FIELD INSTRUCTIONS

FOR THE ANNUAL INVENTORY OF

CALIFORNIA, OREGON, AND WASHINGTON

2013

FOREST INVENTORY AND ANALYSIS

RESOURCE MONITORING AND ASSESSMENT PROGRAM

PACIFIC NORTHWEST RESEARCH STATION

USDA FOREST SERVICE

THIS MANUAL IS BASED ON:

FOREST INVENTORY AND ANALYSIS

NATIONAL CORE FIELD GUIDE

VOLUME I: FIELD DATA COLLECTION PROCEDURES

VERSION 6.0

Cover image by Gretchen Bracher

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CHAPTER 1 INTRODUCTION

This manual documents data collection procedures, codes, standards, and definitions used by the Pacific Northwest Research Station, Forest Inventory and Analysis (PNW-FIA) program in the 2013 annual forest inventory of California, Oregon, and Washington. PNW-FIA is one of four United States Department of Agriculture (USDA) Forest Service, FIA programs across the country which conducts forest inventories in most of the 50 states and in the Pacific Islands. PNW-FIA is responsible for inventorying the forest resources of Alaska, California, Hawaii, Oregon, Washington, and the Pacific Islands. Field data collection within PNW-FIA is completed by two data collection units: the Portland Forestry Sciences Laboratory (PFSL) and the Anchorage Forestry Sciences Laboratory (AFSL). PFSL is based in Portland, Oregon and is responsible for California, Oregon, and Washington. AFSL is based in Anchorage, Alaska and is responsible for Alaska, Hawaii and the Pacific Islands.

Nationally consistent and uniform Core data measurements are assured by following the procedures outlined in the Forest Inventory and Analysis National Core Field Guide. In addition to the Core data items required by the national FIA program, PNW-FIA measures regional data items that are of interest to the clients and customers of the PNW Research Station.

SECTION 1.1 ORGANIZATION OF THIS MANUAL

This manual is structured primarily for use by field personnel. Each chapter corresponds either to a separate function that must be performed in locating and measuring a field plot, or to a particular aspect of data recording that must be completed. Procedures are ordered to coincide, as much as possible, with the order in which field data are collected and entered into the data recorder.

Core field data collection procedures, listed in the Forest Inventory and Analysis National Core Field Guide, Version 6.0, have been incorporated into this manual. Instructions that are single underlined, tables that are shaded, and data item names followed by CORE and the Core chapter/section number in bold and parentheses, describe data items or field procedures included in the Core field guide. Any regional adjustments are noted *in italic font within the underlined text* or shaded table. Note: all scientific names are shown in italic font. Portions of this manual that are not underlined or shaded describe regional procedures which supplement national Core data. Regional data item names are followed, in bold and parentheses, by the specific lab (i.e., PFSL) or by PNW if the data item applies to both PNW labs. When data items are referenced within chapter text, the data item name will appear in all capital letters (e.g., “Record the CONDITION CLASS NUMBER of the condition class in which each tree is located.”).

Database codes have been included in brackets following the data item name. National Information Management System (NIMS) codes are listed for Core data items and regional database codes are listed for regional data items. Note: Core data items containing regional additions (e.g., values, codes) will list “CORE” as the source, but brackets will contain regional database codes; national database codes will be populated from the regional database.

The following examples show how data items will be displayed depending on the source (i.e., Core or regional) of the data item:

ITEM NUMBER; DATA ITEM NAME; **(SOURCE)**; [TABLE.COLUMN NAME]
ITEM X.X.X.X CONDITION CLASS NUMBER (CORE 5.3) [CONDID]..Core
ITEM X.X.X.X PREVIOUS ACTUAL LENGTH (PNW) [TREE.PREV_HT_PNWRS]........AFSL and PFSL
ITEM X.X.X.X TREE AGE METHOD (PFSL) [BH_AGE_FLAG_PNWRS]...............................PFSL only

In addition, the following information is given for each data item:

When collected:	Specific criteria for when data item is recorded
Field width:	X digits
Tolerance:	Acceptable range of measurement
Values:	Legal values/codes for data items

SECTION 1.2 THE INVENTORY

The national FIA program consists of three phases. Phase 1 (P1) is a remote sensing phase aimed at classifying all land into forest and nonforest. Phase 2 (P2) consists of a set of field sample locations distributed across the landscape with approximately one sample location (FIA plot) for every 6,000 acres at standard intensification. Forested sample locations are visited by field crews that collect a variety of forest ecosystem data. Nonforest locations are visited, as necessary, to quantify rates of land use change or to measure regional data items, when specified. This field manual describes the P2 process. Phase 3 (P3) consists of a subset of the phase 2 plots (approximately one every 96,000 acres), which are visited during the growing season in order to collect an extended suite of ecological data including full vegetation census, tree and crown condition, soil data, lichen diversity, coarse woody material, and ozone injury. Data are collected on a subset of plots in all states every year (i.e., annual inventory), as opposed to the historical FIA approach of sampling states sequentially in a cycle (i.e., periodic inventory).

SECTION 1.3 PRODUCTS

PNW-FIA reports on the status and trends of forests in Alaska, Washington, Oregon, California, and the Pacific Islands, and provides information sought by resource planners, policy analysts, and others involved in forest resource decision-making. Data collected in PNW-FIA inventories are summarized, interpreted, analyzed, and published in analytical reports and research articles of national, state, regional, and sub-regional scope. Information is presented by forest land and owner classes for land use change; timber volume, growth, mortality, and removals; potential forest productivity; opportunities for silvicultural treatment; and type and area of wildlife habitats.

The data collected in these inventories represent a wealth of information that can answer questions about the status and trend of forest ecosystems, distribution of plant species and their relationship to the environment, the incidence of insects and disease in relation to forest type and condition, changes in forest structure and productivity resulting from disturbance, and improved prediction of forest growth and development on different sites and in response to management.

SECTION 1.4 UNITS OF MEASURE

The *PNW-FIA program* uses ENGLISH units as the measurement system. Previous inventories used metric units. For commonly used conversion factors, see the Metric Equivalents and Aids section in Appendix B (Reference Information).

SECTION 1.5 PLOT DESIGN GENERAL DESCRIPTION

The *Core ground* plot consists of four subplots approximately 1/24 acre in size with a radius of 24.0 feet *horizontal*. The center subplot is subplot 1. Subplots 2, 3, and 4 are located 120.0 feet horizontal at azimuths of 360, 120, and 240 degrees, *respectively*, from the center of subplot 1 (see *Figure 1.1: FIA Phase 2 plot diagram*). *Field plots* also include macroplots that are ¼ acre in size with a radius of 58.9 feet *horizontal*; each macroplot center coincides with the subplot's center. Macroplots are numbered in the same way as subplots. Throughout this field guide, the use of the word 'plot' refers to the entire set of four subplots/*macroplots*. 'Plot center' is defined as the center of subplot 1.

Each subplot contains a microplot of approximately 1/300 acre in size with a radius of 6.8 feet *horizontal*. The center of the microplot is offset 90 degrees and 12.0 feet horizontal from each subplot center. Microplots are numbered in the same way as subplots.

In the PNW-FIA annual inventory, the four subplots/macroplots are laid out in the pattern shown in *Figure 1.1*; subplots are never "substituted" or "moved" in order to keep the entire subplot/macroplot within a homogeneous condition.

SUBSECTION 1.5.1 PLOT LAYOUT

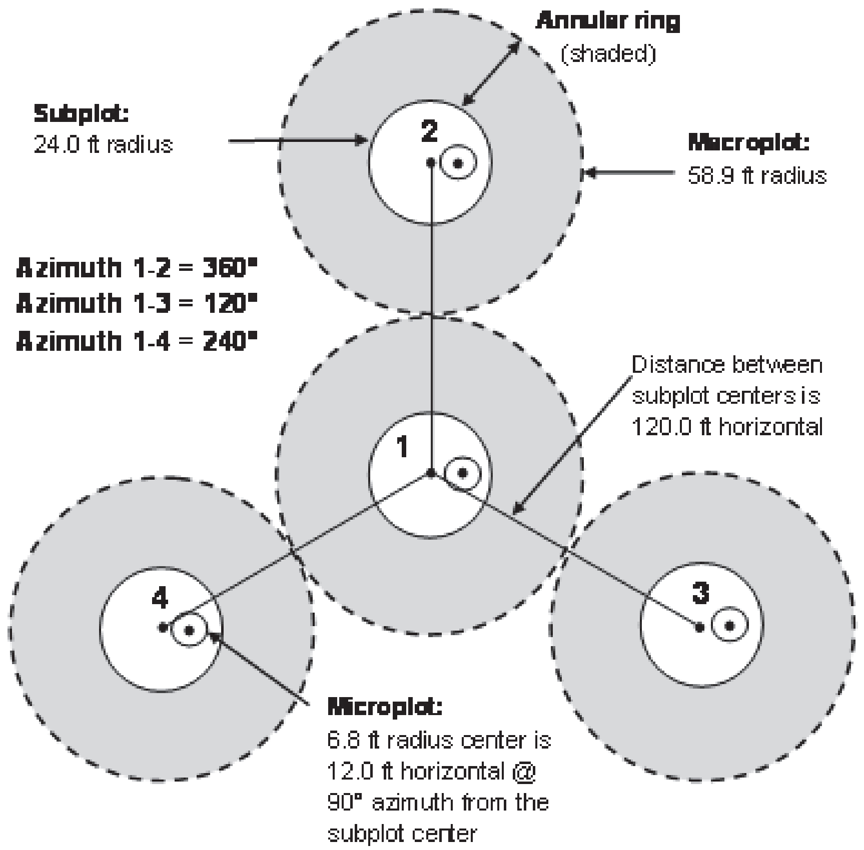


Figure 1.1: FIA Phase 2 plot diagram

SUBSECTION 1.5.2 DATA ARE COLLECTED ON PLOTS AT THE FOLLOWING LEVELS:

Plot- Data that describe the entire cluster of four subplots.

Microplot - Data that describe a small area within a subplot.

Subplot - Data that describe a single subplot of a cluster.

Macroplot- Data that describe a single subplot plus an additional annular ring (from 24.0 feet to 58.9 feet) around that subplot center. There are four macroplots on a plot.

Condition Class - A discrete combination of landscape attributes that describe the environment on all or part of the plot. These attributes include:

1. CONDITION CLASS STATUS
2. RESERVED STATUS
3. OWNER GROUP
4. FOREST TYPE
5. STAND SIZE CLASS
6. REGENERATION STATUS
7. TREE DENSITY

Boundary - An approximate description of the demarcation line between two condition classes that occur on a single subplot, microplot, or macroplot. There is no boundary recorded when the demarcation occurs beyond the fixed-radius plots.

Tree - Data describing *live* saplings with a diameter 1.0 inch through 4.9 inches, and *live or dead* trees with diameter greater than or equal to 5.0 inches.

Seedling - Data describing *live* trees with a diameter less than 1.0 inch and greater than or equal to 0.5 *feet* in length (conifers) or greater than or equal to 1.0 *feet* in length (hardwoods).

Site Tree - Data describing site index trees.

Vegetation - Data describing plant composition and cover.

Invasive Species - Data describing presence and abundance of invasive plant species.

Down Woody Materials - Data describing abundance and stage of decay of down and suspended dead material.

SECTION 1.6 QUALITY ASSURANCE/QUALITY CONTROL

SUBSECTION 1.6.1 GENERAL DESCRIPTION

The goal of the FIA Quality Assurance/Quality Control (QA/QC) program is to ensure that all resource inventory data are scientifically sound, of known quality, and are thoroughly documented. Measurement quality objectives (MQO) are established as standards to define data quality.

The PNW-FIA QA/QC staff works to continually improve the PNW-FIA inventory process by controlling, identifying, and documenting errors and sources of variability that could be detrimental to the quality of PNW-FIA inventory results. Emphasis is placed on extensive crew training, field inspections, and documentation of protocols and procedures used in the inventory.

Measurement quality and consistency are assessed by using three methods: hot checks, cold checks, and blind plots (see Appendix O for inspection plot descriptions). Periodic on-site inspections of field locations are conducted to ensure that the field work is being performed with the required accuracy and precision. Specifically, objectives of field checking are:

1. To obtain uniform and consistent interpretation and application of field instructions among all field crews.
2. To minimize technique errors.
3. To check the performance of each individual crew member.
4. To reveal inadequacies in the instructions and in the training program.
5. To assess and document the quality (accuracy, precision, completeness) of field data.

CHAPTER 2 LOCATING THE PLOT

This chapter describes the steps taken to locate and establish new FIA plots, and to locate and remeasure previously established FIA plots.

Establishing the plot location is the crucial first step in collecting valid field data. While measurements at each location are used to compile statistical information for the entire inventory, each location is also compared to information derived from processing remotely sensed (e.g., satellite, aircraft) data for the same location. Because these two sampling layers must measure attributes on the same location, the ground sample must be located as accurately as possible.

SECTION 2.1 LOCATING AN ESTABLISHED PLOT

Established plots include:

- Annual inventory (P2) remeasurement plots (SAMPLE KIND = 2, Item 4.3.4.7)
- Field plots established by Forest Health Monitoring (P3) crews using the 4-subplot design
- Periodic revisited plots (PNW PLOT KIND = 2 or 3, Item 4.3.4.9) installed with a different design (Appendix K, Historical Inventory Information, for various plot designs)
- Eastern Oregon Juniper inventory plots (SAMPLE KIND = 2)

The first step in relocating a previously established plot is to find the ground location of plot center (PC) marked on the photos; use resources such as photos, maps/drawings, written descriptions, GPS coordinates (Subsection 4.4.4), and reference point (RP) data. Each field crew should have a map with the location of the plots marked and identified with the plot number, and a plot jacket for each plot that may be visited. The county, plot number, and legal description (township, range, and section) are printed on the ownership label on the plot jacket. Use the available resources to reach the general vicinity of the plot. All previously established plots should have an RP from which a slope distance and azimuth to the PC was recorded. This distance and azimuth can be followed from the RP to relocate the PC.

When a previously established plot is difficult to find use the following procedures to re-establish the plot for remeasurement:

- If no trees exist: Use photos, maps, and GPS to verify plot location and treat plot as remeasurement.
- If a major disturbance has occurred with no trees or monumentation remaining: Use photos, maps, and GPS to verify the plot location and consider it a remeasurement plot.
- If some monumentation is present, but not all the trees are found: The plot should be re-established and remeasurement protocol followed.

SUBSECTION 2.1.1 NAVIGATING WITH PHOTOGRAPHY

The plot jacket for each field plot will usually contain photos, supplemental imagery, and maps. The plot center is pinpricked and circled on the old photos. Photo pinpricks must be transferred onto new photos without error. Use both new and old photos to proceed to the plot area when revisiting established plots.

Some photos will be marked with a point-of-departure (POD). They are usually near a road and indicate how the crew approached the plot at a previous visit. In some cases, it may be easier to locate an established plot by heading directly to the plot rather than to the RP because within the plot area there may be numerous "signs" to detect (e.g., trees with reference tags, tree numbers, diameter nails). In searching for the plot, you may find a tagged/numbered tree on one of the subplots, use the plot data from previous visits to determine which subplot you are on.

SUBSECTION 2.1.2 NAVIGATING WITH GPS

Plots visited previously will, in most cases, have field collected GPS coordinates. When using GPS coordinates to navigate, ensure coordinates are entered accurately into the GPS unit using the correct datum and follow your progress on the photo. Compare the GPS navigation readings to other plot location data such as RP to PC distance and azimuth to confirm direction of travel.

If during GPS navigation to the plot you encounter anything that could affect a future crew’s travel or safety (e.g., passage around cliffs, shallow stream crossings, illicit activities, game trails, etc.) create a waypoint. Record the waypoint coordinates (Subsection 4.4.2) and provide an explanation in the electronic GPS NOTES.

Refer to Appendix P, GPS Operating Guide, for operation instructions for specific GPS units used by PFSL.

SUBSECTION 2.1.3 NAVIGATING WITH REFERENCE POINT (RP) DATA

Reference points have been established on most previously visited plots; slope distance and azimuth from the RP to the PC were recorded. On some plots, the previous RP referenced a subplot center other than subplot 1, the pinpricked location; on these plots, the plot center monument was still installed at the pinpricked location. See Section 3.3 for monumentation details.

Species, diameter at breast height (DBH) (to the nearest centimeter on periodic PNW-FIA plots), azimuth from RP to PC, and slope distance from RP to PC (in meters on periodic PNW-FIA plots), were recorded on the plot card and on the photo used at the previous visit, and will be in the previous data printout.

The RP will be monumented with square aluminum tags (non-tree RP monumentation will vary). An RP tree will have three square aluminum tags; two at approximately six feet above ground (facing crew's approach), and one below stump height (facing plot center).

Though measuring the distance and azimuth from the RP to the PC may be time consuming, if done carefully, it is a reliable method for relocating field plots.

Before measuring from the RP to the plot center, check photos to see if the azimuth and distance seem reasonable. If reliable GPS coordinates exist, GPS distance and azimuth can be compared to RP data distance and azimuth.

SUBSECTION 2.1.4 REVERSE REFERENCE POINT (RP) METHOD

If the RP cannot be found, but the plot center is found, locate a new RP after remeasuring the plot (time permitting). The tree/object selected should be visible on the photo, preferably between the POD and PC. Record new RP data using the following methods:

- If GPS coverage is very good, collect coordinates for the new RP. Use the navigation function on the GPS receiver to get an azimuth and horizontal distance from the new RP to the collected PC coordinates. Record all the usual RP data in the RP section of the plot card and label them "GPS" to indicate that azimuth and horizontal distance were not measured with a compass and tape. These data must also be entered into the data recorder. Pinprick the new RP on the best photo available and record the RP data on the back of the photo; label these data with the method (GPS) used to determine the azimuth and horizontal distance to the new RP.
- If GPS coverage is poor, pinprick the location of the new RP on the best photos available (same photos as the PC pinprick). Use the methods in Subsection 2.4.1 (Locating Plots Using Photos) to determine the horizontal distance and azimuth from RP to PC. Record all the usual RP data on the plot card, in the data recorder, and on the back of the photo.

SECTION 2.2 ESTABLISHED PLOT ISSUES

See Section 2.1, Locating an Established Plot, for definition of established plots.

SUBSECTION 2.2.1 DIFFICULTY FINDING ESTABLISHED PLOTS

If an established plot cannot be found, follow these steps:

1. Return to the last known point on the route to the plot. Plan a route to the pinpricked plot center; divide the route into stages with a physical feature at the end of each stage which can be identified on the photos and confirmed on the ground. Proceed stage by stage, confirming the endpoint of the previous stage before proceeding to the next. The endpoint of the last stage should correspond with the pinpricked location, and be monumented with a center stake and witness trees/snags/stumps/objects. If the plot cannot be found, continue with the following steps.
2. Look for stream confluences, ridges, openings, groups of large trees, old skid roads, large snags, etc. on the ground, to confirm you are at the pinpricked location.
3. Try to locate the area where previous crews might have been when they thought they were at the pinpricked location. Check the previous plot card for remarks providing insight on plot location such as: "Plot center moved back 20 feet on same azimuth to agree with photo pinprick". Look for other indicators such as:
    - Stand type and size of trees

- The size and species of the RP and subplot 1 witness trees
- Direction of travel from the RP (it could be 180 degrees off)
- Slope and aspect

4. Previous plot access information (Route to RP and RP Information) should be compared with the original photo pinprick. If these two plot references do not correlate to the same location:
   - Begin a spiral search from where the RP to PC traverse ended; extend up to a 500-foot radius around the ground location.
   - At the same time, use all photos, drawings/maps, previous data, and/or GPS coordinates to aid in relocating.
   - If the ground location of the pinprick is found then begin a spiral search of that area, extending up to a 500-foot radius.
5. If no sign of the plot can be found after an extensive search (at least a day) using all the data and tools available, the plot will be considered lost. See Section 4.1, Lost Plot/Replacement Plot.

SUBSECTION 2.2.2 INCORRECTLY INSTALLED PLOT

Incorrectly installed plots will be relocated or remeasured based on the following criteria:

- **Periodic revisited plots (SAMPLE KIND = 1)**: If the periodic plot center is found or re-established using monumentation, and determined to be installed at an incorrect location (i.e., not at the original photo pinpricked location and off by more than 500 feet), install a new (annual) plot at the original photo pinpricked location. Note: If a plot was installed during the 1980s or earlier and has not been visited since, install the new (annual) plot at the pinpricked location (even if plot center was established at a different location).
- **Remeasurement (SAMPLE KIND = 2)**: Plot is remeasured in its current location, regardless of location errors (i.e., incorrect initial plot location). In this situation, pinprick the actual plot center location on the photos and label the new pinprick on the back of the photo (e.g., “actual plot location”); draw an “X” over the previous pinprick and label (e.g., “initial pinprick location–plot not installed here“). Electronic PLOT NOTES (Item 4.3.5.5) must be recorded, and a written explanation/description included on the plot card.

SUBSECTION 2.2.3 INCORRECTLY INSTALLED SUBPLOT OR MICROPLOT

Subplots and microplots are remeasured where they were installed at the previous annual visit, regardless of installation error (see Subsection 3.2.3, NEW Plot Establishment Tolerances). When a subplot or microplot center is determined to be installed incorrectly, electronic SUBPLOT/MACROPLOT NOTES (PNW)(Item 6.1.2.5) must be recorded documenting why the installation was in error and a written explanation included on the plot card.

SUBSECTION 2.2.4 PC STAKE OR SUBPLOT/MICROPLOT PIN MISSING OR MOVED

If the PC stake or a subplot/microplot pin is missing or has moved, re-establish the PC stake, subplot pins, or microplot pin at the previously established location using all available information (e.g., previous crew's data sheets, plot card diagrams and descriptions, downloaded tree data in PDR, and any monumentation on the ground). The location of the plot center stake and subplot pins is critical for ensuring that trees do not arbitrarily move in or out of tally between surveys. When a crew has exhausted all efforts to find the PC stake or subplot/microplot pin, use the following guidelines to re-establish plot/subplot/microplot center and provide details of the reinstallation in electronic SUBPLOT/MACROPLOT NOTES and on the plot card:

1. If the PC stake or a subplot pin is not in the previous location (i.e., pulled out of ground or moved) or is missing:
   - Locate the witness trees and any trees that are located nearest to the limiting distances of 24.0 feet and 58.9 feet. Use the slope distances and horizontal distances of these trees to ensure proper stake or pin re-establishment.
   - To ensure optimal precision, the crew should measure out the previous slope/horizontal distances along the back-azimuths from the trees nearest the limiting distances to where PC or subplot center should be. The location where the measured distances converge should be the re-established stake/pin position.

- If the measured distances do not intersect at one point after verifying the distances and back-azimuths, re-establish the stake/pin at the average point, and record the discrepancies in the electronic SUBPLOT/MACROPLOT NOTES.

  For example: Tree A has a horizontal distance of 23.4 feet and a back-azimuth of 270 degrees. Tree B has a horizontal distance of 23.2 feet and a back-azimuth of 90 degrees. Although the measuring tapes extending from the two trees should meet at center, there is a gap of 0.4 feet between them. Re-establish center at the average point between the two tapes, and record the details of the reinstallation in electronic SUBPLOT/MACROPLOT NOTES.

2. If the microplot pin is not in the previous location (i.e., pulled out of ground or has moved), or is missing:
   - Locate any previously tallied saplings using the printout and downloaded data in the PDR. Locate saplings on the edge of the 6.8-foot limiting distance and use them to re-establish the center of the microplot.
   - If there is only one tally sapling on the microplot, measure out 12 feet at 90-degrees from subplot center to temporarily mark the location of microplot center. Measure back to this location from the pith of the sapling using previous distance and azimuth and re-establish the microplot pin based on the temporary pin location and previous tally sapling data.
   - If there are no tally saplings on the microplot, re-establish microplot center 12 feet from subplot center at 90-degrees.

SUBSECTION 2.2.5 LOST SUBPLOT

When an individual subplot is lost (cannot be relocated), re-establish the subplot center pin. CONDITION CLASS STATUS (Item 5.7.0.4) of the new subplot must be updated (if necessary) and previous tree data must be reconciled. See Section 8.4, Tree Tracking, for specific instructions for closing out downloaded tree records on lost subplots.Record details of the lost subplot and procedures used to reinstall the pin in electronic SUBPLOT/MACROPLOT NOTES and on the plot card. Record specific notes pertaining to the tree tally in the individual TREE NOTES. In cases where individual subplots are lost (cannot be located, use the following procedures:

- <u>Assign the appropriate present CONDITION CLASS STATUS Code(s) to the new subplot (usually CONDITION CLASS STATUS = 1 or 2).</u>
- <u>Assign TREE STATUS = 0 to all downloaded trees (i.e., incorrectly tallied at the previous survey).</u>
- <u>Assign RECONCILE codes 3 or 4 (i.e., missed live or missed dead) to all trees on the new subplot.</u>
- <u>Assign the next TREE RECORD NUMBER.</u>

SUBSECTION 2.2.6 LOST PLOT (REPLACEMENT PLOT)

If a previously established annual inventory (4-subplot design) plot (SAMPLE KIND = 2) cannot be found following an extensive search (at least a day) using all the data and tools available, the plot is considered lost; certain procedures must be followed to “close out” the old (lost) plot and replace it with a new plot. See Section 4.1, Lost Plot/Replacement Plot, for specific procedures.

SUBSECTION 2.2.7 P3 PLOTS INSTALLED WITHOUT DECLINATION

If the plot was established as a P3 only (FHM) plot and is now a P2/P3 co-located plot, there is a slight chance the subplots were installed without using declination. If this is the case, remeasure the subplots at the location they were installed. Correct all azimuths on any tally trees or witness objects with new measurements using current rules for declination adjustment (see Appendix B, Reference Information). Recognizing that a plot may have been installed without using declination may also help the crew to re-establish the pins if they are missing.

SECTION 2.3 OTHER PLOTS ESTABLISHED USING THE 4-SUBPLOT DESIGN

SUBSECTION 2.3.1 FHM AND EASTERN OREGON JUNIPER PLOTS

Prior to the annual inventory, FHM (i.e., P3 plots) and eastern Oregon juniper plots were established using the 4-subplot design. In Washington and Oregon most, but not all, of these FHM plots were co-located with periodic inventory and Continuous Vegetation Survey (CVS) plots. In California, this occurred less frequently. Some of these plots were mistakenly installed at different ground locations near the periodic inventory location. When a crew encounters this situation, install the plot as follows:

1. New P2 annual inventory installations located on Region 5 (R5) or Region 6 (R6) Forest Service administered lands in which the CVS, P3, or Eastern Oregon Juniper inventory plots were established at a different ground location: Install the new annual inventory (P2) plot at the CVS plot center (PC).

   Note: The existing P3 plot will be treated as a "lost" plot and re-established with the new annual P2 plot at the old CVS plot center.

2. New P2 annual inventory installations located on all other ownerships where the co-located periodic and P3 plots were established at different ground locations: Install the new annual inventory (P2) plot at the existing P3 plot location.

SUBSECTION 2.3.2 REGION 1 AND REGION 4 PLOTS

PNW field crews measure plots on Region 1 (R1) Forest Service administered lands in Washington (Idaho Panhandle National Forest) and Region 4 (R4) Forest Service administered lands in California (Toiyabe National Forest).

Established annual inventory plots (4-subplot design) on these forests were installed by crews from either PNW or the Rocky Mountain Research Station (RMRS), using protocol from each respective region. Determine whether or not the plot was installed using declination (RMRS does not use declination), and measure the plot and tally trees using the protocol by which the plot was installed; do not move subplots.

If an annual inventory plot has not been established, install a new annual inventory plot (SAMPLE KIND = 1) at the old periodic plot center (if the plot was visited at a previous inventory by either RMRS or PNW) and measure the plot using PNW protocol (i.e., with declination).

Plots on these national forests are only considered remeasurement plots (SAMPLE KIND = 2) when previous data are downloaded into the PDR (i.e., plot was installed or measured by a PNW crew previously). See Appendix K, Historical Inventory Information, for old R1/R4 plot layouts.

Note: Special rules for R5/R6 Forest Service administered lands do not apply when a plot lands on R1/R4 Forest Service administered lands (i.e., **do not measure** nonforest condition classes or ground cover on these lands).

SECTION 2.4 LOCATING NEW PLOTS

Annual inventory plots installed for the first time where no periodic P2 plot previously existed should have digital orthophoto quadrangle (DOQ) or better imagery printouts with the plot center marked—either pinpricked or marked with a dot. Some plots may also have coordinates obtained by digitizing USGS topographic maps. Some plots may contain photos and supplemental imagery, which can be used as an aid in locating plot center. When you arrive at the point you believe to be the PC, carefully check the location on the new photos/imagery against the surrounding terrain and pattern of tree crowns and vegetation to confirm the location on the photo/imagery and your location on the ground are the exact same spot. The new plot should be installed accurately: within +/- 10.0 feet of pinprick on a 1:12,000 or finer scale photo (e.g., 1:5,000), and within +/- 30.0 feet if the photo scale is 1:12,000 or broader (e.g., 1:15,840).

SUBSECTION 2.4.1 LOCATING PLOTS USING PHOTOS

To accurately establish the field location the crew will need to know:

- Photo scale reciprocal (PSR), or scale, to determine ground distances
- Baseline azimuth, an azimuth reference on photo to determine compass bearing

Establishing the photo scale reciprocal (PSR) and a baseline azimuth:

If the photo scale or azimuth reference is not included on the photo it will need to be determined using a baseline (see instructions below).

1. Identify and pinprick two objects on the aerial photo that can also be identified on the ground. The points on the photo should be as close as possible to the center of the photo due to distortion near the edges of aerial photography not orthorectified.
2. Measure the horizontal distance between the objects on the ground to the nearest foot (ground distance).

   Note:

   - The pinpricked objects on the ground should be at least 500 feet apart.
   - The sighting between the pinpricked objects should be straight (such as along a road or across a large opening).
   - The elevation of the pinpricked objects on the ground should be similar to the elevation of the plot.
3. Draw a line on the backside of the aerial photo between the two pinpricked objects (the baseline).
4. With a ruler (map units), measure the length of the baseline (map distance).
5. Calculate the photo scale reciprocal (PSR): PSR = ground distance/map distance.
6. Determine the baseline azimuth with a compass by sighting between the two pinpricked objects on the ground. Record the correct azimuth. On the backside of the aerial photo, draw a straight line between a known object (i.e., one of the pinpricked baseline objects) to the pinpricked plot center.

Determine the azimuth and the horizontal distance from the known object to the pinpricked plot center; convert map units to feet using the PSR. Navigate to the plot center using the calculated azimuth and horizontal distance to the pinpricked plot center (will be the center of subplot 1 on the standard layout). If this is a new plot, carefully check the photos against the surrounding terrain and vegetation to make sure you are actually at the location pinpricked on the new photo.

SECTION 2.5 CIRCUMSTANCES PRECLUDING PLOT ESTABLISHMENT/ MEASUREMENT

Active Logging: If the plot area is being actively logged (timber is being felled, bucked, or yarded), **do not establish/measure the plot**. Note the status of the logging operation on the plot jacket and return to the plot when logging activity has ceased.

Plot center (subplot 1) cannot be physically occupied (e.g., Census water, noncensus water, denied access, or hazardous): The subplot will not be installed/measured or referenced; the entire subplot is classified as the subplot center condition, even though a portion of it may be in another condition class. Other subplots are installed/measured using normal procedures (see Subsection 3.4.2, Establishing Subplots when Plot Center is Inaccessible).

- **Note**: If a subplot center (including subplot 1) lands in Census or noncensus water do not install or measure the subplot, **even if it can be occupied safely**.

SECTION 2.6 SKIPPED AND CARRYOVER PLOTS

Plots that cannot be visited due to time constraints and weather will be coded as skipped plots and carried over to the following field season for field measurement. An attempt will be made to access the plot two additional times (i.e., the plot will be on the list of plots for field measurement three times) and then it will be removed from the list of field plots. Include details of the circumstances precluding plot measurement in the plot narrative after the third season on the list of field plots.

CHAPTER 3 PLOT LAYOUT AND REFERENCING

This chapter describes the Forest Inventory and Analysis (FIA) plot design, establishment guidelines, tolerances and procedures used to monument and reference plots and subplots.

SECTION 3.1 PLOT DESIGN

The Core ground plot consists of four subplots with a radius of 24.0 feet horizontal. The center subplot is subplot 1. Subplots 2, 3, and 4 are located 120.0 feet (horizontal) at azimuths of 360, 120, and 240 degrees, respectively, from the center of subplot 1 (see Figure 3.1: FIA Phase 2 plot diagram). Throughout this field manual, the use of the word 'plot' refers to the entire set of four subplots/macroplots. 'Plot center' is defined as the center of subplot 1.

Each subplot contains a microplot with a radius of 6.8 feet horizontal. The center of the microplot is offset 90 degrees and 12.0 feet horizontal from each subplot center. Microplots are numbered in the same way as subplots.

Ground plots also include macroplots with a radius of 58.9 feet horizontal; each macroplot center coincides with the subplot's center. Macroplots are numbered in the same way as subplots.

SUBSECTION 3.1.1 PLOT LAYOUT

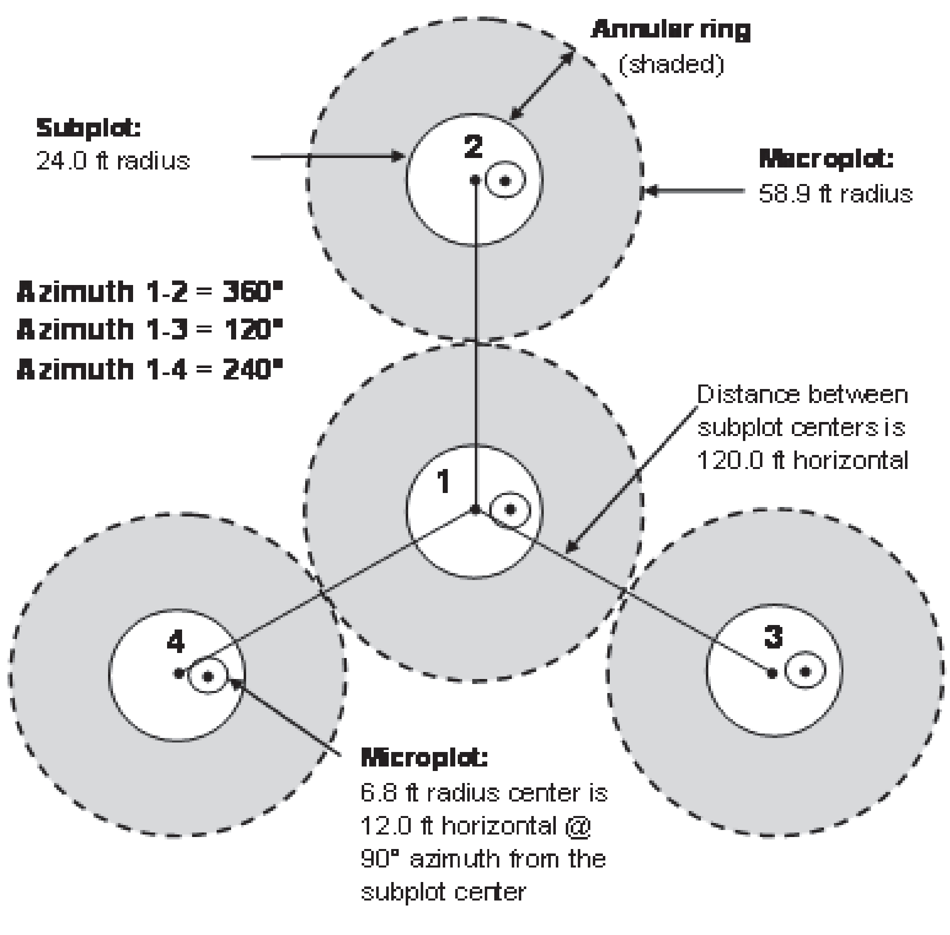


Figure 3.1: FIA Phase 2 plot diagram

<u>The following table can assist in locating subplots *2 through 4* from a subplot other than subplot 1.</u>

Subplot	Numbers	Azimuth	Backsight	Distance
From	To	degrees		feet
2	3	150	330	207.8
2	4	210	030	207.8
3	4	270	090	207.8

SUBSECTION 3.1.2 PLOT DIMENSIONS

A. Macroplot – *for sample intensification or sampling relatively rare events*:
- Radius = 58.9 feet
- Area = 10,899 square feet or 0.25 acre or 1/4 acre

B. Subplot – for sampling landscape-level characteristics, assessing vegetation, tallying trees meeting a minimum diameter at breast height or diameter at root collar:
- Radius = 24.0 feet
- Area = 1,809.56 square feet or approximately 0.04 acre or approximately 1/24 acre

C. Microplot – for assessing fuel loading, counting tree seedlings and tallying tree saplings:
- Radius = 6.8 feet
- Area = 145.27 square feet or approximately 0.003 acre or approximately 1/300 acre

D. Annular plot – outer ring of the macroplot; adds area to the subplot for sampling relatively rare events:
- Radius = from 24.0 feet to 58.9 feet
- Area = 9088.4 square feet or approximately 0.21 acre or 5/24 acre

SECTION 3.2 PLOT ESTABLISHMENT

SUBSECTION 3.2.1 PLOT ESTABLISHMENT GUIDELINES

Establish the ground plot at the location corresponding to the pinprick on the photo, as described in Section 3.1, Plot Design. In the annual inventory the four subplots are laid out in the pattern shown in Figure 3.1: FIA Phase 2 plot diagram.

When the crew cannot occupy the plot center because safety hazards exist, or the plot center is inaccessible or out of the sample, the crew should check the other subplots. See Section 2.5 Circumstances Precluding Plot Establishment/Measurement, for installation instructions when a safety hazard exists. If any subplot centers can be occupied and are in the sample, the subplots that can be occupied should be established and sampled following normal procedures. When a subplot center or microplot center cannot be occupied, no *measurements will be taken on* that subplot or microplot; instead, the entire subplot or microplot should be classified according to the condition preventing occupancy. However, if a localized obstruction (e.g. tree stem, boulder) prevents subplot/microplot center occupancy, measure the subplot or microplot using best estimate distances for references and trees. Document the situation in SUBPLOT/MACROPLOT NOTES (PNW)(Item 6.1.2.5). See SUBPLOT/MACROPLOT STATUS (Item 6.1.1.3) for examples of coding data items in specific situations.

> **Note**: If a subplot center (including subplot 1) is classified as noncensus water (CONDITION CLASS STATUS = 3) or Census water (CONDITION CLASS STATUS = 4), no measurements are taken on that subplot, even if it can be occupied safely (i.e., regardless of water level, a subplot center covered by noncensus or Census water cannot be “occupied”).

If a *remeasurement (*SAMPLE KIND = 2*)* subplot *or microplot* was installed incorrectly at the previous visit, the current crew should remeasure the subplot *or microplot* in its present location*.* Periodic revisited plots (SAMPLE KIND = 1 and PNW PLOT KIND = 2 or 3; see Appendix K, Historical Inventory Information) will be remeasured using the current plot center location unless placement exceeds tolerance (i.e., ground plot is more than 500 feet from the original pinpricked location on the photo). Notes are required, both on the plot card and in SUBPLOT/MACROPLOT NOTES, when previously mislocated subplots are encountered.

In cases where individual subplots are lost (cannot be relocated), *see Subsection 2.2.5, Lost Subplot, for instructions.*

SUBSECTION 3.2.2 PLOT INTEGRITY

Each FIA unit is responsible for minimizing damage to current or prospective sample trees and for specifying how these trees are monumented for remeasurement. The following field procedures are permitted:

- *N*ailing tags on witness trees so that subplot centers can be relocated.
- Boring trees for age on subplots and macroplots to determine tree age, site index, stand age, or for other reasons.

- Nailing and tagging trees on microplots, subplots, and macroplots so that these trees can be identified and relocated efficiently and positively at times of remeasurement.
- Nailing or painting microplot, subplot, and macroplot trees so that the point of diameter measurement can be accurately relocated and remeasured.

All other potentially damaging procedures that may erode subplot integrity are prohibited.

The following practices are specifically prohibited:

- Boring and scribing some specific tree species that are known to be negatively affected (e.g., the initiation of infection or callusing).
- Chopping vines from tally trees. When possible, vines should be pried off trunks to enable accurate measurement. If this is not possible, alternative tools (calipers, biltmore sticks) should be used.

Note: Avoid becoming part of the problem! There is a risk that field crews walking into plot locations could pick up seeds along roadsides or other patches of invasive plants and spread them through the forest and on to the plot. Be aware of the vegetation you are traveling through and consider stopping and removing seeds from boots and clothing before entering uninvaded lands, particularly remote areas that are rarely visited.

SUBSECTION 3.2.3 NEW PLOT ESTABLISHMENT TOLERANCES

Plot center (center of subplot 1): +/- 10.0 feet of pinprick on a 1:12,000 or finer scale photo (e.g., 1:5,000); +/- 30.0 feet if the photo scale is 1:12,000 or broader (e.g., 1:15,840)

Subplot 2, 3, or 4: +/- 5 feet

Microplot: +/- 0.5 feet

SECTION 3.3 MONUMENTING AND REFERENCING PLOT CENTER

All ground visited plots are monumented at plot center and referenced by a reference point (RP) and two witness trees/objects. Install a cedar stake at the plot center (PC, center of subplot 1); see Subsection 3.3.3, Exceptions to Monumenting Plot Center, for valid exceptions to this rule. Use a small aluminum nail to attach a round tag (yellow-side up) to the top of the cedar stake.

If previously established, the plot was monumented at last visit with a cedar or plastic stake in the ground at PC and was referenced by an RP and two nearby witnesses—marked distinctively with square or round tags. If necessary (e.g., stake is broken), remove the old stake and install a new cedar stake at exactly the same location as the old stake, and update witness measurements.

Note: Monumenting and referencing protocol for entirely nonforest plots and plots in wilderness areas or national parks differs from standard protocol; see Section 3.5 (Monumenting and Referencing Entirely Nonforest Plots) through Section 3.7 (Monumenting and Reference Plots in National Parks) for monumenting and referencing guidelines for these areas.

SUBSECTION 3.3.1 THE REFERENCE POINT

The reference point references the plot center monument, a cedar stake marking PC, on all field visited plots. It is an object (usually a tree) that is easily identified on the aerial photo and on the ground, and apt to be present at the next visit. Do not reference a subplot other than the one with the plot center monument just because that subplot is closer to the RP. The RP may reference a subplot other than subplot 1 only when there is a significant obstacle or other obstruction between the RP and subplot 1, or when a subplot other than subplot 1 has the center monumentation (see Subsection 3.3.3, Exceptions to Monumenting Plot Center).

Select an RP: The RP should be distinctive both on the ground and on the aerial imagery. The previous RP tree may be reused, if it is still suitable. If the old RP tree is dead, missing, or difficult to identify on the ground or on the photo, select a new RP and leave the tags on the old RP. If possible, it should be a tree that is not likely to die or be cut before the next inventory, although a snag or other object may be selected as an RP (e.g., a distinctive fence post, building corner). If such an RP is utilized, describe it on the back of the plot photo and under Plot Access Description on the plot card.

Tag the RP: Attach three square aluminum tags to the RP tree; old tags may be reused, if suitable. Nail two tags six feet above ground line; facing the direction(s) from which you expect future crews to approach the RP. Nail one square tag below stump height on the side of the tree facing the plot center monument. Nails should be driven in only enough to anchor them firmly into the wood. If the RP is a building, rock, or other item that should not be tagged, include a description in the Plot Access Description on the plot card and in the RP NOTES (Item 4.3.6.7).

In addition to monumenting the RP, the following must be completed:

- RP data and written description (to the RP and to the plot) recorded on the plot card. See Appendix R, Plot Jacket, for specific guidelines.
- RP pinpricked on the plot photo, and the pinprick labeled with RP data on the back of the photo, noting any irregularities. See the Plot Jacket appendix for specific guidelines.
- RP data recorded in the data recorder, noting any irregularities in the RP NOTES. See Subsection 4.3.6, Reference Point Attributes, for specific guidelines and data items.

SUBSECTION 3.3.2 WITNESS TREES/OBJECTS

All ground visited plots will have two witness trees/objects referencing plot center (see Subsection 3.3.3, Exceptions to Monumenting Plot Center, for exceptions to this rule). Witness the PC monument and subplot pins as follows:

A. **Selecting witnesses:** Select two trees/objects near the subplot center which form, as closely as possible, a right angle with the center marker. Trees/objects within six feet of the subplot center are preferable. If live trees are not available, use similarly sturdy objects that have a low likelihood of moving or rapidly decaying. On previously established subplots, reuse the previous witnesses unless better trees/objects are available.

B. **Monumenting witnesses:** Monumentation procedures vary depending on the subplot being witnessed; plot center (PC, center of subplot 1) has different monumentation than subplots 2 through 4 (see Table 3.1:: Hardware for subplot witness monumentation). When attaching a tag to a live witness tree, drive the nail into the tree only enough to anchor the nail firmly into the wood. On previously established subplots, renew old witness tags as needed. If a witness is replaced, remove old tags to avoid confusion at subsequent visits. Note: Do not remove previous R6 CVS monumentation.

Table 3.1: Hardware for subplot witness monumentation

Subplot	Hardware
Plot Center (PC, Subplot 1)	Silver aluminum square tags. If the witnesses are also numbered tally trees, attach the tree number tags with the same nails (i.e., numbered tag on top of square tag).
Subplots 2-4	Two-color round aluminum tags with yellow side out.

Table 3.2: Standards for monumentation of various witness types

Witness Type	Standards
Live tally tree greater than or equal to 3.0 inches DBH/DRC	Attach one tag below stump height facing subplot center, and attach tags six feet above ground height facing the direction of anticipated approach to the subplot. Note: avoid using tally saplings unless no other trees are available. If saplings must be used, wire the tag to an ancillary branch.
Dead tally tree	Attach one tag below stump height facing subplot center, and attach tags six feet above ground height facing the direction of anticipated approach to the subplot. Pound nails flush with the bole of the snag.
Non-tally tree	Attach one tag below stump height facing subplot center, and attach tags six feet above ground height facing the direction of anticipated approach to the subplot. If the witness is a live tree greater than or equal to 3.0 inches DBH/DRC, attach an aluminum nail at the diameter measurement point. If saplings must be used, wire the tag to an ancillary branch facing subplot center.
Stump (i.e., less than 4.5 feet tall)	Attach a yellow round tag below stump height facing plot center. Attach another tag centered on the top/cut face of the stump. When nailing tags to stumps, pound nails flush to the bole. Tags nailed to stumps stay attached longer if bark is removed prior to nailing the tag.
Shrub	Nail or wire a yellow round tag to the base of the shrub facing subplot center. If possible, nail or wire additional rounds higher in the shrub facing the direction of expected approach to the subplot.
Other objects	Monument as appropriate for the object.

Note: Stump height is 0.5 feet above ground level.

Note: PC always gets two tags six feet above ground level facing the direction of anticipated approach unless not possible; one or two tags should be placed up high on subplots 2-4 facing the direction of approach.

SUBSECTION 3.3.3 EXCEPTIONS TO MONUMENTING PLOT CENTER

The plot center monument is not placed at the center of subplot 1 (plot center) if either of the following situations occur:

- The center of subplot 1 is too hazardous to visit (e.g., subplot center 1 is in the middle of a pond, the middle of a freeway, or on the side of a cliff)

OR

- Placing the plot center monument at the center of subplot 1 is likely to irritate a landowner (e.g., subplot 1 center is in the middle of someone's front lawn)

THEN: Reference the center of the lowest-numbered subplot on which the above exceptions do not apply. Circle the pinprick with a red sharpie pen on the back of the photo; write "RP to subplot X" (insert appropriate number) and required RP data near the circle. Record an electronic PLOT NOTE stating which subplot was monumented.

SECTION 3.4 MONUMENTING AND REFERENCING SUBPLOTS 2 THROUGH 4

Accessible subplots that have a forest land condition class present on the 58.9-foot fixed-radius macroplot, and accessible subplots with a measurable nonforest condition class (NONFOREST CONDITION CLASS SAMPLING STATUS =1) present on the macroplot, also require referencing (see Table 3.1:: Hardware for subplot witness monumentation).

SUBSECTION 3.4.1 LOCATE AND MONUMENT SUBPLOT CENTER

Subplots 2, 3 and 4 are located at 360, 120, 240 degrees respectively (see Subsection 3.1.1, Plot Layout).

Mark subplot center: Place a metal pin and aluminum round, yellow side up, at the ground location of subplot center. Tie a small piece of flagging to the pin under the aluminum round.

Reference witnesses: Reference the metal pin to two nearby witnesses (see Table 3.2:: Standards for monumentation of various witness types).

SUBSECTION 3.4.2 ESTABLISHING SUBPLOTS WHEN PLOT CENTER IS INACCESSIBLE

When plot center is inaccessible (e.g., hazardous due to cliffs, falls in census water), but one or more of the other subplot centers is accessible, establish all accessible subplots by using the offset procedures described below.

In the following example, plot center (PC) is inaccessible, but subplots 2 and 3 are in accessible forest land. All of subplots 1 and 4 are classified as CONDITION CLASS STATUS = 5 (nonsampled). Subplot 2 and subplot 3 must be established since they are in accessible forest land (see Figure 3.2: Inaccessible plot center).

Example: The course from RP to PC is 235 degrees for 230 feet. The cliff is encountered at 198 feet—32 feet short of PC. To establish subplot 2, proceed 360 degrees for 120 feet, then proceed on the original azimuth (235 degrees) for the remaining 32 feet to the center of subplot 2. To establish subplot 3: start where the original course from RP to PC ended; go 120 degrees for 120 feet; then go 235 degrees for 32 feet to the center of subplot 3.

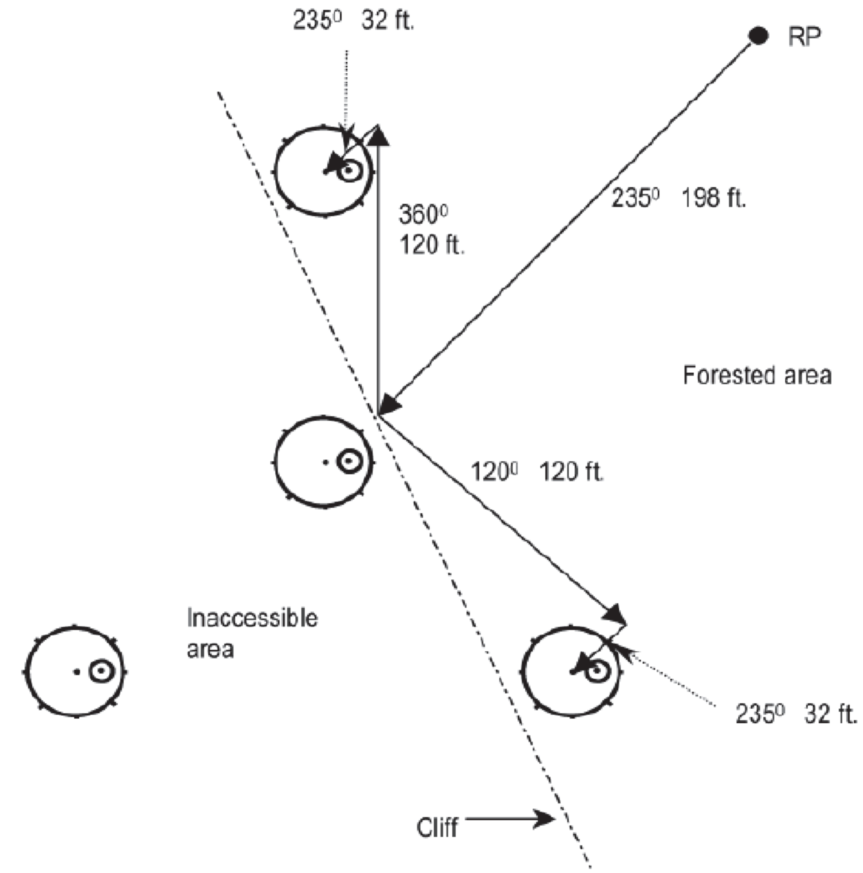


Figure 3.2: Inaccessible plot center

SUBSECTION 3.4.3 LOCATE AND MONUMENT THE MICROPLOT

The center of each 6.8-foot fixed-radius microplot is located 12 feet horizontal from each subplot center at 90 degrees (see Subsection 3.1.1, Plot Layout). Place a metal pin with aluminum round (white side up) at microplot center. Tie a small piece of flagging to the pin under the aluminum round.

SECTION 3.5 MONUMENTING AND REFERENCING ENTIRELY NONFOREST PLOTS

SUBSECTION 3.5.1 NONFOREST PLOTS ON REGION 5 (R5) OR REGION 6 (R6) FOREST SERVICE ADMINISTERED LANDS

Plots on R5 or R6 Forest Service administered lands that are entirely nonforest and are ground visited must be referenced on all four subplots. Follow the steps in Section 3.3 (Monumenting and Referencing Plot Center) and Section 3.4 (Monumenting and Referencing Subplots 2 through 4).

SUBSECTION 3.5.2 NONFOREST PLOTS LOCATED ON ALL OTHER OWNERSHIPS

Plots that are entirely nonforest and are ground visited must be referenced at plot center. Follow the steps in Section 3.3 (Monumenting and Referencing Plot Center) to reference the plot center. Subplots 2 through 4 do not need to be referenced if the entire plot is nonforest.

SECTION 3.6 MONUMENTING AND REFERENCING PLOTS IN WILDERNESS AREAS

Plots located in wilderness areas require special monumenting procedures to be sensitive to the existing character of these areas and to leave as few signs of human disturbance as possible.

The crew should prepare a very detailed plot diagram, showing the RP, other physical features, and a well defined route-to-plot narrative to facilitate relocation and to mitigate the lack of visual reference points normally used to reference plots. Record detailed notes about the monumenting procedures used on the plot card and in electronic PLOT NOTES.

SUBSECTION 3.6.1 FOREST SERVICE AND BUREAU OF LAND MANAGEMENT WILDERNESS AREAS

All plot monumentation materials (nails, pins, tags) **must be painted** with non-glossy brown paint (black and gray are also acceptable in Forest Service wilderness areas). Any flagging used to facilitate plot measurements, or entry and exit from the plot area, must be removed upon completion of the plot measurements.

The RP is not monumented.

Plot center (subplot 1) is monumented with a cedar stake and/or a rock cairn. It is referenced from two permanent witness features (trees or rocks), but no round aluminum or square tags may be used on trees.

Subplots 2, 3, and 4 centers are monumented with a regular metal pin and a painted round aluminum tag. Where rocks are available, rock cairns are used to obscure these markers on the ground; make natural appearing cairns to hide the monumentation. The microplot is not monumented with a metal pin.

All live tally trees greater than or equal to 1.0 inch DBH/DRC and all dead trees greater than or equal to 5.0 inches DBH/DRC are tagged with a painted aluminum tree number tag at the base or hanging on a branch if a sapling less than 3.0 inches DBH. Mark tally trees greater than or equal to 3.0 inches DBH/DRC with similarly painted nail at DBH/DRC. Trees less than 3.0 inches DBH/DRC are marked with an orange paint stik at DBH/DRC.

SECTION 3.7 MONUMENTING AND REFERENCING PLOTS IN NATIONAL PARKS

Plots located in national parks require special monumenting procedures to be sensitive to the existing character of these areas and to leave as few signs of human disturbance as possible. The procedures for national parks are part of a formal agreement between PNW-FIA and the National Park Service (NPS), called a Memorandum of Understanding (MOU).

SUBSECTION 3.7.1 NATIONAL PARKS

Prior to visiting a plot within a national park, refer to Section F of FS Agreement no. 06-SU-11132652-044 (MOU) for general guidelines for research plots on NPS lands. A copy of the MOU can be obtained from the state coordinator. All agreements are based upon the MOU, however, individual parks may apply additional requirements and monumentation guidelines which must be followed. Refer to the collections permit for the specific national park, or the approved procedures agreed upon between PNW-FIA and the individual park unit, for instructions on how to monument plots on all NPS lands. It is the crews' responsibility to read the entire permit and to verify monumentation protocol with the administrator of the permit for that park.

CHAPTER 4 PLOT LEVEL DATA

Plot attributes record information about the plot location, the field crew visit, and landowner contact/requests. This information aids future crews in plot relocation, sets up date and inventory cycle information in the data recorder, and makes it possible to analyze the relationship of plot data to other mapped data (e.g., rivers).

All *data items* listed in *this chapter* are collected on plots with at least one accessible forest land condition (PLOT STATUS = 1) and all *nonforest/nonsampled* plots (PLOT STATUS = 2 or PLOT STATUS = 3). In general, plot level data apply to the entire plot and are recorded from the center of subplot 1. A plot is considered nonforest if no part of it is currently located in forest land (CONDITION CLASS STATUS = 1). A plot is nonsampled if the entire plot is not sampled for one of the reasons listed in PLOT NONSAMPLED REASON.

If a forest plot has been converted to nonforest or becomes a nonsampled plot, the previous data are reconciled and an attempt is made to visit the plot during the next inventory. If a nonforest plot becomes forest or access is gained to a previously nonsampled plot, a new forest ground plot is installed. All nonforest and nonsampled plots are visited if there is any reasonable chance that they might include some forest land condition class.

Trees on previously forest land plots will be reconciled during data processing. There is a distinction between plots that have been clearcut, and plots that have been converted to another land use. A clearcut plot is considered forest land until it is actively converted to another land use. Additional information concerning land use classifications is contained in *Section 5.5, CONDITION CLASS ATTRIBUTES*.

SECTION 4.1 LOST PLOT/REPLACEMENT PLOT

Plots that cannot be relocated by using the guidelines in Section 2.2, Established Plot Issues, are considered lost; certain procedures must be followed to “close out” the old (lost) plot and replace it with a new plot.

- **Periodic revisited plots** - Install a new annual plot at the location of the original PI photo pinprick or the digitized coordinates of that pinprick if there are no photos; plot is assigned PNW PLOT KIND = 5 (periodic replacement plot). Locating and laying out the replacement plot should be performed as if installing the plot for the first time. Note: Periodic plots include any FIA, R1, R4, R5, R6, or BLM plots.
- **Remeasurement plots** (SAMPLE KIND = 2) - (see Replacement Plot, Subsection 4.1.2, pg.19) for specific procedures.

SUBSECTION 4.1.1 LOST ANNUAL PLOT

If a previously established annual inventory (four-subplot design) plot (SAMPLE KIND = 2) cannot be found, the plot is considered lost and the state coordinator must be notified.

1. Close out the lost annual plot:
   - If trees were recorded: Use coding procedures for lost plots listed under PLOT NONSAMPLED REASON (Item 4.3.4.2).
   - If trees were recorded and there is no evidence of disturbance: Document factors you believe contributed to the plot being lost on the plot card and in the electronic PLOT NOTES (Item 4.3.5.5).
   - If trees were recorded and there is evidence of disturbance: efforts to locate plot must be documented and the state coordinator notified. Document factors you believe contributed to the plot being lost on the plot card and in the electronic PLOT NOTES. An explicit description of the percentage of mortality and cause of death of trees must be recorded; the plot will be reviewed by analysts at the end of the season.
2. Install a replacement plot (see Subsection 4.1.2, Replacement Plot).

SUBSECTION 4.1.2 REPLACEMENT PLOT

Once a lost annual plot is closed out (see Subsection 4.1.1, Lost Annual Plot), a replacement plot must be installed at the ground location marked by the original PI photo pinprick or the digitized coordinates of that pinprick if there are no photos. Create a new plot file for the replacement plot (SAMPLE KIND = 3); a new (or surrogate) PLOT NUMBER will be assigned (see Item 4.2.1.3).

Locating and laying out a replacement plot should be performed as if installing the plot for the first time. Notify the data manager before sending any replacement plots to the office.

SECTION 4.2 PLOT LEVEL DATA DOWNLOADED TO THE PDR

Do not change the downloaded code for the following data items. If instructed, verify the code is correct and if it isn't, contact the local QA staff member.

SUBSECTION 4.2.1 PLOT LEVEL DATA ITEMS

Item 4.2.1.1 STATE (CORE 1.1)
[PLOT.STATECD]

The unique *Federal Information Processing Standard (*FIPS*)* code identifying the *STATE* where the plot center is located.

When collected:	All plots	
Field width:	2 digits	
Tolerance:	No errors	
Values:	Code	State
	06	California
	16	Idaho (used for R6 administered plots in Idaho)
	32	Nevada (used for R5 administered plots in Nevada)
	41	Oregon
	53	Washington

Item 4.2.1.2 COUNTY (CORE 1.2)
[PLOT.COUNTYCD]

The unique FIPS code identifying the county where the plot center is located.

When collected:	All plots
Field width:	3 digits
Tolerance:	No errors
Values:	See *Appendix B*

Item 4.2.1.3 PLOT NUMBER (CORE 1.3)
[PLOT.PLOT]

*T*he identification number, unique within *the state, assigned to* each plot*; this item is populated when the plot file is created or extracted in the data recorder.* If SAMPLE KIND = 3 *(Replacement Plot)*, the plot number will be assigned by *the mobile integrated data acquisition system (MIDAS).* If the MIDAS number is not readily available, 99999 will be used as a surrogate number until a new PLOT NUMBER can be appropriately assigned.

Note: If a replacement plot file needs to be created (see Subsection 4.1.2, Replacement Plot), the new plot number assigned by MIDAS (or 99999 as a surrogate) will be entered when opening the new plot file. Do not change the downloaded code within plot attributes.

When collected:	All plots
Field width:	5 digits
Tolerance:	No errors
Values:	00001 to 99999

Item 4.2.1.4 CYCLE (PNW)
[PLOT.CYCLE]

This code identifies the cycle number of the current plot.

When collected:	All Plots
Field width:	2 digits
Tolerance:	No errors
Values:	01-99

Item 4.2.1.5 SUBCYCLE (PNW)
[PLOT.SUBCYCLE]

This code identifies the subcycle of the plot.

When collected:	All Plots
Field width:	2 digits
Tolerance:	No errors
Values:	01-10

Item 4.2.1.6 PERIODIC PLOT NUMBER (PNW)
[PLOT.PERIODIC_PLOT_NBR_PNWRS]

This code identifies the plot number (if any) used for this location at previous periodic inventories. Do not change the downloaded/printed code. Verify downloaded code with the code on the label of the plot jacket. Notify the PDR programmer if a difference exists.

When collected:	Downloaded when plot has been assigned a plot number at previous periodic inventories
Field width:	3 digits
Tolerance:	No errors
Values:	000-999

Item 4.2.1.7 NFS PLOT NUMBER (PFSL)
[PLOT.NFS_PLT_NUM_PNWRS]

Downloaded for all plots on R5 and R6 Forest Service administered lands, including those with an FIA PLOT NUMBER (Item 4.2.1.3). Confirm the downloaded value is correct. If the downloaded NFS PLOT NUMBER does not match the one on the plot jacket, contact the PDR programmer.

When collected:	Downloaded when condition class 1 has ADMINISTRATIVE FOREST CODE = 501 - 699
Field width:	5 digits when ADMINISTRATIVE FOREST CODE is 501 - 599
	7 digits when ADMINISTRATIVE FOREST CODE is 601 - 699
Tolerance:	No errors
Values:	0000001 to 6999999

Item 4.2.1.8 FIELD GUIDE VERSION (CORE 1.12)
[PLOT.MANUAL]

This code identifies the version number of the *Forest Inventory and Analysis* National Core Field Guide that was used to collect the *annual inventory* data on this plot. *This* will be used to match collected data to the proper version of the field guide. The 2013 FIELD GUIDE VERSION is 6.0. Plots are measured using the field guide version that correlates to the year it is actually measured, which may not be the year it was originally scheduled to be visited (i.e., carry over plots are measured with the current year's field guide).

When collected:	All plots
Field width:	*3* digits (x.y)
Tolerance:	No errors
Values:	6.0

Item 4.2.1.9 PDR STARTING DATA RECORDER VERSION NUMBER (PNW)
[PLOT.PDR_START_VERSION]

A 30-digit field identifying the version number of the data recorder program used **at the current visit** to collect data on the plot on the day the plot was started, in the format a.b.c.d.REGION.e. The **a** signifies the national field guide version, and **b** signifies the minor national field guide version. The **c** represents the main national MIDAS build version, and the **d** represents the main national MIDAS revision number. The REGION code will be PNW for our region. The **e** represents the regional version number of MIDAS. As an example 6.0.1.3.PNW.5 represents version 6.0 of the national manual, and it is the first major build of MIDAS, and the 3rd national revision. It also signifies the 5th update of the MIDAS application for PNW. The regional version number will be recycled back to "0" when the main national field guide version is updated, for example, when Core Field Guide 7.0 is implemented.

When collected:	Generated for all plots
Field width:	30 digits
Tolerance:	No errors
Values:	a.b.c.d.REGION.e (starting at 6.0.2.3.PNW.1)

Item 4.2.1.10 PDR ENDING DATA RECORDER VERSION NUMBER (PNW)
[PLOT.PDR_END_VERSION]

A 30-digit field identifying the version number of the data recorder program used **at the current visit** to collect data on the plot on the day the plot was completed. See Item 4.2.1.9, PDR STARTING DATA RECORDER VERSION NUMBER, for a description of the naming convention of values for this data item.

When collected:	Generated for all plots
Field width:	30 digits
Tolerance:	No errors
Values:	a.b.c.d.REGION.e (starting at 0.0.2.3.PNW.1)

Item 4.2.1.11 DECLINATION (CORE OPTIONAL 1.14)
[PLOT.DECLINATION]

*T*he azimuth correction used to adjust magnetic *N*orth to true *N*orth *is downloaded into the PDR*. All azimuths are assumed to be magnetic azimuths unless otherwise designated. This field carries a decimal place because the USGS corrections are provided to the nearest half degree.

DECLINATION is defined as: DECLINATION = (TRUE NORTH - MAGNETIC NORTH)

For plots in California, Oregon, and Washington, azimuths are always in relation to true North. The declination adjustment used for each plot will be downloaded/printed, and is listed by county in Appendix B. This adjustment is made in the field by setting the declination for the plot to "East declination" on the compass. Do not change the downloaded/printed code.

When collected:	*Downloaded for a*ll plots
Field width:	5 digits including sign (+xxx.y)
Tolerance:	No errors
Values:	-014.0 to -016.0 (Oregon)
	-014.5 to -017.0 (Washington)
	-012.0 to -015.0 (California)
	-013.5 to -015.0 (Idaho)
	-012.0 to -014.0 (Nevada)

Item 4.2.1.12 MACROPLOT BREAKPOINT DIAMETER (CORE OPTIONAL 1.20)
[PLOT.MACROPLOT_BREAKPOINT_DIA]

A macroplot breakpoint diameter is the diameter (either DBH or DRC) above which trees are measured on the plot extending from 0.1 to 58.9 feet *(*horizontal distance*)* from the center of each subplot. The Pacific Northwest FIA unit uses breakpoint diameters of 24 inches and 30 inches (24 inches throughout California; and 24 inches on the east side, 30 inches on the west side of the Cascade Range in Oregon and Washington). Breakpoint diameter will be downloaded for each plot.

When collected:	Downloaded for all plots
Field width:	2 digits
Tolerance:	No errors
Values:	24, 30

Item 4.2.1.13 CHANGE MATRIX REQUIRED (PFSL)
[PLOT.CHANGE_MATRIX_REQUIRED_PNWRS]

A downloaded code, indicating if remeasurement protocol (Section 5.6) should be followed. This code cannot be changed in the field.

When collected:	All plots	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	N	Change matrix not required
	Y	Change matrix required

Item 4.2.1.14 P2 VEGETATION SAMPLING STATUS (CORE OPTIONAL 8.3.1)
[PLOT.P2VEG_SAMPLING_STATUS_CD]

This *downloaded* plot-level variable determines whether P2 Vegetation data *(see Vegetation Profile, Chapter 12, pg.227)* will be recorded on the plot and the land condition class(es) on which it will be recorded. In California, Oregon, and Washington, vegetation data is collected on all accessible forest **land** and measurable nonforest conditions.

When collected:	All plots	
Field width:	1 digit	
Tolerances:	At least 99 percent of the time	
Values:	Code	Definition
	0	Not sampling P2 Vegetation
	1	P2 Vegetation data collected only on accessible forest land conditions (CONDITION CLASS STATUS = 1 and NONFOREST SAMPLING STATUS = 0)
	2	P2 Vegetation data collected on all accessible land conditions (CONDITION CLASS STATUS = 1 or 2, NONFOREST *CONDITION CLASS* SAMPLING STATUS = 1)

Item 4.2.1.15 LEVEL OF DETAIL (CORE OPTIONAL 8.3.2)
[PLOT.P2VEG_SAMPLING_LEVEL_DETAIL_CD]

This *downloaded* plot-level variable determines whether data are collected for vegetation structure only or for Species Composition as well. If LEVEL OF DETAIL = 3, then a tree species could be recorded twice, but it would have two different species growth habits (see *Item 12.4.0.8, SPECIES GROWTH HABIT (CORE OPTIONAL 8.6.1)*). PNW FIA will use LEVEL OF DETAIL = 3 for all plots where vegetation data is collected.

When collected:	On all plots where P2 vegetation is being sampled (P2 VEGETATION SAMPLING STATUS = 1 or 2)
Field width:	1 digit
Tolerances:	At least 99 percent of the time

Values:	Code	Definition
	1	Collect data for vegetation structure only; total aerial canopy cover and canopy cover by layer for tally tree species (all sizes), non-tally tree species (all sizes), shrubs/subshrubs/woody vines, forbs, and graminoids.
	2	Collect vegetation structure data (Level of Detail = 1) **plus** understory species composition data including up to four most abundant species per SPECIES GROWTH HABIT per subplot of: seedlings and saplings of any tree species (tally or non-tally) *less than* 5 inches DBH (DRC for woodland species), shrubs/subshrubs/woody vines, forbs, and graminoids.
	3	Collect vegetation structure data, understory species composition data (Level of Detail = 2), **plus** up to four most abundant tree species (tally or non-tally) *greater than or equal to* 5 inches DBH (DRC for woodland species) per SPECIES GROWTH HABIT per subplot.

Item 4.2.1.16 INVASIVE PLANT SAMPLING STATUS (CORE OPTIONAL 9.3)
[PLOT.INVASIVE_SAMPLING_STATUS_CD]

*This downloaded plot-level variable d*etermines whether invasive plant data *(see Invasive Plants , Chapter 14, pg.245)* will be recorded on the plot and the land class(es) on which it will be recorded. Invasive plant data will be collected on all accessible land conditions on Region 5 Forest Service administered lands (ADMINISTRATIVE FOREST CODE = 501-599).

When collected:	All plots	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	0	Not collecting invasive plant data
	1	Invasive plant data collected only on accessible forest land conditions *(CONDITION CLASS STATUS = 1 and NONFOREST SAMPLING STATUS = 0)*
	2	Invasive plant data collected on all accessible land conditions (CONDITION CLASS STATUS = 1 *or NONFOREST CONDITION CLASS SAMPLING STATUS = 1*)

Item 4.2.1.17 INVASIVE PLANT SPECIMEN COLLECTION RULE (CORE OPTIONAL 9.12)
[PLOT.INVASIVE_SPECIMEN_RULE_CD]

Downloaded code to indicate if collection of specimens of unknown *(or suspected)* invasive species is required. While not required in PFSL, unknown specimens can be collected for later identification when a suspected invasive is encountered.

When collected:	Downloaded on all plots where INVASIVE PLANT DATA SAMPLING STATUS = 1 or 2	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Value	Description
	0	FIA unit does not require specimen collection for invasive plants
	1	FIA unit requires specimen collection for invasive plants

Item 4.2.1.18 DWM SAMPLING STATUS (BASE)
[P2DWM_SAMPLING_STATUS_CD]

This downloaded code describes whether DWM data will be recorded and which variables will be recorded. If code = 0, no further data collection is required within this manual section. In California, Oregon, and Washington, BASE biomass DWM variables are measured on all accessible forest land and measurable nonforest conditions (DWM SAMPLING STATUS = 1).

When collected:	All plots
Field width:	1 digit
Tolerance:	No errors

Values:	0	Not sampling DWM
	1	BASE biomass DWM variables collected on measured land conditions (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2).
	2	BASE biomass and wildlife/ecological package DWM variables collected on measured land conditions (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2). **Required for P3 DWM**
	3	Rapid assessment DWM variables collected on measured land conditions (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2).

Item 4.2.1.19 YEAR OF PREVIOUS INVENTORY (PNW)
[PLOT.PREV_INV_YEAR_PNWRS]

This code is downloaded if plot was visited previously. It indicates the year of the previous periodic or annual inventory. Do not change the downloaded date.

When collected:	Downloaded if plot was visited previously
Field width:	4 digits
Tolerance:	No errors
Values:	Year

Item 4.2.1.20 MONTH OF PREVIOUS INVENTORY (PNW)
[PLOT.PREV_INV_MONTH_PNWRS]

This code is downloaded if plot was visited previously. It indicates the month of the previous periodic or annual inventory. Do not change the downloaded date.

When collected:	Downloaded if plot was visited previously
Field width:	2 digits
Tolerance:	No errors
Values:	Month (1 to 12)

Item 4.2.1.21 PREVIOUS GROUND LAND CLASS (PFSL)
[PLOT.PREV_GLC_PNWRS]

This code identifies the ground land class at the previous inventory. Do not change the downloaded code.

When collected:	Downloaded for plots that were classified within inventoried area at the previous inventory
Field width:	2 digits
Tolerance:	No errors
Values:	See Appendix K, Historical Inventory Information, for PREVIOUS GROUND LAND CLASS codes and their definitions

Item 4.2.1.22 ECOLOGICAL UNIT (PFSL)
[PLOT.ECO_UNIT_PNW]

This code identifies one of eight ecological units in California for which separate stockability equations have been developed. Ecological units in California are shown in Appendix J, Stockability Indicators. Do not change the downloaded code.

When collected:	Downloaded for most counties in California (STATE = 06)
Field width:	1 digit
Tolerance:	No errors
Values:	1 - 8, null

Item 4.2.1.23 PHASE (PFSL)
[PLOT.PHASE_PNWRS]

This downloaded code identifies the phase used to determine what data is collected on a plot. Phase 2 plots follow the standard field guide, while Phase 3 plots include additional P3 indicators.

When collected:	Downloaded for all plots
Field width:	2 alphanumeric characters
Tolerance:	No errors
Values:	P2 (Phase 2) or P3 (Phase 2 and Phase 3)

SUBSECTION 4.2.2 SPECIAL STUDIES

Item 4.2.2.1 FIRE PLOT (PNW)
[PLOT.FIRE_PLOT_PNWRS]

This is a downloaded code identifying if plot has been selected as a Fire Effects and Recovery Study (FERS) plot. Protocol can be found in the Fire Effects and Recovery Study manual supplement.

When collected:	All plots	
Field width:	1 character	
Tolerance:	n/a	
Values:	Code	Definition
	Y	Plot has been selected as a FERS plot
	N	Plot is not a FERS plot

Item 4.2.2.2 SPECIAL STUDY 2002A: PLATFORM ABUNDANCE (PFSL)
[PLOT.SPEC_STDY_CD_PNWRS]

This is a downloaded code that identifies whether or not the plot area is within the sample area for Special Study 2002a (this area is within [roughly] 50 miles of the coast), and if qualifying trees on this plot are sampled for Platform Abundance. Do not change the downloaded code, but notify the local QA staff member if you believe it is incorrect.

When collected:	All plots	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Definition
	Y	Qualifying trees are sampled for Platform Abundance
	N	Trees are not sampled for Platform Abundance

SECTION 4.3 PLOT LEVEL DATA COLLECTED IN THE FIELD

SUBSECTION 4.3.1 CREW VISIT INFORMATION

Item 4.3.1.1 SAMPLE METHOD CODE (PNW)

[PLOT.DATA_SOURCE_PNWRS]

Record the code that describes the source for the data collected on the plot location.

When collected:	All plots			
Field width:	1 digit			
Tolerance:	No errors			
Values:	Code	Sample Method	Description	Core codes (office use only)
	1	Ground	All data collected from a ground visit by a field crew.	1
	2	Viewed from a distance	Location was flown over or viewed from a distance (e.g., viewed from a road or adjacent ridgeline).	1
	3	Photo Interpretation	Information for the location was determined using photo interpretation.	2
	4	Other–specify	Specify source of data in PLOT NOTES and on the plot card.	2

Item 4.3.1.2 QA STATUS (CORE 1.17)

[PLOT.QA_STATUS]

Electronic data files are automatically named by the data recorder using the PLOT NUMBER and File Name Code. Electronic data files for plots with QA STATUS 2 through 6 are saved as separate files so that the original standard production plot data is preserved and can be used for quality control and statistical analysis.

<u>Record the code to indicate the type of plot data collected, using the following codes:</u>

When collected:	All plots	
Field width:	1 digit	
Tolerance:	No errors	
Values:	*Code*	*Definition*
	1	Standard production plot
	2	Cold check
	3	Reference plot (off grid)
	4	Training/practice plot (off grid)
	5	Botched plot file (disregard during data processing)
	6	Blind check
	7	Hot check (production plot)

Item 4.3.1.3 CREW TYPE (PNW)

[PLOT.CREW_TYPE_PNWRS]

Record the code to specify what type of crew is measuring the plot.

When collected:	All plots	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Crew Type
	1	Standard Forest Service field crew
	2	QA crew (any QA crew member present collecting data, regardless of plot QA Status)
	3	Standard Contractor field crew

Item 4.3.1.4 CREW NUMBER (CORE 1.18)
[PLOT.CREWNBR1, CREWNBR2, CREWNBR3, CREWNBR4, CREWNBR5]

Record up to *five* crew numbers as assigned to *individual* field crew *members*; always record the crew leader first. The first 2 digits are for the responsible unit's station number (NRS – 24XXXX, SRS – 33XXXX, RMRS – 22XXXX, and PNW – 26XXXX).

When collected:	All plots	
Field Width:	6 digits	
Tolerance:	No errors	
Values:	Code	Definition
	PNW	260001 - 269999

SUBSECTION 4.3.2 CURRENT DATE OF INVENTORY

Item 4.3.2.1 YEAR (CORE 1.13.1)
[PLOT.MEASYEAR]

Record the year in which the plot was completed.

When collected:	All plots
Field width:	4 digits
Tolerance:	No errors
Values:	$\geq$ 2013

Item 4.3.2.2 MONTH (CORE 1.13.2)
[PLOT.MEASMON]

Record the month in which the plot was completed.

When collected:	All plots							
Field width:	2 digits							
Tolerance:	No errors							
Values:	Month	Code		Month	Code		Month	Code
	January	1		May	5		September	9
	February	2		June	6		October	10
	March	3		July	7		November	11
	April	4		August	8		December	12

Item 4.3.2.3 DAY (CORE 1.13.3)
[PLOT.MEASDAY]

Record the day of the month on which the plot was completed.

When collected:	All plots
Field width:	2 digits
Tolerance:	No errors
Values:	1 to 31

SUBSECTION 4.3.3 TIME SPENT ON PLOT

Basic information about time spent collecting plot data is needed. The time it takes to measure plots will help determine possible cost and time savings of changes or deletions to data collected, or cost and time expenditures of proposed new items. The following data items are recorded when a plot is field visited (SAMPLE METHOD CODE = 1).

Item 4.3.3.1 TRAVEL TIME TO PLOT (PNW)
[PLOT.TIME_TO_PLOT_PNWRS]

Record the number of hours it took for the crew to reach and find the plot. Include time spent driving, flying, getting keys from landowners, changing flat tires, hiking, searching for the plot location, etc. This should include the time driving from the previous night's lodging and hiking to the plot. If multiple days were required to reach the plot, include travel time from all days. If additional plots are measured from a single campsite, use travel time from the campsite for the additional plots. If time differs among crew members, use the crew leader's travel time. If the plot was visited on subsequent days, only use travel time to reach the plot on the initial visit. Estimate travel time to the nearest half hour.

When collected:	When SAMPLE METHOD CODE = 1
Field width:	3 digits (xx.y)
Tolerance:	1 hour
Values:	00.0 to 99.5

Item 4.3.3.2 MEASUREMENT TIME ON PLOT (PNW)
[PLOT.TIME_ON_PLOT_PNWRS]

Record the number of person-hours it took to measure all items on the plot (number of people on plot X number of hours on plot). If multiple days were required, add times for a total. Include all time on plot including breaks (if any), equipment repair, etc., as well as actual measurement time. Estimate measurement time on plot to the nearest half hour.

When collected:	When SAMPLE METHOD CODE = 1
Field width:	3 digits (xx.y)
Tolerance:	1 hour
Values:	00.0 to 99.5

Item 4.3.3.3 TRAVEL TIME FROM PLOT (PNW)
[PLOT.TIME_FROM_PLOT_PNWRS]

Record the number of hours you think it will take to travel back from the plot. Do not include time for anticipated stops or delays. Typically this will be from the plot to the lodging where you are staying. If multiple days are required to return, use total travel time anticipated. If additional plots have been measured from a single campsite, use only travel time to the campsite for the additional plots. Estimate travel time to the nearest half hour.

When collected:	When SAMPLE METHOD CODE = 1
Field width:	3 digits (xx.y)
Tolerance:	1 hour
Values:	00.0 to 99.5

SUBSECTION 4.3.4 PLOT LEVEL FUNDAMENTALS

Item 4.3.4.1 PLOT STATUS (CORE 1.4)
[PLOT.PLOT_STATUS_CD]

Record the code describing the sampling status of the plot. In cases where a plot is inaccessible, but obviously contains no forest land, record PLOT STATUS = 2. In cases where a plot is access-denied or hazardous land use, and has the possibility of forest, record PLOT STATUS = 3.

All skipped plots that will be carried over to the following year will be coded as PLOT STATUS = 3, regardless of whether or not a forested condition exists or potentially exists. Skipped plots that are certain to not have a forested condition, have a measurable nonforest condition (NONFOREST SAMPLING STATUS = 1), and have been on the list of field plots for three years should be coded as PLOT STATUS = 2.

When collected:	All plots	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	1	Sampled – at least one accessible forest land condition present on plot
	2	Sampled – no accessible forest land condition present on plot
	3	Nonsampled – possibility of forest land

Item 4.3.4.2 PLOT NONSAMPLED REASON (CORE 1.7)
[PLOT.PLOT_NONSAMPLE_REASN_CD]

For entire plots that cannot be sampled, record one of the following reasons.

When collected:	When PLOT STATUS = 3	
Field width:	2 digits	
Tolerance:	No errors	
Values:	*Code*	*Description*
	01	Outside U.S. boundary – Entire plot is outside of the U.S. border.
	02	Denied access – Access to the entire plot is denied by the legal owner, or by the owner of the only reasonable route to the plot. Because a denied-access plot can become accessible in the future, it remains in the sample and is re-examined at the next occasion to determine if access is available. There are no minimum size or width requirements for a condition class delineated by denied access.
	03	Hazardous – Entire plot cannot be accessed because of a hazard or danger, for example cliffs, quarries, strip mines, illegal substance plantations, high water, etc. Although most hazards will not change over time, a hazardous plot remains in the sample and is re-examined at the next occasion to determine if the hazard is still present. There are no minimum size or width requirements for a condition class delineated by a hazardous condition.
	06	Lost plot – Entire plot cannot be found.Whenever this code is assigned, a replacement plot is required. The plot that is lost is assigned SAMPLE KIND = 2 and NONSAMPLED REASON = 6. The replacement plot is assigned SAMPLE KIND = 3.
	08	Skipped visit – Entire plot skipped. Used for plots that are not completed prior to the time a panel is finished and submitted for processing.
	10	Other – Entire plot not sampled due to a reason other than one of the specific reasons already listed. A*n electronic PLOT NOTE* is required to describe the situation.

Item 4.3.4.3 NONFOREST SAMPLING STATUS (CORE 1.5)
[PLOT.NF_SAMPLING_STATUS_CD]

A downloaded code that indicates whether this plot is part of a nonforest inventory. When a portion of the plot is within Region 5 or Region 6 Forest Service administered land boundaries (ADMINISTRATIVE FOREST CODE = 501-699), land meeting the accessible nonforest land definition within the fixed-radius macroplot is considered a **measurable nonforest condition class** (NONFOREST SAMPLING STATUS =

1). This code may be updated if the downloaded value is determined to be incorrect based on incorrect plot ownership information, or if a measurable nonforest condition is discovered on the plot. Certain data items are recorded in NONFOREST SAMPLING STATUS = 1 conditions which are not typically measured in nonforest conditions; these are identified in the associated “when collected” field for individual data items.

When collected:	All plots	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	0	Nonforest plots / conditions are not inventoried
	1	Nonforest plots / conditions are inventoried

Item 4.3.4.4 NONFOREST PLOT STATUS (CORE 1.6)
[PLOT.NF_PLOT_STATUS_CD]

Record the code that describes the plot status of the nonforest plot, i.e., PLOT STATUS = 2. In cases where the plot is inaccessible, but obviously contains no nonforest land (i.e., plot is either noncensus water or census water) record NONFOREST PLOT STATUS = 2.

When collected:	When PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	1	Sampled - at least one accessible nonforest land condition present on the plot
	2	Sampled - no nonforest land condition present on plot, i.e., plot is either census and/or noncensus water
	3	Nonsampled nonforest

Item 4.3.4.5 NONFOREST PLOT NONSAMPLED REASON (CORE 1.8)
[PLOT.NF_PLOT_NONSAMPLE_REASON_CD]

For entire nonforest plots that cannot be sampled, record one of the following reasons.

When collected:	NONFOREST PLOT STATUS = 3	
Field width:	2 digits	
Tolerance:	No errors	
Values:	Code	Description
	02	Denied access - Access to the entire plot is denied by the legal owner, or by the owner of the only reasonable route to the plot. Because a denied-access plot can become accessible in the future, it remains in the sample and is re-examined at the next occasion to determine if access is available.
	03	Hazardous - Entire plot cannot be accessed because of a hazard or danger, for example cliffs, quarries, strip mines, illegal substance plantations, high water, etc. Although most hazards will not change over time, a hazardous plot remains in the sample and is re-examined at the next occasion to determine if the hazard is still present.
	08	Skipped visit - Entire plot skipped. Used for plots that are not completed prior to the time a panel is finished and submitted for processing.
	10	Other - Entire plot not sampled due to a reason other than one of the specific reasons already listed. A*n electronic PLOT NOTE* is required to describe the situation.

Item 4.3.4.6 SUBPLOTS EXAMINED (CORE 1.9)
[PLOT.SUBP_EXAMINE_CD]

Record the number of subplots examined. By default, PLOT STATUS = 1 plots have all 4 subplots examined.

When collected:	All plots	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Definition
	1	Only subplot 1 center condition examined and all other subplots assumed (inferred) to be the same *(remote sensing use only)*
	4	All four subplots fully described (no assumptions/inferences) *(for field visited plots and plots viewed from a distance)*

Item 4.3.4.7 SAMPLE KIND (CORE 1.10)
[PLOT.KINDCD]

This is a downloaded code that describes the kind of plot being installed. Update if incorrect and contact the office (supervisor or data manager) immediately.

When collected:	All plots	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Sample Kind Definition
	1	Initial 4-subplot plot establishment - the initial establishment and sampling of a national design plot (FIA Field Guide versions 1.1 and higher). SAMPLE KIND 1 is assigned under the following circumstances: ▪ Initial activation of a panel or subpanel ▪ Reactivation of a panel or subpanel that was previously dropped ▪ Resampling of established plots that were not sampled at the previous visit.
	2	Remeasurement – remeasurement of a national design plot that was sampled at the previous *[annual]* inventory.
	3	Replacement plot – a replacement plot for a previously established annual inventory plot. *All attempts to locate the plot have failed. Crew collects all data as if this were a new plot.* Assign SAMPLE KIND = 3 if a plot is re-installed at a location other than the original location (i.e., plots that have been lost, moved, or otherwise replaced). Note that replacement plots require a separate plot file for the replaced plot. Replaced (lost) plots are assigned PLOT STATUS = 3, PLOT NONSAMPLED REASON CODE = 6, and SAMPLE KIND = 2. Lost plots retain the original plot number. For the replacement *(new)* plot, open a new file in the PDR with a plot number generated by MIDAS (or 99999 until the replacement plot number can be generated); assign PLOT STATUS = 1 or 2, SAMPLE KIND = 3, and tie it to the replaced plot by entering the PREVIOUS PLOT NUMBER.

Sample Kind Assignment Matrix

	Time X	Time X+1
PLOT STATUS	1 or 2	1, 2 or 3
SAMPLE KIND	1	2
PLOT STATUS	3	1, 2 or 3
SAMPLE KIND	1	1
PLOT STATUS	3	1, 2 or 3
SAMPLE KIND	2	1

* Time X and Time X+1 refer to any two sequential, scheduled (on-panel) inventories.

Initial Plot Establishment: For the purpose of assigning SAMPLE KIND, initial plot establishment is defined as the first scheduled on-panel sample, not the more literal interpretation of the first time a plot is installed on the ground. For example, a privately owned plot determined to be nonforest during the pre-field review at the first scheduled on-panel sample is coded SAMPLE KIND = 1. At the next on-panel sample, the plot is installed on the ground for the first time and is coded SAMPLE KIND = 2.

Special Situations

- Special Studies: Plots may be measured off-panel when selected for a special study. At the first scheduled on-panel sample these plots are coded as SAMPLE KIND = 1.
- Temporal Intensification of FIA grid plots on Forest Service administered lands in Region 5: Plots from multiple panels were measured as part of temporal intensification in R5. At the first scheduled on-panel sample these plots are coded as SAMPLE KIND = 1.
- Region 5 Intensified Grid Plots: These plots are not part of the regular FIA grid and are referred to as 'off-grid' plots. The first field visit is coded SAMPLE KIND = 1, and subsequent field visits are coded SAMPLE KIND = 2.

- Region 6 Intensified Grid Plots: These plots are not part of the regular FIA grid and are referred to as 'off-grid' plots. These plots use the same coding procedures as regular FIA grid plots because they are measured as part of the panel system.

What data is re-measured: For normally scheduled (on-panel) plots, data from the previous on-panel sample will be re-measured and reconciled, regardless of interim field visits due to special studies or temporal intensification. For off-panel field visited plots, the last field visit will be re-measured and reconciled, regardless if it was on or off-panel.

Item 4.3.4.8 PREVIOUS PLOT MAPPING OR CONDITION ERROR (PFSL)
[PLOT.PREV_COND_MAP_ERROR_PNWRS]

Record a code to indicate whether or not a previous mapping error exists on the plot (any of the four subplots), or if there are errors in any of the previous condition class data items. PREVIOUS PLOT MAPPING OR CONDITION ERROR = Y if any previous errors exist.

When collected:	When CHANGE MATRIX REQUIRED = Y	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	N	No error in previous plot mapping or condition class data items
	Y	Error in previous plot mapping or condition class data items

Item 4.3.4.9 PNW PLOT KIND (PNW)
[PLOT.PLOT_KIND_PNWRS]

The PNW PLOT KIND code identifies annual inventory plots installed at old periodic plot locations (periodic-to-annual) so that estimates of forest change can be made. Although substantial differences exist between periodic and annual inventories, paired plots (annual-to-periodic) can be used to estimate annual net change for 5-year reports, and to estimate mortality, growth, and net change for 10-year reports if “remeasured” periodic plots are clearly identified. Periodic plots include any FIA, R1, R4, R5, R6, or BLM plots.

When collected:	When SAMPLE KIND = 1	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Definition
	1	New plot: No previous periodic plot installed at this location, and plot is not a revisited plot or replacement plot.
	2	Periodic revisited plot – exact: Annual plot of 4-subplots is being established over a periodic plot and the center stake of subplot 1 is at the same position as for the periodic plot. Periodic plots include any FIA, R1, R4, R5, R6, or BLM plots; most of these had 5-subplots (see Appendix K, Historical Inventory Information, for periodic plot designs).
	3	Periodic revisited plot – remonumented: Annual plot of 4-subplots is being established over a periodic plot, but ground disturbance (e.g., logging activities, fire, landslide) required re-establishing subplot 1 in the same location, as best as could be done. Code 3 should also be used when the center stake is no longer in the ground but can be accurately re-established using witness trees, boundary trees, RP, etc. When code 3 is used, provide explanation in the electronic PLOT NOTES.
	4	Periodic replacement plot – wrong location: Previous crew established periodic plot in incorrect location. Current crew is putting in this new annual plot at the correct location. **Do not relocate** an incorrectly installed plot to the correct location **unless 1)** it is more than 500 feet from the correct location **or 2)** it appears that the crew avoided the correct location because of the difficulty of measurement at the correct location. A new plot is installed in the correct location only when at least one of the above conditions is applicable. Collection of data at new (correct) location should follow new plot procedures.
	5	Periodic replacement plot – could not find / lost periodic plot: All attempts to locate the previous plot have failed. Collect all data for this newly installed annual inventory plot.
	6	Periodic plot – first ground plot installation: plot was classified in the office using remotely sensed imagery during the periodic inventory; this is the first ground plot installation.

The following examples describe how to code PNW PLOT KIND and associated data items.

Annual inventory initial installation:

A. Crew installs a new annual plot – no corresponding periodic plot.
   - SAMPLE KIND = 1
   - PNW PLOT KIND = 1
   - No remeasurement protocols apply

Annual inventory installation at previous periodic plot location:

A. Crew installs a new annual plot at the same location as an old periodic plot by finding monumentation from the previous crew.
   - SAMPLE KIND = 1
   - PNW PLOT KIND = 2

   Crew attempts to install a new annual plot at the same location of an old periodic plot but because of ground disturbance (e.g., logging, fire, landslide), the old center stake is no longer in the ground, or no monumentation from the previous crew can be found. Establish the center of annual inventory subplot 1 in the same location, as best as could be done, using all available tools (aerial photos, previous crew's write-up and location map, etc).

   - SAMPLE KIND = 1
   - PNW PLOT KIND = 3

B. Crew attempts to install a new annual plot at the same location as an old periodic plot, but the old periodic plot was in the incorrect location relative to the aerial photo. The correct location for the center of subplot 1 is based on the pinprick of the oldest air photo for the plot. **Do not relocate** an incorrectly installed plot to the correct location unless **1)** it is more than 500 feet from the correct location **or 2)** it appears that the crew avoided the correct location because of the difficulty of measurement at the correct location. A new plot is installed in the correct location only when at least one of the above conditions is applicable.
   - SAMPLE KIND = 1
   - PNW PLOT KIND = 4
   - No remeasurement protocols apply

C. Crew attempts to install a new annual plot at the same location as an old periodic plot and cannot find the old periodic plot. See Section 2.2, Established Plot Issues, for more instructions.
   - SAMPLE KIND = 1
   - PNW PLOT KIND = 5
   - No remeasurement protocols apply

D. Crew installs a new annual plot at the same location as an old periodic plot that was remotely sensed previously; no ground plot exists.
   - SAMPLE KIND = 1
   - PNW PLOT KIND = 6
   - No remeasurement protocols apply

Item 4.3.4.10 PREVIOUS PLOT NUMBER (CORE 1.11)
[PLOT.REPLACED_PLOT_NBR]

Record the identification number for the plot that is being replaced.

When collected:	When SAMPLE KIND = 3
Field width:	5 digits
Tolerance:	No errors
Values:	00001 to 99999

SUBSECTION 4.3.5 ADDITIONAL ITEMS

Item 4.3.5.1 LANDOWNER PLOT SUMMARY REQUEST (PNW)
[PLOT.LAND_OWN_REQ_CD_PNWRS]

Record a 1-digit code which indicates if a landowner of the plot area requests a summary of the data collected on their land. If a plot summary is requested by the owner of subplot 1, verify that the printed name/address is correct. Make any special comments relevant to the data request (e.g., landowner does not own all four subplots, the owner of subplot 2 would like data, etc.) in the electronic PLOT NOTES and use code 2.

When collected:	All plots	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Landowner Plot Summary Request
	0	No data request
	1	Plot summary requested
	2	Special case request

Item 4.3.5.2 TOPOGRAPHIC POSITION (PNW)
[PLOT.TOPO_POSITION_PNW]

Record or update the 1-digit code for the TOPOGRAPHIC POSITION that best describes the plot area. Use the common shape of slope listed in the table below as a guide. Record the code that best fits the TOPOGRAPHIC POSITION (Figure 4.1). On remeasurement plots (SAMPLE KIND = 2), this code should only be updated if there is a physical change or an obvious error by the previous crew. A related PLOT NOTE is required whenever this value is changed.

If the plot straddles a canyon bottom or is on a narrow ridge top, but most of the area lies on one side hill, record the topographic position of the side hill.

When collected:	All plots with either at least one accessible forest land condition class (PLOT STATUS = 1) or one accessible nonforest land condition class when nonforest is being sampled (PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS = 1)		
Field width:	1 digit		
Tolerance:	One class for codes 3, 4, and 5. No errors for other codes.		
Values:	Code	Topographic Position	Common shape of slope
	1	Ridge top or mountain peak over 130 feet	Flat
	2	Narrow ridge top or peak less than 130 feet wide	Convex
	3	Side hill ─ upper 1/3	Convex
	4	Side hill ─ middle 1/3	No rounding
	5	Side hill ─ lower 1/3	Concave
	6	Canyon bottom less than 660 feet wide	Concave
	7	Bench, terrace or dry flat	Flat
	8	Broad alluvial flat over 660 feet wide	Flat
	9	Swamp or wet flat	Flat

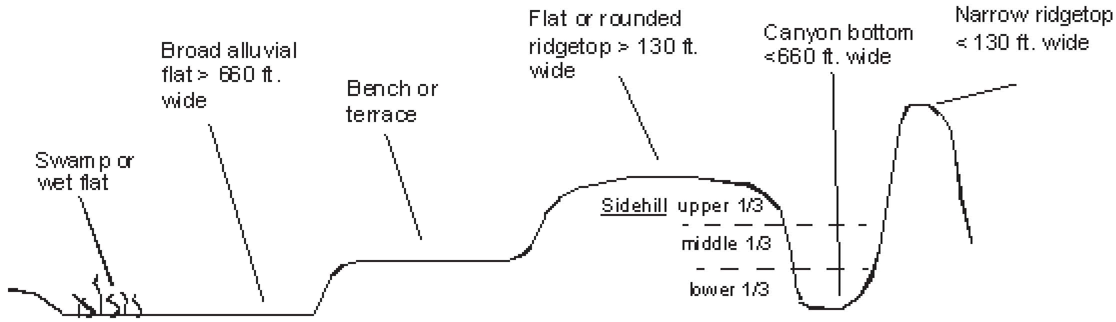


Figure 4.1: Illustration of TOPOGRAPHIC POSITION codes

Item 4.3.5.3 HORIZONTAL DISTANCE TO IMPROVED ROAD (CORE 1.15) [PLOT.RDDISTCD]

Record the straight-line distance from plot center (subplot 1) to the nearest improved road. An improved road is a road of any width that is maintained as evidenced by pavement, gravel, grading, ditching, and/or other improvements.

When collected:	All plots with either at least one accessible forest land condition class (PLOT STATUS = 1) or one accessible nonforest land condition class when nonforest is field-measured (PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS = 1)	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Definition
	1	100 feet or less
	2	101 to 300 feet
	3	301 to 500 feet
	4	501 to 1000 feet
	5	1001 feet to 1/2 mile
	6	1/2 to 1 mile
	7	1 to 3 miles
	8	3 to 5 miles
	9	Greater than 5 miles

Item 4.3.5.4 WATER ON PLOT (CORE 1.16)
[PLOT.WATERCD]

Record the water source that has the greatest impact on the area within the accessible forest/nonforest land portion of any of the four *24-foot radius* subplots. The coding hierarchy is listed in order from large permanent water to temporary water. This variable can be used for recreation, wildlife, hydrology, and timber availability studies.

When collected:	All plots with either at least one accessible forest land condition class (PLOT STATUS = 1) or one accessible nonforest land condition class when nonforest is field-measured (PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS = 1)	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Definition
	0	None – no water sources within the accessible forest/nonforest land
	1	Permanent streams or ponds too small to qualify as noncensus water
	2	Permanent water in the form of deep swamps, bogs, marshes without standing trees present and less than 1.0 ac*re* in size, or with standing trees
	3	Ditch/canal – human-made channels used as a means of moving water, such as irrigation or drainage which are too small to qualify as noncensus water
	4	Temporary streams
	5	Flood zones – evidence of flooding when bodies of water exceed their natural banks
	9	Other temporary water – specify in *PLOT NOTES*

Item 4.3.5.5 PLOT NOTES (CORE 1.21)
[PLOT.NOTES]

Use these fields to record notes pertaining to the entire plot. If the notes apply only to a specific subplot or other specific aspect of the plot, then make that clear in the notes.

When collected:	All plots
Field width:	*2000* characters
Tolerance:	N/A
Values:	English language words, phrases and numbers

SUBSECTION 4.3.6 REFERENCE POINT ATTRIBUTES

Record the following items which describe the reference point (RP) and the course from the RP to the plot as described in the Subsection 3.3.1, The Reference Point. These data items should match what is recorded on the plot card and on the back of the photo.

Note: All ground visited plots (SAMPLE METHOD CODE = 1) require an RP and two witness trees/objects (see Subsection 3.3.2, Witness Trees/Objects).

Item 4.3.6.1 RP TYPE (PNW)
[PLOT.RP_TYPE_PNWRS]

Record the type of object chosen as the reference point (RP).

When collected:	When SAMPLE METHOD CODE = 1	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	RP TYPE
	1	Tree or stump
	2	Rock
	3	Shrub
	4	Other – specify in RP notes

Item 4.3.6.2 RP SPECIES (PNW)
[PLOT.RP_SPCD_PNWRS]

If the RP is a tree or stump record the species code.

When collected:	When RP TYPE = 1
Field width:	4 digits
Tolerance:	No errors
Values:	See Appendix D, Tree Species Lists for species codes.

Item 4.3.6.3 RP DIAMETER (PNW)
[PLOT.RP_DIA_PNWRS]

If the RP is a tree or a stump, measure and record the DBH/DRC to the **nearest inch** (see Section 8.5, Diameter).

When collected:	When RP TYPE = 1
Field width:	3 digits
Tolerance:	+/- 10 percent
Values:	001 to 999 to the nearest inch

Item 4.3.6.4 RP AZIMUTH (PNW)
[PLOT.RP_AZIMUTH_PNWRS]

Record, in degrees, the azimuth from the RP to the plot center. When azimuth is determined using a GPS, include this information in the electronic RP NOTES and on the back of the photo.

When collected:	When SAMPLE METHOD CODE = 1 and RP TYPE > 0
Field width:	3 digits
Tolerance:	+/- 4 degrees
Values:	001 to 360

Item 4.3.6.5 RP HORIZONTAL DISTANCE (PNW)
[PLOT.RP_DIST_PNWRS]

Record, to the nearest foot, the **horizontal** distance from the RP to the plot center; an RP should be within 5000 feet of plot center. When horizontal distance is collected using a GPS, include this information in the electronic RP NOTES and on the back of the photo.

When collected:	When SAMPLE METHOD CODE = 1 and RP TYPE > 0
Field width:	4 digits
Tolerance:	+/- 5 percent
Values:	0000 to 5000 feet

Item 4.3.6.6 RP AZIMUTH/DISTANCE TO SUBPLOT NUMBER (PNW)
[PLOT.RP_SUBP_PNWRS]

Record the 1-digit number of the subplot which is referenced from the RP. Always reference to subplot 1 unless it is inaccessible (e.g., hazardous, denied access, census/non-census water). If subplot 1 center is inaccessible, the PC stake should be installed at the lowest numbered subplot that is accessible.

When collected:	When SAMPLE METHOD CODE = 1 and RP TYPE > 0
Field width:	1 digit
Tolerance;	No errors
Values:	1 to 4

Item 4.3.6.7 RP NOTES (PNW)
[PLOT.RP_NOTES_PNWRS]

Record notes to explain any special RP situation that may need clarification for future plot visits (e.g., shrub species, height/size of rock, RP not visited, RP AZIMUTH and RP HORIZONTAL DISTANCE collected with a GPS, etc.). Required if RP TYPE = 4 (other).

When collected:	When SAMPLE METHOD CODE = 1: as needed to describe a special situation with the plot RP; required when RP TYPE = 4
Field width:	2000 characters
Tolerance:	N/A
Value:	Single words or abbreviated sentences

SUBSECTION 4.3.7 ITEMS RECORDED ON THE PLOT CARD

The following items are collected and recorded on the paper plot card; see Appendix R, Plot Jacket, for descriptions of these items and detailed instructions:

- Plot Information (plot number, state, county, date, crew)
- RP Data (species, diameter, azimuth, horizontal distance, to subplot number)
- Plot Access Description (travel route)
- Plot Narrative Description (condition[s], disturbance[s], treatment[s], hazard[s], and issues not evident in the data)
- Plot Diagram (landforms, hazards, special features)
- Plot Access (location sketch map)
- Is the Documented Owner Correct?
- Condition Mapping

SECTION 4.4 GPS COORDINATES

Use a global positioning system (GPS) unit to determine the plot coordinates and elevation of all plot locations, *including nonforest and nonsampled plot locations when SAMPLE METHOD CODE = 1,* even if GPS has been used to locate the plot in the past.

Multiple records per plot may exist in the GPS screen; records are differentiated by GPS LOCATION TYPE (Item 4.4.1.6). Typically a set of coordinates will only be collected for the PC; additional GPS records (i.e., waypoints) may be recorded and should include a brief description in GPS NOTES (Item 4.4.2.7).

SUBSECTION 4.4.1 GPS UNIT SETTINGS, DATUM, AND COORDINATE SYSTEM

Consult the GPS unit operating manual or other regional instructions to ensure that the GPS unit internal settings, including datum and coordinate system, are correctly configured.

Use the NAD83 datum and the UTM coordinate system. See Appendix P, GPS Operating Guide, for instructions on setting up and using the GPS unit.

Item 4.4.1.1 GPS UNIT TYPE (CORE 1.19.3)
[GPS_PNWRS.GPS_TYPE]

Record the kind of GPS unit used to collect coordinates. If suitable coordinates cannot be obtained, record "0".

When collected:	When SAMPLE METHOD CODE = 1
Field width:	1 digit
Tolerance:	No errors

Values:	Code	GPS UNIT TYPE
	0	GPS coordinates not collected*, including nonsampled plots (requires GPS NOTES)*
	1	Rockwell Precision Lightweight GPS Receiver (PLGR)
	2	Other brands capable of field-averaging
	3	Other brands capable of producing files that can be post-processed
	4	Other brands not capable of field-averaging or post-processing

Item 4.4.1.2 GPS SERIAL NUMBER (CORE 1.19.4)
[GPS_PNWRS.GPS_SERIAL_NBR]

Record the last six digits of the serial number on the GPS unit used.

When collected:	When GPS UNIT *TYPE* > 0
Field width:	6 digits
Tolerance:	No errors
Values:	000001 to 999999

Item 4.4.1.3 GPS ENTRY METHOD (CORE 1.19.5)
[GPS_PNWRS.GPS_ENTRY_METHOD_CD]

Identify the method used to record GPS data. Code “0” will be downloaded for all plots.

When Collected:	GPS UNIT > 0	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	0	GPS data manually entered
	1	GPS data electronically transferred

Item 4.4.1.4 GPS DATUM (CORE 1.19.6)
[GPS_PNWRS.GPS_DATUM]

This is an auto-generated code indicating the map datum that the GPS coordinates are collected in (i.e., the map datum selected on the GPS unit to display the coordinates).

When collected:	When GPS UNIT *TYPE* > 0	
Field width:	5 characters (cccnn)	
Tolerance:	No errors	
Values:	Code	Definition
	NAD83	North American Datum of 1983

Item 4.4.1.5 COORDINATE SYSTEM (CORE 1.19.7)
[GPS_PNWRS.GPS_COORD_SYS]

This is an auto-generated code indicating the type of coordinate system used to obtain readings.

When collected:	When GPS UNIT *TYPE* > 0	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Definition
	2	UTM coordinate system

Item 4.4.1.6 GPS LOCATION TYPE (PNW)
[GPS_PNWRS.GPS_LOC_TYPE]

Record the location type for coordinates collected on the ground. When coordinates cannot be collected record the following GPS information (additional GPS data is not required):

GPS UNIT TYPE = 0

GPS LOCATION TYPE = 3

When coordinates are not collected at plot center but they are collected at another subplot center, two GPS records are required; one for plot center and one for the location where coordinates were actually collected.

Enter the first record as the following:

GPS UNIT TYPE = 0

GPS LOCATION TYPE = 3

Enter a second record with the GPS data collected at the other subplot center (GPS LOCATION TYPE = 4, 5 or 6). For the data items AZIMUTH TO PLOT CENTER and DISTANCE TO PLOT CENTER, record 000.

When collected:	All GPS records		
Field width:	1 digit		
Tolerance:	No errors		
Values:	Code	Type	Description
	1	LZ/TR	Landing zone / Truck parking spot
	2	RP	Reference point
	3	PC	Plot center (PC) (required)
	4	Subplot 2	Use only if PC not possible
	5	Subplot 3	Use only if PC not possible
	6	Subplot 4	Use only if PC not possible
	7	Other	Describe in GPS NOTES and on plot card

SUBSECTION 4.4.2 COLLECTING READINGS

Collect *at least 180 GPS* readings at the plot center. These may be collected in a file for post-processing or averaged by the GPS unit. Each individual position should have an error of less than 70 feet if possible (the error of all the averaged readings is far less).

Soon after arriving at plot center, use the GPS unit to attempt to collect coordinates. If suitable positions (errors less than or equal to 70 feet) cannot be obtained, try again before leaving the plot center.

If it is still not possible to get suitable coordinates from plot center, attempt to obtain them from a location within 200 feet of plot center. Obtain the azimuth and horizontal distance from the “offset” location to plot center. Record the azimuth and horizontal distance *to the plot center* as described in *Item 4.4.3.1 and Item 4.4.3.2*.

Coordinates may be collected further than 200 feet away from the plot center if a laser measuring device is used to determine the horizontal distance from the “offset” location to plot center. Record the azimuth and horizontal distance *to plot center* as described in *Item 4.4.3.1 and Item 4.4.3.2*.

Item 4.4.2.1 UTM ZONE (CORE 1.19.10)
[GPS_PNWRS.UTM_ZONE]

Record a 2-digit and 1 character field UTM ZONE as determined by GPS.

When collected:	When COORDINATE SYSTEM = 2
Field width:	3 digits
Tolerance:	When GPS ENTRY METHOD = 0, No errors in data entry When GPS ENTRY METHOD = 1, not applicable
Values:	*10, 11, and U, T, or S*

Item 4.4.2.2 EASTING (X) UTM (CORE 1.19.11)
[GPS_PNWRS.UTM_EASTING_X]

Record, *in meters*, the Easting coordinate as determined by GPS.

When collected:	When COORDINATE SYSTEM = 2
Field width:	7 digits
Tolerance:	When GPS ENTRY METHOD = 0, No errors in data entry When GPS ENTRY METHOD = 1, not applicable
Values:	0000000 – 9999999

Item 4.4.2.3 NORTHING (Y) UTM (CORE 1.19.12)
[GPS_PNWRS.UTM_NORTHING_Y]

Record, *in meters*, the Northing coordinate as determined by GPS.

When collected:	When COORDINATE SYSTEM = 2
Field width:	7 digits
Tolerance:	When GPS ENTRY METHOD = 0, No errors in data entry When GPS ENTRY METHOD = 1, not applicable
Values:	0000000 – 9999999

Item 4.4.2.4 GPS ELEVATION (CORE 1.19.16)
[GPS_PNWRS.GPS_ELEV]

Record the elevation above mean sea level, in feet, as determined by GPS.

When collected:	When GPS UNIT *TYPE* = 1, 2 or 4
Field width:	6 digits (1st digit is + or -, last 5 digits are numeric)
Tolerance:	No errors
Values:	-00100 to +20000

Item 4.4.2.5 GPS ERROR (CORE 1.19.17)
[GPS_PNWRS.GPS_ERROR]

Record the error as shown on the GPS unit to the nearest foot. As described in *Subsection 4.4.2*, make every effort to collect readings only when the error *is* less than or equal to 70 feet. However, if after trying several different times during the day, at several different locations, this is not possible, record readings with an error of up to 999 feet.

When collected:	When GPS UNIT *TYPE* = 1 or 2
Field width:	3 digits
Tolerance:	No errors
Values:	000 – 999 *(*071 to 999 if an error of less than 70 cannot be obtained*)*

Item 4.4.2.6 NUMBER OF READINGS (CORE 1.19.18)
[GPS_PNWRS.GPS_NBR_READINGS]

Record a 3-digit code indicating how many readings were averaged by the GPS unit to calculate the plot coordinates. Collect at least 180 readings if possible.

The PDR requires the number of averaged readings to be entered. GPS units used by PFSL do not have a number of readings counter, instead they utilize timers. The timer is displayed on the position screen. It displays in hours/minutes/and seconds. The GPS receiver collects one reading per second while averaging. To correctly enter the number of readings in the PDR, the time in minutes and seconds must be converted to number of readings. Since the unit collects 60 readings per minute of averaging crews must remember to multiply the number of minutes by 60 and then add the number of seconds shown to that figure. For example, if the Magellan receiver averages for three minutes and twelve seconds it will display 00:03:12. To convert this to number of readings multiply three minutes by sixty and add twelve (3 X 60 = 180 + 12 = 192). Crews would enter “192” for the NUMBER OF READINGS in the PDR.

When collected:	When GPS UNIT *TYPE* = 1 or 2
Field width:	3 digits
Tolerance:	No errors
Values:	001 to 999

Item 4.4.2.7 GPS NOTES (PNW)
[GPS_PNWRS.NOTES]

Record any notes needed to clarify or explain a special situation in the particular GPS record being defined.

When collected:	As needed; required with GPS LOCATION TYPE = 7 or GPS UNIT TYPE = 0
Field width:	2000 characters
Tolerance:	N/A
Values:	Words and abbreviated sentences

SUBSECTION 4.4.3 CORRECTION FOR OFFSET LOCATION

As described in Subsection 4.4.2, coordinates may be collected at a location other than the plot center (an “offset” location). If the GPS unit is capable of calculating plot center coordinates then AZIMUTH TO PLOT CENTER and DISTANCE TO PLOT CENTER both equal 000. Record the two data items below.

Item 4.4.3.1 AZIMUTH TO PLOT CENTER (CORE 1.19.14)
[GPS_PNWRS.GPS_AZM]

Record the azimuth from the location where coordinates were collected to actual plot center. If coordinates are collected at plot center or are corrected in the field to plot center, record 000. When coordinates are not collected at plot center but are collected at another subplot center (GPS LOCATION TYPE = 4, 5 or 6), record 000.

When collected:	When GPS UNIT = 1, 2, 3 or 4
Field width:	3 digits
Tolerance:	+/- 3 degrees
Values:	000 when coordinates **are** collected at plot center
	001 to 360 when coordinates **are not** collected at plot center

Item 4.4.3.2 DISTANCE TO PLOT CENTER (CORE 1.19.15)
[GPS_PNWRS.GPS_DIST]

Record the horizontal distance in feet from the location where coordinates were collected to the actual plot center. If coordinates are collected at plot center or are corrected in the field to plot center, record 000. When coordinates are not collected at plot center but are collected at another subplot center (GPS LOCATION TYPE = 4, 5 or 6), record 000. As described in *Subsection 4.4.2*, if a laser range finder is used to determine DISTANCE TO PLOT CENTER, offset locations may be up to 999 feet from the plot center. If a range finder is not used, the offset location must be within 200 feet.

When collected:	When GPS UNIT = 1, 2, 3 or 4
Field width:	3 digits
Tolerance:	+/- 6 feet
Values:	
	000 when coordinates **are** collected at plot center
	001 to 200 when a Laser range finder **is not** used to determine distance
	001 to 999 when a Laser range finder **is** used to determine distance

SUBSECTION 4.4.4 DOWNLOADED PLOT COORDINATES

For most plots, previous estimates of plot coordinates (pinprick location) will be available. These estimates come from several sources and will be of undocumented accuracy, but can be used as an aid in plot location. If available, the approximate plot coordinates will be downloaded to the data recorder and will be printed on the previous plot data sheets (see note below). They can be saved as a waypoint on the GPS unit and used to help locate the plot. Do not change any of the downloaded/printed plot coordinates codes.

Note: PFSL began using the NAD83 datum in 2010 (previous datum was NAD27). Plot coordinates printed on previous plot data printouts are in the previous datum; coordinates downloaded into the PDR have been converted to NAD83.

Item 4.4.4.1 PREVIOUS UTM ZONE (PFSL)
[PLOT.HIST_PREV_UTM_ZONE]

A 2-digit and 1 character field indicating in which UTM ZONE the plot is located.

When collected:	When COORDINATE SYSTEM = 2
Field width:	3 digits
Tolerance:	No errors
Values:	10, 11, and U, T, or S

Item 4.4.4.2 PREVIOUS EASTING (X) (PFSL)
[PLOT.HIST_PREV_UTM_EASTING_X]

This field indicates the Easting as determined from USGS maps, aerial photos, or a previous plot visit.

When collected:	When COORDINATE SYSTEM = 2
Field width:	7 digits
Tolerance:	+/- 140 feet
Values:	0000000 – 9999999

Item 4.4.4.3 PREVIOUS NORTHING (Y) (PFSL)
[PLOT.HIST_PREV_UTM_NORTHING_Y]

This field indicates the Northing as determined from USGS maps, aerial photos, or a previous plot visit.

When collected:	When COORDINATE SYSTEM = 2
Field width:	7 digits
Tolerance:	+/- 140 feet
Values:	0000000 – 9999999

Item 4.4.4.4 PREVIOUS COORDINATES METHOD (PNW)
[PLOT.PREV_COORDINATE_METHOD_PNWRS]

This field indicates the method by which previous plot coordinates were obtained.

When collected:	Downloaded for most plots	
Field width:	1 character	
Tolerance:	No errors	
Values:	Code	PREVIOUS COORDINATES METHOD
	D	Digitized from USGS maps
	M	Digitized (MDSD) from PI photography (usually small [broad] scale)
	P	Coordinates taken from old PI tables - sometimes computer generated and plotted on maps or digitized from quad maps
	G	Collected at the plot location using a GPS unit
	T	Target (TGT) coordinates originally derived from Albers meters projection
	I	Image (IMG) coordinates derived from ortho photo and rectified to match location of the pinprick
	S	Digitized from SPOT imagery
	N	Coordinates provided by national forests (R5 and R6) - of unknown origin

CHAPTER 5 CONDITION CLASS

The Forest Inventory and Analysis (FIA) plot is a cluster of four subplots *arranged* in a fixed pattern. A plot may straddle more than one condition class; subplots are never moved or reconfigured in order to confine all four subplots to a single condition class. Every plot *has* at least one condition class: the condition class present at plot center (*PC*, the center of subplot 1). Condition class attributes record information about forest structure, composition, and disturbance. This information allows researchers to group and analyze similar forest types, understand management practices used by different landowners, examine the effects of disturbance, and classify land types.

One of the core missions of the FIA program is to estimate and account for changes in forest land. Condition remeasurement protocol and associated data items are designed to allow PNW-FIA to develop change estimates for forest land and timberland by owner groups. Because PNW-FIA reports on the current status by FOREST TYPE, STAND SIZE CLASS, REGENERATION STATUS and TREE DENSITY, new reconcilable data items, including CONDITION CLASS STATUS, OWNER GROUP and RESERVED STATUS, are added to capture condition class changes and trends.

In 2013, the following plots will be part of the remeasurement protocol:

Oregon, California, and Washington

- Annual inventory plots scheduled for completion in 2003: P2-panel = 5 (macroplot)

Note: Any plots that are off-panel (fire or special study) are not remeasured using this protocol.

SECTION 5.1 DETERMINATION OF CONDITION CLASS

Step 1. Delineate the plot area by CONDITION CLASS STATUS

The first attribute considered when defining a condition class is CONDITION CLASS STATUS. The area sampled by a plot is assigned to condition classes based upon the following differences in CONDITION CLASS STATUS:

1. Accessible forest land
2. Nonforest land
3. Noncensus water
4. Census water
5. Nonsampled – possibility of forest land

*F*orest land *and measurable nonforest land* define the population of interest for FIA purposes. *These are* the area*s* where most of the data collection is conducted.

Step 2. Further subdivide *a*ccessible *f*orest *l*and by *six* delineation variables

Any condition class sampled as accessible forest land must be further subdivided, in order of listed priority, into smaller condition classes if distinct, contrasting condition classes are present because of variation in any of the following attributes within the sampled area:

1. RESERVED STATUS
2. OWNER GROUP
3. FOREST TYPE
4. STAND SIZE CLASS
5. REGENERATION STATUS
6. TREE DENSITY

At time of re-inventory, one additional attribute, PRESENT NONFOREST LAND USE, is used to define new condition classes if the sampled area on a plot has changed from accessible forest land to nonforest land. Conversions from forest to nonforest become new nonforest conditions whenever they occur regardless of size, except when a previously defined nonforest condition has expanded into an adjacent previously defined forest condition.This expanded condition will be captured through boundary changes on respective subplots/macroplots and does not constitute a new separate condition. This allows tracking of land use changes without requiring mapping of all nonforest land condition classes on all plots.

No other attribute shall be the basis for recognizing contrasting accessible forest land condition classes. For each condition class recognized, several "ancillary attributes" that help describe the condition will be collected, but will not be used for delineation purposes. See ANCILLARY (NON-DELINEATING) DATA ITEMS, Subsection 5.7.2, pg.76, for more information.

Note: All condition classes delineated within the 58.9-foot fixed-radius are mapped on the plot card. See Chapter 7, Boundary References, for instruction on how to map condition class boundaries.

Step 3. Delineate *measurable* Nonforest Land by 3 delineation variables.

Any condition class sampled as *measurable* nonforest land must be further subdivided, in order of listed priority, into smaller condition classes if distinct, contrasting condition classes are present because of variation in any of the following attributes within the sampled area:

1. RESERVED STATUS
2. OWNER GROUP
3. PRESENT NONFOREST LAND USE

SECTION 5.2 CONDITION CLASS STATUS DEFINITIONS

SUBSECTION 5.2.1 ACCESSIBLE FOREST LAND

*Accessible forest land is l*and that is within the population of interest, is accessible, is on a subplot that can be occupied at subplot center, can safely be visited, and meets the following criteria:

Forest Land has at least 10 percent canopy cover of live tally tree species of any size or has had at least 10 percent canopy cover of live tally species in the past, based on the presence of stumps, snags *(*or other evidence*) that appear to be less than 30 years old.* Additionally, the condition is not subject to nonforest use(s) that prevent normal tree regeneration and succession, such as regular mowing, intensive grazing, or recreation activities.

In contrast to regular mowing, chaining treatments are recognized as long-term periodic or one-time treatments. Although the intent of chaining may be permanent removal of trees, reoccupation is common in the absence of additional treatments and sometimes the treatment does not remove enough to reduce canopy cover below the threshold of forest land. As a result, only live canopy cover should be considered in areas that have been chained; missing (dead or removed) canopy cover is not considered in the forest land call.

In the cases of land on which either forest is encroaching on adjacent nonforest land, or the land that was previously under a nonforest land use (e.g., agriculture or mining) is reverting to forest naturally, only the live cover criterion applies.

In the case of deliberate afforestation - human-assisted conversion of other land use / land cover to forest land -- there must be at least 150 established trees per acre (all sizes combined) to qualify as forest land. Land that has been afforested at a density of less than 150 trees per acre is not considered forest land (see nonforest land below). If the condition experiences regeneration failure or is otherwise reduced to less than 150 survivors per acre after the time of planting / seeding but prior to achieving 10 percent canopy cover, then the condition should not be classified forest land.

To qualify as forest land, the prospective condition must be at least 1.0 acre in size and 120.0 feet wide measured stem-to-stem from the outer-most edge. Forested strips must be 120.0 feet wide for a continuous length of at least 363.0 feet in order to meet the acre threshold. Forested strips that do not meet these requirements are classified as part of the adjacent nonforest land.

When a forest land condition encroaches into a nonforest land condition, the border between forest and nonforest is often a gradual change in tree cover with no clear and abrupt boundary. In addition, it may be difficult to determine exactly where the forested area meets the minimum cover criteria and where it does not. For these situations, determine where the land clearly meets the 10 percent minimum canopy cover, and where it clearly is less than required cover; divide the zone between these points in half, and determine the side of the zone on which the subplot center is located. Classify the condition class of the subplot based on this line, using the class criteria above.

For example, at measurement time 1, a clear and distinct boundary existed between the forest and nonforest land condition classes. At time 2, however, there now exists a zone of regeneration or small diameter trees between the previous forest condition and where the nonforest clearly remains. If the zone of encroachment is clearly forest where it meets the nonforest, classify the entire zone as forest. If the zone is clearly nonforest up to the original stand, call it all nonforest. If the encroachment or transition zone is not clearly *forest* where it meets the nonforest, determine where it is clearly forest and where it is clearly nonforest; divide this zone in half, and classify the entire subplot based on which side of the line the subplot center falls.

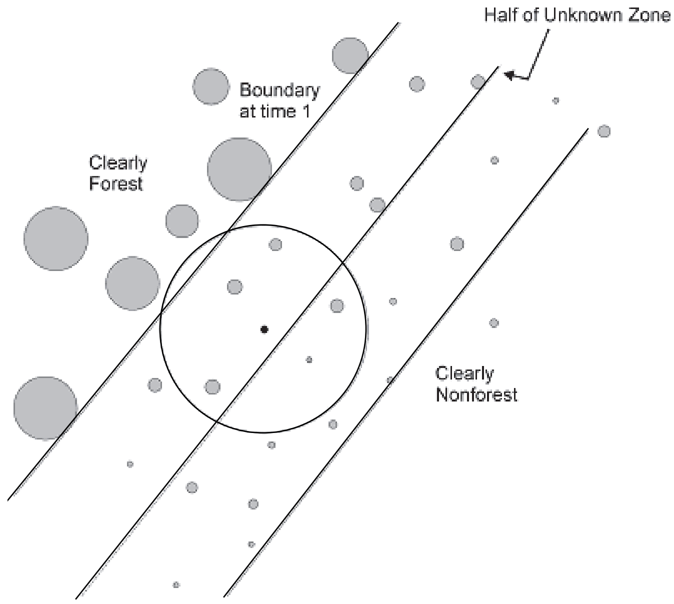


Figure 5.1: Example of classifying the condition class of the subplot in a transition zone with forest/nonforest encroachment.

Treated strips - Occasionally, crews will come across plantations of trees, in which rows of trees alternate with strips of vegetation that have been bulldozed, mowed, tilled, treated with herbicide, or crushed. Because these strip treatments are conducted to optimize growth or to release the stand, the areas are considered forest land, and the treatment is considered a timber stand improvement operation. Do not confuse these practices with similar treatments on nonforest lands such as yards or rights-of-way. Contact with the landowner may help determine the intent of a treatment.

Indistinct boundary due to the condition minimum-width definition - Do not subdivide subplots where a condition class may change due only to the forest vs. nonforest minimum width (120.0 feet) definition. Although the point where the definition changes from forest to nonforest creates an invisible "line" between conditions, this definitional boundary is not distinct and obvious. See *Figure 5.2 and Figure 5.3*. Where the point of the definition change occurs on the subplot, determine only if the subplot center is on the forest or nonforest side of that approximate boundary, and classify the entire subplot based on the condition of the subplot center. If the boundary crosses through the center of the subplot, classify the subplot as the condition it most resembles. If the boundary occurs between subplots, classify each subplot based on its relation to the definitional boundary.

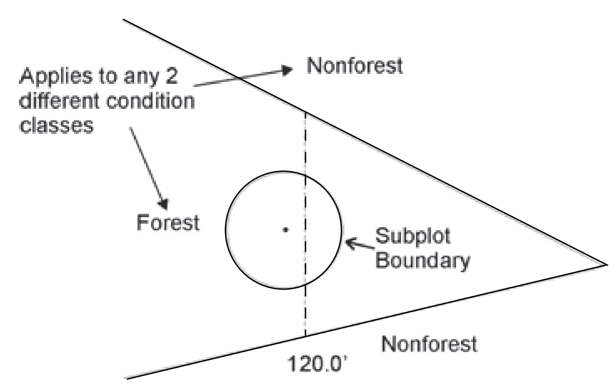


Figure 5.2: Forest condition narrows within a nonforest land condition. Examine the location of the subplot center in reference to the approximate line where the forest narrows to 120.0 feet wide. In this example the entire subplot is classified as forest.

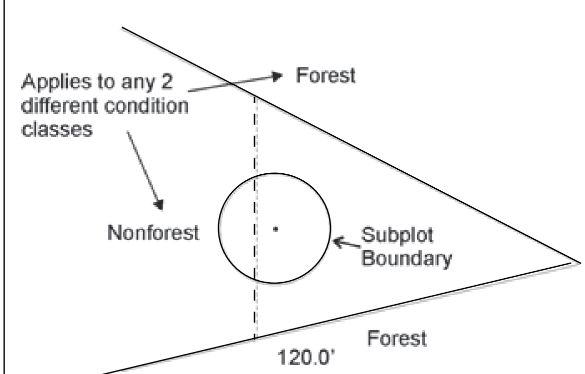


Figure 5.3: Nonforest land condition narrows within a forest condition. Examine the location of the subplot center in reference to the approximate line where the nonforest narrows to 120.0 feet wide. In this example the entire subplot is classified as forest.

Conditions that meet the 10-percent tree canopy cover threshold may be considered nonforest based on land use. Indications of nonforest use may include current extreme grazing, the absence of forest vegetation, and evidence of human habitation and use around maintained structures such as landscaping, gardens, fences, lawns, and play areas. The absence of forest vegetation means that some or all layers of the species present – trees, shrubs, and forbs – differ from what one would expect on forest land undisturbed by nonforest use. For example, a fenced farm lot may have forest trees present, but if extreme sustained grazing has severely diminished or eliminated forest shrub and forb communities and tree regeneration is stifled, the farm lot is likely nonforest. (in Washington, Oregon, and California: grazing, common on forest lands, is rarely reason to classify a plot as "developed for nonforest use" unless a situation similar to the example is encountered).

SUBSECTION 5.2.2 NONFOREST LAND

*Nonforest land is l*and that has less than 10 percent canopy cover of tally tree species of any size (live + missing) and, in the case of afforested land, fewer than 150 established trees per acre; OR land that has sufficient canopy cover or stems, but is classified as nonforest land use (*the condition is subject to nonforest use(s) that prevent normal tree regeneration and succession, such as regular mowing, intensive grazing, or recreation activities*). Nonforest includes areas that have sufficient cover or live stems to meet the Forest Land definition, but do not meet the dimensional requirements. All *land* conditions not meeting the requirements of forest land will be assigned a PRESENT NONFOREST LAND USE CODE.

Note: When a condition class is within Region 5 or Region 6 Forest Service administered land boundaries (ADMINISTRATIVE FOREST CODE = 501-699), land meeting the nonforest land definition (CONDITION CLASS STATUS = 2) within the fixed-radius macroplot is considered a measurable nonforest condition class (NONFOREST CONDITION CLASS SAMPLING STATUS = 1). Certain data items are recorded in measurable nonforest conditions that are not typically measured in nonforest conditions; these are identified in the associated "when collected" field for individual data items:

When collected:	All accessible forest land condition classes (CONDITION CLASS STATUS = 1); or all accessible nonforest land condition classes when nonforest is being sampled (NONFOREST CONDITION CLASS SAMPLING STATUS =1)

Delineate all nonforest condition classes on ground visited subplots when an accessible forest land condition or a measurable nonforest condition class is present within the 58.9-foot fixed-radius plot (see Subsection 5.7.3, DETERMINING CONDITION CLASSES ON NONFOREST LAND).

Example: If accessible forest land, nonforest urban land, and nonforest cropland are all present within a 58.9-foot fixed-radius plot, map the forest land condition and map each nonforest land use as a separate condition class.

If there is no accessible forest land or measurable nonforest land condition class present within a macroplot's 58.9-foot radius, then the only nonforest condition class delineated will be the one present at the subplot center ignoring any other nonforest condition classes that may be present. Use normal procedures to map and measure other condition classes (i.e., Census water, noncensus water, and nonsampled conditions, CONDITION STATUS = 3, 4, or 5).

Example: If nonforest urban land and nonforest cropland make up the entirety of a 58.9-foot macroplot, record only the condition class which occupies the subplot center.

When no accessible forest land condition or measurable nonforest condition classes exist within any of the 58.9-foot fixed-radius macroplots, do not delineate nonforest condition classes. Record only one condition and designate the PRESENT NONFOREST LAND USE that is located at plot center for all subplots.

Plots that do not have accessible forest land or measurable nonforest condition classes that are entirely nonforest fall into one of the following three categories:

1. The plot is visited on the ground (SAMPLE METHOD CODE = 1)

   A plot file is created in the field data recorder.

   GPS coordinates are collected.

   Only one condition is recorded and the PRESENT NONFOREST LAND USE at plot center is designated for each subplot center.

2. The plot is viewed from a distance (SAMPLE METHOD CODE = 2 or 4)

   A plot file is created in the field data recorder.

No GPS coordinates are collected.

Only one condition is recorded and the PRESENT NONFOREST LAND USE at plot center is designated for each subplot center.

3. The plot is not field visited or viewed from a distance. (SAMPLE METHOD CODE = 3 or 4)

A plot data file is created in the office.

No GPS coordinates are collected.

Only one condition is recorded and the PRESENT NONFOREST LAND USE at plot center is designated for each subplot center.

SUBSECTION 5.2.3 NONCENSUS WATER

*Noncensus water includes l*akes, reservoirs, ponds, and similar bodies of water 1.0 acre to 4.5 acres in size*; and r*ivers, streams, canals, etc. 30.0 feet to 200.*0* feet wide. Water levels fluctuate seasonally and annually; river/stream banks, shorelines, average high water marks, and the point where water prevents the establishment of trees (or woody vegetation/perennial terrestrial plants, where the water feature falls next to nonforest) can be used as guidelines to define the boundary of a water feature. When a noncensus water boundary falls close to a subplot (or macroplot) or is mapped, crews must describe how the boundary was defined in the PLOT NARRATIVE DESCRIPTION (Subsection R.2.4) and on the PLOT DIAGRAM (Subsection R.2.5).

If a subplot center (including subplot 1) lands in noncensus water do not install the point, even if it can be occupied safely.

- No field measurements are made on that subplot/macroplot.
- Establish and measure other subplots following normal procedures (see Subsection 3.4.2, Establishing Subplots when Plot Center is Inaccessible, for instructions on how to install a plot without access to plot center).

If the macroplot has an accessible condition at subplot center and has noncensus water present anywhere else within its 58.9-foot fixed-radius boundary:

- Map the noncensus water area as a separate condition class.
- Use normal procedures to map and measure other condition classes.
- Record the segment lengths of any down woody material (DWM) transects that extend into the noncensus water condition (see Section 11.6, Transect Line Segmenting). No other field measurements are made within the noncensus condition class.

SUBSECTION 5.2.4 CENSUS WATER

*Census water includes ocean, l*akes, reservoirs, ponds, and similar bodies of water 4.5 acres in size and larger; and rivers, streams, canals, etc. more than 200 feet wide (1990 U.S. Census definition). Water levels fluctuate seasonally and annually; river/stream banks, shorelines, average high water marks, and the point where water prevents the establishment of trees (or woody vegetation/perennial terrestrial plants, where the water feature falls next to nonforest) can be used as guidelines to define the boundary of a water feature. When a census water boundary falls close to a subplot (or macroplot) or is mapped, crews must describe how the boundary was defined in the PLOT NARRATIVE DESCRIPTION (Subsection R.2.4) and on the PLOT DIAGRAM (Subsection R.2.5).

If a subplot center (including subplot 1) lands in Census water do not install the point, even if it can be occupied safely.

- No field measurements are made on that subplot/macroplot.
- Establish and measure other subplots following normal procedures (see Subsection 3.4.2, Establishing Subplots when Plot Center is Inaccessible, for instructions on how to install a plot without access to plot center).

If the macroplot has an accessible condition at subplot center and has Census water present anywhere else within its 58.9-foot fixed-radius boundary:

- Map the Census water area as a separate condition class.
- Use normal procedures to map and measure other condition classes.

- Record the segment lengths of any DWM transects that extend into the Census water condition (see Section 11.6, Transect Line Segmenting). No other field measurements are made within the Census condition class.

SUBSECTION 5.2.5 NONSAMPLED, POSSIBILITY OF FOREST

See CONDITION NONSAMPLED REASON *(Item 5.9.0.1)* for descriptions of land that qualifies as nonsampled. In cases where a condition is access-denied or hazardous land use, but obviously contains no forest land, record CONDITION CLASS STATUS = 2, 3 or 4. In cases where a condition is access-denied or hazardous land use and has the possibility of forest, record CONDITION CLASS STATUS = 5.

Nonsampled land (CONDITION CLASS STATUS = 5) may be subdivided into condition classes that are based on differences in nonsampled reason.

If a subplot center (including subplot 1) is located in any nonsampled area, as described in CONDITION NONSAMPLED REASON, the entire subplot is considered to be nonsampled. Record the attributes as described in Section 5.9, NONSAMPLED CONDITION CLASS ATTRIBUTES. Establish and measure other subplots following normal procedures. A plot, subplot, or portion of a subplot is hazardous according to the crew's judgment.

If an entire plot is nonsampled, record only one nonsampled condition: the condition at plot center.

If the center of a subplot is accessible, but there is a nonsampled area within the 58.9-foot fixed-radius boundary:

- Map the nonsampled area as a separate condition class.
- Use normal procedures to map and measure other condition classes.
- Record the segment lengths of any DWM transects that extend into the nonsampled condition (see Section 11.6, Transect Line Segmenting) and complete the nonsampled condition class attributes described in Section 5.9.

SECTION 5.3 DELINEATING CONDITION CLASSES DIFFERING IN CONDITION CLASS STATUS

The first step in delineating condition classes is to recognize differences in CONDITION CLASS STATUS. The most common difference is adjacent accessible forest land and nonforest land. Adjacent accessible forest land and nonforest land condition classes are recognized only if each of the two prospective condition classes is at least 1.0 acre in size, and each is at least 120.0 feet in width. These size and width minimums apply to both accessible forest land and nonforest land.

Within an accessible forest land condition class, unimproved roads, rock outcrops, and natural nonforest openings less than 1.0 acre in size and less than 120.0 feet in width are considered forest land and are not delineated as a separate nonforest land condition class.

Within a nonforest land condition class, forested areas or linear strips of trees less than 1.0 acre in size and less than 120.0 feet in width are considered part of the nonforest land condition class.

Six exceptions to these size and width requirements apply:

1. Developed nonforest land condition: human-caused nonforest land condition classes such as homes or cabins that are less than 1.0 acre in size and 120.0 feet in width and are surrounded by forest land. There are three kinds of developed nonforest land conditions that do not have to meet area or width requirements *(see Figure 5.6 and Figure 5.5)*.
   A. Improved roads: paved roads, gravel roads, or improved dirt roads regularly maintained for long-term continuing use *by normal passenger vehicles.* Generally constructed using machinery. The area where the original topography has been disturbed by cutbanks and fill is considered part of the road, if that area is maintained. Unimproved traces and roads created for skidding logs are not considered improved roads.
   B. Maintained rights-of-way: corridors created for railroads, power lines, gas lines, and canals that are periodically treated to limit the establishment and growth of trees and shrubs. Areas under power lines are considered maintained rights-of-way even if no current vegetation treatment is evident.
   C. Developments: structures and the maintained area next to a structure, all less than 1.0 acre in size and surrounded by forest land. Examples of developments are houses or trailers on very small lots, communication installations in a small cleared area within forest land, and barns and sheds.

Figure 5.4: Example with a developed nonforest strip <120 feet wide. Forest strip, while <120 feet wide, is still part of the accessible forest land condition.

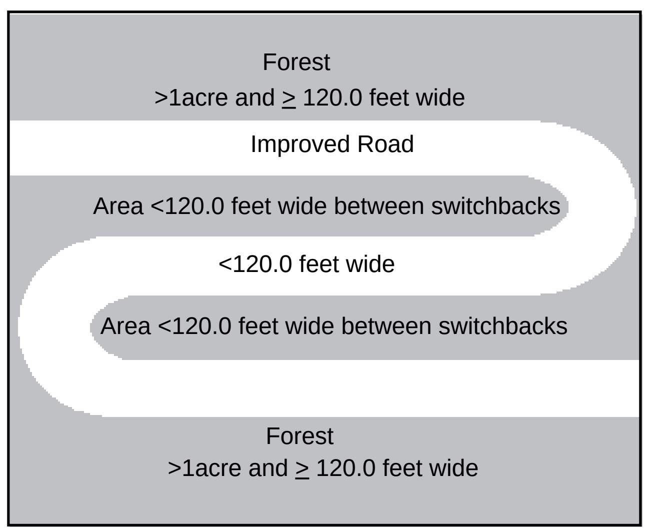


Figure 5.5: Example of a switchback road where the area between the switchbacks is still forest land.

2. Distinct, alternating strips of forest and nonforest land: this situation occurs when a plot or subplot samples a condition class that is less than 1.0 acre in size and less than 120.0 feet in width. The condition class is one of a series of parallel strips of forest and nonforest land in which none of the strips meet the minimum width requirement. This exception applies only to nonforest land conditions that are not listed under *exception number* 1, e.g., improved roads, maintained rights-of-way, and developments *(Figure 5.6)*.
   A. Many small intermingled strips: For many small intermingled strips, determine the total area that the intermingled strips occupy, and classify according to the CONDITION CLASS STATUS (forest land or nonforest land) that occupies the greater area. If the area of intermingled strips is so large or indistinct as to make a total area determination impractical, then classify the sample as forest land.

B. *For t*wo alternating strips of forest and nonforest between two qualifying areas of nonforest land and forest land, *see Figure 5.6. This figure* delineates the boundary between the forest and nonforest land condition classes for four different examples. The plot center defines the plot condition for all strips covered by the arrow. Any subplot that falls in the alternating strips uses th*is* rule. Any subplot that falls in assigned nonforest / forest is assigned that type. Again, this exception applies only to nonforest land conditions that are not listed under *exception* number 1, e.g., improved roads, maintained rights-of-way, and developments.

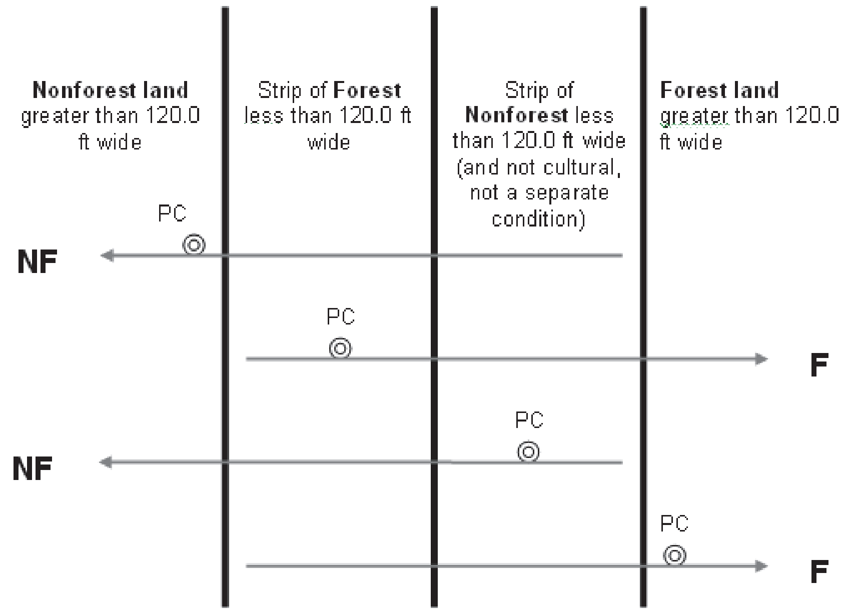


Figure 5.6: Example of alternating strips of forested and nonforested conditions. PC is the plot center (center of subplot 1).

3. The 120.0-foot minimum width for delineation does not apply when a corner angle is 90 degrees or greater *(see Figure 5.7)*.

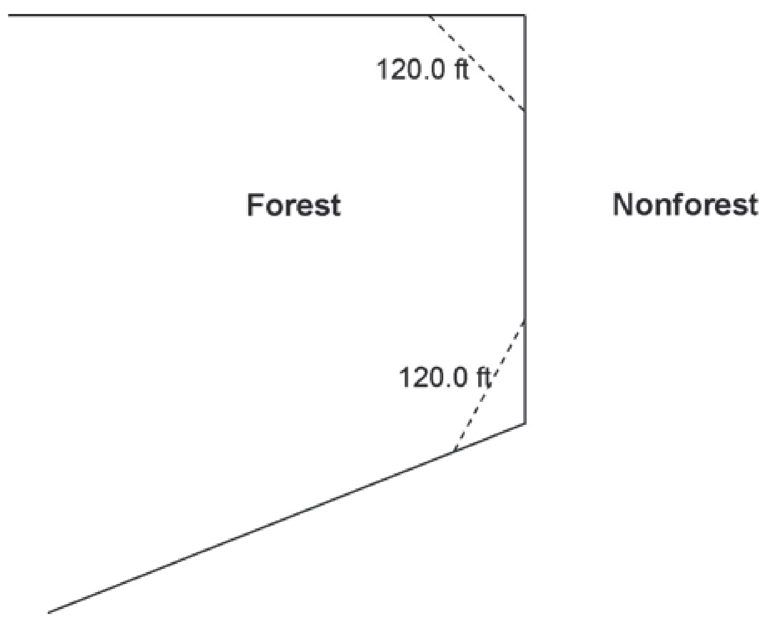


Figure 5.7: Illustration of the 90 degree corner rule. The dotted lines do not create nonforest land conditions.

4. Linear water features: natural water features that are linear in shape such as streams and rivers. A linear water feature must meet the definition for Census or noncensus water to be *a separate condition class*. Therefore, a linear water feature must be at least 30.0 feet wide and cover at least 1.0 acre. The width of a linear water feature is measured *according to the guidelines given in Subsection 5.2.3, NONCENSUS WATER and Subsection 5.2.4, CENSUS WATER*. To determine whether a linear water feature qualifies as *a separate condition class*, rely on all available information on hand such as aerial photos, topographic maps, past survey land calls, and ocular estimates at the current survey visit. Linear water features that do not meet the definition for Census or noncensus water should be classified as forest land only if bounded by forest land on both shores. Crews are *not* expected to measure the length of a linear water feature to determine if it meets the 1.0 acre requirement; use professional judgment and common sense on any linear water feature. A 30-foot wide stream needs to be 1452 feet long to be an acre in size.
5. Nonsampled conditions are delineated as a separate condition class regardless of size.
6. Areas that were sampled and classified at last inventory as accessible forest land and are now nonforest become new nonforest conditions whenever they occur, regardless of size, except when a previously defined nonforest condition has expanded into an adjacent previously defined forest condition. This

expanded condition will be captured through boundary changes on respective subplots/macroplots and does not constitute a new separate condition.

SECTION 5.4 DELINEATING CONDITION CLASSES WITHIN ACCESSIBLE FOREST LAND

Accessible forest land is subdivided into condition classes that are based on differences in RESERVED STATUS, OWNER GROUP, FOREST TYPE, STAND SIZE CLASS, REGENERATION STATUS, and TREE DENSITY. *Section 5.1, DETERMINATION OF CONDITION CLASS,* applies when delineating contrasting forest condition classes. Specific criteria apply for each of the six attributes and are documented by attribute in *Item 5.7.1.1 (RESERVED STATUS) through Item 5.7.1.15 (TREE DENSITY)*. "Stands" are defined by *the* plurality of stocking for all live trees, saplings, and seedlings that are not overtopped.

Additionally, each separate forest condition class recognized within accessible forest land must be at least 1.0 acre in size and at least 120.0 feet in width. If prospective contrasting forest land condition classes do not each meet these minimum size and width requirements, the most similar prospective conditions should be combined until these minimums are attained.

No other attribute shall be the basis for recognizing contrasting condition classes within accessible forest land. For each condition class recognized, many "ancillary attributes" that help describe the condition will be collected, but will not be used for delineation purposes *(see ANCILLARY (NON-DELINEATING) DATA ITEMS, Subsection 5.7.2, pg.76)*.

General instructions for delineating condition classes within accessible forest lands:

1. Distinct boundary within a macroplot, subplot, or microplot – Separate condition classes ARE recognized if, within a macroplot, subplot, *or microplot*, two (or more) distinctly different condition classes are present and delineated by a distinct, abrupt boundary. The boundary is referenced *(see Boundary References, Chapter 7)*.
2. Indistinct boundary within a subplot – Separate condition classes are NOT recognized if the prospective condition classes abut along an indistinct transition zone, rather than on an abrupt, obvious boundary. Only one condition is recognized, and the subplot is classified entirely as the condition it most resembles.

   Example: The four subplots all sample only accessible forest land. Subplots 1, 3, and 4 sample what is clearly a stand of large-diameter trees. Subplot 2 falls in the middle of a stand-size transition zone. In the zone, the large-diameter stand phases into a sapling stand.

   Subplot 2 must not be divided into two condition classes on the basis of stand size. Instead, it is treated entirely as part of the large-diameter condition class or is assigned entirely to a new condition class that is classified as a seedling-sapling stand. The latter occurs only if the crew thinks the entire subplot is more like a stand of seedlings-saplings than a stand of large-diameter trees; then the boundary between the large- and small-diameter stands is assumed to occur between and not on the subplots.

3. A boundary or transition zone between fixed-radius subplots that sample distinctly different condition classes – Separate condition classes are recognized and recorded when a valid attribute obviously differs between two fixed-radius subplots, but a distinct boundary or indistinct transition zone exists outside the sampled (fixed-radius) area of the *macroplots*. In such cases, a boundary, if present, is not referenced.

   Example: The northernmost subplot (2) samples entirely accessible forest land. The other three subplots *(*1, 3, and 4*)* fall clearly in a nonforest meadow. Between subplot 1 and 2 is a transition zone; the number of trees present goes from none to what clearly represents forest land. Two condition classes are sampled: accessible forest land sampled on subplot 2, and nonforest land sampled on the other subplots.

4. Riparian forest area – A riparian forest area is defined as a forest area between 30.0 and 120.0 feet wide, and 1.0 acre or more in size *(*cumulative*)* and adjacent to but not necessarily present on both sides of a naturally occurring or artificially created body of water or watercourse with continuous or intermittent flow. Riparian forest areas may be associated with but not limited to streams, rivers, lakes, sloughs, seeps, springs, marsh*es*, bogs, beaver ponds, sink holes, cypress domes and ponds, *hu*man-made ditches and canals. A riparian forest area must be associated "within forest" *(i.e., must be surrounded by forest on at least one side)* and contain at least one distinct and obvious change in

a condition class delineation attribute from its adjacent accessible forest land condition class. *Figure 5.8 through Figure 5.13* provide examples of when to delineate riparian forest area as a separate condition class. This special size allowance for an accessible riparian forest land condition class only applies if the riparian area would otherwise meet the definition for accessible forest land (i.e., the riparian area meets canopy cover requirements and is not subject to nonforest land uses as described in Subsection 5.7.3).

Note: When the width of forest adjacent to a body of water or water course is between 120.0 feet and 150.0 feet and the width of the riparian forest is at least 30.0 feet wide, the rules for identifying the non-riparian forest (at least 30.0 feet but less than 120.0 feet) need to be modified. The non-riparian forest can be between 30.0 feet and 120.0 feet and mapped as a separate condition as long as it meets the criteria for delineating a separate condition class, otherwise it will be an inclusion in the riparian forest condition class.

A riparian forest area (i.e., a band of alder trees along a creek within a Douglas-fir condition class) is typically different from the surrounding forest because of forest type. However, a change in any of the six condition class delineating variables may make it a candidate for a riparian area condition class.

An area 30 feet wide needs to be 1452 feet long to be an acre in size. An area 60 feet wide needs to be 726 feet long, and an area 90 feet wide needs to be 484 feet long to be an acre in size.

Because chaparral is considered nonforest (Subsection 5.8.1 A.2.2 R5 CHAPARRAL RULES), riparian areas through chaparral must qualify as accessible forest land (120 feet wide and 1-acre in size) on their own in order to be delineated as a separate condition class.

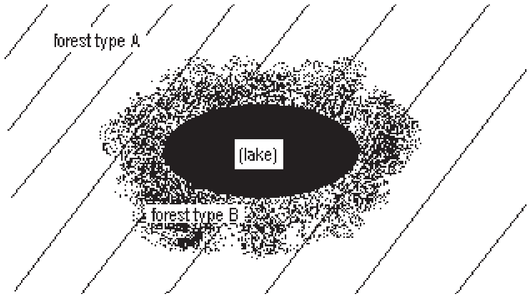


Figure 5.8: (CORE) Forest type B is separate condition class (riparian) if the band of it is between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

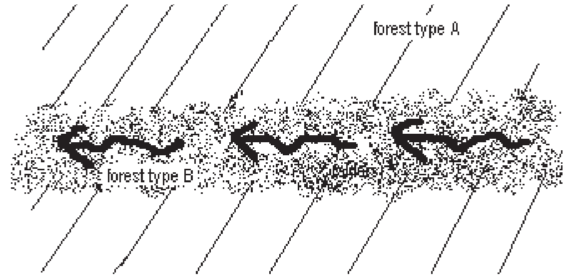


Figure 5.9: (CORE) Forest type B is a separate condition class (riparian) if the band of it is between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

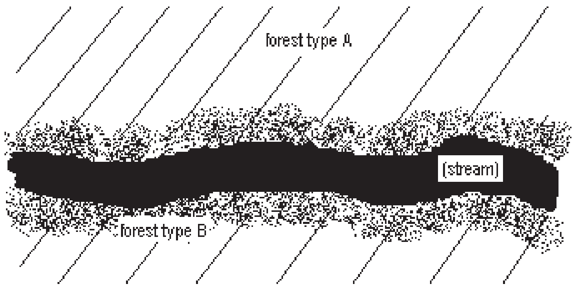


Figure 5.10: (CORE) If the stream is < 30.0 feet wide, forest type B is a separate condition class (riparian) if the sum of the two widths of the bands including the stream falls between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

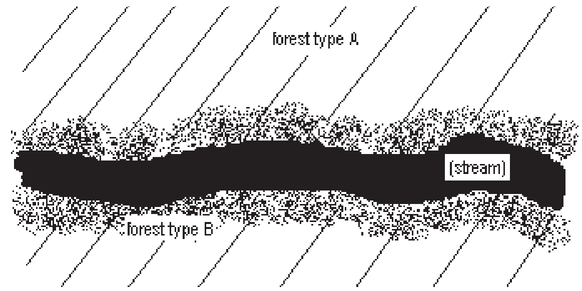


Figure 5.11: (CORE) If the stream is > 30.0 feet wide, forest type B is a separate condition class (riparian) if either of the two widths of the bands falls between 30.0 feet and 120.0 feet wide and is ≥ 1.0 acre in size.

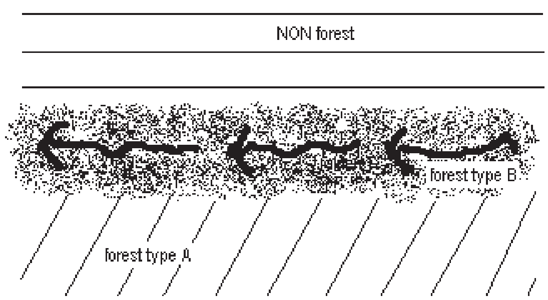


Figure 5.12: (CORE) Forest type B is a separate condition class (riparian) if the band of it is between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

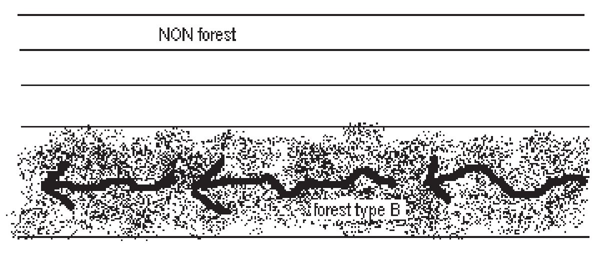


Figure 5.13: (CORE) In a nonforested area, a band of forest type B that is < 120.0 feet wide is NOT considered a riparian area. It is not a separate condition class at all.

SECTION 5.5 CONDITION CLASS ATTRIBUTES

SUBSECTION 5.5.1 ACCESSIBLE FOREST LAND

A CONDITION CLASS NUMBER and a classification for CONDITION CLASS STATUS are required for every condition class sampled on a plot. For each condition class classified as accessible forest land, a classification is required for each of the following attributes:

Item 5.7.1.1, RESERVED STATUS (CORE 2.5.1) Item 5.7.1.5, OWNER GROUP (CORE 2.5.2) Item 5.7.1.9, FOREST TYPE (CORE 2.5.3) Item 5.7.1.11, STAND SIZE CLASS (CORE 2.5.4) Item 5.7.1.13, REGENERATION STATUS (CORE 2.5.5) Item 5.7.1.15, TREE DENSITY (CORE 2.5.6)	ATTRIBUTES WHERE A CHANGE CAUSES A SEPARATE *ACCESSIBLE FOREST LAND* CONDITION CLASS
Item 5.7.2.1, OWNER CLASS (CORE OPTIONAL 2.5.8) Item 5.7.2.2, PREVIOUS OWNER CLASS (PFSL) Item 5.7.2.6, ARTIFICIAL REGENERATION SPECIES (CORE 2.5.14) Item 5.7.2.8, AGE BASIS CODE (PNW) Item 5.7.2.9, STAND AGE (CORE 2.5.15) Item 5.7.2.10, PREVIOUS STAND AGE (PFSL) Item 5.7.2.13, CURRENT GROUND LAND CLASS (PFSL) Item 5.7.2.15, SOIL DEPTH (PFSL) Item 5.7.2.16, PREVIOUS SOIL DEPTH (PFSL) Item 5.7.2.19, DISTURBANCE 1 (CORE 2.5.16) Item 5.7.2.21, DISTURBANCE YEAR 1 (CORE 2.5.17) Item 5.7.2.31, HISTORICAL DISTURBANCE 1 (PNW) Item 5.7.2.32, PREVIOUS HISTORICAL DISTURBANCE 1 (PFSL) Item 5.7.2.43, TREATMENT 1 (CORE 2.5.22) Item 5.7.2.45, TREATMENT YEAR 1 (CORE 2.5.23) Item 5.7.2.55, HISTORICAL TREATMENT 1 (PNW) Item 5.7.2.57, HISTORICAL TREATMENT YEAR 1 (PNW) Item 5.7.2.67, CHAINING CODE (CORE 2.5.37) Item 5.7.2.68, LAND COVER CLASS (CORE 2.5.29) Item 5.8.1.4, CURRENT AFFORESTATION CODE (CORE 2.5.34) Item 5.7.2.69, PLANT ASSOCIATION (PFSL) Item 5.7.2.70, PLANT ASSOCIATION NONSAMPLED REASON (PFSL) Item 5.9.0.1, CONDITION NONSAMPLED REASON (CORE 2.4.3)	ANCILLARY - CHANGES DO NOT DELINEATE A NEW *ACCESSIBLE FOREST LAND* CONDITION CLASS

All other data items including: FOREST TYPE, STAND SIZE CLASS, REGENERATION STATUS, STAND AGE, TREE DENSITY, DISTURBANCE, TREATMENT, and PHYSIOGRAPHIC CLASS, should be determined over the entire condition, including but not exclusive to what is encountered within the subplot/ microplot fixed-radius.

Remeasurement plots: The downloaded condition class delineation data items should always be reviewed and updated as necessary. If changes have occurred, reassess the condition class boundaries mapped by the previous crew. On remeasurement plots use the plot card and the boundary viewer printout located in the plot jacket to review the previous condition class layouts and assess whether any change has occurred. See Chapter 7, Boundary References, for further instruction regarding boundary mapping.

SUBSECTION 5.5.2 NONFOREST LAND

For each condition class classified as nonforest land, a classification is required for each of the following attributes:

Item 5.7.1.1, RESERVED STATUS (CORE 2.5.1) Item 5.7.1.5, OWNER GROUP (CORE 2.5.2) Item 5.7.3.1, PRESENT NONFOREST LAND USE (CORE 2.5.30)	ATTRIBUTES WHERE A CHANGE CAUSES A SEPARATE *NONFOREST* CONDITION CLASS *WITHIN MEASURABLE NONFOREST*
Item 5.7.2.1, OWNER CLASS (CORE OPTIONAL 2.5.8) Item 5.7.2.19, DISTURBANCE 1 (CORE 2.5.16) Item 5.7.2.21, DISTURBANCE YEAR 1 (CORE 2.5.17) Item 5.7.2.11, PHYSIOGRAPHIC CLASS (CORE 2.5.28) Item 5.7.2.67, CHAINING CODE (CORE 2.5.37) Item 5.7.2.68, LAND COVER CLASS (CORE 2.5.29) Item 5.8.1.4, CURRENT AFFORESTATION CODE (CORE 2.5.34)	ANCILLARY - CHANGES DO NOT DELINEATE A NEW *NONFOREST* CONDITION CLASS

SECTION 5.6 CONDITION REMEASUREMENT

Identifying change between the previous and current inventories is a complex process that requires three steps. This process clearly separates previous crew error from physical change (on the ground) and procedural change.

Step 1. Correcting previous crew error

Verify that PREVIOUS CONDITION CLASS STATUS, PREVIOUS OWNER GROUP, and PREVIOUS RESERVED STATUS had been correct at the last measurement. Review the previous mapping to determine if errors exist in the previous condition mapping. Identify and correct any boundary errors or condition status errors as early as possible. Refer to Subsection 5.6.1 for instructions regarding when to correct boundary errors.

If any of the previous boundary mapping azimuths (left, right, or corner) or PREVIOUS CORNER DISTANCE are changed, the PREVIOUS CONDITION CLASS NUMBER (Item 5.7.0.2) of the trees on that subplot will have to be verified and manually reassigned.

Step 2. Map and record current conditions

Use the previous condition mapping (or corrected if changed in step 1) as a base for mapping the current condition. Boundaries and condition classes can be added or deleted, and condition class attributes can be altered. Record current CONDITION CLASS STATUS, OWNER GROUP, and RESERVED STATUS.

Step 3. Reconcile current with previous conditions

If the previous and current conditions are different for CONDITION CLASS STATUS, OWNER GROUP, or RESERVED STATUS, reconcile them as either physical change or procedural change. No other delineating data items need to be reconciled. Any previous crew errors should be changed in step 1. The data recorder will only prompt a change reconcile code if any of the above three data items are different.

SUBSECTION 5.6.1 CORRECTING PREVIOUS CREW ERROR

Previous crew errors can be corrected at any time, however, it is easier to correct them as early as possible. Before mapping the current condition on any macroplot, review:

- All previous mapping
- PREVIOUS CONDITION CLASS STATUS
- PREVIOUS OWNER GROUP
- PREVIOUS RESERVED STATUS

Do not change any of these values if they were correct under the previous protocol; see Tables 5.1 and 5.2 for a list of procedural changes and manual clarifications. In addition, data item text from the previous inventory has been included for all condition class data items that must be updated if an error was found in PREVIOUS CONDITION CLASS STATUS or PREVIOUS OWNER GROUP; review the previous data item text before updating any data item values.

For example, if the previous crew deemed a condition to be forested because the land was (and still is) covered by curlleaf mountain-mahogany, do not change the PREVIOUS CONDITION CLASS STATUS to nonforest.

In past years, procedures affecting CONDITION CLASS STATUS, OWNER GROUP and RESERVED STATUS have been clarified.

For example, if a subplot center lands in noncensus or Census water, the entire subplot/macroplot is considered noncensus or Census water. Sometimes field crews established the subplot when they could occupy the center because it was not covered by water at the time and potentially mapped other condition classes present on the subplot/macroplot. This was clarified in a later manual as incorrect procedure; for the purpose of remeasurement, this is considered “crew error” and needs to be corrected.

