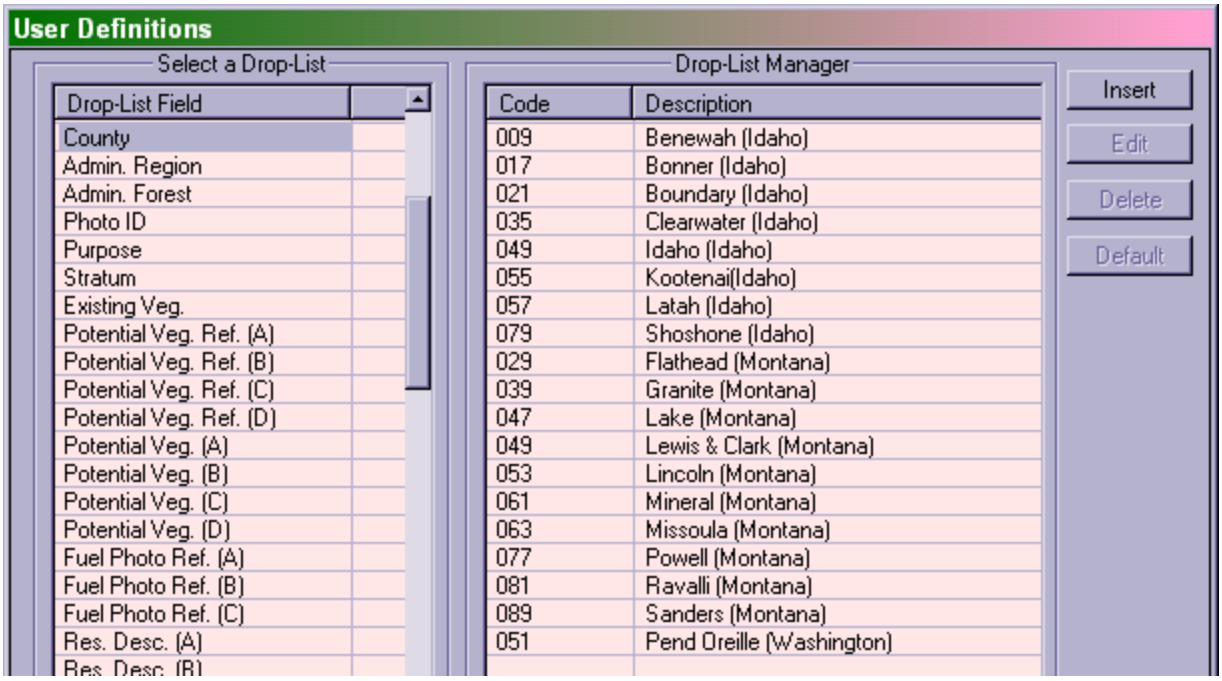
Ownership.



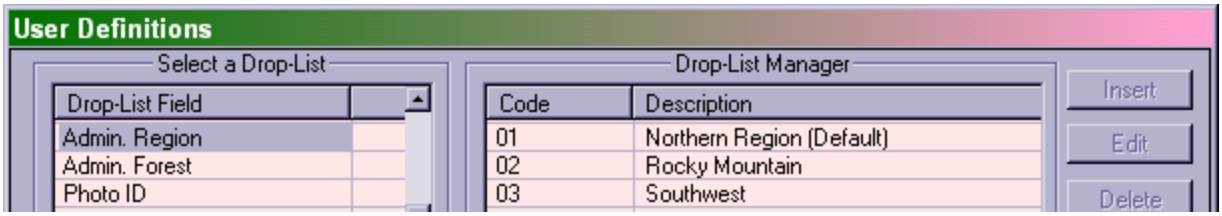
State.



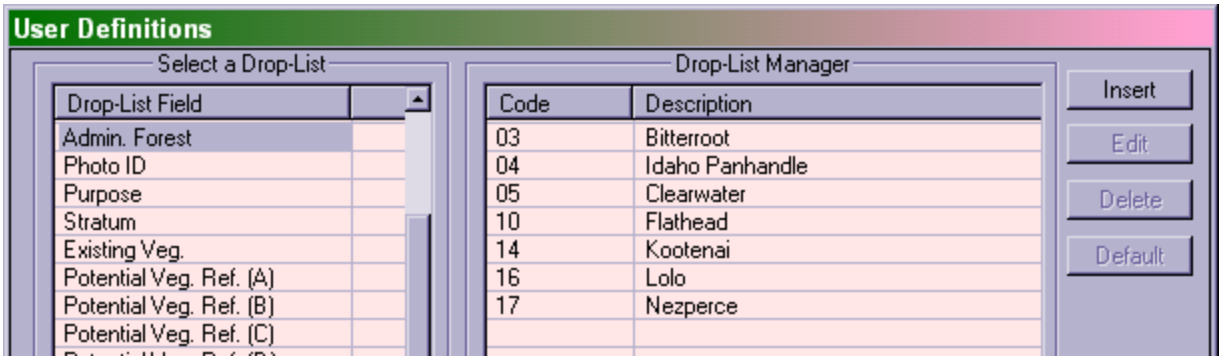
County.



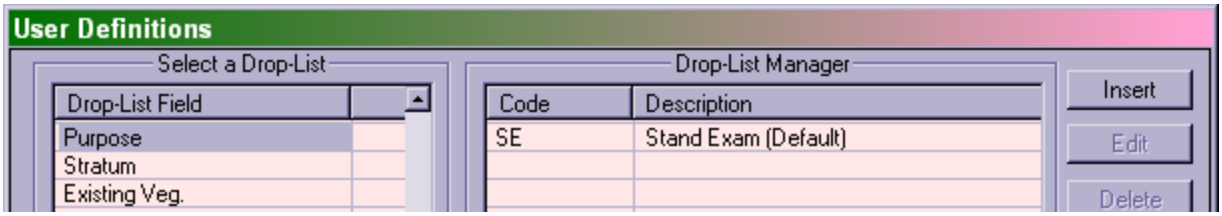
Administrative Region.



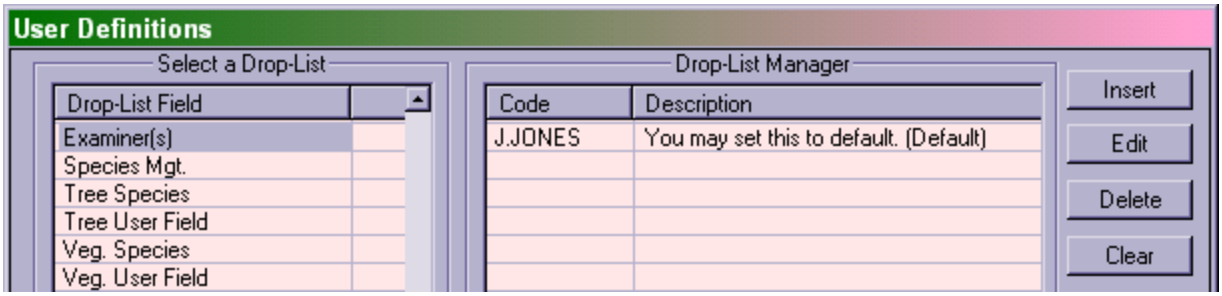
Administrative Forest.



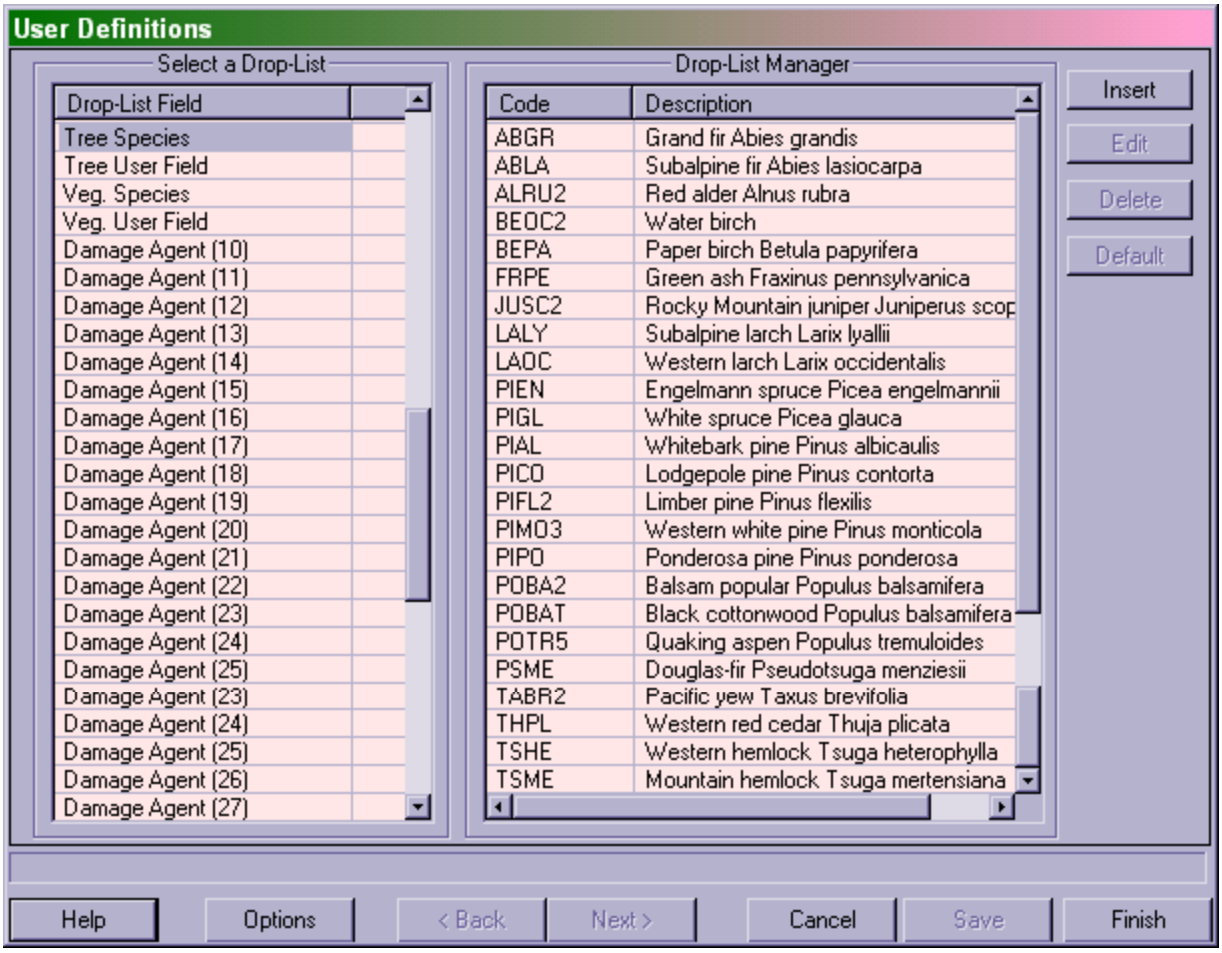
Exam Purpose.



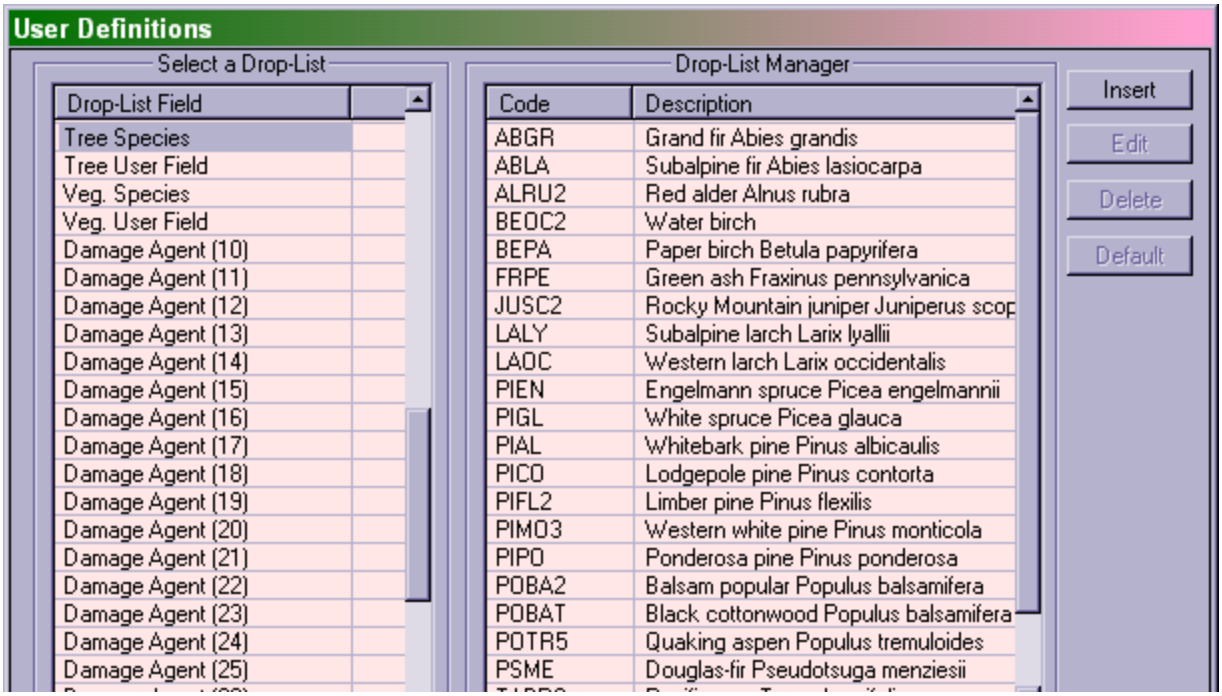
Examiner.



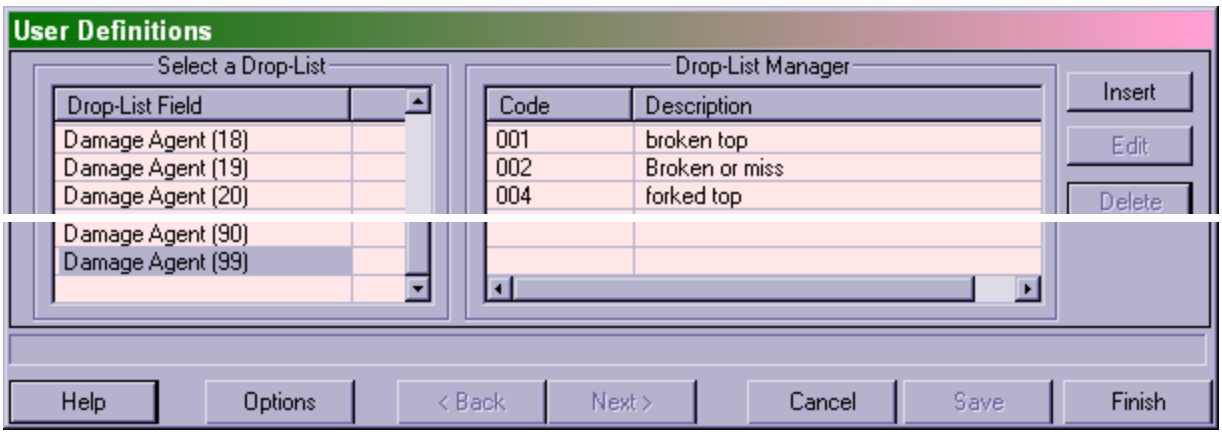
Tree Species.



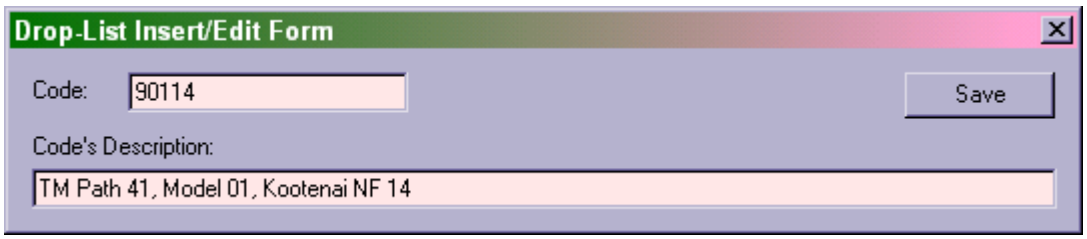
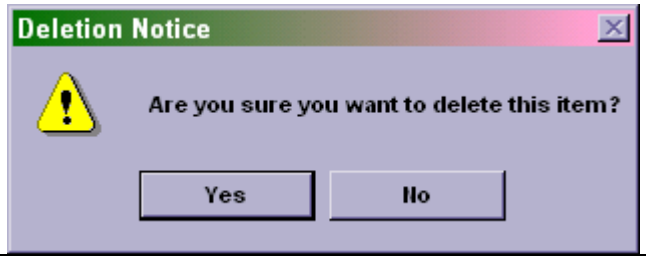
Vegetation Species.

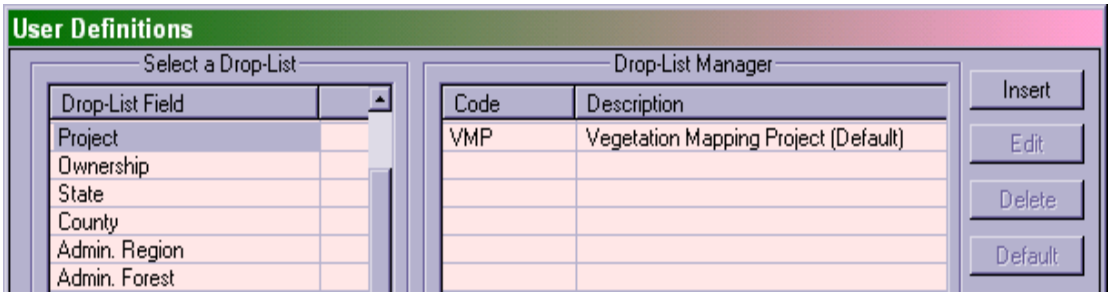


Damage Agent (99).

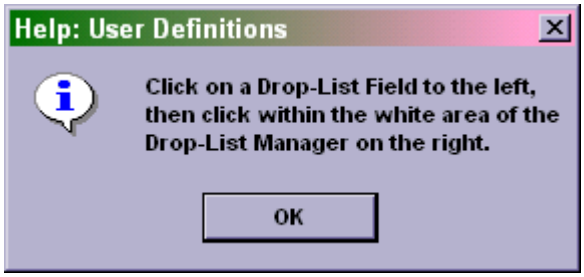


The buttons to the far right of the User Definition screen have the following function:

Insert	Insert a new code and description into the drop list. 
Edit	Edit an existing code or description in the drop list. Select the code first, then select "**Edit**." 
Delete	Delete an existing code and description from the drop list. Select the code first, and then select "**Delete**." 

Default	Select a code in the drop list to be the default, and then click the Default button. 

The space above the bottom buttons displays an explanation of the selected field. The buttons along the bottom of the User Definition screen have the following function:

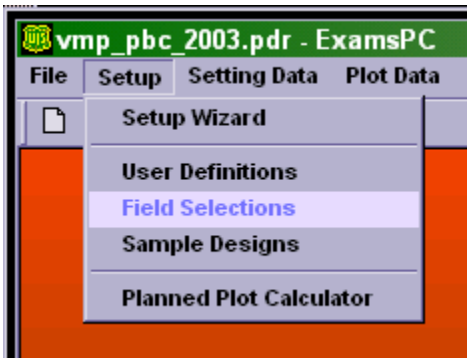
Help	Produce a helpful hint depending on which screen the cursor is in. 
Options/Refresh	Deletes any changes since the last "**Save**" request.
Options/Restore	Deletes **ALL** changes, restores all drop down lists to the original list that accompanied the software. The original software contains all the data collection fields and codes for Region 1. A warning message is **NOT** displayed.
Back	Inactive from this window.
Next	Inactive from this window.

Cancel	Delete all changes, restore all drop down lists to the original list that accompanied the software. A warning message is displayed. 
Save	Inactive from this window.
Finish	Finish and save all changes and return to the main menu.

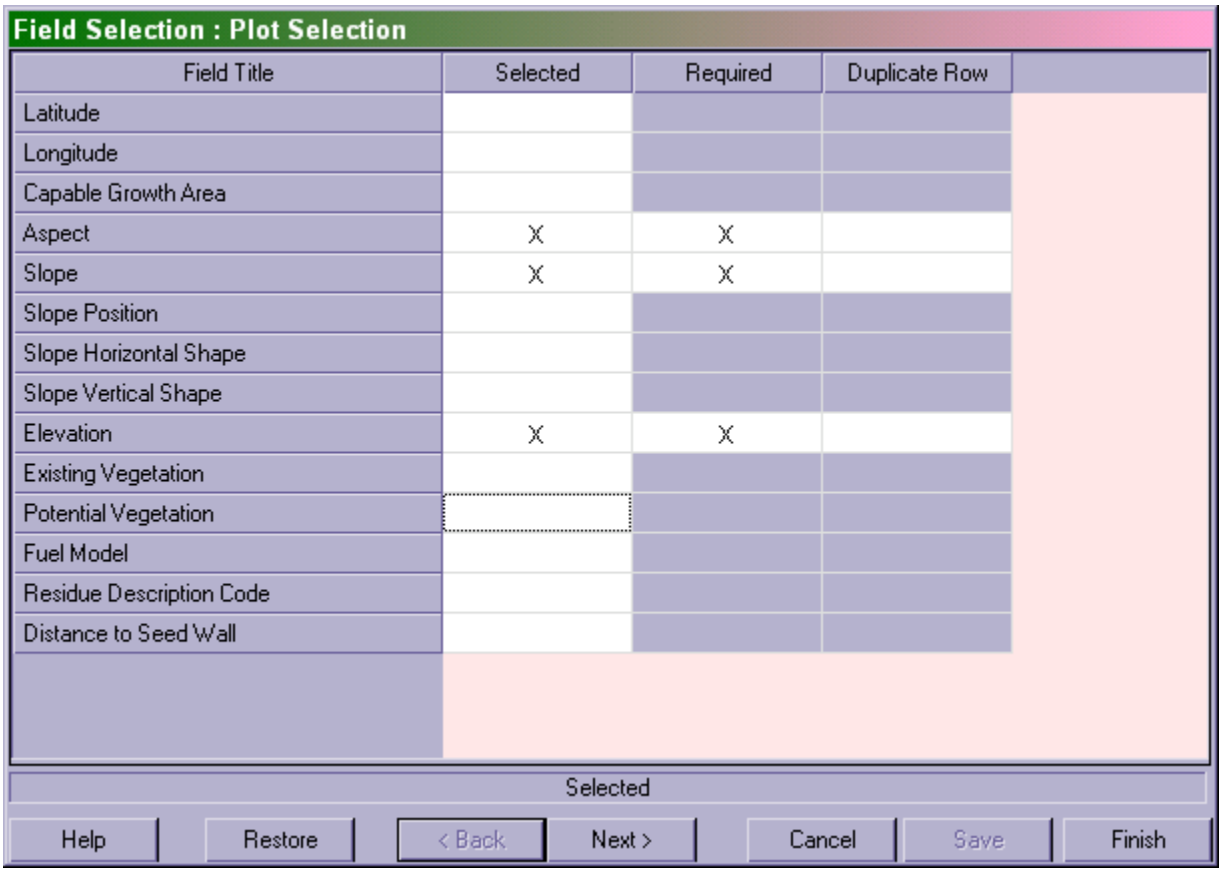
Field Selections.

The Field Selection screens are used to select which plot data, tree data, and vegetation data fields will be displayed. In addition, selected fields are flagged as "required" and/or "duplicates."

