FIELD INSTRUCTIONS

FOR THE URBAN INVENTORY OF

SAN DIEGO, CALIFORNIA &

PORTLAND, OREGON

2018

FOREST INVENTORY AND ANALYSIS

RESOURCE MONITORING AND ASSESSMENT PROGRAM

PACIFIC NORTHWEST RESEARCH STATION

USDA FOREST SERVICE

Note to User: URBAN FIA Field Guide 7.2 is based on the *National CORE Field Guide, Version 7.2*. Data elements are national CORE unless indicated as follows:

- National CORE data elements that end in “+U” (e.g., x.x+U) have had values,codes, or text added, changed, or adjusted from the CORE program. Any additional URBAN FIA text for a national CORE data element is hi-lighted or shown as an "Urban Note".
- All URBAN FIA data elements end in “U” (e.g., x.xU). The text for an URBAN FIA data element is not hi-lighted and does not have a corresponding variable in CORE.
- URBAN FIA electronic file notes:
  - national CORE data elements that are not applicable in URBAN FIA are formatted as light gray or light gray hidden text.
  - hyperlink cross-references are included for various sections, figures, and tables.

*National CORE data elements retain their national CORE field guide data element/variable number but may not retain their national CORE field guide location or sequence within the guide.

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CHAPTER 1 INTRODUCTION

This document describes the standards, codes, methods, and definitions for Forest Inventory and Analysis (FIA) field data items. The objective is to describe URBAN FIA field procedures that are consistent and uniform across all FIA units. This URBAN FIA guide will serve as the framework for regional FIA programs; individual programs may add regional variables that support their CORE program, but may not change or add to the nationally standard URBAN FIA requirements. Unless otherwise noted, the items in this field guide are considered standard URBAN FIA, that is, the information will be collected by all FIA units as specified. Items or codes specified as URBAN OPTIONAL are not required by individual units; however, if the item is collected or coded, it will be done as specified in this field guide. It is expected that on average all items in this guide can be measured by a one or two-person field crew in less than one day, including travel time to and from the plot. URBAN FIA plots will be referred to as Urban plots throughout the field procedures. URBAN FIA variables that are optional are referred to as URBAN OPTIONAL.

SECTION 1.1 URBAN OVERVIEW

The assessment of forest resources conducted by the USDA Forest Service's Forest Inventory and Analysis units provides data on the amount, status, and character of forests. Historically, this information is summarized from general data collected on all plots and detailed tree measurements collected on all forested plots. Forested plots contain a forested area that is at least 1 acre in size, at least 120 feet wide, and can contain at least 10 percent Live Plus Missing Canopy Cover. In addition, the forested area must not be developed for another land use. A classification of 'nonforest' does not mean that an FIA plot is devoid of trees, rather that land in the plot does not fully fit the forested definition. Many areas within a state have tree cover but these trees fall in areas that do not meet the forested definition, and therefore detailed tree measurements are not taken. The FIA research program is continuing an evolution from forest- centric sampling and monitoring to a broader scope of all lands. With this movement there has been interest in collecting data on trees in urban areas regardless of whether they fall in FIA forest areas. One of the central motivators for FIA expansion in urban areas is that most of the population of the United States resides in or near urban areas and not in the forested rural landscape. Thus, it is a forest of great interest and benefit. FIA urban inventory data will be used to produce design-based estimates of the quantity, health, composition, and benefits of urban trees and forests.

This manual describes the field collection procedures for standard URBAN FIA inventory plots. The standard URBAN FIA protocol follows a city-based model where urban inventory plots are located in the U.S. Census-defined urban boundary (UAUC), within a chosen Core-Based Statistical Area (CBSA). The urban boundary is defined by the U.S. Census Bureau as all territory, population, and housing units in Urbanized Areas (UA) and Urban Clusters (UC). In general, an UA is a densely settled area with at least 500 people per square mile that has a census population of at least 50,000, and an UC is a densely settled area with at least 500 people per square mile that has a census population of 2,500 to 49,999. The CBSA-confined UAUC boundary defines what is sometimes referred to as the FIA Blue Line. Within the FIA Blue Line:

- All FIA base grid CORE plots are considered Urban plots which means they will be established based on the urban plot design.
- Some of these FIA base grid CORE plots may also be considered CORE field plots. If so, these CORE field plots will be coincident with the Urban plot and will be established with both plot designs. Plots that are Phase1 office plots in the CORE sample will only be established based on the urban plot design.
- These Urban plots are measured at the same intensity and on the same time line as the rest of the FIA CORE plots in the region unless temporal intensification is requested.

Within the FIA Blue Line there is usually an additional area of interest sometimes referred to as the FIA Red Line, which is defined by the boundaries that make up a specific city. In some cases the political boundary that makes up a city may extend outside the FIA Blue Line.

- Urban plots within the Red Line are treated the same as Urban plots within the Blue Line except that they will generally include an intensified set of Urban design only plots.
- In general, the total number of urban plots in the target city will be 200.

SECTION 1.2 FIELD GUIDE LAYOUT

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.

The following examples show how data items will be displayed:

ITEM X.X.X.X CONDITION CLASS NUMBER (CORE 5.3)

Each section begins with a general overview of the data elements collected at that level and background necessary to prepare field crews for data collection. Descriptions of data elements follow in this format:

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

Urban Note: Some regional data items are described in the field guide but do not require any data entry. These variables are "hidden" variables that are required for regional programming and/or logic checks on collected data items. Data items that require a field entry have an associated PDR (Personal Data Recorder) prompt. Some of these items may be auto-filled (i.e., downloaded values).

Tolerances may be stated in +/- terms or number of classes for ordered categorical data elements (e.g., +/- 2 classes); in absolute terms for some continuous variables (e.g., +/- 0.2 inches); or in terms of percent of the value of the data element (e.g., +/- 10 percent of the value). For some data elements, no errors are tolerated (e.g., PLOT NUMBER).

Urban Note: Some CORE and URBAN FIA variable tolerances have been tightened to comply with regional requirements.

MQO's state the percentage of time that the collected data are required to be within tolerance. Percentage of time within tolerance is generally expressed as "at least X percent of the time," meaning that crews are expected to be within tolerance at least X percent of the time.

PLOT NOTES will be available on every PDR screen for ease in recording notes.

SECTION 1.3 UNITS OF MEASURE

The field guide will use ENGLISH units as the measurement system.

Plot Dimensions:

Subplot:

Radius	= 48.0 feet
Area	= 7,238 square feet or approximately 1/6 acre

Microplot:

Radius	= 6.8 feet
Area	= 145.27 square feet or approximately 0.003 acre or approximately 1/300 acre

CHAPTER 2 GENERAL DESCRIPTION

The Urban field plot consists of one subplot approximately 1/6 acre in size with a radius of 48.0 feet (see Figure 2.2). The subplot is used to collect data on trees with a diameter (at breast height, DBH, or at root collar, DRC) of 5.0 inches or greater.

The subplot contains four microplots; each is approximately 1/300 acre in size with a radius of 6.8 feet. The centers of the microplots are offset 12.0 feet horizontal (+/- 1 foot) in each cardinal direction from the subplot center. Microplots are numbered 11-14 in a clockwise fashion starting at 90 degrees from subplot center. Microplots are used to select and collect data on saplings (DBH/DRC of 1.0 inch through 4.9 inches) and seedlings (DBH/DRC less than 1.0 inch in diameter and greater than 0.5 foot in length [conifers] or greater than 1.0 foot in length [hardwoods]).

Throughout this field guide, the use of the word 'plot' refers to the subplot and the entire set of four microplots. 'Plot center' is defined as the center of subplot.

Data are collected on field plots at the following levels:

Plot	Data that describe the single subplot and cluster of four microplots
Subplot	Data that describe the single 48 ft. fixed radius subplot
Microplot	Data that describe each of the four 6.8 ft. radius microplots
Condition Class	A discrete combination of landscape attributes that describe the environment on all or part of the plot.
Subplot-Condition	Data that represents the portion of a condition that is located within the boundary of a subplot.
Boundary	An approximate description of the demarcation line between two condition classes that occur on a single subplot or microplot.
Tree	Data describing saplings with a diameter 1.0 inch through 4.9 inches, and trees with diameter greater than or equal to 5.0 inches.
Seedling	Data describing trees with a diameter less than 1.0 inch and greater than or equal to 0.5 foot in length (conifers) or greater than or equal to 1.0 foot in length (hardwoods).
Site Tree	Data describing site index trees.

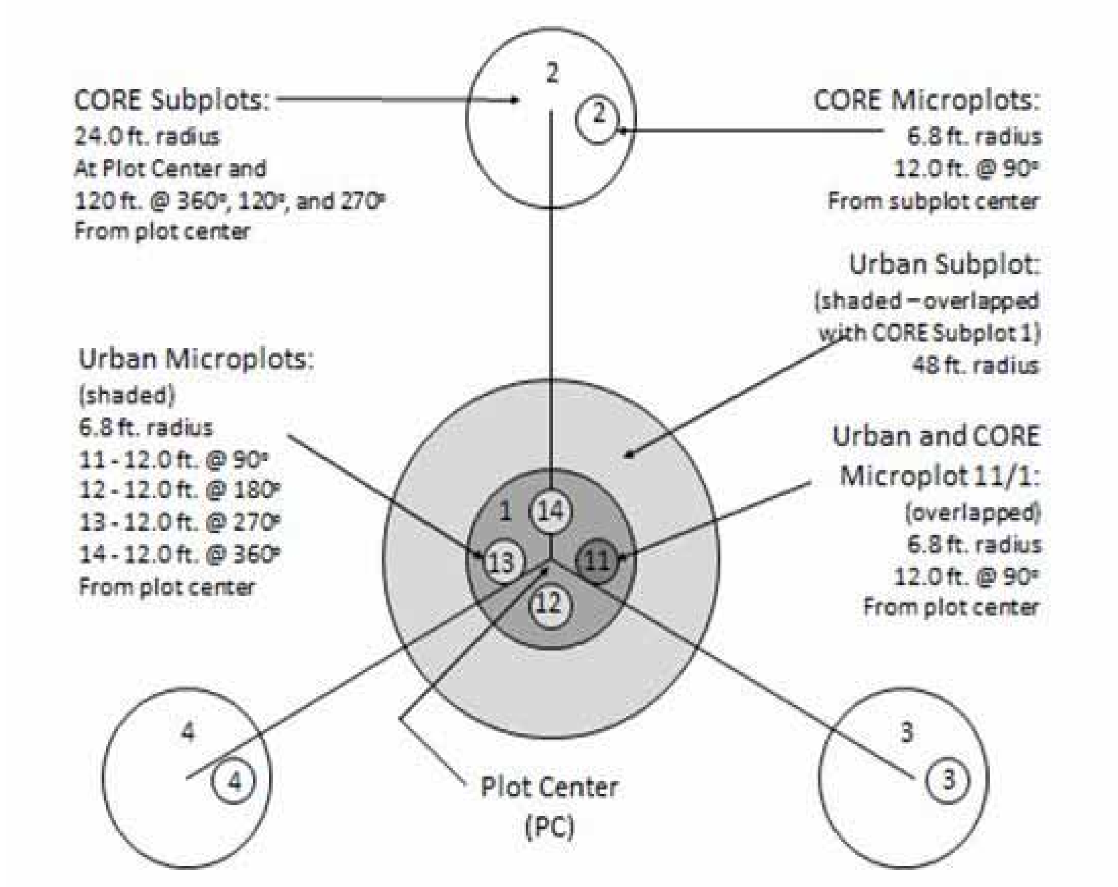


Figure 2.1: Urban-CORE Coincidental plot diagram.

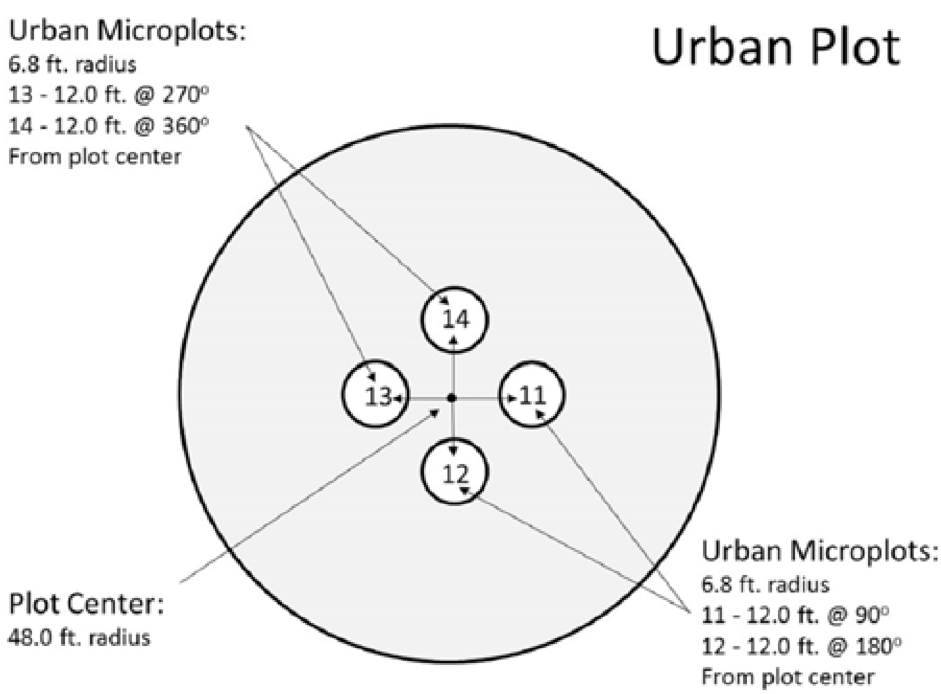


Figure 2.2: Urban Plot diagram.

SECTION 2.1 PLOT SETUP

Plots will be established according to the regional guidelines of each FIA unit. 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 attempt measurements from an Offset Point (Appendix H). When conditions exist that prevent both the Offset Point and the subplot center or microplot center from being occupied, no data will be collected from that subplot or microplot; instead, the entire subplot or microplot should be classified according to the condition preventing occupancy.

SECTION 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. In urban areas, the following field procedures are NOT permitted:

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

SECTION 2.3 PLOT MONUMENTATION

Record two witness objects on the subplot. Microplot Witness Objects are required whenever subplot center cannot be accessed and whenever there is a concern that the next crew may have a problem locating the MICROPLOT. Ideally, permanent objects within 100 ft. and as close to the subplot /microplot center as possible should be selected. These objects could be, but are not limited to, utility poles, mail boxes, or the corner of a building. When permanent objects are not available use the next best available options, which could be live trees. If no witness objects are present, include other features that may help the next crew locate the plot on the plot cluster diagram and install a Starting Point (SP) / Reference Point (RP) according to regional guidelines. Include additional notes in the PLOT NOTES section if needed. In urban areas, do not mark trees with paint, markers, scribes, or other means.

Item 2.3.0.1 MONUMENT TYPE (CORE 0.3.1U)

Record the code to indicate what MONUMENT TYPE is being described.

When Collected:	Install 3 witness objects for accessible plots. One Starting Point (SP) / Reference Point (RP) on field plots where data is collected without physical access to the plot area. Install 2 subplot Witness Objects for each OFFSET point visited, or passed through, on plots where the subplot center cannot be occupied.	
Field width:	1 digit	
Tolerance:	No tolerance	
MQO:	At least 99% of the time	
Values:	1	Starting Point (SP) / Reference Point (RP)
	2	Witness Object
	3	No Witness Object available

Item 2.3.0.2 MONUMENT NUMBER (CORE 0.3.2U)

Record the MONUMENT NUMBER for the monument being described. Each plot may have up to eleven monuments, including a Starting Point (SP) / Reference Point (RP) tree. Start with the Starting Point (SP) / Reference Point (RP) if there is one, followed by the subplot and then continue with the microplots in a clockwise manner starting with microplot 11.

When Collected:	MONUMENT TYPE 1, 2
Field width:	2 digits
Tolerance:	No tolerance
MQO:	At least 99% of the time
Values:	1-11

Item 2.3.0.3 SUBPLOT / MICROPLOT NUMBER (CORE 0.3.3U)

Record the code to indicate which SUBPLOT OR MICROPLOT is being monumented.

When Collected:	Record for each MONUMENT TYPE 1 or 2	
Field width:	2 digits	
Tolerance:	No tolerance	
MQO:	At least 99% of the time	
Values:	01	Subplot (PC)
	11	East Microplot
	12	South Microplot
	13	South Microplot
	14	North Microplot

Item 2.3.0.4 SUBPLOT / MICROPLOT OFFSET POINT (CORE 0.3.4U)

Record the code to indicate which OFFSET POINT is being monumented.

When Collected:	Record for each MONUMENT TYPE 1 or 2	
Field width:	1 digit	
Tolerance:	No tolerance	
MQO:	At least 99% of the time	
Values:	0	Normal position (subplot center)
	1	North subplot offset point
	2	East subplot offset point
	3	South subplot offset point
	4	West subplot offset point
	110	Normal position of microplot 11 (center)
	111	North microplot 11 offset point
	112	East microplot 11 offset point
	113	South microplot 11 offset point
	114	West microplot 11 offset point
	120	Normal position of microplot 12 (center)
	121	North microplot 12 offset point
	122	East microplot 12 offset point
	123	South microplot 12 offset point
	124	West microplot 12 offset point
	130	Normal position of microplot 13 (center)
	131	North microplot 13 offset point
	132	East microplot 13 offset point
	133	South microplot 13 offset point
	134	West microplot 13 offset point
	140	Normal position of microplot 14 (center)
	141	North microplot 14 offset point
	142	East microplot 14 offset point
	143	South microplot 14 offset point
	144	West microplot 14 offset point

Item 2.3.0.5 WITNESS OBJECT / SP / RP TYPE (CORE 0.3.5U)

Indicate the type of reference used to monument the SUBPLOT / MICROPLOT. Choose a Witness Object that is most likely to still be present when the plot is remeasured in the future, for example, a sewer drain is more likely to be present than a street sign. Items in bold are preferred when possible (i.e. 4 fire hydrant, 10 sewer/storm cover, 11 sewer/storm drain).

When Collected:	Record for each MONUMENT TYPE 1 or 2	
Field width:	2 digits	
Tolerance:	No tolerance	
MQO:	At least 99% of the time	
Values:	1	Tally species
	2	Corner of House /Building (the front side of a home is preferable to the rear, as additions are often added to the rear.)
	3	Electric Meter
	4	Fire Hydrant
	5	Gas Meter
	6	Mailbox
	7	Fence Post
	8	Street Sign
	9	Utility Pole
	10	Sewer / Storm Cover
	11	Sewer / Storm Drain
	12	Street Lamp
	13	Sprinkler Box
	14	Utility Box
	99	Other Object

Item 2.3.0.6 WITNESS OBJECT / SP / RP SPECIES (CORE 0.3.6U)

Indicate the species used as a monument.

When Collected:	Record for WITNESS OBJECT / SP / RP TYPE=1
Field width:	4 digits
Tolerance:	No tolerance
MQO:	At least 99% of the time
Values:	See Appendix D

Item 2.3.0.7 OBJECT DESCRIPTION (CORE 0.3.7U)

Describe the reference used to monument the SUBPLOT / MICROPLOT. Be as descriptive as needed. For example, if there is more than one Fence Post in the area, state that it is the third post south of the driveway (Ctr. E on the PDR).

When Collected:	Record for WITNESS OBJECT / SP / RP TYPE 2-12
Field width:	240 characters
Tolerance:	No tolerance
MQO:	At least 99% of the time
Values:	Letters, numbers, and special characters

Item 2.3.0.8 MONUMENT AZIMUTH (CORE 0.3.8U)

MONUMENT TYPE = 1 record the MONUMENT AZIMUTH from the Starting Point (SP) / Reference Point (RP) to the center of the subplot / microplot center or their corresponding OFFSET POINT.

MONUMENT TYPE = 2 Record the MONUMENT AZIMUTH from subplot / microplot center or their corresponding OFFSET POINT to the center of the WITNESS OBJECT / SP / RP TYPE.

Record the AZIMUTH to the nearest degree. Use 360 for north.

When Collected:	Record for MONUMENT TYPE 1 or 2
Field width:	3 digits
Tolerance:	+/- 10 degrees
MQO:	At least 90% of the time
Values:	001 to 360

Item 2.3.0.9 MONUMENT HORIZONTAL DISTANCE (CORE 0.3.9U)

Record the measured HORIZONTAL DISTANCE, to the nearest 0.1 foot, from the center (or corner if monumenting a building) of the MONUMENT TYPE to the corresponding subplot / microplot center or their corresponding OFFSET POINT depending on which is being monumented. When trees are referenced, measure to the pith.

When Collected:	Record for MONUMENT TYPE 1 or 2
Field width:	5 digits (xxxx.y)
Tolerance:	Monument Type 1: +/- 33.0 ft
	Monument Type 2: 0000.1 ft. to 0139.9 ft.:+/- 1.0 ft.
	140.0 ft. to 0500.0 ft.:+/- 2.0 ft.
	0500.1 ft. to 0999.9 ft.:+/- 3.0 ft.
MQO:	Monument Type 1: 99% of the time
	Monument Type 2: At least 90% of the time
Values:	Monument Type 1: 0000.1 ft. to 9999.9 ft.
	Monument Type 2: 0000.1 ft to 0999.9 ft.

Item 2.3.0.10 MONUMENT DBH / DRC (CORE 0.3.10U)

Record the MONUMENT DBH / DRC when a tree is used as a monument.

When Collected:	WITNESS OBJECT / SP / RP TYPE = 1
Field width:	4 digits (xxx.y)
Tolerance:	+/- 0.1 in per 20.0 in increment of measured diameter
	For woodland species: +/- 0.2 in per stem
MQO:	At least 95% of the time
Values:	001.0 to 999.9

CHAPTER 3 PLOT LEVEL DATA

All variables listed in Chapter 3 are collected on plots containing at least one accessible forest land, accessible nonforest land, noncensus water, or census water condition (URBAN PLOT STATUS = 1 -3) and all nonsampled plots (URBAN PLOT STATUS= 4). In general, plot level data apply to the entire plot and they are recorded from the center of subplot 1. A plot is considered nonforest if no part of it is currently located in forest land (URBAN CONDITION CLASS STATUS = 1). A plot is nonsampled if the entire plot is not sampled for one of the reasons listed in URBAN PLOT NONSAMPLED REASON.

If a plot becomes a nonsampled plot, the previous data are reconciled and an attempt is made to visit the plot during the next inventory. If access is gained to a previously nonsampled plot, the plot is re-installed using the location of the previously installed plot.

Trees on previously sampled plots will be reconciled during data processing.

Item 3.0.0.1 CYCLE (CORE 1.0.1U)

This variable represents the number of times a state has been inventoried (includes periodic and annual). In the annual inventory, a cycle is the completion of all sub-cycles.

When Collected:	All plots
Field width:	2 digits
Tolerance:	N/A
MQO:	N/A
Values:	Downloaded value and preprinted on plot location sheet

Item 3.0.0.2 SUB-CYCLE (CORE 1.0.2U)

This variable identifies the sub-panels that are being inventoried. In the annual forest inventory, a sub-cycle is the completion of 14 sub-panels (five year cycle length) or 10 sub-panels (seven year cycle length) in a year.

When Collected:	All plots
Field width:	1 digit
Tolerance:	N/A
MQO:	N/A
Values:	Downloaded value and preprinted on plot location sheet

Item 3.0.0.3 STATE (CORE 1.1)

Record the unique FIPS (Federal Information Processing Standard) code identifying the State where the plot center is located.

When Collected:	All plots
Field width:	2 digits
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	See Appendix A

Item 3.0.0.4 COUNTY (CORE 1.2)

Record the unique FIPS (Federal Information Processing Standard) code identifying the county, parish, or borough (or unit in AK) where the plot center is located.

When Collected:	All plots
Field width:	3 digits
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	See Appendix A

Item 3.0.0.5 PLOT NUMBER (CORE 1.3)

Record the identification number, unique within a county, parish, or borough (survey unit in AK), for each plot. If SAMPLE KIND = 3, the plot number will be assigned by the National Information Management System (NIMS).

When Collected:	All plots
Field width:	5 digits
Tolerance:	No errors
MQO:	t least 99% of the time
Values:	00001 to 99999

Item 3.0.0.6 URBAN PLOT STATUS (CORE 1.4+U)

Record the code that describes the sampling status of the plot. In cases where a plot is access- denied or hazardous, record URBAN PLOT STATUS = 4.

When Collected:	All plots	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	1	Sampled – at least one accessible forest land condition present on subplot
	2	Sampled – no accessible forest but at least one accessible nonforest land condition present on subplot
	3	Sampled -- no accessible forest or non forest land condition present on subplot, i.e. subplot is either census and / or noncensus water
	4	Nonsampled -- ~~possibility of forest land~~

Item 3.0.0.7 URBAN PLOT NONSAMPLED REASON (CORE 1.7+U)

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

When Collected:	When URBAN PLOT STATUS = 4	
Field width:	2 digits	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	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.
	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.
	05	Lost data – Plot data file was discovered to be corrupt after a panel was completed and submitted for processing. This code is applied at the time of processing after notification to the units. This code is for office use only.
	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 URBAN PLOT NONSAMPLED REASON = 6. The replacement plot is assigned SAMPLE KIND = 3.
	07	Wrong location – Previous plot can be found, but its placement is beyond the tolerance limits for plot location. Whenever this code is assigned, a replacement plot is required. The plot being relocated is assigned SAMPLE KIND = 2 and URBAN PLOT NONSAMPLED REASON = 7. Its 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. This code is for office use only.

	09	Dropped intensified plot - Intensified plot dropped due to a change in grid density. This code used only by units engaged in intensification. This code is for office use only.
	10	Other – Entire plot not sampled due to a reason other than one of the specific reasons already listed. A field note is required to describe the situation.
	11	Ocean – Plot falls in ocean water below mean high tide line.

Item 3.0.0.8 SAMPLE KIND (CORE 1.10+U)

Record the code that describes the kind of plot being installed.

When Collected:	All plots	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	1	Initial 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 inventory.
	3	Replacement plot - a replacement plot for a previously established 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 plots are assigned SAMPLE KIND = 2, URBAN PLOT STATUS = 4, and the appropriate URBAN PLOT NONSAMPLED REASON code. The plot number for the new (replacement) plot is assigned by NIMS.

Item 3.0.0.9 PREVIOUS PLOT NUMBER (URBAN OPTIONAL Collected in NRS, PNW, SRS) (CORE 1.11)

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

When Collected:	When SAMPLE KIND = 3
Field width:	5 digits
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	00001 to 99999

SECTION 3.1 CURRENT DATE

Record the year, month, and day that the current plot visit was completed as described in Item 3.1.0.1 – Item 3.1.0.3.

Item 3.1.0.1 YEAR (CORE 1.13.1)

Record the year that the plot was completed.

When Collected:	All plots
Field width:	4 digits
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	≥ 2003

Item 3.1.0.2 MONTH (CORE 1.13.2)

Record the month that the plot was completed.

When Collected:	All plots					
Field width:	2 digits					
Tolerance:	No errors					
MQO:	At least 99% of the time					
Values:	January	01	May	05	September	09
	February	02	June	06	October	10
	March	03	July	07	November	11
	April	04	August	08	December	12

Item 3.1.0.3 DAY (CORE 1.13.3)

Record the day of the month that the plot was completed.

When Collected:	All plots
Field width:	2 digits
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	01 to 31

Item 3.1.0.4 DECLINATION (URBAN OPTIONAL Collected in PNW) (CORE 1.14)

Record the azimuth correction used to adjust magnetic north to true north. All azimuths are assumed to be magnetic azimuths unless otherwise designated. 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 A. 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. 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)

When Collected:	All plots
Field width:	5 digits including sign (+xxx.y)
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	See Appendix A

Item 3.1.0.5 HORIZONTAL DISTANCE TO IMPROVED ROAD (CORE 1.15+U)

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. Improved roads should not have advanced rutting, old washouts, old fallen trees, vegetation, etc. that inhibits regular vehicular travel.

When Collected:	All plots with one accessible forest land condition class (URBAN PLOT STATUS = 1)	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 90% of the time	
Values:	1	100 ft or less
	2	101 to 300 ft
	3	301 to 500 ft
	4	501 to 1000 ft
	5	1001 ft 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 3.1.0.6 WATER ON PLOT (CORE 1.16+U)

Record the water source that has the greatest impact on the area within the accessible forest/nonforest land portion of any of the four subplots. The coding hierarchy is listed in order from large permanent water to temporary water (too small to qualify as noncensus water). This variable can be used for recreation, wildlife, hydrology, and timber availability studies. Do not tally this variable for water that is already defined as a separate Noncensus or Census Water Condition. This variable is intended to indicate the presence of water that has not already defined as its own separate condition.

When Collected:	All plots with at least one accessible forest land condition class (URBAN PLOT STATUS = 1)	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 90% of the time	
Values:	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 in size, or forested swamps, bogs or marshes classified as accessible forest land 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 (includes Springs)

Item 3.1.0.7 QA STATUS (CORE 1.17)

Record the code to indicate the type of plot data collected, using the following codes:

When Collected:	All plots	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	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 3.1.0.8 CREW NUMBER (CORE 1.18)

Record up to 5 crew numbers as assigned to the field crew; 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	
MQO:	At least 99% of the time	
Values:	NRS	240001 – 249999
	SRS	330001 – 339999
	RMRS	220001 – 229999
	PNW	260001 – 269999

SECTION 3.2 GPS COORDINATES

Use a global positioning system (GPS) unit to determine the plot coordinates and elevation of all field-visited plot locations even if GPS has been used to locate the plot in the past.

Additionally, when SURVEY GRADE GPS SUBPLOT ROVER FILES COLLECTED = 1, crews will also collect a 15 minute GPS rover file at each subplot center with more advanced survey grade GNSS (Global Navigation Satellite System) units that collect multiple-frequency (e.g., L1 and L2 code and carrier phase), multiple-constellation (e.g. GPS and GLONASS satellite) data. These rover files are post-processed in the office to obtain more accurate coordinates for each field subplot location.

Multiple records per plot may exist in the GPS screen; records are differentiated by GPS LOCATION TYPE (Item 3.2.2.7).

SUBSECTION 3.2.1 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. Each FIA unit will use the NAD83 Datum to collect coordinates.

The UTM coordinate system will be used to collect UTM Easting, Northing, and Zone.

SUBSECTION 3.2.2 REALTIME PLOT CENTER GPS COORDINATES

Soon after arriving at plot center, use the GPS unit to attempt to collect coordinates. If suitable positions 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 as described in Item 3.2.3.1 and Item 3.2.3.2.

Coordinates may be collected further away than 200 feet 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 as described in Item 3.2.3.1 and Item 3.2.3.2.

Coordinates not collected by automatic means shall be manually double-entered into the data recorder.

Item 3.2.2.1 SURVEY GRADE GPS SUBPLOT ROVER FILES COLLECTED (PNW)

Downloaded code identifying whether or not a Survey Grade GPS rover file should be collected on each subplot.

When collected:	All plots	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Definition
	0	No, Survey Grade GPS Coordinates will not collected
	1	Yes, Survey Grade GPS Coordinates will be collected

Item 3.2.2.2 GPS UNIT (CORE 1.19.3)

Record the kind of GPS unit used to collect coordinates. If suitable *realtime* coordinates cannot be obtained, record 0. Record “3” for Survey Grade GPS units. Record “2” for most standard handheld GPS units used for collecting realtime plot center coordinates. Record “4” when using Survey Grade Trimble units for collecting realtime plot center coordinates.

When Collected:	All field visited plots	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	0	GPS coordinates not collected, *realtime plot center coordinates not collected for nonsampled plots (requires GPS NOTES)*
	2	Models capable of field-averaging
	3	Models capable of producing files that can be post-processed *(including Trimble units when used for collecting subplot rover files)*
	4	Models not capable of field-averaging or post-processing *(including Trimble units when used for collecting realtime plot center coordinates)*

Item 3.2.2.3 GPS SERIAL NUMBER (CORE 1.19.4)

Record the last six digits of the serial number on the GPS unit used. For Survey Grade GPS units, select the serial number from the drop down list in the data recorder.

When Collected:	When GPS UNIT > 0
Field width:	6 digits
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	000001 to 999999

Item 3.2.2.4 GPS ENTRY METHOD (CORE 1.19.5)

Identify the method used to record GPS data. This will be set to “0” for all units, including Survey Grade Units.

When Collected:	When GPS UNIT > 0	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	0	GPS data manually entered
	1	GPS data electronically transferred

Item 3.2.2.5 GPS DATUM (CORE 1.19.6)

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 = *2 or 4*
Field width:	5 characters (cccnn)
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	NAD83 North American Datum of 1983

Item 3.2.2.6 COORDINATE SYSTEM (CORE 1.19.7)

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

When Collected:	When GPS UNIT TYPE = *2 or 4*	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	1	Geographic coordinate system
	2	UTM coordinate system

Item 3.2.2.7 GPS LOCATION TYPE (PNW)

Record the location type for coordinates collected on the ground. Record codes 1 - 7 for realtime coordinates. Record codes 15 for the survey grade rover file collected SURVEY GRADE GPS SUBPLOT ROVER FILES COLLECTED = 1).

- When realtime plot center coordinates cannot be collected record the following GPS information (additional GPS data is not required):

  GPS UNIT TYPE = 0

  GPS LOCATION TYPE = 3

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)
	7	Other	Describe in GPS NOTES
	15	Subplot 1	Required when SURVEY GRADE GPS SUBPLOT ROVER FILES COLLECTED = 1

Item 3.2.2.8 UTM ZONE (URBAN OPTIONAL Collected in PNW) (CORE1.19.10)

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

When Collected:	When COORDINATE SYSTEM = 2 *and GPS UNIT TYPE = 2 or 4*
Field width:	3 digits: (##C)
Tolerance:	When GPS ENTRY METHOD = 0, No errors in data entry
	When GPS ENTRY METHOD = 1, not applicable
MQO:	When GPS ENTRY METHOD = 0, at least 99% of the time
	When GPS ENTRY METHOD = 1, not applicable
Values:	Number varies from 2 in Alaska to 19 on the East Coast. The letter varies from Q in Hawaii to W in Alaska.

Item 3.2.2.9 EASTING (X) UTM (URBAN OPTIONAL Collected in PNW) (CORE 1.19.11)

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

When Collected:	When COORDINATE SYSTEM = 2 *and GPS UNIT TYPE = 2 or 4*
Field width:	7 digits
Tolerance:	When GPS ENTRY METHOD = 0, No errors in data entry
	When GPS ENTRY METHOD = 1, not applicable
MQO:	When GPS ENTRY METHOD = 0, at least 99% of the time
	When GPS ENTRY METHOD = 1, not applicable
Values:	0000000 - 9999999

Item 3.2.2.10 NORTHING (Y) UTM (URBAN OPTIONAL Collected in PNW) (CORE 1.19.12)

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

When Collected:	When COORDINATE SYSTEM = 2 *and GPS UNIT TYPE = 2 or 4*
Field width:	7 digits
Tolerance:	When GPS ENTRY METHOD = 0, No errors in data entry
	When GPS ENTRY METHOD = 1, not applicable
MQO:	When GPS ENTRY METHOD = 0, at least 99% of the time
	When GPS ENTRY METHOD = 1, not applicable
Values:	0000000 - 9999999

SUBSECTION 3.2.3 CORRECTION FOR "OFFSET" GPS LOCATION

As described in Subsection 3.2.2, *realtime plot center* coordinates may be collected at a location other than the plot center (an "offset" location) *(GPS LOCATION TYPE = 3)*. 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 3.2.3.1 AZIMUTH TO PLOT CENTER (CORE 1.19.14)

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. Offsets used to collect survey grade subplot rover files are only recorded in the rover file.

When Collected:	When GPS UNIT TYPE = 2 or 4	
Field width:	3 digits	
Tolerance:	+/- 3 degrees	
MQO:	At least 99% of the time	
Values:	000	when coordinates **are** collected at plot center
	001 to 360	when coordinates **are not** collected at plot center

Item 3.2.3.2 DISTANCE TO PLOT CENTER (CORE 1.19.15)

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. As described in Subsection 3.2.2, 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. Offsets used to collect survey grade subplot rover files are only recorded in the rover file.

When Collected:	When GPS UNIT = 2 or 4	
Field width:	3 digits	
Tolerance:	+/- 6 ft	
MQO:	At least 99% of the time	
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

Item 3.2.3.3 COORDINATE DIFFERENCE (CORE 1.19.15.1U)

This variable indicates the difference, in feet, between the historical coordinates downloaded into the Historical file and the coordinates that have been entered during the current visit. It is calculated and auto-populated once the current coordinates are entered.

When Collected:	When GPS UNIT = 2, 3 or 4
Field width:	6 digits
Tolerance:	
MQO:	
Values:	0-999999

Item 3.2.3.4 GPS ELEVATION (CORE 1.19.16)

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

When Collected:	When GPS UNIT TYPE = 2 or 4
Field width:	6 digits (1st digit is + or -, last 5 digits are numeric)
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	-00100 to +20000

Item 3.2.3.5 GPS ERROR (CORE 1.19.17)

Record the error as shown on the GPS unit to the nearest foot up to 999 feet.

When Collected:	When GPS UNIT = 2
Field width:	3 digits
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	000 - 999

Item 3.2.3.6 NUMBER OF READINGS (CORE 1.19.18)

Record a 3-digit code indicating how many readings were averaged by the GPS unit to calculate the plot coordinates.

The PDR requires the number of averaged readings to be entered. Recreational 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 the Trimble unit (GPS UNIT TYPE = 4) is used for realtime plot center coordinates, record 001.

When Collected:	When GPS UNIT TYPE = 2 *or 4*
Field width:	3 digits
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	001 to 999

Item 3.2.3.7 GPS FILE NAME (CORE OPTIONAL 1.19.19)

For each subplot, record the rover filename that was entered in the GPS unit when the 15 minute rover file was collected.containing the GPS positions collected on the plot.

When collected:	When GPS UNIT= 3 and GPS LOCATION TYPE = 15
Field width:	*16 digits*
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	*st-cty-plot%-sp# (e.g. ca-029-05247-sp1 where st is the 2 character state code, cty is the 3 digit county code (including any leading zeros), plot% is the 5 digit plot number (including any leading zeros), sp# is "sp" followed by the 1 digit subplot number 1-4)*

Item 3.2.3.8 PLOT NOTES (CORE 1.21)

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:	Unlimited alphanumeric character field
Tolerance:	N/A
MQO:	N/A
Values:	English language words, phrases and numbers

Item 3.2.3.9 SAFETY (CORE 1.21.1U)

Identify the presence of any safety concern(s) for future crew reference that were encountered during landowner contact, on route to the plot, and on the plot. A note is required to list the safety concern(s). Include detailed notes to ensure that individuals that may visit the site in the future are aware of the safety concerns(s) and any safety tips for future crews. At remeasurement, remeasure crews should realize conditions may have changed or previous crew may have missed a safety concern. Always be diligent for your own safety.

The Plot/Condition could still be measured despite the concern. It will be up to each individual crew to determine the level of caution necessary to justify completing the Plot/Condition or coding the Plot/ Condition as Hazardous or Denied Access.

When Collected:	All plots. If CONDITION NONSAMPLED REASON = 3 then SAFETY = 1 is required	
Field width:	One digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	0	No safety concern
	1	Safety Concern(s) Present (Ctrl-E to note the specific concern)

Potential safety concerns include but are not limited to:

- Poor SPOT or cellular reception was noticed in normal work pattern and was concern due to plot area.
- Hazardous terrain, e.g. cliff or extreme slope
- Temporary natural conditions such as high water, weather/wind, fire, snow, frozen ground, etc. (Note – If unable to complete plot safely with temporary natural condition, should postpone plot completion until after temporary natural condition has passed)
- Heavy equipment in use including quarry, strip mine, mountain-top-removal, fracking, forestry, or other land development
- Ammunitions testing ground, firing range, buried explosives
- Violent, abusive, or threatening individual, landowner
- Violent, abusive, or threatening individual, non-landowner, incidental contact
- Aggressive domestic animal
- Aggressive wild animal, insects
- Marijuana plantation, mobile or clandestine drug or alcohol production site
- Noxious plants causing phytophotodermatitis, e.g. wild parsley, giant hogweed (plant families include Umbelliferae, Rutaceae, Moraceae, and Leguminosae)

Item 3.2.3.10 SAFETY DESCRIPTION (CORE 1.21.1.1U)

A detailed note for future crew reference describing safety concerns related to access and completion of the plot.

When Collected:	SAFETY = 1
Field width:	2000 characters
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	English words or phrases that describe safety concerns on the plot.

Item 3.2.3.11 INVASIVE PLANT SAMPLING STATUS (CORE 1.23+U)

Determines whether invasive plant data will be recorded on the plot and the land class(es) on which it will be recorded. Code 2 will be downloaded for all plots.

When Collected:	All plots	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	0	Not collecting invasive plant data
	2	Invasive plant data collected on all accessible conditions (URBAN CONDITION CLASS STATUS =1, 2, 3, and 4)

Item 3.2.3.12 INVASIVE PLANT SPECIMEN COLLECTION RULE (CORE 1.24)

Downloaded code to indicate if collection of specimens of unknown invasive species is required. Code 0 will be downloaded for all plots.

When Collected:	Downloaded on all plots where INVASIVE PLANT SAMPLING STATUS = 2	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	0	FIA unit does not require specimen collection for invasive plants
	1	FIA unit requires specimen collection for invasive plants

CHAPTER 4 CONDITION CLASS

The Urban Forest Inventory and Analysis (FIA) plot is one subplot and four microplots in a fixed pattern. The subplot or microplots are never reconfigured or moved in order to confine them to a single condition class; a plot may straddle more than one condition class. If an obstruction prevents occupying a subplot or microplot center all boundary and tree relocation measurements are taken from one of the offset points located on the perimeter of each subplot or microplot. The subplot or microplot centers are never moved. Every plot samples at least one condition class: the condition class present at plot center (the center of subplot 1).

SECTION 4.1 DETERMINATION OF CONDITION CLASS

Step 1. Delineate the plot area by URBAN CONDITION CLASS STATUS

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

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

The population of interest is subdivided into domains of interest defined by URBAN CONDITION CLASS STAUS. Accessible forest and Accessible Nonforest land are further subdivided by a distinct set of additional attributes. In the FIA Urban inventory, all lands are of interest.

Step 2. Further subdivide Accessible Forest Land by 6 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. URBAN RESERVED STATUS
2. URBAN OWNER GROUP
3. FOREST TYPE
4. STAND SIZE CLASS
5. REGENERATION STATUS
6. TREE DENSITY

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 (Subsection 4.3.1).

Step 3. Further subdivide accessible Nonforest Land by 3 delineation variables.

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

1. URBAN RESERVED STATUS Size requirement 120ft wide and an acre
2. URBAN OWNER GROUP Size requirement 120ft wide and an acre
3. URBAN NONFOREST LAND USE Size requirements as defined in Item 4.7.0.2, URBAN NONFOREST LAND USE (CORE 2.5.29+U)

Conditions should not be subdivided based solely on URBAN RESERVED STATUS and/or URBAN OWNER GROUP unless the area meets the 120 ft and an acre minimum size requirement. Conditions that are subdivided based on URBAN NONFOREST LAND USE should receive the appropriate URBAN RESERVED STATUS and URBAN OWNER GROUP codes even if they are under 120ft wide and an acre.

SECTION 4.2 CONDITION CLASS STATUS DEFINITIONS

1. Accessible Forest Land

Land that is within the population of interest, is accessible, is located within the subplot, 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. 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. USE THE REGIONAL CORE SPECIES *in Appendix C (PNW Forest Land Tree Species Codes)* WHEN DETERMINING CANOPY COVER IN REGARDS TO DEFINING FOREST LAND – NOT THE URBAN FIA SPECIES LIST.

In contrast to regular mowing, chaining treatments (as well as prescribed burns or timber stand improvements for intensively managed wildlife areas) 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, non forested marsh 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 (Figure 4.1), using the class criteria above.

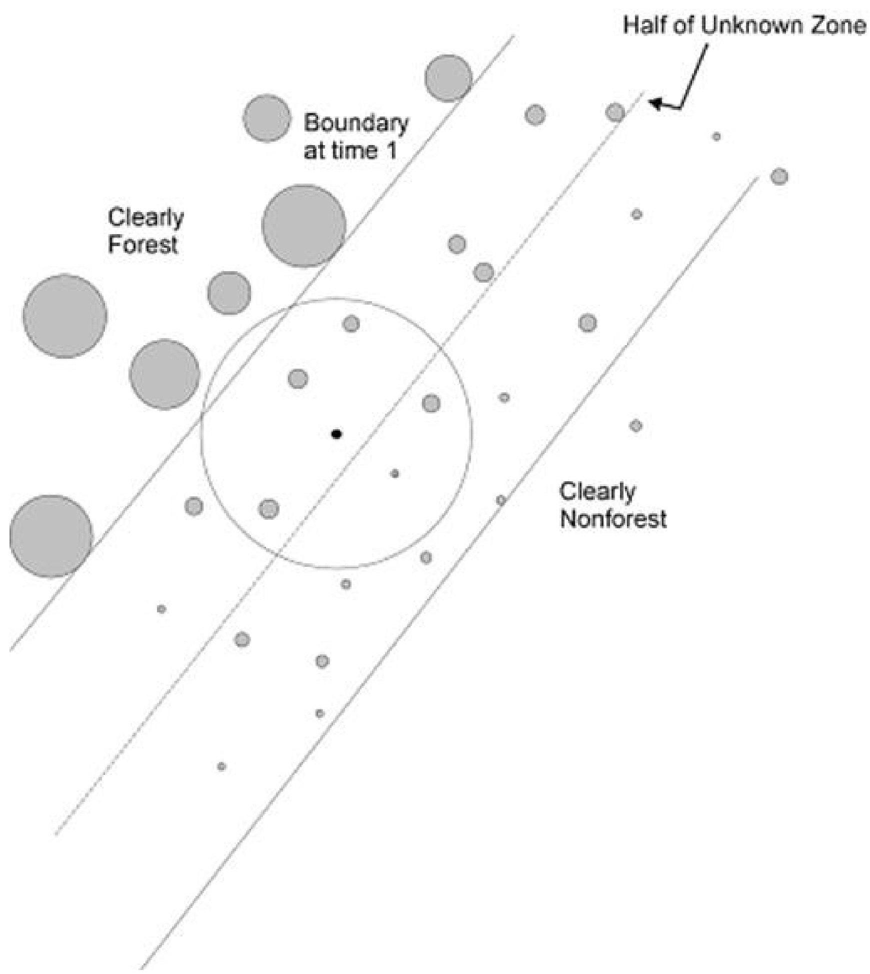


Figure 4.1: Example of classifying the condition class of the subplot in a transition zone with forest/ nonforest encroachment.

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 stocked 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.

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 4.2 and Figure 4.3. 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.

Urban Note: The definitional boundary concepts described in Figure 4.2 and Figure 4.3 are not limited to Forest / Nonforest boundaries; they apply to any two conditions.

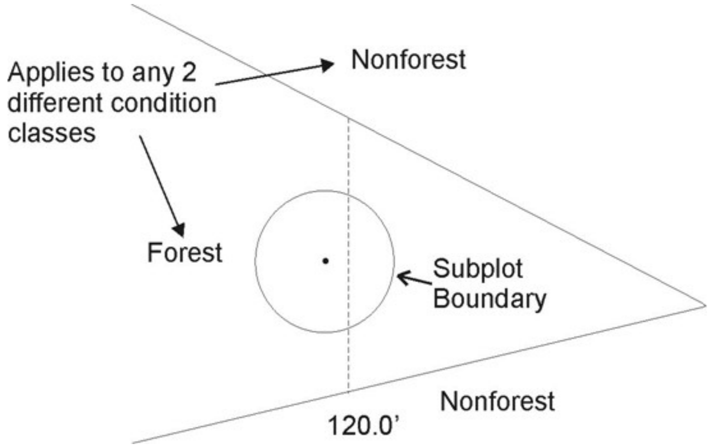


Figure 4.2: Forest condition narrows within a nonforest land condition. Examine the location of the subplot center in reference to the approximate line where the forest narrows to 120.0 ft wide. In this example, the entire subplot is classified as forest.

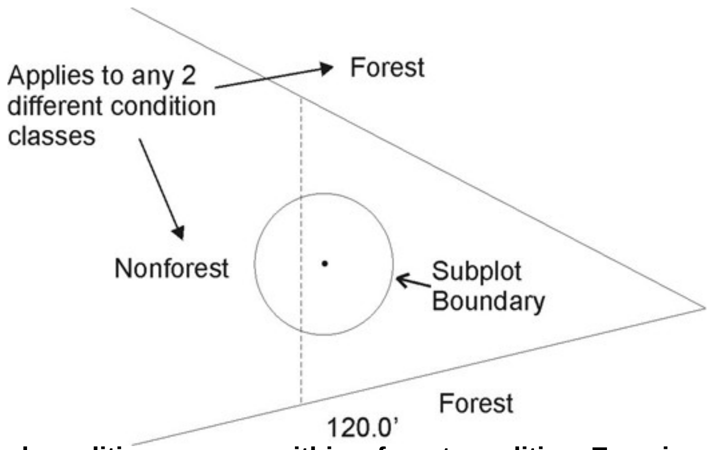


Figure 4.3: Nonforest land condition narrows within a forest condition. Examine the location of the subplot center in reference to the approximate line where the nonforest narrows to 120.0 ft wide. In this example, the entire subplot is classified as forest.

2. Accessible Nonforest Land

Land 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 (see criteria and size requirements under Item 4.7.0.2 URBAN NONFOREST LAND USE). Nonforest includes areas that have sufficient cover or live stems to meet the Forest Land definition, but do not meet the dimensional requirements. All conditions not meeting the requirements of forest land will be assigned a URBAN NONFOREST LAND USE code.

Other Wooded Land – Other wooded land has at least 5 percent, but less than 10 percent, canopy cover of live tally tree species of any size or has had at least 5 percent, but less than 10 percent, canopy cover of tally species in the recent past, based on the presence of stumps, snags, or other evidence. Other wooded land is recognized as a subset of nonforest land, and therefore is not currently considered a separate condition class. 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 addition, other wooded land is classified according to the same nonforest land use rules as forest land (e.g., 6 percent cover in an urban setting is not considered other wooded land). Other wooded land is therefore defined as having ≥5 percent and <10 percent canopy cover at present, or evidence of such in the past, and URBAN NONFOREST LAND USE CODE = 200, 400, 420, 430, or 450.

Commercial cranberry bogs and concrete ponds/raceways associated with fish hatcheries and sewage treatment facilities are considered URBAN CONDITION CLASS STATUS = 2. They should NOT be coded STATUS 3 or 4. Earthen fish hatcheries or sewage treatment ponds will be considered under STATUS 3 or 4 if they meet minimum size requirements.

3. Noncensus Water

Lakes, reservoirs, ponds, and similar bodies of water 1.0 acre to 4.5 acres in size. Rivers, streams, canals, etc., 30.0 feet to 200 feet wide.

4. Census Water

Lakes, 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).

5. Nonsampled~~, possibility of forest~~

See Item 4.4.0.3 URBAN CONDITION NONSAMPLED REASON 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 or nonforest land, record URBAN CONDITION CLASS STATUS = 3 or 4 as long as it can be confirmed that there are no trees or land above the mean high-water line on the plot. In cases where a condition is an access-denied or hazardous land use and has the possibility of URBAN CONDITION CLASS STATUS 1, 2, or URBAN CONDITION CLASS STATUS 3, 4 with the possibility of trees and or land above the mean high-water line; record URBAN CONDITION CLASS STATUS = 5.

Guidance on plots that might otherwise be non-sampled (hazardous or DA):

- If trees are present, or if you can't tell if trees are present, and you can't occupy the plot, the plot is processed as non-sampled.
- If you get close enough to the plot to tell there are no trees AND you can get close enough to accurately measure ALL of the other aspects of data collection. Complete and process the plot based on your visual inspection. (If inspection of invasive plants is the only data item that you are unable to evaluate, process the plot as accessible with an INVASIVE PLANT CONDITION SAMPLE STATUS = 3.) In such a case the only monumentation required will be installing a SP / RP, GPS, and Course to Sample information.
- If you get close enough to the plot to tell there are no trees but can NOT get close enough to accurately measure ALL of the other aspects of data collection. Complete and process the plot as non-sampled. (If inspection of invasive plants is the only data item that you are unable to evaluate, process the plot as accessible with an INVASIVE PLANT CONDITION SAMPLE STATUS = 3.)
    - If you cannot get close enough to the plot to accurately measure ALL aspects of data collection you may make calls based on what you see on the image ONLY if there is no vegetation present, such cases may be where the plot falls entirely within water, a building, or on an impermeable surface. In such a case the only monumentation required will be installing a SP / RP, GPS, and Course to Sample information.

SECTION 4.3 CONDITION CLASS ATTRIBUTES

A CONDITION CLASS NUMBER and a classification for URBAN CONDITION CLASS STATUS are required for every condition class sampled on a plot.

SUBSECTION 4.3.1 FOREST LAND

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

Attributes where a change causes a separate condition class	
2.5.1+U	URBAN RESERVED STATUS
2.5.2+U	URBAN OWNER GROUP
2.5.3	FOREST TYPE
2.5.4	STAND SIZE CLASS
2.5.5	REGENERATION STATUS
2.5.6	TREE DENSITY
Ancillary – changes do not delineate a new condition class	
2.5.7+U	URBAN OWNER CLASS
2.5.12	RESERVED AREA NAME
2.5.13	ARTIFICIAL REGENERATION SPECIES
2.5.14	STAND AGE
2.5.15	DISTURBANCE (up to 3 coded)
2.5.16	DISTURBANCE YEAR (1 per disturbance)
2.5.21	TREATMENT (up to 3 coded)
2.5.22	TREATMENT YEAR (1 per treatment)
2.5.27	PHYSIOGRAPHIC CLASS
2.5.28	LAND COVER CLASS
2.5.29.1U	i-TREE LAND USE
2.5.30+U	URBAN CANOPY COVER SAMPLE METHOD
2.5.31	LIVE CANOPY COVER
2.5.32	LIVE PLUS MISSING CANOPY COVER
2.5.33	CURRENT AFFORESTATION CODE
2.5.34	PREVIOUS AFFORESTATION CODE
2.5.35	TOTAL STEMS
2.5.36	CHAINING CODE

SUBSECTION 4.3.2 URBAN NONFOREST LAND

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

Attributes where a change causes a separate condition class	
2.5.1+U	URBAN RESERVED STATUS
2.5.2+U	URBAN OWNER GROUP
2.5.29+U	URBAN NONFOREST LAND USE
Ancillary - changes do not delineate a new condition class	
2.5.7+U	URBAN OWNER CLASS
2.5.12	RESERVED AREA NAME
2.5.28	LAND COVER CLASS
2.5.29.1U	i-TREE LAND USE
2.5.30+U	URBAN CANOPY COVER SAMPLE METHOD
2.5.31	LIVE CANOPY COVER
2.5.32	LIVE PLUS MISSING CANOPY COVER
2.5.33	CURRENT AFFORESTATION CODE
2.5.34	PREVIOUS AFFORESTATION CODE
2.5.35	TOTAL STEMS
2.5.36	CHAINING CODE

SECTION 4.4 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 and classified 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 and tallied in accordance with Chapter 7.

Within noncensus and census water condition classes, 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 water condition class and tallied in accordance with Chapter 7.

Five 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 (Figure 4.4).
    a. Improved roads: paved roads, gravel roads, or improved dirt roads regularly maintained for long-term continuing use. Unimproved traces and roads created for skidding logs are not considered improved road.

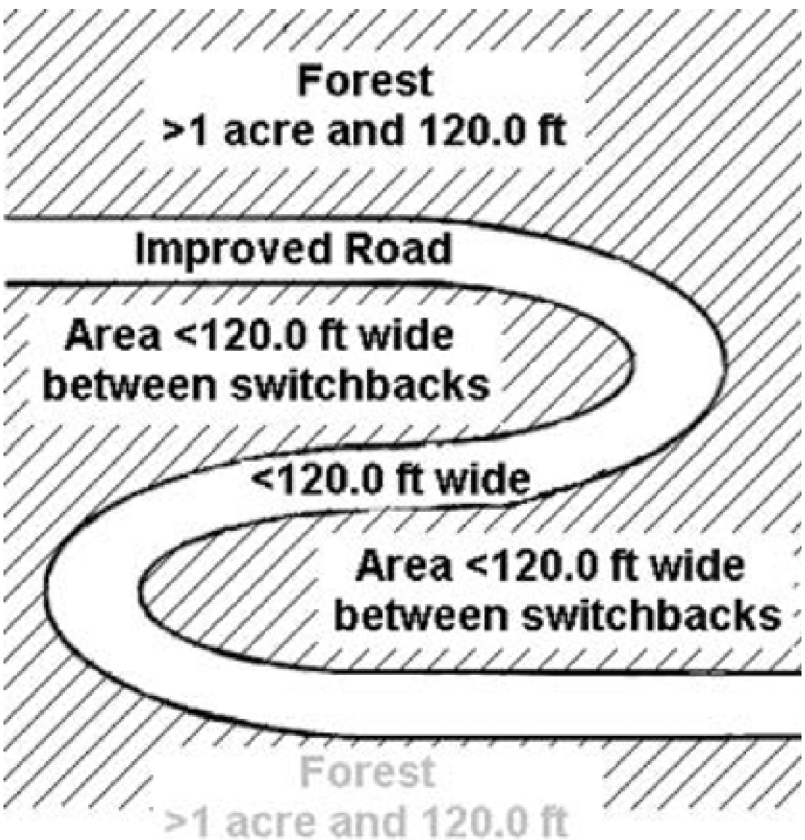


Figure 4.4: Example of a switchback road. All the cross-hatched area is forest and the improved road is a nonforest condition.

    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.

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.

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 #1, e.g., improved roads, maintained rights-of-way, and developments.

   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. Two alternating strips: For two alternating strips of forest and nonforest between two qualifying areas of nonforest land and forest land, see Figure 4.5. Figure 4.5 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 the 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 number 1, e.g., improved roads, maintained rights-of-way, and developments.

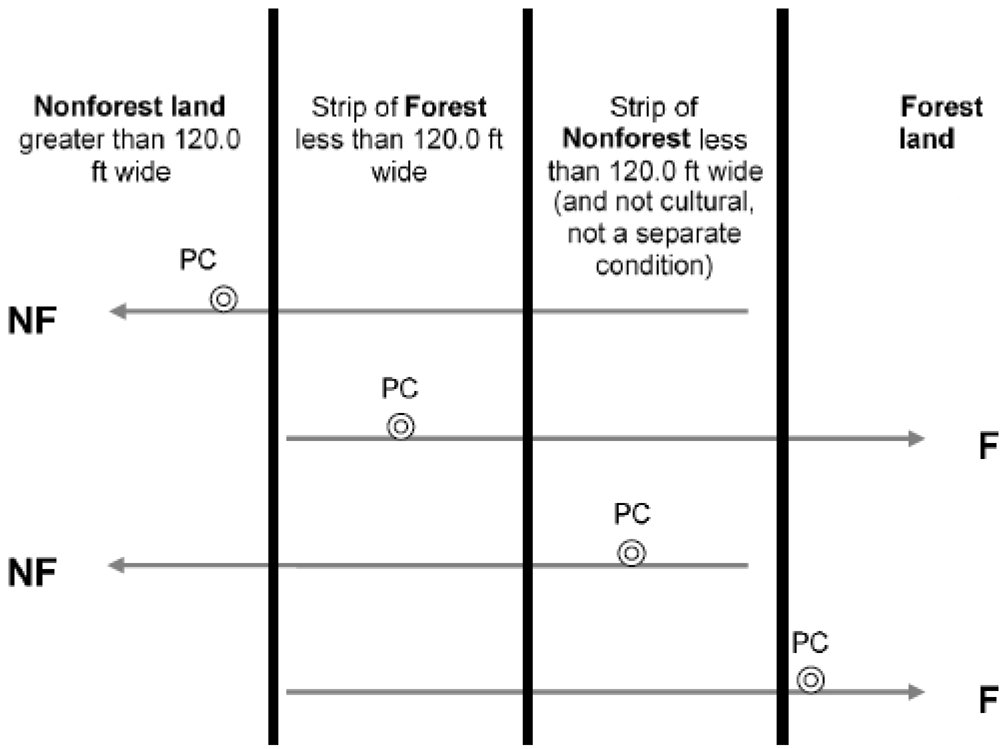


Figure 4.5: Example of alternating strips of forested and nonforested conditions. PC is the plot center (center of subplot 1).

3. The 120.0-foot minimum width for delineation does not apply when a corner angle is 90 degrees or greater (Figure 4.6).
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 nonforest area. 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 across its channel between points on either side up to which water prevents the establishment and survival of trees. To determine whether a linear water feature qualifies as nonforest, 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.
5. Nonsampled conditions are delineated as a separate condition class regardless of size.

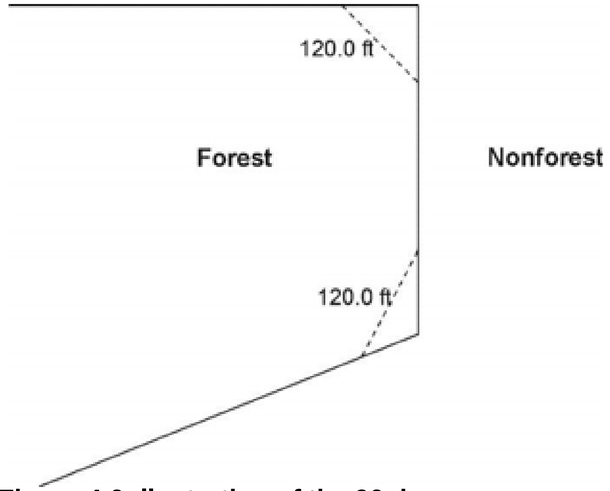


Figure 4.6: Illustration of the 90 degree corner rule. The dotted lines do not create nonforest land conditions

Item 4.4.0.1 CONDITION CLASS NUMBER (CORE 2.4.1)

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. Other condition classes are assigned numbers sequentially at the time each condition class is delineated.

When Collected:	All condition classes
Field width:	1 digit
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	1 to 9

Item 4.4.0.2 URBAN CONDITION CLASS STATUS (CORE 2.4.2+U)

Record the code that describes the sampling status of the condition class. The instructions in Sections Section 4.3 and Section 4.4 apply when delineating condition classes that differ by URBAN CONDITION CLASS STATUS. In situations where a condition is denied access or hazardous, but obviously contains no forest or nonforest land, record URBAN CONDITION CLASS STATUS = 3 or 4 as long as it can be confirmed that there are NO trees or dry land above the mean high-water line on the plot. In cases where a condition is an access-denied or hazardous land use and has the possibility of an URBAN CONDITION CLASS STATUS 1 or 2, or the possibility of a 3 or 4 with the potential to contain trees and or land above the mean high-water line record URBAN CONDITION CLASS STATUS = 5.

When Collected:	All condition classes	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	1	Accessible forest land
	2	Accessible Nonforest land
	3	Noncensus water
	4	Census water
	5	Nonsampled -- ~~possibility of forest land~~

Item 4.4.0.3 URBAN CONDITION NONSAMPLED REASON (CORE 2.4.3+U)

For portions of plots that cannot be sampled (URBAN CONDITION CLASS STATUS = 5), record one of the following reasons.

When Collected:	When URBAN CONDITION CLASS STATUS = 5	
Field width:	2 digits	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	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. See section Section 4.2, Nonsampled prior to using both the Denied Access or Hazardous Situation codes.
	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. See section Section 4.2, Nonsampled prior to using both the Denied Access or Hazardous Situation codes.
	05	Lost data – Plot data file was discovered to be corrupt after a panel was completed and submitted for processing. Used for the single condition that is required for this plot. Applied at the time of processing and used only in conjunction with URBAN PLOT NONSAMPLED REASON code 05. This code is for office use only.
	06	Lost plot – Entire plot cannot be found. Used for the single condition that is required for this plot. Used only in conjunction with URBAN PLOT NONSAMPLED REASON code 06. Can be either generated by the data recorder or in the office.
	07	Wrong location – Previous plot can be found, but its placement is beyond the tolerance limits for plot location. Used for the single condition that is required for this plot. Used only in conjunction with URBAN PLOT NONSAMPLED REASON code 07. Can be either generated by the data recorder or in the office.
	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 URBAN PLOT NONSAMPLED REASON code 08. This code is for office use only.
	09	Dropped intensified plot – Used for the single condition that is required for this plot. Used only by units engaged in intensification. Applied at the time of processing and used only in conjunction with URBAN PLOT NONSAMPLED REASON code 09. This code is for office use only.
	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 field note is required to describe the situation.
	11	Ocean – Condition falls in ocean water below mean high tide line.

SECTION 4.5 DELINEATING CONDITION CLASSES WITHIN ACCESSIBLE FOREST LAND

Accessible forest land is subdivided into condition classes that are based on differences in URBAN RESERVED STATUS, URBAN OWNER GROUP, FOREST TYPE, STAND SIZE CLASS, REGENERATION STATUS, and TREE DENSITY. Section 4.1 applies when delineating contrasting forest condition classes. Specific criteria apply for each of the six attributes and are documented by attribute in Item 4.5.0.1 to Item 4.5.0.6. “Stands” are defined by 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 Item 4.6.0.1 to Item 4.8.0.13).

General instructions for delineating condition classes within accessible forest lands:

1. Distinct boundary within a macroplot (if applicable), subplot, or microplot – Separate condition classes ARE recognized if, within a subplot, two (or more) distinctly different condition classes are present and delineated by a distinct, abrupt boundary. The boundary is referenced; see Chapter 6.
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 urban subplot falls in the middle of a stand-size transition zone. In the zone, the large-diameter stand phases into a sapling stand.

   The urban subplot 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 off the urban subplot.
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 subplots. 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, bogs, beaver ponds, sink holes, cypress domes and ponds, man-made ditches and canals. A riparian forest area must be associated “within forest” and contain at least one distinct and obvious change in a condition class delineation attribute from its adjacent accessible forest land condition class. Figure 4.8 to Figure 4.13 provide examples of when to delineate riparian forest area as a separate condition class.

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.

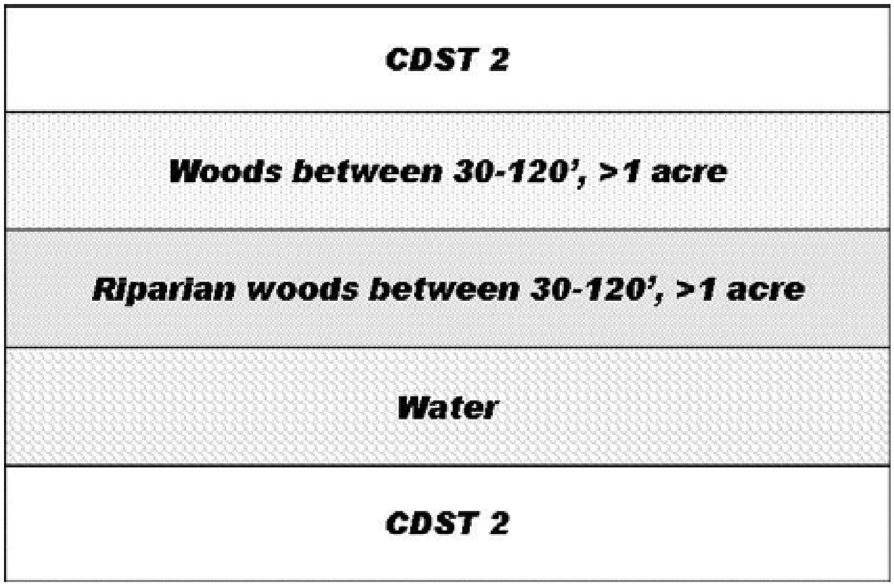


Figure 4.7: Riparian forest containing two distinct forest conditions when the traditional forest land definition is not met. In order to delineate a riparian condition, the accessible forestland must initially be at least 120 ft. in width. Once subdivided, the remaining accessible forestland must be at least 30 ft. in width and 1 acre in size. The riparian condition must be at least 30 ft. in width, but less than 120 ft. in width, and must also be at least one acre in size. The two resulting conditions must maintain a common border for the entire length of the riparian condition.

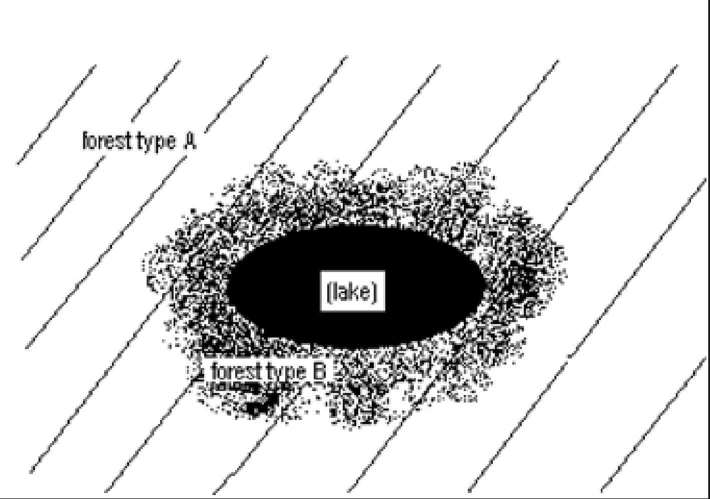


Figure 4.8: Forest type B is a separate condition class (riparian) if the band of it is between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

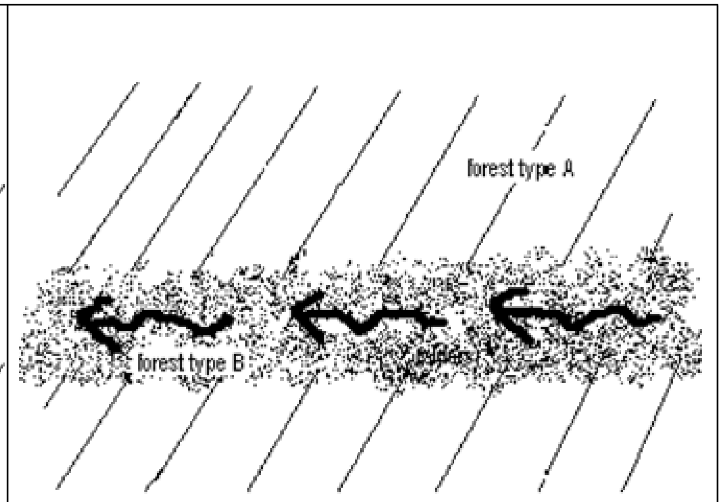


Figure 4.9: Forest type B is a separate condition class (riparian) if the band of it is between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

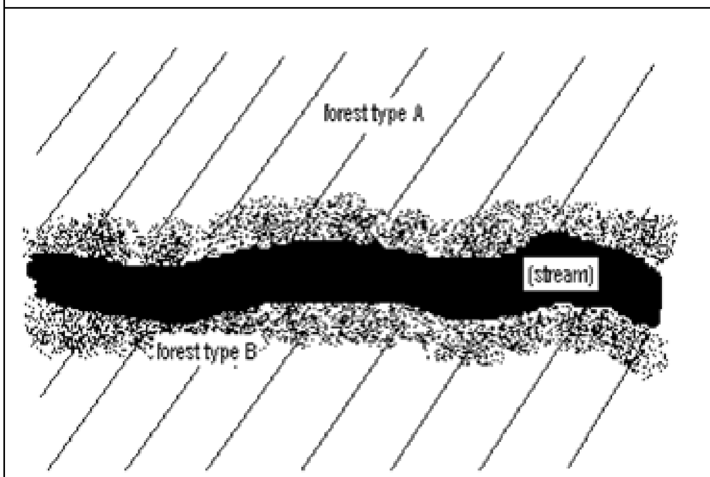


Figure 4.10: If the stream is < 30.0 feet wide, forest type B is a separate condition class (riparian) if the sum of the two widths of the bands, including the stream falls between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

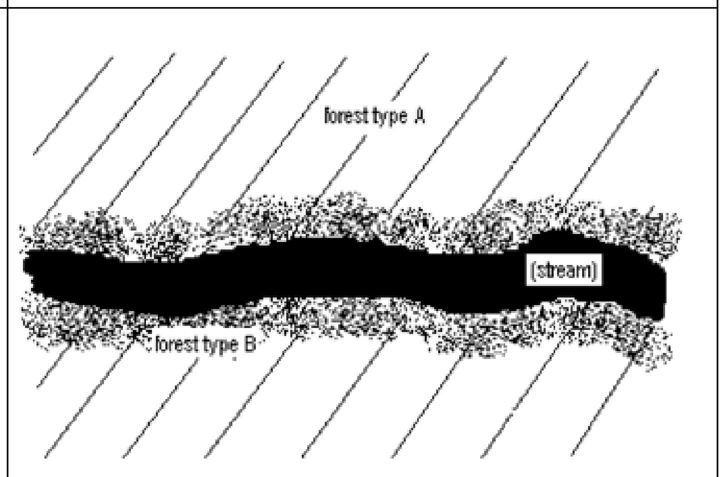


Figure 4.11: If the stream is > 30.0 feet wide, forest type B is a separate condition class (riparian) if either of the two widths of the bands falls between 30.0 feet and 120.0 feet wide and is ≥ 1.0 acre in size.

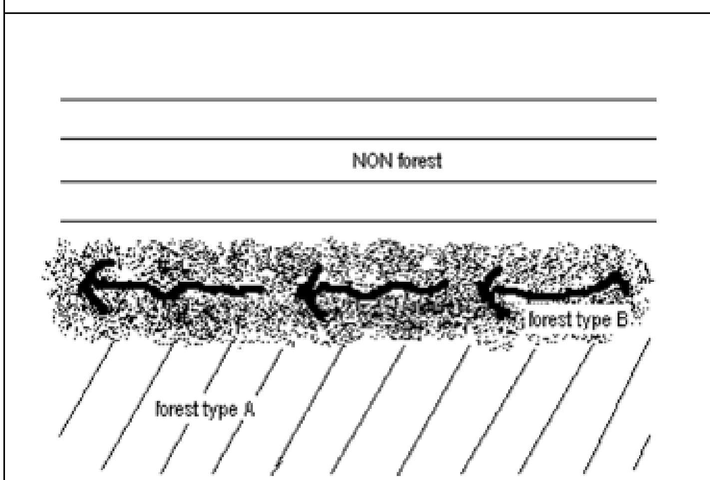


Figure 4.12: Forest type B is a separate condition class (riparian) if the band of it is between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

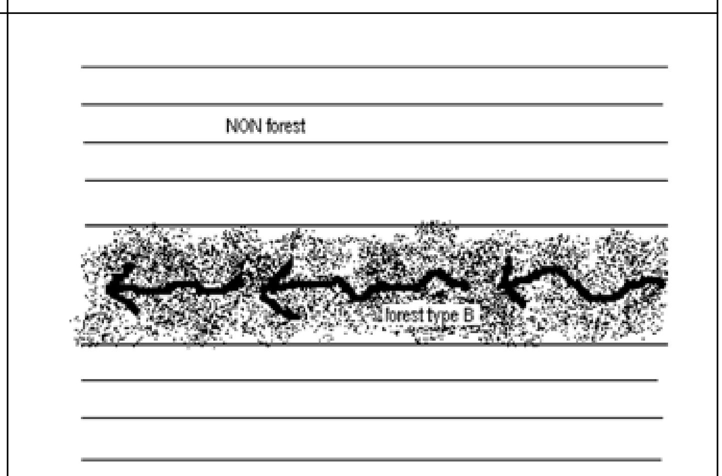


Figure 4.13: In a nonforested area, a band of forest type B that is < 120.0 feet wide is NOT considered a riparian area. It is not a separate condition class at all.

Item 4.5.0.1 URBAN RESERVED STATUS (CORE 2.5.1+U)

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 changed through decision of the land manager (management agency) or through a change in land management personnel, but rather is permanent in nature.

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 G). 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 units 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.

For the URBAN FIA inventory, nonforest areas, as well as census and non census water conditions, 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.

When Collected:	URBAN CONDITION CLASS STATUS = 1, 2, 3, 4	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	0	Not reserved
	1	Reserved

Item 4.5.0.2 URBAN OWNER GROUP (CORE 2.5.2 +U)

Record the URBAN OWNER GROUP code identifying the ownership (or the managing Agency for public lands) of the land in the condition class. Conditions will be delineated based on changes in URBAN OWNER GROUP only; separate conditions due to changes in URBAN OWNER GROUP are recognized only where differences can be clearly identified on the ground when visiting the plot. Assume all census and non census water conditions are state and local government unless they clearly fall with in federal land or are clearly marked as private.

When Collected:	When collected: URBAN CONDITION CLASS STATUS = 1, 2, 5	
Field width:	2 digits	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	10	Forest Service
	20	Other Federal
	30	State and Local Government
	40	Private

Item 4.5.0.3 FOREST TYPE (CORE 2.5.3)

Record the code corresponding to the FOREST TYPE (from Appendix B) 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:

- Evaluate any seedlings available to determine the FOREST TYPE.

If no seedlings exist, use adjacent stands and your best professional judgment to determine FOREST TYPE.

When Collected:	All accessible forest land condition classes (URBAN CONDITION CLASS STATUS = 1)
Field width:	3 digits
Tolerance:	No errors in group or type
MQO:	At least 99% of the time in group; at least 95% of the time in type. No MQO when STAND SIZE CLASS = 0.
Values:	See Appendix B

The instructions in Section 4.1 and Section 4.4 apply when delineating, within accessible forest land, contrasting conditions based on differences in FOREST TYPE.

Item 4.5.0.4 STAND SIZE CLASS (CORE 2.5.4)

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.

When Collected:	All accessible forest land condition classes (URBAN CONDITION CLASS STATUS = 1)	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	0	Nonstocked Meeting the definition of accessible forest land, and one of the following applies: a. less than 10 percent stocked by trees, seedlings, and saplings, and not classified as cover trees, or b. for several woodland species where stocking standards are not available, less than 10 percent **canopy cover** of trees, seedlings, and saplings.
	1	≤ 4.9 inches (seedlings / saplings) At least 10 percent stocking (or 10 percent canopy cover if stocking standards are not available) in trees, seedlings, and 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 (or 10 percent canopy cover if stocking standards are not available) in trees, seedlings, and saplings; and at least 1/3 of the canopy cover is in trees greater than 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 (or 10 percent canopy cover if stocking standards are not available) in trees, seedlings, and saplings; and at least 1/3 of the canopy cover is in trees greater than 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 (or 10 percent canopy cover if stocking standards are not available) in trees, seedlings, and saplings; and at least 1/3 of the canopy cover is in trees greater than 5.0 inches DBH/DRC **and** the plurality of the canopy cover is in trees between 20.0 – 39.9 inches DBH.
	5	40.0 + inches

		at least 10 percent stocking (or 10 percent canopy cover if stocking standards are not available) in trees, seedlings, and saplings; and at least 1/3 of the canopy cover is in trees greater than 5.0 inches DBH/DRC **and** the plurality of the canopy cover is in trees ≥40.0 inches DBH.

The instructions in Section 4.1 and Section 4.4 apply when delineating, on accessible forest land, contrasting conditions based on differences in STAND SIZE CLASS.

Within the sampled area on 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. Use tree stocking of all live trees, seedlings, and saplings that are not overtopped to differentiate between stand-size classes; for most woodland forest types (e.g., pinyon, juniper, gambel oak) where stocking standards are not readily available, use percent tree cover to represent stocking.

When using canopy cover as the surrogate for stocking to determine STAND SIZE CLASS, view the plot from the top down and examine canopy cover. The stand must have at least 10 percent of the canopy cover in STAND SIZE CLASSES of 1, 2, 3, 4, or 5 or any combination of these STAND SIZE CLASSES; otherwise the STAND SIZE CLASS is 0. If 2/3 of the canopy cover is STAND SIZE CLASS = 1, classify the condition as STAND SIZE CLASS = 1. If less than 2/3 of the canopy cover is STAND SIZE CLASS = 1, classify the condition as STAND SIZE CLASS = 2, 3, 4, or 5, based on which of these STAND SIZE CLASSES has the most canopy cover.

Item 4.5.0.5 REGENERATION STATUS (CORE 2.5.5)

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

When Collected:	All accessible forest land condition classes (URBAN CONDITION CLASS STATUS = 1)	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	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

The instructions in section Section 4.1 and Section 4.4 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, 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 is acceptable for determining regeneration status.

Item 4.5.0.6 TREE DENSITY (CORE 2.5.6)

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 previously defined condition class TREE DENSITY.

The instructions in Section 4.1 and Section 4.4 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.

When Collected:	All accessible forest land condition classes (URBAN CONDITION CLASS STATUS = 1)	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	1	Initial density class
	2	Density class 2 - density different than 1
	3	Density class 3 - density different than 1 and 2

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, URBAN RESERVED STATUS, URBAN OWNER GROUP, FOREST TYPE, STAND SIZE CLASS, and REGENERATION STATUS are the same.

SECTION 4.6 ANCILLARY (NON-DELINEATING) URBAN FOREST CONDITION LEVEL VARIABLES

Item 4.6.0.1 ARTIFICIAL REGENERATION SPECIES (CORE 2.5.13)

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.

When Collected:	All accessible forest land condition classes (URBAN CONDITION CLASS STATUS = 1) with evidence of artificial regeneration (REGENERATION STATUS = 1)
Field width:	4 digits
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	See Appendix C, PNW Forest Land Tree Species Codes

Item 4.6.0.2 STAND AGE (CORE 2.5.14)

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. Record 000 for nonstocked 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 (e.g., not age at the point of diameter measurement). Note: For planted stands, estimate age based on the year the stand was planted (e.g., 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. The variance associated with mean stand age increases with stand heterogeneity, and additional cores are not likely to improve the estimate. Core each tree at 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. Unless more specific information is provided at training or by the unit, add 5 years to all eastern species, 5 years to western hardwoods, and 10 years to western softwoods.

Assign a weight to each core by visually estimating the percentage of total overstory trees it represents. Make sure the weights from all cores add up to 1.0, compute the weighted average age, and record. 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 should 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.

If a condition class is nonstocked, assign a STAND AGE of 000.

If all of the trees in a condition class are of a species which, by regional standards, cannot be bored for age (e.g., mountain mahogany, tupelo) record 998. This code should be used in these cases only.

If tree cores are not counted in the field, but are collected and sent to the office for the counting of rings, record 999. Note on the core the percent of stand that type of core represents so that STAND AGE can be calculated later.

When Collected:	All accessible forest land condition classes (URBAN CONDITION CLASS STATUS = 1)
Field width:	3 digits
Tolerance:	+/- 10%
MQO:	At least 95% of the time
Values:	000 to 997, 998, 999

Item 4.6.0.3 DISTURBANCE 1 (CORE 2.5.15)

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 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, etc.). In these cases, a disturbance should be coded when at least 25 percent of the soil surface or understory vegetation has been affected.

When Collected:	All accessible forest land condition classes (URBAN CONDITION CLASS STATUS = 1)		
Field width:	2 digits		
Tolerance:	No errors		
MQO:	At least 99% of the time		
Values:	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 damage to trees, including seedlings and saplings
	30	Fire (from crown and 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/livestock (includes grazing)
	50	Weather damage	
		51	ice
		52	wind (includes hurricane, tornado)
		53	flooding (weather induced)
		54	drought
	60	Vegetation (suppression, competition, vines)	
	70	Unknown/not sure/other (include in 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 condition-level note to describe further.	
	90	Geologic disturbances	
		91	landslide
		92	avalanche track
		93	volcanic blast zone
		94	other geologic event
		95	earth movement/avalanches

Item 4.6.0.4 DISTURBANCE YEAR 1 (CORE 2.5.16)

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
MQO:	At least 99% of the time
Values:	Since the previous plot visit, or the past 5 years for plots visited for the first time; 9999

Item 4.6.0.5 DISTURBANCE 2 (CORE 2.5.17)

Record the second disturbance here. See DISTURBANCE 1 for coding instructions.

Item 4.6.0.6 DISTURBANCE YEAR 2 (CORE 2.5.18)

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

Item 4.6.0.7 DISTURBANCE 3 (CORE 2.5.19)

Record the third disturbance here. See DISTURBANCE 1 for coding instructions.

Item 4.6.0.8 DISTURBANCE YEAR 3 (CORE 2.5.20)

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

Item 4.6.0.9 TREATMENT 1 (CORE 2.5.21)

Forestry treatments are a form of disturbance. These human 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. 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 (SAMPLE KIND = 1 or 3), the treatment must be within the last 5 years. For remeasured plots recognize only those treatments that have occurred since the previous inventory.

When Collected:	All accessible forest land condition classes (URBAN CONDITION CLASS STATUS = 1)	
Field width:	2 digits	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	00	None - No observable treatment.
	10	Cutting - The removal of one or more trees from a stand
	20	Site preparation - Clearing, slash burning, chopping, disking, bedding, or other practices clearly intended to prepare a site for either natural or artificial regeneration.
	30	Artificial regeneration - Following a disturbance or treatment (usually cutting), a new stand where at least 50% of the live trees present resulted from planting or direct seeding.
	40	Natural regeneration - Following a disturbance or treatment (usually cutting), a new stand where at least 50% of the live trees present (of any size) were established through the growth of existing trees and/or natural seeding or sprouting.
	50	Other silvicultural treatment - The use of fertilizers, herbicides, girdling, pruning, or other activities (not covered by codes 10-40) designed to improve the commercial value of the residual stand, or chaining, which is a practice used on woodlands to encourage wildlife forage.

Item 4.6.0.10 TREATMENT YEAR 1 (CORE 2.5.22)

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
MQO:	At least 99% of the time
Values:	Since the previous plot visit, or the past 5 years for plots visited for the first time

Item 4.6.0.11 TREATMENT 2 (CORE2.5.23)

If a stand has experienced more than one treatment, record the second treatment here. See TREATMENT 1 for coding instructions; code 00 if none.

Item 4.6.0.12 TREATMENT YEAR 2 (CORE 2.5.24)

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

Item 4.6.0.13 TREATMENT 3 (CORE 2.5.25)

If a stand has experienced more than two treatments, record the third treatment here. See TREATMENT 1 for coding instructions; code 00 if none.

Item 4.6.0.14 TREATMENT YEAR 3 (CORE 2.5.26)

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

Item 4.6.0.15 PHYSIOGRAPHIC CLASS (CORE 2.5.27)

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 (URBAN CONDITION CLASS STATUS = 1
Field width:	2 digits
Tolerance:	No errors

MQO:	At least 80% of the time	
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.
	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 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 already described.
	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 flood plains.
	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 Flood plains/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 Flood plains/Bottomlands - 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 already described.
	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 pocosins - 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.

SECTION 4.7 DELINEATING CONDITION CLASSES WITHIN ACCESSIBLE NONFOREST LAND

Accessible Nonforest Land is subdivided into condition classes that are based on differences in URBAN RESERVED STATUS, URBAN OWNER GROUP, and URBAN NONFOREST LAND USE. Specific criteria apply for each of the three attributes and are documented by attribute in Item 4.5.0.1, Item 4.5.0.2, and Item 4.7.0.2.

Additionally, each separate nonforest condition class recognized within accessible nonforest land must be at least 1.0 acre in size and at least 120.0 feet in width. If prospective contrasting nonforest 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. The exception is that there is no specific minimum size requirement for the 300 (Developed) series of URBAN NONFOREST LAND USEs other than their shortest dimension must be at least 20 ft. in length. Exceptions to the 20 ft. minimum dimension rule within the 300 (Developed) series are as follows: code 340 (Mining and Wasteland), which must be at least 120 ft. wide and an acre in size and codes 320 (Rights-of-way), 321 (Transportation), 322 (Utility), and 331 (Park) which have no minimum dimension.

Alleyways are not separated into a different condition class, but rather are included in their surrounding condition. If the alley serves more than one condition, lump it with the condition that PC is closest to. An alley is defined as a narrow lane, path, or passage way, for pedestrians or vehicles, which usually runs between or behind buildings, and in some cases provides access to the rear of lots or buildings.

No other attribute shall be the basis for recognizing contrasting condition classes within accessible nonforest 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 Item 4.8.0.1 to Item 4.8.0.13).

Record the URBAN NONFOREST LAND USE that describes the land use occurring closest to the ground, for example:

- An elevated highway that exists over a downtown parking lot would be coded as Commercial / Industrial (314), not Transportation (321).
- A Utility line that exists above a developed URBAN NONFOREST LAND USE would be ignored and considered an inclusion within the surrounding condition.