Table 5.1: Procedural changes			
Relating to condition delineating data items:			
	Procedural Change Description	Affected species/parameters	Manual year
	Forestland definition change from 10 percent stocking to 10 percent canopy cover	CONDITION CLASS STATUS	2013
	Species dropped from Tree Species List (i.e., species is now considered a shrub)	▪ Curlleaf mountain-mahogany ▪ Rocky Mountain maple	2010
	Stocking algorithm change	Stocking values are evaluated by tree SPECIES using one of seven stocking tables based on 1/4 acre or 1 acre areas, instead of FOREST TYPE.	2004
	Stocking values change	Western juniper	2004
	Stocking algorithm change	Stocking values are evaluated by SPECIES using one of two stocking tables based on 1 acre	2009
	RESERVED STATUS changed from being collected only when accessible forest land (CONDITION STATUS = 1) or measured nonforest land on Forest Service administered lands (CONDITION STATUS = 2 and ADMINISTRATIVE FOREST CODE = 501 - 650). Now it is collected on all conditions classes (CONDITION STATUS = 1, 2, 3, 4 or 5).	RESERVED STATUS	2008
	Change in RESERVED STATUS definition	Excluding all private lands (e.g. Nature Conservancy) and providing a list of State and Federal agency lands considered reserved (Appendix N)	2013
	If land was previously managed by a different agency, the owner group of the agency was recorded. Now the owner group of the owner is recorded.	OWNER GROUP = 10, 20 OR 30	2010
	Two STAND SIZE CLASS rule dropped	STAND SIZE CLASS had to be two size classes away from initial size class to delineate a new condition class	2004
	Added new NONFOREST LAND USE codes	Code 42: Vegetated Wetlands	2010
	Added new NONFOREST LAND USE codes	Codes 16: Maintained Wildlife Opening, 17: Windbreak/Shelterbelt, 34: Mining, 43: Beach	2011
Relating to non-delineating data items:			
	STAND AGE codes 997, 998, and 999 no longer have “embedded” meaning; they can be recorded as true age values.	All forest land condition classes	2010
	Treatment codes 14 and 15 no longer have a 1-acre minimum size requirement to code.	Treatment codes 14 and 15	2010

Table 5.2: Manual clarifications that must be corrected		
Manual clarifications		Manual year
	If subplot center is in noncensus or Census water, the entire subplot/macroplot is classified as noncensus or Census water and no mapping is done.	2003
	Areas under power lines are considered maintained rights-of-way	2002
	Nonforest structures or buildings and hazardous cliffs are mapped using a “wedge” (Informal clarification)	2006
	Strips of forest area between switchbacks is not considered nonforest land	2008

Adding or deleting previous conditions

The data recorder allows entire conditions to be added or deleted in order to correct a previous crew error. If a condition is added, all previous condition data items (such as PREVIOUS FOREST TYPE and PREVIOUS STAND SIZE CLASS) need to be updated to reflect the condition as it was at the previous measurement.

For example, if the previous crew missed that subplot 2 belonged to a different OWNER GROUP, add another condition in the previous condition class screen. Update the PREVIOUS OWNER GROUP, PREVIOUS OWNER CLASS, to reflect correct owner information at the time of the previous inventory. All of the other condition data item values may be copied from the original condition if they are correct. If any of them are incorrect, update to reflect what it should have been at the time of the previous inventory. Include detailed notes explaining changes to any previous condition data items in PREVIOUS CONDITION NOTES.

Changing PREVIOUS CONDITION CLASS STATUS from nonforest to forest

If PREVIOUS CONDITION CLASS STATUS changes from nonforest to forest, the suite of delineating and non-delineating data items associated with forest conditions will need to be added for the previous data items (e.g. PREVIOUS FOREST TYPE) to reflect the correct values at the time of the previous measurement.

Reconcile all trees on this condition that should have been measured previously as either “missed live” or “missed dead” (Item 8.4.1.11, RECONCILE (CORE 5.7.1)). Reconcile trees that grew enough to be a tally tree now but previously too small as either “ingrowth/reversions” or “through-growth.”

Changing PREVIOUS CONDITION CLASS STATUS from forest to nonforest

If PREVIOUS CONDITION CLASS STATUS changes from forest to nonforest, the suite of delineating and non-delineating data items associated with nonforest conditions will need to be added for the previous data items (e.g. PREVIOUS NONFOREST LAND USE) to reflect the correct values at the time of the previous measurement.

If the previous crew call is changed from forest to nonforest, reconcile all trees on that condition as “cruiser error” (Item 8.4.1.11, RECONCILE (CORE 5.7.1)).

Changing previous boundary mapping

If the boundary mapped at the previous inventory (azimuths or PREVIOUS CORNER DISTANCE) is edited by the current crew, the data recorder will automatically delete the PREVIOUS CONDITION CLASS NUMBER for the trees tallied on that subplot. The current crew will have to manually assign those tallied trees to a PREVIOUS CONDITION CLASS NUMBER. If the subplot center PREVIOUS CONDITION CLASS NUMBER or PREVIOUS CONTRASTING CONDITION is changed, the data recorder will automatically update the PREVIOUS CONDITION CLASS NUMBER for trees tallied at the previous inventory on that subplot. If only condition level attributes are changed, the PREVIOUS CONDITION CLASS NUMBER does not have to be updated at all.

Minor changes of previous azimuths and PREVIOUS CORNER DISTANCE should be avoided. If the azimuth and distance are edited, the data recorder will automatically display a warning if the difference between previous crew mapping and edited mapping is less than 10 percent.

A boundary (or boundaries) should only be corrected if the correction results in a 10 percent or greater difference in the area of a condition class on the radius being mapped. There are two exceptions:

- The previous boundary should be corrected if the correction results in a condition class presence absence on the radius being mapped.
- If a subplot boundary correction changes the condition class at subplot center, the equivalent macroplot boundary must also be corrected.

Example 1: A road goes through the middle of a subplot. The previous crew boundaries for the road were mapped to the edge of the pavement. You know the cutbanks should have been included as road area. Correcting the boundary on one side of the road results in a 6 percent increase in the area of the road condition. Correcting the boundary on the other side of the road results in a 5 percent increase in the area of the road condition. Considered together, the corrections increase the road area by 11 percent, so the corrections should be made.

Example 2: The previous crew mapped the edge of a forest condition class at the drip-line of the trees. You know they should have mapped to the boles of the trees. Correcting the subplot boundary results in an area difference greater than 10 percent on the subplot. It also changes subplot center from forest to nonforest. Even though correcting the macroplot boundary does not result in a 10 percent area difference on the macroplot, the macroplot boundary must be corrected.

Example 3: The previous crew did not map any boundaries on the subplot. You decide that a sliver of forest is present on the subplot and should have been mapped. The area of the forest sliver is only 2 percent. However, since it is a presence/abscence scenario, the previous boundary must be added. If a tree is tallied and is assigned to the forest condition class, the data recorder will generate an error if the forest condition is not mapped on the subplot.

Explanatory Notes

If the current crew corrects any previous data items, an explanation describing why values were changed is required in the PREVIOUS CONDITION NOTES (Item 5.11.1.1). Include what was determined to be wrong and describe, in detail, the reason the current crew knows a previous error was made.

If a previous condition class is added, an explanation describing the reason for the addition is required in Item 5.11.1.1, PREVIOUS CONDITION CLASS NOTES (PFSL). Describe, in detail, the reason the current crew knows a previous error was made.

If a previous condition class is deleted, an explanation describing the reason for the deletion is required in Item 4.3.5.5, PLOT NOTES (CORE 1.21). Describe, in detail, the reason the current crew knows a previous error was made.

SUBSECTION 5.6.2 RECONCILE CURRENT WITH PREVIOUS CONDITIONS

The purpose of the reconciliation is to distinguish physical (on the ground) change from any procedural change. For each subplot, the data recorder will calculate a change matrix that includes percent macroplot area (subplot if macroplot was not measured) for each previous – current condition combination. If the previous and current condition values for CONDITION CLASS STATUS, OWNER GROUP, and RESERVED STATUS are not the same, the field crew must reconcile them as either physical or procedural change by recording the appropriate code for OWNER GROUP RECONCILE CODE, CONDITION CLASS STATUS RECONCILE CODE, RESERVED STATUS RECONCILE CODE. If they are the same, nothing has to be reconciled by the field crew. When RECONCILE CODES other than 0 are recorded, a detailed note describing the physical or procedural change is required in Item 5.11.1.3, CHANGE MATRIX NOTES (PFSL).

Any changes (procedural or physical) for data items other than CONDITION STATUS, OWNER GROUP, and RESERVED STATUS are not reconciled.

Reconciliation example:

At time 1, the entire subplot is forested. At time 2 the field crew notices a recently built road.

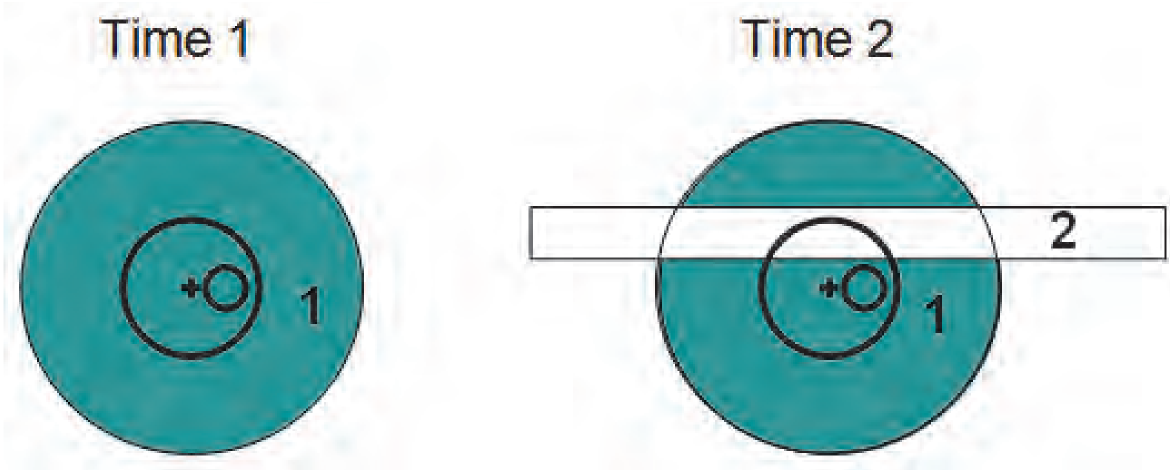


Table 5.3:Condition change matrix														
PLOT TYPE	SUBPLOT NUMBER	CONDITION CLASS NUMBER		SUBPLOT CONDITION PROPORTION	CONDITION CLASS STATUS			OWNER GROUP			RESERVED STATUS			
		t1	t2		t1	t2	reconcile	t1	t2	reconcile	t1	t2	reconcile	
3	1	1	1	0.92	1	1	0	40	40	0	0	0	0	
3	1	1	2	0.08	1	2	1	40	40	0	0	0	0	

Table 5.4:Condition change matrix key		
t1: time 1 t2: time 2		
Reconcile codes:		
	0	no change (auto-filled by data recorder)
	1	physical change
	3	procedural change

After mapping the current condition, the field crew reconciles the condition change. As displayed in the condition change matrix, the field crew only has to fill in the CONDITION CLASS STATUS RECONCILE CODE for the change from forest to road. All previous / current condition combinations with percent area of the plot are calculated by the data recorder. OWNER GROUP and RESERVED STATUS as well as the CONDITION CLASS STATUS for CONDITION CLASS NUMBER 1 (at time 1) to 1 (at time 2) are automatically reconciled by the data recorder with “0” (no change).

Example 1:

Previous mapping

- At time 1, the entire plot was mapped as one forested condition on private land.

Current situation

- The entire plot is still forested. On subplot 2 the current crew maps a separate condition because part of that subplot has OWNER GROUP = 10 (Forest Service). At the reconciliation step, the data recorder prompts the crew to reconcile the change as either procedural or physical change. The crew determines that the Forest Service owned this land at the time of the previous visit.

What should you do?

- The crew needs to go back to step 1 and edit the previous (incorrect) condition class data items and boundary mapping. After editing the previous information, the data recorder will not prompt to reconcile any changes. Since a boundary was added, the PREVIOUS CONDITION CLASS NUMBER for trees tallied at time 1 will have to be manually entered.

Example 2:

Previous mapping

- On subplot 2, the previous crew mapped a meadow (less than 1 acre) that is surrounded by forest as a nonforest condition.

Current situation

- Nothing has changed on the plot.

What should you do?

- The previous mapping was incorrect because the meadow does not meet the size requirements to be considered a separate condition. It should have been included as part of the "forested condition". The current crew should correct the previous crew error by deleting the nonforest condition (if not present and valid elsewhere on plot), deleting the boundary, and assigning the entire subplot to the forested condition.

SECTION 5.7 GENERAL CONDITION CLASS ATTRIBUTES

General attributes such as CONDITION CLASS NUMBER and a classification for CONDITION CLASS STATUS are required for every condition class sampled on a plot.

Item 5.7.0.1 CONDITION CLASS NUMBER (CORE 2.4.1)
[COND.CONDID][CHANGE_MATRIX_PNWRS.CONDID]

<u>On a plot, assign and record a number for each condition class. The condition class at plot center (the center of subplot 1) is designated condition class 1.</u> Number condition classes sequentially as encountered going from subplot 1 through 4, numerically. For remeasurement plots retain the previous CONDITION CLASS NUMBER assignments whenever possible, even if they were assigned in the wrong order.

When collected:	All condition classes
Field width:	1 digit
Tolerance:	No errors
Values:	1 to 9

Item 5.7.0.2 PREVIOUS CONDITION CLASS NUMBER (PFSL)
[PREV_COND_PNWRS.CONDID][CHANGE_MATRIX_PNWRS.PREV_CONDID]

A downloaded value that may be updated if an error was made by the previous crew. If updated, change the number for that condition class.

When collected:	When SAMPLE KIND = 2
Field width:	1 digit
Tolerance:	No errors
Values:	1 to 9

Item 5.7.0.3 SUBPLOT CONDITION PROPORTION (PFSL)
[CHANGE_MATRIX_PNWRS.PERCENT_AREA]

Proportion of macroplot/subplot condition for all previous and current condition class combinations, see RECONCILE CURRENT WITH PREVIOUS CONDITIONS, Subsection 5.6.2, pg.63 and Table 5.3, “Condition change matrix,” on page 63. This data item is calculated by the data recorder and displayed to the user.

When collected:	When SAMPLE KIND = 2 and condition change occurred
Field width:	3 digits
Tolerance:	No errors
Values:	001 - 100

Item 5.7.0.4 CONDITION CLASS STATUS (CORE 2.4.2)
[COND.COND_STATUS_CD][CHANGE_MATRIX_PNWRS.COND_STATUS_CD]

Record the code that describes the status of the condition. The instructions in *Delineating Condition Classes Differing in Condition Class Status (Section 5.3) and Condition Class Attributes (Section 5.5)* apply when delineating condition classes that differ by CONDITION CLASS STATUS. In situations where a condition is denied access or hazardous, but obviously contains no forest land, record CONDITION CLASS STATUS = 2, 3 or 4. In cases where a condition is access-denied or hazardous land use and has the possibility of forest, record CONDITION CLASS STATUS = 5.

When collected:	All condition classes	
Field width:	1 digit	
Tolerance:	No errors	
Values:	*Code*	*Description*
	1	Accessible forest land
	2	Nonforest land
	3	Noncensus water
	4	Census water
	5	Nonsampled – possibility of forest land

Item 5.7.0.5 PREVIOUS CONDITION CLASS STATUS (PNW)
[PREV_COND_PNWRS.COND_STATUS_CD]
[CHANGE_MATRIX_PNWRS.PREV_COND_STATUS_CD_PNWRS]

A downloaded value that may be updated if an error was made by the previous crew. If updated, record the code that describes the status of the condition at the previous measurement. Note: PREVIOUS CONDITION CLASS STATUS has already been updated to current codes.

When collected:	Downloaded when SAMPLE KIND = 2	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	1	Accessible forest land
	2	Nonforest land
	3	Noncensus water
	4	Census water
	5	Nonsampled

Item 5.7.0.6 CONDITION CLASS STATUS RECONCILE CODE (PFSL)
[CHANGE_MATRIX_PNWRS.COND_STATUS_RECONCILE]

Record a code indicating which type of change to CONDITION CLASS STATUS occurred, physical or procedural. If a change occurred, CHANGE MATRIX NOTES must be recorded to describe what the change is (e.g., new road construction). Changes from "nonsampled" to “sampled” or from “sampled” to “nonsampled” are automatically reconciled by the data recorder with code 1 (physical change).

When collected:	When SAMPLE KIND = 2 and condition change occurred	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Change
	0	No change (reconciled by data recorder, not a valid code for field crew)
	1	Physical change
	3	Procedural change

Item 5.7.0.7 CONDITION CLASS STATUS PROCEDURAL CHANGE REASON CODE (PFSL)
[CHANGE_MATRIX_PNWRS.COND_STATUS_PRCD_CHNG_REASN_CD]

Record a code indicating which procedural change occurred. Use code 99 (other) only if one of the codes procedural changes (code 01, 02, or 03) does not apply.

When collected:	CONDITION CLASS STATUS RECONCILE CODE = 3	
Field width:	2 digits	
Tolerance:	No errors	
Values:	Code	Change
	01	Juniper stocking table changes
	02	Species no longer qualifies as tree species (curlleaf mountain-mahogany or Rocky Mountain maple)
	03	Forest land definition change from 10 percent stocking to 10 percent canopy cover
	99	Other (explanatory CHANGE MATRIX NOTES required)

Item 5.7.0.8 NONFOREST CONDITION CLASS STATUS (CORE 2.4.4)
[COND.NF_COND_STATUS_CD]

Record the code that describes the sampling status of the *measurable nonforest* condition class (see the *NONFOREST CONDITION NONSAMPLED REASON codes* below for additional information).

When collected:	When CONDITION CLASS STATUS = 2 and NONFOREST SAMPLING STATUS = 1	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	2	Accessible nonforest land
	5	Nonsampled nonforest

Item 5.7.0.9 NONFOREST CONDITION NONSAMPLED REASON (CORE 2.4.5)
[COND.NF_COND_NONSAMPLE_REASN_CD]

For portions of plots that are *measurable* nonforest land and can not be sampled (NONFOREST CONDITION CLASS STATUS = 5), record one of the following reasons.

When collected:	When NONFOREST CONDITION CLASS STATUS = 5	
Field width:	2 digits	
Tolerance:	No errors	
Values:	Code	Description
	02	Denied access - Any area within the sampled area of a plot to which access is denied by the legal owner, or to which an owner of the only reasonable route to the plot denies access. There are no minimum area or width requirements for a condition class delineated by denied access. Because a denied-access condition can become accessible in the future, it remains in the sample and is re-examined at the next occasion to determine if access is available.
	03	Hazardous situation - Any area within the sampled area on plot that cannot be accessed because of a hazard or danger, for example cliffs, quarries, strip mines, illegal substance plantations, temporary high water, etc. Although the hazard is not likely to change over time, a hazardous condition remains in the sample and is re-examined at the next occasion to determine if the hazard is still present. There are no minimum size or width requirements for a condition class delineated by a hazardous condition.
	10	Other - This code is used whenever a condition class is not sampled due to a reason other than one of the specific reasons listed. *An electronic CONDITION CLASS NOTE* is required to describe the situation.

Item 5.7.0.10 NONFOREST CONDITION CLASS SAMPLING STATUS (PNW)
[COND.NF_COND_SAMPLE_STATUS_PNWRS]

Record a code that indicates whether this nonforest condition (CONDITION CLASS STATUS = 2) is part of a nonforest inventory. When a nonforest condition is within Region 5 or Region 6 Forest Service administered land boundaries (ADMINISTRATIVE FOREST CODE = 501-699), land meeting the accessible nonforest land definition that is within the fixed-radius macroplot is considered a measurable nonforest condition class (NONFOREST CONDITION CLASS SAMPLING STATUS = 1). Certain data items are recorded in NONFOREST CONDITION CLASS SAMPLING STATUS = 1 conditions which are not typically measured in nonforest conditions; these are identified in the associated “when collected” field for individual data items.

When collected:	When NONFOREST CONDITION CLASS STATUS = 2	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	0	Nonforest conditions are not inventoried
	1	Nonforest conditions are inventoried (only when ADMINISTRATIVE FOREST CODE = 501-699)

SUBSECTION 5.7.1 ACCESSIBLE FOREST LAND DELINEATING DATA ITEMS

Data items described in this subsection determine if accessible forest land qualifies to be subdivided into separate condition classes. Section 5.1, DETERMINATION OF CONDITION CLASS, applies when delineating contrasting forest condition classes based on these data items.

Some of these data items are collected regardless of condition status (e.g., RESERVED STATUS and OWNER GROUP are collected on nonforest conditions).

Item 5.7.1.1 RESERVED STATUS (CORE 2.5.1)
[COND.RESERVCD][CHANGE_MATRIX_PNWRS.RESERVCD]

Record the code that identifies the reserved designation for the condition. Reserved land is withdrawn by law(s) prohibiting the management of land for the production of wood products (not merely controlling or prohibiting wood-harvesting methods). Such authority is vested in a public agency or department, and supersedes rights of ownership. The prohibition against management for wood products cannot be unitschanged through decision of the land manager (management agency) or through a change in land management personnel, but rather is permanent in nature. Such areas include: Congressionally designated wilderness areas, national parks, state parks, and other lands protected by law or deed.

Ownership and the name (designation) of an area are critical for determining reserved status. All private lands (OWNGRPCD = 40) are considered not reserved (due to difficulty in determining legal status); this includes in-holdings, where they can be identified. FIA has adopted a default national list of federal land designations which are considered reserved (see *Appendix N*). All federally-owned lands managed by the National Park Service or Fish and Wildlife Service (OWNCD = 21 or 23) are considered reserved. Some lands owned by State or local governments are considered reserved, even in the absence of specific laws covering them, if the agency mandate for that land designation precludes management to produce wood products (e.g., most State Parks). In the absence of State-specific lists of reserved areas, any State or local government land area that includes "park", "wilderness", "wild river", "reserve", or "preserve" in the name is by default considered reserved. There are less common designations that are not on the CORE list and may add exceptions to the list for specific areas that are managed under different legal guidance than is usual for that designation. All designations must be documented using the RESERVED AREA NAME field. Note that harvest can occur in reserved areas, for example for restoration, safety, or recreation.

*N*onforest areas are reserved if forest lands in the same designated area are considered reserved, or if the area would be considered reserved if forestland was present.

Note: The value for this data item may be downloaded (at least for condition class 1) for all plots. However, when field visited, check to be sure the value is correct for the condition.

When collected:	All condition classes	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	0	Not reserved
	1	Reserved

Item 5.7.1.2 PREVIOUS RESERVED STATUS (PFSL)
[PREV_COND_PNWRS.RESERVCD][CHANGE_MATRIX_PNWRS.PREV_RESERVCD]

A downloaded value that may not match the code on the printout from the previous visit. Some codes were updated in the office to reflect the status at the time of the previous inventory using the Core 6.0 definition of RESERVED STATUS. The primary changes are that all National Recreation Areas and National Monuments are considered reserved, while Research Natural Areas and privately owned lands are now considered not reserved. However, the downloaded value may be incorrect due to the imprecision of the GIS layers or the plot-center coordinate. For example, the downloaded value may be 1 (reserved), but in reality the plot is located just outside a park boundary. If corrected, record the code that identifies the reserved designation for the condition at the previous measurement using the Core 6.0 RESERVED STATUS definition.

When collected:	When SAMPLE KIND = 2	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Previous Reserved Status
	0	Not reserved
	1	Reserved

Item 5.7.1.3 RESERVED STATUS RECONCILE CODE (PFSL)
[CHANGE_MATRIX_PNWRS.RESERVCD_RECONCILE]

Record a code indicating which type of change to RESERVED STATUS occurred, physical or procedural. If a change occurred, CHANGE MATRIX NOTES must be recorded to describe what the change is (e.g., new wilderness area).

When collected:	When SAMPLE KIND = 2 and condition change occurred	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Change
	0	No change (reconciled by data recorder, not a valid code for field crew)
	1	Physical change
	3	Procedural change

Item 5.7.1.4 RESERVED STATUS PROCEDURAL CHANGE REASON CODE (PFSL)
[CHANGE_MATRIX_PNWRS.RESERV_PRCD_CHNG_REASN_CD]

This code describes the reason a procedural change in RESERVE STATUS occurred.

When collected:	CONDITION CLASS STATUS RECONCILE CODE = 3	
Field width:	2 digits	
Tolerance:	No errors	
Values:	Code	Description
	01	Change in definition of RESERVED STATUS (Core 6.0, 2013) excluding all private lands (e.g. Nature Conservancy) and providing a list of State and Federal agency lands considered reserved (Appendix N)
	99	Other (explanatory CHANGE MATRIX NOTES required)

Item 5.7.1.5 OWNER GROUP (CORE 2.5.2)
[COND.OWNGRPCD][CHANGE_MATRIX_PNWRS.OWNGRPCD]

Record the OWNER GROUP code identifying the ownership of the land in the condition class. Separate conditions *because of* changes in OWNER GROUP are recognized only where differences can be clearly identified on the ground when visiting the plo*t (e.g., blazed trees or posted boundary signs).* When federal land is owned and administered by two separate entities (e.g., BLM and Forest Service), this data item records the legal owner of the land, not the administrator.

Note: The value may be downloaded (at least for condition class 1 from the current field season review tables); however, check to be sure it is correct.

When collected:	All condition classes	
Field width:	2 digits	
Tolerance:	No errors	
Value:	Code	Description
	10	Forest Service
	20	Other Federal
	30	State and Local Government
	40	Private

Item 5.7.1.6 PREVIOUS OWNER GROUP (PNW)
[PREV_COND_PNWRS.OWNGRPCD][CHANGE_MATRIX_PNWRS.PREV_OWNGRPCD]

On remeasurement plots this item will be populated directly from the previous visits OWNER GROUP data item. Examine the PREVIOUS OWNER GROUP field and determine if it was correctly coded at the previous visit. If the OWNER GROUP of the condition actually changed, do not update this field; change will be captured by comparing OWNER GROUP at the prior visit to OWNER GROUP at the current visit. If the OWNER GROUP recorded at the previous inventory (i.e., PREVIOUS OWNER GROUP) was coded incorrectly use codes 10 through 40 to correct the downloaded code (indicating an error was made at the previous visit). An update to this field requires an explanatory note in the electronic PREVIOUS CONDITION CLASS NOTES.

When collected:	Downloaded when SAMPLE KIND = 2 and PREVIOUS CONDITION CLASS STATUS = 1, 2, or 5	
Field width:	2 digits	
Tolerance:	No errors	
Value:	Code	Description
	10	PREVIOUS OWNER GROUP should be 10 (Forest Service)
	20	PREVIOUS OWNER GROUP should be 20 (Other Federal)
	30	PREVIOUS OWNER GROUP should be 30 (State and Local)
	40	PREVIOUS OWNER GROUP should be 40 (Private)

Item 5.7.1.7 OWNER GROUP RECONCILE CODE (PFSL)
[CHANGE_MATRIX_PNWRS.OWNGRPCD_RECONCILE]

Record a code indicating which type of change to OWNER GROUP occurred, physical or procedural. If a change occurred, a CHANGE MATRIX NOTE must be recorded to describe what the change is (e.g., new road construction).

When collected:	When SAMPLE KIND = 2	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Change
	0	No change (reconciled by data recorder, not a valid code for field crew)
	1	Physical change
	3	Procedural change

Item 5.7.1.8 OWNER GROUP PROCEDURAL CHANGE REASON CODE (PFSL)
[CHANGE_MATRIX_PNWRS.OWN_GRPCD_PRCD_CHNG_REASN_CD]

Record a code indicating which procedural change occurred. Use code 99 (other) only if the procedural change defined in code 01 does not apply.

When collected:	OWNER GROUP RECONCILE CODE = 3	
Field width:	2 digits	
Tolerance:	No errors	
Values:	Code	Description
	01	Administered, but not owned by the Forest Service (see table 5.1)
	99	Other (explanatory CHANGE MATRIX NOTES required)

Item 5.7.1.9 FOREST TYPE (CORE 2.5.3)
[COND.FLDTYPCD]

Record the code corresponding to the FOREST TYPE *(see Appendix E, Forest Type Codes)* that best describes the species with the plurality of stocking for all live trees in the condition class that are not overtopped. Note: Canopy cover is used to determine whether an area is forest or nonforest. Stocking is used with other variables such as this one.

If STAND SIZE CLASS is nonstocked, then FOREST TYPE is determined by the following hierarchy:

For SAMPLE KIND = 2 plots, record the FOREST TYPE of the condition at the previous inventory.

For all other plots:

1. Evaluate any seedlings available to determine the FOREST TYPE.
2. If no seedlings exist, use adjacent stands and your best professional judgment to determine FOREST TYPE.

The instructions in *Section 5.1, DETERMINATION OF CONDITION CLASS* and *Section 5.5, CONDITION CLASS ATTRIBUTES* apply when delineating, within accessible forest land, contrasting conditions based on differences in FOREST TYPE.

When collected:	All accessible forestland condition classes (CONDITION CLASS STATUS = 1)
Field width:	3 digits
Tolerance:	No errors in group or type
Values:	See Appendix E, Forest Type Codes

Item 5.7.1.10 PREVIOUS FOREST TYPE (PFSL)
[PREV_COND_PNWRS.FLDTYPCD]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS FOREST TYPE must be added. If added, record the code corresponding to the FOREST TYPE that best describes the species with the plurality of stocking for all live trees in the condition class that were not overtopped at the previous measurement.

When collected:	When SAMPLE KIND = 2 and PREVIOUS CONDITION CLASS STATUS = 1
Field width:	3 digits
Tolerance:	No errors in group, 100 percent of the time; no errors in type, at least 95 percent of the time
Values:	See Appendix E, Forest Type Codes

Item 5.7.1.11 STAND SIZE CLASS (CORE 2.5.4)
[COND.FLDSZCD]

Record the code that best describes the predominant size class of all live trees, seedlings, and saplings in the condition class. Note: Canopy cover is used to determine whether an area is forest or nonforest. Stocking is used with other variables such as this one.

The instructions in *Section 5.1 and Section 5.5* apply when delineating, on accessible forest land, contrasting conditions based on differences in STAND SIZE CLASS.

Within the sampled area on a microplot, subplot, or macroplot, recognize only very obvious contrasting stands of different mean diameter with an abrupt boundary. Example: an obvious abrupt boundary exists within the sampled (fixed-radius) area of a subplot and demarcates a STAND SIZE CLASS change. *When in doubt, do not split conditions.* Use tree stocking of all live trees, seedlings, and saplings that are not overtopped to differentiate between stand-size classes.

When collected:	All accessible forestland condition classes (CONDITION CLASS STATUS = 1)		
Field width:	1 digit		
Tolerance:	No errors		
Values:	Code	Stand Size Class	Definition
	0	Nonstocked	Meeting the definition of accessible forest land, and the following applies: less than 10 percent stocked by trees, seedlings, and saplings, and not classified as cover trees (see Code 6)
	1	≤ 4.9 inches (seedling, sapling)	At least 10 percent stocking in trees, seedling or saplings; and at least 2/3 of the canopy cover is in trees less than 5.0 inches DBH/DRC
	2	5.0 - 8.9 inches (softwoods) 5.0 - 10.9 inches (hardwoods)	At least 10 percent stocking in trees, seedlings, and saplings; and at least 1/3 of the canopy cover is in trees greater than or equal to 5.0 inches DBH/DRC and the plurality of the canopy cover is in softwoods between 5.0 - 8.9 inches diameter and/or hardwoods between 5.0 - 10.9 inches DBH, and/or woodland trees 5.0 - 8.9 inches DRC.
	3	9.0 - 19.9 inches (softwoods) 11.0 - 19.9 inches (hardwoods)	At least 10 percent stocking in trees, seedlings, and saplings; and at least 1/3 of the canopy cover is in trees greater than or equal to 5.0 inches DBH/DRC and the plurality of the canopy cover is in softwoods between 9.0 - 19.9 inches diameter and/or hardwoods between 11.0 - 19.9 inches DBH, and for woodland trees 9.0 - 19.9 inches DRC.
	4	20.0 - 39.9 inches	At least 10 percent stocking in trees, seedlings, and saplings; and at least 1/3 of the canopy cover is in trees greater than or equal to 5.0 in*ches* DBH/DRC and the plurality of the canopy cover is in trees between 20.0 - 39.9 in*ches* DBH
	5	40.0 + inches	At least 10 percent stocking in trees, seedlings, and saplings; and at least 1/3 of the canopy cover is in trees greater than or equal to 5.0 inches DBH/DRC and the plurality of the canopy cover is in trees ≥ 40.0 inches DBH

Item 5.7.1.12 PREVIOUS STAND SIZE CLASS (PFSL)
[PREV_COND_PNWRS.FLDSZCD]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS STAND SIZE CLASS must be added. If added, record the code that best describes the predominant size class of all live trees in the condition class that were not overtopped at the previous measurement.

The following table was part of the PFSL field manual from 2000 through 2003. Do not correct previous mapping if it was correct using these rules. If no other condition class defining data items are different between accessible forest conditions, map on differences in STAND SIZE CLASS only for the following combinations:

If STAND SIZE CLASS of initial condition is:	Then, the STAND SIZE CLASS of a second condition must be one of the following to delineate as a separate condition based on STAND SIZE CLASS:
0 (Nonstocked)	1, 2, 3, 4, 5 (stocked forest land)
1	3, 4, 5
2	4, 5
3	5
6 (Chaparral)	1, 2, 3, 4, 5 (stocked forest land)

When collected:	When SAMPLE KIND = 2 and PREVIOUS CONDITION CLASS STATUS = 1		
Field width:	1 digit		
Tolerance:	No errors		
Values:	Code	Stand Size Class	Definition
	0	Nonstocked	Meeting the definition of accessible forest land, and one of the following applies: (a) less than 10 percent stocked by trees of any size, and not classified as chaparral, or (b) for forest types where stocking standards are not available, less than 5 percent crown cover of trees of any size.
	1	< 5.0 inches (seedling, sapling)	At least 10 percent stocking (or 5 percent crown cover if stocking tables are not available) in trees of any size; and at least 1/3 of the crown cover is in trees less than 5.0 inches DBH/DRC
	2	5.0 - 8.9 inches (softwoods) 5.0 - 10.9 inches (hardwoods)	At least 10 percent stocking (or 5 percent crown cover if stocking tables are not available) in trees of any size; and at least 1/3 of the crown cover is in trees greater than 5.0 inches DBH/DRC and the plurality of the crown cover is in softwoods between 5.0 - 8.9 inches diameter and/or hardwoods between 5.0 - 10.9 inches DBH, and/or western woodland trees 5.0 - 8.9 inches DRC
	3	9.0 - 19.9 inches (softwoods) 11.0 - 19.9 inches (hardwoods)	At least 10 percent stocking (or 5 percent crown cover if stocking tables are not available) in trees of any size; and at least 1/3 of the crown cover is in trees greater than 5.0 inches DBH/DRC and the plurality of the crown cover is in softwoods between 9.0 - 19.9 inches diameter and/or hardwoods between 11.0 - 19.9 inches DBH, and for western woodland trees 9.0 - 19.9 inches DRC
	4	20.0 - 39.9 inches	At least 10 percent stocking (or 5 percent crown cover if stocking tables are not available) in trees of any size; and at least 1/3 of the crown cover is in trees greater than 5.0 inches DBH/DRC and the plurality of the crown cover is in trees between 20.0 - 39.9 inches DBH
	5	40.0 + inches	At least 10 percent stocking (or 5 percent crown cover if stocking tables are not available) in trees of any size; and at least 1/3 of the crown cover is in trees greater than 5.0 inches DBH/DRC and the plurality of the crown cover is in trees > 40.0 inches DBH
	6	Chaparral	Less than 10 percent stocking by trees of any size, and greater than 5 percent crown cover of species that comprise chaparral communities

Item 5.7.1.13 REGENERATION STATUS (CORE 2.5.5)
[COND.STDORGCD]

Record the code that best describes the artificial regeneration that occurred in the condition.

The instructions in *Section 5.1, DETERMINATION OF CONDITION CLASS and Section 5.3, DELINEATING CONDITION CLASSES DIFFERING IN CONDITION CLASS STATUS* apply when delineating, within accessible forest land, contrasting conditions based on differences in REGENERATION STATUS.

For a forest land condition to be delineated and/or classified as artificially regenerated, the condition must show distinct evidence of planting or seeding. If it is difficult to determine whether or not a stand has been planted or seeded, then use code 0. If no distinct boundary exists within the sampled (fixed-radius) area on any subplot/*macroplot*, then do not recognize separate conditions. In many regions of the West, trees are not planted in rows, and planted stands do not differ in physical appearance from natural conditions. In these cases, there is no need to differentiate conditions based on regeneration status.

Note: Plot records or verbal evidence from landowner *are* acceptable *criteria* for determining regeneration status.

When collected:	All accessible forest land condition classes (CONDITION CLASS STATUS = 1)		
Field width:	1 digit		
Tolerance:	No errors		
Values:	Code	Regeneration	Description
	0	Natural	Present stand shows no clear evidence of artificial regeneration. Includes unplanted, recently cut lands.
	1	Artificial	Present stand shows clear evidence of artificial regeneration.

Item 5.7.1.14 PREVIOUS REGENERATION STATUS (PFSL)
[PREV_COND_PNWRS.STDORGCD]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS REGENERATION STATUS must be added. If added, record the code that best describes the degree of evidence of artificial regeneration which occurred in the condition at the previous measurement.

When collected:	When SAMPLE KIND = 2 and PREVIOUS CONDITION CLASS STATUS = 1
Field width:	1 digit
Tolerance:	No errors
Values:	See REGENERATION STATUS

Item 5.7.1.15 TREE DENSITY (CORE 2.5.6)
[COND.MAPDEN]

Record a code to indicate the relative tree density classification. Base the classification on the number of stems/unit area, basal area, tree cover, or stocking of all live trees, seedlings, and saplings in the condition that are not overtopped, compared to any *other* condition class TREE DENSITY *recorded on the plot*.

The instructions in *Section 5.1, DETERMINATION OF CONDITION CLASS and Section 5.4, DELINEATING CONDITION CLASSES WITHIN ACCESSIBLE FOREST LAND* apply when delineating, within accessible forest land, contrasting conditions based on differences in TREE DENSITY.

Codes 2 and higher are used ONLY when all other attributes used to delineate separate condition classes are homogenous, i.e., when a change in density is the ONLY difference within what would otherwise be treated as only one forest condition. Otherwise, code 1 for all condition classes. Codes 2 and higher are usually, but not always, used to demarcate areas that differ from an adjacent area due to forest disturbance, e.g., a partial harvest or heavy, but not total tree mortality due to a ground fire. Delineation by density should only be done when the less-dense condition is 50 percent or less as dense as the more dense condition.

Do not distinguish between low-stocked stands or stands of sparse and patchy forest.

In order to qualify as a separate condition based on density, there MUST be a distinct, easily observed change in the density of an area's tree cover or basal area.

Examples of valid contrasting conditions defined by differences in tree density are:

- the eastern half of an otherwise homogeneous, 20-acre stand has many trees killed by a bark beetle outbreak
- one portion of a stand is partially cut over (with 40 square feet basal area per acre) while the other portion is undisturbed (with 100 square feet basal area per acre)

Note: In these examples, RESERVED STATUS, OWNER GROUP, FOREST TYPE, STAND SIZE CLASS, and REGENERATION STATUS are the same.

When collected:	All accessible forest land condition classes (CONDITION CLASS STATUS = 1)	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	1	Initial density class
	2	Density class 2 - density different than 1
	3	Density class 3 - density different than 1 and 2

Item 5.7.1.16 PREVIOUS TREE DENSITY (PFSL)
[PREV_COND_PNWRS.MAPDEN]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS TREE DENSITY must be added. If added, record a code to indicate the relative tree density classification at the previous measurement.

When collected:	When SAMPLE KIND = 2 and PREVIOUS CONDITION CLASS STATUS = 1
Field width:	1 digit
Tolerance:	No errors
Values:	See TREE DENSITY

SUBSECTION 5.7.2 ANCILLARY (NON-DELINEATING) DATA ITEMS

Item 5.7.2.1 OWNER CLASS (CORE OPTIONAL 2.5.8)
[COND.OWNCD]

Record the OWNER CLASS code that best corresponds to the ownership of the land in the condition class. Conditions will NOT be delineated based on changes in OWNER CLASS. If multiple OWNER CLASSes occur within a condition class (i.e., within an OWNER GROUP) record the OWNER CLASS closest to the center of the lowest numbered subplot in the condition. Note: When federal land is owned and administered by two separate entities (e.g., BLM and Forest Service), this data item records the legal owner of the land, not the administrator.

The value for this field should be downloaded for condition class 1 and indicates the owner classification for subplot 1 center (the pinpricked field grid location). However, check to be sure the value is correct for the plot and update this code if incorrect. If the difference is due to a change in ownership since the last field visit, record the date of the ownership change (if known), and make a note in CONDITION CLASS NOTES (Item 5.11.1.2).

When collected:	All condition classes	
Field width:	2 digits	
Tolerance:	No errors	
Values:	Code	Description
	Owner Classes within Forest Service lands (OWNER GROUP = 10):	
	11	National Forest
	12	National Grassland and/or Prarie
	13	Other Forest Service land
	Owner Classes within Other Federal lands (OWNER GROUP = 20):	
	21	National Park Service
	22	Bureau of Land Management
	23	Fish and Wildlife Service
	24	Departments of Defense/Energy
	25	Other Federal
	Owner Classes within State and Local Government lands (OWNER GROUP = 30):	
	31	State including state public universities
	32	Local (County, Municipality, etc.) including water authorities
	33	Other Non Federal Public
	Owner Classes within Private lands (OWNER GROUP = 40):	
	41	Corporate, including Native Corporations in Alaska and private universities
	42	Non Governmental Conservation / Natural Resources Organization – Examples: Nature Conservancy, National Trust for Private Lands, Pacific Forest Trust, Boy Scouts of America, etc.
	43	Unincorporated Partnerships / Associations / Clubs – examples: Hunting Clubs that own, not lease property, recreation associations, 4H, churches, etc.
	44	Native American (Indian) - within reservation boundaries
	45	Individual and Family, including trusts, estates, and family partnerships

Item 5.7.2.2 PREVIOUS OWNER CLASS (PFSL)
[PREV_COND_PNWRS.OWNCD]

A downloaded value that cannot be updated by the current crew. However, if a previous CONDITION CLASS STATUS = 1, 2, or 5 condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS OWNER CLASS must be added. If added, record the OWNER CLASS code that best corresponds to the ownership of the land in the condition class at the previous measurement. Note: PREVIOUS OWNER CLASS values have already been updated to current codes.

When collected:	When SAMPLE KIND = 2 and PREVIOUS CONDITION CLASS STATUS = 1, 2, or 5
Field width:	2 digits
Tolerance:	No errors
Values:	See OWNER CLASS

Item 5.7.2.3 RESERVED AREA NAME (CORE 2.5.13)
[COND.RESERVED_AREA_NAME]

Record the specific name of the area that identifies the reserved designation for the condition. This will be downloaded for CONDITION CLASS NUMBER 1 and should be verified; for all other conditions, select from the drop-down list in the PDR.

When collected:	All conditions with RESERVED STATUS = 1
Field width:	Alphanumeric character field
Tolerance:	No errors
Values:	English language words, phrases and numbers

Item 5.7.2.4 ADMINISTRATIVE FOREST CODE (PNW)
[COND.ADFORCD]

Downloaded code identifying the administrative unit (Forest Service region and national forest/grassland/management unit) in which the condition is located. The first two digits of the four digit code are for the region number and the last two are for the administered national forest number. Verify the downloaded code; update if incorrect.

Note: For federal land owned by one entity (e.g., BLM) and administered (managed) by another entity (e.g., Siskiyou National Forest), the ADMINISTRATIVE FOREST CODE of the administrating unit is recorded (0611 - Siskiyou NF in this example). Additional measurements are taken when a condition class is located on R5 or R6 Forest Service administered lands (ADMINISTRATIVE FOREST CODE = 501-699); this includes other federal lands (OWNER GROUP = 20) administered by R5 or R6 Forest Service units. The PDR will generate a warning when this situation exists; crews must verify that ownership and administrating unit are indeed different (i.e., owner and administrator are separate entities).

When collected:	Downloaded for all accessible forest land condition classes (CONDITION CLASS STATUS = 1) and nonforest land condition classes (CONDITION CLASS STATUS = 2 or 5) located on Forest Service administered lands (OWNER GROUP = 10 or 20)			
Field width:	4 digits			
Tolerance:	No errors			
Values:	0104	Idaho Panhandle National Forest	0602	Fremont National Forest
	0417	Toiyabe National Forest	0603	Gifford Pinchot National Forest
	0501	Angeles National Forest	0604	Malheur National Forest
	0502	Cleveland National Forest	0605	Mt. Baker Snoqualmie National Forest
	0503	Eldorado National Forest	0606	Mt. Hood National Forest
	0504	Inyo National Forest	0607	Ochoco National Forest
	0505	Klamath National Forest	0608	Okanogan National Forest
	0506	Lassen National Forest	0609	Olympic National Forest
	0507	Los Padres National Forest	0610	Rogue River National Forest
	0508	Mendocino National Forest	0611	Siskiyou National Forest
	0509	Modoc National Forest	0612	Siuslaw National Forest
	0510	Six Rivers National Forest	0614	Umatilla National Forest
	0511	Plumas National Forest	0615	Umpqua National Forest
	0512	San Bernardino National Forest	0616	Wallowa-Whitman Nat. Forest
	0513	Sequoia National Forest	0617	Wenatchee National Forest
	0514	Shasta-Trinity National Forest	0618	Willamette National Forest
	0515	Sierra National Forest	0620	Winema National Forest
	0516	Stanislaus National Forest	0621	Colville National Forest
	0517	Tahoe National Forest	0622	Columbia River Gorge NSA
	0519	Lake Tahoe Basin Mgmt. Unit	0650	Crooked River National Grassland
	0601	Deschutes National Forest	0000	Other federal land (OWNER GROUP = 20) not administered by the Forest Service

Item 5.7.2.5 PREVIOUS ADMINISTRATIVE FOREST CODE (PNW)
[PREV_COND_PNWRS.ADFORCD]

A downloaded value that cannot be updated by the current crew. However, if a previous CONDITION CLASS STATUS = 1, 2, or 5 condition class is added (i.e., previous condition or mapping error is corrected) located on Forest Service administered lands, a PREVIOUS ADMINISTRATIVE FOREST CODE must be added. Note: PREVIOUS ADMINISTRATIVE FOREST CODE values have already been updated to current codes.

When collected:	When SAMPLE KIND = 2 and PREVIOUS CONDITION STATUS = 1, 2, or 5 and located on Forest Service administered lands (PREVIOUS OWNER GROUP = 10 or 20)
Field width:	4 digits
Tolerance:	No errors
Values:	See ADMINISTRATIVE FOREST CODE

Item 5.7.2.6 ARTIFICIAL REGENERATION SPECIES (CORE 2.5.14)
[COND.STDORGSP]

<u>Record the species code of the predominant tree species for which evidence exists of artificial regeneration in the stand. This attribute is ancillary; that is, contrasting condition classes are never delineated based on variation in this attribute.</u>

When collected:	All accessible forest land condition classes (CONDITION CLASS STATUS = 1) with evidence of artificial regeneration (REGENERATION STATUS = 1)
Field width:	4 digits
Tolerance:	No errors
Values:	See *Appendix D, Tree Species Lists*

Item 5.7.2.7 PREVIOUS ARTIFICIAL REGENERATION SPECIES (PFSL)
[PREV_COND_PNWRS.STDORGSP]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), and PREVIOUS REGENERATION STATUS = 1, a PREVIOUS ARTIFICIAL REGENERATION SPECIES must be added. If added, record the species code of the predominant tree species for which evidence existed of artificial regeneration in the stand at the previous measurement.

When collected:	When SAMPLE KIND = 2 and PREVIOUS CONDITION CLASS STATUS = 1 and PREVIOUS REGENERATION STATUS = 1
Field width:	3 digits
Tolerance:	No errors
Values:	See *Appendix D, Tree Species Lists*

Item 5.7.2.8 AGE BASIS CODE (PNW)
[COND.AGE_BASIS_CD_PNWRS]

Record the code that indicates the method used to determine STAND AGE (Item 5.7.2.9).

When collected:	All accessible forest land condition classes (CONDITION CLASS STATUS = 1)
Field width:	2 digits
Tolerance:	No errors

Values:	Code	Description	Core Code (office use only)
	00	Stand is nonstocked	STAND AGE = 000
	10	Weighted average of trees bored for age (on macroplot)	n/a
	11	Weighted average of trees bored for age (off macroplot)	n/a
	20	Whorl counted only (on or off macroplot)	n/a
	30	Mixed method of whorl-count and/or bored age (on or off macroplot)	n/a
	40	Time since last inventory - years added to previously recorded stand age	n/a
	50	Age based on documentary evidence or landowner discussion	n/a
	51	Age based on crew call considering site and tree diameters	n/a
	60	All trees in the condition are of a species which cannot be bored	STAND AGE = 998
	70	Tree cores not counted in the field, but taken to field office to count	STAND AGE = 999
	80	STAND AGE >997 years	STAND AGE = 997

Item 5.7.2.9 STAND AGE (CORE 2.5.15)
[COND.FLDAGE]

Record the average total age, to the nearest year, of the *overstory* trees (plurality of all live trees, seedlings, and saplings not overtopped) in the predominant STAND SIZE CLASS of the condition, determined using local procedures. Record *"000"* for non-stocked stands. Note: Canopy cover is used to determine whether an area is forest or nonforest. Stocking is used with other variables such as this one.

An estimate of STAND AGE is required for every forest land condition class defined on a plot. Stand age is usually highly correlated with stand size and should reflect the average age of all trees that are not overtopped. Unlike the procedure for site tree age (TREE AGE AT DIAMETER), estimates of STAND AGE should estimate the time of tree establishment (*i.e.*, not age at the point of diameter measurement). Note: For planted stands, estimate age based on the year the stand was planted (*i.e.*, do not add in the age of the planting stock).

To estimate STAND AGE, select two or three dominant or codominant trees from the overstory. If the overstory covers a wide range of tree sizes and species, try to select the trees accordingly but it is not necessary to core additional trees in such stands. Core each tree *just below* the point of diameter measurement and count the rings between the outside edge and the core to the pith. Add in the number of years that passed from germination until the tree reached the point of core extraction to determine the total age of the tree *(use the guidelines below and adjust as needed for site variation and observed growth rates)*.

General regional guidelines for converting breast height age to total age by species:

Years to add:

west side: conifers + 5, hardwoods + 4

east side: conifers + 8, hardwoods + 5

The field crew should use their best judgment in estimating a STAND AGE by taking the average total age of the predominant overstory trees in the stand, using tree ages for guidance. For example, if three trees aged 34, 62, and 59 years represent 25 percent, 60 percent, and 15 percent of the overstory, respectively, the weighted stand age *would* be:

(34 x 0.25) + (62 x 0.60) + (59 x 0.15) = 55 years

In some cases, it may be possible to avoid coring trees to determine age. If a stand has not been seriously disturbed since the previous survey, simply add the number of years since the previous inventory to the previous STAND AGE. In other situations, cores collected from site trees can be used to estimate STAND AGE *when they are representative of the overstory.*

For seedling/sapling sized forested conditions count the number of whorls or branch nodes to help in getting an estimate. Determine age by whorl count for the following species only: Douglas-fir; pines; and true firs. This is only an acceptable practice in young, fast-growing stands (e.g., plantations, regenerating clearcuts); it is almost never acceptable where the environment limits vigorous tree growth (e.g., subalpine areas, bogs).

If all of the trees in *the overstory* are of a species which, by regional standards, cannot be bored for age (e.g., *black oak*, *Pacific madrone*) *examine ancillary information to provide a stand age (see Subsection 8.6.1, Tree Age for list of species that regionally are restricted from being bored for age).*

Use ancillary information that provides clues about STAND AGE, such as planting date estimates offered by the landowner and disturbance dates implied by perusal of multi-date aerial imagery. If estimated age can be determined for hardwoods not bored (for example, counting rings on a nearby stump) then use this information to estimate STAND AGE.

Note: If tree cores are not counted in the field, but are collected and taken to the field office for counting, leave values field blank (i.e., null).

When collected:	*When AGE BASIS CODE < 60*
Field width:	3 digits
Tolerance:	+/- 10 *percent*
Values:	*Null,* 000 to *999*

Item 5.7.2.10 PREVIOUS STAND AGE (PFSL)
[PREV_COND_PNWRS.FLDAGE]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS STAND AGE must be added. If added, record the average total age, to the nearest year, of the trees (plurality of all live trees not overtopped) in the predominant STAND SIZE CLASS of the condition at the previous measurement, determined using local procedures. Record 000 for previously nonstocked stands.

When collected:	PWhen SAMPLE KIND = 2 and PREVIOUS CONDITION CLASS STATUS = 1
Field width:	3 digits
Tolerance:	+/- 10 percent
Values:	*Null,* 000 to *999*

Item 5.7.2.11 PHYSIOGRAPHIC CLASS (CORE 2.5.28)
[COND.PHYSCLCD]

Record the code that best describes the PHYSIOGRAPHIC CLASS of the condition within the plot area; land form, topographic position, and soil generally determine physiographic class.

When collected:	All accessible forest land condition classes (CONDITION CLASS STATUS = 1), or accessible nonforest condition classes when nonforest is being sampled (NONFOREST CONDITION CLASS STATUS = 2)		
Field width:	2 digits		
Tolerance:	No errors		
Values:	Xeric - Sites that are normally low or deficient in moisture available to support vigorous tree growth. These areas may receive adequate precipitation, but experience a rapid loss of available moisture due to runoff, percolation, evaporation, etc.		
	Code	*Physiographic class*	*Description*
	11	Dry Tops	Ridge tops with thin rock outcrops and considerable exposure to sun and wind.
	12	Dry Slopes	Slopes with thin rock outcrops and considerable exposure to sun and wind. Includes most mountain/steep slopes with a southern or western exposure.
	13	Deep Sands	Sites with a deep, sandy surface subject to rapid loss of moisture following precipitation. Typical examples include sand hills, sites along the beach and shores of lakes and streams and many deserts.
	19	Other Xeric	All dry physiographic sites not described above. *Describe in electronic CONDITION CLASS NOTES.*
	Mesic - Sites that have moderate but adequate moisture available to support vigorous tree growth except for periods of extended drought. These sites may be subjected to occasional flooding during periods of heavy or extended precipitation.		
	21	Flatwoods	Flat or fairly level sites outside flood plains. Excludes deep sands and wet, swampy sites.
	22	Rolling Uplands	Hills and gently rolling, undulating terrain and associated small streams. Excludes deep sands, all hydric sites, and streams with associated floodplains.
	23	Moist Slopes and Coves	Moist slopes and coves with relatively deep, fertile soils. Often these sites have a northern or eastern exposure and are partially shielded from wind and sun. Includes moist mountain tops and saddles.
	24	Narrow Floodplains/ Bottomlands	Flood plains and bottomlands less than 1/4-mile in width along rivers and streams. These sites are normally well drained but are subjected to occasional flooding during periods of heavy or extended precipitation. Includes associated levees, benches, and terraces within a 1/4 mile limit. Excludes swamps, sloughs, and bogs
	25	Broad Floodplains	Flood plains and bottomlands 1/4 mile or wider in width along rivers and streams. These sites are normally well drained but are subjected to occasional flooding during periods of heavy or extended precipitation. Includes associated levees, benches, and terraces. Excludes swamps, sloughs, and bogs with year-round water problems.
	29	Other Mesic	All moderately moist physiographic sites not described above. *Describe in electronic CONDITION CLASS NOTES.*
	Hydric - Sites that generally have a year-round abundance or over-abundance of moisture. Hydric sites are very wet sites where excess water seriously limits both growth and species occurrence.		
	31	Swamps/Bogs	Low, wet, flat forested areas usually quite extensive that are flooded for long periods of time except during periods of extreme drought. Excludes cypress ponds and small drains.
	32	Small Drains	Narrow, stream-like, wet strands of forest land often without a well-defined stream channel. These areas are poorly drained or flooded throughout most of the year and drain the adjacent higher ground.
	33	Bays and Wet Pocossins	Low, wet, boggy sites characterized by peaty or organic soils. May be somewhat dry during periods of extended drought. Examples include the Carolina bays in the southeast US.
	34	Beaver Ponds	
	35	Cypress Ponds	
	39	Other Hydric	All other hydric physiographic sites *Describe in electronic CONDITION CLASS NOTES.*

Item 5.7.2.12 PREVIOUS PHYSIOGRAPHIC CLASS (PFSL)
[PREV_COND_PNWRS.PHYSCLCD]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland or measurable nonforest condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS PHYSIOGRAPHIC CLASS must be added. If added, record the code that best describes the PHYSIOGRAPHIC CLASS of the condition at the previous measurement; land form, topographic position, and soil generally determine physiographic class. A related PREVIOUS CONDITION CLASS NOTE is required when correcting a previous crew error.

When collected:	When SAMPLE KIND = 2 and PREVIOUS CONDITION CLASS STATUS = 1; or PREVIOUS CONDITION CLASS STATUS = 2 and PREVIOUS ADMINISTRATIVE FOREST CODE is not null
Field width:	2 digits
Tolerance:	No errors
Values:	See PHYSIOGRAPHIC CLASS (CORE 2.5.28), pg. 81

Item 5.7.2.13 CURRENT GROUND LAND CLASS (PFSL)
[COND.GROUND_LAND_CLASS_PNW]

Record the 3-digit code that corresponds to the best ground land class (GLC) description listed below. GLC should be collected on all accessible and nonsampled forest lands. When SAMPLE KIND = 2 (remeasured plot), previous GLC will be downloaded (in the CURRENT GROUND LAND CLASS field) for all accessible forest land condition classes.

When collected:	All accessible forest land condition classes (CONDITION CLASS STATUS = 1); and all nonsampled forest land condition classes (CONDITION CLASS STATUS = 5 and ESTIMATED NONSAMPLED LAND COVER TYPE = 1)		
Field width:	3 digits		
Tolerance:	No error		
Values:	Code	GLC	Description
	120	Timberland	Forest land which is potentially capable of producing at least 20 cubic feet/acre/year at culmination in fully stocked, natural stands (1.4 cubic meters/hectares/year) of continuous crops of trees to industrial roundwood size and quality. Industrial roundwood requires species that grow to size and quality adequate to produce lumber and other manufactured products (exclude fence posts and fuel wood which are not considered manufactured). Timberland is characterized by no severe limitations on artificial or natural restocking with species capable of producing industrial roundwood.
	141	Other forest-rocky	Other forest land which can produce tree species of industrial roundwood size and quality, but which is unmanageable because the site is steep, hazardous, and rocky, or is predominantly nonstockable rock or bedrock, with trees growing in cracks and pockets. Other forest-rocky sites may be incapable of growing continuous crops due to inability to obtain adequate regeneration success.
	142	Other forest-unsuitable site (wetland, subalpine or coastal conifer scrub) (CA only)	Other forest land which is unsuited for growing industrial roundwood because of one of the following environment factors: willow bogs, spruce bogs, sites with high water tables or even standing water for a portion of the year, and harsh sites due to extreme climatic and soil conditions. Trees present are often extremely slow growing and deformed. Examples: whitebark pine, lodgepole, or mountain hemlock stands at timberline; shore pine along the Pacific Ocean (Monterey, Bishop, and Douglas-Fir); willow wetlands with occasional cottonwoods present; Sitka spruce-shrub communities bordering tidal flats and channels along the coast. Includes aspen stands in high-desert areas.
	143	Other forest-pinyon-juniper	Areas currently capable of 10 percent or more tree stocking with forest trees, with juniper species predominating. These areas are not now, and show no evidence of ever having been, 10 percent or more stocked with trees of industrial roundwood form and quality. Stocking capabilities indicated by live juniper trees or juniper stumps and juniper snags less than 25 years dead or cut.
	144	Other forest-oak (formally oak woodland)	Areas currently 10 percent or more stocked with forest trees, with low quality forest trees of oak, gray pine, madrone, or other hardwood species predominating, and which are not now, and show no evidence of ever having been, 10 percent or more stocked with trees of industrial roundwood form and quality. Trees on these sites are usually short, slow growing, gnarled, poorly formed, and generally suitable only for fuel wood. The following types are included: blue oak, white oak, live oak, oak-gray pine.
	146	(OR & WA only) Other forest-unsuitable site	Other forest land which is unsuited for growing industrial roundwood because of one of the following environment factors: willow bogs, spruce bogs, sites with high water tables or even standing water for a portion of the year, and harsh sites due to climatic conditions. Trees present are often extremely slow growing and deformed. Examples: whitebark pine or mountain hemlock stands at timberline, shore pine along the Pacific Ocean, willow wetlands with occasional cottonwoods present, and sitka spruce-shrub communities bordering tidal flats and channels along the coast. Aspen stands in high-desert areas are considered other forest-unsuitable site.
	148	Other forest-cypress (CA only)	Forest land with forest trees with cypress predominating. Shows no evidence of having had 10 percent or more cover of trees of industrial roundwood quality and species.
	149	Other forest-low productivity (office use only)	(this code will be calculated in the office; field crews should never use this code)Forest land capable of growing crops of trees to industrial roundwood quality, but not able to grow wood at the rate of 20 cubic feet/acre/year. Included are areas of low stocking potential and/or very low site index.

Item 5.7.2.14 PREVIOUS GROUND LAND CLASS (PFSL)
[PREV_COND_PNWRS.GROUND_LAND_CLASS_PNW]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS GROUND LAND CLASS must be added. If added, record the code that corresponds to the best ground land class (GLC) description listed below. A related PREVIOUS CONDITION CLASS NOTE is required when correcting a previous crew error.

When collected:	When SAMPLE KIND = 2 and PREVIOUS CONDITION CLASS STATUS = 1
Field width:	3 digits
Tolerance:	No error

Values:	Code	GLC	Description
	120	Timberland	Forest land which is potentially capable of producing at least 20 cubic feet/acre/year at culmination in fully stocked, natural stands (1.4 cubic meters/hectares/year) of continuous crops of trees to industrial roundwood size and quality. Industrial roundwood requires species that grow to size and quality adequate to produce lumber and other manufactured products (exclude fence posts and fuel wood which are not considered manufactured). Timberland is characterized by no severe limitations on artificial or natural restocking with species capable of producing industrial roundwood.
	141	Other forest-rocky	Other forest land which can produce tree species of industrial roundwood size and quality, but which is unmanageable because the site is steep, hazardous, and rocky, or is predominantly nonstockable rock or bedrock, with trees growing in cracks and pockets. Other forest-rocky sites may be incapable of growing continuous crops due to inability to obtain adequate regeneration success.
	142	Other forest-unsuitable site (wetland, subalpine or coastal conifer scrub) (CA only)	Other forest land which is unsuited for growing industrial roundwood because of one of the following environment factors: willow bogs, spruce bogs, sites with high water tables or even standing water for a portion of the year, and harsh sites due to extreme climatic and soil conditions. Trees present are often extremely slow growing and deformed. Examples: whitebark pine, lodgepole, or mountain hemlock stands at timberline; shore pine along the Pacific Ocean (Monterey, Bishop, and Douglas-Fir); willow wetlands with occasional cottonwoods present; Sitka spruce-shrub communities bordering tidal flats and channels along the coast. Includes aspen stands in high-desert areas.
	143	Other forest-pinyon-juniper	Areas currently capable of 10 percent or more tree stocking with forest trees, with juniper species predominating. These areas are not now, and show no evidence of ever having been, 10 percent or more stocked with trees of industrial roundwood form and quality. Stocking capabilities indicated by live juniper trees or juniper stumps and juniper snags less than 25 years dead or cut. Ten percent juniper stocking means 10 percent crown cover at stand maturity. For westernwoodland juniper species (ten percent stocking means 5 percent crown cover at stand maturity)
	144	Other forest-oak (formally oak woodland)	Areas currently 10 percent or more stocked with forest trees, with low quality forest trees of oak, gray pine, madrone, or other hardwood species predominating, and which are not now, and show no evidence of ever having been, 10 percent or more stocked with trees of industrial roundwood form and quality. Trees on these sites are usually short, slow growing, gnarled, poorly formed, and generally suitable only for fuel wood. The following types are included: blue oak, white oak, live oak, oak-gray pine.
	146	(OR & WA only) Other forest-unsuitable site	Other forest land which is unsuited for growing industrial roundwood because of one of the following environment factors: willow bogs, spruce bogs, sites with high water tables or even standing water for a portion of the year, and harsh sites due to climatic conditions. Trees present are often extremely slow growing and deformed. Examples: whitebark pine or mountain hemlock stands at timberline, shore pine along the Pacific Ocean, willow wetlands with occasional cottonwoods present, and sitka spruce-shrub communities bordering tidal flats and channels along the coast. Aspen stands in high-desert areas are considered other forest-unsuitable site.
	148	Other forest-cypress (CA only)	Forest land with forest trees with cypress predominating. Shows no evidence of having had 10 percent or more cover of trees of industrial roundwood quality and species.
	149	Other forest-low productivity (office use only)	(this code will be calculated in the office; field crews should never use this code) Forest land capable of growing crops of trees to industrial roundwood quality, but not able to grow wood at the rate of 20 cubic feet/acre/year. Included are areas of low stocking potential and/or very low site index.
	150	Other forest-curlleaf mountain mahogany	Areas currently capable of 10 percent or more tree stocking with forest trees, with curlleaf mountain mahogany species predominating. These areas are not now, and show no evidence of ever having been, 10 percent or more stocked with trees of industrial roundwood form and quality. 10 percent mahogany stocking means 5 percent crown cover at stand maturity (western woodland species.)

Item 5.7.2.15 SOIL DEPTH (PFSL)
[COND.SOIL_ROOTING_DEPTH_PNW]

Record a code to describe SOIL DEPTH (the depth to which tree roots can penetrate) within each forest land condition class. Required for all forest condition classes. Code this item "1" when more than half of area in the condition class is estimated to be less than 20 inches deep. Ground pumice, decomposed granite, and sand all qualify as types of soil. Use clues such as abundance of rock outcrops, root wads, and soil depth on cutbanks to make the estimate.

When collected:	All accessible forest land condition classes (CONDITION CLASS STATUS = 1)	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	1	$\leq$ 20 inches
	2	> 20 inches

Item 5.7.2.16 PREVIOUS SOIL DEPTH (PFSL)
[PREV_COND_PNWRS.SOIL_ROOTING_DEPTH_PNW]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS SOIL DEPTH must be added. This item describes soil depth within each forest land condition class at the previous measurement. A related PREVIOUS CONDITION CLASS NOTE is required when correcting a previous crew error.

When collected:	When SAMPLE KIND = 2 and PREVIOUS CONDITION CLASS STATUS = 1
Field width:	1 digit
Tolerance:	No errors
Values:	See SOIL DEPTH

Item 5.7.2.17 STAND STRUCTURE (PFSL)
[COND.STND_STRUC_CD_PNWRS]

Record the code that best represents the overall structure of the stand. A related CONDITION CLASS NOTE is required when correcting a previous crew error.

When collected:	All accessible forest land condition classes (CONDITION CLASS STATUS = 1)		
Field width:	1 digit		
Tolerance:	No error		
Values:	Code	Stand Structure	Description
	1	Even-aged single-storied	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. The smaller trees are usually tall spindly members that have fallen behind their associates. The ages of the trees usually do not differ by more than 20 years.
	2	Even-aged two-storied	Stands composed of two distinct canopy layers, such as an overstory with an understory sapling layer possibly due to seed tree and shelterwood operations. This composition may also be found in older plantations where shade-tolerant trees have become established. Two relatively even canopy levels can be recognized in the stand. 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. The average age of each level differs significantly from the other.
	3	Uneven-aged	Theoretically, these stands contain trees of every age on a continuum from seedlings to mature canopy trees. In practice, uneven-aged stands are characterized by a broken or uneven canopy layer. Usually the largest number of trees are in the smaller diameter classes. As trees increase in diameter, their numbers diminish throughout the stand. Many times, instead of producing a negative exponential distribution of diminishing larger diameters, uneven-aged stands behave irregularly with waves of reproduction and mortality. Consider any stand with 3 or more structural layers as uneven-aged. Some kinds of logging disturbances (for example, selection, diameter limit, and salvage cutting) will give a stand an uneven-aged structure.
	4	Mosaic	At least two distinct size classes are represented and these are not uniformly distributed but are grouped in small repeating aggregations, or occur as stringers less than 120 feet wide, throughout the stand. Each size class aggregation is too small to be recognized and mapped as an individual condition. The aggregations may or may not be even-aged.

Item 5.7.2.18 PREVIOUS STAND STRUCTURE (PFSL)
[PREV_COND_PNWRS.STND_STRUC_CD_PNWRS]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS STAND STRUCTURE must be added. This item describes the overall structure of the stand. A related PREVIOUS CONDITION CLASS NOTE is required when correcting a previous crew error.

When collected:	When SAMPLE KIND = 2 and PREVIOUS CONDITION CLASS STATUS = 1
Field width:	1 digit
Tolerance:	No errors
Values:	See STAND STRUCTURE

Item 5.7.2.19 DISTURBANCE 1 (CORE 2.5.16)
[COND.DSTRBCD1]

Record the code corresponding to the presence of the following disturbances. Disturbance can connote positive or negative effects. The area affected by any natural or human-caused disturbance must be at least 1.0 acre in size. Record up to three different disturbances per condition class from most important to least important. This attribute is ancillary; that is, contrasting conditions are never delineated based on variation in this attribute.

For initial plot establishment (SAMPLE KIND =1 or 3), the disturbance must be within the last 5 years. For remeasured plots *(SAMPLE KIND = 2)* recognize only those disturbances that have occurred since the previous inventory.

Disturbance codes require "significant threshold" damage, which implies mortality and/or damage to 25 percent of all trees in a stand or 50 percent of an individual species' count. Additionally, some disturbances affect land and/or vegetation, but initially may not affect vegetation growth or health (e.g., grazing, browsing, flooding). In these cases, a disturbance should be coded when at least 25 percent of the soil surface or understory vegetation has been affected.

Use the general disturbance codes (i.e., 10, 20, etc) only if one of the more specific codes (i.e., 41, 42, etc) does not apply. When coding fire (30), it is important to distinguish ground fire (31) from crown fire (32) where possible. Code “00” if no DISTURBANCE 1 is observed.

When collected:	All accessible forest land condition classes (CONDITION CLASS STATUS = 1); or accessible nonforest condition classes when nonforest is being sampled (NONFOREST CONDITION CLASS STATUS = 2)			
Field width:	2 digits			
Tolerance:	No errors			
Values:	Code	Disturbance		Definition
	00	None		No observable disturbance
	10	Insect damage		
			11	Insect damage to understory vegetation
			12	Insect damage to trees, including seedlings and saplings
	20	Disease Damage		
			21	Disease damage to understory vegetation
			22	Disease *(including mistletoe)* damage to trees, including seedlings and saplings
	30	Fire		Crown or ground fire, either prescribed or natural
			31	Ground fire
			32	Crown fire
	40	Animal Damage		
			41	Beaver – Includes flooding caused by beaver
			42	Porcupine
			43	Deer/Ungulate
			44	Bear
			45	Rabbit
			46	Domestic animal or livestock – Includes grazing
	50	Weather		
			51	Ice
			52	Wind – Includes hurricane, tornado
			53	Flooding – weather induced
			54	Drought
	60	Vegetation		Suppression, competition, vines
	70	Unknown/ unsure/other		*Describe in electronic CONDITION CLASS NOTES*
	80	Human caused damage		Any significant threshold of human caused damage not described in the DISTURBANCE codes listed or in the TREATMENT codes listed. Must include a *an electronic CONDITION CLASS NOTE* to describe further.
	90	Geological Disturbances		
			91	Landslide
			92	Avalanche Track
			93	Volcanic Blast Zone
			94	Other Geologic Event
			95	Earth movements/avalanches

Item 5.7.2.20 PREVIOUS DISTURBANCE 1 (PFSL)
[PREV_COND_PNWRS.DSTRBCD1]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland or measurable nonforest condition class is added (i.e., previous condition or mapping error is corrected), a previous disturbance must be added for the new condition.

When collected:	When SAMPLE KIND = 2 and PREVIOUS CONDITION CLASS STATUS = 1; or PREVIOUS CONDITION STATUS = 2 and PREVIOUS ADMINISTRATIVE FOREST CODE is not null		
Field width:	2 digits		
Tolerance:	No errors		
Values:	Code	Disturbance	Definition
	00	None	No observable disturbance
	10	Insect damage	
	20	Disease Damage	
	30	Fire	Crown or ground fire, either prescribed or natural
		31	Ground fire
		32	Crown fire
	40	Animal Damage	
		41	Beaver – Includes flooding caused by beaver
		42	Porcupine
		43	Deer/Ungulate
		44	Bear
		45	Rabbit
		46	Domestic animal or livestock – Includes grazing
	50	Weather	
		51	Ice
		52	Wind – Includes hurricane, tornado
		53	Flooding – weather induced
		54	Drought
	60	Vegetation	Suppression, competition, vines
	70	Unknown/ unsure/other	
	80	Human caused damage	Any significant threshold of human caused damage not described in the DISTURBANCE codes listed or in the TREATMENT codes listed.
		91	Landslide
		92	Avalanche Track
		93	Volcanic Blast Zone
		94	Other Geologic Event

Item 5.7.2.21 DISTURBANCE YEAR 1 (CORE 2.5.17)
[COND.DSTRBYR1]

Record the year in which DISTURBANCE 1 occurred. If the disturbance occurs continuously over a period of time, record 9999.

When collected:	When DISTURBANCE 1 > 00
Field width:	4 digits
Tolerance:	+/- 1 year for measurement cycles of 5 years
	+/- 2 years for measurement cycles of > 5 years
Values:	*Year that is the same as or* since the previous *annual inventory* plot visit, or *within* the past 5 years for plots visited for the first time; 9999

Item 5.7.2.22 PREVIOUS DISTURBANCE YEAR 1 (PFSL)
[PREV_COND_PNWRS.DSTRBYR1]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland or measurable nonforest condition class is added (i.e., previous condition or mapping error is corrected), a previous disturbance year can be added for the new condition. If added, record the year in which PREVIOUS DISTURBANCE 1 occurred at the previous measurement. If the disturbance occurs continuously over a period of time, record 9999.

When collected:	When SAMPLE KIND = 2 and PREVIOUS DISTURBANCE 1 > 00
Field width:	4 digits
Tolerance:	No errors
Values:	Since the last periodic or within the 5 years prior to the first annual inventory, 9999

Item 5.7.2.23 DISTURBANCE 2 (CORE 2.5.18)
[COND.DSTRBCD2]

Record the second disturbance here. See DISTURBANCE 1 for coding instructions. Code “00” if no DISTURBANCE 2 is observed and DISTURBANCE 1 is greater than “00”.

Item 5.7.2.24 PREVIOUS DISTURBANCE 2 (PFSL)
[PREV_COND_PNWRS.DSTRBCD2]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland or measurable nonforest condition class is added (i.e., previous condition or mapping error is corrected), a previous disturbance can be added for the new condition. See PREVIOUS DISTURBANCE 1 for coding instructions.

Item 5.7.2.25 DISTURBANCE YEAR 2 (CORE 2.5.19)
[COND.DSTRBYR2]

Record the year in which DISTURBANCE 2 occurred. See DISTURBANCE YEAR 1 for coding instructions.

Item 5.7.2.26 PREVIOUS DISTURBANCE YEAR 2 (PFSL)
[PREV_COND_PNWRS.DSTRBYR2]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland or measurable nonforest condition class is added (i.e., previous condition or mapping error is corrected), a previous disturbance year can be added for the new condition. See PREVIOUS DISTURBANCE YEAR 1 for coding instructions.

Item 5.7.2.27 DISTURBANCE 3 (CORE 2.5.20)
[COND.DSTRBCD3]

Record the third disturbance here. See DISTURBANCE 1 for coding instructions. Code “00” if no DISTURBANCE 3 is observed and DISTURBANCE 2 is greater than “00”.

Item 5.7.2.28 PREVIOUS DISTURBANCE 3 (PFSL)
[PREV_COND_PNWRS.DSTRBCD3]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland or measurable nonforest condition class is added (i.e., previous condition or mapping error is corrected), a previous disturbance can be added for the new condition. See PREVIOUS DISTURBANCE 1 for coding instructions.

Item 5.7.2.29 DISTURBANCE YEAR 3 (CORE 2.5.21)
[COND.DSTRBYR3]

Record the year in which DISTURBANCE 3 occurred. See DISTURBANCE YEAR 1 for coding instructions.

Item 5.7.2.30 PREVIOUS DISTURBANCE YEAR 3 (PFSL)
[PREV_COND_PNWRS.DSTRBYR3]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland or measurable nonforest condition class is added (i.e., previous condition or mapping error is corrected), a previous disturbance year can be added for the new condition. See PREVIOUS DISTURBANCE YEAR 1 for coding instructions.

Item 5.7.2.31 HISTORICAL DISTURBANCE 1 (PNW)
[COND.HIST_DSTRBCD1_PNWRS]

Record the corresponding disturbance code for disturbances which occurred more than 5 years prior to the installation of the new annual inventory plot. This data item is only recorded on new annual inventory plots (SAMPLE KIND = 1). If the plot has been measured previously as a periodic plot, use previous plot write-ups and records as guides to code the important historical disturbances affecting the current stand (including those which originated the stand). Use the same procedures and codes used for DISTURBANCE 1.

Note: Null is erroneous for this data item; code “00” if no HISTORICAL DISTURBANCE 1 is observed.

When collected:	All accessible forest land condition classes on new installations (SAMPLE KIND = 1 and CONDITION CLASS STATUS = 1)
Field width:	2 digits
Tolerance:	No errors
Values:	See DISTURBANCE 1 (Item 5.7.2.19)

Item 5.7.2.32 PREVIOUS HISTORICAL DISTURBANCE 1 (PFSL)
[PREV_COND_PNWRS.HIST_DSTRBCD1_PNWRS]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS HISTORICAL DISTURBANCE 1 must be added for the new condition. If added, record the corresponding disturbance code for disturbances before Oc4 (last periodic inventory). If the plot was measured at Oc4, only record this item if the Oc4 crew missed this item in their coding.

Item 5.7.2.33 HISTORICAL DISTURBANCE YEAR 1 (PNW)
[COND.HIST_DSTRBYR1_PNWRS]

Record the year in which HISTORICAL DISTURBANCE 1 occurred.

When collected:	When HISTORICAL DISTURBANCE 1 > 00
Field width:	4 digits
Tolerance:	+/- 1 year for measurement cycles of 5 years
	+/- 2 years for measurement cycles of > 5 years
Values:	Year that is prior to the previous plot visit, or > 5 years ago for plots visited for the first time

Item 5.7.2.34 PREVIOUS HISTORICAL DISTURBANCE YEAR 1 (PFSL)
[PREV_COND_PNWRS.HIST_DSTRBYR1_PNWRS]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS HISTORICAL DISTURBANCE YEAR 1 can be added for the new condition. If added, record the year in which PREVIOUS HISTORICAL DISTURBANCE 1 occurred.

Item 5.7.2.35 HISTORICAL DISTURBANCE 2 (PNW)
[COND.HIST_DSTRBCD2_PNWRS]

If a stand has experienced more than one historical disturbance, record the second disturbance here. Use the same procedures and codes used for HISTORICAL DISTURBANCE 1. Code “00” if no HISTORICAL DISTURBANCE 2 is observed and HISTORICAL DISTURBANCE 1 is greater than “00”.

Item 5.7.2.36 PREVIOUS HISTORICAL DISTURBANCE 2 (PFSL)
[PREV_COND_PNWRS.HIST_DSTRBCD2_PNWRS]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS HISTORICAL DISTURBANCE 2 can be added for the new condition. If added, record the corresponding disturbance code for disturbances before Oc4 (last periodic inventory). If the plot was measured at Oc4, only record this item if the Oc4 crew missed this item in their coding.

Item 5.7.2.37 HISTORICAL DISTURBANCE YEAR 2 (PNW)
[COND.HIST_DSTRBYR2_PNWRS]

Record the year in which HISTORICAL DISTURBANCE 2 occurred. Use the same procedures and codes used for HISTORICAL DISTURBANCE YEAR 1.

Item 5.7.2.38 PREVIOUS HISTORICAL DISTURBANCE YEAR 2 (PFSL)
[PREV_COND_PNWRS.HIST_DSTRBYR2_PNWRS]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS HISTORICAL DISTURBANCE YEAR 2 can be added for the new condition. If added, record the year in which PREVIOUS HISTORICAL DISTURBANCE 2 occurred.

Item 5.7.2.39 HISTORICAL DISTURBANCE 3 (PNW)
[COND.HIST_DSTRBCD3_PNWRS]

If a stand has experienced more than two historical disturbances, record the third disturbance here. Use the same procedures and codes used for HISTORICAL DISTURBANCE YEAR 1. Code “00” if no HISTORICAL DISTURBANCE 3 is observed and HISTORICAL DISTURBANCE 2 is greater than “00”.

Item 5.7.2.40 PREVIOUS HISTORICAL DISTURBANCE 3 (PFSL)
[PREV_COND_PNWRS.HIST_DSTRBCD3_PNWRS]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS HISTORICAL DISTURBANCE 3 can be added for the new condition. If added, record the corresponding disturbance code for disturbances before Oc4 (last periodic inventory). If the plot was measured at Oc4, only record this item if the Oc4 crew missed this item in their coding.

Item 5.7.2.41 HISTORICAL DISTURBANCE YEAR 3 (PNW)
[COND.HIST_DSTRBYR3_PNWRS]

Record the year in which HISTORICAL DISTURBANCE 3 occurred. Use the same procedures and codes used for HISTORICAL DISTURBANCE YEAR 1.

Item 5.7.2.42 PREVIOUS HISTORICAL DISTURBANCE YEAR 3 (PFSL)
[PREV_COND_PNWRS.HIST_DSTRBYR3_PNWRS]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS HISTORICAL DISTURBANCE YEAR 3 can be added for the new condition. If added, record the year in which PREVIOUS HISTORICAL DISTURBANCE 3 occurred.

Item 5.7.2.43 TREATMENT 1 (CORE 2.5.22)
[COND.TRTCD1]

Forestry treatments are a form of disturbance. These human *caused* disturbances are recorded separately here for ease of coding and analysis. The term treatment further implies that a silvicultural application has been prescribed. This does not include occasional stumps of unknown origin or sparse removals for firewood, Christmas trees, or other miscellaneous purposes. The area affected by any treatment must be at least 1.0 acre in size *(codes 14 and 15 may not seem to meet this area size requirement, yet almost always reflect a localized treatment applied or allowed across a large enough landscape to qualify).* If a tree on the plot has been cut (removed or not) there should be a corresponding "best fit" code for a condition class treatment. Record up to three different treatments per condition class from most important to least important as best as can be determined. This attribute is ancillary; that is, contrasting conditions are never delineated based on variation in this attribute.

For initial plot establishment (*of the annual inventory* SAMPLE KIND = 1 or 3), the treatment must be within the last *five* years. For remeasured plots *(SAMPLE KIND = 2)* recognize only those treatments that have occurred since the previous inventory.

Code the general treatment codes (i.e., 10, 20, etc) only if one of the more specific codes (i.e., 11, 12, etc) does not apply. Code “00” if no TREATMENT 1 is observed.

When collected:	All accessible forest land condition classes (CONDITION CLASS STATUS = 1)			
Field width:	2 digits			
Tolerance:	No errors			
Values:	Code	*Treatment*	*Description*	Core codes (office use only)
	00	None	No observable treatment.	00
	10	Cutting	The removal of one or more trees from a stand.	10
	11	Clearcut	Residual trees of all sizes have < 25 percent crown cover.The residual trees usually are cull trees and low-value hardwoods. Not a firewood or local use harvest.	10
	12	Partial cut (heavy) (>20 percent removed)	Remaining trees comprise > 25 percent crown cover and >20 percent of the trees live and 5.0 inches DBH/DRC or larger were harvested. The residual stand usually consists of commercially desirable trees.Not a firewood or local use harvest.	10
	13	Partial cut (light) (<20 percent removed)	Remaining trees comprise > 25 percent crown cover and < 20 percent of the trees live and 5.0 inches DBH/DRC or larger were harvested. The residual stand usually consists of commercially desirable trees.Not a firewood or local use harvest.	10
	14	Firewood or local use cut	The harvest of trees for firewood, or the harvest of trees for products manufactured and used locally by “do-it-yourselfers”, often on the ship of origin, for improvements such as buildings, bridges and fences. This code does not require a 1.0-acre minimum size.	10
	15	Incidental cut	Includes 1) the haphazard, seemingly random harvest of occasional trees in an otherwise undisturbed stand, or 2) any harvest activity that does not qualify as another kind of disturbance. Trees may have been cut and left on site or cut and transported off site.This code does not require a 1.0-acre minimum size.	10
	16	Precommercial thin	An intermediate harvest in which excess growing stock are cut but not removed.	10
	17	Improvement cut	Cutting of commercial-sized, unsalable trees to free crop trees from competition. Improvement cutting differs from a commercial thinning in that the trees cut are not marketable.	10
	20	Site preparation	Clearing, slash burning, chopping, disking, bedding, or other practices clearly intended to prepare a site for either natural or artificial regeneration.	20
	30	Artificial regeneration	Following a disturbance or treatment (usually cutting), a new stand where at least 50 percent of the live trees present resulted from planting or direct seeding.	30
	31	Planting through-out the stand	Planting the area to establish a manageable stand.	30
	32	Planting within nonstocked holes in the stand	Planting of nonstocked openings to fill-in or create a manageable stand.	30
	33	Underplanting	Planting under a sawtimber overstory.	30
	40	Natural regeneration	Following a disturbance or treatment (usually cutting), a new stand where at least 50 percent of the live trees present (of any size) were established through the growth of existing trees and/or natural seeding or sprouting.	40
	50	Other silvicultural treatment	The use of fertilizers, herbicides, girdling, pruning or other activities (*not already listed above*) designed to improve the commercial value of the residual stand, or chaining, which is a practice used on woodlands to encourage wildlife forage.	50
	51	Stand conversion	Killing of low-value or unmarketable trees-often hardwoods-and planting of the area to establish a manageable stand. Most commonly, low-value hardwood stands are converted to conifer stands.	50
	52	Clean and release	Killing or suppression of undesirable, competing vegetation-usually brush or hardwoods-from a manageable stand. A herbicide treatment in young, regenerated stands is one method of clean and release.	50
	60	Chaining	Removal or killing of undesired woody species, not a silvicultural treatment.	50

Item 5.7.2.44 PREVIOUS TREATMENT 1 (PFSL)
[PREV_COND_PNWRS.TRTCD1_PNWRS]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland or measurable nonforest condition class is added (i.e., previous condition or mapping error is corrected), a previous treatment must be added for the new condition. If added, record the code corresponding to the presence of a treatment since the last periodic inventory or within the 5 years prior to the first annual inventory.

When collected:	When SAMPLE KIND = 2 and (PREVIOUS CONDITION CLASS STATUS = 1) or (PREVIOUS CONDITION CLASS STATUS = 2 and PREVIOUS ADMINISTRATIVE FOREST CODE is not null)
Field width:	2 digits
Tolerance:	No errors
Values:	see TREATMENT 1

Item 5.7.2.45 TREATMENT YEAR 1 (CORE 2.5.23)
[COND.TRTYR1]

Record the year in which TREATMENT 1 occurred.

When collected:	When TREATMENT 1 > 00
Field width:	4 digits
Tolerance:	+/- 1 year for measurement cycles of 5 years
	+/- 2 years for measurement cycles of > 5 years
Values:	*Year that is the same or* since the previous *annual inventory* plot visit, or *within* the past *five* years for plots visited for the first time

Item 5.7.2.46 PREVIOUS TREATMENT YEAR 1 (PFSL)
[PREV_COND_PNWRS.TRTYR1]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland or measurable nonforest condition class is added (i.e., previous condition or mapping error is corrected), a previous treatment year can be added for the new condition. If added, record the year in which PREVIOUS TREATMENT 1 occurred.

When collected:	When SAMPLE KIND = 2 and PREVIOUS TREATMENT 1 > 00
Field width:	4 digits
Tolerance:	No errors
Values:	Since the last periodic or within the 5 years prior to the first annual inventory

Item 5.7.2.47 TREATMENT 2 (CORE 2.5.24)
[COND.TRTCD2]

If a stand has experienced more than one treatment, record the second treatment here. See TREATMENT 1 for coding instructions*. Code "*00*" if no TREATMENT 2 is observed and TREATMENT 1 is greater than "00".*

Item 5.7.2.48 PREVIOUS TREATMENT 2 (PFSL)
[PREV_COND_PNWRS.TRTCD2_PNWRS]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland or measurable nonforest condition class is added (i.e., previous condition or mapping error is corrected), a previous treatment can be added for the new condition. If added, record the code corresponding to the presence of a treatment since the last periodic inventory or within the 5 years prior to the first annual inventory.

See PREVIOUS TREATMENT 1 for coding instructions, code 00 if none.

Item 5.7.2.49 TREATMENT YEAR 2 (CORE 2.5.25)
[COND.TRTYR2]

Record the year in which TREATMENT 2 occurred. See TREATMENT YEAR 1 for coding instructions.

Item 5.7.2.50 PREVIOUS TREATMENT YEAR 2 (PFSL)
[PREV_COND_PNWRS.TRTYR2]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland or measurable nonforest condition class is added (i.e., previous condition or mapping error is corrected), a previous treatment year can be added for the new condition. If added, record the year in which PREVIOUS TREATMENT 2 occurred.

Item 5.7.2.51 TREATMENT 3 (CORE 2.5.26)
[COND.TRTCD3]

If a stand has experienced more than two treatments, record the third treatment here. See TREATMENT 1 for coding instructions*. Code "*00*" if no TREATMENT 3 is observed and TREATMENT 2 is greater than "00"*.

Item 5.7.2.52 PREVIOUS TREATMENT 3 (PFSL)
[PREV_COND_PNWRS.TRTCD3_PNWRS]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland or measurable nonforest condition class is added (i.e., previous condition or mapping error is corrected), a previous treatment can be added for the new condition. If added, record the code corresponding to the presence of a treatment since the last periodic inventory or within the 5 years prior to the first annual inventory.

See PREVIOUS TREATMENT 1 for coding instructions, code 00 if none.

Item 5.7.2.53 TREATMENT YEAR 3 (CORE 2.5.27)
[COND.TRTYR3]

Record the year in which TREATMENT 3 occurred. See TREATMENT YEAR 1 for coding instructions.

Item 5.7.2.54 PREVIOUS TREATMENT YEAR 3 (PFSL)
[PREV_COND_PNWRS.TRTYR3]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland or measurable nonforest condition class is added (i.e., previous condition or mapping error is corrected), a previous treatment year can be added for the new condition. If added, record the year in which PREVIOUS TREATMENT 3 occurred.

Item 5.7.2.55 HISTORICAL TREATMENT 1 (PNW)
[COND.HIST_TRTCD1_PNWRS]

Record the corresponding treatment that occurred more than 5 years prior to the installation of the new annual inventory plot (SAMPLE KIND = 1); this data item is not recorded on remeasurement plots (SAMPLE KIND = 2). If the plot has been measured previously as a periodic plot, use previous plot write-ups and records as guides to code the important historical treatments affecting the current stand (including those which originated the stand). Note: Null is erroneous for this variable. Code "00" if no HISTORICAL TREATMENT 1 is observed.

When collected:	All accessible forest land condition classes on new installations (CONDITION CLASS STATUS = 1 and SAMPLE KIND = 1)
Field width:	2 digits
Tolerance:	No errors
Values:	Use the same procedures and codes used for TREATMENT 1 (Item 5.7.2.43)

Item 5.7.2.56 PREVIOUS HISTORICAL TREATMENT 1 (PFSL)
[PREV_COND_PNWRS.HIST_TRTCD1_PNWRS]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS HISTORICAL TREATMENT 1 must be added for the new condition. If added, record the corresponding disturbance code for disturbances before Oc4 (last periodic inventory). If the plot was measured at Oc4, only record this item if the Oc4 crew missed this item in their coding.

Item 5.7.2.57 HISTORICAL TREATMENT YEAR 1 (PNW)
[COND.HIST_TRTYR1_PNWRS]

Record the year in which HISTORICAL TREATMENT 1 occurred.

When collected:	When HISTORICAL TREATMENT 1 > 00
Field width:	4 digits
Tolerance:	+/- 1 year for measurement cycles of 5 years
	+/- 2 years for measurement cycles of > 5 years
Values:	Year that is prior to the previous plot visit, or > 5 years ago for plots visited for the first time

Item 5.7.2.58 PREVIOUS HISTORICAL TREATMENT YEAR 1 (PFSL)
[PREV_COND_PNWRS.HIST_TRTYR1_PNWRS]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS HISTORICAL TREATMENT YEAR 1 can be added for the new condition. If added, record the year in which PREVIOUS HISTORICAL TREATMENT 1 occurred.

Item 5.7.2.59 HISTORICAL TREATMENT 2 (PNW)
[COND.HIST_TRTCD2_PNWRS]

If the stand has experienced more than one historical treatment, record the second treatment here. Use the same procedures and codes used for HISTORICAL TREATMENT 1. Code “00” if no HISTORICAL TREATMENT 2 is observed and HISTORICAL TREATMENT 1 is greater than “00”.

Item 5.7.2.60 PREVIOUS HISTORICAL TREATMENT 2 (PFSL)
[PREV_COND_PNWRS.HIST_TRTCD2_PNWRS]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS HISTORICAL TREATMENT 2 can be added for the new condition. If added, record the corresponding disturbance code for disturbances before Oc4 (last periodic inventory). If the plot was measured at Oc4, only record this item if the Oc4 crew missed this item in their coding.

Item 5.7.2.61 HISTORICAL TREATMENT YEAR 2 (PNW)
[COND.HIST_TRTYR2_PNWRS]

Record the year in which HISTORICAL TREATMENT 2 occurred. Use the same procedures and codes used for HISTORICAL TREATMENT 1.

Item 5.7.2.62 PREVIOUS HISTORICAL TREATMENT YEAR 2 (PFSL)
[PREV_COND_PNWRS.HIST_TRTYR2_PNWRS]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS HISTORICAL TREATMENT YEAR 2 can be added for the new condition. If added, record the year in which PREVIOUS HISTORICAL TREATMENT 2 occurred.

Item 5.7.2.63 HISTORICAL TREATMENT 3 (PNW)
[COND.HIST_TRTCD3_PNWRS]

If the stand has experienced more than two historical treatments, record the third treatment here. Use the same procedures and codes used for HISTORICAL TREATMENT 1. Code “00” if no HISTORICAL TREATMENT 3 is observed and HISTORICAL TREATMENT 2 is greater than “00”.

Item 5.7.2.64 PREVIOUS HISTORICAL TREATMENT 3 (PFSL)
[PREV_COND_PNWRS.HIST_TRTCD3_PNWRS]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS HISTORICAL TREATMENT 3 can be added for the new condition. If added, record the corresponding disturbance code for disturbances before Oc4 (last periodic inventory). If the plot was measured at Oc4, only record this item if the Oc4 crew missed this item in their coding.

Item 5.7.2.65 HISTORICAL TREATMENT YEAR 3 (PNW)
[COND.HIST_TRTYR3_PNWRS]

Record the year in which HISTORICAL TREATMENT 3 occurred. Use the same procedures and codes used for HISTORICAL TREATMENT 1.

Item 5.7.2.66 PREVIOUS HISTORICAL TREATMENT YEAR 3 (PFSL)
[PREV_COND_PNWRS.HIST_TRTYR3_PNWRS]

A downloaded value that cannot be updated by the current crew. However, if a previous accessible forestland condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS HISTORICAL TREATMENT YEAR 3 can be added for the new condition. If added, record the year in which PREVIOUS HISTORICAL TREATMENT 3 occurred.

Item 5.7.2.67 CHAINING CODE (CORE 2.5.37)
[COND.CHAINING_CD]

Record the code identifying if a condition has been chained, shear bladed, roller chopped, etc., for the purpose of increased forage production. These treatments contrast with silvicultural removals in that little or none of the woody material is removed from the site and there are few residual live trees.

When collected:	When CONDITION CLASS STATUS = 1 or 2	
Field width:	1 digit	
Tolerance:	No errors	
Values:	0	No
	1	Yes

Item 5.7.2.68 LAND COVER CLASS (CORE 2.5.29)
[COND.LAND_COVER_CLASS_CD]

Record this variable for all mapped conditions. When multiple LAND COVER CLASSes occur within a mapped condition, then classify based on first LAND COVER CLASS encountered within the condition. As with CONDITION CLASS STATUS, LAND COVER CLASSes must meet the minimum area and width requirements (except those cases where the condition has been defined due to developed land uses, such as roads and rights-of-ways). As with other condition attributes, inclusions (of less than 1 acre) within the condition should be ignored when assigning the LAND COVER CLASS.

Assignment of LAND COVER CLASS code is hierarchical in nature, and should be performed using the following hierarchical key. Following the guidance of the key, codes should be examined in succession, and the first definition which describes the area of the condition should be chosen. For example, if an area has 15% tree cover that is taller than the 50% shrub cover, it is classified as class 01 (Treeland). Note: Treeland is not equivalent to Forestland (e.g., a recent clearcut could be Forestland, but would not be Treeland). Vegetative cover, as used below, includes the area of ground covered by the vertical projection of the live plant canopy (or other vegetation components like flowers, basal structures or vines) on the area defined by the condition. If foliage is absent due to senescence or dormancy, the cover should be estimated based on the position of plant remains or other evidence of the foliar distribution during the growing season. If burned, then classify based on the remaining live vegetation, including the canopy cover of remaining live trees and shrubs.

When the land surface of a condition is covered by deep non-permanent snow, ice, or water, and/or a condition is defined as CONDITION CLASS STATUS 5 (denied access or hazardous), field crews should use aerial imagery, local knowledge, and field observations to best determine LAND COVER CLASS.

Full Land Cover Class Definitions

- **Dominant:** Refers to the highest (tallest) life form present, typically trees, then shrubs, then herbaceous layers.
- **Predominant:** Refers to the cover class with the highest percent cover in the condition.
- **Vegetated:** Contains at least 10% vegetation cover (modification of NVCS 2008)
- **Sparsely Vegetated:** Does not contain at least 10% vegetation cover

- **Natural vegetation** is defined as vegetation where ecological processes primarily determine species and site characteristics; that is, vegetation comprised of a largely spontaneously growing set of plant species that are shaped by both site and biotic processes. Human activities influence these interactions to varying degrees (e.g., logging, livestock grazing, fire, introduced pathogens), but do not eliminate or dominate the spontaneous processes. Wherever doubt exists as to the naturalness of a vegetation type (e.g., old fields, various forest plantations), it is classified as part of the natural / semi-natural vegetation (NVCS 2008).
- **Semi-natural vegetation** typically encompasses vegetation types where the species composition and/or vegetation growth forms have been altered through anthropogenic disturbances such that no clear natural analogue is known, but they are a largely spontaneous set of plants shaped by ecological processes. Natural (or near-natural) and semi-natural vegetation are part of a continuum of change within natural vegetation that reflects varying degrees of anthropogenic and other disturbances (NVCS 2008). Semi-natural vegetation includes vegetation types where the current structure and/or composition is anthropic, but where it is obvious that natural processes have since resumed (e.g., agricultural lands that have naturally reverted to forest).
- **Anthropic Vegetation** is defined as vegetation with a distinctive structure, composition, and development determined by regular human activity. Developed vegetation has typically been planted or treated, and has relatively distinctive growth form, floristic, or site features when compared to natural vegetation. Distinctive growth form and structural attributes typically include one or more of the following:
    a. Dominant herbaceous vegetation that is regularly-spaced and/or growing in rows, often in areas with substantial cover of bare soil for significant periods of the year, usually determined by tillage or chemical treatment.
    b. Dominant vegetation with highly-manipulated growth forms or structure rarely found as a result of natural plant development, usually determined by mechanical pruning, mowing, clipping, etc.
    c. Dominant vegetation comprised of species not native to the area that have been intentionally introduced to the site by humans and that would not persist without active management by humans (NVCS 2008).

Land Cover Classification Key

Follow the key in sequence. **If a class described the condition, then look no further.**

1. >10% vegetative Cover = **Vegetated**, else 2.

1. 1. Areas where the majority of vegetation (>50% relative cover) has been highly-manipulated = **Anthropic Vegetation**, else 1.2

1. 1. 1. Areas that are predominantly covered by vegetation grown for the production of food, non-woody fiber, and/or ornamental horticulture, including land in any stage of annual crop production, and land being regularly cultivated for production of crops from perennial plants = **06 Agricultural Vegetation**

1. 1. 2. Other areas predominantly covered by vegetation with highly-manipulated growth forms = **07 Developed, Vegetated**

1. 2. Areas where majority of vegetation (>50% relative cover) is natural or semi-natural = **Natural/ Semi-natural Vegetation**

1. 2. 1. Areas on which trees provide 10% or greater canopy cover and are part of the dominant (uppermost) vegetation layer, including areas that have been planted to produce woody crops = **01 Treeland**

1. 2. 2. Areas on which shrubs provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer = **02 Shrubland**

1. 2. 3. Areas on which herbaceous vegetation provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer = **03 Grassland**

1. 2. 4. Areas on which non-vascular vegetation provide 10% or greater cover and are part of the dominant vegetation layer = **04 Non-vascular Vegetation**

1. 2. 5. Areas with 10% or greater vegetative cover but no one life form has 10% or more cover = **05 Mixed Vegetation**

2. <10% vegetative cover = **Sparsely Vegetated**

2\. 1. Areas persistently and predominantly covered by water (census and noncensus water, permanent snow and ice) and with less that 10% cover of emergent vegetation. = **10 Water**

2\. 2. Areas predominantly covered with constructed materials with limited plant life = **09 Developed**

2\. 3. Natural areas with limited vegetation. Areas predominantly covered by bare rock, gravel, sand, silt, clay, or other earthen material, with little (<10% cover) or no "green" vegetation present regardless of its inherent ability to support life = **08 Barren**

When collected:	All condition classes (CONDITION CLASS STATUS = 1, 2, 3, 4, 5)		
Field width:	2 digits		
Tolerance:	No errors		
Values:	Codes are >10% vegetative cover:		
	01	Treeland	Areas on which trees provide 10% or greater canopy cover and are part of the dominant (uppermost) vegetation layer, including areas that have been planted to produce woody crops. Only include tree species that can be tallied in the region, i.e., that are on the regional species list. Example areas include forests, forest plantations, reverting fields with ≥10% tree canopy cover, clearcuts with ≥10% tree canopy cover. This category includes cypress swamps and mangroves (not to be confused with aquatic vegetation).
	02	Shrubland	Areas on which shrubs or subshrubs provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer, provided these areas do not qualify as Treeland. **Shrub/Subshrub** — a woody plant that generally has several erect, spreading, or prostrate stems which give it a bushy appearance. This includes dwarf shrubs, and low or short woody vines (NVCS 2008) and excludes any species on FIA's tree list. Examples include cranberry bogs and other shrub-dominated wetlands, chaparral, and sagebrush.
	03	Grassland	Areas on which herbaceous vegetation provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer, provided these areas do not qualify as Treeland or Shrubland. This includes herbs, forbs, and graminoid species. Examples include meadows and prairies. Grazed land is also included, but not if the pasture is improved to such an extent that it meets the requirements for Agricultural Vegetation. This category also includes emergent wetland vegetation like seasonally flooded grasslands, cattail marshes, etc.
	04	Non-vascular Vegetation	Areas on which non-vascular vegetation provide 10% or greater cover and are part of the dominant vegetation layer, provided these areas do not qualify as Treeland, Shrubland, or Grassland. Examples include mosses, sphagnum moss bogs, liverworts, hornworts, lichens, and algae.
	05	Mixed Vegetation	Areas with 10% or greater vegetative cover but no one life form has 10% or more cover. That is, these areas do not qualify as Treeland, Shrubland, Grassland, or Non-vascular Vegetation, and thus are a mixture of plant life forms. Examples can include early stages of reverting fields and high deserts.
	06	Agricultural Vegetation	Areas that are dominated by vegetation grown for the production of crops (food, non-woody fiber and/or ornamental horticulture), including land in any stage of annual crop production, and land being regularly cultivated for production of crops from perennial plants. Agricultural vegetation shows a) rapid turnover in structure, typically at least on an annual basis, either through harvesting and/or planting, or by continual removal of above ground structure (e.g., cutting, haying, or intensive grazing), or b) showing strong linear (planted) features. The herbaceous layer may be bare at various times of the year (NVCS 2008). Examples include row crops and closely sown crops; sod farms, hay and silage crops; orchards (tree fruits and nuts, Christmas trees, nurseries of trees and shrubs), small fruits, and berries; vegetables and melons; unharvested crops; cultivated or improved pasture; idle cropland (can include land in cover and soil-improvement crops and cropland on which no crops were planted) (NRI Field guide). When idle or fallow land ceases to be predominantly covered with manipulated vegetation, then it is no longer Agricultural Vegetation.
	07	Developed, Vegetated	Areas predominantly covered by vegetation with highly-manipulated growth forms (usually by mechanical pruning, mowing, clipping, etc.), but are not Agricultural. This vegetation type typically contains an almost continuous herbaceous (typically grass) layer, with a closely cropped physiognomy, typically through continual removal of above ground structure (e.g., cutting, mowing), and where tree cover is highly variable, or other highly manipulated planted gardens (NVCS 2008). Examples can include lawns, maintained utility rights-of-way, office parks, and cemeteries.

	Codes are < 10% cover		
	08	Barren	Natural areas of limited plant life (< 10%). Areas generally characterized by bare rock, gravel, sand, silt, clay, or other earthen material, with little or no "green" vegetation present regardless of its inherent ability to support life. Examples include naturally barren areas such as lava fields, gravel bars and sand dunes, as well as areas where land clearance has removed the vegetative cover. Can include the natural material portions of quarries, mines, gravel pits, and cut or burned land <10% vegetation.
	09	Developed	Areas predominantly covered with constructed materials with limited plant life (< 10%). Examples include completely paved surfaces like roads, parking lots and densely developed urban areas.
	10	Water	Areas persistently covered and predominated by water and have <10% emergent vegetative cover. Examples include census and noncensus water and permanent snow and ice. For example, only the open water portion of a bog is to be included.

Item 5.7.2.69 PLANT ASSOCIATION (PFSL)
[COND.HABTYPCD1; PREV_COND_PNWRS.HABTYPCD1]

Plant associations describe the climax or mature plant community on a site based on the combined abundance of all vascular plant species (trees, shrubs, and forbs). They are used to infer climate conditions and to link plots to other information on suitability for management, productivity, and habitat.

Oregon, Washington, and R6 Forest Service administered lands in California (Siskiyou NF and Rogue River NF): Most of the land in these areas have plant association guides applicable to forested lands (see maps in Appendix C for which guides to use where). Some areas on R6 Forest Service administered lands also have nonforest plant associations available (e.g., the Oregon Dunes). In these areas, the plant association code is a 6-digit code that describes the predominant plant association of the site. The first two digits describe the series, defined by the climax (most shade tolerant) tree species found in the reproduction layer, the third and fourth digits relate to the dominant lifeform in the understory (e.g., shrub, forb, or grass) and the fifth and sixth digits relate to understory vegetation composition. The code is downloaded for condition class 1 if recorded at the previous visit. If the downloaded code is a 4-digit code, it should be updated to the full 6-digit association if at all possible. For some woodland and range types, 4-digit codes are the best available and are acceptable to use. In these situations, PLANT ASSOCIATION NONSAMPLED REASON (Item 5.7.2.70) must be recorded.

If no guide exists to cover the area a plot is in, or if a stand is too young (less than 30 years old) or too disturbed to determine the full plant association, keep the previous 4-digit code if available or record the first two digits of the plant association series from the table below. In these situations, PLANT ASSOCIATION NONSAMPLED REASON (Item 5.7.2.70) must be recorded.

Code	Plant Community Association
CA	Sub-alpine fir, Mountain hemlock, Whitebark pine (open forest)
CC	Western redcedar
CD	Douglas-fir
CS	Sitka spruce
CE	Sub-alpine fir, Englemann spruce (closed forest)
CF	Silver fir, Noble fir
CH	Western hemlock
CJ	Juniper, Pinyon pine
CL	Lodgepole pine (climax or seral)
CM	Mountain hemlock
CP	Ponderosa pine, Jeffrey pine
CW	White fir, Grand fir
CX	Coniferous forest
HX	Hardwood forest
HA	Alder
HB	Bigleaf maple
HC	Cottonwood, Ash bottomland, Overflow bottomland
HO	Oregon white oak
HQ	Quaking aspen
HT	Tanoak

Colville, Spokane, and Warm Springs Indian Reservations: Use the FIA version of these publications and record the 6-digit code assigned to each plant association (e.g., CDS715).

On remeasurement plots (SAMPLE KIND = 2), previous PLANT ASSOCIATION will be downloaded if one was recorded at the last visit. Field crews are required to verify that the downloaded code is reasonable for the condition class. Updates to the downloaded code should be made only if one of the following situations applies:

1. No code was entered previously but now there is one that describes the stand.
2. The code can be more specific (i.e., a 2- or 4-digit code was used in Oregon or Washington, but a 6-letter code is available)
3. The previous code is an obvious error or typo.
4. The previous code is from the wrong plant association series.
5. The previous code is from the wrong plant association guide book.

When collected:	When CONDITION CLASS STATUS = 1 or 2, ADMINISTRATIVE FOREST CODE = 0601-0699, and plant association guides are available: or When CONDITION CLASS STATUS = 1, STATE = 41 or 53, ADMINISTRATIVE FOREST CODE = null, and plant association guides are available: or Downloaded when SAMPLE KIND = 2, ADMINISTRATIVE FOREST CODE = 0601-0699, and PLANT ASSOCIATION was recorded at the previous visit.
Field width:	6-digits (2- or 4-digits in some situations) in Washington, Oregon, and on all R6 Forest Service administered lands
Tolerance:	No errors
Values:	Specific for each guide (see Appendix C, Plant Association Reference)

Item 5.7.2.70 PLANT ASSOCIATION NONSAMPLED REASON (PFSL)
[COND.HABTYPCD1_NSMP_REASN_CD_PNWRS]

If a PLANT ASSOCIATION was not collected, or the recorded PLANT ASSOCIATION code is not a valid 6-character code (i.e., a 2- or 4-letter code was recorded), record the appropriate reason.

When collected:	When CONDITION CLASS STATUS = 1 or 2, ADMINISTRATIVE FOREST CODE = 0601-0699, and PLANT ASSOCIATION code was not collected; or When CONDITION CLASS STATUS = 1 or 2, ADMINISTRATIVE FOREST CODE = 0601-0699, and PLANT ASSOCIATION code was not collected or is not a valid 6-character code; or When STATE = 41 or 53, CONDITION CLASS STATUS = 1, ADMINISTRATIVE FOREST CODE = null, and PLANT ASSOCIATION code was not collected or is not a valid 6-character code.	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	Null	PLANT ASSOCIATION was sampled.
	1	Plot is in Oregon (STATE = 41) or Washington (STATE = 53) and either a) no guide covers the area the plot is in, or b) the appropriate code in the guide is a 4-digit code. Note: Code 1 should be used if a 2- or 4-letter code was recorded for PLANT ASSOCIATION (PLANT ASSOCIATION PUBLICATION is required when a 4-digit code is recorded).
	2	Stand is too young (e.g., <30 years old)
	3	Stand is too disturbed (e.g., site disturbed within 10 years and dominated by weedy species, native plants in low abundance so determining relative abundance is not reliable).
	4	Other (explain in the electronic CONDITION CLASS NOTES)

Item 5.7.2.71 PLANT ASSOCIATION PUBLICATION (PFSL)
[COND.HABTYPCD1_PUB_CD]

Record the code identifying the PLANT ASSOCIATION PUBLICATION used to determine a PLANT ASSOCIATION for the plot. If the appropriate code in the publication used at the current visit is a 4-digit code, record a PLANT ASSOCIATION PUBLICATION (note: this data item is not required when a downloaded 4-digit code from the previous visit cannot be updated).

When collected:	When PLANT ASSOCIATION NONSAMPLED REASON = null and: CONDITION CLASS STATUS = 1 or 2, ADMINISTRATIVE FOREST CODE = 0601-0699, and plant association guides are available; or CONDITION CLASS STATUS = 1, STATE = 41 or 53, ADMINISTRATIVE FOREST CODE = null, and plant association guides are available. When PLANT ASSOCIATION NONSAMPLED REASON = 1 and a 4-digit code was recorded for PLANT ASSOCIATION.	
Field width:	3 digits	
Tolerance:	No errors	
Values	Code	Publication:
	608	Plant association and management guide for the pacific silver fir zone, Gifford Pinchot National Forests (R6-ECOL-130A-1983)
	610	Plant associations of the Crooked River National Grassland, Ochoco National Forest (R6-ECOL-133-1983)
	613	Plant association and management guide for the western hemlock zone, Gifford Pinchot National Forest (R6-ECOL-230A-1986)
	614	Plant association and management guide for the western hemlock zone, Mt. Hood National Forest (R6-ECOL-232A-1986)
	615	Plant associations of the Wallowa-Snake Province, Wallowa-Whitman National Forest (R6-ECOL-TP-255B-86)
	617	Riparian zone associations, Deschutes, Ochoco, Fremont, and Winema National Forests (R6-ECOL-TP-279-87)
	618	Forested plant associations of the Olympic National Forest (R6-ECOL-TP-001-88)
	619	Plant association and management guide for the ponderosa pine, Douglas-fir, and grand fir zones, Mt. Hood National Forest (R6-ECOL-TP-004-88)
	620	Plant association and management guide for the grand fir zone, Gifford Pinchot National Forest (R6-ECOL-TP-006-88)
	621	Field guide to the forested plant associations of the Mt. Baker-Snoqualmie National Forest (R6-ECOL-TP-028-91)
	622	Plant associations of the Blue and Ochoco Mountains (R6-ERW-TP-036-92)
	623	Plant association and management guide for the mountain hemlock zone, Gifford Pinchot and Mt. Hood National Forests (R6-MTH-GP-TP-08-95)
	626	Field guide for forested plant associations of the Wenatchee National Forest (PNW-GTR-359)
	627	Forested plant associations of the Colville National Forest (PNW-GTR-360)
	631	Forest habitat types of the Colville Indian Reservation
	635	Plant association guide for the commercial forest of the Warm Springs Indian Reservation
	638	Forest habitat types of the Spokane Indian Reservation
	639	Pacific Northwest ecoclass codes for seral and potential natural communities (Nonforest plant association guide: PNW-GTR-418)
	641	Field guide to the forested plant associations of southwestern Oregon (R6-NR-ECOL-TP-17-96)
	642	Plant associations of the Oregon Dunes National Recreation Area (R6-NR-ECOL-TP-09-98)
	647	Field guide to the forested plant associations of the westside central Cascades of northwest Oregon (R6-NR-ECOL-TP-02-02)
	648	Field guide to the forested plant associations of the northern Oregon Coast Range (R6-NR-ECOL-TP-03-02)
	653	Forested plant associations of the Oregon east Cascades (R6-NR-ECOL-TP-2007)

SUBSECTION 5.7.3 DETERMINING CONDITION CLASSES ON NONFOREST LAND

Within measurable nonforest (NONFOREST SAMPLING STATUS = 1 and NONFOREST CONDITION CLASS STATUS = 2), nonforest land (CONDITION CLASS STATUS = 2) may be subdivided into condition classes that are based on differences in OWNER GROUP, RESERVED STATUS, and NONFOREST LAND USE. See Subsection 5.2.2, NONFOREST LAND, for information on plots that are entirely nonforest.

Item 5.7.3.1 PRESENT NONFOREST LAND USE (CORE 2.5.30)
[COND.PRESNFCD]

Record this attribute for every nonforest condition class sampled. When areas that were sampled and classified at last inventory as accessible forest land have changed from forest to nonforest, this variable is used to track land use change. Conversions from forest to nonforest become new nonforest conditions whenever they occur, except when a previously defined nonforest condition has expanded into an adjacent previously defined forest condition.This expanded condition will be captured through boundary changes on respective subplots and does not constitute a new separate condition.If a macroplot has an accessible forest land or measurable nonforest land condition class present within the 58.9-foot radius, map each nonforest land condition class present. Do not combine nonforest condition classes. Use normal procedures to map and measure other condition classes (i.e., Census water, noncensus water, and nonsampled conditions, CONDITION STATUS = 3, 4, or 5).

> Example: If accessible forest land, nonforest urban land, and nonforest cropland are all present within a 58.9-foot fixed-radius plot, map the forest land condition and map each nonforest land use as a separate condition class (size and width requirements for condition class delineation must be met, or one of five exceptions to the delineation rules must apply).

If there is no accessible forest land or measurable nonforest land condition class present within a macroplot's 58.9-foot radius, then the only nonforest condition class delineated will be the one present at the subplot center ignoring any other nonforest condition classes that may be present. Use normal procedures to map and measure other condition classes (i.e., Census water, noncensus water, and nonsampled conditions, CONDITION STATUS = 3, 4, or 5).

> Example: If nonforest urban land and nonforest cropland make up the entirety of a 58.9-foot fixed-radius macroplot, record only the condition class which occupies the subplot center.

When no accessible forest land condition or measurable nonforest condition classes exist within any of the 58.9-foot fixed-radius macroplots, do not delineate nonforest condition classes. Record only one condition and designate the PRESENT NONFOREST LAND USE that is located at plot center for all subplots.

When collected:	All nonforest conditions (CONDITION CLASS STATUS = 2)		
Field width:	2 digits		
Tolerance:	No errors		
Values:	Code	Land Use	Definition
	10	Agricultural land	Land managed for crops, pasture, or other agricultural use; the area must be at least 1.0 acre in size and 120.0 feet wide (with the exception of windbreak/shelterbelt, which has no minimum width). Use code 10 only for cases not better described by one of the following:
		11 Cropland	*i.e., mint, wheat, rye, corn, planted berry fields, vineyards*
		12 Pasture	Improved through cultural practices *such as grading and mowing*
		13 Idle farmland	
		14 Orchard	
		15 Christmas tree plantation	
		16 Maintained wildlife opening	
		17 Windbreak/ Shelterbelt	
	20	Rangeland *(Grass/ Forb/Shrub land)*	Land primarily composed of grasses, forbs, or shrubs. This includes lands vegetated naturally or artificially to provide a plant cover managed like native vegetation and does not meet the definition of pasture, vegetated wetlands or chaparral. The area must be at least 1.0 acre in size and 120.0 feet wide
	30	Developed	Land used primarily by humans for purposes other than forestry or agriculture. Use the code 30 only for land not better described by one of the following:
		31 Cultural or Urban:	Business (industrial/commercial), residential, and other places of intense human activity
		32 Rights-of-way:	Improved roads, railway, power lines, maintained canal
		33 Recreation:	Parks, skiing, golf courses
		34 Mining	
	40	Other	Land parcels greater than 1.0 acre in size and greater than 120.0 feet wide, which do not fall into one of the uses described above *or below*. Examples include undeveloped beaches, barren land (rock, sand), marshes, bogs, ice, and snow. Use the 40 code only for cases not better described by one of the following:
		41 *Naturally n*onvegetated	*Barren rock, sand, lava, glaciers (ice), undeveloped beaches, glacial outwash*
		42 *Vegetated w*etland	*Vegetated lands where at some period in the year, the water table is usually at or near the surface, or the land is covered by shallow water. Includes: swamps, peatlands (bogs, fens, muskegs), marshes, and tidal flats*
		43 Beach	
		45 Nonforest-Chaparral	*Areas covered with heavily branched dwarfed trees or shrubs, usually evergreen, the crown canopy of which currently covers greater than 10 percent of the ground. The principal species are dwarf Quercus, Cercocarpus, Garrya, Ceanothus, Arctostaphylos, Baccharis, and Adenostoma. Areas in which the predominant cover is Artemisia, Purshia, Gutierrezia, Opuntia, or semi-desert species are considered rangeland (code 20).*

Item 5.7.3.2 PREVIOUS NONFOREST LAND USE (PFSL) [PREV_COND_PNWRS.PRESNFCD_PNWRS]

A downloaded value that cannot be updated by the current crew. However, if a previous nonforest condition class is added (i.e., previous condition or mapping error is corrected), a PREVIOUS NONFOREST LAND USE must be added. If added, record the PREVIOUS NONFOREST LAND USE for all nonforest conditions (Condition Status 2). Use the codes and classifications listed in NONFOREST LAND USE. There are five new NONFOREST LAND USE codes that would not have been in the previous inventories. Do not update previous information with these new codes (16, 17, 34, 42 and 43) since they were added to the field manual in 2010 and 2011.

When collected:	When SAMPLE KIND = 2 and PREVIOUS CONDITION STATUS = 2
Field width:	2 digits
Tolerance:	No errors
Values:	See NONFOREST LAND USE, excluding codes 16, 17, 34, 42, 43

SECTION 5.8 DETERMINATION OF CROWN COVER VALUES FOR LAND USE CLASSIFICATION

SUBSECTION 5.8.1 INTRODUCTION

This section describes the procedures and data items needed to populate the condition-level canopy cover variables (Item 5.8.1.2, LIVE CANOPY COVER (CORE 2.5.32), Item 5.8.1.3, LIVE PLUS MISSING CANOPY COVER (CORE 2.5.33), and Item 5.8.1.6, TOTAL STEMS (CORE 2.5.36)). The procedures should be used whenever LIVE PLUS MISSING CANOPY COVER is not obviously less than 5 percent or not obviously greater than 10 percent. The procedures are also needed for a sensitivity analysis that will assess the differences between a crown cover and a stocking definition of accessible forest land. Therefore, this study will also be conducted on plots when it is questionable whether the condition is 10 percent stocked.

Two sets of data will be collected for the study:

1. Cover plot information
2. Stocking tree data

Item 5.8.1.1 CANOPY COVER SAMPLE METHOD (CORE 2.5.31) [COND.CANOPY_CVR_SAMPLE_METHOD_CD]

Tree cover and stocking data will be collected on the following plot configurations:

1. A single, fixed-area one acre plot that is a 118-foot radius circle
2. Four fixed-area quarter acre subplots that are 58.9-foot radius circles

These cover plot configurations must be entirely within one condition class. When there is only one condition class present on the plot either the single, fixed-area one acre plot should be established from the center of subplot 1 on the FIA annual plot layout *or* the four fixed area quarter acre subplots should be established from the center of subplots 1, 2, 3, and 4 on the FIA annual plot layout.

When multiple condition classes occur on the plot, only use the four fixed-area subplot configuration to collect stocking and cover data. Locate “phantom” cover subplots following the installation instructions below so they are completely within one condition class until you have four of them, or you reach both 25 percent stocking and 25 percent cover. Do not move phantom subplots to better represent the condition in question if phantom subplots fall in sparsely-treed areas or heavier-treed areas. Make sure to note the location of each cover subplot on the plot diagram on the plot card.

<u>Record the CANOPY COVER SAMPLE METHOD used to determine LIVE CANOPY COVER and LIVE PLUS MISSING CANOPY COVER for the condition. If the ocular method is not used, the appropriate plot-based method should be selected according to the condition's dimensions and shape.</u>

<u>Ocular method - The Ocular method is only used in areas that are obviously *less than 5 percent* LIVE PLUS MISSING CANOPY COVER or obviously greater than 10 *percent* LIVE PLUS MISSING CANOPY COVER. In addition to visual inspections of what is on the ground, crews can also use various types of aerial imagery to help determine LIVE CANOPY COVER and LIVE PLUS MISSING CANOPY COVER values using this method. The Ocular method may also be used on *CONDITION STATUS* 2 *conditions* where access to the</u>

nonforest landcover area may be limited, or the nonforest condition is a developed nonforest land use. Note that when the Ocular method is used, it is likely to be easier for the observer to ignore subplot boundaries and assess the percentage of tree canopy cover over the condition in question, without regard to the locations of the stems supporting the canopy over the plot.

Acre and subplot method - When the ocular method is not appropriate, refer to data items Item 5.8.1.2, LIVE CANOPY COVER (CORE 2.5.32), Item 5.8.1.3, LIVE PLUS MISSING CANOPY COVER (CORE 2.5.33), and Item 5.8.1.6, TOTAL STEMS (CORE 2.5.36). If LIVE PLUS MISSING CANOPY COVER appears to be greater than 5 percent but not obviously greater than 10 percent, or a stocking check is needed, trees must be tallied and crowns measured to determine cover and stocking. The acre method refers to the use of a single 1 acre plot or four 1/4 acre subplots.

Phantom plot installation - Install phantom subplots as necessary to yield four 1/4-acre sample areas that fall entirely within the questionable condition. Record the location of these phantom or temporary subplots on your four point plot sketch and monument. Establish phantom plots using the following protocol *(Figure 5.14)*:

a. Begin by locating the phantom subplots using the "highest" numbered regular subplot that falls *entirely* in the questionable condition (e.g., 4 is the highest numbered regular subplot, next 3 and then 2). The phantom subplots are located in the following fashion: (1) 120.0 feet at 360 degrees, (2) 120.0 feet at 120 degrees, then (3) 120.0 feet at 240 degrees.
b. If this fails to yield 4 subplots that fall entirely within the questionable condition, install the remaining phantom subplots off the next highest numbered regular subplot that falls in the questionable condition.
c. If this fails to produce a suitable location, rotate the phantom subplot off the other phantom subplots in the attempted order of installation until 4 subplots have been located in the questionable condition.

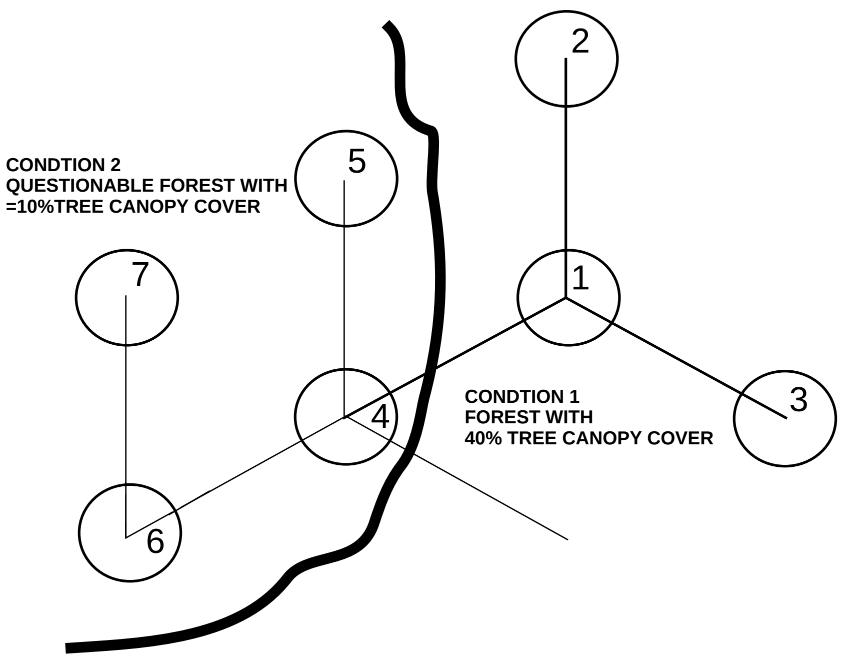


Figure 5.14: Example of the subplot method phantom subplots.

The general guide for installing phantom cover subplots is: Install the next phantom cover subplot off the highest FIA subplot entirely within the condition, until all the FIA subplots have been exhausted. Then put in the next phantom cover subplot off the last established phantom cover subplot. For narrow, linear conditions, phantom subplots should be placed methodically within the condition (e.g. divide the length of the strip by 5 to determine the distance between subplots).

When collected:	CONDITION CLASS STATUS = 1, 2, or 5
Field width:	1 digit
Tolerance:	None

Values:	Code	Description	Core codes (office use only)
	1	Ocular method	1
	3	Acre method (one 118 foot radius plot installed)	3
	5	Acre method (four 58.9 foot radius plots installed)	3

Item 5.8.1.2 LIVE CANOPY COVER (CORE 2.5.32)
[COND.LIVE_CANOPY_CVR_PCT]

Record the percentage of LIVE CANOPY COVER for the condition. Include live tally trees, saplings, and seedlings that cover the sample area. For conditions where the LIVE CANOPY COVER is low and there is a question whether it meets 10 percent LIVE *PLUS MISSING* CANOPY COVER, the crew will measure every crown width within the canopy cover sample area *and enter the Total Live Canopy Cover percent from the stocking/cover calculator (always round down to the nearest percent)*. LIVE CANOPY COVER can be based on an ocular estimate when the condition in question is certain to contain *less than 5 percent or* greater than 10 *percent* LIVE PLUS MISSING CANOPY COVER or CURRENT AFFORESTATION CODE =1 and TOTAL STEMS greater than or equal to 150. For LIVE CANOPY COVER <1 percent (trace), record 01.

Do not include the crown portion of trees, saplings, or seedlings that are vertically overtopped by other trees, saplings or seedlings.

When collected:	All CONDITION CLASS STATUS = 1, 2, or 5
Field width:	2 digits
Tolerance:	0 - 12% - No errors
	13 - 20% - 10% error
	21 - 100% - 25% errror
Values:	00 - 99 (where 99 = 99-100 %)

Item 5.8.1.3 LIVE PLUS MISSING CANOPY COVER (CORE 2.5.33)
[COND.LIVE_MISSING_CANOPY_CVR_PCT]

Record the percentage of LIVE PLUS MISSING CANOPY COVER for the condition by adding the LIVE CANOPY COVER plus the estimated missing canopy cover that existed prior to disturbance (harvesting, fire, etc). Include live and dead and removed tally trees, saplings, and seedlings. Dead trees and dead portions of live trees are not considered as missing unless it is part of the condition disturbance *treatment, historical disturbance, or historical treatment.* Only include dead or removed tally trees, saplings, and seedlings that appear to have died or been removed within the last 30 years. When CANOPY COVER SAMPLE METHOD > 1, enter the Total Live Plus Missing Cover percent from the stocking/cover calculator. *Otherwise, b*ase the estimate on field observations, aerial photos, historical aerial imagery, and similar evidence of undisturbed conditions. The total of the LIVE PLUS MISSING CANOPY COVER cannot exceed 100 *percent*.

When collected:	All CONDITION CLASS STATUS = 1, 2 or 5
Field width:	2 digits
Tolerance:	0 - 12% - No errors
	13 - 20% - 10% error
	21 - 100% - 25% error
Values:	00 - 99 (where 99 = 99-100%)

Item 5.8.1.4 CURRENT AFFORESTATION CODE (CORE 2.5.34)
[COND.AFFORESTATION_CD]

Record the code identifying a condition that has no evidence of prior forest, but does have evidence suggesting deliberate afforestation attempts (planted or prepared to promote tree establishment) to convert to forest in the current inventory cycle or since the last measurement.

When collected:	When CONDITION CLASS STATUS = 1 or 2	
Field width:	1 digit	
Tolerance:	No errors	
Values:	0	No
	1	Yes

Item 5.8.1.5 PREVIOUS AFFORESTATION CODE (CORE 2.5.35)
[COND.PREV_AFFORESTATION_CD]

Record the code identifying a condition that has no evidence of prior forest, but does have evidence suggesting deliberate afforestation attempts (planted or prepared to promote tree establishment) to convert to forest the prior inventory cycle or prior to the last measurement.

When collected:	When SAMPLE KIND = 2 and CONDITION CLASS STATUS = 1 or 2	
Field width:	1 digit	
Tolerance:	No errors	
Values:	0	No
	1	Yes

Item 5.8.1.6 TOTAL STEMS (CORE 2.5.36)
[COND.NBR_LIVE_STEMS]

Record TOTAL STEMS when CURRENT AFFORESTATION CODE = 1 or PREVIOUS AFFORESTATION CODE = 1All CONDITION CLASS STATUS = 1 or 2. When CANOPY COVER SAMPLE METHOD > 1, the number of live stems per acre will be auto-populated by the data recorder. When CANOPY COVER SAMPLE METHOD = 1, conduct a stem count of live tally tree species within either the single one acre plot or four quarter acre plots and record the number counted.

When collected:	CURRENT AFFORESTATION CODE = 1 or PREVIOUS AFFORESTATION CODE = 1
Field width:	5 digits
Tolerance:	10%
Values:	00000 - 99999

Item 5.8.1.7 STOCKING PERCENT (PNW)
[COND.STOCKING_PCT_PNWRS]

Record the total percentage of stocking for the cover subplot(s). Manually enter the value of the computed total from the stocking/cover calculator in the PDR (round down to the nearest percent).

When collected:	All CONDITION CLASS STATUS = 1 or 2 and CANOPY COVER SAMPLE METHOD > 1
Field width:	2 digits
Tolerance:	No errors
Values:	01 to 99

Item 5.8.1.8 STOCKING MAXIMUM DBH/DRC (PNW)
[COND.STOCKING_MAX_DBH_CD_PNWRS]

Record a code describing the largest diameter at breast height (DBH) or diameter at root collar (DRC) of any tree within the established cover subplot area. This will determine which stocking values are used in the stocking/cover calculator in the PDR. If you need to update this value while collecting stocking data, the PDR will automatically re-compute stocking values in the stocking/cover calculator.

When collected:	All CONDITION CLASS STATUS = 1 or 2 and CANOPY COVER SAMPLE METHOD > 1	
Field width:	1 digits	
Tolerance:	No errors	
Values:	Code	Definition
	1	Largest DBH/DRC is a seedling
	2	Largest DBH/DRC is between 1.0-1.9 inches
	3	Largest DBH/DRC is between 2.0-2.9 inches
	4	Largest DBH/DRC is between 3.0-3.9 inches
	5	Largest DBH/DRC is between 4.0-4.9 inches
	6	Largest DBH/DRC is 5.0 inches or above

Item 5.8.1.9 COVER PLOT NOTES (PNW)
[COND.NOTES]

Record notes pertaining to a stocking plot as needed to explain or describe the plot or condition. Include any COVER PLOT NOTES in the electronic CONDITION CLASS NOTES (Item 5.11.1.2) field (a separate field for COVER PLOT NOTES is not available).

When collected:	All cover plots
Field width:	2000 characters
Tolerance:	N/A
Values:	English language words, phrases and numbers

SUBSECTION 5.8.2 COVER TREE DATA ITEMS

For every tree within a cover subplot area, collect the data items in this subsection. Only include dead trees and stumps if you would have used them on a normal stocking subplot in previous years (or those that appear to be less than 30 years old if you are not sure of previous practice). For the purpose of this study, the definition of a tree includes seedlings and saplings.

As trees are entered into the PDR stocking/cover calculator, STOCKING PERCENT and LIVE PLUS MISSING CANOPY COVER will be computed and displayed in the data recorder. Once the STOCKING PERCENT and LIVE PLUS MISSING CANOPY COVER both reach 25 percent, additional trees do not need to be collected.

Item 5.8.2.1 COVER SUBPLOT (PNW)
[STOCKING_TREE_PNWRS.SUBP]

Record the COVER SUBPLOT that trees are collected on. When using the single 118-foot circle, stocking subplot 1 (code 1) is the only valid entry.

When collected:	When CANOPY COVER SAMPLE METHOD > 1	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Definition
	1	Cover subplot 1
	2	Cover subplot 2
	3	Cover subplot 3
	4	Cover subplot 4

Item 5.8.2.2 CONDITION CLASS NUMBER (PNW)
[STOCKING_TREE_PNWRS.CONDID]

Record the CONDITION CLASS NUMBER each cover tree represents.

When Collected:	All cover trees
Field width:	1 digit
Tolerance:	No errors
Values:	1 to 9

Item 5.8.2.3 COVER TREE STATUS (PNW)
[STOCKING_TREE_PNWRS.STATUSCD]

Record the COVER TREE STATUS for every stocking and cover tree.

When collected:	When CANOPY COVER SAMPLE METHOD > 1	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Definition
	1	Live tree
	2	Dead tree
	3	Stump

Item 5.8.2.4 OVER TOPPED STATUS (PNW)
[STOCKING_TREE_PNWRS.OVER_TOP_STATUS]

Record the over topped status for every stocking and cover tree. Note that live trees may be over topped by recently dead trees.

When collected:	When CANOPY COVER SAMPLE METHOD > 1	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Definition
	1	A portion of crown or missing crown is over topped
	2	No piece of the crown or missing crown is over topped

Item 5.8.2.5 COVER TREE SPECIES (PNW)
[STOCKING_TREE_PNWRS.SPCD]

Record the COVER TREE SPECIES. The tree species in the table below do not have a stocking equation; enter the species code for ponderosa pine (122) to use the stocking values for ponderosa pine and put the actual species in the COVER TREE NOTES field.

Note: the surrogate, ponderosa pine, is derived from information in the 2001 report.

“National Algorithms for Determining Stocking Class, Stand Size Class, and Forest Type for Forest Inventory and Analysis Plots”.

Tree Species not in Stocking Tables	
Name	Code
Border pinyon	134
Mexican pinyon pine	140
Great Basin bristlecone pine	142
Gamble oak	814
New Mexico locust	902
Tesota, Arizona ironwood	990

When collected:	When CANOPY COVER SAMPLE METHOD > 1
Field width:	3 digits
Tolerance:	No errors
Values:	Appendix D, Tree Species Lists

Item 5.8.2.6 COVER TREE DIAMETER (PNW)
[STOCKING_TREE_PNWRS.DIA]

Record the COVER TREE DIAMETER to the nearest 0.1 inch. Use normal methods for measuring DBH and DRC.

Diameter point of measurement monumentation is not required on cover trees. If you suspect the cover tree will become a tally tree, insert a nail at diameter point of measurement.

Stumps: enter the diameter that you measure. Diameter for a stump is the average of two width measurements perpendicular to each other, across the top of the stump. The PDR program will automatically use a taper equation to estimate diameter at breast height based on the value entered into this data item. If you are calculating stocking on paper, remember to subtract two inches from your measured stump diameter (on DBH trees). DBH measured as 2.9 inches becomes 0.1 inches (a seedling).

Seedlings: enter the diameter as 0001.

Woodland species: use the DRC calculator the PDR to calculate DRC.

When collected:	When CANOPY COVER SAMPLE METHOD > 1
Field width:	4 digits
Tolerance:	Same as tree tally diameter
Values:	000.1 and 001.0 to 999.9

SUBSECTION 5.8.3 CROWN MEASUREMENTS

Crown measurements will be taken as a “long” crown width and a “short” crown width. Measure COVER TREE LONG CROWN WIDTH where the crown is the widest, from the drip line at one edge to the drip line at the other edge. Make the second measurement (COVER TREE SHORT CROWN WIDTH) at the widest portion of the crown perpendicular to the “long” crown width axis. Use the same procedures described above. Determine drip line end points by projecting where crown edge branch tips would hit the ground if they fell. Occasionally, a branch may protrude abnormally, but the crown line is drawn across the portion of the branch which includes the “normal outline” of the tree. It is helpful to use a clinometer to measure a line perpendicular to the ground. If you cannot see the crown edge from directly beneath the drip line, move away from the tree to make your estimate. Do not combine crowns of single stem trees that overlap or are overtopped by another tree. All measurements are rounded to the nearest foot. See Figure 5.15: LONG CROWN WIDTH is measured on the widest portion of the crown, as seen from above. SHORT CROWN WIDTH is the widest portion of the crown perpendicular to the LONG CROWN WIDTH axis, and Figure 5.16: Leaning tree crown width measurements, for examples of how to measure crowns. If portions of the tree crown are overtopped by an adjacent tree or trees, additional measurements are required of the COVER TREE LONG CROWN WIDTH, non overtopped portion and the COVER TREE SHORT CROWN WIDTH, non-overtopped portion. These will be used to calculate condition-level canopy cover.

Crown measurements are required for dead trees and stumps. Use neighboring live trees in the condition of the same species and of similar diameter and/or height to estimate crown lengths and widths. When there are no live trees in the condition because of a clearcut or burn, go to an adjacent stand of similar composition.

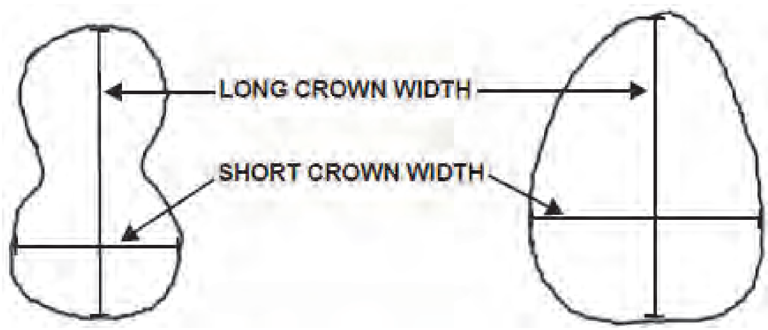


Figure 5.15: LONG CROWN WIDTH is measured on the widest portion of the crown, as seen from above. SHORT CROWN WIDTH is the widest portion of the crown perpendicular to the LONG CROWN WIDTH axis

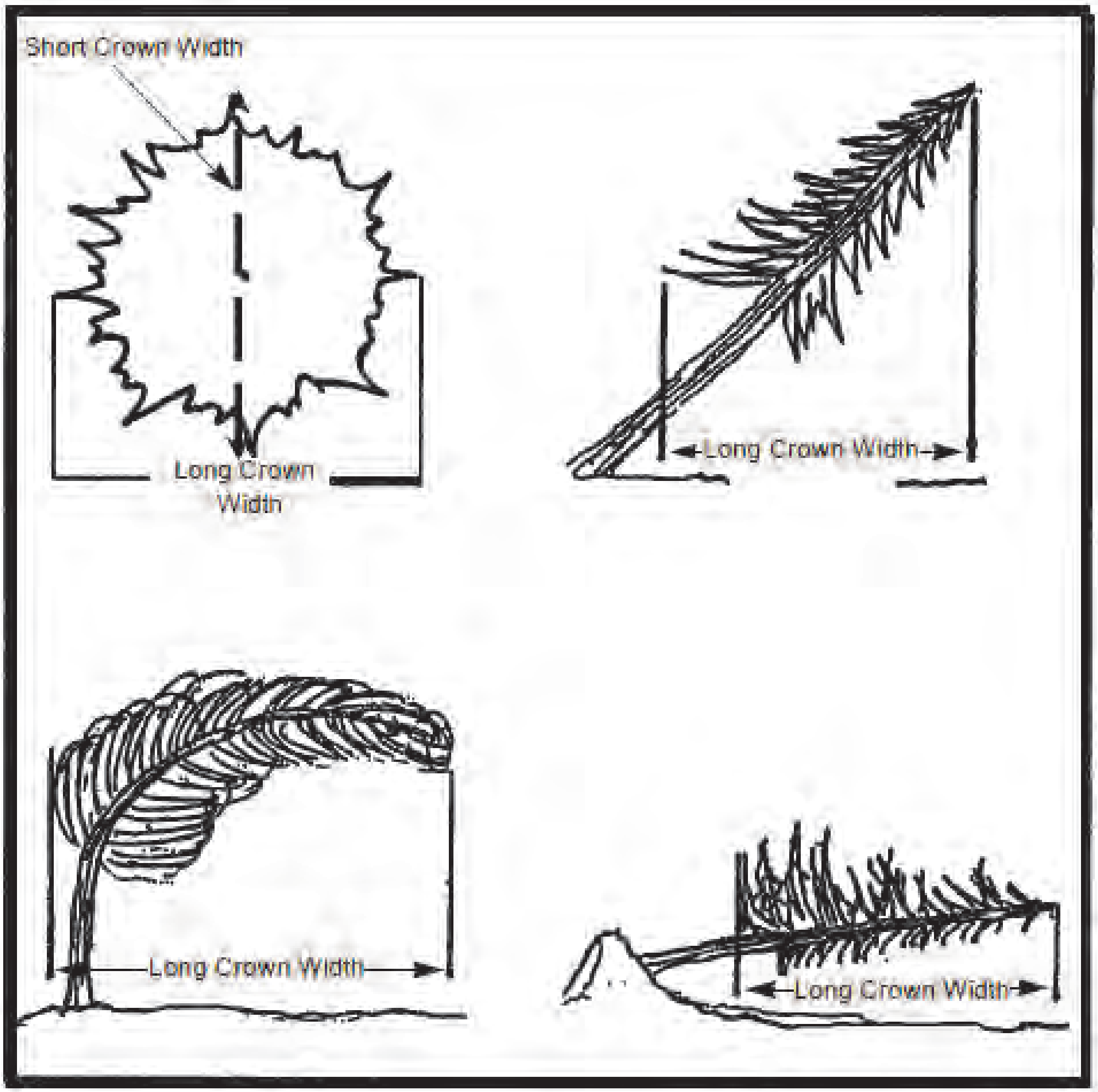


Figure 5.16: Leaning tree crown width measurements

Item 5.8.3.1 COVER TREE COMMINGLED CROWN CODE (PNW)
[STOCKING_TREE_PNWRS.COMMNGLD_CROWN_CODE]

Use this code when it is not possible to accurately measure the crowns of individual trees in a multi-stemmed tree (e.g., a canyon live oak that forks into three trees) or in a clump of trees. Record the same numeric code for each stem in a multi-stemmed tree or clump. Assign code “01” to all stems in the first multi-stemmed tree or clump, and number consecutively as additional multi-stemmed trees or clumps are encountered. Only the first tree in each commingled crown code group will have the crown widths recorded (measure the entire crown including all of the trees). This alleviates field crews from estimating crown widths of closely clumped trees. Enter “00” if each tree’s crown is distinct and can be measured individually.

Do not use this code on crowns of single stem trees that overlap (e.g., a seedling crown is overtopped by a neighboring tree crown). Be careful not to combine species (e.g., canyon live oak and interior live oak) within a commingled crown group.

Also use this code for seedlings of the same species (but not saplings or trees) when it increases the quality of the crown cover estimate. There are two situations that might cause one to do this: 1) an actual clump of seedlings makes it difficult to accurately measure each individual crown (and non-overtopped portion), and 2) Because crown diameters are measured to the nearest foot, numerous scattered seedlings with crowns <1 foot diameter would sum to a highly biased cover. Crews will use the commingled crown coding scheme and group seedlings together using an ocular estimate of crown cover. Note that this "group" of seedlings must form an imaginary circle (not a square) and that the diameters of the long crown length and short crown length must be given. It takes 4 seedlings with a 0.5 foot crown width to equal the cover of one seedling with a 1.0 foot crown width.

Note: This variable does not apply to woodland species because DRC stocking is computed using the calculated DRC, not each individual stem's diameter.

When collected:	When CANOPY COVER SAMPLE METHOD > 1
Field width:	2 digits
Tolerance:	N/A
Values:	00-99

Item 5.8.3.2 COVER TREE LONG CROWN WIDTH (CROWN LENGTH) (PNW)
[STOCKING_TREE_PNWRS.CROWN_WIDTH_LONG]

Record the cover tree crown width measured at the widest part of the crown. Measurements are taken to the nearest foot from one edge of the crown to the other edge of the crown.

When collected:	When CANOPY COVER SAMPLE METHOD > 1
Field width:	2 digits
Tolerance:	N/A
Values:	01-99

Item 5.8.3.3 COVER TREE SHORT CROWN WIDTH (CROWN WIDTH) (PNW)
[STOCKING_TREE_PNWRS.CROWN_WIDTH_SHORT]

Record the cover tree crown width measured at the widest point of the crown that is perpendicular to the long crown width measurement, to the nearest foot.

When collected:	When CANOPY COVER SAMPLE METHOD > 1
Field width:	2 digits
Tolerance:	N/A
Values:	01-99

Item 5.8.3.4 COVER TREE LONG CROWN WIDTH, non-over topped portion (PNW)
[STOCKING_TREE_PNWRS.CROWN_WIDTH_NON_OVER_LONG]

Record the cover tree crown width at its widest point that is not over topped to the nearest foot. Measure between the non-overtopped edges along the same axis as the LONG CROWN WIDTH was measured.

When collected:	When CANOPY COVER SAMPLE METHOD > 1 and OVER TOPPED STATUS = 1
Field width:	2 digits
Tolerance:	N/A
Values:	00-99, 0 when 100 percent overtopped

Item 5.8.3.5 COVER TREE SHORT CROWN WIDTH, non-over topped portion (PNW)
[STOCKING_TREE_PNWRS.CROWN_WIDTH_NON_OVER_SHORT]

Record the cover tree crown width at its shortest point that is not over topped to the nearest foot. Measure between the non-overtopped edges along the same axis as the SHORT CROWN WIDTH was measured.

When collected:	When CANOPY COVER SAMPLE METHOD > 1 and OVER TOPPED STATUS = 1
Field width:	2 digits
Tolerance:	N/A
Values:	00-99, 0 when 100 percent overtopped

Item 5.8.3.6 COVER TREE STOCKING CONTRIBUTION (PNW)
[STOCKING_TREE_PNWRS.STOCK_CONTRB]

The value of a single tree's contribution to stocking will be computed based on the STOCKING MAXIMUM DBH code and the tree's species and diameter for the combined area of the cover plots used. This value is automatically computed by the stocking/cover calculator in the data recorder. This value will not be computed until the STOCKING MAXIMUM DBH (Item 5.8.1.8) is entered.

When collected:	When CANOPY COVER SAMPLE METHOD > 1
Field width:	5 digits (x.yyy)
Tolerance:	N/A
Values:	0.001 to 4.000 percent

Item 5.8.3.7 COVER TREE COVER CONTRIBUTION (PNW)
[STOCKING_TREE_PNWRS.COVER_CONTRB]

The value of a single tree's contribution to percent cover will be computed based on the non-overtopped crown width measurements. The area of an ellipse is computed from the non-over topped crown widths and will be divided by the cover plot area to produce the cover percentage. This value is automatically computed by the stocking/cover calculator in the data recorder.

When collected:	When CANOPY COVER SAMPLE METHOD > 1
Field width:	5 digits (xx.yy)
Tolerance:	N/A
Values:	00.00 to 18.00 percent

Item 5.8.3.8 COVER TREE NOTES (PFSL)
[STOCKING_TREE_PNWRS.NOTES]

Record notes pertaining to an individual stocking tree.

When Collected:	All stocking trees as necessary
Field width:	2000 characters
Tolerance:	N/A
Values:	English language words, phrases and numbers

SECTION 5.9 NONSAMPLED CONDITION CLASS ATTRIBUTES

Nonsampled land (CONDITION CLASS STATUS = 5) may be subdivided into condition classes that are based on differences in nonsampled reason. See Subsection 5.2.5, NONSAMPLED, Possibility of Forest, for information on plots that are entirely nonsampled.

When encountering an area where CONDITION NONSAMPLED REASON (Item 5.9.0.1) is constant but attributes differ, record attributes that apply to the greater part of the area within the nonsampled condition class.

Example: Subplot center is accessible forestland, but there is a hazardous area delineated on the macroplot.

RESERVED STATUS, OWNER GROUP, GROUND LAND CLASS, ESTIMATED NONSAMPLED LAND COVER TYPE, and NONSAMPLED FOREST TYPE will be recorded for the nonsampled condition. If there is an ownership boundary between two OWNER GROUPS on plot within the nonsampled area, the difference in OWNER GROUP is ignored and the OWNER GROUP is assigned based on the condition that covers more area on the macroplot.

Item 5.9.0.1 CONDITION NONSAMPLED REASON (CORE 2.4.3)
[COND.COND_NONSAMPLE_REASN_CD_PNWRS]

For portions of plots that cannot be sampled (CONDITION CLASS STATUS = 5), record one of the following reasons.

When collected:	When CONDITION CLASS STATUS = 5		
Field width:	2 digits		
Tolerance:	No errors		
Values:	Code	Nonsampled Reason	Core code (office use only)
	01	Outside U.S. boundary – Assign this code to condition classes beyond the U.S. border.	01
	02	Denied access area – Any area within the sampled area of a plot to which access is denied by the legal owner, or to which an owner of the only reasonable route to the plot denies access. There are no minimum area or width requirements for a condition class delineated by denied access. Because a denied-access condition can become accessible in the future, it remains in the sample and is re-examined at the next occasion to determine if access is available.	02
	03	Hazardous situation – Any area within the sampled area on plot that cannot be accessed because of a hazard or danger, for example cliffs, quarries, strip mines, illegal substance plantations, temporary high water, etc. Although the hazard is not likely to change over time, a hazardous condition remains in the sample and is re-examined at the next occasion to determine if the hazard is still present. There are no minimum size or width requirements for a condition class delineated by a hazardous condition.	03
	06	Lost plot - Entire plot cannot be found. Used for the single condition that is required for this plot. Used only in conjunction with PLOT NONSAMPLED REASON code 06. Can be either generated by the data recorder or in the office.	06
	08	Skipped visit - Entire plot skipped. Used for the single condition that is required for this plot. Applied at the time of processing and used only in conjunction with PLOT NONSAMPLED REASON code 08.	08
	10	Other – This code is used whenever a condition class is not sampled due to a reason other than one of the specific reasons listed. A*n electronic CONDITION CLASS NOTE* is required to describe the situation.	10
	20 (office use only)	Off-grid – Not on Forest Service administered lands (i.e., plot is part of an intensified sample [not on the FIA grid] and the condition class is not located on Forest Service administered lands [ADMINISTRATIVE FOREST CODE = null])	10

Item 5.9.0.2 PREVIOUS CONDITION NONSAMPLED REASON (PFSL)
[PREV_COND_PNWRS.COND_NONSAMPLE_REASN_CD_PNWRS]

A downloaded value that may be updated if an error was made by the previous crew. If updated, record one of the following reasons for portions of the plot which could not be sampled at the previous measurement (PREVIOUS CONDITION CLASS STATUS = 5). Note: PREVIOUS CONDITION NONSAMPLED REASON values have already been updated to current codes.

When collected:	When SAMPLE KIND = 2 and PREVIOUS CONDITION CLASS STATUS = 5
Field width:	2 digits
Tolerance:	No errors
Values:	see CONDITION NONSAMPLED REASON

Item 5.9.0.3 ESTIMATED NONSAMPLED LAND COVER TYPE (PNW)
[COND.EST_NON_SAMP_LCT_PNWRS]

Record the land cover type best representing the condition class, as determined from the air, ground, or some form of remote sensing. Use your best judgment in estimating which cover type is present. This estimation should be based on the plurality of the cover type present for the entire condition class. When land cover type is inferred using remote sensing, include the type and date of imagery used in the electronic CONDITION CLASS NOTES.

When collected:	When CONDITION NONSAMPLED REASON = 2, 3, or 10	
Field width:	1 digits	
Tolerance:	No errors	
Values:	Code	Description
	1	Forest land
	2	Nonforest land
	3	Noncensus water
	4	Census water

Item 5.9.0.4 NONSAMPLED FOREST TYPE (PNW)
[COND.FLDTYPCD_NON_SAMP_PNWRS]

When the ESTIMATED NONSAMPLED LAND COVER TYPE appears to be forest land, further describe it by determining the forest type.

When collected:	When ESTIMATED NONSAMPLE LAND COVER TYPE = 1
Field width:	3 digits
Tolerance:	No errors
Values:	See Appendix E, Forest Type Codes

SECTION 5.10 STOCKABILITY IN OREGON AND CALIFORNIA

In Oregon and California, some plots have forest land condition classes low in site productivity incapable of attaining normal levels of stocking. For such condition classes, potential productivity (mean annual increment at culmination) must be discounted; and the individual tree contribution to stocking increased to account for the lower stocking capacity. For each such condition, the presence of key indicators is required to determine the discount factor (see tables in Appendix J, Stockability Indicators).

When STATE = 6 and ECOLOGICAL UNIT = 1-7, or STATE = 41 and COUNTY = 19, 29 or 33, and when at least on CONDITION CLASS STATUS = 1 is present anywhere on the plot, now or in the past, record each indicator species found in these classes. An indicator does not have to be within the 58.9-foot radius of a macroplot, but only within the greater area of the condition class to be coded. To be included as a new indicator, trees and shrubs have to be alive. Forbs and grasses (annual and perennial) need to have been alive sometime in the current year, but can be senesced at the time the crew visits. Do not code for the presence of indicators on forest land other than accessible forest land. Do not code the presence of plants in isolated microsites within the plot area, such as in small seeps or springs, or on an isolated rock outcrop.

On some previously visited plots, the previous indicator species list may be downloaded. Do not delete these records. If an indicator was already recorded but seems to be a clear error in species identification, then make a comment in the electronic CONDITION CLASS NOTES (Item 5.11.1.2) explaining why the species may be in error. Do not remove pre-existing species records, even if the indicator plant is presently dead.

SUBSECTION 5.10.1 STOCKABILITY DATA ITEMS

Item 5.10.1.1 STOCKABILITY INDICATOR SPECIES (PFSL)

[STOCKABILITY_INDICATORS.PLANT_SP]

Record the appropriate code indicating the presence of a stockability indicator species. Refer to the tables in Appendix J, Stockability Indicators, for stockability indicator species and California ecological unit descriptions.

When collected:	When STATE = 06 and ECOLOGICAL UNIT = 1-7 and CONDITION CLASS STATUS = 1; OR when STATE = 41 and COUNTY = 19, 29, or 33 and CONDITION CLASS STATUS = 1
Field width:	8 alphanumeric characters
Tolerance:	No error in Indicator identification
Values:	See tables in Appendix J (Stockability Indicators)

Item 5.10.1.2 SPECIES CONDITION CLASS (PFSL)

[STOCKABILITY_INDICATORS.CONDID]

Record the condition class represented by the STOCKABILITY INDICATOR SPECIES.

When collected:	All STOCKABILITY INDICATOR SPECIES
Field width:	1 digits
Tolerance:	No errors
Values:	1 - 9

Item 5.10.1.3 OREGON STOCKABILITY DISCOUNT FACTOR (PFSL)

[COND.PLANT_STOCKABILITY_FACTOR_PNW]

For plots in Douglas county, Oregon, record the most appropriate stockability discount factor. If more than one condition class is present, assign a discount factor for each. Use the following guidelines:

<table>
<tr><td>When collected:</td><td colspan="3">All accessible forest land condition classes when CONDITION CLASS STATUS = 1, STATE = 41, and COUNTY = 19</td></tr>
<tr><td>Field width:</td><td colspan="3">4 digits</td></tr>
<tr><td>Tolerance:</td><td colspan="3">No error in Indicator identification</td></tr>
<tr><td rowspan="6">Values:</td><td>Stockability Discount Factor</td><td>Plant community</td><td>Indicators</td></tr>
<tr><td>1.00</td><td></td><td>None</td></tr>
<tr><td>.27</td><td>Peridotite/serpentine; elevation is 3000 feet or less</td><td>Jeffrey pine and/or serpentine pod fern</td></tr>
<tr><td>.62</td><td>Very xeric; non-peridotite/ serpentine</td><td>Pussytoes and/or woolly sunflower and/or squirreltail (if Jeffrey pine and/ or serpentine pod fern present, use discount of 0.27; any others may be present without changing the factor)</td></tr>
<tr><td>.70</td><td>White oak; elevation is 1000 feet or less</td><td>Oregon white oak and/or coastal wood fern (canyon live oak may be present, but not Jeffrey pine, serpentine pod fern, everlasting, woolly sunflower, or squirreltail)</td></tr>
<tr><td>.86</td><td>Canyon live oak</td><td>Canyon live oak (there must not be other indicators present)</td></tr>
</table>

SECTION 5.11 CONDITION CLASS NOTES

SUBSECTION 5.11.1 CONDITION CLASS NOTES

Item 5.11.1.1 PREVIOUS CONDITION CLASS NOTES (PFSL)

[PREV_COND_PNWRS.NOTES]

Record any notes needed to clarify or explain changes to previous condition class data items or condition class mapping. If the current crew corrects any previous crew errors, an explanation describing why values were changed is required. Include what was determined to be wrong and describe, in detail, the reason the current crew knows a previous error was made.

When collected:	All plots when previous crew incorrectly recorded condition class variables and previous values were changed by current crew
Field width:	2000 characters
Tolerance:	N/A
Values:	Single words and abbreviated sentences

Item 5.11.1.2 CONDITION CLASS NOTES (PNW)

[COND.NOTES]

Record any notes needed to clarify or explain a special situation in the particular condition class being defined.

When collected:	All plots, use when clarification is needed
Field width:	2000 characters
Tolerance:	N/A
Values:	Single words and abbreviated sentences

Item 5.11.1.3 CHANGE MATRIX NOTES (PFSL)

[CHANGE_MATRIX_PNWRS.NOTES]

Record any notes needed to explain physical or procedural change in CONDITION CLASS STATUS, RESERVED STATUS, and OWNER GROUP

When collected:	CONDITION CLASS STATUS RECONCILE CODE = 1 or 3, CONDITON CLASS STATUS PROCEDURAL CHANGE REASON CODE = 99, RESERVED STATUS RECONCILE CODE = 1 or 3, RESERVED STATUS PRECDURAL CHANGE REASON CODE = 99, and OWNER GROUP RECONCILE CODE = 1 or 3, OWNER GROUP PROCDURAL CHANGE REASON CODE = 99.
Field width:	2000 characters
Tolerance:	N/A
Values:	Single words and abbreviated sentences

CHAPTER 6 SUBPLOT INFORMATION

Each subplot/*macroplot* is described by a series of area parameters relating to topographic features and existing cover type. These data also relate to the microplot, since the microplot is contained within the subplot perimeter. This information is used for a variety of topics, including: identifying potential limits to management (e.g., topography), and relating physical site features to forest composition and productivity.

SECTION 6.1 RECORDING SUBPLOT INFORMATION

SUBSECTION 6.1.1 SUBPLOT INFORMATION

Item 6.1.1.1 SUBPLOT NUMBER (CORE 3.1)
[SUBPLOT.SUBP]

Record the code corresponding to the number of the subplot.

When Collected:	All subplots	
Field width:	1 digit	
Tolerance:	No errors	
Values:	1	Center subplot
	2	North subplot
	3	Southeast subplot
	4	Southwest subplot

Item 6.1.1.2 PREVIOUS SUBPLOT MAPPING ERROR (PFSL)
[SUBPLOT.PREV_COND_MAP_ERROR_PNWRS]

Record a code to indicate whether or not a previous mapping error exists on a subplot or if an error exists in PREVIOUS SUBPLOT/MACROPLOT CENTER CONDITION or PREVIOUS MICROPLOT CENTER CONDITION. If PREVIOUS SUBPLOT MAPPING ERROR = Y, a note must be entered in SUBPLOT NOTES explaining why the crew knows an error was made previously.

When collected:	SAMPLE KIND = 2	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	N	No error on subplot
	Y	Error on subplot

Item 6.1.1.3 SUBPLOT/MACROPLOT STATUS (CORE 3.2)
[SUBPLOT.SUBP_STATUS_CD]

Indicate whether or not this subplot/*macroplot* currently has at least one accessible forest land condition class. In situations where *PLOT STATUS = 1 or 2* and subplot/macroplot is denied access or hazardous, but obviously contains no forest land, record SUBPLOT/MACROPLOT STATUS = 2. In cases where a subplot/macroplot is access-denied or hazardous land use and has the possibility of forest, record SUBPLOT/MACROPLOT STATUS = 3.

When collected:	All subplots/*macroplots*	
Field width:	1 digit	
Tolerance:	No errors	
Values:	*Code*	*Definition*
	1	Sampled – at least one accessible forest land condition present on subplot/*macroplot*
	2	Sampled – no accessible forest land condition present on subplot/*macroplot*
	3	Nonsampled – *possibility of forest land*
	4	Sampled – *QA crew only measured condition, boundary and some subplot level data.* For use only on check plots (QA STATUS = 2 *through* 6). Not a legal entry on production plots (QA STATUS = 1 or 7).