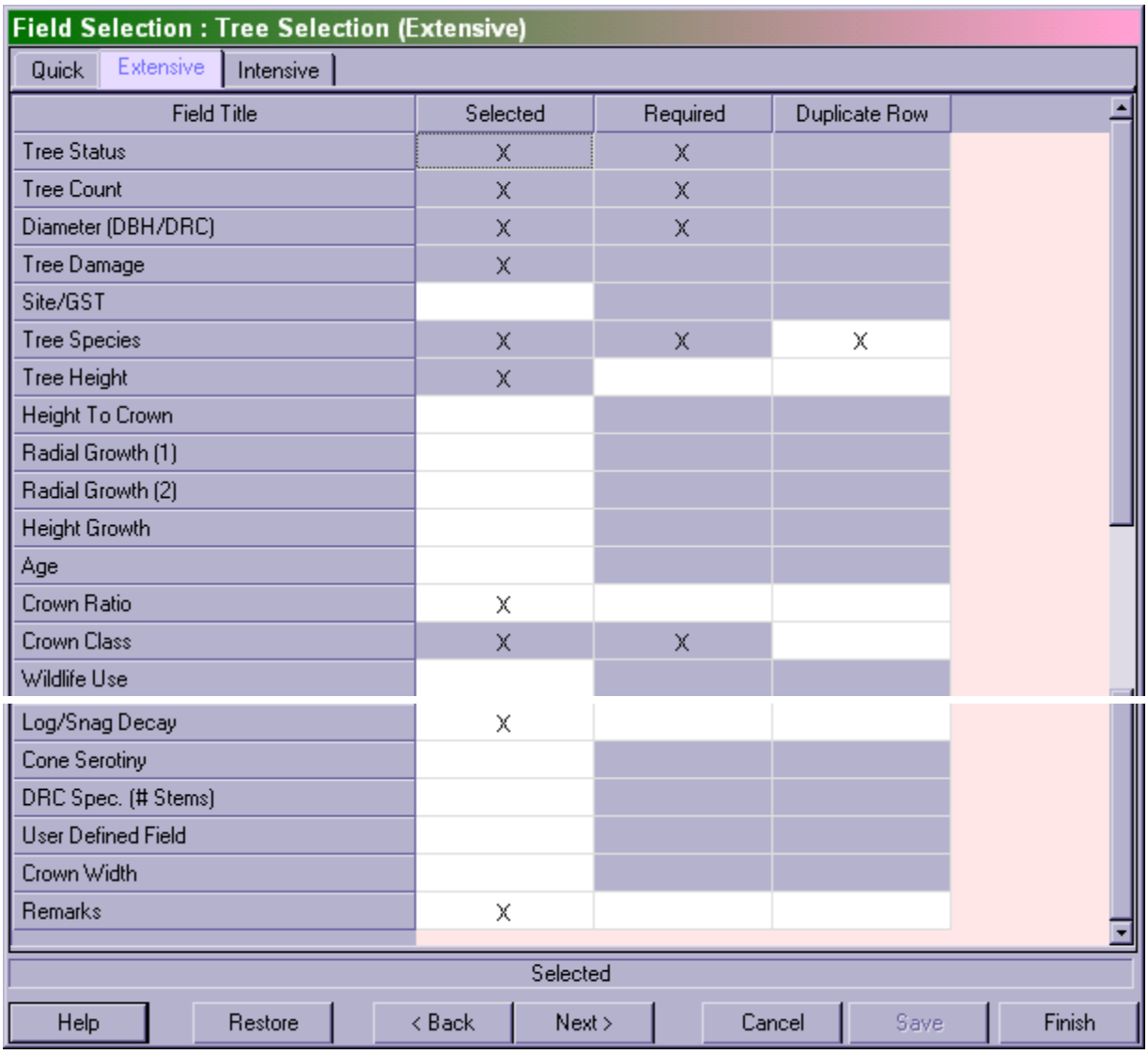
From the **"ExamsPC"** main menu, select **"Setup"/** "**Field Selections**."



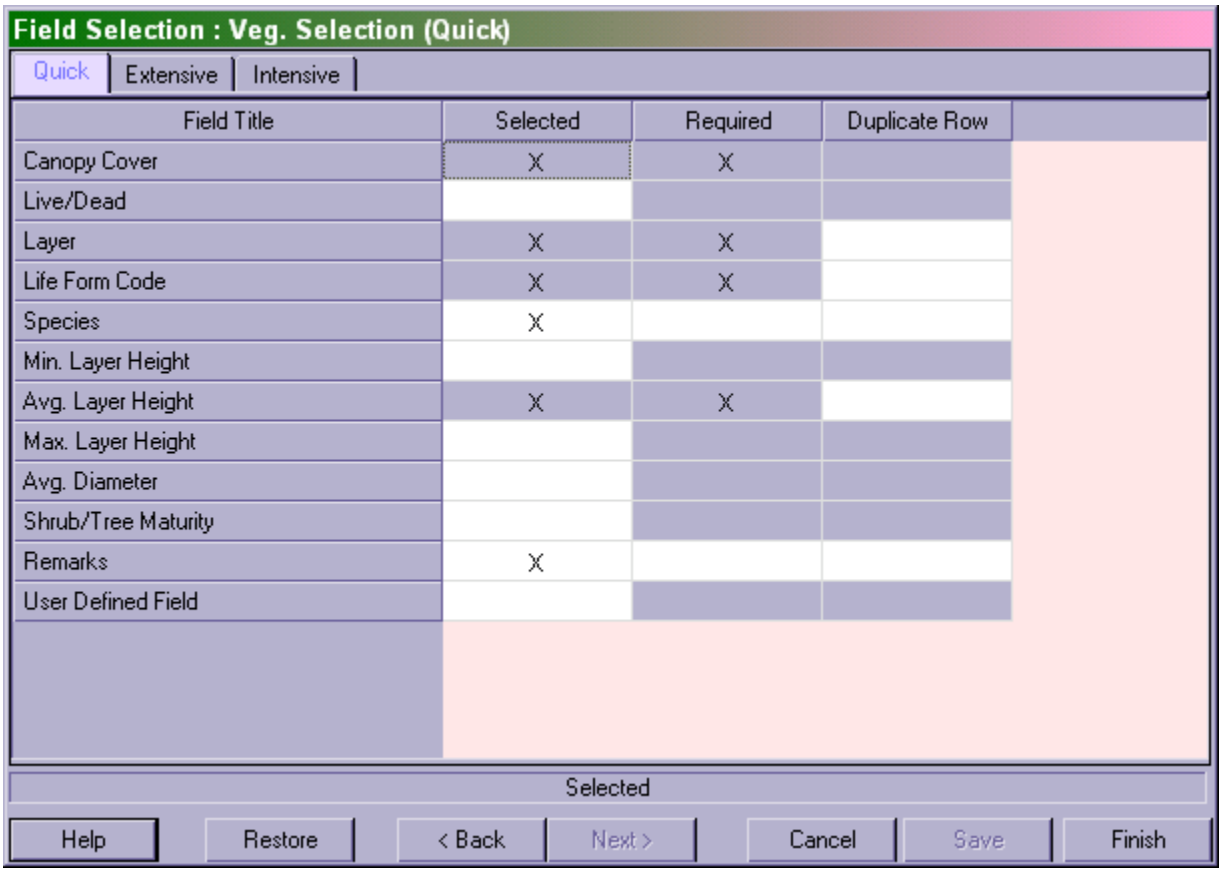
Plot Selection.



Tree Selection (Extensive).



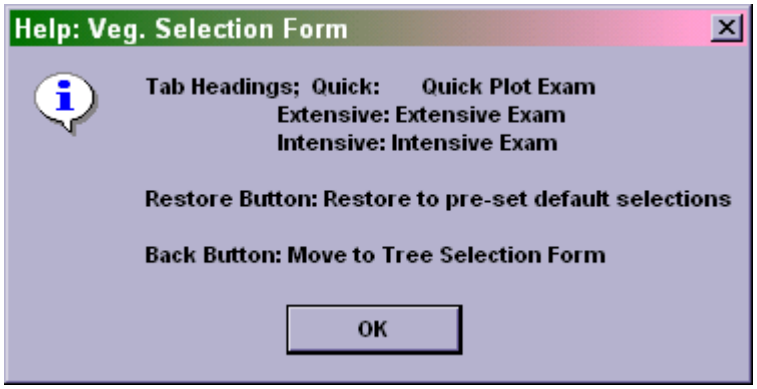
Vegetation Selection (Quick).



The buttons along the top of the screen have the following function:

Selected	Selected fields are displayed and available for data input from the plot form under Plot Data.
Required	A field must first be "**selected**" before it can be "**required**." An error check is preformed on required fields upon exit of the plot form. An error message is produced if a required field is blank.
Duplicate Row	A field must first be "**selected**" before it can be "**duplicated**." During data entry, when a new blank line is accessed, the value from the previous line is duplicated. The duplicated value may be overwritten.

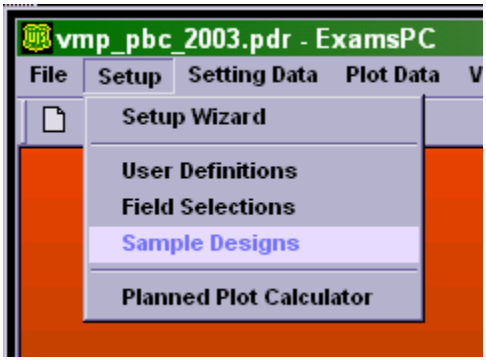
The buttons along the bottom of the screen have the following function:

Help	Defines the tab headings. 
Restore	Deletes **ALL** changes and restores all field selections to the original .pdr file. A warning message will **NOT** be displayed.
Back	Returns to the previous screen.
Next	Jumps to the next screen.
Cancel	Delete all changes made after last save and restores all field selections to the original .pdr file. 
Save	Inactive from this window.
Finish	Finish and saves all changes and returns to the main menu.

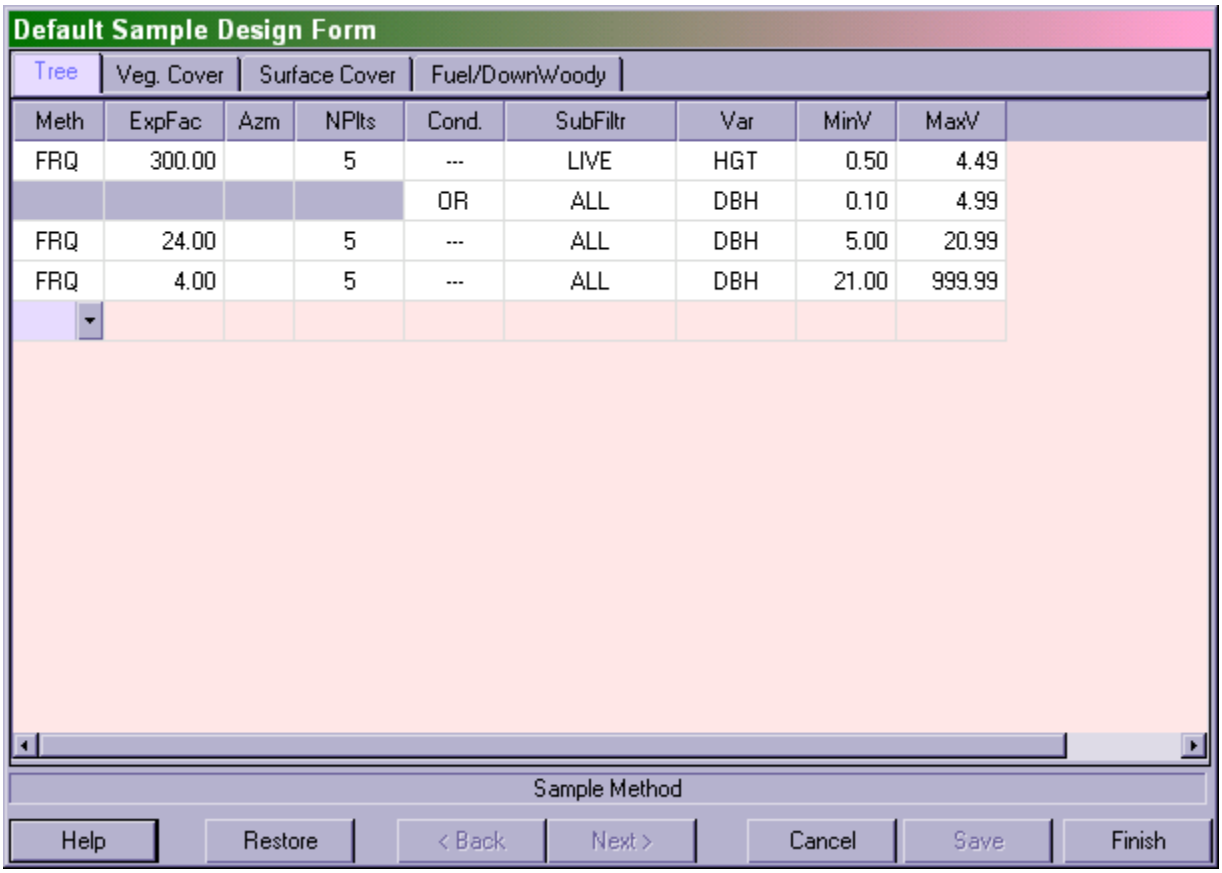
Sample Designs

The following shall be the sample designs for Tree Data, Vegetation Composition Data and Surface Cover Data used for R1-VMP exams.

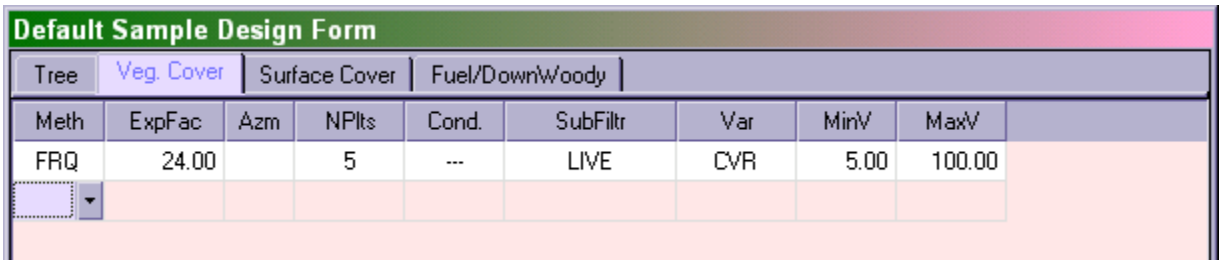
From the **"ExamsPC"** main menu, select **"Setup"/** "**Sample Designs**."



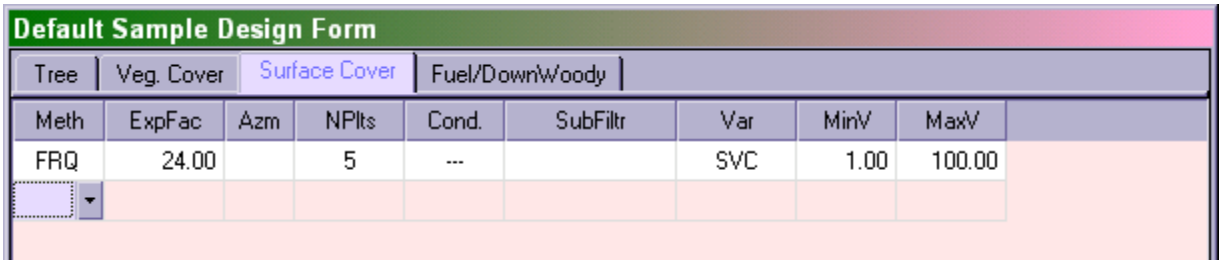
Tree Data.



Vegetation Cover Data.



Surface Cover Data.



The buttons along the top of the screen access the sample design for the selected form.

The space above the bottom buttons displays an explanation of the selected field. The buttons along the bottom of the screen have the following function:

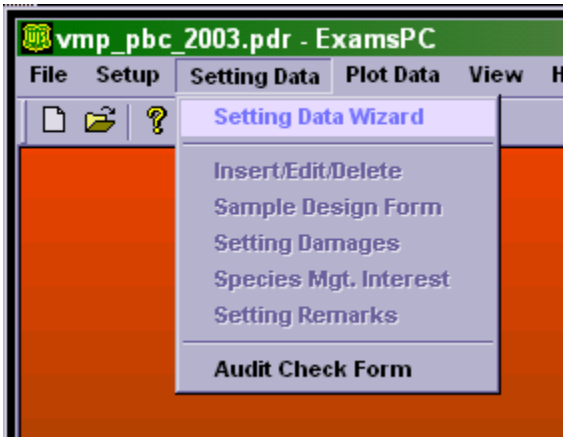
Help	Produces a helpful hint depending on which screen the cursor is in.
Restore	Deletes **ALL** changes and restores all field selections to the original .pdr file. A warning message will **NOT** be displayed.
Back	Return to the previous screen.
Next	Inactive from this window
Cancel	Deletes all changes and restore defaults to the original .pdr file. A warning message is displayed.
Save	Inactive from this window.
Finish	Finish and saves all data and returns to the main menu.

SETTING DATA

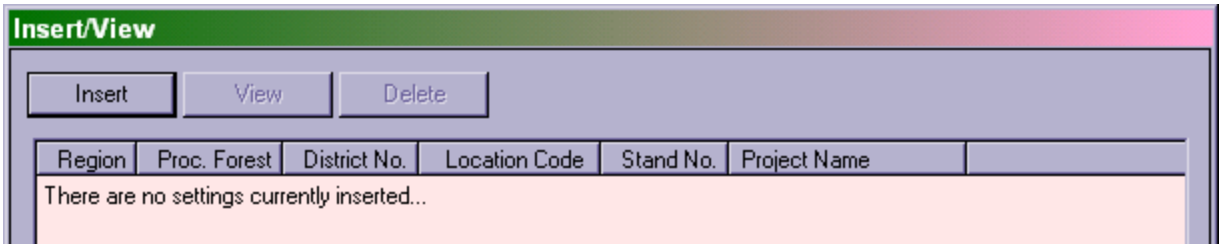
Setting Data Wizard.

Each file shall contain one setting (stand).

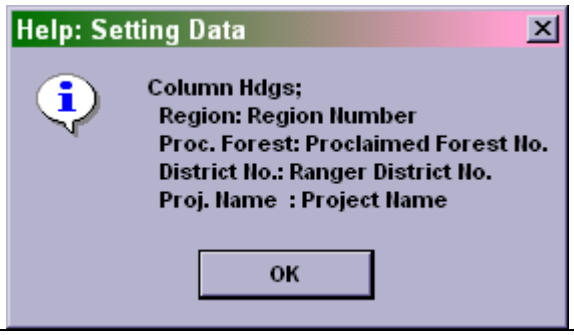
From the **"ExamsPC"** main menu, select **"Setup"**/"**Setting Data Wizard**."



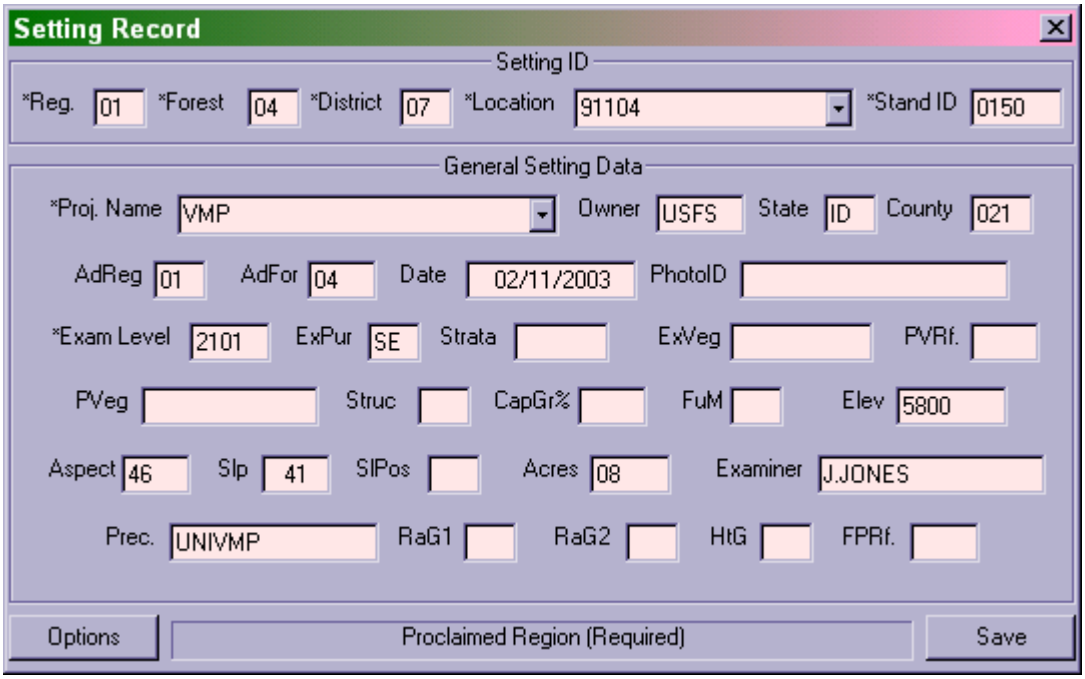
To enter a new setting, select the "**Insert**" button.



The buttons along the bottom of the screen have the following function:

Help	Describes the column headings. 
Back	Inactive from this window.

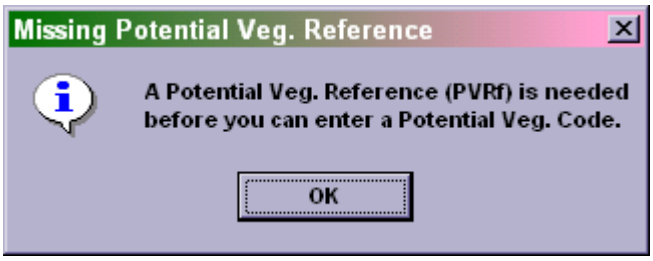
Next	Inactive from this window.
Cancel	Delete all setting data. 
Save	Inactive from this window.
Finish	Finish and saves all changes and returns to the main menu.



Fields that are set with a default for setting in User Definition are found here.

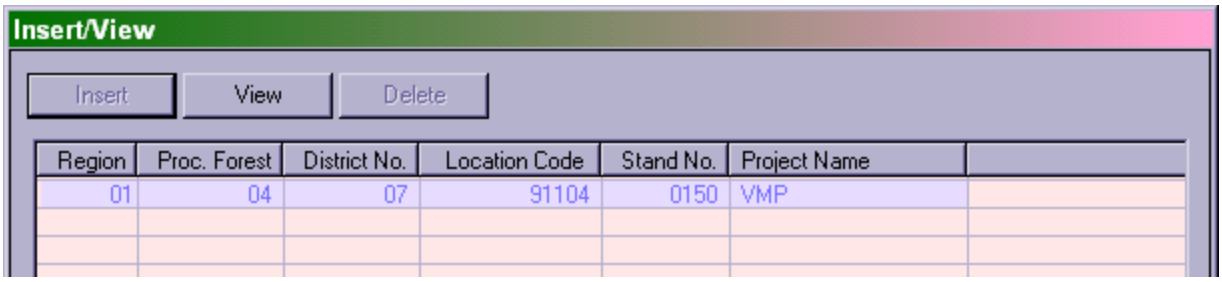
The “Options” button and the “Help” button flip back and forth depending on the field you select. The “Option” button contains a drop-down list of values and the “Help” button explains the field. All fields with an “*” before the field name are required. To move between fields, use the tab or enter key.

When you hit the “PVRf.” Field the following message comes up. Say ok and place the cursor on the “Struc” field and continue.

