FOREST INVENTORY AND ANALYSIS

NATIONAL URBAN FIA PLOT FIELD GUIDE

FIELD DATA COLLECTION PROCEDURES FOR URBAN FIA PLOTS

SRS Version 9.2

FOREST SERVICE

U.S. DEPARTMENT OF AGRICULTURE

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Note to User: URBAN FIA Field Guide 9.2 is based on the National CORE Field Guide, Version 9.2. 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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FOREST INVENTORY AND ANALYSIS
NATIONAL URBAN FIA PLOT FIELD GUIDE

FIELD DATA COLLECTION PROCEDURES FOR URBAN FIA PLOTS

Version 9.2

Version History:

6.0U	June 2014 (first version implemented Austin, Texas and Baltimore, Maryland, 2014)
6.1	October 2014 CORE field guide (revised from change management process, change proposal approved by FIA Management Team; and multiple Data Acquisition Band conference calls)
6.1U	June 2015 Baltimore Maryland, Des Moines Iowa, Houston Texas, Madison & Milwaukee Wisconsin, Providence Rhode Island, and St. Louis Missouri. First year of remeasurement plots in Austin Texas.
7.0	October 2015 CORE field guide (revised from change management process, change proposals approved by FIA Management Team; multiple Data Acquisition Band conference calls, from Portland, OR, Data Acquisition Band Meeting, Feb. 2015; and from results of a field guide reorganization team)
7.0U	May 2016 Baltimore Maryland, Des Moines Iowa, Madison & Milwaukee WI, Providence Rode Island, St. Louis Springfield & Kansas City Missouri, Burlington Vermont, Cleveland Ohio, Chicago Illinois, Rochester New York, Pittsburg Pennsylvania, and remeasure plots in Austin & Houston Texas.
7.1	October 2016 Core field guide (revised from multiple Data Acquisition Band conference calls)
7.1U	March 2017 Urban FIA field guide
7.2	October 2017 Core field guide (revised from the Pacific Northwest FIA Program's 2017 annual operations meeting and other meetings)
7.2U	March 2018 Urban FIA field guide
7.2.1U	April 2018 Urban FIA field guide
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9.1	September 2021 (revised from change management process, change proposals approved by FIA Management Team, and multiple Data Acquisition Band conference calls.)
9.1U	September 2021 Urban FIA field guide
9.2	September 2022 (revised from change management process, change proposals approved by FIA Management Team, and multiple Data Acquisition Band conference calls.)
9.2U	September 2022 Urban FIA field guide

Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

INTRODUCTION+U

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.

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.

Urban FIA data collection period:

In order to assure thorough and accurate collection of invasive plant data and to provide foliage etc. for improved tree species identification, Urban FIA plot data is intended to be collected during the leaf-on season of the area in which the plot is located. All efforts must be taken to complete data collection during this window. Should extenuating circumstances occur that cause Urban FIA plot data collection to occur outside of this window, the plot area must be snow free.

Field Guide Layout

Each section of the field guide corresponds to one of the following sections:

0	General Description / Plot Monumentation
1	Plot Level Data
2	Condition Class Data
3	Subplot Information / Subplot-Condition Data
4	Boundary References
5	Tree Measurements and Sapling Data
6	Seedling Data
7	Site Tree Information Data
9	Invasive Plants
	National Appendices
+	Urban Appendices

National URBAN FIA Field Guide	is referred to as URBAN FIA
Regional URBAN FIA Field Guide	is referred to as URBAN FIA and Regional items are highlighted.
National CORE Field Guide	is referred to as CORE
Regional CORE Field Guide	is referred to as CORE and Regional items are highlighted

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:

DATA ELEMENT NAME -- <brief variable description>

When collected: <when data element is recorded>
Field width: <X digits>
Tolerance: <range of measurement that is acceptable>
MQO: <measurement quality objective>
Values: <legal values for coded variables>

Field width designates the number of columns (or spaces) needed to properly record the data element.

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.

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

Tree Limiting Dimensions:

breast height	4.5 ft.
stump height	1.0 ft.
merchantable top	4.0 in DOB
merchantable top for woodland	1.5 in DOB
minimum conifer seedling length	0.5 ft.

minimum hardwood seedling length	1.0 ft.
seedling/sapling DBH/DRC break	1.0 in DOB
sapling/tree DBH/DRC break	5.0 in DOB

0.0+U 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 0-2U).) 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 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. There is no boundary recorded when the demarcation occurs beyond the fixed-radius plots.
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.

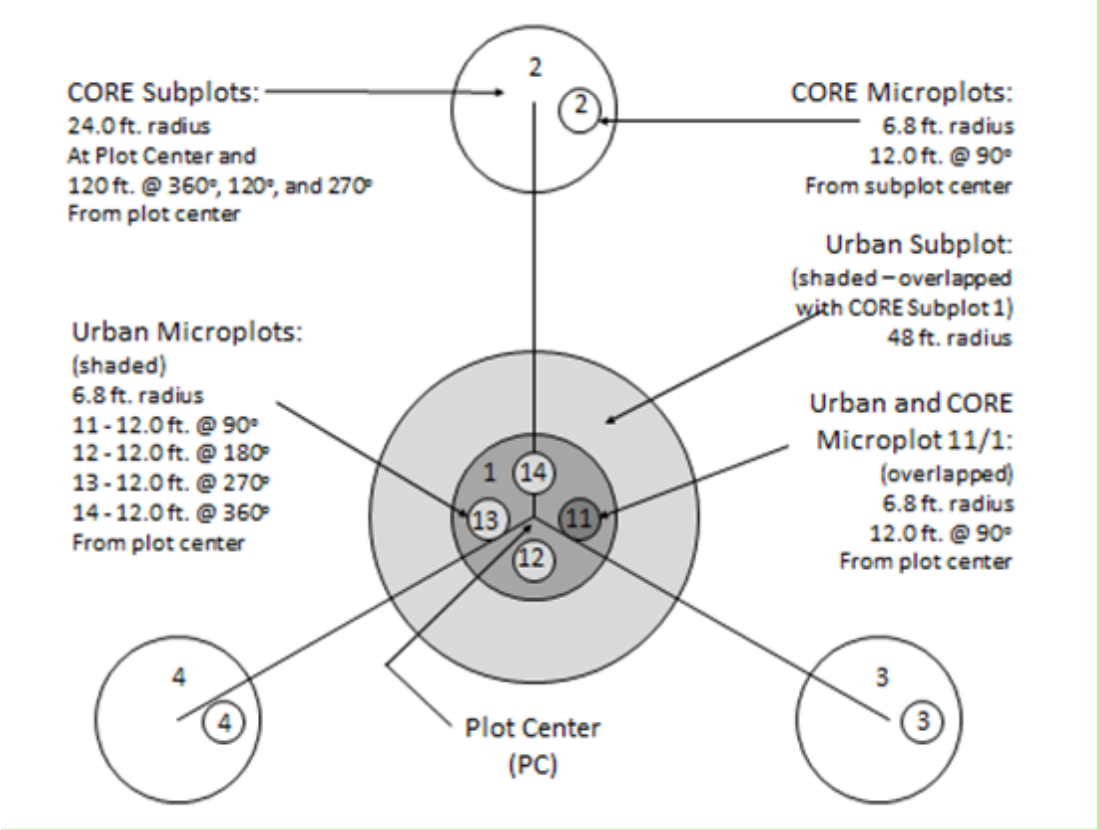


Figure 0-1U. Urban-CORE Coincidental plot diagram.

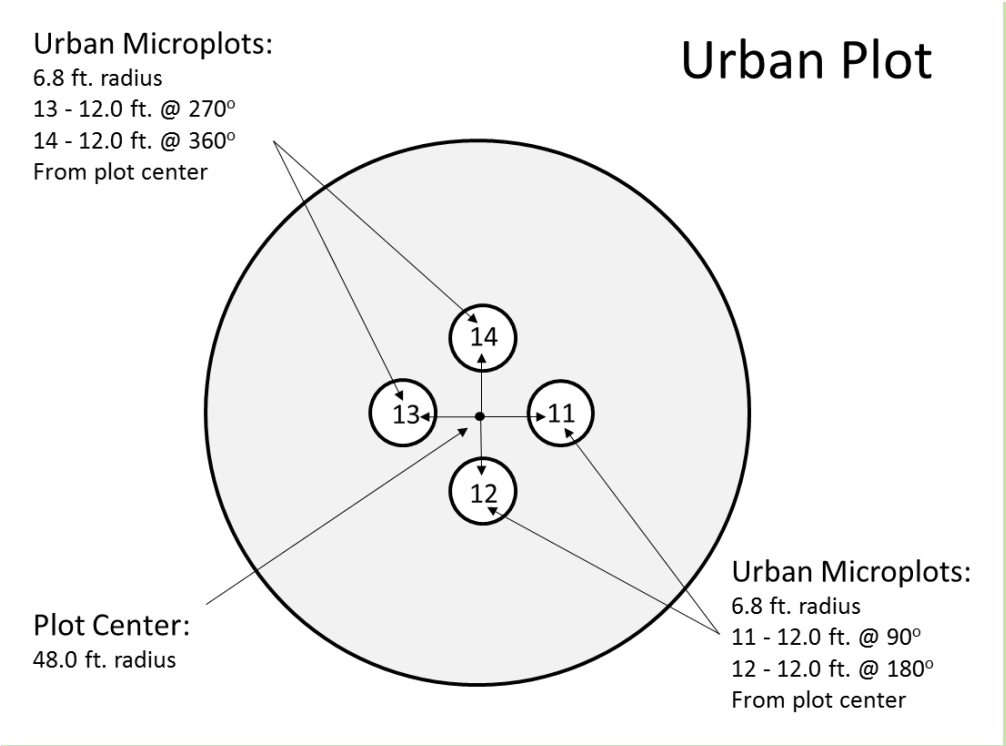


Figure 0-2U. Urban Plot diagram.

0.1+U Plot Setup
Plots will be established according to the guidelines provided in Appendix 17U. URBAN FIA Plot Establishment and Relocation Procedures.

0.2+U 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 talk to the landowner in regards to marking trees with paint, markers, scribes, or other means. In some cases owners may allow the base of a tree to be marked if the mark is out of view. If the landowner agrees, the following field procedures are 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.

All other potentially damaging procedures that may erode subplot integrity are prohibited. The following practices are specifically prohibited:

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

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

0.3U Plot Monumentation

Record plot monuments as required and add additional monuments as needed. 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, mailboxes, 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 talk to the landowner regarding marking trees with paint, markers, scribes, or other means. In some cases, owners may allow the base of a tree to be marked if the mark is out of view.

SRS NOTE: At least one starting point (SP) is required on all occupied plots.

0.3.1U MONUMENT TYPE

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

When collected: Two subplot Witness Objects, OR a Starting Point (SP) / Reference Point (RP) when no Witness Objects are possible, per occupied plot that contains an URBAN CONDITION CLASS STATUS 2, 3, or 4. Plots that contain at least one URBAN CONDITION CLASS STATUS 1 are monumented based on Regional CORE standards. Microplot Witness Objects as needed.

(URBAN OPTIONAL) Install 3 monument objects for accessible plots. A Starting Point (SP) / Reference Point (RP) is required on field plots which are not visually installed and may serve as one of the three required Monument Objects. Additionally, install 2 Witness Objects for each Subplot OFFSET point visited, or passed through. Install Monument Objects for Microplots as needed to ensure accurate remeasurement. On plots where trees are the ONLY available Monument Objects three monuments are still required but tally tree records may serve as monument object records. (It is not mandatory to copy tree records over to the monumentation records field; instead add a TREE NOTE identifying which are Monument Objects.) In such cases, a code of 3 (No Witness Object available) may be used where additional monumentation is not required.

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

0.3.2U MONUMENT NUMBER

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

0.3.3U SUBPLOT / MICROPLOT NUMBER

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	West Microplot
14	North Microplot

0.3.4U SUBPLOT / MICROPLOT OFFSET POINT

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

When collected: Record for each MONUMENT TYPE 1 or 2
Field width: 3 digits
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

0.3.5U WITNESS OBJECT / SP / RP TYPE

Indicate the type of reference used to monument the SUBPLOT / MICROPLOT. Choose a Monument 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

0.3.6U WITNESS OBJECT / SP / RP SPECIES

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 3

0.3.7U OBJECT DESCRIPTION

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: Required 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

0.3.8U MONUMENT AZIMUTH

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.

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

0.3.9U MONUMENT HORIZONTAL DISTANCE

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 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.
0140.0 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.

0.3.10U MONUMENT DBH / DRC

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 inch per 20.0 inch increment of measured diameter
For woodland species: +/- 0.2 inch per stem
MQO: At least 95% of the time
Values: 001.0 to 999.9

0.4U GPS Starting Point Variables URBAN OPTIONAL

Record the latitude and longitude of the SP / RP on the plot sheet and data recorder using the same procedures for collecting SUBPLOT center coordinates.

When collected: (URBAN OPTIONAL) MONUMENT TYPE = 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.

Each FIA unit will determine which coordinate system to use. Regions using a Geographic system will collect coordinates in Degrees, Minutes, and Seconds of Latitude and Longitude; the regions using the UTM coordinate system will collect UTM Easting, Northing, and Zone.

0.4.1U SP/RP GPS UNIT

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

When collected: MONUMENT TYPE = 1
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

- 0 GPS coordinates not collected
- 2 Models capable of field-averaging
- 3 Models capable of producing files that can be post-processed
- 4 Models not capable of field-averaging or post-processing

0.4.2U SP/RP GPS ENTRY METHOD

Identify the method used to record GPS data. If GPS data are manually entered, record 0. If GPS data are transferred electronically from the GPS receiver to the data recorder, record 1.

Upon entering a 1 the following variables are automatically populated in accordance with the GPS receiver setup in 1.19.1 (coordinates LATITUDE, LONGITUDE or UTM, GPS ELEVATION, GPS ERROR, and NUMBER OF READINGS). All other GPS variables must be populated via manual key-entry.

When collected: 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

SRS Note: GPS ENTRY METHOD is auto-populated in the PDR MIDAS Application as read-only. If the data is transferred electronically, MIDAS will populate a ‘1’ in this field. If any auto-populated GPS data is changed in any way, the value will automatically change to a ‘0’

0.4.3U SP/RP GPS DATUM

Record the acronym 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).

SRS Note: All GPS coordinates will be collected using NAD83. This variable is auto-populated in MIDAS and is not displayed.

When collected: When GPS UNIT >0
Field width: 5 characters (cccnn)
Tolerance: No errors
MQO: At least 99% of the time
Values:

NAD83 North American Datum of 1983

0.4.4U SP/RP COORDINATE SYSTEM

Record a code indicating the type of coordinate system used to obtain readings.

SRS Note: All GPS coordinates will be collected using the geographic coordinate system. This variable is auto-populated in MIDAS and is not displayed.

When collected: When GPS UNIT > 0
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

1 Geographic coordinate system
2 UTM coordinate system

0.4.5U SP/RP LATITUDE DEGREES

Record the latitude degrees of the SP / RP as determined by GPS.

When collected: When COORDINATE SYSTEM = 1
Field width: 3 digits (1st digit is + or -, last 2 digits are numeric)
Tolerance: No errors
MQO: At least 99% of the time
Values:

0.4.6U SP/RP LATITUDE MINUTES

Record the latitude minutes of the SP / RP as determined by GPS.

When collected: When COORDINATE SYSTEM = 1
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: 1 – 59

0.4.7U SP/RP LATITUDE SECONDS

Record the latitude decimal seconds of the SP / RP to the nearest hundredth place as determined by GPS.

When collected: When COORDINATE SYSTEM = 1
Field width: 4 digits
Tolerance: +/- 140 ft.
MQO: At least 99% of the time
Values: 0.00 - 59.99

0.4.8U SP/RP LONGITUDE DEGREES

Record the longitude degrees of the SP / RP as determined by GPS.

When collected: When COORDINATE SYSTEM = 1
Field width: 4 digits (1st digit is + or -, last 3 digits are numeric)
Tolerance: No errors
MQO: At least 99% of the time
Values:

0.4.9U SP/RP LONGITUDE MINUTES

Record the longitude minutes of the SP / RP as determined by GPS.

When collected: When COORDINATE SYSTEM = 1
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: 1 – 59

0.4.10U SP/RP LONGITUDE SECONDS

Record the longitude decimal seconds of the SP / RP to the nearest hundredth place as determined by GPS.

When collected: When COORDINATE SYSTEM = 1
Field width: 4 digits
Tolerance: +/- 140 ft.
MQO: At least 99% of the time
Values: 0.00 – 59.99

0.4.11U SP/RP UTM ZONE (URBAN OPTIONAL)

SRS Note: This variable is not collected in our region.

0.4.12U SP/RP EASTING (X) UTM (URBAN OPTIONAL)

SRS Note: This variable is not collected in our region.

0.4.13U SP/RP NORTHING (Y) UTM (URBAN OPTIONAL)

SRS Note: This variable is not collected in our region.

1.0+U PLOT LEVEL DATA

All variables listed in Section 1.0 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.

1.0.1U CYCLE

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

1.0.2U SUB-CYCLE

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

1.1 STATE

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 1

1.2 COUNTY

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 1

1.3 PLOT NUMBER

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).

SRS Note: Contact the Knoxville office to obtain a replacement plot number when SAMPLE KIND = 3. Two electronic data files will be required – one with the original plot number, defined as a 'Lost Plot' and one with the new number, defined as a 'Replacement Plot'.

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

1.4+U URBAN PLOT STATUS

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 nonforest land condition present on subplot, i.e. subplot is either census and / or noncensus water
4 Nonsampled -- ~~possibility of forest land~~

1.5 NONFOREST SAMPLING STATUS Not Collected in URBAN FIA

1.6 NONFOREST PLOT STATUS Not Collected in URBAN FIA

1.7+U URBAN PLOT NONSAMPLED REASON

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.

1.8 NONFOREST PLOT NONSAMPLED REASON Not Collected in URBAN FIA

1.9 SUBPLOTS EXAMINED Not Collected in URBAN FIA

1.10+U SAMPLE KIND

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.

1.11+U PREVIOUS PLOT NUMBER (URBAN OPTIONAL Collected in NRS, PNW, SRS)
Record the identification number for the plot that is being replaced.

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

1.12 FIELD GUIDE VERSION Not Collected in URBAN FIA

1.13 Current Date
Record the year, month, and day that the current plot visit was completed as described in 1.13.1 – 1.13.3.

1.13.1 YEAR
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

1.13.2 MONTH
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

1.13.3 DAY
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

1.14 DECLINATION (URBAN OPTIONAL Collected in PNW)
SRS Note: This variable is not collected in our region.

1.15+U HORIZONTAL DISTANCE TO IMPROVED ROAD
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.

SRS Note: Public roads maintained by federal, state, county or municipalities are improved roads; however, these roads may or may not be passable at all times of the year. Maintenance on public road systems is periodic due to funding and the degree of maintenance varies by the public authority. Road systems maintained by public agencies (e.g., NFS, state forests, etc.) may be considered improved if they meet the qualifications. Maintenance on these roads is periodic as well due to funding.

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

1.16+U WATER ON PLOT
Record the water source that has the greatest impact on the area within the accessible forest/nonforest land portion of subplot. 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 been 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 -- e.g., ephemeral and intermittent; can be seasonal, but may also have water present after a weather event.
5 Flood zones – evidence of flooding when bodies of water exceed their natural banks
9 Other temporary water – specify in plot notes (includes Springs)

SRS Note: Permanent streams and water may or may not have water present during periods of extreme drought. Crews should do their best to code this variable as it would be found during normal precipitation year. Topographic maps can be consulted to assist in this assessment.

1.17 QA STATUS

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 (QA crew reviews collected data while checking plot; may be done with or without field crew present)
3 Reference plot (off grid – SRS QA certification plot answer key – paper tally only)
4 Training/practice plot (off grid – SRS QA certification plot answer key – paper tally only)
5 Botched plot file (disregard during data processing)
6 Blind check
7 Hot check (production plot)

1.18 CREW NUMBER

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). Noncertified crew members (such as temporary assistants, volunteers, etc.) may be recorded using 330991, 330992, 330993 or 330994 if they do not have a cruiser number assigned.

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

1.18.1U QA SCORE (URBAN OPTIONAL Collected in NRS)

SRS Note: This variable is not collected in our region.

1.18.1.1U QA SCORE CREW NUMBER (URBAN OPTIONAL Collected in NRS)

SRS Note: This variable is not collected in our region.

1.19 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.

1.19.1 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.

Each FIA unit will determine which coordinate system to use. Regions using a Geographic system will collect coordinates in Degrees, Minutes, and Seconds of Latitude and Longitude; the regions using the UTM coordinate system will collect UTM Easting, Northing, and Zone.

1.19.2 Collecting Readings

Critical GPS settings such as maximum PDOP, maximum EHE, minimum satellite elevation, minimum SNR, and number of readings to average will be determined by each region based on recommendations from the Mobile Geospatial Technology Advisory Group (MGTAG) where available. These may be collected in a file for post-processing or may be averaged by the GPS unit.

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 Sections 1.19.14 and 1.19.15.

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 Sections 1.19.14 and 1.19.15.

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

1.19.3 GPS UNIT

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

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
- 2 Models capable of field-averaging
- 3 Models capable of producing files that can be post-processed

4 Models not capable of field-averaging or post-processing

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

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

1.19.5 GPS ENTRY METHOD
Identify the method used to record GPS data. If GPS data are manually entered, record 0. If GPS data are transferred electronically from the GPS receiver to the data recorder, record 1.

Upon entering a 1 the following variables are automatically populated in accordance with the GPS receiver setup in 1.19.1 (coordinates LATITUDE, LONGITUDE or UTM, GPS ELEVATION, GPS ERROR, and NUMBER OF READINGS). All other GPS variables must be populated via manual key-entry.

When collected: 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

1.19.6 GPS DATUM
Record the acronym 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 >0
Field width: 5 characters (cccnn)
Tolerance: No errors
MQO: At least 99% of the time
Values: NAD83 North American Datum of 1983

1.19.7 COORDINATE SYSTEM
Record a code indicating the type of coordinate system used to obtain readings.

When collected: When GPS UNIT > 0
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

1 Geographic coordinate system
2 UTM coordinate system

1.19.8 Latitude
Record the latitude of the plot center to the nearest hundredth second, as determined by GPS.

Note: The following can be customized at the region level (e.g., decimal minutes to the nearest thousandth) as long as the final results recorded are within the specified tolerance to the nearest hundredth of a second or +/- 1.01 ft.

1.19.8.1 LATITUDE DEGREES

Record the latitude degrees of the plot center as determined by GPS.

When collected: When COORDINATE SYSTEM = 1
Field width: 3 digits (1st digit is + or -, last 2 digits are numeric)
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: 0-90

1.19.8.2 LATITUDE MINUTES

Record the latitude minutes of the plot center as determined by GPS.

When collected: When COORDINATE SYSTEM = 1
Field width: 2 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: 0 – 59

1.19.8.3 LATITUDE SECONDS

Record the latitude decimal seconds of the plot center to the nearest hundredth place as determined by GPS.

When collected: When COORDINATE SYSTEM = 1
Field width: 4 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: 0.00 - 59.99

1.19.9 Longitude

Record the longitude of the plot center, to the nearest hundredth second, as determined by GPS.

Note: The following can be customized at the region level (e.g., decimal minutes to the nearest thousandth) as long as the final results recorded are within the specified tolerance to the nearest hundredth of a second or +/- 1.01 ft.

1.19.9.1 LONGITUDE DEGREES

Record the longitude degrees of the plot center as determined by GPS.

When collected: When COORDINATE SYSTEM = 1
Field width: 4 digits (1st digit is + or -, last 3 digits are numeric)
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: 1-180

1.19.9.2 LONGITUDE MINUTES

Record the longitude minutes of the plot center as determined by GPS.

When collected: When COORDINATE SYSTEM = 1
Field width: 2 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: 0 – 59

1.19.9.3 LONGITUDE SECONDS

Record the longitude decimal seconds of the plot center to the nearest hundredth place as determined by GPS.

When collected: When COORDINATE SYSTEM = 1
Field width: 4 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: 0.00 – 59.99

1.19.10+U UTM ZONE (URBAN OPTIONAL Collected in PNW)

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

When collected: PNW When COORDINATE SYSTEM = 2
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.

1.19.11+U EASTING (X) UTM (URBAN OPTIONAL Collected in PNW)

Record the Easting coordinate of the plot center as determined by GPS.

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

1.19.12+U NORTHING (Y) UTM (URBAN OPTIONAL Collected in PNW)
Record the Northing coordinate of the plot center as determined by GPS.

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

1.19.13 Correction for "Offset" GPS Location
As described in Section 1.19.2, coordinates may be collected at a location other than the plot center (an “offset” location). If the GPS unit is capable of calculating plot center coordinates then AZIMUTH TO PLOT CENTER and DISTANCE TO PLOT CENTER both equal 000.

1.19.14 AZIMUTH TO PLOT CENTER
Record the azimuth from the location where coordinates were collected to actual plot center. If coordinates are collected at plot center or are corrected in the field to plot center, record 000.

When collected: When GPS UNIT = 2, 3 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

1.19.15 DISTANCE TO PLOT CENTER
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 Section 1.19.2, if a laser range finder is used to determine DISTANCE TO PLOT CENTER, offset locations may be up to 999 feet from the plot center. If a range finder is not used, the offset location must be within 200 feet.

When collected: When GPS UNIT = 2, 3 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

1.19.15.1U COORDINATE DIFFERENCE

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

1.19.16 GPS ELEVATION

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

When collected: When GPS UNIT = 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

1.19.17 GPS ERROR

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

1.19.18 NUMBER OF READINGS

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

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

1.19.19 GPS FILE NAME (CORE OPTIONAL) Not Collected in URBAN FIA

1.20 MACROPLOT BREAKPOINT DIAMETER (CORE OPTIONAL) Not Collected in URBAN FIA

1.21 PLOT NOTES

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

When collected: All plots
Field width: Unlimited alphanumeric character field
Tolerance: N/A
MQO: N/A
Values: English language words, phrases and numbers

1.21.1U SAFETY

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 GPS coverage or cellular reception in the 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)

1.21.1.1U SAFETY DESCRIPTION

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.

1.22 P2 Vegetation Sampling Options – Plot-Level Variables Not Collected in URBAN FIA

1.23+U INVASIVE PLANT SAMPLING STATUS (Plot-level variable)
Determines whether invasive plant data will be recorded on the plot and the land class(es) on which it will be recorded.

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)

1.24 INVASIVE PLANT SPECIMEN COLLECTION RULE (Plot-level variable)
Downloaded code to indicate if collection of specimens of unknown invasive species is required.

SRS Note: Specimens are not currently collected in SRS. If an unknown species is encountered and is suspected of being invasive, contact the regional invasive coordinator for identification assistance. This variable will be autofilled and hidden in the data recorder.

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

1.25 Plot-Level Variables for DWM Protocol Not Collected in URBAN FIA

1.26 SRS GPS STATUS
Record the code to describe the status of the GPS coordinates collected.

When collected: All plots
Field width: 1 digit
Tolerance: No errors
MQO: At least 90% of the time
Values:

Current GPS coordinates collected normally (includes instances when coordinates cannot be collected)
2 Current GPS coordinates range calculated
9 Plot remotely sampled – no field visit

1.27 SRS PAST DATE

Record the year, month, and day that the current plot was last inventoried in the same format as

CURRENT DATE.

1.27.1 SRS PREVIOUS YEAR

Record the year that the plot was last inventoried.

When collected: SAMPLE KIND = 2
Field width: 4 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: varies with state or territory

1.27.2 SRS PREVIOUS MONTH

Record the month that the plot was last inventoried.

When collected: SAMPLE KIND = 2
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

1.27.3 SRS PREVIOUS DAY

Record the day of the month that the plot was last inventoried.

When collected: SAMPLE KIND = 2
Field width: 2 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: 01 to 31

2.0+U CONDITION CLASS

The Urban Forest Inventory and Analysis (FIA) plot is one subplot and four microplots arranged 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 (contains) at least one condition class: the condition class present at Plot Center (PC, the center of subplot 1). Condition class attributes describe the portion of the condition within the Area of Observation and provide the ability to analyze and compare landscape and forest characteristics such as structure, composition, disturbance, and ownership.

Area of Observation (AOO) for a condition:

The acre portion of the condition that is evaluated to describe the condition class attributes using the following steps:

1. Follow the condition delineation procedures to first determine how many conditions the plot contains.
2. Once this has been completed, determine the shape of the AOO following the procedures below for a Single, Multi, or Split condition plot based on the number of conditions recognized on the plot.
3. Follow the specific guidance associated with each individual condition attribute while describing them within the AOO.

- Single condition plot: The AOO is defined by the area contained within 117.7-foot radius circle originating from subplot center, the area of which is equal to one acre. Ignore any area within the AOO that contains a condition other than the one located at Plot Center (PC). See Figure 2-1U.
- Multi-condition plot: The AOO is defined by the nearest acre shape in relation to Plot Center (PC) while including all portions of the subplot in the condition being evaluated. See Figure 2-2U and Figure 2-3U.
- Split condition plot: A split condition plot is a special case of a multi-condition plot. A split condition plot occurs when one condition (condition 2 for example) is split into two or more parts by another condition (condition 1 for example). This results in the need for two or more separate shapes to be created (each proportionally sized to the part of the condition it is representing). Combined, these shapes serve as the AOO. Each shape must include the portion of the subplot in the condition being evaluated, be closest to PC, and remain in the condition being evaluated. Combined these shapes should equal an acre. There may be situations where this is not always possible. In such cases, the goal is to visualize a combined acre represented by the combined area of these shapes within condition 1. See Figure 2-4U.
- Nonsampled Conditions: Nonsampled conditions are treated the same way as sampled conditions with the following exceptions. (1) Estimate required condition attributes from the image and (2) If there appear to be multiple adjoined potential CONDITION CLASS STATUS 1 conditions on a plot, all of which are nonsampled, use the Single condition plot AOO design; (3) If a plot contains both CONDITION CLASS STATUS 5 and one or more additional CONDITION CLASS STATUS 2, 3, or 4 conditions, use the multiple-condition plot AOO design.

For conditions that are less than an acre, such as a small developed area, the AOO is defined by the boundaries of the condition itself. In all cases the AOO must remain entirely within the

condition being evaluated. Canopy cover checks and TOTAL STEMS counts do not take place within the AOO. They are evaluated within the Canopy cover sample area.

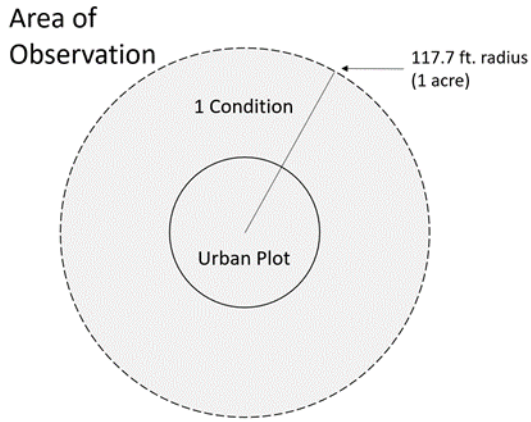


Figure 2-1U. Single condition plot.

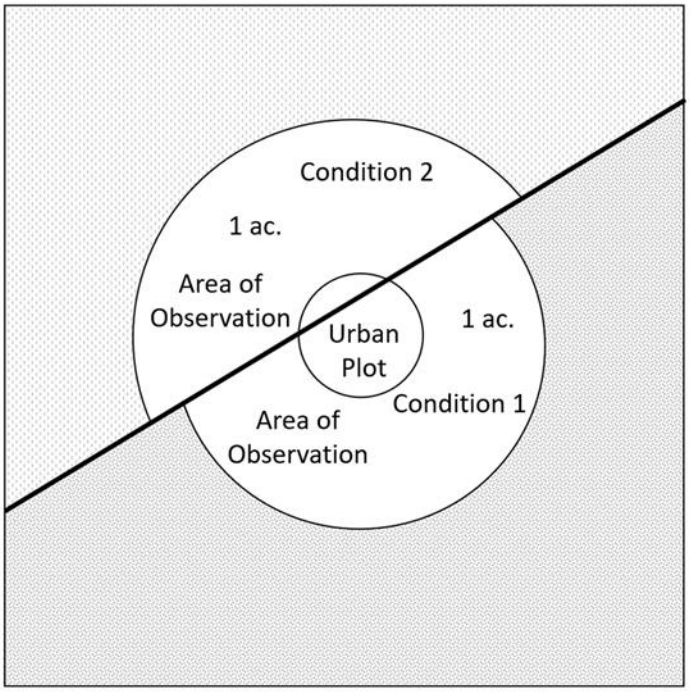


Figure 2-2U. Multi-condition plot.

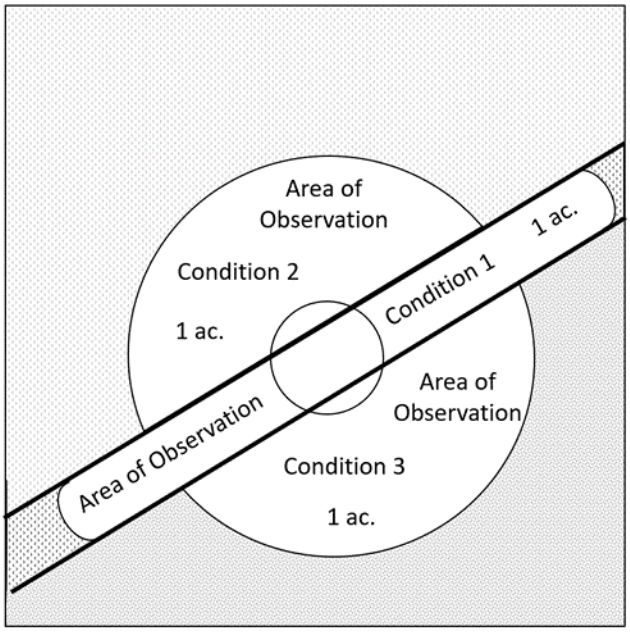


Figure 2-3U. Another multi-condition plot.

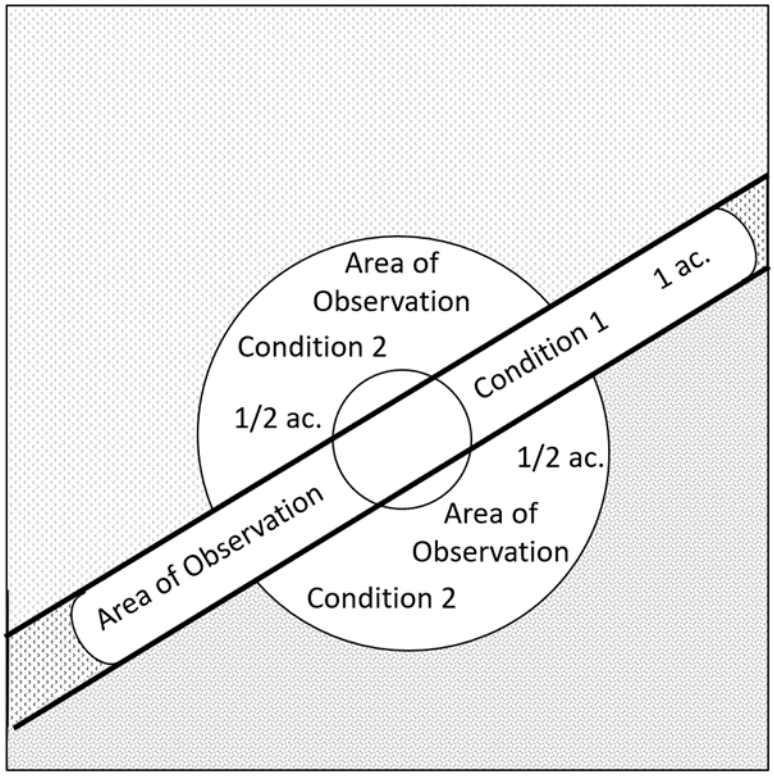


Figure 2-4U. Split condition plot.

2.1 Determination of Condition Class

2.1.1+U Step 1: Recognize the URBAN CONDITION CLASS STATUS on the subplot

Recognize and delineate (map) between all CONDITION CLASS STATUSes on each subplot.

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 STATUS. 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.

2.1.2 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 (see Section 2.3.1).

2.1.3+U Step 3: Further subdivide accessible Nonforest Land by 3 delineation variables

Size and width minimums described in 2.4 apply to condition delineation for both accessible forest land and accessible nonforest land. 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 2.5.29+U, URBAN NONFOREST LAND USE

This process starts with a CONDITION CLASS STATUS = 2 condition that is then subdivided first by RESERVED STATUS then OWNER GROUP. Each resulting condition must meet the minimum size requirement of 120 feet and one acre. Each of these resulting conditions will be

further subdivided by PRESENT NONFOREST LAND USE, consistent with their respective size requirements.

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.

2.2+U Condition Class Status Definitions

1+U 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 or managed grazing where direct human intervention is actively suppressing regeneration.

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, nonforested marsh or mining) is reverting to forest naturally, only the live cover criterion applies.

SRS Note: When evaluating a condition for the 10 % canopy cover threshold required for forest land, evaluate the condition based on observations on the day the plot is visited without taking into account how the land may be used in the future.

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.

SRS Note: See Regional CORE Field Guide 9.0 section 2.4 for more guidance dealing with strips less than 120 feet wide.

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 2-5), using the class criteria above.

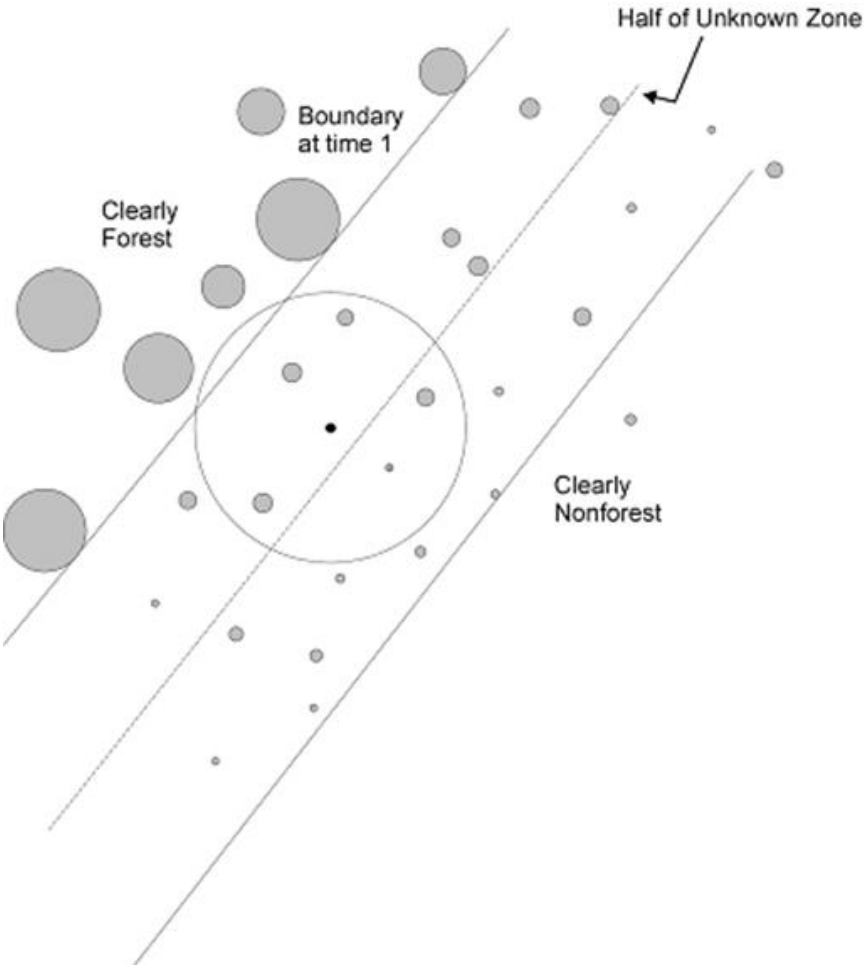


Figure 2-5. Example of classifying the condition class of the subplot in a transition zone with forest/nonforest encroachment.

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. In this example, the entire subplot would be classified as forest.

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 2-6, Figure 2-7, and Figure 2-8. 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.

Urban Note: The definitional boundary concepts described in Figure 2-6 and Figure 2-7 are not limited to Forest / Nonforest boundaries; they apply to any two conditions. In addition, they may also be applied to SRS regional minimum width situations when dealing with narrow strips at least 30 feet in width (see Exception 1, SRS Figure A)

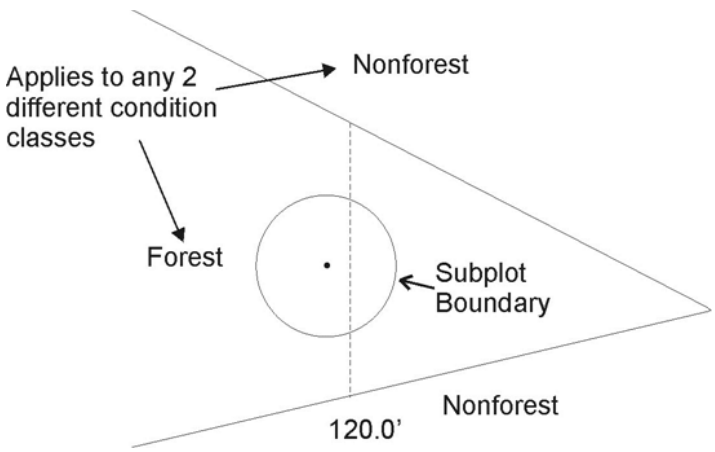


Figure 2-6. Forest condition narrows within a nonforest land condition. Examine the location of the subplot center in reference to the approximate line where the forest narrows to 120.0/30.0 ft wide. In this example, the entire subplot is classified as forest.

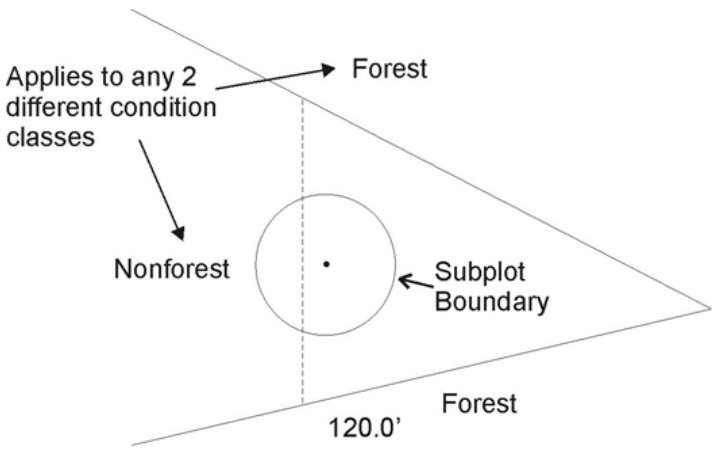


Figure 2-7. Nonforest land condition narrows within a forest condition. Examine the location of the subplot center in reference to the approximate line where the nonforest narrows to 120.0/30.0 ft wide. In this example, the entire subplot is classified as forest.

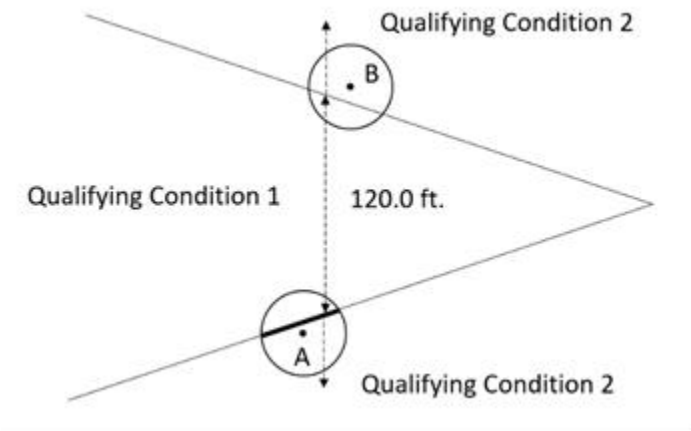


Figure 2-8. Subplot A's center falls within qualifying condition 2. Since subplot A's center falls where condition 1 is greater than or equal to 120/30 ft wide, delineate a separate condition on the subplot. If, as in the case of subplot B, subplot center falls within a qualifying second condition but condition 1 is less than 120 ft wide, recognize only the condition at subplot center and do not delineate separate conditions or map boundaries on the subplot.

2+U 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 section 2.5.29+U 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.

SRS Note: Non-linear Noncensus and Census water must maintain a minimum width of 120 ft.

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).

SRS Note: The minimum required dimensions for Condition Class Status 3 and 4 are measured to the mean high water mark and these minimum dimensions must be maintained over the entirety of the condition.

5+U Nonsampled, ~~possibility of forest~~
See section 2.4.3 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 nonsampled (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 nonsampled.
- 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 nonsampled. (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.

2.3 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.

2.3.1+U Forest Land

For each condition class classified as accessible forest land, a classification is required for each required condition-level variable. The following are the only ones that force delineation of a separate condition.

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

All other condition-level variables are ancillary; do not delineate new condition classes based on any of the ancillary variables.

2.3.2+U Urban Nonforest Land

For each condition class classified as nonforest land, a classification is required for a subset of the condition class attributes. The following are the only ones that force delineation of a separate condition.

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

All other condition-level variables are ancillary; do not delineate new condition classes based on any of the ancillary variables.

2.4+U 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 section 5.

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 section 5.

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 (**Error! Reference source not found.**).

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

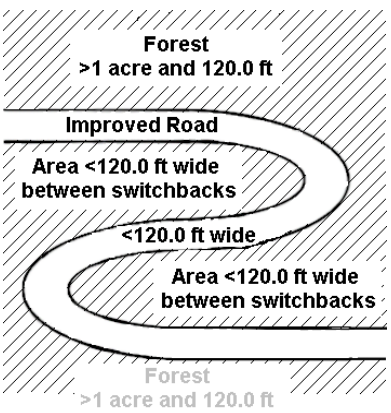
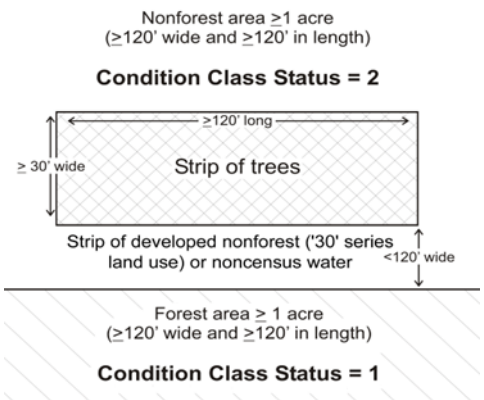


Figure 2-9. Example of a switchback road. All the cross-hatched area is forest and the improved road is a nonforest



SRS Figure A. Example of a forest condition crossing a nonforest strip.

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.

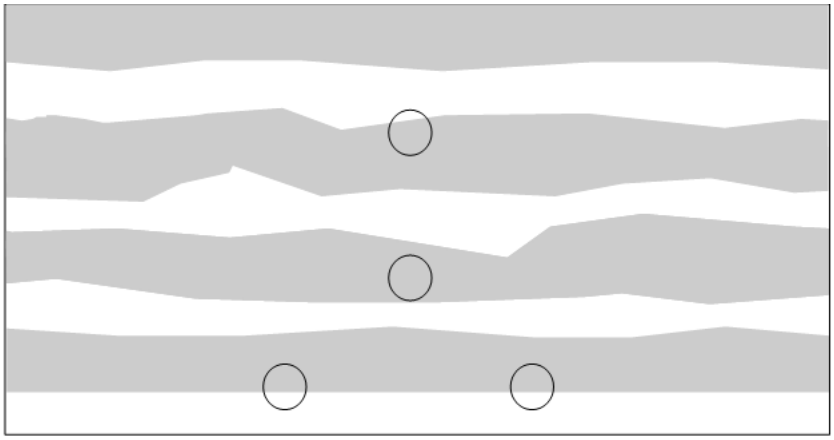
c Developments:
structures and the maintained area next to a structure, all less than 1.0 acre in size and surrounded by forest land. Examples of developments are houses or trailers on very small lots, communication installations in a small cleared area within forest land, and barns and sheds.

SRS Special Situation: When a forested area is divided either by one of the situations listed above or by noncensus water, the remnant strip of trees may be considered forestland if it meets

the minimum criteria. In order for a narrow strip or sliver to be considered, it must be separated by either noncensus water or a 30-series nonforest land use (creating a new defined condition) that is less than 120 feet wide. It must also be at least 120 feet in length and maintain a minimum 30 foot width throughout the entire strip. If the separating nonforest strip is not in the '30' series land use or land use 92 (noncensus water) and the separation is between 30 and 119 feet in width, the alternating strip rule applies (see exception 2b). If the separating nonforest condition is greater than 119 feet, the strip of trees is included as part of the surrounding nonforest condition. If the separation is less than 30 feet, the nonforest strip is included with the surrounding forest condition. If any of these criteria are not met, then the strip is either included with the surrounding nonforest land use or the alternating strip rule (exception 2b on page 46) may be applied.

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.



SRS Figure B. Entire plot area consists of strips of forest and nonforest land. None of the strips meets the 120 ft minimum width to qualify as a separate land use and the nonforest strips are not developed nonforest conditions. In this example, the entire area is classified as forest since the sum of the areas occupied by the forest land use exceeds the sum of the nonforested area in this example.

b Two alternating strips:
For two alternating strips of forest and nonforest between two qualifying areas of nonforest land and forest land, see Figure 2-9. Figure 2-9 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.

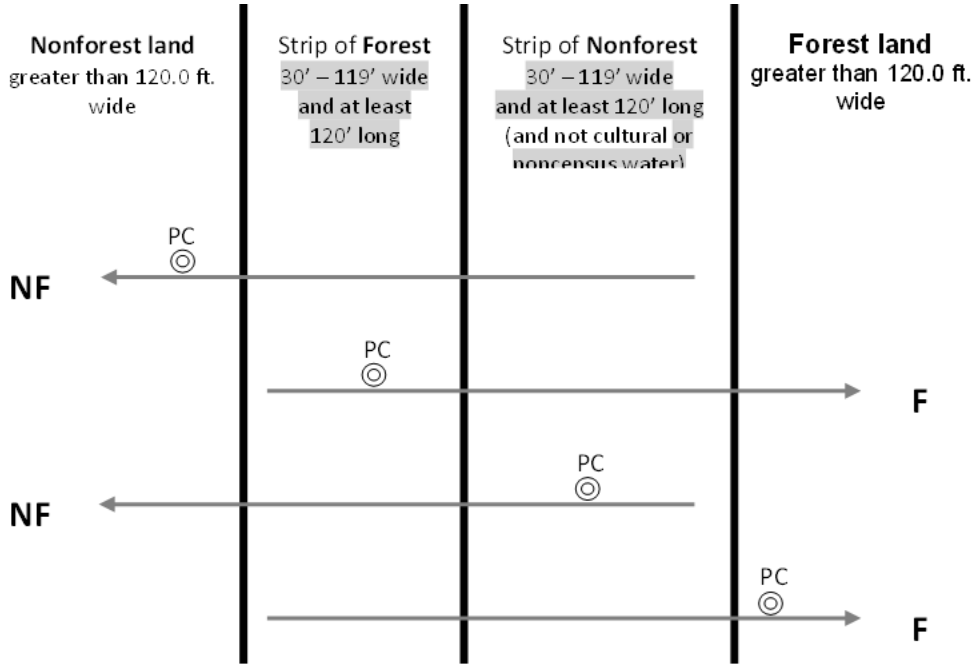


Figure 2-9. Example of alternating strips of forested and nonforested conditions. PC is the plot center (center of subplot 1).

3 The 120.0-foot minimum width for delineation does not apply when a corner angle is 90 degrees or greater (Figure 2-10).

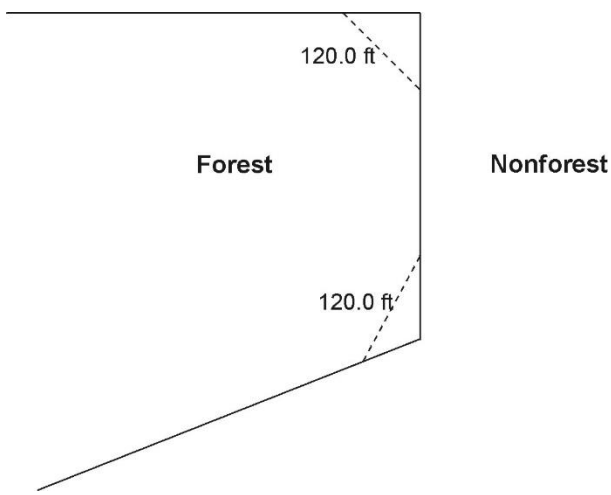
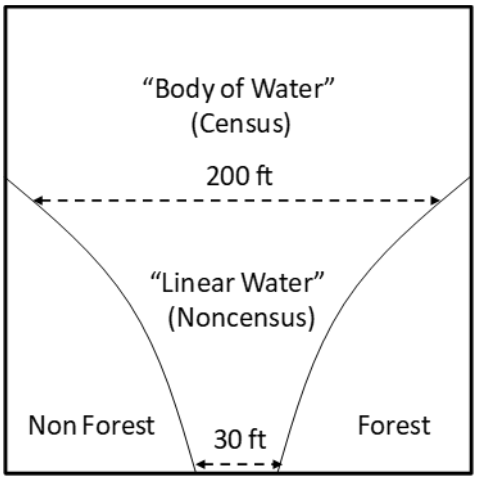


Figure 2-10. Illustration of the 90 degree corner rule. The dotted lines do not create nonforest land conditions.

4 Linear water features:
natural water features that are linear in shape such as streams and rivers. A linear water feature must meet the definition for census or noncensus water to be 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.



SRS Figure C. Although dimensional requirements for bodies of water and linear features are distinct, there may be instances where a linear Noncensus Water feature (or narrow finger of a body of water) feeds into a body of Census or Noncensus Water. In these cases, the linear feature will be mapped only if it meets the 1 acre size requirement, excluding any acreage that otherwise would qualify as Census or Noncensus water for the body. Specifically, only the acreage between the 30' minimum width for linear features and the 120' minimum width for bodies of water would be considered.

If the minimum acreage is not met, the linear feature (or narrow finger of a body of water) is considered part of the adjacent Nonforest condition. In a similar context, if Accessible Forestland borders both sides of the linear feature that does not meet the minimum acreage, the linear feature is considered part of the surrounding Forestland.

5 Nonsampled conditions
are delineated as a separate condition class regardless of size.

2.4.1 CONDITION CLASS NUMBER
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

2.4.2+U URBAN CONDITION CLASS STATUS
Record the code that describes the sampling status of the condition class. The instructions in Sections 2.3 and 2.4 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~~

2.4.3 FOREST LAND CONDITION STATUS CHANGE – New Forest Condition or Loss of Previous Forest Condition

Field protocol change, physical change on the ground, and crew error can all have an effect on new forested conditions (not originating from a previous forested condition) moving onto a plot or previously forested conditions being reclassified to a condition status other than forest land between field visits. The purpose of this variable is to identify what caused:

1. A new forested condition (not originating from a previous forested condition) to be recognized on the plot,

And / Or

2. A previously forested condition is no longer recognized as forest land on the plot

Examples:

At time 1 a condition is recognized as idle farm land and at time 2 that same condition now meets the forest land definition due to the additional canopy cover provided by a new species that has been added to the species list (such as Bradford pear) between visits. This new forested condition would be coded as FOREST LAND CONDITION STATUS CHANGE = 3.

At time 1 a 100 x 363-foot block of tally trees (with 10% canopy cover) outlined by a 30-foot strip of dense non-tally buckthorn was considered an inclusion within a condition recognized as crop land. Between visits, buckthorn was added to the species list. At time 2, the combined area of the initial block of trees and the strip of buckthorn met the forestland definition, causing the previous nonforest condition to be reclassified as a new forested condition. The resulting forested condition would be coded as FOREST LAND CONDITION STATUS CHANGE = 3.

A forested condition at time 1 could potentially be reclassified to a nonforest land use at time 2 if a species that contributed over 90% of the condition's canopy cover was dropped from the species list between visits. The resulting nonforest condition would be coded as FOREST LAND CONDITION STATUS CHANGE = 3.

If the construction of a new home caused a previously designated forested condition (a small woodlot) to drop below the forest land minimum size requirement, the resulting nonforest condition would be coded as FOREST LAND CONDITION STATUS CHANGE = 1.

All forested conditions that remain forested between visits 1 and 2 (regardless if their area has expanded or contracted on the plot) would be coded as FOREST LAND CONDITION STATUS CHANGE = 0, as would new CONDITION CLASS STATUS = 2, 3, or 4 conditions that are NOT the direct result of a previous forest condition no longer qualifying as forest land. For example, if a new road was established within a forested condition, and in the process eliminated the forested condition from the plot, it would be coded as FOREST LAND CONDITION STATUS CHANGE = 1. If the previous forested condition remains on the plot and is now just smaller in area the due to the addition of the road the FOREST LAND CONDITION STATUS CHANGE = 0.

When collected: CONDITION CLASS STATUS = 1, 2, 3, or 4 on remeasured plots
Field width: 1 digit
Tolerance: No errors
MQO: At least 90% of the time
Values:

- 0 No change – the condition is not a new forested condition (not originating from a previous forested condition) nor is it a new condition that is the result of a previously forested condition no longer qualifying as such, or the condition was previously not field visited or was previously classified as non-sampled.
- 1 Physical changes - condition status changed due to actual on-the-ground physical change either natural or human-caused.
- 2 Crew error - condition status changed due to a previous crew's error.
- 3 Procedural changes – condition status changed due to a change in variable definition or procedures.

2.4.4+U URBAN CONDITION NONSAMPLED REASON

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 2.2+U, 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 2.2+U, 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.

2.4.5 NONFOREST CONDITION CLASS STATUS Not Collected in URBAN FIA

2.4.6 NONFOREST CONDITION NONSAMPLED REASON Not Collected in URBAN FIA

2.5a 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 2.1 applies when delineating contrasting forest condition classes. Specific criteria apply for each of the six attributes and are documented by attribute in 2.5.1+U to 2.5.6. “Stands” are defined by plurality of stocking / canopy cover for all live trees, saplings, and seedlings that are not overtopped within the Area of Observation.

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.

General instructions for delineating condition classes within accessible forest lands:

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 Section 4.0+U.

2+U 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 Not Collected in URBAN FIA

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. Figure 2-11 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 2-11U to Figure 2-17 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.

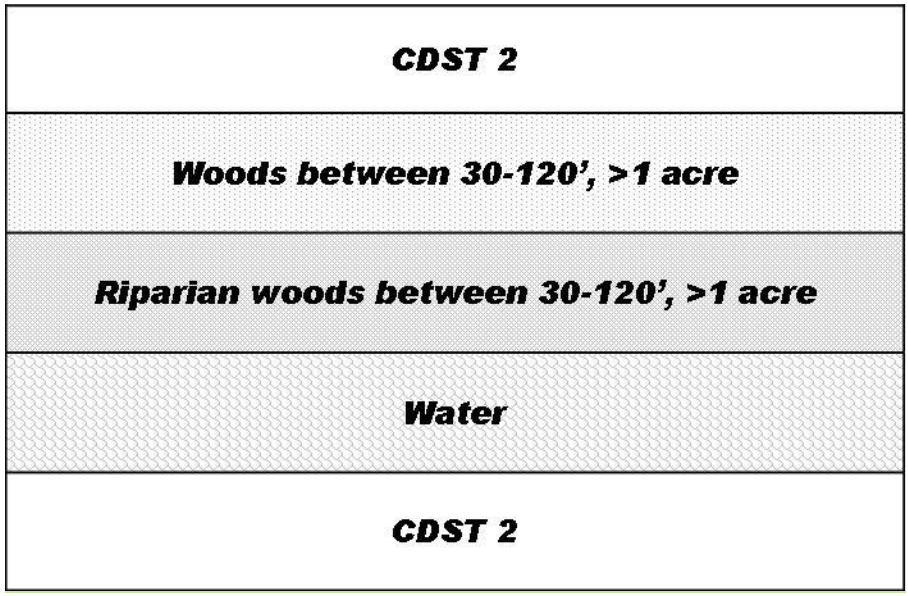


Figure 2-11U Riparian forest containing two distinct forest conditions when the traditional forest land definition is not met. In order to delineate a riparian condition, the accessible forestland must initially be at least 120 ft. in width. Once subdivided, the remaining accessible forestland must be 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.

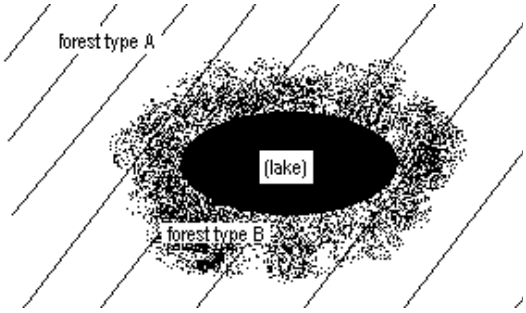


Figure 2-12. Forest type B is a separate condition class (riparian) if the band of it is between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

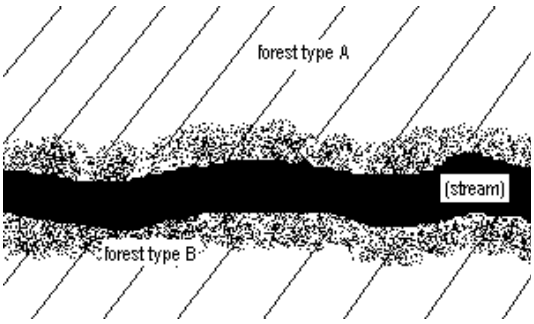


Figure 2-13. If the stream is < 30.0 feet wide, forest type B is a separate condition class (riparian) if the sum of the two widths of the bands, including the stream falls between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

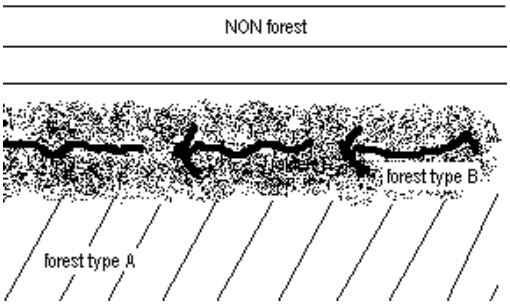


Figure 2-14. Forest type B is a separate condition class (riparian) if the band of it is between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

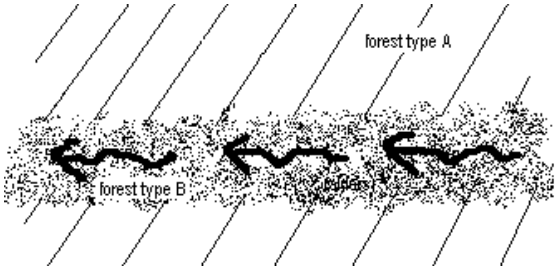


Figure 2-15. Forest type B is a separate condition class (riparian) if the band of it is between 30.0 feet and 120.0 feet wide, and is ≥ 1.0 acre in size.

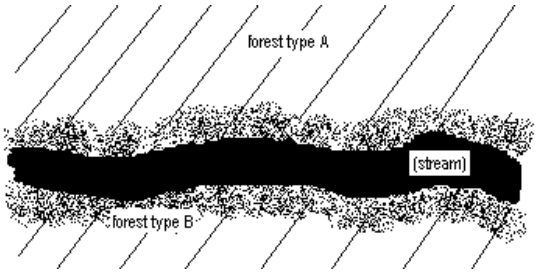


Figure 2-16. If the stream is > 30.0 feet wide, forest type B is a separate condition class (riparian) if either of the two widths of the bands falls between 30.0 feet and 120.0 feet wide and is ≥ 1.0 acre in size.

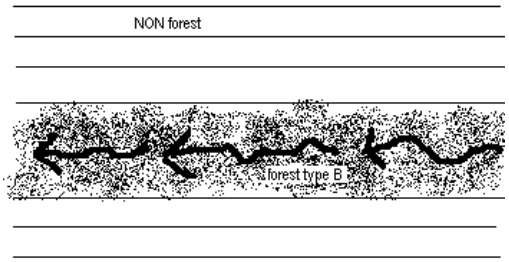


Figure 2-17. In a nonforested area, a band of forest type B that is < 120.0 feet wide is NOT considered a riparian area. It is not a separate condition class at all.

2.5.1+U URBAN RESERVED STATUS

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. For conditions with both reserved and not reserved areas, neither of which is an acre in size, the condition will be defined by the predominant RESERVED STATUS within the Area of Observation.

SRS Note: URBAN RESERVED STATUS is coded as 0 for all private land (OWNER GROUP = 40) regardless of conservation easements that may restrict harvesting. All public land requires documentation in the PLOT NOTES of URBAN RESERVED STATUS in the data recorder. This designation removes the associated forest into noncommercial forest land. See Regional CORE Field Guide 9.0 Appendix 12 for additional instructions about documentation procedures for reserved public land.

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 12 for state-specific lists). 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 noncensus 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

2.5.2+U URBAN OWNER GROUP

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. For conditions with multiple OWNER GROUPS, none of which are an acre in size, the condition will be defined by the predominant OWNER GROUP within the Area of Observation. Assume all census and noncensus water conditions are state and local government unless they clearly fall with in federal land or are clearly marked as private.

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

2.5.3 FOREST TYPE

Record the code corresponding to the FOREST TYPE (from Appendix 2) that best describes the species with the plurality of stocking for all live trees in the Area of Observation that are not overtopped. Ignore inclusions and "visually" replace the area lost to inclusions with the FOREST TYPE of the immediate surrounding area within, and or adjacent to, the AOO. Note: Canopy cover is used to determine whether an area is forest or nonforest. Stocking is used with other variables such as this one.

From Appendix 2: 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).

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.

SRS Note: Matching a condition to a nationally defined forest type is often times difficult. Regional forest types cannot be developed without national input (i.e., change proposal procedures). Therefore, when determining forest type, first try to match the trees present with the "named" type. If this does not match the stand, match the stand with the trees listed as associates under each type even if the named type species are not present in the stand. The site or physiographic class should also be considered in determining forest type. When the species tallied do not represent the forest type (e.g., a microsite that does not qualify as a separate condition), a plot note should be written to indicate the disparity between the recorded forest type and the tally.

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 2

The instructions in Sections 2.1 and 2.4 apply when delineating, within accessible forest land, contrasting conditions based on differences in FOREST TYPE.

2.5.4 STAND SIZE CLASS

Record the code that best describes the predominant size class of all live trees, seedlings and saplings in the within the Area of Observation while ignoring inclusions. “Visually” replace the area lost to inclusions with the STAND SIZE CLASS of the immediate surrounding area within, and or adjacent to, the AOO. 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 10 percent canopy cover if stocking standards are not available.
(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 and woodland trees) / 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 and woodland trees) / 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/or 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 Sections 2.1 and 2.4 apply when delineating, on accessible forest land, contrasting conditions based on differences in STAND SIZE CLASS.

Within the sampled area on microplot, or subplot, 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.

2.5.5 REGENERATION STATUS

Record the code that best describes the artificial regeneration that occurred in the Area of Observation.

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. Do not include planted trees that have died, or pockets of planted trees that are less than 120 feet wide and an acre in size.

The instructions in section 2.1 and 2.4 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.

2.5.6 TREE DENSITY

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 Area of Observation that are not overtopped, compared to any previously defined condition class TREE DENSITY. Ignore inclusions and “visually” replace the area lost to inclusions with the TREE DENSITY of the immediate surrounding area within, and or adjacent to, the AOO.

The instructions in Sections 2.1 and 2.4 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 / low canopy cover 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.

Ancillary (Non-Delineating) Urban Forest Condition Level Variables

2.5.13 ARTIFICIAL REGENERATION SPECIES

Record the species code of the predominant tree species for which evidence exists of artificial regeneration within the Area of Observation of the REGENERATION STATUS delineated condition. 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 3

2.5.14 STAND AGE

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 within the Area of Observation, 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 CLASS within the Area of Observation 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. In SRS, add 2 years to hardwoods, 7 years to longleaf pine and 3 years for all other 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.

When determining stand age for multi-storied stands, only the live trees that are not overtopped within the STAND SIZE coded are used to determine the weighted average stand age.

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

2.5.15 DISTURBANCE 1

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 (to both understory vegetation and trees)
  - 11 insect damage to understory vegetation
  - 12 insect damage to trees, including seedlings and saplings
- 20 Disease damage (to both understory vegetation and trees)
  - 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 (other than listed below)

- 41 beaver (includes flooding caused by beaver)
- 42 porcupine
- 43 deer/ungulate
- 44 bear (CORE OPTIONAL)
- 45 rabbit (CORE OPTIONAL)
- 46 domestic animal/livestock (includes grazing)

50 Weather damage (other than listed below)
- 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. (e.g., pine straw removal by raking and baling).

90 Geologic disturbances
- 91 landslide
- 92 avalanche track
- 93 volcanic blast zone
- 94 other geologic event
- 95 earth movement/avalanches

2.5.16 DISTURBANCE YEAR 1

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

2.5.17 DISTURBANCE 2

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

2.5.18 DISTURBANCE YEAR 2

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

2.5.19 DISTURBANCE 3

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

2.5.20 DISTURBANCE YEAR 3

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

2.5.21 TREATMENT 1

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.

SRS Note: Natural regeneration is considered a treatment if the stand meets the criteria below.

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, invasive species removal 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. SRS Note: Prescribed fire is considered a disturbance and not a treatment. See Disturbance 30.

2.5.22 TREATMENT YEAR 1
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

2.5.23 TREATMENT 2
If a stand has experienced more than one treatment, record the second treatment here. See TREATMENT 1 for coding instructions; code 00 if none.

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

2.5.25 TREATMENT 3

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

2.5.26 TREATMENT YEAR 3

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

2.5.27 PHYSIOGRAPHIC CLASS

Record the code that best describes the PHYSIOGRAPHIC CLASS of the condition within the Area of Observation; land form, topographic position, and soil generally determine physiographic class. Once PHYSIOGRAPHIC CLASS has been determined to be Xeric, Mesic, or Hydric, it is permissible to look at the characteristics of the surrounding landscape to assign the associated code within each grouping if it is not obvious within the Area of Observation. Unless there was an obvious error made at the previous visit, do not change the PHYSIOGRAPHIC CLASS.

When collected: When 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
36	Forest or Nonforest over Permafrost - Low-lying, sometimes wet, flat areas, often characterized by a thick moss layered ground surface, sometimes comprised of tussocks that tend to form a waterlogged soils layer as the active layer thaws seasonally. Permafrost may be visible or detected with a soil probe. At later periods in the season when permafrost cannot be detected, waterlogged soils layered on top of deeper permafrost are possible.
39	Other hydric - All other hydric physiographic sites.

2.5.28 SRS CONDITION SITE CLASS

Record the site class of the condition. If a site tree is collected for the condition, then the site class will be calculated by the data recorder. If no site tree is collected, then the field crew will estimate the site class. See Appendix 4 for a limited selection of southern site class curves.

When collected: If CONDITION CLASS STATUS = 1
Field width: 1 digit
Tolerance: +/- 1 class
MQO: At least 99% of the time
Values: 1 - 7

2.5bU 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 Sections 2.5.1+U, 2.5.2+U, and 2.5.29+U.

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 are 170 (Windbreak / Shelterbelt within nonforest conditions) and within the 300 (Developed) series codes: 320 (Rights-of-way), 321 (Transportation), 322 (Utility), and 331 (Park) sections containing developed areas / trails (concrete, asphalt, or structural wood throughout) which have no minimum dimension WHEN THEY PRESENT AS A LINEAR FEATURE. In addition, code 340 (Mining and Wasteland) must be at least 120 ft. wide and an acre in size.

Alleyways are not separated into a different condition class, but rather are considered associated greenscape / hardscape of the condition they serve. 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 Sections 2.5.7+U to 2.5.36.

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:

- 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 Section 4.0+U.
- 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.

(2.5.1+U URBAN RESERVED STATUS)

(See full data element description in Section 2.5.1+U URBAN RESERVED STATUS)

(2.5.2+U URBAN OWNER GROUP)

(See full data element description in section Section 2.5.2+U URBAN OWNER GROUP)

2.5.29+U URBAN NONFOREST LAND USE

Record this attribute for every CONDITION CLASS STATUS = 2 condition class identified on the plot. At times an URBAN CONDITION CLASS STATUS 2 condition may be made up of multiple nonforest land uses, none 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.

The following guidelines apply to all URBAN NONFOREST LAND USEs (except the Developed land uses, 310-322, which do not have size requirements).

- In cases where the first encountered potential URBAN NONFOREST LAND USE does not meet minimum size requirements but is bounded by a single qualifying adjacent URBAN NONFOREST LAND USE, the former will be considered an inclusion in the latter which will be used to represent the condition within the Area of Observation.

- Nonforest conditions may consist of multiple non-qualifying URBAN NONFOREST LAND USEs that are less than an acre or less than 120 feet in width (excluding the Developed land uses 310-322). In such cases, the first nonforest land use encountered will be used to represent the condition, assuming the combined areas of the multiple nonforest land uses is at least 120 feet and an acre.
- In cases where a wooded strip does not meet size requirements for accessible forest land it is considered an inclusion and needs to be lumped with an adjacent qualifying condition. If it is bordered on each side by two different qualifying distinct and specific Nonforest Land Uses, assign the wooded strip to the condition that Plot Center (PC) is closest to.
- In cases where a wooded strip does not meet size requirements for accessible forest land and it is bordered on each side by two different non-qualifying Nonforest Land Uses, assuming the combined area of all three is at least 120 feet and an acre, assign the strip of trees a Nonforest Land Use of 40 (Other).

When collected: URBAN 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 of fencing, 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]. This code is a subdivision of the Agriculture land use (100) and should only be coded when located within or directly adjacent to agricultural land. It should not be used to define similar features located within urban / developed areas that are not directly adjacent to agricultural lands. Such lands should be considered a part of the green space associated with the developed land use. A widely spaced row of trees located in a maintained area within a developed land use adjacent to agricultural lands is considered part of the developed condition due to both the spacing and the maintenance observed between the trees.

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 331 (Park) sections containing developed areas /trails (concrete, asphalt, or structural wood throughout) which have no minimum dimension WHEN THEY PRESENT AS A LINEAR FEATURE. 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 associated green space/hardscape (maintained or unmaintained) serving a single independent housing unit.
Such units (normally with a single family) include fully detached, semidetached (semiattached, side-by-side), row houses, and townhouses. In the case of attached units, each must be separated from the adjacent unit by a ground-to-roof wall (completely walled off from other units, without any common space) in order to be classified as a single-family structure. Also, these units must not share heating/air-conditioning systems or utilities.
Units built one on top of another and those built side-by-side that do not have a ground-to-roof wall (a clear divider between units eliminating any potential for common space) and/or have common facilities (i.e., shared attic, basement, heating plant, plumbing, etc.) are not included in the single-family statistics. When the presences or absence of shared common space is not clearly visible look for evidence of separate utilities to determine if it is a single independent housing unit.

312 Multi-family residential: Structures containing more than one housing unit and associated green space/hardscape (maintained or unmaintained).
Residential buildings containing units built one on top of another AND those built side-by-side which may have common space due to the lack of a ground-to-roof wall (clear divider between units preventing common space)and/or have common facilities (i.e., attic, basement, heating plant, plumbing, etc.) and their associated green / gray spaces.

313 Institutional: Schools, hospitals/medical complexes, colleges, religious buildings, government buildings, etc., and associated green space/hardscape (maintained or unmaintained).

314 Commercial/Industrial: In addition to standard commercial and industrial land uses associated green space/hardscape (maintained or unmaintained), 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 associated green space/hardscape (maintained or unmaintained) 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) and associated green space/hardscape (maintained or unmaintained) such as rest areas, railway or airport.

322 Utility: power lines, solar power facilities, pipelines, maintained levees, storm-water runoff systems including retention ponds, and flood control channels. Storm-water runoff areas are usually fenced and publicly administered and do not include systems that are clearly associated with another defined land use such as those associated with a Walmart parking lot.
All maintained utility Rights-of-Way are coded as such when they occur within Forestland (URBAN CONDITION CLASS STATUS 1). However, if a utility right-of-way extends into another nonforest condition, that condition will take precedence if utility maintenance is not influencing the underlying condition. For example, a power line may run over a Multi-Family Residential land use, in this case code it as Multi-Family Residential. If there is an obvious change in maintenance or use related to the utility then the area would be coded as 322 (Utility). For example if a powerline crosses over cropland, but the land under the powerline is not planted to crops, the powerline would be called 322 (Utility) not 110 (Cropland). If a powerline is adjacent to a road R-O-W and there is NO CLEAR DIFFERENCE between the maintenance of the two the powerline shall be included within the R-O-W (grass maintenance in most cases).

330 Recreation: Skiing, campgrounds, playing fields, athletic, sports tracks, etc. and associated green space/hardscape (maintained or unmaintained). 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 / vegetation 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 (concrete, asphalt, or structural wood throughout) running through narrow linear corridors (less than 120') 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 in the surrounding land uses. Developed trails occurring in a road bed / shoulder (for example: a bicycle commuter trail defined by a painted lane on an existing road) would be recorded as 320 NOT 331. Once the developed trail leaves the road bed/shoulder and enters maintained or unmaintained vegetation it would be classified as 331.

332 Golf courses. This category includes associated access roads, buildings and associated green space/hardscape (maintained and unmaintained) while excluding obvious public roads which would be considered Rights-of-Ways.

340 Mining and wasteland
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 an URBAN CONDITION CLASS STATUS 2 condition may be made up of multiple nonforest land uses, some of which may not 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. Do not use this code for areas that can be considerd associated green space/hardscape (maintained or unmaintained) within the devloped series (300) land uses. 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 and bald cypress can adapt to bog or swamp 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 (Noncensus and Census Water) conditions.

910 Has the potential to include URBAN CONDITION CLASS STATUS = 1 (FIA defined forest land) IF it were accessible but is currently URBAN CONDITION CLASS STATUS = 5.

Ancillary (Non-Delineating) Urban Condition Level Variables

2.5.29.1U i-TREE LAND USE

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 managed for wood production and not reserved.

20 Residential: Free standing structures and associated green space/hardscape (maintained or unmaintained) serving a single independent housing unit.
Such units (normally with a single family) include fully detached, semidetached (semiattached, side-by-side), row houses, and townhouses. In the case of attached units, each must be separated from the adjacent unit by a ground-to-roof wall (completely walled off from other units, without any common space) in order to be classified as a single-family structure. Also, these units must not share heating/air-conditioning systems or utilities.
Units built one on top of another and those built side-by-side that do not have a ground-to-roof wall (a clear divider between units eliminating any potential for common space) and/or have common facilities (i.e., shared attic, basement, heating plant, plumbing, etc.) are not included in the single-family statistics. When the presences or absence of shared common space is not clearly visible look for evidence of separate utilities to determine if it is a single independent housing unit.
This code is valid with URBAN NONFOREST LAND USE 311 and 320

21 Multi-family residential: Residential buildings containing units built one on top of another AND those built side-by-side which may have common space due to the lack of a ground-to-roof wall (clear divider between units to prevent common space) and/or have common facilities (i.e., attic, basement, heating plant, plumbing, etc.) and their associated green space/hardscape (maintained or unmaintained). 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 associated green space/hardscape (maintained or unmaintained). 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 and their associated green space/hardscape (maintained or unmaintained), 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, associated green space/hardscape (maintained or unmaintained), 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 associated green space/hardscape (maintained or unmaintained) (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, empty storm-water runoff retention areas, flood control channels, conduits, and associated green space/hardscape (maintained or unmaintained). Storm-water runoff areas are usually fenced and publicly administered and do not include systems that are clearly associated with another defined land use such as those associated with a Walmart parking lot. 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 nonforest conditions as well as forested conditions that are not being managed for wood products and associated green space/hardscape (maintained or unmaintained). Nonforest 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, associated green space/hardscape (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. Do not use this code for areas that can be considerd associated green space/hardscape (maintained or unmaintained) within the devloped UNFU series (300) land uses. This code is valid with URBAN NONFOREST LAND USE 300, 310, 320, and 400.

Cond. Status	Urban Nonforest 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; 24
2	310	60; 24
2	311	20; 24
2	312	21; 24
2	313	22; 24
2	314	23;24;31

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 2-1U. Condition status, Urban Nonforest Land Use, and i-Tree codes.

2.5.7+U URBAN OWNER CLASS

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 PCArea of Observation.

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 educational institutions (including private universities).Owner names that include Inc. or Corp. are considered corporate by law so will be coded under OWNER CLASS 41 (Rare exceptions are described in OWNER CLASS = 43 and 45.)
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. (Although rare, LLCs and LLPs that are associated with a Partnership, Association, or Club are coded under OWNER CLASS 43.)
44 Native American (Indian) – within reservation boundaries
45 Individual and Family, including trusts, estates, and family partnerships (Although rare, LLCs and LLPs that are associated directly with a family, such as the Jones Family LLC, are coded under OWNER CLASS = 45. In the absence of any indication that the LLC or LLP is tied to a family, code as OWNER CLASS = 41.)

2.5.8 OWNER SUB-CLASS (CORE OPTIONAL) Not Collected in URBAN FIA

2.5.9 PUBLIC ADMINISTRATIVELY WITHDRAWN STATUS (CORE OPTIONAL) Not Collected in URBAN FIA

2.5.10 ADMINISTRATIVELY WITHDRAWN AREA NAME (CORE OPTIONAL) Not Collected in URBAN FIA

2.5.11 ADMINISTRATIVELY WITHDRAWN NOTES (CORE OPTIONAL) Not Collected in URBAN FIA

2.5.12 RESERVED AREA NAME

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

2.5.28+U COVER CLASS

Record this variable to describe the Area of Observation within each mapped condition. As with 2.4.2 CONDITION CLASS STATUS, COVER CLASSes must meet the minimum area and width requirements (except those cases where the condition has been defined due to one of the exceptions to the size and width requirements. If the condition is less than 1 acre, then apply the key to the condition. In order to assign a single cover class to a mapped condition that contains more than one candidate cover class, proceed as follows: if no prospective 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 cover classes (i.e., those which meet minimum area and width requirements) exist in the condition, assign the first 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 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 COVER CLASS selection.

Assignment of 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 that 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 (Tree Cover). Note: Tree Cover is not equivalent to Forestland (e.g., a recent clearcut could be Forestland, but would not be Tree Cover). 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 vegetation rooted outside of a condition is hanging over the condition being evaluated, it is considered in the cover calculations. If burned, then classify based on the remaining live vegetation, including the canopy cover of remaining live trees and shrubs. When the 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 COVER CLASS.

Full Cover Class Definitions

- Dominant: Refers to the highest (tallest) life form present that is not overtopped, 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% live vegetation cover.
- Sparsely Vegetated: Does not contain at least 10% live vegetation cover.

Cover Classification Key

Follow the key in sequence. If a class described the condition, then look no further.