Item 6.1.1.4 SUBPLOT/MACROPLOT NONSAMPLED REASON (CORE 3.3)
[SUBPLOT.POINT_NONSAMPLE_REASN_CD]

For entire subplots*/macroplots* that cannot be sampled, record one of the following reasons.

When collected:	When SUBPLOT/MACROPLOT STATUS = 3	
Field width:	2 digits	
Tolerance:	No errors	
Values:	*Code*	*Definition*
	01	Outside U.S. boundary – Assign this code to condition classes beyond the U.S. border.
	02	Denied access area – Any area within the sampled area of a plot to which access is denied by the legal owner, or to which an owner of the only reasonable route to the plot denies access. There are no minimum area or width requirements for a condition class delineated by denied access. Because a denied-access condition can become accessible in the future, it remains in the sample and is re-examined at the next occasion to determine if access is available.
	03	Hazardous situation – Any area within the sampled area on *a* plot that cannot be accessed because of a hazard or danger, for example cliffs, quarries, strip mines, illegal substance plantations, temporary high water, etc. Although the hazard is not likely to change over time, a hazardous condition remains in the sample and is re-examined at the next occasion to determine if the hazard is still present. There are no minimum size or width requirements for a condition class delineated by a hazardous condition.
	04	Time limitation – This code applies to full subplots that cannot be sampled due to a time restriction. This code is reserved for areas with limited access, and in situations where it is imperative for the crew to leave before the plot can be completed (e.g., scheduled helicopter rendezvous). Use of this code requires notification to the field supervisor. This code should not be used for an entire plot (use code 8 [skipped visit] when an entire plot is skipped; see *Chapter 4, Plot Level Data*).
	06	Lost plot - Entire plot cannot be found. Used for the four subplots that are required for this plot. Used only in conjunction with PLOT NONSAMPLED REASON code 06. Can be either generated by the data recorder or in the office.
	08	Skipped visit - Entire plot skipped. Used for the four subplots that are required for this plot. Applied at the time of processing and used only in conjunction with PLOT NONSAMPLED REASON code 08.
	10	Other – This code is used whenever a plot or condition class is not sampled due to a reason other than one of the specific reasons already listed. A*n electronic SUBPLOT NOTE* is required to describe the situation.

Item 6.1.1.5 NONFOREST SUBPLOT/MACROPLOT STATUS (CORE 3.4)
[SUBPLOT.NONFOREST_SUBP_STATUS]

Record the code that describes the sampling status of the other-than-forest subplot, i.e., SUBPLOT/MACROPLOT STATUS = 2. In cases where subplot is denied access or hazardous, but obviously contains no nonforest land, i.e., subplot is either noncensus water or Census water, record NONFOREST SUBPLOT/MACROPLOT STATUS = 2.

When collected:	When NONFOREST SAMPLING STATUS = 1 and SUBPLOT/MACROPLOT STATUS = 2	
Field width:	1 digit	
Tolerance:	no errors	
Values:	Code	Description
	1	Sampled - at least one accessible nonforest land condition present on the subplot.
	2	Sampled - no nonforest land condition present on subplot, i.e., subplot is either census and/or noncensus water.
	3	Nonsampled nonforest

Item 6.1.1.6 NONFOREST SUBPLOT/MACROPLOT NONSAMPLED REASON (CORE 3.5)
[SUBPLOT.NONFOREST_SUBP_NONSAMP_REASN]

For entire nonforest subplots that can not be sampled, record one of the following reasons.

When collected:	When NONFOREST SUBPLOT/MACROPLOT STATUS = 3	
Field width:	2 digits	
Tolerance:	no errors	
Values:	Code	Description
	02	Denied access - A subplot/macroplot to which access is denied by the legal owner, or to which an owner of the only reasonable route to the plot denies access. Because a denied-access subplot can become accessible in the future, it remains in the sample and is re-examined at the next occasion to determine if access is available.
	03	Hazardous situation - A subplot/macroplot that cannot be accessed because of a hazard or danger, for example cliffs, quarries, strip mines, illegal substance plantations, temporary high water, etc. Although the hazard is not likely to change over time, a hazardous condition remains in the sample and is re-examined at the next occasion to determine if the hazard is still present.
	04	Time limitation - This code applies to a full subplot/macroplot that cannot be sampled due to a time restriction. This code is reserved for areas with limited access, and in situations where it is imperative for the crew to leave before the plot can be completed (e.g., scheduled helicopter rendezvous). Use of this code requires notification to the field supervisor.
	10	Other - This code is used whenever a subplot/macroplot is not sampled due to a reason other than one of the specific reasons already listed. An *electronic SUBPLOT NOTE* is required to describe the situation.

Item 6.1.1.7 PREVIOUS SUBPLOT/MACROPLOT CENTER CONDITION (PNW)
[SUBPLOT.PREV_SUBPCOND_PNWRS]

A downloaded value that may be updated if an error was made by the previous crew. If updated, record the CONDITION CLASS NUMBER of the condition class at the subplot/macroplot center as it existed at the previous measurement.

When collected:	When SAMPLE KIND = 2
Field width:	1 digit
Tolerance:	No errors
Values:	1 to 9

Item 6.1.1.8 SUBPLOT/MACROPLOT CENTER CONDITION (CORE 3.6)
[SUBPLOT.SUBPCOND]

Record the CONDITION CLASS NUMBER of the condition class at the subplot center.

When collected:	All subplots
Field width:	1 digit
Tolerance:	No errors
Values:	1 to 9

Item 6.1.1.9 SUBPLOT/MACROPLOT CONDITION LIST (CORE 3.11)
[SUBPLOT.CONDLIST]

This is a listing of all condition classes located within the 58.9-foot radius around the *subplot/*macroplot center. A maximum of four conditions is permitted at any individual subplot/macroplot *(a maximum of nine condition classes can be recorded on a plot)*. If a condition class has already been defined at a previously completed subplot/macroplot, use the same condition class number whenever that condition is encountered. Define new condition classes as they are encountered. If more than one condition class is listed here, boundary data are required. If only one condition class is listed, this condition is automatically assigned to the subplot center and microplot center. If *fewer* than four condition classes occur on this subplot, complete the remainder of this field with zeros. For example, if condition 1 is the only condition class on a subplot, record 1000.

When collected:	All plots
Field width:	4 digits
Tolerance:	No errors
Values:	1000 to 9876

Item 6.1.1.10 MICROPLOT CENTER CONDITION (CORE 3.7)
[SUBPLOT.MICRCOND]

Record the CONDITION CLASS NUMBER of the condition class at the microplot center.

When collected:	All microplots
Field width:	1 digit
Tolerance:	No errors
Values:	1 to 9

Item 6.1.1.11 PREVIOUS MICROPLOT CENTER CONDITION (PFSL)
[SUBPLOT.PREV_MICRCOND]

A downloaded value that may be updated if an error was made by the previous crew. If updated, record the CONDITION CLASS NUMBER of the condition class at the microplot center as it existed at the previous measurement.

When collected:	SAMPLE KIND = 2
Field width:	1 digit
Tolerance:	No errors
Values:	1 to 9

SUBSECTION 6.1.2 PHYSIOGRAPHIC CLASS INFORMATION

Item 6.1.2.1 MACROPLOT PHYSIOGRAPHIC CLASS (PFSL)
[SUBPLOT.PHYSCLCD_PNWRS]

Record the code best describing the physiographic class of the macroplot. Land form, topographic position, and soil generally determine physiographic class. Look over the 58.9-foot radius macroplot area to determine MACROPLOT PHYSIOGRAPHIC CLASS.

When collected:	All subplots/macroplots with at least one accessible forest land condition class present on the subplot/macroplot (SUBPLOT/MACROPLOT STATUS = 1); **or** All subplots/macroplots with at least one accessible nonforest land condition class present on the subplot/macroplot when nonforest is being sampled (NONFOREST SUBPLOT/MACROPLOT STATUS = 1)
Field width:	2 digits
Tolerance:	No errors
Values:	See PHYSIOGRAPHIC CLASS (Item 5.7.2.10)

Item 6.1.2.2 SUBPLOT SLOPE (CORE 3.8)
[SUBPLOT.SLOPE]

Record the angle of slope across the *24.0-foot radius* subplot to the nearest 1-percent. SUBPLOT SLOPE is determined by sighting the clinometer along a line parallel to the average incline (or decline) of each subplot. This angle is measured along the shortest pathway down slope before the drainage direction changes. To measure SUBPLOT SLOPE, Observer 1 should stand at the uphill edge of the subplot and sight Observer 2, who stands at the downhill edge of the subplot. Sight Observer 2 at the same height as the eye-level of Observer 1. Read the slope directly from the percent*age* scale of the clinometer:

- If slope changes gradually across the subplot, record an average slope.
- If slope changes across the subplot but the slope is predominantly of one direction, code the predominant slope percentage rather than the average.
- If the subplot falls directly on or straddles a canyon bottom or narrow ridge top, code the average slope of the side hill(s).

If the subplot 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 where most of the area lies.

When collected:	All subplots with at least one accessible forest land condition *class* present on subplot*/macroplot* (SUBPLOT/MACROPLOT STATUS = 1)*; **or*** *All subplots with at least one* accessible nonforest condition class present *on the subplot/macroplot* when nonforest is being sampled (NONFOREST SUBPLOT/ MACROPLOT STATUS = 1)
Field width:	3 digits
Tolerance:	+/- 10 percent
Values:	000 to 155

Item 6.1.2.3 SUBPLOT ASPECT (CORE 3.9)
[SUBPLOT.ASPECT]

Record the aspect across the *24.0-foot radius* subplot, to the nearest 1 degree. SUBPLOT ASPECT is determined along the direction of slope for land surfaces with at least 5-percent slope in a generally uniform direction. SUBPLOT ASPECT is measured with a hand compass along the same direction used to determine slope.

- If aspect changes gradually across the subplot, record an average aspect.
- If aspect changes across the subplot but the aspect is predominately of one direction, code the predominate direction rather than the average.
- If the subplot falls on or straddles a canyon bottom or narrow ridge top, code the aspect of the ridge line or canyon bottom.

- If the subplot 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.

When collected:	All subplots with at least one accessible forest land condition *class* present on subplot/*macroplot* (SUBPLOT/MACROPLOT STATUS = 1)***; or*** *All subplots with at least one* accessible nonforest condition class present *on the subplot/macroplot when nonforest is being sampled (NONFOREST SUBPLOT/ MACROPLOT STATUS = 1)*	
Field width:	3 digits	
Tolerance:	+/- 10 degrees	
Values:	Code	Definition
	000	no aspect, slope < 5-percent
	001	1 degree
	002	2 degrees
	.....	....
	360	360 degrees, due north

Item 6.1.2.4 SNOW/WATER DEPTH (CORE 3.10)
[SUBPLOT.WATERDEP]

Record, to the nearest 0.1 foot, the average approximate depth of water or snow covering the *24.0-foot radius* subplot at the time of data collection. This *data item* is used to indicate subplots where some *data items* (e.g., seedling count, total lengths) may be measured with less certainty *because of* conditions at the time of measurement.

This item is intended for water/snow/ice which covers substantial portions of subplots. Record "00" for streams contained within their banks and not affecting any measurements.

When collected:	All subplots with at least one accessible forest land condition *class* present on subplot/*macroplot* (SUBPLOT/MACROPLOT STATUS = 1)***; or*** *All subplots with at least one* accessible *n*onforest condition class present *on the subplot/macroplot* when *n*onforest is being sampled (NONFOREST SUBPLOT/ MACROPLOT STATUS = 1)
Field width:	2 digits (x.y)
Tolerance:	+/- 0.5 feet
Values:	0.0 to 9.9

Item 6.1.2.5 SUBPLOT/MACROPLOT NOTES (PNW)
[SUBPLOT.NOTES]

Record any notes needed to clarify or explain a special situation encountered on the subplot.

When collected:	All plots: as needed
Field width:	2000 characters
Tolerance:	N/A
Values:	Single words and abbreviated sentences

SECTION 6.2 ROOT DISEASE RATING

SUBSECTION 6.2.1 GUIDE FOR IDENTIFYING ROOT DISEASE

Root disease identification information can be found in Appendix M, Disease Keys.

SUBSECTION 6.2.2 ROOT DISEASE DATA ITEMS

Item 6.2.2.1 ROOT DISEASE SEVERITY RATING (PFSL)

[SUBPLOT.ROOT_DIS_SEV_CD_PNWRS]

The macroplot is assigned a ROOT DISEASE SEVERITY RATING. Evaluate all accessible forest land and measurable nonforest land area within the 58.9-foot radius macroplot boundary in Oregon, Washington, and California, and assign the ROOT DISEASE SEVERITY RATING best describing the degree of root disease severity present.

When collected:	All subplots with at least one accessible forest land condition present on subplot/ macroplot (SUBPLOT/MACROPLOT PLOT STATUS = 1); **or** All subplots with at least one *accessible nonforest condition class present* on the subplot/macroplot *when nonforest is being sampled (NONFOREST SUBPLOT/ MACROPLOT STATUS = 1)*	
Field width:	1 digit	
Tolerance:	+/- 1 class	
Values:	Code	Root disease severity rating
	0	No evidence of root disease visible within 50 feet of the 58.9-foot macroplot.
	1	Root disease present within 50 feet of the macroplot, but no evidence of disease on the macroplot.
	2	Minor evidence of root disease on the macroplot, such as suppressed tree killed by root disease, or a minor part of the overstory showing symptoms of infection. Little or no detectable reduction in canopy closure or volume.
	3	Canopy reduction evident, up to 20-percent; usually as result of death of one codominant tree on an otherwise fully-stocked site. In absence of mortality, numerous trees showing symptoms of root disease infection.
	4	Canopy reduction at least 20-percent; up to 30-percent as a result of root disease mortality. Snags and downed trees removed from canopy by disease as well as live trees with advance symptoms of disease contribute to impact.
	5	Canopy reduction of 30- to 50-percent as a result of root disease. At least half of the ground area of macroplot considered infested with evidence of root disease-killed trees. Macroplots representing mature stands with half of their volume in root disease-tolerant species usually do not go much above severity “5” because of the ameliorating effect of the disease-tolerant trees.
	6	50- to 75-percent reduction in canopy with most of the ground area considered infested as evidenced by symptomatic trees. Much of the canopy variation in this category is generally a result of root disease-tolerant species occupying infested ground.
	7	At least 75-percent canopy reduction. Macroplots reaching this severity level usually are occupied by only the most susceptible species. There are very few of the original overstory trees remaining although infested ground is often densely stocked with regeneration of susceptible species.
	8	The entire macroplot falls within a definite root disease pocket with only one or very few susceptible overstory trees present.
	9	The entire macroplot falls within a definite root disease pocket with no overstory trees of the susceptible species present.

CHAPTER 7 BOUNDARY REFERENCES

SECTION 7.1 GENERAL INSTRUCTIONS

Boundary reference data are used to compute the area for the condition classes sampled on a plot and to remeasure plots. Record all boundaries between condition classes that occur within the sampled (fixed-radius) area on *microplots, subplots, and macroplots*. Boundaries outside sampled (fixed-radius) areas are not referenced.

In addition to using the recording procedures described herein, sketch maps of condition class boundaries onto the pre-printed plot diagrams on *the back of the plot card, accurately representing the shape of each boundary as it is on the ground (boundary data recorded in the PDR should represent the condition class area, but may not accurately represent the shape)*.

SECTION 7.2 REFERENCE PROCEDURE

Within the sampled area on each microplot, and macroplot, reference the approximate boundary of each condition class that differs from the condition class at *the* center. Trees selected on these fixed-radius plots are assigned to the actual condition in which they lie regardless of the recorded approximate boundary delineated.

Boundary referencing is done by recording azimuths and distances from subplot or microplot center to the reference points (*Figure 7.1 and Figure 7.2*). Each boundary is marked by a maximum of three points –- two where the boundary intersects the *respective fixed-radius plot* circumference, and one "corner" point between the two end points, if necessary. Only the corner point requires a distance, since the distance from the center to the circumference is always equal to the fixed plot radius.

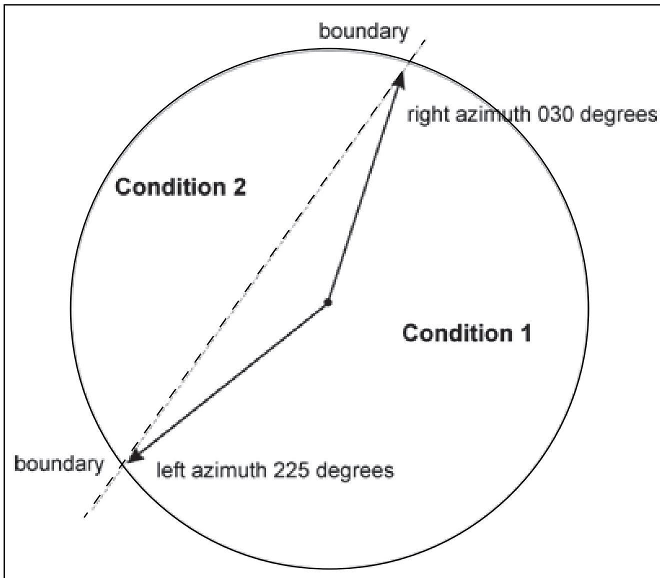


Figure 7.1: How to measure a straight boundary on a *fixed-radius plot*.

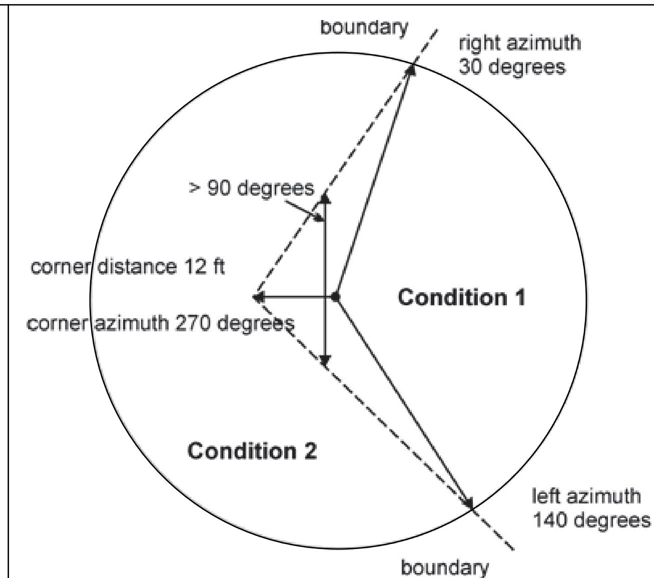


Figure 7.2: How to measure a boundary with a corner on a *fixed-radius plot*.

Microplot boundaries are referenced to the microplot center, and macroplot boundaries are referenced to the subplot center in the same manner described for subplots. Note that the larger the *fixed-radius* plot, the greater likelihood of a need for a boundary corner to record boundaries that are not straight lines.

Refer to *Section 5.1* and *Section 5.3* for general condition class delineation guidelines. The following additional rules apply when referencing a boundary within a *fixed-radius plot*:

1. When a boundary between accessible forest land and nonforest land or between two contrasting accessible forest land condition classes is clearly marked, use that feature to define the boundary. Examples of clear demarcation are a fence line, plowed field edge, sharp ridge line, *defined stem line,* and water's edge along a stream course, ditch, or canal.
2. When a boundary between forest land and nonforest land is not clearly marked by an obvious feature, the boundary should follow the nonforest side of the stems of the trees at the forest edge.

3. When a boundary between two contrasting forest land condition classes is not clearly marked, map along the stems of the contrasting condition. When the boundary between two contrasting forest land condition classes is separated by a narrow linear inclusion (creek, fire line, narrow meadow, unimproved road), establish the boundary at the far edge of the inclusion relative to subplot center.
4. Although individual tolerances are specified for the azimuths and distances, in practice a crew will be considered 'correct' when the difference in areas as mapped by the original crew and by the QA crew is less than 10 percent of the *fixed-radius plot* area. This allows for slight variations in azimuths or distances due to the approximate nature of mapping procedures.
5. Small developed nonforest land conditions and Nonsampled conditions (see Section 5.4) that are too small to represent accurately given electronic mapping limitations (e.g. only one corner) are diagramed using a 'wedge.' On the plot card, draw them as they actually exist on the ground. Boundary reference data should then be collected to map a wedge that accurately represents the area of the condition on each fixed-radius plot on which it exists. Remember the fixed radius plots overlap, so if the mapped condition is present fully within the boundaries of the 24.0 foot radius subplot, it also occupies area and must be mapped on the 58.9 foot radius annular plot. The outer edge of the wedge shall face the direction of the actual location of the nonforest or nonsampled condition on each fixed-radius plot.

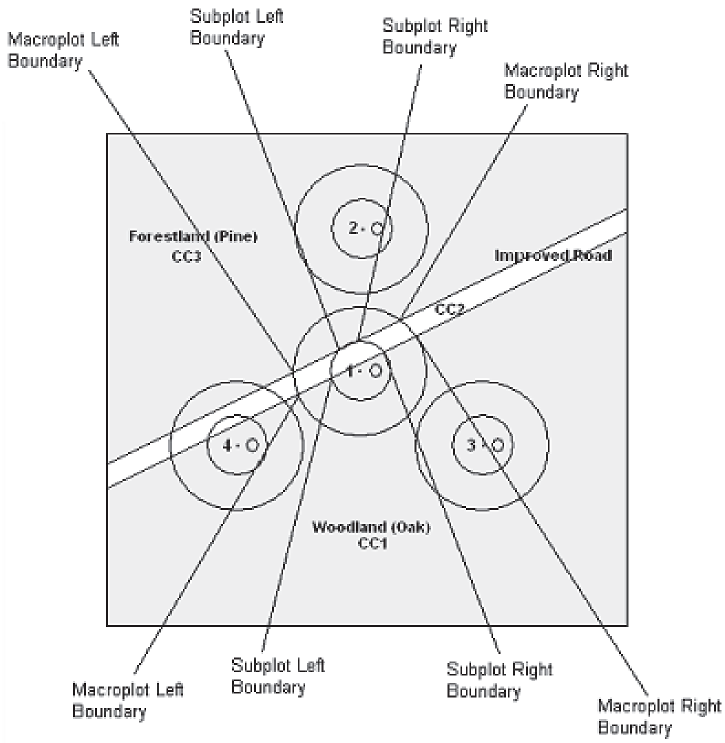


Figure 7.3: How to map subplot 1.

SUBSECTION 7.2.1 BOUNDARIES ON REMEASUREMENT PLOTS

When a plot is remeasured, the crew will examine the boundaries referenced at last inventory *and reassess the condition class delineating data items*. If no change has occurred, the current crew will retain the boundary data that were recorded at last inventory. If a boundary has changed, a new boundary is present, *a procedural change has altered the boundary,* or the previous crew made an obvious error; record new or updated boundary data. See Section 5.6, CONDITION REMEASUREMENT for guidance on when to correct previous mapping error. Record the reason for the change in BOUNDARY CHANGE (Item 7.2.2.4). Delete boundaries that are no longer distinct. If in doubt about whether or not a boundary change has occurred, leave boundary as delineated at the previous inventory.

SUBSECTION 7.2.2 BOUNDARY DATA

Record the appropriate values for each boundary mapped on the subplot, microplot, or macroplot as follows:

Item 7.2.2.1 SUBPLOT NUMBER (CORE 4.2.1)
[BOUNDARY.SUBP]

<u>*Generated* code corresponding to the number of the subplot.</u>

When collected:	All boundaries	
Field width:	1 digit	
Tolerance:	No errors	
Values:	1	Center subplot
	2	North subplot
	3	Southeast subplot
	4	Southwest subplot

Item 7.2.2.2 PLOT TYPE (CORE 4.2.2)
[BOUNDARY.SUBPTYP]

<u>Record the code to specify whether the boundary data are for a subplot, microplot or macroplot.</u>

When collected:	All boundaries	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Plot Type
	Null	No boundaries are recorded for the subplot
	1	Subplot boundary
	2	Microplot boundary
	3	Macroplot boundary

Item 7.2.2.3 PREVIOUS PLOT TYPE (PFSL)
[PREV_BOUNDARY_PNWRS.SUBPTYP]

A downloaded value that may be updated if an error was made by the previous crew. If updated, record the code to specify whether the boundary data were recorded for a subplot, microplot or macroplot.

When collected:	SAMPLE KIND = 2	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Plot Type
	Null	No boundaries are recorded for the subplot
	1	Subplot boundary
	2	Microplot boundary
	3	Macroplot plot boundary

Item 7.2.2.4 BOUNDARY CHANGE (CORE 4.2.3)
[BOUNDARY.BNDCHG]

<u>Remeasurement (SAMPLE KIND = 2) locations only. Record the appropriate code to indicate the relationship between previously recorded and current boundary information.</u>

When collected:	*When* SAMPLE KIND = 2	
Field width:	1 digit	
Tolerance:	No errors	
Values:	0	No change – boundary is the same as indicated on plot map and/or data collected by a previous crew.
	1	New boundary, or boundary data has been changed to reflect an actual on-the-ground physical change resulting in a difference from the boundaries recorded.
	2	Boundary has been changed to correct an error from previous crew.
	3	Boundary has been changed to reflect a change in variable definition.

Item 7.2.2.5 CONTRASTING CONDITION (CORE 4.2.4)
[BOUNDARY.CONTRAST]

Record the CONDITION CLASS NUMBER of the condition class that contrasts with the condition class located at the subplot center (for boundaries on the subplot or macroplot) or at the microplot center (for boundaries on the microplot), i.e., the condition class present on the other side of the boundary line.

When collected:	All boundaries
Field width:	1 digit
Tolerance:	No errors
Values:	1 to 9

Item 7.2.2.6 PREVIOUS CONTRASTING CONDITION (PFSL)
[PREV_BOUNDARY_PNWRS.CONTRAST]

A downloaded value that may be updated if an error was made by the previous crew. If updated, record the CONDITION CLASS NUMBER of the condition class that contrasted with the condition class located at the subplot center at the previous measurement (for boundaries on the subplot, microplot, or macroplot), e.g., the condition class present on the other side of the boundary line.

When collected:	SAMPLE KIND = 2
Field width:	1 digit
Tolerance:	No errors
Values:	1 to 9

Item 7.2.2.7 LEFT AZIMUTH (CORE 4.2.5)
[BOUNDARY.AZMLEFT]

Record the azimuth from the subplot, microplot or macroplot center to the farthest left point (facing the contrasting condition) where the boundary intersects the circumference.

When collected:	All boundaries
Field width:	3 digits
Tolerance:	+/- 10 degrees
Values:	001 to 360

Item 7.2.2.8 PREVIOUS LEFT AZIMUTH (PFSL)
[PREV_BOUNDARY_PNWRS.AZMLEFT]

A downloaded value that may be updated if an error was made by the previous crew. If updated, record the azimuth from the subplot, microplot, or macroplot center to the farthest left point (facing the contrasting condition class) where the boundary intersected the subplot, microplot, or macroplot circumference at the previous measurement.

When collected:	SAMPLE KIND = 2
Field width:	3 digits
Tolerance:	+/- 10 degrees
Values:	001 to 360

Item 7.2.2.9 CORNER AZIMUTH (CORE 4.2.6)
[BOUNDARY.AZMCORN]

Record the azimuth from the subplot, microplot or macroplot center to a corner or curve in a boundary. If a boundary is best described by a straight line between the two circumference points, then record 000 for CORNER AZIMUTH (000 = none).

When collected:	All boundaries
Field width:	3 digits
Tolerance:	+/- 10 degrees
Values:	000 to 360

Item 7.2.2.10 PREVIOUS CORNER AZIMUTH (PFSL)
[PREV_BOUNDARY_PNWRS.AZMCORN]

A downloaded value that may be updated if an error was made by the previous crew. If updated, record the azimuth from the subplot, microplot or macroplot center to a corner or curve in a boundary at the previous measurement.

When collected:	SAMPLE KIND = 2
Field width:	3 digits
Tolerance:	+/- 10 degrees
Values:	000 to 360

Item 7.2.2.11 CORNER DISTANCE (CORE 4.2.7)
[BOUNDARY.DISTCORN]

Record the horizontal distance, to the nearest 1 foot, from the subplot, microplot or macroplot center to a boundary corner point.

When collected:	All boundaries when CORNER AZIMUTH > 000	
Field width:	3 digits	
Tolerance:	+/- 1 foot	
Values:	Plot Type	Values for Corner Distance
	Microplot	001 to 007 feet (actual limiting distance is 6.8 feet)
	Subplot	001 to 024 feet
	Macroplot	001 to 059 feet (actual limiting distance is 58.9 feet)

Item 7.2.2.12 PREVIOUS CORNER DISTANCE (PFSL)
[PREV_BOUNDARY_PNWRS.DISTCORN]

A downloaded value that may be updated if an error was made by the previous crew. If updated, record the horizontal distance as it should have been measured, to the nearest 1 foot, from the subplot, microplot or macroplot center to a boundary corner point.

When collected:	SAMPLE KIND = 2	
Field width:	3 digits	
Tolerance:	+/- 1 foot	
Values:	Plot Type	Values for Corner Distance
	Microplot	001 to 007 feet (actual limiting distance is 6.8 feet)
	Subplot	001 to 024 feet
	Macroplot	001 to 059 feet

Item 7.2.2.13 RIGHT AZIMUTH (CORE 4.2.8)
[BOUNDARY.AZMRIGHT]

Record the azimuth from the subplot, microplot or macroplot center to the farthest right point (facing the contrasting condition) where the boundary intersects the circumference.

When collected:	All boundaries
Field width:	3 digits
Tolerance:	+/- 10 degrees
Values:	001 to 360

Item 7.2.2.14 PREVIOUS RIGHT AZIMUTH (PFSL)
[PREV_BOUNDARY_PNWRS.AZMRIGHT]

A downloaded value that may be updated if an error was made by the previous crew. If updated, record the azimuth from the subplot, microplot, or macroplot center to the farthest right point (facing the contrasting condition class) where the boundary intersected the subplot, microplot, or macroplot circumference at the previous measurement.

When collected:	SAMPLE KIND = 2
Field width:	3 digits
Tolerance:	+/- 10 degrees

Values:	001 to 360

Item 7.2.2.15 BOUNDARY NOTES (PNW)
[BOUNDARY.NOTES]

Record electronic BOUNDARY NOTES, if needed, to clarify or explain a special situation in the boundary being defined.

When collected:	As needed
Field width:	2000 characters
Tolerance:	N/A
Values:	Single words and abbreviated sentences

CHAPTER 8 TREE AND SAPLING DATA

This chapter describes how and where to tally live trees, standing dead trees (snags), and saplings. Determining which measurements are required is based on tree size, tree status, condition class status, and regional location, as well as land ownership. *Tree and sapling* data yield information on tree volume, growth, mortality, and removals; wildlife habitats; forest structure and composition; biomass; and carbon sequestration.

This chapter also describes how to record witness trees/stumps/objects. Witness information is recorded alongside the tree tally information (as witness trees and tally trees can be one in the same). Witness information assists the next field crew in relocating the center of a previously established plot/subplot.

SECTION 8.1 DEFINITIONS

Trees meeting specific criteria for diameter at breast height (DBH), or diameter at root collar (DRC), and length, are included in the sample. General definitions are listed below, followed by a table containing specific requirements.

Tree: An individual tree is categorized as a live tree, a standing dead tree (snag), or a sapling based on specific criteria listed in the table below. These criteria are different depending on whether the tree is a DBH or a DRC species. When the word “tree” is used in the field guide with no additional descriptors it applies to live trees, snags, and saplings. Applicable species are listed in Appendix D, Tree Species Lists.

Live tree: Trees are alive if they have any living parts (leaves, buds, cambium) at or above the point of diameter measurement, either at DBH or at DRC. Trees that have been temporarily defoliated are still alive. Uprooted trees with signs of life above the point of diameter are considered alive as long as some roots are still in substrate.

Standing dead tree (snag): To qualify as a standing dead tally tree, dead trees must be at least 5.0 inches in diameter, have a bole which has an unbroken ACTUAL LENGTH of at least 4.5 feet *for DBH species and 1.0 feet for woodland species*, and lean less than 45 degrees from vertical as measured from the base of the tree to *the point of diameter measurement*. *D*ead standing tally trees, and partially separated boles of dead tally trees, do not have to be self-supported. They may be supported by other trees, branches, or their crown. Standing dead trees, recorded at the previous annual inventory, that shrink below minimum diameter and length requirements maintain dead tree status. Portions of boles on dead trees that are separated greater than 50 percent (either above or below *the point of diameter measurement*), are considered severed and may qualify as Down Woody Material (DWM), *if they otherwise meet DWM* criteria *(Chapter 11)*. For woodland species with multiple stems, a tree is considered down if more than 2/3 of the volume is no longer attached or upright.

Sapling: Trees ≥1.0 inch but <5.0 inches *DBH that meet a minimum length requirement are tallied on the microplot.* These criteria are different depending on whether the tree is a DBH or a DRC species.

Woodland species: Woodland species require a diameter measurement at the root collar (DRC) of ≥1.0 inch; individual stems must be at least 1.0 feet in length and 1.0 inch at 1.0 foot up the stem from the diameter measurement point. Examples include: honey mesquite; California juniper; and common pinyon. These species are listed in Appendix D, Tree Species Lists. For multi-stemmed woodland species, a cumulative DRC is used to compute diameter as described in *Subsection 8.5.4*.

Tally trees: ‘Tally trees’ are defined as all live and standing dead trees in accessible forest land *or measurable nonforest land* condition classes encountered on the subplot*/macroplot* the first time a subplot/*macroplot* is established, and all trees that grow into a subplot*/macroplot* thereafter. ‘Tally saplings’ are defined as all live saplings encountered the first time a microplot is established, and all saplings that grow into each microplot thereafter, *and* are included until they grow to 5.0 inches or larger, at which time they are tallied on the subplot and referenced (new AZIMUTH and HORIZONTAL DISTANCE taken) to the subplot center.

	Diameter	**Length**
Live tree (DBH species)	≥ 5.0 inches DBH	≥ 4.5 feet in length with living parts at or above DBH
Live tree (DRC species)	At least one stem ≥ 1.0 inches DRC and a cumulative DRC ≥5.0 inches*	≥ 1.0 feet in length with living parts at or above DRC*
Standing dead tree (DBH species)	≥ 5.0 inches DBH	≥ 4.5 feet in length (leaning less than 45 degrees from vertical)
Standing dead tree (DRC species)	At least one stem ≥ 1.0 inches DRC and a cumulative DRC ≥5.0 inches*	≥ 1.0 feet in length (leaning less than 45 degrees from vertical)*
Sapling (DBH species)	1.0 inch to 4.9 inches DBH	≥ 4.5 feet in length with living parts at or above DBH
Sapling (DRC species)	At least one stem ≥ 1.0 inches DRC and a cumulative DRC <5.0 inches*	≥ 1.0 feet in length with living parts at or above DRC*
*Single stems, and at least one stem contributing toward the cumulative DRC, must be ≥1.0 feet in length and ≥1.0 inches diameter at 1 foot up the stem from the point of diameter measurement.		

SECTION 8.2 SELECTING TALLY TREES

SUBSECTION 8.2.1 WHERE TO TALLY

Determining whether a tree qualifies as a "tally tree" depends upon a combination of the following:

- STATE
- OWNER CLASS
- ADMINISTRATIVE FOREST CODE
- CONDITION CLASS STATUS
- TREE SPECIES (must be listed on the Tree Species List found in Appendix D)
- DIAMETER (DBH/DRC) of the tree
- TREE STATUS
- TREE LENGTH
- HORIZONTAL DISTANCE from the fixed-radius plot center
- MACROPLOT BREAKPOINT DIAMETER

Trees on the subplot, microplot and annular plot are tallied according to the following rules. If a tree is located in an area that does not meet the criteria below, it is not a tally tree.

Table 8.1: Where to tally trees in California

<table>
<tr><th colspan="4">CALIFORNIA [STATE = 06]</th></tr>
<tr><td colspan="3">CONDITION CLASS OWNERSHIP TYPE</td><td>Lands not administered by the Forest Service and R4 Forest Service administered lands [ADMINISTRATIVE FOREST CODE = null or 417]</td><td>R5 or R6 Forest Service administered lands [ADMINISTRATIVE FOREST CODE = 501 - 599 or 610 or 611]</td></tr>
<tr><td colspan="3">TREES ARE TALLIED IN</td><td>Accessible forest land condition classes [CONDITION CLASS STATUS = 1]</td><td>Accessible forest land and nonforest land condition classes [CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS SAMPLING STATUS =1]</td></tr>
<tr><td colspan="3">MICROPLOT
(6.8-foot radius)</td><td colspan="2">All live saplings (1.0 inches to 4.9 inches DBH/DRC) on the microplot are tallied and referenced to the microplot center</td></tr>
<tr><td colspan="3">SUBPLOT
(24.0-foot radius)</td><td colspan="2">All live trees and snags ≥ 5.0 inches DBH/DRC on the subplot are tallied and referenced to the subplot center</td></tr>
<tr><td>ANNULAR AREA/ MACROPLOT (24.0 to 58.9-foot radius from subplot center)</td><td>MACROPLOT BREAKPOINT DIAMETER</td><td>24 INCHES</td><td colspan="2">All live trees and snags ≥ 24.0 inches DBH/DRC on the annular plot are tallied and referenced to the subplot center</td></tr>
</table>

Table 8.2: Where to tally trees in Oregon and Washington

<table>
<tr><th colspan="5">OREGON [STATE = 41] and WASHINGTON [STATE = 53]</th></tr>
<tr><td colspan="3">CONDITION CLASS OWNERSHIP TYPE</td><td>Lands not administered by the Forest Service and R1 Forest Service administered lands [ADMINISTRATIVE FOREST CODE = null or 104]</td><td>R6 Forest Service administered lands [ADMINISTRATIVE FOREST CODE = 601 - 699]</td></tr>
<tr><td colspan="3">TREES ARE TALLIED IN</td><td>Accessible forest land condition classes [CONDITION CLASS STATUS = 1]</td><td>Accessible forest land and nonforest land condition classes [CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS SAMPLING STATUS =1]</td></tr>
<tr><td colspan="3">MICROPLOT
(6.8-foot radius)</td><td colspan="2">All live saplings (1.0 inches to 4.9 inches DBH/DRC) on the microplot are tallied and referenced to the microplot center</td></tr>
<tr><td colspan="3">SUBPLOT
(24.0-foot radius)</td><td colspan="2">All live trees and snags ≥ 5.0 inches DBH/DRC on the subplot are tallied and referenced to the subplot center</td></tr>
<tr><td rowspan="2">ANNULAR AREA/ MACROPLOT
(24.0 to 58.9-foot radius from subplot center)</td><td rowspan="2">MACROPLOT BREAKPOINT DIAMETER
See Appendix B for east/west designation for by county</td><td>24 INCHES: Eastern OR & WA</td><td colspan="2">All live trees and snags ≥ 24.0 inches DBH/DRC on the annular plot are tallied and referenced to the subplot center</td></tr>
<tr><td>30 INCHES: Western OR & WA</td><td colspan="2">All live trees and snags ≥ 30.0 inches DBH/DRC on the annular plot are tallied and referenced to the subplot center</td></tr>
</table>

SUBSECTION 8.2.2 WITHIN PLOT AREA CRITERIA

Trees and saplings are selected for tally (measurement) only when the HORIZONTAL DISTANCE from the microplot/subplot center to the bole center at the ground is less than or equal to the radius of that microplot/ subplot/macroplot. Trees must be selected for tally within the appropriate fixed-radius area without error. The tolerances for HORIZONTAL DISTANCE to trees (Item 8.4.1.14) do not apply when determining whether a tree is tallied within the specified plot area.

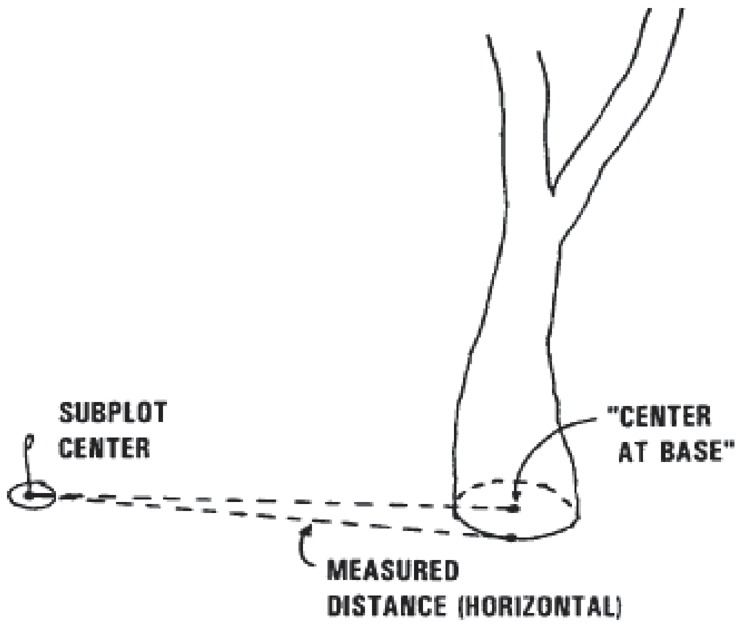


Figure 8.1: Horizontal distance from plot center criteria for determining tally trees.

SECTION 8.3 CONDUCTING THE TREE TALLY

Begin tallying trees at an azimuth of 001 degrees from subplot center and continue clockwise around the *macroplot. Work outward from subplot center to macroplot perimeter. R*epeat this sequence for trees on the microplot. Select, record, and tag subplot witness trees/stumps/objects while recording tree tracking data on the macroplot.

SUBSECTION 8.3.1 SUBPLOT WITNESS TREES/OBJECTS

Each of the four subplot center stakes or metal pins should be referenced by a minimum of two subplot witness trees/objects. Use the following procedures to select and record witnesses. Refer to Table 3.2:: Standards for monumentation of various witness types, for specific monumentation guidelines.

A. **Selecting witnesses:** Select two trees/objects near the subplot center which form, as closely as possible, a right angle with the center marker. Trees within six feet of the subplot center are preferable. If live trees are not available, use sound snags, stumps, or objects. On subplots established previously, reuse the previous witness trees, unless better trees are available.

B. **Monumenting witnesses:** Monumentation procedures vary depending on the subplot being witnessed; plot center (PC, center of subplot 1) has different monumentation than subplots 2 through 4. Refer to Table 3.2:: Standards for monumentation of various witness types, for specific monumentation guidelines.

C. **Recording witness data (all subplots on the standard layout):** Identify witness trees/snags/stumps/ objects in the data recorder (PDR) using the procedures listed below:
   - **Tally tree/snag (a trackable tree record):** Record SUBPLOT TALLY TREE WITNESS FLAG = Y (Item 8.4.1.9) to mark tally trees/snags as witnesses.
   - **Non-tally tree/snag:** Enter a new record for the tree/snag; record PRESENT TREE STATUS = 8, witness non-tally tree (Item 8.4.1.8).

- **Stump**: Enter a new record for the stump; record PRESENT TREE STATUS = 7, witness stump (Item 8.4.1.8). Note: When recording stumps as witnesses, use the guidelines listed in Subsection 8.5.2 (Diameter on Stumps) to measure diameter.
- **Shrub or object:** Enter a new record for the shrub or object; record PRESENT TREE STATUS = 9, witness-only object (Item 8.4.1.8). Note: Record the shrub species name in TREE NOTES (Item 8.10.1.1).

In addition, record the following information for each witness:

- SPECIES - If applicable (Item 8.4.1.12)
- AZIMUTH - Subplot center to tree (Item 8.4.1.13)
- SLOPE DISTANCE TO WITNESS TREE OR OBJECT - From the subplot stake/pin where it enters the ground to the head of the top nail affixing the basal tag or tree number tag (Item 8.4.1.15)
- DIAMETER (Item 8.5.3.2 or Item 8.5.4.2)

Note: For witnesses, distance is always recorded as a slope distance from the subplot center to the tag at the base of the tree, rather than as a horizontal distance to the center of the tree collected for tally trees.

SUBSECTION 8.3.2 SUBPLOTS/CONDITIONS WITHOUT TALLY TREES

This subsection provides information about recording tree data on subplots with special circumstances.

- If all accessible forest condition classes within subplot 1 have no tally trees present, two records are required to **witness subplot center**. These witness records can represent sound stumps or snags, but live trees are preferable.
- If the plot is entirely nonforest and it was ground visited, record two witness records for subplot 1.
- If the plot is entirely nonforest and it is on Region 5 or Region 6 Forest Service administered lands, record two witness records for each subplot.

SECTION 8.4 TREE TRACKING

SUBSECTION 8.4.1 TREE TRACKING DATA ITEMS

Item 8.4.1.1 SUBPLOT NUMBER (CORE 5.1)
[SUBP]

A 1-digit code, generated for each tree record entered into the PDR, regardless of the status of the tree record (live tree, snag, witness-only tree, etc.).

When Collected:	*All tree records*	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Definition
	1	Center subplot
	2	North subplot
	3	Southeast subplot
	4	Southwest subplot

Item 8.4.1.2 TREE RECORD NUMBER (CORE 5.2)
[TREE]

A 3-digit code, *assigned by the PDR*, to uniquely and permanently identify each tree on a given subplot. At the time of remeasurement (SAMPLE KIND = 2), TREE RECORD NUMBERS will be downloaded for previously recorded trees, snags, and witness-only records. TREE RECORD NUMBERS cannot be changed by the field crew.

When Collected:	All tree records
Field width:	3 digits
Tolerance:	No errors
Values:	001 to 999

Item 8.4.1.3 TREE TAG NUMBER (PFSL)
[TAG_NO_PNWRS]

Affix an aluminum tree number tag and record a TREE TAG NUMBER for all tally trees ≥ 1.0 inch DBH/DRC (**except** witness-only trees) sampled at the current inventory; this includes trees recorded, but not tagged, during a previous visit (e.g., saplings and snags). Number trees in a clockwise order from AZIMUTH 001 to 360, and work outwards from subplot center to macroplot perimeter. Repeat this sequence for saplings on the microplot. Attempt to keep tree numbers in order. However, **do not** renumber all trees on a microplot/ subplot/macroplot in order to assign a more "correct" tree number to a missed tree.

Saplings <3.0 inches DBH/DRC: Wire the tag to an ancillary branch.

Saplings ≥3.0 inches DBH/DRC: Nail the tag below stump height and facing microplot center.

Trees ≥5.0 inches DBH/DRC: Nail the tag below stump height and facing subplot center.

- Live trees: Drive the nail in only as far as is necessary to firmly anchor it in the wood. If a tree which requires a TREE TAG NUMBER has a PNW-FIA tag from a previous inventory, reuse the old tag, if serviceable, or attach a new tag. When replacing an old PNW-FIA tag, discard it. If an old tag cannot be removed, pound it in until flush with the bark so it will be overgrown and will not be confused with the new tag.
- Standing dead trees: Pound the nail flush with the bole on all standing dead trees; including previously live trees, which are now dead.

Do not use a TREE TAG NUMBER more than once on a plot. Before leaving the vehicle, make sure the tree numbers previously assigned to downloaded trees are different than numbers on the new tags you may use.

- **On Region 6 (R6) Forest Service administered lands** use long nails and blue number tags at the current visit to differentiate them from the old CVS tags. Do not remove previous R6 CVS tree number tags.
- **On Region 5 (R5) Forest Service administered lands** use standard number tags at the current visit. Do not remove previous R5 inventory tree number tags.

Follow any special monumenting protocols specified for wilderness or national park plots (see Section 3.6 and Section 3.7).

When collected:	When PRESENT TREE STATUS = 1; **or** when PRESENT TREE STATUS = 2 and STANDING DEAD = 1
Field width:	3 digits
Tolerance:	No errors
Values:	001 to 999

Item 8.4.1.4 PREVIOUS TREE TAG NUMBER (PFSL)
[PREV_TAG_NO_PNWRS]

If any tree tallied at the current inventory has a tree number tag from a previous R6 CVS plot, R5 inventory plot, or PNW-FIA plot, record the tag number. This item is recorded for live trees, dead trees, and saplings, and will help link current data to previously collected data.

If more than one old tree number tag is present, record the one from the most recent inventory.

If more than one old tree number tag is present and **a tag is reused**:

- On periodic revisited plots (PNW PLOT KIND = 2 or 3): Record the most recent periodic number for TREE TAG NUMBER and also for PREVIOUS TREE TAG NUMBER.
- On remeasurement plots (SAMPLE KIND = 2): Record the TREE TAG NUMBER from the previous annual visit for the "current" TREE TAG NUMBER and also for PREVIOUS TREE TAG NUMBER.

When collected:	When SAMPLE KIND = 2 or PNW PLOT KIND = 2 or 3: all live and dead tally trees with a previous Region 6 CVS, Region 5, or PNW-FIA number tag on the tree
Field width:	3 digits
Tolerance:	No errors
Values:	001 to 999

Item 8.4.1.5 CONDITION CLASS NUMBER (CORE 5.3)
[CONDID]

Record the CONDITION CLASS NUMBER in which each tree is located. Often, a referenced boundary is approximate, and trees selected for tally are assigned to the actual condition in which they lie regardless of the recorded approximate boundary (*Figure 8.2*).Trees must be assigned to a condition present on the subplot/macroplot condition list.

On remeasurement plots (SAMPLE KIND = 2), the previous CONDITION CLASS NUMBER is downloaded and displayed on the PDR for each remeasurement tree. If necessary, change the CONDITION CLASS NUMBER to reflect current condition classes and boundaries.

When Collected:	All *tally* trees
Field width:	1 digit
Tolerance:	No errors
Values:	1 to 9

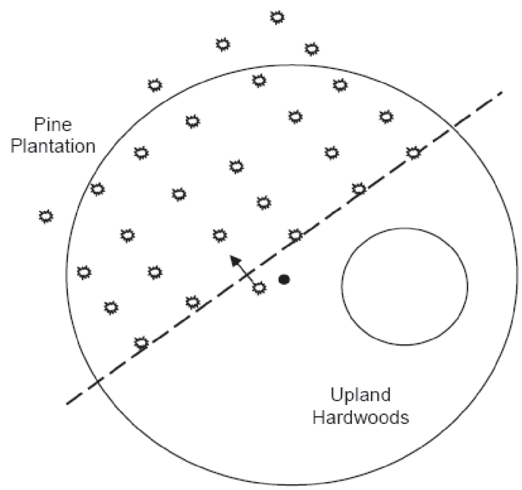


Figure 8.2: Ragged condition class boundary and tree condition class designation

Item 8.4.1.6 PREVIOUS CONDITION CLASS NUMBER (PFSL)
[PREVCOND]

A downloaded value that may be updated if an error was made by the previous crew. Only edit and change PREVIOUS CONDITION CLASS NUMBER if the previous crew made a mistake. The data recorder will automatically update the PREVIOUS CONDITION CLASS NUMBER if none of the previous boundaries have changed. If any of the previous boundaries have been changed, the current crew is required to assign the previously tallied trees to a corrected PREVIOUS CONDITION CLASS NUMBER.

When Collected:	SAMPLE KIND = 2
Field width:	1 digit
Tolerance:	No errors
Values:	1 to 9

Item 8.4.1.7 PREVIOUS TREE STATUS (CORE 5.6)
[PREV_STATUS_CD]

A downloaded code for all trees tallied at the previous inventory. This code is used to track the status of sample trees over time.

When Collected:	On remeasurement plots (SAMPLE KIND = 2), all previously tallied trees ≥ 1.0 in*ch* DBH*/DRC.*	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	1	Live Tree – alive at the previous inventory
	2	Dead tree – standing dead tree at the previous inventory
	8	Witness Non-Tally Tree – A non-tally live or dead tree that is used for a subplot witness.
	9	9 Witness-Only – A subplot witness that is not a tree. It may be a shrub, rock or other.

Item 8.4.1.8 PRESENT TREE STATUS (CORE 5.7)
[STATUSCD_PNWRS; Regional codes 7, 8, 9 loaded in NON_TALLY_TREE_PNWRS]

Record a PRESENT TREE STATUS for each tallied tree; this code is used to track the status of sample trees over time: as they first appear, as ingrowth, as they survive, and when they die or are removed.

Witness-only trees/stumps/objects are also assigned a PRESENT TREE STATUS.

When collected:	All tally trees *and witness non-tally trees, witness stumps, and witness-only objects.*		
Field width:	1 digit		
Tolerance:	No errors		
Values:	Code	Tree Status	Description
	0	No Status	*Remeasurement plots only.* Tree is not presently in the sample. Tree was incorrectly tallied at the previous inventory or currently is not tallied due to definition or procedural change, or is not tallied due to natural causes *(e.g., moved beyond the radius of the plot by small earth movement, hurricane, etc)*. Requires RECONCILE code = 5-9
	1	Live Tree	Any live tree (new, remeasured or ingrowth)
	2	Dead Tree	Any dead tree (new, remeasured or ingrowth) regardless of cause of death. Includes all previously standing dead trees that no longer qualify as standing dead, as well as trees killed by silvicultural or land clearing activity, and are assumed not to have been utilized. *Includes: previously dead standing, now down, and previously dead standing that no longer meet diameter and length requirements.*
	3	Removed	*Remeasurement plots only.* A tree that has been cut or removed by direct human activity related to harvesting, silvicultural activity or land clearing. The tree is assumed to have been utilized.
	7	Witness Stump	A subplot witness that is a **stump***
	8	Witness Non-Tally Tree	A **non-tally** live or dead tree that is to be used for a subplot witness
	9	Witness-Only Object	A subplot **witness that is not a tree**. It may be a shrub, rock, or other; TREE NOTES are required to describe the witness.
*Refer to Subsection 8.5.2, Diameter on Stumps, for stump diameter measurement guidelines.			

Item 8.4.1.9 SUBPLOT TALLY TREE WITNESS (PNW)
[SUBP_WITNESS_FLAG_PNWRS]

Use this data item to mark the current tally tree (live or dead) as a witness. See Subsection 3.3.2, Witness Trees/Objects, for witness monumentation instructions. Note: The default for this item is “N”; update the field to “Y” to record a witness.

When collected:	When PRESENT TREE STATUS = 1; **or** when PRESENT TREE STATUS = 2 and STANDING DEAD = 1	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	N	current record is not a tally tree witness
	Y	current record is a tally tree witness

Item 8.4.1.10 STANDING DEAD (CORE 5.7.2)
[STANDING_DEAD_CD]

Record the code that describes whether or not a tree qualifies as standing dead. *Standing* dead trees must be at least 5.0 inches in diameter *(DBH or DRC)*, have a bole which has an unbroken ACTUAL LENGTH of at least 4.5 feet *(DBH species) or 1.0 feet (DRC species with single stems)*, and lean less than 45 degrees from vertical as measured from the base of the tree to *the point of diameter measurement*. See *Figure 8.3 through Figure 8.5*.

“Unbroken” is defined as at least 50 percent attached to the original source of growth. The degree of lean on dead trees with partially separated (i.e., 1 to 50 percent) boles is measured from the base of the tree to the top of ACTUAL LENGTH.

Portions of boles on dead trees that are separated greater than 50 percent (either above or below 4.5 feet), are considered severed and are included in Down Woody Material (DWM) if they otherwise meet DWM tally criteria.

For woodland species (*Appendix D, Tree Species Lists*) with multiple stems, a tree is considered down if more than 2/3 of the volume is no longer attached or upright; do not consider cut and removed volume.

Live and dead standing tally trees, and partially separated boles of dead tally trees, do not have to be self-supported. They may be supported by other trees, branches, or their crown.

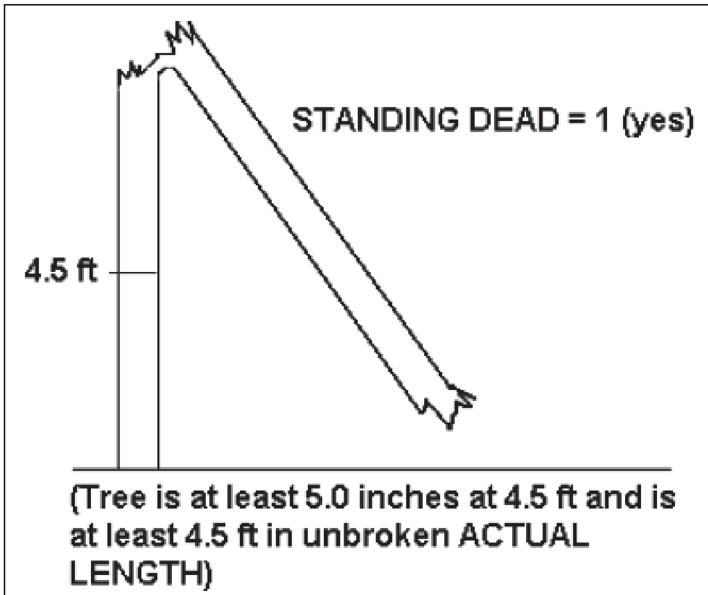


Figure 8.3: Example of an unbroken bole to 4.5 feet

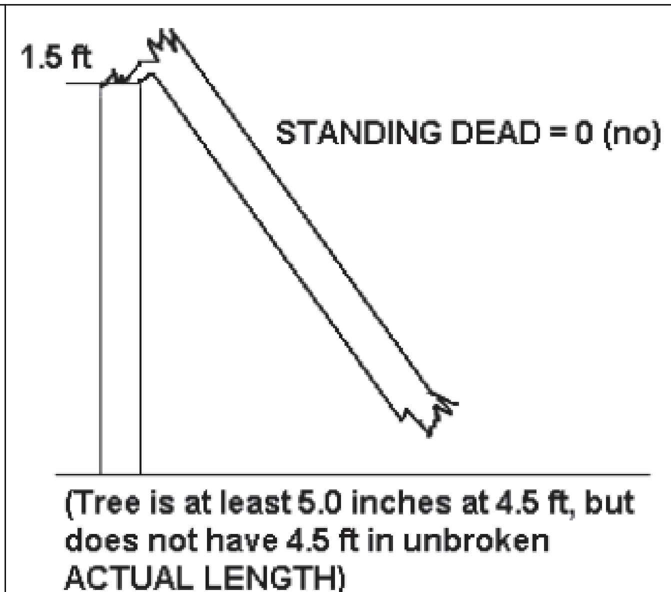
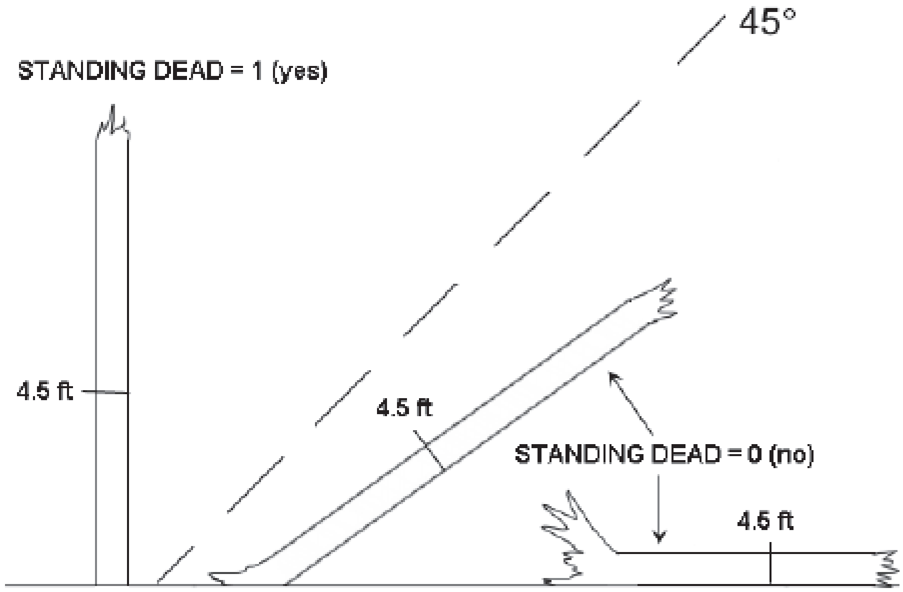


Figure 8.4: Example of an unbroken bole of <1.5 feet



Trees are at least 5.0 inches at 4.5 ft and are at least 4.5 ft in unbroken ACTUAL LENGTH

Figure 8.5: Other examples of dead trees

When Collected:	All dead tally trees (PRESENT TREE STATUS = 2)	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	0	No – tree does not qualify as standing dead
	1	Yes – tree does qualify as standing dead

Item 8.4.1.11 RECONCILE (CORE 5.7.1)
[RECONCILECD_PNWRS]

For remeasurement locations only *(SAMPLE KIND = 2)*, record a RECONCILE code for any new tally tree that was not tallied in the previous inventory, and for all no status remeasurement trees (PRESENT TREE STATUS = 0). This code is used to identify the reason a new tree appeared in the inventory, and identify the reason a remeasurement tree no longer qualifies as a tally tree.

Code 5 is used to indicate live trees that shrink below the diameter threshold on the microplot/subplot/macroplot. For example, if a live remeasurement tree shrinks below the 5.0 inch DBH/DRC, then record the following combination of codes: PREVIOUS TREE STATUS = 1, PRESENT TREE STATUS = 0, RECONCILE = 5. If a live measured tree shrinks below the 5.0 inch threshold on the subplot and is currently greater than or equal to 1.0 inch on the microplot, then record PREVIOUS TREE STATUS = 1, PRESENT TREE STATUS = 1. Record all required items for a tally sapling. Use the *TREE CODING GUIDE* in *Appendix F* to determine the national coding method for remeasurement trees.

When collected:	*When* SAMPLE KIND = 2*:* all new live tally trees ≥ 1.0 in*ch* DBH/DRC (PRESENT TREE STATUS = 1 and no PREVIOUS TREE STATUS)*;* all new dead tally trees ≥ 5.0 in (PRESENT TREE STATUS = 2 and no PREVIOUS TREE STATUS)*;* all no status trees (PRESENT TREE STATUS = 0)*.*	
Field width:	*2* digit	
Tolerance:	No errors	
Values:	Code	Definition

Codes 1 - 4 are **valid for new trees on the plot**:	1	Ingrowth	Either a new tally tree not qualifying as through growth or a new tree on land that was formerly nonforest and now qualifies as forest land (*includes* reversion or encroachment).
	2	Through growth	New tally tree 5.0 inches DBH/DRC and larger, within the microplot, which was not missed at the previous inventory.
	3	Missed live	A live tree missed at previous inventory and that is live or dead now.
	4	Missed dead	A dead tree missed at previous inventory that is dead now.
Codes 5 - 9 are **valid for remeasured trees that no longer qualify as tally**:	5	Shrank	Live tree that shrank below threshold diameter on microplot/ subplot/macroplot.
	6	*Moved*	Tree was correctly tallied in previous inventory, but has now moved beyond the radius of the plot due to natural causes (e.g., small earth movement, hurricane). Tree must be either live before and still alive now or dead before and dead now. If tree was live before and now dead, this is a mortality tree and should have PRESENT TREE STATUS = 2 (not 0).
	7	Cruiser error	Erroneously tallied at previous inventory.
	8	Procedural change	Tree was tallied at the previous inventory, but is no longer tallied *because of* a definition or procedural change.
	9	Sampled before	Tree was sampled before, but now the area where the tree was located is nonsampled. All trees on the nonsampled area have RECONCILE = 9.

Item 8.4.1.12 SPECIES (CORE 5.8)
[SPCD; PREV_SPCD_PNWRS]

Record the SPECIES code from the *Tree Species List* in *Appendix D*. If a species is encountered that is not listed in Appendix D,it should not be tallied. If the species cannot be determined in the field, tally the tree, but bring branch samples, foliage, cones, flowers, bark, etc. to the *office* for identification. If possible, collect samples outside the *macroplots* from similar specimens and make a note to correct the SPECIES code later. *Genus-only* codes should *not be used for live trees and are not included in Appendix D*. *In the case of* standing dead trees on newly established plots, use the sample collections procedures described earlier in this paragraph.

Note: The Tree Species List appendix contains all tree species designated as “Core” on the national list and all additional species tallied in PNW during the current inventory. Code “999” is **not a valid species code** for PNW.

Plants included in the tree species list are measured as trees regardless of form. If a tree species has multiple varieties and one or more of the varieties appears on the tree species list, only those varieties listed will be included as tally trees. If a tree species has multiple varieties but only one genus and species is listed on the tree species list, all varieties will be included as tally trees.

On remeasurement plots (SAMPLE KIND = 2), previous SPECIES information will be downloaded and displayed in the current SPECIES field in the PDR for each remeasurement tree. Correct the SPECIES code if the SPECIES was incorrectly identified, or SPECIES = 999 at the last inventory, even if the tree is no longer a valid tally tree (PRESENT TREE STATUS = 0).

When Collected:	*All trees (PRESENT TREE STATUS = 0-8)*
Field width:	4 digits
Tolerance:	No errors
Values:	*999 (valid only as a downloaded code); Species on the TREE SPECIES LIST, Appendix D*

Item 8.4.1.13 AZIMUTH (CORE 5.4)
[AZIMUTH; PREV_AZM_PNWRS]

Sight the AZIMUTH from the subplot center (for trees ≥ 5.0 inches DBH/DRC) or the microplot center (for *live* trees ≥ 1.0 inch and < 5.0 inches DBH/DRC) *to* the center of the base of *the* tree. Sight to the geographic center for multi-stemmed woodland species (*Appendix D*). The geographic center is a point of equal distance between all tallied stems for a given woodland tree. Record AZIMUTH to the nearest degree. Use 360 for north.

- Use the magnetic declinations shown in Appendix B, Reference Information.

On remeasurement plots (SAMPLE KIND = 2), previous AZIMUTH will be downloaded into the current AZIMUTH field. The current crew is responsible for verifying downloaded data and updating when it is out of tolerance.

- For saplings on the microplot that become trees (at the time of plot remeasurement), crews must collect new AZIMUTH information from the subplot center. For live trees on the subplot that shrink to become saplings on the microplot at remeasurement, crews must collect new AZIMUTH from the microplot center.

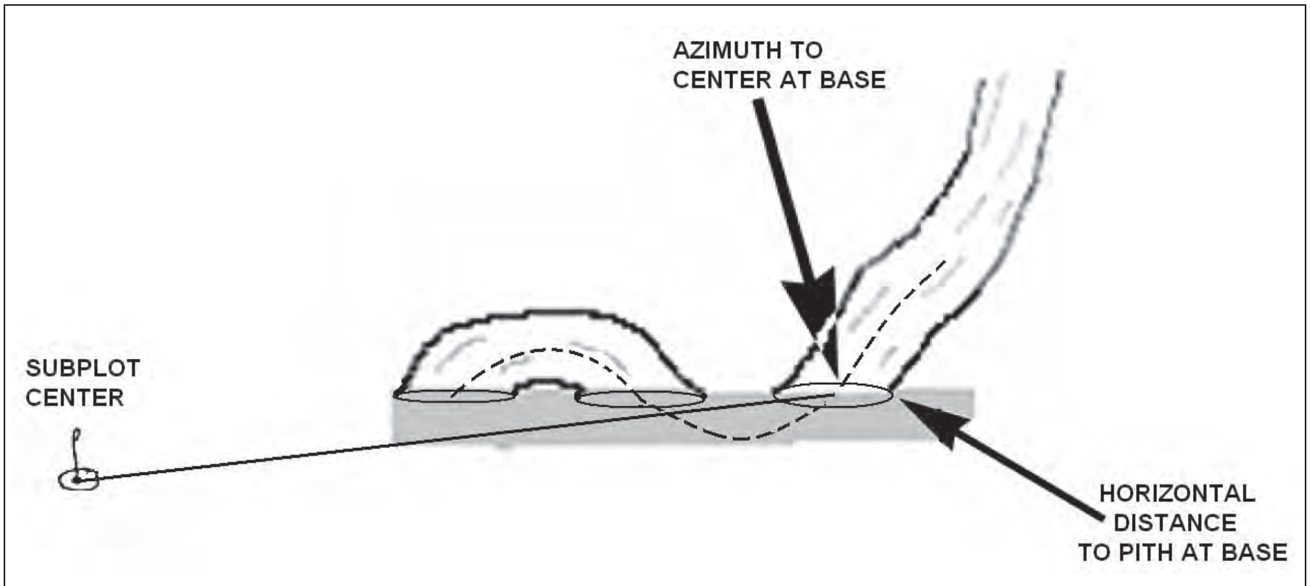


Figure 8.6: Where to measure AZIMUTH and HORIZONTAL DISTANCE when the main tree bole goes below the duff layer and reemerges

When Collected:	All live tally trees ≥ 1.0 in*ch* DBH/DRC*,* standing dead tally trees ≥ 5.0 in*ches* DBH/DRC*, and witness-only trees/stumps/objects. When SAMPLE KIND = 2, downloaded previous AZIMUTH must be verified.*
Field width:	3 digits
Tolerance:	*Tally trees:* +/- 10 degrees
	Witness-only trees/stumps/objects: +/- 4 degrees
Values:	001 to 360

Item 8.4.1.14 HORIZONTAL DISTANCE (CORE 5.5)
[DIST; PREV_HORIZ_DIST_PNWRS]

Record the measured HORIZONTAL DISTANCE, to the nearest 0.1 foot, from the subplot center (for trees ≥ 5.0 inches DBH/DRC) or microplot center (for *live* trees ≥ 1.0 inch and < 5.0 inches DBH/DRC) to the pith of the tree at the base. For all multi-stemmed woodland trees (woodland species indicated in *Appendix D*), the HORIZONTAL DISTANCE is measured from subplot or microplot center to the "geographic center" of the tree. The geographic center is a point of equal distance between all tallied stems for a given woodland tree.

On remeasurement plots (SAMPLE KIND = 2), previous HORIZONTAL DISTANCE will be downloaded into the current HORIZONTAL DISTANCE field. The current crew is responsible for verifying downloaded data and updating when it is out of tolerance. There is no tolerance for added or missed trees regardless of the previous crew's downloaded data. When the old pin or dowel is not found, current cruisers should consider all "edge" trees or saplings that were in or out on the previous occasion when reestablishing the subplot center.

- For saplings on the microplot that become trees (at the time of plot remeasurement), crews must collect new HORIZONTAL DISTANCE information from the subplot center.
- For live trees on the subplot that shrink to become saplings on the microplot at remeasurement, crews must collect new HORIZONTAL DISTANCE from the microplot center.

When Collected:	All live tally trees ≥ 1.0 inch DBH/DRC, standing dead tally trees ≥ 5.0 inch DBH/DRC. *When SAMPLE KIND = 2, downloaded previous HORIZONTAL DISTANCE must be verified.*
Field width:	4 digits (xxx.y)
Tolerance:	Microplot: +/- 0.2 feet
	Microplot woodland species: +/- 0.4 feet
	Subplot: +/- 1.0 feet from 0.1 to 23.0 ft
	Subplot: +/- 0.2 ft from 23.1 to 24.0 ft
	Subplot multi-stemmed woodland species: +/- 2.0 feet
	Annular plot: +/- 3.0 feet from 24.0 to 55.9 ft
	Annular plot: +/- 1.0 ft from 55.9 to 58.9 ft
	Annular plot woodland species: +/- 6.0 feet
Values:	Microplot: 00.1 to 06.8
	Subplot: 00.1 to 24.0
	Annular plot: 24.1 to 58.9

Item 8.4.1.15 SLOPE DISTANCE TO WITNESS TREE OR OBJECT (PNW) [SLOPE_DIST_TO_WITNESS_PNWRS]

Record the SLOPE DISTANCE, to the nearest 0.1 foot, from the base of the subplot center pin, to the head of the nail that affixes the TREE TAG NUMBER/basal tag or other witness object. If more than one nail is used to affix the basal tag, measure to the head of the top nail. If a basal tag cannot be attached to the witness object, or if in wilderness areas or national parks where TREE TAG NUMBER/basal tags cannot be used, measure from the base of the subplot/macroplot to the front of the tree/object at the base.

On remeasurement plots (SAMPLE KIND = 2), previous SLOPE DISTANCE will be downloaded into the current SLOPE DISTANCE field. The current crew is responsible for verifying downloaded data and updating when it is out of tolerance.

When Collected:	All witness trees, stumps, or objects (PRESENT TREE STATUS = 1 or 2 and SUBPLOT TALLY TREE WITNESS FLAG = Y; **or** PRESENT TREE STATUS = 7, 8, or 9). When SAMPLE KIND = 2: previous SLOPE DISTANCE must be verified.
Field width:	4 digits (xxx.y)
Tolerance:	+/- 0.2 feet
Values:	00.1 to 99.9

SECTION 8.5 DIAMETER

Diameters are measured at either breast height (DBH) or at the root collar (DRC). Species requiring DRC, referred to as woodland species, are denoted with a “w” in *Appendix D*. Trees with diameters between 1.0- and 4.9-inches are measured on the 6.8-foot radius microplot, those with diameters of 5.0-inches and larger are measured on the 24-foot radius subplots. Additional trees, with diameter breakpoints defined by region, are measured on the macroplot.

Diameters are used in calculating volume, growth, average stand diameter, and stocking-related estimates such as forest type and stand size.

Unless one of the special situations listed in Subsection 8.5.3 is encountered, measure DBH at 4.5 feet above the ground line on the uphill side of the tree.

SUBSECTION 8.5.1 MARKING CURRENT DIAMETER

1. Marking saplings < 3.0 inches DBH and woodland species (regardless of DRC) tallied for the first time:
   - Mark location of diameter measurement with a grease pencil. Each stem of a multi-stemmed woodland species must be marked.
2. Marking live DBH species ≥ 3.0 inches DBH, or snags ≥ 5.0 inches DBH, tallied for the first time:

- Set an aluminum nail at the point of diameter measurement. Place the nail on the side of the tree facing subplot/microplot center. **On steep slopes**, where placing the nail towards subplot/microplot center is not possible, place the nail on the uphill side of the bole. The nail should be driven in only as far as is necessary to firmly anchor it in the wood.
- Use caution to avoid damaging trees.
- On R6 Forest Service administered lands: use 4 inch nails to mark DBH.
- Use painted nails (brown, black, or gray) if required by special monumenting protocols for wilderness or national park plots (see Chapter 3, Plot Layout and Referencing).

3. Additional instructions for marking diameter on trees ≥ 32.0 inches:

   If a live tree or snag (new or remeasured) is 32.0 inches DBH/DRC or larger, affix an additional nail, and for every additional 12 inches of diameter add another nail, distributing the nails evenly around the circumference of the bole (e.g., a 44.3 inch tree would have three nails around the circumference of the tree at DBH/DRC – ideally, one on the uphill side of the tree and the other two about 1/3 of the way around the tree on each side). Set these nails while the diameter tape is wrapped around the tree at the point of diameter.

4. Marking DBH on trees previously marked:

   The DBH location on previously tallied trees ≥ 3.0 inches was marked with an aluminum nail. Remeasure diameter at the location of the previous crew's nail if appropriate using the rules below:

   - For live trees: Reset the old nail enough so that as much of the old nail is exposed as possible. If the old nail cannot be pulled out to meet this requirement, set a new nail at the same location.
   - For dead trees: Pound the nail flush with the bole.
   - For live and dead trees: If the previous location is no longer accessible (e.g., covered by a landslide), there is an abnormality at the PREVIOUS DIAMETER measurement point, or it is more than 12 inches away from where the diameter should be measured according to current protocols (either because protocols have changed or the previous crew made a mistake) move the point of measurement and the nail, and assign a DIAMETER CHECK code of "2".
     - If the point of DBH measurement is being moved (on live or dead trees), follow the instructions outlined in *Item 8.5.3.1, PREVIOUS DIAMETER AT BREAST HEIGHT (CORE 5.9.1)* to estimate a new PREVIOUS DIAMETER AT BREAST HEIGHT.
     - If the old nail marks a point of diameter measurement not used at the current inventory, remove it if possible; otherwise pound it in flush with the tree.
   - If the previous nail falls within the range of tolerance outlined above, do not pull it out of the tree just because it is not facing the subplot center. Keep original placement of nails at all times unless there is an obvious error.

5. <u>The following apply at remeasurement:</u>

   - <u>If at the previous visit a forked tree was recorded as two separate trees but should have been recorded as one tree, give one of the tree data lines a PRESENT TREE STATUS = 0, RECONCILE = 7 or 8, and a TREE NOTE *(remove the D.B.H. nail)*. The remaining tree data line receives PRESENT TREE STATUS = 1 or 2 with DIAMETER CHECK = 2, and a TREE NOTE. Correct the *PREVIOUS DIAMETER AT BREAST HEIGHT (Item 8.5.3.2) and relocate the D.B.H. nail.*</u>
   - <u>If at the previous visit a forked tree was recorded as one tree but should have been recorded as two separate trees, correct the *PREVIOUS DIAMETER AT BREAST HEIGHT* for the remeasured tree to represent one tree, and add the other fork as a missed tree. Use the existing tree data line to represent one of the stems; PRESENT TREE STATUS = 1 or 2, DIAMETER CHECK = 2, and a TREE NOTE. The second stem would get PRESENT TREE STATUS = 1 or 2, RECONCILE = 3 or 4, and a TREE NOTE.</u>

   Note: The current crew should not correct for subjective differences in interpretation of forked trees; i.e., only gross errors made by the previous crew should be corrected. If in doubt, use the previous crew's interpretation of the forked trees.

SUBSECTION 8.5.2 DIAMETER ON STUMPS

Diameter on stump < 4.5 feet tall: Use a logger's tape, cloth tape or ruler to measure the longest and shortest axes across the top of the stump. Record diameter as the average of the two measurements.

Special DBH situations:

1. **Forked tree:** Forks originate at the point on the bole where the piths intersect. Forked trees are handled differently depending on whether the fork originates below 1.0 foot, between 1.0 and 4.5 feet, or above 4.5 feet.

   A. **Trees forked below 1.0 foot:** Trees forked below 1.0 foot *(see Figure 8.7)* are treated as distinctly separate trees. The diameter and angle rules (see Trees forked between 1.0 foot and 4.5 feet, below) do not apply. However, lateral branches (e.g., a branch whorl) below one foot on a single-stemmed tree are not stems and should not be tallied. Distances and azimuths are measured individually to the center of each stem where it splits from the stump. DBH is measured for each stem at 4.5 feet above the ground. When stems originate from pith intersections below 1 foot, it is possible for some stems to be within the limiting distance of the microplot or subplot, and others to be beyond the limiting distance. If stems originating from forks that occur below 1.0 foot fork again between 1.0 and 4.5 feet, the rules in the next paragraph apply.

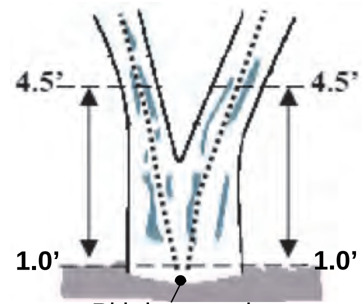


Figure 8.7: Trees forked below 1.0 foot

   B. **Trees forked between 1.0 foot and 4.5 feet:** 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. The size of the prospective fork is measured at the point of separation (crotch), above any abnormal swelling at the crotch (see Figure 8.8). The angle of branching for the prospective fork is measured in the immediate vicinity of pith intersection (see Figure 8.8). Trees forked between 1.0 foot and 4.5 feet *(see Figure 8.8)* are *tallied* as separate trees, but *the same* distance and azimuth (to the central stump) is recorded for each stem. Although a single azimuth and distance applies to all, multiple stems should be recorded as they occur in clockwise order (from front to back when one stem is directly in front of another). The DBH of each fork is measured at a point 3.5 feet above the pith intersection. When forks originate from pith intersections between 1.0 and 4.5 feet, the limiting distance is the same for all forks – they are either all on, or all off the plot.

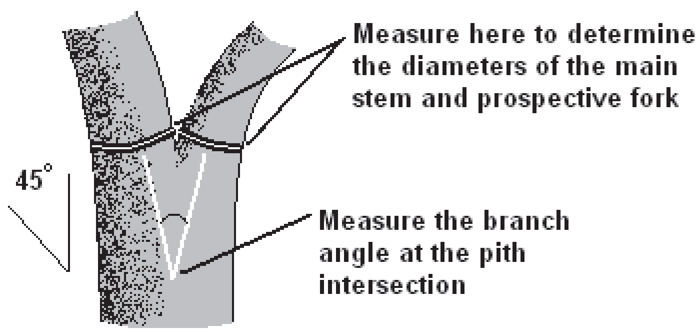


Figure 8.8: Trees forked between 1.0' and 4.5'

   - Multiple forks are possible if they all originate from approximately the same point on the main stem. In such cases, measure DBH on all stems at 3.5 feet above the common pith intersection.

- Once a stem is tallied as a fork that originated from a pith intersection between 1.0 and 4.5 feet, do not recognize any additional forks that may occur on that stem. Measure the diameter of such stems below the base of stem separation (i.e., do not move the point of diameter the entire 3.5 feet above the first fork).

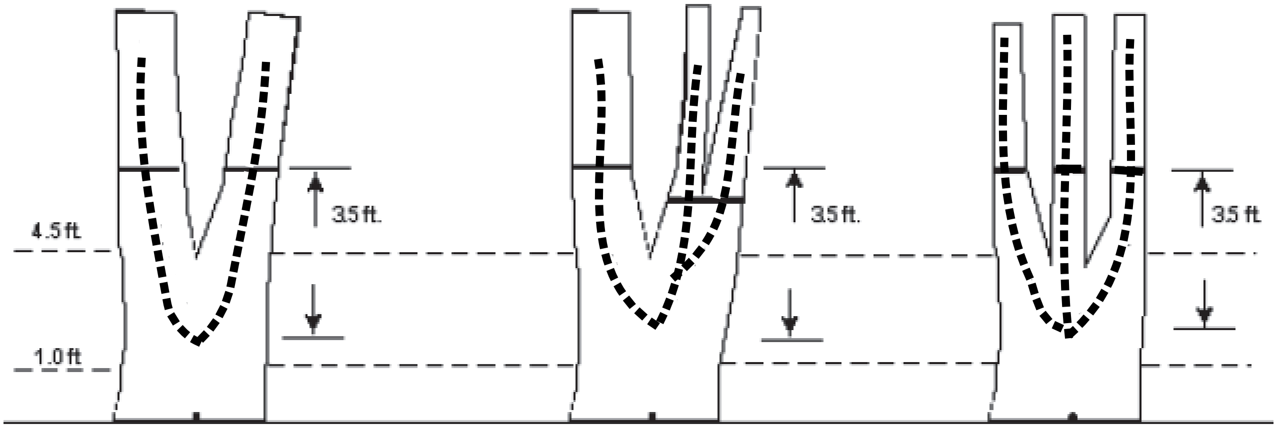


Figure 8.9: Where to measure DBH on trees forked above 1.0 feet.

C. **Trees forked at or above 4.5 feet:** Trees forked at or above 4.5 feet count as one single tree (*Figure 8.10: One tree*). If a fork occurs at or immediately above 4.5 feet, measure diameter below the fork just beneath any swelling that would inflate DBH.

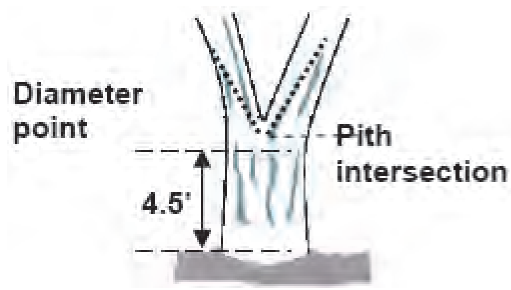


Figure 8.10: One tree

2. **Stump sprouts:** Stump sprouts originate between ground level and 4.5 feet on the boles of trees that have died or have 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 feet are measured at 4.5 feet from ground line. Stump sprouts originating between 1.0 feet and 4.5 feet are measured at 3.5 foot above their point of occurrence. As with forks, rules for measuring distance and azimuth depend on whether the sprouts originate above or below 1.0 feet. For multi-stemmed woodland species, treat all new sprouts as part of the same new tree.
3. **Tree with butt-swell or bottleneck:** Measure these trees 1.5 feet above the end of the swell or bottleneck if the swell or bottleneck extends 3.0 feet or more above the ground (Figure 8.11).
4. **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 (Figure 8.11 through Figure 8.13).

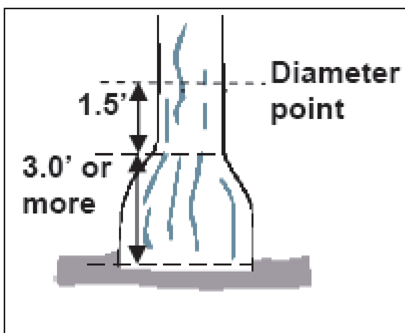


Figure 8.11: Bottleneck tree, *butt swell*

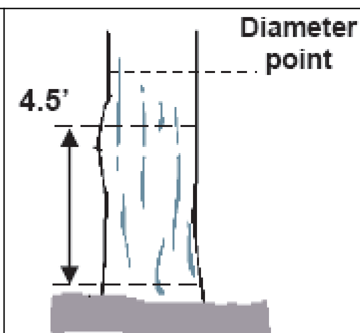


Figure 8.12: Tree with a *swell at 4.5 feet*

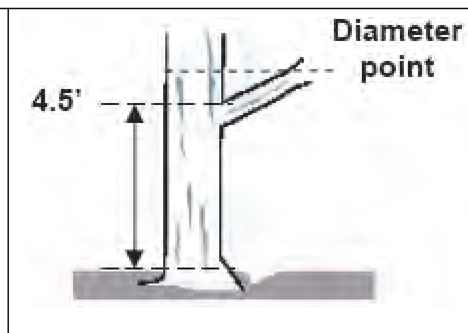


Figure 8.13: Tree with a branch *at 4.5 feet*

5. **Tree on slope:** Measure diameter at 4.5 feet from the ground along the bole on the uphill side of the tree (*Figure 8.14: Tree on a slope*).

6. **Leaning tree:** Measure diameter at 4.5 feet from the ground along the bole. The 4.5 foot distance is measured along the underside face of the bole (*Figure 8.15: Leaning tree*).
7. **Turpentine tree:** On trees with turpentine face extending above 4.5 feet, estimate the diameter at 10.0 feet above the ground and multiply by 1.1 to estimate DBH outside bark.

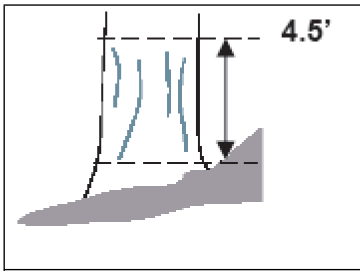


Figure 8.14: Tree on a slope

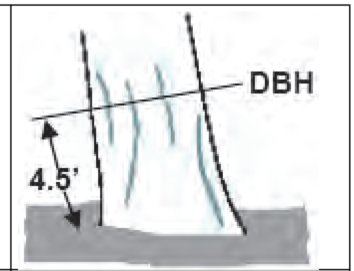


Figure 8.15: Leaning tree

8. **Independent trees that grow together:** If two or more independent stems have grown together at or above the point of DBH *(Figure 8.16)*, continue to treat them as separate trees. Set two diameter nails at DBH halfway around the tree's circumference from each other (after placing 1st nail, stand back from bole; take azimuth to nail; on opposite side of bole, place nail where the back azimuth of the first nail lines up). Measure the distance between the nails with a diameter tape making sure zero is aligned and not the hook at the end of the diameter tape with one diamter nail. Multiply the measurement by 2 and record the result as the current diameter. Example: Distance measured = 12.8 inches (12.8 X 2) = 25.6 inches. Set the DIAMETER CHECK code to "7".

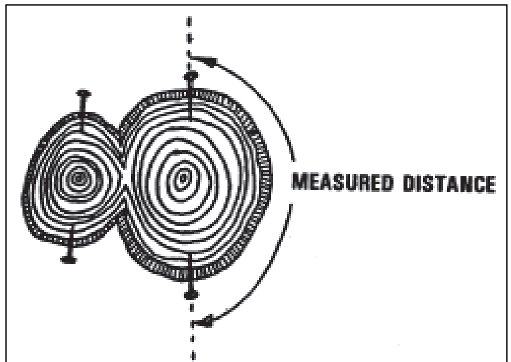


Figure 8.16: Independent trees growing together

- *If unable to use the "Double Nail Method"* estimate the diameter of each, set the "DIAMETER CHECK" code to *"1"*, and explain the situation in *TREE NOTES*.

9. **Missing wood or bark:** Do not reconstruct the DBH of a tree that is missing wood or bark at the point of measurement *(Figure 8.17). Note: for standing dead trees missing 25% or more of the diameter estimate a reconstructed diameter for Item 8.5.3.3, SNAG ESTIMATED DIAMETER (PNW).* Record the diameter, to the nearest 0.1 inch, of the wood and bark that is still attached to the tree. If a tree has a localized abnormality (gouge, depression, etc.) at the point of DBH, apply the procedure described for trees with irregularities at DBH.

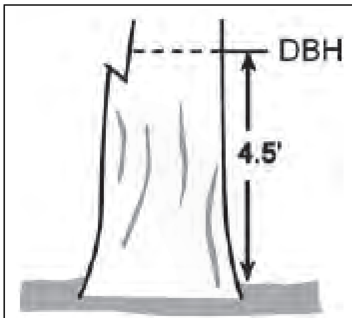


Figure 8.17: Tree with *missing wood or bark*

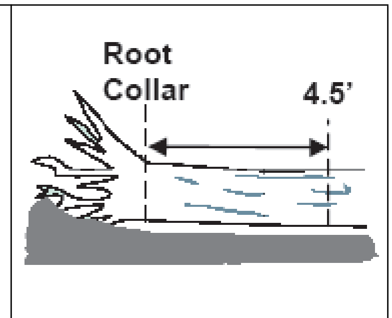


Figure 8.18: *Live wind-thrown tree*

10. **Live windthrown tree:** Measure from the top of the root collar along the length to 4.5 feet (Figure 8.18).
11. **Down live tree with tree-form branches growing vertical from main bole:** When a down live tree, touching the ground, has vertical (less than 45 degrees from vertical) tree-like branches coming off the main bole, determine whether or not the pith of the main bole (averaged along the first log of the tree) is above or below the duff layer.

    A. If the pith of the main bole is above the duff layer, use the same forking rules specified for a forked tree, and take all measurements accordingly *unless:*.

- If the pith intersection of the main down bole and vertical tree-like branch occurs below 4.5 feet from the stump along the main bole, treat that branch as a separate tree, and measure DBH 3.5 *feet* above the pith intersection for both the main bole and the tree-like branch *(Figure 8.19)*.

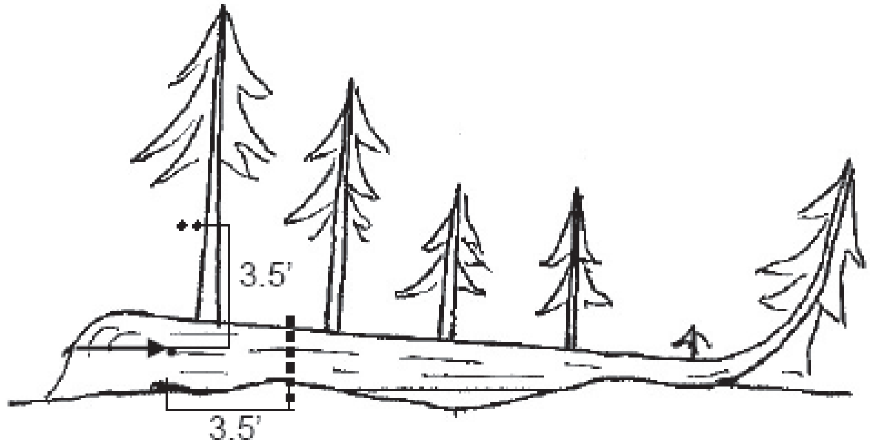


Figure 8.19: Down tree above duff

- If the intersection between the main down bole and the tree-like branch occurs beyond the 4.5 foot point from the stump along the main bole, treat that branch as part of the main down bole *(Figure 8.20)*.

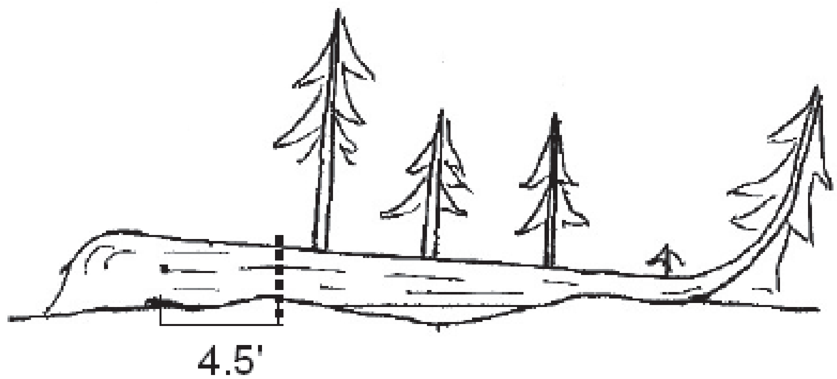


Figure 8.20: Branch beyond 4.5 feet from stump

B. If the pith of main tree bole is below the duff layer, ignore the main bole, and treat each tree-like branch as a separate tree; take DBH and length measurements from the ground, not necessarily from the top of the down bole (*Figure 8.21*). However, if the top of the main tree bole curves out of the ground towards a vertical angle, treat that portion of that top as an individual tree originating where the pith leaves the duff layer.

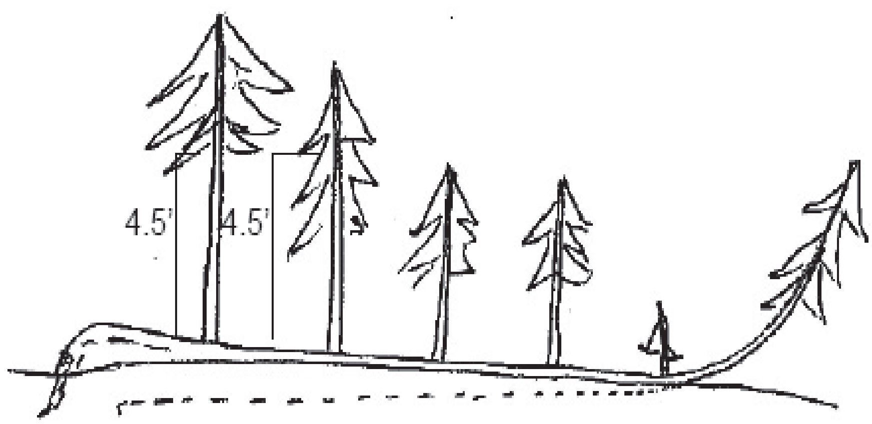


Figure 8.21: Down tree below duff

12. **Tree with curved bole (pistol butt tree)**: Measure along the bole on the uphill side (upper surface) of the tree (Figure 8.22).

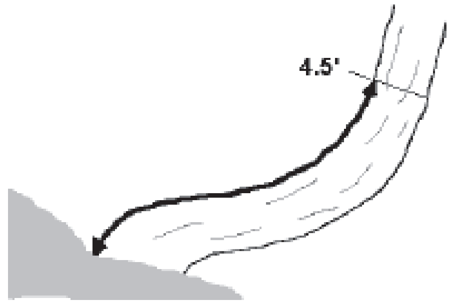


Figure 8.22: Tree with curved bole (pistol butt tree)

13. **Trees with stilted roots or growing on nurse logs**: On trees with stilted roots (e.g., redwood), growing on nurse logs or on top of stumps (not stump sprouts), DBH should be taken at 4.5 feet above the highest point of the root collar of the new tree.

Item 8.5.3.1 PREVIOUS DIAMETER AT BREAST HEIGHT (CORE 5.9.1) [PREVDIA]

This is the DBH assigned at the previous *annual inventory*. It has been downloaded from the previous inventory. Any change made to this field signifies *a procedural change or* an error at the time of the previous inventory.

Downloaded data should be verified, and updated if one of two situations occurs:

1. The current diameter measurement point is moved to correspond with the corrected location (either because of procedural change or previous crew error in nail location). DIAMETER CHECK should be set to “2” and an explanation is required in the TREE NOTES.
2. It is clear that there was a typo, illogical value or poorly estimated PREVIOUS DIAMETER AT BREAST HEIGHT.

Estimate the new value for PREVIOUS DIAMETER AT BREAST HEIGHT by doing one of the following:

- Take an increment core at the location of the previous diameter measurement: From the cambium, count back the number of growth rings since the previous visit. Measure this increment to the nearest 1/20 inch and subtract it from the current diameter at previous location. This will provide you with an estimate to correct the PREVIOUS DIAMETER AT BREAST HEIGHT from the same location.
- Measure the diameter at both the correct diameter location and at the previous diameter location. Determine the difference between these two diameters. Add or subtract this value (the difference) to the downloaded value of the PREVIOUS DIAMETER. This will provide an estimate of PREVIOUS DIAMETER corresponding to the corrected location.
- Estimate the correct PREVIOUS DIAMETER based on the "best" information at hand (e.g., the PREVIOUS DIAMETER of similar sized nearby trees of the same species).

When collected:	Downloaded when SAMPLE KIND = 2: all previously tallied trees ≥ 1.0 inch DBH
Field width:	4 digits (xxx.y)
Tolerance:	N/A
Values:	001.0 to 999.9

Item 8.5.3.2 DIAMETER AT BREAST HEIGHT (CORE 5.9.2) [DIA]

Unless one of the special situations *listed in Subsection 8.5.3 (Diameter at Breast Height; Special DBH Situations)* is encountered, measure DBH at 4.5 feet above the ground line on the uphill side of the tree. Round each measurement down to the last 0.1 inch. For example, a reading of 3.68 inches is recorded as 3.6 inches.

When collected:	All live tally trees ≥ 1.0 in*ches* DBH, standing dead tally trees ≥ 5.0 in*ches* DBH, *witness-only trees (PRESENT TREE STATUS = 1, 2 or 8); and witness stumps* (PRESENT TREE STATUS = 7)*
Field width:	4 digits (xxx.y)

Tolerance:	Live trees and dead trees with DECAY CLASS 1, 2	+/- 0.1 inches per 20.0 in*ches* increment of measured diameter.
	Dead trees with DECAY CLASS 3, 4, 5	+/- 1.0 inches per 20.0 in*ches* increment of measured diameter.
Values:	001.0 to 999.9	
***Note:** Although stumps do not meet DBH criteria, their DIAMETERS are recorded in this data item.		

Item 8.5.3.3 SNAG ESTIMATED DIAMETER (PNW)
[DIA_EST_PNWRS]

When DIAMETER AT BREAST HEIGHT of a snag appears to be less than 75 percent of the DIAMETER AT BREAST HEIGHT when the tree was alive (more than 25% of the diameter is missing), **because of breakage or rot**, record an estimate of the DIAMETER AT BREAST HEIGHT of tree when it was alive (see Figure 8.23).

This data item is complimentary to the ROTTEN/MISSING CULL data item, and is used to calculate the **total volume** of the snag before breakage or rot occurred.

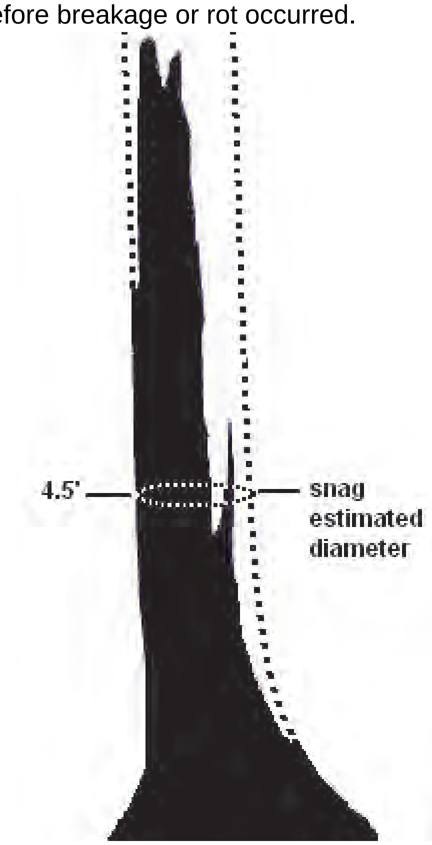


Figure 8.23: How to estimate SNAG ESTIMATED DIAMETER

When collected:	All standing dead trees greater than or equal to 5.0 inches DBH (PRESENT TREE STATUS = 2) when DIAMETER AT BREAST HEIGHT appears to be less than 75 percent of DBH (more than 25% of the diameter is missing) when the tree was alive (see Figure Figure 8.23)
Field width:	4 digits (xxx.y)
Tolerance:	+/- 5.0 inches per 20 inches of live DBH
Values:	Null, 006.7 to 999.9

SUBSECTION 8.5.4 DIAMETER AT ROOT COLLAR

For species requiring diameter at the root collar (refer to *Appendix D*), measure the diameter at the ground line or at the stem root collar, whichever is higher. For these trees, treat clumps of stems having a unified crown and common root stock as a single tree; examples include *honey* mesquite, *California* juniper, and *common pinyon*. For woodland trees, record DRC STEM DIAMETER and DRC STEM STATUS (described below). Then compute and record the DRC value from the individual stem diameter information. *The data recorder has a feature to compute DRC.*

Measuring woodland stem diameters: Before measuring DRC, remove the loose material on the ground (e.g., litter) but not mineral soil. Measure just above any swells present, and in a location so that the diameter measurements are a good representation of the volume in the stems (especially when trees are extremely deformed at the base). Stems must be at least 1 foot in length and at least 1.0 inch in diameter 1 foot up from the stem diameter measurement point to qualify for measurement. Additional instructions for DRC measurements are illustrated in *Figure 8.24*. For each qualifying stem of the woodland tree, measure and record DRC STEM DIAMETER *(Item 8.5.4.2)* and indicate the DRC STEM STATUS *(Item 8.5.4.3)*.

Computing and Recording DRC: For all tally trees requiring DRC, with at least one stem 1 foot in length and at least 1.0 inch in diameter 1 foot up from the stem diameter measurement point, DRC is computed as the square root of the sum of the squared stem diameters. For a single-stemmed DRC tree, the computed DRC is equal to the single diameter measured.

Use the following formula to compute DRC:

$$\text{DRC} = \text{SQRT}\ [\text{SUM}\ (\text{stem diameter}^2)]$$

Round the result to the nearest 0.1 inch. For example, a multi-stemmed woodland tree with stems of 12.2, 13.2, 3.8, and 22.1 would be calculated as:

$$\begin{aligned}\text{DRC} &= \text{SQRT}\ (12.2^2 + 13.2^2 + 3.8^2 + 22.1^2)\\ &= \text{SQRT}\ (825.93)\\ &= 28.74\\ &= 28.7\end{aligned}$$

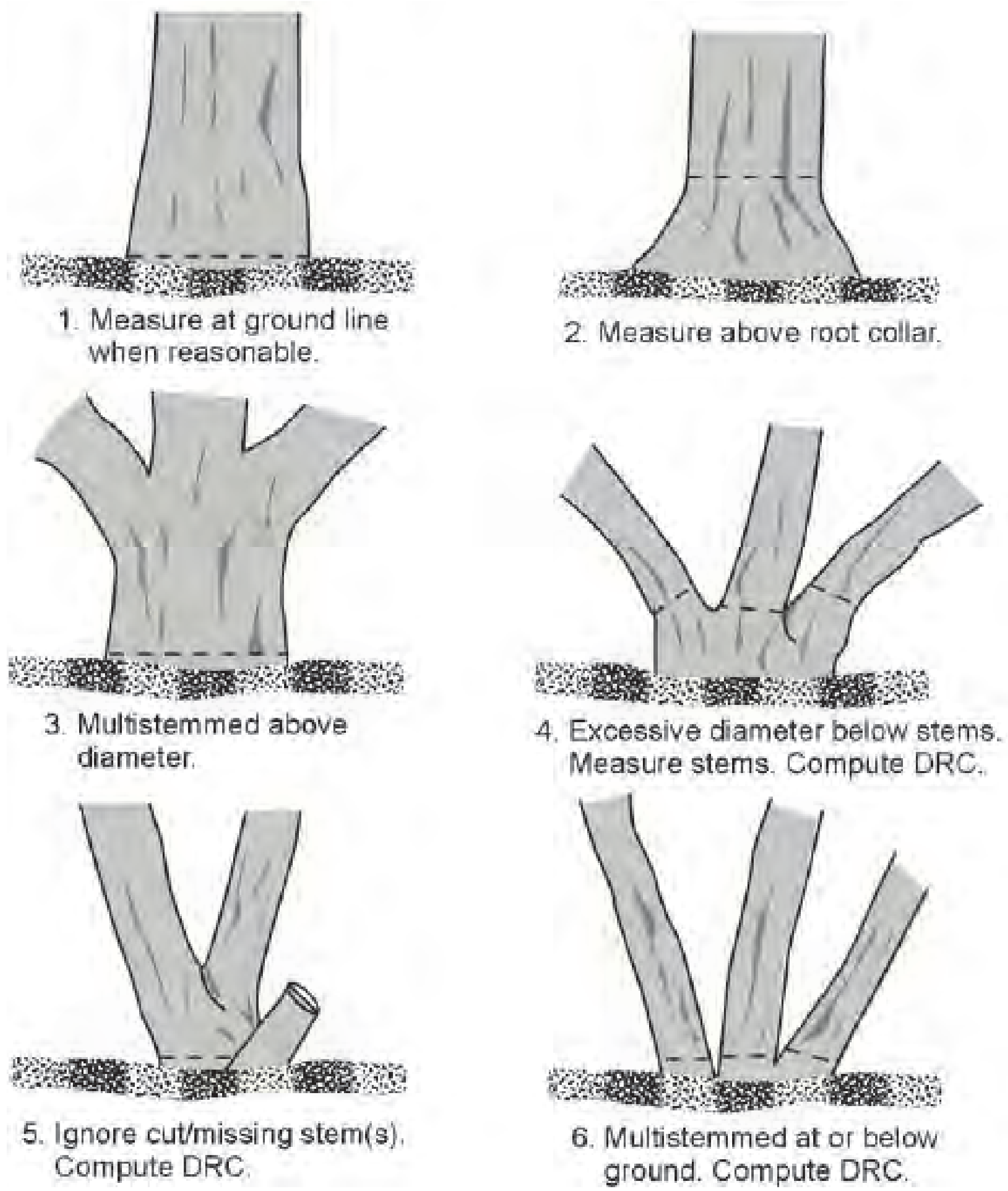


Figure 8.24: How to measure DRC in a variety of situations

Item 8.5.4.1 PREVIOUS DIAMETER AT ROOT COLLAR (CORE 5.9.3)
[TREE.PREVDIA]

This is the DRC assigned at the previous *annual inventory*. It has been downloaded from the previous inventory. Any change made to this field signifies a misclassification at the time of the previous inventory *and should only occur if the previous measurement was off more than 40 percent*. "DIAMETER CHECK" should be set to *"2"* and an explanation is required in the *TREE NOTES* if previous DRC is changed.

When collected:	Downloaded when SAMPLE KIND = 2: all previously tallied trees ≥ 1.0 inch DRC
Field width:	4 digits (xxx.y)
Tolerance:	No errors for updating (when previous measurement was off more than 40 percent).
Values:	001.0 to 999.9

Item 8.5.4.2 DRC STEM DIAMETER (CORE 5.9.4.1)
[TREE.DIA]

Record the diameter of each individual qualifying stem on the woodland tree.

When collected:	All stems on woodland tree species that are at least 1 foot in length and at least 1.0 inches in diameter 1 foot up from the stem diameter measurement point *when CURRENT NUMBER OF STEMS >0*
Field width:	4 digits (xxx.y)
Tolerance:	+/- 0.2 inches per stem
Values:	001.0 to 999.9

Item 8.5.4.3 DRC STEM STATUS (CORE 5.9.4.2)
[TREE.STATUSCD]

Record the status of each individual stem on the woodland tally tree.

When Collected:	All stems on woodland tree species that are at least 1 foot in length and at least 1.0 inches in diameter 1 foot up from the stem diameter measurement point	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Definition
	1	live stem
	2	dead stem

Item 8.5.4.4 PAST NUMBER OF STEMS (CORE 5.10)
[TREE.PREV_WDLDSTEM]

If the PAST NUMBER OF STEMS does not equal the CURRENT NUMBER OF STEMS, **do not** change the *downloaded* value. Make a note in TREE NOTES suggesting the possible reason for the difference.

When Collected:	*Downloaded when* SAMPLE KIND = 2
Field width:	2 digits
Tolerance:	No errors
Values:	1 to 99

Item 8.5.4.5 CURRENT NUMBER OF STEMS (CORE 5.11)
[TREE.WDLDSTEM]

Record the total number of stems that were measured for DRC (e.g., record 1 stem as 01; record 12 stems as 12). Count only the number of qualifying stems used to calculate DRC. Qualifying stems are those that are at least 1.0 foot in length and at least 1.0 inch in diameter, 1 foot up from the measurement point.

When Collected:	For tallied **woodland** species with at least one stem 1.0 *inches* in diameter or larger; includes woodland species tallied on the microplot
Field width:	2 digits
Tolerance:	No errors
Values:	1 to 99

SUBSECTION 8.5.5 ADDITIONAL DIAMETER DATA ITEMS

Item 8.5.5.1 DIAMETER CHECK (CORE 5.12)
[TREE.DIACHECK_PNWRS]

Record this code to identify the accuracy of the diameter measurement due to factors such as abnormal swellings, diseases, damage, new measurement positions, etc.) that may affect use of this tree in diameter growth/change analyses. Note: If both code 2 ***and*** *code 1, 5, 6, or 7* apply, *diameter is both estimated and moved,* use code 2 *and change the PREVIOUS DIAMETER if necessary.*

If diameter is estimated because of moss/vine/obstruction, record an estimate of the diameter without the obstruction. Do not remove moss, lichens, or vines.

If diameter at the current inventory is measured at a different location than at the previous inventory, record DIAMETER CHECK = 2 and remove the d-nail(s) from the previous inventory. If the previous point diameter measurement cannot be found on a live tree (i.e., nail fell out) also record code “2”.

DIAMETER CHECK = 2 should not be coded for remeasurement saplings without diameter nails or trees without nails due to monumenting restrictions (such as trees in National Parks).

Note: If either code 1 or code 2 is used, a tree-level note is required.

When Collected:	All live tally trees ≥ 1.0 in*ches* DBH/DRC and standing dead tally trees ≥ 5.0 in*ches* DBH/DRC		
Field width:	1 digit		
Tolerance:	No errors		
Values:	*PNW Code*	*Description*	Core Code (office use only)
	0	Diameter measured accurately *at correct location*	0
	1	Diameter estimated*, for any reason other than moss, vines, or the double nail method*	1
	2	Diameter measured at different location than previous measurement (*remove original d-nail*)*: no old nail found, or previous diameter was obviously incorrect; value has been updated. An electronic Tree Note is required to describe the situation.*	2
	5	Diameter estimated because of moss	1
	6	Diameter estimated because of vines	1
	7	Diameter estimated (double nail diameter)	1

SECTION 8.6 TREE GROWTH

SUBSECTION 8.6.1 TREE AGE

Item 8.6.1.1 TREE AGE (PFSL)
[BHAGE]

This data item is used to determine STAND AGE, and to develop regression estimators of tree growth, mortality and harvest.

Selection: Starting from North and working in a clockwise direction on each subplot/macroplot, determine the age of one live tree representing each SPECIES, within each CROWN CLASS, for each condition class present on the plot. Although this selection method is to be used on each subplot/macroplot, only one tree in each SPECIES/CROWN CLASS/condition class needs to be aged on the entire plot. Saplings can be aged using the whorl-count procedures below, only if sufficient age data cannot be obtained on larger trees. If a sapling has been aged prior to encountering a tree ≥5.0 inches (with the same SPECIES/CROWN CLASS/condition class) on a subsequent subplot, an age must be obtained for the tree ≥5.0 inches. The PDR will identify trees to be aged using the above selection criteria.

- **Example:** Subplot 1 has a white fir, with a CROWN CLASS of “3”, in condition class 1. Over the entire plot, only one white fir in condition class 1 with a CROWN CLASS of “3” needs to be aged. This selection method is applied regardless of differences in diameter of the trees.

Do not select or use: Trees with any sign of rot present within the lower bole; trees with rot present in an increment core on which age cannot be accurately determined; or any tree with severe deformities at DBH. Bypass these trees and select the next one by SPECIES/CROWN CLASS/condition class.

Do not collect TREE AGE for Great Basin bristlecone pine (142), any woodland species, or any hardwood species except red alder.

Leave the extracted increment core at the base of the tree in a relatively protected location so it can be located, if necessary.

Note: Trees ages of 999 years and greater are recorded as “999”.

Determining age for trees that have been cored previously:

Trees bored at a previous occasion will have TREE AGE updated to the current year on the PDR. Current crews are responsible for the accuracy of data when using a previously bored age and also in making sure the selection requirements listed above, are met.

In certain situations, previously collected TREE AGE should be changed, removed from the data set, or supplemented with additional age trees. These include changes in condition class or CROWN CLASS, and corrections to tree SPECIES of aged trees. In rare instances, the previous age may be a typo or an obvious error. If you find an error, re-bore the tree to collect a new age. Overwrite the existing age with the new one and change the TREE AGE METHOD to a "1" (bored at the current inventory). For those trees with suspicious ages that cannot be re-bored, delete the existing age and select another tree to satisfy the SPECIES/CROWN CLASS/condition class requirement.

1. **Remeasurement (annual to annual inventory) plots:** TREE AGE from the previous visit will be downloaded to the PDR. Field crews are required to verify the accuracy of this age and revise when necessary. Downloaded TREE AGE will have an "2" next to the age indicating that it is updated to current year. The PDR will alert the user if an additional TREE AGE is required for a given SPECIES/ CROWN CLASS/condition class category whenever updated information indicates a missing category.
2. **Periodic to annual inventory plots:** TREE AGE may be obtained from measurements made during the periodic inventory and can be used to fulfill the selection requirements above (SPECIES/ CROWN CLASS/condition class). Use the old plot data printouts to determine which trees were bored for age (denoted by a "+" next to the age). If the previous age seems correct, add the number of growing seasons to that age and record as the current TREE AGE.
    - Some plots were visited multiple times during the periodic inventory. These plots may have old plot data sheets which contain ages updated to the current year of that inventory (denoted by an "*" next to the age).
    - On R5 Forest Service administered lands only, the previously recorded TREE AGE includes 10 years added to DBH ages to allow for tree growth to 4.5 feet. Subtract this 10 years before adding the number of growing seasons to the current year.

Determining age for trees that have not been cored previously (use one of the following methods):

A. Core the tree with an increment borer and record the number of rings between the current year's increment and the pith. **Core a tree only if it is ≥ 5.0 inches in diameter at 4.5 feet.** Bore the tree about one inch below the point where the diameter measurement was taken (to avoid impacting the diameter measurement), on the side of the tree facing subplot center; if impossible, bore the tree on the side opposite subplot center. If neither of these locations will suffice, bore the tree just below the point of diameter measurement at any accessible location on the tree’s circumference. Extrapolate ages for trees too large to reach the pith with the borer (see instructions below).

B. Determining breast height age of large trees: Large tree size is not a valid reason for bypassing a tree for boring. To determine the age of a tree whose radius is greater than the length of the increment borer, use the following procedure. This procedure is available as a "pop-up" menu on the data recorder.

Step 1. Bore into the tree as far as possible, extract the core (do not discard the bark), and count the rings. Record this number for NUMBER OF RINGS (Item 8.6.1.3).

Step 2. Count the number of rings in the inner 2 inches of the core closest to the center of the tree. Record this number for NUMBER OF RINGS IN INNER 2 INCHES (Item 8.6.1.4).

Step 3. Measure the total length of the extracted core to the nearest 0.1 inch (include the entire thickness of bark at point of measurement, even though some of it may not be in the core because it crumbled or the tree was cored in a bark furrow). Record this length for LENGTH OF MEASURED CORE (Item 8.6.1.5).

Step 4. Divide the tree's diameter by 2 to determine the radius in inches.

Step 5. Subtract #3 (length of the extracted core) from #4 (the radius in inches). The result is the length in inches that the extracted core is short of reaching the tree center.

Step 6. Divide #5 (inches from the core to tree center) by 2 inches. The result equals the number of 2 inch lengths to the tree center.

Step 7. Multiply #6 by the number of rings in the inner 2 inches (#2) to determine the number of rings from the inner end of the extracted core to the tree center.

Step 8. Add #7 to the total number of rings in the extracted core (#1). This is the tree's estimated age at breast height (i.e., number of rings in the entire radius).

Step 9. Record an extrapolated age for TREE AGE METHOD (Item 8.6.1.2).

Example: Determine the age of a 59.6-inch western hemlock. The core has 110 rings, and has 10 rings in the inner 2 inches. 0.8 inches of the 16.4-inch-long increment borer did not penetrate the tree and 1 inch of bark within the core fell off when it was extracted from the borer, resulting in a 14.6-inch core. Each number below is associated with its corresponding step above:

Step 1. 110 rings counted

Step 2. 10 rings in the inner 2 inches of the core

Step 3. 14.6 inches of core was extracted + 1 inch of bark that fell out of the core = 15.6

Step 4. 59.6 inches is the tree's diameter, then divide by 2 = 29.8 inches to center of tree (pith)

Step 5. 29.8 inches (true center) - 15.6 inches (measured core) = 14.2 inches short of reaching pith

Step 6. 14.2 inches / 2 = 7.1 (2 inches) lengths short

Step 7. 7.1 (from step 6) x 10 (from step 2) = 71 rings not counted

Step 8. 110 rings counted (step 1) + 71 rings not counted (step 7) = 181 years old at breast height

Step 9. Record an extrapolated age for TREE AGE METHOD (Item 8.6.1.2).

C. Age of some species can be determined by counting the whorls of saplings. If no suitable tree ≥ 5.0 inches DBH is available for a given SPECIES/CROWN CLASS/condition class combination, check for the species in the microplot sapling tally, using the selection criteria below. Count whorls above the 4.5-foot mark if < 5.0 inches at DBH.

Selection: Starting from North and working in a clockwise direction on the microplot, determine the age of one live sapling representing each species for which an age could not be obtained on a tree ≥ 5.0 inches, within each CROWN CLASS, for each condition class present on the plot.

Do not record for: Suppressed trees (CROWN CLASS = 5).

Determine age by whorl count for the following species only: pines; Douglas-fir; and true firs.

When collected:	On new plots (SAMPLE KIND = 1): first live tree by species/crown class/ condition class. On remeasurement plots (SAMPLE KIND = 2), or revisited periodic plots (PNW PLOT KIND = 2 or 3): downloaded previous ages must be verified. Excludes: Great Basin bristlecone pine (142), any woodland species, or any hardwood species except red alder.	
Field width:	3 digits	
Tolerance:	Trees with bored age	+/- 10 percent
	Trees with extrapolated age	+/- 30 percent
Values:	001 to 999	

Item 8.6.1.2 TREE AGE METHOD (PFSL)
[BORED_CD_PNWRS]

Record a code for the method used to determine TREE AGE. Trees bored or “whorl-counted” at the current inventory are assigned code "1". Ages derived from previous inventory data and updated to the current year are assigned code "2". Extrapolated ages are assigned code “3”.

When collected:	Trees bored or whorl-counted at the current inventory	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	1	Bored or whorl-counted at the current inventory
	2	Derived from previous inventory data and updated to the current year
	3	Extrapolated age

Item 8.6.1.3 NUMBER OF RINGS (PFSL)
[RING_COUNT_PNWRS]

When TREE AGE is extrapolated (TREE AGE METHOD = 3), record the total NUMBER OF RINGS counted.

When collected:	When TREE AGE METHOD = 3
Field width:	3 digits
Tolerance:	+/- 10 percent
Values:	001-999

Item 8.6.1.4 NUMBER OF RINGS IN INNER 2 INCHES (PFSL)
[RING_COUNT_INNER_2INCHES_PNWRS]

When TREE AGE is extrapolated (TREE AGE METHOD = 3), record the number of rings counted in the inner 2 inches of the core closest to the center of the tree.

When collected:	When TREE AGE METHOD = 3
Field width:	2 digits
Tolerance:	+/- 10 percent
Values:	01-99

Item 8.6.1.5 LENGTH OF MEASURED CORE (PFSL)
[CORE_LENGTH_PNWRS]

When TREE AGE is extrapolated (TREE AGE METHOD = 3), measure and record the total length of the extracted core to the nearest 0.1 inch (include the entire thickness of bark at point of measurement, even though some of it may not be in the core because it crumbled or the tree was cored in a bark furrow).

When collected:	When TREE AGE METHOD = 3
Field width:	5 digits (xxx.y)
Tolerance:	+/- 0.2 inch
Values:	000.1-999.9

Item 8.6.1.6 10-YEAR INCREMENT (PNW)
[INC10YR_PNWRS]

This is a 3-digit code recording bored radial increment for all conifer species and red alder. Measurement is taken to the nearest 1/20th inch, for a 10-year period. 10-YEAR INCREMENT is recorded for every tree cored for TREE AGE with an increment borer at the current inventory.

Do not collect for trees bored for age at the previous annual visit (when SAMPLE KIND = 2).

To obtain a radial increment:

Step 1. Use the same core extracted to determine TREE AGE. Count back 10 growth rings from the cambium end of the core starting from the first fully-formed ring (and skipping this year's summer growth). See diagram below:

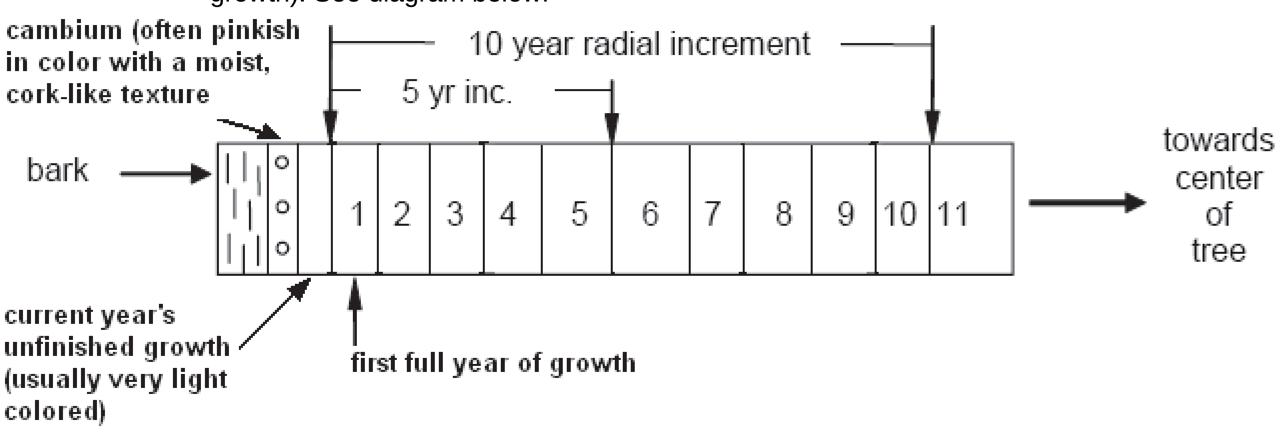


Figure 8.25: Bored tree core showing where to measure 5- and 10-year radial increments.

Step 2. Measure the length of this segment of the core to the nearest 1/20th inch to get radial increment. Enter this radial increment as the number of twentieths, e.g., 18/20 is recorded "18" and 27/20 is recorded "27".

When collected:	When TREE AGE ≥ 10 and TREE AGE METHOD = 1 or 3: all conifer and red alder trees bored for TREE AGE with an increment borer at the current visit
Field width:	3 digits
Tolerance:	1/20th per 1 inch of increment
Values:	001 to 999

Item 8.6.1.7 5-YEAR INCREMENT (PFSL)
[INC5YR_PNWRS]

A 3-digit code recording bored radial increment for all conifer species and red alder. Measurement is taken to the nearest 1/20th inch, for a 5-year period. 5-YEAR INCREMENT is recorded for every tree cored for TREE AGE with an increment borer at the current inventory. The procedures for the 5-YEAR INCREMENT are the same as for the 10-YEAR INCREMENT, except the increment period is five years.

Do not collect for trees bored for age at the previous annual visit (when SAMPLE KIND = 2).

When collected:	When TREE AGE METHOD = 1 or 3: all conifer and red alder trees bored for TREE AGE with an increment borer at the current visit
Field width:	3 digits
Tolerance:	1/20th per 1 inch of increment
Values:	001 to 999

Item 8.6.1.8 5-YEAR HEIGHT GROWTH (PFSL)
[INC5YRHT_PNWRS]

For R5 and R6 Forest Service administered lands only: This data item is specific to growth and yield models used by R5 and R6. Record a 5-YEAR HEIGHT GROWTH on saplings (trees ≥ 1.0 inch and < 5.0 inches DBH). Begin at the sixth branch whorl from the top of the tree and measure to the first branch whorl from the top. Do not count false whorls or the current year's growth. Measure to the nearest 0.1 foot, always rounding down.

Record 5-YEAR HEIGHT GROWTH for the following species only: Pine; spruce; Douglas-fir; and true fir (i.e., all species within the genera Pinus, Abies, Picea, and Pseudotsuga). Note: although whorl-counted ages are not obtained for spruce, 5-year height growth is recorded for spruce.

Do not record for: suppressed trees (CROWN CLASS = 5 and/or DAMAGE AGENT = 50); woodland species; or hardwoods.

<u>New installations</u> (SAMPLE KIND = 1): Starting from North and working in a clockwise direction on each microplot, record a 5-YEAR HEIGHT GROWTH measurement for at least the first sapling representing each SPECIES, in each CROWN CLASS, for each condition class present on the plot.

- Although this selection method is to be used on each microplot, only one tree in each SPECIES/ CROWN CLASS/condition class needs a growth measurement on the entire plot.

<u>Remeasurement plots</u> (SAMPLE KIND = 2): Record this measurement for ingrowth (saplings that are now ≥ 1.0 inch and < 5.0 inches) since the previous inventory, regardless of SPECIES/CROWN CLASS/condition class.

When collected:	On new installations (ADMINISTRATIVE FOREST CODE = 501 - 699 and SAMPLE KIND = 1): one live sapling (≥ 1.0 inch and < 5.0 inches DBH) per species/crown class/condition class on microplot. On remeasurement plots (ADMINISTRATIVE FOREST CODE = 501 - 699 and SAMPLE KIND = 2): any sapling ingrowth (saplings that are now ≥ 1.0 inch and < 5.0 inches) on the microplot since the previous inventory, regardless of species/crown class/condition class.
Field width:	4 digits (xx.y)

Tolerance:	The tolerance depends on the height of the tree:	
	< 15 feet	+/- 0.5 feet
	15 – 35 feet	+/- 1.0 feet
	36 – 50 feet	+/- 2.0 feet
	≥ 50 feet	+/- 3.0 feet
Values:	0.1 to 25.0	

SUBSECTION 8.6.2 TREE LENGTH

Item 8.6.2.1 PREVIOUS ACTUAL LENGTH (PNW)
[PREV_ACTUALHT_PNWRS]

This is the actual tree length measured by the field crew during the previous annual visit. It has been downloaded from the annual inventory and will be editable by the current field crew. These data are provided to help ensure quality of tree length data through comparison of the previous length versus the currently measured length, and to assist in estimation of current tree length, if estimation is necessary due to lean, dead top, etc.

Editing or otherwise overwriting the PREVIOUS ACTUAL LENGTH is restricted to the following scenarios:

1. Obvious error: Correct PREVIOUS ACTUAL LENGTH if error appears to be greater than twenty percent of the PREVIOUS ACTUAL LENGTH.
2. Data entry error: Correct PREVIOUS ACTUAL LENGTH if error is diagnosable as a typographical error.

Any change made to this field signifies an error at the time of the previous inventory.

When collected:	When SAMPLE KIND = 2: all downloaded live tally trees ≥ 1.0 inch DBH/DRC; and standing dead tally trees ≥ 5.0 inch DBH/DRC with a measured (not estimated) ACTUAL LENGTH at the previous inventory
Field width:	3 digits
Tolerance:	N/A
Values:	001 to 400

Item 8.6.2.2 ACTUAL LENGTH (CORE 5.15)
[ACTUALHT]

The ACTUAL LENGTH of the tree is recorded from ground level (measured from the uphill side of a tree on a slope) to the highest remaining portion of the tree still present and attached to the bole. *F*or trees with missing tops (top on live trees is completely detached; top on dead trees is greater than 50 percent detached from the tree), *r*ecord the ACTUAL LENGTH of the tree to the nearest 1.0 foot from ground level to the break. Use the length to the break for ACTUAL LENGTH until a new leader qualifies as the new top for TOTAL LENGTH; until that occurs, continue to record ACTUAL LENGTH to the break. Trees with previously broken tops are considered recovered (i.e., ACTUAL LENGTH = TOTAL LENGTH) when a new leader is 1/3 the diameter of the broken top at the point where the top was broken (not where the new leader originates from the trunk). Account for lean (see Figure 8.26: Measuring height of leaning tree), but do not add length for crooks and sweeps. Forked trees should be treated the same as unforked trees.

ACTUAL LENGTH should only differ from TOTAL LENGTH if the tree has a broken or missing top.

When Collected:	All live tally trees ≥ 1.0 in DBH/DRC and standing dead tally trees ≥ 5.0 in DBH/DRC
Field width:	3 digits
Tolerance:	+/- 5 percent of true length for live trees < 60 feet
	+/- 10 percent of true length for live trees ≥ 60 feet and all dead trees
Values:	*001* to 400

Item 8.6.2.3 PREVIOUS TOTAL LENGTH (PNW)
[PREV_HT_PNWRS]

This is the total tree length recorded by the field crew during the previous annual visit. It has been downloaded from the annual inventory and will be editable by the current field crew. These data are provided to help ensure quality of tree length data through comparison of the PREVIOUS TOTAL LENGTH to the currently measured TOTAL LENGTH, and to assist in estimation of current tree length, if estimation is necessary due to lean, dead top, etc.

Editing or otherwise overwriting the PREVIOUS TOTAL LENGTH is restricted to the following scenarios:

1. Obvious error: Correct PREVIOUS TOTAL LENGTH if error appears to be greater than twenty percent of PREVIOUS TOTAL LENGTH.
2. Data entry error: Correct PREVIOUS TOTAL LENGTH if error is diagnosable as a typographical error.

Any change made to this field signifies an error at the time of the previous inventory.

When collected:	When SAMPLE KIND = 2: all downloaded live tally trees ≥ 1.0 inch DBH/DRC; and standing dead tally trees ≥ 5.0 inch DBH/DRC with a recorded TOTAL LENGTH at the previous inventory
Field width:	3 digits
Tolerance:	N/A
Values:	001 to 400

Item 8.6.2.4 TOTAL LENGTH (CORE 5.14)
[HT]

Record the TOTAL LENGTH of the tree, to the nearest 1.0 foot from ground level to the top of the tree. For trees growing on a slope, measure on the uphill side of the tree.

If the tree has a missing top (top is broken and completely detached from the tree), estimate what the total length would be if there were no missing top. Account for lean (see Figure 8.26), but do not add length for crooks and sweeps. Forked trees should be treated the same as unforked trees.

Height on leaning trees: Measure or estimate total normally-formed bole length (from the base to the tip of the tree), and not the perpendicular from the ground to the tip. To measure heights of leaning trees using a clinometer, follow these steps:

Step 1. Move to a point along a line (point D) that is perpendicular to the plane in which the tree is leaning.

Step 2. Using a clinometer, measure the height of point A above point B.

Step 3. By standing at the base of the tree and sighting up the bole with your clinometer, measure the slope of the bole in degrees (Angle E in the diagram above).

Step 4. Subtract the degrees of lean (step 3) from 90 degrees. This gives you the degrees of angle F.

Step 5. By sighting through your clinometer, convert the angle calculated in step 4 to a percentage.

Step 6. Use the slope correction table in Appendix B to determine the expansion factor for the percent slope determined in step 5. Multiply the expansion factor by the measured distance from point A to point B (step 2). This gives the length of the bole (point A to point C).

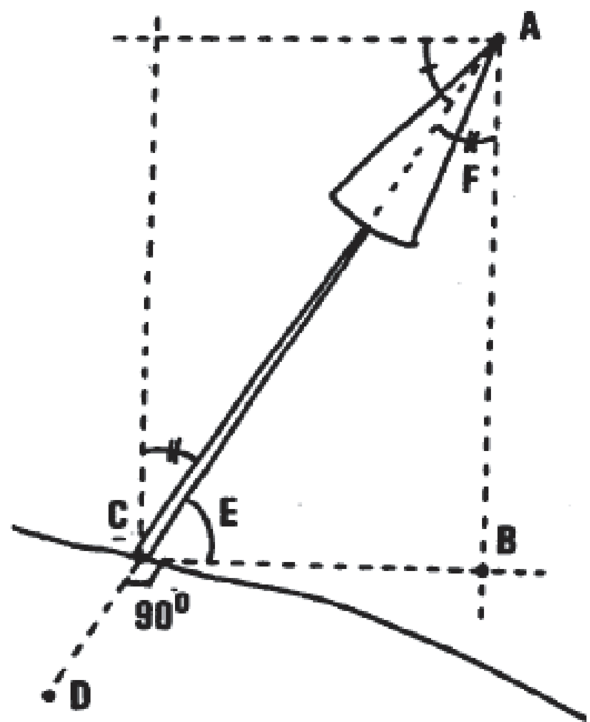


Figure 8.26: Measuring height of leaning tree

When Collected:	All live tally trees ≥ 1.0 in*ch* DBH/DRC and all standing dead tally trees ≥ 5.0 in*ch* DBH/DRC
Field width:	3 digits
Tolerance:	+/- 10 percent of true length
Values:	*001* to 400

Item 8.6.2.5 LENGTH METHOD (CORE 5.16)
[HTCD]

Record the code that indicates the method used to determine tree length.

When Collected:	All live tally trees ≥ 1.0 inch DBH/DRC and all standing dead tally trees ≥ 5.0 inches DBH/DRC	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	1	Total and actual lengths are field measured with a measurement instrument (e.g., clinometer, relascope, tape, laser)
	2	Total length is visually estimated, actual length is measured with an instrument
	3	Total and actual lengths are visually estimated *(not measured)*

Item 8.6.2.6 PREVIOUS LENGTH METHOD (PNW)
[PREV_HTCD_PNWRS]

Downloaded code indicating the method used to determine tree length at the previous visit. This field cannot be updated by the field crew.

When Collected:	All live tally trees ≥ 1.0 inch DBH/DRC and all standing dead tally trees ≥ 5.0 inches DBH/DRC recorded at the previous inventory	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	1	Total and actual lengths are field measured with a measurement instrument (e.g., clinometer, relascope, tape, laser)
	2	Total length is visually estimated, actual length is measured with an instrument
	3	Total and actual lengths are visually estimated (not measured)

SUBSECTION 8.6.3 TREE LIVE CROWN MEASUREMENTS

Item 8.6.3.1 COMPACTED CROWN RATIO (CORE 5.19)
[CR]

Record the COMPACTED CROWN RATIO for each live tally tree, 1.0 inch and larger, to the nearest one percent. COMPACTED CROWN RATIO is that portion of the tree supporting live foliage (or in the case of extreme defoliation should be supporting live foliage) and is expressed as a percentage of the ACTUAL TREE LENGTH *(include dead tops but not missing tops in the ratio)*. To determine COMPACTED CROWN RATIO, ocularly transfer lower live branches to fill in large holes in the upper portion of the tree until a full, even crown is visualized.

Do not over-compact trees beyond their typical full crown *structure*. For example, if tree branches tend to average 2 feet between whorls, do not compact crowns any tighter than the 2-foot spacing (*Figure 8.27*). Include epicormic branches with a 1-inch diameter or greater.

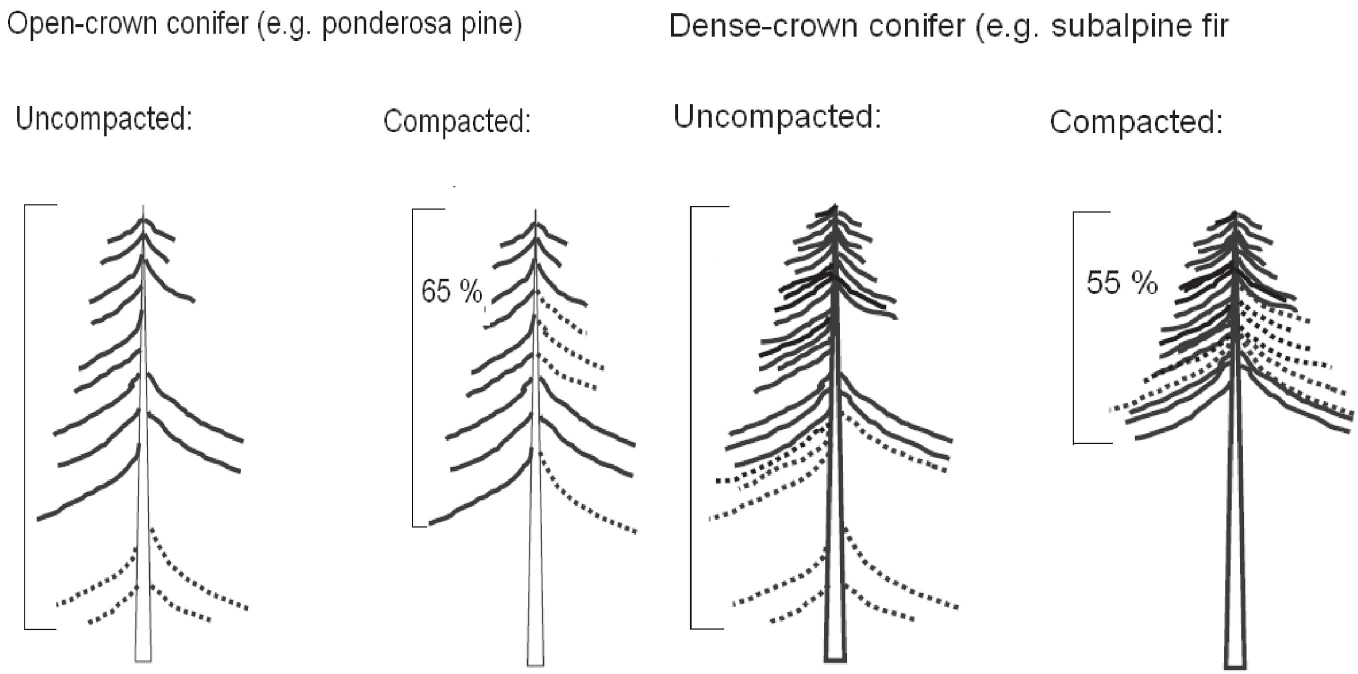


Figure 8.27: *Examples of COMPACTED CROWN RATIO*

Note: Crown ratio is based on the ratio of foliage, not where the limbs attach to the tree bole.

For multi-stemmed woodland species, ocularly transfer lower live foliage to fill large holes on all stems and form an even crown across the tree.

Crown ratio is an indicator of a tree's vigor. In data analysis, trees with a crown ratio of 30 percent or less are considered less vigorous. For this reason, **be particularly careful when deciding between codes greater or less than "30".** It is preferable to use a laser or clinometer to measure live crown ratios on these trees.

When Collected:	All live tally trees ≥ 1.0 in*ch* DBH/DRC
Field width:	2 digits
Tolerance:	+/- 10 percent
Values:	00 to 99

Item 8.6.3.2 CROWN CLASS (CORE 5.17)
[CCLCD]

Rate tree crowns in relation to the ***sunlight received*** and proximity to neighboring trees (*Figure 8.28*). Base the assessment on the position of the crown at the time of observation. Example: a formerly overtopped tree that is now dominant due to tree removal is classified as dominant. Crown classifications are easily applied in even-aged stands. Classifications are more difficult to assign in uneven-aged stands or in plots where more than one age class is present. In these situations, classify the tree based on its immediate environment. In other words, base your classification on how much light the tree's crown is receiving, not its position in the canopy. This data item is used to predict tree growth. The intermediate and overtopped crown classes are meant to include trees seriously affected by direct competition with adjacent trees.

Figure 8.28: Examples of CROWN CLASS by code definitions (numbers are CROWN CLASS codes)

Crown class describes a tree's "social" position in the stand and may indicate how well the tree is competing for light.

For example, a young, vigorous tree that is considerably shorter than other trees in the stand – but that is not overtopped by other trees and that receives full light from above and partly from the side – is classified as dominant. The same principle applies to two-storied stands: understory trees should only be assigned subordinate crown classes if they are adjacent to overtopping trees. In plots with scattered residual overstory trees over younger trees, a considerable portion of the understory trees will be classified as dominant or codominant.

When Collected:	All live tally trees ≥1.0 in*ch* DBH/DRC	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	1	Open Grown – trees with crowns that received full light from above and from all sides throughout most of its life, particularly during its early developmental period.
	2	Dominant – trees with crown extending above the general level of the crown canopy and receiving full light from above and partly from the sides. These trees are taller than the average trees in the stand and their crowns are well developed, but they could be somewhat crowded on the sides. Also, trees whose crowns have received full light from above and from all sides during early development and most of their life. Their crown form or shape appears to be free of influence from neighboring trees.
	3	Co-dominant – trees with crowns at the general level of the crown canopy. Crowns receive full light from above but little direct sunlight penetrates their sides. Usually they have medium-sized crowns and are somewhat crowded from the sides. In stagnated stands, co-dominant trees have small-sized crowns and are crowded on the sides.
	4	Intermediate – trees that are shorter than dominants and co-dominant, but their crowns extend into the canopy of co-dominant and dominant trees. They receive little direct light from above and none from the sides. As a result, intermediate trees usually have small crowns and are very crowded from the sides.
	5	Overtopped – trees with crowns entirely below the general level of the crown canopy that receive no direct sunlight either from above or the sides.

SECTION 8.7 TREE DAMAGE

Damage is a composite variable. Up to three damaging agents may be recorded per tree. Many damaging agents are host specific and their potential for damage could vary by region. In general, a recorded damage is likely to:

1. Prevent the tree from surviving more than 1-2 years
2. Reduce the growth of the tree in the near term
3. Negatively affect a tree's marketable products (cubic, BF, or other)

It is not necessary to record damage agents in order of their severity unless there are more than three agents. If there are more than three agents, record only the most important ones using the list of impacts above as a guide (i.e., agents threatening survival are more important than agents that reduce wood quality). In general, agents that affect the roots or bole tend to be most threatening, because they have the capacity to affect the entire tree; damage to peripheral parts of the tree may be temporary because leaves, shoots, and reproductive structures may be replaced.

Codes used for this variable come from a January 2012 Pest Trend Impact Plot System, (PTIPS) list from the Forest Health Technology Enterprise Team (FHTET) that has been modified to meet FIA needs. This list is made up of General Agents and then further subdivided into specific agents. Not every General Agent PTIPS code will be available for use for this variable; some do not cause tree damage as defined above while others are better recorded in a different General Agent. Not every specific agent PTIPS code will be available for use for this variable. Regions will decide which specific agents they will identify in their areas.

Record the general agent unless the Region opts to collect specific agents. Specific agents can later be collapsed into the general agent categories for cross-region comparisons. In the unusual instance when more than one specific agent in the same general category occurs on the same tree, record them both If a specific agent is identified on that plot but that agent is not on the regionally recognized list of codes for damage agents, use its General Agent code. *Appendix G* contains the regionally recognized list of codes for damage agent based on the modified PTIPS list from FHTET. Only the specific agent codes from *Appendix G* may be used instead of the general codes listed under DAMAGE AGENT 1. Any damage code in *Appendix G* may be used for DAMAGE AGENT 1, DAMAGE AGENT 2, or DAMAGE AGENT 3.

Follow the instructions in Appendix L (Sudden Oak Death Syndrome Assessment) whenever DAMAGE AGENT code 21028 is used, OR whenever Sudden Oak Death presence is suspected in the plot area.

Item 8.7.0.1 DAMAGE AGENT 1 (CORE 5.20.1)

Inspect the tree from bottom to top - roots, bole, branches, foliage (including buds and shoots). Record the first damage agent observed from the list of agents (unless you observe more than 3 damages). If there are more than three agents, record only the most important ones using the list of impacts listed in *Section 8.7* as a guide (i.e., agents threatening survival are more important than agents that reduce wood quality). The general agent codes, damage thresholds, and general agent descriptions are listed here. Specific agents within the general categories, if required by your Region, are listed in *Appendix G*, along with their associated thresholds. These codes can be collapsed into the national core general codes..

When collected:	All live tally trees ≥ 1.0 in DBH/DRC
Field width:	5 digits
Tolerance:	No errors
Values:	General Agent Damage Codes, Damage Thresholds, and Descriptions. Specific agent codes are in Appendix G.

CODE	GENERAL AGENT	DAMAGE THRESHOLD*	DESCRIPTIONS
0		No damage	
10000	General insects	Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/ needle affected.	Insect damage that cannot be placed in any of the following insect categories.

11000	Bark beetles	Any evidence of a successful attack (successful attacks generally exhibit boring dust, many pitch tubes and/or fading crowns).	Bark beetles (*Dendroctonus*, *Ips*, and other genera) are phloem-feeding insects that bore through the bark and create extensive galleries between the bark and the wood. Symptoms of beetle damage include fading or discolored tree crown (yellow or red), pitch tubes or pitch streaks on the bark, extensive egg galleries in the phloem, boring dust in the bark crevices or at the base of the tree. Bark chipping by woodpeckers may be conspicuous. They inflict damage or destroy all parts of trees at all stages of growth by boring in the bark, inner bark, and phloem. Visible signs of attack include pitch tubes or large pitch masses on the tree, dust and frass on the bark and ground, and resin streaming. Internal tunneling has various patterns. Most have tunnels of uniform width with smaller galleries of variable width radiating from them. Galleries may or may not be packed with fine boring dust.
12000	Defoliators	Any damage to the terminal leader; damage ≥20% of the foliage with ≥50% of the leaf/needle affected.	These are foliage-feeding insects that may reduce growth and weaken the tree causing it to be more susceptible to other damaging agents. General symptoms of defoliation damage include large amounts of missing foliage, browning foliage, extensive branch mortality, or dead tree tops.
13000	Chewing insects	Any damage to the terminal leader; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	Insects, like grasshoppers and cicadas that chew on trees (those insects not covered by defoliators in code 12000).
14000	Sucking insects	Any damage to the terminal leader; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	Adelgids, scales and aphids feed on all parts of the tree. Often they cause galling on branches and trunks. Some appear benign but enable fungi to invade where they otherwise could not (e.g., beech bark disease). The most important ones become conspicuous because of the mass of white, cottony wax that conceals eggs and young nymphs.
15000	Boring insects	Any damage to the terminal leader; damage ≥20% of the roots, stems, or branches.	Most wood boring insects attack only severely declining and dead trees. Certain wood boring insects cause significant damage to trees, especially the exotic Asian longhorn beetle, emerald ash borer, and Sirex wood wasp. Bark beetles have both larval and adult galleries in the phloem and adjacent surface of the wood. Wood borers have galleries caused only by larval feeding. Some, such as the genus *Agrilus* (including the emerald ash borer) have galleries only in the phloem and surface of the wood. Other wood borers, such as Asian longhorn beetle bore directly into the phloem and wood. Sirex adults oviposit their eggs through the bark, and developing larvae bore directly into the wood of pines.
19000	General diseases	Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected.	Diseases that cannot be placed in any of the following disease categories.
21000	Root/butt diseases	Any occurrence.	Root disease kills all or a portion of a tree's roots. Quite often, the pathogenic fungus girdles the tree at the root collar. Tree damage includes mortality (often occurring in groups or "centers"), reduced tree growth, and increased susceptibility to other agents (especially bark beetles). General symptoms include resin at the root collar, thin, chlorotic (faded) foliage, and decay of roots. A rot is a wood decay caused by fungi. Rots are characterized by a progression of symptoms in the affected wood. First, the wood stains and discolors, then it begins to lose its structural strength, and finally the wood starts to break down, forming cavities in the stem. Even early stages of wood decay can cause cull due to losses in wood strength and staining of the wood. Rot can lead to mortality, cull, an increased susceptibility to other agents (such as insects), wind throw, and stem breakage.

22000	Cankers (non-rust)	Any occurrence.	A canker -- a sunken lesion on the stem caused by the death of cambium -- may cause tree breakage or kill the portion of the tree above the canker. Cankers may be caused by various agents but are most often caused by fungi. A necrotic lesion begins in the bark of branches, trunk or roots, and progresses inward killing the cambium and underlying cells. The causal agent may or may not penetrate the wood. This results in areas of dead tissue that become deeper and wider. There are two types of cankers, annual and perennial. Annual cankers enlarge only once and do so within an interval briefer than the growth cycle of the tree, usually less than one year. Little or no callus is associated with annual cankers, and they may be difficult to distinguish from mechanical injuries. Perennial cankers are usually the more serious of the two, and grow from year to year with callus forming each year on the canker margin, often resulting in a target shape. The most serious non-rust cankers occur on hardwoods, although branch mortality often occurs on conifers.
22500	Stem decays	Any visual evidence (conks; fruiting bodies; rotten wood)	Rot occurring in the bole/stems of trees above the roots and stump.
23000	Parasitic / Epiphytic plants	Dwarf mistletoes with Hawksworth rating of ≥3; true mistletoes and vines covering ≥ 50% of crown.	Parasitic and epiphytic plants can cause damage to trees in a variety of ways. The most serious ones are dwarf mistletoes, which reduce growth and can cause severe deformities. Vines may damage trees by strangulation, shading, or physical damage. Benign epiphytes, such as lichens or mosses, are not considered damaging agents.
24000	Decline Complexes/ Dieback/Wilts	Damage ≥ 20 % dieback of crown area.	Tree disease which results not from a single causal agent but from an interacting set of factors. Terms that denote the symptom syndrome, such as dieback and wilt, are commonly used to identify these diseases.
25000	Foliage diseases	Damage ≥20% of the foliage with ≥50% of the leaf/needle affected.	Foliage diseases are caused by fungi and result in needle shed, growth loss, and, potentially, tree mortality. This category includes needle casts, blights, and needle rusts.
26000	Stem rusts	Any occurrence on the bole or stems (on multi-stemmed woodland species), or on branches ≤1 foot from boles or stems; damage to ≥20% of branches	A stem rust is a disease caused by fungi that kill or deform all or a portion of the stem or branches of a tree. Stem rusts are obligate parasites and host specialization is very common. They infect and develop on fast-growing tissues and cause accelerated growth of infected tissues resulting in galls or cankers. Heavy resinosis is usually associated with infections. Sometimes yellow or reddish-orange spores are present giving a "rusty" appearance. Damage occurs when the disease attacks the cambium of the host, girdling and eventually killing the stem above the attack. Symptoms of rusts include galls (an abnormal and pronounced swelling or deformation of plant tissue that forms on branches or stems) and cankers (a sunken lesion on the stem caused by death of the cambium which often results in the death of tree tops and branches).
27000	Broom rusts	≥50% of crown area affected.	Broom rust is a disease caused by fungi that kill or deform all or a portion of the branches of a tree. Broom rusts are obligate parasites and host specialization is very common. They infect and develop on fast-growing tissues and cause accelerated growth of infected tissues resulting in galls. Symptoms of rusts include galls, an abnormal and pronounced swelling or deformation of plant tissue that forms on branches or stems.
30000	Fire	Damage ≥ 20% of bole circumference; >20% of stems on multi-stemmed woodland species affected; ≥20% of crown affected	Fire damage may be temporary, such as scorched foliage, or may be permanent, such as in cases where cambium is killed around some portion of the bole. The location and amount of fire damage will determine how the damage may affect the growth and survival of the tree. Fire often causes physiological stress, which may predispose the tree to attack by insects of other damaging agents.

41000	Wild animals	Any damage to the terminal leader; damage ≥20% of the roots or boles with> 20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/ needle affected.	Wild animals from birds to large mammals cause open wounds. Some common types of damage include: sapsucker bird peck, deer rub, bear clawing, porcupine feeding, and beaver gnawing.
42000	Domestic animals	Any damage to the terminal leader; damage ≥20% of the roots or boles with> 20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/ needle affected.	Open wounds caused by cattle and horses occur on the roots and lower trunk. Soil compaction from the long term presence of these animals in a woodlot can also cause indirect damage.
50000	Abiotic	Any damage to the terminal leader; damage ≥20% of the roots or boles with> 20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/ needle affected._	Abiotic damages are those that are not caused by other organisms. In some cases, the type and severity of damage may be similar for different types of agents (e.g., broken branches from wind, snow, or ice).
60000	Competition	Overtopped shade intolerant trees that are not expected to survive for 5 years or saplings not expected to reach tree size (5.0 inches DBH/DRC).	Suppression of overtopped shade intolerant species. Trees that are not expected to survive for 5 years or saplings not expected to reach tree size (5.0 inches DBH/DRC).
70000	Human activities	Any damage to the terminal leader; damage ≥20% of the roots or boles with> 20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/ needle affected._	People can injure trees in a variety of ways, from poor pruning, to vandalism, to logging injury. Signs include open wounds or foreign embedded objects.
71000	Harvest	Removal of ≥10% of cubic volume	Only recorded for woodland species trees that have partial cutting
90000	Other damage	Any damage to the terminal leader; damage ≥20% of the roots or boles with> 20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/ needle affected.	
99000	Unknown damage	Any damage to the terminal leader; damage ≥20% of the roots or boles with> 20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/ needle affected._	Use this code only when observed damage cannot be attributed to a general or specific agent.

***** Some Regional specific damage agents within a category may have differing damage thresholds.

Item 8.7.0.2 DAMAGE AGENT 2 (CORE 5.20.2)

Follow procedures described for DAMAGE AGENT 1.

When collected:	All live tally trees ≥ 1.0 in DBH/DRC
Field width:	5 digits
Tolerance:	*No errors*
Values:	See *Item 8.7.0.1*

Item 8.7.0.3 DAMAGE AGENT 3 (CORE 5.20.3)

Follow procedures described for DAMAGE AGENT 1.

When collected:	All live tally trees ≥ 1.0 in DBH/DRC
Field width:	5 digits
Tolerance:	*No errors*
Values:	See *Item 8.7.0.1*

Item 8.7.0.4 DWARF MISTLETOE CLASS (CORE OPTIONAL 5.26)
[MIST_CL_CD]

Rate all live conifer species, except juniper *and incense cedar*, ≥ 1.0 inch diameter for dwarf mistletoe (*Arceuthobium spp.*) infection. Use the Hawksworth six-class rating system: divide the live crown into thirds, and rate each third using the following scale (*Figure 8.29*). Sum the three individual ratings to obtain a total mistletoe class (0 to 6) for the tree. An infection on just the bole within a third is considered light and that third should receive a rating of 1.

Code	*Mistletoe*	*Description*
0	No visible infection	None
1	Light infection	< 50 percent of the total branches infected
2	Heavy infection	≥ 50 percent of the total branches infected

Example: A conifer tree has no infection in top third of crown, light infection in the middle third, and has many brooms in the lower third.

The Mistletoe Rating is: 0 + 1 + 2 = 3; the code is: "3"

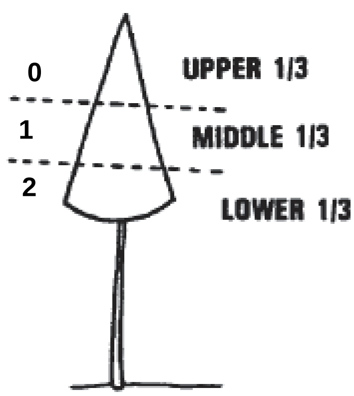


Figure 8.29: Example of the Hawksworth six-class rating system

When collected:	All live conifer (except juniper *and incense cedar*) tally trees ≥ 1.0 in*ch* DBH/DRC
Field width:	1 digit
Tolerance:	+/- 1 class
Values:	0 to 6

Item 8.7.0.5 ROTTEN/MISSING CULL (CORE 5.13)
[CULL_FLD]

Record the percent*age of* rotten or missing cubic-foot cull for all live tally trees ≥ 5.0 inches DBH/DRC and *missing cubic-foot cull on* all standing dead tally trees ≥ 5.0 inches DBH/DRC. Record the percentage of rotten and missing cubic-foot volume, to the nearest 1 percent.

When estimating volume loss (tree cull), only consider the cull on the merchantable bole/portion of the tree, from a 1-foot stump to a 4-inch DOB *(diameter outside bark)* top. Do not include any cull estimate above ACTUAL LENGTH. For woodland species, the merchantable portion is between the point of DRC measurement to a 1.5-inch DOB top.

Rotten and missing volume loss is often difficult to estimate. Refer to supplemental disease and insect pests field guides and local defect guidelines as an aid in identifying damaging agents and their impact on volume loss. *B*e alert to such defect indicators as the following:

- Cankers or fruiting bodies
- Swollen or punky knots
- Dull, hollow sound of bole (use regional standards)
- Large dead limbs, especially those with frayed ends
- Sawdust around the base of the tree

When estimating tree cull, first estimate and record the percentage of ROTTEN/MISSING CULL using the guidelines provided below (Table 8.3:: Percentage of rotten cull guidelines). When a portion of a tree includes both ROTTEN/MISSING and ROUGH CULL, include the estimated portion as ROTTEN/MISSING CULL only. ROUGH CULL and ROTTEN/MISSING CULL should never add up to more than 100-percent.

If a live tree is physically missing some of its volume (below ACTUAL LENGTH), use the volume estimation tables (Table 8.4:: Percentage of tree cubic foot volume distribution by 16-foot logs from tree total length or tree height in logs for a tree of average dimensions) below to estimate the missing percentage. Broken tops occur above ACTUAL LENGTH and are not included in ROTTEN/MISSING CULL (the volume of the broken top is obtained in the office by comparing ACTUAL LENGTH vs. TOTAL LENGTH).

If a snag is physically missing some of its volume, use the estimated diameter of the tree when it was alive to aid in calculating the percentage of MISSING CULL of the remaining portion of the snag (i.e., if a snag is 8 feet in length, calculate the percentage of MISSING CULL of the 7-foot section remaining above stump height).

Use the following PNW-FIA regional guidelines to determine the percentage of ROTTEN CULL in live trees.

The following are indicators that bole rot exists:

- There is an open or closed trunk wound over 10 years old and in contact with ground.
- There is an open trunk wound with visible rot or a closed trunk wound >10 years old. To qualify, the wound must be either 10 feet long in lower half of bole or 16 feet long in top half of bole. For true fir and hemlock, the wound must be ≥ 5 feet long anywhere on bole.
- The tree is a conifer and has, in lower 2/3 of the bole, two or more crooks or forks which indicate past top out.
- There is a swollen or hollow butt.
- There are large rotten knots or limb stubs.
- There are conks.

Table 8.3: Percentage of rotten cull guidelines

Percent Rotten Cull Guide	Indicators of this class
Bole is 75 percent to 99 percent rotten if one or more of these indicators are present	*E. tinctorium* or *P. pini* conks present and spread along > 60 percent of bole
	E. tinctorium or *P. pini* conks present and spread along >30 percent of bole and top missing
	> 60 percent of bole rotten based on rot indicators above
	30 to 59 percent of bole rotten and top out
	Oligoporus amarus rot, conk or shot hole cup on incense cedar or *Fomitopsis officinalis* conk on douglas fir, pine, larch
	Hardwood > 100 years old and any amount of rot or 2 or more conks
Bole is 40 percent to 74 percent rotten if one or more of these indicators are present	*E. tinctorium* or *Phellinus cancriformans* present
	P. pini conks spread along 30-59 percent of bole
	30-59 percent of bole rotten based on rot indicators above
	Tree is a hardwood and one conk present
Bole is 10 percent to 39 percent rotten if one or more of these indicators are present	none of above class indicators present (as noted in this table)
	> 10 percent of bole rotten based on rot indicators above
Bole is less than 10 percent rotten	< 10 percent of bole rotten based on rot indicators above

Use Table 8.4 as a guideline to estimate the missing portion of a live tree because of cull. It shows the percentage of volume in typical trees of varying number of logs and heights. Use either the tree height in logs (divide the length to a 4-inch top – diameter inside bark [DIB] – by 16) or the measured TOTAL LENGTH to estimate what percentage of volume is estimated in each 16-foot log. Multiply each percentage in that log section times the percentage of rotten or missing volume. Then sum the values to get the total percentage of the tree that is rotten or missing.

- Example: A 9-log tree (measured at 160 feet TOTAL LENGTH) has a missing section that is about 1/3 of both the second and third logs. Table 8.4 shows the second log has about 18 percent of the volume in the tree, and the third log has about 16 percent of the volume in the tree.
  - Calculate the percentage of cull in each log and sum to estimate the total percentage of cull for the tree (about 11 percent):
    - (0.18 X 0.33) + (0.16 X 0.33) = 0.06 + 0.05 = 0.11

Table 8.4: Percentage of tree cubic foot volume distribution by 16-foot logs from tree total length or tree height in logs for a tree of average dimensions

Average Total Length	Tree Height in LOGS	Log1	Log2	Log3	Log4	Log5	Log6	Log7	Log8	Log9	Log10	Log11	Log12
28	1	100											
48	2	70	30										
64	3	54	32	14									
80	4	43	30	19	8								
96	5	36	27	20	12	5							
111	6	31	24	20	14	8	3						
127	7	28	22	18	14	10	6	2					
143	8	25	20	17	14	11	8	4	1				
158	9	24	18	16	13	11	8	6	3	1			
176	10	22	17	15	13	11	9	7	4	1	1		
194	11	20	15	14	12	11	9	7	5	4	2	1	
212	12	20	14	13	12	11	9	8	6	4	2	1	0

Record the reason for the ROTTEN/MISSING CULL by recording a DAMAGE AGENT code when appropriate (see Section 8.7, Tree Damage). Note: it may not be possible to record a DAMAGE AGENT if three higher priority DAMAGE AGENTS have already been recorded.

When Collected:	*For all live tally trees ≥ 5.0 inches DBH/DRC: record ROTTEN/MISSING CULL. For standing dead tally trees ≥ 5.0 inches DBH/DRC: record MISSING CULL only.*
Field width:	2 digits
Tolerance:	+/- 10 percent
Values:	00 to 99

Item 8.7.0.6 ROUGH CULL (CORE OPTIONAL 5.25)
[ROUGHCULL]

For each live *conifer or red alder* tally tree 5.0 inches DBH/DRC and larger, record the total percentage of cubic-foot volume that is cull due to sound dead material or tree form. Record to the nearest 1 percent. When estimating volume loss (tree cull), only consider the cull on the merchantable bole/portion of the tree, from a 1-foot stump to a 4-inch top.

For woodland species, the merchantable portion is between the point of DRC measurement to a 1.5-inch DOB *(diameter outside bark)* top, and rough cull includes only sound dead.

Refer to local defect guidelines as an aid in determining cull volume for various damages such as crook, fork, sweep, pistol butt, etc. Small trees (5-9 inches for softwoods and 5-11 inches for hardwoods) that have poor form and are not expected to ever produce merchantable material should be coded 99 percent rough cull*, or the remainder of the bole after ROTTEN/MISSING CULL deductions have been recorded*.

- **Code only when the ROUGH CULL covers 3.0 feet or more of the tree.**

When Collected:	All live *conifer or red alder* tally trees ≥ 5.0 in*ches* DBH/DRC.
Field width:	2 digits
Tolerance:	+/- 10 percent
Values:	00 to 99

SECTION 8.8 MISCELLANEOUS TREE MEASURED DATA ITEMS

SUBSECTION 8.8.1 LIVE TREE MEASURED DATA ITEMS

Item 8.8.1.1 CAVITY PRESENCE (PFSL)
[CAVITY_USE_PNWRS]

Record a code to indicate wildlife use. A cavity must be able to be used by wildlife (birds, small mammals, large mammals, etc.) to be coded. If more than one cavity is present, record the size of the largest one.