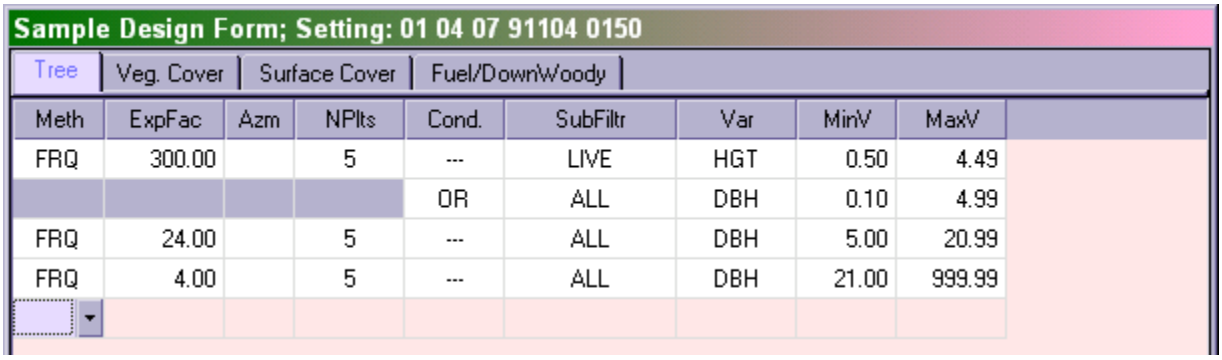


Once all of the data has been entered, select the "**Save**" and **"Finish"** to return to the main setting screen.

To view the stand, highlight the setting and select the "**View**" button at the top of the screen.

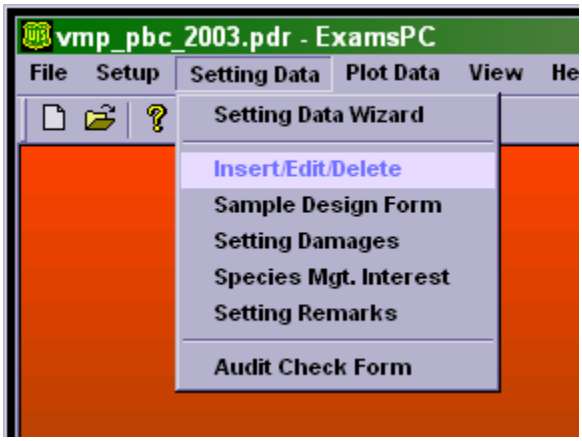


Select the "**Next**" button at the bottom of the screen to view the various Sample Design screens, the setting damage form and species of management interest.

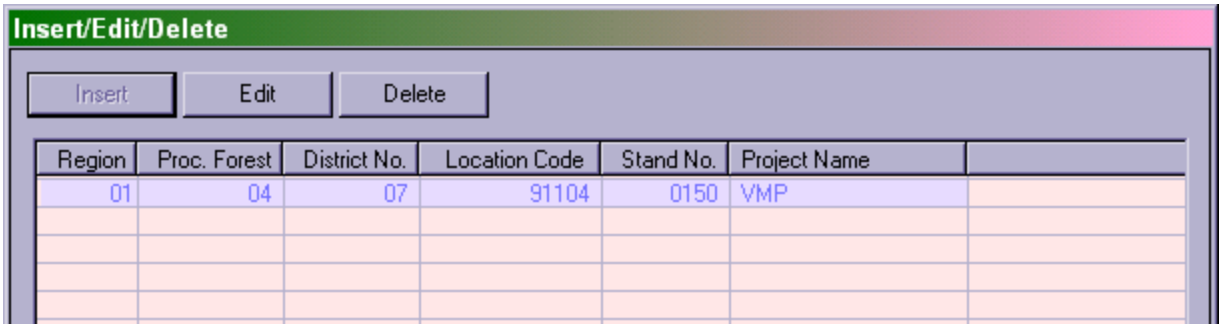


Insert/Edit/Delete.

From the **"ExamsPC"** main menu, select **"Setup"/"Insert/Edit/Delete"** to edit or delete a stand.

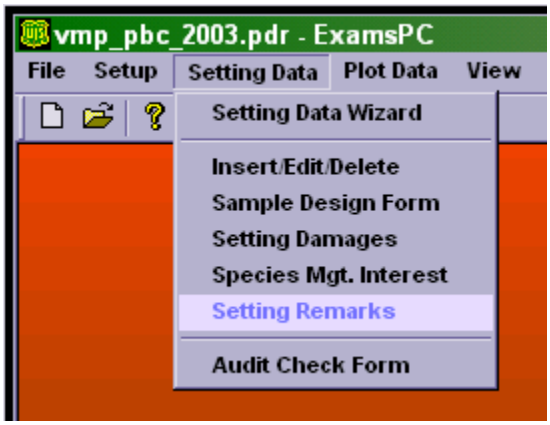


Select "edit" or "delete" to perform these functions.

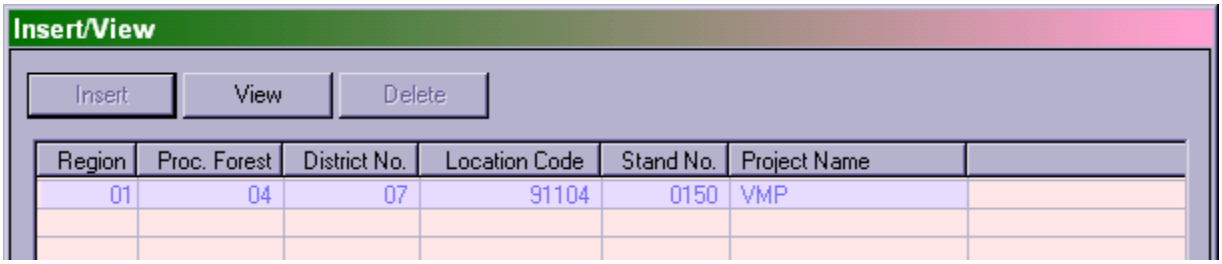


Setting Remarks.

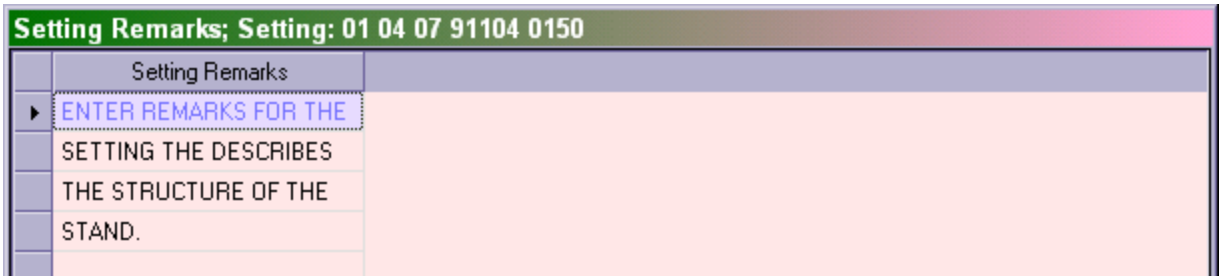
From the **"ExamsPC"** main menu, select **"Setup"/"Setting Remarks"** to enter setting remarks.



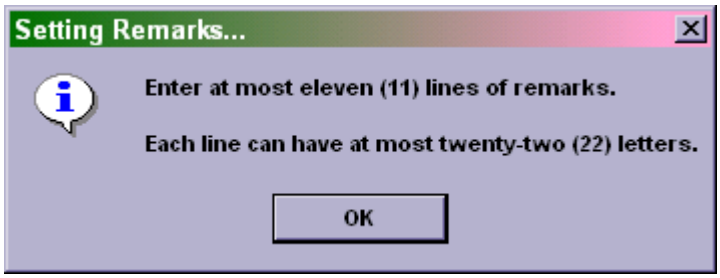
To insert setting remarks, highlight the setting and select next.



Enter remarks that describe the structure of the setting and select "Finish". All text will be converted to upper case.



The buttons along the bottom of the screen have the following function:

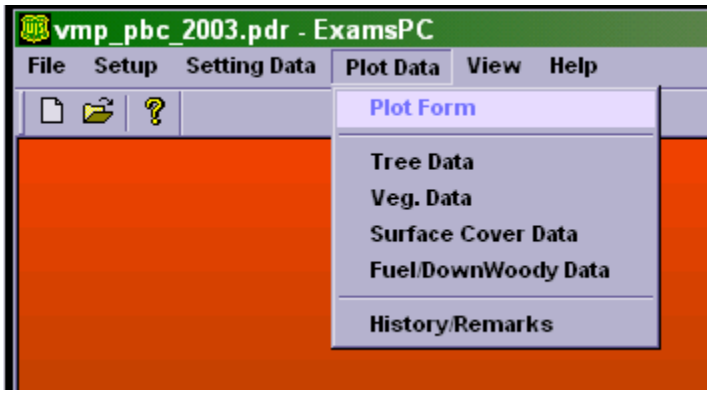
Help	Display hints for setting remarks. 
Option	This button is inactive from this screen.
Back	Return to the Insert/View screen.
Next	This button is inactive from this screen.

Cancel	Deletes all changes and restores all field selections to the original .pdr file 
Save	Inactive from this window.
Finish	Finish and saves all changes and returns to the main menu.

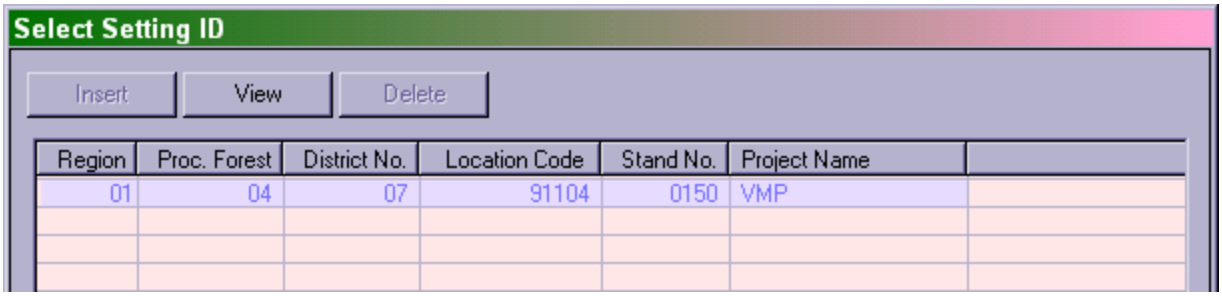
PLOT DATA.

Plot Form.

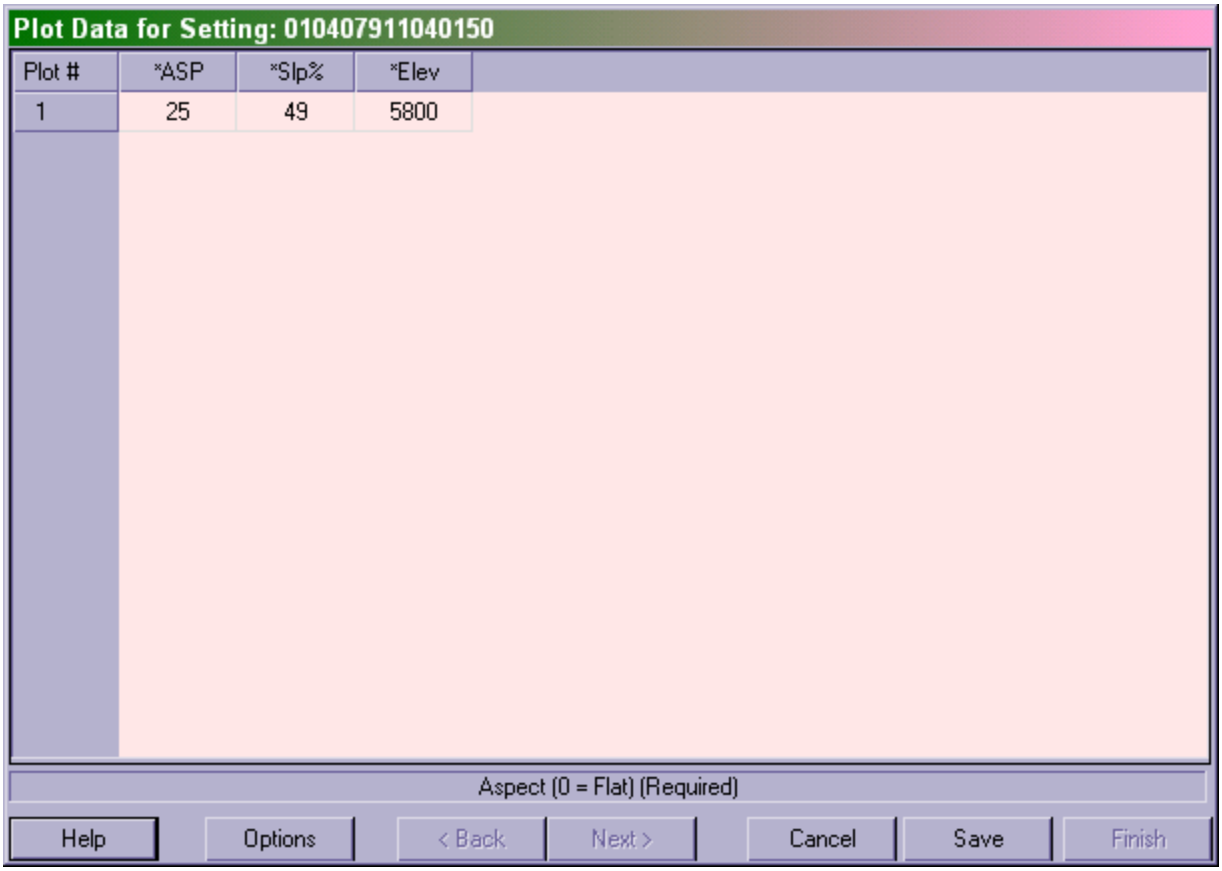
From the **"ExamsPC"** main menu, select "**Plot Data"/ "Plot Form**."



Select the setting by highlighting it; select the "**Next"** button at the bottom of the screen.

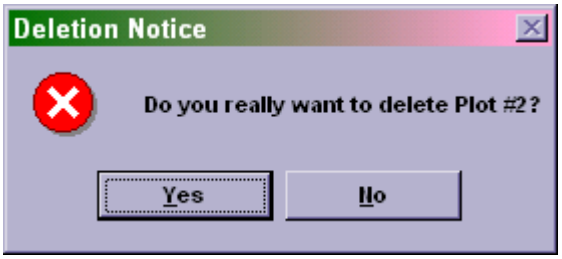


Only those plot data fields selected during the Setup process will be displayed on this screen.

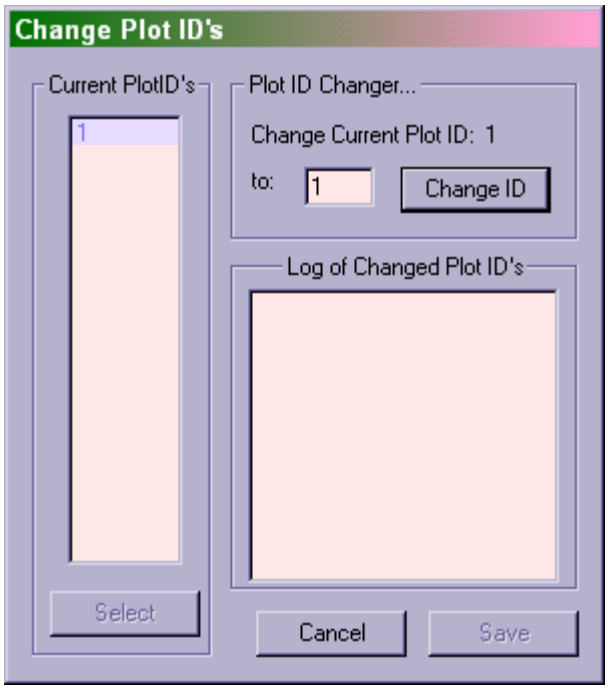
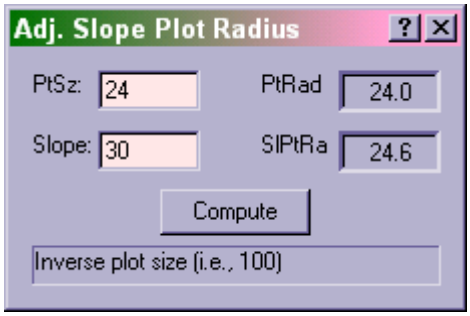


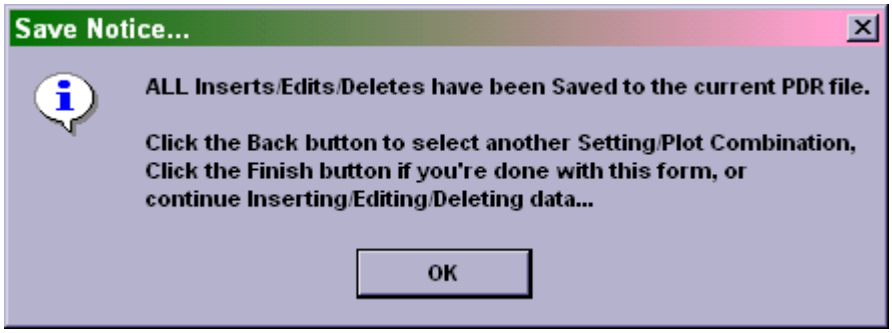
To **insert** a new plot anywhere on the form, press the keyboard's **Insert** key, or navigate to the last plot (i.e., last line) on the form and press the keyboard's **down arrow** key.

To **delete** an existing plot anywhere on the form, press the keyboard's **Delete** key and a delete notice will appear. To renumber the plots you must have all data entered select Save/OK then select Options/Change Plot ID's, then select Save/OK.



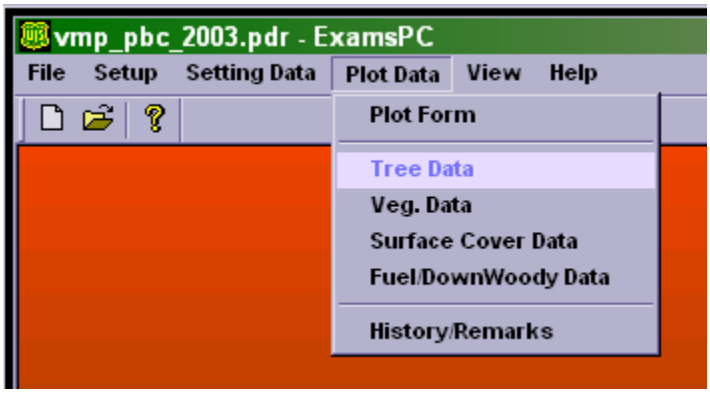
The space above the bottom buttons displays an explanation of the selected field. The buttons along the bottom of the screen are described below:

Help	Contains hints about each plot data field.
Options: Change Plot ID's	Change Plot ID Numbers. Click on the Plot ID number you want to change under the **Current PlotID's** box to the left. Type in a new Plot ID number in the **Plot ID Changer** box, then click on the **Change ID** button. Do this for all Plot ID numbers you want changed. When you're finished, click the **Save** button. 
Options: Adj. Slope Radius Plot	Adjusted slope plot radius calculator. Enter the inverse of the plot size such as a 10 for a 1/10th acre plot. Enter the slope, in percent. Select the "**Compute**" button. The computed "**PtRad**" field contains the plot radius without a slope correction, and the "**SlPtRa**" field contains the plot radius with a slope correction. 

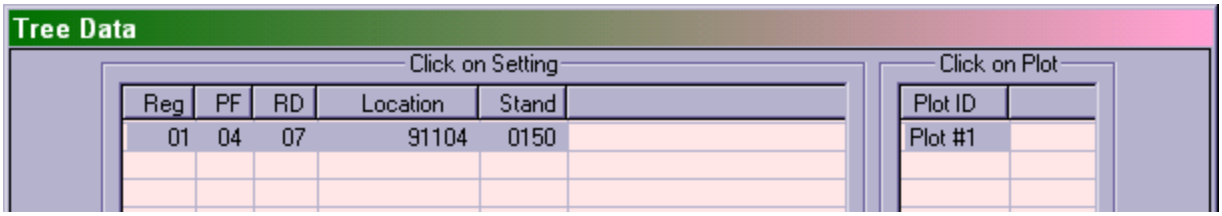
Restore	Inactive from this window.
Back	Returns to the previous screen to select another Setting.
Cancel	Delete all changes; restore all input field values to the ones that were last saved. 
Save	Save all changes, "OK". 
Finish	Finish and return to the main menu.

Tree Data

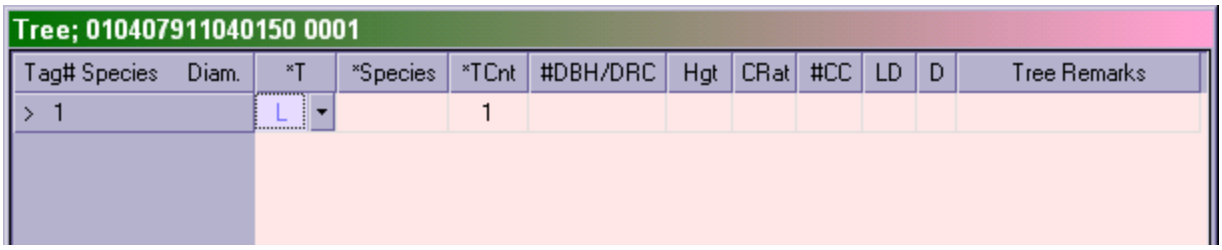
From the **"ExamsPC"** main menu, select "**Plot Data**,"/"**Tree Data**."

