

Southwest Idaho
Common Stand Exam
Field Guide
Version 1.6



Field Season 2004

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Section 1: Data Collection Procedures

The following fields are "**required**" regardless of examination level.

Setting	Project Name Region Proclaimed Forest Number District Location Stand Number Date Exam Level Precision Protocol
Design	Selection Method Expansion Factor Selection Criteria Number
Plot	Plot Number
Surface	Plot Number
Down Woody	Plot Number

Quick Plot – A quick plot exam may group trees by species, diameter, heights and/or damage classes on both large and small plots. These exams collect stand structural data in an efficient manner. Measurement tolerances are relaxed to allow for ocular estimation of many parameters. Diameters of live trees are estimated by DBH class and standing dead tree heights are recorded in 10 foot classes. Limited tree defect information is collected, growth data is not collected, and small tree measurements are not made other than a percentage of the understory vegetation. Cost is minimized by limiting the information gathered and reducing measurement accuracy standards.

Extensive - An extensive exam collects accurate tree measurements to tolerance standards tighter than a quick plot, but not as tight as an intensive exam. Trees on the large plot are recorded individually, but trees on the small plot may be recorded in groups. Some tree defect information is collected.

Intensive – An intensive exam collects accurate tree measurements to tight tolerance standards. It provides a comprehensive inventory for unique stands. Trees on the large plot are recorded individually, but trees on the small plot may be recorded in groups. Diameters of live trees are measured to the nearest 1/10th of an inch. Heights are measured to the nearest foot. Detailed tree defects are collected.

The following fields are required depending on the examination level.

Tree Form

Field	Quick Plot	Extensive Plot	Intensive Plot
Plot Number	X	X	X
Tag Number		X	X
Tree Status	X	X	X
Site/GST Tree			X
Tree Species	X	X	X
Tree Count	X	X	X
DBH/DRC	Trees \geq 4.5 feet tall	Trees \geq 4.5 feet tall	Trees \geq 4.5 feet tall
Height	Trees < 4.5 feet tall	Trees < 4.5 feet tall	GST only and trees < 4.5 feet tall
Height to Crown			
Radial Growth			GST only
Radial Growth 2			
Height Growth			GST only
Age			GST/Site only
Crown Ratio			X
Crown Class			
Crown Width			
Damage Category		X	X
Damage Agent			X
Damage Part			
Damage Severity		X	X
Wildlife Use			
Log/Snag Decay		If Dead/Down is taken	If Dead/Down is taken
Cone Serotiny			
Number of Stems	DRC only	DRC only	DRC only
Remarks			

Vegetation Composition

Field	Quick Plot	Extensive Plot	Intensive Plot
Plot Number	X	X	X
Live/Dead			
Layer	X	X	X
Life Form	X	X	X
Species		If possible, or genus	If possible, or genus
Height Min.			X
Height Avg.	X	X	
Height Max.			X
Canopy Cover	X	X	X
Diameter Avg.			Trees only
Maturity			Shrubs only
Remarks			X

Setting

Accuracy standards are for intensive exams types. The accuracy standard is "No Errors" unless otherwise noted.

Field 1: Project Name (25-character)

Enter project name. Name should be consistent throughout project, which aids in database management later.

Field 2: Proclaimed Region (2-digit) *Required*

Use a code of "4" for Region 4.

Field 3: Proclaimed National Forest (2-digit) *Required*

01	Ashley	07	Dixie	14	Sawtooth
02	Boise	08	Fishlake	15	Targhee
03	Bridger	09	Humboldt	16	Teton
04	Cache	10	Manti-Lasal	17	Toiyabe
05	Caribou	12	Payette	18	Uinta
06	Challis	13	Salmon	19	Wasatch

Field 4: District (2-digit) *Required*

<u>Boise</u>	<u>Challis</u>	<u>Payette</u>	<u>Salmon</u>	<u>Sawtooth</u>
01 Mountain Home	01 Middle Fork	01 Council	01 Cobalt	01 Burley
03 Idaho City	02 Challis	02 Weiser	02 North Fork	02 Twin Falls
04 Cascade	03 Yankee Fork	03 New Meadows	04 Leadore	03 Ketchum
05 Lowman	04 Lost River	04 McCall	05 Salmon	04 Sawtooth NRA
06 Emette		06 Krassel		05 Fairfield

Field 5: Location (16-character) *Required*

Use a 4 digit code. See Site List.

Field 6: Stand Number (4-digit) *Required*

Use a 4 digit code. See Site List.

Field 7: Ownership (4-character)

Enter "USFS" for the Forest Service.

Field 8: State (2-character) *Settings that cross state boundaries must be subdivided.*

ID	Idaho	NV	Nevada
UT	Utah	WY	Wyoming

Field 9: County (3-digit)

Idaho

001 Ada	023 Butte	045 Gem	067 Minidoka
003 Adams	025 Camas	047 Gooding	069 Nez Perce
005 Bannock	027 Canyon	049 Idaho	071 Oneida
007 Bear Lake	029 Caribou	051 Jefferson	073 Owyhee
009 Benewah	031 Cassia	053 Jerome	075 Payette
011 Bingham	033 Clark	055 Kootenai	077 Power

013 Blaine	035 Clearwater	057 Latah	079 Shoshone
015 Boise	037 Custer	059 Lemhi	081 Teton
017 Bonner	039 Elmore	061 Lewis	083 Twin Falls
019 Bonneville	041 Franklin	063 Lincoln	085 Valley
021 Boundary	043 Fremont	065 Madison	087 Washington

Field 10: Administrative Region (2-digit)

Record the appropriate Administrative Region code. See Proclaimed Region for codes.

Field 11: Administrative Forest (2-digit)

01	Ashley	10	Manti-Lasal
02	Boise	12	Payette
03	Bridger - Teton	13	Salmon
05	Caribou	14	Sawtooth
06	Challis	15	Targhee
07	Dixie	17	Toiyabe
08	Fishlake	18	Uinta
09	Humboldt	19	Wasatch - Cache

Field 12: Date (8-digit) Required

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

Field 13: Photo ID (14-character)

Record the Photo ID of the aerial photo where the majority of the setting is located.

- First six numbers represent Photo Symbol/Project ID
- Second four numbers represent the roll number
- Last four numbers represent the exposure number

Field 14: Examination Level (4-digit)

Record the examination level that identifies the scope and range of information being collected. The range of data collected on each form is one of the following:

<u>Code</u>	<u>Description</u>
0	This form was not used
1	Quick Plot
2	Extensive examination
3	Intensive examination

For example, a code of 3010 indicates the following:

	Tree form	Vegetation Composition	Down Woody Material	Ground Surface Cover
Level	Intensive (3)	Not taken (0)	Taken (1)	Not taken (0)

The Ground Surface Cover and Down Woody forms may only have values of zero (not taken) and 1 (taken).

Field 15: Exam Purpose (2-character)

Use one of the following codes to define the purpose of the exam. Most stand examinations will use the code “SE.”

- RE** Regeneration/Stocking Surveys
- TH** Thinning Exam (certify thinning prescription accomplishment)
- ID** Insect & Disease Exams
- TI** Tree Improvement
- SE** Stand Exam

Field 16: Stratum (6-character)

Record the current setting stratum. Refer to aerial photo typing or other stratification information done in conjunction with the examination

Field 17: Existing Vegetation Composition Type (8-character)

Record the dominant existing vegetation composition code based on plot observations. Refer to Appendix E.

Field 18: Potential Vegetation Reference (3-character)

Record the potential vegetation reference code for the potential vegetation code used in field 18. Only one potential vegetation reference code may be selected per examination.

Code

401 Forest habitat types of Cental Idaho. Gen. Tech. Rep. INT-114.

Field 19: Potential Vegetation (8-digit)

Record the predominant potential vegetation code for the setting. If the setting is evenly split between two habitat types, select the drier type. See Appendix G for a complete list of Potential Vegetation codes.

Field 20: Structure (2-character)

(SS) Single-story - A single even canopy characterizes the stand. The greatest number of trees are in a height class represented by the average height of the stand; there are substantially fewer trees in height classes above and below this mean. Tree layers should comprise at least 15% cover to be considered an independent layer.

(TS) Two-storied - Two relatively even canopy levels can be recognized in the stand. The frequency distribution of trees by height class tends to be bimodal. Understory or overtopped trees are common. Neither canopy level is necessarily continuous or closed, but both canopy levels tend to be uniformly distributed across the stand (e.g., overstory with regenerated understory). Tree layers should comprise at least 15% cover to be considered an independent canopy level.

(MS) Multi-storied - At least three height size classes are commonly represented in the stand. Generally, the canopy is broken and uneven although multiple canopy levels may be distinguishable. The various size classes tend to be uniformly distributed throughout the stand.

(MO) Mosaic - At least two distinct height size classes are represented and these are not uniformly distributed, but are grouped in small repeating aggregations, or occur as stringers less than two chains wide, throughout the stand. Each size class aggregation is too small to be recognized and mapped as an individual stand.

(UA) Unknown – stand did not fit into one of the pre-defined categories.