General instructions for delineating condition classes within accessible nonforest land:

1. Distinct boundary within a subplot or microplot – Separate condition classes ARE recognized if, within a subplot, two (or more) distinctly different condition classes are present and delineated by a distinct, abrupt boundary. The boundary is referenced; see Chapter 6.
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.

Item 4.7.0.1 URBAN RESERVED STATUS (CORE 2.5.1+U)

(See full data element description in Item 4.5.0.1 URBAN RESERVED STATUS)

URBAN OWNER GROUP (CORE 2.5.2+U)

(See full data element description in section Item 4.5.0.2 URBAN OWNER GROUP)

Item 4.7.0.2 URBAN NONFOREST LAND USE (CORE 2.5.29+U)

Record this attribute for every nonforest condition class identified on the plot. At times an URBAN CONDITION CLASS STATUS 2 condition may be made up of multiple nonforest land uses neither of which meet the minimum size requirement individually. In such cases, record the first URBAN NONFOREST LAND USE encountered. If unable to determine the URBAN NONFOREST LAND USE FOR a non–sampled condition on the ground make the best call based on the image provided to install the plot.

When Collected:	CONDITION CLASS STATUS = 2, 3, 4, 5			
Field width:	3 digits			
Tolerance:	No errors			
MQO:	At least 99% of the time			
Values:	100	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 and can be less than an acre.) If a windbreak or shelterbelt meets the size and definition requirements of accessible forest land, then it is not considered nonforest. Use the 100 code only for cases not better described by one of the following:		
		110	Cropland - Land utilized for agricultural crops including silage and feed grains; and bare farm fields resulting from cultivation or harvest.	
		120	Pasture (improved through cultural practices) - Land maintained and used for grazing with canopy cover less than 10 percent in live trees (established seedlings, saplings or larger trees). Evidence of maintenance, besides the degree of grazing, includes condition offencing, presence of stock ponds or water tanks. Land also may be periodically brush hogged indicated by seedlings 3 to 4 feet in height and basal scars present on trees.	
		130	Idle farmland - Former cropland or pasture that has not been tended within the last 2 years and that has less than 10 percent canopy cover with live trees, (established seedlings or larger trees) regardless of species. A field that is between crop rotations should NOT be called Idle Farmland.	
		140	Orchard / Nursery - Land utilized for orchards and nursery stock.	
		150	Christmas tree plantation	
		160	Maintained wildlife opening - Land maintained as a permanent opening of primarily herbaceous vegetation within woodland areas to provide food and cover benefits for early successional wildlife species. [Source: USDA NRCS] These may be located on public or private land.	
		170	Windbreak/Shelterbelt - Windbreaks or shelterbelts are plantings of single or multiple rows of trees or shrubs that are established for environmental purposes. Windbreaks or shelterbelts are generally established to protect or shelter nearby leeward areas from troublesome winds. Such plantings are used to reduce wind erosion, protect growing plants (crops and forage), manage snow, and improve irrigation efficiency. Windbreaks also protect structures and livestock, provide wildlife habitat, improve aesthetics, and provide tree or shrub products. Also, when used as a living screen, windbreaks control views and lessen noise. [Source: USDA NRCS, Windbreak /Shelterbelt Conservation Practice Job Sheet 380, April 1997]	
	200	Rangeland - 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. The area must be at least 1.0 acre in size and 120.0 feet wide.		
	300	Developed - Land used primarily by humans for purposes other than forestry or agriculture. There is no specific minimum size requirement for the 300 (Developed) series of codes except that their shortest dimension must be at least 20ft in length. exceptionS to this rule are code 340 (Mining and wasteland) which must be at least 120 ft. wide and an acre in size and codes 320 (Rights-of-way), 321 (Transportation), 322 (Utility), and linear sections of Parks contained developed trails 331 (Park) which have no minimum width. In some situations a building may serve multiple land uses, such as a commercial store front on the first floor with residential units on the second floor. In such cases assign the land use that produces the most pedestrian "foot traffic". Use the 300 code only for land not better described by one of the following:		
		310	Cultural: business (industrial/commercial), residential, and other places of intense human activity. Use the 310 code only for land not better described by one of the following:	
			311	Residential: Free standing structures and related green space/hardscape serving one to four families each.

			312	Multi-family residential: Structures containing more than four units each. A block of attached one-four family structures would be considered Multi-family residential. A residential complex consisting of many separate one-four family structure (analogous to an apartment complex) and related green space/hardscape would be also considered Multi-family residential. Residential complexes are described as a group of well-defined units with shared common areas such as green space, recreation, parking, and or other services. They may be a group of rental units or part of an inclusive single development. Homeowners associations and gated communities are NOT to be considered residential complexes.
			313	Institutional: Schools, hospitals/medical complexes, colleges, religious buildings, government buildings, etc., and related green space/hardscape.
			314	Commercial/Industrial: In addition to standard commercial and industrial land uses related green space/hardscape, outdoor storage/staging areas, and parking lots in downtown areas that are not connected with institutional or residential use are also included. Home businesses, such as day care, tax preparation, hair styling, etc. that are run out of Residential buildings are considered Commercial.
			316	Cemetery. This category includes associated access roads, buildings and green space (maintained and unmaintained) and hardscape while excluding obvious public roads which would be considered Rights- of-Ways.
		320	Rights-of-way: improved roads, maintained canal. • An improved road that specifically serves a Developed area such as a residence, parking lot, campground, or a cemetery is considered a part of that greater Developed NFLU, and is not delineated as a Right-of-Way so long as it remains within that Developed land use. Once that road departs from the specific Developed land use, it may be considered a Right-of- Way. Improved roads that are adjacent to Developed Nonforest areas, but do not uniquely serve those areas are considered rights-of-way and are not incorporated into the greater Developed condition. unless it's bounded (on both sides) by accessible forest land. • An alley or alleyway is NOT delineated and mapped as a R.O.W. and is included in its' surrounding condition. An alley is defined as a narrow lane, path, or passage way, for pedestrians or vehicles, which usually runs between or behind buildings, and in some cases provides access to the rear of lots or buildings. If the alley serves more than one UNFLU, lump it with the one that PC is closest to. Consider the area between the road edge and the far side of the sidewalk as part of the R.O.W. In cases where there is no sidewalk present look to the following ranked locations to determine the R.O.W. boundary: 1. Signs of periodic vegetation manipulation associated with the roadway 2. A clear change in ownership between public and private 3. The far side the drainage ditch associated with the road Use code 320 for land not better described by the following:	
			321	Transportation: limited access roadway (highways with on-off ramps), railway or airport and related green space/hardscape.
			322	Utility: power lines, pipelines, maintained levees and flood control channels. All maintained utility Rights-of-Way are coded as such when they occur within Forestland (URBAN CONDITION STATUS 1). However, if a utility right-of-way extends into a developed land use (the 300 series codes), the developed land use takes precedence. For example, a power line may run over a Multi-Family Residential land use, in this case code it as Multi-Family Residential.

		330		Recreation: Skiing, campgrounds, playing fields, athletic, sports tracks, etc. These are areas where persons participate in sports and outdoor activities. This code excludes complexes such as professional football stadiums, such areas would be considered Commercial / Industrial. Use code 330 for land not better described by the following:
			331	Park: Parks are developed green space that are generally publicly owned and are always open to the public. This land use generally consists of open maintained green space, playgrounds, recreational trails, buildings and/or athletic fields and includes associated parking areas and access roads. Related unmaintained woods that do NOT qualify as forest land and other areas that can not stand alone as a separate UNFLU will be treated as an inclusion in the park. Obvious public roads that do not exclusively serve the park should be considered Rights-of-Ways and mapped as a separate condition. Ownership by a parks department or other public agency does not, by itself, determine the UNFLU to be 331. Maintenance or development as described above must be present. Developed recreational trails running through narrow corridors that would have otherwise been considered inclusions in the surrounding condition serve as the evidence necessary to call such areas Parks as opposed to inclusions.
			332	Golf courses. This category includes associated access roads, buildings and green space/hardscape (maintained and unmaintained) while excluding obvious public roads which would be considered Rights- of-Ways.
		340		Mining and wasteland Note: Code 340 must be at least 1 acre in size and 120.0 feet in width. Surface mining, gravel pits, dumps, landfills or reclaimed mining areas that are at least 1 acre and 120.0 feet in width. Note: Reclaimed mining areas are not always nonforest. Some trees such as black locust readily adapt to reclaimed areas. If the 10 %canopy cover requirement is met,the land is considered forest land. The field crew will make the decision of whether the land is productive or unproductive. Reclaimed mine areas should remain in this land use until either the 10% canopy cover threshold is met for accessible forest land or another nonforest land use applies.
	400			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. At times a URBAN CONDITION CLASS STATUS 2 condition may be made up of multiple nonforest land uses, some of which may not be meet defined size requirements. In this case record the first nonforest land use that you encounter, regardless of size. Examples include undeveloped beaches, barren land (rock, sand), marshes, bogs, ice, and snow. Use the 400 code only for cases not better described by one of the following:
		410		Nonvegetated
		420		Wetland - Areas subjected to periodic tidal flooding or other areas where water is present for extended periods during the growing season and for longer periods during the non-growing season. Water usually comes from rainfall, snowmelt, a rising water table, groundwater seepage, or incoming tides. Water may be present on the surface of wetlands for varying periods, as in flooded or ponded wetlands, or it may simply keep the underlying soils saturated near the surface with no surface water present. Wetlands include bogs, marshes, salt marshes, swamps, meadows and fens. [Source: Tiner] Bogs are not always nonforest. Some tree species such as black spruce can adapt to bog conditions. If the 10% canopy cover requirement is met, the land is considered forest land. Swamps are not always nonforest. Some tree species readily adapt to the swamp conditions. If the 10% canopy cover requirement is met, the land is considered forest land. Drained beaver ponds that are not stocked are included in this category.
		430		Beach - Sandy or pebbly shore associated with an ocean or lake.
		450		Nonforest-Chaparral

	900	All URBAN CONDITION CLASS STATUS = 3, 4 (Census and Noncensus Water) conditions.	
		910	URBAN CONDITION CLASS STATUS = 5 (AND has the potential to be forest land).

SECTION 4.8 ANCILLARY (NON-DELINEATING) URBAN CONDITION LEVEL VARIABLES

Item 4.8.0.1 i-TREE LAND USE (CORE 2.5.29.1U)

Assign each condition an i-TREE LAND USE. If multiple i-TREE LAND USES exist within a condition, record the first one that is encountered starting at zero degrees.

i-TREE LAND USE does not recognize URBAN NONFOREST LAND USE 320, Rights-of-way. Assign such conditions an i-TREE Land Use based on the surrounding condition. For example, a Right-of-Way in a multi-family residential neighborhood would be assigned an i-TREE LAND USE of 21 – Multi-family residential. When a Right-of-Way is between multiple UNFLUs, assign the i-Tree LAND USE based on which UNFLU is closest to PC.

When Collected:	URBAN CONDITION CLASS STATUS = 1, 2, 3, 4	
Field width:	2 digits	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	10	Agriculture: Is defined as cropland, pasture, idle farmland, orchards, vineyards, nurseries, maintained wildlife openings, farmsteads and related buildings, feed lots, rangeland, and includes windbreaks and shelterbelts that do not meet the definition for forest land. Wooded areas /plantations that are managed for a specific crop such as nuts or Christmas trees or forest land that shows obvious evidence of management activity related specifically to wood production are also included. This code is valid with URBAN NONFOREST LAND USE 100, 110, 120, 130, 140, 150, 160,170,200, 320 and CONDITION CLASS STATUS = 1 (accessible forest land) conditions that are not reserved.
	20	Residential: Freestanding, and related green space/hardscape, structures serving one to four families each. This code is valid with URBAN NONFOREST LAND USE 311 and 320
	21	Multi-family residential: Structures containing more than four residential units. [Note: A block of attached one- to four-family structures would be considered multi-family residential. A residential complex consisting of many separate one- to four-family structures and related green-space/ hardscape would be also considered multi- family residential]. This code is valid with URBAN NONFOREST LAND USE 312 and 320
	22	Institutional: Schools, hospitals/medical complexes, colleges, religious buildings, government buildings, etc., and related green spaces/ hardscape. This code is valid with URBAN NONFOREST LAND USE 313, 320 and 340. [Note: If a parcel contains large unmaintained areas, possibly for expansion or other reasons, treat the area as Unused (i-TREE LAND USE 24). However, small islands of trees in a maintained landscape would be considered Institutional.]

	23	Commercial/Industrial: In addition to standard commercial and industrial land uses, this category includes outdoor storage/staging areas as well as parking lots in downtown areas that are not connected with an institutional or residential use. This code is valid with URBAN NONFOREST LAND USE 314, 320 and 340. NOTE: For mixed-use buildings, land use is based on the dominant use, i.e., the use that receives the majority of the foot traffic. It might not always occupy the majority of space in the building. For example, a building with commercial use of the first floor and apartments on upper floors would be classified as Commercial/Industrial.
	24	Unused This category includes land with no clear intended present or past use. An empty lot where its associated structures have been removed should be called unused. Abandoned buildings, vacant structures, and their associated infrastructure and green space/hardscape should be classified based on their original intended use. For example, an overgrown parking lot and playground associated with an abandoned apartment complex would be classified as Multi-family Residential, not Unused. Idle farmland should be classified as Agriculture. Forest land that is not clearly actively managed for timber production and is not contained within the boundaries of a Park, Golf course, or Cemetery land use would be coded as Unused. For example forest land in the form of a woodlot in the middle of a corn field that is not being managed for wood products would be considered Unused, as the land is not associated with a particular land use. Forest land contained within the boundaries of a Park, Golf Course, or Cemetery would be coded respectively. This code is valid with URBAN NONFOREST LAND USE 300, 310, 311, 312, 313, 314,320, 410, 430, 450 and CONDITION CLASS STATUS = 1 (accessible forest land) conditions that are not managed for wood production or part of a Park, Cemetery, or Golf Course.
	25	Cemetery: Includes associated access roads, buildings, green space (maintained & unmaintained), hardscape and forest land within the Cemetery boundary that is not being managed for wood products. This code is valid with URBAN NONFOREST LAND USE 316, 320, and CONDITION CLASS STATUS = 1 (accessible forest land) conditions that are not managed for wood production or part of a Park or Golf Course.
	30	Transportation: Includes limited access roadways and related green-spaces/hardscape (such as interstate highways with on and off ramps, sometimes fenced); railroad stations, tracks and yards; shipyards; airports; etc. If plot falls on any other type of road, or associated median strip, classify according to nearest adjacent land use. This code is valid with URBAN NONFOREST LAND USE 320 and 321.
	31	Utility: Power-generating facilities, sewage treatment facilities, covered and uncovered reservoirs, and empty storm-water runoff retention areas, flood control channels, conduits. This code is valid with URBAN NONFOREST LAND USE 314, 320 and 322.

	40	Park: The PARK i-Tree code differs slightly from the PARKS UNFLU code in that the i-Tree code may be used to describe both non-forest conditions as well as forested conditions that are not being managed for wood products. Non-Forest parks are developed green space that are generally publicly owned and are always open to the public. These areas generally consist of open maintained green space, playgrounds, recreational trails, buildings and/or athletic fields and include associated parking areas and access roads. Forested parks take on many forms but normally include "park", "wilderness," "wild river," "reserve," or "preserve" in their names, are normally publicly owned and are generally open to the public although they may be closed for resource protection or public safety reasons. The i-Tree Park land use is based on the condition's UNFLU, not the actual park boundary. For example, a wetland (UNFLU 420) within the park boundaries would receive an i-Tree land use of 50 NOT 40. This code is valid with URBAN NONFOREST LAND USE 320, 330,331, and CONDITION CLASS STATUS = 1 (accessible forest land) conditions that are not managed for wood production or part of a Cemetery or Golf Course. When Condition Status = 1 and RESERVE = 1, i-Tree must equal 40.
	41	Golf Course: Includes associated access roads, buildings, green space (maintained and unmaintained), and forest land within the Golf Course boundary that is not being managed for wood products. This code is valid with URBAN NONFOREST LAND USE 320, 332 and CONDITION CLASS STATUS = 1 (accessible forest land) conditions that are not managed for wood production or part of a Park or Cemetery.
	50	Water/wetland: Streams, rivers, lakes, storm-water retention areas and other water bodies / wetlands (natural or manmade) that meet the definition of URBAN CONDITION CLASS STATUS 3 or 4 or areas meeting the definition of URBAN NONFOREST LAND USE 420. Areas of standing water / wetlands that do not meet minimum size requirements should be classified based on the adjacent land use; such areas may include small pools and fountains. This code is valid with URBAN CONDITION CLASS STATUS 3 and 4 as well as URBAN NONFOREST LAND USE 320, 420 and 900.
	60	Other: Land uses that are not better described by one of the categories listed above. This designation should be used very sparingly as it provides very little useful information for the model. Clarify with comments in Notes. This code is valid with URBAN NONFOREST LAND USE 300, 310, 320, and 400.

Cond. Status	Urban Non-Forest Land Use	i-Tree
1	null	10;24;25;40;41
3	900	50
4	900	50
5	100;110;120;130;140;150;160;170;200;300;310;311;312;313;314;316;320;321;322;330;331;332;340;400;410;420;430;450;900;910	null
2	100;110;120;130;140; 150;160;170	10
2	200	10
2	300	60
2	310	60
2	311	20; 24
2	312	21; 24
2	313	22; 24
2	314	23;24;31

Cond. Status	Urban Non-Forest Land Use	i-Tree
2	316	25
2	320	10;20;21;22;23;24;25;30; 31;40;41;50;60
2	321	30
2	322	31
2	330	40
2	331	40
2	332	41
2	340	22;23
2	400	60
2	410	24
2	420	50
2	430	24
2	450	24

Table 4.1: Condition status, Urban Non-Forest Land Use, and i-Tree codes.

Item 4.8.0.2 URBAN OWNER CLASS (CORE 2.5.7+U)

Record the URBAN OWNER CLASS code that best corresponds to the ownership (or the managing Agency for public lands) of the land in the condition class. Conditions will NOT be delineated based on changes in URBAN OWNER CLASS. If multiple URBAN OWNER CLASSes occur within a condition class (i.e., within an URBAN OWNER GROUP), record the URBAN OWNER CLASS closest to PC.

When Collected:	URBAN CONDITION CLASS STATUS = 1, 2, 5	
Field width:	2 digits	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	Owner Classes within Forest Service Lands (Owner Group 10)	
	11	National Forest
	12	National Grassland and/or Prairie
	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 (Including the Army Corps of Engineers)
	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 (including private educational institutions)
	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 4.8.0.3 RESERVED AREA NAME (CORE 2.5.12)

Record the specific name of the area that identifies the reserved designation for the condition. If a drop-down list is provided in the PDR, either select the correct name or select "Other" and type the correct name in the notes field.

When Collected:	All conditions with URBAN RESERVED STATUS = 1
Field width:	Alphanumeric character field
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	English language words, phrases, and numbers

Item 4.8.0.4 LAND COVER CLASS (CORE 2.5.28)

Record this variable for all mapped conditions. As with Item 4.4.0.2 CONDITION CLASS STATUS, LAND COVER CLASSes must meet the minimum area and width requirements (except those cases where the condition has been solely defined due to developed land uses, such as roads and rights-of-ways). If the condition is less than 1 acre, then apply the key to the condition. Within larger mapped conditions, evaluate the potential for multiple land cover classes as follows: if no prospective land cover classes meet the minimum width and area requirements, apply the key to the acre area that is within the condition being evaluated and closest to the lowest numbered subplot center associated with the condition. If multiple land cover classes (i.e., those which meet minimum area and width requirements) exist in the condition, assign the first land cover class that is encountered to the condition. As with other condition attributes, inclusions (of less than 1 acre) within the condition should be ignored when assigning the LAND COVER CLASS. Therefore, areas of the inclusion within the acre area are ignored when making the relative cover assessments. Apply the key as a guide and/or to verify the LAND COVER CLASS selection.

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:
    - 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.
    - 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.
    - 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.
    a. Areas where the majority of vegetation (≥50% relative cover) has been highly- manipulated = **Anthropic Vegetation**, else 1.2
        i. 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**
        ii. Other areas predominantly covered by vegetation with highly-manipulated growth forms = **07 Developed, Vegetated**
    b. Areas where majority of vegetation (≥50% relative cover) is natural or semi-natural = **Natural/Semi-natural Vegetation**
        i. 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**
        ii. Areas on which shrubs provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer = **02 Shrubland**
        iii. Areas on which herbaceous vegetation provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer = **03 Grassland**
        iv. Areas on which non-vascular vegetation provide 10% or greater cover and are part of the dominant vegetation layer = **04 Non-vascular Vegetation**
        v. 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**
    a. Areas persistently and predominantly covered by water (census and noncensus water, permanent snow and ice) and with less than 10% cover of emergent vegetation. = **10 Water**
    b. Areas predominantly covered with constructed materials with limited plant life = **09 Developed**
    c. 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
MQO:	At least 95% of the time
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 4.8.0.5 URBAN CANOPY COVER SAMPLE METHOD (CORE 2.5.30+U)

Record the URBAN 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. If the plot location also contains an active CORE FIA field plot that requires a canopy check to determine if the CORE plot meets the threshold for forestland there is no reason to repeat the process on the Urban FIA plot, base your call on whatever method you used for the CORE plot and record the canopy percentages in the Urban plot file.

Ocular method - The Ocular method is only used in areas that are obviously 0% LIVE PLUS MISSING CANOPY COVER or obviously greater than 10% 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 URBAN CONDITION CLASS STATUS 2, 3, and 4 plots where access to the nonforest land cover 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 method - The Acre method is used when the ocular method is not appropriate and when it is safe and practical to sample on the entire acre.

1. To determine if minimum 10% LIVE PLUS MISSING CANOPY COVER is reached (4356 sq ft), the crew samples all live, dead, and missing tree canopies on the one-acre sample plot (117.75 foot radius) as described above in LIVE PLUS MISSING CANOPY COVER.
2. If the 10% LIVE PLUS MISSING CANOPY COVER threshold is met and there is additional LIVE PLUS MISSING CANOPY COVER on the acre plot, crews can estimate the remaining LIVE PLUS MISSING CANOPY COVER using the ocular method.
3. As with the subplot method, the sample acre (117.75 foot radius plot) must fall entirely in the questionable condition.

Percent Canopy Cover Calculation for Acre method:

If a condition is close to 10% canopy cover, and other methods may not accurately represent tree canopy cover due to irregular spatial distribution of tree canopies (e.g., clumpiness), the Acre method provides another estimate of the total tree canopy area within the radius of a 1-acre plot located within the condition in question.

Given:

1. The area of an acre is 43,560 ft^2
2. A 1-acre circle has a radius of 117.75 ft.
3. 10% of 1-acre is 4,356 ft^2

and assuming the canopies to be ellipses:

1. Measure the approximate canopy diameter (long axis and short axis) for each tree on the acre.
2. Calculate the canopy area for each tree as Canopy Area = pi*((long axis diameter/2)*(90 degrees axis diameter/2)).
3. Add up the Canopy Areas, and divide by 435.6 (1% of an acre) to obtain percent cover (truncate)

Transition zones and forest/nonforest encroachment – When an accessible forest land condition encroaches into a nonforest condition, the border between forest and nonforest is often a gradual change in tree cover with no clear and abrupt boundary. This may cause difficulties determining exactly where the forested area meets the minimum canopy cover or stem count criteria. For these cases, determine where the land clearly meets the minimum requirements, and where it clearly is less than required. 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.

Sub-acre method - The Sub-Acre method is only used when the ocular method is not appropriate.

1. Ensure that the canopy cover sample area is representative of the condition in question.
2. Determine if minimum 10% LIVE PLUS MISSING CANOPY COVER is reached. The crew samples all live, dead, and missing tree canopies on the canopy cover sample plot as described above in LIVE PLUS MISSING CANOPY COVER. The 10% threshold is dependent on the sample plot size and respective area in square feet.
3. If the 10% LIVE PLUS MISSING CANOPY COVER threshold is met and there is additional LIVE PLUS MISSING CANOPY COVER on the sub-acre plot, crews can estimate the remaining LIVE PLUS MISSING CANOPY COVER using the ocular method.
4. The temporary sub-acre subplot must fall entirely in the questionable condition.
5. Potential circular plot sizes and appropriate scaling factors:

Acre Fraction	Radius (ft)	Area (sq ft)	10% Cover (sq ft)
1	117.7	43,560	4356
1/2	83.3	21,780	2178
1/3	68.0	14,520	1452
1/4	58.9	10,890	1089
1/5	52.7	8,712	872
1/6	48.0	7,260	726

When Collected:	CONDITION CLASS STATUS = 1, 2, 3, 4, 5	
Field width:	1 digit	
Tolerance:	None	
MQO:	At least 90% of the time	
Values:	1	Ocular method
	2	Sub-acre method
	3	Acre method

Urban Note: If a portion of the Acre or Sub-acre plot falls in a potentially forested condition, a phantom canopy cover sampling plot is established entirely within the condition in question (Figure 4.14) to determine % canopy of the questionable condition. See Figure 4.1 for an example of classifying the condition class of the subplot in a transition zone with forest/nonforest encroachment.

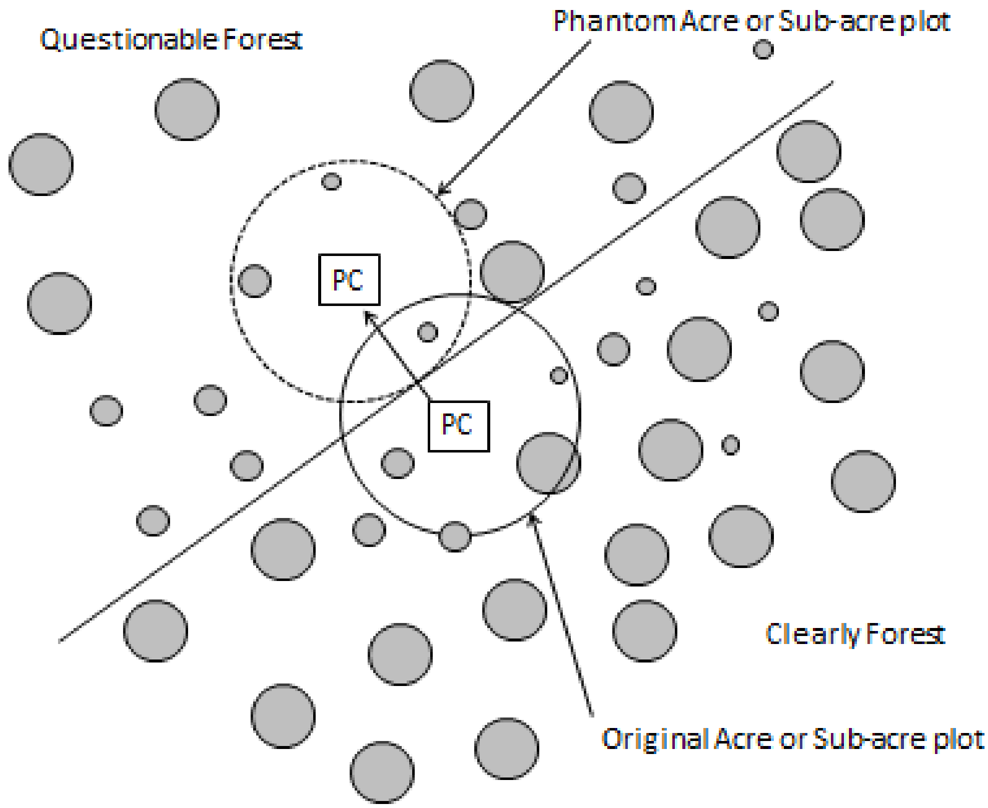


Figure 4.14: Example of using the Acre or Sub-acre plot method when determining CANOPY COVER when a portion of the Acre or Sub- acre plot falls within an area of questionable CANOPY COVER.

Item 4.8.0.6 LIVE CANOPY COVER (CORE 2.5.31+U)

Record the percentage of LIVE CANOPY COVER for the condition. Include live tally trees, saplings, and seedlings (Include all species in Appendix C, PNW Forest Land Tree Species Codes only) 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 CANOPY COVER, the crew will measure every crown width within the canopy cover sample area. When the 10% threshold is determined by measuring crown widths, the crew can use the ocular method to determine the total LIVE CANOPY COVER value.

Canopy widths are measured using the ellipse formula for calculation of canopy area. This requires two measurements. The first measurement is the long axis diameter. The second measurement is made at 90 degrees to the first measurement at the widest point of the crown (Figure 4.15). Canopy area = pi*((long axis diameter/2)*(90 degrees axis diameter/2)).

- Do not include the crown portion of trees, saplings, or seedlings that are vertically overtopped by other trees, saplings or seedlings.
- Do not include canopy cover from tally species that you have determined to be "shrub form" and have NOT tallied (See Chapter 7, TREE AND SAPLING DATA). Cover from these trees that are presenting as shrub form will be included in the SHRUB/SEEDLING COVER instead.
- Only include tree canopy measurements from trees with stems that originate within the sample area, although canopy measurements can extend outside the sample area.
- Occasionally, a branch may protrude abnormally, but the lateral crown line is drawn across the portion of the branch which includes the “normal outline” of the tree.
- For leaning trees, ocularly upright the trees and measure crowns as if the trees were upright.

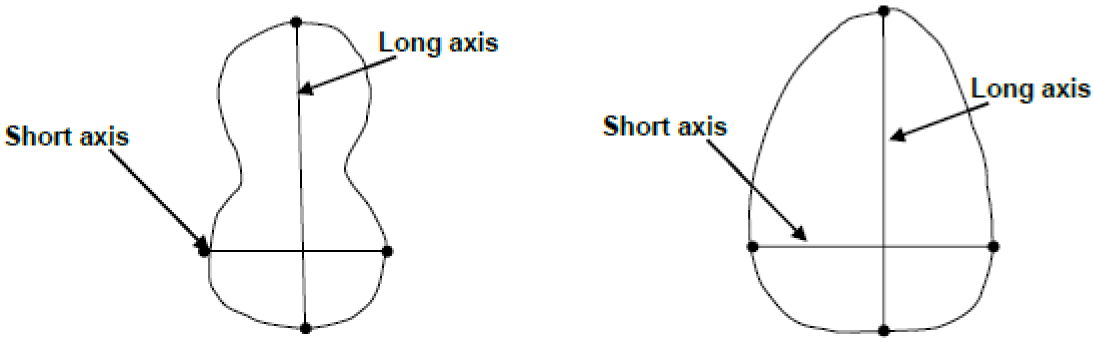


Figure 4.15: Examples of where to measure canopy widths.

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. For LIVE CANOPY COVER <1 percent (trace), record 01.

When Collected:	URBAN CONDITION CLASS STATUS = 1, 2, 3, 4, or 5
Field width:	2 digits
Tolerance:	0 – 12% - No errors
	13 – 20% - 10% error
	21 – 100% - 25% error
MQO:	At least 99% of the time
Values:	00 – 99 (where 99=99-100%)

Item 4.8.0.7 URBAN LIVE CANOPY COVER (CORE 2.5.31.1U)

Record the percentage of URBAN LIVE CANOPY COVER for the condition. Include live tally trees, saplings, and seedlings (all tree species in Appendix D). For conditions where the URBAN LIVE CANOPY COVER is low and there is a question whether it meets 10 percent URBAN LIVE CANOPY COVER, the crew will measure every crown width within the canopy cover sample area. When the 10% threshold is determined by measuring crown widths, the crew can use the ocular method to determine the total URBAN LIVE CANOPY COVER value.

Canopy widths are measured using the ellipse formula for calculation of canopy area. This requires two measurements. The first measurement is the long axis diameter. The second measurement is made at 90 degrees to the first measurement at the widest point of the crown (Figure 4.16). Canopy area = pi*((long axis diameter/2)*(90 degrees axis diameter/2)).

- Do not include the crown portion of trees, saplings, or seedlings that are vertically overtopped by other trees, saplings or seedlings.
- Do not include canopy cover from tally species that you have determined to be "shrub form" and have NOT tallied (See Chapter 7, TREE AND SAPLING DATA). Cover from these trees that are presenting as shrub form will be included in the SHRUB/SEEDLING COVER instead.
- Only include tree canopy measurements from trees with stems that originate within the sample area, although canopy measurements can extend outside the sample area.
- Occasionally, a branch may protrude abnormally, but the lateral crown line is drawn across the portion of the branch which includes the “normal outline” of the tree.
- For leaning trees, ocularly upright the trees and measure crowns as if the trees were upright.

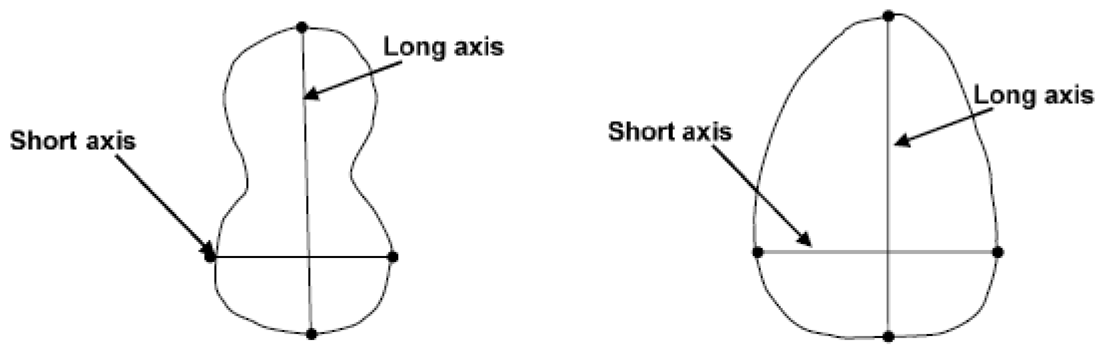


Figure 4.16: Examples of where to measure canopy widths.

URBAN LIVE CANOPY COVER can be based on an ocular estimate when the condition in question is certain to contain greater than 10% URBAN LIVE PLUS MISSING CANOPY COVER or URBAN CURRENT AFFORESTATION CODE = 1 and URBAN TOTAL STEMS greater than or equal to 150. For URBAN LIVE CANOPY COVER <1 percent (trace), record 01.

When Collected:	URBAN CONDITION CLASS STATUS = 1, 2, 3, 4, or 5
Field width:	2 digits
Tolerance:	0 – 12% - No errors
	13 – 20% - 10% error
	21 – 100% - 25% error
MQO:	At least 99% of the time
Values:	00 – 99 (where 99=99-100%)

Item 4.8.0.8 LIVE PLUS MISSING CANOPY COVER (CORE 2.5.32+U)

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, dead and removed tally trees, saplings, and seedlings (Include all species in Appendix C, PNW Forest Land Tree Species Codes only). Dead trees and dead portions of live trees are not considered as missing unless it is part of the condition disturbance. Base 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%.

When Collected:	URBAN CONDITION CLASS STATUS = 1, 2, 3, 4, or 5
Field width:	2 digits
Tolerance:	0 – 12% - No errors
	13 – 20% - 10% error
	21 – 100% - 25% error
MQO:	At least 80% of the time
Values:	00 – 99 (where 99=99-100%)

Item 4.8.0.9 URBAN LIVE PLUS MISSING CANOPY COVER (CORE 2.5.32.1U)

Record the percentage of URBAN LIVE PLUS MISSING CANOPY COVER for the condition by adding the URBAN 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 (all tree species in Appendix D). Dead trees and dead portions of live trees are not considered as missing unless it is part of the condition disturbance. Base the estimate on field observations, aerial photos, historical aerial imagery, and similar evidence of undisturbed conditions. The total of the URBAN LIVE PLUS MISSING CANOPY COVER cannot exceed 100%.

When Collected:	URBAN CONDITION CLASS STATUS = 1, 2, 3, 4, or 5
Field width:	2 digits
Tolerance:	0 – 12% - No errors
	3 – 20% - 10% error
	21 – 100% - 25% error
MQO:	At least 80% of the time
Values:	00 – 99 (where 99=99-100%)

Item 4.8.0.10 CURRENT AFFORESTATION CODE (CORE 2.5.33+U)

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:	URBAN CONDITION CLASS STATUS = 1, 2, 3, 4	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	0	No
	1	Yes

Item 4.8.0.11 PREVIOUS AFFORESTATION CODE (CORE 2.5.34+U)

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 URBAN CONDITION CLASS STATUS = 1, 2, 3, 4	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	0	No
	1	Yes

Item 4.8.0.12 TOTAL STEMS (CORE 2.5.35)

Record the estimated number of live stems per acre of the condition. Base the estimate on actual stem count of tally tree species within the sample area. When using the subplot method, use the appropriate expansion factor according to tree and subplot size to obtain an estimate of the number of live stems per acre. Using microplots (i.e., the subplot method) to estimate stems <5.0 inches diameter in conditions with wide spacing or 'clumping' is discouraged.

When Collected:	CURRENT AFFORESTATION CODE = 1 or PREVIOUS AFFORESTATION CODE = 1
Field width:	5 digits
Tolerance:	10%
MQO:	At least 90% of the time
Values:	00000 – 99999

Item 4.8.0.13 CHAINING CODE (CORE 2.5.36+U)

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 URBAN CONDITION CLASS STATUS = 1, 2, 3, 4	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	0	No
	1	Yes

Item 4.8.0.14 INVASIVE PLANT CONDITION SAMPLE STATUS (CORE 2.7U)

Record the code to indicate whether the condition was sampled for invasive plants and whether invasive plants were present on a sampled condition. If there is any part of an accessible condition where other plot measurements are made but invasive plants cannot be assessed (e.g., inability to evaluate from outside a Denied Access or Hazardous area, high water, hazardous weather, time limitation), enter code 3 and do not record any invasive plant measurements. A condition should not be called inaccessible due solely to the inability to assess invasive plants.

When Collected:	INVASIVE PLANT SAMPLING STATUS = 2 and URBAN CONDITION CLASS STATUS = 1, 2, 3, or 4	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	1	Condition sampled, invasive plants present
	2	Condition sampled, no invasive plants present
	3	Condition not sampled for invasive plants

Item 4.8.0.15 INVASIVE PLANT CONDITION NONSAMPLED REASON (CORE 2.8U)

Record the reason why a condition cannot be sampled for invasive plants.

When Collected:	On conditions where INVASIVE PLANT SUBPLOT SAMPLE STATUS = 3	
Field width:	2 digits	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	4	Time limitation
	5	Lost data (office use only)
	10	Other (for example, invasive plants are the only data item that cannot be evaluated from a distance on a Denied Access or Hazardous condition that can otherwise be assessed as an accessible condition, high water does not allow for complete evaluation of invasive plants across the condition). A note is required when this code is used.

CHAPTER 5 SUBPLOT INFORMATION

Each subplot 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.

Item 5.0.0.1 URBAN SUBPLOT NUMBER (CORE 3.1+U)

Record the code corresponding to the number of the subplot.

When Collected:	Urban subplot	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	1	Urban subplot

Item 5.0.0.2 URBAN SUBPLOT STATUS (CORE 3.2+U)

Indicate whether or not this subplot was sampled or not sampled.

When Collected:	All subplots	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	1	Sampled – at least one accessible forest land condition present on subplot
	2	Sampled – no accessible forest but at least one accessible nonforest land condition present on subplot
	3	Sampled -- no accessible forest or accessible nonforest land condition present on subplot. i.e. subplot is either census and/or noncensus water
	4	NonSampled – ~~possibility of forest land~~

Item 5.0.0.3 URBAN SUBPLOT NONSAMPLED REASON (CORE 3.3+U)

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

When Collected:	When URBAN SUBPLOT STATUS = 4	
Field width:	2 digits	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	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 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 Item 3.0.0.7).
	05	Lost data – The plot data file was discovered to be corrupt after a panel was completed and submitted for processing. This code is assigned to entire plots or full subplots that could not be processed, and is applied at the time of processing after notification to the region. Note: This code is for office use only.
	06	Lost plot – Entire plot cannot be found. Used for the subplots that are required for this plot. Used only in conjunction with URBAN PLOT NONSAMPLED REASON code 06. Can be either generated by the data recorder or in the office.
	07	Wrong location – Previous plot can be found, but its placement is beyond the tolerance limits for plot location. Used for the four subplots that are required for this plot. Used only in conjunction with URBAN PLOT NONSAMPLED REASON code 07. 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 URBAN PLOT NONSAMPLED REASON code 08. This code is for office use only.
	09	Dropped intensified plot – Used for the four subplots that are required for this plot. Used only by units engaged in intensification. Applied at the time of processing and used only in conjunction with URBAN PLOT NONSAMPLED REASON code 09. This code is for office use only.
	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 field note is required to describe the situation.
	11	Ocean – Subplot falls in ocean water below mean high tide line.

Item 5.0.0.4 SUBPLOT CENTER CONDITION (CORE 3.6)

Record the CONDITION CLASS NUMBER of the condition class at the subplot center.

When Collected:	All subplots
Field width:	1 digit
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	1 to 9

SECTION 5.1 MICROPLOT CENTER CONDITION

Item 5.1.0.1 URBAN MICROPLOT 11 (EAST) CENTER CONDITION (CORE 3.7.1U)

Record the CONDITION CLASS NUMBER of the condition class at the microplot center.

When Collected:	All microplots
Field width:	1 digit
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	1 to 9

Item 5.1.0.2 URBAN MICROPLOT 12 (SOUTH) CENTER CONDITION (CORE 3.7.2U)

Record the CONDITION CLASS NUMBER of the condition class at the microplot center.

When Collected:	All microplots
Field width:	1 digit
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	1 to 9

Item 5.1.0.3 URBAN MICROPLOT 13 (WEST) CENTER CONDITION (CORE 3.7.3U)

Record the CONDITION CLASS NUMBER of the condition class at the microplot center.

When Collected:	All microplots
Field width:	1 digit
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	1 to 9

Item 5.1.0.4 URBAN MICROPLOT 14 (NORTH) CENTER CONDITION (CORE 3.7.4U)

Record the CONDITION CLASS NUMBER of the condition class at the microplot center.

When Collected:	All microplots
Field width:	1 digit
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	1 to 9

Item 5.1.0.5 SUBPLOT SLOPE (CORE 3.8+U)

Record the angle of slope across the 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 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:	Subplot with at least one accessible forest land condition present (URBAN SUBPLOT STATUS = 1)
Field width:	3 digits
Tolerance:	+/- 10%
MQO:	At least 90% of the time
Values:	000 to 155

Item 5.1.0.6 SUBPLOT ASPECT (CORE 3.9+U)

Record the aspect across the 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:	Subplot with at least one accessible forest land condition present (URBAN SUBPLOT STATUS = 1)	
Field width:	3 digits	
Tolerance:	+/- 10 degrees	
MQO:	At least 90% of the time	
Values:	000	no aspect, slope < 5 percent
	001	1 degree
	002	2 degrees
	.	.
	.	.
	360	360 degrees, due north

Item 5.1.0.7 SNOW/WATER DEPTH (CORE 3.10+U)

Record to the nearest 0.1 foot the average approximate depth of water or snow covering the subplot at the time of data collection. This variable is used to indicate subplots where some variables (e.g., seedling count, total lengths) may be measured with less certainty due to conditions at the time of measurement.

For snow and flooding that covers the entire subplot, use an average depth across the entire subplot. This variable is used to filter out unusual situations that compromise the data, like deep snow or flooding that affects the accuracy of various SEEDLING DATA and TREE DATA measurements.

When Collected:	(URBAN SUBPLOT STATUS = 1, 2, 3)
Field width:	2 digits (x.y)
Tolerance:	+/- 0.5 ft
MQO:	At the time of measurement (no MQO after initial date of visit)
Values:	0.0 to 9.9

Item 5.1.0.8 URBAN SUBPLOT CONDITION LIST (CORE 3.11+U)

This is a listing of all condition classes located within the 48.0-foot radius around the subplot center. A maximum of six conditions is permitted at any individual subplot. 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 less than six condition classes occur on this subplot, complete the remainder of this field with zeroes. For example, if condition 1 is the only condition class on a subplot, record 100000.

When Collected:	All plots
Field width:	6 digits
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	100000 to 654321

Item 5.1.0.9 REMAINING CONDITION (CORE 3.18U)

The purpose of collecting boundary data is to compute the proportion of identified conditions on the plot footprint. The addition of new boundary types has complicated the calculation of these condition proportions. In order to ensure data integrity and validity it was necessary to create a new variable at the subplot level. REMAINING CONDITION is the condition that accounts for the remaining area of the subplot after all other mapped areas are accounted for. See Figure 5.1.

When Collected:	All plots
Field width:	digit
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	1 to 6

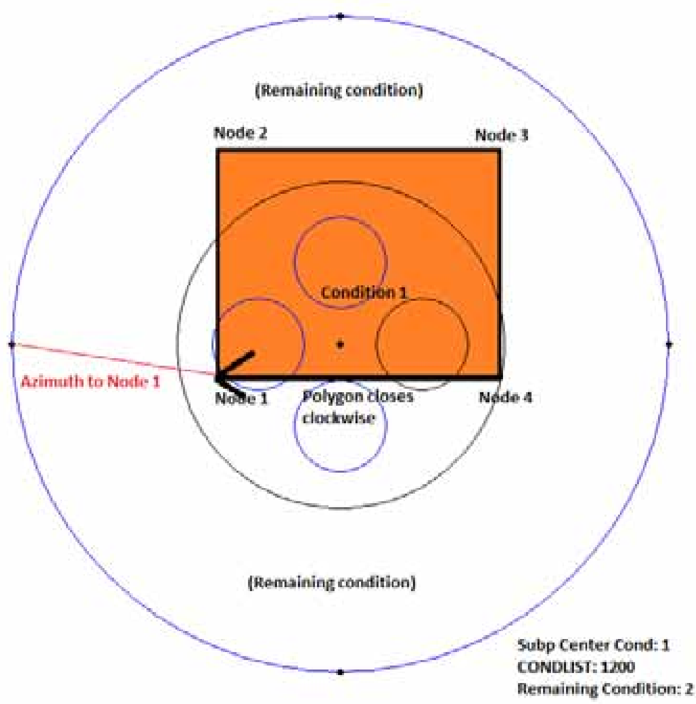


Figure 5.1: Example of the use of REMAINING CONDITION. This subplot contains 2 conditions, one of which has been mapped out. In this case the mapped out area is a closed boundary representing condition 1, the remaining unmapped area within the subplot (condition 2) is considered the REMAINING CONDITION.

Item 5.1.0.10 NON-TALLY TREE PRESENT (CORE 3.19U)

The species list used in URBAN FIA is an expansion of the traditional CORE species list and is the result of consultations between arborists, foresters, and urban forest specialists around the nation. Although it is a comprehensive list that will account for the majority of species that crews may encounter in the field, it is possible to encounter a species that was unintentionally excluded from this expanded list. The purpose of this variable is to provide information on such species in an attempt to further refine the urban species list in future inventories.

A NON-TALLY TREE is defined as a tree that is at least 5 inches DBH located within the subplot that is not on your regional urban species list (Appendix D). Record the presence or absence of any NON-TALLY TREEs found on the subplot. When non tally trees are present, record the data for each individual species as described in Chapter 11.

When Collected:	All subplots with URBAN CONDITION STATUS 1, 2, 3, 4	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 90% of the time	
Values:	0	No non-tally trees present
	1	Non-tally tree present

SECTION 5.2 SUBPLOT-CONDITION LEVEL

Surface and Vegetation cover is the area represented within the intersection between the SUBPLOT footprint and each mapped CONDITION. Vegetation does not need to originate within the subplot or condition being evaluated, this variable is measured from the stand point of looking down from above.

Item 5.2.0.1 SUBPLOT–CONDITION SUBPLOT NUMBER (CORE 3.21U)

Record the code corresponding to the number of the subplot.

When Collected:	All subplots	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	1	Urban subplot

Item 5.2.0.2 SUBPLOT–CONDITION CONDITION NUMBER (CORE 2.22U)

Record the CONDITION CLASS NUMBER for each condition encountered on the SUBPLOT.

When Collected:	All subplots
Field width:	1 digit
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	1 to 6

SUBSECTION 5.2.1 SUBPLOT-CONDITION VEGETATION COVER

VEGETATION COVER will be measured for the portion of each CONDITION contained within the SUBPLOT. Ignore portions of a CONDITION that fall outside of the boundary of the SUBPLOT. Vegetation must cover a minimum of 1% of a CONDITION contained within the SUBPLOT in order to be recorded. VEGETATION COVER is split into two categories, PERCENT TREE / SAPLING COVER and PERCENT SHRUB SEEDLING COVER. These two variables are evaluated independently of each other. For example, a condition could contain both 100% PERCENT TREE / SAPLING COVER and 100% PERCENT SHRUB / SEEDLING COVER. In the following text height refers to the height from the ground to the highest foliage regardless of subject's specific length.Trees, saplings, and seedlings are limited to those species that are in APPENDIX C, PNW Forest Land Tree Species Codes and APPENDIX D, FIA Tree Species Codes; all other woody vegetation and trees that are landscaped or manicured to the extent that an accurate DBH/DRC cannot be measured are considered shrubs. Vegetation must be alive. Vegetation in planters that can be moved without the use of heavy equipment is not counted toward the vegetation cover. Consider all vegetation contained within a cylinder coincident to the subplot radius regardless of where it originates.

Subplot radius = 48.0 feet, Subplot area = 7238 ft

Cover	Area (ft^2)	Length of a side of a square(ft)	Radius of circular area(ft)
1%	72	8.5	4.8
3%	217	14.7	8.3
5%	362	19.0	10.7
10%	724	26.9	15.2
20%	1448	38.0	21.5
25%	1810	42.1	24.0

Table 5.1: Cover to area relationships for urban subplot. Only applies when the entire subplot is ONE condition.

Item 5.2.1.1 PERCENT TREE / SAPLING COVER (CORE 3.23.1U)

Is defined as the amount of tree canopies, (defined as all tree species with a diameter of at least 1” DBH/ DRC), covering the portion of each CONDITION contained within the SUBPLOT.

When Collected:	URBAN CONDITION CLASS STATUS 1, 2, 3, 4
Field width:	3 digits
Tolerance:	+/- 10%
MQO:	At least 90% of the time
Values:	00 to100

Item 5.2.1.2 PERCENT SHRUB / SEEDLING COVER (CORE 3.23.2U)

Is defined as the amount of shrub / seedling cover (defined as all shrub species ≥12” in height and all tree species <1” diameter and ≥12” in height) covering the portion of each CONDITION contained within the SUBPLOT. Woody vines are included as shrubs.

When Collected:	URBAN CONDITION CLASS STATUS 1, 2, 3, 4
Field width:	3 digits
Tolerance:	+/- 10%
MQO:	At least 90% of the time
Values:	00 to 100

SUBSECTION 5.2.2 SUBPLOT-CONDITION SURFACE COVER

Record SURFACE COVER for the portion of each recorded condition that is contained within the SUBPLOT (example- the % surface covered by a 72ft² area will vary depending on whether the entire subplot is one condition or more than one condition); ignore portions of a CONDITION that fall outside of the perimeter of the SUBPLOT. Record percentages of SURFACE COVER as follows:

- BUILDINGS
- IMPERVIOUS (concrete, asphalt, etc.)
- HERBACEOUS (grasses, low shrubs, etc.)
- PERMEABLE (gravel, mulch, sand, dirt, duff etc.)
- WATER

A particular material must cover a minimum of 1% of a CONDITION contained within the SUBPLOT in order to be recorded. Ignore the basal area of both live and dead trees in the sample area. The sum of the cover types listed above MUST sum to 100% for each CONDITION encountered. The purpose of this variable is to estimate the effect that surface cover will have on rain runoff, so record cover to the lowest permanent cover type in relation to the ground. This would include the ground beneath a building’s eaves or decks that are either elevated or sitting on footers resting on the ground. Another example would be to code WATER instead of IMPERVIOUS if the evaluation area falls entirely on an IMPERVIOUS bridge if there is WATER below the bridge. Objects that not permanent and can be moved, such as picnic tables, a sheet of metal on ground, or inflatable/portable swimming pool are not considered surface cover. If an object would require the assistance of machinery to move or if there is any doubt as to if an object can be moved consider them permanent.

IMPERVIOUS is defined as non-building material that does not allow water to percolate through, such as rock, asphalt, and cement. Examples of PERMEABLE include soil and gravel.

HERBACEOUS overrides PERMEABLE. WATER overrides HERBACEOUS (in the form of emergent vegetation) and includes swimming pools that are permanent in nature.

The following tools may aid in calculation of surface cover:

DIST	% Area	DIST	% Area	DIST	% Area	DIST	% Area
1	48.7	13	33.0	25	18.4	37	6.4
2	47.3	14	31.7	26	17.3	38	5.5
3	46.0	15	30.4	27	16.2	39	4.7
4	44.7	16	29.2	28	15.1	40	4.0
5	43.4	17	27.9	29	14.0	41	3.3
6	42.1	18	26.7	30	13.0	42	2.6
7	40.8	19	25.5	31	12.0	43	2.0
8	39.4	20	24.3	32	11.0	44	1.4
9	38.1	21	23.1	33	10.0	45	0.9
10	36.8	22	21.9	34	9.0	46	0.5
11	35.5	23	20.7	35	8.1	47	0.2
12	34.3	24	19.6	36	7.2	48	0.0

Table 5.2: The percent area of the subplot covered by a surface crossing the perimeter of the subplot in a straight line. DIST is perpendicular line from plot center to the boundary. These percentages must be adjusted if the subplot contains more than one condition.

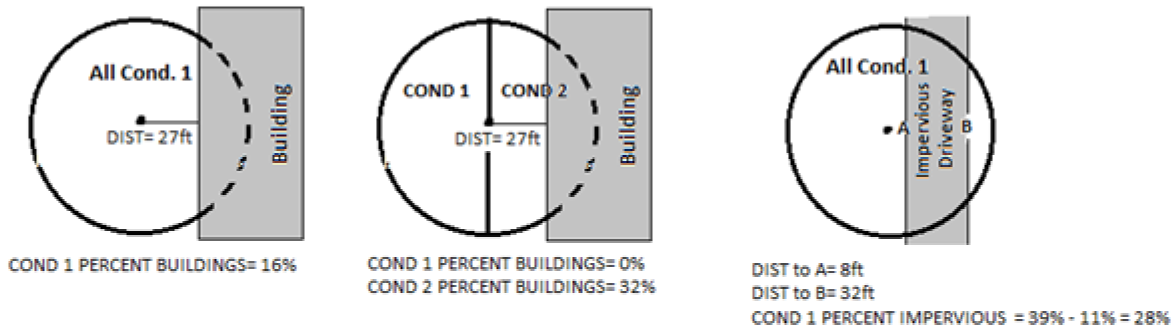


Figure 5.2: Examples of using Table 5.2 to calculate Subplot-Condition Surface Cover.

Item 5.2.2.1 PERCENT BUILDINGS (CORE 3.24.1U)

Record the percent of buildings covering the portion of each CONDITION contained within the SUBPLOT.

When Collected:	URBAN CONDITION CLASS STATUS 1, 2, 3, 4
Field width:	digits
Tolerance:	+/- 10%
MQO:	At least 90% of the time
Values:	00 to 100

Item 5.2.2.2 PERCENT IMPERVIOUS (CORE 3.24.2U)

Record the percent of impervious materials (concrete, asphalt, tennis courts, etc.) covering the portion of each CONDITION contained within the SUBPLOT. Artificial turf laid on top of an impervious surface, such as concrete, is considered impervious; otherwise artificial turf is considered permeable. An area must be completely impervious for at least 72 ft2 before it may be added to the PERCENT IMPERVIOUS total. For example, the area covered by a 9x9 cement slab will be considered impervious and added to the total PERCENT IMPERVIOUS, but the area of many 2x3 headstones in a cemetery will not be added to the total PERCENT IMPERVIOUS.

When Collected:	URBAN CONDITION CLASS STATUS 1, 2, 3, 4
Field width:	3 digits
Tolerance:	+/- 10%
MQO:	At least 90% of the time
Values:	00 to 100

Item 5.2.2.3 PERCENT PERMEABLE (CORE 3.24.3U)

Record the percent of permeable materials (gravel, bare soil, sand, mulch, leaf litter, stumps, ungrouted patio bricks etc.) covering the portion of each CONDITION contained within the SUBPLOT. Gravel or other material that is applied over a fabric or plastic base is considered permeable. Patios, walkways, and other related features that use stonework or bricks are considered Permeable IF they are pieced together without the use of grout of some sort.

When Collected:	URBAN CONDITION CLASS STATUS 1, 2, 3, 4
Field width:	3 digits
Tolerance:	+/- 10%
MQO:	At least 90% of the time
Values:	00 to 100

Item 5.2.2.4 PERCENT LOW WOODY VEGETATION/HERBACEOUS (CORE 3.24.4U)

Record the percent of live and dead herbaceous materials (of any height) and woody plants less that 1 foot tall (herbaceous ground cover of any height, including agricultural crops, grass, mosses, cactus, and succulents; also includes woody plants <12" in height) covering the portion of each CONDITION contained within the SUBPLOT. Plants without leaves are accounted for in this variable.

When Collected:	URBAN CONDITION CLASS STATUS 1, 2, 3, 4
Field width:	3 digits
Tolerance:	+/- 10%
MQO:	At least 90% of the time
Values:	00 to 100

Item 5.2.2.5 PERCENT WATER (CORE 3.24.5U)

Record the percent of water (swimming pools, canals, etc.) covering the portion of each CONDITION contained within the SUBPLOT.

When Collected:	URBAN CONDITION CLASS STATUS 1, 2, 3, 4
Field width:	3 digits
Tolerance:	+/- 10%
MQO:	At least 90% of the time
Values:	00 to 100

CHAPTER 6 BOUNDARY REFERENCES

Boundary reference data are used to compute the area for the condition classes sampled on a plot and to track condition changes on remeasure plots. Record all boundaries between condition classes that occur within the sampled (fixed-radius) area on the subplot and microplots.

Boundaries outside the sampled (fixed-radius) areas are not referenced. Do not attempt to map potential conditions that represent less than 1% of the subplot or microplot area (as determined by the % area function on the PDR) as these will be considered inclusions in the surrounding condition - see Chapter 4 for additional condition size requirements.

Due to the size of the urban subplot and the nature of urban areas URBAN FIA consists of two types of boundaries, both of which may be defined from center points or offset points:

1. Traditional Boundaries: These straight transecting line boundaries are defined using only a left and right azimuth as well as a corner azimuth and distance as necessary.
2. Closed Boundaries: Measurements are used to map the boundaries of a condition that either falls entirely within the subplot or intersects the subplot in such a manner that multiple measurements are required to capture its extent on the subplot. A measurement is taken to a corner of the condition being described or to the location where the mapped condition and the subplot perimeter intersect. From there the boundary is drawn by traversing the condition being mapped in a clockwise direction.

In addition to using the recording procedures described herein, draw condition class boundaries onto the pre-printed plot diagrams on paper field tally sheets.

SUBSECTION 6.0.1 URBAN BOUNDARY RULES

There are a few rules that are required in order to implement these urban boundaries. These rules are intended to constrain the potential complexity of urban boundaries.

1. When defining subplot boundaries (URBAN PLOT TYPE=1), traditional boundaries and closed boundaries cannot be mixed. If all conditions present on a subplot can be estimated using only traditional boundaries, then only traditional boundaries should be used. However, if any boundary is collected as a closed boundary, then all subplot (URBAN PLOT TYPE = 1) boundaries must be collected using closed boundaries, even if one of them is a straight transecting line.
2. Microplot boundaries (URBAN PLOT TYPE = 2) may only be defined using traditional boundaries.
3. When defining boundaries on a plot, it is also required that the REMAINING CONDITION be recorded. REMAINING CONDITION is defined as:

   The condition that accounts for the remaining area of the subplot after all other mapped areas are accounted for.

4. No boundaries can intersect or share an edge. If two mapped conditions (other than REMAINING CONDITION) share a boundary edge, azimuth and distance entries must be adjusted to create a tiny sliver of space between the two mapped boundaries. This allows the necessary validations to occur on the PDR program.
5. The subplot center condition must always be 1.
6. Conditions may be nested within other conditions provided no boundaries intersect.
7. When shooting traditional boundary azimuths, the left azimuth will always be on your left and the right azimuth will always be on your right as you stand facing the boundary, whether creating the boundary from a center point or from an offset point.
8. After completing any entries within the boundary menu it is critical to utilize the Urban Boundary Diagram function from the boundary menu within the PDR program to ensure that the diagram matches your expectations.
9. Microplot boundaries can be populated based on the subplot boundaries by using the Create Microplot Boundaries function from the boundary menu in the PDR. The field crew will be required to enter the MAPPED CONDITION field to complete the microplot boundary information. It is critical to review the microplot boundaries as calculated by the PDR tool and correct the boundary record if it appears different from the boundary as observed on the ground.

10. There are minimum lengths for boundary segments depending on the type of boundary

Traditional Boundary: No minimum
Closed Boundary, CROSSES SUBPLOT PERIMETER=1: 14-foot minimum
Closed Boundary, CROSSES SUBPLOT PERIMETER=0: 20-foot minimum

SECTION 6.1 REFERENCE PROCEDURE

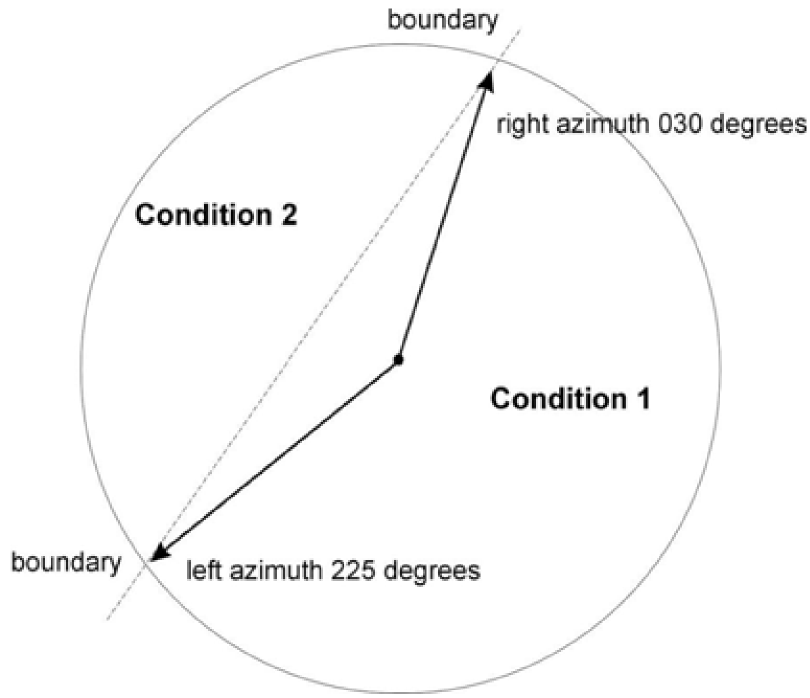


Figure 6.1: How to measure a traditional boundary on a microplot or subplot. or macroplot. The left and right azimuths are measured where the condition meets the subplot perimeter.

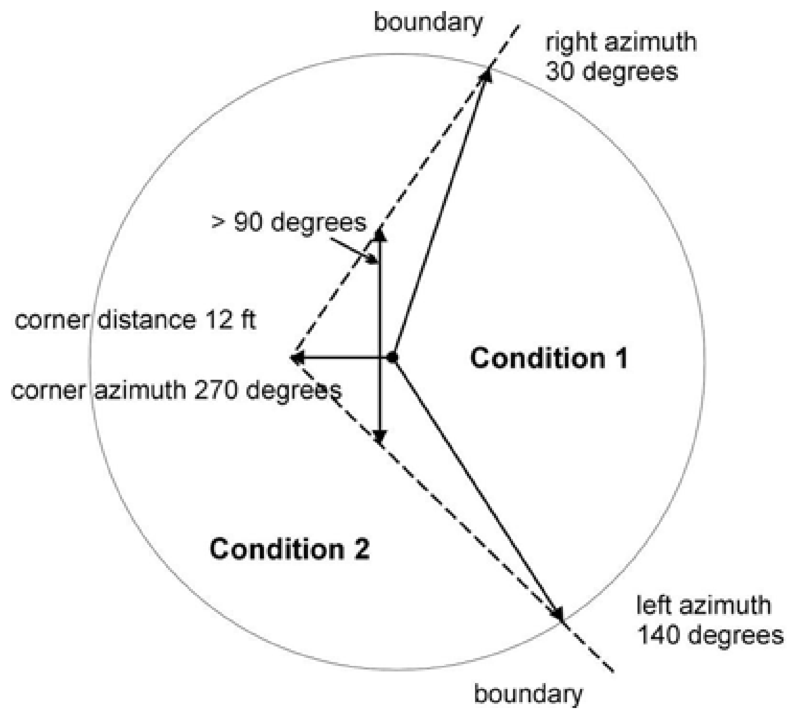


Figure 6.2: How to measure a traditional boundary with a corner on a subplot. The left and right azimuths are measured where the condition boundary meets the subplot perimeter. Left and right are determined by facing the condition boundary.

A 48.0 ft. radius subplot may have a greater likelihood of a need for a boundary corner to record boundaries that are not straight lines.

Refer to Section 4.1 and Section 4.4 for general condition class delineation guidelines. The following additional rules apply when referencing a boundary within a subplot or microplot:

1. When a boundary is clearly marked, use that feature to define the boundary. Examples of clear demarcation are a fence line, plowed field edge, boundary marker, sharp ridge line, and water's edge along a stream course, ditch, or canal.
2. When a boundary is not clearly marked by an obvious feature, the boundary should be placed to best represent the condition change or follow the nonforest side of the stems of the trees at the forest edge.
3. When a boundary between two contrasting accessible land condition classes is not clearly marked, map along the stems of the contrasting condition. When the boundary between two contrasting accessible 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. When a plot is remeasured, the crew will examine the boundaries referenced at last inventory. If no change has occurred, the current crew will retain the boundary data that were recorded at last inventory. If a boundary has changed, or a new boundary is present, or the previous crew made an obvious error, record new or updated boundary data. Delete boundaries that are no longer distinct.
5. 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 subplot or microplot area. This allows for slight variations in azimuths or distances due to the approximate nature of mapping procedures.

SECTION 6.2 BOUNDARY DATA

Item 6.2.0.1 URBAN SUBPLOT NUMBER (CORE 4.2.1+U)

Record the code corresponding to the number of the subplot.

When Collected:	All boundaries	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	1	Urban subplot

Item 6.2.0.2 OFFSET POINT (CORE 4.2.1.1U)

Record appropriate code corresponding to the location from which the boundary was measured for each subplot / microplot (See Appendix H for detailed offset procedures).

When Collected:	All subplots and microplots	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	0	Normal position (subplot center)
	1	North subplot offset point
	2	East subplot offset point
	3	South subplot offset point
	4	West subplot offset point
	110	Normal position of microplot 11 (center)
	111	North microplot 11 offset point
	112	East microplot 11 offset point
	113	South microplot 11 offset point
	114	West microplot 11 offset point
	120	Normal position of microplot 12 (center)
	121	North microplot 12 offset point
	122	East microplot 12 offset point
	123	South microplot 12 offset point

	124	West microplot 12 offset point
	130	Normal position of microplot 13 (center)
	131	North microplot 13 offset point
	132	East microplot 13 offset point
	133	South microplot 13 offset point
	134	West microplot 13 offset point
	140	Normal position of microplot 14 (center)
	141	North microplot 14 offset point
	142	East microplot 14 offset point
	143	South microplot 14 offset point
	144	West microplot 14 offset point

Item 6.2.0.3 BOUNDARY CHANGE (CORE 4.2.3)

Remeasurement (SAMPLE KIND = 2) locations only. Record the appropriate code to indicate the relationship between previously recorded and current boundary information.

When Collected:	SAMPLE KIND = 2, All boundaries	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
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 6.2.0.4 MAPPED CONDITION (CORE 4.2.4+U)

Record the CONDITION CLASS NUMBER of the condition class that is being mapped. See Chapter 5 for subplot data.

When Collected:	All boundaries
Field width:	1 digit
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	1 to 9

Item 6.2.0.5 PERCENT AREA (URBAN OPTIONAL Collected in NRS, PNW, RMRS) (CORE 4.2.4.1U)

The percent area represents the portion of the plot in the MAPPED CONDITION.

When Collected:	All boundaries
Field width:	3 digits
Tolerance:	N/A
MQO:	N/A
Values:	001 to 100

Item 6.2.0.6 URBAN PLOT TYPE (CORE 4.2.2)

Record the code to specify whether the boundary data are for a subplot or microplot.

When Collected:	All boundaries	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:		Traditional Boundaries:
	1	Subplot boundary
	2	Microplot boundary
		Closed Boundaries:
	1	Subplot

SUBSECTION 6.2.1 TRADITIONAL BOUNDARIES

Measurements are taken from subplot or microplot center or from an offset point to the condition being mapped where the boundary bisects the subplot / microplot. Record the appropriate values for each boundary mapped as follows:

Item 6.2.1.1 URBAN MICROPLOT NUMBER (CORE 4.2.2.1U)

Record the code corresponding to the number of the microplot.

When Collected:	All boundaries when URBAN PLOT TYPE = 2	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	11	East microplot
	12	South microplot
	13	West microplot
	14	North microplot

Item 6.2.1.2 URBAN LEFT AZIMUTH (CORE 4.2.5+U)

Record the azimuth from the subplot or microplot center to the farthest left point of the condition being mapped where the boundary intersects the subplot or microplot perimeter.

When Collected:	All Traditional Boundaries when MICROPLOT NUMBER = null and OFFSET POINT = 0 or MICROPLOT NUMBER = 11 and OFFSET POINT = 110 or MICROPLOT NUMBER = 12 and OFFSET POINT = 120 or MICROPLOT NUMBER = 13 and OFFSET POINT = 130 or MICROPLOT NUMBER = 14 and OFFSET POINT = 140
Field width:	3 digits
Tolerance:	+/- 10 degrees
MQO:	At least 90% of the time
Values:	001 to 360

Item 6.2.1.3 URBAN CORNER AZIMUTH (CORE 4.2.6+U)

Record the azimuth from the subplot or microplot center to a corner or curve in a boundary. If a boundary is best described by a straight line between the two perimeter points, then record 000 for CORNER AZIMUTH (000= none).

When Collected:	All Traditional Boundaries when MICROPLOT NUMBER = null and OFFSET POINT = 0 or MICROPLOT NUMBER = 11 and OFFSET POINT = 110 or MICROPLOT NUMBER = 12 and OFFSET POINT = 120 or MICROPLOT NUMBER = 13 and OFFSET POINT = 130 or MICROPLOT NUMBER = 14 and OFFSET POINT = 140
Field width:	3 digits
Tolerance:	+/- 10 degrees
MQO:	At least 90% of the time
Values:	000 to 360

Item 6.2.1.4 URBAN CORNER DISTANCE (CORE 4.2.7+U)

Record the horizontal distance, to the nearest 1 foot, from the subplot or microplot center to a boundary corner point.

When Collected:	All Traditional Boundaries when CORNER AZIMUTH > 000 and MICROPLOT NUMBER = null and OFFSET POINT = 0 or MICROPLOT NUMBER = 11 and OFFSET POINT = 110 or MICROPLOT NUMBER = 12 and OFFSET POINT = 120 or MICROPLOT NUMBER = 13 and OFFSET POINT = 130 or MICROPLOT NUMBER = 14 and OFFSET POINT = 140	
Field width:	2 digits	
Tolerance:	+/- 1 ft	
MQO:	At least 90% of the time	
Values:	microplot	01 to 07 ft (actual limiting distance is 6.8 ft)
	subplot	01 to 48 ft

Item 6.2.1.5 URBAN RIGHT AZIMUTH (CORE 4.2.8+U)

Record the azimuth from subplot or microplot center to the farthest right point of the mapped condition where the boundary intersects the subplot or microplot perimeter.

When Collected:	All Traditional Boundaries when MICROPLOT NUMBER = null and OFFSET POINT = 0 or MICROPLOT NUMBER = 11 and OFFSET POINT = 110 or MICROPLOT NUMBER = 12 and OFFSET POINT = 120 or MICROPLOT NUMBER = 13 and OFFSET POINT = 130 or MICROPLOT NUMBER = 14 and OFFSET POINT = 140
Field width:	3 digits
Tolerance:	+/- 10 degrees
MQO:	At least 90% of the time
Values:	001 to 360

Item 6.2.1.6 OFFSET LEFT AZIMUTH (CORE 4.2.8.1U)

When using an OFFSET POINT other then the center point of the subplot/microplot to which the boundaries are assigned, record the azimuth from the OFFSET POINT to the farthest left point of the mapped condition where the boundary intersects the subplot or microplot perimeter for which the boundary is being defined.

When Collected:	All Traditional boundaries where MICROPLOT NUMBER = null and OFFSET POINT ≠ 0 or MICROPLOT NUMBER = 11 and OFFSET POINT ≠ 110 or MICROPLOT NUMBER = 12 and OFFSET POINT ≠ 120 or MICROPLOT NUMBER = 13 and OFFSET POINT ≠ 130 or MICROPLOT NUMBER = 14 and OFFSET POINT ≠ 140
Field width:	3 digits
Tolerance:	+/- 10 degrees
MQO:	At least 90% of the time
Values:	001 to 360

Item 6.2.1.7 OFFSET CORNER AZIMUTH (CORE 4.2.8.2U)

When using an OFFSET POINT other then the center point of the subplot/microplot to which the boundaries are assigned, record the azimuth from the OFFSET POINT to a corner or curve in a boundary. If a boundary is best described by a straight line between the two perimeter points, then record 000 for CORNER AZIMUTH (000=none).

When Collected:	All Traditional boundaries where MICROPLOT NUMBER = null and OFFSET POINT ≠ 0 or MICROPLOT NUMBER = 11 and OFFSET POINT ≠ 110 or MICROPLOT NUMBER = 12 and OFFSET POINT ≠ 120 or MICROPLOT NUMBER = 13 and OFFSET POINT ≠ 130 or MICROPLOT NUMBER = 14 and OFFSET POINT ≠ 140
Field width:	3 digits
Tolerance:	+/- 10 degrees
MQO:	At least 90% of the time
Values:	000 to 360

Item 6.2.1.8 OFFSET CORNER DISTANCE (CORE 4.2.8.3U)

When using an OFFSET POINT other then the center point of the subplot/microplot to which the boundaries are assigned, record the horizontal distance, to the nearest 1 foot, from the OFFSET POINT to a boundary corner point.

When Collected:	All Traditional boundaries when CORNER AZIMUTH > 000 and MICROPLOT NUMBER = null and OFFSET POINT ≠ 0 or MICROPLOT NUMBER = 11 and OFFSET POINT ≠ 110 or MICROPLOT NUMBER = 12 and OFFSET POINT ≠ 120 or MICROPLOT NUMBER = 13 and OFFSET POINT ≠ 130 or MICROPLOT NUMBER = 14 and OFFSET POINT ≠ 140	
Field width:	2 digits	
Tolerance:	+/- 1 ft	
MQO:	At least 90% of the time	
Values:	microplot	01 to 07 ft (actual limiting distance is 6.8 ft)
	subplot	01 to 96 ft

Item 6.2.1.9 OFFSET RIGHT AZIMUTH (CORE 4.2.8.4U)

When using an OFFSET POINT other then the center point of the subplot/microplot to which the boundaries are assigned, record the azimuth from the OFFSET POINT to the farthest right point of the mapped condition where the boundary intersects the subplot or microplot perimeter for which the boundary is being defined.

When Collected:	When collected: All Traditional boundaries where MICROPLOT NUMBER = null and OFFSET POINT ≠ 0 or MICROPLOT NUMBER = 11 and OFFSET POINT ≠ 110 or MICROPLOT NUMBER = 12 and OFFSET POINT ≠ 120 or MICROPLOT NUMBER = 13 and OFFSET POINT ≠ 130 or MICROPLOT NUMBER = 14 and OFFSET POINT ≠ 140
Field width:	3 digits
Tolerance:	+/- 10 degrees
MQO:	At least 90% of the time
Values:	001 to 360

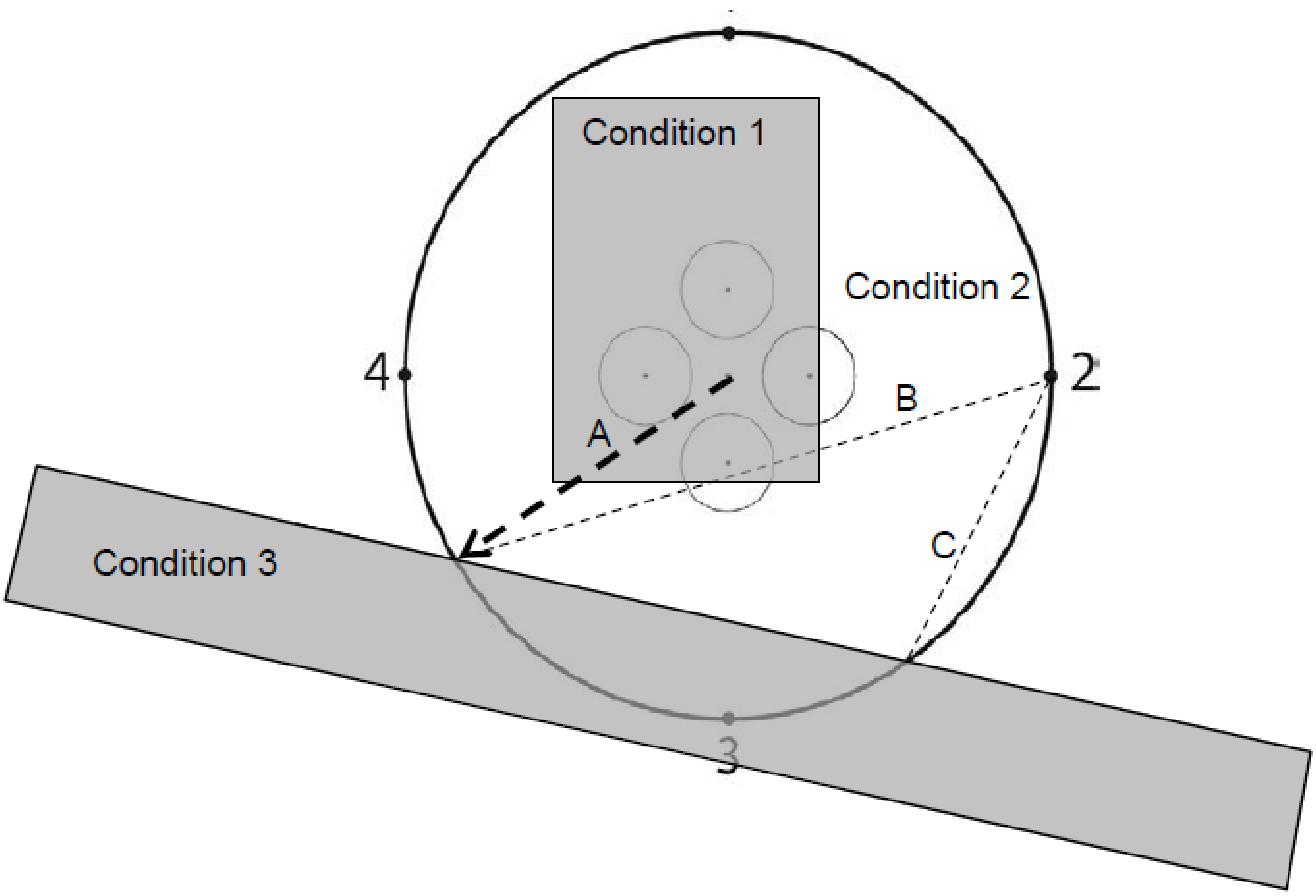


Figure 6.3: Mapping from OFFSET POINTS. Offset boundaries are difficult because the subplot perimeter cannot be established from subplot center on the ground. A protractor can be used on the image to determine the azimuth to the intersection of the subplot perimeter and the MAPPED CONDITION from subplot center. The Intersection Tool in the PDR utilizes this information to provide a distance and azimuth to the intersection point from a known offset point. In this case the azimuth of line A is 240 degrees. The next step is to solve for line B from OFFSET POINT 2. The same process is then repeated to solve for line C.

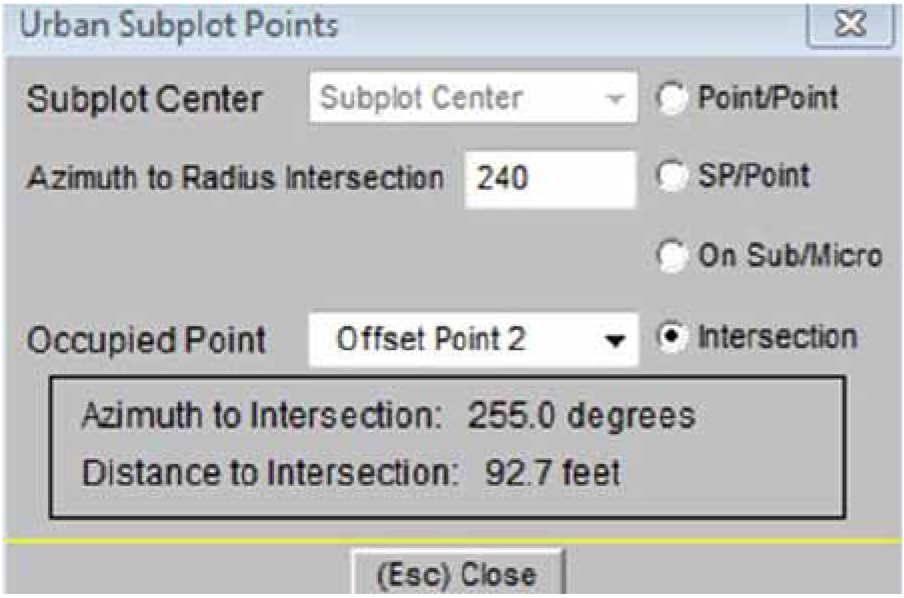


Figure 6.4: PDR Intersection TOOL. Select Function>Midas Tools from within an Urban FIA plot file and choose the Intersection option on the right hand side of the menu. Enter the Azimuth to Radius Intersection, in this case 240 degrees from subplot center, as well as the Occupied Point location, in this case OFFSET POINT 2, and the PDR will solve for line B

SUBSECTION 6.2.2 CLOSED BOUNDARIES

Measurements are taken from subplot center, or a subplot OFFSET POINT, to map the boundaries of a condition that either falls entirely within the subplot, or intersects the subplot perimeter in such a manner that multiple measurements are required to capture its extent on the subplot. The first measurement is from subplot center, or an offset point, to a corner of the condition being mapped. This first corner is called NODE 1. Crews will traverse the condition being mapped by measuring a distance and azimuth between each NODE thereafter in a clockwise direction. A maximum of four additional NODES (corners) will be recorded in order to map the condition. Traversing must always proceed in a clockwise direction and continue in that direction throughout the process. The distance and azimuth between the final NODE (corner) and NODE 1 completes the outline of the condition and is computed by the PDR, not the field crew. Closed boundaries should not overlap one another.

In cases where the condition crosses the subplot perimeter, NODE 1 must be established at the intersection of the mapped condition and the subplot perimeter in such a fashion that the condition can be traversed in a clockwise direction without crossing or following the subplot perimeter. The final NODE is established at the intersection of the subplot perimeter and the condition on the opposite side of the condition from NODE1. The PDR will complete the outline of the condition by following the arc of the subplot perimeter.

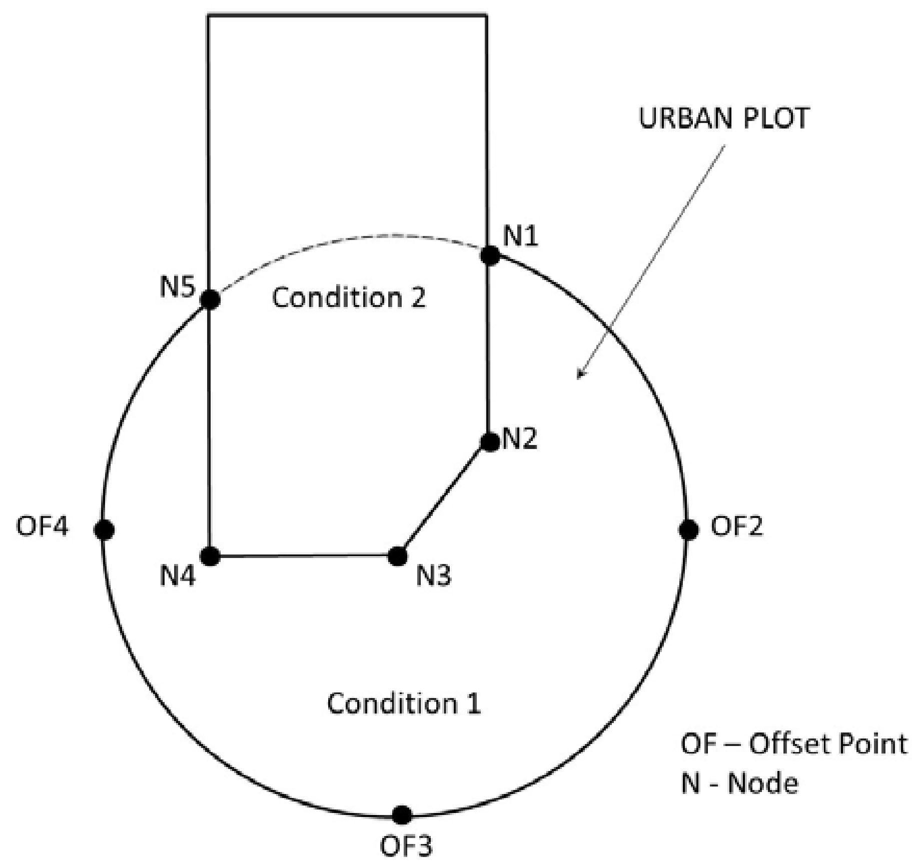


Figure 6.5: Subplot node traverse where the mapped condition crosses the subplot perimeter.

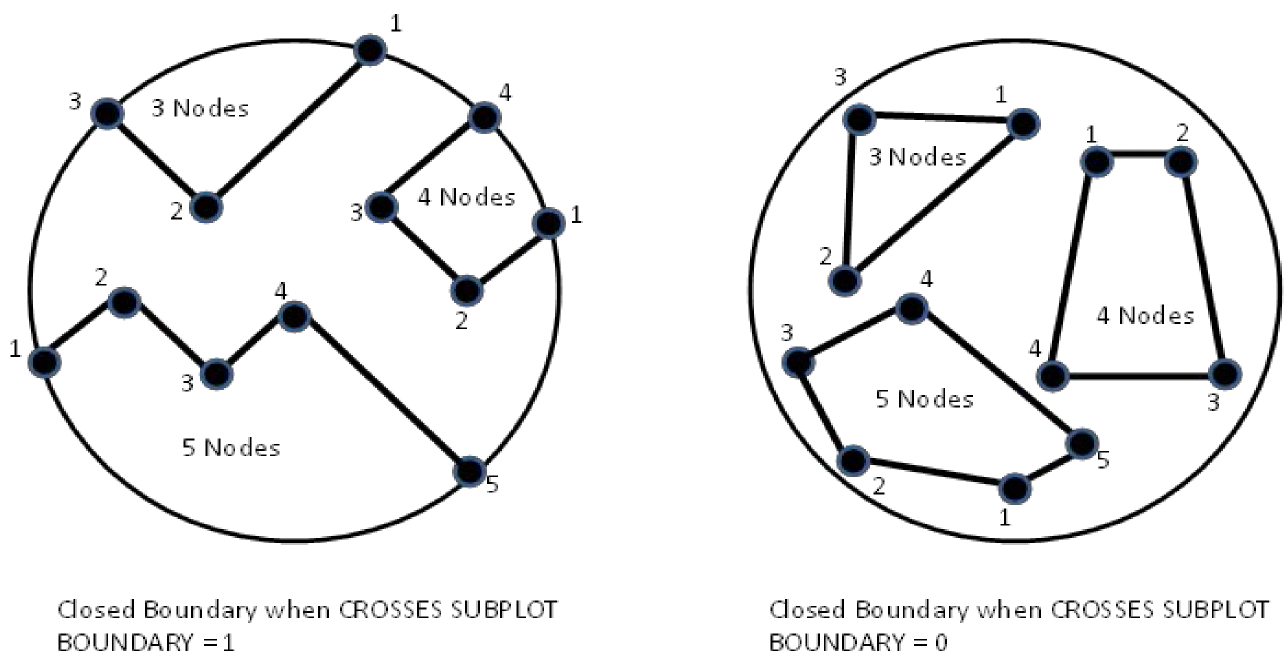


Figure 6.6: Closed boundary examples.