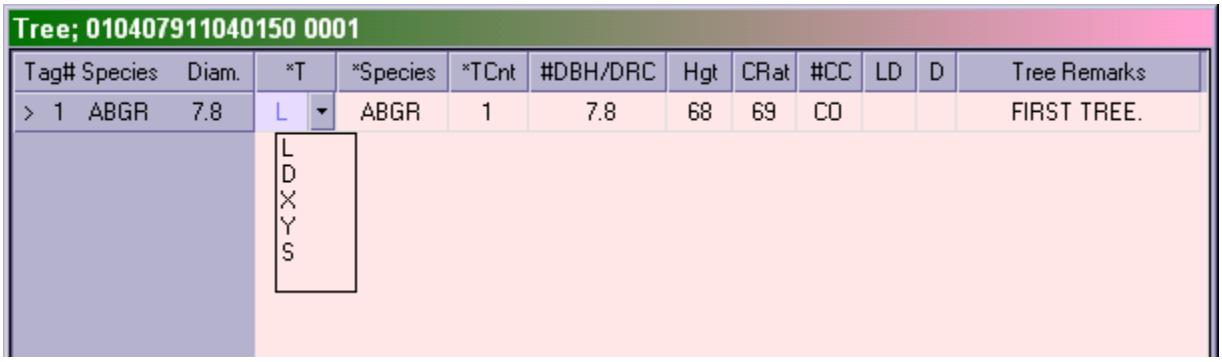


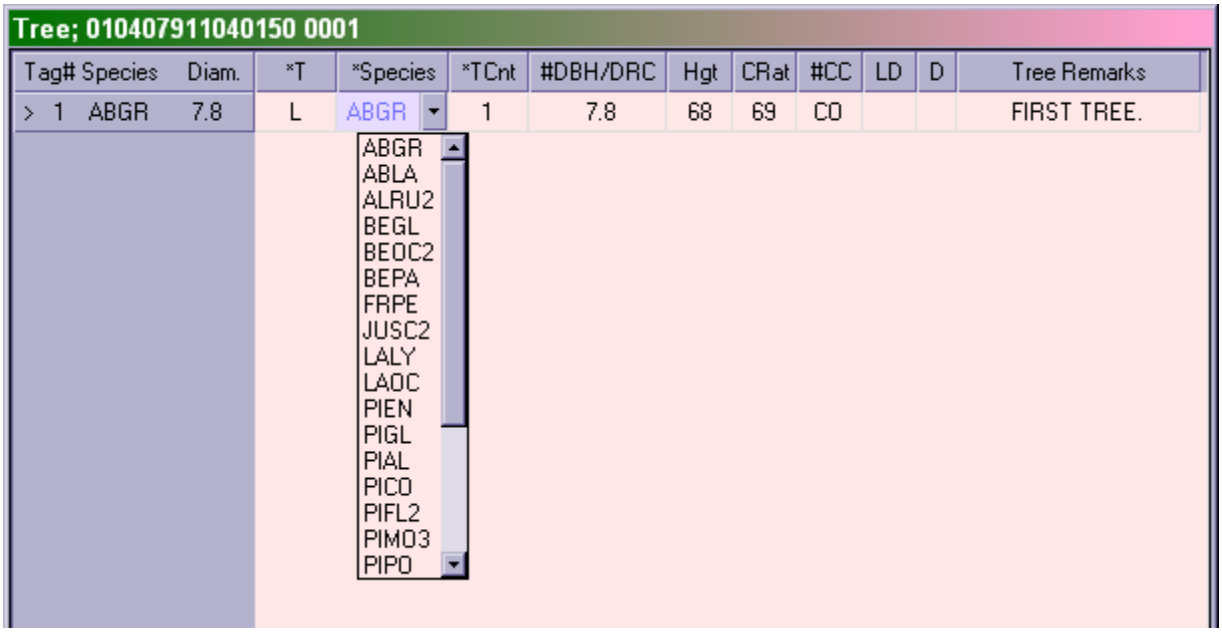
Select the setting ID and plot number for entering tree data. Then select the "Next" button at the bottom of the screen

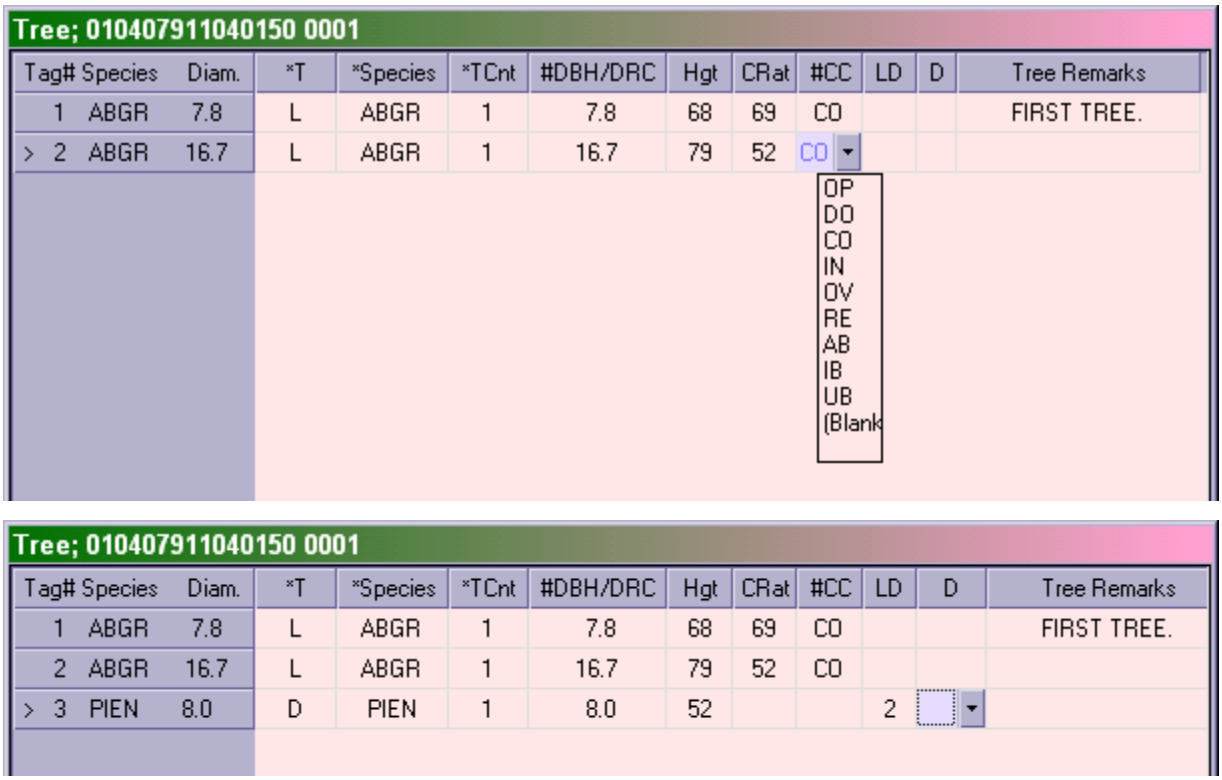


Only the settings specified in "Field Selections" will show up.



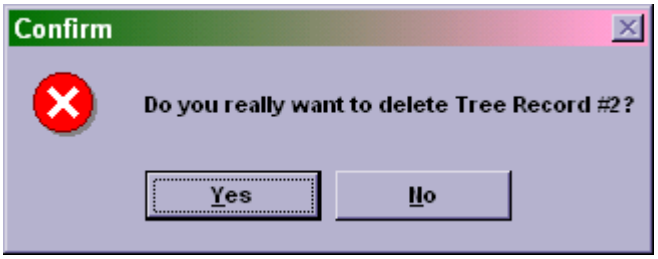




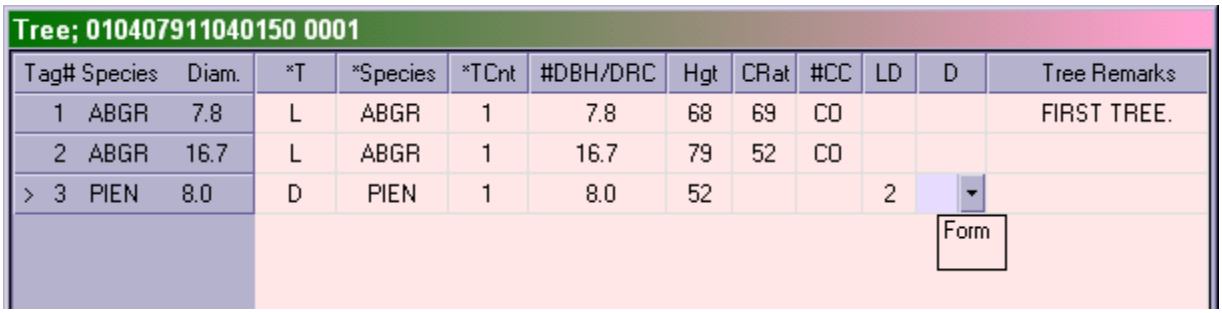


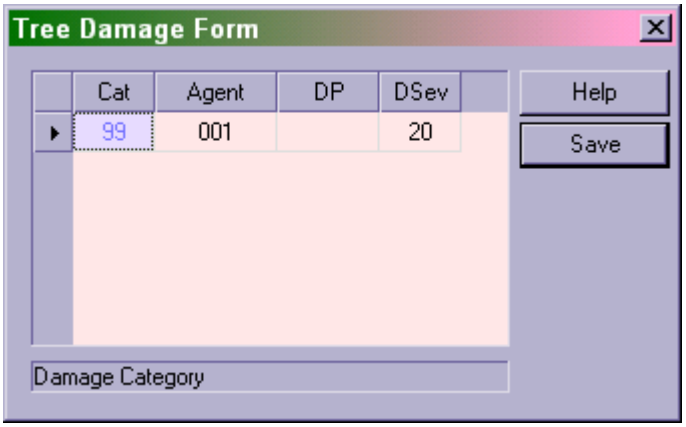
To **insert** a new line of tree data, use the down arrow. The tag ID will automatically increment. The tag ID, species, and diameter of each tree will be placed on the left hand part of the screen and frozen. The right hand section of the screen can be scrolled to access other data fields.

To **delete** an existing line of tree data, press the keyboard's **Delete** key and a delete notice will appear.



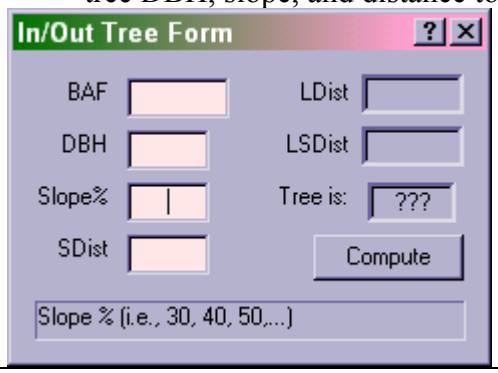
Tree damages are entered from the field labeled "D." This field has a pull down menu called "Form" that will access the tree damage form.

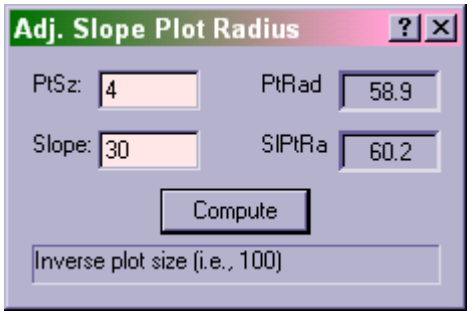
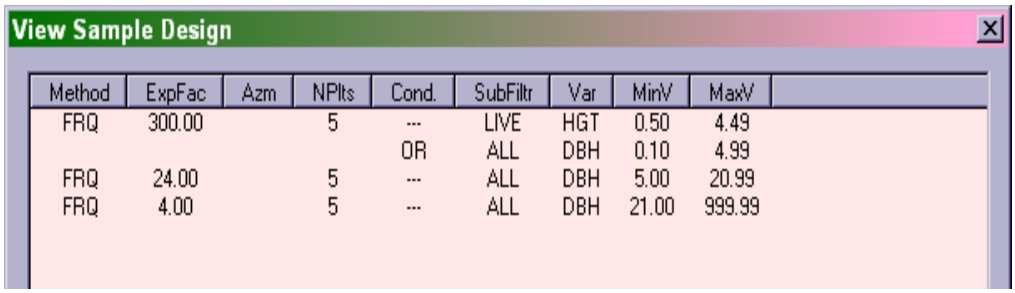
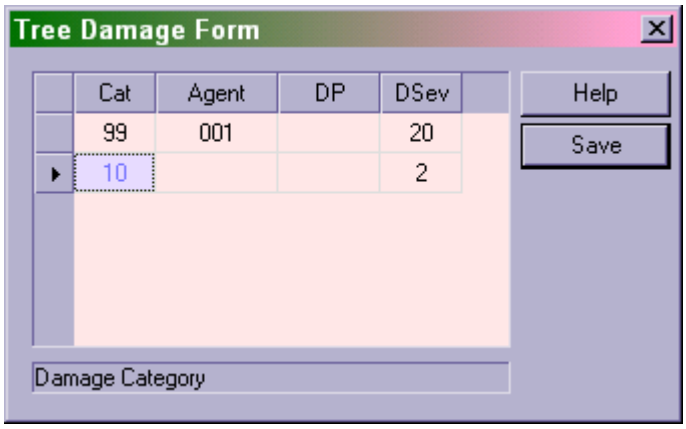


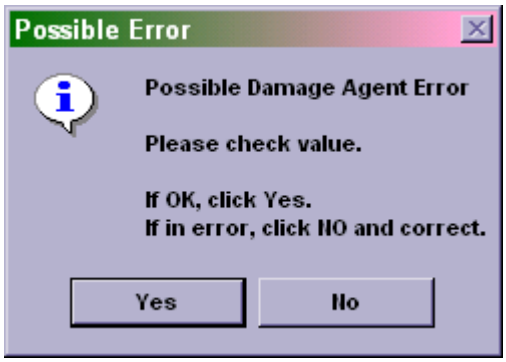
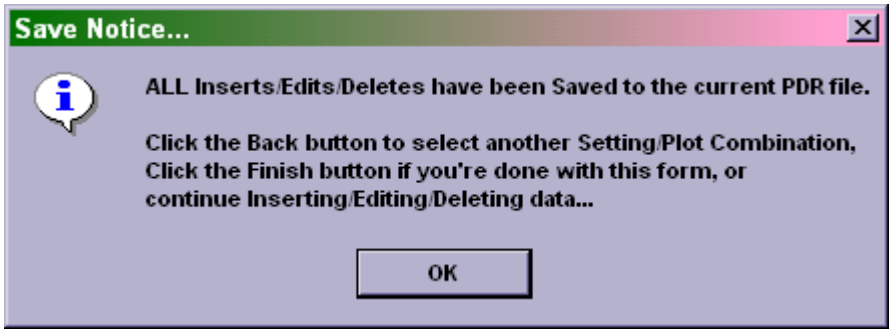


Use the "Help" button to access the codes and descriptions for the tree damage fields.

The space above the bottom buttons displays an explanation of the selected field. The buttons along the bottom of the screen have the following function:

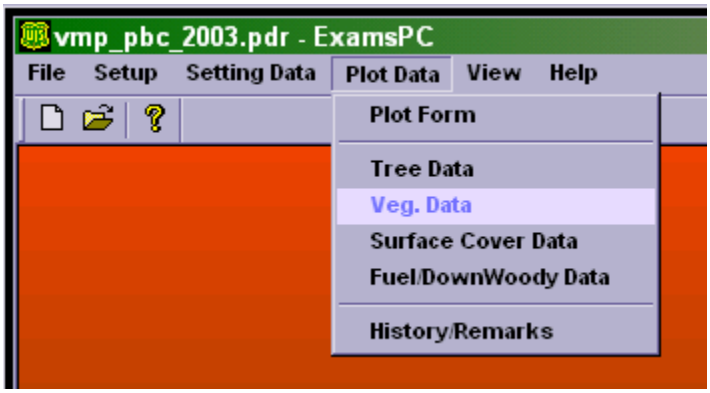
Help	Each pull down list contains explanations of the codes.
Options: In/Out	A calculator to determine if a tree is IN or OUT if a plot, based on BAF, tree DBH, slope, and distance to the tree. 

Options: Adj. Slope Radius Plot	Adjusted slope plot radius calculator. Enter the inverse of the plot size such as a 10 for a 1/10th acre plot. Enter the slope, in percent. Select the "**Compute**" button. The computed "**PtRad**" field contains the plot radius without a slope correction, and the "**SlPtRa**" field contains the plot radius with a slope correction. 
Options: Large Tree Age	Under construction.
Options Sample Design	Displays the Sample Design for Tree Data. 
Options Damage Form	Access a form to enter multiple damages for each tree. Use the down arrow to enter a new line of damage data. 

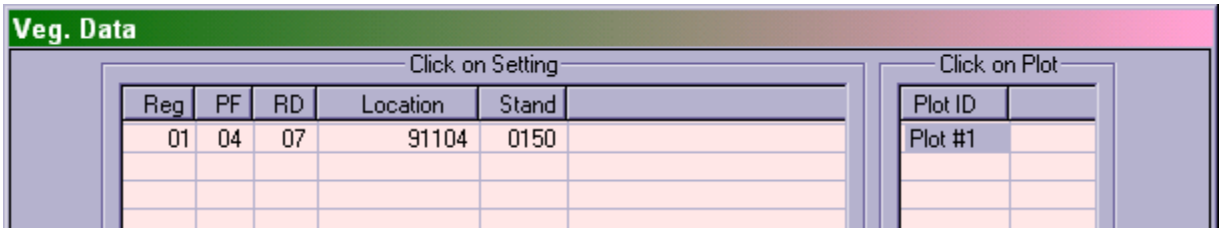
	You will receive this error when you "Save". This is ok as Damage Agent is not recorded. Click "Yes". 
Restore	Restore tree data input field selections to Default tree data field selections. Inactive if the current field selections are the same as the Default field selections.
Back	Inactive in this screen.
Cancel	Deletes all changes and restores all input field values to the ones contained in the original .pdr file. 
Save	Save all changes, "OK". 
Finish	Finish and return to the main menu.

Vegetation Composition Data.

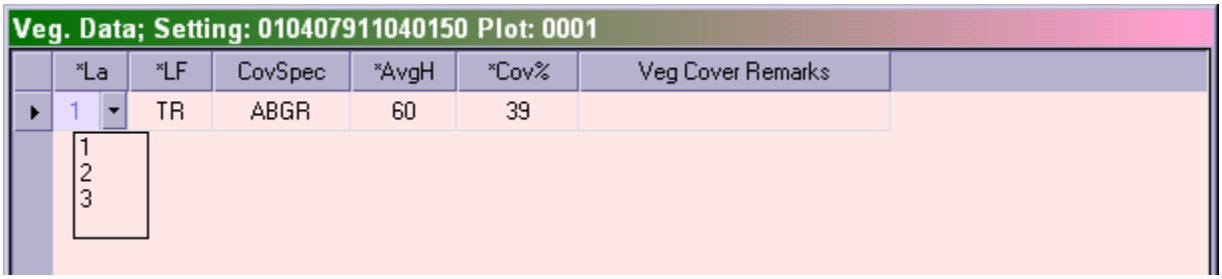
From the **"ExamsPC"** main menu, select "**Plot Data,"/"Veg. Data**."

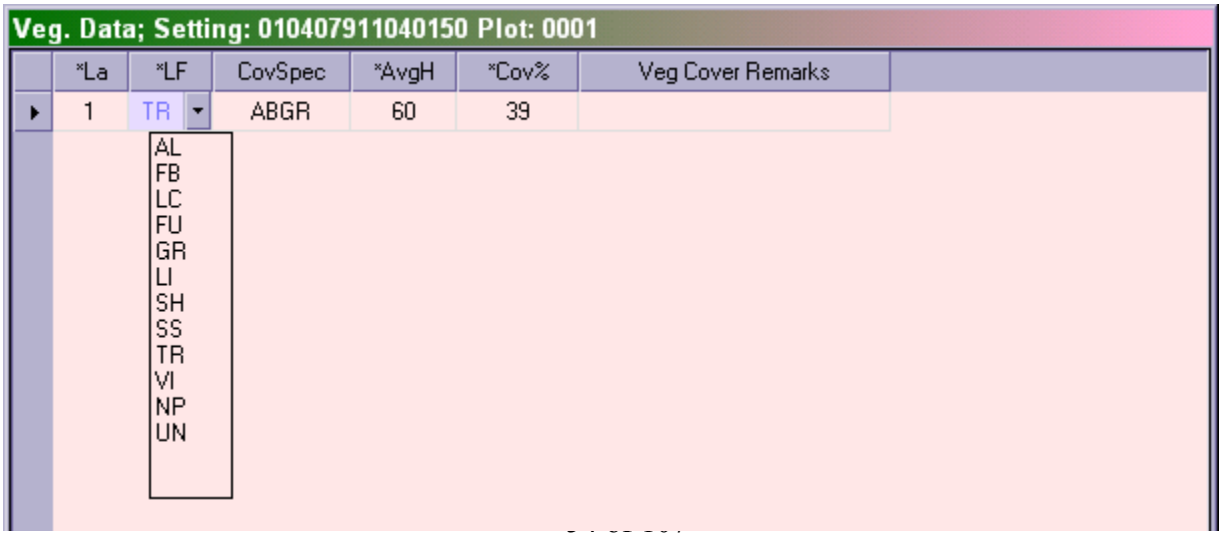


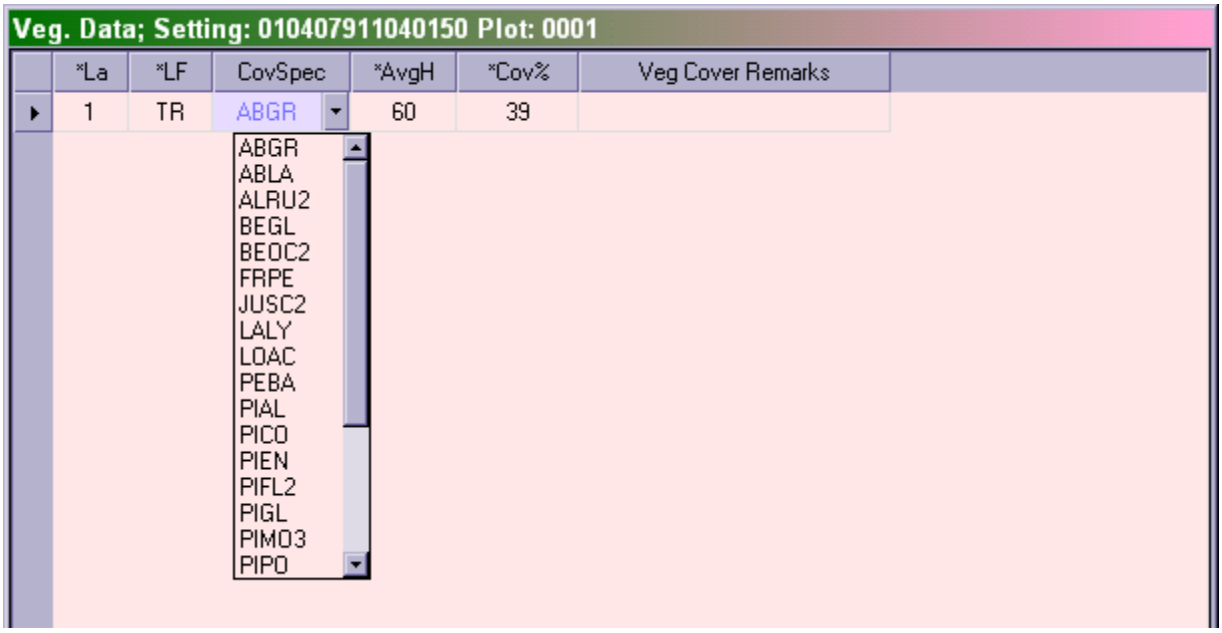
Select the setting ID and plot number for the Veg. data. Then select the "Next" button at the bottom of the screen



Only the settings specified in "Field Selections" will show up.

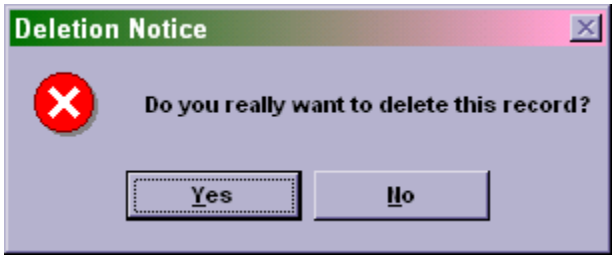






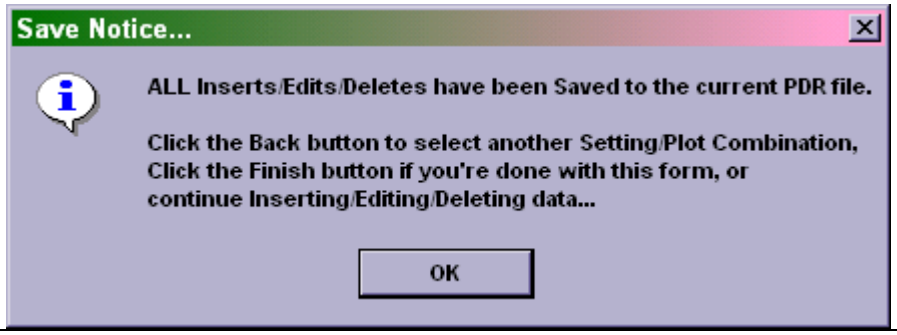
To **insert** a new line of vegetation data, use the down arrow.

To **delete** an existing line of vegetation data, press the keyboard's **Delete** key and a delete notice will appear.