Field 21: Capable Growing Area (3-digit)

Estimate the percent of the setting area capable of supporting trees. Deduct areas such as roads, creeks, swamps, rock outcrops, etc. For example, if an area contains 5% rock outcropping and 10% road, record a capable growing area of 85%. Accuracy Standard is ± 10 percent.

Field 22: Fuel Model (2-digit)

Record the predominant setting fuel model determined by the plurality of sample plot fuel model codes.

2	Timber (grass and understory)
5	Brush (2 feet)
8	Closed timber litter
9	Hardwood litter
10	Timber (litter and understory)
11	Light logging slash
12	Medium logging slash

Field 23: Elevation (5-digit)

Record the median setting elevation, in feet. Accuracy Standard is ± 2 contour intervals.

Field 24: Aspect (3-digit)

Record the predominant setting aspect in degrees, 0° to 360°. Setting aspect is the general direction toward which the setting faces. Stand aspect may be determined from contour maps or by taking compass readings directly down slope at various places within the setting. Accuracy Standard: ± 45 degrees.

- If aspect changes gradually across the setting, record an average aspect.
- If aspect changes across the setting but is predominately of one direction, code predominate direction, rather than the average.
- If the setting falls on or straddles a canyon bottom or narrow ridge top, code the aspect of the ridgeline or canyon bottom.
- If the setting falls on a canyon bottom or on a narrow ridge top, but most of the area lies on one side hill, code the aspect of the side hill.

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

Field 25: Slope (3-digit)

Record the average slope for the stand, in percent. Accuracy Standard is ± 10 percent.

Field 26: Slope Position (2-character)

Record the position of the setting on the landscape. See [Field 7](#) under Plot Data for definitions. Accuracy standard is ± 1 class.

SU **Summit/Ridgetop/Plateau.**
 SH **Shoulder.**
 BS **Backslope.**
 FS **Footslope**

TS **Toeslope**
VB **Valley Bottom.**

Field 27: Acres (4-digit)

Record the stand acres. See Site List.

Field 28: Radial Growth Interval (2-digit)

Record the time period used for measuring radial growth.

Code

10 10 years.

Field 30: Height Growth Interval (2-digit)

Record the time period associated with the height growth measurements.

Code

5 5 years.

Field 31: Fuel Photo Reference (3-digit)

Record the fuel photo reference code.

Field 32: Precision Protocol (6-character)

Record the precision protocol used. Record the precision protocol used in data collection. The default precision protocol “CSE” follows the CSE guidelines specified in this document for intensive exams. “CSE_E” is for Extensive exams; “CSE_Q” is for Quick Plot exams. Refer to the CSE User Guide for details on the Precision Protocols.

Field 33: Setting Remarks (242-character)

Record remarks about setting conditions. Include comments on overall health of stand, species and size class distribution, exposed rock, wildlife observations, regeneration, minor habitat types, etc.

Field 34: Damage Category (2-digit)

Record damage seen within the setting that was not recorded as tree damages or plot history. See Appendix R for a complete list of damage category codes. Accuracy Standard: No Errors if found in stand along transect and not represented in tree damage or plot history.

Field 35: Damage Agent (3-digit)

Record the damage agent. See Appendix R for a complete list of all damage agent codes. Record if found in setting along transect and not represented in tree damage or plot history.

Field 36: Damage Severity (2-character)

Record the damage severity. See Appendix R for a complete list of all damage severity codes. Use the setting severity codes where indicated in Appendix R. Record if found in setting and not represented in tree damage.

Field 37: Species of Management Interest (8-character)

Record plant species of management interest that occur in the setting, but do not occur on any of the plots. Species of management interest may include noxious weeds, threatened, endangered, or sensitive plants, or management indicator species. Multiple species codes may be entered. Note the approximate location of these species in the

stand sketch notes. See Appendix H for a complete list of noxious weeds, threatened, endangered, and sensitive plants. This is only an indication of the presence of a species of management interest.

Field 38: Sketch Map And Traverse Notes

Make a sketch of the setting showing the relative location of the plots. Record azimuth and distance for each transect. Include a North arrow and other notable features such as roads, trails, lakes, and creeks that will assist in relocating the plots. Also note the location of special features, such as cliffs, wallows, rock outcrops, landslides, springs or seeps, caves, and large bird nests.

Field 39: Examiner (12-character) Required

Record the individual(s) responsible for data collection. When using a Portable Data recorder, do not use reserved characters such as +, /, -, or * in this field.

Sample Design

Complete one Sample Design Form for each setting. The accuracy standard is "No Errors" unless otherwise noted.

A sample form will be included in the contract. Use that as an example to follow.

Field 1: Sample Selection Method Type (3-character) Required

Record the method by which trees, shrubs, grasses, or down woody material were selected.

FRQ	Frequency for fixed area plots or linear strip plots.
BAF	Basal area factor for a horizontal plot sample.
TRN	Fixed length transect line, to the nearest foot.

Field 2: Sample Expansion Factor (6,1- digit) Required

This field corresponds to the Sample Selection Method Type, and converts tree or piece data to a per-unit-area basis.

Field 2	Code	Description
FRQ	20	The inverse of a 1/20 th acre plot or strip area
FRQ	3	The inverse of a 1/3 rd acre plot or strip area
FRQ	2	The inverse of a 5 acre plot or strip area
BAF	40	40 basal area factor
TRN	27	The horizontal length of a transect line to the nearest foot.

Field 3: Starting Azimuth (3-digit)

Record the starting azimuth for transect lines (where selection method type is "TRN").

Field 4: Plots Installed (4-digit)

Record the total number of plots installed for the above selection method type.

Field 5: Subpopulation Filter (8-character)

Record the filter used to define the subpopulation. Use the following codes:

LIVE	Live standing
DEAD	Dead standing
ALL	Both live and dead standing
STUMPS	Stumps
DOWN	Down logs

Field 6: Selection Criteria Number (2-digit) Required

Record a sequential number, starting with "1," for each line of data within a sample selection method. Do not reuse a number between sample selection methods. Vegetation must meet **one** of the sequentially numbered criteria in order to be sampled on the plot type. If two or more lines have the **same number**, they are considered a "set," and vegetation must meet **all** the criteria in the set in order to be sampled by that selection method.

Example 1: On a variable radius plot, sample all live and dead trees which are **either** greater than 5.0 inches DBH **or** are greater than 3.0 inches DRC. This requires **two** different selection criteria numbers:

Form Type	Sample Selection Method	Sample Expansion Factor	Subpop. Filter	Selection Criteria Number	Subpop. Variable	Subpop. Minimum Value	Subpop. Maximum Value
TREE	BAF	20	ALL	1	DBH	5.0	999.9
				2	DRC	3.0	999.9

Example 2: On a 27-foot transect, sample down woody pieces that are greater than 12 inches at the intersection diameter **AND** are at least six feet long. This requires the **SAME** selection criteria number. This implies that **both** intersection diameter **and** piece length must be recorded in order for a piece of vegetation to meet these two criteria.

Form Type	Sample Selection Method	Sample Expansion Factor	Subpop. Filter	Selection Criteria Number	Subpop. Variable	Subpop. Minimum Value	Subpop. Maximum Value
DNWDY	TRN	27	DOWN	1	DIA	12.0	999.9
				1	LGT	6	999.9

Example 3: If both of the above selection parameters were placed on the same sample design form it would look like the following:

Form Type	Sample Selection Method	Sample Expansion Factor	Subpop. Filter	Selection Criteria Number	Subpop. Variable	Subpop. Minimum Value	Subpop. Maximum Value
TREE	BAF	20	ALL	1	DBH	5.0	999.9
				2	DRC	3.0	999.9
DNWDY	TRN	27	DOWN	3	DIA	12.0	999.9
				3	LGT	6	999.9

The first two lines have **different** selection criteria numbers, hence a piece of vegetation would have to meet **either** one of the criteria to be sampled on the variable radius plot. The next two lines have the **same** selection criteria numbers, hence a piece of vegetation would have to meet **both** of the criteria to be sampled on the transect. This implies that **both** intersection diameter **and** piece length must be recorded in order for a piece of vegetation to meet these two criteria.

Field 7: Subpopulation Variable (3-character)

Record the characteristic used to define the subpopulations sampled.

DBH	Diameter at Breast Height
DRC	Diameter at Root Collar
HGT	Height
CVR	Percent Vegetation Species Cover
SVC	Percent Ground Surface Cover
LGT	Length
DIA	Diameter at Midpoint or Intersection
DMG	Tree Damage Category
SPP	Species

Field 8: Subpopulation Minimum Value (4,1- digit)

Record the minimum value for the subpopulation variables. Default is 0.

Field 9: Subpopulation Maximum Value (4,1- digit)

Record the maximum value for the subpopulation variables. Default is 999.9.

Field 10: Sample Design Remarks (242-character)

Record information to explain the sample design used.

Plot Data

Record separate sets of plot data for each plot in the stand. The accuracy standard is "No Errors" unless otherwise noted.