1. ≥10% live vegetative Cover = Vegetated, else 2.
    a. Areas on which live 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 Tree Cover
    b. Areas on which live shrubs provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer = 02 Shrub Cover
    c. Areas on which live herbaceous vegetation (including seasonally senescent cover) provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer = 03 Herbaceous Cover
    d. Areas on which non-vascular vegetation provide 10% or greater cover and are part of the dominant vegetation layer = 04 Non-vascular Vegetation Cover
    e. Areas with 10% or greater live vegetative cover but no one life form has 10% or more cover = 05 Mixed Vegetation Cover
2. <10% live 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 Impervious

c. Areas predominantly covered by bare rock, gravel, sand, silt, clay, or other earthen material, which contains <10% vegetation cover regardless of its inherent ability to support life = 08 Barren

When collected: All condition classes
Field width: 2 digits
Tolerance: No errors
MQO: At least 95% of the time
Values:

Codes are ≥10% vegetative cover:

01 Tree Cover: Areas on which live 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, Christmas trees, orchards, etc. Only include tree species that are listed in Appendix 3 after taking into account the three exclusion zones (see variable 5.8 SPECIES). Varieties and subspecies are tallied at the species level and hybrids are based on the dominant external characteristics. Species not included in Appendix 3 are considered shrub cover. 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 Shrub Cover: Areas on which live shrubs or subshrubs provide 10% or greater cover and are part of the dominant (uppermost) vegetation layer, provided these areas do not qualify as Tree Cover. 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, berry crops, and other shrub-dominated wetlands, chaparral, and sagebrush.

03 Herbaceous Cover: Areas on which live herbaceous vegetation (including seasonally senescent cover) provides 10% or greater cover and are part of the dominant (uppermost) vegetation layer, provided these areas do not qualify as Tree Cover or Shrub Cover. This includes herbs, forbs, and graminoid species. Examples include meadows, prairies, croplands (while crops are present), and improved pasture. This category also includes emergent wetland vegetation like seasonally flooded grasslands, cattail marshes, etc.

04 Non-vascular Vegetation Cover: 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 Tree Cover, Shrub Cover, or Herbaceous Cover. Examples include mosses, sphagnum moss bogs, liverworts, hornworts, lichens, and algae.

05 Mixed Vegetation Cover: Areas with 10% or greater live vegetative cover but no one life form has 10% or more cover. That is, these areas do not qualify as Tree Cover, Shrub Cover, Herbaceous Cover, or Non-vascular Vegetation Cover, and thus are a mixture of plant life forms. Examples can include early stages of reverting fields and high deserts.

Codes are < 10% live vegetative cover

08 Barren: Areas predominately covered by bare rock, gravel, sand, silt, clay, or other earthen material, which contains <10% vegetation cover regardless of its inherent ability to support life. Examples include naturally barren areas such as lava fields, gravel bars, sand dunes, salt flats, deserts, playas, and rock outcroppings, as well as areas of bare soil exposed by land clearing (including plowed, harvested, or planted but not yet emerged cropland), wildfire and other forms of disturbance. Also includes minerals and other geologic materials exposed by surface mining and roads made of dirt and gravel.

09 Impervious: Areas predominantly covered with constructed materials that contain < 10% vegetation cover. Examples include paved roads, parking lots, driveways, sidewalks, rooftops and other man-made structures.

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 as well as glaciers. For example, only the open water portion of a bog is to be included.

2.5.30+U Canopy Cover Variables Overview

Canopy cover variables are condition level variables that are collected on all CONDITION CLASS STATUS = 1, 2, 3, 4 and 5 conditions. A condition requires a minimum LIVE PLUS MISSING CANOPY COVER of 10 percent from species that are valid within the geographic area that the plot is located in according to the tree species list (Appendix 3: FIA Tree Species Codes) to be classified as forestland.

In order for a condition to be considered forest it must contain 10 percent LIVE PLUS MISSING CANOPY COVER, meet minimum size requirements, and not be subject to nonforest use(s) that prevent normal tree regeneration and succession, such as regular mowing, intensive grazing, or recreation activities. Areas of potential forest that do not meet size requirements are considered inclusions within the surrounding nonforest condition. When conducting a canopy cover check to determine if the 10 percent threshold has been met, do NOT include any canopy cover derived from inclusions; although such canopy cover is included when populating the LIVE CANOPY COVER variable.

Using canopy cover to determine if an area meets the definition of forestland in sparsely treed areas:

Homogenous areas: When the tree density of a potential condition is homogenous or when it is not clear that the tree density is not homogenous, use the Subplot, Acre, or Sub-acre CANOPY COVER SAMPLING METHOD to determine if the area qualifies as forestland based on canopy cover.

Isolated islands or groups of trees: In some cases, tree density may not be homogenous, but will consist of groups or islands of trees with greater than or equal to 10 percent canopy cover, none of which meet the minimum forestland size requirement individually. Examples of such areas may include reverting fields, rangeland, pastures, areas of exposed bedrock, sand dunes, beaches, bogs, marshes, or clumps of trees in an alpine environment. In these cases, first define all areas between the islands or groups that qualify as nonforest land. In doing so it will become apparent that some of the islands or groups may be inclusions within their surrounding nonforest condition (inclusions are excluded from the canopy cover check process when determining if the sample area meets the forestland canopy cover threshold). Second, evaluate the remaining island or groups of trees with a canopy cover check. This may require installing phantom subplots or acres. It is not uncommon for areas that look like forestland to end up as nonforest land due to the patchiness of trees that are present (Figure 2-18).

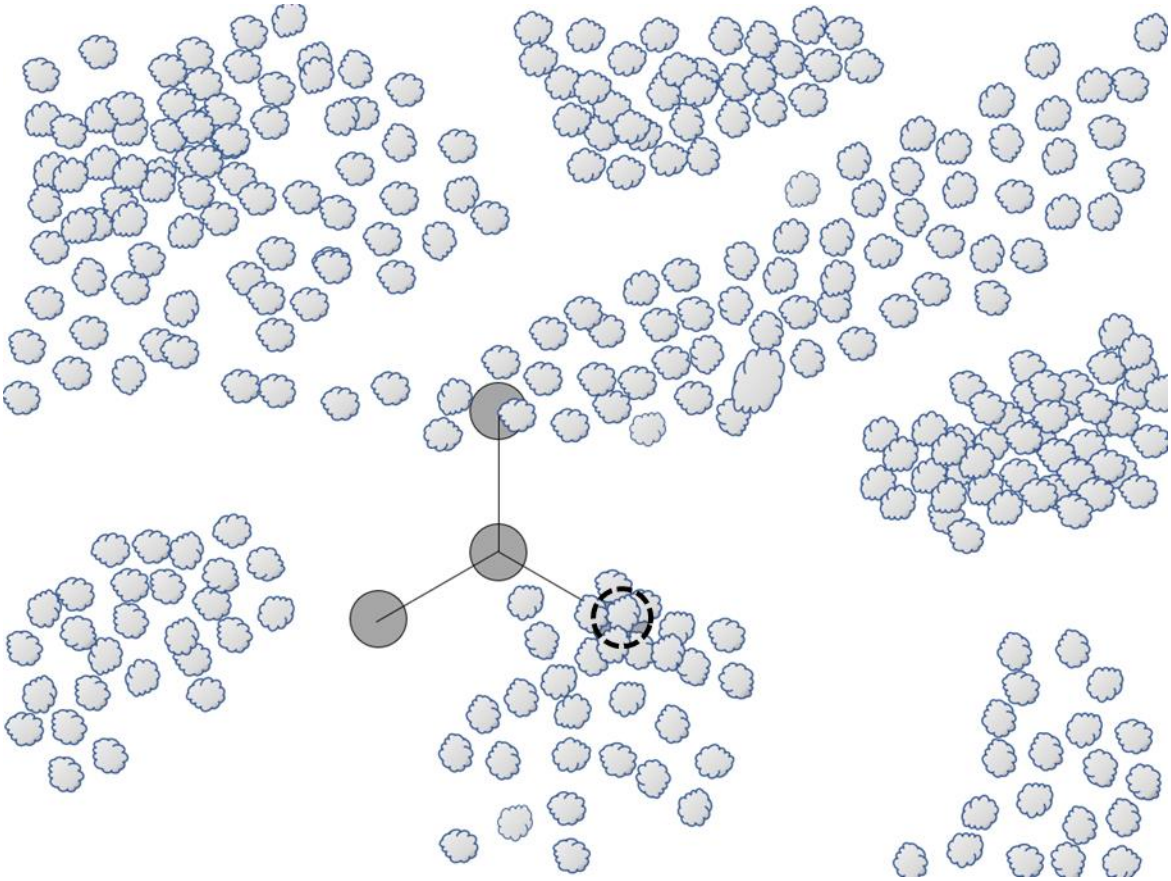


Figure 2-18 CORE. At times it is difficult to determine if a canopy cover check is required and, or if, phantom subplots will need to be installed. In this example the entire area consists of islands or groups of trees with greater than or equal to 10% canopy cover located within an otherwise nonforest area. None of islands or groups of trees meet forest land size requirements individually. When conducting a canopy cover check, first define all the areas that qualify as nonforest land. This would be the area below the dark line in Figure 2-19. These areas will not be included in the canopy cover check.

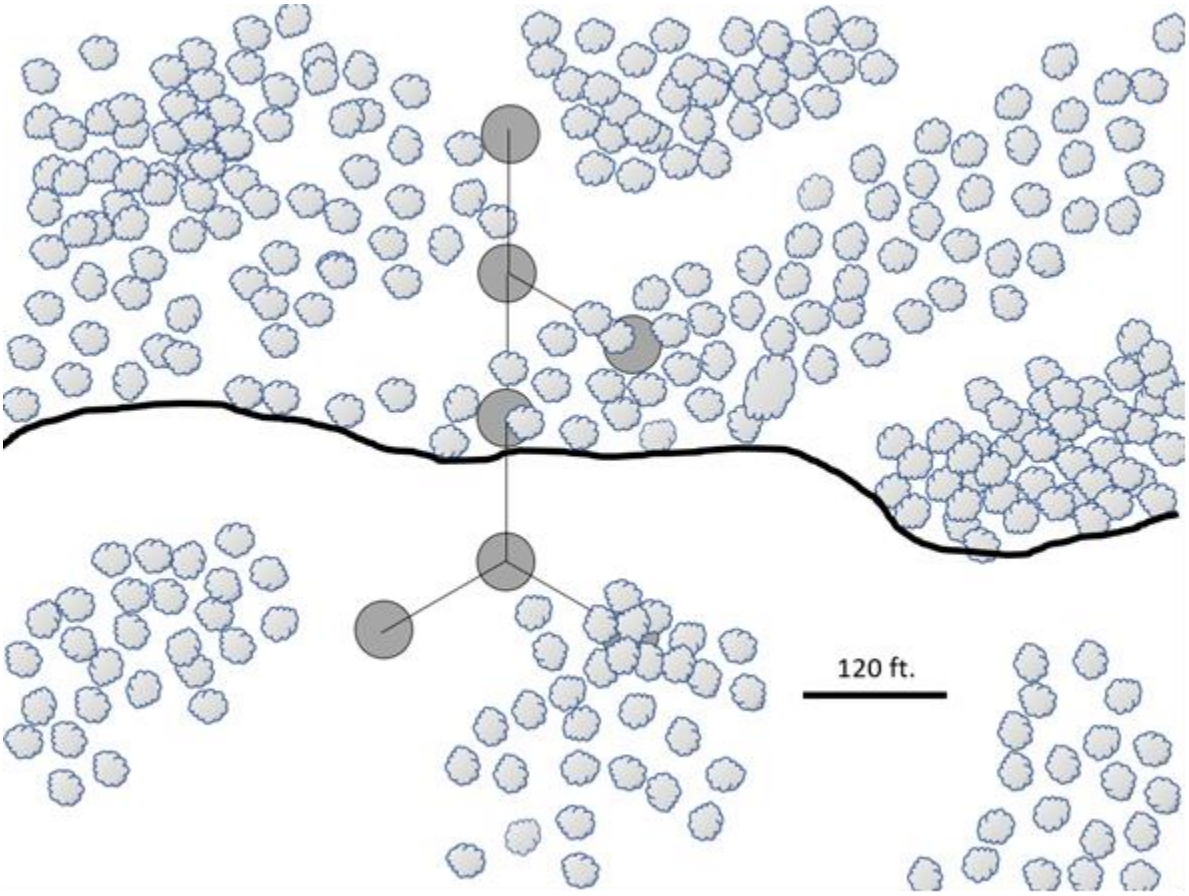


Figure 2-19 CORE. All the treeless areas below the black line are at least 120 feet wide and attached to at least an acre of nonforest land, making them all nonforest. Although the remaining islands of trees below the line have greater than 10 percent canopy cover, they are all considered inclusions in the surrounding nonforest condition because they do not meet the minimum size requirements for forestland. This makes subplots 1, 3, and 4 nonforest. Although the islands above the black line are also too small to stand alone as forestland, the treeless space between them is less than 120 feet wide, allowing the area to be evaluated collectively and in doing so the islands meet the minimum size requirement. Phantom subplots are installed off of subplot 2 and a canopy cover check is completed in order to determine CONDITION CLASS STATUS. In this example, the canopy cover check only yields about 4 percent canopy cover, so there is only one condition present on this plot and it is nonforest. When evaluating the resulting single condition nonforest plot, the canopy cover is estimated using the original 4 supblots. In this example the LIVE CANOPY COVER would be estimated to be about 25 percent. This same concept applies in regions where macroplots are used with the Subplot method as well as when the Acre method is used instead of the Subplot method.

2.5.30.1+U URBAN CANOPY COVER SAMPLE METHOD

The determination of applying the Subplot, Acre or Sub-acre methods is based on FIA Region and the most repeatable method for the area to be measured for LIVE CANOPY COVER and LIVE PLUS MISSING CANOPY COVER.

Ocular method

- If LIVE PLUS MISSING CANOPY COVER is ≤ 5% OR

- If LIVE PLUS MISSING CANOPY COVER is ≥ 15% OR
- On CONDITION CLASS STATUS = 2 conditions where access to the nonforest area may be limited OR
- If the nonforest condition is a developed or agricultural nonforest land use OR
- When CONDITION CLASS STATUS = 5

Subplot method Not Collected in Urban FIA

Acre method

- If LIVE PLUS MISSING CANOPY COVER is >5% and <15% (not valid in NRS or Alaska)

Sub-acre method

- If LIVE PLUS MISSING CANOPY COVER is >5% and <15% (not valid in RMRS or PNW)

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 less than or equal to 5 percent LIVE PLUS MISSING CANOPY COVER or obviously greater than or equal to 15 percent LIVE PLUS MISSING CANOPY COVER. In addition to visual inspections of what is on the ground, crews can also use various types of aerial imagery to help determine LIVE CANOPY COVER and LIVE PLUS MISSING CANOPY COVER values using this method. The Ocular method may also be used on URBAN CONDITION CLASS STATUS = 2, 3, and 4 conditions where access to the nonforest canopy cover area may be limited; it is clear there is no change from a nonforest classification made at the previous visit, imagery, and/or observations made from a helicopter that tree canopy cover is well below 10 percent; or the nonforest condition is a developed or agricultural nonforest land use. Note that when the Ocular method is used, it is limited to the Area of Observation of the condition. The Ocular method is also used when CONDITION CLASS STATUS = 5.

Subplot method - Not Collected in Urban FIA

Acre method -

The Acre method is used, where regionally permitted, when the ocular method is not appropriate, when it is safe and practical to sample on the entire acre, and LIVE PLUS MISSING CANOPY COVER is greater than 5 percent and less than 15 percent.

1. To determine if minimum 10 percent LIVE PLUS MISSING CANOPY COVER is reached (4356 ft2), 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 percent 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 and record as such.
3. As with the Subplot method, the sample acre (117.75 foot radius plot) must fall entirely in the questionable condition.
4. Phantom Acre: When using the Acre method, ensure the sample acre falls entirely within the questionable condition by moving generally perpendicular away from any contrasting conditions or inclusions and establishing the center of the phantom acre 117.75 feet into an area that represents the questionable condition.

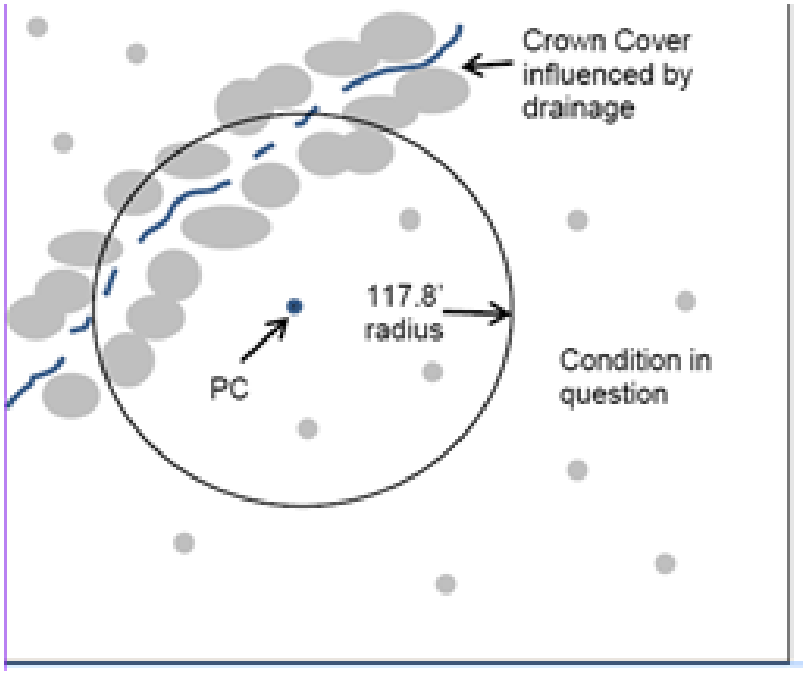


Figure 2-20. Plot center is located near a drainage that includes an inclusion of trees. Although the inclusion appears to have about 25% canopy cover, it is not clear if the surrounding area to the east of the inclusion meets the 10% canopy cover threshold in order to be considered forest land. In this example the area to the west has been determined to be obvious nonforest and does not need a canopy cover check.

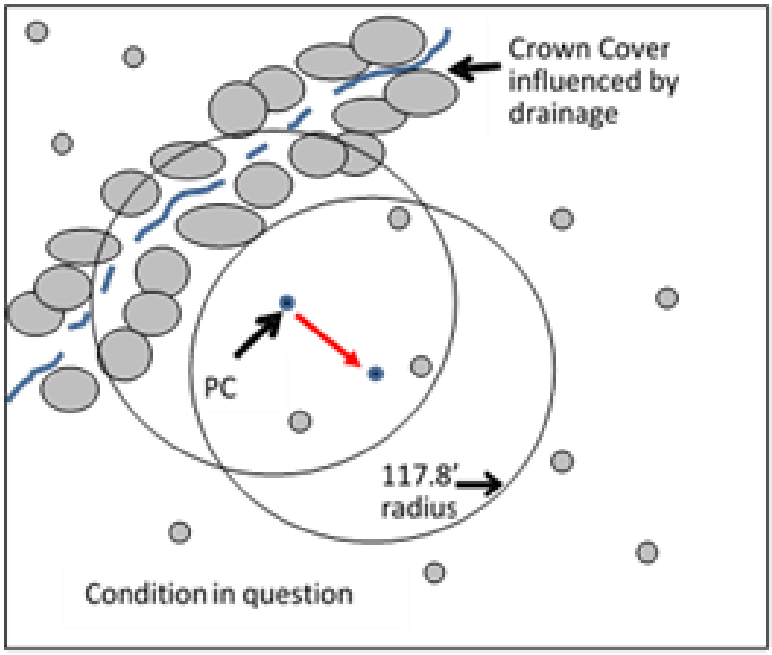


Figure 2-21. In order to determine if the 10% canopy cover threshold is met in the questionable area to the east a phantom acre must be established by moving away from plot center, generally perpendicular from the inclusion in this example and establishing the phantom plot center 117.75 feet into an area that represents the questionable area. The point is to move away from the inclusion, not necessarily from the drainage, in this example.

In cases where there is more than one questionable condition in the sample area, multiple phantom acres will need to be installed. For example, if plot center falls directly in an inclusion with 25 percent cover, it may be necessary to establish phantom acres in questionable conditions on both sides of the inclusion (in this case the drainage) to determine if the 10 percent canopy cover threshold is met on either side of the inclusion.

If the phantom acre(s) yield less than 10 percent canopy cover in the questionable condition(s), the entire plot is considered to be within a nonforest condition. Canopy cover is then recorded for the acre at PC (and includes the inclusion), not the areas evaluated within the phantom acres.

Percent Canopy Cover Calculation for Acre method:

If a condition is close to 10 percent 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 ft2
2. A 1-acre circle has a radius of 117.75 ft
3. 10% of 1-acre is 4,356 ft2

and assuming the canopies to be ellipses:

1. Measure the approximate canopy diameter (long axis and 90 degrees 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 and LIVE PLUS MISSING CANOPY COVER is greater than 5 percent and less than 15 percent.

1. Ensure that the canopy cover sample area is representative of the condition in question.
2. Determine if minimum 10 percent 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 percent threshold is dependent on the sample plot size and respective area in square feet.
3. If the 10 percent 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 and record as such.
4. The temporary Sub-acre subplot must fall entirely in the questionable condition.
5. In oddly shaped conditions, such as a narrow strip, a square or rectangular area may be used for a canopy cover check using the F5 Custom Canopy Cover Calculator in the PDR.
6. Potential circular plot sizes and appropriate scaling factors:

Acre Fraction	Radius (ft)	Area (sq ft)	10% Cover (sq ft)
1	117.7	43,560	4,356
1/2	83.3	21,780	2,178
1/3	68.0	14,520	1,452
1/4	58.9	10,890	1,089
1/5	52.7	8,712	872
1/6	48.0	7,260	726

When collected: CONDITION CLASS STATUS = 1, 2, 3, 4, or 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 2-22U) to determine % canopy of the questionable condition. See Figure 2-5 for an example of classifying the condition class of the subplot in a transition zone with forest/nonforest encroachment.

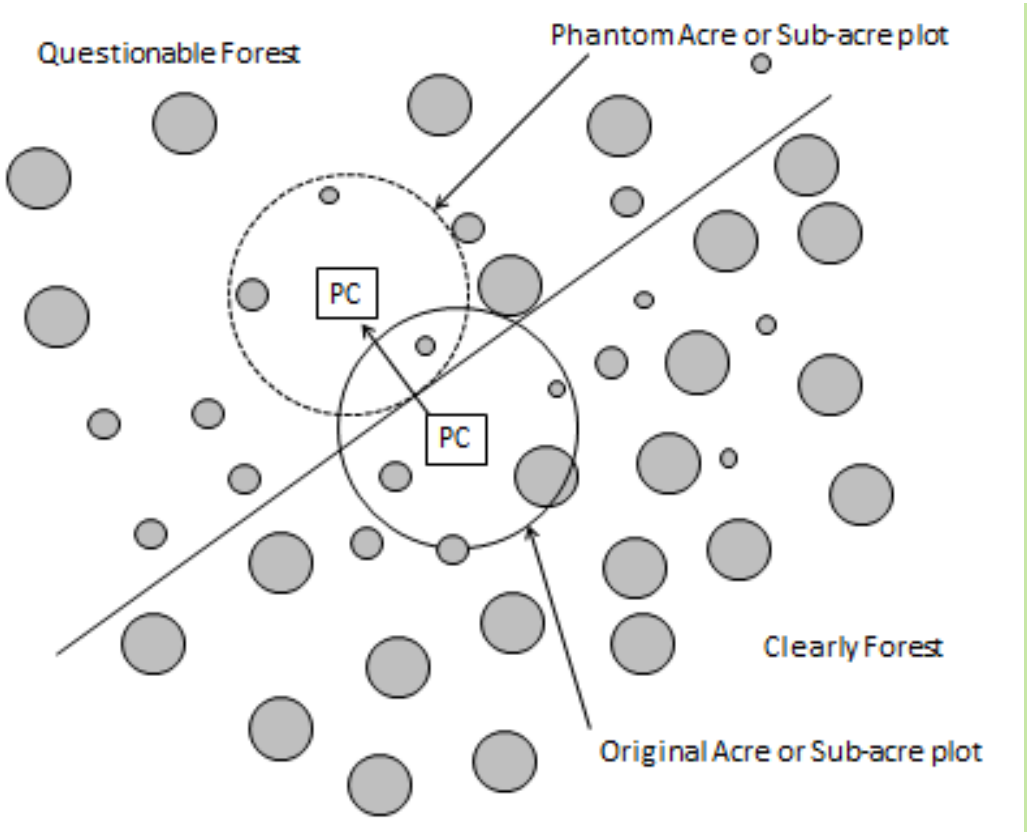


Figure 2-22U. Example of using the Acre or Sub-acre plot method when determining CANOPY COVER when a portion of the Acre or Sub- acre plot falls within an area of questionable CANOPY COVER.

2.5.30.2+U LIVE CANOPY COVER

Record the percentage of LIVE CANOPY COVER for the condition. Include live tally trees, saplings, and seedlings that cover the sample area. For conditions where the LIVE CANOPY COVER is low and there is a question whether it meets 10 percent LIVE PLUS MISSING CANOPY COVER, the crew will measure every crown width within the canopy cover sample area (based on the CANOPY COVER SAMPLE METHOD) and enter the total LIVE CANOPY COVER percent from the canopy cover calculator in the PDR (always round down to the nearest percent). Once the 10 percent threshold is determined by measuring crown widths, the crew can switch to the ocular method to determine the total LIVE CANOPY COVER value. LIVE CANOPY COVER can be based on an ocular estimate when the condition in question is certain to contain less than 6 percent or greater than 14 percent LIVE PLUS MISSING CANOPY COVER or CURRENT AFFORESTATION CODE = 1 and TOTAL STEMS greater than or equal to 150. For LIVE CANOPY COVER less than 1 percent (trace), record 01.

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 2-23). Canopy area = pi*((long axis diameter/2)*(90 degrees axis diameter/2)).

- Include live trees, saplings, and seedlings species that are valid within the geographic area that the plot is located in according to the tree species list (appendix 3: FIA Tree Species Codes).
- Trees, saplings, and seedlings with stems originating within the entire Subplot, Acre, Sub-acre, or their associated phantoms are counted in this process.
- 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 5.0U "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.
- When a clump of trees, saplings, or seedlings is encountered within a subplot, their combined crowns can be measured as one unified crown. When individual stems from within a clump originate outside the sample area, ignore the canopy cover associated with these stems.
- 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.
- Do not compact crown width measurements (with exception of abnormal branches) even if trees are sparsely leafed. Crown width measurements are not compacted and are measured to the end of the branches regardless of how sparsely leafed the branches are.
- For leaning trees originating within the sample area, ocularly upright the trees and measure crown widths as if the trees were upright. The only reason the tree is evaluated in the upright position is to allow for a consistent canopy width measurement. Do not count any canopy cover that is being overtopped by the leaning tree in its leaning position.
- Hardwood seedlings must have a length of at least 1 foot and softwoods a length of at least 6 inches to be included in canopy cover.
- Enter all qualified seedlings whose crowns are less than 1 foot by 1 foot as 1 foot by 1 foot in the canopy cover calculator. This does not apply in cases where such seedlings are comingled in such a fashion that their comingled dimensions are already greater than 1 foot by 1 foot.
- Grasses, herbs, shrubs, and UNLISTED tree species are not considered when determining whether a crown is overtopped.
- For entirely nonsampled plots (CONDITION CLASS STATUS = 5), use current and historical imagery to determine LIVE CANOPY COVER of the condition class that would be defined at plot center if ground visited.

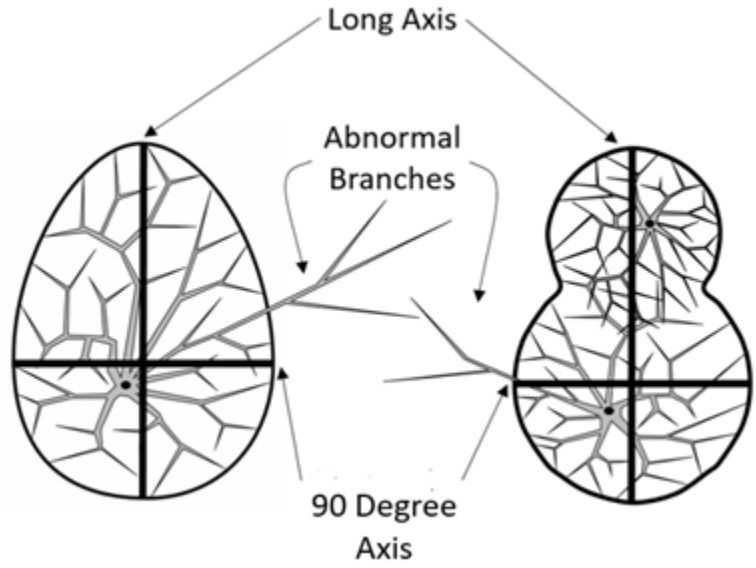


Figure 2-23. Examples of where to measure canopy widths. The Long Axis is measured on the widest portion of the crown as seen from above and the 90 Degree Axis is the widest portion of the crown perpendicular to the Long Axis. It is not required that either axis intersect with the bole of the tree or trees.

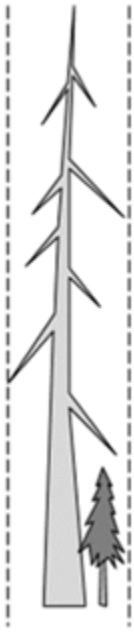


Figure 2-24. LIVE CANOPY COVER is attributed to the live sapling and LIVE PLUS MISSING CANOPY is only attributed to the portion of the missing canopy not already assigned to the live saplings crown.

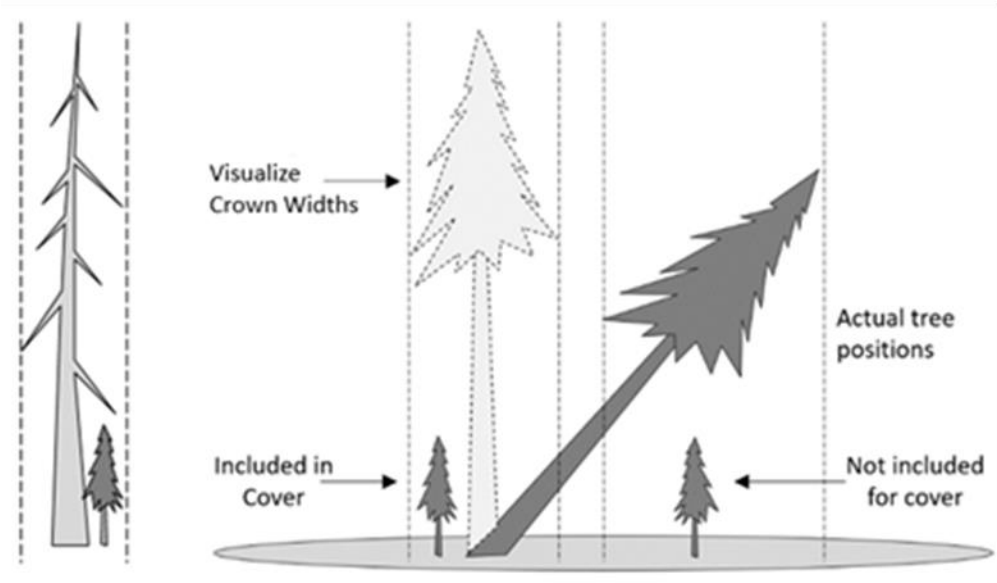


Figure 2-25. In order to measure crown widths on leaning trees visualize them as if they were completely upright. Do not count any canopy cover that is being overtopped by the leaning tree in its leaning position. Do not exclude canopy cover that would be temporarily overtopped while the tree is visualized in the upright position for crown width measurements.

LIVE CANOPY COVER can be based on an ocular estimate when the condition in question is certain to contain greater than 14 percent or less than 6 percent LIVE PLUS MISSING CANOPY COVER or CURRENT AFFORESTATION CODE = 1 and TOTAL STEMS greater than or equal to 150. For LIVE CANOPY COVER less than 1 percent (trace), record 01.

When collected: URBAN CONDITION CLASS STATUS = 1, 2, 3, 4, or 5
Field width: 2 digits
Tolerance: +/- Class one class: 0-5, 6-7, 8-9, 10-12, 13-15, 16-19, 20-24, 25-49, 50-74, 75-100
MQO: At least 99% of the time
Values: 00 – 99 (where 99 = 99-100%)

2.5.30.3+U LIVE PLUS MISSING CANOPY COVER

LIVE PLUS MISSING CANOPY COVER is used to ensure that a temporary reduction in LIVE CANOPY COVER does not result in a forested condition being reclassified to a nonforest condition solely due to natural events or management practices that the canopy is expected to recover from.

Record the percentage of LIVE PLUS MISSING CANOPY COVER for the condition by adding the LIVE CANOPY COVER to the estimated missing canopy cover. Missing canopy cover includes all dead, harvested, and removed trees, saplings, and seedlings as well as dead portions of live trees. Only include species that are valid within the geographic area that the plot is located in according to the tree species list (Appendix 3: FIA Tree Species Codes). Do not include missing canopy that has been replaced by the current live canopy or missing canopy that existed before the most recent conversion of a forested condition to a nonforest condition. Base the estimate on field observations, aerial photos, historical aerial imagery, and similar evidence in adjacent stands that do not have dead, harvested, or removed trees. The total of the LIVE PLUS MISSING CANOPY COVER cannot exceed 100%.

- Forest land cannot be classified as nonstocked indefinitely. The time frames listed below mark the amount of time a condition initially classified as nonstocked forestland may remain so if the condition does not contain any live seedling, saplings, or trees within the CANOPY COVER SAMPLE METHOD used to evaluate it (Subplot, Sub-acre, Acre, or Phantom). At which point, after the timeframe is reached, the previously nonstocked condition is considered converted to nonforest land.
  - 10 years National Forest Regions 8 and 9
  - 30 years National Forest Regions 1, 2, 3 ,4, 5, 6, and 10
- Use professional judgment when estimating missing crowns from stumps. Take into consideration the spacing of the stumps and the size of any possible remaining live crowns in the area.
- Do not double count canopy layers. Live canopy supersedes any missing canopy at the same location. Ignore portions of missing canopy that have live trees, saplings, and seedlings below them.
- For entirely nonsampled plots, use current and historical imagery to determine LIVE PLUS MISSING CANOPY COVER of the condition at plot center.
- If there was a conversion from a forestland condition to a nonforest condition and now the converted condition is starting to regenerate, ignore any missing canopy that was present prior to the conversion.
- Don't count missing canopy that has been replaced by new growth, even if the new growth is now dead. It's the new growth (now dead) that is counted as missing canopy.

Do not include missing canopy cover in the following situations because in these cases LIVE CANOPY COVER should equal LIVE PLUS MISSING CANOPY

- In contrast to regular mowing (a sign of a nonforest condition), chaining or similar 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 forestland. As a result, only live canopy cover should be considered in the forestland determination in those areas that have been chained or have received similar treatments where the intent was the permanent removal of trees; missing (dead or removed) canopy cover is not considered in the forestland call.
- Agricultural practices such as grazing that are so intensive that live canopy cover is reduced below 10 percent, thus creating a nonforest condition.
- There has been a deliberate conversion to a developed or agricultural nonforest condition.
- Unless the previous crew made an obvious error, do not include missing canopy cover on a remeasure plot that was initially determined to be nonforest. Once a condition has been classified as nonforest, the missing canopy cover timeline starts fresh and missing canopy from prior to, or as a result of, the conversion to a nonforest condition is not considered at remeasurement when evaluating the condition as potential forestland.
- A natural / semi-natural CONDITION CLASS STATUS change prevents the establishment and survival of trees. These are the instances where the canopy is not expected to recover. For example:
  - Beaver activity or landslides cause a long-term back-up of a waterway, converting the area to Noncensus or Census water after the trees die.
  - A volcanic lava flow, major rockslide, or other similar event changes the site condition to such an extent that it could no longer support the establishment or survival of trees, and is now considered nonforest.

- Saltwater intrudes after a hurricane creating a saltwater marsh.

When collected: URBAN CONDITION CLASS STATUS = 1 or 5 Dropping missing canopy on status 2 conditions.
Field width: 2 digits
Tolerance: +/- Class one class: 0-5, 6-7, 8-9, 10-12, 13-15, 16-19, 20-24, 25-49, 50-74, 75-100
MQO: At least 80% of the time
Values: 00 – 99 (where 99 = 99-100%)

2.5.31+U CURRENT AFFORESTATION CODE

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

2.5.32+U PREVIOUS AFFORESTATION CODE

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

2.5.33 TOTAL STEMS

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 canopy cover 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

2.5.34+U CHAINING CODE

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

2.6 Optional Fuels Variables for DWM Protocol Not Collected in URBAN FIA

2.7+U INVASIVE PLANT CONDITION SAMPLE STATUS

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

2.8+U INVASIVE PLANT CONDITION NONSAMPLED REASON

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

When collected: On conditions where INVASIVE PLANT CONDITION 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.

3.0 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.

3.1+U URBAN SUBPLOT NUMBER

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

3.2+U SUBPLOT MONUMENT FOUND (CORE OPTIONAL)

Remeasurement (SAMPLE KIND = 2) locations only. Record a code to indicate if the previously placed subplot monument (pin stake or other) was found as established by the prior crew. If a subplot was not previously monumented, use code 0.

When collected: SAMPLE KIND = 2 and URBAN SUBPLOT STATUS = 1, 2, or 3
Field Width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

0 Previous subplot monument was not placed, was not found, or was found displaced
1 Previous subplot monument was found in its established location

3.3+U MICROPLOT MONUMENT FOUND (CORE OPTIONAL)

Remeasurement (SAMPLE KIND = 2) locations only. Record a code to indicate if the previously placed microplot monument (pin stake or other) was found as established by the prior crew. If a microplot was not previously monumented, use code 0.

When collected: SAMPLE KIND = 2 URBAN SUBPLOT STATUS = 1, 2, or 3
Field Width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

0 Previous microplot monument was not placed, was not found, was found displaced, or would occupy a nonsampled area
1 Previous microplot monument was found in its established location

3.4+U URBAN SUBPLOT STATUS

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~~

3.5+U URBAN SUBPLOT NONSAMPLED REASON
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 Section 1.5).
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 subplot 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 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.

3.6 NONFOREST SUBPLOT/MACROPLOT STATUS Not Collected in URBAN FIA

3.7 NONFOREST SUBPLOT/MACROPLOT NONSAMPLED REASON Not Collected in URBAN FIA

3.8 SUBPLOT CENTER CONDITION

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

3.9 MICROPLOT CENTER CONDITION

3.9.1U URBAN MICROPLOT 11 (EAST) CENTER CONDITION

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

3.9.2U URBAN MICROPLOT 12 (SOUTH) CENTER CONDITION

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

3.9.3U URBAN MICROPLOT 13 (WEST) CENTER CONDITION

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

3.9.4U URBAN MICROPLOT 14 (NORTH) CENTER CONDITION

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

3.10+U SUBPLOT SLOPE

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

3.11+U SUBPLOT ASPECT

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

3.12+U SNOW/WATER DEPTH

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 PLOT 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

3.13+U URBAN SUBPLOT CONDITION LIST

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

3.14 P2 VEG SUBPLOT SAMPLE STATUS Not Collected in URBAN FIA

3.15 VEGETATION NONSAMPLED REASON Not Collected in URBAN FIA

3.16 VEGETATION SUBPLOT NOTES Not Collected in URBAN FIA

3.17 INVASIVE PLANT SUBPLOT SAMPLE STATUS (Subplot-level variable) Not Collected in URBAN FIA

3.18 INVASIVE PLANT NONSAMPLED REASON (Subplot-level variable) Not Collected in URBAN FIA

3.19 INVASIVE PLANT DATA NOTES Not Collected in URBAN FIA

3.20 UNLISTED TREE PRESENT

The Master Species List is the result of consultations among arborists, foresters, and forest specialists around the Nation. It is a comprehensive list that will account for the majority of tree

form species that crews may encounter in the field. However, it is still possible for crews to encounter a species with tree-like growth form that was unintentionally OR intentionally excluded from the list. For example, when local environmental conditions cause the growth form of a species to present as a woody plant with a single well-defined, dominant main stem with a DBH/DRC of at least 5.0 inches. The purpose of this variable is to provide information on such species to further refine the species list in future inventories.

An UNLISTED TREE is defined as a live tree that is at least 5.0 inches DBH located within a subplot that is not listed in Appendix 3 OR is listed but is found within an Island, Mainland, or P2/3 Sub-list where it is not a legal tally tree.

The diameter standard switches to DRC for those DRC species on the list that are found in an Island, Mainland, or P2/3 Sub-list where they are not a legal tally. In order for these DRC species to qualify, they must have at least one 5-inch diameter stem. If it is a multiple stem DRC tree and it has 2 qualifying stems, it is only recordedas one tree.

Record the presence of any UNLISTED TREEs found on the subplot / macroplot when SUBPLOT / MACROPLOT STATUS = 1 or NONFOREST SUBPLOT / MACROPLOT STATUS = 1 regardless of the specific condition in which the unlisted tree is located.

When collected: When SUBPLOT / MACROPLOT STATUS = 1 or NONFOREST SUBPLOT / MACROPLOT STATUS = 1
Field width: 1 digit
Tolerance: No errors
MQO: At least 90% of the time
Values:

0 No unlisted trees present.
1 Unlisted tree present.

3.21 UNLISTED TREE GENUS
Record the genus for each UNLISTED TREE species encountered on the subplot.

When collected: When UNLISTED TREE PRESENT = 1
Field width: 70 characters
Tolerance: No errors
MQO: At least 70% of the time
Values: English language letters

3.22 UNLISTED TREE SPECIES
Record the species of each UNLISTED TREE GENUS recorded.

When collected: When UNLISTED TREE PRESENT = 1
Field width: 70 characters
Tolerance: No errors
MQO: At least 70% of the time
Values: English language letters

3.23 UNLISTED TREE SPECIES COUNT
Record the number of instances each UNLISTED TREE SPECIES is encountered on the subplot. Estimate counts over 10 individuals. If a species is found on a subplot and not present on another subplot, code 0 for any other subplots where it is not present.

When collected: For each UNLISTED SPECIES encountered
Field width: 2 digits
Tolerance: +/- 10%
MQO: At least 70% of the time
Values: 0 to 99

3.24 UNLISTED TREE SPECIMEN COLLECTED (CORE OPTIONAL Collected in NRS, RMRS)
Record a code to indicate whether or not a specimen was collected for each UNLISTED TREE SPECIES. If a specimen is not collected, describe the reason it is not collected in UNLISTED TREE NOTES.

When collected: All UNLISTED TREE SPECIES records. Collected in NRS, RMRS
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.

3.25 SPECIMEN LABEL NUMBER (CORE OPTIONAL Collected in NRS, RMRS)
Record the label number for the collected specimen.

When collected: When UNLISTED TREE SPECIMEN COLLECTED = 1. Collected in NRS, RMRS.
Field width: 5 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: 1 to 99999, as pre-assigned by FIA unit

3.26 UNLISTED TREE NOTES
Notes are required for each UNLISTED 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 UNLISTED TREE.

PDR Note: Record this note while in the UNLISTED 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).

When collected: Required for each UNLISTED TREE SPECIES record
Field width: Unlimited alphanumeric character field
Tolerance: N/A
MQO: N/A
Values: English language words, phrases, and numbers

3.27U REMAINING CONDITION

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 3-U.

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

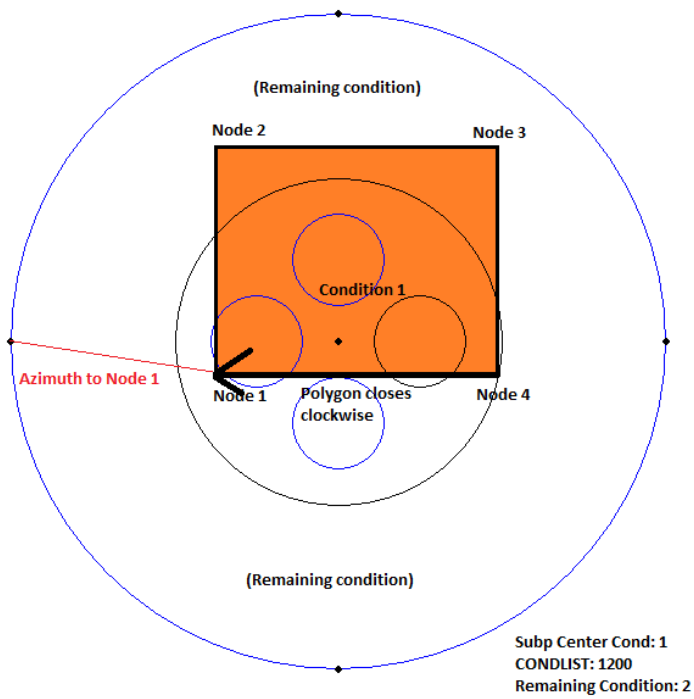


Figure 3-1U. Example of the use of REMAINING CONDITION. This subplot contains 2 conditions, one of which has been mapped out. In this case the mapped out area is a closed boundary representing condition 1, the remaining unmapped area within the subplot (condition 2) is considered the REMAINING CONDITION.

3.28U 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.

3.29U SUBPLOT–CONDITION SUBPLOT NUMBER

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

3.30U SUBPLOT–CONDITION CONDITION NUMBER

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

3.31U 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 listed on the Master Species List; all other woody vegetation, including trees that are landscaped or manicured to the extent that an accurate DBH / DRC can not 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 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

Table 3-1U. Cover to area relationships for urban subplot. Only applies when the entire subplot is ONE condition.

3.31.1U PERCENT TREE / SAPLING COVER

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 to 100

3.31.2U PERCENT SHRUB / SEEDLING COVER

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

3.32U 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 3-2U. 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.

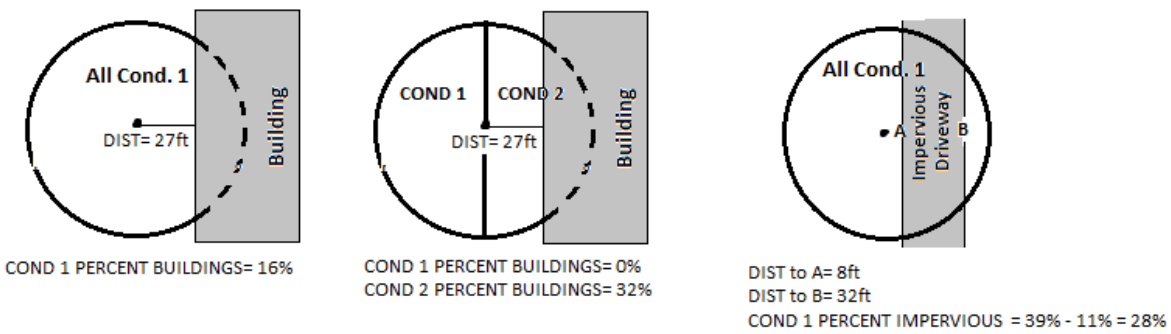


Figure 3-2U. Examples of using Table 3-2U to calculate Subplot-Condition Surface Cover.

3.32.1U PERCENT BUILDINGS

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: 3 digits
Tolerance: +/- 10%
MQO: At least 90% of the time
Values: 00 to 100

3.32.2U PERCENT IMPERVIOUS

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. A specific impervious area on the ground must be at least 72 ft^2 before it may be added to the PERCENT IMPERVIOUS total. For example, the area covered by a 9'x9' cement slab will be considered impervious and added to the total PERCENT IMPERVIOUS, but the area of many 2'x3' 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

3.32.3U PERCENT PERMEABLE

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

3.32.4U PERCENT LOW WOODY VEGETATION/HERBACEOUS

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

3.32.5U PERCENT WATER

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

4.0+U 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.

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:

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.

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.

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

4.1+U Reference Procedure

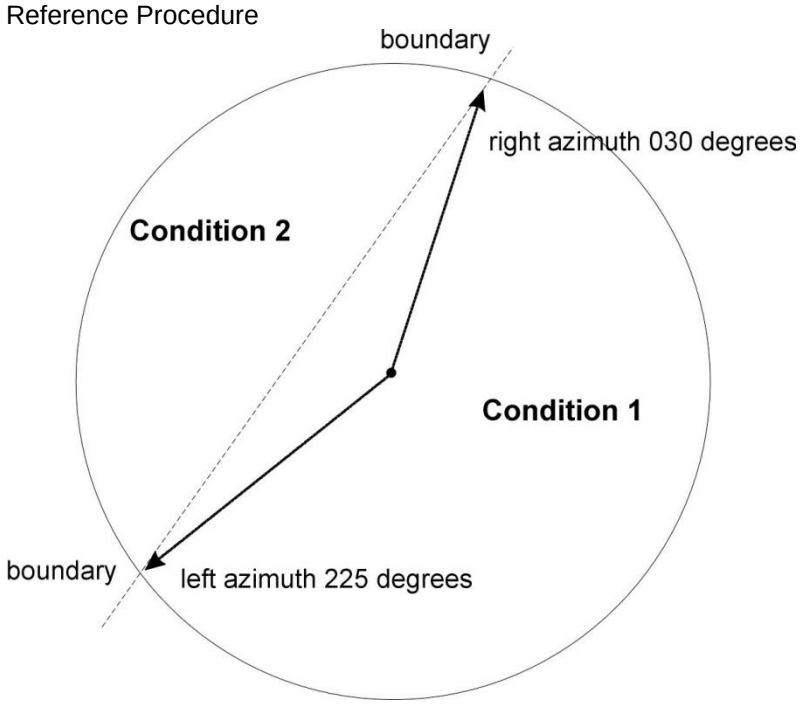


Figure 4-1+U. How to measure a straight traditional boundary on a microplot, or subplot. The left and right azimuths are measured where the condition meets the subplot perimeter.

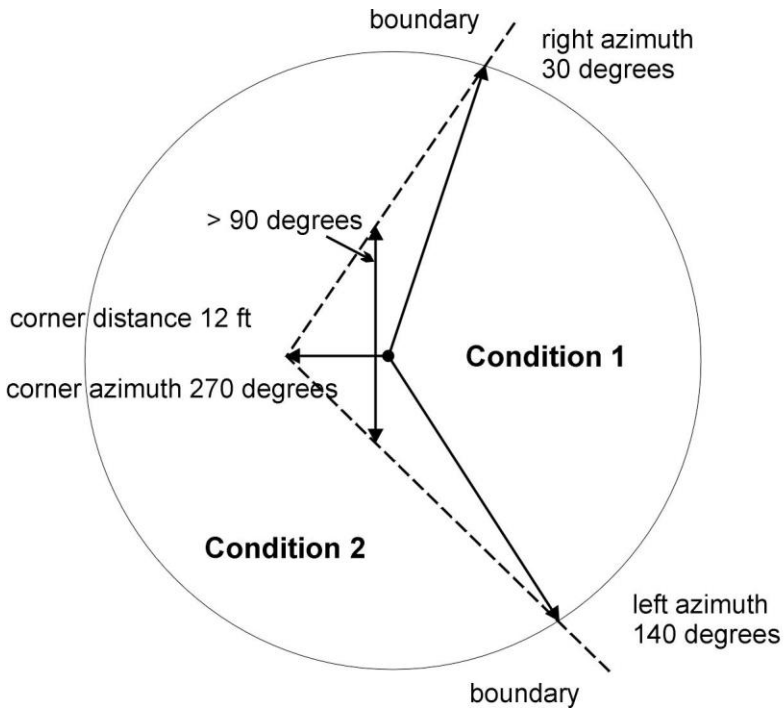


Figure 4-2+U. How to measure a traditional boundary with a corner on a subplot. The left and right azimuths are measured where the condition boundary meets the subplot perimeter. Left and right are determined by facing the condition boundary.

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 2.1 and Section 2.4 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. Parcel lines on maps and images do not meet the clear demarcation standard.
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.

4.2 Boundary Data

4.2.1+U URBAN SUBPLOT NUMBER

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

4.2.1.1U OFFSET POINT

Record appropriate code corresponding to the location from which the boundary was measured for each subplot / microplot (See Appendix 15U for detailed offset procedures)

When collected: All subplots and microplots
Field width: 3 digits
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

4.2.3 BOUNDARY CHANGE

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.

4.2.4+U MAPPED CONDITION

Record the CONDITION CLASS NUMBER of the condition class that is being mapped. See section 3.0 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

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

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

When collected: NRS, PNW, RMRS All boundaries
Field width: 3 digits
Tolerance: N/A
MQO: N/A
Values: 001 to 100

4.2.2+U URBAN PLOT TYPE

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

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:

4.2.2.1U URBAN MICROPLOT NUMBER

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

4.2.5+U URBAN LEFT AZIMUTH

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

4.2.6+U URBAN CORNER AZIMUTH

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

4.2.7+U URBAN CORNER DISTANCE

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

4.2.8+U URBAN RIGHT AZIMUTH

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

4.2.8.1U OFFSET LEFT AZIMUTH

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

4.2.8.2U OFFSET CORNER AZIMUTH

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

4.2.8.3U OFFSET CORNER DISTANCE

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

4.2.8.4U OFFSET RIGHT AZIMUTH

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: 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

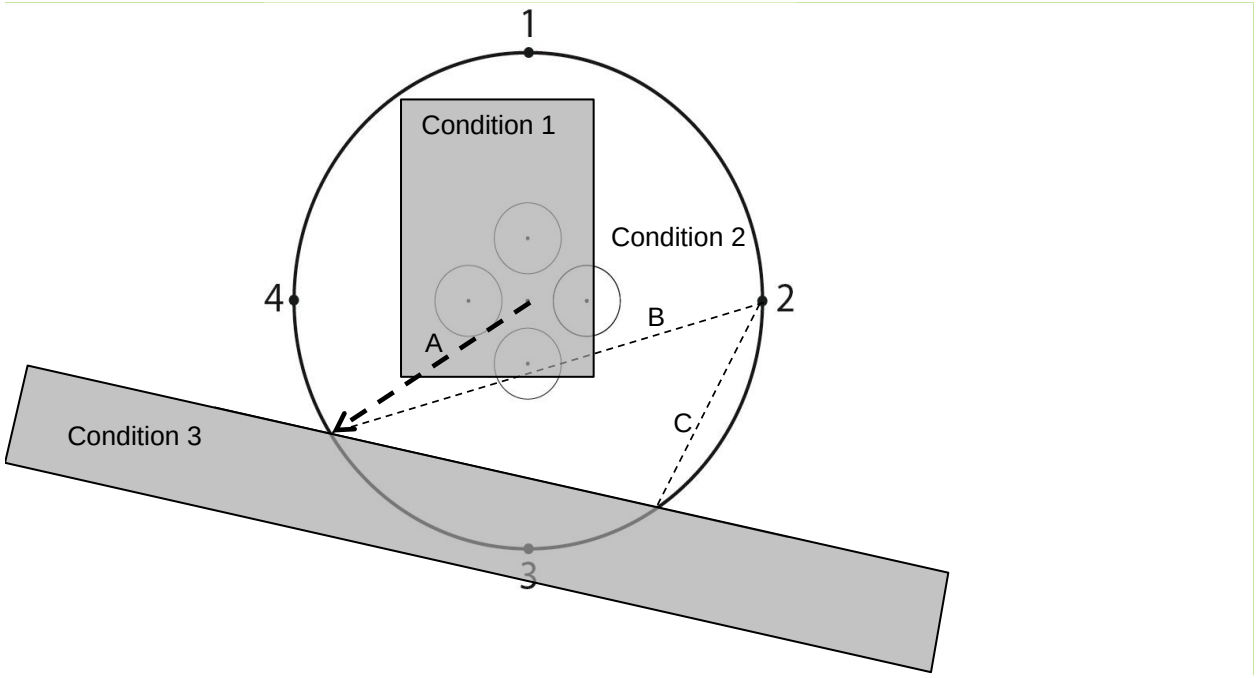


Figure 4-3U. Mapping from OFFSET POINTS. Offset boundaries are difficult because the subplot perimeter cannot be established from subplot center on the ground. A protractor can be used on the image to determine the azimuth to the intersection of the subplot perimeter and the MAPPED CONDITION from subplot 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.

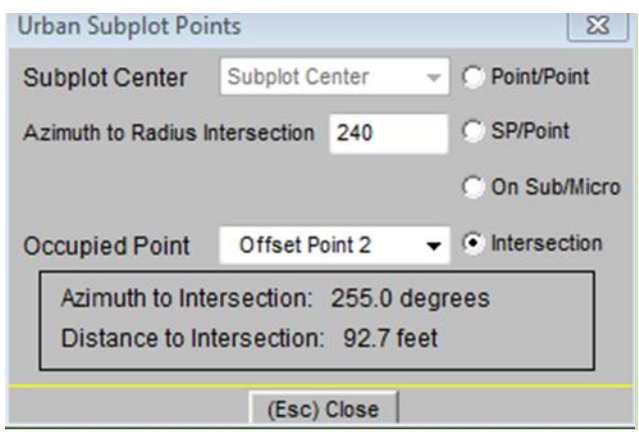


Figure 4-4U. PDR Intersection TOOL. Select Function>Midas Tools from within an Urban FIA plot file and choose the Intersection option on the right hand side of the menu. Enter the Azimuth to Radius Intersection, in this case 240 degrees from subplot center, as well as the Occupied Point location, in this case OFFSET POINT 2, and the PDR will solve for line B

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.

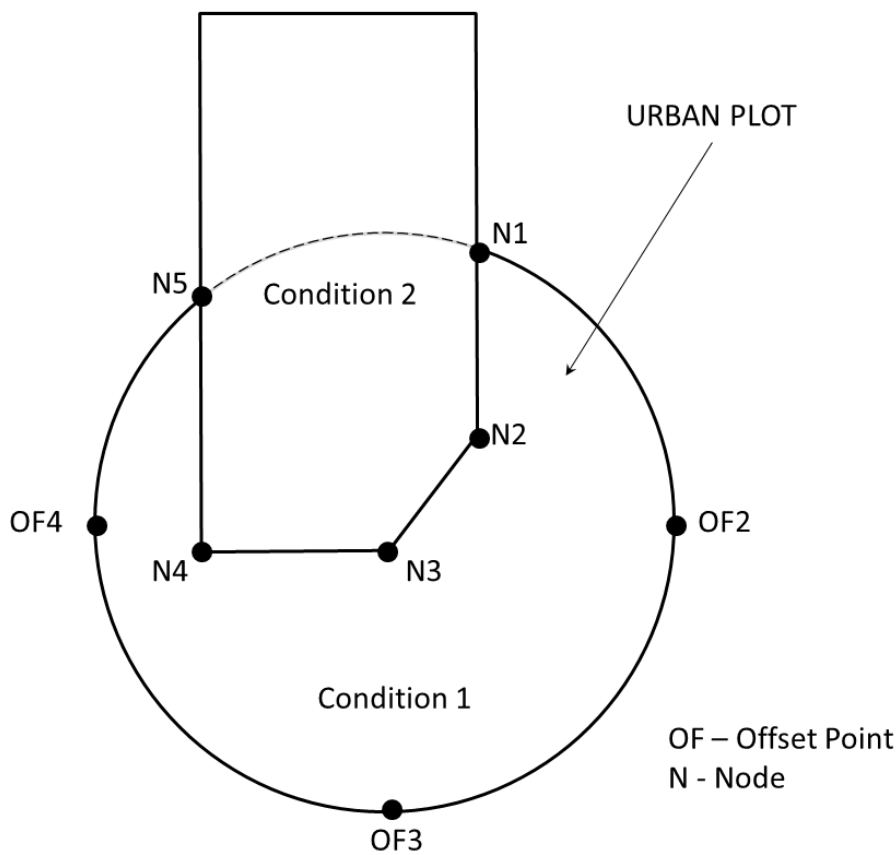


Figure 4-5U. Subplot node traverse where the mapped condition crosses the subplot perimeter.

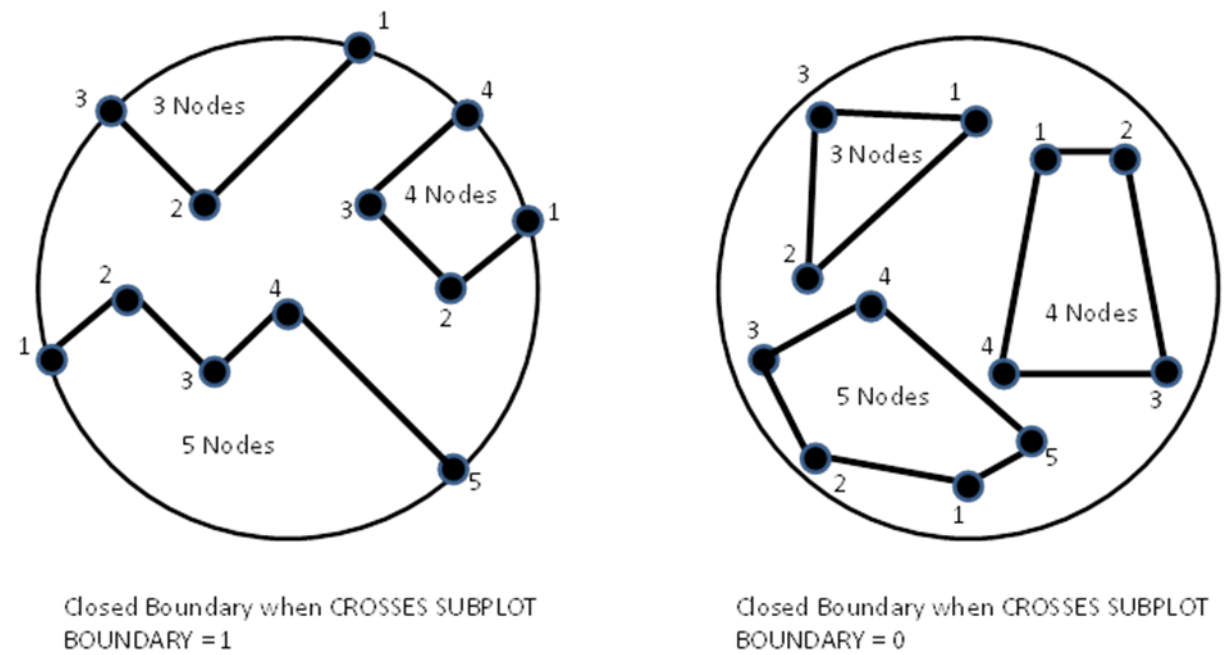


Figure 4-6U. Closed boundary examples.

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

4.2.9U CROSSES SUBPLOT PERIMETER

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

4.2.9.1U NUMBER OF NODES

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 4-6U.

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

4.2.10U AZIMUTH TO NODE 1

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 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

4.2.10.1U OFFSET AZIMUTH TO NODE 1

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: 001 to 360

4.2.11U DISTANCE TO NODE 1

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

4.2.11.1U OFFSET DISTANCE TO NODE 1

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

4.2.12U AZIMUTH TO NODE 2

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

4.2.13U DISTANCE TO NODE 2

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

4.2.14U AZIMUTH TO NODE 3

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

4.2.15U DISTANCE TO NODE 3

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

4.2.16U AZIMUTH TO NODE 4

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

4.2.17U DISTANCE TO NODE 4

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

4.2.18U AZIMUTH TO NODE 5

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

4.2.19U DISTANCE TO NODE 5

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	01 to 96 ft

5.0+U 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. Saplings are often generically termed trees within the national and regional variable text. Refer to "When Collected" to see if a variable pertains to a sapling as well as tree.

For multi-stemmed woodland species, a cumulative DRC is used to compute diameter as described in Sections 5.9 and 5.9.4. DRC species are noted in Appendix 3 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 a 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 5-1U. 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 5-2U. Manicured Arborvitae 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) depending on species. Trees that have been temporarily defoliated are still alive. SRS Note: If the stem is broken and still attached below DBH, the stem is tallied as a live tree. The severity of the break (i.e., more or less than 50% attached) on a live stem is not considered. Therefore, as long as the stem is attached and the tree is **live at DBH**, it is tallied. If all stems of a previously tallied woodland tree were killed, cut or removed and there are new sprouts at the base, treat the previously tallied tree as dead and the new sprouts (1.0-inch DRC and larger) as part of a new tree (See 5.9.4 Diameter at Root Collar Woodland stump sprouts). For DBH trees stump sprouts are considered new trees, saplings or seedlings if they originate between ground level and 4.5 feet after the creation of the “stump” (See 5.9.2 #2 Stump Sprouts).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), is considered severed and may qualify as Down Woody Material (DWM). See DWM procedures for tally criteria.

SRS Note: Dead trees where the bole is separated greater than 50 percent at 4.5 feet but maintains a DBH of 5.0 inches or greater will be measured as a Standing Dead tree.

For woodland species (Appendix 3) 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.

Trees that have been cut above the previous diameter measurement location qualify as tally trees, provided they meet the size requirement.

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.

5.1+U URBAN SUBPLOT NUMBER
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

5.1.1U URBAN MICROPLOT NUMBER
Record the microplot number where the tree occurs.

When collected: All live tally trees ≥ 1.0 inch DBH/DRC and < 5.0 inches 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

5.2+U URBAN TREE RECORD NUMBER
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

5.2.1U CORE TREE RECORD NUMBER
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.

5.2.1.1U OFFSET POINT

Record appropriate code corresponding to the location from which trees and saplings were measured for each subplot / microplot (See Appendix 15U for detailed offset procedures)

When collected: All subplots and microplots
Field width: 3 digits
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

5.3 CONDITION CLASS NUMBER

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 5-3).

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

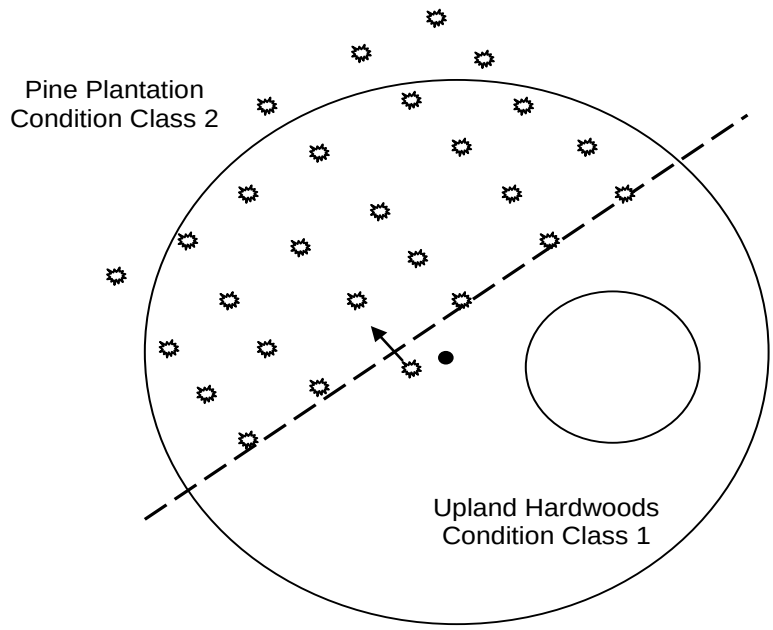


Figure 5-3. Ragged CONDITION CLASS boundary and tree condition class designation.

5.4+U URBAN AZIMUTH

Record the URBAN AZIMUTH, to the nearest degree, 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), by sighting the pith of the tree at the base where it enters the ground using a compass. Sight to the "geographic center" for multi-stemmed woodland species (Appendix 3). 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/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

5.4.1U URBAN OFFSET AZIMUTH

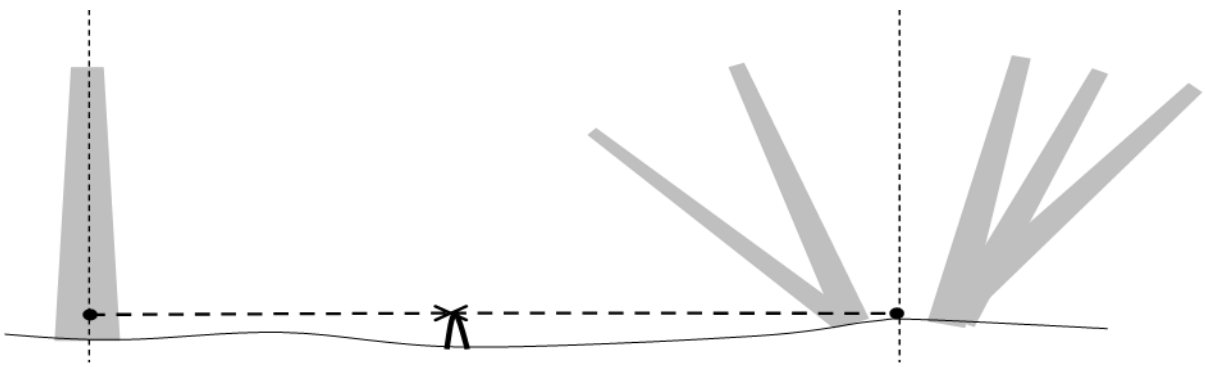
Procedures are the same as Section 5.4+U with the exception that the measurements are taken from an OFFSET POINT which does not represent the center of the subplot/microplot to which the tree/sapling is assigned.

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

5.5+U URBAN HORIZONTAL DISTANCE

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 3), 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.

To determine the pith center of a tree is difficult. Horizontal distance is measured to the center of the tree that is a perpendicular line from the pin center.



SRS Figure E. Horizontal distance measurement to single stem v. multistemmed woodland tree.

Note: On remeasurement plots (SAMPLE KIND = 2), the current crew is responsible for verifying downloaded data and updating when it is out of tolerance. When the old pin or dowel is not found, current cruisers should consider all “edge” trees or saplings that were in or out on the previous occasion when reestablishing the subplot center. An error in pin placement may result in trees that were previously tallied as in to be out and vice versa. For saplings on the microplot that become trees at the time of plot remeasurement, crews must collect new HORIZONTAL DISTANCE information from the subplot center.

Crews must take extra time when measuring new trees on the outer edge of the subplot and/or microplot. New trees are either in the fixed radius plot or not. It is unacceptable to tally a tree beyond the dimensions of the fixed radius plot.

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.

5.5.1U URBAN OFFSET HORIZONTAL DISTANCE

Procedures are the same as Section 5.5+U 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.

5.6 PREVIOUS TREE STATUS

If not downloaded from the previous inventory, record PREVIOUS TREE STATUS for each remeasured tally tree, including ALL new standing dead trees (PRESENT TREE STATUS = 2, STANDING DEAD CODE = 1, RECONCILE >0). This code is used to track the status of sample trees over time. This information is needed to correctly assign the tree to the proper component of 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

5.7+U URBAN PRESENT TREE STATUS

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 to the proper component of change.

SRS Note: When measuring a tree that has a temporary hazardous situation (e.g., hornet's nest, seasonal high water, etc.) isolating the tree on the subplot or microplot, it should be given URBAN PRESENT TREE STATUS = 1 or 2 and the crew is allowed to estimate the measured variables. When estimating measured variables, view similar trees on plot and be conservative. A tree that occupies a permanent hazardous situation requires that the subplot area be delineated as nonsampled (URBAN CONDITION CLASS STATUS 5).

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 because it is located on a Nonsampled Condition (i.e., hazardous or denied). 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 5-1U. 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 live or dead saplings on the microplot, crews must collect new URBAN AZIMUTH and URBAN HORIZONTAL DISTANCE information from the microplot center.

5.7.1+U URBAN RECONCILE

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 information to the proper component of 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 1-2 are only valid for new trees (URBAN PRESENT TREE STATUS = 1 or 2) on the plot and exclude trees associated with a change in procedures / definitions or previous cruiser error, as such trees are accounted for with RECONCILE = 7 or 8. If a new tree is located in an area that was previously nonsampled, then use RECONCILE = 9.

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 (i.e., grew from seedling to at least 5.0 inches DBH between plot inventory cycles – such trees were never tallied on a microplot). This code would be used for trees that were transplanted to the site and had a DBH/DRC of 5” or greater.

Code 5 is only valid for remeasured trees (URBAN PRESENT TREE STATUS = 0) that no longer qualify as tally:

5 Shrank – Live tree that shrank below threshold diameter on microplot/subplot. Must currently be alive.

Codes 6-9 are valid for both new tally trees (PRESENT TREE STATUS = 1 or 2) and remeasured trees that no longer qualify as tally (URBAN PRESENT TREE STATUS = 0).

6 Physical movement – Either (a) 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), or (b) tree was outside the radius of the plot previously, but has now moved within the plot due to natural causes. 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 – Either (a) tree was erroneously tallied (added tree), or (b) tree was erroneously not tallied (missed tree) at the previous inventory.
8 Procedural change – Either (a) tree was tallied at the previous inventory, but is no longer tallied due to a definition or procedural change, or (b) was not tallied at the previous inventory, but is now tallied due to a definition or procedural change, regardless of DBH/DRC at the time of the previous inventory.
9 Nonsampled area - Either (a) tree was located in a sampled condition at the previous inventory, but now is in a nonsampled condition, or (b) the area where the tree is located was previously not sampled, but now is sampled. All trees located in a nonsampled area (either now or previously) 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 Appendix 8 CORE 9.2 to determine the national coding method for remeasurement trees.

5.7.2 STANDING DEAD

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 5-8Figure 5-10 for examples. Trees that do not meet the standing dead definition are considered down dead regardless of the diameter of any remaining shards at the diameter measurement point.

Unbroken is demonstrated by ≥ 50 percent of the bole's circumference (shell) being continuously intact. Intact is defined as not severed, splintered, shattered, fractured or missing (due to fracturing) and still attached to the original source of growth. To determine the percentage broken compare the current intact portion of the shell to a projection of the portion of the shell that is no longer intact (Figure 5-4 and Figure 5-5). If a bole has split into multiple sections at least one of the sections must represent at least 50 percent of the bole's circumference to be considered unbroken (Figure 5-6). Boles that have shrunk for any reason but are still intact are considered unbroken (Figure 5-7). Additionally, the emphasis is on an "unbroken" bole rather than any rotten or missing wood that would be captured in the ROTTEN/MISSING CULL variable. At times differentiating wood that is missing due to fracturing (counts towards a broken bole) from wood that is missing due to rot, fire or other (does not count towards a broken bole) is difficult; if uncertainty exists assume the missing wood is due to fracturing.

Trees that do not meet the standing dead definition are considered down dead regardless of the diameter of any remaining shards at the diameter measurement point .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.

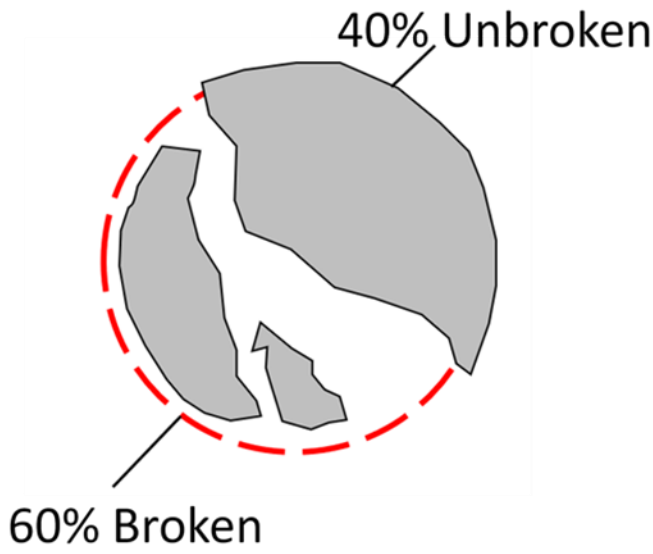


Figure 5-4. 40 % Unbroken.

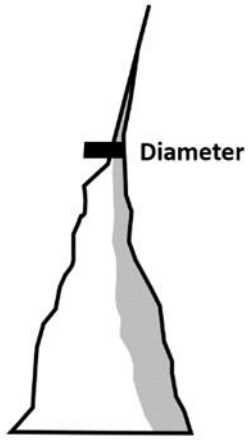


Figure 5-5. 10% Unbroken.

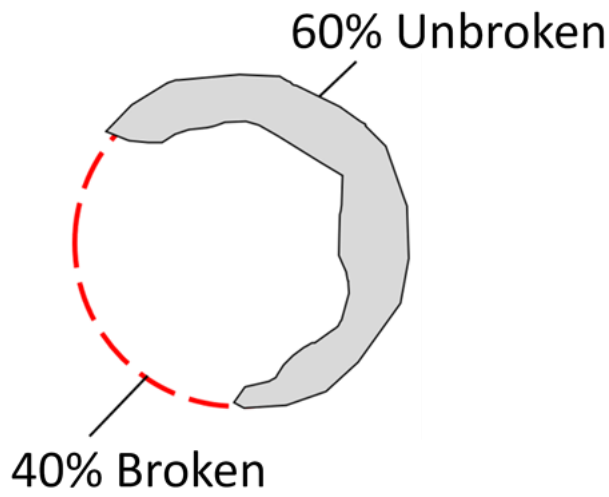


Figure 5-6. 60% Unbroken.

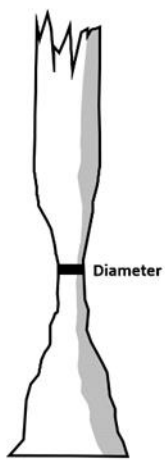


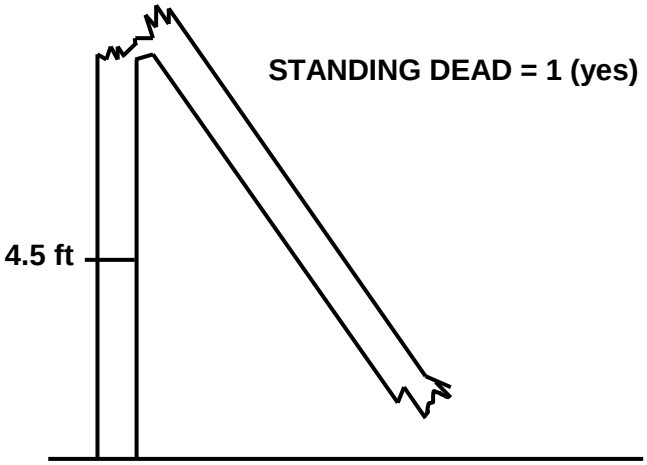
Figure 5-7. 100% Unbroken.

For woodland species (Appendix 3) 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.

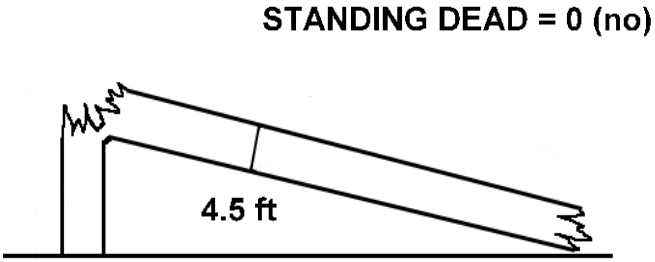
When collected: SAMPLE KIND = 2 only: All dead tally trees (PRESENT TREE STATUS = 2)
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

0	No – tree does not qualify as standing dead
1	Yes – tree does qualify as standing dead.



(Tree is at least 1.0 inch at 4.5 feet and is at least 4.5 feet in unbroken ACTUAL LENGTH)

Figure 5-8. Example of an unbroken bole to 4.5 feet.



(Tree is at least 1.0 inch at 4.5 feet, but does not have 4.5 feet in unbroken ACTUAL LENGTH)

Figure 5-9. Example of an unbroken length of < 4.5 feet.

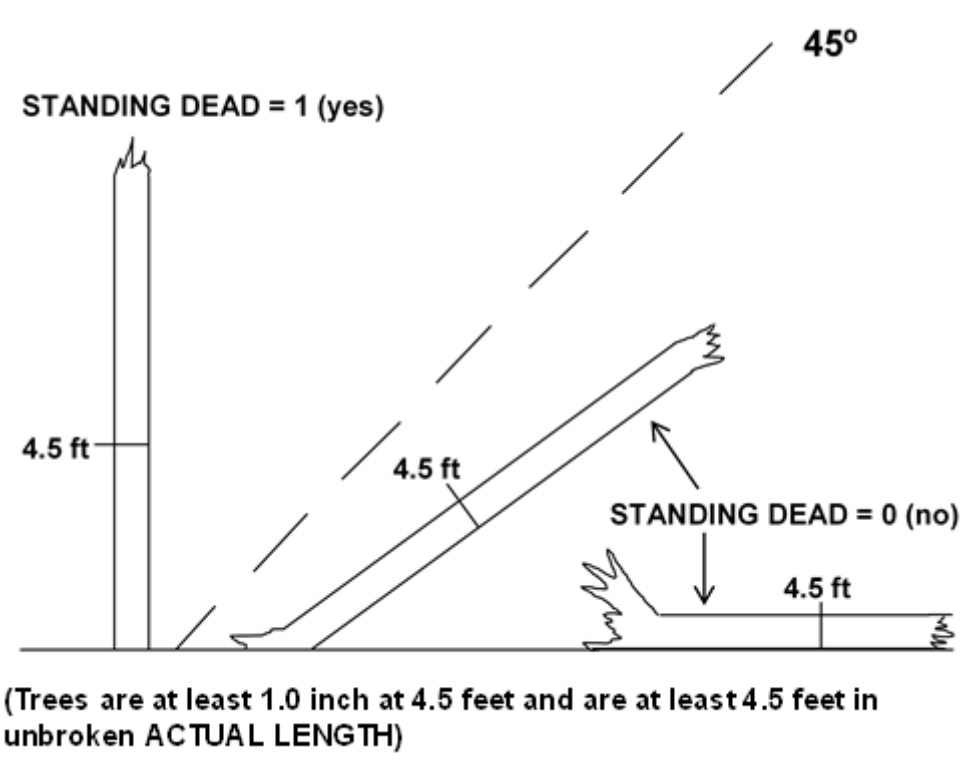


Figure 5-10. Other examples of dead trees

5.7.3 MORTALITY (URBAN OPTIONAL Collected in PNW)

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: PNW 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.

5.7.4U BOLE/STUMP REMOVED

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.

5.8+U SPECIES

Record the appropriate SPECIES code from the Master Species List (Appendix 3. If the species cannot be determined in the field, tally the tree, but collect samples of, foliage, cones, flowers, bark, etc. to the office for further researching. If possible, collect samples outside the subplots from similar specimens and make a note to correct the SPECIES code later. Use code 0999 only as a place holder (outside the Pacific and Caribbean Islands) in the PDR for an unknown live tree while its actual species is being investigated. Use code 0299 for unknown dead conifer, 0998 for unknown dead hardwood when the genus or species codes cannot be determined. This is often the case with standing dead trees on newly established plots. The generic (genus) code should only be used when you are sure the species is on the Master Species List, but you cannot differentiate among acceptable species. Use of the genus code should be a last resort and is limited to valid genus codes within the Island Sub-list, Mainland Sub-list, and their respective P2/3 Sub-lists that are associated with the trees geographic location. If a hybrid species is found, naturally or planted, and is on the Master Species List, use the hybrid code; otherwise code the parent species with the most dominant characteristic from the list. If neither the hybrid nor either of the parent species are listed, then do not tally the species and follow the UNLISTED TREE protocol. If a variety or subspecies is found, naturally or planted, and is listed on the Master Species List, use the corresponding variety / subspecies code. If the variety is not listed, but the species is listed, code the specimen using the species code. Species marked as woodland (W) designate species where DRC is measured instead of DBH. When trees are grafted, use the dominant characteristics visible on the tree to assign the species.

The Master Species List includes all tree species tallied in the Continental U.S., as well as both the Pacific and Caribbean Islands, including Hawaii Figure 5-11.

- It includes an Islands Sub-list which also contains one P2/3 Sub-list which allows for species to be excluded from tally on P2/3 plot types. As of Field Guide 9.2, there are no species on the Islands P2/3 Sub-list.
- It also includes a Mainland Sub-list which also contains nine P2/3 Sub-lists based on National Forest System regional boundaries which allows for species to be excluded from tally on P2/3 plot types. Plots are assigned to specific National Forest System regional boundaries in the office as these boundaries do not always follow State boundaries. For example, NFS R1 goes into WA, NFS R6 goes into ID, NFS R4 goes into CA, and NFS R8 goes into WV (Figure 5-12).
- 33 species (FG 9.2) separate the Islands Sub-list from the Mainland Sub-list as shown in Table 5-1, tally of these species is limited to the Islands (Pacific and Caribbean). These species are referred to as Island Only Species (IOS).
- Species listed on a specific P2/3 Sub-list are considered shrubs within the specific area associated with the P2/3 Sub-list on both P2 and P3 plots including DWM.