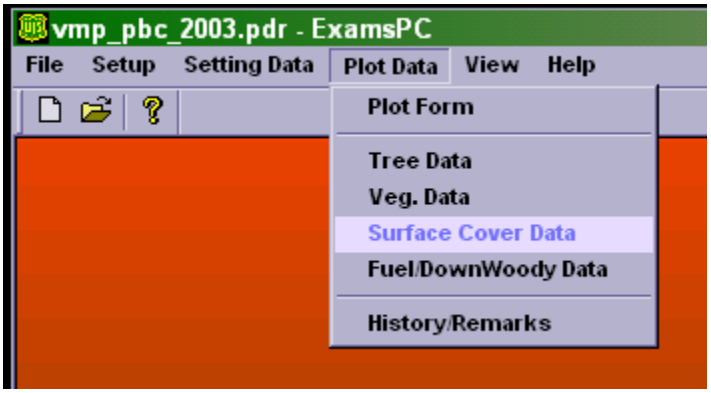
The space above the bottom buttons displays an explanation of the selected field. The buttons along the bottom of the screen have the following function:

Help	Explanations of valid codes for each field.
Restore	Restore veg. data input field selections to Default veg. data field selections. Inactive if the current field selections are the same as the Default field selections.
Back	Return to the previous screen to select another setting ID or plot number.
Next	Inactive in this screen.

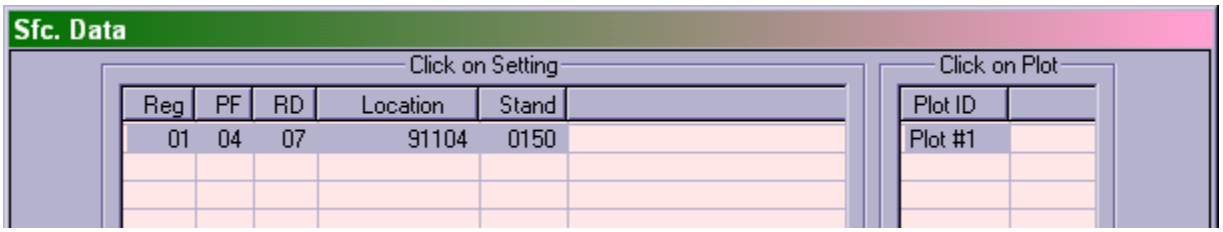
Cancel	Deletes all changes and restores all input field values contained in the original .pdr file. A warning message is displayed. 
Save	Save all changes. A message will be displayed stating that changes have been saved. 
Finish	Finish and returns to the main menu.

Surface Cover Data.

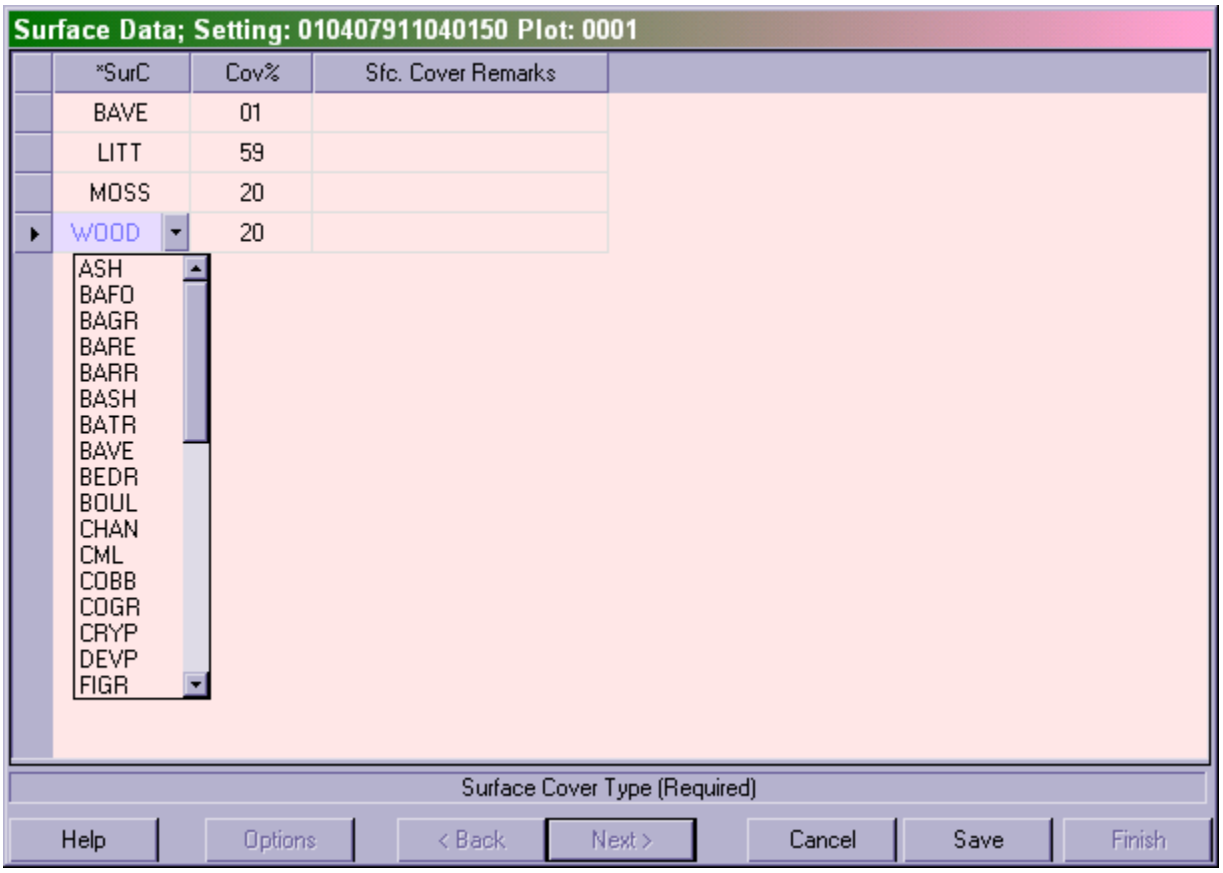
From the **"ExamsPC"** main menu, select "**Plot Data**,"/"**Surface Cover Data**.



Select the setting ID and plot number for the Surface Cover data. Then select the "Next" button at the bottom of the screen

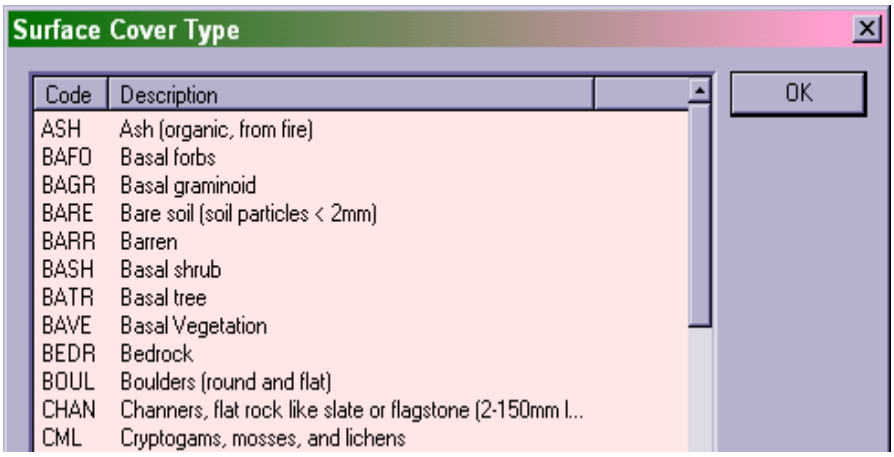
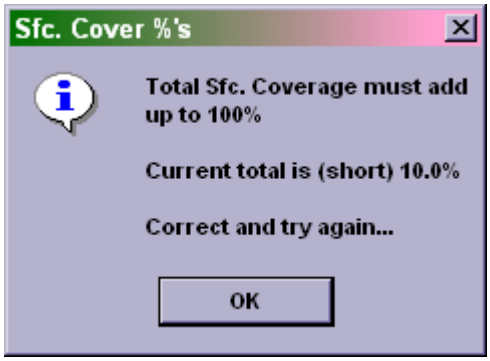


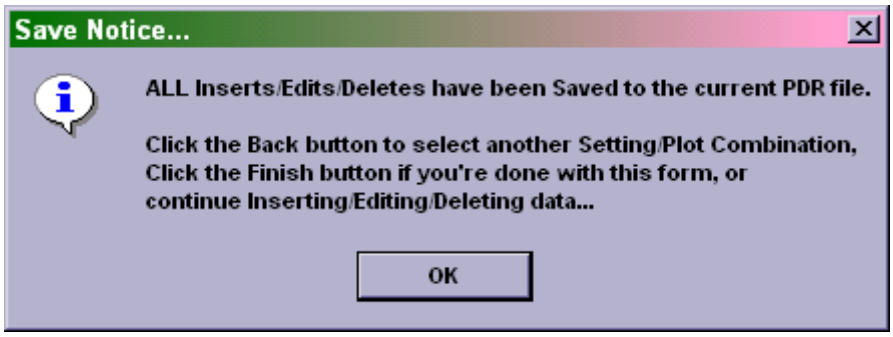
Only the settings specified in "User Definitions" under surface cover data will show up for selection.



To insert a new line of data, use the keyboards down arrow.

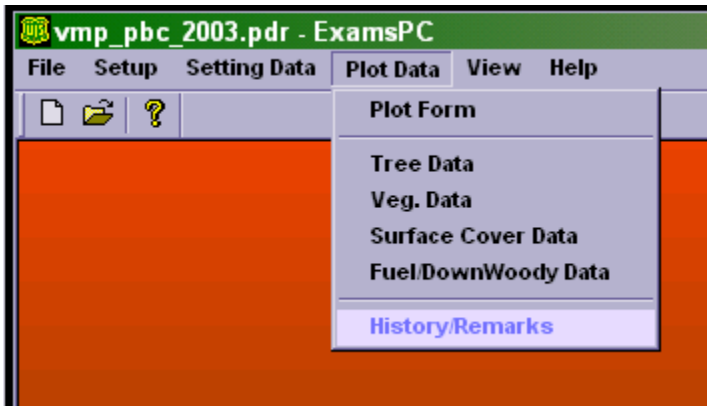
The buttons along the bottom of the screen have the following function:

Help	Explanations of valid codes for each field. 
Back	Return to the previous screen to select another setting ID or plot number.
Cancel	Delete all changes; restore all input field values to the ones that were in place when entering the form. A warning message is displayed. 
Save	If the Total Sfc. Percent does not total too% this message will appear. 

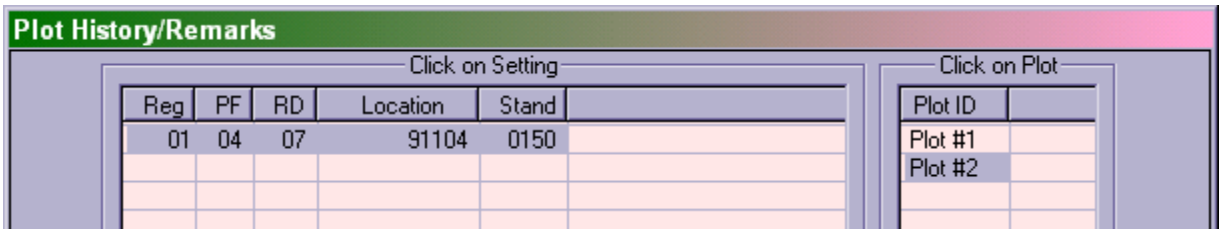
	When the Sfc. Percent total is correct this message will appear. 
Finish	Finish and return to the main menu.

Plot History and Plot Remarks.

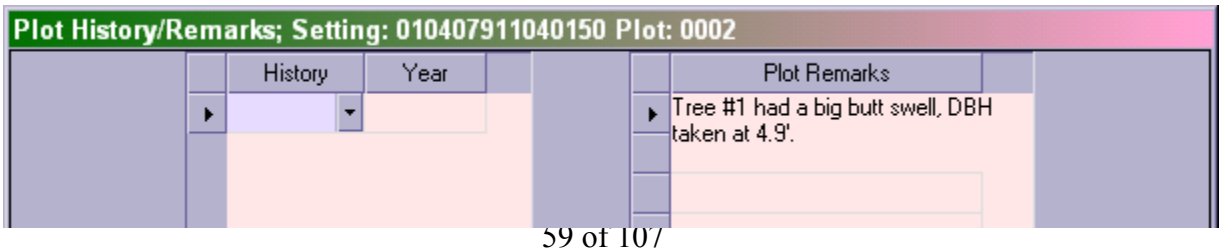
From the **"ExamsPC"** main menu, select "**Plot Data**"/ "**History/Remarks**."



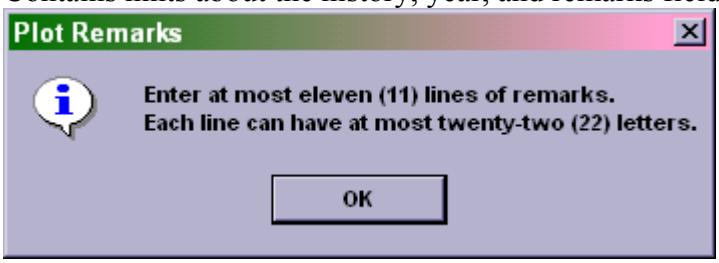
Select the setting ID and plot number for the plot history and remarks.



Enter the plot remarks, up to 242 characters. The remarks will be changed to all upper case letters.



The buttons along the bottom of the screen have the following function:

Help	Contains hints about the history, year, and remarks fields. 
Back	Return to the Plot/History Remarks setting selection screen.
Next	Inactive from this screen.
Cancel	Inactive from this screen
Save	Inactive from this screen
Finish	Finish and returns to the main menu.

APPENDIX H:

List of Tree Species

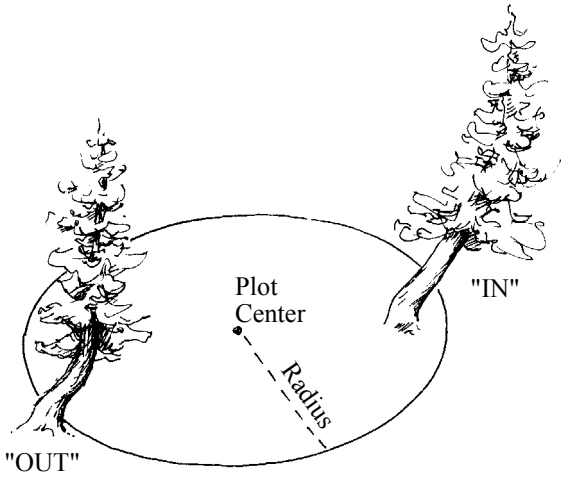
Plants Code	Common Name	Scientific Name
Timber		
ABGR	Grand fir	Abies grandis
ABLA	Subalpine fir	Abies lasiocarpa
JUSC2	Rocky Mountain Juniper	Juniperus scopulorum
LALY	Subalpine larch	Larix lyallii
LAOC	Western larch	Larix occidentalis
PIAL	Whitebark pine	Pinus albicaulis
PICO	Lodgepole pine	Pinus contorta
PIEN	Engleman spruce	Picea engelmannii
PIFL2	Limber pine	Pinus flexilis
PIGL	White spruce	Picea glauca
PIMO3	Western white pine	Pinus monticola
PIPO	Ponderosa pine	Pinus ponderosa
PSME	Douglas-fir	Pseudotsuga menziesii
TABR2	Pacific yew	Taxus brevifolia
THPL	Western red cedar	Thuja plicata
TSHE	Western hemlock	Tsuga heterophylla
TSME	Mountain hemlock	Tsuga mertensiana
Hardwoods		
ALRU2	Red Alder	Alnus rubra
BEOC2	Water birch	Betula occidentalis
BEPA	Paper birch	Betula papyifera
FRPE	Green ash	Fraxinus pennsylvanica
POBA2	Balsam Cottonwood	Populus balsamifera;
POBAT	Black Cottonwood	Populus trichocarpa
POTR5	Quaking aspen	Populus tremuloides

APPENDIX J:

Fixed Radius Plot

A fixed radius plot is used to sample trees which are less than the specified breakpoint diameter. These sample trees are determined to be "in or out" at ground line. If the measured distance from plot center to the central axis (geographic center) of the tree at ground line is equal to or less than the fixed plot radius the tree is tallied as a sample tree. If this distance is greater than the fixed plot radius, the tree is not tallied.

On level ground, the fixed plot radius is determined by holding the measuring tape or pole in a horizontal position from plot center to the central axis of the sample tree. On slopes greater than 9 percent, if a measuring tape or pole cannot be held horizontally from plot center to the central axis of the sample tree, the fixed plot radius is corrected for slope percent by using the following method.



Determine the slope limiting distance to borderline trees by measuring the distance, parallel to the ground line, to the borderline tree. This method always results in an oval plot on the slope.

To determine the slope limiting distance, multiply the plot radius by the slope correction factor.

Example1:

1/300 acre fixed plot; 4.9” DBH tree, distance of 7.7’ from plot center; 45% slope.
1/300 acre fixed plot = 6.8 foot radius; slope correction factor for 45% slope is 1.10.
6.8 x 1.10 = 7.48’
This tree is “OUT” by .2”.

Example 2:

1/24 acre fixed plot; 9.9" DBH tree, distance of 24.6' from plot center; 25% slope.
1/24 acre fixed plot = 24.0 foot radius; slope correction factor for 25% is 1.03.
24.0 x 1.03 = 24.72'
This tree is "IN" by .1".

Table 9: Fixed Plot Sizes and the Associated Plot Radius.

Plot Size	Plot Radius
1/300	6.8 feet
1/24	24.0 feet
1/4	58.9 feet

Table 10: Slope Correction

Slope %	Correction Factor		Slope %	Correction Factor
0-9	1.00		70	1.22
10-17	1.01		71-72	1.23
18-22	1.02		73-74	1.24
23-26	1.03		75	1.25
27-30	1.04		76-77	1.26
31-33	1.05		78-79	1.27
34-36	1.06		80	1.28
37-39	1.07		81-82	1.29
40-42	1.08		83	1.30
43-44	1.09		84-855	1.31
45-47	1.10		86	1.32
48-49	1.11		87-88	1.33
50-51	1.12		89	1.34
52-53	1.13		90-91	1.35
54-55	1.14		92	1.36
56-57	1.15		93-94	1.37
58-59	1.16		95	1.38
60-61	1.17		96-97	1.39
62-63	1.18		98	1.40
64-65	1.19		99-100	1.41
66-67	1.20		101	1.42
68-69	1.21			

Appendix L:

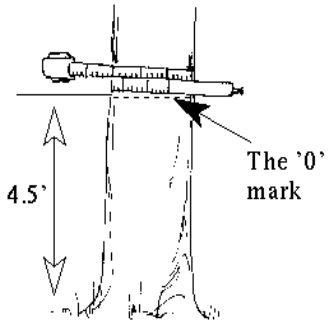
Measuring Diameters

Diameter at Breast Height:

Diameters shall be recorded which give accurate representations of tree size and volume. When a bole form irregularity occurs at the normal DBH point, field crews will adjust the point of measurement and note the height at which it was measured, and explain the reason in remarks (i.e. "DBH at 5.3 – limb"). Measure diameters directly and do not attempt to compensate for missing bark and/or wood.

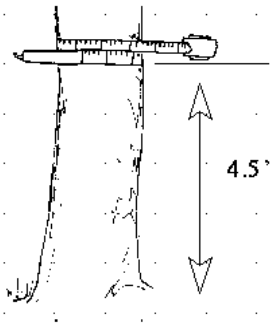
Proper use of a diameter tape.

Correct Method



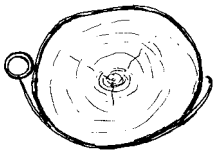
End of tape (with the '0' mark or hook) crossed under.

Optional method if left handed

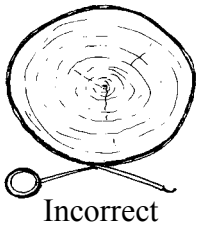


End of tape crossed under (Becareful -- reading will be be made from upside down d-tape marks).

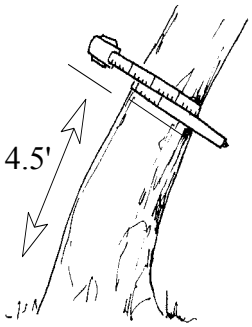
Press the tape firmly against the tree. Do not pull it out at a tangent to the tree at the point of measurement.



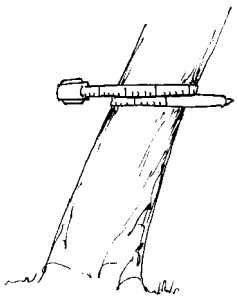
Correct



Incorrect

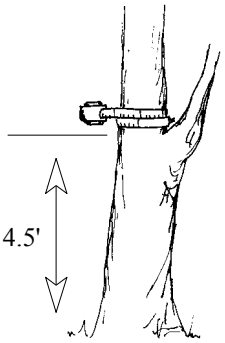


Correct

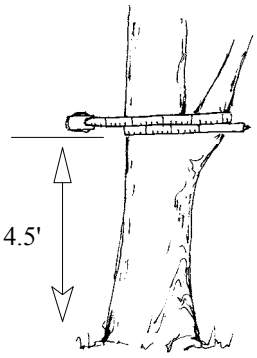


Incorrect

Tape must be at right angles to lean of tree.



Correct

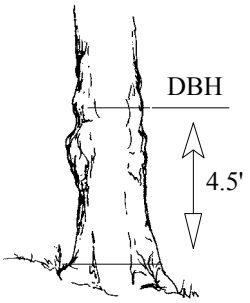


Incorrect

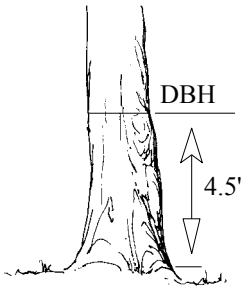
Do not place tape at abnormal location on bole of tree.

Appendix M:

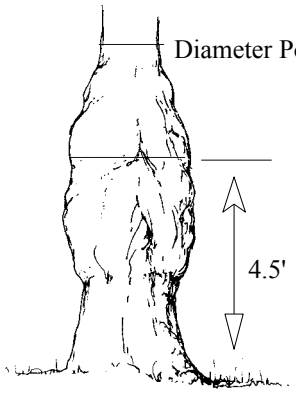
Point of Measurement for DBH.