When collected:	All live and standing dead tally trees ≥ 5.0 inches DBH/DRC	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	0	No cavity or den present
	1	Cavity or den present < 6.0 inches wide
	2	Cavity or den present ≥ 6.0 inches wide

Item 8.8.1.2 REMNANT TREE (PFSL)
[REMNANT_CD_PNWRS]

A remnant tree is a tree left by previous management activity or catastrophic event that is significantly older than the surrounding vegetation. Remnant trees do not form a canopy layer and are usually isolated individuals or small clumps. Record a code that indicates whether or not the tree is a remnant.

When collected:	All live tally trees ≥ 5.0 inches DBH/DRC	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	0	No
	1	Yes

Item 8.8.1.3 FORM CLASS (PFSL)
[FORMCL]

Record this code for all live hardwood trees ≥ 5.0 inches DBH. The FORM CLASS code is used in calculating net tree volume. When estimating form class, only consider the merchantable bole/portion of the tree from a 1-foot stump to a 4-inch top. Woodland species do not require a FORM CLASS. A log is considered straight if a line drawn through the centers of both ends of the log does not pass outside the curve of the log.

Stoppers are defects that result in a length deduction of a log and include forks, culled missing sections, and rot.

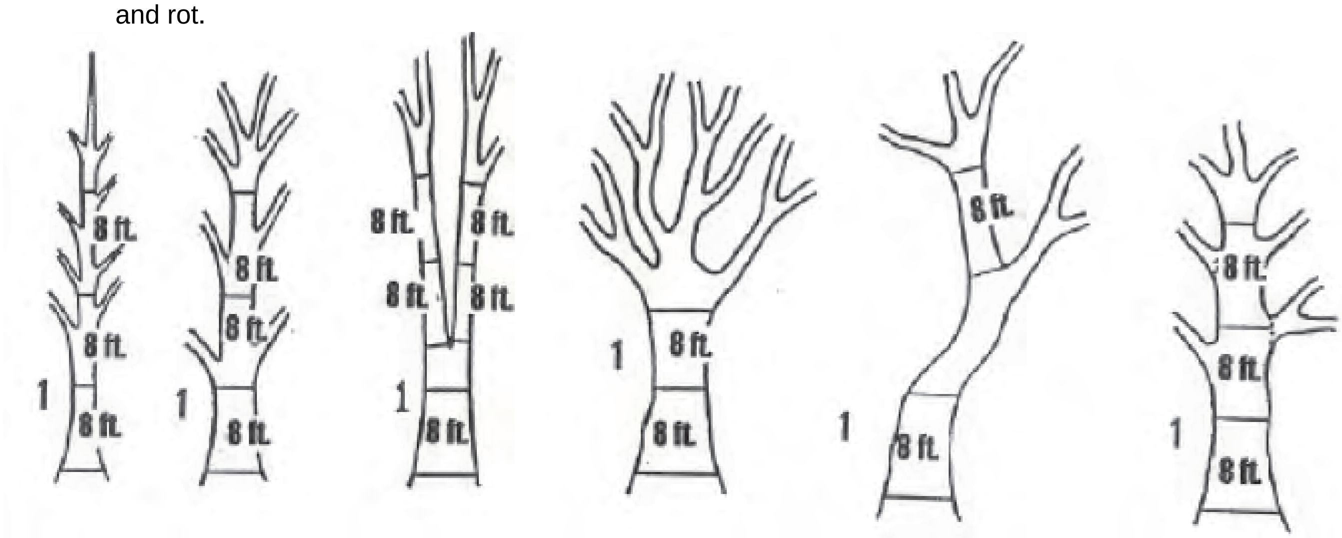


Figure 8.30: Various Examples of Hardwood form Class 1

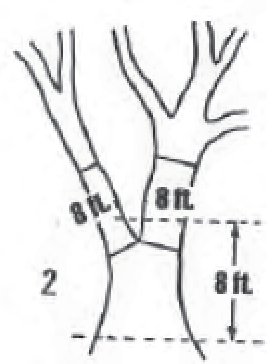


Figure 8.31: Fork stopping an 8' section

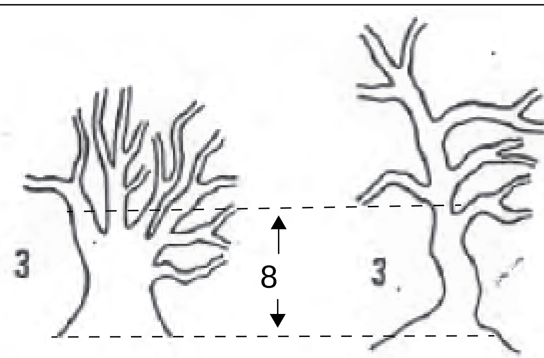


Figure 8.32: Trees with no qualifying 8' section

When collected:	All live hardwood tally trees (excluding woodland species) ≥ 5.0 inches DBH	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Form class
	1	First 8 feet above stump is straight.
	2	First 8 feet above stump is **not** straight or forked; but must have at least one straight 8 foot log elsewhere in the tree.
	3	No 8 foot logs anywhere in tree now or in the future due to form.

SUBSECTION 8.8.2 STANDING DEAD OR REMOVED

Item 8.8.2.1 CAUSE OF DEATH (CORE 5.21)

[TREE.AGENTCD_PNWRS]

Record a *CAUSE OF DEATH* for all trees that have died or been cut since the previous survey. If *CAUSE OF DEATH* cannot be reliably estimated, record unknown/not sure/other.

When Collected:	*When* SAMPLE KIND = 2: all PREVIOUS TREE STATUS = 1 and PRESENT TREE STATUS = 2 or 3; ***or*** PRESENT TREE STATUS = 2 and RECONCILE = 1, 2, or 3		
Field width:	2 digits		
Tolerance:	No errors		
Values:	*Code*	*Description*	Core Code (office use only)
	10	Insect	10
	20	Disease	20
	30	Fire	30
	40	Animal	40
	50	Weather	50
	51	Flood	50
	52	Wind (direct cause only; use 71 if killed by falling tree)	50
	53	Avalanche (snow & ice)	50
	54	Landslide (soil & rock)	50
	55	Severe and/or extended drought	50
	60	Vegetation (suppression, competition, vines/kudzu)	60
	70	Unknown/not sure/other – includes death from human activity not related to silvicultural or landclearing activity (accidental, random, etc.). TREE NOTES required.	70
	71	*Hit or knocked over by falling object (tree, snag, rock, etc.)*	70
	80	Silvicultural or landclearing activity (death caused by harvesting or other silvicultural activity, including girdling, chaining, etc., or to landclearing activity).	80

Item 8.8.2.2 MORTALITY YEAR (CORE OPTIONAL 5.22)

[TREE.MORTYR]

*On remeasurement plots (SAMPLE KIND = 2), r*ecord the estimated year that remeasured trees died or were cut. For each remeasured tree that has died or been cut since the previous inventory, record the 4-digit year in which the tree died. *MORTALITY YEAR* is also recorded for trees on land that has been converted to a nonforest land use, if it can be determined that a tree died before the land was converted.

When Collected:	*When* SAMPLE KIND = 2: all PREVIOUS TREE STATUS = 1 and PRESENT TREE STATUS = 2 or 3; ***or*** PRESENT TREE STATUS = 2 and RECONCILE = 1, 2, or 3
Field width:	4 digits
Tolerance:	+/- 1 year for remeasurement cycles of 5 years
	+/- 2 years for remeasurement cycles of > 5 years
Values:	*YEAR OF PREVIOUS INVENTORY* or higher

Item 8.8.2.3 DECAY CLASS (CORE 5.23)
[TREE.DECAYCD]

Record for each standing dead tally tree, 5.0 inches in diameter and larger, the code indicating the tree's stage of decay.

When standing dead trees have characteristics from more than one DECAY CLASS stage, record the best overall stage of the snag (e.g., new dead with no fine limbs left because it broke below the crown, should be coded as "1").

Rarely will a DECAY CLASS 5 tree be recorded; by the time a dead tree has reached DECAY CLASS 5 it will be unlikely to meet the definition of standing dead.

Snag characteristics are for Douglas-fir. Snags of other species may vary; use this table as a guide. Rate the overall snag					
DECAY CLASS stage (code)	Limbs and branches	Top	Percent bark remaining	Sapwood presence and condition*	Heartwood condition*
1	All present	Pointed	100	Intact; sound, incipient decay, hard, original color	Sound, hard, original color
2	Few limbs, no fine branches	May be broken	Variable	Sloughing; advanced decay, fibrous, firm to soft, light brown	Sound at base, incipient decay in outer edge of upper bole, hard, light to reddish brown
3	Limb stubs only	Broken	Variable	Sloughing; fibrous, soft, light to reddish brown	Incipient decay at base, advanced decay throughout upper bole, fibrous, hard to firm, reddish brown
4	Few or no stubs	Broken	Variable	Sloughing; cubical, soft, reddish to dark brown	Advanced decay at base, sloughing from upper bole, fibrous to cubical, soft, dark reddish brown
5	None	Broken	Less than 20	Gone	Sloughing, cubical, soft, dark brown, OR fibrous, very soft, dark reddish brown, encased in hardened shell

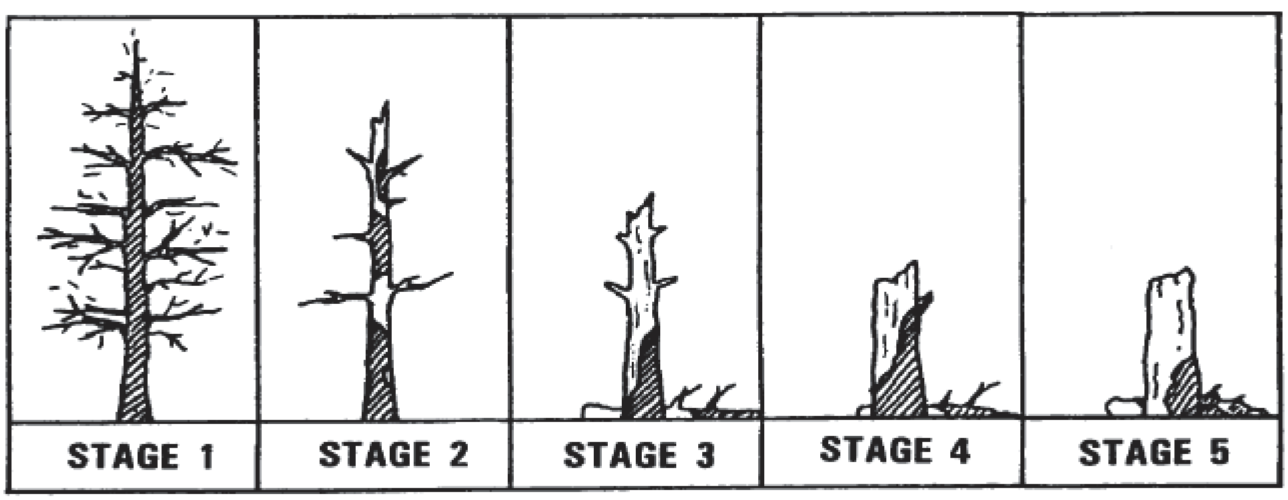


Figure 8.33: Douglas-fir decay class characteristics

When Collected:	All standing dead tally trees ≥ 5.0 in*ches* DBH/DRC
Field width:	1 digit
Tolerance:	+/- 1 class
Values:	*1-5*

Item 8.8.2.4 SNAG REASON FOR DISAPPEARANCE (PNW)
[SNAG_DIS_CD_PNWRS]

On remeasurement, record a code to indicate the reason for disappearance of a tree previously tallied as standing dead.

When collected:	When SAMPLE KIND = 2: All standing dead trees tallied at the previous inventory which no longer qualify as standing dead (PREVIOUS TREE STATUS = 2, PRESENT TREE STATUS = 2, and STANDING DEAD = 0)	
Field width:	1 digit	
Tolerance:	No Errors	
Values:	Code	Description
	2	Fell over "naturally" (wind, decay, etc.) or no longer self-supported; still present.
	3	Fell over "naturally;" removed from the site, or not discernible by crew.
	4	Cut down or pushed over; still present.
	5	Cut down or pushed over; removed from the site, or not discernible by crew.
	6	DBH/DRC and/or height no longer meet minimum for tally (snag "shrank" to less than 5.0 inches DBH/DRC or less than 4.5 feet tall).

Item 8.8.2.5 CULTURALLY KILLED (PNW)
[CULTURALLY_KILLED_PNWRS]

A 1-digit code to identify cut trees that have been killed by direct human intervention, but not utilized (removed from plot).

Note: When CULTURALLY KILLED = 1, a TREATMENT (Item 5.7.2.43) must be recorded.

When collected:	When SAMPLE KIND = 2: All trees with PREVIOUS TREE STATUS = 1 and PRESENT TREE STATUS = 2	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	0	Any tree that does not meet the criteria listed in code 1.
	1	Any tree that was killed by direct human cause (girdled, cut, knocked over, sprayed with herbicide, etc.) which has not been removed from plot (a TREATMENT must be recorded).

SECTION 8.9 SPECIAL STUDIES

SUBSECTION 8.9.1 SPECIAL STUDY 2002A PLATFORM ABUNDANCE

Platform data are collected on qualifying conifer trees located on the macroplot where Item 4.2.2.2, SPECIAL STUDY 2002A: PLATFORM ABUNDANCE (PFSL) = Y. For the purpose of this study, a platform can be any place on an approximately horizontal limb where the diameter, including the enlarging effects of moss, limb forks, mistletoe, and defects, meets or exceeds 6 inches. Because it can be difficult to estimate limb diameter in a tree's canopy while standing on the ground, it is strongly recommended that field staff conduct periodic self-tests on their ability to discriminate a 6-inch diameter limb from smaller limbs at distances of about 100 feet.

Selection of Viewing Positions: Select position(s) as needed to accurately view and assess a qualifying tree for platforms. Viewing positions on the uphill side of trees often provide the clearest view of a tree's crown area.

Item 8.9.1.1 PLATFORM ABUNDANCE (PFSL)
[PLAT_ABUN_CD_PNWRS]

Count the number of limbs containing one or more platforms. Each limb with one or more platforms is counted only once, regardless of the number of platform structures on the limb. Limb counts from 1 to 9 are tallied as individuals (i.e., 1, 2, 3, etc.). A tree with 10 or greater limbs with one or more platforms shall be tallied as “10”.

A platform is a section or area of a live limb that is greater than or equal to 6.0 inches diameter, located greater than or equal to 33.0 feet above the ground up to the top of a live crown of a tree, and horizontal or with an angle of less than 45 degrees from horizontal. As noted above, include as part of a limb's diameter areas that have been enlarged by effects of limb forks, insects, mistletoe, disease, physical injury, or the accumulation of moss.

When collected:	All live conifer tally trees (tree species < 300) with DBH greater than or equal to 20.0 on plots where Plot Attributes Special Study 2002a = Y and horizontal distance is less than 58.9 feet
Field width:	2 digits
Tolerance:	No errors when tally tree's true value = 0; ±2 for individual tally trees with greater than 0 limbs with platforms
Values:	00 to 10

SECTION 8.10 TREE NOTES

SUBSECTION 8.10.1 TREE NOTES

Item 8.10.1.1 TREE NOTES (CORE 5.27)
[NOTES]

Record notes pertaining to an individual tree as called for to explain or describe another *data item*.

When Collected:	All trees, as needed
Field width:	2000 characters
Tolerance:	N/A
Values:	English language words, phrases and numbers

CHAPTER 9 SEEDLING DATA

SECTION 9.1 GENERAL INSTRUCTIONS

Regeneration information is obtained by counting live seedlings within the 6.8-foot radius microplot located 90 degrees and 12.0 feet from each subplot center within each of the four subplots. Seedlings are counted in groups by species and condition class. Only count seedlings occurring in accessible forest land condition classes *(CONDITION CLASS STATUS = 1), or measurable nonforest condition classes (NONFOREST CONDITION CLASS SAMPLING STATUS =1), using the guidelines listed below.*

SUBSECTION 9.1.1 SEEDLING DATA ITEMS

Item 9.1.1.1 SUBPLOT NUMBER (CORE 6.1)
[SUBP]

This is a generated code corresponding to the number of the subplot (see Item 6.1.1.1).

When Collected:	*All seedling count records*	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Definition
	1	Center subplot
	2	North subplot
	3	Southeast subplot
	4	Southwest subplot

Item 9.1.1.2 CONDITION CLASS NUMBER (CORE 6.3)
[CONDID]

Use the same procedures described in *Chapter 8 to assign the appropriate CONDITION CLASS NUMBER to the seedlings rooted in the respective condition*.

When Collected:	*All seedling count records*
Field width:	1 digit
Tolerance:	No errors
Values:	1-9

Item 9.1.1.3 SPECIES (CORE 6.2)
[SPCD]

Record the SPECIES code from the Tree Species List in Appendix D. Use the same procedures described in *Item 8.4.1.12*.

If the species cannot be determined in the field, tally the seedling, but bring branch samples, foliage, flowers, bark, etc. to the office for identification. If possible, collect samples outside the macroplot from similar specimens and make a note to correct the SPECIES code later.

When Collected:	*All seedling count records*
Field width:	4 digits
Tolerance:	No errors for genus, no errors for species
Values:	*Appendix D*

Item 9.1.1.4 SEEDLING COUNT (CORE 6.4)
[TREECOUNT]

On each microplot, record the number of live tally seedlings, by *SPECIES* and *CONDITION CLASS*. Conifer seedlings must be at least 6.0 inches in length and less than 1.0 inch at DBH to qualify for counting. Hardwood seedlings must be at least 12.0 inches in length and less than 1.0 inch at DBH in order to qualify for counting.

For woodland species, each stem on a single tree must be less than 1.0 inch at DRC.

General seedling count rules:

- Count all live seedlings with their bases inside the microplot boundary regardless of vigor, damage, or closeness to other trees.
- Multiple "suckers" that originate from the same location, and stump sprouts are considered one seedling.
- Measure seedling length, not "height". Length is measured along the main stem from ground level to the dominant apical leader.
- Do not tally or count "layers" (undetached tree branches partially or completely covered by soil and/or organic materials, usually at the base) as seedlings.
- Do not tally any seedlings that sprout from a live tally tree.

When Collected:	Each accessible forest land condition class *(CONDITION CLASS STATUS = 1)* on each microplot*; and each measurable nonforest land condition class (NONFOREST CONDITION CLASS SAMPLING STATUS =1) on each microplot*.
Field width:	3 digits
Tolerance:	No errors for 5 or *fewer* per species; +/-20 *percent* over a count of 5
Values:	001 through 999

Item 9.1.1.5 SEEDLING NOTES (PNW)
[NOTES]

Record notes to clarify or explain a special situation in the SEEDLING NOTES.

When Collected:	As needed
Field width:	2000 characters
Tolerance:	N/A
Values:	Single words and abbreviated sentences

CHAPTER 10 SITE TREE INFORMATION

SECTION 10.1 OVERVIEW

Site index is a measure of a forest's potential productivity and is defined as the height of the dominant or co-dominant trees at a specified age in a stand. It is calculated in an equation using the tree's length and age. Site index can help predict timber productivity and the potential growth rate of a forest. For PNW-FIA, the site index is used primarily as input to the mean annual increment (MAI) equations. Site index equations differ by tree species and region.

Trees must meet specific selection criteria before being used to calculate site index. PFSL employs three selection methods: King's, Primary, and California Mixed Conifer. The CALIFORNIA MIXED CONIFER METHOD is an adaptation of the PRIMARY SELECTION METHOD that has been expanded to accept several tree species within the California Mixed Conifer forest type. Each selection method has its own set of specific criteria for selecting site trees and is used with the KEY TO SITE TREE SELECTION to determine a quality set of site tree data.

On sites with unsuitable conditions, site index alone does not adequately represent the maximum potential stand volume or density. On these sites, stockability discount factors are used to construct an adjusted MAI. PNW uses plant stockability factor (Stockability in Oregon and California, Section 5.10) to adjust for this. Stockability indicators are only collected in certain areas of Oregon and California.

SECTION 10.2 GENERAL INSTRUCTIONS

If suitable site trees are available, site tree data are required for every accessible forest land condition class defined on a plot. An individual site tree may be used for more than one condition class where differences in condition classes are not the result of differences in site productivity. For example, when different condition classes are caused solely due to differences in reserved status *or* owner class, a site tree may be used for more than one condition class. When in doubt, do not use a site tree for more than one condition class.

Select at least one site tree for each accessible forest land condition class where no previous site tree data exist *or where previous site tree data is incomplete or unreliable*. The absence of site tree data may occur because:

- This is the first visit to the site
- On the previous visit no suitable site tree could be found for the condition
- Since the last visit there has been a change in condition class that renders the previous data incompatible with the current conditions

If a site tree is needed, select *the* tree from a species common to the condition class being sampled, based on the criteria listed below (see Section 10.4). Select trees *outside* the subplot*/macroplot boundary* where possible. Use only trees that have remained in a dominant or co-dominant crown position throughout their entire life span. If possible, trees should be 5.0 inches in diameter, or larger, and at least *15* years old *at breast height*. Trees with damages appearing to substantially reduce height growth, trees with ring patterns that exhibit signs of suppression, and trees with rotten cores should be rejected.

PNW requires at least three site trees for each accessible forest land condition class with a GROUND LAND CLASS (GLC) of 120 (Timberland); each tree collected as a site tree must meet the selection criteria appropriate to the site, following Section 10.4. Note King's method requires 5-10 site trees depending on the STAND AGE. When the selection criteria cannot be met, or for an accessible forest land condition class with a GLC other than 120, only one site tree is required for that condition class. Not all of the site trees need to be from the current inventory.

The first step in site tree selection is to determine the appropriate method for the site being sampled. Use Section 10.4, Site Index Equation Selection Method and Site Tree Selection Key for OR, WA and CA to determine the appropriate method for the site. Once the appropriate method has been determined, follow the key to select any new site trees needed. If previously collected site trees are present in the data, crews must determine if they are appropriate for the site based on the key in Section 10.4. When choosing a site tree, try to select from a species representative of the stand being sampled. Generally, the preferred site tree species coincides with the FOREST TYPE. FOREST TYPE is a classification of forest land based on the trees or tree communities representing the plurality of stocking for all live trees not overtopped in the condition (see FOREST TYPE, Item 5.7.1.9). For PNW, “representative of the stand” means a species defining the FOREST TYPE.

If no suitable site trees are available from the plot area, the field crew will consider all trees within a 400-foot radius of plot center. If appropriate site trees have still not been found, crews may select trees more than 400 feet away from plot center. Site trees collected off plot should be from an area best representing the conditions found on the plot (e.g., aspect, slope, elevation, substrate, moisture regime, etc.).

If no suitable site trees can be found on or off plot, or if the required number of trees within the desired site index range cannot be met, a detailed explanation must be given in the electronic PLOT NOTES (Item 4.3.5.5) explaining the circumstances. Important note: “No suitable site trees” is not acceptable! Please explain why there were no suitable site trees. Examples: storm damage, disease, or evidence of suppression throughout stand; pure oak stand therefore no acceptable site tree species available; or the stand is too young.

When no site trees are collected, additional PLOT NOTES should include general topography, moisture regime, and substrate material in order to aid analysts in creating a reasonable site index for the plot. Using your best professional judgement describe the general characteristics of the site. You may include slope, aspect, water availability (e.g., droughty or boggy), and soil type (e.g., rocky, loamy, or clayey). General descriptors like "boggy black spruce area" or "shallow rocky soil" or "cold alpine area" are helpful. For younger plantations with no previous site tree data and no current tree tally include total height and current age at breast height and/or height growth for saplings.

The field crew should delete new site tree records not considered within the tolerable site index range only when the minimum number of trees has been met for the selection method.

SECTION 10.3 PLOTS WITH SITE TREES COLLECTED PREVIOUSLY

At previous inventories, site tree data were collected at the plot level and will usually correspond to the current condition class 1. However, keep in mind a substantial portion of the periodic plot layout does not cover the current annual four subplot layout. Crews should verify previously collected site trees meet the SPECIES, AGE, and SITE INDEX range requirements for the current condition class being sampled, according to the key in Section 10.4.

Generally, additional site trees are needed when site index information is incomplete, absent, or unreliable. In the field, the crew should evaluate the validity of previous site trees by checking SITE TREE SELECTION METHOD, SITE TREE AGE, LENGTH, SPECIES, and SITE INDEX in the PDR. Printouts can be unreliable as changes have been made to some site tree data in the office since the last inventory. When possible, crews should confirm downloaded data by comparing it to the actual tree. Do not delete or make changes to downloaded site tree records; if SITE TREE SELETION METHOD, SPECIES, DIAMETER, SITE TREE LENGTH and/or TREE AGE AT DIAMETER appears to be grossly incorrect, enter the correct data as a new record. In this situation, the SITE TREE STATUS of the downloaded tree should be changed to "I" (invalid). Explain why invalidated site trees are no longer valid in SITE TREE NOTES, Item 10.5.1.17. Updating the CONDITION CLASS LIST on downloaded site trees is required.

In general new site trees should be collected if:

- the previous selection method is inappropriate for the site.
- previous site trees are outside of the preferred age range for the site, and site trees are available within this range.
- the site tree species are not an acceptable combination for the FOREST TYPE or site.
- there has been a change in FOREST TYPE.
- the previous crew collected site trees that do not meet the current criteria and/or better site trees can be found.
- a treatment has occurred affecting the site’s productivity (e.g., irrigation, fertilization, etc.)
- the previous site index looks suspicious (e.g., too low, too high, or has a wide range)
- the current crew has noticed discrepancies in previous tree measurements (e.g., tree lengths are consistently less at current visit than at previous visit due to previous crew errors)

SECTION 10.4 SITE INDEX EQUATION SELECTION METHOD AND SITE TREE SELECTION KEY FOR OR, WA AND CA

PFSL employs three methods to select a population of trees best representing the site's potential productivity. Below is a key to help field crews decide which method best suits the site. Only use the previous method when it is the appropriate method for the site. If the previous selection method is determined to be incorrect for the site, then collect new site trees using the appropriate method for the site based on the steps below (explain why invalidated site trees are no longer valid in SITE TREE NOTES, Item 10.7.1.22). In some cases, it may be possible to re-enter previously collected site trees on a new line with the appropriate selection method, if they meet all other criteria for the appropriate selection method (see descriptions below).

A. Is the condition in a coastal Douglas-fir site (see description below) less than 130 years old (stand age), and below 3000 feet in elevation?

Yes . . . . King's Method
No . . . . go to B

B. Is the condition a California Mixed Conifer forest type (see description below)?

Yes . . . . CA Mixed Conifer Method
No . . . . Primary Method

King's Method

King's is the preferred selection method for coastal Douglas-fir sites throughout western Washington, Oregon, and northern California. Only use this method if the overall stand age is less than 130 years old, and the plot is located below 3000 feet in elevation.

Coastal Douglas-fir sites are found in coastal counties in northwestern California, and western Oregon and Washington on the west slopes of the Coast Range and foothills west of the Cascades. In California, Douglas-fir is often found in combination with redwood, forming more pure stands on the higher, drier slopes. Grand fir, Sitka spruce, red alder, western hemlock, and western red-cedar may also be found on a Coastal Douglas-fir site.

Any site tree with a clear history of suppression should be rejected, and the next largest tree if it is suitable should be selected. Do not use trees with abnormally formed tops (forked tops or top outs) or with any other damages. Do not use trees with extrapolated ages.

<u>1. The average breast height age of the stand is greater than or equal to 30 years.</u>

No . . . . go to 2
Yes . . . . Locate a group of at least 25 mainstand Douglas-fir and/or grand fir trees in an area of no more than 130ft diameter and go to 1.1

<u>1. 1. First Choice; Select 5 Douglas-fir site trees.</u>

a. Within the age range of 30-80.
b. Site index varies by no more than 20
c. Dominant or codominant with no history of suppression
d. No damages

<u>1. 2. Second Choice: Select a mix of Douglas-fir and grand fir site trees for a total of 5 site trees. Douglas-fir and grand fir can be combined, however, Douglas-fir is preferred.</u>

a. See 1.1 criteria

<u>1. 3. Third Choice: Select 5 western hemlock site trees.</u>

a. See 1.1 criteria

<u>1. 4. Fourth Choice: Select Sitka spruce or a mix of western hemlock and sitka spruce site trees for a total of 5 site trees.</u>

a. See 1.1 criteria

<u>1. 5. Fifth Choice: Work through 1.1-1.4 above, expanding the age range to 15-250.</u>

1. 6. Sixth Choice: Five trees are required for this method. If the stocking does not perfectly fit (i.e. 25 mainstand trees within 130 ft diameter) but 5 site trees are available this is still the preferred method; work through 1.1-1.5, above. If 5 suitable trees (between 15-250 years old, with site indices within 20) cannot be collected, go to B.

2. The average breast height age of the stand is less than 30 years.

No . . . . go to 1
Yes . . . . Locate a group of at least 50 mainstand Douglas-fir and/or grand fir trees in an area of no more than 130ft diameter and go to 2.1

2. 1. First Choice: Select 10 Douglas-fir site trees.

a. Within the age range of 15-35.
b. Site index varies by no more than 20
c. Dominant or codominant with no history of suppression
d. No damages

2. 2. Second Choice: Select a mix of Douglas-fir and grand fir site trees for a total of 10 trees. Douglas-fir and grand fir can be combined, however, Douglas-fir is preferred.

a. See 2.1 criteria.

2. 3. Third Choice: Select 10 western hemlock site trees.

a. See 2.1 criteria.

2. 4. Fourth Choice: Select Sitka spruce or a mix of western hemlock and sitka spruce site trees for a total of 10 site trees.

a. See 2.1 criteria.

2. 5. Fifth Choice: Work through 2.1-2.4 above, expanding the age range to 15-80.

2. 6. Sixth Choice: Ten site trees are required for this method. If the stocking does not perfectly fit (i.e. 50 mainstand trees within 130ft diameter) but 10 site trees are available, this is still the preferred method; work through 2.1-2.5, above. If 10 suitable trees (between 15-80 years old, with site indices within 20) cannot be collected, go to B.

CA Mixed Conifer Method

Mixed conifer types grow on the east facing slopes of the Coast Range and on the west facing slopes, or at higher elevation, east facing slopes of the Cascades and Sierra Nevada. This type also extends south into southern California. Trees can be any combination of ponderosa pine, Douglas-fir, white fir or red fir. If additional site trees are needed to satisfy the minimum of 3 trees per condition, then sugar pine and Jeffrey pine can be used. Do not use any other species when in this forest type. For PNW, “representative of the stand” means the species defining the forest type. “Not representative of the stand” means a species found in the condition, but it is not the species defining the forest type. Do not collect any species not found in tables 10.1 or 10.2.

Condition Ground Land Class (GLC) = 120?

NO . . . . One site tree required
YES. . . . . Three site trees required

1. First choice: Representative of the stand and found in Table 10.1: Group A, below

a. Within the preferred age range for the stand (between 35 and 80 years old at breast height)
b. Site index varies by no more than 20 (site indices for starred species in Tables 10.1 and 10.2 can vary by up to 30)
c. Dominant or co-dominant with no history of suppression
d. No damages

2. Second choice: Not representative of the stand and found in Table 10.1: Group A, below

a. See 1 criteria

3. Third choice: Representative of the stand and found in Table 10.2: Group B, below

a. See 1 criteria

4. Fourth choice: Not representative of the stand and found in Table 10.2: Group B, below

a. See 1 criteria

5. Fifth choice: Work through 1-4 above expanding the age range to 15-250 years old at breast height

6. Sixth Choice: Work through 1-5 above allowing site index to vary by more than 30. Use questionable site tree flag = 0 for any site trees outside of the desirable site index range

7. Last resort (collect only one site tree if no other trees are available; requires QUESTIONABLE SITE TREE FLAG = 0):

a. Any acceptable site tree species from Table 10.1: Group A, and Table 10.2: Group B
b. May be greater than 250 years old
c. May have damages not appearing to substantially reduce height growth (for example, dead or broken tops clearly affect height growth, so trees with these damages should not be used)
d. Trees with extrapolated ages
e. DO NOT USE: Any trees showing signs of suppression or with rotten cores

If a “last resort” tree is collected, explain why it is a last resort in the SITE TREE NOTES. Never combine a “last resort” tree with any other site tree. Record the appropriate QUESTIONABLE SITE TREE FLAG (Item 10.5.1.4) = 0 “Site tree does not meet selection criteria” for all last resort trees.

Primary Method

The Primary selection method now includes several different site equations. In Oregon and Washington, use this method if King's cannot be met. In California, use this method if King's or the CA Mixed Conifer method cannot be used. Do not mix tree species. The only exception to this rule is noble fir and mountain hemlock can be combined, however, noble fir is preferred. For PNW, "representative of the stand" means the species defining the forest type. "Not representative of the stand" means a species found in the condition, but it is not the species defining the forest type. Do not collect any species not found in tables 10.1 or 10.2.

Condition Ground Land Class (GLC) = 120?

NO . . . . One site tree required
YES. . . . . Three site trees required

1. First choice: Representative of the stand and found in Table 10.1: Group A, below

a. Within the preferred age range for the stand (between 35 and 80 years old at breast height).
b. Site index varies by no more than 20 (site indices for starred species in Tables 10.1 and 10.2 can vary by up to 30)
c. Dominant or co-dominant with no history of suppression
d. No damages

2. Second choice: Not representative of the stand and found in Table 10.1: Group A, below

a. See 1 criteria

3. Third choice: Representative of the stand and found in Table 10.2: Group B, below

a. See 1 criteria

4. Fourth choice: Not representative of the stand and found in Table 10.2: Group B, below

a. See 1 criteria

5. Fifth choice: Work through 1-4 above expanding the age range to 15-250 years old at breast height

6. Sixth Choice: Work through 1-5 above allowing site index to vary by more than 30. Use questionable site tree flag = 0 for any site trees outside of the desirable site index range

7. Last resort (collect only one site tree if no other trees are available; requires QUESTIONABLE SITE TREE FLAG = 0):

a. Any acceptable site tree species from Table 10.1: Group A, and Table 10.2: Group B

b. May be greater than 250 years old
c. May have damages not appearing to substantially reduce height growth (for example, dead or broken tops clearly affect height growth, so trees with these damages should not be used)
d. Trees with extrapolated ages
e. DO NOT USE: Any trees showing signs of suppression or with rotten cores

If a “last resort” tree is collected, explain why it is a last resort in the SITE TREE NOTES. Never combine a “last resort” tree with any other site tree. Record the appropriate QUESTIONABLE SITE TREE FLAG (Item 10.5.1.4) = 0 “Site tree does not meet selection criteria” for all last resort trees.

Table 10.1: Group A		
Species code	Common name	Forest type
11	Pacific silver fir	264
15	White fir	261
17	Grand fir	267
19	Subalpine fir	268,266
20	California red fir	262
21	Shasta red fir	262
22	Noble fir*	263
73	Western larch	321
93	Engelmann spruce	265, 266
98	Sitka spruce	305
108	Lodgepole pine*	281
119	Western white pine*	241
120	Bishop pine	363
122	Ponderosa pine*	221
202	Douglas-fir*	201
211	Redwood	341
242	Western red cedar	304
263	Western hemlock	301
264	Mountain hemlock*	270
351	Red alder	911

Table 10.2: Group B		
Species code	Common name	Forest type
42	Alaska yellow-cedar	271
64	Western juniper	369
72	Subalpine larch	368
81	Incense cedar	222
94	White spruce	122
95	Black spruce	125
103	Knobcone pine	361
104	Foxtail pine	365
109	Coulter pine*	226
116	Jeffrey pine	225
117	Sugar pine	224
124	Monterey pine	364
127	Gray pine	921
201	Bigcone Douglas-fir	203

*Starred species are associated with 100-year site equations and site indices may vary by up to 30. Douglas-fir is associated with a 100-year site equation only on sites above 3000’ elevation.

SECTION 10.5 SITE TREE DATA ITEMS

SUBSECTION 10.5.1 SITE TREE DATA ITEMS

Item 10.5.1.1 SITE TREE NUMBER (PNW)

[TREE]

The data recorder will automatically assign a number to each new site tree. On previously visited plots numbers will be assigned to downloaded site trees.

When collected:	All site trees
Field width:	4 digits
Tolerance:	No errors
Values:	0001-9999

Item 10.5.1.2 SUBPLOT NUMBER (CORE OPTIONAL 7.2.7)

[SUBP]

<u>Record the subplot number to which the site tree is referenced.</u>

Use the same procedures described in SUBPLOT NUMBER (Item 6.1.1.1). Record a 1-digit code indicating the number of the subplot which a site tree is on or near. Subplot numbers for site trees previously collected will be downloaded/printed if on file.

When collected:	All site trees	
Field width:	1 digit	
Tolerance:	No errors	
Values:	*Code*	*Definition*
	1	Center subplot
	2	North subplot
	3	Southeast subplot
	4	Southwest subplot

Item 10.5.1.3 SITE TREE STATUS (PNW)

[SITE_AGE_TREE_STATUS_PNWRS]

This data item is used to determine if this site tree is new “N”, old “O”, or invalid old “I”. New site tree records, copied from the tree screen or entered manually (as a non-tally site tree), will have a status “N”. Downloaded tree records from the previous visit have status of “O”. If information for an old site tree (“O”) is copied into a new site tree record and updated with current information, change the SITE TREE STATUS code from “O” to “N”. If an old site tree is determined to be previously collected in error, or a crew does not feel it best represents the forest condition and can replace it with a better representative tree, change the SITE TREE STATUS code from “O” to “I” (explain why the old site trees are no longer valid in SITE TREE NOTES, Item 10.5.1.17).

When collected:	When SAMPLE METHOD CODE = 1: all site trees	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Definition
	N	New site tree (copied from previous inventory and updated, copied from current tree tally, or entered manually as non-tally site tree)
	O	Old site tree (downloaded from previous plot visit)
	I	Invalid “Old” site tree (only to be used for procedural differences or previous crew selection error or if better stand representative site trees are now available)

Item 10.5.1.4 QUESTIONABLE SITE TREE FLAG (PNW)
[QUESTION_SITE_AGE_TREE_PNWRS]

Record a code to identify whether or not the current site tree meets the selection criteria as outlined above (all last resort site trees, choice 6 under Section 10.3, will be assigned a “0”). Any site tree with a QUESTIONABLE SITE TREE FLAG = 0 require an electronic SITE TREE NOTE (Item 10.5.1.17) describing why it does not meet the selection criteria. Code "0" must be used for all last resort site trees, but can also be used to indicate old or new site trees outside of the desired site index range or showing sign of an acceptable damage but which are collected because no better site trees are available.

Downloaded site trees with SITE TREE STATUS = O (old) and QUESTIONABLE SITE FLAG = 0 should be replaced with a new site tree meeting the selection criteria if possible. If a questionable "Old" site tree is replaced with a "New" tree, the "Old" tree should be marked with a SITE TREE STATUS of "Invalid" (explain why the old site tree is no longer valid in SITE TREE NOTES).

When collected:	When SAMPLE METHOD CODE = 1, CONDITION CLASS STATUS = 1, and SITE TREE STATUS = N or O	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Definition
	0	Site tree does not meet selection criteria
	1	Selection criteria met

Item 10.5.1.5 CONDITION CLASS LIST (CORE 7.2.1)
[CONDLIST]

<u>List all CONDITION CLASS NUMBERS that the site index data from this tree represent.</u>

If there is a change in the numbering of condition classes from the previous visit, it is important “old” site trees have their CONDITION CLASS LIST updated to reflect the changes.

When collected:	All site trees
Field width:	4 digits
Tolerance:	No errors
Values:	1000 to 9876

Item 10.5.1.6 TREE TAG NUMBER (PNW)
[TALLY_TREE_NBR_PNWRS]

This number is automatically recorded when the site tree is copied from tally tree record, and should be entered for any site trees which are also tally trees anywhere on the plot.

When collected:	When SAMPLE METHOD CODE = 1, CONDITION CLASS STATUS = 1, and SITE TREE STATUS = N: When site tree is also a tally tree
Field width:	3 digits
Tolerance:	No errors
Values:	001 to 999

Item 10.5.1.7 AZIMUTH (CORE OPTIONAL 7.2.8)
[AZIMUTH]

<u>Record the AZIMUTH from the subplot center; sight the center of the base of each tree with a compass. Record AZIMUTH to the nearest degree. Use 360 for north.</u>

When collected:	*When SAMPLE METHOD CODE = 1, CONDITION CLASS STATUS = 1, and SITE TREE STATUS = N:* all site trees
Field width:	3 digits
Tolerance:	+/- 10 degrees
Values:	001 to 360

Item 10.5.1.8 HORIZONTAL DISTANCE (CORE OPTIONAL 7.2.9)
[DIST]

Record the measured HORIZONTAL DISTANCE, to the nearest 0.1 feet, from the subplot center to the pith of the tree at the base. When recording a distance greater than 999.9 feet horizontal distance, enter 999.9 in this field then record the actual distance in the SITE TREE NOTES.

When collected:	*When SAMPLE METHOD CODE = 1, CONDITION CLASS STATUS = 1, and SITE TREE STATUS = N: a*ll site trees
Field width:	4 digits (xxx.y)
Tolerance:	+/- 5 feet
Values:	000.1 to 999.9

Item 10.5.1.9 SPECIES (CORE 7.2.2)
[SPCD]

Record for new site trees. Only use SPECIES codes found in Table 10.1:: Group A, and Table 10.2:: Group B above. SPECIES is downloaded for site trees previously collected.

When collected:	*When SAMPLE METHOD CODE = 1, CONDITION CLASS STATUS = 1, and SITE TREE STATUS = N: a*ll site trees
Field width:	4 digits
Tolerance:	No errors
Values:	*000 to 999*

Item 10.5.1.10 DIAMETER (CORE 7.2.3)
[DIA]

Use the same procedures described in *Section 8.5 (Diameter).* DIAMETER is downloaded for site trees previously collected. Record for new site trees.

When collected:	*When SAMPLE METHOD CODE = 1, CONDITION CLASS STATUS = 1, and SITE TREE STATUS = N or O: a*ll site trees
Field width:	4 digits (xxx.y)
Tolerance:	+/- 0.1 inches per 20.0 inches increment of measured diameter
Values:	001.0 to 999.9

Item 10.5.1.11 SITE TREE LENGTH (CORE 7.2.4)
[HT]

With a clinometer or other approved instrument, measure the total length of the site tree from the ground to the top of the tree. Record to the nearest 1.0 foot. SITE TREE LENGTH must be measured; no estimates are permitted on site trees. Refer to TOTAL LENGTH (Item 8.6.2.4) when measuring SITE TREE LENGTH.

SITE TREE LENGTH is downloaded for site trees previously collected. If updating a downloaded site tree, measure the tree's current length and enter it in the new record for the tree (be sure to also enter a current age at breast height in the new record and mark the old tree record with a SITE TREE STATUS of "Invalid")**.**

When collected:	*When SAMPLE METHOD CODE = 1, CONDITION CLASS STATUS = 1, and SITE TREE STATUS = N or O: a*ll site trees
Field width:	3 digits
Tolerance:	less than 60 feet +/- 5 percent of true length greater than 60 feet +/- 10 percent of true length
Values:	005 to 999

Item 10.5.1.12 TREE AGE AT DIAMETER (CORE 7.2.5)
[AGEDIA]

Record the tree age as determined by an increment sample. Bore the tree *about one inch below* the point of diameter measurement (DBH) with an increment borer. Count the rings between the outside edge of the core and the pith. Do not add years to get total age.

This is a downloaded for site trees previously collected. If updating a downloaded site tree, determine the number of years elapsed since the tree was taken as a site tree, add this number to the downloaded age and enter the sum in the new (second) record for the tree (be sure also to measure and enter the current height in the new record and mark the old tree record with a SITE TREE STATUS of "Invalid").

When collected:	*When SAMPLE METHOD CODE = 1, CONDITION CLASS STATUS = 1, and SITE TREE STATUS = N or O: a*ll site trees
Field width:	3 digits
Tolerance:	+/- 5 years
Values:	001 to 999

Item 10.5.1.13 SITE TREE SELECTION METHOD (PFSL)
[SITE_TREE_METHOD_PNWRS]

This data item distinguishes between King's and Primary, and California Mixed Conifer selection methods for relevant species. This item may be downloaded for site trees previously collected.

When collected:	All site trees	
Field width:	1 digits	
Tolerance:	No errors	
Values:	Code	Definition
	K	Kings
	P	Primary
	M	Mixed

Item 10.5.1.14 SITE INDEX (PNW)
[FLD_SITREE_PNWRS]

This code is downloaded for site trees previously collected. For new site trees, the data recorder will calculate site index after SPECIES, SITE TREE LENGTH, TREE AGE AT DIAMETER, SITE INDEX EQUATION NUMBER (PDR generated), and SITE TREE SELECTION METHOD (when appropriate) are entered.

When collected:	Generated by the PDR when SITE TREE STATUS = N
Field width:	3 digits
Tolerance:	N/A
Values:	001 to 999

Item 10.5.1.15 SITE INDEX EQUATION BASE AGE (PNW)
[SIBASE_AGE_PNWRS]

The SITE INDEX EQUATION BASE AGE is used to define the acceptable range for the calculated site index. It is determined by the PDR after SPECIES, SITE TREE LENGTH, TREE AGE AT DIAMETER, SITE INDEX EQUATION NUMBER (PDR generated), and SITE TREE SELECTION METHOD (when appropriate) are entered. Site trees with a base age of 50 should have a site index within 20. Site trees with a base age of 100 should be within 30.

When collected:	Generated by the PDR when SITE TREE STATUS = N	
Field width:	3 digits	
Tolerance:	No errors	
Values:	Code	Definition
	50	50 year base age, site index should be within 20
	100	100 year base age, site index should be within 30

Item 10.5.1.16 SITE INDEX EQUATION NUMBER (PNW)
[SITREE_EQU_NO_PNWRS]

This code is generated by the PDR for all site trees. The SITE INDEX EQUATION NUMBER identifies which site index equation was used to calculate site index. This data item cannot be updated by the field crew.

When collected:	Generated for all site trees when SITE TREE STATUS = N
Field width:	3 digits
Tolerance:	No errors
Values:	See list in Appendix H (Site Index Equation Numbers)

Item 10.5.1.17 SITE TREE NOTES (CORE 7.2.6)
[NOTES]

Record notes pertaining to an individual site tree.

When collected:	All site trees as necessary
Field width:	2000 characters
Tolerance:	N/A
Values:	English language words, phrases and numbers

CHAPTER 11 DOWN WOODY MATERIALS

SECTION 11.1 INTRODUCTION

Down woody materials (DWM) are important components of forest ecosystems across the country. DWM is dead material on the ground in various stages of decay. Wildlife biologists, ecologists, mycologists, foresters, and fuels specialists are some of the people interested in DWM because it helps describe the:

- Quality and status of wildlife habitats.
- Structural diversity within a forest.
- Fuel loading and fire behavior.
- Carbon sequestration – the amount of carbon tied up in dead wood.
- Storage and cycling of nutrients and water – important for site productivity.

Down wood components and fuels estimated by the FIA program are coarse wood, slash, fine wood, and litter and duff depth.

DWM is sampled on accessible forest conditions intersected by a transect, and on accessible nonforest conditions if they are being measured on the plot (NONFOREST CONDITION CLASS STATUS = 2). If a transect crosses a condition boundary, the boundary locations on the transect are recorded. All DWM in the inventory is sampled using the line intersect sampling method (also called planar intercept method). In this method, transects are established, and individual pieces of Coarse Woody Debris (CWD, ≥3 inches diameter and ≥0.5 foot long) or Fine Woody Debris (FWD, <3 inches diameter) are tallied if the central axis of the piece is intersected by the plane of the transect.

SECTION 11.2 DEFINITION OF DOWN WOODY MATERIALS

Coarse Woody Debris – In this inventory, CWD includes downed, dead tree and shrub boles, large limbs, and other woody pieces that are ≥3 inches in diameter and severed from their original source of growth. CWD **also** includes dead tally species trees or single-stemmed woodland species trees (either self-supported by roots, severed from roots, or uprooted and supported by other objects) that are leaning >45 degrees from vertical and not considered part of the standing tree inventory. Portions of dead trees that are separated greater than 50 percent (either above or below 4.5 feet), are considered severed and are included in the CWD inventory (see discussion and diagrams in *Item 8.4.1.10, STANDING DEAD (CORE 5.7.2)*). For multi-stemmed woodland species (*Appendix D*) such as juniper, only tally stems that are dead and detached**.** Include as CWD all dead multi-stemmed woodland tree stems that do not qualify as standing dead if they meet the size requirements for CWD pieces. Also included are non-machine processed round wood such as fence posts and cabin logs.

CWD is measured primarily using intersect diameter. In rare instances when pieces are in a pile and it is impossible to estimate the size of individual pieces, use the pile protocol.

CWD does not include:

1. Woody pieces <3.0 inches in diameter at the point of intersection with the transect.
2. Dead trees leaning 0 to 45 degrees from vertical (see discussion and diagrams in *Item 8.4.1.10, STANDING DEAD (CORE 5.7.2)*).
3. Dead shrubs, self-supported by their roots.
4. Trees showing any sign of life.
5. Stumps that are rooted in the ground (i.e., not uprooted).
6. Dead foliage, bark or other non-woody pieces that are not an integral part of a bole or limb. (Bark attached to a portion of a piece is an integral part).
7. Roots or main bole below the root collar.

Fine Woody Debris – In this inventory, FWD includes downed, dead branches, twigs, and small tree or shrub boles <3 inches in diameter that are not attached to a living or standing dead source. FWD can be connected to a larger branch, as long as this branch is on the ground and not connected to a standing dead or live tree. Only the woody branches, twigs, and fragments that intersect the transect are counted. FWD can be connected to a down, dead tree bole or down, dead shrub. FWD can be twigs from shrubs and vines. FWD must be no higher than 6 feet above the ground to be counted.

FWD does not include:

1. Woody pieces >3.0 inches in diameter at the point of intersection with the transect.
2. Dead branches connected to a live tree or shrub; or to a standing dead tree or dead shrub.
3. Dead foliage (i.e., pine or fir needles, or leaf petioles).
4. Bark fragments or other non-woody pieces that are not an integral part of a branch, twig, or small bole.
5. Small pieces of decomposed wood (i.e., chunks of cubical rot)

SECTION 11.3 LOCATING AND ESTABLISHING LINE TRANSECTS

Transects are established on each subplot if the subplot center is accessible (i.e., not census water, access denied, or hazardous), and there is at least one forest or measured nonforest land condition class mapped within the 24.0-foot radius subplot (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2). Transects begin at the subplot center and extend 24.0 feet to the edge of the subplot. The location of condition class boundaries are recorded along the transect, starting at the subplot center and working towards the fixed radius plot boundary. It is extremely important to lay out the transect in a straight line to avoid biasing the selection of pieces and to allow the remeasurement of transect lines and tally pieces for QA purposes.

Transect lines should be marked with a small piece of flagging at the end of the line (24.0 feet, horizontal distance) to help the QA staff identify the path of the transect during the check-plot procedure. Because the tolerance for the transect azimuth is +/- 2 degrees, the line might have been laid down in a slightly different direction from the check-plot crew. This could affect the location of diameter measurements for CWD pieces as well as identifying whether a CWD piece is a valid tally piece. It is also helpful to mark the point where the FWD transect begins (14 feet, horizontal distance).

SUBSECTION 11.3.1 CWD TRANSECTS

Two transects are established that originate at the subplot center and extend out 24.0 feet horizontal distance (the radius of the subplot) (*Figure 11.1*).

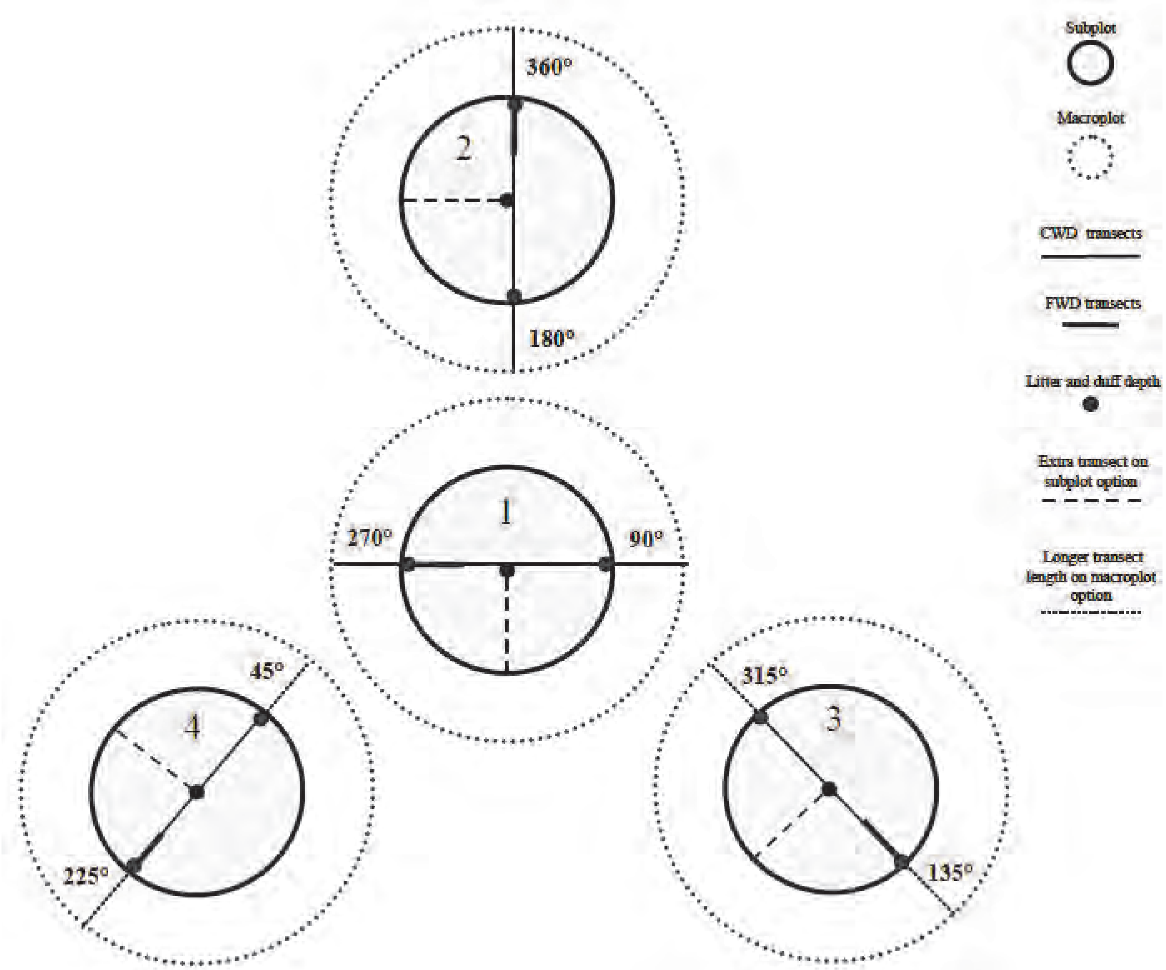


Figure 11.1: Plot layout for sampling CWD, FWD, and litter and duff depth. CWD transects include two 24-foot transects per subplot (starting at subplot center designated by its azimuth as labeled).

SUBSECTION 11.3.2 FWD TRANSECTS

On a portion of one CWD transect on each subplot, FWD is tallied within 3 size classes. Because FWD is generally present in high densities, a shorter transect will pick up an acceptable amount of tally. The transect begins at 14 feet (horizontal distance) from the subplot center and extends out either 6 or 10 feet (horizontal distance) depending on the FWD size class, as follows:

Category of FWD	Size Class	Diameter range	Transect length (horizontal distance)	Transect location (horizontal distance)
Small FWD	1	0 in to 0.24 in	6 feet	14 to 20 feet
Medium FWD	2	0.25 in to 0.9 in	6 feet	14 to 20 feet
Large FWD	3	1.0 in to 2.9 in	10 feet	14 to 24 feet

It is helpful to have a size gauge available until your eye is ‘trained’ to recognize the 3 FWD size classes. Examples include a plastic or cardboard card with 3 notches cut for each size class, or a set of 3 dowels representing each size class.

SECTION 11.4 PLOT-LEVEL VARIABLES FOR DWM PROTOCOL

The codes in this section define the type of variables and transect configuration used for measuring DWM.

Item 11.4.0.1 DWM NUMBER OF SUBPLOTS (BASE 10.3.2)
[PLOT.P2DWM_NBR_SUBP]

A downloaded variable identifying the number of subplots on which DWM is measured. When DWM SAMPLING STATUS = 1 or 2, number of subplots = 4.

When collected:	All plots where DWM SAMPLING STATUS >0
Field width:	1 digit
Tolerance:	No errors
Values:	1 to 4

Item 11.4.0.2 DWM NUMBER OF TRANSECTS ON SUBPLOT (BASE 10.3.3)
[PLOT.P2DWM_NBR_SUBP_TRANSECT]

A downloaded variable identifying the number of transects per subplot on which DWM is measured. A "transect" is defined as a line starting from subplot center and ending at or beyond the subplot boundary. When DWM SAMPLING STATUS = 1, number of transects per subplot = 2.

When collected:	All plots where DWM SAMPLING STATUS >0
Field width:	1 digit
Tolerance:	No errors
Values:	1

Item 11.4.0.3 DWM TRANSECT LENGTH (BASE 10.3.4)
[PLOT.P2DWM_TRANSECT_LENGTH]

A downloaded variable identifying the length of each transect on which DWM is measured. The transect length when DWM SAMPLING STATUS >0 is 24.0 feet, measured to the nearest 0.1 foot.

When collected:	All plots where DWM SAMPLING STATUS >0
Field width:	3 digits (xx.y)
Tolerance:	+/- 1 ft
Values:	24.0

Item 11.4.0.4 DWM NOTES (BASE 10.3.5)

Use these fields to record notes pertaining to the Down Woody Materials indicator. If the notes apply only to a specific subplot or other specific aspect of the plot, then make that clear in the notes.

When collected:	All plots where DWM SAMPLING STATUS >0, as needed
Field width:	Unlimited alphanumeric character field
Tolerance:	N/A
Values:	English language words, phrases and numbers

SECTION 11.5 FUELS VARIABLES FOR DWM PROTOCOL

Item 11.5.0.1 CONDITION FUELBED TYPE (OPTIONAL 10.4.1)
[COND.P2DWM_FUELBED_TYPCD]

Record the fuelbed code from the Scott and Burgan (2005; RMRS-GTR-153) fuel model guide that best corresponds with the combined fire behavior characteristics of live and dead materials on and near the ground surface. The visual appearance of the condition on the plot is not as important as the amount and packing density of live and dead fuels of different sizes. Refer to fuelbed descriptions, keys, and photos in Scott and Burgan *(2005; RMRS-GTR-153)* to select the fuel model which best matches conditions on the condition class. Use the following key for field reference. Oregon, Washington, and California are considered arid to semiarid; tropical climates are considered humid and subhumid. The humid and subhumid fuel types are not valid codes in Oregon, Washington, and California.

1. Nearly pure grass and/or forb type (Grass)
   a. Arid to semiarid climate (rainfall deficient in summer). Extinction moisture content is 15 percent.
      i. **GR1** Grass is short, patchy, and possibly heavily grazed. Spread rate moderate; flame length low.

- ii. **GR2** Moderately coarse continuous grass, average depth about 1 foot. Spread rate high; flame length moderate.
- iii. **GR4** Moderately coarse continuous grass, average depth about 2 feet. Spread rate very high; flame length high.
- iv. **GR7** Moderately coarse continuous grass, average depth about 3 feet. Spread rate very high; flame length very high.

2. Mixture of grass and shrub, up to about 50 percent shrub coverage (Grass- Shrub)
   a. Arid to semiarid climate (rainfall deficient in summer). Extinction moisture content is 15 percent.
      - i. **GS1** Shrubs are about 1 foot high, low grass load. Spread rate moderate; flame length low.
      - ii. **GS2** Shrubs are 1 to 3 feet high, moderate grass load. Spread rate high; flame length moderate.

3.. Shrubs cover at least 50 percent of the site; grass sparse to nonexistent (Shrub)
   a. Arid to semiarid climate (rainfall deficient in summer). Extinction moisture content is 15 percent.
      - i. **SH1** Low shrub fuel load, fuelbed depth about 1 foot; some grass may be present. Spread rate very low; flame length very low.
      - ii. **SH2** Moderate fuel load (higher than SH1), depth about 1 foot, no grass fuel present. Spread rate low; flame length low.
      - iii. **SH5** Heavy shrub load, depth 4 to 6 feet. Spread rate very high; flame length very high.
      - iv. **SH7** Very heavy shrub load, depth 4 to 6 feet. Spread rate lower than SH5, but flame length similar. Spread rate high; flame length very high.

4. Grass or shrubs mixed with litter from forest canopy (Timber-Understory)
   a. Semiarid to subhumid climate. Extinction moisture content is 20 percent.
      - i. **TU1** Fuelbed is low load of grass and/or shrub with litter. Spread rate low; flame length low.
      - ii. **TU4** Fuelbed is short conifer trees with grass or moss understory. Spread rate moderate; flame length moderate.
      - iii. **TU5** Fuelbed is high load conifer litter with shrub understory. Spread rate moderate; flame length moderate.

5. Dead and down woody fuel (litter) beneath a forest canopy (Timber Litter)
   a. Fuelbed is recently burned but able to carry wildland fire.
      - i. **TL1** Light to moderate load, fuels 1 to 2 inches deep. Spread rate very low; flame length very low.

   b. Fuelbed not recently burned.
      - i. Fuelbed composed of broadleaf (hardwood) litter.
         1. **TL2** Low load, compact. Spread rate very low; flame length very low.
         2. **TL6** Moderate load, less compact. Spread rate moderate; flame length low.
         3. **TL9** Very high load, fluffy. Spread rate moderate; flame length moderate.
      - ii. Fuelbed composed of long-needle pine litter.
         1. **TL8** moderate load and compactness may include small amount of herbaceous load. Spread rate moderate; flame length low.
      - iii. Fuelbed not composed broadleaf or long-needle pine litter.
         1. Fuelbed includes both fine and coarse fuels.
            a. **TL4** Moderate load, includes small diameter downed logs. Spread rate low; flame length low.
            b. **TL7** Heavy load, includes larger diameter downed logs. Spread rate low; flame length low.
         2. Fuelbed does not include coarse fuels.
            a. **TL3** Moderate load conifer litter. Spread rate very low; flame length low.
            b. **TL5** High load conifer litter; light slash or mortality fuel. Spread rate low; flame length low.
            c. **TL9** Very high load broadleaf litter; heavy needle-drape in otherwise sparse shrub layer. Spread rate moderate; flame length moderate.

6. Activity fuel (slash) or debris from wind damage (blowdown) (Slash-Blowdown)
   a. Fuelbed is activity fuel.
      - i. **SB1** Fine fuel load is 10 to 20 tons/acre, weighted toward fuels 1 to 3 inches diameter class, depth is less than 1 foot. Spread rate moderate; flame length low.
      - ii. **SB2** Fine fuel load is 7 to 12 tons/acre, evenly distributed across 0 to 0.25, 0.25 to 1, and 1 to 3 inch diameter classes, depth is about 1 foot. Spread rate moderate; flame length moderate.

iii. **SB3** Fine fuel load is 7 to 12 tons/acre, weighted toward 0 to 0.25 inch diameter class, depth is more than 1 foot. Spread rate high; flame length high.

b. Fuelbed is blowdown.

i. **SB2** Blowdown is scattered, with many trees still standing. Spread rate moderate; flame length moderate.

ii. **SB3** Blowdown is moderate, trees compacted to near the ground. Spread rate high; flame length high.

iii. **SB4** Blowdown is total, fuelbed not compacted, foliage still attached. Spread rate very high; flame length very high.

7. Insufficient wildland fuel to carry wildland fire under any condition (Nonburnable)

a. **NB1** Urban or suburban development; insufficient wildland fuel to carry wildland fire.

b. **NB2** Snow/ice.

c. **NB3** Agricultural field, maintained in nonburnable condition.

d. **NB8** Open water.

e. **NB9** Bare ground.

When collected:	All conditions where DWM SAMPLING STATUS >0	
Field width:	3 alpha-numeric characters	
Tolerance:	+/- 1 class within a type	
Values:	GR1	Short, Sparse Dry Climate Grass
	GR2	Low Load, Dry Climate Grass
	GR4	Moderate Load, Dry Climate Grass
	GR7	High Load, Dry Climate Grass
	GS1	Low Load, Dry Climate Grass-Shrub
	GS2	Moderate Load, Dry Climate Grass-Shrub
	SB1	Slash-Blowdown: Low Load Activity Fuel
	SB2	Moderate Load Activity Fuel or Low Load Blowdown
	SB3	High Load Activity Fuel or Moderate Load Blowdown
	SB4	High Load Blowdown
	SH1	Low Load Dry Climate Shrub
	SH2	Moderate Load Dry Climate Shrub
	SH5	High Load, Dry Climate Shrub
	SH7	Very High Load, Dry Climate Shrub
	TL1	Low Load Compact Conifer Litter
	TL2	Low Load Broadleaf Litter
	TL3	Moderate Load Conifer Litter
	TL4	Small downed logs
	TL5	High Load Conifer Litter
	TL6	Moderate Load Broadleaf Litter
	TL7	Large Downed Logs
	TL8	Long-Needle Litter
	TL9	Very High Load Broadleaf Litter
	TU1	Low Load Dry Climate Timber-Grass-Shrub
	TU4	Dwarf Conifer With Understory
	TU5	Very High Load, Dry Climate Timber-Shrub
	NB1	Nonburnable Urban/developed
	NB2	Nonburnable Snow/ice
	NB3	Nonburnable Agricultural
	NB8	Nonburnable Open water
	NB9	Nonburnable Bare ground

SECTION 11.6 TRANSECT LINE SEGMENTING

Transect lines are segmented to determine the length of transect that occurs within each mapped condition class intersecting the line. These lengths determine the expansion factors for the measured DWM. It is important that any changes or corrections to condition identity, location and size mapped on the subplot spatially match the segmentation done on the transects. A segment is a length of transect that is in one condition. Segments are identified by recording the BEGINNING DISTANCE and ENDING DISTANCE from subplot center towards the end of the transect.

If any part of the transect segment is in a measured condition but the CWD is not measurable (e.g., snow or water), do not measure any DWM (CWD, FWD, or duff/litter depth) on that transect segment and set DWM TRANSECT SEGMENT SAMPLE STATUS = 0.

Starting at the subplot center and working towards the fixed radius plot boundary, each segment of transect line in a different condition class is delineated and recorded as a separate record. The horizontal BEGINNING DISTANCE and ENDING DISTANCE are recorded for each condition class encountered (*Figure 11.2*). The first record for each transect will have a BEGINNING DISTANCE of 0 feet. If only one condition class occurs on the transect line, only one segment is recorded. The last segment on all transects must have an ENDING DISTANCE of 24.0 feet horizontal distance if sampling the subplot. All condition segments on the transect must be defined and all transect length recorded and accounted for, either by condition, or by DWM TRANSECT SEGMENT SAMPLE STATUS.

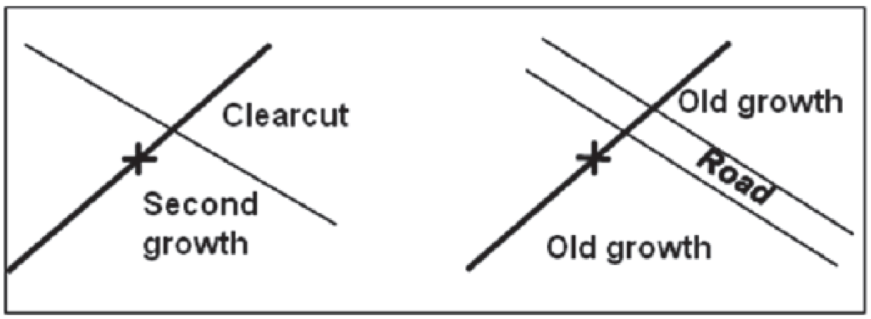


Figure 11.2: Transects are installed across condition class boundaries.

Item 11.6.0.1 SUBPLOT NUMBER (BASE 10.5.1)

Record the code indicating the subplot center from which the transect originates.

When collected:	All transect segments on plots where DWM SAMPLING STATUS >0	
Field width:	1 digit	
Tolerance:	No errors	
Values:	1	Center subplot
	2	North subplot
	3	Southeast subplot
	4	Southwest subplot

Item 11.6.0.2 TRANSECT (BASE 10.5.2)

[P2DWM_TRANSECT_SEGMENT.TRANSECT]

Record the transect azimuth (degrees) on which a condition class is being delineated. These transects, when being installed, have a tolerance of +/- 2 degrees.

When collected:	All transect segments where DWM SAMPLING STATUS > 0	
Field width:	3 digits	
Tolerance:	No errors	
Values:	Subplot	Transect direction (degrees) from center of subplot
	1	090
		270
	2	360
		180
	3	135
		315

	4	045
		225

Item 11.6.0.3 SEGMENT NUMBER (PFSL)
[PSDWM_TRANSECT_SEGMENT.SEGMT]

A generated number to identify each segment length contained within one condition class; numbering begins at plot center and works out to the plot perimeter.

When collected:	All transect segments in all condition classes
Field width:	1 digit
Tolerance:	No errors
Values:	1-9

Item 11.6.0.4 SEGMENT CONDITION CLASS NUMBER (BASE 10.5.3)
[P2DWM_TRANSECT_SEGMENT.CONDID]

Record the code indicating the number of the condition class for the transect segment. Use the same code assigned to the condition class on the subplot or elsewhere on the plot. The first segment recorded for each transect will have the same CONDITION CLASS NUMBER as assigned to the subplot center.

When collected:	All transect segments where DWM SAMPLING STATUS >0
Field width:	1 digit
Tolerance:	No errors
Values:	1 to 9

Item 11.6.0.5 SEGMENT BEGINNING DISTANCE (BASE 10.5.4)
[P2DWM_TRANSECT_SEGMENT.BEGINHORIZDIST]

Record the location (using horizontal distance to nearest 0.1 foot) on the transect line where the transect intersects the boundary with the adjacent condition class nearer to the subplot center. The first record for each transect will have a BEGINNING DISTANCE of 0 ft. Each subsequent record will have a BEGINNING DISTANCE equal to the ENDING DISTANCE of the previous record.

When collected:	All transect segments where DWM SAMPLING STATUS >0
Field width:	3 digits (xx.y)
Tolerance:	+/- 1 ft
Values:	00.0 to *24.0* horizontal feet

Item 11.6.0.6 SEGMENT ENDING DISTANCE (BASE 10.5.5)
[P2DWM_TRANSECT_SEGMENT.ENDHORIZDIST]

Record the location (using horizontal distance to nearest 0.1 foot) on the transect line where the transect exits the condition class being delineated and intersects the boundary with a different condition class further away from the subplot center. If no other condition classes are encountered, record the location (using horizontal distance) of the end of the transect line.

When collected:	All transect segments where DWM SAMPLING STATUS >0
Field width:	3 digits (xx.y)
Tolerance:	+/- 1 ft
Values:	00.1 to *24.0* horizontal feet

Item 11.6.0.7 DWM TRANSECT SEGMENT SAMPLE STATUS (BASE 10.5.6)
[P2DWM_TRANSECT_SEGMENT.SEGMNT_STATUS_CD]

Record the sample status for the transect segment. If any part of the segment is in an accessible condition that would be measured (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2), but the CWD is not measurable due to an obstruction such as snow or water, do not measure DWM on any part of the transect segment, and set code to 0 for that segment. In all other situations, set the code to 1. For conditions on which DWM would not be measured regardless (CONDITION CLASS STATUS = 3 or NONFOREST CONDITION CLASS STATUS = 2), will automatically be coded 1; those conditions should be identified in the transect segmenting.

When collected:	All transect segments on plots where DWM SAMPLING STATUS >0	
Field width:	1 digit	
Tolerance:	No errors	
Values:	0	Transect segment not sampled
	1	Transect segment sampled

Item 11.6.0.8 DWM TRANSECT SEGMENT NONSAMPLED REASON (BASE 10.5.7)
[P2DWM_TRANSECT_SEGMENT.SEGMNT_NONSAMPLE_REASN_CD]

Record the reason that DWM cannot be measured on the transect.

When collected:	All transects where DWM TRANSECT SEGMENT SAMPLE STATUS = 0	
Field width:	2 digits	
Tolerance:	No errors	
Values:	05	Lost data (office use only)
	10	Other (for example, snow or water covering CWD that is supposed to be sampled). *DWM NOTE required when using this code.*

SECTION 11.7 SAMPLING METHODS FOR COARSE WOODY DEBRIS (CWD)

SUBSECTION 11.7.1 TALLY RULES FOR COARSE WOODY DEBRIS (CWD)

1. Coarse woody debris (CWD) is sampled on accessible forest conditions, and on accessible nonforest conditions if they are being measured on the plot (i.e., NONFOREST CONDITION CLASS STATUS = 2). Tally CWD by starting at the subplot center and working towards the fixed radius plot boundary. Measurements should **not** be taken along transects moving inward toward subplot center. Tally a piece if its central longitudinal axis intersects the transect, and the condition class is measured at the point of intersection (*Figure 11.3*). The entire piece is assigned to this condition.

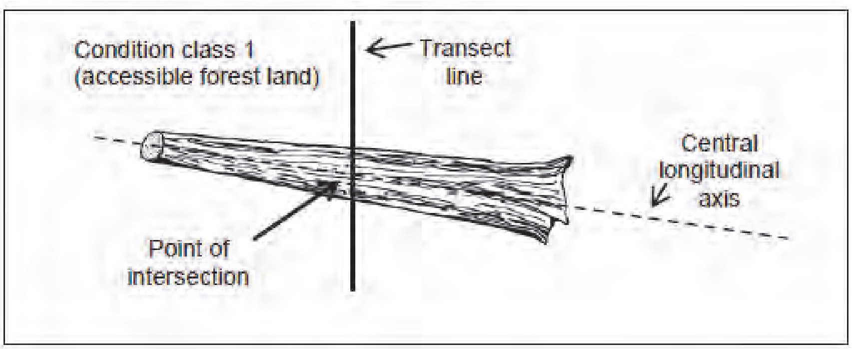


Figure 11.3: Tally rules for CWD.

2. Tally dead trees and tall stumps that are leaning > 45 degrees from vertical. Do not tally live trees or standing dead trees and tall stumps that are still upright and leaning < 45 degrees from vertical. Follow the same rules for down trees as outlined in *Section 8.1, Definitions* for determining what qualifies as standing and down dead trees and portions/tops of trees. Most CWD will be laying on the ground.

   Note: In order to avoid double counting or totally missing trees or portions in either protocol, once a decision is made on whether a tree or portion/top of a tree is considered standing or down it is important to include it in either one or the other protocol (standing tree or CWD), but not both. See additional diagrams in *Item 8.4.1.10, STANDING DEAD (CORE 5.7.2)*.

3. The minimum length for any tally piece is 0.5 feet and it needs to meet the minimum transect diameter guidelines.
4. Decay class of the piece determines whether or not the piece is tallied (*see Item 11.7.3.7*).

   For decay classes 1 to 4: tally a piece if it is >3.0 inches in diameter at the point of intersection with the transect (*Figure 11.4*).

   For decay class 5: tally a piece if it is >5.0 inches in diameter at the point of intersection and >5.0 inches high from the uphill side of the ground. The reason for treating decay class 5 pieces differently is because they are difficult to identify, especially when heavily decomposed. Only pieces that still have some shape and log form are tallied—humps of decomposed wood that are becoming part of the duff layer are not tallied.

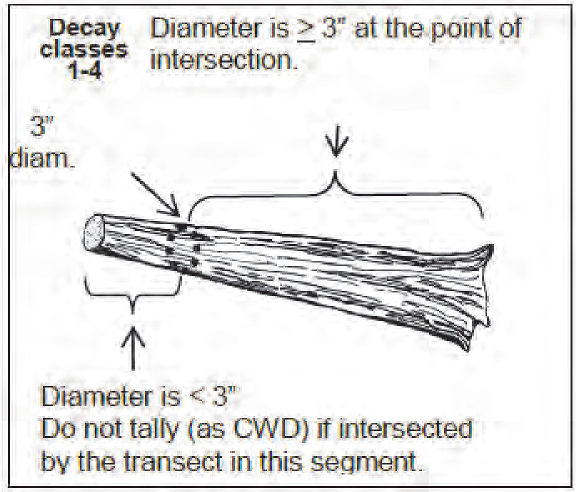


Figure 11.4: Tally rules for CWD decay classes 1-4.

5. Tally pieces created by natural causes (examples: natural breakage or uprooting) or by human activities such as cutting. In some cases it may be impossible to measure or estimate individual pieces—for example when CWD pieces are in machine-piled slash piles or windrows, or are part of *a* jumble from flooding, landslide or avalanche. In these situations, piles are described using the instructions in *Section 11.8, SAMPLING RESIDUE PILES*. Because biomass estimates from piles have great uncertainty associated with them, pieces should be measured individually if at all possible.
6. Tally a piece only if the point of intersection occurs above the ground. If one end of a piece is buried in the litter, duff, or mineral soil, the piece ends at the point where it is no longer visible. Measure the diameter and length at this point.
7. If the central longitudinal axis of a piece is intersected more than once on a transect line or if it is intersected by two transect lines, tally the piece each time it is intersected (uncommon situation, see *Figure 11.5*).

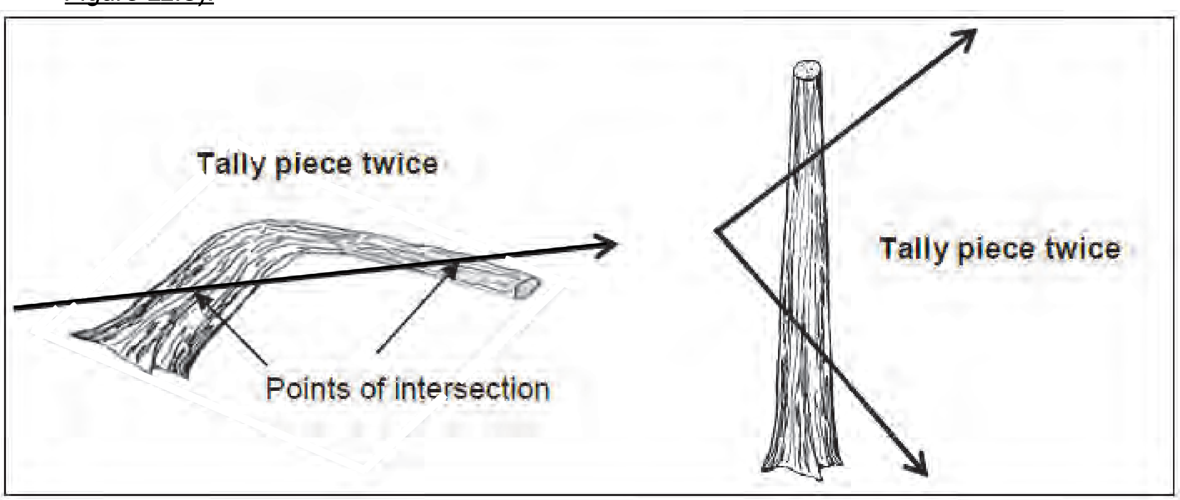


Figure 11.5: CWD tally rules: intersections.

8. Tally a piece only once if the subplot center falls directly on the central longitudinal axis of the piece. Tally the piece on the smallest azimuth degree transect.
9. If a piece is fractured across its diameter or length, and would pull apart at the fracture if pulled from either end or sides, treat it as two separate pieces. If judged that it would not pull apart, tally as one piece. Tally only the piece intersected by the transect line.
10. Do not tally a piece if it intersects the transect on the root side of the root collar. Do not tally roots.
11. When the transect crosses a forked down tree bole or large branch connected to a down tree, tally each qualifying piece separately. To be tallied, each individual piece must meet the minimum diameter requirements.

12. In the case of forked trees, consider the "main bole" to be the piece with the largest diameter at the fork. Variables for this fork such as TOTAL LENGTH and DECAY CLASS should pertain to the entire main bole. For smaller forks or branches connected to a main bole (even if the main bole is not a tally piece), variables pertain only to that portion of the piece up to the point where it attaches to the main bole (see *Figure 11.6*).
13. If a transect intersects a non-measured condition (e.g., a road when NONFOREST CONDITION CLASS STATUS = 5, or an inaccessible condition class, or a non-sampled code for CWD), CWD is not tallied.

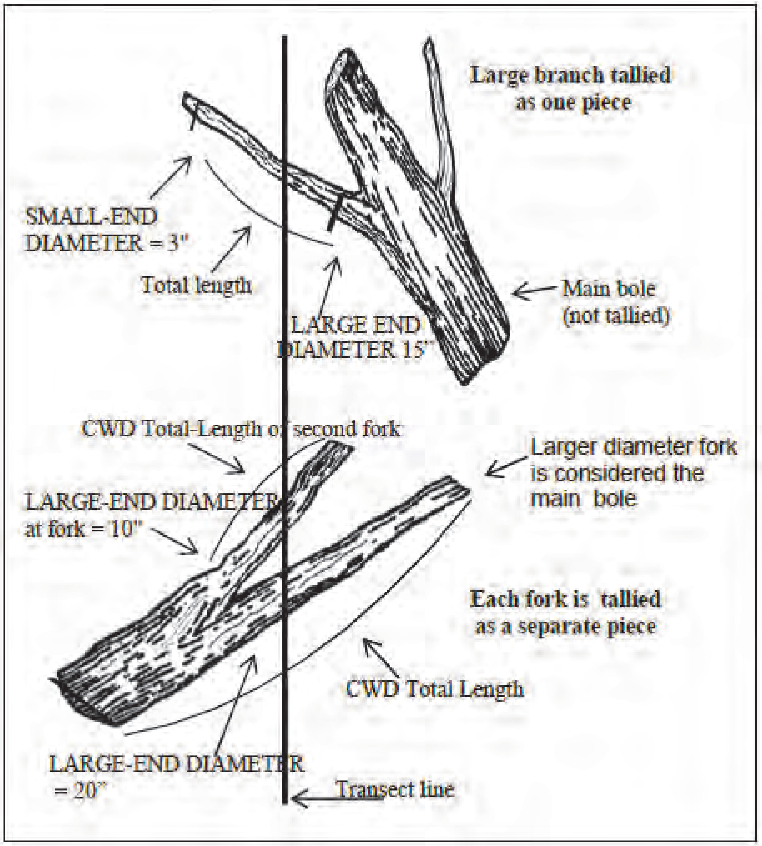


Figure 11.6: CWD tally rules for forked trees.

SUBSECTION 11.7.2 MARKING CWD

Marking CWD is highly recommended if allowed by the land owner, a wax crayon is a good option. Marked CWD is an aid to future crews returning to the plot for a QA check.

SUBSECTION 11.7.3 RECORDING PROCEDURES FOR CWD

The tolerance for the total number of pieces (≥ 3 inches, transect diameter) tallied across all transects on the plot is: +/- 1 piece for the plot.

Item 11.7.3.1 SUBPLOT NUMBER (BASE 10.6.3.1)

Record the code indicating the number of the subplot center from which the transect originates.

When collected:	All tally pieces in CONDITION CLASS STATUS = 1 OR NONFOREST CONDITION CLASS STATUS = 2 where DWM TRANSECT SEGMENT SAMPLE STATUS = 1	
Field width:	1 digit	
Tolerance:	No errors	
Values:	1	Center subplot
	2	North subplot
	3	Southeast subplot
	4	Southwest subplot

Item 11.7.3.2 COARSE WOODY DEBRIS ID (PFSL)
[P2DWM_CWD.CWDID]

This is a 4-digit code, assigned by the PDR, to uniquely and permanently identify each piece of CWD on a transect.

When collected:	All tally pieces in CONDITION CLASS STATUS = 1, **or** NONFOREST CONDITION CLASS SAMPLING STATUS =1
Field width:	4 digits
Tolerance:	No errors
Values:	1-9999

Item 11.7.3.3 TRANSECT (BASE 10.6.3.2)
[P2DWM_CWD.TRANSECT]

Record the azimuth of the transect on which the CWD piece is sampled.

When collected:	All tally pieces where DWM TRANSECT SAMPLE STATUS = 1	
Field width:	3 digits	
Tolerance:	No errors	
Values:	Subplot	Transect direction (degrees) from center of subplot
	1	090
		270
	2	360
		180
	3	135
		315
	4	045
		225

Item 11.7.3.4 CWD CONDITION CLASS (BASE 10.6.3.3)
[P2DWM_CWD.CONDID]

Record the condition class number for each CWD piece at the point where the central longitudinal axis of the piece intersects the transect. If there is only one condition on the plot all CWD pieces will be assigned to CWD condition class = 1. If more than one condition has been identified and/or mapped on the plot/subplot, record the appropriate condition based on the location of the transect diameter measurement. All CWD pieces require a condition class and only classes that have been identified and/or mapped are valid.

When collected:	All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST C0NDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width:	1 digit
Tolerance:	No errors
Values:	1 to 9

Item 11.7.3.5 PIECE ON SUBPLOT OR ANNULAR PLOT? (BASE 10.6.3.4)
[P2DWM_CWD.ONSUBP_ANNPCD]

Identify whether point of transect intersection with piece is on the subplot or macroplot. *In California, Oregon, and Washington*, all pieces will be assigned code = 1.

When collected:	All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST C0NDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1	
Field width:	1 digit	
Tolerance:	No errors	
Values:	1	Central longitudinal axis of piece intersects the transect on the subplot (<= 24.0 horizontal feet)
	2	Central longitudinal axis of piece intersects the transect on the macroplot (24.1 – 58.9 horizontal feet)

Item 11.7.3.6 CWD SLOPE DISTANCE (PFSL)
[SLOPDIST_PNWRS]

Record the code indicating the slope distance from the subplot center to the point where the transect intersects the longitudinal center of the piece. If two or more pieces have the same slope distances, record the top piece first. Measure and record to the nearest 0.1 feet. CWD SLOPE DISTANCE is used to locate the piece for QA purposes.

When collected:	All tally pieces in CONDITION CLASS STATUS = 1, **or** NONFOREST CONDITION CLASS SAMPLING STATUS =1
Field width:	4 digits
Tolerance:	+/- 1.0 feet
Values:	00.1 to 99.9

Item 11.7.3.7 CWD DECAY CLASS (BASE 10.6.3.6)
[P2DWM_CWD.DECAYCD]

Record a 1-digit code indicating the decay class of the piece. Code the decay class that predominates along the observed length of the piece. Use the guide below to determine CWD DECAY CLASS.

When collected:	All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2 where DWM TRANSECT SEGMENT SAMPLE STATUS = 1					
Field width:	1 digit					
Tolerance:	+/- 1 class					
Values:	Decay Class	Structural Integrity	Texture of Rotten Portions	Color of Wood	Invading Roots	Branches and Twigs
	1	Sound, freshly fallen, intact logs	Intact, no rot; conks of stem decay absent	Original color	Absent	If branches are present, fine twigs are still attached and have tight bark
	2	Sound	Mostly intact; sapwood partly soft (starting to decay) but can't be pulled apart by hand	Original color	Absent	If branches are present, many fine twigs are gone and remaining fine twigs have peeling bark
	3	Heartwood sound; piece supports its own weight	Hard, large pieces; sapwood can be pulled apart by hand or sapwood absent	Reddish-brown or original color	Sapwood only	Branch stubs will not pull out
	4	Heartwood rotten; piece does not support its own weight, but maintains it shape	Soft, small blocky pieces; a metal pin can be pushed into heartwood	Reddish or light brown	Through-out	Branch stubs pull out
	5	None, piece no longer maintains its shape, it spreads out on ground	Soft; powdery when dry	Red-brown to dark brown	Through-out	Branch stubs and pitch pockets have usually rotted down

Note: CWD DECAY CLASS 5 pieces can be difficult to identify because they often blend into the duff and litter layers. They must still resemble a log; therefore, the first tally rule is that they must be >5.0 inches in diameter and > 5.0 inches from the surface of the ground. Decomposed logs that are slightly elevated 'humps' on the ground are not tallied.

CWD DECAY CLASS: The chart above was developed primarily for Douglas-fir in the Pacific Northwest. At the present time, there are no other charts available to use to describe decay classes for other species or locations. Concentrate on the structural integrity and texture when estimating a decay class for CWD logs.

If a log is case hardened (hard, intact outer sapwood shell) but the heartwood is rotten, code this log as a CWD DECAY CLASS 2. CWD DECAY CLASS 1 should be reserved for 'freshly fallen' logs that are completely intact (i.e., recent windfalls, or harvest).

Item 11.7.3.8 SPECIES (BASE 10.6.3.7)

Record the code indicating the species of the piece. Since CWD pieces are not necessarily always tally species, record the most detailed available species code (see *Appendix D*). For shrubs or vines enter *code 0001*.

Species identification may be uncertain for some pieces. The piece's bark (either attached or sloughed and laying beside the piece), branching pattern (if the branches are still present), or heartwood smell (particularly if cedars, Douglas-fir, or western hemlock) may provide clues. On remeasurement plots, see what tree species were tallied in past inventories. One way to distinguish hardwoods from softwoods is by the type of decay present. Hardwoods usually have a white or grayish stringy rot, while softwoods usually have a reddish-brown blocky rot. If it is not possible to identify the species, attempt to estimate if it is softwood or hardwood. Enter code 0299 for unknown dead conifer or 0998 for unknown dead hardwood.

Note: Codes 0299 and 0998 are **not valid** when CWD DECAY CLASS = 1, 2 or 3.

When collected:	All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2 where DWM TRANSECT SEGMENT SAMPLE STATUS = 1 and CWD DECAY CLASS = 1 to 4	
Field width:	4 digits	
Tolerance:	No errors	
Values:	Code	Core code (office use only)
	0299, 0998, species codes in *Appendix D*	
	0001 - shrub or vine	0998

SUBSECTION 11.7.4 DIAMETERS

If possible, the best way to measure diameter is to wrap the tape perpendicular to the longitudinal axis at the point of transect intersection (*Figure 11.7*). If that is not possible it is useful to carry a steel carpenters retracting tape to measure diameters. Other methods include wrapping a tape around the bole if possible, holding a straight-edge ruler above the piece, or using calipers.

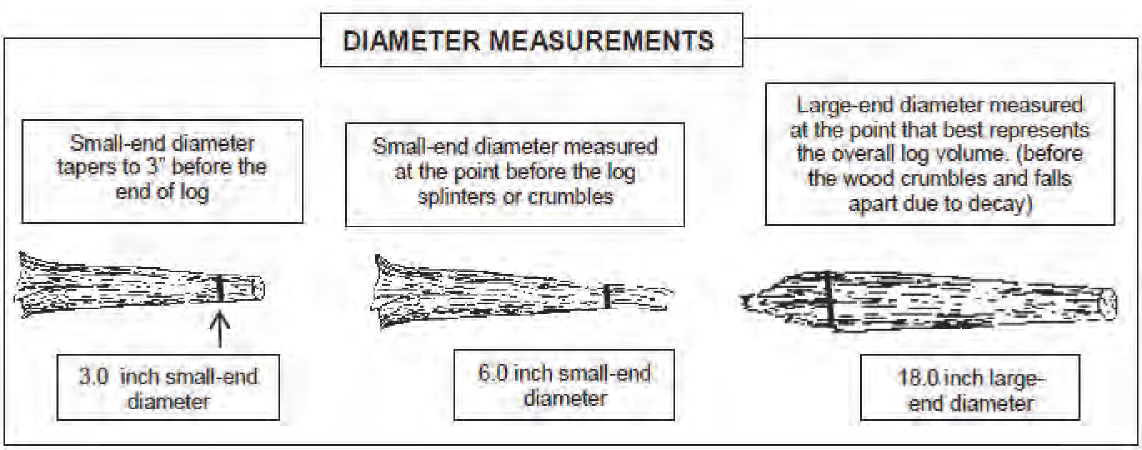


Figure 11.7: Diameter measurements

For pieces that cannot be taped and are not round in cross-section because of missing chunks of wood or "settling" due to decay, measure the diameter in two directions and take an average. Estimate the longest and shortest axis of the cross-section ("A" and "B" in *Figure 11.8*), and enter the average in the diameter field. This technique applies to intersect, small-end, and large-end diameters.

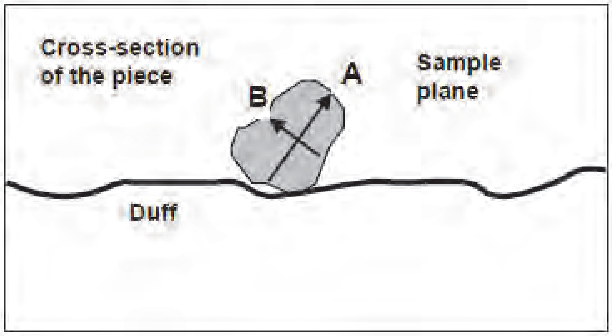


Figure 11.8: Estimating the diameter of pieces that are not round in cross-section.

If the transect intersects the log at the decayed or splintered end (*Figure 11.9*), record the diameter at this location as the intersect diameter. Record the large end and small end diameters on the same side of the transect diameter as illustrated. Record the small end diameter as 3 inches if it tapers below 3 inches. If the splintered end appears to be two separate pieces (i.e., a major split located just at the end) – in this situation treat it as one log and take a diameter around the end (take two measurements if it is odd shaped.

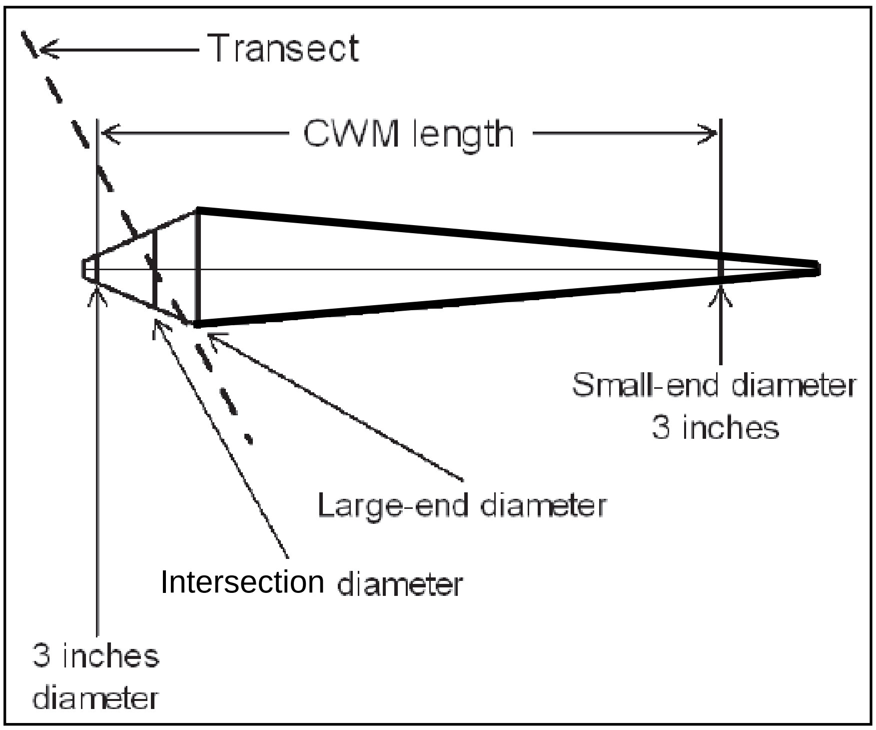


Figure 11.9: Example of decayed end intersecting the transect

Item 11.7.4.1 DIAMETER AT POINT OF INTERSECTION (BASE 10.6.3.8.1)
[P2DWM_CWD.TRANSECT_DIA]

Record the piece's diameter at the point where the transect intersects the longitudinal center of the piece. Record the diameter to the nearest inch. If the diameter is close to 3 inches, measure the diameter to the nearest 0.1 inch to determine if the piece is actually >3.0 inches and a valid tally piece.

When collected:	All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width:	3 digits

Tolerance:	Pieces < 20.0 inches diameter: +/- 1 inch for decay class 1-4, +/- 2 inches for decay class 5 Pieces ≥20.0 inches diameter (decay classes 1-4): +/- 2 inches for each 20-inch increment >20.0 inches Pieces ≥20.0 inches diameter (decay class 5): +/- 3 inches for each 20-inch increment above 20.0 inches
Values:	003 to 200 inches

Item 11.7.4.2 DIAMETER OF HOLLOW AT POINT OF INTERSECTION (BASE 10.6.3.8.2)
[P2DWM_CWD.HOLLOW_DIA]

Record the diameter of hollow at the point of intersection. This variable contributes to reducing bias in biomass estimate and only applies to the point of intersection. If it can be ascertained that the piece is hollow at the transect diameter location, measure or estimate the diameter of hollow to the nearest inch, otherwise record as 0. Diameter of hollow must be less than the transect diameter. Note: Record a hollow diameter only when it is obvious that a piece is hollow at the point of intersection (a hole or crack in the piece, evidence of hollow as observed from the end, etc.). Unlike *Item 11.7.5.3*, there is no hollow size requirement for this variable.

When collected:	All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1 and CWD DECAY CLASS = 1 to 4
Field width:	3 digits
Tolerance:	Pieces < 20.0 inches diameter: +/- 1 inch Pieces ≥20.0 inches diameter: +/- 2 inches for each 20-inch increment above 20.0 inches
Values:	000, 001 to 200 inches

Item 11.7.4.3 DIAMETER AT THE SMALL END (WILDLIFE OPTION 10.6.3.8.3)
[P2DWM_CWD.SMALL_END_DIA]

Record the diameter at the piece's small end. The diameter is recorded to the nearest inch. The DIAMETER AT THE SMALL END occurs either at (1) the actual end of the piece, if the end has a diameter >3.0 inches, or (2) at the point where the piece tapers down to 3.0 inches in diameter. If the end is splintered or decomposing (sloughing off), measure the diameter at the point where it best represents the overall log volume. Use the same measuring procedures described in *Subsection 11.7.4* (see *Figure 11.7*).

When collected:	*When ADMINISTRATIVE FOREST CODE = 501 - 699:* All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM SAMPLING STATUS = 1, DWM TRANSECT SEGMENT SAMPLE STATUS = 1, CWD DECAY CLASS = 1 to 4, and CWD LENGTH >=3 FEET = 1
Field width:	3 digits
Tolerance:	Pieces <20.0 inches diameter: +/- 1 inch Pieces ≥20.0 inches diameter: +/- 2 inches for each 20-inch increment above 20.0 inches
Values:	003 to 200 inches

Item 11.7.4.4 DIAMETER AT THE LARGE END (WILDLIFE OPTION 10.6.3.8.4)
[P2DWM_CWD.LARGE_END_DIA]

Record the diameter at the piece's large end. The diameter is recorded to the nearest inch. The large end will occur either at a broken or sawn end, at a fracture, or at the root collar. If the end is splintered or decomposing (sloughing off), measure the diameter at the point where it best represents the overall log volume. Use the same measuring procedures used for *Subsection 11.7.4*.

When collected:	*When ADMINISTRATIVE FOREST CODE = 501 - 699:* All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM SAMPLING STATUS = 1, DWM TRANSECT SEGMENT SAMPLE STATUS = 1, CWD DECAY CLASS = 1 to 4, and CWD LENGTH >=3 FEET = 1
Field width:	3 digits

Tolerance:	Pieces <20.0 inches diameter: +/- 1 inch Pieces ≥20.0 inches diameter: +/- 2 inches for each 20-inch increment above 20.0 inches
Values:	003 to 250 inches

SUBSECTION 11.7.5 LENGTH MEASUREMENTS

Measure the length of the piece (to the nearest foot) along its centerline, either to the end of the piece or to the point where the diameter reaches 3 inches. If the piece tapers at both sides, due to decay or breakage, the length is measured for the 3-inch diameter cutoff at both ends, regardless of where the large end-diameter may be (see *Figure 11.9*). No length is recorded for pieces <3 feet long.

Item 11.7.5.1 CWD LENGTH >= 3 FEET (BASE 10.6.3.9.1)

[P2DWM_CWD.LENGTH_3FTCD]

Record the code that indicates whether the CWD TOTAL LENGTH is less than 3 feet long (and at least 0.5 foot long). Distinguish length orientation by direction of the pith. Note: the diameter of a small piece may be larger than its length. Total length of the log is measured between the physical ends of the log.

When collected:	All tally pieces >0.5 foot long, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1	
Field width:	1 digit	
Tolerance:	No error	
Values:	1	CWD TOTAL LENGTH ≥3 feet
	2	CWD TOTAL LENGTH ≥0.5 foot and < 3 feet

Item 11.7.5.2 CWD TOTAL LENGTH (WILDLIFE OPTION 10.6.3.9.2)

[P2DWM_CWD.LENGTH]

For DECAY CLASS = 5, DIAMETER AT THE SMALL END and DIAMETER AT THE LARGE END are not recorded for a log, therefore the length is measured between the two physical ends of the log. For curved logs, measure along the curve. CWD TOTAL LENGTH is recorded to the nearest foot.

When collected:	*When ADMINISTRATIVE FOREST CODE = 501 - 699:* All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM SAMPLING STATUS = 1, DWM TRANSECT SEGMENT SAMPLE STATUS = 1, and CWD LENGTH >=3 FEET = 1
Field width:	3 digits
Tolerance:	+/- 20%
Values:	003 to 250 feet

Item 11.7.5.3 IS THE PIECE HOLLOW? (OPTIONAL 10.6.3.10)
[P2DWM_CWD.HOLLOWCD]

Record the code indicating whether or not the piece is hollow (see *Figure 11.10*). This definition of hollow is different from the definition used in *Item 11.7.4.2* DIAMETER OF HOLLOW AT POINT OF INTERSECTION. This variable provides information for wildlife assessment.

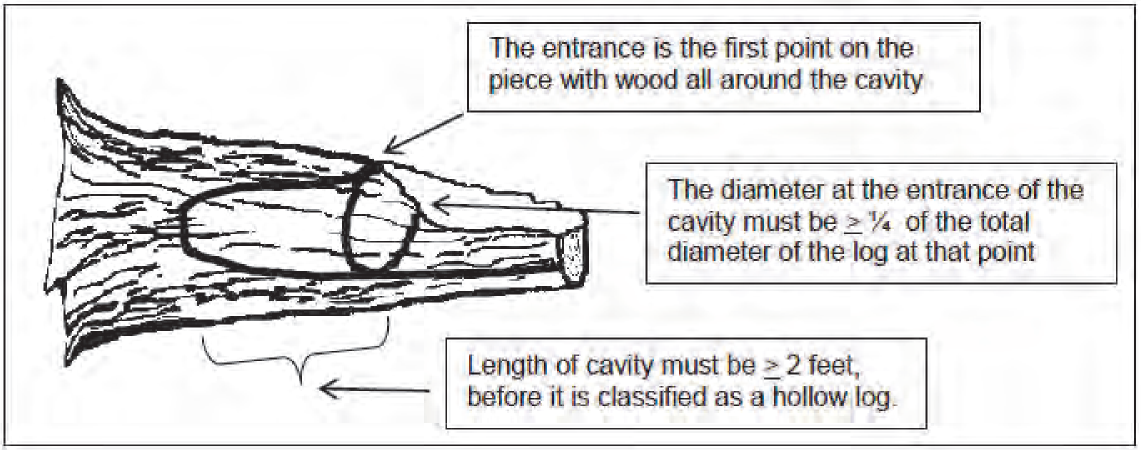


Figure 11.10: Determining if the piece is hollow.

When collected:	All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1 and CWD DECAY CLASS = 1 to 4 and CWD LENGTH >= 3 FEET = 1	
Field width:	1 digit	
Tolerance:	No errors	
Values:	0	Does not meet criteria for being a hollow log
	1	A piece is considered hollow if a cavity extends at least 2 feet along the central longitudinal axis of the piece, and the diameter of the entrance to the cavity is at least 1/4 of the diameter of the piece where the entrance occurs. The entrance occurs at the point where the circumference of the cavity is whole -- the point where wood is present completely around the circumference of the cavity. The length of the cavity begins at this point. This definition of hollow is different from the definition used in *Item 11.7.4.2* DIAMETER OF HOLLOW AT POINT OF INTERSECTION.

Item 11.7.5.4 PIECE INCLINATION (OPTIONAL 10.6.3.11)
[P2DWM_CWD.INCLINATION]

Record the inclination from horizontal of the piece in degrees. Measure the inclination with a clinometer. Inclination from horizontal should be estimated rapidly by setting a clinometer along the top of the log, adjusting if necessary to match the angle between the location of the large end diameter and the location of the small end diameter, and reading the inclination from the face of the clinometer in degrees.

When collected:	All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width:	2 digits
Tolerance:	+/- 5 degrees
Values:	00 to 90 degrees

Item 11.7.5.5 CWD HISTORY (OPTIONAL 10.6.3.12)
[P2DWM_CWD.CWDHISTCD]

Record the code that indicates whether or not the piece of CWD is on the ground as a result of harvesting operations or as a result of natural circumstances. One objective of this item is to identify those pieces that are considered logging residue. If the piece appears to have fallen to the ground as a result of natural causes such as decomposition or windfall, enter a code of 1. This category would include blown out tops, snapped off boles, wind-fallen trees on clearcut edges, and trees that basically collapsed and fell over due to decomposition.

If the piece is on the ground as a result of recent (since last annual remeasurement; if the plot is new, the time between the panel remeasurements) harvesting activity, either because the tree was cut down with a chainsaw (or other device) or pushed over by harvesting equipment (bulldozer), enter a code of 2. A code of 2 would be considered logging residue (usually you are in the middle of a recent clearcut).

If the piece is on the ground as a result of older (more than 15 years) harvesting activity, enter a code of 3. This would be a situation where you tally an old decomposing log that has a sawn end – if it appears that the log was cut and left on site, then enter a code of “3”.

If a piece is on the ground as a result of incidental harvest (such as a standing tree was cut for firewood or small clearing), enter a code of “4”. Incidental harvest involves a few trees and is not a part of a major organized harvesting operation.

If the crew cannot decide the history of the CWD log, classify it as “unknown”, and give it a code of “5”.

When Collected:	All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1 and CWD DECAY CLASS = 1 to 4	
Field width:	1 digit	
Tolerance:	No errors	
Values:	1	CWD piece is on the ground as a result of natural causes
	2	CWD piece is on the ground as a result of major recent harvest activity (<= 15 yrs old)
	3	CWD piece is on the ground as a result of older harvest activity (> 15 yrs old)
	4	CWD piece is on the ground as a result of an incidental harvest (such as firewood cutting)
	5	Exact Reason Unknown

Item 11.7.5.6 PERCENT OF LOG CHARRED BY FIRE (OPTIONAL 10.6.3.13)
[P2DWM_CWD.CHARCD]

Record a code that represents the percentage of the log's surface area that has been charred by fire. Only examine the visible surface of the log. These data will be used by wildlife biologists to determine the impact fire has had on wildlife habitat. Wildlife tend to avoid charred logs because fire seals the wood making it slow to rot and hard to excavate.

When collected:	All tally pieces in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1, DIAMETER AT POINT OF INTERSECTION >20, and CWD DECAY CLASS = 1 to 3	
Field width:	1 digit	
Tolerance:	+/- 1 class	
Values:	0	None of the log is charred by fire
	1	Up to 1/3 of the log is charred by fire
	2	1/3 to 2/3 of the log is charred by fire
	3	2/3 or more of the log is charred by fire

Item 11.7.5.7 COARSE WOODY DEBRIS NOTES (PFSL)
[NOTES]

Record any notes needed to clarify or explain a special situation encountered with a piece of CWD.

When collected:	All plots: as needed
Field width:	40 characters
Tolerance:	N/A
Values:	Single words and abbreviated sentences

SECTION 11.8 SAMPLING RESIDUE PILES

A pile is an accumulation of large woody material in which individual pieces are impossible to tally separately. Piles may be created by human activity or natural causes. However, loose piles created by windthrow, landslides, fires or other natural causes, or by thinning or logging operations, should be tallied using the regular CWD protocols unless it is physically impossible to separate individual pieces. The pile protocol should only be used as a last resort, when the regular CWD protocols cannot be used.

Piles are tallied only if intersected by a transect and located in an accessible forest condition class (CONDITION CLASS STATUS = 1) or a measurable nonforest condition (NONFOREST CONDITION CLASS STATUS = 2). An estimate of the length and depth of the pile, species composition and decay class are recorded:

1. Tally individual pieces along the transect until it is not possible to measure them separately and record the horizontal transect distance to this point. Then, record the horizontal transect distance to the point where individual pieces can again be tallied separately (see *Figure 11.11*).
2. If the pile straddles two condition classes, assign it to the condition class that is closest to subplot center along the transect.
3. Estimate the average height of the pile along the transect. Visually compact the pile to estimate the height of wood, excluding air, rocks, debris and pieces of wood less than 3 inches in diameter at the plane of intersection with the transect. There is a tendency to overestimate the proportion of the cross-section of the pile made of wood. Note that when packing perfect circles of equal diameter, the maximum attainable packing ratio is less than 90% (see *Figure 11.12*).
4. Record the predominant species in the pile.
5. Record the predominant decay class of the pieces in the pile

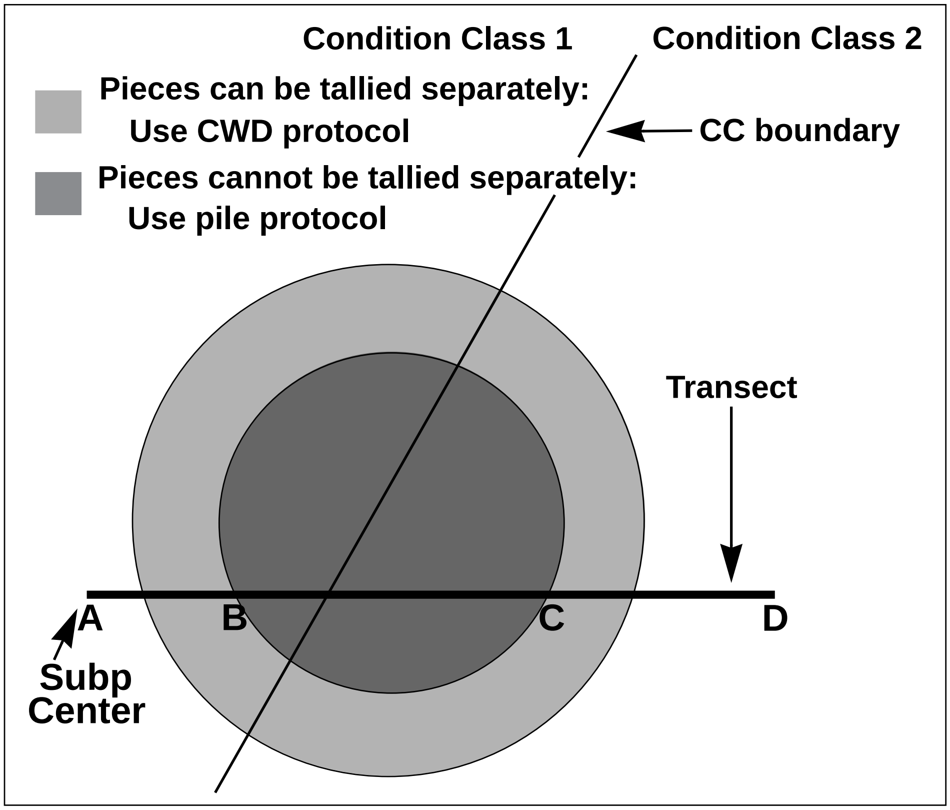


Figure 11.11: Example for measuring a pile. Pieces can be identified and tallied separately between points A-B and C-D, so the CWD protocols are used, even though part of the transect may be within the pile. Between points B and C, pieces cannot be tallied separately and the pile protocol is used. Enter the horizontal distance at B as the pile beginning distance, the horizontal distance at C as the pile ending distance, and estimate the compacted height of wood, predominant species, and predominant decay class between B and C. Assign the entire pile to condition class 1.

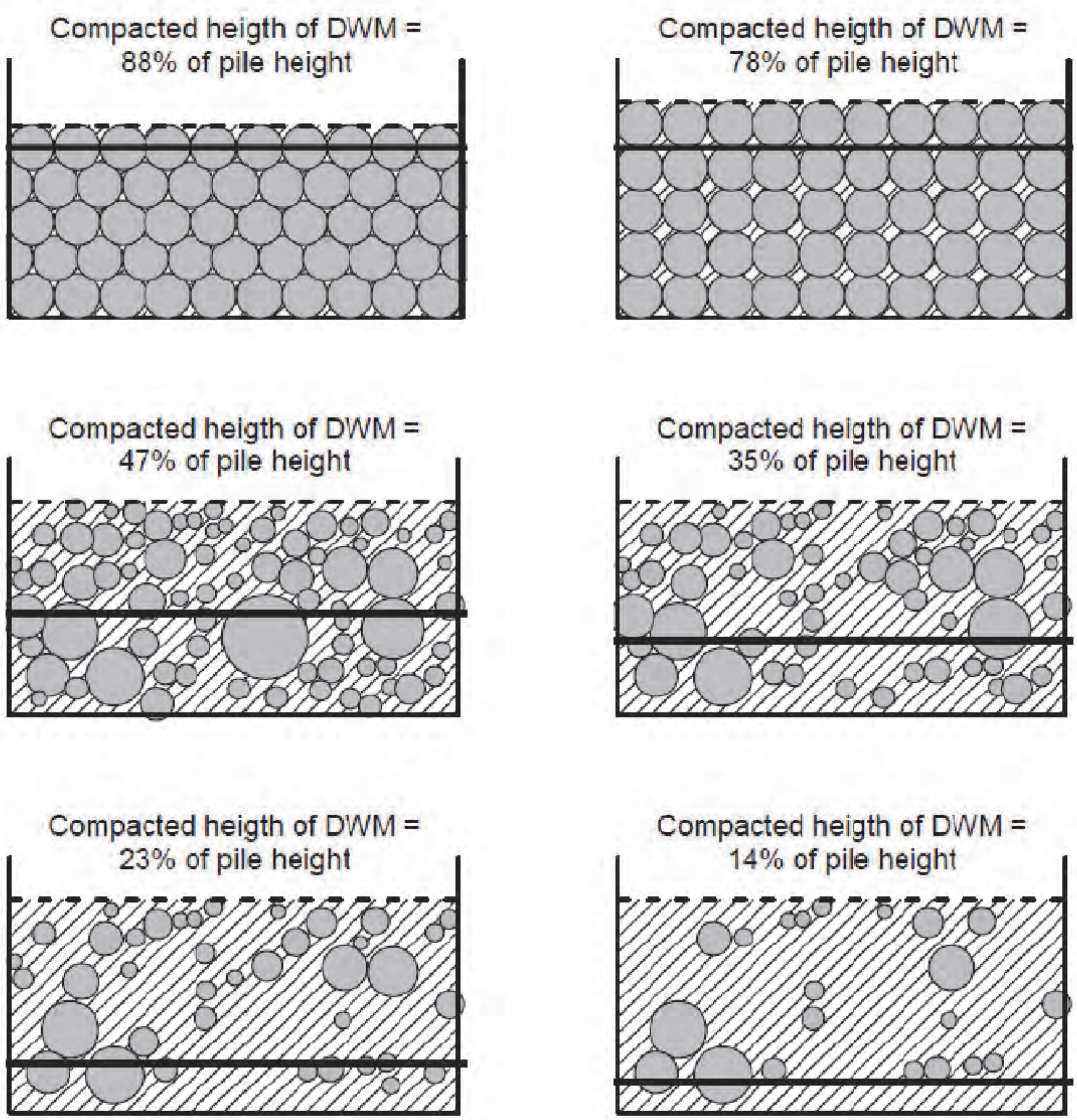


Figure 11.12: Calculating compacted height of CWD. The dashed line represents the height of the pile, the solid, thick line the compacted height of wood. Grey circles are cross sections of woody pieces greater than 3 inches of diameter and the fill represents debris, air and smaller pieces of wood.

Item 11.8.0.1 PILE SUBPLOT NUMBER (BASE 10.7.1)

Record the code indicating the number of the subplot center from which the transect originates.

When collected:	All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1	
Field width:	1 digit	
Tolerance:	No errors	
Values:	1	Center subplot
	2	North subplot
	3	Southeast subplot
	4	Southwest subplot

Item 11.8.0.2 PILE NUMBER (PFSL)
[PILEID]

Assign a unique number to identify each pile present on the subplot. PILE NUMBERs should be assigned sequentially, beginning with "1" for the first pile encountered.

When collected:	When CONDITION CLASS STATUS = 1, **or** NONFOREST CONDITION CLASS SAMPLING STATUS =1
Field width:	2 digits
Tolerance:	No errors
Values:	01 to 99

Item 11.8.0.3 PILE TRANSECT (BASE 10.7.2)
[P2DWM_RESIDUE_PILE.TRANSECT]

Record the azimuth of the transect on which the pile is sampled.

When Collected:	All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1	
Field width:	3 digits	
Tolerance:	No errors	
Values:	Subplot	Transect direction (degrees) from center of subplot
	1	090
		270
	2	360
		180
	3	135
		315
	4	045
		225

Item 11.8.0.4 PILE CONDITION CLASS NUMBER (BASE 10.7.3)
[P2DWM_RESIDUE_PILE.CONDID]

Record the code indicating the number of the condition class. If the pile straddles two condition classes, assign it to the one closest to subplot center along the transect.

When collected:	All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width:	1 digit
Tolerance:	No errors
Values:	1 to 9

Item 11.8.0.5 PILE BEGINNING DISTANCE (BASE 10.7.4)
[P2DWM_RESIDUE_PILE.BEGINHORIZDIST]

Record the horizontal length of the transect to the beginning of the pile (to the nearest 0.1 foot), defined as the point when pieces cannot be tallied individually. If the pile occupies subplot center, record 00.0 for the beginning distance.

When collected:	All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width:	3 digits
Tolerance:	+/- 10%
Values:	00.0 to *24.0* feet

Item 11.8.0.6 PILE ENDING DISTANCE (BASE 10.7.5)
[P2DWM_RESIDUE_PILE.ENDHORIZDIST]

Record the horizontal length of the transect to the end of the pile, defined as the point when pieces can be tallied individually again. If the transect ends within the pile, record DWM TRANSECT LENGTH.

When collected:	All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width:	3 digits (xx.y)
Tolerance:	+/- 10%
Values:	00.1 to *24.0* feet

Item 11.8.0.7 COMPACTED HEIGHT OF CWD IN PILE (BASE 10.7.6)
[P2DWM_RESIDUE_PILE.COMP_HT]

Record average height of wood pieces greater than 3 inches in diameter at the intersection of the transect with the pile. Record value to the nearest foot. Visually compact the pile to estimate the height of wood, excluding air, debris and pieces of wood less than 3 inches in diameter at the point of intersection with the transect. If the transect starts or ends within a pile, only consider the portion of cross-section of the pile above the measured transect.

When collected:	All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width:	2 digits
Tolerance:	+/- 10%
Values:	1 to 99 feet

Item 11.8.0.8 PILE DECAY CLASS (BASE 10.7.7)
[P2DWM_RESIDUE_PILE.DECAYCD]

Record a 1-digit code indicating the predominant decay class in the pile. Use the guide below to determine CWD DECAY CLASS.

When collected:	All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1					
Field width:	1 digit					
Tolerance:	+/- 1 decay class					
Values:	Decay Class	Structural Integrity	Texture of Rotten Portions	Color of Wood	Invading Roots	Branches and Twigs
	1	Sound, freshly fallen, intact logs	Intact, no rot; conks of stem decay absent	Original color	Absent	If branches are present, fine twigs are still attached and have tight bark
	2	Sound	Mostly intact; sapwood partly soft (starting to decay) but can't be pulled apart by hand	Original color	Absent	If branches are present, many fine twigs are gone and remaining fine twigs have peeling bark
	3	Heartwood sound; piece supports its own weight	Hard, large pieces; sapwood can be pulled apart by hand or sapwood absent	Reddish-brown or original color	Sapwood only	Branch stubs will not pull out
	4	Heartwood rotten; piece does not support its own weight, but maintains it shape	Soft, small blocky pieces; a metal pin can be pushed into heartwood	Reddish or light brown	Through-out	Branch stubs pull out
	5	None, piece no longer maintains its shape, it spreads out on ground	Soft; powdery when dry	Red-brown to dark brown	Through-out	Branch stubs and pitch pockets have usually rotted down

Item 11.8.0.9 PILE SPECIES (BASE 10.7.8)
[P2DWM_RESIDUE_PILE.SPCD]

Record the code indicating the predominant species in the pile.

When collected:	All sampled residue piles on transects in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2, where DWM TRANSECT SEGMENT SAMPLE STATUS = 1 and PILE DECAY CLASS = 1 to 4
Field width:	4 digits
Tolerance:	No errors
Values:	See species codes in *Appendix D*

Item 11.8.0.10 RESIDUE PILE NOTES (PFSL)
[NOTES]

Record any notes needed to clarify or explain a special situation encountered with the residue pile measurements.

When collected:	All plots: as needed
Field width:	2000 characters
Tolerance:	N/A
Values:	Single words and abbreviated sentences

SECTION 11.9 SAMPLING METHODS FOR FINE WOODY DEBRIS (FWD)

1. Fine Woody Debris (FWD) is only sampled on accessible forest land conditions (CONDITION CLASS STATUS = 1) and measurable nonforest conditions (NONFOEST CONDITION CLASS STATUS = 2) intersected by the transect. FWD is tallied on the outer portion of the following transects: 270°on subplot 1, 360°on subplot 2, 135°on subplot 3, and 225°on subplot 4. The length of FWD transects is measured in horizontal distance, starting at 14.0 feet and extending for 6.0 or 10.0 feet depending on FWD size class.
2. If the start of the FWD transect segment is in a measured condition (see item 1 above) but a portion of the transect segment is not visible due to the presence of snow or standing water, consider the entire transect segment not measurable. In this situation, do not sample anything on the transect segment--set FWD TRANSECT SEGMENTSAMPLE STATUS code = 0 and record the reason in FWD TRANSECT SEGMENT NONSAMPLED REASON.
3. Only sample FWD that intersects the transect in a plane from the ground to a height of 6 feet.
4. FWD is sampled in three size classes, along transect azimuths described in item 1 above (see Section 11.3 for details on transects). Pieces in two FWD size classes (0.01 to 0.24 inches and 0.25 to 0.9 inches) are counted on a 6-foot transect, from 14 to 20 feet horizontal distance. Pieces in the largest size class (1.0 to 2.9 inches) are counted on a 10-foot transect, from 14 to 24 feet. These transects overlap. Note: individual diameters are not recorded for FWD.
5. Count a piece of FWD if it intersects the transect. Be sure to count only woody material such as a twig, branch, wood fragment, or small shrub or tree bole Do not count material that is actually litter, such as pine or fir needles, non-woody parts (e.g., petiole and rachis) of a shrub or tree, etc.
6. Accumulate the number of pieces counted within each size class and enter the total count on one record for the subplot. If there is no tally on a transect, enter zeros for the count. If the transect is not measured (FWD TRANSECT SAMPLE STATUS = 0) the count is null.
7. Accurate counts of FWD can be conducted efficiently up to about 50 pieces for small and medium size classes, and up to 20 pieces for the large size class. After that, crews can begin estimating counts in a systematic fashion. Transects that fall on very dense FWD where counting is nearly impossible, can be sub-sampled and calculated. For example, an accurate count can be conducted on a 2.0-foot section of the transect and then multiplied by 3 to provide an estimate for the 6 foot transect, as long as the crew feels that the remaining transect has a similar density of FWD pieces.
8. If a transect intersects a large pile of material such as a wood rat's nest, recently fallen tree (with many attached fine branches), or a residue pile, crews should estimate a count based on # 7 above, but also enter a code indicating that this is an unusual situation (see *Item 11.9.0.9*). In the case of a residue pile on the transect, estimate a count by looking at the transect just before and after the pile along with assessing what's inside the pile, and enter a count for the whole transect.

9. If rocks or logs are present along the transect (14- to 24-foot section) include any FWD that is present on top of these things in the respective FWD counts. If the obstructions are so large (huge boulder) that the top surface cannot be seen, assume the count is zero in this area, and continue counting if there is transect line beyond the boulder.
10. If a transect crosses a condition class boundary, record the condition class number and enter a count for each condition on separate records. Transect lengths within each condition class will be obtained from the transect segmenting data entered for the plot.

Item 11.9.0.1 FWD SUBPLOT NUMBER (BASE 10.8.1)

Record the code indicating the subplot center from which the transect originates.

When collected:	All FWD transect segments where DWM TRANSECT SEGMENT SAMPLE STATUS = 1	
Field width:	1 digit	
Tolerance:	No errors	
Values:	1	Center subplot
	2	North subplot
	3	Southeast subplot
	4	Southwest subplot

Item 11.9.0.2 FWD TRANSECT (BASE 10.8.2)
[P2DWM_FWD.TRANSECT]

Record the azimuth (degrees) of the transect on which FWD is sampled.

When collected:	All FWD transect segments where DWM TRANSECT SEGMENT SAMPLE STATUS = 1	
Field width:	3 digits	
Tolerance:	No errors	
Values:	degrees	
	Subplot	Transect direction (degrees) from center of subplot
	1	270
	2	360
	3	135
	4	225

Item 11.9.0.3 FWD CONDITION CLASS NUMBER (BASE 10.8.3)
[P2DWM_FWD.CONDID]

Record the code indicating the number of the condition class at the start of the transect (14.0 feet horizontal distance from subplot center).

When collected:	All FWD transect segments where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width:	1 digit
Tolerance:	No errors
Values:	1 to 9

Item 11.9.0.4 FWD TRANSECT SEGMENT SAMPLE STATUS (BASE 10.8.4)
[P2DWM_FWD.FWD_STATUS_CD]

Record the sample status for FWD on the transect. There may be situations where the CWD is measurable, but the FWD is hidden from view by snow or water and not measurable. If any part of the FWD transect segment is on a measured condition but the FWD is not measurable, do not count any FWD and set the STATUS code to 0 and the FWD TRANSECT NONSAMPLED REASON code to 10.

In all other situations, set the code to 1. Conditions on which FWD would not be measured regardless (CONDITION CLASS STATUS = 3 or CONDITION CLASS STATUS = 2 AND NONFOREST CONDITION CLASS STATUS = 5) should always be coded 1.

When collected:	All FWD transect segments where DWM TRANSECT SEGMENT SAMPLE STATUS = 1	
Field width:	1 digit	
Tolerance:	No errors	
Values:	0	FWD transect segment not sampled
	1	FWD transect segment sampled

Item 11.9.0.5 FWD TRANSECT SEGMENT NONSAMPLED REASON (BASE 10.8.5)
[P2DWM_FWD.FWD_NONSAMPLE_REASN_CD]

Record the reason that FWD cannot be measured on the transect.

When Collected:	All FWD transect segments where FWD TRANSECT SEGMENT SAMPLE STATUS = 0	
Field width:	2 digits	
Tolerance:	No errors	
Values:	05	Lost data (office use only)
	10	Other (for example, snow or water covering CWD that is supposed to be sampled). *FINE WOODY DEBRIS NOTES required* when using this code.

Item 11.9.0.6 SMALL FWD COUNT (BASE 10.8.6)
[P2DWM_FWD.SMALLCT]

Record the number of pieces counted in this size class (0.01 to 0.24-inch diameter) along the transect segment. An accurate count should be conducted up to 50 pieces. If the count exceeds 50, the transect can be sub-sampled to estimate a total count for the transect length (see *Section 11.9*, #8).

When collected:	All FWD transect segments in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2 where FWD TRANSECT SEGMENT SAMPLE STATUS = 1
Field width:	3 digits
Tolerance:	0 to 50 = +/- 20% of the total count for the transect 51 to 100 = +/- 25% of the total count for the transect 100 + = +/- 50% of the total count for the transect
Values:	000 to 999 pieces

Item 11.9.0.7 MEDIUM FWD COUNT (BASE 10.8.7)
[P2DWM_FWD.MEDIUMCT]

Record the number of pieces counted in this size class (0.25 to 0.99-inch diameter) along the transect segment. An accurate count should be conducted up to 50 pieces. If the count exceeds 50, the transect can be sub-sampled to estimate a total count for the transect segment (see *Section 11.9*, # 8).

When collected:	All FWD transect segments in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2 where FWD TRANSECT SEGMENT SAMPLE STATUS = 1
Field width:	3 digits
Tolerance:	+/- 20% of the total count for the transect
Values:	000 to 999 pieces

Item 11.9.0.8 LARGE FWD COUNT (BASE 10.8.8)
[P2DWM_FWD.LARGECT]

Record the number of pieces counted in this size class (1.0 to 2.9 inch diameter) along the transect segment. An accurate count should be conducted up to 20 pieces. If the count exceeds 20, the transect can be sub-sampled to estimate a total count for the transect segment (see *Section 11.9*, # 8).

When collected:	All FWD transect segments in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2 where FWD TRANSECT SEGMENT SAMPLE STATUS = 1
Field width:	3 digits
Tolerance:	+/- 20% of the total count for the transect
Values:	000 to 500 pieces

Item 11.9.0.9 HIGH COUNT REASON (BASE 10.8.9)
[P2DWM_FWD.]

Enter a code that applies to the situation encountered on the transect. Enter a code if any of the counts on the transect are greater than 100 pieces.

When collected:	All FWD transect segments in CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2 where FWD TRANSECT SEGMENT SAMPLE STATUS = 1 and (SMALL FWD COUNT ≥ 100 or MEDIUM FWD COUNT ≥100 or LARGE FWD COUNT ≥100	
Field width:	1 digit	
Tolerance:	No errors	
Values:	1	High count is due to an overall high density of FWD across the transect
	2	Wood Rat's nest located on transect
	3	Tree or shrub laying across transect
	4	Other reason
	5	Residue pile

Item 11.9.0.10 FINE WOODY DEBRIS NOTES (PFSL)
[NOTES]

Record any notes needed to clarify or explain a special situation encountered with a piece of FWD.

When collected:	All plots: as needed
Field width:	2000 characters
Tolerance:	N/A
Values:	Single words and abbreviated sentences

SECTION 11.10 DUFF AND LITTER DEPTH MEASUREMENTS

Depth measurements are sampled in accessible forest land conditions (and accessible nonforest conditions, where nonforest conditions are measured). The depth of the duff layer and litter layer are important components of carbon tracking and fire models that estimate fire behavior, fire spread, fire effects, and smoke production. These measurements are taken at the 24-foot location on each transect. If an object such as a rock, log, or residue pile is present at the sample point, depths will be estimated by examining the surface of the object or the area surrounding the object. In the office, an average depth will be calculated and stored with other information about the condition class on the plot.

SUBSECTION 11.10.1 DEFINITIONS

1. Litter is the layer of freshly fallen leaves, needles, twigs (<0.25 inch in diameter), cones, detached bark chunks, dead moss, dead lichens, detached small chunks of rotted wood, dead herbaceous stems, and flower parts (detached and not upright). Litter is the loose plant material found on the top surface of the forest floor which is undecomposed or only partially decomposed organic material. The components of the litter layer can still be readily identified (e.g., plant leaves, twigs, and peat, etc.).

   Litter is flash fuel – so think about it as the loose material that is exposed to the air, capable of igniting quickly and carrying a fire across the surface of the forest floor.

Litter does not include bark that is still attached to a down log, or rotten chunks of wood that are still inside a decaying log or log end (i.e., if a decayed log end has a lot of rotten cubes or pieces laying on a log surface and exposed to air, they are considered part of the log and not litter – fire would burn differently if it hit a pile of rotten punky wood chips cradled by the unrotted sapwood shell). If these rotten chunks have spilled out to the ground and are actually on the ground surface, then they would be included in the litter layer.

Litter does not include animal manure.

2. Duff is the layer just below litter located just above the A-horizon (or uppermost soil mineral horizon). Duff is a dark soil layer dominated by organic material derived from the decomposition of plant and animal litter (pine straw, leaves, twigs, etc) and deposited on top of an organic or mineral surface. This layer is distinguished from the litter layer in that the original organic material has undergone sufficient decomposition that the source of this material (e.g., individual plant parts) can no longer be identified. You should see no recognizable plant parts. When moss is present, the top of the duff layer is just below the green portion of the moss.

   If peat is present in your part of the country, record it with the duff layer. Peat is an accumulation of partially decayed vegetation matter that forms under conditions of poor drainage such as those found in wetlands or bogs. A layer of peat develops when dead plant material is inhibited from decaying fully because of acidic or anaerobic conditions. In some areas of the U.S. the depth of this layer can be extensive.

SUBSECTION 11.10.2 OVERVIEW OF MEASUREMENTS

Depth measurements will be taken at the 24-foot (horizontal distance) location on each transect. If a log, rock, or residue pile occurs at the sample location, record the depth of the litter on top and below these objects and estimate the duff depth as close to the object as possible. Examine the area around the object to develop an average depth for these layers.

DUFF/LITTER SAMPLE STATUS identifies whether or not the duff and litter depth could be measured or reasonably estimated. Examples of situations where measurement is not possible include the presence of snow or standing water at the sample location. In this case, the STATUS code is set to 1 with the DUFF/LITTER NONSAMPLED REASON code set to 10.

The DUFF AND LITTER METHOD variable has three options for indicating if duff and litter were measured or estimated at each sample location. The default value for this variable is 1, indicating that both depths were measured and recorded. A code of 2 means that litter depth was measured, but duff depth was estimated and a code of 3 indicates that both duff and litter depths were estimated.

Carefully expose a shallow profile of the forest floor by digging out an area at the sample point using a knife, hatchet, or other tool. Estimate the depth of each layer with a ruler to the nearest 0.1 inch. As you dig the hole for this measurement, if you encounter a subsurface rock, root, or buried log – stop the depth measurement at this point. If there is a log, rock, or residue pile on the surface at the sample point, and there appears to be duff and litter under it (or litter on top of it), record a reasonable estimate for each depth. Most likely, the area immediately adjacent to the obstruction will have to be examined to determine an average depth. Depths of zero are perfectly valid: for example if the point falls on bedrock or on top of a log that it resting on mineral soil.

As a general rule, duff depth should rarely exceed a few inches (except when a peat layer is present). Crews should be absolutely sure they are measuring deep duff depths, instead of mineral soil layers or parts of the litter layer. Duff can easily weigh more than 6 times that of litter. If unsure of the bottom of the duff layer, crews should feel the texture of the suspect material in their hand. Rub the soil between your fingers. Does it crumble (duff) or feel more like modeling clay (mineral). If the layer includes a substantial amount of peat, stop the measurement at 2 feet.

The height of the litter should be measured at the top of the loose material located at the sample point on the transect (or nearby if an obstruction exists). Try to preserve the conditions of this location by walking around this point, so the QA staff will measure the same height as the original crew.

Item 11.10.2.1 DUFF/LITTER SUBPLOT NUMBER (BASE 10.9.3)

Record the code indicating the number of the subplot center from which the transect originates.

When collected:	All duff/litter transects where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width:	1 digit

Tolerance:	No errors	
Values:	1	Center subplot
	2	North subplot
	3	Southeast subplot
	4	Southwest subplot

Item 11.10.2.2 DUFF/LITTER TRANSECT (BASE 10.9.4)
[P2DWM_DUFF_LITTER.TRANSECT]

Record the azimuth (degrees) of the transect on which duff/litter is sampled.

When collected:	All duff/litter transects where DWM TRANSECT SEGMENT SAMPLE STATUS = 1	
Field width:	3 digits	
Tolerance:	No errors	
Values:	Subplot	Transect direction (degrees) from center of subplot
	1	090
		270
	2	360
		180
	3	135
		315
	4	045
		225

Item 11.10.2.3 DUFF/LITTER CONDITION CLASS NUMBER (BASE 10.9.5)
[P2DWM_DUFF_LITTER.COND]

Record the code indicating the number of the condition class at the sample point (24.0 feet horizontal distance from subplot center).

When collected:	All duff/litter transects where DWM TRANSECT SEGMENT SAMPLE STATUS = 1
Field width:	1 digit
Tolerance:	No errors
Values:	1 to 9

Item 11.10.2.4 DUFF/LITTER SAMPLE STATUS (BASE 10.9.6)
[P2DWM_DUFF_LITTER.DL_STATUS_CD]

Record the sample status for duff and litter depth on the transect. There may be situations where the CWD is measurable (e.g., shallow depth of snow or water), but the duff and litter are not measurable. If the measurement point is on a measured condition but the duff/litter is not measurable, do not measure duff/litter and set code to 0 with the DUFF/LITTER NONSAMPLED REASON code set to 10.

In all other situations (including where duff and litter depth = 0), set the code to 1. For example, conditions on which duff/litter would not be measured regardless (CONDITION CLASS STATUS = 3 or NONFOREST CONDITION CLASS STATUS = 5) should always be coded 1.

When collected:	All duff/litter transects where DWM TRANSECT SEGMENT SAMPLE STATUS = 1	
Field width:	1 digit	
Tolerance:	No errors	
Values:	0	Duff and litter point not sampled
	1	Duff and litter point sampled

Item 11.10.2.5 DUFF/LITTER NONSAMPLED REASON (BASE 10.9.7)
[P2DWM_DUFF_LITTER.DL_NONSAMPLE_REASN_CD]

Record the reason that duff/litter cannot be measured on the transect.

When Collected:	All duff/litter transects where DUFF/LITTER SAMPLE STATUS = 0
Field width:	2 digits
Tolerance:	No errors

Values:	05	Lost data (office use only)
	10	Other (for example, snow or water covering measurement point that is supposed to be sampled). *DUFF, LITTER, FUELBED NOTES required* when using this code

Item 11.10.2.6 DUFF DEPTH (BASE 10.9.8)
[P2DWM_DUFF_LITTER.DUFFDEP]

Record the code indicating the depth of the duff layer to the nearest 0.1 inch. Record 24.0 inches when DUFF DEPTH is >24.0 inches and enter Code #4 (Litter depth was measured, duff (peat) depth exceeds 24.0 inches) for 10.9.8 DUFF AND LITTER METHOD.

When collected:	All duff/litter transects in measureable conditions (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) where DUFF/LITTER SAMPLE STATUS = 1
Field width:	3 digits (xx.y)
Tolerance:	+/- 0.5 inch
Values:	00.0 to 24.0 inches

Item 11.10.2.7 LITTER DEPTH (BASE 10.9.9)
[P2DWM_DUFF_LITTER.LITTERDEP]

Record the code indicating the depth of the litter layer to the nearest 0.1 inch.

When collected:	All duff/litter transects in measurable conditions (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) where DUFF/LITTER SAMPLE STATUS = 1
Field width:	3 digits (xx.y)
Tolerance:	+/- 0.5 inch
Values:	00.0 to 99.9 inches

Item 11.10.2.8 DUFF AND LITTER METHOD (BASE 10.9.10)
[P2DWM_DUFF_LITTER.DL_METHODCD]

Record the code indicating whether duff and litter depths were measured or estimated.

When Collected:	All duff/litter transects where DUFF/LITTER SAMPLE STATUS = 1 and duff/litter transect is in a measurable condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2)	
Field width:	1 digit	
Tolerance:	No errors	
Values:	1	Both duff and litter depth were measured
	2	Litter depth was measured, duff depth (≤ 24.0 inches) was estimated
	3	Both duff and litter depth were estimated
	4	Litter depth was measured, duff (peat) depth exceeds 24.0 inches (*DUFF, LITTER, AND FUELBED NOTES* required)

Item 11.10.2.9 DUFF AND LITTER NOTES (PFSL)
[NOTES]

Record any notes needed to clarify or explain a special situation encountered with the DUFF, LITTER, or FUELBED measurements.

When collected:	All plots: as needed
Field width:	2000 characters
Tolerance:	N/A
Values:	Single words and abbreviated sentences

CHAPTER 12 VEGETATION PROFILE

The Phase 2 (P2) Vegetation data are collected to describe vegetation structure and dominant species composition for vascular plants. The data collected provide a horizontal and vertical estimation of vegetation located within the sample area and provide information about the most abundant species found on the subplot. Information on the abundance, structure, and species composition of understory plant communities has many uses. It can be used to assess wildlife habitat, biomass, forage availability, grazing potential, vegetation competition with tree growth, fuel loadings from understory vegetation, and potential site productivity. The most abundant species provide information to describe plant communities and to predict associated forest stand characteristics. Accurately representing the species present on a site and monitoring their change in abundance in response to forest development, disturbance, or management is therefore important to a wide variety of users. This information is also used to augment forest ecosystem health assessments from *Phase 3 (*P3*)* plots, in terms of vegetation structure and rates of change of community vascular plant composition.

SECTION 12.1 VEGETATION SAMPLING DESIGN

The P2 Vegetation Profile includes measurements of vVegetation Structure - canopy cover by layer and total aerial canopy cover of each growth habit - with additional *data* collect*ed* on the most abundant species.

P2 Vegetation is sampled on accessible condition classes within the 24.0-foot radius subplot. *Vegetation data is collected on all accessible forest land and measurable nonforest conditions in California, Oregon, and Washington*. If the area of an accessible condition class is less than 100 percent on a subplot, P2 Vegetation measurements are recorded only on the portion that is in the accessible condition class(es). If multiple accessible condition classes are present on the subplot, separate estimates are made for each accessible condition class on the subplot.The P2 Vegetation Profile is best recorded when all plant species are fully leafed out. However, crews may end up visiting plots early in the season before leaves are fully expanded or late in the season when plants are beginning to senesce. Notes can be added to *Item 12.3.1.4, VEGETATION SUBPLOT NOTES (CORE OPTIONAL 8.4.5)* indicating unusual phenological conditions *(e.g., after leaf fall)*. Crews should *avoid* collect*ing* P2 Vegetation data when snow covers the subplot, Item 12.3.1.2, P2 VEG SUBPLOT SAMPLE STATUS (CORE OPTIONAL 8.4.2).

SECTION 12.2 GENERAL DEFINITIONS

Canopy Cover – Canopy cover is defined as the area of ground surface covered by a vertical projection of the canopy of a vascular plant. The canopy is described by a polygon surrounding the outer edges of the foliage (*Figure 12.1*), without subtracting any normal spaces occurring between the leaves of plants (Daubenmire 1959[1]). Overlapping crowns are not double-counted (visualize the canopy cover collapsed into a 2-dimensional space); the maximum possible canopy cover is the percentage of the subplot area within the accessible condition.

All canopy cover estimates are focused on foliage within the sampled accessible condition class(es) within the subplot perimeter (24.0-foot radius, horizontal distance). Canopy cover is estimated for each sampled accessible condition of the subplot. If multiple sampled accessible conditions occur on a subplot, treat the condition boundary as a vertical wall on the plot: plant foliage is included in the condition it is hanging over, even if the plant is rooted in a different condition. However, the canopy cover value is always estimated as a percentage of an entire subplot. That is, if the canopy cover within the accessible condition is about equal to a circle with a radius of 5.3 feet, the canopy cover estimate will always be 5 percent, even if only 30 percent of the subplot is in the accessible condition on which the canopy cover is being measured.

Canopy cover is collected by height layer and as a total (aerial view) across all layers for each growth habit in *Section 12.5* Vegetation Structure. For each layer, examine the canopy cover of each Structure Growth Habit as if the other growth habits and other layers do not exist. If a Structure Growth Habit does not have foliage in a layer, enter 0 (do not count tree boles as cover). For total aerial canopy cover by Structure Growth Habit, examine each growth habit individually as if the other growth habits do not exist. Total aerial canopy cover is collected for each most abundant species in *Section 12.4* Species Composition; examine each species individually, as if the other species do not exist.

1. Daubenmire. R. 1959. A canopy-coverage method of vegetational analysis. Northwest Science 33(1): 43-64.

Canopy cover is estimated to the nearest 1 percent. For Vegetation Structure assessments, canopy cover >0 and <=1 percent is coded as 1 percent (i.e. trace amounts are coded as 1%). For Species Composition assessments, a species must have at least 3 percent total aerial canopy cover (i.e. do not round total aerial canopy cover <3% up to 3%).

Canopy cover is vertically projected from the outline of the foliage at the time of plot visit. All foliage that is or was alive during the current growing season is included in the cover estimates. Canopy cover from broken tops and stems is included, unless completely detached. Do not ocularly upright leaning trees.

See tabulation below for canopy cover to area relationships for a 1/24 acre subplot and *Figure 12.3: Example of growth habit by layer and species composition* and Figure 12.4 for additional visual calibrations.

Cover	Area (ft^2)	Square length on side (ft)	Circle radius (ft)
1%	18	4.3	2.4
3%	54	7.4	4.2
5%	90	9.5	5.4
10%	181	13.4	7.6
15%	271	16.5	9.3
20%	362	19.0	10.7
25%	452	21.3	12.0
50%	905	30.1	17.0

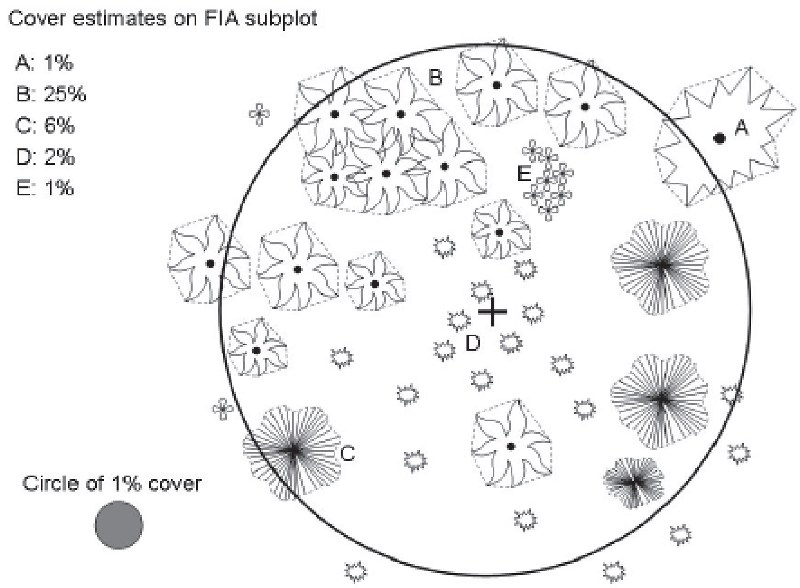


Figure 12.1: Assessing canopy cover.

Growth Habits – P2 Vegetation data are collected by growth habits at each level of detail. In general, growth habits for vascular plants include trees, shrubs/subshrubs/woody vines, forbs, and graminoids.

Layer Codes – Structure Growth Habits are assessed by layers in *Section 12.5* Vegetation Structure, and one of the following layer codes, *see SPECIES VEGETATION LAYER (CORE OPTIONAL 8.6.5), Item 12.4.0.9, pg.237,* will be assigned to individual plant species' SPECIES GROWTH HABITs in *Section 12.4* Species Composition. Measure the layer height from ground level; see Figure 12.2 for examples of measuring layer heights on sloping and uneven ground.

Layer 1	0 to 2.0 feet
Layer 2	2.1 to 6.0 feet
Layer 3	6.1 to 16.0 feet
Layer 4	Greater than 16 feet

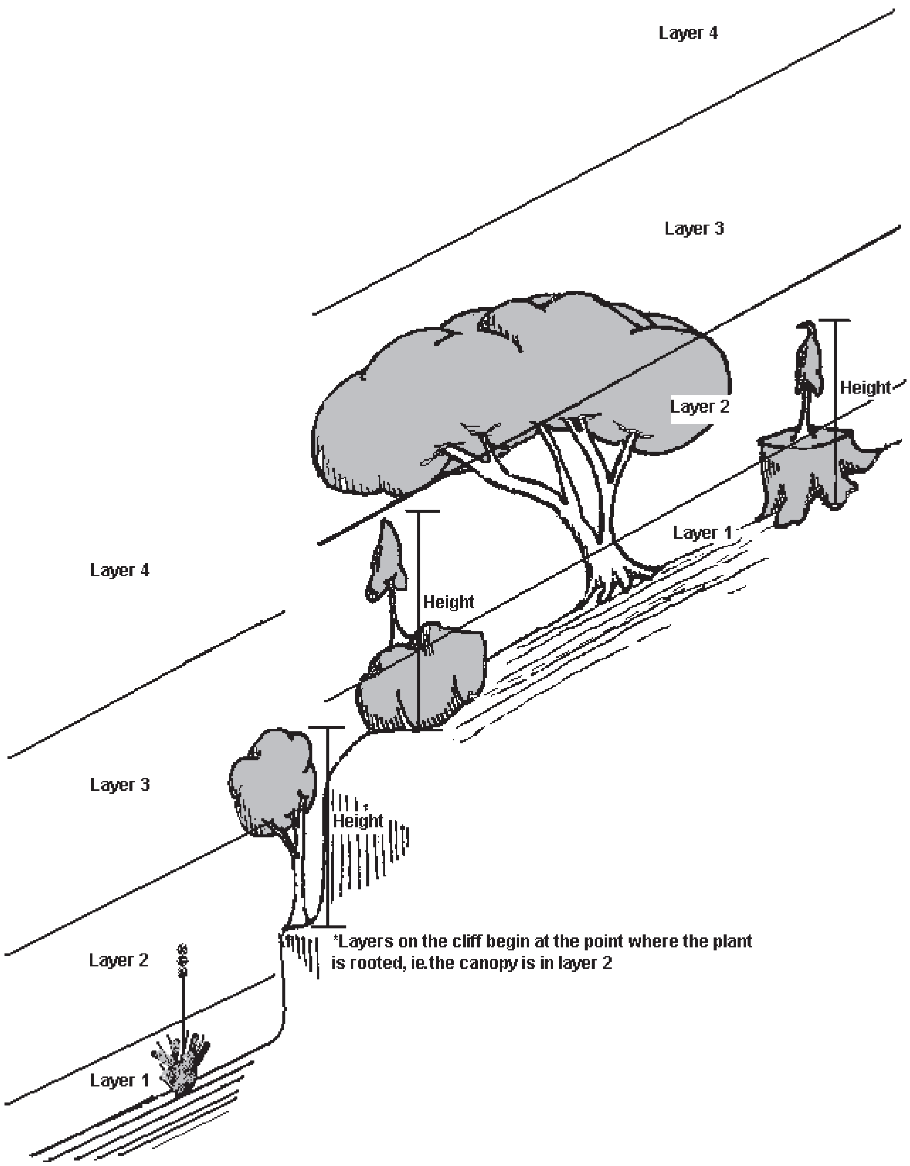


Figure 12.2: To determine the layer of a plant, measure the height of the layer from the ground.

NRCS PLANTS database – The Natural Resource Conservation Service (NRCS) PLANTS Database provides standardized information about the vascular plants, mosses, liverworts, hornworts, and lichens of the U.S. and its territories. It includes names, plant symbols, checklists, distributional data, species abstracts, characteristics (including growth habits), images, crop information, automated tools, onward Web links, and references:

USDA, NRCS. 2010. The PLANTS Database (http://plants.usda.gov, 1 January 2010). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

FIA currently uses a stable code set downloaded in January of 2010.

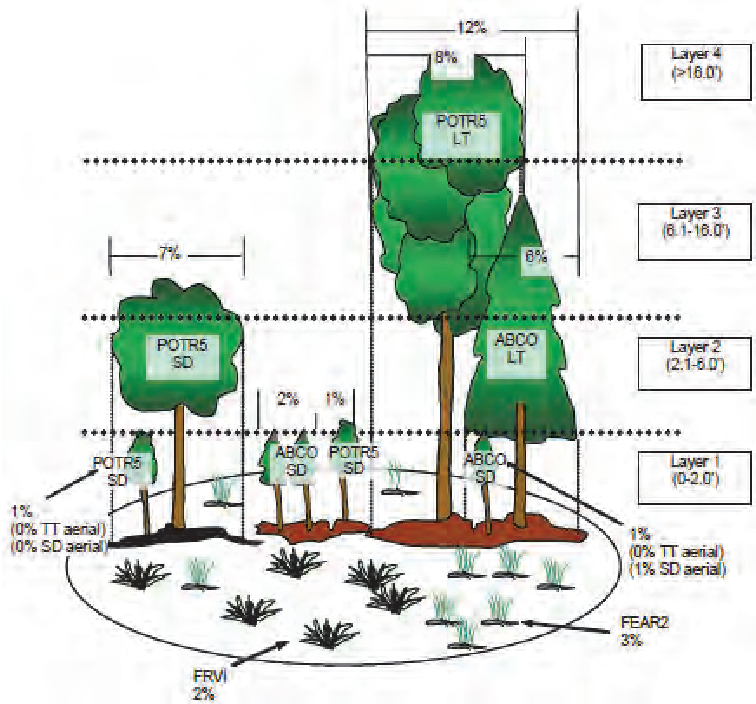


Figure 12.3: Example of growth habit by layer and species composition

Table 12.1:Estimation of canopy cover by layer and aerial view of each Structure Growth Habit in *Figure 12.3*

Vegetation Structure Growth Habit	Layer 1 (0-2.0 ft)	Layer 2 (2.1- 6.0 ft)	Layer 3 (6.1-16.0 ft)	Layer 4 (>16.1 ft)	Aerial
	Percent canopy cover				
Tally tree sp (TT)	005	013	019	008	022
Non-tally tree sp (NT)	000	000	000	000	000
Shrub/Subshrub/Woody Vine (SH)	000	000	000	000	000
Forb (FB)	002	000	000	000	002
Graminoid (GR)	003	000	000	000	003

Table 12.2:Estimation of total aerial canopy cover by species in *Figure 12.3*

Level of Detail	Species Growth Habit	Species Code	Cover	Layer
2	GR	FEAR2	003	1
2	SD	ABCO	003	1
2	SD	POTR5	008	3
3	LT	POTR5	008	4
3	LT	ABCO	006	3

Note: FRVI, estimated at 2 *percent*, was not recorded, and ABCO and POTR5 are present as two different SPECIES GROWTH HABITs (seedling/sapling and large tree) with at least 3 *percent* total aerial cover within the SPECIES GROWTH HABIT on the subplot.

SECTION 12.3 VEGETATION DATA COLLECTION LOCATION

SUBSECTION 12.3.1 SUBPLOT - LEVEL DATA ITEMS

Item 12.3.1.1 SUBPLOT NUMBER (CORE OPTIONAL 8.4.1)
[SUBPLOT.SUBP]

Record the code corresponding to the number of the subplot.

When collected:	On all subplots where P2 vegetation is being sampled (P2 VEGETATION SAMPLING STATUS = 1 or 2)	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Definition
	1	Center subplot
	2	North subplot
	3	Southeast subplot
	4	Southwest subplot

Item 12.3.1.2 P2 VEG SUBPLOT SAMPLE STATUS (CORE OPTIONAL 8.4.2)
[SUBPLOT.P2VEG_SUBP_STATUS_CD]

Record the code to indicate if the subplot was sampled for P2 vegetation. A subplot may be sampled for P2 Vegetation but not have any vascular plants present. If there is any part of an accessible portion of the subplot where other plot measurements are made but **all** the P2 Vegetation measurements cannot be completed on the subplot (for example, deep snow or water), enter code 2 and do not record **any** P2 Vegetation measurements.

When collected:	On all subplots where P2 vegetation is being sampled on accessible forest land (P2 VEGETATION SAMPLING STATUS = 1) and at least one accessible forest land condition (CONDITION CLASS STATUS = 1) exists within the 24-foot radius subplot, or P2 Vegetation is being sampled on all accessible land conditions (P2 VEGETATION SAMPLING STATUS=2) and at least one accessible forest condition or measurable nonforest condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) exists within the 24-foot radius subplot.	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Definition
	1	Subplot sampled for P2 Vegetation
	2	Subplot not sampled for P2 Vegetation

Item 12.3.1.3 VEGETATION NONSAMPLED REASON (CORE OPTIONAL 8.4.3)
[SUBPLOT.P2VEG_SUBP_NONSAMPLE_REASN_CD]

Record the reason why P2 vegetation on a subplot cannot be sampled.

When collected:	On all subplots where P2 VEG SUBPLOT SAMPLE STATUS = 2	
Field width:	2 digits	
Tolerance:	No errors	
Values:	Code	Defintion
	05	Lost data (for office use only)
	10	Other (for example, snow or water covering vegetation that is supposed to be sampled). *Record an explanation in SUBPLOT NOTES.*

Item 12.3.1.4 VEGETATION SUBPLOT NOTES (CORE OPTIONAL 8.4.5)
[P2VEG_SUBP_STRUCTURE.NOTES]

Use this field to record notes pertaining to the subplot, and any unusual conditions encountered.

When plant specimens are collected, use this field to record a community type description for each subplot sampled for P2 Vegetation. The community description is intended to fully automate the specimen collection process by providing a description of the community in which this plant was found. Some examples of community descriptions are as follows:

- 25 year aspen boundary of mature trees. very little slope. a lot of light entry
- *Acer saccharum* floodplain forest. hummock-hollow microtopography.
- mature mesic hemlock-hardwood forest adjacent to pond

The community type description field is a note that is accessible via Ctrl+E from the P2 Subplot screen for P2VEG.

When collected:	VEGETATION NONSAMPLED REASON = 10 or as needed
Field width:	2000 alphanumeric characters
Tolerance:	N/A
Values:	English language words, phrases, and numbers

SECTION 12.4 SPECIES COMPOSITION

Identify the (up to) four most abundant species within each SPECIES GROWTH HABIT (tree seedlings and saplings, shrubs/subshrubs/woody vines, forbs, graminoids, and large trees) that occupy 3 percent or greater total aerial canopy cover on the subplot and within the SPECIES GROWTH HABIT (do not round total aerial canopy cover <3% up to 3%.). Although up to four species per SPECIES GROWTH HABIT can be recorded, crews should not spend more than 5 minutes searching for additional species when less than four species are not readily observable. The methods described assume that only one field crew member per plot is entering P2 Vegetation Profile data.

When there are multiple accessible conditions within a subplot, the species must be present at 3 percent or more total aerial canopy cover on the full 24-foot radius subplot and within the SPECIES GROWTH HABIT in order to be recorded. If part of the subplot is a non-sampled condition (e.g., nonforest condition, not sampled for P2 Vegetation because *4.2.1.14* P2 VEGETATION SAMPLING STATUS = 1; or inaccessible condition, not sampled because *5.7.0.4* CONDITION CLASS STATUS = 5), estimate total aerial canopy cover for the full subplot if possible; otherwise assume the species canopy cover is the same on the non-sampled portion. If a species is present at 3 percent total aerial canopy cover or more on the full subplot and within the SPECIES GROWTH HABIT, record SPECIES GROWTH HABIT, SPECIES CANOPY COVER, and SPECIES VEGETATION LAYER separately for each accessible condition. SPECIES

CANOPY COVER values less than 3 percent for a condition are valid as long as the total aerial canopy cover of the species on the full subplot and within the SPECIES GROWTH HABIT is at least 3 percent. See *Figure 12.4* for an example of species total aerial canopy cover estimation. See *Figure 12.5* for a Species Composition subplot flow.

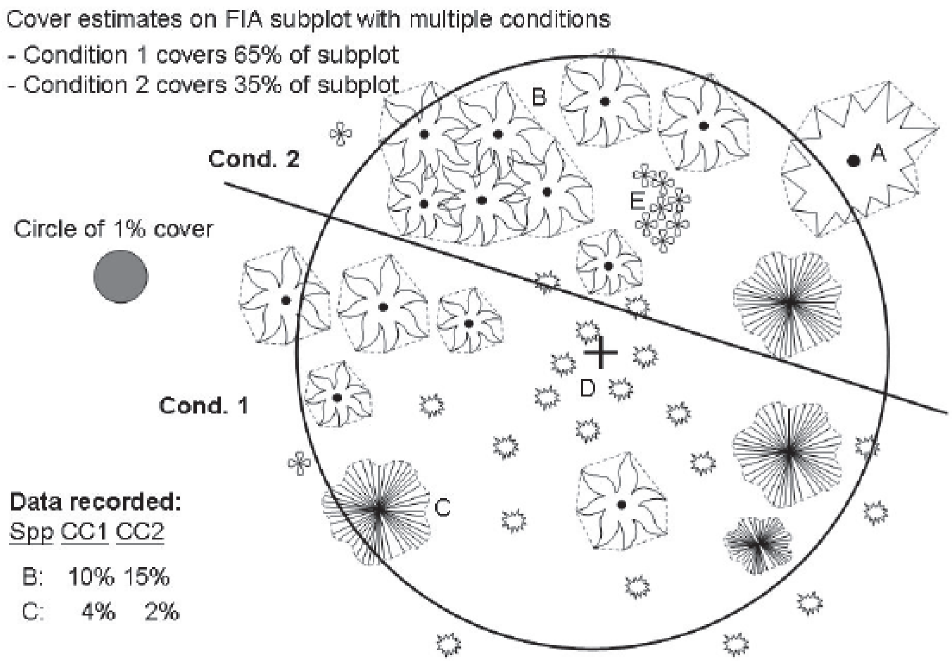


Figure 12.4: Example of species total aerial canopy cover estimation on a subplot with 2 accessible conditions. See Figure 12.1 for total aerial canopy cover across the subplot. In Figure 12.1, species A, D, and E would be included in estimates of Vegetation Structure by Structure Growth Habit, but not recorded for Species Composition. Note that species with subplot total aerial canopy cover <3% are not recorded, but that SPECIES CANOPY COVER recorded on an accessible condition can be less than 3%.

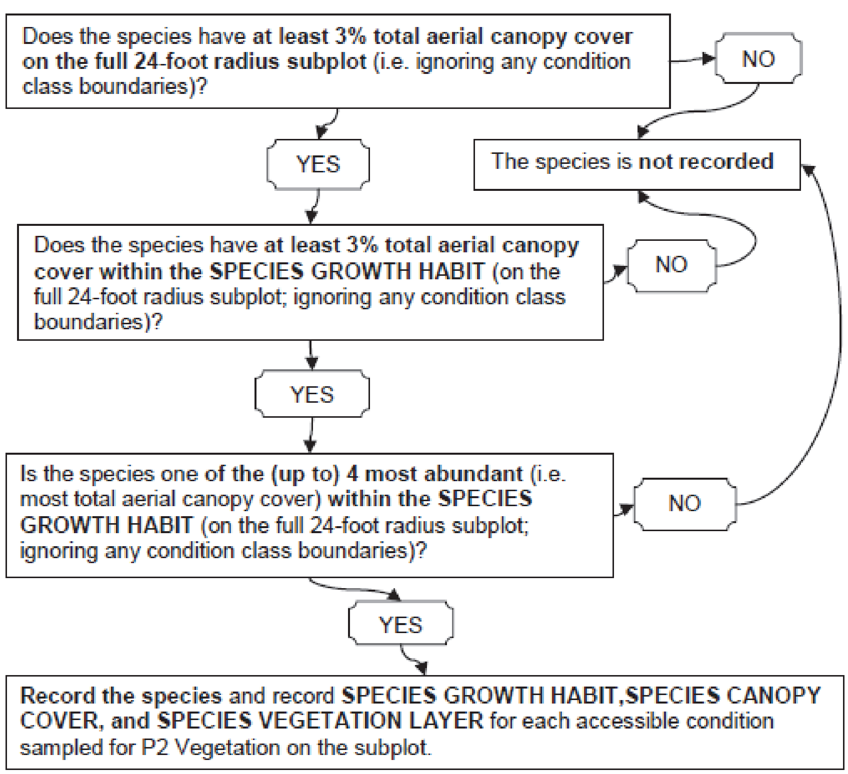


Figure 12.5: Species Composition subplot flow chart.

Item 12.4.0.1 SPECIES CODE (CORE OPTIONAL 8.6.2)
[P2VEG_PLOT_SPECIES.VEG_FLDSPCD]

Record a code for each most abundant *(see Section 12.4, Species Composition)* vascular plant species *(i.e. one of the four most abundant species within each growth habit group (tree seedlings and saplings, shrubs/woody vines, forbs, graminoids, and overstory trees) that occupy 3 percent or greater canopy cover on the subplot)*. Species codes must be the standardized codes in the Natural Resource Conservation Service (NRCS) PLANTS database (currently January 2010 version). Identification to species only is expected. However, if subspecies information is known, enter the appropriate NRCS code. For graminoids, genus and unknown codes are acceptable, but do not lump species of the same genus or unknown code. For example, if several unknown CAREX species are present, only record the individual most abundant species.