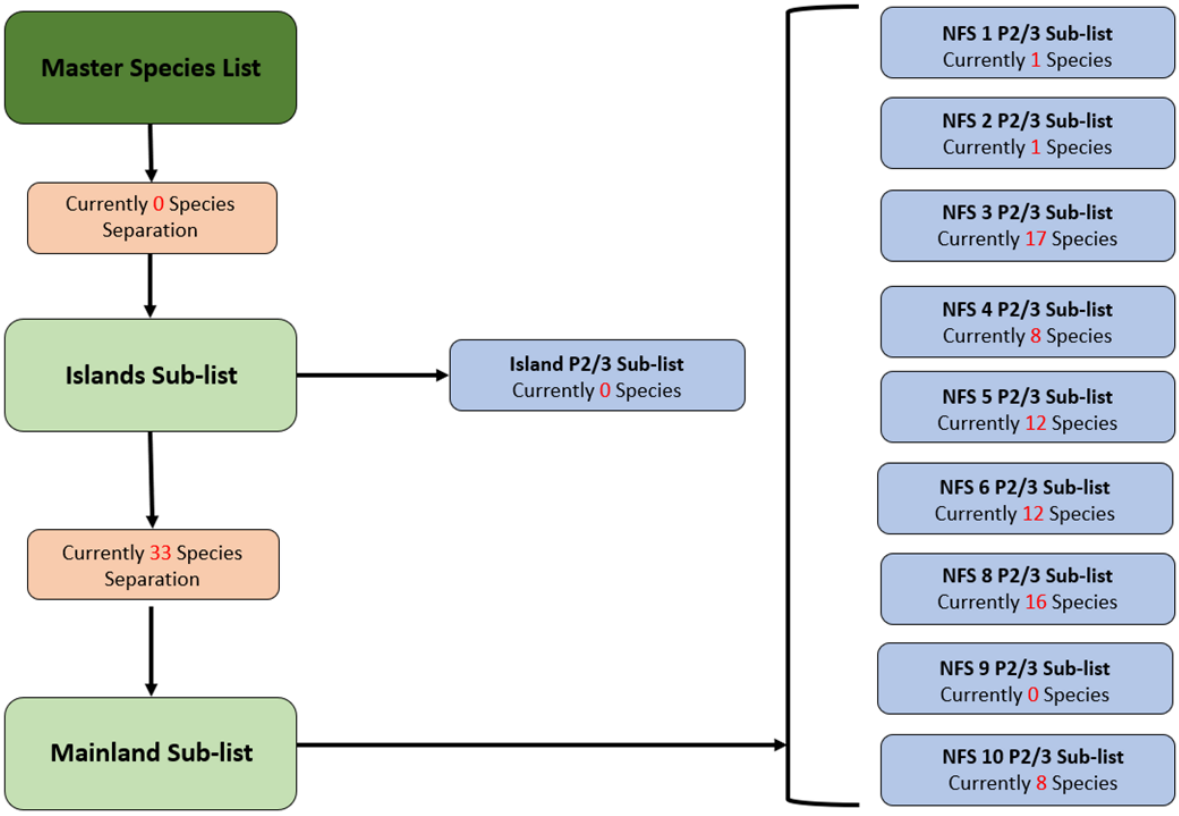


Figure 5-11. Description of the Master Species List.

Table 5-2. List of species separating the Island and Mainland Sub-lists; these species are referred to as Island Only Species (IOS)

Islands Only Species	Woodland	FIA code	Common name	Genus	Species	Variety	PLANTS code	Past NRS tally	Past PNW tally	Past RMRS tally	Past SRS tally	Carib-bean	Pacific	Urban	Historic P2
IOS	.	300	acacia spp.	Acacia	spp.	.	ACACI	R, U	P, U	U	C, U	C	P	.	P2
IOS	.	999	other or unknown live tree	Tree	unknown	.	2TREE	R, U	R, U	R, U	R, C, U	C	.	.	P2
IOS	.	6161	shoebutton	Ardisia	elliptica	.	AREL4	U	P, U	U	U	.	P	.	.
IOS	.	6474	day jessamine	Cestrum	diurnum	.	CEDI6	U	P, U	U	C, U	C	P	.	.
IOS	.	6535	icaco coco plum	Chrysobalanus	icaco	.	CHIC	U	U	U	C, U	C	.	.	.
IOS	.	6670	seagrape	Coccoloba	uvifera	.	COUV	U	P, U	U	C, U	C	P	.	.
IOS	.	6862	swamp titi	Cyrilla	racemiflora	.	CYRA	U	U	U	C, U	C	.	.	.
IOS	.	7104	Surinam cherry	Eugenia	uniflora	.	EUUN2	U	P, U	U	C, U	C	P	.	.
IOS	.	7196	Florida swampprivet	Forestiera	segregata	.	FOSE	U	U	U	C, U	C	.	.	.
IOS	.	7264	upland cotton	Gossypium	hirsutum	.	GOHIH2	U	P, U	U	C, U	C	P	.	.
IOS	.	7330	scarletbush	Hamelia	patens	.	HAPA3	U	U	U	C, U	C	.	.	.
IOS	.	7408	Dixie rosemallow	Hibiscus	mutabilis	.	HIMU3	U	P, U	U	U	.	P	.	.
IOS	.	7410	shoeblackplant	Hibiscus	rosa-sinensis	.	HIRO3	U	U	U	C, U	C	.	.	.
IOS	.	7455	dahoon	Ilex	cassine	.	ILCA	U	U	U	C, U	C	.	.	.
IOS	.	7493	coralbush	Jatropha	multifida	.	JAMU	U	U	U	C, U	C	.	.	.
IOS	.	7768	teabush	Melochia	tomentosa	.	METO4	U	U	U	C, U	C	.	.	.
IOS	.	7845	Wax Myrtle	Morella	cerifera	.	MOCE2	U	P, U	U	C, U	C	P	.	.
IOS	.	7912	Myrsine cubana	Myrsine	cubana	.	MYCU2	U	U	U	C, U	C	.	.	.
IOS	.	8425	white indigoberry	Randia	aculeata	.	RAAC	U	U	U	C, U	C	.	.	.
IOS	.	8472	castorbean	Ricinus	communis	.	RICO3	U	P, U	U	C, U	C	P	.	.
IOS	.	8563	Brazilian peppertree	Schinus	terebinthifolius	.	SCTE	U	P, U	U	C, U	C	P	.	.
IOS	.	8589	flor de San Jose	Senna	atomaria	.	SEAT3	U	U	U	C, U	C	.	.	.
IOS	.	8592	valamuerto	Senna	pendula	.	SEPE4	U	P, U	U	U	.	P	.	.
IOS	.	8628	American black nightshade	Solanum	americanum	.	SOAM	U	P, U	U	U	.	P	.	.
IOS	.	8626	Solanum bahamense	Solanum	bahamense	.	SOBAB	U	U	U	C, U	C	.	.	.
IOS	.	8627	mullein nightshade	Solanum	donianum	.	SODO3	U	U	U	C, U	C	.	.	.
IOS	.	8629	potatotree	Solanum	erianthum	.	SOER2	U	U	U	C, U	C	.	.	.
IOS	.	8643	silver bush	Sophora	tomentosa	.	SOTO3	U	P, U	U	U	.	P	.	.
IOS	.	8676	bay cedar	Suriana	maritima	.	SUMA2	U	P, U	U	C, U	C	P	.	.
IOS	.	8876	simpleleaf chastetree	Vitex	trifolia	.	VITR7	U	P, U	U	U	.	P	.	.
IOS	.	8901	tallow wood	Ximenia	americana	.	XIAM	U	P, U	U	C, U	C	P	.	.
IOS	.	8916	aloe yucca	Yucca	aloifolia	.	YUAL	U	U	U	C, U	C	.	.	.
IOS	.	8918	moundlily yucca	Yucca	gloriosa	.	YUGL2	U	U	U	C, U	C	.	.	.

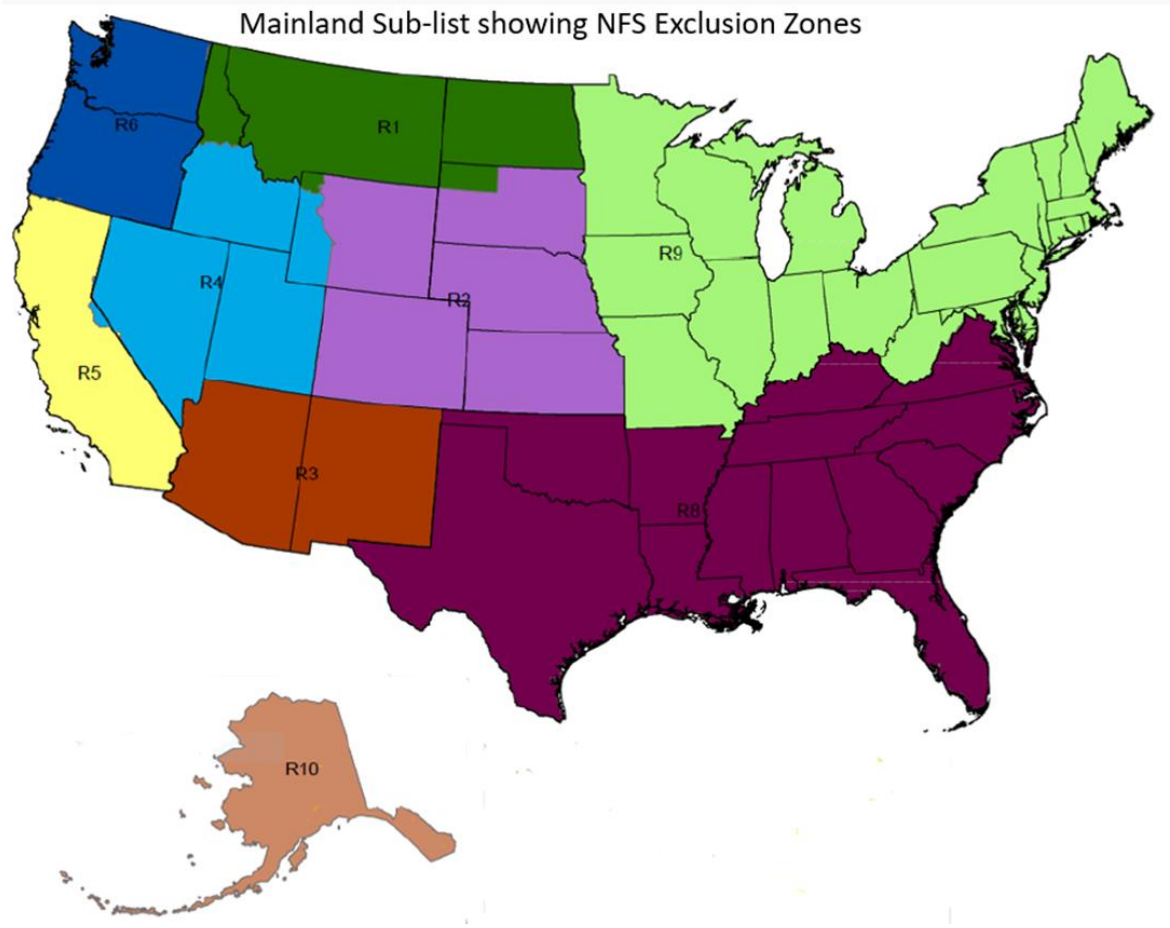


Figure 5-12. Map of the nine P2/3 National Forest System Regional Boundary (NFS) Sub-list areas.

National Forest System (NFS) Regional Boundary Sub-lists; these species are considered shrubs within their associated NFS Region (Figure 5-12 and Table 5-3).

Table 5-3. List of species associated with the nine P2/3 National Forest System Regional Boundary (NFS) Sub-lists

NFS Region Sub-list	Wood-land	FIA code	Common name	Genus	Species	Variety	PLANTS code	Past NRS tally	Past PNW tally	Past RMRS tally	Past SRS tally	Carib-bean	Pacific	Urban	Historic P2
3,4,5,6,10	.	70	larch spp.	Larix	spp.	.	LARIX	R, U	U	U	U	.	.	.	P2
3	w	303	sweet acacia	Acacia	farnesiana	.	ACFA	R, U	P, U	U	R, C, U	C	P	.	P2
5,6,10	.	356	serviceberry spp.	Amelanchier	spp.	.	AMELA	R, U	U	.	R, U	.	.	.	P2
3	.	461	sugarberry	Celtis	laevigata	.	CELA	R, U	PNWS, U	R,U	R, U	.	.	.	P2
3	.	463	netleaf hackberry	Celtis	laevigata	reticulata	CELAR	.	.	.	.	.	.	.	P2
5,6	w	475	curlleaf mountain-mahogany	Cercocarpus	ledifolius	.	CELE3	R, U	PNWS, U	R,U	U	.	.	.	P2
3,4,5,6,10	.	500	hawthorn spp.	Crataegus	spp.	.	CRATA	R, U	U	U	R, U	.	.	.	P2
4,5,6	.	508	oneseed hawthorn	Crataegus	monogyna	.	CRMO3	.	U	U	U	.	.	.	P2
5,6,10	.	510	eucalyptus spp.	Eucalyptus	spp.	.	EUCAL	R, U	P, U	U	R, C, U	C	P	.	P2
5,6,10	.	660	apple spp.	Malus	spp.	.	MALUS	R, U	U	U	R, U	.	.	.	P2
3,4,5,6,10	.	760	cherry and plum spp.	Prunus	spp.	.	PRUNU	R, U	U	U	R, C, U	C	.	.	P2
3	.	763	chokecherry	Prunus	virginiana	.	PRVI	R, U	PNWS, U	.	R, U	.	.	.	P2
3	.	768	bitter cherry	Prunus	emarginata	.	PREM	R, U	PNWS, U	.	U	.	.	.	P2
3,6,8	.	772	sour cherry	Prunus	cerasus	.	PRCE	R, U	U	U	U	.	.	.	P2
3,4	.	805	canyon live oak	Quercus	chrysolepis	.	QUCH2	R, U	PNWS,U	U	U	.	.	.	P2
8	.	845	dwarf chinkapin oak	Quercus	prinoides	.	QUPR	R, U	PNWS, U	U	R, U	.	.	.	P2
3,4,5,8	w	902	New Mexico locust	Robinia	neomexicana	.	RONE	R, U	PNWS, U	.	R, U	.	.	.	P2
8	.	925	coastal plain willow	Salix	caroliniana	.	SACA5	R, U	PNWS, U	R, U	R, U	.	.	.	P2
5,6,10	.	5146	vine maple	Acer	circinatum	.	ACCI	U	U	U	U	.	.	U	.
8	.	5776	storehousebush	Cudrania	tricuspidata	.	CUTR2	U	U	U	U	.	.	U	.
8	.	6524	Chinese fringetree	Chionanthus	retusus	.	CHRE9	.	U	U	U	.	.	U	.
8	.	6918	common buckthorn	Rhamnus	cathartica	.	RHCA3	U	U	U	U	.	.	U	.
3	.	6961	golden dewdrops	Duranta	erecta	.	DUER	U	P, U	U	C, U	C	P	.	.
3	.	7262	Creole cotton	Gossypium	barbadense	.	GOBA	U	P, U	U	C, U	C	P	.	.
8	.	7469	yaupon	Ilex	vomitoria	.	ILVO	U	U	U	U	.	.	U	.
8	w	7577	Japanese privet	Ligustrum	japonicum	.	LIJA	.	U	U	U	.	.	U	.
8	w	7578	glossy privet	Ligustrum	lucidum	.	LILU2	.	U	U	U	.	.	U	.

NFS Region Sub-list	Wood-land	FIA code	Common name	Genus	Species	Variety	PLANTS code	Past NRS tally	Past PNW tally	Past RMRS tally	Past SRS tally	Carib-bean	Pacific	Urban	Historic P2
3,4	.	8111	Jerusalem thorn	Parkinsonia	aculeata	.	PAAC3	U	P, U	U	C, U	C	P	.	.
8	.	8345	Carolina laurelcherry	Prunus	caroliniana	.	PRCA	.	U	U	U	.	.	U	.
5,6,10	.	8420	pear spp.	Pyrus	spp.	.	PYRUS	U	U	U	U	.	.	U	.
8	.	8466	Rose Myrtle	Rhodomyrtus	tomentosa	.	RHTO10	U	P, U	U	U	.	P	.	.
3,8	.	8479	prairie sumac	Rhus	lanceolata	.	RHLA3	U	U	U	U	.	.	U	.
1,2,3,4,5,6,8	.	8504	arroyo willow	Salix	lasiolepis	.	SALA6	.	U	U	U	.	.	U	.
8	.	8631	earleaf nightshade	Solanum	mauritianum	.	SOMA3	U	P, U	U	U	.	P	.	.
3,8	.	8917	Eve’s needle	Yucca	faxoniana	.	YUFA	U	U	U	U	.	.	U	.

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 3

5.9+U 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 3. Trees with diameters between 1.0- and 4.9-inches are measured on the 6.8-foot radius microplots. 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, regions have the option of measuring and recording the distance from the ground to the point of diameter measurement, or marking the point of measurement with a scribe, crayon, paint, or aluminum nail. When marking trees for the first time, measure the diameter after the mark is in place. Use caution to avoid damaging trees with scribes and nails. Do not scribe or nail trees less than 3.0-inches in diameter, or species vulnerable to introduction of pathogens (e.g., aspen). Do not penetrate the cambium when using a bark scribe.

Remeasurement Trees:

When remeasuring the diameter of a tree tallied at a previous survey, take the measurement at the location monumented by the previous crew. See exceptions below for when it is acceptable to move the previous diameter location. If the diameter location is out of reach, estimate diameter at the previous diameterlocation (normally 4.5 feet unless forking rules apply). Assign a DIAMETER CHECK code of 2 whenever the point of measurement is moved.

There are four exceptions when it is necessary to move the diameter measurement location:

1. When there is an abnormality or irregularity (e.g. bulge or branch) at the previous DIAMETER measurement point, move the diameter above the abnormality/irregularity. If not possible to reach this location, move the diameter below the abnormality/irregularity at the best repeatable location but do not go below stump height of 1.0 foot. If unable to move the diameter above or below, or normal stem form does not exist, then estimate diameter at the prescribed location (normally 4.5 feet unless forking rules apply) regardless of the previous diameter location.
2. When the Measure Low Approach is applied for the first time to a remeasured tree.
3. When it is not possible to retain the previous diameter measurement location, move the diameter location to obtain the correct number of trees. For example, if at the previous measurement a forked tree was tallied in error as one tree, but now qualifies as two separate trees, move the diameter measurement point to obtain two distinct DBH measurement locations. Alternatively, if two forks were tallied at the previous visit, but only one should be tallied at the current visit, move the diameter measurement point to obtain one DBH measurement location.
4. When previous diameter measurement location is now less than 1 foot from current ground level (e.g., due to a mudslide or avalanche), measure up from the current ground level to establish a new DBH measurement location. See Figure 5-13.

Do not move the diameter measurement point or change PREVIOUS DIAMETER for subjective differences in interpretation of forked trees. Only gross errors made by the previous crew should be corrected, and if the tree qualifies for the measure low approach or has branch like stems that were previously tallied. If in doubt, use the previous crew's interpretation of the forked trees.

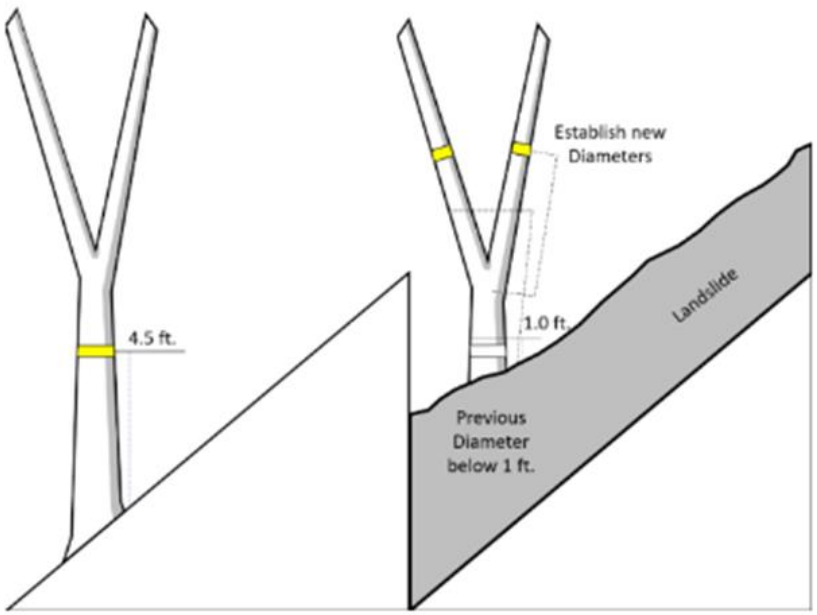


Figure 5-13. Example of a tree requiring a new DBH measurement location.

The following apply at remeasurement:

1. If at Time 1 a forked tree was recorded as two separate trees but should have been recorded as one, or new protocols allow for only one, reconcile one tree record as URBAN PRESENT TREE STATUS = 0 and move the diameter to the correct measurement location for the remaining tree record. The remaining tree record receives URBAN PRESENT TREE STATUS = 1 or 2 with DIAMETER CHECK = 2, and a TREE NOTE at Time 2.

   Use the following method for trees that were erroneously tallied at Time 1 under previous forking protocol, and the forked tree should be recorded as a single tree at Time 2 under current forking protocol. This applies when there was an obvious mistake at the previous visit. Assign trees that drop out of the inventory the following:

- URBAN PRESENT TREE STATUS = 0
- URBAN RECONCILE = 7
- TREE NOTE explaining the situation

It may be difficult to determine if an error was made at the previous visit, and trees could also drop out of the current inventory due to changes in forking protocol. For trees that appear to be correctly tallied at Time 1, but at Time 2 no longer qualify under the current forking protocol, assign trees that drop out of the inventory the following:

- PRESENT TREE STATUS = 0
- RECONCILE = 8
- TREE NOTE explaining the situation

2. If at Time 1 a forked tree was recorded as one tree but should have been recorded as two separate trees, use the existing tree record to represent one of the forks and move the diameter to the correct measurement location of this remeasured tree. Code URBAN PRESENT TREE STATUS = 1 or 2, DIAMETER CHECK = 2, and a TREE NOTE.

   Use the following method for trees that were erroneously not tallied at Time 1 and remain an error under current forking protocol at Time 2. This applies when there was an obvious mistake at the previous visit. Assign the missed tree the following:

- URBAN PRESENT TREE STATUS = 1 or 2
- URBAN RECONCILE = 7
- TREE NOTE explaining the situation

   Use the following method for trees that were correctly not tallied at Time 1 but now are tallied using current forking protocol at Time 2. Assign trees that move into the inventory the following:

- URBAN PRESENT TREE STATUS = 1 or 2
- URBAN RECONCILE = 8
- TREE NOTE explaining the situation

   For new trees that grow into the inventory and qualify as a fork under the current protocol, create a new record for the ingrowth tree and assign the new tree the following:

- URBAN PRESENT TREE STATUS = 1 or 2
- URBAN RECONCILE = 1

3. 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 6) 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 assign the following:

- DIAMETER CHECK = 2
- LENGTH TO DIAMETER MEASUREMENT POINT
- TREE NOTE explaining the situation

   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 the following:

- PRESENT TREE STATUS = 0
- RECONCILE = 8
- TREENOTE explaining the situation

When a tree diameter was too small at the forked locations to meet diameter threshold at Time 1, but now at Time 2 it meets the limiting diameter for subplot using the measure low approach, assign the following:

- PRESENT TREE STATUS = 1 or 2
- RECONCILE = 8
- TREENOTE explaining the situation

4. Core 8.0 introduced updated definitions on how to define a branch versus a stem based on form and function. See #1 Forked tree under Special DBH situations. 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, 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 – all three requirements must be satisfied. For example, if a stem tallied at Time 1 is exhibiting "branch-like" form and is leaning at an angle less than 45 degrees from vertical at Time 2, it is no longer considered a tree. Assign trees that drop out of the inventory the following:

- PRESENT TREE STATUS = 0
- RECONCILE = 8
- TREE NOTE explaining the situation

Trees moving into the inventory based on this situation will be unlikely, but assign these new trees the following:

- PRESENT TREE STATUS = 1 or 2
- RECONCILE = 8
- TREE NOTE explaining the situation

For new trees that grow into the inventory, create a new record for the ingrowth tree and assign the new tree the following:

- PRESENT TREE STATUS = 1 or 2
- RECONCILE = 1
- TREE NOTE explaining the situation

5. WOODLANDS: If at the previous visit a multi-stemmed tree was recorded as two or more separate trees but should have been recorded as one tree, assign one of the tree records the following:

- PRESENT TREE STATUS = 0
- RECONCILE = 7 or 8
- TREE NOTE explaining the situation

The remaining tree data line receives:

- PRESENT TREE STATUS = 1 or 2
- DIAMETER CHECK = 2
- TREE NOTE explaining the situation

6. WOODLANDS: If at the previous visit a multi-stemmed tree was recorded as one tree but should have been recorded as two or more separate trees, correct the PREVIOUS DIAMETER for the remeasured tree to represent one of the two or more trees encountered at this visit. Add the other stem(s) as missed tree(s). Use the existing tree record to represent one of the trees and assign it as follows:

- PRESENT TREE STATUS = 1 or 2
- DIAMETER CHECK = 2
- TREE NOTE explaining the situation

The second (third, etc.) tree would get:

- PRESENT TREE STATUS = 1 or 2
- RECONCILE 7
- and a TREE NOTE

Note: The current crew should not correct for subjective differences in interpretation of multi-stemmed trees; i.e., only gross errors made by the previous crew should be corrected. If in doubt, use the previous crew's interpretation of the multi-stemmed trees.

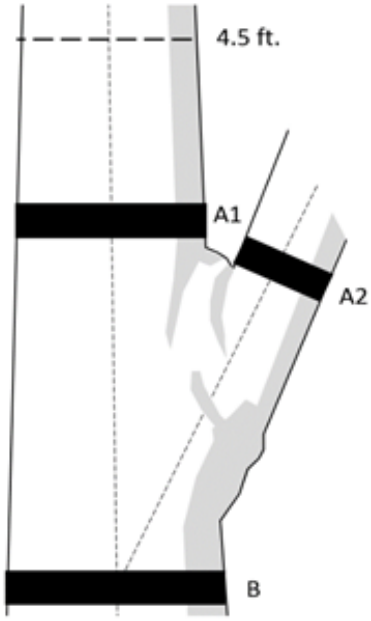
When collected: All live and standing dead tally trees ≥ 1.0 inch DBH/DRC
Field width: 4 digits (xxx.y)
Tolerance: +/- 0.1 inch per 20.0-inch increment of measured diameter on all live trees and standing dead trees with DECAY CLASS = 1, 2
+/- 1.0 inch per 20.0-inch increment of measured diameter on standing 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

5.9.1 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.

5.9.2+U 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 5-14 to Figure 5-19) 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 5-19 provides examples where the 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. Seedling-sized stems, (i.e., stems that are less than 1 inch in diameter at the point of attachment or at the prescribed diameter location, 3.5 feet above pith separation), are not considered forks.

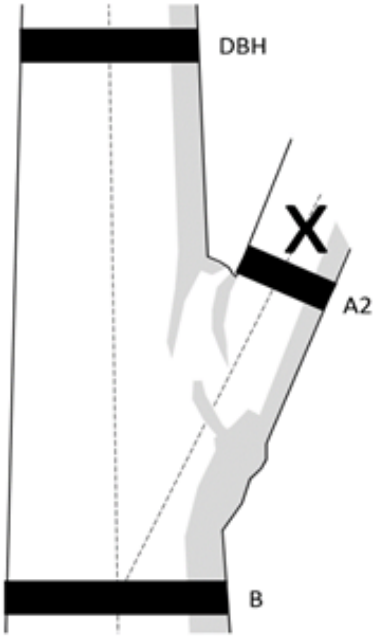


A1, A2 and B represent diameter locations for determining if minimum diameter ratios are met. Diameter ratios are met if:

$$\frac{A1}{B} \geq \frac{1}{3}$$

$$\frac{A2}{B} \geq \frac{1}{3}$$

Figure 5-14. 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.



If one of the potential forks is less than 1/3 the diameter at B, then no fork exists and the diameter would be placed at 4.5 feet from the ground on the qualifying stem.

$$\frac{A2}{B} < \frac{1}{3}$$

Figure 5-15. 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.

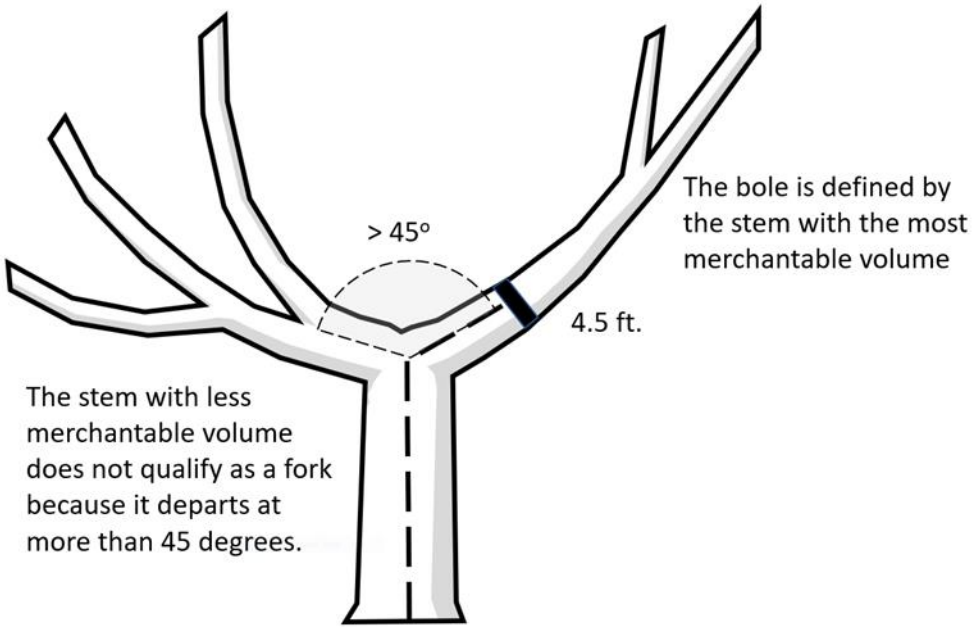


Figure 5-16. The stem with the most merchantable volume is considered the Bole (main stem) of the tree. Because the prospective fork on the left occurs at an angle greater than 45 degrees from the main stem, it does not qualify as a fork and is considered a branch. The diameter is then placed at the normal location on the main stem.

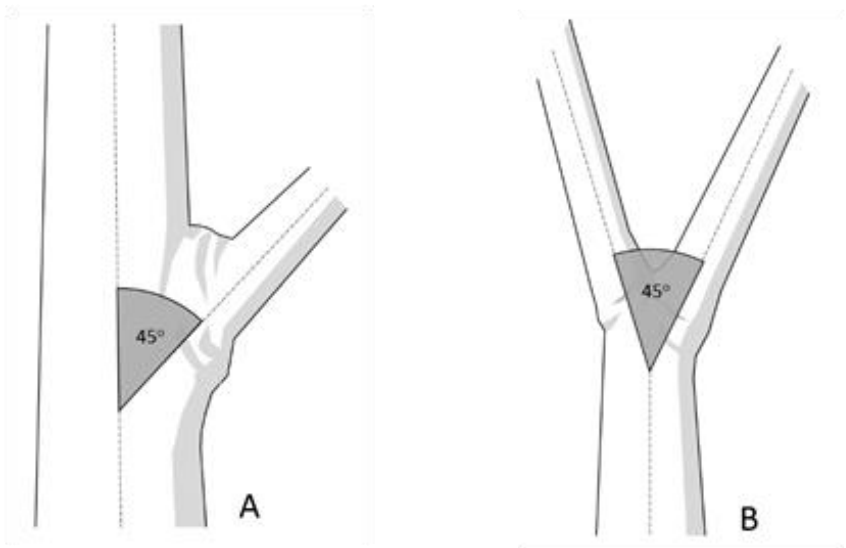


Figure 5-17. Forking angle. In order to qualify as a fork, the piths must diverge at an angle not exceeding 45 degrees from the main stem (A). In cases where there is no obvious main stem (B), consider the angle of pith separation between the two stems.

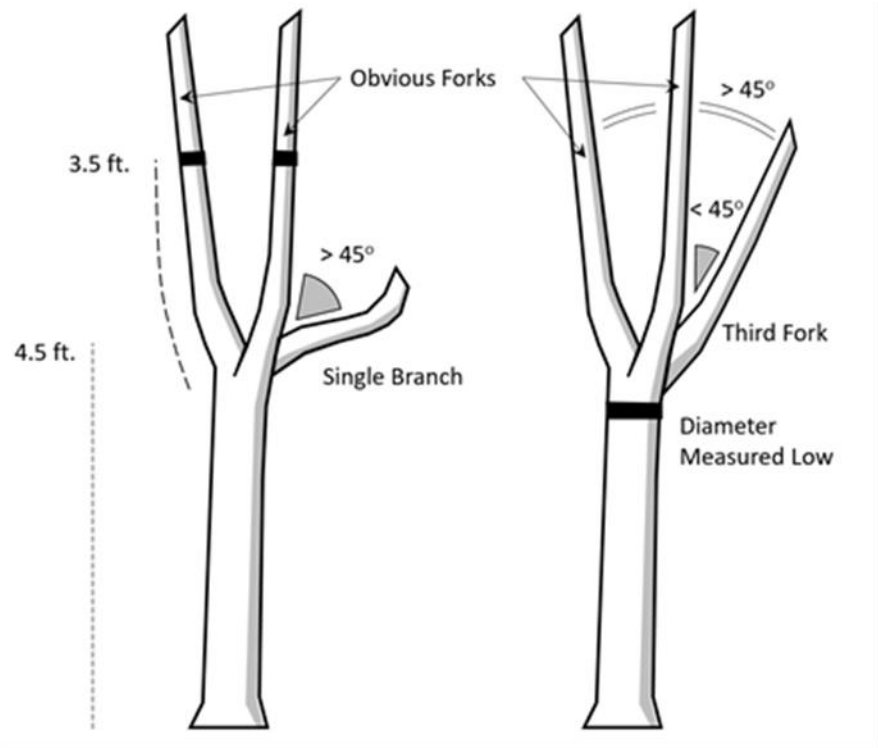


Figure 5-18. The tree on the left has two stems that are clearly forks and a single branch that departs at an angle of greater than 45 degrees from either existing fork. This branch is ignored when placing diameters. The tree on the right also has two stems that clearly qualify as forks, plus a third stem that is within 45 degrees of one fork, but not the other. So long as it is within 45 degrees of an adjacent qualifying fork, it too is considered a fork. In this case, it is the third fork from approximately the same location on this tree and the Measure Low Approach must be applied.

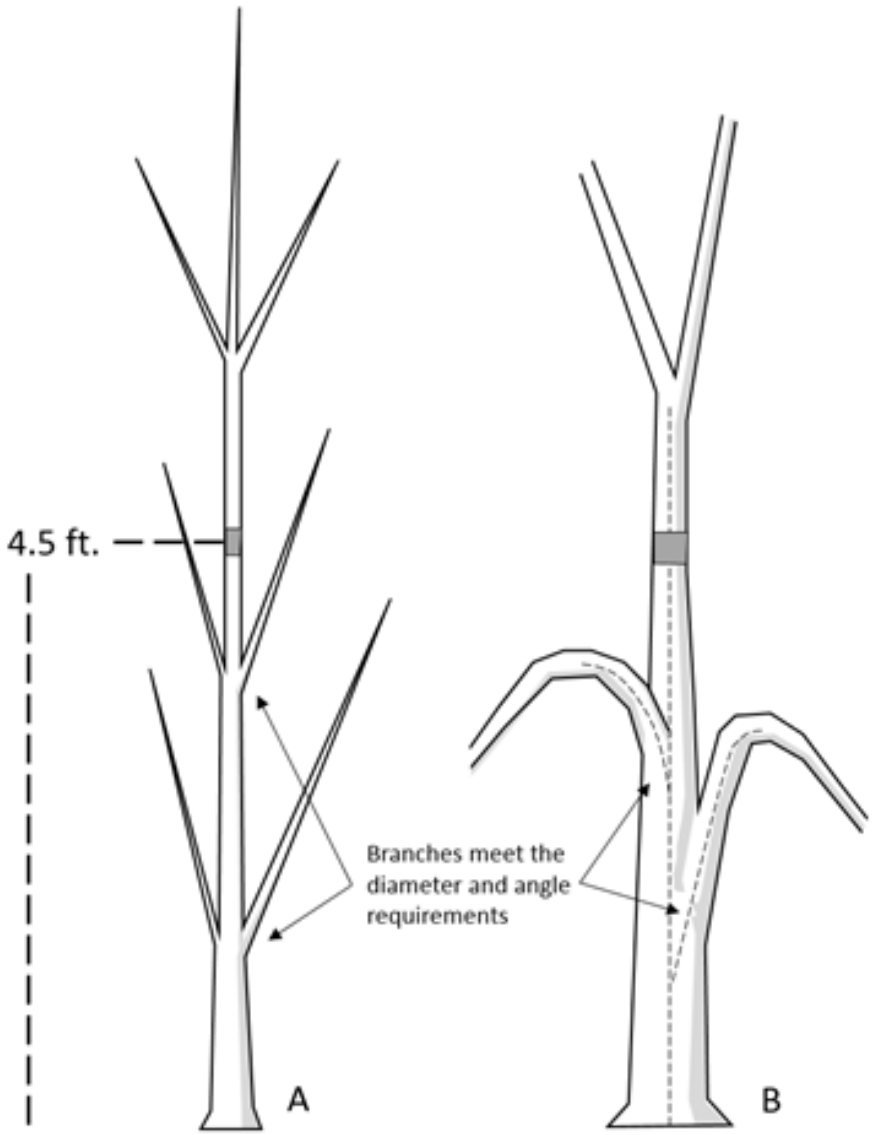


Figure 5-19. Forks that have branch-like form and function, leading to the tally of a single tree instead of multiple trees. In example A, although the potential fork is currently 1/3 the diameter of the main bole and is within 45 degrees of the main bole at the point of attachment, it appears to be 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 5-20). Distances and azimuths are measured individually to the center of each stem where it splits from the stump (Figure 5-25 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 below 1.0 foot fork again between 1.0 and 4.5 feet (Figure 5-25 E), the rules in the next paragraph apply.

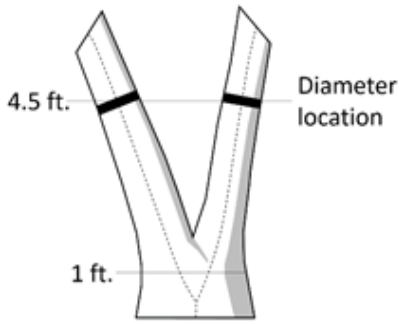


Figure 5-20. Forked below 1.0 ft.

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 5-21), but only one distance and azimuth (to the central stump) is recorded for each stem (Figure 5-25 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. Diameter measurement due to a fork is to be taken 3.5 feet above the pith separation or at a “reasonable” reach that is repeatable for remeasurement by the next crew. This measurement point is recorded as the LENGTH TO DIAMETER MEASUREMENT POINT (see 5.24).

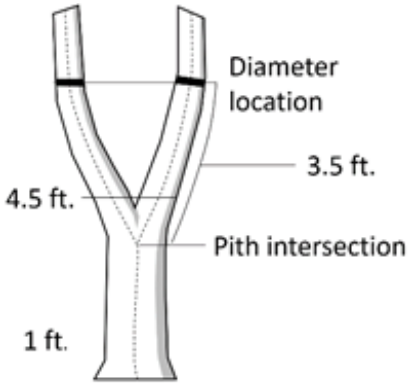


Figure 5-21. Forked between 1.0-4.5 ft.

Measure Low Approach

Crews may encounter trees of any species displaying growth forms with multiple forks (≥3) 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 a specific crown shape.

In cases where such multiple forks (≥3) 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):

i. Multiple forks (≥3) (Figure 5-22 D)

ii. Prolific branching originating from approximately the same location that prevents accurate and repeatable diameter measurement (Figure 5-22 A-B). Prolific branching, as defined here, are those trees that often lack a defined main stem and/or qualifying forks, and take on a bushy appearance as the lower bole splits out into multiple branches at or below 4.5 feet. This is a rare situation that should not be confused with normal branching patterns that allow for accurate diameter placement (Figure 5-22 C).

iii. Any combination of multiple forks (≥3) and prolific branching originating at approximately the same location.

iv. 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 5-23)

Figure 5-22 and Figure 5-23 illustrate a combination of forks and or branches all originating at the approximate same location will trigger a measure low approach.

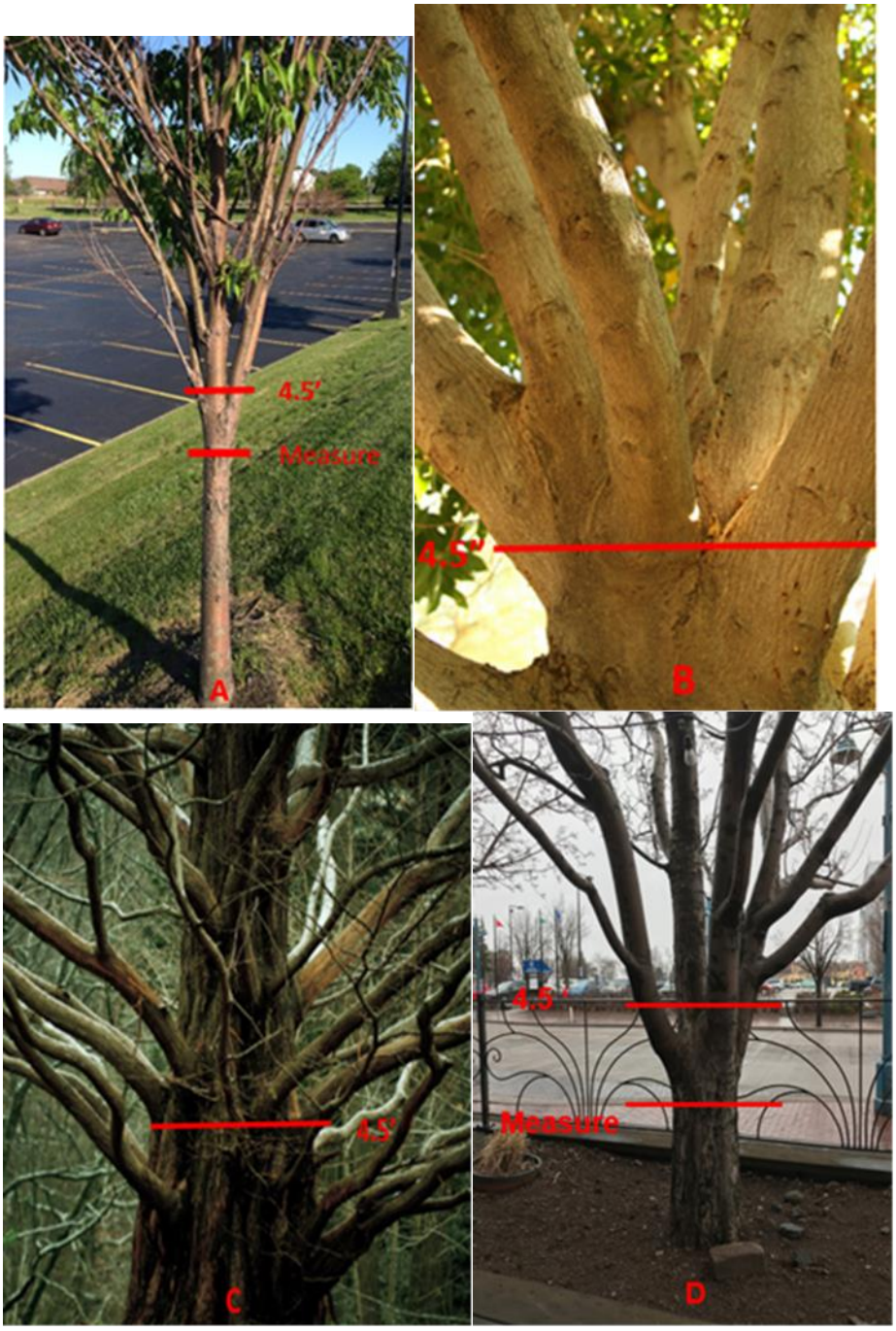


Figure 5-22. Both A and B are examples of Prolific Branching where the Measure Low Approach must be implemented causing the diameter to be taken below 4.5 feet. Although C has many branches it is not a candidate for the Measure Low Approach because the branching is not deemed "Prolific"; traditional DBH measurement protocols would apply. D is an example of multiple forks originating from approximately the approximately same area. Similar to Prolific Branching, the diameter is taken low, and D is 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. Secondary forks need only meet the 1/3 diameter and 45 degree requirements to be considered forks; they do not need to be tree-like or 1 inch in diameter. When such secondary forks are encountered, measure/estimate the diameter of such stems at the most repeatable location below stem separation but above the first pith separation (Figure 5-25 F-I while attempting to avoid measuring double piths (Figure 5-32) where possible (i.e., do not move the point of diameter the entire 3.5 feet above the first fork).

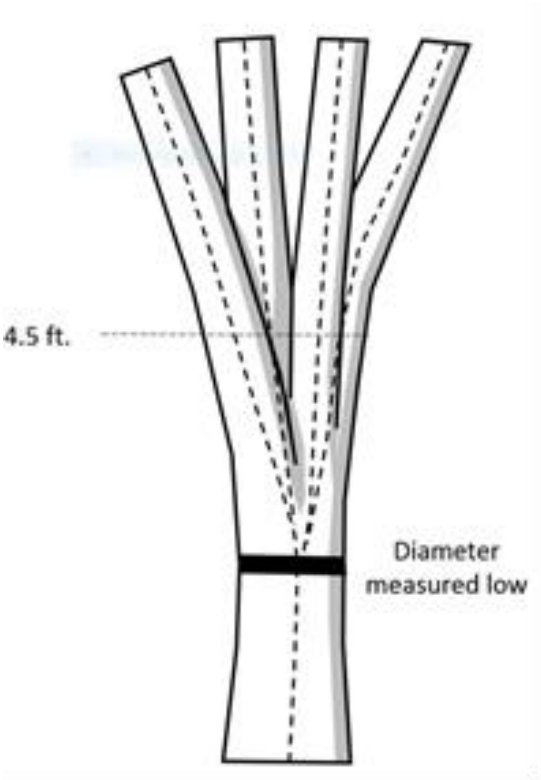


Figure 5-23. Using pith separation to determine diameter locations. In this example it is clear that all piths appear to separate from approximately the same location; this triggers the "Measure Low Approach". In cases where the piths do NOT originate within approximately the same location, normal forking rules are applied as demonstrated in Figure 5-25 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 5-24). If a fork occurs at or immediately above 4.5 feet, measure diameter below the fork just beneath any swelling that would inflate DBH.

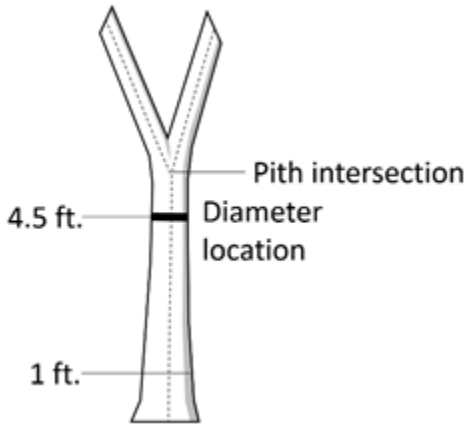


Figure 5-24. One tree.

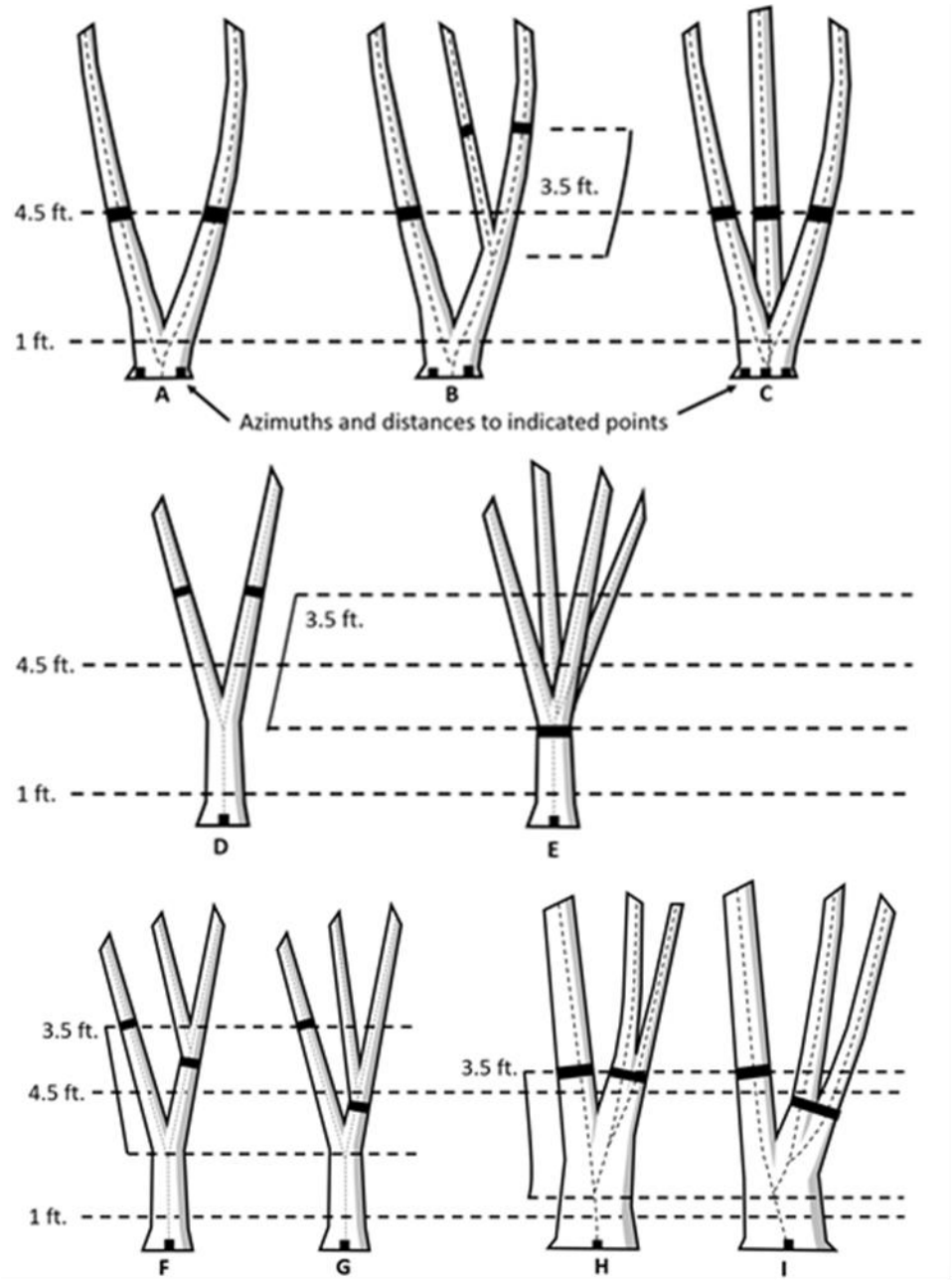


Figure 5-25. Summary of where to measure diameter, distance and azimuth on trees that fork below 1.0 foot (A, B, C) and trees that fork above 1.0 foot (D, E, F, G, H, I). Figure E represents the Measure Low Approach. Figures F and G represent secondary forks with abnormal diameters at stem separation. Figures H and I represent secondary forks with normal diameters at stem separation.

2. DBH tree stump sprouts: “Stumps” are created when it is obvious that the bole of a tree has died, broken off, or been cut at or below the diameter measurement point. If it is not obvious, do not consider it a stump and follow normal forking rules. Stump sprouts are new sprouts that originate between ground level and 4.5 feet after the creation of the stump. Stump sprouts are required to have tree-like form and function but are not required to depart the stump at a 45-degree angle or less, nor are they required to have 1/3 the diameter of the stump. Once identified as a stump sprout, all forking rules apply to the resulting sprout.. 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 and azimuth depend on whether the sprouts originate above or below 1.0 foot. After a sprout has been tallied as a stump sprout at Time 1, continue to tally as a stump sprout at Time 2 unless there was an obvious error at Time 1.

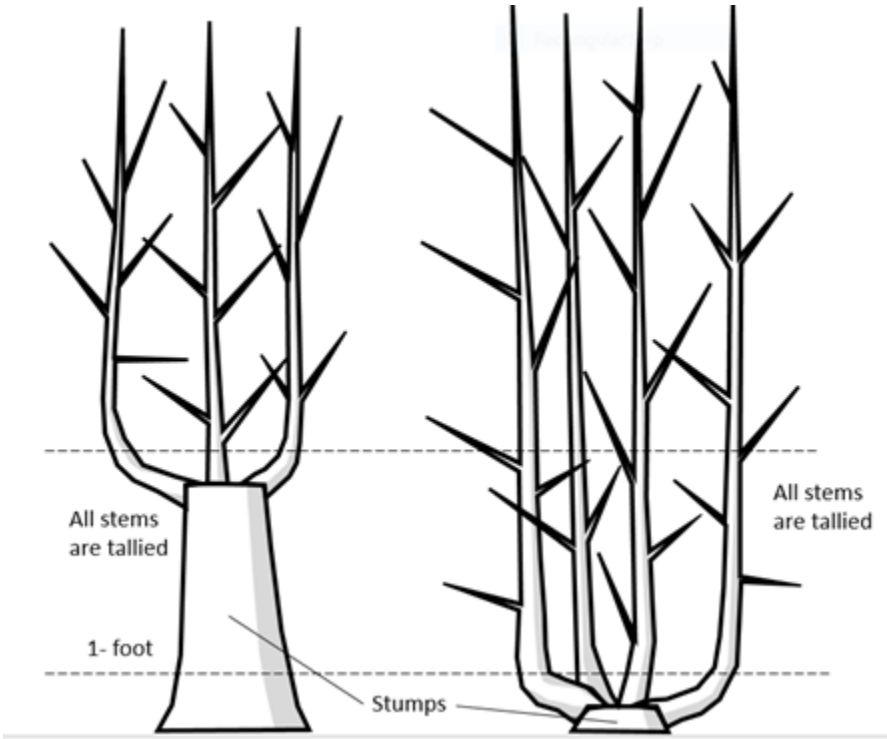


Figure 5-26. For sprouts originating from stumps below 4.5 feet from the ground, the forking rules are not applied when defining each initial sprout. All tree-like sprouts are tallied. Once defined as a stump sprout normal forking rules are applied to the resulting sprout. For stump sprouts originating between 1.0 and 4.5 feet, sprout diameters are taken 3.5 feet above the point of occurrence. For stump sprouts originating below 1.0 foot, sprout diameters are taken at the normal location.

3. Tree with butt-swell or bottleneck or buttress roots: Measure these trees 1.5 feet above the end of the swell or bottleneck or buttress if the swell or bottleneck or buttress extends 3.0 feet or more above the ground (Figure 5-27). Use a prism with a known BAF to determine diameter on trees where the diameter measurement point is too high to reach. See the coding summary or Supplement B for tables and complete directions for using a prism.

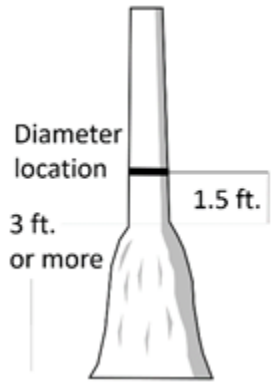
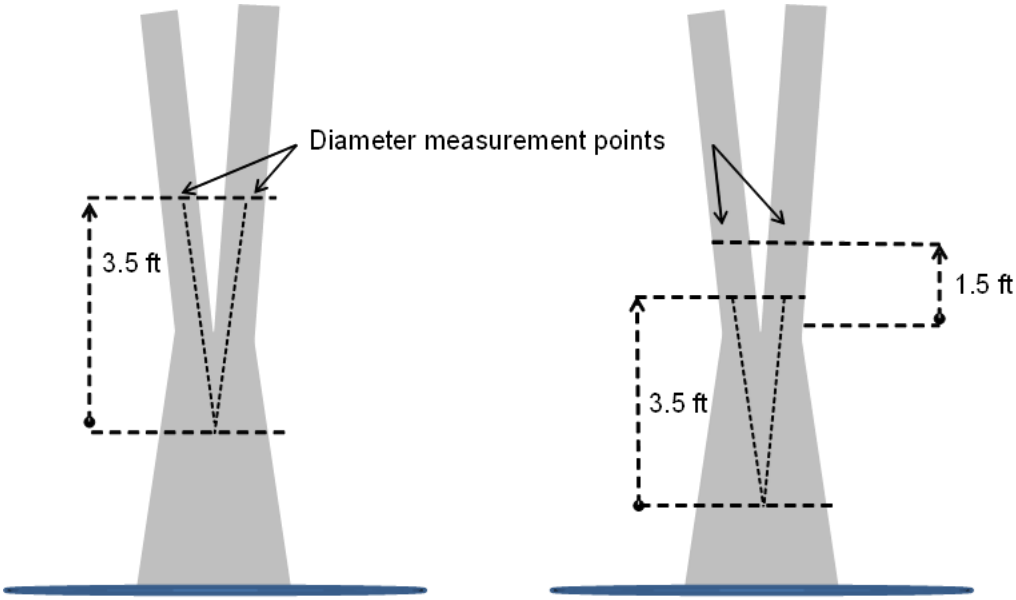


Figure 5-27. Bottleneck tree.



SRS Figure H. For naturally swelled-butted trees that are forked, the 3.5 foot from pith intersection rule still applies unless the new diameter point is within 1.5 feet of the top of the swell. If this occurs, the diameter location is taken 1.5 above the swell.

4. Tree with irregularities at DBH: On trees with swellings (Figure 5-28), bumps, depressions, and branches (Figure 5-29) at DBH, diameter will be measured immediately above the irregularity at the place it ceases to affect normal stem form. If the diameter point is out of reach above the irregularity, the diameter will be measured below the irregularity at the best repeatable location. If normal stem form does not exist, the diameter will be estimated at the prescribed location.

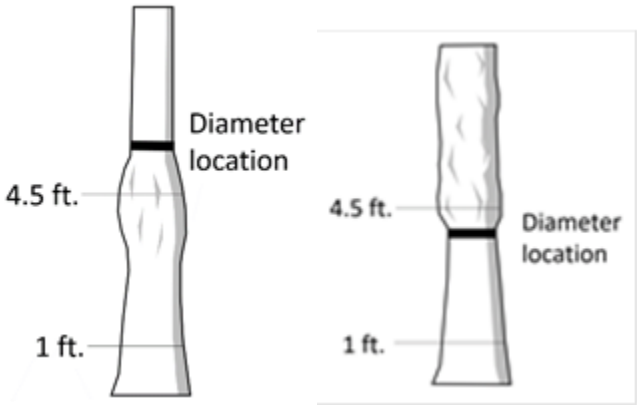


Figure 5-28. Tree with swelling.

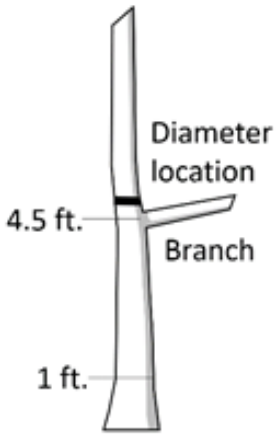


Figure 5-29. Tree with branch.

5. Tree on slope: Measure diameter at 4.5 feet from the ground along the bole on the uphill side of the tree (Figure 5-30).

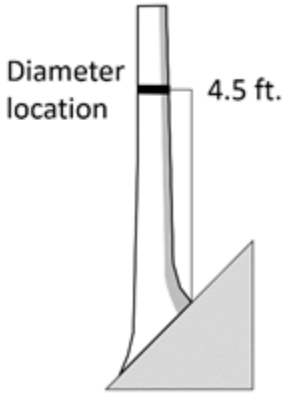


Figure 5-30. Tree on a slope.

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 5-31).

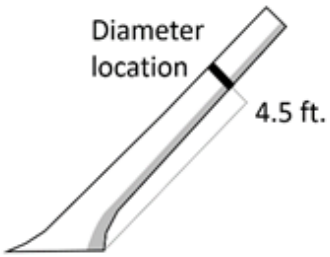


Figure 5-31. Leaning tree.

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 5-32).

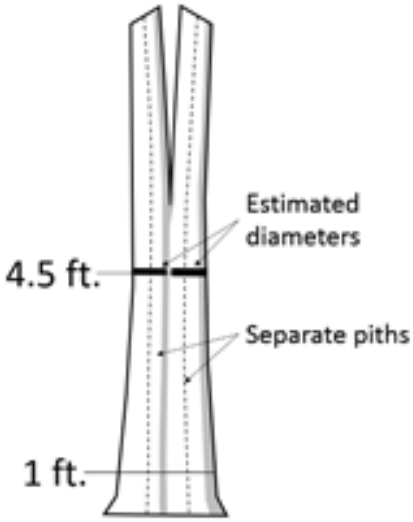


Figure 5-32. Independent trees grown together.

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 5-33). 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 5-28).

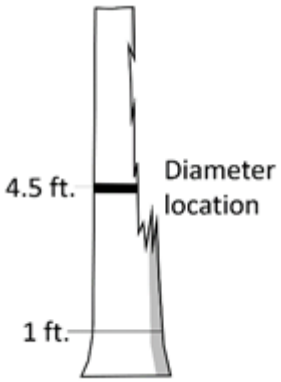


Figure 5-33. Tree with part of stem missing.

10. Live windthrown tree: Measure from the top of the root collar along the length to 4.5 feet (Figure 5-34).

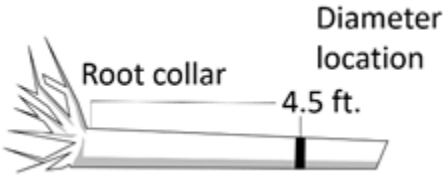


Figure 5-34. Tree on the ground.

11. Down live tree with tree-form branches growing vertical from main bole: When a down live (either touching the ground or whose main bole is leaning and close to being parallel to the surface of the ground) tree 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. These procedures also apply to dead trees that met these same conditions prior to death.

    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 (

    b. Figure 5-35).

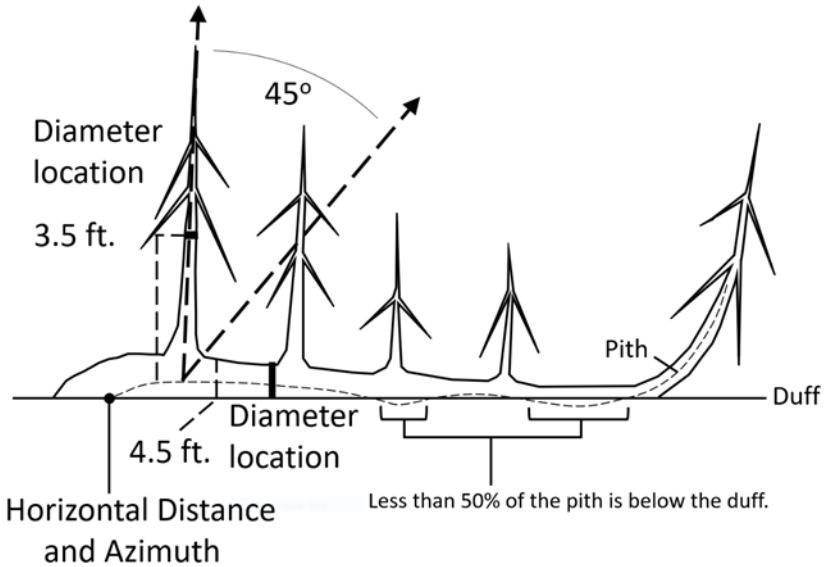
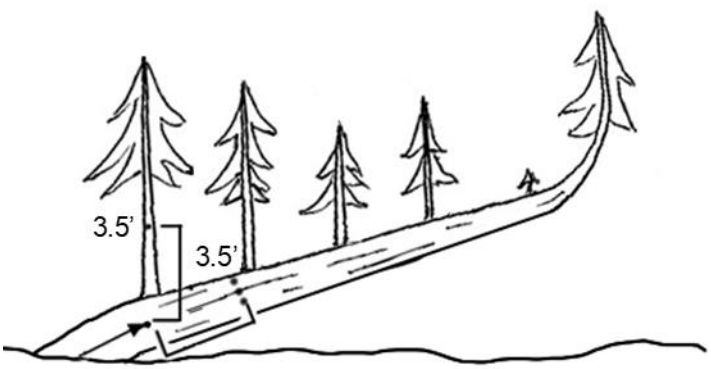


Figure 5-35. Down tree with pith above the duff.



SRS Figure I. Leaning tree with vertical forks. In this example, the tree is not on the ground, but the forks along the main stem have grown vertical from the ground. The diameter locations for the two qualifying stems are as shown.

c. 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.

d. 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.

e. 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 (

f. Figure 5-36). 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.This is also the point from which the tree is judged in or out of the sample and where DISTANCE and AZIMUTH are measured to.

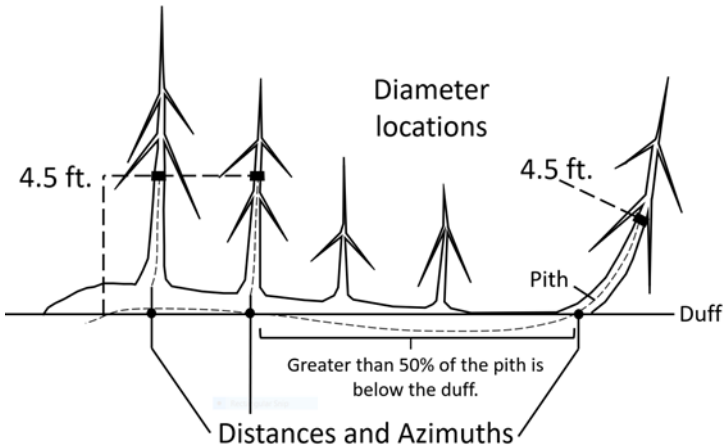


Figure 5-36. Down tree with pith below the duff.

12. Tree with curved bole (pistol butt tree): Measure along the bole on the uphill side (upper surface) of the tree (Figure 5-37).

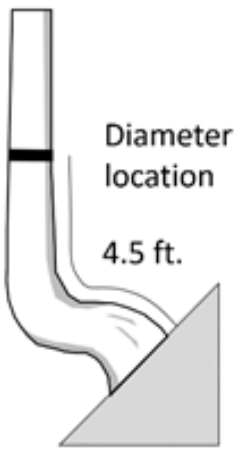
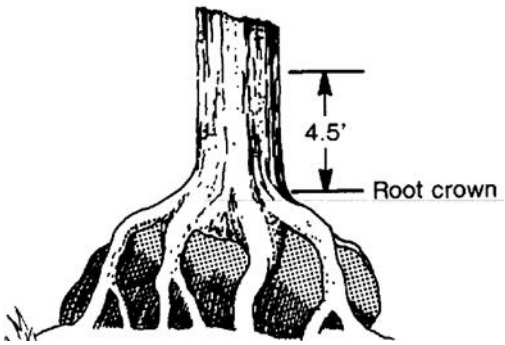


Figure 5-37. Tree with curved bole (pistol butt tree).

13. Tree growing on objects or with adventitious roots: When trees are growing on objects, such as rocks or logs, measure at 4.5 feet above the root crown or collar rather than above the forest floor (SRS FigureJ). [Source: FSH2409.12-2000] Trees that reside in water much of the year can also produce “prop-like” roots or adventitious roots. Diameter is measured in a similar method at 4.5 feet above the root crown or collar. Note: For species with adventious roots, choosing a diameter location and determining the root collar will be variable. For repeatable diameter measurements, the LENGTH TO DIAMETER MEASUREMENT POINT is measured from the ground and not the collar for trees growing on objects or with adventitious roots.



SRS Figure J. Trees growing on objects (e.g., rocks, logs).

5.9.3 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.

5.9.4 Diameter At Root Collar (DRC)

For species requiring diameter at the root collar (refer to Appendix 3), 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 5-38 For each qualifying stem of the woodland tree, measure and record DRC STEM DIAMETER (5.9.4.1) and indicate the DRC STEM STATUS (5.9.4.2).

Woodland stump sprouts: If all stems of a previously tallied woodland tree were killed, cut or removed and there are new sprouts at the base, treat the previously tallied tree as dead and the new sprouts (1.0-inch DRC and larger) as part of a new tree.

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

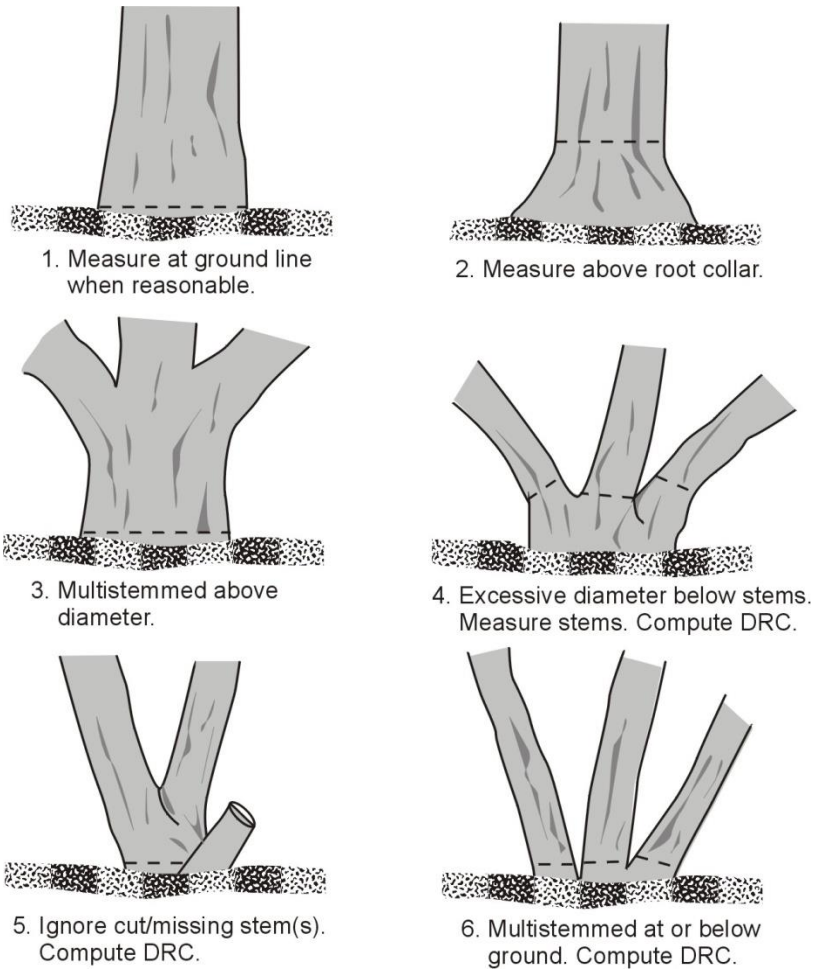


Figure 5-38. How to measure DRC in a variety of situations.

5.9.4.1 DRC STEM DIAMETER

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 inch per stem
MQO: At least 95% of the time
Values: 001.0 to 999.9

5.9.4.2 DRC STEM STATUS

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

5.10 PAST NUMBER OF STEMS

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

5.11 CURRENT NUMBER OF STEMS

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

5.12 DIAMETER CHECK

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.

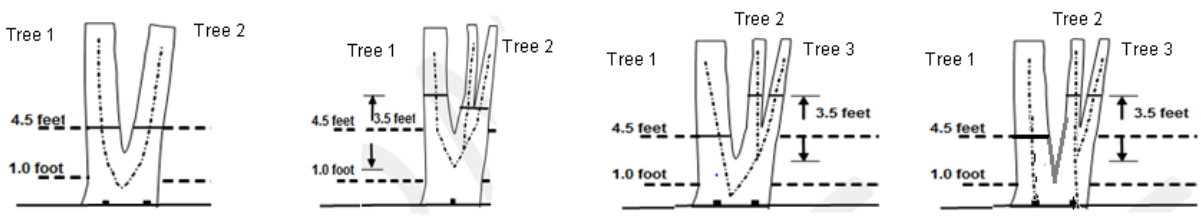
SRS Note: When remeasuring the diameter of a live tree tallied at a previous survey, always take the measurement at the location monumented by the previous crew unless it is not physically possible (e.g., tree buried by mudslide), there is an abnormality at the previous DIAMETER measurement point, or the previous location is more than 12 inches beyond where the diameter should be measured according to current protocols. Previous diameter measurement locations should not be moved due to the loss or addition of a forked stem

5.12.1U MOTHER TREE NUMBER

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 5-4U. 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.



Tree #	Mother #
1	1
2	1

Tree #	Mother #
1	1
2	1

Tree	Mother #
1	1
2	1
3	1

Tree	Mother #
1	
2	2
3	2

Figure 5-39U. 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

5.12.2U TREE CLASS (USE REGIONAL DEFINITIONS)

Record the code that indicates the tree class. All palm species are coded TREE CLASS = 3.

This code represents a classification of the overall quality of the tree that is ≥ 5 inches in diameter. It classifies the quality of a live sawtimber tree based on the present condition. It also forecasts the potential quality of a live poletimber tree when it becomes sawtimber size. The goal of the tree classification system is basically a check of the straightness and soundness of sawlog length or the potential sawlog length of poletimber-size trees. A small diameter poletimber-size tree should be allowed more leeway due to the possibilities of growing out of deformities.

Prior to assigning a tree class, it is necessary to determine the sawlog length and the amount of board-foot cull present within the sawlog length. When evaluating the sawlog length for tree class, the sawlog length is measured from a 1 foot stump to a 9.0-in top DOB for hardwoods or a 7.0-in top DOB for softwoods. For trees that fork, only use one stem when determining sawlog length (i.e., follow the stem yielding the most merchantable volume). See SRS Figure H.

The following is a general rule to determine the future DOB sawlength top on a poletimber-size tree. (The rule assumes that a tree's diameter increases uniformly along its bole and should not be applied to trees that fork.) To apply the rule, take the current diameter and subtract 2-inches. Determine where this new diameter exists on the current bole. The point on the bole where this lesser diameter occurs is the predicted top DOB when the tree becomes sawtimber-size. Example, a tree has a current DBH of 7.5-in. Find the current point on the bole that is currently 5.5-in DOB. The length from a 1 ft. stump to this point is the estimated top DOB of the saw log length once the tree becomes sawtimber size. Is there 12 ft. or more of length? If yes, then tree can potentially be a Tree Class 2 as long as it will potentially have 1/3 merchantable board full volume.

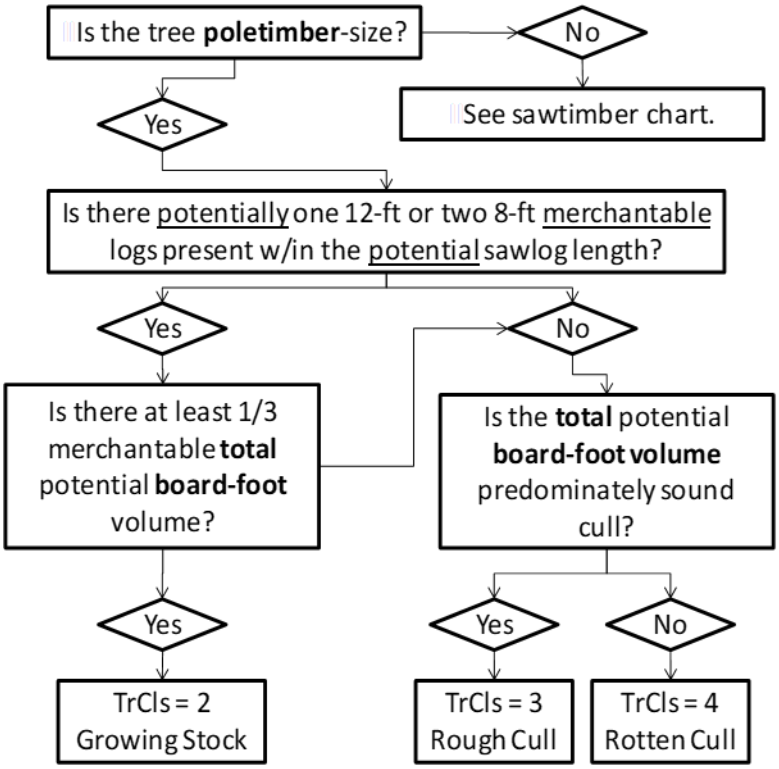
On naturally swelled-butted trees (e.g., baldcypress, pondcypress, water tupelo, swamp tupelo, Carolina ash), TREE CLASS is determined 3.5 feet below the recorded LENGTH TO DIAMETER MEASUREMENT POINT. This point is the base of the butt log. See TOTAL LENGTH for illustration.

When collected: All live tally trees >5.0 in DBH and all TREE STATUS =2 and RECONCILE =1-3.
Field width: 1 digit
MQO: at least 90% of the time
Tolerance: no errors
Values: 2 – 4

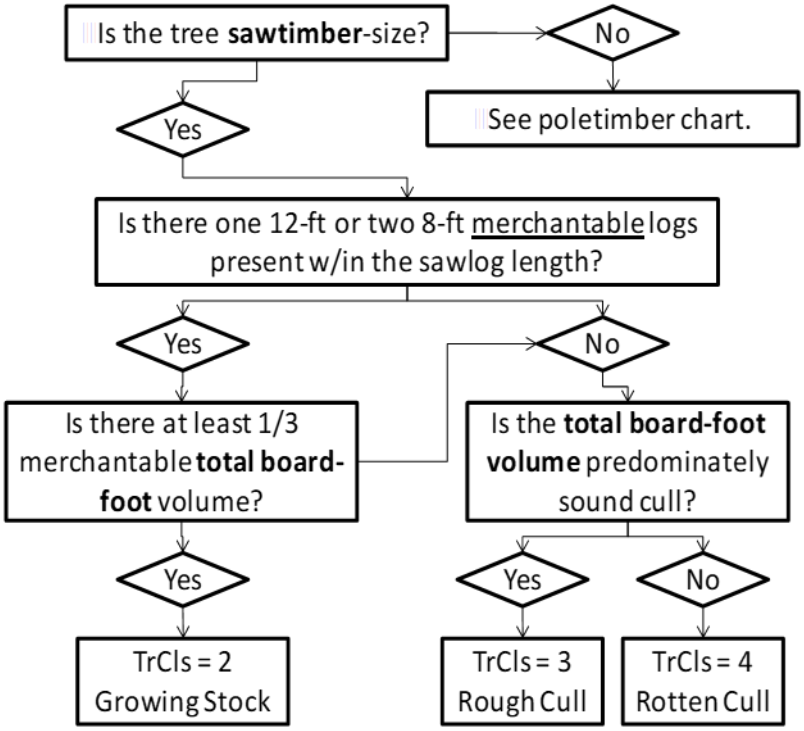
2 Growing stock — Trees with one-third or more of the gross board foot volume in the entire sawlog section with commercial logs meeting grade, soundness, and size requirements or the potential to do so for poletimber-sized trees. A tree class 2 tree must have one 12-foot log or two 8-foot logs, now or prospectively, for live poletimber-sized trees to qualify as growing stock.

3 Rough cull — Trees that do not contain at least one 12-foot sawlog or two 8-foot logs now or prospectively, primarily because of roughness or poor form. Less than 1/3 of its gross board-foot volume meets size, soundness, and grade requirements and less than 1/2 of the cubic-foot cull is rotten or unsound.

4 Rotten cull — Trees that do not contain at least one 12-foot sawlog or two 8-foot logs now or prospectively and/or do not meet grade specifications for percent sound primarily because of rot. All species not having 1/3 or more of its gross board-foot volume meeting size, soundness, and grade requirements, and over 1/2 of the cubic-foot cull is rotten or unsound.



SRS Figure K. Poletimber-size TREE CLASS flow



SRS Figure L. Sawtimber-size TREE CLASS flow chart.

5.12.3U TREE GRADE (URBAN OPTIONAL Collected in NRS) (USE REGIONAL DEFINITIONS)

5.13 ROTTEN/MISSING CULL

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 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.

On naturally swelled-butted trees (e.g., baldcypress, pondcypress, water tupelo, swamp tupelo, Carolina ash) cull is determined 3.5 feet below the recorded LENGTH TO DIAMETER MEASUREMENT POINT. This point is the base of the butt log. No cull is assessed below this point. See TOTAL LENGTH for illustration.

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 imbedded in the wood. (e.g., sign, deer stands, fences, bullets, etc.). Cull portions of the tree that contain embedded metal objects (e.g., fencing, nails) and sections between metal objects that are less than 4 feet in length, from the stump to the 4-inch top. Embedded aluminum is okay.

Note the following procedures relating to the bole:

- All variables relating to merchantability are evaluated on the bole.
- Regional TREE CLASS protocols are evaluated on the bole.
- Regional TREE GRADE protocols are evaluated on the bole, the same area being evaluated for TREE CLASS.

When collected: All live tally trees ≥ 5.0 inches DBH/DRC
Field width: 2 digits
Tolerance:
+/- 10 %
MQO: At least 90% of the time
Values: 00 to 99

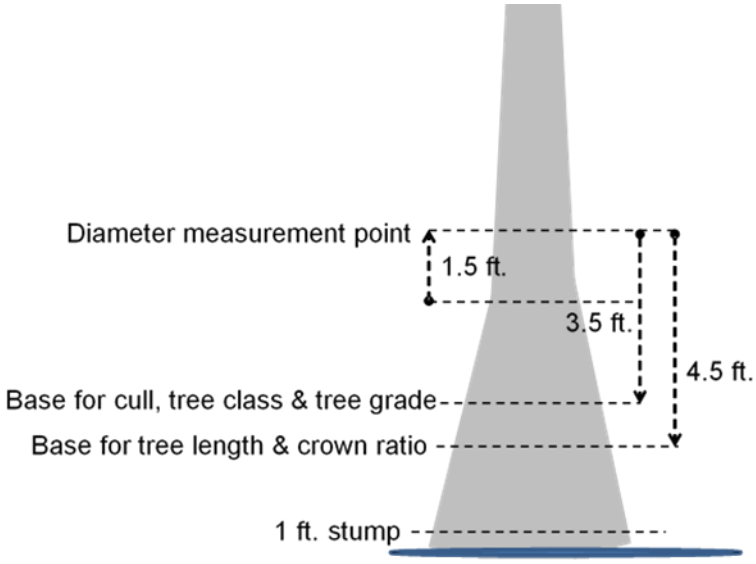
5.14 TOTAL LENGTH

Record the TOTAL LENGTH of the bole, to the nearest 1.0 foot from ground level up past the 4-inch top 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 missing top (top is broken and completely detached from the tree), estimate what the total length would be if there were no missing top. TOTAL LENGTH on multi-stemmed woodland species is based on the length of the longest stem present.

If a tree is leaning or the tree structure has multiple lateral type forking and branching (e.g., live oak), traditional methods of determining length will not be applicable. Crews should use the best means to determine length. This can be the “string” method. Where a “string” is used to approximate the leaning length and then held at a vertical angle to measure the length with either a clinometer or hypsometer. Or if the lean is severe enough, a logger’s tape can be used at ground level to determine the length.