Record the appropriate values for each closed boundary mapped on the subplot as follows:

Item 6.2.2.1 CROSSES SUBPLOT PERIMETER (CORE 4.2.9U)

Record the code to specify whether the condition being mapped crosses the subplot perimeter.

When Collected:	All Closed Boundaries	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	0	Does not cross the subplot perimeter
	1	Does cross the subplot perimeter

Item 6.2.2.2 NUMBER OF NODES (CORE 4.2.9.1U)

Record the number of Nodes that define the condition represented by the Closed Boundary. The program will allow a maximum of 5 nodes. For Closed Boundaries that cross the subplot perimeter, include the two nodes that result from the intersection of the condition boundary and subplot perimeter (NODE 1 and the final NODE). See Figure 6.6.

When Collected:	All Closed Boundaries
Field width:	1 digit
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	2 to 5

Item 6.2.2.3 AZIMUTH TO NODE 1 (CORE 4.2.10U)

Record the azimuth from subplot center to a corner point of the closed boundary condition being mapped. If CROSSES SUBPLOT PERIMETER = 1, then Node 1 must be established as described in above.

When Collected:	All Closed Boundaries when MICROPLOT NUMBER = null and OFFSET POINT = 0 or MICROPLOT NUMBER = 11 and OFFSET POINT = 110 or MICROPLOT NUMBER = 12 and OFFSET POINT = 120 or MICROPLOT NUMBER = 13 and OFFSET POINT = 130 or MICROPLOT NUMBER = 14 and OFFSET POINT = 140
Field width:	3 digits
Tolerance:	+/- 10 degrees
MQO:	At least 90% of the time
Values:	001 to 360

Item 6.2.2.4 OFFSET AZIMUTH TO NODE 1 (CORE 4.2.10.1U)

When using an OFFSET POINT other then the center point of the subplot/microplot to which the boundaries are assigned, record the azimuth from the OFFSET POINT to a corner point of the closed boundary condition being mapped. If CROSSES SUBPLOT PERIMETER =1, then Node 1 must be established as described above.

When Collected:	All Closed Boundaries when MICROPLOT NUMBER = null and OFFSET POINT ≠ 0 or MICROPLOT NUMBER = 11 and OFFSET POINT ≠ 110 or MICROPLOT NUMBER = 12 and OFFSET POINT ≠ 120 or MICROPLOT NUMBER = 13 and OFFSET POINT ≠ 130 or MICROPLOT NUMBER = 14 and OFFSET POINT ≠ 140
Field width:	3 digits
Tolerance:	+/- 10 degrees
MQO:	At least 90% of the time
Values:	Values: 001 to 360

Item 6.2.2.5 DISTANCE TO NODE 1 (CORE 4.2.11U)

Record the horizontal distance, to the nearest 1 foot, from subplot center to Node 1. If CROSSES SUBPLOT PERIMETER =1, then Node 1 must be established as described above.

When Collected:	All Closed Boundaries when MICROPLOT NUMBER = null and OFFSET POINT = 0 or MICROPLOT NUMBER = 11 and OFFSET POINT = 110 or MICROPLOT NUMBER = 12 and OFFSET POINT = 120 or MICROPLOT NUMBER = 13 and OFFSET POINT = 130 or MICROPLOT NUMBER = 14 and OFFSET POINT = 140	
Field width:	2 digits	
Tolerance:	+/- 1 ft	
MQO:	At least 90% of the time	
Values:	subplot	01 to 96 ft

Item 6.2.2.6 OFFSET DISTANCE TO NODE 1 (CORE 4.2.11.1U)

When using an OFFSET POINT other then the center point of the subplot/microplot to which the boundaries are assigned, record the horizontal distance, to the nearest 1 foot, from the OFFSET POINT to a corner point of the closed boundary condition being mapped. If CROSSES SUBPLOT PERIMETER =1, then Node 1 must be established as described above.

When Collected:	All Closed Boundaries when MICROPLOT NUMBER = null and OFFSET POINT ≠ 0 or MICROPLOT NUMBER = 11 and OFFSET POINT ≠ 110 or MICROPLOT NUMBER = 12 and OFFSET POINT ≠ 120 or MICROPLOT NUMBER = 13 and OFFSET POINT ≠ 130 or MICROPLOT NUMBER = 14 and OFFSET POINT ≠ 140	
Field width:	2 digits	
Tolerance:	+/- 1 ft	
MQO:	At least 90% of the time	
Values:	subplot	01 to 96 ft

Item 6.2.2.7 AZIMUTH TO NODE 2 (CORE 4.2.12U)

Record the azimuth from NODE 1 to the next corner of the Closed Boundary clockwise from NODE 1. This second corner will be called NODE 2.

When Collected:	All Closed Boundaries
Field width:	3 digits
Tolerance:	+/- 10 degrees
MQO:	At least 90% of the time
Values:	001 to 360

Item 6.2.2.8 DISTANCE TO NODE 2 (CORE 4.2.13U)

Record the horizontal distance, to the nearest 1 foot, from NODE 1 to the next corner of the Closed Boundary clockwise from NODE 1. This second corner will be called NODE 2.

When Collected:	All Closed Boundaries	
Field width:	2 digits	
Tolerance:	+/- 1 ft	
MQO:	At least 90% of the time	
Values:	subplot	01 to 96 ft

Item 6.2.2.9 AZIMUTH TO NODE 3 (CORE 4.2.15U)

Record the azimuth from NODE 2 to the next corner of the Closed Boundary clockwise from NODE 2. This third corner will be called NODE 3.

When Collected:	All Closed Boundaries
Field width:	3 digits
Tolerance:	+/- 10 degrees
MQO:	At least 90% of the time
Values:	001 to 360

Item 6.2.2.10 DISTANCE TO NODE 3 (CORE 4.2.16U)

Record the horizontal distance, to the nearest 1 foot, from NODE 2 to the next corner of the Closed Boundary clockwise from NODE 2. This third corner will be called NODE 3.

When Collected:	All Closed Boundaries	
Field width:	2 digits	
Tolerance:	+/- 1 ft	
MQO:	At least 90% of the time	
Values:	subplot	01 to 96 ft

Item 6.2.2.11 AZIMUTH TO NODE 4 (CORE 4.2.17U)

Record the azimuth from NODE 3 to the next corner of the Closed Boundary clockwise from NODE 3. This fourth corner will be called NODE 4.

When Collected:	All Closed Boundaries (if required to describe the condition being mapped)
Field width:	3 digits
Tolerance:	+/- 10 degrees
MQO:	At least 90% of the time
Values:	001 to 360

Item 6.2.2.12 DISTANCE TO NODE 4 (CORE 4.2.18U)

Record the horizontal distance, to the nearest 1 foot, from NODE 3 to the next corner of the Closed Boundary clockwise from NODE 3. This fourth corner will be called NODE 4.

When Collected:	All Closed Boundaries (if required to describe the condition being mapped)	
Field width:	2 digits	
Tolerance:	+/- 1 ft	
MQO:	At least 90% of the time	
Values:	subplot	01 to 96 ft

Item 6.2.2.13 AZIMUTH TO NODE 5 (CORE 4.2.19U)

Record the azimuth from NODE 4 to the next corner of the Closed Boundary clockwise from NODE 4. This fifth corner will be called NODE 5.

When Collected:	All Closed Boundaries (if required to describe the condition being mapped)
Field width:	3 digits
Tolerance:	+/- 10 degrees
MQO:	At least 90% of the time
Values:	001 to 360

Item 6.2.2.14 DISTANCE TO NODE 5 (CORE 4.2.20U)

Record the horizontal distance, to the nearest 1 foot, from NODE 4 to the next corner of the Closed Boundary clockwise from NODE 4. This fifth corner will be called NODE 5.

When Collected:	All Closed Boundaries (if required to describe the condition being mapped)	
Field width:	2 digits	
Tolerance:	+/- 1 ft	
MQO:	At least 90% of the time	
Values:	subplot	1 to 96 ft

CHAPTER 7 TREE AND SAPLING DATA

Trees at least 5.0 inches in diameter are sampled within the subplot on all URBAN CONDITION CLASS STATUS 1, 2, 3, and 4 conditions. 'Tally trees' are defined as all live and standing dead trees encountered on the subplot the first time a subplot is established, and all trees that grow into a subplot thereafter. These data yield information on tree volume, growth, mortality, and removals; wildlife habitats; forest structure and composition; biomass; and carbon sequestration.

Trees with a diameter at least 1.0 inch but less than 5.0 inches, termed saplings, are sampled within the microplot on all URBAN CONDITION CLASS STATUS 1, 2, 3, and 4 conditions. 'Tally saplings' are defined as all live and standing dead saplings encountered the first time a microplot is established, and all saplings that grow into each microplot thereafter are included until they grow to 5.0 inches or larger, at which time they are tallied on the subplot and referenced (new URBAN AZIMUTH and URBAN HORIZONTAL DISTANCE taken) to the subplot center.

For multi-stemmed woodland species, a cumulative DRC is used to compute diameter as described in Section 7.1 and Subsection 7.1.4. DRC species are noted in Appendix C and Appendix D with a "W".

Include trees, saplings, and seedlings growing in permanent planters and other forms of raised beds while excluding those growing on top of or inside buildings and in movable planters. Moveable planters are defined as ones that the average person could lift up and move. Include trees and vegetation growing in courtyards but exclude them when growing inside or on top of buildings.

Exclude trees, saplings, and seedlings that are, or have been, landscaped, manicured, hybridized, cultivated, or designed to grow in such manner that they are prevented from reaching a form that allows for accurate and repeatable diameter measurement. Such trees may take the form of, but are not limited to, hedgerows, bushes, or low lying spreading ground cover. They shall be treated as shrubs and tallied as SHRUB / SEEDLING COVER and their canopy cover shall NOT be counted toward LIVE/MISSING CANOPY COVER or URBAN LIVE/MISSING CANOPY COVER. The key is that such trees are PREVENTED from reaching a form that allows for accurate and repeatable diameter measurement, NOT the fact that they are landscaped or manicured. Manicured trees that still allow for proper diameter measurement are still tallied as trees.

Figure 7.1: Examples of landscaped and manicured hedgerows or bushes that are maintained in such a fashion that they are prevented from reaching a form that allows for accurate and repeatable diameter measurement leading them to be treated as SHRUB / SEEDLING COVER instead of being treated as a tree.

Figure 7.2: Manicured Arborvitea that maintain tree form and should be tallied as trees and Picea mariana 'Ericoides' designed to spread out on the ground that should be tallied as a shrub.

Trees are alive if they have any living parts (leaves, buds, or cambium) at or above the point of diameter measurement, either diameter at breast height (DBH) or diameter at root collar (DRC). Trees that have been temporarily defoliated are still alive.

Once tallied, dead trees 1.0 inch and greater in diameter are tracked until they no longer qualify as standing dead. Working around dead trees is a safety hazard - crews should exercise extreme caution! Trees that are deemed unsafe to measure should be estimated.

To qualify as a standing dead tally tree, dead trees must be at least 1.0 inch in diameter, have a bole which has an unbroken ACTUAL LENGTH of at least 4.5 feet, and lean less than 45 degrees from vertical as measured from the base of the tree to 4.5 feet.

The portion of a bole on dead trees that is separated greater than 50 percent above 4.5 feet), are considered severed and may qualify as Down Woody Material (DWM). See DWM procedures for tally criteria.

For woodland species (Appendix C and Appendix D) 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. For woodland species with single stems to qualify as a standing dead tally tree, dead trees must be at least 1.0 inch in diameter, be at least 1.0 foot in unbroken ACTUAL LENGTH, and lean less than 45 degrees from vertical.

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.

The following apply at remeasurement:

- If at the previous visit a forked tree was recorded as two separate trees but should have been recorded as one tree, reconcile one tree and correct the diameter for the remaining tree. Give one of the tree data lines a URBAN PRESENT TREE STATUS = 0, URBAN RECONCILE = 7, and a TREE NOTE. The remaining tree data line receives URBAN PRESENT TREE STATUS = 1 or 2 with DIAMETER CHECK = 2, and a TREE NOTE.
- If at the previous visit a forked tree was recorded as one tree but should have been recorded as two separate trees, correct the diameter 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. URBAN PRESENT TREE STATUS = 1 or 2, DIAMETER CHECK = 2, and a TREE NOTE. The second stem would get URBAN PRESENT TREE STATUS = 1 or 2, URBAN RECONCILE 3 or 4, and a TREE NOTE.

Begin tallying trees at an azimuth of 001 degrees from subplot center and continue clockwise around the subplot. Repeat this sequence for trees on the microplot.

Item 7.0.0.1 URBAN SUBPLOT NUMBER (CORE 5.1+U)

Record the subplot number where the tree occurs.

When Collected:	All tree records	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	1	Urban subplot

Item 7.0.0.2 URBAN MICROPLOT NUMBER (CORE 5.1.1U)

Record the microplot number where the tree occurs.

When Collected:	All live tally trees ≥ 1.0 in DBH/DRC and < 5.0 in DBH/DRC	
Field width:	2 digits	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	11	East microplot
	12	South microplot
	13	West microplot
	14	North microplot

Item 7.0.0.3 URBAN TREE RECORD NUMBER (CORE 5.2+U)

Record a code to uniquely and permanently identify each tree on the subplot. The URBAN TREE RECORD NUMBERs must be unique within the subplot – being unique is more important than being sequential. In general, work clockwise from azimuth 001 to 360, and work outwards from subplot center to subplot perimeter. On remeasured plots, use the previously assigned tree number. Saplings tallied on microplots will retain their initially assigned tree number if they grow to tree size. Missed trees and ingrowth trees (trees that either grew over the 1.0-inch threshold on the microplot or grew onto the subplot) will be assigned the next available tree number. DO NOT renumber all plot trees in order to assign a more “correct” tree number to a missed tree. Numbers assigned to trees that are subsequently found to be extra will be dropped and not reused.

This variable is handled the same as it is in CORE procedures with the following exception – if a CORE tree is exported from the CORE file to the URBAN FIA file on the PDR the PDR will assign the tree a TREE RECORD NUMBER = to the next consecutive tree number in the urban file.

When Collected:	All tree records
Field width:	3 digits
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	000 or 001 to 999

Item 7.0.0.4 CORE TREE RECORD NUMBER (CORE 5.2.1U)

The CORE TREE RECORD NUMBER represents each tree’s corresponding tree number on the CORE plot when the URBAN FIA plot straddles a CORE plot. The PDR will auto populate this variable when it is exported from the CORE plot file to the URBAN FIA file.

Item 7.0.0.5 OFFSET POINT (CORE 5.1.1.1U)

Record appropriate code corresponding to the location from which trees and saplings were measured for each subplot / microplot (See Appendix H for detailed offset procedures).

When Collected:	All subplots and microplots	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	0	Normal position (subplot center)
	1	North subplot offset point
	2	East subplot offset point
	3	South subplot offset point
	4	West subplot offset point
	110	Normal position of microplot 11 (center)
	111	North microplot 11 offset point
	112	East microplot 11 offset point
	113	South microplot 11 offset point
	114	West microplot 11 offset point
	120	Normal position of microplot 12 (center)
	121	North microplot 12 offset point
	122	East microplot 12 offset point
	123	South microplot 12 offset point
	124	West microplot 12 offset point
	130	Normal position of microplot 13 (center)
	131	North microplot 13 offset point
	132	East microplot 13 offset point
	133	South microplot 13 offset point
	134	West microplot 13 offset point
	140	Normal position of microplot 14 (center)
	141	North microplot 14 offset point
	142	East microplot 14 offset point
	143	South microplot 14 offset point
	144	West microplot 14 offset point

Item 7.0.0.6 CONDITION CLASS NUMBER (CORE 5.3)

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 7.3).

When Collected:	All trees
Field width:	1 digit
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	1 to 9

. .

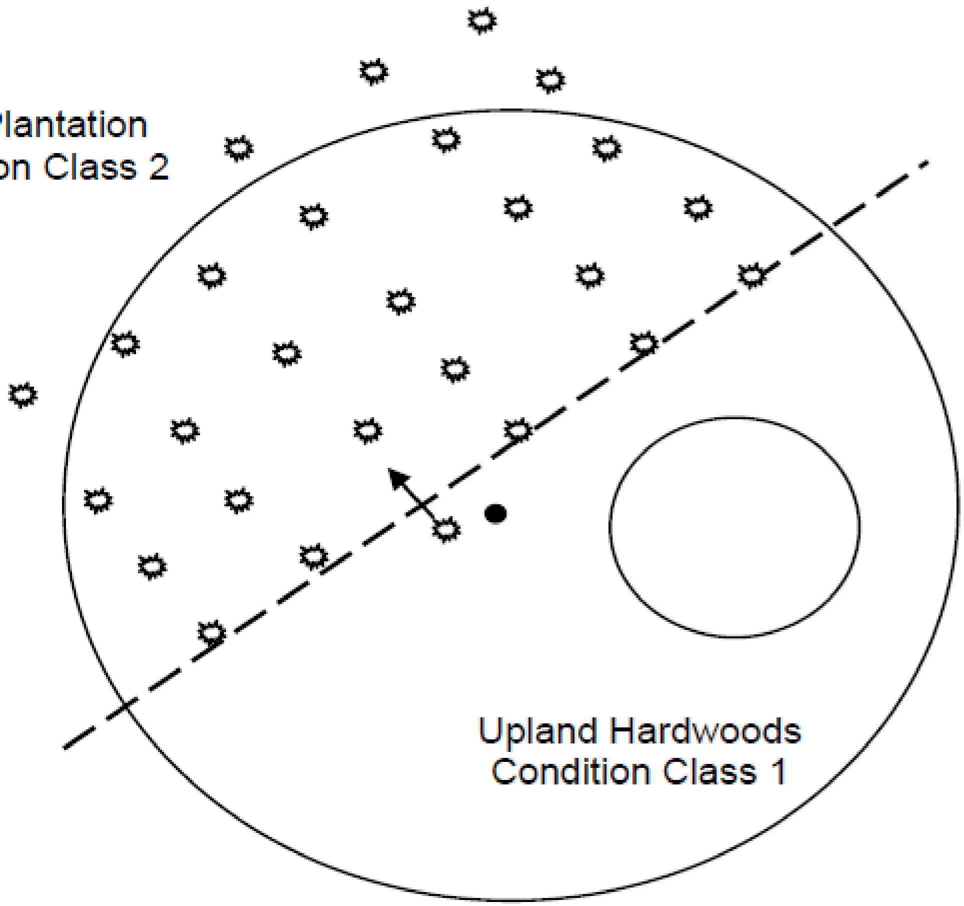


Figure 7.3: Ragged CONDITION CLASS boundary and tree condition class designation.

Item 7.0.0.7 URBAN AZIMUTH (CORE 5.4+U)

Record the URBAN AZIMUTH from the subplot center (for trees greater than or equal to 5.0 inches DBH/DRC) or the microplot center (for trees greater than or equal to 1.0 inch and less than 5.0 inches DBH/DRC), to the center of the base of each tree as measured with a compass. Sight to the "geographic center" for multi-stemmed woodland species (Appendix C and Appendix D). The geographic center is a point of equal distance between all tallied stems for a given woodland tree. Record the URBAN AZIMUTH to the nearest degree. Use 360 for north.

When Collected:	All live and standing dead tally trees ≥ 1.0 inch DBH/DRCDRC where MICROPLOT NUMBER = null and OFFSET POINT = 0 or MICROPLOT NUMBER = 11 and OFFSET POINT = 110 or MICROPLOT NUMBER = 12 and OFFSET POINT = 120 or MICROPLOT NUMBER = 13 and OFFSET POINT = 130 or MICROPLOT NUMBER = 14 and OFFSET POINT = 140
Field width:	3 digits
Tolerance:	+/- 10 degrees
MQO:	At least 90% of the time
Values:	001 to 360

Item 7.0.0.8 URBAN OFFSET AZIMUTH (CORE 5.5.4.1U)

Procedures are the same as Item 7.0.0.7 with the exception that the measurements are taken from an OFFSET POINT which does not represent the center of the subplot/microplot to which the tree/sapling is assigned.

When Collected:	All live and standing dead tally trees ≥ 1.0 in DBH/DRC where MICROPLOT NUMBER = null and OFFSET POINT ≠ 0 or MICROPLOT NUMBER = 11 and OFFSET POINT ≠ 110 or MICROPLOT NUMBER = 12 and OFFSET POINT ≠ 120 or MICROPLOT NUMBER = 13 and OFFSET POINT ≠ 130 or MICROPLOT NUMBER = 14 and OFFSET POINT ≠ 140
Field width:	3 digits
Tolerance:	+/- 10 degrees
MQO:	At least 90% of the time
Values:	001 to 360

Item 7.0.0.9 URBAN HORIZONTAL DISTANCE (CORE 5.5+U)

Record the measured URBAN HORIZONTAL DISTANCE, to the nearest 0.1 foot, from the subplot center (for trees greater than or equal to 5.0 inches DBH/DRC) or microplot center (for trees greater than or equal to 1.0 inch and less than 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 C and Appendix D), the URBAN 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.

When Collected:	All live and standing dead tally trees ≥ 1.0 inch DBH/DRC where MICROPLOT NUMBER = null and OFFSET POINT = 0 or MICROPLOT NUMBER = 11 and OFFSET POINT = 110 or MICROPLOT NUMBER = 12 and OFFSET POINT = 120 or MICROPLOT NUMBER = 13 and OFFSET POINT = 130 or MICROPLOT NUMBER = 14 and OFFSET POINT = 140	
Field width:	3 digits (xx.y)	
Tolerance:	Urban microplot: +/- 0.2 ft.	
	Urban microplot woodland species: +/- 0.4 ft	
	Urban subplot: +/- 1.0 ft. from 0.1 to 23.9 ft.	
	Urban subplot: +/- 2.0 ft. from 24.0 to 47.0 ft.	
	Urban subplot: +/- 0.2 ft. from 47.1 to 48.0 ft.	
	Urban subplot plot single-stem woodland species: +/- 1.0 ft. from 0.1 to 23.9 ft.	
	Urban subplot plot single-stem woodland species: +/- 2.0 ft. from 24.0 to 47.0 ft.	
	Urban subplot plot single-stem woodland species: +/- 0.2 ft. from 47.1 to 48.0 ft.	
	Urban subplot multi-stemmed woodland species: +/- 2.0 ft. from 0.1 to 23.9 ft.	
	Urban subplot multi-stemmed woodland species: +/- 3.0 ft. from 24.0 to 47.0 ft.	
	Urban subplot multi-stemmed woodland species: +/- 1.0 ft. from 47.1 to 48.0 ft.	
MQO:	At least 90% of the time	
Values:	Microplot	00.1 ft. to 06.8 ft.
	Subplot	00.1 ft. to 48.0 ft.

Item 7.0.0.10 URBAN OFFSET HORIZONTAL DISTANCE (CORE 5.5.1U)

Procedures are the same as Item 7.0.0.9 with the exception that the measurements are taken from an OFFSET POINT which does not represent the center of the subplot/microplot to which the tree/sapling is assigned.

When Collected:	All live and standing dead tally trees ≥ 1.0 inches DBH/DRC where MICROPLOT NUMBER = null and OFFSET POINT ≠ 0 or MICROPLOT NUMBER = 11 and OFFSET POINT ≠ 110 or MICROPLOT NUMBER = 12 and OFFSET POINT ≠ 120 or MICROPLOT NUMBER = 13 and OFFSET POINT ≠ 130 or MICROPLOT NUMBER = 14 and OFFSET POINT ≠ 140	
Field width:	3 digits (xx.y)	
Tolerance:	Urban microplot: +/- 0.2 ft.	
	Urban microplot woodland species: +/- 0.4 ft	
	Urban subplot: +/- 1.0 ft. from 0.1 to 23.9 ft.	
	Urban subplot: +/- 2.0 ft. from 24.0 to 95.0 ft.	
	Urban subplot: +/- 0.2 ft. from 95.1 to 96.0 ft.	
	Urban subplot plot single-stem woodland species: +/- 1.0 ft. from 0.1 to 23.9 ft.	
	Urban subplot plot single-stem woodland species: +/- 2.0 ft. from 24.0 to 95.0 ft.	
	Urban subplot plot single-stem woodland species: +/- 0.2 ft. from 95.1 to 96.0 ft.	
	Urban subplot multi-stemmed woodland species: +/- 2.0 ft. from 0.1 to 23.9 ft.	
	Urban subplot multi-stemmed woodland species: +/- 3.0 ft. from 24.0 to 95.0 ft.	
	Urban subplot multi-stemmed woodland species: +/- 1.0 ft. from 95.1 to 96.0 ft.	
MQO:	At least 90% of the time	
Values:	Microplot	0.1 ft. to 13.6 ft.
	Subplot	00.1 ft. to 96.0 ft.

Item 7.0.0.11 PREVIOUS TREE STATUS (CORE 5.6)

If not downloaded from the previous inventory, record PREVIOUS TREE STATUS for each remeasured tally tree. This code is used to track the status of sample trees over time. This information is needed to correctly assign the tree's volume to the proper component of volume change.

When Collected:	On remeasurement plots (SAMPLE KIND = 2), all previously tallied trees ≥ 1.0 inch DBH	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 95% of the time	
Values:	1	Live Tree – alive at the previous inventory
	2	Dead tree – standing dead tree at the previous inventory

Item 7.0.0.12 URBAN PRESENT TREE STATUS (CORE 5.7+U)

Record a current URBAN 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. This information is needed to correctly assign the tree's volume to the proper component of volume change.

When Collected:	All new live and standing dead tally trees ≥ 1.0 inch DBH/DRC On remeasurement plots, all previously tallied trees	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 95% of the time	
Values:	0	No status – tree is not presently in the sample (remeasurement plots only). Tree was incorrectly tallied at the previous inventory, currently is not tallied due to definition or procedural change, or is not tallied due to natural causes. 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) where the bole of the tree remains on the site, regardless of cause of death. Includes all previously standing dead trees that no longer qualify as standing dead. Does not include trees that are removed from the site.

	3	Cut & Utilized – Collected on remeasurement trees. A tree that occupied a forested condition in the previous inventory only. A tree that has been cut and removed by direct human activity related to harvesting, silviculture or land clearing (remeasurement plots only). The tree is assumed to have been utilized for commercial purposes, such as timber, chips, or firewood, and noncommercial purposes such as domestic firewood, landscaping, and fence posts.
	4	Removed – Collected on remeasurement trees only. A tree that has been removed by direct human activity but not likely utilized for a commercial product, such as timber, chips, or firewood, and noncommercial purposes such as domestic firewood, landscaping, and fence posts.

Time 1 Condition	Time 2 Condition	URBAN PRESENT TREE STATUS				
		0	**1**	**2**	**3**	**4**
Forest	Forest	Yes	Yes	Yes	Yes	Yes
Forest	Nonforest	Yes	Yes	Yes	Yes	Yes
Nonforest	Forest	Yes	Yes	Yes	No	Yes
Nonforest	Nonforest	Yes	Yes	Yes	No	Yes

Table 7.1: Table summarizes the legal values for URBAN PRESENT TREE STATUS for every combination of Time 1 and Time 2 conditions.

Note: On remeasured plots, crews must collect new URBAN AZIMUTH and URBAN HORIZONTAL DISTANCE information from the subplot center for microplot saplings that grow to become subplot trees. For live or standing dead subplot trees that shrink to become love or dead saplings on the microplot, crews must collect new URBAN AZIMUTH and URBAN HORIZONTAL DISTANCE information from the microplot center.

Item 7.0.0.13 URBAN RECONCILE (CORE 5.7.1+U)

For remeasurement locations only, record a URBAN RECONCILE code for any new tally tree that was not tallied in the previous inventory, and for all no status remeasurement trees (URBAN 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. This information is needed to correctly assign volume information to the proper component of volume change.

When Collected:	On SAMPLE KIND = 2; all new live and standing dead tally trees and saplings ≥1.0 inch DBH/DRC (URBAN PRESENT TREE STATUS = 1 or 2 and no PREVIOUS TREE STATUS) and all no status trees (URBAN PRESENT TREE STATUS = 0)	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 95% of the time	
Values:	Codes 1-4 are valid for new trees on the plot:	
	1	Ingrowth –a new tally tree not qualifying as through growth
	2	Through growth – new tally tree 5.0 inches DBH/DRC and larger, within the microplot, which was not missed at the previous inventory. This code would be used for trees that were transplanted to the site and had a DBH/DRC of 5” or greater.
	3	Missed live – a live tree missed at previous inventory and that is live or dead now. Includes currently tallied trees on previously nonsampled conditions.
	4	Missed dead – a dead tree missed at previous inventory that is dead now. Includes currently tallied trees on previously nonsampled conditions.
	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.

	6	Missing (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 URBAN 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 due to a definition or procedural change.
	9	Tree was sampled before, but now the area where the tree was located is nonsampled. All trees on the nonsampled area have URBAN RECONCILE = 9.

Code 5 is used to indicate live trees that shrink below the diameter threshold on the microplot/subplot. 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, URBAN PRESENT TREE STATUS = 0, URBAN 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, URBAN PRESENT TREE STATUS = 1. Record all required items for a tally sapling including reference to the MICROPLOT. Use the tree coding guide in CORE 7.0 to determine the national coding method for remeasurement trees.

Item 7.0.0.14 STANDING DEAD (CORE 5.7.2)

Record the code that describes whether or not a tree qualifies as standing dead. To qualify as a standing dead tally tree, dead trees must be at least 1.0 inch in diameter, have a bole that has an unbroken ACTUAL LENGTH of at least 4.5 feet, and lean less than 45 degrees from vertical as measured from the base of the tree to 4.5 feet. See Figure 7.4 - Figure 7.6 for examples.

“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 (above 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) 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. For woodland species with single stems to qualify as a standing dead tally tree, dead trees must be at least 1.0 inch in diameter, be at least 1.0 foot in unbroken ACTUAL LENGTH, and lean less than 45 degrees from vertical.

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.

When Collected:	SAMPLE KIND = 2 only: All dead tally trees (PRESENT TREE STATUS = 2)	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	0	No – tree does not qualify as standing dead
	1	Yes – tree does qualify as standing dead.

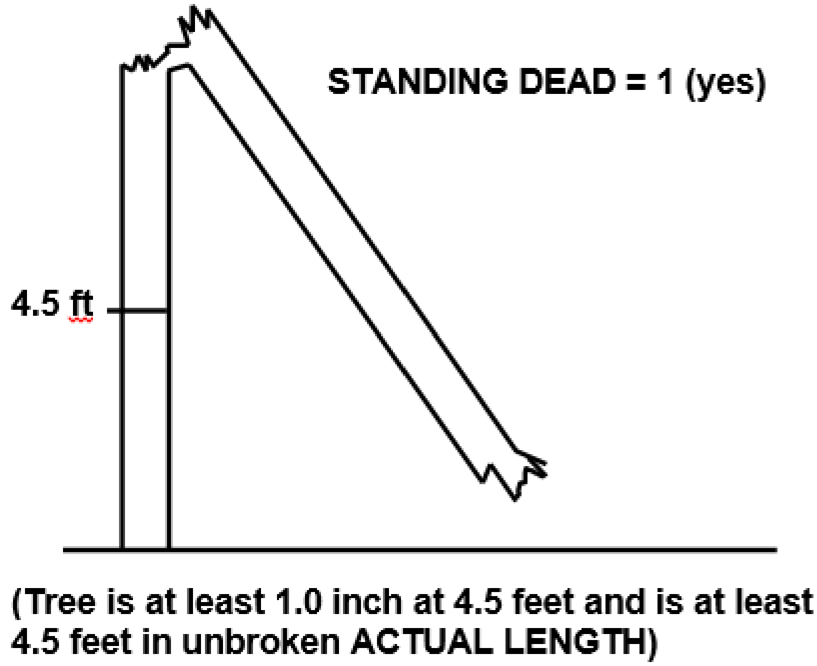


Figure 7.4: Example of an unbroken bole to 4.5 feet.

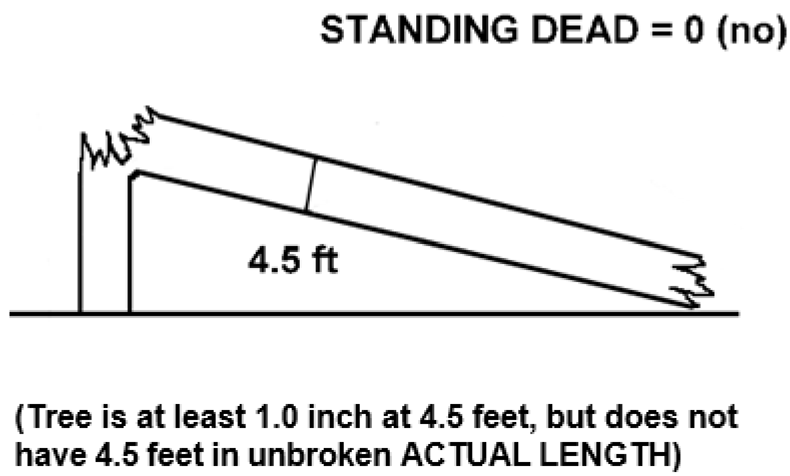


Figure 7.5: Example of an unbroken length of < 4.5 feet.

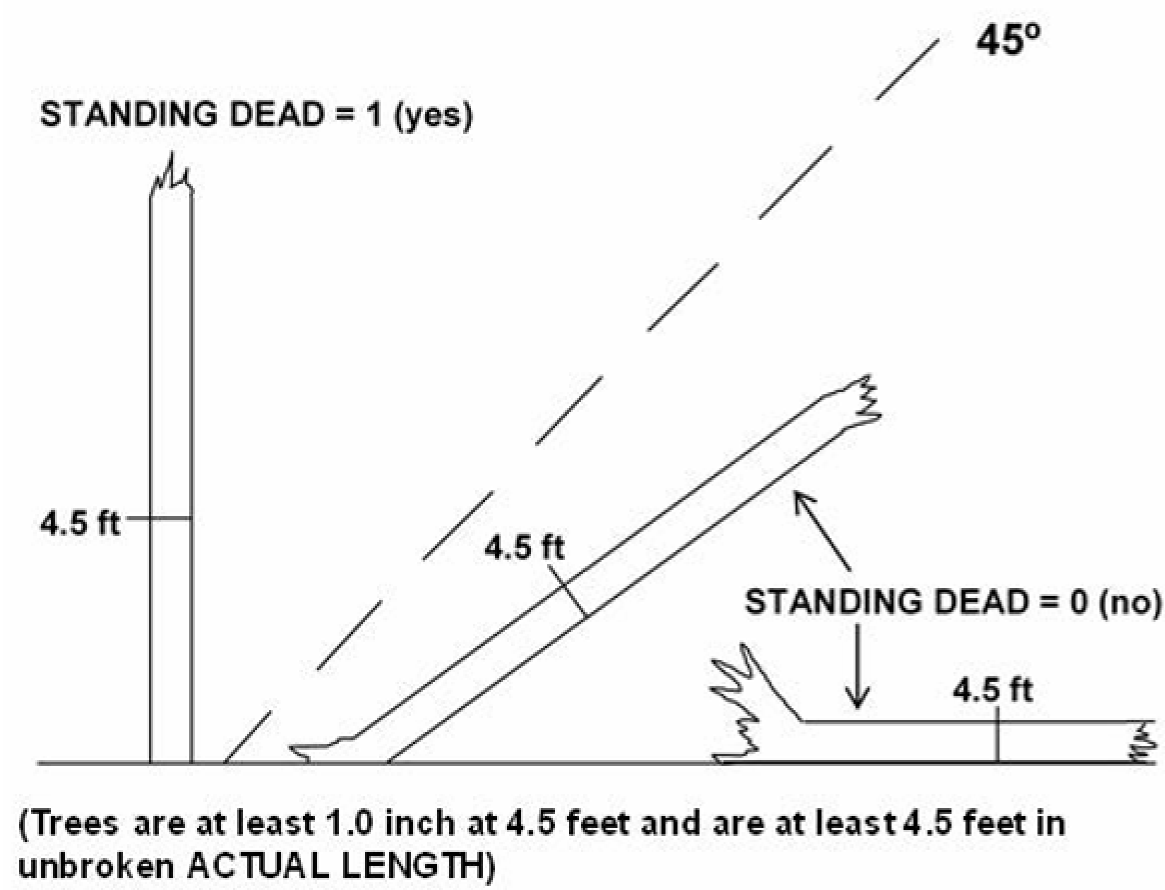


Figure 7.6: Other examples of dead trees

Item 7.0.0.15 MORTALITY (URBAN OPTIONAL Collected in PNW) (CORE 5.7.3)

Record a mortality code for any tree that was live within the past five years but has died, regardless of cause of death. This information is needed to correctly assign volume information to the proper component of volume change.

When Collected:	All standing dead trees 1.0 inch DBH/DRC and larger that were live within the past 5 years if no previous inventory (PRESENT TREE STATUS = 2 on SAMPLE KIND = 1 or 3 plots).	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 85% of the time	
Values:	0	No - tree does not qualify as mortality.
	1	Yes – tree does qualify as mortality.

Item 7.0.0.16 BOLE/STUMP REMOVED (CORE 5.7.4U)

For remeasurement locations only, record a BOLE/STUMP REMOVED code for any tree that was tallied in the previous inventory but has now been removed from the site (URBAN PRESENT TREE STATUS = 3 or 4). This code is used to track the types of tree removal as well as influence predictions on future occupancy of the site. The method of stump removal does not matter as long as the entire surface of the stump is removed or reduced below ground level. Common methods include heavy equipment (bulldozer or tractor), digging, or grinding.

When Collected:	On SAMPLE KIND = 2; all tally trees with an URBAN PRESENT TREE STATUS of 3 or 4.
Field width:	1 digit
Tolerance:	No errors
MQO:	At least 95% of the time

Values:	1	Bole removed – The bole of the tree was removed but the stump remains on site
	2	Bole & stump removed – The bole and stump were removed from the site. Use this code if the entire surface of the stump has been reduced below ground level or removed completely.

Item 7.0.0.17 URBAN SPECIES (CORE 5.8+U)

Record the appropriate SPECIES code from the list in Appendix C and Appendix D. If the species cannot be determined in the field, tally the tree, collect samples of foliage, cones, flowers, bark, etc. to the supervisor for later identification. If possible, collect samples outside the subplots from similar specimens and make a note to correct the SPECIES code later. Use code 0299 for unknown dead conifer, 0998 for unknown dead hardwood when the genus or species codes cannot be used, and 0999 as a temporary place holder for other or unknown live tree. The generic code should only be used when you are sure the species is on the species list, but you cannot differentiate among acceptable species. This is often the case with standing dead trees on newly established plots. In this case use the sample collections procedures described earlier in this paragraph. If a hybrid species is found, naturally or planted, and is listed in the Appendix C or Appendix D, use the hybrid code; otherwise code the parent species with the most dominant characteristic from Appendix C or Appendix D. If neither the hybrid nor either of the parent species are listed, then do not tally the species and follow NON-TALLY TREE procedures in Item 5.1.0.10. If a variety or subspecies is found, naturally or planted, and is listed in Appendix C or Appendix D, use the corresponding variety/ subspecies code. If the variety is not listed, but the species is listed, code the specimen using the species code. When trees are grafted, use the dominant characteristics visible on the tree to assign the species.

The species code list in Appendix C and Appendix D includes all tree species tallied in the Continental U.S., Alaska, Pacific, and the Caribbean.. Species marked as Woodland (W) designate species where DRC is measured instead of DBH. All Core and Core Optional species, from all regions, from both the Appendix C, PNW Forest Land Tree Species Codes and Appendix D, FIA Tree Species Codes, are recorded in the urban inventory.

When Collected:	All tree records
Field width:	4 digits
Tolerance:	No errors
MQO:	At least 99% of the time for genus, at least 95% of the time for species
Values:	See Appendix C and Appendix D

SECTION 7.1 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 48-foot radius subplot.

In order to accurately remeasure diameter (DBH or DRC) at the same point on the tree bole at successive visits, measure and record the distance from the ground to the point of diameter measurement (Item 7.3.1.11).

Remeasurement trees:

When remeasuring the diameter of a tree tallied at a previous survey, always take the measurement at the location monumented by the previous crew unless it is not physically possible (e.g., tree buried by mudslide), there is an abnormality at the previous DIAMETER measurement point, or the previous location is more than 12 inches beyond where the diameter should be measured according to current protocols (either because protocols have changed or the previous crew made a mistake). Previous diameter measurement locations should not be moved due to the loss or addition of a forked stem. Assign a DIAMETER CHECK code of 2 whenever the point of measurement is moved.

For remeasurement of a group of multiple forks (3+) that originate from approximately the same point on the main stem at Time 1 that are now recorded as a single tree using the Measure Low Approach (see Appendix E) at Time 2 select one of the group to represent the resulting single tree (choose the "most representative" of the group in relation to the resulting tree) to measure at Time 2 and record a current diameter based on the Measure Low Approach guidelines and assigned with:

- DIAMETER CHECK = 2
- LENGTH TO DIAMETER MEASUREMENT POINT

The remaining forks that were measured at Time 1 are now considered part of this single tree (branches). The tree records for these are retired with:

- PRESENT TREE STATUS = 0
- RECONCILE = 8

When Collected:	All live and standing dead tally trees ≥ 1.0 inch DBH/DRC
Field width:	4 digits (xxx.y)
Tolerance:	+/- 0.1 inch per 20.0-inch increment of measured diameter on all live trees and standing dead trees with DECAY CLASS = 1, 2
	+/- 1.0 inch per 20.0-inch increment of measured diameter on standing dead trees with DECAY CLASS = 3, 4, 5
	For woodland species: +/- 0.2 inch per stem
MQO:	At least 95% of the time. For example: a tree with a diameter of 41.0 inches would have a tolerance of plus or minus 0.3 inch. (Note: the MQO for point of measurement is
	+/- 0.2 inch when the tree is first measured and within 1 foot of the location established by the previous crew when the tree is remeasured.)
Values:	001.0 to 999.9

SUBSECTION 7.1.1 PREVIOUS DIAMETER AT BREAST HEIGHT

This is the DBH assigned at the previous survey. It has been downloaded from the previous inventory. Any change made to this field signifies an error at the time of the previous inventory. DIAMETER CHECK should be set to 2 and an explanation is required in the notes if previous DBH is changed.

SUBSECTION 7.1.2 DIAMETER AT BREAST HEIGHT (DBH)

Unless one of the following special 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.

Special DBH situations:

1. Forked tree: In order to qualify as a fork, the stem in question must be at least 1/3 the diameter of the main stem and must branch out from the main stem at an angle of 45 degrees or less (Figure 7.7 thru Figure 7.10) AND must be judged to have, or have the potential to assume, an obvious "tree like" form and function as opposed to an obvious "branch like" form and function. If there is any doubt as to the form and function of a potential fork call it a fork instead of a branch. Figure 7.11 provides examples where form and function are considerations. 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.

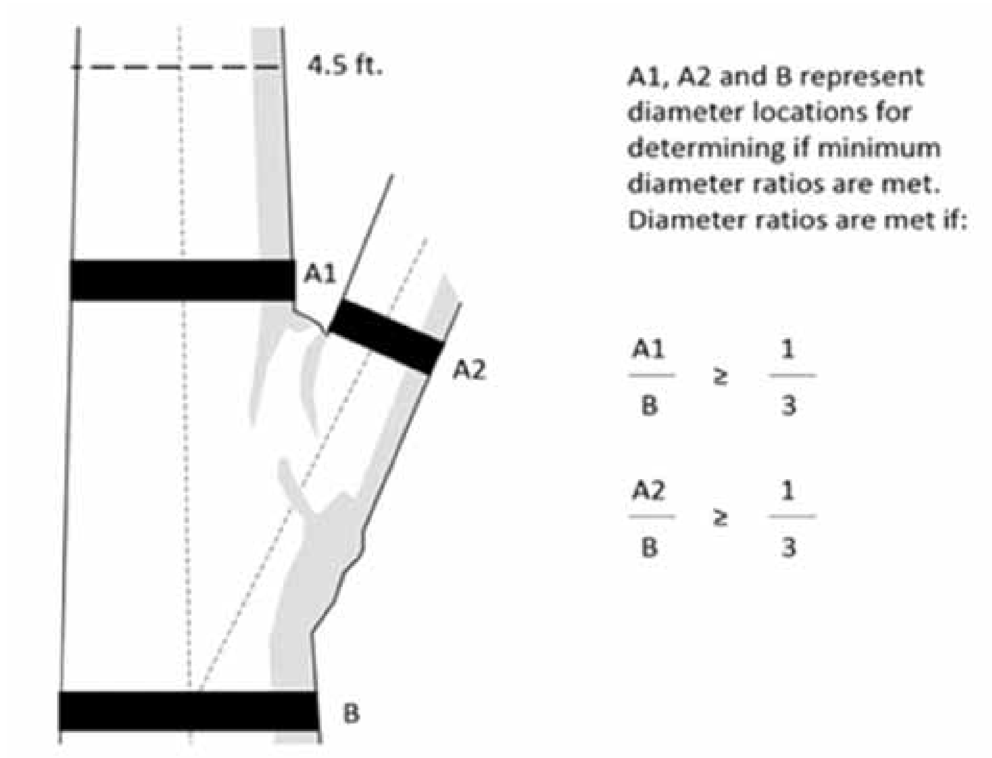


Figure 7.7: Determining diameter ratio of forks. When determining if a fork meets the 1/3 diameter requirement for qualifying as a fork, the diameter of the potential fork taken at locations A1 and A2 must be 1/3 of the diameter at location B.

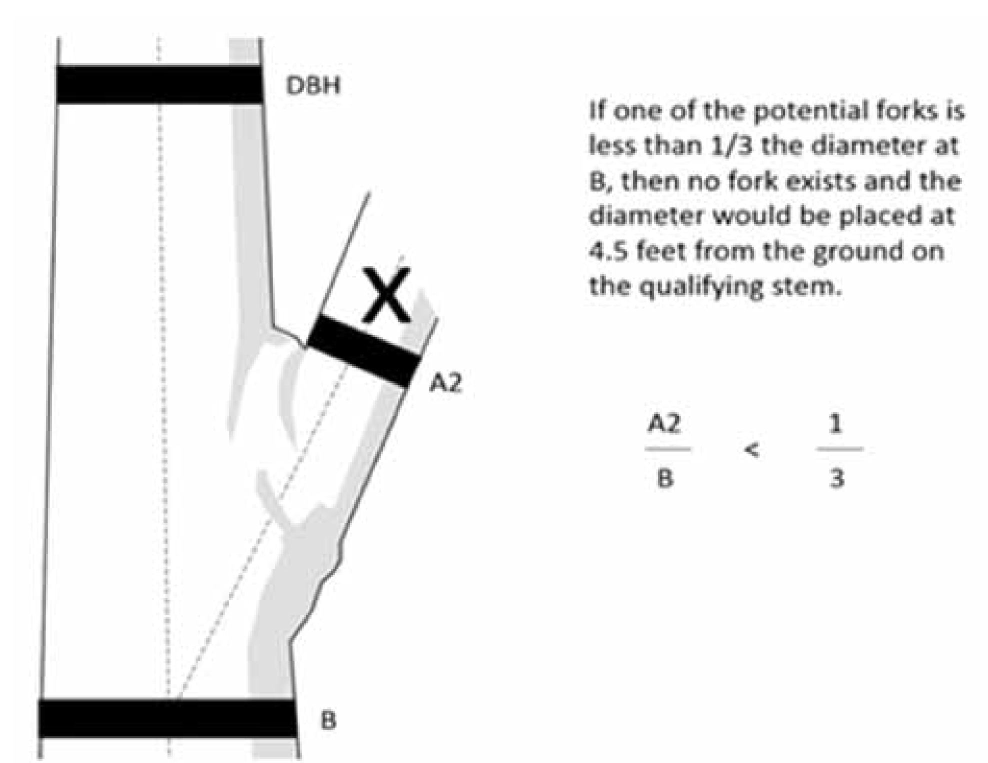


Figure 7.8: A single non-qualifying fork. If one of the forks does not meet the minimum ratio, then no fork exists and the diameter is placed at the normal location on the dominant stem.

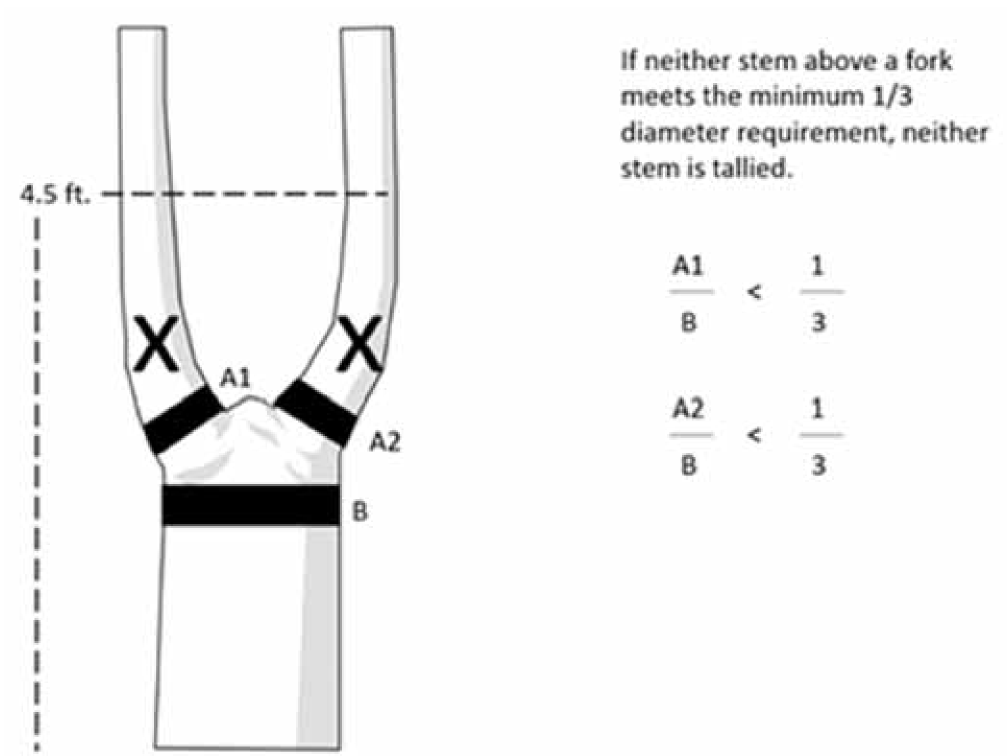


Figure 7.9: Two non-qualifying stems. If neither stem meets the 1/3 diameter requirement, neither is tallied. This is often associated with broken tops and is consistent with the point at which a stem is considered recovered from a break.

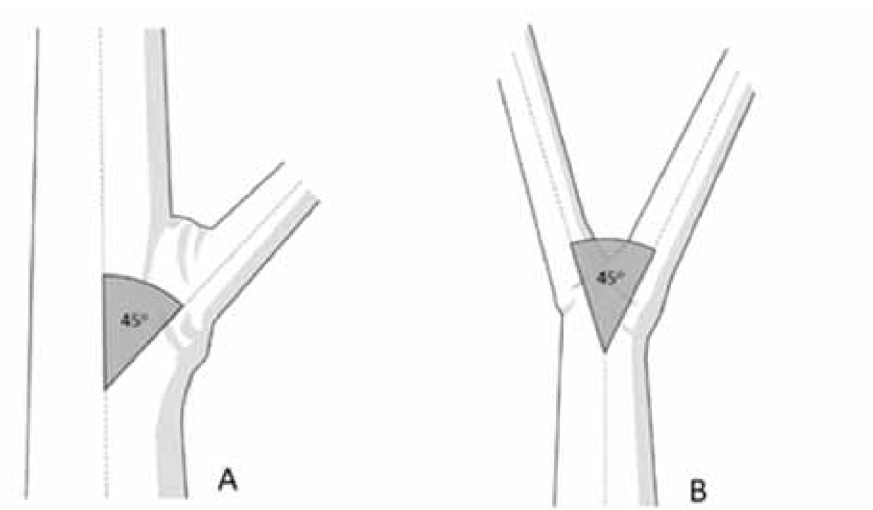


Figure 7.10: Forking angle. In order to qualify as a fork, the piths must diverge at an angle not exceeding 45 degrees from the main stem (A). In cases where there is no obvious main stem (B), consider the angle of pith separation between the two stems.

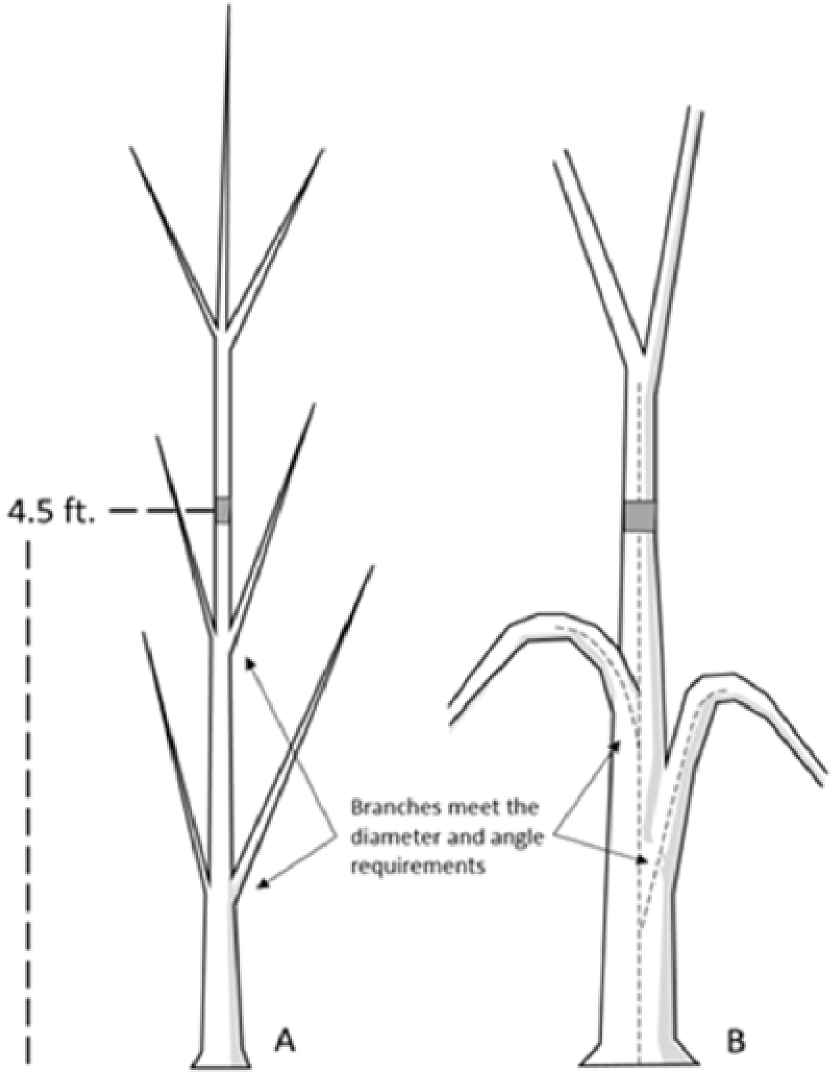


Figure 7.11: Forks that have branch-like form and function, leading to the tally of a single tree instead of multiple trees. In example A, although the potential fork is currently 1/3 the diameter of the main bole and is within 45 degrees of the main bole at the point of attachment, it appears to be serving as a branch as opposed to an additional independent tree. In addition, as the main bole continues to grow, the "branch" may reach the point where it is no longer 1/3 the main bole, dropping out of the inventory based on definition. Such potential forks would be ignored and the main bole would be tallied as a single tree with diameter measured at 4.5 feet. The tree is evaluated at each future visit and tallied following standard remeasurement procedures. In example B, although the potential fork is 1/3 the diameter of the main bole and is within 45 degrees of the main bole at point of attachment, it deviates drastically beyond 45 degrees about 1 inch from the main bole, taking on the form and function of a branch. This should be tallied as a single tree with diameter measured at 4.5 feet.

a. Trees forked below 1.0 foot. Trees forked below 1.0 foot are treated as distinctly separate trees (Figure 7.12). Distances and azimuths are measured individually to the center of each stem where it splits from the stump (Figure 7.18 A-C). 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 below1.0 foot fork again between 1.0 and 4.5 feet (Figure 7.18 E), the rules in the next paragraph apply.

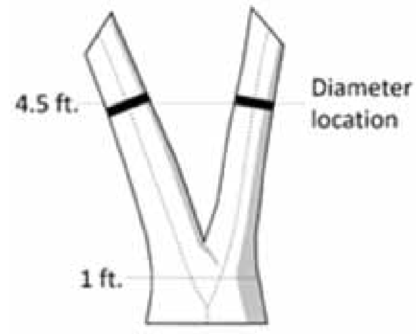


Figure 7.12: Forked below 1.0 ft.

b. Trees forked between 1.0 foot and 4.5 feet. Trees forked between 1.0 foot and 4.5 feet are also counted as separate trees (Figure 7.13), but only one distance and azimuth (to the central stump) is recorded for each stem (Figure 7.18 D-F). 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.

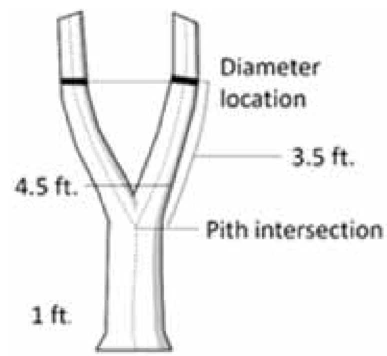


Figure 7.13: Forked between 1.0-4.5 ft.

Measure Low Approach:

Crews may encounter trees of any species displaying growth forms with multiple forks that make applying traditional forking rules very difficult. In some instances these growth forms are species specific and in others they are the result of either the immediate growing conditions or the fact that the trees have been bred, pruned, or managed in a way that promotes multiple stems in order to promote a certain crown shape.

In cases where such multiple forks all originate from approximately the same point on the main stem, follow the Measure Low Approach, where the diameter is taken at the highest, most repeatable location between the 1-foot stump and initial pith separation. This approach is applicable in instances where any of the following are present between the 1-foot stump and DBH (4.5 feet):

1. Multiple forks (Figure 7.14)
2. Prolific branching originating from approximately the same location that prevents accurate and repeatable diameter measurement (Figure 7.15). This is a rare situation that should not be confused with normal branching patterns that allow for accurate diameter placement.
3. Any combination of multiple forks and prolific branching originating at approximately the same location.
4. The stems of a forked tree are grown together in such a fashion that an accurate dbh cannot be measured or estimated   due to deformation resulting from the presence of the above mentioned criteria (Figure 7.16)

Figure 7.14 thru Figure 7.16 illustrate a combination of forks and or branches all originating at the approximate same location will trigger a measure low approach.

Figure 7.14: Multiple forks originating from the same area. In cases such as this the diameter is taken low and all stems are treated as one tree.

Figure 7.15: Multiple forks and branches originating from the same area. Similar to having multiple forks, when there are multiple forks and branches, the diameter is taken low and all stems are treated as one tree.

A tree can only fork once. Following are specific procedures to **secondary** forking:

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 (or potential forks) that may occur on that stem. When such secondary forks are encountered, measure/estimate the diameter of such stems at the most repeatable location below stem separation as shown in but above the first pith separation (Figure 7.18) while attempting to avoid measuring double piths (Figure 7.24) where possible (i.e., do not move the point of diameter the entire 3.5 feet above the first fork).

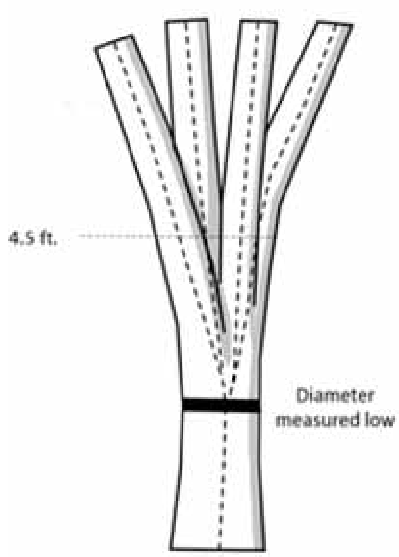


Figure 7.16: Using pith separation to determine diameter locations. In this example it is clear that all piths appear to separate from approximately the same location; this triggers the "Measure Low Approach". In cases where the piths do NOT originate within approximately the same location, normal forking rules are applied as demonstrated in Figure 7.18 A-D and F-I.

c. Trees forked at or above 4.5 feet. Trees forked at or above 4.5 feet count as one single tree (Figure 7.17). If a fork occurs at or immediately above 4.5 feet, measure diameter below the fork just beneath any swelling that would inflate DBH.

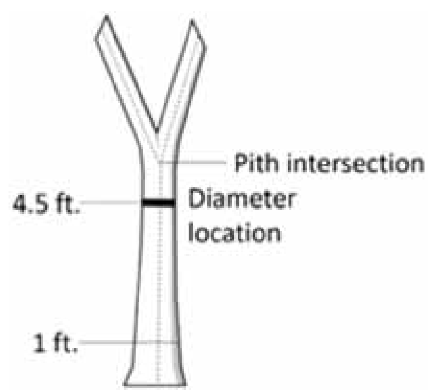


Figure 7.17: One tree.

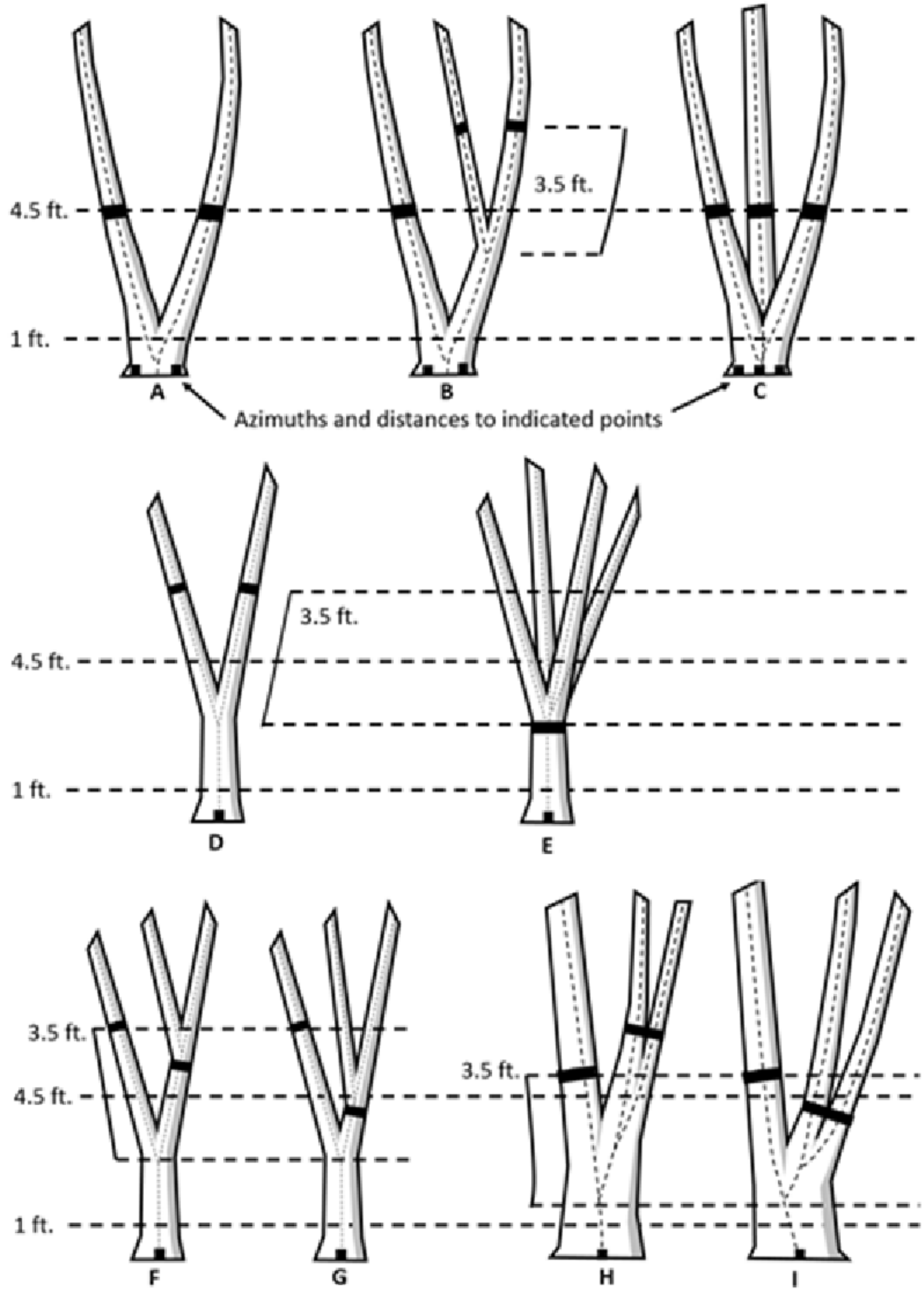


Figure 7.18: Summary of where to measure diameter, distance and azimuth on trees that fork below 1.0 foot (A, B, C) and trees that fork above 1.0 foot (D, E, F, G, H, I). Figure E represents the "Measure Low Approach". Figures F and G represent secondary forks with abnormal diameters at stem separation. Figures H and I represent secondary forks with normal diameters at stem separation.

2. <u>Stump sprouts: Stump sprouts originate between ground level and 4.5 feet on the boles of trees that have died or been cut. Stump sprouts are handled the same as forked trees, with the exception that stump sprouts are not required to be 1/3 the diameter of the dead bole. Stump sprouts originating below 1.0 foot are measured at 4.5 feet from ground line. Stump sprouts originating between 1.0 foot and 4.5 feet are measured at 3.5 feet above their point of occurrence. As with forks, rules for measuring distance</u>

and azimuth depend on whether the sprouts originate above or below 1.0 foot. 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 7.19).

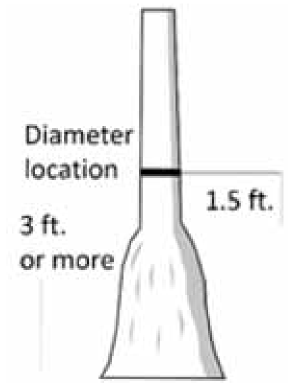


Figure 7.19: Bottleneck tree.

4. Tree with irregularities at DBH: On trees with swellings (Figure 7.20), bumps, depressions, and branches (Figure 7.21) at DBH, diameter will be measured immediately above the irregularity at the place it ceases to affect normal stem form.

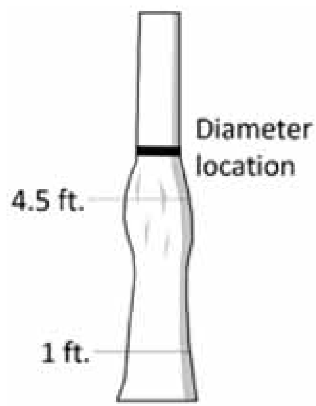


Figure 7.20: Tree with swelling.

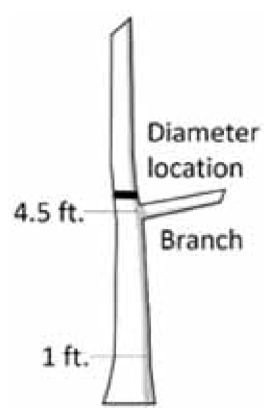


Figure 7.21: Tree with branch.

5. Tree on slope: Measure diameter at 4.5 feet from the ground along the bole on the uphill side of the tree (Figure 7.22).

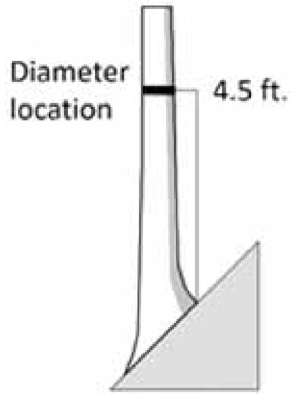


Figure 7.22: Tree on a slope.

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 7.23).

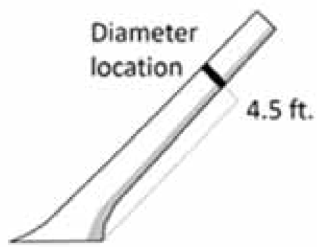


Figure 7.23: Leaning tree.

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.
8. Independent trees that grow together: If two or more independent stems have grown together at or above the point of DBH, continue to treat them as separate trees. Estimate the diameter of each, set the “DIAMETER CHECK” code to 1, and explain the situation in the notes (Figure 7.24).

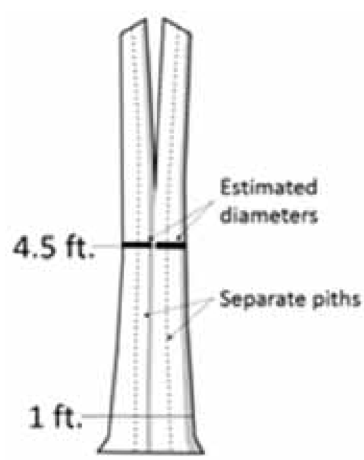


Figure 7.24: Independent trees grown together.

9. Missing wood or bark: Do not reconstruct the DBH of a tree that is missing wood or bark at the point of measurement. Record the diameter, to the nearest 0.1 inch, of the wood and bark that is still attached to the tree (Figure 7.25). 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 7.20).

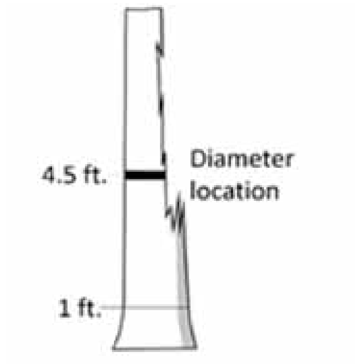


Figure 7.25: Tree with part of stem missing.

10. Live windthrown tree: Measure from the top of the root collar along the length to 4.5 feet (Figure 7.26).

Figure 7.26: Tree on the ground.

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, first 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 (Figure 7.27).

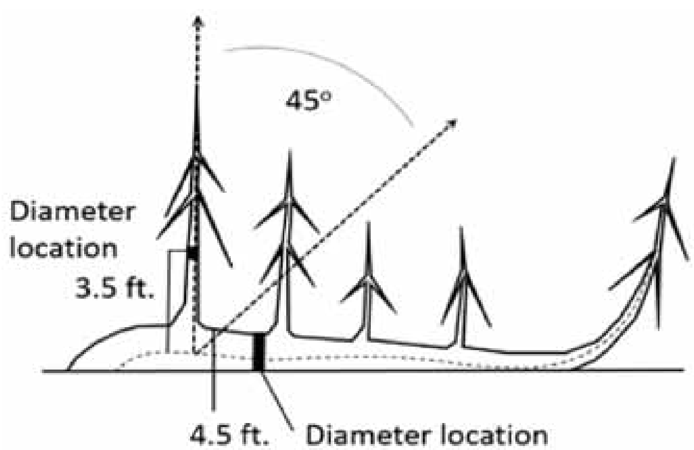


Figure 7.27: Down tree with pith above the duff.

    b. 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.
    c. If the intersection between the main down bole and the tree-like branch occurs beyond the 4.5 feet point from the stump along the main bole, treat that branch as part of the main down bole.

d. 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 7.28). 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.

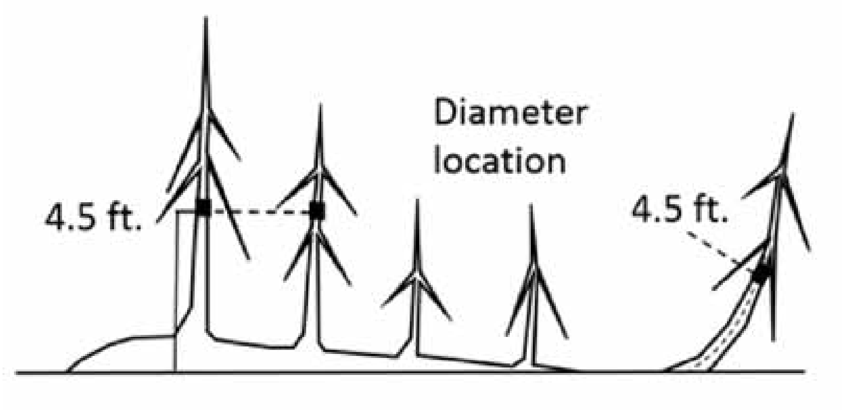


Figure 7.28: Down tree with pith below the duff.

12. Tree with curved bole (pistol butt tree): Measure along the bole on the uphill side (upper surface) of the tree (Figure 7.29).

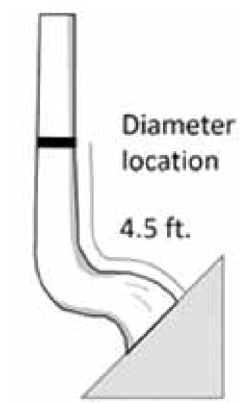


Figure 7.29: Tree with curved bole (pistol butt tree).

SUBSECTION 7.1.3 PREVIOUS DIAMETER AT ROOT COLLAR

This is the DRC assigned at the previous survey. It has been downloaded from the previous inventory. Any change made to this field signifies a misclassification at the time of the previous inventory. “DIAMETER CHECK” should be set to 2 and an explanation is required in the notes if previous DRC is changed.

SUBSECTION 7.1.4 DIAMETER AT ROOT COLLAR (DRC)

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 mesquite, juniper, and mountain mahogany. Treat stems of woodland species such as Gambel oak and bigtooth maple as individual trees if they originate below the ground. 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.

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. Whenever DRC is impossible or extremely difficult to measure with a diameter tape (e.g., due to thorns, extreme number of limbs), stems may be estimated and recorded to the nearest 1.0-inch class. Additional instructions for DRC measurements are illustrated in Figure 7.30. For each qualifying stem of the woodland tree, measure and record DRC STEM DIAMETER (Item 7.1.4.1) and indicate the DRC STEM STATUS (Item 7.1.4.2).

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:

DRC = SQRT [SUM (stem diameter2)]

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:

DRC = SQRT (12.22 + 13.22 + 3.82 + 22.12)

= SQRT (825.93)

= 28.74

= 28.7

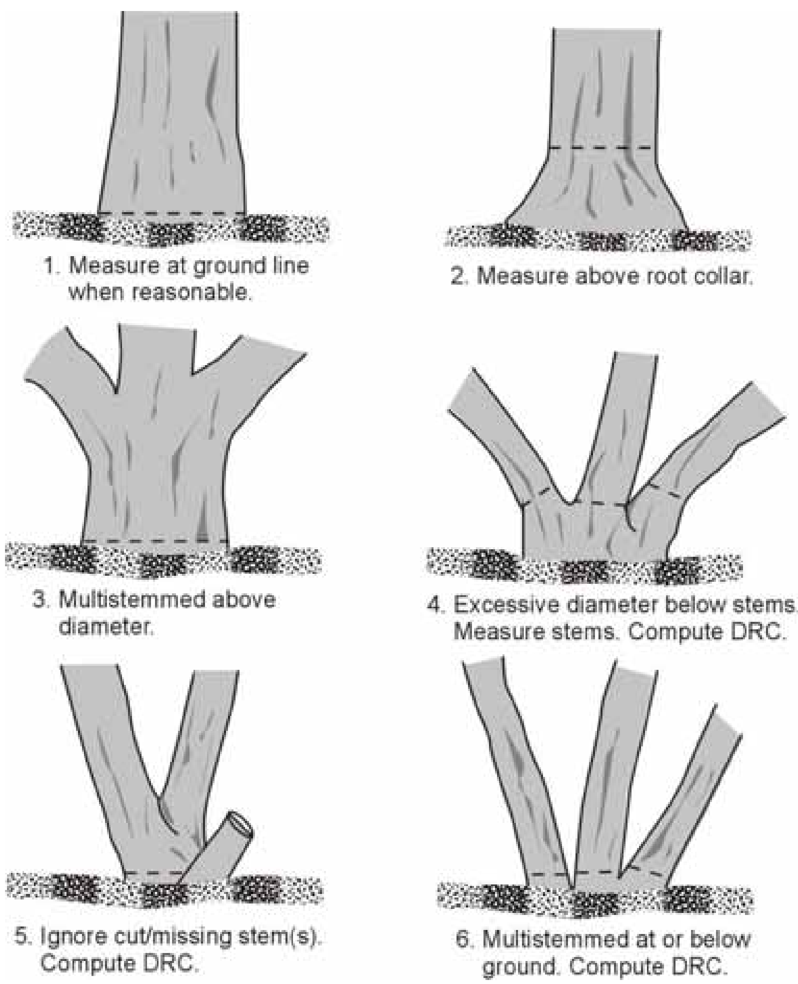


Figure 7.30: How to measure DRC in a variety of situations.

Item 7.1.4.1 DRC STEM DIAMETER (CORE 5.9.4.1)

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 inch in diameter 1 foot up from the stem diameter measurement point
Field width:	4 digits (xxx.y)
Tolerance:	+/- 0.2 in per stem
MQO:	At least 95% of the time
Values:	001.0 to 999.9

Item 7.1.4.2 DRC STEM STATUS (CORE 5.9.4.2)

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 inch in diameter 1 foot up from the stem diameter measurement point	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 95% of the time	
Values:	1	live stem
	2	dead stem

Item 7.1.4.3 PAST NUMBER OF STEMS (CORE 5.10)

If the PAST NUMBER OF STEMS does not equal the CURRENT NUMBER OF STEMS, do not change the preprinted value. Make a note in TREE NOTES suggesting the possible reason for the difference.

When Collected:	Value is preprinted for SAMPLE KIND = 2 locations
Field width:	2 digits
Tolerance:	No errors
MQO:	At least 90% of the time
Values:	1 to 99

Item 7.1.4.4 CURRENT NUMBER OF STEMS (CORE 5.11)

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 inch in diameter or larger; includes woodland species tallied on the microplot
Field width:	2 digits
Tolerance:	No errors
MQO:	At least 90% of the time
Values:	1 to 99

Item 7.1.4.5 DIAMETER CHECK (CORE 5.12)

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.

When Collected:	All live and standing dead tally trees ≥ 1.0 inch DBH/DRC	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	0	Diameter measured accurately.
	1	Diameter estimated.
	2	Diameter measured at different location than previous measurement (remeasurement trees only).

Note: If both codes 1 and 2 apply, use code 2.

Note: If either code 1 or code 2 is used, a tree-level note is required.

Item 7.1.4.6 MOTHER TREE NUMBER (CORE 5.12.1U)

When a single bole forks above ground, FIA pith/forking protocols may result in the differentiation of multiple stems into individual tally trees that originate from a single common stump or bole. The i-Tree protocols consider this a single tree. The MOTHER TREE NUMBER variable will account for this difference by linking each of these FIA-defined trees together. When pith and forking protocols create multiple trees from a single stump, the resulting trees will receive a MOTHER TREE NUMBER equal to the URBAN TREE RECORD NUMBER of the first live tree/sapling (or fork that qualifies as a live tree/sapling) that is encountered on the bole. If ALL stems tallied within the Mother Tree Unit are dead, then the MOTHER TREE NUMBER will be assigned based on the first dead tally tree encountered. Subsequent piths and/or forks from the same stump that qualify as trees will be assigned the same MOTHER TREE NUMBER as the first tally tree/sapling. Presumably, such trees should have the same azimuth and distance unless they represent both microplot and subplot tree/s. If the piths of trees are separate when they enter the ground then the trees will not receive a MOTHER TREE NUMBER even if they are in close proximity to one another. Assume that piths of stump sprouts originate underground, eliminating them from consideration as Mother Trees.

URBAN TREE RECORD NUMBER	SPECIES	TREE STATUS	URBAN DISTANCE	URBAN AZIMUTH	DBH	MOTHER TREE NUMBER	To Clarify:
1	131	1	8.4	71	9.8		
2	131	1	8.6	72	6.2		
3	837	2	15.2	181	7.3	4	1st Fork
4	837	1	15.2	181	6.5	4	2nd Fork
5	837	1	15.2	181	8.2	4	3rd Fork
6	837	2	3.2	185	3.2	4	Microplot fork

Table 7.2: MOTHER TREE NUMBER example. This table contains 6 tree records. Two of the trees are growing within close proximity to one another but are supported by separate stumps with piths that enter the ground separately. For those trees (#1 and #2) no MOTHER TREE NUMBER is entered. The last four stems all originate from a single bole which forks below 4.5 ft. but above ground level. The purpose of the MOTHER TREE # variable is to link such trees (that are derived from forks or originate above ground but below the 1' stump) back to the single bole from which they originate. In this example, the link is established by assigning tree number 4 as the "Mother Tree"; as it is the first of the live forks encountered. All other stems supported by the same stump will also receive MOTHER TREE NUMBER = 4.

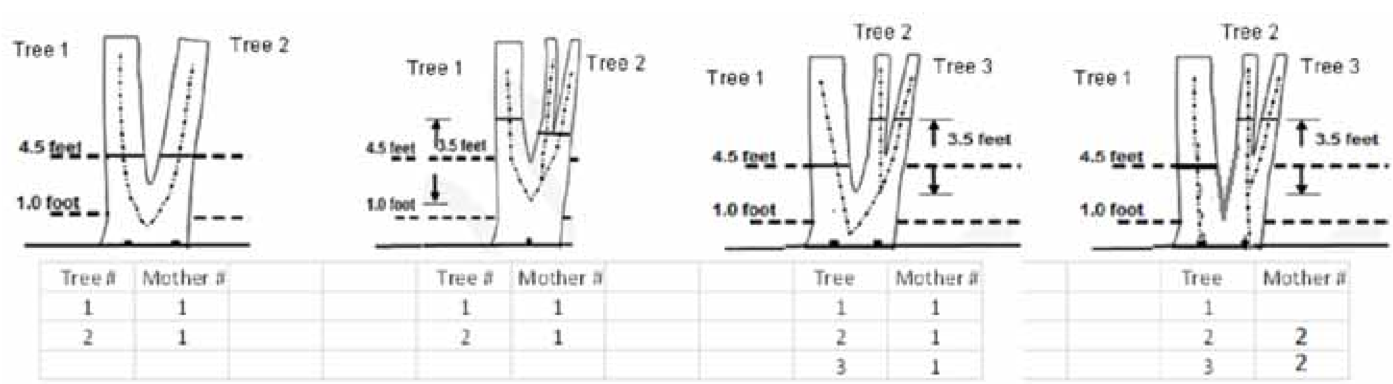


Figure 7.31: Mother Tree Pith and Forking protocols

When Collected:	All DBH species tally trees that are the result of FIA pith or forking protocols ≥ 1.0 in DBH. Leave this variable blank for all DRC species trees as well as trees that are not a result of pith or forking protocols.
Field width:	3 digits
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	001 to 999

Item 7.1.4.7 TREE CLASS (CORE 5.12.2U)

Record the TREE CLASS code that best describes the general quality of the tree or sapling. Use the definitions for each of the codes provided to help in determining tree or sapling quality. When GROWTH SAMPLE TREE = N, the TREE CLASS from the previous visit will be downloaded. Update this value if there is an obvious error or change.

When Collected:	All live trees ≥ 1.0 inches DBH, and all dead trees ≥ 5.0 inches DBH qualifying as standing dead (STANDING DEAD = 1)	
Field width:	1 digit	
Tolerance:	No errors	
Values:	Code	Description
	2	**Growing stock**: A live sapling (1.0 - 4.9 inches DBH) with minor or no evidence of form defects, insects, or disease, that is expected to become a sound tree 5.0 inches DBH or larger with ***good form and vigor***. A live tree, 5.0 inches DBH or larger, that has less than 75% of the merchantable volume cull, and contains at least one solid 8-foot section reasonably free from form defect, on the merchantable bole.
	3	**Rough cull**: Trees that do not have, now or prospectively, at least one solid 8 foot section (reasonably free of form defect) on the merchantable bole **OR** have 75% or more of the merchantable volume cull: AND **more than half of this cull** is due to sound dead wood cubic-foot loss or severe form defect volume loss. A dead tree, 5.0 inches DBH or larger, that has a DECAY CLASS = 1.
	4	**Rotten cull**: Trees with 75% or more of the merchantable volume cull, AND **more than half of this cull** is due to rotten or missing cubic-foot volume loss. A dead tree, 5.0 inches DBH or larger, that has a DECAY CLASS >1.

Item 7.1.4.8 ROTTEN/MISSING CULL (CORE 5.13)

Record the percent rotten or missing cubic-foot cull for all live tally trees greater than or equal to 5.0 inches DBH/DRC (CORE) and all standing dead tally trees greater than or equal to 5.0 inches DBH/DRC (CORE OPTIONAL).

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 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. Use your best judgment and be 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.
- Metal embedded in the wood.

When Collected:	All live tally trees ≥ 5.0 in DBH/DRC *For standing dead tally trees ≥ 5.0 inches DBH/DRC: record MISSING CULL only.*
Field width:	2 digits
Tolerance:	+/- 10 %
MQO:	At least 90% of the time
Values:	00 to 99

Item 7.1.4.9 TOTAL LENGTH (CORE 5.14)

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. Forked trees should be treated the same as unforked trees.

When Collected:	All live and dead tally trees ≥ 1.0 inch DBH/DRC
Field width:	3 digits
Tolerance:	+/- 10 % of true length
MQO:	At least 90% of the time
Values:	001 to 400

Item 7.1.4.10 ACTUAL LENGTH (CORE 5.15)

Record 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).

If the top is intact, this item may be omitted. Record 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 (dead or alive) 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). Forked trees should be treated the same as unforked trees.

Note: Some regions will measure ACTUAL LENGTH differently due to growth form. Some examples are swamp tupelo, cypress, and trees growing off of old high stumps with stilted roots in the West. Check regional field guides for regional guidance.

When Collected:	All live and standing dead tally trees (with broken or missing tops) ≥ 1.0 inch DBH/DRC
Field width:	3 digits
Tolerance:	+/- 10 % of true length
MQO:	At least 90% of the time
Values:	001 to 400

Item 7.1.4.11 LENGTH METHOD (CORE 5.16)

Record the code that indicates the method used to determine tree lengths.

When Collected:	All live and standing dead tally trees ≥ 1.0 inch DBH/DRC	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	1	Total and actual lengths are field measured with a measurement instrument (e.g., clinometer, relascope, tape).
	2	Total length is visually estimated, actual length is measured with an instrument.
	3	Total and actual lengths are visually estimated.

Item 7.1.4.12 CROWN CLASS (CORE 5.17)

Rate tree crowns in relation to the sunlight received and proximity to neighboring trees (Figure 7.32). 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.

When Collected:	All live tally trees ≥ 1.0 in DBH/DRC
Field width:	1 digit
Tolerance:	No errors
MQO:	At least 85% of the time

Values:	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. Trees growing in clumps or trees that are the result of the forking protocols are not considered Open Grown.
	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.

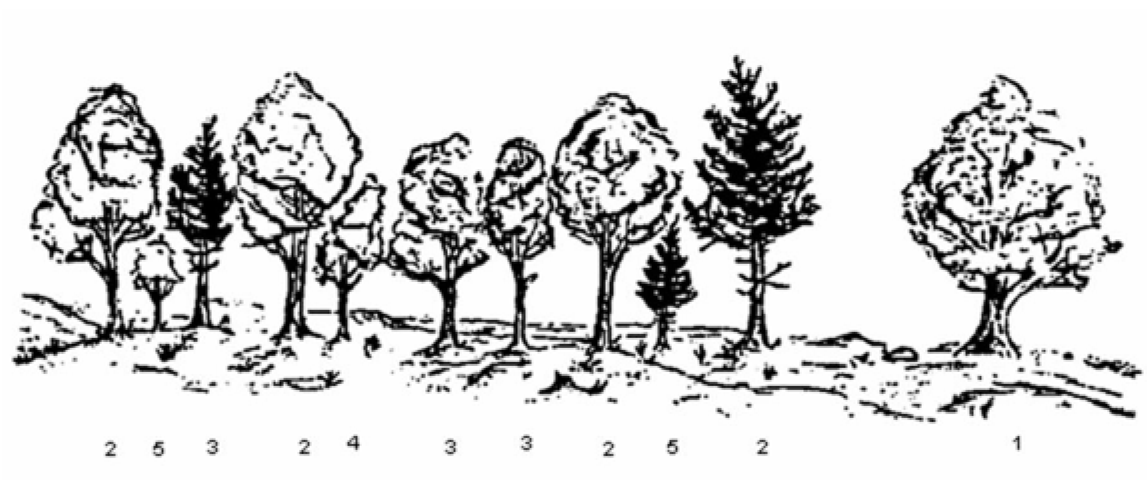


Figure 7.32: Examples of CROWN CLASS code definitions (numbers are the CROWN CLASS codes).