If a plant cannot be identified quickly and confidently, assign a NRCS PLANTS genus or unknown code *(listed below)* appropriate to the species. Collect a specimen away from the subplot unless the species is locally sparse or another SPECIMEN NOT COLLECTED REASON CODE (12.4.0.6) applies. A species is "locally sparse" if 5 or fewer plants are present in the entire plot (4 subplots) and immediate surrounding area. A species may be sparse and still meet the criteria for inclusion in species composition, but this will be rare.

Acceptable unknown codes

Code	Common Name
2FERN	Fern or Fern Ally
2FORB	Forb (herbaceous, not grass nor grasslike)
2FD	Forb, dicot
2FM	Forb, monocot
2GRAM	Graminoid (grass or grasslike)
2GA	Grass, annual
2GP	Grass, perennial
2GL	Grass-like, (sedges and rushes)
2PLANT	Plant
2SHRUB	Shrub (>0.5m)
2SUBS	Subshrub (<0.5m)
2TREE	Tree
2VH	Vine, herbaceous
2VW	Vine, woody

When collected:	species total aerial canopy cover on the full subplot and within a SPECIES GROWTH HABIT is 3 *percent* or greater.
Field width:	8 alpha-numeric characters
Tolerance:	No errors
Values:	Accepted NRCS species code when the species is known, or an accepted NRCS genus or unknown code when the species is not known

Item 12.4.0.2 UNIQUE SPECIES NUMBER (CORE OPTIONAL 8.6.3)
[P2VEG_PLOT_SPECIES.UNIQUE_SP_NBR]

When any *SPECIES CODE* is entered for the first time on a plot, it is assigned UNIQUE SPECIES NUMBER = 1. If more than one unidentified species is discovered that is described by the same genus or *acceptable* unknown code *(see SPECIES CODE above)*, the next sequential number is assigned. If a recorded unidentified species is encountered again elsewhere on the plot, the field crew records the species with the same genus or unknown code with the same unique species number.

When collected:	All species recorded
Field width:	2 digits
Tolerance:	No errors
Values:	1-99, assigned in sequential numbers

Item 12.4.0.3 SPECIES CODE TYPE (PNW)
[P2VEG_PLOT_SPECIES.SPCD_TYPE]

When any SPECIES CODE is entered, it is automatically assigned a SPECIES CODE TYPE determined by its classification into one of the three SPECIES CODE TYPEs; G = Genus, S= Species, U = Unknown.

When collected:	All SPECIES CODEs	
Field width:	1 alpha character	
Tolerance:	N/A	
Values:	Code	Definition
	G	Genus
	S	Species
	U	Unknown

Item 12.4.0.4 SPECIES CODE STATUS (PNW)
[P2VEG_PLOT_SPECIES.SPCD_STATUS]

When any SPECIES CODE is entered which is not expected in the applicable state, SPECIES CODE STATUS is automatically assigned; SPECIES CODE STATUS = #.

When collected:	All SPECIES CODEs not expected in the applicable state
Field width:	1 alpha character
Tolerance:	N/A
Values:	#

Item 12.4.0.5 SPECIMEN OFFICIALLY COLLECTED (CORE OPTIONAL 8.6.6)
[P2VEG_PLOT_SPECIES.SPECIMEN_COLLECTED]

Record a code to indicate whether or not a specimen was collected or not for each species, genus or unknown code entered as a new unique species. Crews in California, Oregon, and Washington are not required to collect official specimens to be sent to herbaria, but are encouraged to collect samples of common species they can't identify and informally seek assistance from other crew members, agency personnel, or local botanists if possible.

When collected:	All species recorded	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	0	No, a specimen was not collected
	1	Yes, a specimen was collected

Item 12.4.0.6 P2 SPECIMEN NOT COLLECTED REASON CODE (CORE OPTIONAL 8.6.8)
[P2VEG_PLOT_SPECIES.SPECIMEN_NOT_COLLECTED_REASON]

Record the code that describes why a specimen has not been collected.

When collected:	An unknown code or genus code is entered and SPECIMEN OFFICIALLY COLLECTED = 0	
Field width:	2 digits	
Tolerance:	No errors	
Values:	Code	Description
	01	Species is locally sparse (fewer than 5 individual plants in area of the plot)
	02	Species has no mature foliage or reproductive parts present, so is unlikely to be identifiable if collected.
	03	Hazardous situation
	04	Time limitation
	05	Wilderness or reserved land where plant collections are not allowed
	06	Specimen collected for immediate/local identification
	07	Not required by inventory unit
	10	Other (explain in notes)

Item 12.4.0.7 SPECIMEN LABEL NUMBER (CORE OPTIONAL 8.6.7)
[P2VEG_PLOT_SPECIES.SPECIMEN_LABEL_NBR]

Record the label number for the collected specimen. Pre-numbered labels are provided to each crew by the regional coordinator or auto-generated with the data collection software.

When collected:	SPECIMEN OFFICIALLY COLLECTED = 1
Field width:	5 digits
Tolerance:	No errors
Values:	1 to 99999, as pre-printed and assigned by region or auto-generated in the PDR

Item 12.4.0.8 SPECIES GROWTH HABIT (CORE OPTIONAL 8.6.1)
[P2VEG_SUBPLOT_SPP.GROWTH_HABIT_CD]

Record the growth habit of the species. Because many species can exhibit more than one growth habit, it is important to note which growth habit each recorded species is demonstrating on each accessible condition in a subplot (subplot-condition).

Tally tree species (all core tree species and any core optional tree species selected by a particular FIA unit) are always recorded as seedling/sapling (SD) and/or large tree (LT) SPECIES GROWTH HABITs, even when they exhibit a shrub-like growth habit in some environments.

Non-tally tree species (tree species not on a particular FIA unit's tree tally list that are woody plants with a single well-defined dominant stem, not supported by other vegetation or structures [not vines], and which are, or are expected to become, greater than 13 feet in height) are recorded as seedling/sapling (SD) and/or large tree (LT) SPECEIS GROWTH HABITs when they exhibit a tree-like growth habit; and are recorded as shrub (SH) SPECIES GROWTH HABIT when they exhibit a shrub-like growth habit.

A species may be recorded with a different SPECIES GROWTH HABIT on a different subplot-condition on the same subplot. If a species has more than one growth habit on an accessible condition in a subplot, record the one SPECIES GROWTH HABIT that is most prevalent within the subplot-condition (except for tally and non-tally tree species when LEVEL OF DETAIL 3).

For tally and non-tally tree species, both tree SPECIES GROWTH HABITs (SD and LT) are coded for the same species within the subplot-condition if the species has a total aerial canopy cover of at least 3% in each SPECIES GROWTH HABIT and it is one of the four most abundant and greater than 3 percent cover.

When collected:	for each species recorded	
Field width:	2 alphanumeric characters	
Tolerance:	No errors	
Values:	Code	Description
	SD	Seedlings and Saplings: Small trees less than 5 inches DBH or DRC, including tally and non-tally tree species. Seedlings of any length are included (i.e., no minimum.) Up to four species are recorded if individual species total aerial canopy cover is at least 3 *percent* on the subplot and within the SPECIES GROWTH HABIT.
	SH	Shrubs/Subshrubs/ Woody Vines: Woody, multiple-stemmed plants of any size, subshrubs (low-growing shrubs under 1.5 feet tall at maturity, and vines. Most cacti are included in this category. Subshrub species are usually included in this category. However, there are many species that can exhibit either subshrub or forb/herb growth habits. Each FIA region will develop a list of common species that can exhibit either growth habits (according to the NRCS PLANTS database) with regional guidance as to which growth habit the species should normally be assigned, while still allowing species assignments to different growth habits when the species is obviously present in a different growth habit. Up to four species are recorded if individual species total aerial canopy cover is at least 3 *percent* on the subplot and within the SPECIES GROWTH HABIT.
	FB	Forbs / Herbaceous, broad-leaved plants; includes non-woody-vines, ferns*, and fern allies* (does not include mosses and cryptobiotic crusts). Up to four species are recorded if individual species total aerial canopy cover is at least 3 *percent* on the subplot and within the SPECIES GROWTH HABIT.

	GR	Graminoids: Grasses and grass-like plants (includes rushes and sedges). Up to four species are recorded if individual species total aerial canopy cover is at least 3 *percent* on the subplot and within the SPECIES GROWTH HABIT.
	LT	Large Trees: Large trees greater than or equal to 5 inches DBH or DRC , including tally and non-tally tree species. Up to four species of large trees (DBH or DRC at least 5 inches) are recorded if individual species aerial canopy cover is at least 3 *percent* on the subplot and within the SPECIES GROWTH HABIT .

Item 12.4.0.9 SPECIES VEGETATION LAYER (CORE OPTIONAL 8.6.5)
[P2VEG_SUBPLOT_SPP.LAYER]

For each individual species recorded, assign one of the vegetation layers. These layers illustrate the vertical diversity of the most abundant species found on the subplot.

Assign each plant species record to only one of the vegetation layers per SPECIES GROWTH HABIT per subplot-condition. If a plant species is found in more than one layer, assign the species to the layer where most of the canopy cover occurs. If a species occupies multiple layers equally, assign the highest of the equally occupied layers. If a plant has a seed head that grows much taller than the rest of the plant, record the layer that the main part of the plant is in, not the top of the seed head.

When collected:	For each species recorded.	
Field width:	1 digits	
Tolerance:	No errors	
Values:	Code	Description
	1	0 to 2.0 feet
	2	2.1 to 6.0 feet
	3	6.1 to 16.0 feet
	4	Greater than 16 feet

Item 12.4.0.10 SPECIES CANOPY COVER (CORE OPTIONAL 8.6.4)
[P2VEG_SUBPLOT_SPP.COVER_PCT]

For each species recorded, estimate and record the total aerial canopy cover present on the subplot-condition to the nearest 1 percent. Examine each species individually as if the other species do not exist. When recording SPECIES CANOPY COVER for seedlings and saplings (SPECIES GROWTH HABIT = SD), do not include any canopy from trees greater than or equal to 5 inches DBH (DRC for woodland species), regardless of how close to the ground the canopy cover extends. *A* separate estimate is made for the SPECIES CANOPY COVER of trees greater than or equal to 5 inches DBH/DRC.

When collected:	*All species recorded*
Field width:	3 digits
Tolerance:	*+/- 1 class based on the following canopy cover classes* 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%
Values:	001-100

Item 12.4.0.11 VEGETATION SPECIES NOTES (CORE OPTIONAL 8.6.9)
[P2VEG_PLOT_SPECIES.NOTES]

Notes may be entered for any species encountered, but are required for each new species that is not identified. Enter text that describes the species. This text may be used in the specimen label and unknown report.

When collected:	As needed
Field width:	Unlimited alphanumeric character field
Tolerance:	N/A
Values:	English language words, phrases, and numbers

SECTION 12.5 VEGETATION STRUCTURE

In this section, use ocular methods to estimate canopy cover by layer and aerial view coverage for each Structure Growth Habit, and record to the nearest percent (canopy cover >0 and <1% is coded as 1%; i.e., trace amounts are coded as 1%).

Canopy cover by layer:

Estimate the canopy cover in each Structure Growth Habit for each of the four layers. Include Structure Growth Habits with foliage present on the accessible condition and with foliage overhanging the accessible condition. For each layer canopy cover, examine the canopy cover of each Structure Growth Habit as if the other growth habits and other layers do not exist. Do not double count overlapping crowns within a Structure Growth Habit; visualize the canopy cover within the layer collapsed into a 2-dimensional space. If a Structure Growth Habit does not have foliage in a layer, enter 0 (do not count tree boles as cover).

Aerial View Coverage:

Determine the total aerial canopy cover by Structure Growth Habit. Examine each Structure Growth Habit individually as if the other growth habits do not exist. Do not double-count overlapping crowns within a Structure Growth Habit (maximum cover = the percentage of the subplot area in the accessible condition).

The total aerial canopy cover for a Structure Growth Habit must be equal to or greater than the highest canopy cover recorded for an individual layer in that growth habit, but cannot be greater than the sum of the canopy covers recorded for all the layers in that growth habit.

Vegetation Structure Growth Habits:

Apply the definitions that follow based on the species and appearance of the plants **on the subplot-condition** (i.e. do not put the same species in multiple Structure Growth Habits on the same subplot-condition). If a tree species has been selected as a tally tree species by the particular FIA unit, always record that species in the tally tree species growth habit (TT), even if it grows as a shrub in some environments. Woody plants **not** on the unit's tally tree species list may have a tree growth habit in some environments, and these should be recorded as non-tally tree species (NT). If the growth habit is shrub in another environment, record that species as a shrub (SH). The definitions (adapted from NRCS PLANTS) are:

TT	**Tally Tree Species (TT):** All core tree species **and** any core-optional tree species selected by a particular FIA unit. Any plant of that species is included, regardless of its shape and regardless of whether it was tallied on the subplot or microplot during tree tally. Seedlings (any length, no minimum), saplings, and mature plants are included.
NT	**Non-tally Tree Species (NT):** Tree species not on a particular FIA unit's tree tally list that are woody plants with a single well-defined, dominant main stem, not supported by other vegetation or structures (not vines), and which are, or are expected to become, greater than 13 feet in height. Seedlings (any length, no minimum), saplings, and mature plants are included.
SH	**Shrubs/Subshrubs/Woody Vines (SH):** Woody, multiple-stemmed plants of any size, subshrubs (low-growing shrubs under 1.5 feet tall at maturity, and woody vines. Most cacti are included in this category.
FB	**Forbs (FB):** Herbaceous, broad-leaved plants; includes non-woody-vines, ferns*, and fern allies* (does not include mosses and cryptobiotic crusts).
GR	**Graminoids (GR):** Grasses and grass-like plants (includes rushes and sedges).

Item 12.5.0.1 CONDITION CLASS NUMBER (CORE OPTIONAL 8.4.4)
[P2VEG_SUBP_STRUCTURE.CONDID]

Record the number for the sampled accessible condition class in which the vegetation is found. If multiple accessible sampled conditions occur on the same subplot, data will be collected for each accessible condition separately.

When collected:	Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS =1)
Field width:	1 digit
Tolerance:	No errors

Values:	1 to 9

Item 12.5.0.2 TALLY TREE SPECIES COVER LAYER 1 (CORE OPTIONAL 8.5.1)
[P2VEG_SUBP_STRUCTURE.TREE_COVER_PCT_LAYER1]

Record canopy cover for all tally tree species in layer 1 (0-2.0 feet) to the nearest percent. Canopy cover includes all tally tree species present, regardless of DBH or DRC.

When Collected:	Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)
Field Width:	3 digits
Tolerance:	+/- 1 class based on the following canopy cover classes 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%
Values:	000-100

Item 12.5.0.3 TALLY TREE SPECIES COVER LAYER 2 (CORE OPTIONAL 8.5.2)
[P2VEG_SUBP_STRUCTURE.TREE_COVER_PCT_LAYER2]

Record canopy cover for all tally tree species in layer 2 (2.1- 6.0 feet) to the nearest percent. Canopy cover includes all tally tree species present, regardless of DBH or DRC. Follow the same procedures as for TALLY TREE SPECIES COVER LAYER 1.

Item 12.5.0.4 TALLY TREE SPECIES COVER LAYER 3 (CORE OPTIONAL 8.5.3)
[P2VEG_SUBP_STRUCTURE.TREE_COVER_PCT_LAYER3]

Record canopy cover for all tally tree species in layer 3 (6.1- 16.0 feet) to the nearest percent. Canopy cover includes all tally tree species present, regardless of DBH or DRC. Follow the same procedures as for TALLY TREE SPECIES COVER LAYER 1.

Item 12.5.0.5 TALLY TREE SPECIES COVER LAYER 4 (CORE OPTIONAL 8.5.4)
[P2VEG_SUBP_STRUCTURE.TREE_COVER_PCT_LAYER4]

Record canopy cover for all tally tree species in layer 4 (16.1 feet and above) to the nearest percent. Canopy cover includes all tally tree species present, regardless of DBH or DRC. Follow the same procedures as for TALLY TREE SPECIES COVER LAYER 1.

Item 12.5.0.6 TALLY TREE SPECIES COVER – AERIAL VIEW (CORE OPTIONAL 8.5.5)
[P2VEG_SUBP_STRUCTURE.TREE_COVER_PCT_AERIAL]

Record the total aerial canopy cover for all tally tree species over all layers. Canopy cover includes all tally tree species present, regardless of DBH or DRC. Follow the same procedures as for TALLY TREE SPECIES COVER LAYER 1, but include all layers.

Item 12.5.0.7 NON-TALLY TREE SPECIES COVER LAYER 1 (CORE OPTIONAL 8.5.6)
[P2VEG_SUBP_STRUCTURE.NONTALLYTREE_COVER_PCT_LAYER1]

Record canopy cover for species **not** on the tally tree species list with tree growth habit in layer 1 (0-2.0 feet) to the nearest percent. Cover includes all non-tally tree species present, regardless of DBH or DRC.

When Collected:	Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)
Field Width:	3 digits
Tolerance:	*+/- 1 class based on the following canopy cover classes* 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%
Values:	000-100

Item 12.5.0.8 NON-TALLY TREE SPECIES COVER LAYER 2 (CORE OPTIONAL 8.5.7)
[P2VEG_SUBP_STRUCTURE.NONTALLYTREE_COVER_PCT_LAYER2]

Record canopy cover for species **not** on the tally tree species list with tree growth form in layer 2 (2.1- 6.0 feet) to the nearest percent. Canopy cover includes all non-tally tree species present, regardless of DBH or DRC. Follow the same procedures as for NON-TALLY TREE SPECIES COVER LAYER 1.

Item 12.5.0.9 NON-TALLY TREE SPECIES COVER LAYER 3 (CORE OPTIONAL 8.5.8)
[P2VEG_SUBP_STRUCTURE.NONTALLYTREE_COVER_PCT_LAYER3]

Record canopy cover for species **not** on the tally tree species list with tree growth form in layer 3 (6.1- 16.0 feet) to the nearest percent. Canopy cover includes all non-tally tree species present, regardless of DBH or DRC. Follow the same procedures as for NON-TALLY TREE SPECIES COVER LAYER 1.

Item 12.5.0.10 NON-TALLY TREE SPECIES COVER LAYER 4 (CORE OPTIONAL 8.5.9)
[P2VEG_SUBP_STRUCTURE.NONTALLYTREE_COVER_PCT_LAYER4]

Record a total aerial canopy cover for species **not** on the tally tree species list with tree growth habit in layer 4 (16.1 feet and above) to the nearest percent. Canopy cover includes all non-tally tree species present, regardless of DBH or DRC. Follow the same procedures as for NON-TALLY TREE SPECIES COVER LAYER 1.

Item 12.5.0.11 NON-TALLY TREE SPECIES COVER – AERIAL VIEW (CORE OPTIONAL 8.5.2)
[P2VEG_SUBP_STRUCTURE.NONTALLYTREE_COVER_PCT_AERIAL]

Record the total aerial canopy cover for species **not** on the tally tree species list with tree growth habit over all layers. Canopy cover includes all non-tally tree species present, regardless of DBH or DRC. Follow the same procedures as for NON-TALLY TREE SPECIES COVER LAYER 1, but include all layers.

Item 12.5.0.12 SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 1 (CORE OPTIONAL 8.5.11)
[P2VEG_SUBP_STRUCTURE.SHRUB_VINE_COVER_PCT_LAYER1]

Record canopy cover for shrubs/subshrubs/woody vines in layer 1 (0-2.0 feet) to the nearest percent.

When collected:	Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)
Field width:	3 digits
Tolerance:	*+/- 1 class based on the following canopy cover classes* 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%
Values:	000-100

Item 12.5.0.13 SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 2 (CORE OPTIONAL 8.5.12)
[P2VEG_SUBP_STRUCTURE.SHRUB_VINE_COVER_PCT_LAYER2]

Record canopy cover for shrubs/subshrubs/woody vines in layer 2 (2.1-6.0 feet) to the nearest percent. Follow the same procedures as for SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 1.

Item 12.5.0.14 SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 3 (CORE OPTIONAL 8.5.13)
[P2VEG_SUBP_STRUCTURE.SHRUB_VINE_COVER_PCT_LAYER3]

Record canopy cover for shrubs/subshrubs/woody vines in layer 3 (6.1-16.0 feet) to the nearest percent. Follow the same procedures as for SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 1.

Item 12.5.0.15 SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 4 (CORE OPTIONAL 8.5.14)
[P2VEG_SUBP_STRUCTURE.SHRUB_VINE_COVER_PCT_LAYER4]

Record canopy cover for shrubs/subshrubs/woody vines in layer 4 (16.1 feet and above) to the nearest percent. Follow the same procedures as for SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 1.

Item 12.5.0.16 SHRUB, SUBSHRUB, AND WOODY VINE COVER—AERIAL VIEW (CORE OPTIONAL 8.5.15)
[P2VEG_SUBP_STRUCTURE.SHRUB_VINE_COVER_PCT_AERIAL]

Record the total aerial canopy cover for the shrub/subshrub/woody vine growth habit over all layers. Follow the same procedures as for SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 1, but include all layers.

Item 12.5.0.17 FORB COVER LAYER 1 (CORE OPTIONAL 8.5.16)
[P2VEG_SUBP_STRUCTURE.FORB_COVER_PCT_LAYER1]

Record canopy cover for forbs in layer 1 (0-2.0 feet) to the nearest percent.

When collected:	Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)
Field width:	3 digits
Tolerance:	*+/- 1 class based on the following canopy cover classes* 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%
Values:	000-100

Item 12.5.0.18 FORB COVER LAYER 2 (CORE OPTIONAL 8.5.17)
[P2VEG_SUBP_STRUCTURE.FORB_COVER_PCT_LAYER2]

Record canopy cover for forbs in layer 2 (2.1-6.0 feet) to the nearest percent. Follow the same procedures as for FORB COVER LAYER 1.

Item 12.5.0.19 FORB COVER LAYER 3 (CORE OPTIONAL 8.5.18)
[P2VEG_SUBP_STRUCTURE.FORB_COVER_PCT_LAYER3]

Record canopy cover for forbs in layer 3 (6.1-16.0 feet) to the nearest percent. Follow the same procedures as for FORB COVER LAYER 1.

Item 12.5.0.20 FORB COVER LAYER 4 (CORE OPTIONAL 8.5.19)
[P2VEG_SUBP_STRUCTURE.FORB_COVER_PCT_LAYER4]

Record canopy cover for forbs in layer 4 (16.1 feet and above) to the nearest percent. Follow the same procedures as for FORB COVER LAYER 1.

Item 12.5.0.21 FORB COVER—AERIAL VIEW (CORE OPTIONAL 8.5.20)
[P2VEG_SUBP_STRUCTURE.FORB_COVER_PCT_AERIAL]

Record the total aerial canopy cover for the forb growth habit over all layers. Follow the same procedures as for FORB COVER LAYER , but include all layers.

Item 12.5.0.22 GRAMINOID COVER LAYER 1 (CORE OPTIONAL 8.5.21)
[P2VEG_SUBP_STRUCTURE.GRAMINOID_COVER_PCT_LAYER1]

Record canopy cover for graminoids in layer 1 (0-2.0 feet) to the nearest percent.

When collected:	Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)
Field width:	3 digits
Tolerance:	*+/- 1 class based on the following canopy cover classes 1*%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, 96-100%
Values:	000-100

Item 12.5.0.23 GRAMINOID COVER LAYER 2 (CORE OPTIONAL 8.5.22)
[P2VEG_SUBP_STRUCTURE.GRAMINOID_COVER_PCT_LAYER2]

Record canopy cover for graminoids in layer 2 (2.1-6.0 feet) to the nearest percent. Follow the same procedures as for GRAMINOID COVER LAYER 1.

Item 12.5.0.24 GRAMINOID COVER LAYER 3 (CORE OPTIONAL 8.5.23)
[P2VEG_SUBP_STRUCTURE.GRAMINOID_COVER_PCT_LAYER3]

Record canopy cover for graminoids in layer 3 (6.1-16.0 feet) to the nearest percent. Follow the same procedures as for GRAMINOID COVER LAYER 1.

Item 12.5.0.25 GRAMINOID COVER LAYER 4 (CORE OPTIONAL 8.5.24)
[P2VEG_SUBP_STRUCTURE.GRAMINOID_COVER_PCT_LAYER4]

Record canopy cover for graminoids in layer 4 (16.1 feet and above) to the nearest percent. Follow the same procedures as for GRAMINOID COVER LAYER 1.

Item 12.5.0.26 GRAMINOID COVER—AERIAL VIEW (CORE OPTIONAL 8.5.25)
[P2VEG_SUBP_STRUCTURE.GRAMINOID_COVER_PCT_AERIAL]

Record the total aerial canopy cover for the graminoid growth habit over all layers. Follow the same procedures as for GRAMINOID COVER LAYER 1, but include all layers.

CHAPTER 13 INDICATOR SPECIES ON REGION 6 LANDS

Plant associations have been developed for Region 6 Forest Service administered lands which are useful for ecological and management purposes. Plant associations are consistent groups of vascular plant species (i.e., plant communities) that occur in climax forests. Some species are reliable "indicators" for one or more plant associations. Forest Service botanists and ecologists find that having the cover data for these species, in addition to the condition-level plant association code (Item 5.7.2.69, PLANT ASSOCIATION (PFSL)), allows them to assess community conditions in greater depth.

Indicator species are recorded on any sampled accessible subplot on Region 6 Forest Service administered land. Lists of indicator species have been created for groups of National Forests and are found in Appendix A, Plots on Forest Service Lands. Plant identification guides have been developed for the species on these lists and should be available to every crew (guides are cited at the beginning of each list). Standard Phase 2 field crews (i.e., those without specific training and materials) must look for the plants identified specifically as forest "indicators" for no more than 10 minutes on each subplot, coding all species they can in that amount of time, regardless of abundance. The "nonforest", "weed", and "sensitive" plant species can also be recorded if crews recognize them, but are intended for inventory by botanists with specific training.

Item 13.0.0.1 SUBPLOT NUMBER (PNW)
[SUBP]

This is a generated code corresponding to the number of the subplot.

When collected:	All subplots when P2 VEG SUBPLOT SAMPLE STATUS = 1 and ADMINISTRATIVE FOREST CODE = 601-699 for SUBPLOT/MACROPLOT CENTER CONDITION.	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Subplot location
	1	Center subplot
	2	North subplot
	3	Southeast subplot
	4	Southwest subplot

Item 13.0.0.2 SPECIES (PNW)
[VEG_FLDSPCD]

Record the accepted NRCS species code for any species included on the Region 6 Plant Indicator list (Appendix A) for the National Forest being sampled.

When collected:	All accessible subplots where listed species are observed
Field width:	10 alpha-numeric characters
Tolerance:	No errors
Values:	See Appendix A.3 (Region 6 Reference Information for FIA Plots on R6 Forest Service Administered Lands) for species codes

Item 13.0.0.3 SPECIES CANOPY COVER (PNW)
[SUBP_(1,2,3,4)_SP_CANOPY_CVR_TTL_PNWRS]

A rapid canopy cover estimate is made for each listed species across all layer heights. Canopy cover is based on a vertically-projected polygon described by the outline of the foliage, ignoring any normal spaces occurring between the leaves of the plant (Daubenmire 1959). Canopy cover is estimated as a percentage of the entire 24-foot radius subplot. In cases where the subplot is not fully accessible (access denied, hazardous, water, etc.), record the percentage of cover on the accessible portions as if the subplot was entirely accessible. That is, if cover is about equal to a circle with a radius of 5.3 feet, enter 5 percent, as you would for a fully forested subplot, on any partially forested subplot.

If percentage of cover is greater than zero but less than 1 percent, enter 1. For species of moderate cover, it may be easiest to divide the subplots into quarters, estimate canopy cover of each quarter separately, and then add them together. The following area-cover sizes may be useful in developing estimates for an entirely forested subplot:

Table 13.1: Area represented by different cover estimates

Subplot radius = 24 feet			
Subplot area = 1,809 feet^2			
Cover	Area (feet^2)	Length on a side of a square (feet)	Radius of a circular area (feet)
1%	18	4.3	2.4
3%	54	7.4	4.1
5%	90	9.5	5.3
10%	181	13.4	7.6
20%	362	19.0	10.7

When collected:	All species records
Field width:	3 digits
Tolerance:	+/- one class based on the following canopy cover classes: 0-1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, and 96-100%
Values:	001 to 100

CHAPTER 14 INVASIVE PLANTS

The objectives of the Phase 2 (P2) invasive plants protocol are to document abundance and monitor changes in abundance of selected species over time. Combined with other plot data and other datasets, this data can be used to predict the future spread of selected species. Invasive plant species are having tremendous economic and ecological impacts on our nation's forests, and the impacts are increasing over time. Providing accurate, statistically valid estimates of the distribution and abundance of some of the most damaging species will give managers and policy-makers a better understanding of the problem.

Each FIA unit, has developed lists of the most important invasive species to monitor on forested lands. Depending on local needs or forest conditions, there may be different lists of species for individual states or portions of states.

Invasive species are sampled on accessible forest and nonforest land condition classes on Region 5 Forest Service administered lands.

Data will be collected by crew members trained and certified in the *i*nvasive plants protocol methods. These crew members are expected to have field guides that allow for unambiguous identification of the plant species on the list, and training in field identification and cover estimation of those species under different conditions.

Note: Avoid becoming part of the problem! There is a risk that field crews walking into plot locations could pick up seeds along roadsides or other patches of invasive plants and spread them through the forest and on to the plot. Be aware of the vegetation you are traveling through and consider stopping and removing seeds from boots and clothing before entering uninvaded lands, particularly *in* remote areas that are rarely visited.

SECTION 14.1 INVASIVE SPECIES SAMPLE DESIGN

Phase 2 sampling of invasive species is focused on accessible forest condition classes within the 24.0-foot radius subplot. If the total area of all forest *and nonforest* land condition classes is less than 100 *percent of* a subplot, **invasive species measurements are done on *both* the forest *and nonforest* land condition classes**. If multiple forest *and/or nonforest* condition classes are present on the subplot, separate estimates are made for each condition class on the subplot.

Canopy cover is estimated for any listed invasive species present on the measured condition(s) of a subplot, regardless of abundance (i.e., there is no minimum cover threshold for sampling). When crews are not sure about the identification of a plant that might be a listed invasive, they are encouraged to collect specimens for later identification.

SECTION 14.2 SPECIES RECORDS

SUBSECTION 14.2.1 INVASIVE SPECIES DATA ITEMS

Total cover is estimated on measured conditions on each 24.0-foot radius subplot for every species on the invasive plant list found.

Item 14.2.1.1 SUBPLOT NUMBER (CORE OPTIONAL 9.4)
[INVASIVE_SUBPLOT_SPP.SUBP]

A 1-digit code, *generated for each record, that* corresponds to the number of the subplot.

When collected:	On all subplots where INVASIVES PLANT SAMPLING STATUS = 1 or 2	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Subplot location
	1	Center subplot
	2	North subplot
	3	Southeast subplot
	4	Southwest subplot

Item 14.2.1.2 INVASIVE PLANT SUBPLOT SAMPLE STATUS (CORE OPTIONAL 9.5)
[SUBPLOT.INVASIVE_SUBP_STATUS_CD]

Record the code to indicate whether the subplot was sampled for invasive plants. A subplot may be sampled but not have any invasive plants present. If there is any part of an accessible portion of the subplot where other plot measurements are made but invasive plants can't be assessed (e.g., because of snow, water), enter code 3 and do not record any invasive plant measurements.

When collected:	On all subplots where invasive species are being sampled on accessible forest land (INVASIVE PLANT SAMPLING STATUS=1 and at least one accessible forest land condition (CONDITION CLASS STATUS = 1) exists within the 24-foot radius subplot or invasive species are being sampled on all accessible land conditions (INVASIVE PLANT SAMPLING STATUS=2) and at least one accessible forest condition or measurable nonforest condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) exists within the 24-foot radius subplot	
Field width:	1 digit	
Tolerance:	No errors	
Values:	1	Subplot sampled, invasive plants present
	2	Subplot sampled, no invasive plants present
	3	Subplot not sampled for invasive plants

Item 14.2.1.3 INVASIVE PLANT NONSAMPLED REASON (CORE OPTIONAL 9.6)
[INVASIVE_PLOT_SPECIES.SPECIMEN_NOT_COLLECTED_REASON]

Record the reason why a subplot cannot be sampled for invasive plants.

When collected:	On all subplots where INVASIVE PLANT SUBPLOT SAMPLE STATUS = 3	
Field width:	2 digit	
Tolerance:	No errors	
Values:	Code	Location
	5	Lost Data (office use only)
	10	Other (for example, snow or water covering vegetation that is supposed to be sampled, *explanation required in SUBPLOT NOTES*)

Item 14.2.1.4 INVASIVE PLANT DATA NOTES (CORE OPTIONAL 9.7)
[INVASIVE_PLOT_SPECIES.NOTES]

Use this field to record any notes about the condition on the subplot, particularly any unusual conditions encountered.

When collected:	INVASIVE PLANT NONSAMPLED REASON = 10 or as needed
Field width:	Unlimited alphanumeric character field
Tolerance:	N/A
Values:	English language words, phrases, and numbers

Item 14.2.1.5 CONDITION CLASS NUMBER (CORE OPTIONAL 9.8)
[INVASIVE_SUBPLOT_SPP.CONDID]

Record the number for the measured condition class in which the invasive plant(s) is found. If multiple measured conditions occur on the same subplot, data will be collected for each condition separately.

When collected:	Any accessible measured land condition within subplots (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS =2) when invasive plants are being sampled on the subplot(INVASIVE PLANT SUBPLOT SAMPLE STATUS=1or 2
Field width:	1 digit
Tolerance:	No errors
Values:	1-9

Item 14.2.1.6 SPECIES CODE (CORE OPTIONAL 9.9)
[INVASIVE_PLOT_SPECIES.VEG_FLDSPCD]

Record the code for any species listed in your region's invasive plant species list *the table below* (Table 14.1) that is found rooted in or overhanging (and rooted out of) the measured condition within the subplot. *For tree species, there are no minimum (or maximum) height limits as are required for seedling counts. All plants that are or were alive in the current growing season are included.* Species codes must be the standardized codes in the Natural Resource Conservation Service (NRCS) PLANTS database January 2010 version maintained by the FIA IM group (USDA, NRCS. 2010. The PLANTS database [http://plants.usda.gov/plants]. National Plant Data Center, Baton Rouge, LA 70874-4490).

In many of the invasive plant ID guides used by FIA units, some species are grouped together in the ID descriptions, and it may be difficult to distinguish between them with the information provided. In addition, some plants may be hybrids of listed species. Enter the code for the most likely species in the group, or the first one in the group if you are not sure.

The following is a list of Invasive species and the appropriate NRCS code which should be recorded if encountered on plot on Region 5 Forest Service administered lands.

Table 14.1: Invasive Plant Species Coded on R5 Land

CODE	PLANTS Species	R5 species	Common Name
AIAL	*Ailananthus altissima*	*Ailanthus altissima*	Tree of heaven
ALJU	*Albizia julibrissin*	*Albizia julibrissin*	Silk Tassel
CANU4	*Carduus nutans*	*Carduus nutans*	Musk Thistle
CEDI3	*Centaurea diffusa*	*Centauria diffusa*	Diffuse Knapweed
CESO3	*Centaurea solstitialis*	*Centauria solstitialis*	Yellowstar thistle
CESTM	Centaurea stoebe spp. micranthos	*Centauria maculosa*	Spotted Knapweed
CHJU	*Chondrilla juncea*	*Chondrilla juncea*	Rush Skeleton Weed
CIAR4	*Cirsium arvense*	*Cirsium arvense*	Canada Thistle
EUES	*Euphorbia esula*	*Euphorbia esula*	leafy spurge
EUOB4	*Euphorbia oblongata*	*Euphorbia oblongata*	oblong spurge
GEMO2	*Genista monspessulana*	*Genista monspessulana*	French Broom
HYPE	*Hypericum perforatum*	*Hypericum perforatum*	Klamath Weed
MEAZ	*Melia azedarach*	*Melia azedarach*	Chinaberry tree
MEQU	*Melaleuca quinquinervia*	*Melaleuca quinquinervia*	Punk tree
PATO2	*Paulownia tomentosa*	*Paulownia tomentosa*	Princess tree
TACA8	*Taeniatherum caput-medusae*	*Taeniatherum caputmedusa*	medusa head
TRSE6	*Triadica sebifera*	*Triadica sebifera*	Tallow tree
ULPU	*Ulmus pumila*	*Ulmus pumila*	Siberian elm

If a species is suspected of being a listed invasive but cannot be identified quickly and confidently, assign a NRCS PLANTS unknown code. A subset of acceptable unknown codes that can be used is listed below *(Table 14.2)*.

Table 14.2: NRCS Unknown Codes

Unknown Code	Common Name
2FERN	Fern or Fern Ally
2FORB	Forb (herbaceous, not grass nor grasslike)
2GRAM	Graminoid (grass or grasslike)
2PLANT	Plant
2SHRUB	Shrub (>.5m)
2SUBS	Subshrub (<.5m)
2TREE	Tree
2VH	Vine, herbaceous
2VW	Vine, woody

When collected:	Any accessible measured land condition within subplots (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS =2) when invasive plants are being sampled on the subplot (INVASIVE PLANT SUBPLOT SAMPLE STATUS=1 or 2)
Field width:	8 alpha-numeric characters
Tolerance:	No errors
Values:	Accepted NRCS species code from the appropriate list for the unit when the species is known, or a NRCS unknown code when the species is not known.

Item 14.2.1.7 UNIQUE SPECIES NUMBER (CORE OPTIONAL 9.10)
[INVASIVE_PLOT_SPECIES.UNIQUE_SP_NBR]

When any species code is entered for the first time on a plot, the UNIQUE SPECIES NUMBER *automatically* assigned is “1”. If more than one unidentified species is recorded that is described by the same unknown code, the next sequential number is assigned. If a previously-recorded unidentified species is encountered again elsewhere on the plot, the UNIQUE SPECIES NUMBER that corresponds to the earlier encountered specimen must be entered. For example, an unknown thistle and unknown hawkweed would both be given a species code of “2FORB” but would need to be given different UNIQUE SPECIES NUMBERs when measured.

When collected:	All species records
Field width:	2 digits
Tolerance:	No errors
Values:	1-99, assigned in sequential numbers

Item 14.2.1.8 SPECIES CANOPY COVER (CORE OPTIONAL 9.11)
[INVASIVE_SUBPLOT_SPP.COVER_PCT]

A rapid canopy cover estimate, to the nearest percent cover, is made for each species for all foliage across all layer heights. All vegetation and plant parts that are or were alive during the current growing season are included in the cover estimates (e.g. brown Canada thistle in late summer is counted, live buds on Russian olive in late fall are used to estimate crown cover). Canopy cover is based on a vertically-projected polygon described by the outline of the foliage, ignoring any normal spaces occurring between the leaves of plants (Daubenmire 1959), and ignoring overlap among multiple layers of a species. Canopy cover estimates are only made for the area within *each measured* condition—for example, vegetation cover over-hanging a nonforest road condition is not included in the *adjacent forested condition* estimate.

For each species, cover can never exceed 100 *percent*. Cover is estimated for each measured condition on the subplot separately. However, the foliage cover is always estimated as a percent of an entire subplot. For example, on a subplot with two sampled conditions, a species occurs with a cover equal to a circle with a radius of 7.6 feet on the full subplot, or 10 percent cover. On condition class *number* 1 it covers an area equal to a circle of 2.4 feet radius and is recorded as 1 percent cover. The remainder, 9 percent cover, is recorded for condition *number* 2. If the species is only present on condition class *number* 1 with an area equal to a circle of 2.4-feet radius it is recorded as 1 percent. The proportion of the subplot in each condition does not matter.

If cover is greater than 0 but less than 1.5 percent, record as 1 percent cover. For species of moderate cover, it may be easiest to divide the subplots into quarters, estimate canopy cover of each quarter separately, and then add them together. The following area-cover sizes may be useful in developing estimates for an entirely forested subplot:

Subplot radius = 24.0 feet, Subplot area = 1809 ft^2			
Cover	Area (ft^2)	Length of a side of a square(ft)	Radius of circular area(ft)
1%	18	4.3	2.4
3%	54	7.4	4.1
5%	90	9.5	5.3
10%	181	13.4	7.6
20%	362	19	10.7

When collected:	All species records
Field width:	3 digits
Tolerance:	+/- one class based on the following canopy cover classes: 1%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95%, and 96-100%
Values:	001 to 100

Item 14.2.1.9 INVASIVE PLANT NOTES (CORE OPTIONAL 9.15)
[INVASIVE_PLOT_SPECIES.NOTES]

Notes are **required** for each record with an unknown code. Enter text that describes the species.

When collected	Required for each record with an unknown code and SPECIMEN LABEL NUMBER.
Field width	Unlimited alphanumeric character field
Tolerance	N/A
Values	English language words, phrases, and numbers

CHAPTER 15 GROUND COVER ON FOREST SERVICE LANDS

Information on the abundance of different ground cover types provides information on the hydrologic function of a site and its potential to erode. Because estimates of bare ground and rock cover need to be relatively precise, estimates are done on the fuels transects, rather than on the subplot as a whole (as is done for vegetation cover). Two 10-foot long segments are located on each transect, and cover is estimated separately on each section.

Ground cover is measured on all accessible (forest and nonforest) condition classes on Region 5 or Region 6 Forest Service administered lands (ADMINISTRATIVE FOREST CODE = 501 - 699). Ground cover is recorded by condition class; if a transect crosses an ownership or other condition class boundary, the change will be identified by recording a GROUND COVER TYPE of “NONS” for those portions of the transect not on R5 or R6 Forest Service administered lands. If a portion of a transect falls in hazardous, Census water, noncensus water, denied access, or not in the sample area (but it is owned by R5 or R6), record a GROUND COVER TYPE of “NOIN” for that portion of the transect.

SECTION 15.1 GROUND COVER MEASUREMENTS

SUBSECTION 15.1.1 GROUND COVER DATA ITEMS

Item 15.1.1.1 SUBPLOT NUMBER (PFSL)

[SUBP]

Generated code corresponding to the number of the subplot from which the transect originates.

When Collected:	All subplots containing at least one condition class on Region 5 or Region 6 Forest Service administered lands (ADMINISTRATIVE FOREST CODE = 501 - 699)	
Field width:	1 digit	
Tolerance:	No errors	
Values:	1	Center subplot
	2	North subplot
	3	Southeast subplot
	4	Southwest subplot

Item 15.1.1.2 TRANSECT (PFSL)

[TRANSECT]

Record a 3-digit code indicating the transect on which ground cover is being measured.

When collected:	All tally segments	
Field width:	3 digits	
Tolerance:	No errors	
Values:	Subplot	Transect direction (degrees) from center of subplot
	1	090
		270
	2	360
		180
	3	135
		315
	4	045
		225

Item 15.1.1.3 SEGMENT ID (PFSL)

[GRND_CVR_SEG]

Starting at 4 feet slope distance from plot center, the 10-foot segments are numbered 1-2 out to the edge of the subplot. Select the appropriate segment number (1 or 2), based on the slope distance from point center.

When collected:	All tally segments
Field width:	1 digit
Tolerance:	No errors

Values:	Segment	Slope Distance
	1	4.0-14.0 feet
	2	14.0-24.0 feet

Item 15.1.1.4 GROUND COVER TYPE (PNW)
[GRND_CVR_TYP]

Record the appropriate ground cover code for cover types found on each transect segment. Select ground cover items visible when looking down from above. Ground cover items must be in contact with the ground (e.g., a log suspended 1-foot above the ground over the transect does not count as ground cover). In order to get an accurate portrayal of ground cover; cover of basal portions of forbs, grass clumps, trees, and woody shrubs, plus any other non-vegetation cover must all add up to 100-percent for each segment along the transect. Select ground layers in the order presented, top to bottom. At times items will overlay each other (e.g., MOSS over ROCK, LITTER over WOOD). When this occurs, the item viewed from above is measured.

GROUND COVER TYPE is only recorded for condition classes on R5 or R6 Forest Service administered lands (ADMINISTRATIVE FOREST CODE = 501-699); record “NONS” for portions of the transect not on R5 or R6 Forest Service administered land.

When collected:	All tally segments	
Field width:	4 digit	
Tolerance:	No errors	
Values:	Code	Description
	LITT	Leaf and needle litter, and duff not yet incorporated into the decomposed top humus layer. (includes animal droppings)
	WOOD	Woody Material, Slash & Debris: Any woody material, small and large woody debris, regardless of depth. Includes stumps. Litter is not included.
	LICH	An organism generally recognized as a single plant consisting of a fungus and an alga or cyanobacterium living in a symbiotic association. This code does not apply to lichen growing on bare soil in dry rangeland conditions. For rangeland conditions see cryptogamic crusts.
	MOSS	Nonvascular, terrestrial green plant, including mosses, hornworts, and liverworts. Always herbaceous. This code does not apply to moss growing on bare soil in dry rangeland conditions. For rangeland conditions see cryptogamic crusts.
	BARE	Exposed Soil: Bare soil, composed of particles less than 1/8 inch in diameter, which is not covered by rock, cryptogams, or organic material. Does not include any part of a road (see definition for road).
	CRYP	Thin, biotically dominated ground or surface crusts on soil in dry rangeland conditions; e.g., cryptogamic crust (algae, lichen, mosses or cyanobacteria).
	ROCK	Relatively hard, naturally formed mineral or petrified matter greater than 1/8 inch in diameter appearing on the soil surface, as small to large fragments, or as relatively large bodies, cliffs, outcrops or peaks. Includes bedrock. Does not include tephra or pyroclastic material. (see definition for TEPH)
	BAVE	The basal area cover, at ground surface, of any plants occupying the ground surface area (only include area where plant stems come out of the ground). Includes any trees, shrubs, basal grasses, and forbs (live, or senesced from the current year). Senesced = live during the current year’s growing season, but now dead.
	WATE	Water is coded where the water table is above the ground surface during the growing season, such as streams, bogs, swamps, marshes, and ponds.
	ROAD	Includes improved roads used to assign condition class, which are generally constructed using machinery, and is the area where the original topography has been disturbed by cutbanks and fill. Also includes unimproved trails impacted by regular use of motorized machines (e.g., motorcycles, jeeps, and off road vehicles). Non-motorized trails and unimproved traces, and roads created by occasional use for skidding logs are not included.
	DEVP	Surface area occupied or covered by any man-made structure other than a road, such as a building, dam, parking lot, electronic site/structure.
	ASH	Residue after wood and other combustible material has been burned off. Does not include ash from aerial volcanic expulsions.
	TEPH	All material formed by volcanic explosion or aerial expulsion from a volcanic vent, such as tephra, or pyroclastic material.
	PEIS	Surface area covered by ice and snow at the time of plot measurement, considered permanent.
	TRIS	Surface area covered by ice and snow at the time of plot measurement, considered transient.
	NOIN	Non-inventoried condition classes **on** R5 or R6 Forest Service administered land: Census water, noncensus water, or nonsampled (hazardous, access denied, outside U.S. boundary).
	NONS	Nonsampled: Condition class is **not on** R5 or R6 Forest Service administered land.

Item 15.1.1.5 COVER (PFSL)
[CVR_PCT]

Estimate the percentage of cover of each item from one edge to the other as it is intersected by the transect section. Remember to view the ground layer in the absence of aerial vegetation for purposes of measurement. Record the accumulated cover for each ground item within a 10-foot section of the transect to the nearest 1 percent (one tenth of a foot on a 10-foot section equals 1 percent).

When collected:	All tally segments
Field width:	3 digits
Tolerance:	+/- 5 percent for each item on a segment
Values:	000 to 100

Item 15.1.1.6 GROUND COVER NOTES (PFSL)
[NOTES]

Record any notes pertaining to ground cover transects.

When collected:	As needed to describe ground cover transects
Field width:	2000 characters
Tolerance:	N/A
Values:	Single words and abbreviated sentences

APPENDIX A PLOTS ON FOREST SERVICE LANDS

SECTION A.1 REGION 1 AND REGION 4 REFERENCE INFORMATION FOR FIA PLOTS ON FOREST SERVICE ADMINISTERED LANDS

SUBSECTION A.1.1 REGION 1 (R1) PLOT MEASUREMENT RULES

Plots on R1 Forest Service administered lands (e.g., Idaho Panhandle N.F.) are measured like all other plots not on R5 and R6 Forest Service administered lands (i.e., no special protocols are applied). See Subsection 2.3.2 (Region 1 and Region 4 Plots) for more information about plots in Region 1.

SUBSECTION A.1.2 REGION 4 (R4) PLOT MEASUREMENT RULES

Plots on R4 Forest Service administered lands (e.g., Toiyabe N.F.) are measured like all other plots not on R5 and R6 Forest Service administered lands (i.e., no special protocols are applied). See Subsection 2.3.2 (Region 1 and Region 4 Plots) for more information on plots in Region 4.

SECTION A.2 REGION 5 REFERENCE INFORMATION FOR FIA PLOTS ON R5 FOREST SERVICE ADMINISTERED LANDS

SUBSECTION A.2.1 REGION 5 (R5) SURVEY TREE SPECIES CODES AND CURRENT PNW-FIA TREE SPECIES CODE EQUIVALENT

R5 Code	Species	Scientific name	PNW Code
1	Douglas-fir	*Pseudotsuga menziesii*	202
2	Bigcone Douglas-fir	*Pseudotsuga macrocarpa*	201
5	Redwood	*Sequoia sempervirens*	211
6	Giant sequoia	*Sequoiadendron giganteum*	212
11	Ponderosa pine	*Pinus ponderosa*	122
12	Jeffrey pine	*Pinus jeffreyi*	116
13	Sugar pine	*Pinus lambertiana*	117
14	Western white pine	*Pinus monticola*	119
15	Lodgepole pine	*Pinus contorta*	108
19	Washoe pine	*Pinus washoensis*	137
21	Coulter pine	*Pinus coulteri*	109
22	Monterey pine	*Pinus radiata*	124
23	Gray pine (digger pine)	*Pinus sabiniana*	127
24	Knobcone pine	*Pinus attenuata*	103
25	Bishop pine	*Pinus muricata*	120
26	Whitebark pine	*Pinus albicaulis*	101
27	Singleleaf pinyon	*Pinus monophylla*	133
28	Bristlecone pine	*Pinus aristata*	102
29	Limber pine	*Pinus flexilis*	113
30	Foxtail pine	*Pinus balfouriana*	104
31	White fir	*Abies concolor*	15
32	Red fir	*Abies magnifica*	20
33	Grand fir	*Abies grandis*	17
34	Bristlecone fir	*Abies brackteata*	14
35	Noble fir	*Abies procera*	22
37	Subalpine fir	*Abies lasiocarpa*	19
39	Pacific silver fir	*Abies amabilis*	11
42	Sitka spruce	*Picea sitchensis*	98
45	Baker cypress	*Cupressus bakeri ssp. bakeri*	52
46	Brewer spruce	*Picea breweriana*	92
47	Mountain hemlock	*Tsuga mertensiana*	264

R5 Code	Species	Scientific name	PNW Code
48	Western hemlock	*Tsuga heterophylla*	263
51	Incense-cedar	*Calocedrus decurrens*	81
52	Alaska yellow cedar	*Chamaecyparis nootkatensis*	42
53	Port-Orford-cedar	*Chamaecyparis lawsoniana*	41
54	Western red-cedar	*Thuja plicata*	242
57	Monterey cypress	*Cupressus macrocarpa*	54
58	Tecate cypress	*Cupressus forbesii*	53
59	MacNab cypress	*Cupressus macnabiana*	56
61	California-nutmeg	*Torreya californica*	251
62	Pacific yew	*Taxus brevifolia*	231
63	Western juniper	*Juniperus occidentalis*	64
64	Cypress	*Cupressus sp.*	none
65	Utah juniper	*Juniperus osteosperma*	65
66	California juniper	*Juniperus californica*	62
68	Other conifers		
70	California buckeye	*Aesculus californica*	333
71	Red alder	*Alnus oregona (rubra)*	351
72	Ash	*Fraxinus sp.*	none
73	Aspen	*Populus tremuloides*	746
74	White alder	*Alnus rhombifolia*	352
75	Black cottonwood	*Populus trichocarpa*	747
76	Bigleaf maple	*Acer macrophyllum*	312
77	Tree of Heaven	*Ailanthus altissima*	341
78	Fremont cottonwood	*Populus fremontii*	748
79	Engelmann oak	*Quercus engelmanni*	811
80	Unknown oak sp.	*Quercus sp.*	none
81	California black oak	*Quercus kelloggii*	818
82	Coast live oak	*Quercus agrifolia*	801
83	California white (valley) oak	*Quercus lobata*	821
84	Canyon live oak	*Quercus chrysolepis*	805
85	Interior live oak	*Quercus wislizenii*	839
86	Oregon white oak	*Quercus garryana*	815
87	Tanoak	*Lithocarpus densiflorus*	631
88	Blue oak	*Quercus douglassii*	807
89	Willow sp.	*Salix sp.*	none
90	Walnut sp.	*Juglans sp.*	none
91	California-laurel	*Umbellularia californica*	981
92	California boxelder	*Acer negundo californicum*	313
93	Giant chinquapin	*Castanopsis chrysophylla*	431
94	Madrone	*Arbutus menziesii*	361
95	Pacific dogwood	*Cornus nuttallii*	492
96	Sycamore	*Platanus racemosa*	730
97	Eucalyptus sp.	*Eucalyptus sp.*	none
98	Other hardwoods		

SUBSECTION A.2.2 R5 CHAPARRAL RULES

Chaparral is measured like all other nonforest conditions on R5 Forest Service administered lands (i.e., there are no special rules for chaparral in R5).

SUBSECTION A.2.3 R5 WEED LIST

See Chapter 14, Invasive Plants for Region 5 weed list.

SECTION A.3 REGION 6 REFERENCE INFORMATION FOR FIA PLOTS ON R6 FOREST SERVICE ADMINISTERED LANDS

SUBSECTION A.3.1 REGION 6 (R6) PLANT INDICATOR LISTS

Most national forests have produced illustrated guides to identify forest indicator (“indi”) species and to distinguish them from related species; they are listed below for each ecological zone. Some species, defined as “trees” by PNW-FIA, are sampled using normal tree tally procedures, and are included on the list as reference only because they appear as “shrubs” in the R6 guides. The “R6 old species” names and codes are those found in the plant association guides for the respective forests. Within each zone’s list, species are grouped first by use, and secondarily by PLANTS species name.

Species are listed in four categories of “use”:

indi: indicator species for forested plant associations-recorded only when 50 percent or more of a subplot is in a forested condition class,

nfor: indicator species for nonforest plant associations (either completed or in development)-recorded only when 50 percent or more of a subplot is in a nonforest condition class,

weed: noxious or invasive plants of special interest-recorded on all conditions, and

sens: usually rare species that are believed to be sensitive to management-recorded on all conditions.

SUBSECTION A.3.2 NW OREGON

Mt. Hood, Siuslaw, and Willamette National Forests

ID Guide: Halverson, Nancy M. 1986. Major Indicator Shrubs and Herbs on National Forests of Western Oregon and Southwestern Washington. USDA Forest Service, Pacific Northwest Region R6-TM-229-1986.

PLANTS	PLANTS species	Use	form	R6code	R6 old species	common_name
CHCHC4	*Chrysolepis chrysophylla var. chrysophylla*	indi	tree	CACH	*Castanopsis chrysophylla*	Golden Chinquapin
ACCI	*Acer circinatum*	indi	shrub	ACCI	*Acer circinatum*	vine maple
AMAL2	*Amelanchier alnifolia*	indi	shrub	AMAL	*Amelanchier alnifolia*	Saskatoon serviceberry
ARNE	*Arctostaphylos nevadensis*	indi	shrub	ARNE	*Arctostaphylos nevadensis*	pinemat manzanita
ARUV	*Arctostaphylos uva-ursi*	indi	shrub	ARUV	*Arctostaphylos uva-ursi*	Bearberry, kinnikinnick
CHUM	*Chimaphila umbellata*	indi	shrub	CHUM	*Chimaphila umbellata*	Prince's pine
COCO6	*Corylus cornuta*	indi	shrub	COCO2	*Corylus cornuta*	California hazel
GASH	*Gaultheria shallon*	indi	shrub	GASH	*Gaultheria shallon*	salal
HODI	*Holodiscus discolor*	indi	shrub	HODI	*Holodiscus discolor*	oceanspray
JUCO6	*Juniperus communis*	indi	shrub	JUCO4	*Juniperus communis*	common juniper
MAAQ2	*Mahonia aquifolium*	indi	shrub	BEAQ	*Berberis aquifolium*	tall Oregon grape
MANE2	*Mahonia nervosa*	indi	shrub	BENE	*Berberis nervosa*	Oregon grape
MEFE	*Menziesia ferruginea*	indi	shrub	MEFE	*Menziesia ferruginea*	fool's huckleberry
OPHO	*Oplopanax horridus*	indi	shrub	OPHO	*Oplopanax horridus*	devil's club
PHEM	*Phyllodoce empetriformis*	indi	shrub	PHEM	*Phyllodoce empetriformis*	pink mountain-heath
PUTR2	*Purshia tridentata*	indi	shrub	PUTR	*Purshia tridentata*	bitterbrush
RHAL2	*Rhododendron albiflorum*	indi	shrub	RHAL	*Rhododendron albiflorum*	cascades azalea
RHMA3	*Rhododendron macrophyllum*	indi	shrub	RHMA	*Rhododendron macrophyllum*	Pacific rhododendron
RUPA	*Rubus parviflorus*	indi	shrub	RUPA	*Rubus parviflorus*	thimbleberry
RUSP	*Rubus spectabilis*	indi	shrub	RUSP	*Rubus spectabilis*	salmonberry
RUUR	*Rubus ursinus*	indi	shrub	RUUR	*Rubus ursinus*	Pacific blackberry
SYAL	*Symphoricarpos albus*	indi	shrub	SYAL	*Symphoricarpos albus*	common snowberry
SYHE	*Symphoricarpos hesperius*	indi	shrub	SYMO	*Symphoricarpos mollis*	trailing snowberry
TODI	*Toxicodendron diversilobum*	indi	shrub	RHDI	*Rhus diversiloba*	poison oak
VADE	*Vaccinium deliciosum*	indi	shrub	VADE	*Vaccinium deliciosum*	delicious blueberry
VAME	*Vaccinium membranaceum*	indi	shrub	VAME	*Vaccinium membranaceum*	big huckleberry
VAOV	*Vaccinium ovalifolium*	indi	shrub	VAAL	*Vaccinium alaskense*	Alaska huckleberry
VAOV	*Vaccinium ovalifolium*	indi	shrub	VAOV	*Vaccinium ovalifolium*	oval-leaf huckleberry
VAOV2	*Vaccinium ovatum*	indi	shrub	VAOV2	*Vaccinium ovatum*	evergreen huckleberry
WHMO	*Whipplea modesta*	indi	shrub	WHMO	*Whipplea modesta*	whipplevine
ACRU2	*Actaea rubra*	indi	forb	ACRU	*Actaea rubra*	baneberry
ACTR	*Achlys triphylla*	indi	forb	ACTR	*Achlys triphylla*	vanilla leaf
ADAL	*Adiantum aleuticum*	indi	forb	ADPE	*Adiantum pedatum*	maidenhar fern
ADBI	*Adenocaulon bicolor*	indi	forb	ADBI	*Adenocaulon bicolor*	trail plant
ASCA2	*Asarum caudatum*	indi	forb	ASCA3	*Asarum caudatum*	wild ginger
ATFI	*Athyrium filix-femina*	indi	forb	ATFI	*Athyrium filix-femina*	common ladyfern
BASA3	*Balsamorhiza sagittata*	indi	forb	BASA	*Balsamorhiza sagittata*	arrowleaf balsamroot
BLSP	*Blechnum spicant*	indi	forb	BLSP	*Blechnum spicant*	deer fern
CLDO2	*Clinopodium douglasii*	indi	forb	SADO	*Satureja douglasii*	yerba buena
CLSI2	*Claytonia sibirica*	indi	forb	MOSI	*Claytonia sibirica*	miner's lettuce
CLUN2	*Clintonia uniflora*	indi	forb	CLUN	*Clintonia uniflora*	queen's cup beadlilly
COCA13	*Cornus canadensis*	indi	forb	COCA	*Cornus canadensis*	bunchberry

PLANTS	PLANTS species	Use	form	R6code	R6 old species	common_name
DRCA11	*Dryopteris carthusiana*	indi	forb	DRAU2	*Dryopteris campyloptera*	shield-fern
ERMO8	*Erythronium montanum*	indi	forb	ERMO	*Erythronium montanum*	avalanche lily/giant faw
EULEL2	*Eucephalus ledophyllus var. ledophyllus*	indi	forb	ASLE2	*Aster ledophyllus*	Cascades aster
FRAGA	*Fragaria sp.*	indi	forb	FRAGA	*Fragaria sp.*	strawberry species
FRVE	*Fragaria vesca*	indi	forb	FRVE	*Fragaria vesca*	woodland strawberry
HIAL2	*Hieracium albiflorum*	indi	forb	HIAL	*Hieracium albiflorum*	White Hawkweed
LAPO3	*Lathyrus polyphyllus*	indi	forb	LAPO	*Lathyrus polyphyllus*	leafy pea vine
LIBO3	*Linnaea borealis*	indi	forb	LIBO2	*Linnaea borealis*	twinflower
LYAM3	*Lysichiton americanus*	indi	forb	LYAM	*Lysichiton americanum*	skunk cabbage
MADI	*Maianthemum dilatatum*	indi	forb	MADI2	*Maianthemum dilatatum*	false lily of the vally
MARA7	*Maianthemum racemosum*	indi	forb	SMRA	*Smilacina racemosa*	false Solomon's seal
MAST4	*Maianthemum stellatum*	indi	forb	SMST	*Smilacina stellata*	starry Solomon's seal
MOMA3	*Moehringia macrophylla*	indi	forb	ARMA3	*Arenaria macrophylla*	bigleaf sandwort
OSBE	*Osmorhiza berteroi*	indi	forb	OSCH	*Osmorhiza chilensis*	sweet cicely
OXOR	*Oxalis oregana*	indi	forb	OXOR	*Oxalis oregana*	Oregon oxalis
PODA	*Polygonum davisiae*	indi	forb	PONE4	*Polygonum newberryi*	Newberry's fleeceflower
POMU	*Polystichum munitum*	indi	forb	POMU	*Polystichum munitum*	western swordfern
POPU3	*Polemonium pulcherrimum*	indi	forb	POPU	*Polemonium pulcherrimum*	Jacob's ladder
STLAC	*Streptopus lanceolatus var. curvipes*	indi	forb	STRO	*Streptopus roseus*	rosy twistedstalk
STME	*Stachys mexicana*	indi	forb	STME2	*Stachys mexicana*	Mexican hedgenettle
SYRE	*Synthyris reniformis*	indi	forb	SYRE	*Synthyris reniformis*	snowqueen
TITR	*Tiarella trifoliata*	indi	forb	TITR	*Tiarella trifoliata*	threeleaf foamflower
TRBOL	*Trientalis borealis ssp. latifolia*	indi	forb	TRLA2	*Trientalis latifolia*	western starflower
VAHE	*Vancouveria hexandra*	indi	forb	VAHE	*Vancouveria hexandra*	white inside-out-flower
XETE	*Xerophyllum tenax*	indi	forb	XETE	*Xerophyllum tenax*	beargrass
CAGE2	*Carex geyeri*	indi	grami	CAGE	*Carex geyeri*	elk sedge
FEOC	*Festuca occidentalis*	indi	grami	FEOC	*Festuca occidentalis*	western fescue
FEVI	*Festuca viridula*	indi	grami	FEVI	*Festuca viridula*	green fescue
LUZUL	*Luzula sp.*	indi	grami	LUZUL	*Luzula sp.*	woodrush

SUBSECTION A.3.3 SW OREGON

Rogue River, Siskyou, and Umpqua National Forests

ID Guide: Seda, Anita, Thomas Atzet, and David Wheeler. 1989 (updated 1997). Key Species for Plant Associations on the Rogue River, Siskiyou, and Umpqua National Forests. USDA Forest Service, Pacific Northwest Region R6-NR-ECOL-TP-026-97.

PLANTS	*PLANTS species*	Use	form	R6code	*R6 old species*	common_name
CHCHC4	*Chrysolepis chrysophylla var. chrysophylla*	indi	tree	CACH	*Castanopsis chrysophylla*	golden chinquapin
LIDEE	*Lithocarpus densiflora var. echinoides*	indi	tree	LIDEE	*Lithocarpus densiflora echinoides*	tanoak (shrub form)
ACCI	*Acer circinatum*	indi	shrub	ACCI	*Acer circinatum*	vine maple
ACGLD4	*Acer glabrum var. Douglasii*	indi	shrub	ACGLD	*Acer glabrum var. Douglasii*	Douglas maple
ARCA5	*Arctostaphylos canescens*	indi	shrub	ARCA5	*Arctostaphylos canescens*	hoary manzanita
ARCO3	*Arctostaphylos columbiana*	indi	shrub	ARCO3	*Arctostaphylos columbiana*	hairy manzanita
ARCTO3	*Arctostaphylos spp.*	indi	shrub	ARCTO	*Arctostaphylos spp.*	arctostaphylos spp.
ARNE	*Arctostaphylos nevadensis*	indi	shrub	ARNE	*Arctostaphylos nevadensis*	pinemat manzanita
ARPA6	*Arctostaphylos patula*	indi	shrub	ARPA	*Arctostaphylos patula*	greenleaf manzanita
ARVI4	*Arctostaphylos viscida*	indi	shrub	ARVI	*Arctostaphylos viscida*	whiteleaf manzanita
CECU	*Ceanothus cuneatus*	indi	shrub	CECU	*Ceanothus cuneatus*	buckbrush
CEIN3	*Ceanothus integerrimus*	indi	shrub	CEIN	*Ceanothus intergerrimus*	deerbrush
CEPR	*Ceanothus prostratus*	indi	shrub	CEPR	*Ceanothus prostratus*	squawcarpet
CEPU	*Ceanothus pumilus*	indi	shrub	CEPU	*Ceanothus pumilus*	dwarf ceanothus
CETH	*Ceanothus thyrsiflorus*	indi	shrub	CETH	*Ceanothus thyrsiflorus*	blue blossom ceanothus
CEVE	*Ceanothus velutinus*	indi	shrub	CEVE	*Ceanothus velutinus*	snowbrush ceanothus
CHME	*Chimaphila menziesii*	indi	shrub	CHME	*Chimaphila menziesii*	little prince’s-pine
CHUM	*Chimaphila umbellata*	indi	shrub	CHUM	*Chimaphila umbellata*	prince's pine
COCOC	*Corylus cornuta var. californica*	indi	shrub	COCOC	*Corylus cornuta californica*	California hazel
FRCA12	*Frangula californica*	indi	shrub	RHCA	*Rhamnus californica*	coffeeberry
FRPU7	*Frangula purshiana*	indi	shrub	RHPU	*Rhamnus purshiana*	cascara
GABU2	*Garrya buxifolia*	indi	shrub	GABU	*Garrya buxifolia*	box-leaved silk-tassel
GAOV2	*Gaultheria ovatifolia*	indi	shrub	GAOV	*Gaultheria ovatifolia*	slender salal
GASH	*Gaultheria shallon*	indi	shrub	GASH	*Gaultheria shallon*	salal
HODI	*Holodiscus discolor*	indi	shrub	HODI	*Holodiscus discolor*	oceanspray
LEDA	*Leucothoe davisiae*	indi	shrub	LEDA	*Leucothoe davisiae*	Sierra-laurel
LOHI2	*Lonicera hispidula*	indi	shrub	LOHI	*Lonicera hispidula*	hairy honeysuckle
MAAQ2	*Mahonia aquifolium*	indi	shrub	BEPI	*Berberis piperiana*	Piper’s Oregon grape
MANE2	*Mahonia nervosa*	indi	shrub	BENE	*Berberis nervosa*	Oregon grape
MARE11	*Mahonia repens*	indi	shrub	BERE	*Berberis repens*	creeping Oregon grape
PAMY	*Paxistima myrsinites*	indi	shrub	PAMY	*Pachistima myrsinites*	Oregon boxwood
QUSA2	*Quercus sadleriana*	indi	shrub	QUSA	*Quercus sadleriana*	Sadler oak
QUVA	*Quercus vaccinifolia*	indi	shrub	QUVA	*Quercus vaccinifolia*	huckleberry oak
RHMA3	*Rhododendron macrophyllum*	indi	shrub	RHMA	*Rhododendron macrophyllum*	Pacific rhododendron
RHOC	*Rhododendron occidentale*	indi	shrub	RHOC	*Rhododendron occidentale*	western azalea
RIBI	*Ribes binominatum*	indi	shrub	RIBI	*Ribes binominatum*	Siskiyou gooseberry
RICE	*Ribes cereum*	indi	shrub	RICE	*Ribes cereum*	squaw current
RICR	*Ribes cruentum*	indi	shrub	RICR	*Ribes cruentum*	shinyleaf gooseberry
RILA	*Ribes lacustre*	indi	shrub	RILA	*Ribes lacustre*	prickly currant

PLANTS	*PLANTS species*	Use	form	R6code	*R6 old species*	common_name
RILO	*Ribes lobbii*	indi	shrub	RILO	*Ribes lobbii*	gummy gooseberry
RIMA2	*Ribes marshallii*	indi	shrub	RIMA	*Ribes marshallii*	Applegate gooseberry
RISA	*Ribes sanguineum*	indi	shrub	RISA	*Ribes sanguineum*	red currant
RIVI3	*Ribes viscossissimum*	indi	shrub	RIVI	*Ribes viscossissimum*	sticky currant
ROGY	*Rosa gymnocarpa*	indi	shrub	ROGY	*Rosa gymnocarpa*	baldhip rose
RULA2	*Rubus lasiococcus*	indi	shrub	RULA	*Rubus lasiococcus*	dwarf bramble
RUNI2	*Rubus nivalis*	indi	shrub	RUNI	*Rubus nivalis*	snow bramble
RUSP	*Rubus spectabilis*	indi	shrub	RUSP	*Rubus spectabilis*	salmonberry
RUUR	*Rubus ursinus*	indi	shrub	RUUR	*Rubus ursinus*	Pacific blackberry
SYHE	*Symphoricarpos hesperius*	indi	shrub	SYMO	*Symphoricarpos mollis*	trailing snowberry
TODI	*Toxicodendron diversilobum*	indi	shrub	RHDI	*Rhus diversiloba*	poison oak
VAME	*Vaccinium membranaceum*	indi	shrub	VAME	*Vaccinium membranaceum*	big huckleberry
VAOV2	*Vaccinium ovatum*	indi	shrub	VAOV2	*Vaccinium ovatum*	evergreen huckleberry
VAPA	*Vaccinium parvifolium*	indi	shrub	VAPA	*Vaccinium parvifolium*	red huckleberry
VASC	*Vaccinium scoparium*	indi	shrub	VASC	*Vaccinium scoparium*	grouse huckleberry
WHMO	*Whipplea modesta*	indi	shrub	WHMO	*Whipplea modesta*	whipplevine
ACMI2	*Achillea millefolium*	indi	forb	ACMI	*Achillea millefolium*	western yarrow
ACRU2	*Actaea rubra*	indi	forb	ACRU	*Actaea rubra*	baneberry
ACTR	*Achlys triphylla*	indi	forb	ACTR	*Achlys triphylla*	vanilla leaf
ADBI	*Adenocaulon bicolor*	indi	forb	ADBI	*Adenocaulon bicolor*	trail plant
ANDE3	*Anemone deltoidea*	indi	forb	ANDE	*Anemone deltoidea*	threeleaf anemone
APAN2	*Apocynum androsaemifolium*	indi	forb	APAN	*Apocynum androsaemifolium*	spreading dogbane
ARCO9	*Arnica cordifolia*	indi	forb	ARCO	*Arnica cordifolia*	heart-leaf arnica
ARLA8	*Arnica latifolia*	indi	forb	ARLA	*Arnica latifolia*	broadleaf arnica
ASDE6	*Aspidotis densa*	indi	forb	ASDE	*Aspidotis densa*	rock fern
CLUN2	*Clintonia uniflora*	indi	forb	CLUN	*Clintonia uniflora*	queen's cup beadlilly
CYGR	*Cynoglossum grande*	indi	forb	CYGR	*Cynoglossum grande*	Pacific hound's-tongue
DIHOO	*Disporum hookeri var. oreganum*	indi	forb	DIHOO	*Disporum hookeri oreganum*	Oregon fairybell
EQAR	*Equisetum arvense*	indi	forb	EQAR	*Equisetum arvense*	Common horsetail
ERUM	*Eriogonum umbellatum*	indi	forb	ERUM	*Eriogonum umbellatum*	sulphurflower
FRVEB2	*Fragaria vesca ssp. bracteata*	indi	forb	FRVEB3	*Fragaria vesca bracteata*	woods strawberry
GAAM2	*Galium ambiguum*	indi	forb	GAAM	*Galium ambiguum*	obscure bedstraw
GAAP2	*Galium aparine*	indi	forb	GAAP	*Galium aparine*	catchweed bedstraw
GAOR	*Galium oreganum*	indi	forb	GAOR	*Galium oreganum*	Oregon bedstraw
GATR3	*Galium triflorum*	indi	forb	GATR	*Galium triflorum*	sweetscented bedstraw
GOOB2	*Goodyera oblongifolia*	indi	forb	GOOB	*Goodyera oblongifolia*	western rattlesnake-plantain
HIAL2	*Hieracium albiflorum*	indi	forb	HIAL	*Hieracium albiflorum*	White Hawkweed
LIBOL2	*Linnaea borealis ssp. longiflora*	indi	forb	LIBOL	*Linnaea borealis longiflora*	western twinflower
MAMA	*Madia madioides*	indi	forb	MAMA	*Madia madioides*	woodland tarweed
MARA7	*Maianthemum racemosum*	indi	forb	SMRA	*Smilacina racemosa*	False Solomon's seal
MAST4	*Maianthemum stellatum*	indi	forb	SMST	*Smilacina stellata*	starry Solomon's seal
MITR4	*Mitella trifida*	indi	forb	MITR2	*Mitella trifida*	three-tooth mitrewort
MOOD	*Monardella odoratissima*	indi	forb	MOOD	*Monardella odoratissima*	mountain balm
OSBE	*Osmorhiza berteroi*	indi	forb	OSCH	*Osmorhiza chilensis*	sweet cicely
OSPU	*Osmorhiza purpurea*	indi	forb	OSPU	*Osmorhiza purpurea*	purple sweet-root

PLANTS	*PLANTS species*	Use	form	R6code	*R6 old species*	common_name
OXOR	*Oxalis oregana*	indi	forb	OXOR	*Oxalis oregana*	Oregon oxalis
POMU	*Polystichum munitum*	indi	forb	POMU	*Polystichum munitum*	western swordfern
POPU3	*Polemonium pulcherrimum*	indi	forb	POPU	*Polemonium pulcherrimum*	Jacob's ladder
PTAQ	*Pteridium aquilinum*	indi	forb	PTAQ	*Pteridium aquilinum*	bracken fern
PYAS	*Pyrola asarifolia*	indi	forb	PYAS	*Pyrola asarifolia*	alpine pyrola
PYPI2	*Pyrola picta*	indi	forb	PYDE	*Pyrola dentata*	toothleaf pyrola
PYPI2	*Pyrola picta*	indi	forb	PYPI	*Pyrola picta*	whitevein pyrola
ORSE	*Orthilia secunda*	indi	forb	PYSE	*Pyrola secunda*	Sidebells pyrola
TITRU	*Tiarella trifoliata var. unifoliata*	indi	forb	TITRU	*Tiarella trifoliata unifoliata*	coolwort foamflower
TRBOL	*Trientalis borealis ssp. latifolia*	indi	forb	TRLA2	*Trientalis latifolia*	western starflower
TROV2	*Trillium ovatum*	indi	forb	TROV	*Trillium ovatum*	white trillium
VAHE	*Vancouveria hexandra*	indi	forb	VAHE	*Vancouveria hexandra*	white inside-out-flower
VASI	*Valeriana sitchensis*	indi	forb	VASI	*Valeriana sitchensis*	sitka valerian
VIGL	*Viola glabella*	indi	forb	VIGL	*Viola glabella*	stream violet
VIOR	*Viola orbiculata*	indi	forb	VIOR2	*Viola orbiculata*	round-leaved violet
XETE	*Xerophyllum tenax*	indi	forb	XETE	*Xerophyllum tenax*	beargrass
CAIN9	*Carex inops*	indi	grami	CAPE5	*Carex pensylvanica*	long-stolon sedge
CYEC	*Cynosurus echinatus*	indi	grami	CYEC	*Cynosurus echinatus*	hedgehog dogtail
FEID	*Festuca idahoensis*	indi	grami	FEID	*Festuca idahoensis*	idaho fescue
FESTU	*Festuca sp.*	indi	grami	FESTU	*Festuca spp.*	fescue species
MESU	*Melica subulata*	indi	grami	MESU	*Melica subulata*	Alaska oniongrass
CYSC4	*Cytisus scoparius*	weed	shrub	CYSC	*Cytisus scoparius*	Scotch broom
GEMO2	*Genista monspessulana*	weed	shrub	CYMO3	*Cytisus monspessulanas*	French broom
SPJU2	*Spartium junceum*	weed	shrub	SPJU?	*Spartium junceum*	Spanish broom
ULEU	*Ulex europaeus*	weed	shrub	ULEU	*Ulex europaeus*	gorse
ACNO4	*Acaena novae-zelandica*	weed	forb	ACAN	*Acaena anserinifolia*	Biddy-biddy
ACRE3	*Acroptilon repens*	weed	forb	ACRE3	*Acroptilon repens*	Russian knapweed
CALA20	*Carthamus lanatus*	weed	forb	CALA?	*Carthamus lanatus*	woolly distaff thistle
CANU4	*Carduus nutans*	weed	forb	CANU4	*Carduus nutans*	musk thistle
CAPY2	*Carduus pycnocephalus*	weed	forb	CAPY3	*Carduus pycnocephalus*	italian thistle
CEBI2	*Centaurea bieberstinii*	weed	forb	CEMA	*Centaurea maculosa*	spotted knapweed
CEDET	*Centaurea debeauxii ssp. thuillieri*	weed	forb	CENIJ	*Centaurea jacea x nigra*	knapweed, meadow
CEDI3	*Centaurea diffusa*	weed	forb	CEDI	*Centaurea diffusa*	diffuse knapweed
CEME2	*Centaurea melitensis*	weed	forb	CEME	*Centaurea melitensis*	Malta starthistle
CESO3	*Centaurea solstitialis*	weed	forb	CESO	*Centaurea solstitialis*	yellow starthistle
CETR8	*Centaurea triumfetti*	weed	forb	CEVI?	*Centaurea virgata*	Squarrose knapweed
CHJU	*Chondrilla juncea*	weed	forb	CHJU	*Chondrilla juncea*	rush skeletonweed
CIAR4	*Cirsium arvense*	weed	forb	CIAR	*Cirsium arvense*	canada thistle
CIVU	*Cirsium vulgare*	weed	forb	CIVU	*Cirsium vulgare*	bull thistle
COAR4	*Convolvulus arvensis*	weed	forb	COAR2	*Convolvulus arvensis*	Field bindweed
CYOF	*Cynoglossum officinale*	weed	forb	CYOF	*Cynoglossum officinale*	hound's tongue
HYPE	*Hypericum perforatum*	weed	forb	HYPE	*Hypericum perforatum*	common st. john's wort
ISTI	*Isatis tinctoria*	weed	forb	ISTI	*Isatis tinctoria*	dyers woad
LIDA	*Linaria dalmatica*	weed	forb	LIDA	*Linaria dalmatica*	dalmation toadflax
LIVU2	*Linaria vulgaris*	weed	forb	LIVU2	*Linaria vulgaris*	yellow toadflax
LYSA2	*Lythrum salicaria*	weed	forb	LYSA	*Lythrum salicaria*	purple loosestrife
SEJA	*Senecio jacobaea*	weed	forb	SEJA	*Senecio jacobaea*	tansy ragwort
SIMA3	*Silybum marianum*	weed	forb	SIMA3	*Silybum marianum*	milk thistle
TRTE	*Tribulus terrestris*	weed	forb	TRTR	*Tribulus terrestris*	puncturevine

PLANTS	*PLANTS species*	Use	form	R6code	*R6 old species*	common_name
CORTA	*Cortaderia spp.*	weed	grami	CORTA	*Cortaderia spp.*	pampas grasses
CYESL	*Cyperus esculentus var. leptostachyus*	weed	grami	CYES	*Cyperus esculentus*	yellow nutsedge
ELRE4	*Elymus repens*	weed	grami	AGRE	*Agropyron repens*	quackgrass
POSA4	*Polygonum sachalinense*	weed	grami	POSA2	*Polygonum sachalinense*	giant knotweed
TACA8	*Taeniatherum caput-medusae*	weed	grami	TACA	*Taeniatherum caput-medusae*	medusa head

SUBSECTION A.3.4 CENTRAL OREGON

Deschutes, Fremont, Ochoco, and Winema National Forests, and the Crooked River National Grassland.

ID Guide: Hopkins, William, and Robert Rawlings. 1988 (revised version). Major Indicator Shrubs and Herbs on National Forests of Eastern Oregon. USDA Forest Service, Pacific Northwest Region R6-TM-190-1985.

Johnson, Charles Grier Jr. 1993. Common Plants of the Inland Pacific Northwest, Malheur, Umatilla, Wallowa-Whitman National Forests. USDA Forest Service, Pacific Northwest Region R6-ERW-TP051-93.

PLANTS	***PLANTS species***	Use	form	**R6code**	**R6 old species**	**common_name**
ACMA3	*Acer macrophyllum*	indi	tree	ACMA3	*Acer macrophyllum*	bigleaf maple
ALRU2	*Alnus rubra*	indi	tree	ALRU	*Alnus rubra*	red alder
CHCH7	*Chrysolepis chysophylla*	indi	tree	CACH	*Castanopsis chysophylla*	golden chinquapin
CONU4	*Cornus nuttallii*	indi	tree	CONU	*Cornus nuttallii*	Pacific dogwood
POTR5	*Populus tremuloides*	indi	tree	POTR	*Populus tremuloides*	quaking aspen
QUGA4	*Quercus garryana*	indi	tree	QUGA	*Quercus garryana*	Oregon white oak
TABR2	*Taxus brevifolia*	indi	tree	TABR	*Taxus brevifolia*	western yew
ACCI	*Acer circinatum*	indi	shrub	ACCI	*Acer circinatum*	vine maple
ACGL	*Acer glabrum*	indi	shrub	ACGL	*Acer glabrum*	Rocky Mountain maple
ALIN2	*Alnus incana*	indi	shrub	ALIN	*Alnus incana*	mountain alder
ALVIS	*Alnus viridis ssp. sinuata*	indi	shrub	ALSI	*Alnus sinuata*	sitka alder
AMAL2	*Amelanchier alnifolia*	indi	shrub	AMAL	*Amelanchier alnifolia*	Saskatoon serviceberry
ARAR8	*Artemisia arbuscula*	indi	shrub	ARAR	*Artemisia arbuscula*	low sagebrush
ARNE	*Arctostaphylos nevadensis*	indi	shrub	ARNE	*Arctostaphylos nevadensis*	pinemat manzanita
ARPA6	*Arctostaphylos patula*	indi	shrub	ARPA	*Arctostaphylos patula*	greenleaf manzanita
ARRI2	*Artemisia rigida*	indi	shrub	ARRI	*Artemisia rigida*	stiff sagebrush
ARTR2	*Artemisia tridentata*	indi	shrub	ARTR	*Artemisia tridentata*	big sagebrush
ARTRV	*Artemisia tridentata ssp. vaseyana*	indi	shrub	ARTRV	*Artemisia tridentata vaseyana*	mountain big sagebrush
ARUV	*Arctostaphylos uva-ursi*	indi	shrub	ARUV	*Arctostaphylos uva-ursi*	bearberry, kinnikinnick
BENA	*Betula nana*	indi	shrub	BEGL	*Betula glandulosa*	bog birch
CELE3	*Cercocarpus ledifolius*	indi	shrub	CELE	*Cercocarpus ledifolius*	curlleaf mountain mahogany
CEMOG	*Cercocarpus montanus var. glaber*	indi	shrub	CEMO	*Cercocarpus montanus*	birchleaf mountain-mahogany
CEPR	*Ceanothus prostratus*	indi	shrub	CEPR	*Ceanothus prostratus*	squawcarpet
CEVE	*Ceanothus velutinus*	indi	shrub	CEVE	*Ceanothus velutinus*	snowbrush ceanothus
CHRYS9	*Chrysothamnus SSP.*	indi	shrub	CHRYS9	*Chrysothamnus*	grey/green rabbitbrush
CHUM	*Chimaphila umbellata*	indi	shrub	CHUM	*Chimaphila umbellata*	Prince's pine
HODI	*Holodiscus discolor*	indi	shrub	HODI	*Holodiscus discolor*	oceanspray
JUCO6	*Juniperus communis*	indi	shrub	JUCO4	*Juniperus communis*	common juniper
KAMI	*Kalmia microphylla*	indi	shrub	KAMI	*Kalmia microphylla*	alpine laurel
LOIN5	*Lonicera involucrata*	indi	shrub	LOIN	*Lonicera involucrata*	bearberry honeysuckle
LOUT2	*Lonicera utahensis*	indi	shrub	LOUT2	*Lonicera utahensis*	Utah honeysuckle
MAAQ2	*Mahonia aquifolium*	indi	shrub	BEAQ	*Berberis aquifolium*	tall Oregon grape
MANE2	*Mahonia nervosa*	indi	shrub	BENE	*Berberis nervosa*	Oregon grape
MARE11	*Mahonia repens*	indi	shrub	BERE	*Berberis repens*	creeping Oregon grape
MEFE	*Menziesia ferruginea*	indi	shrub	MEFE	*Menziesia ferruginea*	fool's huckleberry
PAMY	*Paxistima myrsinites*	indi	shrub	PAMY	*Pachistima myrsinites*	Oregon boxwood
PERA4	*Peraphyllum ramosissimum*	indi	shrub	PERA3	*Peraphyllum ramosissimum*	squaw apple
PHEM	*Phyllodoce empetriformis*	indi	shrub	PHEM	*Phyllodoce empetriformis*	pink mountain-heath
PHLE4	*Philadelphus lewisii*	indi	shrub	PHLE4	*Philadelphus lewisii*	Lewis' mock orange

PLANTS	PLANTS species	Use	form	R6code	R6 old species	common_name
PHMA5	*Physocarpus malvaceus*	indi	shrub	PHMA	*Physocarpus malvaceus*	ninebark
PRUNU	*Prunus spp*	indi	shrub	PRUNUS	*Prunus spp*	cherry or choke cherry
PUTR2	*Purshia tridentata*	indi	shrub	PUTR	*Purshia tridentata*	bitterbrush
RHAL2	*Rhododendron albiflorum*	indi	shrub	RHAL	*Rhododendron albiflorum*	cascades azalea
RHMA3	*Rhododendron macrophyllum*	indi	shrub	RHMA	*Rhododendron macrophyllum*	Pacific rhododendron
RICE	*Ribes cereum*	indi	shrub	RICE	*Ribes cereum*	squaw current
RILA	*Ribes lacustre*	indi	shrub	RILA	*Ribes lacustre*	prickly currant
RIVI3	*Ribes viscossissimum*	indi	shrub	RIVI	*Ribes viscossissimum*	sticky currant
RUPA	*Rubus parviflorus*	indi	shrub	RUPA	*Rubus parviflorus*	thimbleberry
RUUR	*Rubus ursinus*	indi	shrub	RUUR	*Rubus ursinus*	Pacific blackberry
SASC	*Salix scouleriana*	indi	shrub	SASC	*Salix scouleriana*	Scouler's willow
SPBE2	*Spiraea betulifolia*	indi	shrub	SPBE	*Spiraea betulifolia*	birchleaf spirea
SPDO	*Spiraea douglasii*	indi	shrub	SPDO	*Spiraea douglasii*	Douglas spiraea
SYAL	*Symphoricarpos albus*	indi	shrub	SYAL	*Symphoricarpos albus*	common snowberry
SYHE	*Symphoricarpos hesperius*	indi	shrub	SYMO	*Symphoricarpos mollis*	creeping snowberry
SYOR2	*Symphoricarpos oreophilus*	indi	shrub	SYOR	*Symphoricarpos oreophilus*	mountain snowberry
VADE	*Vaccinium deliciosum*	indi	shrub	VADE	*Vaccinium deliciosum*	delicious blueberry
VAME	*Vaccinium membranaceum*	indi	shrub	VAME	*Vaccinium membranaceum*	big huckleberry
VASC	*Vaccinium scoparium*	indi	shrub	VASC	*Vaccinium scoparium*	grouse huckleberry
VAUL	*Vaccinium uliginosum*	indi	shrub	VAOC2	*Vaccinium occidentale*	bog blueberry
ACTR	*Achlys triphylla*	indi	forb	ACTR	*Achlys triphylla*	vanilla leaf
ADBI	*Adenocaulon bicolor*	indi	forb	ADBI	*Adenocaulon bicolor*	trail plant
APAN2	*Apocynum androsaemifolium*	indi	forb	APAN	*Apocynum androsaemifolium*	spreading dogbane
ARCO9	*Arnica cordifolia*	indi	forb	ARCO	*Arnica cordifolia*	heart-leaf arnica
ARKI	*Arenaria kingii*	indi	forb	ARKI	*Arenaria kingii*	king's sandwort
ARLA8	*Arnica latifolia*	indi	forb	ARLA	*Arnica latifolia*	broadleaf arnica
ASCA2	*Asarum caudatum*	indi	forb	ASCA3	*Asarum caudatum*	wild ginger
ATFI	*Athyrium filix-femina*	indi	forb	ATFI	*Athyrium filix-femina*	common ladyfern
BASA3	*Balsamorhiza sagittata*	indi	forb	BASA	*Balsamorhiza sagittata*	arrowleaf balsamroot
CAQU2	*Camassia quamash*	indi	forb	CAQU2	*Camassia quamash*	small camas
CLUN2	*Clintonia uniflora*	indi	forb	CLUN	*Clintonia uniflora*	queen's cup beadlilly
COCA13	*Cornus canadensis*	indi	forb	COCA	*Cornus canadensis*	bunchberry
DIHO3	*Disporum hookeri*	indi	forb	DIHO	*Disporum hookeri*	hooker fairybells
DITR2	*Disporum trachycarpum*	indi	forb	DITR	*Disporum tracycarpum*	fairy bells
FRVI	*Fragaria virginiana*	indi	forb	FRVI	*Fragaria virginiana*	strawberry
GETR	*Geum triflorum*	indi	forb	GETR	*Geum triflorum*	red avens, old man's whiskers
GOOB2	*Goodyera oblongifolia*	indi	forb	GOOB	*Goodyera oblongifolia*	western rattlesnake-plantain
GYDR	*Gymnocarpium dryopteris*	indi	forb	GYDR	*Gymnocarpium dryopteris*	oak fern
LIBO3	*Linnaea borealis*	indi	forb	LIBO2	*Linnaea borealis*	twinflower
LOMAT	*Lomatium*	indi	forb	LOMAT	*Lomatium*	desertparsley
LUAR3	*Lupinus argenteus*	indi	forb	LUAR3	*Lupinus argenteus*	silvery lupine
LUCA	*Lupinus caudatus*	indi	forb	LUCA	*Lupinus caudatus*	tailcup lupine
LULE2	*Lupinus lepidus*	indi	forb	LULE2	*Lupinus lepidus*	Pacific lupine
LUPE	*Luetkea pectinata*	indi	forb	LUPE	*Luetkea pectinata*	partridgefoot
LUPO2	*Lupinus polyphyllus*	indi	forb	LUPO2	*Lupinus polyphyllus*	bigleaf lupine
LYAM3	*Lysichiton americanus*	indi	forb	LYAM	*Lysichiton americanum*	skunk cabbage

PLANTS	*PLANTS species*	Use	form	R6code	R6 old species	common_name
MARA7	*Maianthemum racemosum*	indi	forb	SMRA	*Smilacina racemosa*	False Solomn'S Seal
MAST4	*Maianthemum stellatum*	indi	forb	SMST	*Smilacina stellata*	starry Solomon's seal
PENST	*Penstemon*	indi	forb	PENST	*Penstemon*	beardtongue
PHLOX	*Phlox*	indi	forb	PHLOX	*Phlox spp.*	phlox
POMU	*Polystichum munitum*	indi	forb	POMU	*Polystichum munitum*	western swordfern
POPU3	*Polemonium pulcherrimum*	indi	forb	POPU	*Polemonium pulcherrimum*	Jacob's ladder
PSJA2	*Pseudostellaria jamesiana*	indi	forb	STJA	*Stellaria jamesiana*	tuber starwort
PTAQ	*Pteridium aquilinum*	indi	forb	PTAQ	*Pteridium aquilinum*	bracken fern
SETR	*Senecio triangularis*	indi	forb	SETR	*Senecio triangularis*	arrowleaf groundsel
STAM2	*Streptopus amplexifolius*	indi	forb	STAM	*Streptopus amplexifolius*	twisted stalk
TITRU	*Tiarella trifoliata var. unifoliata*	indi	forb	TITRU	*Tiarella trifoliata unifoliata*	coolwort foamflower
TITRU	*Tiarella trifoliata var. unifoliata*	indi	forb	TIUN	*Tiarella unifoliata*	coolwort foamflower
TRBOL	*Trientalis borealis ssp. latifolia*	indi	forb	TRLA2	*Trientalis latifolia*	western starflower
TRCA	*Trautvetteria caroliniensis*	indi	forb	TRCA3	*Trautvetteria caroliniensis*	false bugbane
VIGL	*Viola glabella*	indi	forb	VIGL	*Viola glabella*	stream violet
WYMO	*Wyethia mollis*	indi	forb	WYMO	*Whyethia mollis*	woolly wyethia
XETE	*Xerophyllum tenax*	indi	forb	XETE	*Xerophyllum tenax*	beargrass
ACOCO	*Achnatherum occidentale ssp. occidentale*	indi	grami	STOC	*Stipa occidentalis*	western needlegrass
BRCA5	*Bromus carinatus*	indi	grami	BRCA	*Bromus carinatus*	California brome
BRTE	*Bromus tectorum*	indi	grami	BRTE	*Bromus tectorum*	cheatgrass
BRVU	*Bromus vulgaris*	indi	grami	BRVU	*Bromus vulgaris*	columbia brome
CAAN15	*Carex angustata*	indi	grami	CAEU	*Carex eurycarpa*	widefruit sedge
CAGE2	*Carex geyeri*	indi	grami	CAGE	*Carex geyeri*	elk sedge
CAIN9	*Carex inops*	indi	grami	CAPE5	*Carex pensylvanica*	long-stolon sedge
CARO5	*Carex rossii*	indi	grami	CARO	*Carex rossii*	ross' sedge
CARU	*Calamagrostis rubescens*	indi	grami	CARU	*Calamagrostis rubescens*	pinegrass
ELEL5	*Elymus elymoides*	indi	grami	SIHY	*Sitanion hystrix*	squirreltail
ELGL	*Elymus glaucus*	indi	grami	ELGL	*Elymus glaucus*	blue wildrye
ELQU2	*Eleocharis quinqueflora*	indi	grami	ELPA2	*Eleocharis pauciflora*	few-flowered spikerush
FEID	*Festuca idahoensis*	indi	grami	FEID	*Festuca idahoensis*	idaho fescue
FEOC	*Festuca occidentalis*	indi	grami	FEOC	*Festuca occidentalis*	western fescue
PONE2	*Poa nervosa*	indi	grami	PONE	*Poa nervosa*	Wheeler's bluegrass
POSE	*Poa secunda*	indi	grami	POSA	*Poa sandbergii*	Sandberg's bluegrass
PSSP6	*Pseudoroegneria spicata*	indi	grami	AGSP	*Agropyron spicatum*	bluebunch wheatgrass
ROSA5	*Rosa spp.*	nfor	shrub	ROSA	*Rosa spp.*	Rose
ASTRA	*Astragalus*	nfor	forb	ASTRA	*Astragalus spp.*	milkvetch
ERBL	*Erigeron bloomeri*	nfor	forb	ERBL	*Erigeron bloomeri*	dwarf yellow fleabane
ERCH4	*Erigeron chrysopsidis*	nfor	forb	ERCH	*Erigeron chrysopsidis*	dwarf yellow fleabane
ERFL4	*Eriogonum flavum*	nfor	forb	ERFL	*Eriogonum flavum*	golden buckwheat
ERHE2	*Eriogonum heracleoides*	nfor	forb	ERHE	*Eriogonum heracleoides*	creamy or Wyeth's buckwheat
ERIGE2	*Erigeron*	nfor	forb	ERIGE2	*Erigeron*	fleabane
ERIOG	*Eriogonum*	nfor	forb	ERIOG	*Eriogonum*	buckwheat
POPH	*Polygonum phytolaccaefolium*	nfor	forb	POPH	*Polygonum phytolaccaefolium*	pokeweed fleeceflower
TRMA3	*Trifolium macrocephalum*	nfor	forb	TRMA	*Trifolium macrocephalum*	bighead clover

PLANTS	PLANTS species	Use	form	R6code	R6 old species	common_name
CACA4	*Calamagrostis canadensis*	nfor	grami	CACA	*Calamagrostis canadensis*	bluejoint reedgrass
DAUN	*Danthonia unispicata*	nfor	grami	DAUN	*Danthonia unispicata*	One-Spike Oatgrass
DECA18	*Deschampsia caespitosa*	nfor	grami	DECE	*Deschampsia cespitosa*	tufted hairgrass
FEVI	*Festuca viridula*	nfor	grami	FEVI	*Festuca viridula*	green fescue
LECI4	*Leymus cinereus*	nfor	grami	ELCI2	*Elymus cinereus*	giant wildrye
POPR	*Poa pratensis*	nfor	grami	POPR	*Poa pratensis*	Kentucky bluegrass
POSE	*Poa secunda*	nfor	grami	POSA	*Poa sandbergii*	Sandberg's bluegrass
ARLUE	*Artemisia ludoviciana ssp. estesii*	sens	shrub	ARLUE	*Artemisia ludoviciana ssp. estesii*	Estes' wormwood
AGEL	*Agoseris elata*	sens	forb	AGEL	*Agoseris elata*	Tall agoseris
ALBO	*Allium bolanderi*	sens	forb	ALBO	*Allium bolanderi*	Bolander's onion
ALBR	*Allium brandegeei*	sens	forb	ALBR	*Allium brandegei*	brandegee onion
ALMA6	*Allium madidum*	sens	forb	ALMA2	*Allium madidum*	swamp onion
ARSUH	*Arabis suffrutescens var. horizontalis*	sens	forb	ARSUH	*Arabis suffrutescens var. horizontalis*	Crater Lake rockcress
ARVI6	*Arnica viscosa*	sens	forb	ARVI2	*Arnica viscose*	Shasta arnica
ASCAV	*Asarum caudatum var. viridiflorum*	sens	forb	ASWA2	*Asarum wagnerii*	green-flowered ginger
ASDI2	*Astragalus diaphanus*	sens	forb	ASDID2	*Astragalus diaphanous var. diurnus*	transparent milkvetch
ASDI2	*Astragalus diaphanus*	sens	forb	ASDID	*Astragalus diaphanus var. diaphanus*	transparent milkvetch
ASHO3	*Astragalus howellii*	sens	forb	ASHOH	*Astragalus howellii var. howellii*	Howell's milkvetch
ASPE4	*Astragalus peckii*	sens	forb	ASPE2	*Astragalus peckii*	Peck's milkvetch
ASTE4	*Astragalus tegetarioides*	sens	forb	ASTE	*Astragalus tegetarioides*	Deschutes milkvetch
BOPU2	*Botrychium pumicola*	sens	forb	BOPU	*Botrychium pumicola*	pumice grape-fern
CACH15	*Castilleja chlorotica*	sens	forb	CACH4	*Castilleja chlorotica*	green-tinged paintbrush
CALOL	*Calochortus longebarbatus var. longebarbatus*	sens	forb	CALOL	*Calochortus longebarbatus var. longebarbatus*	long-bearded mariposa lily
CALOP4	*Calochortus longebarbatus var. peckii*	sens	forb	CALOP	*Calochortus longebarbatus var. peckii*	long-bearded mariposa lily
CASC6	*Campanula scabrella*	sens	forb	CASC	*Campanula scabrella*	rough harebell
CIBU	*Cicuta bulbifera*	sens	forb	CIBU	*Cicuta bulbifera*	bulb-bearing waterhemlock
COMA	*Collomia mazama*	sens	forb	COMA4	*Collomia mazama*	Mt. Mazama collomia
COMA3	*Collomia macrocalyx*	sens	forb	COMA	*Collomia macrocalyx*	bristle-flower collomia
CYCA4	*Cypripedium californicum*	sens	forb	CYCA	*Cypripedium californicum*	California lady's slipper
CYNI3	*Cymopterus nivalis*	sens	forb	CYNI	*Cymopterus nivalis*	Hayden's cymopterus
CYPA19	*Cypripedium parviflorum*	sens	forb	CYCAP	*Cypripedium calceolus var. parviflorum*	yellow lady's slipper
DRAU2	*Draba aureola*	sens	forb	DRAU	*Draba aureola*	alpine draba
ERDI10	*Eriogonum diclinum*	sens	forb	ERDI3	*Eriogonum diclinum*	Jayne's Canyon buckwheat
ERPR9	*Eriogonum prociduum*	sens	forb	ERPR3	*Eriogonum prociduum*	prostrate buckwheat
EUGO5	*Eucephalus gormanii*	sens	forb	ASGO	*Aster gormanii*	Gorman's aster
GASEW	*Galium serpenticum ssp. Warnerense*	sens	forb	GASEW	*Galium serpenticum ssp. Warnerense*	Warner Mtn. bedstraw
GENE	*Gentiana newberryi*	sens	forb	GENE	*Gentiana newberryi*	Newberry's gentian
HAWHD 2	*Hazardia whitneyi var. discoideus*	sens	forb	HAWHD	*Haplopappus whitneyi ssp. discoideus*	Whitney's haplopappus
HIBO	*Hieracium bolanderi*	sens	forb	HIBO	*Hieracium bolanderi*	Bolander's hawkweed
IVSH	*Ivesia shockleyi*	sens	forb	IVSH	*Ivesia shockleyi*	Shockley's ivesia
LODO	*Lobelia dortmanna*	sens	forb	LODO3	*Lobelia dortmanna*	Water lobelia

PLANTS	PLANTS species	Use	form	R6code	R6 old species	common_name
LUCU	*Lupinus cusickii*	sens	forb	LUCU	*Lupinus cusickii*	Cusick's lupine
LYAN2	*Lycopodium annotinum*	sens	forb	LYAN	*Lycopodium annotinum*	Stiff club-moss
MIJE	*Mimulus jepsonii*	sens	forb	MIJE	*Mimulus jepsonii*	Jepson's monkey-flower
MITR3	*Mimulus tricolor*	sens	forb	MITR3	*Mimulus tricolor*	tricolored monkey-flower
OPPU3	*Ophioglossum pusillum*	sens	forb	OPVU	*Ophioglossum vulgatum*	adder's-tongue
OXOC	*Oxypolis occidentalis*	sens	forb	OXOC	*Oxypolis occidentalis*	western oxypolis
PEER3	*Perideridia erythrorhiza*	sens	forb	PEER2	*Perideridia erythrorhiza*	red-root yampah
PEGL10	*Penstemon glaucinus*	sens	forb	PEGL6	*Penstemon glaucinus*	blue-leaved penstemon
PEHO5	*Perideridia howellii*	sens	forb	PEHO	*Perideridia howellii*	Howell's yampah
PEPE10	*Penstemon peckii*	sens	forb	PEPE2	*Penstemon peckii*	Peck's penstemon
ROCO3	*Rorippa columbiae*	sens	forb	ROCO	*Rorippa columbiae*	Columbia cress
SINUI2	*Silene nuda ssp. insectivora*	sens	forb	SINUI	*Silene nuda ssp. insectivora*	fringed campion
SISCS	*Silene scaposa var. scaposa*	sens	forb	SISCS	*Silene scaposa var. scaposa*	scapose catchfly
STPS	*Stylocline psilocarphoides*	sens	forb	STPS	*Stylocline psilocarphoides*	Peck's stylocline
THBR	*Thelypodium brachycarpum*	sens	forb	THBR	*Thelypodium brachycarpum*	Short-fruited thelypodium
THHOH	*Thelypodium howellii ssp. howellii*	sens	forb	THHOH	*Thelypodium howellii ssp. howellii*	Howell's thelypodium
ACHE10	*Achnatherum hendersonii*	sens	grami	ORHE	*Oryzopsis hendersonii*	Henderson's ricegrass
CABR	*Calamagrostis breweri*	sens	grami	CABR7	*Calamagrostis breweri*	brewer's reedgrass
CAMI7	*Carex microptera*	sens	grami	CALI3	*Carex limnophila*	pond sedge
MEST	*Melica stricta*	sens	grami	MEST	*Melica stricta*	nodding melica
PLOR3	*Pleuropogon oregonus*	sens	grami	PLOR	*Pleuropogon oregonus*	Oregon semaphoregrass
CYSC4	*Cytisus scoparius*	weed	shrub	CYSC	*Cytisus scoparius*	broom, Scotch
RUDI2	*Rubus discolor*	weed	shrub	RUDI	*Rubus discolor*	Himalayan blackberry
ACRE3	*Acroptilon repens*	weed	forb	CERE	*Centaurea repens*	Russian Knapweed
ACRE3	*Acroptilon repens*	weed	forb	ACRE3	*Acroptilon repens*	Russian knapweed
ARMI2	*Arctium minus*	weed	forb	ARMI2	*Arctium minus*	lessor burdock
KOSC	*Kochia scoparia*	weed	forb	BASC5	*Bassia scoparia*	kochia
CADR	*Cardaria draba*	weed	forb	CADR2	*Cardaria draba*	white top (hoary cress)
CANU4	*Carduus nutans*	weed	forb	CANU4	*Carduus nutans*	musk thistle
CEBI2	*Centaurea bieberstinii*	weed	forb	CEMA	*Centaurea maculosa*	spotted knapweed
CEDI3	*Centaurea diffusa*	weed	forb	CEDI	*Centaurea diffusa*	diffuse knapweed
CESO3	*Centaurea solstitialis*	weed	forb	CESO	*Centaurea solstitialis*	yellow starthistle
CHJU	*Chondrilla juncea*	weed	forb	CHJU	*Chondrilla juncea*	rush skeletonweed
CIAR4	*Cirsium arvense*	weed	forb	CIAR	*Cirsium arvense*	canada thistle
CIVU	*Cirsium vulgare*	weed	forb	CIVU	*Cirsium vulgare*	bull thistle
COAR4	*Convolvulus arvensis*	weed	forb	COAR2	*Convolvulus arvensis*	field bindweed
CYOF	*Cynoglossum officinale*	weed	forb	CYOF	*Cynoglossum officinale*	hound's tongue
DIFU2	*Dipsacus fullonum*	weed	forb	DISY	*Dipsacus sylvestris*	teasel
EUES	*Euphorbia esula*	weed	forb	EUES	*Euphorbia esula*	leafy spurge
HYPE	*Hypericum perforatum*	weed	forb	HYPE	*Hypericum perforatum*	common St. John's wort
ISTI	*Isatis tinctoria*	weed	forb	ISTI	*Isatis tinctoria*	dyers woad
LIDA	*Linaria dalmatica*	weed	forb	LIDA	*Linaria dalmatica*	dalmation toadflax
LIVU2	*Linaria vulgaris*	weed	forb	LIVU2	*Linaria vulgaris*	yellow toadflax
LYSA2	*Lythrum salicaria*	weed	forb	LYSA	*Lythrum salicaria*	purple loosestrife
MADIA	*Madia*	weed	forb	MADIA	*Madia spp.*	tarweed
ONAC	*Onopordum acanthium*	weed	forb	ONAC	*Onopordum acanthium*	scotch thistle
PORE5	*Potentilla recta*	weed	forb	PORE	*Potentilla recta*	cinquefoil, sulfur
SAAE	*Salvia aethiopis*	weed	forb	SAAE2	*Salvia aethiopis*	mediterranean sage
SAKA	*Salsola kali*	weed	forb	SAKA	*Salsola kali*	russian thistle

PLANTS	*PLANTS species*	Use	form	R6code	R6 old species	common_name
SEJA	*Senecio jacobaea*	weed	forb	SEJA	*Senecio jacobaea*	tansy ragwort
SIMA3	*Silybum marianum*	weed	forb	SIMA3	*Silybum marianum*	milk thistle
SOAR2	*Sonchus arvensis*	weed	forb	SOAR	*Sonchus arvensis*	perennial sowthistle
TAPA6	*Tanecetum parthenium*	weed	forb	TAPA6	*Tanecetum parthenium*	feverfew
TRTE	*Tribulus terrestris*	weed	forb	TRTR	*Tribulus terrestris*	puncturevine
VETH	*Verbascum thapsus*	weed	forb	VETH	*Verbascum thapsus*	mullein, common
ELRE4	*Elymus repens*	weed	grami	AGRE	*Agropyron repens*	quackgrass
PHAR3	*Phalaris arundinacea*	weed	grami	PHAR	*Phalaris arundinacea*	reed canary grass
PHAR3	*Phalaris arundinacea*	weed	grami	PHARP	*Phalaris arundinacea var. picta*	ribbongrass
TACA8	*Taeniatherum caput-medusae*	weed	grami	TACA	*Taeniatherum caput-medusae*	medusa head
VEDU	*Ventenata dubia*	weed	grami	VEDU	*Ventenata dubia*	ventenata

SUBSECTION A.3.5 NE OREGON

Malheur, Umatilla, and Wallowa-Whitman National Forests.

ID Guide: Johnson, Charles Grier Jr. 1993. Common Plants of the Inland Pacific Northwest, Malheur, Umatilla, Wallowa-Whitman National Forests. USDA Forest Service, Pacific Northwest Region R6-ERW-TP051-93.

PLANTS	*PLANTS species*	Use	form	R6code	R6 old species	common_name
TABR2	*Taxus brevifolia*	indi	tree	TABR	*Taxus brevifolia*	western yew
ACGLD4	*Acer glabrum var. Douglasii*	indi	shrub	ACGLD	*Acer glabrum var. Douglasii*	Douglas maple
ALVIS	*Alnus viridis ssp. sinuata*	indi	shrub	ALSI	*Alnus sinuata*	sitka alder
ARAR8	*Artemisia arbuscula*	indi	shrub	ARAR	*Artemisia arbuscula*	low sagebrush
ARCTO3	*Arctostaphylos spp.*	indi	shrub	ARCTO	*Arctostaphylos spp.*	Arctostaphylos spp.
ARRI2	*Artemisia rigida*	indi	shrub	ARRI	*Artemisia rigida*	stiff sagebrush
ARTRV	*Artemisia tridentata ssp. vaseyana*	indi	shrub	ARTRV	*Artemisia tridentata vaseyana*	mountain big sagebrush
CELE3	*Cercocarpus ledifolius*	indi	shrub	CELE	*Cercocarpus ledifolius*	curlleaf mountain mahogany
HODI	*Holodiscus discolor*	indi	shrub	HODI	*Holodiscus discolor*	oceanspray
MEFE	*Menziesia ferruginea*	indi	shrub	MEFE	*Menziesia ferruginea*	fool's huckleberry
PERA4	*Peraphyllum ramosissimum*	indi	shrub	PERA3	*Peraphyllum ramosissimum*	squaw apple
PHEM	*Phyllodoce empetriformis*	indi	shrub	PHEM	*Phyllodoce empetriformis*	pink mountain-heath
PHMA5	*Physocarpus malvaceus*	indi	shrub	PHMA	*Physocarpus malvaceus*	ninebark
PUTR2	*Purshia tridentata*	indi	shrub	PUTR	*Purshia tridentata*	bitterbrush
RHAL2	*Rhododendron albiflorum*	indi	shrub	RHAL	*Rhododendron albiflorum*	cascades azalea
RHGL	*Rhus glabra*	indi	shrub	RHGL	*Rhus glabra*	smooth sumac
SPBE2	*Spiraea betulifolia*	indi	shrub	SPBE	*Spiraea betulifolia*	birchleaf spirea
SYAL	*Symphoricarpos albus*	indi	shrub	SYAL	*Symphoricarpos albus*	common snowberry
SYOR2	*Symphoricarpos oreophilus*	indi	shrub	SYOR	*Symphoricarpos oreophilus*	mountain snowberry
VAME	*Vaccinium membranaceum*	indi	shrub	VAME	*Vaccinium membranaceum*	big huckleberry
VASC	*Vaccinium scoparium*	indi	shrub	VASC	*Vaccinium scoparium*	grouse huckleberry
ADBI	*Adenocaulon bicolor*	indi	forb	ADBI	*Adenocaulon bicolor*	trail plant
ARCO9	*Arnica cordifolia*	indi	forb	ARCO	*Arnica cordifolia*	heart-leaf arnica
ASCA2	*Asarum caudatum*	indi	forb	ASCA3	*Asarum caudatum*	wild ginger
CLUN2	*Clintonia uniflora*	indi	forb	CLUN	*Clintonia uniflora*	queen's cup beadlilly
COCA13	*Cornus canadensis*	indi	forb	COCA	*Cornus canadensis*	bunchberry
COOC	*Coptis occidentalis*	indi	forb	COOC2	*Coptis occidentalis*	goldthread
DITR2	*Disporum trachycarpum*	indi	forb	DITR	*Disporum tracycarpum*	fairy bells
GYDR	*Gymnocarpium dryopteris*	indi	forb	GYDR	*Gymnocarpium dryopteris*	oak fern
LIBO3	*Linnaea borealis*	indi	forb	LIBO2	*Linnaea borealis*	twinflower
POMU	*Polystichum munitum*	indi	forb	POMU	*Polystichum munitum*	western swordfern
POPH	*Polygonum phytolaccaefolium*	indi	forb	POPH	*Polygonum phytolaccaefolium*	pokeweed fleeceflower
POPU3	*Polemonium pulcherrimum*	indi	forb	POPU	*Polemonium pulcherrimum*	Jacob's ladder
PTAQ	*Pteridium aquilinum*	indi	forb	PTAQ	*Pteridium aquilinum*	bracken fern
SETR	*Senecio triangularis*	indi	forb	SETR	*Senecio triangularis*	arrowleaf groundsel
STAM2	*Streptopus amplexifolius*	indi	forb	STAM	*Streptopus amplexifolius*	twisted stalk
TITRU	*Tiarella trifoliata var. unifoliata*	indi	forb	TITRU	*Tiarella trifoliata unifoliata*	coolwort foamflower
TRCA	*Trautvetteria caroliniensis*	indi	forb	TRCA3	*Trautvetteria caroliniensis*	false bugbane
VASI	*Valeriana sitchensis*	indi	forb	VASI	*Valeriana sitchensis*	Sitka valerian

PLANTS	*PLANTS species*	Use	form	R6code	R6 old species	common_name
ACOCO	*Achnatherum occidentale ssp. occidentale*	indi	grami	STOC	*Stipa occidentalis*	Western Needlegrass
BRVU	*Bromus vulgaris*	indi	grami	BRVU	*Bromus vulgaris*	columbia brome
CAGE2	*Carex geyeri*	indi	grami	CAGE	*Carex geyeri*	elk sedge
CARO5	*Carex rossii*	indi	grami	CARO	*Carex rossii*	ross' sedge
CARU	*Calamagrostis rubescens*	indi	grami	CARU	*Calamagrostis rubescens*	pinegrass
FEID	*Festuca idahoensis*	indi	grami	FEID	*Festuca idahoensis*	Idaho fescue
JUDR	*Juncus drummondii*	indi	grami	JUDR	*Juncus drummondii*	drummond rush
POSE	*Poa secunda*	indi	grami	POSA	*Poa sandbergii*	Sandberg's bluegrass
POWH2	*Poa wheeleri*	indi	grami	PONEW	*Poa nervosa wheeleri*	Wheeler's bluegrass
PSSPS	*Pseudoroegneria spicata ssp. spicata*	indi	grami	AGSP	*Agropyron spicatum*	bluebunch wheatgrass
ALVIS	*Alnus viridis ssp. sinuata*	nfor	shrub	ALSI	*Alnus sinuata*	sitka alder
AMAL2	*Amelanchier alnifolia*	nfor	shrub	AMAL	*Amelanchier alnifolia*	Saskatoon serviceberry
ARAR8	*Artemisia arbuscula*	nfor	shrub	ARAR	*Artemisia arbuscula*	low sagebrush
ARRI2	*Artemisia rigida*	nfor	shrub	ARRI	*Artemisia rigida*	stiff sagebrush
ARTRV	*Artemisia tridentata ssp. vaseyana*	nfor	shrub	ARTRV	*Artemisia tridentata vaseyana*	mountain big sagebrush
CELAR	*Celtis laevigata var. reticulata*	nfor	shrub	CERE2	*Celtis reticulata*	netleaf hackberry
CELE3	*Cercocarpus ledifolius*	nfor	shrub	CELE	*Cercocarpus ledifolius*	curlleaf mountain mahogany
CEVE	*Ceanothus velutinus*	nfor	shrub	CEVE	*Ceanothus velutinus*	snowbrush ceanothus
GLSPA	*Glossopetalon spinescens var. aridium*	nfor	shrub	GLNE	*Glossopetalon nevadense*	Snake River green-bush
HODI	*Holodiscus discolor*	nfor	shrub	HODI	*Holodiscus discolor*	oceanspray
PERA4	*Peraphyllum ramosissimum*	nfor	shrub	PERA3	*Peraphyllum ramosissimum*	squaw apple
PHLE4	*Philadelphus lewisii*	nfor	shrub	PHLE4	*Philadelphus lewisii*	Lewis' mock orange
PHMA5	*Physocarpus malvaceus*	nfor	shrub	PHMA	*Physocarpus malvaceus*	ninebark
PRUNU	*Prunus spp*	nfor	shrub	PRUNUS	*Prunus spp*	cherry or choke cherry
PUTR2	*Purshia tridentata*	nfor	shrub	PUTR	*Purshia tridentata*	bitterbrush
RHGL	*Rhus glabra*	nfor	shrub	RHGL	*Rhus glabra*	smooth sumac
ROSA5	*Rosa spp.*	nfor	shrub	ROSA	*Rosa spp.*	rose
SYAL	*Symphoricarpos albus*	nfor	shrub	SYAL	*Symphoricarpos albus*	common snowberry
SYOR2	*Symphoricarpos oreophilus*	nfor	shrub	SYOR	*Symphoricarpos oreophilus*	mountain snowberry
ASCU5	*Astragalus cusickii*	nfor	forb	ASCU4	*Astragalus cusickii*	Cusick's milkvetch
ASIN5	*Astragalus inflexus*	nfor	forb	ASIN2	*Astragalus inflexus*	hairy milkvetch
BAIN	*Balsamorhiza incana*	nfor	forb	BAIN	*Balsamorhiza incana*	hoary balsmroot
BASA3	*Balsamorhiza sagittata*	nfor	forb	BASA	*Balsamorhiza sagittata*	arrowleaf balsamroot
CACU2	*Camassia cusickii*	nfor	forb	CACU	*Camassia cusickii*	Cusick's camas
DAOR2	*Dalea ornata*	nfor	forb	PEOR4	*Petalostemon ornatus*	western prairie-clover
ERCH4	*Erigeron chrysopsidis*	nfor	forb	ERCH	*Erigeron chrysopsidis*	dwarf yellow fleabane
ERDO	*Eriogonum douglasii*	nfor	forb	ERDO	*Eriogonum douglasii*	Douglas' buckwheat
ERFL4	*Eriogonum flavum*	nfor	forb	ERFL	*Eriogonum flavum*	golden buckwheat
ERHE2	*Eriogonum heracleoides*	nfor	forb	ERHE	*Eriogonum heracleoides*	creamy or wyeth's buckwheat
ERMI4	*Eriogonum microthecum*	nfor	forb	ERMI	*Eriogonum microthecum*	slender buckwheat
ERPU2	*Erigeron pumilus*	nfor	forb	ERPU	*Erigeron pumilus*	shaggy fleabane
ERST4	*Eriogonum strictum*	nfor	forb	ERST2	*Eriogonum strictum*	strict buckwheat
ERUMM	*Eriogonum umbellatum var. majus*	nfor	forb	ERUMS	*Eriogonum umbellatum subalpinum*	sulfur buckwheat
FRAL2	*Frasera albicaulis*	nfor	forb	FRAL2	*Frasera albicaulis*	white stemmed frasera

PLANTS	PLANTS species	Use	form	R6code	R6 old species	common_name
GETR	*Geum triflorum*	nfor	forb	GETR	*Geum triflorum*	red avens, old man's whiskers
HICY	*Hieracium cynoglossoides*	nfor	forb	HIAL2	*Hieracium albertinum*	western hawkweed
LECOW	*Lewisia columbiana var. wallowaensis*	nfor	forb	LECOW	*Lewisia columbiana wallowaensis*	wallowa lewisia
LOCO4	*Lomatium cous*	nfor	forb	LOCO2	*Lomatium cous*	cous biscuit-root
LOMA3	*Lomatium macrocarpum*	nfor	forb	LOMA	*Lomatium macrocarpum*	large fruited lomatium
LUARL5	*Lupinus argenteus ssp. argenteus var. laxiflorus*	nfor	forb	LULA2	*Lupinus laxiflorus*	spurred lupine
LUCA	*Lupinus caudatus*	nfor	forb	LUCA	*Lupinus caudatus*	tailcup lupine
LUSE4	*Lupinus sericeus*	nfor	forb	LUSE	*Lupinus sericeus*	silky lupine
OECA10	*Oenothera caespitosa*	nfor	forb	OECA2	*Oenothera caespitosa*	desert evening primrose
OPPO	*Opuntia polyacantha*	nfor	forb	OPPO	*Opuntia polyacantha*	plains prickly pear
PEEL4	*Penstemon elegantulus*	nfor	forb	PEEL	*Penstemon elegantulus*	lovely penstemon
PEGL5	*Penstemon globosus*	nfor	forb	PEGL4	*Penstemon globosus*	globe penstemon
PETR6	*Penstemon triphyllus*	nfor	forb	PETR	*Penstemon triphyllus*	whorled penstemon
PHCO10	*Phlox colubrina*	nfor	forb	PHCO2	*Phlox colubrina*	Snake River phlox
PHOR2	*Physaria oregana*	nfor	forb	PHOR	*Physaria oregana*	Oregon twinpod
POPH	*Polygonum phytolaccaefolium*	nfor	forb	POPH	*Polygonum phytolaccaefolium*	pokeweed fleeceflower
SCAN3	*Scutellaria angustifolia*	nfor	forb	SCAN	*Scutellaria angustifolia*	narrowleaf skullcap
SELA	*Sedum lanceolatum*	nfor	forb	SELA2	*Sedum lanceolatum*	lanceleaved stonecrop
TRMA3	*Trifolium macrocephalum*	nfor	forb	TRMA	*Trifolium macrocephalum*	bighead clover
ACOCO	*Achnatherum occidentale ssp. occidentale*	nfor	grami	STOC	*Stipa occidentalis*	western needlegrass
ARPUL	*Aristida purpurea longiseta*	nfor	grami	ARLO3	*Aristida longiseta*	fendler (red) threeawn
BRCA5	*Bromus carinatus*	nfor	grami	BRCA	*Bromus carinatus*	California brome
CAGE2	*Carex geyeri*	nfor	grami	CAGE	*Carex geyeri*	elk sedge
CAHO5	*Carex hoodii*	nfor	grami	CAHO	*Carex hoodii*	Hood's sedge
CAPE7	*Carex petasata*	nfor	grami	CAPE	*Carex petasata*	Liddon's sedge
DAIN	*Danthonia intermedia*	nfor	grami	DAIN	*Danthonia intermedia*	timber oatgrass
DAUN	*Danthonia unispicata*	nfor	grami	DAUN	*Danthonia unispicata*	one-spike oatgrass
ELELE	*Elymus elymoides ssp. elymoides*	nfor	grami	SIHY	*Sitanian hystrix*	bottlebrush squirreltail
FEID	*Festuca idahoensis*	nfor	grami	FEID	*Festuca idahoensis*	Idaho fescue
FEVI	*Festuca viridula*	nfor	grami	FEVI	*Festuca viridula*	green fescue
JUPA	*Juncus parryi*	nfor	grami	JUPA	*Juncus parryi*	Parry's rush
KOMA	*Koeleria macrantha*	nfor	grami	KOCR	*Koeleria cristata*	prairie junegrass
LECI4	*Leymus cinereus*	nfor	grami	ELCI2	*Elymus cinereus*	giant wildrye
POPR	*Poa pratensis*	nfor	grami	POPR	*Poa pratensis*	Kentucky bluegrass
POSE	*Poa secunda*	nfor	grami	POSA	*Poa sandbergii*	Sandberg's bluegrass
POWH2	*Poa wheeleri*	nfor	grami	PONEW	*Poa nervosa wheeleri*	wheeler's bluegrass
PSSPS	*Pseudoroegneria spicata ssp. spicata*	nfor	grami	AGSP	*Agropyron spicatum*	bluebunch wheatgrass
SPCR	*Sporobolus cryptandrus*	nfor	grami	SPCR	*Sporobolus cryptandrus*	sand dropseed
CYSC4	*Cytisus scoparius*	weed	shrub	CYSC	*Cytisus scoparius*	broom, Scotch
ACRE3	*Acroptilon repens*	weed	forb	ACRE3	*Acroptilon repens*	russian knapweed
CADR	*Cardaria draba*	weed	forb	CADR2	*Cardaria draba*	white top (hoary cress)
CANU4	*Carduus nutans*	weed	forb	CANU4	*Carduus nutans*	musk thistle
CEBI2	*Centaurea bieberstinii*	weed	forb	CEMA	*Centaurea maculosa*	spotted knapweed
CEDI3	*Centaurea diffusa*	weed	forb	CEDI	*Centaurea diffusa*	diffuse knapweed
CESO3	*Centaurea solstitialis*	weed	forb	CESO	*Centaurea solstitialis*	yellow starthistle

PLANTS	PLANTS species	Use	form	R6code	R6 old species	common_name
CHJU	*Chondrilla juncea*	weed	forb	CHJU	*Chondrilla juncea*	rush skeletonweed
CIAR4	*Cirsium arvense*	weed	forb	CIAR	*Cirsium arvense*	canada thistle
CIDO	*Cicuta douglasii*	weed	forb	CIDO	*Cicuta douglasii*	water hemlock
CIVU	*Cirsium vulgare*	weed	forb	CIVU	*Cirsium vulgare*	bull thistle
COMA2	*Conium maculatum*	weed	forb	COMA2	*Conium maculatum*	poison hemlock
CYOF	*Cynoglossum officinale*	weed	forb	CYOF	*Cynoglossum officinale*	hound's tongue
DIFU2	*Dipsacus fullonum*	weed	forb	DISY	*Dipsacus sylvestris*	teasel
EUES	*Euphorbia esula*	weed	forb	EUES	*Euphorbia esula*	leafy spurge
HEPU5	*Hemizonia pungens*	weed	forb	HEPU2	*Hemizonia pungens*	spikeweed
HYNI	*Hyoscyamus niger*	weed	forb	HYNI	*Hyoscyamus niger*	black henbane
HYPE	*Hypericum perforatum*	weed	forb	HYPE	*Hypericum perforatum*	common St. John's wort
LELA2	*Lepidium latifolium*	weed	forb	LELA	*Lepidium latifolium*	perennial pepperweed
LIDA	*Linaria dalmatica*	weed	forb	LIDA	*Linaria dalmatica*	dalmation toadflax
LIVU2	*Linaria vulgaris*	weed	forb	LIVU2	*Linaria vulgaris*	yellow toadflax
LYSA2	*Lythrum salicaria*	weed	forb	LYSA	*Lythrum salicaria*	purple loosestrife
ONAC	*Onopordum acanthium*	weed	forb	ONAC	*Onopordum acanthium*	scotch thistle
PORE5	*Potentilla recta*	weed	forb	PORE	*Potentilla recta*	cinquefoil, sulfur
SAAE	*Salvia aethiopis*	weed	forb	SAAE2	*Salvia aethiopis*	mediterranean sage
SAOF4	*Saponaria officinallis*	weed	forb	SAOF2	*Saponaria officinallis*	bounching bet, soapwort
SEJA	*Senecio jacobaea*	weed	forb	SEJA	*Senecio jacobaea*	tansy ragwort
TAVU	*Tanacetum vulgare*	weed	forb	TAVU	*Tanacetum vulgare*	common tansy
TRTE	*Tribulus terrestris*	weed	forb	TRTR	*Tribulus terrestris*	puncturevine
ZIVE	*Zigadenus venenosus*	weed	forb	ZIVE	*Zigadenus venenosus*	meadow deathcamus
CELO3	*Cenchrus longispinus*	weed	grami	CELO	*Cenchrus longispinus*	sandbur, longspine
DAGL	*Dactylis glomerata*	weed	grami	DAGL	*Dactylis glomerata*	orchard grass
LOLIU	*Lolium spp*	weed	grami	LOLIU	*Lolium spp*	ryegrass
PHPR3	*Phleum pratense*	weed	grami	PHPR	*Phleum pratense*	timothy
TACA8	*Taeniatherum caput-medusae*	weed	grami	TACA	*Taeniatherum caput-medusae*	medusa head
THIN6	*Thinopyrum intermedium*	weed	grami	AGIN2	*Agropyron intermedium*	intermediate wheatgrass
THIN6	*Thinopyrum intermedium*	weed	grami	AGTR2	*Agropyron trichophorum*	pubescent wheatgrass

SUBSECTION A.3.6 NW WASHINGTON

Mt. Baker-Snoqualmie (605), Olympic (609) National Forests.

ID Guide: Lesher, Robin D., and Jan A. Henderson. 1992. Indicator Species of Forested Plant Associations on National Forests of Northwestern Washington. USDA Forest Service, Pacific Northwest Region R6-MBS-TP-041-1992.

PLANTS	*PLANTS species*	Use	form	R6code	*R6 old species*	common_name
ACCI	*Acer circinatum*	indi	shrub	ACCI	*Acer circinatum*	vine maple
ARUV	*Arctostaphylos uva-ursi*	indi	shrub	ARUV	*Arctostaphylos uva-ursi*	bearberry, kinnikinnick
CHME	*Chimaphila menziesii*	indi	shrub	CHME	*Chimaphila menziesii*	little prince’s-pine
CHUM	*Chimaphila umbellata*	indi	shrub	CHUM	*Chimaphila umbellata*	prince's pine
ELPY	*Elliota pyroliflorus*	indi	shrub	CLPY	*Cladothamnus pyrolaeflorus*	copperbrush
FRPU7	*Frangula purshiana*	indi	shrub	RHPU	*Rhamnus purshiana*	cascara
GASH	*Gaultheria shallon*	indi	shrub	GASH	*Gaultheria shallon*	salal
HODI	*Holodiscus discolor*	indi	shrub	HODI	*Holodiscus discolor*	oceanspray
JUCO6	*Juniperus communis*	indi	shrub	JUCO4	*Juniperus communis*	common juniper
LOHI2	*Lonicera hispidula*	indi	shrub	LOHI	*Lonicera hispidula*	hairy honeysuckle
MANE2	*Mahonia nervosa*	indi	shrub	BENE	*Berberis nervosa*	Oregon grape
OPHO	*Oplopanax horridus*	indi	shrub	OPHO	*Oplopanax horridus*	devil's club
PAMY	*Paxistima myrsinites*	indi	shrub	PAMY	*Pachistima myrsinites*	Oregon boxwood
PHEM	*Phyllodoce empetriformis*	indi	shrub	PHEM	*Phyllodoce empetriformis*	pink mountain-heath
RHAL2	*Rhododendron albiflorum*	indi	shrub	RHAL	*Rhododendron albiflorum*	cascades azalea
RHMA3	*Rhododendron macrophyllum*	indi	shrub	RHMA	*Rhododendron macrophyllum*	Pacific rhododendron
RIBR	*Ribes bracteosum*	indi	shrub	RIBR	*Ribes bracteosum*	stink currant
ROGY	*Rosa gymnocarpa*	indi	shrub	ROGY	*Rosa gymnocarpa*	baldhip rose
RULA2	*Rubus lasiococcus*	indi	shrub	RULA	*Rubus lasiococcus*	dwarf bramble
RUPE	*Rubus pedatus*	indi	shrub	RUPE	*Rubus pedatus*	five-leaved bramble
RUSP	*Rubus spectabilis*	indi	shrub	RUSP	*Rubus spectabilis*	salmonberry
SARA2	*Sambucus racemosa*	indi	shrub	SARA	*Sambucus racemosa*	red elderberry
SOSI2	*Sorbus sitchensis*	indi	shrub	SOSI	*Sorbus sitchensis*	Sitka mountain-ash
SYAL	*Symphoricarpos albus*	indi	shrub	SYAL	*Symphoricarpos albus*	common snowberry
VADE	*Vaccinium deliciosum*	indi	shrub	VADE	*Vaccinium deliciosum*	delicious blueberry
VAME	*Vaccinium membranaceum*	indi	shrub	VAME	*Vaccinium membranaceum*	big huckleberry
VAOV	*Vaccinium ovalifolium*	indi	shrub	VAAL	*Vaccinium alaskense*	Alaska huckleberry
VAOV	*Vaccinium ovalifolium*	indi	shrub	VAOV	*Vaccinium ovalifolium*	oval-leaf huckleberry
VAOV2	*Vaccinium ovatum*	indi	shrub	VAOV2	*Vaccinium ovatum*	evergreen huckleberry
VAPA	*Vaccinium parvifolium*	indi	shrub	VAPA	*Vaccinium parvifolium*	red huckleberry
ACTR	*Achlys triphylla*	indi	forb	ACTR	*Achlys triphylla*	vanilla leaf
ATFI	*Athyrium filix-femina*	indi	forb	ATFI	*Athyrium filix-femina*	common ladyfern
BLSP	*Blechnum spicant*	indi	forb	BLSP	*Blechnum spicant*	deer fern
CALEH2	*Caltha leptosepala ssp. howellii*	indi	forb	CABI	*Caltha biflora*	two-flowered marsh-marigold
CASC7	*Campanula scouleri*	indi	forb	CASC2	*Campanula scouleri*	Scouler's harebell
CIAL	*Circaea alpina*	indi	forb	CIAL	*Circaea alpina*	enchanter's nightshade
CLSI2	*Claytonia sibirica*	indi	forb	MOSI	*Claytonia sibirica*	miner's lettuce
CLUN2	*Clintonia uniflora*	indi	forb	CLUN	*Clintonia uniflora*	queen's cup beadlilly
COCA13	*Cornus canadensis*	indi	forb	COCA	*Cornus canadensis*	bunchberry
COME4	*Corallorhiza mertensiana*	indi	forb	COME	*Corallorhiza mertensiana*	western coralroot
DRCA11	*Dryopteris carthusiana*	indi	forb	DRAU2	*Dryopteris campyloptera*	shield-fern
ERMO8	*Erythronium montanum*	indi	forb	ERMO	*Erythronium montanum*	avalanche lily/giant faw
GATR3	*Galium triflorum*	indi	forb	GATR	*Galium triflorum*	sweetscented bedstraw

PLANTS	*PLANTS species*	Use	form	R6code	*R6 old species*	common_name
GOOB2	*Goodyera oblongifolia*	indi	forb	GOOB	*Goodyera oblongifolia*	western rattlesnake-plantain
GYDR	*Gymnocarpium dryopteris*	indi	forb	GYDR	*Gymnocarpium dryopteris*	oak fern
LEVU	*Leucanthemum vulgare*	weed	forb	CHLE2	*Chrysanthemum leucanthemum*	oxeye daisy
LIBO3	*Linnaea borealis*	indi	forb	LIBO2	*Linnaea borealis*	twinflower
LULA4	*Lupinus latifolius*	indi	forb	LULA	*Lupinus latifolius*	broadleaf lupine
LYAM3	*Lysichiton americanus*	indi	forb	LYAM	*Lysichiton americanum*	skunk cabbage
MADI	*Maianthemum dilatatum*	indi	forb	MADI2	*Maianthemum dilatatum*	false lily of the vally
MAST4	*Maianthemum stellatum*	indi	forb	SMST	*Smilacina stellata*	starry Solomon's seal
MOMA3	*Moehringia macrophylla*	indi	forb	ARMA3	*Arenaria macrophylla*	bigleaf sandwort
OXOR	*Oxalis oregana*	indi	forb	OXOR	*Oxalis oregana*	Oregon oxalis
POMU	*Polystichum munitum*	indi	forb	POMU	*Polystichum munitum*	western swordfern
ORSE	*Orthilia secunda*	indi	forb	PYSE	*Pyrola secunda*	sidebells pyrola
STLAC	*Streptopus lanceolatus var. curvipes*	indi	forb	STRO	*Streptopus roseus*	rosy twistedstalk
STST3	*Streptopus streptopoides*	indi	forb	STST	*Streptopus streptopoides*	kruhsea twisted-stalk
TITR	*Tiarella trifoliata*	indi	forb	TITR	*Tiarella trifoliata*	threeleaf foamflower
TITRU	*Tiarella trifoliata var. unifoliata*	indi	forb	TIUN	*Tiarella unifoliata*	coolwort foamflower
TRBOL	*Trientalis borealis ssp. latifolia*	indi	forb	TRLA2	*Trientalis latifolia*	western starflower
VAHE	*Vancouveria hexandra*	indi	forb	VAHE	*Vancouveria hexandra*	white inside-out-flower
VASI	*Valeriana sitchensis*	indi	forb	VASI	*Valeriana sitchensis*	sitka valerian
XETE	*Xerophyllum tenax*	indi	forb	XETE	*Xerophyllum tenax*	beargrass
FEOC	*Festuca occidentalis*	indi	grami	FEOC	*Festuca occidentalis*	western fescue
ALVIS	*Alnus viridis ssp. sinuata*	nfor	shrub	ALSI	*Alnus sinuata*	sitka alder
ARUV	*Arctostaphylos uva-ursi*	nfor	shrub	ARUV	*Arctostaphylos uva-ursi*	bearberry, kinnikinnick
CAME7	*Cassiope mertensiana*	nfor	shrub	CAME	*Cassiope mertensiana*	western moss heather
ELPY	*Elliota pyroliflorus*	nfor	shrub	CLPY	*Cladothamnus pyrolaeflorus*	copperbrush
COSES	*Cornus sericia ssp. sericia*	nfor	shrub	COST	*Cornus stolonifera*	red-osier dogwood
DAFL3	*Dasiphora floribunda*	nfor	shrub	POFR	*Potentilla fruticosa*	shrubby cinquefoil
EMNI	*Empetrum nigrum*	nfor	shrub	EMNI	*Empetrum nigrum*	black crowberry
JUCO6	*Juniperus communis*	nfor	shrub	JUCO4	*Juniperus communis*	common juniper
KAMI	*Kalmia microphylla*	nfor	shrub	KAMI	*Kalmia microphylla*	alpine laurel
PHEM	*Phyllodoce empetriformis*	nfor	shrub	PHEM	*Phyllodoce empetriformis*	pink mountain-heath
PHGL6	*Phyllodoce glanduliflora*	nfor	shrub	PHGL	*Phyllodoce glanduliflora*	tellow mountain-heath
RIBR	*Ribes bracteosum*	nfor	shrub	RIBR	*Ribes bracteosum*	stink currant
RUSP	*Rubus spectabilis*	nfor	shrub	RUSP	*Rubus spectabilis*	salmonberry
SABA3	*Salix barclayi*	nfor	shrub	SABA3	*Salix barclayi*	Barclay's willow
SACA6	*Salix cascadensis*	nfor	shrub	SACA6	*Salix cascadensis*	Cascade willow
SACO2	*Salix commutata*	nfor	shrub	SACO2	*Salix commutata*	undergreen willow
SANI8	*Salix nivalis*	nfor	shrub	SANI	*Salix nivalis*	snow willow
SASI2	*Salix sitchensis*	nfor	shrub	SASI2	*Salix sitchensis*	Sitka willow
SPDO	*Spiraea douglasii*	nfor	shrub	SPDO	*Spiraea douglasii*	Douglas spiraea
SPSPS	*Spiraea splendens var. splendens*	nfor	shrub	SPDE	*Spiraea densiflora*	rose meadowsweet
VADE	*Vaccinium deliciosum*	nfor	shrub	VADE	*Vaccinium deliciosum*	delicious blueberry
ANLA3	*Antennaria lanata*	nfor	forb	ANLA	*Antennaria lanata*	woolly pussytoes
CALEH2	*Caltha leptosepala ssp. howellii*	nfor	forb	CABI	*Caltha biflora*	two-flowered marsh-marigold
CAPA26	*Castilleja parviflora*	nfor	forb	CAPA3	*Castilleja parviflora*	mountain paintbrush

PLANTS	*PLANTS species*	Use	form	R6code	*R6 old species*	common_name
CARU9	*Castilleja rupicola*	nfor	forb	CARU4	*Castilleja rupicola*	cliff paintbrush
CHLA13	*Chamerion latifolium*	nfor	forb	EPLA	*Epilobium latifolium*	dwarf fireweed
DOJE	*Dodecatheon jeffreyi*	nfor	forb	DOJE	*Dodecatheon jeffreyi*	Sierra shootingstar
DOPU	*Dodecatheon pulchellum*	nfor	forb	DOPU2	*Dodecatheon pulchellum*	darkthroat shootingstar
EPAN4	*Epilobium anagallidifolium*	nfor	forb	EPAL	*Epilobium alpinum*	pimpernel willowherb
EQAR	*Equisetum arvense*	nfor	forb	EQAR	*Equisetum arvense*	common horsetail
EQFL	*Equisetum fluviatile*	nfor	forb	EQFL	*Equisetum fluviatile*	water horsetail
EQHY	*Equisetum hyemale*	nfor	forb	EQHY	*Equisetum hyemale*	scouringbrush horsetail
ERPE3	*Erigeron peregrinus*	nfor	forb	ERPE	*Erigeron peregrinus*	subalpine fleabane
HEMA80	*Heracleum maximum*	nfor	forb	HELA	*Heracleum lanatum*	common cowparsnip
LEPY	*Leptarrhena pyrolifolia*	nfor	forb	LEPY2	*Leptarrhena pyrolifolia*	fireleaf leptarrhena
LOMA5	*Lomatium martindalei*	nfor	forb	LOMA2	*Lomatium martindalei*	Cascade desertparsley
LULA4	*Lupinus latifolius*	nfor	forb	LULA	*Lupinus latifolius*	broadleaf lupine
LUPE	*Luetkea pectinata*	nfor	forb	LUPE	*Luetkea pectinata*	partridgefoot
METR3	*Menyanthes trifoliata*	nfor	forb	METR	*Menyanthes trifoliata*	buckbean
MILE2	*Mimulus lewisii*	nfor	forb	MILE	*Mimulus lewisii*	purple monkeyflower
NULUP	*Nuphar lutea ssp. polysepala*	nfor	forb	NUPO	*Nuphar polysepala*	Rocky Mountain pondlily
PEDA2	*Penstemon davidsonii*	nfor	forb	PEDA	*Penstemon davidsonii*	Davidson's penstemon
PEGR2	*Pedicularis groenlandica*	nfor	forb	PEGR	*Pedicularis groenlandica*	elephanthead
PHDI3	*Phlox diffusa*	nfor	forb	PHDI	*Phlox diffusa*	spreading phlox
POBI6	*Polygonum bistortoides*	nfor	forb	POBI	*Polygonum bistortoides*	American bistort
POFL3	*Potentilla flabellifolia*	nfor	forb	POFL2	*Potentilla flabellifolia*	high mountain cinquefoil
RAES	*Ranunculus eschscholtzii*	nfor	forb	RAES	*Ranunculus eschscholtzii*	Eschsholtz's buttercup
SABR6	*Saxifraga bronchialis*	nfor	forb	SABR	*Saxifraga bronchialis*	yellowdot saxifrage
SATO2	*Saxifraga tolmiei*	nfor	forb	SATO	*Saxifraga tolmiei*	Tolmie's saxifrage
SIAC	*Silene acaulis*	nfor	forb	SIAC	*Silene acaulis*	moss campion
VASI	*Valeriana sitchensis*	nfor	forb	VASI	*Valeriana sitchensis*	sitka valerian
VEVI	*Veratrum viride*	nfor	forb	VEVI	*Veratrum viride*	American false hellebore
VIPA4	*Viola palustris*	nfor	forb	VIPA2	*Viola palustris*	marsh violet
XETE	*Xerophyllum tenax*	nfor	forb	XETE	*Xerophyllum tenax*	beargrass
CACA4	*Calamagrostis canadensis*	nfor	grami	CACA	*Calamagrostis canadensis*	bluejoint reedgrass
CAIN11	*Carex interior*	nfor	grami	CAIN5	*Carex interior*	inland sedge
CALE8	*Carex lenticularis*	nfor	grami	CALE5	*Carex lenticularis*	lakeshore sedge
CANI2	*Carex nigricans*	nfor	grami	CANI2	*Carex nigricans*	black alpine sedge
CASP5	*Carex spectabilis*	nfor	grami	CASP	*Carex spectabilis*	showy sedge
ERAN6	*Eriophorum angustifolium*	nfor	grami	ERPO2	*Eriophorum polystachion*	many-spiked cotton-grass
FEOV	*Festuca ovina*	nfor	grami	FEOV	*Festuca ovina*	sheep fescue
FEVI	*Festuca viridula*	nfor	grami	FEVI	*Festuca viridula*	green fescue
JUDR	*Juncus drummondii*	nfor	grami	JUDR	*Juncus drummondii*	drummond rush
JUPA	*Juncus parryi*	nfor	grami	JUPA	*Juncus parryi*	Parry's rush
LUPI2	*Luzula piperi*	nfor	grami	HEGL	*Luzula piperi*	Piper's woodrush
SCMI2	*Scirpus microcarpus*	nfor	grami	SCMI	*Scirpus microcarpus*	small-fruit bulrush
SPAN2	*Sparganium angustifolium*	nfor	grami	SPAN	*Sparganium angustifolium*	narrowleaf burr-reed
BOTRY	*Botrychium spp.*	sens	forb	BOSPP	*Botrychium spp.*	grageferns (genus)
COAS	*Coptis asplenifolia*	sens	forb	COAS	*Coptis asplenifolia*	spleen-leaved goldthread
ERRE5	*Erythronium revolutum*	sens	forb	ERRE	*Erythronium revolutum*	pink fawn lily
GAKA	*Galium kamtschaticum*	sens	forb	GAKA	*Galium kamtschaticum*	boreal bedstraw
PLFI2	*Pleuricospora fimbriloata*	sens	forb	PLFI2	*Pleuricospora fimbriloata*	fringed pinesap
CYSC4	*Cytisus scoparius*	weed	shrub	CYSC	*Cytisus scoparius*	broom, Scotch

PLANTS	*PLANTS species*	Use	form	R6code	*R6 old species*	common_name
CEBI2	*Centaurea bieberstinii*	weed	forb	CEMA	*Centaurea maculosa*	spotted knapweed
CEDET	*Centaurea debeauxii ssp. thuillieri*	weed	forb	CENIJ	*Centaurea jacea x nigra*	knapweed, meadow
CEDI3	*Centaurea diffusa*	weed	forb	CEDI	*Centaurea diffusa*	diffuse knapweed
CEJA	*Centaurea jacea*	weed	forb	CEJA	*Centaurea jacea*	brown knapweed
CENI3	*Centaurea nigrescens*	weed	forb	CENI4	*Centaurea nigrescens*	vochin knapweed
CESO3	*Centaurea solstitialis*	weed	forb	CESO	*Centaurea solstitialis*	yellow starthistle
LEVU	*Leucanthemum vulgare*	weed	forb	CHLE2	*Chrysanthemum leucanthemum*	oxeye daisy
CIAR4	*Cirsium arvense*	weed	forb	CIAR	*Cirsium arvense*	canada thistle
CIVU	*Cirsium vulgare*	weed	forb	CIVU	*Cirsium vulgare*	bull thistle
DACA6	*Daucus carota*	weed	forb	DACA4	*Daucus carota*	wild carrot
GERO	*Geranium robertianum*	weed	forb	GERO	*Geranium robertianum*	herb-Robert
HIAU	*Hieracium aurantiacum*	weed	forb	HIAU	*Hieracium aurantiacum*	hawkweed, orange
HICA10	*Hieracium caespitosum*	weed	forb	HICA	*Hieracium caespitosum*	yellow hawkweed
HYPE	*Hypericum perforatum*	weed	forb	HYPE	*Hypericum perforatum*	common st. john's wort
HYRA3	*Hypochaeris radicata*	weed	forb	HYRA	*Hypochaeris radicata*	catsear, spotted
LELA2	*Lepidium latifolium*	weed	forb	LELA	*Lepidium latifolium*	perennial pepperweed
LIDAD	*Linaria dalmatica ssp. dalmatica*	weed	forb	LIGED	*Linaria genistifolla dalmatatian*	dalmatian toadflax
LIVU2	*Linaria vulgaris*	weed	forb	LIVU2	*Linaria vulgaris*	yellow toadflax
LYSA2	*Lythrum salicaria*	weed	forb	LYSA	*Lythrum salicaria*	purple loosestrife
POCU6	*Polygonum cuspidatum*	weed	forb	POCU2	*Polygonum cuspidatum*	Japanese knotweed
PORE5	*Potentilla recta*	weed	forb	PORE	*Potentilla recta*	cinquefoil, sulfur
SEJA	*Senecio jacobaea*	weed	forb	SEJA	*Senecio jacobaea*	tansy ragwort
SOAR2	*Sonchus arvensis*	weed	forb	SOAR	*Sonchus arvensis*	perennial sowthistle
TAVU	*Tanacetum vulgare*	weed	forb	TAVU	*Tanacetum vulgare*	common tansy
VETH	*Verbascum thapsus*	weed	forb	VETH	*Verbascum thapsus*	mullein, common
CYESL	*Cyperus esculentus var. leptostachyus*	weed	grami	CYES	*Cyperus esculentus*	yellow nutsedge
PHAR3	*Phalaris arundinacea*	weed	grami	PHAR	*Phalaris arundinacea*	reed canarygrass

SUBSECTION A.3.7 SW WASHINGTON

Gifford Pinchot (603) National Forest.

ID Guide: Halverson, Nancy M. 1986. Major Indicator Shrubs and Herbs on National Forests of Western Oregon and Southwestern Washington. USDA Forest Service, Pacific Northwest Region R6-TM-229-1986.

PLANTS	PLANTS species	Use	form	R6code	R6 old species	common_name
ACCI	*Acer circinatum*	indi	shrub	ACCI	*Acer circinatum*	vine maple
AMAL2	*Amelanchier alnifolia*	indi	shrub	AMAL	*Amelanchier alnifolia*	Saskatoon serviceberry
ARNE	*Arctostaphylos nevadensis*	indi	shrub	ARNE	*Arctostaphylos nevadensis*	pinemat manzanita
ARUV	*Arctostaphylos uva-ursi*	indi	shrub	ARUV	*Arctostaphylos uva-ursi*	bearberry, kinnikinnick
CHUM	*Chimaphila umbellata*	indi	shrub	CHUM	*Chimaphila umbellata*	prince's pine
COCO6	*Corylus cornuta*	indi	shrub	COCO2	*Corylus cornuta*	California hazel
GASH	*Gaultheria shallon*	indi	shrub	GASH	*Gaultheria shallon*	salal
HODI	*Holodiscus discolor*	indi	shrub	HODI	*Holodiscus discolor*	oceanspray
JUCO6	*Juniperus communis*	indi	shrub	JUCO4	*Juniperus communis*	common juniper
LOHI2	*Lonicera hispidula*	indi	shrub	LOHI	*Lonicera hispidula*	hairy honeysuckle
MAAQ2	*Mahonia aquifolium*	indi	shrub	BEAQ	*Berberis aquifolium*	tall Oregon grape
MANE2	*Mahonia nervosa*	indi	shrub	BENE	*Berberis nervosa*	Oregon grape
MEFE	*Menziesia ferruginea*	indi	shrub	MEFE	*Menziesia ferruginea*	fool's huckleberry
OPHO	*Oplopanax horridus*	indi	shrub	OPHO	*Oplopanax horridus*	devil's club
PAMY	*Paxistima myrsinites*	indi	shrub	PAMY	*Pachistima myrsinites*	Oregon boxwood
PHEM	*Phyllodoce empetriformis*	indi	shrub	PHEM	*Phyllodoce empetriformis*	pink mountain-heath
RHAL2	*Rhododendron albiflorum*	indi	shrub	RHAL	*Rhododendron albiflorum*	cascades azalea
RHMA3	*Rhododendron macrophyllum*	indi	shrub	RHMA	*Rhododendron macrophyllum*	Pacific rhododendron
ROGY	*Rosa gymnocarpa*	indi	shrub	ROGY	*Rosa gymnocarpa*	baldhip rose
RULA2	*Rubus lasiococcus*	indi	shrub	RULA	*Rubus lasiococcus*	dwarf bramble
RUPA	*Rubus parviflorus*	indi	shrub	RUPA	*Rubus parviflorus*	thimbleberry
RUPE	*Rubus pedatus*	indi	shrub	RUPE	*Rubus pedatus*	five-leaved bramble
RUSP	*Rubus spectabilis*	indi	shrub	RUSP	*Rubus spectabilis*	salmonberry
RUUR	*Rubus ursinus*	indi	shrub	RUUR	*Rubus ursinus*	Pacific blackberry
SYHE	*Symphoricarpos hesperius*	indi	shrub	SYMO	*Symphoricarpos mollis*	trailing snowberry
VADE	*Vaccinium deliciosum*	indi	shrub	VADE	*Vaccinium deliciosum*	delicious blueberry
VAME	*Vaccinium membranaceum*	indi	shrub	VAME	*Vaccinium membranaceum*	big huckleberry
VAOV	*Vaccinium ovalifolium*	indi	shrub	VAOV	*Vaccinium ovalifolium*	oval-leaf huckleberry
VAOV	*Vaccinium ovalifolium*	indi	shrub	VAAL	*Vaccinium alaskense*	Alaska huckleberry
VAOV2	*Vaccinium ovatum*	indi	shrub	VAOV2	*Vaccinium ovatum*	evergreen huckleberry
VAPA	*Vaccinium parvifolium*	indi	shrub	VAPA	*Vaccinium parvifolium*	red huckleberry
VASC	*Vaccinium scoparium*	indi	shrub	VASC	*Vaccinium scoparium*	grouse huckleberry
WHMO	*Whipplea modesta*	indi	shrub	WHMO	*Whipplea modesta*	whipplevine
ACTR	*Achlys triphylla*	indi	forb	ACTR	*Achlys triphylla*	vanilla leaf
ADAL	*Adiantum aleuticum*	indi	forb	ADPE	*Adiantum pedatum*	maidenhar fern
ADBI	*Adenocaulon bicolor*	indi	forb	ADBI	*Adenocaulon bicolor*	trail plant
ANDE3	*Anemone deltoidea*	indi	forb	ANDE	*Anemone deltoidea*	threeleaf anemone
ARLA8	*Arnica latifolia*	indi	forb	ARLA	*Arnica latifolia*	broadleaf arnica
ASCA2	*Asarum caudatum*	indi	forb	ASCA3	*Asarum caudatum*	wild ginger
ATFI	*Athyrium filix-femina*	indi	forb	ATFI	*Athyrium filix-femina*	common ladyfern
BLSP	*Blechnum spicant*	indi	forb	BLSP	*Blechnum spicant*	deer fern
CLSI2	*Claytonia sibirica*	indi	forb	MOSI	*Claytonia sibirica*	miner's lettuce
CLUN2	*Clintonia uniflora*	indi	forb	CLUN	*Clintonia uniflora*	queen's cup beadlilly
COCA13	*Cornus canadensis*	indi	forb	COCA	*Cornus canadensis*	bunchberry

PLANTS	PLANTS species	Use	form	R6code	R6 old species	common_name
DIHO3	*Disporum hookeri*	indi	forb	DIHO	*Disporum hookeri*	Hooker fairybells
DRCA11	*Dryopteris carthusiana*	indi	forb	DRAU2	*Dryopteris campyloptera*	shield-fern
ERMO8	*Erythronium montanum*	indi	forb	ERMO	*Erythronium montanum*	avalanche lily/giant faw
EULEL2	*Eucephalus ledophyllus var. ledophyllus*	indi	forb	ASLE2	*Aster ledophyllus*	Cascades aster
FRVE	*Fragaria vesca*	indi	forb	FRVE	*Fragaria vesca*	woodland strawberry
GATR3	*Galium triflorum*	indi	forb	GATR	*Galium triflorum*	sweetscented bedstraw
GYDR	*Gymnocarpium dryopteris*	indi	forb	GYDR	*Gymnocarpium dryopteris*	oak fern
HIAL2	*Hieracium albiflorum*	indi	forb	HIAL	*Hieracium albiflorum*	white hawkweed
IRTE	*Iris tenax*	indi	forb	IRTE	*Iris tenax*	Oregon iris
LAPO3	*Lathyrus polyphyllus*	indi	forb	LAPO	*Lathyrus polyphyllus*	leafy pea vine
LEVU	*Leucanthemum vulgare*	weed	forb	CHLE2	*Chrysanthemum leucanthemum*	oxeye daisy
LIBO3	*Linnaea borealis*	indi	forb	LIBO2	*Linnaea borealis*	twinflower
LULA4	*Lupinus latifolius*	indi	forb	LULA	*Lupinus latifolius*	broadleaf lupine
LYAM3	*Lysichiton americanus*	indi	forb	LYAM	*Lysichiton americanum*	skunk cabbage
MADI	*Maianthemum dilatatum*	indi	forb	MADI2	*Maianthemum dilatatum*	false lily of the vally
MARA7	*Maianthemum racemosum*	indi	forb	SMRA	*Smilacina racemosa*	false Solomon's seal
MAST4	*Maianthemum stellatum*	indi	forb	SMST	*Smilacina stellata*	starry Solomon's seal
MIBR6	*Mitella breweri*	indi	forb	MIBR	*Mitella breweri*	Brewer's miterwort
MOMA3	*Moehringia macrophylla*	indi	forb	ARMA3	*Arenaria macrophylla*	bigleaf sandwort
OXOR	*Oxalis oregana*	indi	forb	OXOR	*Oxalis oregana*	Oregon oxalis
PODA	*Polygonum davisiae*	indi	forb	PONE4	*Polygonum newberryi*	Newberry's fleeceflower
POMU	*Polystichum munitum*	indi	forb	POMU	*Polystichum munitum*	western swordfern
PTAQ	*Pteridium aquilinum*	indi	forb	PTAQ	*Pteridium aquilinum*	bracken fern
ORSE	*Orthilia secunda*	indi	forb	PYSE	*Pyrola secunda*	sidebells pyrola
SAME7	*Saxifraga mertensiana*	indi	forb	SAME3	*Saxifraga mertensiana*	Merten's saxifrage
STLAC	*Streptopus lanceolatus var. curvipes*	indi	forb	STRO	*Streptopus roseus*	Rosy twistedstalk
STME	*Stachys mexicana*	indi	forb	STME2	*Stachys mexicana*	Mexican hedgenettle
SYRE	*Synthyris reniformis*	indi	forb	SYRE	*Synthyris reniformis*	snowqueen
TITRU	*Tiarella trifoliata var. unifoliata*	indi	forb	TITRU	*Tiarella trifoliata unifoliata*	coolwort foamflower
TRBOL	*Trientalis borealis ssp. latifolia*	indi	forb	TRLA2	*Trientalis latifolia*	western starflower
TROV2	*Trillium ovatum*	indi	forb	TROV	*Trillium ovatum*	white trillium
VAHE	*Vancouveria hexandra*	indi	forb	VAHE	*Vancouveria hexandra*	white inside-out-flower
VASI	*Valeriana sitchensis*	indi	forb	VASI	*Valeriana sitchensis*	sitka valerian
VIGL	*Viola glabella*	indi	forb	VIGL	*Viola glabella*	stream violet
XETE	*Xerophyllum tenax*	indi	forb	XETE	*Xerophyllum tenax*	beargrass
CAGE2	*Carex geyeri*	indi	grami	CAGE	*Carex geyeri*	elk sedge
CARU	*Calamagrostis rubescens*	indi	grami	CARU	*Calamagrostis rubescens*	pinegrass
FEID	*Festuca idahoensis*	indi	grami	FEID	*Festuca idahoensis*	idaho fescue
FEOC	*Festuca occidentalis*	indi	grami	FEOC	*Festuca occidentalis*	western fescue
FEVI	*Festuca viridula*	indi	grami	FEVI	*Festuca viridula*	green fescue
LUGLH	*Luzula glabrata var. hitchcockii*	indi	grami	LUHI	*Luzula hitchcokii*	smooth woodrush
CYSC4	*Cytisus scoparius*	weed	shrub	CYSC	*Cytisus scoparius*	broom, Scotch
CEBI2	*Centaurea bieberstinii*	weed	forb	CEMA	*Centaurea maculosa*	spotted knapweed
CEDET	*Centaurea debeauxii ssp. thuillieri*	weed	forb	CENIJ	*Centaurea jacea x nigra*	knapweed, meadow
CEDI3	*Centaurea diffusa*	weed	forb	CEDI	*Centaurea diffusa*	diffuse knapweed
CEJA	*Centaurea jacea*	weed	forb	CEJA	*Centaurea jacea*	brown knapweed

PLANTS	PLANTS species	Use	form	R6code	R6 old species	common_name
CENI3	*Centaurea nigrescens*	weed	forb	CENI4	*Centaurea nigrescens*	vochin knapweed
CESO3	*Centaurea solstitialis*	weed	forb	CESO	*Centaurea solstitialis*	yellow starthistle
LEVU	*Leucanthemum vulgare*	weed	forb	CHLE2	*Chrysanthemum leucanthemum*	oxeye daisy
CIAR4	*Cirsium arvense*	weed	forb	CIAR	*Cirsium arvense*	Canada thistle
CIVU	*Cirsium vulgare*	weed	forb	CIVU	*Cirsium vulgare*	bull thistle
DACA6	*Daucus carota*	weed	forb	DACA4	*Daucus carota*	wild carrot
GERO	*Geranium robertianum*	weed	forb	GERO	*Geranium robertianum*	herb-Robert
HIAU	*Hieracium aurantiacum*	weed	forb	HIAU	*Hieracium aurantiacum*	hawkweed, orange
HICA10	*Hieracium caespitosum*	weed	forb	HICA	*Hieracium caespitosum*	yellow hawkweed
HYPE	*Hypericum perforatum*	weed	forb	HYPE	*Hypericum perforatum*	common st. john's wort
HYRA3	*Hypochaeris radicata*	weed	forb	HYRA	*Hypochaeris radicata*	catsear, spotted
LELA2	*Lepidium latifolium*	weed	forb	LELA	*Lepidium latifolium*	perennial pepperweed
LIDAD	*Linaria dalmatica ssp. dalmatica*	weed	forb	LIGED	*Linaria genistifolla dalmatatian*	dalmatian toadflax
LIVU2	*Linaria vulgaris*	weed	forb	LIVU2	*Linaria vulgaris*	yellow toadflax
LYSA2	*Lythrum salicaria*	weed	forb	LYSA	*Lythrum salicaria*	purple loosestrife
POCU6	*Polygonum cuspidatum*	weed	forb	POCU2	*Polygonum cuspidatum*	Japanese knotweed
PORE5	*Potentilla recta*	weed	forb	PORE	*Potentilla recta*	cinquefoil, sulfur
SEJA	*Senecio jacobaea*	weed	forb	SEJA	*Senecio jacobaea*	tansy ragwort
SOAR2	*Sonchus arvensis*	weed	forb	SOAR	*Sonchus arvensis*	perennial sowthistle
TAVU	*Tanacetum vulgare*	weed	forb	TAVU	*Tanacetum vulgare*	common tansy
VETH	*Verbascum thapsus*	weed	forb	VETH	*Verbascum thapsus*	mullein, common
CYESL	*Cyperus esculentus var. leptostachyus*	weed	grami	CYES	*Cyperus esculentus*	yellow nutsedge
PHAR3	*Phalaris arundinacea*	weed	grami	PHAR	*Phalaris arundinacea*	reed canarygrass

SUBSECTION A.3.8 NE WASHINGTON

Colville (621), Okanogan (608), Wenatchee (617) National Forests.