For palms, the total length is measured to the terminal bud and not the top of the fronds.

On naturally swelled-butted trees (e.g., baldcypress, pondcypress, water tupelo, swamp tupelo, Carolina ash) length is determined 4.5 feet below the recorded LENGTH TO DIAMETER MEASUREMENT POINT. This point is the base the tree. No length is included below this point. See SRS Figure M.



SRS Figure M. For buttressed species, the variables of tree length, crown ratio, cull (board foot and cubic), tree class and tree grade are assessed as depicted in the above diagram. For these types of trees, the base for the tree length starts 4.5 ft. below the diameter measurement point. The base to assess cull, tree class and tree grade, if applicable, starts 3.5 ft. below the diameter measurement point.

When collected: All live and standing 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

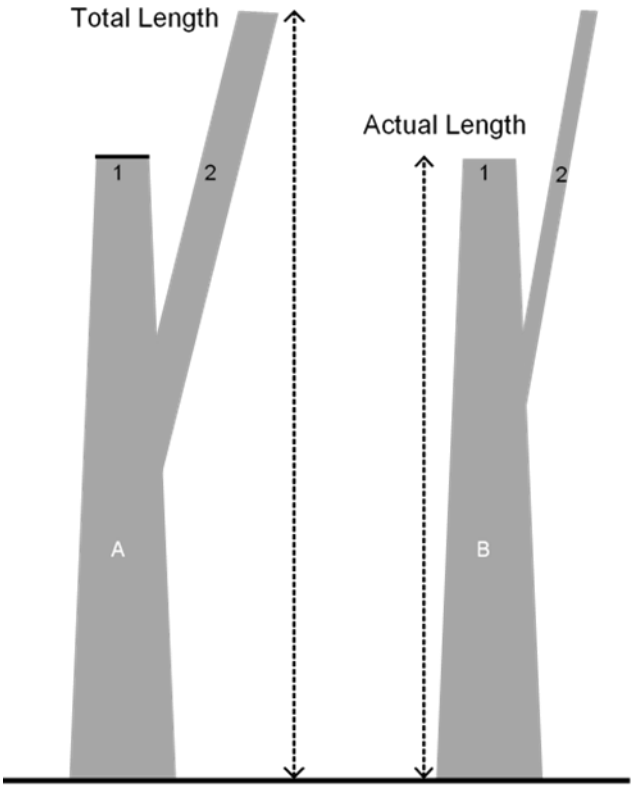
5.15 ACTUAL LENGTH

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 bole, as demonstrated by greater than 50 percent of the bole's circumference (shell) no longer being continuously intact)]. On live or dead trees, do not include shards that may remain above a broken or missing bole.

If the top is intact, this variable 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).

Live trees that are bowed over (leaning) with dead tops follow the same rule as above. Branches cannot become new leaders until the diameter is 1/3 the diameter at the point of the break. If the dead top is intact, a live branch can only become the new leader when the diameter at the point of attachment is of equal size to the dead intact leader.

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.



SRS Figure N. Total length vs. actual length on trees with broken stems. Tree A has a recovered top, because stem 2 is at least 1/3 the diameter of stem 1 at the point of the break. Total Length for tree A is measured from stem 2 (top of the tree). Tree B has not recovered, because stem 2 is less than 1/3 of the diameter of stem at the point of the break. Actual Length for tree B is measured to the break point of stem 1 and Total Length is estimated.

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

5.16 LENGTH METHOD

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.

5.17+U CROWN CLASS

Rate tree crowns in relation to the sunlight received and proximity to neighboring trees not its position in the canopy (Figure 5-40). 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 inch 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.

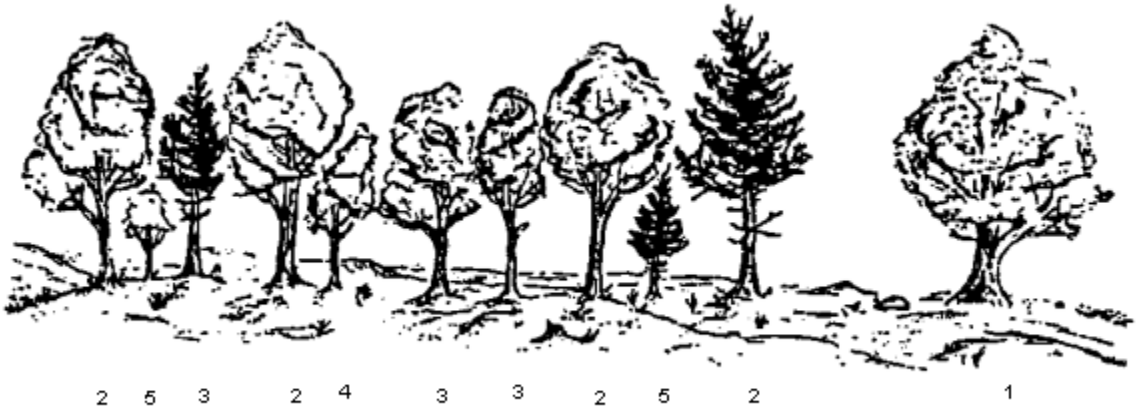


Figure 5-40. Examples of CROWN CLASS code definitions (numbers are the CROWN CLASS codes).

5.18+U UNCOMPACTED LIVE CROWN RATIO (URBAN FIA,)

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 5-41). 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 stump 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.

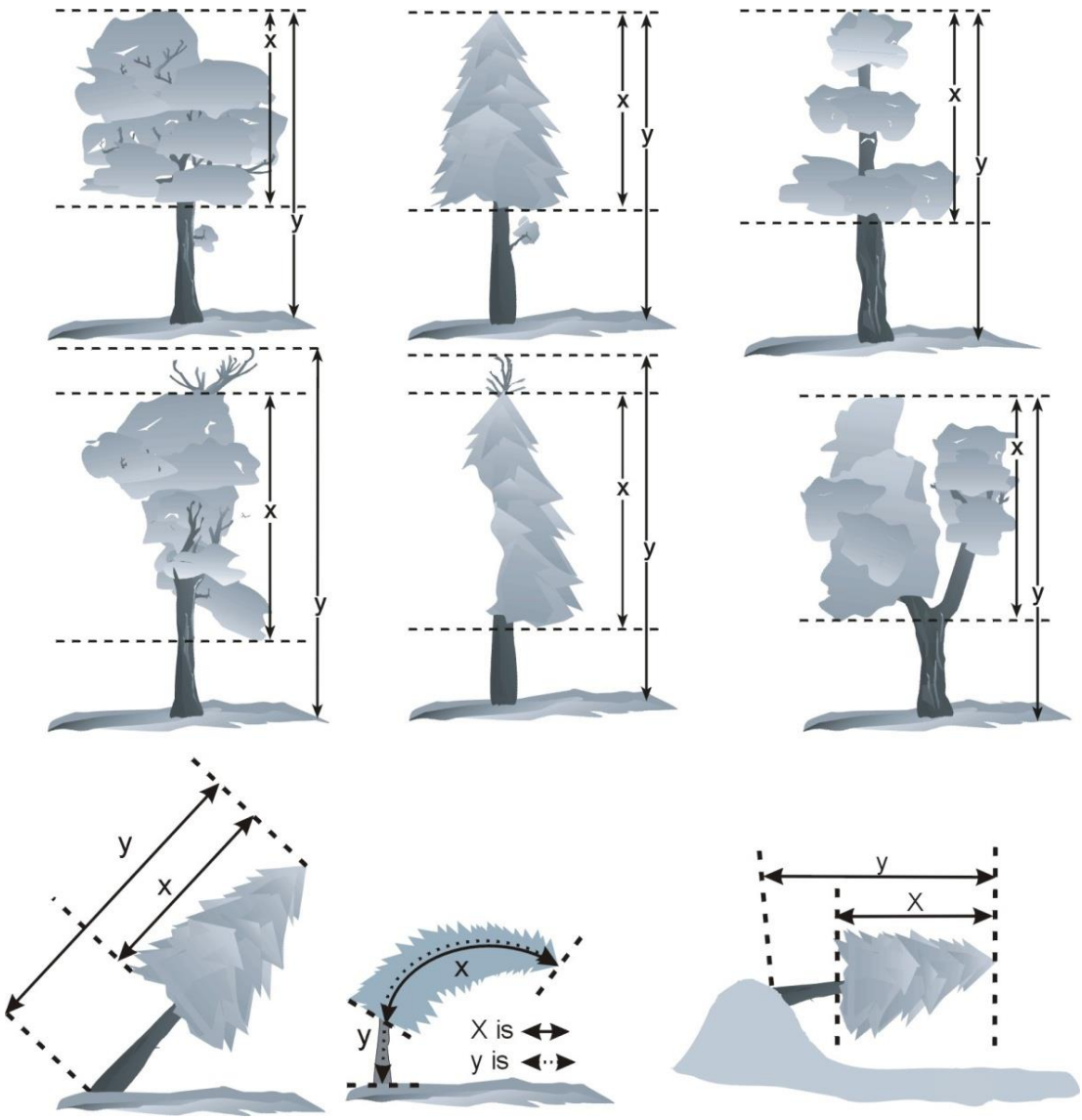


Figure 5-41. UNCOMPACTED LIVE CROWN RATIO examples.

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 5-42).

When collected: Live tally trees ≥ 1.0 inch 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

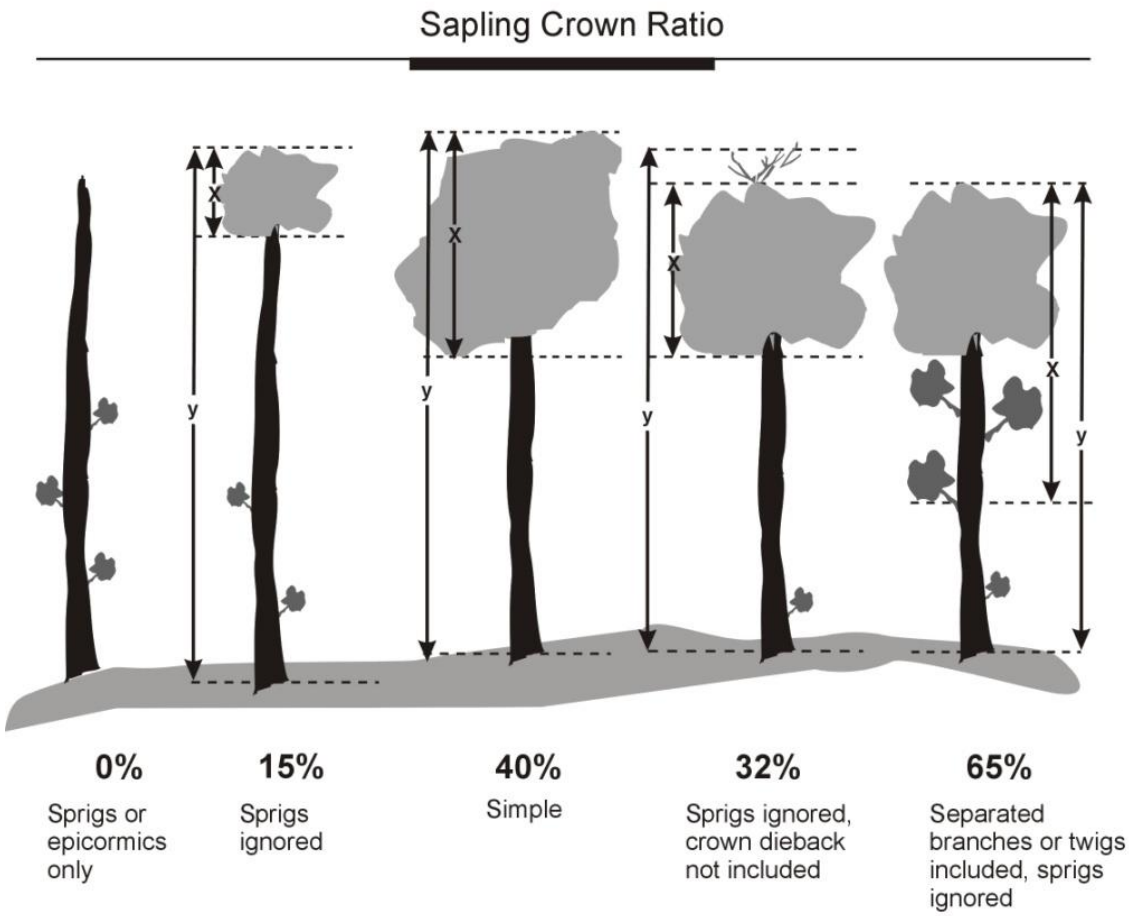


Figure 5-42. Sapling ratio determination examples.

5.18.1U CROWN DIAMETER WIDE (URBAN OPTIONAL Collected in Pacific and Caribbean Islands)

Live crown width estimated at the widest point. Record measurement to nearest 1 ft. Dead trees always have a CROWN DIAMETER WIDE 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 inch 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

5.18.2U CROWN DIAMETER 90 DEGREES (URBAN OPTIONAL Collected in Pacific and Caribbean Islands)

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 inch 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

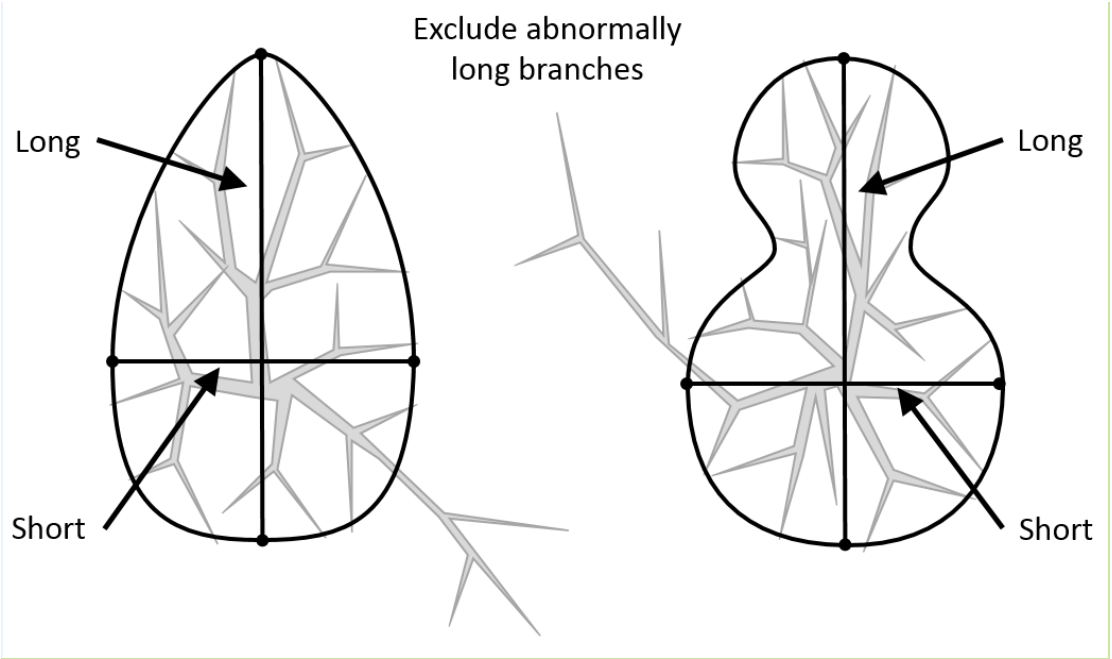


Figure 5-43U. Examples of where to measure crown diameter widths. The "long" axis is the CROWN DIAMETER WIDE measurement; the "short" axis is the CROWN DIAMETER 90 DEGREES measurement.

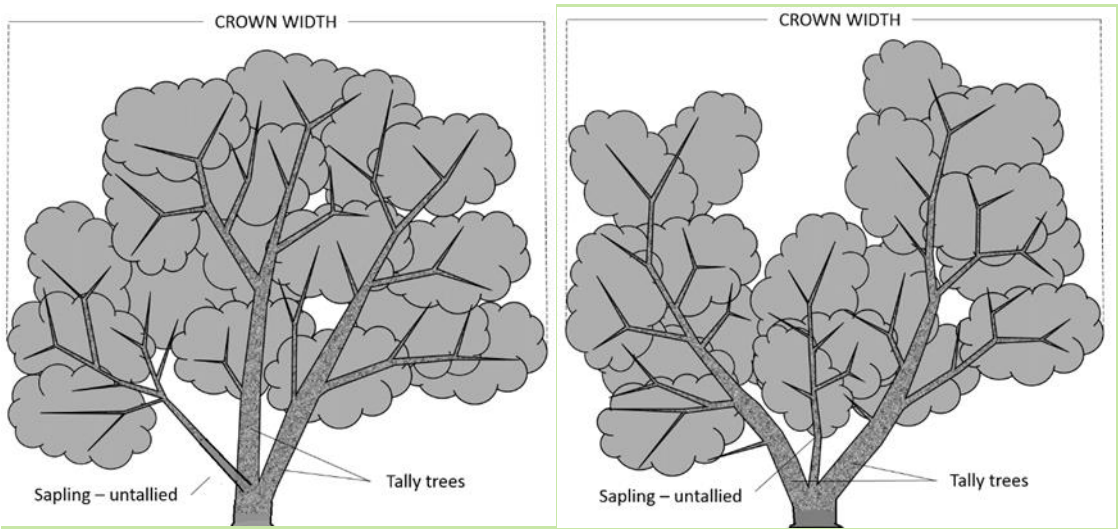


Figure 5-44U. Examples of how to measure MOTHER TREE CROWN DIAMETER WIDE. In both of these examples the piths join in such a fashion that there is only one pith entering the ground.

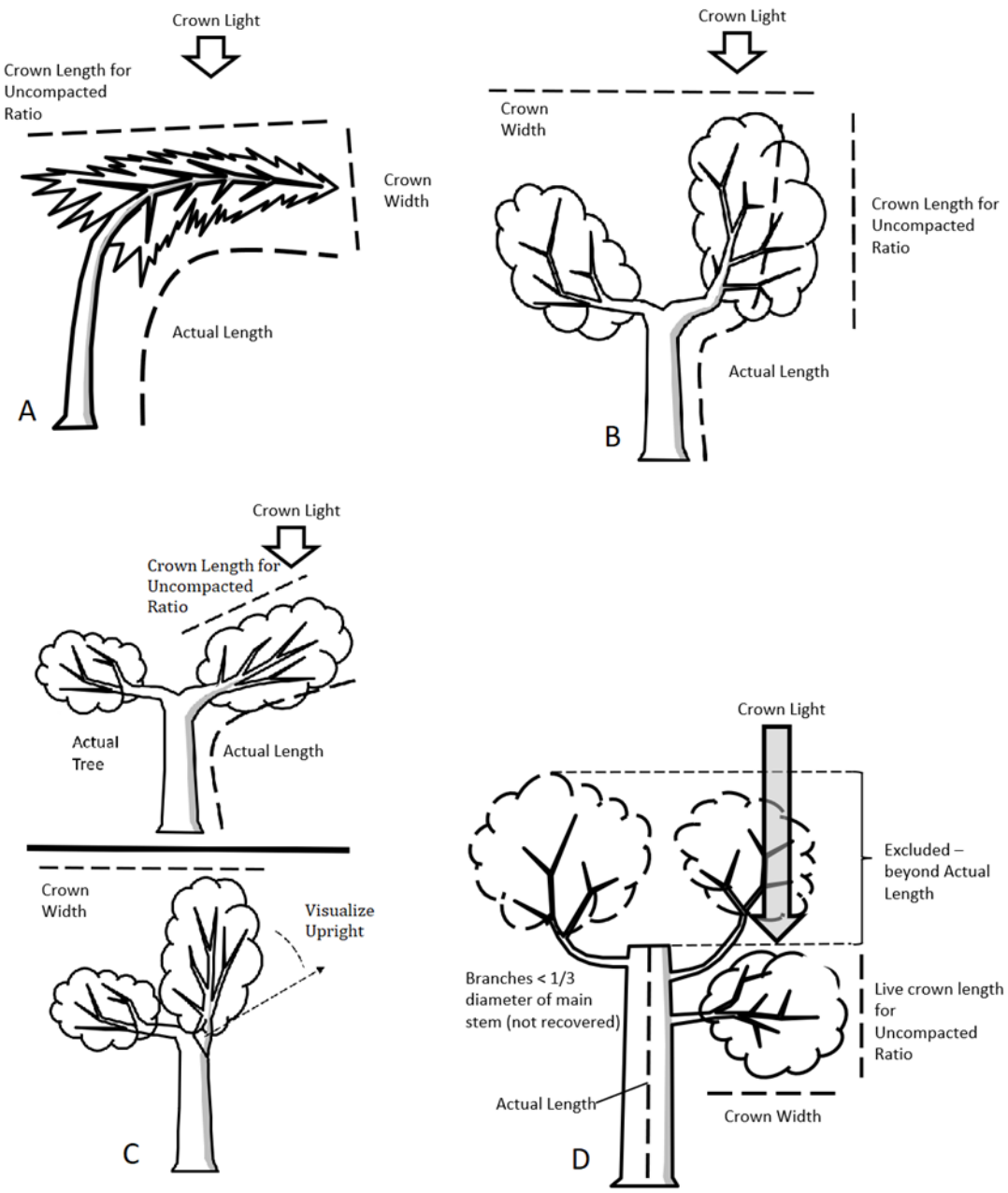


Figure 5-45U. Crown measurement examples.
A. The side facing the ground does not receive light for CLE and the side facing the sky is considered the top of the tree.
B. CLE, ACTUAL LENGTH, and UNCOMPACTED CROWN RATIO is based off of the stem with the longest length while CROWN WIDTHS is based off of the entire tree.
C. When pruning, topping or other conditions cause the current main stem to present in a more horizontal than vertical position, visually stand the stem up to estimate CROWN WIDTHS.
D. In cases where no new leader is considered recovered the ACTUAL LENGTH is measured to the break of the old main stem and the crown above the ACTUAL LENGTH is ignored for crown measurements. Trees can not shade themselves so in this case, even

though the lower branch is being evaluated for CLE, the top (of the lower branch) is considered to have full sunlight.

5.19 COMPACTED CROWN RATIO

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 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. On trees with an unrecovered broken top, do not include any foliage that extends above the actual break regardless of where it originates (Figure 5-46).

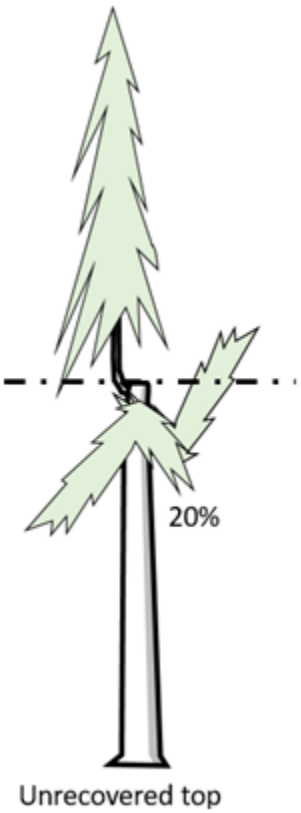


Figure 5-46. ACTUAL LENGTH is measured up to the dashed line at the break and no foliage above that point is considered when calculating the COMPACTED CROWN RATIO, which is estimated to be 20% in this example.

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 5-47). Figure 5-48 shows an example of COMPACTED CROWN RATIO on a leaning tree.

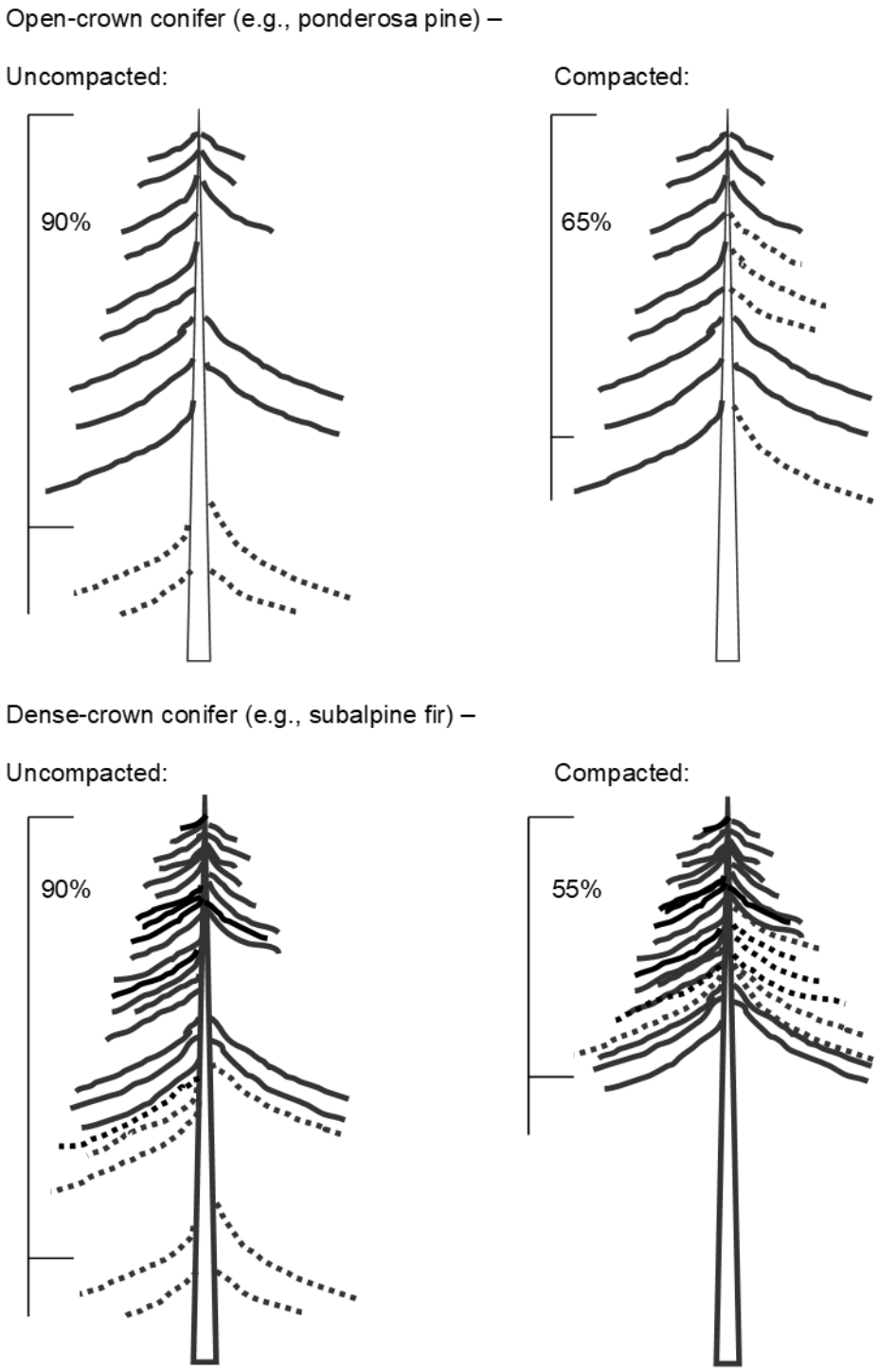


Figure 5-47. Examples of and comparison between COMPACTED CROWN RATIO and UNCOMPACTED LIVE CROWN RATIO of conifers.

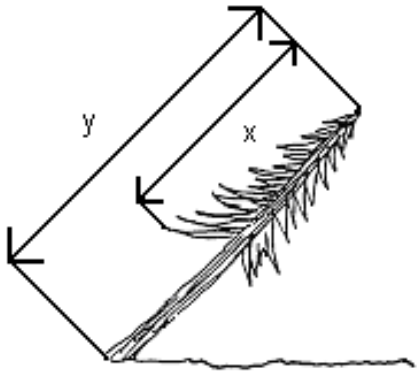


Figure 5-48. COMPACTED CROWN RATIO on a leaning tree. CROWN RATIO = (x/y)100.

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 5-49).

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

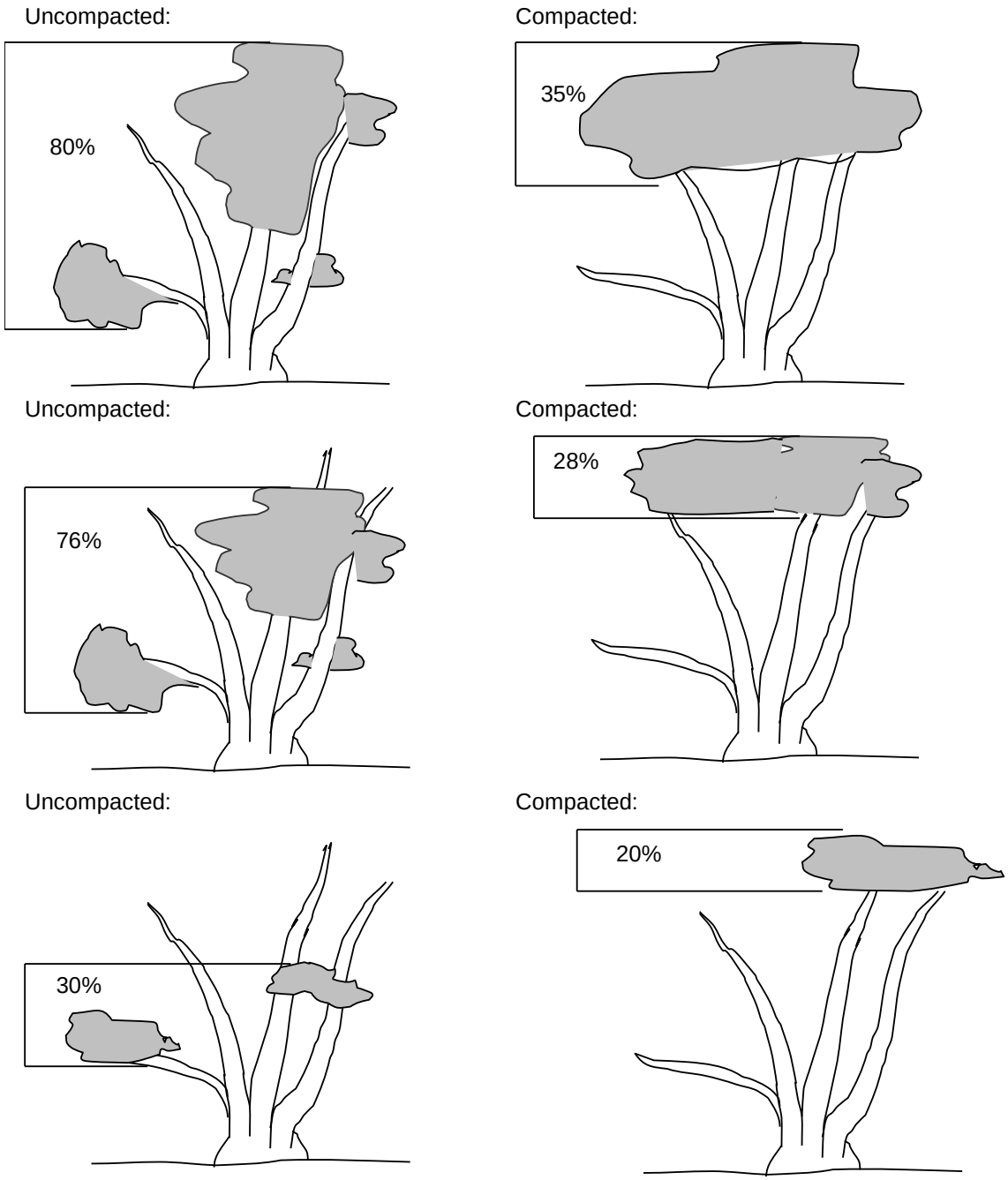


Figure 5-49. Examples of and comparison between COMPACTED CROWN RATIO and UNCOMPACTED LIVE CROWN RATIO of woodland species.

23.1+U 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, LIGHT EXPOSURE, and 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 23-). 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.

23.2 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. 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 base

above 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 23-).

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.

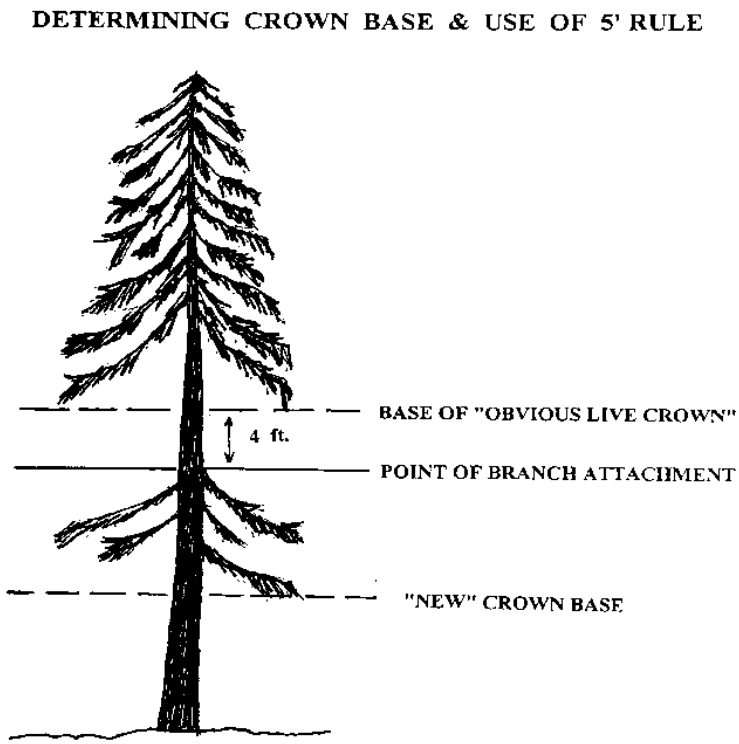


Figure 23-1. Determining the base of the live crown.

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.

23.4 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 23-). 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.

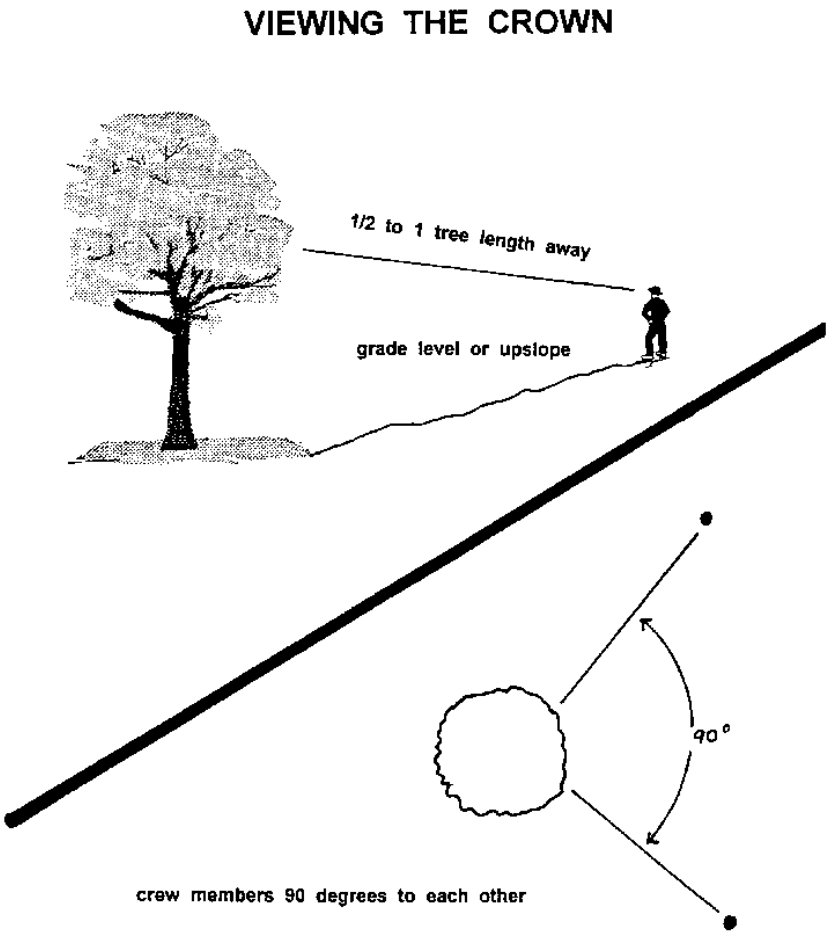


Figure 23-2. Crew positions for viewing crowns.

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). CROWN LIGHT EXPOSURE should still be estimated relative to the tree's actual location in the canopy. 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

23.6+U CROWN LIGHT EXPOSURE

As illustrated in Figure 23-, 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 as can foliage from vines in the upper and outer portions of the crown. Dead tops of a live tree cannot 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 (>45° from vertical), do not count any quarters that face the ground.

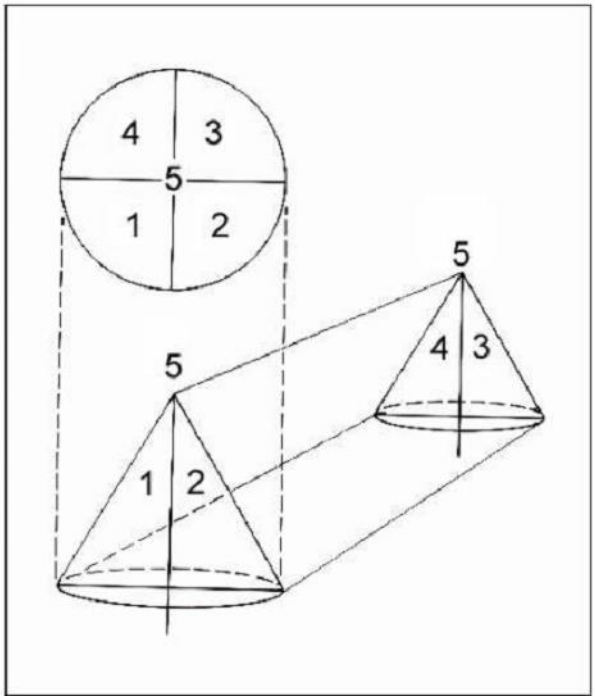


Figure 23-3. Dividing the crown.

Note: A sliver of a quarter receiving light does not qualify (Figure 23-). 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 23-).

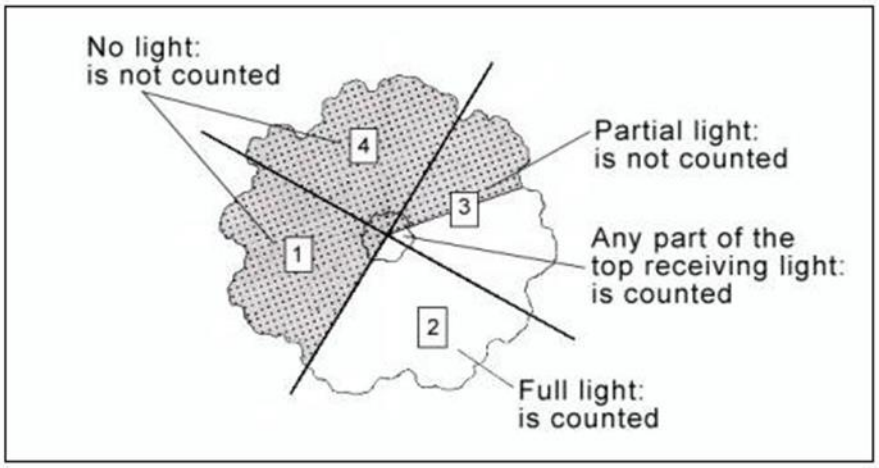


Figure 23-4+U. Crown light exposure. Some trees have a small pointy top, like the tree shown here. Others might have a broad top, like an oak. When evaluating broad tops determine the location where TOTAL LENGTH would be measured to. The width of the crown at that location would then be evaluated for receiving light; everything below that width would be considered part of the sides.

When collected: Live trees ≥ 1.0 inch 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 light on the top and less than full light on the sides because it is shaded by trees, vines, or other vegetation; or the tree has no crown by definition.
1 The tree/Mother Tree unit receives some light on the top.
2 The tree/Mother Tree unit receives some light on the top and full light on 1 quarter.
3 The tree/Mother Tree unit receives some light on the top and full light on 2 quarters.
4 The tree/Mother Tree unit receives some light on the top and full light on 3 quarters.
5 The tree/Mother Tree unit receives full light on the top and full light on 4 quarters.

5.20+U CROWN DIEBACK (URBAN FIA,)

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 5-50 and Figure 5-51).

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 considered only 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.

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.

When collected: Live trees ≥ 1.0 inches DBH/DRC when MOTHER TREE # = null or MOTHER TREE # = URBAN TREE RECORD NUMBER
Field width: 2 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%
30	26-30%	65	61-65%	99	96-100%

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

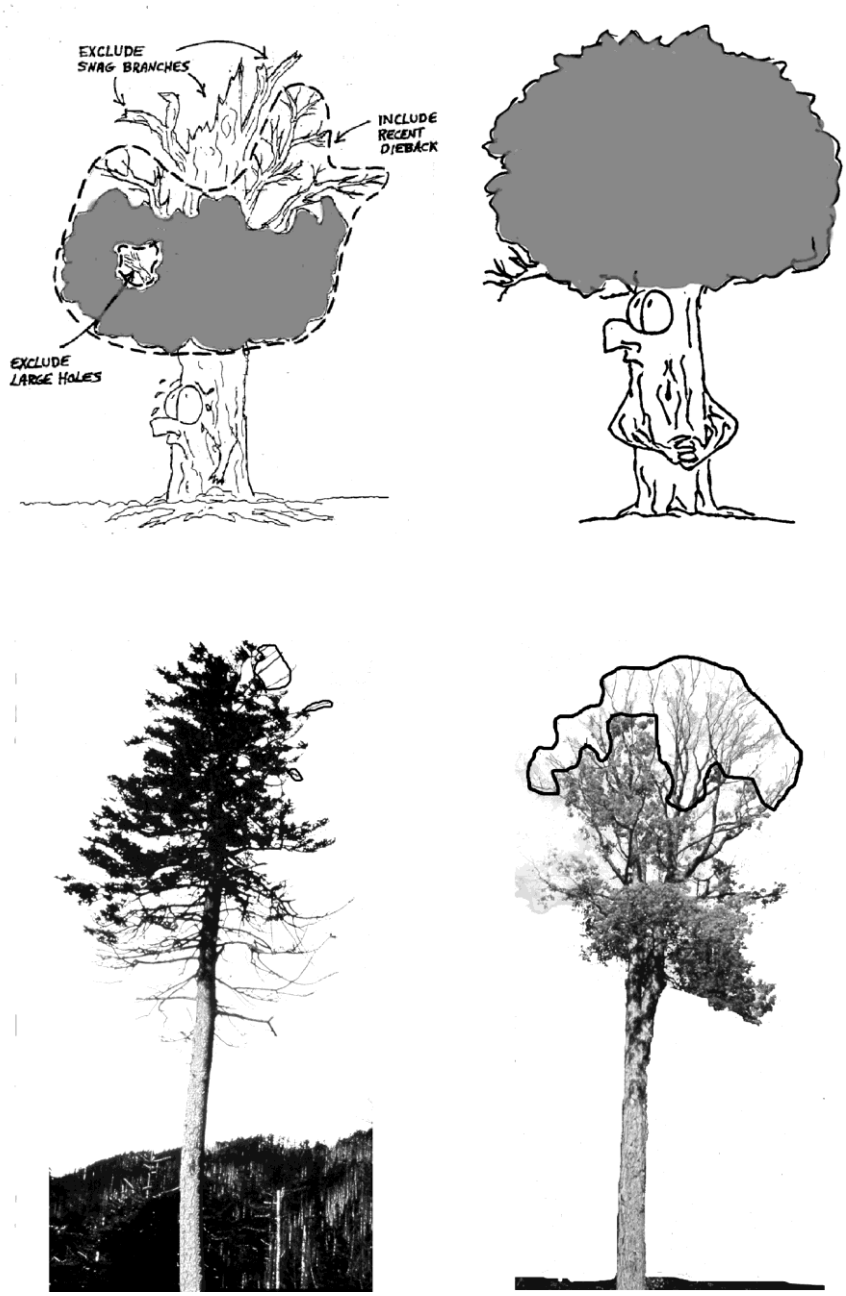


Figure 5-50. CROWN DIEBACK rating outline examples.

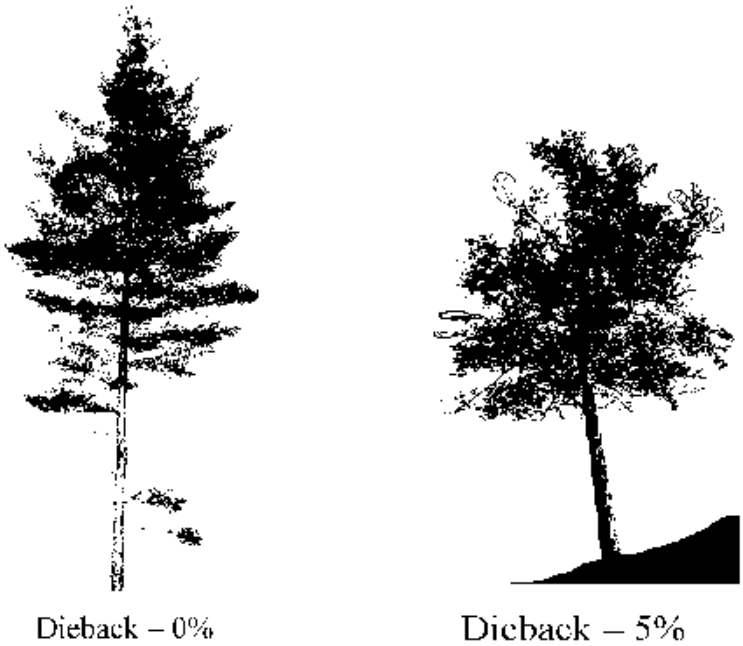


Figure 5-51. Dieback outline and rating examples.

5.21+U 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.

Record the general agent unless the Region opts to collect specific agents. Specific agents can later be collapsed into the general agent categories for cross-region comparisons. In the unusual instance when more than one specific agent in the same general category occurs on the same tree, record them both. If a specific agent is identified on that plot but that agent is not on the regionally recognized list of codes for damage agents, use its General Agent code. Appendix 11 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 11 may be used instead of the general codes listed under URBAN DAMAGE AGENT 1. Any damage code in Appendix 11 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.

Primary categories of damage. Refer to Appendix 11 for the complete list of damages for SRS.

5.21.1+U URBAN DAMAGE AGENT 1

Inspect the tree from bottom to top – roots, bole, branches, foliage (including buds and shoots). Record the first damage agent observed from the list of agents (unless you observe more than 3 damages). If there are more than three agents, record only the most important ones using the list of impacts listed in Section 5.20 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 11, 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 no damage is present, record ‘0’. Refer to Appendix 11 for the complete list of damages for SRS.

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

General Agent Damage Codes, Damage Thresholds, and Descriptions.

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).

Code	General Agent	Damage Threshold*	Descriptions
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.

Code	General Agent	Damage Threshold*	Descriptions
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.

Code	General Agent	Damage Threshold*	Descriptions
24000	Decline Complexes/ Dieback/Wilts	Damage ≥20% dieback of crown area.	Tree disease which results not from a single causal agent but from an interacting set of factors. Terms that denote the symptom syndrome, such as dieback and wilt, are commonly used to identify these diseases.
25000	Foliage diseases	Damage ≥20% of the foliage with ≥50% of the leaf/needle affected.	Foliage diseases are caused by fungi and result in needle shed, growth loss, and, potentially, tree mortality. This category includes needle casts, blights, and needle rusts.
26000	Stem rusts	Any occurrence on the bole or stems (on multi-stemmed woodland species), or on branches ≤1 foot from boles or stems; damage to ≥20% of branches	A stem rust is a disease caused by fungi that kill or deform all or a portion of the stem or branches of a tree. Stem rusts are obligate parasites and host specialization is very common. They infect and develop on fast-growing tissues and cause accelerated growth of infected tissues resulting in galls or cankers. Heavy resinosis is usually associated with infections. Sometimes yellow or reddish-orange spores are present giving a “rusty” appearance. Damage occurs when the disease attacks the cambium of the host, girdling and eventually killing the stem above the attack. Symptoms of rusts include galls (an abnormal and pronounced swelling or deformation of plant tissue that forms on branches or stems) and cankers (a sunken lesion on the stem caused by death of the cambium which often results in the death of tree tops and branches).

Code	General Agent	Damage Threshold*	Descriptions
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.

Code	General Agent	Damage Threshold*	Descriptions
50000	Abiotic	Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected.	Abiotic damages are those that are not caused by other organisms. In some cases, the type and severity of damage may be similar for different types of agents (e.g., broken branches from wind, snow, or ice).
60000	Competition	Overtopped shade intolerant trees that are not expected to survive for 5 years or saplings not expected to reach tree size (5.0 inches DBH/DRC).	Suppression of overtopped shade intolerant species. Trees that are not expected to survive for 5 years or saplings not expected to reach tree size (5.0 inches DBH/DRC).
70000	Human activities	Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected.	People can injure trees in a variety of ways, from poor pruning, to vandalism, to logging injury. Signs include open wounds or foreign embedded objects.
71000	Harvest	Removal of ≥10% of cubic volume	Only recorded for woodland species trees that have partial cutting
90000	Other damage	Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected.	
99000	Unknown damage	Any damage to the terminal leader; damage ≥20% of the roots or boles with >20% of the circumference affected; damage >20% of the multiple-stems (on multi-stemmed woodland species) with >20% of the circumference affected; >20% of the branches affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected.	Use this code only when observed damage cannot be attributed to a general or specific agent.

* Some Regional specific damage agents within a category may have differing damage thresholds.

5.21.2+U URBAN DAMAGE AGENT 2

Follow procedures described for URBAN DAMAGE AGENT 1

When collected: URBAN FIA: All live tally trees ≥ 1.0 inch DBH/DRC
Field width: 5 digits
Tolerance: 1 of 2 damages correct
MQO: Will be established following blind audit results
Values: See 5.20.1

5.21.3+U URBAN DAMAGE AGENT 3

Follow procedures described for URBAN DAMAGE AGENT 1

When collected: URBAN FIA: All live tally trees ≥ 1.0 inch DBH/DRC
Field width: 5 digits
Tolerance: 2 of 3 damages correct
MQO: Will be established following blind audit results
Values: See 5.20.1

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.

5.21.4U URBAN SPECIFIC DAMAGE VARIABLE 1

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 inch 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

5.21.5U URBAN SPECIFIC DAMAGE VARIABLE 2

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 5.20.4U

5.21.6U URBAN SPECIFIC DAMAGE VARIABLE 3

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 5.20.4U

5.21.7U URBAN SPECIFIC DAMAGE VARIABLE 4

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 5.20.4U

5.21.8U URBAN SPECIFIC DAMAGE VARIABLE 5

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 5.20.4U

5.21.9U URBAN SPECIFIC DAMAGE VARIABLE 6

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 5.20.4U

5.21.10U URBAN SPECIFIC DAMAGE VARIABLE 7

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 5.20.4U

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.

Location: Roots / Stump

Severity Threshold: 25% of circumference

Figure 5-52U. The picture above illustrates a root crossing root, and is not considered a girdling root.

Figure 5-53U. 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 5-54U. 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.

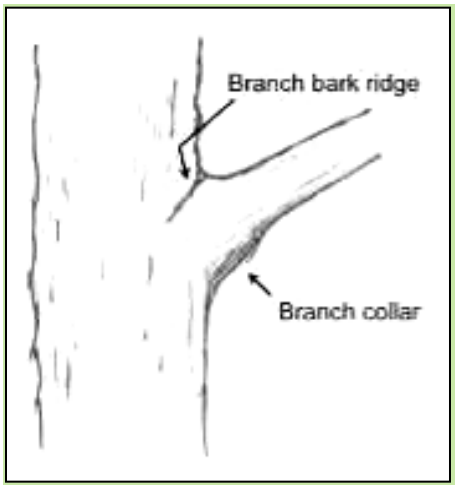


Figure 5-55U. A strong branch union has a conspicuous branch bark ridge.

Figure 5-56U. "V" Notch with included bark resulting in a split tree.

Figure 5-57U. "V" Notch.

Figure 5-58U. This is a "V" Notch and recordable. There is no branch bark ridge between the two branches.

Figure 5-59U. 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 5-60U. Topping.

Figure 5-61U. Poor pruning.

Figure 5-62U. Poor pruning.

Figure 5-63U. An example of severe topping, showing the weakly attached sprouts regenerating from the cut limb.

Figure 5-64U. 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 5-65U. Excessive mulch.

Figure 5-66U. Excessive mulch.

Conflict With Roots

Description: Damage to infrastructure such as sidewalks, driveways, roads, or other hardscapes 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). Figure 5-67U shows examples of such conflicts. Figure 5-68U shows examples of situations that do NOT warrant a Conflict With Roots damage code but do warrant a Urban Damage Agent of 70000 (Human Activities) or 70003 (Imbedded object).

Location: Roots up to the top of the1' stump

Severity Threshold: None

Shown below are examples of sidewalk conflicts.

Figure 5-67U. Conflicts with roots showing infrastructure damage.

Figure 5-68U. These examples would NOT be coded as Conflict with Roots because there is no infrastructure damage; however since >20% of the roots or bole are affected they would be coded with Urban Damage Agent 70000 (Human Activities) on the left and 70003 (Embedded object) on the right.

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 5-69U. Utility wires, marked with blue arrows, going through a tree crown.

Improper Planting

Description: Evidence of improper planting which may include burlap, twine or root ball wire not removed prior to planting, or root flare buried. Any of the following are visible at the soil surface: burlap, twine, or cage/wire; OR evidence that the root flare not visible.

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 5-70U. Improper planting.

Figure 5-71U. Very little mulch present in image, root flare covered by soil, tree takes on the appearance of cylinder placed in the ground - code as a damage.

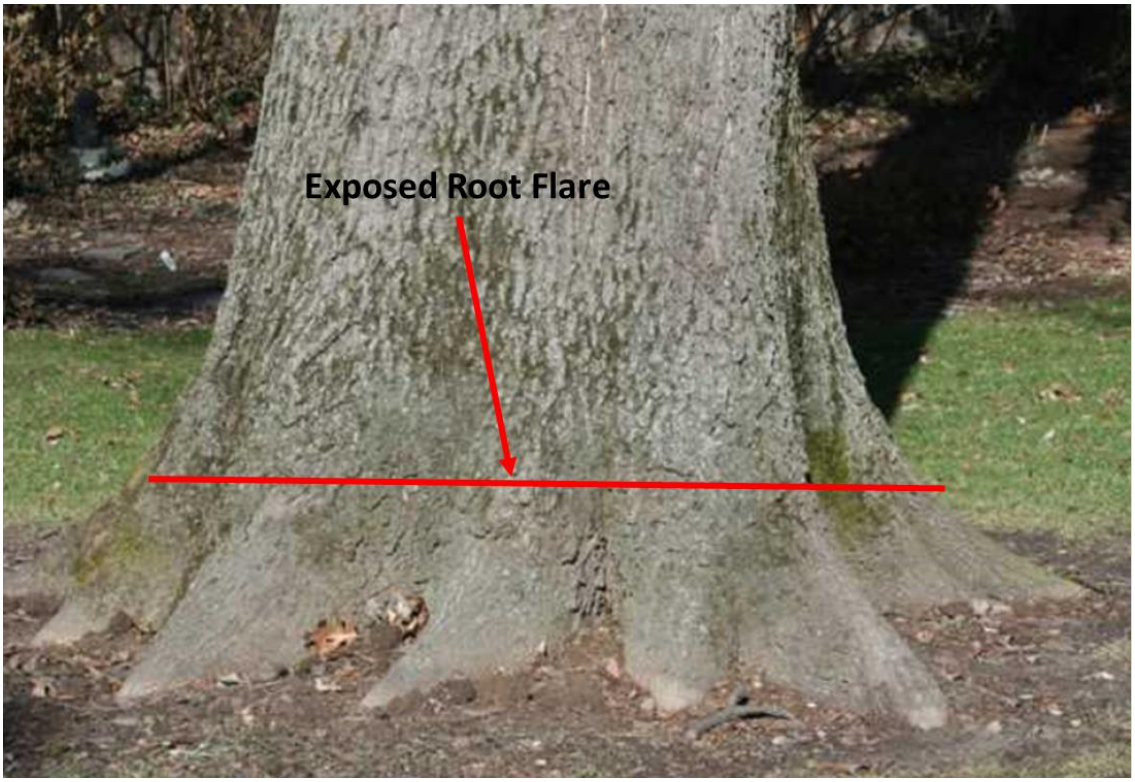


Figure 5-72U. Although this tree is over 10" DBH it does demonstrate the existence of an obvious root flare, a sign of a properly planted tree

5.22+U CAUSE OF DEATH

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
URBAN OPTIONAL: 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)

5.23+U URBAN MORTALITY YEAR (URBAN OPTIONAL Collected in PNW, RMRS, SRS)

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: PNW, RMRS, SRS 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.
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

5.24 DECAY CLASS

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.

5.25 LENGTH TO DIAMETER MEASUREMENT POINT

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.

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

5.26 ROUGH CULL (CORE OPTIONAL) Not Collected in URBAN FIA

5.27 DWARF MISTLETOE CLASS (CORE OPTIONAL) Not Collected in URBAN FIA

5.28 TREE NOTES

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

5.29U Building Energy Data

Data is collected for trees greater than or equal to 20 feet in vertical height (Figure 5-73U) 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 but are NOT limited specifically to the Residential land use
- Contain no more than 2 stories (plus an attic and a basement that is at least partially below ground) in height above ground level and include attached garages. When it appears that an attic space has been converted to living quarters, it will be considered an additional story, rather than an attic.
- Are space conditioned (heated and perhaps cooled).

Do not count detached garages, sheds, or other outbuildings.

Building Energy Data focuses on the definition of a building as described above, not necessarily the land use associated with the building. The building can be in any land use. For example, a 2 story space-conditioned building that was built as a residence but is now 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.

Groups of connected single or multiunit buildings (townhomes, duplexes, rowhouses, etc…) meeting these requirements would be considered a SINGLE building and receive a single interaction within any qualifying tree. Multiunit buildings with more than 4 units are excluded.

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).

If more than 4 qualifying buildings are within 60 ft. of a qualifying tree, record the 4 buildings that are closest.

A qualifying Building Energy Tree can originate in any land use and its associated building does not need to be on the plot. Distance is measured in feet from the point where the pith of the tree enters the ground to the closest wall or corner of the building.

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 stem of the Mother Tree Unit 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.

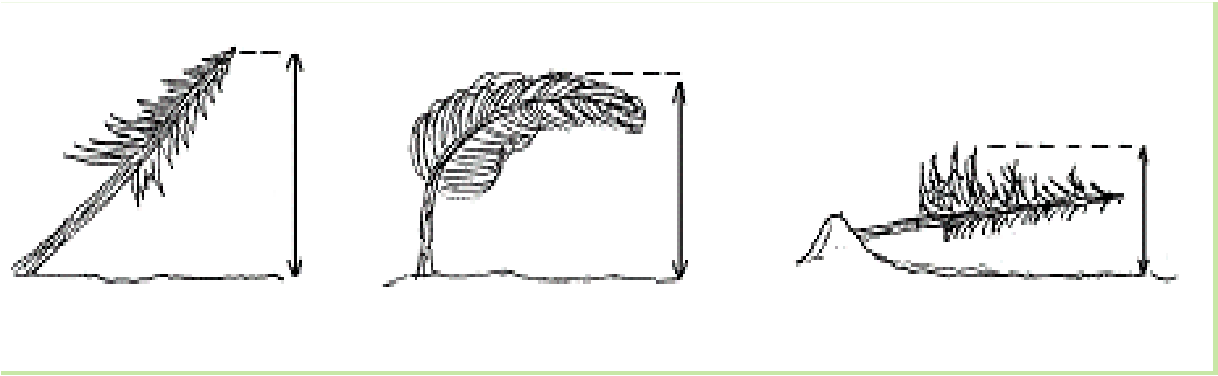


Figure 5-73U. Vertical height measurement.

5.29.1U BUILDING DISTANCE 1

The shortest distance to the closest 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 20.1 feet
2	20.1 to 40.0 feet

3 40.1 to 60.0 feet

5.29.2U BUILDING AZIMUTH 1

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

5.29.3U BUILDING DISTANCE 2

Follow same procedures as BUILDING DISTANCE 1

5.29.4U BUILDING AZIMUTH 2

Follow same procedures as BUILDING AZIMUTH 1

5.29.5U BUILDING DISTANCE 3

Follow same procedures as BUILDING DISTANCE 1

5.29.6U BUILDING AZIMUTH 3

Follow same procedures as BUILDING AZIMUTH 1

5.29.7U BUILDING DISTANCE 4

Follow same procedures as BUILDING DISTANCE 1

5.29.8U BUILDING AZIMUTH 4

Follow same procedures as BUILDING AZIMUTH 1

5.30U MAINTAINED AREA TREE

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 CLASS 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

5.31U RIPARIAN RIVER / STREAM TREE

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

5.32U STREET TREE

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 distance from the road are also defined as STREET TREES. For a road surface to count for a STREET TREE it must be a road that is (or would be) conditioned out as an URBAN NONFOREST LAND USE = 320 (Right-of-way). Maintained surfaced roads associated with URBAN NONFOREST LAND USE = 321 (Transportation) are excluded as are maintained surfaced roads such as alleys, driveways, local internal use roads and trails, and parking areas that specifically provide access to and service developed land uses; such maintained surfaced roads are assigned the land use of the surrounding developed condition and are not considered Right-of-ways. Examples of these cases are often found in parks, cemeteries, commercial, and institutional areas.

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 CLASS 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

5.33U PLANTED TREE

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 inch DBH/DRC within URBAN CONDITION CLASS 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

5.34 SRS ABNORMAL TERMINATION

For all standing trees, record the code indicating whether the tree length was terminated early due to a broken top (top on live trees is completely detached; top on dead trees is greater than 50 percent detached from the tree).

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

0	Stem is not abnormally terminated
1	Stem is abnormally terminated

6.0+U 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 CLASS STATUSes except URBAN CONDITION CLASS STATUS 5 (NONSAMPLED) are included.

6.1 URBAN SUBPLOT NUMBER

Use the same procedures described in Section 3.1.

When collected: All counts of seedlings

6.1.1U URBAN MICROPLOT NUMBER

Use the same procedures described in Section 3.1.

When collected: All counts of seedlings

6.2+U URBAN SPECIES

Use the same procedures described in Section 5.8.

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 3

6.3 CONDITION CLASS NUMBER

Use the same procedures described in Section 2.0.

When collected: All counts of seedlings

6.4+U URBAN SEEDLING COUNT

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. If multiple seedlings originate from a standing dead tally tree count as 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

6.4.1U MAINTAINED AREA SEEDLING

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 CLASS 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

6.4.2U PLANTED SEEDLING

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 CLASS 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

7.0+U 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.

7.1+U 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.

7.2 Site Tree Data Variables

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

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: NRS, PNW, SRS All site trees
Field width: 3 digits
Tolerance: No errors
MQO: At least 99% of the time
Values: 001 to 999

7.2.1+U CONDITION CLASS LIST

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

7.2.2+U SPECIES

Use the same procedures described in Section 5.8. 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:

Eastern U.S. Site-Tree Species: NE = Northeast, NC = North Central, SO = Southern

Code	Common Name	Region
---------- Softwood Species ----------		
0012	balsam fir	NE, NC
0043	Atlantic white-cedar	NE
0068	eastern redcedar	NE, NC
0070	larch (introduced)	NE
0071	tamarack	NE, NC
0094	white spruce	NE, NC
0095	black spruce	NE, NC
0097	red spruce	NE
0105	jack pine	NE, NC
0107	sand pine	SO

Code	Common Name	Region
0110	shortleaf pine	NE, NC, SO
0111	slash pine	SO
0121	longleaf pine	SO
0122	Ponderosa pine	NC
0125	red pine	NE, NC
0128	pond pine	NE, SO
0129	eastern white pine	NE, NC, SO
0130	Scotch pine	NE, NC
0131	loblolly pine	NE, SO
0132	Virginia pine	NE, SO
0241	northern white cedar	NE, NC
0261	eastern hemlock	NE, NC
---------- Hardwood Species ----------		
0316	red maple	NE, NC
0317	silver maple	NE, NC
0318	sugar maple	NE, NC
0371	yellow birch	NE, NC
0375	paper birch	NE, NC
0402	bitternut hickory	NE, NC
0403	pignut hickory	NC
0404	pecan	NC
0405	shellbark hickory	NC
0407	shagbark hickory	NE, NC
0408	black hickory	NC
0409	mockernut hickory	NC
0462	hackberry	NC
0531	American beech	NE, NC
0541	white ash	NE, NC
0543	black ash	NE, NC
0544	green ash	NE, NC
0602	black walnut	NC
0611	sweetgum	NE, NC, SO
0621	yellow-poplar	NE, NC, SO
0741	balsam poplar	NC
0742	eastern cottonwood	NE, NC, SO
0743	bigtooth aspen	NE, NC
0746	quaking aspen	NE, NC
0762	black cherry	NC
0802	white oak	NE, NC, SO
0806	scarlet oak	NE, NC, SO
0809	northern pin oak	NC
0812	southern red oak	NE, SO
0813	cherrybark oak	NE, SO
0817	shingle oak	NE, NC, SO
0823	bur oak	NC
0826	chinkapin oak	NC
0827	water oak	NE, SO
0830	pin oak	NE, NC, SO
0832	chestnut oak	NE, SO
0833	northern red oak	NE, NC, SO
0835	post oak	NE, NC, SO
0837	black oak	NE, NC, SO
0901	black locust	NE, NC

Code	Common Name	Region
0951	American basswood	NE, NC
0972	American elm	NE, NC
0975	slippery elm	NC
0977	rock elm	NC

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

Code	Common Name	Region
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

7.2.3 DIAMETER

Use the same procedures described in Section 5.9.

When collected: All site trees
Field width: 4 digits (xxx.y)
Tolerance: +/- 0.1 inch per 20.0 inches increment of measured diameter on all live trees and dead trees with DECAY CLASS = 1, 2
+/- 1.0 inch per 20.0 inches increment of measured diameter on 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 ft of the location established by the previous crew when the tree is remeasured.)
Values: 001.0 to 999.9

7.2.4 SITE TREE LENGTH

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

7.2.5 TREE AGE AT DIAMETER

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: 3 digits
Tolerance: +/- 5 years
MQO: At least 95% of the time
Values: 001 to 999

7.2.6 SITE TREE NOTES

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

7.2.7+U URBAN SUBPLOT NUMBER (URBAN OPTIONAL Collected in NRS, PNW, RMRS, SRS)

Record the subplot number to which the site tree is referenced.

If subplot center cannot be occupied reference the site tree to the nearest subplot OFFSET POINT that can be occupied and make a note in Site Tree Notes section in the PDR.

When collected: NRS, RMRS, SRS All site trees
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values:

1	Urban subplot

7.2.7.1U OFFSET POINT (URBAN OPTIONAL Collected in NRS, PNW, RMRS)

Record the appropriate code corresponding to the location from which site tree was measured from, (See Appendix 15U for detailed offset procedures).

When collected: NRS, RMRS All site trees
Field width: 3 digits
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

7.2.8+U AZIMUTH (URBAN OPTIONAL Collected in NRS, PNW, RMRS, SRS)

Record the AZIMUTH from the subplot center; sight the center of the base of each tree with a compass. Record AZIMUTH to the nearest degree. Use 360 for north.

When collected: NRS, RMRS, SRS All site trees where OFFSET POINT = 0
Field width: 3 digits
Tolerance: +/- 10 degrees
MQO: At least 90% of the time
Values: 001 to 360

7.2.8.1U URBAN OFFSET AZIMUTH (URBAN OPTIONAL Collected in NRS, PNW, RMRS, SRS)

Procedures are the same as Section 7.2.8 with the exception that the measurements are taken from an OFFSET POINT other than subplot center.

When collected: NRS, RMRS, SRS OFFSET POINT IS > 0, All site trees.
Field width: 3 digits
Tolerance: +/- 10 degrees
MQO: At least 90% of the time
Values: 001 to 360

7.2.9+U URBAN HORIZONTAL DISTANCE (URBAN OPTIONAL Collected in NRS, PNW, RMRS, SRS)

Record the measured HORIZONTAL DISTANCE, to the nearest 0.1 foot, from the subplot center to the pith of the tree at the base.

When collected: NRS, RMRS, SRS All site trees where OFFSET POINT = 0
Field width: 4 digits (xxx.y)
Tolerance: +/- 5 ft
MQO: At least 90% of the time
Values: 000.1 to 320.0

7.2.9.1U URBAN OFFSET HORIZONTAL DISTANCE (URBAN OPTIONAL Collected in NRS, PNW, RMRS, SRS)

Procedures are the same as 7.2.9 with the exception that the measurements are taken from an OFFSET POINT other than subplot center.

When collected: NRS, RMRS, SRS OFFSET POINT >0, All site trees
Field width: 4 digits (xxx.y)
Tolerance: +/- 5 ft
MQO: At least 90% of the time
Values: 0.1 to 320.0

9.0+U 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.

9.1+U 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 (Appendix 10). Rules and expectations for plant collection and identification are specified by individual FIA units.

9.2+U 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.

9.3+U SUBPLOT NUMBER

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

9.4+U CONDITION CLASS NUMBER
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 SAMPLING STATUS = 2)
Field width: 1 digit
Tolerance: No errors
MQO: At least 99% of the time
Values: 1-9

9.5+U SPECIES CODE
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 September 15, 2017 version maintained by the FIA IM group (USDA, NRCS. 2017. 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 (Appendix 9) but cannot be identified quickly and confidently, and the FIA unit's protocols require specimen collection (INVASIVE PLANT SPECIMEN COLLECTION RULE = 1, 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. When locally sparse the preferred method is to use the INVASIVE PLANTS NOTES section to describe the plant. If possible also submit multiple pictures of the plant highlighting shape, form, foliage, buds, and flowers.

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 subplot (URBAN CONDITION CLASS STATUS = 1, 2, 3, and 4) when invasive plants are present on the subplot (INVASIVE PLANT CONDITION SAMPLE STATUS = 1)
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. When INVASIVE PLANT SPECIMEN COLLECTION RULE = 0, Unknown Codes may be used only as a temporary placeholder. Before loading the plot they must be replaced with the proper NRCS species code or deleted if the plant is determined to not be a listed invasive species.

9.6 UNIQUE SPECIES NUMBER

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

9.7+U SPECIES CANOPY COVER

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

Table 9-5U. Area-cover sizes useful in developing estimates for an entirely forested Urban FIA subplot.

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

9.7.1U MAINTAINED AREA SPECIES

Record the code to indicate if at least half (estimated for each measured condition on the subplot separately) of the 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 CLASS 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

9.8+U INVASIVE SPECIMEN COLLECTED

SRS Note: This variable is not collected in our region

9.9 SPECIMEN LABEL NUMBER

SRS Note: This variable is not collected in our region

9.10 INVASIVE PLANT NOTES

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

9.11 References

Daubenmire, R. 1959. A canopy-coverage method of vegetational analysis. Northwest Science 33(1): 43-64.

APPENDIX 1. STATE AND COUNTY, PARISH, OR BOROUGH FIPS CODES

States are sorted by county.

TEXAS

County		Unit	County		Unit
(013)	Atacosa	4	(201)	Harris	1
(015)	Austin	3	(209)	Hays	5
(019)	Bandera	5	(259)	Kendall	5
(021)	Bastrop	3	(291)	Liberty	1
(029)	Bexar	5	(325)	Medina	5
(039)	Brazoria	4	(339)	Montgomery	1
(055)	Caldwell	3	(407)	San Jacinto	1
(071)	Chambers	1	(453)	Travis	5
(091)	Comal	5	(473)	Waller	1
(157)	Fort Bend	4	(491)	Williamson	5
(167)	Galveston	4	(493)	Wilson	4
(187)	Guadalupe	3			

APPENDIX 2. FIA FOREST TYPE CODES

This following list includes all forest types in the Continental U.S. and Alaska.Types designated East/West are commonly found in those regions, although types designated for one region may occasionally be found in another.

East	West	Code	Species Type
			White / Red / Jack Pine Group
E		101	Jack pine
E		102	Red pine
E		103	Eastern white pine
E		104	Eastern white pine / eastern hemlock
E		105	Eastern hemlock
			Spruce / Fir Group
E		121	Balsam fir
E		122	White spruce
E		123	Red spruce
E		124	Red spruce / balsam fir
E	W	125	Black spruce
E		126	Tamarack
E		127	Northern white-cedar
E		128	Fraser fir
E		129	Red spruce / Fraser fir
			Longleaf / Slash Pine Group
E		141	Longleaf pine
E		142	Slash pine
			Tropical Softwoods Group
E		151	Tropical pines
			Loblolly / Shortleaf Pine Group
E		161	Loblolly pine
E		162	Shortleaf pine
E		163	Virginia pine
E		164	Sand pine
E		165	Table Mountain pine
E		166	Pond pine
E		167	Pitch pine
E		168	Spruce pine
			Other Eastern Softwoods Group
E		171	Eastern redcedar
E		172	Florida softwoods
			Pinyon / Juniper Group
E	W	182	Rocky Mountain juniper
E	W	184	Juniper woodland
E	W	185	Pinyon-juniper woodland
			Douglas-fir Group
E	W	201	Douglas-fir
	W	202	Port-Orford-cedar

East	West	Code	Species Type
	W	203	Bigcone Douglas-fir
			Ponderosa Pine Group
E	W	221	Ponderosa pine
	W	222	Incense-cedar
	W	224	Sugar pine
	W	225	Jeffrey pine
	W	226	Coulter pine
			Western White Pine Group
	W	241	Western white pine
			Fir / Spruce / Mountain Hemlock Group
	W	261	White fir
	W	262	Red fir
	W	263	Noble fir
	W	264	Pacific silver fir
	W	265	Engelmann spruce
	W	266	Engelmann spruce / subalpine fir
	W	267	Grand fir
	W	268	Subalpine fir
	W	269	Blue spruce
	W	270	Mountain hemlock
	W	271	Alaska-yellow-cedar
			Lodgepole Pine Group
	W	281	Lodgepole pine
			Hemlock / Sitka Spruce Group
	W	301	Western hemlock
	W	304	Western redcedar
	W	305	Sitka spruce
			Western Larch Group
	W	321	Western larch
			Redwood Group
	W	341	Redwood
	W	342	Giant sequoia
			Other Western Softwoods Group
	W	361	Knobcone pine
	W	362	Southwestern white pine
	W	363	Bishop pine
	W	364	Monterey pine
	W	365	Foxtail pine / bristlecone pine
	W	366	Limber pine
	W	367	Whitebark pine
	W	368	Misc. western softwoods
	W	369	Western juniper
			California Mixed Conifer Group
	W	371	California mixed conifer

East	West	Code	Species Type
			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		403	Longleaf pine / oak
E		404	Shortleaf pine / oak
E		405	Virginia pine / southern red oak
E		406	Loblolly pine / hardwood
E		407	Slash pine / hardwood
E		409	Other pine / hardwood
			Oak / Hickory Group
E		501	Post oak / blackjack oak
E		502	Chestnut oak
E		503	White oak / red oak / hickory
E		504	White oak
E		505	Northern red oak
E		506	Yellow-poplar / white oak / N. red oak
E		507	Sassafras / persimmon
E		508	Sweetgum / yellow-poplar
E		509	Bur oak
E		510	Scarlet oak
E		511	Yellow-poplar
E		512	Black walnut
E		513	Black locust
E		514	Southern scrub oak
E		515	Chestnut oak / black oak / scarlet oak
E		516	Cherry / white ash / yellow-poplar
E		517	Elm / Ash / black locust
E		519	Red maple / oak
E		520	Mixed upland hardwoods
			Oak / Gum / Cypress Group
E		601	Swamp chestnut oak / cherrybark oak
E		602	Sweetgum / Nuttall oak / willow oak
E		605	Overcup oak / water hickory
E		606	Atlantic white-cedar
E		607	Baldcypress / water tupelo
E		608	Sweetbay / swamp tupelo / red maple
E		609	Baldcypress / pondcypress
			Elm / Ash / Cottonwood Group
E		701	Black ash / American elm / red maple
E		702	River birch / sycamore
E	W	703	Cottonwood
E	W	704	Willow

East	West	Code	Species Type
E		705	Sycamore / pecan / American elm
E		706	Sugarberry / hackberry / elm / green ash
E		707	Silver maple / American elm
E		708	Red maple / lowland
E	W	709	Cottonwood / willow
	W	722	Oregon ash
			Maple / Beech / Birch Group
E		801	Sugar maple / beech / yellow birch
E		802	Black cherry
E		805	Hard maple / basswood
E		809	Red maple / upland
			Aspen / Birch Group
E	W	901	Aspen
E	W	902	Paper birch
E		903	Gray birch
E	W	904	Balsam poplar
E	W	905	Pin cherry
			Alder / Maple Group
	W	911	Red alder
	W	912	Bigleaf maple
			Western Oak Group
	W	921	Gray pine
	W	922	California black oak
	W	923	Oregon white oak
	W	924	Blue oak
	W	931	Coast live oak
	W	933	Canyon live oak
	W	934	Interior live oak
	W	935	California white oak (valley oak)
			Tanoak / Laurel Group
	W	941	Tanoak
	W	942	California laurel
	W	943	Giant chinkapin
			Other Hardwoods Group
	W	961	Pacific madrone
	W	962	Other hardwoods
			Woodland Hardwoods Group
	W	971	Deciduous oak woodland
	W	972	Evergreen oak woodland
	W	973	Mesquite woodland
	W	974	Cercocarpus (Mountain brush) woodland
	W	975	Intermountain maple woodland
	W	976	Misc. woodland hardwoods
			Tropical Hardwoods Group
E		982	Mangrove
E	W	983	Palms

East	West	Code	Species Type
		984	Dry forest
		985	Moist forest
		986	Wet and rain forest
		987	Lower montane wet and rain forest
		988	Cloud forest
E		989	Other tropical hardwoods
			Exotic Hardwoods Group
E		991	Paulownia
E		992	Melaleuca
E	W	993	Eucalyptus
E	W	995	Other exotic hardwoods

For nonstocked stands, see Section 2.5.3 for procedures to determine FOREST TYPE.

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).

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.

128 Fraser fir: Associates – red spruce, hemlock, yellow birch, less frequently, beech, sugar maple, yellow buckeye, mountain-ash, and mountain maple. Sites -- mainly occurs in the Appalachian Mountains of North Carolina and Tennessee. This type is used if the stocking of Fraser fir is at least 50 percent of the total stocking.

129 Red spruce/Fraser fir: Associates – hemlock, yellow birch, and less frequently, beech, sugar maple, yellow buckeye, mountain-ash, and mountain maple. Sites -- mainly occurs in the Appalachian Mountains of North Carolina and Tennessee. For this type to be used, the sum of the stocking of red spruce and Fraser fir must be at least 50 percent of the total stocking and red

spruce stocking must be between 5 and 49 percent of total and Fraser fir stocking must be between 5 and 49 percent of total.

LONGLEAF/SLASH PINE GROUP

141 Longleaf pine: Longleaf pine occurs as a pure type or comprises a majority of the trees in the overstory. Associates-slash, loblolly and shortleaf pine, southern red oak, blackjack oak, water oak, persimmon, and sweetgum. Sites - -those areas that can and do burn on a periodic basis--usually occurs on middle and upper slopes with a low severity of hardwood and brush competition. SRS distribution--coastal plain and piedmont units.

142 Slash pine: Slash pine is pure or provides a majority of the stocking. Associates--on moist sites; a wide variety of moist-site hardwoods, pond pine, and pondcypress. On dry sites; a wide variety of dry-site hardwoods, longleaf, loblolly, and sand pine. Sites -- both moist and well-drained flatwoods, and bays. SRS distribution--coastal plain and piedmont units from North Carolina to Florida.

TROPICAL SOFTWOODS GROUP

151 Tropical pines: Tropical pine forests and plantations comprised of Caribbean pine (Pinus caribea). Associates are P. oocarpa, P. patula and other pine species native to the Florida Keys, Caribbean, Central America and Mexico. Pines are not native to Puerto Rico or the U.S. Virgin Islands but can be found in plantations or naturally regenerating to a limited extent on sites that were formerly plantations. P. caribea was once rare on the South Florida mainland, but practically non-existent there now and it is not used in plantations in Florida.

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.

164 Sand pine: Sand pine occurs in pure stands or provides a majority of the stocking. Associates--dwarf live oak, dwarf post oak, turkey oak, persimmon, and longleaf pine. Sites -- dry, acidic, infertile sands. SRS distribution--found chiefly in the central peninsula and panhandle of Florida, although planted stands extend into the sandhills of Georgia and South Carolina.

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.

168 Spruce pine: Spruce pine comprises a majority of the stocking. Associates--any of the moist site softwood or hardwood species. Sites - -moist or poorly drained areas. SRS distribution--this type is rarely encountered and is found almost exclusively in the coastal plain.

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.

172 Florida softwoods (includes either Florida yew or Florida torreya): Either of these two species comprises the majority of stocking. Sites -- Along bluffs and ravines of the Apalachicola River and its tributaries in north Florida and South Georgia.

PINYON/JUNIPER GROUP

181 Eastern redcedar- retired, see code 171

182 Rocky Mountain juniper: Rocky Mountain juniper comprises the majority of stocking. Associates – ponderosa pine, Douglas-fir, other junipers, pinyons, and oaks. Sites -- often found on calcareous and somewhat alkaline soils.

184 Juniper woodland: Includes Pinchot juniper, redberry juniper, Ashe juniper, California juniper, alligator juniper, Utah juniper, oneseed juniper and pinyon is NOT present. Associates – various woodland oaks and cercocarpus, ponderosa pine, Arizona cypress, and Douglas-fir. Sites -- lower elevation with low annual precipitation.

185 Pinyon-juniper woodland: Includes all pinyons and all junipers except Rocky Mountain and western juniper. Must have pinyon present. Associates – various woodland oaks and cercocarpus, ponderosa pine, Arizona cypress, and Douglas-fir. Sites--occurs at lower elevations with low annual precipitation.

DOUGLAS-FIR GROUP

201 Douglas-fir: Associates – western hemlock, grand fir, Pacific silver fir, white fir, noble fir, California red fir, western redcedar, bigleaf maple, red alder, ponderosa pine, western white pine, western hemlock, Sitka spruce. Sites -- throughout the western U.S.

202 Port-Orford-cedar: Associates – Douglas-fir, western hemlock, Sitka spruce, grand fir, lodgepole pine, western redcedar, redwood, tanoak, red alder, bigleaf maple and California laurel. Sites --higher elevations tending to occur on northerly aspects.

203 Bigcone Douglas-fir: Associates – Canyon live oak, ponderosa, Jeffrey, sugar, knobcone, and Coulter pines, incense-cedar, white fir, California black oak, California laurel, and bigleaf maple. Sites -- Mainly confined to the Transverse and Peninsular Ranges of southern California. Stands are found on many combinations of slope, aspect, soil, but as elevations increase, the preferred aspect shifts from cooler to warmer slopes.

PONDEROSA PINE GROUP

221 Ponderosa pine (includes Arizona pine): Associates - Douglas-fir, lodgepole pine, grand fir, Jeffrey pine, western larch, quaking aspen, Utah juniper, Gambel oak. Sites -- this forest type is distributed over vast areas in the West and therefore can have great differences in environmental conditions.

222 Incense-cedar: Associates – Douglas-fir, ponderosa pine, sugar pine, western white pine, Jeffrey pine, white and grand fir, western hemlock, western redcedar, Port-Orford-cedar, giant sequoia, Oregon white oak, California black oak, tanoak, giant chinkapin, and Pacific madrone; it is rarely found in pure stands. Sites -- Grows from the coastal fog belt to the dry inland slopes of eastern California and central Oregon. Once established, incense-cedar is a good competitor on hot, dry sites and commonly shares an upper canopy position on southwestern slopes. On cooler, moister aspects, it is usually subdominant to other species.