Item 7.1.4.13 UNCOMPACTED LIVE CROWN RATIO (CORE 5.18+U)

Record the UNCOMPACTED LIVE CROWN RATIO to the nearest one percent. UNCOMPACTED LIVE CROWN RATIO is the percentage of actual tree length supporting live foliage (or in cases of extreme defoliation should be supporting live foliage) that is effectively contributing to tree growth. UNCOMPACTED LIVE CROWN RATIO is determined by the ratio of live crown length to ACTUAL LENGTH (Figure 7.33).

When trees have an associated mother tree, a single UNCOMPACTED CROWN RATIO measurement will be recorded for all trees with the same Mother Tree Number (aka "unit" or "Mother Tree Unit"). In these cases the UNCOMPACTED CROWN RATIO measurement will be determined using the crowns of all boles, forks and branches (including any boles/forks supported by the same s tump that were not tallied) as a single unit and recorded in the UNCOMPACTED LIVE CROWN RATIO field of the Mother Tree.

Live crown length is determined from the last live foliage at the crown top (dieback in the upper portion of the crown is not part of the live crown) to the "base of live crown". Many times there are additional live branches below the "base of live crown". These branches are only included if they have a basal diameter greater than 1 inch and are within 5 feet of the base of the obvious live crown. The live crown base becomes that point on the main bole perpendicular to the lowest live foliage on the last branch that is included in the live crown. The live crown base is determined by the live foliage and not by the point where a branch intersects with the main bole.

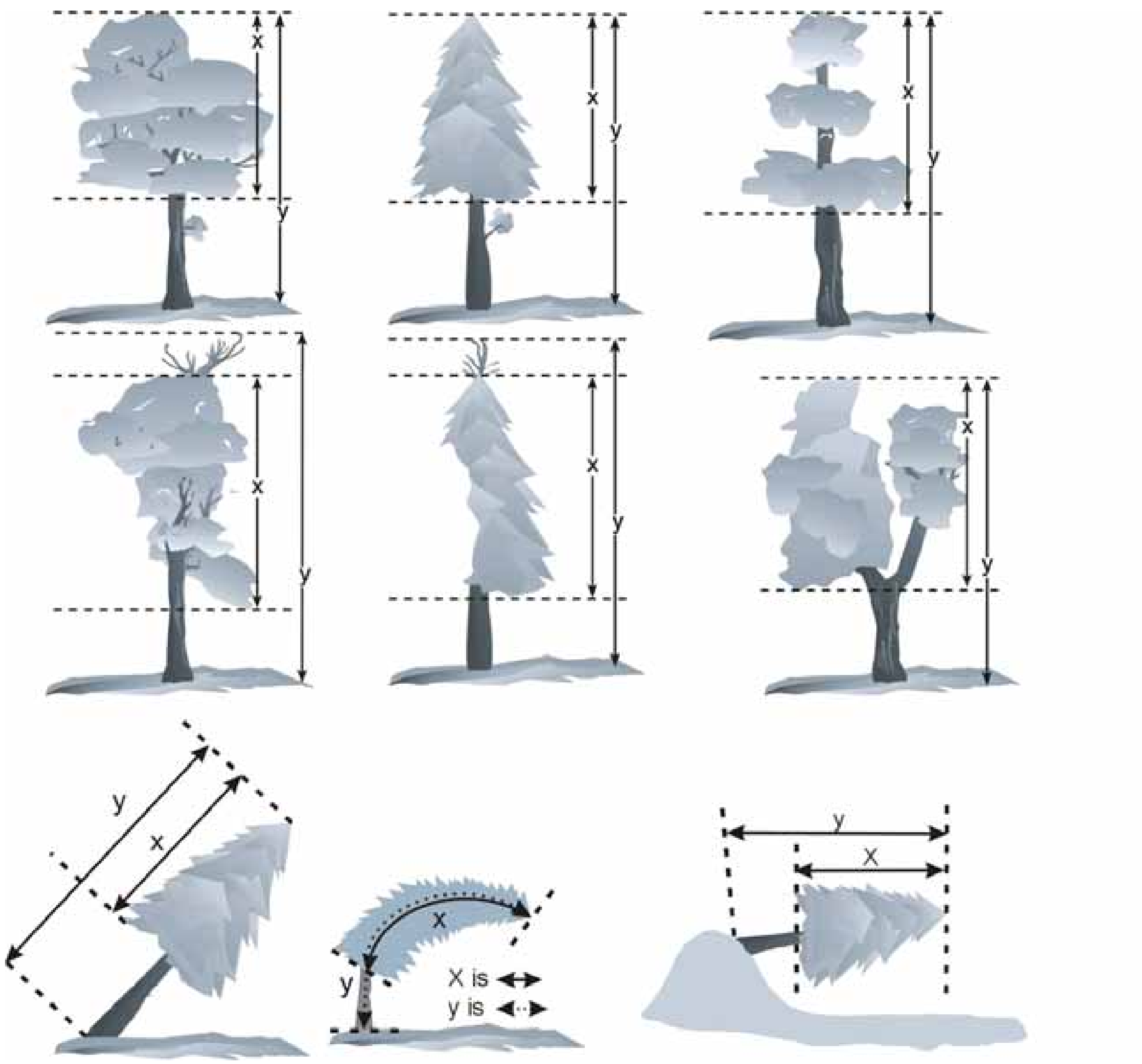


Figure 7.33: UNCOMPACTED LIVE CROWN RATIO examples.

Determine sapling UNCOMPACTED LIVE CROWN RATIO by dividing the live crown length by ACTUAL LENGTH. Live crown length is the distance between the top live foliage (dieback and dead branches are not included) and the lowest live twig for saplings. The live crown base for saplings is different from trees 5.0 inches DBH/DRC and larger; the 1-inch/5-foot rule does not apply in this case. Do not include sprigs or leaves on the main stem below the lowest live twig (Figure 7.34).

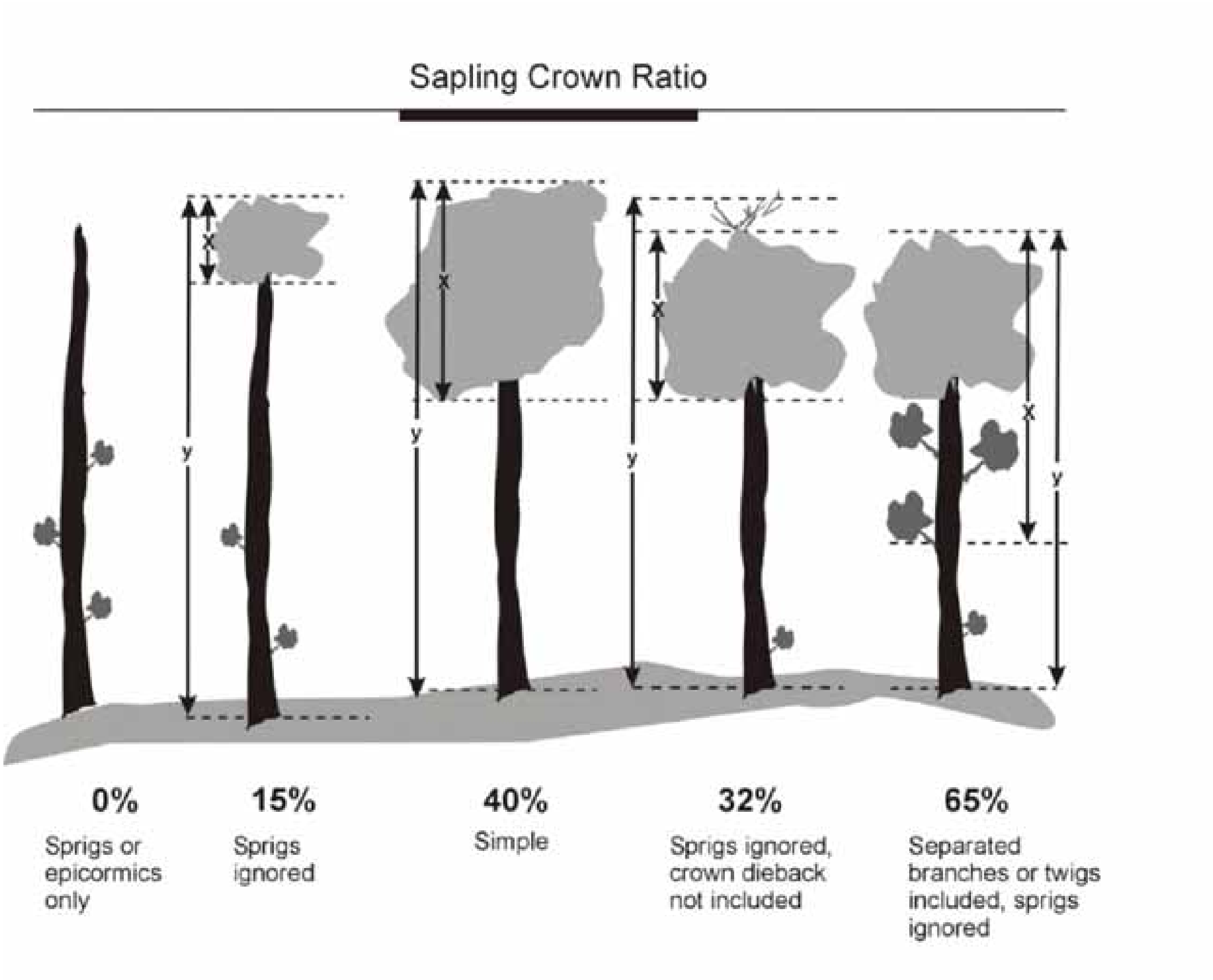


Figure 7.34: Sapling ratio determination examples.

When Collected:	Live tally trees ≥ 1.0 in DBH/DRC when MOTHER TREE # = null or when MOTHER TREE # = URBAN TREE RECORD NUMBER #
Field width:	2 digits
Tolerance:	+/- 10%
MQO:	At least 90% of the time
Values:	00 to 99 percent

Item 7.1.4.14 CROWN DIAMETER WIDE (CORE 5.18.1U)

Live crown width estimated at the widest point. Record measurement to nearest 1 ft. Dead trees always have a crown DIAMETER WIDE width of 0. If tree is downed or leaning, take width measurements perpendicular to tree bole. Exclude abnormally long branches that protrude from the general crown shape.

When trees have an associated Mother Tree only one CROWN DIAMETER WIDE measurement will be taken for all trees with the same MOTHER TREE NUMBER (aka- "unit" or "Mother Tree unit"). In these cases measure the widest point across the crowns of all live boles, forks and branches of the unit (all trees with the same Mother Tree Number including any boles/forks supported by the same stump that were not tallied). Exclude abnormally long branches that protrude from the general crown shape of the Mother Tree Unit. This measurement will be recorded in the CROWN DIAMETER WIDE field of the Mother Tree.

When Collected:	Live tally trees ≥ 1.0 in DBH/DRC when Mother Tree # = null or MOTHER TREE # = URBAN TREE RECORD NUMBER
Field width:	3 digits (xxx)
Tolerance:	+/- 5 feet
MQO:	At least 90% of the time
Values:	000 to 999

Item 7.1.4.15 CROWN DIAMETER 90 DEGREES (CORE 5.18.2U)

Live crown width estimated of the widest point along the axis running perpendicular to CROWN DIAMETER WIDE measurement. Record measurement to nearest 1 ft. Dead trees always have a CROWN DIAMETER 90 DEGREES of 0. If tree is downed or leaning, take width measurements perpendicular to tree bole. Exclude abnormally long branches that protrude from the general crown shape.

When trees have an associated Mother Tree only one CROWN DIAMETER 90 DEGREES measurement will be taken for all trees with the same MOTHER TREE NUMBER (aka- "unit" or "Mother Tree unit"). In these cases measure the widest point along the axis running perpendicular to the CROWN DIAMETER WIDE measurement across the crowns of all live boles, forks and branches of the unit (all trees with the same Mother Tree Number including any boles/forks supported by the same stump that were not tallied). Exclude abnormally long branches that protrude from the general crown shape of the Mother Tree Unit. This measurement will be recorded in the CROWN DIAMETER 90 DEGREES field of the Mother Tree.

When Collected:	Live tally trees ≥ 1.0 in DBH/DRC when MOTHER TREE # = null or MOTHER TREE # = URBAN TREE RECORD NUMBER
Field width:	3 digits (xxx)
Tolerance:	+/- 5 feet
MQO:	At least 90% of the time
Values:	000 to 999

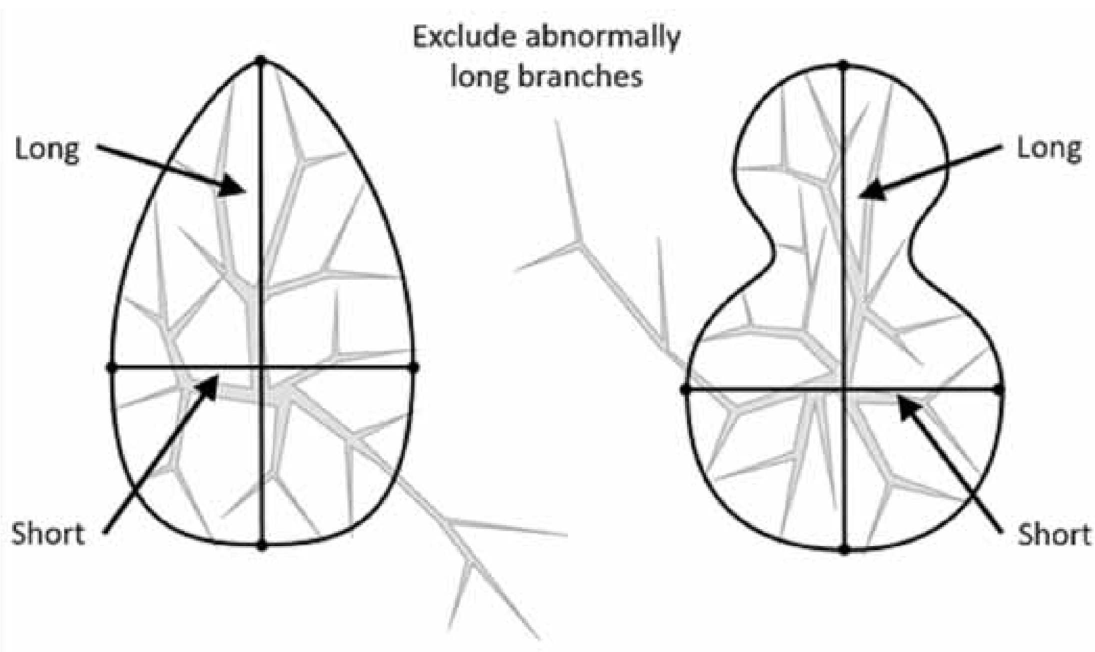


Figure 7.35: Examples of where to measure crown diameter widths. The “long” axis is the CROWN DIAMETER WIDE measurement; the “short” axis is the CROWN DIAMETER 90 DEGREES measurement.

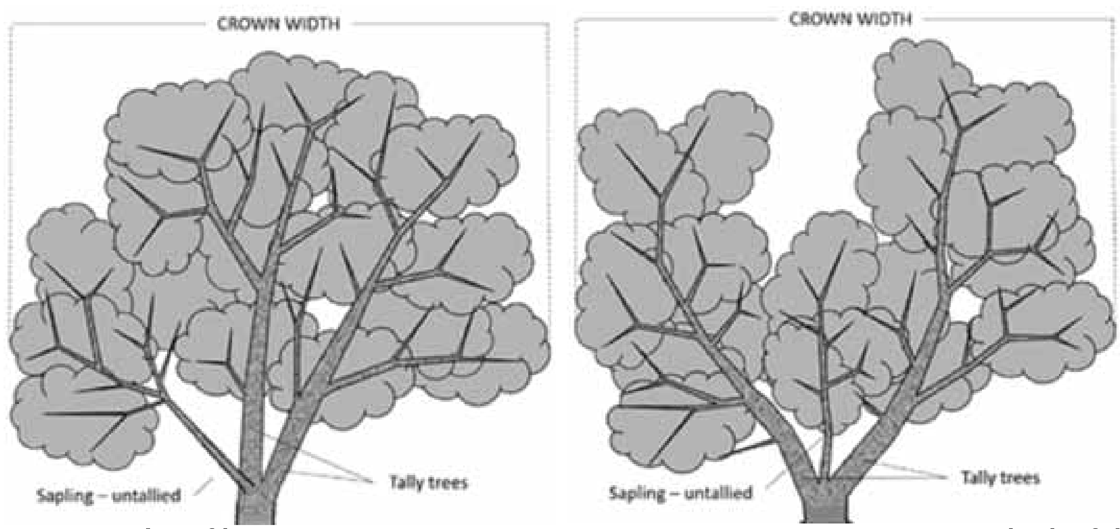


Figure 7.36: Examples of how to measure MOTHER TREE CROWN DIAMETER WIDE. In both of these examples the piths join in such a fashion that there is only one pith entering the ground.

Item 7.1.4.16 FOLIAGE ABSENT (CORE 5.18.3U)

The UFORE model uses crown length and width, modified by FOLIAGE ABSENT, to estimate leaf area. FOLIAGE ABSENT is an estimate of the percent foliage missing within the Foliage Absent Outline due to the following:

- Pruning
- CROWN DIEBACK (within the Foliage Absent Outline)
- Defoliation
- Dead or missing branches unrelated to internal shading
- Uneven or missing crown due to:
  - Competition from other vegetation or interference from man made structures
  - Gaps in the crown that are unrelated to the natural crown shape of a particular species

The Foliage Absent Outline is defined as a silhouette around the shape of the crown created by:

- Live Crown width
- ACTUAL LENGTH
- Base of the UNCOMPACTED LIVE CROWN RATIO

The silhouette includes Dieback (within the Foliage Absent Outline), but excludes missing or removed tops and dead branches that extend beyond the live crown width. Visualize the crown area within the silhouette as being filled with leaves as if it were representative of a healthy tree in excellent condition. Thin or missing foliage due to "interior shading", a characteristic of conifers or other trees with dense foliage, is not considered FOLIAGE ABSENT.

Be sure to base the estimate on the existing crown that is being evaluated. A third of the crown outside the Foliage Absent Outline may have been removed for power line clearance however, the crown that remains could have a 0% missing value, if the existing crown is full.

Dead branches in the interior or lower portion of the live crown area are assumed to have died from competition / shading.

Regardless of the age of pruning it will continue to affect FOLIAGE ABSENT up until the point at which the tree has replaced the gap that the initial pruning created within the Foliage Absent Outline.

Foliage from rogue branches that extend outside the Foliage Absent Outline (those not included in the crown width measurements) may be used to replace absent foliage within the outline.

When trees have an associated Mother Tree only one FOLIAGE ABSENT measurement will be taken for all trees with the same MOTHER TREE NUMBER (aka- "unit" or "Mother Tree unit"). In these cases the FOLIAGE ABSENT measurement will be determined using a single foliage absent outline drawn around the foliage of all boles, forks and branches of the Mother Tree Unit (all trees with the same Mother Tree # including any boles/forks/branches supported by the same stump that were not tallied). The foliage absent outline will be determined using the CROWN WIDE and UNCOMPACTED CROWN measurements of the unit and the ACTUAL HEIGHT of the tallest portion (whether tallied or not) of the Mother Tree Unit. The measurement will then be recorded in the FOLIAGE ABSENT field of the Mother Tree.

At times, after a sudden release or some type of damage, a tree may have very dense foliage present, yet by definition have no crown present (due to foliage that is limited to epicormics or sprigs). The following combination of codes is valid for trees with no crowns present.

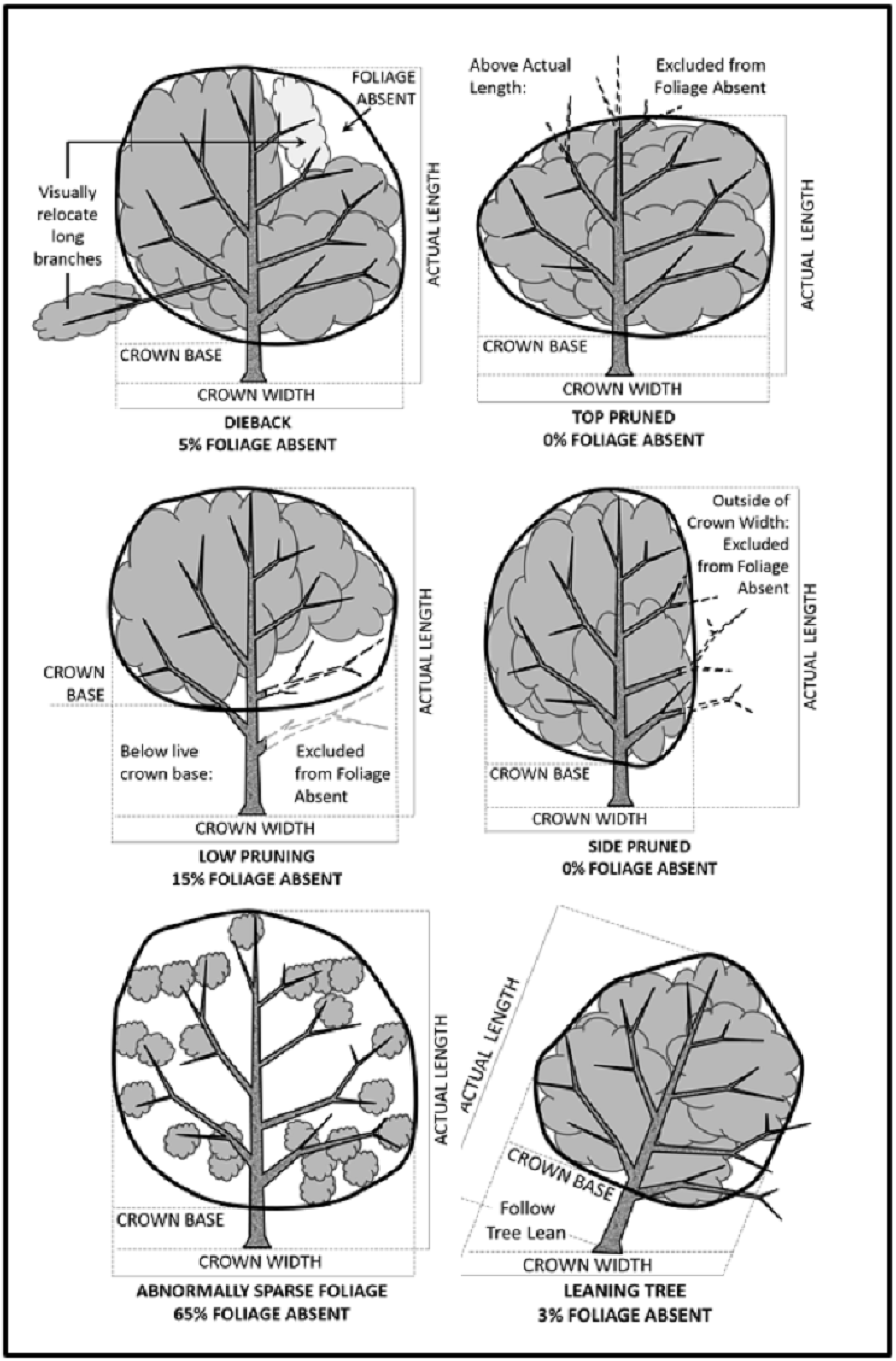
UNCOMPACTED LIVE CROWN RATIO =00

CROWN LIGHT EXPOSURE = 0

CROWN DIEBACK = 99

FOLIAGE ABSENT= 99

When Collected:	Live trees ≥1.0 in DBH/DRC when MOTHER TREE # = null or MOTHER TREE # = URBAN TREE RECORD NUMBER
Field width:	2 digits
Tolerance:	+/- 10%
MQO:	At least 80% of the time
Values:	00 to 99



FOLIAGE ABSENT
Visually relocate long branches
ACTUAL LENGTH
CROWN BASE
CROWN WIDTH
DIEBACK
5% FOLIAGE ABSENT
Above Actual Length:
Excluded from Foliage Absent
ACTUAL LENGTH
CROWN BASE
CROWN WIDTH
TOP PRUNED
0% FOLIAGE ABSENT
CROWN BASE
ACTUAL LENGTH
Below live crown base:
Excluded from Foliage Absent
CROWN WIDTH
LOW PRUNING
15% FOLIAGE ABSENT
Outside of Crown Width: Excluded from Foliage Absent
ACTUAL LENGTH
CROWN BASE
CROWN WIDTH
SIDE PRUNED
0% FOLIAGE ABSENT
ACTUAL LENGTH
CROWN BASE
CROWN WIDTH
ABNORMALLY SPARSE FOLIAGE
65% FOLIAGE ABSENT
ACTUAL LENGTH
CROWN BASE
Follow Tree Lean
CROWN WIDTH
LEANING TREE
3% FOLIAGE ABSENT

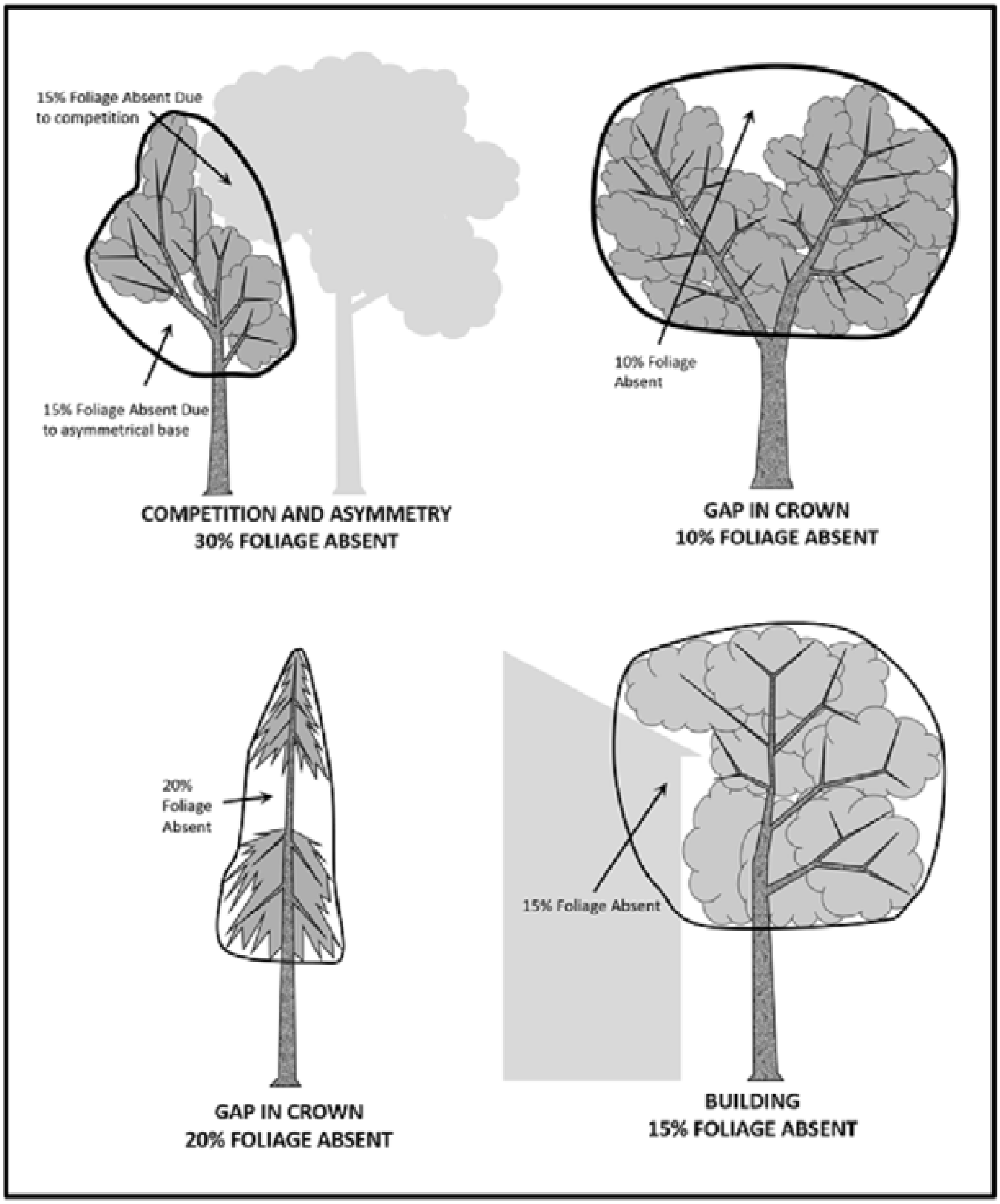


Figure 7.37: FOLIAGE ABSENT examples.

Figure 7.38: Defoliation: Foliage Absent = 99% based upon what foliage could have been within the Foliage Absent Outline without the current defoliation.

Figure 7.39: Dieback: Foliage Absent = 90%. The Foliage Absent Outline includes Dieback.

Figure 7.40: Tops pruned: Foliage Absent = 60%. The Foliage Absent Outline excludes missing or removed tops. Rate the crown based only on the area within the outline. In this case most of the foliage in the foreground is missing, as well as some in the upper part of the backside of the tree.

Figure 7.41: Dieback: FOLIAGE ABSENT = 70%. The Foliage Absent Outline includes Dieback. In this example the tree in the center of the photograph is being evaluated.

Figure 7.42: Needle mortality (aphids): FOLIAGE ABSENT = 99% based on what could have been within the Foliage Absent Outline had it not been for the needle mortality. This example assumes there are some live needles still present.

Figure 7.43: Utility Pruning: FOLIAGE ABSENT = 25%. Vertical and horizontal arrows show one width measurement and the height measure. The diagonal arrow within the outline indicates foliage absent.

Figure 7.44: Pruning: Foliage Absent = 5% each for the first two hardwoods in the picture. In addition to excluding missing tops the Foliage Absent Outline excludes portions of the exterior of the crown that have been removed and only includes the portion of the crown that is still present. In this example, utility pruning reduced the size of the crown width.

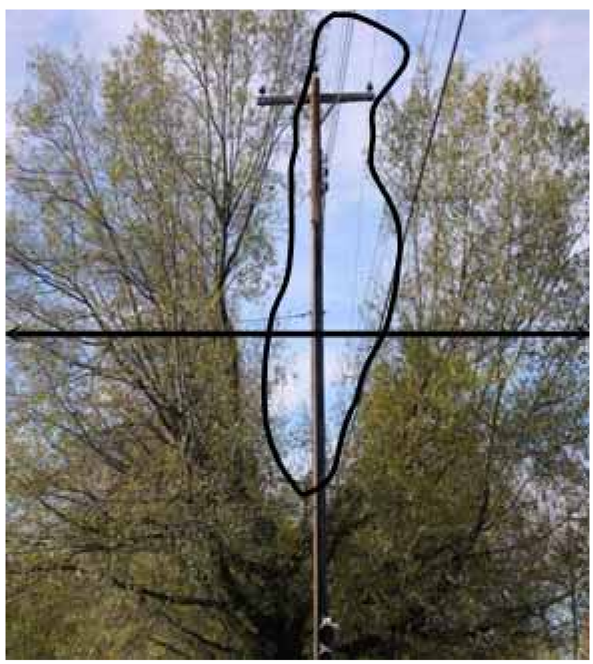


Figure 7.45: Utility pruning: FOLIAGE ABSENT = 20%. The Foliage Absent Outline includes the entire width of the crown present as depicted by the arrow. Interior pruning for the utility lines in this picture has created a void within the width of the crown shown in the outlined area.

Item 7.1.4.17 COMPACTED CROWN RATIO (CORE 5.19)

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. 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 situation. For example, if tree branches tend to average 2 feet between whorls, do not compact crowns any tighter than the 2-foot spacing (Figure 7.46). Figure 7.47 shows an example of COMPACTED CROWN RATIO on a leaning tree.

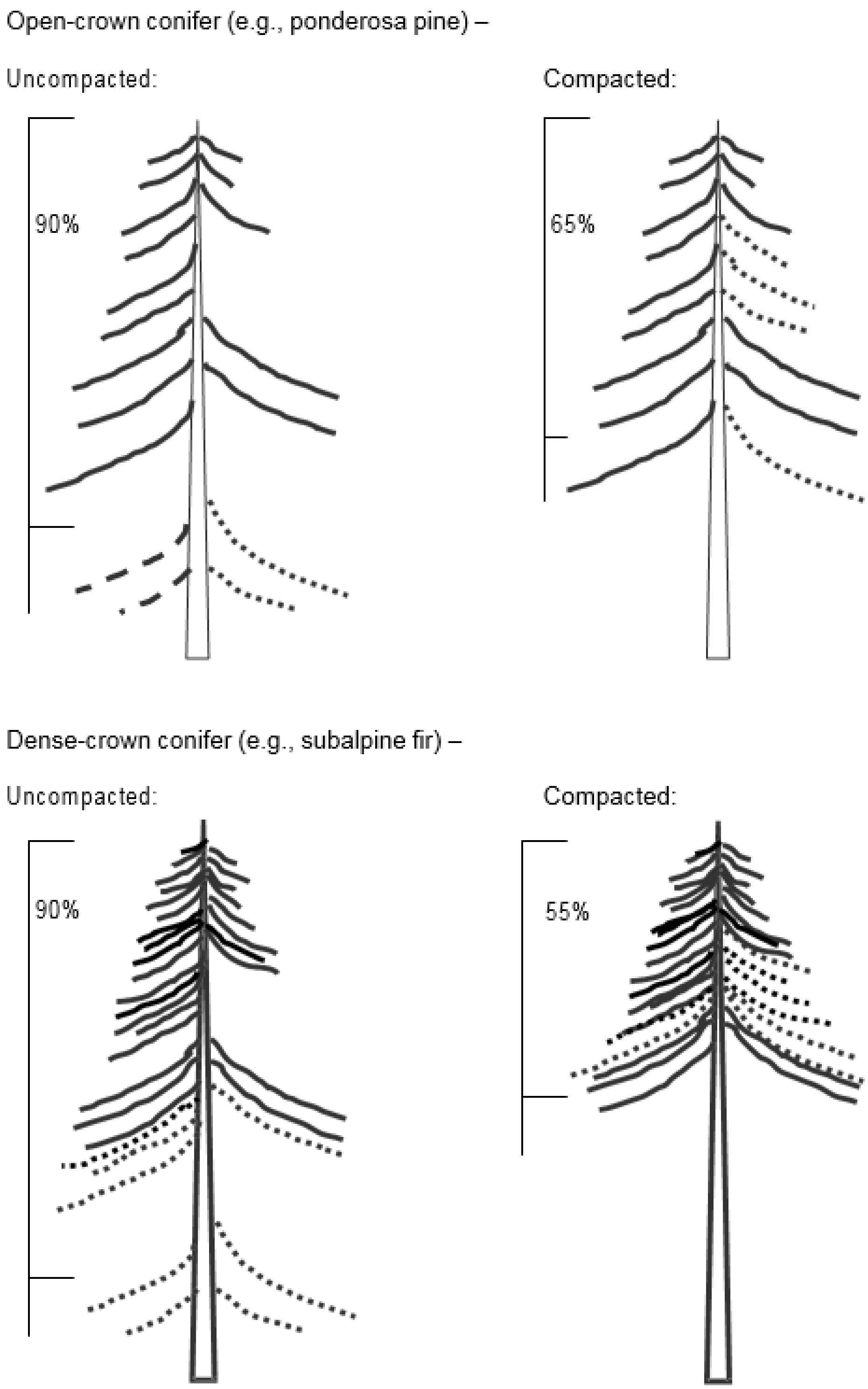


Figure 7.46: Examples of and comparison between COMPACTED CROWN RATIO and UNCOMPACTED LIVE CROWN RATIO of conifers.

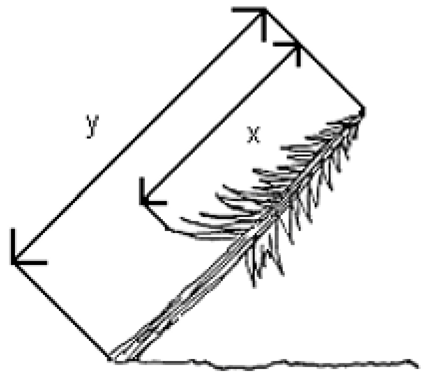


Figure 7.47: COMPACTED CROWN RATIO on a leaning tree. CROWN RATIO =(x/y)100.

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 (Figure 7.48).

When Collected:	All live tally trees ≥ 1.0 in DBH/DRC
Field width:	2 digits
Tolerance:	+/- 10 %
MQO:	At least 80% of the time
Values:	00 to 99

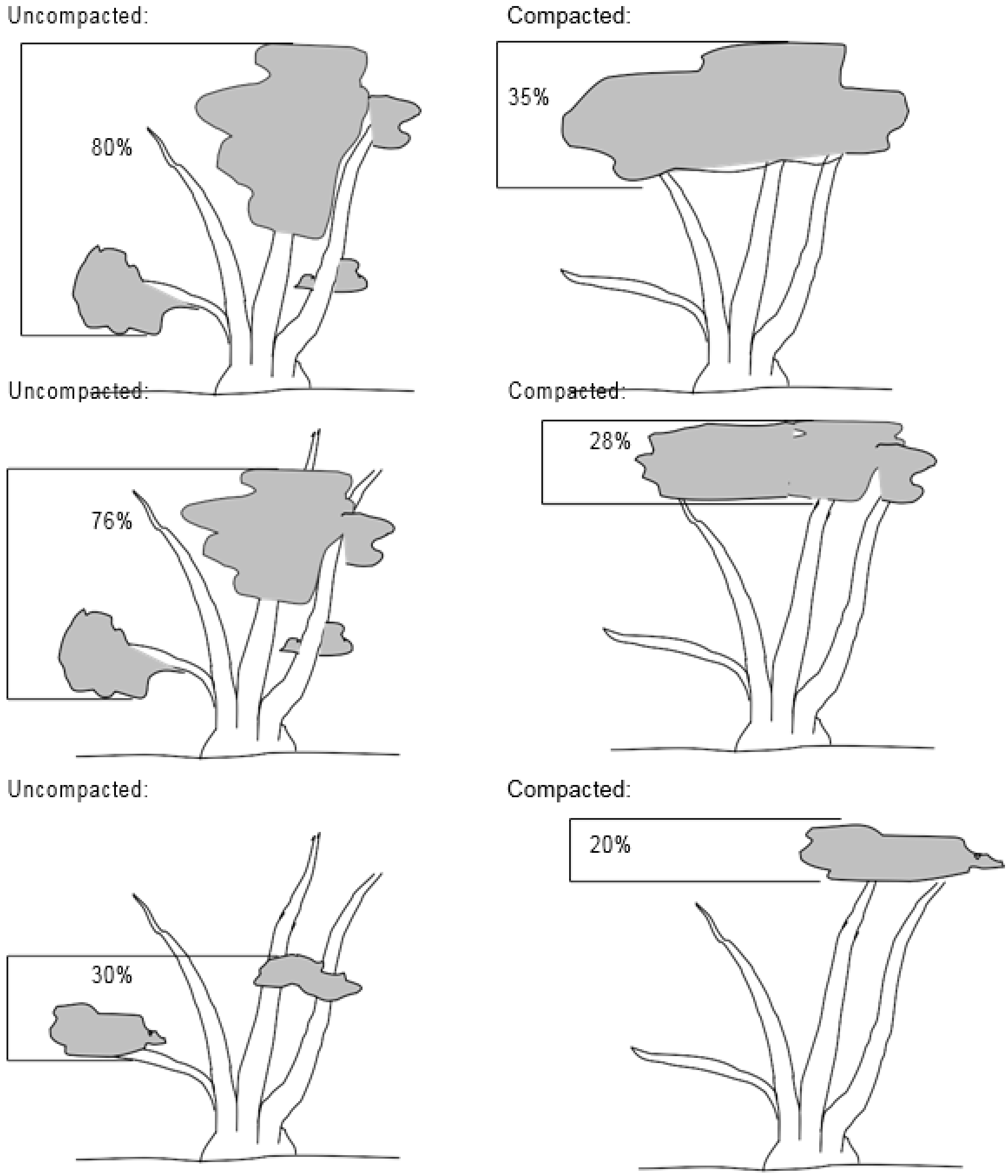


Figure 7.48: Examples of and comparison between COMPACTED CROWN RATIO and UNCOMPACTED LIVE CROWN RATIO of woodland species.

SECTION 7.2 CROWNS OVERVIEW

Crown indicators are designed to be used together. Each indicator comprises a piece of information that can be used individually or as a factor in combination with other indicators. Each variable, alone or in combination with others, adds to the overall rating given each tree. It is important to realize that models are designed to rate trees on how they look, from thriving to almost dead and to help predict future conditions of trees and forest ecosystems.

UNCOMPACTED LIVE CROWN RATIO, CROWN LIGHT EXPOSURE, and CROWN DIEBACK are determined for each sapling. All sapling measurements are done during plot establishment and whenever plot remeasurement occurs.

Crown evaluations, including UNCOMPACTED LIVE CROWN RATIO, CROWN LIGHT EXPOSURE, and CROWN DIEBACK are made on all trees with DBH/DRC 5.0 inches or larger. Crown evaluations allow for the quantitative assessment of current tree conditions and provide an integrated measure of site conditions, stand density and influence of external stresses. All crown measurements are taken during plot establishment and whenever plot remeasurement occurs.

Two persons make all crown measurements. Individuals should be ½ to 1 tree length from the base of the tree to obtain a good view of the crown. Move away from each other at least 10 feet to take these measurements. A position of 90 degrees to each other from the tree base is ideal (Figure 7.50). When estimates made by two individuals disagree, they should discuss the reasons for their ratings until an agreement is reached, or use the methods below to resolve the situation.

If the numbers for a crown measurement estimated by two crew members do not match, arrive at the final value by: (1) taking an average, if the numbers differ by 10 percent (2 classes) or less; (2) changing positions, if the numbers differ by 15 percent or more and attempting to narrow the range to 10 percent or less if crew members cannot agree; or (3) averaging the two estimates for those trees that actually have different ratings from the two viewing areas (ratings of 30 and 70 would be recorded as 50).

There may be cases where in is not possible to have two persons on the site; in these situations it is recommended that the person rating the crowns does so from two separate vantage points in order to get the same perspective as a two person crew would have.

SUBSECTION 7.2.1 CROWN DEFINITIONS

Crown Shape: Crown shape is the silhouette of a tree, drawn from branch tip to branch tip, which contains all of a tree's foliage as it grows in a stand. Exclude abnormally long branches beyond the edge of the crown for this silhouette. Normally, silhouettes are derived from vigorous, open grown trees and tend to be species-specific. For Phase 3 purposes, silhouettes vary with age and spacing. Tree crowns tend to flatten out with age and be more slender when growing in crowded conditions. Crown shape is used as an outline for the sides of the tree.

Crown Top: The crown top is the highest point of a standing tree. Young trees usually have more conical-shaped crowns and the main terminal is the top. Older trees and many hardwoods have globose and flat-topped crowns, where a lateral branch is the highest point. For some measurements the highest live foliage is considered the live crown top. Other measurements include a dead top. Some crown measurements assess how much of the expected crown is present and include broken or missing tops.

Dieback: This is recent mortality of branches with fine twigs, which begins at the terminal portion of a branch and proceeds toward the trunk. Dieback is only considered when it occurs in the upper and outer portions of the tree. When whole branches are dead in the upper crown, without obvious signs of damage such as breaks or animal injury, assume that the branches died from the terminal portion of the branch. Dead branches in the lower portion of the live crown are assumed to have died from competition and shading. Dead branches in the lower live crown are not considered as part of crown dieback, unless there is continuous dieback from the upper and outer crown down to those branches.

Epicormic: Shoot growth, from latent or suppressed buds, that arises from old branches, from the trunk or near large branch wounds or breaks. Epicormics remain epicormics until they regain the size of previous branches for trees with no branches 1.0 inch or larger in diameter at the baseabove the swelling. For trees that had 1.0 inch or larger branches when the epicormics formed, epicormics become branches once they reach 1.0 inch in diameter.

Live Branch: A live branch is any woody lateral growth supporting foliage, and is 1.0 inch or larger in diameter at the base above the swelling where it joins a main stem or larger branch. Small trees or certain tree species greater than 5.0 inches DBH/DRC may have only live twigs which have not yet reached 1.0 inch or larger at the point of attachment. If the death of larger branches is not the cause of these twigs, the twigs are considered branches for these smaller branched trees until the tree matures to a point where twigs have attained 1.0 inch or larger in diameter at the base above the swelling where it joins a main stem or larger branch.

Live Crown Base: The live crown base is an imaginary horizontal line drawn across the trunk from the bottom of the lowest live foliage of the "obvious live crown" for trees and from the lowest live foliage of the lowest twig for saplings. The "obvious live crown" is described as the point on the tree where most live branches/twigs above that point are continuous and typical for a tree species (and/or tree size) on a particular site. Include most crown branches/twigs, but exclude epicormic twigs/sprigs and straggler branches that usually do not contribute much to the tree's growth. The base of the live branch/twig bearing the lowest foliage may be above or below this line.

For trees 5.0 inches DBH/DRC or greater, if any live branch is within 5 feet below this "obvious live crown" line, a new horizontal line is established. Create the new line at the base of live foliage on that branch. Continue this evaluation process until no live branches are found within 5 feet of the foliage of the lowest qualifying branch (Figure 7.49).

Occasionally, all original major crown branches/twigs are dead or broken and many new twigs/sprigs develop. These situations are likely to occur in areas of heavy thinning, commercial clearcuts and severe weather damage:

- Trees that had an "obvious live crown" with live branches now have no crown to measure until the new live twigs become live branches. When these new live branches appear, draw the new live crown base to the live foliage of the lowest live branch that now meets the 5-foot rule.
- Saplings and small trees that had only live twigs should establish the crown base at the base of the live foliage on the new lowest live twig. If no live twigs are present, there is no crown to measure.

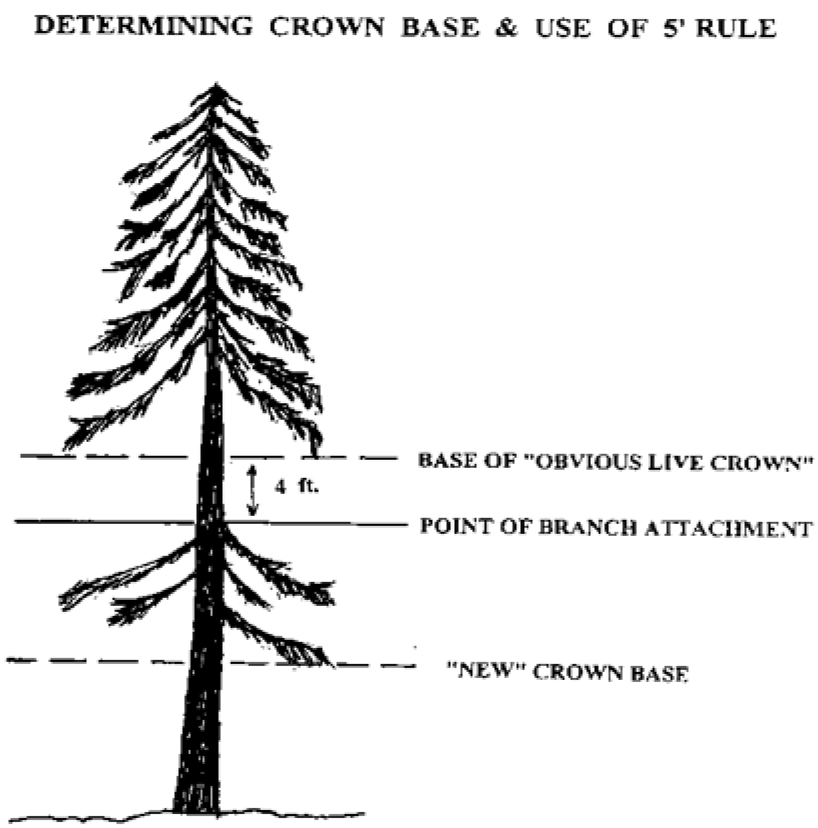


Figure 7.49: Determining the base of the live crown.

Overstory Canopy Zone: The area delineated by the average live crown height determined from the UNCOMPACTED LIVE CROWN RATIO of overstory trees. The bottom of the overstory canopy zone is the average height of the live crown bases. The top of the zone is the average height for the live crown tops.

Snag Branch: A dead upper crown branch without twigs or sprigs attached to it. A lower branch on woodland trees such as juniper is not considered a snag branch unless the branch reaches into the upper crown, or reached into the upper crown when the branch was alive. A branch that died due to shading in any crown is not a snag branch.

Sprig: Any woody or non-woody lateral growth, without secondary branching, less than 1.0 inch in diameter at the base above the swelling at the point of attachment to a branch or crown stem.

Twig: Any woody lateral growth, with secondary branching, less than 1.0 inch in diameter at the base above the swelling at the point of attachment to a branch or crown stem.

SUBSECTION 7.2.2 CROWN RATING PRECAUTIONS

Crews must be especially careful when making evaluations, and pay special attention to certain factors that may affect measurements in the field. These factors include:

- Distance and slope from the tree
- View of the crown
- Climatic conditions
- Heavy defoliation
- Leaning trees
- Trees with no “crown” by definition

Distance and slope from the tree: Crews must attempt to stay at least 1/2 to 1 tree length from the tree being evaluated. Some ratings change with proximity to the tree. In some situations, it is impossible to satisfy this step, but the crew should do the best it can in each case. All evaluations are made at grade (same elevation as base of the tree) or up slope from the tree. This may not be possible in all cases but evaluating trees from the down slope side should be avoided.

View of the crown: Crew members should evaluate trees when standing at an angle to each other, striving to obtain the best view of the crown. The ideal positions are at 90 degrees to each other on flat terrain (Figure 7.50). If possible, never evaluate the tree from the same position or at 180 degrees. In a thick canopy forest, getting a good perspective of the crown becomes difficult. Overlapping branches, background trees and lack of a good viewing area can cause problems when rating some trees. Crews need to move laterally to search for a good view. Take special care when rating such trees.

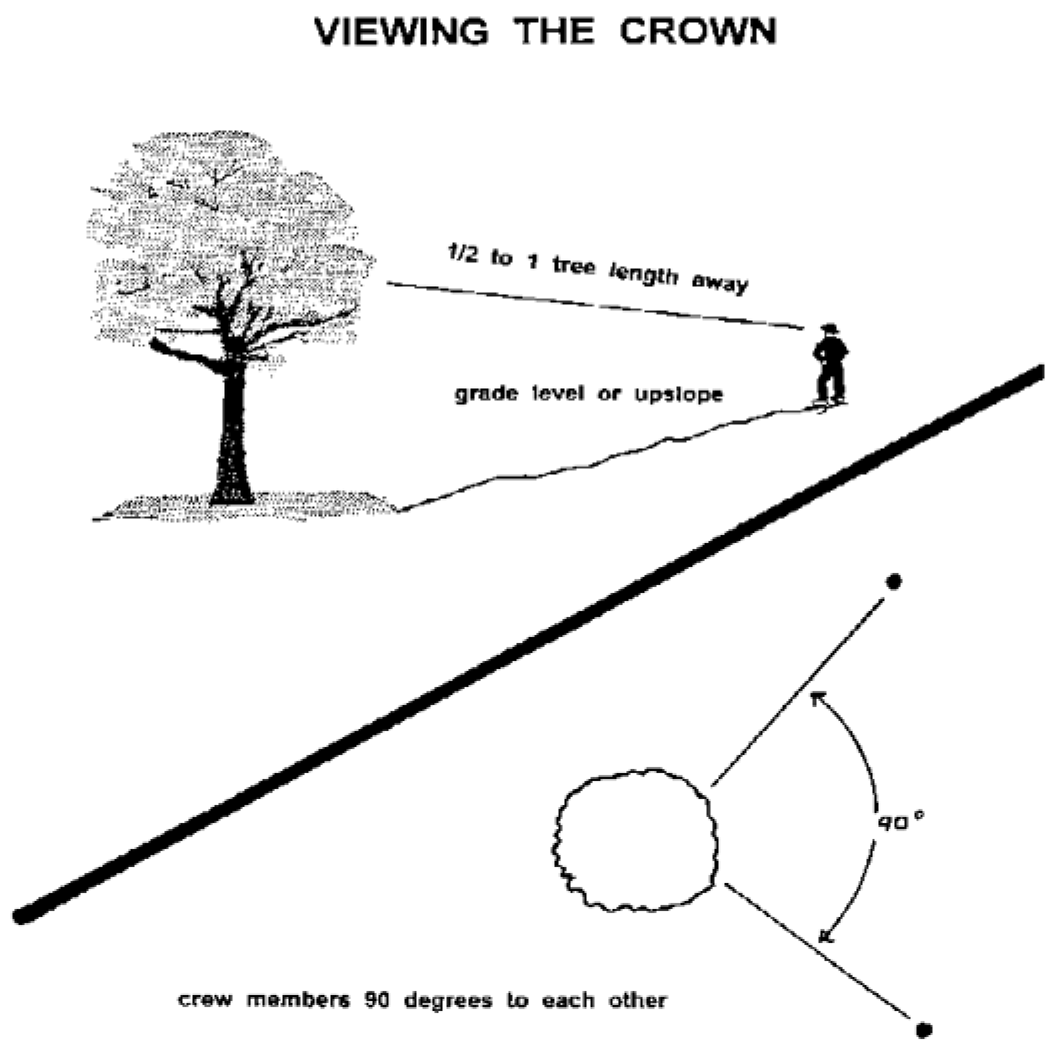


Figure 7.50: Crew positions for viewing crowns.

Climatic conditions: Cloudy or overcast skies, fog, rain and poor sun angles may affect the accuracy of crown estimates. Crews need to be especially careful during poor lighting conditions to obtain the best possible view of the crown for the given climate conditions.

Heavy defoliation: During heavy defoliation, CROWN DIEBACK may be overestimated. The use of binoculars may help in separating dead twigs from defoliated twigs.

Leaning trees: So that crown dimensions are measured consistently on both leaning and upright trees, UNCOMPACTED LIVE CROWN RATIO for leaning and down trees must be rated in relation to the actual length of the tree bole (as opposed to height above the ground). Place a note in the PDR TREE NOTES field that the tree is leaning if it is leaning more than 45 degrees from vertical.

Trees with no “crown” by definition (epicormics or sprigs only): After a sudden release or damage, a tree may have very dense foliage, but no crown. The following combination of codes is a flag for trees with no crowns:

UNCOMPACTED LIVE CROWN RATIO = 00

CROWN LIGHT EXPOSURE = 0

CROWN DIEBACK = 99

After a sudden release or damage, a sapling may have very dense foliage, but no crown as it only has sprigs. The following combination of codes is a flag for saplings with no crowns:

UNCOMPACTED LIVE CROWN RATIO = 00

CROWN LIGHT EXPOSURE = 0

Item 7.2.2.1 CROWN LIGHT EXPOSURE (CORE 23.6)

As illustrated in Figure 7.51, visually divide the crown vertically into four equal quarters (25 percent of the crown circumference.) Rate the UNCOMPACTED LIVE CROWN RATIO for each quarter separately using the criteria for estimating total UNCOMPACTED LIVE CROWN RATIO. In order for an individual quarter to be tallied, that quarter must have an uncompacted live crown ratio of at least 35 percent. Additionally for a quarter to be counted as receiving full light, a continuous portion of live crown (at least 35 percent of the actual tree length) would be completely exposed to direct light if the sun were directly above the tree. Try to divide the crown in such a way that as many quarters as possible receive full light. Count the number of quarters that qualify as receiving full light. Add one if the tree receives direct light from the top.

When trees have an associated mother tree only one CROWN LIGHT EXPOSURE measurement will be taken for all trees with the same Mother Tree Number (aka "unit" or "Mother Tree Unit"). In these cases the CROWN LIGHT EXPOSURE measurement will be determined using the crowns of all boles, forks and branches as a single unit (including any boles/forks/branches supported by the same stump that were not tallied) and recorded in the CROWN LIGHT EXPOSURE field of the Mother Tree.

For this measurement, crown shape cannot result in a tree shading itself (e.g., umbrella-shaped trees). Buildings can shade a tree. Dead tops of a live tree can not shade a tree regardless of whether the highest vertical live foliage is part of a recovered top or not. For down trees or trees with severe lean, do not count any quarters that face the ground.

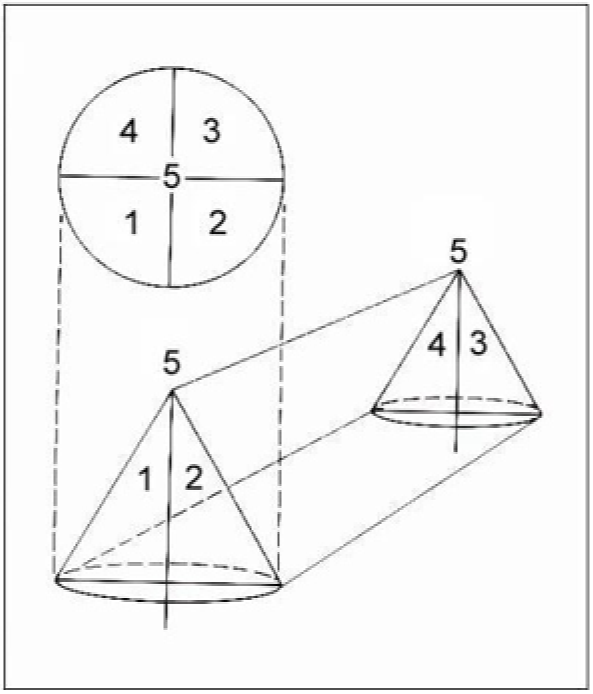


Figure 7.51: Dividing the crown.

Note: A sliver of a quarter receiving light does not qualify (Figure 7.52). Trees with all quarters having less than a 35 percent UNCOMPACTED LIVE CROWN RATIO can have a maximum crown exposure of one. Individual quarters with less than 35 percent UNCOMPACTED LIVE CROWN RATIO should not be counted (Figure 7.52).

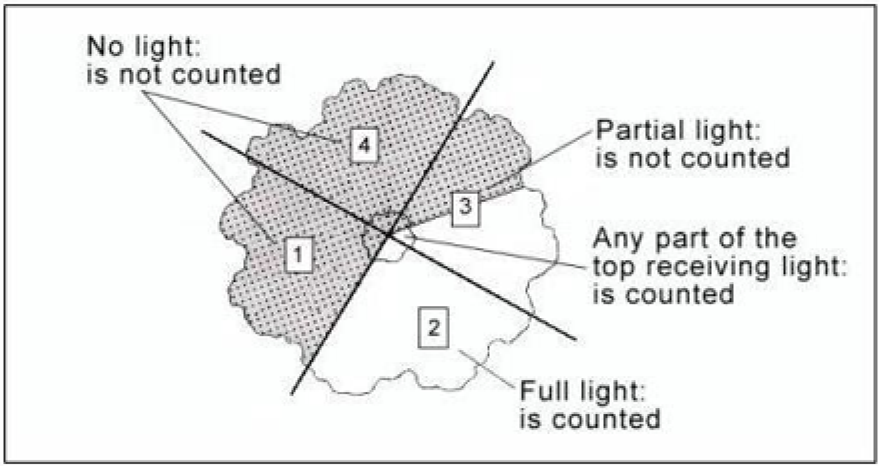


Figure 7.52: Crown light exposure. Some trees have a small pointy top, like the tree shown here. Others might have a broad top, like an oak. When evaluating broad tops determine the location where TOTAL LENGTH would be measured to. The width of the crown at that location would then be evaluated for receiving light; everything below that width would be considered part of the sides.

When Collected:	:Live trees ≥ 1.0 in DBH/DRC when MOTHER TREE # = null or MOTHER TREE # = URBAN TREE RECORD NUMBER	
Field width:	1 digit	
Tolerance:	within 1 if > 0	
MQO:	At least 85% of the time	
Values:	0	The tree/Mother Tree unit receives no full light because it is shaded by trees, vines, or other vegetation; the tree has no crown by definition.
	1	The tree/Mother Tree unit receives full light from the top or 1 quarter.
	2	The tree/Mother Tree unit receives full light from the top and 1 quarter (or 2 quarters without the top).
	3	The tree/Mother Tree unit receives full light from the top and 2 quarters (or 3 quarters without the top).
	4	The tree/Mother Tree unit receives full light from the top and 3 quarters.
	5	The tree/Mother Tree unit receives full light from the top and 4 quarters.

Item 7.2.2.2 CROWN DIEBACK (CORE 23.10+U)

CROWN DIEBACK estimates reflect the severity of recent stresses on a tree. Estimate CROWN DIEBACK as a percentage of the live crown area, including the dieback area. The crown base should be the same as that used for the UNCOMPACTED LIVE CROWN RATIO estimate.

Assume the perimeter of the crown is a two-dimensional outline from branch-tip to branch-tip, excluding snag branches and large holes or gaps in the crown (Figure 7.53 and Figure 7.54). Code FOLIAGE ABSENT when CROWN DIEBACK is >0.

Project a two-dimensional crown outline, block in the dieback and estimate the dieback area. When two individuals disagree with their estimates, follow the guidelines listed at the end of Section 7.2 Crowns Overview. The estimate is placed into one of 21 percentage classes.

When trees have an associated mother tree only one CROWN DIEBACK measurement will be taken for all trees with the same MOTHER TREE NUMBER (aka "unit" or "Mother Tree Unit"). In these cases the CROWN DIEBACK measurement will be determined using the crowns of all boles, forks and branches (including any boles/forks supported by the same stump that were not tallied) as a single unit and recorded in the CROWN DIEBACK field of the Mother Tree.

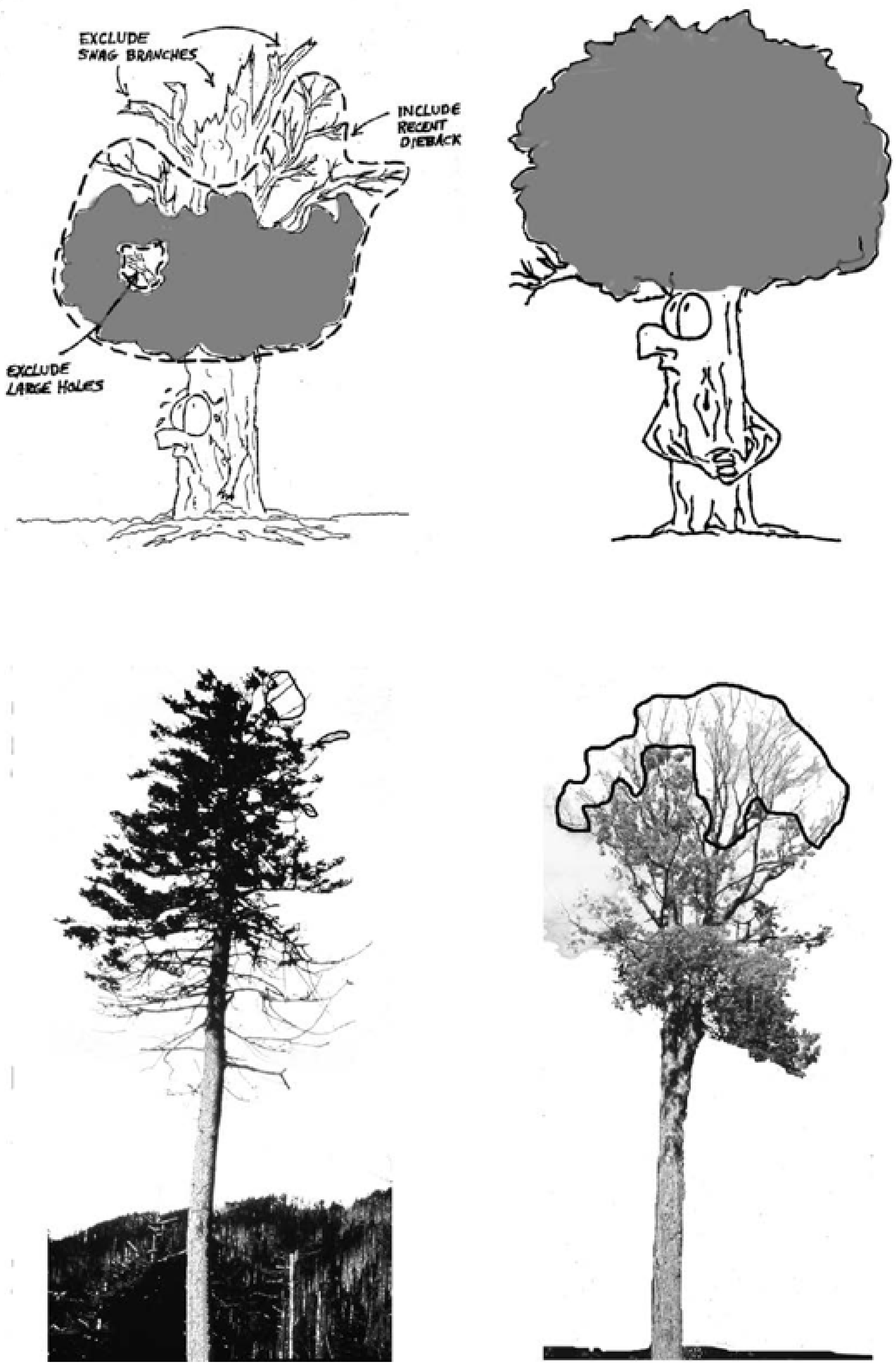


Figure 7.53: CROWN DIEBACK rating outline examples.

Figure 7.54: Dieback outline and rating examples.

When Collected:	Live trees ≥ 1.0 in DBH/DRC when MOTHER TREE # = null or MOTHER TREE # = URBAN TREE RECORD NUMBER					
Field width:	digits					
Tolerance:	+/- 10% (2 classes)					
MQO:	At least 90% of the time					
Values:	00	0%	35	31-35%	70	66-70%
	05	1-5%	40	36-40%	75	71-75%
	10	6-10%	45	41-45%	80	76-80%
	15	11-15%	50	46-50%	85	81-85%
	20	16-20%	55	51-55%	90	86-90%
	25	21-25%	60	56-60%	95	91-95%

Note: Class code is the percentage of the upper limits of the class, i.e., Code 10 is 6% to 10%, etc.

SECTION 7.3 URBAN 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.

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 F 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 F may be used instead of the general codes listed under URBAN DAMAGE AGENT 1. Any damage code in Appendix F may be used for URBAN DAMAGE AGENT 1, URBAN DAMAGE AGENT 2, or URBAN DAMAGE AGENT 3. URBAN DAMAGE AGENT 1, 2, 3 are assigned at the Stem level NOT the Mother Tree Unit level.

Item 7.3.0.1 URBAN DAMAGE AGENT 1 (CORE 5.20.1+U)

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 7.3 as a guide (i.e., agents threatening survival are more important than agents that reduce wood quality). Specific agents within the general categories, if required by your Region, are listed in Appendix F, along with their associated thresholds. These codes can be collapsed into the national CORE general codes. Note: in some cases, thresholds for specific agents may be different from the threshold for the corresponding general agent. If a region is collecting a specific insect agent and no one is collecting the general agent, then the specific insect agent is collapsed into the general insect category 10000.

When Collected:	URBAN FIA: All live tally trees ≥ 1.0 in DBH/DRC
Field width:	5 digits
Tolerance:	No errors
MQO:	Will be established following blind audit results
Values:	Appendix F

General Agent Damage Codes, Damage Thresholds, and Descriptions. Specific agent codes are in Appendix F.

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.

Code	General Agent	Damage Threshold*	Descriptions
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		
Note: this is only collected by IW and SRS.	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.

Code	General Agent	Damage Threshold*	Descriptions
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.

Code	General Agent	Damage Threshold*	Descriptions
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).

Code	General Agent	Damage Threshold*	Descriptions
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 7.3.0.2 URBAN DAMAGE AGENT 2 (CORE 5.20.2+U)

Follow procedures described for URBAN DAMAGE AGENT 1

When Collected:	URBAN FIA: All live tally trees ≥ 1.0 in DBH/DRC
Field width:	5 digits
Tolerance:	1 of 2 damages correct
MQO:	Will be established following blind audit results
Values:	See Item 7.3.0.1

Item 7.3.0.3 URBAN DAMAGE AGENT 3 (CORE 5.20.3+U)

Follow procedures described for URBAN DAMAGE AGENT 1

When Collected:	URBAN FIA: All live tally trees ≥ 1.0 in DBH/DRC
Field width:	5 digits
Tolerance:	2 of 3 damages correct
MQO:	Will be established following blind audit results
Values:	See Item 7.3.0.1

SUBSECTION 7.3.1 URBAN SPECIFIC DAMAGE VARIABLES

For the urban forest inventory, there is the need to know of the presence of the seven urban specific damages described in detail below. Record the presence of up to all seven of these damages on each live tally tree 1 inch DBH/DRC. Be sure that any urban specific damages coded meet the thresholds noted within the description of that damage. Urban specific damages are applied at the Stem level NOT the Mother Tree Unit level. If a damage, such as bark inclusion, occurs between two stems record the damage on both stems.

Item 7.3.1.1 URBAN SPECIFIC DAMAGE VARIABLE 1 (CORE 5.20.4U)

Inspect the tree for each of the urban specific damages listed below. If one or more of the damages is present on the tree and meets the severity threshold requirement listed within the description, enter the value that corresponds to one of the urban specific damages present.

When Collected:	All live tally trees ≥ 1 inches DBH/DRC	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 80% of the time	
Values:	0	No urban specific damage present
	1	Stem Girdling
	2	Bark Inclusion
	3	Severe Topping or Poor Pruning
	4	Excessive Mulch
	5	Conflict with Roots
	6	Conflict with Tree Crown
	7	Improper Planting

Item 7.3.1.2 URBAN SPECIFIC DAMAGE VARIABLE 2 (CORE 5.20.5U)

Follow procedures described for URBAN SPECIFIC DAMAGE VARIABLE 1.

When Collected:	All live tally trees ≥ 1 inch DBH/DRC when URBAN SPECIFIC DAMAGE VARIABLE 1 > 0
Field width:	1 digit
Tolerance:	No errors
MQO:	At least 80% of the time
Values:	See Item 7.3.1.1

Item 7.3.1.3 URBAN SPECIFIC DAMAGE VARIABLE 3 (CORE 5.20.6U)

Follow procedures described for URBAN SPECIFIC DAMAGE VARIABLE 1.

When Collected:	All live tally trees ≥ 1 inch DBH/DRC when URBAN SPECIFIC DAMAGE VARIABLE 2 > 0
Field width:	1 digit
Tolerance:	No errors
MQO:	At least 80% of the time
Values:	See Item 7.3.1.1

Item 7.3.1.4 URBAN SPECIFIC DAMAGE VARIABLE 4 (CORE 5.20.7U)

Follow procedures described for URBAN SPECIFIC DAMAGE VARIABLE 1.

When Collected:	All live tally trees ≥ 1 inch DBH/DRC when URBAN SPECIFIC DAMAGE VARIABLE 3 > 0
Field width:	1 digit
Tolerance:	No errors
MQO:	At least 80% of the time
Values:	See Item 7.3.1.1

Item 7.3.1.5 URBAN SPECIFIC DAMAGE VARIABLE 5 (CORE 5.20.8U)

Follow procedures described for URBAN SPECIFIC DAMAGE VARIABLE 1.

When Collected:	All live tally trees ≥ 1 inch DBH/DRC when URBAN SPECIFIC DAMAGE VARIABLE 4 > 0
Field width:	1 digit
Tolerance:	No errors
MQO:	At least 80% of the time
Values:	See Item 7.3.1.1

Item 7.3.1.6 URBAN SPECIFIC DAMAGE VARIABLE 6 (CORE 5.20.9U)

Follow procedures described for URBAN SPECIFIC DAMAGE VARIABLE 1.

When Collected:	All live tally trees ≥ 1 inch DBH/DRC when URBAN SPECIFIC DAMAGE VARIABLE 5 > 0
Field width:	1 digit
Tolerance:	No errors
MQO:	At least 80% of the time
Values:	See Item 7.3.1.1

Item 7.3.1.7 URBAN SPECIFIC DAMAGE VARIABLE 7 (CORE 5.20.10U)

Follow procedures described for URBAN SPECIFIC DAMAGE VARIABLE 1.

When Collected:	All live tally trees ≥ 1 inch DBH/DRC when URBAN SPECIFIC DAMAGE VARIABLE 6 > 0
Field width:	1 digit
Tolerance:	No errors
MQO:	At least 80% of the time
Values:	See Item 7.3.1.1

STEM GIRDLING

Description: Roots begin to grow around the main stem of the tree and cut off or restrict the movement of water, plant nutrients and stored food reserves. Certain trees are more prone to this problem than others. Lindens, magnolias, pines, and maples (other than the silver maple) are susceptible to root girdling. On the other hand, silver maple, oaks, ash, and elm are well known for their ability to form functional root grafts and are rarely adversely affected by girdling roots.

Location: Roots / Stump

Severity Threshold: 25% of circumference

Figure 7.55: The picture above illustrates a root crossing root, and is not considered a girdling root.

Figure 7.56: The pictures above illustrate a girdling root that is encircling the stem, though on the left, these girdling roots would probably not be apparent from above. The illustration on the right is the recordable damage. The photograph on the left shows below ground stem girdling.

BARK INCLUSION

Description: Weak branch unions are places where branches are not strongly attached to the tree. A weak union occurs when two or more branches grow so closely together that bark grows between the branches and inside the union. This ingrown, or included, bark does not have the structural strength of wood and the union can become very weak. The inside bark may also act as a wedge and force the branch union to split apart. Trees with a tendency to form upright branches, such as elm and maple, often produce weak branch unions. Focus on the V shaped appearance of the union as well signs of where the bark has folded in on itself. Both forks and branches are included in this variable. In cases where this union is formed between two tally trees record the damage on both.

Location: Consider the first 15 feet of the bole from ground level.

Severity Threshold: None

Figure 7.57: The photo above illustrates a strong branch union (left) and a weak branch union with the characteristic "V" branching pattern (right). Strong branch union vs. "V" notch. The branching pattern on the right is recordable because the two branches have grown closely together and contains included bark. Notice the easily identifiable branch bark ridge and "U" shape of the strong union of the left.

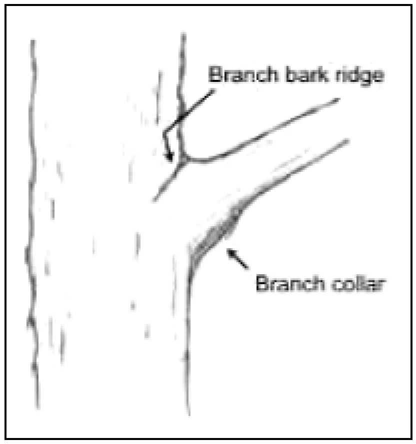


Figure 7.58: A strong branch union has a conspicuous branch bark ridge.

Figure 7.59: "V" Notch with included bark resulting in a split tree.

Figure 7.60: "V" Notch.

Figure 7.61: This is a "V" Notch and recordable. There is no branch bark ridge between the two branches.

Figure 7.62: Normal Branching: These branch unions are okay and are not considered a "V" branching pattern.

SEVERE TOPPING OR POOR PRUNING

Description: A tree is considered to have been severely topped when it has been reduced to a single "pole" due to severe over-pruning and branch removal. "Topping" is the cutting of branches to stubs, or, if 25% or more at the main stem has been cut to reduce tree height. Topping usually results in a profusion of shoots rendering the tree more susceptible to wind damage. Poor pruning techniques include leaving stubs outside the branch collar, or cutting into the branch collar. A tree with proper pruning may still maintain the look and shape of the tree, just shorter.

Location: Crown Stem or Branches

Severity Threshold: 25% or more of crown area

Figure 7.63: Topping.

Figure 7.64: Poor pruning.

Figure 7.65: Poor pruning.

Figure 7.66: An example of severe topping, showing the weakly attached sprouts regenerating from the cut limb.

Figure 7.67: Severe topping.

EXCESSIVE MULCH

Description: Root flare is not visible at base of trunk because of mulch. Mulch piled high around stem and mulch depth greater than 3 inches. Over mulching of landscape plants, sometimes to the extent of creating mountainous mulch "volcanoes," can result in disease or death of the tree. Mulch can take the form of many different materials and is not limited to wood chips. Over mulching can:

- promote excessive soil moisture and subsequent root rots
- cause inner bark tissue (phloem) death of aboveground stem flares
- cause fungal and bacterial diseases, and root, crown, and butt rots
- lead to rodent chewing on phloem tissue and subsequent stem girdling
- lead to the production of toxic organic acids (alcohols and volatile gases such as ammonia) by anaerobic microorganisms
- promote nutrient deficiencies and imbalances and possible allelopathic toxicities (allelopathy)
- lower soil temperatures during critical root growth periods, which may suppress overall root and plant growth
- prevent moisture penetration due to dry fungal masses becoming hydrophobic and actually repelling water

Location: Roots and Stump

Severity Threshold: None

Figure 7.68: Excessive mulch.

Figure 7.69: Excessive mulch.

CONFLICT WITH ROOTS

Description: Damage to sidewalk, driveway, road, or other hardscape directly caused by roots. Tree roots grow under sidewalks and asphalt. They do this in many instances because that is where the soil oxygen and moisture are located. Conflicts with curbs, driveways, or roads are all considered conflicts with roots. To be recorded, the conflict should be readily apparent (i.e. damage to sidewalk or hardscape is occurring). Or, as in the illustration below (Figure 7.70), tree roots are being cut to avoid the damage.

Location: Stump

Severity Threshold: None

Shown below are examples of sidewalk conflicts.

Figure 7.70: Sidewalk conflicts with roots.

CONFLICT WITH TREE CROWN

Description: The tree branches, foliage or bole are within 5 feet of utility wires of any type, including drop lines that extend from the main line to a building. Conflict with overhead wires can cause problems for both trees and wires creating maintenance problems and hazard situations. Conflict with overhead power, cable, and telephone wires is common along streets, yards, parking lots, and in commercial areas. Conflict is present when utility wires (electric, telephone, and/or cable) are within 5 feet of tree branches, foliage or boles.

Location: Overhead wires

Severity Threshold: None

Figure 7.71: Utility wires, marked with blue arrows, going through a tree crown.

IMPROPER PLANTING

Description: Evidence that burlap, twine or root ball wire was not removed prior to planting. Any of the following are visible at the soil surface: burlap, twine, or cage/wire.

Location: Roots and Stump of trees less than or equal to 10 in. DBH/DRC

Severity Threshold: None

Burlap showing from original root ball.

Burlap from original root ball has not decomposed and is girdling stem.

Rope that held the root ball together was not removed at tie of planting. 15 years later it is girdling the base of the tree.

Figure 7.72: Improper planting.

Item 7.3.1.8 CAUSE OF DEATH (CORE 5.21)

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:	SAMPLE KIND = 2 plots: all PREVIOUS TREE STATUS = 1 and URBAN PRESENT TREE STATUS = 2, or 3; or 4 or URBAN PRESENT TREE STATUS = 2 and URBAN RECONCILE = 1, 2, or 3 SAMPLE KIND = 1 plots; all MORTALITY = 1	
Field width:	2 digits	
Tolerance:	No errors	
MQO:	At least 80% of the time	
Values:	10	Insect
	20	Disease
	30	Fire
	40	Animal
	50	Weather
	60	Vegetation (suppression, competition, vines/kudzu)
	70	Unknown/not sure/other - includes death from human activity not related to silvicultural or land clearing activity (accidental, random, etc.). TREE NOTES required.
	80	Silvicultural or land clearing activity (death caused by harvesting or other silvicultural activity, including girdling, chaining, etc., or to land clearing activity)

Item 7.3.1.9 URBAN MORTALITY YEAR (URBAN OPTIONAL Collected in PNW, RMRS, SRS) (CORE 5.22+U)

Record 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:	Plots where SAMPLE KIND = 2: all URBAN PREVIOUS TREE STATUS = 1 and URBAN PRESENT TREE STATUS = 2 or 3; or URBAN 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
MQO:	At least 70% of the time
Values:	1994 or higher

Item 7.3.1.10 DECAY CLASS (CORE 5.23)

Record for each standing dead tally tree, 1.0 inch in diameter and larger, the code indicating the tree's stage of decay.

When Collected:	All standing dead tally trees ≥ 1.0 inch DBH/DRC
Field width:	1 digit
Tolerance:	+/- 1 class
MQO:	At least 90% of the time
Values:	Use the following table for guidelines:

Decay class stage (code)	Limbs and branches	Top	% 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

*Characteristics are for Douglas-fir. Dead trees of other species may vary somewhat. Use this only as a guide.

Item 7.3.1.11 URBAN LENGTH TO DIAMETER MEASUREMENT POINT (CORE 5.24)

Record this item when tree diameter measurement locations are not monumented. For those trees measured directly at 4.5 feet above the ground, leave this item blank. If the diameter is not measured at 4.5 feet, record the actual length from the ground, to the nearest 0.1 foot, at which the diameter was measured for each tally tree, 1.0 inch DBH and larger. Leave this item blank for woodland species measured for diameter at root collar.

When Collected:	All live and dead tally trees (except woodland species) ≥1.0 in DBH
Field width:	3 digits
Tolerance:	+/- 0.2 ft
MQO:	At least 90% of the time
Values:	00.1 – 15.0

Item 7.3.1.12 TREE NOTES (CORE 5.27)

Record notes pertaining to an individual tree as called for to explain or describe another variable.

When Collected:	All trees
Field width:	Alphanumeric character field
Tolerance:	N/A
MQO:	N/A
Values:	English language words, phrases and numbers

SECTION 7.4 BUILDING ENERGY DATA

Data is collected for trees greater 20 feet in vertical height (Figure 7.73) within 60 feet of buildings. Both live and standing dead trees are included. Buildings are defined as structures that:

- Are estimated to have been originally constructed for residential purposes
- Contain no more than 3 stories (2 stories + attic) in height above ground level and include attached garages.
- Are space conditioned (heated and perhaps cooled).

The UFORE model utilizes an algorithm for single standing (excludes row-houses) residential - type structures no larger than 4000 square feet in total inhabitable (heated or cooled) space, although larger single-family homes or duplexes should be included regardless of size. Do not count unheated detached garages, sheds, or other outbuildings. If unsure if a detached out building is heated or cooled consider it unheated. Building Energy Data focuses on the definition of a building, not necessarily the land use associated with the building. For example a 2 story space-conditioned building that is being used as a Tax Preparation small business would be considered Commercial in terms of land use, but since the building was assumed to have been originally constructed for residential use, is 2 stories tall, and is spaced conditioned, it would still be considered a building in terms of Building Energy Data.

The building the tree affects does not have to be on the plot.

Distance is measured from the point where the pith of the tree enters the ground. The shortest distance to the building measured in feet. Measure to closest wall or to corner of building (for tree planted on corner).

A qualifying tree may affect up to 4 qualifying buildings; if more than 4 such buildings are within 60 ft. tally the 4 that are closest.

An obvious vacant, abandoned, or condemned house would NOT be considered space conditioned, but other homes that are not occupied, such as homes for sale or homes of seasonal residents ARE considered space conditioned as long as they are sealed (containing windows and doors).

When trees have an associated Mother Tree, building energy data measurements will be recorded once for the Mother Tree unit, rather than for each stem. The tallest portion of the unit (all trees with the same Mother Tree Number including any boles/forks supported by the same stump that were not tallied) must reach at least 20 ft in height. Base the BUILDING DISTANCE 1-4 and BUILDING AZIMUTH 1-4 measurements on the pith of the single stump that supports the Mother Tree unit. These measurements will be recorded in the BUILDING DISTANCE 1-4 and BUILDING AZIMUTH 1-4 fields of the Mother Tree.

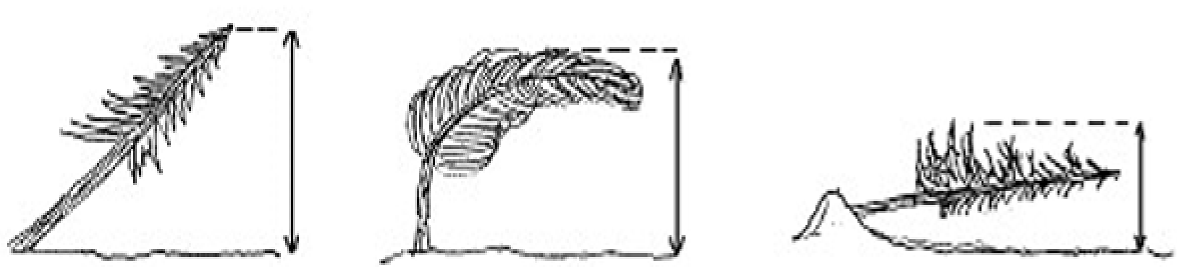


Figure 7.73: Vertical height measurement.

Item 7.4.0.1 BUILDING DISTANCE 1 (CORE 5.28.1U)

The shortest distance to the building measured in feet. Measure to closest wall or to corner of building (for tree planted on corner). Note: some trees may be within 60 feet of more than one building; in this case; add data to BUILDING DISTANCE 2 for second building, BUILDING DISTANCE 3 for third building, etc. The building the tree affects does not have to be on the plot.

When Collected:	Trees ≥ 1.0 inch DBH/DRC and ≥ 20 ft. in height when MOTHER TREE # = null or MOTHER TREE # = URBAN TREE RECORD NUMBER	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 90% of the time	
Values:	0	No building within 60 feet or tree does not meet height requirements
	1	Less than 20 feet
	2	21 to 40 feet
	3	41 to 60 feet

Item 7.4.0.2 BUILDING AZIMUTH 1 (CORE 5.28.2U)

Direction to building, measured in degrees. Note: some trees may be within 60 feet of more than one building; in this case; add data to BUILDING AZIMUTH 2 for second building, BUILDING AZIMUTH 3 for third building, etc. The building the tree affects does not have to be on the plot.

When Collected:	Trees ≥ 1.0 inch DB/DRC and ≥20 ft. in height where BUILDING DISTANCE is >0 and MOTHER TREE # = null or MOTHER TREE # = URBAN TREE RECORD NUMBER
Field width:	3 digits
Tolerance:	5 degrees
MQO:	At least 90% of the time
Values:	001 to 360

Item 7.4.0.3 BUILDING DISTANCE 2 (CORE 5.28.3U)

Follow same procedures as BUILDING DISTANCE 1

Item 7.4.0.4 BUILDING AZIMUTH 2 (CORE 5.28.4U)

Follow same procedures as BUILDING AZIMUTH 1

Item 7.4.0.5 BUILDING DISTANCE 3 (CORE 5.28.5U)

Follow same procedures as BUILDING DISTANCE 1

Item 7.4.0.6 BUILDING AZIMUTH 3 (CORE 5.28.6U)

Follow same procedures as BUILDING AZIMUTH 1

Item 7.4.0.7 BUILDING DISTANCE 4 (CORE 5.28.7U)

Follow same procedures as BUILDING DISTANCE 1

Item 7.4.0.8 BUILDING AZIMUTH 4 (CORE 5.28.8U)

Follow same procedures as BUILDING AZIMUTH 1

Item 7.4.0.9 MAINTAINED AREA TREE (CORE 5.29U)

Record the code to indicate if the tree is located within a maintained area (tree bole must be partially or fully contained within the maintained area). Maintained areas are defined as those which are consistently being impacted by mowing, weeding, brushing, herbiciding, landscaping, etc. Examples include, but are not limited to, lawns, maintained shrub beds, Rights-of-ways, brushed hogged areas, and manicured park areas. Examples of unmaintained areas are overgrown lots, small wooded areas, and riverbanks, among others.

When trees have an associated Mother Tree, MAINTAINED AREA TREE will be recorded only once for the Mother Tree unit, rather than for each stem. Base the measurement on the location of the bole of the single stump that supports the Mother Tree unit. This measurement will be recorded in the MAINTAINED AREA TREE field of the Mother Tree.

When Collected:	Tally trees ≥ 1.0 inch DBH/DRC within URBAN CONDITION STATUS 2, 3, 4 where MOTHER TREE # = null or MOTHER TREE # = URBAN TREE RECORD NUMBER	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 90% of the time	
Values:	0	No, tree/Mother Tree unit is not in a maintained area
	1	Yes, tree/Mother Tree unit is in a maintained area

Item 7.4.0.10 RIPARIAN RIVER / STREAM TREE (CORE 5.30U)

Record the code to indicate whether the tree qualifies as a RIPARIAN RIVER/STREAM TREE. Such a tree is one that falls within 30 ft. of the edge (mean high water mark) of a stream or river.