Field 1: Plot Number (3-digit) *Required*

Record plot number for each plot. Plots do not have to be numbered consecutively, but the number of plots must equal the number entered on the Sample Design Form.

Field 2: Plot Latitude (7-digit)

Record the plot latitude as measured by a Global Positioning System (GPS). Latitude consists of a 3-digit "degree", a 2-digit "minute", and a 2-digit "second" value.

Field 3: Plot Longitude (7-digit)

Record the plot longitude as measured by a Global Positioning System (GPS). Longitude consists of a 3-digit "degree", a 2-digit "minute", and a 2-digit "second" value.

Field 4: Capable Growing Area Percent (3-digit)

Record an estimate of the percent of the plot capable of supporting trees. Exclude areas such as roads, creeks, swamps, rock outcrops, etc. Use the fixed plot size for estimating the capable growing area percent. A plot not capable of supporting trees would be coded as 0. Accuracy Standard is ± 10 percent

Field 5: Plot Aspect (3-digit)

Record the direction, in degrees, which the plot faces. Aspect may be determined by taking compass readings directly downslope from plot center.

- If aspect changes gradually across the plot, record an average aspect.
- If aspect changes across the plot but is predominately of one direction, code predominate aspect, rather than the average.
- If the plot falls on or straddles a canyon bottom or narrow ridge top, code the aspect of the ridgeline or canyon bottom.
- If the plot falls on a canyon bottom or on a narrow ridge top, but most of the area lies on one side hill, code the aspect of the side hill.
- Use a code of zero for flat
- Use a code of 999 for indeterminate, nor predominant aspect, or undulating

Accuracy Standard is $\pm 45^\circ$

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

Field 6: Plot Slope (3-digit)

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.

- If slope changes gradually across the plot, record an average slope.
- If slope changes across the plot but the slope is predominately of one direction, code predominate slope percentage rather than the average.
- If the slope falls directly between two side hills, code the average slope of the side hill(s).

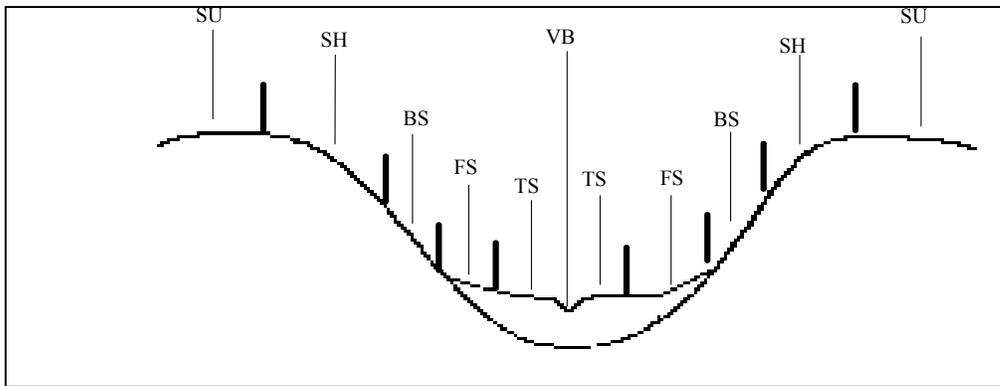
If the slope falls on a canyon bottom or on a narrow ridge top, but most of the area lies on one side hill, code the slope of the side hill.

Accuracy Standard is ± 10 percent.

Field 7: Slope Position (2-character)

Record the plot position on the landscape. Accuracy Standard is ± 1 Class.

- SU **Summit/Ridgetop/Plateau.**
- SH **Shoulder**
- BS **Backslope**
- FS **Footslope**
- TS **Toeslop**
- VB **Valley Bottom**

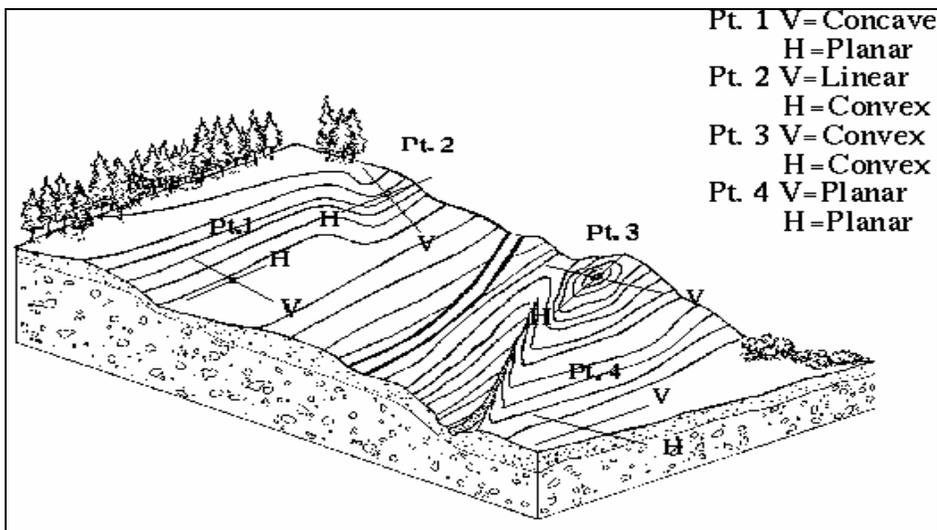


Field 8: Slope Horizontal Shape (2-character)

Record the micro-site horizontal shape of the plot. The horizontal shape is oriented across the slope, perpendicular to the vertical shape, or roughly parallel to the contours of the landforms. It goes from side-slope to side-slope. Use 1/10th acre plot for ocular estimate. Valid codes are the same as Slope Vertical Shape, Field 9 below.

Field 9: Slope Vertical Shape (2-character)

Record the micro-site vertical shape of the plot. The vertical shape lies perpendicular to the contours, going from up-slope to down-slope, regardless of the slope percentage. See previous graphic for examples (size 1/10 acre ocular estimate). At hilltops and depression bottoms, all directions are perpendicular to the contours and no direction is parallel. While the above definitions of horizontal and vertical shape really do not apply at these locations, both shapes are considered convex on hilltops and concave in depression bottoms, and their specific direction is irrelevant.



BR Broken CC Concave CV Convex
LL Linear or Planar PA Patterned UN Undulating
UA Unable to Assess

Field 10: Plot Elevation (5-digit)

Record the elevation, in feet, of the plot center. Accuracy Standard is ± 2 contour intervals on provided maps.

Field 11: Plot Existing Vegetation Composition Type (8-character)

Record the current (not potential) vegetative or non-vegetative type currently dominating the plot. Use canopy or foliage cover as the measure of dominance. See Appendix E for a complete list of Existing Cover Type codes.

Field 12: Plot Potential Vegetation (8-character)

Record the potential vegetation code for the plot. Potential vegetation is the community that develops over time, primarily influenced by soil and climate. It represents the area in a climax or near-climax condition.

Potential Vegetation (Habitat Type/Phase) will be determined for each plot, except for those stands identified in the Site List.

1. The plot h.t. shall be identified according to the procedures described in "Forest Habitat Types of Central Idaho", Steele et al, 1981. The first step in correctly identifying h.t. is becoming familiar with the instructions for use of the key. The next step is identifying the potential climax species, followed by the h.t and the phase. This shall be done by recording occurrence and the appropriate canopy coverage class of the most predominant indicator species for each sample plot. Four indicator species must be identified at each plot, if available. This reference information should give the correct h.t. for the site. To validate the key, review the written h.t. descriptions closely along with the constancy and coverage data within the publication.

To assist in identifying the correct h.t. the "Habitat Type Field Form" is available upon request to record the canopy coverages of the indicator species present. Completion of this form will assist greatly in the identification of the correct h.t. as edit information, and serve as a tool in the familiarization to Southwest Idaho habitat types. This is an optional form and not required to be turned with completed site.

2. The alpha codes are generally determined by using the first two letters of the genus name in conjunction with the first two letters of the species name. See App. H. List of Species.

Example:

- Abies Lasiocarpa series would read -- ABLA
- Vaccinium Globulare habitat type would read -- VAGL
- Vaccinium Scoparium phase would read -- VASC

The correct h.t. acronym in this example would be:
-ABLA VAGL-VASC

The habitat type is then given the corresponding Potential Veg. code. See App. G, Potential Vegetation Codes.

Example: ABLA VAGL-VASC = PV code 41721

In some cases sites may be delineated within several h.t. If this occurs record the type that best represents the entire site. If two h.t.'s occur in equal portions, select the drier of the two. Mention the other less dominant h.t.'s in the Setting Remarks (Field 39).

3. Habitat typing shall be done by estimating the percent coverage of all occurring indicator species within a 1/10 acre plot radius (37.2 ft. radius) surrounding the plot center. Record these estimates according to the previous paragraph. When estimating percent cover of a specific plant consider how much of a radius it will cover around plot center. If it will cover a 3.6 foot radius plot that would constitute a 1% coverage. If the plant covers an 8 foot radius plot it would be 5% coverage. For larger percentages of cover, imagine crosshairs transecting the plot. Then estimate if specific plant species would take up 1/4, 1/2 or more of the plot radius. This is particularly helpful in estimating tree canopy coverages.