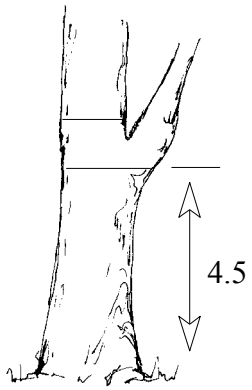
Tree on slope



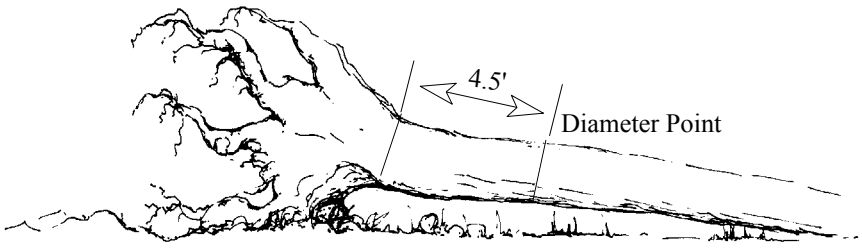
Tree on level ground



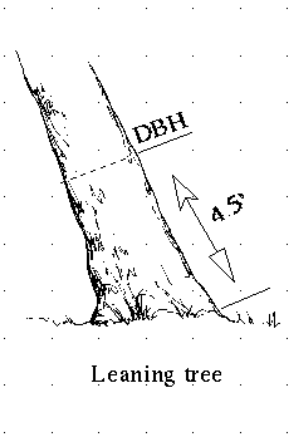
Tree deformed at DBH



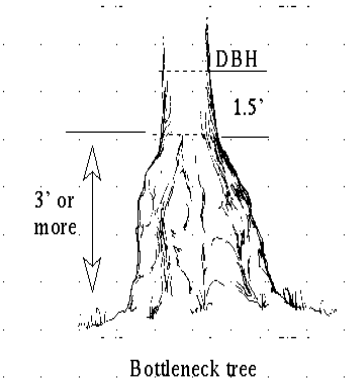
Tree with
at 4.5



Windthrown tree

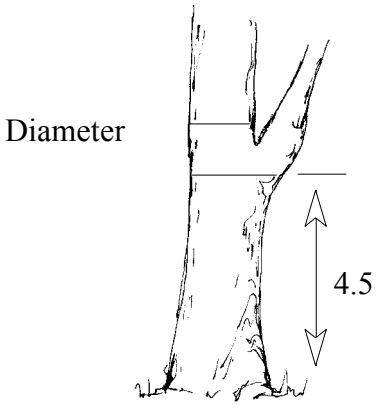


Leaning tree



Bottleneck tree

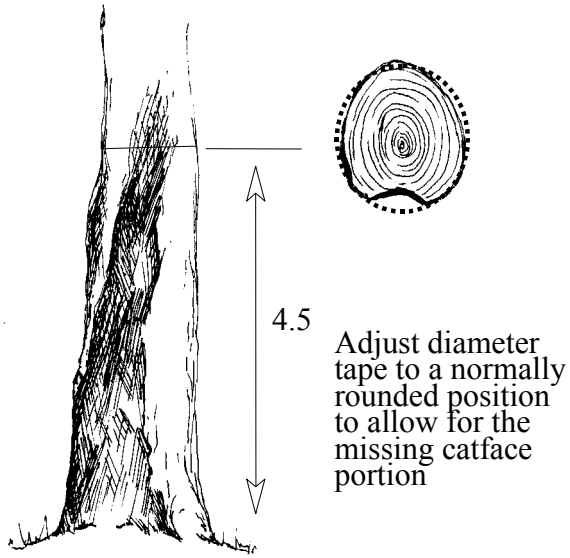
Major localized irregularities such as limbs, burls, scaring, and swelling will require DBH be measured immediately above the irregularity at the point where it ceases to affect normal stem form.



Tree with branch
at 4.5 feet

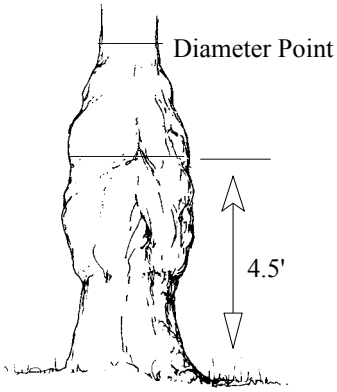
If the irregularity extends a considerable distance up the bole but the stem form below the normal DBH point is unaffected, measure the diameter immediately below the irregularity as near to 4.5 feet above the ground as possible. Do not measure diameters less than 3.0 feet above the ground.

Non-localized irregularities such as lightening scars, cracks, seams, and logging scars sometimes extend over so much of the bole length that adjustment above or below is impossible or gives an unrealistic representation of tree size. In this circumstance, measure DBH at the normal point 4.5 feet above the ground unless another major localized irregularity occurs there.



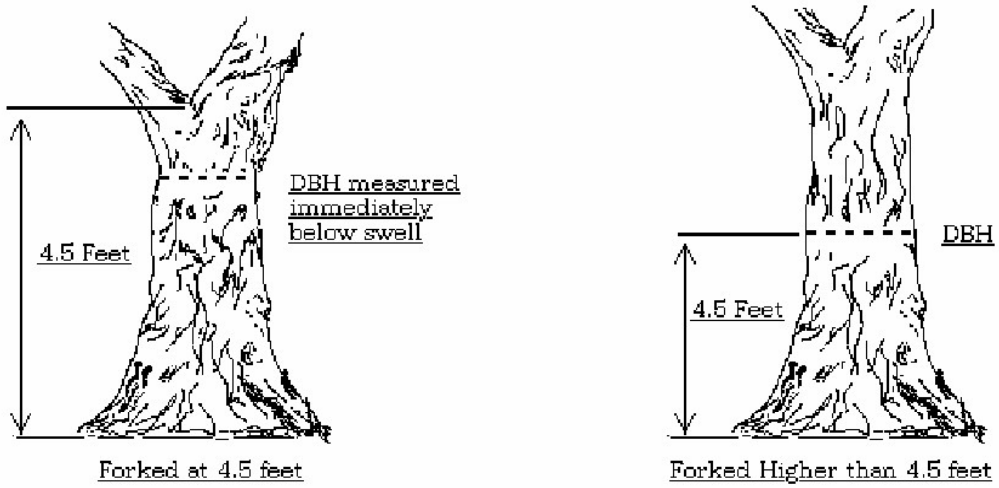
Tree with a catface

Butt swell that extends up the stem 4.5 feet or more will require the diameter be measured at a point immediately above the swell where the stem resumes normal form.



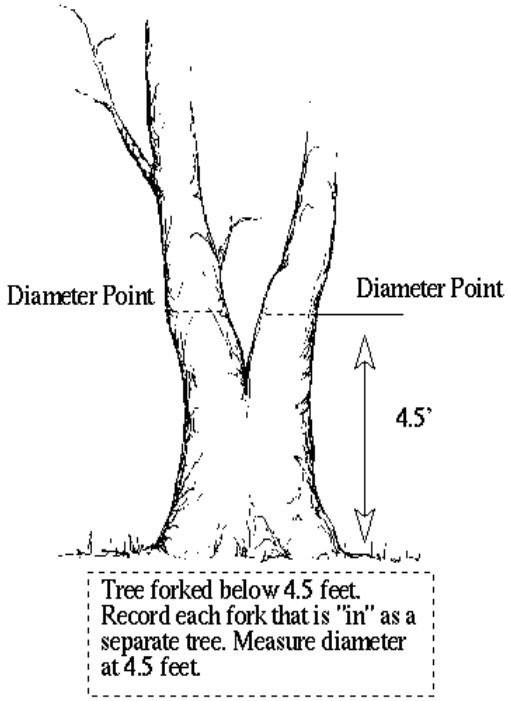
Tree deformed at DBH

Trees forked at or above 4.5 feet: Record as one tree. Measure DBH immediately below any swelling but as near to the normal point as possible.

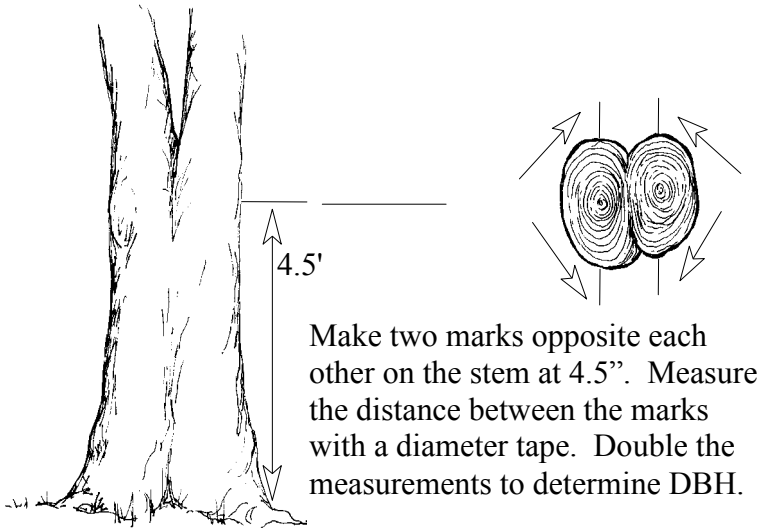


Trees forked at or above 4.5'

Trees forked below 4.5 feet: When the open crotch of the fork begins below 4.5 feet; each fork shall be recorded as a separate tree. If the forks appear to have grown together refer instead to "Two trees growing together".



Trees growing together sometimes give the appearance of a forked tree. Trees that have grown together will be recorded as one tree and DBH will be measured at the normal point 4.5 feet. Determine DBH making two marks opposite each other on the center line of each bole's circumference. Measure the distance between the marks with a diameter tape and double it to determine DBH. Note the situation clearly in remarks.



Broken trees should have DBH measured at the normal position, 4.5 feet up the bole. If the stem is broken below 4.5 feet, consider the upright portion a stump and the severed portion of the tree down woody material. If the stem is broken at or above 4.5 feet, tally the tree and measure the diameter at 4.5 feet.

Dead trees will have actual diameters recorded. Do not reconstruct diameters to account for missing bark or rotten wood. Record the actual diameter with no adjustments made for minor irregularities. When major deformities are present at 4.5 feet, adjust the measurement point as specified in the preceding examples.

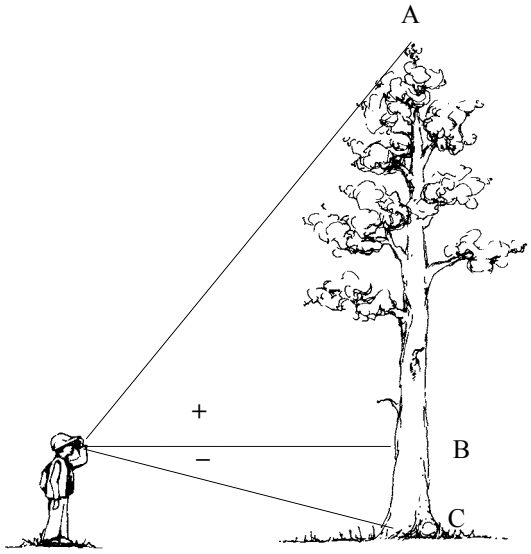
Adjusting the Level of DBH Measurement*:*

The objective is to obtain a measurement at a level 4.5 feet above the ground line on the uphill side of the tree. Accumulations of litter and debris will be considered part of the ground line based on the extent to which they have become incorporated into the soil. . Recent debris such as limbs, small pieces of wood and a distinct build-up of larch needles should be moved aside. Do not, however, dig down into the duff layer. Loose duff should be stepped on and compressed.

Appendix P:
Measuring Heights

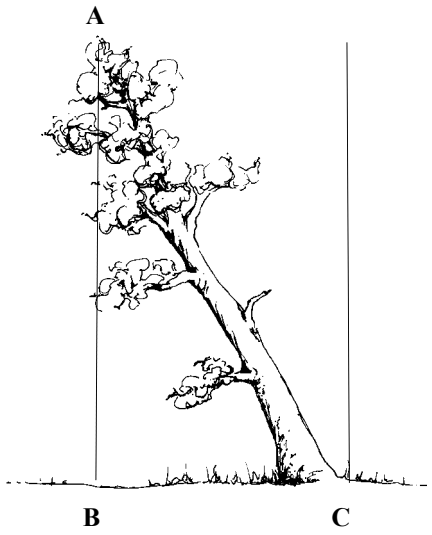
Total Tree Height

Measure height from the base of the tree, on the uphill side or same contour line as the tree, to the tip of the tree leader. Record total tree height to the nearest foot.



Leaning Trees

Trees leaning 25% (about 15°) or more from vertical require the following special height measuring technique.



Locate point on ground directly under tip of leaning tree. Measure height A B. Measure horizontal distance B C. Determine actual tree height (AC) using either the Pythagorean theory for right triangles where:

$$\text{Tree Height} = \sqrt{AB^2 + BC^2}$$

Example: Measured height (AB) = 120'
Horizontal distance (BC) = 40'

$$\text{Corrected tree height} = \sqrt{120^2 + 40^2} = 126.49$$

The following table is another method.

Table 11: Horizontal Distance Chart

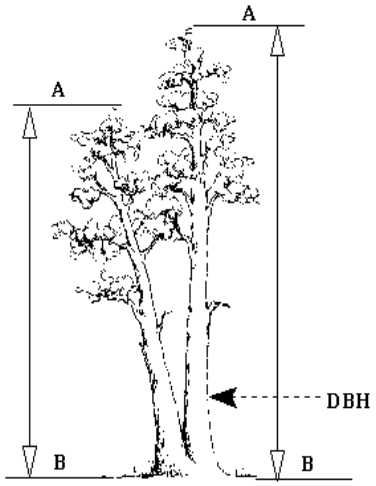
Horizontal Distance - tip to center of bole at ground (B C)

MS HT	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	81	85	90
40	40	41	43	45														
50	50	51	52	54	56													
60	60	61	62	63	65	67												
70		71	72	73	74	76	78											
80		81	81	82	84	86	87	89										
90		91	91	92	94	95	97	98	101									
100		101	101	102	103	104	106	108	110	112								
110			111	112	113	114	116	117	119	121	123							
120			121	122	123	124	125	126	128	130	132	134						
130			131	131	132	133	135	136	138	139	141	143	145					
140			141	141	142	143	144	146	147	149	150	152	154	157				
150			151	151	152	153	154	155	157	158	160	162	164	166	168			
160			161	161	162	163	164	165	166	168	169	171	173	175	177	179		
170			171	171	172	173	174	175	176	177	179	180	182	184	186	188	190	
180			181	181	182	183	183	184	176	187	188	190	191	193	195	197	199	201
190				191	192	192	193	194	195	196	198	200	201	203	204	206	208	210
200				201	202	202	203	204	205	206	208	209	211	212	214	215	217	219

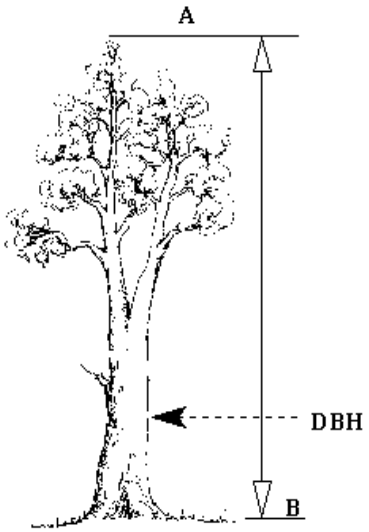
MS HT = (A B) Measured Height

Forked Trees

If the tree forks below DBH, treat as two trees and measure height of each stem from base of tree to tip of tree.

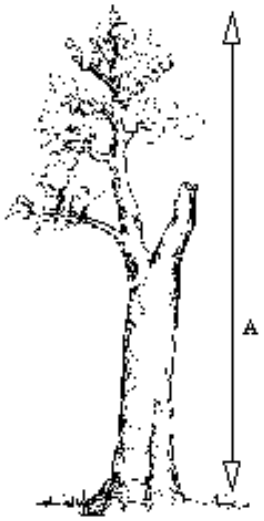


If the fork crotch occurs at or above 4.5 feet on high ground side, the tree is treated as a single tree. Measure height of the tallest fork.



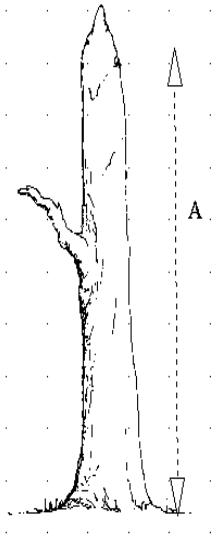
Forked Tree with a Broken Top

Measure and record the height of the tallest fork. Record a Tree Damage Category of "99", Tree Damage Agent of "001" for broken top and "004" for forked tree and the appropriate severity code for each agent.



Trees with a Missing Top

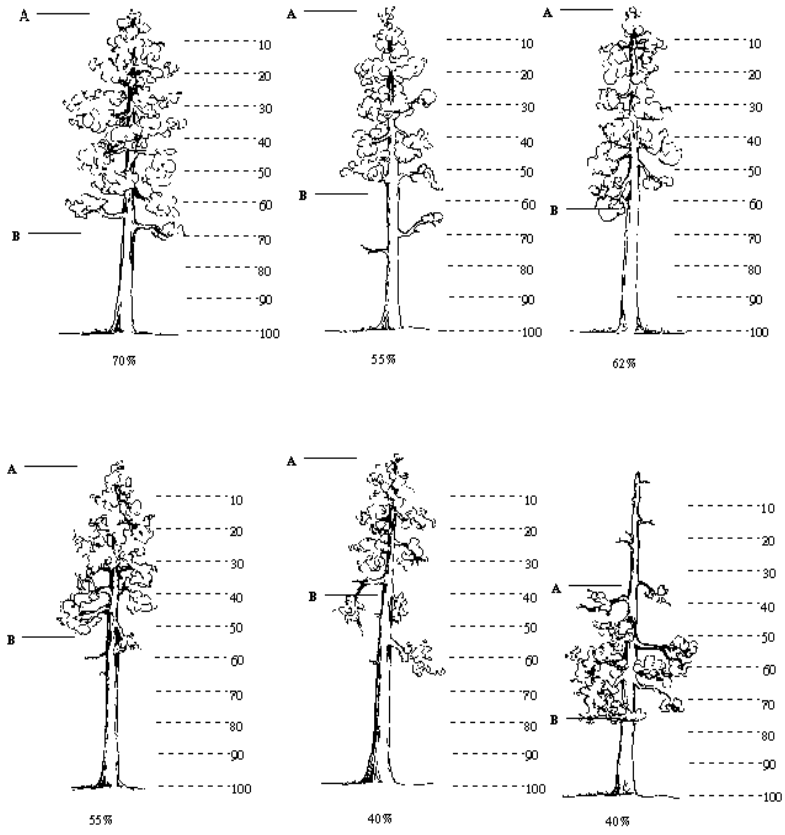
Measure and record the height of the remaining tree. Record a Tree Damage Category of "99", Tree Damage Agent of "001"and the appropriate severity code.



Appendix Q:

Measuring Crowns

Crown ratio is the portion of the tree bole supporting live, healthy foliage and is expressed as a percent of the actual tree height. The distance between A and B is the existing crown length.



Appendix R:

Damage Categories, Agents and Severity Ratings

Damage Categories with associated Agents and Severity Ratings follow on the next page.

Table 12: Damage Categories

Code	Description
10	General Insects
11	Bark Beetles
12	Defoliators
13	Chewing Insects
14	Sucking Insects
15	Boring Insects
16	Seed-Cone-Flower-Fruit Insects
17	Gallmaker Insects
18	Insect Preditors
19	General Diseases
20	Biotic Damage
21	Root-Butt Diseases
22	Stem Decays-Cankers
23	Parasitic-Epiphytic Plants
24	Decline Complexes-Dieback-Wilts
25	Foliage diseases
26	Stem Rusts
27	Broom Rusts
30	Fire
41	Wild animals
42	Domestic animals
50	Abiotic damage
60	Competition
70	Human Activities
71	Harvest
80	Multi-Damage (Insect-Disease)
99	Physical Effect

Damage Categories, Agents and Severity Ratings

10	General Insects	
Severity Rating 101 = Minor: trees that will have reduced growth rates and minor damage. 102 = Severe: trees that are likely to die within 10 years.		
Category	**Common Name**	**Scientific Name**
10	Thrips	
	Clerid beetle	Cleridae
	Green rose chafer	Dichelonyx backi
	Bagworm moth	Psychidae
	Scarab	Scarabaeidae
		Steremnius carinatus
	Wood wasps	Siricidae spp.
11	**Bark Beetles**	
Severity Rating 111 = Unsuccessful bole attack: pitch out and beetle brood absent. pitch-out are recognized by clear or cream colored pitch tubes (globules) on pines and streams of pitch on true firs or Douglas-fir. No boring dust is present. 112 = Strip attacks: galleries and brood present; presence of boring dust and or reddish-brown colored pitch tubes or streams occurring on less than ¾ of the bole circumference. 113 = Successful bole attack: galleries and brood present, boring dust and or reddish-brown pitch exudations are found on greater than ¾ of the bole circumference. 114 = Topkill: the upper portion of their crown fading or dead.		
Category	**Common Name**	**Scientific Name**
11	Roundheaded pine beetle	Dendroctonus adjunctus
	Western pine beetle	Dendrodtonus brevicomis
	Lodgepole pine beetle	Dendroctonus murrayanae
	Mountain pine beetle	Dendroctonus ponderosae
	Douglas-fir beetle	Dendroctonus pseudotsugae
	Spruce beetle	Dendroctonus rufipennis
	Red turpentine beetle	Dendroctonus valens
		Dryocoetes affaber
	Western balsam bark beetle	Dryocoetes confusus
		Dryocoetes sechelti
	Ash bark beetles	Hylesinus spp.
	Native elm bark beetle	Hylurgopinus rufipes
	Sixspined ips	Ips calligraphus
	Emarginate ips	Ips emarginatus
		Ips latidens
	Monterey pine ips	Ips mexicanus
	Northern Spruce engraver beetle	Ips perturbatus
	Pine engraver	Ips pini
	Ips engraver beetles	Ips spp.
		Ips tridens

Category	Common Name	Scientific Name
11 (cont.)	Western ash bark beetle	Leperisinus californicus
		Orthotomicus caelatus
	Cedar bark beetles	Phleosinus spp.
	Western cedar bark beetle	Phloeosinus punctatus
	Bark Beetles	
	Tip beetles	Pityogenes spp.
	Douglas-fir twig beetle	Pityophthorus pseudotsugae
	Twig beetles	Pityophthorus spp.
	Foureyed spruce beetle	Polygraphus rufipennis
	Fir root bark beetle	Pseudohylesinum granulatus
		Pseudohylesinus dispar
	Douglas-fir pole beetle	Pseudohylesinus nebulosus
	Silver fir beetle	Pseudohylesinus sericeus
	Small European Elm bark beetle	Scolytus multistriatus
	Spruce engraver	Scolytus piceae
	True fir bark beetles	Scolytus spp.
	Douglas-fir engraver	Scolytus unispinosus
	Fir engraver	Scolytus ventralis
	Four-eyed bark beetle	Polygraphus spp.
	Hemlock beetle	Pseudohylesinus tsugae
12	**Defoliators**	

Severity Rating
121 = Light defoliation (1-25%), no topkill
122 = Light defoliation (1-25%), topkill <=10%
123 = Light defoliation (1-25%), topkill >10%
124 = Moderate defoliation (26-75%), no topkill
125 = Moderate defoliation (26-75%), topkill <=10%
126 = Moderate defoliation (26-75%), topkill >10%
127 = Heavy defoliation (76-100%), no topkill
128 = Heavy defoliation (76-100%), topkill <=10%
129 = Heavy defoliation (76-100%), topkill >10%

Category	Common Name	Scientific Name
12	Casebearer	
	Looper	
	Sawfly	
	Larger elm leaf beetle	Monocesta coryli
	Spanworm	
	Western blackheaded budworm	Acleris gloverana
	Whitefly	Aleyrodoidae
	Fall cankerworm	Alsophila pometaria
	Alder flea beetle	Altica ambiens
	Mountain mahogany looper	Anacamptodes clivinaria profanata
	Oak worms	Anisota spp.
	Western larch sawfly	Anoplonyx occidens
	Fruit tree leafroller	Archips argyrospila