If a stream is intermittent, or no water is running at the time of plot measurement, the stream must have a naturally developed stream bottom to be recognized as a stream. Ignore lakes, ponds holding basins, and wet lands. Man-made ditches and canals used to funnel storm water during periods of high rainfall are not considered streams by our definition. However, some stream segments, especially in urban areas, may occasionally have cement sides and bottoms, and these segments, that are generally part of a larger stream network, would be considered a stream by our definition.

When trees have an associated Mother Tree, RIPARIAN RIVER/STREAM TREE will be recorded only once for the Mother Tree unit, rather than for each stem. Base the measurement on the location of the bole of the single stump that supports the Mother Tree unit. This measurement will be recorded in the RIPARIAN RIVER/STREAM TREE field of the Mother Tree.

When Collected:	Tally trees ≥ 1.0 inch DBH/DRC where MOTHER TREE # = null or MOTHER TREE # = URBAN TREE RECORD NUMBER	
Field width:	1 digit	
Tolerance:	No tolerance	
MQO:	At least 90% of the time	
Values:	0	No, tree/Mother Tree unit is not a riparian tree
	1	Yes, tree/Mother Tree unit is a riparian tree

Item 7.4.0.11 STREET TREE (CORE 5.31U)

Record the code to indicate whether the tree qualifies as a STREET TREE. A STREET TREE is defined as a MAINTAINED AREA TREE, natural or planted, that is located within 8 ft. of the edge of a maintained surfaced road (as measured from the pith of the tree to the edge of the flat surface of the road). Trees located in the space between the edge of the road and the sidewalk or within a median strip between roads regardless of its distance from the road are also defined as STREET TREES. Proximity to other maintained surfaces such as parking lots, alleys or driveways DO NOT cause a tree to be recorded as a STREET TREE. A "clover leaf" interchange is not considered part of a median. Therefore trees growing within a "clover leaf" interchange would only be considered a STREET TREE if they were within 8 ft of the maintained road. In general, street trees provide shade, aesthetic values, or serve as a physical barrier between the street and adjacent property. These trees will generally have a visible, physical interaction with the street via its root system, overhanging branches, or proximity of the trunk. When unsure if a tree meets this definition code it as 0- No, this is not a street tree.

When trees have an associated Mother Tree, STREET TREE will be recorded only once for the Mother Tree unit, rather than for each stem. Base the measurement on the location of the bole of the single stump that supports the Mother Tree unit. This measurement will be recorded in the STREET TREE field of the Mother Tree.

When Collected:	Tally trees ≥1.0 inch DBH/DRC within URBAN CONDITION STATUS=2, 3, 4 and MAINTAINED AREA TREE = 1 when MOTHER TREE # =null or MOTHER TREE # = URBAN TREE RECORD NUMBER	
Field width:	1 digit	
Tolerance:	No tolerance	
MQO:	At least 90% of the time	
Values:	0	No, tree/Mother Tree unit is not a street tree
	1	Yes, tree/Mother Tree unit is a street tree

Item 7.4.0.12 PLANTED TREE (CORE 5.32U)

Record the corresponding code to indicate whether the tree shows some evidence of being planted (include plantation trees). In some cases this may be very obvious upon initial observation. In other cases it may be hard to tell for sure, in such cases it may be helpful ask yourself the following questions:

- Does the landscaping around the tree give any clues to the trees origin?
- Is the tree of a species that is natural to the area or is it a common landscape species?
- How does the tree fit the overall landscape?
- Does the position of the tree within the overall landscape seem planned?
- Does it appear that the home, buildings, or landscape were built around the tree or does it appear that the tree was positioned based on the structures?
- Does the size or form of the tree fit the setting?

In some cases there may be no way to ascertain the trees origin, in which case use code 3 – Not Sure.

When trees have an associated Mother Tree, PLANTED TREE will be recorded only once for the Mother Tree unit, rather than for each stem. Base the measurement on the location of the bole of the single stump that supports the Mother Tree unit. This measurement will be recorded in the PLANTED TREE field of the Mother Tree.

When Collected:	New or missed tally trees ≥ 1.0 in DBH/DRC within URBAN CONDITION STATUS = 1, 2, 3, 4 when MOTHER TREE # = null or MOTHER TREE # = URBAN TREE RECORD NUMBER		
Field width:	1 digit		
Tolerance:	No errors		
MQO:	At least 70% of the time		
Values:	1	Planted	Tree/Mother Tree unit appears to have been planted at some point in the past
	2	Natural	Tree/Mother Tree unit appears to be of a natural origin
	3	Not Sure	Unable to confidently determine if the tree/Mother Tree unit was planted or not

CHAPTER 8 URBAN SEEDLING DATA

Regeneration information is obtained by counting live seedlings within the 6.8-foot radius microplots located in each cardinal direction and 12.0 feet from the subplot center. 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. Seedlings are counted in groups by species and condition class, up to five individuals per species. Counts beyond five may be estimated. Seedlings occurring in all condition statuses except CONDITION STATUS 5 (NONSAMPLED) are included.

Item 8.0.0.1 URBAN SUBPLOT NUMBER (CORE 6.1)

Use the same procedures described in Chapter 5.

When Collected:	All counts of seedlings

Item 8.0.0.2 URBAN MICROPLOT NUMBER (CORE 6.1.1U)

Use the same procedures described in Chapter 5.

When Collected:	All counts of seedlings

Item 8.0.0.3 URBAN SPECIES (CORE 6.2)

Use the same procedures described in Item 7.0.0.17.

When Collected:	All counts of seedlings
Field width:	4 digits
Tolerance:	No errors for genus, no errors for species
MQO:	At least 90% of the time for genus, at least 85% of the time for species
Values:	See Appendix C and Appendix D

Item 8.0.0.4 CONDITION CLASS NUMBER (CORE 6.3)

Use the same procedures described in Chapter 4.

When Collected:	All counts of seedlings

Item 8.0.0.5 URBAN SEEDLING COUNT (CORE 6.4+U)

On each microplot, record the number of live tally tree seedlings, by species and condition class. Count up to five individuals by species: estimate the total count if there are more than five individuals of any given species in any given condition class. When seedlings are distributed evenly on a microplot, a suggested method of estimating is to count the number of seedlings on one quarter of the microplot and multiply by four (given that there is only one condition class on the microplot). Repeat for each species. 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. If water levels are excessive on the microplot the seedling tally is restricted to the seedlings visible above the water.

For woodland species, each stem on a single tree must be less than 1.0 inch at DRC.

Multiple “suckers” that originate from the same location, and stump sprouts are considered one seedling. Do not tally or count “layers” (undetached branches partially or completely covered by soil, usually at the base) as seedlings. Do not tally any seedlings that sprout from a live tally tree.

When Collected:	URBAN CONDITION CLASS STATUS: 1, 2, 3, 4
Field width:	3 digits
Tolerance:	No errors for 5 or less per species; +/- 20% over a count of 5
MQO:	At least 90% of the time
Values:	001 through 999

Item 8.0.0.6 MAINTAINED AREA SEEDLING (CORE 6.4.1U)

Record this code to indicate if at least half of the seedling count for an individual species is located within a maintained area (seedling bole must be partially or fully contained within the maintained area to qualify). Maintained areas are defined as those which are consistently being impacted by mowing, weeding, brushing, herbiciding, landscaping, etc. Examples include, but are not limited to, lawns, maintained shrub beds, Rights-of-ways, and manicured park areas. Examples of unmaintained areas are overgrown lots, small wooded areas, and riverbanks, among others.

When Collected:	All SEEDLING COUNTs within URBAN CONDITION STATUS 2, 3, 4	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 90% of the time	
Values:	0	No, < 50% of the seeding count for an individual species is in a maintained area
	1	Yes, 50% or more of the seedling count for an individual species is in a maintained area

Item 8.0.0.7 PLANTED SEEDLING (CORE 6.4.2U)

Record the corresponding code to indicate if at least half of the seedling count for an individual species shows some evidence of being planted. In some cases this may be very obvious upon initial observation. In other cases it may be hard to tell for sure, in such cases it may be helpful ask yourself the following questions:

- Does the landscaping around the tree give any clues to the trees origin?
- Is the seedling species natural to the area or is it a common landscape species?
- How does the seedling fit the overall landscape?
- Does the position of the seedling within the overall landscape seem planted?

In some cases there may be no way to ascertain the seedling's origin, in which case use code 3 – Not Sure.

When Collected:	All SEEDLING COUNTs, URBAN CONDITION STATUS = 2, 3, 4		
Field width:	1 digit		
Tolerance:	No errors		
MQO:	At least 70% of the time		
Values:	1	Planted	At least half of the seedling count for an individual species appear to have been planted at some point in the past
	2	Natural	At least half of the seedling count for an individual species appear to be of a natural origin
	3	Not Sure	Unable to confidently determine if at least half of the seedling count for an individual species was planted or are natural

CHAPTER 9 URBAN SITE TREE INFORMATION

Site trees are a measure of site productivity expressed by the height to age relationship of dominant and co-dominant trees. 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, owner class, and/or disturbance-related differences in density (e.g., heavily thinned vs. unthinned), 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.

Urban Note: Site Trees are required on all URBAN CONDITION CLASS STATUS 1 conditions. In many cases forest land encountered within in the FIA URBAN inventory may be in close proximity to developed land uses and land owners may be very sensitive to anything that may be perceived as detrimental to their trees. In cases where the crew judges that this is the case it is always best to ask permission prior to coring a site tree. If the owner would rather no site trees were cored skip the Site Tree section and record a PLOT NOTE stating why.

SECTION 9.1 SITE TREE SELECTION

Select at least one site tree for each accessible forest land condition class where no previous site tree data exist. 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 tree from a species common to the condition class being sampled, based on the criteria listed below. Select trees off the subplot 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 20 years old. Trees that are visibly damaged, trees with ring patterns that exhibit signs of suppression, and trees with rotten cores should be rejected. If there are no acceptable site trees, record that in the plot notes and leave this section blank.

SECTION 9.2 SITE TREE DATA VARIABLES

Item 9.2.0.1 TREE RECORD NUMBER (URBAN OPTIONAL Collected in NRS, PNW, SRS) (CORE 7.2.0U)

Record a code to uniquely and permanently identify each site index tree. On remeasured plots, use the previously assigned site index tree number. These trees will keep their original number as long as they meet the criteria for site trees. If a new tree is selected, use the "next available tree number" function on the MIDAS PDR Application to assign a number.

When Collected:	All site trees
Field width:	3 digits
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	001 to 999

Item 9.2.0.2 CONDITION CLASS LIST (CORE 7.2.1+U)

List all CONDITION CLASS NUMBERs that the site index data from this tree represent.

When Collected:	All site trees
Field width:	6 digits
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	100000 to 987654

Item 9.2.0.3 SPECIES (CORE 7.2.2)

Use the same procedures described in Section 5.8+U. Ideally, site trees in the eastern U.S. should be between 20-70 years old. If preferred trees cannot be found in this age range, expand the age range to 15-120 years. Reject trees outside the 15-120 year age range, trees that exhibit signs of damage, trees with ring patterns that show signs of suppression, trees less than 5.0 inches DBH, trees with abnormalities at DBH, and trees with rotten cores. A list of preferred site-tree species is provided. Site trees should be selected in the following order of preference:

- 1st Choice: representative of the stand, on the list for your region.
- 2nd Choice: representative of the stand, on the list for an adjoining eastern region.
- 3rd Choice: not representative of the stand, on the list for your region.
- 4th Choice: not representative of the stand, on the list for an adjoining eastern region.

Ideally, site trees in the western U.S. should be between 35-80 years old. If preferred trees cannot be found in this age range, expand the age range to 15-250 years. Reject trees outside the 15-250 year age range, trees that exhibit signs of damage, trees with ring patterns that show signs of suppression, trees less than 5.0 inches DBH, trees with abnormalities at DBH, trees with rotten cores, and woodland species. A list of preferred site-tree species is provided. Site trees should be selected in the following order of preference:

- 1st Choice: representative of the stand, on the list for your region.
- 2nd Choice: representative of the stand, on the list for an adjoining western region.
- 3rd Choice: not representative of the stand, on the list for your region.
- 4th Choice: not representative of the stand, on the list for an adjoining western region.

When Collected:	All site trees
Field width:	4 digits
Tolerance:	No errors
MQO:	At least 99% of the time for genus, at least 95% of the time for species
Values:	

Western U.S. Site-Tree Species: PNW = Pacific Northwest FIA, RMRS = Rocky Mountain FIA		
Code	Common Name	Region
------------------- Softwood Species -------------------		
0011	Pacific silver fir	PNW
0015	white fir	RMRS, PNW
0017	grand fir	RMRS, PNW
0018	corkbark fir	RMRS
0019	subalpine fir	RMRS, PNW
0020	California red fir	RMRS, PNW
0021	shasta red fir	PNW
0022	noble fir	PNW
0042	Alaska yellow-cedar	PNW
0068	eastern red cedar	RMRS
0073	western larch	RMRS, PNW
0081	incense-cedar	RMRS, PNW
0093	Engelmann spruce	RMRS, PNW
0094	white spruce	RMRS, PNW
0095	black spruce	PNW
0096	blue spruce	RMRS
0098	sitka spruce	PNW
0101	whitebark pine	RMRS, PNW
0104	foxtail pine	RMRS
0108	lodgepole pine	RMRS, PNW
0109	Coulter pine	PNW
0112	Apache pine	RMRS
0116	Jeffrey pine	RMRS, PNW
0117	sugar pine	RMRS, PNW
0119	western white pine	RMRS, PNW
0120	bishop pine	PNW

0122	ponderosa pine	RMRS, PNW
0135	Arizona pine	RMRS
0201	bigcone Douglas-fir	PNW
0202	Douglas-fir	RMRS, PNW
0211	redwood	PNW
0231	Pacific yew	RMRS, PNW
0242	western redcedar	RMRS, PNW
0263	western hemlock	RMRS, PNW
0264	mountain hemlock	RMRS, PNW
	-------------------- Hardwood Species --------------------	
0312	bigleaf maple	PNW
0351	red alder	RMRS, PNW
0375	paper birch	RMRS, PNW
0462	hackberry	RMRS
0544	green ash	RMRS
0741	balsam poplar	RMRS, PNW
0742	eastern cottonwood	RMRS
0745	plains cottonwood	RMRS
0746	quaking aspen	RMRS, PNW
0747	black cottonwood	RMRS, PNW
0748	Fremont poplar/cottonwood	RMRS
0749	narrowleaf cottonwood	RMRS
0972	American elm	RMRS

Item 9.2.0.4 DIAMETER (CORE 7.2.4)

Use the same procedures described in Section 7.1.

When Collected:	All site trees
Field width:	4 digits (xxx.y)
Tolerance:	+/- 0.1 in per 20.0 in increment of measured diameter on all live trees and dead trees with DECAY CLASS = 1, 2
	+/- 1.0 in per 20.0 in increment of measured diameter on dead trees with DECAY CLASS
	For woodland species: +/- 0.2 in per stem
MQO:	At least 95% of the time. For example: a tree with a diameter of 41.0 in would have a tolerance of plus or minus 0.3 in. (Note: the MQO for point of measurement is +/- 0.2 in when the tree is first measured and within 1 ft of the location established by the previous crew when the tree is remeasured.)
Values:	001.0 to 999.9

Item 9.2.0.5 SITE TREE LENGTH (CORE 7.2.5)

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.

When Collected:	All site trees
Field width:	3 digits
Tolerance:	+/- 10% of true length
MQO:	At least 90% of the time
Values:	005 to 999

Item 9.2.0.6 TREE AGE AT DIAMETER (CORE 7.2.6)

Record the tree age as determined by an increment sample. Bore the tree at 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.

When Collected:	All site trees
Field width:	Field width: 3 digits
Tolerance:	+/- 5 years
MQO:	At least 95% of the time
Values:	001 to 999

Item 9.2.0.7 SITE TREE NOTES (CORE 7.2.7)

Record notes pertaining to an individual site tree.

When Collected:	All site trees as necessary
Field width:	alphanumeric character field
Tolerance:	N/A
MQO:	N/A
Values:	English language words, phrases and numbers

CHAPTER 10 INVASIVE PLANTS

The objectives of the Urban 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, these 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 than they would otherwise have.

Each FIA unit, in collaboration with vegetation experts, 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. Changes to the species on these lists are managed by the individual FIA units using local change procedures. However, when an FIA unit samples invasive species, they will use the field protocols contained in this chapter.

Data will be collected by crew members who have been trained and certified in the Invasive plants protocol methods. These crew members are expected to have field guides that allow for unambiguous identification of the plant species on the list they are to use, 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 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.

SECTION 10.1 INVASIVE SPECIES SAMPLE DESIGN

Urban sampling of invasive species is focused on all accessible condition classes within the 48.0-foot radius subplot. If multiple accessible 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. Rules and expectations for plant collection and identification are specified by individual FIA units.

SECTION 10.2 SPECIES RECORDS

The invasive plant recorder does a search of each measured condition on the subplot. Only listed species rooted in or overhanging (and rooted out of) this condition are included. For tree species, there are no minimum (or maximum) height limits as are required for seedling counts. All foliage that is or was alive during the current growing season is 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 canopy cover).

Total cover is estimated on measured conditions on each 48.0-foot radius subplot for every species on the invasive plant list found. If multiple conditions are being sampled on the same subplot, separate cover estimates for every species must be made.

Item 10.2.0.1 SUBPLOT NUMBER (CORE 9.3+U)

Record the code corresponding to the number of the subplot.

When Collected:	On all subplots where INVASIVE PLANT SAMPLING STATUS = 2	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	1	Urban subplot

Item 10.2.0.2 CONDITION CLASS NUMBER (CORE 9.4)

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 condition within subplot (URBAN CONDITION CLASS STATUS = 1, 2, 3, and 4) when invasive plants are being sampled on the subplot (INVASIVE PLANT SUBPLOT SAMPLE STATUS=2)
Field width:	1 digit
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	1-9

Item 10.2.0.3 SPECIES CODE (CORE 9.5)

Record the code for any species listed in your region's invasive plant species list that is found rooted in or overhanging (and rooted out of) the measured condition within the subplot. 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.

If a species is suspected of being a listed invasive but cannot be identified quickly and confidently, and the FIA unit's protocols require specimen collection, assign a NRCS PLANTS unknown code. A subset of acceptable unknown codes that can be used is listed below. Collect a specimen unless the species is locally sparse. A species is "locally sparse" if five or fewer plants are present in the entire plot and immediate surrounding area.

Table 10.1:Portland Invasive SpeciesList

Symbol	Scientific Name (From USDA PLANTS)	Common name (From USDA PLANTS)
ALPE4	*Alliaria petiolata*	garlic mustard
ARIT	*Arum italicum*	Italian lords and ladies
BUDA2	*Buddleja davidii*	orange eye butterflybush
CLVI6	*Clematis vitalba*	evergreen clematis
COMA2	*Conium maculatum*	poison hemlock
COAR4	*Convolvulus arvensis*	field bindweed
CYSC4	*Cytisus scoparius*	Scotch broom
DALA11	*Daphne laureola*	spurgelaurel
HEHE	*Hedera helix, H. hibernica*	English ivy
ILAQ80	*Ilex aquifolium*	English holly
IMCA	*Impatiens capensis*	jewelweed
IMGL	*Impatiens glandulifera*	ornamental jewelweed
IRPS	*Iris pseudacorus*	paleyellow iris
LAGA2	*Lamiastrum galeobdolon*	yellow archangel
LYSA2	*Lythrum salicaria*	purple loosestrife
PHAM4	*Phytolacca americana*	American pokeweed
POCU6	*Polygonum cuspidatum, P. sachalinense*	Japanese knotweed
PRLA5	*Prunus laurocerasus*	cherry laurel
RAFI	*Ranunculus ficaria*	fig buttercup
RUAR9	*Rubus armeniacus (Rubus bifrons)*	Himalayan blackberry

Table 10.2:San Diego Invasive Species List

Symbol	Scientific Name (From USDA PLANTS)	Common name (From USDA PLANTS)
AIAL	*Ailananthus altissima*	Tree of heaven
ALJU	*Albizia julibrissin*	Silk Tassel
CANU4	*Carduus nutans*	Musk Thistle
CEDI3	*Centaurea diffusa*	Diffuse Knapweed
CESO3	*Centaurea solstitialis*	Yellowstar thistle
CESTM	*Centaurea stoebe spp. micranthos*	Spotted Knapweed
CHJU	*Chondrilla juncea*	Rush Skeleton Weed
CIAR4	*Cirsium arvense*	Canada Thistle
EUES	*Euphorbia esula*	leafy spurge
EUOB4	*Euphorbia oblongata*	oblong spurge
GEMO2	*Genista monspessulana*	French Broom
HYPE	*Hypericum perforatum*	Klamath Weed
KOELR	*Koelrueteria spp.*	golden raintree, China tree
MEAZ	*Melia azedarach*	chinaberry tree, Pride of India, bead-tree
MEQU	*Melaleuca quinquinervia*	Punk tree
PATO2	*Paulownia tomentosa*	Princess tree
SCMO	*Schinus molle*	Californian pepper tree, American pepper, false pepper
SCTE	*Schinus terebinthifolius*	Brazilian peppertree, Christmas berry, Florida holly, broad leaf pepper
TACA8	*Taeniatherum caput-medusae*	medusa head
TAMAR2	*Tamarix spp*	tamarisk, salt cedar
TRSE6	*Triadica sebifera*	Tallow tree
ULPU	*Ulmus pumila*	Siberian elm

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 condition within subplots (URBAN CONDITION CLASS STATUS = 1, 2, 3, and 4) when invasive plants are being sampled on the subplot (INVASIVE PLANT SUBPLOT SAMPLE STATUS=2)
Field width:	8 alpha-numeric characters
Tolerance:	No errors
MQO:	At least 99% of the time
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 10.2.0.4 UNIQUE SPECIES NUMBER (CORE 9.6)

When any species code is entered for the first time on a plot, the UNIQUE SPECIES NUMBER 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
MQO:	At least 99% of the time
Values:	1-99, assigned in sequential numbers

Item 10.2.0.5 SPECIES CANOPY COVER (CORE 9.7+U)

A rapid canopy cover estimate, to the nearest percent cover, is made for each species for all foliage 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 plants (Daubenmire 1959), and ignoring overlap among multiple layers of a species. 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 15.2 feet on the full subplot, or 10 percent cover. On condition class #1 it covers an area equal to a circle of 4.8 feet radius and is recorded as 1 percent cover. The remainder, 9 percent cover, is recorded for condition #2. If the species is only present on condition class #1 with an area equal to a circle of 4.8-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 = 48.0 feet, Subplot area = 7238 ft²			
Cover	**Area (ft²)**	**Length of a side of a square(ft)**	**Radius of circular area(ft)**
1%	72	8.5	4.8
3%	217	14.7	8.3
5%	362	19.0	10.7
10%	724	26.9	15.2
20%	1448	38.0	21.5
25%	1810	42.1	24.0

When Collected:	All species records
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%
MQO:	At least 90% of the time
Values:	001 to 100

Item 10.2.0.6 MAINTAINED AREA SPECIES (CORE 9.7.1U)

Record the code to indicate if at least half of the (estimated for each measured condition on the subplot separately) SPECIES CANOPY COVER is located within a maintained area. Maintained areas are defined as those which are consistently being impacted by mowing, weeding, brushing, herbiciding, landscaping, etc. Examples include, but are not limited to, lawns, maintained shrub beds, Rights-of-ways, and manicured park areas. Examples of unmaintained areas are overgrown lots, small wooded areas, and riverbanks, among others.

When Collected:	All SPECIES CODES with SPECIES CANOPY COVER > 0 within URBAN CONDITION STATUS 2, 3, 4	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	at least 90% of the time	
Values:	0	No, species is not in a maintained area
	1	Yes, species is in a maintained area

Item 10.2.0.7 9.8 INVASIVE SPECIMEN COLLECTED (CORE 9.8)

Record a code to indicate whether or not a specimen was collected for each species genus or unknown code entered as a new unique species. If the record is an unknown code, your unit requires specimen collection, and a plant specimen is not collected, describe the reason it was not collected in Item 10.2.0.9, INVASIVE PLANT NOTES.

When Collected:	All species records when INVASIVE PLANT SPECIMEN COLLECTION RULE = 1	
Field width:	1 digit	
Tolerance:	No errors	
MQO:	At least 99% of the time	
Values:	0	No, a specimen was not officially collected
	1	Yes, a specimen was officially collected

Item 10.2.0.8 SPECIMEN LABEL NUMBER (CORE 9.9)

Record the label number for the collected specimen. Where plant specimen collection is required, numbered labels are provided to each crew.

When Collected:	Where INVASIVE SPECIMEN COLLECTED= 1
Field width:	5 digits
Tolerance:	No errors
MQO:	At least 99% of the time
Values:	1 to 99999, as pre-printed and assigned by FIA unit.

Item 10.2.0.9 INVASIVE PLANT NOTES (CORE 9.10)

Notes are required for each species record with an unknown code. Enter text that describes the species or that explains why it was not collected if collection was required but not done. This text may be used on the specimen label and any spreadsheet used to track specimens.

When Collected:	Required for each record with an unknown code and SPECIMEN LABEL NUMBER.
Field width:	Unlimited alphanumeric character field
Tolerance:	N/A
MQO:	N/A
Values:	English language words, phrases, and numbers

SECTION 10.3 REFERENCES

Daubenmire, R. 1959. A canopy-coverage method of vegetational analysis. Northwest Science 33(1): 43-64.

CHAPTER 11 NON-TALLY TREES

Item 11.0.0.1 NON-TALLY TREE GENUS (CORE 11.1U)

Record the genus for each NON-TALLY TREE species encountered on the subplot.

When Collected:	NON-TALLY TREE PRESENT = 1
Field width:	70 characters
Tolerance:	No errors
MQO:	At least 70% of the time
Values:	Letters

Item 11.0.0.2 NON-TALLY TREE SPECIES (CORE 11.2U)

Record the species of each NON-TALLY TREE GENUS recorded.

When Collected:	NON-TALLY TREE PRESENT = 1
Field width:	70 characters
Tolerance:	No errors
MQO:	At least 70% of the time
Values:	Letters

Item 11.0.0.3 NON-TALLY TREE NOTES (CORE 11.5U)

Notes are required for each NON-TALLY TREE SPECIES record. Enter text that describes the species or that explains why it was not collected if collection was required but not done. This text may be used on the specimen label and any spreadsheet used to track specimens. Use the notes section to provide any information about sources used to identify the species of the NON-TALLY TREE.

When Collected:	Required for each NON-TALLY TREE SPECIES record
Field width:	Unlimited alphanumeric character field
Tolerance:	N/A
MQO:	N/A
Values:	English language words, phrases, and numbers

PDR Note: Record this note while in the NON-TALLY TREE SPECIES record. Press the "Ctrl"+"N".

Listed are some examples of why a specimen may not be collected:

- Species has less than 1% canopy cover on the subplot and no mature foliage or reproductive parts are present
- Hazardous situation
- Time limitation
- Other (explain in notes)

APPENDIX A STATE AND COUNTY FIPS CODES AND DECLINATIONS

SECTION A.1 STATE CODES

Code	State
06	California
41	Oregon
53	Washington

SECTION A.2 COUNTY CODES AND DECLINATIONS

SUBSECTION A.2.1 CALIFORNIA COUNTY CODES AND DECLINATIONS

Code	County	Declination - degrees East
001	Alameda	13.5
003	Alpine	13
005	Amador	13.5
007	Butte	14
009	Calavaras	13.5
011	Colusa	14
013	Contra Costa	13.5
015	Del Norte	14.5
017	El Dorado	13.5
019	Fresno	13
021	Glenn	14
023	Humboldt	14.5
025	Imperial	11
027	Inyo	12.5
029	Kern	12.5
031	Kings	12.5
033	Lake	14
035	Lassen	14
037	Los Angeles	12
039	Madera	13
041	Marin	13.5
043	Mariposa	13
045	Mendocino	14
047	Merced	13
049	Modoc	14
051	Mono	13
053	Monterey	13
055	Napa	13.5
057	Nevada	13.5

Code	County	Declination - degrees East
059	Orange	12
061	Placer	13.5
063	Plumas	13.5
065	Riverside	11.5
067	Sacramento	13.5
069	San Benito	13
071	San Bernardino	11.5
073	San Diego	11.5
075	San Francisco	13.5
077	San Joaquin	13.5
079	San Luis Obispo	12.5
081	San Mateo	13.5
083	Santa Barbara	12.5
085	Santa Clara	13.5
087	Santa Cruz	13.5
089	Shasta	14
091	Sierra	13.5
093	Siskiyou	14.5
095	Solano	13.5
097	Sonoma	13.5
099	Stanislaus	13
101	Sutter	13.5
103	Tehama	14
105	Trinity	14
107	Tulare	12.5
109	Tuolumne	13
111	Ventura	12
113	Yolo	13.5
115	Yuba	13.5

SUBSECTION A.2.2 OREGON COUNTY CODES AND DECLINATIONS

Code	County	Declination degrees - East
001	Baker	14
003	Benton	15
005	Clackamas	15
007	Clatsop	15.5
009	Columbia	15.5
011	Coos	15
013	Crook	14.5
015	Curry	15
017	Deschutes	14.5
019	Douglas	15
021	Gilliam	14.5
023	Grant	14
025	Harney	14
027	Hood River	15
029	Jackson	14.5
031	Jefferson	15
033	Josephine	14.5
035	Klamath	14.5
037	Lake	14
039	Lane	15
041	Lincoln	15
043	Linn	15
045	Malheur	13.5
047	Marion	15
049	Morrow	14.5
051	Multnomah	15
053	Polk	15
055	Sherman	15
057	Tillamook	15.5
059	Umatilla	14.5
061	Union	14
063	Wallowa	14
065	Wasco	15
067	Washington	15.5
069	Wheeler	14.5
071	Yamhill	15.5

SUBSECTION A.2.3 WASHINGTON COUNTY CODES AND DECLINATIONS

Code	County	Declination Degrees - East
001	Adams	14.5
003	Asotin	14
005	Benton	14.5
007	Chelan	15.5
009	Clallam	16
011	Clark	15
013	Columbia	14.5
015	Cowlitz	15.5
017	Douglas	15
019	Ferry	15
021	Franklin	14.5
023	Garfield	14.5
025	Grant	15
027	Grays Harbor	16
029	Island	16
031	Jefferson	16
033	King	15.5
035	Kitsap	15.5
037	Kittitas	15
039	Klickitat	15
041	Lewis	15.5
043	Lincoln	14.5
045	Mason	15.5
047	Okanogan	15.5
049	Pacific	15.5
051	Pend Oreille	14.5
053	Pierce	15.5
055	San Juan	16
057	Skagit	16
059	Skamania	15
061	Snohomish	15.5
063	Spokane	14.5
065	Stevens	15
067	Thurston	15.5
069	Wahkiakum	15.5
071	Walla Walla	14.5
073	Whatcom	16
075	Whitman	14.5
077	Yakima	15

APPENDIX B FIA FOREST TYPE CODES

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
			Loblolly / Shortleaf Pine Group
E		161	Loblolly pine
E		162	Shortleaf pine
E		163	Virginia pine
E		165	Table Mountain pine
E		166	Pond pine
E		167	Pitch pine
			Other Eastern Softwoods Group
E		171	Eastern redcedar
			Pinyon / Juniper Group
E	W	182	Rocky Mountain juniper
			Douglas-fir Group
E	W	201	Douglas-fir
			Ponderosa Pine Group
E	W	221	Ponderosa pine
			Exotic Softwoods Group
E		381	Scotch pine
E	W	383	Other exotic softwoods
E		384	Norway spruce
E		385	Introduced larch
			Other Softwoods Group
E	W	391	Other Softwoods
			Oak / Pine Group
E		401	Eastern white pine / N. red oak / white ash
E		402	Eastern redcedar / hardwood
E		404	Shortleaf pine / oak
E		405	Virginia pine / southern red oak
E		406	Loblolly pine / hardwood
E		409	Other pine / hardwood
			Oak / Hickory Group
E		501	Post oak / blackjack oak
E		502	Chestnut oak

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		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
			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
			Exotic Hardwoods Group
E		991	Paulownia
E	W	995	Other exotic hardwoods

<u>For nonstocked stands, see Item 4.5.0.3 for procedures to determine FOREST TYPE.</u>

<u>Unless otherwise stated, forest types are named for the predominant species (or group of species) on the condition. In order to determine if the type should be classified as softwood versus hardwood, first estimate the stocking (site occupancy) of trees in each of these two categories. If softwoods predominate (50% or more), then the forest type will be one of the softwood types (codes 101 through 391) and vice versa for hardwoods (codes 401 through 995).</u>

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For the Eastern United States, there are mixed hardwood-pine forest types (codes 401 through 409) when the pine and/or redcedar (either eastern or southern) component is between 25 and 49% of the stocking. If the pine/redcedar component is less than 25% of the stocking, then one of the hardwood forest types is assigned.

WHITE/RED/JACK PINE GROUP

In these pure pine forest types, stocking of the pine component needs to be at least 50 percent. Otherwise, check the forest types listed under the Oak / Pine Group (beginning with forest type code 401)

101 Jack pine: Associates -northern pin oak, bur oak, red pine, bigtooth aspen, paper birch, northern red oak, eastern white pine, red maple, balsam fir, white spruce, black spruce, and tamarack. Sites-dry to mesic sites.

102 Red pine: Associates - eastern white pine, jack pine, red maple, northern red oak, white spruce, balsam fir, quaking aspen, bigtooth aspen, paper birch, northern pin oak. Sites-common on sandy soils, but reaches best development on well-drained sandy loam to loam soils.

103 Eastern white pine: Associates - pitch pine, gray birch, aspen, red maple, pin cherry, white oak, paper birch, sweet birch, yellow birch, black cherry, white ash, northern red oak, sugar maple, basswood, hemlock, northern white-cedar, yellow-poplar, white oak, chestnut oak, scarlet oak, and shortleaf pine. Sites -- wide variety, but best development on well drained sands and sandy loams.

104 Eastern white pine/ eastern hemlock (includes Carolina hemlock): Associates - beech, sugar maple, basswood, red maple, yellow birch, gray birch, red spruce, balsam fir, black cherry, white ash, paper birch, sweet birch, northern red oak, white oak, chestnut oak, yellow-poplar, and cucumbertree. Sites -- wide variety but favors cool locations, moist ravines, and north slopes.

105 Eastern hemlock (includes Carolina hemlock): Associates - white pine, balsam fir, red spruce, beech, sugar maple, yellow birch, basswood, red maple, black cherry, white ash, paper birch, sweet birch, northern red oak, and white oak. Sites -- cool locations, moist ravines, and north and east slopes.

SPRUCE/FIR GROUP

These types are mostly in the Eastern United States. See FIR/SPRUCE/MOUNTAIN HEMLOCK for Western United States.

121 Balsam fir: Associates - black, white, or red spruce; paper or yellow birch; quaking or bigtooth aspen, beech; red maple; hemlock; tamarack; black ash; or northern white-cedar. Sites-- upland sites on low lying moist flats and in swamps.

122 White spruce: Associates - black spruce, paper birch, quaking aspen, red spruce, balsam fir, and balsam poplar. Sites-Transcontinental; grows well on calcareous and well-drained soils, but is found on acidic rocky and sandy sites, and sometimes in fen peatlands along the maritime coast.

123 Red spruce: Associates - vary widely and may include red maple, yellow birch, eastern hemlock, eastern white pine, white spruce, northern white-cedar, paper birch, pin cherry, gray birch, mountain-ash, beech, striped maple, sugar maple, northern red oak, red pine, and aspen. Sites -- include moderately well-drained to poorly-drained flats and thin slopes and on varying acidic soils in abandoned fields and pastures. This code should be used where red spruce comprises a plurality or majority of the stand's stocking but where balsam fir is either nonexistent or has very little stocking (< 5 percent of total). Otherwise the plot would be coded 124, red spruce/balsam fir.

124 Red spruce/balsam fir: Associates - red maple, paper birch, white pine, hemlock, white spruce, and northern white-cedar. Sites -- moderately drained to poorly drained flats or on thin-soiled upper slopes.

125 Black spruce: Associates - white spruce, quaking aspen, balsam fir, paper birch, tamarack, northern white-cedar, black ash, and red maple. Sites - wide variety from moderately dry to very wet.

126 Tamarack: Associates - black spruce, balsam fir, white spruce, northern white-cedar, and quaking aspen. Sites -- found on wetlands and poorly drained sites.

127 Northern white-cedar: Associates - balsam fir, tamarack, black spruce, white spruce, red spruce, black ash, and red maple. Sites -- mainly occurs in swamps, but also in seepage areas, limestone uplands and old fields.

LOBLOLLY/SHORTLEAF PINE GROUP

161 Loblolly pine: Associates - sweetgum, southern red oak, post oak, blackjack oak, blackgum, yellow-poplar, and pond pine. Sites -- upland soils with abundant moisture but good drainage, and on poorly drained depressions.

162 Shortleaf pine: Associates - white oak, southern red oak, scarlet oak, black oak, hickory, post oak, blackjack oak, blackgum, red maple, pitch pine, and Virginia pine. Sites -- low, well drained ridges to rocky, dry, south slopes and the better drained spur ridges on north slopes and also on old fields.

163 Virginia pine: Associates - shortleaf pine, white oak, chestnut oak, southern red oak, black oak, sweetgum, red maple, blackgum, and pitch pine. Sites--dry sites, often abandoned fields.

165 Table Mountain pine: Associates - chestnut oak, scarlet oak, pitch pine, and black oak. Sites--poor, dry, often rocky slopes.

166 Pond pine: Associates - loblolly pine, sweetgum, baldcypress, and Atlantic white-cedar. Sites -- rare, but found in southern New Jersey, Delaware, and Maryland in low, poorly drained acres, swamps, and marshes.

167 Pitch pine: Associates - chestnut oak, scarlet oak, table-mountain pine, black oak, and blackgum. Sites -- relatively infertile ridges, dry flats, and slopes.

OTHER EASTERN SOFTWOODS GROUP

171 Eastern redcedar (includes southern redcedar): Associates - gray birch, red maple, sweet birch, Virginia Pine, shortleaf pine, oak. Sites -- usually dry uplands and abandoned fields on limestone outcrops and other shallow soils but can grow well on good sites.

PINYON/JUNIPER GROUP

181 Eastern redcedar- retired, see code 171

DOUGLAS-FIR GROUP

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.

EXOTIC SOFTWOODS GROUP

381 Scotch pine: plantation type, not naturally occurring. 383 Other exotic softwoods; Austrian pine

384 Norway spruce: plantation type, not naturally occurring 385 Introduced larch: introduced larch (species code 0070)

OTHER SOFTWOODS GROUP

391 Other softwoods: All softwood species identified to genus level only, except cypress, baldcypress, and larch.

OAK/PINE GROUP

In these oak/pine forest types, stocking of the pine component needs to be 25-49 percent.

401 Eastern white pine/northern red oak/white ash: Associates - red maple, basswood, yellow birch, bigtooth aspen, sugar maple, beech, paper birch, black cherry, hemlock, and sweet birch. Sites --deep, fertile, well-drained soil.

402 Eastern redcedar/hardwood: Associates - oak, hickory, walnut, ash, locust, dogwood, blackgum, hackberry, winged elm, shortleaf pine, and Virginia pine. Sites -- usually dry uplands and abandoned fields.

404 Shortleaf pine/oak: Associates - (oaks generally include white, scarlet, blackjack, black, post, and southern red) hickory, blackgum, sweetgum, Virginia pine, and pitch pine. Sites --generally in dry, low ridges, flats, and south slopes.

405 Virginia pine/southern red oak: Associates - black oak, scarlet oak, white oak, post oak, blackjack oak, shortleaf pine, blackgum, hickory, pitch pine, table-mountain pine, chestnut oak. Sites -- dry slopes and ridges.

406 Loblolly pine/hardwood: Associates - wide variety of moist and wet site hardwoods including blackgum, sweetgum, yellow-poplar, red maple, white and green ash, and American elm; on drier sites associates include southern and northern red oak, white oak, post oak, scarlet oak, persimmon, and hickory. Sites -- usually moist to very moist though not wet all year, but also on drier sites.

409 Other pine/hardwood: A type used for those unnamed pine-hardwood combinations that meet the requirements for oak-pine. These are stands where hardwoods (usually oaks) comprise the plurality of the stocking with at least a 25 to 49 percent pine, eastern redcedar, or southern redcedar component.

OAK/HICKORY GROUP

501 Post oak/blackjack oak (includes dwarf post oak): Associates - black oak, hickory, southern red oak, white oak, scarlet oak, shingle oak, live oak, shortleaf pine, Virginia pine, blackgum, sourwood, red maple, winged elm, hackberry, chinkapin oak, shumard oak, dogwood, and eastern redcedar. Sites -- dry uplands and ridges.

502 Chestnut oak: Associates - scarlet oak, white oak, black oak, post oak, pitch pine, blackgum, sweetgum, red maple, red oak, shortleaf pine, Virginia pine. Sites -- rocky outcrops with thin soil, ridge tops.

503 White oak/red oak/hickory (includes all hickories except water and shellbark hickory): Associates - pin oak, northern pin oak, chinkapin oak, black oak, dwarf chinkapin oak, American elm, scarlet oak, bur oak, white ash, sugar maple, red maple, walnut, basswood, locust, beech, sweetgum, blackgum, yellow-poplar, and dogwood. Sites -- wide variety of well-drained upland soils.

504 White oak: Associates - black oak, northern red oak, bur oak, hickory, white ash, yellow-poplar. Sites -- scattered patches on upland, loamy soils but on drier sites than type 503.

505 Northern red oak: Associates - black oak, scarlet oak, chestnut oak, and yellow-poplar. Sites -- spotty distribution on ridge crests and north slopes in mountains but also found on rolling land, slopes, and benches on loamy soil.

506 Yellow-poplar/white oak/northern red oak: Associates - black oak, hemlock, blackgum, and hickory. Sites -- northern slopes, coves, and moist flats.

507 Sassafras/persimmon: Associates - elm, eastern redcedar, hickory, ash, sugar maple, yellow-poplar, Texas sophora, and oaks. Sites -- abandoned farmlands and old fields.

508 Sweetgum/yellow-poplar: Associates - red maple, white ash, green ash, and other moist site hardwoods. Sites -- generally occupies moist, lower slopes.

509 Bur oak: Associates-northern pin oak, black oak, chinkapin oak, and eastern redcedar in northern and dry upland sites; shagbark hickory, black walnut, eastern cottonwood, white ash, American elm, swamp white oak, honey locust, and American basswood in southern and lowland sites. Sites -- drier uplands to moist bottomlands with the drier uplands more common in the northern part of the range and the moist bottomlands more common in the southern part of the range.

510 Scarlet oak: Associates - black oak, southern red oak, chestnut oak, white oak, post oak, hickory, pitch pine, blackgum, sweetgum, black locust, sourwood, dogwood, shortleaf pine, and Virginia pine. Sites -- dry ridges, south- or west-facing slopes and flats but often moister situations probably as a result of logging or fire.

511 Yellow-poplar: Associates - black locust, red maple, sweet birch, cucumbertree, and other moist-site hardwoods (except sweetgum, see type 508) and white oak and northern red oak (see type 503). Sites -- lower slopes, northerly slopes, moist coves, flats, and old fields.

512 Black walnut: Associates - yellow-poplar, white ash, black cherry, basswood, beech, sugar maple, oaks, and hickory. Sites -- coves and well-drained bottoms.

513 Black locust: Associates - many species of hardwoods and hard pines may occur with it in mixture, either having been planted or from natural seeding. Sites -- may occur on any well- drained soil but best on dry sites, often in old fields.

515 Chestnut oak/black oak/scarlet oak: Associates-northern and southern red oaks, post oak, white oak, sourwood, shagbark hickory, pignut hickory, yellow-poplar, blackgum, sweetgum, red maple, eastern white pine, pitch pine, Table Mountain pine, shortleaf pine, and Virginia pine. Sites -- dry upland sites on thin-soiled rocky outcrops on dry ridges and slopes.

516 Cherry/white ash/yellow-poplar: Associates - sugar maple, American beech, northern red oak, white oak, blackgum, hickory, cucumbertree, and yellow birch. Sites -- fertile, moist well- drained sites.

517 Elm/ash/black locust: Associates - Black locust, silver maple, boxelder, blackbead ebony, American elm, slippery elm, rock elm, red maple, green ash predominate. Found in North Central region, unknown in the Northeast. Sites -- upland

519 Red maple/oak: Associates - the type is dominated by red maple and some of the wide variety of central hardwood associates include upland oak, hickory, yellow-poplar, black locust, sassafras as well as some central softwoods like Virginia and shortleaf pines. Sites -- uplands.

520 Mixed upland hardwoods: Includes Ohio buckeye, yellow buckeye, Texas buckeye, red buckeye, painted buckeye, American hornbeam, American chestnut, eastern redbud, flowering dogwood, hawthorn spp., cockspur hawthorn, downy hawthorn, Washington hawthorn, fleshy hawthorn, dwarf hawthorn, honeylocust, Kentucky coffeetree, Osage-orange, all mulberries, blackgum, sourwood, southern red oak, shingle oak, laurel oak, water oak, live oak, willow oak, black locust, blackbead ebony, anacahuita, and September elm. Associates - Any mixture of hardwoods of species typical of the upland central hardwood region should include at least some oak. Sites -- wide variety of upland sites.

OAK/GUM/CYPRESS GROUP

601 Swamp chestnut oak/cherrybark oak: Associates - Shumard oak, Delta post oak, white ash, hickory, white oak, blackgum, sweetgum, southern red oak, post oak, American elm, winged elm, yellow-poplar, and beech. Sites -- within alluvial flood plains of major rivers, on all ridges in the terraces, and on the best fine sandy loam soils on the highest first bottom ridges.

602 Sweetgum/Nuttall oak/willow oak: Associates - American holly, green ash, American elm, pecan, cottonwood, red maple, honeylocust, persimmon, and anacahuita. Sites -- very wet.

605 Overcup oak/water hickory (includes shellbark hickory): Associates - pin oak, willow oak, American elm, green ash, hackberry, persimmon, and red maple. Sites -- in South within alluvial flood plains in low, poorly drained flats with clay soils; also in sloughs and lowest backwater basins and low ridges with heavy soils that are subject to late spring inundation.

606 Atlantic white-cedar: Associates - North includes gray birch, pitch pine, hemlock, blackgum, and red maple. South includes pond pine, baldcypress, and red maple. Sites --usually confined to sandy-bottomed, peaty, interior, and river swamps, wet depressions, and stream banks.

607 Baldcypress/water tupelo: 25-50 percent stocking of baldcypress (either baldcypress or Montezuma baldcypress), Associates - blackgum, willow, red maple, American elm, persimmon, overcup oak, and sweetgum. Sites -- very low, poorly drained flats, deep sloughs, and swamps; wet most all the year. Also, floodplains and stream margins.

608 Sweetbay/swamp tupelo/red maple: Associates - blackgum, Florida maple, water birch, gum bumelia, waterlocust, loblolly bay, all magnolias, red maple, Ogechee tupelo, red bay, water-elm, Oglethorpe oak, loblolly and pond pines, American elm, and other moist-site hardwoods. Sites -- very moist but seldom wet all year--shallow ponds, muck swamps, along smaller creeks in Coastal Plain (rare in Northeast).

609 Baldcypress/pondcypress: >50 percent stocking of baldcypress and/or pondcypress. Associates - blackgum, willow, red maple, American elm, persimmon, overcup oak, and sweetgum. Sites -- very low, poorly drained flats, deep sloughs, and swamps; wet most all the year. Also, floodplains and stream margins.

ELM/ASH/COTTONWOOD GROUP

701 Black ash/American elm/red maple (includes slippery and rock elm): Associates - swamp white oak, silver maple, sycamore, pin oak, blackgum, white ash, and cottonwood. Sites -- moist to wet areas, swamps, gullies, and poorly drained flats.

702 River birch/sycamore: Associates - red maple, black willow, and other moist-site hardwoods. Sites -- moist soils at edges of creeks and rivers.

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.

705 Sycamore/pecan/American elm (includes slippery and rock elm): Associates - sweetgum, green ash, hackberry, silver maple, cottonwood, willow, boxelder, and river birch. Sites -- bottomlands, alluvial flood plains of major rivers.

706 Sugarberry/hackberry/elm/green ash (includes American, winged, cedar, slippery and rock elm): Associates - boxelder, pecan, blackgum, persimmon, honeylocust, red maple, and hackberry. Sites--low ridges and flats in flood plains.

707 Silver maple/American elm: Silver maple and American elm are the majority species in this type. Associates - chalk maple, sweetgum, pin oak, swamp white oak, eastern cottonwood, sycamore, green ash, and other moist-site hardwoods, according to the region. Sites -- primarily on well-drained moist sites along river bottoms and flood plains, and beside lakes and larger streams.

708 Red maple/lowland: Red maple comprises a majority of the stocking. Because this type grows on a wide variety of sites over an extensive range, associates are diverse. Associates include yellow-poplar, blackgum, sweetgum, and loblolly pine. Sites -- generally restricted to very moist to wet sites with poorly drained soils, and on swamp borders.

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.

MAPLE/BEECH/BIRCH GROUP

801 Sugar maple/beech/yellow birch: Associates - butternut, basswood, red maple, hemlock, northern red oak, white ash, white pine, black cherry, sweet birch, American elm, rock elm, and eastern hophornbeam. Sites -- fertile, moist, well-drained sites.

802 Black cherry: Associates - sugar maple, northern red oak, red maple, white ash, basswood, sweet birch, butternut, American elm, and hemlock. Sites -- fertile, moist, well-drained sites.

803 Cherry/ash/yellow-poplar: Retired - see code 516.

805 Hard maple/basswood (includes American, Carolina and white basswood): Associates - black maple, white ash, northern red oak, eastern hophornbeam, American elm, red maple, eastern white pine, eastern hemlock. Sugar maple and basswood occur in different proportions but together comprise the majority of the stocking. Sites -- fertile, moist, well-drained sites.

807 Elm/ash/locust: Retired - see code 517.

809 Red maple/upland: Associates - the type is dominated by red maple and some of the wide variety of northern hardwood associates include sugar maple, beech, birch, aspen, as well as some northern softwoods like white pine, red pine, and hemlock; this type is often the result of repeated disturbance or cutting. Sites -- uplands. (See Type 519 under oak/hickory group)

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.

903 Gray birch: Associates - oaks, red maple, white pine and others. Sites- poor soils of abandoned farms and burns.

904 Balsam poplar: Associates - paper birch, white spruce, black spruce, and tamarack. Sites -- occurs on rich floodplains where erosion and folding are active.

905 Pin cherry: Associates - quaking and bigtooth aspen; paper and yellow birch; striped, red and sugar maple; beech; northern red oak; balsam fir; and red spruce. In the Appalachians, Fraser fir and mountain-ash are additional associates. In the central and Lake states, chokecherry and black cherry are common. Sites -- occurs over a wide range of soils and drainage classes, found on sites varying from dry rocky ledges and sandy plains to moist loamy soils.

EXOTIC HARDWOODS GROUP

991 Paulownia: Stands with the majority of stocking comprised of Paulownia tomentosa, commonly known as Princess tree, royal paulownia or empress tree. Sites -- can be found along roadsides, streambanks, and forest edges. It tolerates infertile and acid soils and drought conditions. It easily adapts to disturbed habitats, including previously burned areas, forests defoliated by pests (such as the gypsy moth) and landslides and can colonize rocky cliffs and scoured riparian zones. Paulownia can also be found in plantations.

995 Other exotic hardwoods: Includes any of the following species: Norway maple, ailanthus, mimosa, European alder, Chinese chestnut, ginkgo, Lombardy poplar, European mountain-ash, West Indian mahogany, Siberian elm, saltcedar spp., chinaberry, Chinese tallowtree, tung-oil- tree, Russian-olive, and avocado.

For nonstocked stands, see Item 4.5.0.3 for procedures to determine FOREST TYPE.

APPENDIX C PNW FOREST LAND TREE SPECIES CODES

This list includes all tally tree species used to define forest land conditions in Oregon, Washington, and California. 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	**CUNO**	**Alaska yellow-cedar**	***Cupressus***	***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***
	0094	**PIGL**	**white spruce**	***Picea***	***glauca***

Woodland	FIA Code	PLANTS Code	Common name	Genus	Species
	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***
w	**0138**	**PIQU**	**four-leaf pine, Parry pinyon pine**	***Pinus***	***quadrifolia***
	0139	**PITO**	**Torrey pine**	***Pinus***	***torreyana***

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Woodland	FIA Code	PLANTS Code	Common name	Genus	Species
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*
	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*

Woodland	FIA Code	PLANTS Code	Common name	Genus	Species
	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*
	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*

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Woodland	FIA Code	PLANTS Code	Common name	Genus	Species
	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*
	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*

Woodland	FIA Code	PLANTS Code	Common name	Genus	Species
	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*

Woodland	FIA Code	PLANTS Code	Common name	Genus	Species
w	0803	QUAR	Arizona white oak and gray oak	*Quercus*	*arizonica*
	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*

Woodland	FIA Code	PLANTS Code	Common name	Genus	Species
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***
	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 D FIA TREE SPECIES CODES

This list includes all tree species tallied in the Continental U.S., Alaska, Caribbean, *and the Pacific Islands. All species, including Core, Core Optional, and from all regions, are valid tally trees for the urban inventory.* Woodland species designate species where DRC is measured instead of DBH.

Woodland	FIA Code	PLANTS Code	Common Name	Genus	Species
	11	ABAM	Pacific silver fir	Abies	amabilis
	12	ABBA	balsam fir	Abies	balsamea
	14	ABBR	Santa Lucia or bristlecone fir	Abies	bracteata
	15	ABCO	white fir	Abies	concolor
	16	ABFR	Fraser fir	Abies	fraseri
	17	ABGR	grand fir	Abies	grandis
	19	ABLA	subalpine fir	Abies	lasiocarpa
	18	ABLAA	corkbark fir	Abies	lasiocarpa var. arizonica
	20	ABMA	California red fir	Abies	magnifica
	22	ABPR	noble fir	Abies	procera
	21	ABSH	Shasta red fir	Abies	shastensis
	10	ABIES	fir spp.	Abies	spp.
	6001	ACAN4	blackbrush wattle	Acacia	anegadensis
	6002	ACAN10	mulga	Acacia	aneura
	6003	ACAU	auri	Acacia	auriculiformis
	6004	ACCO	small Philippine acacia	Acacia	confusa
	6016	ACDE3	silver wattle	Acacia	dealbata
	6017	ACDE	green wattle	Acacia	decurrens
W	303	ACFA	sweet acacia	Acacia	farnesiana
W	304	ACGR	catclaw acacia	Acacia	greggii
	6006	ACKO	koa	Acacia	koa
	6007	ACKO2	koaoha	Acacia	koaia
	6019	ACLO	Sydney golden wattle	Acacia	longifolia
	6008	ACMA	porknut	Acacia	macracantha
	6009	ACMA12	black wattle	Acacia	mangium
	6010	ACME80	black wattle	Acacia	mearnsii
	6011	ACME	blackwood	Acacia	melanoxylon
	6012	ACMU	spineless wattle	Acacia	muricata
	6013	ACNI2	gum arabic tree	Acacia	nilotica
	6014	ACPA81	South Wales wattle	Acacia	parramattensis
	6015	ACPO3	Acacia polyacantha	Acacia	polyacantha
W	300	ACACI	acacia spp.	Acacia	spp.
	6018	ACTO	poponax	Acacia	tortuosa
	6020	ACVE2	prickly Moses	Acacia	verticillata
	311	ACBA3	Florida maple	Acer	barbatum
	5145	ACCA5	hedge maple	Acer	campestre
	5146	ACCI	vine maple	Acer	circinatum
	5147	ACGI	Amur maple	Acer	ginnala
W	321	ACGL	Rocky Mountain maple	Acer	glabrum
W	322	ACGR3	bigtooth maple	Acer	grandidentatum
	5148	ACGR14	paperbark maple	Acer	griseum
	323	ACLE	chalk maple	Acer	leucoderme
	312	ACMA3	bigleaf maple	Acer	macrophyllum
	5155	ACMI7	State Street Maple	Acer	miyabei ssp. Morton
	5149	ACMO10	Painted maple	Acer	mono
	313	ACNE2	boxelder	Acer	negundo
	314	ACNI5	black maple	Acer	nigrum
	5150	ACPA2	Japanese maple	Acer	palmatum
	315	ACPE	striped maple	Acer	pensylvanicum
	320	ACPL	Norway maple	Acer	platanoides
	5157	ACPL2	Norwegian Sunset Maple	Acer	platanoides x truncatum
	5151	ACPS	sycamore maple	Acer	pseudoplatanus
	316	ACRU	red maple	Acer	rubrum
	317	ACSA2	silver maple	Acer	saccharinum
	318	ACSA3	sugar maple	Acer	saccharum
	319	ACSP2	mountain maple	Acer	spicatum

Woodland	FIA Code	PLANTS Code	Common Name	Genus	Species
	310	ACER	maple spp.	Acer	spp.
	5152	ACTA80	tatarian maple	Acer	tataricum
	5156	ACTR7	Three Flower Maple	Acer	triflorum
	5154	ACFR	Freeman maple	Acer	x freemanii
	6021	ACAR	hollowheart	Acnistus	arborescens
	906	ACWR4	Everglades palm, paurotis-palm	Acoelorraphe	wrightii
	6023	ACME2	grugru palm	Acrocomia	media
	6025	ADDI3	baobab	Adansonia	digitata
	6026	ADRI	wild lime	Adelia	ricinella
	6028	ADPA	red beadtree	Adenanthera	pavonina
	6029	ADENA	beadtree	Adenanthera	spp.
	6032	AEMA	Caribbean spiritweed	Aegiphila	martinicensis
	333	AECA	California buckeye	Aesculus	californica
	332	AEFL	yellow buckeye	Aesculus	flava
	331	AEGL	Ohio buckeye	Aesculus	glabra
	334	AEGLA	Texas buckeye	Aesculus	glabra var. arguta
	5163	AEHI	horse chestnut	Aesculus	hippocastanum
	5164	AEPA2	bottlebrush buckeye	Aesculus	parviflora
	336	AEPA	red buckeye	Aesculus	pavia
	330	AESCU	buckeye, horsechestnut spp.	Aesculus	spp.
	337	AESY	painted buckeye	Aesculus	sylvatica
	6034	AFFA	yellowwood	Afrocarpus	falcatus
	6035	AFGR	East African yellowwood	Afrocarpus	gracilior
	6036	AGAU4	kauri	Agathis	australis
	6037	AGRO6	Queensland kauri	Agathis	robusta
	6042	AGMA14	Titimel	Aglaia	mariannensis
	6043	AGPA19	mesecheues	Aglaia	palauensis
	6044	AGPO4	karasyu, marasau	Aglaia	ponapensis
	6046	AGSA9	laga ali	Aglaia	samoensis
	6047	AGLAI	Aglaia	Aglaia	spp.
	6048	AICO2	Olomea	Aidia	cochinchinensis
	6049	AIRA2	Aidia racemosa	Aidia	racemosa
	341	AIAL	ailanthus	Ailanthus	altissima
	6051	AILAN	ailanthus	Ailanthus	spp.
	6053	AIMI	Aiphanes minima	Aiphanes	minima
	6055	ALAD	cream albizia	Albizia	adinocephala
	6056	ALCA8	naked albizia	Albizia	carbonaria
	6057	ALCH2	Chinese albizia	Albizia	chinensis
	6058	ALFA5	ukall ra ngebard	Albizia	falcataria
	345	ALJU	mimosa, silktree	Albizia	julibrissin
	6059	ALLE	woman's tongue	Albizia	lebbeck
	6060	ALPR	tall albizia	Albizia	procera
	6061	ALRE	ukall ra ngebard	Albizia	retusa
	6062	ALSA10	whiteflower albizia	Albizia	saponaria
	6063	ALBIZ	albizia	Albizia	spp.
	6064	ALLA	achiotillo	Alchornea	latifolia
	6066	ALFL3	palo de gallina	Alchorneopsis	floribunda
	6069	ALMA	Hawaii alectryon	Alectryon	macrococcus
	6073	ALECT	alectryon	Alectryon	spp.
	6075	ALMO2	Indian walnut	Aleurites	moluccana
	6077	ALEUR	aleurites	Aleurites	spp.
	6078	ALTR11	lumbang	Aleurites	trisperma
	6080	ALCR9	palo blanco	Allophylus	crassinervis
	6082	ALRA	palo de caja	Allophylus	racemosus
	6083	ALLOP	Allophylus	Allophylus	spp.
	6084	ALTE13	chebeludes	Allophylus	ternatus
	6085	ALTI2	ebeludes, chebeludes	Allophylus	timorensis
	5189	ALCO13	Italian alder	Alnus	cordata
	355	ALGL2	European alder	Alnus	glutinosa
	5188	ALIN2	gray alder	Alnus	incana
	6086	ALNE2	Nepal alder	Alnus	nepalensis
	353	ALOB2	Arizona alder	Alnus	oblongifolia

Woodland	FIA Code	PLANTS Code	Common Name	Genus	Species
	352	ALRH2	white alder	Alnus	rhombifolia
	351	ALRU2	red alder	Alnus	rubra
	5190	ALSE2	hazel alder	Alnus	serrulata
	350	ALNUS	alder spp.	Alnus	spp.
	5192	ALVI5	green alder	Alnus	viridis
	6088	ALCA21	chelebiob, elebiong	Alphitonia	carolinensis
	6089	ALPO3	Hawaii kauilatree	Alphitonia	ponderosa
	6090	ALPHI	Alphitonia	Alphitonia	spp.
	6091	ALZI	toi	Alphitonia	zizyphoides
	6092	ALBR4	helecho gigante de la sierra	Alsophila	bryophila
	6093	ALPO7	Alsophila portoricensis	Alsophila	portoricensis
	6095	ALMA16	deviltree	Alstonia	macrophylla
	6096	ALPA22	Alstonia pacifica	Alstonia	pacifica
	6097	ALSTO	alstonia	Alstonia	spp.
	357	AMAR3	common serviceberry	Amelanchier	arborea
	5203	AMLA	Allegheny serviceberry	Amelanchier	laevis
	358	AMSA	roundleaf serviceberry	Amelanchier	sanguinea
	356	AMELA	serviceberry spp.	Amelanchier	spp.
	6101	AMLA4	black calabash	Amphitecna	latifolia
	6103	AMBA2	balsam torchwood	Amyris	balsamifera
	852	AMEL	sea torchwood	Amyris	elemifera
	6107	ANOC	cashew	Anacardium	occidentale
	6106	ANACA	anacardium	Anacardium	spp.
	6108	ANGL5	Anacolosa glochidiiformis	Anacolosa	glochidiiformis
	6109	ANIN13	Anacolosa insularis	Anacolosa	insularis
	6111	ANPE13	Anadenanthera peregrina	Anadenanthera	peregrina
	6114	ANIN	cabbagebark tree	Andira	inermis
	6118	ANEV	dermarm	Angiopteris	evecta
	6120	ANBR7	canelillo	Aniba	bracteata
	6124	ANCH9	Annona cherimola	Annona	cherimola
	6125	ANDI11	ilama	Annona	diversifolia
	853	ANGL4	pond-apple	Annona	glabra
	6127	ANMO	mountain soursop	Annona	montana
	6128	ANMU2	soursop	Annona	muricata
	6129	ANRE	custard apple	Annona	reticulata
	6130	ANNON	Annona	Annona	spp.
	6131	ANSQ	sugar apple	Annona	squamosa
	6137	ANBU3	Antidesma bunius	Antidesma	bunius
	6135	ANKA	Kapua china laurel	Antidesma	kapuae
	6138	ANKU3	Antidesma kusaiense	Antidesma	kusaiense
	6139	ANPL2	ha a	Antidesma	platyphyllum
	6142	ANPO8	Antidesma ponapense	Antidesma	ponapense
	6143	ANPU2	hame	Antidesma	pulvinatum
	6144	ANSP14	Antidesma sphaerocarpum	Antidesma	sphaerocarpum
	6145	ANTID	chinalaurel	Antidesma	spp.
	6146	ANAC4	placa chiquitu	Antirhea	acutata
	6147	ANCO3	pegwood	Antirhea	coriacea
	6148	ANIN2	Antirhea inconspicua	Antirhea	inconspicua
	6149	ANLU3	palo iloron	Antirhea	lucida
	6150	ANOB2	quina roja	Antirhea	obtusifolia
	6151	ANPO3	Puerto Rico quina	Antirhea	portoricensis
	6152	ANSI	Sintenis' quina	Antirhea	sintenisii
	5232	AREL8	Japanese angelica tree	Aralia	elata
	5233	ARSP2	devil's walkingstick	Aralia	spinosa
	6154	ARAN15	parana pine	Araucaria	angustifolia
	6155	ARCO32	New Caledonia pine	Araucaria	columnaris
	6156	AREX4	Norfolk Island Pine	Araucaria	excelsa
	6157	ARHE12	Norfolk Island pine	Araucaria	heterophylla
	6158	ARAUC2	Araucaria	Araucaria	spp.
	362	ARAR2	Arizona madrone	Arbutus	arizonica
	361	ARME	Pacific madrone	Arbutus	menziesii
	360	ARBUT	madrone spp.	Arbutus	spp.

Woodland	FIA Code	PLANTS Code	Common Name	Genus	Species
	6180	ARUN4	strawberry tree	Arbutus	unedo
W	363	ARXA80	Texas madrone	Arbutus	xalapensis
	6159	ARAL	Alexandra palm	Archontophoenix	alexandrae
	6160	ARCU2	Bangalow palm	Archontophoenix	cunninghamiana
	6161	AREL4	shoebutton	Ardisia	elliptica
	6162	ARGL11	ausubon	Ardisia	glauciflora
	6163	ARLU3	mountain marlberry	Ardisia	luquillensis
	6164	AROB2	Guadeloupe marlberry	Ardisia	obovata
	6165	ARSO	China-shrub	Ardisia	solanacea
	6166	ARDIS	marlberry	Ardisia	spp.
	6167	ARCA41	betelnut	Areca	catechu
	6169	ARPI6	cabo-negro	Arenga	pinnata
	6171	ARAL7	breadfruit	Artocarpus	altilis
	6173	ARHE2	Artocarpus heterophyllus	Artocarpus	heterophyllus
	6175	ARMA28	dugdug, Marianas breadfruit	Artocarpus	mariannensis
	6176	ARNO	Artocarpus nobilis	Artocarpus	nobilis
	6177	AROD2	Marang	Artocarpus	odoratissimus
	6178	ARTOC	meduu	Artocarpus	spp.
	6179	ARBR11	taputoi	Arytera	brackenridgei
	6181	ASDI14	afia	Ascarina	diffusa
	5256	ASPA18	smallflower pawpaw	Asimina	parviflora
	367	ASTR	pawpaw	Asimina	triloba
	6184	ASKU2	Astronidium kusaianum	Astronidium	kusaianum
	6185	ASNA10	Astronidium navigatorum	Astronidium	navigatorum
	6186	ASPA37	meskui	Astronidium	palauense
	6187	ASPI11	Astronidium pickeringii	Astronidium	pickeringii
	6188	ASSA23	Astronidium samoense	Astronidium	samoense
	6189	ASTRO4	Astronidium	Astronidium	spp.
	6190	ASSU31	Astronidium subcordata	Astronidium	subcordata
	6193	ATRA2	ifi ifi	Atuna	racemosa
	6197	AVBI	Bilimbi	Averrhoa	bilimbi
	6198	AVCA	carambola	Averrhoa	carambola
	6199	AVERR	Averrhoa	Averrhoa	spp.
	6200	AVAL	biut	Avicennia	alba
	986	AVGE	black-mangrove	Avicennia	germinans
	6203	AVMA3	Avicennia marina	Avicennia	marina
	6205	AVICE	Avicennia	Avicennia	spp.
	6206	AZIN2	neem	Azadirachta	indica
	6208	BATA	Saitamu	Baccaurea	taitensis
	5259	BAGL	silverling	Baccharis	glomeruliflora
	5260	BAHA	eastern baccharis	Baccharis	halimifolia
	5261	BAGA2	peach palm	Bactris	gasipaes
	6213	BAPA8	ralm	Badusa	palauensis
	6215	BAMBU	bamboo	Bambusa	spp.
	6216	BAVU2	common bamboo	Bambusa	vulgaris
	6217	BAPO	Puerto Rico palo de ramon	Banara	portoricensis
	6219	BAVA2	Vanderbilt's palo de ramon	Banara	vanderbiltii
	6220	BAAS3	sea putat	Barringtonia	asiatica
	6221	BARA5	langaasag	Barringtonia	racemosa
	6222	BASA9	falaga	Barringtonia	samoensis
	6223	BARRI	Barringtonia	Barringtonia	spp.
	6224	BAEG6	Bastardiopsis eggersii	Bastardiopsis	eggersii
	6225	BABI6	Bauhinia binata	Bauhinia	binata
	6241	BALU	Texasplume	Bauhinia	lunarioides
	6226	BAMO2	Napoleon's plume	Bauhinia	monandra
	6227	BAMU3	petite flamboyant bauhinia	Bauhinia	multinervia
	6228	BAPA3	railroadfence	Bauhinia	pauletia
	6229	BAPU	butterfly tree	Bauhinia	purpurea
	6230	BAUHI	bauhinia	Bauhinia	spp.
	6231	BATO	St. Thomas tree	Bauhinia	tomentosa
	6232	BAVA	mountain ebony	Bauhinia	variegata
	6252	BABL	bauhinia	Bauhinia	x blakeana

Woodland	FIA Code	PLANTS Code	Common Name	Genus	Species
	6218	BERE4	bottle-palm	Beaucarnea	recurvata
	6233	BEPE	slugwood	Beilschmiedia	pendula
	6235	BEDI2	Caribbean myrtlecroton	Bernardia	dichotoma
	371	BEAL2	yellow birch	Betula	alleghaniensis
	372	BELE	sweet birch	Betula	lenta
	376	BENE4	resin birch	Betula	neoalaskana
	373	BENI	river birch	Betula	nigra
	374	BEOC2	water birch	Betula	occidentalis
	375	BEPA	paper birch	Betula	papyrifera
	5279	BEPE3	European white birch	Betula	pendula
	5280	BEPL2	Asian white birch	Betula	platyphylla
	379	BEPO	gray birch	Betula	populifolia
	5281	BEPU5	downy birch	Betula	pubescens
	370	BETUL	birch spp.	Betula	spp.
	377	BEUB	Virginia roundleaf birch	Betula	uber
	378	BEUT	northwestern paper birch	Betula	x utahensis
	6236	BIJA	Javanese bishopwood	Bischofia	javanica
	6237	BISCH	bishopwood	Bischofia	spp.
	6238	BIOR	lipsticktree	Bixa	orellana
	6239	BIXA	bixa	Bixa	spp.
	6240	BLSA2	akee	Blighia	sapida
	6242	BOBR3	akupa	Bobea	brevipes
	6243	BOEL3	ahakea lau nui	Bobea	elatior
	6244	BOSA2	Hawaii dogweed	Bobea	sandwicensis
	6245	BOBEA	ahakea	Bobea	spp.
	6246	BOTI	ahakea	Bobea	timonioides
	6247	BOFR2	parrotweed	Bocconia	frutescens
	6248	BOCCO	bocconia	Bocconia	spp.
	6250	BOVI7	virgata	Boehmeria	virgata
	6251	BODA	white alling	Bontia	daphnoides
	6253	BORA2	Bourreria radula	Bourreria	radula
	6255	BOSU2	bodywood	Bourreria	succulenta
	6257	BOVI2	roble de guayo	Bourreria	virgata
	6258	BRDI6	pink flame tree	Brachychiton	discolor
	6259	BRPO6	whiteflower kurrajong	Brachychiton	populneum
	6260	BRAR6	kanawao	Broussaisia	arguta
	6262	BRPA4	paper mulberry	Broussonetia	papyrifera
	6264	BRCA12	angels-trumpet	Brugmansia	candida
	6266	BRGY3	Oriental mangrove	Bruguiera	gymnorhiza
	6267	BRPA15	smallflower bruguiera	Bruguiera	parviflora
	6268	BRSE11	Oriental mangrove	Bruguiera	sexangula
	6269	BRUGU	bruguiera	Bruguiera	spp.
	6270	BRCO6	West Indian sumac	Brunellia	comocladiifolia
	6272	BRAM4	American brunfelsia	Brunfelsia	americana
	6273	BRDE4	Serpentine Hill raintree	Brunfelsia	densifolia
	6274	BRLA5	vega blanca	Brunfelsia	lactea
	6275	BRPO3	Puerto Rico raintree	Brunfelsia	portoricensis
	6277	BUEN	omail	Buchanania	engleriana
	6278	BUME4	gasu	Buchanania	merrillii
	6279	BUPA16	omail, deuachel	Buchanania	palawensis
	6280	BUCHA	Buchanania	Buchanania	spp.
	6283	BUTE4	fourleaf buchenavia	Buchenavia	tetraphylla
	6284	BUBU	gregorywood	Bucida	buceras
	5322	BUAL	fountain butterflybush	Buddleja	alternifolia
	6286	BUAS	dogtail	Buddleja	asiatica
	6294	BUGL2	cafe falso	Bunchosia	glandulifera
	6295	BUGL	cafe forastero	Bunchosia	glandulosa
	6297	BUPO5	Bunchosia polystachia	Bunchosia	polystachia
	6299	BURI3	Burckella richii	Burckella	richii
	854	BUSI	gumbo limbo	Bursera	simaruba
	6303	BULA10	Buxus laevigata	Buxus	laevigata
	6304	BUPO	Puerto Rico box	Buxus	portoricensis

Woodland	FIA Code	PLANTS Code	Common Name	Genus	Species
	5329	BUSE2	common box	Buxus	sempervirens
	6306	BUVA	Vahl's box	Buxus	vahlii
	6308	BYCR	maricao cimun	Byrsonima	crassifolia
	6311	BYLU	Long Key locustberry	Byrsonima	lucida
	6313	BYSP	doncella	Byrsonima	spicata
	6315	BYWA	almendrillo	Byrsonima	wadsworthii
	6317	CACO28	divi divi	Caesalpinia	coriaria
	6318	CAKA5	uhiuhi	Caesalpinia	kavaiensis
	6319	CAPU13	pride-of-Barbados	Caesalpinia	pulcherrima
	6320	CASA28	sappanwood	Caesalpinia	sappan
	6316	CAESA	nicker	Caesalpinia	spp.
	6325	CASU33	Surinamese stickpea	Calliandra	surinamensis
	6326	CAAM14	caparosa	Callicarpa	ampla
	6328	CACI15	crimson bottlebrush	Callistemon	citrinus
	6329	CAVI23	weeping bottlebrush	Callistemon	viminalis
	6331	CACO2	Callitris columellaris	Callitris	columellaris
	81	CADE27	incense-cedar	Calocedrus	decurrens
	6337	CAEC2	Caloncoba echinata	Caloncoba	echinata
	6338	CAAN22	Antilles calophyllum	Calophyllum	antillanum
	6341	CAIN4	Alexandrian laurel	Calophyllum	inophyllum
	6342	CANE31	tamanu	Calophyllum	neo-ebudicum
	6343	CAPE15	chesemolech	Calophyllum	pelewense
	6344	CASO12	olebtaches, chesemolech	Calophyllum	soulattri
	6345	CALOP	calophyllum	Calophyllum	spp.
	6346	CAPR	roostertree	Calotropis	procera
	6347	CALOT	calotropis	Calotropis	spp.
	6350	CACA73	degame	Calycophyllum	candidissimum
	6351	CAKI	Kiaerskov's lidflower	Calyptranthes	kiaerskovii
	6352	CAKR	limoncillo	Calyptranthes	krugii
	6353	CALU12	Luquillo forest lidflower	Calyptranthes	luquillensis
	6354	CAPA8	pale lidflower	Calyptranthes	pallens
	6355	CAPO9	Puerto Rico lidflower	Calyptranthes	portoricensis
	6356	CASI8	limoncillo de monte	Calyptranthes	sintenisii
	6358	CATH3	Thomas' lidflower	Calyptranthes	thomasiana
	6359	CAZU	myrtle of the river	Calyptranthes	zuzygium
	6360	CARI3	Puerto Rico manac	Calyptronoma	rivalis
	5363	CAJA9	camellia	Camellia	japonica
	5364	CASI16	tea	Camellia	sinensis
	6367	CABR42	Campnosperma brevipetiolata	Campnosperma	brevipetiolata
	6366	CABR18	kelela charm, kiu	Campnosperma	brevipetiolatum
	6370	CAOD	ilang-ilang	Cananga	odorata
	6373	CAHI14	mesecheues	Canarium	hirsutum
	6374	CAIN42	lukerr	Canarium	indicum
	6372	CAHA39	mafoa	Canarium	mafoa
	6375	CAOV7	Pili Nut	Canarium	ovatum
	6377	CANAR2	Canarium	Canarium	spp.
	6378	CAVI26	maali	Canarium	vitiense
	6379	CAVU9	Canarium vulgare	Canarium	vulgare
	6380	CAWI	wild cinnamon	Canella	winteriana
	6383	CAAM13	burro blanco	Capparis	amplissima
	6384	CABA2	caper	Capparis	baducca
	6386	CACY	Jamaican caper	Capparis	cynophallophora
	6387	CAFL2	falseteeth	Capparis	flexuosa
	6389	CAHA9	broadleaf caper	Capparis	hastata
	6390	CAIN5	linguam	Capparis	indica
	5375	CAAR18	Siberian peashrub	Caragana	arborescens
	6393	CAGU6	crabwood	Carapa	guianensis
	6395	CAPA23	papaya	Carica	papaya
	6396	CARIC	papaya	Carica	spp.
	6397	CARE22	scorpionbush	Carmona	retusa
	6398	CARMO	scorpionbush	Carmona	spp.
	5378	CABE8	European hornbeam	Carpinus	betulus

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	391	CACA18	American hornbeam, musclewood	Carpinus	caroliniana
	409	CAAL27	mockernut hickory	Carya	alba
	401	CAAQ2	water hickory	Carya	aquatica
	413	CACA38	southern shagbark hickory	Carya	carolinae-septentrionalis
	402	CACO15	bitternut hickory	Carya	cordiformis
	411	CAFL6	scrub hickory	Carya	floridana
	403	CAGL8	pignut hickory	Carya	glabra
	404	CAIL2	pecan	Carya	illinoinensis
	405	CALA21	shellbark hickory	Carya	laciniosa
	406	CAMY	nutmeg hickory	Carya	myristiciformis
	412	CAOV3	red hickory	Carya	ovalis
	407	CAOV2	shagbark hickory	Carya	ovata
	410	CAPA24	sand hickory	Carya	pallida
	400	CARYA	hickory spp.	Carya	spp.
	408	CATE9	black hickory	Carya	texana
	6399	CAMI36	fish tail palm	Caryota	mitis
	6400	CARYO	Caryota	Caryota	spp.
	6401	CAUR3	fishtail palm	Caryota	urens
	6402	CAAC3	rabo de ranton	Casearia	aculeata
	6403	CAAR8	gia verde	Casearia	arborea
	6405	CACA28	keuert	Casearia	cauliflora
	6406	CADE11	wild honeytree	Casearia	decandra
	6407	CAGU2	Guyanese wild coffee	Casearia	guianensis
	6408	CASEA	Casearia	Casearia	spp.
	6410	CASY2	crackopen	Casearia	sylvestris
	6415	CAFI3	golden shower	Cassia	fistula
	6417	CAGR11	pink shower	Cassia	grandis
	6418	CAJA3	apple blossom	Cassia	javanica
	6419	CALE49	gold medallion tree	Cassia	leptophylla
	6420	CASI4	kassod tree	Cassia	siamea
	6422	CASSI	Cassia	Cassia	spp.
	6425	CAXY	marbletree	Cassine	xylocarpa
	6427	CAGU3	goatwood	Cassipourea	guianensis
	5401	CACR27	Japanese chestnut	Castanea	crenata
	421	CADE12	American chestnut	Castanea	dentata
	424	CAMO83	Chinese chestnut	Castanea	mollissima
	422	CAPU9	Allegheny chinkapin	Castanea	pumila
	423	CAPUO	Ozark chinkapin	Castanea	pumila var. ozarkensis
	5402	CASA27	European chestnut	Castanea	sativa
	420	CASTA	chestnut spp.	Castanea	spp.
	6429	CAER3	goatbush	Castela	erecta
	6430	CAEL5	Panama rubbertree	Castilla	elastica
	6433	CACU8	river sheoak	Casuarina	cunninghamiana
	6434	CAEQ	beach sheoak	Casuarina	equisetifolia
	856	CAGL11	gray sheoak	Casuarina	glauca
	857	CALE28	belah	Casuarina	lepidophloia
	6437	CALI8	gagu,australian pine	Casuarina	litorea
	855	CASUA	sheoak spp.	Casuarina	spp.
	451	CABI8	southern catalpa	Catalpa	bignonioides
	6439	CALO8	Haitian catalpa	Catalpa	longissima
	5411	CAOV5	Chinese catalpa	Catalpa	ovata
	452	CASP8	northern catalpa	Catalpa	speciosa
	450	CATAL	catalpa spp.	Catalpa	spp.
	5415	CEVE	snowbrush ceanothus	Ceanothus	velutinus
	6441	CEOB	trumpet tree	Cecropia	obtusifolia
	6443	CESC9	pumpwood	Cecropia	schreberiana
	6444	CECRO	pumpwood	Cecropia	spp.
	6445	CEOD	Spanish cedar	Cedrela	odorata
	5420	CEAT4	Atlas cedar	Cedrus	atlantica
	5423	CEDE2	Deodar cedar	Cedrus	deodara
	5421	CELI6	cedar of Lebanon	Cedrus	libani
	6447	CEAC4	pochote	Ceiba	acuminata

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	6448	CEAE2	pochote	Ceiba	aesculifolia
	6449	CEPE2	kapoktree	Ceiba	pentandra
	461	CELA	sugarberry	Celtis	laevigata
	463	CELAR	netleaf hackberry	Celtis	laevigata var. reticulata
	462	CEOC	hackberry	Celtis	occidentalis
	6452	CEPA6	Celtis paniculata	Celtis	paniculata
	6458	CESI8	Chinese hackberry	Celtis	sinensis
	460	CELTI	hackberry spp.	Celtis	spp.
	6454	CETR3	almex	Celtis	trinervia
	5432	CEOC2	common buttonbush	Cephalanthus	occidentalis
	6457	CESI3	St. John's bread	Ceratonia	siliqua
	6459	CEDI12	chuti	Cerbera	dilatata
	6460	CEFL2	emeridech	Cerbera	floribunda
	6461	CEMA20	leva	Cerbera	manghas
	6462	CEOD2	chiute	Cerbera	odollam
	6463	CERBE	Cerbera spp.	Cerbera	spp.
	5435	CEJA2	katsura tree	Cercidiphyllum	japonicum
	471	CECA4	eastern redbud	Cercis	canadensis
	5436	CEOR9	California redbud	Cercis	orbiculata
W	475	CELE3	curlleaf mountain-mahogany	Cercocarpus	ledifolius
	6468	CEHE3	lady of the night cactus	Cereus	hexagonus
	6469	CEHI3	Cereus hildmannianus	Cereus	hildmannianus
	6470	CEREU	sweetpotato cactus	Cereus	spp.
	6472	CETA2	biut	Ceriops	tagal
	6473	CEAU2	orange jessamine	Cestrum	aurantiacum
	6474	CEDI6	day jessamine	Cestrum	diurnum
	6475	CELA2	galen del monte	Cestrum	laurifolium
	6477	CENO	night jessamine	Cestrum	nocturnum
	6478	CESTR	jessamine	Cestrum	spp.
	41	CHLA	Port-Orford-cedar	Chamaecyparis	lawsoniana
	42	CHNO	Alaska yellow-cedar	Chamaecyparis	nootkatensis
	5443	CHOB8	hinoki false cypress	Chamaecyparis	obtusa
	40	CHAMA4	white-cedar spp.	Chamaecyparis	spp.
	43	CHTH2	Atlantic white-cedar	Chamaecyparis	thyoides
	6480	CHHU7	European fan palm	Chamaerops	humilis
	6481	CHAR8	jointed sandmat	Chamaesyce	articulata
	6482	CHAT2	koko	Chamaesyce	atrococca
	6483	CHCE	ekoko	Chamaesyce	celastroides
	6492	CHHE3	Herbsts sandmat	Chamaesyce	herbstii
	6493	CHKU	kokomalei	Chamaesyce	kuwaleana
	6494	CHOL3	alpine sandmat	Chamaesyce	olowaluana
	6495	CHRO2	Koolau Range sandmat	Chamaesyce	rockii
	6496	CHAMA15	sandmat	Chamaesyce	spp.
	6497	CHDE3	Napali coast papala	Charpentiera	densiflora
	6498	CHEL	ellipticleaf papala	Charpentiera	elliptica
	6499	CHOB2	broadleaf papala	Charpentiera	obovata
	6500	CHOV2	Koolau Range papala	Charpentiera	ovata
	6503	CHARP	papala	Charpentiera	spp.
	6504	CHTO3	Waianae Range papala	Charpentiera	tomentosa
	6507	CHDO3	Domins club	Cheirodendron	dominii
	6508	CHFA	Fauries club	Cheirodendron	fauriei
	6509	CHFO4	olapa	Cheirodendron	forbesii
	6510	CHPL	lapalapa	Cheirodendron	platyphyllum
	6513	CHEIR	cheirodendron	Cheirodendron	spp.
	6514	CHTR2	olapalapa	Cheirodendron	trigynum
	6517	CHOA	alaweo	Chenopodium	oahuense
	6518	CHENO	goosefoot	Chenopodium	spp.
	5462	CHLI2	desert willow	Chilopsis	linearis
	6519	CHAX2	hueso	Chionanthus	axilliflorus
	6520	CHCO12	bridgotree	Chionanthus	compactus
	6521	CHDO4	white rosewood	Chionanthus	domingensis
	6522	CHHO4	hueso prieto	Chionanthus	holdridgei

Woodland	FIA Code	PLANTS Code	Common Name	Genus	Species
	6523	CHLI6	cabra blanca	Chionanthus	ligustrinus
	6524	CHRE9	Chinese fringetree	Chionanthus	retusus
	6525	CHVI22	vitiensis	Chionanthus	vitiensis
	6526	CHSE5	puntaj jayuya	Chione	seminervis
	6528	CHVE4	fatpork	Chione	venosa
	6529	CHEX5	african teak	Chlorophora	excelsa
	6532	CHSP13	silk-floss tree	Chorisia	speciosa
	6535	CHIC	icaco coco plum	Chrysobalanus	icaco
	431	CHCHC4	giant chinkapin, golden chinkapin	Chrysolepis	chrysophylla var. chrysophylla
	6539	CHAR6	bastard redwood	Chrysophyllum	argenteum
	6541	CHCA10	star apple	Chrysophyllum	cainito
	6542	CHOL	satinleaf	Chrysophyllum	oliviforme
	6543	CHPA31	camito de perro	Chrysophyllum	pauciflorum
	6546	CICH	Chamissos manfern	Cibotium	chamissoi
	6547	CIGL	hapuu	Cibotium	glaucum
	6545	CIHE7	Hawaiian tree fern	Cibotium	heleniae
	6548	CIME8	hapuu li	Cibotium	menziesii
	6549	CIBOT	manfern	Cibotium	spp.
	6552	CIPU	quinine	Cinchona	pubescens
	6553	CINCH	cinchona	Cinchona	spp.
	6554	CIAR8	cassia	Cinnamomum	aromaticum
	6555	CIBU2	Padang cassia	Cinnamomum	burmannii
	858	CICA	camphortree	Cinnamomum	camphora
	6557	CICA2	ochod	Cinnamomum	carolinense
	6559	CIEL2	laurel avispillo	Cinnamomum	elongatum
	6560	CIMO3	avispillo	Cinnamomum	montanum
	6561	CIPE6	ochod	Cinnamomum	pedatinervium
	6562	CISE2	matieu	Cinnamomum	sessilifolium
	6563	CINNA2	cinnamon	Cinnamomum	spp.
	6564	CIVE2	cinnamon	Cinnamomum	verum
	6565	CICA8	juniper berry	Citharexylum	caudatum
	859	CIFR	Florida fiddlewood	Citharexylum	fruticosum
	6567	CISP3	spiny fiddlewood	Citharexylum	spinosum
	6568	CITHA	fiddlewood	Citharexylum	spp.
	6569	CITR7	threespike fiddlewood	Citharexylum	tristachyum
	6570	CISA2	samoensis	Citronella	samoensis
	6572	CIAU	Lime (Tipolo)	Citrus	aurantifolia
	6578	CIGR	grapefruit, kahet magas	Citrus	grandis
	6579	CIHY2	limon china	Citrus	hystrix
	6580	CIMA10	kahet, wild orange	Citrus	macroptera
	6581	CIMA5	Citrus maxima	Citrus	maxima
	6582	CIME3	Citrus medica	Citrus	medica
	6583	CIMI3	calamondin, kingkang	Citrus	mitis
	6584	CIRE3	Citrus reticulata	Citrus	reticulata
	860	CITRU2	citrus spp.	Citrus	spp.
	6573	CIAU7	key lime	Citrus	xaurantiifolia
	6574	CIAU8	sour orange	Citrus	xaurantium
	6575	CILI5	lemon	Citrus	xlimon
	6576	CIPA3	grapefruit	Citrus	xparadisi
	6577	CISI3	sweet orange	Citrus	xsinensis
	481	CLKE	yellowwood	Cladrastis	kentukea
	6586	CLCA15	koee	Claoxylon	carolinianum
	6588	CLFA6	Claoxylon fallax	Claoxylon	fallax
	6589	CLLO5	Claoxylon longiracemosum	Claoxylon	longiracemosum
	6590	CLMA25	katteknau, katot	Claoxylon	marianum
	6591	CLSA	poola	Claoxylon	sandwicense
	6592	CLAOX	claoxylon	Claoxylon	spp.
	6593	CLCA18	Cleistanthus carolinianus	Cleistanthus	carolinianus
	6594	CLIN8	Cleistanthus insularis	Cleistanthus	insularis
	6595	CLEIS5	Cleistanthus	Cleistanthus	spp.
	6597	CLAR4	oha wai nui	Clermontia	arborescens
	6601	CLCL	Kauai clermontia	Clermontia	clermontioides