224 Sugar pine: Associates – In the northern part of its range: Douglas-fir, ponderosa pine, grand fir, incense-cedar, western hemlock, western redcedar, Port-Orford-cedar, tanoak, and madrone. In the central part of its range: ponderosa pine, Jeffrey pine, white fir, incense-cedar, California red fir, giant sequoia, and California black oak. Farther south: Jeffrey pine, ponderosa pine, Coulter pine, incense-cedar, white fir, and bigcone Douglas-fir. Sites -- grows in areas that have warm, dry summers and cool, wet, mild winters. Terrain is commonly steep and rugged, favoring warm exposures as the elevation increases. Found in Oregon and California, but is most abundant in the mixed conifer forests on the west slope of the Sierra Nevada.

225 Jeffrey pine: Associates – Incense-cedar, ponderosa pine, sugar pine, Douglas-fir, Port-Orford-cedar, western white pine, knobcone pine, gray pine, red and white fir. Sites -- thrives in fairly harsh environments throughout most of its range, and is cold hardy, drought tolerant, adapted to short growing seasons, and tolerant of infertile sites. The majority of trees are found in California, although its range extends into SW Oregon and western Nevada.

226 Coulter pine: Associates – blue oak, California black oak, interior live oak, coast live oak, valley oak, California scrub oak, buckeye, ponderosa pine. Sites -- grows singly or in small stands primarily on dry, rocky slopes of southern California coastal ranges, between 3,000 and 6,000 feet. Occurs from Mt. Diablo and the Santa Lucia Mountains down to the San Bernardino, San Jacinto, and Cuyamaca Mountains in the south.

WESTERN WHITE PINE GROUP

241 Western white pine: Associates – western larch, grand fir, western redcedar, and western hemlock. Sites -- occurs primarily on moist, mid-elevation sites from 1,500 to 4,000 feet.

FIR/SPRUCE/MOUNTAIN HEMLOCK GROUP

261 White fir: Associates – Douglas-fir, sugar pine, ponderosa pine, Jeffrey pine, incense-cedar, California red fir, blue spruce, limber pine, and aspen. Sites -- deep well-drained sandy loam-covered slopes and benches with a northerly exposure.

262 Red fir (includes California and Shasta red fir): Associates – Jeffrey pine, western white pine, lodgepole pine, mountain hemlock, and sugar pine. Sites -- found at elevations ranging from 5,400 to 7,500 feet.

263 Noble fir: Associates - Douglas-fir, Pacific silver fir, western and mountain hemlocks, lodgepole pine, western redcedar, and Alaska cedar. Sites -- found on a variety of sites where precipitation is high and snowpacks are common, generally above 3,000 feet in elevation in the Cascade and Coast ranges.

264 Pacific silver fir: Associates - western and mountain hemlocks, western redcedar, Alaska cedar, grand fir, Sitka spruce, lodgepole pine, subalpine fir, and Engelmann spruce. Sites -- most abundant on sites where summer drought is minimal and snowpacks are common, such as areas of heavy rainfall, seepage, or prolonged snowmelt.

265 Engelmann spruce: Associates – western white pine, western redcedar, western hemlock, Douglas-fir, western larch, grand fir, subalpine fir, and lodgepole pine. For this type to be used, the total stocking of Engelmann spruce must be at least 75 percent of the total stocking.

266 Engelmann spruce-subalpine fir: Associates – western white pine, western redcedar, western hemlock, Douglas-fir, western larch, grand fir, and lodgepole pine. Sites -- this type is widespread in the Western U.S. For this type to be used, the sum of the stocking of Engelmann spruce and subalpine fir must be at least 75 percent of the total stocking and Engelmann spruce stocking must be between 5 and 74 percent of total and subalpine fir stocking must be between 5 and 74 percent of total.

267 Grand fir: Associates – ponderosa pine, Douglas-fir, western hemlock, western redcedar, western white pine, Pacific yew, lodgepole pine, and western larch. Sites -- in Idaho, found on moist slopes from 1,500 to 5,200-foot elevations; in Oregon, it occupies moist low-elevation sites, but also extends up to mid-elevations to as high as 6,000 feet.

268 Subalpine fir: Associates – western white pine, western redcedar, western hemlock, Douglas-fir, western larch, grand fir, Engelmann spruce, and lodgepole pine. For this type to be used, the total stocking of subalpine fir must be at least 75 percent of the total stocking. Sites -- found at high elevations, near timberline.

269 Blue spruce: Associates – Douglas-fir, ponderosa pine, white fir, lodgepole pine, and Rocky Mountain juniper. Sites -- restricted to the southern Rocky Mountains, typically located in the montane zone.

270 Mountain hemlock: Associates – Alaska-cedar, Pacific silver fir, western white pine, lodgepole pine, noble fir, and subalpine fir. Sites -- occurs in cold, moist regions and growing conditions are poor.

271 Alaska-yellow-cedar: Associates: In California, California red fir, Brewer spruce, incense-cedar, Pacific yew, and western white pine; in Oregon and Washington, found with mountain hemlock, subalpine fir, Pacific silver fir, noble fir, western white pine, and western hemlock. Sites -- Cool and humid climate, most stands grow within 100 miles of the Pacific coast.

LODGEPOLE PINE GROUP

281 Lodgepole pine: Associates – subalpine fir, Engelmann spruce, white spruce, Douglas-fir, western redcedar, red alder, and western hemlock. Sites -- one of the most widespread types in the Western U.S. tolerating a broad range of temperature and moisture regimes.

HEMLOCK/SITKA SPRUCE GROUP

301 Western hemlock: Associates – Sitka spruce, western redcedar, Douglas-fir, Alaska-yellow-cedar, grand fir, Engelmann spruce, bigleaf maple, and red alder. Sites -- nearly any soil provides a seedbed but requires abundant moisture. Often comes in cut-over or burned-over areas.

304 Western redcedar: Associates – western white pine, western hemlock, western larch, grand fir, Douglas-fir, and Pacific silver fir. Sites -- inhabits moist flats and slopes, the banks of rivers and swamps and can be found in bogs.

305 Sitka spruce: Associates – western hemlock, Douglas-fir, western redcedar, Port Orford-cedar, red alder, bigleaf maple, and black cottonwood. Sites - -limited to a relatively narrow oceanside strip characterized by mild winters, cool summers, and abundant moisture throughout the growing season.

WESTERN LARCH GROUP

321 Western larch: Associates – Douglas-fir, subalpine fir, lodgepole pine, Engelmann spruce, western hemlock, and western redcedar. Sites -- best growth on deep, moist, porous soils in high valleys and on mountain slopes of northern and western exposure.

REDWOOD GROUP

341 Redwood: Associates – Douglas-fir, grand fir, western hemlock, California torreya, Pacific yew, and western redcedar. Sites -- largely confined to coastal topography between 35 degrees 41 minutes and 42 degrees 9 minutes north latitude.

342 Giant sequoia: Associates: California white fir, sugar pine, incense-cedar, California red fir, California white fir, ponderosa pine and California black oak. Sites -- Deep, well-drained soils with high soil moisture available during dry summers. Most stands found above 4,000 feet elevation, rarely forming pure stands.

OTHER WESTERN SOFTWOODS GROUP

361 Knobcone pine: Associates – Gray pine, canyon live oak and many western oaks, Douglas-fir, and Port Orford-cedar. Sites -- found on soils that are shallow, dry, stony or high in magnesium.

362 Southwestern white pine: Associates- Douglas-fir, white fir, ponderosa pine, Gambel oak, and aspen. Sites -- higher elevations in Arizona and New Mexico

363 Bishop pine: Grows singly or in small stands along the coast of California.

364 Monterey pine: Grows singly or in small stands. Sites -- Native stands are found in the high humidity and summer fogs of the central-coast area of California in San Mateo, Santa Cruz, Monterey, and San Luis Obispo Counties.

365 Foxtail pine/bristlecone pine: Associates – limber pine, white fir, Engelmann spruce, ponderosa pine, and pinyon. Sites -- found on rocky outcrops, usually on southern or southwestern exposures and can range in elevation from 8,000 to 11,000 feet.

366 Limber pine: Associates – low to mid elevations: Douglas-fir, ponderosa pine, Rocky Mountain juniper; mid to high elevations: lodgepole pine and aspen; high elevations: Engelmann spruce, subalpine fir, bristlecone pine, and whitebark pine. Sites -- a very wide range of elevations and latitudes across the Rocky mountains; can be the majority species as an early seral stage under a variety of harsh establishment conditions, as climax in dry, high elevation sites in the central and southern Rockies.

367 Whitebark pine: Associates – subalpine fir, subalpine larch, Engelmann spruce, and lodgepole pine. Sites -- poor, high elevation.

368 Miscellaneous western softwoods: A “catch-all” group for such species as all cypress (Cupressus) species, subalpine larch, Brewer spruce, Apache pine, Chihuahua pine, Washoe pine, Torrey pine, Pacific yew, and California torreya.

369 Western juniper: Associates – ponderosa pine and Jeffrey pine. Sites -- found on dry sites and ranges in elevation from just above sea level to 6,500 feet.

CALIFORNIA MIXED CONIFER GROUP

371 California mixed conifer: Associates - defined only for plots in California (STATE = 06), typically a mixture of several conifer species occurring as single trees or small groups, sometimes with a broad range of heights, in which any of ponderosa pine, Jeffrey pine, sugar pine, Douglas-fir, white fir, red fir, Shasta red fir and incense-cedar may predominate. In some cases, only one species is present (as implied by rules 1 and 2 below). The type is often found on, but not limited to, east-facing slopes of the Coast Range and on the west-facing and higher elevation east facing slopes of the Cascades and Sierra Nevada.

Formal rules - to classify as a mixed conifer forest type, the condition class must be capable of being stocked with 70-percent conifers and one of the following must be true (only applicable in California (STATE = 06):

1. Douglas-fir predominates and the COUNTY is not Del Norte (015), Humboldt (023), Marin (041), Mendocino (045), Napa (055), San Mateo (081), Santa Clara (085), Santa Cruz (087), or Sonoma (097).
2. Sugar pine (117) or incense cedar (081) predominates.
3. Ponderosa pine (122) and/or Jeffrey pine (116), either singly or in combination, predominate but make up less than 80-percent of the conifer stocking.
4. White fir (015), and/or red fir (020) and/or Shasta red fir (021) either singly or in combination predominate, but make up less than 80-percent of the conifer stocking

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.

403 Longleaf pine/oak: Longleaf pine and scrub oaks-primarily turkey, bluejack, blackjack, and dwarf post oak--comprise the type. Associates--southern scrub oaks in the understory. Sites -- common on sandhills where soils are dry, infertile, and coarse textured. SRS distribution-- coastal plain and piedmont units.

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.

407 Slash pine/hardwood: Slash pine and a variable mixture of hardwoods comprise the type. Associates-- codominant with the slash pine component are sweetbay, blackgum, loblolly-bay, pondcypress, pond pine, Atlantic white-cedar, red maple, ash, and water oak. Sites -- undrained or poorly drained depressions such as bays or pocosins and along pond margins. SRS distribution--primarily coastal plain units.

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.

514 Southern scrub oak: This forest cover type consists of a mixture of scrub oaks that may include several of the following species: turkey oak, bluejack oak, dwarf live oak, Durand oak, and bear oak (otherwise known as scrub oak). Also includes anacahuita. Sites -- dry sandy ridges-the type frequently develops on areas formerly occupied by longleaf pine. SRS distribution--common throughout all coastal plain units and into the lower Piedmont.

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, and boxelder. 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.

722 Oregon ash: Associates - red alder, bigleaf maple, black cottonwood, willow. Sites -- riparian areas, prefers damp, loose soils, below 3000 feet.

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.

ALDER/MAPLE GROUP

911 Red alder: Associates - Douglas-fir, western hemlock, western redcedar, grand fir, Sitka spruce, black cottonwood, bigleaf maple, willow. Sites -- stream bottoms and lower slopes, west of the Cascades, usually within 125 miles of the coast, below 2,400 feet.

912 Bigleaf maple: Associates - Douglas-fir, western hemlock, western redcedar, black cottonwood, Pacific madrone, Pacific dogwood, red alder. Sites -- Flat interior valleys, gently sloping stream bottoms, and moderate to steep slopes; favors moist, well-drained soils of river terraces and flood plains, but also grows on drier rocky, south-facing slopes in the Coast Ranges of northwestern Oregon.

WESTERN OAK GROUP

921 Gray pine: Associates - Blue oak, California black oak, interior live oak, coast live oak, valley oak, California scrub oak, buckeye, western juniper, Coulter pine. Sites -- dry foothill woodland communities of California's Central Valley, on rocky slopes and steep canyon walls below 3,000 feet. Prefers areas with hot, dry summers and absence of summer fog. Tolerates infertile, low moisture soils.

922 California black oak: Associates – ponderosa pine, Douglas-fir, incense-cedar, knobcone pine, Pacific madrone, tanoak, and Oregon white oak.

923 Oregon white oak: Associates – Douglas-fir, bigleaf maple, and Oregon ash. Sites -- commonly occurs in very moist locations, in mixture with Oregon ash on floodplains of the Willamette Valley, and on poorly drained heavy clay soils.

924 Blue oak: Associates – Gray pine, interior live oak, canyon live oak, valley oak, and California buckeye. Sites -- low valleys and foothills of the Coast Ranges and Sierras in California.

931 Coast live oak: Associates – knobcone pine, Monterey pine, interior live oak, valley oak, blue oak, tanoak, Pacific madrone, and California laurel. Sites -- usually occupies well-drained soils.

933 Canyon live oak: Associates – Douglas-fir, bigcone Douglas-fir, ponderosa pine, Jeffrey pine, bigleaf maple, Pacific madrone, and California laurel. Sites -- found on steep rocky canyon slopes and boulder-filled bottoms.

934 Interior live oak: Associates - Blue oak, coast live oak, valley oak, canyon live oak, gray pine, ponderosa pine, Douglas-fir. Sites -- from valleys to foothills, below 5,000 feet; grows on moister sites than blue oak.

935 California white oak (valley oak): Associates - Canyon live oak, coast live oak, California black oak, blue oak, California buckeye, gray pine, ponderosa pine. Sites -- hot interior valleys and slopes below 2,000 feet; tolerates cool wet winters and hot dry summers; prefers fertile soils of valley floors.

TANOAK/LAUREL GROUP

941 Tanoak: Associates – Douglas-fir, Pacific madrone, and canyon live oak. Sites -- sea level to 5,000 feet elevation from southern Oregon south along the Coast Ranges to the Santa Ynez Mountains in California.

942 California laurel: Associates - usually found in mixed stands with a wide variety of associated species. Sites -- from the cool, humid conditions of dense coastal forests to hot, dry sites found inland in open woodlands and chaparral, below 4,000 feet.

943 Giant chinkapin: Associates - rarely grows in pure stands, usually a component of other types. Found with Douglas-fir, western hemlock, incense-cedar, white fir, western white pine, sugar pine, ponderosa pine, Pacific madrone, tanoak, and California black oak. Sites -- from valley bottoms to ridgetops, in the coast and cascade ranges, below 5,000 feet. Tolerates infertile and droughty sites.

OTHER HARDWOODS GROUP

961 Pacific madrone: Associates - a wide variety of species, but most common with Douglas-fir and tanoak. Sites -- grows on all aspects but is found most often on those facing south and west, and tolerates low soil moisture in summer.

962 Other hardwoods: A “catch-all” group for hardwood species identified only to the genus level, with the exception of the following species (Note: This code primarily applies to a mapped subplot, where only one or two “uncommon” tree species are tallied): hackberry spp., hawthorn spp., eucalyptus spp., persimmon spp., magnolia spp., mulberry spp., mesquite spp., citrus spp., royal palm spp., willow spp., and saltcedar spp., AND striped maple, mountain maple, California buckeye, Arizona alder, serviceberry, Arizona madrone, pawpaw, sweet birch, Virginia roundleaf birch, Allegany chinkapin, Ozark chinkapin, southern catalpa, northern catalpa, yellowwood, Pacific dogwood, pumpkin ash, blue ash, velvet ash, Carolina ash, Texas ash, all silverbells, California black walnut, southern California black walnut, Texas walnut, Arizona walnut, all apple species, eastern hophornbeam, California sycamore, Arizona sycamore, chokecherry, peach, Canada plum, wild plum, bitter cherry, Allegheny plum, Chickasaw plum, sweet cherry, sour cherry, European plum, Mahaleb plum, western soapberry, American mountain-ash, northern mountain-ash, Joshua tree, smoketree, great leucaena, and berlandier ash.

WOODLAND HARDWOODS GROUP

971 Deciduous oak woodland: areas with predominantly Gambel oak, which is often associated with ponderosa pine, white fir, Douglas-fir, alligator juniper, bigtooth maple, and chokecherry. Sites -- most soils, on elevations generally ranging from 4,000 to 8,000 feet.

972 Evergreen oak woodland: areas with predominantly evergreen oaks, such as Arizona white oak, Emory oak, Engelmann oak, Mexican blue oak, silverleaf oak, gray oak and/or netleaf oak. Other associates – various pinyons and junipers. Sites -- alluvial soils, from 4,000 to 7,500 feet elevation.

973 Mesquite woodland: Honey mesquite and screwbean mesquite comprise the majority of the stocking of this cover type. Honey mesquite associates, which are many, vary with climate and soils. Sites -- occurs on a wide variety of soils at elevations mostly below 5,000 feet.

974 Cercocarpus (Mountain brush) woodland (includes curlleaf mountain-mahogany): Associates - Rocky Mountain juniper, big sagebrush, and snowberry. Sites -- dry, course-textured soils.

975 Intermountain maple woodland (includes Rocky Mountain and/or bigtooth maple): Associates - chokecherry, boxelder, birchleaf mountain-mahogany, and Gambel oak. Sites -- most soils but does not tolerate long flooding periods. Found growing between 4,500 and 7,500 feet elevation.

976 Miscellaneous woodland hardwoods [includes acacia, New Mexico locust, and/or Arizona ironwood (tesota)]. Sites – occurs on a wide variety of soils at elevations mostly below 5,000 feet.

TROPICAL HARDWOODS GROUP

982 Mangrove: Forests in which mangrove comprises a majority of the stocking. Associates--cabbage palm on some of the higher sites in the area. Sites -- predominantly salt marshes; mangrove frequently develops its own island or shoreline made up of a dense mat of root structures. SRS distribution--restricted to South Florida and the Keys.

983 Palms: Includes paurotia-palm, silver palm, coconut palm, royal palm spp., cabbage palmetto, Mexican palmetto, key thatch palm, Florida thatch palm, and other palms. Associates – Sand live oak, slash pine, live oak, laurel oak, water oak, baldcypress, southern magnolia, red maple, redbay, swamp tupelo, sweetgum, southern redcedar, and loblolly pine. In extreme southern Florida, tropical hardwoods replace temperate hardwoods as associates. Sites -- can tolerate a broad range of soil pH, salinity, and drainage.

984 Dry forest (FGDC – Lowland to Submontane Drought Deciduous, Semi-deciduous and Semi-evergreen Forest; Holdridge life zone - Subtropical Dry Forest): Bursera simaruba (L.) Sarg., Bucida buceras L., Cephalocereus royenii (L.) Britton, and Guaiacum officinale L. are species commonly associated with Puerto Rican dry forest. The more heavily-disturbed dry forest areas have numerous, smaller stemmed Leucaena leucocephala (Lam.) deWit, Prosopis juliflora (Sw.) DC., Acacia macracantha Humb. & Bonpl. and Acacia farnesiana (L.) Willd. individuals. Some of the native tree species that are common in subtropical dry forest in the U.S. Virgin Islands are Bursera simaruba (L.) Sarg., Amyris elemifera L., Capparis cynophallophora L., Cordia ricksecker Millsp., Pisonia subcordata Sw., Guaiacum officinale L., Plumeria alba L., and Pictetia aculeata (Vahl) Urban. The more heavily-disturbed dry forest areas have numerous, smaller stemmed Leucaena leucocephala (Lam.) deWit, Prosopis juliflora (Sw.) DC., Acacia macracantha Humb. & Bonpl., and Acacia farnesiana (L.) Willd. Individuals.

985 Moist forest (FGDC – Lowland and Submontane Seasonal Evergreen; Holdridge life zone – Subtropical Moist Forest): In the Caribbean, subtropical moist forests are found in areas with 1000 to 2200 mm of annual precipitation. The subtropical moist life zone is the most extensive on Puerto Rico and covers a wide variety of soil parent materials, topographic classes and land uses resulting in highly diverse mixes that typically include Tabebuia heterophylla (DC.) Britton, Spathodea campanulata Beauv., Guarea guidonia (L.) Sleumer, Andira inermis (W. Wright) Kunth ex DC., Roystonea borinquena O. F. Cook, Mangifera indica L., Cecropia peltata L., Schefflera morototonii (Aubl.) Maguire, Steyermark and species of the Nectandra, Ocotea, and Coccoloba genera. Some of the many natural indicator species of subtropical moist forest in the U.S. Virgin Islands include the Andira inermis (W. Wright) Kunth ex DC., Guapira fragrans (Dum.-Cours.) Little, Spondias mombin L., Bucida buceras L., Hura crepitans L., Ceiba pentandra (L.) Gaertn., Cedrela odorata L., Pimenta racemosa var. racemosa, Roystonea borinquena O.F. Cook (on St. Croix only), Hymanaea courbaril L., Cecropia schreberiana Miq., and Tabebuia heterophylla (DC.) Britt. While subtropical moist forests have some of the same introduced species found in subtropical dry forest, Tamarindus indica L. and Melicoccus bijugatus Jacq. are also common.

986 Wet and rain forest (FGDC – Submontane Evergreen Forest; Holdridge life zone – Subtropical Wet and Rain Forest): In the Caribbean, subtropical wet and rain forests are found in areas with 2000 to 4000 mm of annual precipitation. Dacryodes excelsa Vahl., Sloanea berteriana Choisy, Manilkara bidentata (A.DC.) are species indicative of the tabonuco forest type. Cecropia peltata L., Schefflera morototonii (Aubl.) Maguire and Ochroma lagopus Sw. are also common in wet forest stands at early stages of succession or recovery from disturbance. Wet forest shade coffee plantations hold species such as Guarea guidonia (L.) Sleumer, Inga laurina (Sw.) Willd., Inga vera Willd., and Erythrina poeppigiana (Walp.) O.F. Cook.

987 Lower montane wet and rain forest (FGDC – Montane Evergreen Forest; Holdridge life zone – Lower Montane Wet and Rain Forest): In the Caribbean, lower montane wet and rain forests are found in areas with elevations between 700-1000 meters. Forest types and their typical species include the palo colorado forest type (Cyrilla racemiflora L., Ocotea spathulata Mez., Micropholis guyanensis (A. DC.) Pierre and Micropholis garciniifolia Pierre), elfin forest type (Eugenia borinquensis Britton, Tabebuia rigida Urban, Weinmannia pinnata L. and Calycogonium squamulosum Cogn.) and the palm brake forest type (Prestoea montana (Graham) Nichols.).

988 Cloud forest - These forests are covered with clouds or fog much of the time. The trees have low canopies and are often dripping with moisture. The trees are typically small-leafed and covered with masses of epiphytic mosses and liverworts, which also form a deep ground cover.

989 Other tropical hardwoods: This type consists of dense forests of hardwood trees and palms. Includes gumbo-limbo, tamarind, poisonwood, pigeon-plum, torchwood, willow bustic, false mastic, pond apple, sheoak, gray sheoak, river sheoak, camphor tree, fiddlewood, citrus spp., soldierwood, Geiger tree, carrotwood, red stopper, inkwood, strangler fig, shortleaf fig, blolly, manchineel, paradise tree, Java plum, false tamarind, mango, fishpoison tree, and octopus tree.

Associates –black ironwood (leadwood), lancewood, and mastic as well as more temperate live oak and red bay. Sites -- Occurs on land slightly higher than surrounding fresh and saltwater marshes or on pine land.

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.

992 Melaleuca: Stands with the majority of stocking comprised of melaleuca (Melaleuca quinquenervia). Melaleuca trees, also known as punk trees or paperbark tea trees, are native to Australia. Sites -- In the gulf-coastal plain, it is found in swamps and glades, often eliminating all other forms of vegetation.

993 Eucalyptus: Associates - As an introduced and naturalized species, it has few common associates. Usually planted as an ornamental, in plantations for firewood, or along roads and parks for cover. Sites -- good drainage, low salinity, mild temperate climates.

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 Section 2.5.3 for procedures to determine FOREST TYPE.

APPENDIX 3. FIA TREE SPECIES CODES

This list includes all tree species tallied by FIA. Conifer species are listed first (sorted by genus), followed by hardwoods (sorted by genus). The Islands Only Species (IOS) column and the Mainland NFS P2/3 Sub-lists column indicate where the species are excluded even though the species is tallied in the islands or in other NFS regions. The Past Tally columns indicate how the species were tallied in a specific FIA region in previous years (AK = Alaska, C = Caribbean, P = Pacific, PNWS = Pacific Northwest South excluding Alaska, R = regional mainland on the region's tally list in field guide version 8.0, and U = urban on the tally list in field guide version 8.0). Species designated Caribbean (C), Pacific (P), and Urban (U) are commonly found in those areas, although species designated for one area may occasionally be found in another. Woodland species designate species where DRC is measured instead of DBH. Species designated as being Historic P2 species (P2) were collected as part of the P2 annual inventory, excluding the Caribbean and Pacific Islands, prior to Field Guide version 9.0.

Note that appendix 3 in any field guide version is a snapshot in time of the species code list for a specific data collection period. The date at the top of the page is the beginning date of the collection period. The Master Species List is a living document and the most up-to-date version can be accessed online (https://www.fia.fs.fed.us/library/field-guides-methods-proc/index.php) via the national FIA public web site (https://www.fia.fs.fed.us/).

Softwoods

Master Species List (MSL)	Islands Only Species (IOS) – Not valid on the Mainland	Mainland NFS P2/3 Sub-lists - Not valid on P2/3 plots within a specific NFS Region	Woodland	FIA Code	Common Name	Genus	Species1	PLANTS Code	Past NRS Tally	Past PNW Tally	Past RMRS Tally	Past SRS Tally	Caribbean	Pacific	Urban	Historic P2
MSL	.	.	.	11	Pacific silver fir	Abies	amabilis	ABAM	R, U	PNWS, AK, U	R, U	U	.	.	.	P2
MSL	.	.	.	12	balsam fir	Abies	balsamea	ABBA	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	14	Santa Lucia or bristlecone fir	Abies	bracteata	ABBR	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	15	white fir	Abies	concolor	ABCO	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	16	Fraser fir	Abies	fraseri	ABFR	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	17	grand fir	Abies	grandis	ABGR	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	18	corkbark fir	Abies	lasiocarpa var. arizonica	ABLAA	R, U	PNWS, U	R, U	R, U	.	.	.	P2

[1] Entries in this column also contain the variety name when the variety clarifies the species, or subspecies name when the subspecies clarifies the species.

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MSL	.	.	.	19	subalpine fir	Abies	lasiocarpa	ABLA	R, U	PNWS, AK, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	20	California red fir	Abies	magnifica	ABMA	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	22	noble fir	Abies	procera	ABPR	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	21	Shasta red fir	Abies	shastensis	ABSH	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	6154	parana pine	Araucaria	angustifolia	ARAN15	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6155	New Caledonia pine	Araucaria	columnaris	ARCO32	U	P, U	U	U	.	P	U	.
MSL	.	.	.	6157	Norfolk Island pine	Araucaria	heterophylla	ARHE12	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6331	Callitris columellaris	Callitris	columellaris	CACO2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	81	incense-cedar	Calocedrus	decurrens	CADE27	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	5420	Atlas cedar	Cedrus	atlantica	CEAT4	U	U	U	U	.	.	U	.
MSL	.	.	.	5423	Deodar cedar	Cedrus	deodara	CEDE2	U	U	U	U	.	.	U	.
MSL	.	.	.	5421	cedar of Lebanon	Cedrus	libani	CELI6	U	U	U	U	.	.	U	.
MSL	.	.	.	41	Port-Orford-cedar	Chamaecyparis	lawsoniana	CHLA	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	42	Alaska yellow-cedar	Chamaecyparis	nootkatensis	CHNO	R, U	PNWS, AK, U	R, U	U	.	.	.	P2
MSL	.	.	.	5443	hinoki false cypress	Chamaecyparis	obtusa	CHOB8	U	U	U	U	.	.	U	.
MSL	.	.	.	5444	sawara-cypress	Chamaecyparis	pisifera	CHPI12	.	.	.	.	.	.	.	.
MSL	.	.	.	43	Atlantic white-cedar	Chamaecyparis	thyoides	CHTH2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6786	Japanese cedar	Cryptomeria	japonica	CRJA3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6788	Chinese fir	Cunninghamia	lanceolata	CULA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	5800	Leyland cypress	Cupressocyparis	leylandii	CULE2	U	U	U	U	.	.	U	.
MSL	.	.	.	51	Arizona cypress	Cupressus	arizonica	CUAR	R, U	PNWS, U	R, U	R, U	.	.	.	P2

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MSL	.	.	.	52	Baker or Modoc cypress	Cupressus	bakeri	CUBA	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	53	Tecate cypress	Cupressus	forbesii	CUFO2	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	6795	cedar-of-Goa	Cupressus	lusitanica	CULU2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	56	MacNab's cypress	Cupressus	macnabiana	CUMA	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	54	Monterey cypress	Cupressus	macrocarpa	CUMA2	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	55	Sargent's cypress	Cupressus	sargentii	CUSA3	R, U	PNWS, U	U	U	.	.	.	P2
MSL	.	.	.	6796	Italian cypress	Cupressus	sempervirens	CUSE2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	w	61	Ashe juniper	Juniperus	ashei	JUAS	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL				7486	Bermuda juniper	Juniperus	bermudiana	JUBE3	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	w	62	California juniper	Juniperus	californica	JUCA7	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	7489	Chinese juniper	Juniperus	chinensis	JUCH4	.	U	U	U	.	.	U	.
MSL	.	.	w	59	redberry juniper	Juniperus	coahuilensis	JUCO11	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	w	63	alligator juniper	Juniperus	deppeana	JUDE2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	w	60	Drooping juniper	Juniperus	flaccida	JUFL	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	w	69	oneseed juniper	Juniperus	monosperma	JUMO	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	64	western juniper	Juniperus	occidentalis	JUOC	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	w	65	Utah juniper	Juniperus	osteosperma	JUOS	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	w	58	Pinchot juniper	Juniperus	pinchotii	JUPI	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	w	66	Rocky Mountain juniper	Juniperus	scopulorum	JUSC2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	67	southern redcedar	Juniperus	virginiana var. silicicola	JUVIS	R, U	PNWS, U	U	R, U	.	.	.	P2
MSL	.	.	.	68	eastern redcedar	Juniperus	virginiana	JUVI	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6212	European larch	Larix	decidua	LADE2	U	U	U	U	.	.	U	P2
MSL	.	.	.	74	Japanese larch	Larix	kaempferi	LAKA2	.	.	.	.	.	.	.	.

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MSL	.	.	.	71	tamarack	Larix	laricina	LALA	R, U	PNWS, AK, U	R, U	U	.	.	.	P2
MSL	.	.	.	72	subalpine larch	Larix	lyallii	LALY	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	73	western larch	Larix	occidentalis	LAOC	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	75	Siberian larch	Larix	sibirica	LASI3	.	.	.	.	.	.	.	.
MSL	.	3,4,5,6,10	.	70	larch spp.	Larix	spp.	LARIX	R, U	U	U	U	.	.	.	P2
MSL	.	.	.	7779	dawn redwood	Metasequoia	glyptostroboides	MEGL8	U	U	U	U	.	.	U	.
MSL	.	.	.	91	Norway spruce	Picea	abies	PIAB	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	92	Brewer spruce	Picea	breweriana	PIBR	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	93	Engelmann spruce	Picea	engelmannii	PIEN	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	94	white spruce	Picea	glauca	PIGL	R, U	PNWS, AK, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6533	Sakhalin spruce	Picea	glehnii	PIGL7	U	U	U	U	.	.	U	.
MSL	.	.	.	95	black spruce	Picea	mariana	PIMA	R, U	PNWS, AK, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6538	Serbian spruce	Picea	omorika	PIOM2	U	U	U	U	.	.	U	.
MSL	.	.	.	96	blue spruce	Picea	pungens	PIPU	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	97	red spruce	Picea	rubens	PIRU	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	98	Sitka spruce	Picea	sitchensis	PISI	R, U	PNWS, AK, U	R, U	U	.	.	.	P2
MSL	.	.	.	101	whitebark pine	Pinus	albicaulis	PIAL	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	102	Rocky Mountain bristlecone pine	Pinus	aristata	PIAR	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	135	Arizona pine	Pinus	arizonica	PIAR5	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	103	knobcone pine	Pinus	attenuata	PIAT	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	104	foxtail pine	Pinus	balfouriana	PIBA	R, U	PNWS, U	R, U	U	.	.	.	P2

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MSL	.	.	.	105	jack pine	Pinus	banksiana	PIBA2	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	8200	Bunge's pine	Pinus	bungeana	PIBU2	U	U	U	U	.	.	U	.
MSL	.	.	.	8201	Canary Island pine	Pinus	canariensis	PICA15	U	U	U	U	.	.	U	.
MSL	.	.	.	8183	Caribbean pine	Pinus	caribaea	PICA18	U	P, U	U	C, U	C	P	.	.
MSL	.	.	w	140	Mexican pinyon pine	Pinus	cembroides	PICE	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	107	sand pine	Pinus	clausa	PICL	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	108	lodgepole pine	Pinus	contorta	PICO	R, U	PNWS, AK, U	R, U	U	.	.	.	P2
MSL	.	.	.	109	Coulter pine	Pinus	coulteri	PICO3	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	8189	Japanese red pine	Pinus	densiflora	PIDE5	U	U	U	U	.	.	U	.
MSL	.	.	w	134	border pinyon	Pinus	discolor	PIDI3	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	110	shortleaf pine	Pinus	echinata	PIEC2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	w	106	common or two-needle pinyon	Pinus	edulis	PIED	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	111	slash pine	Pinus	elliottii	PIEL	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	144	Honduras pine	Pinus	elliottii var. elliottii	PIELE2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	112	Apache pine	Pinus	engelmannii	PIEN2	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	113	limber pine	Pinus	flexilis	PIFL2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	115	spruce pine	Pinus	glabra	PIGL2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8202	aleppo pine	Pinus	halepensis	PIHA7	U	U	U	U	.	.	U	.
MSL	.	.	.	116	Jeffrey pine	Pinus	jeffreyi	PIJE	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	117	sugar pine	Pinus	lambertiana	PILA	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	118	Chihuahuan pine	Pinus	leiophylla	PILE	R, U	PNWS, U	R, U	U	.	.	.	P2

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MSL	.	.	.	142	Great Basin bristlecone pine	Pinus	longaeva	PILO	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	8184	Chinese red pine	Pinus	massoniana	PIMA11	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8185	Merkus pine	Pinus	merkusii	PIME2	U	U	U	C, U	C	.	.	.
MSL	.	.	w	133	singleleaf pinyon	Pinus	monophylla	PIMO	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	w	143	Arizona pinyon pine	Pinus	monophylla var. fallax	PIMOF	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	119	western white pine	Pinus	monticola	PIMO3	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	120	bishop pine	Pinus	muricata	PIMU	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	136	Austrian pine	Pinus	nigra	PINI	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8186	ocote chino	Pinus	oocarpa	PIOO2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	121	longleaf pine	Pinus	palustris	PIPA2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8197	five-needle pine	Pinus	parviflora	PIPA12	U	U	U	U	.	.	U	.
MSL	.	.	.	8187	Mexican weeping pine	Pinus	patula	PIPA13	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8188	maritime pine	Pinus	pinaster	PIPI6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8203	Italian stone pine	Pinus	pinea	PIPI7	U	U	U	U	.	.	U	.
MSL	.	.	.	122	ponderosa pine	Pinus	ponderosa	PIPO	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	123	Table Mountain pine	Pinus	pungens	PIPU5	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	w	138	four-leaf or Parry pinyon pine	Pinus	quadrifolia	PIQU	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	124	Monterey pine	Pinus	radiata	PIRA2	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	w	141	papershell pinyon pine	Pinus	remota	PIRE5	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	.	125	red pine	Pinus	resinosa	PIRE	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	126	pitch pine	Pinus	rigida	PIRI	R, U	PNWS, U	R, U	R, U	.	.	.	P2

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MSL	.	.	.	8182	Indian longleaf pine	Pinus	roxburghii	PIRO2	U	U	U	U	.	.	U	.
MSL	.	.	.	127	gray or California foothill pine	Pinus	sabiniana	PISA2	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	128	pond pine	Pinus	serotina	PISE	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	114	southwestern white pine	Pinus	strobiformis	PIST3	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	129	eastern white pine	Pinus	strobus	PIST	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	130	Scotch pine	Pinus	sylvestris	PISY	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	131	loblolly pine	Pinus	taeda	PITA	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8198	Japanese black pine	Pinus	thunbergii	PITH2	U	U	U	U	.	.	U	.
MSL	.	.	.	139	Torrey pine	Pinus	torreyana	PITO	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	132	Virginia pine	Pinus	virginiana	PIVI2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	137	Washoe pine	Pinus	washoensis	PIWA	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	8249	Oriental arborvitae	Platycladus	orientalis	PLOR80	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8274	yew plum pine	Podocarpus	macrophyllus	POMA32	U	U	U	U	.	.	U	.
MSL	.	.	.	201	bigcone Douglas-fir	Pseudotsuga	macrocarpa	PSMA	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	202	Douglas-fir	Pseudotsuga	menziesii	PSME	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	211	redwood	Sequoia	sempervirens	SESE3	R, U	PNWS, P, U	R, U	U	.	P	.	P2
MSL	.	.	.	212	giant sequoia	Sequoiadendron	giganteum	SEGI2	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	222	pondcypress	Taxodium	ascendens	TAAS	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	221	baldcypress	Taxodium	distichum	TADI2	R, U	PNWS, U	R, U	R, U	.	.	.	P2

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MSL	.	.	.	223	Montezuma baldcypress	Taxodium	mucronatum	TAMU	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	.	8738	English yew	Taxus	baccata	TABA80	U	U	U	U	.	.	U	.
MSL	.	.	.	231	Pacific yew	Taxus	brevifolia	TABR2	R, U	PNWS, AK, U	R, U	U	.	.	.	P2
MSL	.	.	.	8739	Japanese yew	Taxus	cuspidata	TACU	U	U	U	U	.	.	U	.
MSL	.	.	.	232	Florida yew	Taxus	floridana	TAFL	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	241	northern white-cedar	Thuja	occidentalis	THOC2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	242	western redcedar	Thuja	plicata	THPL	R, U	PNWS, AK, U	R, U	U	.	.	.	P2
MSL	.	.	.	251	California torreya (nutmeg)	Torreya	californica	TOCA	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	252	Florida torreya (nutmeg)	Torreya	taxifolia	TOTA	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	299	unknown dead conifer	Tree	evergreen	2TE	R, U	PNWS, AK, U	R, U	P2, U	.	.	.	P2
MSL	.	.	.	261	eastern hemlock	Tsuga	canadensis	TSCA	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	262	Carolina hemlock	Tsuga	caroliniana	TSCA2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	263	western hemlock	Tsuga	heterophylla	TSHE	R, U	PNWS, AK, U	R, U	U	.	.	.	P2
MSL	.	.	.	264	mountain hemlock	Tsuga	mertensiana	TSME	R, U	PNWS, AK, U	R, U	U	.	.	.	P2

Hardwoods

Master Species List (MSL)	Islands Only Species (IOS) – Not valid on the Mainland	Mainland NFS P2/3 Sub-lists - Not valid on P2/3 plots within a specific NFS Region	Woodland	FIA Code	Common Name	Genus	Species[2]	PLANTS Code	Past NRS Tally	Past PNW Tally	Past RMRS Tally	Past SRS Tally	Caribbean	Pacific	Urban	Historic P2
MSL	.	.	.	6001	blackbrush wattle	Acacia	anegadensis	ACAN4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6002	mulga	Acacia	aneura	ACAN10	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6003	auri	Acacia	auriculiformis	ACAU	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6004	small Philippine acacia	Acacia	confusa	ACCO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6016	silver wattle	Acacia	dealbata	ACDE3	U	U	U	U	.	.	U	.
MSL	.	.	.	6017	green wattle	Acacia	decurrens	ACDE	U	U	U	U	.	.	U	.
MSL	.	3	w	303	sweet acacia	Acacia	farnesiana	ACFA	R, U	P, U	U	R, C, U	C	P	.	P2
MSL	.	.	.	6006	koa	Acacia	koa	ACKO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6007	koaoha	Acacia	koaia	ACKO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6019	Sydney golden wattle	Acacia	longifolia	ACLO	U	U	U	U	.	.	U	.
MSL	.	.	.	6008	porknut	Acacia	macracantha	ACMA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6009	black wattle	Acacia	mangium	ACMA12	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6010	black wattle	Acacia	mearnsii	ACME80	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6011	blackwood	Acacia	melanoxylon	ACME	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6012	spineless wattle	Acacia	muricata	ACMU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6013	gum arabic tree	Acacia	nilotica	ACNI2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6014	South Wales wattle	Acacia	parramattensis	ACPA81	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6015	Acacia polyacantha	Acacia	polyacantha	ACPO3	U	U	U	C, U	C	.	.	.
MSL	IOS	.	.	300	acacia spp.	Acacia	spp.	ACACI	R, U	P, U	U	C, U	C	P	.	P2
MSL	.	.	.	6018	poponax	Acacia	tortuosa	ACTO	U	U	U	C, U	C	.	.	.

[2] Entries in this column also contain the variety name when the variety clarifies the species, or subspecies name when the subspecies clarifies the species.

Master Species List (MSL)	Islands Only Species (IOS) – Not valid on the Mainland	Mainland NFS P2/3 Sub-lists - Not valid on P2/3 plots within a specific NFS Region	Woodland	FIA Code	Common Name	Genus	Species2	PLANTS Code	Past NRS Tally	Past PNW Tally	Past RMRS Tally	Past SRS Tally	Caribbean	Pacific	Urban	Historic P2
MSL	.	.	.	6020	prickly Moses	Acacia	verticillata	ACVE2	U	U	U	U	.	.	U	.
MSL	.	.	.	311	Florida maple	Acer	barbatum	ACBA3	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	5145	hedge maple	Acer	campestre	ACCA5	U	U	U	U	.	.	U	.
MSL		5,6,10	.	5146	vine maple	Acer	circinatum	ACCI	U	U	U	U	.	.	U	.
MSL	.	.	.	5147	Amur maple	Acer	ginnala	ACGI	U	U	U	U	.	.	U	.
MSL	.	.	w	322	bigtooth maple	Acer	grandidentatum	ACGR3	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	5148	paperbark maple	Acer	griseum	ACGR14	U	U	U	U	.	.	U	.
MSL	.	.	.	323	chalk maple	Acer	leucoderme	ACLE	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	312	bigleaf maple	Acer	macrophyllum	ACMA3	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	5155	Miyabe maple	Acer	miyabei	ACMI7	U	U	U	U	.	.	U	.
MSL	.	.	.	5149	Painted maple	Acer	mono	ACMO10	U	U	U	U	.	.	U	.
MSL	.	.	.	313	boxelder	Acer	negundo	ACNE2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	314	black maple	Acer	nigrum	ACNI5	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	5150	Japanese maple	Acer	palmatum	ACPA2	U	U	U	U	.	.	U	.
MSL	.	.	.	315	striped maple	Acer	pensylvanicum	ACPE	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	320	Norway maple	Acer	platanoides	ACPL	R, U	PNWS, U	U	R, U	.	.	.	P2
MSL	.	.	.	5157	Norway maple x shantung maple	Acer	platanoides x truncatum	ACPL2	U	U	U	U	.	.	U	.
MSL	.	.	.	5151	sycamore maple	Acer	pseudoplatanus	ACPS	U	U	U	U	.	.	U	.
MSL	.	.	.	316	red maple	Acer	rubrum	ACRU	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	317	silver maple	Acer	saccharinum	ACSA2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	318	sugar maple	Acer	saccharum	ACSA3	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	319	mountain maple	Acer	spicatum	ACSP2	R, U	PNWS, U	U	R, U	.	.	.	P2
MSL	.	.	.	5152	tatarian maple	Acer	tataricum	ACTA80	U	U	U	U	.	.	U	.
MSL	.	.	.	5156	Three Flower Maple	Acer	triflorum	ACTR7	U	U	U	U	.	.	U	.
MSL	.	.	.	5154	Freeman maple	Acer	x freemanii	ACFR	U	U	U	U	.	.	U	.
MSL	.	.	.	6021	hollowheart	Acnistus	arborescens	ACAR	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	906	Everglades palm, paurotis-palm	Acoelorraphe	wrightii	ACWR4	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	.	6023	grugru palm	Acrocomia	media	ACME2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6025	baobab	Adansonia	digitata	ADDI3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6026	wild lime	Adelia	ricinella	ADRI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6028	red beadtree	Adenanthera	pavonina	ADPA	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6032	Caribbean spiritweed	Aegiphila	martinicensis	AEMA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	333	California buckeye	Aesculus	californica	AECA	R, U	PNWS, U	U	U	.	.	.	P2
MSL	.	.	.	332	yellow buckeye	Aesculus	flava	AEFL	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	331	Ohio buckeye	Aesculus	glabra	AEGL	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	334	Texas buckeye	Aesculus	glabra var.arguta	AEGLA	R, U	PNWS, U	U	R, U	.	.	.	P2
MSL	.	.	.	5163	horse chestnut	Aesculus	hippocastanum	AEHI	U	U	U	U	.	.	U	.
MSL	.	.	.	6034	yellowwood	Afrocarpus	falcatus	AFFA	U	U	U	U	.	.	U	.
MSL	.	.	.	6035	East African yellowwood	Afrocarpus	gracilior	AFGR	U	U	U	U	.	.	U	.
MSL	.	.	.	6036	kauri	Agathis	australis	AGAU4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6037	Queensland kauri	Agathis	robusta	AGRO6	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6042	Titimel	Aglaia	mariannensis	AGMA14	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6044	karasyu, marasau	Aglaia	ponapensis	AGPO4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6046	laga ali	Aglaia	samoensis	AGSA9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6048	Olomea	Aidia	cochinchinensis	AICO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6049	Aidia racemosa	Aidia	racemosa	AIRA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	341	ailanthus	Ailanthus	altissima	AIAL	R, U	PNWS, P, U	R, U	R, U	.	P	.	P2
MSL	.	.	.	6053	Aiphanes minima	Aiphanes	minima	AIMI	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	6055	cream albizia	Albizia	adinocephala	ALAD	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6056	naked albizia	Albizia	carbonaria	ALCA8	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6057	Chinese albizia	Albizia	chinensis	ALCH2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	345	mimosa, silktree	Albizia	julibrissin	ALJU	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6059	woman's tongue	Albizia	lebbeck	ALLE	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6060	tall albizia	Albizia	procera	ALPR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6061	ukall ra ngebard	Albizia	retusa	ALRE	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6062	whiteflower albizia	Albizia	saponaria	ALSA10	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6064	achiotillo	Alchornea	latifolia	ALLA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6066	palo de gallina	Alchorneopsis	floribunda	ALFL3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6069	Hawaii alectryon	Alectryon	macrococcus	ALMA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6075	Indian walnut	Aleurites	moluccana	ALMO2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6078	lumbang	Aleurites	trisperma	ALTR11	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6080	palo blanco	Allophylus	crassinervis	ALCR9	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6082	palo de caja	Allophylus	racemosus	ALRA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6084	chebeludes	Allophylus	ternatus	ALTE13	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6085	ebeludes, chebeludes	Allophylus	timorensis	ALTI2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	5189	Italian alder	Alnus	cordata	ALCO13	U	U	U	U	.	.	U	.
MSL	.	.	.	355	European alder	Alnus	glutinosa	ALGL2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6086	Nepal alder	Alnus	nepalensis	ALNE2	U	P, U	U	U	.	P	U	.
MSL	.	.	.	353	Arizona alder	Alnus	oblongifolia	ALOB2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	352	white alder	Alnus	rhombifolia	ALRH2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	351	red alder	Alnus	rubra	ALRU2	R, U	PNWS, AK, U	R, U	U	.	.	.	P2

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MSL	.	.	.	6088	chelebiob, elebiong	Alphitonia	carolinensis	ALCA21	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6089	Hawaii kauilatree	Alphitonia	ponderosa	ALPO3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6091	toi	Alphitonia	zizyphoides	ALZI	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6092	helecho gigante de la sierra	Alsophila	bryophila	ALBR4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6093	Alsophila portoricensis	Alsophila	portoricensis	ALPO7	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6095	deviltree	Alstonia	macrophylla	ALMA16	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6096	Alstonia pacifica	Alstonia	pacifica	ALPA22	U	P, U	U	U	.	P	.	.
MSL	.	.	.	357	common serviceberry	Amelanchier	arborea	AMAR3	.	U	U	U	.	.	.	P2
MSL	.	.	.	5203	Allegheny serviceberry	Amelanchier	laevis	AMLA	.	U	U	U	.	.	U	.
MSL	.	.	.	358	roundleaf serviceberry	Amelanchier	sanguinea	AMSA	.	U	U	U	.	.	.	P2
MSL		5,6,10	.	356	serviceberry spp.	Amelanchier	spp.	AMELA	R, U	U	.	R, U	.	.	.	P2
MSL	.	.	.	6101	black calabash	Amphitecna	latifolia	AMLA4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6103	balsam torchwood	Amyris	balsamifera	AMBA2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	852	sea torchwood	Amyris	elemifera	AMEL	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	.	6107	cashew	Anacardium	occidentale	ANOC	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6108	Anacolosa glochidiiformis	Anacolosa	glochidiiformis	ANGL5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6109	Anacolosa insularis	Anacolosa	insularis	ANIN13	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6111	Anadenanthera peregrina	Anadenanthera	peregrina	ANPE13	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	6114	cabbagebark tree	Andira	inermis	ANIN	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6120	canelillo	Aniba	bracteata	ANBR7	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6124	Annona cherimola	Annona	cherimola	ANCH9	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6125	ilama	Annona	diversifolia	ANDI11	U	U	U	C, U	C	.	.	.
MSL	.	.	.	853	pond-apple	Annona	glabra	ANGL4	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	.	6127	mountain soursop	Annona	montana	ANMO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6128	soursop	Annona	muricata	ANMU2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6129	custard apple	Annona	reticulata	ANRE	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6131	sugar apple	Annona	squamosa	ANSQ	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6137	Antidesma bunius	Antidesma	bunius	ANBU3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6138	Antidesma kusaiense	Antidesma	kusaiense	ANKU3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6135	Kapua china laurel	Antidesma	kapuae	ANKA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6139	ha a	Antidesma	platyphyllum	ANPL2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6143	hame	Antidesma	pulvinatum	ANPU2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6146	placa chiquitu	Antirhea	acutata	ANAC4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6147	pegwood	Antirhea	coriacea	ANCO3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6148	Antirhea inconspicua	Antirhea	inconspicua	ANIN2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6149	palo iloron	Antirhea	lucida	ANLU3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6150	quina roja	Antirhea	obtusifolia	ANOB2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6151	Puerto Rico quina	Antirhea	portoricensis	ANPO3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6152	Sintenis' quina	Antirhea	sintenisii	ANSI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	5232	Japanese angelica tree	Aralia	elata	AREL8	U	U	U	U	.	.	U	.

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MSL	.	.	.	362	Arizona madrone	Arbutus	arizonica	ARAR2	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	361	Pacific madrone	Arbutus	menziesii	ARME	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	6180	strawberry tree	Arbutus	unedo	ARUN4	.	U	U	U	.	.	U	.
MSL	.	.	w	363	Texas madrone	Arbutus	xalapensis	ARXA80	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	.	6159	Alexandra palm	Archontophoenix	alexandrae	ARAL	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6160	Bangalow palm	Archontophoenix	cunninghamiana	ARCU2	U	U	U	U	.	.	U	.
MSL	IOS	.	.	6161	shoebutton	Ardisia	elliptica	AREL4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6162	ausubon	Ardisia	glauciflora	ARGL11	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6163	mountain marlberry	Ardisia	luquillensis	ARLU3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6164	Guadeloupe marlberry	Ardisia	obovata	AROB2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6165	China-shrub	Ardisia	solanacea	ARSO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6167	betelnut	Areca	catechu	ARCA41	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6169	cabo-negro	Arenga	pinnata	ARPI6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6171	breadfruit	Artocarpus	altilis	ARAL7	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6173	Artocarpus heterophyllus	Artocarpus	heterophyllus	ARHE2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6175	dugdug, Marianas breadfruit	Artocarpus	mariannensis	ARMA28	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6176	Artocarpus nobilis	Artocarpus	nobilis	ARNO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6177	Marang	Artocarpus	odoratissimus	AROD2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6179	taputoi	Arytera	brackenridgei	ARBR11	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6181	afia	Ascarina	diffusa	ASDI14	U	P, U	U	U	.	P	.	.
MSL	.	.	.	367	pawpaw	Asimina	triloba	ASTR	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6184	Astronidium kusaianum	Astronidium	kusaianum	ASKU2	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	6185	Astronidium navigatorum	Astronidium	navigatorum	ASNA10	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6186	mesekui	Astronidium	palauense	ASPA37	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6187	Astronidium pickeringii	Astronidium	pickeringii	ASPI11	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6188	Astronidium samoense	Astronidium	samoense	ASSA23	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6190	Astronidium subcordata	Astronidium	subcordata	ASSU31	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6193	ifi ifi	Atuna	racemosa	ATRA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6197	Bilimbi	Averrhoa	bilimbi	AVBI	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6198	carambola	Averrhoa	carambola	AVCA	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	986	black mangrove	Avicennia	germinans	AVGE	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	.	6203	Avicennia marina	Avicennia	marina	AVMA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6200	biut	Avicennia	Marina ssp.Marina	AVAL	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6206	neem	Azadirachta	indica	AZIN2	U	P, U	U	C, U	C	.	.	.
MSL	.	.	.	6208	Saitamu	Baccaurea	taitensis	BATA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	5261	peach palm	Bactris	gasipaes	BAGA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6213	ralm	Badusa	palauensis	BAPA8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6217	Puerto Rico palo de ramon	Banara	portoricensis	BAPO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6219	Vanderbilt's palo de ramon	Banara	vanderbiltii	BAVA2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6220	sea putat	Barringtonia	asiatica	BAAS3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6221	langaasag	Barringtonia	racemosa	BARA5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6222	falaga	Barringtonia	samoensis	BASA9	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	6224	Bastardiopsis eggersii	Bastardiopsis	eggersii	BAEG6	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6241	Texasplume	Bauhinia	lunarioides	BALU	U	U	U	U	.	.	U	.
MSL	.	.	.	6226	Napoleon's plume	Bauhinia	monandra	BAMO2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6227	petite flamboyant bauhinia	Bauhinia	multinervia	BAMU3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6228	railroadfence	Bauhinia	pauletia	BAPA3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6229	butterfly tree	Bauhinia	purpurea	BAPU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6231	St. Thomas tree	Bauhinia	tomentosa	BATO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6232	mountain ebony	Bauhinia	variegata	BAVA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6252	bauhinia	Bauhinia	x blakeana	BABL	U	U	U	U	.	.	U	.
MSL	.	.	.	6233	slugwood	Beilschmiedia	pendula	BEPE	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6235	Caribbean myrtlecroton	Bernardia	dichotoma	BEDI2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	371	yellow birch	Betula	alleghaniensis	BEAL2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	372	sweet birch	Betula	lenta	BELE	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	376	resin birch	Betula	neoalaskana	BENE4	R, U	AK	R, U	U	.	.	.	P2
MSL	.	.	.	373	river birch	Betula	nigra	BENI	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	374	water birch	Betula	occidentalis	BEOC2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	375	paper birch	Betula	papyrifera	BEPA	R, U	PNWS, AK, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	5279	European white birch	Betula	pendula	BEPE3	U	U	U	U	.	.	U	.
MSL	.	.	.	5280	Asian white birch	Betula	platyphylla	BEPL2	U	U	U	U	.	.	U	.
MSL	.	.	.	379	gray birch	Betula	populifolia	BEPO	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	5281	downy birch	Betula	pubescens	BEPU5	U	U	U	U	.	.	U	.

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MSL	.	.	.	377	Virginia roundleaf birch	Betula	uber	BEUB	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	378	northwestern paper birch	Betula	x utahensis	BEUT	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	6236	Javanese bishopwood	Bischofia	javanica	BIJA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6238	lipsticktree	Bixa	orellana	BIOR	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6240	akee	Blighia	sapida	BLSA2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6242	akupa	Bobea	brevipes	BOBR3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6243	ahakea lau nui	Bobea	elatior	BOEL3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6244	Hawaii dogweed	Bobea	sandwicensis	BOSA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6246	ahakea	Bobea	timonioides	BOTI	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6247	parrotweed	Bocconia	frutescens	BOFR2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6250	virgata	Boehmeria	virgata	BOVI7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6251	white alling	Bontia	daphnoides	BODA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6253	Bourreria radula	Bourreria	radula	BORA2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6255	bodywood	Bourreria	succulenta	BOSU2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6257	roble de guayo	Bourreria	virgata	BOVI2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6258	pink flame tree	Brachychiton	discolor	BRDI6	U	U	U	U	.	.	U	.
MSL	.	.	.	6259	whiteflower kurrajong	Brachychiton	populneum	BRPO6	U	U	U	U	.	.	U	.
MSL	.	.	.	6262	paper mulberry	Broussonetia	papyrifera	BRPA4	U	P, U	U	U	.	P	U	.
MSL	.	.	.	6264	angels-trumpet	Brugmansia	candida	BRCA12	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6266	Oriental mangrove	Bruguiera	gymnorhiza	BRGY3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6267	smallflower bruguiera	Bruguiera	parviflora	BRPA15	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	6268	Oriental mangrove	Bruguiera	sexangula	BRSE11								
MSL	.	.	.	6270	West Indian sumac	Brunellia	comocladiifolia	BRCO6	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6272	American brunfelsia	Brunfelsia	americana	BRAM4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6273	Serpentine Hill raintree	Brunfelsia	densifolia	BRDE4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6274	vega blanca	Brunfelsia	lactea	BRLA5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6275	Puerto Rico raintree	Brunfelsia	portoricensis	BRPO3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6277	omail	Buchanania	engleriana	BUEN	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6278	gasu	Buchanania	merrillii	BUME4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6279	omail, deuachel	Buchanania	palawensis	BUPA16	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6283	fourleaf buchenavia	Buchenavia	tetraphylla	BUTE4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6284	gregorywood	Bucida	buceras	BUBU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6294	cafe falso	Bunchosia	glandulifera	BUGL2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6295	cafe forastero	Bunchosia	glandulosa	BUGL	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6297	Bunchosia polystachia	Bunchosia	polystachia	BUPO5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6299	Burckella richii	Burckella	richii	BURI3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	854	gumbo limbo	Bursera	simaruba	BUSI	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	.	5328	South American jelly palm	Butia	capitata	BUCA15	.	.	.	.	.	.	.	.
MSL	.	.	.	6303	Buxus laevigata	Buxus	laevigata	BULA10	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6306	Vahl's box	Buxus	vahlii	BUVA	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	6308	maricao cimun	Byrsonima	crassifolia	BYCR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6311	Long Key locustberry	Byrsonima	lucida	BYLU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6313	doncella	Byrsonima	spicata	BYSP	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6315	almendrillo	Byrsonima	wadsworthii	BYWA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6317	divi divi	Caesalpinia	coriaria	CACO28	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6318	uhiuhi	Caesalpinia	kavaiensis	CAKA5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6319	pride-of-Barbados	Caesalpinia	pulcherrima	CAPU13	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6320	sappanwood	Caesalpinia	sappan	CASA28	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6316	nicker	Caesalpinia	spp.	CAESA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6325	Surinamese stickpea	Calliandra	surinamensis	CASU33	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6326	caparosa	Callicarpa	ampla	CAAM14	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6328	crimson bottlebrush	Callistemon	citrinus	CACI15	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6329	weeping bottlebrush	Callistemon	viminalis	CAVI23	U	P, U	U	U	.	P	U	.
MSL	.	.	.	6338	Antilles calophyllum	Calophyllum	antillanum	CAAN22	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6341	Alexandrian laurel	Calophyllum	inophyllum	CAIN4	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6342	tamanu	Calophyllum	neo-ebudicum	CANE31	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6343	chesemolech	Calophyllum	pelewense	CAPE15	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6344	olebtaches, chesemolech	Calophyllum	soulattri	CASO12	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6346	roostertree	Calotropis	procera	CAPR	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6350	degame	Calycophyllum	candidissimum	CACA73	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	6351	Kiaerskov's lidflower	Calyptranthes	kiaerskovii	CAKI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6352	limoncillo	Calyptranthes	krugii	CAKR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6353	Luquillo forest lidflower	Calyptranthes	luquillensis	CALU12	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6354	pale lidflower	Calyptranthes	pallens	CAPA8	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6355	Puerto Rico lidflower	Calyptranthes	portoricensis	CAPO9	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6356	limoncillo de monte	Calyptranthes	sintenisii	CASI8	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6358	Thomas' lidflower	Calyptranthes	thomasiana	CATH3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6359	myrtle of the river	Calyptranthes	zuzygium	CAZU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6360	Puerto Rico manac	Calyptronoma	rivalis	CARI3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6366	kelela charm, kiu	Campnosperma	brevipetiolatum	CABR18	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6370	ilang-ilang	Cananga	odorata	CAOD	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6373	mesecheues	Canarium	hirsutum	CAHI14	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6374	lukerr	Canarium	indicum	CAIN42	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6372	mafoa	Canarium	mafoa	CAHA39	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6375	Pili Nut	Canarium	ovatum	CAOV7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6378	maali	Canarium	vitiense	CAVI26	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6379	Canarium vulgare	Canarium	vulgare	CAVU9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6380	wild cinnamon	Canella	winterana	CAWI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6383	burro blanco	Capparis	amplissima	CAAM13	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6384	caper	Capparis	baducca	CABA2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6386	Jamaican caper	Capparis	cynophallophora	CACY	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6387	falseteeth	Capparis	flexuosa	CAFL2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6389	broadleaf caper	Capparis	hastata	CAHA9	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	6390	linguam	Capparis	indica	CAIN5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	5375	Siberian peashrub	Caragana	arborescens	CAAR18	U	U	U	U	.	.	U	.
MSL	.	.	.	6393	crabwood	Carapa	guianensis	CAGU6	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6395	papaya	Carica	papaya	CAPA23	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6397	scorpionbush	Carmona	retusa	CARE22	U	P, U	U	U	.	P	.	.
MSL	.	.	.	5378	European hornbeam	Carpinus	betulus	CABE8	U	U	U	U	.	.	U	.
MSL	.	.	.	391	American hornbeam, musclewood	Carpinus	caroliniana	CACA18	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	409	mockernut hickory	Carya	alba	CAAL27	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	401	water hickory	Carya	aquatica	CAAQ2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	413	southern shagbark hickory	Carya	carolinae-septentrionalis	CACA38	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	402	bitternut hickory	Carya	cordiformis	CACO15	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	411	scrub hickory	Carya	floridana	CAFL6	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	403	pignut hickory	Carya	glabra	CAGL8	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	404	pecan	Carya	illinoinensis	CAIL2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	405	shellbark hickory	Carya	laciniosa	CALA21	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	406	nutmeg hickory	Carya	myristiciformis	CAMY	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	412	red hickory	Carya	ovalis	CAOV3	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	407	shagbark hickory	Carya	ovata	CAOV2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	410	sand hickory	Carya	pallida	CAPA24	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	408	black hickory	Carya	texana	CATE9	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6399	fish tail palm	Caryota	mitis	CAMI36	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6401	fishtail palm	Caryota	urens	CAUR3	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	6402	rabo de ranton	Casearia	aculeata	CAAC3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6403	gia verde	Casearia	arborea	CAAR8	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6405	keuert	Casearia	cauliflora	CACA28	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6406	wild honeytree	Casearia	decandra	CADE11	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6407	Guyanese wild coffee	Casearia	guianensis	CAGU2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6410	crackopen	Casearia	sylvestris	CASY2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6415	golden shower	Cassia	fistula	CAFI3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6417	pink shower	Cassia	grandis	CAGR11	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6418	apple blossom	Cassia	javanica	CAJA3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6419	gold medallion tree	Cassia	leptophylla	CALE49	U	U	U	U	.	.	U	.
MSL	.	.	.	6425	marbletree	Cassine	xylocarpa	CAXY	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6427	goatwood	Cassipourea	guianensis	CAGU3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	5401	Japanese chestnut	Castanea	crenata	CACR27	U	U	U	U	.	.	U	.
MSL	.	.	.	421	American chestnut	Castanea	dentata	CADE12	R, U	PNWS, U	U	R, U	.	.	.	P2
MSL	.	.	.	424	Chinese chestnut	Castanea	mollissima	CAMO83	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	422	Allegheny chinkapin	Castanea	pumila	CAPU9	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	423	Ozark chinkapin	Castanea	pumila var. ozarkensis	CAPUO	R, U	PNWS, U	U	R, U	.	.	.	P2
MSL	.	.	.	5402	European chestnut	Castanea	sativa	CASA27	U	U	U	U	.	.	U	.
MSL	.	.	.	6429	goatbush	Castela	erecta	CAER3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6430	Panama rubbertree	Castilla	elastica	CAEL5	U	P, U	U	C, U	C	P	.	.

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MSL	.	.	.	6433	river sheoak	Casuarina	cunninghamiana	CACU8	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6434	beach sheoak	Casuarina	equisetifolia	CAEQ	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	856	gray sheoak	Casuarina	glauca	CAGL11	R, U	PNWS, P, U	R, U	R, C, U	C	P	.	P2
MSL	.	.	.	857	belah	Casuarina	lepidophloia	CALE28	R, U	PNWS, U	R, U	R, C, U	C	.	.	P2
MSL	.	.	.	6437	gagu, australian pine	Casuarina	litorea	CALI8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	451	southern catalpa	Catalpa	bignonioides	CABI8	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6439	Haitian catalpa	Catalpa	longissima	CALO8	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	5411	Chinese catalpa	Catalpa	ovata	CAOV5	U	U	U	U	.	.	U	.
MSL	.	.	.	452	northern catalpa	Catalpa	speciosa	CASP8	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6441	trumpet tree	Cecropia	obtusifolia	CEOB	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6443	pumpwood	Cecropia	schreberiana	CESC9	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6445	Spanish cedar	Cedrela	odorata	CEOD	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6447	pochote	Ceiba	acuminata	CEAC4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6448	pochote	Ceiba	aesculifolia	CEAE2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6449	kapoktree	Ceiba	pentandra	CEPE2	U	P, U	U	C, U	C	P	.	.
MSL	.	3	.	461	sugarberry	Celtis	laevigata	CELA	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	462	hackberry	Celtis	occidentalis	CEOC	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	3	.	463	netleaf hackberry	Celtis	laevigata var. reticulata	CELAR	.	.	.	.	.	.	.	P2
MSL	.	.	.	6452	Celtis paniculata	Celtis	paniculata	CEPA6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6458	Chinese hackberry	Celtis	sinensis	CESI8	U	U	U	U	.	.	U	.
MSL	.	.	.	6454	almex	Celtis	trinervia	CETR3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6457	St. John's bread	Ceratonia	siliqua	CESI3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6460	emeridech	Cerbera	floribunda	CEFL2	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	6461	leva	Cerbera	manghas	CEMA20	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6462	chiute	Cerbera	odollam	CEOD2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	5435	katsura tree	Cercidiphyllum	japonicum	CEJA2	U	U	U	U	.	.	U	.
MSL	.	.	.	471	eastern redbud	Cercis	canadensis	CECA4	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL																
MSL	.	5,6	w	475	curlleaf mountain-mahogany	Cercocarpus	ledifolius	CELE3	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	6468	lady of the night cactus	Cereus	hexagonus	CEHE3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6469	Cereus hildmannianus	Cereus	hildmannianus	CEHI3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6472	biut	Ceriops	tagal	CETA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6473	orange jessamine	Cestrum	aurantiacum	CEAU2	U	P, U	U	U	.	P	.	.
MSL	IOS	.	.	6474	day jessamine	Cestrum	diurnum	CEDI6	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6475	galen del monte	Cestrum	laurifolium	CELA2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6477	night jessamine	Cestrum	nocturnum	CENO	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6480	European fan palm	Chamaerops	humilis	CHHU7	U	U	U	U	.	.	U	.
MSL	.	.	.	6481	jointed sandmat	Chamaesyce	articulata	CHAR8	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6482	koko	Chamaesyce	atrococca	CHAT2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6483	ekoko	Chamaesyce	celastroides	CHCE	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6492	Herbsts sandmat	Chamaesyce	herbstii	CHHE3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6493	kokomalei	Chamaesyce	kuwaleana	CHKU	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6494	alpine sandmat	Chamaesyce	olowaluana	CHOL3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6495	Koolau Range sandmat	Chamaesyce	rockii	CHRO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6497	Napali coast papala	Charpentiera	densiflora	CHDE3	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	6498	ellipticleaf papala	Charpentiera	elliptica	CHEL	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6499	broadleaf papala	Charpentiera	obovata	CHOB2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6500	Koolau Range papala	Charpentiera	ovata	CHOV2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6504	Waianae Range papala	Charpentiera	tomentosa	CHTO3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6507	Domins club	Cheirodendron	dominii	CHDO3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6508	Fauries club	Cheirodendron	fauriei	CHFA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6509	olapa	Cheirodendron	forbesii	CHFO4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6510	lapalapa	Cheirodendron	platyphyllum	CHPL	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6514	olapalapa	Cheirodendron	trigynum	CHTR2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6517	alaweo	Chenopodium	oahuense	CHOA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6519	hueso	Chionanthus	axilliflorus	CHAX2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6520	bridgotree	Chionanthus	compactus	CHCO12	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6521	white rosewood	Chionanthus	domingensis	CHDO4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6522	hueso prieto	Chionanthus	holdridgei	CHHO4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6523	cabra blanca	Chionanthus	ligustrinus	CHLI6	U	U	U	C, U	C	.	.	.
MSL	.	8	.	6524	Chinese fringetree	Chionanthus	retusus	CHRE9	.	U	U	U	.	.	U	.
MSL	.	.	.	6525	vitiensis	Chionanthus	vitiensis	CHVI22	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6526	puntaj jayuya	Chione	seminervis	CHSE5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6528	fatpork	Chione	venosa	CHVE4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6529	african teak	Chlorophora	excelsa	CHEX5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6532	silk-floss tree	Chorisia	speciosa	CHSP13	U	U	U	C, U	C	.	.	.
MSL	IOS	.	.	6535	icaco coco plum	Chrysobalanus	icaco	CHIC	U	U	U	C, U	C	.	.	.
MSL	.	.	.	431	giant chinkapin, golden chinkapin	Chrysolepis	chrysophylla var. chrysophylla	CHCHC4	R, U	PNWS, U	U	U	.	.	.	P2
MSL	.	.	.	6539	bastard redwood	Chrysophyllum	argenteum	CHAR6	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	6541	star apple	Chrysophyllum	cainito	CHCA10	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6542	satinleaf	Chrysophyllum	oliviforme	CHOL	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6543	camito de perro	Chrysophyllum	pauciflorum	CHPA31	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6546	Chamissos manfern	Cibotium	chamissoi	CICH	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6547	hapuu	Cibotium	glaucum	CIGL	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6545	Hawaiian tree fern	Cibotium	heleniae	CIHE7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6548	hapuu li	Cibotium	menziesii	CIME8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6549	manfern	Cibotium	spp.	CIBOT	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6552	quinine	Cinchona	pubescens	CIPU	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6554	cassia	Cinnamomum	aromaticum	CIAR8	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6555	Padang cassia	Cinnamomum	burmannii	CIBU2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	858	camphortree	Cinnamomum	camphora	CICA	R, U	P, U	U	R, C, U	C	P	.	P2
MSL	.	.	.	6557	ochod	Cinnamomum	carolinense	CICA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6559	laurel avispillo	Cinnamomum	elongatum	CIEL2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6560	avispillo	Cinnamomum	montanum	CIMO3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6561	ochod	Cinnamomum	pedatinervium	CIPE6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6562	matieu	Cinnamomum	sessilifolium	CISE2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6564	cinnamon	Cinnamomum	verum	CIVE2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6565	juniper berry	Citharexylum	caudatum	CICA8	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6567	spiny fiddlewood	Citharexylum	spinosum	CISP3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6570	samoensis	Citronella	samoensis	CISA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6572	Lime (Tipolo)	Citrus	aurantifolia	CIAU	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6579	limon china	Citrus	hystrix	CIHY2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6580	kahet, wild orange	Citrus	macroptera	CIMA10	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	6581	Citrus maxima	Citrus	maxima	CIMA5	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6582	Citrus medica	Citrus	medica	CIME3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6583	calamondin, kingkang	Citrus	mitis	CIMI3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6584	Citrus reticulata	Citrus	reticulata	CIRE3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	860	citrus spp.	Citrus	spp.	CITRU2	R, U	P, U	U	R, C, U	C	P	.	P2
MSL	.	.	.	6573	key lime	Citrus	x aurantiifolia	CIAU7	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6574	sour orange	Citrus	x aurantium	CIAU8	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6575	lemon	Citrus	x limon	CILI5	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6576	grapefruit	Citrus	x paradisi	CIPA3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6577	sweet orange	Citrus	x sinensis	CISI3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	481	yellowwood	Cladrastis	kentukea	CLKE	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6586	koee	Claoxylon	carolinianum	CLCA15	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6588	Claoxylon fallax	Claoxylon	fallax	CLFA6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6589	Claoxylon longiracemosum	Claoxylon	longiracemosum	CLLO5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6590	katteknau, katot	Claoxylon	marianum	CLMA25	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6591	poola	Claoxylon	sandwicense	CLSA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6593	Cleistanthus carolinianus	Cleistanthus	carolinianus	CLCA18	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6594	Cleistanthus insularis	Cleistanthus	insularis	CLIN8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6597	oha wai nui	Clermontia	arborescens	CLAR4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6601	Kauai clermontia	Clermontia	clermontioides	CLCL	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6604	Kohala Mountain clermontia	Clermontia	drepanomorpha	CLDR2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6605	haha aiakamanu	Clermontia	fauriei	CLFA	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	6606	bog clermontia	Clermontia	grandiflora	CLGR3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6610	oha kepau	Clermontia	hawaiiensis	CLHA4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6611	forest clermontia	Clermontia	kakeana	CLKA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6612	Waipio Valley clermontia	Clermontia	kohalae	CLKO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6596	oha wai nui Clermontia	Clermontia	x leptoclada	CLLE3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6613	hillside clermontia	Clermontia	lindseyana	CLLI3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6614	Maui clermontia	Clermontia	micrantha	CLMI3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6615	Mauna Loa clermontia	Clermontia	montis-loa	CLMO5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6616	Oahu clermontia	Clermontia	oblongifolia	CLOB2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6620	Wailai Pali clermontia	Clermontia	pallida	CLPA6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6621	smallflower clermontia	Clermontia	parviflora	CLPA8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6622	pele clermontia	Clermontia	peleana	CLPE2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6625	Waioiani clermontia	Clermontia	persicifolia	CLPE3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6626	Hamakua clermontia	Clermontia	pyrularia	CLPY2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6627	Clermontia singuliflora	Clermontia	singuliflora	CLSI3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6628	clermontia	Clermontia	spp.	CLERM	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6629	Haleakala clermontia	Clermontia	tuberculata	CLTU2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6630	swampforest clermontia	Clermontia	waimeae	CLWA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6631	haggarbush	Clerodendrum	aculeatum	CLAC2	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	5523	rose glorybower	Clerodendrum	bungei	CLBU	U	U	U	U	.	.	U	.
MSL	.	.	.	6633	Natal glorybower	Clerodendrum	glabrum	CLGL2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6635	velvetleaf glorybower	Clerodendrum	macrostegium	CLMA24	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6636	glorybower	Clerodendrum	spp.	CLERO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6637	teta prieta	Cleyera	albopunctata	CLAL4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6639	jackass breadnut	Clibadium	erosum	CLER	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6641	Clidemia cymosa	Clidemia	cymosa	CLCY5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6645	kiniyaw, ochop	Clinostigma	carolinense	CLCA21	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6644	Philippine pigeonwings	Clitoria	fairchildiana	CLFA5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6646	cupeillo	Clusia	clusioides	CLCL2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6648	Grundlach's attorney	Clusia	gundlachii	CLGU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6650	cupey de monte	Clusia	minor	CLMI2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6651	Scotch attorney	Clusia	rosea	CLRO	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6655	treadsoftly	Cnidoscolus	aconitifolius	CNAC	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6658	uvilla	Coccoloba	costata	COCO8	U	U	U	C, U	C	.	.	.
MSL	.	.	.	863	tietongue, pigeon-plum	Coccoloba	diversifolia	CODI8	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	.	6660	whitewood	Coccoloba	krugii	COKR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6661	puckhout	Coccoloba	microstachya	COMI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6662	pale seagrape	Coccoloba	pallida	COPA24	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6663	grandleaf seagrape	Coccoloba	pubescens	COPU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6664	uvera	Coccoloba	pyrifolia	COPY	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6665	ortegon	Coccoloba	rugosa	CORU4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6666	uvero de monte	Coccoloba	sintenisii	COSI2	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	6668	Swartz's pigeonplum	Coccoloba	swartzii	COSW	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6669	Bahama pigeonplum	Coccoloba	tenuifolia	COTE9	U	U	U	C, U	C	.	.	.
MSL	IOS	.	.	6670	seagrape	Coccoloba	uvifera	COUV	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6671	false chiggergrape	Coccoloba	venosa	COVE	U	U	U	C, U	C	.	.	.
MSL	.	.	.	907	Florida silver palm	Coccothrinax	argentata	COAR	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	.	6673	Coccothrinax barbadensis	Coccothrinax	barbadensis	COBA3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6679	silk cottontree	Cochlospermum	vitifolium	COVI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	908	coconut palm	Cocos	nucifera	CONU	R, U	P, U	U	R, C, U	C	P	.	P2
MSL	.	.	.	6683	garden croton	Codiaeum	variegatum	COVA3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6684	Arabian coffee	Coffea	arabica	COAR2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6686	Coffea liberica	Coffea	liberica	COLI8	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6685	robusta coffee	Coffea	robusta	CORO8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6688	Cojoba arborea	Cojoba	arborea	COAR9	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6689	abata cola	Cola	acuminata	COAC4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6691	uab, chuchab	Colona	scabra	COSC13	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6693	common snakebark	Colubrina	arborescens	COAR3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	864	soldierwood	Colubrina	elliptica	COEL2	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	.	6697	kauila	Colubrina	oppositifolia	COOP	U	P, U	U	U	.	P	.	.
MSL	.	.	.	5559	bladder senna	Colutea	arborescens	COAR6	U	U	U	U	.	.	U	.
MSL	.	.	.	6703	Mao	Commersonia	bartramia	COBA17	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	6705	poison ash	Comocladia	dodonaea	CODO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6706	carrasco	Comocladia	glabra	COGL4	U	U	U	C, U	C	.	.	.
MSL	.	.	w	867	Bluewood	Condalia	hookeri	COHO	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	.	987	buttonwood-mangrove	Conocarpus	erectus	COER2	R, U	P, U	U	R, C, U	C	P	.	P2
MSL	.	.	.	6710	Luquillo Mountain snailwood	Conostegia	rufescens	CORU17	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6711	Consolea moniliformis	Consolea	moniliformis	COMO8	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6712	Consolea rubescens	Consolea	rubescens	CORU8	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6714	copaiba	Copaifera	officinalis	COOF2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6716	forest mirrorplant	Coprosma	foliosa	COFO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6717	koi	Coprosma	kauensis	COKA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6718	Oahu mirrorplant	Coprosma	longifolia	COLO4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6719	alpine mirrorplant	Coprosma	montana	COMO3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6720	Maui mirrorplant	Coprosma	ochracea	COOC3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6721	pubescent mirrorplant	Coprosma	pubens	COPU8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6722	woodland mirrorplant	Coprosma	rhynchocarpa	CORH	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6724	mirrorplant	Coprosma	spp.	COPRO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6726	olena	Coprosma	waimeae	COWA4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6728	Spanish elm	Cordia	alliodora	COAL	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6729	Tou	Cordia	aspera	COAS6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8651	Anacahuita Texas Olive	Cordia	boissieri	COBO2	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	.	6730	muneco	Cordia	borinquensis	COBO3	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	6731	red manjack	Cordia	collococca	COCO5	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6733	fragrant manjack	Cordia	dichotoma	CODI18	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6735	smooth manjack	Cordia	laevigata	COLA12	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6736	Cordia micronesica	Cordia	micronesica	COMI6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6737	clammy cherry	Cordia	obliqua	COOB3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6738	San Bartolome	Cordia	rickseckeri	CORI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	865	largeleaf geigertree	Cordia	sebestena	COSE2	R, U	P, U	U	R, C, U	C	P	.	P2
MSL	.	.	.	6742	kou	Cordia	subcordata	COSU2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6743	mucilage manjack	Cordia	sulcata	COSU3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6744	tiplant	Cordyline	fruticosa	COFR2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	491	flowering dogwood	Cornus	florida	COFL2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	5591	kousa dogwood	Cornus	kousa	COKO2	U	U	U	U	.	.	U	.
MSL	.	.	.	492	Pacific dogwood	Cornus	nuttallii	CONU4	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	6746	nigua	Cornutia	obovata	COOB4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6747	azulejo	Cornutia	pyramidata	COPY2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	5600	Turkish hazelnut	Corylus	colurna	COCO30	U	U	U	U	.	.	U	.
MSL	.	.	.	6749	redgum	Corymbia	calophylla	COCA48	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6750	Corymbia citriodora	Corymbia	citriodora	COCI4	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6751	redflower gum	Corymbia	ficifolia	COFI7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6752	red bloodwood	Corymbia	gummifera	COGU4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6754	karaka nut	Corynocarpus	laevigatus	COLA6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	5603	European smoketree	Cotinus	coggygria	COCO10	U	U	U	U	.	.	U	.