ID Guide: Williams, Clinton K., and Terry R. Lillybridge. 1987. Major Indicator Shrubs and Herbs on National Forests of Eastern Washington, USDA Forest Service, Pacific Northwest Region R6-TM-TP-304-87

PLANTS	PLANTS species	Use	form	R6code	R6 old species	common_name
TABR2	Taxus brevifolia	indi	tree	TABR	*Taxus brevifolia*	western yew
ACCI	Acer circinatum	indi	shrub	ACCI	*Acer circinatum*	vine maple
ACGLD4	Acer glabrum var. Douglasii	indi	shrub	ACGLD	*Acer glabrum var. Douglasii*	Douglas maple
ALVIS	Alnus viridis ssp. sinuata	indi	shrub	ALSI	*Alnus sinuata*	sitka alder
AMAL2	Amelanchier alnifolia	indi	shrub	AMAL	*Amelanchier alnifolia*	Saskatoon serviceberry
ARNE	Arctostaphylos nevadensis	indi	shrub	ARNE	*Arctostaphylos nevadensis*	pinemat manzanita
ARTRV	Artemisia tridentata ssp. vaseyana	indi	shrub	ARTRV	*Artemisia tridentata vaseyana*	mountain big sagebrush
ARUV	Arctostaphylos uva-ursi	indi	shrub	ARUV	*Arctostaphylos uva-ursi*	bearberry, kinnikinnick
CESA	Ceanothus sanguineus	indi	shrub	CESA	*Ceanothus sanguineus*	redstem ceanothus
CEVE	Ceanothus velutinus	indi	shrub	CEVE	*Ceanothus velutinus*	snowbrush ceanothus
CHUMO2	Chimaphila umbellata ssp. occidentalis	indi	shrub	CHUMO	*Chimaphila umbellata var. occidentalis*	western prince's pine
COSES	Cornus sericia ssp. sericia	indi	shrub	COST	*Cornus stolonifera*	red-osier dogwood
GAOV2	Gaultheria ovatifolia	indi	shrub	GAOV	*Gaultheria ovatifolia*	slender salal
HODI	Holodiscus discolor	indi	shrub	HODI	*Holodiscus discolor*	oceanspray
LEGL	Ledum glandulosum	indi	shrub	LEGL	*Ledum glandulosum*	western ledum
LOUT2	Lonicera utahensis	indi	shrub	LOUT2	*Lonicera utahensis*	Utah honeysuckle
MAAQ2	Mahonia aquifolium	indi	shrub	BEAQ	*Berberis aquifolium*	tall Oregon grape
MANE2	Mahonia nervosa	indi	shrub	BENE	*Berberis nervosa*	Oregon grape
MEFE	Menziesia ferruginea	indi	shrub	MEFE	*Menziesia ferruginea*	fool's huckleberry
OPHO	Oplopanax horridus	indi	shrub	OPHO	*Oplopanax horridus*	devil's club
PAMY	Paxistima myrsinites	indi	shrub	PAMY	*Pachistima myrsinites*	Oregon boxwood
PHEM	Phyllodoce empetriformis	indi	shrub	PHEM	*Phyllodoce empetriformis*	pink mountain-heath
PHMA5	Physocarpus malvaceus	indi	shrub	PHMA	*Physocarpus malvaceus*	ninebark
PUTR2	Purshia tridentata	indi	shrub	PUTR	*Purshia tridentata*	bitterbrush
RHAL2	Rhododendron albiflorum	indi	shrub	RHAL	*Rhododendron albiflorum*	cascades azalea
RICE	Ribes cereum	indi	shrub	RICE	*Ribes cereum*	squaw current
RILA	Ribes lacustre	indi	shrub	RILA	*Ribes lacustre*	prickly currant
RIVI3	Ribes viscossissimum	indi	shrub	RIVI	*Ribes viscossissimum*	sticky currant
ROGY	Rosa gymnocarpa	indi	shrub	ROGY	*Rosa gymnocarpa*	baldhip rose
ROSA5	Rosa spp.	indi	shrub	ROSA	*Rosa spp.*	rose
RULA2	Rubus lasiococcus	indi	shrub	RULA	*Rubus lasiococcus*	dwarf bramble
RUPA	Rubus parviflorus	indi	shrub	RUPA	*Rubus parviflorus*	thimbleberry
RUPE	Rubus pedatus	indi	shrub	RUPE	*Rubus pedatus*	five-leaved bramble
SASC	Salix scouleriana	indi	shrub	SASC	*Salix scouleriana*	Scouler's willow
SHCA	Shepherdia canadensis	indi	shrub	SHCA	*Shepherdia canadensis*	russet buffaloberry
SOSC2	Sorbus scopulina	indi	shrub	SOSC2	*Sorbus scopulina*	mountain ash
SPBEL	Spiraea betulifolia var. lucida	indi	shrub	SPBEL	*Spiraea betulifolia var. lucida*	shiny-leaf spirea
SYAL	Symphoricarpos albus	indi	shrub	SYAL	*Symphoricarpos albus*	common snowberry
SYHE	Symphoricarpos hesperius	indi	shrub	SYMOH	*Symphoricarpos mollis var. hesperius*	creeping snowberry
SYOR2	Symphoricarpos oreophilus	indi	shrub	SYOR	*Symphoricarpos oreophilus*	mountain snowberry

PLANTS	PLANTS species	Use	form	R6code	R6 old species	common_name
VACA13	Vaccinium caespitosum	indi	shrub	VACA	*Vaccinium caespitosum*	dwarf huckleberry
VADE	Vaccinium deliciosum	indi	shrub	VADE	*Vaccinium deliciosum*	delicious blueberry
VAME	Vaccinium membranaceum	indi	shrub	VAME	*Vaccinium membranaceum*	big huckleberry
VAMY2	Vaccinium myrtillus	indi	shrub	VAMY	*Vaccinium myrtillus*	low huckleberry
VAOV	Vaccinium ovalifolium	indi	shrub	VAOV	*Vaccinium ovalifolium*	oval-leaf huckleberry
VAOV	Vaccinium ovalifolium	indi	shrub	VAAL	*Vaccinium alaskense*	Alaska huckleberry
VAPA	Vaccinium parvifolium	indi	shrub	VAPA	*Vaccinium parvifolium*	red huckleberry
VASC	Vaccinium scoparium	indi	shrub	VASC	*Vaccinium scoparium*	grouse huckleberry
ACMI2	Achillea millefolium	indi	forb	ACMI	*Achillea millefolium*	Western Yarrow
ACRU2	Actaea rubra	indi	forb	ACRU	*Actaea rubra*	baneberry
ACTR	Achlys triphylla	indi	forb	ACTR	*Achlys triphylla*	vanilla leaf
ADBI	Adenocaulon bicolor	indi	forb	ADBI	*Adenocaulon bicolor*	trail plant
ARCO9	Arnica cordifolia	indi	forb	ARCO	*Arnica cordifolia*	heart-leaf arnica
ARLA8	Arnica latifolia	indi	forb	ARLA	*Arnica latifolia*	broadleaf arnica
ARNU2	Aralia nudicaulis	indi	forb	ARNU3	*Aralia nudicaulis*	wild sarsparilla
ASCA2	Asarum caudatum	indi	forb	ASCA3	*Asarum caudatum*	wild ginger
ASDE6	Aspidotis densa	indi	forb	ASDE	*Aspidotis densa*	rock fern
ATFI	Athyrium filix-femina	indi	forb	ATFI	*Athyrium filix-femina*	common ladyfern
BASA3	Balsamorhiza sagittata	indi	forb	BASA	*Balsamorhiza sagittata*	arrowleaf balsamroot
CANA5	Cacaliopsis nardosima	indi	forb	LUNA2	*Luina nardosima*	silvercrown
CLUN2	Clintonia uniflora	indi	forb	CLUN	*Clintonia uniflora*	queen's cup beadlilly
COCA13	Cornus canadensis	indi	forb	COCA	*Cornus canadensis*	bunchberry
DIHO3	Disporum hookeri	indi	forb	DIHO	*Disporum hookeri*	Hooker fairybells
DITR2	Disporum trachycarpum	indi	forb	DITR	*Disporum tracycarpum*	fairy bells
EQAR	Equisetum arvense	indi	forb	EQAR	*Equisetum arvense*	common horsetail
GATR3	Galium triflorum	indi	forb	GATR	*Galium triflorum*	sweetscented bedstraw
GYDR	Gymnocarpium dryopteris	indi	forb	GYDR	*Gymnocarpium dryopteris*	oak fern
HIAL2	Hieracium albiflorum	indi	forb	HIAL	*Hieracium albiflorum*	white hawkweed
LAPA5	Lathyrus pauciflorus	indi	forb	LAPA3	*Lathyrus pauciflorus*	few-flowered peavine
LIBOL2	Linnaea borealis ssp. longiflora	indi	forb	LIBOL	*Linnaea borealis longiflora*	western twinflower
LULA4	Lupinus latifolius	indi	forb	LULA	*Lupinus latifolius*	broadleaf lupine
LUSE4	Lupinus sericeus	indi	forb	LUSE	*Lupinus sericeus*	silky lupine
MARA7	Maianthemum racemosum	indi	forb	SMRA	*Smilacina racemosa*	false Solomon's seal
MAST4	Maianthemum stellatum	indi	forb	SMST	*Smilacina stellata*	starry Solomon's seal
MOMA3	Moehringia macrophylla	indi	forb	ARMA3	*Arenaria macrophylla*	Bigleaf Sandwort
OSBE	Osmorhiza berteroi	indi	forb	OSCH	*Osmorhiza chilensis*	sweet Cicely
PEBR	Pedicularis bracteosa	indi	forb	PEBR	*Pedicularis bracteosa*	bracted pedicularis
PERA	Pedicularis racemosa	indi	forb	PERA	*Pedicularis racemosa*	sickletop pedicularis
POMU	Polystichum munitum	indi	forb	POMU	*Polystichum munitum*	western swordfern
PTAQ	Pteridium aquilinum	indi	forb	PTAQ	*Pteridium aquilinum*	bracken fern
PYAS	Pyrola asarifolia	indi	forb	PYAS	*Pyrola asarifolia*	alpine pyrola
ORSE	*Orthilia secunda*	indi	forb	PYSE	*Pyrola secunda*	sidebells pyrola
SETR	Senecio triangularis	indi	forb	SETR	*Senecio triangularis*	arrowleaf groundsel
STAM2	Streptopus amplexifolius	indi	forb	STAM	*Streptopus amplexifolius*	twisted stalk
STLAC	Streptopus lanceolatus var. curvipes	indi	forb	STRO	*Streptopus roseus*	rosy twistedstalk
THOC	Thalictrum occidentale	indi	forb	THOC	*Thalictrum occidentale*	western meadowrue
TITRU	Tiarella trifoliata var. unifoliata	indi	forb	TIUN	*Tiarella unifoliata*	coolwort foamflower

PLANTS	PLANTS species	Use	form	R6code	R6 old species	common_name
TRBOL	Trientalis borealis ssp. latifolia	indi	forb	TRLA2	*Trientalis latifolia*	western starflower
TRCA	Trautvetteria caroliniensis	indi	forb	TRCA3	*Trautvetteria caroliniensis*	false bugbane
TROV2	Trillium ovatum	indi	forb	TROV	*Trillium ovatum*	white trillium
VASI	Valeriana sitchensis	indi	forb	VASI	*Valeriana sitchensis*	Sitka valerian
VEVI	Veratrum viride	indi	forb	VEVI	*Veratrum viride*	American false hellebore
VIGL	Viola glabella	indi	forb	VIGL	*Viola glabella*	stream violet
VIOR	Viola orbiculata	indi	forb	VIOR2	*Viola orbiculata*	round-leaved violet
VIPU4	Viola purpurea	indi	forb	VIPU	*Viola purpurea*	goosefoot violet
XETE	Xerophyllum tenax	indi	forb	XETE	*Xerophyllum tenax*	beargrass
CACO11	Carex concinnoides	indi	grami	CACO	*Carex concinnoides*	northwestern sedge
CAGE2	Carex geyeri	indi	grami	CAGE	*Carex geyeri*	elk sedge
CARO5	Carex rossii	indi	grami	CARO	*Carex rossii*	ross' sedge
CARU	Calamagrostis rubescens	indi	grami	CARU	*Calamagrostis rubescens*	pinegrass
FEID	Festuca idahoensis	indi	grami	FEID	*Festuca idahoensis*	Idaho fescue
FEOC	Festuca occidentalis	indi	grami	FEOC	*Festuca occidentalis*	western fescue
LUGLH	*Luzula glabrata var. hitchcockii*	indi	grami	LUHI	*Luzula hitchcokii*	smooth woodrush
PSSPS	Pseudoroegneria spicata ssp. spicata	indi	grami	AGSP	*Agropyron spicatum*	bluebunch wheatgrass
CYSC4	Cytisus scoparius	weed	shrub	CYSC	*Cytisus scoparius*	broom, Scotch
ACRE3	Acroptilon repens	weed	forb	CERE	*Centaurea repens*	Russian knapweed
ANAR16	Anchusa arvensis	weed	forb	ANOF	*Anchusa arvensis*	bugloss, annual
CAAC	Carduus acanthoides	weed	forb	CAAC	*Carduus acanthoides*	thistle, plumeless
CADR	Cardaria draba	weed	forb	CADR2	*Cardaria draba*	white top (hoary cress)
CANU4	Carduus nutans	weed	forb	CANU4	*Carduus nutans*	musk thistle
CEBI2	Centaurea bieberstinii	weed	forb	CEMA	*Centaurea maculosa*	spotted knapweed
CECA2	Centaurea calcitrapa	weed	forb	CECA	*Centaurea calcitrapa*	starthistle, purple
CEDET	Centaurea debeauxii ssp. thuillieri	weed	forb	CENIJ	*Centaurea jacea x nigra*	knapweed, meadow
CEDI3	Centaurea diffusa	weed	forb	CEDI	*Centaurea diffusa*	diffuse knapweed
CESO3	Centaurea solstitialis	weed	forb	CESO	*Centaurea solstitialis*	yellow starthistle
CHJU	Chondrilla juncea	weed	forb	CHJU	*Chondrilla juncea*	rush skeletonweed
LEVU	*Leucanthemum vulgare*	weed	forb	CHLE2	*Chrysanthemum leucanthemum*	oxeye daisy
CIAR4	Cirsium arvense	weed	forb	CIAR	*Cirsium arvense*	canada thistle
CIVU	Cirsium vulgare	weed	forb	CIVU	*Cirsium vulgare*	bull thistle
CRVU2	Crupina vulgaris	weed	forb	CRVU	*Crupina vulgaris*	crupina, common
CYOF	Cynoglossum officinale	weed	forb	CYOF	*Cynoglossum officinale*	hound's tongue
ECVU	Echium vulgare	weed	forb	ECVU	*Echium vulgare*	blueweed
EUES	Euphorbia esula	weed	forb	EUES	*Euphorbia esula*	leafy spurge
HIAU	Hieracium aurantiacum	weed	forb	HIAU	*Hieracium aurantiacum*	hawkweed, orange
HICA10	Hieracium caespitosum	weed	forb	HIPR	*Hieracium pratense*	hawkweed, yellow
HYPE	Hypericum perforatum	weed	forb	HYPE	*Hypericum perforatum*	common st. john's wort
HYRA3	Hypochaeris radicata	weed	forb	HYRA	*Hypochaeris radicata*	catsear, spotted
ISTI	Isatis tinctoria	weed	forb	ISTI	*Isatis tinctoria*	dyers woad
LELA2	Lepidium latifolium	weed	forb	LELA	*Lepidium latifolium*	perennial pepperweed
LIDAD	Linaria dalmatica ssp. dalmatica	weed	forb	LIGED	*Linaria genistifolla dalmatatian*	dalmatian toadflax
LIVU2	Linaria vulgaris	weed	forb	LIVU2	*Linaria vulgaris*	yellow toadflax
LYSA2	Lythrum salicaria	weed	forb	LYSA	*Lythrum salicaria*	purple loosestrife
MINY	Mirabilis nyctaginea	weed	forb	MINY	*Mirabilis nyctaginea*	four o'clock, wild
MYSP2	Myriophyllum spicatum	weed	forb	MYSP2	*Myriophyllum spicatum*	Eurasian water-milfoil

PLANTS	PLANTS species	Use	form	R6code	R6 old species	common_name
ONAC	Onopordum acanthium	weed	forb	ONAC	*Onopordum acanthium*	scotch thistle
PORE5	Potentilla recta	weed	forb	PORE	*Potentilla recta*	cinquefoil, sulfur
SAPR2	Salvia pratensis	weed	forb	SAPR	*Salvia pratensis*	meadow clary (sage)
SEJA	Senecio jacobaea	weed	forb	SEJA	*Senecio jacobaea*	tansy ragwort
TAVU	Tanacetum vulgare	weed	forb	TAVU	*Tanacetum vulgare*	common tansy
VETH	Verbascum thapsus	weed	forb	VETH	*Verbascum thapsus*	mullein, common
AECY	Aegilops cylindrica	weed	grami	AECY	*Aegilops cylindrica*	goatgrass, jointed
CELO3	Cenchrus longispinus	weed	grami	CELO	*Cenchrus longispinus*	sandbur, longspine

APPENDIX B REFERENCE INFORMATION

SECTION B.1 STATE CODES

Code	State
06	California
16	Idaho *(used for R6 administered plots in Idaho)*
32	Nevada *(used for R5-administered plots in Nevada)*
41	Oregon
53	Washington

SECTION B.2 COUNTY CODES AND DECLINATIONS

SUBSECTION B.2.1 CALIFORNIA COUNTY CODES (06)

Code	County	Decl. East	Unit		Code	County	Decl. East	Unit
001	Alameda	14	CC		059	Orange	12	SO
003	Alpine	14	SJ		061	Placer	14	SA
005	Amador	14	SJ		063	Plumas	14	SA
007	Butte	14	SA		065	Riverside	12	SO
009	Calavaras	14	SJ		067	Sacramento	14	SA
011	Colusa	14	SA		069	San Benito	13	CC
013	Contra Costa	14	CC		071	San Bernardino	12	SO
015	Del Norte	15	NC		073	San Diego	12	SO
017	El Dorado	14	SA		075	San Francisco	14	CC
019	Fresno	13	SJ		077	San Joaquin	14	SJ
021	Glenn	14	SA		079	San Luis Obispo	13	CC
023	Humboldt	15	NC		081	San Mateo	14	CC
025	Imperial	12	SO		083	Santa Barbara	13	CC
027	Inyo	13	SO		085	Santa Clara	14	CC
029	Kern	13	SJ		087	Santa Cruz	14	CC
031	Kings	13	SJ		089	Shasta	15	NI
033	Lake	14	SA		091	Sierra	14	SA
035	Lassen	14	NI		093	Siskiyou	15	NI
037	Los Angeles	12	SO		095	Solano	14	CC
039	Madera	13	SJ		097	Sonoma	14	NC
041	Marin	14	CC		099	Stanislaus	14	SJ
043	Mariposa	13	SJ		101	Sutter	14	SA
045	Mendocino	14	NC		103	Tehama	14	SA
047	Merced	14	SJ		105	Trinity	15	NI
049	Modoc	15	NI		107	Tulare	13	SJ
051	Mono	13	SJ		109	Tuolumne	14	SJ
053	Monterey	13	CC		111	Ventura	13	CC
055	Napa	14	SA		113	Yolo	14	SA
057	Nevada	14	SA		115	Yuba	14	SA

- Units codes: (NC) North Coast, (NI) North Interior, (SA) Sacramento, (CC) Central Coast, (SJ) San Joaquin, (SO) Southern.

SUBSECTION B.2.2 OREGON COUNTY CODES (41)

Code	County	Declination degrees-East	Unit	East or West
001	Baker	14.5	B	E
003	Benton	15.5	WC	W
005	Clackamas	15.5	NW	W
007	Clatsop	16	NW	W
009	Columbia	16	NW	W
011	Coos	15.5	SW	W
013	Crook	15	C	E
015	Curry	15.5	SW	W
017	Deschutes	15	C	E
019	Douglas	15.5	SW	W
021	Gilliam	15.5	C	E
023	Grant	15	B	E
025	Harney	14.5	B	E
027	Hood River	15.5	NW	W
029	Jackson	15	SW	W
031	Jefferson	15.5	C	E
033	Josephine	15	SW	W
035	Klamath	15	C	E
037	Lake	15	C	E
039	Lane	15.5	WC	W
041	Lincoln	16	WC	W
043	Linn	15.5	WC	W
045	Malheur	14	B	E
047	Marion	15.5	NW	W
049	Morrow	15	B	E
051	Multnomah	16	NW	W
053	Polk	16	NW	W
055	Sherman	15.5	C	E
057	Tillamook	16	NW	W
059	Umatilla	15	B	E
061	Union	15	B	E
063	Wallowa	14.5	B	E
065	Wasco	15.5	C	E
067	Washington	16	NW	W
069	Wheeler	15	C	E
071	Yamhill	16	NW	W

- Western Oregon Unit codes: NW = Northwest, SW = Southwest, WC = Westcentral
- Eastern Oregon Unit codes: B = Blue Mountains, C = Central

SUBSECTION B.2.3 WASHINGTON COUNTY CODES (53)

Code	County	Declination Degrees - East	Unit	East or West
001	Adams	15.5	E	E
003	Asotin	14.5	E	E
005	Benton	15.5	E	E
007	Chelan	16	C	E
009	Clallam	17	OLY	W
011	Clark	16	SW	W
013	Columbia	15	E	E
015	Cowlitz	16	SW	W
017	Douglas	16	C	E
019	Ferry	15.5	E	E
021	Franklin	15.5	E	E
023	Garfield	15	E	E
025	Grant	15.5	E	E
027	Grays Harbor	16.5	OLY	W
029	Island	16.5	PS	W
031	Jefferson	16.5	OLY	W
033	King	16	PS	W
035	Kitsap	16.5	PS	W
037	Kittitas	16	C	E
039	Klickitat	15.5	C	E
041	Lewis	16	SW	W
043	Lincoln	15.5	E	E
045	Mason	16.5	OLY	W
047	Okanogan	16	C	E
049	Pacific	16.5	SW	W
051	Pend Oreille	15.5	E	E
053	Pierce	16	PS	W
055	San Juan	17	PS	W
057	Skagit	16.5	PS	W
059	Skamania	16	SW	W
061	Snohomish	16.5	PS	W
063	Spokane	15	E	E
065	Stevens	15.5	E	E
067	Thurston	16.5	OLY	W
069	Wahkiakum	16	SW	W
071	Walla Walla	15	E	E
073	Whatcom	16.5	PS	W
075	Whitman	15	E	E
077	Yakima	15.5	C	E

- Western Washington Unit Codes: OLY = Olympic Unit, PS = Puget Sound unit, SW = Southwest Unit
- Eastern Washington Unit Codes: C = Central Washington Unit, E = Eastern Washington Unit

SUBSECTION B.2.4 NEVADA COUNTY CODES (32)

Code	County	Declination Degrees - East
510	Carson City	14
3	Clark	12
5	Douglas	14
7	Elko	13
9	Esmeralda	13
13	Humboldt	14
19	Lyon	14
21	Mineral	13
23	Nye	13
29	Storey	14
31	Washoe	14

SUBSECTION B.2.5 IDAHO COUNTY CODES (16)

Code	County	Declination Degrees - East
3	Adams	14
9	Benewah	15
17	Bonner	15
21	Boundary	15
27	Canyon	14
49	Idaho	14
55	Kootenai	15
57	Latah	14.5
61	Lewis	14.5
69	Nez Perce	14.5
73	Owyhee	13.5
75	Payette	14
85	Valley	14
87	Washington	14

SECTION B.3 SLOPE CORRECTION TABLE

Percent	Expansion Factor	Expansion Factor Reciprocal	-------Slope Distance-------			
			24.0 feet	58.9 feet	100 feet	185.1 feet
10	1.005	0.995	24.1	59.2	100.5	186.0
15	1.01	0.99	24.3	59.6	101.1	187.2
20	1.02	0.98	24.5	60.1	102.0	188.8
25	1.03	0.97	24.7	60.7	103.1	190.8
30	1.04	0.96	25.1	61.5	104.4	193.3
35	1.06	0.94	25.4	62.4	105.9	196.1
40	1.08	0.93	25.8	63.4	107.7	199.4
45	1.10	0.91	26.3	64.6	109.7	203.0
50	1.12	0.89	26.8	65.9	111.8	206.9
55	1.14	0.88	27.4	67.2	114.1	211.2
60	1.17	0.86	28.0	68.7	116.6	215.9
65	1.19	0.84	28.6	70.2	119.3	220.8
70	1.22	0.82	29.3	71.9	122.1	225.9
75	1.25	0.80	30.0	73.6	125.0	231.4
80	1.28	0.78	30.7	75.4	128.1	237.0
85	1.31	0.76	31.5	77.3	131.2	242.9
90	1.35	0.74	32.3	79.2	134.5	249.0
95	1.38	0.72	33.1	81.2	137.9	255.3
100	1.41	0.71	33.9	83.3	141.4	261.8
105	1.45	0.69	34.8	85.4	145.0	268.4
110	1.49	0.67	35.7	87.6	148.7	275.2
115	1.52	0.66	36.6	89.8	152.4	282.1
120	1.56	0.64	37.5	92.0	156.2	289.1
125	1.60	0.62	38.4	94.3	160.1	296.3
130	1.64	0.61	39.4	96.6	164.0	303.6
135	1.68	0.60	40.3	99.0	168.0	311.0
140	1.72	0.58	41.3	101.3	172.0	318.5
145	1.76	0.57	42.3	103.7	176.1	326.0
150	1.80	0.55	43.3	106.2	180.3	333.7
155	1.84	0.54	44.3	108.6	184.5	341.4

SECTION B.4 METRIC EQUIVALENTS AND AIDS

Length		
1 inch	=	2.54 centimeters (cm.)
0.1 feet	=	3.048 centimeters (cm.)
1 foot	=	0.3048 meter (m.)
1 mile	=	1.609 kilometers (km.)
1 centimeter (cm.)	=	.03 foot (ft.)
1 meter (m.)	=	3.2808 feet (ft.)
1 mile	=	5280 feet
Area		
1 acre	=	0.4 hectare (ha.) (approximately)
5 acres	=	2 hectares (ha.) (approximately)
1,000 acres	=	404.7 hectares (ha.)
1 hectare	=	2.471 acres (ac.)
2.5 hectares	=	6 acres (ac.) (approximately)
Volume		
1,000 cubic feet	=	28.3 meters (m3)
1 cubic foot per acre	=	0.07 cubic meter per hectare (m3/ha)
Condition Class Minimum Area		
0.4 hectares (1 acre)	=	4,000 square meters
	=	40 meters x 100 meters
	=	35 meter radius circle
1 acre	=	118 foot radius circle
	=	209 feet x 209 feet
	=	43,560 square feet
Metric System - Length		
1 meter	=	10 decimeters (dm.)
1 meter	=	100 centimeters (cm.)
1 meter	=	1,000 millimeters (mm.)
.001 meters	=	1 millimeter
.01 meters	=	1 centimeter
.1 meters	=	1 decimeter
1 meter	=	1 meter
10 meters	=	1 decameter
100 meters	=	1 hectometer
1,000 meters	=	1 kilometer
Photo Scales		
Scale	**Length on Photo**	**Length on Ground**
1:15,840	1 mm.	15.8 meters
1:24,000	1 mm.	24.0 meters
1:31,680	1 mm.	31.7 meters
1:40,000	1 mm.	40.0 meters
1:15,840	1 inch	1,320 feet
	0.1 inch	132 feet
	.05 inch (1/20)	66 feet
1:24,000	1 inch	2,000 feet
	0.1 inch	200 feet
	.05 inch (1/20)	100 feet
1:31,680	1 inch	2,640 feet
	0.1 inch	264 feet
	.05 inch (1/20)	132 feet
1:40,000	1 inch	3,333 feet
	0.1 inch	333 feet
	.05 inch (1/20)	166 feet

APPENDIX C PLANT ASSOCIATION REFERENCE

This appendix identifies which PLANT ASSOCIATION PUBLICATION (Item 5.7.2.71) to use to determine the PLANT ASSOCIATION (Item 5.7.2.69) for each plot. Note: “Plant association guide” and “plant association publication” are one in the same, and may be used interchangeably in this appendix.

SECTION C.1 OREGON

SUBSECTION C.1.1 COUNTY PLANT ASSOCIATION KEY

Baker Co.—see map on following pages
- north and east of US 80-: Wallowa-Snake PA Guide
- south and west of US 80: Blue Mountain PA Guide

Crook Co.—all: Blue Mountain PA Guide

Deschutes Co.—East Cascades PA Guide

Gilliam Co.—no PA Guide available

Grant Co.—all: Blue Mountain PA Guide

Harney Co.—north of US 20: Blue Mountain PA Guide

Hood River Co.—
- generally above 3000 feet: Mt. Hood Silver Fir Zone PA Guide
- generally below 3000 feet: Mt. Hood Ponderosa-Doug-fir-Grand Fir PA Guide

Jefferson Co.—see map on following pages
- timberlands on the Warm Springs Reservation: Warm Springs PA Guide
- south of Warm Springs Reservation and west from east half of Range 11E: East Cascades PA Guide
- east of Range 14E: Blue Mountain PA Guide
- east half of Range 11E east thru Range 14E: Crooked River Grasslands PA Guide

Klamath Co.—East Cascades PA Guide

Lake Co.—East Cascades PA Guide

Malhuer Co.—no PA Guide available

Morrow Co.—see map on following pages
- south of Township 2S: Blue Mountain PA Guide

Sherman Co.—no PA Guide available

Umatilla Co.—all: Blue Mountain PA Guide

Union Co.—see map on following pages
- east of US 80 and the Grande Ronde River: Wallowa-Snake PA Guide
- west of US 80 and the Grande Ronde River: Blue Mountain PA Guide

Wallowa Co.—see map on following pages
- east of the Grande Ronde River: Wallowa-Snake PA Guide
- west of the Grande Ronde River: Blue Mountain PA Guide

Wasco Co.—see map on following pages
- timberlands on the Warm Springs Reservation: Warm Springs PA Guide
- north of Warm Springs Reservation, generally above 3000 feet: Mt. Hood Silver Fir Zone PA Guide
- north of Warm Springs Reservation, generally below 3000 feet: Mt. Hood Ponderosa-Doug-fir-Grand Fir PA Guide

SUBSECTION C.1.2 OREGON PLANT ASSOCIATION PUBLICATIONS

Warm Springs Indian Reservation: Marsh, R.; Heliwell, R.; and Rogers, J. 1987. Plant association guide for the commercial forest of the Warm Springs Indian Reservation. Warm Springs, Oregon: Warm Springs Indian Reservation.

Willamette and Mt. Hood, westside: McCain, C.; Diaz, N. 2002. Field guide to the forested plant associations of the westside central Cascades of northwest Oregon. R6-NR-ECOL-TP-02-02. USDA Forest Service, Pacific Northwest Region.

Mt. Hood, eastside Hemlock zone (TSHE): Halverson, N. M.; Topik, C.; and Van Vickle, R. 1986. Plant Association and Management Guide for the Western Hemlock Zone, Mt. Hood National Forest. R6-ECOL-232A-1986. USDA Forest Service, Pacific Northwest Region.

Mt. Hood, eastside Ponderosa, Douglas-fir, and Grand fir zones (PIPO, PSME, ABGR): Topik, C.; Halverson, N. M.; and High, T. 1988. Plant Association and Management Guide for the Ponderosa Pine, Douglas-fir, and Grand Fir Zones, Mt. Hood National Forest. R6-ECOL-TP-004-88. USDA Forest Service, Pacific Northwest Region.

Siuslaw, not Oregon Dunes: McCain, C.; Diaz, N. 2002. Field guide to the forested plant associations of the northern Oregon Coast Range. R6-NR-ECOL-TP-03-02. USDA Forest Service, Pacific Northwest Region.

Siuslaw, Oregon Dunes NRA: Christy, J. A.; Kagan, J. S.; and Wiedemann, A. M. 1986. Plant Associations of the Oregon Dunes National Recreation Area. R6-NR-ECOL-TP-09-98. USDA Forest Service, Pacific Northwest Region.

Atzet, T.; White, D. E.; McCrimmon, L. A.; Martinez, P. A.; et al.1996. Field Guide to the Forested Plant Associations of Southwestern Oregon. Technical Paper R6-NR-ECOL-TP-17-96. USDA Forest Service, Pacific Northwest Region.

Deschutes, Winema, and Fremont: Simpson, Michael. 2007. Forested Plant Associations of the Oregon East Cascades. USDA Forest Service, Pacific Northwest Region R6-NR-ECOL-TP-2007

Ochoco: Johnson, C. Jr.; and Clausnitzer, R. 1992. Plant Associations of the Blue and Ochoco Mountains. R6-ERW-TP-036-92. USDA Forest Service, Pacific Northwest Region.

Crooked River grasslands and PIPO (Ochoco): Hopkins, W.; and Kovalchik, B. 1983. Plant Associations of the Crooked River National Grasslands, Ochoco National Forest. R6-ECOL-133-1983. USDA Forest Service, Pacific Northwest Region.

RIPARIAN, all forests: Kovalchik, B. 1987. Riparian Zone Associations: Deschutes, Ochoco, Fremont, and Winema National Forests. R6-ECOL-TP-279-87. USDA Forest Service, Pacific Northwest Region.

Wallowa-Whitman National Forest (Wallowa Valley, Hells Canyon NRA, Eagle Cap, Pine, and eastern portion of La Grande Districts): Johnson, C.G. Jr.; Simon, S. A. 1987. Plant Associations of the Wallowa-Snake Province, Wallowa-Whitman National Forest. R6-ECOL-TP-255B-86. USDA Forest Service, Pacific Northwest Region.

Malheur National Forest, Umatilla National Forest, and Wallowa-Whitman National Forest (Unity, Baker, and western portion of La Grande Districts): Johnson, C. G. Jr.; Claunitzer, R. R. 1992. Plant Associations of the Blue and Ochoco Mountains, Wallowa-Whitman National Forest. R6-ERW-TP-036-92. USDA Forest Service, Pacific Northwest Region.

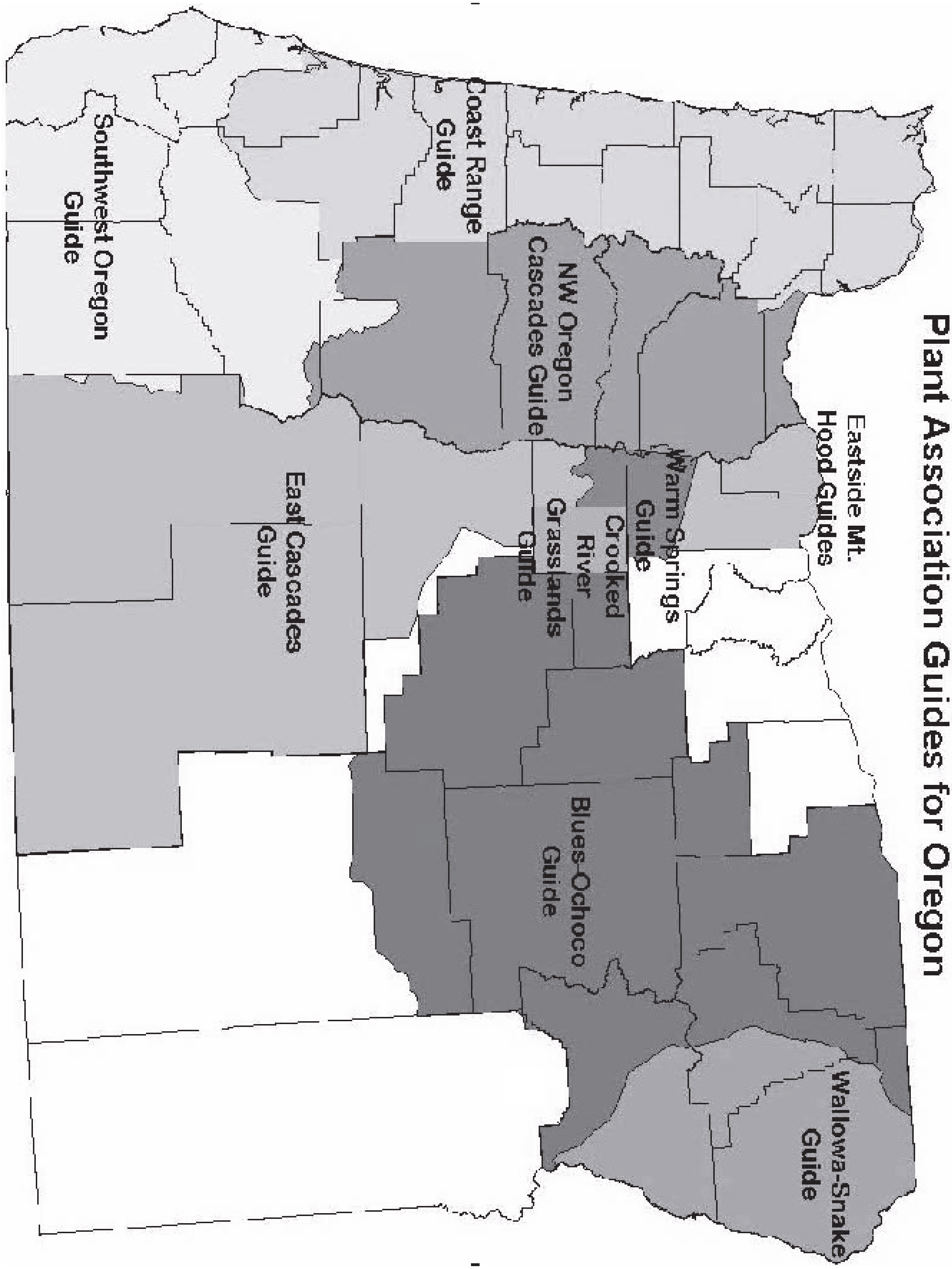


Figure C.1: Oregon plant association guides

SUBSECTION C.1.3 OREGON INDICATOR PLANT ID GUIDES

Halverson, N. M. 1986. Major Indicator Shrubs and Herbs on National Forests of Western Oregon and Southwestern Washington. R6-TM-229-1986. USDA Forest Service, Pacific Northwest Region.

Seda, A.; Atzet, T.; and Wheeler, D. 1989 (updated 1997). Key Species for Plant Associations on the Rogue River, Siskiyou, and Umpqua National Forests. R6-NR-ECOL-TP-026-97. USDA Forest Service, Pacific Northwest Region.

Uplands: Hopkins, W.; and Rawlings, R. 1988 (revised version). Major Indicator Shrubs and Herbs on National Forests of Eastern Oregon. R6-TM-190-1985. USDA Forest Service, Pacific Northwest Region.

Johnson, C. G. Jr. 1993. Common Plants of the Inland Pacific Northwest, Malheur, Umatilla, Wallowa-Whitman National Forests. R6-ERW-TP051-93. USDA Forest Service, Pacific Northwest Region.

Riparian: Kovalchik, B. L.; Hopkins, W. E.; and Brunsfeld, S. J. 1988. Major Indicator Shrubs and Herbs in Riparian Zones on National Forests of Central Oregon. R6-ECOL-TP-005-88. USDA Forest Service, Pacific Northwest Region.

Noxious and sensitive: Hopkins, W. E.; and Garrett, S. 1990. Sensitive Plant—Animal and Noxious Weeds Guide for Deschutes, Fremont, Ochoco and Winema National Forests—Area IV. R6-DES-TP-017-90. USDA Forest Service, Pacific Northwest Region.

Johnson, C. G. Jr. 1993. Common Plants of the Inland Pacific Northwest, Malheur, Umatilla, Wallowa-Whitman National Forests. R6-ERW-TP051-93. USDA Forest Service, Pacific Northwest Region.

SECTION C.2 WASHINGTON

SUBSECTION C.2.1 COUNTY PLANT ASSOCIATION KEY

Asotin Co. (3)—south of Grande Ronde River: Wallowa-Snake PA Guide

Asotin Co. (3)—north of Grande Ronde River: Blue Mountain PA Guide

Columbia Co. (13)—all: Blue Mountain PA Guide

Cowlitz Co. (15)—west of I5: Olympic PA Guide; east of I5: Gifford-Pinchot PA Guide

Ferry Co. (19)—North of the Colville reservation: Colville NF PA Guide; south of the Colville reservation's north border: Colville Reservation PA Guide

Garfield Co. (23)—all: Blue Mountain PA Guide

Klickitat Co. (39)—on National Forest: Gifford-Pinchot PA Guides; east of National Forest: Wenatchee PA Guide

Lewis Co. (41)—west of I5: Olympic PA Guide; east of I5: Gifford-Pinchot PA Guide

Lincoln Co. (43)—Northeast section: Spokane Reservation PA Guide

Okanagon Co. (47)—west of the Okanogan River: Wenatchee PA Guide; east of Okanogan River and north of the Colville Reservation: Colville National Forest PA Guide; east of Okanogan River and south of the Colville Reservation's north border: Colville Reservation PA Guide

Skagit Co. (57)—east of North Cascades National Park: Wenatchee PA Guide; otherwise: Mt. Baker-Snoqualmie PA Guide

Spokane Co. (63)—No Plant Association Guides Available

Stevens Co. (65)—North of the Spokane Reservation: Colville National Forest PA Guide; south of the Spokane Reservation's north border: Spokane Reservation PA Guide

Thurston Co. (67)—west of I5: Olympic PA Guide; east of I5: Gifford-Pinchot PA Guides

Walla Walla Co. (71)—all: Blue Mountain PA Guide

Whatcom Co. (73)—east of North Cascades National Park: Wenatchee PA Guide; otherwise: Mt. Baker Snoqualmie PA Guide

Yakima Co. (77)—on National Forest: Gifford-Pinchot PA Guides; east of National Forest: Wenatchee PA Guide; Yakama Reservation and north of Yakama Reservation: Wenatchee PA Guide

SUBSECTION C.2.2 WASHINGTON PLANT ASSOCIATION PUBLICATIONS

Colville Indian Reservation: Forest habitat types of the Colville Indian Reservation. 1987. Clausnitzer, R.R. and Zamora, B.A. MISC0110. Pullman, Washington: Washington State University, Agricultural Research Center.

Spokane Indian Reservation: Forest habitat types of the Spokane Indian Reservation. 1883. Zamora, B.A. Research Bulletin XB-0936. Pullman, Washington: Washington State University, Agricultural Research Center.

Mt. Baker-Snoqualmie: Henderson, J.A.; Lesher, R.D.; Peter, D. H.; and Shaw, D.C.1992. Field Guide to the Forested Plant Associations Of The Mt. Baker-Snoqualmie National Forest. Technical Paper R6-ECOL-TP-028-91. USDA Forest Service, Pacific Northwest Region.

Olympic: Henderson, J.A.; Lesher, R.D.; Peter, D. H.; and Shaw, D.C. 1989. Forested Plant Associations Of The Olympic National Forest. Technical Paper R6-ECOL-TP-001-88. USDA Forest Service, Pacific Northwest Region.

Non-forest: Hall, Frederick C. 1998. Pacific Northwest ecoclass codes for seral and potential natural communities. General Technical Report PNW-GTR-418. Portland, OR: USDA Forest Service, Pacific Northwest Research Station.

Colville National Forest and Okanogan National Forest east of the Okanogan River: Williams, C. K.; Lillybridge, T. R.; and Smith, B. G. 1995. Forested Plant Associations of the Colville National Forest. PNW-GTR-360. USDA Forest Service, Pacific Northwest Research Station.

Wenatchee National Forest and Okanogan National Forest west of Okanogan River: Lillybridge, T. R.; Kovalchik, B. R.; Williams, C. K.; and Smith, B. G. 1995. Field Guide for Forested Plant Associations of the Wenatchee National Forest. PNW-GTR-359. USDA Forest Service, Pacific Northwest Research Station.

ABAM Zone: Brockway, D.G.; Topik, C.; Hemstrom, M. A.; and Emmingham, W. H. 1983. Plant Association and Management Guide for the Pacific Silver Fir Zone, Gifford Pinchot National Forest. R6-Ecol-130a-1983. USDA Forest Service, Pacific Northwest Region.

TSME Zone: Diaz, N. M.; High, C. T.; Mellen, T. K.; et al. 1997. Plant Association and Management Guide for the Mountain Hemlock Zone, Gifford Pinchot and Mt. Hood National Forests. R6-MTH-GP-TP-08-95. USDA Forest Service, Pacific Northwest Region.

TSHE Zone: Topik, C.; Halverson, N. M.; and Brockway, D. G. 1986. Plant Association and Management Guide for the Western Hemlock Zone, Gifford Pinchot National Forest. R6-ECOL-230A-1986. USDA Forest Service, Pacific Northwest Region.

ABGR Zone: Topik, C. 1989. Plant Association and Management Guide for the Grand Fir Zone Gifford Pinchot National Forest. USDA Forest Service, Pacific Northwest Region R6-Ecol-TP-006-88.

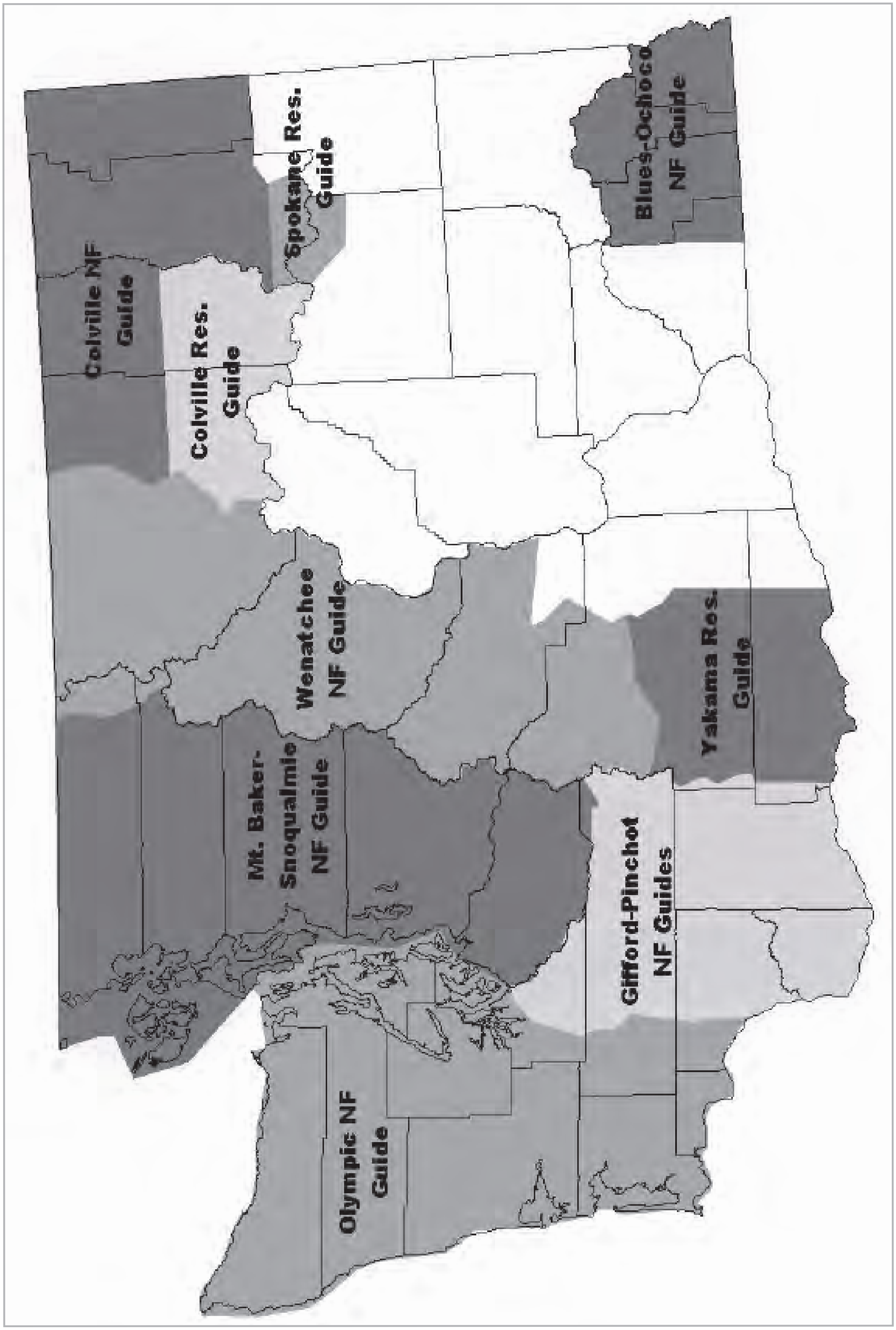


Figure C.2: Washington plant association guides

SUBSECTION C.2.3 WASHINGTON INDICATOR PLANT ID GUIDES

Lesher, R. D. and Jan A. Henderson. 1992. Indicator Species of Forested Plant Associations on National Forests of Northwestern Washington. MBS-TP-041-1992. USDA Forest Service, Pacific Northwest Region R6.

Non-forest, weed, or sensitive plants: No Guide. Use Hitchcock, C.L.; and Cronquist, A. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle, WA. or Pojar, J.; and MacKinnon, A. 1994. Plants of the Pacific Northwest Coast. Lone Pine Publishing, Vancouver, BC.

Halverson, N.M. 1986. Major Indicator Shrubs and Herbs on National Forests of Western Oregon and Southwestern Washington. R6-TM-229-1986. USDA Forest Service, Pacific Northwest Region.

Williams, C. K.; and Lillybridge, T.R. 1987. Major Indicator Shrubs and Herbs on National Forests of Eastern Washington. R6-TM-TP-304-87. USDA Forest Service, Pacific Northwest Region.

Weeds: Smith-Kuebel, C.; and Lillybridge, T. R. Sensitive Plants and Noxious Weeds of the Wenatchee National Forest. R6-WEN-93-014. USDA Forest Service, Wenatchee National Forest.

APPENDIX D TREE SPECIES LISTS

SECTION D.1 TREE SPECIES LISTS

This appendix includes two tree species lists: Current Tree Species and Previously Used Tree Species Codes. Current Tree Species includes current valid codes and species. Previously Used Tree Species Codes includes codes used previously but invalid now (used for reconcile purposes only).

SUBSECTION D.1.1 CURRENT TREE SPECIES

This list includes all tree species tallied in the Continental *United States*. Woodland species designate species where DRC is measured instead of DBH.

Species tallied as trees which are common to the PNW area are in bold. Shaded species are “Core” and are tallied in all regions.

”Genus-only” codes are not valid in PNW.

Woodland	FIA Code	PLANTS Code	Common name	Genus	Species
	0011	**ABAM**	**Pacific silver fir**	***Abies***	***amabilis***
	0012	ABBA	balsam fir	*Abies*	*balsamea*
	0014	**ABBR**	**Santa Lucia fir, bristlecone fir**	***Abies***	***bracteata***
	0015	**ABCO**	**white fir**	***Abies***	***concolor***
	0016	ABFR	Fraser fir	*Abies*	*fraseri*
	0017	**ABGR**	**grand fir**	***Abies***	***grandis***
	0018	ABLAA	corkbark fir	*Abies*	*lasiocarpa var. arizonica*
	0019	**ABLA**	**subalpine fir**	***Abies***	***lasiocarpa***
	0020	**ABMA**	**California red fir**	***Abies***	***magnifica***
	0021	**ABSH**	**Shasta red fir**	***Abies***	***shastensis***
	0022	**ABPR**	**noble fir**	***Abies***	***procera***
	0041	**CHLA**	**Port-Orford-cedar**	***Chamaecyparis***	***lawsoniana***
	0042	**CHNO**	**Alaska yellow-cedar**	***Chamaecyparis***	***nootkatensis***
	0043	CHTH2	Atlantic white-cedar	*Chamaecyparis*	*thyoides*
	0051	**CUAR**	**Arizona cypress**	***Cupressus***	***arizonica***
	0052	**CUBA**	**Baker cypress, Modoc cypress**	***Cupressus***	***bakeri***
	0053	**CUFO2**	**tecate cypress**	***Cupressus***	***forbesii***
	0054	**CUMA2**	**Monterey cypress**	***Cupressus***	***macrocarpa***
	0055	**CUSA3**	**Sargent's cypress**	***Cupressus***	***sargentii***
	0056	**CUMA**	**MacNab's cypress**	***Cupressus***	***macnabiana***
w	0058	JUPI	Pinchot juniper	*Juniperus*	*pinchotii*
w	0059	JUCO11	redberry juniper	*Juniperus*	*coahuilensis*
w	0061	JUAS	Ashe juniper	*Juniperus*	*ashei*
w	**0062**	**JUCA7**	**California juniper**	***Juniperus***	***californica***
w	0063	JUDE2	alligator juniper	*Juniperus*	*deppeana*
	0064	**JUOC**	**western juniper**	***Juniperus***	***occidentalis***
w	**0065**	**JUOS**	**Utah juniper**	***Juniperus***	***osteosperma***
w	**0066**	**JUSC2**	**Rocky Mountain juniper**	***Juniperus***	***scopulorum***
	0067	JUVIS	southern redcedar	*Juniperus*	*virginiana var. silicicola*
	0068	JUVI	eastern redcedar	*Juniperus*	*virginiana*
w	0069	JUMO	oneseed juniper	*Juniperus*	*monosperma*
	0071	**LALA**	**tamarack (native)**	***Larix***	***laricina***
	0072	**LALY**	**subalpine larch**	***Larix***	***lyallii***
	0073	**LAOC**	**western larch**	***Larix***	***occidentalis***
	0081	**CADE27**	**incense-cedar**	***Calocedrus***	***decurrens***
	0091	PIAB	Norway spruce	*Picea*	*abies*
	0092	**PIBR**	**Brewer spruce**	***Picea***	***breweriana***
	0093	**PIEN**	**Engelmann spruce**	***Picea***	***engelmannii***

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	0094	**PIGL**	**white spruce**	***Picea***	***glauca***
	0095	**PIMA**	**black spruce**	***Picea***	***mariana***
	0096	PIPU	blue spruce	*Picea*	*pungens*
	0097	PIRU	red spruce	*Picea*	*rubens*
	0098	**PISI**	**Sitka spruce**	***Picea***	***sitchensis***
	0101	**PIAL**	**whitebark pine**	***Pinus***	***albicaulis***
	0102	**PIAR**	**Rocky Mountain bristlecone pine**	***Pinus***	***aristata***
	0103	**PIAT**	**knobcone pine**	***Pinus***	***attenuata***
	0104	**PIBA**	**foxtail pine**	***Pinus***	***balfouriana***
	0105	PIBA2	jack pine	*Pinus*	*banksiana*
w	**0106**	**PIED**	**Common pinyon, two-needle pinyon**	***Pinus***	***edulis***
	0107	PICL	sand pine	*Pinus*	*clausa*
	0108	**PICO**	**lodgepole pine**	***Pinus***	***contorta***
	0109	**PICO3**	**Coulter pine**	***Pinus***	***coulteri***
	0110	PIEC2	shortleaf pine	*Pinus*	*echinata*
	0111	PIEL	slash pine	*Pinus*	*elliottii*
	0112	PIEN2	Apache pine	*Pinus*	*engelmannii*
	0113	**PIFL2**	**limber pine**	***Pinus***	***flexilis***
	0114	PIST3	southwestern white pine	*Pinus*	*strobiformis*
	0115	PIGL2	spruce pine	*Pinus*	*glabra*
	0116	**PIJE**	**Jeffrey pine**	***Pinus***	***jeffreyi***
	0117	**PILA**	**sugar pine**	***Pinus***	***lambertiana***
	0118	PILE	Chihuahua pine	*Pinus*	*leiophylla*
	0119	**PIMO3**	**western white pine**	***Pinus***	***monticola***
	0120	**PIMU**	**bishop pine**	***Pinus***	***muricata***
	0121	PIPA2	longleaf pine	*Pinus*	*palustris*
	0122	**PIPO**	**ponderosa pine**	***Pinus***	***ponderosa***
	0123	PIPU5	Table Mountain pine	*Pinus*	*pungens*
	0124	**PIRA2**	**Monterey pine**	***Pinus***	***radiata***
	0125	PIRE	red pine	*Pinus*	*resinosa*
	0126	PIRI	pitch pine	*Pinus*	*rigida*
	0127	**PISA2**	**gray pine, California foothill pine**	***Pinus***	***sabiniana***
	0128	PISE	pond pine	*Pinus*	*serotina*
	0129	PIST	eastern white pine	*Pinus*	*strobus*
	0130	**PISY**	**Scotch pine**	***Pinus***	***sylvestris***
	0131	PITA	loblolly pine	*Pinus*	*taeda*
	0132	PIVI2	Virginia pine	*Pinus*	*virginiana*
w	**0133**	**PIMO**	**singleleaf pinyon**	***Pinus***	***monophylla***
w	0134	PIDI3	border pinyon	*Pinus*	*discolor*
	0135	PIAR5	Arizona pine	*Pinus*	*arizonica*
	0136	PINI	Austrian pine	*Pinus*	*nigra*
	0137	**PIWA**	**Washoe pine**	***Pinus***	***washoensis***
	0138	**PIQU**	**four-leaf pine, Parry pinyon pine**	***Pinus***	***quadrifolia***
	0139	**PITO**	**Torrey pine**	***Pinus***	***torreyana***
w	0140	PICE	Mexican pinyon pine	*Pinus*	*cembroides*
	0142	**PILO**	**Great Basin bristlecone pine**	***Pinus***	***longaeva***
w	0143	PIMOF	Arizona pinyon pine	*Pinus*	*monophylla var. fallax*
	0144	PIELE2	Carribean pine	*Pinus*	*elliottii var. elliottii*
	0201	**PSMA**	**bigcone Douglas-fir**	***Pseudotsuga***	***macrocarpa***
	0202	**PSME**	**Douglas-fir**	***Pseudotsuga***	***menziesii***
	0211	**SESE3**	**redwood**	***Sequoia***	***sempervirens***
	0212	**SEGI2**	**giant sequoia**	***Sequoiadendron***	***giganteum***
	0221	TADI2	baldcypress	*Taxodium*	*distichum*
	0222	TAAS	pondcypress	*Taxodium*	*ascendens*

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	0231	**TABR2**	**Pacific yew**	***Taxus***	***brevifolia***
	0232	TAFL	Florida yew	*Taxus*	*floridana*
	0241	THOC2	northern white-cedar	*Thuja*	*occidentalis*
	0242	**THPL**	**western redcedar**	***Thuja***	***plicata***
	0251	**TOCA**	**California torreya (nutmeg)**	***Torreya***	***californica***
	0252	TOTA	Florida torreya (nutmeg)	*Torreya*	*taxifolia*
	0261	TSCA	eastern hemlock	*Tsuga*	*canadensis*
	0262	TSCA2	Carolina hemlock	*Tsuga*	*caroliniana*
	0263	**TSHE**	**western hemlock**	***Tsuga***	***heterophylla***
	0264	**TSME**	**mountain hemlock**	***Tsuga***	***mertensiana***
	0311	ACBA3	Florida maple	*Acer*	*barbatum*
	0312	**ACMA3**	**bigleaf maple**	***Acer***	***macrophyllum***
	0313	**ACNE2**	**boxelder**	***Acer***	***negundo***
	0314	ACNI5	black maple	*Acer*	*nigrum*
	0315	ACPE	striped maple	*Acer*	*pensylvanicum*
	0316	ACRU	red maple	*Acer*	*rubrum*
	0317	ACSA2	silver maple	*Acer*	*saccharinum*
	0318	ACSA3	sugar maple	*Acer*	*saccharum*
	0319	ACSP2	mountain maple	*Acer*	*spicatum*
	0320	**ACPL**	**Norway maple**	***Acer***	***platanoides***
w	**0322**	**ACGR3**	**bigtooth maple**	***Acer***	***grandidentatum***
	0323	ACLE	chalk maple	*Acer*	*leucoderme*
	0331	AEGL	Ohio buckeye	*Aesculus*	*glabra*
	0332	AEFL	yellow buckeye	*Aesculus*	*flava*
	0333	**AECA**	**California buckeye**	***Aesculus***	***californica***
	0334	AEGLA	Texas buckeye	*Aesculus*	*glabra var. arguta*
	0337	AESY	painted buckeye	*Aesculus*	*sylvatica*
	0341	**AIAL**	**ailanthus**	***Ailanthus***	***altissima***
	0345	ALJU	mimosa/silktree	*Albizia*	*julibrissin*
	0351	**ALRU2**	**red alder**	***Alnus***	***rubra***
	0352	**ALRH2**	**white alder**	***Alnus***	***rhombifolia***
	0353	**ALOB2**	**Arizona alder**	***Alnus***	***oblongifolia***
	0355	ALGL2	European alder	*Alnus*	*glutinosa*
	0361	**ARME**	**Pacific madrone**	***Arbutus***	***menziesii***
	0362	**ARAR2**	**Arizona madrone**	***Arbutus***	***arizonica***
	0367	ASTR	Pawpaw	*Asimina*	*triloba*
	0371	BEAL2	yellow birch	*Betula*	*alleghaniensis*
	0372	BELE	sweet birch	*Betula*	*lenta*
	0373	BENI	river birch	*Betula*	*nigra*
	0374	**BEOC2**	**water birch**	***Betula***	***occidentalis***
	0375	**BEPA**	**paper birch**	***Betula***	***papyrifera***
	0377	BEUB	Virginia roundleaf birch	*Betula*	*uber*
	0378	**BEUT**	**northwestern paper birch**	***Betula***	***X utahensis***
	0379	BEPO	gray birch	*Betula*	*populifolia*
	0381	SILAL3	Chittamwood, gum bumelia	*Sideroxylon*	*lanuginosum ssp. lanuginosum*
	0391	CACA18	American hornbeam, musclewood	*Carpinus*	*caroliniana*
	0401	CAAQ2	water hickory	*Carya*	*aquatica*
	0402	CACO15	bitternut hickory	*Carya*	*cordiformis*
	0403	CAGL8	pignut hickory	*Carya*	*glabra*
	0404	CAIL2	pecan	*Carya*	*illinoinensis*
	0405	CALA21	shellbark hickory	*Carya*	*laciniosa*
	0406	CAMY	nutmeg hickory	*Carya*	*myristiciformis*
	0407	CAOV2	shagbark hickory	*Carya*	*ovata*
	0408	CATE9	black hickory	*Carya*	*texana*

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	0409	CAAL27	mockernut hickory	*Carya*	*alba*
	0410	CAPA24	sand hickory	*Carya*	*pallida*
	0411	CAFL6	scrub hickory	*Carya*	*floridana*
	0412	CAOV3	red hickory	*Carya*	*ovalis*
	0413	CACA38	southern shagbark hickory	*Carya*	*carolinae-septentrionalis*
	0421	CADE12	American chestnut	*Castanea*	*dentata*
	0422	CAPU9	Allegheny chinkapin	*Castanea*	*pumila*
	0423	CAPUO	Ozark chinkapin	*Castanea*	*pumila var. ozarkensis*
	0424	CAMO83	Chinese chestnut	*Castanea*	*mollissima*
	0431	**CHCHC4**	**giant chinkapin, golden chinkapin**	***Chrysolepis***	***chrysophylla var. chrysophylla***
	0451	CABI8	southern catalpa	*Catalpa*	*bignonioides*
	0452	CASP8	northern catalpa	*Catalpa*	*speciosa*
	0461	CELA	sugarberry	*Celtis*	*laevigata*
	0462	CEOC	hackberry	*Celtis*	*occidentalis*
	0463	CELAR	netleaf hackberry	*Celtis*	*laevigata var. reticulata*
	0471	CECA4	eastern redbud	*Cercis*	*canadensis*
	0481	CLKE	yellowwood	*Cladrastis*	*kentukea*
	0491	COFL2	flowering dogwood	*Cornus*	*florida*
	0492	**CONU4**	**Pacific dogwood**	***Cornus***	***nuttallii***
	0501	CRCR2	cockspur hawthorn	*Crataegus*	*crus-galli*
	0502	CRMO2	downy hawthorn	*Crataegus*	*mollis*
	0511	**EUGL**	**Tasmanian bluegum, eucalyptus**	***Eucalyptus***	***globulus***
	0512	**EUCA2**	**river redgum**	***Eucalyptus***	***camaldulensis***
	0513	**EUGR12**	**grand eucalyptus**	***Eucalyptus***	***grandis***
	0514	EURO2	swamp mahogany	*Eucalyptus*	*robusta*
	0521	DIVI5	common persimmon	*Diospyros*	*virginiana*
	0522	DITE3	Texas persimmon	*Diospyros*	*texana*
	0531	FAGR	American beech	*Fagus*	*grandifolia*
	0541	FRAM2	white ash	*Fraxinus*	*americana*
	0542	**FRLA**	**Oregon ash**	***Fraxinus***	***latifolia***
	0543	FRNI	black ash	*Fraxinus*	*nigra*
	0544	FRPE	green ash	*Fraxinus*	*pennsylvanica*
	0545	FRPR	pumpkin ash	*Fraxinus*	*profunda*
	0546	FRQU	blue ash	*Fraxinus*	*quadrangulata*
	0547	**FRVE2**	**velvet ash**	***Fraxinus***	***velutina***
	0548	FRCA3	Carolina ash	*Fraxinus*	*caroliniana*
	0549	FRTE	Texas ash	*Fraxinus*	*texensis*
	0551	GLAQ	waterlocust	*Gleditsia*	*aquatica*
	0552	GLTR	honeylocust	*Gleditsia*	*triacanthos*
	0555	GOLA	loblolly bay	*Gordonia*	*lasianthus*
	0561	**GIBI2**	**Ginkgo, maidenhair tree**	***Ginkgo***	***biloba***
	0571	GYDI	Kentucky coffeetree	*Gymnocladus*	*dioicus*
	0581	HACA3	Carolina silverbell	*Halesia*	*carolina*
	0582	HADI3	two-wing silverbell	*Halesia*	*diptera*
	0583	HAPA2	little silverbell	*Halesia*	*parviflora*
	0591	**ILOP**	**American holly**	***Ilex***	***opaca***
	0601	JUCI	butternut	*Juglans*	*cinerea*
	0602	**JUNI**	**black walnut**	***Juglans***	***nigra***
	0603	**JUHI**	**Northern California black walnut**	***Juglans***	***hindsii***
	0604	**JUCA**	**Southern California black walnut**	***Juglans***	***californica***
	0605	JUMI	Texas walnut	*Juglans*	*microcarpa*
	0606	**JUMA**	**Arizona walnut**	***Juglans***	***major***
	0611	LIST2	sweetgum	*Liquidambar*	*styraciflua*
	0621	LITU	yellow-poplar	*Liriodendron*	*tulipifera*

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	0631	**LIDE3**	**tanoak**	***Lithocarpus***	***densiflorus***
	0641	MAPO	Osage-orange	*Maclura*	*pomifera*
	0651	MAAC	cucumbertree	*Magnolia*	*acuminata*
	0652	MAGR4	southern magnolia	*Magnolia*	*grandiflora*
	0653	MAVI2	sweetbay	*Magnolia*	*virginiana*
	0654	MAMA2	bigleaf magnolia	*Magnolia*	*macrophylla*
	0655	MAFR	mountain magnolia, Fraser magnolia	*Magnolia*	*fraseri*
	0657	MAPY	pyramid magnolia	*Magnolia*	*pyramidata*
	0658	MATR	umbrella magnolia	*Magnolia*	*tripetala*
	0661	**MAFU**	**Oregon crabapple**	***Malus***	***fusca***
	0662	MAAN3	southern crabapple	*Malus*	*angustifolia*
	0663	MACO5	sweet crabapple	*Malus*	*coronaria*
	0664	MAIO	prairie crabapple	*Malus*	*ioensis*
	0681	MOAL	white mulberry	*Morus*	*alba*
	0682	MORU2	red mulberry	*Morus*	*rubra*
	0684	MONI	black mulberry	*Morus*	*nigra*
	0691	NYAQ2	water tupelo	*Nyssa*	*aquatica*
	0692	NYOG	Ogeechee tupelo	*Nyssa*	*ogeche*
	0693	NYSY	blackgum	*Nyssa*	*sylvatica*
	0694	NYBI	swamp tupelo	*Nyssa*	*biflora*
	0701	OSVI	eastern hophornbeam	*Ostrya*	*virginiana*
	0711	OXAR	sourwood	*Oxydendrum*	*arboreum*
	0712	PATO2	paulownia, empress-tree	*Paulownia*	*tomentosa*
	0721	PEBO	redbay	*Persea*	*borbonia*
	7211	PEAM3	avocado	*Persea*	*americana*
	0722	PLAQ	water-elm, planertree	*Planera*	*aquatica*
	0730	**PLRA**	**California sycamore**	***Platanus***	***racemosa***
	0731	**PLOC**	**American sycamore**	***Platanus***	***occidentalis***
	0732	**PLWR2**	**Arizona sycamore**	***Platanus***	***wrightii***
	0741	**POBA2**	**balsam poplar**	***Populus***	***balsamifera***
	0742	PODE3	eastern cottonwood	*Populus*	*deltoides*
	0743	POGR4	bigtooth aspen	*Populus*	*grandidentata*
	0744	POHE4	swamp cottonwood	*Populus*	*heterophylla*
	0745	PODEM	plains cottonwood	*Populus*	*deltoides ssp. monilifera*
	0746	**POTR5**	**quaking aspen**	***Populus***	***tremuloides***
	0747	**POBAT**	**black cottonwood**	***Populus***	***balsamifera ssp. trichocarpa***
	0748	**POFR2**	**Fremont's cottonwood**	***Populus***	***fremontii***
	0749	POAN3	narrowleaf cottonwood	*Populus*	*angustifolia*
	0752	POAL7	silver poplar	*Populus*	*alba*
	0753	**PONI**	**Lombardy poplar**	***Populus***	***nigra***
w	**0756**	**PRGL2**	**honey mesquite,western honey mesquite**	***Prosopis***	***glandulosa***
w	**0757**	**PRVE**	**velvet mesquite**	***Prosopis***	***velutina***
w	**0758**	**PRPU**	**screwbean mesquite**	***Prosopis***	***pubescens***
	0761	PRPE2	pin cherry	*Prunus*	*pensylvanica*
	0762	PRSE2	black cherry	*Prunus*	*serotina*
	0763	**PRVI**	**common chokecherry**	***Prunus***	***virginiana***
	0765	PRNI	Canada plum	*Prunus*	*nigra*
	0766	PRAM	American plum, wild plum	*Prunus*	*americana*
	0768	**PREM**	**bitter cherry**	***Prunus***	***emarginata***
	0771	**PRAV**	**sweet cherry (domesticated)**	***Prunus***	***avium***
	0801	**QUAG**	**California live oak, coast live oak**	***Quercus***	***agrifolia***
	0802	QUAL	white oak	*Quercus*	*alba*
w	0803	QUAR	Arizona white oak and gray oak	*Quercus*	*arizonica*

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	0804	QUBI	swamp white oak	*Quercus*	*bicolor*
	0805	**QUCH2**	**canyon live oak**	***Quercus***	***chrysolepis***
	0806	QUCO2	scarlet oak	*Quercus*	*coccinea*
	0807	**QUDO**	**blue oak**	***Quercus***	***douglasii***
	0808	QUSIS	Durand oak	*Quercus*	*sinuata var. sinuata*
	0809	QUEL	northern pin oak	*Quercus*	*ellipsoidalis*
w	0810	QUEM	Emory oak	*Quercus*	*emoryi*
	0811	**QUEN**	**Engelmann oak**	***Quercus***	***engelmannii***
	0812	QUFA	southern red oak	*Quercus*	*falcata*
	0813	QUPA5	cherrybark oak	*Quercus*	*pagoda*
w	0814	QUGA	Gambel oak	*Quercus*	*gambelii*
	0815	**QUGA4**	**Oregon white oak**	***Quercus***	***garryana***
	0816	QUIL	scrub oak	*Quercus*	*ilicifolia*
	0817	QUIM	shingle oak	*Quercus*	*imbricaria*
	0818	**QUKE**	**California black oak**	***Quercus***	***kelloggii***
	0819	QULA2	turkey oak	*Quercus*	*laevis*
	0820	QULA3	laurel oak	*Quercus*	*laurifolia*
	0821	**QULO**	**California white oak**	***Quercus***	***lobata***
	0822	QULY	overcup oak	*Quercus*	*lyrata*
	0823	QUMA2	bur oak	*Quercus*	*macrocarpa*
	0824	QUMA3	blackjack oak	*Quercus*	*marilandica*
	0825	QUMI	swamp chestnut oak	*Quercus*	*michauxii*
	0826	QUMU	chinkapin oak	*Quercus*	*muehlenbergii*
	0827	QUNI	water oak	*Quercus*	*nigra*
	0828	QUTE	Nuttall oak, Texas red oak	*Quercus*	*texana*
w	0829	QUOB	Mexican blue oak	*Quercus*	*oblongifolia*
	0830	QUPA2	pin oak	*Quercus*	*palustris*
	0831	QUPH	willow oak	*Quercus*	*phellos*
	0832	QUPR2	chestnut oak	*Quercus*	*prinus*
	0833	QURU	northern red oak	*Quercus*	*rubra*
	0834	QUSH	Shumard's oak	*Quercus*	*shumardii*
	0835	QUST	post oak	*Quercus*	*stellata*
	0836	QUSI2	Delta post oak	*Quercus*	*similis*
	0837	QUVE	black oak	*Quercus*	*velutina*
	0838	QUVI	live oak	*Quercus*	*virginiana*
	0839	**QUWI2**	**interior live oak**	***Quercus***	***wislizeni***
	0840	QUMA6	dwarf post oak	*Quercus*	*margarettiae*
	0841	QUMI2	dwarf live oak	*Quercus*	*minima*
	0842	QUIN	bluejack oak	*Quercus*	*incana*
w	0843	QUHY	silverleaf oak	*Quercus*	*hypoleucoides*
	0844	QUOG	Oglethorpe oak	*Quercus*	*oglethorpensis*
	0845	QUPR	dwarf chinkapin oak	*Quercus*	*prinoides*
w	0846	QUGR3	gray oak	*Quercus*	*grisea*
w	0847	QURU4	netleaf oak	*Quercus*	*rugosa*
	0856	CAGL11	gray sheoak	*Casuarina*	*glauca*
	0857	CALE28	Australian pine	*Casuarina*	*lepidophloia*
	0901	**ROPS**	**black locust**	***Robinia***	***pseudoacacia***
w	0902	RONE	New Mexico locust	*Robinia*	*neomexicana*
	0912	SAPA	cabbage palmetto	*Sabal*	*palmetto*
	0919	SASAD	western soapberry	*Sapindus*	*saponaria var. drummondii*
	0921	SAAM2	peachleaf willow	*Salix*	*amygdaloides*
	0922	**SANI**	**black willow**	***Salix***	***nigra***
	0925	SACA5	coastal plain willow	*Salix*	*caroliniana*
	0926	**SAPY**	**balsam willow**	***Salix***	***pyrifolia***

Woodland	FIA Code	PLANTS Code	Common name	Genus	Species
	0927	SAAL2	white willow	*Salix*	*alba*
	0929	SASE10	weeping willow	*Salix*	*sepulcralis*
	0931	SAAL5	sassafras	*Sassafras*	*albidum*
	0935	SOAM3	American mountain ash	*Sorbus*	*americana*
	0936	SOAU	European mountain ash	*Sorbus*	*aucuparia*
	0937	SODE3	northern mountain ash	*Sorbus*	*decora*
	0951	TIAM	American basswood	*Tilia*	*americana*
	0952	TIAMH	white basswood	*Tilia*	*americana var. heterophylla*
	0953	TIAMC	Carolina basswood	*Tilia*	*americana var. caroliniana*
	0971	ULAL	winged elm	*Ulmus*	*alata*
	0972	ULAM	American elm	*Ulmus*	*americana*
	0973	ULCR	cedar elm	*Ulmus*	*crassifolia*
	0974	ULPU	Siberian elm	*Ulmus*	*pumila*
	0975	ULRU	slippery elm	*Ulmus*	*rubra*
	0976	ULSE	September elm	*Ulmus*	*serotina*
	0977	ULTH	rock elm	*Ulmus*	*thomasii*
	0981	**UMCA**	**California laurel**	***Umbellularia***	***californica***
	0989	RHMA2	American mangrove	*Rhizophora*	*mangle*
w	**0990**	**OLTE**	**desert ironwood,tesota, Arizona-ironwood**	***Olneya***	***tesota***
	0992	MEQU	melaleuca	*Melaleuca*	*quinquenervia*
	0993	MEAZ	chinaberry	*Melia*	*azedarach*
	0994	TRSE6	Chinese tallowtree	*Triadica*	*sebifera*
	0995	VEFO	tungoil tree	*Vernicia*	*fordii*
	0996	COOB2	smoketree	*Cotinus*	*obovatus*
	0997	**ELAN**	**Russian-olive**	***Elaeagnus***	***angustifolia***

APPENDIX E FOREST TYPE CODES

The following list includes all forest types in the Continental U.S. and Alaska. Types designated East/West are commonly found in those regions, although types designated for one region may occasionally be found in another. These codes are used for FOREST TYPE (Item 5.7.1.9).

East	West	Code	Species Type
White / Red / Jack Pine Group			
E		101	**Jack pine**
E		102	**Red pine**
E		103	**Eastern white pine**
E		104	**Eastern white pine / eastern hemlock**
E		105	**Eastern hemlock**
Spruce / Fir Group			
E		121	**Balsam fir**
E		122	**White spruce**
E		123	**Red spruce**
E		124	**Red spruce / balsam fir**
E	W	125	**Black spruce**
E		126	**Tamarack**
E		127	**Northern white-cedar**
E		128	**Fraser fir**
E		129	**Red spruce / Fraser fir**
Longleaf / Slash Pine Group			
E		141	**Longleaf pine**
E		142	**Slash pine**
Tropical Softwoods Group			
E		151	**Tropical pines**
Loblolly / Shortleaf Pine Group			
E		161	**Loblolly pine**
E		162	**Shortleaf pine**
E		163	**Virginia pine**
E		164	**Sand pine**
E		165	**Table-mountain pine**
E		166	**Pond pine**
E		167	**Pitch pine**
E		168	**Spruce pine**
Other Eastern Softwoods Group			
E		171	**Eastern redcedar**
E		172	**Florida softwoods**
Pinyon / Juniper Group			
E	W	182	**Rocky Mountain juniper**
E	W	184	**Juniper woodland**
E	W	185	**Pinyon-juniper woodland**
Douglas-fir Group			
E	W	201	**Douglas-fir**
	W	202	**Port-Orford-cedar**
	W	203	**Bigcone Douglas-fir**
Ponderosa Pine Group			
E	W	221	**Ponderosa pine**
	W	222	**Incense-cedar**
	W	224	**Sugar pine**
	W	225	**Jeffrey pine**
	W	226	**Coulter pine**
Western White Pine Group			

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East	West	Code	Species Type
	W	241	**Western white pine**
Fir / Spruce / Mountain Hemlock Group			
	W	261	**White fir**
	W	262	**Red fir**
	W	263	**Noble fir**
	W	264	**Pacific silver fir**
	W	265	**Engelmann spruce**
	W	266	**Engelmann spruce / subalpine fir**
	W	267	**Grand fir**
	W	268	**Subalpine fir**
	W	269	**Blue spruce**
	W	270	**Mountain hemlock**
	W	271	**Alaska-yellow-cedar**
Lodgepole Pine Group			
	W	281	**Lodgepole pine**
Hemlock / Sitka Spruce Group			
	W	301	**Western hemlock**
	W	304	**Western redcedar**
	W	305	**Sitka spruce**
Western Larch Group			
	W	321	**Western larch**
Redwood Group			
	W	341	**Redwood**
	W	342	**Giant sequoia**
Other Western Softwoods Group			
	W	361	**Knobcone pine**
	W	362	**Southwestern white pine**
	W	363	**Bishop pine**
	W	364	**Monterey pine**
	W	365	**Foxtail pine / bristlecone pine**
	W	366	**Limber pine**
	W	367	**Whitebark pine**
	W	368	**Misc. western softwoods**
	W	369	**Western juniper**
California Mixed Conifer Group			
	W	371	**California mixed conifer**
Exotic Softwoods Group			
E		381	**Scotch pine**
E	W	383	**Other exotic softwoods**
E		384	**Norway spruce**
E		385	**Introduced larch**
Other Softwoods Group			
		391	**Other softwoods**
Oak / Pine Group			
E		401	**Eastern white pine / N. red oak / white ash**
E		402	**Eastern redcedar / hardwood**
E		403	**Longleaf pine / oak**
E		404	**Shortleaf pine / oak**
E		405	**Virginia pine / southern red oak**
E		406	**Loblolly pine / hardwood**
E		407	**Slash pine / hardwood**
E		409	**Other pine / hardwood**
Oak / Hickory Group			
E		501	**Post oak / blackjack oak**
E		502	**Chestnut oak**

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East	West	Code	Species Type
E		503	**White oak / red oak / hickory**
E		504	**White oak**
E		505	**Northern red oak**
E		506	**Yellow-poplar / white oak / N. red oak**
E		507	**Sassafras / persimmon**
E		508	**Sweetgum / yellow-poplar**
E		509	**Bur oak**
E		510	**Scarlet oak**
E		511	**Yellow-poplar**
E		512	**Black walnut**
E		513	**Black locust**
E		514	**Southern scrub oak**
E		515	**Chestnut oak / black oak / scarlet oak**
E		516	**Cherry / white ash / yellow-poplar**
E		517	**Elm / ash / black locust**
E		519	**Red maple / oak**
E		520	**Mixed upland hardwoods**
Oak / Gum / Cypress Group			
E		601	**Swamp chestnut oak / cherrybark oak**
E		602	**Sweetgum / Nuttall oak / willow oak**
E		605	**Overcup oak / water hickory**
E		606	**Atlantic white-cedar**
E		607	**Baldcypress / water tupelo**
E		608	**Sweetbay / swamp tupelo / red maple**
E		609	**Baldcypress / pondcypress**
Elm / Ash / Cottonwood Group			
E		701	**Black ash / American elm / red maple**
E		702	**River birch / sycamore**
E	W	703	**Cottonwood**
E	W	704	**Willow**
E		705	**Sycamore / pecan / American elm**
E		706	**Sugarberry / hackberry / elm / green ash**
E		707	**Silver maple / American elm**
E		708	**Red maple / lowland**
E	W	709	**Cottonwood / willow**
	W	722	**Oregon ash**
Maple / Beech / Birch Group			
E		801	**Sugar maple / beech / yellow birch**
E		802	**Black cherry**
E		805	**Hard maple / basswood**
E		809	**Red maple / upland**
Aspen / Birch Group			
E	W	901	**Aspen**
E	W	902	**Paper birch**
E		903	**Gray birch**
E	W	904	**Balsam poplar**
E	W	905	**Pin cherry**
Alder / Maple Group			
	W	911	**Red alder**
	W	912	**Bigleaf maple**
Western Oak Group			
	W	921	**Gray pine**
	W	922	**California black oak**
	W	923	**Oregon white oak**
	W	924	**Blue oak**

East	West	Code	Species Type
	W	931	**Coast live oak**
	W	933	**Canyon live oak**
	W	934	**Interior live oak**
	W	935	**California white oak (valley oak)**
Tanoak / Laurel Group			
	W	941	**Tanoak**
	W	942	**California laurel**
	W	943	**Giant chinkapin**
Other Harwoods Group			
	W	961	**Pacific madrone**
	W	962	**Other hardwoods**
Woodland Hardwoods Group			
	W	971	**Deciduous oak woodland**
	W	972	**Evergreen oak woodland**
	W	973	**Mesquite woodland**
	W	974	**Cercocarpus (Mountain brush) woodland**
	W	975	**Intermountain maple woodland**
	W	976	**Misc. woodland hardwoods**
Tropical and Subtropical Hardwoods Groups			
E		982	**Mangrove swamps**
E	W	983	**Palms**
		984	**Dry forest**
		985	**Moist forest**
		986	**Wet and rain forest**
		987	**Lower montane forest**
E		989	**Other tropical and subtropical hardwoods**
Exotic Hardwoods Group			
E		991	**Paulownia**
E		992	**Melaleuca**
E	W	993	**Eucalyptus**
E	W	995	**Other exotic hardwoods**

For nonstocked stands, see *FOREST TYPE (Item 5.7.1.9)* for procedures to determine FOREST TYPE.

SUBSECTION E.0.1 PINYON / JUNIPER GROUP

- 182 Rocky Mountain juniper: Rocky Mountain juniper comprises the majority of stocking. Associates - ponderosa pine, Douglas-fir, other junipers, pinyons, and oaks. Sites -- often found on calcareous and somewhat alkaline soils.
- 184 Juniper woodland: Includes Pinchot juniper, redberry juniper, Ashe juniper, California juniper, alligator juniper, Utah juniper, oneseed juniper and pinyon is NOT present. Associates: various woodland oaks and cercocarpus, ponderosa pine, Arizona cypress, and Douglas-fir. Sites -- lower elevation with low annual precipitation.
- 185 Pinyon-juniper woodland: Includes all pinyons and all junipers except Rocky Mountain and western juniper. Must have pinyon present. Associates: various woodland oaks and cercocarpus, ponderosa pine, Arizona cypress, and Douglas-fir. Sites--occurs at lower elevations with low annual precipitation.

SUBSECTION E.0.2 DOUGLAS-FIR GROUP

- 201 Douglas-fir: Associates - western hemlock, grand fir, Pacific silver fir, white fir, noble fir, California red fir, western redcedar, bigleaf maple, red alder, ponderosa pine, western white pine, western hemlock, Sitka spruce. Sites -- throughout the western U.S.
- 202 Port-Orford-cedar: Associates - Douglas-fir, western hemlock, Sitka spruce, grand fir, lodgepole pine, western redcedar, redwood, tanoak, red alder, bigleaf maple and California laurel. Sites --higher elevations tending to occur on northerly aspects.

• 203 Bigcone Douglas-fir: Associates - Canyon live oak, ponderosa, Jeffrey, sugar, knobcone, and Coulter pines, incense-cedar, white fir, California black oak, California laurel, and bigleaf maple. Sites -- Mainly confined to the Transverse and Peninsular Ranges of southern California. Stands are found on many combinations of slope, aspect, soil, but as elevations increase, the preferred aspect shifts from cooler to warmer slopes.

SUBSECTION E.0.3 PONDEROSA PINE GROUP

• 221 Ponderosa pine (includes Arizona pine): Associates - Douglas-fir, lodgepole pine, grand fir, Jeffrey pine, western larch, quaking aspen, Utah juniper, Gambel oak. Sites -- this forest type is distributed over vast areas in the West and therefore can have great differences in environmental conditions.

• 222 Incense-cedar: Associates - Douglas-fir, ponderosa pine, sugar pine, western white pine, Jeffrey pine, white and grand fir, western hemlock, western redcedar, Port-Orford-cedar, giant sequoia, Oregon white oak, California black oak, tanoak, giant chinkapin, and Pacific madrone; it is rarely found in pure stands. Sites -- Grows from the coastal fog belt to the dry inland slopes of eastern California and central Oregon. Once established, incense-cedar is a good competitor on hot, dry sites and commonly shares an upper canopy position on southwestern slopes. On cooler, moister aspects, it is usually subdominant to other species.

• 224 Sugar pine: Associates - In the northern part of its range: Douglas-fir, ponderosa pine, grand fir, incense-cedar, western hemlock, western redcedar, Port-Orford-cedar, tanoak, and madrone. In the central part of its range: ponderosa pine, Jeffrey pine, white fir, incense-cedar, California red fir, giant sequoia, and California black oak. Farther south: Jeffrey pine, ponderosa pine, Coulter pine, incense-cedar, white fir, and bigcone Douglas-fir. Sites -- grows in areas that have warm, dry summers and cool, wet, mild winters. Terrain is commonly steep and rugged, favoring warm exposures as the elevation increases. Found in Oregon and California, but is most abundant in the mixed conifer forests on the west slope of the Sierra Nevada.

• 225 Jeffrey pine: Associates - Incense-cedar, ponderosa pine, sugar pine, Douglas-fir, Port-Orford-cedar, western white pine, knobcone pine, Digger pine, red and white fir. Sites -- thrives in fairly harsh environments throughout most of its range, and is cold hardy, drought tolerant, adapted to short growing seasons, and tolerant of infertile sites. The majority of trees are found in California, although its range extends into SW Oregon and western Nevada.

• 226 Coulter pine: Associates - blue oak, California black oak, interior live oak, interior live oak, coast live oak, valley oak, California scrub oak, buckeye, ponderosa pine. Sites -- grows singly or in small stands primarily on dry, rocky slopes of southern California coastal ranges, between 3,000 and 6,000 feet. Occurs from Mt. Diablo and the Santa Lucia Mountains down to the San Bernardino, San Jacinto, and Cuyamaca Mountains in the south.

SUBSECTION E.0.4 WESTERN WHITE PINE GROUP

• 241 Western white pine: Associates - western larch, grand fir, western redcedar, and western hemlock. Sites -- occurs primarily on moist, mid-elevation sites from 1,500 to 4,000 feet.

SUBSECTION E.0.5 FIR/SPRUCE/MOUNTAIN HEMLOCK GROUP

• 261 White fir: Associates - Douglas-fir, sugar pine, ponderosa pine, Jeffrey pine, incense-cedar, California red fir, blue spruce, limber pine, and aspen. Sites -- deep well-drained sandy loam-covered slopes and benches with a northerly exposure.

• 262 Red fir (includes California and Shasta red fir): Associates - Jeffrey pine, western white pine, lodgepole pine, mountain hemlock, and sugar pine. Sites -- found at elevations ranging from 5,400 to 7,500 feet.

• 263 Noble fir: Associates - Douglas-fir, Pacific silver fir, western and mountain hemlocks, lodgepole pine, western redcedar, and Alaska cedar. Sites -- found on a variety of sites where precipitation is high and snowpacks are common, generally above 3,000 feet in elevation in the Cascade and Coast ranges.

• 264 Pacific silver fir: Associates - western and mountain hemlocks, western redcedar, Alaska cedar, grand fir, Sitka spruce, lodgepole pine, subalpine fir, and Engelmann spruce. Sites -- most abundant on sites where summer drought is minimal and snowpacks are common, such as areas of heavy rainfall, seepage, or prolonged snowmelt.

- 265 Engelmann spruce: Associates - western white pine, western redcedar, western hemlock, Douglas-fir, western larch, grand fir, subalpine fir, and lodgepole pine. For this type to be used, the total stocking of Engelmann spruce must be at least 75 percent of the total stocking.
- 266 Engelmann spruce-subalpine fir: Associates - western white pine, western redcedar, western hemlock, Douglas-fir, western larch, grand fir, and lodgepole pine. Sites -- this type is widespread in the Western U.S. For this type to be used, the sum of the stocking of Engelmann spruce and subalpine fir must be at least 75 percent of the total stocking and Engelmann spruce stocking must be between 5 and 74 percent of total and subalpine fir stocking must be between 5 and 74 percent of total.
- 267 Grand fir: Associates - ponderosa pine, Douglas-fir, western hemlock, western redcedar, western white pine, Pacific yew, lodgepole pine, and western larch. Sites -- in Idaho, found on moist slopes from 1,500 to 5,200-foot elevations; in Oregon, it occupies moist low-elevation sites, but also extends up to mid-elevations to as high as 6,000 feet.
- 268 Subalpine fir: Associates - western white pine, western redcedar, western hemlock, Douglas-fir, western larch, grand fir, Engelmann spruce, and lodgepole pine. For this type to be used, the total stocking of subalpine fir must be at least 75 percent of the total stocking. Sites -- found at high elevations, near timberline.
- 269 Blue spruce: Associates - Douglas-fir, ponderosa pine, white fir, lodgepole pine, and Rocky Mountain juniper. Sites -- restricted to the southern Rocky Mountains, typically located in the montane zone.
- 270 Mountain hemlock: Associates - Alaska-cedar, Pacific silver fir, western white pine, lodgepole pine, noble fir, and subalpine fir. Sites -- occurs in cold, moist regions and growing conditions are poor.
- 271 Alaska-yellow-cedar: Associates: In California, California red fir, Brewer spruce, incense-cedar, Pacific yew, and western white pine; in Oregon and Washington, found with mountain hemlock, subalpine fir, Pacific silver fir, noble fir, western white pine, and western hemlock. Sites -- Cool and humid climate, most stands grow within 100 miles of the Pacific coast.

SUBSECTION E.0.6 LODGEPOLE PINE GROUP

- 281 Lodgepole pine: Associates - subalpine fir, Engelmann spruce, white spruce, Douglas-fir, western redcedar, red alder, and western hemlock. Sites -- one of the most widespread types in the Western U.S. tolerating a broad range of temperature and moisture regimes.

SUBSECTION E.0.7 HEMLOCK/SITKA SPRUCE GROUP

- 301 Western hemlock: Associates - Sitka spruce, western redcedar, Douglas-fir, Alaska-yellow-cedar, grand fir, Engelmann spruce, bigleaf maple, and red alder. Sites -- nearly any soil provides a seedbed but requires abundant moisture. Often comes in cut-over or burned-over areas.
- 304 Western redcedar: Associates - western white pine, western hemlock, western larch, grand fir, Douglas-fir, and Pacific silver fir. Sites -- inhabits moist flats and slopes, the banks of rivers and swamps and can be found in bogs.
- 305 Sitka spruce: Associates - western hemlock, Douglas-fir, western redcedar, Port Orford-cedar, red alder, bigleaf maple, and black cottonwood. Sites - -limited to a relatively narrow oceanside strip characterized by mild winters, cool summers, and abundant moisture throughout the growing season.

SUBSECTION E.0.8 WESTERN LARCH GROUP

- 321 Western larch: Associates - Douglas-fir, subalpine fir, lodgepole pine, Engelmann spruce, western hemlock, and western redcedar. Sites -- best growth on deep, moist, porous soils in high valleys and on mountain slopes of northern and western exposure.

SUBSECTION E.0.9 REDWOOD GROUP

- 341 Redwood: Associates - Douglas-fir, grand fir, western hemlock, California torreya, Pacific yew, and western redcedar. Sites -- largely confined to coastal topography between 35 degrees 41 minutes and 42 degrees 9 minutes north latitude.
- 342 Giant sequoia: Associates: California white fir, sugar pine, incense-cedar, California red fir, California white fir, ponderosa pine and California black oak. Sites -- Deep, well-drained soils with high soil moisture available during dry summers. Most stands found above 4,000 feet elevation, rarely forming pure stands.

SUBSECTION E.0.10 OTHER WESTERN SOFTWOODS GROUP

- 361 Knobcone pine: Associates - Digger pine, canyon live oak and many western oaks, Douglas-fir, and Port Orford-cedar. Sites -- found on soils that are shallow, dry, stony or high in magnesium.
- 362 Southwestern white pine: Associates- Douglas-fir, white fir, ponderosa pine, Gambel oak, and aspen. Sites -- higher elevations in Arizona and New Mexico
- 363 Bishop pine: Grows singly or in small stands along the coast of California.
- 364 Monterey pine: Grows singly or in small stands. Sites -- Native stands are found in the high humidity and summer fogs of the central-coast area of California in San Mateo, Santa Cruz, Monterey, and San Luis Obispo Counties.
- 365 Foxtail pine/bristlecone pine: Associates - limber pine, white fir, Engelmann spruce, ponderosa pine, and pinyon. Sites -- found on rocky outcrops, usually on southern or southwestern exposures and can range in elevation from 8,000 to 11,000 feet.
- 366 Limber pine: Associates - low to mid elevations.: Douglas-fir, ponderosa pine, Rocky Mountain juniper; mid to high elevations: lodgepole pine and aspen; high elevations: Engelmann spruce, subalpine fir, bristlecone pine, and whitebark pine. Sites -- a very wide range of elevations and latitudes across the Rocky mountains; can be the majority species as an early seral stage under a variety of harsh establishment conditions, as climax in dry, high elevation sites in the central and southern Rockies.
- 367 Whitebark pine: Associates - subalpine fir, subalpine larch, Engelmann spruce, and lodgepole pine. Sites -- poor, high elevation.
- 368 Miscellaneous western softwoods: A "catch-all" group for such species as all cypress (Cupressus) species, subalpine larch, Brewer spruce, Apache pine, Chihuahua pine, Washoe pine, Torrey pine, Pacific yew, and California torreya.
- 369 Western juniper: Associates - ponderosa pine and Jeffrey pine. Sites -- found on dry sites and ranges in elevation from just above sea level to 6,500 feet.

SUBSECTION E.0.11 CALIFORNIA MIXED CONIFER GROUP

- 371 California mixed conifer: Associates - a complex association of ponderosa pine, sugar pine, Douglas-fir, white fir, red fir, and incense-cedar. Generally, five or six conifer species are intermixed either as single trees or in small groups. Sites -- Mixed conifer sites are often on east-facing slopes of the California Coast Range and on the west-facing and higher elevation east-facing slopes of the Oregon Cascades and Sierra Nevadas.

  California Mixed Conifer, is only applicable when the plot is in California (STATE = 06). To classify as a mixed conifer forest type the condition class must be capable of being stocked with 70-percent conifers and one of the following must be true:

  1. Douglas-fir predominates and the COUNTY is not Del Norte (015), Humboldt (023), Marin (041), Mendocino (045), Napa (055), San Mateo (081), Santa Clara (085), Santa Cruz (087), or Sonoma (097).
  2. Sugar pine (117) or incense-cedar (081) predominates.
  3. Ponderosa pine (122) and/or Jeffrey pine (116), either singly or in combination, predominate but make up less than 80-percent of the conifer stocking.
  4. White fir (015), and/or red fir (020) and/or Shasta red fir (021) either singly or in combination predominate, but make up less than 80-percent of the conifer stocking.

  On a mixed conifer site a complex association of ponderosa pine, sugar pine, Douglas-fir, white fir and red fir may exist. Incense-cedar may also be a component. Generally these five or six conifer species are intermixed either as single trees or in small groups. Vertical mixing is also common with one to three species in the overstory and one or two species in the understory. Mixed conifer sites are often on east facing slopes of the Coast Range, and on the west facing and higher elevation east facing slopes of the Cascade Range and the Sierra Nevada Range.

SUBSECTION E.0.12 OTHER SOFTWOODS GROUP

- 391 Other softwoods: All softwood species identified to genus level only, except cypress, baldcypress, and larch.

SUBSECTION E.0.13 ELM/ASH/COTTONWOOD GROUP

- 703 Cottonwood: Associates - willow, white ash, green ash, and sycamore. Sites - streambanks where bare, moist soil is available.
- 704 Willow (includes peachleaf and black willow): Associates - cottonwood, green ash, sycamore, pecan, American elm, red maple, and boxelder. Sites - streambanks where bare, moist soil is available.
- 709 Cottonwood/willow (includes peachleaf, black and Bebb willow): Associates - white ash, green ash, sycamore, American elm, red maple and boxelder. Sites -- stream banks where bare, moist soil is available.
- 722 Oregon ash: Associates - red alder, bigleaf maple, black cottonwood, willow. Sites -- riparian areas, prefers damp, loose soils, below 3000 feet.

SUBSECTION E.0.14 ASPEN/BIRCH GROUP

- 901 Aspen: Associates - Engelmann spruce, lodgepole pine, ponderosa pine, Douglas-fir, subalpine fir, white fir, white spruce, balsam poplar, and paper birch. Sites -- aspen has the capacity to grow on a variety of sites and soils, ranging from shallow stony soils and loamy sands to heavy clays.
- 902 Paper birch (includes northern paper birch): Associates - aspen, white spruce, black spruce, and lodgepole pine. Sites -- can be found on a range of soils, but best developed on well-drained sandy loam and silt loam soils.

SUBSECTION E.0.15 ALDER/MAPLE GROUP

- 911 Red alder: Associates - Douglas-fir, western hemlock, western redcedar, grand fir, Sitka spruce, black cottonwood, bigleaf maple, willow. Sites -- stream bottoms and lower slopes, west of the Cascades, usually within 125 miles of the coast, below 2,400 feet.
- 912 Bigleaf maple: Associates - Douglas-fir, western hemlock, western redcedar, black cottonwood, Pacific madrone, Pacific dogwood, red alder. Sites -- Flat interior valleys, gently sloping stream bottoms, and moderate to steep slopes; favors moist, well-drained soils of river terraces and flood plains, but also grows on drier rocky, south-facing slopes in the Coast Ranges of northwestern Oregon.

SUBSECTION E.0.16 WESTERN OAK GROUP

- 921 Gray pine: Associates - Blue oak, California black oak, interior live oak, coast live oak, valley oak, California scrub oak, buckeye, western juniper, Coulter pine. Sites -- dry foothill woodland communities of California's Central Valley, on rocky slopes and steep canyon walls below 3,000 feet. Prefers areas with hot, dry summers and absence of summer fog. Tolerates infertile, low moisture soils.
- 922 California black oak: Associates - ponderosa pine, Douglas-fir, incense-cedar, knobcone pine, Pacific madrone, tanoak, and Oregon white oak.
- 923 Oregon white oak: Associates - Douglas-fir, bigleaf maple, and Oregon ash. Sites -- commonly occurs in very moist locations, in mixture with Oregon ash on floodplains of the Willamette Valley, and on poorly drained heavy clay soils.
- 924 Blue oak: Associates - Gray pine, interior live oak, canyon live oak, valley oak, and California buckeye. Sites -- low valleys and foothills of the Coast Ranges and Sierras in California.
- 931 Coast live oak: Associates - knobcone pine, Monterey pine, interior live oak, valley oak, blue oak, tanoak, Pacific madrone, and California laurel. Sites -- usually occupies well-drained soils.
- 933 Canyon live oak: Associates - Douglas-fir, bigcone Douglas-fir, ponderosa pine, Jeffrey pine, bigleaf maple, Pacific madrone, and California laurel. Sites -- found on steep rocky canyon slopes and boulder-filled bottoms.
- 934 Interior live oak: Associates - Blue oak, coast live oak, valley oak, canyon live oak, gray pine, ponderosa pine, Douglas-fir. Sites -- from valleys to foothills, below 5,000 feet; grows on moister sites than blue oak.
- 935 California white oak (valley oak): Associates - Canyon live oak, coast live oak, California black oak, blue oak, California buckeye, gray pine, ponderosa pine. Sites -- hot interior valleys and slopes below 2,000 feet; tolerates cool wet winters and hot dry summers; prefers fertile soils of valley floors.

SUBSECTION E.0.17 TANOAK/LAUREL GROUP

- 941 Tanoak: Associates - Douglas-fir, Pacific madrone, and canyon live oak. Sites -- sea level to 5,000 feet elevation from southern Oregon south along the Coast Ranges to the Santa Ynez Mountains in California.
- 942 California laurel: Associates - usually found in mixed stands with a wide variety of associated species. Sites -- from the cool, humid conditions of dense coastal forests to hot, dry sites found inland in open woodlands and chaparral, below 4,000 feet.
- 943 Giant chinkapin: Associates - rarely grows in pure stands, usually a component of other types. Found with Douglas-fir, western hemlock, incense-cedar, white fir, western white pine, sugar pine, ponderosa pine, Pacific madrone, tanoak, and California black oak. Sites -- from valley bottoms to ridgetops, in the coast and cascade ranges, below 5,000 feet. Tolerates infertile and droughty sites.

SUBSECTION E.0.18 OTHER HARDWOODS GROUP

- 961 Pacific madrone: Associates - a wide variety of species, but most common with Douglas-fir and tanoak. Sites -- grows on all aspects but is found most often on those facing south and west, and tolerates low soil moisture in summer
- 962 Other hardwoods: A "catch-all" group for hardwood species identified only to the genus level, with the exception of the following species (Note: This code primarily applies to a mapped subplot, where only one or two "uncommon" tree species are tallied): hackberry spp., hawthorn spp., eucalyptus spp., persimmon spp., magnolia spp., mulberry spp., mesquite spp., citrus spp., royal palm spp., willow spp., and saltcedar spp., AND striped maple, mountain maple, California buckeye, Arizona alder, serviceberry, Arizona madrone, pawpaw, sweet birch, Virginia roundleaf birch, Allegany chinkapin, Ozark chinkapin, southern catalpa, northern catalpa, yellowwood, Pacific dogwood, pumpkin ash, blue ash, velvet ash, Carolina ash, Texas ash, all silverbells, California black walnut, southern California black walnut, Texas walnut, Arizona walnut, all apple species, eastern hophornbeam, California sycamore, Arizona sycamore, chokecherry, peach, Canada plum, wild plum, bitter cherry, Allegheny plum, Chickasaw plum, sweet cherry, sour cherry, European plum, Mahaleb plum, western soapberry, American mountain-ash, northern mountain-ash, Joshua tree, smoketree, great leucaena, and berlandier ash.

SUBSECTION E.0.19 WOODLAND HARDWOODS GROUP

- 971 Deciduous oak woodland: areas with predominantly Gambel oak, which is often associated with ponderosa pine, white fir, Douglas-fir, alligator juniper, bigtooth maple, and chokecherry. Sites -- most soils, on elevations generally ranging from 4,000 to 8,000 feet.
- 972 Evergreen oak woodland: areas with predominantly evergreen oaks, such as Arizona white oak, Emory oak, Engelmann oak, Mexican blue oak, silverleaf oak, gray oak and/or netleaf oak. Other associates - various pinyons and junipers. Sites -- alluvial soils, from 4,000 to 7,500 feet elevation.
- 973 Mesquite woodland: Honey mesquite and screwbean mesquite comprise the majority of the stocking of this cover type. Honey mesquite associates, which are many, vary with climate and soils. Sites -- occurs on a wide variety of soils at elevations mostly below 5,000 feet.
- 974 Cercocarpus (Mountain brush) woodland (includes curlleaf mountain-mahogany): Associates - Rocky Mountain juniper, big sagebrush, and snowberry. Sites -- dry, course-textured soils.
- 975 Intermountain maple woodland (includes Rocky Mountain and/or bigtooth maple): Associates - chokecherry, boxelder, birchleaf mountain-mahogany, and Gambel oak. Sites -- most soils but does not tolerate long flooding periods. Found growing between 4,500 and 7,500 feet elevation.
- 976 Miscellaneous woodland hardwoods [includes acacia, New Mexico locust, and/or Arizona ironwood (tesota)]. Sites - occurs on a wide variety of soils at elevations mostly below 5,000 feet.

For nonstocked stands, see FOREST TYPE (CORE 2.5.3)(Item 5.7.1.9) for procedures to determine FOREST TYPE.

APPENDIX F TREE CODING GUIDE

Previous Measurement	Present Measurement	PREVIOUS TREE STATUS	PRESENT TREE STATUS	RECONCILE	STANDING DEAD	CAUSE OF DEATH
SAMPLE KIND 1 or 3						
	Live 1.0+DBH/DRC		1			
	Dead 5.0+ DBH/DRC		2			
SAMPLE KIND 2 (*Remeasurement*)						
Live 5.0+ DBH/DRC	Live 5.0+ DBH/DRC	1	1			
Live 1.0-4.9 DBH/DRC on microplot	Live 5.0+ DBH	1	1			
Live 1.0-4.9 DBH/DRC on microplot	Live 1.0-4.9 DBH/DRC on microplot	1	1			
Live 5.0+ DBH/DRC	Live but shrank < 5.0 and on microplot	1	1			
Live 1 inch +	Live but land no longer qualifies as forest	1	1			
Live 5.0+ DBH/DRC	Standing dead 5.0+	1	2		1	10-80
Live 5.0+ DBH/DRC	Down dead 5.0+	1	2		0	10-80
Live 1.0-4.9 DBH/DRC on microplot	Dead 1.0-4.9 DBH/DRC	1	2		0	10-80
Live 1.0-4.9 DBH/DRC on microplot	Dead 5.0+ (standing or down)	1	2		0 or 1	10-80
Live 1.0+ DBH/DRC	Cruiser unable to locate tree due to a weather (including geologic, such as landslide) or fire event & assume tree is down dead or you can see tree and it is dead and off the plot	1	2		0	30 or 50-55
Live 1.0+ DBH/DRC	Cut and left in the woods	1	2		0	80
Live 1 inch +	Dead and land no longer qualifies as forest (land clearing or conversion to nonforest land use)	1	2		0 or 1	10-80
Dead 5 inch +	Dead and land no longer qualifies as forest (land clearing or conversion to nonforest land use)	2	2		0 or 1	
Live 1.0+ DBH/DRC	Tree removed (cut and hauled away)	1	3			80
Live 1 inch +	Gone (cut and removed?) and land no longer qualifies as forest	1	3			80
Dead 5.0+ DBH/DRC	Dead standing 5.0 DBH/ DRC	2	2		1	
Dead 5.0+ DBH/DRC	Dead down 5.0+	2	2		0	
Dead 5.0+ DBH/DRC	Dead DBH/DRC < 5.0	2	2		0	
Dead 5.0+ DBH/DRC	Cruiser is unable to locate tree due to a weather (including geologic) or fire event & assume it is down dead	2	2		0	
Dead 5.0+ DBH/DRC	Tree removed (cut and hauled away)	2	3			

Previous Measurement	Present Measurement	PREVIOUS TREE STATUS	PRESENT TREE STATUS	RECONCILE	STANDING DEAD	CAUSE OF DEATH
Live 5.0+ DBH/DRC	*Live t*ree shrank <5.0 and NOT on microplot	1	0	5		
Live 1.0-4.9 DBH/DRC	Tree shrank <1.0	1	0	5		
Live 1.0-4.9 DBH/DRC	Live 1.0-4.9 DBH/DRC, shouldn't have been tallied—beyond 6.8—cruiser error	1	0	7		
Live 5.0+ DBH/DRC	Live 5.0+ DBH/DRC, shouldn't have been tallied –beyond 24.0–cruiser error	1	0	7		
Live 1.0+ DBH/DRC	No longer a tally species	1	0	8		
Live 1.0+ DBH/DRC	Tree moved off plot due to a geologic (i.e., slight earth movement) or weather event (i.e., hurricane) and you can still see it (live before, live now)	1	0	6		
Live 1 inch +	Nonsampled area now	1	0	9		
Dead 5.0+ DBH/DRC	No longer a tally species	2	0	8		
Dead 5.0 DBH/DRC	Tree moved off plot due to a geologic (i.e., small earth movement) or weather event (i.e., hurricane) and you can still see the tree	2	0	6		
Dead 5 inch +	Nonsampled area now	2	0	9		
Missed live	Live 1.0+ DBH/DRC	-	1	3		
< 5.0 live	5.0+ DBH/DRC live (not on the microplot)	-	1	1		
< 1.0 live	1.0-4.9 DBH/DRC live *(on the microplot)*	-	1	1		
< 1.0 live	5.0+ DBH/DRC live (on the microplot) (through growth)	-	1	2		
Nonsampled area before	Live 1 inch +	-	1	3		
Nonsampled area before and tree is <1.0"	Live 1.0"+		1	1		
Nonforest before	Forest now, live 1 inch+	-	1	1		
Missed dead	Dead 5.0+ DBH/DRC	-	2	4	1	
Missed live	Dead 5.0+ DBH/DRC	-	2	3	1	10-80
< 5.0 live	5.0+ DBH/DRC dead (very rare)	-	2	1	0 or 1	10-80
Nonsampled area before	Standing Dead 5 inch+	-	2	3 or 4		
Nonforest before	Forest now, Standing Dead 5 inch+	-	2	1		
Live 5.0+ DBH/DRC	Dead <5.0 inch DBH/DRC	1	2		0	10-80
Reference only (Witness only)	Tree is no longer used for any reason	9	0			
Live 1.0 inch +	Tree diameter was erroneously measured on a swell or damage, and now the nail must be moved to the correct location, and tree is not big enough to qualify as tally at the new location	1	0	7		

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Previous Measurement	Present Measurement	PREVIOUS TREE STATUS	PRESENT TREE STATUS	RECONCILE	STANDING DEAD	CAUSE OF DEATH
Live 1.0 inch +	Tree diameter was erroneously measured on a swell or damage, and now the nail must be moved to the correct location (If the tree is now large enough to be tallied a new tree line should be created and reconciled as ingrowth)	-	1	1		
No Status	Tree moved onto plot due to a geologic (i.e., small earth movement) or weather event (i.e., hurricane)	-	1 or 2	1		

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APPENDIX G DAMAGE CODES

The REGION column means that only the region(s) listed are allowed to collect the specific code, and must do so when the damage is present and meets or exceeds the required threshold.

CODE	Common Name	Scientific Name	Threshold	REGION
0	No Damage			ALL
10000	General Insects (General Codes are Bold)		Any damage to the terminal leader; damage ≥ 20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected	ALL
10001	thrips			
10002	Pine tip moth			
10003	wasp			
10004	Chinese rose beetle	Adoretus sinicus		
10005	rose beetle	Adoretus versutus		
10006	coconut hispid beetle	Brontispa longissima		
10007	clerid beetle	Cleridae		
10008	weevil	Curculionidae		
10009	green rose chafer	Dichelonyx backi		
10010	Allegheny mound ant	Formica exsectoides		
10011	ant	Formicidae		
10012	stick insect	Graeffea crovanii		
10013	Hulodes cranea	Hulodes cranea		
10014	conifer swift moth	Korsheltellus gracilis		
10015	Caroline shortnosed weevil	Lophothetes spp.		
10016	coconut rhinoceros beetle	Oryctes rhinoceros		
10017	bagworm moth	Psychidae	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	NRS
10018	coconut palm weevil	Rhobdoscelus asperipennis		
10019	scarab	Scarabaeidae		
10020	ash white fly	Siphoninus phillyreae		
10021	conifer seedling weevil	Steremnius carinatus		
10022	pyralid moth	Thliptoceras octoquttale		
10023	wood wasps	Siricidae spp.		
11000	Bark Beetles		Any evidence of a successful attack (successful attacks generally exhibit boring dust, many pitch tubes and/or fading crowns)	ALL
11001	roundheaded pine beetle	Dendroctonus adjunctus		
11002	western pine beetle	Dendroctonus brevicomis		
11003	southern pine beetle	Dendroctonus frontalis	Any occurrence	SRS
11004	Jeffery pine beetle	Dendroctonus jeffreyi		
11005	lodgepole pine beetle	Dendroctonus murrayanae		
11006	mountain pine beetle	Dendroctonus ponderosae	Any evidence of a successful attack	IW
11007	Douglas-fir beetle	Dendroctonus pseudotsugae		
11008	Allegheny spruce beetle	Dendroctonus punctatus		
11009	spruce beetle	Dendroctonus rufipennis	Any evidence of a successful attack	IW; PNW
11010	eastern larch beetle	Dendroctonus simplex		
11011	black turpentine beetle	Dendroctonus terebrans	Any evidence of a successful attack	SRS
11012	red turpentine beetle	Dendroctonus valens		
11013	Dryocoetes affaber	Dryocoetes affaber		
11014	Dryocoetes autographus	Dryocoetes autographus		
11015	western balsam bark beetle	Dryocoetes confusus		
11016	Dryocoetes sechelti	Dryocoetes sechelti		
11017	ash bark beetles	Hylesinus spp.		
11018	native elm bark beetle	Hylurgopinus rufipes		
11019	pinon ips	Ips confusus		
11020	small southern pine engraver	Ips avulsus		
11021	sixspined ips	Ips calligraphus		
11022	emarginate ips	Ips emarginatus		
11023	southern pine engraver beetle	Ips grandicollis		
11024	Orthotomicus latidens	Orthotomicus latidens		
11025	Arizona five-spined ips	Ips lecontei		
11026	Monterey pine ips	Ips mexicanus		
11027	California fivespined ips	Ips paraconfusus		

CODE	Common Name	Scientific Name	Threshold	REGION
11028	northern spruce engraver beetle	Ips perturbatus		
11029	pine engraver	Ips pini		
11030	Ips engraver beetles	Ips spp.	Any evidence of a successful attack	IW; SRS
11031	Ips tridens	Ips tridens		
11032	western ash bark beetle	Leperisinus californicus		
11033	Oregon ash bark beetle	Leperisinus oregonus		
11034	Orthotomicus caelatus	Orthotomicus caelatus		
11035	cedar bark beetles	Phloeosinus spp.		
11036	western cedar bark beetle	Phloeosinus punctatus		
11037	tip beetles	Pityogenes spp.		
11038	Douglas-fir twig beetle	Pityophthorus pseudotsugae		
11039	twig beetles	Pityophthorus spp.		
11040	foureyed spruce bark beetle	Polygraphus rufipennis		
11041	fir root bark beetle	Pseudohylesinum granulatus		
11042	Pseudohylesinus dispar	Pseudohylesinus dispar		
11043	Douglas-fir pole beetle	Pseudohylesinus nebulosus		
11044	silver fir beetle	Pseudohylesinus sericeus		
11045	small European elm bark beetle	Scolytus multistriatus		
11046	spruce engraver	Scolytus piceae		
11047	hickory bark beetle	Scolytus quadrispinosus		
11048	true fir bark beetles	Scolytus spp.		
11049	Douglas-fir engraver	Scolytus unispinosus		
11050	fir engraver	Scolytus ventralis		
11051	striped ambrosia beetle	Tryachykele lineatum		
11052	Sitka spruce engraver beetle	Ips conncinnus		
11053	four-eyed bark beetle	Polygraphus spp.		
11054	hemlock beetle	Pseudohylesinus tsugae		
11055	spruce ips	Ips pilifrons		
11056	(smaller) Mexican pine beetle	Dendroctonus mexicanus		
11057	banded elm bark beetle	Scolytus schevyrewi		
11058	redbay ambrosia beetle	Xyleborus glabratus		
11059	southern cypress beetle	Phloeosinus taxodii		
11060	Mediterranean pine engraver	Orthotomicus erosus		
11800	other bark beetle (known)	other bark beetle (known)		
11900	unknown bark beetle	unknown bark beetle		
11999	western bark beetle complex	western bark beetle complex		
12000	Defoliators		Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	ALL
12001	casebearer			
12002	leaftier			
12003	loopers			
12004	needleminers			
12005	sawflies			
12006	skeletonizer			
12007	larger elm leaf beetle	Monocesta coryli		
12008	spanworm			
12009	webworm			
12010	pine false webworm	Acantholyda erythrocephala		
12011	western blackheaded budworm	Acleris gloverana		
12012	eastern blackheaded budworm	Acleris variana		
12013	whitefly	Aleyrodoidae		
12014	fall cankerworm	Alsophila pometaria		
12015	alder flea beetle	Altica ambiens		
12016	mountain mahogany looper	Anacamptodes clivinaria profanata		
12017	birch leaffolder	Ancylis disigerana		
12018	oak worms	Anisota spp.		
12019	orange-striped oakworm	Anisota senatoria		
12020	western larch sawfly	Anoplonyx occidens		
12021	fruittree leafroller	Archips argyrospila		
12022	uglynest caterpillar	Archips cerasivorana		
12023	boxelder defoliator	Archips negundanus		
12024	oak leafroller	Archips semiferana		
12025	birch sawfly	Arge pectoralis		
12026	arborvitae leafminer	Argyresthia thuiella		
12027	coconut scale	Aspidiotus destructor		
12028	texas leafcutting ant	Atta texana	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	SRS

CODE	Common Name	Scientific Name	Threshold	REGION
12029	oak skeletonizer	Bucculatrix ainsliella		
12030	pear sawfly	Caliroa cerasi		
12031	scarlet oak sawfly	Caliroa quercuscoccineae		
12032	elm calligrapha	Calligrapha scalaris		
12033	boxelder leafroller	Caloptilia negundella		
12034	maple petiole borer	Caulocampus acericaulis		
12035	spruce webspinning sawfly	Cephalcia fascipennis		
12036	two-year budworm	Choristoneura biennis		
12037	large aspen tortrix	Choristoneura conflictana		
12038	spruce budworm	Choristoneura fumiferana	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	NRS
12039	western pine budworm	Choristoneura lambertiana		
12040	western spruce budworm	Choristoneura occidentalis	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	IW; PNW
12041	jack pine budworm	Choristoneura pinus	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	NRS
12042	Modoc budworm	Choristoneura retiniana		
12043	aspen leaf beetle	Chrysomela crotchi		
12044	cottonwood leaf beetle	Chrysomela scripta		
12045	leafhopper	Cicadellidae		
12046	poplar tentmaker	Clostera inclusa		
12047	larch casebearer	Coleophora laricella		
12048	birch casebearer	Coleophora serratella		
12049	lodgepole needleminer	Coleotechnites milleri		
12050	Gelechiid moths/ needleminers	Coleotechnites spp.		
12051	Black Hills pandora moth	Coloradia doris		
12052	pandora moth	Coloradia pandora		
12053	sycamore lace bug	Corythucha ciliata		
12054	lace bugs	Corythucha spp.		
12055	oak leaftier	Croesia semipurpurana		
12056	dusky birch sawfly	Croesus latitarsus		
12057	walnut caterpillar	Datana integerrima		
12058	yellownecked caterpillar	Datana ministra		
12059	walkingstick	Diapheromera femorata		
12060	spruce coneworm	Dioryctria reniculelloides		
12061	introduced pine sawfly	Diprion similis		
12062	greenstriped mapleworm	Dryocampa rubicunda		
12063	spruce needleminer (east)	Endothenia albolineana		
12064	elm spanworm	Ennomos subsignaris	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	NRS
12065	maple trumpet skeletonizer	Epinotia aceriella		
12066	white fir needleminer	Epinotia meritana		
12067	linden looper	Erannis tiliaria		
12068	browntail moth	Euproctis chrysorrhoea		
12069	pine needleminer	Exoteleia pinifoliella		
12070	birch leafminer	Fenusa pusilla		
12071	elm leafminer	Fenusa ulmi		
12072	geometrid moth	Geometridae		
12073	leafblotch miner	Gracillariidae		
12074	spotted tussock moth	Halisidota maculata		
12075	pale tussock moth	Halysidota tessellaris		
12076	hesperiid moth	Hasora choromus		
12077	brown day moth	Hemileuca eglanterina		
12078	buck moth	Hemileuca maia		
12079	saddled prominent	Heterocampa guttivitta		
12080	variable oakleaf caterpillar	Heterocampa manteo		
12081	cherry scallop shell moth	Hydria prunivorata	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	NRS
12082	fall webworm	Hyphantria cunea	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	SRS
12083	hemlock looper	Lambdina fiscellaria		
12084	oak looper	Lambdina punctat		
12085	tent caterpillar moth	Lasiocampidae		
12086	satin moth	Leucoma salicis		

CODE	Common Name	Scientific Name	Threshold	REGION
12087	willow leafblotch miner	Lithocolletis spp.		
12088	aspen blotchminer	Lithocolletis tremuloidiella		
12089	gypsy moth	Lymantria dispar	Any occurrence	NRS; SRS
12090	cottonwood leafminers	Lyonetia spp.		
12091	dogwood sawfly	Macremphytus tarsatus		
12092	rose chafer	Macrodactylus subspinosus		
12093	eastern tent caterpillar	Malacosoma americanum	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	NRS; SRS
12094	western tent caterpillar	Malacosoma californicum		
12095	Pacific tent caterpillar	Malacosoma constrictum		
12096	forest tent caterpillar	Malacosoma disstria	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	NRS
12097	southwestern tent caterpillar	Malacosoma incurvum		
12098	leafcutting bees	Megachilidae		
12099	blister beetle	Meloidae		
12100	early birch leaf edgeminer	Messa nana		
12101	juniper sawfly	Monoctenus fulvus		
12102	common sawflies	Nematus spp.		
12103	balsam fir sawfly	Neodiprion abietis		
12104	lodgepole sawfly	Neodiprion burkei		
12105	blackheaded pine sawfly	Neodiprion excitans		
12106	pine infesting sawflies	Neodiprion fulviceps		
12107	redheaded pine sawfly	Neodiprion lecontei		
12109	ponderosa pine sawfly	Neodiprion mundus		
12110	white pine sawfly	Neodiprion pinetum		
12111	jack pine sawfly	Neodiprion pratti banksianae		
12112	Virginia pine sawfly	Neodiprion pratti pratti		
12113	European pine sawfly	Neodiprion sertifer		
12114	loblolly pine sawfly	Neodiprion taedae linearis		
12115	hemlock sawfly	Neodiprion tsugae		
12116	pine butterfly	Neophasia menapia		
12117	false hemlock looper	Nepytia canosaria		
12118	California tortoiseshell	Nymphalis californica		
12119	locust leafminer	Odontota dorsalis		
12120	Bruce spanworm	Operophtera bruceata		
12121	rusty tussock moth	Orgyia antiqua		
12122	whitemarked tussock moth	Orgyia leucostigma		
12123	Douglas-fir tussock moth	Orgyia pseudotsugata		
12124	western tussock moth	Orgyia vetusta		
12125	spring cankerworm	Paleacrita vernata		
12126	black citrus swallowtail butterfly	Papilio polytes		
12127	maple leafcutter	Paraclemensia acerifoliella		
12128	pine tussock moth	Parorgyia grisefacta		
12129	poinciana looper	Pericyma cruegeri		
12130	half-wing geometer	Phigalia titea		
12131	Phoberia moth	Phoberia atomaris		
12132	California oakworm	Phryganidia californica		
12133	European snout beetle	Phyllobius oblongus		
12134	citrus leafminer	Phyllocnistis citrella		
12135	aspen leafminer	Phyllocnistis populiella		
12136	yellowheaded spruce sawfly	Pikonema alaskensis		
12137	tenlined June beetle	Polyphylla decemlineata		
12138	Japanese beetle	Popillia japonica		
12139	larch sawfly	Pristiphora erichsonii		
12140	mountain-ash sawfly	Pristiphora geniculata		
12141	elm leaf beetle	Pyrrhalta luteola		
12142	spearmarked black moth	Rheumaptera hastata		
12143	giant silkworm moth	Saturniidae		
12144	redhumped caterpillar	Schizura concinna		
12145	redbanded thrips	Selenothrips rubrocinctus		
12146	green larch looper	Semiothisa sexmaculata		
12147	maple leafroller	Sparganothis acerivorana		
12148	redhumped oakworm	Symmerista canicosta		
12149	orangehumped mapleworm	Symmerista leucitys		
12150	spruce needleminer (west)	Taniva albolineana		
12151	maple webworm	Tetralopha asperatella		
12152	pine webworm	Tetralopha robustella		
12153	introduced basswood thrips	Thrips calcaratus		

CODE	Common Name	Scientific Name	Threshold	REGION
12154	bagworm	Thyridopteryx ephemeraeformis	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	SRS
12155	leafroller/seed moth	Tortricidae		
12156	willow defoliation	Tortricidae		
12157	euonymus caterpillar	Yponomeuta spp.		
12158	spruce bud moth	Zeiraphera canadensis		
12159	larch bud moth	Zeiraphera improbana		
12160	pine needle sheathminer	Zelleria haimbachi		
12161	cypress looper	Anacamptodes pergracilis		
12162	Chrysomela leaf beetle	Chrysomela spp.		
12163	pine colaspis	Colaspis pini		
12164	saddleback looper	Ectropis crepuscularia		
12165	birch leaf roller	Epinotia solandriana		
12166	New Mexico fir looper	Galenara consimilis		
12167	striped alder sawfly	Hemichroa crocea		
12168	greenstriped looper	Melanoplophia imitata		
12169	willow leaf blotchminer	Micrurapteryx salicifoliella		
12170	pine sawfly	Neodiprion autmnalis		
12171	pinon sawfly	Neodiprion edulicolus		
12172	Neodiprion gilletti	Neodiprion gilletti		
12173	Neodiprion ventralis	Neodiprion ventralis		
12174	pine looper	Phaeoura mexicanaria		
12175	Zadiprion rohweri	Zadiprion rohweri		
12176	bull pine sawfly	Zadiprion townsendi		
12177	Douglas-fir budmoth	Zeiraphera hesperiana		
12178	western oak looper	Lambdina fiscellaria somniaria		
12179	phantom hemlock looper	Nepytia phantasmaria		
12180	tent caterpillar	Malacosoma spp.		
12181	Abbot's sawfly	Neodiprion abbotii		
12182	slash pine sawfly	Neodiprion merkeli		
12183	sand pine sawfly	Neodiprion pratti		
12184	melalueca leaf weevil	Oxyops vitiosa		
12185	cypress leaf beetle	Systena marginalis		
12186	Nepytia janetae	Nepytia janetae		
12187	agromyzid fly	Agromyza viridula		
12188	elm sawfly	Cimbex americana		
12189	june beetle	Phyllophaga spp.		
12190	hickory tussock moth	Halisidota caryae		
12191	pin oak sawfly	Caliroa lineata		
12192	palmerworm	Dichomeris ligulella		
12193	pitch pine looper	Lambdina athasaria pellucidaria		
12194	red pine sawfly	Neodiprion nanulus nanulus		
12195	pine tube moth	Argyrotaenia pinatubana		
12196	baldcypress leafroller	Archips goyerana		
12197	winter moth	Operophtera brumata		
12198	basswood thrips	Neohydatothrips tiliae		
12199	noctuid moth	Xylomyges simplex (Walker)		
12200	pyralid moth	Palpita magniferalis		
12201	pacific silver fir budmoth	Zeiraphera spp.		
12202	red pine needle midge	Thecodiplosis piniresinosae		
12203	western hemlock looper	Lambdina fiscellaria lugubrosa		
12204	lodgepole pine sawfly	Neodiprion nanulus contortae		
12205	silverspotted tiger moth	Lophocampa argentata		
12206	green alder sawfly	Monsoma pulveratum		
12207	conifer sawflies	conifer sawflies		
12208	ambermarked birch leafminer	Profenusa thomsoni		
12209	cycad blue butterfly	Chilades pandava		
12300	budworm	budworms	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	PNW
12800	other defloiater (known)	other defloiater (known)		
12900	unknown defoliator	unknown defoliator		
13000	Chewing Insects		Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	ALL
13001	grasshopper			
13002	shorthorn grasshoppers	Acrididae		

CODE	Common Name	Scientific Name	Threshold	REGION
13003	black cutworm	Agrotis ipsilon		
13004	Palau coconut beetle	Brontispa palauenis		
13005	clearwinged grasshopper	Camnula pellucida		
13006	cicadas	Cicadidae	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	SRS
13007	eurytomids	Eurytoma spp.		
13008	cutworms	Euxoa excellens		
13009	whitefringed beetles	Graphognathus spp.		
13010	pales weevil	Hylobius pales	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	SRS
13011	vegetable weevil	Listroderes difficilis		
13012	periodical cicada	Magicicada septendecim		
13013	migratory grasshopper	Melanoplus sanguinipes		
13014	valley grasshopper	Oedaleonotus enigma		
13015	strawberry root weevil	Otiorhyhchus ovatus		
13016	black vine weevil	Otiorhynchus sulcatus		
13017	pandanus beetle	Oxycephala pandani		
13018	spaeth pandanus	Oxycephala spaethi		
13019	agamemnon butterfly	Papilio agememnon		
13020	northern pitch twig moth	Petrova albicapitana		
13021	ponderosa pine tip moth	Rhyacionia zozana		
13022	pine needle weevil	Scythropus spp.		
13023	coconut longhorned grasshopper	Segestes unicolor		
13024	clover root curculio	Sitona hispidulus		
13025	Madron thrips	Thrips madronii		
13026	ash plant bug	Tropidosteptes amoenus		
13027	shorthorned grasshopper	Valanga nigricornis		
13028	pitch-eating weevil	Pachylobius picivorus		
13029	eastern pine weevil	Pissodes nemorensis		
13030	adana tip moth	Rhyacionia adana		
13800	other chewing insect (known)	other chewing insect (known)		
13900	unknown chewing insect	unknown chewing insect		
14000	Sucking Insects		Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	ALL
14001	scale insects			
14002	western larch woolly aphid	Adelges oregonensis		
14003	balsam woolly adelgid	Adelges piceae	Any occurrence	ALL
14004	hemlock woolly adelgid	Adelges tsugae	Any occurrence	NRS; SRS; IW
14005	spiraling whitefly	Aleurodicus dispersus		
14006	aphid	Aphididae		
14007	pine spittlebug	Aphrophora parallela		
14008	western pine spittlebug	Aphrophora permutata		
14009	Saratoga spittlebug	Aphrophora saratogensis		
14010	spittlebug	Cercopidae		
14011	wax scale	Ceroplastes spp.		
14012	pine needle scale	Chionaspis pinifoliae		
14014	giant conifer aphids	Cinara spp.		
14015	white pine aphid	Cinara strobi		
14016	beech scale	Cryptococcus fagisuga	Any occurrence	NRS
14017	spruce aphid	Elatobium abietinum		
14018	woolly apple aphid	Eriosoma lanigerum		
14019	striped mealybug	Ferrisia vergata		
14020	elongate hemlock scale	Fiorinia externa	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	NRS
14021	coconut red scale	Furcaspis oceanica		
14022	pine thrips	Gnophothrips spp.		
14023	leucaena psyllid	Heteropsylla cubana		
14024	honeysuckle aphids	Hyadaphis tataricae		
14025	Egyptian fluted scale	Icerya aegyptiaca		
14026	Lecanium scale	Lecanium spp.		
14027	common falsepit scale	Lecanodiaspis prosopidis		
14028	oystershell scale	Lepidosaphes ulmi		
14029	pinyon needle scale	Matsucoccus acalyptus		
14030	ponderosa pine twig scale	Matsucoccus bisetosus		
14031	pine twig scale	Matsucoccus californicus		

CODE	Common Name	Scientific Name	Threshold	REGION
14032	ponderosa pine scale	Matsucoccus degeneratus		
14033	red pine scale	Matsucoccus resinosae		
14034	Prescott scale	Matsucoccus vexillorum		
14035	treehoppers	Membracidae		
14036	hibiscus psyllid	Mesohomotoma hibisci		
14037	balsam twig aphid	Mindarus abietinus		
14038	hibiscus mealybug	Nipaecoccus vastator		
14039	black pineleaf scale	Nuculaspis californica		
14040	spruce spider mite	Oligonychus ununquis		
14041	twig girdler	Oncideres cingulata	Any damage to the terminal leader; damage > 20% of the foliage with > 50% of the leaf/ needle affected	SRS
14042	woolly alder aphid	Paraprociphilus tessellatus		
14043	maple aphids	Periphyllus spp.		
14044	spruce bud scale	Physokermes piceae		
14045	red pine adelgid	Pineus borneri		
14046	pine leaf adelgid	Pineus pinifoliae		
14047	white pine adelgid	Pineus spp.		
14048	pine bark adelgid	Pineus strobi		
14049	root aphid	Prociphilus americanus		
14050	mealybug	Pseudococcidae		
14051	cottony maple scale	Pulvinaria innumerabilis		
14052	fir mealybug	Puto cupressi		
14053	Douglas-fir mealybug	Puto profusus		
14054	spruce mealybug	Puto sandini		
14055	hemispherical scale	Saissetia coffeae		
14056	woolly pine needle aphid	Schizolachnus piniradiatae		
14057	steatococcus scale	Steatococcus samaraius		
14058	pear thrips	Taeniothrips inconsequens		
14059	mulberry whitefly	Tetraleurodes mori		
14060	tuliptree scale	Toumeyella liriodendri		
14061	pine tortoise scale	Toumeyella parvicornis		
14062	citrus snow scale	Unaspis citri		
14063	birch aphid	Euceraphis betulae		
14064	Kermes scale	Allokermes spp.		
14065	Casuarina spittlebug	Clastoptera undulata		
14066	giant bark aphid	Longistigma caryae		
14067	woolly pine scale	Pseudophilippia quaintancii		
14068	european elm scale	Gossyparia spuria		
14069	elm scurfy scale	Chionaspis americana		
14070	magnolia scale	Neolecanium cornuparvum		
14071	beech blight aphid	Grylloprociphilus imbricator		
14072	beech woolly aphid	Phyllaphis fagi		
14073	Asian cycad scale	Aulacaspis yasumatsui		
14074	European fruit lecanium scale	Parthenolecanium corni		
14075	lobate lac scale	Paratachardina lobata		
14800	other sucking insect (known)	other sucking insect (known)		
14900	unknown sucking insect	unknown sucking insect		
15000	Boring Insects		Any damage to the terminal leader; damage >20% of the roots, stems, or branches	ALL
15001	shoot borer			
15002	termite			
15003	ponderosa pine bark borer	Acanthocinus princeps		
15004	bronze birch borer	Agrilus anxius		
15005	twolined chestnut borers	Agrilus bilineatus		
15006	bronze poplar borer	Agrilus liragus		
15007	carpenter bees	Apidae		
15008	flatheaded borer	Buprestidae		
15009	golden buprestid	Buprestis aurulenta		
15010	carpenter ants	Camponotus spp.		
15011	gouty pitch midge	Cecidomyia piniinopis		
15012	shootboring sawflies	Cephidae		
15013	roundheaded borer	Cerambycidae		
15014	flatheaded apple tree borer	Chrysobothris femorata		
15015	cranberry girdler	Chrysoteuchia topiaria		
15016	Columbian timber beetle	Corthylus columbianus		
15017	pitted ambrosia beetle	Corthylus punctatissimus		
15018	carpenterworm moths	Cossidae		
15019	poplar and willow borer	Cryptorphynchus lapathi		
15020	pine reproduction weevil	Cylindrocopturus eatoni		
15021	Douglas-fir twig weevil	Cylindrocopturus furnissi		

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CODE	Common Name	Scientific Name	Threshold	REGION
15022	Zimmerman pine moth	Dioryctria zimmermani		
15023	oak twig borers	Elaphidionoides spp.		
15024	twig pruner	Elaphidionoides villosus		
15025	lesser cornstalk borer	Elasmopalpus lignosellus		
15026	red oak borer	Enaphalodes rufulus	Damage to >10% of the bole circumference	SRS
15027	ponderous borer	Ergates spiculatus		
15028	eastern pine shoot borer	Eucosma gloriola		
15029	western pine shoot borer	Eucosma sonomana		
15030	Eucosma shoot borers	Eucosma spp.		
15031	sugar maple borer	Glycobius speciosus		
15032	Goes borers	Goes spp.		
15033	pine root collar weevil	Hylobius radicis		
15034	Warren root collar weevil	Hylobius warreni		
15035	powderpost beetle	Lyctidae		
15036	tarnished plant bug	Lygus lineolaris		
15037	bark weevils	Magdalis spp.		
15038	white pine barkminer moth	Marmara fasciella		
15039	locust borer	Megacyllene robiniae		
15040	California flathead borer	Melanophila californica		
15041	flatheaded fir borer	Melanophila drummondi		
15042	whitespotted sawyer	Monochamus scutellatus		
15043	redheaded ash borer	Neoclytus acuminutus		
15044	western ash borer	Neoclytus conjunctus		
15045	oberea shoot borers	Oberea spp.		
15046	eucalyptus longhorned borer	Phoracantha semipunctata		
15047	northern pine weevil	Pissodes approximatus		
15048	balsam bark weevil	Pissodes dubius		
15049	Monterey pine weevil	Pissodes radiatae		
15050	Engelmann spruce weevil	Pissodes strobi		
15051	lodgepole terminal weevil	Pissodes terminalis		
15052	ambrosia beetles	Platypus spp.	Damage to >10% of the bole circumference	SRS
15053	cottonwood borer	Plectrodera scalator		
15054	balsam shootboring sawfly	Pleroneura brunneicornis		
15055	pine gall weevil	Podapion gallicola		
15056	ash borer	Podesesia syringae fraxini		
15057	lilac borer	Podosesia syringae		
15058	carpenterworm	Prionoxystus robiniae		
15059	maple shoot borers	Proterteras spp.		
15060	western subterranean termite	Reticulitermes hesperus		
15061	coconut trunk weevil	Rhabdoscelus asperipennis		
15062	New Guinea sugarcane weevil	Rhabdoscelus obscurus		
15063	European pine shoot moth	Rhyacionia buoliana		
15064	western pine tip moth	Rhyacionia bushnelli		
15065	Nantucket pine tip moth	Rhyacionia frustrana	Any damage to terminal leader; damage to > 20% of lateral shoots and buds	
15066	lodgepole pine tip moth	Rhyacionia montana		
15067	southwestern pine tip moth	Rhyacionia neomexicana		
15068	poplar borer	Saperda calcarata		
15069	roundheaded appletree borer	Saperda candida		
15070	Saperda shoot borer	Saperda spp.		
15071	clearwing moths	Sesiidae		
15072	dogwood borer	Synanthedon scitula		
15073	roundheaded fir borer	Tetropium abietis		
15074	western larch borer	Tetropium velutinum		
15075	western cedar borer	Trachykele blondeli		
15076	Douglas-fir pitch moth	Vespamima novaroensis		
15077	sequoia pitch moth	Vespamima sequoia		
15078	black twig borer	Xylosandrus compactus		
15079	Pacific dampwood termite	Zootermopsis angusticollis		
15080	subtropical pine tip moth	Rhyacionia subtropica		
15081	Asian ambrosia beetle	Xylosandrus crassiusculus		
15082	Asian longhorned beetle	Anoplophora glabripennis	Any occurrence	SRS
15083	cottonwood twig borer	Gypsonoma haimbachiana		
15084	southern pine sawyer	Monochamus titillator		
15085	banded ash borer	Neoclytus capraea		
15086	sitka spruce weevil	Pissodes sitchensis		
15087	emerald ash borer	Agrilus planipennis	Any occurrence	NRS; SRS
15088	hemlock borer	Melanophila fulvoguttata		
15089	Formosan subterranean termite	Coptotermes formosanus		
15090	sirex woodwasp	Sirex noctilio		

CODE	Common Name	Scientific Name	Threshold	REGION
15091	Oregon fir sawyer	Monochamus scutellatus oregonensis		
15092	cypress weevil	Eudociminus mannerheimii		
15093	camphor shot borer	Xylosandrus mutilatus		
15094	goldenspotted oak borer	Agrilus coxalis		
15095	European oak borer	Agrilus sulcicollis		
15096	X. germanus ambrosia beetle	Xylosandrus germanus		
15097	Icosium tomentosum	Icosium tomentosum		
15800	other boring insect (known)	other boring insect (known)		
15900	unknown boring insect	unknown boring insect		
16000	Seed/Cone/Flower/Fruit Insects			
16001	Douglas-fir cone moth	Barbara colfaxiana		
16002	lodgepole cone beetle	Conophthorus contortae		
16003	limber pine cone beetle	Conophthorus flexilis		
16004	mountain pine cone beetle	Conophthorus monticolae		
16005	ponderosa pine cone beetle	Conophthorus ponderosae		
16006	Monterey pine cone beetle	Conophthorus radiatae		
16007	red pine cone beetle	Conophthorus resinosae		
16008	white pine cone beetle	Conopthorus coniperda		
16009	black walnut curculio	Conotrachelus retentus		
16010	Douglas-fir cone gall midge	Contarinia oregonensis		
16011	Douglas-fir cone scale midge	Contarinia washingtonensis		
16012	acorn/nut weevils	Curculio spp.		
16013	Caroline fruitfly	Dacus frauenfeldi		
16014	spruce bud midge	Dasineura swainei		
16015	fir coneworm	Dioryctria abietivorella		
16016	southern pine cone worm	Dioryctria amatella		
16017	ponderosa pine coneworm	Dioryctria auranticella		
16018	loblolly pine cone worm	Dioryctria merkeli		
16019	ponderosa twig moth	Dioryctria ponderosae		
16020	Dioryctria pseudotsugella	Dioryctria pseudotsugella		
16021	Dioryctria moths	Dioryctria spp.		
16022	lodgepole cone moth	Eucosma rescissoriana		
16023	seed chalcid	Eurytomidae		
16024	slash pine flower thrips	Gnophothrips fuscus		
16025	spruce cone maggot	Hylemya anthracina		
16026	longleaf pine seed worm or moth	Laspeyresia ingens		
16027	ponderosa pine seed moth	Laspeyresia piperana		
16028	spruce seed moth	Laspeyresia youngana		
16029	boxelder bug	Leptocoris trivittatus		
16030	leaffooted pine seed bug	Leptoglossus corculus		
16031	western conifer seed bug	Leptoglossus occidentalis		
16032	hollyhock thrips	Liothrips varicornis		
16033	Magastigmus lasiocarpae	Magastigmus lasiocarpae		
16034	spruce seed chalcid	Magastigmus piceae		
16035	ponderosa pine seed chalcid	Megastigmus albifrons		
16036	fir seed chalcid	Megastigmus pinus		
16037	Douglas-fir seed chalcid	Megastigmus spermotrophs		
16038	yellow poplar weevil	Odontopus calceatus		
16039	fruitpiercing moth	Othreis fullonia		
16040	roundheaded cone borer	Paratimia conicola		
16041	mango shoot caterpillar	Penicillaria jocosatrix		
16042	coneworm	Phycitidae		
16043	harvester ants	Pogonomyrmex spp.		
16044	citrus flower moth	Prays citri		
16045	fir cone maggot	Strobilomyia abietis		
16046	spruce cone maggot	Strobilomyia anthracina		
16047	shieldbacked pine seed bug	Tetyra bipunctata		
16048	coneworm	Hylemia spp.		
16049	prairie tent caterpillar	Malacosoma lutescens		
16050	jack pine tip beetle	Conophthorus banksianae		
16051	webbing coneworm	Dioryctria disclusa		
16052	blister coneworm	Dioryctria clarioralis		
16053	southern cone gall midge	Cecidomyia bisetosa		
16054	seed bugs	Lygaeidae spp.		
16800	other seed/cone/flower insect (known)	other seed/cone/flower insect (known)		
16900	unknown seed/cone/ flower insects	unknown seed/cone/ flower insects		
17000	Gallmaker Insects			

CODE	Common Name	Scientific Name	Threshold	REGION
17001	birch budgall mite	Aceria rudis		
17002	eastern spruce gall adelgid	Adelges abietis		
17003	Cooley spruce gall adelgid	Adelges cooleyi		
17004	horned oak gall	Callirhytis cornigera		
17005	oak gall wasp	Callirhytis quercuspunctata		
17006	gall midge	Cecidomyiidae		
17007	Douglas-fir needle gall midge	Contarinia pseudotsugae		
17008	gall mite	Eriophyidae		
17009	spruce gall midge	Mayetiola piceae		
17010	hackberry nipplegall maker	Pachypsylla celtidismamma		
17011	balsam gall midge	Paradiplosis tumifex		
17012	hickory gall Phylloxera	Phylloxera caryaecaulis		
17013	gall aphid	Phylloxeridae		
17014	alder gall mite	Phytoptus laevis		
17015	psyllid	Psyllidae		
17016	sugarberry psyllid	Tetragonocephela flava		
17017	mountain apple psyllid	Trioza vitiensis		
17018	gouty pitch midge	Cedidomyia piniinopsis		
17019	spider mites	Oligonychus spp.		
17020	cypress gall midges	Taxodiomyia spp.		
17021	jumping oak gall wasp	Neuroterus saltatorius		
17022	erythrina gall wasp	Quadrastichus erythrinae		
17800	other gallmaking insect (known)	other gallmaking insect (known)		
17900	unknown gallmaking insect	unknown gallmaking insect		
18000	Insect Predators			
18001	lacewing			
18002	blackbellied clerid	Enoclerus lecontei		
18003	redbellied clerid	Enoclerus sphegeus		
18004	red wood ant	Formica rufa		
18005	western yellowjacket	Vespula pennsylvanica		
19000	General Diseases		Any damage to the terminal leader; damage > 20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; > 20% of the branches affected; damage > 20% of the foliage with > 50% of the leaf/needle affected	ALL
20000	Biotic Damage			
20001	damping off			
20002	gray mold	Botrytis cinerea		
20003	Cassytha	Cassytha filiformis		
20004	hemlock fluting			
21000	Root/Butt Diseases		Any occurrence	ALL
21001	Armillaria root disease	Armillaria spp.	Any occurrence	PNW; NRS; SRS
21002	yellow stringy rot	Corticium galactimum		
21003	Cylindrocladium root disease	Cylindrocladium spp.		
21004	brown crumbly rot	Fomitopsis pinicola		
21005	black root rot of pine	Fusarium oxysporum		
21006	Fusarium root rot	Fusarium spp.		
21007	white mottled rot	Ganoderma applanatum		
21008	Ganoderma rot of hardwoods	Ganoderma lucidum		
21009	Ganoderma rot of conifers	Ganoderma tsugae		
21010	Heterobasidion root disease	Heterobasidion annosum	Any occurrence	PNW; NRS; SRS
21011	circinatus root rot	Inonotus circinatus		
21012	tomentosus root rot/false velvet top fungus	Inonotus tomentosus		
21013	charcoal root rot	Macrophomina phaseolina		
21014	black stain root disease	Ophiostoma wageneri	Any occurrence	PNW
21015	Schweinitzii root and butt rot	Phaeolus schweinitzii	Any occurrence	PNW
21016	flame tree root disease	Phellinus noxious		
21017	laminated root rot	Phellinus weirii	Any occurrence	PNW
21019	littleleaf disease/ Phytophthora root rot	Phytophthora cinnamomi	Any occurence	SRS
21020	Port-Orford-Cedar root disease	Phytophthora lateralis	Any occurrence	PNW
21022	Pythium root rot	Pythium spp.		
21023	procera root disease of conifers	Verticicladiella procera		

CODE	Common Name	Scientific Name	Threshold	REGION
21024	crown gall	Agrobacterium tumefaciens		
21025	borealis conk	Climacocystis borealis		
21026	yellow pitted rot	Hericium abietis		
21027	brown cubical rot	Laetiporus sulphureus	Any occurrence	PNW
21028	sudden oak death	Phytophthora ramorum	Any occurrence	PNW; SRS
21029	Rhizina root disease	Rhizina undulata		
21030	yellow root rot	Perenniporia subacida		
21031	brown top rot	Fomitopsis cajanderi		
21033	pocket dry rot	Tyromyces amarus		
21700	root or butt decay (indicators present)	root or butt decay (indicators present)		
21800	other root or butt disease (known)	other root or butt disease (known)		
21900	unknown root or butt disease	unknown root or butt disease		
22000	Cankers		Any occurrence	All
22005	viruses			
22006	black knot of cherry	Apiosporina morbosa	Any occurrence on the bole or on branches ≤1 foot from bole; damage to ≥50% of branches	NRS; SRS
22007	Atropellis canker	Atropellis piniphila		
22008	Siberian elm canker	Botryodiplodia hypodermia		
22009	Botryosphaeria canker	Botryosphaeria ribis		
22011	Caliciopsis canker	Caliciopsis pinea		
22012	black canker of aspen	Ceratocystis fimbriata		
22013	sycamore canker stain	Ceratocystis fimbriata f.sp. plataini		
22023	chestnut blight	Cryphonectria parasitica	Any occurrence	NRS
22025	Cryptosphaeria canker of aspen	Cryptosphaeria populina		
22026	Cytospora canker of fir	Cytospora abietis		
22029	sooty-bark canker	Encoelia pruinosa		
22030	Eutypella canker	Eutypella parasitica	Any occurrence	NRS
22032	pitch canker of pines	Fusarium subglutinans	Any occurrence	PNW
22033	Fusicoccum canker	Fusicoccum spp.		
22034	Scleroderris canker	Gremmeniella abietina		
22035	amelanchier rust	Gymnosporangium harknessianum		
22036	cedar apple rust	Gymnosporangium juniperi-virginianae		
22037	Hypoxylon canker of oak	Hypoxylon atropunctatum	Any occurrence	SRS
22038	Hypoxylon canker of aspen	Hypoxylon mammatum	Any occurrence	NRS
22041	European larch canker	Lachnellula willkommii		
22042	beech bark disease	Nectria coccinea	Any occurrence	NRS; SRS
22043	Nectria canker	Nectria galligena	Any occurrence	NRS
22050	Phomopsis canker	Phomopsis occulta		
22051	Phomopsis canker	Phomopsis spp.		
22052	cypress canker	Seiridium cardinale		
22053	butternut canker	Sirococcus clavigignenti-jugl.	Any occurrence	NRS
22054	maple canker	Steganosporium spp.		
22055	Thyronectria canker	Thyronectria austro-americana		
22056	citrus canker	Xanthomonas citri		
22057	Cytospora canker of aspen	Cytospora chrysosperma		
22058	Dothichiza canker	Dothichiza populae		
22060	Leucocytospora canker of spruce	Leucocytospora kunzei		
22073	hemlock canker	Xenomeris abietis		
22075	Lachnellula canker	Lachnellula flavovirens		
22076	strumella canker	Strumella coryneoidea		
22077	phomopsis blight	Phomopsis juniperovora		
22078	fusarium canker of yellow poplar	Fusarium solani		
22079	sterile conk of maple and beech	Inonotus glomeratus		
22080	canker of spruce	Aleurodiscus spp.		
22082	Discocainia canker	Discocainia treleasei		
22083	red ring rot canker	Phellinus pini var. cancriformans		
22084	Douglas-fir cankers	Douglas-fir cankers		
22085	Scleroderris canker of western firs	Grovesiella abieticola		
22086	Thousand cankers disease	Geosmithia morbida	Any occurrence	SRS

CODE	Common Name	Scientific Name	Threshold	REGION
22087	nonrust canker	unknown	Damage ≥20% of bole circumference (in a running 3-foot section) at point of occurrence	PNW
22300	other canker disease (known)	other canker disease (known)		
22400	unknown canker disease	unknown canker disease		
22500	Stem Decay		Any visual evidence	All
22001	heart rot		Any visual evidence	SRS
22002	stem rot		Any visual evidence	
22003	sap rot		Any visual evidence	
22004	slime flux			
22010	black rot fungus	Botryosphaeria stevensii		
22024	gray-brown sap rot	Cryptoporus volvatus		
22027	western red rot	Dichomitus squalens		
22028	Indian paint fungus	Echinodontium tinctorium	Any occurrence	PNW
22031	Fusarium cortical stem rot	Fusarium avenaceum		
22039	canker rot of oak	Inonotus hispidus		
22040	sterile conk trunk rot of birch	Inonotus obliquus		
22044	ash heart rot	Pereniporia fraxinophila		
22047	red heart rot	Phellinus pini	Any occurrence	PNW
22048	aspen trunk rot	Phellinus tremulae		
22049	stem decay of black walnut	Phellinus weirianus		
22059	red belt fungus/brown crumbly rot	Fomitopsis pinicola		
22062	quinine fungus/brown trunk rot	Fomitopsis Officinalis		
22063	brown cubical decay	Coniophora puteana		
22064	tinder fungus	Fomes fomentarius		
22065	purple conk	Hirschioporus abietinus		
22066	pinyon black stain	Leptographium wagnerii		
22067	Phellinus hartigii	Phellinus hartigii		
22068	false tinder fungus	Phellinus igniarius		
22069	robustus conk	Phellinus robustus		
22070	yellow cap fungus	Pholiota spp.		
22071	oyster mushroom	Pleurotus ostreatus		
22072	white ring rot	Poria albipellucida		
22074	cedar brown pocket rot	Poria sericeomollis		
22081	birch conk	Piptoporus betulinus		
22800	other stem decay (known)	other stem decay (known)		
22900	unknown stem decay	unknown stem decay		
23000	Parasitic/Epiphytic Plants		Dwarf mistletoes with Hawksworth rating of ≥3; true mistletoes or vines covering ≥ 50% of crown	ALL
23001	mistletoe	mistletoe		
23002	parasitic plants	parasitic plants		
23003	vine damage	vine damage	Vines covering ≥50% of crown	PNW; NRS
23005	white fir dwarf mistletoe	Arceuthobium abietinum f. sp. concoloris		
23006	lodgepole pine dwarf mistletoe	Arceuthobium americanum		
23007	Apache dwarf mistletoe	Arceuthobium apachecum		
23008	western dwarf mistletoe	Arceuthobium campylopodum		
23009	limber pine dwarf mistletoe	Arceuthobium cyanocarpum		
23010	pinyon dwarf mistletoe	Arceuthobium divaricatum		
23011	Douglas-fir dwarf mistletoe	Arceuthobium douglasii	Dwarf mistletoes with Hawksworth rating of ≥3; true mistletoes or vines covering ≥ 50% of crown	SRS
23012	Chihuahua pine dwarf mistletoe	Arceuthobium gillii		
23013	larch dwarf mistletoe	Arceuthobium laricis		
23014	western spruce dwarf mistletoe	Arceuthobium microcarpum		
23015	eastern dwarf mistletoe	Arceuthobium pusillum	Any occurrence	NRS
23016	hemlock dwarf mistletoe	Arceuthobium tsugense		
23017	southwestern dwarf mistletoe	Arceuthobium vaginatum subsp. crytopodum	Dwarf mistletoes with Hawksworth rating of ≥3; true mistletoes or vines covering ≥ 50% of crown	SRS
23018	dodder	Cuscuta spp.		
23019	white fir mistletoe	Phoradendron bolleanum subsp. pauciflorum		
23020	true mistletoe (other)		True mistletoe covering ≥50% of crown	IW; PNW
23021	red fir dwarf mistletoe	Arceuthobium abietinum f. sp. magnificae		
23022	juniper true mistletoe	Phoradendron juniperum		
23023	dwarf mistletoe	Arceuthobium spp.	Hawksworth rating of ≥3	IW; PNW

CODE	Common Name	Scientific Name	Threshold	REGION
23024	Weins dwarf mistletoe	Arceuthobium abietinum f. sp magnificae		
24000	Decline Complexes/Dieback/ Wilts		Damage ≥ 20 dieback of crown area	ALL
24001	Alaska-yellow cedar decline	Alaska-yellow cedar decline		
24002	Norfolk Island pine decline	Norfolk Island pine decline		
24003	Stillwell's syndrome	Stillwell's syndrome		
24004	ash decline/yellows	ash decline/yellows	Damage ≥ 20 dieback of crown area	NRS
24005	birch dieback	birch dieback		
24006	coconut cadang-cadang viroid	Cocadviroid coconut cadang-cadang viroid		
24007	complex	complex		
24008	decline	decline		
24009	fall hardwood defoliator complex	fall hardwood defoliator complex		
24010	joga decline	joga decline		
24011	larch decline	larch decline		
24012	looper abiotic complex	looper abiotic complex		
24013	maple decline	maple decline		
24014	oak decline	Hypoxylon spp.	Damage ≥ 20 dieback of crown area	SRS
24015	pingelap disease	pingelap disease		
24016	sprout dieback	sprout dieback		
24017	true fir pest complex	true fir pest complex		
24018	western X disease	western X disease		
24019	pinewood nematode	Bursaphelenchus xylophilus		
24020	sapstreak disease of sugar maple	Ceratocystis coerulescens		
24021	oak wilt	Ceratocystis fagacearum	Damage ≥ 20 dieback of crown area	NRS
24022	Dutch elm disease	Ceratocystis ulmi	Damage ≥ 20 dieback of crown area	NRS; SRS
24023	bacterial wetwood	Erwinia nimipressuralis		
24024	mimosa wilt	Fusarium oxysporum f. sp. perniciosum		
24025	Verticillium wilt	Verticilium albo-atrum		
24026	bacterial leaf scorch	Xylella fastidiosa		
24027	wetwood	wetwood		
24028	hemlock decline	hemlock decline		
24029	Pacific madrone decline	Pacific madrone decline		
24030	elm phloem necrosis	Mycoplasma spp.		
24031	laurel wilt	Raffaelea spp.	Damage ≥ 20% dieback of crown area	SRS
24032	sudden aspen decline	sudden aspen decline		
24800	other decline/complex/wilt (known)	other decline/complex/ wilt (known)		
24900	unknown decline/complex/ wilt	unknown decline/complex/ wilt		
25000	Foliage diseases		Damage ≥20% of the foliage with ≥50% of the leaf/needle affected	ALL
25001	blight	blight		
25003	juniper blights	juniper blights		
25004	leaf spots	leaf spots		
25005	needlecast	needlecast		
25006	powdery mildew	powdery mildew		
25007	tobacco mosaic virus	tobacco mosaic virus		
25008	tobacco ringspot virus of ash	Nepovirus TRSV		
25009	true fir needlecast	true fir needlecast		
25010	sycamore anthracnose	Apiognomonia veneta	Damage ≥20% of the foliage with ≥50% of the leaf/needle affected	SRS
25011	Cercospora blight of juniper	Cercospora sequoiae		
25013	large-spored spruce-laborador tea rust	Chrysomyxa ledicola		
25014	ink spot of aspen	Ciborinia whetzelii		
25015	pine needle rust	Coleosporium spp.	Damage ≥20% of the foliage with ≥50% of the leaf/needle affected	SRS
25016	anthracnose on Russian olive	Colletotrichum spp.		
25017	Coronado limb rust	Cronartium arizonicum		
25018	leaf shothole	Cylindrosporium spp.		
25019	cedar leaf blight	Didymascella thujina		
25020	dogwood anthracnose	Discula spp.	Damage ≥20% of the foliage with ≥50% of the leaf/needle affected	SRS
25021	mango scab	Elsinoe magiferae		
25022	Elytroderma needle blight	Elytroderma deformans		

CODE	Common Name	Scientific Name	Threshold	REGION
25023	fire blight	Erwinia amylovora		
25024	walnut anthracnose	Gnomonia leptostyla	Damage ≥20% of the foliage with ≥50% of the leaf/needle affected	SRS
25025	anthracnose	Gnomonia spp.		
25027	brown felt blight	Herpotrichia juniperi		
25028	larch needle blight	Hypodermella laricis		
25029	hardwood anthracnose	Kabatiella apocrypta		
25030	Lasiodiplodia cone damage	Lasiodiplodia spp.		
25031	spruce needle cast	Lirula macrospora		
25032	fir needle cast	Lirula spp.		
25033	white pine needle cast	Lophodermella arcuata		
25034	Lophodermella needle cast	Lophodermella spp.		
25036	Marssonina blight	Marssonina populi		
25037	Douglas-fir rust	Melampsora medusae		
25039	larch needle cast	Meria laricis		
25040	Dothistroma needle blight	Mycosphaerella pini		
25041	brown felt blight of pines	Neopeckia coulteri		
25042	snow blight	Phacidum abietis		
25043	Swiss needle cast	Phaeocryptopus gaumannii		
25044	Phoma blight	Phoma spp.		
25045	Phyllosticta leaf spot	Phyllosticta spp.		
25046	bud rot	Phytophthora palmivora		
25047	Ploioderma needle cast	Ploioderma spp.		
25048	ash rust	Puccinia sparganioides		
25049	fir and hemlock needle rusts	Pucciniastrum spp.		
25050	Rhabdocline needle cast	Rhabdocline spp.		
25051	Rhizoctonia needle blight	Rhizoctonia spp.		
25052	Rhizophaeria needle cast	Rhizophaeria spp.		
25053	Rhizopus rot	Rhizopus artocarpi		
25054	brown spot needle blight	Scirrhia acicola		
25055	Septoria leaf spot	Septoria alnifolia		
25056	Septoria leaf spot and canker	Septoria musiva		
25057	Sirococcus tip blight	Sirococcus conigenus		
25058	Diplodia canker	Sphaeropsis sapinea		
25059	leaf blister of oak	Taphrina caerulescens		
25060	Venturia leaf blight of maple	Venturia acerina		
25061	shepherd's crook	Venturia tremulae		
25062	Dothistroma needle blight	Dothistroma septospora		
25063	yellow-cedar shoot blight	Apostrasseria spp.		
25065	spruce needle rust	Chrysomyxa weirii		
25066	cedar leaf blight	Gymnosporangium nootkatense		
25067	spruce needle cast	Lophodermium picea		
25068	hardwood leaf rusts	Melampsora spp.		
25070	hemlock needle rust	Pucciniastrum vaccinii		
25071	spruce needle cast	Rhizosphaera pini		
25072	sirococcus shoot blight	Sirococcus strobilinus		
25073	shepherds crook	Venturia populina		
25074	Delphinella shoot blight	Delphinella abietis		
25075	tar spot	Rhytisma acerinum		
25076	birch leaf fungus	Septoria betulae		
25077	Septoria leaf spot of maple	Septoria aceris		
25800	other /shoot disease (known)	other /shoot disease (known)		
25900	unknown foliage /shoot disease	Unknown foliage /shoot disease		
26000	Stem Rusts		Any occurrence on the bole or stems (on multi-stemmed woodland species), or on branches ≤1 foot from boles or stems; damage to ≥ 20% of branches	ALL
26001	white pine blister rust	Cronartium ribicola	Any occurrence on the bole or stems (on multi-stemmed woodland species), or on branches ≤1 foot from boles or stems; damage to ≥ 20% of branches	PNW; SRS
26002	western gall rust	Peridermium harknessii		
26003	stalactiform blister rust	Cronartium coleosporioides		
26004	comandra blister rust	Cronartium comandrae	Any occurrence on the bole or stems (on multi-stemmed woodland species), or on branches ≤1 foot from boles or stems; damage to ≥ 20% of branches	SRS
26005	pinyon rust	Cronartium occidentale		

CODE	Common Name	Scientific Name	Threshold	REGION
26006	eastern gall rust	Cronartium quercuum	Any occurrence on the bole or stems (on multi-stemmed woodland species), or on branches ≤1 foot from boles or stems; damage to ≥ 20% of branches	SRS
26007	gall rust of jack pine	Cronartium quercuum f. sp. banksignae		
26008	gall rust of shortleaf pine	Cronartium quercuum f. sp. echinatae		
26009	fusiform rust	Cronartium quercuum f. sp. fusiforme	Any occurrence on the bole or stems (on multi-stemmed woodland species), or on branches ≤1 foot from boles or stems; damage to ≥ 20% of branches	SRS
26010	gall rust of virginia pine	Cronartium quercuum f. sp. virginianae		
26011	Bethuli rust	Peridermium bethuli		
26012	limb rust	Peridermium filamentosum		
26013	southern cone rust	Cronartium strobilinum		
26800	other stem rust (known)	other stem rust (known)		
26900	unknown stem rust	unknown stem rust		
27000	Broom Rusts		≥50% of crown area affected	ALL
27001	spruce broom rust	Chrysomyxa arctostaphyli		
27002	Incense cedar broom rust	Gymnosporangium libocedri		
27003	juniper broom rust	Gymnosporangium nidus-avis		
27004	fir broom rust	Melampsorella caryophyllacearum		
27800	other broom rust (known)	other broom rust (known)		
27900	unknown broom rust	unknown broom rust		
30000	Fire		Damage ≥ 20% of bole circumference; >20% of stems on multi-stemmed woodland species affected ≥20% of crown affected	ALL
30001	wild fire			
30002	human caused fire			
30003	crown fire damage			
30004	ground fire damage			
41000	Wild Animals		Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected	ALL
41001	bears	Ursus spp.		
41002	beavers	Castor canadensis	Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected ; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected	SRS
41003	big game	big game	Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected ; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected	IW
41004	mice or voles	mice or voles		

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CODE	Common Name	Scientific Name	Threshold	REGION
41005	pocket gophers	Geomyidae spp.	Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected ; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected	IW
41006	porcupines	Erethizon dorsatum	Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected ; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected	IW
41007	rabbits or hares	Sylvilagus spp.		
41008	sapsuckers	Sphyrapicus spp.		IW; SRS
41009	squirrels	Sciuridae spp.		
41010	woodpeckers	Piciformes spp.		
41011	moose	Alces alces		
41012	elk	Cervus elaphus		
41013	deer	Odocoileus spp.		
41014	feral pigs	Sus scrofa		
41015	mountain beaver	Aplodontia rufa		
41017	earthworms	Lumbricidae		
41800	other wild animals (known)	other wild animals (known)		
41900	unknown wild animals	unknown wild animals		
42000	Domestic Animals		Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; > 20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	ALL
42001	cattle	Bos taurus		
42002	goats	Capra hircus		
42003	horses	Equus caballus		
42004	sheep	Ovis aries		
42800	other domestic animal (unknown)	other domestic animal (unknown)		
42900	unknown domestic animals	unknown domestic animals		
50000	Abiotic Damage		Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; > 20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	ALL
50001	air pollutants		Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; > 20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	IW
50002	chemical		Any damage to the terminal leader; damage >20% of the roots, stems, or branches; damage >20% of the foliage with >50% of the leaf/needle affected	NRS

CODE	Common Name	Scientific Name	Threshold	REGION
50003	drought		Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	IW; NRS
50004	flooding/high water		Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	IW; NRS; SRS
50005	frost		Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	IW
50006	hail			
50007	heat			
50008	lightning		Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	ALL
50009	nutrient imbalances			
50010	radiation		Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	IW
50011	snow/ice		Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	ALL
50013	wind		Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected; damage ≥ 20% of the foliage with ≥50% of the leaf/needle affected	ALL

CODE	Common Name	Scientific Name	Threshold	REGION
50014	winter injury		Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	IW
50015	avalanche		Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	IW
50016	mud-land slide			
50017	volcano			
50018	other geologic event			
50019	mechanical (non-human caused)			
50020	saltwater injury - flooding/ hurricane			
50800	other abiotic damage (known)	other abiotic damage (known)		
50900	unknown abiotic damage	unknown abiotic damage		
60000	Competition		Overtopped shade intolerant trees that are not expected to survive for 5 years or saplings not expected to reach tree size (5.0 inches DBH/ DRC)	ALL
60001	Suppression		Overtopped shade intolerant trees that are not expected to survive for 5 years or saplings not expected to reach tree size (5.0 inches DBH/ DRC)	IW
70000	Human Activities		Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	ALL
70001	herbicides		Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	SRS
70003	imbedded objects		Any occurrence on the bole	SRS; NRS
70004	improper planting technique			
70005	land clearing		Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected ; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	SRS
70006	land use conversion			

CODE	Common Name	Scientific Name	Threshold	REGION
70007	logging damage		Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	ALL
70008	mechanical			
70009	pesticides			
70010	roads			
70011	soil compaction			
70013	vehicle damage			
70014	road salt			
71000	Harvest		Removal of ≥10% cubic volume	ALL
71001	Woodland cutting		Removal of ≥10% cubic volume	IW
80000	Multi-Damage (Insect/Disease)			
80001	aspen defoliation (caused by 12037, 12096, 25036 and 25037)			
80002	subalpine fir mortality			
80003	five-needle pine decline			
80004	pinyon pine mortality			
85000	Invasive Plants			
90000	Other Damages and Symptoms		Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected	ALL
90001	broken top	Not recorded for multi-stemmed trees	When actual length is less than total length	ALL
90002	dead top		Any occurrence	IW; PNW; NRS
90003	limby-wolf tree	Not recorded for non sawlog trees	Damage when board foot defect is > 10%	IW
90004	forked top	Not recorded for non sawlog trees	Any occurrence	PNW
90005	forked below merch top	Not recorded for non sawlog trees	Damage when board foot defect is > 10%	IW; PNW
90006	crook or sweep	Not recorded for non sawlog trees	Damage when board foot defect is > 10%	IW; PNW
90007	checks, bole cracks	Not recorded for non sawlog trees	Damage when board foot defect is > 10%	PNW
90008	foliage discoloration		Damage > 20% of crown affected	IW; NRS;PNW
90010	dieback		Damage > 20% of crown affected	ALL
90011	open wound		Damage ≥20% of bole circumference (in a running 3-foot section) at point of occurrence	IW; PNW
90012	resinosis		Damage ≥20% of bole circumference (in a running 3-foot section) at point of origin; ≥20% of branches affected	PNW
90013	broken branches		Damage ≥20% of branches affected	PNW
99000	UNKNOWN		Any damage to the terminal leader; damage ≥20% of the roots or boles with > 20% of the circumference affected; damage > 20% of the multiple-stems (on multi-stemmed woodland species) with > 20% of the circumference affected; >20% of the branches affected; damage ≥ 20% of the foliage with ≥50% of the leaf/needle affected	ALL

APPENDIX H SITE INDEX EQUATION NUMBERS

California		
Equation Number	**Base Age**	**Rules**
26	100	Mixed Conifer Site = true Spcd = 202, 122, 15, 20, 117, 116, 21
26	100	Mixed Conifer Site = false Spcd = 201
25	50	Mixed Conifer Site = false Spcd = 211
3	50	Mixed Conifer Site = false Site Index Equation Method = Kings Spcd = 202,17
4	50	Mixed Conifer Site = false Site Index Equation Method = Primary (McCardle) TreeAge < 40 Spcd = 202, 17
5	50	Mixed Conifer Site = false Site Index Equation Method = Primary (McCardle) TreeAge ≥ 40 Spcd = 202, 17
22	50	Mixed Conifer Site = false Spcd = 20
8	50	Mixed Conifer Site = false TreeAge ≤ 120 Spcd = 98, 263
9	50	Mixed Conifer Site = false TreeAge > 120 Spcd = 98, 263
17	50	Mixed Conifer Site = false TreeAge ≤ 50 Spcd = 242
18	50	Mixed Conifer Site = false TreeAge > 50 Spcd = 242
21	50	Mixed Conifer Site = false Spcd = 747, 748
20	50	Mixed Conifer Site = false Spcd ≥ 300 and ≤ 746 OR Spcd ≥ 748 and ≤ 999

Oregon		
Equation Number	**Base Age**	**Rules**
1	50	Countycd = 29,33 Spcd = 202
2	50	Countycd = 29,33 Spcd = 15,17
6	100	Treeage ≤ 100 Countycd = east side county Spcd = 202,17,15
7	100	Treeage > 100 Countycd = east side county Spcd = 202,17,15
10	100	Treeage ≤ 100 Spcd = 21,22,11,19,264
11	100	Treeage > 100 Spcd = 21,22,11,19,264
14	100	Treeage ≤ 130 Spcd = 116, 122
15	100	Treeage > 130 Spcd = 116, 122
16	100	Spcd = 108
24	50	Spcd = 73
20	50	(Spcd ≥ 300 and ≤746) **OR** (spcd ≥ 748 and ≤ 999)
21	50	Spcd = 747
13	50	Treeage < 182 Spcd = 93
8	50	Treeage ≤ 120 Spcd = 98,263
9	50	Treeage > 120 Spcd = 98,263
17	50	Treeage ≤ 50 Spcd = 242
18	50	Treeage > 50 Spcd = 242
3	50	Countycd = west side county Spcd = 202,17 Equation Method = Kings
4	50	Treeage < 40 Countycd = west side county Spcd = 202,17 Equation Method = Primary
5	50	Treeage ≥ 40 Countycd = west side county Spcd = 202,17 Equation Method = Primary
10	100	Treeage ≤ 100 Countycd = west side county Spcd = 15
11	100	Treeage > 100 Countycd = west side county Spcd = 15
16	100	Countycd = west side county Spcd = 119

Oregon East Side Counties: 1,13,17,21,23,25,31,35,37,45,47,49,55,59,61,63,65,69

Oregon West Side Counties: 3,5,7,9,11,15,19,27,29,33,39,41,43,47,51,53,57,67,71

Washington		
Equation Number	**Base Age**	**Rules**
6	100	Treeage ≤ 100 Countycd = east side county Spcd = 202,17,15
7	100	Treeage > 100 Countycd = east side county Spcd = 202,17,15
10	100	Treeage ≤ 100 Spcd = 21,22,11,19,264
11	100	Treeage > 100 Spcd = 21,22,11,19,264
14	100	Treeage ≤ 130 Spcd = 116, 122
15	100	Treeage > 130 Spcd = 116, 122
16	100	Spcd = 108
29	50	Spcd = 73
20	50	(Spcd ≥ 300 and ≤746) **OR** (spcd ≥ 748 and ≤ 999)
21	50	Spcd = 747
13	50	Treeage < 182 Spcd = 93
8	50	Treeage ≤ 120 Spcd = 98,263
9	50	Treeage > 120 Spcd = 98,263
17	50	Treeage ≤ 50 Spcd = 242
18	50	Treeage > 50 Spcd = 242
3	50	Countycd = west side county Spcd = 202,17 Equation Method = Kings
4	50	Treeage < 40 Countycd = west side county Spcd = 202,17 Equation Method = Primary
5	50	Treeage ≥ 40 Countycd = west side county Spcd = 202,17 Equation Method = Primary
10	100	Treeage ≤ 100 Countycd = west side county Spcd = 15
11	100	Treeage > 100 Countycd = west side county Spcd = 15
16	100	Countycd = west side county Spcd = 119

Washington East Side Counties: 1,3,5,7,13,17,19,21,23,25,37,39,43,47,51,63,65,71,75,77

Washington West Side Counties: 9,11,15,27,29,31,33,35,41,45,49,53,55,57,59,61,67,69,73

APPENDIX I STOCKING TABLES

Trees are assigned stocking values in the field to assist with three measurements: 1) to determine the stocking level of a condition; 2) to assign FOREST TYPE (CORE 2.5.3)(Item 5.7.1.9) to a forested condition; and 3) to differentiate between STAND SIZE CLASS 0 (nonstocked) from other STAND SIZE CLASSes for a condition (Item 5.7.1.11). A detailed discussion of these three measurements follows the introduction.