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	6604	CLDR2	Kohala Mountain clermontia	Clermontia	drepanomorpha
	6605	CLFA	haha aiakamanu	Clermontia	fauriei
	6606	CLGR3	bog clermontia	Clermontia	grandiflora
	6610	CLHA4	oha kepau	Clermontia	hawaiiensis
	6611	CLKA	forest clermontia	Clermontia	kakeana
	6612	CLKO	Waipio Valley clermontia	Clermontia	kohalae
	6596	CLLE3	oha wai nui Clermontia	Clermontia	leptoclada
	6613	CLLI3	hillside clermontia	Clermontia	lindseyana
	6614	CLMI3	Maui clermontia	Clermontia	micrantha
	6615	CLMO5	Mauna Loa clermontia	Clermontia	montis-loa
	6616	CLOB2	Oahu clermontia	Clermontia	oblongifolia
	6620	CLPA6	Wailai Pali clermontia	Clermontia	pallida
	6621	CLPA8	smallflower clermontia	Clermontia	parviflora
	6622	CLPE2	pele clermontia	Clermontia	peleana
	6625	CLPE3	Waioiani clermontia	Clermontia	persicifolia
	6626	CLPY2	Hamakua clermontia	Clermontia	pyrularia
	6627	CLSI3	Clermontia singuliflora	Clermontia	singuliflora
	6628	CLERM	clermontia	Clermontia	spp.
	6629	CLTU2	Haleakala clermontia	Clermontia	tuberculata
	6630	CLWA2	swampforest clermontia	Clermontia	waimeae
	6631	CLAC2	haggarbush	Clerodendrum	aculeatum
	5523	CLBU	rose glorybower	Clerodendrum	bungei
	6632	CLCH4	stickbush	Clerodendrum	chinense
	6633	CLGL2	Natal glorybower	Clerodendrum	glabrum
	6634	CLIN	turks turbin	Clerodendrum	indicum
	6635	CLMA24	velvetleaf glorybower	Clerodendrum	macrostegium
	6636	CLERO2	glorybower	Clerodendrum	spp.
	5529	CLAC3	mountain sweetpepperbush	Clethra	acuminata
	6637	CLAL4	teta prieta	Cleyera	albopunctata
	6639	CLER	jackass breadnut	Clibadium	erosum
	6641	CLCY5	Clidemia cymosa	Clidemia	cymosa
	6642	CLHI3	soapbush	Clidemia	hirta
	6645	CLCA21	palm tree	Clinostigma	carolinense
	6644	CLFA5	Philippine pigeonwings	Clitoria	fairchildiana
	6646	CLCL2	cupeillo	Clusia	clusioides
	6648	CLGU	Grundlach's attorney	Clusia	gundlachii
	6650	CLMI2	cupey de monte	Clusia	minor
	6651	CLRO	Scotch attorney	Clusia	rosea
	6652	CLUSI	attorney	Clusia	spp.
	6653	CNHO	deepwoods fern	Cnemidaria	horrida
	6655	CNAC	treadsoftly	Cnidoscolus	aconitifolius
	6658	COCO8	uvilla	Coccoloba	costata
	863	CODI8	tietongue, pigeon-plum	Coccoloba	diversifolia
	6660	COKR	whitewood	Coccoloba	krugii
	6661	COMI	puckhout	Coccoloba	microstachya
	6662	COPA24	pale seagrape	Coccoloba	pallida
	6663	COPU	grandleaf seagrape	Coccoloba	pubescens
	6664	COPY	uvera	Coccoloba	pyrifolia
	6665	CORU4	ortegon	Coccoloba	rugosa
	6666	COSI2	uvero de monte	Coccoloba	sintenisii
	6668	COSW	Swartz's pigeonplum	Coccoloba	swartzii
	6669	COTE9	Bahama pigeonplum	Coccoloba	tenuifolia
	6670	COUV	seagrape	Coccoloba	uvifera
	6671	COVE	false chiggergrape	Coccoloba	venosa
	907	COAR	Florida silver palm	Coccothrinax	argentata
	6673	COBA3	Coccothrinax barbadensis	Coccothrinax	barbadensis
	6679	COVI	silk cottontree	Cochlospermum	vitifolium
	908	CONU	coconut palm	Cocos	nucifera
	6681	COCOS	coconut palm	Cocos	spp.
	6683	COVA3	garden croton	Codiaeum	variegatum
	6684	COAR2	Arabian coffee	Coffea	arabica
	6686	COLI8	Coffea liberica	Coffea	liberica

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	6685	CORO8	robusta coffee	Coffea	robusta
	6687	COFFE	coffee	Coffea	spp.
	6688	COAR9	Cojoba arborea	Cojoba	arborea
	6689	COAC4	abata cola	Cola	acuminata
	6691	COSC13	uab, chuchab	Colona	scabra
	6693	COAR3	common snakebark	Colubrina	arborescens
	6694	COAS3	Asian nakedwood	Colubrina	asiatica
	864	COEL2	soldierwood	Colubrina	elliptica
	6697	COOP	kauila	Colubrina	oppositifolia
	6699	COLUB	nakedwood	Colubrina	spp.
	6700	COVE6	Urban's nakedwood	Colubrina	verrucosa
	5559	COAR6	bladder senna	Colutea	arborescens
	6702	COTE15	ochaol	Combretum	tetralophum
	6703	COBA17	Mao	Commersonia	bartramia
	6705	CODO	poison ash	Comocladia	dodonaea
	6706	COGL4	carrasco	Comocladia	glabra
W	867	COHO	Bluewood	Condalia	hookeri
	987	COER2	buttonwood-mangrove	Conocarpus	erectus
	6709	CONOC	mangrove	Conocarpus	spp.
	6710	CORU17	Luquillo Mountain snailwood	Conostegia	rufescens
	6711	COMO8	Consolea moniliformis	Consolea	moniliformis
	6712	CORU8	Consolea rubescens	Consolea	rubescens
	6714	COOF2	copaiba	Copaifera	officinalis
	6716	COFO2	forest mirrorplant	Coprosma	foliosa
	6717	COKA	koi	Coprosma	kauensis
	6718	COLO4	Oahu mirrorplant	Coprosma	longifolia
	6719	COMO3	alpine mirrorplant	Coprosma	montana
	6720	COOC3	Maui mirrorplant	Coprosma	ochracea
	6721	COPU8	pubescent mirrorplant	Coprosma	pubens
	6722	CORH	woodland mirrorplant	Coprosma	rhynchocarpa
	6724	COPRO	mirrorplant	Coprosma	spp.
	6726	COWA4	olena	Coprosma	waimeae
	6728	COAL	Spanish elm	Cordia	alliodora
	6729	COAS6	Tou	Cordia	aspera
	8651	COBO2	Anacahuita Texas Olive	Cordia	boissieri
	6730	COBO3	muneco	Cordia	borinquensis
	6731	COCO5	red manjack	Cordia	collococca
	6733	CODI18	fragrant manjack	Cordia	dichotoma
	6735	COLA12	smooth manjack	Cordia	laevigata
	6736	COMI6	Cordia micronesica	Cordia	micronesica
	6737	COOB3	clammy cherry	Cordia	obliqua
	6738	CORI	San Bartolome	Cordia	rickseckeri
	6739	CORU5	Puerto Rico manjack	Cordia	rupicola
	865	COSE2	largeleaf geigertree	Cordia	sebestena
	6741	CORDI	cordia	Cordia	spp.
	6742	COSU2	kou	Cordia	subcordata
	6743	COSU3	mucilage manjack	Cordia	sulcata
	6744	COFR2	tiplant	Cordyline	fruticosa
	6745	CORDY2	cordyline	Cordyline	spp.
	6748	CODR	roughleaf dogwood	Cornus	drummondii
	491	COFL2	flowering dogwood	Cornus	florida
	5591	COKO2	kousa dogwood	Cornus	kousa
	492	CONU4	Pacific dogwood	Cornus	nuttallii
	490	CORNU	dogwood spp.	Cornus	spp.
	6746	COOB4	nigua	Cornutia	obovata
	6747	COPY2	azulejo	Cornutia	pyramidata
	5599	COAM3	American hazelnut	Corylus	americana
	5600	COCO30	Turkish hazelnut	Corylus	colurna
	6749	COCA48	redgum	Corymbia	calophylla
	6750	COCI4	Corymbia citriodora	Corymbia	citriodora
	6751	COFI7	redflower gum	Corymbia	ficifolia
	6752	COGU4	red bloodwood	Corymbia	gummifera

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	6754	COLA6	karaka nut	Corynocarpus	laevigatus
	6755	CORYN2	corynocarpus	Corynocarpus	spp.
	5603	COCO10	European smoketree	Cotinus	coggygria
	996	COOB2	smoketree	Cotinus	obovatus
	6756	COGU3	cannonball tree	Couroupita	guianensis
	503	CRBR3	Brainerd's hawthorn	Crataegus	brainerdii
	504	CRCA	pear hawthorn	Crataegus	calpodendron
	505	CRCH	fireberry hawthorn	Crataegus	chrysocarpa
	501	CRCR2	cockspur hawthorn	Crataegus	crus-galli
	506	CRDI	broadleaf hawthorn	Crataegus	dilatata
	507	CRFL	fanleaf hawthorn	Crataegus	flabellata
	502	CRMO2	downy hawthorn	Crataegus	mollis
	508	CRMO3	oneseed hawthorn	Crataegus	monogyna
	509	CRPE	scarlet hawthorn	Crataegus	pedicellata
	5091	CRPH	Washington hawthorn	Crataegus	phaenopyrum
	500	CRATA	hawthorn spp.	Crataegus	spp.
	5092	CRSU5	fleshy hawthorn	Crataegus	succulenta
	5093	CRUN	dwarf hawthorn	Crataegus	uniflora
	6758	CRRE12	sacred garlic pear	Crateva	religiosa
	6760	CRAL11	houka, calabash	Crescentia	alata
	6761	CRCU	common calabash tree	Crescentia	cujete
	6762	CRLI5	higuerito	Crescentia	linearifolia
	6763	CRPO6	higuero de sierra	Crescentia	portoricensis
	6765	CRPO7	Critonia portoricensis	Critonia	portoricensis
	6767	CRRH	maidenberry	Crossopetalum	rhacoma
	6769	CRBI9	Saitamu	Crossostylis	biflora
	6771	CRLO3	longbeak rattlebox	Crotalaria	longirostrata
	6773	CRAS3	wild marrow	Croton	astroites
	6774	CRFL23	Croton flavens	Croton	flavens
	6775	CRPO4	sabinon	Croton	poecilanthus
	6772	CROTO	croton spp.	Croton	spp.
	6779	CREL8	laulilii	Cryptocarya	elegans
	6781	CRMA8	holio	Cryptocarya	mannii
	6778	CROR5	Cryptocarya oreophila	Cryptocarya	oreophila
	6783	CRYPT2	cryptocarya	Cryptocarya	spp.
	6784	CRTU4	laulilii	Cryptocarya	turbinata
	6786	CRJA3	Japanese cedar	Cryptomeria	japonica
	6787	CRYPT4	Japanese cedar	Cryptomeria	spp.
	5776	CUTR2	storehousebush	Cudrania	tricuspidata
	6788	CULA	Chinese fir	Cunninghamia	lanceolata
	6790	CUAM	wild ackee	Cupania	americana
	6792	CUTR	guara blanca	Cupania	triquetra
	866	CUAN4	carrotwood	Cupaniopsis	anacardioides
	5800	CULE2	Leyland cypress	Cupressocyparis	leylandii
	51	CUAR	Arizona cypress	Cupressus	arizonica
	52	CUBA	Baker or Modoc cypress	Cupressus	bakeri
	53	CUFO2	Tecate cypress	Cupressus	forbesii
	6795	CULU2	cedar-of-Goa	Cupressus	lusitanica
	56	CUMA	MacNab's cypress	Cupressus	macnabiana
	54	CUMA2	Monterey cypress	Cupressus	macrocarpa
	55	CUSA3	Sargent's cypress	Cupressus	sargentii
	6796	CUSE2	Italian cypress	Cupressus	sempervirens
	50	CUPRE	cypress	Cupressus	spp.
	6800	CYAC4	Haleakala cyanea	Cyanea	aculeatiflora
	6801	CYAR10	palmtree cyanea	Cyanea	arborea
	6802	CYFI6	Kauai cyanea	Cyanea	fissa
	6805	CYFL4	Degeners cyanea	Cyanea	floribunda
	6806	CYGI5	Kilauea Mauna cyanea	Cyanea	giffardii
	6807	CYHA6	wetforest cyanea	Cyanea	hamatiflora
	6810	CYHA7	Oahu cyanea	Cyanea	hardyi
	6811	CYHO6	prickly cyanea	Cyanea	horrida
	6812	CYKU3	Limahuli Valley cyanea	Cyanea	kuhihewa

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	6813	CYKU	Kunths cyanea	Cyanea	kunthiana
	6814	CYLE5	giant kokee cyanea	Cyanea	leptostegia
	6815	CYMA10	purple cyanea	Cyanea	macrostegia
	6818	CYMA14	Marks cyanea	Cyanea	marksii
	6819	CYPI4	hairy cyanea	Cyanea	pilosa
	6822	CYPO5	pohaku cyanea	Cyanea	pohaku
	6823	CYPR8	Molokai cyanea	Cyanea	procera
	6824	CYPY	manyfruit cyanea	Cyanea	pycnocarpa
	6825	CYQU	oakleaf cyanea	Cyanea	quercifolia
	6826	CYRI4	plateau delissea	Cyanea	rivularis
	6827	CYSO2	pua kala	Cyanea	solenocalyx
	6828	CYANE	cyanea	Cyanea	spp.
	6829	CYST5	Kaiholena cyanea	Cyanea	stictophylla
	6830	CYSU8	Mt. Kaala cyanea	Cyanea	superba
	6833	CYTR6	aku aku	Cyanea	tritomantha
	6834	CYAN	parrotfeather treefern	Cyathea	andina
	6835	CYAR	West Indian treefern	Cyathea	arborea
	6837	CYCO18	Coopers cyathea	Cyathea	cooperi
	6838	CYDE16	olioli	Cyathea	decurrens
	6839	CYFU	Jamaican treefern	Cyathea	furfuracea
	6840	CYLU5	olioli	Cyathea	lunulata
	6841	CYME12	olioli	Cyathea	medullaris
	6842	CYNI7	kattar	Cyathea	nigricans
	6843	CYPA7	small treefern	Cyathea	parvula
	6844	CYPO11	kattar	Cyathea	ponapeana
	6847	CYATH	treefern	Cyathea	spp.
	6848	CYTE10	helecho gigante	Cyathea	tenera
	6849	CYTR11	olioli	Cyathea	truncata
	6850	CYSI	Cybianthus sintenisii	Cybianthus	sintenisii
	6852	CYCI3	queen sago	Cycas	circinalis
	6853	CYRE11	remiang	Cycas	revoluta
	6854	CYCAS	Cycas	Cycas	spp.
	6855	CYBA7	ola	Cyclophyllum	barbatum
	5818	CYOB2	quince	Cydonia	oblonga
	6857	CYPO2	oreganillo falso	Cynometra	portoricensis
	6858	CYRA8	gulos	Cynometra	ramiflora
	6859	CYYO	eeme	Cynometra	yokotae
	6860	CYBE3	tree-tomato	Cyphomandra	betacea
	6862	CYRA	swamp titi	Cyrilla	racemiflora
	6865	CYGI3	forest cyrtandra	Cyrtandra	giffardii
	6863	CYPU13	cyrtandra	Cyrtandra	pulchella
	6864	CYRA3	Cyrtandra	Cyrtandra	ramosissima
	6866	CYRTA	cyrtandra	Cyrtandra	spp.
	6867	DAEX	candletree	Dacryodes	excelsa
	6868	DARE6	Dalbergia retusa	Dalbergia	retusa
	6869	DASI	Indian rosewood	Dalbergia	sissoo
	6870	DATU	cocobolo	Dalbergia	tucurensis
	6871	DAAM2	burn nose	Daphnopsis	americana
	6872	DAHE2	Heller's cieneguillo	Daphnopsis	helleriana
	6873	DAPH	emajagua de sierra	Daphnopsis	philippiana
	6875	DEFA	Hawaii delissea	Delissea	fallax
	6876	DELA4	cutleaf delissea	Delissea	laciniata
	6877	DENI	Niihau delissea	Delissea	niihauensis
	6880	DEPA9	smallflower delissea	Delissea	parviflora
	6881	DELIS	delissea	Delissea	spp.
	6882	DEUN2	leechleaf delissea	Delissea	undulata
	6883	DERE	royal poinciana	Delonix	regia
	6884	DELON	delonix	Delonix	spp.
	6885	DEHA5	salato	Dendrocnide	harveyi
	6886	DELA13	kahtat	Dendrocnide	latifolia
	6887	DENDR16	Dendrocnide	Dendrocnide	spp.
	6888	DEAR	angelica tree	Dendropanax	arboreus

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	6889	DELA3	palo de vaca	Dendropanax	laurifolius
	6891	DIAL13	redpalm	Dictyosperma	album
	6896	DIIN6	chulta	Dillenia	indica
	6898	DISU11	shrubby dillenia	Dillenia	suffruticosa
	6899	DILO7	Dimocarpus longan	Dimocarpus	longan
	6900	DIBL3	mabolo	Diospyros	blancoi
	6902	DIDI9	Mabolo	Diospyros	discolor
	6903	DIEB	Black sapote	Diospyros	ebenaster
	6904	DIEL3	anume	Diospyros	elliptica
	6905	DIFE5	Diospyros ferrea	Diospyros	ferrea
	6906	DIHI4	elama	Diospyros	hillebrandii
	6907	DIKA2	persimmon	Diospyros	kaki
	6909	DIRE6	black apple	Diospyros	revoluta
	6910	DISA16	auauli	Diospyros	samoensis
	6911	DISA10	lama	Diospyros	sandwicensis
	6912	DISI3	Chinese persimmon	Diospyros	sintenisii
	520	DIOSP	persimmon spp.	Diospyros	spp.
	522	DITE3	Texas persimmon	Diospyros	texana
	521	DIVI5	common persimmon	Diospyros	virginiana
	6921	DIPO	otot	Discocalyx	ponapensis
	6923	DIMY	jaboncillo	Ditta	myricoides
	6927	DOVI	Florida hopbush	Dodonaea	viscosa
	6928	DOSP3	rru	Dolichandrone	spathacea
	6930	DOHE2	Ceylon gooseberry	Dovyalis	hebecarpa
	6932	DRFR2	fragrant dracaena	Dracaena	fragrans
	6933	DRMU2	Dracaena multiflora	Dracaena	multiflora
	6934	DRRE6	song of India	Dracaena	reflexa
	6937	DRAL5	cafeillo	Drypetes	alba
	6935	DRCA18	Drypetes carolinensis	Drypetes	carolinensis
	6936	DRDO3	Drypetes dolichocarpa	Drypetes	dolichocarpa
	6938	DRGL2	varital	Drypetes	glauca
	6939	DRIL	rosewood	Drypetes	ilicifolia
	6940	DRLA3	guiana plum	Drypetes	lateriflora
	6941	DRNI3	kevert	Drypetes	nitida
	6942	DRYPE	Drypetes	Drypetes	spp.
	6943	DRVI5	none	Drypetes	vitiensis
	6949	DRYA	Drypetes yapensis	Drypetes	yapensis
	6947	DUAR	Mauna Kea dubautia	Dubautia	arborea
	6944	DUDE	Dubautia	Dubautia	demissifolia
	6945	DUFA2	Dubautia	Dubautia	fallax
	6948	DUKN	forest dubautia	Dubautia	knudsenii
	6952	DUMI	Kauai dubautia	Dubautia	microcephala
	6946	DUMO2	Dubautia	Dubautia	montana
	6953	DUPL	plantainleaf dubautia	Dubautia	plantaginea
	6957	DURE2	netvein dubautia	Dubautia	reticulata
	6958	DUBAU	dubautia	Dubautia	spp.
	6961	DUER	golden dewdrops	Duranta	erecta
	6965	DUZI	Durian	Durio	zibethinus
	6966	DYLU	Dypsis lutescens	Dypsis	lutescens
	6968	DYHU2	maota mea	Dysoxylum	huntii
	6969	DYMA	maota	Dysoxylum	maota
	6972	DYMOM	Dysoxylum mollissimum ssp. Molle	Dysoxylum	mollissimum
	6970	DYSA	mamala	Dysoxylum	samoense
	6971	DYSOX	Dysoxylum	Dysoxylum	spp.
	868	EBEB	Blackbead ebony	Ebenopsis	ebano
W	523	EHAN	Anacua knockaway	Ehretia	anacua
	997	ELAN	Russian-olive	Elaeagnus	angustifolia
	6973	ELGU	oil nut palm	Elaeis	guineensis
	6975	ELBI	kalia	Elaeocarpus	bifidus
	6976	ELCA20	syatak	Elaeocarpus	carolinensis
	6977	ELFL6	\`a\`mati\`e	Elaeocarpus	floridanus
	6978	ELGR	Elaeocarpus graeffei	Elaeocarpus	graeffei

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	6979	ELGR6	sapatua	Elaeocarpus	grandis
	6980	ELJO	joga	Elaeocarpus	joga
	6974	ELKU2	Kosrae elaeocarpus	Elaeocarpus	Kaneh
	6981	ELKE	Elaeocarpus kerstingianus	Elaeocarpus	kerstingianus
	6982	ELKU	maratte, opop	Elaeocarpus	kusanoi
	6983	ELAEO	Elaeocarpus	Elaeocarpus	spp.
	6984	ELTO4	aamatie	Elaeocarpus	tonganus
	6985	ELUL	Elaeocarpus	Elaeocarpus	ulianus
	6072	ALSA12	Elattostachys falcata	Elattostachys	falcata
	6990	ELFA3	taputoi	Elattostachys	falcata
	6992	ELDU3	utuutu	Eleocharis	dulcis
	6994	ENEL	elaeocarpa	Endiandra	elaeocarpa
	6996	ENCY	monkeysoap	Enterolobium	cyclocarpum
	6997	ERDE16	bronze loquat	Eriobotrya	deflexa
	6998	ERJA3	loquat	Eriobotrya	japonica
	6999	ERIOB	loquat	Eriobotrya	spp.
	7000	ERFR4	blacktorch	Erithalis	fruticosa
	7004	ERBE3	machete	Erythrina	berteriana
	7005	ERCO22	coral erythrina	Erythrina	corallodendron
	7003	ERCO	naked coral tree	Erythrina	coralloides
	7006	ERCR6	crybabytree	Erythrina	crista-galli
	7007	EREG	cock's spur	Erythrina	eggersii
	7008	ERFU2	bucayo	Erythrina	fusca
	7011	ERPO5	mountain immortelle	Erythrina	poeppigiana
	7012	ERSA11	wili wili	Erythrina	sandwicensis
	7013	ERYTH	erythrina	Erythrina	spp.
	7014	ERSU15	gatae palagi	Erythrina	subumbrans
	7015	ERVA7	tiger's claw	Erythrina	variegata
	7016	ERVAO	tiger's claw	Erythrina	variegata var. orientalis
	7017	ERAC10	acuminatissimum	Erythrospermum	acuminatissimum
	7019	ERAR17	swamp-redwood	Erythroxylum	areolatum
	7021	ERRO3	ratwood	Erythroxylum	rotundifolium
	7022	ERRU4	rufous false cocaine	Erythroxylum	rufum
	7024	ERUR4	Urban's false cocaine	Erythroxylum	urbanii
	7025	EUBO2	southern mahogany	Eucalyptus	botryoides
	7026	EUBR2	applebox	Eucalyptus	bridgesiana
	512	EUCA2	river redgum	Eucalyptus	camaldulensis
	7028	EUCI80	argyle apple	Eucalyptus	cinerea
	7030	EUCL	sugargum	Eucalyptus	cladocalyx
	7035	EUCO31	silver-dollar eucalyptus	Eucalyptus	cordata
	7031	EUCO3	yate	Eucalyptus	cornuta
	7032	EUCR	narrowleaf red ironbark	Eucalyptus	crebra
	7033	EUDE	roundleaf gum	Eucalyptus	deanei
	7034	EUDE2	Indonesian gum	Eucalyptus	deglupta
	511	EUGL	Tasmanian bluegum	Eucalyptus	globulus
	7038	EUGO	tuart	Eucalyptus	gomphocephala
	7039	EUGO2	mountain graygum	Eucalyptus	goniocalyx
	513	EUGR12	grand eucalyptus	Eucalyptus	grandis
	7041	EUHE12	white box	Eucalyptus	hemiphloia
	7036	EULE13	white ironbark	Eucalyptus	leucoxylon
	7043	EUMA23	spotted gum	Eucalyptus	maculata
	7044	EUMA4	jarrah	Eucalyptus	marginata
	7045	EUMI	Australian tallowwood	Eucalyptus	microcorys
	7046	EUPA	gray ironbark	Eucalyptus	paniculata
	7047	EUPI	blackbutt	Eucalyptus	pilularis
	7040	EUPO	redbox	Eucalyptus	polyanthemos
	7048	EURA4	black ironbox	Eucalyptus	raveretiana
	7049	EURE2	redmahogany	Eucalyptus	resinifera
	514	EURO2	swampmahogany	Eucalyptus	robusta
	7051	EURU2	Western Australian floodedgum	Eucalyptus	rudis
	7052	EUSA17	black peppermint	Eucalyptus	salicifolia
	7053	EUSA	Sydney bluegum	Eucalyptus	saligna

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	7054	EUSI2	red ironbark	Eucalyptus	sideroxylon
	510	EUCAL	eucalyptus spp.	Eucalyptus	spp.
	7056	EUTE	forest redgum	Eucalyptus	tereticornis
	7057	EUVI	manna gum	Eucalyptus	viminalis
	7059	EUAQ	edebsachel, chedebsachel	Eugenia	aquea
	7060	EUAX	white stopper	Eugenia	axillaris
	7061	EUBI	blackrodwood	Eugenia	biflora
	7062	EUBO3	Sierra de Cayey stopper	Eugenia	boqueronensis
	7063	EUBO4	guayabota de sierra	Eugenia	borinquensis
	7065	EUCA16	cloves	Eugenia	caryophyllus
	7066	EUCO4	redberry stopper	Eugenia	confusa
	7067	EUCO5	lathberry	Eugenia	cordata
	7068	EUCOS	lathberry	Eugenia	cordata var. sintenisii
	7069	EUCO13	sperry guava	Eugenia	corozalensis
	7071	EUDO	serrette guave	Eugenia	domingensis
	7072	EUEG	guasabara	Eugenia	eggersii
	7075	EUGL6	smooth rodwood	Eugenia	glabrata
	7076	EUHA4	Luquillo Mountain stopper	Eugenia	haematocarpa
	7078	EUJA4	macupa, wax apple	Eugenia	javanica
	7079	EUKO	nioi	Eugenia	koolauensis
	7081	EULI	privet stopper	Eugenia	ligustrina
	7082	EUMA5	makupa, malay apple	Eugenia	malaccensis
	7084	EUMO	birdcherry	Eugenia	monticola
	7086	EUNI2	Eugenia nitida	Eugenia	nitida
	7087	EUPA3	orenged	Eugenia	palauensis
	7088	EUPA28	agatelang	Eugenia	palumbis
	7089	EUPR4	rockmyrtle	Eugenia	procera
	7090	EUPS	Christmas cherry	Eugenia	pseudopsidium
	7091	EURE7	mountain stopper	Eugenia	reinwardtiana
	873	EURH	red stopper	Eugenia	rhombea
	7093	EUSE9	serrasuela	Eugenia	serrasuela
	7094	EUSE10	sessileleaf stopper	Eugenia	sessiliflora
	7096	EUGEN	stopper	Eugenia	spp.
	7098	EUST3	Stahl's stopper	Eugenia	stahlii
	7099	EUST24	luluhut	Eugenia	stelechantha
	7100	EUST6	Stewardson's stopper	Eugenia	stewardsonii
	7101	EUSU9	rebotel	Eugenia	suzukii
	7102	EUTH4	atoto	Eugenia	thompsonii
	7103	EUUN	Underwood's stopper	Eugenia	underwoodii
	7104	EUUN2	Surinam cherry	Eugenia	uniflora
	7105	EUXE	aridland stopper	Eugenia	xerophytica
	7123	EUHO5	Euodia hortensis	Euodia	hortensis
	7124	EUNI8	kertub	Euodia	nitida
	7125	EUPA29	beror	Euodia	palawensis
	7126	EUPO15	Euodia ponapensis	Euodia	ponapensis
	7127	EUODI	Euodia	Euodia	spp.
	7128	EUTR13	Euodia trichantha	Euodia	trichantha
	5965	EUAL13	burningbush	Euonymus	alatus
	7109	EUCO24	Mexican shrubby spurge	Euphorbia	cotinifolia
	7110	EUHA2	Kauai spurge	Euphorbia	haeleeleana
	7111	EULA8	mottled spurge	Euphorbia	lactea
	7112	EUNE4	Indian spurgetree	Euphorbia	neriifolia
	7113	EUPE8	manchineel berry	Euphorbia	petiolaris
	7114	EUPU9	poinsettia	Euphorbia	pulcherrima
	7115	EUPHO	spurge	Euphorbia	spp.
	7116	EUTI	Indiantree spurge	Euphorbia	tirucalli
	7117	EULO7	Longan	Euphoria	longana
	7119	EUSA6	anini	Eurya	sandwicensis
	7120	EURYA	eurya	Eurya	spp.
	7129	EXAG	blinding tree	Excoecaria	agallocha
	7131	EXGA	hulumoa	Exocarpos	gaudichaudii
	7132	EXOCA	exocarpos	Exocarpos	spp.

Woodland	FIA Code	PLANTS Code	Common Name	Genus	Species
	7133	EXPO2	kotop	Exorrhiza	ponapensis
	7135	EXCA	Caribbean princewood	Exostema	caribaeum
	7136	EXEL	plateado	Exostema	ellipticum
	7137	EXSA2	Exostema sanctae-luciae	Exostema	sanctae-luciae
	874	EXPA	butterbough, inkwood	Exothea	paniculata
	7141	FABE	pualulu	Fagraea	berteroana
	7142	FAKS	ksid	Fagraea	ksid
	7143	FAGRA	Fagraea	Fagraea	spp.
	531	FAGR	American beech	Fagus	grandifolia
	5983	FASY	European beech	Fagus	sylvatica
	7144	FAMO	peacocksplume	Falcataria	moluccana
	7145	FALCA2	peacocksplume	Falcataria	spp.
	915	ARECA	other palms	Family Arecaceae	not listed above
	7146	FAOC	false coffee	Faramea	occidentalis
	7147	FESE2	feijoa	Feijoa	sellowiana
	7148	FIAM	Jamaican cherry fig	Ficus	americana
	876	FIAU	Florida strangler fig	Ficus	aurea
	7153	FIAU3	Roxburgh fig	Ficus	auriculata
	7149	FIBE2	Indian banyan	Ficus	benghalensis
	7150	FIBE	weeping fig	Ficus	benjamina
	7151	FICA	edible fig	Ficus	carica
	877	FICI	wild banyantree, shortleaf fig	Ficus	citrifolia
	7152	FICO2	Ficus copiosa	Ficus	copiosa
	7154	FIDR3	brown-woolly fig	Ficus	drupacea
	7155	FIEL	Indian rubberplant	Ficus	elastica
	7156	FIGO	mati	Ficus	godeffroyi
	7158	FILU	Ficus lutea	Ficus	lutea
	7159	FILY	fiddleleaf fig	Ficus	lyrata
	7160	FIMI2	Chinese banyan	Ficus	microcarpa
	7162	FINO3	tibig	Ficus	nota
	7163	FIOB3	aoa	Ficus	obliqua
	7164	FIOB	amate	Ficus	obtusifolia
	7165	FIPR2	aoa	Ficus	prolixa
	7166	FIRE3	peepul tree	Ficus	religiosa
	7167	FIRU4	Port Jackson fig	Ficus	rubiginosa
	7168	FISA	lulk, banyan	Ficus	saffordii
	7169	FISC3	mati vao	Ficus	scabra
	7171	FICUS	fig	Ficus	spp.
	7173	FIST	jaguey	Ficus	stahlii
	7174	FISY2	sycamore fig	Ficus	sycomorus
	7175	FITH2	Chinese banyan	Ficus	thonningii
	7176	FITI2	mati	Ficus	tinctoria
	7177	FITR	jaguey blanco	Ficus	trigonata
	7178	FIUN	mati	Ficus	uniauriculata
	7179	FIVI3	higo	Ficus	virens
	7180	FICH	Finschia chloroxantha	Finschia	chloroxantha
	7181	FISI2	Chinese parasoltree	Firmiana	simplex
	7182	FISP3	burrdaisytree	Fitchia	speciosa
	7184	FLIN	governor's plum	Flacourtia	indica
	7185	FLIN3	batoko plum	Flacourtia	inermis
	7186	FLRU2	filimoto	Flacourtia	rukam
	7188	FLBR	Queensland maple	Flindersia	brayleyana
	7190	FLAC	Flueggea acidoton	Flueggea	acidoton
	7191	FLFL4	poumuli	Flueggea	flexuosa
	7192	FLNE	mehamehame	Flueggea	neowawraea
	7193	FLUEG	bushweed	Flueggea	spp.
	7194	FOEG	inkbush	Forestiera	eggersiana
	7195	FORH	caca ravet	Forestiera	rhamnifolia
	7196	FOSE	Florida swampprivet	Forestiera	segregata
	7198	FOMA2	oval kumquat	Fortunella	margarita
	7200	FRCA12	California buckthorn	Frangula	californica
	7202	FRSPL	West Indian buckthorn	Frangula	sphaerosperma

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	7203	FRAL	Franklin tree	Franklinia	alatamaha
	541	FRAM2	white ash	Fraxinus	americana
	5491	FRBE	Berlandier ash	Fraxinus	berlandieriana
	548	FRCA3	Carolina ash	Fraxinus	caroliniana
	5492	FREX80	European ash	Fraxinus	excelsior
	7205	FRGO	Goodding's ash	Fraxinus	gooddingii
	542	FRLA	Oregon ash	Fraxinus	latifolia
	543	FRNI	black ash	Fraxinus	nigra
	5493	FROX	Caucasian ash	Fraxinus	oxycarpa
	544	FRPE	green ash	Fraxinus	pennsylvanica
	545	FRPR	pumpkin ash	Fraxinus	profunda
	546	FRQU	blue ash	Fraxinus	quadrangulata
	540	FRAXI	ash spp.	Fraxinus	spp.
	549	FRTE	Texas ash	Fraxinus	texensis
	7206	FRUH	shamel ash	Fraxinus	uhdei
	547	FRVE2	velvet ash	Fraxinus	velutina
	7207	FUBO	Bolivian fuchsia	Fuchsia	boliviana
	7208	FUPA2	shrubby fuchsia	Fuchsia	paniculata
	7209	FUCHS	fuchsia	Fuchsia	spp.
	7210	FUEL	silkrubber	Funtumia	elastica
	7212	GADU3	Gourka	Garcinia	dulcis
	7213	GAHE5	lemon saptree	Garcinia	hessii
	7214	GAMA10	mangosteen	Garcinia	mangostana
	7215	GAMA8	tilol	Garcinia	matsudai
	7216	GAMY	none	Garcinia	myrtifolia
	7217	GAPO4	konpuil	Garcinia	ponapensis
	7218	GAPO2	palo de cruz	Garcinia	portoricensis
	7220	GAQU2	Garcinia quadrilocularis	Garcinia	quadrilocularis
	7219	GARU3	tilol	Garcinia	rumiyo
	7221	GARCI	Garcinia	Garcinia	spp.
	7223	GAXA	Garcinia xanthochymus	Garcinia	xanthochymus
	7224	GABR	forest gardenia	Gardenia	brighamii
	7225	GAMA6	Oahu gardenia	Gardenia	mannii
	7226	GARE	Remys gardenia	Gardenia	remyi
	7227	GARDE	gardenia	Gardenia	spp.
	7228	GATA	Tahitian gardenia	Gardenia	taitensis
	7229	GAFL8	manuai vivao	Garuga	floribunda
	7231	GAAT	llume	Gaussia	attenuata
	7233	GERU3	taipoipo	Geniostoma	rupestre
	7235	GEAM	jagua	Genipa	americana
	7237	GEPE4	arbol de Navidad	Gesneria	pedunculosa
	561	GIBI2	ginkgo, maidenhair tree	Ginkgo	biloba
	7239	GIRO	bastard gregre	Ginoria	rohrii
	7241	GICE2	Gironniera celtidifolia	Gironniera	celtidifolia
	551	GLAQ	waterlocust	Gleditsia	aquatica
	550	GLEDI	honeylocust spp.	Gleditsia	spp.
	552	GLTR	honeylocust	Gleditsia	triacanthos
	7245	GLSE2	quickstick	Gliricidia	sepium
	7247	GLCU	masame	Glochidion	cuspidatum
	7257	GLKA	Glochidion kanehirae	Glochidion	kanehirae
	7248	GLMA9	Glochidion marianum	Glochidion	marianum
	7249	GLRA4	masame	Glochidion	ramiflorum
	7250	GLOCH	Glochidion	Glochidion	spp.
	7255	GLPA4	flower axistree	Glycosmis	parviflora
	7251	GMEL	belau	Gmelina	elliptica
	7252	GMPA	blacheos	Gmelina	palawensis
	7253	GMELI	Gmelina	Gmelina	spp.
	7254	GNGN	Gnetum gnemon	Gnetum	gnemon
	7256	GOEL	mata buey	Goetzea	elegans
	7258	GOLI	grand merisier	Gomidesia	lindeniana
	7260	GOCA2	Goniothalamus carolinensis	Goniothalamus	carolinensis
	555	GOLA	loblolly-bay	Gordonia	lasianthus

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	7262	GOBA	Creole cotton	Gossypium	barbadense
	7264	GOHIH2	Gossypium hirsutum	Gossypium	hirsutum
	7268	GROT	Graffenrieda ottoschulzii	Graffenrieda	ottoschulzii
	7272	GRBA	kahiliflower	Grevillea	banksii
	7273	GRRO	silkoak	Grevillea	robusta
	7274	GREVI	grevillea	Grevillea	spp.
	7275	GRCR4	fau ui	Grewia	crenata
	7279	GUOF	lignum-vitae	Guaiacum	officinale
	7280	GUSA	holywood	Guaiacum	sanctum
	7282	GUMA4	paipai	Guamia	mariannae
	882	GUDI	beeftree, longleaf blolly	Guapira	discolor
	7285	GUFR	black mampoo	Guapira	fragrans
	7286	GUOB	corcho prieto	Guapira	obtusata
	7288	GUGL3	alligatorwood	Guarea	glabra
	7290	GUGU	American muskwood	Guarea	guidonia
	7294	GUBL	haya minga	Guatteria	blainii
	7295	GUCA2	haya blanca	Guatteria	caribaea
	7298	GUUL	bastardcedar	Guazuma	ulmifolia
	7299	GUEL	hammock velvetseed	Guettarda	elliptica
	7300	GUKR	frogwood	Guettarda	krugii
	7302	GUOD	cucubano de vieques	Guettarda	odorata
	7303	GUOV	cucubano	Guettarda	ovalifolia
	7305	GUPU	roseta	Guettarda	pungens
	7306	GUSC	wild guave	Guettarda	scabra
	7307	GUSP3	puapua	Guettarda	speciosa
	7309	GUVA	cucubano de monte	Guettarda	valenzuelana
	7311	GURH	rhoifolia	Guioa	rhoifolia
	7312	GUIOA	Guioa	Guioa	spp.
	7313	GUPA	bochela uchererak, uch	Gulubia	palauensis
	7315	GYLA	West Indian false box	Gyminda	latifolia
	7317	GYLU	oysterwood	Gymnanthes	lucida
	571	GYDI	Kentucky coffeetree	Gymnocladus	dioicus
	7319	GYAM2	vilivili	Gyrocarpus	americanus
	7321	HACA2	bloodwoodtree	Haematoxylum	campechianum
	7327	HASAO	palo de hueso	Haenianthus	salicifolius
	581	HACA3	Carolina silverbell	Halesia	carolina
	582	HADI3	two-wing silverbell	Halesia	diptera
	583	HAPA2	little silverbell	Halesia	parviflora
	580	HALES	silverbell spp.	Halesia	spp.
	7328	HATE3	mountain silverbell	Halesia	tetraptera
	7329	HAVE2	Ozark witchhazel	Hamamelis	vernalis
	7331	HAVI4	American witchhazel	Hamamelis	virginiana
	7330	HAPA3	scarletbush	Hamelia	patens
	7332	HAFL	Haplolobus floribundus	Haplolobus	floribundus
	7333	HACA10	South African wild plum	Harpephyllum	caffrum
	7334	HAAR4	fa`aili	Harpullia	arborea
	7335	HAPA10	haujillo	Havardia	pallens
	7336	HECU10	false locust	Hebestigma	cubense
	7338	HEDE14	denticulata	Hedycarya	denticulata
	7340	HEDYC2	Hedycarya	Hedycarya	spp.
	7341	HEAR	cigarbush	Hedyosmum	arborescens
	7343	HEFO5	Fosbergs starviolet	Hedyotis	fosbergii
	7344	HEHI8	manono	Hedyotis	hillebrandii
	7345	HEDYO2	starviolet	Hedyotis	spp.
	7346	HETE21	variable starviolet	Hedyotis	terminalis
	7347	HEJA	screwtree	Helicteres	jamaicensis
	7349	HEPO4	white moho	Heliocarpus	popayanensis
	7350	HELIO	heliocarpus	Heliocarpus	spp.
	7353	HEFA5	camasey peludo	Henriettea	fascicularis
	7354	HEMA11	MacFadyen's camasey	Henriettea	macfadyenii
	7355	HEME5	thinleaf camasey	Henriettea	membranifolia
	7357	HESQ	jusillo	Henriettea	squamulosum

Woodland	FIA Code	PLANTS Code	Common Name	Genus	Species
	7359	HELI9	ufa	Heritiera	littoralis
	7360	HELO12	ufa halemtano	Heritiera	longipetiolata
	7362	HERIT2	Heritiera	Heritiera	spp.
	7368	HELA27	Hernandia labyrinthica	Hernandia	labyrinthica
	7363	HEMO13	pipi	Hernandia	moerenhoutiana
	7364	HENY	pua, Chinese lantern tree	Hernandia	nymphaeifolia
	7365	HEOV4	Hernandia ovigera	Hernandia	ovigera
	7366	HESO	mago	Hernandia	sonora
	7367	HERNA	Hernandia	Hernandia	spp.
	7370	HEAR9	Lanai island-aster	Hesperomannia	arborescens
	7371	HEAR10	Maui island-aster	Hesperomannia	arbuscula
	7372	HELY	Kauai island-aster	Hesperomannia	lydgatei
	7373	HESPE8	island-aster	Hesperomannia	spp.
	7374	HEAR5	toyon	Heteromeles	arbutifolia
	7376	HETER5	toyon	Heteromeles	spp.
	7377	HEEL9	palma brava	Heterospathe	elata
	7381	HEBR8	para rubber tree	Hevea	brasiliensis
	7384	HIBO2	hau kuahiwi	Hibiscadelphus	bombycinus
	7385	HICR	lava hau kuahiwi	Hibiscadelphus	crucibracteatus
	7386	HIDI	Kauai hau kuahiwi	Hibiscadelphus	distans
	7387	HIGI	Kilauea hau kuahiwi	Hibiscadelphus	giffardianus
	7388	HIHU	Hualalai hau kuahiwi	Hibiscadelphus	hualalaiensis
	7389	HIPU2	hau kuahiwi	Hibiscadelphus	puakuahiwi
	7390	HIBIS	hibiscadelphus	Hibiscadelphus	spp.
	7391	HIWI	Maui hau kuahiwi	Hibiscadelphus	wilderianus
	7392	HIWO	Woods hau kuahiwi	Hibiscadelphus	woodii
	7393	HIAR	white rosemallow	Hibiscus	arnottianus
	7397	HIBR	Brackenridges rosemallow	Hibiscus	brackenridgei
	7401	HICA6	lemonyellow rosemallow	Hibiscus	calyphyllus
	7402	HICL	red Kauai rosemallow	Hibiscus	clayi
	7403	HIEL	mahoe	Hibiscus	elatus
	7404	HIKO	red rosemallow	Hibiscus	kokio
	7407	HIMA5	largeleaf rosemallow	Hibiscus	macrophyllus
	7408	HIMU3	Dixie rosemallow	Hibiscus	mutabilis
	7409	HIPE3	seaside mahoe	Hibiscus	pernambucensis
	7410	HIRO3	shoeblackplant	Hibiscus	rosa-sinensis
	7411	HIBIS2	rosemallow	Hibiscus	spp.
	7412	HITI	sea hibiscus	Hibiscus	tiliaceus
	7413	HIWA	white Kauai rosemallow	Hibiscus	waimeae
	883	HIMA2	manchineel	Hippomane	mancinella
	7418	HIRU2	teta de burra cinarron	Hirtella	rugosa
	7420	HITR3	pigeonberry	Hirtella	triandra
	8008	HOAC4	fanuamamala	Homalanthus	acuminatus
	8009	HONU3	fanuamamala	Homalanthus	nutans
	8010	HOMAL6	Homalanthus	Homalanthus	spp.
	7422	HORA	white cogwood	Homalium	racemosum
	7424	HOWH	Homalium whitmeeanum	Homalium	whitmeeanum
	7427	HOAM2	chemeklachel, eumail	Horsfieldia	amklaal
	7428	HONO2	ersachel	Horsfieldia	novoguineensis
	7429	HONU2	Horsfieldia nunu	Horsfieldia	nunu
	7430	HOPA10	chersachel	Horsfieldia	palauensis
	7431	HORSF2	Horsfieldia	Horsfieldia	spp.
	7432	HODU2	Japanese raisintree	Hovenia	dulcis
	7433	HOFO	sentrypalm	Howeia	forsteriana
	7434	HUCR	sandbox tree	Hura	crepitans
	7438	HYCL	cedro macho	Hyeronima	clusioides
	7440	HYLOC	nightblooming cactus	Hylocereus	spp.
	7441	HYUN3	nightblooming cactus	Hylocereus	undatus
	7442	HYCO	stinkingtoe	Hymenaea	courbaril
	7445	HYTR	inkwood	Hypelate	trifoliata
	7446	HYLA8	limestone snakevine	Hyperbaena	laurifolia
	7448	HYCA11	Canary Island St. Johnswort	Hypericum	canariense

Woodland	FIA Code	PLANTS Code	Common Name	Genus	Species
	7453	ILAN	Hawaii holly	Ilex	anomala
	7454	ILAQ80	English holly	Ilex	aquifolium
	7455	ILCA	dahoon	Ilex	cassine
	7456	ILCO3	te	Ilex	cookii
	7457	ILGU	maconcona	Ilex	guianensis
	7458	ILMA	Caribbean holly	Ilex	macfadyenii
	6438	ILMU	catberry	Ilex	mucronata
	7459	ILNI	Puerto Rico holly	Ilex	nitida
	591	ILOP	American holly	Ilex	opaca
	7460	ILPA3	mate	Ilex	paraguariensis
	7462	ILSI	gongolin	Ilex	sideroxyloides
	7463	ILSI2	Sintenis' holly	Ilex	sintenisii
	7464	ILEX	holly	Ilex	spp.
	7465	ILUR	Urban's holly	Ilex	urbaniana
	7466	ILURR	Ilex urbaniana	Ilex	urbaniana var. riedlaei
	7469	ILVO	yaupon	Ilex	vomitoria
	7472	INED	ice cream bean	Inga	edulis
	7470	INLA	sacky sac bean	Inga	laurina
	7471	INNOQ	Inga nobilis	Inga	nobilis
	7467	INGA	inga	Inga	spp.
	7474	INVE	river koko	Inga	vera
	7475	INFA3	ifi	Inocarpus	fagifer
	7477	INBI	ifilele	Intsia	bijuga
	7479	IXFE	palo de hierro	Ixora	ferrea
	7481	IXTH	white jungleflame	Ixora	thwaitesii
	7482	JAMI	black poui	Jacaranda	mimosifolia
	7483	JACAR	jacaranda	Jacaranda	spp.
	7485	JAAR2	braceletwood	Jacquinia	armillaris
	7487	JABE	bois bande	Jacquinia	berteroi
	7490	JAUM	chirriador	Jacquinia	umbellata
	7491	JACU2	Barbados nut	Jatropha	curcas
	7492	JAHE	wild oilnut	Jatropha	hernandiifolia
	7493	JAMU	coralbush	Jatropha	multifida
	7494	JATRO	nettlespurge	Jatropha	spp.
	604	JUCA	southern California black walnut	Juglans	californica
	601	JUCI	butternut	Juglans	cinerea
	603	JUHI	northern California black walnut	Juglans	hindsii
	7495	JUJA	West Indian walnut	Juglans	jamaicensis
	606	JUMA	Arizona walnut	Juglans	major
	605	JUMI	Texas walnut	Juglans	microcarpa
	602	JUNI	black walnut	Juglans	nigra
	7496	JURE80	English walnut	Juglans	regia
	600	JUGLA	walnut spp.	Juglans	spp.
W	61	JUAS	Ashe juniper	Juniperus	ashei
W	62	JUCA7	California juniper	Juniperus	californica
	7489	JUCH4	Chinese juniper	Juniperus	chinensis
W	59	JUCO11	redberry juniper	Juniperus	coahuilensis
W	63	JUDE2	alligator juniper	Juniperus	deppeana
W	60	JUFL	Drooping juniper	Juniperus	flaccida
W	69	JUMO	oneseed juniper	Juniperus	monosperma
	64	JUOC	western juniper	Juniperus	occidentalis
W	65	JUOS	Utah juniper	Juniperus	osteosperma
W	58	JUPI	Pinchot juniper	Juniperus	pinchotii
W	66	JUSC2	Rocky Mountain juniper	Juniperus	scopulorum
	57	JUNIP	redcedar/juniper spp.	Juniperus	spp.
	68	JUVI	eastern redcedar	Juniperus	virginiana
	67	JUVIS	southern redcedar	Juniperus	virginiana var. silicicola
	7497	KAPA4	ketoguit	Kayea	pacifica
	7499	KHAN	Khaya anthotheca	Khaya	anthotheca
	7501	KHSE2	Senegal mahogany	Khaya	senegalensis
	7503	KIAF	Kigelia africana	Kigelia	africana
	7506	KLHO	guest tree	Kleinhovia	hospita

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	7508	KOPO	Koanophyllon polyodon	Koanophyllon	polyodon
	7507	KOBI3	goldenrain tree	Koelreuteria	bipinnata
	7515	KOPA	goldenrain tree	Koelreuteria	paniculata
	7509	KOCO2	Molokai treecotton	Kokia	cookei
	7510	KODR	Hawaii treecotton	Kokia	drynarioides
	7511	KOKA	Kauai treecotton	Kokia	kauaiensis
	7512	KOLA2	Wailupe Valley treecotton	Kokia	lanceolata
	7513	KOKIA	treecotton	Kokia	spp.
	7514	KRFE	leadwood	Krugiodendron	ferreum
	7516	KUER	burgan	Kunzea	ericoides
	7517	KUNZE	Kunzea	Kunzea	spp.
	7518	LAFA2	summit labordia	Labordia	fagraeoidea
	7519	LAHE2	bog labordia	Labordia	hedyosmifolia
	7520	LAHI5	mountain labordia	Labordia	hirtella
	7521	LAKA	Waianae Range labordia	Labordia	kaalae
	7522	LALY2	Wahiawa Mountain labordia	Labordia	lydgatei
	7523	LABOR	labordia	Labordia	spp.
	7524	LATI2	paleflower labordia	Labordia	tinifolia
	7528	LATR4	Lanai labordia	Labordia	triflora
	7529	LAWA3	Nevada peavine	Labordia	waiolani
	7531	LAAN2	golden chain tree	Laburnum	anagyroides
	7530	LAPR2	cuero de rana	Laetia	procera
	7532	LAIN	crapemyrtle	Lagerstroemia	indica
	7533	LASP	pride of India	Lagerstroemia	speciosa
	988	LARA2	white-mangrove	Laguncularia	racemosa
	7539	LADO2	Langsat	Lansium	domesticum
	7541	LAPO	nino de cota	Laplacea	portoricensis
	6212	LADE2	European larch	Larix	decidua
	71	LALA	tamarack (native)	Larix	laricina
	72	LALY	subalpine larch	Larix	lyallii
	73	LAOC	western larch	Larix	occidentalis
	70	LARIX	larch spp.	Larix	spp.
	7543	LALO	bluelatan	Latania	loddigesii
	7550	LAIN5	henna	Lawsonia	inermis
	7552	LEKR	Krug's roughleaf	Leandra	krugiana
	7556	LEQU	pitahaya	Leptocereus	quadricostatus
	7558	LEMO20	large-leaf yellow teatree	Leptospermum	morrisonii
	7559	LEPE23	common teatree	Leptospermum	petersonii
	7560	LEPO22	common teatree	Leptospermum	polygalifolim
	7561	LESC2	broom teatree	Leptospermum	scoparium
	7562	LEPTO4	teatree	Leptospermum	spp.
	7564	LEIN31	Leucaena insularum	Leucaena	insularum
	7565	LELE10	white leadtree	Leucaena	leucocephala
	869	LEPU3	Great leucaene	Leucaena	pulverulenta
	7567	LERE5	littleleaf leadtree	Leucaena	retusa
	7566	LEUCA	leadtree	Leucaena	spp.
	7569	LIBR5	Maria laurel	Licaria	brittoniana
	7570	LIPA9	Puerto Rico cinnamon	Licaria	parvifolia
	7573	LITR	pepperleaf sweetwood	Licaria	triandra
	7574	LIAM	Amur privet	Ligustrum	amurense
W	7577	LIJA	Japanese privet	Ligustrum	japonicum
W	7578	LILU2	glossy privet	Ligustrum	lucidum
W	7579	LIOV	California privet	Ligustrum	ovalifolium
W	7575	LISI	Chinese privet	Ligustrum	sinense
	7576	LIGUS2	privet	Ligustrum	spp.
	7580	LIME7	southern spicebush	Lindera	melissifolia
	6234	LISU8	bog spicebush	Lindera	subcoriacea
	7571	LIOR2	Oriental sweetgum	Liquidambar	orientalis
	611	LIST2	sweetgum	Liquidambar	styraciflua
	621	LITU	yellow-poplar	Liriodendron	tulipifera
	7583	LICH4	Lychee	Litchi	chinensis
	631	LIDE3	tanoak	Lithocarpus	densiflorus

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	7586	LISA8	papaono	Litsea	samoensis
	7587	LITSE	Litsea	Litsea	spp.
	7588	LICH3	fountain palm	Livistona	chinensis
	7590	LODO5	geno geno	Lonchocarpus	domingensis
	7591	LOGL2	geno	Lonchocarpus	glaucifolius
	7592	LOHE7	broadleaf lancepod	Lonchocarpus	heptaphyllus
W	7593	LOMA6	Amur honeysuckle	Lonicera	maackii
	7595	LOCO9	vinegartree	Lophostemon	confertus
	7598	LUNE4	Egg Fruit / Canistel	Lucuma	nervosa
	7600	LUSP11	luehea	Luehea	speciosa
	7602	LULI8	bakauaine, nana	Lumnitzera	littorea
	7606	LUEK	Lunania ekmanii	Lunania	ekmanii
	7604	LUNAN	lunania	Lunania	spp.
	7608	LYRU2	St. Thomas staggerbush	Lyonia	rubiginosa
	884	LYLA3	false tamarind	Lysiloma	latisiliquum
	7614	MAIN8	macadamia nut tree, pengua	Macadamia	integrifolia
	7616	MACAD	Macadamia	Macadamia	spp.
	7617	MATE16	Macadamia Nut	Macadamia	tetraphylla
	7618	MACA25	bedel	Macaranga	carolinensis
	7619	MAGR	Macaranga grayana	Macaranga	grayana
	7620	MAHA9	lau pata	Macaranga	harveyana
	7621	MAMA28	pengua	Macaranga	mappa
	7623	MACAR	macaranga	Macaranga	spp.
	7625	MAST7	lau fatu	Macaranga	stipulosa
	7626	MATA3	parasol leaf tree	Macaranga	tanarius
	7627	MATH3	Macaranga thompsonii	Macaranga	thompsonii
	7628	MALU2	palo de hoz	Machaerium	lunatum
	7630	MAPO6	Puerto Rico alfilerillo	Machaonia	portoricensis
	641	MAPO	Osage-orange	Maclura	pomifera
	7632	MATI3	Maclura tinctoria	Maclura	tinctoria
	7633	MAEM2	umbrella-tree	Maesopsis	eminii
	651	MAAC	cucumbertree	Magnolia	acuminata
	655	MAFR	mountain or Fraser magnolia	Magnolia	fraseri
	652	MAGR4	southern magnolia	Magnolia	grandiflora
	654	MAMA2	bigleaf magnolia	Magnolia	macrophylla
	7635	MAPO2	Puerto Rico magnolia	Magnolia	portoricensis
	657	MAPY	pyramid magnolia	Magnolia	pyramidata
	7637	MASI14	Oyama magnolia	Magnolia	seboldii
	7636	MASP	laurel magnolia	Magnolia	splendens
	650	MAGNO	magnolia spp.	Magnolia	spp.
	658	MATR	umbrella magnolia	Magnolia	tripetala
	653	MAVI2	sweetbay	Magnolia	virginiana
	7638	MAPA6	Mallotus palauensis	Mallotus	palauensis
	7639	MAPH4	kamala tree	Mallotus	philippensis
	7641	MALLO	mallotus	Mallotus	spp.
	7642	MATI4	Mallotus tiliifolius	Mallotus	tiliifolius
	7643	MACO11	Singapore holly	Malpighia	coccigera
	7644	MAEM	Barbados cherry	Malpighia	emarginata
	7645	MAFU2	palo bronco	Malpighia	fucata
	7646	MAGL6	wild crapemyrtle	Malpighia	glabra
	7647	MAIN5	cowhage cherry	Malpighia	infestissima
	7648	MALI2	bastard cherry	Malpighia	linearis
	662	MAAN3	southern crab apple	Malus	angustifolia
	7649	MABA	Siberian crab apple	Malus	baccata
	663	MACO5	sweet crab apple	Malus	coronaria
	7650	MAFL80	Japanese flowering crab apple	Malus	floribunda
	661	MAFU	Oregon crab apple	Malus	fusca
	664	MAIO	prairie crab apple	Malus	ioensis
	7651	MAPU	paradise apple	Malus	pumila
	660	MALUS	apple spp.	Malus	spp.
	7652	MAAM2	mammee apple	Mammea	americana
	7653	MAGL12	manapau	Mammea	glauca

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	7654	MAOD2	chopak	Mammea	odorata
	7655	MAMME	Mammea	Mammea	spp.
	885	MAIN3	mango	Mangifera	indica
	7657	MAMI3	kanit	Mangifera	minor
	7658	MAOD	saipan mango	Mangifera	odorata
	7659	MANGI	mango	Mangifera	spp.
	7660	MAGL5	ceara rubbertree	Manihot	glaziovii
	7661	MANIH	manihot	Manihot	spp.
	7662	MABI5	bulletwood	Manilkara	bidentata
	7663	MABIS	Surinam bulletwood	Manilkara	bidentata ssp. surinamensis
	7664	MADI14	pani	Manilkara	dissecta
	7666	MAHO5	kohle	Manilkara	hoshinoi
	7667	MAJA2	wild dilly	Manilkara	jaimiqui
	7669	MAPL2	zapote de costa	Manilkara	pleeana
	7671	MANIL	Manilkara	Manilkara	spp.
	7672	MAUD	udeuid	Manilkara	udoido
	7673	MAVA3	nisperillo	Manilkara	valenzuela
	7674	MAZA	sapodilla	Manilkara	zapota
	7677	MARA3	palo de cana	Mappia	racemosa
	7679	MACO	bkau, apgau	Maranthes	corymbosa
	7680	MAFR11	dermarm	Marattia	fraxinea
	7682	MANO	bastard hogberry	Margaritaria	nobilis
	7684	MASI3	beruquillo	Marlierea	sintenisii
	7688	MAAP5	Matayba apetala	Matayba	apetala
	7689	MADO2	negra lora	Matayba	domingensis
	7694	MABO8	mayten	Maytenus	boaria
	7695	MACY2	Caribbean mayten	Maytenus	cymosa
	7697	MAEL3	Puerto Rico mayten	Maytenus	elongata
	7698	MALA8	white cinnamon	Maytenus	laevigata
	715	MAPA28	Maytenus palauica	Maytenus	palauica
	7699	MAPO5	ponce mayten	Maytenus	ponceana
	7700	MATH4	luluhut	Maytenus	thompsonii
	7702	MELA7	Mecranium latifolium	Mecranium	latifolium
	7704	MECA21	Medusanthera carolinensis	Medusanthera	carolinensis
	7705	MESA11	matamo	Medusanthera	samoensis
	7706	MEDUS2	Medusanthera	Medusanthera	spp.
	7715	MELI7	cajeput tree	Melaleuca	linariifolia
	992	MEQU	melaleuca	Melaleuca	quinquenervia
	7709	MELAL	melaleuca	Melaleuca	spp.
	7710	MEMU10	alom	Melanolepis	multiglandulosa
	7712	MECA9	Melastoma candidum	Melastoma	candidum
	7713	MESA3	Melastoma sanguineum	Melastoma	sanguineum
	993	MEAZ	chinaberry	Melia	azedarach
	7716	MELIA	melia	Melia	spp.
	7717	MEBI	Spanish lime	Melicoccus	bijugatus
	7719	MEAN3	mokihana	Melicope	anisata
	7720	MEBA2	Ballous melicope	Melicope	balloui
	7721	MEBA3	uahiapele	Melicope	barbigera
	7722	MECH2	Waianae Range melicope	Melicope	christophersenii
	7723	MECI6	manena	Melicope	cinerea
	7724	MECL	kukaemoa	Melicope	clusiifolia
	7725	MECR5	piloula	Melicope	cruciata
	7726	MEEL2	leiohiiaka	Melicope	elliptica
	7727	MEHA7	Haleakala melicope	Melicope	haleakalae
	7728	MEHA3	Haupa Mountain melicope	Melicope	haupuensis
	7729	MEHA4	mokihana kukae moa	Melicope	hawaiensis
	7730	MEHI6	Monoa melicope	Melicope	hiiakae
	7731	MEHO2	Honolulu melicope	Melicope	hosakae
	7732	MEKA2	Kaala melicope	Melicope	kaalaensis
	7733	MEKN	Olokele Valley melicope	Melicope	knudsenii
	7750	MERE8	soopini	Melicope	latifolia
	7734	MEMA6	Kaholuamanu melicope	Melicope	macropus

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	7735	MEMA7	Makaha Valley melicope	Melicope	makahae
	7736	MEMO6	Molokai melicope	Melicope	molokaiensis
	7737	MEMU4	alani	Melicope	mucronulata
	7738	MEOA	Oahu melicope	Melicope	oahuensis
	7739	MEOB4	Makawao melicope	Melicope	obovata
	7740	MEOR4	Honokahua melicope	Melicope	orbicularis
	7741	MEOV	Hana melicope	Melicope	ovalis
	7742	MEOV2	eggshape melicope	Melicope	ovata
	7743	MEPA6	pale melicope	Melicope	pallida
	7744	MEPA7	Lihue melicope	Melicope	paniculata
	7745	MEPE9	boxfruit alani	Melicope	peduncularis
	7746	MEPS	Kohala Summit melicope	Melicope	pseudoanisata
	7747	MEPU4	hairy melicope	Melicope	puberula
	7748	MEQU3	fourangle melicope	Melicope	quadrangularis
	7749	MERA2	kapu melicope	Melicope	radiata
	7751	MERO3	roundleaf melicope	Melicope	rotundifolia
	7752	MESA4	St. Johns melicope	Melicope	saint-johnii
	7753	MESA5	Mt. Kaala melicope	Melicope	sandwicensis
	7754	MELIC3	melicope	Melicope	spp.
	7755	MEVO	volcanic melicope	Melicope	volcanica
	7756	MEWA2	alani wai	Melicope	waialealae
	7757	MEWA4	Monoa melicope	Melicope	wawraeana
	7758	MEZA	kipuka piaula	Melicope	zahlbruckneri
	7759	MESA9	samoensis	Melicytus	samoensis
	7763	MEHE	aguacatillo	Meliosma	herbertii
	7764	MEOB2	cacaillo	Meliosma	obtusifolia
	7766	MEAR16	mao	Melochia	aristata
	7767	MELOC	melochia	Melochia	spp.
	7768	METO4	teabush	Melochia	tomentosa
	7769	MEUM3	hierba del soldado	Melochia	umbellata
	7770	MEVIC4	sayafe spp.	Melochia	villosissima var. compacta
	7771	MEVIV	sayafe	Melochia	villosissima var. villosissima
	7774	MEME12	faniok	Merrilliodendron	megacarpum
	7776	MEMA16	fagufagu	Meryta	macrophylla
	7777	MESE11	omechidel	Meryta	senfftiana
	7778	MERYT	Meryta	Meryta	spp.
	7779	MEGL8	dawn redwood	Metasequoia	glyptostroboides
	886	METO3	Florida poisontree	Metopium	toxiferum
	7781	MEPOP2	collina	Metrosideros	collina
	7782	MEMA4	ohia	Metrosideros	macropus
	7783	MEPO5	ohia lehua	Metrosideros	polymorpha
	7792	MERU2	lehua papa	Metrosideros	rugosa
	7793	METRO	lehua	Metrosideros	spp.
	7794	METR5	lehua ahihi	Metrosideros	tremuloides
	7795	MEWA	Kauai bottlebrush	Metrosideros	waialealae
	7798	MEAM4	ivory-nut palm	Metroxylon	amicarum
	7799	MESA7	sago palm	Metroxylon	sagu
	7800	METRO2	Metroxylon	Metroxylon	spp.
	7801	MICH4	Orange Champak	Michelia	champaca
	7804	MIAF	saquiyac	Miconia	affinis
	7805	MICA20	velvet tree	Miconia	calvescens
	7806	MIFO	Puerto Rico johnnyberry	Miconia	foveolata
	7807	MIIM	camasey de costilla	Miconia	impetiolaris
	7808	MILA8	smooth johnnyberry	Miconia	laevigata
	7803	MILA10	hairy johnnyberry	Miconia	lanata
	7810	MIMI3	camasey cuatrocanales	Miconia	mirabilis
	7812	MIPA7	camasey racimoso	Miconia	pachyphylla
	7813	MIPR3	granadillo bobo	Miconia	prasina
	7814	MIPU9	auquey	Miconia	punctata
	7815	MIPY2	ridge johnnyberry	Miconia	pycnoneura
	7816	MIRA2	camasey felpa	Miconia	racemosa
	7817	MIRU4	peralejo	Miconia	rubiginosa

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	7818	MISE2	jau jau	Miconia	serrulata
	7819	MISI2	mountain johnnyberry	Miconia	sintenisii
	7821	MISU3	forest johnnyberry	Miconia	subcorymbosa
	7822	MITE4	rajador	Miconia	tetrandra
	7823	MITH	camasey tomaso	Miconia	thomasiana
	7824	MIMI23	talafulu	Micromelum	minutum
	7828	MIGA	caimitillo verde	Micropholis	garciniifolia
	7829	MIGU2	Micropholis guyanensis	Micropholis	guyanensis
	7831	MIPI9	pinnata	Millettia	pinnata
	7833	MIAR4	elegant mimosa	Mimosa	arenosa
	7835	MIEL4	bulletwood, elengi	Mimusops	elengi
	7839	MONOD	monodora	Monodora	spp.
	7841	MOHI	treedaisy	Montanoa	hibiscifolia
	7842	MONTA	montanoa	Montanoa	spp.
	7845	MOCE2	Morella cerifera	Morella	cerifera
	7846	MOFA	firetree	Morella	faya
	7847	MOHO3	Morella holdridgeana	Morella	holdridgeana
	7848	MOREL2	bayberry	Morella	spp.
	7849	MOCI3	Indian mulberry	Morinda	citrifolia
	7850	MOLA12	ngel	Morinda	latibractea
	7851	MOPE2	Morinda pedunculata	Morinda	pedunculata
	7852	MORIN	morinda	Morinda	spp.
	7853	MOTR	noni kuahiwi	Morinda	trimera
	7855	MOOL	horseradishtree	Moringa	oleifera
	7857	MOAM	ratapple	Morisonia	americana
	681	MOAL	white mulberry	Morus	alba
	683	MOMI	Texas mulberry	Morus	microphylla
	684	MONI	black mulberry	Morus	nigra
	682	MORU2	red mulberry	Morus	rubra
	680	MORUS	mulberry spp.	Morus	spp.
	7862	MODO2	murta	Mouriri	domingensis
	7863	MOHE	mameyuelo	Mouriri	helleri
	7865	MURA3	falseohe	Munroidendron	racemosum
	7867	MUCA4	strawberrytree	Muntingia	calabura
	7868	MUNTI	muntingia	Muntingia	spp.
	7869	MUEX2	Murraya exotica	Murraya	exotica
	7870	MUKO	Murraya koenigii	Murraya	koenigii
	7873	MUCO8	bungeltuu	Musa	coccinea
	7874	MUNA	tama	Musa	nana
	7872	MUPA3	French plantain	Musa	paradisiaca
	7875	MUSA	tuu banana	Musa	sapientum
	7876	MUSA2	meia	Musa	spp.
	7877	MUTE6	blantalos	Musa	textilis
	7878	MUTI	tikap	Musa	tikap
	7879	MUTR2	fei banana	Musa	troglodytarum
	7880	MUFR3	Mussaenda frondosa	Mussaenda	frondosa
	7881	MURA5	aloalo vao	Mussaenda	raiateensis
	7882	MUSSA	Mussaenda	Mussaenda	spp.
	7861	MYLA5	ngaio tree	Myoporum	laetum
	7883	MYSA	naio	Myoporum	sandwicense
	7884	MYOPO	myoporum	Myoporum	spp.
	7886	MYCI	red rodwood	Myrcia	citrifolia
	7887	MYDE	cieneguillo	Myrcia	deflexa
	7888	MYFA3	curame	Myrcia	fallax
	7889	MYLE	guayabacon	Myrcia	leptoclada
	7890	MYPA	ausu	Myrcia	paganii
	7891	MYSP	punchberry	Myrcia	splendens
	7892	MYRCI	rodwood	Myrcia	spp.
	7893	MYFR	twinberry	Myrcianthes	fragrans
	7894	MYCA9	jaboticaba	Myrciaria	cauliflora
	7895	MYFL	guavaberry	Myrciaria	floribunda
	7899	MYRU3	yamamomo, strawberry tree	Myrica	rubra

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	7900	MYRIC	sweetgale	Myrica	spp.
	7902	MYHY2	atoneulu	Myristica	hypargyraea
	7903	MYIN3	adepurot	Myristica	insularis
	7906	MYIN4	Myristica inutilis	Myristica	inutilis
	7904	MYRIS	Myristica	Myristica	spp.
	7905	MYFR2	cercipo	Myrospermum	frutescens
	7907	MYBA3	balsam of Tolu	Myroxylon	balsamum
	7910	MYAL4	forest colicwood	Myrsine	alyxifolia
	7911	MYCO2	leathery colicwood	Myrsine	coriacea
	7912	MYCU2	Myrsine cubana	Myrsine	cubana
	7913	MYDE2	summit colicwood	Myrsine	degeneri
	7914	MYEM	mountain colicwood	Myrsine	emarginata
	7915	MYFE	streambank colicwood	Myrsine	fernseei
	7916	MYFO	Koolau Range colicwood	Myrsine	fosbergii
	7918	MYHE3	Wahiawa Bog colicwood	Myrsine	helleri
	7919	MYKA	Kauai colicwood	Myrsine	kauaiensis
	7920	MYKN	Kokee colicwood	Myrsine	knudsenii
	7921	MYLA3	Lanai colicwood	Myrsine	lanaiensis
	7922	MYLE2	kolea lau nui	Myrsine	lessertiana
	7923	MYME2	Hanapepe River colicwood	Myrsine	mezii
	7929	MYPA7	Myrsine palauensis	Myrsine	palauensis
	7924	MYPE3	swamp colicwood	Myrsine	petiolata
	7925	MYPU2	Molokai colicwood	Myrsine	pukooensis
	7926	MYSA2	kokea lau lii	Myrsine	sandwicensis
	7927	MYRSI	colicwood	Myrsine	spp.
	7928	MYWA	Mt. Kahili colicwood	Myrsine	wawraea
	7932	NECO	Nectandra coriacea	Nectandra	coriacea
	7933	NEHI2	shinglewood	Nectandra	hihua
	7934	NEKR	Nectandra krugii	Nectandra	krugii
	7935	NEME3	Nectandra membranacea	Nectandra	membranacea
	7936	NEPA4	Nectandra patens	Nectandra	patens
	7939	NETU	Nectandra turbacensis	Nectandra	turbacensis
	7940	NEBU	saltwood	Neea	buxifolia
	7942	NEOP	fao	Neisosperma	oppositifolia
	7944	NECA7	kadam	Neolamarckia	cadamba
	7946	NERE2	aquilon	Neolaugeria	resinosa
	7948	NEFO2	afa	Neonauclea	forsteri
	7952	NELA7	Rambutan	Nephelium	lappaceum
	7953	NERA3	pulasan	Nephelium	ramboutan-ake
	7954	NEME5	maaloa	Neraudia	melastomifolia
	7956	NEOL	oleander	Nerium	oleander
	7958	NEPO	keahi	Nesoluma	polynesicum
	7960	NESA2	Hawaii olive	Nestegis	sandwicensis
	7961	NESTE	nestegis	Nestegis	spp.
	7962	NECE	kalm, aralm	Neuburgia	celebica
	7964	NIGL	tree tobacco	Nicotiana	glauca
	7965	NICOT	tobacco	Nicotiana	spp.
	7966	NOBR2	smallflower aiea	Nothocestrum	breviflorum
	7967	NOLA	broadleaf aiea	Nothocestrum	latifolium
	7968	NOLO	longleaf aiea	Nothocestrum	longifolium
	7969	NOPE	Oahu aiea	Nothocestrum	peltatum
	7970	NOTHO3	aiea	Nothocestrum	spp.
	7971	NOHU	kaala rockwort	Nototrichium	humile
	7972	NOSA	Hawaii rockwort	Nototrichium	sandwicense
	7974	NYFR2	toechel, teuechel	Nypa	fruticans
	691	NYAQ2	water tupelo	Nyssa	aquatica
	694	NYBI	swamp tupelo	Nyssa	biflora
	692	NYOG	Ogeechee tupelo	Nyssa	ogeche
	690	NYSSA	tupelo spp.	Nyssa	spp.
	693	NYSY	blackgum	Nyssa	sylvatica
	7976	OCMO4	African bird's-eye bush	Ochna	mossambicensis
	7977	OCHNA	ochna	Ochna	spp.