4. No variance from the correct h.t. shall be acceptable.

See Appendix G for a complete list of Potential Vegetation codes. Accuracy Standards: Accurate to series, understory union, and Forest or District specified phases (three possible discrepancies).

Field 13: Fuel Model (2-digit)

Record the fuel model that best describes the plot. Refer to local reference for descriptions (see contract).

2	Timber (grass and understory)
5	Brush (2 feet)
8	Closed timber litter, short needles
9	Hardwood litter, long needles
10	Timber (litter and understory)
11	Light logging slash
12	Medium logging slash

Field 14: Residual Descriptive Code (15-character)

Record the residual descriptive code or photo stand number of the corresponding photo selected. This field is only recorded when a photo series for estimating fire behavior is used to determine Field 15, Fuel Model.

Field 16: Plot History (4-digit)

Record activities that occurred on the plot, or affected the plot. Multiple codes may be entered. For each additional event, record the plot number and history code on the next consecutive line.

Code	Description
1	Site Preparation
2	Artificial Regeneration
3	Natural Regeneration
4	Stand Improvement
5	Tree cutting
6	Fire
7	Other Silvicultural Treatments
8	Other Human Disturbance
9	Natural Disturbance
10	Land Clearing
11	Insect/Disease outbreak
12	Animal Damage
13	Type Conversion
14	Mining

Field 17: Plot History Date (4-digit)

Record the 4-digit year in which a disturbance/activity occurred based on field observations.

Field 18: Distance to Seed Wall (3-digit)

Record the distance, in feet, from the plot center to the boundary of an adjoining stand where there are seed-producing trees, or a seed wall. Typically, this value is recorded where most of the overstory has been removed or destroyed within the last 20 years. The accuracy Standard is ± 100 feet.

Field 19: Plot Remarks (242-character)

Enter remarks relevant to the plot. Special features (see Field 38 under Setting) may be noted here as well.

Tree Data

The accuracy standard is "No Errors" unless otherwise noted.

Field 1: Plot Number (3-digit)

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

Field 2: Tag ID Number (4-digit)

Record the tag ID number. Tag ID is the consecutive numbering of the tree data lines for each plot beginning with "01" from true North. The numbering sequence is repeated on each plot. Each Tag ID is associated with a tree or a group of trees.

Field 3: Tree Status (1-character)

Code	Description
L	Live - includes all standing trees that have at least one green point of growth. This includes deciduous trees that have lost their foliage for the season, and trees that have recently lost their leaves to defoliators, but will re-flush.
D	Dead - standing trees without a green point of growth. Note: many of the tree fields are not used if the tree is a dead tree. If dead trees are recorded, a snag decay class is required for extensive and intensive exam levels.
S	Stump - woody base of a tree left in the ground less than 4.5 feet tall. Note: many tree form fields are not used for stumps.
X	Down dead - includes all dead trees that have their main stem lying on the ground, or are supported by branch wood. A tree is considered down if it is leaning more than 45 degrees from vertical, not self-supporting, and/or in contact with the ground. Record any broken trees as one tree. If down trees are recorded, a log decay class is required for extensive and intensive exam levels. Only trees in decay class 1 or 2 should be recorded here.

See important Note under Field 21 Damage Category for more information on Tree Status

Field 4: Site/Growth Trees (1-character)

Record if a tree is a Site or Growth Sample Tree. If tree is neither, leave blank.

G	Growth Sample Tree
S	Site Tree on Plot
F	Site Tree off Plot
B	Both a growth sample tree and an on-plot site tree

Site Tree (S)

Tree for which age, height, and radial growth are measured to determine site index and yield capacity for a tree. Site trees have never experienced any overstory competition or damage that would reduce height growth during any period of their life. Freedom from height growth suppression is the single most important selection criteria for site trees. Site trees should be distributed throughout the stand as much as possible. Select trees whose microsite is representative of the rest of the stand. Site trees should be flagged around the bole of the tree with the Location, Stand, and plot number written on the flagging.

Site Tree Selection Criteria

1. Freedom from height growth suppression
 - Choose dominants or codominants.

- No evidence of top damage, past or present.
- No damage that could influence height growth
- No pronounced period of radial growth suppression

2. Species Selection in order of species preference are as follows:

PSME habitat type - PIPO, PSME
 ABGR habitat type - PIPO, PSME, LAOC, PIEN, ABGR
 ABLA habitat type - PSME, PIEN, PICO, ABLA

If possible, selection shall include at least ONE EACH of the first two preferred species. At least two sites trees must be of the same species within a stand.

3. Have a crown ratio of at least 50%.
4. Tree of good form and high vigor.
5. Mistletoe is not greater than a severity of 2 and does not occur in the upper half of the crown.
6. Similar age class, preferably middle-aged, avoid old growth and young age classes. Typically > 35 years and < 200 years.
7. The number of site required site trees depends on the number of plots taken in the stand.

3 plots	3 site trees
4 plots	4 site trees
5 plots or more	5 site trees

Growth Sample Trees (GST) may be used as site trees if they meet all site tree criteria (code B). If the minimum number of site trees cannot be selected from the GSTs on the plots, select suitable site tree from other suitable trees on the plots (code S). If this is still not sufficient, collect site trees from off the plots (code F). Off plot site trees may be collected within sight distance of the plot center or along the transect between plots. If there are less than the minimum number of suitable trees on or off the plots, make note for the reason of lack of site trees in the Setting Remarks.

Growth Sample Trees (GST)

A growth sample tree is a tree for which growth (radial or height) and age are measured, in addition to other measurements taken. Hardwoods, such as POTR5, will not be sampled as GSTs.

- If only one tree species is expected to be present in the stand, one large (≥ 5.0 " DBH) GST will be measured on each plot. Measure the first live standing tree when moving clockwise from north.
- If more than one tree species is expected to be present in the stand, two large (≥ 5.0 " DBH) GSTs will be measured on each plot. The first live standing tree of each species encountered, moving clockwise from north, will be measured until two trees of different species are assessed. For individual plots with only one species, select the first two live trees from north.
- For GSTs on the fixed plot (<5.0" DBH), select a representative tree from each species on the plot and collect height growth. GSTs on the fixed plot shall be from 6" in height to 1.0" DBH.

If age cannot be determined due to rot, select the next tree as GST.

Field 5: Tree Species (8-character)

Record the species of every sampled tree. See Appendix H for a list of common tree species codes.

ABGR	Grand fir (<i>Abies grandis</i>)
ABLA	Subalpine fir (<i>Abies lasiocarpa</i>)
LAOC	Western Larch (<i>Larix occidentalis</i>)
PIAL	Whitebark pine (<i>Pinus albicaulis</i>)
PICO	Lodgepole pine (<i>Pinus contorta</i>)
PIEN	Engelmann spruce (<i>Picea engelmannii</i>)
PIFL2	Limber pine (<i>Pinus flexillis</i>)
PIPO	Ponderosa pine (<i>Pinus ponderosa</i>)
POTR5	Quaking aspen (<i>Populus tremuloides</i>)
PSME	Douglas-fir (<i>Pseudotsuga menziesii</i>)

Field 6: Tree Count (3-digit)

Record the number of trees represented by each line of tree data. Record all trees ≥ 5.0 " DBH individually for intensive and extensive examinations. Trees may be recorded in groups for quick plot examinations.

Trees < 5.0 " DBH shall be grouped in diameter classes (see Field 8) by species, status, and damage. All trees grouped on a data line must within the diameter class recorded. All other fields recorded for the group shall be the average of the group. Growth Sample Trees collected on the fixed plot shall be recorded separately.

Height	Diameter	Trees on Plot	Missed Tree Tolerance
*All	All	0	0 trees
$> 0.5'$ to $< 4.5'$	NA	1-5	0 trees
$> 0.5'$ to $< 4.5'$	NA	6+	$\pm 20\%$
All	0.1" – 4.9"	1-5	0 trees
All	0.1" – 4.9"	6+	$\pm 10\%$
All	5.0" +	1+	0 trees

Field 7: Number of Stems (3-digit)

Record the number of stems for DRC measured species.

Field 8: DBH/DRC (3,1-digit)

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.

Forked tree: In order to qualify as a fork, the stem in question must be at least 1/3 the diameter of the main stem and must branch out from the main stem at an angle of 45 degrees or less. Forks originate at the point on the bole where the piths intersect. Forked trees are handled differently depending on whether the fork originates above or below 4.5 feet.

Trees forked below 4.5 feet are treated as distinctly separate trees. DBH is measured for each stem at 4.5 ft above the ground.

Trees forked at or above 4.5 feet count as one tree. If a fork occurs at or immediately above 4.5 ft, measure diameter below the fork just beneath any swelling that would inflate DBH.

Stump sprouts originate between ground level and 4.5 ft on the boles of trees that have died or been cut. Stump sprouts are handled the same as forked trees, with the exception that stump sprouts are not required to be 1/3 the diameter of the dead bole. Stump sprouts originating below 1.0 ft are measured at 4.5 ft from ground line. For multi-stemmed woodland species, treat all new sprouts as part of the same new tree.