Category	Common Name	Scientific Name
12(cont.)	Uglynest caterpillar	Archips cerasivorana
	Boxelder defoliator	Archips negundanus
	Pear sawfly	Caliroa cerasi
	Boxelder leafroller	Caloptilia negundella
	Spruce webspinning sawfly	Cephalcia fascipennis
	Two-year budworm	Choristoneura biennis
	Large aspen tortrix	Choristoneura conflictana
	Sugar pine tortrix	Choristoneura lambertiana
	Western spruce budworm	Choristoneura occidentalis
	Aspen leaf beetle	Chrysomela crotchi
	Cottonwood leaf beetle	Chrysomela scripta
	Leafhopper	Cicadellidae
	Poplar tentmaker	Clostera inclusa
	Larch casebearer	Coleophora laricella
	Lodgepole needleminer	Coleotechnites milleri
	Ponderosa needleminer	Coleotechnites spp.
	Black Hills Pandora moth	
	Pandora moth	Coloradia pandora
	Sycamore lace bug	Corythucha ciliata
	Lace bugs	Corythucha spp.
	Oak leaftier	Croesia semipurpurana
	Yellownecked caterpillar	Datana ministra
	Walkingstick	Diapheromera femorata
	Spruce coneworm	Dioryctria reniculelloides
	Introduced pine sawfly	Diprion similis
	White fir needleminer	Epinotia meritana
	Elm leafminer	
	Geometrid moth	Geometridae
	Leafblotch miner	Gracillariidae
	Spotted tussock moth	Halisidota maculata
	Brown day moth	Hemileuca eglanterina
	Fall webworm	Hyphantria cunea
	Hemlock looper	Lambdina fiscellaria
	Tent caterpillar moth	Lasiocampidae
	Satin moth	Leucoma salicis
	Willow leafblotch miner	Lithocolletis spp.
	Aspen blotchminer	Lithocolletis tremuloidiella
	Gypsy moth	Lymantria dispar
	Cottonwood leafminers	Lyonetia spp.
	Western tent caterpillar	Malacosoma californicum
	Forest tent caterpillar	Malacosoma disstria
	Leafcutting bees	Megachilidae
	Blister beetle	Meloidae
	Willow sawfly	Nematus spp.
	Lodgepole sawfly	Neodiprion burkei
	Pine infesting sawflies	Neodiprion fulviceps
	Ponderosa pine sawfly	Neodiprion mundus

Category	Common Name	Scientific Name
12(cont.)	Hemlock sawfly	Neodiprion tsugae
	Pine butterfly	Neophasia menapia
	False hemlock looper	Nepytia canosaria
	California tortoiseshell	Nymphalis californica
	Bruce spanworm	Operophtera bruceata
	Rusty tussock moth	Orgyia antiqua
	Whitemarked tussock moth	Orgyia leucostigma
	Douglas-fir tussock moth	Orgyia pseudotsugata
	Western tussock moth	Orgyia vetusta
	Spring cankerworm	Paleacrita vernata
	Aspen leafminer	Phyllocnistis populiella
	Yellowheaded spruce sawfly	Pikonema alaskensis
	Tenlined June beetle	Polyphylla decemlineata
	Japanese beetle	Popillia japonica
	Larch sawfly	Pristiphora erichsonii
	Mountain-ash sawfly	Pristiphora geniculata
	Elm leaf beetle	Pyrrhalta luteola
	Spearmarked black moth	Rheumaptera hastata
	Giant silkworm moth	Saturniidae
	Redhumped caterpillar	Schizura concinna
	Larch looper	Semiothisa sexmaculata
	Spruce needleminer (west)	Taniva albolineana
		Thyridopteryx ephemeraeformis
	Leafroller/seed moth	Tortricidae
	Willow defoliation	Tortricidae
	Euonymus caterpiller	Yponomeuta spp.
	Larch bud moth	Zeiraphera improbana
	Pine needle sheathminer	Zelleria haimbachi
	Cottonwood leaf beetle	Chrysomela spp.
	Saddle-backed looper	Ectropis crepuscularia
	Leaf roller	Epinotia solandriana
	Green-striped looper	Melanoplophia imitata
	Pine looper	Phaeoura mexicanaria
		Zadiprion townsendi
	Douglas-fir budmoth	Zeiraphera hesperiana
	Phantom hemlock looper	Nepytia phantasmaria
	Tent caterpiller	Malacossoma spp.
	Elm sawfly	Cimbex americana
	June beetles/leaf chafers	Phyllophaga spp.
13	**Chewing Insects**	

Severity Rating
131 = Minor: trees that will have reduced growth rates and minor damage
132 = Severe: trees that are likely to die within 10 years

Category	Common Name	Scientific Name
13	Grasshopper	

Category	Common Name	Scientific Name
13 (cont.)	Shorthorn grasshoppers	Acrididae
	Clearwinged grasshopper	Camnula pellucida
	Cicadas	Cicadidae
	Eurytomids	Eurytoma spp.
	Cutworms	Euxoa excellens
	Pales weevel	Hylobius pales
	Periodical cicada	Magicicada septendecim
	Migratory grasshopper	Melanoplus sanguinipes
	Valley grasshopper	Oedaleonotus enigma
	Strawberry root weevil	Otiorhyhchus ovatus
	Northern pitch twig moth	Petrova albicapitana
	Ponderosa pine tip moth	Rhyacionia zozana
	Pine needle weevil	Scythropus spp.
		Thrips madronii
	Ash plant bug	Tropidosteptes amoenus
	Pitch-eating weevil	Pachylobius picivorus
14	**Sucking Insects**	

Severity Rating
141 = Minor: trees that will have reduced growth rate and minor damage.
142 = Severe: trees that are likely to die within 10 years.

Category	Common Name	Scientific Name
14	Scale insect	
	Western larch wooly aphid	Adelges oregonensis
	Balsam woolly adelgid	Adelges piceae
	Hemlock woolly adelgid	Adelges tsugae
	Aphid	Aphididae
	Western pine spittlebug	Aphrophora permutata
	Spittlebug	Cercopidae
	Pine needle scale	Chionaspis pinifoliae
	Giant conifer aphids	Cinara spp.
	Spruce aphid	Elatobium abietinum
	Wolly apple aphid	Erisoma lanigerum
	Pine thrips	Gnophothrips spp.
	Lecanium scale	Lecanium spp.
	Oystershell scale	Lepidosaphes ulmi
	Pinyon needle scale	Matsucoccus acalyptus
	Ponderosa pine twig scale	Matsucoccus bisetosus
	Treehoopers	Membracidae
	Black pineleaf scale	Nuculaspis californica
	Spruce spider mite	Oligonychus ununquis
	Maple aphids	Periphyllus spp.
	Spruce bud scale	Physokermes piceae
	Pine leaf adelgid	Pineus pinifoliae
	White pine adelgid	Pineus spp.
	Pine bark adelgid	Pineus strobi

Category	Common Name	Scientific Name
14 (cont.)	Root aphid	Prociphilus americanus
	Mealybug	Pseudococcidae
	Cottony maple scale	Pulvinaria innumerabilis
	Fir mealybug	Puto cupressi
	Douglas-fir mealybug	
	Pine tortoise scale	Toumeyella parvicornis
	Birch aphid	Euceraphis betulae
	European elm scale	Gossyparia spuria
15	**Boring Insects**	

Severity Rating
151 = Minor: trees that will have reduced growth rates and minor damage.
152 = Severe: trees that are likely to die within 10 years.

Category	Common Name	Scientific Name
15	Shoot borer	
	Termite	
	Ponderosa pine bark borer	Acanthocinus princeps
	Bronze birch borer	Agrilus anxius
	Bronze poplar borer	Agrilus liragus
	Carpenter bees	Apidae
	Flatheaded borer	Buprestidae
	Golden buprestid	Buprestis aurulenta
	Carpenter ants	Camponotus spp.
	Gouty pitch midge	Cecidomyia piniinopis
	Shootboring sawflies	Cephidae
	Roundheaded borer	Cerambycidae
	Flatheaded apple tree borer	Chrysobothris femorata
	Pitted ambrosia beetle	Corthylus punctatissimus
	Carpenterworm moths	Cossidae
	Poplar and willow borer	Cryptorphynchus lapathi
	Pine reproduction weevil	Cylindrocopturus eatoni
	Douglas-fir twig weevil	Cylindrocopturus furnissi
	Ponderous borer	Ergates spiculatus
	Western pine shoot borer	Eucosma sonomana
	Eucosma species	Eucosma spp.
	Warren's collar weevil	Hylobius warreni
	Powderpost beetle	Lyctidae
	Tarnished plant bug	Lygus lineolaris
		Magdalis spp.
	White pine bark miner	Marmara fasciella
	Locust borer	Megacyllene robiniae
	California flathead borer	Melanophila californica
	Flathead fir borer	Melanophila drummondi
	Whitespotted sawyer	Monochamus scutellatus
	Redheaded ash borer	Neoclytus acuminutus
	Oberea shoot borers	Oberea spp.

Category	Common Name	Scientific Name
15 (cont.)		Pissodes dubius
	White pine weevil	Pissodes strobi
	Lodgepole terminal weevil	Pissodes terminalis
	Ambrosia beetles	Platypus spp.
	Cottonwood borer	Plectrodera scalator
	Ash borer	Podesesia syringae fraxini
	Lilac borer	Podosesia syringae
		Prionoxystus robiniae
	Maple shoot borers	Proterteras spp.
	Western subterranean termite	Reticulitermes hesperus
	European pine shoot moth	Rhyacionia buoliana
	Western pine tip moth	Rhyacionia bushnelli
	Nantucket pine tip moth	Rhyacionia frustrana
	Lodgepole pine tip moth	Rhyacionia montana
	Southwestern pine tip moth	Rhyacionia neomexicana
	Saperda shoot borer	Saperda spp.
	Clearwing moths	Sesiidae
	Roundheaded fir borer	Tetropium abietis
	Western larch borer	Tetropium velutinum
	Western cedar borer	Trachykele blondeli
	Douglas-fir pitch moth	Vespamima novaroensis
	Sequoia pitch moth	Vespamima sequoia
	Cottonwood twig borer	Gypsonama haimbachiana
	Banded ash borer	Neoclytus capraea
16	**Seed/Cone/Flower/ Fruit Insects**	

Severity Rating
161 = Minor: trees that will have reduced growth rates and minor damage.
162 = Severe: trees that are likely to die within 10 years.

Category	Common Name	Scientific Name
16	Douglas-fir cone moth	Barbara colfaxiana
	Lodgepole cone beetle	Conophthorus contortae
	Limber pine cone beetle	Conophthorus flexilis
	Mountain pine cone beetle	Conophthorus monticolae
	Ponderosa pine cone beetle	Conophthorus ponderosae
	Douglas-fir cone midge	Contarinia oregonensis
	Cone scale midge	Contarinia washingtonensis
	Pecan	Curculio spp.
	Fir coneworm	Dioryctria abietivorella
	Pine coneworm	Dioryctria auranticella
	Ponderosa twig moth	Dioryctria ponderosae
		Dioryctria pseudotsugella
	Dioryctria moths	Dioryctria spp.
	Lodgepole cone moth	Eucosma rescissoriana
	Seed chalcid	Eurytomidae

Category	Common Name	Scientific Name
16 (cont.)	Cone maggot	Hylemya anthracina
	Ponderosa pine seed worm/moth	Laspeyresia piperana
	Spruce seed moth	Laspeyresia youngana
	Boxelder bug	Leptocoris trivittatus
	Western conifer seed bug	Leptoglossus occidentalis
		Magastigmus lasiocarpae
	Spruce seed chalcid	
	Ponderosa pine seed chalcid	Megastigmus albifrons
	Fir seed chalcid	Megastigmus pinus
	Douglas-fir seed chalcid	Megastigmus spermotrophs
	Roundheaded cone borer	Paratimia conicola
	Coneworm	Phycitidae
	Harvester ants	Pogonomyrmex spp.
	Coneworm	Hylemia spp.
	Prairie tent caterpillar	Malacosoma lutescens
17	**Gallmaker Insects**	

Severity Rating
171 = Minor: trees that will have reduced growth rates and minor damage.
172 = Severe: trees that are likely to die within 10 years.

Category	Common Name	Scientific Name
17	Cooley spruce gall adelgid	Adelges cooleyi
	Gall midge	Cecidomyiidae
	Doug-fir needle gall midge	Contarinia pseudotsugae
	Gall mite	Eriophyidae
	Spruce gall midge	Mayetiola piceae
	Gall aphid	Phylloxeridae
	Alder gall mite	Phytoptus laevis
	Psyllid	Psyllidae
	Gouty pitch midge	Cedidomyia piniinopsis
	Spider mites	Oligonychus spp.
18	**Insect Predators**	

Severity Rating
181 = Minor: trees that will have reduced growth rates and minor damage.
182 = Severe: trees that are likely to die within 10 years.

Category	Common Name	Scientific Name
18	Lacewing	
	Blackbellied clerid	Enoclerus lecontei
	Redbellied clerid	Enoclerus sphegeus
	Western yellowjacket	Vespula pennsylvanica

19	General Diseases	
Severity Rating 191 = Minor: trees that will have reduced growth rates and minor damage. 192 = Severe: trees that are likely to die within 10 years.		
20	**Biotic Damage**	
Severity Rating 201 = *Minor*: trees that will have reduced growth rates and minor damage. 202 = *Sever*: trees that are likely to die within 10 years.		
Category	**Common Name**	**Scientific Name**
20	Damping off	
	Gray mold	Botrytis cinerea
21	**Root/Butt Diseases**	
Severity Rating 211 = Tree within 30 feet of tree with deteriorating crown, tree with diagnostic symptoms or signs, or tree killed by root disease 212 = Pathogen (sign) or diagnostic symptom detected - no crown deterioration 213 = Crown deterioration detected - no diagnostic symptoms or signs 214 = Both crown deterioration and diagnostic signs symptoms detected		
Category	**Common Name**	**Scientific Name**
21	Armillaria root disease	Armillaria spp.
	Cylindrocladium root disease	Cylindrocladium spp.
	Brown crumbly rot	Fomitopsis pinicola
	Fusarium root rot	Fusarium spp.
	White mottled rot	Ganoderma applanatum
	Ganoderma rot of conifers	Ganoderma tsugae
	Annosus root disease	Heterobasidion annosum
	Tomentosus root disease	Inonotus tomentosus
	Black stain root disease	Ophiostoma wageneri
	Schweinitzii butt rot	Phaeolus schweinitzii
	Laminated root rot	Phellinus weirii
	Pythium root rot	Pythium spp.
	Yellow pitted rot	Hericium abietis

22	Stem Decays and Cankers	

Severity Rating
220 = 0 – 4% rotten
221 = 5-15% rotten
222 = 16-25% rotten
223 = 26-35% rotten
…. = ….
229 = 86-100% rotten

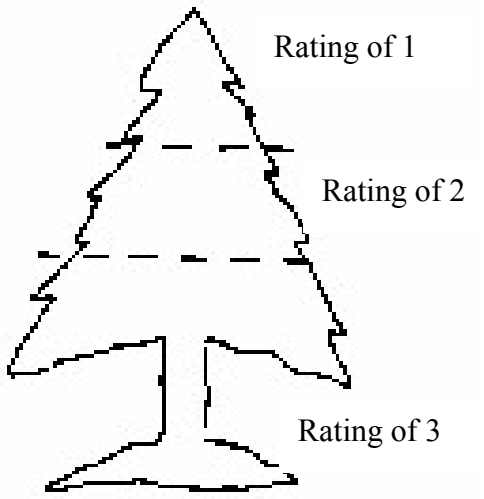
Severity codes for Stem Decay and Cankers describe the amount of sawlog volume loss, in terms of board feet. Trees smaller than merchantable size the severity codes are used to record the amount of rotten wood in order to indirectly estimate the sound wood volume yield suitable for pulp or firewood. The percent rotten estimate for these "unmerchantable" trees should thus be made in terms of cubic foot measure. Because the percent of the tree volume in log sections is similar for cubic foot and board foot measures, the procedure for estimating percent rotten is the same for trees of merchantable size. The extent of decay in one-log or smaller trees is estimated directly in cubic foot terms.

Category	Common Name	Scientific Name
22	Heart rot	
	Stem rot	
	Sap rot	
	Black knot of cherry	Apiosporina morbosa
	Atropellis canker	Atropellis piniphila
	Black canker of aspen	Ceratocystis fimbriata
	Gray-brown sap rot	Cryptoporus volvatus
	Cryptosphaeria canker of aspen	Cryptosphaeria populina
	Cytospora canker of fir	Cytospora abietis
	Western red rot	Dichomitus squalens
	Rust-red stringy rot	Echinodontium tinctorium
	Sooty-bark canker	Encoelia pruinosa
	Amelanchier rust	Gymnosporangium harknessianum
	Cedar apple rust	Gymnosporangium juniperi-virginianae
	Hypoxylon canker of aspen	Hypoxylon mammatum
	Sterile conk trunk rot of birch	Inonotus obliquus
	Red ring rot	Phellinus pini
	Aspen trunk rot	Phellinus tremulae
	Phomopsis canker	
	Cytospora canker of aspen	Cytospora chrysosperma
	Red belt fungus	Fomitopsis pinicola
	Brown heartrot	Fomitopsis Officinalis
		Coniophora puteana
	Tinder fungus	Fomes fomentarius
	Purple conk	Hirschioporus abietinus

Category	Common Name	Scientific Name
22 (cont.)		Leptographium wagnerii
		Phellinus hartigii
	False tinder fungus	Phellinus igniarius
	Yellow cap fungus	Pholiota spp.
	Oyster mushroom	Pleurotus ostreatus
	Cedar brown pocket rot	Poria sericeomollis
	Lanchnellula canker	Lanchnellula flavoirens
	Phomopsis blight	Phomopsis juniperovora
23	**Parasitic/Epiphytic Plants (Dwarf Mistletoe)**	

Severity Rating
231 - Hawksworth tree DMR rating 1
232 – Hawksworth tree DMR rating 2
233 – Hawksworth tree DMR rating 3
234 – Hawksworth tree DMR rating 4
235 – Hawksworth tree DMR rating 5
236 - Hawksworth tree DMR rating 6

Table 13: Hawksworth DMR Rating Severity Classes

Instructions: Hawksworth DMR Rating Severity Classes	Example:
STEP 1. Divide live crown into thirds. STEP 2. Rate each third separately. Each third should be given a rating of 0, 1 or 2 as described below. (0) No visible infections (1) Light infection (1/2 or less of the total number of branches in the crown third are infected) (2) Heavy infection (more than 1/2 of total number of branches in the crown third are infected). STEP 3. Finally, add ratings of thirds to obtain rating for total tree.	
The dwarf mistletoe rating for the above tree is 233 (top (0) + middle (1) + bottom (2))	

Category	Common Name	Scientific Name
23	Mistletoe	
	Vine damage	

Category	Common Name	Scientific Name
23 (cont.)	Lodgepole pine dwarf mistletoe	Arceuthobium americanum
	Western dwarf mistletoe	Arceuthobium campylopodum
	Limber pine dwarf mistletoe	Arceuthobium cyanocarpum
	Douglas-fir dwarf mistletoe	Arceuthobium douglasii
	Larch dwarf mistletoe	Arceuthobium laricis
24	**Decline Complexes /Dieback/Wilts**	

Severity Rating
241 = Minor: trees that will have reduced growth rates and minor damage.
242 = Severe: trees that are likely to die within 10 years.

Category	Common Name	Scientific Name
24	Ash decline/yellow	
	Dutch elm disease	Ceratocystis ulmi
25	**Foliage Diseases**	

Severity Rating
251 = Minor: trees that will have reduced growth rates and minor damage.
252 = Severe: trees that are likely to die within 10 years.

Category	Common Name	Scientific Name
25	Blight	
	Broom rust	
	Juniper blights	
	Leaf spots	
	Needlecast	
	Powdery mildew	
	True fir needlecast	
	Large-pored spruce-laborador tea rust	Chrysomyxa ledicola
	Ink spot of aspen	Ciborinia whetzelii
	Pine needle rust	Coleosporium spp.
	Cedar leaf blight	Didymascella thujina
	Dogwood anthracnose	Discula spp.
	Elytroderma disease	Elytroderma deformans
	Fire blight	Erwinia amylovora
	Brown felt blight	Herpotrichia juniperi
	Larch needle blight	Hypodermella laricis
	Spruce needle cast	Lirula macrospora
	Fir needle cast	Lirula spp.
	White pine needle cast	Lophodermella arcuata
	Lophodermella needle cast	Lophodermella spp.
	Lophodermium needle cast	Lophodermium spp.

Category	Common Name	Scientific Name
25 (cont.)	Marssonina blight	Marssonina populi
	Melampsora rusts	Melampsora medusae
	Larch needle cast	Meria laricis
	Dothistroma needle blight	Mycosphaerella pini
	Brown felt blight of pines	Neopeckia coulteri
	Snow blight	Phacidum abietis
	Swiss needle cast	Phaeocryptopus gaumannii
	Fir needle rust	Pucciniastrum spp.
	Douglas-fir needle cast	Rhabdocline spp.
	Rhizophaeria needle cast	Rhizophaeria spp.
	Brown spot needle blight	Scirrhia acicola
	Septoria leaf spot and canker	Septoria musiva
	Diplodia blight	Sphaeropsis sapinea
	Shepherd's crook	Venturia tremulae
	Dothistroma needle blight	Dothistroma septospora
	Broom rust	Chrysomyxa arctostaphyli
	Spruce needle rust	Chrysomyxa weirii
	Spruce needle cast	Lophodermium picea
	Hardwood leaf rusts	Melampsora spp.
	Sirococcus shoot blight	Sirococcus strobilinus
	Shepherds crook	Venturia populina
	Delphinella shoot blight	Delphinella abietis
26	**Stem Rusts**	

Severity Rating
261 = Branch infections located greater than 2 feet from tree bole.
262 = Branch infections located between 6 inches and 2 feet from tree bole.
263 = Bole infections or branch infections located within 6 inches of bole.
264 = Topkill.

Category	Common Name	Scientific Name
26	White pine blister rust	Cronartium ribicola
	Western gall rust	Peridermium harknessii
	Stalactiform blister rust	Cronartium coleosporioides
	Comandra blister rust	Cronartium comandrae
	Bethuli rust	Peridermium bethuli
27	**Broom Rusts**	

Severity Rating
271 = Minor: trees that will have reduced growth rates and minor damage.
272 = Severe: trees that are likely to die within 10 years.

Category	Common Name	Scientific Name
27	Spruce broom rust	Chrysomyxa arctostaphyli

Category	Common Name	Scientific Name
27 (cont.)	Juniper broom rust	Gymnosporangium nidus-avis
	Fir broom rust	Melampsorella caryophyllacearum
	Bethuli rust	Perdermium bethuli
30	**Fire**	

Severity Rating
301 = Minor: trees that will have reduced growth rates and minor damage.
302 = Severe: trees that are likely to die within 10 years.

41	**Wild Animals**	

Severity Rating
411 = Minor: trees that will have reduced growth rates and minor damage.
412 = Severe: trees that are likely to die within 10 years.

Category	Common Name	Scientific Name
41	Bear	
	Beaver	
	Big game	
	Mice or voles	
	Pocket gophers	
	Porcupines	
	Rabbits or hares	
	Sapsucker	
	Squirrels	
	Woodpeckers	
	Moose	
	Elk	
	Deer	
42	**Domestic animals**	

Severity Rating
421 = Minor: trees that will have reduced growth rates and minor damage.
422 = Severe: trees that are likely to die within 10 years.

Code only when ½ or more of the bole circumference has been girdled or stripped, or when browsing or trampling has seriously decimated a small tree, and the damage will ultimately prevent the tree from ever becoming a 5.0-inch sound tree with good form and vigor.

Category	Common Name	Scientific Name
42	Cattle	
	Goats	
	Horses	
	Sheep	

50	Abiotic damage	
Severity Rating 501 = Minor: trees that will have reduced growth rates and minor damage. 502 = Severe: trees that are likely to die within 10 years.		
Category	**Common Name**	
50	Air pollutants	
	Chemical	
	Drought	
	Flooding/high water	
	Frost	
	Hail	
	Heat	
	Lightning	
	Nutrient imbalances	
	Radiation	
	Snow/ice	
	Wild fire	
	Wind/tornado	
	Winter injury	
	Avalanche	
	Mud/land slide	
60	**Competition**	
Severity Rating 601 = Minor: trees that will have reduced growth rates and minor damage. 602 = Severe: trees that are likely to die within 10 years.		
70	**Human Activities**	
Severity Rating 701 = Minor: trees that will have reduced growth rates and minor damage. 702 = Severe: trees that are likely to die within 10 years.		
Category	**Common Name**	
70	Herbicides	
	Human caused fire	
	Imbedded objects	
	Improper planting technique	
	Land clearing	
	Land use conversion	
	Logging damage	
	Mechanical	
	Pesticides	
	Roads	
	Soil compaction	
	Suppression	
	Vehicle damage	
	Road salt	

71	Harvest	

Severity Rating
711 = Minor: trees that will have reduced growth rates and minor damage.
712 = Severe: trees that are likely to die within 10 years.