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	7978	OCTH	Thomas birds-eye bush	Ochna	thomasiana
	7980	OCPY	Ochroma pyramidale	Ochroma	pyramidale
	7982	OCCO	holei	Ochrosia	compta
	7983	OCHA	island yellowwood	Ochrosia	haleakalae
	7984	OCKA	Kauai yellowwood	Ochrosia	kauaiensis
	7985	OCKI	Hawaii yellowwood	Ochrosia	kilaueaensis
	7987	OCMA2	langiti	Ochrosia	mariannensis
	7986	OCHRO2	yellowwood	Ochrosia	spp.
	7990	OCFL	laurel espada	Ocotea	floribunda
	7991	OCFO	black sweetwood	Ocotea	foeniculacea
	7994	OCLE	loblolly sweetwood	Ocotea	leucoxylon
	7996	OCMO	nemoca	Ocotea	moschata
	7997	OCNE	laurel sassafras	Ocotea	nemodaphne
	7999	OCPO	laurel de paloma	Ocotea	portoricensis
	8001	OCSP	nemoca cimarrona	Ocotea	spathulata
	8003	OCWR	Wright's laurel canelon	Ocotea	wrightii
	8004	OLEU	olive	Olea	europaea
	8007	OLEA	olive	Olea	spp.
	8000	OLNE	oleandra fern	Oleandra	neriiformis
W	990	OLTE	desert ironwood	Olneya	tesota
	8011	OPPA4	Ophiorrhiza palauensis	Ophiorrhiza	palauensis
	8013	OPCO4	cochineal nopal cactus	Opuntia	cochenillifera
	8014	OPFI	tuna cactus	Opuntia	ficus-indica
	8015	OPMO5	common pricklypear	Opuntia	monacantha
	8018	OPUNT	pricklypear	Opuntia	spp.
	8019	ORCA12	amansis, edebsungelked, necklace bead tree	Ormosia	calavensis
	8020	ORKR	peronia	Ormosia	krugii
	8022	OSOL	kesiamel	Osmoxylon	oliveri
	8023	OSPA	kesiamel	Osmoxylon	pachyphyllum
	8024	OSMOX	Osmoxylon	Osmoxylon	spp.
	718	OSTR	kesiamel	Osmoxylon	truncatum
	6479	OSKN	Knowlton's hophornbeam	Ostrya	knowltonii
	701	OSVI	eastern hophornbeam	Ostrya	virginiana
	8027	OTRH	pincho palo de rosa	Ottoschulzia	rhodoxylon
	8029	OUIL	chicharron amarillo	Ouratea	ilicifolia
	8030	OULI	abey amarillo	Ouratea	littoralis
	8032	OUST	guanabanilla	Ouratea	striata
	8033	OXLA4	blacklancewood	Oxandra	lanceolata
	8034	OXLA5	haya	Oxandra	laurifolia
	711	OXAR	sourwood	Oxydendrum	arboreum
	8036	PAAQ2	miich era ngebard, guiana chestnut	Pachira	aquatica
	8037	PAIN7	wild chestnut	Pachira	insignis
	8074	PAKA	Palaquium karrak	Palaquium	karrak
	8044	PAST24	gasu	Palaquium	stehlinii
	8045	PAAL9	tafetan	Palicourea	alpina
	8047	PACR3	red cappel	Palicourea	crocea
	8049	PACR18	Palicourea croceoides	Palicourea	croceoides
	8051	PAGU	showy cappel	Palicourea	guianensis
	8054	PAAI	chertochet	Pandanus	aimiriikensis
	8055	PACO51	matal	Pandanus	cominsii
	8056	PACO3	ongor	Pandanus	compressus
	8057	PACY10	silaue	Pandanus	cylindricus
	8058	PADI2	kienpel	Pandanus	dilatatus
	8059	PADI29	ongor	Pandanus	divergens
	8060	PADU3	pahong	Pandanus	dubius
	8061	PADU4	ongor	Pandanus	duriocarpus
	8062	PAEN	moak	Pandanus	enchabiensis
	8063	PAFI	hara	Pandanus	fischerianus
	8064	PAFR7	aggag	Pandanus	fragrans
	8065	PAHO6	nenketak	Pandanus	hosinoi
	8066	PAJA3	pacheren	Pandanus	jaluitensis
	8053	PAJA2	Pandanus japensis	Pandanus	japensis

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	8067	PAKA2	buuk	Pandanus	kanehirae
	8068	PAKO2	siu	Pandanus	korrensis
	8069	PALA3	lakatwa	Pandanus	lakatwa
	8070	PALA4	erwan, jonmouia	Pandanus	laticanaliculatus
	8071	PAMA3	intekul, pasyure	Pandanus	macrocephalus
	8072	PAMA32	ongor, ertochet	Pandanus	macrojeanneretia
	8073	PAME18	menne	Pandanus	menne
	8092	PAOB7	lonlin, lajokorer	Pandanus	obliquus
	8075	PAOD2	Pandanus odontoides	Pandanus	odontoides
	8076	PAPA38	ongor, ertochet	Pandanus	palawensis
	8077	PAPA39	peet	Pandanus	patina
	8078	PAPE	ongor	Pandanus	peliliuensis
	8079	PAPO2	alwan, kipal, taip	Pandanus	ponapensis
	8080	PAPU18	deipw, jomineia	Pandanus	pulposus
	8081	PARE2	pathaplip	Pandanus	rectangulatus
	8082	PARE19	fasa	Pandanus	reineckei
	8083	PARO2	magojokojok	Pandanus	rotundatus
	8084	PANDA	screwpine	Pandanus	spp.
	8085	PATE2	Tahitian screwpine	Pandanus	tectorius
	8086	PATO6	kiparenwel	Pandanus	tolotomensis
	8087	PATR	mojel	Pandanus	trukensis
	8088	PAUT	common screwpine	Pandanus	utilis
	8090	PAVA4	berrakelongor	Pandanus	variegatus
	8091	PAED4	rauel	Pangium	edule
	8099	PACR2	scratchthroat	Parathesis	crenulata
	8103	PAIN20	sea	Parinari	insularum
	8104	PALA5	ais	Parinari	laurina
	8105	PARIN	Parinari	Parinari	spp.
	8107	PAKO5	Parkia korom	Parkia	korom
	8108	PAPA2	kmekumer	Parkia	parvifoliola
	8106	PARKI3	parkia	Parkia	spp.
	8110	PATI5	Parkia timoriana	Parkia	timoriana
	8111	PAAC3	Jerusalem thorn	Parkinsonia	aculeata
	8112	PARKI2	paloverde	Parkinsonia	spp.
	8115	PATE10	Texas paloverde	Parkinsonia	texana
	8113	PAAC13	cuachilote	Parmentiera	aculeata
	8114	PACE8	candle tree	Parmentiera	cereifera
	712	PATO2	paulownia, empress-tree	Paulownia	tomentosa
	8121	PEPT3	Peltophorum pterocarpum	Peltophorum	pterocarpum
	8123	PEAC6	ngis	Pemphis	acidula
	8125	PEBU4	butter tree	Pentadesma	butyracea
	8127	PEBU2	jiqi	Pera	bumeliifolia
	8129	PEMO13	Pericopsis mooniana	Pericopsis	mooniana
	8131	PESA3	olomea	Perrottetia	sandwicensis
	7211	PEAM3	avocado	Persea	americana
	721	PEBO	redbay	Persea	borbonia
	8134	PEKR	canela	Persea	krugii
	6511	PEPA37	swamp bay	Persea	palustris
	720	PERSE	bay spp.	Persea	spp.
	8138	PEUR2	aquacatillo	Persea	urbaniana
	8141	PEDO	bastard stopper	Petitia	domingensis
	8146	PHNI11	Phaleria nisidai	Phaleria	nisidai
	6516	PHAM2	Amur corktree	Phellodendron	amurense
	8143	PHGR11	aquilon prieto	Phialanthus	grandifolius
	8144	PHMY	candlewood	Phialanthus	myrtilloides
	8151	PHCA13	Canary Island date palm	Phoenix	canariensis
	8152	PHDA4	date palm	Phoenix	dactylifera
	8150	PHRO6	pygmy date palm	Phoenix	roebelenii
	8153	PHOEN2	date palm	Phoenix	spp.
	8154	PHSY3	date palm	Phoenix	sylvestris
	8155	PHDA5	Chinese photinia	Photinia	davidiana
	8156	PHFR9	Fraser's photinia	Photinia	xfraseri

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	8157	PHAC3	Tahitian gooseberry tree	Phyllanthus	acidus
	8159	PHDI10	pamakani mahu	Phyllanthus	distichus
	8160	PHJU2	gamo de costa	Phyllanthus	juglandifolius
	8162	PHOR10	Phyllanthus orbicularis	Phyllanthus	orbicularis
	91	PIAB	Norway spruce	Picea	abies
	92	PIBR	Brewer spruce	Picea	breweriana
	93	PIEN	Engelmann spruce	Picea	engelmannii
	94	PIGL	white spruce	Picea	glauca
	6533	PIGL7	Sakhalin spruce	Picea	glehnii
	95	PIMA	black spruce	Picea	mariana
	6538	PIOM2	Serbian spruce	Picea	omorika
	96	PIPU	blue spruce	Picea	pungens
	97	PIRU	red spruce	Picea	rubens
	98	PISI	Sitka spruce	Picea	sitchensis
	90	PICEA	spruce spp.	Picea	spp.
	8164	PIPE	Florida bitterbush	Picramnia	pentandra
	8167	PIEX	bitterwood	Picrasma	excelsa
	8169	PIAC	fustic	Pictetia	aculeata
	8171	PIRA3	aceitillo	Pilocarpus	racemosus
	8173	PIRO6	Royen's tree cactus	Pilosocereus	royenii
	8175	PIDI2	allspice	Pimenta	dioica
	8177	PIRA	bayrumtree	Pimenta	racemosa
	8178	PIRAG	bayrumtree	Pimenta	racemosa var. grisea
	8180	PIMEN	Pimenta	Pimenta	spp.
	8181	PIIN5	chebouch, demailei	Pinanga	insignis
	101	PIAL	whitebark pine	Pinus	albicaulis
	102	PIAR	Rocky Mountain bristlecone pine	Pinus	aristata
	135	PIAR5	Arizona pine	Pinus	arizonica
	103	PIAT	knobcone pine	Pinus	attenuata
	104	PIBA	foxtail pine	Pinus	balfouriana
	105	PIBA2	jack pine	Pinus	banksiana
	8200	PIBU2	Bunge's pine	Pinus	bungeana
	8201	PICA15	Canary Island pine	Pinus	canariensis
	8183	PICA18	Caribbean pine	Pinus	caribaea
W	140	PICE	Mexican pinyon pine	Pinus	cembroides
	107	PICL	sand pine	Pinus	clausa
	108	PICO	lodgepole pine	Pinus	contorta
	109	PICO3	Coulter pine	Pinus	coulteri
	8189	PIDE5	Japanese red pine	Pinus	densiflora
W	134	PIDI3	border pinyon	Pinus	discolor
	110	PIEC2	shortleaf pine	Pinus	echinata
W	106	PIED	common or two-needle pinyon	Pinus	edulis
	111	PIEL	slash pine	Pinus	elliottii
	144	PIELE2	Honduras pine	Pinus	elliottii var. elliottii
	112	PIEN2	Apache pine	Pinus	engelmannii
	113	PIFL2	limber pine	Pinus	flexilis
	115	PIGL2	spruce pine	Pinus	glabra
	8202	PIHA7	aleppo pine	Pinus	halepensis
	116	PIJE	Jeffrey pine	Pinus	jeffreyi
	117	PILA	sugar pine	Pinus	lambertiana
	118	PILE	Chihuahuan pine	Pinus	leiophylla
	142	PILO	Great Basin bristlecone pine	Pinus	longaeva
	8184	PIMA11	Chinese red pine	Pinus	massoniana
	8185	PIME2	Merkus pine	Pinus	merkusii
W	133	PIMO	singleleaf pinyon	Pinus	monophylla
W	143	PIMOF	Arizona pinyon pine	Pinus	monophylla var. fallax
	119	PIMO3	western white pine	Pinus	monticola
	120	PIMU	bishop pine	Pinus	muricata
	136	PINI	Austrian pine	Pinus	nigra
	8186	PIOO2	ocote chino	Pinus	oocarpa
	121	PIPA2	longleaf pine	Pinus	palustris
	8197	PIPA12	five-needle pine	Pinus	parviflora

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	8187	PIPA13	Mexican weeping pine	Pinus	patula
	8188	PIPI6	maritime pine	Pinus	pinaster
	8203	PIPI7	Italian stone pine	Pinus	pinea
	122	PIPO	ponderosa pine	Pinus	ponderosa
	123	PIPU5	Table Mountain pine	Pinus	pungens
W	138	PIQU	four-leaf or Parry pinyon pine	Pinus	quadrifolia
	124	PIRA2	Monterey pine	Pinus	radiata
W	141	PIRE5	Papershell pinyon pine	Pinus	remota
	125	PIRE	red pine	Pinus	resinosa
	126	PIRI	pitch pine	Pinus	rigida
	8182	PIRO2	Indian longleaf pine	Pinus	roxburghii
	127	PISA2	gray or California foothill pine	Pinus	sabiniana
	128	PISE	pond pine	Pinus	serotina
	100	PINUS	pine spp.	Pinus	spp.
	114	PIST3	southwestern white pine	Pinus	strobiformis
	129	PIST	eastern white pine	Pinus	strobus
	130	PISY	Scotch pine	Pinus	sylvestris
	131	PITA	loblolly pine	Pinus	taeda
	8198	PITH2	Japansese Black pine	Pinus	thunbergii
	139	PITO	Torrey pine	Pinus	torreyana
	132	PIVI2	Virginia pine	Pinus	virginiana
	137	PIWA	Washoe pine	Pinus	washoensis
	8190	PIAD	higuillo de hoja menuda	Piper	aduncum
	8191	PIAM2	higuillo de limon	Piper	amalago
	8192	PIBL	moth pepper	Piper	blattarum
	8193	PIGL3	Guyanese pepper	Piper	glabrescens
	8194	PIHI2	Jamaican pepper	Piper	hispidum
	8195	PIJA	Caracas pepper	Piper	jacquemontianum
	8196	PIMA4	marigold pepper	Piper	marginatum
	8199	PISW	spanish elder	Piper	swartzianum
	8205	PIAL2	Waimea pipturus	Pipturus	albidus
	8206	PIAR8	soga	Pipturus	argenteus
	8207	PIPTU	pipturus	Pipturus	spp.
	8208	PICA5	stinkwood	Piscidia	carthagenensis
	887	PIPI3	fishpoison tree	Piscidia	piscipula
	8210	PISCI	piscidia	Piscidia	spp.
	8211	PIAL3	corcho bobo	Pisonia	albida
	8212	PIBR3	Australasian catchbirdtree	Pisonia	brunoniana
	8213	PIGR6	grand devils-claws	Pisonia	grandis
	8214	PISA5	aulu	Pisonia	sandwicensis
	8215	PISON	catchbirdtree	Pisonia	spp.
	8216	PISU	water mampoo	Pisonia	subcordata
	8217	PIUM2	umbrella catchbirdtree	Pisonia	umbellifera
	8218	PIWA2	Kauai catchbirdtree	Pisonia	wagneriana
	8219	PICH4	Chinese pistache	Pistacia	chinensis
	8220	PIDU	monkeypod	Pithecellobium	dulce
	8223	PIUN	catclaw blackbead	Pithecellobium	unguis-cati
	8226	PIAR4	Hawaii poisonberry tree	Pittosporum	argentifolium
	8227	PICO4	hoawa	Pittosporum	confertiflorum
	8225	PIFE3	kamal	Pittosporum	ferrugineum
	8228	PIFL4	Waianae Range cheesewood	Pittosporum	flocculosum
	8229	PIGA2	Waialeale cheesewood	Pittosporum	gayanum
	8230	PIGL4	Koolau Range cheesewood	Pittosporum	glabrum
	8231	PIHA3	hoawa	Pittosporum	halophilum
	8232	PIHA4	Hawaii cheesewood	Pittosporum	hawaiiense
	8233	PIHO	Kona cheesewood	Pittosporum	hosmeri
	8234	PIKA3	Kauai cheesewood	Pittosporum	kauaiense
	8224	PIMO4	Mona cheesewood, Pittosporum	Pittosporum	monae
	8235	PINA	royal cheesewood	Pittosporum	napaliense
	8236	PIPE8	Taiwanese cheesewood	Pittosporum	pentandrum
	8238	PITTO	cheesewood	Pittosporum	spp.
	8239	PITE5	cream cheesewood	Pittosporum	terminalioides

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	8222	PITO2	Japanese cheesewood	Pittosporum	tobira
	8240	PIUN2	Australian cheesewood	Pittosporum	undulatum
	8241	PIVI5	cape cheesewood	Pittosporum	viridiflorum
	8242	PLGA2	alaa	Planchonella	garberi
	8243	PLGR11	alaa	Planchonella	grayana
	8244	PLLI6	alaa	Planchonella	linggensis
	8246	PLSA9	mamalava	Planchonella	samoensis
	8247	PLANC	Planchonella	Planchonella	spp.
	8248	PLTO2	mamalava	Planchonella	torricellensis
	722	PLAQ	water-elm, planertree	Planera	aquatica
	8253	PLHY3	London planetree	Platanus	hybrida
	8256	PLME9	Mexican sycamore	Platanus	mexicana
	731	PLOC	American sycamore	Platanus	occidentalis
	8254	PLOR6	Oriental planetree	Platanus	orientalis
	730	PLRA	California sycamore	Platanus	racemosa
	729	PLATA	sycamore spp.	Platanus	spp.
	732	PLWR2	Arizona sycamore	Platanus	wrightii
	8249	PLOR80	Oriental arborvitae	Platycladus	orientalis
	8250	PLRE4	Hawaii pilo kea	Platydesma	remyi
	8251	PLSP3	Maui pilo kea	Platydesma	spathulata
	8252	PLATY	platydesma	Platydesma	spp.
	8255	PLMA6	chupa gallo	Pleodendron	macranthum
	8257	PLAU2	golden hala pepe	Pleomele	aurea
	8258	PLAU5	Maui hala pepe	Pleomele	auwahiensis
	8259	PLFE	Lanai hala pepe	Pleomele	fernaldii
	8260	PLFO2	Waianae Range hala pepe	Pleomele	forbesii
	8261	PLHA3	royal hala pepe	Pleomele	halapepe
	8262	PLHA4	Hawaii hala pepe	Pleomele	hawaiiensis
	8263	PLEOM	hala pepe	Pleomele	spp.
	8266	PLAL	nosegaytree	Plumeria	alba
	8268	PLOB2	Singapore graveyard flower	Plumeria	obtusa
	8269	PLOBO	Plumeria obtusa	Plumeria	obtusa var. obtusa
	8271	PLRU2	templetree	Plumeria	rubra
	8272	PLUME	Plumeria	Plumeria	spp.
	8273	POCO3	yucca plum pine	Podocarpus	coriaceus
	8274	POMA32	yew plum pine	Podocarpus	macrophyllus
	8275	POFL20	Poitea florida	Poitea	florida
	8276	POPU19	Poitea punicea	Poitea	punicea
	8279	POCO5	violet tree	Polygala	cowellii
	8280	POPE13	crevajosa	Polygala	penaea
	8283	POGR28	bungaruau	Polyscias	grandifolia
	8284	POGU	geranium aralia	Polyscias	guilfoylei
	8285	POMA	Polyscias macgillivrayi	Polyscias	macgillivrayi
	8286	PONO10	bngei	Polyscias	nodosa
	8287	POSA27	tagitagi	Polyscias	samoensis
	8288	POSC10	shield aralia	Polyscias	scutellaria
	8289	POLYS4	Polyscias	Polyscias	spp.
	8290	POPI12	tava	Pometia	pinnata
	8292	POHO	kattai	Ponapea	hosinoi
	8293	POLE21	Ponapea ledermanniana	Ponapea	ledermanniana
	8294	PONAP	Ponapea	Ponapea	spp.
	8296	POTR4	hardy orange	Poncirus	trifoliata
	8295	POPI4	kisaks	Pongamia	pinnata
	752	POAL7	silver poplar	Populus	alba
	749	POAN3	narrowleaf cottonwood	Populus	angustifolia
	741	POBA2	balsam poplar	Populus	balsamifera
	747	POBAT	black cottonwood	Populus	balsamifera ssp. trichocarpa
	742	PODE3	eastern cottonwood	Populus	deltoides
	745	PODEM	plains cottonwood	Populus	deltoides ssp. monilifera
	748	POFR2	Fremont cottonwood	Populus	fremontii
	743	POGR4	bigtooth aspen	Populus	grandidentata
	744	POHE4	swamp cottonwood	Populus	heterophylla

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	753	PONI	Lombardy poplar	Populus	nigra
	740	POPUL	cottonwood and poplar spp.	Populus	spp.
	746	POTR5	quaking aspen	Populus	tremuloides
	8313	POCA19	Carolina poplar	Populus	x canadensis
	8314	POCA14	gray poplar	Populus	x canescens
	8297	POCA43	Abiu	Pouteria	caimito
	8298	POCA6	elangel, chelangel	Pouteria	calcarea
	8299	POCA23	eggfruit	Pouteria	campechiana
	8300	PODI5	cocuyo	Pouteria	dictyoneura
	8301	POHO4	redmammee	Pouteria	hotteana
	8302	POMU6	bullytree	Pouteria	multiflora
	8303	POOB8	lalahag	Pouteria	obovata
	8304	POSA11	alaa	Pouteria	sandwicensis
	8305	POSA13	mammee sapote	Pouteria	sapota
	8306	POUTE	pouteria	Pouteria	spp.
	8307	PROB	ahgao	Premna	obtusifolia
	8308	PRPU5	Premna pubescens	Premna	pubescens
	8309	PRSE6	aloalo	Premna	serratifolia
	8310	PREMN	Premna	Premna	spp.
	8311	PRACM	Prestoea acuminata	Prestoea	acuminata
	8315	PRAF	Hawaii pritchardia	Pritchardia	affinis
	8316	PRAR2	Maui pritchardia	Pritchardia	arecina
	8317	PRBE	Kilauea pritchardia	Pritchardia	beccariana
	8318	PRFO	Mt. Eke pritchardia	Pritchardia	forbesiana
	8319	PRHA2	Makaleha pritchardia	Pritchardia	hardyi
	8320	PRHI	loulu lelo	Pritchardia	hillebrandii
	8321	PRKA	Waianae Range pritchardia	Pritchardia	kaalae
	8322	PRLA3	Lanai pritchardia	Pritchardia	lanaiensis
	8323	PRLA4	loulu	Pritchardia	lanigera
	8324	PRLI2	Limahuli Valley pritchardia	Pritchardia	limahuliensis
	8325	PRLO2	Molokai pritchardia	Pritchardia	lowreyana
	8326	PRMA5	Koolau Range pritchardia	Pritchardia	martii
	8327	PRMI3	Alakai Swamp pritchardia	Pritchardia	minor
	8328	PRMU3	Kamalo pritchardia	Pritchardia	munroi
	8329	PRPA11	fan palm	Pritchardia	pacifica
	8330	PRPE7	Waioli Valley pritchardia	Pritchardia	perlmanii
	8331	PRRE	Nihoa pritchardia	Pritchardia	remota
	8336	PRSC	lands of papa pritchardia	Pritchardia	schattaueri
	8337	PRITC	pritchardia	Pritchardia	spp.
	8338	PRVI2	stickybud pritchardia	Pritchardia	viscosa
	8339	PRWA	poleline pritchardia	Pritchardia	waialealeana
	8340	PRCR2	guasimilla	Prockia	crucis
	8341	PRPE6	fua lole	Procris	pedunculata
	8342	PRCI4	jand	Prosopis	cineraria
W	756	PRGL2	honey mesquite	Prosopis	glandulosa
	8343	PRJU	mesquite	Prosopis	juliflora
	8344	PRPA4	kiawe	Prosopis	pallida
W	758	PRPU	screwbean mesquite	Prosopis	pubescens
W	755	PROSO	mesquite spp.	Prosopis	spp.
W	757	PRVE	velvet mesquite	Prosopis	velutina
	769	PRAL5	Allegheny plum	Prunus	alleghaniensis
	766	PRAM	American plum	Prunus	americana
	770	PRAN3	Chickasaw plum	Prunus	angustifolia
	8350	PRAR3	apricot	Prunus	armeniaca
	771	PRAV	sweet cherry, domesticated	Prunus	avium
	8345	PRCA	Carolina laurelcherry	Prunus	caroliniana
	8348	PRCE2	cherry plum	Prunus	cerasifera
	772	PRCE	sour cherry, domesticated	Prunus	cerasus
	773	PRDO	European plum, domesticated	Prunus	domestica
	8351	PRDU	sweet almond	Prunus	dulcis
	768	PREM	bitter cherry	Prunus	emarginata
	6696	PRLA5	cherry laurel	Prunus	laurocerasus

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	774	PRMA	Mahaleb cherry, domesticated	Prunus	mahaleb
	8346	PRMY	West Indian cherry	Prunus	myrtifolia
	765	PRNI	Canada plum	Prunus	nigra
	8347	PROC	western cherry laurel	Prunus	occidentalis
	761	PRPE2	pin cherry	Prunus	pensylvanica
	764	PRPE3	peach	Prunus	persica
	8360	PRSA3	Japanese plum	Prunus	salicina
	762	PRSE2	black cherry	Prunus	serotina
	8349	PRSEC	Prunus serotina	Prunus	serotina ssp. capuli
	6707	PRSE3	Japanese flowering cherry	Prunus	serrulata
	760	PRUNU	cherry and plum spp.	Prunus	spp.
	763	PRVI	chokecherry	Prunus	virginiana
	8357	PRYE	Yoshino flowering cherry	Prunus	x yedoensis
	8352	PSSP2	false breadnut	Pseudolmedia	spuria
	8353	PSSA	Florida cherry palm	Pseudophoenix	sargentii
	201	PSMA	bigcone Douglas-fir	Pseudotsuga	macrocarpa
	202	PSME	Douglas-fir	Pseudotsuga	menziesii
	200	PSEUD7	Douglas-fir spp.	Pseudotsuga	spp.
	8354	PSAM	mountain guava	Psidium	amplexicaule
	8355	PSCA	strawberry guava	Psidium	cattleianum
	8356	PSGU	guava	Psidium	guajava
	8358	PSLOO	Psidium longipes	Psidium	longipes
	8359	PSSI2	Sintenis' guava	Psidium	sintenisii
	8361	PSBE	cachimbo-cumun	Psychotria	berteriana
	8362	PSBR2	palo de cachimbo	Psychotria	brachiata
	8363	PSBR3	Browne's wild coffee	Psychotria	brownei
	8368	PSCA18	chimei	Psychotria	carolinensis
	8413	PSCH4	Psychotria cheathamiana	Psychotria	cheathamiana
	8364	PSDO2	Psychotria domingensis	Psychotria	domingensis
	8365	PSFA	Koolau Range wild coffee	Psychotria	fauriei
	8366	PSGR	largeflower wild coffee	Psychotria	grandiflora
	8367	PSGR2	cachimbo grande	Psychotria	grandis
	8369	PSGR3	Kauai wild coffee	Psychotria	greenwelliae
	8370	PSHA2	Waianae Range wild coffee	Psychotria	hathewayi
	8373	PSHA3	kopikoula	Psychotria	hawaiiensis
	8377	PSHE2	woodland wild coffee	Psychotria	hexandra
	8382	PSHEO	Oahu wild coffee	Psychotria	hexandra ssp. oahuensis
	8386	PSHO	milolii kopiwai	Psychotria	hobdyi
	8387	PSIN10	matalafi	Psychotria	insularum
	8388	PSKA	kopiko kea	Psychotria	kaduana
	8389	PSMA4	cachimbo de gato	Psychotria	maleolens
	8390	PSYMAR	aplohkateng	Psychotria	mariana
	8391	PSMA5	cachimbo de maricao	Psychotria	maricaensis
	8392	PSMA6	forest wild coffee	Psychotria	mariniana
	8393	PSMA7	opiko	Psychotria	mauiensis
	8394	PSMI	thicket wild coffee	Psychotria	microdon
	8395	PSNU2	floating balsamo	Psychotria	nutans
	8397	PSPU	hairy wild coffee	Psychotria	pubescens
	8398	PSRH2	Psychotria rhombocarpa	Psychotria	rhombocarpa
	8399	PSRO2	Psychotria rotensis	Psychotria	rotensis
	8400	PSYCH	wild coffee	Psychotria	spp.
	8401	PSWA2	leatherleaf wild coffee	Psychotria	wawrae
	6381	CAME35	Olasina	Psydrax	merrillii
	8402	PSOD	alahee	Psydrax	odorata
	8403	PTTR	common hoptree	Ptelea	trifoliata
	8404	PTKA	Kauai pteralyxia	Pteralyxia	kauaiensis
	8405	PTMA	ridged pteralyxia	Pteralyxia	macrocarpa
	8406	PTERA	pteralyxia	Pteralyxia	spp.
	8407	PTIN2	pterocarpus	Pterocarpus	indicus
	8408	PTMA7	Burma padauk	Pterocarpus	macrocarpus
	8409	PTMA3	Malabar kino	Pterocarpus	marsupium
	8410	PTOF	dragonsblood tree	Pterocarpus	officinalis

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	8411	PTST80	Chinese wingnut	Pterocarya	stenoptera
	8412	PTLE3	Ptychococcus ledermannianus	Ptychococcus	ledermannianus
	8415	PTMA8	Macarthur feather palm	Ptychosperma	macarthuri
	8416	PTPA	chesdbuuch	Ptychosperma	palauense
	8418	PTYCH4	Ptychosperma	Ptychosperma	spp.
	8419	PUGR2	pomegranate	Punica	granatum
	6759	PUST	Stansbury cliffrose	Purshia	stansburiana
	8421	PYCA80	Callery pear	Pyrus	calleryana
	8423	PYCO	common pear	Pyrus	communis
	8426	PYPY2	Chinese pear	Pyrus	pyrifolia
	8420	PYRUS	pear spp.	Pyrus	spp.
	8422	QUTU	swizzlestick tree	Quararibea	turbinata
	8427	QUAC80	sawtooth oak	Quercus	acutissima
	801	QUAG	California live oak	Quercus	agrifolia
	802	QUAL	white oak	Quercus	alba
W	803	QUAR	Arizona white oak	Quercus	arizonica
	6768	QUAR2	Arkansas oak	Quercus	arkansana
	8429	QUAU	bastard white oak	Quercus	austrina
	804	QUBI	swamp white oak	Quercus	bicolor
	8513	QUBU2	Buckley oak	Quercus	buckleyi
	8437	QUCE	European turkey oak	Quercus	cerris
	805	QUCH2	canyon live oak	Quercus	chrysolepis
	806	QUCO2	scarlet oak	Quercus	coccinea
	807	QUDO	blue oak	Quercus	douglasii
	809	QUEL	northern pin oak	Quercus	ellipsoidalis
W	810	QUEM	Emory oak	Quercus	emoryi
	811	QUEN	Engelmann oak	Quercus	engelmannii
	812	QUFA	southern red oak	Quercus	falcata
	8438	QUFU	Texas live oak	Quercus	fusiformis
W	814	QUGA	Gambel oak	Quercus	gambelii
	815	QUGA4	Oregon white oak	Quercus	garryana
	8441	QUGE2	sand live oak	Quercus	geminata
	6782	QUGE	Georgia oak	Quercus	georgiana
	851	QUGR	Chisos oak	Quercus	graciliformis
	8511	QUGR2	Graves oak	Quercus	gravesii
W	846	QUGR3	gray oak	Quercus	grisea
	6785	QUHA3	Havard oak	Quercus	havardii
	8449	QUHE2	Darlington oak	Quercus	hemisphaerica
W	843	QUHY	silverleaf oak	Quercus	hypoleucoides
	8450	QUIL2	holly oak	Quercus	ilex
	816	QUIL	scrub oak	Quercus	ilicifolia
	817	QUIM	shingle oak	Quercus	imbricaria
	842	QUIN	bluejack oak	Quercus	incana
	818	QUKE	California black oak	Quercus	kelloggii
	8514	QULA	Lacey oak	Quercus	laceyi
	819	QULA2	turkey oak	Quercus	laevis
	820	QULA3	laurel oak	Quercus	laurifolia
	821	QULO	California white oak	Quercus	lobata
	822	QULY	overcup oak	Quercus	lyrata
	823	QUMA2	bur oak	Quercus	macrocarpa
	840	QUMA6	dwarf post oak	Quercus	margarettiae
	824	QUMA3	blackjack oak	Quercus	marilandica
	825	QUMI	swamp chestnut oak	Quercus	michauxii
	841	QUMI2	dwarf live oak	Quercus	minima
	826	QUMU	chinkapin oak	Quercus	muehlenbergii
	6791	QUMY	myrtle oak	Quercus	myrtifolia
	827	QUNI	water oak	Quercus	nigra
W	829	QUOB	Mexican blue oak	Quercus	oblongifolia
	844	QUOG	Oglethorpe oak	Quercus	oglethorpensis
	813	QUPA5	cherrybark oak	Quercus	pagoda
	830	QUPA2	pin oak	Quercus	palustris
	6794	QUPE2	durmast oak	Quercus	petraea

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	831	QUPH	willow oak	Quercus	phellos
	8512	QUPO2	Mexican white oak	Quercus	polymorpha
	845	QUPR	dwarf chinkapin oak	Quercus	prinoides
	832	QUPR2	chestnut oak	Quercus	prinus
	8453	QUPU	pungent oak	Quercus	pungens
	6797	QURO2	English oak	Quercus	robur
	8492	QURO3	robust oak	Quercus	robusta
	833	QURU	northern red oak	Quercus	rubra
W	847	QURU4	netleaf oak	Quercus	rugosa
	834	QUSH	Shumard oak	Quercus	shumardii
	836	QUSI2	Delta post oak	Quercus	similis
	6799	QUSI	bastard oak	Quercus	sinuata
	8487	QUSIB	bastard oak	Quercus	sinuata var. breviloba
	808	QUSIS	Durand oak	Quercus	sinuata var. sinuata
	800	QUERC	oak spp.	Quercus	spp.
	835	QUST	post oak	Quercus	stellata
	8424	QUSU5	cork oak	Quercus	suber
	8455	QUTA	lateleaf oak	Quercus	tardifolia
	828	QUTE	Texas red oak	Quercus	texana
	8457	QUTO2	Toumey oak	Quercus	toumeyi
	8459	QUTU2	Sonoran scrub oak	Quercus	turbinella
	8461	QUVA5	sandpaper oak	Quercus	vaseyana
	837	QUVE	black oak	Quercus	velutina
	838	QUVI	live oak	Quercus	virginiana
	839	QUWI2	interior live oak	Quercus	wislizeni
	8425	RAAC	white indigoberry	Randia	aculeata
	8430	RAMY	togo vao	Rapanea	myricifolia
	8432	RAIN8	omechidel	Rauvolfia	insularis
	8433	RANI2	palo amargo	Rauvolfia	nitida
	8434	RASA3	devils-pepper	Rauvolfia	sandwicensis
	8435	RAUVO	devils-pepper	Rauvolfia	spp.
	8431	RAVO	poison devils-pepper	Rauvolfia	vomitoria
	8436	RAMA7	traveler's tree	Ravenala	madagascariensis
	8439	RAUR	tortugo prieto	Ravenia	urbanii
	8440	RELA	vi vao	Reynoldsia	lanutoensis
	8442	RESA	ohe makai	Reynoldsia	sandwicensis
	8443	REYNO	reynoldsia	Reynoldsia	spp.
	8444	REGU	guama	Reynosia	guama
	8445	REKR	Krug's darlingplum	Reynosia	krugii
	8447	REUN	sloe	Reynosia	uncinata
	6918	RHCA3	common buckthorn	Rhamnus	cathartica
	8456	RHED4	Rheeda	Rheedia	edulis
	8458	RHAP2	mangle	Rhizophora	apiculata
	8460	RHLA12	Rhizophora lamarckii	Rhizophora	lamarckii
	989	RHMA2	American mangrove	Rhizophora	mangle
	8462	RHMU	mangle hembra	Rhizophora	mucronata
	8463	RHIZO	mangrove	Rhizophora	spp.
	8464	RHST8	Rhizophora stylosa	Rhizophora	stylosa
	8471	RHCA8	Catawba rosebay	Rhododendron	catawbiense
	8465	RHODO2	rose myrtle	Rhodomyrtus	spp.
	8466	RHTO10	Rhodomyrtus tomentosus	Rhodomyrtus	tomentosa
	8475	RHCO	winged sumac	Rhus	copallinum
	8477	RHGL	smooth sumac	Rhus	glabra
	8470	RHLA11	African sumac	Rhus	lancea
	8479	RHLA3	prairie sumac	Rhus	lanceolata
	8467	RHSA2	neneleau	Rhus	sandwicensis
	8468	RHUS	sumac	Rhus	spp.
	8469	RHTA	tavai	Rhus	taitensis
	6924	RHTY	staghorn sumac	Rhus	typhina
	8472	RICO3	castorbean	Ricinus	communis
	8473	RICIN	ricinus	Ricinus	spp.
	8474	RICA16	Rinorea carolinensis	Rinorea	carolinensis

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	8486	ROHI	bristly locust	Robinia	hispida
W	902	RONE	New Mexico locust	Robinia	neomexicana
	901	ROPS	black locust	Robinia	pseudoacacia
	8476	ROAC2	greenheart ebony	Rochefortia	acanthophora
	8478	ROSP8	Rochefortia spinosa	Rochefortia	spinosa
	8480	RODE5	Rollinia	Rollinia	deliciosa
	8481	ROMU3	wild sugar apple	Rollinia	mucosa
	8483	ROIN4	cordobancillo	Rondeletia	inermis
	8484	ROPI3	cordobancillo peludo	Rondeletia	pilosa
	8485	ROPO	Juan Tomas	Rondeletia	portoricensis
	8489	ROBO	Puerto Rico royal palm	Roystonea	borinquena
	8490	ROEL	Roystonea elata	Roystonea	elata
	8491	ROOL	royal palm	Roystonea	oleracea
	909	ROYST	royal palm spp.	Roystonea	spp.
	8494	SACA	Puerto Rico palmetto	Sabal	causiarum
	911	SAME8	Mexican palmetto	Sabal	mexicana
	8495	SAMI8	dwarf palmetto	Sabal	minor
	912	SAPA	cabbage palmetto	Sabal	palmetto
	8499	SAUM3	white hogwood	Sagraea	umbrosa
	927	SAAL2	white willow	Salix	alba
	921	SAAM2	peachleaf willow	Salix	amygdaloides
	923	SABE2	Bebb willow	Salix	bebbiana
	924	SABO	Bonpland willow	Salix	bonplandiana
	925	SACA5	coastal plain willow	Salix	caroliniana
	8502	SADI	pussy willow	Salix	discolor
	6954	SAEL	Elaeagnus willow	Salix	elaeagnos
	6959	SAGE2	Geyer willow	Salix	geyeriana
	8508	SAGO	Goodding's willow	Salix	gooddingii
	8501	SAHU	Salix humboldtiana	Salix	humboldtiana
	6963	SALA3	red willow	Salix	laevigata
	8504	SALA6	arroyo willow	Salix	lasiolepis
	8519	SALU2	yellow willow	Salix	lutea
	6967	SAMA13	corkscrew willow	Salix	matsudana
	922	SANI	black willow	Salix	nigra
	8523	SAPL2	diamondleaf willow	Salix	planifolia
	926	SAPY	balsam willow	Salix	pyrifolia
	928	SASC	Scouler's willow	Salix	scouleriana
	929	SASE10	weeping willow	Salix	sepulcralis
	8524	SASE	silky willow	Salix	sericea
	8507	SASI2	Sitka willow	Salix	sitchensis
	920	SALIX	willow spp.	Salix	spp.
	8503	SAIN13	etkeam, cheskeam	Samadera	indica
	8505	SASA10	raintree	Samanea	saman
	8506	SAMAN	raintree	Samanea	spp.
	8509	SANIC4	common elderberry	Sambucus	nigra
	8527	SANIN2	European black elderberry	Sambucus	nigra ssp. nigra
	6991	SARA2	red elderberry	Sambucus	racemosa
	8510	SAMBU	raintree	Sambucus	spp.
	8556	SADO7	guayabilla	Samyda	dodecandra
	8515	SAKO4	santol, kechapi	Sandoricum	koetjape
	8518	SAAL16	sandalwood	Santalum	album
	8516	SAEL2	coastal sandalwood	Santalum	ellipticum
	8517	SAFR4	forest sandalwood	Santalum	freycinetianum
	8521	SAHA3	Haleakala sandalwood	Santalum	haleakalae
	8522	SAPA7	mountain sandalwood	Santalum	paniculatum
	8525	SASA8	willowleaf sandalwood	Santalum	salicifolium
	8526	SANTA	sandalwood	Santalum	spp.
	8528	SAOA3	lonomea	Sapindus	oahuense
	8529	SASA4	wingleaf soapberry	Sapindus	saponaria
	919	SASAD	western soapberry	Sapindus	saponaria var. drummondii
	8531	SAPIN	soapberry	Sapindus	spp.
	8532	SAVI17	vitiensis	Sapindus	vitiensis

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	8533	SAGL5	gumtree	Sapium	glandulosum
	8534	SAIN2	maskerekur	Sapium	indicum
	8535	SALA25	hinchahuevos	Sapium	laurifolium
	8536	SALA8	milktree	Sapium	laurocerasus
	8544	SAPA35	uunu	Sarcopygme	pacifica
	931	SAAL5	sassafras	Sassafras	albidum
	8546	SASE6	amansa guapo	Savia	sessiliflora
	8548	SCCE3	Scaevola, naupaka	Scaevola	cerasifolia
	8549	SCCH3	naupaka kuahiwi	Scaevola	chamissoniana
	8550	SCGA2	mountain naupaka	Scaevola	gaudichaudiana
	8551	SCPR	forest naupaka	Scaevola	procera
	8552	SCAEV	naupaka	Scaevola	spp.
	8560	SCTA	Toitoi	Scaevola	taccada
	8554	SCFR	Florida boxwood	Schaefferia	frutescens
	8555	SCHAE	schaefferia	Schaefferia	spp.
	888	SCAC2	octopus tree, schefflera	Schefflera	actinophylla
	8557	SCGL6	yuquilla	Schefflera	gleasonii
	8553	SCKR2	Schefflera kraemeri	Schefflera	kraemeri
	8558	SCMO10	matchwood	Schefflera	morototonii
	8559	SCSA10	samoensis	Schefflera	samoensis
	8561	SCMO	Peruvian peppertree	Schinus	molle
	8563	SCTE	Brazilian peppertree	Schinus	terebinthifolius
	8565	SCPA23	Brazilian firetree	Schizolobium	parahybum
	8567	SCOL3	lac tree	Schleichera	oleosa
	8571	SCAR2	arana	Schoepfia	arenaria
	8572	SCOB	white beefwood	Schoepfia	obovata
	8573	SCSC3	gulf graytwig	Schoepfia	schreberi
	8577	SCHY5	kuat	Scyphiphora	hydrophyllacea
	8583	SEFL9	poumuli	Securinega	flexuosa
	8585	SEKR3	poison tree	Semecarpus	kraemeri
	8586	SEVE4	tonget	Semecarpus	venenosa
	8588	SEAL4	emperor's candlesticks	Senna	alata
	8589	SEAT3	flor de San Jose	Senna	atomaria
	7023	SECO9	Argentine senna	Senna	corymbosa
	8590	SEGA2	Gaudichauds senna	Senna	gaudichaudii
	8591	SEMU5	false sicklepod	Senna	multijuga
	8592	SEPE4	valamuerto	Senna	pendula
	8594	SEPO5	retama prieta	Senna	polyphylla
	8595	SESE13	senna	Senna	septemtrionalis
	8596	SESI3	Siamese cassia	Senna	siamea
	8597	SESP9	casia amarilla	Senna	spectabilis
	8598	SENNA	senna	Senna	spp.
	8599	SESU10	Senna sulfurea	Senna	sulfurea
	8600	SESU4	glossy shower	Senna	surattensis
	211	SESE3	redwood	Sequoia	sempervirens
	212	SEGI2	giant sequoia	Sequoiadendron	giganteum
	8601	SEKA2	ukall	Serianthes	kanehirae
	8603	SENE9	hayun lago, trongkon guafi	Serianthes	nelsonii
	8605	SEGR5	vegetable hummingbird	Sesbania	grandiflora
	8606	SESE8	Egyptian riverhemp	Sesbania	sesban
	8607	SESBA	riverhemp	Sesbania	spp.
	8608	SHIN	Shirakiopsis indica	Shirakiopsis	indica
	8609	SIFA	yellow Ilima	Sida	fallax
	8610	SIDA	fanpetals	Sida	spp.
	8612	SICE2	saffron plum	Sideroxylon	celastrinum
	8611	SICU7	espejuelo	Sideroxylon	cubense
	890	SIFO	false mastic	Sideroxylon	foetidissimum
	8618	SILA4	Tamaulipan Coma	Sideroxylon	laetevirens
	381	SILAL3	chittamwood, gum bumelia	Sideroxylon	lanuginosum ssp. lanuginosum
	8615	SILY	buckthorn bully	Sideroxylon	lycioides
	8613	SIOB	breakbill	Sideroxylon	obovatum
	8614	SIPO3	Puerto Rico bully	Sideroxylon	portoricense

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	891	SISA6	white bully, willow bustic	Sideroxylon	salicifolium
	8616	SITE2	tough bully	Sideroxylon	tenax
	895	SIGL3	paradisetree	Simarouba	glauca
	8617	SIMAR	simarouba	Simarouba	spp.
	8619	SITU	aceitillo falso	Simarouba	tulae
	8620	SIDE6	hoja menuda	Siphoneugena	densiflora
	8623	SLAM	motillo	Sloanea	amygdalina
	8624	SLBE	bullwood	Sloanea	berteriana
	8622	SLOAN	bullwood	Sloanea	spp.
	8628	SOAM	American black nightshade	Solanum	americanum
	8626	SOBAB	Solanum bahamense	Solanum	bahamense
	8627	SODO3	mullein nightshade	Solanum	donianum
	8629	SOER2	potatotree	Solanum	erianthum
	8631	SOMA3	earleaf nightshade	Solanum	mauritianum
	8632	SONU4	forest nightshade	Solanum	nudum
	8633	SOPO	cakalaka berry	Solanum	polygamum
	8634	SORU	tabacon aspero	Solanum	rugosum
	8635	SOLAN	nightshade	Solanum	spp.
	8636	SOTO4	turkey berry	Solanum	torvum
	8639	SOAL10	mangrove	Sonneratia	alba
	870	SOAF	Texas sophora	Sophora	affinis
	8641	SOCH	mamani	Sophora	chrysophylla
	8648	SOSE3	mescal bean	Sophora	secundiflora
	8642	SOPHO	necklacepod	Sophora	spp.
	8643	SOTO3	silver bush	Sophora	tomentosa
	8657	SORBA	false spiraea	Sorbaria	spp.
	935	SOAM3	American mountain-ash	Sorbus	americana
	936	SOAU	European mountain-ash	Sorbus	aucuparia
	937	SODE3	northern mountain-ash	Sorbus	decora
	8658	SOSC2	Greene's mountain ash	Sorbus	scopulina
	8659	SOSI2	western mountain ash	Sorbus	sitchensis
	934	SORBU	mountain-ash spp.	Sorbus	spp.
	8660	SOAM2	maras	Soulamea	amara
	8644	SPCA2	African tuliptree	Spathodea	campanulata
	8645	SPATH	spathodea	Spathodea	spp.
	8646	SPSA7	Spiraeanthemum samoense	Spiraeanthemum	samoense
	8649	SPDU3	Spondias dulcis	Spondias	dulcis
	8650	SPMO	yellow mombin	Spondias	mombin
	8656	SPPI4	titmel	Spondias	pinnata
	8652	SPPU	purple mombin	Spondias	purpurea
	8653	SPOND	Spondias	Spondias	spp.
	8654	STMO	cobana negra	Stahlia	monosperma
	8655	STAM10	ngmui	Stemonurus	ammui
	8664	STAP	Panama tree	Sterculia	apetala
	8665	STFA5	fanaio	Sterculia	fanaiho
	8666	STFO2	hazel sterculia	Sterculia	foetida
	8667	STPA20	Sterculia palauensis	Sterculia	palauensis
	8868	STPO10	Sterculia ponapensis	Sterculia	ponapensis
	8675	STKO2	Stewartia	Stewartia	koreana
	8668	STMA	silky camellia	Stewartia	malacodendron
	8672	STOV	mountain camellia	Stewartia	ovata
	8669	STAN9	anthropophagorum	Streblus	anthropophagorum
	8670	STPE3	Hawaii roughbush	Streblus	pendulinus
	8671	STREB	streblus	Streblus	spp.
	8647	STJA9	Japanese pagoda tree	Styphnolobium	japonicum
	8673	STAM4	American snowbell	Styrax	americanus
	7083	STGR4	bigleaf snowbell	Styrax	grandifolius
	8674	STPO3	palo de jazmin	Styrax	portoricensis
	8676	SUMA2	bay cedar	Suriana	maritima
	8679	SWMA	Honduras mahogany	Swietenia	macrophylla
	940	SWMA2	West Indian mahogany	Swietenia	mahagoni
	8678	SWIET	mahogany	Swietenia	spp.

Woodland	FIA Code	PLANTS Code	Common Name	Genus	Species
	8686	SYRO4	queen palm	Syagrus	romanzoffiana
	8683	SYLA2	nispero cimarron	Symplocos	lanata
	8684	SYMA	Martinique sweetleaf	Symplocos	martinicensis
	8685	SYMI3	aceitunilla	Symplocos	micrantha
	8687	SYRA6	chebtui, ebtui	Symplocos	racemosa
	8689	SYGL	turpentine tree	Syncarpia	glomulifera
	8690	SYNCA	turpentine tree	Syncarpia	spp.
	8691	SYDU	Miracle Berry	Synsepalum	dulcificum
	7092	SYRE2	Japanese tree lilac	Syringa	reticulata
	8693	SYVU	common lilac	Syringa	vulgaris
	8694	SYAQ	watery roseapple	Syzygium	aqueum
	8695	SYBR3	asi	Syzygium	brevifolium
	8696	SYCA4	popona	Syzygium	carolinense
	8697	SYCL	asi vai	Syzygium	clusiifolium
	896	SYCU	Java plum	Syzygium	cumini
	8699	SYDE3	asi vai	Syzygium	dealatum
	8698	SYGR2	sea apple	Syzygium	grande
	8700	SYIN2	asi	Syzygium	inophylloides
	8701	SYJA	Syzygium jambos	Syzygium	jambos
	8702	SYMA2	Malaysian apple	Syzygium	malaccense
	8707	SYPA7	brush cherry	Syzygium	paniculatum
	8703	SYRI3	popona	Syzygium	richii
	8704	SYSA3	nonu vao	Syzygium	samarangense
	8705	SYSA6	fena vao	Syzygium	samoense
	8706	SYSA	ohia ha	Syzygium	sandwicense
	8708	SYZYG	syzygium	Syzygium	spp.
	8709	TACH3	roble amarillo	Tabebuia	chrysantha
	8710	TADO2	primavera	Tabebuia	donnell-smithii
	8712	TAHA	roble cimarron	Tabebuia	haemantha
	8713	TAHE	white cedar	Tabebuia	heterophylla
	8714	TAPA10	pink tabebuia	Tabebuia	pallida
	8715	TARI	roble de sierra	Tabebuia	rigida
	8716	TARO	pink trumpet-tree	Tabebuia	rosea
	8717	TASC2	roble colorado	Tabebuia	schumanniana
	8718	TABEB	trumpet-tree	Tabebuia	spp.
	8719	TAAU3	Tabernaemontana aurantiaca	Tabernaemontana	aurantiaca
	8720	TACI	milkwood	Tabernaemontana	citrifolia
	8722	TAPA13	Pulu	Tabernaemontana	pandacaqui
	8723	TARO3	Tabernaemontana rotensis	Tabernaemontana	rotensis
	897	TAIN2	tamarind	Tamarindus	indica
	8727	TAAP	Athel tamarisk	Tamarix	aphylla
	8728	TACH2	five-stamen tamarisk	Tamarix	chinensis
	8729	TARA	saltcedar	Tamarix	ramosissima
	991	TAMAR2	saltcedar	Tamarix	spp.
	8737	TASA2	manunu	Tarenna	sambucina
	222	TAAS	pondcypress	Taxodium	ascendens
	221	TADI2	baldcypress	Taxodium	distichum
	223	TAMU	Montezuma baldcypress	Taxodium	mucronatum
	220	TAXOD	baldcypress spp.	Taxodium	spp.
	8738	TABA80	English yew	Taxus	baccata
	231	TABR2	Pacific yew	Taxus	brevifolia
	8739	TACU	Japanese yew	Taxus	cuspidata
	232	TAFL	Florida yew	Taxus	floridana
	230	TAXUS	yew spp.	Taxus	spp.
	8741	TECA9	chestnutleaf trumpetbush	Tecoma	castanifolia
	8743	TEST	yellow trumpetbush	Tecoma	stans
	8744	TEGR	teak	Tectona	grandis
	8745	TECTO	tectona	Tectona	spp.
	8749	TECA16	kehma	Terminalia	carolinensis
	8750	TECA	tropical almond	Terminalia	catappa
	8751	TECR3	esemiich, chesemiich	Terminalia	crassipes
	8752	TEED	esemiich, chesemiich	Terminalia	edulis

Woodland	FIA Code	PLANTS Code	Common Name	Genus	Species
	8754	TEIV2	Ivory Coast almond	Terminalia	ivorensis
	8755	TEKA4	tropical almond	Terminalia	kaernbachii
	8753	TELI7	strand tree	Terminalia	litoralis
	8756	TEMY	East Indian almond	Terminalia	myriocarpa
	8757	TEOB	Peruvian almond	Terminalia	oblonga
	8758	TERI3	malili	Terminalia	richii
	8759	TESA2	talie	Terminalia	samoensis
	8748	TERMI	tropical almond	Terminalia	spp.
	8761	TESU2	superb terminalia	Terminalia	superba
	8762	TEHE3	saintedwood	Ternstroemia	heptasepala
	8763	TELU2	palo colorado	Ternstroemia	luquillensis
	8764	TEPE	copey vera	Ternstroemia	peduncularis
	8766	TEST3	mamey de cura	Ternstroemia	stahlii
	8767	TESU	el yunque colorado	Ternstroemia	subsessilis
	8768	TEBA	masa	Tetragastris	balsamifera
	8770	TEFL5	Flynnsohe	Tetraplasandra	flynnii
	8771	TEGY	Koolau Rangeohe	Tetraplasandra	gymnocarpa
	8772	TEHA2	Hawaii ohe	Tetraplasandra	hawaiensis
	8773	TEKA3	ohe ohe	Tetraplasandra	kavaiensis
	8774	TEOA	ohe mauka	Tetraplasandra	oahuensis
	8775	TETRA11	tetraplasandra	Tetraplasandra	spp.
	8776	TEWA	Mt. Waialeale ohe	Tetraplasandra	waialealae
	8777	TEWA3	ohe kiko ola	Tetraplasandra	waimeae
	8778	TEAN2	stinkingfish	Tetrazygia	angustifolia
	8779	TEBI	Florida clover ash	Tetrazygia	bicolor
	8780	TEBI2	Puerto Rico clover ash	Tetrazygia	biflora
	8781	TEEL	krekre	Tetrazygia	elaeagnoides
	8783	TEUR	cenizo	Tetrazygia	urbanii
	8784	THCA	cacao	Theobroma	cacao
	8786	THGR2	maga	Thespesia	grandiflora
	8787	THPO3	Portia tree	Thespesia	populnea
	8788	THESP	thespesia	Thespesia	spp.
	8789	THPE3	luckynut	Thevetia	peruviana
	8793	THST2	ceboruquillo	Thouinia	striata
	8794	THSTP	Puerto Rico ceboruquillo	Thouinia	striata var. portoricensis
	913	THMO4	key thatch palm	Thrinax	morrisii
	914	THRA2	Florida thatch palm	Thrinax	radiata
	241	THOC2	northern white-cedar	Thuja	occidentalis
	242	THPL	western redcedar	Thuja	plicata
	240	THUJA	thuja spp.	Thuja	spp.
	8803	TIGR3	Brazilian glorytree	Tibouchina	granulosa
	8804	TIBOU	glorytree	Tibouchina	spp.
	8805	TIUR	princess-flower	Tibouchina	urvilleana
	951	TIAM	American basswood	Tilia	americana
	953	TIAMC	Carolina basswood	Tilia	americana var. caroliniana
	952	TIAMH	white basswood	Tilia	americana var. heterophylla
	8813	TICO2	littleleaf linden	Tilia	cordata
	950	TILIA	basswood spp.	Tilia	spp.
	8814	TITO	Silver linden	Tilia	tomentosa
	8799	TIAL2	Timonius albus	Timonius	albus
	8806	TICO7	Timonius corymbosus	Timonius	corymbosus
	8800	TILE4	kehn	Timonius	ledermanii
	8807	TIMO4	Timonius mollis	Timonius	mollis
	8801	TIPO5	tuhke duwehte kamal	Timonius	ponapensis
	8808	TIMON	Timonius	Timonius	spp.
	8809	TISU3	Timonius subauritus	Timonius	subauritus
	8810	TITI	Timonius timon	Timonius	timon
	8815	TITI2	tipa	Tipuana	tipu
	8812	TOCI	Australian redcedar	Toona	ciliata
	8811	TOONA	redcedar	Toona	spp.
	8816	TOCU	boje	Torralbasia	cuneifolia
	251	TOCA	California torreya (nutmeg)	Torreya	californica

Woodland	FIA Code	PLANTS Code	Common Name	Genus	Species
	250	TORRE	torreya (nutmeg) spp.	Torreya	spp.
	252	TOTA	Florida torreya (nutmeg)	Torreya	taxifolia
	8822	TOLA	olona	Touchardia	latifolia
	8823	TOUCH	touchardia	Touchardia	spp.
	8824	TOAR2	velvetleaf soldierbush	Tournefortia	argentea
	8825	TOFI	cold withe	Tournefortia	filiflora
	8826	TOURN	soldierbush	Tournefortia	spp.
	8830	TOVE	poison sumac	Toxicodendron	vernix
	8821	TRFO3	Chinese windmill palm	Trachycarpus	fortunei
	998	2TB	Unknown dead hardwood	Tree	broadleaf
	299	2TE	Unknown dead conifer	Tree	evergreen
	999	2TREE	Other or unknown live tree	Tree	unknown
	8827	TRCA33	magele	Trema	cannabina
	8828	TRLA2	Lamarck's trema	Trema	lamarckianum
	8829	TRMI2	Jamaican nettletree	Trema	micranthum
	8831	TROR	oriental trema	Trema	orientalis
	8832	TREMA	trema	Trema	spp.
	994	TRSE6	Chinese tallowtree	Triadica	sebifera
	8833	TRHI3	broomstick	Trichilia	hirta
	8834	TRPA2	gaita	Trichilia	pallida
	8836	TRTR8	bariaco	Trichilia	triacantha
	8837	TRIK	Trichospermum ikutai	Trichospermum	ikutai
	8838	TRLE8	elsau, oleiulakersus	Trichospermum	ledermannii
	8839	TRRI9	maouli	Trichospermum	richii
	8842	TRTR7	limeberry	Triphasia	trifolia
	8844	TRCU6	ant tree	Triplaris	cumingiana
	8843	TRIPL5	Triplaris spp.	Triplaris	spp.
	8846	TROB7	faia	Tristiropsis	obtusangula
	8848	TRRA4	white ramoon	Trophis	racemosa
	8849	TRCA7	Trukia carolinensis	Trukia	carolinensis
	261	TSCA	eastern hemlock	Tsuga	canadensis
	262	TSCA2	Carolina hemlock	Tsuga	caroliniana
	263	TSHE	western hemlock	Tsuga	heterophylla
	264	TSME	mountain hemlock	Tsuga	mertensiana
	260	TSUGA	hemlock spp.	Tsuga	spp.
	8850	TUOC	muttonwood	Turpinia	occidentalis
	971	ULAL	winged elm	Ulmus	alata
	972	ULAM	American elm	Ulmus	americana
	973	ULCR	cedar elm	Ulmus	crassifolia
	8862	ULDA	Japanese elm	Ulmus	davidiana
	8851	ULPA	Chinese elm	Ulmus	parvifolia
	8852	ULPR	English elm	Ulmus	procera
	974	ULPU	Siberian elm	Ulmus	pumila
	975	ULRU	slippery elm	Ulmus	rubra
	976	ULSE	September elm	Ulmus	serotina
	970	ULMUS	elm spp.	Ulmus	spp.
	977	ULTH	rock elm	Ulmus	thomasii
	981	UMCA	California-laurel	Umbellularia	californica
	8859	UNSP	Mexican buckeye	Ungnadia	speciosa
	8853	URBA	scratchbush	Urera	baccifera
	8854	URCA2	flameberry	Urera	caracasana
	8855	URCH2	ortiga	Urera	chlorocarpa
	8856	URGL	hopue	Urera	glabra
	8857	URKA	opuhe	Urera	kaalae
	8858	URERA	urera	Urera	spp.
	8860	VAAR	farkleberry	Vaccinium	arboreum
	8861	VAMA5	voa vanga	Vangueria	madagascariensis
	8863	VAOA5	Vavaea pauciflora	Vavaea	pauciflora
	8866	VEME3	Manila palm	Veitchia	merrillii
	995	VEFO	tungoil tree	Vernicia	fordii
	8869	VEMO3	mu oil tree	Vernicia	montana
	8870	VERNI	vernicia	Vernicia	spp.

Woodland	FIA Code	PLANTS Code	Common Name	Genus	Species
	8877	VILE	nannyberry	Viburnum	lentago
	8878	VIPR	blackhaw	Viburnum	prunifolium
	8879	VIRU	rusty blackhaw	Viburnum	rufidulum
	8880	VISI	Siebold's arrowwood	Viburnum	sieboldii
	8871	VIAG	lilac chastetree	Vitex	agnus-castus
	8872	VICO17	bars, beokel	Vitex	cofassus
	8873	VIDI2	higuerillo	Vitex	divaricata
	7199	VINE2	Chinese chastetree	Vitex	negundo
	8874	VIPA6	smallflower chastetree	Vitex	parviflora
	8875	VITEX	chastetree	Vitex	spp.
	8876	VITR7	simpleleaf chastetree	Vitex	trifolia
	8881	WALA	Wallenia lamarckiana	Wallenia	lamarckiana
	8883	WAFI	California fan palm	Washingtonia	filifera
	8885	WARO	Washington fan palm	Washingtonia	robusta
	8884	WEBI	ateate	Wedelia	biflora
	8886	WEAF	Weinmannia affinis	Weinmannia	affinis
	8887	WEPI	bastard briziletto	Weinmannia	pinnata
	8889	WIBI	alpine false ohelo	Wikstroemia	bicornuta
	8890	WIFU	forest false ohelo	Wikstroemia	furcata
	8891	WIMO	montane false ohelo	Wikstroemia	monticola
	8892	WIOA	Oahu false ohelo	Wikstroemia	oahuensis
	8895	WIPH2	Hawaii false ohelo	Wikstroemia	phillyreifolia
	8896	WIPU	Kohala false ohelo	Wikstroemia	pulcherrima
	8897	WISA	variableleaf false ohelo	Wikstroemia	sandwicensis
	8898	WISK	Skottsbergs false ohelo	Wikstroemia	skottsbergiana
	8899	WIKST	false ohelo	Wikstroemia	spp.
	8900	WIVI	hairy false ohelo	Wikstroemia	villosa
	8901	XIAM	tallow wood	Ximenia	americana
	8903	XYGR	lalanyog	Xylocarpus	granatum
	8904	XYMO2	leilei	Xylocarpus	moluccensis
	8905	XYLOC2	Xylocarpus	Xylocarpus	spp.
	8914	XYBI	mission manzanita	Xylococcus	bicolor
	8906	XYBU	mucha-gente	Xylosma	buxifolia
	8902	XYCO7	dense logwood	Xylosma	congestum
	8907	XYCR	sawtooth logwood	Xylosma	crenata
	8908	XYHA	Hawaii brushholly	Xylosma	hawaiiensis
	8909	XYNE2	Xylosma nelsonii	Xylosma	nelsonii
	8910	XYPA2	spiny logwood	Xylosma	pachyphylla
	8911	XYSA	Xylosma samoensis	Xylosma	samoensis
	8912	XYSC2	white logwood	Xylosma	schaefferioides
	8913	XYSC3	Schwaneck's logwood	Xylosma	schwaneckeana
	8915	XYLOS	xylosma	Xylosma	spp.
	8916	YUAL	aloe yucca	Yucca	aloifolia
	982	YUBR	Joshua tree	Yucca	brevifolia
	8917	YUFA	Eve's needle	Yucca	faxoniana
	8918	YUGL2	moundlily yucca	Yucca	gloriosa
	8919	YUGU	bluestem yucca	Yucca	guatemalensis
	8942	ZAAM	common pricklyash	Zanthoxylum	americanum
	8923	ZABI	Maricao pricklyash	Zanthoxylum	bifoliolatum
	8924	ZACA3	prickly yellow	Zanthoxylum	caribaeum
	8944	ZACL	Hercules' club	Zanthoxylum	clava-herculis
	8925	ZADI	kawau	Zanthoxylum	dipetalum
	8928	ZAFL	West Indian satinwood	Zanthoxylum	flavum
	8929	ZAHA	Hawaii pricklyash	Zanthoxylum	hawaiiense
	8930	ZAKA	Kauai pricklyash	Zanthoxylum	kauaense
	8931	ZAMA	white pricklyash	Zanthoxylum	martinicense
	8932	ZAMO	yellow prickle	Zanthoxylum	monophyllum
	8933	ZAOA	Oahu pricklyash	Zanthoxylum	oahuense
	8934	ZAPU2	dotted pricklyash	Zanthoxylum	punctatum
	8935	ZASP	niaragato	Zanthoxylum	spinifex

Woodland	FIA Code	PLANTS Code	Common Name	Genus	Species
	8936	ZANTH	pricklyash	Zanthoxylum	spp.
	8937	ZATH	St. Thomas pricklyash	Zanthoxylum	thomasianum
	8938	ZAPO2	Zapoteca portoricensis	Zapoteca	portoricensis
	7243	ZESE80	Japanese zelkova	Zelkova	serrata
	8939	ZIMA	Indian jujube	Ziziphus	mauritiana
	7246	ZIOB	lotebush	Ziziphus	obtusifolia
	8940	ZIRE	cacao rojo	Ziziphus	reticulata
	8941	ZIRI	soana	Ziziphus	rignonii
	8943	ZITA	Taylor's jujube	Ziziphus	taylorii
	8947	ZIZI	common jujube	Ziziphus	zizyphus

APPENDIX E GLOSSARY

Accessible Forest Land – Land 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:

1. Forest Land has at least 10 percent canopy cover of live tally tree species of any size (Appendix C, PNW Forest Land Tree Species Codes) or has had at least 10 percent canopy cover of live tally species (Appendix C, PNW Forest Land Tree Species Codes) in the past, based on the presence of stumps, snags, or other evidence. 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.
2. 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
3. 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.
4. 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.
5. 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.

ACTUAL LENGTH – For trees with broken or missing tops. The actual length of the tree is recorded to the nearest 1.0 foot from ground level to the highest remaining portion of the tree still present and attached to the bole. If the top is intact, this item may be omitted. Forked trees should be treated the same as unforked trees.

Agricultural Land – 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 120.0 feet wide at the point of occurrence.

ARTIFICIAL REGENERATION SPECIES – Indicates the predominant species that is planted or seeded in an artificially regenerated condition.

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. If a full plot re-installation is not possible, then full subplots will be completed with a minimum of 15 total trees being remeasured. 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.

Bole – The main stem of a tree, extending from one foot above the ground to the point on the tree where 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.

Building Energy Data – Data that measures the effect of trees on building energy use and related reductions in carbon dioxide. Data is collected for trees greater 20 feet in vertical height within 60 feet of buildings. Buildings and attached garages are defined as space conditioned structures (heated and perhaps cooled) that are no more than 3 stories (2 stories + attic) in height above ground level. The UFORE model utilizes an algorithm for single standing structures no larger than 4000 square feet in total inhabitable (heated or cooled) space, although larger single-family homes or duplexes should be included regardless of size. Do not count unheated detached garages, sheds, or other outbuildings. If unsure if a detached out building is heated or cooled consider it unheated. The building the tree affects does not have to be on the plot.

Boundary – The intersection of two or more conditions on a subplot or microplot. Each boundary is described by recording the azimuth and horizontal distance from the subplot or microplot center to the left and right points of where the boundary intersects the perimeter of the subplot or microplot. 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.

Boundary (Closed) – Protocols to define the boundaries of a condition that either falls entirely within the subplot, or intersects the subplot in such a manner that multiply measurements are required to capture its extent on the subplot. These measurements are limited to the subplot and its offset points.

Boundary (Offset) – Protocols to define boundaries whenever the subplot / microplot center cannot be occupied. Measurements are taken from a predetermined location on the perimeter of the subplot / microplot, called an OFFSET POINT

Census Water – Rivers and streams that are more than 200 feet wide and 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.

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. Discrepancies between the inspection crew measurements and the production crew measurements are identified, and changes may be made to production data to correct these errors. Cold checks are done on production plots only.

CONDITION CLASS – The combination of discrete landscape and forest attributes that identify and define different strata on the plot. Examples of such attributes include condition class status, forest type, stand origin, stand size, owner group, reserve status and stand density.

Core FIA plot – Plot data that is collected according to the current National CORE FIA field data collection protocols; such protocols may be in relation to Phase 1 (P1), Phase 2 (P2), Phase 2+ (P2+), Phase 2+ Soils (P2+ Soils) or Phase 3 (P3) plots.

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.

CROWN DIEBACK –The recent mortality of branches with fine twigs, which begins at the terminal portion of a branch and proceeds toward the trunk. Dieback is only considered when it occurs in the upper and outer portions of the tree. When whole branches are dead in the upper crown, without obvious signs of damage such as breaks or animal injury, assume that the branches died from the terminal portion of the branch. Dead branches in the lower portion of the live crown are assumed to have died from competition and shading. Dead branches in the lower live crown are not considered as part of crown dieback, unless there is continuous dieback from the upper and outer crown down to those branches.

Cull – Portions of a tree that are unusable for industrial wood products because of rot, form, or other defect.

Damages (7 Urban specific damages collected in addition the CORE FIA damages)**:**

1. Stem Girdling – Stem Girdling occurs when roots begin to grow around the main stem of the tree and cut off or restrict the movement of water, plant nutrients and stored food reserves. Certain trees are more prone to this problem than others. Lindens, magnolias, pines, and maples (other than the silver maple) are susceptible to root girdling. On the other hand, silver maple, oaks, ash, and elm are well known for their ability to form functional root grafts and are rarely adversely affected by girdling roots.
2. Bark Inclusion – Bark Inclusions are a sign of weak branch unions and are places where branches are not strongly attached to the tree. A weak union occurs when two or more branches grow so closely together that bark grows between the branches and inside the union. This ingrown, or included, bark

does not have the structural strength of wood and the union can become very weak. The inside bark may also act as a wedge and force the branch union to split apart. Trees with a tendency to form upright branches, such as elm and maple, often produce weak branch unions. The V shaped appearance of the union as well signs of where the bark has folded in on itself are both signs of this damage. Both forks and branches are included in this variable.

3. Severe Topping or Poor Pruning – A tree is considered to have been severely topped when it has been reduced to a single "pole" due to severe over-pruning and branch removal. "Topping" is the cutting of branches to stubs, or, if 30% or more at the main stem has been cut to reduce tree height. Topping usually results in a profusion of shoots rendering the tree more susceptible to wind damage. Poor pruning techniques include leaving stubs outside the branch collar, or cutting into the branch collar. A tree with proper pruning may still maintain the look and shape of the tree, just shorter.
4. Excessive Mulch – Excessive Mulch is defined as mulch piled high around the stem and mulch depth greater than 8 inches. The root flare is not visible at base of trunk because of mulch. Over mulching of landscape plants, sometimes to the extent of creating mountainous mulch "volcanoes," can result in disease or death of the tree.
5. Conflict with Roots - Damage to sidewalk, driveway, road, or other hardscape directly caused by roots. Tree roots grow under sidewalks and asphalt. They do this in many instances because that is where the soil oxygen and moisture are located. Conflicts with curbs, driveways, or roads are all considered conflicts with roots. To be recorded, the conflict should be readily apparent (i.e. damage to sidewalk or hardscape is occurring).
6. Conflict with Tree Crown - Conflict with Tree Crown occurs when tree crown bole, branches, or foliage are within 5 feet of any utility wires. Conflict with overhead wires can cause problems for both trees and wires creating maintenance problems and hazard situations. Conflict with overhead power, cable, and telephone wires is common along streets, yards, parking lots, and in commercial areas.
7. Improper Planting – Improper Planting occurs when burlap, twine or root ball wire is not removed prior to planting and is coded when any of the following are visible at the soil surface: burlap, twine, or cage/wire.

Diameter at Breast Height (DBH) – The diameter of the bole of a tree at breast height (4.5 feet above the ground), measured outside of the bark.

Diameter at Root Collar (DRC) – The diameter of a tree measured at the ground line or stem root collar, measured outside of the bark.

Diameter Outside Bark (DOB) – A diameter that may be taken at various points on a tree, or log, outside of the bark. Diameter Outside Bark is often estimated.

Federal Information Processing Standard (FIPS) – A unique code identifying U.S. States and counties (or units in Alaska).

Forest Industry Land – Land owned by companies or individuals that operate wood-using plants.

Forest Trees – Plants having a well-developed, woody stem and usually more than 12 feet in height at maturity.

FOREST TYPE – A classification of forest land based upon the trees or tree communities that constitute the majority of stocking on the site.

GPS – Global Positioning System. Information from this system is collected and used to determine the latitude and longitude of each plot.

Green Space – Land that is partly or completely covered with grass, trees, shrubs, or other vegetation.

Hardwoods – Dicotyledonous and monocotyledonous trees, usually broad-leaved and deciduous.

Hot check – an 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 Farmland – Former cropland or pasture that has not been tended within the last 2 years and that has less than 10 percent stocking with live trees.

Impervious – Defined as non-building material that does not allow water to percolate through, such as rock, asphalt, and cement.

Improved Pasture – 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.

Inclusion – An area that would generally would 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 Wood – All roundwood products, except firewood.

Inspection crew – a crew of qualified QC/QA individuals whose primary responsibility is the training, certification and inspection of production crews.

i-Tree – A suite of computer tools designed to assess urban forests and their associated ecosystem services and values (www.itreetools.org).

i-Tree Eco – An i-Tree model formerly known as the urban forest effects model that uses field data in conjunction with air pollution and meteorological inputs to quantify urban forest structure (such as species composition, tree density, tree health, leaf area, and biomass), environmental services (such as air pollution removal, carbon storage and sequestration, effects of trees on energy use), and potential pest impacts.

i-TREE LAND USE – i-TREE LAND USE is used to make adjustments to the i-Tree Eco model based on the differences in tree growth and valuation characteristics associated with predefined actual land uses. For example, a tree located within Transportation land use condition will grow at a different rate than a similar tree that is located within a Golf Course or a Residential land use. This data describes how the land is being used, which is not necessarily the same as the ownership of the land. An i-Tree land use is assigned to each accessible condition recognized on a plot.

Land Area – 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.

MAINTAINED AREA TREE – A tree located within a maintained area (tree bole must be partially or fully contained within the maintained area). Maintained areas are defined as those which are consistently being impacted by mowing, weeding, brushing, herbiciding, landscaping, etc. Examples include, but are not limited to, lawns, maintained shrub beds, Rights-of-ways, and manicured park areas. Examples of unmaintained areas are overgrown lots, small wooded areas, and riverbanks, among others.

Maintained Road – Any road, hard topped or other surfaces, that is plowed or graded periodically and capable of use by a large vehicle. Rights-of-way that are cut or treated to limit herbaceous growth are included in this area.

Marsh – Low, wet areas characterized by heavy growth of weeds and grasses and an absence of trees.

Measure Low Approach – A method of measuring DBH on trees where the following originate at the approximate same location on the bole preventing accurate and repeatable diameter measurement: multiple forks, prolific branching, or a combination of multiple forks and prolific branching. This method is also applied in situations where forked trees are grown together in such a fashion that an accurate and repeatable diameter cannot be measured OR estimated due to the deformation resulting from the presence of the above mentioned criteria. In such cases a single tree is tallied and the diameter is measured at the highest most repeatable location between the 1-foot stump and the initial pith separation.

Measurement Quality Objective (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 bole of trees 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, as well as other vegetation. The four urban microplots (labeled 11, 12, 13, and 14) are located 12 feet from subplot center in each cardinal direction, 360, 90, 180, 270 degrees, respectively.

Mother Tree – The first tree (fork that qualifies as a tree) that is tallied when pith and forking protocols create multiple trees from a single stump (piths enter the ground as one). (TREE # = MOTHER TREE #).

Mother Tree Unit – a term used to describe all trees with the same Mother Tree Number and including any untallied branches/boles/forks supported by the same stump (piths enter the ground as one).

National Forest Land – Federal lands which have been legally designated as National Forests or purchase units, and other lands under the administration of the Forest Service, including experimental areas and Bankhead-Jones Title III lands.

Native American (Indian) Land – 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.

Node – a corner of the condition being mapped when creating a boundary between conditions.

Noncensus Water – Bodies of water from 1 to 4.5 acres in size and water courses from 30 feet to 200 feet in width.

Nonforest Land – 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, 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.

NON-TALLY TREE – A tree that is at least 5 in DBH / DRC located within the subplot that is not on the species list in Appendix C and Appendix D.

OFFSET POINT – A predetermined point located at each of the cardinal directions on the perimeter of either a subplot or microplot from which tree distances or boundaries are referenced from when the subplot or microplot center cannot be occupied.

Other Federal Lands – Federal land other than National Forests. 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 variable that classifies land into fine categories of ownership.

OWNER GROUP – A variable that classifies 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.

Permeable – material that allows water to percolate through such as gravel, mulch, sand, dirt, duff etc.

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.

PLANTED TREE – A tree that is not the result of natural regeneration.

Plot (Urban) – One subplot that samples approximately 1/6 acre. Each subplot has an associated set of four microplots.

Production crew – a crew containing at least one certified individual. The crew is involved in routine installation 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 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).

REGENERATION STATUS – A stand descriptor that indicates whether a stand has been naturally or artificially regenerated.

Regional Urban / Regional CORE Field Guide – Each region uses regional guides that expand beyond the National Urban or CORE field guide. This allows each region to address regional issues as well as set a specific regional species list.

Reserved Land – Land that is withdrawn from timber utilization by a public agency or by law.

RESERVED STATUS – An indication of whether the land in a condition has been reserved.

RIPARIAN RIVER / STREAM TREE – A tree that falls within 30 ft. of the edge (mean high water mark) of a stream or river. If a stream is intermittent, or no water is running at the time of plot measurement, the stream must have a naturally developed stream bottom to be recognized as a stream. Lakes, ponds holding basins, and wet lands are ignored. Man-made ditches and canals used to funnel storm water during periods of high rainfall are not considered streams by our definition. However, some stream segments, especially in urban areas, may occasionally have cement sides and bottoms, and these segments, that are generally part of a larger stream network, would be considered a stream by this definition.

Saplings – Live trees 1.0 to 4.9 inches DBH.

Seedlings – 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.

Softwoods – Coniferous trees, usually evergreen having needles or scale-like leaves.

Stem – A term used to describe a single tallied tree within a Mother Tree Unit. Tally trees where Mother Tree # ≥ 1.

Straddle Plot – A FIA plot where both the CORE FIA plot and the Urban FIA plot are coincidental. These are also sometime referred to as “dual design” plots.

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.

Stand 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 previously defined condition class tree density.

Stand size – A stand descriptor that indicates which size-class of trees that are not overtopped constitutes the majority of stocking in the stand.

State, County and Municipal Lands – Lands owned by states, counties, and local public agencies or municipalities, or lands leased to these government units for 50 years or more.

STREET TREE – A MAINTAINED AREA TREE, natural or planted, that is located within 8 ft. of the edge of a maintained and surfaced road. In addition, all maintained area trees located in the space between the edge of the road and the sidewalk, or within a median strip between roads are considered street trees. In general, street trees provide shade, aesthetic values, or serve as physical barriers between the street and adjacent property. These trees will generally have a visible, physical interaction with the street via their root system, overhanging branches, or proximity of the trunk.

Stocking – The relative degree of occupancy 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 48.0 feet. The subplot represents a 1/6 acre fixed plot sample unit.

Subplot-condition surface cover – A measure of surface cover for the portion of each recorded condition that is contained within the subplot (ignoring portions of a condition that fall outside of the boundary of the subplot). Surface cover categories are buildings, impervious (concrete, asphalt, etc.), permeable (gravel, mulch, sand, dirt, duff, etc.), herbaceous (grasses, low shrubs, etc.), and water.

Impervious is defined as non-building material that does not allow water to percolate through, such as rock, asphalt, and cement. Examples of permeable include soil and gravel. Herbaceous overrides permeable. Water overrides herbaceous (in the form of emergent vegetation) and includes swimming pools that are permanent in nature.

Subplot-condition vegetation cover – Vegetation cover is measured for the portion of each condition contained within the subplot. Portions of a condition that fall outside of the boundary of the subplot are ignored. Vegetation cover is split into two categories, PERCENT TREE /SAPLING COVER and PERCENT SHRUB / SEEDLING COVER. These two variables are evaluated independently of each other. For example, a condition could contain both 100% PERCENT TREE / SAPLING COVER and 100% PERCENT SHRUB / SEEDLING COVER. In the following text height refers to the height from the ground to the highest foliage regardless of subject's specific length. A value of 99% assumes that the area is completely covered.

Tree / sapling and shrub / seedling cover with a DBH/DRC 1" or greater are considered trees. Tree species (see Appendix C and Appendix D) with stem diameter <1" are defined as seedlings. Shrub species (woody vegetation not listed as a tree species) are never classified as a tree, regardless of their DBH/DRC.

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

Transition Zone – An area where a distinct boundary between two or more different conditions cannot be determined.

Tree – A woody perennial plant, typically large, with a single well-defined stem carrying a more or less definite crown; sometimes defined as attaining a minimum diameter of 3 inches and a minimum height of 15 feet at maturity. For FIA, any plant on the tree list in the current field manual is measured as a tree.

UFORE – Urban Forest Effects Model, now called i-Tree Eco. A computer model that assesses urban forest structure, ecosystem services and values.

Urban – The area within the U.S. Census-defined urban boundary (UAUC), within a chosen Core-Based Statistical Area (CBSA). The urban boundary is defined by the U.S. Census Bureau as all territory, population, and housing units in urbanized areas (UA) and urban clusters (UC). In general, an UA is a densely settled area with at least 500 people per square mile that has a census population of at least 50,000, and an UC is a densely settled area with at least 500 people per square mile that has a census population of 2,500 to 49,999. The CBSA-confined UAUC boundary defines what is sometimes referred to as the FIA Blue Line.

Urban FIA Plot – A reference to the national Urban FIA data collection protocols.

Urban forest – Term used for all trees within the urban boundary (both forest and nonforest lands)

URBAN NONFOREST LAND USE – Each land use describes how nonforest (Condition Status 2) conditions are being used. These land uses include all the CORE FIA land uses and have been expanded to include additional uniquely urban land uses. All of these land uses can be collapsed back into the initial list of CORE FIA land uses.

APPENDIX F DAMAGE CODES

SECTION F.1 TREE DAMAGE REFERENCE INFORMATION

SUBSECTION F.1.1 DEFINITIONS

Merchantable Top - Defined by a 4inch diameter outside bark (DOB).

Length of Tree (Logs) - Defined by the number of 16 foot sections present on a tree from a 1 foot stump to a 4 inch DOB top.

Crook - An abrupt bend in a tree or log.

Sweep - A gradual and consistent deviation from a straight centerline. This is distinct from a leaning stem. The amount of sweep is measured as the deflection of the centerline of the log. Sweep is expressed as a proportion of the small end diameter.

Board Foot Defect - An estimate of the board foot volume lost due to a combination of form and cubic foot defect in sawtimber (softwood trees ≥ 9-inch DBH and hardwoods ≥ 11-inch DBH with a minimum of one 16 foot log with a merchantable top of 4 inches DOB).

SUBSECTION F.1.2 PERCENT DISTRIBUTION OF BOARD FOOT VOLUME

PERCENTAGE DISTRIBUTION OF BOARD FOOT TREE VOLUME BY 16' LOG TO 4" DOB TOP

LOG POSITION

TREE HEIGHT (logs)	1	2	3	4	5	6	7	8	9	10
1	100									
2	69	31								
3	52	33	15							
4	39	30	20	11						
5	33	26	20	13	8					
6	27	23	19	15	10	6				
7	24	29	17	14	11	8	6			
8	21	18	16	13	11	9	7	5		
9	19	16	14	12	11	9	8	6	5	
10	17	15	13	12	11	9	8	6	5	4

SECTION F.2 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**		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			

CODE	Common Name	Scientific Name	Threshold	REGION
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	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	PNW
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; NRS
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	Any evidence of a successful attack	SRS
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		
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; NRS
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.		

CODE	Common Name	Scientific Name	Threshold	REGION
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		Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	NRS
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
12029	oak skeletonizer	Bucculatrix ainsliella	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	NRS
12030	pear sawfly	Caliroa cerasi		
12031	scarlet oak sawfly	Caliroa		
12032	elm calligrapha	Calligrapha scalaris		
12033	boxelder leafroller	Caloptilia negundella		

CODE	Common Name	Scientific Name	Threshold	REGION
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	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	NRS
12048	birch casebearer	Coleophora serratella	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	NRS
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	Any occurrence	NRS
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		

CODE	Common Name	Scientific Name	Threshold	REGION
12086	satin moth	Leucoma salicis	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	NRS
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	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	NRS
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		

CODE	Common Name	Scientific Name	Threshold	REGION
12150	spruce needleminer (west)	Taniva albolineana		
12151	maple webworm	Tetralopha asperatella		
12152	pine webworm	Tetralopha robustella		
12153	introduced basswood thrips	Thrips calcaratus		
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	Any occurrence	NRS
12198	basswood thrips	Neohydatothrips tiliae		
12199	noctuid moth	Xylomyges simplex (Walker)		
12200	pyralid moth	Palpita magniferalis	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	NRS
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

CODE	Common Name	Scientific Name	Threshold	REGION
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	SRS, IW
13001	grasshopper			
13002	shorthorn grasshoppers	Acrididae		
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		
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		Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	NRS
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		

CODE	Common Name	Scientific Name	Threshold	REGION
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		
14032	ponderosa pine scale	Matsucoccus degeneratus		
14033	red pine scale	Matsucoccus resinosae	Any occurrence	NRS
14034	Prescott scale	Matsucoccus vexillorum		
14035	treehoopers	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	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/ needle affected	PNW
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		Any damage to the terminal leader; damage ≥20% of the roots, stems, or branches	NRS
15002	termite			
15003	ponderosa pine bark borer	Acanthocinus princeps		
15004	bronze birch borer	Agrilus anxius	Any damage to the terminal leader; damage ≥20% of the roots, stems, or branches	NRS
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.		

CODE	Common Name	Scientific Name	Threshold	REGION
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		
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 $\geq$10% of the bole circumference	SRS, NRS
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	Any damage to the terminal leader; damage ≥20% of the roots, stems, or branches	NRS
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 $\geq$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		
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		

CODE	Common Name	Scientific Name	Threshold	REGION
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	Any damage to the terminal leader; damage ≥20% of the roots, stems, or branches	NRS
15089	Formosan subterranean termite	Coptotermes formosanus		
15090	sirex woodwasp	Sirex noctilio		
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		

CODE	Common Name	Scientific Name	Threshold	REGION
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**			
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	Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected	NRS
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	Any occurrence	PNW
21009	Ganoderma rot of conifers	Ganoderma tsugae		

CODE	Common Name	Scientific Name	Threshold	REGION
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	Any occurrence	PNW
21017	laminated root rot	Phellinus weirii	Any occurrence	PNW
21019	littleleaf disease/ Phytophthora root rot	Phytophthora cinnamomi	Any occurrence	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		
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		

CODE	Common Name	Scientific Name	Threshold	REGION
22073	hemlock canker	Xenomeris abietis		
22075	Lachnellula canker	Lachnellula flavovirens	Any occurrence	NRS
22076	strumella canker	Strumella coryneoidea	Any occurrence	NRS
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
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			
22003	sap rot			
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		

CODE	Common Name	Scientific Name	Threshold	REGION
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
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	Damage ≥ 20% dieback of crown area	PNW
24007	complex	complex		
24008	decline	decline		
24009	fall hardwood defoliator complex	fall hardwood defoliator complex		
24010	joga decline	joga decline	Damage ≥ 20% dieback of crown area	PNW
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		

CODE	Common Name	Scientific Name	Threshold	REGION
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	Damage ≥20% of the foliage with ≥50% of the leaf/needle affected	PNW
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	Damage ≥20% of the foliage with ≥50% of the leaf/needle affected	NRS
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	Damage ≥20% of the foliage with ≥50% of the leaf/needle affected	NRS
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		

CODE	Common Name	Scientific Name	Threshold	REGION
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	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
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		
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

CODE	Common Name	Scientific Name	Threshold	REGION
41001	bears	Ursus 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.	PNW
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, PNW
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, PNW
41004	mice or voles	mice or voles	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.	PNW
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, PNW
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, PNW
41007	rabbits or hares	Sylvilagus 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.	PNW
41008	sapsuckers	Sphyrapicus 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; SRS

CODE	Common Name	Scientific Name	Threshold	REGION
41009	squirrels	Sciuridae 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.	PNW
41010	woodpeckers	Piciformes spp.		
41011	moose	Alces alces		
41012	elk	Cervus elaphus		
41013	deer	Odocoileus 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	PNW
41014	feral pigs	Sus scrofa	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	PNW
41015	mountain beaver	Aplodontia rufa	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.	PNW
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

CODE	Common Name	Scientific Name	Threshold	REGION
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
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

CODE	Common Name	Scientific Name	Threshold	REGION
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
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		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	PNW
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			

CODE	Common Name	Scientific Name	Threshold	REGION
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			
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	IW, PNW, NRS
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

CODE	Common Name	Scientific Name	Threshold	REGION
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 G 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 a	OWNCD b	Land designation (and example)	RESERVCD c	ADWDRAWCD d	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	1	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	1	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	1	Federal unit, recommended	Managed as Wilderness pending possible designation
10,20	all	Proposed Wilderness	0	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,	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.

OWNGRP a	OWNCD b	Land designation (and example)	RESERVCD c	ADWDRAWCD d	Designated by	Comments
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	1	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	0	Congress/WO	Purpose includes research and management
10	all	Experimental Range (Santa Rita, AZ)	0	0	Congress/WO	Purpose includes research and management
10	all	Research Natural Area (Limestone Jags, AK)	0	1	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	1	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	1	NFS unit	
10	all	Special Recreation Area (Bell Smith Springs, IL)	0	1	NFS unit	
10	all	Suitable for Timber Harvest	0	1	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	0	NFS unit	Areas designated in Forest Plans as in the timber base, and managed for multiple use

OWNGRP a	OWNCD b	Land designation (and example)	RESERVCD c	ADWDRAWCD d	Designated by	Comments
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	1	BLM unit	Authorized by Congress in FLPMA to protect significant areas, designated by management units
20	22	National Conservation Areas (Kings River, CA)	0	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	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	0	State Forestry Dept	Usually managed by state agencies for multiple values, including production of timber products

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OWNGRP a	OWNCD b	Land designation (and example)	RESERVCD c	ADWDRAWCD d	Designated by	Comments
40	all	All private lands	0	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.
d. ADWDRAWCD: Administratively withdrawn from timber production. Timber harvest may still be allowed for other land management objectives. See description for Administratively Withdrawn Status.

APPENDIX H OFFSET POINTS

All boundaries, trees and saplings must be referenced to a known location on the plot. Plot locations are fixed and it is possible that subplot and/or micro-plot centers may be inaccessible due to obstructions such as buildings, water or denied access property. It is also possible that such obstacles may block passage from a subplot center to a tally tree. In order to decrease the potential for such barriers to cause trees and saplings to be left untallied, offset points may be installed and used as reference points on the perimeters of the subplot and all four micro-plots at each of the four cardinal directions (Figure H.1).

With these additional offset points, a total of 25 points exist from which trees, saplings and boundaries may be referenced. Whenever a tree or sapling or boundary is measured, one of these points must be entered in the OFFSET POINT data field to describe to which point the tree is being referenced. These 25 points are numbered as follows:

0	Normal position (subplot center)
1	North subplot offset point
2	East subplot offset point
3	South subplot offset point
4	West subplot offset point
110	Normal position of microplot 11 (center)
111	North microplot 11 offset point
112	East microplot 11 offset point
113	South microplot 11 offset point
114	West microplot 11 offset point
120	Normal position of microplot 12 (center)
121	North microplot 12 offset point
122	East microplot 12 offset point
123	South microplot 12 offset point
124	West microplot 12 offset point
130	Normal position of microplot 13 (center)
131	North microplot 13 offset point
132	East microplot 13 offset point
133	South microplot 13 offset point
134	West microplot 13 offset point
140	Normal position of microplot 14 (center)
141	North microplot 14 offset point
142	East microplot 14 offset point
143	South microplot 14 offset point
144	West microplot 14 offset point

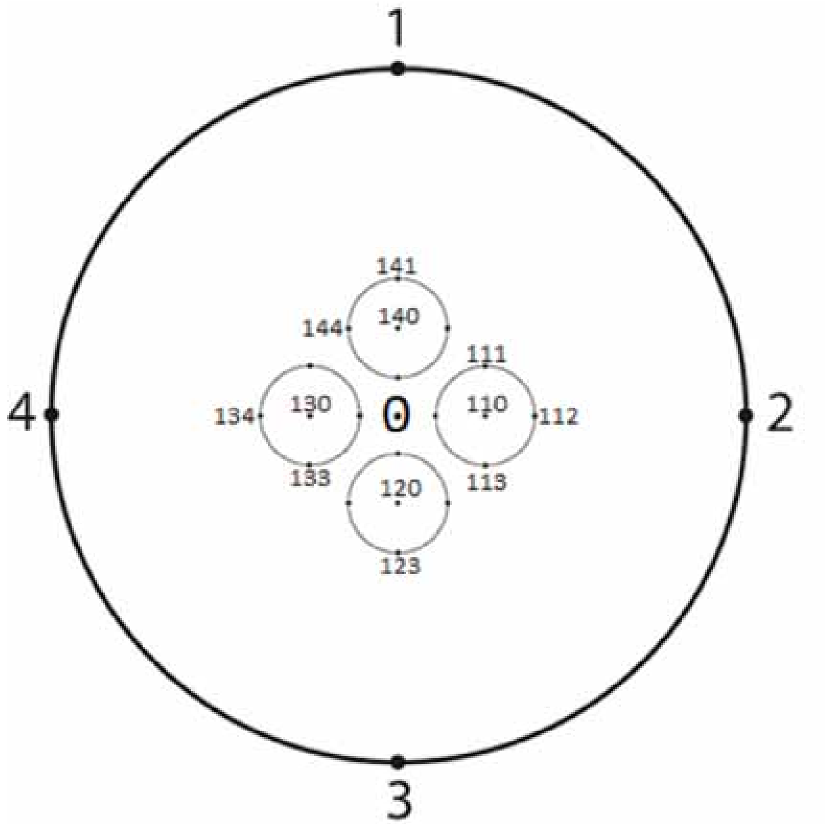


Figure H.1: Location of subplot/micro-plot offset points. (Not all offset point numbers are shown here in order to reduce clutter in the figure.)

The following illustrations provide information that facilitates plot establishment and measurement using these offset reference points.

CASE 1: AN OBSTRUCTION OCCURS AT THE CENTER OF THE CENTER OF THE PLOT.

If an obstruction prevents access to the center of the plot, then stop at or before the obstruction, offset 48.0 ft. in one of the cardinal directions (360, 090, 180, or 270 degrees), and complete the course to arrive at one of the offset points. For example, say the course to plot center is 375 ft. at 45 degrees, the obstruction extends 33 ft. from plot center, and the most convenient offset point is #3. Stop at 342.0 ft., proceed 48.0 ft. at 180 degrees, and then go 33.0 ft. at 45 degrees. This will position you at Offset Point 3 (Figure H.2).

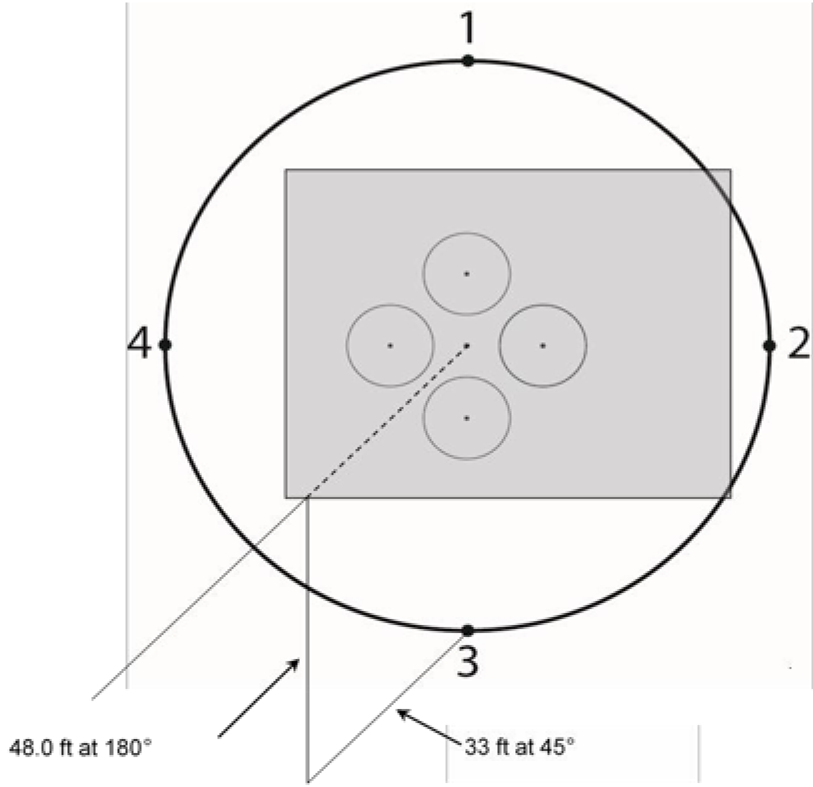


Figure H.2: Locating offset point #3.

The PDR program has the ability to provide a distance and azimuth to an Offset Point if there is a known distance and azimuth to plot center or another know location within the Subplot. Select Function>Midas Tools>and choose the SP/Point option from an open Urban FIA plot. Then choose subplot center as the know point, enter in the distance and azimuth, and then choose your destination point. The PDR will then provide a course to sample to the destination that you have selected.

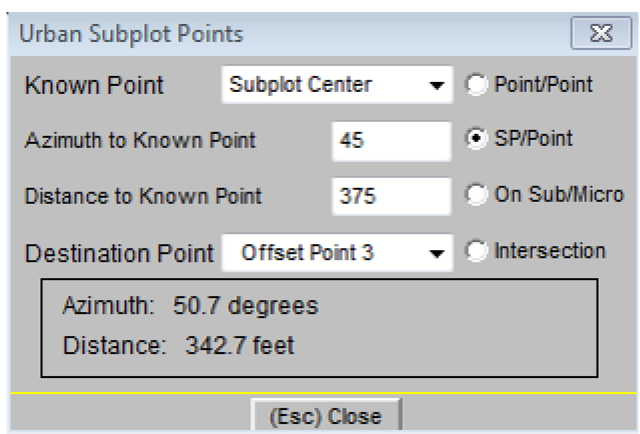


Figure H.3: PDR Know Point Tool. In Case 1: Course to Subplot Center is 45 degrees for 375 ft. Due to an obstruction at plot center Offset Point 3 is chosen as the new destination, the PDR provides a course to Offset Point 3.