SECTION I.1 INTRODUCTION

The tables in this appendix show the stocking values to assign to trees. Tables 5e and 5f show stocking values for trees saplings, and seedlings when they are tallied on one acre; Table 5f is a continuation of the "5.0+ DBH of tally tree" columns of 5e.

Stocking values are assigned to the trees depending on the following three factors: 1) the size of the largest tree in the condition on the stocking subplots; 2) the species of the tree; and 3) the dbh of the tree. Each tree is assigned a stocking value based on these factors.

SECTION I.2 DETERMINING THE STOCKING LEVEL OF A CONDITION

SUBSECTION I.2.1 BACKGROUND

The Forest Inventory and Analysis definition of forest land (CONDITION CLASS STATUS = 1) was based on stocking in the Periodic and Annual inventories through 2012. Conditions with ≥10% stocking were defined as forest land. In conditions with questionable stocking, crews conducted a "stocking check" (and installed stocking subplots analogous to the Acre Method in Section 5.8) to determine if the condition was forested. Stocking values were assigned to individual trees based on the tables in this appendix, and then summed together to determine if the condition met the 10% threshold for forest land.

With the implementation of the CORE 6.0 Field Guide in field season year 2013, the definition of forest land changed to a definition based on a threshold of 10% canopy cover. The Pacific Northwest Research Station is conducting a study to determine the relationship between stocking levels and canopy cover by species and eco-region. This study will allow data users to differentiate between actual changes in forest area and changes due to the adoption of a new definition of forest land.

As part of this study, field crews will continue to initiate a stocking check (i.e., use the Acre method described in Section 5.8) on conditions where it is uncertain if ≥10% stocking is present, regardless of canopy cover. These are the same situations in which crews would have formerly done a stocking check prior to the change in the forest land definition from stocking to canopy cover. In the initial determination of stocking levels, the field crew should consider the condition over its entire area, not just the trees and seedlings that would be tallied on the subplots and microplots, especially when the plot straddles conditions.

If stocking is in question, crews MUST follow the procedures in Section 5.8 and use the AcreMethod in the field data recorder (PDR) to measure stocking and canopy cover. The acre sampling area will be used to assess stocking and canopy cover. Note that the sampled area (either the four 58.9 foot radius plots or the single 118 foot radius plot) must fall entirely in the same condition.

When assessing stocking to determine if a condition meets the former definition of forest land (≥10% stocked), include dead trees and stumps that were alive prior to recent (within approximately 30 years) disturbance.

SUBSECTION I.2.2 INSTRUCTIONS FOR USING THE STOCKING TABLES MANUALLY

The following simplified example illustrates how to use the tables manually for reference purposes.

A condition has scattered western juniper seedlings, saplings, and trees. It is unclear whether the condition is 10% stocked. The largest tree on the four quarter acre stocking plots is 22" dbh.

On the four quarter acre stocking plots (a total of one acre) the seedlings, saplings, and trees in the table that follows are tallied. Note that all the seedlings and saplings on the four quarter acre stocking plots must be counted, not just the seedlings and saplings on the four microplots. The condition is only 9.11% stocked.

Table I.1:Stocking values for the seedlings, saplings, and trees counted on the four subplots

Species	Size Class	Number Tallied on the Acre	Stocking Value for an Individual Tree (from Tables 5e and 5f)	Total Stocking Value (Number * Stocking Value)
western juniper (species 64)	seedling	75	0.011%	0.825%
western juniper (species 64)	2.0-2.9	30	0.039%	1.17%
western juniper (species 64)	7.0-8.9	12	0.16%	1.92%
western juniper (species 64)	15.0-16.9	5	0.64%	3.2%
western juniper (species 64)	19.0-20.9	2	1.00%	2%
Total	--	--	--	9.11%

SECTION I.3 USING STOCKING VALUES TO ASSIGN FOREST TYPE

FOREST TYPE is assigned to a condition based on the species with the plurality of stocking for all live trees in the condition that are not overtopped (Item 5.7.1.9). Crews are not expected to assign stocking values to individual trees measured on the subplots to assign FOREST TYPE, but the tables might be used in situations where the FOREST TYPE is not clear.

For example, a recent clear cut has an even mix of paper birch seedlings (species 375) and white spruce seedlings (species 94), and no saplings or larger trees. Paper birch seedlings have a stocking value of .142 and white spruce seedlings have a stocking value of .094. The FOREST TYPE is determined to be paper birch, since paper birch has a higher stocking value than white spruce. Because the two tree species are found in an equal mixture, all that matters for determining forest type is the relative difference in stocking value between the two tree species (i.e., .142 is greater than .094). Dead trees and stumps are not assigned stocking values when determining FOREST TYPE.

SECTION I.4 USING STOCKING VALUES TO DIFFERENTIATE BETWEEN STAND SIZE CLASS 0 (NONSTOCKED) AND OTHER STAND SIZE CLASSES

Forest land conditions that are less than 10 percent stocked with living trees are assigned STAND SIZE CLASS 0, nonstocked. An example of a nonstocked forest land condition would be a recent clearcut in which no trees had regenerated. the condition is forested (it had ≥10 percent canopy cover in the recent past), but is a nonstocked STAND SIZE CLASS. Conversely, if a similar recent harvest left ≥10 percent stocking, it would be STAND SIZE CLASS 1-6, depending on the size of the trees in the condition. Most often, the question is between a nonstocked STAND SIZE CLASS and STAND SIZE CLASS 1, seedling-sapling. Note that dead trees and stumps in this example count for determining stocking levels for the condition (Section 5.8), but do not count for determining STAND SIZE CLASS.

SECTION I.5 STOCKING VALUES FOR ALL TREES <7 INCHES OBSERVED ON ONE ACRE

Table 5e.

	5.0+						4.0-4.9					3.0-3.9				2.0-2.9			1.0-1.9		Seedling
	DBH of tally tree						DBH of tally tree					DBH of tally tree				DBH of tally tree			DBH of tally tree		
Species	5.0-6.9	4.0-4.9	3.0-3.9	2.0-2.9	1.0-1.9	Seed-ling	4.0-4.9	3.0-3.9	2.0-2.9	1.0-1.9	Seed-ling	3.0-3.9	2.0-2.9	1.0-1.9	Seed-ling	2.0-2.9	1.0-1.9	Seed-ling	1.0-1.9	Seedling	Seedling
19, 93, 94	0.12	0.092	0.069	0.054	0.035	0.016	0.105	0.083	0.062	0.040	0.019	0.102	0.076	0.050	0.023	0.099	0.065	0.031	0.096	0.047	0.094
72, 73	0.10	0.075	0.057	0.044	0.028	0.013	0.086	0.068	0.050	0.033	0.015	0.083	0.062	0.041	0.019	0.081	0.053	0.025	0.079	0.038	0.076
95	0.11	0.083	0.063	0.048	0.031	0.014	0.094	0.075	0.056	0.036	0.017	0.092	0.068	0.045	0.021	0.089	0.059	0.028	0.087	0.042	0.084
130, 299	0.16	0.122	0.092	0.071	0.046	0.021	0.139	0.110	0.082	0.053	0.025	0.135	0.100	0.066	0.031	0.131	0.086	0.041	0.128	0.062	0.124
108	0.09	0.066	0.050	0.039	0.025	0.011	0.075	0.060	0.044	0.029	0.013	0.073	0.055	0.036	0.017	0.071	0.047	0.022	0.069	0.034	0.067
103, 104, 119	0.07	0.055	0.042	0.032	0.021	0.009	0.063	0.050	0.037	0.024	0.011	0.062	0.046	0.030	0.014	0.060	0.039	0.019	0.058	0.028	0.056
53, 54, 55, 62, 64, 65, 66, 101, 102, 106, 109, 113, 116, 117, 120, 122, 124, 127, 133, 137, 138, 139, 321, 475, 756, 757, 758, 811	0.09	0.067	0.051	0.039	0.025	0.011	0.077	0.061	0.045	0.029	0.014	0.074	0.055	0.036	0.017	0.072	0.048	0.023	0.070	0.034	0.068
15, 201, 202, 511	0.12	0.090	0.068	0.053	0.034	0.015	0.103	0.082	0.061	0.040	0.018	0.100	0.075	0.049	0.023	0.098	0.064	0.031	0.095	0.046	0.092
11, 14, 17, 20, 21, 22, 41, 42, 81, 92, 98, 231, 242, 251, 263, 264	0.09	0.063	0.048	0.037	0.024	0.011	0.072	0.057	0.043	0.028	0.013	0.070	0.052	0.034	0.016	0.068	0.045	0.022	0.067	0.032	0.065
211, 212	0.07	0.050	0.038	0.029	0.019	0.009	0.057	0.046	0.034	0.022	0.010	0.056	0.042	0.027	0.013	0.054	0.036	0.017	0.053	0.026	0.051
312, 341, 421, 424, 631, 763, 768, 821, 997, 999	0.17	0.128	0.097	0.075	0.048	0.022	0.146	0.116	0.086	0.056	0.026	0.142	0.105	0.069	0.033	0.138	0.091	0.043	0.134	0.065	0.130
351, 352, 492	0.21	0.156	0.118	0.091	0.059	0.026	0.178	0.141	0.105	0.068	0.032	0.173	0.128	0.084	0.040	0.168	0.111	0.053	0.163	0.079	0.159
333	0.19	0.145	0.110	0.085	0.055	0.025	0.165	0.131	0.097	0.063	0.030	0.161	0.120	0.078	0.037	0.156	0.103	0.049	0.152	0.074	0.148
375	0.19	0.140	0.106	0.082	0.053	0.024	0.160	0.127	0.094	0.061	0.028	0.155	0.115	0.076	0.036	0.151	0.099	0.047	0.147	0.071	0.142
361, 431, 661, 801, 805, 807, 815, 818, 839, 981	0.21	0.155	0.117	0.090	0.058	0.026	0.176	0.140	0.104	0.068	0.032	0.172	0.128	0.084	0.039	0.167	0.110	0.053	0.162	0.079	0.158
603, 604	0.23	0.169	0.128	0.099	0.064	0.029	0.193	0.153	0.114	0.074	0.034	0.188	0.140	0.091	0.043	0.183	0.120	0.057	0.178	0.086	0.172
741, 746	0.20	0.146	0.110	0.085	0.055	0.025	0.166	0.132	0.098	0.064	0.030	0.162	0.120	0.079	0.037	0.157	0.103	0.049	0.153	0.074	0.148
540, 542	0.17	0.124	0.094	0.072	0.047	0.021	0.141	0.112	0.083	0.054	0.025	0.138	0.102	0.067	0.032	0.134	0.088	0.042	0.130	0.063	0.126
313, 345, 463, 730, 747, 748	0.19	0.143	0.109	0.084	0.054	0.024	0.164	0.130	0.097	0.063	0.029	0.159	0.118	0.078	0.037	0.155	0.102	0.049	0.151	0.073	0.146

SECTION I.6 STOCKING VALUES FOR ALL TREES 5.0 INCHES AND GREATER OBSERVED ON ONE ACRE

Table 5f.

Species	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+
19, 93, 94	0.12	0.19	0.26	0.34	0.43	0.53	0.63	0.73	0.84	0.96	1.08	1.20	1.33
72, 73	0.10	0.17	0.24	0.33	0.44	0.55	0.67	0.81	0.95	1.11	1.27	1.45	1.63
95	0.11	0.15	0.19	0.23	0.27	0.31	0.35	0.39	0.43	0.48	0.52	0.56	0.60
130, 299	0.16	0.26	0.37	0.49	0.63	0.78	0.94	1.11	1.29	1.48	1.68	1.89	2.11
108	0.09	0.14	0.21	0.29	0.37	0.47	0.57	0.69	0.81	0.94	1.07	1.22	1.37
103, 104, 119	0.07	0.12	0.18	0.25	0.32	0.41	0.50	0.60	0.70	0.82	0.94	1.07	1.20
53, 54, 55, 62, 64, 65, 66, 101, 102, 106, 109, 113, 116, 117, 120, 122, 124, 127, 133, 137, 138, 139, 321, 475, 756, 757, 758, 811	0.09	0.16	0.25	0.36	0.49	0.64	0.81	1.00	1.21	1.44	1.69	1.96	2.25
15, 201, 202, 511	0.12	0.19	0.27	0.35	0.45	0.55	0.66	0.78	0.90	1.03	1.16	1.30	1.45
11, 14, 17, 20, 21, 22, 41, 42, 81, 92, 98, 231, 242, 251, 263, 264	0.09	0.14	0.20	0.27	0.35	0.44	0.53	0.64	0.75	0.86	0.98	1.11	1.25
211, 212	0.07	0.11	0.16	0.22	0.28	0.35	0.43	0.51	0.60	0.69	0.79	0.90	1.01
312, 341, 421, 631, 768, 821, 997, 999	0.17	0.27	0.37	0.49	0.63	0.77	0.92	1.08	1.25	1.43	1.62	1.81	2.01
351, 352, 492	0.21	0.31	0.43	0.56	0.69	0.83	0.98	1.14	1.31	1.48	1.65	1.83	2.02
333	0.19	0.33	0.50	0.71	0.94	1.21	1.50	1.83	2.18	2.56	2.97	3.41	3.88
375	0.19	0.32	0.49	0.70	0.93	1.20	1.50	1.83	2.19	2.58	3.00	3.45	3.93
361, 431, 661, 801, 805, 807, 815, 818, 839, 981	0.21	0.33	0.48	0.64	0.83	1.03	1.24	1.48	1.73	1.99	2.27	2.56	2.86
603, 604	0.23	0.35	0.49	0.64	0.81	0.99	1.18	1.38	1.60	1.82	2.05	2.29	2.54
741, 746	0.20	0.30	0.41	0.54	0.67	0.82	0.97	1.13	1.30	1.48	1.66	1.85	2.05
540, 542	0.17	0.23	0.30	0.36	0.43	0.50	0.58	0.65	0.72	0.80	0.87	0.95	1.03
313, 345, 463, 730, 747, 748	0.19	0.33	0.50	0.70	0.93	1.19	1.49	1.81	2.16	2.54	2.95	3.38	3.85

APPENDIX J STOCKABILITY INDICATORS

SECTION J.1 STOCKABILITY INDICATORS FOR OREGON

In Oregon, stockability indicators are collected in Jackson, Josephine, and Douglas counties. Refer to the table below to determine when stockability indicators should be recorded.

Table J.1: Stockability indicators for Oregon

County	Code	Scientific Name	Common Name
Jackson & Josephine	ABGR	*Abies grandis*	Grand fir
	PIJE	*Pinus jeffreyi*	Jeffrey pine
	QUGA4	*Quercus garryana*	Oregon white oak
	ARVI4	*Arctostaphylos viscida*	Whiteleaf manzanita
	CECU	*Ceanothus cuneatus*	Wedgeleaf ceanothus
	PAMY	*Paxistima myrsinites*	Oregon boxwood
	SYMPH	*Symphoricarpos spp.*	Snowberry
	AICA	*Aira caryophyllea*	Hairgrass
Douglas	PIJE	*Pinus jeffreyi*	Jeffrey pine
	QUCH2	*Quercus chrysolepis*	Canyon live oak
	QUGA4	*Quercus garryana*	Oregon white oak
	ASDE6	*Aspidotis densa*	Serpentine pod fern
	DRAR3	*Dryopteris arguta*	Coastal wood fern
	ANTEN	*Antennaria spp.*	Pussytoes
	ERLA6	*Eriophyllum lanatum*	Woolly sunflower
	ELEL5	*Elymus elymoides*	Squirreltail

SECTION J.2 STOCKABILITY INDICATORS FOR CALIFORNIA

The state of California has eight ecological units to which some counties in the state have been assigned. In order to estimate the stocking capacity of each condition class, separate stockability equations have been developed for these units, with the exception of unit 8. Counties not assigned to an ECOLOGICAL UNIT (Item 4.2.1.22) also lack stockability equations and indicators are not collected on plots that fall in them. The equations are based, in part, on the presence or absence of certain plants. The plant indicators required for each ecological unit are listed below in the tables below.

Counties within each Ecological Unit:

- Ecological Unit 1: Shasta and Trinity
- Ecological Unit 2: Western Tehama, Glenn, Colusa, Sutter, Lake , Napa, and Yolo
- Ecological Unit 3: Modoc, Lassen, eastern Plumas, eastern Sierra, eastern Nevada, eastern Placer and eastern Eldorado
- Ecological Unit 4: Western Sierra, western Nevada, Yuba, western Placer, and western El Dorado
- Ecological Unit 5: Amador, Calaveras, Tuolumne, Mariposa, Madera, Fresno, Tulare, Kern
- Ecological Unit 6: Eastern Tehama, Butte, western Plumas
- Ecological Unit 7: Siskiyou
- Ecological Unit 8: Del Norte, Humboldt, Mendocino, Sonoma, Marin, San Francisco, San Mateo, Santa Cruz, Monterey, and Santa Clara (Note: There are no equations for Ecological Unit 8)
- No Ecological Unit: Alpine, Mono, Inyo, Sacramento, Solano, Contra Costa, Alemeda, San Joaquin, Stanislaus, Merced, San Benito, Kings, San Luis Obispo, Santa Barbara, Ventura, Los Angeles, Orange, San Bernardino, Riverside, San Diego, Imperial.

Table J.1: Ecological Unit 1 Shasta and Trinity counties			
	Code	**Scientific name**	**Common name**
Trees:	ABMA	*Abies magnifica*	Red fir, California red fir
	PILA	*Pinus lambertiana*	Sugar pine
	PIPO	*Pinus ponderosa*	Ponderosa pine
	PSME	*Pseudotsuga menziesii*	Douglas-fir
	QUGA4	*Quercus garryana*	Oregon white oak
	QUKE	*Quercus kelloggii*	California black oak
	QUWI2	*Quercus wislizeni*	Interior live oak
Shrubs:	CHSE11	*Chrysolepis sempervirens*	Bush chinquapin
	CEMOG	*Cercocarpus montanus* var. *glaber*	Birchleaf mountain-mahogany
	CECU	*Ceanothus cuneatus*	Wedgeleaf ceanothus
	CELE	*Ceanothus lemmonii*	Lemmon ceanothus
	CELE3	*Cercocarpus ledifolius*	Curlleaf mountain-mahogany
	CEOR9	*Cercis orbiculata*	California redbud
	CEPR	*Ceanothus prostratus*	Mahala mat
	PREM	*Prunus emarginata*	Bitter cherry
	QUGAB	*Quercus garryana v breweri*	Brewer oak
Forbs:	ASARU	*Asarum* sp.	Herbaceous wild ginger
	CHUM	*Chimaphila umbellata*	Prince's pine
	PTAN2	*Pterospora andromedea*	Pinedrops
	PYPI2	*Pyrola picta*	White-veined pyrola
	MAIAN	*Maianthemum* spp	False Solomon-seal
	TRBOL	*Trientalis borealis* spp. *latifolia*	Broadleaf starflower

Table J.2: Ecological Unit 2 Western Tehama, Glenn, Coluca, Sutter, Lake, Napa, and Yolo counties.			
	Code	**Scientific name**	**Common name**
Trees:	PISA2	*Pinus sabiniana*	Gray pine
	QUGA4	*Quercus garryana*	Oregon white oak
Shrubs:	ARCA5	*Arctostaphylos canescens*	Hoary manzanita
	ARMA	*Arctostaphylos manzanita*	Big manzanita
	ARVI4	*Arctostaphylos viscida*	Whiteleaf manzanita
	CECO	*Ceanothus cordulatus*	Mountain whitethorn ceanothus
	CEIN3	*Ceanothus integerrimus*	Deerbrush
	QUDU	*Quercus dumosa*	Scrub oak
	QUGAB	*Quercus garryana* var. *brewerii*	Brewer oak
	ROGY	*Rosa gymnocarpa*	Wild rose
Forbs:	PHSPO	*Phlox speciosa* ssp. *occidentalis*	Phlox

Table J.3: Ecological Unit 3 Modoc, Lassen, eastern Plumas, eastern Sierra, eastern Nevada, eastern Placer and eastern Eldorado counties			
	Code	**Scientific name**	**Common name**
Trees:	ABMA	*Abies magnifica*	Red fir, California red fir
Shrubs:	CEMOG	*Cercocarpus montanus* var. *glaber*	Birchleaf mountain mahogany
	CELE3	*Cercocarpus ledifolius*	Curlleaf mountain mahogany
	RICE	*Ribes cereum*	Squaw currant
	RIRO	*Ribes roezlii*	Sierra gooseberry
	SYMPH	*Symphoricarpos* spp.	Snowberry
Forbs:	ACMIO	*Achillea millefolium* var. *occidentalis*	Western yarrow
	AGHE2	*Agoseris heterophylla*	Mountain dandelion
	AGRE	*Agoseris retrosa*	Mountain dandelion
	BALSA	*Balsamorhiza* spp.	Balsam root
	BRTE	*Bromus tectorum*	Cheatgrass
	CIUMU	*Cistanthe umbellata* var. *umbellata*	Pussypaws
	CHUM	*Chimaphila umbellata*	Prince's pine
	ERCA14	*Erysimum capitatum*	Wallflower
	LICI	*Linanthus ciliatus*	Bristly-leaved linanthus
	LINU3	*Linanthus nuttallii*	Nutall's linanthus
	LONU2	*Lomatium nudicaule*	Hog-fennel
	LODO2	*Lomatium donnellii*	Hog-fennel
	OSBE	*Osmorhiza berteroi*	Sweet-cicely
	POTEN	*Potentilla* spp.	Cinquefoil
	PTAN2	*Pterospora andromedea*	Pinedrops
	PYPI2	*Pyrola picta*	White-veined pyrola
	MAIAN	*Maianthemum* spp.	False Solomon-seal
	ACHNA	*Achnatherum* spp.	Needlegrass

Table J.4: Ecological Unit 4 Western Sierra, western Nevada, Yuba, western Placer, and western El Dorado counties			
	Code	**Scientific name**	**Common name**
Shrubs:	ARVI4	*Arctostaphylos viscida*	Whiteleaf manzanita
	CECU	*Ceanothus cuneatus*	Wedgeleaf ceanothus
	RULE	*Rubus leucodermis*	Western raspberry
Forbs:	GOOB2	*Goodyera oblongifolia*	Rattlesnake plaintain
	POCO4	*Polygala cornuta*	Milkwort
	ELEL5	*Elymus elymoides*	Bottlebrush squirreltail
	VILO2	*Viola lobata*	Violet

Table J.5: Ecological Unit 5 Amador, Calaveras, Tuolumne, Mariposa, Madera, Fresno, Tulare, Kern counties			
	Code	**Scientific name**	**Common name**
Trees:	PIMO3	*Pinus monticola*	Western white pine
	PISA2	*Pinus sabiniana*	Gray pine
	QUDO	*Quercus douglasii*	Blue oak
	UMCA	*Umbellularia californica*	California laurel-myrtle
Shrubs:	CEMOG	*Cercocarpus montanus* var.*glaber*	Birchleaf mountain mahogany
	CELE3	*Cercocarpus ledifolius*	Curlleaf mountain mahogany
	CECU	*Ceanothus cuneatus*	Wedgeleaf ceanothus
	GAFR	*Garrya fremontii*	Garrya silktassel
	QUGAS	*Quercus garryana* var. *semota*	Kaweah oak
	RHIL	*Rhamnus ilicifolia*	Redberry
Forbs:	ADBI	*Adenocaulon bicolor*	Trail plant

	CHME	*Chimaphila menziesii*	Pipsissewa
	CHRYS9	*Chrysothamnus* spp.	Rabbit-brush
	CHUM	*Chimaphila umbellata*	Prince’s pine
	DISPO	*Disporum* spp.	Fairy bells
	GOOB2	*Goodyera oblongifolia*	Rattlesnake plantain
	PESE2	*Pedicularis semibarbata*	Indian warrior
	PTAN2	*Pterospora andromedea*	Pinedrops
	PYPI2	*Pyrola picta*	White-veined pyrola
	ELEL5	*Elymus elymoides*	Bottlebrush squirreltail
	MAIAN	*Maianthemum* spp.	False Solomon-seal
	VILO2	*Viola lobata*	Violet

Table J.6: Ecological Unit 6
Eastern Tehama, Butte, western Plumas counties

	Code	Scientific name	Common name
Trees:	ABCO	*Abies concolor*	White fir
	ABGR	*Abies grandis*	Grand fir
	ABMA	*Abies magnifica*	Red fir, California red fir
	QUGA4	*Quercus garryana*	Oregon white oak
Shrubs:	CEMOG	*Cercocarpus montanus* var. *glaber*	Birchleaf mountain-mahogany
	CECU	*Ceanothus cuneatus*	Wedgeleaf ceanothus
	CELE	*Ceanothus lemmonii*	Lemmon ceanothus
	CELE3	*Cercocarpus ledifolius*	Curlleaf mountain-mahogany
	CEOR9	*Cercis orbiculata*	California redbud
	CEPR	*Ceanothus prostratus*	Mahala mat
	PRSU2	*Prunus subcordata*	Klamath plum
Forbs:	BRTE	*Bromus tectorum*	Cheatgrass
	CHUM	*Chimaphila umbellata*	Prince's pine
	PYPI2	*Pyrola picta*	White-veined pyrola

Table J.7: Ecological Unit 7
Siskiyou county

	Code	Scientific name	Common name
Trees:	ABMA	*Abies x magnifica*	Red fir, California red fir
	ABSH	*Abies shastensis*	Shasta red fir
	JUOC	*Juniperus occidentalis*	Western juniper
	PICO	*Pinus contorta*	Lodgepole pine
	QUGA4	*Quercus garryana*	Oregon white oak
	SALIX	*Salix* spp.	Willow
Shrubs:	ARVI4	*Arctostaphylos viscida*	Whiteleaf manzanita
	RHTR	*Rhus trilobata*	Skunk bush
	ARTR2	*Artemisia tridentata*	Big sage brush
Forbs:	AGROP2	*Agropyron* spp.	Wheatgrass
	PSSPS	*Pseudoroegneria spicata* ssp. *spicata*	Bluebunch wheatgrass
	ADBI	*Adenocaulon bicolor*	Trail plant
	CAAP4	*Castilleja applegatei*	Indian paintbrush
	CHRYS9	*Chrysothamnus* spp.	Rabbit-brush
	FESTU	*Festuca* spp.	Fescue
	LONU2	*Lomatium nudicaule*	Hog-fennel
	MAIAN	*Maianthemum* spp.	False Solomon-seal

APPENDIX K HISTORICAL INVENTORY INFORMATION

SECTION K.1 THE INVENTORY OF CALIFORNIA

SUBSECTION K.1.1 CALIFORNIA INVENTORY BACKGROUND

In California, PNW-FIA collects data on all lands, across all ownerships, including national forests and reserved areas such as state and national parks. The state has been divided into six inventory units: North Coast, North Interior, Sacramento, Central Coast, San Joaquin, and Southern. The annual inventory of California represents the fourth measurement of plots established by PNW Research Station. California plots were previously measured in 1965-1972, Occasion 1; 1981-1984, Occasion 2; and in 1991-1994, Occasion 3.

At Occasion 1, plots were selected from a 0.85 mile primary sample grid using stratified random sampling. This method utilized several different scale photos and selected plots outside of national forest lands and all reserved (municipal, state, and national parks) lands. The actual plot was of a 10-point configuration that did not utilize mapping to show different condition classes. Only timberland plots were established and measured on the ground outside of all reserved land areas.

At Occasion 2, a more standardized 3.4 mile base grid was used in plot selection, with woodland plots only being established using a 6.8 mile grid resulting in every 4th woodland plot being measured. At this time, some plots from the Soil Conservation Service (currently the National Resource Conservation Service, NRCS) were incorporated in to the selection process thus augmenting the selection process. The plot design varied between a 5-point design for new installed plots to a 3-point design for remeasured plots from Occasion 1.

At Occasion 3, further refinement of the plots selection process continued. The field plot grid was spaced again at 3.4 mile intervals, but little augmentation was applied in selecting plots off grid as in Occasion 2. Limited juniper plots were sampled, and the oak woodland plots were again established but only every second plot using the 3.4 grid was measured (this is called the 11k grid as seen on Occasion 3 plot cards). Although the field grid used at this occasion was established in 1981, about half of the plots are at locations established before 1981 inherited from previous occasions detailed above.

SUBSECTION K.1.2 CALIFORNIA INVENTORY DATES

Occasion 1: 1965-1972

Occasion 2: 1981-1984

Occasion 3: 1991-1994

SUBSECTION K.1.3 CALIFORNIA INVENTORY DESIGN

The California Annual Inventory design is based on a double sample for stratification as described by Cochran (1977, p. 327-335), but differing from Cochran's description in that both primary and second phases are permanent, systematic grids of photo and field plots, therefore not strictly allocated proportionally by stratum. The primary plots (Phase 1) are on a 0.85 mile (1.37 kilometer) photo interpretation (PI) grid that was established on base maps and transferred to aerial photos used in the periodic surveys of occasions 1, 2, and 3. This Phase 1 grid is further sub-sampled by a secondary field grid (Phase 2) in which the plots are laid out with 1 field plot per 6,000 acres. This provides an average of one Phase 2 or FIA field grid location for every 13 Phase 1 photo plots. The Phase 1--the photo grid--is used to stratify inventoried area by land class and degree of urbanization, and where forest land is stratified by forest condition. The stratification reduces overall variance, resulting in more precise estimates of forest area and volume statistics. Data collected on the Phase 2 field plots are used to adjust area estimates developed from classification of the Phase 1 grid and to obtain comprehensive information about forest conditions that is of known precision (MQO’s and tolerances for every variable that has data collected). During the periodic survey, large areas of continuous nonforest lands were not sampled with field plots. Areas such as extensive agricultural lands, urban areas, hard chaparral, and desert were not sampled due to the vastness of these areas, and also the fact that change in these areas happened over such a long time that the current sampling methods were ill suited in these areas. It was also not a goal to track resource data in nonforested areas, since the surveys were geared toward forested resources only.

SUBSECTION K.1.4 OCCASION 3 PLOT LAYOUT IN CALIFORNIA

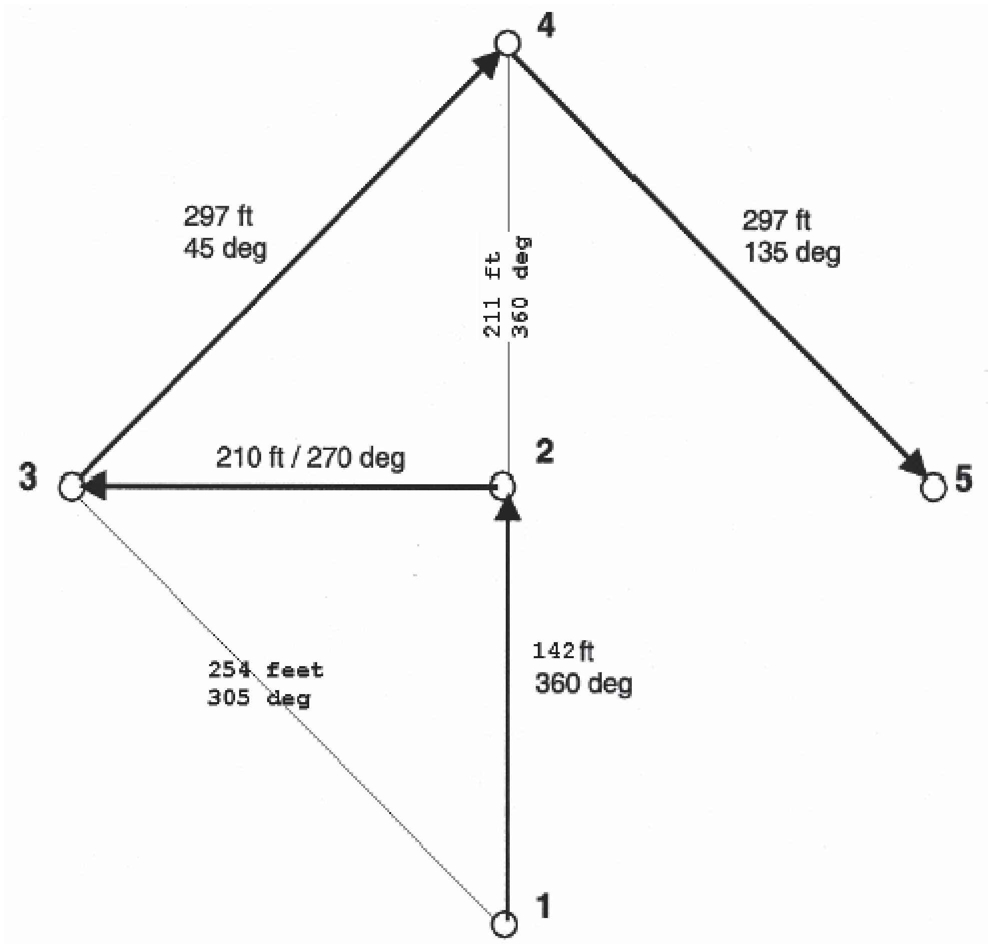


Figure K.1: Occasion 3 plot layout in California

SECTION K.2 THE INVENTORY OF OREGON AND WASHINGTON

SUBSECTION K.2.1 OREGON AND WASHINGTON INVENTORY BACKGROUND

In the late 1950s, PNW-FIA generated a grid of field locations across all lands in Washington and Oregon. This was done on USGS maps or other available map coverage. To generate the grid on these maps, a point was selected randomly, and from this point grid lines were mapped out on cardinal directions every 3.4 miles. The intersections of these east-west and north-south lines on the maps became the basis for locating field plots on the ground in all PNW-FIA inventories since the late 1950s. In some cases, the grid was drawn county by county, and errors caused gaps or concentrations in the grid where the lines did not match up along county boundaries.

SUBSECTION K.2.2 OREGON/ WASHINGTON INVENTORY DESIGN

The Oregon and Washington annual inventory design is based on a double sample for stratification as described by Cochran (1977, p. 327-335), but differing from Cochran's description in that both primary and second phases are permanent, systematic grids of photo and field plots and therefore, not strictly allocated proportionally by stratum. The primary plots are on a 0.85 mile (1.37 kilometer) grid that was established on base maps and transferred to aerial photos. The primary grid is subsampled by the secondary field grid. The field plot grid is laid out with 1 field plot per 6,000 acres, providing an average of one secondary field grid location for every 13 primary photo plots. The primary phase--the photo grid--is used to stratify inventoried area by land class and degree of urbanization, and, where forest land, by forest condition. The stratification reduces overall variance, resulting in more precise estimates of forest area and volume statistics. Data collected on the field plots are used to adjust area estimates developed from classification of the primary grid and to obtain comprehensive information about forest conditions that is of known precision.

SUBSECTION K.2.3 OREGON

Occasion 1

All Oregon counties were assigned to one of five administrative units, the Southwest unit, West-Central, Northwest, Central, or the Blue Mountain unit. Plots were established in 1961-1962 (Southwest, West-Central, and Northwest), 1964 (Central) and 1969 (Blue Mountains) using a 10-subplot, 1-acre plot. The counties and their units are listed in Appendix B (Reference Information).

Occasion 2

At Occasion 2 the 1-acre, 10-subplot plots were remeasured in Douglas County in 1973, the Southwest unit in 1974, the West-Central in 1975, and the Northwest in 1976. In 1977 a new 5-subplot, 10-acre plot was established in the Central unit, and 3 of the 10 original subplots were remeasured. The Blue Mountain unit was measured in 1977 with a “walk-through” inventory that classified trees as living, mortality or cut, and which updated the seedling, sapling and tree tally.

Occasion 3

In 1984-1986 the new 5-subplot, 10-acre plot design was established in western Oregon, and 3 of the previous 10 subplots were remeasured. About 99 hardwood plot areas were projected at this time with models in western Oregon. In Central Oregon 1/6 of the 5-subplot, 7.5-acre plots were remeasured in 1986. In 1987 the remaining 5/6 of these plots were surveyed with the “walkthrough” method described above. Also in 1987, the 5-subplot, 7.5-acre plot design was established in the Blue Mountains, while 3 of the previous 10 subplots were remeasured. In eastern Oregon at this time, about 57 5-subplot, 10-acre juniper plots were established for the Oregon juniper inventory.

Occasion 4

At Occasion 4 the 5-subplot, 7.5-acre plot design was used for remeasurement and new data in western Oregon in 1995-1997, and for eastern Oregon timberland plots in 1998 and 1999. In 1999 approximately 600 juniper plots were established in eastern Oregon using the 4-subplot, 24.0 foot fixed-radius plot design.

SUBSECTION K.2.4 WASHINGTON

All Occasions

See Subsection K.2.5, Oregon and Washington Previous Plot Layouts.

SUBSECTION K.2.5 OREGON AND WASHINGTON PREVIOUS PLOT LAYOUTS

Usually, the 5-subplot plots installed at occasions 2 and 3 were laid out in the standard pattern diagrammed in Figure K.2: Previous plot layouts in Oregon and Washington. However, subplots were installed at positions off of the standard pattern in order to keep all five subplots entirely within the same forest land class and stand condition (broad forest type and stand size); i.e., subplots were never split between forest and nonforest land or between different stand condition classes.

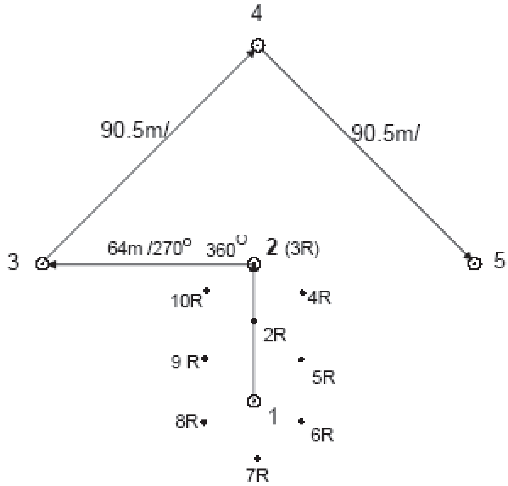
The location of subplots that were not on the standard pattern was determined one of two ways:

1. A substitute subplot location (a "substituted subplot") was adopted if the center of the standard subplot location was in different forest land class or forest condition than was present at the field grid location.
2. If the subplot center was in the same forest land class and forest condition class as the field grid location, but was within 58.9 feet of a different land class or forest condition class, the standard subplot center was moved (a "moved subplot") until 58.9 feet inside the same forest land class and forest condition present at the field grid location.

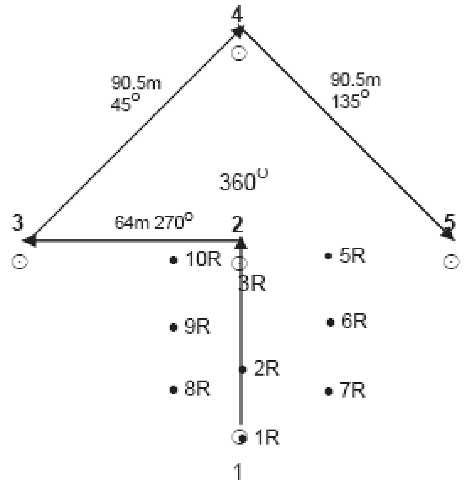
At Occasion 3, a single fixed-radius plot (16.95, or 17.0 meter radius) for sampling the vegetation profile was installed at field grid locations that fell in forest land classified as other forest-rocky, chaparral, or unsuitable site (GLCs 41, 45, 46) or were at locations that ordinarily required a 5-subplot plot but were too hazardous (cliffs etc.) to allow its installation.

At Occasion 4, the 5-subplot plot installed on all western Oregon and all eastern Oregon timberland locations is diagramed in Figure K.2: Previous plot layouts in Oregon and Washington. All subplots are laid out in their standard location across condition classes to collect data about the current status of forest resources.

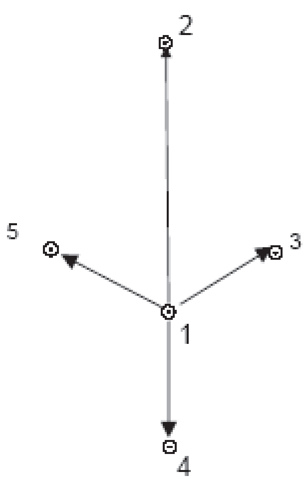
The 1999 eastern Oregon juniper inventory used the same plot layout as the annual inventory.



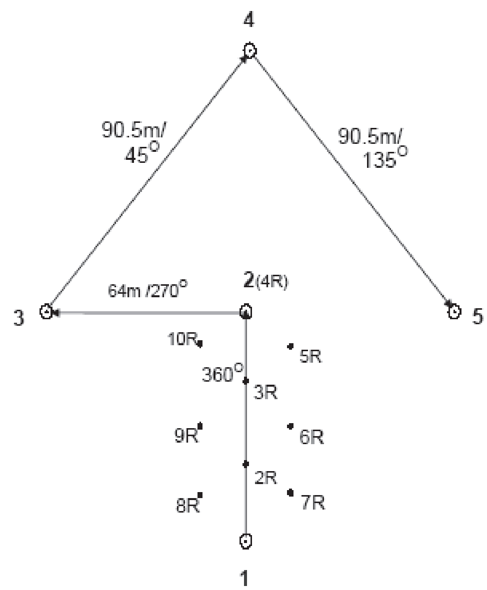
Blue Mountain Unit Oc3
Oc4 (no R-points included)
Puget Unit, Oc1
Olympic Unit, Oc1
Point 1 to 2 = 42.6m (140')



Western OR, Oc3
Oc4 (no R-points included)
Southwestern WA Unit, Oc2 & Oc3
Point 1 to 2 = 55m (180')



Eastern WA unit Oc2, Oc3 & Oc4



Central OR; Oc2, Oc3 & Oc4 (no R-points included)
Oc 4 (no R-points included)
Point 1 to 2 = 64m (210')

Figure K.2: Previous plot layouts in Oregon and Washington

SECTION K.3 PNW TREE HISTORY CODES AND DEFINITIONS FROM PERIODIC INVENTORIES

“Cond Class”, codes 1-5, indicates the condition class that the tree is located in. The second digit indicates the tree history (TH) needed for all trees.

Cond Class	TH	Tree History	Description
1-5	0	No tally	Enter a line with TH 0 for subplots that do not have any live tally trees (TH 1,2,4,6). Enter a line for nonforest subplots and GLC 44 subplots, which are not on the 11K grid.
1	1	Remeasured	Tree tallied live at OCC2 and still live at OCC3.
1	2	Reconstructed	Live tree in condition class 1 tallied for the first time at OCC 3.
2-5	2	Not reconstructed	Live tree in condition class 2-5 at OCC 3.
1	3	Culturally-killed	Culturally-killed tree that was live at OCC 2. Tree was not harvested. It can be a stump, standing, or felled. Include trees killed in logging but not felled. Not tallied on N# subplots.
1	4	OCC3 Ingrowth	Tree tallied live at OCC 3 on 10.8 feet fixed-radius plot which was not alive at OCC 2 or was< 1 inch at OCC 2. Not tallied on N# subplots.
1	5	Mortality	Tree tallied or reconstructed as live at OCC 2 but now dead. Death was natural and not due to human activity. Include partially uprooted windthrows leaning more than 45 degrees. If the dead tree qualifies as a snag, record snag information on a separate line with the same 5-digit line # and a TH 7. Not tallied on N# subplots.
1	6	Missed tree	Live tree on a remeasured subplot, which should have been tallied at OCC 2. Or a tally tree on the 10.89 feet fixed-radius which was > 1 inch DBH at OCC 2 but did not qualify for tally at OCC 2. Requires reconstruction. Not tallied on N# subplots.
1-5	7	Snag	A standing dead tree which is > 9 inches DBH and > 6.6 feet tall at OCC 3. On remeasured subplots: Leave as TH 7 a snag tallied at OCC 2 but gone at OCC 3; leave as TH 7 a snag tallied at OCC 2 but <9 inches DBH or < 6.6 feet tall at OCC 3. Do not tally snags on remeasured subplots which have "grown in" since OCC 2 and died, but tally missed snags.
1	8	Harvested	A tree tallied or reconstructed as live and > 5 inches DBH at OCC2 which has been harvested for industrial supply, firewood, local use or incidental reasons. Not tallied on N# subplots.
1-5	9	Reference	Reference only.

SECTION K.4 FOREST HEALTH MONITORING PROGRAM

SUBSECTION K.4.1 CALIFORNIA FOREST HEALTH MONITORING PROGRAM

Since 1992, Forest Health Monitoring (FHM) plots, now called Phase 3 (P3) plots, have been established on a subset of FIA Phase 2 (P2) plots across all lands in California. One tenth of these plots (approximately 100 to 110 plots) are measured each year, with around 40 to 50 of these plots being forested and field measured. These P3 plots utilize the same plot design as the P2 plots, with the same base information collected as outlined in the national core FIA field manual. In addition, a lichen survey, erosion assessment, ground and soils samples, and crown ratings for health monitoring purposes are evaluated on each P3 plot.

SUBSECTION K.4.2 OREGON/ WASHINGTON FOREST HEALTH MONITORING PROGRAM

In 1997, P3 (FHM) plots were installed at the grid locations on 207 forested plots in Oregon and 144 plots in Washington. Each year crews measure about 58 plots in Oregon and about 52 in Washington on a 5-year cycle, resulting in an eventual total of approximately 250 and 200 plots respectively. On P3 plots, tree, vegetation, lichens, ozone, and soils data are collected. P3 plots use the same 4-subplot, 24.0-foot fixed-radius design used for the P2 annual inventory.

SECTION K.5 ADDITIONAL SOURCES OF DOCUMENTATION FOR PERIODIC INVENTORIES

More information on the procedures detailed above is available from the following documents, on file at the PNW-FIA Lab in Portland, Oregon:

SUBSECTION K.5.1 CALIFORNIA

1. Field instructions for the inventory of California --1965/72, 1981-1984.
2. California PI manual for 1981-84.
3. California PI manual for 1991-94.
4. California inventory techniques manual and study plan.
5. Complete documentation for the inventory of California, 1991-1994.
6. Field Instructions for the Annual Inventory of Oregon and California, 2002
7. Forest Inventory and Analysis National Core Field Guide: Phase 2 Version 1.4 February 2000
8. Forest Inventory and Analysis National Core Field Guide: Phase 2 Version 1.5 2001
9. Forest Inventory and Analysis National Core Field Guide: Phase 2 Version 1.6 2002
10. Forest Inventory and Analysis National Core Field Guide: Version 2.0 2004
11. Forest Inventory and Analysis National Core Field Guide: Version 3.0 2006
12. Region 5 FIA Users Guide, 2000.

SUBSECTION K.5.2 OREGON AND WASHINGTON

1. Forest Survey Field Instructions; Oregon and Washington – 1961-62.
2. Manual of Field Instructions for Forest Survey and Timber Management Inventories; Oregon and Washington – 1964.
3. Field Instructions for Integrated Forest Survey and Timber Management Inventories in Oregon, Washington, and California – 1969.
4. Forest Survey Field Instructions for Oregon, Washington, and California – 1973.
5. Forest Survey Field Instructions for Southwest Oregon – 1974.
6. Forest Survey Field Instructions for West Central Oregon – 1975.
7. Forest Survey Field Instructions for Northwest Oregon – 1976.
8. Forest Survey Field Instructions for Eastern Oregon – 1977.
9. Field Instructions for the Inventory Clatsop & Columbia counties, Western Oregon – 1984.
10. Field Instructions for the Inventory of Western Oregon – 1985-86.
11. Field Instructions for the Inventory of Eastern Oregon – 1986-87.
12. Field Instructions for the Inventory of Western Oregon – 1995-97.
13. Field instructions for the Inventory of Eastern Oregon – 1998.

SECTION K.6 FOREST SERVICE ADMINISTERED LANDS: PREVIOUSLY USED REFERENCES, PROCEDURES, AND CODES

SUBSECTION K.6.1 REGION 1 AND REGION 4

PNW field crews measure plots on Region 1 (R1) Forest Service administered lands in Washington (Idaho Panhandle National Forest) and Region 4 (R4) Forest Service administered lands in California (Toiyabe National Forest). See Subsection 2.3.2 (Region 1 and Region 4 Plots), for more information about measuring plots on R1 or R4 administered lands.

- Previous Rocky Mountain Research Station (RMRS) plot layouts

  In the previous inventory, the sampling factor designated the plot layout and sampling system used. For plots with the sampling factor coded as a 20 or 40, a 5-point, 7-point, or 10-point variable radius timberland plot was established. On locations with the Sampling Factor coded as 01, 02, 05, 91, 92, or 95, a fixed-radius woodland plot was established.

A. Variable-radius plots

The LC (location center) was designated as point 1 of 5, 7, or 10 points on the plot. Points 2 through 5, 7, or 10 were distributed around the LC, and within the condition of the LC, using a triangular grid pattern with 100 foot or 70 foot intervals (Figure K.3: Previous RMRS variable-radius plot layouts).

In the previous inventory, when points 2 through 5, 7, or 10 fell into vegetation conditions different than the condition at the LC, those points were redistributed back into the LC condition. At each of the points, timber species 5.0 inches DBH and larger, and woodland species 3.0 inches DRC and larger, were tallied on a variable-radius main plot; a 20 or 40 basal area factor (BAF) angle gauge, depending on forest type, was used to select tally trees. In addition, saplings were tallied or counted, and seedlings were counted, on a 1/300 acre fixed-radius microplot centered on the point stake.

B. Fixed-radius plots

In general, fixed-radius plots were used to sample locations consisting of woodland tree species; however, some inventories used fixed-radius plots to sample locations consisting of timber species. The LC was the center point of a fixed-radius circular plot.

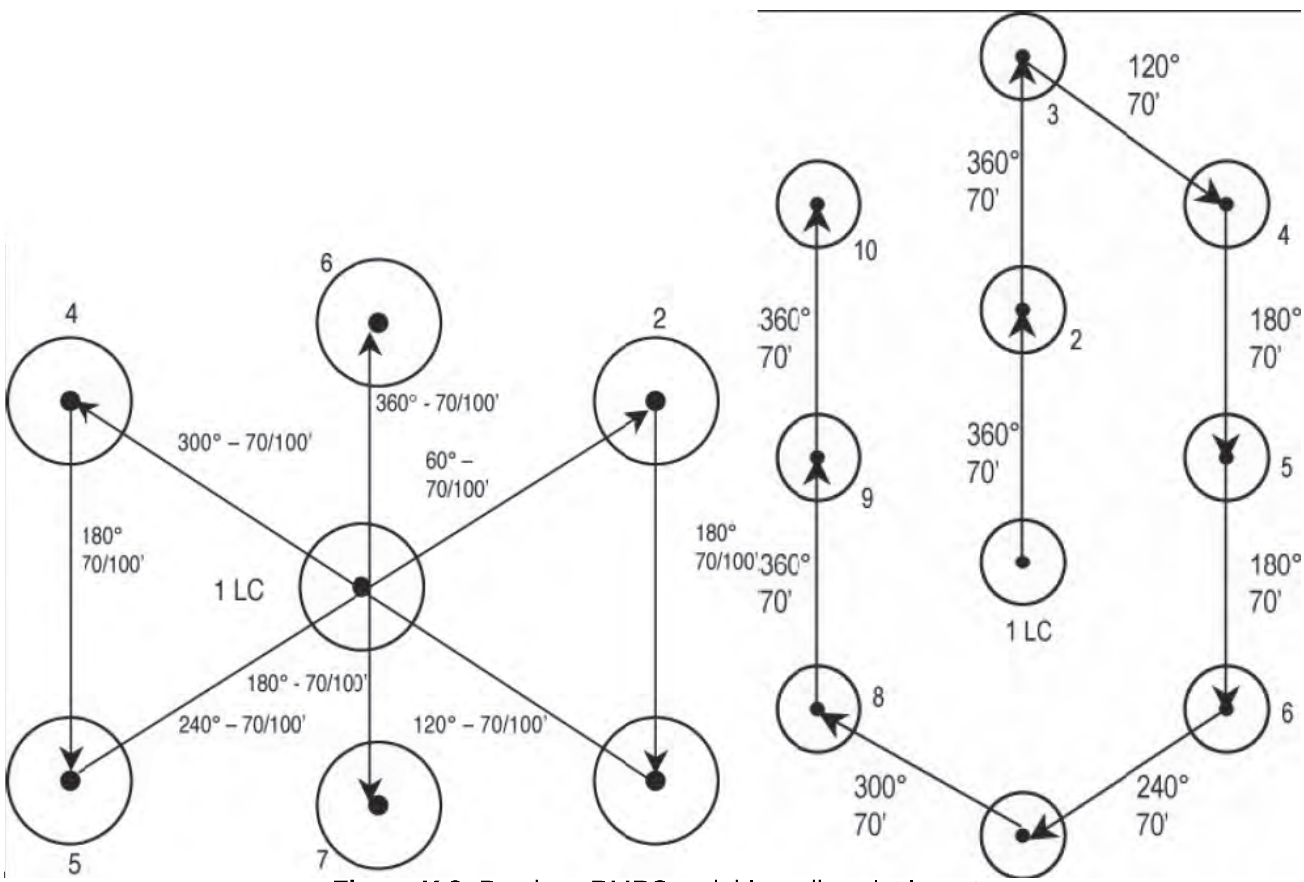


Figure K.3: Previous RMRS variable-radius plot layouts

SUBSECTION K.6.2 REGION 5 (CALIFORNIA)

A. Region 5 national forest and ranger district codes

- Used to identify plots on Forest Service administered lands **(used in R5 past data only)**

Code	Forest	Code	Forest
1	Angeles	10	Six Rivers
2	Cleveland	11	Plumas
3	Eldorado	12	San Bernardino
4	Inyou	13	Sequoia
5	Klamath	14	Shasta-Trinity
6	Lassen	15	Sierra
7	Los Padres	16	Stanislaus
8	Mendocino	17	Tahoe
9	Modoc	19	Lake Tahoe Basin

- Used to identify ranger districts **(used in R5 past data only)**:

National Forest (Administered)	Ranger District	Ranger District Number
Angeles	Los Angeles River	51
	San Gabriel	52
	Santa Clara/Mojave Rivers	53
Cleveland	Trabuco	52
	Palomar	53
	Descanso	54
Eldorado	Amador	51
	Georgetown	53
	Pacific	55
	Placerville	56
	Placerville Nursery & Forest Genetics Lab	57
Inyo	Mono Lake	51
	Mammoth	52
	White Mountain	53
	Mt. Whitney	54
Klamath	Oak Knoll	51
	Happy Camp	52
	Salmon River	54
	Scott River	55
	Goosenest	57
	Ukonom	58
Lassen	Almanor	51
	Hat Creek	53
	Eagle Lake	58
Los Padres	Monterey	51
	Santa Lucia	53
	Santa Barbara	54
	Ojai	55
	Mt. Pinos	57
Mendocino	Corning	51
	Chico Tree Improvement	52
	Stonyford	53
	Upper Lake	54
	Covelo	56
Modoc	Warner Mt.	53
	Big Valley	54
	Devil's Garden	55
	Doublehead	56

Six Rivers	Gasquet	51
	Orleans	52
	Lower Trinity	53
	Mad River	54
	Humboldt Nursery	69
Plumas	Beckwourth	51
	Mount Hough	52
	Feather River	53
San Bernardino	Arrowhead	51
	Big Bear	52
	Cajon	53
	San Gorgonio	54
	San Jacinto	55
Sequoia	Hume Lake	51
	Tule River	52
	Hotsprings	53
	Greenhorn	54
	Cannell Meadow	56
Shasta-Trinity	Yolla Bolla	51
	Hayfork	52
	Big Bar	54
	Weaverville	56
	Shasta Lake	58
	Mt. Shasta	59
	McCloud	61
Sierra	Mariposa	51
	Pineridge	53
	Kings River	54
	Minarets	55
	San Joaquin Exp.Ranger	56
Stanislaus	Mi-Wok	51
	Calaveras	52
	Summit	53
	Groveland	54
Tahoe	Downieville	53
	Foresthill	54
	Nevada City	55
	Sierraville	56
	Truckee	57
Lake Tahoe Basin	Lake Tahoe Basin	51

B. R5 Periodic Survey tree type measurement codes (Used in R5 past data only)

The type of record for each item that was measured or tallied on each subplot.

Code	Record Type
P	Prism tree record
M	Measured tree record for prism plot
N	Measured tree record for fixed area plot
S	Seedling record for fixed area plot
F	Fixed area plot tree/snag record
D	Down log record for fixed area plot
R	Root collar record for fixed area plot
X	Non-stockable plot

- Type "S" records show the number of seedlings that exist on that point. This number would be "0" if no seedlings exist on the point and the area is capable of growing trees (does not qualify as non-stockable). If the point is non-stockable, an X was recorded.

- Even if a point had no tree or down log records at all, as a minimum the point must have had either a null seedling record ("S" record with zero in the tree number field), or an "X" record. This assures that the point was counted in the statistics and not dropped.

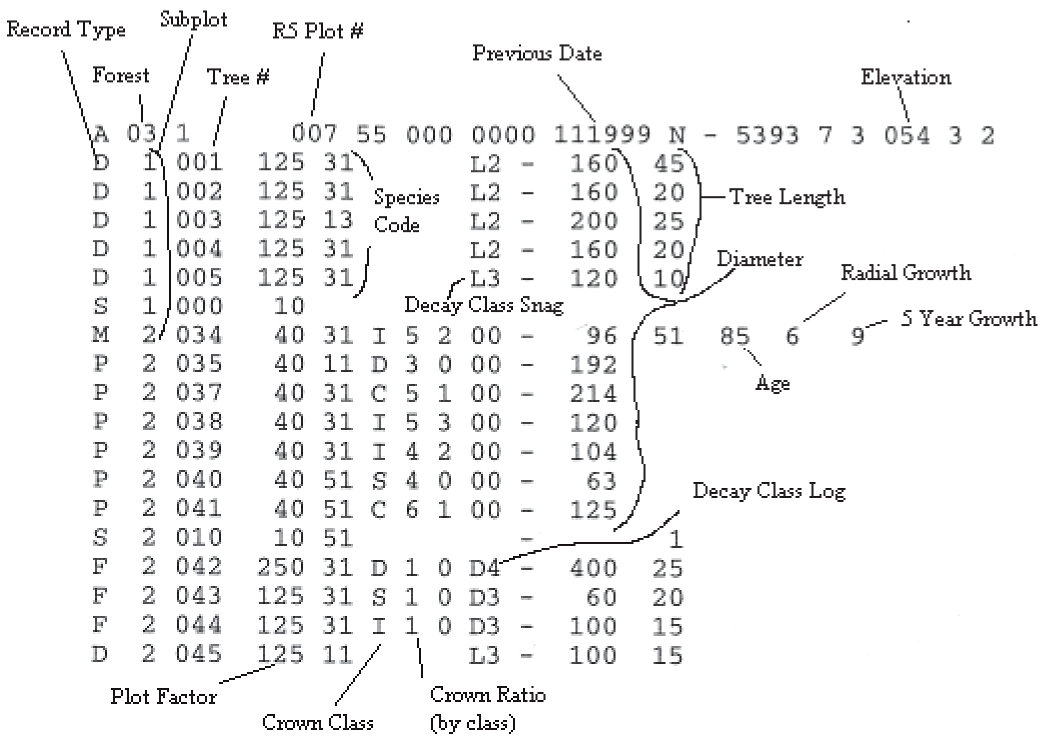


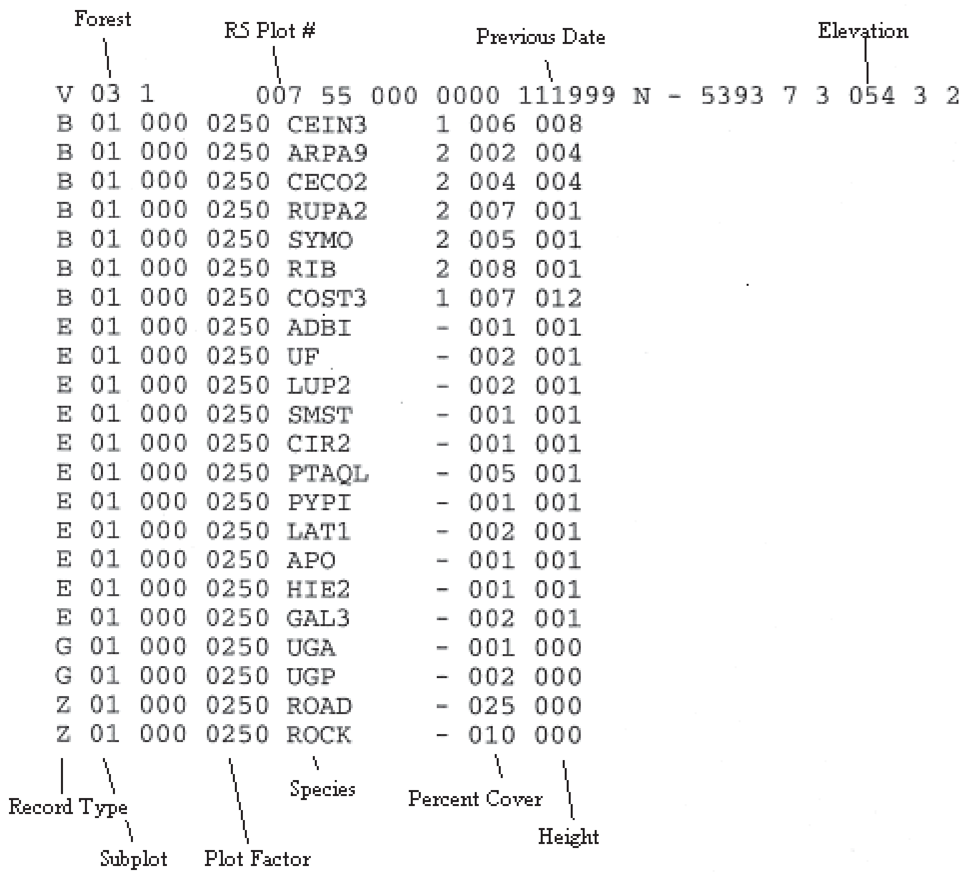
Figure K.4: Sample of R5 Survey Tree Data Sheet

C. Region 5 Periodic Survey plot vegetation profile information (used in R5 past data only)

When seedlings and sapling size conifers and hardwood trees are collected in the tree samples on the Tree Plot Record, do not collect data on these species groups as part of the understory vegetation.

Code	Record Type
C	Conifer
H	Hardwood
B	Shrub (Brush)
E	Herbaceous
G	Grasses
K	Special Features
Z	Other

- Point Number: Record the point number at which the information is being taken.
- Plot Factor: Record the fixed plot code for the area being sampled. A 1/2-acre plot is usually used, and recorded as 500. Plot sizes other than 1/2-acre can be used where appropriate.
- Species: For each species group: conifer, hardwood, shrub (brush), herbaceous, and grasses, record the three most common species in order of prevalence.
- Percent Cover: Record the percent cover on the plot. These should be recorded by cover classes.
- Height: Record the average height of the plants to the nearest foot for each species. Do not record the height of the ground cover component (herbaceous, grass, and other records).




```
V 03 1      007 55 000 0000 111999 N - 5393 7 3 054 3 2
B 01 000 0250 CEIN3   1 006 008
B 01 000 0250 ARPA9   2 002 004
B 01 000 0250 CECO2   2 004 004
B 01 000 0250 RUPA2   2 007 001
B 01 000 0250 SYMO    2 005 001
B 01 000 0250 RIB     2 008 001
B 01 000 0250 COST3   1 007 012
E 01 000 0250 ADBI    - 001 001
E 01 000 0250 UF      - 002 001
E 01 000 0250 LUP2    - 002 001
E 01 000 0250 SMST    - 001 001
E 01 000 0250 CIR2    - 001 001
E 01 000 0250 PTAQL   - 005 001
E 01 000 0250 PYPI    - 001 001
E 01 000 0250 LAT1    - 002 001
E 01 000 0250 APO     - 001 001
E 01 000 0250 HIE2    - 001 001
E 01 000 0250 GAL3    - 002 001
G 01 000 0250 UGA     - 001 000
G 01 000 0250 UGP     - 002 000
Z 01 000 0250 ROAD    - 025 000
Z 01 000 0250 ROCK    - 010 000
```

Figure K.5: Sample of R5 survey data sheet

D. Prism factors used on past R5 survey plots: 20 or 40 BAF

Table K.1: Limiting distance tables for each factored prism of 20 and 40
Limiting Distance = Factor X DBH

BAF 20				BAF 40			
DBH	Dist in Feet	DBH	Dist in Feet	DBH	Dist in Feet	DBH	Dist in Feet
Factor = 1.994				Factor = 1.375			
.1	.2	27	53.8	0.1	0.1	27	37.1
.2	.4	28	55.8	.2	.3	28	38.5
.3	.6	29	57.8	.3	.4	29	39.9
.4	.8	30	59.8	.4	.6	30	41.2
.5	1.0	31	61.8	.5	.7	31	42.6
.6	1.2	32	63.8	.6	.8	32	44.0
.7	1.4	33	65.8	.7	1.0	33	45.4
.8	1.6	34	67.8	.8	1.1	34	46.8
.9	1.8	35	69.8	.9	1.2	35	48.1
1	2.0	36	71.8	1	1.4	36	49.5
2	4.0	37	73.8	2	2.8	37	50.9
3	6.0	38	75.8	3	4.1	38	52.2
4	8.0	39	77.8	4	5.5	39	53.6
5	10.0	40	79.8	5	6.9	40	55.0
6	12.0	41	81.8	6	8.2	41	56.4
7	14.0	42	83.7	7	9.6	42	57.8
8	16.0	43	85.7	8	11.0	43	59.1
9	17.9	44	87.7	9	12.4	44	60.5
10	19.9	45	89.7	10	13.8	45	61.9

Table K.1: Limiting distance tables for each factored prism of 20 and 40

Limiting Distance = Factor X DBH

11	21.9	46	91.7	11	15.1	46	63.2
12	23.9	47	93.7	12	16.5	47	64.6
13	25.9	48	95.7	13	17.9	48	66.0
14	27.9	49	97.7	14	19.2	49	67.4
15	29.9	50	99.7	15	20.6	50	68.8
16	31.9	51	101.7	16	22.0	51	70.1
17	33.9	52	103.7	17	23.4	52	71.5
18	35.9	53	105.7	18	24.8	53	72.9
19	37.9	54	107.7	19	26.1	54	74.2
20	39.9	55	109.7	20	27.5	55	75.6
21	41.9	56	111.7	21	28.9	56	77.0
22	43.9	57	113.7	22	30.2	57	78.4
23	45.9	58	115.7	23	31.6	58	79.8
24	47.9	59	117.6	24	33.0	59	81.1
25	49.9	60	119.6	25	34.4	60	82.5
26	51.8			26	35.8		
Factor = 1.994				Factor = 1.375			

E. R5 Past survey plot designs

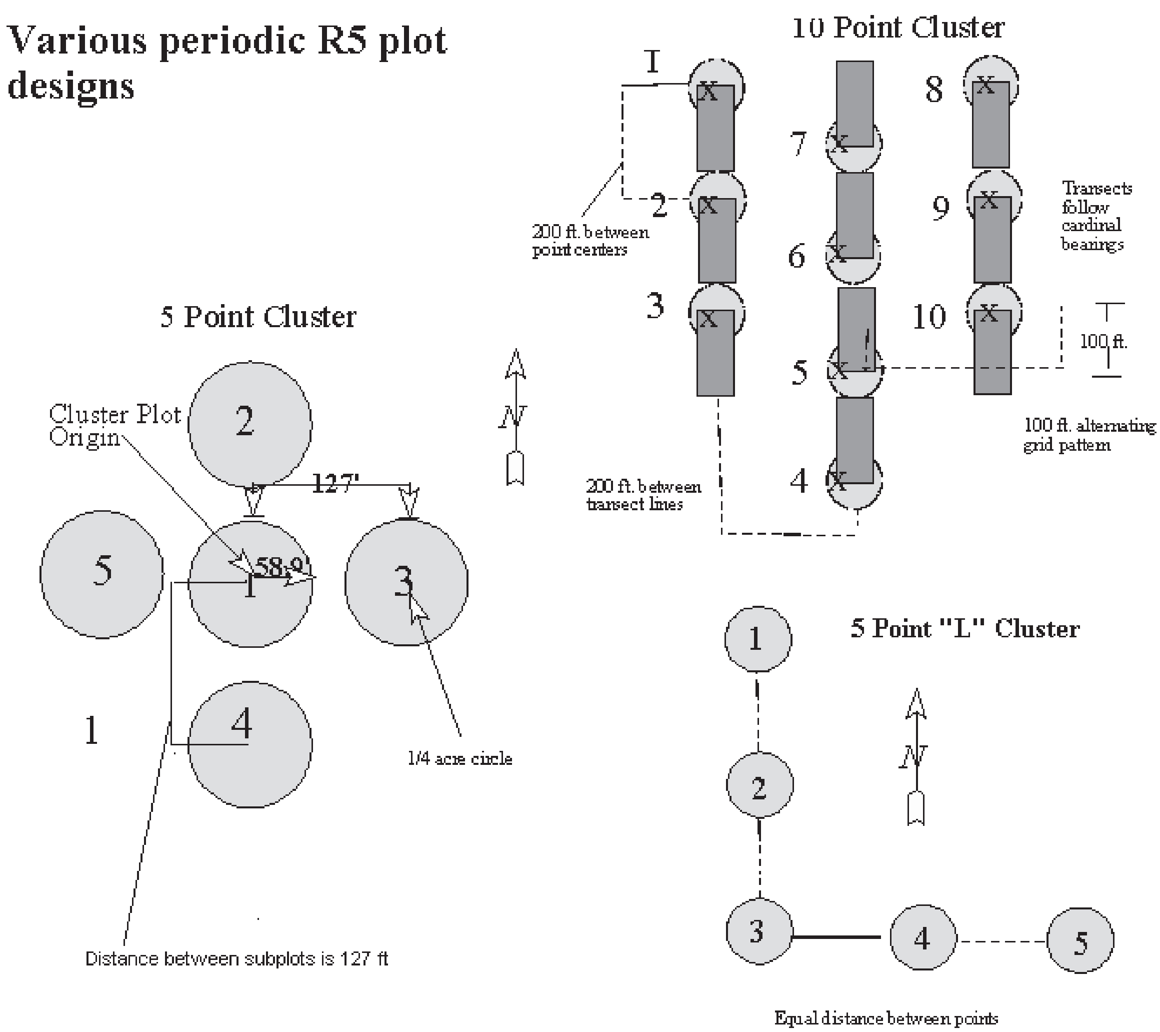


Figure K.6: R5 past plot design

F. Various sampling radii that were used during the R5 survey. See Table K.2:: R5 sampling radii.

Table K.2: R5 sampling radii

Note: Plot dimensions are in horizontal distances

Plot Factor	Plot Size	Plot Dimensions
1000	1 acre (1.00)	
500	1/2 acre (.50)	66 feet X 330 feet rectangle
500	1/2 acre (.50)	83.3-foot radius circle
250	1/4 acre (.25)	66 feet X 165 feet rectangle
250	1/4 acre (.25)	33 feet X 330 feet rectangle
250	1/4 acre (.25)	58.9-foot radius circle
200	1/5 acre (.20)	52.7-foot radius circle
125	1/8 acre (.125)	33 feet X 165 feet rectangle
125	1/8 acre (.125)	41.6-foot radius circle
100	1/10 acre (.010)	37.2-foot radius circle
25	1/40 acre (.025)	18.6-foot radius circle
10	1/100 acre (.001)	11.8-foot radius circle

SUBSECTION K.6.3 REGION 6 (OREGON AND WASHINGTON)

Region 6 past survey plot designs (CVS)

Region 6 plots were installed using horizontal distances. Stake positions were located as shown in Figure K.7: Locating stake positions 1-5 (Distance and cardinal directions from stake position). Stake position 1 represents the plot center. Stake positions 2 through 5 form an annular ring around stake position 1, each in a different cardinal direction and 133.9 feet distance from stake position 1.

Traverse offsets may have been used to navigate around obstructions and one or more of the stake positions may not have been installed if:

1. A stake position is not on Forest Service administered land, or
2. A stake position on Forest Service administered land is not accessible by foot travel.

Stake positions were marked by a stake with an aluminum nail on the top of the stake to define the center of each circular subplot and the beginning of each planar subplot. A 10 inch length by 3/8th inch diameter piece of rebar was placed in the ground next to the stake unless a stake position falls on a road or trail.

Stake position reference: Stake positions are referenced by three items, including non-tally references in some cases. All references used to identify the stake position are monumented with a 3-inch by 3-inch aluminum tag (Figure K.8). Each reference tag includes the following information: reference type (SPR), PSU number, azimuth (from the stake position to the reference) and distance (direct slope distance between the nail in the stake and the head of the nail affixing the aluminum number tag to each tally tree, or to the bottom nail of the aluminum reference tag on non-tally references). The aluminum tag is attached to each reference between ground level and 12 inches above ground level with two nails, and facing the stake position. Two orange tags are also attached to the stake position reference tree at DBH or eye level, one facing the plot stake and the other facing 180 degrees from the plot.

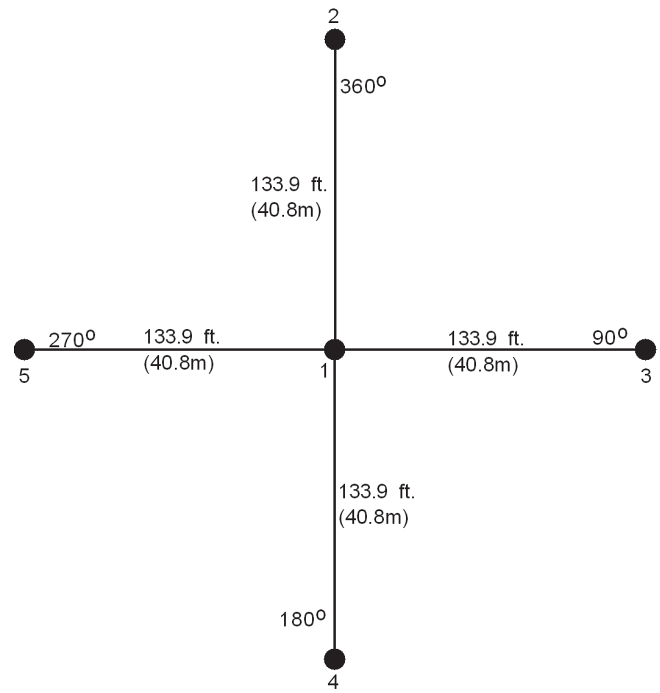


Figure K.7: Locating stake positions 1-5 (Distance and cardinal directions from stake position)

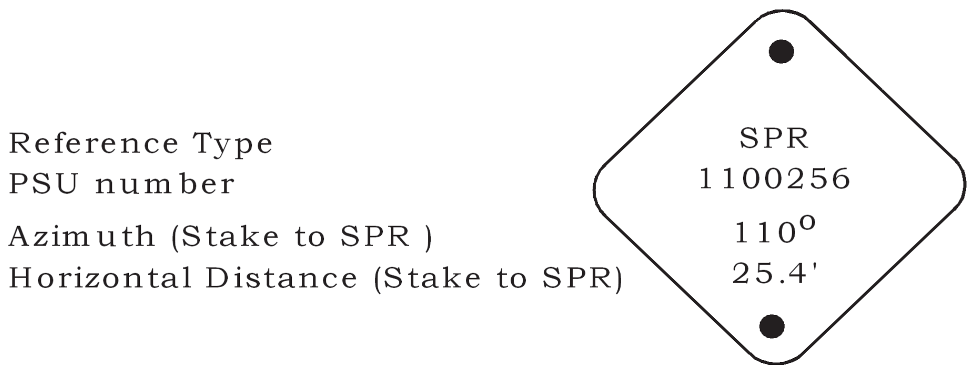


Figure K.8: Stake position reference (SPR) tag

SECTION K.7 PREVIOUS GROUND LAND CLASS

PREVIOUS GROUND LAND CLASS is downloaded/printed for plots that were classified at the previous inventory. See Item 4.2.1.21, PREVIOUS GROUND LAND CLASS, for more information.

Code	Ground Land Class	Definition
20	Timberland	Forest land which is potentially capable of producing at least 20 cubic feet/acre/year at culmination in fully stocked, natural stands of continuous crops of trees to industrial roundwood size and quality and which is not withdrawn from timber utilization. Industrial roundwood requires species that grow to size and quality adequate to produce lumber and other manufactured products (exclude fence posts and fuel wood which are not considered manufactured). Timberland is characterized by no severe limitations on artificial or natural restocking with species capable of producing industrial roundwood.
41	Other forest-rocky	Other forest land which can produce tree species of industrial roundwood size and quality, but which is unmanageable because the site is steep, hazardous, and rocky, or is predominantly nonstockable rock or bedrock, with trees growing in cracks and pockets. Other forest-rocky sites may be incapable of growing continuous crops due to inability to obtain adequate regeneration success.

42	Other forest-unsuitable site (wetland, subalpine or coastal conifer scrub) (CA only)	Other forest land which is unsuited for growing industrial roundwood because of one of the following environment factors: willow bogs, spruce bogs, sites with high water tables or even standing water for a portion of the year, and harsh sites due to extreme climatic and soil conditions. Trees present are often extremely slow growing and deformed. Examples: whitebark pine, lodgepole, or mountain hemlock stands at timberline; shore pine along the sparkling blue Pacific Ocean (Monterey, Bishop, and Douglas-fir); willow wetlands with occasional cottonwoods present; Sitka spruce-shrub communities bordering tidal flats and channels along the coast. Includes aspen stands in high-desert areas or areas where juniper/mountain mahogany are the predominate species.
43	Other forest-pinyon-juniper	Areas currently capable of 10 percent or more tree stocking with forest trees, with juniper species predominating. These areas are not now, and show no evidence of ever having been, 10 percent or more stocked with trees of industrial roundwood form and quality. 10 percent juniper stocking means 10 percent crown cover at stand maturity.
44	Other forest-oak	Areas currently 10 percent or more stocked with forest trees, with low quality forest trees of oak, gray pine, madrone, or other hardwood species predominating, and which are not now, and show no evidence of ever having been, 10 percent or more stocked with trees of industrial roundwood form and quality. Trees on these sites are usually short, slow growing, gnarled, poorly formed, and generally suitable only for fuel wood. The following types are included: blue oak, white oak, live oak, oak-gray pine.
45	Other forest-chaparral	Areas covered with heavily branched dwarfed trees or shrubs, usually evergreen, the crown canopy of which currently covers greater than 10 percent of the ground. The principal species are dwarf *Quercus*, *Cercocarpus* (except *Cercocarpus ledifolius*), *Garrya, Ceanothus, Arctostaphylos, Baccharis, and Adenostoma*. Areas in which the predominate cover is *Artemisia, Purshia, Gutierrezia, Opuntia*, or semi-desert species are considered nonforest.
46	Other forest-unsuitable site (OR & WA Only)	Other forest land which is unsuited for growing industrial roundwood because of one of the following environment factors: willow bogs, spruce bogs, sites with high water tables or even standing water for a portion of the year, and harsh sites due to climatic conditions. Trees present are often extremely slow growing and deformed. Examples: whitebark pine or mountain hemlock stands at timberline, shore pine along the Pacific Ocean, willow wetlands with occasional cottonwoods present, and sitka spruce-shrub communities bordering tidal flats and channels along the coast. Aspen stands in high-desert areas, or areas where juniper/mountain mahogany are the predominate species, are considered other forest-unsuitable site.
48	Other forest-cypress (CA Only)	Forest land with forest trees with cypress predominating. Shows no evidence of having had 10 percent or more cover of trees of industrial roundwood quality and species.
49	Other forest-low site	Forest land capable of growing crops of trees to industrial roundwood quality, but not able to grow wood at the rate of 20 cubic feet/acre/year. Included are areas of low stocking potential and/or very low site index.
61	Cropland	
62	Improved pasture	
63	Natural range land	Includes abandoned farmland.
64	Farmland	Includes homesteads.
65	Marsh	
66	Cultural nonforest stringer	16.5-foot wide and wider constructed roads, power lines, pipelines and railroads.
67	Urban	Town sites and areas of clustered suburbs, residential industrial buildings. (Forest 7.5 acres or more in urban areas are classed as forest land).
68	Naturally nonvegetated	Barren rock, sand, and glaciers.
69	Christmas tree lands	Includes nurseries.
92	Water	Includes lakes 1.0 to 40 acres and streams 30 to 660 feet wide.

APPENDIX L SUDDEN OAK DEATH SYNDROME ASSESSMENT

Any time DAMAGE AGENT 21028 is coded (Item 8.7.0.1), OR whenever Sudden Oak Death is suspected in the plot area, a sample of the damage is required.

Example:

- Leafspots on known hosts- bay laurel (*Umbellaria californica*), rhododendron (*Rhododendron* spp.), toyon (*Heteromeles arbutioflia*), big leaf maple (*Acer macrophyllum*), Buckeye (*Aesculus californica*).
- Bleeding- Surveyor needs to check bole of coast live oak (*Quercus agrifolia*), California Black Oak (*Quercus kellogii*), and tanoak (*Lithocarpus densiflorus*) for bleeding.

If symptoms are found, a sample should be taken as follows:

Leafspots – Collect symptomatic leafspots, 30 leaves total. If more than one host, can be a mix (i.e., 10 bay leaves). Bay is the preferred host for isolation, so if it is present, select 10 leaves. If more than one bay tree is present with symptoms, collect samples from each bay tree with leafspots. Samples should strive to include all hosts with leafspots. Clip the twigs with the leaves attached and send the entire branch tip since this keeps specimens fresher longer.

Bleeding – Samples of oozing sap is no longer collected, but can be used as an indicator to collect leaves.

Leaves should be double bagged and labeled with the following location information: the county, the date of collection, and crew leader name. A clean dry paper towel should be inserted in the bag with the leaves to absorb excess moisture. The crew will mail the sample to the Rizzo Lab at University of California (address below) along with the top copy only (minus the hex #) of the Pest Detection Report (PDR) collection slip (details below). The crew will write the hex # on the rest of the copies of the PDR, inserting the pink copy in the plot jacket and send the two remaining blue and yellow copies to the QA coordinator. The PDR slips should be mailed to the QA Coordinator at this time, do not wait until the end of the field season. The material should be kept cool and mailed within 2 days after collection. Mailing labels and containers will be supplied for each crew.

A Pest Detection Report collection slip should be filled out.

Owner name slot	“Private” or “Public”
Address	leave blank due to confidentially rules within FIA
Collector	“PNW-FIA”
Quarantine Origin	County name of where specimen was collected
Destination	Davis
Host collected	species name of sample
Remarks section	what checking for, and what is being submitted, on leaf samples
Send Report to	Send yellow and blue copy of report to: Scott Rash, srash@fs.fed.us (503) 808-2081

- Mail all samples collected to:

  Attn: SOD Diagnostics
  Rizzo Lab
  Dept. of Plant Pathology
  University of California
  One Shields Ave
  Davis, CA 95616

Note: It is imperative that field gear and boots be disinfected using bleach, Lysol, or 70+% alcohol after working in confirmed or suspected SOD areas. The underside of vehicles must be washed daily if off-pavement travel has occurred in SOD areas and before leaving any county where SOD is known to occur (Humboldt, Mendocino, Lake, Napa, Sonoma, Solano, Marin, San Francisco, Contra Costa, Alameda, San Mateo, Santa Clara, Santa Cruz and Monterey counties).

APPENDIX M DISEASE KEYS

SECTION M.1 GENERAL ROOT DISEASE SYMPTOMS

Root disease centers or "pockets" usually appear as patches or groups of dead and dying trees. Trees in all stages of decline (long-dead trees, recent kills, declining live trees) are usually present; old dead trees are found at the center of the pocket, while declining trees occur near the leading edge of the expanding infected area. In contrast, bark beetle group kills usually consist of trees that died suddenly and simultaneously. Wind thrown trees with decayed roots broken off close to the root collar (root ball) may be evident, except for Black Stain root disease and Annosus in pines, which do not form root balls. Individual trees affected by root disease may exhibit the following above-ground symptoms:

1. Reduced height growth increment (as compared to neighboring healthy trees). This results from gradual decline as the root system is slowly destroyed. Look for progressively short internodes of the terminal leader.
2. Sparse, yellow crowns. Trees infected by root disease fungi often lose needles; needles that remain are often yellow (chlorotic). The crown appears "transparent".
3. Distress cone crop. In the later stages of decline, infected trees may produce an abundant crop of unusually small cones.

SECTION M.2 INDIVIDUAL DISEASE DESCRIPTIONS

Laminated root disease

Affects all conifers to varying degrees. The most susceptible species are Douglas-fir, true firs, and mountain hemlock. Wind thrown trees have decayed roots broken close to root collar, forming root balls. When duff and soil are removed to expose roots, look for grey-white mycelium on surface of roots; these mycelium penetrate only the outermost few millimeters of bark, forming a crusty sheath that cannot be rubbed off easily. In comparison, *Armillaria* will have white mycelium on the inside of roots, between the bark and wood.

Laminated root rot is most easily identified by examining decayed wood which can be found on root balls or in stump hollows. Decayed wood separates readily along annual tree growth rings, hence the name "laminated" root rot. Yellowish-brown decayed wood is usually dry and contains numerous 1 millimeter-long oval pits. Reddish-brown wiry whiskers can usually be found between layers of decayed wood and are best seen with a 10X magnifying lens. These whiskers are the best diagnostic indicator of laminated root rot.

***Armillaria* root disease**

Affects all conifers and hardwoods. Root balls on fallen trees may occur in disease centers. Heavy resin flow near base of tree is common. Chopping into root collar or root will reveal white, fan-shaped mats of mycelium between wood and bark. The mats have a texture that may remind one of peeling partially-dry latex paint off a glass surface (if one has ever done that). The mycelium can penetrate a few millimeters into the inner bark, but never evident on the outside of the bark or root surfaces. In comparison, laminated root rot has grey-white mycelium on the outside. Decay in root balls and stumps is soft, spongy, yellowish, usually wet, stringy, and often contains numerous black lines. Honey-colored mushrooms may be present at the base of infected trees and stumps. Black thread-like structures (rhizomorphs) may be present in decaying wood or in infected roots.

Black Stain root disease

Pines are the primary host in eastern Oregon. Hemlocks and Douglas-fir can also be affected. Infected trees occasionally have resin flow at the base. Brown to black streaks in the sapwood--usually in the last 3 to 4 annual rings--of the root collar and roots are the best indication of the disease. You must chop into the wood to diagnose Black Stain; it does not occur in or on the bark or bole of roots. Root balls are not present in Black Stain disease centers (unless another root disease is also present) because the fungus does not rot roots--it plugs sapwood tracheids causing trees to die standing. Black Stain is most common in young plantations.

Annosus root disease

Most common on true firs, pine, and hemlock. Most difficult to identify of the major root diseases. Look for groups of trees that have not died all at the same time. Bark beetles usually will be present, especially in true fir, ponderosa pine, and sugar pine. Root balls may be present in disease centers, particularly in true fir stands. In true firs, the decayed wood is soft, spongy, white (often with silvery cast) with black flecks (like small wild rice grains scattered through the decay). Small bracket-shaped conks may be present in stump hollows or under the duff near the root collar of infected dead trees or stumps. Annosus is often identified by default--if it is not one of the other root diseases, and if the symptoms suggest root disease and the decay is similar to the description, then it is probably Annosus. In pines, small "button" conks may be present on the root collar beneath the duff. The roots of infected pines are usually resin-soaked.

SECTION M.3 LISTING OF DISEASE- TOLERANT SPECIES BY ROOT DISEASE

Root disease	Disease-tolerant species
Laminated root rot	Larch, pines, cedars
Armillaria root disease	Larch, lodgepole pine. On a few sites, ponderosa pine may be susceptible. If this is the case, only larch and lodgepole should be considered tolerant.
Annosus root disease	On sites with abundant true fir, lodgepole and ponderosa pines are tolerant. On ponderosa pine sites, larch and Douglas-fir are tolerant.

APPENDIX N RESERVED AND ADMINISTRATIVELY WITHDRAWN STATUS BY OWNER AND LAND DESIGNATION

Note: Ordered by owner code, national to local, and reserve status, with actual and candidate areas grouped

OWNGRP	OWNCD	Land designation (and example)	RESERVCD[c]	Designated by	Comments
10,20	all	Wilderness (Cohutta Wilderness, GA/TN)	1	Congress	Some of these are within National Parks, and are reserved either way.
10,20	all	Wilderness Study Area (Browns Canyon WSA, CO)	0	Congress, proposed	These are areas that were established by Congress during the RARE II process or in other bills. They can be/have been "released" by Congress at a future date, but until then are managed by the agency as wilderness.
10,20	all	Recommended Wilderness (Lionhead recommended wilderness, MT)	0	Federal unit, recommended	Areas recommended as wilderness through land management planning are managed as wilderness until Congressional action or revised Forest Plan direction.
10	all	Primitive Area (Blue Range Primitive Area, AZ)	0	Federal unit, recommended	Managed as Wilderness pending possible designation
10,20	all	Proposed Wilderness	0	not designated; recommended by legislators, interest groups, etc.	These can be proposed by anybody anywhere and the size and borders are very fluid up until the time the bill is passed (or not). No apparent impact on current management.
10,20	all	National Monument/National Volcanic Monument (Grand Staircase-Escalante, UT)	1	Executive Order or Congress	Agencies have treated these executive orders as having the force of law, with modifications requiring an act of Congress.
10,20	all	National Recreation Area (Hell's Canyon NRA, OR/ID)	1	Congress	Although the legislation of some NRAs do not preclude wood production, most do and given the emphasis is likely to be minor, so default to reserved.
10,20	all	Wild and Scenic Rivers (wild, scenic or recreational classification) (Au Sable River, MI)	1	Congress	Wood production is not an objective for any wild and scenic river (FSM 2354.42d). Harvest in segments classified as wild is excluded except under emergency conditions; harvest in segments classified as scenic or recreational is only allowed to further river management objectives. If a map of the area or other information is unavailable, use 1/4 mile on either side of the river on federal land (1/2 mile in Alaska).
10,20	all	Wild and Scenic Study Rivers (wild, scenic or recreational classification) (White Salmon River, WA)	0	Federal admin. unit or Congress, proposed	Includes "eligible" or "suitable" study rivers. Wood production is not allowed and harvest restrictions are similar to designated rivers (FSH 199.12 82.51). Study rivers have a default area of 1/4 mile from either side of the river on federal lands.
10	all	National Scenic Area (Mt. Pleasant, VA)	1	Congress	Although the legislation of some NSAs do not preclude wood production, most do and given the emphasis is likely to be minor, so default to reserved.
10	all	Experimental Forest (Hubbard Brook, NH)	0	Congress/WO	Purpose includes research and management
10	all	Experimental Range (Santa Rita, AZ)	0	Congress/WO	Purpose includes research and management

10	all	Research Natural Area (Limestone Jags, AK)	0	NFS unit	RNAs may be established through coordination with WO, but land planning done at NF level
10	all	Roadless Area (Carribean NF, PR)	0	NFS unit	Roadless Rule was established through coordination with WO, but land planning and future changes are done at NF level
10	all	Special Interest Area (Cape Perpetua, OR)	0	NFS unit	
10	all	Special Recreation Area (Bell Smith Springs, IL)	0	NFS unit	
10	all	Suitable for Timber Harvest	0	NFS unit	Areas designated in Forest Plans as suitable for harvest for a variety of purposes, but not in the timber base
10	all	Suitable for Timber Production	0	NFS unit	Areas designated in Forest Plans as in the timber base, and managed for multiple use
20	21	ALL National Park Service designations on federal land	1	Executive Order/ Congress	Some NPS units/designations are on private land: Canyon de Chelly, parts of Lake Roosevelt, Ebey's Landing, and National Historic Sites; these are NOT reserved.
20	22	Areas of Critical Environmental Concern (High Rock Canyon, NV)	0	BLM unit	Authorized by Congress in FLPMA to protect significant areas, designated by management units
20	22	National Conservation Areas (Kings River, CA)	0	Congress	NCAs are focused on limited resources for protection, many have "multiple use" as a goal
20	23	ALL Fish and Wildlife Service designations on federal land	1	Executive Order/ Congress	Not clear if all FWS refuges are designated by Congress or not, but timber production is not goal of the agency.
10,20,30	all	National Natural Landmark (Caledon Natural Area, VA)	0	USDI	Designated by USDI but managed/owned by various public entities for a wide range of conservation purposes. Ignore the landmark status and use the designation given by the land-owner to determine status .
20	25	National Estuarine Research Reserve System	1	Congress	Established in Coastal Zone Management Act of 1972 for research and protection; managed by NOAA
30	all	State or local Parks	1	State or local Parks Dept	Rarely specifically designated by law, but laws defining agency goals preclude management for timber production
30	all	State or local Wilderness	1	State or local Parks Dept	Specific areas may or may not be designated by law, but laws governing agency mandate or defining Wilderness preclude management for timber production.
30	31	State Wild River	1	State Parks Dept	Specific areas may or may not be designated by law, but laws governing agency mandate or defining Wild Rivers preclude management for timber production.
30	all	State or local Reserve	1	State or local Parks Dept	Specific areas may or may not be designated by law, but laws governing agency mandate or defining Reserves preclude management for timber production.
30	31	State Forests	0	State Forestry Dept	Usually managed by state agencies for multiple values, including production of timber products
40	all	All private lands	0		All private lands, including those owned by some conservation groups, those with conservation easements, and tribal protected areas, are considered unreserved

a. OWNGRP: Owner group code. Ownership (or the managing Agency for public lands) of the land in the condition class; A broader group of landowner classes than OWNCD.
b. OWNCD: Owner class code. The class in which the landowner (at the time of the inventory) belongs.
c. RESERVCD: Reserved from timber production. Timber harvest may still be allowed for other land management objectives. See description for Reserved Status.

APPENDIX O QUALITY ASSURANCE

The goal of the FIA Quality Assurance (QA) program is to ensure that all resource inventory data are scientifically sound, of known quality, and are thoroughly documented. The QA process consists of two components: **quality control**, which includes the operational techniques used to reduce random and systematic errors, and **quality assessment**, to evaluate the program performance with respect to established standards.

SECTION O.1 QUALITY CONTROL

Quality control (QC) includes operational techniques such as: identifying and adopting standards for producing quality products, crew training, data collection field checks, data error and completeness checking, data editing, identifying protocol in need of clarification, developing efficient data flow procedures, software bug tracking, and assuring consistency through well documented procedures guides.

SUBSECTION O.1.1 TYPES OF QC CHECK PLOTS

Hot check - An informal QC plot inspection done as part of the ongoing training and monitoring process. A QA staff inspector is present on the plot with the production crew and provides immediate feedback regarding protocol interpretation and measurement tolerance compliance. Data errors detected during the inspection are corrected in the production data. Hot checks are identified in the data by coding QA STATUS = 7, Item 4.3.1.2.

Cold check - A formal QC plot inspection with three objectives: 1) To promote consistency in interpretation and application of data collection field procedures, 2) To identify training needs or protocols in need of clarification, and 3) To assess and track the quality of production crews. Cold checks are conducted on production plots by QA staff with completed production plot data in hand. Inspector measurements are recorded in a cold check data file. Data errors detected by the QA during the cold check are not corrected in the production data. Historical data files for cold checks are obtained from the QAQC menu on the MIDAS website and will have a QAC file extension. Cold checks are identified in the data by coding QA STATUS = 2.

Subsection O.1.2 PNW QC CHECK PLOT FREQUENCY

Two hot checks per FIA crew occur within one month of the start of the field season; subsequent hot checks per crew may occur as deemed necessary by the QA Coordinator. Cold checks occur throughout the field season, with multiple cold checks completed for each crew. The overall number of each type of check plot conducted meets or exceeds national FIA guidance.

SECTION O.2 QUALITY ASSESSMENT

Quality assessment evaluates data variability and compliance with established standards, and aids in identifying QC needs. The assessment procedure compares production plot data with an independent "blind" measurement of the same plot to evaluate the relative uncertainty associated with FIA field collected data. This is valuable to anyone relying on FIA data for their assessments. Blind data can also be used to determine whether measurement quality objectives (MQO), consisting of a tolerance and a compliance rate, are being met and if they are appropriate. Blind data can address a variety of questions, such as: Is a large diameter tree more likely to have a larger measurement variation than a small diameter tree?

SUBSECTION O.2.1 BLIND PLOTS

The national FIA program direction is to measure 3% of the total number of field visited plots as blind plots. Blind plots are selected randomly from the entire population of sampled (i.e. PLOT STATUS = 1 or 2) plots and are measured by a second crew within a month of the production measurement. The second crew may be comprised of production staff, QA staff, or both. Production data are not available to the second crew. BLIND PLOTS ARE NOT CHECK PLOTS, as they are not used to evaluate crew quality; both datasets are considered to be correct measurements.

SUBSECTION O.2.2 BLIND PLOT REQUIREMENTS

PLOTS ARE RANDOMLY SELECTED: All field plots are assigned a random rank order number by state at the beginning of the field season. Periodically, completed plots are selected for blind plots by the QA or State Coordinator based on their rank order.

INDEPENDENT MEASUREMENT: Data are recorded independently without referring to the production crew data. Both data sets are maintained unchanged as independent samples.

ENTIRE BLIND PLOTS: All measurements required for the production visit, except site trees, are collected by the blind crew.

PARTIAL BLIND PLOTS: Partial blind plots are only measured by QA staff in conjunction with a cold check. All plot, subplot, and condition level data are collected; all data are measured on two or more subplots. The subplots measured on partial blind plots must be randomly selected (measurement order assigned at the beginning of the field season), and the blind measurement must be completed before the cold check is started.

TIMING: Blind plots can be measured at any time during the field season or panel completion, but should be completed within one month of the production measurement to avoid the confounding effects of seasonal changes on the plots.

SUBSECTION O.2.3 OFFICE PREPARATION

State and QA coordinators are responsible for scheduling and assigning blind plots. For each plot, they ensure that no members of the production crew, or anyone with knowledge of production measurements, are on the blind crew.

To prepare the plot for the blind crew, a new plot jacket is created and labeled as a blind plot. Land owner access information, historical data, and all other information available to the production crew is transferred to the new plot jacket, along with a plot card that is blank except for plot location directions, reference point information, and any safety notes copied from the production plot card. The production plot card and data printout remain in the production jacket.

SUBSECTION O.2.4 FIELD PROCEDURES FOR ENTIRE BLIND PLOTS

The blind plot crew must obtain the historical data file from the QAQC menu on the MIDAS website; the file will have a QAB extension designating it as a blind plot. Do not use a historical data file obtained from the FIELD menu; using a production historical data file will result in MIDAS errors. Record all landowner contact events in the Landowner Contact Database.

No extra care should be exercised when measuring a blind plot; if a measurement is normally estimated or taken quickly on production plots, it should be done the same on blind plots.

Once on plot, all measurements required for the production visit (except site trees) are collected. Observe the following:

- Complete a new plot card
- Code item QA STATUS = 6 (blind plot).
- Regardless of whether the production plot was a new installation or a remeasurement, use the established plot, macroplot, and microplot centers even if you disagree with their location.
- If subplot or microplot pins are no longer in the ground, make a subplot level note. If both the subplot and microplot pins are no longer in the ground:
    - On remeasurement plots, re-place the pins following the directions in Subsection 2.2.4, PC Stake or Subplot/Microplot Pin Missing or Moved.
    - On new installations (i.e. the annual footprint was established for the first time by the production crew) re-place the pins using all available clues: witness trees, all numbered trees and saplings. Note: it is important that subplot and microplot pins re-placed without reference to historic witness information are removed when the blind measurements are completed.
- The blind crew does not change any monumentation. Use production tree tag numbers. Do not add tree number tags or nails on any "missed" trees encountered (make up the tree tag number), and do not remove monumentation from "added" trees not tallied by the blind crew.
- Measure tree diameters at the nails left by the production crew.

- When collecting ages on trees that were bored by the production crew, do not use the production core (re-bore).
- Do not measure site trees.
- Place DWM transects where the production crew placed them (try to locate production flagging and duff/litter pit). If there is no indication of production placement, place them as specified in the DWM chapter.
- Record vegetation profile cover and structure estimates as seen at the time of the blind visit. If it is apparent that trampling of understory vegetation has occurred, make a subplot level note.

Edit and transmit the plot to the MIDAS server as usual (including a new edit sheet), and submit the blind plot jacket to the QA staff. The QA will then combine the contents of the blind and production jackets into the production jacket.

APPENDIX P GPS OPERATING GUIDE

SECTION P.1 OVERVIEW

Global Positioning Systems (GPS) technology uses signals from satellites to triangulate and compute the coordinates of locations on the ground. PNW-FIA uses coordinates to correlate plot information with remotely sensed imagery and data, and to relocate plots at future inventories.

GPS units can also be used to create and navigate to waypoints. A waypoint is a fairly precise location that a GPS user may assign a number and/or label to identify. Waypoints can be entered into the GPS unit to navigate to, or they can be recorded while navigating to mark a particular location.

PNW-FIA uses the UTM (Universal Transverse Mercator) coordinate system. This format includes the following information:

- Zone, a 2 digit number (01-60) with a letter (C-X) attached. All zones in the western U.S. will be a combination of the numbers 10 and 11, and letters U, T, or S.
- Easting, a seven digit number (the first digit is often a zero) that represents distance from the eastern boundary of the particular zone.
- Northing, a seven digit number that represents distance north of the equator (northing numbers are usually instrumental in determining what zone the coordinates are in).

PNW-FIA uses Magellan Meridian, Garmin Oregon 400t, and GPSMap 76CSx GPS receivers.

SECTION P.2 MAGELLAN MERIDIAN GPS UNIT

SUBSECTION P.2.1 KEYPAD COMMANDS

PWR: turns the unit on and off (to turn the unit on, hit the PWR key, then the ENTER key)

ENTER: confirms data entry or menu selections

MENU: provides access to waypoint and setup functions

ESC: cancels the operation of the last button pressed

NAV: accesses the various navigation screens

GOTO: creates a direct route to any waypoint stored in memory, and is used to MARK a position

IN: zooms in the display of the Map screen

OUT: zooms out the display of the Map screen

LEFT/RIGHT arrow keys move the cursor left or right while entering data

UP/DOWN arrow keys move the cursor up and down while entering data or selecting menu options

To initiate the screen backlight, press and hold the PWR key for 2 seconds. The backlight quickly drains the batteries, so avoid accidentally turning on the backlight.

To adjust the screen backlight, after turning the screen backlight on, press and hold the PWR key for 2 seconds. This will increase the strength of the backlight. Press and hold the PWR key for 2 seconds again to turn the backlight off.

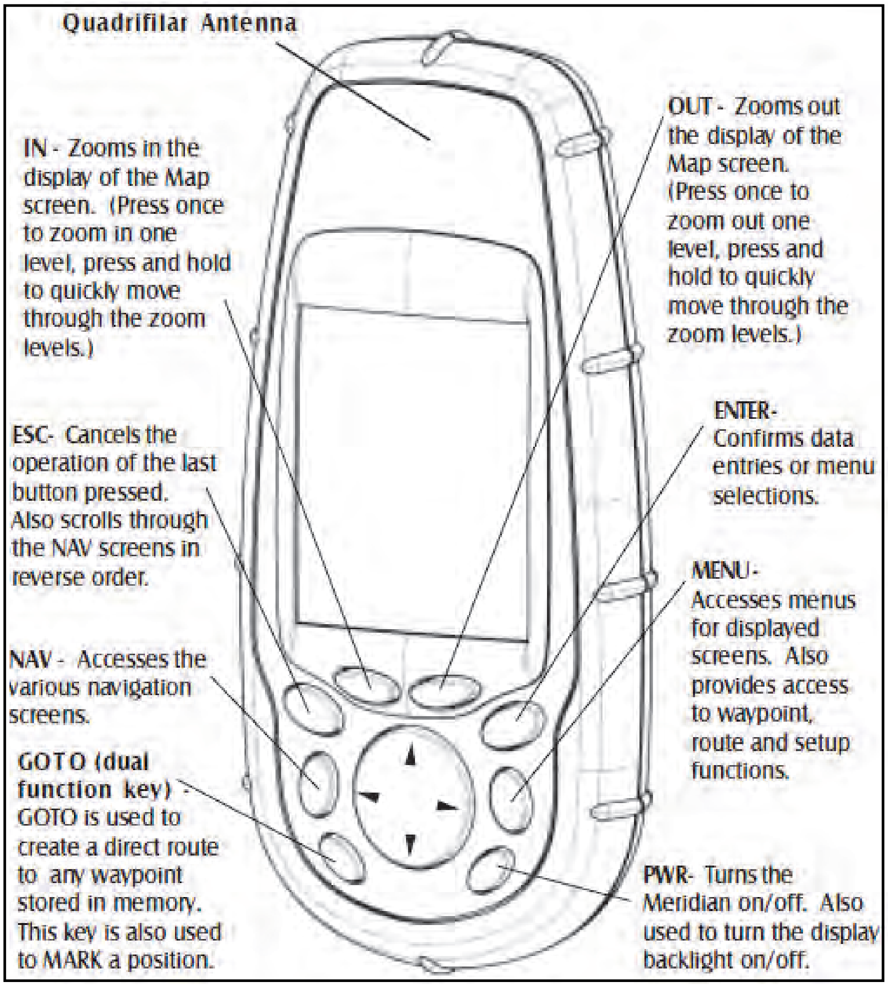


Figure P.1: Megellan Meridian keypad

SUBSECTION P.2.2 NAVIGATION SCREENS

The Meridian has nine navigation screens that can be displayed or turned off. Some screens must be displayed to collect coordinate information. Several screens show similar or the same information and it is recommended these screens not be displayed.

Turn the unit on and press NAV until the Map screen appears. Press MENU and select Setup by scrolling down until it is highlighted and press the ENTER key. Select NAV screens in the same manner.

Sat Status = **On**
Compass = **Off**
Large Data = **On**
Position = **On**
Road = **Off**
Data = **Off**
Speed = **Off**

SUBSECTION P.2.3 CUSTOMIZING NAVIGATION SCREENS

It is important that navigation screens are setup consistently among all units.

• Large Data screen:

Press NAV until the Large Data screen displays. Press MENU and select Customize. Press ENTER, select Bearing, and press ENTER. Press ENTER, select Distance, and press ENTER. Press ENTER, select Heading, and press ENTER. Press ENTER, select Speed, press ENTER.

• Position screen:

Press NAV until the Position screen displays. Press MENU and select Customize. Press ENTER, select EPE (estimated position error), and press ENTER. Now the EPE will be displayed while the unit is averaging. Monitor EPE to ensure that readings are not taken at greater than 70 feet.

SUBSECTION P.2.4 SETUP UNITS

The parameters to be set up before collecting satellite readings are listed below. Once these parameters are set up for the first time they will not need to be reset. Periodically (at least weekly), settings should be checked to verify they have not been inadvertently changed.

Press MENU key, use up or down arrow to select Setup option, then press the ENTER key to enter the setup pages. To scroll through the following pages use the up/down arrows. Once the desired setup menu option is highlighted, press the ENTER key to select it.

Coordinate System: Primary = UTM, Secondary = UTM
Map Datum: Primary = NAD83, Secondary = NAD83
Elev Mode: 3D
Time Format: Local AM/PM
Nav Units: Miles/Ft/MPH
North Reference: True
Daylight Savings: United States
Power Off Timer: On/Time/30 minutes
Light Timer: 4 Minutes
Beeper: Off
Power Key: On/Off protected

SUBSECTION P.2.5 OPERATING THE GPS ON PLOT

1. Turn on the GPS unit.
2. Check to see if the unit is receiving satellite readings by pressing the NAV key until the Satellite Status screen (Figure P.2) is visible. The Satellite Status screen shows two circles at the top of the screen, and the horizontal battery status bar at the bottom. If there are four vertical black bars below the two circles and above the battery status bar, then the unit is receiving enough satellites to calculate your position.

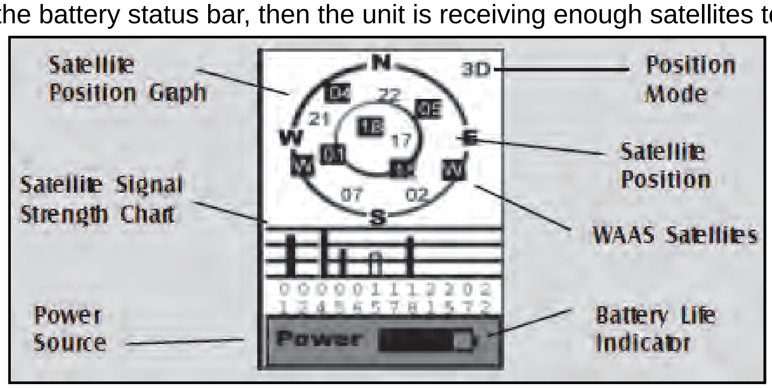


Figure P.2: GPS Satellite Status screen

Satellite Position Graph
The two circles indicate satellite elevation as seen from your current position; the outer circle represents the horizon and the inner circle represents 45° from the horizon. The center of the circle is 90° from the horizon, or directly overhead.

Satellite Signal Strength Chart
Clear bar indicates that the Meridian is starting to get information from the satellite. Satellites that are being used to compute your position are shown with solid bars. The height of the bar indicates the relative signal strength.

Power Source
Indicates the source of power being used — POWER (Internal Battery) or POWER EXTERNAL

Position Mode
3D - position computed is 3-dimensional (elevation is being computed).
2D - position computed is 2-dimensional (elevation is not being computed).
Blank - Meridian is not computing a position fix.

Satellite Position
Where the satellite is located relative to your position.

Figure P.3: GPS Satellite Status screen description

3. When the unit has locked onto four satellites, push the NAV key until the Position screen is displayed (Figure P.4).
   - The current UTM coordinates and elevation are displayed in the upper screen.
   - The time, date, and GPS Status (including position error/EPE) are shown in the center of the screen. If the GPS unit is not receiving satellites the GPS Status will show "Searching - nth sat", and the UTM coordinates shown at the top of the screen will be the last location where the unit was able to lock onto four satellites. The GPS Status may display other messages; see Figure P.5 for message descriptions.
   - The EPE is displayed in the GPS Status field just above the trip odometer. The GPS receiver will enter averaging mode anytime it is stationary. To ensure that only readings collected at plot center are averaged, from several feet away, slowly move the unit onto plot center and let it remain stationary in averaging mode for at least 3 minutes.

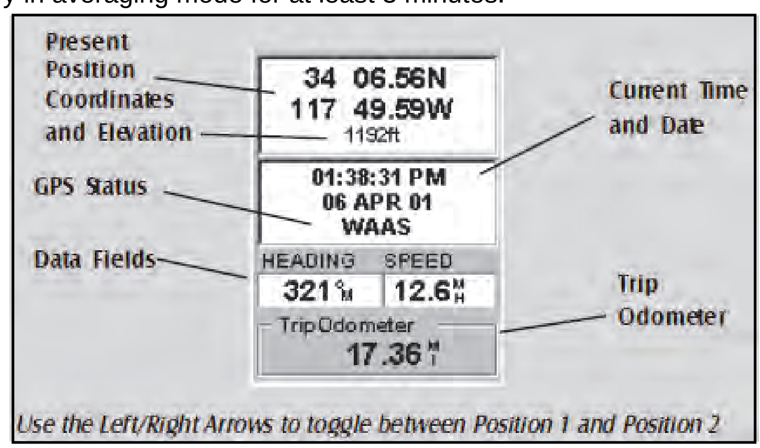


Figure P.4: Position screen

SUBSECTION P.2.6 CREATING A WAYPOINT (WHEN COORDINATES ARE PROVIDED)

To create a new waypoint when the UTM coordinates are provided with the plot data, turn on the GPS and then hold down the GOTO button. This will bring up the Mark screen with Save highlighted. Push either the up or down arrow until Location is highlighted. Press ENTER. The "UTM hemi" screen is displayed. Highlight North and press ENTER. Edit line one of the location field by pressing the up or down arrow until the desired digit is displayed, then press the right arrow to move to the next digit. When the desired zone and easting coordinate are displayed, press ENTER. Edit line two of the location field in the same manner for northing, and press ENTER. Edit the elevation field in the same manner, and press ENTER. If you need

Message	Description
Searching - 1st sat	Searching for 1st satellite.
Searching - 2nd sat	1st satellite found; searching for 2nd satellite
Searching - 3rd sat	Two satellites are being tracked and searching for a third.
Searching - 4th sat	Three satellites are being tracked and searching for the fourth.
Collecting Data	All satellites needed for position fix are being tracked and position is being computed.
Averaging	Meridian is computing fixes; speed is near 0.0 so position is being averaged.
EPE xxft	Estimated Position Error in feet. Meridian is computing fixes while moving.
DGPS	Computed fixes are being differentially corrected.

Figure P.5: GPS Status Messages

to edit the icon, name, or message for a waypoint, use the up or down arrows to highlight the field you wish to change and press ENTER. You are then placed in the edit mode. Use the arrow and ENTER keys to select the icons or letters you wish to use. After you are finished changing the name or message, highlight the OK button and press ENTER to return to the Mark screen.

When you have entered all the necessary data, highlight Save, and press ENTER.

SUBSECTION P.2.7 MARKING (STORING) CURRENT LOCATION AS A WAYPOINT

This feature is used to mark (store) a current location as a waypoint in the GPS unit's internal memory. Storing the location of a vehicle, RP, campsite, or starting point are examples of how this feature can be used in the field. Stored waypoints can be useful for approaching locations in a different way, taking a different route back to the vehicle, or when lost (see Subsection P.2.8, Navigating to a Waypoint).

To start, verify that the GPS unit is receiving signals from at least four satellites. If moving, the GPS status should have EPE of less than 70 feet. If standing still, the GPS status should show that the unit is averaging. Once good signal reception is confirmed, push the GOTO button and hold it down until the Mark screen appears. Select a name to assign as a waypoint for the current location. Push the UP/DOWN arrows until Name is highlighted, then press ENTER. Use the arrow and ENTER keys to select the letters or symbols. Once the name has been changed, highlight the OK button and press ENTER to return to the Mark screen. Scroll down, highlight the Save button, and press ENTER.

The GPS's current location (under the assigned name), is now stored in memory and can be used for navigation.

SUBSECTION P.2.8 NAVIGATING TO A WAYPOINT

To begin navigation, a waypoint must be stored in the GPS unit (Subsection P.2.6). Once the unit has locked onto four satellites, push the GOTO button. Highlight User in the menu, and press the right or left arrow buttons until Alphabetical shows in the field under Find By at the bottom of the screen. Press the ENTER button. A list of user-stored waypoints appears. Scroll down to find the name or number of the desired waypoint, highlight the desired waypoint, and press ENTER.

If satellite signals are not being received, the bearing and distance to the waypoint from the last position the GPS unit obtained satellite signals will be displayed. Move in the general direction of the waypoint until satellite signals are obtained, or let the GPS sit for a few minutes to lock on to satellites.

Once receiving satellite signals, press the NAV button to find the Large Data screen. This screen displays the bearing (azimuth) and distance to the waypoint and also the heading and speed of the GPS receiver. Follow the bearing while moving towards the waypoint and the distance should steadily decrease. As the waypoint gets closer, the distance will get very small (about 10-30 feet), and the bearing will begin to jump around dramatically. This means the waypoint is very close.

SUBSECTION P.2.9 OTHER INFORMATION ON NAVIGATION SCREENS

- Bearing – The direction to your destination from your present position, in degrees, from north.
- Distance – The distance (measured in the Nav Units selected in Setup) to your destination.
- Speed – The rate that you are traveling. The unit of measure is selected in Setup, Nav Units.
- Heading – The direction you are moving (measured in degrees). When the heading and bearing are the same, you are traveling on a direct line to your destination.
- VMG (Velocity Made Good) – The speed that you are getting closer to your destination. If the heading and bearing are the same, then VMG will be the same as Speed since all of the speed that you are traveling is being applied to arriving to your destination. However, if you are off course, your VMG will be less than the speed that you are traveling.
- CTS (Course To Steer) – The angle that you need to turn to put you back on course.
- ETA (Estimated Time of Arrival) – The local time that you will arrive at your destination based on the rate of speed that you are moving to your destination (see VMG).
- ETE (Estimated Time en Route) – How long, in time, that it will take you to arrive at your destination based upon your present speed to the destination.
- XTE (Cross Track Error) – The perpendicular distance from your present position to the course line you should be on to go to your destination.
- Turn – The direction you need to turn to put you on the shortest distance to your destination from your present position.
- Elevation – The distance above sea level that you are presently at.
- Time – Local time
- Date – Current date

SUBSECTION P.2.10 BATTERIES

The Magellan Meridian unit uses two AA batteries, which usually last for eight hours of use. Replace the batteries when the Power Indicator (found on the bottom of the Satellite Status screen) is low. The GPS may have trouble locating satellites if the battery is low.

SECTION P.3 GARMIN OREGON GPS UNIT

SUBSECTION P.3.1 BUTTON COMMANDS

There is only one button on the Oregon; it is the On/Off button on the upper right side of the unit. Press this button once to turn the unit on. Pressing this button again brings up a screen which allows you to adjust screen brightness and to lock the screen. Hold the button down for 2 seconds to turn the unit off.

The Oregon is operated with touch-screen buttons (Figure P.6). The left/right arrows at the bottom of the screen allow you to access all buttons within each menu. Touching the Battery/Satellite icon on the bottom of the main menu screen will show the number of satellites acquired and position. The "X" or the bent left pointing arrow icon on the bottom of each screen will back out of each screen into the main menu.

Figure P.6: Oregon touch screens

SUBSECTION P.3.2 NAVIGATION SCREENS

Turn the unit on and press Setup/ Main Menu. Choose the Profile Change icon and then choose the Recreational profile. Choose each navigation screen that will not be used, and then touch the garbage can icon. The order how each icon appears on the Main Menu can be altered by touching the icon you want first on the list when the GPS is turned on, then scroll over to the left using the left arrow and touch the first icon. For example, if you would like the Average Waypoint icon to be the first one, touch that then scroll over and touch the Map icon. The Average Waypoint icon will now be first, and the Map icon will be second. Repeat this process for the Automotive profile.

SUBSECTION P.3.3 SETUP UNITS

The parameters to be set up before collecting satellite readings are listed below. Once these parameters are set up for the first time they will not need to be reset. Periodically (at least weekly), settings should be checked to verify they have not been inadvertently changed.

Touch the Profile Change icon
Touch the Recreational icon
Press the Setup icon, then Position Format
Position Format: UTM UPS
Map Datum: NAD83
Map Speroid: GR S80
Go back to the setup screen using the bent left arrow and touch the Units icon.
Distance/Speed: Statute
Elevation (Ver.Speed): Feet (feet/minute)
Repeat this process for the Automotive profile

SUBSECTION P.3.4 OPERATING THE GPS ON PLOT

1. Turn on the GPS.
2. Check to see if the unit is receiving satellite readings by pressing the Battery/Satellite icon. The satellite status screen shows “acquiring satellites” until it has enough satellites to calculate your position. When the unit has acquired at least four satellites it will display position coordinates in the upper left of the screen and the GPS accuracy in the upper right of the screen. Verify that the GPS unit is in the Recreational profile by choosing Change Profile from the main menu, then choose Recreational.
3. When the GPS accuracy is below 70 feet, make a note of the GPS accuracy, go back to the main menu and touch the Waypoint Averaging icon. A screen with sample confidence, averaged location coordinates, and averaging time (Figure P.7) will appear. Leave the GPS unit in one place until the average function is completed. It is possible to reach 3 minutes of averaging time before the sample confidence has reached 100 percent. For more accurate coordinates, save the waypoint once the sample confidence has reached 100 percent. Note the averaging time before saving the waypoint. Save the averaged coordinates by touching the Save icon; a waypoint will be saved and named automatically. To edit the name of the waypoint go to the main menu and touch Waypoint Manager, the saved waypoint, and Change Name. The “<“ icon to the right of the name erases the name. Type letters or numbers to name the waypoint. Touch the green check icon to save the new name..

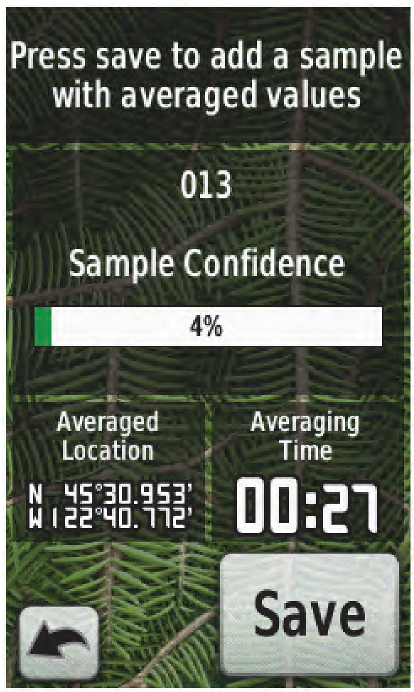


Figure P.7: Sample confidence

4. To view the averaged waypoint coordinates from the main menu, touch Waypoint Manager and the name of the waypoint. Touch the down arrow and then touch View Map. Touch the name of the waypoint in the icon at the top of the map screen. The elevation and waypoint coordinates will be displayed. The GPS accuracy will not be displayed. You will need to view the GPS accuracy either before or after the waypoint is averaged.

SUBSECTION P.3.5 CREATING A WAYPOINT (WHEN COORDINATES ARE PROVIDED)

Turn on the GPS and touch the Mark Waypoint icon. Touch the Save and Edit icon. Touch the Change Name icon. Touch the < icon to the right of the waypoint name to delete the name automatically given to the waypoint. Type in the name you want to give the waypoint using letters, numbers, and/or symbols. Numbers and symbols can be accessed by touching the right arrow at the bottom of the screen. When you are done, press the green check icon at the bottom of the screen to save the new name. Touch the Change Location icon. Edit the coordinates by touching the right/left arrows to highlight the values you would like to change. Touch the number buttons to enter new values. When you are done entering the coordinates, touch the green check icon at the bottom of the screen. Touch the down arrow until you see the View Map icon. Touch the View Map icon and the waypoint will be displayed on the map.

SUBSECTION P.3.6 MARKING (STORING) YOUR CURRENT LOCATION

This feature is used to mark (store) a current location as a waypoint in the GPS unit’s internal memory.

Once the GPS accuracy is less than 70 feet, touch the Mark Waypoint icon. Touch the Save and Edit icon. Touch the Change Name icon. Touch the “<“ icon to the right of the waypoint name to delete the name automatically given to the waypoint. Type a name for the waypoint using letters, numbers, and/or symbols. Numbers and symbols can be accessed by touching the right arrow at the bottom of the screen. To save the new name, press the green check icon at the bottom of the screen. Press the “X” icon at the bottom of the screen to access the main menu.

SUBSECTION P.3.7 NAVIGATING TO A WAYPOINT

To begin navigation, a waypoint must be stored in the GPS unit (Subsection P.3.5). On the initial screen, touch the Profile Change icon. Touch Recreational. If your GPS unit is in Automotive profile mode the GPS will give you directions along roads and will not show your “tracks”. Make sure the GPS is in Recreational profile to show the most direct route to your waypoint, topographic lines, and to show the route you took to the waypoint. After the unit has locked onto four satellites, touch the “Where To?” icon. Touch the Waypoints icon. Touch Waypoints. You can search for a waypoint in this screen by touching the ABC icon at the bottom of the screen and entering the name of the waypoint. Touch the name of the waypoint you want. Touch the green GO button at the bottom of the screen. A map will appear on screen with your current location. Distance to destination and bearing will show at the top of the screen.

SUBSECTION P.3.8 BATTERIES

The Garmin Oregon GPS unit uses two AA batteries, which usually last for eight hours of use. Replace the batteries when the low battery screen is displayed or the power indicator located at the bottom of the main menu screen is low. The GPS may have trouble locating satellites if the battery is low.

SECTION P.4 GPSMAP 76CSX

SUBSECTION P.4.1 SETUP

Press Menu button twice
Setup > Enter button
Units > Enter button
Position format: UTM UPS
Map Datum: NAD83
Distance/Speed: Statute
Elevation: Feet
Quit button
Time > Enter button
Choose the time format you wish to use
Time Zone: US- Pacific
Quit button

Note: The GPSMap does not come with a topo map. This must be installed separately. Refer to the GPS instructions on the Google website for more information on installing topo maps.

SUBSECTION P.4.2 AVERAGING A WAYPOINT

1. Turn on the gps.
2. Check to see if the unit is receiving satellite readings on the Satellite screen. When the unit has acquired 4 satellites and is getting readings there will be UTM coordinates on the upper right side of the satellite screen, and an error reading on the upper left part of the screen.
3. When the accuracy is below 70 feet hold down the Enter (Mark) button until the Mark Waypoint screen appears.
4. Use the rocker button to move the cursor left to Avg and push Enter.
5. Wait until Measurement Count is at least 180. This is the number you will enter in the data recorder for "number of readings"
6. Make a note of the Accuracy.
7. Push Enter to save the waypoint.
8. Change the name of the waypoint by using the Rocker button to scroll up to the top of the screen and push Enter. Use the Rocker button to scroll around the letter and numbers. Push the Enter button for each number or letter you wish to use. When the name is complete, scroll to the OK button and push the OK button.
9. The elevation and UTM coordinates are displayed on the bottom half of the screen.

SUBSECTION P.4.3 CREATING A WAYPOINT WHEN COORDINATES ARE PROVIDED

1. Turn on the gps.
2. Hold down the Enter (Mark) button until the Mark Waypoint screen appears.
3. Use the Rocker button to scroll up to the Location field and press the Enter button.
4. Use the Rocker button and the Enter button to enter UTM coordinates. When the coordinates are correct select OK and push the Enter button

SUBSECTION P.4.4 MARKING YOUR CURRENT LOCATION AS A WAYPOINT

1. Turn on the gps.
2. Check to see if the unit is receiving satellite readings on the Satellite screen. When the unit has acquired 4 satellites and is getting readings there will be UTM coordinates on the upper right side of the satellite screen, and an error reading on the upper left part of the screen.
3. When the accuracy is below 70 feet hold down the Enter (Mark) button until the Mark Waypoint screen appears.
4. Change the name of the waypoint if you wish using the Rocker button and Enter button.
5. Highllight OK at the bottom right of the screen and push the Enter button.

SUBSECTION P.4.5 NAVIGATING TO A WAYPOINT

1. Turn on the gps.
2. Press the Find button.
3. Highlight Waypoints and press the Enter button.
4. Use the Rocker button and the Enter button to type in the name of the waypoint you wish to navigate to.
5. Highlight OK and push the Enter button.
6. Make sure the waypoint you wish to navigate to is highlighted and push the Enter button.
7. Highlight Go To and push the Enter button.
8. Use the Page button to scroll through the different navigation pages.

SUBSECTION P.4.6 CUSTOMIZING NAVIGATION SCREENS

You can customize the navigations screens by displaying the page you would like to customize and push the Menu button.

1. Highlight Change Data Fields and push the Enter button.
2. Highlight the field you wish to change and push the Enter button. Scroll down to the field you wish to display and push the Enter button.
3. When the fields look the way you want them push the Quit button.

SECTION P.5 COLLECTING GPS INFORMATION

SUBSECTION P.5.1 GPS READINGS

GPS information is recorded in the PDR (see Section 4.4, GPS COORDINATES). For Magellan Meridian and Garmin Oregon 400t GPS receivers, record GPS UNIT TYPE code 2.

The PDR requires the number of averaged readings be entered. The Magellan unit does not have a number of readings counter, instead it utilizes a timer. The timer is displayed on the position screen. It displays in hours, minutes, and seconds. The GPS receiver collects one reading per second while averaging. To correctly enter the number of readings in the data recorder, the time in minutes and seconds must be converted to number of readings. Since the unit collects 60 readings per minute of averaging crews must remember to multiply the number of minutes by 60 and then add the number of seconds shown to that figure.

For example, if the Magellan receiver averages for 3 minutes and 12 seconds it will display 00:03:12. To convert this to number of readings multiply 3 minutes by 60, then add 12 (3 X 60 = 180 + 12 = 192); the number of readings would be 192.

APPENDIX Q LASER 200 INSTRUCTIONS

SECTION Q.1 OVERVIEW

Accurate heights are necessary in order to determine tree volume and for other uses. The laser can be used to get fast and accurate tree heights. It can also be used to measure distances and percent slope. This instrument is more fragile than the GPS units. Some precautions must be taken with the lasers to keep them working properly. These are:

Never look at the sun through the scope. Looking directly at the sun can permanently damage your eyes.

Never point the laser directly at the sun. Exposing the lens system to direct sunlight, even for a brief period, may permanently damage the laser transmitter.

Do not expose the laser to extreme temperatures. It is rated for a temperature range of -22 to +140 degrees fahrenheit. Don't leave the instrument in the vehicle during the heat of the day.

Do not use batteries with "voltage check" features built on the batteries. The battery case of the laser is too narrow for these batteries, and they could get stuck in the instrument.

Do not drop the laser. Immediately return it to its case when you get back to the vehicle. There is usually more danger of damaging the instrument in the vehicle than out in the woods.

SECTION Q.2 BASIC OPERATION

All directions for using the laser buttons are given assuming you are holding the instrument with the LCD display screen facing you and the 2 round lenses are facing the object you want to measure. The buttons will be referred to as:

L1 - the left button closest to you
L2 - the left button in the middle
L3 - the left button furthest away from you
R1 - the right button closest to you
R2 - the right button in the middle
R3 - the right button furthest away from you

- Turn the laser on by pushing L1 or R1
- Turn it off by pushing L2 and L3 at the same time. The laser may turn itself off after a period of inactivity. Once the instrument is on, push the R1 button to make the red dot appear in the sighting scope. If there is no red sighting dot, repeatedly push the L2 button until the red dot appears and is the correct brightness.
- To light up the display screen, press L3. Press L3 again to turn off the light.

SECTION Q.3 SETTINGS

Make sure the settings are correct before using the laser. To set the correct measurement units, go into the main menu and:

Step 1. Press R2 or R3 to scroll through the menu until SYS is displayed in the upper right hand corner of the screen.

Step 2. Press R1. ON or OFF will show in the center of the screen. FILTER will flash at the bottom.

Step 3. Press R2 until OFFSET is flashing. The number displayed should be 0000.00. This means that the starting measuring point is the center of the instrument.

Step 4. Press R2 until PIVOT is flashing. The number displayed should be 0000.59. When this number is set at 0.00, the laser is set to calculate heights using a tripod attached to the center of the instrument. The pivot point is the center of the laser. We use the pivot value at 0.59 because this sets the pivot point at the rear of the instrument, and this allows you to shoot a height while using your head as the pivot point. To change this number, press L1 until the number you want to change is flashing. Press L2 or L3 until the correct number is showing. When the number is set at 0000.59, press R1.

Step 5. Press R2 until UNITS is flashing. Select F (feet) using the R1 button.

Step 6. Press R2 again and D (degrees) should be flashing. If not, press R1 to toggle on D.

Step 7. Press R2 again and “%” should be flashing. It should say ON. If not, press R1.

Step 8. Press R3 twice to accept the new settings and back out to the main display.

SECTION Q.4 FILTER AND REFLECTORS

When you are working in areas of dense brush, you need to make sure the laser is giving you the distance to the correct target. The best way to do this is to use a reflector as a target and use the filter option on the laser. The laser will only lock onto the highly reflective targets and ignore the less reflective brush. To use the filter option:

Step 1. Place a reflector (or have someone hold it) on the tree where it can be seen from the required distance. The laser will not work in the filter mode without a reflector as a target.

Step 2. Go to the main menu on the laser and push R2 or R3 until SYS is displayed on the screen.

Step 3. Press R1 to select the SYS option. The FILTER option will blink, and it will say the FILTER is OFF or ON.

Step 4. Push R1 to toggle FILTER between ON and OFF.

Step 5. Press R3 to save the desired setting and to back out into the main display. When the FILTER is on, FILTER will appear at the bottom of the screen when the laser is measuring distances.

SECTION Q.5 DISTANCE AND PERCENT SLOPE

Horizontal distance (HD): Turn the laser on. The top-middle of the LCD screen will say HD. Point the red sighting dot at the target. Press R1 and hold it down until the laser locks on the target, then release. You can tell when the instrument locks onto its target by sound. It buzzes while it is searching for the target, then beeps when it locks on to a target or there is an error. If you get an error message, simply aim again and press R1.

Slope distance (SD) and Vertical distance (VD): Push R2 or R3 until the correct display is shown. Then aim and press R1 until the laser locks on target. Or, measure a horizontal distance, then push R2 until the correct display is shown.

Percent slope: Press R2 or R3 until INC is displayed. Then aim and press R1.

SECTION Q.6 TREE HEIGHTS

The best way to measure a tree height is to make sure you have a clear shot at the leader or a clear shot of the tree trunk. Make sure you are getting a distance to the tree trunk, and not some branches in front of it. If you can’t get a clear shot at the leader or the tree trunk, use a reflector (Section Q.4). Once you are in position with your target in sight, go to the main menu:

Step 1. Push R2 or R3 until HT is displayed in the upper left of the screen.

Step 2. Push R1 once, aim at the target, then push R1 until the laser locks on target. This will measure the horizontal distance.

Step 3. The down arrow will flash. Aim at the base of the tree and push R1 to get the percent slope.

Step 4. The up arrow will flash. Aim at the top of the tree and push R1 again to get another percent slope.

Step 5. Press R1 once more and the laser will display the height. Make sure this height is reasonable before recording it in the PDR.

SECTION Q.7 GATES

The gate option can extend the laser’s minimum range or restrict its maximum range. It is most often used to help you make sure you are hitting the right target when objects near you or just beyond your target might give you false readings. You don’t have to set both gates. You will probably only need to set the short gate because of brush or fog between you and your target. You can set a gate by shooting a target or by entering distances into the instrument. To set a short gate by laser, go to the main menu and:

Step 1. Press R2 or R3 until GATE is shown on the display.

Step 2. Push R1 to select the gate option.

Step 3. Press R1 to toggle the gate between ON and OFF.

Step 4. Push R2. The S indicator will flash.

Step 5. Aim at a target that is at the distance you want to set as the short gate and press R1.

Step 6. Now you can either set a long gate, or press R3 to go back to save the short gate and return to the main menu. The S will be displayed when you are measuring distances to show the short gate is on.

To set a long gate:

Step 7. Push R2. The L indicator will flash.

Step 8. Aim at an appropriate target and press R1.

Step 9. Press R3 to save the gate and go back to the main display. The L will be displayed when measuring distances.

The gates are reset to OFF when the laser is turned off, but gate values are saved in memory. This means that if you have saved a gate and turn off the instrument, when you turn it back on the gate will be set to OFF. If you go back into the gate option and turn the gate ON, it will remember the last distances you shot for the long and short gates.

To clear out a gate value: Display the gate values by following the instructions in this section. When the desired gate value is displayed, press and hold down R3 until the number is deleted.

SECTION Q.8 CUMULATIVE DISTANCES

A cumulative distance measurement allows you to move from one target point to the next, stopping at each one to measure the distance to the next target point. The laser accumulates the measured distances in both slope and horizontal distances (SD and HD) to give you a running total.

To take a cumulative distance, go to the main menu and:

Step 1. Press R2 or R3 until MULTI is displayed on the screen.

Step 2. Press R1 to enter the MULTI option. DIFF will be displayed.

Step 3. Press R2 once. CUM will be displayed.

Step 4. Press R1. Either SEL or a number will be displayed. If SEL is displayed, HD will flash on and off. Press R1 to toggle between HD and SD. Press R2 when the correct indicator is flashing. If a number is displayed, that means there is already a cumulative distance saved on this instrument. You can either clear out this distance by holding down R3 until 0.00 appears, or continue to add to the distance by going to step 5.

Step 5. Aim at the target and press R1 to fire the laser.

Step 6. If you are not satisfied with the measurement, repeat step 5 to retake the measurement. If you are satisfied with the measurement, and wish to add it to your total, press R2. The new total will be displayed.

Step 7. Repeat steps 5 and 6 to add more measurements to the total.

You can choose whether you want horizontal or slope distances at any time. If a distance has been measured, you can change from slope or horizontal distance by pressing R3 twice. SEL will be displayed. Push R1 to toggle between SD and HD. Press R2 twice to get back to the total distance. Go to step 5 to add more distances.

The cumulative measurement total is saved in memory even if the instrument is turned off. Turn the instrument on and scroll back to the MULTI-CUM option and resume the procedure with step 5. To clear out the current total and begin another series of measurements, hold down R3 while the cumulative distance is showing until the number is deleted.

APPENDIX R PLOT JACKET

In this section, items that field crews are responsible for filling out are in bold and underlined.

The plot jacket is used to store hard copies of all pertinent past and present information pertaining to an FIA plot. The outside cover contains labels with plot information, and inside contents include: plot card, edit sheet, past and present plot data printouts, landowner contact sheet and aerial photos. Most plot jackets also contain a USGS map printout and a digital ortho quad (DOQ) showing the approximate plot center location. Occasionally, county tax assessor information and tax parcel maps are included to aid crews in contacting the correct landowners for permission to access or cross multiple properties. The following provides a description of each part of a plot jacket and what is required of the field crew for plot completion.

SECTION R.1 PLOT LABELS

There are typically three labels on the outside front cover of the plot jacket.

Two of the labels are pre-printed and little action is required of the field staff. One label contains plot identification information such as: the P2 panel number, STATE, FIA Hex ID (i.e., PLOT NUMBER), county number and name, USFS plot number (i.e., NFS PLOT NUMBER) or PERIODIC PLOT NUMBER when applicable, and the duty station name. A second label indicating the RESERVED STATUS may be included (Figure R.1). **If the plot is located on Forest Service administered lands, field crews should verify the USFS plot # on the plot jacket matches the USFS plot # downloaded in the PDR. If they do not match contact the QA Inspector.**

P2 Panel 2 California
FIA Hex ID # 3145
Ventura (111) County USFS Plot # 7180
Santa Clarita Duty Station

Reserved
Santa Clarita Duty Station
California (6) Hex 3145
Los Padres National Forest
Sespe Wilderness

Figure R.1: Plot identification labels

Another label contains ownership information (see Figure R.2). It includes the name and address of the legal owner of the land where the plot center is located based on county tax assessor records. There is also a place for notes, a legal description of the plot location with approximate elevation, and four "yes" or "no" questions. **Field crews are required to update information on this label when there is a change to the owner of the plot center location or if the contact person is someone different. If there is a special data request, indicate where the data request should be sent here as well.On every plot, field crews must circle 'Y' or 'N' for each of the four questions: Access granted; need key/combo; overnighter; and water available. For access denied plots it is only necessary to circle 'N' for access granted.**

California Hex 3145 Ownership 2010
Owner: Los Padres National Forest
Sespe Wilderness

Twn 6N Rng 25 E Sec 20 Ventura County
Duty Station: Santa Clarita UTM Zone 10 Elevation: 2136
Access Granted Y/N Need Key/Combo Y/N Overnighter Y/N Water Available Y/N
Notes: Cliffs, Steep Rocky Slope

Figure R.2: Landowner information label

The last label is for crew information and must be filled out by field crews for every plot, as well as QA inspectors for any plot he or she checks. Field crews completing a plot must fill out the top part which contains the following information: completed by; edit sheet completed by; FDM edit by; final electronic corrections; and FTPed by. The label also includes dates for each of these items (Figure R.3).

ANNUAL INVENTORY 2012

Completed By:______________________ Date:________________

Edit Sheet Completed By:______________Date:________________

Final Electronic Corrections:____________Date:________________
FTPed By:___________________________Date:________________

Plot Checked By:__________Date:______Type:________________

QA Jacket Check:____________________Date:________________

Figure R.3: Crew information label

Write in the name of each person who collected measurements on the plot in the 'completed by' section with the date the plot was completed. This date should be consistent with the date on the plot card and in the electronic plot data.

- **Note**: If more than one day was necessary to complete the plot, write the date the plot was completed. Write in the name(s) of whoever did the edit sheet, electronic corrections and FTP, with the date(s) they completed these items.

The bottom part of this label is for quality assurance inspectors to fill out and pertains mainly to a check plot. It contains the following information: Plot checked by, date, type, jacket check, and date. Write in the names of the inspectors, date the check plot was completed, and what type of inspection (cold or hot), name of whoever did the edit. Fill in the name of whoever completed the jacket check and date it was done.

- **Note:** All people should be identified by their first initial and full last name on this label.

SECTION R.2 PLOT CARD

The plot card is like a cover sheet containing many different pieces of information pertaining to an individual plot. A copy of the plot card can be found in Appendix S, Plot Forms.

SUBSECTION R.2.1 HEADER

This is the box at the top of the plot card on the front side and contains the following parts: PLOT NUMBER, STATE, COUNTY, date, crew leader (name and number); and crew member(s) (name and number). **<u>This part must be completed for every plot.</u>** Fill in the PLOT NUMBER, state abbreviation and number, county name and number, date on which the plot was completed, the crew leader's name, and names of all crew members who took measurements on the plot.

- **Note:** All people should be identified by their first initial and last name.

SUBSECTION R.2.2 RP DATA

This box is found directly under the header on the left side of the page and includes: species; diameter (to nearest inch); azimuth (from RP to PC); horizontal distance (to nearest foot); and, to subplot number. **<u>This item must be completed for all plots in which there is a reference point established</u>** and the data should match the plot printout and RP info on the back of the aerial photos.

SUBSECTION R.2.3 PLOT ACCESS DESCRIPTION

This box is directly under the header and to the right of the RP data. Directions should be written so they are easy to read and understand, and include information that will aid future crews in relocating the plot. **<u>Directions must be filled out for every plot field visited</u>** (i.e., plot center occupied **or** nonforest/access denied/hazardous plots viewed from a distance).

Directions should include the following:

1. Starting point: Select a permanent feature easily identifiable on the map, aerial photos (if they cover it) and on the ground. It should be referenced to a minimum of two county highways using names or numbers found on the ground (maps may have different road names and this must be noted as well). In some cases (wilderness access) the starting point may be a trailhead or the end of a local road. Make sure to include the trail name and number.
2. Reference the starting point to a town including direction and approximate mileage from the town (e.g., '10 miles north of Portland', '~half mile southwest of Salem').
3. Identify the mode of travel (e.g., driving, hiking).
4. Include the distance traveled between road or trail segments.
5. Give the direction of travel when turning onto a road or trail (e.g., 'turn west [left] onto Forest Lane and proceed...'). Use compass references first in case the plot must be approached from a direction other than the way described. Wording such as left, right or straight should be included in parentheses.
6. Note all gates or other pertinent information that may aid future crews in re-locating the plot (e.g., 'there is an old road on the west [left] with a locked gate [contact DNR for combination]').

7. Describe any prominent features present in the plot area that are unlikely to change in the next ten years. Include details such as streams, rock outcrops, benches, man-made features, unusual or large trees, slope, aspect or topographic position.
8. If finding a place to park is difficult, provide directions for where to park the truck. This information can prevent numerous turn-arounds on potentially hazardous roads.
9. Points of Departure (POD): If PODs are used, include them in the route descriptions to the RP. A POD is typically a tree or object and is used when foot travel becomes the primary means of accessing the RP or when the travel route is long or complex. Use the same methods of monumentation as those for the RP and include that information in this description.
10. Include the RP location in reference to the ending distance or POD (e.g., ‘the RP is a large Douglas-fir [over 120 feet tall] in a draw ~10 feet east [right] of FS Road 32’, or ‘from POD, RP is located 450 feet at 250 degrees).

SUBSECTION R.2.4 PLOT NARRATIVE DESCRIPTION

This is the box directly under RP data and plot access description and it provides a written description of the plot as well as relevant information to land owners, analysts, crew supervisors, crew leaders and QA inspectors. Analysts use it to provide an explanation for any major changes that have occurred since the previous inventory, especially those related to condition class attributes, as well as any anomalies in the data. They also use the historical information to better understand why the plot conditions are what they are today. Crew supervisors and crew leaders review previous narratives to determine the overall level of difficulty of a plot, anticipate access problems, and explain any oddities about previously collected data. QA inspectors review narratives as part of overall plot quality. <u>**This item must be filled out for every plot.**</u>

The plot narrative should observe the following guidelines:

- Writing must be clear and legible.
- Describe species, stand structure, damages, etc., with words rather than using the corresponding data item codes.
- Exclude unprofessional comments. Plot cards are public documents being scanned to electronic files available for viewing by anyone. They are also copied and mailed to the landowner upon request.
- Transfer relevant information written on the outside of the plot jacket.

Provide documentation for the following information in the order listed under each category.

Accessible Forest Land

1. <u>RESERVED STATUS – **If it is classified as reserved** write the name of the park, wilderness area, national monument, etc. (e.g., plot is located in Sequoia National Park).</u>
2. <u>Condition class – Write a description of each condition class present on plot.</u>
   - Include changes to CONDITION CLASS STATUS (forest, nonforest, noncensus water, Census water, nonsampled).
   - Write a description of any changes to CONDITION CLASS STATUS since the previous visit (e.g., ‘at the previous inventory plot was called nonforest rangeland but now trees are regenerating and condition has 10 percent canopy cover; therefore it is now forest land’, or ‘at the previous inventory plot was accessible forest land, but has since been cleared for development’).
   - If the CURRENT GROUND LAND CLASS has changed since the previous inventory describe the reason(s) for this change.
   - Stand description, including but not limited to, the following: age; stand size; physiographic information; tree species present; regeneration, including relative abundance and species; present and past treatments; present or past disturbances from insects, disease, weather, environment, human, etc.; and understory species of shrubs, forbs and graminoids using English or Latin names (codes change over time).
   - Pertinent information or plot anomalies – Describe any information pertinent to the plot including things that might not be represented in the data (e.g., ‘subplot 3 has a higher tree tally because of a dense thicket of Douglas-fir lining a seasonal stream’, or ‘root disease was coded at the previous inventory but there is currently no evidence of it’, or ‘tree number 101 was called a limber pine at the last inventory but it is a whitebark pine’, or ‘Pacific dogwood and yew are present in the condition but did not show up in tally or veg profile’).

3. On remeasurement plots, if the crew determines there is a physical change to the previously mapped boundaries, describe why/how they have changed.
4. Ownership changes – If the owner has changed since the previous visit, note why (e.g., land swap, a park bought the land, last occasion had the wrong owner, etc.).
5. Hazards – Describe any human or environmental hazard[s] found on the plot (e.g., ‘subplot two has a bees nest near the microplot center’).
6. Inability to install any portion of the plot – These are typically human or environmental related and require an explanation as to why it was not installed.
7. Any deviation from prescribed monumentation – If unable to use monumentation described in the manual, explain why and what the crew did to work around the issue (e.g., ‘no squares, rounds, or DBH nails in trees per landowner’s request’, or ‘microplot 2 center fell on a large, sloped rock slab with no way to stabilize metal pin, instead used orange crayon to make a 2-inch circle with center dot showing where pin should have been’).
8. Site tree information – Describe why site trees were not collected. “No suitable site trees available” is not an acceptable reason. Explain why none are available (e.g., ‘crew ran out of time’, ‘all western redcedar trees were rotten’, ‘stand age is too old/young’). Describe any hazards preventing the collection of site information. Also explain why site index is not within the specified ranges. (e.g., ‘stand is a 15-year old Douglas-fir plantation and due to variability in site index at this age’ or ‘crew could not get ten trees to satisfy the range limits for King’s method’).
9. Plant association – if there is no suitable plant association then explain why (e.g., ‘no plant association guide covers this region’, or ‘there is no mixed conifer plant association for the southern Sierra’).

Nonforest Land

Describe the NONFOREST LAND USE class. Include a list of the species present on the condition and any disturbances that may have occurred since a previous visit, especially important if the condition was accessible forest land and is now nonforest. Note whether this condition has the potential to become forested in the future. If the entire plot is nonforest state whether plot center is occupied or viewed from a distance. If plot center was occupied and no stake was put in the ground, explain why.

Field Visited With Marginal Canopy Cover

Explain how the plot or condition did or did not meet the canopy cover requirement to meet the definition of forest land. If the subplot method was used to assess canopy cover and/or stocking, describe the details (including methodology for locating phantom subplots) and the results. Include the LIVE CANOPY COVER, LIVE PLUS MISSING CANOPY COVER, STOCKING PERCENT, STOCKING MAXIMUM DBH/DRC, and TOTAL STEMS (if applicable).

Noncensus or Census Water

State that the plot/subplot center (or the entire plot) lands in either noncensus or census water and provide a description of the body of water (e.g., lake, river, etc.).

Nonsampled – Access Denied and Hazardous

Describe why the condition is nonsampled. If the condition is access denied, state this here and write the reason why, if given one by the landowner. If the condition is hazardous, explain why (e.g., ‘crew attempted to reach subplot 3, but due to unstable slopes and cliffs it is not possible to occupy subplot center’).

Special Studies

If the plot is being completed as part of a special study, identify the name of the study early in the narrative.

SUBSECTION R.2.5 PLOT DIAGRAM

This item is located in the box directly under the plot narrative on the left side. It contains a diagram of the plot layout. It is used as a tool to help relocate plots. Roughly sketch in condition class changes as they appear on the ground, landforms, hazards and any other pertinent information that could aid a future crew in relocating the plot. If phantom subplots were installed to determine canopy cover or stocking, record the location of the phantom subplots on the diagram. Use the back of the Plot Card if extra space is necessary. **This item must be filled out for every plot in which the crew occupies plot center.**

SUBSECTION R.2.6 PLOT ACCESS

This is the box located next to plot diagram and is meant to be a sketch map that correlates to the directions provided in the plot access description. Provide road/trail names or numbers, mileage between reference points, any gates or other obstructions blocking road access, the approximate location of the RP and PC, and any other pertinent information that may aid a future crew in relocating the plot. **This item must be filled out for every plot for which the crew collects directions.**

SUBSECTION R.2.7 FOOTER

This is the box located on the bottom of the front side of the plot card. It contains two items: 'Notes to field crew from office review' which should include comments from the reviewer (e.g., "possible forested conditions on subplots 3 and 4"); and 'Is the documented owner correct?', requiring a check next to 'yes' or 'no'. **This item must be filled out for every plot.**

SUBSECTION R.2.8 MAPPING

This is the dot map on the back side of the plot card. Draw in any boundaries mapped on the microplots, subplots and macroplots and label each condition class appropriately. Include a sketch of the boundary as it appears on the ground. **This item must be filled out for every plot. If the plot is all one condition class, label as 'All CC1' with a brief description of the condition.**

- **Note**: Fill in the state code and plot number on the back side of the plot card if it is not preprinted (e.g., 4101234: '41' is the state code and '01234' is the plot number). Plot cards are scanned and stored electronically; these identifiers ensure that information contained on the back of the plot card is tied to the correct plot.