Tree with irregularities at DBH: On trees with swellings, bumps, depressions, and branches at DBH, diameter will be measured immediately above the irregularity at the place it ceases to affect normal stem form. If this is not possible, because of the vertical extent of the irregularity, then adjust the DBH measurement to better reflect the diameter of a regular bole.

Tree on slope: Measure diameter at 4.5 ft from the ground along the bole on the uphill side of the tree.

Leaning tree: Measure diameter at 4.5 ft from the ground along the bole.

Turpentine tree: On trees with turpentine face extending above 4.5 ft, estimate the diameter at 10.0 ft above the ground and multiply by 1.1 to estimate DBH outside bark.

Independent trees that grow together: If two or more independent stems have grown together at or above the point of DBH, continue to treat them as separate trees.

Missing wood or bark: If 50% or more of the circumference of the bole is intact, reconstruct the diameter at DBH.

Diameter on stump: Use a logger's tape, cloth tape, or ruler to measure the longest and shortest axis across the top of the stump. Record the diameter as the average of the two measurements.

*	< .5' tall
(blank)	.5' tall < 4.5' tall
2.0	4.5' tall to 2.9" DBH
4.0	3.0" to 4.9" DBH
6.1	06.1 inches DBH
18.7	18.7 inches DBH

* do not collect data for these trees.

DRC is the outside bark diameter measured at the root collar or at the natural ground line, whichever is higher. A stem generally grows in an upright position and contributes to the main structural support of a tree crown. DRC-measured trees commonly have multiple stems. DRC-measured trees with stems clumped together and a unified crown and appearing to be from the same origin are treated as one tree. If necessary for diameter measurement, remove loose material on the ground but not mineral soil.

For multi-stemmed DRC-measured trees with at least one stem ≥ 5.0 " at the root collar, DRC is computed as the square root of the sum of the squared stem diameters. For a single-stemmed tree, DRC is equal to the single diameter measured. For a multi-stemmed tree, DRC is calculated from the diameter measurements of all qualifying stems (≥ 1.5 " diameter and at least one foot in length.) Whenever DRC is impossible or extremely

difficult to measure with a diameter tape (e.g., due to thorns, extreme limbs, packrat's nest), the stem(s) may be estimated to the nearest inch. Note "estimated DRC" in the tree form "REMARKS" column.

Accuracy Standards:

- < 5.0" DBH - correct diameter class
- ≥ 5.0" DBH - ± 1% of actual diameter (round up)
- Borderline variable plot trees ± .1 inch (to determine trees in or out)

Field 9: Height (3-digit)

Record tree height, in feet, from ground line on the uphill side, to the uppermost tip. If the top is broken, record the height to the break, and record a tree damage of "broken top" (99-1). See Appendix P for details on measuring tree heights. Tree heights are required for all trees.

Accuracy Standards

- Site trees - ±3% of actual tree height
- All other trees - ± 10%, not to exceed ±10 feet of actual tree height.

Field 10: Height to Crown (3-digit)

Record crown height, in feet, on the uphill side of the tree, from the ground line to the base of the live crown (the lowest branch whorl with live branches in at least two quadrants exclusive of epicormic branches and whorls not continuous with the main crown). See Appendix Q for examples of determining height to crown. The accuracy standard is ± 10%.

Field 11: Radial Growth (2-digit)

Record the radial growth increment for Site and Growth Sample Trees ≥ 5.0 inches to the nearest $1/20^{\text{th}}$ of an inch. Make the increment boring at breast height facing plot center. Measure the width of the outer complete annual increments up to the number of years equal to the growth period entered on the Setting form with a $1/20^{\text{th}}$ of an inch scale ruler. Enter radial growth using integers only. See Appendix N for instructions on measuring radial growth. The accuracy standard is $\pm 2/20$ inch.

Field 12: Radial Growth # 2 (2-digit)

This field is not used in Region 4.

Field 13: Height Growth (2,1-digit)

Record height growth, to the nearest $1/10^{\text{th}}$ foot, for Growth Sample Trees that are from 6 inches tall to 1.0 inches in diameter. Measure the five most recent complete height increments of leader growth. See Appendix N for instructions on measuring height growth.

Accuracy Standard:

- Tree height ≥ 6 feet ± 1 foot
- Tree height < 6 feet ± 0.1 feet

Field 14: Tree Age (4-digit)

Record the tree age, in years, for Growth Sample Trees and Site Trees. Additional age measurements may be recorded for other live sample trees. Record age at DBH for trees 5.0 inches DBH and larger. Age is determined from an increment boring made at DBH and is the annual ring count to the pith of the tree. See Appendix O for details on how to determine tree age from increment borings.

If total age cannot be determined because of extensive heartrot, and this is a growth sample tree or a site tree, select another tree. If recording age for other live sample trees, leave this field blank.

Accuracy Standard: $\pm 10\%$ (Based on actual tree ring count at breast height for trees ≥ 5.0 " DBH.)

Field 15: Crown Ratio (3-digit)

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. See Appendix Q for information on measuring crown ratios. Accuracy Standard: ± 10 percent.

Field 16: Crown Class (2-character)

In even aged stands, record the crown class for all live trees. Crown Class for each tree is determined in the context of its immediate environment, trees or shrubs that are competing for sunlight or moisture with the subject tree.

Code	Name	Description
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.
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.

Field 17: Crown Width (3-digit)

Record the average crown width, in feet. Crown width is the average of two measurements: 1) widest distance anywhere in the crown between the outer ends of two live branches (the drip line); and 2) the distance perpendicular to the widest measurement. Abnormally long branches sticking out beyond the edge of the crown are not used in establishing the extent of a crown.

A tree's widest crown measurement, if viewed from the air, is the diameter of a circle including all foliage. Measure it at the crown's widest point with a tape held by two crew people standing under opposite drip lines at

the crown's edges. Make the second measurement at 90 degrees to the crown diameter at the widest point using the same procedures.

With shoulders parallel to the tape, determine drip line end points by looking up perpendicular to the tape and projecting where crown edge branch tips would hit the ground if they fell. Occasionally, a branch may protrude abnormally, but the lateral crown line is drawn across the portion of the branch, which includes the "normal outline" of the tree. It is helpful to use a device, such as a clinometer, that allows the observer to measure a line perpendicular to the ground. The clinometer should be used for training and to check estimates made during the operational field season. If you cannot see the crown edge from directly beneath the drip line, both observers should move an equal distance away from the tree and make your estimate. All measurements are rounded to the nearest foot. Crown width measurements or estimates can be used to compute crown volume and surface area.

Field 18: Wildlife Use (2-character)

Record stem characteristics that may indicate the presence of wildlife.

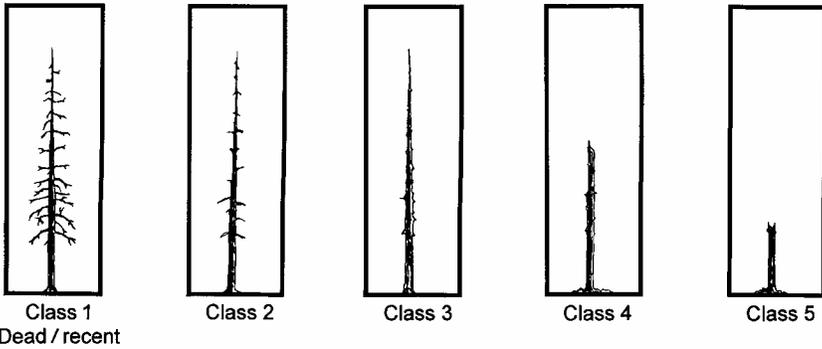
NO	No wildlife characteristics observed
SC	Small cavities less than 3 inches in diameter
LC	Large cavities greater than 3 inches in diameter
LB	Loose Bark
FH	Foraging Holes/Flaked Bark: Antler Rubs, Porcupine feeding
NE	Nest in tree and not in cavity

Field 19: Log/Snag Decay (1-digit)

Record the condition of standing dead (snag) or down dead trees (log). 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.

Snag Decay

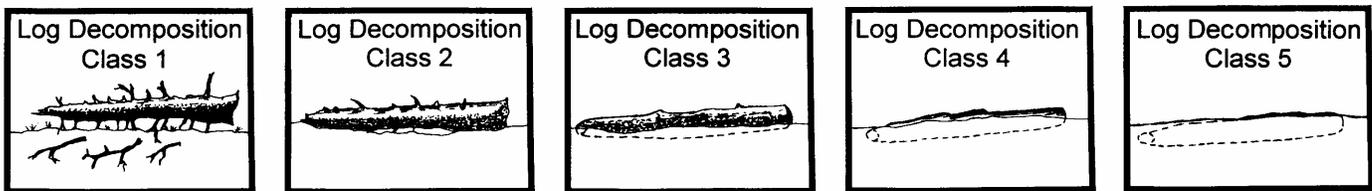
Code	Bark	Heartwood Decay	Sapwood Decay	Limbs	Top Breakage	Bole Form	Time Since Death
1	Tight, intact	Minor	None to incipient	Mostly Present	May be present	Intact	1-5 years
2	50% loose or missing	None to advanced	None to incipient	Small limbs missing	May be present	Intact	>5 years
3	75% missing	Incipient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



Log Decay

Code	Bark	Twigs	Texture	Shape	Wood Color	Portion of log on ground
1*	Intact	Present	Intact	Round	Original	None, elevated on supporting points
2	Intact	Absent	Intact to soft	Round	Original	Parts touch, still elevated, sagging slightly
3	Trace	Absent	Hard large pieces	Round	Original to faded	Bole on ground
4	Absent	Absent	Soft blocky pieces	Round to oval	Light brown to faded brown	Partially below ground
5	Absent	Absent	Soft, powdery	Oval	Faded light yellow or gray	Mostly below ground

*Implies recent mortality, within the last 5 years.