CASE 2: LOCATING OFFSET POINTS FROM EACH OTHER ON THE SAME PLOT/MICROPLOT.

Once one offset point is determined, the location of other offset points can be found as indicated in Table H.1: and Table H.2: (Figure H.4).

From offset point	To offset point							
	North (1)		**East (2)**		**South (3)**		**West (4)**	
	Azim. degrees	**Dist. feet**	**Azim. degrees**	**Dist. feet**	**Azim. degrees**	**Dist. feet**	**Azim. degrees**	**Dist. feet**
North (1)	-	-	135	67.9	180	96.0	225	67.9
East (2)	315	67.9	-	-	225	67.9	270	96.0
South (3)	360	96.0	045	67.9	-	-	315	67.9
West (4)	045	67.9	090	96.0	135	67.9	-	-

Table H.1: Distances and Azimuths Between Plot Offset Points.

From microplot offset	To microplot offset point							
	North (1)		**East (2)**		**South (3)**		**West (4)**	
	Azim. degrees	**Dist. feet**	**Azim. degrees**	**Dist. feet**	**Azim. degrees**	**Dist. feet**	**Azim. degrees**	**Dist. feet**
North (1)	-	-	135	9.6	180	13.6	225	9.6
East (2)	315	9.6	-	-	225	9.6	270	13.6
South (3)	360	13.6	045	9.6	-	-	315	9.6
West (4)	045	9.6	090	13.6	135	9.6	-	-

Table H.2: Distances and Azimuths Between Microplot Offset Points.

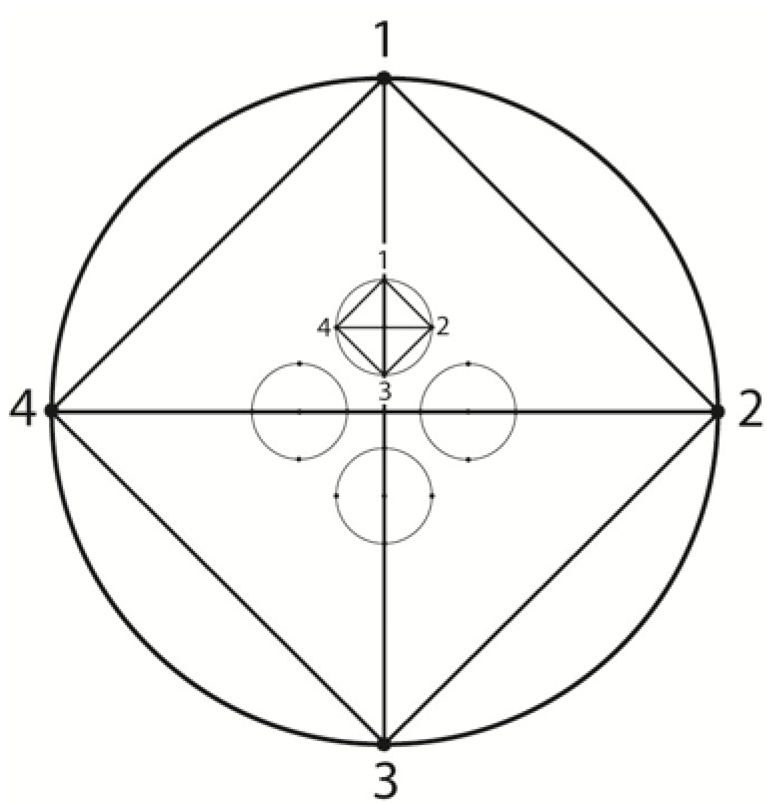


Figure H.4: Locating offset points from each other on the same plot.

In Case 2: Once one offset point is determined the location of the other offset points can be fund using the Point to Point Tool on the PDR. Select Function>Midas Tools>and choose the Point to Point option from an open Urban FIA plot. Then choose the location from which you are starting from, followed by your destination point; the PDR will produce the distance and azimuth to your destination. For example, if you are standing on offset 3 and want to go to microplot 11 your course would be 14 degrees for 49.5 ft. as displayed below:

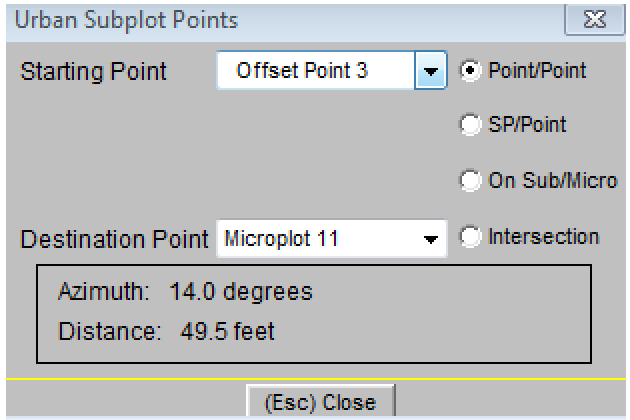


Figure H.5: PDR Point to Point Tool

CASE 3: TALLYING TREES FROM OFFSET POINTS.

Not all trees may be visible from the initial offset point. It is permissible to use more than one offset point to tally trees. Trees can be tallied from any of the offset points (Figure H.6).

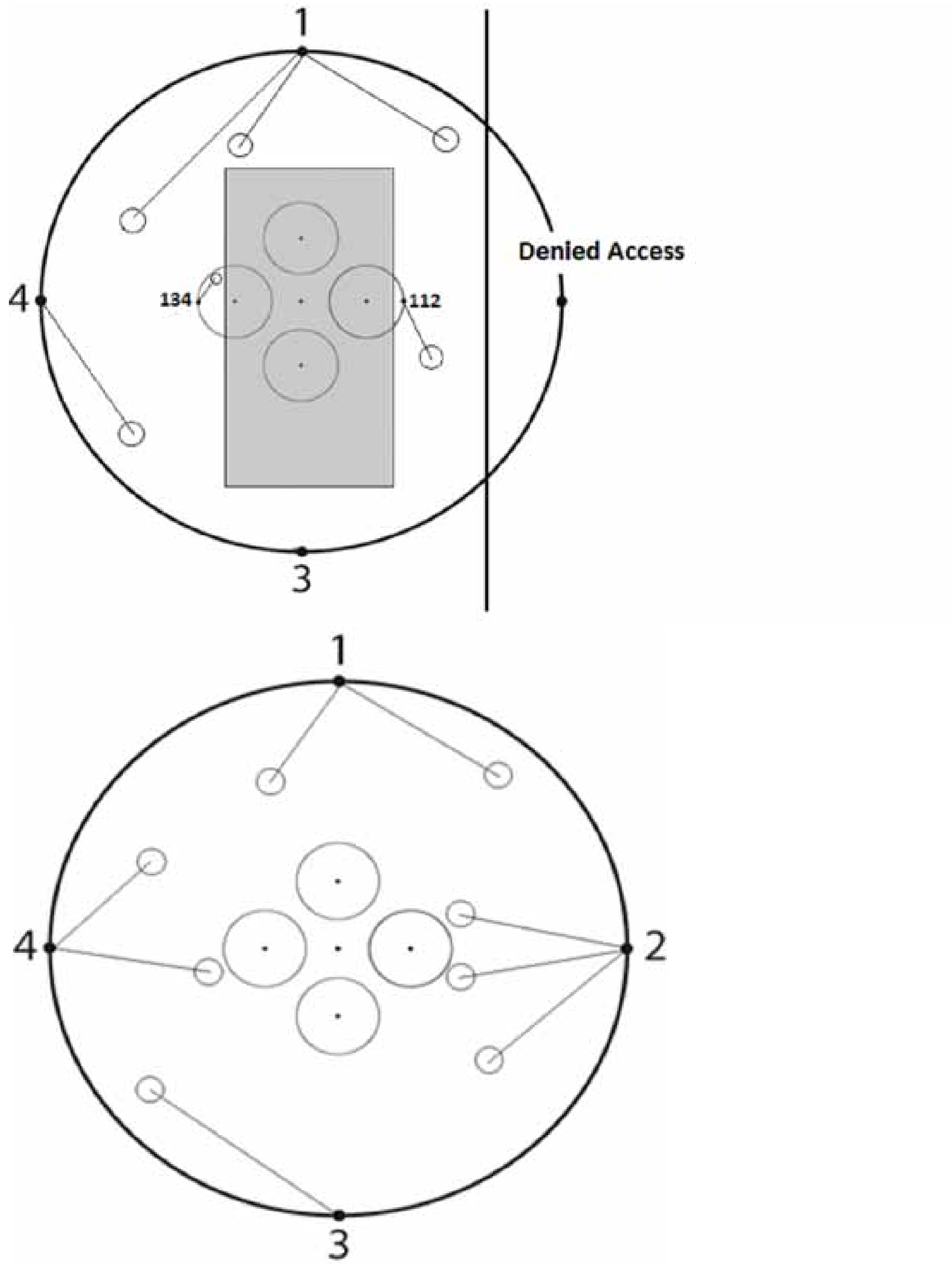


Figure H.6: Referencing trees to offset points.

CASE 4: CHECKING LIMITING DISTANCES FROM OFFSET POINTS WITHOUT A PDR.

Table H.3: lists the angle and limiting distance to 18 perimeter points on the plot (Figure H.7). The angle is the difference between the azimuth to plot center (180, 270, 360, or 90 degrees) and the azimuth to the tree. This angle should never be more than 90 degrees. Borderline trees should be tallied and will be checked later during data processing.

For example, standing at Offset 4, tree is located at 55 degrees and is 82.9 feet away. Is the tree in or out?

From offset point 4 to plot center is 90 degrees. The azimuth to the tree is 55 degrees. The difference between the two is 35 degrees. Using Table H.3: below, the limiting distance for the tree is 78.6. Since the tree is 82.9 feet away, the tree is out.

Degrees	Feet	Degrees	Feet	Degrees	Feet	Degrees	Feet
0	96.0	25	87.0	50	61.7	75	24.9
5	95.6	30	83.1	55	55.1	80	16.7
10	94.5	35	78.6	60	48.0	85	8.4
15	92.7	40	73.5	65	40.6	90	0.0
20	90.2	45	67.9	70	32.8		

Table H.3:Limiting Distances to 18 Points on the Plot.

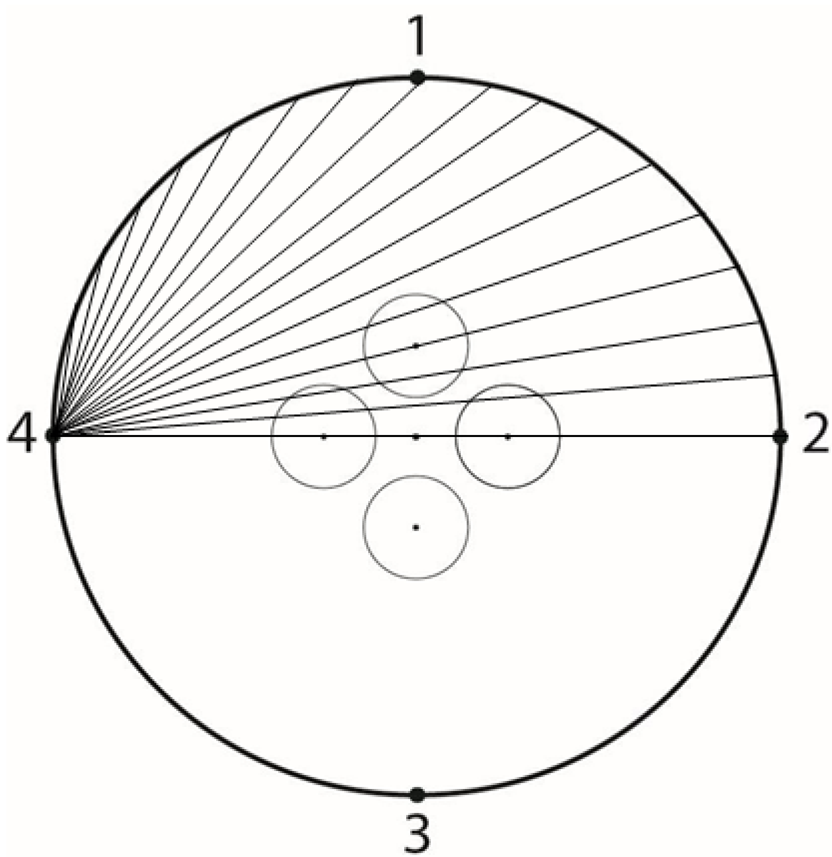


Figure H.7: Plot limiting distances from offset point #4

Degrees	Feet	Degrees	Feet	Degrees	Feet	Degrees	Feet	Degrees	Feet	Degrees	Feet
0	96.00	16	92.3	32	81.4	48	64.2	64	42.1	**80**	**16.7**
1	95.99	17	91.8	33	80.5	49	63	**65**	**40.6**	81	15.0
2	95.94	18	91.3	34	79.6	**50**	**61.7**	66	39.1	82	13.4
3	95.87	19	90.8	**35**	**78.6**	51	60.4	67	37.5	83	11.7
4	95.77	**20**	**90.2**	36	77.7	52	59.1	68	36.0	84	10.0
5	**95.6**	21	89.6	37	76.7	53	57.8	69	34.4	**85**	**8.4**
6	95.5	22	89	38	75.7	54	56.4	**70**	**32.8**	86	6.7
7	95.3	23	88.4	39	74.6	**55**	**55.1**	71	31.3	87	5.0
8	95.1	24	87.7	**40**	**73.5**	56	53.7	72	29.7	88	3.4
9	94.8	**25**	**87**	41	72.5	57	52.3	73	28.1	89	1.7
10	**94.5**	26	86.3	42	71.3	58	50.9	74	26.5	**90**	**0.0**
11	94.2	27	85.5	43	70.2	59	49.4	**75**	**24.9**		
12	93.9	28	84.8	44	69.1	**60**	**48.0**	76	23.2		
13	93.5	29	84	**45**	**67.9**	61	46.5	77	21.6		
14	93.2	**30**	**83.1**	46	66.7	62	45.1	78	20.0		
15	**92.7**	31	82.3	47	65.5	63	43.6	79	18.3		

Table H.4: Complete Limiting Distance Chart for Plot Offsets.

Degrees	Feet	Degrees	Feet	Degrees	Feet	Degrees	Feet	Degrees	Feet	Degrees	Feet
0	13.6	16	13.1	32	11.5	48	9.1	64	6.0	80	2.4
1	13.6	17	13.0	33	11.4	49	8.9	65	5.8	81	2.1
2	13.6	18	12.9	34	11.3	50	8.7	66	5.5	82	1.9
3	13.6	19	12.9	35	11.1	51	8.6	67	5.3	83	1.7
4	13.6	20	12.8	36	11.0	52	8.4	68	5.1	84	1.4
5	13.6	21	12.7	37	10.9	53	8.2	69	4.9	85	1.2
6	13.5	22	12.6	38	10.7	54	8.0	70	4.7	86	1.0
7	13.5	23	12.5	39	10.6	55	7.8	71	4.4	87	0.7
8	13.5	24	12.4	40	10.4	56	7.6	72	4.2	88	0.5
9	13.4	25	12.3	41	10.3	57	7.4	73	4.0	89	0.2
10	13.4	26	12.2	42	10.1	58	7.2	74	3.8	90	0.0
11	13.4	27	12.1	43	10.0	59	7.0	75	3.5		
12	13.3	28	12.0	44	9.8	60	6.8	76	3.3		
13	13.3	29	11.9	45	9.6	61	6.6	77	3.1		
14	13.2	30	11.8	46	9.5	62	6.4	78	2.8		
15	13.1	31	11.7	47	9.3	63	6.2	79	2.6		

Table H.5: Complete Limiting Distance Chart for Microplot Offsets.

AZM from Offset 1; 111; 121; 131; 141	AZM from Offset 2; 112; 122; 132; 142	AZM from Offset 3; 113; 123; 133; 143	AZM from Offset 4; 114; 124; 134; 144	Subplot Limiting Distance (ft)	Microplot Limiting Distance (ft)
90	180	270	360	0.00	0.00
91	181	271	1	1.68	0.24
92	182	272	2	3.35	0.47
93	183	273	3	5.02	0.71
94	184	274	4	6.70	0.95
95	185	275	5	8.37	1.19
96	186	276	6	10.03	1.42
97	187	277	7	11.70	1.66
98	188	278	8	13.36	1.89
99	189	279	9	15.02	2.13
100	190	280	10	16.67	2.36
101	191	281	11	18.32	2.60
102	192	282	12	19.96	2.83
103	193	283	13	21.60	3.06
104	194	284	14	23.22	3.29
105	195	285	15	24.85	3.52
106	196	286	16	26.46	3.75
107	197	287	17	28.07	3.98
108	198	288	18	29.67	4.20
109	199	289	19	31.25	4.43
110	200	290	20	32.83	4.65
111	201	291	21	34.40	4.87
112	202	292	22	35.96	5.09
113	203	293	23	37.51	5.31
114	204	294	24	39.05	5.53
115	205	295	25	40.57	5.75
116	206	296	26	42.08	5.96
117	207	297	27	43.58	6.17
118	208	298	28	45.07	6.38
119	209	299	29	46.54	6.59
120	210	300	30	48.00	6.80
121	211	301	31	49.44	7.00
122	212	302	32	50.87	7.21
123	213	303	33	52.29	7.41
124	214	304	34	53.68	7.61
125	215	305	35	55.06	7.80
126	216	306	36	56.43	7.99
127	217	307	37	57.77	8.18
128	218	308	38	59.10	8.37
129	219	309	39	60.41	8.56
130	220	310	40	61.71	8.74
131	221	311	41	62.98	8.92
132	222	312	42	64.24	9.10

AZM from Offset 1; 111; 121; 131; 141	AZM from Offset 2; 112; 122; 132; 142	AZM from Offset 3; 113; 123; 133; 143	AZM from Offset 4; 114; 124; 134; 144	Subplot Limiting Distance (ft)	Microplot Limiting Distance (ft)
133	223	313	43	65.47	9.28
134	224	314	44	66.69	9.45
135	225	315	45	67.88	9.62
136	226	316	46	69.06	9.78
137	227	317	47	70.21	9.95
138	228	318	48	71.34	10.11
139	229	319	49	72.45	10.26
140	230	320	50	73.54	10.42
141	231	321	51	74.61	10.57
142	232	322	52	75.65	10.72
143	233	323	53	76.67	10.86
144	234	324	54	77.67	11.00
145	235	325	55	78.64	11.14
146	236	326	56	79.59	11.27
147	237	327	57	80.51	11.41
148	238	328	58	81.41	11.53
149	239	329	59	82.29	11.66
150	240	330	60	83.14	11.78
151	241	331	61	83.96	11.89
152	242	332	62	84.76	12.01
153	243	333	63	85.54	12.12
154	244	334	64	86.28	12.22
155	245	335	65	87.01	12.33
156	246	336	66	87.70	12.42
157	247	337	67	88.37	12.52
158	248	338	68	89.01	12.61
159	249	339	69	89.62	12.70
160	250	340	70	90.21	12.78
161	251	341	71	90.77	12.86
162	252	342	72	91.30	12.93
163	253	343	73	91.81	13.01
164	254	344	74	92.28	13.07
165	255	345	75	92.73	13.14
166	256	346	76	93.15	13.20
167	257	347	77	93.54	13.25
168	258	348	78	93.90	13.30
169	259	349	79	94.24	13.35
170	260	350	80	94.54	13.39
171	261	351	81	94.82	13.43
172	262	352	82	95.07	13.47
173	263	353	83	95.28	13.50
174	264	354	84	95.47	13.53
175	265	355	85	95.63	13.55
176	266	356	86	95.77	13.57
177	267	357	87	95.87	13.58
178	268	358	88	95.94	13.59

AZM from Offset 1; 111; 121; 131; 141	AZM from Offset 2; 112; 122; 132; 142	AZM from Offset 3; 113; 123; 133; 143	AZM from Offset 4; 114; 124; 134; 144	Subplot Limiting Distance (ft)	Microplot Limiting Distance (ft)
179	269	359	89	95.99	13.60
180	270	360	90	96.00	13.60
181	271	1	91	95.99	13.60
182	272	2	92	95.94	13.59
183	273	3	93	95.87	13.58
184	274	4	94	95.77	13.57
185	275	5	95	95.63	13.55
186	276	6	96	95.47	13.53
187	277	7	97	95.28	13.50
188	278	8	98	95.07	13.47
189	279	9	99	94.82	13.43
190	280	10	100	94.54	13.39
191	281	11	101	94.24	13.35
192	282	12	102	93.90	13.30
193	283	13	103	93.54	13.25
194	284	14	104	93.15	13.20
195	285	15	105	92.73	13.14
196	286	16	106	92.28	13.07
197	287	17	107	91.81	13.01
198	288	18	108	91.30	12.93
199	289	19	109	90.77	12.86
200	290	20	110	90.21	12.78
201	291	21	111	89.62	12.70
202	292	22	112	89.01	12.61
203	293	23	113	88.37	12.52
204	294	24	114	87.70	12.42
205	295	25	115	87.01	12.33
206	296	26	116	86.28	12.22
207	297	27	117	85.54	12.12
208	298	28	118	84.76	12.01
209	299	29	119	83.96	11.89
210	300	30	120	83.14	11.78
211	301	31	121	82.29	11.66
212	302	32	122	81.41	11.53
213	303	33	123	80.51	11.41
214	304	34	124	79.59	11.27
215	305	35	125	78.64	11.14
216	306	36	126	77.67	11.00
217	307	37	127	76.67	10.86
218	308	38	128	75.65	10.72
219	309	39	129	74.61	10.57
220	310	40	130	73.54	10.42
221	311	41	131	72.45	10.26
222	312	42	132	71.34	10.11
223	313	43	133	70.21	9.95
224	314	44	134	69.06	9.78

AZM from Offset 1; 111; 121; 131; 141	AZM from Offset 2; 112; 122; 132; 142	AZM from Offset 3; 113; 123; 133; 143	AZM from Offset 4; 114; 124; 134; 144	Subplot Limiting Distance (ft)	Microplot Limiting Distance (ft)
225	315	45	135	67.88	9.62
226	316	46	136	66.69	9.45
227	317	47	137	65.47	9.28
228	318	48	138	64.24	9.10
229	319	49	139	62.98	8.92
230	320	50	140	61.71	8.74
231	321	51	141	60.41	8.56
232	322	52	142	59.10	8.37
233	323	53	143	57.77	8.18
234	324	54	144	56.43	7.99
235	325	55	145	55.06	7.80
236	326	56	146	53.68	7.61
237	327	57	147	52.29	7.41
238	328	58	148	50.87	7.21
239	329	59	149	49.44	7.00
240	330	60	150	48.00	6.80
241	331	61	151	46.54	6.59
242	332	62	152	45.07	6.38
243	333	63	153	43.58	6.17
244	334	64	154	42.08	5.96
245	335	65	155	40.57	5.75
246	336	66	156	39.05	5.53
247	337	67	157	37.51	5.31
248	338	68	158	35.96	5.09
249	339	69	159	34.40	4.87
250	340	70	160	32.83	4.65
251	341	71	161	31.25	4.43
252	342	72	162	29.67	4.20
253	343	73	163	28.07	3.98
254	344	74	164	26.46	3.75
255	345	75	165	24.85	3.52
256	346	76	166	23.22	3.29
257	347	77	167	21.60	3.06
258	348	78	168	19.96	2.83
259	349	79	169	18.32	2.60
260	350	80	170	16.67	2.36
261	351	81	171	15.02	2.13
262	352	82	172	13.36	1.89
263	353	83	173	11.70	1.66
264	354	84	174	10.03	1.42
265	355	85	175	8.37	1.19
266	356	86	176	6.70	0.95
267	357	87	177	5.02	0.71
268	358	88	178	3.35	0.47
269	359	89	179	1.68	0.24
270	360	90	180	0.00	0.00

Table H.6: Expanded Limiting Distance Chart for Subplot and Microplot Offsets. Microplot limiting distances are only applicable for microplot variables such as saplings and microplot boundaries.

CASE 5: CHECKING LIMITING DISTANCES FROM OFFSET POINTS USING THE ON SUB/MICRO TOOL ON THE PDR.

In order to determine if a tree is within the sample area select Function>Midas Tools>and choose the On Sub/Micro option from an open Urban FIA plot. Then choose the location that you are starting from (Reference Point), followed by the distance and azimuth to the stem in question and the PDR will determine if the tree is within a microplot or on the subplot. In this case a stem is determined to be 44 ft out from offset point 3 at an azimuth of 14 degrees. The PDR determines that this tree is within microplot 11.

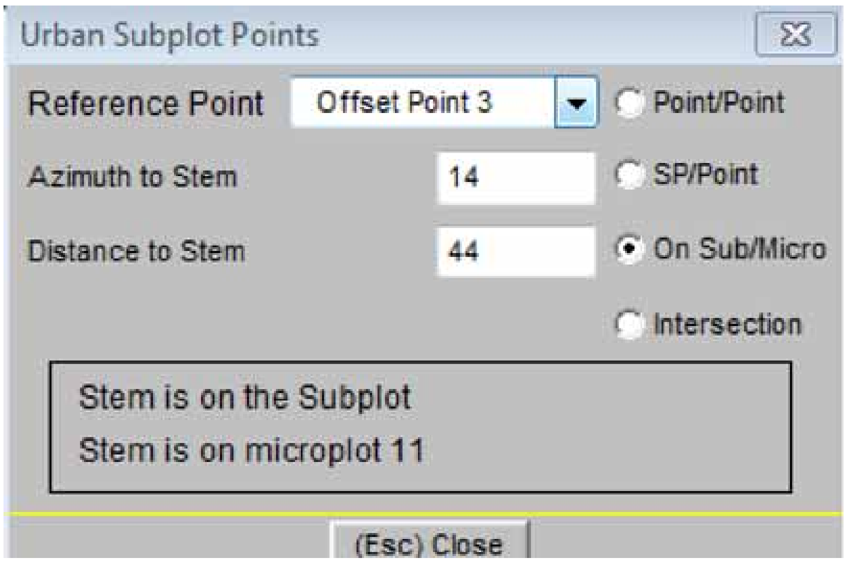
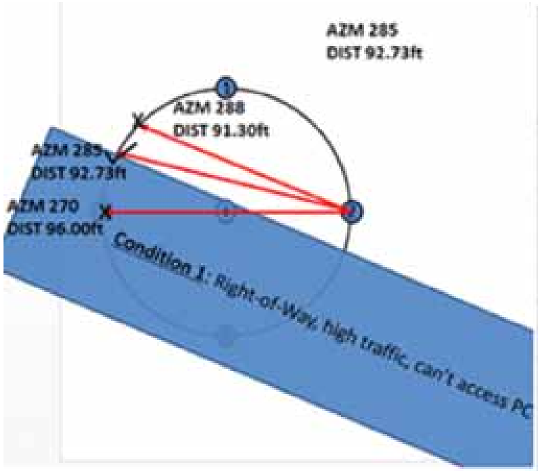


Figure H.8: On Sub/Micro PDR Tool.

CASE 6: RECORDING TRADITIONAL BOUNDARIES FROM OFFSET POINTS.

Choose one offset point from which the left, right, and corner azimuths and distances can be measured. If possible, select an offset point which is on the same side of the boundary as the plot center.

When referenced to an offset point, it is difficult to pinpoint where a boundary crosses the plot perimeter. Left and right azimuths and distances from an offset point often have to be estimated and then gradually adjusted to find the correct azimuth/distance combination that accurately represents the location of the condition boundary intersection with the subplot perimeter. (Figure H.9). This can be accomplished by using the PDR tools or by using Table H.6: - Expanded Limiting Distance Chart for Plot Offsets.



AZM from Offset 1; 111; 121; 131; 141	AZM from Offset 2; 112; 122; 132; 142	AZM from Offset 3; 113; 123; 133; 143	AZM from Offset 4; 114; 124; 134; 144	Subplot Limiting Distance (ft)	Microplot Limiting Distance (ft)
179	269	359	89	95.99	13.60
180	270	360	90	96.00	13.60
181	271	1	91	95.99	13.60
182	272	2	92	95.94	13.59
183	273	3	93	95.87	13.58
184	274	4	94	95.77	13.57
185	275	5	95	95.63	13.55
186	276	6	96	95.47	13.53
187	277	7	97	95.28	13.50
188	278	8	98	95.07	13.47
189	279	9	99	94.82	13.43
190	280	10	100	94.54	13.39
191	281	11	101	94.24	13.35
192	282	12	102	93.90	13.30
193	283	13	103	93.54	13.25
194	284	14	104	93.15	13.20
195	285	15	105	92.73	13.14
196	286	16	106	92.28	13.07
197	287	17	107	91.81	13.01
198	288	18	108	91.30	12.93
199	289	19	109	90.77	12.86

Figure H.9: Estimating boundaries from offset points.

CASE 7: RECORDING CLOSED BOUNDARIES FROM AN OFFSET POINT.

Closed boundaries may also be installed from offset points.

In Figure H.10, Node 1 is established from Offset 1. Measure the azimuth and distance from Offset 1 to Node 1 and record. Once NODE 1 is established, traverse around the entity in a clockwise direction. Continue traversing clockwise until the final corner is documented. The PDR will allow up to a maximum of 5 nodes to describe the shape of the condition. Once the final node is recorded (NODE 4 for this figure), the PDR will calculate the distance and azimuth from the last NODE entered back to NODE 1 to complete the outline.

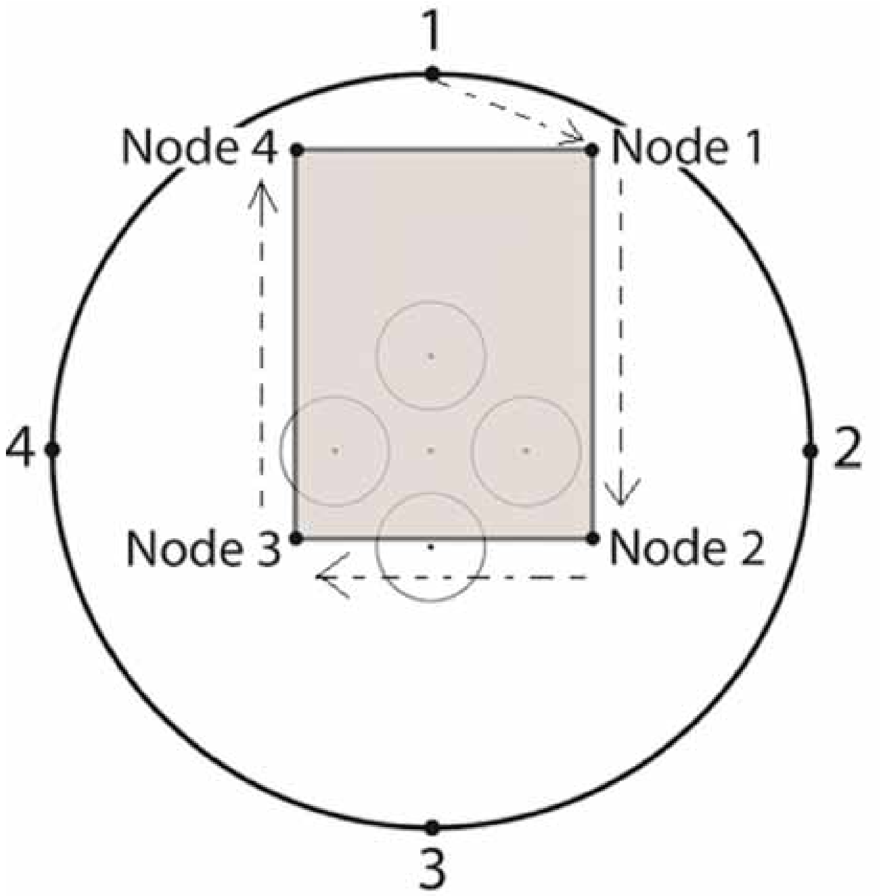


Figure H.10: Recording a fully enclosed boundary from offset point 1.

APPENDIX I URBAN BOUNDARY EXAMPLES

This section will provide several examples of scenarios that may be encountered by field crews. Each example will provide a subplot diagram of the scenario and a description of the process.

EXAMPLE 1: FULLY-ENCLOSED CLOSED BOUNDARY (CROSSES SUBPLOT PERIMETER =0)

This example demonstrates a fully-enclosed boundary. This particular example shows the condition delineated by the boundary as occupying the subplot center.

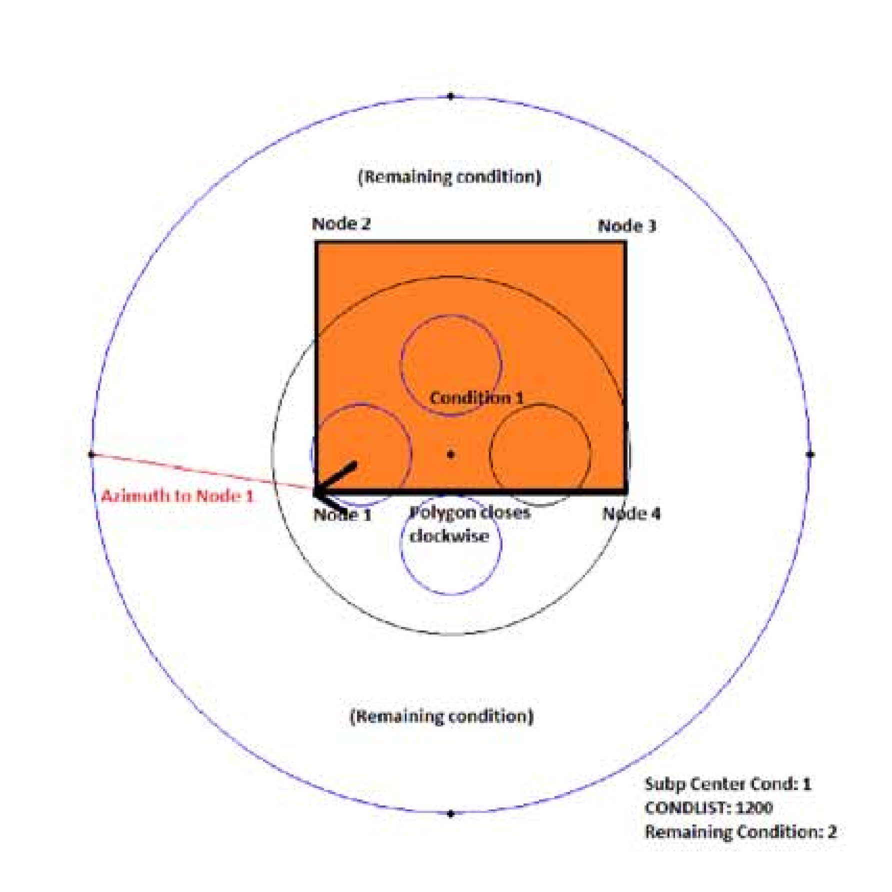


Figure I.1: Example 1 Subplot Diagram.

In this case, the crew elects to shoot the azimuth and distance from the western offset point to the first node of the closed boundary. On the closed boundary screen, they enter the initial azimuth and distance from the western offset to the first node in OFFSETAZMNODE1 and OFFSETDISTNODE1. The AZMNODE1 and AZMNODE2 columns will be auto-filled by the program. From there, they proceed clockwise around the polygon. After recording the distance and azimuth from Node 3 to Node 4, the software closes the polygon in the clockwise direction. The data are collected on the closed boundary screen in MIDAS. There are only two conditions occurring on the subplot. Condition 1 is mapped and the area within the square is accounted for. The crew enters 2 as the REMAINING_CONDITION, meaning the rest of the unaccounted for area on the subplot belongs to condition 2. The PDR "Create Microplot Boundaries" tool should then be used to create the necessary traditional boundaries for the microplots.

EXAMPLE 2: FULLY-ENCLOSED CLOSED BOUNDARY (CROSSES SUBPLOT PERIMETER=0) AND A CLOSED BOUNDARY THAT DOES CROSS THE SUBPLOT PERIMETER (CROSSES SUB-PLOT PERIMETER=1)

In this example there is a fully-enclosed boundary that covers subplot center as well as an additional boundary designating another condition south of subplot center. There are three conditions total. There is no one correct way to designate these conditions. Condition 1 must always contain the subplot center. But the crew could elect to designate the remaining condition as condition 2 and map condition 3. This is the solution shown in this example. Alternatively, the crew could elect to map condition 2 and designate the remaining condition as condition 3. That is shown as Example 3.

In this example the crew elects to shoot the distance and azimuth to the first node of both boundaries from the western offset point. The crew traverses the fully-enclosed boundary, collecting the distance and azimuth between nodes 1 through 4. The software closes the polygon clockwise between Node 4 and Node 1. They designate this as condition 1 on the closed boundary record. Then, they traverse the boundary that crosses the subplot perimeter as shown. In this example they designate the second boundary record as condition 3. The software will always close the polygon in a clockwise direction along the arc of the subplot. The crew also designates condition 2 as the remaining condition because it accounts for all the area of the subplot after all the mapped area is accounted for. In this case, no other boundary records map condition 2.

-

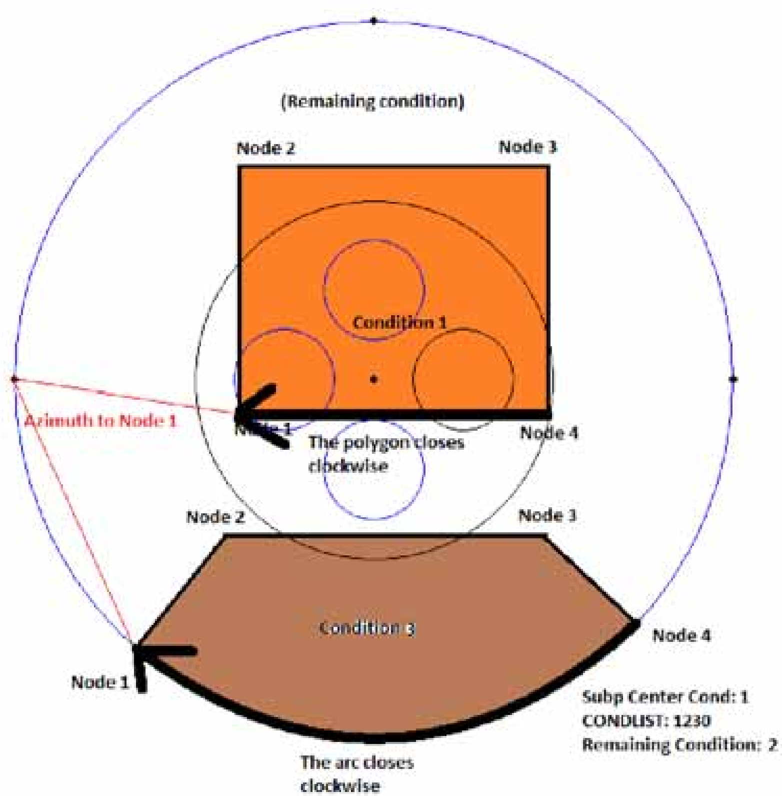


Figure I.2: Example 2 Subplot Diagram.

EXAMPLE 3: FULLY-ENCLOSED BOUNDARY AND MULTI-NODE BOUNDARY

This example shows an alternate solution to the scenario depicted in Example 2. The difference is that the crew uses the second boundary record to map condition 2 and declares the remaining condition to be condition 3. All other aspects of the scenario are exactly the same.

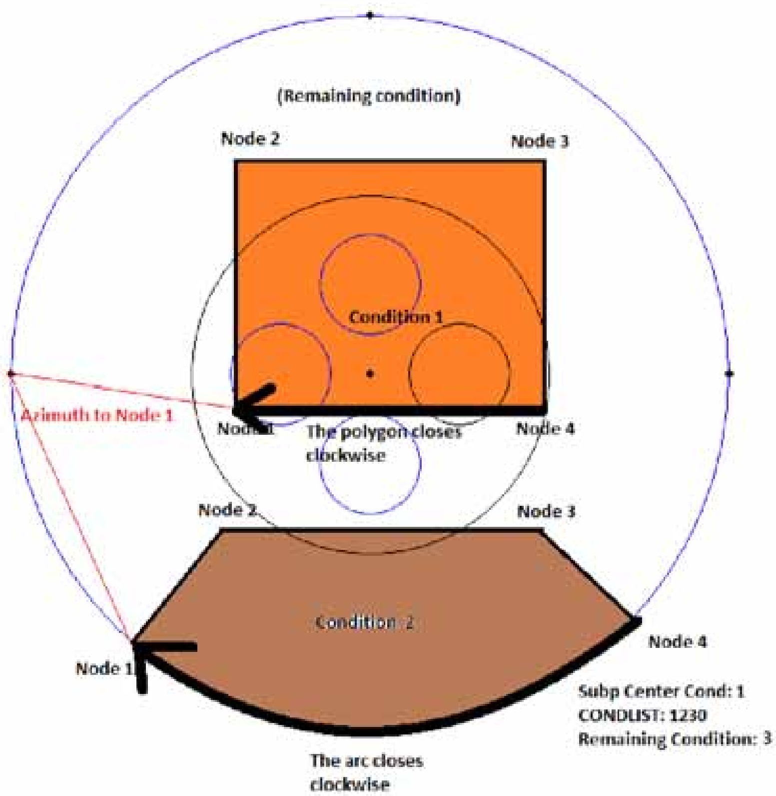


Figure I.3: Example 3 Subplot Diagram.

EXAMPLE 4: A FULLY-ENCLOSED BOUNDARY WITH TWO NESTED CLOSED BOUNDARIES THAT CROSS THE SUBPLOT PERIMETER.

This example demonstrates how the remaining condition can also be a mapped condition. In this particular case, the subplot center condition is also the remaining condition. This is also an example of a nested boundary; where the mapped portion of condition 1 is entirely within the mapped condition 3. When computing the areas for these polygons the area of the mapped condition 1 will be subtracted from the area of mapped condition 3.

In this scenario, the crew designates the area covering subplot center as condition 1. Next, they map condition 2 using a fully-enclosed boundary. To do this, they shoot the distance and azimuth from PC to the first node and populate the AZMNODE1 and DISTNODE1 columns. Then traverse the polygon collecting the distance and azimuth from each node to the next. Next they map a multi-node boundary that designates condition 3. The crew starts by shooting the first node to the west and working clockwise around because they want the area south of the boundary to be designated condition 3, and they know the polygon will be closed by completing the arc clockwise. Next, they map a portion of condition 1 using a multi-node boundary. The same logic is employed in this second multi-node boundary. The crew designates the remaining condition to be condition 1 because it represents the area remaining after all mapped areas are accounted for. Note that in this case, condition 1 is both the remaining condition and a mapped condition.

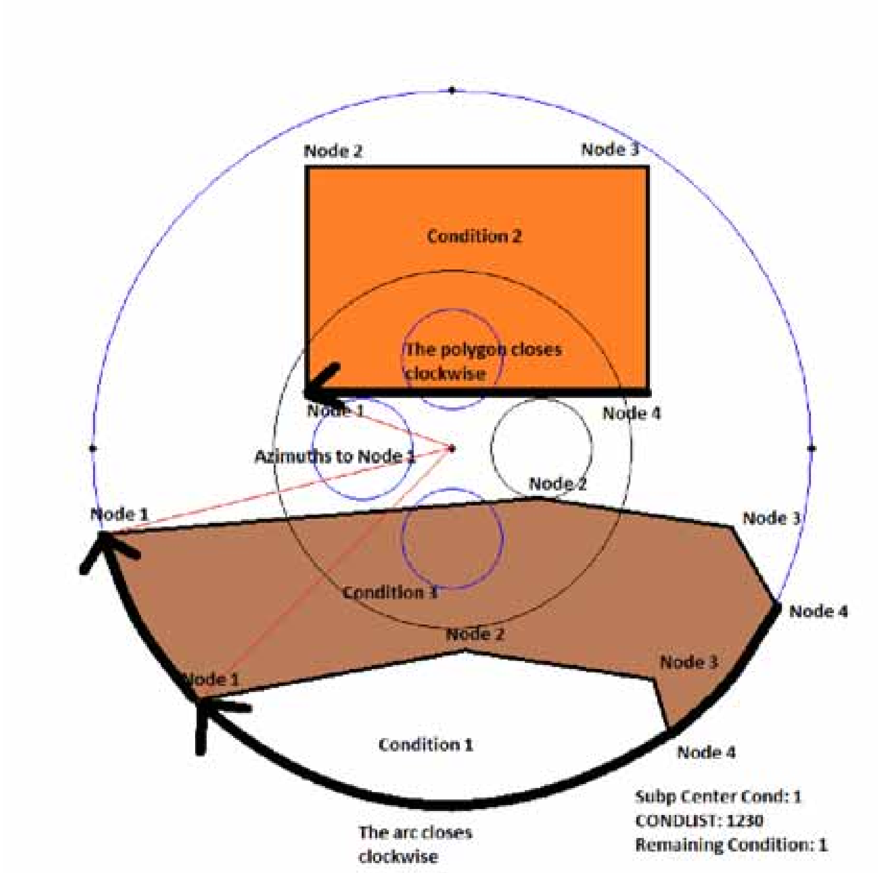


Figure I.4: Example 4 Subplot Diagram.

APPENDIX J URBAN FIA PLOT ESTABLISHMENT AND RELOCATION PROCEDURES

SECTION J.1 ESTABLISHING NEW PLOTS

When establishing new Urban FIA plots where PC or offset points are accessible, three methods are available:

- Visual installation
- Photo Work Installation
- GPS Installation

SUBSECTION J.1.1 VISUAL INSTALLATION

Urban aerial images often include significant landmarks that allow for accurate placement of Urban FIA plots simply by visually locating Plot Center (PC) or a Subplot Offset* based on landmarks on the image. Microplot centers/offsets may NOT be used to visually install a plot. Visual Installation is the preferred installation method if the imagery provided is clear and includes the landmarks necessary for confident, accurate placement of the plot. To install a plot using this method, place the plot center or one of the subplot offsets* based on landmarks visible in the image. After a single point has been installed visually, all other subplot and micro-plot locations should be installed using measurements from the initial point that was visually installed. Additional points must not be visually placed unless it is impossible to place them using on the ground measurements and the Midas Urban tools available.

When visually installing plots, it is important to consider the following issues to ensure accurate placement.

Displacement

Displacement occurs on tall objects due to the angle at which the aerial image was taken. A tree or house may appear closer or farther from the plot center mark depending on the direction from which the image was taken. Trees, buildings and other tall objects are unreliable landmarks for plot placement. Displacement can cause a plot to appear as though the center lands on a building rooftop when in fact the correct location is alongside the building. Landmarks such as sidewalk intersections, parking lot corners, flower beds and other ground level items that appear to have not changed since the photo was taken allow for much more accurate plot placement.

Shadows

Shadows can cause dark areas on the photo that hide or distort landmarks. If shadows hide the landmarks needed to install the plot visually then another method will need to be used.

*Declination- Relevant only to regions that do not adjust their compass for declination.

When plot center is inaccessible, subplot offsets may be used to visually install the plot. Offset tick marks on the imagery have not been adjusted for declination. In regions that install plots without adjusting for declination (do not use declination adjusted compasses), the location must be manually adjusted before installing the offset visually. After the initial offset point is visually installed, all other locations will be placed using ground measurements and compass readings as usual.

Simply defined, declination is the angle between true north and the magnetic fields that surround the planet. Where these magnetic fields converge is called magnetic north. Declination varies across the US and varies over time. In 2017 declinations across the United States range from 16° East in the Olympic Mountains of Washington to 16° West in northern Maine. The greater the declination, the more the location of the pre-printed offset tick marks will be incorrect compared to the actual correct ground location.

To adjust the offset tick marks to the correct position:

Check the declination of the city in which you are working at https://www.ngdc.noaa.gov/geomag-web/#declination. You may round the listed declination to the nearest degree.

Using the convention that a West declination is negative and an East declination is positive, add the declination to the azimuth of the offsets and mark the offset at the appropriate Azimuth using a properly scaled protractor overlay.

Example: Subplot Offset 3 is on the perimeter of the subplot 180° from PC. If the declination at your location is "5° 0' W", subtract 5° from 180° (add -5° to 180°) to determine that your Offset 3 tick mark on the image should actually appear at the plot perimeter at 175°. Use a pin or fine tipped pen to mark the Offset in the appropriate location on the image and then visually install the offset based on the manually corrected mark and landmarks in the photo.

OR

Use a fine pin to poke a small hole on a properly scaled 360° protractor overlay at 0°, 90°, 180° and 270° along the plot perimeter line. Center the overlay on PC with the four pin holes aligned over the printed tick marks. Keeping the overlay centered, turn it the appropriate number of degrees left (counter-clockwise) for West declinations and right (clockwise) for East declinations. Use a fine pin to poke holes in the image through the holes in the overlay. These holes will now identify the correct position of the offsets. Visually install the offset based on the manually corrected mark and landmarks in the photo..

Example: Portland, ME has 15° W declination. To manually adjust the subplot offset tick marks to represent the correct location of the offsets, rotate a protractor overlay counter-clockwise 15° and then mark the corrected offset locations along the plot perimeter.

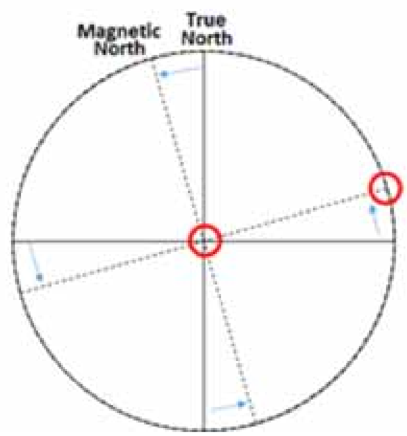


Figure J.1: Declination.

SUBSECTION J.1.2 PHOTO WORK INSTALLATION

When the plot imagery does not include adequate landmarks or is not clear enough to distinguish the necessary landmarks, using photo work to establish a course to sample (the distance and direction from a SP/RP to PC) may the most accurate way to install the plot.

To establish a course to sample using photo work:

- Select and record a BASELINE on the aerial image. A Baseline links the photo image and the ground with a compass bearing. The Baseline is then used to determine the correct azimuth from the SP/RP to Plot Center.
- Identify two features on the ground that are easily recognizable on the aerial image. If possible, the two features should be at least 5 chains apart when using an aerial image with a scale of 1:750. Select features such as straight road sections, road intersections or other landmarks close to the ground. Avoid using tall features such as the corners of buildings because they can be inaccurate due to displacement. Avoid using railroads or major powerlines since they can influence the compass reading.
- Using your compass, measure the azimuth between the two features to the nearest half-degree.
- Using a fine pin, pinprick both features on the photo. On the back of the image, circle the pinpricks and use a straight edge and fine tipped pen or pencil to draw a line connecting the pinpricks. Place an arrow on the line to indicate the azimuth direction and record the azimuth that you measured.
- Select a SP/RP. The SP/RP must be identifiable on the image and on the ground. Avoid using tall features which can be inaccurate due to displacement.
- Using a fine pin, pinprick the SP/RP and PC on the image.
- On the back of the image, circle the pinpricks and use a straight edge and a fine tipped pen or pencil to draw a line connecting the SP/RP and PC pinpricks extending the line (if necessary) to intersect with the Baseline. Lines should extend well beyond the intersection to allow reading of both the azimuth and back-azimuth from a protractor overlay. This will be your "COURSE TO SAMPLE" line.
- If the Course to Sample line does not intersect with the Baseline, draw an additional REFERENCE LINE that will intersect with both existing lines (see Figure J.2, Example B).
- On the back of the image, use an inverted 360° protractor or flip a standard protractor to measure the angle between the lines starting from the Baseline. (East-west azimuths are reversed when working on the back of the photo).

- Center the protractor where the lines intersect along the Baseline. If the Baseline and Course to Sample line intersect, you will center your protractor on this intersection. If an additional Reference Line was needed (as in Figure J.2, Example B) you will center your protractor on the intersection of the Baseline and the Reference Line.
- Align the protractor to the correct azimuth of the Baseline. To minimize error, be sure that the Baseline azimuth, the center of the protractor overlay and the back-azimuth are all aligned.
- Read the azimuth of the intersecting line directly off the protractor. To minimize error, double check the back-azimuth of both lines. Ex: If your Baseline was 20° then the back-azimuth would be 200°. If the SP/RP to Plot Center was 90° then the back-azimuth would be 270°. If the protractor is precisely aligned then the two lines will be lined up accurately with each of their back-sights being 180° in the opposite direction. This is a check to ensure that the protractor is precisely aligned for an accurate reading.
- If an additional Reference line was needed, repeat the process where the Reference line and Course to Sample line intersect.
- Record the resulting azimuth from SP/RP to PC on the back of the photo.
- Using a photo scale, measure the distance on the photo from the pinprick at SP/RP to the pinprick at PC and record the distance, in feet, on the back of the photo.
- Establish your plot using the course to sample information you calculated. (See Using the Course to Sample to Establish your Plot)

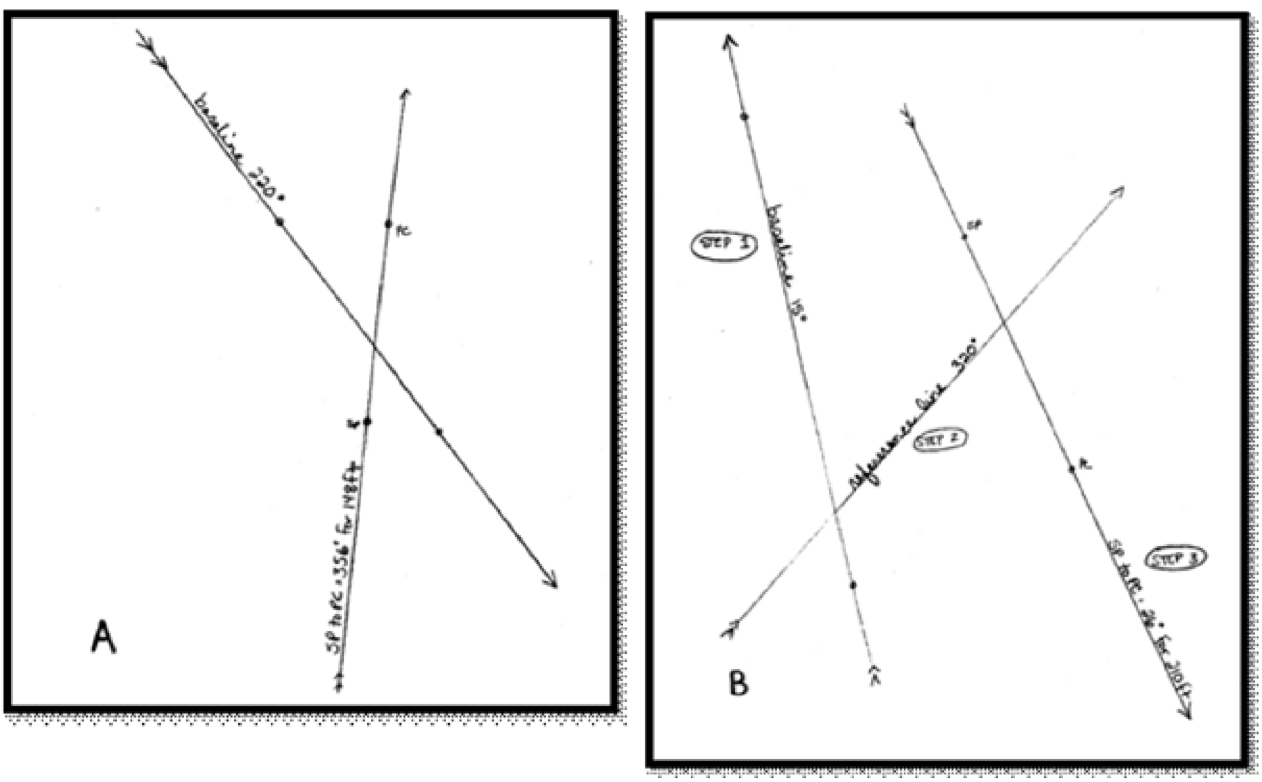


Figure J.2: Documentation on the back of two images. Both identify all lines drawn and include arrows on lines, identify SP and PC, and include azimuths for a Baseline and a course to sample line. The photo work in Example A did not require use of a reference line, while the photo work in Example B did require a reference line to be added.

SUBSECTION J.1.3 GPS INSTALLATION

When imagery provided does not allow for visual or photo work installation, the GPS can be used to install the plot. This method requires creating a course to sample using GPS coordinates.

To establish a course to sample using the GPS:

1. Enter the provided PC coordinates into GPS unit
2. Navigate to approximately 75-150 feet from the PC coordinates entered
3. Create a waypoint following regional guidelines for collecting GPS coordinates.

4. Use the navigation function on your GPS to calculate the course to sample (the distance and azimuth from the waypoint to PC).
5. Establish your plot using the course to sample information you calculated. (See Using the Course to Sample to Establish your Plot.)

SUBSECTION J.1.4 USING THE COURSE TO SAMPLE TO ESTABLISH YOUR PLOT

The course to sample azimuth and distance provide you the information that you need to establish Plot Center or any other micro-plot center or offset on the plot. If Plot Center is not accessible, the Urban Tools available in Midas Mobile will allow calculation of the distance and azimuth from SP/RP to any accessible point on the plot.

Example: You have completed photo work to learn that the course to sample from SP/RP to PC is 356° for 148 ft (as in Figure J.2 A above). PC falls on a building so you are unable to access it, but the center of Microplot 11 lands in the grass next to the building. In this example Subplot Center is your "Known Point" and Microplot 11 is your "Destination Point." Using the Midas Urban Tool "SP/Point" enter the azimuth and distance from your Course to Sample into the "Azimuth to Known Point" and "Distance to Known Point" fields. MIDAS Urban Tools will calculate the azimuth and distance to Microplot 11 from the SP/RP. This is located in the box at the bottom of the screen. In this scenario Microplot 11 is ~1 degree for 148 ft from your SP/RP.

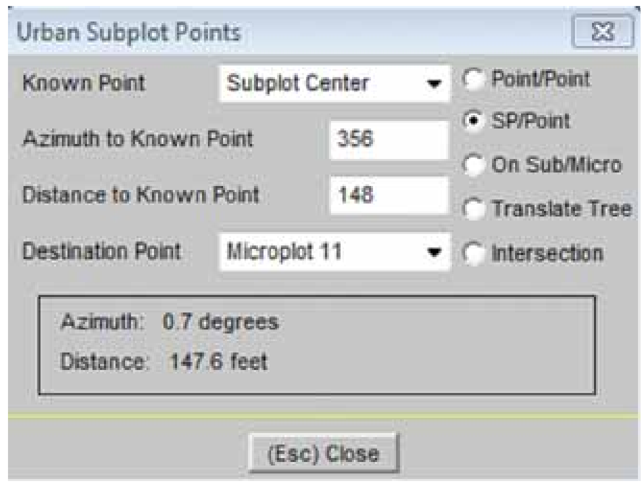


Figure J.3: MIDAS Urban Tools.

Once you have established a course to sample distance and azimuth from SP/RP or another accessible point to PC, use your compass and measuring tapes to run the course on the ground. The photo work distance represents horizontal distance, so use a clinometer and slope correction calculations to adjust for slope between the two points.

Upon reaching the point being used to establish the plot (PC or a micro-plot or offset) monument the point following the protocol in Section 0.3U Plot Monumentation.

SUBSECTION J.1.5 INSTALLING A PLOT WHEN NO SUB/MICRO PLOT CENTER OR OFFSET POINTS ARE ACCESSIBLE

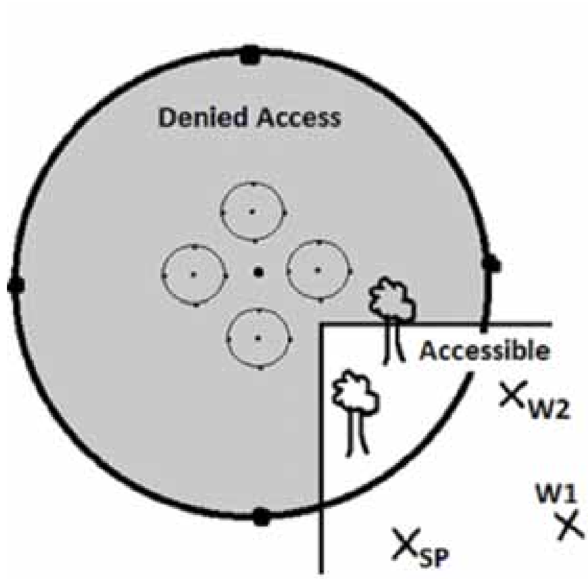


Figure J.4: An example of a plot that is partially accessible but which has no accessible center or offset points. The calculated Course to Sample is: SP to PC= 345° for 52 ft.

Occasionally we may run into plots where a portion of the plot is accessible but we are unable to access any of the subplot or micro-plot center points or offset points due to Denied Access conditions or because they land on top of a building or other inaccessible location. In these situations, follow the procedures below to establish the plot and take the necessary plot measurements.

Locate an acceptable SP/RP object that you can access and from which you can take measurements and azimuths to the accessible portion of the plot

- Calculate a Course to Sample from SP/RP to PC using photo work or the GPS
- Enter the SP/RP distance, azimuth and other information in the URBAN PLOT MONUMENT section as if you were able to access PC
- Find suitable Witness Objects within the accessible area
- Measure DIST and AZM from the established SP to each Witness Object
- Use the Midas Mobile "Traverse" tool to calculate the DIST and AZM from PC to the Witness Object.

The "Traverse" tool provides a distance and azimuth from a place where you start traversing to the place that you finish traversing. So, we imagine traversing FROM PC to SP and then FROM SP to your Witness point. Therefore, using Figure J.5 as an example, your first AZM and DIST will be AZM=165° (opposite of your calculated Course to Sample) DIST= 52 ft. Your second AZM and DIST are your actual on the ground measurement from SP to your Witness point. In this example SP to W1 is AZM=80° DIST=35.4 ft

To use the "Traverse" tool in MIDAS:

- F5
- Traverse
- Azimuth and Distance (from PC to SP)
- Add
- Azimuth and Distance (from SP to Witness Point)
- Add
- Read results: "Azimuth to End Point: 132 Distance to End Point: 64.9" (from PC to end point)

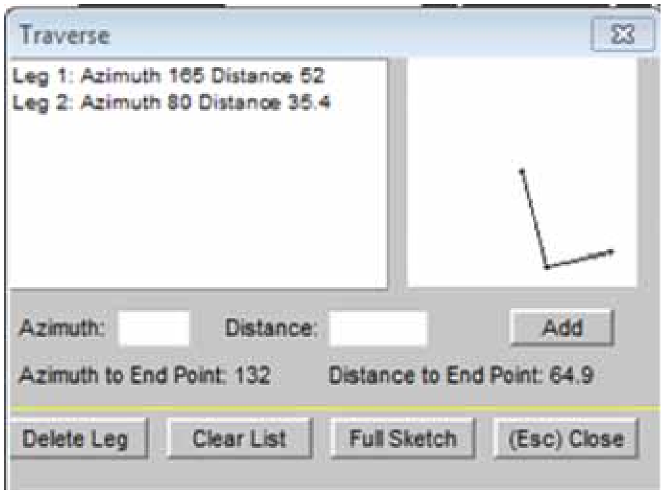


Figure J.5: MIDAS Traverse Tool

- Enter your Witness Objects' distances, azimuths and other information into the URBAN PLOT MONUMENT section using the results provided with the Traverse tool as though you were able to access PC.
- Make a note for each Witness object to record the distance and azimuth measured from SP to the Witness object.
- Complete required tree measurements, boundary installations and other required measurements by taking actual measurements from your SP to the necessary tally item and using the Traverse tool to calculate the DIST and AZM from PC. (Use the same procedure used to establish your witness points in order to measure trees etc.)
- Enter data just as if you had been able to access PC using the results provided from the Traverse tool.
- Make a note for each data item to record the distance and azimuth measured from SP to the data item.
- Make clear plot notes to make sure it is clear that Center Points and Offset Points were not actually accessible.

SECTION J.2 LOCATING PLOTS FROM A PREVIOUS CYCLE

When re-visiting a plot that has already been installed, use aerial photos and GPS coordinates to find the approximate plot location. After occupying the approximate plot location, identify old Monuments and tally items to re-locate the plot in exactly the same location as previously measured. If available, use plot photos to confirm accurate placement. There may be significant changes since the previous visit. Pay close attention to whether Monument Items may have changed (for example if sidewalks have been re-paved, parking lots re-painted, or house exteriors re-modeled). Use monument and tally items that are unchanged since the previous visit to re-locate plot center.

Placement of the plot in the same location as the previous visit is prioritized over placement based on the image. Do not move the plot from the location identified by Monumentation and tally items in order to make it match the provided image.

If Monumentation or tally items are linked to a subplot or offset which is no longer accessible, use the SP/ Point Urban Tool in the Midas program to provide a distance and direction to a point that you can access.

If no previous Monuments or tally items appear to be present, first double check that maps, aerial photos and GPS coordinates confirm you are in the correct general location. If the area has been altered so significantly that the exact location of the previous plot cannot be identified, the plot will need to be re-installed using one of the methods described earlier in this chapter.

APPENDIX K PLOT PHOTOS

SECTION K.1 INTRODUCTION

Relocating Urban Inventory plots will be a challenge due to lack of physical monumentation on the plot. In order to assist future crews with plot relocation and to help track changes over time, pictures of plot center or any occupied offset location will be taken and labeled.

SECTION K.2 URBAN PLOT PHOTO INSTRUCTIONS

This section describes procedures for taking digital photographs of the plot area. Photos will be taken on all accessible plots regardless of Condition Status. If plot center (PC) cannot be occupied the crew will take pictures of any offset location that is occupied. Photos are taken of the PC or offset point from any location that provides visual references for relocating the plot.

The first photo taken will be of the plot folder, plot sheet or image displaying the plot number. It is assumed that all following photos are associated with this plot thus allowing for easier re-naming and organization at the end of the day. This photo is not included in the zip file uploaded to MIDAS. To comply with FIA confidentially requirements do not include anything that will divulge the actual plot id or location in these plot photos. Photos cannot be used for publications or otherwise publically displayed if such information is contained in the field of view. Similarly, crew members depicted in photos should be wearing proper PPE as appropriate.

- Take one close-up of the front of the plot folder which clearly shows the plot number.
- The plot location should be marked with a brightly colored object that is clearly visible, such as a logger's tape, and make sure there are no other objects around to confuse which one is the point center.
- Take well-composed and in focus photos looking toward the occupied point(s).
- Take photos from a variety of directions and angles.
- Attempt to include landmarks, landscape and permanent objects to provide context.
- Take as many photos as needed to capture background reference objects.
- In areas lacking objects close in to the point, include a wide area for reference.

SECTION K.3 PHOTO NAMING

Photos will be named and stored with the electronic plot record. At the end of the day download the plot photos to the field laptop, and rename them with the following naming convention. Save them to the folder: C:\Midas\PlotPackets\<regionfolder>\Collected\<plotfolder>

Naming convention for plot photos:

- Start with the Midas file name
  - MidasFileName.URBAN
  - Then put an underscore and the location of the photo
  - MidasFileName0.URBAN_PC
  - MidasFileName.URBAN_OFFSET120
- Add another underscore and put a photo number, restarting the photo number at 01 for each plot
  - MidasFileName.URBAN_PC_01
  - MidasFileName.URBAN_OFFSET120_01
  - ZIP all photos for an individual plot with the Midas file name, then dot PHOTOS
  - MidasFileName.URBAN.PHOTOS.ZIP
- Place the zip file in the Plot Packets folder
  - C:\Midas\PlotPackets\PNWRS\Collected\MidasFileName.URBAN

SECTION K.4 UNABLE TO OCCUPY THE PLOT

If the plot cannot be physically occupied due to access denied, hazardous, or any other reason attempt to take a photo from a distance, and label the photo _VIEWEDFROMDISTANCE. Record an electronic plot note stating where the photo was taken from and the approximate distance to the plot.

If the plot cannot be viewed from a distance take a photo of the DOQ or scan it and follow the naming instructions above.

SECTION K.5 PHOTO TIPS

The most effective photos clearly show the offset location and unique building, landscaping, or environmental characteristics in reference to the occupied location. Below are example photos with suggestions for improvement.

Figure K.1: Brighter flagging is preferred, step back from plot center to show more of the plot area.

Figure K.2: Clearly mark the point and step back from plot center to show more of the plot area.

Figure K.3: Mark the point with bright flagging, change the perspective to include background reference objects.

Figure K.4: Step back to show more of the plot area, change the perspective to include background reference objects.

Figure K.5: A good photo that provides reference to a fixed object and appropriate scale.

Figure K.6: Change the angle to include the house for reference.

Figure K.7: A good photo of clearly marked point center and includes a permanent object as reference.

APPENDIX L 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 (QC), which includes the operational techniques used to reduce random and systematic errors, and quality assessment (QA), to evaluate the program performance with respect to established standards.

SECTION L.1 URBAN QA / QC TARGETS

The Prefield process will examine all selected plots and filter out "Office Visit" plots from the sample. The remaining selected plots will be considered "Field Visit" plots and will be sent to the field for measurement; with a national inspection goal of 10%. The following guidance will serve as a means towards reaching this goal:

- 2% Hot Checks, 4% Cold Checks, and 4% Blind Checks
- Language in Plot Contracts and / or Agreements may dictate specific QA/QC plot types to check
- All plots sent to the field make up the pool of potential check plots, including plots with or without trees and non-sampled plots
- Blind check plot selection should be random and it is preferable to preselect check plots at the start of the field season when possible
- Blind Checks, once completed, may be reused and performed as Cold Checks.
- Blind data is loaded to the DB without any adjustments made to the data collected
- Hot and Cold checks do not need to be selected at random
- When a Cold or Blind check plot has more than 15 trees and saplings, the minimum data measurement requirement calls for the remeasurement of at least 15 trees and saplings. (See "URBAN INSPECTION PROCEDURES" below for further information.)
- Production data is never changed in the DB after a blind or cold check is performed on it

SECTION L.2 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 procedural guides.

SECTION L.3 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. Two hot checks per urban crew may occur within two weeks of the start of the field season; subsequent hot checks per crew may occur as deemed necessary by the QA Inspector.

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. Cold checks occur throughout the field season, with multiple cold checks completed for each crew. 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.

SECTION L.4 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 Urban FIA field collected data. This is valuable to anyone relying on Urban 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?

SECTION L.5 BLIND PLOTS

The national Urban FIA program direction is to measure 4% of the total number of field visited plots as blind plots. Blind plots are selected randomly from the entire population of field sampled (i.e. PLOT STATUS = 1 - 5) 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 L.5.1 BLIND PLOT REQUIREMENTS

PLOTS ARE RANDOMLY SELECTED: All field plots are preselected at the beginning of the field season.

INDEPENDENT MEASUREMENT: Data are recorded independently without referring to the production crew data. Both data sets are maintained unchanged as independent samples.

BLIND PLOT MEASUREMENTS: All measurements required for the production visit are collected by the blind crew.

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 L.5.2 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, land owner access information, historical data, and any other pertinent information is provided, along with a plot sheet that is blank except for monumentation information, and any safety notes copied from the production crew.

SUBSECTION L.5.3 FIELD PROCEDURES FOR BLIND PLOTS

Once on plot, all measurements required for the production visit are collected. Use the procedures described in URBAN INSPECTION PROCEDURE and observe the following:

- Complete a new plot sheet if required by your region
- Code item QA STATUS = 6 (blind plot).
- Attempt to use the established plot, and microplot centers even if you disagree with their location. Use the production crew monumentation data to relocate them.
- Reuse production crew monumentation info and update if any measurements are incorrect.
- Collect GPS coordinates at Plot Center using regional protocol.
  - PNW urban crews will collect survey grade GPS coordinates at Plot Center in addition to recreational grade GPS coordinates.
- Make an independent determination of all condition classes and boundaries.
- Measure tree diameters at the location the blind crew deems to be correct.
- Do not measure site trees.
- Edit and transmit the blind plot file and plot packet to the MIDAS server as usual.

- For PNW, submit hard copies to the inspector. The inspector will then combine the contents of the blind and production documents into the plot folder.

SECTION L.6 URBAN INSPECTION PROCEDURE

The Urban plot is divided into quadrants during inspections. Ideally, remeasurement begins on a preselected random quadrant. This preselected quadrant is remeasured in its entirety including the microplot associated with it as shown in Figure L.1. The minimum requirement calls for the remeasurement of at least 15 trees and saplings. If fewer than 15 trees and saplings are tallied, then the next consecutive quadrant is inspected in its entirety. When 15 or more trees and saplings are tallied, no additional tree/sapling remeasurement is required.

In many cases, Urban plots have fewer than 15 trees which results in a complete remeasurement of all stems. However, if a region decides to remeasure all trees rather than just meeting the 15 tree minimum, it is important to establish that protocol in advance.

At this time, there is no MIDAS data field to indicate which quadrants were inspected. That information should be included in the general notes.

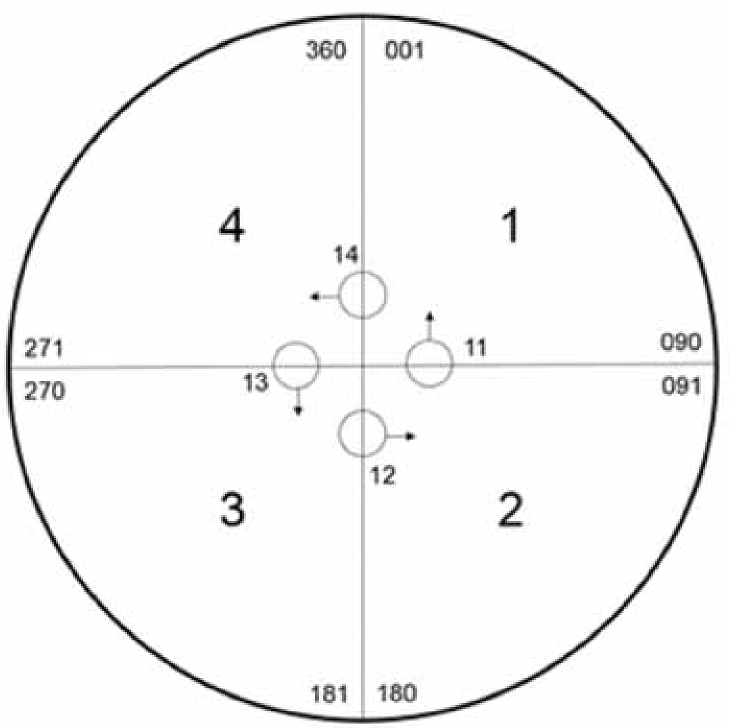


Figure L.1: The Urban plot is divided into 4 quadrants that include their respective microplots. Once remeasurement is started in any quadrant, that quadrant must be remeasured completely.

APPENDIX M URBAN FIA PALM SUPPLEMENT

Figure M.1: Desert fan palms, *Washingtonia filifera,* described as a flowering plant in the palm family (Arecaceae), and native to the southwestern U.S. and Baja California. Other common names include California fan palm and petticoat palm. Notice the dead fronds still attached beneath the live crown. (photo 49-Palms, CA, Thomas Brandeis)

We treat the following variables (in FIA terms not terms used in previous studies) on Palms.

Missing branches would be missing fronds in the live crown, perhaps from wind damage, or improper pruning. Palms often have older dead fronds clinging to the stem at the base of the live crown, these are often removed by pruning.

a. Total Length = the distance parallel to the stem of the palm from the ground to the top of the highest unfurled frond. see Figure M.2 and Figure M.3.
b. Actual Length = less than total length if the palm's crown is missing top fronds from damage or missing completely.
c. Crown Ratio = based on base of live crown, see Figure M.2 and Figure M.3.
d. Uncompacted Crown Ratio = based on base of live crown, see Figure M.2 and Figure M.3.
e. Crown width = width of widest part of crown, excluding errant fronds that extend beyond the majority.
f. Crown width 90 = widest part of crown at 90-degrees to first width measurement.
g. Dieback = as with trees, a percent of crown area counted for dead fronds in the upper and outer part of the crown. If not pruned, dead fronds tend to cling for a time under the live crown and are not part of dieback. (see Figure M.1).
h. Pruning = cut or missing fronds within the area determined to be the outline of an undisturbed live crown.
i. Defoliation = dead or missing fronds from what should be the area occupied by an undamaged live crown.

j. Missing branches = (fronds) if missing from the live crown.

Diameter - If the tree is immature, that is, the stem green not woody at 4.5-feet, or the stem is below 4.5 feet with only fronds reaching 4.5 feet, the tree would be called a seedling and not tallied unless it was on a micro plot.

Multi-stemmed palms - We are reclassifying palms that normally produce multiple stems and are typically less than 21 feet tall as shrubs (e.g. Areca spp., Figure M.4). There might be some reclassified as DRC species. Tom and Angie will be looking into this to identify the species.

Damages - Damages to palms are similar to the same damages faced by trees. One pest of palms is the giant palm-boring beetle (Dinapate wrightii), that leaves dime-sized holes in the trunk when larva emerge as adults. Another might be the rhino beetle (Oryctes rhinoceros) though it may not yet be found in California.

Root Conflicts - The roots of palms are fibrous, not woody. Though they may require enough room to grow, they will not generally damage sidewalks or streets.

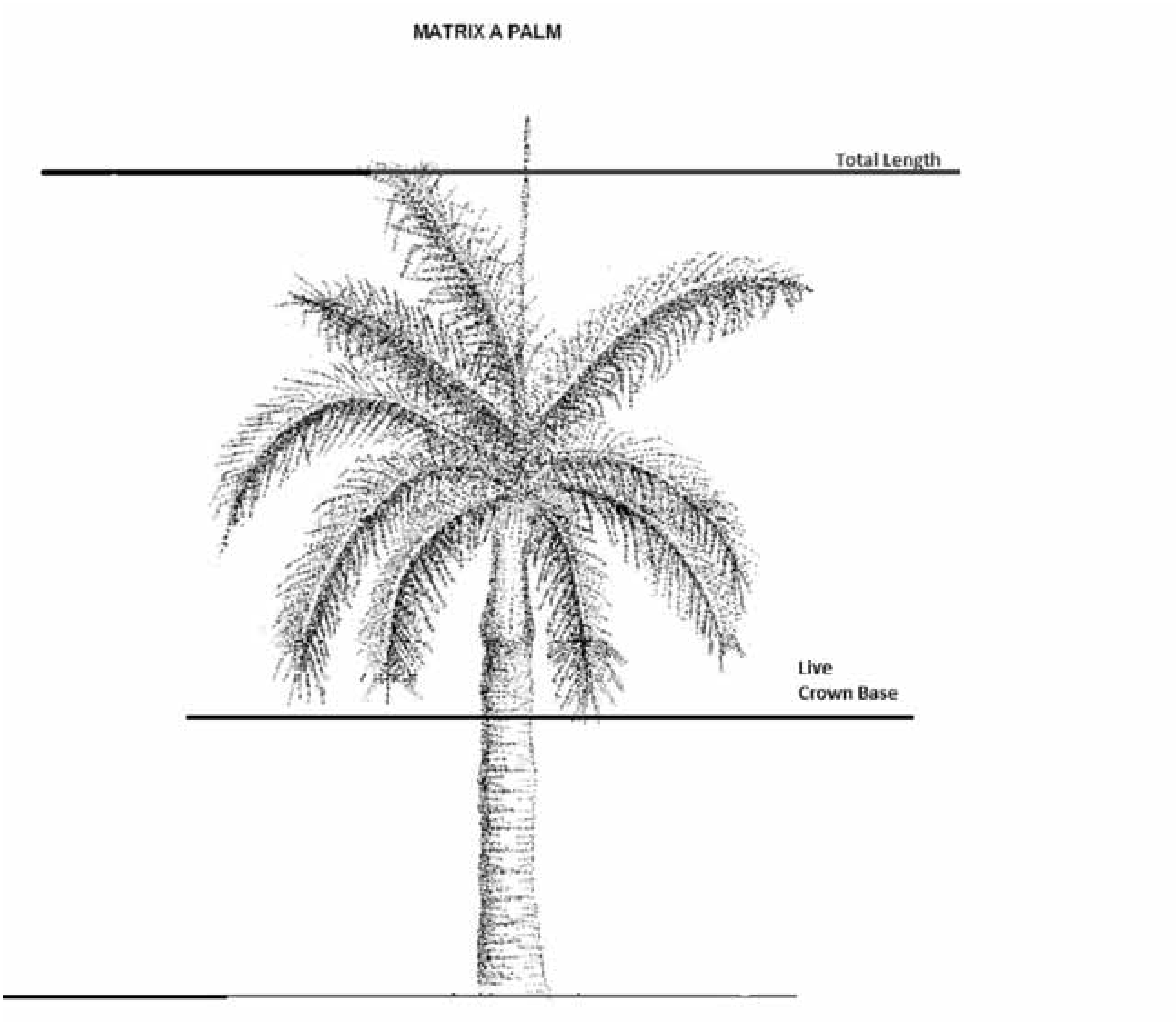


Figure M.2: SINGLE TRUNK, PINNATE ROYAL PALM

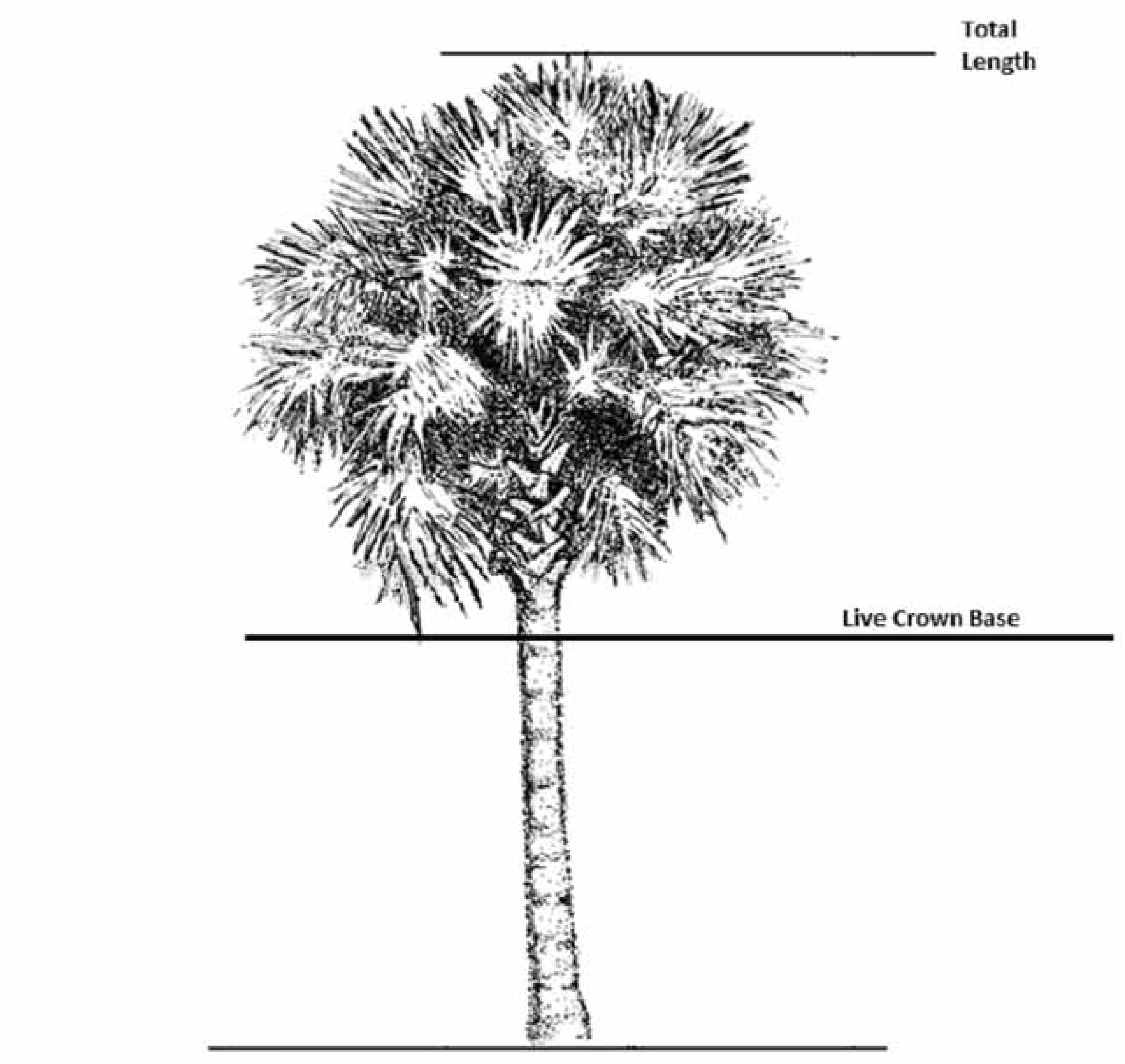


Figure M.3: SABAL PALM

Figure M.4: Acera Palm. This multi-stemmed spp will be classified by UFIA as a shrub.

APPENDIX N MANUAL CHANGES

2017 PNW Manual Section/Item Number	Section/Item Name	Description
Item 2.3.0.6	Witness Object/SP/RP Species	Updated values to FIA Tree Species Codes list.
Section 4.2	Condition Class Status Definitions	Updated values to PNW Forest Land Tree Species Codes.
Item 4.6.0.1	Artificial Regeneration Species	Update values to PNW Forest Land Tree Species Codes list.
Item 4.8.0.6	Live Canopy Cover	Updated values to PNW Forest Land Tree Species Codes list.
Item 4.8.0.7	Urban Live Canopy Cover	Updated description to reference species in the FIA Tree Species Codes list.
Item 4.8.0.8	Live Plus Missing	Updated description to reference species in the PNW Forest Land Tree Species Codes list.
Item 4.8.0.9	Urban Live Plus Missing	Updated description to reference species in the FIA Tree Species Codes list.
Item 5.1.0.13	Non-Tally Tree Present	Updated description to reference species in the FIA Tree Species Codes list.
Subsection 5.2.1	Subplot-Condition Vegetation Cover	Updated description to reference PNW Forest Land Tree Species Codes list for trees, seedlings and saplings, and FIA Tree Species Codes list for all woody vegetation.
Chapter 7	Introduction	Updated description of woodland species to reference species in the PNW Forest Land Tree Species Codes and FIA Urban Tree Species Codes lists.
Item 7.0.0.7	Urban Azimuth	Updated description of woodland species to reference species in the PNW Forest Land Tree Species Codes and FIA Urban Tree Species Codes lists.
Item 7.0.0.9	Urban Horizontal Distance	Updated description of woodland species to reference species in the PNW Forest Land Tree Species Codes and FIA Urban Tree Species Codes lists.
Item 7.0.0.14	Standing Dead	Updated description of woodland species to reference species in the FIA Tree Species Codes list.
Item 7.0.0.17	Urban Species	Updated references to include species in the PNW Forest Land Tree Species Codes and FIA Urban Tree Species Codes lists.
Section 7.1	Diameter	Updated description of woodland species to reference species in the FIA Tree Species Codes list.
Subsection 7.1.4	Diameter at Root Collar (DRC)	Updated description of woodland species to reference species in the FIA Tree Species Codes list.
Item 8.0.0.3	Urban Species	Updated description and values to reference species in the FIA Tree Species Codes and FIA Urban Tree Species Codes lists.
Item 9.2.0.8	Offset Point (Site Trees)	Removed data item, optional data item not collected at PNW.
Appendix A	FIPS Codes	Updated declinations.
Appendix C	FIA Tree Species Codes	Renamed to PNW Forestland Tree Species Codes, species list remains unchanged. Removed sentence, “This list includes all tree species tallied in the Continental United States and Alaska.”, added sentence, “This list includes all tally tree species used to define forest land conditions in Oregon, Washington, and California.”
Appendix D	FIA Urban Tree Species Codes	Removed appendix, species combined with FIA Tree Species Codes list.
Appendix G	Glossary	Accessible Forest Land - updated to reference the PNW Forest Land Tree Species Codes list. NON-TALLY TREE - removed reference to “Regional” species list, updated reference to species in the FIA Tree Species Codes list.
Appendix I	Urban Ownership	Removed appendix, PNW records ownership using NOMS.
		Applied CORE 7.1 to 7.2 changes.