SECTION R.3 IMAGES

Plot jackets typically contain one or more sets of aerial photos as well as a printed DOQ (digital ortho-quad). Write the plot number and county name of the plot on the back of every photo at the top. Figure R.4 shows the correct way to label aerial photos. Place this label near the edge of the photo so as not to obscure the pinprick location.

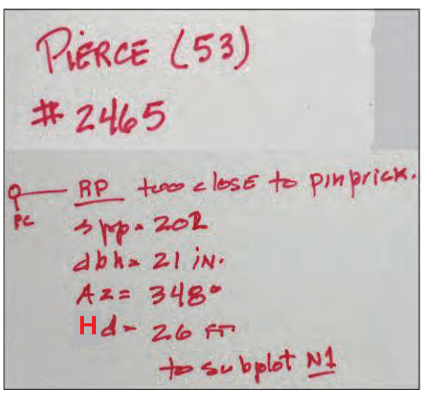


Figure R.4: Correct aerial photo labeling

The 'main' photo from the newest set of photos in the plot jacket should contain a circled and labeled pinprick of the plot center (PC) location. Some plots will have photos already containing a pinprick of the center location. Pinprick the newest set of photos. Correct any pinprick that is incorrect and cross out the old one. Record a note in the plot narrative section of the plot card and in the electronic PLOT NOTES explaining the situation if they do not match (Subsection R.2.4). In addition, crews shall check to make sure the printed plot location on the DOQ matches the on-the-ground plot location. If the printed plot location on the DOQ is incorrect, the PC location shall be pinpricked on the DOQ, and the printed dot crossed out using a ball point pen. The pinprick shall be circled and labeled on the back of the DOQ using a ball point pen.

The reference point used at the current inventory should also be pinpricked, circled and labeled on the main photo from the newest set as long as it does not obscure another pinprick. If the RP will obscure another pinprick write "[Year] RP too close to pinprick" on the back of the photo. Write the current RP information off to the side or corner of the photo back, including: current year, species code, DBH (to nearest inch), horizontal distance (to nearest foot), azimuth and the subplot it is referencing. Always reference the RP to the cedar stake unless one of the exceptions listed in Subsection 3.3.3, Exceptions to Monumenting Plot Center, applies.

Points of departure (POD) used at the current inventory should also be pinpricked, circled, and labeled. Write the current POD information off to the side or corner of the photo back in the same manner as for RP data including: species code or object name, DBH (to nearest inch), horizontal distance (to nearest foot), azimuth and what it is referencing (e.g., RP, POD2, etc.).

SECTION R.4 LANDOWNER CONTACT SHEET AND PRINTOUT

Crews should record information on the provided form as completely as necessary. All ownership and contact event information is required to be entered into the Landowner Contact Database (LCD). Use of the handwritten Landowner Contact Sheet is voluntary. Required fields in the LCD include the following: plot number, state, county, date, time of contact, full name of contact, address, status, detailed contact information and name of the crew member who contacted the landowner. Record any and all contact with the landowner before and after the plot is completed (e.g., ‘gate key returned’, or ‘land owner was notified when plot was completed’, or ‘landowner was called to confirm historical treatments/disturbances’). The remaining fields should be filled out when applicable. **An LCD printout showing all ownership information and contact events must be included in the plot jacket, for every plot except those on Forest Service administered lands.The Landowner Contact Sheet should be included in the plot jacket if it was used to take notes during landowner contacts.**

- **Note:** If the plot is on Forest Service administered lands and someone not affiliated with the Forest Service was contacted about access, an LCD printout is required.

SECTION R.5 PLOT EDIT SHEET

An edit is part of completing a plot. Print out the current version of the edit sheet. Review each applicable item on the edit sheet and circle ‘OK’ when the item is complete. Make updates to any data on the plot printout in ink and initial it when the electronic corrections are made. Complete the following items on the header of the edit sheet: plot number, county, ‘printout edited by’ with the date of the edit, ‘electronic files corrected by’ with the date corrections were made to the electronic files. If no corrections are needed, write ‘N/A’ in the ‘electronic files corrected by’ part and write ‘no corrections needed’ on the plot printout including the editors initials and date of edit.

Every plot must go through this edit process; the edit sheet must be completed and included in the plot jacket.

SECTION R.6 TREE DBH VS. LENGTH GRAPH

The Tree DBH/Length graph is a tool used to aid the editing process and is one of the items referenced by the edit sheet. Open up the file to generate this graph and print out a hard copy whenever there are live tally trees on the plot. Review the graph to make sure there are no outliers or anomalies in the DBH/Length data resulting in improbable DBH/Length combinations. For example, a sapling size tree (1.5 inch DBH) coded as 300 feet tall. Confirm other outliers due to damage or unusual circumstances and have the appropriate damage agent or tree note coded.

Every plot with at least one live tally tree must have a Tree DBH/Length graph printed and included in the plot jacket.

SECTION R.7 BOUNDARY VIEWER

Boundary Viewer is a tool used to aid the editing process and is another item referenced by the edit sheet. When multiple condition classes, with a corresponding mapped boundary, exist on a plot, open up the file in Boundary Viewer. Review the mapping to verify all boundary references are correct and accurately represent the area of the condition classes on plot. Print out a hard copy of the boundary viewer screen for any plot with a mapped condition class boundary.

The Boundary Viewer application is also used as a tool for adjusting map lines when difficult mapping situations occur and cannot be input as they exist on the ground due to limitations in the PDR program.

Every plot with mapped condition class boundaries must have the Boundary Viewer screen printed and included in the plot jacket.

SECTION R.8 MIDAS CHECK EXPLANATIONS

After completing MIDAS Mobile edits, all critical warnings will require an explanation before loading the plot. Import the plot files into PNW FDM on the laptop and open the MIDAS Check Explanations option. Print out the initial page (even if it is blank) before writing any explanations. Carefully review all warnings and address anything that needs electronic data corrections. Notify the QA staff if you believe the warning is incorrect. Provide an explanation for any remaining warnings and print out the final page with these explanations. Include both pages in the plot jacket with the plot data printout even if there are no warnings or explanations on it.

Every plot must be imported into PNW FDM, have explanations for any critical warnings and have the MIDAS Check Explanations page(s) printed and included with the plot printout in the plot jacket.

SECTION S.1 PLOT LEVEL DATA

Item 4.2.1.1	STATE	
Item 4.2.1.2	COUNTY	
Item 4.2.1.3	PLOT NUMBER	
Item 4.2.1.4	CYCLE	
Item 4.2.1.5	SUBCYCLE	
Item 4.2.1.6	PERIODIC PLOT NUMBER	
Item 4.2.1.7	NFS PLOT NUMBER	
Item 4.2.1.8	FIELD GUIDE VERSION	
Item 4.2.1.9	PDR STARTING DATA RECORDER VERSION NUMBER	
Item 4.2.1.10	PDR ENDING DATA RECORDER VERSION NUMBER	
Item 4.2.1.11	DECLINATION	
Item 4.2.1.12	MACROPLOT BREAKPOINT DIAMETER	
Item 4.2.1.13	CHANGE MATRIX REQUIRED	
Item 4.2.1.14	P2 VEGETATION SAMPLING STATUS	
Item 4.2.1.15	LEVEL OF DETAIL	
Item 4.2.1.16	INVASIVE PLANT SAMPLING STATUS	
Item 4.2.1.17	INVASIVE PLANT SPECIMEN COLLECTION RULE	
Item 4.2.1.18	DWM SAMPLING STATUS	
Item 4.2.1.19	YEAR OF PREVIOUS INVENTORY	
Item 4.2.1.20	MONTH OF PREVIOUS INVENTORY	
Item 4.2.1.21	PREVIOUS GROUND LAND CLASS	
Item 4.2.1.22	ECOLOGICAL UNIT	
Item 4.2.1.23	PHASE	
Subsection 4.2.2 Special Studies		
Item 4.2.2.1	FIRE PLOT	
Item 4.2.2.2	SPECIAL STUDY 2002A: PLATFORM ABUNDANCE	
Section 4.3 Plot Level Data Collected in the Field		
Subsection 4.3.1 Crew Visit Information		
Item 4.3.1.1	SAMPLE METHOD CODE	
Item 4.3.1.2	QA STATUS	
Item 4.3.1.3	CREW TYPE	
Item 4.3.1.4	CREW NUMBER	
	CREW NUMBER	
	CREW NUMBER	
	CREW NUMBER	
	CREW NUMBER	
Subsection 4.3.2 Current Date of Inventory		
Item 4.3.2.1	YEAR	
Item 4.3.2.2	MONTH	
Item 4.3.2.3	DAY	
Subsection 4.3.3 Time Spent on Plot		
Item 4.3.3.1	TRAVEL TIME TO PLOT	
Item 4.3.3.2	MEASUREMENT TIME ON PLOT	
Item 4.3.3.3	TRAVEL TIME FROM PLOT	
Subsection 4.3.4 Plot Level Fundamentals		
Item 4.3.4.1	PLOT STATUS	
Item 4.3.4.2	PLOT NONSAMPLED REASON	
Item 4.3.4.3	NONFOREST SAMPLING STATUS	
Item 4.3.4.4	NONFOREST PLOT STATUS	
Item 4.3.4.5	NONFOREST PLOT NONSAMPLED REASON	
Item 4.3.4.6	SUBPLOTS EXAMINED	
Item 4.3.4.7	SAMPLE KIND	

Item 4.3.4.8	PREVIOUS PLOT MAPPING OR CONDITION ERROR	
Item 4.3.4.9	PNW PLOT KIND	
Item 4.3.4.10	PREVIOUS PLOT NUMBER	
Subsection 4.3.5 Additional Items		
Item 4.3.5.1	LANDOWNER PLOT SUMMARY REQUEST	
Item 4.3.5.2	TOPOGRAPHIC POSITION	
Item 4.3.5.3	HORIZONTAL DISTANCE TO IMPROVED ROAD	
Item 4.3.5.4	WATER ON PLOT	
Item 4.3.5.5	PLOT NOTES	
Subsection 4.3.6 Reference Point Attributes		
Item 4.3.6.1	RP TYPE	
Item 4.3.6.2	RP SPECIES	
Item 4.3.6.3	RP DIAMETER	
Item 4.3.6.4	RP AZIMUTH	
Item 4.3.6.5	RP HORIZONTAL DISTANCE	
Item 4.3.6.6	RP AZIMUTH/DISTANCE TO SUBPLOT NUMBER	
Item 4.3.6.7	RP NOTES	
Section 4.4 GPS Coordinates		
Subsection 4.4.1 GPS Unit Settings, Datum, and Coordinate System		
Item 4.4.1.1	GPS UNIT TYPE	
Item 4.4.1.2	GPS SERIAL NUMBER	
Item 4.4.1.3	GPS ENTRY METHOD	
Item 4.4.1.4	GPS DATUM	
Item 4.4.1.5	COORDINATE SYSTEM	
Item 4.4.1.6	GPS LOCATION TYPE	
Subsection 4.4.2 Collecting Readings		
Item 4.4.2.1	UTM ZONE	
Item 4.4.2.2	EASTING	
Item 4.4.2.3	NORTHING	
Item 4.4.2.4	GPS ELEVATION	
Item 4.4.2.5	GPS ERROR	
Item 4.4.2.6	NUMBER OF READINGS	
Item 4.4.2.7	GPS NOTES	
Subsection 4.4.3 Correction for Offset Location		
Item 4.4.3.1	AZIMUTH TO PLOT CENTER	
Item 4.4.3.2	DISTANCE TO PLOT CENTER	

SECTION S.2 CONDITION CLASS

Subsection 5.7.0 General Condition Class Attributes						
Item 5.7.0.1	CONDITION CLASS NUMBER					
Item 5.7.0.2	PREV CONDITION CLASS NUMBER					
Item 5.7.0.3	SUBPLOT CONDITION PROPORTION					
Item 5.7.0.4	CONDITION CLASS STATUS					
Item 5.7.0.5	PREV CONDITION CLASS STATUS					
Item 5.7.0.6	CONDITION CLASS STATUS RECONCILE CODE					
Item 5.7.0.7	CC STATUS PROCEDURAL CHANGE REASON CODE					
Item 5.7.0.8	NONFOREST CONDITION CLASS STATUS					
Item 5.7.0.9	NONFOREST CONDITION NONSAMPLED REASON					
Item 5.7.0.10	NONFOREST CC SAMPLING STATUS					
Subsection 5.7.1 Accessible Forest Land Delineating Data Items						
Item 5.7.1.1	RESERVED STATUS					
Item 5.7.1.2	PREV RESERVED STATUS					
Item 5.7.1.3	RESERVED STATUS RECONCILE CODE					
Item 5.7.1.4	RESERVED STATUS PROCEDURAL CHANGE RSN CODE					
Item 5.7.1.5	OWNER GROUP					
Item 5.7.1.6	PREV OWNER GROUP					
Item 5.7.1.7	OWNER GROUP RECONCILE CODE					
Item 5.7.1.8	OWNER GROUP PROCEDURAL CHANGE REASON CODE					
Item 5.7.1.9	FOREST TYPE					
Item 5.7.1.10	PREV FOREST TYPE					
Item 5.7.1.11	STAND SIZE CLASS					
Item 5.7.1.12	PREV STAND SIZE CLASS					
Item 5.7.1.13	REGENERATION STATUS					
Item 5.7.1.14	PREV REGENERATION STATUS					
Item 5.7.1.15	TREE DENSITY					
Item 5.7.1.16	PREV TREE DENSITY					
Subsection 5.7.2 Ancillary						
Item 5.7.2.1	OWNER CLASS					
Item 5.7.2.2	PREV OWNER CLASS					
Item 5.7.2.3	RESERVED AREA NAME					
Item 5.7.2.4	ADMINISTRATIVE FOREST CODE					
Item 5.7.2.5	PREV ADMINISTRATIVE FOREST CODE					
Item 5.7.2.6	ARTIFICIAL REGENERATION SPECIES					
Item 5.7.2.7	PREV ARTIFICIAL REGENERATION SPECIES					
Item 5.7.2.8	AGE BASIS CODE					
Item 5.7.2.9	STAND AGE					
Item 5.7.2.10	PREV STAND AGE					
Item 5.7.2.11	PHYSIOGRAPHIC CLASS					
Item 5.7.2.12	PREV PHYSIOGRAPHIC CLASS					
Item 5.7.2.13	CURRENT GROUND LAND CLASS					
Item 5.7.2.14	PREV GROUND LAND CLASS					
Item 5.7.2.15	SOIL DEPTH					
Item 5.7.2.16	PREV SOIL DEPTH					
Item 5.7.2.17	STAND STRUCTURE					
Item 5.7.2.18	PREV STAND STRUCTURE					
Item 5.7.2.19	DISTURBANCE 1					

Item 5.7.2.20	PREV DISTURBANCE 1					
Item 5.7.2.21	DISTURBANCE YEAR 1					
Item 5.7.2.22	PREV DISTURBANCE YEAR 1					
Item 5.7.2.23	DISTURBANCE 2					
Item 5.7.2.24	PREV DISTURBANCE 2					
Item 5.7.2.25	DISTURBANCE YEAR 2					
Item 5.7.2.26	PREV DISTURBANCE YEAR 2					
Item 5.7.2.27	DISTURBANCE 3					
Item 5.7.2.28	PREV DISTURBANCE 3					
Item 5.7.2.29	DISTURBANCE YEAR 3					
Item 5.7.2.30	PREV DISTURBANCE YEAR 3					
Item 5.7.2.31	HISTORICAL DISTURBANCE 1					
Item 5.7.2.32	PREV HISTORICAL DISTURBANCE 1					
Item 5.7.2.33	HISTORICAL DISTURBANCE YEAR 1					
Item 5.7.2.34	PREV HISTORICAL DISTURBANCE YEAR 1					
Item 5.7.2.35	HISTORICAL DISTURBANCE 2					
Item 5.7.2.36	PREV HISTORICAL DISTURBANCE 2					
Item 5.7.2.37	HISTORICAL DISTURBANCE YEAR 2					
Item 5.7.2.38	PREV HISTORICAL DISTURBANCE YEAR 2					
Item 5.7.2.39	HISTORICAL DISTURBANCE 3					
Item 5.7.2.40	PREV HISTORICAL DISTURBANCE 3					
Item 5.7.2.41	HISTORICAL DISTURBANCE YEAR 3					
Item 5.7.2.42	PREV HISTORICAL DISTURBANCE YEAR 3					
Item 5.7.2.43	TREATMENT 1					
Item 5.7.2.44	PREV TREATMENT 1					
Item 5.7.2.45	TREATMENT YEAR 1					
Item 5.7.2.46	PREV TREATMENT YEAR 1					
Item 5.7.2.47	TREATMENT 2					
Item 5.7.2.48	PREV TREATMENT 2					
Item 5.7.2.49	TREATMENT YEAR 2					
Item 5.7.2.50	PREV TREATMENT YEAR 2					
Item 5.7.2.51	TREATMENT 3					
Item 5.7.2.52	PREV TREATMENT 3					
Item 5.7.2.53	TREATMENT YEAR 3					
Item 5.7.2.54	PREV TREATMENT YEAR 3					
Item 5.7.2.55	HISTORICAL TREATMENT 1					
Item 5.7.2.56	PREV HISTORICAL TREATMENT 1					
Item 5.7.2.57	HISTORICAL TREATMENT YEAR 1					
Item 5.7.2.58	PREV HISTORICAL TREATMENT YEAR 1					
Item 5.7.2.59	HISTORICAL TREATMENT 2					
Item 5.7.2.60	PREV HISTORICAL TREATMENT 2					
Item 5.7.2.61	HISTORICAL TREATMENT YEAR 2					
Item 5.7.2.62	PREV HISTORICAL TREATMENT YEAR 2					
Item 5.7.2.63	HISTORICAL TREATMENT 3					
Item 5.7.2.64	PREV HISTORICAL TREATMENT 3					
Item 5.7.2.65	HISTORICAL TREATMENT YEAR 3					
Item 5.7.2.66	PREV HISTORICAL TREATMENT YEAR 3					
Item 5.7.2.67	CHAINING CODE					
Item 5.7.2.68	LAND COVER CLASS					
Item 5.7.2.69	PLANT ASSOCIATION					

Item 5.7.2.70	PLANT ASSOCIATION NONSAMPLED REASON					
Item 5.7.2.71	PLANT ASSOCIATION PUBLICATION					
Subsection 5.7.3 Determining Condition Classes on Nonforest Land						
Item 5.7.3.1	PRESENT NONFOREST LAND USE					
Item 57.3.2	PREV NONFOREST LAND USE					
Section 5.8 Determination of Crown Cover Values for Land Use Classification						
Subsection 5.8.1 Introduction						
Item 58.1.1	CANOPY COVER SAMPLE METHOD					
Item 5.8.1.2	LIVE CANOPY COVER					
Item 5.8.1.3	LIVE PLUS MISSING CANOPY COVER					
Item 5.8.1.4	CURRENT AFFORESTATION CODE					
Item 5.8.1.5	PREVIOUS AFFORESTATION CODE					
Item 5.8.1.6	TOTAL STEMS					
Item 5.8.1.7	STOCKING PERCENT					
Item 5.8.1.8	STOCKING MAXIMUM DBH/DRC					
Item 5.8.1.9	COVER PLOT NOTES					
Subsection 5.9 Nonsampled Condition Class Attributes						
Item 5.9.0.1	CONDITION NONSAMPLED REASON					
Item 5.9.0.2	PREV CONDITION NONSAMPLED REASON					
Item 5.9.0.3	EST NONSAMPLED LAND CVR TYPE					
Item 5.9.0.4	NONSAMPLED FOREST TYPE					
Section 5.10 Stockability in Oregon and California						
Subsection 5.10.1 Stockability Data Items						
Item 5.10.1.1	STOCKABILITY INDICATOR SPECIES					
Item 5.10.1.2	SPECIES CONDITION CLASS					
Item 5.10.1.3	OREGON STOCKABILITY DISCOUNT FACTOR					
Item 5.10.1.1	PREVIOUS CONDITION CLASS NOTES					
Item 5.10.1.2	CONDITION CLASS NOTES					
Item 5.10.1.3	CHANGE MATRIX NOTES					

SECTION S.3 DETERMINATION OF CROWN COVER VALUES

Subsection 5. 7.2 Cover Tree Data Items																							
Item 5.8.2.1	CVR SUBPLOT																						
Item 5.8.2.2	CONDITION CLASS NUMBER																						
Item 5.8.2.3	CVR TREE STATUS																						
Item 5.7.2.4	OVER TOPPED STATUS																						
Item 5.8.2.5	CVR TREE SPECIES																						
Item 5.8.2.6	CVR TREE DIAMETER																						
Subsection 5.8.3 Crown Measurements																							
Item 5.8.3.1	CVR TREE COMINGLED CROWN CODE																						
Item 5.8.3.2	CVR TREE LONG CROWN WIDTH																						
Item 5.8.3.3	CVR TREE SHORT CROWN WIDTH																						
Item 5.8.3.4	CVR TREE LONG CROWN WIDTH, NON-OVERTOPPED																						
Item 5.8.3.5	CVR TREE SHORT CROWN WIDTH, NON-OVERTOPPED																						
Item 5.8.3.6	CVR TREE STOCKING CONTRIBUTION																						
Item 5.8.3.7	CVR TREE CVR CONTRIBUTION																						
Item 5.8.3.8	CVR TREE NOTES																						

SECTION S.4 SUBPLOT INFORMATION

Item 6.1.1.1	SUBPLOT NUMBER	1	2	3	4
Item 6.1.1.2	PREVIOUS SUBPLOT MAPPING ERROR				
Item 6.1.1.3	SUBPLOT/MACROPLOT STATUS				
Item 6.1.1.4	SUBPLOT/MACROPLOT NONSAMPLED REASON				
Item 6.1.1.5	NONFOREST SUBPLOT/MACROPLOT STATUS				
Item 6.1.1.6	NONFOREST SUBPLOT/MACROPLOT NONSAMPLED RSN				
Item 6.1.1.7	PREVIOUS SUBPLOT/MACROPLOT CENTER CONDITION				
Item 6.1.1.8	SUBPLOT/MACROPLOT CENTER CONDITION				
Item 6.1.1.9	SUBPLOT/MACROPLOT CONDITION LIST				
Item 6.1.1.10	MICROPLOT CENTER CONDITION				
Item 6.1.1.11	PREVIOUS MICROPLOT CENTER CONDITION				
Subsection 6.1.2 Physiographic Class Information					
Item 6.1.2.1	MACROPLOT PHYSIOGRAPHIC CLASS				
Item 6.1.2.2	SUBPLOT SLOPE				
Item 6.1.2.3	SUBPLOT ASPECT				
Item 6.1.2.4	SNOW/WATER DEPTH				
Item 6.1.2.5	SUBPLOT/MACROPLOT NOTES				
Section 6.2 Root Disease Rating					
Subsection 6.2.2 Root Disease Data Items					
Item 6.2.2.1	ROOT DISEASE SEVERITY RATING				

SECTION S.5 BOUNDARY REFERENCES

Boundary #1					
Item 7.2.2.1	SUBPLOT NUMBER	1	2	3	4
Item 7.2.2.2	PLOT TYPE				
Item 7.2.2.3	PREV PLOT TYPE				
Item 7.2.2.4	BOUNDARY CHANGE				
Item 7.2.2.5	CONTRASTING CONDITION				
Item 7.2.2.6	PREV CONTRASTING COND				
Item 7.2.2.7	LEFT AZIMUTH				
Item 7.2.2.8	PREV LEFT AZIMUTH				
Item 7.2.2.9	CORNER AZIMUTH				
Item 7.2.2.10	PREV CORNER AZIMUTH				
Item 7.2.2.11	CORNER DISTANCE				
Item 7.2.2.12	PREV CORNER DISTANCE				
Item 7.2.2.13	RIGHT AZIMUTH				
Item 7.2.2.14	PREV RIGHT AZIMUTH				
Item 7.2.2.15	BOUNDARY NOTES				

Boundary #2					
Item 7.2.2.2	PLOT TYPE				
Item 7.2.2.3	PREV PLOT TYPE				
Item 7.2.2.4	BOUNDARY CHANGE				
Item 7.2.2.5	CONTRASTING CONDITION				
Item 7.2.2.6	PREV CONTRASTING COND				
Item 7.2.2.7	LEFT AZIMUTH				
Item 7.2.2.8	PREV LEFT AZIMUTH				
Item 7.2.2.9	CORNER AZIMUTH				
Item 7.2.2.10	PREV CORNER AZIMUTH				
Item 7.2.2.11	CORNER DISTANCE				
Item 7.2.2.12	PREV CORNER DISTANCE				
Item 7.2.2.13	RIGHT AZIMUTH				
Item 7.2.2.14	PREV RIGHT AZIMUTH				
Item 7.2.2.15	BOUNDARY NOTES				

Boundary #3					
Item 7.2.2.2	PLOT TYPE				
Item 7.2.2.3	PREV PLOT TYPE				
Item 7.2.2.4	BOUNDARY CHANGE				
Item 7.2.2.5	CONTRASTING CONDITION				
Item 7.2.2.6	PREV CONTRASTING COND				
Item 7.2.2.7	LEFT AZIMUTH				
Item 7.2.2.8	PREV LEFT AZIMUTH				
Item 7.2.2.9	CORNER AZIMUTH				
Item 7.2.2.10	PREV CORNER AZIMUTH				
Item 7.2.2.11	CORNER DISTANCE				
Item 7.2.2.12	PREV CORNER DISTANCE				
Item 7.2.2.13	RIGHT AZIMUTH				
Item 7.2.2.14	PREV RIGHT AZIMUTH				
Item 7.2.2.15	BOUNDARY NOTES				

Boundary #4					
Item 7.2.2.2	PLOT TYPE				
Item 7.2.2.3	PREV PLOT TYPE				
Item 7.2.2.4	BOUNDARY CHANGE				
Item 7.2.2.5	CONTRASTING CONDITION				
Item 7.2.2.6	PREV CONTRASTING COND				
Item 7.2.2.7	LEFT AZIMUTH				
Item 7.2.2.8	PREV LEFT AZIMUTH				
Item 7.2.2.9	CORNER AZIMUTH				
Item 7.2.2.10	PREV CORNER AZIMUTH				
Item 7.2.2.11	CORNER DISTANCE				
Item 7.2.2.12	PREV CORNER DISTANCE				
Item 7.2.2.13	RIGHT AZIMUTH				
Item 7.2.2.14	PREV RIGHT AZIMUTH				
Item 7.2.2.15	BOUNDARY NOTES				

SECTION S.6 TREE AND SAPLING DATA

Item 8.4.1.1	SUBPLOT NUMBER													
Item 8.4.1.2	TREE RECORD NUMBER													
Item 8.4.1.3	TREE TAG NUMBER													
Item 8.4.1.4	PREVIOUS TREE TAG NUMBER													
Item 8.4.1.5	CONDITION CLASS NUMBER													
Item 8.4.1.6	PREVIOUS CONDITION CLASS NUMBER													
Item 8.4.1.7	PREVIOUS TREE STATUS													
Item 8.4.1.8	PRESENT TREE STATUS													
Item 8.4.1.9	SUBPLOT TALLY TREE WITNESS													
Item 8.4.1.10	STANDING DEAD													
Item 8.4.1.11	RECONCILE													
Item 8.4.1.12	SPECIES													
Item 8.4.1.13	AZIMUTH													
Item 8.4.1.14	HORIZONTAL DISTANCE													
Item 8.4.1.15	SLOPE DIST TO WITNESS TREE OR OBJECT													
Subsection 8.5.3 Diameter at Breast Height														
Item 8.5.3.1	PREVIOUS DIAMETER AT BREAST HEIGHT													
Item 8.5.3.2	DIAMETER AT BREAST HEIGHT													
Item 8.5.3.3	SNAG ESTIMATED DIAMETER													
Subsection 8.5.4 Diameter at Root Collar														
Item 8.5.4.1	PREVIOUS DIAMETER AT ROOT COLLAR													
Item 8.5.4.2	DRC STEM DIAMETER													
Item 8.5.4.3	DRC STEM STATUS													
Item 8.5.4.4	PAST NUMBER OF STEMS													
Item 8.5.4.5	CURRENT NUMBER OF STEMS													
Subsection 8.5.5 Additional Diameter Data Items														
Item 8.5.5.1	DIAMETER CHECK													
Subsection 8.6.1 Tree Age														
Item 8.6.1.1	TREE AGE													
Item 8.6.1.2	TREE AGE METHOD													
Item 8.6.1.3	NUMBER OF RINGS													
Item 8.6.1.4	NUMBER OF RINGS IN INNER 2 INCHES													
Item 8.6.1.5	LENGTH OF MEASURED CORE													
Item 8.6.1.6	10-YEAR INCREMENT													
Item 8.6.1.7	5-YEAR INCREMENT													
Item 8.6.1.8	5-YEAR HEIGHT GROWTH													
Subsection 8.6.2 Tree Length														
Item 8.6.2.1	PREVIOUS ACTUAL LENGTH													
Item 8.6.2.2	ACTUAL LENGTH													
Item 8.6.2.3	PREVIOUS TOTAL LENGTH													
Item 8.6.2.4	TOTAL LENGTH													
Item 8.6.2.5	LENGTH METHOD													
Item 8.6.2.6	PREVIOUS LENGTH METHOD													
Subsection 8.6.3 Tree Live Crown Measurements														
Item 8.6.3.1	COMPACTED CROWN RATIO													
Item 8.6.3.2	CROWN CLASS													
Subsection 8.7 Tree Damage														
Item 8.7.0.1	DAMAGE AGENT 1													

Item 8.7.0.2	DAMAGE AGENT 2													
Item 8.7.0.3	DAMAGE AGENT 3													
Item 8.7.0.4	DWARF MISTLETOE CLASS													
Item 8.7.0.5	ROTTEN/MISSING CULL													
Item 8.7.0.6	ROUGH CULL													
Subsection 8.8.1 Live Tree Measured Data Items														
Item 8.8.1.1	CAVITY PRESENCE													
Item 8.8.1.2	REMNANT TREE													
Item 8.8.1.3	FORM CLASS													
Subsection 8.8.2 Standing Dead or Removed														
Item 8.8.2.1	CAUSE OF DEATH													
Item 8.8.2.2	MORTALITY YEAR													
Item 8.8.2.3	DECAY CLASS													
Item 8.8.2.4	SNAG REASON FOR DISAPPEARANCE													
Item 8.8.2.5	CULTURALLY KILLED													
Subsection 8.9.1 Special Study 2002a Platform Abundance														
Item 8.9.1.1	PLATFORM ABUNDANCE													

SECTION S.7 DRC STEM DIAMETER

[Record each live stem with an "L" (DRC STEM STATUS=0), and each dead stem with a "D" (DRC STEM STATUS=1).]																				
Subplot #																				
Tree #																				
Current # of Stems																				
Dia 1																				
Dia 2																				
Dia 3																				
Dia 4																				
Dia 5																				
Dia 6																				
Dia 7																				
Dia 8																				
Dia 9																				
Dia 10																				
Dia 11																				
Dia 12																				
Dia 13																				
Dia 14																				
Dia 15																				
Dia 16																				
Dia 17																				
Dia 18																				
Dia 19																				
Dia 20																				
DRC																				

$$\mathrm{DRC} = \sqrt{[\Sigma(\mathrm{Diameter}^2)]}$$

$$\mathrm{DRC} = \sqrt{[\mathrm{Diameter}^2 + \mathrm{Diameter}^2 + \mathrm{Diameter}^2]}$$

SECTION S.8 SEEDLING DATA

Species	CC #	Subplot 1 Seedling count	CC #	Subplot 2 Seedling Count	CC #	Subplot 3 Seedling Count	CC #	Subplot 4 Seedling Count
Seedling Notes:								

SECTION S.9 SITE TREE INFORMATION

Item 10.5.1.1	SITE TREE NUMBER										
Item 10.5.1.2	SUBPLOT NUMBER										
Item 10.5.1.3	SITE TREE STATUS										
Item 10.5.1.4	QUESTIONABLE SITE TREE FLAG										
Item 10.5.1.5	CONDITION CLASS LIST										
Item 10.5.1.6	TREE TAG NUMBER										
Item 10.5.1.7	AZIMUTH										
Item 10.5.1.8	HORIZONTAL DISTANCE										
Item 10.5.1.9	SPECIES										
Item 10.5.1.10	DIAMETER										
Item 10.5.1.11	SITE TREE LENGTH										
Item 10.5.1.12	TREE AGE AT DIAMETER										
Item 10.5.1.13	SITE TREE SELECTION METHOD										

SECTION S.10 DOWN WOODY MATERIAL

Plot Number:			Date:				
Subplot Number	Transect (Azimuth)	Segment Number	Condition Class #	Beginning Distance	Ending Distance	SEGMENT SAMPLE STATUS	SEGEMENT NONSAMPLED REASON
1	90	.	.	. . . .	. . . .		
	90	.	.	. . . .	. . . .		
	90	.	.	. . . .	. . . .		
	90	.	.	. . . .	. . . .		
1	270	.	.	. . . .	. . . .		
	270	.	.	. . . .	. . . .		
	270	.	.	. . . .	. . . .		
	270	.	.	. . . .	. . . .		
2	360	.	.	. . . .	. . . .		
	360	.	.	. . . .	. . . .		
	360	.	.	. . . .	. . . .		
	360	.	.	. . . .	. . . .		
2	180	.		. . . .	. . . .		
	180	.		. . . .	. . . .		
	180	.		. . . .	. . . .		
	180	.		. . . .	. . . .		
3	135	.	.	. . . .	. . . .		
	135	.	.	. . . .	. . . .		
	135	.	.	. . . .	. . . .		
	135	.	.	. . . .	. . . .		
3	315	.	.	. . . .	. . . .		
	315	.	.	. . . .	. . . .		
	315	.	.	. . . .	. . . .		
	315	.	.	. . . .	. . . .		
4	045	.	.	. . . .	. . . .		
	045	.	.	. . . .	. . . .		
	045	.	.	. . . .	. . . .		
	045	.	.	. . . .	. . . .		
4	225	.	.	. . . .	. . . .		
	225	.	.	. . . .	. . . .		
	225	.	.	. . . .	. . . .		
	225	.	.	. . . .	. . . .		

SECTION S.11 COARSE WOODY DEBRIS DATA FORM

Item 11.7.3.1	SUBPLOT NUMBER																			
Item 11.7.3.2	COARSE WOODY DEBRIS ID																			
Item 11.7.3.3	TRANSECT																			
Item 11.7.3.4	CWD CONDITION CLASS																			
Item 11.7.3.5	PIECE ON SUBPL/ANN PLOT																			
Item 11.7.3.6	CWD SLOPE DISTANCE																			
Item 11.7.3.7	CWD DECAY CLASS																			
Item 11.7.3.8	SPECIES																			
Item 11.7.4.1	DIAM AT POINT OF INT																			
Item 11.7.4.2	DIAM AT HOLLOW PT OF INT																			
Item 11.7.4.3	DIAM AT SMALL END																			
Item 11.7.4.4	DIAM AT LARGE END																			
Item 11.7.5.1	CWD LENGTH >=3 FEET																			
Item 11.7.5.2	CWD CWD TOTAL LENGTH																			
Item 11.7.5.3	IS THE PIECE HOLLOW																			
Item 11.7.5.4	PIECE INCLINATION																			
Item 11.7.5.5	CWD HISTORY																			
Item 11.7.5.6	% CHARRED BY FIRE																			
Item 11.7.5.7	NOTES																			

SECTION S.12 FINE WOODY DEBRIS

Item 11.9.0.1	SUBPLOT NUMBER	1	2	3	4
Item 11.9.0.2	TRANSECT	270	360	135	225
Item 11.9.0.3	COND CLASS NUMBER				
Item 11.9.0.4	TRANSECT SAMPLE STATUS				
Item 11.9.0.5	TRANSECT NONSAMP REASN				
Item 11.9.0.6	SMALL FWD COUNT				
Item 11.9.0.7	MEDIUM FWD COUNT				
Item 11.9.0.8	LARGE FWD COUNT				
Item 11.9.0.9	HIGH COUNT REASON				
Item 11.9.0.10	FINE WOODY DEBRIS NOTES				

SECTION S.13 DUFF AND LITTER DEPTH MEASUREMENTS

Item 11.10.2.1	SUBPLOT NUMBER	1	1	2	2	3	3	4	4
Item 11.10.2.2	TRANSECT	90	270	360	180	135	315	45	225
Item 11.10.2.3	COND CLASS NUMBER								
Item 11.10.2.4	DUFF/LITTER SAMP STATUS								
Item 11.10.2.5	DUFF/LITTER NONSAMP RSN								
Item 11.10.2.6	DUFF DEPTH								
Item 11.10.2.7	LITTER DEPTH								
Item 11.10.2.8	DUFF AND LITTER METHOD								
Item 11.10.2.9	DUFF AND LITTER NOTES								

SECTION S.14 RESIDUE PILES

Item 11.8.0.1	SUBPLOT NUMBER								
Item 11.8.0.2	PILE NUMBER								
Item 11.8.0.3	PILE TRANSECT								
Item 11.8.0.4	PILE COND CLASS NUMBER								
Item 11.8.0.5	PILE BEGINNING DISTANCE								
Item 11.8.0.6	PILE ENDING DISTANCE								
Item 11.8.0.7	PILE COMP HGT OF CWD IN PILE								
Item 11.8.0.8	PILE DECAY CLASS								
Item 11.8.0.9	PILE SPECIES								
Item 11.8.0.10	RESIDUE PILE NOTES								

SECTION S.15 VEGETATION SPECIES COMPOSITION

SUBPLOT NUMBER	1	2	3	4
P2 VEG SUBPLOT SAMPLE				
VEG NONSAMPLED RESN				

Subplot 1	Condition Class 1	SPECIES CODE														
		UNIQUE Sp NUMBER														
		Sp CODE TYPE														
		Sp CODE STATUS														
		Sp OFFIC. COLLECTED														
		Sp NOT COLLECTED RSN														
		Sp LABEL NUMBER														
		Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														
		VEGETATION Sp NOTES														
	CC2	Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														
	CC3	Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														
	CC4	Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														
	CC5	Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														
Subplot 2	CC1	Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														
	CC2	Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														
	CC3	Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														
	CC4	Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														
	CC5	Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														
Subplot 3	CC1	Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														
	CC2	Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														
	CC3	Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														
	CC4	Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														
	CC5	Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														
Subplot 4	CC1	Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														
	CC2	Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														
	CC3	Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														
	CC4	Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														
	CC5	Sp GROWTH HABIT														
		Sp VEGETATION LAYER														
		Sp CANOPY COVER														

SECTION S.16 VEGETATION STRUCTURE

SUBPLOT	1					2					3					4				
CONDITION CLASS NUMBER	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
TALLY TREE SP COVER LAYER 1																				
TALLY TREE SP COVER LAYER 2																				
TALLY TREE SP COVER LAYER 3																				
TALLY TREE SP COVER LAYER 4																				
TALLY TREE SP COVER-AERIAL VIEW																				
NON-TALLY TREE SP COVER LAYER 1																				
NON-TALLY TREE SP COVER LAYER 2																				
NON-TALLY TREE SP COVER LAYER 3																				
NON-TALLY TREE SP COVER LAYER 4																				
NON-TALLY TREE SP COVER-AERIAL VIEW																				
SHRUB AND WOODY VINE COVER LAYER 1																				
SHRUB AND WOODY VINE COVER LAYER 2																				
SHRUB AND WOODY VINE COVER LAYER 3																				
SHRUB AND WOODY VINE COVER LAYER 4																				
SHRUB AND WOODY VINE COVER-AERIAL VIEW																				
FORB COVER LAYER 1																				
FORB COVER LAYER 2																				
FORB COVER LAYER 3																				
FORB COVER LAYER 4																				
FORB COVER—AERIAL VIEW																				
GRAMINOID COVER LAYER 1																				
GRAMINOID COVER LAYER 2																				
GRAMINOID COVER LAYER 3																				
GRAMINOID COVER LAYER 4																				
GRAMINOID COVER-AERIAL VIEW																				
VEGETATION SUBPLOT NOTES																				

SECTION S.17 INDICATOR SPECIES ON R6 LANDS

Item 13.0.0.1	SUBPLOT NUMBER											
Item 13.0.0.2	SPECIES											
Item 13.0.0.3	SPECIES CANOPY COVER											

SECTION S.18 INVASIVE SPECIES

Item 14.2.1.1	SUBPLOT NUMBER	1	2	3	4																					
Item 14.2.1.2	INVASIVE PLANT SUBPLOT STATUS																									
Item 14.2.1.3	INVASIVE PLANT NONSAMPLED RSN																									
Item 14.2.1.4	INVASIVE PLANT DATA NOTES																									
Item 14.2.1.6	SPECIES CODE																									
Item 14.2.1.5	CONDITION CLASS NUMBER	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Item 14.2.1.7	UNIQUE SPECIES NUMBER																									
Item 14.2.1.8	SPECIES CANOPY COVER																									
Item 14.2.1.9	INVASIVE PLANT NOTES																									

SECTION S.19 GROUND COVER ON FOREST SERVICE LANDS

Plot Number:		**Date:**		**Page of**	
		Segment ID=1 (4.0-14.0 feet)		Segment ID=2 (14.0-24.0 feet)	
Subplot Number	Transect (Azimuth)	Ground Cover Type	Cover (%)	Ground Cover Type	Cover (%)
.	. . .	. . . .	. .	. . . .	. .
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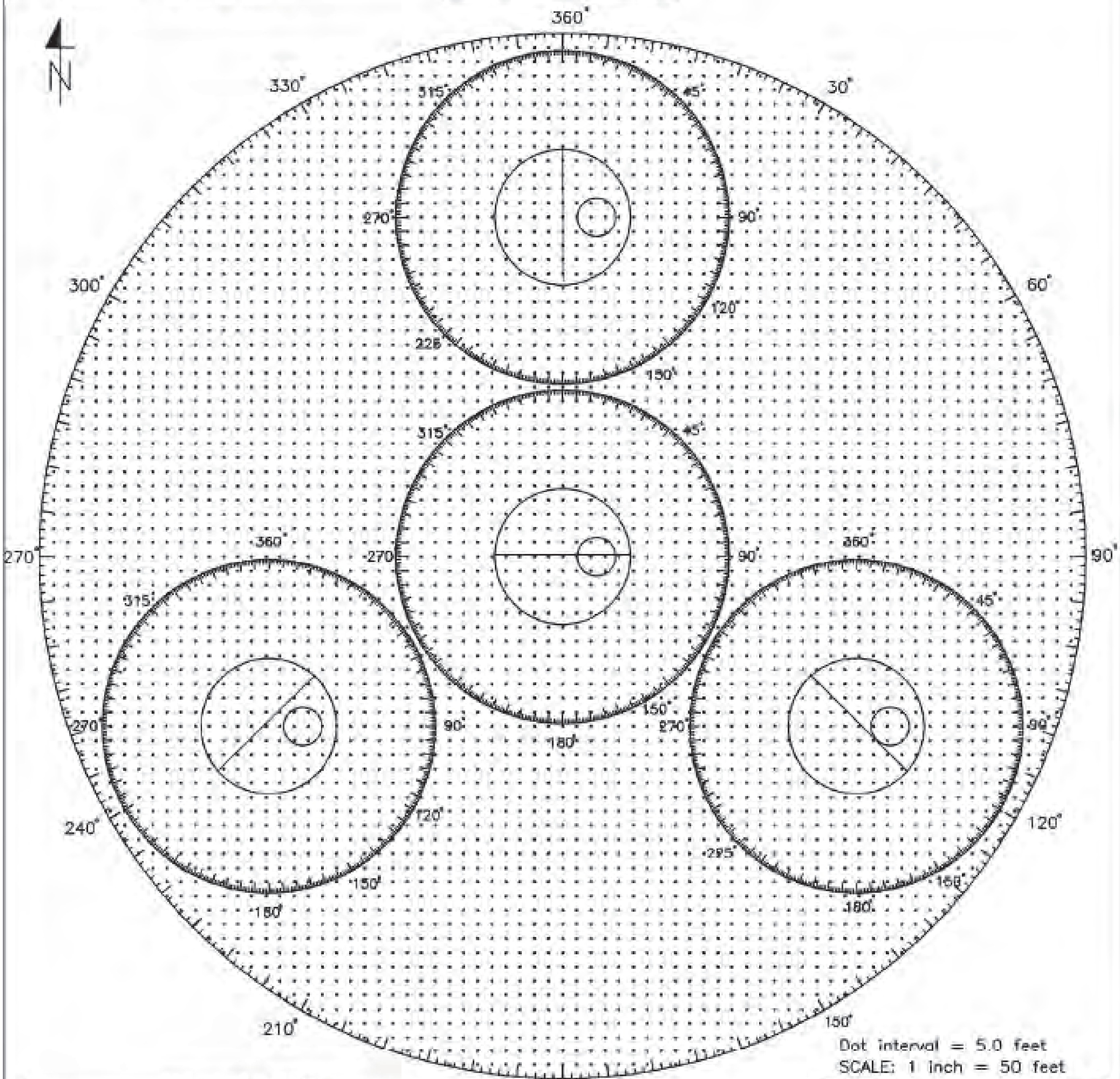
Ground Cover Notes:					

EXHIBIT C, PSU RFQ #22404

SECTION S.20 PLOT CARD

STATE______ PLOT NUMBER __________

MAPPING



Dot interval = 5.0 feet

SCALE: 1 inch = 50 feet

(Use 50 scale on ruler)

TO CALCULATE % AREA			
PLOT RADIUS (FT)	TOTAL DOTS	%/DOT	%AREA =
24.0	69	1.45	#DOTS ÷ 0.69
58.9	437	0.23	#DOTS ÷ 4.37
185.1	4281	0.02	#DOTS ÷ 2.81

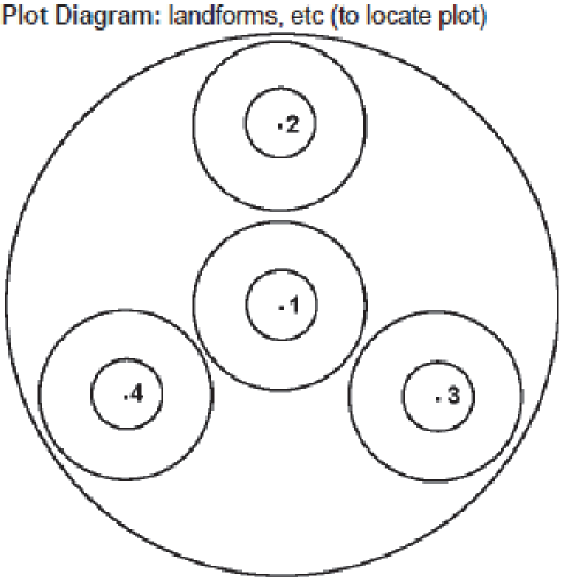
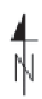
PLOT CARD

PLOT NUMBER __________ STATE __________ (   ) COUNTY ________________ (   ) DATE ____/____/____

CREW LEADER __________________________ CREW ____

RP Data:	Plot Access Description: travel route
Species #________	
DBH ______ in.	
Azimuth ________	
Horiz dist. _____ ft.	
To subplot #_____	

Plot Narrative Description: Condition(s), disturbance(s), treatment(s), hazard(s), & issues not evident in the data

Plot Diagram: landforms, etc (to locate plot)	Plot Access: location sketch map
	

Notes to field crew from office review ____

Is the Documented Owner Correct? ___ Yes ___ No **If not, update** Owner on Plot Jacket

APPENDIX T IMPORTANT PHONE NUMBERS

SECTION T.1 PNW - FIA

Name		Office	Extra Info	Mobile	FAX
AMT					
	PFSL Front Desk	503-808-2000			503-808-3100
	PFSL – Acting Travel - Johanna St Amie	503-808-2103			503-808-3100
	Willis, Yolanda – Purchasing	503-808-2021			503-808-3100
	Fuentes, Florisa – Support Services Supervisor	503-808-2032			503-808-3100
	Willis, Yolanda – Mail / Leave / FedEx / Time	503-808-2021			503-808-3100
	AMT – mobile (from Data Collection mobile phones)			503-708-8420	
	AMT – mobile (from Data Collection mobile phones), possible backup			503-708-8421	
Data Collection (DC)					
	Cromwell, Shirley – Data Collection	503-808-2049			503-808-3232
	Dunn, Summer – California State Coordinator	503-808-2071		503-708-8422	503-808-3232
	Kihia, Simon - Data Collection Team Leader	503-808-2087			503-808-3232
	Jesswien, Amy - Gear/Fleet Coordinator	503-808-3129		503-539-8831	503-808-3232
	Patterson, Melissa - Prefield Coordinator	503-808-2073			503-808-3232
	Nicholas, Gretchen - FIA Program Manager	503-808-2034			503-808-3232
	Rash, Scott – QA Coordinator	503-808-2081		503-539-8672	503-808-3232
	Terzibashian, Jane – Oregon State Coordinator	503-808-3127		503-539-8689	503-808-3232
	Holgerson, Justin - Acting Washington State Coordinator	503-808-3131		916-261-4080	503-808-3232
	Waddell, Karen – Forest Resource Analyst	503-808-2046			503-808-3232
Information Management (IM)					
	Chase, John – GIS	503-808-2089			
	Gallati, Peter - Software Developer/Programmer	503-808-2080			
	Wanek, Ron – Programmer	503-808-2048			
	Weyermann, Dale – GIS	503-808-2042			
	Veneklase, Chuck – Data Recorder Programmer	503-808-2045			
Human Resources (HR)					
	Albuquerque Service Center	877-372-7248	http://fsweb.asc.fs.fed.us		
Vehicle Contacts					
	GSA Maintenance Center (all GSA repairs/service)	888-622-6344			
Voice Mail					
	To check voice mail	800-327-4706	ext#, password#		
	To call someone in the office	Get into mailbox (above): 0*, ext#			
Daily Departure/Return Check In		800-830-4075 (primary)			
		206-230-4584 (secondary)			
Customer Help Desk – **Computer Assistance (24 Hour)**		866-945-1354	http://fsweb.chd.fs.fed.us		
Mobile Phone Unlock Code		4801			
PNW-FIA Office Address					
	Portland Forestry Sciences Lab 620 SW Main Street, Suite 400 Portland, OR 97205				
Region 5/Region 6 National Forest System (NFS) Contract Inspectors/Contracting Officers Representives (COR)					
	Kennedy, Kama – Region 5, RSL	916 640-1253			
	Needham, Dell – Olympic, Gifford Pinchot, Mt. Baker-Snoqualmie	425-783-6038			
	Robison, Dolly – Umatilla, Wallowa Whitman, Malheur	541-278-6471			
	Vacant – West Side Oregon				

SECTION T.2 REGIONAL INSECT AND DISEASE CONTACTS

Name		Office	Extra Info	FAX
Insects/Disease Contacts				
	Angwin, Paul – Entomologist (CA, Shasta-Trinity NF)	530-242-2336		
	Bohne, Michael – Entomologist (R5)	530-759-1745		
	Bulaon, Beverly – Entomologist (CA, Stanislaus NF)	209-532-3671	x242	
	Flowers, Rob – Entomologist (OR Dept of Forestry)	503-945-7396		
	Kanaskie, Alan – Pathologist (OR Dept of Forestry)	503-945-7397		
	Koonce, Andi – Pathologist (CA, San Bernardino NF)	909-382-2673		
	MacKenzie, Martin – Pathologist (CA, Stanislaus NF)	209-532-3671	x242	
	Omdal, Dan – Pathologist (WA DNR-Oympia)	360-902-1692		
	Ripley, Karen – Entomologist (WA DNR-Olympia)	360-902-1691		
	Smith, Sheri – Entomologist (CA, Lassen NF)	530-252-6667		
	Woodruff, Bill – Pathologist (CA, Lassen NF)	530-252-6680		
	Zambino, Paul – Pathologist (CA, San Bernardino NF)	909-382-2727		
R6 Forest Health Protection Staff		http://www.fs.fed.us/r6/nr/fid/staffweb/field.shtml		
	Blue Mountains Service Center (LaGrande, OR): Forestry Sciences Laboratory 1401 Gekeler Lane La Grande, OR 97850			FAX: 541-962-6504
	Schmitt, Craig – Plant Pathologist	541-962-6544	clschmitt@fs.fed.us	
	Scott, Donald W.– Entomologist	541-962-6545	dwscott@fs.fed.us	
	Spiegel, Lia – Entomologist	541-962-6574	lspiegel@fs.fed.us	
	Central Oregon Service Center (Bend, OR): Deschutes National Forest 1001 SW Emkay Drive Bend, OR 97702			FAX: 541-383-5531
	Eglitis, Andris – Entomologist	541-383-5701	aeglitis@fs.fed.us	
	Maffei, Helen – Plant Pathologist	541-383-5591	hmaffei@fs.fed.us	
	Simpson, Mike – Silviculturist/Analyst {available part-time to FHP}	541-383-5575	mlsimpson@fs.fed.us	
	Smith, Aaron L. – Plant Pathologist (SCEP)	541-383-5771	alsmith@fs.fed.us	
	Southwest Oregon Service Center (Central Point, OR): Herbert Stone Nursery 2606 Old Stage Road Central Point, OR 97529			FAX: 541-858-6110
	Betlejewski, Frank – Port-Orford-cedar Program Manager	541-858-6127	fbetlejewski@fs.fed.us	
	Goheen, Don – Pathologist/Entomologist	541-858-6125	dgoheen@fs.fed.us	
	Goheen, Ellen Michaels – Pathologist	541-858-6126	egoheen@fs.fed.us	
	Mallams, Katy – Pathologist	541-858-6124	kmallams@fs.fed.us	
	Schroeter, Bob – Aerial Observer	541-858-6123	rschroeter@fs.fed.us	
	Wenatchee Service Center (Wenatchee, WA): Forestry Sciences Laboratory 1133 N. Western Wenatchee, WA 98801			FAX: 509-826-3789
	Carlson, Darci M. – Entomologist (SCEP)	509-664-1745	dmcarlson@fs.fed.us	
	Hadfield, James S. – Plant Pathologist	509-664-9215	jshadfield@fs.fed.us	
	Magelssen, Roy W. – Biological Science Technician	509-664-9214	rmagelssen@fs.fed.us	
	Mehmel, Connie J. – Entomologist	509-664-9213	cmehmel@fs.fed.us	
	Saavedra, Angel – Plant Pathologist	509-664-9223	alsaavedra@fs.fed.us	
	Westside Service Center (Sandy, OR): Mount Hood National Forest 16400 Champion Way Sandy, OR 97055			FAX: 503-668-1423
	Chadwick, Kristen – Plant Pathologist	503-668-1474	klchadwick@fs.fed.us	
	Hildebrand, Diane M. – Plant Pathologist	503-668-1474	dhildebrand@fs.fed.us	
	Hostetler, Bruce B. – Entomologist	503-668-1475	bhostetler@fs.fed.us	
	Smith, Ben – Aerial Observer	503-668-1761	bsmith02@fs.fed.us	
	Sprengel, Keith – Forestry Technician	503-668-1476	ksprengel@fs.fed.us	
	Willhite, Beth – Entomologist	503-668-1477	bwillhite@fs.fed.us	
Region 5 NFS/Remote Sensing Lab Contacts				
	Marshall, Jack (CDF Pathologist) - Willits, CA	707-459-7448		
	Owen, Don (CDF Entomologist) - Redding, CA	530-224-2494		
	Smith, Tom (CDF Pathologist) - Davis, CA	530-758-0306	tom.smith@fire.ca.gov	

SECTION T.3 24-HOUR EMERGENCY SHERIFF DISPATCH NUMBERS

SUBSECTION T.3.1 CALIFORNIA

County	Phone Number	Extra Info	County	Phone Number	Extra Info
Alameda	510-667-7721		Nevada	530-265-1172	
Alpine	530-694-2231		Orange	714-647-7000	
Amador	209-223-6500		Placer	530-886-5375	
Butte	530-538-7321		Plumas	530-283-6300	
Calaveras	209-754-6500		Riverside	951-776-1099	800-950-2444
Colusa	530-458-0200		Sacramento	916-874-5111	
Contra Costa	925-335-1500		San Benito	831-636-4102	831-636-4103
Del Norte	707-464-4191	opt 0;	San Bernardino	909-387-8313	
El Dorado	530-621-6600		San Diego	858-565-5200	
Fresno	559-488-3111		San Francisco	415-558-2411	
Glenn	530-934-6431		San Joaquin	209-468-4400	
Humboldt	707-445-7251		San Luis Obispo	805-781-4550	
Imperial	760-339-6311		San Mateo	650-363-4000	
Inyo	760-878-0383		Santa Barbara	805-683-2724	
Kern	661-861-3110		Santa Clara	408-299-2505	
Kings	559-584-9276		Santa Cruz	831-471-1121	
Lake	707-263-2331		Shasta	530-245-6025	
Lassen	530-257-6121		Sierra	530-289-3700	
Los Angeles	Crescent Valley	818-248-3464	Siskiyou	530-841-2900	
	Altadena	626-798-1131	Solano	707-421-7090	
	Lancaster	661-948-8466	Sonoma	701-565-2121	
Madera	559-675-7770		Stanislaus	209-552-2468	
Marin	415-499-7233		Sutter	530-822-7307	
Mariposa	209-966-3614		Tehama	530-529-7900	
Mendocino	707-463-4086		Trinity	530-623-8128	
Merced	209-385-7445		Tulare	559-733-6218	
Modoc	530-233-4416		Tuolumne	209-533-5815	
Mono	760-932-7549		Ventura	850-654-2311	opt 1
Monterey	831-755-4451		Yolo	530-666-8920	
Napa	707-253-4451		Yuba	530-749-7777	

SUBSECTION T.3.2 OREGON

County	Phone Number	Extra Info	County	Phone Number	Extra Info
Baker	541-523-6415		Lake	541-947-2504	
Benton	541-766-6911		Lane	541-681-4141	
Clackamas	503-655-8911		Lincoln	541-265-4231	
Clatsop	503-325-2061		Linn	541-967-3911	
Columbia	503-397-1521		Malheur	541-473-5124	
Coos	541-396-2106		Marion	503-588-5032	800-606-4460
Crook	541-416-0854		Morrow	541-676-5317	
Curry	541-247-3242		Multnomah	503-823-3333	
Deschutes	541-388-0170		Polk	503-585-8910	
Douglas	541-440-4471		Sherman	541-384-2080	
Gilliam	541-384-2080		Tillamook	503-842-3442	
Grant	541-575-0030		Umatilla	541-966-3651	
Harney	541-573-6028		Union	541-963-1017	
Hood River	541-386-2711		Wallowa	541-426-3131	
Jackson	541-776-7206	or 7207	Wasco	541-296-5454	
Jefferson	541-475-2201		Washington	503-629-0111	
Josephine	541-479-3311		Wheeler	541-384-2080	
Klamath	541-884-6849		Yamhill	503-434-6500	

SUBSECTION T.3.3 WASHINGTON

County	Phone Number	Extra Info	County	Phone Number	Extra Info
Adams	509-659-1122		Lewis	360-740-1105	
Asotin	509-758-2331		Lincoln	509-725-3501	
Benton	509-628-0333		Mason	360-427-9670	x226
Chelan	509-663-9911		Okanogan	509-422-7232	
Clallam	360-417-2459		Pacific	360-875-9397	
Clark	360-696-4461		Pend Oreille	509-447-3151	opt 0
Columbia	509-382-2518	or 1100	Pierce	253-798-4721	opt 1
Cowlitz	360-577-3090		San Juan	360-378-4151	
Douglas	509-663-9911		Skagit	360-428-3211	
Ferry	509-775-3132	or 3136	Skamania	509-427-9490	
Franklin	509-545-3510		Snohomish	425-407-3970	
Garfield	509-843-3494		Spokane	509-456-2233	
Grant	509-762-1160		Stevens	509-684-2555	
Grays Harbor	360-533-8765		Thurston	360-704-2740	
Island	360-679-9567		Wahkiakum	360-795-3242	
Jefferson	360-385-3831	opt 1	Walla Walla	509-527-1960	or 3265
King	206-296-3311		Whatcom	360-676-6912	
Kitsap	360-478-0011		Whitman	509-332-2521	
Kittitas	509-925-8534		Yakima	509-574-2500	
Klickitat	509-773-4547				

APPENDIX U RANGER DISTRICT INFORMATION

SECTION U.1 NATIONAL FOREST AND RANGER DISTRICT INFORMATION

SUBSECTION U.1.1 REGION 1

REGION 1 Idaho: National Forest and Ranger District Location Information

Idaho Panhandle National Forest SO… Coeur d'Alene	208-765-7223
Priest Lake,…Priest Lake	208-443-2512

SUBSECTION U.1.2 REGION 4

REGION 4 Nevada: National Forest and Ranger District Location Information

Humboldt Toiyabe National Forest SO… Sparks	775-331-6444
Bridgeport,…Bridgeport	760-932-7070
Carson,…Carson City	775-882-2766

SUBSECTION U.1.3 REGION 5

REGION 5 California: National Forest and Ranger District Location Information

USDA Forest Service, Regional Office, R-5… Vallejo	707-562-8737
Angeles National Forest SO… Arcadia	626-574-1613
Los Angeles River, ... San Fernando San Gabriel River, ... Glendora Santa Clara/Mojave Rivers, ... Saugus Chilao Visitor Center,…La Canada Mt. Baldy Visitor Center,…Mt. Baldy Clear Creek Info Center,…La Canada Big Pines Info Center,…Wrightwood	818-899-1900 626-335-1251 661-296-9710 626-796-5541 909-982-2829 626-821-6764 760-249-3504
Cleveland National Forest SO… Rancho Bernardo	858-673-6180
Descanso, ... Alpine Palomar, ... Ramona Trabuco… Corona	619-445-6235 760-788-0250 909-736-1811
Eldorado National Forest SO... Placerville	530-622-5061
Amador, ... Pioneer Georgetown, ...Georgetown Pacific, ... Pollock Pines Placerville, ... Camino	530-333-4312 209-295-4251 530-644-2349 530-644-2324
Inyo National Forest SO… Bishop	760-873-2400
Lee Vining,…Lee Vining Mammoth,… Mammoth Lakes White Mountain,… Bishop Mt. Whitney,… Lone Pine Interagency Visitor Center,… Lone Pine Mono Basin Scenic Visitor Center,… Lee Vining Ancient Bristlecone Pine Forest Visitor Center	760-647-3044 760-924-5500 760-873-2500 760-876-6200 760-876-6222 760-873-2408 760-873-2500
Klamath National Forest SO...Yreka	530-842-6131
Happy Camp,… Happy Camp Goosenest,… Macdoel Ukonom,… Orleans Salmon River & Scott River, ... Fort Jones	530-493-2243 530-398-4391 530-627-3291 530-468-5351
Lake Tahoe Basin Management Unit ...South Lake Tahoe	530-543-4036
Lassen National Forest SO... Susanville	530-257-2151

Almanor, ... Chester	530-258-2141
Eagle Lake, ... Susanville	530-257-4188
Hat Creek, ... Fall River Mills	530-336-5521
Los Padres National Forest SO... Goleta	805-968-6640
Monterey,... King City	831-385-5434
Mt. Pinos,...Frazier Park	661-245-3731
Ojai... Ojai	805-646-4348
Santa Barbara,… Santa Barbara	805-967-3481
Santa Lucia,… Santa Maria	805-925-9538
Mendocino National Forest SO... Willows	530-934-3316
Covelo, ... Covelo	707-983-6118
Grindstone, ... Willows	530-934-3316
Stonyford, …Stonyford	530-963-3128
Upper Lake, ... Upper Lake	707-275-2361
Genetic Resource & Conservation Center,… Chico	530-895-1176
Paskenta Work Center,… Paskenta	530-833-5544
Elk Creek Work Center,… Elk Creek	530-968-5329
Modoc National Forest SO... Alturas	530-233-5811
Warner Mountain, ... Cedarville	530-279-6116
Big Valley, ... Adin	530-299-3215
Devil's Garden, ... Alturas	530-233-5811
Doublehead, ... Tulelake	530-667-2246
Plumas National Forest SO... Quincy	530-283-2050
Beckwourth, ... Blairsden	530-836-2575
Feather River, ... Oroville	530-534-6500
Mt. Hough, ... Quincy	530-283-0555
San Bernardino National Forest SO... San Bernardino	909-382-2600
Big Bear, ... Fawnskin	909-866-3437
San Bernardino Work Center,…Lytle Creek	909-887-2576
San Jacinto, ... Idyllwild	909-382-2921
Arrowhead, …Skyforest	909-382-2782
Mill Creek, … Mentone	909-794-1123
Sequoia National Forest SO... Porterville	559-784-1500
Hume Lake, ... Dunlap	559-338-2251
Tule River/Hot Springs, ... Springville	559-539-2607
Greenhorn, ... Lake Isabella	760-379-5646
Cannell Meadow, ... Kernville	760-376-3781
Hot Springs,… California Hot Springs	661-548-6503
Bakersfield Visitor Center,… Bakersfield	661-391-6088
Shasta-Trinity National Forest SO…Redding	530 226-2500
Yolla Bolla,…Plantina	530-352-4211
Big Bar, …Big Bar	530 623-6106
Hayfork, … Hayfork	530-628-5227
Shasta Lake, …Shasta Lake City	530-275-1587
Mt. Shasta, …Mt. Shasta	530 926-4511
McCloud, …McCloud	530-964-2184
Weaverville, …Weaverville	530-623-2121

Sierra National Forest SO... Clovis	559-297-0706
Bass Lake, …North Fork High Sierra, …Prather	559-877-2218 559-855-5355
Six Rivers National Forest SO... Eureka	707-442-1721
Smith River NRA, …Gasquet Orleans, ... Orleans Lower Trinity, ... Willow Creek Mad River, ... Mad River	707-457-3131 530-627-3291 530-629-2118 707-574-6233
Stanislaus National Forest SO... Sonora	209-532-3671
Calaveras, ... Hathaway Pines Groveland, ... Groveland Mi-Wok, ... Mi-Wuk Village Summit, ... Pinecrest	209-795-1381 209-962-7825 209-586-3234 209-965-3434
Tahoe National Forest SO... Nevada City	530-265-4531
North Yuba, ...Camptonville American River, ...Foresthill Nevada City, ... Nevada City Sierraville, ... Sierraville Truckee, ... Truckee Big Bend Visitor Center,… Soda Springs	530-288-3231 530-367-2226 530-265-4531 530-994-3401 530-587-3558 530-426-3609

R5 National Forest Contacts for FIA

Forest Number		Forest	Contact Name	Phone Number	e-mail
1	501	Angeles	Clem Lagrosa	626-574-5256	clagrosa@fs.fed.us
2	502	Cleveland	Bernice Bigelow	858-674-2919	bbigelow@fs.fed.us
3	503	Eldorado	Mike Grimm	530-647-5382	mgrimm@fs.fed.us
4	504	Inyo	Tom Higley	760-647-3032	thigley@fs.fed.us
5	505	Klamath	Dan Blessing	530-398-5790	dblessing@fs.fed.us
6	506	Lassen	Dave Evans	530-252-6681	devans01@fs.fed.us
7	507	Los Padres	Jim Turner	805-961-5752	jmturner@fs.fed.us
8	508	Mendocino	Nancy Mulligan	530-934-1149	nmulligan@fs.fed.us
9	509	Modoc	Bill Schoeppach	530-233-8736	bschoeppach@fs.fed.us
10	510	Six Rivers	Roy Bergstrom	707-441-3553	rbergstrom@fs.fed.us
11	511	Plumas	Paul Stancheff	530-283-7843	pstancheff@fs.fed.us
12	512	San Bernardino	Mary Najera	909-382-2720	mnajera@fs.fed.us
13	513	Sequoia	Paul Miller	559-784-1500 x1151	psmiller@fs.fed.us
14	514	Shasta-Trinity	Robert Ramirez	530-226-2434	rramirez@fs.fed.us
15	515	Sierra	Mark Smith	559-297-0706 x4952	msmith04@fs.fed.us
16	516	Stanislaus	John Schmechel	209-532-3671 x329	jschmechel@fs.fed.us
17	517	Tahoe	Jerry Westfall	530-478-6297	jwestfall@fs.fed.us
19	519	LTBMU	Scott Parsons	530-543-2687	sparsons@fs.fed.us
n/a	n/a	Region 5 RSL	Kama Kennedy	916-640-1253	kkennedy@fs.fed.us

SUBSECTION U.1.4 REGION 6

REGION 6 – Oregon: National Forest and Ranger District Location Information

- USDA Forest Service, Regional Office, R-6… Portland

  Deschutes National Forest … 1645 Highway 20 East, Bend, OR 97701
  - Bend/Ft. Rock 1230 NE 3rd St. Suite A-262, Bend, OR 97701 541-383-4000
  - Crescent 136471 Hwy 97 North, PO Box 208, Crescent, OR 97733 541-433-3200
  - Sisters Hwy 20 & Pine St., PO Box 249, Sisters, OR 97759 541-549-7700

  Fremont-Winema National Forests Lakeview 1301 South G Street, Lakeview, OR 97630, 541-947-2151
  - Bly 61100 Hwy. 140 East, PO Box 25, Bly, OR 97622 541-353-2427
  - Chemult 110500 Hwy. 97 North, PO Box 150, Chemult,OR 97731 541-365-7001
  - Chiloquin 38500 Highway 97 South, Chiloquin, OR 97624 541-783-400
  - Klamath Falls 1936 California Avenue, Klamath Falls, OR 97601 541-885-3400 541-883-6714
  - Lakeview 18049 Hwy. 395, Lakeview, OR 97630, 541-947-3334
  - Paisley 303 Hwy. 31, PO Box 67, Paisley, OR 97636, 541-943-3114
  - Silver Lake 65600 Hwy 31, PO Box 129,Silver Lake,OR 97638, 541-576-2107

  Malheur National Forest 431 Patterson Bridge Rd, PO Box 909, John Day, OR 97845, 541-575-3000;
  - Blue Mountain PO Box 909, 431 Patterson Bridge Rd, John Day,OR 97845, 541-575-3000
  - Emigrant Creek 265 Highway 20 South, Hines, OR 97738, 541-573-4300
  - Prairie City 327 SW Front, PO Box 337, Prairie City, OR 97869, 541-820-3800

  Mt. Hood National Forest 16400 Champion Way, Sandy, OR 97055, 503-668-1700
  - Barlow 780 NE Court, Dufur, OR 97021, 541-467-2291
  - Clackamas River 595 NW Industrial Way, Estacada, OR 97023, 503-630-6861
  - Hood River 6780 Hwy 35, Mt.Hood-Parkdale, OR 97031, 541-352-6002
  - Zigzag 70220 East Hwy. 26, Zigzag, OR 97049, 503-622-3191

  Ochoco National Forest 3160 NE 3rd Street, Prineville, OR 97754-0490, 541-416-6500;
  - Crooked River National Grassland 813 SW Hwy 97, Madras, OR 97741, 541-475-9272,
  - Lookout Mountain 3160 NE 3rd St., PO Box 490, Prineville, OR 97754-0490, 541-416-6500,
  - Paulina 7803 Beaver Creek Rd, Paulina, OR 97751-9706, 541-477-6900

  Rogue River-Siskiyou National Forest …, Federal Building, 333 W. 8th Street, Box 520, Medford, OR 97501-0209, 541-858-2200
  - Applegate 6941 Upper Applegate Rd, Jacksonville, OR 97530, 541-899-3800
  - Ashland 645 Washington St., Ashland, OR 97520, 541-552-2900
  - Butte Falls 800 Laurel St, PO Box 227, Butte Falls, OR 97522, 541-865-2700
  - Chetco 555 5th Street, Brookings, OR 97415, 541-412-6000
  - Galice 200 NE Greenfield Rd., Grants Pass, OR 97526, 541-471-6500
  - Gold Beach 1225 South Ellensburg, PO Box 7, Gold Beach, OR 97444, 541-247-3600
  - Illinois Valley 26568 Redwood Hwy, Cave Junction, OR 97523, 541-592-4000
  - Powers Powers, OR 97466, 541-439-6200
  - Prospect 47201 Hwy 62, Prospect, OR 97536, 541-560-3400

  Siuslaw National Forest 4077 Research Way, PO Box 1148, Corvallis, OR 97339,541-750-7000
  - Hebo 31525 Hwy 22/PO Box 324, Hebo, OR 97122, 503-392-3161
  - South Zone Ranger District 541-902-8526
  - Waldport Office 1049 SW Pacific Hwy, PO Box 400, Waldport, OR 97394, 541-563-3211
  - Florence Office 4480 Hwy 101, Bldg G - Florence, OR 97439, 541-902-8526
  - Oregon Dunes NRA Office 855 Hwy 101, Reedsport, OR 97467, 541-271-3611

  Umatilla National Forest 2517 SW Hailey Ave., Pendleton, OR 97801, 541-278-3716
  - Heppner 117 S. Main St., Heppner, OR 97836, 541-676-9187
  - North Fork John Day PO Box 158, Ukiah, OR 97880, 541-427-3231
  - Pomeroy 71 West Main St., Pomeroy, WA 99347, 509-843-1891
  - Walla Walla 1415 West Rose, Walla Walla, WA 99362, 509-522-6290

  Umpqua National Forest 2900 NW Stewart Parkway, Roseburg, OR 97470, 541-672-6601
  - Cottage Grove 78405 Cedar Park Rd., Cottage Grove, OR 97424, 541-767-5001
  - Diamond Lake 2020 Toketee Ranger Sta. Rd, Idleyld Park, OR 97447, 541-498-2531
  - North Umpqua 18782 N. Umpqua Hwy, Glide, OR 97443, 541-496-3532
  - Tiller 27812 Tiller Trail Hwy, Tiller, OR 97484, 541-825-3201

Wallowa-Whitman National Forest 1550 Dewey Ave., PO Box 907, Baker City, OR 97814, 541-523-6391

- Eagle Cap 88401 Hwy 82, Enterprise, OR 97828, 541-426-4978
- La Grande 3502 Hwy 30, La Grande, OR 97850, 541-963-7186
- Wallowa Valley 88401 Hwy 82, Enterprise, OR 97828, 541-426-4978
- Whitman Unit 541-426-4476
- Baker Office: 3165 10th Street, Baker City, OR 97814, 541-523-4476
- Pine Office: 38470 Pine Town Lane, Halfway, OR 97834, 541-742-7511
- Unity Office: 214 Main Street, Unity, OR 97884, 541-446-3351
- Hells Canyon NRA 88401 Hwy 82, Enterprise, OR 97828, 541-426-4978

Willamette National Forest … Dallas Emch, 211 East 7th Ave., PO Box 10607, Eugene, OR 97440-2607, 541-225-6300; Fax: 541-225-6223; TDD: 541-465-6323

- Detroit HC-73, Box 320, Mill City, OR 97360, 503-854-3366
- Middle Fork 46375 Hwy 58, Westfir, OR 97492, 541-782-2283
- McKenzie River 57600 McKenzie Hwy, McKenzie Bridge, OR 97413, 541-822-3381
- Sweet Home 3225 Hwy. 20, Sweet Home, OR 97386, 541-367-5168

REGION 6 – Washington: National Forest and Ranger District Location Information

Colville National Forest 765 S. Main, Colville, WA 99114, 509-684-7000

- Three Rivers 255 West 11th, Kettle Falls, WA 99141, 509-738-7700
- Newport 315 N. Warren, Newport, WA 99156, 509-447-7300
- Republic 180 N. Jefferson, Republic, WA 99166, 509-775-7400
- Sullivan Lake 12641 Sullivan Lake Rd, Metaline Falls, WA 99153, 509-446-7500

Gifford Pinchot National Forest 10600 NE 51st Circle, Vancouver, WA 98682, 360-891-5000

- Cowlitz Valley 10024 US Hwy 12, Randle, WA 98377-9105, 360-497-1100
- Mt. Adams 2455 Hwy 141, Trout Lake, WA 98650-9046, 509-395-3400
- Mount St. Helens National Volcanic Monument 42218 NE Yale Bridge Rd, Amboy, WA 98601-9715, 360-449-7800

Mt. Baker-Snoqualmie National Forest 21905 64th Avenue West, Mountlake Terrace, WA 98043, 425 775-9702

- Mt. Baker 810 State. Rt. 20, Sedro Woolley, WA 98284, 360-856-5700
- Skykomish 74920 NE Stevens Pass Hwy, PO Box 305, Skykomish, WA 98288, 360-677-2414
- Snoqualmie 42404 SE North Bend Way, North Bend, WA 98045, 425-888-1421
- Snoqualmie - Enumclaw Office 450 Roosevelt Ave E., Enumclaw, WA 98022, 360-825-6585

Okanogan and Wenatchee National Forests 215 Melody Lane, Wenatchee, WA 98801-5933, 509-664-9200; Okanogan Valley Office … 1240 South Second Ave, Okanogan, WA 98840-9723, 509-826-3275;

- Chelan 428 W. Woodin Ave., Chelan, WA 98816, 509-682-2576
- Cle Elum 803 W. 2nd St., Cle Elum, WA 98922, 509-852-1100
- Entiat 2108 Entiat Way, PO Box 476, Entiat, WA 98822, 509-784-1511
- Leavenworth 600 Sherbourne, Leavenworth, WA 98826, 509-548-6977 x200
- Methow Valley 24W. Chewuch Road, Winthrop, WA 98862, 509-996-4003
- Naches 10237 Highway 12, Naches, WA 98937, 509-653-1400
- Tonasket 1 West Winesap, Tonasket, WA 98855, 509-486-2186

Olympic National Forest 1835 Black Lake Blvd SW, Olympia, WA 98512-5623, 360-956-2301

- Hood Canal Ranger District (Quilcene Office) 295142 Hwy 101 S, PO Box 280, Quilcene, WA 98376, 360-765-2200
- Pacific Ranger District (Forks Office) 437 Tillicum Lane, Forks, WA 98331, 360-374-6522
- Pacific Ranger District (Quinault Office) 353 South Shore Rd, PO Box 9, Quinault, WA 98575, 360-288-2525

APPENDIX V SUMMARY OF MANUAL CHANGES

2012 to 2013 PFSL Manual* *2012 manual section/item numbers are listed		
Location		**Change**
Chapter: Introduction		
	Figure 1.1	Updated figure with new Core figure.
Chapter: Locating the Plot		
	2.2.5 Lost Subplot	Added previously hidden Core instructions for recording lost subplots.
	Skipped and Carryover Plots	Added new section.
Chapter: Plot Layout and Referencing		
	Plot Integrity	Added previously hidden Core instructions for maintaining plot integrity.
Chapter: Plot Level Data		
	4.2.1.11Declination	Updated values
	4.3.4.1 Plot Status	Added instruction for recording Skipped Visits.
	4.3.4.2 Plot Nonsampled Reason	Hid “This code is for office use only” from code 08. Hid codes 05, 07, 09, they are not valid.
	4.3.4.5 Nonforest Plot Nonsampled Reason	Hid “This code is for office use only” from code 08. Hid code 09, it is not valid.
	4.3.4.8 Change Matrix Required	Moved data item to Plot Level Data Downloaded to the PDR Section.
		Added new data item DWM SAMPLING STATUS.
	4.4.2 Collecting Readings	Added instruction to collect180 readings, replacing deleted Core text.
	4.4.2.6 Number of Readings	Added instruction to collect 180 readings, replacing deleted Core text.
Chapter: Condition Class		
	Introduction	Updated which plots are to be remeasured.
	Section 5.1 Determination of Condition Class	Unhide previously hidden Core paragraph describing use if NONFOREST LAND USE in delineating conditions. Step 2 added sentence: “ Conversions from forest to nonforest become new nonforest conditions whenever they occur regardless of size, except when a previously defined nonforest condition has expanded into an adjacent previously defined forest condition.This expanded condition will be captured through boundary changes on respective subplots/macroplots and does not constitute a new separate condition.”
	5.2.1 Accessible Forest Land	Added 30 year rule to new definition of forest land.
	5.2.3 Noncensus Water	Updated definition to clarify delineating when woody vegetation is not present.
	5.2.4 Census Water	Updated definition to clarify delineating when woody vegetation is not present.
	5.3 Delineating Condition Classes Differing in Condition Class Status	Fourth paragraph, changed “Five exceptions” to “Six”. Added number 6: Areas that were sampled and classified at last inventory as accessible forest land and are now nonforest become new nonforest conditions whenever they occur regardless of size, except when a previously defined nonforest condition has expanded into an adjacent previously defined forest condition. This expanded condition will be captured through boundary changes on respective subplots/macroplots and does not constitute a new separate condition.

	Table 5.1	First section of table renamed “Relating to condition delineating data items”. “Two STAND SIZE CLASS rule dropped” moved to condition delineating section of the table. Nonforest land use changes moved to condition delineating section. Added forest land definition change to table 5.1. Added stocking algorithm table changes in 2004 and 2012. Added forest land definition change for 2013. For second and third row regarding stocking algorithm and stocking value changes, updated year from 2003 to 2004 (error). Added RESERVED STATUS definition change.
	Table 5.2	“Strips of forest area between switchbacks is not considered nonforest land, 2008” added to table.
	5.6 Condition Remeasurement	Step 1: Replaced last sentence with reference to subsection describing correcting previous boundary errors. Deleted second paragraph of about correcting previous condition items.
	5.6.1 Correcting Previous Crew Error	Second paragraph, second sentence, updated “can be updated to “must be updated if an error was found in PREVIOUS CONDITION CLASS STATUS or PREVIOUS OWNER GROUP.” Last paragraph, second sentence, added: “and potentially mapped other condition classes present on the subplot/macroplot.” Changing PREVIOUS CONDITION CLASS STATUS from nonforest to forest: Deleted list, replace with: “If PREVIOUS CONDITION CLASS STATUS changes from nonforest to forest, the suite of delineating and non-delineating data items associated with forest conditions will need to be added for the previous data items (e.g. PREVIOUS FOREST TYPE) to reflect the correct values at the time of the previous measurement.” Changing PREVIOUS CONDITION CLASS STATUS from forest to nonforest: Added: “If PREVIOUS CONDITION CLASS STATUS changes from forest to nonforest, the suite of delineating and non-delineating data items associated with nonforest conditions will need to be added for the previous data items (e.g. PREVIOUS NONFOREST LAND USE) to reflect the correct values at the time of the previous measurement." Changing previous boundary mapping: Added further explanation and examples for regarding when to correct mapping. Explanatory Notes: Added addition instruction for recording notes.
	5.6.2 Reconcile Current With Previous Conditions	First paragraph, added sentence about recording notes when Reconcile Code is other than 0. Example 2, What should you do?: Added additional instruction.
	5.6.3.2 Previous Condition Class Number	Updated when collected.
	5.6.3.3 Subplot Condition Proportion	Updated when collected.
	5.6.3.5 Previous Condition Class Status	Updated when collected.
	5.6.3.7 Condition Class Status Reconcile Code	Changed that notes need to be recorded in Change Matrix Notes instead of Condition Notes. Updated when collected.
	5.6.3.7 Condition Class Status Procedural Change Reason Code	Added code” 03 - Forest land definition change from 10 percent stocking to percent canopy cover”. Changed that code 99 notes need to be recorded in Change Matrix Notes instead of Condition Notes.
	5.6.4 Accessible Forest Land Delineating Data Items	Deleted “with the exception of PREVIOUS OWNER GROUP CORRECTED which serves as a code to confirm changes in owner group”
	5.6.4.1 Reserved Status	Deleted second paragraph about reserved areas and private landowners.
	5.6.4.2 Previous Reserved Status	Updated description and instructions for updating. Updated when collected.
	5.6.4.3 Reserved Status Reconcile Code	Changed that notes need to be recorded in Change Matrix Notes instead of Condition Notes. Updated when collected.
	5.6.4.4 Reserved Status Procedural Change Reason Code	Changed that code 99 notes need to be recorded in Change Matrix Notes instead of Condition Notes. Added new code 01 to account for Core Reserved Area definition change, updated data item instructions.
	5.6.4.6 Previous Owner Group	Updated when collected.

	5.6.4.7 Owner Group Reconcile Code	Changed that notes need to be recorded in Change Matrix Notes instead of Condition Notes. Updated when collected.
	5.6.4.8 Owner Group Procedural Change Reason Code	Changed that code 99 notes need to be recorded in Change Matrix Notes instead of Condition Notes.
	5.6.4.9 Forest Type	Moved detailed instruction for forest type 371 to the Forest Type Code Appendix
	5.6.4.10 Previous Forest Type	Updated instruction for when to update. Updated when collected.
	5.6.4.12 Previous Stand Size Class	Updated instruction for when to update. Updated when collected.
	5.6.4.14 Previous Regeneration Status	Updated instruction for when to update. Updated when collected.
	5.6.4.16 Previous Tree Density	Updated instruction for when to update. Updated when collected.
	5.6.5.1 Owner Class	Deleted phrase, “”collected in the county courthouse” from the first sentence of second paragraph.
	5.6.5.2 Previous Owner Class	Updated instruction for when to update. Updated when collected.
	5.6.5.4 Previous Administrative Forest Code	Updated instruction for when to update. Updated when collected.
	5.6.5.8 Previous Artificial Regeneration Species	Updated instruction for when to update. Updated when collected.
	5.6.5.11 Previous Stand Age	Updated instruction for when to update. Updated when collected.
	5.6.5.13 Previous Physiographic Class	Updated instruction for when to update. Updated when collected.
	5.6.5.15 Previous Ground Land Class	Updated instruction for when to update. Updated when collected.
	5.6.5.17 Previous Soil Depth	Updated instruction for when to update. Updated when collected.
	5.6.5.19 Previous Stand Structure	Updated instruction for when to update. Updated when collected.
	5.6.5.5 Private Owner Industrial Status	Deleted data item (Core)
	5.6.5.6 Previous Private Owner Industrial Status	Deleted regional data item
	5.6.5.20 Disturbance 1	Added “(including mistletoe”) to code 22.
	5.6.5.21 Previous Disturbance 1	Updated instruction for when to update. Updated when collected.
	5.6.5.23 Previous Disturbance Year 1	Updated instruction for when to update. Updated when collected. Updated values.
	5.6.5.33 Previous Historical Disturbance 1	Updated instruction for when to update.
	5.6.5.35 Previous Historical Disturbance Year 1	Updated instruction for when to update.
	5.6.5.58 Historical Treatment Year 1	Updated values to “Year that is prior to the previous plot visit, or > 5 years ago for plots visited for the first time”.
	5.6.5.45 Previous Treatment 1	Updated instruction for when to update. Updated when collected.
	5.6.5.47 Previous Treatment Year 1	Updated instruction for when to update. Updated when collected.
	5.6.5.58 Previous Historical Treatment 1	Updated instruction for when to update.
	5.6.5.59 Previous Historical Treatment Year 1	Updated instruction for when to update.

	5.6.6 Determine Condition Classes on Nonforest Land	Updated to include Reserved Status and Owner Group as delineating data items.
	5.6.6.1	Added paragraph about entiremly nonforest plots.
	5.6.6.2 Previous Nonforest Land Use	Updated instruction for when to update. Updated when collected.
	5.7.1.1 Canopy Cover Sample Method	Added clarifying language about not moving phantom subplots. Deleted reference to 200 stems.
	5.7.1.3 Live Plus Missing Canopy Cover	Added language referring to the 30 year rule.
	5.7.1.4 Total Stems	Updated entire description.
	5.8.0.1 Condition Nonsampled Reason	Hid, “for office use only” from code 08.
	5.7.2 Cover Tree Data Items	Deleted “Consider a clump of trees (e.g., stump sprouts) less than 5 inches DBH to be a single tree.”
	5.8.0.2 Previous Condition Nonsampled Reason	Updated when collected.
	5.9 Stockability in Oregon and California	Added clarifying language to establish when collected.
	5.9.1.1 Stockability Indicator Species	Updated when collected.
	Change Matrix Notes	Added new data item.
Chapter: Subplot Information		
	6.1.1.2 Previous Subplot Mapping Error	Updated when collected. Updated first sentence to: ”Record a code to indicate whether or not a previous mapping error exists on a subplot or if an error exists in PREVIOUS SUBPLOT/MACROPLOT CENTER CONDITION or PREVIOUS MICROPLOT CENTER CONDITION.”
	6.1.1.3 Subplot Status	Updated second sentence to, “In situations where *PLOT STATUS = 1 or 2* and subplot/macroplot is denied access or hazardous, but obviously contains no forest land, record SUBPLOT/MACROPLOT STATUS = 2.”
	6.1.1.4 Subplot/Macroplot Nonsampled Reason	Hid, “for office use only” from code 8. Hid code 5, not valid.
	6.1.1.6 Nonforest Subplot/ Macroplot Nonsampled Reason	Code 10 - Updated that an electronic SUBPLOT NOTE is required.
	6.1.1.7 Previous Subplot/ Macroplot Center Condition	Updated when collected.
	6.1.1.11 Previous Microplot Center Condition	Updated when collected.
Chapter: Boundary References		
	7.2 Reference Procedure	Added new bullet with instructions for mapping small conditions using the “wedge” procedure.
	7.2.2.3 Previous Plot Type	Updated when collected.
	7.2.2.4 Boundary Change	Updated when collected.
	7.2.2.6 Previous Contrasting Condition	Updated when collected.
	7.2.2.8 Previous Left Azimuth	Updated when collected.
	7.2.2.10 Previous Corner Azimuth	Updated when collected.
	7.2.2.12 Previous Corner Distance	Updated when collected.
	7.2.2.14 Previous Right Distance	Updated when collected.

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Chapter: Tree and Sapling Data		
	8.4.1.5 Condition Class Number	Added, “Trees must be assigned to a condition present on the subplot/ macroplot condition list.”
	8.4.1.6 Previous Condition Class Number	Updated when collected.
	8.4.1.7 Previous Tree Status	Deleted sentence” Add PREVIOUS TREE STATUS if null and tree was not tallied at the previous inventory because of a definition or procedural change (RECONCILE = 10).” Updated when collected.
	8.5.1 Marking Current Diameter	Added a note to number five. “Note: The current crew should not correct for subjective differences in interpretation of forked trees; i.e., only gross errors made by the previous crew should be corrected. If in doubt, use the previous crew's interpretation of the forked trees.”
	8.5.3 Diameter at Breast Height	Situation 1, hid Core sentence, “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.” Situation 1A, added, “The diameter and angle rules (see Trees forked between 1.0 foot and 4.5 feet, below) do not apply. However, lateral branches (e.g., a branch whorl) below one foot on a single-stemmed tree are not stems and should not be tallied.” Situation 1B, added: “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. The size of the prospective fork is measured at the point of separation (crotch), above any abnormal swelling at the crotch. The angle of branching for the prospective fork is measured in the immediate vicinity of pith intersection.” Added new forking diagram. Updated situation 9 to, “Note: for standing dead trees missing 25% or more of the diameter estimate a reconstructed diameter for, Item 8.5.3.3, SNAG ESTIMATED DIAMETER (PNW).”
	8.5.5.1 Diameter Check	Added “An electronic Tree Note is required to describe the situation.’ to code 2.
	Section 8.7 Tree Damage	Deleted damage section, replaced with new Core 6.0 Damage protocol. Added instruction for collecting SOD samples when code 21028 is recorded, or when SOD is suspected in the plot area, no longer limited to CA.
	8.7.3.6 Dwarf Mistletoe Class	Added instruction for coding an infection on just the bole.
	8.7.3.7 Rotten/Missing Cull	6th paragraph, last part of sentence, changed to, “calculate the percentage of MISSING CULL of the 7-foot section remaining above stump height).”
Chapter: Site Tree Information		
	Entire Chapter	Site tree selection keys modified
Chapter: Down Woody Material		
	Entire chapter	Replaced with new 6.0 Core chapter.
	11.2.3.3 Segment Number	Regional item retained from 2012 manual.
	11.2.6 Recording Procedures for CWD	Added tolerance for number of pieces across plot (absent from 6.0 Core). Changed to +/- one piece across plot (from 2 or 5%, whichever is greater).
	11.2.6.2 Coarse Woody Debris ID	Regional item retained from 2012 manual.
	11.2.6.4 CWD Slope Distance	Regional item retained from 2012 manual. Removed sentence about how this data item is used, now used for QA only.
	11.2.6.6. Species	Added code 0001 for shrubs and vines, as used in the 2012 manual. Limited 0299 and 0998 to decay class 4, as used in the 2012 manual.
	11.2.7.8 Coarse Woody Debris Notes	Regional item retained from 2012 manual.

	11.2.8.9 Fine Woody Debris Notes	Regional item retained from 2012 manual.
	11.3.4.7 Fuelbed Depth	Regional item from 2012 manual deleted for 2013.
	11.4.1.2 Pile Number	Regional item retained from 2012 manual, changed radius to subplot.
	11.4.1.14 Residue Pile Notes	Regional item retained from 2012 manual.
Chapter: Ground Cover on Forest Service Lands		
	15.1.1.2 Transect	Updated values to reflect transect locations in new Core 6.0 DWM chapter.
		Updated number 2 with more accurate description.
Appendix: Reference Information		
	C.2 County Codes and Declinations	Updated declinations.
Appendix: Forest Type Codes		
		Added forest type descriptions.
Appendix: Tree Species List		
	826 chinkapin oak	Un-bolded.
Appendix: Tree Coding Guide		
		Added new scenarios.
Appendix: Sudden Oak Death Syndrome Assessment		
		Updated to include new damage agent code, and that samples should be collected when SOD is suspected in the plot area.
Appendix: Quality Assurance/Quality Control		
	M.2.4 Field Procedures for Entire Blind Plots	Added that the crew is required to complete a new plot card and edit sheet and should record landowner contact events in the Landowner Contact Database.
Appendix: Plot Jacket		
		Updated throughout to reflect change from 10% stocking to 10% canopy cover.
	P.3 Photos	Updated section name to “Images”. Updated image labeling instructions.
Appendix: Plot Forms		
	Plot Card	Updated Plot Card
Appendix: Changes from the Core Phase 2 Field Guide Version 5.1 to Version 6.0		
Appendix: Summary of Manual Changes		

APPENDIX W CHANGES FROM THE PHASE 2 FIELD GUIDE VERSION 5.1 TO VERSION 6.0

Changes documented in change proposals are indicated in **bold** type. The corresponding proposal name can be seen using the comments feature in the electronic file. These change pages are intended to highlight significant changes to the field guide and do not contain all of the details or minor changes.

- Introduction. Field Guide Layout. Made the following changes:

Old text	New text
0 General Description	0 General Description
1 Plot	1 Plot Level Data
2 Condition	2 Condition Class
3 Subplot	3 Subplot Information
4 Boundary	4 Boundary References
5 Tree Measurements	5 Tree Measurements and Sapling Data
6 Seedling	6 Seedling Data
7 Site Tree	7 Site Tree Information
8 Phase 2 Vegetation Profile (core optional)	8 Phase 2 (P2) Vegetation Profile (core optional)
9 Invasive Plants	9 Invasive Plants
	10 Down Woody Materials

- 0.0 General Description. Paragraph 5, Defined NIMS (the National Information Management System). Also Figure 1. Figure 1 was replaced by a plot diagram including the annular ring.
- 0.2 Plot Integrity. Copied the following paragraph (as it appears in chapter 9) to the end of the section: "**Note: Avoid becoming part of the problem!** There is a risk that field crews walking into plot locations could pick up seeds along roadsides or other patches of invasive plants and spread them through the forest and on to the plot. Be aware of the vegetation you are traveling through and consider stopping and removing seeds from boots and clothing before entering uninvaded lands, particularly remote areas that are rarely visited."
- 1.3 PLOT NUMBER. Changed *When collected* from "SAMPLE KIND=1 or SAMPLE KIND=2" to "All plots".
- 1.6 NONFOREST PLOT STATUS. Changed *When collected* from "When PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 0 or 1" to "When PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1". Also changed the first sentence from "Record the code that describes the sampling status of the other-than-forest plot, i.e., PLOT STATUS = 2." to "Record the code that describes the plot status of the nonforest plot, i.e., PLOT STATUS = 2."
- 1.8 NONFOREST POT NONSAMPLED REASON. Changed description from "For entire plots that cannot be sampled, record one of the following reasons." to "For entire nonforest plots that cannot be sampled, record one of the following reasons."
- 1.9 SUBPLOTS EXAMINED. Changed *When collected* from "When PLOT STATUS = 2 or 3" to "All plots".
- 1.12 FIELD GUIDE VERSION. Changed *Values* from "4.0" to "6.0".
- 1.15 HORIZONTAL DISTANCE TO IMPROVED ROAD. Changed *When collected* from "All plots with either one accessible forest land condition class (PLOT STATUS = 1) or one accessible nonforest land condition class when nonforest is being sampled (PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS =1)" to "All plots with either one accessible forest land condition class (PLOT STATUS = 1) or one accessible nonforest land condition class when nonforest is field-measured (PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS =1)".
- 1.16 WATER ON PLOT. Changed *When collected* from "All plots with either at least one accessible forest land condition class (PLOT STATUS = 1) or one accessible nonforest land condition class when nonforest is being sampled (PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS = 1)" to "All plots with either at least one accessible forest land condition class (PLOT STATUS = 1) or one accessible nonforest land condition class when nonforest is field-measured (PLOT STATUS = 2 and NONFOREST SAMPLING STATUS = 1 and NONFOREST PLOT STATUS = 1)". Also deleted "CONDITION CLASS" from code 0.
- 1.19.2 Collected Readings. Deleted all references to 180 readings from this section.
- 1.19.8.2 LATITUDE MINUTES. Corrected *Values* from "1 – 59" to "0 – 59".
- 1.19.9.2 LONGITUDE MINUTES. Corrected *Values* from "1 – 59" to "0 – 59".

- 1.19.18 NUMBER OF READINGS. Deleted the sentence “Collect at least 180 readings if possible.”
- 2.1.1 Step 1: Delineate the plot area by CONDITION CLASS STATUS. Added this sentence to the description ” Additionally, nonforest land is sampled in some areas of special interest.”
- 2.1.2 Step 2: Further subdivide Accessible Forest Land by 6 delineation variables. Moved last paragraph from 2.1.1 to the end of this section. Updated the section number in the Note and the section number in the last paragraph.
- 2.1.3 Step 3. When inventorying Nonforest Land, delineate accessible Nonforest Land by 3 delineation variables. Added this step to accommodate nonforest land.
- **2.2 Condition Class Status Definitions. Added the text for the new forest land definition. Replaced part of the text under #1 Accessible Forest Land and retained the name ‘accessible forest land’ rather than changing the name to ‘forest land’. Replaced the old text with the new text under #2 Nonforest Land.**Proposal ID: ForestDefRevision_2010Jul07.doc
- **2.3.1 Forest Land. Deleted 2.5.12 PRIVATE OWNER INDUSTRIAL STATUS because this variable is no longer in the field guide..**Proposal ID: FIA Ownership Variables – Field Collected.doc and email from Brett Butler dated 11/18/2011
- 2.3.2 Nonforest Land. Added this subsection to match accommodate nonforest land.
- 2.4 Delineating Condition Classes Differing in Condition Class Status. Deleted old figure 6 from version 5.1. Also, in step 5, changed the sentence from “Nonsampled conditions within accessible forest land are delineated, regardless of size, as a separate condition” to “Nonsampled conditions are delineated as a separate condition class regardless of size.”
- **2.4.3 CONDITION NONSAMPLED REASON. Added code 05, 06, 07, 08, and 09.**Proposal ID: 2010_03_01_cond_lost_code.doc
- 2.4.5 NONFOREST CONDITION NONSAMPLED REASON. In the *When collected*, corrected the variable “NONFOREST CONDITION STATUS” to “NONFOREST CONDITION CLASS STATUS.”
- 2.5 Delineating Condition Classes Within Accessible Forest Land. Changed the final sentence in the first paragraph from ““Stands” are defined by plurality of stocking for all live trees that are not overtopped.” to ““Stands” are defined by plurality of stocking for all live trees, saplings, and seedlings that are not overtopped.” This is needed to accommodate new definition of forest land. Also, in step 3, the third sentence in the example was changed from “Between subplot 1 and 2 is a transition zone; the number of trees present goes from none to what clearly represents at least 10-percent tree stocking.” To “Between subplot 1 and 2 is a transition zone; the number of trees present goes from none to what clearly represents forest land.” Also “in step 4, the first line of the Note was changed from “When the width of forest adjacent to a stream is between 120.0 feet and 150.0 feet and the width of the riparian forest is at least 30.0 feet wide, the rules for identifying the non-riparian forest (at least 30.0 feet but less than 120.0 feet) need to be modified.” to “When the width of forest adjacent to a body of water or water course is between 120.0 feet and 150.0 feet and the width of the riparian forest is at least 30.0 feet wide, the rules for identifying the non-riparian forest (at least 30.0 feet but less than 120.0 feet) need to be modified.” Also, under #3 in the first sentence, changed “fixed radii plots” to “fixed-radius subplots, and in the second sentence, changed “two fixed-radius plots” to “two fixed-radius subplots”.
- **2.5.1 RESERVED STATUS. Added clarification to the text.**Proposal ID: Reserve_AdminWithdrawn_Change_Proposal2.doc Made an additional change to the new text – added “preserve” to the list of “park, wilderness, wild river, reserve”. Also, clarified the *When collected CORE OPTIONAL* from “All accessible forest land condition classes (CONDITION CLASS = 1) and nonforest land condition classes (CONDITION CLASS STATUS >1)” to “All condition classes”.
- 2.52.OWNER GROUP. Clarified the *When collected CORE OPTIONAL* from “All accessible forest land condition classes (CONDITION CLASS = 1) and nonforest land condition classes (CONDITION CLASS STATUS >1)” to “All condition classes”.
- 2.5.3 FOREST TYPE. Added this note to the text: . NOTE: Canopy cover is used to determine whether an area is forest or nonforest. Stocking is used with other variables such as this one.”
- 2.5.4 STAND SIZE CLASS. Added “seedlings and saplings” to the first sentence and this note to the text: . NOTE: Canopy cover is used to determine whether an area is forest or nonforest. Stocking is used with other variables such as this one.” Also, in each code, changed “…5 percent crown cover…” to “…10 percent canopy cover…” and added “seedlings and saplings” to accommodate the new definition of forest land. Also, deleted code 6 to correct the field guide to match the MIDAS program.
- 2.5.5 REGENERATION STATUS. Changed the last sentence before the Note from “In these cases, there is no need to differentiate conditions based on stand origin ” to “In these cases, there is no need to differentiate conditions based on regeneration status”.

- 2.5.6 TREE DENSITY. Changed the second sentence from “Base the classification on the number of stems/unit area, basal area, tree cover, or stocking of all live trees in the condition that are not overtopped, compared to any previously defined condition class TREE DENSITY.” to “Base the classification on the number of stems/unit area, basal area, tree cover, or stocking of all live trees, seedlings, and saplings in the condition that are not overtopped, compared to any previously defined condition class TREE DENSITY.”
- **2.5.8 (old) PRIVATE OWNER INDUSTRIAL STATUS. Deleted from the field guide (determined by expert panel) in final revision of the Ownership proposal.** Proposal ID: FIA Ownership Variables – Field Collected.doc
- **2.5.8 OWNER CLASS. (was 2.5.7) Modified the descriptive text. Changed the *When collected* CORE OPTIONAL statement from “CORE OPTIONAL: All accessible forest land condition classes (CONDITION CLASS STATUS = 1) and nonforest land condition classes CONDITION CLASS STATUS > 1)” to “CORE OPTIONAL: All condition classes (CONDITION CLASS STATUS ≥1)”. Also, dropped code 44 and modified the text in codes 42, 43, and 45.** Proposal ID: FIA Ownership Variables – Field Collected.doc **Added back in: the OWNER GROUP names back in as subheadings; Boy Scouts of America as an example in OWNER CLASS-FIELD code 42; and church camps in OWNER CLASS code 43, with the agreement of the proposal champion. Added back in code 44 with the agreement of the proposal champion.** Also, clarified the *When collected* CORE OPTIONAL from “All accessible forest land condition classes (CONDITION CLASS STATUS = 1) and nonforest land condition classes (CONDITION CLASS STATUS > 1)” to “All condition classes”.
- **2.5.9 OWNER SUB-CLASS (CORE OPTIONAL). Added this new variable and renumbered the rest of the section.** Proposal ID: FIA Ownership Variables – Field Collected.doc
- **2.5.10 PUBLIC ADMINISTRATIVELY WITHDRAWN STATUS (CORE OPTIONAL). Added this new variable and renumbered the rest of the section.** Proposal ID: Reserve_AdminWithdrawn_Change_Proposal2.doc Clarified *When collected* from “Any defined and documented combination of STATECD, COUNTYCD (if necessary), CONDITION CLASS and OWNCD (<40) for each individual assessment, where RESERVED STATUS=0.” to “When OWNCD <40 and RESERVED STATUS=0”.
- **2.5.11 ADMINISTRATIVELY WITHDRAWN AREA NAME. Added this new variable and renumbered the rest of the section.** Proposal ID: Reserve_AdminWithdrawn_Change_Proposal2.doc
- **2.5.12 ADMINISTRATIVELY WITHDRAWN NOTES (CORE OPTIONAL). Added this new variable and renumbered the rest of the section.** Proposal ID: Reserve_AdminWithdrawn_Change_Proposal2.doc
- **2.5.13 RESERVED AREA NAME. Added this new variable and renumbered the rest of the section.** Proposal ID: Reserve_AdminWithdrawn_Change_Proposal2.doc
- 2.5.15 STAND AGE. Changed the first sentence from “Record the average total age, to the nearest year, of the trees (plurality of all live trees not overtopped) in the predominant STAND SIZE CLASS of the condition, determined using local procedures.” to “Record the average total age, to the nearest year, of the trees (plurality of all live trees, seedlings, and saplings not overtopped) in the predominant STAND SIZE CLASS of the condition, determined using local procedures.” Also added this note to the first paragraph “NOTE: Canopy cover is used to determine whether an area is forest or nonforest. Stocking is used with other variables such as this one.”
- 2.5.16 DISTURBANCE 1. Changed the *When collected* from “All accessible forest land condition classes (CONDITION CLASS STATUS = 1) or accessible nonforest condition classes when nonforest is being sampled (NONFOREST SAMPLING STATUS = 1 and CONDITION CLASS STATUS = 2 and NONFOREST CONDITION CLASS STATUS = 2)” to “All accessible forest land condition classes (CONDITION CLASS STATUS = 1) or accessible nonforest condition classes when nonforest is being sampled (NONFOREST CONDITION CLASS STATUS = 2)”. Also, in code 80, changed the final sentence from “Must include a plot-level note to describe further.” to “Must include a condition-level note to describe further.”
- 2.5.22 TREATMENT1. Changed the *When collected* from “All accessible forest land condition classes (CONDITION CLASS STATUS = 1), or accessible nonforest condition classes when nonforest is being sampled (NONFOREST SAMPLING STATUS = 1 and CONDITION CLASS STATUS = 2 and NONFOREST CONDITION CLASS STATUS = 2)” to “All accessible forest land condition classes (CONDITION CLASS STATUS = 1”.

- 2.5.28 PHYSIOGRAPHIC CLASS. Changed the *When collected* from “All accessible forest land condition classes (CONDITION CLASS STATUS = 1), or accessible nonforest condition classes when nonforest is being sampled (NONFOREST SAMPLING STATUS = 1 and CONDITION CLASS STATUS = 2 and NONFOREST CONDITION CLASS STATUS = 2)” to “All accessible forest land condition classes (CONDITION CLASS STATUS = 1), or accessible nonforest condition classes when nonforest is being sampled (NONFOREST CONDITION CLASS STATUS = 2)”.
- **2.5.29 LAND COVER CLASS. Added this new variable and renumbered the rest of the section.**Proposal ID: 07_01_2009_Land_Cover_9.doc In code 06, dropped the following sentence: “The Common Land Unit (CLU) and/or the Cropland Data Layer code (from prefield) can be used to guide assignment of this class if it is ambiguous.” Also changed final sentence in code 08 from “Can include the natural material portions of quarries, mines, and gravel pits.” to “Can include the natural material portions of quarries, mines, gravel pits, and cut or burned land <10% vegetation.” Also in code 09, deleted “Sparsely Vegetated” form the name of the code. Also added a paragraph to the description.
- 2.5.30 PRESENT NONFOREST LAND USE. Modified the text. Changed the *When collected* from “CORE: SAMPLE KIND = 2, current CONDITION CLASS STATUS = 2, CORE OPTIONAL: SAMPLE KIND = 1, 2, or 3; current CONDITION CLASS STATUS = 2” to “CONDITION CLASS STATUS = 2”.
- 2.5.31 CANOPY COVER SAMPLE METHOD. Changed first sentence from “Record the CANOPY COVER SAMPLE METHOD used to determine LIVE CANOPY COVER, LIVE PLUS MISSING CANOPY COVER, and TOTAL STEMS for the condition.” to “Record the CANOPY COVER SAMPLE METHOD used to determine LIVE CANOPY COVER and LIVE PLUS MISSING CANOPY COVER for the condition.” Changed by DAB to accommodate Proposal ID: ForestDefRevision_2010Jul07.doc Also, under Subplot method number 3, deleted the second paragraph and the table, and changed “plots” to “subplots” in the last sentence of the first paragraph. Also, under Acre method, deleted the old number 3 and moved the old number 4 to number 3; corrected the equation “Canopy Area = pi*long axis d/2*short axis d/2)” to “pi*((long axis diameter/2)*(90 degrees axis diameter/2))”; in the paragraph Transition zones and forest/nonforest encroachment, deleted “stocking” from the first sentence; replaced figure 15 with a new figure. Also, under Sub-acre method, deleted the old number 4 and moved old number 5 and 6 up; deleted the far right column in the table; in the second column, changed “67.6” to “68.0” and “49.0” to “48.1”. Also, changed the *When collected* from “CONDITION CLASS STATUS = 1 or 2” to “CONDITION CLASS STATUS = 1, 2, or 5”.
- 2.5.32 LIVE CANOPY COVER. Changed text just prior to the *When collected* from “LIVE CANOPY COVER can be based on an ocular estimate when the condition in question is certain to contain greater than 10% LIVE PLUS MISSING CANOPY COVER or TOTAL STEMS greater than 200.” to “LIVE CANOPY COVER can be based on an ocular estimate when the condition in question is certain to contain greater than 10% LIVE PLUS MISSING CANOPY COVER or CURRENT AFFORESTATION CODE =1 and TOTAL STEMS greater than or equal to 150.”Changed by DAB to accommodate Proposal ID: ForestDefRevision_2010Jul07.doc and DAB conference calls Also, added this sentence to the last paragraph of text: “For LIVE CANOPY COVER <1 percent (trace), record 01. Also, changed the *When collected* from “All CONDITION CLASS STATUS = 1 or 2” to “CONDITION CLASS STATUS = 1, 2, or 5”.
- 2.5.33 LIVE PLUS MISSING CANOPY COVER. Deleted “chaining” from the first sentence. Added the following to the text “Dead trees and dead portions of live trees are not considered as missing unless it is part of the condition disturbance.” Also, changed the *When collected* from “CONDITION CLASS STATUS = 1 or 2” to “CONDITION CLASS STATUS = 1, 2, or 5”.
- **2.5.34 CURRENT AFFORESTATION CODE. Added this new variable.**Proposal ID: ForestDefRevision_2010Jul07.doc
- **2.5.35 PREVIOUS AFFORESTATION CODE. Added this new variable.**Proposal ID: ForestDefRevision_2010Jul07.doc
- **2.5.36 TOTAL STEMS. Change *When collected* from “CONDITION CLASS STATUS = 1 or 2” to “CURRENT AFFORESTATION CODE = 1 or PREVIOUS AFFORESTATION CODE = 1”.**Proposal ID: ForestDefRevision_2010Jul07.doc
- Also, in the second sentence, changed “plot size” to “subplot size”.
- **2.5.37 CHAINING CODE. Added this new variable.**Proposal ID: ForestDefRevision_2010Jul07.doc
- **3.3 SUBPLOT NONSAMPLED REASON. Added codes 06, 07, 08, and 09.**Proposal ID: 2010_03_01_cond_lost_code.doc

- 3.8 SUBPLOT SLOPE. Changed the *When collected* from "All subplots with at least one accessible forest land condition present on subplot (SUBPLOT/MACROPLOT STATUS = 1) or subplots with an accessible nonforest condition class present when nonforest is being sampled (NONFOREST SAMPLING STATUS = 1 and SUBPLOT/MACROPLOT STATUS = 2 and NONFOREST SUBPLOT/ MACROPLOT STATUS = 1)" to "All subplots with at least one accessible forest land condition present on subplot (SUBPLOT/MACROPLOT STATUS = 1) or subplots with an accessible nonforest condition class present when nonforest is being sampled (NONFOREST SUBPLOT/MACROPLOT STATUS = 1)".
- 3.9 SUBPLOT ASPECT. Changed the *When collected* from "All subplots with at least one accessible forest land condition present on subplot (SUBPLOT/MACROPLOT STATUS = 1) or subplots with an accessible nonforest condition class present when nonforest is being sampled (NONFOREST SAMPLING STATUS = 1 and SUBPLOT/MACROPLOT STATUS = 2 and NONFOREST SUBPLOT/ MACROPLOT STATUS = 1)" to "All subplots with at least one accessible forest land condition present on subplot (SUBPLOT/MACROPLOT STATUS = 1) or subplots with an accessible nonforest condition class present when nonforest is being sampled (NONFOREST SUBPLOT/MACROPLOT STATUS = 1)".
- 4.1 Reference Procedure. In #5, in the first sentence, changed "MQO's" to "tolerances".
- 5.0 Tree and Sapling Data. Fifth paragraph. Corrected the first sentence from "Once tallied, dead trees over 5.0 inches in diameter are tracked until they no longer qualify as standing dead." to "Once tallied, dead trees 5.0 inches and greater in diameter are tracked until they no longer qualify as standing dead."
- 5.5 HORIZONTAL DISTANCE. Added the following text to the description "Note: On remeasurement plots (SAMPLE KIND = 2), the current crew is responsible for verifying downloaded data and updating when it is out of tolerance. When the old pin or dowel is not found, the current crew cruisers should make sure that consider all "edge" trees or saplings that were in or out on the previous occasion when reestablishing the subplot center. For saplings on the microplot that become trees at the time of plot remeasurement, crews must collect new HORIZONTAL DISTANCE information from the subplot center." Also, Modified the tolerances to the following:

  Microplot: +/- 0.2 ft

  Microplot woodland species: +/- 0.4 ft

  Subplot: +/- 1.0 ft from 0.1 to 23.0 ft

  Subplot: +/- 0.2 ft from 23.1 to 24.0 ft

  Subplot multi-stemmed woodland species: +/- 2.0 ft

  Annular plot: +/- 3.0 ft from 24.0 to 55.9 ft

  Annular plot: +/- 1.0 ft from 55.9 to 58.9 ft

  Annular plot woodland species: +/- 6.0 ft
- 5.7.1 RECONCILE. In code 6, corrected "i.e." to "e.g."
- 5.8 SPECIES. Modified the text to reflect the addition of Caribbean species in version 5.1.
- 5.9.2 DIAMETER AT BREAST HEIGHT (DBH). Under #2, figure 26 was updated to clarify measure of trees that fork at or above 1.0 foot.
- 5.12 DIAMETER CHECK. Modified the text from "Record this code to identify any irregularities in diameter measurement positions (e.g., abnormal swellings, diseases, damage, new measurement positions, etc.) that may affect use of this tree in diameter growth/change analyses." to "Record this code to identify the accuracy of the diameter measurement (due to factors such as abnormal swellings, diseases, damage, new measurement positions, etc.) that may affect use of this tree in diameter growth/change analyses." Also added the following Note: "If either code 1 or code 2 is used, a tree-level note is required."
- 5.15 ACTUAL LENGTH. Added the following Note: ": Some regions will measure ACTUAL LENGTH differently due to growth form. Some examples are swamp tupelo, cypress, trees growing off of old high stumps with stilted roots in the West. Check regional field guides for regional guidance."
- **5.20 Tree Damage. Changed from CORE OPTIONAL to CORE. Also completely revised the text.**Proposal ID: Damage_final.doc
- 5.20 Tree Damage. Corrections were made to the table of code after the original posting of chapter 5 (file dated 4/26/2012)
- **5.20.1 DAMAGE LOCATION 1 (CORE OPTIONAL). Deleted this variable.**Proposal ID: Damage_final.doc
- **Figure 45. Location codes for damage. Deleted this figure.**Proposal ID: Damage_final.doc
- **Figure 46. The damage runs from stump to crownstem. Deleted this figure.**Proposal ID: Damage_final.doc
- **5.20.1 DAMAGE AGENT 1. Added this new variable.**Proposal ID: Damage_final.doc

- **5.20.2 DAMAGE TYPE 1 (CORE OPTIONAL). Deleted this variable.**Proposal ID: Damage_final.doc
- **5.20.2 DAMAGE AGENT 2. Added this new variable.**Proposal ID: Damage_final.doc
- **5.20.3 DAMAGE SEVERITY 1 (CORE OPTIONAL). Deleted this variable.**Proposal ID: Damage_final.doc
- **Figure 47. A canker which exceeds threshold. Deleted this figure.**Proposal ID: Damage_final.doc
- **Figure 48. Multiple damage in "stump" and lower bole. Deleted this figure.**Proposal ID: Damage_final.doc
- **Figure 49. Examples of damage coding. Deleted this figure.**Proposal ID: Damage_final.doc
- **Figure 50. Examples of damage coding. Deleted this figure.**Proposal ID: Damage_final.doc
- **Figure 51. Examples of damage coding. Deleted this figure.**Proposal ID: Damage_final.doc
- **Figure 52. Examples of damage coding. Deleted this figure.**Proposal ID: Damage_final.doc
- **Figure 53. Examples of damage coding. Deleted this figure.**Proposal ID: Damage_final.doc
- **Figure 54. Examples of damage coding. Deleted this figure.**Proposal ID: Damage_final.doc
- **Figure 55. Examples of damage coding. Deleted this figure.**Proposal ID: Damage_final.doc
- **5.20.3 DAMAGE AGENT 3. Added this new variable.**Proposal ID: Damage_final.doc
- **5.20.4 DAMAGE LOCATION 2 (CORE OPTIONAL). Deleted this variable.**Proposal ID: Damage_final.doc
- **5.20.5 DAMAGE TYPE 2 (CORE OPTIONAL). Deleted this variable.**Proposal ID: Damage_final.doc
- **5.20.6 DAMAGE SEVERITY 2 (CORE OPTIONAL). Deleted this variable.**Proposal ID: Damage_final.doc
- 5.26. DWARF MISTLETOE CLASS (CORE OPTIONAL). Added the following note: "In addition to these requirements, longleaf pine (0121) seedlings must be greater than or equal to 0.5 inches DRC."
- 6.0 SEEDLING DATA. Modified the first sentence from "Stocking and regeneration information are obtained by counting live seedlings within the 6.8-foot radius microplot located 90 degrees and 12.0 feet from each subplot center within each of the four subplots." to "Regeneration information is obtained by counting live seedlings within the 6.8-foot radius microplot located 90 degrees and 12.0 feet from each subplot center within each of the four subplots."
- 7.2.2 SPECIES. The site tree selection guidelines and values for the Eastern and Western U.S. were moved to this location from appendix 4. Also, added the following to match what is listed in 5.8 SPECIES: "Field width: 4 digits Tolerance: No errors MQO: At least 99% of the time for genus, at least 95% of the time for species". Also, the following changes were made in the list of valid *Values*:

Type of change	Species code	Common name	Region
Eastern U.S. species			
Deleted region	0131	loblolly pine	NC
Deleted region	0132	Virginia pine	NC
Deleted code	0135	Arizona pine	SO
Deleted code	0202	Douglas-fir	SO
Added code	0403	pignut hickory	NC
Added code	0404	pecan	NC
Added code	0405	shellbark hickory	NC
Added code	0408	black hickory	NC
Added code	0409	mockernut hickory	NC
Added code	0741	balsam poplar	NC
Deleted code	0745	plains cottonwood	SO
Deleted region	0746	quaking aspen	SO
Deleted code	0748	Fremont poplar	SO
Deleted code	0749	narrowleaf cottonwood	SO
Added code	0809	northern pin oak	NC
Deleted region	0813	cherrybark oak	NC
Added code	0823	bur oak	NC
Added code	0826	chinkapin oak	NC
Deleted region	0832	chestnut oak	NC
Added code	0975	slippery elm	NC
Added code	0977	rock elm	NC
Western U.S. species			
Added code	0068	eastern red cedar	RMRS

Added code	0101	whitebark pine	RMRS, PNW
Added region	0231	Pacific yew	RMRS
Added region	0351	red alder	RMRS
Added code	0462	hackberry	RMRS
Added code	0544	green ash	RMRS
Added code	0742	eastern cottonwood	RMRS
Added code	0972	American elm	RMRS

- 8.0 Phase 2 (P2) Vegetation Profile (Core Optional). The introductory text was clarified.
- 8.1 Vegetation Sampling Design. The text in this section was clarified.
- 8.2 General definitions. Canopy cover – this text was expanded and clarified. Figure 45 was clarified. Growth habits – this text was clarified including adding subshrubs to the description. Layer codes – this text was expanded and clarified: a table and figure were added. NRCS PLANTS database – the database reference was updated (occurred in version 5.1 but repeated here for clarity.) Figure 46 was added and the following figures renumbered. New figure 47 was clarified. Tables 1 and 2 were updated.
- 8.3.1 P2 VEGETATION SAMPLING STATUS. Modified code 2 from "Vegetation data collected on all accessible land conditions (CONDITION CLASS STATUS=1 or 2, NONFOREST SAMPLING STATUS =1 and NONFOREST PLOT STATUS=1)" to "P2 Vegetation data collected on all accessible land conditions (CONDITION CLASS STATUS=1 or NONFOREST CONDITION CLASS STATUS =2)".
- 8.3.2 LEVEL OF DETAIL. Modified the text from "This plot-level variable determines whether data are collected for vegetation structure growth habits only or for individual species (that qualify as most abundant) as well. If LEVEL OF DETAIL = 3, then a tree species could be recorded twice, but it would have two different species growth habits (see 8.6.1)." to "This plot-level variable determines whether data are collected for *Vegetation Structure* only or for *Species Composition* as well. If LEVEL OF DETAIL = 3, then a tree species could be recorded twice, but it would have two different SPECIES GROWTH HABITs (see 8.6.1)." Also modified text in all three codes.
- 8.4.1 SUBPLOT NUMBER. Modified *When collected* from "On all plots where P2 Vegetation is being sampled (P2 VEGETATION SAMPLING STATUS = 1 or 2)" to "On all subplots where P2 Vegetation is being sampled (P2 VEGETATION SAMPLING STATUS = 1 or 2)".
- 8.4.2 P2VEG SUBPLOT SAMPLE STATUS. Clarified the text. Also modified the *When collected* from "On all subplots where P2 vegetation is being sampled on accessible forest land (P2 VEGETATION SAMPLING STATUS=1 and SUBPLOT STATUS = 1) or is being sampled on accessible forest land or nonforest land and at least one accessible nonforest land condition is present on the plot (P2 VEGETATION SAMPLING STATUS=2 and NONFOREST SUBPLOT STATUS=1) to "On all subplots where P2 Vegetation is being sampled on accessible forest land (P2 VEGETATION SAMPLING STATUS=1) and at least one accessible forest land condition (CONDITION CLASS STATUS = 1) exists within the 24-foot radius subplot, or P2 Vegetation is being sampled on all accessible land conditions (P2 VEGETATION SAMPLING STATUS=2) and at least one accessible forest condition or measurable nonforest condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) exists within the 24-foot radius subplot."
- 8.4.3 VEGETATION NONSAMPLED REASON. Modified the *When collected* from "On all subplots where P2 vegetation is being sampled on all accessible land conditions (P2 VEG SUBPLOT SAMPLE STATUS = 2)" to "On all subplots where P2 VEG SUBPLOT SAMPLE STATUS = 2".
- 8.4.4 CONDITION CLASS NUMBER. Clarified the text. Also, modified the *When collected* from "Any accessible condition class when P2 vegetation is being sampled on accessible forest land conditions (P2 VEGETATION SAMPLING STATUS =1)" to "Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)".
- 8.4.5 VEGETATION SUBPLOT NOTES. Added the following text: "When plant specimens are collected, use this field to record a community type description for each subplot sampled for P2 Vegetation. The community description is intended to fully automate the specimen collection process by providing a description of the community in which this plant was found. Some examples of community descriptions are as follows:
    - 25 year aspen boundary of mature trees. very little slope. a lot of light entry
    - *acer saccharum* floodplain forest. hummock-hollow microtopography.
    - mature mesic hemlock-hardwood forest adjacent to pond

  The community type description field is a note that is accessible via Ctrl+E from the P2 Subplot screen for P2VEG."

- 8.5 Vegetation Structure. Clarified the introductory text. Canopy cover by layer – clarified the description. Aerial View Coverage – this text was almost completely rewritten for clarity. Vegetation Structure Growth Habits – the definitions of the growth habits Tally Tree Species (TT), Non-tally Tree Species (NT), and Shrubs/Subshrubs/Woody Vines (SH) were clarified.
- 8.5.1 TALLY TREE SPECIES COVER LAYER 1. Modified the *When collected* from "On all conditions within subplots where (P2 VEGETATION SAMPLING STATUS=1 and CONDITION CLASS STATUS = 1) or (P2 VEGETATION SAMPLING STATUS=2 and NONFOREST CONDITION STATUS=2)" to "Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)".
- 8.5.6 NON_TALLY TREE SPECIES COVER LAYER 1. Modified the *When collected* from "On all conditions within subplots where (P2 VEGETATION SAMPLING STATUS=1 and CONDITION CLASS STATUS = 1) or (P2 VEGETATION SAMPLING STATUS=2 and NONFOREST CONDITION STATUS=2)" to "Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)".
- 8.5.10 NON_TALLY TREE SPECIES COVER – AERIAL VIEW. Changed the last sentence in the text from "Follow the same procedures as for NON-TALLY TREE SPECIES COVER LAYER 1" to "Follow the same procedures as for NON-TALLY TREE SPECIES COVER LAYER 1, but include all layers."
- 8.5.11 SHRUB AND WOODY VINE COVER LAYER 1. Change the variable name from "SHRUB AND WOODY VINE COVER LAYER 1" to "SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 1". Changed the text from "Record a total canopy coverage for shrubs in layer 1 (0-2.0 feet) to the nearest percent." to "Record canopy cover for shrubs/subshrubs/woody vines in layer 1 (0-2.0 feet) to the nearest percent." Also modified the *When collected* from "On all conditions within subplots where (P2 VEGETATION SAMPLING STATUS=1 and CONDITION CLASS STATUS = 1) or (P2 VEGETATION SAMPLING STATUS=2 and NONFOREST CONDITION STATUS=2)" to "Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)".
- 8.5.12 SHRUB AND WOODY VINE COVER LAYER 2. Change the variable name from "SHRUB AND WOODY VINE COVER LAYER 2" to "SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 2". Changed the text from "Record a total canopy coverage for shrubs in layer 2 (2.1-6.0 feet) to the nearest percent." to "Record canopy cover for shrubs/subshrubs/woody vines in layer 2 (2.1-6.0 feet) to the nearest percent."
- 8.5.13 SHRUB AND WOODY VINE COVER LAYER 3. Change the variable name from "SHRUB AND WOODY VINE COVER LAYER 3" to "SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 3". Changed the text from "Record a total canopy coverage for shrubs in layer 3 (6.1-16.0 feet) to the nearest percent." to "Record canopy cover for shrubs/subshrubs/woody vines in layer 3 (6.1-16.0 feet) to the nearest percent."
- 8.5.14 SHRUB AND WOODY VINE COVER LAYER 4. Change the variable name from "SHRUB AND WOODY VINE COVER LAYER 4" to "SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 4". Changed the text from "Record a total canopy coverage for shrubs in layer 4 (16.1 feet and above) to the nearest percent." to "Record canopy cover for shrubs/subshrubs/woody vines in layer 4 (16.1 feet and above) to the nearest percent."
- 8.5.15 SHRUB AND WOODY VINE COVER – AERIAL VIEW. Change the variable name from "SHRUB AND WOODY VINE COVER – AERIAL VIEW" to "SHRUB, SUBSHRUB, AND WOODY VINE COVER = AERIAL VIEW". Changed the text from "Record the total canopy cover for the shrub/ woody vine growth habit over all layers. Follow the same procedures as for SHRUB AND WOODY VINE COVER LAYER 1, but include all layers." to "Record the total aerial canopy cover for the shrub/subshrub/woody vine growth habit over all layers. Follow the same procedures as for SHRUB, SUBSHRUB, AND WOODY VINE COVER LAYER 1, but include all layers".
- 8.5.16 FORB COVER LAYER 1. Modified the *When collected* from "On all conditions within subplots where (P2 VEGETATION SAMPLING STATUS=1 and CONDITION CLASS STATUS = 1) or (P2 VEGETATION SAMPLING STATUS=2 and NONFOREST CONDITION STATUS=2)" to "Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)".

- 8.5.20 FORB COVER _ AERIAL VIEW. Changed the text from “Record the total canopy cover for the forb growth habit over all layers. Follow the same procedures as for FORB COVER LAYER 1.” to “Record the total aerial canopy cover for the forb growth habit over all layers. Follow the same procedures as for FORB COVER LAYER 1, but include all layers.”
- 8.5.21 GRAMINOID COVER LAYER 1. Modified the *When collected* from “On all conditions within subplots where (P2 VEGETATION SAMPLING STATUS=1 and CONDITION CLASS STATUS = 1) or (P2 VEGETATION SAMPLING STATUS=2 and NONFOREST CONDITION STATUS=2)” to “Any accessible measured land condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) when P2 vegetation is being sampled on the subplot (P2 VEG SUBPLOT SAMPLE STATUS = 1)”.
- 8.5.25 GRAMINOID COVER – AERIAL VIEW. Changed the text from “Record the total canopy cover for the graminoid growth habit over all layers. Follow the same procedures as for GRAMINOID COVER LAYER 1.” To “Record the total aerial canopy cover for the graminoid growth habit over all layers. Follow the same procedures as for GRAMINOID COVER LAYER 1, but include all layers.”
- 8.6 Species Composition. The text was extensively rewritten for clarity. Also, the caption for figure 48 was revised. Also, a new figure was added, figure 49. Renumbered the rest of figures following figure 49.
- 8.6.1 SPECIES GROWTH HABIT. The text was extensively rewritten for clarity. All five codes were also revised.
- 8.6.2 SPECIES CODE. Three sentences in the text were revised. The first two were changed from “Record a code for each sampled vascular plant species found rooted in or overhanging the sampled condition of the subplot at any height. Species codes must be the standardized codes in the Natural Resource Conservation Service (NRCS) PLANTS database (currently January 2010 version). ” to “Record a code for each most abundant (see section 8.6) vascular plant species. Species codes must be the standardized codes in the Natural Resource Conservation Service (NRCS) PLANTS database (currently January 2010 version).” The other sentence was changed from “For example, if several unknown CAREX species are present, only record the individual species present with cover of at least 3 percent.” to For example, if several unknown CAREX species are present, only record the individual most abundant species.” Also added the following sentence to the text: “See appendix 10, Unknown Plant Specimen Collection.” Also the *When collected* was changed from “LEVEL OF DETAIL = 2 or 3 and species canopy cover on the full subplot is 3% or greater.” to “Level of detail = 2 or 3 and species total aerial canopy cover on the full subplot and within a SPECIES GROWTH HABIT is 3% or greater.”
- 8.6.4 SPECIES CANOPY COVER. The text was extensively revised. Also, the *When collected* was changed from “For each plant species present on the subplot with canopy cover greater than or equal to 3%. A plant species is defined as a unique SPECIES CODE and UNIQUE SPECIES NUMBER pair.” to “For each plant species present on the subplot with total aerial canopy cover greater than or equal to 3% within a SPECIES GROWTH HABIT. A plant species is defined as a unique SPECIES CODE and UNIQUE SPECIES NUMBER pair.”
- 8.6.5 SPECIES VEGETATION LAYER. The text was clarified.
- 8.6.6 SPECIMEN OFFICIALLY COLLECTED. The text was clarified.
- 8.6.7 SPECIMEN LABEL NUMBER. The text was changed from “Record the label number for the collected specimen. Pre-numbered labels are provided to each crew by the regional coordinator.” to “Record the label number for the collected specimen. Pre-numbered labels are provided to each crew by the regional coordinator or auto-generated with the data collection software.” Also, the *Values* were clarified from “1 to 99999, as pre-printed and assigned by region” to “1 to 99999, as pre-printed and assigned by region or auto-generated in the PDR”.
- 9.1 Invasive species sample design. Deleted the reference to appendix 9 from paragraph 3.
- 9.2 Species Records. The fourth sentence was changed to use terminology consistent with the rest of the chapter (“foliage” instead of “vegetation and plant parts”).
- 9.3 INVASIVE PLANT SAMPLING STATUS (Plot-level variable). In code 2, NONFOREST CONDITION STATUS was corrected to NONFOREST CONDITION CLASS STATUS.
- 9.5 INVASIVE PLANT SUBPLOT STATUS (Subplot-level variable). Changed the variable name to “INVASIVE PLANT SUBPLOT SAMPLE STATUS”. Also, the *When collected* was changed from “On all subplots where (INVASIVE PLANT SAMPLING STATUS=1 and SUBPLOT STATUS=1) or (INVASIVE PLANT SAMPLING STATUS=2 and NONFOREST SUBPLOT STATUS=2)” to “On all subplots where invasive species are being sampled on accessible forest land (INVASIVE PLANT SAMPLING STATUS=1 and at least one accessible forest land condition (CONDITION CLASS STATUS = 1) exists

within the 24-foot radius subplot, or invasive species are being sampled on all accessible land conditions (INVASIVE PLANT SAMPLING STATUS=2) and at least one accessible forest condition or measurable nonforest condition (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS = 2) exists within the 24-foot radius subplot"

- 9.6 INVASIVE PLANT NONSAMPLED REASON (Subplot-level variable). The *When collected* was changed from "On all subplots where INVASIVE PLANT SUBPLOT STATUS = 3" to "On all subplots where INVASIVE PLANT SUBPLOT SAMPLE STATUS = 3".
- 9.8 CONDITION CLASS NUMBER. The *When collected* was changed from "Any condition class where (INVASIVE PLANT SAMPLING STATUS=1 and CONDITION CLASS STATUS=1) or (INVASIVE PLANT SAMPLING STATUS=2 and NONFOREST CONDITION CLASS STATUS=2)." to "Any accessible measured land condition within subplots (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS =2) when invasive plants are being sampled on the subplot (INVASIVE PLANT SUBPLOT SAMPLE STATUS=1 or 2)".
- 9.9 SPECIES CODE. Updated the text for no appendix 9, and updated the reference to the PLANTS database. The *When collected* was changed from ": On all conditions within subplots where INVASIVE PLANT SUBPLOT STATUS=1 and ((INVASIVE PLANT SAMPLING STATUS=1 and CONDITION CLASS STATUS=1) or (INVASIVE PLANT SAMPLING STATUS=2 and NONFOREST CONDITION CLASS STATUS=2))." to "Any accessible measured land condition within subplots (CONDITION CLASS STATUS = 1 or NONFOREST CONDITION CLASS STATUS =2) when invasive plants are being sampled on the subplot (INVASIVE PLANT SUBPLOT SAMPLE STATUS=1 or 2)".
- 9.13 INVASIVE SPECIMEN COLLECTED. The *When collected* was changed from "Each record where INVASIVES PLANT SUBPLOT STATUS=1, INVASIVE PLANT SPECIMEN COLLECTION RULE = 1, and an unknown SPECIES CODE was used." to "All species records when INVASIVE PLANT SPECIMEN COLLECTION RULE = 1" Also, the text was clarified.
- **Chapter 10. Down Woody Materials. Added this new chapter.** Proposal ID: DWM_Review_response-Proposal_Mod.doc and DWM_FieldGuide_Dec2009.docx and subsequent revisions by the DWM team. **This chapter takes the place of the old P3 Down Woody Materials procedures.**
- List of APPENDICES. Modifications were made to number 3 and number 4 to match changes in the respective appendices. Added appendix 11 and appendix 12.
- Appendix 2. FIA Forest Type Codes. Code 962 description. Clarified the text.
- Appendix 3. Made the following corrections to the species code list:

These changes were originally made in the online version of the FIA Field Guide version 5.0. The corrections are documented again here for the convenience of the user.

FIA code	Changes (in red type)
0583	Corrected PLANTS code from HAPA3 to HAPA2 (Correct in pdr and database)
7016	Species changed to variegata var. orientalis
7037	Deleted this duplicate code for Tasmanian bluegum, Eucalyptus globulus
7068	Species changed to cordata var. sintenisii
7466	Species changed to urbaniana var. riedlaei
7663	Species changed to bidentata ssp. surinamensis
8178	Species changed to racemosa var. grisea
8269	Species changed to obtusa var. obtusa
8349	Species changed to serotina ssp. capuli
8615	Deleted this duplicate code for white bully, Sideroxylon, salicifolium
8680	Deleted this duplicate code for West Indian mahogany, Swietenia mahagoni
8739	Deleted this duplicate code for Montezuma bald cypress, Taxodium mucronatum
8794	Species changed to striata var. portoricensis
8798	Deleted this duplicate code for Florida thatch palm, Thrinax radiata
8868	Deleted this duplicate code for Vernicia fordii

These were additional changes from 5.1 to 6.0.

FIA code	Changes (in red type)
118	Chihuahuan Pine
748	Fremont~~'s~~ Cottonwood
840	margartt~~i~~ae
859	Added C to the Caribbean column

. .

891	Added C to the Caribbean column
940	Added C to the Caribbean column

- Appendix 4. Moved the text to 7.2.2 and changed the title to "Was previously: Site Tree Selection Criteria and Species list (This information is now located in 7.2.2 SPECIES".
- **Appendix 6. Glossary. Updated the definition of Accessible Forest Land to match the change in definition approved through the change process.** Changed by DAB to accommodate Proposal ID: ForestDefRevision_2010Jul07.doc
- Appendix 7. Tolerance/MQO/VALUE/Units Table. Updated this appendix based on changes in the rest of the document.
- Appendix 9. Invasive Plant list. The table was deleted and the following text was added: "To obtain a current invasive plant list, contact the local region for the appropriate list."This changes was made by the DAB with the agreement of the invasive plants indicator advisor (chapter author).
- Appendix 10. Unknown Plant Specimen Collection. The text was clarified.
- **Appendix 11. Damage… Added this new appendix.** Proposal ID: workshhet_12_15.xlsx After the original file was posted (file dated 4/26/2012), the following correction were made:

Added codes and information for codes 11057,11058, 11059, 11060, 11800, 11900, 12200, 12201, 12202, 12203, 12204, 12205, 12206, 12207, 12208, 12209, 12300, 12800, 12900, 13030, 13800, 13900, 14071, 14072, 14073, 14074, 14075, 14800, 14900, 15088,15089, 15090, 15091, 15092, 15093, 15094, 15095, 15096, 15097,15800, 15900, 16050, 16051, 16052, 16053,16054, 16800, 16900, 17021, 17022, 17800, 17900, 21027, 21028, 21029, 21030, 21031, 21033, 21700, 21800, 21900, 22083, 22084, 22085, 22086, 22087, 22300, 22400, 22001, 22002, 22003, 22004, 22010, 22024, 22027, 22028, 22031, 22039, 22040, 22044, 22047, 22048, 22049, 22059, 22062, 22063, 22064, 22065, 22066, 22067, 22068, 22069,22070, 22071, 22072, 22074, 22081, 22800, 22900, 23022, 23023, 23024, 24029, 24030, 24031, 24032, 24800, 24900, 25074, 25075, 25076, 25077, 25800, 25900, 26012, 26013, 26800, 26900, 27003, 27004, 27800, 27900, 41015, 41017, 41800, 41900, 50019, 50020, 50800, 50900, 60001, 71001, 85000, 90011, 90012, 90013, 99000, 99999.

Code 11024 – the common name and scientific names were changed from "Ips latiens" to "Orthotomicus latidens".

Code 12021 – the common name was changed from "fruit tree leafroller" to "fruittree leafroller".

Code 12039 – the common name was changed from "western pine tortrix" to "western pine budworm".

Code 12164 – the common name was changed from "saddlebacked looper" to "saddleback looper".

Code 12182 – the scientific name was changed from "Neodiprion merkel1" to "Neodiprion merkeli".

Code 12195 – the common name was changed from "pine tip moth" to "pine tube moth".

Code 14001 – the common name was changed from "scale insect" to "scale insects".

Code 15030 – the common name was changed from "Eucosma species" to "Eucosma shoot borers".

Code 15034 – the common name was changed from "Warren's collar weevil" to "Warren root collar weevil".

Code 15038 – the common name was changed from "white pine bark miner" to "white pine barkminer moth".

Code 15052 – the threshold was changed from "Damage to ≥10% of the circumference" to "Damage to ≥10% of the bole circumference".

Code 16900 – the common and scientific names were changed from "unknown seed/cone/flower/fruit insects" to "unknown seed/cone/flower insects".

Code 22006 – the region was changed from "SRS" to "NRS; SRS".

Code 22087 – the region was changed from blank to "All".

Code 23001 – the scientific name was changed from blank to "mistletoe".

Code 23002 – the scientific name was changed from blank to "parasitic plants".

Code 23003 – the scientific name was changed from blank to "vine damage".

Code 25022 – the common name was changed from "Elytroderma disease" to "Elytroderma needle blight".

Code 25900 – the common and scientific names were changed from "unknown other/shoot disease" to "unknown foliage/shoot disease".

Code 30000 – the threshold was changed from "Damage ≥ 20% of bole circumference; ≥20% of stems on multi-stemmed woodland species affected; ≥20% of crown affected." to "Damage ≥ 20% of bole circumference; >20% of stems on multi-stemmed woodland species affected; ≥20% of crown affected."

Code 41001 – the common name was changed from "bear" to bears".

Code 41002 – the common name was changed from "beaver" to "beavers".

Code 41003 – the common name was changed from "big game (deer)" to "big game".

Code 42004 was added.

Code 42800 was added.

Old code 42004 was changed to code 42900.

Code 70007 – In the threshold, the duplicated phrase "Any damage to the terminal" was deleted.

Code 70012 was deleted.

The code number for 80000 was added.

Code 90011 – the threshold was changed from "Damage ≥20% of bole" to "Damage ≥20% of bole circumference (in a running 3-foot section) at point of occurrence."

Code 90012 – the threshold was changed from "Damage ≥20% of bole" to "Damage ≥20% of bole circumference (in a running 3-foot section) at point of origin; ≥20% of branches affected"

Code 90013 – the region was changed from blank to "PNW".

- Appendix 12. Reserved and Administratively Withdrawn Status by Owner and Land Designation. Added this new appendix.Proposal ID: Reserve_AdminWithdrawn_Change_Proposal2.doc
- Appendix 13. Ownership Prefield Procedures. Added this new appendix. Also, the following corrections have been made in appendix 13 since the first posting:

A13.10 COMPANY. Changed the *When collected* for Core from "All corporate and other private organization plot ownerships (OWNER CLASS = 41, 42, or 43 and OWNER TYPE = 1)" to "All corporate and other private organization plot ownerships (OWNER CLASS = 41, 42, 43, or 44 and OWNER TYPE = 1)". And changed the Core Optional *When collected* from ""All corporate and other organization ownerships and public agencies recorded for a plot (OWNER CLASS = 41, 42, or 43 and OWNER TYPE ≥ 1)" to ""All corporate and other organization ownerships and public agencies recorded for a plot (OWNER CLASS = 41, 42, 43, or 44 and OWNER TYPE ≥ 1)".

A13.11 MANAGEMENT UNIT. Change the *When collected* for Core from "All public and private plot ownerships (OWNER CLASS = 11, 12, 13, 21, 22, 23, 24, 25, 31, 32, or 33 and OWNER TYPE = 1)" to "All public and private plot ownerships (OWNER TYPE = 1)". And changed the *When collected* for Core Optional from "All public and private ownerships recorded for a plot (OWNER CLASS = 11, 12, 13, 21, 22, 23, 24, 25, 31, 32, or 33 and OWNER TYPE ≥ 1)" to "All public and private ownerships recorded for a plot (OWNER TYPE ≥ 1)".

A13.19 ADDRESS PROVINCE. Changed the *When collected* for Core "All private plot ownerships with mailing addresses in the United States (OWNER CLASS ≥ 41 and OWNER TYPE = 1 and ADDRESS COUNTRY ≠ "US")" to "All private plot ownerships with mailing addresses outside of the United States (OWNER CLASS ≥ 41 and OWNER TYPE = 1 and ADDRESS COUNTRY ≠ "US")". And changed the Core Optional *When collected* from "All private plot ownerships with mailing addresses in the United States (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1 and ADDRESS COUNTRY ≠ "US")" to "All private plot ownerships with mailing addresses outside of the United States (OWNER CLASS ≥ 11 and OWNER TYPE ≥ 1 and ADDRESS COUNTRY ≠ "US")"

A13.47 OWNERSHIP CONTACT METHOD (CORE OPTIONAL). Change the *When collected* from "All ownerships contacted (OWNER CONTACTED = 1)" to "All ownerships contacted".

A13.49 ACCESS GRANTED (CORE OPTIONAL). Change the *When collected* from "All ownerships contacted (OWNER CONTACTED = 1)" to "All ownerships contacted".

A13.52 ACCESS NOTES (CORE OPTIONAL). Change the *When collected* from "All ownerships contacted (OWNER CONTACTED = 1)" to "All ownerships contacted".

A13.53 OWNERSHIP REQUESTS NOTICE (CORE OPTIONAL). Change the *When collected* from "All ownerships contacted (OWNER CONTACTED = 1)" to "All ownerships contacted".

A13.54 OWNERSHIP REQUESTS INFORMATION (CORE OPTIONAL). Change the *When collected* from "All ownerships contacted (OWNER CONTACTED = 1)" to "All ownerships contacted".

A13.56 INFORMATION REQUEST FULFILLED (CORE OPTIONAL). Change the *When collected* from "All ownerships contacted (OWNER CONTACTED = 1)" to "All ownerships contacted".

Glossary

Note: Data items listed as glossary terms are shown in all capital letters (e.g., ACTUAL LENGTH).

Accessible - Can be safely reached and occupied (access denied, Census water, and noncensus water are never accessible).

ACTUAL LENGTH - The *ACTUAL LENGTH* of the tree is *measured* from ground level *(measured from the uphill side of a tree on a slope)* to the highest remaining portion of the tree still present and attached to the bole. For trees with missing tops (top on live trees is completely detached; top on dead trees is greater than 50 percent detached from the tree), measure the ACTUAL LENGTH of the tree from ground level to the break. Forked trees should be treated the same as unforked trees.

Agricultural *l*and - Land managed for crops, pasture, or other agricultural use. Evidence includes geometric field and road patterns, fencing, and the traces produced by livestock or mechanized equipment. The area must be at least 1.0 acre in size and *meet the minimum width requirement of* 120.0 feet *to qualify*.

Annular plot - *A* circular ring with a beginning radius of 24.0 feet from subplot center and an ending radius of 58.9 feet.

ARTIFICIAL REGENERATION SPECIES - Indicates the predominant species that is planted or seeded in an artificially regenerated condition.

Aspect - Compass direction that a slope faces.

Basal area - The area of a given section of land that is occupied by the cross-section of a tree trunk, or a stem, at its base.

Baseline - A line on an aerial photo used as a datum for further work. When the azimuth and length of the line are known (provided, or determined by taking ground measurements), the orientation and scale of the photo can be determined.

Blind check - *A* re-installation of a production plot done by a qualified crew without production crew data on hand. A full re-installation of the plot is recommended for the purpose of obtaining a measure of uncertainty in the data. All plot-level information (e.g., boundary and condition information) will be collected on each blind check plot. The two data sets are maintained separately. Discrepancies between the two sets of data are not reconciled. Blind checks are done on production plots only.

Board foot - A volume measure of lumber 1-foot wide,1-foot long, and 1 inch thick equal to 144 cubic inches.

Bole - The main stem of a tree, extending from one foot above the ground to the point on the tree where *diameter outside bark (*DOB*)* reaches 4 inches.

Botched plot - A plot that should not be included in the standard inventory data base due to data collection errors or other problems.

Boundary - The intersection of two or more conditions on a subplot, *macroplot, hectare plot,* or microplot. Each boundary is described by recording the azimuth and horizontal distance from the subplot, *macroplot, hectare plot,* or microplot center to the left and right points of where the boundary intersects the perimeter of the *respective fixed-radius plot*. An azimuth and distance to a corner point may also be described, if one exists. If multiple boundaries exist at a subplot, they are recorded in the order of their occurrence on the subplot, starting from north and proceeding around the compass.

Census *w*ater - Rivers, streams, *and canals etc.* that are more than 200 feet wide and *ocean, lakes, reservoirs, ponds, and similar* bodies of water that are greater than 4.5 acres in size.

Certification plot - *A* plot installed by a certification candidate. It may be a training plot or a production plot. The candidate working alone installs the plot.

Chaparral - Areas covered with heavily branched dwarfed trees or shrubs, usually evergreen, the crown canopy of which currently covers greater than 10 percent of the ground. The principal species are dwarf Quercus, Cercocarpus, Garrya, Ceanothus, Arctostaphylos, Baccharis, and Adenostoma.

Clump - Three or more live hardwood stems, 1.0 inch or greater, originating from a common root system; includes stumps and forks below DBH, but not seedling-sized sprouts or suckers.

Cold check - An inspection of a production plot done either as part of the training process, periodic review of field crew performance, or as part of the ongoing QA/QC program. Normally the installation crew is not present at the time of inspection. The inspector has the completed data in-hand at the time of inspection. The inspection can include the whole plot or a subset of the plot. Cold checks are done on production plots only.

Compaction (soil) - Process by which soil grains are rearranged so as to come into closer contact with one another, resulting in a decrease in void space and an increase in soil bulk density (Helms 1998).

Condition class - The combination of discrete attributes that describe the area associated with a plot. These attributes include condition status (land use), forest type, stand origin, stand size, owner group, reserve status, and stand density, as well as other ancillary and computed attributes.

Corporate land - An ownership class of private lands owned by a company, corporation, legal partnership, investment firm, bank, timberland investment management organization (TIMO), or real estate investment trust (REIT).

Crook - Abrupt bend in a tree or log (Helms 1998).

Cropland - Land under cultivation within the past 24 months, including orchards and land in soil improving crops, but excluding land cultivated in developing improved pasture.

CROWN CLASS - A classification of trees based on dominance in relation to adjacent trees within the stand as indicated by crown development and the amount of sunlight received from above and sides.

Cull - Portions of a tree that are unusable for industrial wood products because of rot, form, or other defect.

Declination - The azimuth correction used to adjust magnetic north to true north with a compass, measured in degrees.

Defoliation - Premature removal of foliage (Goheen and Willhite 2006).

Diameter at *b*reast *h*eight (DBH) - The diameter of the bole of a tree at breast height (4.5 feet above the ground *on the uphill side of tree*), measured outside of the bark.

Diameter at *r*oot *c*ollar (DRC) - The diameter of a tree measured at the ground line or stem root collar, measured outside of the bark.

Diameter *o*utside *b*ark (DOB) - A diameter that may be taken at various points on a tree, or log, **outside** of the bark. Diameter *o*utside *b*ark is often estimated.

Disturbance - Any relatively discrete event in time that disrupts ecosystem, community, or population structure and changes resources, substrate availability, or the physical environment (Helms 1998).

Down woody material (DWM) - Dead material on the ground in various stages of decay, including coarse and fine woody material.

Duff - Duff is the layer just below litter. It is the soil layer dominated by organic material derived from the decomposition of plant and animal litter and deposited on either an organic or a mineral surface. This layer is distinguished from the litter layer in that the original organic material has undergone sufficient decomposition that the sources of this material (e.g., individual plant parts) can no longer be identified.

Ecological unit - Zones defined in an FIA stockability study that share similar plant species.

FDM - Field Data Manager (also known as Plot Edit Tools) is a Microsoft Access Application which runs on a PC. It is used as a secondary edit of plot data which captures the crew's explanations for errors and warnings found in the data.

Federal Information Processing Standard (FIPS) - A unique code identifying U.S. States and counties (or units in Alaska).

Forest *i*ndustry *l*and - Land owned by companies or individuals that operate *a primary wood processing* plant.

Forest Service administered lands - Land owned or administered by the Forest Service; includes national forests, national grasslands, wilderness, national scenic areas, etc.

FOREST TYPE - A classification of forest land based upon, and named for, the tree *species that forms the plurality of live-tree stocking*.

Forked tree - A tree with a stem that is at least 1/3 the diameter of the main stem and branches 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.

Fuelbed - The accumulated mass of dead, woody material on the surface of the forest floor.

GPS - Global Positioning System. Information from this system is collected and used to determine the latitude and longitude of each plot.

Graminoid - Grasses (family Gramineae or Poaceae) and grasslike plants such as sedges (family Cyperaceae) and rushes (family Juncaceae).

Hardwoods - *Tree species belonging to the botanical subdivision Angiospermae, class* Dicotyledonous, usually broad-leaved and deciduous.:

Hazardous - An area that cannot be accessed because of a hazard or danger, for example: cliffs, quarries, strip mines, illegal substance plantations, high water, etc.

Hectare plot - A circular, fixed area plot with a radius of 185.1 feet. Hectare plots are used for sampling very large trees on qualifying federal lands.

Hex number - Previous terminology for "plot number"; hex number equals plot number.

Hot check - *A*n inspection normally done as part of the training process. The inspector is present on the plot with the trainee and provides immediate feedback regarding data quality. Data errors are corrected. Hot checks can be done on training plots or production plots.

Idle *f*armland - Former cropland or pasture that has not been tended within the last *two* years and that has less than 10 percent stocking with live trees.

Improved *p*asture - Land that is currently maintained and used for grazing. Evidence of maintenance, besides the degree of grazing, includes condition of fencing, presence of stock ponds, periodic brush removal, seeding, irrigation, or mowing.

Improved road - Paved roads, gravel roads, or improved dirt roads regularly maintained for longterm continuing use by normal passenger vehicles. Generally constructed using machinery. The area where the original topography has been disturbed by cutbanks and fill is considered part of the road, if that area is maintained. Unimproved traces and roads created for skidding logs are not considered improved roads.

Inclusion - An area that would generally be recognized as a separate condition, except that it is not large enough to qualify. For example, a ½ acre pond within a forested stand.

Industrial roundwood - Trees that are capable of growing to size and quality adequate to produce lumber and other manufactured products (exclude fence posts and fuel wood which are not considered manufactured)**.**

Industrial *w*ood - All roundwood products, except firewood.

Inspect*or* - *A* qualified QC/QA individual whose primary responsibility is the training, certification and inspection of production crews.

Krummholz - The shrubby, multi-stemmed form assumed by trees near treeline.

Land *a*rea - As defined by the Bureau of the Census: The area of dry land and land temporarily or partially covered by water such as marshes, swamps, and river flood plains (omitting tidal flats below mean tide); streams, sloughs, estuaries and canals less than 200 feet in width, and ponds less than 4.5 acres in area.

Litter - Undecomposed or only partially decomposed organic material that can be readily identified. Includes the layer of freshly fallen leaves, needles, twigs (< 0.25 inch in diameter), cones, detached bark chunks, dead moss, dead lichens, detached small chunks of rotted wood, dead herbaceous stems and flower parts (detached and not upright).

Macroplot - A circular, fixed area plot with a radius of 58.9 feet. Macroplots may be used for sampling relatively rare events*, such as large trees or mortality.*

Marsh - Low, wet areas characterized by heavy growth of *herbaceous plants* and grasses and an absence of trees.

Measurable nonforest condition class - Nonforest condition classes on Region 5 or Region 6 Forest Service administered lands. Certain data items are recorded in measurable nonforest conditions that are not typically measured in nonforest conditions; these are identified in the associated "when collected" field for individual data items.

Measurement *q*uality *o*bjective (MQO) - Describes the acceptable tolerance for each data element. MQOs consist of two parts: a statement of the tolerance and a percentage of time when the collected data are required to be within tolerance.

Merchantable *top* - The point on the *tree bole* above which merchantable material cannot be produced. Merchantable top is 1.5 inches for woodland species and 4.0 inches for all other species.

Microplot - A circular, fixed-radius plot with a radius of 6.8 feet that is used to sample trees less than 5.0 inches at DBH/*DRC*, as well as other vegetation *and fuel measurements*. Microplot center is 90 degrees and 12 feet offset from the center of each subplot.

MIDAS - Mobile integrated data acquisition system; the portable data recorder program used by PNW-FIA.

Native American (Indian) *l*and - Tribal lands held in fee, or trust, by the Federal government but administered for Indian tribal groups and Indian trust allotments. This land is considered "Private Lands", Owner Group 40.

Noncensus *w*ater - Bodies of water from 1 to 4.5 acres and water courses from 30 feet to 200 feet in width.

New installation - The initial establishment of the "annual" four-subplot national plot design; includes plots field-visited for the first time (i.e., no ground plot exists) and periodic revisited plots (periodic to annual; annual plot is being established at the periodic plot location).

Nonforest *l*and - Land that does not support, or has never supported, forests, and lands formerly forested where use for timber management is precluded by development for other uses. Includes areas used for crops, improved pasture, residential areas, city parks, improved roads of any width and adjoining rights-of-way, power line clearings of any width, *Census* and noncensus water. If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120.0 feet wide, and clearings, etc., more than one acre in size, to qualify as nonforest land.

Nonstockable - Areas of forest land that are not capable of supporting trees because of the presence of rock, water, etc.

Nonstocked - Timberland less than 10 percent stocked with live trees. Recent clearcuts scheduled for planting are classified as nonstocked area.

Other *f*ederal *l*ands - Federal land other than *Forest Service administered lands*. These include lands administered by the USDI Bureau of Land Management, USDI National Park Service, USDI Fish and Wildlife Service, Department of Defense, Department of Energy, Army Corps of Engineers, and military bases.

OWNER CLASS - A *classification* that *divides* land into fine categories of ownership.

OWNER GROUP - A *classification* that *divides* land into broad categories of ownership*:* Forest Service, Other Federal Agency, State and Local Government, and Private. Differing categories of Owner Group on a plot require different conditions.

Ownership - A legal entity having an ownership interest in land, regardless of the number of people involved. An ownership may be an individual; a combination of persons; a legal entity such as corporation, partnership, club, or trust; or a public agency. An ownership has control of a parcel or group of parcels of land (USDA Forest Service 2006).

PDR - Portable data recorder.

Pathogen - Parasitic organism directly capable of causing disease (Helms 1998).

Perennating - To survive from one growing season to the next, often with a period of reduced or arrested growth between seasons.

Phase 1 (P1) - FIA activities done as part of remote-sensing and/or aerial photography.

Phase 2 (P2) - FIA activities done on the network of ground plots formerly known as FIA plots.

Phase 3 (P3) - FIA activities done on a subset of Phase 2 plots formerly known as Forest Health Monitoring plots. Additional ecological indicator information is collected from Phase 3 plots.

Plot - A cluster of four subplots that samples approximately 1/6 acre. The subplots are established so that subplot 1 is centered within the sample and the centers of subplots 2, 3,and 4 are located 120.0 feet from the center of subplot 1 at azimuths of 360, 120, and 240 degrees, respectively. Each subplot has an associated microplot and macroplot.

Plot card - A paper form, included in each plot jacket, containing the following information: plot number; state; county; date; crew leader name; crew member name(s); reference point (RP) data; plot access information; plot narrative description (condition[s], disturbance, treatments, hazards, pertinent notes/ information); plot diagram; plot access sketch map; notes to field crew from office review; ownership verification; and boundary mapping.

Plurality - An amount or group (as of stocking points) that is greater than any other amount or group within a total but that is not necessarily a majority (more than half).

PRIVATE OWNER INDUSTRIAL STATUS - Indicates whether Private land owners own and operate a wood processing plant.

Production crew - *A* crew containing at least one certified individual. The crew is involved in routine installation *and measurement* of plots.

Production plot - A plot measured by a production crew. These plots may also be used for training purposes.

Reference plot (off grid) - A plot that is used for crew certification. These plots are NOT included in the ongoing inventory process and data from these plots do not become part of the standard inventory database. To ensure that these plots do not enter into the inventory database, they are assigned plot numbers outside the normal range of production plots or other invalid plot identification information such as an invalid STATE code (STATECD).

REGENERATION STATUS - A stand descriptor that indicates whether a stand has been naturally or artificially regenerated.

RESERVE*D* STATUS - An indication of whether the land in a condition has been reserved.

Sapling - *A l*ive tree 1.0 to 4.9 inches DBH.

Seedling - Conifer seedlings must be at least 6.0 inches in length and less than 1.0 inch at DBH/DRC in order to qualify for tallying. Hardwood seedlings must be at least 12.0 inches in length and less than 1.0 inch at DBH/DRC in order to qualify for tallying. For woodland species, each stem on a single tree must be less than 1.0 inch in DRC.

Senescence - The life phase of an organism or a part of the organism that precedes natural death, usually involving a decreased ability to repair damage and degradation. For plants, this is when the current season's growth (foliage) begins to fade before dormancy, or death for annuals.

Site index - The average total height that dominant and co-dominant trees in fully stocked, even-aged stands will obtain at key ages, as determined by an equation.

Slope - Measure of change in surface value over distance, expressed as a percentage (Helms 1998).

Softwoods - Coniferous trees, usually evergreen having needles or scale-like leaves.

Snag - A standing dead tree that must be at least 5.0 inches in diameter(DBH or DRC), have a bole which has an unbroken ACTUAL LENGTH of at least 4.5 feet(DBH species) or 1.0 feet (DRC species with single stems), and lean less than 45 degrees from vertical as measured from the base of the tree to the point of diameter measurement.

STAND AGE - A stand descriptor that indicates the average age of the live trees not overtopped in the predominant stand size-class of a condition.

Standing dead tree - A dead tree that must be at least 5.0 inches in diameter(DBH or DRC), have a bole which has an unbroken ACTUAL LENGTH of at least 4.5 feet (DBH species) or 1.0 feet (DRC species with single stems), and lean less than 45 degrees from vertical as measured from the base of the tree to the point of diameter measurement.

STAND SIZE - A stand descriptor that indicates which size-class of trees constitutes the majority of stocking in the stand.

State, *c*ounty and *m*unicipal *l*ands - Lands owned by states, counties, and local public agencies or municipalities, or lands leased to these government units for 50 years or more.

Stocking - The relative degree of occupancy *of* land by trees, measured as basal area or the number of trees in a stand by size or age and spacing, compared to the basal area or number of trees required to fully utilize the growth potential of the land; that is, the stocking standard.

Subplot - A circular, fixed-area plot with a radius of 24.0 feet. Each subplot represents ¼ of the fixed plot sample unit.

TOTAL LENGTH - The total length of the tree, recorded to the nearest 1.0 foot from ground level to the tip of the apical meristem. For trees growing on a slope, measure on the uphill side of the tree. If the tree has a broken or missing top, the total length is estimated to what the length would be if there were no missing or broken top. Forked trees should be treated the same as unforked trees.

Training (practice) plot - A plot established for training or certification purposes only. It is NOT a plot in the ongoing inventory process and data from these plots do not become part of the standard inventory data base. To ensure that these plots do not enter into the inventory data base, they are assigned plot numbers outside the normal range of production plots or other invalid plot identification information such as an invalid STATE code (STATECD).

Transect - A narrow sample strip or a measured line laid out through vegetation chosen for study (Helms 1998).

Transition *zone* - An area where a distinct boundary between two or more different conditions cannot be determined.

***TREE* DENSITY** - A stand descriptor that indicates the relative tree density of a condition class. The classification is based on the number of stems/unit area, basal area, tree cover, or stocking of all live trees in the condition which are not overtopped, compared to any *other* condition class tree density *recorded on the plot*.