Field 20: Cone Serotiny (1-digit)

Record the open or closed condition of the majority of a tree's viable cones for lodgepole pine and jack pine. Only consider the cones on the tree, not cones on the ground. Trees have closed cones (serotinous) if more than 50% of the cones are closed.

0	No Cones	2	Closed Cones
1	Open/Opening Cones	3	Intermediate - Both Open and Closed Cones

Tree Damage

Record the tree damage code for live and dead trees, based on physical evidence. For dead trees, no cause of death is required, although a damage that is recorded may have resulted in the death of the tree. If category is recorded, severity is required. Multiple damage codes may be recorded for each tree, with a maximum of three. See Appendix R for a complete listing of Category, Agent, Part, and Severity codes. Refer to Common Stand Exam Insect and Disease Handbook (govt furnished property) for agent descriptions.

Field 21: Tree Damage Category (2-digit)

This field required for all trees coded with damage. For descriptions of damage categories and agents, see the Common Stand Exam Insect, Disease, and Damage Handbook.

Field 22: Tree Damage Agent (3-digit)

This field required for Damage Categories 50, 70, and 99.

Field 23: Tree Damage Part (2-character)

This field not required.

Field 24: Tree Damage Severity (2-digit)

This field required for all trees coded with damage.

Note: The tree damage severity (except severities for category 99) must be entered into the database preceded by the 2-digit category code. For example, a mistletoe severity of “3” must be entered as 233. When using a PDR and field forms, only the severity rating needs to be recorded; however, when typing this value into the database via the electronic forms, the severity code **MUST** be preceded by the 2-digit category code.

Category	Category Description	Tolerance
11	Bark Beetles	No misses on live trees with a severity of 2 or greater.
12	Defoliators	No misses on live trees with a severity of 3 or greater.
13-17	Other Insects	No misses of shoot moths or weevils on live trees.
21	Root/Butt Diseases	No misses on live trees with a severity of 2 or greater.
22	Stem Decays/Cankers	No misses on live trees with a severity of 3 or greater.
25	Foliage Diseases	No misses on Elytroderma on live trees.
41-42	Animal Damage	No misses on live trees with terminal leader damage or with greater than 1/4 of bole circumference affected.
50	Abiotic Damage	No misses on wind, snow, or ice bending, breakage, or bole cracks and frost damage to shoots on trees less than 1-inch diameter and lightning.
70	Human Damage	No misses on live trees for logging damage or fire if the damage affects greater than 1/4 of the bole circumference or if an open wound is in contact with the ground.
99	Physical Effects	No misses on live trees with a severity of 20 % or greater

Field 25: Tree Remarks (30-character)

Record information unique to the tree. Make note of abnormal DBHs, limiting distance notes (dbh, slope, measured distance), distance and azimuth from plot center to off plot site trees, and any other pertinent remarks.

Field 26: User Defined

Record Tree Class codes here for each line of data.

LIVE TREES

Code Description

- DE Desirable Crop Tree. Meets all conditions below:
- all species (except aspen) with no defects that will reduce merchantable yields
 - no damage agents that affect growth or survival
 - relatively vigorous as evidence by past growth rate and crown condition

- minimum crown ratio 40%
- crown class of OP, DO, CO, or RE

AC Acceptable Crop Tree. Meets one or more conditions below:

- minor defects that reduce, but not exclude merchantable yields
- may possess damaging agents in minor amounts, but will not affect survival for at least 10 years
- reflects slow past growth or poor crown condition, but retains potential to grow and accumulate net merchantable volume
- minimum crown ratio 25%
- crown class of OP, DO, CO, IN, or RE

UA Unacceptable Crop Tree. Meets one or more conditions below:

- noncull species (all other than aspen)
- has a severe rating from any damaging agent, but does or will meet minimum merchantability standards (at least one 8' log, 6" dia small end)
- expected to die within next 10 years
- not accumulating net growth, deteriorating more rapidly than growing
- would not release if relieved of competition
- crown class of IN or OV
- crown ratio < 25%

C Rough Tree. Meets one or more conditions below:

- cull trees not expected to yield sawlog products (8' log 6" dia at small end inside bark) because of severe damage other than rot
- are non-commercial species (POTR5)
- for trees < 5.0" DBH:
 - mistletoe ≥ 4
 - stem rusts with severity of 3 or more
 - trees with dead or broken tops
 - crook, sweep, bole cracks with severity 66% or greater
 - trees coded with category 10, 11, 12, 19, 20, 24, 27, 30, 41, 42, 50, 60, 70, 71 and coded with a severity of 2

R Rotten Tree. Meets one or more conditions below:

- cull trees not presently or expected to be capable of containing a merchantable sawlog due to rot (at least 1/3 sound)
- trees coded with a category 22 with a severity of 7 or greater

DEAD TREES

M Salvable/Recent Dead. Meets all conditions below:

- tree that died within last 5 years
- tree is sound
- coded with decay class of 1

D Salvable/Older Dead. Meets all conditions below:

- tree died more than 5 years ago
- tree is sound
- coded with a decay class of 2

- N Non-salvable/Recent Dead. Meets all conditions below:
- tree died within last 5 years
 - coded with decay class of 1
 - tree is not sound or merchantable

- X Non-salvable/Older Dead. Meets all conditions below:
- tree died more than 5 years ago
 - tree coded with decay class of 3 or greater
 - tree is not sound

Vegetation Composition

The Vegetation Composition form is used to collect ocular estimates of height layering, cover and maturity of trees, shrubs, forbs, and grass species within a fixed area. Conduct calibration of ocular estimates at the outset of the examination, and occasionally during the examination. Calibrate ocular estimates by using cover-frequency, line intercept transect methods, or other sample technique. Refer to page 1-3 for a list of required fields by exam type.

Field 1: Plot Number (3-digit) *Required*

Record the unique plot number on which the information is being taken.

Field 2: Live / Dead (1-character)

Record whether a species or life form is live (**L**) or dead (**D**).

Field 3: Layer (1-digit)

Record the layer that describes structural information about the plot. To specify layers, group individuals by species into one or more layers (up to a maximum of three). There can be multiple layers for each species as long as the breaks are logical and consistent. If clear breaks cannot be determined, do not split them. There must be significant cover in the layer (at least 15%) to be considered a separate layer.

1	Lowest
2	Mid -level
3	Highest

Field 4: Life Form (2-character) *Required*

AL	Algae	SH	Woody Shrub
FB	Herbaceous forb/herb	SS	Woody Subshrub/Half-shrub
LC	Lichen	TR	Woody Tree
FU	Fungus	VI	Herbaceous Vine
GR	Herbaceous graminoid	NP	Nonvascular plant
LI	Woody Liana	UN	Unknown

Field 5: Species (8-character)

Record the plant species by layer. Use the NRCS PLANTS database codes. Identify plants to species, if possible, otherwise identify to the genus level. For genus identification, enter the appropriate genus code (for example, "AGROP2" for *Agropyron* spp.). Do not repeat plant names within a layer. The accuracy standard is: No Error in species level identification for dominant, common, or community indicator plants.

Field 6: Minimum Layer Height (3-digit)

Record the average minimum height, in feet, of the layer for each cover species. This value represents the average height of the shortest individuals occupying the layer. Height is the distance from the base of the plant on the high side at ground level to the tip of the plant. The accuracy standard is $\pm 10\%$ of height.

Field 7: Average Layer Height (3-digit)

Record the average height, in feet, by layer for each cover species. This value represents the average height of all individuals within the layer. Height is the distance from the base of the plant on the high side at ground level to the tip of the plant. This value represents the average height of all individuals within the layer. The accuracy standard is $\pm 10\%$ of height.

Field 8: Maximum Layer Height (3-digit)

Record the average maximum height, in feet, for each species. This value represents the average height of the tallest individuals occupying the layer. Height is the distance from the base of the plant on the high side at ground level to the tip of the plant. The accuracy standard is $\pm 10\%$ of height.

Field 9: Canopy Cover (3,1-digit) Required

Record the estimated canopy cover, in percent, for each species by layer. Enter the percent of ground area covered by the vertical projection of a species by layer. This percentage is unique to the particular layer/species combination. Percent canopy cover for a species can total more than 100%. The accuracy standard is ± 10 percent.