80	Multi-Damage (Insect/Disease)

Severity Rating
801 = Minor: trees that will have reduced growth rates and minor damage.
802 = Severe: trees that are likely to die within 10 years.

Category	Common Name
80	Aspen defoliation 12037 = Defoliator/ large aspen tortrix 12096 = Defoliator/ forest tent caterpillar 25036 = Foliage disease/ Marssonina blight 25037 = Foliage disease/ Melampsora rusts
	Subalpine fir mortality 11015 = Bark beetles/ Western balsam bark beetle 21001 = Root/butt disease/ armillaria root disease 21010 = Root/butt disease/ annosus root disease 50014 = Abiotic damage/ winter injury

99	Physical Effect		

Severity Rating
Severity is the amount of volume loss and is estimated in terms of board feet for all trees of merchantable size; submerchantable sized trees are based on the cubic foot. These severities do not need to be proceeded by the category code of 99. Only the actual percentage needs to be recorded.

Category	Agent Code	Physical Effects Description	Severity Description
99	001	Broken or missing top. Record for all species when the break occurs at or above 4.5 feet, for hardwoods record when the break occurs on the main stem.	% of missing height
	002	Dead top. Record for all trees with a dead terminal leader.	% of dead height
	004	Forked top. Do not record for hardwoods. Trees 5.0" DBH or larger shall be recorded for forked top when the fork appears below 4.0" diameter top.	% of height above fork

Appendix T:

Accuracy Standards

Distance Measurements

Field	Tolerance
Plot Center	± 30 meters horizontal distance
Limiting Distance	Determination of in/out trees ≥ .1 in. dbh is.1 ft. horizontal distance and trees ≥ 5.0 in. dbh is .5 feet horizontal distance from plot center to the geographic center of the tree at ground line.

Stand Data

Field	Tolerance
01 - Project Name	No Errors
02 - Region	No Errors
03 - Proclaimed Forest	No Errors
04 - District	No Errors
05 - Location	No Errors
06 - Stand Number	No Errors
07 - Ownership	No Errors
08 - State	No Errors
09 - County	No Errors
10 - Administrative Forest	No Errors
11 - Date	No Errors
13 - Exam Level	No Errors
14 - Exam Purpose	No Errors
22 - Elevation	± 200 ft.
23 - Aspect	± 45 degrees
24 - Slope	± 10 Percent
26 - Acres	No Errors
31 - Precision Protocol	No Errors
32 - Examiner	No Errors
33 - Stand Remarks	No Errors

Plot Data

Field	Tolerance
01 - Plot Number	No Errors
02 –Plot Latitude	± 30 meters horizontal distance
03 –Plot Longitude	± 30 meters horizontal distance
05 - Plot Aspect	± 45°
06 - Plot Slope	± 10 Percent

Tree Data

<table>
<tr><th>Field</th><th>Tolerance</th></tr>
<tr><td>01 - Plot Number</td><td>No Errors</td></tr>
<tr><td>02 - Tag ID Number</td><td>No Errors</td></tr>
<tr><td>03 - Tree Status</td><td>No Errors</td></tr>
<tr><td>05 - Tree Species</td><td>No Errors</td></tr>
<tr><td>06 - Tree Count</td><td>
<u>LIVE TREES</u>
<table>
<tr><th><u>Height Range</u></th><th><u>Diameter Range</u></th><th><u>Trees on Plot</u></th><th><u>Tolerance</u></th></tr>
<tr><td>*All</td><td>All</td><td>0</td><td>0 trees</td></tr>
<tr><td>≥0.5 feet</td><td><0.5” DBH</td><td>1-5</td><td>± 1 tree</td></tr>
<tr><td>≥0.5 feet</td><td><0.5” DBH</td><td>6 +</td><td>± 20%</td></tr>
<tr><td>All</td><td>.5"- 4.9” DBH</td><td>1-5</td><td>± 1 tree</td></tr>
<tr><td>All</td><td>.5"- 4.9” DBH</td><td>6 +</td><td>± 10%</td></tr>
<tr><td>All</td><td>5.0” DBH +</td><td>1 +</td><td>0 trees</td></tr>
</table>
<u>DEAD TREES</u>
<table>
<tr><th><u>Height Range</u></th><th><u>Diameter Range</u></th><th><u>Trees on Plot</u></th><th><u>Tolerance</u></th></tr>
<tr><td>*All</td><td>All</td><td>0</td><td>0 trees</td></tr>
<tr><td>≥0.5 feet</td><td><0.5” DBH</td><td>1-5</td><td>± 2 tree</td></tr>
<tr><td>≥0.5 feet</td><td><0.5” DBH</td><td>6 +</td><td>± 40%</td></tr>
<tr><td>All</td><td>.5"- 4.9” DBH</td><td>1-5</td><td>± 2 tree</td></tr>
<tr><td>All</td><td>.5"- 4.9” DBH</td><td>6 +</td><td>± 20%</td></tr>
<tr><td>All</td><td>5.0” DBH +</td><td>1 +</td><td>2 trees</td></tr>
</table>
*There is no tolerance for recording a live or dead tree when none are actually present in any of the above size classes. The recording of a fixed plot live or dead tree when none are present will result in a single discrepancy. The recording of a live tree ≥ 5.0” DBH when none are present will result in an unacceptable pay unit.
</td></tr>
<tr><td>08 - DBH</td><td>
<table>
<tr><th>Size Class</th><th>Tolerance</th></tr>
<tr><td><.5 inch</td><td>No Errors</td></tr>
<tr><td>.5 in. - 13.9 in.</td><td>± .1 Inch</td></tr>
<tr><td>14.0 in. - 23.9 in.</td><td>± .2 Inch</td></tr>
<tr><td>24.0 in. - 34.9 in.</td><td>± .3 Inch</td></tr>
<tr><td>35.0 in. +</td><td>± .5 Inch</td></tr>
</table>
</td></tr>
<tr><td>09 - Height</td><td>± 10 %</td></tr>
<tr><td>15 - Crown Ratio</td><td>± 10 %</td></tr>
<tr><td>16 - Crown Class</td><td>± 1 Crown Class</td></tr>
<tr><td>19 – Snag Decay</td><td>± 1 Decay Class</td></tr>
</table>

Field	Damage Tolerance	Severity Tolerance
21 - Damage Category		
11 - Bark Beetles	No misses on live trees with a severity of ≥ 2.	± 0
12 - Defoliators	No misses on live trees with a severity of ≥ 3.	± 1 Code
13 – Chewing Insects	No misses on live trees with a severity of ≥ 2.	± 0
14 – Sucking Insects	No misses on live trees with a severity of ≥ 2.	± 0
15 – Boring Insects	No misses on weevils (Pissodes) or shoot moths (Eucosma) on live trees.	± 0
16 -Seed/cone/flower/ fruit insects	No misses of shoot moths (Eucosma) on live trees.	± 0
17 – Gallmaker Insects	No misses on live trees with a severity of 2.	± 0
21 - Root/Butt Diseases	No misses on live trees with a severity of ≥ 2.	± 0
22 - Stem Decays/ Cankers	No misses on live trees with a severity of ≥ 3.	± 1 Code
23 - Parasitic - Mistletoe	No misses on live trees with a severity of ≥ 3.	± 1 Code
25 - Foliage Diseases	No misses on Elytroderma on live trees.	± 0
26 – Stem Rusts	No misses on live trees with a severity of ≥ 2.	± 0
27 – Broom Rusts	No misses on live trees with a severity of 2.	± 0
30 - Fire	No misses if damage affects > ¼ of the bole circumference or if an open wound is in contact with the ground.	± 0
41 – Wild Animals	No misses on live trees with terminal leader damage or with greater than 1/4 of bole circumference affected.	± 0
42 – Domestic Animals	No misses on live trees with terminal leader damage or with greater than 1/4 of bole circumference affected.	± 0
50 - Abiotic Damage	No misses on wind, snow, or ice bending, breakage, or bole cracks and frost damage to shoots on trees < 1" DBH and lightning on trees ≥ 5" DBH.	± 0
70 – Human Activity	No misses on live trees if the damage affects >1/4 of the bole circumference or if an open wound is in contact with the ground.	± 0
71 - Harvest	No misses on live trees for logging damage if the damage affects >1/4 of the bole circumference or if an open wound is in contact with the ground.	± 0
99 - Physical Effects	No misses on live trees with a severity of ≥ 2.	± 10%
25 – Tree Remarks	No errors when applicable.	

Understory Vegetation Cover

Field	Tolerance
01 - Plot Number	No Errors
03 - Layer	No Errors
04 – Life Form	No Errors
05 - Species	No Error
07 - Average Height	± 10%
09 - Canopy Cover	± 5 % for < 20 % coverage and ± 10% for ≥ 20% coverage
12 - Cover Remarks	No errors when applicable.

Surface Cover

Field	Tolerance
01 - Plot Number	No Errors
02 – Surface Cover Type	No Errors
03 – Surface Cover Percent	± 5 % for < 20 % coverage and ± 10% for ≥ 20% coverage
04 – Surface Cover Remarks	No errors when applicable.

APPENDIX U:

Glossary of Terms

Access	A means of approaching, entering, exiting, or making use of; passage into each plot.
Apical Dominance	The inhibitory influence on the growth of lateral buds exerted by the terminal bud of a growing plant shoot.
Aspect	A position facing or commanding a given direction; exposure. In respect to this manual aspect is the compass direction of the prevailing slope with respect to true north.
Azimuth	A horizontal angular or bearing of a point, measure clockwise from true north to an object of interest. The azimuth plus or minus 180° is termed the back azimuth.
Bole	The main stem of a timber species tree.
Bole Length	The straight line distance measured parallel to the main bole of a tree, from its base to its tip.
Borderline Tree	A tree that is difficult to judge as being IN or OUT of a subplot because it is located close to the subplot radius and limiting distance measurements are taken.
Breast Height	A point located on the uphill side of the main stem, by measuring 4.5 feet along the uphill side of the bole from ground level or the predominant root collar. Preclude slight, non-compacted litter accumulations when establishing breast height.
Conk	The fruiting body of a wood-destroying fungus that projects from the bole, roots, or other tree parts. The size, shape, color of conks will vary depending on the fungus species.
Crook	An abrupt curvature or bend in a tree bole.
Crown Class	The relative position of the tree crown with respect to the competing vegetation around it. Crown class for each tree is judged in the context of its immediate environment, that is, those tree or shrubs which are competing for sunlight with the subject tree.
Crown Cover	The ground area covered by a plant crown, as defined by the vertical projection of its outermost perimeter.
Crown Ratio	The ratio of live crown length to bole length. Lengths are measured parallel to the bole from the base of the tree to the tip.
Deciduous	See Hardwoods.
Diameter at Breast Height (DBH)	The outside bark diameter of a tree measured at breast height and perpendicular to the tree bole. The measurement is taken a 4.5’ above the ground on the uphill side of the tree.
Diameter Class	A classification of trees based on DBH.
Down Tree	Any tree that is not self supporting and has NO root contact with the ground. The main stem may be lying on the ground or supported by branch wood.

Duff	The fermentation and humus layers of the forest floor. It does not include the freshly cast materials in the litter layer. The top of the duff is where needles, leaves and other castoff vegetative materials have noticeably began to decompose. Individual particles usually will be bound by fungal mycelium. When moss is present, the top of the duff layer is just below the green portion of the moss. The bottom of the duff is mineral soil.
Ecotone	The boundary or transision zone between adjacent plant communities; it often separates different habitat types.
Elevation	The height above sea level.
Fixed-Radius Plot	A circular sample plot of a specified horizontal radius: 1/300 acre = 6.8 foot radius, 1/24 acre = 24.0 foot radius, ¼ acre = 58.9 foot radius.
Geographic Center	The physical center of a single stemmed tree or the physical center of all the stems of a multistemmed woodland tree (defined as the center of a stand scribed by connecting the centers of the outermost stems in the tree at the DRC point; stems of any diameter are to be used).
Ground Level	The forest floor, made up by soil and a duff layer. It does not include unincorporated woody debris that may rise above the ground line. In reference to a point of measure it is the highest point of the ground touching the base of the object being referenced.
Group Tally	A count of one or more items of the same type or species and recorded as a single line entry.
Ground Surface Cover Type	The general classification of an area into ground layers; i.e. Bave, Gravel, Moss, etc.
Hardwoods	Dicotyledonous trees, usually broad-leaved and deciduous (leaves that fall off or shed at specific seasons).
Height Sample Tree	Height sample tree is the first live standing tree of each species encountered on the plot when moving clockwise from 0 degrees azimuth within pre-determined DBH classes.
Herbaceous	Of or relating to a seed-producing annual, biannual, or perennial plant that does not develop persistent woody tissue, and dies down at the end of a growing season. Non-woody plants such as grasses, grass-like plants, and forbs.
Lean	Tree: The deflection from vertical > 15 degrees of a straight line passing through the geometric center of the base and top of the main stem.
Limiting Distance	The maximum horizontal distance a tree can be from the plot center and still be considered for tally. A comparative measurement between the plot radius and the distance from the plot center to the geographic center of the object. The comparison is used to determine whether the object is IN or OUT of the fixed area plot. In reference to fixed-area plots, limiting distance is determined by the size of the sample; for a 1/24 acre sample, the limiting distance to the geographic center of the tree at the base is 24 feet. IN - The object is "in" if the measured distance is equal to or less than the subplot radius. OUT – The object is "out" if the measured distance is greater than the subplot radius.

Litter	The uppermost layer of organic debris on a forest floor; that is, essentially the freshly fallen, or only slightly decomposed material, mainly foliage, but also bark fragments, twigs, flowers, fruits, pinecones, carcasses, feces, and so forth.
Normally Formed Tree	A tree with a central bole that Appendixes physiological traits and development typical of its tree species, age, and environment. A tree that has been a Dominant or Codominant crown class its entire life.
Outcrop	Surface exposure of a significant geologic strata, i.e. rock.
Pathogen	An organism capable of causing disease.
Seedling	See Tree.
Slope	The average percent deviation from horizontal.
Snag	A standing dead tree (reference "tree") that is ≥ 5" DBH and ≥ 4.5' tall.
Species	A code that represents a fundamental category of taxonomic classification of an organism.
Softwoods	Coniferous trees that are usually evergreen (retaining leaves year-round), and having needle – or scale-like leaves. Larix is included in this category.
Stem Void	The main stem area of a tree not occupied by sound wood fiber, when the main stem is contiguous and defined as inside bark circumference.
Stump	The basal portion of a tree remaining in contact with the soil after the trunk or main stem has been severed at a point less than 4.5 feet above ground height (measured on the uphill side) and has a diameter greater than or equal to 5 inches at the point of separation.
Sweep	A curve in a tree bole, not an abrupt bend (crook).
Suppressed Tree	A tree having its crown in the lower layer of the canopy, the leading shoot is not free to grow. The crown receives no direct sunlight.
Tree	A woody perennial plant, typically large, with a single well-defined stem carrying a more or less definite crown. Seedling: In addition to the definition for a tree, include; The stem is at least six inches in height, less than 1.0" DBH and root contact with mineral soil. Sapling: In addition to the definition for a tree, include; a timber species 1.0" to 4.9" DBH. Poletimber: In addition to the definition for a tree, include; a timber species 5.0" to 8.9" DBH for a softwood and 5.0" to 10.9" DBH for a hardwood. Sawtimber: In addition to the definition for a tree, include; a timber species ≥ 9.0" DBH for a softwood and ≥ 11.0" DBH for a hardwood. Live Tree: In addition to the definition for a tree, include; having viable meristematic tissue and root contact with mineral soil.

Tree (cont.)	Dead Tree (Snag): In addition to the definition for a tree, include; having no viable meristematic tissue and self-supporting and with the upper bole portion not in contact with the organic layer.
=	Equal to.
<	Less than.
≤	Less than equal to.
>	Greater than.
≥	Greater than or equal to.

Exhibit A:

GPS Guidelines

Plot Acquisition standards.

1. The Contractor shall provide a GPS receiver that has the ability to obtain the stated accuracy standard of ± 30 meters in the horizontal dimension.

2. All directions from compass observations shall be corrected for magnetic declination.

3. All GPS data shall be supplied using the following format:

Map Projection – Albers

Latitude 1 – 46 00 0.0000 N
Latitude 2 – 48 00 0.0000 N
Central Meridian – 109 30 0.0000 W
Origin Latitude – 44 00 0.0000 N
False Easting – 600000.00
False Northing – 0.00

Geodetic Datum – NAD83

Coordinate System – Latitude and Longitude, dd°mm'ss.s"

Plot Acquisition Data Collection

1. The field GPS receiver shall be set to position or record observations to a minimum of four satellites above 15 degrees elevation (also known as "3D" mode).

2. For each point feature, the minimum occupation time shall allow for 180 individual position fixes.

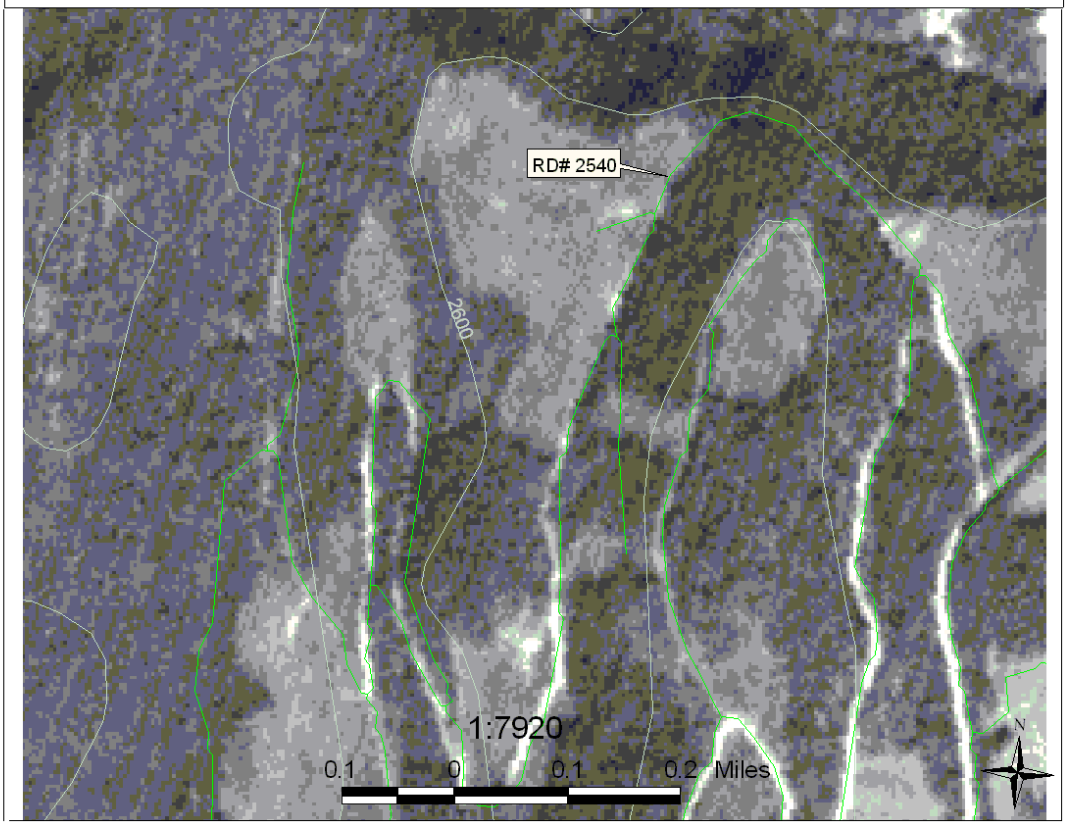
3. Point features are surveyed where the GPS antenna is over plot center for a period of time. During that time, a number of individual GPS position fixes are collected and averaged to give a single location for the point. While acquiring, the GPS receiver must not move as satellite signals are continuously received. The emphasis of this mode is on high accuracy and stability in the position solution.

Exhibit B

Field Forms

SETTING FORM

Project Name F-1 VMP	Proc. Region F-2 01	Proc. For. F-3 __	District F-4 __	Location F-5 _____	Stand # F-6 _____	Ownership F-7 USFS	State F-8 __
County F-9 ___	**Admin. For. F-10** __	**Date F-11** __/__/_____	**Exam Level F-13** 2101	**Exam Purpose F-14** SE	**Elev. F-22** _____		
Aspect F-23 ___	**Slope F-24** ___	**Acres F-26** ____	**Prec. Pro. F-31** UNIVMP	**Examiner F-32** _____			
Stand Remarks F-33 242 Characters _____							



Sample Design Form

Region:_____ Forest:_____ District_____ Location: _____ **Stand Number**:_____

Name: _____ Date: ____ /____ /____

(Record the number of plots taken in each setting for each Form Type.)

Form Type F-1	Method F-2	Exp. Factor F-3	Azm. F-4	# of Plots F-5	Condition	Subpop Filter F-6	Variable F-9	Min. Value F-10	Max. Value F-11
TREE	FRQ	300				LIVE	HGT	.50	4.49
					OR	ALL	DBH	.10	4.99
TREE	FRQ	24				ALL	DBH	5.00	20.99
TREE	FRQ	4				ALL	DBH	21.00	999.99
VEGCOV	FRQ	24				LIVE	CVR	5.00	100.00
SURCOV	FRQ	24					SVC	1.00	100.00

Plot Data Form

Region:__01___ Forest:____ District____ Location: ___________ Stand Number:________

Name: __________________ Date: ____ /____ /____

Plot # F -1 XXX	Aspect F -5 XXX	Slope F-6 XXX	Plot Remarks F-18 (242 – character)

Tree Data Form

Region:__01__ Forest:_____ District_____ Location: __________ Stand Number:__________

Name: __________________ Date: ____ /____ /____ **Fixed Plot Sizes: 1/4 acre, 1/24 acre and 1/300 acre.**

Plot #	Tag	Tree Status	Species	Tree Count	DBH	Height	Crown Ratio	Crown Class	Snag Decay	Damage Category			Damage Agent			Damage Severity			Tree Remarks
F-1	F-2	F-3	F-5	F-6	F-8	F-9	F-15	F-16	F-19	F-21			F-22			F-24			F-25
XXX	XXXX	X	XXXXXXXXX	XXX	XXX.X	XXX	XXX	XX	X	XX	XX	XX	XX	XX	XX	XX	XX	XX	30 Characters
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Vegetation Composition Form

Region:__01___ Forest:____ District____ Location: ________ Stand Number:_________

Name: _________________ Date: ____ /____ /____ Fixed Plot size: 1/24 acre plot

Plot # F-1 XXX	Layer F-3 X	Life Form F-4 XX	Species F-5 XXXXXX	Avg. Height F-7 XXX	Canopy Cover F-9 XXX.X	Vegetation Remarks F-12 20 Characters
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Ground Surface Cover Form

Region:__01___ Forest:____ District____ Location: _________ Stand Number:__________

Name: __________________ Date: ____ /____ /____ **Fixed Plot size: 1/24 acre plot**

Plot # F-1 XXX	Ground Surface Cover Type F-2 XXXX	Ground Surface Cover Percent F-3 XXX.X	Ground Surface Cover Remarks F-4 20 Characters
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