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MSL	.	.	.	996	smoketree	Cotinus	obovatus	COOB2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6756	cannonball tree	Couroupita	guianensis	COGU3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	503	Brainerd's hawthorn	Crataegus	brainerdii	CRBR3	.	U	U	U	.	.	.	P2
MSL	.	.	.	504	pear hawthorn	Crataegus	calpodendron	CRCA	.	U	U	U	.	.	.	P2
MSL	.	.	.	505	fireberry hawthorn	Crataegus	chrysocarpa	CRCH	.	U	U	U	.	.	.	P2
MSL	.	.	.	501	cockspur hawthorn	Crataegus	crus-galli	CRCR2	.	PNWS, U	U	R, U	.	.	.	P2
MSL	.	.	.	506	broadleaf hawthorn	Crataegus	dilatata	CRDI	.	U	U	U	.	.	.	P2
MSL	.	.	.	507	fanleaf hawthorn	Crataegus	flabellata	CRFL	.	U	U	U	.	.	.	P2
MSL	.	.	.	502	downy hawthorn	Crataegus	mollis	CRMO2	.	PNWS, U	U	R, U	.	.	.	P2
MSL	.	4,5,6	.	508	oneseed hawthorn	Crataegus	monogyna	CRMO3	.	U	U	U	.	.	.	P2
MSL	.	.	.	509	scarlet hawthorn	Crataegus	pedicellata	CRPE	.	U	U	U	.	.	.	P2
MSL		3,4,5,6,10	.	500	hawthorn spp.	Crataegus	spp.	CRATA	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	.	5092	fleshy hawthorn	Crataegus	succulenta	CRSU5	.	U	U	U	.	.	.	P2
MSL	.	.	.	5093	dwarf hawthorn	Crataegus	uniflora	CRUN	.	U	U	U	.	.	.	P2
MSL	.	.	.	6758	sacred garlic pear	Crateva	religiosa	CRRE12	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6760	houka, calabash	Crescentia	alata	CRAL11	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6761	common calabash tree	Crescentia	cujete	CRCU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6762	higuerito	Crescentia	linearifolia	CRLI5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6763	higuero de sierra	Crescentia	portoricensis	CRPO6	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6765	Critonia portoricensis	Critonia	portoricensis	CRPO7	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	6767	maidenberry	Crossopetalum	rhacoma	CRRH	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6769	Saitamu	Crossostylis	biflora	CRBI9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6771	longbeak rattlebox	Crotalaria	longirostrata	CRLO3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6773	wild marrow	Croton	astroites	CRAS3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6774	Croton flavens	Croton	flavens	CRFL23	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6775	sabinon	Croton	poecilanthus	CRPO4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6779	laulilii	Cryptocarya	elegans	CREL8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6781	holio	Cryptocarya	mannii	CRMA8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6778	Cryptocarya oreophila	Cryptocarya	oreophila	CROR5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6784	laulilii	Cryptocarya	turbinata	CRTU4	U	P, U	U	U	.	P	.	.
MSL	.	8	.	5776	storehousebush	Cudrania	tricuspidata	CUTR2	U	U	U	U	.	.	U	.
MSL	.	.	.	6790	wild ackee	Cupania	americana	CUAM	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6792	guara blanca	Cupania	triquetra	CUTR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	866	carrotwood	Cupaniopsis	anacardioides	CUAN4	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	.	6800	Haleakala cyanea	Cyanea	aculeatiflora	CYAC4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6801	palmtree cyanea	Cyanea	arborea	CYAR10	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6802	Kauai cyanea	Cyanea	fissa	CYFI6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6805	Degeners cyanea	Cyanea	floribunda	CYFL4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6806	Kilauea Mauna cyanea	Cyanea	giffardii	CYGI5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6807	wetforest cyanea	Cyanea	hamatiflora	CYHA6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6810	Oahu cyanea	Cyanea	hardyi	CYHA7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6811	prickly cyanea	Cyanea	horrida	CYHO6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6812	Limahuli Valley cyanea	Cyanea	kuhihewa	CYKU3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6813	Kunths cyanea	Cyanea	kunthiana	CYKU	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	6814	giant kokee cyanea	Cyanea	leptostegia	CYLE5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6815	purple cyanea	Cyanea	macrostegia	CYMA10	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6818	Marks cyanea	Cyanea	marksii	CYMA14	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6819	hairy cyanea	Cyanea	pilosa	CYPI4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6822	pohaku cyanea	Cyanea	pohaku	CYPO5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6823	Molokai cyanea	Cyanea	procera	CYPR8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6824	manyfruit cyanea	Cyanea	pycnocarpa	CYPY	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6825	oakleaf cyanea	Cyanea	quercifolia	CYQU	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6826	plateau delissea	Cyanea	rivularis	CYRI4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6827	pua kala	Cyanea	solenocalyx	CYSO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6828	cyanea	Cyanea	spp.	CYANE	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6829	Kaiholena cyanea	Cyanea	stictophylla	CYST5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6830	Mt. Kaala cyanea	Cyanea	superba	CYSU8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6833	aku aku	Cyanea	tritomantha	CYTR6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6834	parrotfeather treefern	Cyathea	andina	CYAN	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6835	West Indian treefern	Cyathea	arborea	CYAR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6837	Coopers cyathea	Cyathea	cooperi	CYCO18	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6838	olioli	Cyathea	decurrens	CYDE16	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6839	Jamaican treefern	Cyathea	furfuracea	CYFU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6840	olioli	Cyathea	lunulata	CYLU5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6841	olioli	Cyathea	medullaris	CYME12	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6842	kattar	Cyathea	nigricans	CYNI7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6843	small treefern	Cyathea	parvula	CYPA7	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6844	kattar	Cyathea	ponapeana	CYPO11	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	6848	helecho gigante	Cyathea	tenera	CYTE10	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6849	olioli	Cyathea	truncata	CYTR11	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6850	Cybianthus sintenisii	Cybianthus	sintenisii	CYSI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6852	queen sago	Cycas	circinalis	CYCI3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6856	Micronesian cycad, fadang	Cycas	micronesica	CYMI8	.	.	.	.	.	P	.	.
MSL	.	.	.	6853	remiang	Cycas	revoluta	CYRE11	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6855	ola	Cyclophyllum	barbatum	CYBA7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	5818	quince	Cydonia	oblonga	CYOB2	U	U	U	U	.	.	U	.
MSL	.	.	.	6857	oreganillo falso	Cynometra	portoricensis	CYPO2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6858	gulos	Cynometra	ramiflora	CYRA8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6859	eeme, aapwo	Cynometra	yokotae	CYYO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6860	tree-tomato	Cyphomandra	betacea	CYBE3	U	P, U	U	U	.	P	.	.
MSL	IOS	.	.	6862	swamp titi	Cyrilla	racemiflora	CYRA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6865	forest cyrtandra	Cyrtandra	giffardii	CYGI3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6864	Cyrtandra	Cyrtandra	ramosissima	CYRA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6867	candletree	Dacryodes	excelsa	DAEX	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6868	cocobolo	Dalbergia	retusa	DARE6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6869	Indian rosewood	Dalbergia	sissoo	DASI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6870	cocobolo	Dalbergia	tucurensis	DATU	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6871	burn nose	Daphnopsis	americana	DAAM2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6872	Heller's cieneguillo	Daphnopsis	helleriana	DAHE2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6873	emajagua de sierra	Daphnopsis	philippiana	DAPH	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6875	Hawaii delissea	Delissea	fallax	DEFA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6876	cutleaf delissea	Delissea	laciniata	DELA4	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	6877	Niihau delissea	Delissea	niihauensis	DENI	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6880	smallflower delissea	Delissea	parviflora	DEPA9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6881	delissea	Delissea	spp.	DELIS	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6882	leechleaf delissea	Delissea	undulata	DEUN2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6883	royal poinciana	Delonix	regia	DERE	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6885	salato	Dendrocnide	harveyi	DEHA5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6886	kahtat	Dendrocnide	latifolia	DELA13	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6888	angelica tree	Dendropanax	arboreus	DEAR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6889	palo de vaca	Dendropanax	laurifolius	DELA3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6891	redpalm	Dictyosperma	album	DIAL13	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6896	chulta	Dillenia	indica	DIIN6	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6898	shrubby dillenia	Dillenia	suffruticosa	DISU11	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6899	Dimocarpus longan	Dimocarpus	longan	DILO7	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6900	mabolo	Diospyros	blancoi	DIBL3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6902	Mabolo	Diospyros	discolor	DIDI9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6904	anume	Diospyros	elliptica	DIEL3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6905	Diospyros ferrea	Diospyros	ferrea	DIFE5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6906	elama	Diospyros	hillebrandii	DIHI4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6907	persimmon	Diospyros	kaki	DIKA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6909	black apple	Diospyros	revoluta	DIRE6	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6910	auauli	Diospyros	samoensis	DISA16	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6911	lama	Diospyros	sandwicensis	DISA10	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6912	Chinese persimmon	Diospyros	sintenisii	DISI3	U	U	U	C, U	C	.	.	.
MSL	.	.	w	522	Texas persimmon	Diospyros	texana	DITE3	R, U	PNWS, U	R, U	R, U	.	.	.	P2

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MSL	.	.	.	521	common persimmon	Diospyros	virginiana	DIVI5	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6921	otot	Discocalyx	ponapensis	DIPO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6923	jaboncillo	Ditta	myricoides	DIMY	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6927	Florida hopbush	Dodonaea	viscosa	DOVI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6928	rru	Dolichandrone	spathacea	DOSP3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6930	Ceylon gooseberry	Dovyalis	hebecarpa	DOHE2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6932	fragrant dracaena	Dracaena	fragrans	DRFR2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6933	Dracaena multiflora	Dracaena	multiflora	DRMU2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6934	song of India	Dracaena	reflexa	DRRE6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6937	cafeillo	Drypetes	alba	DRAL5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6935	Drypetes carolinensis	Drypetes	carolinensis	DRCA18	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6936	Drypetes dolichocarpa	Drypetes	dolichocarpa	DRDO3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6938	varital	Drypetes	glauca	DRGL2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6939	rosewood	Drypetes	ilicifolia	DRIL	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6940	guiana plum	Drypetes	lateriflora	DRLA3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6941	kevert	Drypetes	nitida	DRNI3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6943	.	Drypetes	vitiensis	DRVI5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6949	Drypetes yapensis	Drypetes	yapensis	DRYA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6947	Mauna Kea dubautia	Dubautia	arborea	DUAR	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6944	Dubautia	Dubautia	demissifolia	DUDE	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6945	Dubautia	Dubautia	x fallax	DUFA2	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	6948	forest dubautia	Dubautia	knudsenii	DUKN	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6952	Kauai dubautia	Dubautia	microcephala	DUMI	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6946	Dubautia	Dubautia	montana	DUMO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6953	plantainleaf dubautia	Dubautia	plantaginea	DUPL	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6957	netvein dubautia	Dubautia	reticulata	DURE2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6958	dubautia	Dubautia	spp.	DUBAU	U	P, U	U	U	.	P	.	.
MSL	.	3	.	6961	golden dewdrops	Duranta	erecta	DUER	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6965	Durian	Durio	zibethinus	DUZI	U	P, U	U	U	.	P	.	.
MSL	.	.	w	6966	yellow butterfly palm	Dypsis	lutescens	DYLU	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6968	maota mea	Dysoxylum	huntii	DYHU2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6969	maota	Dysoxylum	maota	DYMA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6972	Dysoxylum mollissimum ssp. Molle	Dysoxylum	mollissimum	DYMOM	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6970	mamala	Dysoxylum	samoense	DYSA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	868	Blackbead ebony	Ebenopsis	ebano	EBEB	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	w	523	Anacua knockaway	Ehretia	anacua	EHAN	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	.	997	Russian-olive	Elaeagnus	angustifolia	ELAN	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6973	oil nut palm	Elaeis	guineensis	ELGU	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6975	kalia	Elaeocarpus	bifidus	ELBI	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6976	syatak	Elaeocarpus	carolinensis	ELCA20	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6977	`a`mati`e	Elaeocarpus	floridanus	ELFL6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6978	Elaeocarpus graeffei	Elaeocarpus	graeffei	ELGR	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6979	sapatua	Elaeocarpus	grandis	ELGR6	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	6980	joga	Elaeocarpus	joga	ELJO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6981	Elaeocarpus kerstingianus	Elaeocarpus	kerstingianus	ELKE	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6974	Kosrae elaeocarpus	Elaeocarpus	kusaiensis	ELKU2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6982	maratte, opop	Elaeocarpus	kusanoi	ELKU	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6984	aamatie	Elaeocarpus	tonganus	ELTO4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6985	Elaeocarpus	Elaeocarpus	ulianus	ELUL	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6990	taputoi	Elattostachys	falcata	ELFA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6994	elaeocarpa	Endiandra	elaeocarpa	ENEL	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6996	monkeysoap	Enterolobium	cyclocarpum	ENCY	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	6997	bronze loquat	Eriobotrya	deflexa	ERDE16	U	U	U	U	.	.	U	.
MSL	.	.	.	6998	loquat	Eriobotrya	japonica	ERJA3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7000	blacktorch	Erithalis	fruticosa	ERFR4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7004	machete	Erythrina	berteriana	ERBE3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7005	coral erythrina	Erythrina	corallodendron	ERCO22	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7003	naked coral tree	Erythrina	coralloides	ERCO	U	U	U	U	.	.	U	.
MSL	.	.	.	7006	crybabytree	Erythrina	crista-galli	ERCR6	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7007	cock's spur	Erythrina	eggersii	EREG	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7008	bucayo	Erythrina	fusca	ERFU2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7011	mountain immortelle	Erythrina	poeppigiana	ERPO5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7012	wili wili	Erythrina	sandwicensis	ERSA11	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7014	gatae palagi	Erythrina	subumbrans	ERSU15	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7015	tiger's claw	Erythrina	variegata	ERVA7	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7016	tiger's claw	Erythrina	variegata var. orientalis	ERVAO	U	P, U	U	C, U	C	P	.	.

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MSL	.	.	.	7017	acuminatissimum	Erythrospermum	acuminatissimum	ERAC10	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7019	swamp-redwood	Erythroxylum	areolatum	ERAR17	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7021	ratwood	Erythroxylum	rotundifolium	ERRO3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7022	rufous false cocaine	Erythroxylum	rufum	ERRU4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7024	Urban's false cocaine	Erythroxylum	urbanii	ERUR4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7025	southern mahogany	Eucalyptus	botryoides	EUBO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7026	applebox	Eucalyptus	bridgesiana	EUBR2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	512	river redgum	Eucalyptus	camaldulensis	EUCA2	R, U	PNWS, P, U	R, U	U	.	P	.	P2
MSL	.	.	.	7028	argyle apple	Eucalyptus	cinerea	EUCI80	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7030	sugargum	Eucalyptus	cladocalyx	EUCL	U	P, U	U	U	.	P	U	.
MSL	.	.	.	7035	silver-dollar eucalyptus	Eucalyptus	cordata	EUCO31	U	U	U	U	.	.	U	.
MSL	.	.	.	7031	yate	Eucalyptus	cornuta	EUCO3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7032	narrowleaf red ironbark	Eucalyptus	crebra	EUCR	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7033	roundleaf gum	Eucalyptus	deanei	EUDE	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7034	Indonesian gum	Eucalyptus	deglupta	EUDE2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	511	Tasmanian bluegum	Eucalyptus	globulus	EUGL	R, U	PNWS, P, U	R, U	U	.	P	.	P2
MSL	.	.	.	7038	tuart	Eucalyptus	gomphocephala	EUGO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7039	mountain graygum	Eucalyptus	goniocalyx	EUGO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	513	grand eucalyptus	Eucalyptus	grandis	EUGR12	R, U	PNWS, P, U	R, U	R, C, U	C	P	.	P2

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MSL	.	.	.	7041	white box	Eucalyptus	hemiphloia	EUHE12	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7036	white ironbark	Eucalyptus	leucoxylon	EULE13	U	U	U	U	.	.	U	.
MSL	.	.	.	7043	spotted gum	Eucalyptus	maculata	EUMA23	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7044	jarrah	Eucalyptus	marginata	EUMA4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7045	Australian tallowwood	Eucalyptus	microcorys	EUMI	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7046	gray ironbark	Eucalyptus	paniculata	EUPA	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7047	blackbutt	Eucalyptus	pilularis	EUPI	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7040	redbox	Eucalyptus	polyanthemos	EUPO	U	U	U	U	.	.	U	.
MSL	.	.	.	7048	black ironbox	Eucalyptus	raveretiana	EURA4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7049	redmahogany	Eucalyptus	resinifera	EURE2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	514	swampmahogany	Eucalyptus	robusta	EURO2	R, U	PNWS, P, U	R, U	R, C, U	C	P	.	P2
MSL	.	.	.	7051	Western Australian floodedgum	Eucalyptus	rudis	EURU2	U	P, U	U	U	.	P	U	.
MSL	.	.	.	7052	black peppermint	Eucalyptus	salicifolia	EUSA17	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7053	Sydney bluegum	Eucalyptus	saligna	EUSA	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7054	red ironbark	Eucalyptus	sideroxylon	EUSI2	U	P, U	U	U	.	P	U	.
MSL	.	5,6,10	.	510	eucalyptus spp.	Eucalyptus	spp.	EUCAL	R, U	P, U	U	R, C, U	C	P	.	P2
MSL	.	.	.	7056	forest redgum	Eucalyptus	tereticornis	EUTE	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7057	manna gum	Eucalyptus	viminalis	EUVI	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7060	white stopper	Eugenia	axillaris	EUAX	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7061	blackrodwood	Eugenia	biflora	EUBI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7062	Sierra de Cayey stopper	Eugenia	boqueronensis	EUBO3	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	7063	guayabota de sierra	Eugenia	borinquensis	EUBO4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7065	cloves	Eugenia	caryophyllus	EUCA16	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7066	redberry stopper	Eugenia	confusa	EUCO4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7067	lathberry	Eugenia	cordata	EUCO5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7068	lathberry	Eugenia	cordata var. sintenisii	EUCOS	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7069	sperry guava	Eugenia	corozalensis	EUCO13	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7071	serrette guave	Eugenia	domingensis	EUDO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7072	guasabara	Eugenia	eggersii	EUEG	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7075	smooth rodwood	Eugenia	glabrata	EUGL6	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7076	Luquillo Mountain stopper	Eugenia	haematocarpa	EUHA4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7079	nioi	Eugenia	koolauensis	EUKO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7081	privet stopper	Eugenia	ligustrina	EULI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7084	birdcherry	Eugenia	monticola	EUMO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7086	Eugenia nitida	Eugenia	nitida	EUNI2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7087	orenged	Eugenia	palauensis	EUPA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7088	agatelang	Eugenia	palumbis	EUPA28	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7089	rockmyrtle	Eugenia	procera	EUPR4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7090	Christmas cherry	Eugenia	pseudopsidium	EUPS	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7091	mountain stopper	Eugenia	reinwardtiana	EURE7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	873	red stopper	Eugenia	rhombea	EURH	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	.	7093	serrasuela	Eugenia	serrasuela	EUSE9	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7094	sessileleaf stopper	Eugenia	sessiliflora	EUSE10	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7096	stopper	Eugenia	spp.	EUGEN	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	7098	Stahl's stopper	Eugenia	stahlii	EUST3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7100	Stewardson's stopper	Eugenia	stewardsonii	EUST6	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7101	rebotel	Eugenia	suzukii	EUSU9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7102	atoto	Eugenia	thompsonii	EUTH4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7103	Underwood's stopper	Eugenia	underwoodii	EUUN	U	U	U	C, U	C	.	.	.
MSL	IOS	.	.	7104	Surinam cherry	Eugenia	uniflora	EUUN2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7105	aridland stopper	Eugenia	xerophytica	EUXE	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7123	Euodia hortensis	Euodia	hortensis	EUHO5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7124	kertub	Euodia	nitida	EUNI8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7125	beror	Euodia	palawensis	EUPA29	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7126	Euodia ponapensis	Euodia	ponapensis	EUPO15	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7128	Euodia trichantha	Euodia	trichantha	EUTR13	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7109	Mexican shrubby spurge	Euphorbia	cotinifolia	EUCO24	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7110	Kauai spurge	Euphorbia	haeleeleana	EUHA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7111	mottled spurge	Euphorbia	lactea	EULA8	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7112	Indian spurgetree	Euphorbia	neriifolia	EUNE4	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7113	manchineel berry	Euphorbia	petiolaris	EUPE8	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7114	poinsettia	Euphorbia	pulcherrima	EUPU9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7115	spurge	Euphorbia	spp.	EUPHO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7116	Indiantree spurge	Euphorbia	tirucalli	EUTI	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7119	anini	Eurya	sandwicensis	EUSA6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7129	blinding tree	Excoecaria	agallocha	EXAG	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7131	hulumoa	Exocarpos	gaudichaudii	EXGA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7133	kotop	Exorrhiza	ponapensis	EXPO2	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	7135	Caribbean princewood	Exostema	caribaeum	EXCA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7136	plateado	Exostema	ellipticum	EXEL	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7137	Exostema sanctae-luciae	Exostema	sanctae-luciae	EXSA2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	874	butterbough, inkwood	Exothea	paniculata	EXPA	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	.	7141	pualulu	Fagraea	berteroana	FABE	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7142	ksid	Fagraea	ksid	FAKS	U	P, U	U	U	.	P	.	.
MSL	.	.	.	531	American beech	Fagus	grandifolia	FAGR	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	5983	European beech	Fagus	sylvatica	FASY	U	U	U	U	.	.	U	.
MSL	.	.	.	7144	peacocksplume	Falcataria	moluccana	FAMO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7146	false coffee	Faramea	occidentalis	FAOC	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7147	feijoa	Feijoa	sellowiana	FESE2	U	U	U	U	.	.	U	.
MSL	.	.	.	7148	Jamaican cherry fig	Ficus	americana	FIAM	U	U	U	C, U	C	.	.	.
MSL	.	.	.	876	Florida strangler fig	Ficus	aurea	FIAU	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	.	7153	Roxburgh fig	Ficus	auriculata	FIAU3	U	U	U	U	.	.	U	.
MSL	.	.	.	7149	Indian banyan	Ficus	benghalensis	FIBE2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7150	weeping fig	Ficus	benjamina	FIBE	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7151	edible fig	Ficus	carica	FICA	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	877	wild banyantree, shortleaf fig	Ficus	citrifolia	FICI	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	.	7152	Ficus copiosa	Ficus	copiosa	FICO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7154	brown-woolly fig	Ficus	drupacea	FIDR3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7155	Indian rubberplant	Ficus	elastica	FIEL	U	P, U	U	C, U	C	P	.	.

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MSL	.	.	.	7156	mati	Ficus	godeffroyi	FIGO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7158	Ficus lutea	Ficus	lutea	FILU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7159	fiddleleaf fig	Ficus	lyrata	FILY	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7160	Chinese banyan	Ficus	microcarpa	FIMI2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7162	tibig	Ficus	nota	FINO3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7163	aoa	Ficus	obliqua	FIOB3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7164	amate	Ficus	obtusifolia	FIOB	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7165	aoa	Ficus	prolixa	FIPR2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7166	peepul tree	Ficus	religiosa	FIRE3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7167	Port Jackson fig	Ficus	rubiginosa	FIRU4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7168	lulk, banyan	Ficus	saffordii	FISA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7169	mati vao	Ficus	scabra	FISC3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7171	fig	Ficus	spp.	FICUS	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7173	jaguey	Ficus	stahlii	FIST	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7174	sycamore fig	Ficus	sycomorus	FISY2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7175	Chinese banyan	Ficus	thonningii	FITH2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7176	mati	Ficus	tinctoria	FITI2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7177	jaguey blanco	Ficus	trigonata	FITR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7178	mati	Ficus	uniauriculata	FIUN	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7179	higo	Ficus	virens	FIVI3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6068	Japanese fern tree	Filicium	decipiens	FIDE2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7180	Finschia chloroxantha	Finschia	chloroxantha	FICH	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7181	Chinese parasoltree	Firmiana	simplex	FISI2	U	U	U	U	.	.	U	.
MSL	.	.	.	7182	burr daisytree	Fitchia	speciosa	FISP3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7184	governor's plum	Flacourtia	indica	FLIN	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	7185	batoko plum	Flacourtia	inermis	FLIN3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7186	filimoto	Flacourtia	rukam	FLRU2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7188	Queensland maple	Flindersia	brayleyana	FLBR	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7190	Flueggea acidoton	Flueggea	acidoton	FLAC	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7191	poumuli	Flueggea	flexuosa	FLFL4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7192	mehamehame	Flueggea	neowawraea	FLNE	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7194	inkbush	Forestiera	eggersiana	FOEG	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7195	caca ravet	Forestiera	rhamnifolia	FORH	U	U	U	C, U	C	.	.	.
MSL	IOS	.	.	7196	Florida swampprivet	Forestiera	segregata	FOSE	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7198	oval kumquat	Fortunella	margarita	FOMA2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7202	West Indian buckthorn	Frangula	sphaerosperma	FRSPL	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7203	Franklin tree	Franklinia	alatamaha	FRAL	U	U	U	U	.	.	U	.
MSL	.	.	.	541	white ash	Fraxinus	americana	FRAM2	R, U	PNWS, P, U	R, U	R, U	.	P	.	P2
MSL	.	.	.	5491	Berlandier ash	Fraxinus	berlandieriana	FRBE	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	.	548	Carolina ash	Fraxinus	caroliniana	FRCA3	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	5492	European ash	Fraxinus	excelsior	FREX80	U	U	U	U	.	.	U	.
MSL	.	.	.	542	Oregon ash	Fraxinus	latifolia	FRLA	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	543	black ash	Fraxinus	nigra	FRNI	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	5493	Caucasian ash	Fraxinus	oxycarpa	FROX	U	U	U	U	.	.	U	.
MSL	.	.	.	544	green ash	Fraxinus	pennsylvanica	FRPE	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	545	pumpkin ash	Fraxinus	profunda	FRPR	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	546	blue ash	Fraxinus	quadrangulata	FRQU	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	549	Texas ash	Fraxinus	texensis	FRTE	R, U	PNWS, U	R, U	R, U	.	.	.	P2

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MSL	.	.	.	7206	shamel ash	Fraxinus	uhdei	FRUH	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	547	velvet ash	Fraxinus	velutina	FRVE2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	7207	Bolivian fuchsia	Fuchsia	boliviana	FUBO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7208	shrubby fuchsia	Fuchsia	paniculata	FUPA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7210	silkrubber	Funtumia	elastica	FUEL	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7212	Gourka	Garcinia	dulcis	GADU3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7213	lemon saptree	Garcinia	hessii	GAHE5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7214	mangosteen	Garcinia	mangostana	GAMA10	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7215	tilol	Garcinia	matsudai	GAMA8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7216	garcinia	Garcinia	myrtifolia	GAMY	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7217	konpuil	Garcinia	ponapensis	GAPO4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7218	palo de cruz	Garcinia	portoricensis	GAPO2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7220	Garcinia quadrilocularis	Garcinia	quadrilocularis	GAQU2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7219	tilol	Garcinia	rumiyo	GARU3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7223	Garcinia xanthochymus	Garcinia	xanthochymus	GAXA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7224	forest gardenia	Gardenia	brighamii	GABR	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7225	Oahu gardenia	Gardenia	mannii	GAMA6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7226	Remys gardenia	Gardenia	remyi	GARE	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7227	gardenia	Gardenia	spp.	GARDE	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7228	Tahitian gardenia	Gardenia	taitensis	GATA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7229	manuai vivao	Garuga	floribunda	GAFL8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7231	llume	Gaussia	attenuata	GAAT	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7233	taipoipo	Geniostoma	rupestre	GERU3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7235	jagua	Genipa	americana	GEAM	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7237	arbol de Navidad	Gesneria	pedunculosa	GEPE4	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	561	ginkgo, maidenhair tree	Ginkgo	biloba	GIBI2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	7239	bastard gregre	Ginoria	rohrii	GIRO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7241	Gironniera celtidifolia	Gironniera	celtidifolia	GICE2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	551	waterlocust	Gleditsia	aquatica	GLAQ	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	552	honeylocust	Gleditsia	triacanthos	GLTR	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	7245	quickstick	Gliricidia	sepium	GLSE2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7247	masame	Glochidion	cuspidatum	GLCU	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7257	Glochidion kanehirae	Glochidion	kanehirae	GLKA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7248	Glochidion marianum	Glochidion	marianum	GLMA9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7250	Glochidion	Glochidion	spp.	GLOCH	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7255	flower axistree	Glycosmis	parviflora	GLPA4	U	U	U	U	.	.	U	.
MSL	.	.	.	7251	belau	Gmelina	elliptica	GMEL	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7252	blacheos	Gmelina	palawensis	GMPA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7254	Gnetum gnemon	Gnetum	gnemon	GNGN	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7256	mata buey	Goetzea	elegans	GOEL	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7258	grand merisier	Gomidesia	lindeniana	GOLI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7260	Goniothalamus carolinensis	Goniothalamus	carolinensis	GOCA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	555	loblolly-bay	Gordonia	lasianthus	GOLA	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	3	.	7262	Creole cotton	Gossypium	barbadense	GOBA	U	P, U	U	C, U	C	P	.	.
MSL	IOS	.	.	7264	upland cotton	Gossypium	hirsutum	GOHIH2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7268	Graffenrieda ottoschulzii	Graffenrieda	ottoschulzii	GROT	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7272	kahiliflower	Grevillea	banksii	GRBA	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	7273	silkoak	Grevillea	robusta	GRRO	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7279	lignum-vitae	Guaiacum	officinale	GUOF	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7280	holywood	Guaiacum	sanctum	GUSA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7282	paipai	Guamia	mariannae	GUMA4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	882	beeftree, longleaf blolly	Guapira	discolor	GUDI	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	.	7285	black mampoo	Guapira	fragrans	GUFR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7286	corcho prieto	Guapira	obtusata	GUOB	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7288	alligatorwood	Guarea	glabra	GUGL3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7290	American muskwood	Guarea	guidonia	GUGU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7294	haya minga	Guatteria	blainii	GUBL	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7295	haya blanca	Guatteria	caribaea	GUCA2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7298	bastardcedar	Guazuma	ulmifolia	GUUL	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7299	hammock velvetseed	Guettarda	elliptica	GUEL	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7300	frogwood	Guettarda	krugii	GUKR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7302	cucubano de vieques	Guettarda	odorata	GUOD	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7303	cucubano	Guettarda	ovalifolia	GUOV	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7305	roseta	Guettarda	pungens	GUPU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7306	wild guave	Guettarda	scabra	GUSC	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7307	puapua	Guettarda	speciosa	GUSP3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7309	cucubano de monte	Guettarda	valenzuelana	GUVA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7311	rhoifolia	Guioa	rhoifolia	GURH	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7313	bochela uchererak, uch	Gulubia	palauensis	GUPA	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	7315	West Indian false box	Gyminda	latifolia	GYLA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7317	oysterwood	Gymnanthes	lucida	GYLU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	571	Kentucky coffeetree	Gymnocladus	dioicus	GYDI	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	7319	vilivili	Gyrocarpus	americanus	GYAM2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7321	bloodwoodtree	Haematoxylum	campechianum	HACA2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7327	palo de hueso	Haenianthus	salicifolius	HASAO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	581	Carolina silverbell	Halesia	carolina	HACA3	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	582	two-wing silverbell	Halesia	diptera	HADI3	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	IOS	.	.	7330	scarletbush	Hamelia	patens	HAPA3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7332	Haplolobus floribundus	Haplolobus	floribundus	HAFL	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7333	South African wild plum	Harpephyllum	caffrum	HACA10	U	U	U	U	.	.	U	.
MSL	.	.	.	7334	fa`aili	Harpullia	arborea	HAAR4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7335	haujillo	Havardia	pallens	HAPA10	U	U	U	U	.	.	U	.
MSL	.	.	.	7336	false locust	Hebestigma	cubense	HECU10	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7338	denticulata	Hedycarya	denticulata	HEDE14	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7341	cigarbush	Hedyosmum	arborescens	HEAR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7343	Fosbergs starviolet	Hedyotis	fosbergii	HEFO5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7344	manono	Hedyotis	hillebrandii	HEHI8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7345	starviolet	Hedyotis	spp.	HEDYO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7346	variable starviolet	Hedyotis	terminalis	HETE21	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7347	screwtree	Helicteres	jamaicensis	HEJA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7349	white moho	Heliocarpus	popayanensis	HEPO4	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	7353	camasey peludo	Henriettea	fascicularis	HEFA5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7354	MacFadyen's camasey	Henriettea	macfadyenii	HEMA11	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7355	thinleaf camasey	Henriettea	membranifolia	HEME5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7357	jusillo	Henriettea	squamulosum	HESQ	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7359	ufa	Heritiera	littoralis	HELI9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7360	ufa halemtano	Heritiera	longipetiolata	HELO12	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7368	Hernandia labyrinthica	Hernandia	labyrinthica	HELA27	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7363	pipi	Hernandia	moerenhoutiana	HEMO13	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7364	pua, Chinese lantern tree	Hernandia	nymphaeifolia	HENY	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7365	Hernandia ovigera	Hernandia	ovigera	HEOV4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7366	mago	Hernandia	sonora	HESO	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7370	Lanai island-aster	Hesperomannia	arborescens	HEAR9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7371	Maui island-aster	Hesperomannia	arbuscula	HEAR10	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7372	Kauai island-aster	Hesperomannia	lydgatei	HELY	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7377	palma brava	Heterospathe	elata	HEEL9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7381	para rubber tree	Hevea	brasiliensis	HEBR8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7384	hau kuahiwi	Hibiscadelphus	bombycinus	HIBO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7385	lava hau kuahiwi	Hibiscadelphus	crucibracteatus	HICR	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7386	Kauai hau kuahiwi	Hibiscadelphus	distans	HIDI	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7387	Kilauea hau kuahiwi	Hibiscadelphus	giffardianus	HIGI	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	7388	Hualalai hau kuahiwi	Hibiscadelphus	hualalaiensis	HIHU	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7389	hau kuahiwi	Hibiscadelphus	x puakuahiwi	HIPU2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7391	Maui hau kuahiwi	Hibiscadelphus	wilderianus	HIWI	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7392	Woods hau kuahiwi	Hibiscadelphus	woodii	HIWO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7393	white rosemallow	Hibiscus	arnottianus	HIAR	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7397	Brackenridges rosemallow	Hibiscus	brackenridgei	HIBR	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7401	lemonyellow rosemallow	Hibiscus	calyphyllus	HICA6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7402	red Kauai rosemallow	Hibiscus	clayi	HICL	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7403	mahoe	Hibiscus	elatus	HIEL	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7404	red rosemallow	Hibiscus	kokio	HIKO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7407	largeleaf rosemallow	Hibiscus	macrophyllus	HIMA5	U	P, U	U	U	.	P	.	.
MSL	IOS	.	.	7408	Dixie rosemallow	Hibiscus	mutabilis	HIMU3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7409	seaside mahoe	Hibiscus	pernambucensis	HIPE3	U	U	U	C, U	C	.	.	.
MSL	IOS	.	.	7410	shoeblackplant	Hibiscus	rosa-sinensis	HIRO3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7412	sea hibiscus	Hibiscus	tiliaceus	HITI	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7413	white Kauai rosemallow	Hibiscus	waimeae	HIWA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	883	manchineel	Hippomane	mancinella	HIMA2	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	.	7418	teta de burra cinarron	Hirtella	rugosa	HIRU2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7420	pigeonberry	Hirtella	triandra	HITR3	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	8008	fanuamamala	Homalanthus	acuminatus	HOAC4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8009	fanuamamala	Homalanthus	nutans	HONU3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7422	white cogwood	Homalium	racemosum	HORA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7424	Homalium whitmeeanum	Homalium	whitmeeanum	HOWH	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7427	chemeklachel, eumail	Horsfieldia	amklaal	HOAM2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7428	ersachel	Horsfieldia	novoguineensis	HONO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7429	Horsfieldia nunu	Horsfieldia	nunu	HONU2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7430	chersachel	Horsfieldia	palauensis	HOPA10	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7432	Japanese raisintree	Hovenia	dulcis	HODU2	U	U	U	U	.	.	U	.
MSL	.	.	.	7433	sentrypalm	Howeia	forsteriana	HOFO	U	U	U	U	.	.	U	.
MSL	.	.	.	7434	sandbox tree	Hura	crepitans	HUCR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7438	cedro macho	Hyeronima	clusioides	HYCL	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7442	West Indian locust, Brazilian cherry, stinkingtoe	Hymenaea	courbaril	HYCO	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7445	inkwood	Hypelate	trifoliata	HYTR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7446	limestone snakevine	Hyperbaena	laurifolia	HYLA8	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7453	Hawaii holly	Ilex	anomala	ILAN	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7454	English holly	Ilex	aquifolium	ILAQ80	U	P, U	U	U	.	P	.	.
MSL	IOS	.	.	7455	dahoon	Ilex	cassine	ILCA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7456	te	Ilex	cookii	ILCO3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7457	maconcona	Ilex	guianensis	ILGU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7458	Caribbean holly	Ilex	macfadyenii	ILMA	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	7459	Puerto Rico holly	Ilex	nitida	ILNI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	591	American holly	Ilex	opaca	ILOP	R, U	U	R, U	R, U	.	.	.	P2
MSL	.	.	.	7460	mate	Ilex	paraguariensis	ILPA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7462	gongolin	Ilex	sideroxyloides	ILSI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7463	Sintenis' holly	Ilex	sintenisii	ILSI2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7465	Urban's holly	Ilex	urbaniana	ILUR	U	U	U	C, U	C	.	.	.
MSL	.	8	.	7469	yaupon	Ilex	vomitoria	ILVO	U	U	U	U	.	.	U	.
MSL	.	.	.	7472	ice cream bean	Inga	edulis	INED	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7470	sacky sac bean	Inga	laurina	INLA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7471	Inga nobilis	Inga	nobilis	INNOQ	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7467	inga	Inga	spp.	INGA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7474	river koko	Inga	vera	INVE	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7475	ifi	Inocarpus	fagifer	INFA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7477	ifilele	Intsia	bijuga	INBI	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7479	palo de hierro	Ixora	ferrea	IXFE	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7481	white jungleflame	Ixora	thwaitesii	IXTH	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7482	black poui	Jacaranda	mimosifolia	JAMI	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7485	braceletwood	Jacquinia	armillaris	JAAR2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7487	bois bande	Jacquinia	berteroi	JABE	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7491	Barbados nut	Jatropha	curcas	JACU2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7492	wild oilnut	Jatropha	hernandiifolia	JAHE	U	U	U	C, U	C	.	.	.
MSL	IOS	.	.	7493	coralbush	Jatropha	multifida	JAMU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	604	southern California black walnut	Juglans	californica	JUCA	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	601	butternut	Juglans	cinerea	JUCI	R, U	PNWS, U	R, U	R, U	.	.	.	P2

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MSL	.	.	.	603	northern California black walnut	Juglans	hindsii	JUHI	R, U	PNWS, U	U	U	.	.	.	P2
MSL	.	.	.	7495	West Indian walnut	Juglans	jamaicensis	JUJA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	606	Arizona walnut	Juglans	major	JUMA	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	605	Texas walnut	Juglans	microcarpa	JUMI	R, U	PNWS, U	U	R, U	.	.	.	P2
MSL	.	.	.	602	black walnut	Juglans	nigra	JUNI	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	7496	English walnut	Juglans	regia	JURE80	U	U	U	U	.	.	U	.
MSL	.	.	.	7497	ketenguit	Kayea	pacifica	KAPA4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7499	Khaya anthotheca	Khaya	anthotheca	KHAN	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7501	Senegal mahogany	Khaya	senegalensis	KHSE2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7503	Kigelia africana	Kigelia	africana	KIAF	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7506	guest tree	Kleinhovia	hospita	KLHO	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7507	goldenrain tree	Koelreuteria	bipinnata	KOBI3	U	U	U	U	.	.	U	.
MSL	.	.	.	7515	goldenrain tree	Koelreuteria	paniculata	KOPA	U	U	U	U	.	.	U	.
MSL	.	.	.	7509	Molokai treecotton	Kokia	cookei	KOCO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7510	Hawaii treecotton	Kokia	drynarioides	KODR	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7511	Kauai treecotton	Kokia	kauaiensis	KOKA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7512	Wailupe Valley treecotton	Kokia	lanceolata	KOLA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7514	leadwood	Krugiodendron	ferreum	KRFE	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7516	burgan	Kunzea	ericoides	KUER	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7518	summit labordia	Labordia	fagraeoidea	LAFA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7519	bog labordia	Labordia	hedyosmifolia	LAHE2	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	7520	mountain labordia	Labordia	hirtella	LAHI5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7521	Waianae Range labordia	Labordia	kaalae	LAKA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7522	Wahiawa Mountain labordia	Labordia	lydgatei	LALY2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7523	labordia	Labordia	spp.	LABOR	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7524	paleflower labordia	Labordia	tinifolia	LATI2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7528	Lanai labordia	Labordia	triflora	LATR4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7529	Nevada peavine	Labordia	waiolani	LAWA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7531	golden chain tree	Laburnum	anagyroides	LAAN2	U	U	U	U	.	.	U	.
MSL	.	.	.	7530	cuero de rana	Laetia	procera	LAPR2	U	U	U	C, U	C	.	.	.
MSL	.	.	w	7532	crapemyrtle	Lagerstroemia	indica	LAIN	.	U	U	C, U	C	.	.	.
MSL	.	.	.	7533	pride of India	Lagerstroemia	speciosa	LASP	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	988	white mangrove	Laguncularia	racemosa	LARA2	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	.	7539	Langsat	Lansium	domesticum	LADO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7541	nino de cota	Laplacea	portoricensis	LAPO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7543	bluelatan	Latania	loddigesii	LALO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7550	henna	Lawsonia	inermis	LAIN5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7552	Krug's roughleaf	Leandra	krugiana	LEKR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7556	pitahaya	Leptocereus	quadricostatus	LEQU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7558	large-leaf yellow teatree	Leptospermum	morrisonii	LEMO20	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7559	common teatree	Leptospermum	petersonii	LEPE23	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7560	common teatree	Leptospermum	polygalifolim	LEPO22	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7561	broom teatree	Leptospermum	scoparium	LESC2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7562	teatree	Leptospermum	spp.	LEPTO4	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	7565	white leadtree	Leucaena	leucocephala	LELE10	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	869	Great leucaene	Leucaena	pulverulenta	LEPU3	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	.	7567	littleleaf leadtree	Leucaena	retusa	LERE5	U	U	U	U	.	.	U	.
MSL	.	.	.	7569	Maria laurel	Licaria	brittoniana	LIBR5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7570	Puerto Rico cinnamon	Licaria	parvifolia	LIPA9	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7573	pepperleaf sweetwood	Licaria	triandra	LITR	U	U	U	C, U	C	.	.	.
MSL	.	8	w	7577	Japanese privet	Ligustrum	japonicum	LIJA	.	U	U	U	.	.	U	.
MSL	.	8	w	7578	glossy privet	Ligustrum	lucidum	LILU2	.	U	U	U	.	.	U	.
MSL	.	.	.	7571	Oriental sweetgum	Liquidambar	orientalis	LIOR2	.	U	U	U	.	.	U	.
MSL	.	.	.	611	sweetgum	Liquidambar	styraciflua	LIST2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	621	yellow-poplar	Liriodendron	tulipifera	LITU	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	7583	Lychee	Litchi	chinensis	LICH4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	631	tanoak	Lithocarpus	densiflorus	LIDE3	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	7586	papaono	Litsea	samoensis	LISA8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7588	fountain palm	Livistona	chinensis	LICH3	U	P, U	U	U	.	P	U	.
MSL	.	.	.	7590	geno geno	Lonchocarpus	domingensis	LODO5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7591	geno	Lonchocarpus	glaucifolius	LOGL2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7592	broadleaf lancepod	Lonchocarpus	heptaphyllus	LOHE7	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7595	vinegartree	Lophostemon	confertus	LOCO9	U	P, U	U	U	.	P	U	.
MSL	.	.	.	7600	luehea	Luehea	speciosa	LUSP11	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7602	bakauaine, nana	Lumnitzera	littorea	LULI8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7606	Lunania ekmanii	Lunania	ekmanii	LUEK	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	7608	St. Thomas staggerbush	Lyonia	rubiginosa	LYRU2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	884	false tamarind	Lysiloma	latisiliquum	LYLA3	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	.	7614	macadamia nut tree, pengua	Macadamia	integrifolia	MAIN8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7617	Macadamia Nut	Macadamia	tetraphylla	MATE16	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7618	bedel	Macaranga	carolinensis	MACA25	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7619	Macaranga grayana	Macaranga	grayana	MAGR	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7620	lau pata	Macaranga	harveyana	MAHA9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7621	pengua	Macaranga	mappa	MAMA28	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7625	lau fatu	Macaranga	stipulosa	MAST7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7626	parasol leaf tree	Macaranga	tanarius	MATA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7627	Macaranga thompsonii	Macaranga	thompsonii	MATH3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7628	palo de hoz	Machaerium	lunatum	MALU2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7630	Puerto Rico alfilerillo	Machaonia	portoricensis	MAPO6	U	U	U	C, U	C	.	.	.
MSL	.	.	.	641	Osage-orange	Maclura	pomifera	MAPO	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	7632	Maclura tinctoria	Maclura	tinctoria	MATI3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7633	umbrella-tree	Maesopsis	eminii	MAEM2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	651	cucumbertree	Magnolia	acuminata	MAAC	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	655	mountain or Fraser magnolia	Magnolia	fraseri	MAFR	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	652	southern magnolia	Magnolia	grandiflora	MAGR4	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	654	bigleaf magnolia	Magnolia	macrophylla	MAMA2	R, U	PNWS, U	R, U	R, U	.	.	.	P2

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MSL	.	.	.	7635	Puerto Rico magnolia	Magnolia	portoricensis	MAPO2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	657	pyramid magnolia	Magnolia	pyramidata	MAPY	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL																
MSL	.	.	.	7636	laurel magnolia	Magnolia	splendens	MASP	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7631	star magnolia	Magnolia	stellata	MAST6	.	.	.	.	.	.	.	.
MSL	.	.	.	658	umbrella magnolia	Magnolia	tripetala	MATR	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	653	sweetbay	Magnolia	virginiana	MAVI2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	7634	Chinese magnolia	Magnolia	x soulangiana	MASO9	.	.	.	.	.	.	.	.
MSL	.	.	.	7639	kamala tree	Mallotus	philippensis	MAPH4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7642	Mallotus tiliifolius	Mallotus	tiliifolius	MATI4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7644	Barbados cherry	Malpighia	emarginata	MAEM	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7645	palo bronco	Malpighia	fucata	MAFU2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7646	wild crapemyrtle	Malpighia	glabra	MAGL6	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7647	cowhage cherry	Malpighia	infestissima	MAIN5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7648	bastard cherry	Malpighia	linearis	MALI2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	662	southern crab apple	Malus	angustifolia	MAAN3	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	7649	Siberian crab apple	Malus	baccata	MABA	U	U	U	U	.	.	U	.
MSL	.	.	.	663	sweet crab apple	Malus	coronaria	MACO5	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	7650	Japanese flowering crab apple	Malus	floribunda	MAFL80	U	U	U	U	.	.	U	.
MSL	.	.	.	661	Oregon crab apple	Malus	fusca	MAFU	R, U	PNWS, AK, U	R, U	U	.	.	.	P2

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MSL	.	.	.	664	prairie crab apple	Malus	ioensis	MAIO	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	7651	paradise apple	Malus	pumila	MAPU	U	U	U	U	.	.	U	.
MSL	.	5,6,10	.	660	apple spp.	Malus	spp.	MALUS	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	.	7652	mammee apple	Mammea	americana	MAAM2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7653	manapau	Mammea	glauca	MAGL12	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7654	chopak	Mammea	odorata	MAOD2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	885	mango	Mangifera	indica	MAIN3	R, U	P, U	U	R, C, U	C	P	.	P2
MSL	.	.	.	7657	kanit	Mangifera	minor	MAMI3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7658	saipan mango	Mangifera	odorata	MAOD	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7660	ceara rubbertree	Manihot	carthaginensis ssp. Glaziovii	MACAG 4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7662	bulletwood	Manilkara	bidentata	MABI5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7663	Surinam bulletwood	Manilkara	bidentata ssp. surinamensis	MABIS	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7664	pani	Manilkara	dissecta	MADI14	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7666	kohle	Manilkara	hoshinoi	MAHO5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7667	wild dilly	Manilkara	jaimiqui	MAJA2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7669	zapote de costa	Manilkara	pleeana	MAPL2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7672	udeuid	Manilkara	udoido	MAUD	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7673	nisperillo	Manilkara	valenzuela	MAVA3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7674	sapodilla	Manilkara	zapota	MAZA	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7677	palo de cana	Mappia	racemosa	MARA3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7679	bkau, apgau	Maranthes	corymbosa	MACO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7682	bastard hogberry	Margaritaria	nobilis	MANO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7684	beruquillo	Marlierea	sintenisii	MASI3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7688	Matayba apetala	Matayba	apetala	MAAP5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7689	negra lora	Matayba	domingensis	MADO2	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	7694	mayten	Maytenus	boaria	MABO8	U	U	U	U	.	.	U	.
MSL	.	.	.	7695	Caribbean mayten	Maytenus	cymosa	MACY2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7697	Puerto Rico mayten	Maytenus	elongata	MAEL3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7698	white cinnamon	Maytenus	laevigata	MALA8	U	U	U	C, U	C	.	.	.
MSL	.	.	.	715	Maytenus palauica	Maytenus	palauica	MAPA28	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7699	ponce mayten	Maytenus	ponceana	MAPO5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7700	luluhut	Maytenus	thompsonii	MATH4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7702	Mecranium latifolium	Mecranium	latifolium	MELA7	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7704	Medusanthera carolinensis	Medusanthera	carolinensis	MECA21	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7705	matamo	Medusanthera	samoensis	MESA11	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7715	cajeput tree	Melaleuca	linariifolia	MELI7	U	U	U	U	.	.	U	.
MSL	.	.	.	992	melaleuca	Melaleuca	quinquenervia	MEQU	R, U	PNWS, P, U	R, U	R, C, U	C	P	.	P2
MSL	.	.	.	7710	alom	Melanolepis	multiglandulosa	MEMU10	U	P, U	U	U	.	P	.	.
MSL	.	.	.	993	chinaberry	Melia	azedarach	MEAZ	R, U	PNWS, P, U	R, U	R, C, U	C	P	.	P2
MSL	.	.	.	7717	Spanish lime	Melicoccus	bijugatus	MEBI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7719	mokihana	Melicope	anisata	MEAN3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7720	Ballous melicope	Melicope	balloui	MEBA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7721	uahiapele	Melicope	barbigera	MEBA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7722	Waianae Range melicope	Melicope	christophersenii	MECH2	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	7723	manena	Melicope	cinerea	MECI6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7724	kukaemoa	Melicope	clusiifolia	MECL	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7725	piloula	Melicope	cruciata	MECR5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7726	leiohiiaka	Melicope	elliptica	MEEL2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7727	Haleakala melicope	Melicope	haleakalae	MEHA7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7728	Haupa Mountain melicope	Melicope	haupuensis	MEHA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7729	mokihana kukae moa	Melicope	hawaiensis	MEHA4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7730	Monoa melicope	Melicope	hiiakae	MEHI6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7731	Honolulu melicope	Melicope	hosakae	MEHO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7732	Kaala melicope	Melicope	kaalaensis	MEKA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7733	Olokele Valley melicope	Melicope	knudsenii	MEKN	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7750	soopini	Melicope	latifolia	MERE8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7734	Kaholuamanu melicope	Melicope	macropus	MEMA6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7735	Makaha Valley melicope	Melicope	makahae	MEMA7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7736	Molokai melicope	Melicope	molokaiensis	MEMO6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7737	alani	Melicope	mucronulata	MEMU4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7738	Oahu melicope	Melicope	oahuensis	MEOA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7739	Makawao melicope	Melicope	obovata	MEOB4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7740	Honokahua melicope	Melicope	orbicularis	MEOR4	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	7741	Hana melicope	Melicope	ovalis	MEOV	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7742	eggshape melicope	Melicope	ovata	MEOV2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7743	pale melicope	Melicope	pallida	MEPA6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7744	Lihue melicope	Melicope	paniculata	MEPA7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7745	boxfruit alani	Melicope	peduncularis	MEPE9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7746	Kohala Summit melicope	Melicope	pseudoanisata	MEPS	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7747	hairy melicope	Melicope	puberula	MEPU4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7748	fourangle melicope	Melicope	quadrangularis	MEQU3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7749	kapu melicope	Melicope	radiata	MERA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7751	roundleaf melicope	Melicope	rotundifolia	MERO3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7752	St. Johns melicope	Melicope	saint-johnii	MESA4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7753	Mt. Kaala melicope	Melicope	sandwicensis	MESA5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7754	melicope	Melicope	spp.	MELIC3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7755	volcanic melicope	Melicope	volcanica	MEVO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7756	alani wai	Melicope	waialealae	MEWA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7757	Monoa melicope	Melicope	wawraeana	MEWA4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7758	kipuka piaula	Melicope	zahlbruckneri	MEZA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7759	samoensis	Melicytus	samoensis	MESA9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7763	aguacatillo	Meliosma	herbertii	MEHE	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7764	cacaillo	Meliosma	obtusifolia	MEOB2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7766	mao	Melochia	aristata	MEAR16	U	P, U	U	U	.	P	.	.
MSL	IOS	.	.	7768	teabush	Melochia	tomentosa	METO4	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	7769	hierba del soldado	Melochia	umbellata	MEUM3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7771	sayafe	Melochia	villosissima var. villosissima	MEVIV	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7770	sayafe	Melochia	villosissima var. compacta	MEVIC4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7774	faniok	Merrilliodendron	megacarpum	MEME12	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7776	fagufagu	Meryta	macrophylla	MEMA16	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7777	omechidel	Meryta	senfftiana	MESE11	U	P, U	U	U	.	P	.	.
MSL	.	.	.	886	Florida poisontree	Metopium	toxiferum	METO3	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	.	7781	collina	Metrosideros	collina	MEPOP2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7782	ohia	Metrosideros	macropus	MEMA4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7783	ohia lehua	Metrosideros	polymorpha	MEPO5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7792	lehua papa	Metrosideros	rugosa	MERU2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7794	lehua ahihi	Metrosideros	tremuloides	METR5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7795	Kauai bottlebrush	Metrosideros	waialealae	MEWA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7798	ivory-nut palm	Metroxylon	amicarum	MEAM4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7799	sago palm	Metroxylon	sagu	MESA7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7801	Orange Champak	Michelia	champaca	MICH4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7804	saquiyac	Miconia	affinis	MIAF	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7805	velvet tree	Miconia	calvescens	MICA20	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7806	Puerto Rico johnnyberry	Miconia	foveolata	MIFO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7807	camasey de costilla	Miconia	impetiolaris	MIIM	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	7808	smooth johnnyberry	Miconia	laevigata	MILA8	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7803	hairy johnnyberry	Miconia	lanata	MILA10	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7810	camasey cuatrocanales	Miconia	mirabilis	MIMI3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7812	camasey racimoso	Miconia	pachyphylla	MIPA7	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7813	granadillo bobo	Miconia	prasina	MIPR3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7814	auquey	Miconia	punctata	MIPU9	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7815	ridge johnnyberry	Miconia	pycnoneura	MIPY2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7816	camasey felpa	Miconia	racemosa	MIRA2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7817	peralejo	Miconia	rubiginosa	MIRU4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7818	jau jau	Miconia	serrulata	MISE2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7819	mountain johnnyberry	Miconia	sintenisii	MISI2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7821	forest johnnyberry	Miconia	subcorymbosa	MISU3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7822	rajador	Miconia	tetrandra	MITE4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7823	camasey tomaso	Miconia	thomasiana	MITH	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7824	talafulu	Micromelum	minutum	MIMI23	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7828	caimitillo verde	Micropholis	garciniifolia	MIGA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7829	Micropholis guyanensis	Micropholis	guyanensis	MIGU2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7831	pinnata	Millettia	pinnata	MIPI9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7833	elegant mimosa	Mimosa	arenosa	MIAR4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7835	bulletwood, elengi	Mimusops	elengi	MIEL4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7839	monodora	Monodora	spp.	MONOD	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	7841	treedaisy	Montanoa	hibiscifolia	MOHI	U	P, U	U	U	.	P	.	.
MSL	IOS	.	.	7845	Wax Myrtle	Morella	cerifera	MOCE2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7846	firetree	Morella	faya	MOFA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7847	Morella holdridgeana	Morella	holdridgeana	MOHO3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7849	Indian mulberry	Morinda	citrifolia	MOCI3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7850	kesengelngel	Morinda	latibractea	MOLA12	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7851	Morinda pedunculata	Morinda	pedunculata	MOPE2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7853	noni kuahiwi	Morinda	trimera	MOTR	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7855	horseradishtree	Moringa	oleifera	MOOL	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7857	ratapple	Morisonia	americana	MOAM	U	U	U	C, U	C	.	.	.
MSL	.	.	.	681	white mulberry	Morus	alba	MOAL	R, U	PNWS, P, U	R, U	R, C, U	C	P	.	P2
MSL	.	.	.	683	Texas mulberry	Morus	microphylla	MOMI	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	.	684	black mulberry	Morus	nigra	MONI	R, U	PNWS, U	R, U	R, C, U	C	.	.	P2
MSL	.	.	.	682	red mulberry	Morus	rubra	MORU2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	7862	murta	Mouriri	domingensis	MODO2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7863	mameyuelo	Mouriri	helleri	MOHE	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7865	falseohe	Munroidendron	racemosum	MURA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7867	strawberrytree	Muntingia	calabura	MUCA4	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7869	Murraya exotica	Murraya	exotica	MUEX2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7870	Murraya koenigii	Murraya	koenigii	MUKO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7881	aloalo vao	Mussaenda	raiateensis	MURA5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7861	ngaio tree	Myoporum	laetum	MYLA5	U	U	U	U	.	.	U	.
MSL	.	.	.	7883	naio	Myoporum	sandwicense	MYSA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7886	red rodwood	Myrcia	citrifolia	MYCI	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	7887	cieneguillo	Myrcia	deflexa	MYDE	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7888	curame	Myrcia	fallax	MYFA3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7889	guayabacon	Myrcia	leptoclada	MYLE	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7890	ausu	Myrcia	paganii	MYPA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7891	punchberry	Myrcia	splendens	MYSP	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7893	twinberry	Myrcianthes	fragrans	MYFR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7894	jaboticaba	Myrciaria	cauliflora	MYCA9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7895	guavaberry	Myrciaria	floribunda	MYFL	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7899	yamamomo, strawberry tree	Myrica	rubra	MYRU3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7902	atoneulu	Myristica	hypargyraea	MYHY2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7903	adepurot	Myristica	insularis	MYIN3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7906	Myristica inutilis	Myristica	inutilis	MYIN4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7905	cercipo	Myrospermum	frutescens	MYFR2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7907	balsam of Tolu	Myroxylon	balsamum	MYBA3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7910	forest colicwood	Myrsine	alyxifolia	MYAL4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7911	leathery colicwood	Myrsine	coriacea	MYCO2	U	U	U	C, U	C	.	.	.
MSL	IOS	.	.	7912	Myrsine cubana	Myrsine	cubana	MYCU2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7913	summit colicwood	Myrsine	degeneri	MYDE2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7914	mountain colicwood	Myrsine	emarginata	MYEM	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7915	streambank colicwood	Myrsine	fernseei	MYFE	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7916	Koolau Range colicwood	Myrsine	fosbergii	MYFO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7918	Wahiawa Bog colicwood	Myrsine	helleri	MYHE3	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	7919	Kauai colicwood	Myrsine	kauaiensis	MYKA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7920	Kokee colicwood	Myrsine	knudsenii	MYKN	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7921	Lanai colicwood	Myrsine	lanaiensis	MYLA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7922	kolea lau nui	Myrsine	lessertiana	MYLE2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7923	Hanapepe River colicwood	Myrsine	mezii	MYME2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7929	Myrsine palauensis	Myrsine	palauensis	MYPA7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7924	swamp colicwood	Myrsine	petiolata	MYPE3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7925	Molokai colicwood	Myrsine	pukooensis	MYPU2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7926	kokea lau lii	Myrsine	sandwicensis	MYSA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7928	Mt. Kahili colicwood	Myrsine	wawraea	MYWA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7932	Nectandra coriacea	Nectandra	coriacea	NECO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7933	shinglewood	Nectandra	hihua	NEHI2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7934	Nectandra krugii	Nectandra	krugii	NEKR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7935	Nectandra membranacea	Nectandra	membranacea	NEME3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7936	Nectandra patens	Nectandra	patens	NEPA4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7939	Nectandra turbacensis	Nectandra	turbacensis	NETU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7940	saltwood	Neea	buxifolia	NEBU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7944	kadam	Neolamarckia	cadamba	NECA7	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7946	aquilon	Neolaugeria	resinosa	NERE2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7948	afa	Neonauclea	forsteri	NEFO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7952	Rambutan	Nephelium	lappaceum	NELA7	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	7953	pulasan	Nephelium	ramboutan-ake	NERA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7954	maaloa	Neraudia	melastomifolia	NEME5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7958	keahi	Nesoluma	polynesicum	NEPO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7960	Hawaii olive	Nestegis	sandwicensis	NESA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7962	kalm, aralm	Neuburgia	celebica	NECE	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7964	tree tobacco	Nicotiana	glauca	NIGL	U	P, U	U	U	.	P	U	.
MSL	.	.	.	7966	smallflower aiea	Nothocestrum	breviflorum	NOBR2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7967	broadleaf aiea	Nothocestrum	latifolium	NOLA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7968	longleaf aiea	Nothocestrum	longifolium	NOLO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7969	Oahu aiea	Nothocestrum	peltatum	NOPE	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7971	kaala rockwort	Nototrichium	humile	NOHU	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7972	Hawaii rockwort	Nototrichium	sandwicense	NOSA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	691	water tupelo	Nyssa	aquatica	NYAQ2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	694	swamp tupelo	Nyssa	biflora	NYBI	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	692	Ogeechee tupelo	Nyssa	ogeche	NYOG	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	693	blackgum	Nyssa	sylvatica	NYSY	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	7976	African bird's-eye bush	Ochna	mossambicensis	OCMO4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7978	Thomas birds-eye bush	Ochna	thomasiana	OCTH	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7980	Ochroma pyramidale	Ochroma	pyramidale	OCPY	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	7982	holei	Ochrosia	compta	OCCO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7983	island yellowwood	Ochrosia	haleakalae	OCHA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7984	Kauai yellowwood	Ochrosia	kauaiensis	OCKA	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	7985	Hawaii yellowwood	Ochrosia	kilaueaensis	OCKI	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7987	langiti	Ochrosia	mariannensis	OCMA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7942	fao	Ochrosia	oppositifolia	OCOP	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7990	laurel espada	Ocotea	floribunda	OCFL	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7991	black sweetwood	Ocotea	foeniculacea	OCFO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7994	loblolly sweetwood	Ocotea	leucoxylon	OCLE	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7996	nemoca	Ocotea	moschata	OCMO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7997	laurel sassafras	Ocotea	nemodaphne	OCNE	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7999	laurel de paloma	Ocotea	portoricensis	OCPO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8001	nemoca cimarrona	Ocotea	spathulata	OCSP	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8003	Wright's laurel canelon	Ocotea	wrightii	OCWR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8004	olive	Olea	europaea	OLEU	U	P, U	U	U	.	P	U	.
MSL	.	.	.	8019	amansis, edebsungelked, necklace bead tree	Ormosia	calavensis	ORCA12	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8020	peronia	Ormosia	krugii	ORKR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8022	kesiamel	Osmoxylon	oliveri	OSOL	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8023	kesiamel	Osmoxylon	pachyphyllum	OSPA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	718	kesiamel	Osmoxylon	truncatum	OSTR	U	P, U	U	U	.	P	.	.
MSL	.	.	.	701	eastern hophornbeam	Ostrya	virginiana	OSVI	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8027	pincho palo de rosa	Ottoschulzia	rhodoxylon	OTRH	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	8029	chicharron amarillo	Ouratea	ilicifolia	OUIL	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8030	abey amarillo	Ouratea	littoralis	OULI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8032	guanabanilla	Ouratea	striata	OUST	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8033	blacklancewood	Oxandra	lanceolata	OXLA4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8034	haya	Oxandra	laurifolia	OXLA5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	711	sourwood	Oxydendrum	arboreum	OXAR	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8036	miich era ngebard, guiana chestnut	Pachira	aquatica	PAAQ2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8037	wild chestnut	Pachira	insignis	PAIN7	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8074	Palaquium karrak	Palaquium	karrak	PAKA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8044	gasu	Palaquium	stehlinii	PAST24	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8045	tafetan	Palicourea	alpina	PAAL9	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8047	red cappel	Palicourea	crocea	PACR3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8049	Palicourea croceoides	Palicourea	croceoides	PACR18	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8051	showy cappel	Palicourea	guianensis	PAGU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8054	chertochet	Pandanus	aimiriikensis	PAAI	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8055	matal	Pandanus	cominsii	PACO51	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8060	pahong	Pandanus	dubius	PADU3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8053	Pandanus japensis	Pandanus	japensis	PAJA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8067	buuk	Pandanus	kanehirae	PAKA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8072	ongor, ertochet	Pandanus	macrojeannereti a	PAMA32	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8076	ongor, ertochet	Pandanus	palawensis	PAPA38	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8077	peet	Pandanus	patina	PAPA39	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	8078	ongor	Pandanus	peliliuensis	PAPE	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8082	fasa	Pandanus	reineckei	PARE19	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8084	screwpine	Pandanus	spp.	PANDA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8085	Tahitian screwpine	Pandanus	tectorius	PATE2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8088	common screwpine	Pandanus	utilis	PAUT	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8091	rauel	Pangium	edule	PAED4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8099	scratchthroat	Parathesis	crenulata	PACR2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8103	sea	Parinari	insularum	PAIN20	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8104	ais	Parinari	laurina	PALA5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8107	Parkia korom	Parkia	korom	PAKO5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8108	kmekumer	Parkia	parvifoliola	PAPA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8106	parkia	Parkia	spp.	PARKI3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8110	Parkia timoriana	Parkia	timoriana	PATI5	U	U	U	C, U	C	.	.	.
MSL	.	3,4	.	8111	Jerusalem thorn	Parkinsonia	aculeata	PAAC3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8115	Texas paloverde	Parkinsonia	texana	PATE10	U	U	U	U	.	.	U	.
MSL	.	.	.	8113	cuachilote	Parmentiera	aculeata	PAAC13	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8114	candle tree	Parmentiera	cereifera	PACE8	U	U	U	C, U	C	.	.	.
MSL	.	.	.	712	paulownia, empress-tree	Paulownia	tomentosa	PATO2	R, U	PNWS, P, U	R, U	R, U	.	P	.	P2
MSL	.	.	.	8121	Peltophorum pterocarpum	Peltophorum	pterocarpum	PEPT3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8123	ngis	Pemphis	acidula	PEAC6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8125	butter tree	Pentadesma	butyracea	PEBU4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8127	jiqi	Pera	bumeliifolia	PEBU2	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	8129	Pericopsis mooniana	Pericopsis	mooniana	PEMO13	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8131	olomea	Perrottetia	sandwicensis	PESA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7211	avocado	Persea	americana	PEAM3	R, U	P, U	R, U	R, C, U	C	P	.	P2
MSL	.	.	.	721	redbay	Persea	borbonia	PEBO	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8134	canela	Persea	krugii	PEKR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6511	swamp bay	Persea	palustris	PEPA37	U	U	U	U	.	.	U	.
MSL	.	.	.	8138	aquacatillo	Persea	urbaniana	PEUR2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8141	bastard stopper	Petitia	domingensis	PEDO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8146	Phaleria nisidai	Phaleria	nisidai	PHNI11	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6516	Amur corktree	Phellodendron	amurense	PHAM2	U	U	U	U	.	.	U	.
MSL	.	.	.	8143	aquilon prieto	Phialanthus	grandifolius	PHGR11	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8144	candlewood	Phialanthus	myrtilloides	PHMY	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8151	Canary Island date palm	Phoenix	canariensis	PHCA13	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8152	date palm	Phoenix	dactylifera	PHDA4	U	P, U	U	U	.	P	U	.
MSL	.	.	.	8150	pygmy date palm	Phoenix	roebelenii	PHRO6	U	U	U	U	.	.	U	.
MSL	.	.	.	8154	date palm	Phoenix	sylvestris	PHSY3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8155	Chinese photinia	Photinia	davidiana	PHDA5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8157	Tahitian gooseberry tree	Phyllanthus	acidus	PHAC3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8159	pamakani mahu	Phyllanthus	distichus	PHDI10	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8160	gamo de costa	Phyllanthus	juglandifolius	PHJU2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8162	Phyllanthus orbicularis	Phyllanthus	orbicularis	PHOR10	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8164	Florida bitterbush	Picramnia	pentandra	PIPE	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8167	bitterwood	Picrasma	excelsa	PIEX	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	8169	fustic	Pictetia	aculeata	PIAC	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8171	aceitillo	Pilocarpus	racemosus	PIRA3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8173	Royen's tree cactus	Pilosocereus	royenii	PIRO6	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8175	allspice	Pimenta	dioica	PIDI2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8177	bayrumtree	Pimenta	racemosa	PIRA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8178	bayrumtree	Pimenta	racemosa var. grisea	PIRAG	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8181	chebouch, demailei	Pinanga	insignis	PIIN5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8190	higuillo de hoja menuda	Piper	aduncum	PIAD	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8191	higuillo de limon	Piper	amalago	PIAM2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8192	moth pepper	Piper	blattarum	PIBL	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8196	marigold pepper	Piper	marginatum	PIMA4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8199	spanish elder	Piper	swartzianum	PISW	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8205	Waimea pipturus	Pipturus	albidus	PIAL2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8206	soga	Pipturus	argenteus	PIAR8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8208	stinkwood	Piscidia	carthagenensis	PICA5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	887	fishpoison tree	Piscidia	piscipula	PIPI3	R, U	P, U	U	R, U	.	P	.	P2
MSL	.	.	.	8211	corcho bobo	Pisonia	albida	PIAL3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8212	Australasian catchbirdtree	Pisonia	brunoniana	PIBR3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8213	grand devils-claws	Pisonia	grandis	PIGR6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8214	aulu	Pisonia	sandwicensis	PISA5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8216	water mampoo	Pisonia	subcordata	PISU	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	8217	umbrella catchbirdtree	Pisonia	umbellifera	PIUM2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8218	Kauai catchbirdtree	Pisonia	wagneriana	PIWA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8219	Chinese pistache	Pistacia	chinensis	PICH4	U	U	U	U	.	.	U	.
MSL	.	.	.	8220	monkeypod	Pithecellobium	dulce	PIDU	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8223	catclaw blackbead	Pithecellobium	unguis-cati	PIUN	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8226	Hawaii poisonberry tree	Pittosporum	argentifolium	PIAR4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8227	hoawa	Pittosporum	confertiflorum	PICO4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8225	kamal	Pittosporum	ferrugineum	PIFE3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8228	Waianae Range cheesewood	Pittosporum	flocculosum	PIFL4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8229	Waialeale cheesewood	Pittosporum	gayanum	PIGA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8230	Koolau Range cheesewood	Pittosporum	glabrum	PIGL4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8231	hoawa	Pittosporum	halophilum	PIHA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8232	Hawaii cheesewood	Pittosporum	hawaiiense	PIHA4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8233	Kona cheesewood	Pittosporum	hosmeri	PIHO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8234	Kauai cheesewood	Pittosporum	kauaiense	PIKA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8224	Mona cheesewood, Pittosporum	Pittosporum	monae	PIMO4	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	8235	royal cheesewood	Pittosporum	napaliense	PINA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8236	Taiwanese cheesewood	Pittosporum	pentandrum	PIPE8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8238	cheesewood	Pittosporum	spp.	PITTO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8239	cream cheesewood	Pittosporum	terminalioides	PITE5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8222	Japanese cheesewood	Pittosporum	tobira	PITO2	U	U	U	U	.	.	U	.
MSL	.	.	.	8240	Australian cheesewood	Pittosporum	undulatum	PIUN2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8241	cape cheesewood	Pittosporum	viridiflorum	PIVI5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8242	alaa	Planchonella	garberi	PLGA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8243	alaa	Planchonella	grayana	PLGR11	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8244	alaa	Planchonella	linggensis	PLLI6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8303	lalahag	Planchonella	obovata	PLOB5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8248	mamalava	Planchonella	torricellensis	PLTO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	722	water-elm, planertree	Planera	aquatica	PLAQ	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8253	London planetree	Platanus	hybrida	PLHY3	U	U	U	U	.	.	U	.
MSL	.	.	.	8256	Mexican sycamore	Platanus	mexicana	PLME9	U	U	U	U	.	.	U	.
MSL	.	.	.	731	American sycamore	Platanus	occidentalis	PLOC	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8254	Oriental planetree	Platanus	orientalis	PLOR6	U	U	U	U	.	.	U	.
MSL	.	.	.	730	California sycamore	Platanus	racemosa	PLRA	R, U	PNWS, U	R, U	U	.	.	.	P2

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MSL	.	.	.	732	Arizona sycamore	Platanus	wrightii	PLWR2	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	8250	Hawaii pilo kea	Platydesma	remyi	PLRE4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8251	Maui pilo kea	Platydesma	spathulata	PLSP3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8255	chupa gallo	Pleodendron	macranthum	PLMA6	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8257	golden hala pepe	Pleomele	aurea	PLAU2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8258	Maui hala pepe	Pleomele	auwahiensis	PLAU5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8259	Lanai hala pepe	Pleomele	fernaldii	PLFE	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8260	Waianae Range hala pepe	Pleomele	forbesii	PLFO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8261	royal hala pepe	Pleomele	halapepe	PLHA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8262	Hawaii hala pepe	Pleomele	hawaiiensis	PLHA4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8266	nosegaytree	Plumeria	alba	PLAL	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8268	Singapore graveyard flower	Plumeria	obtusa	PLOB2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8269	Plumeria obtusa	Plumeria	obtusa var. obtusa	PLOBO	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8271	templetree	Plumeria	rubra	PLRU2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8273	yucca plum pine	Podocarpus	coriaceus	POCO3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8275	Poitea florida	Poitea	florida	POFL20	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8279	violet tree	Polygala	cowellii	POCO5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8280	crevajosa	Polygala	penaea	POPE13	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8283	bungaruau	Polyscias	grandifolia	POGR28	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8284	panax, geranium aralia	Polyscias	guilfoylei	POGU	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8285	Polyscias macgillivrayi	Polyscias	macgillivrayi	POMA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8286	bngei	Polyscias	nodosa	PONO10	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	8287	tagitagi	Polyscias	samoensis	POSA27	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8288	shield aralia	Polyscias	scutellaria	POSC10	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8289	Polyscias	Polyscias	spp.	POLYS4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8290	tava	Pometia	pinnata	POPI12	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8292	kattai	Ponapea	hosinoi	POHO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8293	Ponapea ledermanniana	Ponapea	ledermanniana	POLE21	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8295	kisaks	Pongamia	pinnata	POPI4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	752	silver poplar	Populus	alba	POAL7	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	749	narrowleaf cottonwood	Populus	angustifolia	POAN3	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	741	balsam poplar	Populus	balsamifera	POBA2	R, U	PNWS, AK, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	747	black cottonwood	Populus	balsamifera ssp. trichocarpa	POBAT	R, U	PNWS, AK, U	R, U	U	.	.	.	P2
MSL	.	.	.	742	eastern cottonwood	Populus	deltoides	PODE3	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	748	Fremont cottonwood	Populus	fremontii	POFR2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	743	bigtooth aspen	Populus	grandidentata	POGR4	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	744	swamp cottonwood	Populus	heterophylla	POHE4	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	753	Lombardy poplar	Populus	nigra	PONI	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	746	quaking aspen	Populus	tremuloides	POTR5	R, U	PNWS, AK, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8313	Carolina poplar	Populus	x canadensis	POCA19	U	U	U	U	.	.	U	.
MSL	.	.	.	8314	gray poplar	Populus	x canescens	POCA14	U	U	U	U	.	.	U	.
MSL	.	.	.	8297	Abiu	Pouteria	caimito	POCA43	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	8298	elangel, chelangel	Pouteria	calcarea	POCA6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8299	eggfruit	Pouteria	campechiana	POCA23	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8300	cocuyo	Pouteria	dictyoneura	PODI5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8301	redmammee	Pouteria	hotteana	POHO4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8302	bullytree	Pouteria	multiflora	POMU6	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8304	alaa	Pouteria	sandwicensis	POSA11	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8305	mammee sapote	Pouteria	sapota	POSA13	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8307	ahgao	Premna	obtusifolia	PROB	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8308	Premna pubescens	Premna	pubescens	PRPU5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8309	aloalo	Premna	serratifolia	PRSE6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8311	Prestoea acuminata	Prestoea	acuminata	PRACM	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8315	Hawaii pritchardia	Pritchardia	affinis	PRAF	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8316	Maui pritchardia	Pritchardia	arecina	PRAR2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8317	Kilauea pritchardia	Pritchardia	beccariana	PRBE	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8318	Mt. Eke pritchardia	Pritchardia	forbesiana	PRFO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8319	Makaleha pritchardia	Pritchardia	hardyi	PRHA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8320	loulu lelo	Pritchardia	hillebrandii	PRHI	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8321	Waianae Range pritchardia	Pritchardia	kaalae	PRKA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8322	Lanai pritchardia	Pritchardia	lanaiensis	PRLA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8323	loulu	Pritchardia	lanigera	PRLA4	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	8324	Limahuli Valley pritchardia	Pritchardia	limahuliensis	PRLI2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8325	Molokai pritchardia	Pritchardia	lowreyana	PRLO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8326	Koolau Range pritchardia	Pritchardia	martii	PRMA5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8327	Alakai Swamp pritchardia	Pritchardia	minor	PRMI3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8328	Kamalo pritchardia	Pritchardia	munroi	PRMU3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8329	fan palm	Pritchardia	pacifica	PRPA11	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8330	Waioli Valley pritchardia	Pritchardia	perlmanii	PRPE7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8331	Nihoa pritchardia	Pritchardia	remota	PRRE	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8336	lands of papa pritchardia	Pritchardia	schattaueri	PRSC	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8337	pritchardia	Pritchardia	spp.	PRITC	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8338	stickybud pritchardia	Pritchardia	viscosa	PRVI2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8339	poleline pritchardia	Pritchardia	waialealeana	PRWA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8340	guasimilla	Prockia	crucis	PRCR2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8342	jand	Prosopis	cineraria	PRCI4	U	U	U	C, U	C	.	.	.
MSL	.	.	w	756	honey mesquite	Prosopis	glandulosa	PRGL2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8343	mesquite	Prosopis	juliflora	PRJU	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8344	kiawe	Prosopis	pallida	PRPA4	U	P, U	U	C, U	C	P	.	.
MSL	.	.	w	758	screwbean mesquite	Prosopis	pubescens	PRPU	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	w	757	velvet mesquite	Prosopis	velutina	PRVE	R, U	PNWS, U	R, U	R, U	.	.	.	P2

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MSL	.	.	.	769	Allegheny plum	Prunus	alleghaniensis	PRAL5	R, U	U	U	U	.	.	.	P2
MSL	.	.	.	766	American plum	Prunus	americana	PRAM	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8350	apricot	Prunus	armeniaca	PRAR3	U	U	U	U	.	.	U	.
MSL	.	.	.	771	sweet cherry	Prunus	avium	PRAV	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	8	.	8345	Carolina laurelcherry	Prunus	caroliniana	PRCA	.	U	U	U	.	.	U	.
MSL	.	.	.	8348	cherry plum	Prunus	cerasifera	PRCE2	U	U	U	U	.	.	U	.
MSL	.	3,6,8	.	772	sour cherry	Prunus	cerasus	PRCE	R, U	U	U	U	.	.	.	P2
MSL	.	.	.	773	European plum	Prunus	domestica	PRDO	R, U	U	U	U	.	.	.	P2
MSL	.	.	.	8351	sweet almond	Prunus	dulcis	PRDU	U	U	U	U	.	.	U	.
MSL		3	.	768	bitter cherry	Prunus	emarginata	PREM	R, U	PNWS, U	.	U	.	.	.	P2
MSL	.	.	.	6696	cherry laurel	Prunus	laurocerasus	PRLA5	U	U	U	U	.	.	U	.
MSL	.	.	.	774	Mahaleb cherry	Prunus	mahaleb	PRMA	R, U	U	U	U	.	.	.	P2
MSL	.	.	.	6708	Mexican plum	Prunus	mexicana	PRME	.	.	.	.	.	.	.	.
MSL	.	.	.	8346	West Indian cherry	Prunus	myrtifolia	PRMY	U	U	U	C, U	C	.	.	.
MSL	.	.	.	765	Canada plum	Prunus	nigra	PRNI	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8347	western cherry laurel	Prunus	occidentalis	PROC	U	U	U	C, U	C	.	.	.
MSL	.	.	.	761	pin cherry	Prunus	pensylvanica	PRPE2	R, U	PNWS, U	.	R, U	.	.	.	P2
MSL	.	.	.	764	peach	Prunus	persica	PRPE3	R, U	P, U	U	R, U	.	P	.	P2
MSL	.	.	.	8360	Japanese plum	Prunus	salicina	PRSA3	U	U	U	U	.	.	U	.
MSL	.	.	.	762	black cherry	Prunus	serotina	PRSE2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8349	Prunus serotina	Prunus	serotina ssp. capuli	PRSEC	U	U	U	C, U	C	.	.	.
MSL	.	.	.	6707	Japanese flowering cherry	Prunus	serrulata	PRSE3	U	U	U	U	.	.	U	.