Field 10: Average Diameter (3-digit)

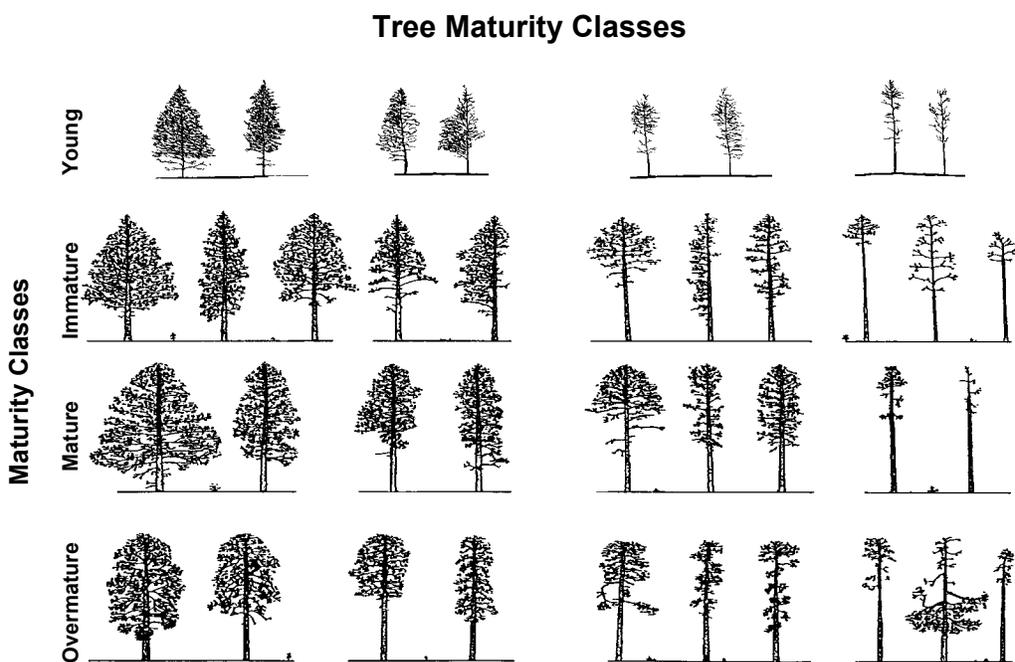
If the tree data form is being used, DO NOT record tree diameters on this form, otherwise record the diameter for all trees (lifeform TR) for each layer. Estimate diameter at DBH.

Field 11: Maturity (2-character)

Record the maturity code of tree and shrub species. Maturity codes indicate relative maturity or physiological age rather than actual age. Differences in site, elevation, moisture, and other environmental factors influence the age at which trees mature.

Tree Species

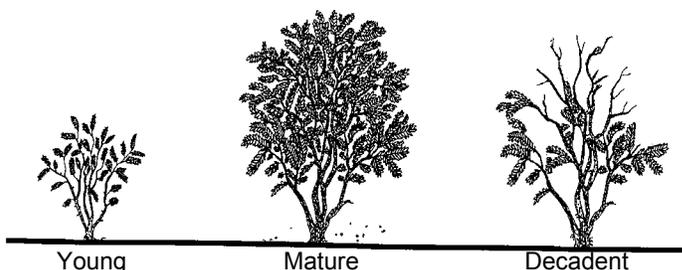
Use the following figure to determine maturity classes for conifer species. Recognize the change in crown shape from young to over-mature. As the tree matures, the top becomes flat, branches appear flat to drooping, giving a more cylindrical rather than conical shape, and branches become larger. For ponderosa pine, the amount of needles growing along the length of each branch decreases. In over-mature trees, the branches show tufts of needles at the ends.



Use the following codes to record tree maturity.

Code	Tree Maturity Class	Description	Crowns	Branches	Bark
YO	Young	tree appears young	pointed	distinct whorls, upturned, small in comparison with the main stem	generally smooth and not platey
IM	Immature	tree appears middle-aged	may be pointed or slightly rounded, but never flat	slightly flattened lower branches	slightly rough, plates or furrows beginning to form
MA	Mature	tree slightly showing age	pyramidal or rounded, occasionally pointed	flattened lower branches	rough, somewhat platey or furrowed
DE	Overmature Or Decadent	tree shows age	flattened or rounded, but never pointed	open, large, gnarled, or misshaped upper branches	platey or deeply furrowed

Shrub Maturity Classes



Shrub Maturity Codes

Code	Shrub Maturity Class	Description	Crowns	Branches	Bark
SS	Seedling/sprout	newly emerged plant	not rounded and are made up of all living wood; less than 1/8 – 1/2 inch at base, varying with species	simple branching; does not show signs of flowering and seed production	not fibrous, not fissured
YO	Young	relatively young plant	not rounded and are made up of all living wood; larger than a sprout or seedling (1/8-inch to 1/2-inch diameter at the base, varying with species)	more complex branching; may possess multiple basal stems but is attached to a relatively small root stock (except for saplings); may or may not show signs of flowering and seed production	more fibrous but is not fissured as with a mature plant
MA	Mature	shrubs slightly showing age	rounded growth form large, heavy, often gnarled stems and a firmly established predominant root stock; root crown is made up of three-quarters or more living wood		fibrous fissured bark
DE	Decadent	decadent	mature plant which possesses more than 50 percent dead wood in the		N/A

			crown		
X	Dead	Dead	N/A	N/A	N/A

Field 12: Vegetation Remarks (20-character)

Enter comments relevant to each line of data.

Field 13: User Field (4-character)

This field is not used in Region 4.

Ground Surface Cover

The Ground Surface Cover Form is used to collect ground surface cover data that is not a specific PLANTS species. The accuracy standard is "No Errors" unless otherwise noted.

Field 1: Plot Number (3-digit) Required

Record the unique plot number at which the information is being taken.

Field 2: Ground Surface Cover Type (4-character) Required

Record the major ground surface cover categories.

Code	Description	Definition
ROCKS		
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 rel. large bodies, cliffs, outcrops or peaks. Includes bedrock.
GRAV	Gravel (2-75 mm)	Rock fragments between 2 and 75 mm in diameter.
FIGR	Fine gravel (2-5 mm)	Rock fragments between 2 and 5 mm in diameter.
MEGR	Medium gravel (5-20 mm)	Rock fragments between 5 and 20 mm in diameter.
COGR	Course gravel (20-75 mm)	Rock fragments between 20 and 250 mm in diameter.
COBB	Cobbles (70-250 mm)	Rock fragments between 75 and 250 mm in diameter.
STON	Stones (round and flat)	
ROST	Round stone (250-600 mm)	Rock fragments between 250 and 600 mm in diameter.
BOUL	Boulders (round and flat)	Rock > 600 mm in diameter or length. Generic term for use when boulders are not differentiated by round and flat.
ROBO	Round Boulder (>600 mm)	Round Rock fragments >600 mm in diameter.
CHAN	Channers (2-150 mm long)	Long, thin rock fragments up to 150 mm in length, as determined by National Cooperative Soil Survey.
FLAG	Flag Stones (150-380 mm lg)	Flag Rock fragments >600 mm in diameter.
FLBO	Flat Boulders (>600 mm long)	Flat Rock fragments >600 mm in diameter.
FLST	Flat Stone (380-600mm long)	Flat Rock fragments between 380 and 600 mm in diameter.
BEDR	Bedrock	A general term for the rock, usually solid, that underlies soil or other unconsolidated, superficial material.
WATER, SNOW, AND ICE		
WATE	Water	Where the water table is above the ground surface during the growing season, such as streams, bogs, swamps, marshes and ponds (FIA definition).
TRIC	Transient ice	Ice covering the surface; the ice will melt during the growing season.
TRSN	Transient snow	Snow covering the surface; the snow will melt during the growing season.
TRIS	Transient ice and snow	Surface area covered by ice and snow at the time of plot measurement, considered transient. For use when permanent ice and snow are not differentiated.
PEIC	Permanent ice	Ice covering the surface. Does not melt during the growing season. The surface is ice-covered for the entire year (i.e., glaciers).
PESN	Permanent snow	Snow covering the surface; does not melt during the growing season. The surface is snow- covered for the entire year.
PEIS	Permanent ice and snow	Surface area covered with ice and snow at the time of plot measurement, considered permanent. For use when permanent ice and snow are not differentiated.

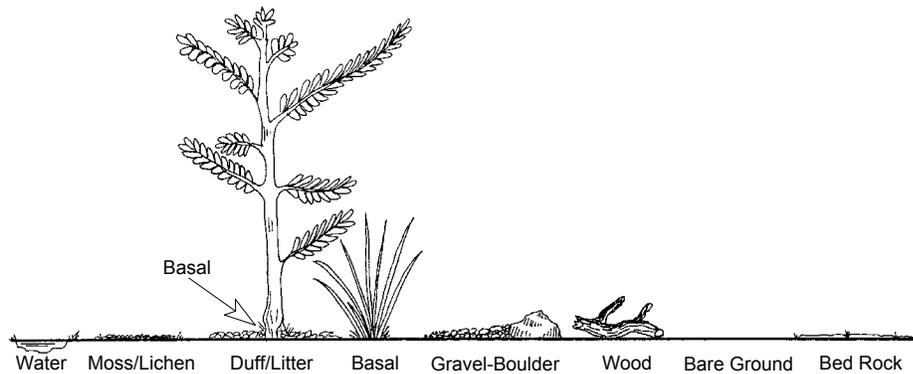
Ground Surface Cover Type (cont.)