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MSL	.	3,4,5,6,10	.	760	cherry and plum spp.	Prunus	spp.	PRUNU	R, U	U	U	R, C, U	C	.	.	P2
MSL		3	.	763	chokecherry	Prunus	virginiana	PRVI	R, U	PNWS, U	.	R, U	.	.	.	P2
MSL	.	.	.	8357	Yoshino flowering cherry	Prunus	x yedoensis	PRYE	U	U	U	U	.	.	U	.
MSL	.	.	.	8352	false breadnut	Pseudolmedia	spuria	PSSP2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8353	Florida cherry palm	Pseudophoenix	sargentii	PSSA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8354	mountain guava	Psidium	amplexicaule	PSAM	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8355	strawberry guava	Psidium	cattleianum	PSCA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8356	guava	Psidium	guajava	PSGU	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8358	Psidium longipes	Psidium	longipes	PSLOO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8359	Sintenis' guava	Psidium	sintenisii	PSSI2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8361	cachimbo-cumun	Psychotria	berteriana	PSBE	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8362	palo de cachimbo	Psychotria	brachiata	PSBR2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8363	Browne's wild coffee	Psychotria	brownei	PSBR3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8368	chimei	Psychotria	carolinensis	PSCA18	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8413	Psychotria cheathamiana	Psychotria	cheathamiana	PSCH4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8364	Psychotria domingensis	Psychotria	domingensis	PSDO2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8365	Koolau Range wild coffee	Psychotria	fauriei	PSFA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8366	largeflower wild coffee	Psychotria	grandiflora	PSGR	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8367	cachimbo grande	Psychotria	grandis	PSGR2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8369	Kauai wild coffee	Psychotria	greenwelliae	PSGR3	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	8370	Waianae Range wild coffee	Psychotria	hathewayi	PSHA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8373	kopikoula	Psychotria	hawaiiensis	PSHA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8377	woodland wild coffee	Psychotria	hexandra	PSHE2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8382	Oahu wild coffee	Psychotria	hexandra ssp. oahuensis	PSHEO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8386	milolii kopiwai	Psychotria	hobdyi	PSHO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8387	matalafi	Psychotria	insularum	PSIN10	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8388	kopiko kea	Psychotria	kaduana	PSKA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8389	cachimbo de gato	Psychotria	maleolens	PSMA4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8390	aplohkateng	Psychotria	mariana	PSYMAR	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8391	cachimbo de maricao	Psychotria	maricaensis	PSMA5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8392	forest wild coffee	Psychotria	mariniana	PSMA6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8393	opiko	Psychotria	mauiensis	PSMA7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8395	floating balsamo	Psychotria	nutans	PSNU2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8397	hairy wild coffee	Psychotria	pubescens	PSPU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8398	Psychotria rhombocarpa	Psychotria	rhombocarpa	PSRH2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8399	Psychotria rotensis	Psychotria	rotensis	PSRO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8400	wild coffee	Psychotria	spp.	PSYCH	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8401	leatherleaf wild coffee	Psychotria	wawrae	PSWA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	6381	Olasina	Psydrax	merrillii	CAME35	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8402	alahee	Psydrax	odorata	PSOD	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	8404	Kauai pteralyxia	Pteralyxia	kauaiensis	PTKA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8405	ridged pteralyxia	Pteralyxia	macrocarpa	PTMA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8407	pterocarpus	Pterocarpus	indicus	PTIN2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8408	Burma padauk	Pterocarpus	macrocarpus	PTMA7	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8409	Malabar kino	Pterocarpus	marsupium	PTMA3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8410	dragonsblood tree	Pterocarpus	officinalis	PTOF	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8411	Chinese wingnut	Pterocarya	stenoptera	PTST80	U	U	U	U	.	.	U	.
MSL	.	.	.	8412	Ptychococcus ledermannianus	Ptychococcus	ledermannianus	PTLE3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8415	Macarthur feather palm	Ptychosperma	macarthuri	PTMA8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8416	chesdbuuch	Ptychosperma	palauense	PTPA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8419	pomegranate	Punica	granatum	PUGR2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8421	Callery pear	Pyrus	calleryana	PYCA80	U	U	U	U	.	.	U	.
MSL	.	.	.	8423	common pear	Pyrus	communis	PYCO	.	U	U	U	.	.	U	.
MSL	.	.	.	8426	Chinese pear	Pyrus	pyrifolia	PYPY2	.	U	U	U	.	.	U	.
MSL	.	5,6,10	.	8420	pear spp.	Pyrus	Spp.	PYRUS	U	U	U	U	.	.	U	.
MSL	.	.	.	8422	swizzlestick tree	Quararibea	turbinata	QUTU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8427	sawtooth oak	Quercus	acutissima	QUAC80	U	U	U	U	.	.	U	.
MSL	.	.	.	801	California live oak	Quercus	agrifolia	QUAG	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	802	white oak	Quercus	alba	QUAL	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	w	803	Arizona white oak	Quercus	arizonica	QUAR	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6768	Arkansas oak	Quercus	arkansana	QUAR2	U	U	U	U	.	.	U	.
MSL	.	.	.	8429	bastard white oak	Quercus	austrina	QUAU	U	U	U	U	.	.	U	.
MSL	.	.	.	804	swamp white oak	Quercus	bicolor	QUBI	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8513	Buckley oak	Quercus	buckleyi	QUBU2	R, U	U	U	R, C, U	C	.	.	P2

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MSL	.	.	.	8437	European turkey oak	Quercus	cerris	QUCE	U	U	U	U	.	.	U	.
MSL		3,4	.	805	canyon live oak	Quercus	chrysolepis	QUCH2	R, U	PNWS, U	U	U	.	.	.	P2
MSL	.	.	.	806	scarlet oak	Quercus	coccinea	QUCO2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	807	blue oak	Quercus	douglasii	QUDO	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	809	northern pin oak	Quercus	ellipsoidalis	QUEL	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	w	810	Emory oak	Quercus	emoryi	QUEM	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	811	Engelmann oak	Quercus	engelmannii	QUEN	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	812	southern red oak	Quercus	falcata	QUFA	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8438	Texas live oak	Quercus	fusiformis	QUFU	U	U	U	U	.	.	U	.
MSL	.	.	w	814	Gambel oak	Quercus	gambelii	QUGA	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	815	Oregon white oak	Quercus	garryana	QUGA4	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	8441	sand live oak	Quercus	geminata	QUGE2	U	U	U	U	.	.	U	.
MSL	.	.	.	6782	Georgia oak	Quercus	georgiana	QUGE	U	U	U	U	.	.	U	.
MSL	.	.	.	851	Chisos oak	Quercus	graciliformis	QUGR	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	.	8511	Graves oak	Quercus	gravesii	QUGR2	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	w	846	gray oak	Quercus	grisea	QUGR3	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8449	Darlington oak	Quercus	hemisphaerica	QUHE2	U	U	U	U	.	.	U	.
MSL	.	.	w	843	silverleaf oak	Quercus	hypoleucoides	QUHY	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8450	holly oak	Quercus	ilex	QUIL2	U	U	U	U	.	.	U	.
MSL	.	.	.	816	scrub oak	Quercus	ilicifolia	QUIL	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	817	shingle oak	Quercus	imbricaria	QUIM	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	842	bluejack oak	Quercus	incana	QUIN	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	818	California black oak	Quercus	kelloggii	QUKE	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	8514	Lacey oak	Quercus	laceyi	QULA	R, U	U	U	R, C, U	C	.	.	P2

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MSL	.	.	.	819	turkey oak	Quercus	laevis	QULA2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	820	laurel oak	Quercus	laurifolia	QULA3	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	821	California white oak	Quercus	lobata	QULO	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	822	overcup oak	Quercus	lyrata	QULY	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	823	bur oak	Quercus	macrocarpa	QUMA2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	840	dwarf post oak	Quercus	margarettiae	QUMA6	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	824	blackjack oak	Quercus	marilandica	QUMA3	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	825	swamp chestnut oak	Quercus	michauxii	QUMI	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	841	dwarf live oak	Quercus	minima	QUMI2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	826	chinkapin oak	Quercus	muehlenbergii	QUMU	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6791	myrtle oak	Quercus	myrtifolia	QUMY	U	U	U	U	.	.	U	.
MSL	.	.	.	827	water oak	Quercus	nigra	QUNI	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	w	829	Mexican blue oak	Quercus	oblongifolia	QUOB	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	844	Oglethorpe oak	Quercus	oglethorpensis	QUOG	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	813	cherrybark oak	Quercus	pagoda	QUPA5	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	830	pin oak	Quercus	palustris	QUPA2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6794	durmast oak	Quercus	petraea	QUPE2	U	U	U	U	.	.	U	.
MSL	.	.	.	831	willow oak	Quercus	phellos	QUPH	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8512	Mexican white oak	Quercus	polymorpha	QUPO2	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	8	.	845	dwarf chinkapin oak	Quercus	prinoides	QUPR	R, U	PNWS, U	U	R, U	.	.	.	P2
MSL	.	.	.	832	chestnut oak	Quercus	prinus	QUPR2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6797	English oak	Quercus	robur	QURO2	U	U	U	U	.	.	U	.
MSL	.	.	.	8492	robust oak	Quercus	robusta	QURO3	U	U	U	U	.	.	U	.
MSL	.	.	.	833	northern red oak	Quercus	rubra	QURU	R, U	PNWS, U	R, U	R, U	.	.	.	P2

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MSL	.	.	w	847	netleaf oak	Quercus	rugosa	QURU4	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	834	Shumard oak	Quercus	shumardii	QUSH	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	836	Delta post oak	Quercus	similis	QUSI2	R, U	PNWS, U	U	R, U	.	.	.	P2
MSL	.	.	.	808	Durand oak	Quercus	sinuata var. sinuata	QUSIS	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6799	bastard oak	Quercus	sinuata	QUSI	U	U	U	U	.	.	U	.
MSL	.	.	.	8487	bastard oak	Quercus	sinuata var. breviloba	QUSIB	U	U	U	U	.	.	U	.
MSL	.	.	.	835	post oak	Quercus	stellata	QUST	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8424	cork oak	Quercus	suber	QUSU5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8455	lateleaf oak	Quercus	tardifolia	QUTA	U	U	U	U	.	.	U	.
MSL	.	.	.	828	Texas red oak	Quercus	texana	QUTE	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8461	sandpaper oak	Quercus	vaseyana	QUVA5	.	U	U	U	.	.	U	.
MSL	.	.	.	837	black oak	Quercus	velutina	QUVE	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	838	live oak	Quercus	virginiana	QUVI	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	839	interior live oak	Quercus	wislizeni	QUWI2	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	IOS	.	.	8425	white indigoberry	Randia	aculeata	RAAC	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8430	togo vao	Rapanea	myricifolia	RAMY	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8432	omechidel	Rauvolfia	insularis	RAIN8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8433	palo amargo	Rauvolfia	nitida	RANI2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8434	devils-pepper	Rauvolfia	sandwicensis	RASA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8431	poison devils-pepper	Rauvolfia	vomitoria	RAVO	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8436	traveler's tree	Ravenala	madagascariensis	RAMA7	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8439	tortugo prieto	Ravenia	urbanii	RAUR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8440	vi vao	Reynoldsia	lanutoensis	RELA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8442	ohe makai	Reynoldsia	sandwicensis	RESA	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	8444	guama	Reynosia	guama	REGU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8445	Krug's darlingplum	Reynosia	krugii	REKR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8447	sloe	Reynosia	uncinata	REUN	U	U	U	C, U	C	.	.	.
MSL	.	8	.	6918	common buckthorn	Rhamnus	cathartica	RHCA3	U	U	U	U	.	.	U	.
MSL	.	.	.	8456	Rheeda	Rheedia	edulis	RHED4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8458	mangle	Rhizophora	apiculata	RHAP2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8460	Rhizophora lamarckii	Rhizophora	lamarckii	RHLA12	U	P, U	U	U	.	P	.	.
MSL	.	.	.	989	American mangrove	Rhizophora	mangle	RHMA2	R, U	PNWS, P, U	R, U	R, C, U	C	P	.	P2
MSL	.	.	.	8462	mangle hembra	Rhizophora	mucronata	RHMU	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8464	Rhizophora stylosa	Rhizophora	stylosa	RHST8	U	P, U	U	U	.	P	.	.
MSL	.	8	.	8466	Rose Myrtle	Rhodomyrtus	tomentosa	RHTO10	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8470	African sumac	Rhus	lancea	RHLA11	U	U	U	U	.	.	U	.
MSL	.	3,8	.	8479	prairie sumac	Rhus	lanceolata	RHLA3	U	U	U	U	.	.	U	.
MSL	.	.	.	8467	neneleau	Rhus	sandwicensis	RHSA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8469	tavai	Rhus	taitensis	RHTA	U	P, U	U	U	.	P	.	.
MSL	IOS	.	.	8472	castorbean	Ricinus	communis	RICO3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8474	Rinorea carolinensis	Rinorea	carolinensis	RICA16	U	P, U	U	U	.	P	.	.
MSL	.	3,4,5,8	w	902	New Mexico locust	Robinia	neomexicana	RONE	R, U	PNWS, U	.	R, U	.	.	.	P2
MSL	.	.	.	901	black locust	Robinia	pseudoacacia	ROPS	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8476	greenheart ebony	Rochefortia	acanthophora	ROAC2	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	8478	Rochefortia spinosa	Rochefortia	spinosa	ROSP8	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8480	Rollinia	Rollinia	deliciosa	RODE5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8481	wild sugar apple	Rollinia	mucosa	ROMU3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8483	cordobancillo	Rondeletia	inermis	ROIN4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8484	cordobancillo peludo	Rondeletia	pilosa	ROPI3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8485	Juan Tomas	Rondeletia	portoricensis	ROPO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8489	Puerto Rico royal palm	Roystonea	borinquena	ROBO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8490	Roystonea elata	Roystonea	elata	ROEL	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8491	royal palm	Roystonea	oleracea	ROOL	U	P, U	U	U	.	P	.	.
MSL	.	.	.	909	royal palm spp.	Roystonea	spp.	ROYST	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	.	8494	Puerto Rico palmetto	Sabal	causiarum	SACA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	911	Mexican palmetto	Sabal	mexicana	SAME8	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	.	912	cabbage palmetto	Sabal	palmetto	SAPA	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8499	white hogwood	Sagraea	umbrosa	SAUM3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	927	white willow	Salix	alba	SAAL2	R, U	PNWS, U	U	R, U	.	.	.	P2
MSL	.	.	.	921	peachleaf willow	Salix	amygdaloides	SAAM2	R, U	PNWS, U	U	R, U	.	.	.	P2
MSL	.	8	.	925	coastal plain willow	Salix	caroliniana	SACA5	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	6954	Elaeagnus willow	Salix	elaeagnos	SAEL	U	U	U	U	.	.	U	.
MSL	.	.	.	6955	crack willow	Salix	fragilis	SAFR	.	.	.	.	.	.	.	.
MSL	.	.	.	8501	Salix humboldtiana	Salix	humboldtiana	SAHU	U	U	U	C, U	C	.	.	.

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MSL	.	1,2,3,4,5,6,8	.	8504	arroyo willow	Salix	lasiolepis	SALA6	.	U	U	U	.	.	U	.
MSL	.	.	.	922	black willow	Salix	nigra	SANI	R, U	PNWS, U	U	R, U	.	.	.	P2
MSL	.	.	.	926	balsam willow	Salix	pyrifolia	SAPY	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	929	weeping willow	Salix	x sepulcralis	SASE10	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8503	etkeam, cheskeam	Samadera	indica	SAIN13	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8505	raintree	Samanea	saman	SASA10	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8556	guayabilla	Samyda	dodecandra	SADO7	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8515	santol, kechapi	Sandoricum	koetjape	SAKO4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8518	sandalwood	Santalum	album	SAAL16	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8516	coastal sandalwood	Santalum	ellipticum	SAEL2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8517	forest sandalwood	Santalum	freycinetianum	SAFR4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8521	Haleakala sandalwood	Santalum	haleakalae	SAHA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8522	mountain sandalwood	Santalum	paniculatum	SAPA7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8525	willowleaf sandalwood	Santalum	salicifolium	SASA8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8528	lonomea	Sapindus	oahuense	SAOA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	919	western soapberry	Sapindus	saponaria var. drummondii	SASAD	R, U	PNWS, U	U	R, U	.	.	.	P2
MSL	.	.	.	8529	wingleaf soapberry	Sapindus	saponaria	SASA4	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8532	vitiensis	Sapindus	vitiensis	SAVI17	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	8533	gumtree	Sapium	glandulosum	SAGL5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8535	hinchahuevos	Sapium	laurifolium	SALA25	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8536	milktree	Sapium	laurocerasus	SALA8	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8544	uunu	Sarcopygme	pacifica	SAPA35	U	P, U	U	U	.	P	.	.
MSL	.	.	.	931	sassafras	Sassafras	albidum	SAAL5	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8546	amansa guapo	Savia	sessiliflora	SASE6	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8554	Florida boxwood	Schaefferia	frutescens	SCFR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	888	octopus tree, schefflera	Schefflera	actinophylla	SCAC2	R, U	P, U	U	R, C, U	C	P	.	P2
MSL	.	.	.	8557	yuquilla	Schefflera	gleasonii	SCGL6	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8553	Schefflera kraemeri	Schefflera	kraemeri	SCKR2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8558	matchwood	Schefflera	morototonii	SCMO10	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8559	samoensis	Schefflera	samoensis	SCSA10	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8561	Peruvian peppertree	Schinus	molle	SCMO	U	P, U	U	U	.	P	U	.
MSL	IOS	.	.	8563	Brazilian peppertree	Schinus	terebinthifolius	SCTE	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8565	Brazilian firetree	Schizolobium	parahybum	SCPA23	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8567	lac tree	Schleichera	oleosa	SCOL3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7564	Schleinitzia fosbergii	Schleinitzia	fosbergii	SCFO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8571	arana	Schoepfia	arenaria	SCAR2	U	U	U	C, U	C	.	.	.
MSL	.		.	8572	white beefwood	Schoepfia	obovata	SCOB	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8573	gulf graytwig	Schoepfia	schreberi	SCSC3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8577	kuat	Scyphiphora	hydrophyllacea	SCHY5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8583	poumuli	Securinega	flexuosa	SEFL9	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	8585	poison tree, panew	Semecarpus	kraemeri	SEKR3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8586	tonget	Semecarpus	venenosa	SEVE4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8588	emperor's candlesticks	Senna	alata	SEAL4	U	P, U	U	C, U	C	P	.	.
MSL	IOS	.	.	8589	flor de San Jose	Senna	atomaria	SEAT3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8590	Gaudichauds senna	Senna	gaudichaudii	SEGA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8591	false sicklepod	Senna	multijuga	SEMU5	U	P, U	U	C, U	C	P	.	.
MSL	IOS	.	.	8592	valamuerto	Senna	pendula	SEPE4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8594	retama prieta	Senna	polyphylla	SEPO5	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8595	senna	Senna	septemtrionalis	SESE13	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8596	Siamese cassia	Senna	siamea	SESI3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8597	casia amarilla	Senna	spectabilis	SESP9	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8598	senna	Senna	spp.	SENNA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8599	Senna sulfurea	Senna	sulfurea	SESU10	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8600	glossy shower	Senna	surattensis	SESU4	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8601	ukall	Serianthes	kanehirae	SEKA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8603	hayun lago, trongkon guafi	Serianthes	nelsonii	SENE9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8605	vegetable hummingbird	Sesbania	grandiflora	SEGR5	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8606	Egyptian riverhemp	Sesbania	sesban	SESE8	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8608	Shirakiopsis indica	Shirakiopsis	indica	SHIN	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8612	saffron plum	Sideroxylon	celastrinum	SICE2	U	U	U	U	.	.	U	.
MSL	.	.	.	8611	espejuelo	Sideroxylon	cubense	SICU7	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	890	false mastic	Sideroxylon	foetidissimum	SIFO	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	.	8618	Tamaulipan Coma	Sideroxylon	laetevirens	SILA4	U	U	U	U	.	.	U	.
MSL	.	.	.	381	chittamwood, gum bumelia	Sideroxylon	lanuginosum ssp. lanuginosum	SILAL3	R, U	PNWS, U	U	R, U	.	.	.	P2
MSL	.	.	.	8615	buckthorn bully	Sideroxylon	lycioides	SILY	U	U	U	U	.	.	U	.
MSL	.	.	.	8613	breakbill	Sideroxylon	obovatum	SIOB	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8621	Bully tree	Sideroxylon	persimile	SIPE11	.	.	.	.	.	.	.	.
MSL	.	.	.	8614	Puerto Rico bully	Sideroxylon	portoricense	SIPO3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	891	white bully, willow bustic	Sideroxylon	salicifolium	SISA6	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	.	8616	tough bully	Sideroxylon	tenax	SITE2	U	U	U	U	.	.	U	.
MSL	.	.	.	895	paradisetree	Simarouba	glauca	SIGL3	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	.	8617	simarouba	Simarouba	spp.	SIMAR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8619	aceitillo falso	Simarouba	tulae	SITU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8620	hoja menuda	Siphoneugena	densiflora	SIDE6	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8623	motillo	Sloanea	amygdalina	SLAM	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8624	bullwood	Sloanea	berteriana	SLBE	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8622	bullwood	Sloanea	spp.	SLOAN	U	U	U	C, U	C	.	.	.
MSL	IOS	.	.	8628	American black nightshade	Solanum	americanum	SOAM	U	P, U	U	U	.	P	.	.
MSL	IOS	.	.	8626	Solanum bahamense	Solanum	bahamense	SOBAB	U	U	U	C, U	C	.	.	.
MSL	IOS	.	.	8627	mullein nightshade	Solanum	donianum	SODO3	U	U	U	C, U	C	.	.	.
MSL	IOS	.	.	8629	potatotree	Solanum	erianthum	SOER2	U	U	U	C, U	C	.	.	.

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MSL	.	8	.	8631	earleaf nightshade	Solanum	mauritianum	SOMA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8632	forest nightshade	Solanum	nudum	SONU4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8633	cakalaka berry	Solanum	polygamum	SOPO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8634	tabacon aspero	Solanum	rugosum	SORU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8636	turkey berry	Solanum	torvum	SOTO4	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8639	mangrove	Sonneratia	alba	SOAL10	U	P, U	U	U	.	P	.	.
MSL	.	.	.	870	Texas sophora	Sophora	affinis	SOAF	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	.	8641	mamani	Sophora	chrysophylla	SOCH	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8648	mescal bean	Sophora	secundiflora	SOSE3	U	U	U	U	.	.	U	.
MSL	IOS	.	.	8643	silver bush	Sophora	tomentosa	SOTO3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	935	American mountain-ash	Sorbus	americana	SOAM3	R, U	PNWS, U	U	R, U	.	.	.	P2
MSL	.	.	.	936	European mountain-ash	Sorbus	aucuparia	SOAU	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	937	northern mountain-ash	Sorbus	decora	SODE3	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8660	maras	Soulamea	amara	SOAM2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8644	African tuliptree	Spathodea	campanulata	SPCA2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8646	Spiraeanthemum samoense	Spiraeanthemum	samoense	SPSA7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8649	Spondias dulcis	Spondias	dulcis	SPDU3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8650	yellow mombin	Spondias	mombin	SPMO	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8656	titmel	Spondias	pinnata	SPPI4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8652	purple mombin	Spondias	purpurea	SPPU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8654	cobana negra	Stahlia	monosperma	STMO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8655	ngmui	Stemonurus	ammui	STAM10	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8664	Panama tree	Sterculia	apetala	STAP	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	8665	fanaio	Sterculia	fanaiho	STFA5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8666	hazel sterculia	Sterculia	foetida	STFO2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8667	Sterculia palauensis	Sterculia	palauensis	STPA20	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8868	Sterculia ponapensis	Sterculia	ponapensis	STPO10	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8675	Stewartia	Stewartia	koreana	STKO2	U	U	U	U	.	.	U	.
MSL	.	.	.	8669	anthropophagorum	Streblus	anthropophagorum	STAN9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8670	Hawaii roughbush	Streblus	pendulinus	STPE3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8647	Japanese pagoda tree	Styphnolobium	japonicum	STJA9	U	U	U	U	.	.	U	.
MSL	.	.	.	8674	palo de jazmin	Styrax	portoricensis	STPO3	U	U	U	C, U	C	.	.	.
MSL	IOS	.	.	8676	bay cedar	Suriana	maritima	SUMA2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8679	Honduras mahogany	Swietenia	macrophylla	SWMA	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	940	West Indian mahogany	Swietenia	mahagoni	SWMA2	R, U	P, U	U	R, C, U	C	P	.	P2
MSL	.	.	.	8678	mahogany	Swietenia	spp.	SWIET	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8686	queen palm	Syagrus	romanzoffiana	SYRO4	U	U	U	U	.	.	U	.
MSL	.	.	.	8683	nispero cimarron	Symplocos	lanata	SYLA2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8684	Martinique sweetleaf	Symplocos	martinicensis	SYMA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8685	aceitunilla	Symplocos	micrantha	SYMI3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8687	chebtui, ebtui	Symplocos	racemosa	SYRA6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8689	turpentine tree	Syncarpia	glomulifera	SYGL	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8691	miraculous berry	Synsepalum	dulcificum	SYDU	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	7092	Japanese tree lilac	Syringa	reticulata	SYRE2	U	U	U	U	.	.	U	.
MSL	.	.	.	8694	watery roseapple	Syzygium	aqueum	SYAQ	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8695	asi	Syzygium	brevifolium	SYBR3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8696	popona	Syzygium	carolinense	SYCA4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8697	asi vai	Syzygium	clusiifolium	SYCL	U	P, U	U	U	.	P	.	.
MSL	.	.	.	896	Java plum	Syzygium	cumini	SYCU	R, U	P, U	U	R, U	.	P	.	P2
MSL	.	.	.	8699	asi vai	Syzygium	dealatum	SYDE3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8698	sea apple	Syzygium	grande	SYGR2	U	U	U	U	.	.	U	.
MSL	.	.	.	8700	asi	Syzygium	inophylloides	SYIN2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8701	Syzygium jambos	Syzygium	jambos	SYJA	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8702	Malaysian apple	Syzygium	malaccense	SYMA2	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8707	brush cherry	Syzygium	paniculatum	SYPA7	U	U	U	U	.	.	U	.
MSL	.	.	.	8703	popona	Syzygium	richii	SYRI3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8704	nonu vao	Syzygium	samarangense	SYSA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8705	fena vao	Syzygium	samoense	SYSA6	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8706	ohia ha	Syzygium	sandwicense	SYSA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8708	syzygium	Syzygium	spp.	SYZYG	U	P, U	U	U	.	P	.	.
MSL	.	.	.	7099	luluhut	Syzygium	stelechanthum	SYST3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8709	roble amarillo	Tabebuia	chrysantha	TACH3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8710	primavera	Tabebuia	donnell-smithii	TADO2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8712	roble cimarron	Tabebuia	haemantha	TAHA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8713	white cedar	Tabebuia	heterophylla	TAHE	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8714	pink tabebuia	Tabebuia	pallida	TAPA10	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8715	roble de sierra	Tabebuia	rigida	TARI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8716	pink trumpet-tree	Tabebuia	rosea	TARO	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8717	roble colorado	Tabebuia	schumanniana	TASC2	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	8719	Tabernaemontana aurantiaca	Tabernaemontana	aurantiaca	TAAU3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8720	milkwood	Tabernaemontana	citrifolia	TACI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8722	Pulu	Tabernaemontana	pandacaqui	TAPA13	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8723	Tabernaemontana rotensis	Tabernaemontana	rotensis	TARO3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	897	tamarind	Tamarindus	indica	TAIN2	R, U	P, U	U	R, C, U	C	P	.	P2
MSL	.	.	.	8737	manunu	Tarenna	sambucina	TASA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8741	chestnutleaf trumpetbush	Tecoma	castanifolia	TECA9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8743	yellow trumpetbush	Tecoma	stans	TEST	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8744	teak	Tectona	grandis	TEGR	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8749	kehma	Terminalia	carolinensis	TECA16	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8750	tropical almond	Terminalia	catappa	TECA	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8751	esemiich, chesemiich	Terminalia	crassipes	TECR3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8752	esemiich, chesemiich	Terminalia	edulis	TEED	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8754	Ivory Coast almond	Terminalia	ivorensis	TEIV2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8755	tropical almond	Terminalia	kaernbachii	TEKA4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8753	strand tree, sin	Terminalia	litoralis	TELI7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8756	East Indian almond	Terminalia	myriocarpa	TEMY	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8757	Peruvian almond	Terminalia	oblonga	TEOB	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	8758	malili	Terminalia	richii	TERI3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8759	talie	Terminalia	samoensis	TESA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8748	tropical almond	Terminalia	spp.	TERMI	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8761	superb terminalia	Terminalia	superba	TESU2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8762	saintedwood	Ternstroemia	heptasepala	TEHE3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8763	palo colorado	Ternstroemia	luquillensis	TELU2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8764	copey vera	Ternstroemia	peduncularis	TEPE	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8766	mamey de cura	Ternstroemia	stahlii	TEST3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8767	el yunque colorado	Ternstroemia	subsessilis	TESU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8768	masa	Tetragastris	balsamifera	TEBA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8770	Flynnsohe	Tetraplasandra	flynnii	TEFL5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8771	Koolau Rangeohe	Tetraplasandra	gymnocarpa	TEGY	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8772	Hawaii ohe	Tetraplasandra	hawaiensis	TEHA2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8773	ohe ohe	Tetraplasandra	kavaiensis	TEKA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8774	ohe mauka	Tetraplasandra	oahuensis	TEOA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8776	Mt. Waialeale ohe	Tetraplasandra	waialealae	TEWA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8777	ohe kiko ola	Tetraplasandra	waimeae	TEWA3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8778	stinkingfish	Tetrazygia	angustifolia	TEAN2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8779	Florida clover ash	Tetrazygia	bicolor	TEBI	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8780	Puerto Rico clover ash	Tetrazygia	biflora	TEBI2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8781	krekre	Tetrazygia	elaeagnoides	TEEL	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8783	cenizo	Tetrazygia	urbanii	TEUR	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8784	cacao	Theobroma	cacao	THCA	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8786	maga	Thespesia	grandiflora	THGR2	U	U	U	C, U	C	.	.	.

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MSL	.	.	.	8787	Portia tree	Thespesia	populnea	THPO3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8789	luckynut	Thevetia	peruviana	THPE3	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8793	ceboruquillo	Thouinia	striata	THST2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8794	Puerto Rico ceboruquillo	Thouinia	striata var. portoricensis	THSTP	U	U	U	C, U	C	.	.	.
MSL	.	.	.	913	key thatch palm	Thrinax	morrisii	THMO4	R, U	U	U	R, C, U	C	.	.	P2
MSL	.	.	.	914	Florida thatch palm	Thrinax	radiata	THRA2	R, U	U	U	R, U	.	.	.	P2
MSL	.	.	.	8803	Brazilian glorytree	Tibouchina	granulosa	TIGR3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	951	American basswood	Tilia	americana	TIAM	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	952	white basswood	Tilia	americana var. heterophylla	TIAMH	R, U	PNWS, U	U	R, U	.	.	.	P2
MSL	.	.	.	953	Carolina basswood	Tilia	americana var. caroliniana	TIAMC	R, U	PNWS, U	U	R, U	.	.	.	P2
MSL	.	.	.	8813	littleleaf linden	Tilia	cordata	TICO2	U	U	U	U	.	.	U	.
MSL	.	.	.	8814	Silver linden	Tilia	tomentosa	TITO	U	U	U	U	.	.	U	.
MSL	.	.	.	8799	Timonius albus	Timonius	albus	TIAL2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8806	Timonius corymbosus	Timonius	corymbosus	TICO7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8800	.	Timonius	ledermannii	TILE4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8807	Timonius mollis	Timonius	mollis	TIMO4	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8801	.	Timonius	ponapensis	TIPO5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8808	Timonius	Timonius	spp.	TIMON	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8809	Timonius subauritus	Timonius	subauritus	TISU3	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	8810	Timonius timon	Timonius	timon	TITI	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8815	tipa	Tipuana	tipu	TITI2	U	U	U	U	.	.	U	.
MSL	.	.	.	8812	Australian redcedar	Toona	ciliata	TOCI	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8816	boje	Torralbasia	cuneifolia	TOCU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8824	velvetleaf soldierbush	Tournefortia	argentea	TOAR2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8825	cold withe	Tournefortia	filiflora	TOFI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8821	Chinese windmill palm	Trachycarpus	fortunei	TRFO3	U	U	U	U	.	.	U	.
MSL	.	.	.	998	unknown dead hardwood	Tree	broadleaf	2TB	R, U	P	R, U	R, C, U	C	P	.	P2
MSL	IOS	.	.	999	other or unknown live tree	Tree	unknown	2TREE	R, U	R, U	R, U	R, C, U	C	.	.	P2
MSL	.	.	.	8827	magele	Trema	cannabina	TRCA33	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8828	Lamarck's trema	Trema	lamarckiana	TRLA2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8829	Jamaican nettletree	Trema	micrantha	TRMI2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8831	oriental trema	Trema	orientalis	TROR	U	P, U	U	U	.	P	.	.
MSL	.	.	.	994	Chinese tallowtree	Triadica	sebifera	TRSE6	R, U	PNWS, P, U	R, U	R, U	.	P	.	P2
MSL	.	.	.	8833	broomstick	Trichilia	hirta	TRHI3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8834	gaita	Trichilia	pallida	TRPA2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8836	bariaco	Trichilia	triacantha	TRTR8	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8837	Trichospermum ikutai	Trichospermum	ikutai	TRIK	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8838	elsau, oleiulakersus	Trichospermum	ledermannii	TRLE8	U	P, U	U	U	.	P	.	.

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MSL	.	.	.	8839	maouli	Trichospermum	richii	TRRI9	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8844	ant tree	Triplaris	cumingiana	TRCU6	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8846	faia	Tristiropsis	obtusangula	TROB7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8848	white ramoon	Trophis	racemosa	TRRA4	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8849	Trukia carolinensis	Trukia	carolinensis	TRCA7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8850	muttonwood	Turpinia	occidentalis	TUOC	U	U	U	C, U	C	.	.	.
MSL	.	.	.	971	winged elm	Ulmus	alata	ULAL	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	972	American elm	Ulmus	americana	ULAM	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	973	cedar elm	Ulmus	crassifolia	ULCR	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8862	Japanese elm	Ulmus	davidiana	ULDA	U	U	U	U	.	.	U	.
MSL	.	.	.	8851	Chinese elm	Ulmus	parvifolia	ULPA	U	U	U	U	.	.	U	.
MSL	.	.	.	8852	English elm	Ulmus	procera	ULPR	U	U	U	U	.	.	U	.
MSL	.	.	.	974	Siberian elm	Ulmus	pumila	ULPU	R, U	PNWS, P, U	R, U	R, U	.	P	.	P2
MSL	.	.	.	975	slippery elm	Ulmus	rubra	ULRU	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	976	September elm	Ulmus	serotina	ULSE	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	977	rock elm	Ulmus	thomasii	ULTH	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	981	California laurel	Umbellularia	californica	UMCA	R, U	PNWS, U	R, U	U	.	.	.	P2
MSL	.	.	.	8859	Mexican buckeye	Ungnadia	speciosa	UNSP	U	U	U	U	.	.	U	.
MSL	.	.	.	8853	scratchbush	Urera	baccifera	URBA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8854	flameberry	Urera	caracasana	URCA2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8855	ortiga	Urera	chlorocarpa	URCH2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8856	hopue	Urera	glabra	URGL	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8857	opuhe	Urera	kaalae	URKA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8861	voa vanga	Vangueria	madagascariensis	VAMA5	U	U	U	C, U	C	.	.	.

Master Species List (MSL)	Islands Only Species (IOS) – Not valid on the Mainland	Mainland NFS P2/3 Sub-lists - Not valid on P2/3 plots within a specific NFS Region	Woodland	FIA Code	Common Name	Genus	Species2	PLANTS Code	Past NRS Tally	Past PNW Tally	Past RMRS Tally	Past SRS Tally	Caribbean	Pacific	Urban	Historic P2
MSL	.	.	.	8863	Vavaea pauciflora	Vavaea	pauciflora	VAOA5	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8866	Manila palm	Veitchia	merrillii	VEME3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	995	tungoil tree	Vernicia	fordii	VEFO	R, U	PNWS, U	R, U	R, U	.	.	.	P2
MSL	.	.	.	8869	mu oil tree	Vernicia	montana	VEMO3	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8880	Siebold's arrowwood	Viburnum	sieboldii	VISI	U	U	U	U	.	.	U	.
MSL	.	.	.	8871	lilac chastetree	Vitex	agnus-castus	VIAG	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8872	bars, beokel	Vitex	cofassus	VICO17	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8873	higuerillo	Vitex	divaricata	VIDI2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7199	Chinese chastetree	Vitex	negundo	VINE2	U	U	U	U	.	.	U	.
MSL	.	.	.	8874	smallflower chastetree	Vitex	parviflora	VIPA6	U	P, U	U	U	.	P	.	.
MSL	IOS	.	.	8876	simpleleaf chastetree	Vitex	trifolia	VITR7	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8881	Wallenia lamarckiana	Wallenia	lamarckiana	WALA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8883	California fan palm	Washingtonia	filifera	WAFI	U	U	U	U	.	.	U	.
MSL	.	.	.	8885	Washington fan palm	Washingtonia	robusta	WARO	U	U	U	U	.	.	U	.
MSL	.	.	.	8886	Weinmannia affinis	Weinmannia	affinis	WEAF	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8887	bastard briziletto	Weinmannia	pinnata	WEPI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8889	alpine false ohelo	Wikstroemia	bicornuta	WIBI	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8890	forest false ohelo	Wikstroemia	furcata	WIFU	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8891	montane false ohelo	Wikstroemia	monticola	WIMO	U	P, U	U	U	.	P	.	.

Master Species List (MSL)	Islands Only Species (IOS) – Not valid on the Mainland	Mainland NFS P2/3 Sub-lists - Not valid on P2/3 plots within a specific NFS Region	Woodland	FIA Code	Common Name	Genus	Species2	PLANTS Code	Past NRS Tally	Past PNW Tally	Past RMRS Tally	Past SRS Tally	Caribbean	Pacific	Urban	Historic P2
MSL	.	.	.	8892	Oahu false ohelo	Wikstroemia	oahuensis	WIOA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8895	Hawaii false ohelo	Wikstroemia	phillyreifolia	WIPH2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8896	Kohala false ohelo	Wikstroemia	pulcherrima	WIPU	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8897	variableleaf false ohelo	Wikstroemia	sandwicensis	WISA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8898	Skottsbergs false ohelo	Wikstroemia	skottsbergiana	WISK	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8899	false ohelo	Wikstroemia	spp.	WIKST	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8900	hairy false ohelo	Wikstroemia	villosa	WIVI	U	P, U	U	U	.	P	.	.
MSL	IOS	.	.	8901	tallow wood	Ximenia	americana	XIAM	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8903	lalanyog	Xylocarpus	granatum	XYGR	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8904	leilei	Xylocarpus	moluccensis	XYMO2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8906	mucha-gente	Xylosma	buxifolia	XYBU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8902	dense logwood	Xylosma	congestum	XYCO7	U	U	U	U	.	.	U	.
MSL	.	.	.	8907	sawtooth logwood	Xylosma	crenata	XYCR	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8908	Hawaii brushholly	Xylosma	hawaiiensis	XYHA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8909	Xylosma nelsonii	Xylosma	nelsonii	XYNE2	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8910	spiny logwood	Xylosma	pachyphylla	XYPA2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8911	Xylosma samoensis	Xylosma	samoensis	XYSA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8912	white logwood	Xylosma	schaefferioides	XYSC2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8913	Schwaneck's logwood	Xylosma	schwaneckeana	XYSC3	U	U	U	C, U	C	.	.	.
MSL	IOS	.	.	8916	aloe yucca	Yucca	aloifolia	YUAL	U	U	U	C, U	C	.	.	.
MSL	.	3,8	.	8917	Eve's needle	Yucca	faxoniana	YUFA	U	U	U	U	.	.	U	.

Master Species List (MSL)	Islands Only Species (IOS) – Not valid on the Mainland	Mainland NFS P2/3 Sub-lists - Not valid on P2/3 plots within a specific NFS Region	Woodland	FIA Code	Common Name	Genus	Species2	PLANTS Code	Past NRS Tally	Past PNW Tally	Past RMRS Tally	Past SRS Tally	Caribbean	Pacific	Urban	Historic P2
MSL	IOS	.	.	8918	moundlily yucca	Yucca	gloriosa	YUGL2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8919	bluestem yucca	Yucca	guatemalensis	YUGU	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8923	Maricao pricklyash	Zanthoxylum	bifoliolatum	ZABI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8924	prickly yellow	Zanthoxylum	caribaeum	ZACA3	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8925	kawau	Zanthoxylum	dipetalum	ZADI	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8928	West Indian satinwood	Zanthoxylum	flavum	ZAFL	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8929	Hawaii pricklyash	Zanthoxylum	hawaiiense	ZAHA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8930	Kauai pricklyash	Zanthoxylum	kauaense	ZAKA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8931	white pricklyash	Zanthoxylum	martinicense	ZAMA	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8932	yellow prickle	Zanthoxylum	monophyllum	ZAMO	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8933	Oahu pricklyash	Zanthoxylum	oahuense	ZAOA	U	P, U	U	U	.	P	.	.
MSL	.	.	.	8934	dotted pricklyash	Zanthoxylum	punctatum	ZAPU2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8935	niaragato	Zanthoxylum	spinifex	ZASP	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8937	St. Thomas pricklyash	Zanthoxylum	thomasianum	ZATH	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8938	Zapoteca portoricensis	Zapoteca	portoricensis	ZAPO2	U	U	U	C, U	C	.	.	.
MSL	.	.	.	7243	Japanese zelkova	Zelkova	serrata	ZESE80	U	U	U	U	.	.	U	.
MSL	.	.	.	8939	Indian jujube	Ziziphus	mauritiana	ZIMA	U	P, U	U	C, U	C	P	.	.
MSL	.	.	.	8940	cacao rojo	Ziziphus	reticulata	ZIRE	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8941	soana	Ziziphus	rignonii	ZIRI	U	U	U	C, U	C	.	.	.
MSL	.	.	.	8943	Taylor's jujube	Ziziphus	taylorii	ZITA	U	U	U	C, U	C	.	.	.

APPENDIX 6+U. 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 3) or has had at least 10 percent canopy cover of live tally species (Appendix 3) 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 – 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 bole, as demonstrated by greater than 50 percent of the bole's circumference (shell) no longer being continuously intact). On live or dead trees, do not include shards that may remain above a broken or missing bole. If the top is intact, this variable 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).

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.

Area of Observation (AOO) for a condition – The acre portion of the condition that is evaluated to describe the condition class attributes using the following steps:

1. Follow the condition delineation procedures to first determine how many conditions the plot contains.
2. Once this has been completed, determine the shape of the AOO following the procedures below for a Single-, Multi-, or Split-condition plot based on the number of conditions recognized on the plot.
3. Follow the specific guidance associated with each individual condition attribute while describing them within the AOO.

- Single-condition plot: The AOO is defined by the area contained within 117.7-ft. radius circle originating from subplot center, the area of which is equal to one acre. Ignore any area within the AOO that contains a condition other than the one located at Plot center (PC). See Figure 2-1.
- Multi-condition plot: The AOO is defined by the nearest acre shape in relation to Plot center (PC) while including all portions of the subplot in the condition being evaluated. See Figure 2-2 and Figure 2-3.
- Split-condition plot: A split condition plot is a special case of a multi-condition plot. A split condition plot occurs when one condition (condition 2 for example) is split into two or more parts by another condition (condition 1 for example). This results in the need for two or more separate shapes to be created (each proportionally sized to the part of the condition it is representing). Combined, these shapes serve as the AOO. Each shape must include the portion of the subplot in the condition being evaluated, be closest to PC, and remain in the condition being evaluated. Combined these shapes should equal an acre. There may be situations where this is not always possible. In such cases the goal is to visualize a combined acre represented by the combined area of these shapes within condition 1. See Figure 2-4.
- Nonsampled Conditions: Nonsampled conditions are treated the same way as sampled conditions with the following exceptions. (1) Estimate required condition attributes from the image and (2) If there appears to be multiple adjoined potential CONDITION CLASS STATUS 1 conditions on a plot, all of which are nonsampled, use the Single-condition plot AOO design. (3) If a plot contains both CONDITION CLASS STATUS 5 and one or more additional CONDITION CLASS STATUS 2, 3, or 4 conditions, use the multiple-condition plot AOO design. If only one CONDITION CLASS STATUS is to be recorded on the plot, estimate the required condition attributes from the CONDITION CLASS STATUS 5 AOO only and use these to describe the entire plot regardless of the CONDITION CLASS STATUS at the PC.

For conditions that are less than an acre, such as a small developed area, the AOO is defined by the boundaries of the condition itself. In all cases the AOO must remain entirely within the condition being evaluated. Canopy cover checks and TOTAL STEMS counts do not take place within the AOO. They are evaluated within the Canopy cover sample area.

ARTIFICIAL REGENERATION SPECIES – Indicates the predominant species that is planted or seeded in an artificially regenerated condition.

Bay forests – These forests are restricted to coastal depressions or floodplains where saturated conditions prevail. Surface flooding is common, but usually not persistent. They occur exclusively in the Coastal Plain Physiographic province, and range from Maryland to southeast Texas.

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.

Bogs – Peatlands usually lacking an overlaying layer of mineral soils. They occur primarily in formerly glaciated areas of the northeastern U.S., the north-central states, and Canada and often develop in deep glaciated lakes. Bogs are characterized by evergreen trees and shrubs and are often covered with sphagnum moss.

Bole – The main stem of a tree, represented by the stem with the most merchantable volume extending from one foot above the ground to the point on the tree where DOB reaches 4 inches. On trees with secondary forks above the diameter measurement point, the bole is represented by the stem with the most merchantable volume. If there is no merchantable volume within any of the potential stems, choose the stem with the most volume that is not rotten cull. Diameter, damages, and all variables that relate to merchantability are evaluated on the bole as are regional TREE CLASS and TREE GRADE protocols. Saplings are evaluated based on a projection of the development of their future 4-inch DOB top. For woodland species there is no defined bole; follow the specific woodland species instructions included in each associated data variable.

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 2 stories (plus an attic and a basement that is at least partially below ground) in height above ground level and are estimated to have been originally constructed for residential purposes. Do not count detached garages, sheds, or other outbuildings. The building the tree affects does not have to be on the plot and both can be within any land use.

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.

Canopy Cover Check – The process used to sample a potential condition to determine if it meets the 10 percent canopy cover threshold needed to be considered Accessible Forest Land. It is required when LIVE PLUS MISSING CANOPY is estimated to be greater than 5 percent but less than 15 percent. The shape of the condition being evaluated and regional guidelines determine which of the three CANOPY COVER METHODs (Subplot, Acre, and Sub-acre) are used for the check. In situations where a canopy cover check is not required, the Ocular Method may be used to populate LIVE CANOPY COVER and LIVE PLUS MISSING CANOPY COVER. The Ocular

Method estimates the canopy cover over the Area of Observation as opposed to the canopy cover sample area.

Canopy cover sample area – The canopy cover sample area is the area contained within the bounds of the CANOPY COVER SAMPLE METHOD (includes Sub-acre, Acre, Subplot, and their associated phantoms when required) used to complete TOTAL STEMS counts. This area is used to determine LIVE CANOPY COVER and LIVE PLUS MISSING CANOPY COVER when the ocular CANOPY COVER SAMPLE METHOD is not appropriate.

Carolina bays – Elliptical depressions of the southeastern Coastal Plain which are consistently oriented in a northwest-southeast direction and many of which contain shrub bog communities. They occur predominately in the coastal areas of South Carolina and in southeastern North Carolina.

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.

Clear-cut – The cutting of all merchantable trees from an area. Often leaves a large number of unsalable trees.

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 -- A discrete combination of forest and/or landscape attributes that describe the environment on all, or part of the plot (when there is more than one delineated area present). These attributes include CONDITION CLASS STATUS, RESERVED STATUS, OWNER GROUP, FOREST TYPE, STAND SIZE CLASS, REGENERATION STATUS, TREE DENSITY, and when completing nonforest inventories, PRESENT NONFOREST LAND USE. Conditions are defined at the minimum size requirement required for each CONDITION CLASS STATUS (with the exception of 5 specific PRESENT NONFOREST LAND USEs that have no size requirements). The minimum size requirements associated with each of the six delineating variables linked to CONDITION CLASS STATUS = 1 (Accessible Forest Land) is 120 feet and 1 acre. The size requirements for PRESENT NONFOREST LAND USE is dependent on the individual land use being evaluated.

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.

Conservation easement – A conservation easement is a restriction placed on a piece of property to protect its associated resources. The easement is either voluntarily donated or sold by the landowner and constitutes a legally binding agreement that limits certain types of uses or prevents development from taking place on the land in perpetuity while the land remains in private hands. A conservation easement is legally binding, whether the property is sold or passed on to heirs. *[Source: nature.org]*

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 bole that are unusable for industrial wood products because of rot, form, or other defect.

Cultivar - The international term cultivar denotes an assemblage of cultivated plants that is clearly distinguished by any characters (morphological, physiological, cytological, chemical, or others) and when reproduced (sexually or asexually), retains its distinguishing characters. The term is derived from “cultivated variety,” or their etymological equivalents in other languages. For cultivated plants, the term cultivar is the equivalent of a botanical variety, in accordance with the International Code of Nomenclature of Cultivated Plants 1980. Usage: cultivar names are not italicized and are indicated by single quotes at first use, or the word cultivar (but not both). The abbreviation cv. is properly used only with a binomial name: Genus species cv. cultivar name. Omit the abbreviation if single quotes are used: Genus species ‘cultivar name'. (National Resources Conservation Service [NRCS] 2010. Title 190 – National Plant Materials Manual: Part 542.1 Glossary of Terms for Use in Plant Materials. 190-V-NPMM, Fourth Edition, July 2010. p. 13. Available online: https://www.nrcs.usda.gov/wps/portal/nrcs/main/plantmaterials/about/handbook/.)

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.
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 (including drop lines 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.
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.

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. Crown dieback is intended as a measure of recent crown stress.

Federal Information Processing Standard (FIPS) – A unique code identifying U.S. States and counties (or units in Alaska).

Fens – A type of peatland which resemble bogs. However, fens support marsh-like vegetation including sedges and wildflowers. The main differences between fens and bogs are in flora, hydrology and water chemistry. Fens, like bogs, tend to occur in glaciated areas of the northern United States. *[Source: www.aquatic.uoguelph.ca and EPA 843-F-01-002b]*

Forest Industry Land – Land owned by companies or individuals that operate wood-using plants.

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.

Hybrid - (1) Offspring of a cross between genetically dissimilar individuals. (2) First-generation progeny resulting from the controlled cross-fertilization between individuals that differ in one or more genes. (National Resources Conservation Service [NRCS] 2010. Title 190 – National Plant Materials Manual: Part 542.1 Glossary of Terms for Use in Plant Materials. 190-V-NPMM, Fourth Edition, July 2010. p. 27. Available online: https://www.nrcs.usda.gov/wps/portal/nrcs/main/plantmaterials/about/handbook/.)

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. Artificial turf laid on top of an impervious surface, such as concrete, is considered impervious; otherwise artificial turf is considered permeable. A specific impervious area on the ground must be at least 72 ft2 before it may be added to the PERCENT IMPERVIOUS total. For example, the area covered by a 9'x9' cement slab will be considered impervious and added to the total PERCENT IMPERVIOUS, but the area of many 2'x3' headstones in a cemetery will not be added to the total PERCENT IMPERVIOUS.

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 be recognized as a separate condition, except that it is not large enough to qualify on its own. For example, a ½ acre pond within a forested stand or ½ acre of saplings within a pole size stand. The same logic applies in nonforest conditions. For example, a ½-acre pond within rangeland or a ½-acre island of trees within rangeland. This concept extends to ancillary condition level variables in relation to their associated size requirements.

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.

Islands Only Species (IOS) - Tally species limited to the Islands Sub-list (Caribbean and Pacific islands, including Hawaii). Such species are not valid tally trees on the mainland (continental) United States.

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.

Legal Description – A legal description is used to describe the location of land in legal documents. The Land Ordinance of 1785 devised a system base lines and meridian lines using to survey the western lands outside the initial 13 colonies. Base lines run east/west and meridian lines run north/south. Along these lines the land was divided into 6 square mile blocks, called "Townships". Each Township is given an identifying number, according to where it falls. The east/west numbers are identified by the term "Range" and the north/south numbers are identified by the term "Township". Each township is divided into 36 square-mile parcels of 640 acres, called "Sections". Every section is numbered from 1 to 36, depending upon its position within the township. A section can be further divided into halves, quarters, etc. *[Source: http://www.csuchico.edu/lbib/maps/townships.html]*

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. Master Species List - All species listed in Appendix 3. The master list consists of an Islands and a Mainland Sub-list. There are currently 33 species (FG 9.2) that separate the two and the Mainland Sub-list collapses back into the Islands Sub-list. There is one P2/3 Sub-list within the Islands list and there are nine P2/3 Sub-lists within the Mainland list where specific species can be excluded from P2/3 tally. Currently (FG 9.2) there are no species on the Islands P2/3 Sub-list. After taking into account the Island, Mainland, and P2/3 Sub-lists, these are the species used to define FIA Forest Land. Species not listed are considered shrubs and do not factor into defining FIA Forest. Species listed on a specific P2/3 Sub-list are considered shrubs within the area that the P2/3 Sub-list represents on both P2 and P3 plots, including Down Woody Materials (DWM).

Marshes are separated into freshwater and saltwater types. Freshwater marshes are primarily inland, while salt marshes line the coasts of North America. *[Source: www.aquatic.uoguelph.ca]*

Meadows – Wet meadows are herb-dominated areas saturated for long periods during the growing season, but are seldom flooded. Some sedge meadows may have standing surface water and look more marsh-like in appearance. Wet meadows are often associated with agricultural lands, especially pastures. Wet meadows commonly occur in poorly drained areas such as shallow lake basins, low-lying depressions, and the land between shallow marshes and upland areas. Precipitation serves as their primary water supply, so they are often dry in the summer. *[Source: Tiner and EPA 843-F-01-002b]*

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, 90, 180, 270, 360 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.

National Forest Region Exclusion (NFS 1, 2, 3, 4, 5, 6, 8, 9, and/or 10) – These species are not valid tally trees on plots within the specified National Forest System Region. However, they are valid on plots that are located within urban areas in that NFS Region.

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.

Nonstocked Forest Land – Non-stocked forest land is based on canopy cover. A condition otherwise meeting the definition of accessible forest land that has less than 10 percent LIVE CANOPY COVER. Conditions with a TOTAL STEMS count greater than or equal to 150 are excluded. This term is not related to STAND SIZE CLASS = Nonstocked. as in this context non-stocked is based on stocking.

Nonstockable – Areas of forest land that are not capable of supporting trees because of the presence of rock, water, etc.

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.P2/3 Sub-lists – These lists exclude specific species from tally on P2/3 plot types.

- Islands P2/3 Sub-list - covers all the Pacific and Caribbean Islands.
- National Forest System Regional Boundary Sub-list (NFS 1, 2, 3, 4, 5, 6, 8, 9, and/or 10) – covers all lands (public or private) within the boundaries of each of the 9 NFS Regions

Permeable - material that allows water to percolate through such as gravel, bare soil, sand, mulch, leaf litter, stumps, ungrouted patio bricks 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 2+ – FIA activities done on a subset of Phase 2 plots. A reduced set of variables are collected for P2 Down Wood Materials and P2 Veg. Also, two additional crowns variables are collected on these 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 a set of four associated microplots. Throughout this field guide the use of the word 'plot' refers to the entire subplot. This is the area that determines which conditions are tallied on the plot during the condition delineation process.

Plot area (Urban) – The plot area is the area contained within the subplot. This is the area that determines which conditions are tallied on the plot during the condition delineation process.

Pocosins – The word pocosin comes from the Algonquin Native American word for "swamp on a hill". These evergreen shrub and tree dominated landscapes are found on the Atlantic Coastal Plain from Virginia to northern Florida, though most are found in North Carolina. Usually, there is no standing water present in pocosins, but a shallow water table leaves the soil saturated for much of the year. They range in size from less than an acre to several thousand acres located between and isolated from old or existing stream systems in most instances. *[Source: www.epa.gov/owow/wetlands/types/]*

Private owner industrial status – Indicates whether Private land owners own and operate a wood processing plant.

Production crew – a crew containing at least one certified individual. The crew is involved in routine installation of plots.

Production plot – A plot measured by a production crew. These plots may also be used for training purposes.

Punk Knot --Soft, decayed branch stubs that usually indicate the presence of decay in a tree.

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.

Scaling Diameter – The average small end diameter inside bark in inches at the top of the log being evaluated in a tree that is standing.

Seedlings – Conifer seedlings (except longleaf pine) must be at least 6.0 inches in length and less than 1.0 inch at DBH/DRC in order to qualify for tallying. Longleaf pine must be ½" at the root collar. 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.

Stand -- A contiguous group of trees sufficiently uniform in age-class distribution, composition, and structure, and growing on a site of sufficiently uniform quality, to be a distinguishable unit (The Dictionary of Forestry John A Helms 1998). Although this term is used in its generic sense throughout the field guide this term is specific to the plurality of all live trees, saplings and seedlings that are not overtopped within the Area of Observation when associated with describing a condition. For example, STAND SIZE CLASS and STAND AGE are specific to the portion of a stand that is within the Area of Observation used to describe the condition.

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 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 physical barriers 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.

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 – The portion of a condition that is located within a subplot.

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.

Swamps – Wet areas dominated by woody shrubs and trees, some with hardwoods such as red maple and ashes and others with softwoods like cedar and spruce. Willows, alders, shrubby dogwoods, and buttonbush dominate shrub swamps. Some shrub swamps are permanent, while others slowly transform to forested swamps.

Tree / sapling and shrub / seedling cover with a DBH/DRC 1" or greater are considered trees. Tree species (see Appendix 3) 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.

Subspecies - A grouping within a species used to describe geographically isolated variants, a category above "variety," and is indicated by the abbreviation "ssp." in the scientific name (Natural Resource Conservation Service (NRCS) PLANTS Database September 15, 2017 version maintained by the Forest Inventory and Analysis Information management group as database table REF_PLANT_DICTIONARY [USDA, NRCS. September 15, 2017. The Plants Database. http://plants.usda.gov/plants. National Plant Data Center, Baton Rouge, LA 70874-4490])

TOTAL LENGTH – The total length of the bole, recorded to the nearest 1.0 foot from ground level up past the 4-inch top 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. TOTAL LENGTH on multi-stemmed woodland species is based on the length of the longest stem present.

Training (practice) plot – A plot established for training or certification purposes only. It is NOT a plot in the ongoing inventory process and data from these plots do not become part of the standard inventory data base. To ensure that these plots do not enter into the inventory data base, they are assigned plot numbers outside the normal range of production plots or other invalid plot identification information such as an invalid STATE code (STATECD).

Transition Zone – An area where a distinct boundary between two or more different conditions cannot be determined.

Tree (FIA definition) - All species on the Master Species List. In FIA, a tree is defined as any plant on the tree list in the current field manual. When deciding whether to add or remove species from the tree list, species form is taken into account and a tree is generally described as 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 3.0 inches (7.6 cm) and a minimum height of 15 feet (4.6 m) at maturity.

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 Areas – These are census defined areas with a population density of 500 people per square mile associated with a town or city with a population of at least 2,500. Within these areas there is the potential for an Urban plot type and a P2/3 plot type to be coincident. In these cases, the P2/3 plot type will be measured using the P2/3 field guides and the Urban plot type will be measured using the Urban field guide.

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.

Variety - (1a) The botanical nomenclature division consisting of more or less recognizable entities within a species that are not genetically isolated from each other, below the level of subspecies, and is indicated by the abbreviation “var.” in the scientific name (see “botanical variety”); (1b) The rank of taxa below subspecies but above forma; a plant which retains most of the characteristics of the species, but differs in some way such as flower or leaf color, size of mature plant, etc. A variety is added to the specific binomial and preceded by "var.," such as saxatilis in the epithet Juniperus communis var. saxatilis. (2) Term used in some national and international legislation to denominate one clearly distinguishable taxon from another; equivalent to “cultivar.” (Note: the PMP does not recognize the terms “variety” and “cultivar” as equivalent.). (National Resources

Conservation Service [NRCS] 2010. Title 190 – National Plant Materials Manual: Part 542.1 Glossary of Terms for Use in Plant Materials. 190-V-NPMM, Fourth Edition, July 2010. p. 54. Available online:https://www.nrcs.usda.gov/wps/portal/nrcs/main/plantmaterials/about/handbook/.)

Wetlands – Areas subject 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. *[Source: Tiner]*

APPENDIX 9. INVASIVE PLANT LIST

The national invasive species list is available on the FIA public website (https://www.fia.fs.fed.us/library/field-guides-methods-proc/index.php). The list shows the regions and/or States and Pacific Islands. For more information, contact the local region for details about the regional list of interest.

1	Schinus terebinthifolius	SCTE	Brazilian Pepper
2	Pyrus calleryana	PYCA80	Bradford Pear
3	Cinnamomum camphora	CICA	Camphortree
4	Melia azedarach	MEAZ	Other common names: Persian lilac, pride-of-India, chinaberry
5	Firmiana simplex	FISI2	Chinese Parasoltree
6	Frangula alnus	FRAL4	Glossy Buckthorn
7	Broussonetia papyrifer	BRPA4	Paper Mulberry
8	Paulownia tomentosa	PATO2	Princesstree
9	Olive Group	ELAEA	Elaeagnus umbellate Autumn Olive, Elaeagnus angustifolia Russian Olive
10	Albizia julibrissin	ALJU	Mimosa
11	Triadica sebifera	TRSE6	Tallowtree, popcorntree
12	Ailanthus altissima	AIAL	Tree of Heaven
13	Poncirus trifoliata	POTR4	Trifoliate orange
14	Vernicia fordii	VEFO	Tungoil Tree
15	Lonicera Group	LONIC	L. tatarica Tatarian Honeysuckle, Lonicera maackii Amur Honeysuckle, L. morrowii Morrow's Honeysuckle, L. fragrantissima Sweet-breath-of-spring, L. x bella Bell's honeysuckle
16	Privet Group 1	LIJA	Ligustrum japonicum Japanese privet, Ligustrum lucidum Glossy privet
17	Privet Group 2	LIGUS2	Ligustrum sinense Chinese Privet, L. vulgare European Privet, Ligustrum obtusifolium, Ligustrum ovalifolium
18	Ardisia crenata	ARCR80	Coral Ardisia, Hen's eyes
19	Berberis thunbergii	BETH	Japanese Barberry
20	Polygonum cuspidatum	POCU6	Japanese Knotweed
21	Spiraea japonica	SPJA	Japanese Meadowsweet
22	Mahonia bealei	MABE2	Leatherleaf Mahonia
23	Rose Group	ROSA5	Rosa multiflora Multiflora rose, R. bracteata Macartney rose, R. laevigata Cherokee rose, Other nonnative roses, Rosa spp.
24	Nandina domestica	NADO	Sacred Bamboo
25	Lespedeza Group	LESPE	Lespedeza bicolor Shrubby Lespedeza, L. thunbergii Thunberg's Lespedeza
26	Elaeagnus pungens	ELPU2	thorny elaeagnus, silverthorn
27	Euonymus alatus	EUAL8	winged burning bush
28	Ampelopsis brevipedunculata	AMBR7	Amur peppervine
29	Yam Group	DIOSC	Dioscorea bulbifera Air yam, D. oppositifolia Chinese yam, D. alata Water yam
30	Akebia quinata	AKQU	Five-Leaf Akebia, chocolate vine
31	Lonicera japonica	LOJA	Japanese honeysuckle
32	Pueraria montana	PUMOL	Kudzu
33	Ivy Group	HEDER	Hedera helix English Ivy, H. hibernica Atlantic Ivey, H. colchica Colchis ivy
34	Wisteria Group	WISTE	Wisteria sinensis Chinsese wisteria, W. floribunda Japanese wisteria
35	Celastrus orbiculatus	CEOR7	Oriental bittersweet
36	Vinca Group	VINCA	Vinca minor Common periwinkle, V. major Bigleaf periwinkle
37	Euonymus fortunei	EUFO5	Winter creeper

38	Bamboo Group	BAMBU	Phyllostachys aurea, Other invasive banboos: Phyllostachys spp. and Bambusa spp.
39	Miscanthus sinensis	MISI	Chinese silvergrass
40	Imperata cylindrica	IMCY	Cogongrass
41	Microstegium vimineum	MIVI	Nepalese Browntop
42	Schedonorus phoenix	SCPH	Tall Fescue
43	Eragrostis curvula	ERCU2	Weeping lovegrass
44	Lygodium japonicum	LYJA	Japanese Climbing Fern
45	Liriope Group	LIRIO2	Liriope muscari Sunonym: Ophiopogon muscari, L. spicata Creeping Liriope, Monkey Grass
46	Lespedeza cuneata	LECU	Chinese Lespedeza
47	Securigera varia	SEVA4	Crownvetch
48	Alliaria petiolata	ALPE4	Garlic Mustard
49	Tamarix Group	TAMAR2	Tamarix spp. Saltcedar

The following species are valid ONLY in West Texas

CODE	COMMON NAME	SCIENTIFIC NAME
	Tree/tree-form	
PICH4	Chinese pistache	*Pistacia chinensis*
	Shrub	
PYCO2	Scarlet firethorn	*Pyracantha coccinea*
PHSE17	Taiwanese photinia	*Photinia serratifolia*
PHFR9	Fraser's photinia, red-tipped photinia	*Photinia x fraseri*
	Grass	
BASC5	Burningbush	*Bassia scoparia*
	Fern	
CYFA2	Japanese netvein hollyfern	*Cyrtomium falcatum*

APPENDIX 10+U. UNKNOWN PLANT SPECIMEN COLLECTION

The following information describes some useful procedures and examples of data-collection aids for collecting plant specimens. The preferred option is to use procedures developed for the P3 Vegetation Indicator protocol which relies on automated data-recorder and database tracking of plant specimens. This protocol also automates the creation of labels for specimens that can be downloaded and printed.

If your unit requires collection of plant specimens for species that:

1. you cannot identify quickly and confidently using field guides but are potentially identifiable, or
2. are a new record for the state and URBAN CONDITION CLASS STATUS = 1, or
3. are an UNLISTED TREE SPECIES

follow these basic steps:

1. Assign a valid SPECIES code.
2. Record whether or not a specimen was collected in the appropriate SPECIMEN COLLECTED variable.
3. When a specimen is collected, enter a SPECIMEN LABEL NUMBER. Place a label with the corresponding label number in the bag with the specimen.
4. Describe any newly encountered unknown species in the appropriate NOTES variable.
5. Record the canopy cover estimates of the unknown species on the condition on the subplot where encountered.

Example Field Specimen Label

Where specimen collection is part of the protocol, each crew may be issued a set of printed labels to track unknown specimens. The information to be completed by hand in the field is optional, but may include date, unknown code, unique species number and crew name.

Label Number: 1 Date: 8/06/06 Unknown Code: ACANT2 Unique Species Nbr: 1 Veg Spec. crew: John Doe

Example Specimen Label

Official specimen labels are printed from plot data collected in the data-recorder (PDR) and accompany the unknown specimen as it is pressed, dried and submitted for further identification. Labels will not include sensitive plot identification data – the unique specimen label number is sufficient identification for each specimen.

Specimen Label
State: Ohio County: Lawrence
Plot:
Label Number: 21 Resolved Species Code:
Resolved scientific name:
Resolved by (name):
Date Collected: 6/22/2005
Unknown Code: 2GRAM Unique Species Nbr: 7
Field collected scientific name:
Collected by: (name or number)
Community type(s) where found: bottomland, old stripmine
ridgetop with atv trl, stripped yrs ago moist bottom

Collecting and pressing plants

If fewer than 5 individuals of an unknown herbaceous plant species are present do not collect.

Use a digging tool to extract the entire plant, including any underground portions, flowers, fruits, and leaves. If the plant is abundant, collection of two samples will increase the likelihood of a good specimen.

Collected unknown specimens should be transported in the field and from the field in the 1 and/or 2 gallon zip-lock bags provided. Only one species and label may be placed in a single bag. Acceptable methods of transporting collected specimens include:

- Use a 3-hole-punch to punch holes in the bottom of your bags prior to traveling in the field. Place the punched bags into a 2-inch 3-ring binder with the zip-lock portion facing outward. Plants can then be placed with labels into the bag directly in the binder. This method prevents crumpling, tearing, and destroying the specimen during transportation.
- Use a 1-hole-punch to punch a hole in the one upper corner of each bag. The hole should be placed in such a manner that it cannot easily be torn. Place the bags on an aluminum carabineer (available at drug stores) or on heavy twine and fasten to your field vest or backpack. Be careful to seal the plants and labels securely inside the bags to prevent accidental loss.

Press and label the plant if not identified by the end of the day:

- After returning to the field office print all of the labels associated with the collected unknown specimens. The printed labels should now have all of the plot information (plot number, state, notes, unknown code, etc.) in addition to the original label number, make sure that the printed information is correct and matches the unknown specimen before including it in the press.
- Each specimen representing a unique species should be placed individually inside a single layer of folded newsprint. Each specimen is to be accompanied by its corresponding unknown specimen label. Small plant specimens are to be pressed individually. Large plant specimens may be folded in a “v”, “z”, or “w” arrangement to fit on a single newsprint page. Arrange the specimen so that at least one upper and one lower leaf surface is exposed. Plants may be trimmed to reduce bulk, so long as all diagnostic parts are included. Diagnostic portions include stem sections, petioles, leaves, roots, flowers, and fruits. Bulky fruits or nuts may be stored separately in a paper envelope that is taped to the newsprint and is accompanied by an identical copy of the specimen’s unknown label. Unknown codes can be written on the outside of the folded newspaper to aid sorting as specimens are processed.
- Stack the specimens in their individual newsprint sleeves between two pieces of cardboard. Bind the cardboard and plants together using a piece of twine or flat cloth ribbon wrapped around the length and width of the cardboard bundle. For mailing numerous specimens, several bundles may be used. Place all bundles inside a cardboard box for shipping.

Package and submit specimens as dictated by your FIA unit or lab. It is suggested that Unknown specimens be packaged and shipped at the end of every work week. Exceptions will be made when extended field excursions prevent the vegetation specialist from reaching a post office.

All packaged specimens are to be accompanied by a legible completed label. Unknown Spreadsheets tracking collected unknown plants are generated from the PDR plot file.

APPENDIX 11. DAMAGE CODES

The REGION column means that only the region(s) listed are allowed to collect the code. This list has been modified to reflect only those damages that will be collected in SRS. The complete list is available in the National Core Field Guide, Version 6.0.

CODE	Common Name	Scientific Name	Threshold
0	**No damage present**		
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.
11000	**Bark Beetles**		Any evidence of a successful attack (successful attacks generally exhibit boring dust, many pitch tubes and/or fading crowns).
12000	**Defoliators**		Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected.
13000	**Chewing Insects**		Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected.
14000	**Sucking Insects**		Any damage to the terminal leader; damage ≥ 20% of the foliage with ≥ 50% of the leaf/needle affected.
15000	**Boring Insects**		Any damage to the terminal leader; damage >20% of the roots, stems, or branches.
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.
21000	**Root/Butt Diseases**		Any occurrence
22000	**Cankers**		Any occurrence
22500	**Stem Decay**		Any visual evidence
22001	heart rot		Any visual evidence
23000	**Parasitic/Epiphytic Plants**		Dwarf mistletoes with Hawksworth rating of ≥3; true mistletoes or vines covering ≥ 50% of crown.
24000	**Decline Complexes/ Dieback/Wilts**		Damage ≥ 20 dieback of crown area.
25000	**Foliage diseases**		Damage ≥20% of the foliage with ≥50% of the leaf/needle affected.
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.
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.
26004	comandra blister rust	Cronartium comandrae	Any occurrence on the bole or stems (on multi-stemmed woodland species), or on live branches ≤1 foot from boles or stems; damage to ≥ 20% of branches.
26006	eastern gall rust	Cronartium quercuum	Any occurrence on the bole or stems (on multi-stemmed woodland species), or on live branches ≤1 foot from boles or stems; damage to ≥ 20% of branches.
26009	fusiform rust	Cronartium quercuum f. sp. fusiforme	Any occurrence on the bole or stems (on multi-stemmed woodland species), or on live branches ≤1 foot from boles or stems; damage to ≥ 20% of branches.
27000	**Broom Rusts**		≥50% of crown area affected

CODE	Common Name	Scientific Name	Threshold
30000	**Fire**		Damage ≥ 20% of bole circumference; >20% of stems on multi-stemmed woodland species affected; ≥20% of crown affected.
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.
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.
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.
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.
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.
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.
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.
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.
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.
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).
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

CODE	Common Name	Scientific Name	Threshold
			affected; damage ≥20% of the foliage with ≥50% of the leaf/needle affected.
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.
70003	imbedded objects		Any occurrence on the bole.
70005	landclearing		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.
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.
71000	**Harvest**		Removal of ≥10% of cubic volume (on multi-stemmed woodland species with partial cutting only)
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.
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.

APPENDIX 12. 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.

OWNGRPa	OWNCDb	Land designation (and example)	RESERVCDc	ADWDRAWCDd	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, UT)	1		Executive Order or Congress	Agencies have treated these executive orders as having the force of law, with modifications requiring an act of Congress.

OWNGRPa	OWNCDb	Land designation (and example)	RESERVCDc	ADWDRAWCDd	Designated by	Comments
10,20	all	National Recreation Area (Hell's Canyon NRA, OR/ID)	1		Congress	Although the legislation of some NRAs do not preclude wood production, most do and given the emphasis is likely to be minor, so default to reserved.
10,20	all	Wild and Scenic Rivers (wild, scenic or recreational classification) (Au Sable River, MI)	1		Congress	Wood production is not an objective for any wild and scenic river (FSM 2354.42d). Harvest in segments classified as wild is excluded except under emergency conditions; harvest in segments classified as scenic or recreational is only allowed to further river management objectives. If a map of the area or other information is unavailable, use 1/4 mile on either side of the river on federal land (1/2 mile in Alaska).
10,20	all	Wild and Scenic Study Rivers (wild, scenic or recreational classification) (White Salmon River, WA)	0	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

OWNGRPa	OWNCDb	Land designation (and example)	RESERVCDc	ADWDRAWCDd	Designated by	Comments
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 (Caribbean 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
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

OWNGRPa	OWNCDb	Land designation (and example)	RESERVCDc	ADWDRAWCDd	Designated by	Comments
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

OWNGRPa	OWNCDb	Land designation (and example)	RESERVCDc	ADWDRAWCDd	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 13+U. URBAN SYNCING MIDAS OWNERSHIP/CONTACT DATA ENTRY WITH NOMS DATABASE REQUIREMENTS

A13.1+U Introduction

FIA uses ownership information for multiple purposes. Initially, it is used to identify and contact ownerships and gain access to the land. Ownership variables are important for quantifying what types of ownerships own how much land and among other things, the relative differences among the forests owned by different types of ownerships. FIA's National Woodland Owner uses name and address information to contact landowners and invite them to participate in the ownership survey. This chapter describes the variables and protocols for data related to land ownership collected prior to measurement of field (i.e., P2) variables. Some of the variables will be downloaded in the Historical Plot data files.

The (core) ownership variables described below are required for:

- The first private, forested condition encountered on a plot.
- The PC condition when it is both privately owned and supports a LIVE CANOPY COVER ≥1%.

Ownership and contact information is optional for:

- Other ownerships (private or public) on the plot; and
- Other contacts associated with the plot – e.g., other persons who may need to be contacted in order to gain access to the plot.

(Although this information is optional it is encouraged that all information that can be obtained for such ownerships be entered into the PDR to assist in future visits to the plot.)

SRS Note: SRS will collect ownership data on all URBAN CONDITION STATUS 1 and 2 conditions. When there are multiple landowners, record each landowner's information into the *MIDAS PDR Application*. OWNERSHIP CONDITION LIST will be entered to indicate which respective condition is located on each landowner's property.

Rules for entering name and address information:

- As a rule of thumb, enter name and address information as it should appear on a mailing label
- Use upper and lower case letters
- Avoid unnecessary punctuation
- If initials are recorded, leave a space between them (e.g., W W)
- Unless part of an official name (e.g., U S Steel), the only acceptable abbreviations are:
  - Inc, Co (for company), LLC, LLP, and similar business abbreviations
  - Mr, Ms, Mrs,
  - c/o and attn:
  - Jr, Sr, II, III, …
- Use numbers for street number, e.g., 3rd Ave not Third Ave
- If there is a PO Box and a street address, record the PO Box information in ADDRESS LINE 1 and the street address in ADDRESS LINE 2 and, if necessary, ADDRESS LINE 3.

- If there is an apartment or suite number, record it at end of the street address (on the same line).

Examples are included in section A13.57.1.

A13.2 STATE Not Collected in URBAN FIA

A13.3 COUNTY Not Collected in URBAN FIA

A13.4 PLOT NUMBER Not Collected in URBAN FIA

A13.5 RECORD TYPE

Record type is used to reconcile the data collected in the field to the National Ownership Management Systems (NOMS). It defines a data record as being an existing owner or contact within the NOMS system, a new record to be added or a deletion of the existing record.

When collected: All records
Field Width: N/A
Tolerance: No errors
MQO: At least 95% of the time
Values:

1	Confirm/Update Record – Owner or contact from last measurement and recorded in NOMS (Downloaded information in historical file.) Ownership information should be reviewed. Update information only if changes have occurred or corrections are necessary. Update the owner name and owner sub-name fields only if there is a spelling correction.
2	Add a record – Select when there is a new owner or contact to add, or an owner or contact was not recorded at the time of last measurement. An owner check must be completed before uploading a data file into MIDAS if this value is used. The owner check is to determine if the new owner is already in the NOMS database due to owning more than one plot location.
3	Delete Existing Record – Select when a downloaded owner or contact no longer pertains to the plot. The NOMS database managers will use these records marked for deletion to reflect the changes in the NOMS system

A13.6 OWNERSHIP TYPE

Record whether the information corresponds to the person who owns part or all of the plot area, or if the information was collected for access purposes.

When collected: All ownerships recorded for a plot
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

1 Landowner – owns land within the plot area
2 Contact – does not own the land but is contacted to gain access to the plot

A13.7 PLOT CENTER OWNER

Record whether the ownership information corresponds to the ownership that owns plot center

When collected: All ownerships recorded for a plot (OWNERSHIP TYPE = 1)
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

0	The ownership is not the owner of plot center
1	The ownership is the owner of plot center

A13.8+U URBAN OWNERSHIP CONDITION LIST

Record each condition number that is present on the defined owner.

When collected: All OWNER CLASSes on URBAN CONDITION CLASS STATUS = 1, 2, 3, 4, and 5 with the exception of those linked to the following URBAN NONFOREST LAND USEs: Rights-of way (320), Transportation (321),Utility (322), and noncensus and census water conditions (900) when OWNER GROUP is Federal, State, or Local governments (10, 20, 30)
Field width: 9 digits
Tolerance: No errors
MQO: At least 95% of the time
Values: 000000000 to 123456789

A13.9 OWNER NAME

Record the name of the ownership. All information available in the public tax records or other sources should be included. The name should be formatted as if one were addressing an envelope. “Care of” (e.g., c/o), “attention” (e.g., Attn:), and similar information should be recorded in ATTENTION.

Record name of Private Landowner (OWNER CLASS = 45), name of Company or Organization (OWNER CLASS = 41, 42, 43, or 44). Or name of Public Agency (OWNER CLASS = 11, 12, 13, 21, 23, 24, 25, 31, 32, or 33).

Note that for a contact ownership type (OWNERSHIP TYPE = 2), this item will be auto-filled to contain the owner name associated with the contact.

When collected: Required for the first private, forested condition encountered on a plot.
URBAN OPTIONAL: Other ownerships (private or public) on the plot; and other contacts associated with the plot – e.g., other persons who may need to be contacted to gain access to the plot.
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters

A13.10 OWNER SUBNAME

For public owners, record the management unit, department, or division of the agency that owns or manages the forest land as indicated by public tax records or other data sources. For corporate owners record the unit or division of the main company recorded in the OWNER NAME field. For private owners and Native American lands, include the entire name of person or tribe in the OWNER NAME field, and do not enter any information in this field.

Note that for a contact ownership type (OWNERSHIP TYPE = 2), this item will be auto filled to contain the owner subname associated with this contact.

When collected: CORE: Required for the first public or corporate forested condition encountered on a plot.
CORE OPTIONAL: Other ownerships (private or public or corporate) on the plot; and other contacts associated with the plot – e.g., other persons who may need to be contacted to gain access to the plot.
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.11 FIRST NAME OWNER

Record the first name of the owner. For private ownerships, this field will be concatenated to the OWNER NAME field.

When collected: CORE: All private ownership (OWNER CLASS = 45) and contact records (OWNERSHIP TYPE = 1)
Field width: 50 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.12 MIDDLE NAME OWNER

Record the middle name of the owner. For private ownerships, this field will be concatenated to the OWNER NAME field.

When collected: CORE: All private ownership (OWNER CLASS = 45) and contact records (OWNERSHIP TYPE = 1)
Field width: 50 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.13 LAST NAME OWNER

Record the last name of the owner. For private ownerships, this field will be concatenated to the OWNER NAME field.

When collected: CORE: All private ownership (OWNER CLASS = 45) and contact records (OWNERSHIP TYPE = 1)
Field width: 50 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.14 FIRST NAME CONTACT

Record the first name of the contact. For private ownerships, this field will be concatenated to the OWNER NAME field.

When collected: CORE: All private ownership (OWNER CLASS = 45) and contact records (OWNERSHIP TYPE = 2)
Field width: 50 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.15 MIDDLE NAME CONTACT

Record the middle name of the contact. For private ownerships, this field will be concatenated to the OWNER NAME field.

When collected: CORE: All private ownership (OWNER CLASS = 45) and contact records (OWNERSHIP TYPE = 2)
Field width: 50 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.16 LAST NAME CONTACT

Record the last name of the contact. For private ownerships, this field will be concatenated to the OWNER NAME field.

When collected: CORE: All private ownership (OWNER CLASS = 45) and contact records (OWNERSHIP TYPE = 2)
Field width: 50 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.17 ATTENTION OWNER

If applicable, “care of” (e.g., c/o), “attention” (e.g., Attn:), and similar information should be recorded here. If available, job title should be included in this field.

When collected: Required for the first private, forested condition encountered on a plot and OWNERSHIP TYPE = 1
URBAN OPTIONAL: Other ownerships (private or public) on the plot
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.18 ATTENTION CONTACT

If applicable, “care of” (e.g., c/o), “attention” (e.g., Attn:), and similar information should be recorded here. If available, job title should be included in this field.

When collected: CORE: Required for the first private, forested condition encountered on a plot and OWNERSHIP TYPE = 2
CORE OPTIONAL: Other contacts associated with the plot – e.g., other persons who may need to be contacted to gain access to the plot
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.19 ADDRESS LINE 1 OWNER
Record the first line of the mailing address for the record. If there is a PO Box and a street address, record the PO Box information in ADDRESS LINE 1 and the street address in ADDRESS LINE 2 and ADDRESS LINE 3. If there is an apartment or suite number, record it at end of the street address (on the same line).

When collected: Required for the first private, forested condition encountered on a plot and OWNERSHIP TYPE = 1
URBAN OPTIONAL: Other ownerships (private or public) on the plot
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.20 ADDRESS LINE 1 CONTACT
Record the first line of the mailing address for the record. If there is a PO Box and a street address, record the PO Box information in ADDRESS LINE 1 and the street address in ADDRESS LINE 2 and ADDRESS LINE 3. If there is an apartment or suite number, record it at end of the street address (on the same line).

When collected: CORE: Required for the first private, forested condition encountered on a plot and OWNERSHIP TYPE = 2
CORE OPTIONAL: Other contacts associated with the plot – e.g., other persons who may need to be contacted to gain access to the plot
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.21 ADDRESS LINE 2 OWNER
Where applicable, record the second line of the mailing address for the record.

When collected: Required for the first private, forested condition encountered on a plot and OWNERSHIP TYPE = 1)
URBAN OPTIONAL: Other ownerships (private or public) on the plot
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters. Null values are permissible

A13.22 ADDRESS LINE 2 CONTACT
Where applicable, record the second line of the mailing address for the record.

When collected: CORE: Required for the first private, forested condition encountered on a plot and OWNERSHIP TYPE = 2
CORE OPTIONAL: Other contacts associated with the plot – e.g., other persons who may need to be contacted to gain access to the plot
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters. Null values are permissible

A13.23 ADDRESS LINE 3 OWNER
Where applicable, record the third line of the mailing address for the record.

When collected: Required for the first private, forested condition encountered on a plot and OWNERSHIP TYPE = 1
URBAN OPTIONAL: Other ownerships (private or public) on the plot
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters. Null values are permissible

A13.24 ADDRESS LINE 3 CONTACT
Where applicable, record the third line of the mailing address for the record.

When collected: CORE: Required for the first private, forested condition encountered on a plot and OWNERSHIP TYPE = 2
CORE OPTIONAL: Other contacts associated with the plot – e.g., other persons who may need to be contacted to gain access to the plot
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters. Null values are permissible

A13.25 ADDRESS CITY OWNER
Record the city of the mailing address for the record.

When collected: Required for the first private, forested condition encountered on a plot and OWNERSHIP TYPE = 1
URBAN OPTIONAL: Other ownerships (private or public) on the plot
Field width: 100 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters

A13.26 ADDRESS CITY CONTACT
Record the city of the mailing address for the record.

When collected: CORE: Required for the first private, forested condition encountered on a plot and OWNERSHIP TYPE = 2
CORE OPTIONAL: Other contacts associated with the plot – e.g., other persons who may need to be contacted to gain access to the plot
Field width: 100 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters

A13.27 ADDRESS STATE OWNER
For records with mailing addresses in the United States (including territories and protectorates), record the State of the mailing address for the record.

When collected: Required for the first private, forested condition encountered on a plot and OWNERSHIP TYPE = 1
URBAN OPTIONAL: Other ownerships (private or public) on the plot
Field width: 2 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: See section A13.57.2

A13.28 ADDRESS STATE CONTACT
For records with mailing addresses in the United States (including territories and protectorates), record the State of the mailing address for the record.