Code	Description	Definition
WOODY PIECES		
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).
ROADS		
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 cutbanks and fills.
PAVE	Pavement	A natural concentration of closely packed and polished stones at the soil surface in a desert (may or may not be an erosional lag).
MOSS, LICHEN, FUNGI		
CRYP	Cryptogamic crust	Thin, biotically dominated ground or surface crusts on soil in dry rangeland conditions, e.g. cryptogamic crust (algae, lichen, mosses or cyanobacteria).
CML	Cryptogams, mosses, and lichens	For situations where information is not further differentiated
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. For lichen growing on bare soil in dry rangeland conditions, see cryptogamic crusts.
MOSS	Moss	Nonvascular, terrestrial green plants including mosses, hornworts and liverworts - always herbaceous. This code does not apply to moss growing on bare soils in dry rangeland conditions. For rangeland conditions, see cryptogamic crusts.
DUFF AND LITTER		
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 a BARE).
BAVE	Basal vegetation	Basal vegetation not differentiated by life form. For use when basal vegetation is not separated into more detailed codes (BAFO, etc.)
BATR	Basal tree	Basal (cross-sectional area at or near the ground level) cover of trees. (Definition adapted from definition of basal area in National Range & Pasture Handbook)
BASH	Basal shrub	Basal (cross-sectional area at or near the ground level) cover of shrubs.
BAFO	Basal forb	Basal (cross-sectional area at or near the ground level) cover of forbs.
BAGR	Basal graminoid	Basal (cross-sectional area at or near the ground level) cover of grasses or grass-like plants.

OTHER		
UNKN	Unknown	Other covers not defined elsewhere.
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.
BARR	Barren	Areas naturally devoid of vegetation, such as intermittent lakebeds and saline flats. Does not include areas denuded of vegetation.
BARE	Bare soil (soil particles < 2 mm)	Bare soil, not covered by rock, cryptogams or organic material. Does not include any part of a road (see definition for road).
ASH	Ash (organic, from fire)	Remaining residue after all combustible material has been burned off.
TEPH	Tephra volcanic	A general term for all material formed by volcanic explosion or aerial expulsion (as opposed to flow) from volcanic vent.

Note: 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 basal plant cover ranges between 3-7 percent; 15 percent is very high and rarely encountered.

Ground Surface Cover Categories



Field 3: Ground Surface Cover Percent (3,1-digit) Required

Record the estimated percent ground cover at the soil surface plane for each ground surface cover type. Cover is defined as that portion of the horizontal surface layer intersected by ground surface features. Total ground surface cover of all features **must equal 100%** (foliar canopy cover above the soil surface plane is not considered to be ground surface cover).

Whether moss covering a rock is recorded as "moss" or "rock" depends on the exam objective. Record whichever describes the soil surface and meets the exam objective. Record moss that is growing directly on the soil surface as "moss." The accuracy standard is ± 10 percent.

Field 4: Ground Surface Cover Remarks (20-character)

Enter remarks about the ground surface cover relevant to this plot.

Down Woody Material

Downed woody material is the dead twigs, branches, stems, boles of trees, and brush that have fallen and lie on or above the ground. The accuracy standard is "No Errors" unless otherwise noted.

Field 1: Plot Number (3-digit) Required

Record the unique plot number where the information is being collected.

Fields 2 and 3: First Duff (+litter) and Second Duff (+litter) (2,1-digit)

Record duff to the nearest 1 inch. For stand examinations in Southern Idaho, this measurement is taken from top of the mineral soil to the top of the litter layer (including twigs less than .25 inches). This information is required by the R4 FVS Hazard program.

Carefully expose a profile of the forest floor for the measurement. A knife or hatchet helps, but is not essential. Avoid compacting or loosening the duff where the depth is measured. Take the first duff measurement 6 inches from the bole of the largest tree on the variable plot, on the uphill side, and record it in the "First Duff" column. Take the second duff on the same side of the same tree, half way between the bole and the drip line of the tree and record it in the "Second Duff" column. When stumps, logs, and trees occur at the plot of measurement, offset 1 foot perpendicular to the right of the sampling plane. Measure through rotten logs whose central axis is in the duff layer. The accuracy standard is ± 1 inch.

Field 4: Fuel Depth (2,1-digit)

Record the total vertical fuel depth, in tenths of feet, of all woody material vertically from the duff to the highest point of down vegetable material. Record one value per plot.

Field 5: Twig1 (0 - .24) (3-digit)

Record the number of small twig intersections for each sampling plot. Small twigs are defined as pieces that have a cross section diameter of less than 1/4 inch at the point of intersection with the sampling plane. The accuracy standard is $\pm 40\%$.

Field 6: Twig2 (.25 - .99) (3-digit)

Record the number of large twig intersections for each sampling plot. Large twigs are defined as pieces which have a cross section diameter of between .25 and .99 inches inclusive at the point of intersection with the sampling plane. The accuracy standard is $\pm 30\%$.

Field 7: Twig3 (1.0 - 2.99) (3-digit)

Record the number of branch intersections for each sampling plot. Twig3 pieces are defined as pieces with a cross section diameter of between 1.0 and 2.99 inches inclusive at the point of intersection with the sampling plane. The accuracy standard is $\pm 20\%$.

Field 8, 10, 12, and 14: Volume (6,1-digit)

These fields are not used in Region 4.

Field 9, 11, 13, and 15 : Weight (3-digit)

Record the average tons per acre in each twig class and for all pieces larger than 3.0 inches as determined by fuel photos.

Field 16: Piece Count (3-digit)

Record the number of large pieces (3 inches in diameter or as stated on the Sample Design Form). Sound and Rotten pieces should be tallied separately. These pieces can be grouped according to Brown's transect rules (Appendix S) or as specified in the Sample Design Form. If pieces are still touching, it is still considered on piece.

Code	Description
1	This is the default value and normally the value used.
3	Three pieces are all rotten or all sound and have the same diameter.

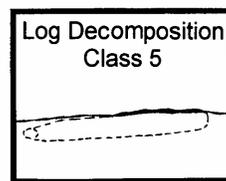
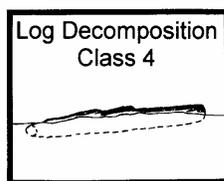
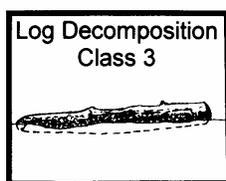
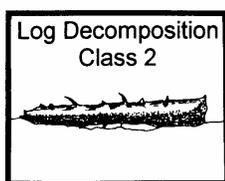
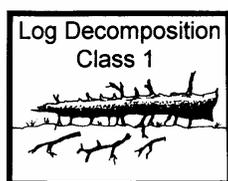
Accuracy Standard: No missed pieces

Field 17: Decay Class (1-character)

Record the decay class (1-5) for the large woody pieces (3 inches in diameter or as stated on the Sample Design Form). See Appendix S for information on measuring down woody material.

Log Decay Class

Code	Bark	Twigs	Texture	Shape	Wood Color	Portion of log on ground
1	Intact	Present	Intact	Round	Original	None, elevated on supporting points
2	Intact	Absent	Intact to soft	Round	Original	Parts touch, still elevated, sagging slightly
3	Trace	Absent	Hard large pieces	Round	Original to faded	Bole on ground
4	Absent	Absent	Soft blocky pieces	Round to oval	Light brown to faded brown	Partially below ground
5	Absent	Absent	Soft, powdery	Oval	Faded light yellow or gray	Mostly below ground



Field 18: Diameter (3,1-digit)

Record the diameter of each intersected large piece (3 inches in diameter or as stated on the Sample Design Form). If a fixed area plot is installed, instead of a transect, record the diameter of the piece at its midpoint.

Accuracy Standard: ± 1 inch

Field 19: Piece Length (3,1-digit)

Record the piece length, in feet, of each large piece (3 inches in diameter or as stated on the Sample Design Form). Sound and rotten pieces are tallied separately.

Brown's Formula Protocols

When collecting Down Woody Material data according to Brown's protocol, set up the sample design form as follows:

Form Type	Sample Selection Method	Sample Expansion Factor	Subpop Status	Selection Criteria Number	Subpop. Variable	Subpop. Minimum Value	Subpop. Maximum Value
Down Woody	TRN	7	Down	1	DIA	0.1	.24
Down Woody	TRN	7	Down	2	DIA	.25	.99
Down Woody	TRN	7	Down	3	DIA	1.0	2.99
Down Woody	TRN	27	Down	4	DIA	3.0	999.9