When collected: CORE: Required for the first private, forested condition encountered on a plot and OWNERSHIP TYPE = 2
CORE OPTIONAL: Other contacts associated with the plot – e.g., other persons who may need to be contacted to gain access to the plot
Field width: 2 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: See section A13.73.2

A13.29 ADDRESS PROVINCE OWNER
For records with mailing addresses outside of the United States, record the province, State, or other pertinent geographic division of the mailing address of the record.

When collected: Required for the first private, forested condition encountered on a plot and OWNERSHIP TYPE = 1
URBAN OPTIONAL: Other ownerships (private or public) on the plot
Field width: 50 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters

A13.30 ADDRESS PROVINCE CONTACT
For records with mailing addresses outside of the United States, record the province, State, or other pertinent geographic division of the mailing address of the record.

When collected: CORE: Required for the first private, forested condition encountered on a plot and OWNERSHIP TYPE = 2
CORE OPTIONAL: Other contacts associated with the plot – e.g., other persons who may need to be contacted to gain access to the plot
Field width: 50 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters

A13.31 ADDRESS POSTAL CODE OWNER
Record the postal code of the mailing address for the record. Postal codes for US and foreign addresses should be included here.

When collected: Required for the first private, forested condition encountered on a plot and OWNERSHIP TYPE = 1
URBAN OPTIONAL: Other ownerships (private or public) on the plot
Field width: 10 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Alphanumeric

A13.32 ADDRESS POSTAL CODE CONTACT
Record the postal code of the mailing address for the record. Postal codes for US and foreign addresses should be included here.

When collected: CORE: Required for the first private, forested condition encountered on a plot and OWNERSHIP TYPE = 2
CORE OPTIONAL: Other contacts associated with the plot – e.g., other persons who may need to be contacted to gain access to the plot
Field width: 10 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Alphanumeric

A13.33 ADDRESS COUNTRY OWNER
Record the two-character code for the country of the mailing address for the record. The default value is United States (US).

When collected: Required for the first private, forested condition encountered on a plot and OWNERSHIP TYPE = 1
URBAN OPTIONAL: Other ownerships (private or public) on the plot
Field width: 2 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: See section A13.57.3

A13.34 ADDRESS COUNTRY CONTACT
Record the two-character code for the country of the mailing address for the record. The default value is United States (US).

When collected: CORE: Required for the first private, forested condition encountered on a plot and OWNERSHIP TYPE = 2
CORE OPTIONAL: Other contacts associated with the plot – e.g., other persons who may need to be contacted to gain access to the plot
Field width: 2 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: See section A13.73.3

A13.35 PHONE COUNTRY CODE 1 OWNER (CORE OPTIONAL)
Record the country code for PHONE NUMBER 1 OWNER. Country code for US is 001.

When collected: When PHONE NUMBER 1 OWNER is recorded
Field width: 3 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Numbers

A13.36 PHONE COUNTRY CODE 1 CONTACT (CORE OPTIONAL)
Record the country code for PHONE NUMBER 1 CONTACT. Country code for US is 001.

When collected: When PHONE NUMBER 1 CONTACT is recorded
Field width: 3 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Numbers

A13.37 PHONE NUMBER 1 OWNER (URBAN OPTIONAL Collected in NRS, PNW, RMRS, SRS)
When available, record the primary phone number for the record, including area code. If available, record the extension in PHONE NUMBER 1 EXTENSION OWNER. It should be formatted as follows: (123) 456-7890.

When collected: NRS, PNW, RMRS, SRS When available and OWNERSHIP TYPE = 1
Field width: 20 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Numbers and the special characters '-' (dash) and "()" (parentheses). Null values are permissible

A13.38 PHONE NUMBER 1 CONTACT (CORE OPTIONAL)
When available, record the primary phone number for the record, including area code. If available, record the extension in PHONE NUMBER 1 EXTENSION CONTACT. It should be formatted as follows: (123) 456-7890.

When collected: When available and OWNERSHIP TYPE = 2
Field width: 20 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Numbers and the special characters '-' (dash) and "()" (parentheses). Null values are permissible

A13.39 PHONE NUMBER 1 EXTENSION OWNER (URBAN OPTIONAL Collected in NRS, PNW, RMRS, SRS)
When available, record the extension associated with the primary phone number for the record.

When collected: NRS, PNW, RMRS, SRS When PHONE NUMBER 1 OWNER is recorded and includes an extension
Field width: 5 digits
Tolerance: No errors
MQO: At least 95% of the time
Values: Numbers. Null values are permissible

A13.40 PHONE NUMBER 1 EXTENSION CONTACT (CORE OPTIONAL)
When available, record the extension associated with the primary phone number for the record.

When collected: When PHONE NUMBER 1 CONTACT is recorded and includes an extension
Field width: 5 digits
Tolerance: No errors
MQO: At least 95% of the time
Values: Numbers. Null values are permissible

A13.41 PHONE NUMBER 1 TYPE OWNER (URBAN OPTIONAL Collected in NRS, PNW, RMRS, SRS)
When available, record whether the phone number is a work, home, mobile, or other number.

When collected: NRS, PNW, RMRS, SRS When PHONE NUMBER 1 OWNER is recorded
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

1 Work
2 Home
3 Mobile
4 Other
Null values are permissible

A13.42 PHONE NUMBER 1 TYPE CONTACT (CORE OPTIONAL)
When available, record whether the phone number is a work, home, mobile, or other number.

When collected: When PHONE NUMBER 1 CONTACT is recorded
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

1	Work
2	Home
3	Mobile
4	Other
	Null values are permissible

A13.43 PHONE COUNTRY CODE 2 OWNER (CORE OPTIONAL)
Record the country code for PHONE NUMBER 2 OWNER. Country code for US is 001.

When collected: When a PHONE NUMBER 2 OWNER is recorded
Field width: 3 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Numbers

A13.44 PHONE COUNTRY CODE 2 CONTACT (CORE OPTIONAL)
Record the country code for PHONE NUMBER 2 CONTACT. Country code for US is 001.

When collected: When a PHONE NUMBER 2 CONTACT is recorded
Field width: 3 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Numbers

A13.45 PHONE NUMBER 2 OWNER (URBAN OPTIONAL Collected in NRS, PNW, RMRS, SRS)
When available, record the secondary phone number for the record, including area code. If available, record the extension in PHONE NUMBER 2 EXTENSION OWNER. It should be formatted as follows: (123) 456-7890.

When collected: NRS, PNW, RMRS, SRS When available and OWNERSHIP TYPE = 1
Field width: 20 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Numbers and the special characters '-' (dash) and "()" (parentheses). Null values are permissible

A13.46 PHONE NUMBER 2 CONTACT (CORE OPTIONAL)
When available, record the secondary phone number for the record, including area code. If available, record the extension in PHONE NUMBER 2 EXTENSION CONTACT. It should be formatted as follows: (123) 456-7890 .

When collected: When available and OWNERSHIP TYPE = 2
Field width: 20 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Numbers and the special characters '-' (dash) and "()" (parentheses). Null values are permissible.

A13.47 PHONE NUMBER 2 EXTENSION OWNER (URBAN OPTIONAL Collected in NRS, PNW, RMRS, SRS)
When available, record the extension associated with the secondary phone number for the record.

When collected: NRS, PNW, RMRS, SRS When PHONE NUMBER 2 OWNER is recorded and includes an extension
Field width: 5 digits
Tolerance: No errors
MQO: At least 95% of the time
Values: Numbers. Null values are permissible

A13.48 PHONE NUMBER 2 EXTENSION CONTACT (CORE OPTIONAL)
When available, record the extension associated with the secondary phone number for the record.

When collected: When PHONE NUMBER 2 CONTACT is recorded and includes an extension
Field width: 5 digits
Tolerance: No errors
MQO: At least 95% of the time
Values: Numbers. Null values are permissible

A13.49 PHONE NUMBER 2 TYPE OWNER (URBAN OPTIONAL Collected in NRS, PNW, RMRS, SRS)
When available, record whether the phone number is a work, home, mobile, or other number.

When collected: NRS, PNW, RMRS, SRS When PHONE NUMBER 2 OWNER is recorded
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

1 Work
2 Home
3 Mobile
4 Other
Null values are permissible

A13.50 PHONE NUMBER 2 TYPE CONTACT (CORE OPTIONAL)
When available, record whether the phone number is a work, home, mobile, or other number.

When collected: When PHONE NUMBER 2 CONTACT is recorded
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

1	Work
2	Home
3	Mobile
4	Other
	Null values are permissible

A13.51 E-MAIL ADDRESS OWNER (URBAN OPTIONAL Collected in NRS, PNW, RMRS, SRS)
When available, record the e-mail address for the record.

When collected: NRS, PNW, RMRS, SRS When available and OWNERSHIP TYPE = 1
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters. Null values are permissible

A13.52 E-MAIL ADDRESS CONTACT (CORE OPTIONAL)
When available, record the e-mail address for the record.

When collected: When available and OWNERSHIP TYPE = 2
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters. Null values are permissible

A13.53 MERIDIAN (CORE OPTIONAL) Not Collected in URBAN FIA

A13.54 TOWNSHIP (URBAN OPTIONAL Collected in NRS, PNW)
Record the Township that, in conjunction with MERIDIAN, RANGE, SECTION, QUARTER SECTION, QUARTER-QUARTER SECTION, and QUARTER-QUARTER-QUARTER SECTION, can be used to relocate the ownership information. The information should be recorded as the number followed by a cardinal direction (e.g., 4N). This information is only applicable to parts of the United States that use the TRS cadastral system.

When collected: NRS, PNW All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNERSHIP TYPE = 1)
Field width: 4 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters and numbers

A13.55 RANGE (URBAN OPTIONAL Collected in NRS, PNW)
Record the Range that, in conjunction with MERIDIAN, TOWNSHIP, SECTION, QUARTER SECTION, QUARTER-QUARTER SECTION, and QUARTER-QUARTER-QUARTER SECTION, can be used to relocate the ownership information. The information should be recorded as the number followed by a cardinal direction (e.g., 10W). This information is only applicable to parts of the United States that use the TRS cadastral system.

When collected: NRS, PNW All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNER TYPESHIP = 1)
Field width: 4 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters and numbers

A13.56 SECTION (URBAN OPTIONAL Collected in NRS, PNW)
Record the Section that, in conjunction with MERIDIAN, TOWNSHIP, RANGE, QUARTER SECTION, QUARTER-QUARTER SECTION, and QUARTER-QUARTER-QUARTER SECTION, can be used to relocate the ownership information. This information is only applicable to parts of the United States that use the TRS cadastral system.

When collected: NRS, PNW All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNERSHIP TYPE = 1)
Field width: 2 digits
Tolerance: No errors
MQO: At least 95% of the time
Values: 01 - 36

A13.57 QUARTER SECTION+U (URBAN OPTIONAL Collected in NRS, PNW)
QUARTER SECTION and QUARTER QUARTER SECTION have been combined in the PDR.

Record the Quarter Section that, in conjunction with MERIDIAN, TOWNSHIP, RANGE, SECTION, QUARTER-QUARTER SECTION, and QUARTER-QUARTER-QUARTER SECTION, can be used to relocate the ownership information. This information is only applicable to parts of the United States that use the TRS cadastral system.

When collected: NRS, PNW All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNERSHIP TYPE = 1)
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

1 NE
2 SE
3 SW
4 NW

A13.58 QUARTER QUARTER SECTION (URBAN OPTIONAL Collected in NRS, PNW)
Record the Section that, in conjunction with MERIDIAN, TOWNSHIP, RANGE, SECTION, QUARTER SECTION, and QUARTER-QUARTER-QUARTER SECTION, can be used to relocate the ownership information. This information is only applicable to parts of the United States that use the TRS cadastral system.

When collected: NRS, PNW All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNERSHIP TYPE = 1)
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

1 NE
2 SE
3 SW
4 NW

A13.59 QUARTER QUARTER QUARTER SECTION (CORE OPTIONAL) Not Collected in URBAN FIA

A13.60 MAP NUMBER (URBAN OPTIONAL Collected in NRS, PNW, SRS)
Record the map number that, in conjunction with BLOCK NUMBER and PARCEL NUMBER, can be used to relocate the ownership information. This is most useful in the parts of the United States that use metes and bounds cadastral systems.

When collected: NRS, PNW, SRS All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNERSHIP TYPE = 1)
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.61 BLOCK NUMBER (CORE OPTIONAL) Not Collected in URBAN FIA

A13.62 PARCEL NUMBER (URBAN OPTIONAL Collected in NRS, PNW, RMRS, SRS)
Record the parcel number that, in conjunction with MAP NUMBER, and BLOCK NUMBER, can be used to relocate the ownership information. This is most useful in the parts of the United States that use metes and bounds cadastral systems.

When collected: NRS, PNW, RMRS, SRS All ownerships recorded for a plot (OWNER CLASS ≥ 11 and OWNERSHIP TYPE = 1)
Field width: 255 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Letters, numbers, and special characters

A13.63 TRACT SIZE (CORE OPTIONAL) Not Collected in URBAN FIA

A13.64 TRACT PERCENT FOREST COVER (CORE OPTIONAL) Not Collected in URBAN FIA

A13.65 NOTES
Record any notes that should be conveyed about the ownership and/or contact data.

When collected: All ownerships and contacts recorded for a plot (OWNER CLASS ≥ 11 and OWNERSHIP TYPE ≥ 1)
Field width: 2000 characters
Tolerance: N/A
MQO: N/A
Values: English language words, phrases and numbers. Null values are permissible

A13.66 OWNERSHIP CONTACT DATE (URBAN OPTIONAL Collected in NRS, PNW)
Record the date of the attempted ownership contact.

When collected: NRS, PNW When an ownership contact attempt has been made
Field width: 11 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Date

A13.66.1U OWNER CONTACT MONTH

A13.66.2U OWNER CONTACT DAY

A13.66.3U OWNER CONTACT YEAR

A13.67 OWNERSHIP CONTACT METHOD (URBAN OPTIONAL Collected in NRS, PNW)
Record the code identifying how the ownership was contacted.

When collected: NRS, PNW All ownerships contacted
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

1 In person
2 Left voice message
3 Spoke to by phone
4 Sent email
5 Sent postal mail
6 Message received on phone
7 Message received via return email
8 Message received via return mail
9 Other (notes required)

A13.68 ACCESS GRANTED (URBAN OPTIONAL Collected in NRS, PNW)
Record the code identifying if a representative of the ownership granted us access to their land. If the ownership allows access under specific arrangements (ACCESS GRANTED = 2), then record the specific arrangements in ACCESS NOTES.

When collected: NRS, PNW All ownerships contacted
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

0	No
1	Yes
2	Conditional yes (record conditions in access notes)

A13.69 ACCESS GRANTED DATE URBAN OPTIONAL Collected in NRS, PNW)
Record the date access was granted. Date should be in the form DD-MON-YYYY.

When collected: NRS, PNW When access has been granted (ACCESS GRANTED = 1 or 2)
Field width: 11 characters
Tolerance: No errors
MQO: At least 95% of the time
Values: Date

A13.69.1U ACCESS GRANTED MONTH (URBAN OPTIONAL Collected in NRS, PNW)

A13.69.2U ACCESS GRANTED DAY (URBAN OPTIONAL Collected in NRS, PNW)

A13.69.3U ACCESS GRANTED YEAR (URBAN OPTIONAL Collected in NRS, PNW)

A13.70 ACCESS NOTES (URBAN OPTIONAL Collected in NRS, PNW, SRS)
Record any other information relevant to contacting and accessing the plot.

When collected: NRS, PNW, SRS All ownerships contacted
Field width: 2,000 characters
Tolerance: N/A
MQO: N/A
Values: English language words, phrases and numbers. Null values are permissible

A13.71 OWNERSHIP REQUESTS NOTICE (URBAN OPTIONAL Collected in NRS, PNW)
Record the code identifying if the ownership wants to be notified before we access their land.

When collected: NRS, PNW All ownerships contacted
Field width: 1 digit
Tolerance: No errors
MQO: At least 95% of the time
Values:

0	No
1	Yes

A13.72 OWNERSHIP REQUESTS INFORMATION (CORE OPTIONAL) Not Collected in URBAN FIA

A13.73 Supplemental Information for Ownership Prefield Procedures

A13.73.1 FIA Ownership Data Recording Examples

OWNER NAME will be auto-filled. The crew will enter the name based on OWNER CLASS. For example, if the OWNER CLASS = 45 than FIRST, MIDDLE, and LAST NAME will appear on the PDR screen. If OWNER CLASS 11 is entered, the Agency will appear on the PDR screen.

1. U.S. Forest Service

Owner class 11

AGENCY (OWNER NAME): USDA Forest Service

MANAGEMENT UNIT (OWNER SUBNAME): Siuslaw National Forest, Hebo Ranger District

2. State Forestry Agency

Owner class 31

AGENCY (OWNER NAME): Pennsylvania Department of Conservation and Natural Resources

MANAGEMENT UNIT (OWNER SUBNAME): William Penn State Forest

ADDRESS COUNTRY:

3. Company with c/o

Owner class: 41

Company 1 (OWNER NAME): Generic Tree Company

Company 2 (OWNER SUBNAME): Central Hardwoods Unit

ATTENTION: c/o Jane Doe, Chief Forester

4. Single individual

OWNER NAME (Read-only, auto-filled): Mr John D Doe

First : Mr. John

Middle: D.

Last: Doe

5. Multiple individuals

OWNER NAME (Read-only, auto-filled): Jane and Jack Doe

First: Jane and Jack

Middle:

Last: Doe

6. Estate

OWNER NAME (Read-only, auto-filled): Jennifer A Smith Estate

First: Jennifer

Middle: A

Last: Smith Estate

A13.73.2 Two-letter Abbreviations for U.S. States, Territories, and Protectorates

Source: National Institute of Standards and Technology. 1987. Codes for the identification of the States, District of Columbia and the outlying areas of the United States, and associated areas. Washington, DC: U.S. Department of Commerce, National Institute of Standards and Technology. Federal Information Processing Standards (FIPS) Publication 5-2. http://www.itl.nist.gov/fipspubs/fip5-2.htm (last accessed: March 28, 2007)

Name	Code	Name	Code
Alabama	AL	New Jersey	NJ
Alaska	AK	New Mexico	NM
Arizona	AZ	New York	NY
Arkansas	AR	North Carolina	NC
California	CA	North Dakota	ND
Colorado	CO	Ohio	OH
Connecticut	CT	Oklahoma	OK
Delaware	DE	Oregon	OR
District of Columbia	DC	Pennsylvania	PA
Florida	FL	Rhode Island	RI
Georgia	GA	South Carolina	SC
Hawaii	HI	South Dakota	SD
Idaho	ID	Tennessee	TN
Illinois	IL	Texas	TX
Indiana	IN	Utah	UT
Iowa	IA	Vermont	VT
Kansas	KS	Virginia	VA
Kentucky	KY	Washington	WA
Louisiana	LA	West Virginia	WV
Maine	ME	Wisconsin	WI
Maryland	MD	Wyoming	WY
Massachusetts	MA	American Samoa	AS
Michigan	MI	Federated States of Micronesia	FM
Minnesota	MN	Guam	GU
Mississippi	MS	Marshall Islands	MH
Missouri	MO	Northern Mariana Islands	MP
Montana	MT	Palau	PW
Nebraska	NE	Puerto Rico	PR
Nevada	NV	U.S. Minor Outlying Islands	UM
New Hampshire	NH	Virgin Islands of the U.S.	VI

A13.73.3 Country Codes

Source: International Organization for Standardization. 2006. Codes for the representation of names of countries and their subdivisions – Part 1: Country codes. Geneva, Switzerland: International Organization for Standardization. ISO 3166-1: 2006. 69 p.

Country	Code	Country	Code
Afghanistan	AF	Liberia	LR
Åland Islands	AX	Libyan Arab Jamahiriya	LY
Albania	AL	Liechtenstein	LI
Algeria	DZ	Lithuania	LT
American Samoa	AS	Luxembourg	LU
Andorra	AD	Macao	MO
Angola	AO	Macedonia, The Former Yugoslav Republic of	MK
Anguilla	AI	Madagascar	MG
Antarctica	AQ	Malawi	MW
Antigua and Barbuda	AG	Malaysia	MY
Argentina	AR	Maldives	MV
Armenia	AM	Mali	ML
Aruba	AW	Malta	MT
Australia	AU	Marshall Islands	MH
Austria	AT	Martinique	MQ
Azerbaijan	AZ	Mauritania	MR
Bahamas	BS	Mauritius	MU
Bahrain	BH	Mayotte	YT
Bangladesh	BD	Mexico	MX
Barbados	BB	Micronesia, Federated States of	FM
Belarus	BY	Moldova, Republic of	MD
Belgium	BE	Monaco	MC
Belize	BZ	Mongolia	MN
Benin	BJ	Montenegro	ME
Bermuda	BM	Montserrat	MS
Bhutan	BT	Morocco	MA
Bolivia	BO	Mozambique	MZ
Bosnia and Herzegovina	BA	Myanmar	MM
Botswana	BW	Namibia	NA
Bouvet Island	BV	Nauru	NR
Brazil	BR	Nepal	NP
British Indian Ocean Territory	IO	Netherlands	NL
Brunei Darussalam	BN	Netherlands Antilles	AN
Bulgaria	BG	New Caledonia	NC
Burkina Faso	BF	New Zealand	NZ
Burundi	BI	Nicaragua	NI
Cambodia	KH	Niger	NE
Cameroon	CM	Nigeria	NG
Canada	CA	Niue	NU
Cape Verde	CV	Norfolk Island	NF
Cayman Islands	KY	Northern Mariana Islands	MP
Central African Republic	CF	Norway	NO
Chad	TD	Oman	OM
Chile	CL	Pakistan	PK
China	CN	Palau	PW
Christmas Island	CX	Palestinian Territory, Occupied	PS
Cocos (Keeling) Islands	CC	Panama	PA
Colombia	CO	Papua New Guinea	PG
Comoros	KM	Paraguay	PY
Congo	CG	Peru	PE
Congo, The Democratic Republic of The	CD	Philippines	PH
Cook Islands	CK	Pitcairn	PN

Country	Code	Country	Code
Costa Rica	CR	Poland	PL
Côte D'Ivoire	CI	Portugal	PT
Croatia	HR	Puerto Rico	PR
Cuba	CU	Qatar	QA
Cyprus	CY	Réunion	RE
Czech Republic	CZ	Romania	RO
Denmark	DK	Russian Federation	RU
Djibouti	DJ	Rwanda	RW
Dominica	DM	Saint Helena	SH
Dominican Republic	DO	Saint Kitts and Nevis	KN
Ecuador	EC	Saint Lucia	LC
Egypt	EG	Saint Pierre and Miquelon	PM
El Salvador	SV	Saint Vincent and The Grenadines	VC
Equatorial Guinea	GQ	Samoa	WS
Eritrea	ER	San Marino	SM
Estonia	EE	Sao Tome and Principe	ST
Ethiopia	ET	Saudi Arabia	SA
Falkland Islands (Malvinas)	FK	Senegal	SN
Faroe Islands	FO	Serbia	RS
Fiji	FJ	Seychelles	SC
Finland	FI	Sierra Leone	SL
France	FR	Singapore	SG
French Guiana	GF	Slovakia	SK
French Polynesia	PF	Slovenia	SI
French Southern Territories	TF	Solomon Islands	SB
Gabon	GA	Somalia	SO
Gambia	GM	South Africa	ZA
Georgia	GE	South Georgia and The South Sandwich Islands	GS
Germany	DE	Spain	ES
Ghana	GH	Sri Lanka	LK
Gibraltar	GI	Sudan	SD
Greece	GR	Suriname	SR
Greenland	GL	Svalbard and Jan Mayen	SJ
Grenada	GD	Swaziland	SZ
Guadeloupe	GP	Sweden	SE
Guam	GU	Switzerland	CH
Guatemala	GT	Syrian Arab Republic	SY
Guernsey	GG	Taiwan, Province of China	TW
Guinea	GN	Tajikistan	TJ
Guinea-Bissau	GW	Tanzania, United Republic of	TZ
Guyana	GY	Thailand	TH
Haiti	HT	Timor-Leste	TL
Heard Island and Mcdonald Islands	HM	Togo	TG
Holy See (Vatican City State)	VA	Tokelau	TK
Honduras	HN	Tonga	TO
Hong Kong	HK	Trinidad and Tobago	TT
Hungary	HU	Tunisia	TN
Iceland	IS	Turkey	TR
India	IN	Turkmenistan	TM
Indonesia	ID	Turks and Caicos Islands	TC
Iran, Islamic Republic of	IR	Tuvalu	TV

Country	Code	Country	Code
Iraq	IQ	Uganda	UG
Ireland	IE	Ukraine	UA
Isle of Man	IM	United Arab Emirates	AE
Israel	IL	United Kingdom	GB
Italy	IT	United States	US
Jamaica	JM	United States Minor Outlying Islands	UM
Japan	JP	Uruguay	UY
Jersey	JE	Uzbekistan	UZ
Jordan	JO	Vanuatu	VU
Kazakhstan	KZ	Vatican City State See Holy See	
Kenya	KE	Venezuela	VE
Kiribati	KI	Viet Nam	VN
Korea, Democratic People's Republic of	KP	Virgin Islands, British	VG
Korea, Republic of	KR	Virgin Islands, U.S.	VI
Kuwait	KW	Wallis and Futuna	WF
Kyrgyzstan	KG	Western Sahara	EH
Lao People's Democratic Republic	LA	Yemen	YE
Latvia	LV	Zaire See Congo, The Democratic Republic of The	
Lebanon	LB	Zambia	ZM
Lesotho	LS	Zimbabwe	ZW

A13.73.4 Meridian Codes Not Collected in URBAN FIA

APPENDIX 14. CHANGES IN THE SPECIES CODE LIST (APPENDIX 3) BEGINNING IN VERSION 9.0 (OCTOBER, 2019)

FIA Code	Common Name	Genus	Species	Kind of Change	Last field guide before change	Field guide in which change was made
10	Fir spp.	Abies	spp.	deleted	8.0	9.0
40	cedar spp.	Chamaecyparis	spp.	deleted	8.0	9.0
50	cypress	Cupressus	spp.	deleted	8.0	9.0
53	Tecate cypress	Cupressus	forbesii	capitalized common name	8.0	9.0
57	redcedar, juniper spp.	Juniperus	spp.	deleted	8.0	9.0
70	larch spp.	Larix	spp.	added NFS region exclusions	9.0	9.1
71	tamarack	Larix	laricina	change in common name	9.0	9.1
74	Japanese larch	Larix	kaempferi	added	-	9.0
75	Siberian larch	Larix	sibirica	added	-	9.0
90	spruce spp.	Picea	spp.	deleted	8.0	9.0
100	pine spp.	Pinus	spp.	deleted	8.0	9.0
141	papershell pinyon pine	Pinus	remota	removed capitalization in common name	9.0	9.1
144	Honduras pine	Pinus	elliottii	change in common name	8.0	9.0
200	Douglas-fir spp.	Pseudotsuga	spp.	deleted	8.0	9.0
220	cypress spp.	Taxodium	spp.	deleted	8.0	9.0
230	yew spp.	Taxus	spp.	deleted	8.0	9.0
240	Thuja spp.	Thuja	spp.	deleted	8.0	9.0
250	torreya (nutmeg) spp.	Torreya	spp.	deleted	8.0	9.0
260	hemlock spp.	Tsuga	spp.	deleted	8.0	9.0
299	unknown dead conifer	Tree	evergreen	Deleted; added back – 2/4/2020 revision;	8.0	9.0 2/4/2020 revision
299	unknown dead conifer	Tree	evergreen	deleted non-urban exclusion and removed capitalization in common name	9.0 2/4/2020 revision	9.1

FIA Code	Common Name	Genus	Species	Kind of Change	Last field guide before change	Field guide in which change was made
300	acacia spp.	Acacia	spp.	added non-urban exclusion and deleted NFS region exclusion	8.0	9.0 2/4/2020 revision
300	acacia spp.	Acacia	spp.	deleted woodland designation	9.0 2/4/2020	9.1
300	acacia spp.	Acacia	spp.	deleted non-urban exclusion and added Islands only species designation	9.1	9.2
304	catclaw acacia	Acacia	greggii	deleted	8.0	9.0
310	maple spp.	Acer	spp.	deleted	8.0	9.0
321	Rocky Mountain maple	Acer	glabrum	deleted	8.0	9.0
330	buckeye, horsechestnut spp.	Aesculus	spp.	deleted	8.0	9.0
336	red buckeye	Aesculus	pavia	deleted	8.0	9.0
337	painted buckeye	Aesculus	sylvatica	deleted	8.0	9.0
350	alder spp.	Alnus	spp.	deleted	8.0	9.0
360	Madrone spp.	Arbutus	spp.	deleted	8.0	9.0
370	birch spp.	Betula	spp.	deleted	8.0	9.0
376	resin birch	Betula	neoalaskana	new common name	8.0	9.0
378	northwestern paper birch	Betula	x utahensis	changed hydrid symbol to lower case	8.0	9.0
400	hickory spp.	Carya	spp.	deleted	8.0	9.0
420	chestnut spp.	Castanea	spp	deleted	8.0	9.0
450	catalpa spp.	Catalpa	spp.	deleted	8.0	9.0
460	hackberry spp.	Celtis	spp.	deleted	8.0	9.0
461	sugarberry	Celtis	laevigata	added NFS region exclusions	9.0	9.1

FIA Code	Common Name	Genus	Species	Kind of Change	Last field guide before change	Field guide in which change was made
461	sugarberry	Celtis	laevigata	deleted region 4 from NFS region exclusion (now Mainland NFS P2/3 Sub-lists)	9.1	9.2
463	netleaf hackberry	Celtis	laevigata var reticulata	deleted	8.0	9.0
463	netleaf hackberry	Celtis	laevigata var reticulata	added back	9.0	9.1
463	netleaf hackberry	Celtis	laevigata var reticulata	deleted region 4 from NFS region exclusion (now Mainland NFS P2/3 Sub-lists)	9.1	9.2
490	dogwood spp.	Cornus	spp.	deleted	8.0	9.0
500	hawthorn spp.	Crataegus	spp.	added NFS region exclusion	9.0	9.1
508	oneseed hawthorn	Crataegus	monogyna	deleted non-urban exclusion and added 4, 5, 6 to NFS region Sub-list	9.1	9.2
510	eucalyptus spp.	Eucalyptus	spp.	added NFS region exclusion	9.0	9.1
520	persimmon spp.	Diospyros	spp.	deleted	8.0	9.0
522	Texas persimmon	Diospyros	texana	marked as woodland	8.0	9.0
523	Anacua knockaway	Ehretia	anacua	change in common name	8.0	9.0
540	ash spp.	Fraxinus	spp.	deleted	8.0	9.0
550	locust spp.	Gleditsia	spp.	deleted	8.0	9.0
580	silverbell spp.	Halesia	spp.	deleted	8.0	9.0
583	little silverbell	Halesia	parviflora	deleted	8.0	9.0
600	walnut spp.	Juglans	spp.	deleted	8.0	9.0
650	magnolia spp.	Magnolia	spp.	deleted	8.0	9.0
680	mulberry spp.	Morus	spp.	deleted	8.0	9.0
690	tupelo spp.	Nyssa	spp.	deleted	8.0	9.0
715	Matenus palauica	Maytenus	palauica	added	-	9.0
718	kesiamel	Osmoxylon	truncatum	added	-	9.0

FIA Code	Common Name	Genus	Species	Kind of Change	Last field guide before change	Field guide in which change was made
720	bay spp.	Persea	spp.	deleted	8.0	9.0
729	sycamore spp.	Platanus	spp.	deleted	8.0	9.0
740	cottonwood and poplar spp.	Populus	spp.	deleted	8.0	9.0
745	plains cottonwood	Populus	deltoides ssp monilifera	deleted	8.0	9.0
755	mesquite spp.	Prosopis	spp.	deleted	8.0	9.0
760	cherry and plum spp.	Prunus	spp.	added NFS region exclusions	9.0	9.1
763	chokecherry	Prunus	virginiana	change in common name	8.0	9.0
763	chokecherry	Prunus	virginiana	deleted region 4 from NFS region exclusion (now Mainland NFS P2/3 Sub-lists)	9.1	9.2
768	bitter cherry	Prunus	emarginata	deleted region 4 from NFS region exclusion (now Mainland NFS P2/3 Sub-lists)	9.1	9.2
770	Chickasaw plum	Prunus	angustifolia	deleted	9.0	9.1
771	sweet cherry	Prunus	avium	change in common name	9.0	9.1
772	sour cherry	Prunus	cerasus	change in common name	9.0	9.1
772	sour cherry	Prunus	cerasus	deleted non-urban exclusion and added 3, 6, 8 to NFS region Sub-list	9.1	9.2
773	European plum	Prunus	domestica	change in common name	9.0	9.1
774	Mahaleb cherry	Prunus	mahaleb	change in common name	9.0	9.1
800	oak spp.	Quercus	spp.	deleted	8.0	9.0
805	canyon live oak	Quercus	chrysolepis	added NFS region exclusion	9.0	9.1

FIA Code	Common Name	Genus	Species	Kind of Change	Last field guide before change	Field guide in which change was made
828	Texas red oak	Quercus	texana	change in common name	8.0	9.0
834	Shumard oak	Quercus	shumardii	new common name	8.0	9.0
845	dwarf chinkapin oak	Quercus	prinoides	added NFS region exclusion	9.0	9.1
852	sea torchwood	Amyris	elemifera	change in common name	8.0	9.0
853	pond-apple	Annona	glabra	change in common name	8.0	9.0
853	pond-apple	Annona	glabra	hyphen added to common name	8.0	9.0
855	sheoak spp.	Casuarina	spp.	deleted	8.0	9.0
857	belah	Casuarina	lepidophloia	new common name	8.0	9.0
858	camphortree	Cinnamomum	camphora	space deleted in common name	8.0	9.0
859	fiddlewood	Citharexylum	fruticosum	deleted	8.0	9.0
863	pigeon plum, tietongue	Coccoloba	diversifolia	change in common name	8.0	9.0
865	largeleaf geigertree	Cordia	sebestena	change in common name	8.0	9.0
876	Florida strangler fig	Ficus	aurea	change in common name	8.0	9.0
877	wild banyantree, shortleaf fig,	Ficus	citrifolia	change in common name	8.0	9.0
882	beeftree, longleaf blolly	Guapira	discolor	change in common name	8.0	9.0
886	Florida poisontree	Metopium	toxiferum	change in common name	8.0	9.0
888	octopus tree, schefflera	Schefflera	actinophylla	change in common name	8.0	9.0
895	paradisetree	Simarouba	glauca	change in common name	8.0	9.0

FIA Code	Common Name	Genus	Species	Kind of Change	Last field guide before change	Field guide in which change was made
902	New Mexico locust	Robinia	neomexicana	deleted non-urban exclusion and added 3, 4, 5, 8 to NFS region Sub-list	9.1	9.2
906	Everglades palm, paurotis-palm	Acoelorraphe	wrightii	new common name	8.0	9.0
907	Florida silver palm	Coccothrinax	argentata	new common name	8.0	9.0
915	other palms	Family Arecaceae	not listed above	deleted	9.0	9.1
920	willow spp.	Salix	spp.	deleted	8.0	9.0
923	Bebb willow	Salix	bebbiana	deleted	8.0	9.0
924	Bonpland willow	Salix	bonplandiana	change in common name	8.0	9.0
924	Bonpland willow	Salix	bonplandiana	deleted	9.0	9.1
925	coastal plain willow	Salix	caroliniana	added NFS region exclusion	9.0	9.1
928	Scouler's willow	Salix	scouleriana	deleted	9.1	9.2
929	weeping willow	Salix	x sepulcralis	change in speices name	9.0	9.1
934	mountain ash spp	Sorbus	spp	deleted	8.0	9.0
940	West Indian mahogany	Swietenia	mahagoni	change in common name	8.0	9.0
950	basswood spp.	Tilia	spp.	deleted	8.0	9.0
970	elm spp.	Ulmus	spp.	deleted	8.0	9.0
981	California laurel	Umbellularia	californica	deleted hyphen from common name	9.0	9.1
982	Joshua tree	Yucca	brevifolia	deleted	8.0	9.0
986	black-mangrove	Avicennia	germinans	hyphen added to common name	8.0	9.0
986	black mangrove	Avicennia	germinans	deleted hyphen from common name	9.0	9.1
987	buttonwood-mangrove	Conocarpus	erectus	hyphen added to common name	8.0	9.0

FIA Code	Common Name	Genus	Species	Kind of Change	Last field guide before change	Field guide in which change was made
988	white mangrove	Laguncularia	racemosa	deleted hyphen from common name	9.0	9.1
990	desert ironwood	Olneya	tesota	deleted	8.0	9.0
991	saltcedar	Tamarix	spp.	deleted	8.0	9.0
998	Unknown dead hardwood	Tree	broadleaf	added non-urban exclusion and deleted NFS region exclusion	8.0	9.0 2/4/2020 revision
998	Unknown dead hardwood	Tree	broadleaf	deleted non-urban exclusion and removed capitalization in common name	9.0	9.1
999	other or unknown live tree	Tree	unknown	removed capitalization in common name	9.0	9.1
999	other or unknown live tree	Tree	unknown	changed mainland exclusion designation to Islands only species	9.1	9.2
5091	Washington hawthorn	Crataegus	phaenopyrum	deleted	8.0	9.0
5146	vine maple	Acer	circinatum	Deleted; added back – 2/4/2020 revision	8.0	9.0 2/24/2020 revision
5164	bottlebrush buckeye	Aesculus	parviflora	deleted	9.0	9.1
5188	gray alder	Alnus	incana	deleted	9.0	9.1
5190	hazel alder	Alnus	serrulata	deleted	8.0	9.0
5192	green alder	Alnus	viridus	deleted	9.1	9.2
5233	devil's walkingstick	Aralia	spinosa	deleted	8.0	9.0
5322	fountain butterflybush	Buddleja	alternifolia	deleted	8.0	9.0
5328	South American jelly palm	Butia	capitate	added	-	9.0
5246	smallflower pawpaw	Asimina	parviflora	deleted	9.0	9.1
5260	eastern baccharis	Baccharis	halimifolia	deleted	9.0	9.1
5329	common box	Buxus	sempervirens	deleted	9.0	9.1

FIA Code	Common Name	Genus	Species	Kind of Change	Last field guide before change	Field guide in which change was made
5363	camellia	Camellia	japonica	deleted	9.0	9.1
5364	tea	Camellia	sinensis	deleted	9.0	9.1
5415	snowbrush ceanothus	Ceanothus	velutinus	deleted	8.0	9.0
5432	common buttonbush	Cephalanthus	occidentalis	deleted	8.0	9.0
5436	California redbud	Cercis	orbiculata	deleted	9.1	9.2
5444	sawara-cypress	Chamaecyparis	pisifera	added	-	9.0
	desert willow	Chilopsis	linearis	deleted	8.0	9.0
5529	mountain sweetpepperbush	Clethra	acuminate	deleted	9.0	9.1
5776	storehousebush	Cudrania	tricuspidata	added NFS region exclusion	9.0	9.1
6009	black wattle	Acacia	mangium	new common name	8.0	9.0
6029	beadtree	Adenanthera	spp.	deleted	8.0	9.0
6043	mesecheues	Aglaia	palauensis	deleted	8.0	9.0
6047	Aglaia	Aglaia	spp.	deleted	8.0	9.0
6051	ailanthus	Ailanthus	spp.	deleted	8.0	9.0
6058	ukall ra ngebard	Albizia	falcataria	deleted	8.0	9.0
6063	albizia	Albizia	spp.	deleted	8.0	9.0
6068	Japanese fern tree	Filicium	decipiens	added	9.0	9.1
6073	alectryon	Alectryon	spp.	deleted	8.0	9.0
6077	aleurites	Aleurites	spp.	deleted	8.0	9.0
6083	Allophylus	Allophylus	spp.	deleted	8.0	9.0
6090	Alphitonia	Alphitonia	spp.	deleted	8.0	9.0
6097	alstonia	Alstonia	spp.	deleted	8.0	9.0
6106	anacardium	Anacardium	Spp.	deleted	9.0	9.1
6130	Annona	Annona	spp.	deleted	8.0	9.0
6142	Antidesma ponapense	Antidesma	ponapense	deleted	8.0	9.0
6144	Antidesma sphaerocarpum	Antidesma	sphaerocarpum	deleted	8.0	9.0
6145	chinalaurel	Antidesma	spp.	deleted	8.0	9.0
6154	parana pine	Araucaria	angustifolia	moved from Hardwood section in Appendix 3 to the Softwood section	9.0	9.1

FIA Code	Common Name	Genus	Species	Kind of Change	Last field guide before change	Field guide in which change was made
6156	Norfolk Island Pine	Araucaria	excelsa	deleted	8.0	9.0
6157	Norfolk Island Pine	Araucaria	heterophylla	moved from Hardwood section in Appendix 3 to the Softwood section	9.0	9.1
6158	Araucaria	Araucaria	spp.	deleted	8.0	9.0
6161	shoebutton	Ardisia	elliptica	added mainland exclusion	9.0	9.1
6161	shoebutton	Ardisia	elliptica	Mainland exclusion changed to Islands only species	9.1	9.2
6166	marlberry	Ardisia	spp.	deleted	8.0	9.0
6178	meduu	Artocarpus	spp.	deleted	8.0	9.0
6186	mesekui	Astronidium	palauense	corrected common name spelling	9.0	9.1
6189	Astronidium	Astronidium	spp.	deleted	8.0	9.0
6199	Averrhoa	Averrhoa	spp.	deleted	8.0	9.0
6205	Avicennia	Avicennia	spp.	deleted	8.0	9.0
6216	common bamboo	Bambusa	vulgaris	deleted	8.0	9.0
6223	Barringtonia	Barringtonia	spp	deleted	8.0	9.0
6225	Bauhinia binata	Bauhinia	binata	deleted	8.0	9.0
6230	bauhinia	Bauhinia	spp.	deleted	8.0	9.0
6234	bog spicebush	Lindera	subcoriacea	deleted	8.0	9.0
6237	bishopwood	Bischofia	spp.	deleted	8.0	9.0
6239	bixa	Bixa	spp.	deleted	8.0	9.0
6245	ahakea	Bobea	spp.	deleted	8.0	9.0
6248	bocconia	Bocconia	spp.	deleted	8.0	9.0
6268	Oriental mangrove	Bruguiera	sexangular	added	9.0	9.1
6268	Oriental mangrove	Bruguiera	sexangula	corrected spelling of scientific species name from sexangular to sexangula	9.1	9.2

FIA Code	Common Name	Genus	Species	Kind of Change	Last field guide before change	Field guide in which change was made
6269	bruguiera	Bruguiera	spp.	deleted	8.0	9.0
6280	Buchanania	Buchanania	spp.	deleted	8.0	9.0
6286	dogtail	Buddleja	asiatica	deleted	8.0	9.0
6304	Puerto Rico box	Buxus	portoricensis	deleted	8.0	9.0
6337	Caloncoba echinata	Caloncoba	echinata	deleted	8.0	9.0
6345	calophyllum	Calophyllum	spp.	deleted	8.0	9.0
6347	calotropis	Calotropis	spp.	deleted	8.0	9.0
6367	kelela charm, kiu	Campnosperma	brevipetiolata	deleted	8.0	9.0
6377	Canarium	Canarium	spp.	deleted	8.0	9.0
6380	wild cinnamon	Canella	winterana	corrected species spelling	9.0	9.1
6398	scorpionbush	Carmona	spp.	deleted	8.0	9.0
6400	Caryota	Caryota	spp.	deleted	8.0	9.0
6408	Casearia	Casearia	spp.	deleted	8.0	9.0
6420	kassod tree	Cassia	siamea	deleted	8.0	9.0
6422	Cassia	Cassia	spp.	deleted	8.0	9.0
6437	gagu, australian pine	Casuarina	litorea	moved from Softwood section in Appendix 3 to the Hardwood section	9.0	9.1
6438	catberry	Ilex	mucronata	deleted	8.0	9.0
6444	pumpwood	Cecropia	spp.	deleted	8.0	9.0
6459	chuti	Cerbera	dilatata	deleted	8.0	9.0
6463	Cerbera spp	Cerbera	spp.	deleted	8.0	9.0
6470	sweetpotato cactus	Cereus	spp.	deleted	8.0	9.0
6474	day jessamine	Cestrum	diurnum	added mainland exclusion	9.0	9.1
6474	day jessamine	Cestrum	diurnum	changed mainland exclusion designation to Islands only species	9.1	9.2
6478	jessamine	Cestrum	spp.	deleted	8.0	9.0
6479	Knowlton's hophornbeam	Ostrya	knowltonii	deleted	8.0	9.0
6496	sandmat	Chamaesyce	spp.	deleted	8.0	9.0

FIA Code	Common Name	Genus	Species	Kind of Change	Last field guide before change	Field guide in which change was made
6503	papala	Charpentiera	spp.	deleted	8.0	9.0
6513	cheirodendron	Cheirodendron	spp.	deleted	8.0	9.0
6518	goosefoot	Chenopodium	spp.	deleted	8.0	9.0
6524	Chinese fringetree	Chionanthus	retusus	deleted non-urban exclusion and added 8 to NFS region Sub-list	9.1	9.2
6535	icaco coco plum	Chrysobalanus	icaco	added mainland exclusion	9.0	9.1
6535	icaco coco plum	Chrysobalanus	icaco	changed mainland exclusion designation to Islands only species	9.1	9.2
6553	cinchona	Cinchona	spp.	deleted	8.0	9.0
6563	cinnamon	Cinnamomum	spp.	deleted	8.0	9.0
6568	fiddlewood	Citharexylum	spp.	deleted	8.0	9.0
6569	threespike fiddlewood	Citharexylum	tristachyum	deleted	8.0	9.0
6573	key lime	Citrus	x aurantiifolia	changed hydrid symbol to lower case	8.0	9.0
6573	key lime	Citrus	x aurantiifolia	put space between x and species name in table	9.0	9.1
6574	sour orange	Citrus	x aurantium	changed hydrid symbol to lower case	8.0	9.0
6574	sour orange	Citrus	x aurantium	put space between x and species name in table	9.0	9.1
6575	lemon	Citrus	x limon	changed hydrid symbol to lower case	8.0	9.0

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6575	lemon	Citrus	x limon	put space between x and species name in table	9.0	9.1
6576	grapefruit	Citrus	x paradisi	changed hydrid symbol to lower case	8.0	9.0
6576	grapefruit	Citrus	x paradisi	put space between x and species name in table	9.0	9.1
6577	sweet orange	Citrus	x sinensis	changed hydrid symbol to lower case	8.0	9.0
6577	sweet orange	Citrus	x sinensis	put space between x and species name in table	9.0	9.1
6578	grapefruit, kahet magas	Citrus	grandis	deleted	8.0	9.0
6592	claoxylon	Claoxylon	spp.	deleted	8.0	9.0
6595	Cleistanthus	Cleistanthus	spp.	deleted	8.0	9.0
6596	oha wai nui Clermontia	Clermontia	x leptoclada	corrected species name	9.0	9.1
6632	stickbush	Clerodendrum	chinense	deleted	8.0	9.0
6634	turks turbin	Clerodendrum	indicum	deleted	8.0	9.0
6642	soapbush	Clidemia	hirta	deleted	8.0	9.0
6652	attorney	Clusia	spp.	deleted	8.0	9.0
6653	deepwoods fern	Cnemidaria	horrida	deleted	8.0	9.0
6670	seagrape	Coccoloba	uvifera	added a mainland exclusion	9.0	9.1
6670	seagrape	Coccoloba	uvifera	changed mainland exclusion designation to Islands only species	9.1	9.2
6681	coconut palm	Cocos	spp.	deleted	8.0	9.0

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6687	coffee	Coffea	spp.	deleted	8.0	9.0
6693	common snakebark	Colubrina	arborescens	change in common name	8.0	9.0
6694	Asian nakedwood	Colubrina	asiatica	deleted	8.0	9.0
6699	nakedwood	Colubrina	spp.	deleted	8.0	9.0
6700	Urban's nakedwood	Colubrina	verrucosa	deleted	8.0	9.0
6702	ochaol	Combretum	tetralophum	deleted	8.0	9.0
6708	Mexican plum	Prunus	mexicana	added	-	9.0
6709	mangrove	Conocarpus	spp.	deleted	8.0	9.0
6739	Puerto Rico manjack	Cordia	rupicola	deleted	8.0	9.0
6741	cordia	Cordia	spp.	deleted	8.0	9.0
6745	cordyline	Cordyline	spp.	deleted	9.0	9.1
6748	roughleaf dogwood	Cornus	drummondii	deleted	9.0	9.1
6755	corynocarpus	Corynocarpus	spp.	deleted	8.0	9.0
6759	Stansbury cliffrose	Purshia	stansburiana	deleted	8.0	9.0
6772	croton	Croton	spp.	deleted	8.0	9.0
6783	cryptocarya	Cryptocarya	spp.	deleted	8.0	9.0
6785	Havard oak	Quercus	havardii	deleted	8.0	9.0
6787	Japanese cedar	Cryptomeria	spp.	deleted	8.0	9.0
6852	queen sago	Cycas	circinalis	new species name	8.0	9.0
6854	Cycas	Cycas	spp.	deleted	8.0	9.0
6856	Micronesian cycad, fadang	Cycas	micronesica	added	9.1	9.2
6862	swamp titi	Cyrilla	racemiflora	changed mainland exclusion designation to Islands only species	9.1	9.2
6863	cyrtandra	Cyrtandra	pulchella	deleted	8.0	9.0
6866	cyrtandra	Cyrtandra	spp.	deleted	8.0	9.0
6884	delonix	Delonix	spp.	deleted	8.0	9.0
6887	Dendrocnide	Dendrocnide	spp.	deleted	8.0	9.0
6918	common buckthorn	Rhamnus	cathartica	added NFS region exclusion	9.0	9.1

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6924	staghorn sumac	Rhus	typhina	deleted	8.0	9.0
6942	Drypetes	Drypetes	spp.	deleted	8.0	9.0
6945	Dubautia	Dubautia	x fallax	corrected species name	9.0	9.1
6955	crack willow	Salix	fragilis	added	-	9.0
6959	Geyer willow	Salix	geyeriana	deleted	8.0	9.0
6971	Dysoxylum	Dysoxylum	spp.	deleted	8.0	9.0
6972	Dysoxylum mollissimum ssp Molle	Dysoxylum	mollissimum	new common name	8.0	9.0
6983	Elaeocarpus	Elaeocarpus	spp.	deleted	8.0	9.0
6991	red elderberry	Sambucus	racemosa			
6992	utuutu	Eleocharis	dulcis	deleted	8.0	9.0
6966	yellow butterfly palm	Dypsis	lutescens	new common name	9.0	9.1
6999	loquat	Eriobotrya	spp.	deleted	8.0	9.0
7013	erythrina	Erythrina	spp.	deleted	8.0	9.0
7016	tiger's claw	Erythrina	variegata	corrected species name spelling	8.0	9.0
7023	Argentine senna	Senna	corymbosa	deleted	9.0	9.1
7059	edebsachel, chedebsachel	Eugenia	aquea	deleted	8.0	9.0
7068	lathberry	Eugenia	cordata	new common name	8.0	9.0
7082	makupa, malay apple	Eugenia	malaccensis	deleted	8.0	9.0
7083	bigleaf snowball	Styrax	grandifolius	deleted	9.0	9.1
7104	Surinam cherry	Eugenia	uniflora	added mainland exclusion	9.0	9.1
7104	Surinam cherry	Eugenia	uniflora	changed mainland exclusion designation to Islands only species	9.1	9.2
7117	Longan	Euphoria	longana	deleted	8.0	9.0
7120	eurya	Eurya	spp.	deleted	8.0	9.0
7127	Euodia	Euodia	spp.	deleted	8.0	9.0
7132	exocarpos	Exocarpos	spp.	deleted	8.0	9.0

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7143	Fagraea	Fagraea	spp.	deleted	8.0	9.0
7145	peacocksplume	Falcataria	spp.	deleted	8.0	9.0
7182	burr daisytree	Fitchia	speciosa	corrected common name	9.0	9.1
7196	Florida swamprivet	Forestiera	segregata	added mainland exclusion	9.0	9.1
7193	bushweed	Flueggea	spp.	deleted	8.0	9.0
7196	Florida swampprivet	Forestiera	segregata	changed mainland exclusion designation to Islands only species	9.1	9.2
7200	California buckthorn	Frangula	californica	deleted	8.0	9.0
7205	Goodding's ash	Fraxinus	gooddingii	deleted	8.0	9.0
7209	fuchsia	Fuchsia	spp.	deleted	8.0	9.0
7216	garcinia	Garcinia	myrtifolia	added a common name	9.0	9.1
7221	Garcinia	Garcinia	spp.	deleted	8.0	9.0
7246	lotebush	Ziziphus	obtusifolia	deleted	8.0	9.0
7253	Gmelina	Gmelina	spp.	deleted	8.0	9.0
7264	upland cotton	Gossypium	hirsutum	added mainland exclusion and corrected common name	9.0	9.1
7264	upland cotton	Gossypium	hirsutum	changed mainland exclusion designation to Islands only species	9.1	9.2
7274	grevillea	Grevillea	spp.	deleted	8.0	9.0
7275	fau ui	Grewia	crenata	deleted	8.0	9.0
7279	lignum-vitae	Guajacum	officinale	corrected genus spelling	8.0	9.0
7312	Guioa	Guioa	spp.	deleted	8.0	9.0
7328	mountain silverbell	Halesia	tetraptera	deleted	9.0	9.1

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7329	Ozark witchhazel	Hamamelis	vernalis	deleted	8.0	9.0
7330	scarletbush	Hamelia	patens	added mainland exclusion	9.0	9.1
7330	scarletbush	Hamelia	patens	changed mainland exclusion designation to Islands only species	9.1	9.2
7331	American witchhazel	Hamamelis	virginiana	deleted	8.0	9.0
7340	Hedycarya	Hedycarya	spp.	deleted	8.0	9.0
7350	heliocarpus	Heliocarpus	spp.	deleted	8.0	9.0
7362	Heritiera	Heritiera	spp.	deleted	8.0	9.0
7367	Hernandia	Hernandia	spp.	deleted	8.0	9.0
7373	island-aster	Hesperomannia	spp.	deleted	8.0	9.0
7374	toyon	Heteromeles	arbutifolia	deleted	9.0	9.1
7376	toyon	Heteromeles	spp.	deleted	8.0	9.0
7389	hau kuahiwi	Hibiscadelphus	x puakuahiwi	corrected species name	9.0	9.1
7390	hibiscadelphus	Hibiscadelphus	spp.	deleted	8.0	9.0
7408	Dixie rosemallow	Hibiscus	mutabilis	added mainland exclusion	9.0	9.1
7408	Dixie rosemallow	Hibiscus	mutabilis	changed mainland exclusion designation to Islands only species	9.1	9.2
7410	shoeblackplant	Hibiscus	rosa-sinensis	added mainland exclusion	9.0	9.1
7410	shoeblackplant	Hibiscus	rosa-sinensis	changed mainland exclusion designation to Islands only species	9.1	9.2
7411	rosemallow	Hibiscus	spp.	deleted	8.0	9.0

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7431	Horsfieldia	Horsfieldia	spp.	deleted	8.0	9.0
7440	nightblooming cactus	Hylocereus	spp.	deleted	8.0	9.0
7441	nightblooming cactus	Hylocereus	undatus	deleted	8.0	9.0
7442	West Indian locust, Brazilian cherry, stinkingtoe	Hymenaea	courbaril	change to common name	8.0	9.0
7448	Canary Island St Johnswort	Hypericum	canariense	deleted	8.0	9.0
7455	dahoon	Ilex	cassine	added mainland exclusion	9.0	9.1
7455	dahoon	Ilex	cassine	changed mainland exclusion designation to Islands only species	9.1	9.2
7464	holly	Ilex	spp.	deleted	8.0	9.0
7466	Ilex urbaniana	Ilex	urbaniana var riedlaei	deleted	8.0	9.0
7469	yaupon	Iiex	vomitoria	added non-urban exclusion	8.0	9.0 2/4/2020 revision
7469	yaupon	Iiex	vomitoria	deleted non-urban exclusion and added 8 to NFS region Sub-list	9.0 2/4/2020 revision	9.2
7483	jacaranda	Jacaranda	spp.	deleted	8.0	9.0
7486	Bermuda juniper	Juniperus	bermudiana	added	9.0	9.1
7490	chirriador	Jacquinia	umbellata	deleted	8.0	9.0
7493	coralbush	Jatropha	multifida	added mainland exclusion	9.0	9.1
7493	coralbush	Jatropha	multifida	changed mainland exclusion designation to Islands only species	9.1	9.2
7494	nettlespurge	Jatropha	spp.	deleted	8.0	9.0

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7497	ketenguit	Kayea	pacifica	corrected common name	9.0	9.1
7508	Koanophyllon polyodon	Koanophyllon	polyodon	deleted	8.0	9.0
7513	treecotton	Kokia	spp.	deleted	8.0	9.0
7517	Kunzea	Kunzea	spp.	deleted	8.0	9.0
7566	leadtree	Leucaena	spp.	deleted	8.0	9.0
7574	Amur privet	Ligustrum	amurense	deleted	8.0	9.0
7575	Chinese privet	Ligustrum	sinense	deleted	8.0	9.0
7576	privet	Ligustrum	spp.	deleted	8.0	9.0
7577	Japanese privet	Ligustrum	japonicum	deleted non-urban exclusion and added 8 to NFS region Sub-list	9.0	9.2
7578	glossy privet	Ligustrum	lucidum	deleted non-urban exclusion and added 8 to NFS region Sub-list	9.1	9.2
7579	California privet	Ligustrum	ovalifolium	deleted	9.1	9.2
7580	southern spicebush	Lindera	melissifolia	deleted	8.0	9.0
7587	Litsea	Litsea	spp.	deleted	8.0	9.0
7598	Egg Fruit / Canistel	Lucuma	nervosa	deleted	8.0	9.0
7604	lunania	Lunania	spp.	deleted	8.0	9.0
7616	Macadamia	Macadamia	spp.	deleted	8.0	9.0
7623	macaranga	Macaranga	spp.	deleted	8.0	9.0
7631	star magnolia	Magnolia	stellata	added	-	9.0
7634	Chinese magnolia	Magnolia	x soulangiana	added	-	9.0
7637	Oyama magnolia	Magnolia	sieboldii	deleted	9.1	9.2
7638	Mallotus palauensis	Mallotus	palauensis	deleted	8.0	9.0
7641	mallotus	Mallotus	spp.	deleted	8.0	9.0
7643	Singapore holly	Malpighia	coccigera	deleted	8.0	9.0
7655	Mammea	Mammea	spp.	deleted	8.0	9.0
7659	mango	Mangifera	spp.	deleted	8.0	9.0
7663	Surinam bulletwood	Manikara	bidenta	new common name	8.0	9.0

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7671	Manilkara	Manilkara	spp.	deleted	8.0	9.0
7680	dermarm	Marattia	fraxinea	deleted	8.0	9.0
7706	Medusanthera	Medusanthera	spp.	deleted	8.0	9.0
7709	melaleuca	Melaleuca	spp.	deleted	8.0	9.0
7716	melia	Melia	spp.	deleted	8.0	9.0
7767	melochia	Melochia	spp.	deleted	8.0	9.0
7768	teabush	Melochia	tomentosa	added mainland exclusion	9.0	9.1
7768	teabush	Melochia	tomentosa	changed mainland exclusion designation to Islands only species	9.1	9.2
7778	Meryta	Meryta	spp.	deleted	8.0	9.0
7793	lehua	Metrosideros	spp.	deleted	8.0	9.0
7800	Metroxylon	Metroxylon	spp.	deleted	8.0	9.0
7842	montanoa	Montanoa	spp.	deleted	8.0	9.0
7845	Wax Myrtle	Morella	cerifera	added mainland exclusion and corrected common name	9.0	9.1
7845	Wax Myrtle	Morella	cerifera	changed mainland exclusion designation to Islands only species	9.1	9.2
7848	bayberry	Morella	spp.	deleted	8.0	9.0
7850	kesengelngel	Morinda	latibractea	new common name	9.0	9.1
7852	morinda	Morinda	spp.	deleted	8.0	9.0
7868	muntingia	Muntingia	spp.	deleted	8.0	9.0
7876	meia	Musa	spp.	deleted	8.0	9.0
7880	Mussaenda frondosa	Mussaenda	frondosa	deleted	8.0	9.0
7882	Mussaenda	Mussaenda	spp.	deleted	8.0	9.0
7884	myoporum	Myoporum	spp.	deleted	8.0	9.0

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7892	rodwood	Myrcia	spp.	deleted	8.0	9.0
7900	sweetgale	Myrica	spp.	deleted	8.0	9.0
7904	Myristica	Myristica	spp.	deleted	8.0	9.0
7912	Myrsine cubana	Myrsine	cubana	added mainland exclusion	9.0	9.1
7912	Myrsine cubana	Myrsine	cubana	changed mainland exclusion designation to Islands only species	9.1	9.2
7927	colicwood	Myrsine	spp.	deleted	8.0	9.0
7956	oleander	Nerium	oleander	deleted	8.0	9.0
7961	nestegis	Nestegis	spp.	deleted	8.0	9.0
7965	tobacco	Nicotiana	spp.	deleted	8.0	9.0
7970	aiea	Nothocestrum	spp.	deleted	8.0	9.0
7977	ochna	Ochna	spp.	deleted	8.0	9.0
7986	yellowwood	Ochrosia	spp.	deleted	8.0	9.0
8000	oleandra fern	Oleandra	neriiformis	deleted	8.0	9.0
8007	olive	Olea	spp.	deleted	8.0	9.0
8010	Homalanthus	Homalanthus	spp.	deleted	8.0	9.0
8011	Ophiorrhiza palauensis	Ophiorrhiza	palauensis	deleted	8.0	9.0
8013	cochineal nopal cactus	Opuntia	cochenillifera	deleted	8.0	9.0
8014	tuna cactus	Opuntia	ficus-indica	deleted	8.0	9.0
8015	common pricklypear	Opuntia	monacantha	deleted	8.0	9.0
8018	pricklypear	Opuntia	spp.	deleted	8.0	9.0
8024	Osmoxylon	Osmoxylon	spp.	deleted	8.0	9.0
8056	ongor	Pandanus	compressus	deleted	8.0	9.0
8057	silaue	Pandanus	cylindricus	deleted	8.0	9.0
8058	kienpel	Pandanus	dilatatus	deleted	8.0	9.0
8059	ongor	Pandanus	divergens	deleted	8.0	9.0
8061	ongor	Pandanus	duriocarpus	deleted	8.0	9.0
8062	moak	Pandanus	enchabiensis	deleted	8.0	9.0
8063	hara	Pandanus	fischerianus	deleted	8.0	9.0
8065	nenketak	Pandanus	hosinoi	deleted	8.0	9.0
8066	pacheren	Pandanus	jaluitensis	deleted	8.0	9.0

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8068	siu	Pandanus	korrensis	deleted	8.0	9.0
8069	lakatwa	Pandanus	lakatwa	deleted	8.0	9.0
8070	erwan, jonmouia	Pandanus	laticanaliculatus	deleted	8.0	9.0
8071	intekul, pasyure	Pandanus	macrocephalus	deleted	8.0	9.0
8073	menne	Pandanus	menne	deleted	8.0	9.0
8075	Pandanus odontoides	Pandanus	odontoides	deleted	8.0	9.0
8079	alwan, kipal, taip	Pandanus	ponapensis	deleted	8.0	9.0
8080	deipw, jomineia	Pandanus	pulposus	deleted	8.0	9.0
8081	pathaplip	Pandanus	rectangulatus	deleted	8.0	9.0
8083	magojokojok	Pandanus	rotundatus	deleted	8.0	9.0
8086	kiparenwel	Pandanus	tolotomensis	deleted	8.0	9.0
8087	mojel	Pandanus	trukensis	deleted	8.0	9.0
8090	berrakelongor	Pandanus	variegatus	deleted	8.0	9.0
8092	lonlin, lajokorer	Pandanus	obliquus	deleted	8.0	9.0
8105	Parinari	Parinari	spp.	deleted	8.0	9.0
8111	Jerusalem thorn	Parkinsonia	aculeata	added NFS region exclusion	9.0	9.1
8112	paloverde	Parkinsonia	spp.	deleted	9.1	9.2
8153	date palm	Phoenix	spp.	deleted	8.0	9.0
8156	Fraser's photinia	Photinia	x fraseri	deleted	8.0	9.0
8180	Pimenta	Pimenta	spp.	deleted	8.0	9.0
8193	Guyanese pepper	Piper	glabrescens	deleted	8.0	9.0
8194	Jamaican pepper	Piper	hispidum	deleted	8.0	9.0
8195	Caracas pepper	Piper	jacquemontianum	deleted	8.0	9.0
8198	Japanese black pine	Pinus	thunbergii	corrected common name	9.0	9.1
8207	pipturus	Pipturus	spp.	deleted	8.0	9.0
8210	piscidia	Piscidia	spp.	deleted	8.0	9.0
8215	catchbirdtree	Pisonia	spp.	deleted	8.0	9.0
8246	mamalava	Planchonella	samoensis	deleted	8.0	9.0
8247	Planchonella	Planchonella	spp.	deleted	8.0	9.0
8252	platydesma	Platydesma	spp.	deleted	8.0	9.0
8263	hala pepe	Pleomele	spp.	deleted	8.0	9.0
8269	Plumeria obtusa	Plumeria	obtusa	corrected species name spelling	8.0	9.0
8272	Plumeria	Plumeria	spp.	deleted	8.0	9.0

FIA Code	Common Name	Genus	Species	Kind of Change	Last field guide before change	Field guide in which change was made
8276	Poitea punicea	Poitea	punicea	deleted	8.0	9.0
8284	panax,geranium aralia	Polyscias	guilfoylei	change to common name	8.0	9.0
8294	Ponapea	Ponapea	spp.	deleted	8.0	9.0
8296	hardy orange	Poncirus	trifoliata	deleted	9.0	9.1
8306	pouteria	Pouteria	spp.	deleted	8.0	9.0
8310	Premna	Premna	spp.	deleted	8.0	9.0
8341	fua lole	Procris	pedunculata	deleted	8.0	9.0
8345	Carolina laurelcherry	Prunus	caroliniana	deleted non-urban exclusion and added 8 to NFS region Sub-list	9.1	9.2
8394	thicket wild coffee	Psychotria	microdon	deleted	8.0	9.0
8403	common hoptree	Ptelea	trifoliata	deleted	8.0	9.0
8406	pteralyxia	Pteralyxia	spp.	deleted	8.0	9.0
8418	Ptychosperma	Ptychosperma	spp.	deleted	8.0	9.0
8420	pear	Pyrus	Spp.	species name capitalized	8.0	9.0
8425	white indigoberry	Randia	aculeata	added mainland exclusion	9.0	9.1
8425	white indigoberry	Randia	aculeata	changed mainland exclusion designation to Islands only species	9.1	9.2
8435	devils-pepper	Rauvolfia	spp.	deleted	8.0	9.0
8443	reynoldsia	Reynoldsia	spp.	deleted	8.0	9.0
8453	pungent oak	Quercus	pungens	deleted	8.0	9.0
8457	Toumey oak	Quercus	toumeyi	deleted	8.0	9.0
8459	Sonoran scrub oak	Quercus	turbinella	deleted	8.0	9.0
8463	mangrove	Rhizophora	spp.	deleted	8.0	9.0
8465	rose myrtle	Rhodomyrtus	spp.	deleted	8.0	9.0

FIA Code	Common Name	Genus	Species	Kind of Change	Last field guide before change	Field guide in which change was made
8466	Rose Myrtle	Rhodomyrtus	tomentosa	Added NFS region exclusion and corrected common name	9.0	9.1
8468	sumac	Rhus	spp.	deleted	8.0	9.0
8471	Catawba rosebay	Rhododendron	catawbiense	deleted	9.0	9.1
8472	castorbean	Ricinus	communis	added mainland exclusion and deleted NFS region exclusion	9.0	9.1
8472	castorbean	Ricinus	communis	deleted mainland exclusion (now Islands only species)	9.1	9.2
8473	ricinus	Ricinus	spp.	deleted	8.0	9.0
8475	winged sumac	Rhus	copallinum	deleted	8.0	9.0
8477	smooth sumac	Rhus	glabra	deleted	8.0	9.0
8479	prairie sumac	Rhus	lanceolata	Added NFS region exclusion	9.0	9.1
8486	bristly locust	Robinia	hispida	deleted	8.0	9.0
8490	Roystonea elata	Roystonea	elata	new species name	8.0	9.0
8495	dwarf palmetto	Sabal	miinor	deleted	9.0	9.1
8502	pussy willow	Salix	discolor	deleted	8.0	9.0
8504	arroyo willow	Salix	lasiolepis	deleted non-urban exclusion and added 1, 2, 3, 4, 5, 6, 8 to NFS region Sub-list	9.1	9.2
8506	raintree	Samanea	spp.	deleted	8.0	9.0
8507	Sitka willow	Salix	sitchensis	deleted	8.0	9.0
8508	Goodding's willow	Salix	gooddingii	deleted	8.0	9.0
8509	common elderberry	Sambucus	nigra	deleted	8.0	9.0
8510	raintree	Sambucus	spp.	deleted	8.0	9.0
8513	Buckley oak	Quercus	buckleyi	change in common name	8.0	9.0

FIA Code	Common Name	Genus	Species	Kind of Change	Last field guide before change	Field guide in which change was made
8519	yellow willow	Salix	lutea	deleted	8.0	9.0
8523	diamondleaf willow	Salix	planifolia	deleted	8.0	9.0
8524	silky willow	Salix	sericea	deleted	9.0	9.1
8526	sandalwood	Santalum	spp.	deleted	8.0	9.0
8527	European black elderberry	Sambucus	nigra ssp nigra	deleted	8.0	9.0
8531	soapberry	Sapindus	spp.	deleted	8.0	9.0
8534	maskerekur	Sapium	indicum	deleted	8.0	9.0
8555	schaefferia	Schaefferia	spp.	deleted	8.0	9.0
8563	Brazilian peppertree	Schinus	terebinthifolius	added mainland exclusion	9.0	9.1
8563	Brazilian peppertree	Schinus	terebinthifolius	changed mainland exclusion designation to Islands only species	9.1	9.2
8589	flor de San Jose	Senna	atomaria	added mainland exclusion	9.0	9.1
8589	flor de San Jose	Senna	atomaria	changed mainland exclusion designation to Islands only species	9.1	9.2
8592	valamuerto	Senna	pendula	added mainland exclusion	9.0	9.1
8592	valamuerto	Senna	pendula	changed mainland exclusion designation to Islands only species	9.1	9.2
8607	riverhemp	Sesbania	spp.	deleted	8.0	9.0
8609	yellow llima	Sida	fallax	deleted	8.0	9.0
8610	fanpetals	Sida	spp.	deleted	8.0	9.0
8621	Bully tree	Sideroxylon	persimile	added	-	9.0

FIA Code	Common Name	Genus	Species	Kind of Change	Last field guide before change	Field guide in which change was made
8626	Solanum bahamense	Solanum	bahamense	added mainland exclusion	9.0	9.1
8626	Solanum bahamense	Solanum	bahamense	mainland exclusion designation to Islands only species	9.1	9.2
8627	mullein nightshade	Solanum	donianum	added mainland exclusion	9.0	9.1
8627	mullein nightshade	Solanum	donianum	mainland exclusion designation to Islands only species	9.1	9.2
8628	American black nightshade	Solanum	americanum	added mainland exclusion	9.0	9.1
8628	American black nightshade	Solanum	americanum	changed mainland exclusion designation to Islands only species	9.1	9.2
8629	potatotree	Solanum	erianthum	added mainland exclusion	9.0	9.1
8629	potatotree	Solanum	erianthum	changed mainland exclusion designation to Islands only species	9.1	9.2
8631	earleaf nightshade	Solanum	mauritianum	added NFS region exclusion	9.0	9.1
8635	nightshade	Solanum	spp.	deleted	8.0	9.0
8642	necklacepod	Sophora	spp.	deleted	8.0	9.0
8643	silver bush	Sophora	tomentosa	added mainland exclusion	9.0	9.1

FIA Code	Common Name	Genus	Species	Kind of Change	Last field guide before change	Field guide in which change was made
8643	silver bush	Sophora	tomentosa	changed mainland exclusion designation to Islands only species	9.1	9.2
8645	spathodea	Spathodea	spp.	deleted	8.0	9.0
8651	Anacahuita, Texas olive	Cordia	boissieri	new common name	8.0	9.0
8653	Spondias	Spondias	spp.	deleted	8.0	9.0
8658	Greene's mountain ash	Sorbus	scopulina	deleted	8.0	9.0
8659	western mountain ash	Sorbus	sitchensis	deleted	8.0	9.0
8668	silky camellia	Stewartia	malacodendron	deleted	9.0	9.1
8671	streblus	Streblus	spp.	deleted	8.0	9.0
8672	mountain camellia	Stewartia	ovata	deleted	9.0	9.1
8673	American snowball	Styrax	americanus	deleted	9.0	9.1
8676	bay cedar	Suriana	maritima	added mainland exclusion	9.0	9.1
8676	bay cedar	Suriana	maritima	changed mainland exclusion designation to Islands only species	9.1	9.2
8690	turpentine tree	Syncarpia	spp.	deleted	8.0	9.0
8691	miraculous berry	Synsepalum	dulcificum	new common name	9.0	9.1
8718	trumpet-tree	Tabebuia	spp.	deleted	8.0	9.0
8727	Athel tamarisk	Tamarix	aphylla	deleted	8.0	9.0
8728	five-stamen tamarisk	Tamarix	chinensis	deleted	8.0	9.0
8729	saltcedar	Tamarix	ramosissima	deleted	8.0	9.0
8745	tectona	Tectona	spp.	deleted	8.0	9.0
8775	tetraplasandra	Tetraplasandra	spp.	deleted	8.0	9.0
8788	thespesia	Thespesia	spp.	deleted	8.0	9.0
8800	.	Timonius	ledermannii	corrected species spelling		
8804	glorytree	Tibouchina	spp.	deleted	8.0	9.0

FIA Code	Common Name	Genus	Species	Kind of Change	Last field guide before change	Field guide in which change was made
8805	princess-flower	Tibouchina	urvilleana	deleted	8.0	9.0
8811	redcedar	Toona	spp.	deleted	9.0	9.1
8822	olona	Touchardia	latifolia	deleted	8.0	9.0
8823	touchardia	Touchardia	spp.	deleted	8.0	9.0
8826	soldierbush	Tournefortia	spp.	deleted	8.0	9.0
8828	Lamarck's trema	Trema	lamarckiana	corrected species spelling	9.0	9.1
8829	Jamaican nettletree	Trema	micrantha	corrected species spelling	9.0	9.1
8830	poison sumac	Toxicodendron	vernix	deleted	8.0	9.0
8832	trema	Trema	spp.	deleted	8.0	9.0
8842	limeberry	Triphasia	trifolia	deleted	9.0	9.1
8843	Triplaris spp.	Triplaris	spp.	deleted	9.0	9.1
8849	Trukia carolinensis	Trukia	carolinensis	corrected genus spelling	8.0	9.0
8858	urera	Urera	spp.	deleted	8.0	9.0
8860	farkleberry	Vaccinium	arboreum	deleted	9.0	9.1
8870	vernicia	Vernicia	spp.	deleted	8.0	9.0
8875	chastetree	Vitex	spp.	deleted	8.0	9.0
8876	simpleleaf chastetree	Vitex	trifolia	added mainland exclusion	9.0	9.1
8876	simpleleaf chastetree	Vitex	trifolia	changed mainland exclusion designation to Islands only species	9.1	9.1
8877	nannyberry	Viburnum	lentago	deleted	8.0	9.0
8878	blackhaw	Viburnum	prunifolium	deleted	8.0	9.0
8879	rusty blackhaw	Viburnum	rufidulum	deleted	8.0	9.0
8884	ateate	Wedelia	biflora	deleted	8.0	9.0
8901	tallow wood	Ximenia	americana	added mainland exclusion	9.0	9.1

FIA Code	Common Name	Genus	Species	Kind of Change	Last field guide before change	Field guide in which change was made
8901	tallow wood	Ximenia	americana	changed mainland exclusion designation to Islands only species	9.1	9.2
8905	Xylocarpus	Xylocarpus	spp.	deleted	8.0	9.0
8915	xylosma	Xylosma	spp.	deleted	8.0	9.0
8916	aloe yucca	Yucca	aloifolia	added mainland exclusion	9.0	9.1
8916	aloe yucca	Yucca	aloifolia	changed mainland exclusion designation to Islands only species	9.1	9.2
8917	Eve's needle	Yucca	faxoniana	added NFS region exclusions	9.0	9.1
8918	moundlily yucca	Yucca	gloriosa	added mainland exclusion	9.0	9.1
8918	moundlily yucca	Yucca	gloriosa	changed mainland exclusion designation to Islands only species	9.1	9.2
8936	pricklyash	Zanthoxylum	spp.	deleted	8.0	9.0
8942	common pricklyash	Zanthoxylum	americanum	deleted	8.0	9.0 revision (2/4/2020)
8944	Hercules’ club	Zanthoxylum	clava-herculis	deleted	8.0	9.0 revision (2/4/2020)
8947	common jujube	Ziziphus	zizyphus	deleted	8.0	9.0

APPENDIX 15U. 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 U).

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

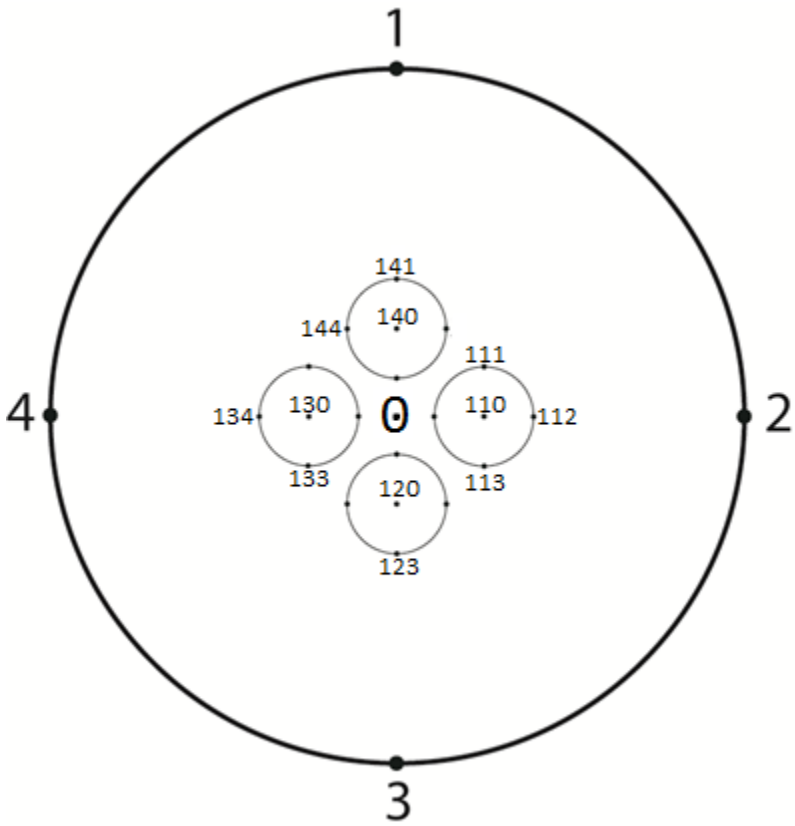


Figure A15-1U. Location of subplot/micro-plot offset points. (Not all offset point numbers are shown here in order to reduce clutter in the figure.)

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 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 A15-2U).

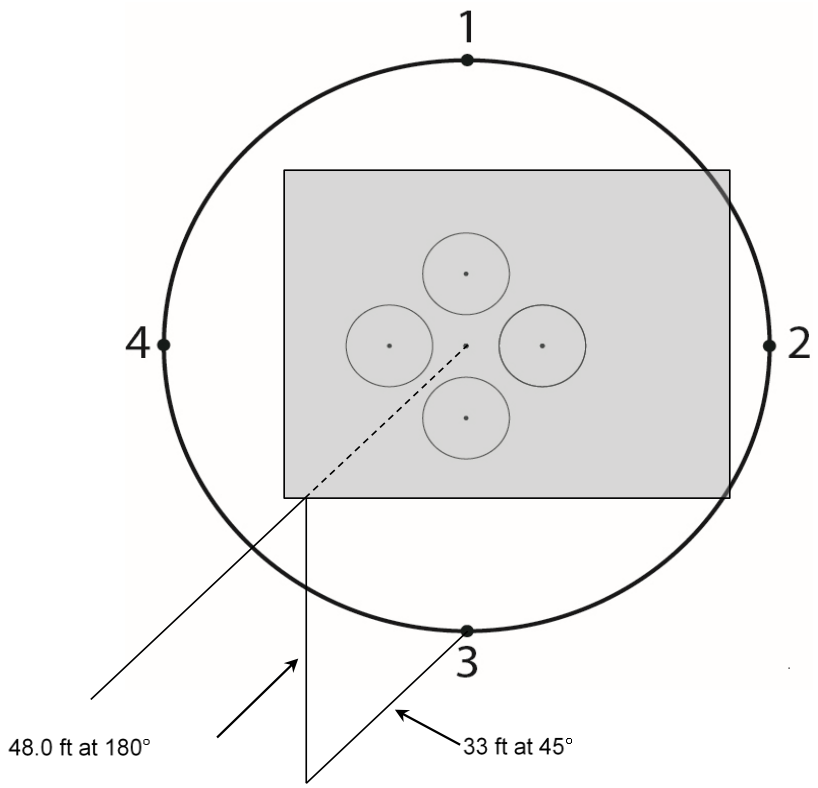


Figure A15-2U. Manually locating offset point #3.

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 known 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 known 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.

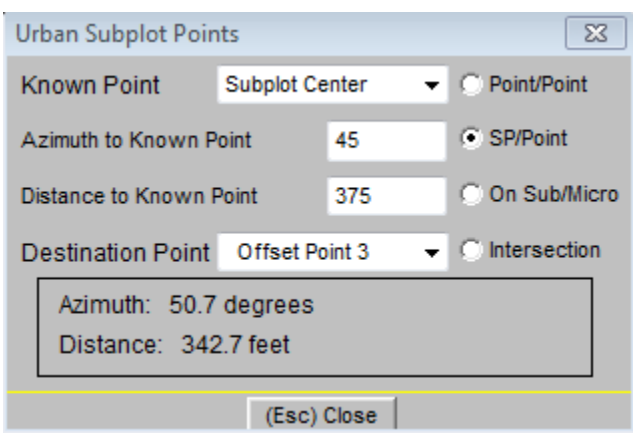


Figure A15-3U. PDR Known Point Tool. In Case 1: Course to Subplot Center is 45 degrees for 375 ft. Due to an obstruction at plot center Offset Point 3 is chosen as the new destination, the PDR provides a course to Offset Point 3.

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 A15-U and Table A15-2U. (Figure A15-4U).

From offset point	To offset point							
	North (1)		East (2)		South (3)		West (4)	
	Azim.	Dist.	Azim.	Dist.	Azim.	Dist.	Azim.	Dist.
	degrees	feet	degrees	feet	degrees	feet	degrees	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 A15-1U. Distances and Azimuths Between Plot Offset Points.

From microplot offset point	To microplot offset point							
	North (1)		East (2)		South (3)		West (4)	
	Azim.	Dist.	Azim.	Dist.	Azim.	Dist.	Azim.	Dist.
	degrees	feet	degrees	feet	degrees	feet	degrees	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 A15-2U. Distances and Azimuths Between Microplot Offset Points.

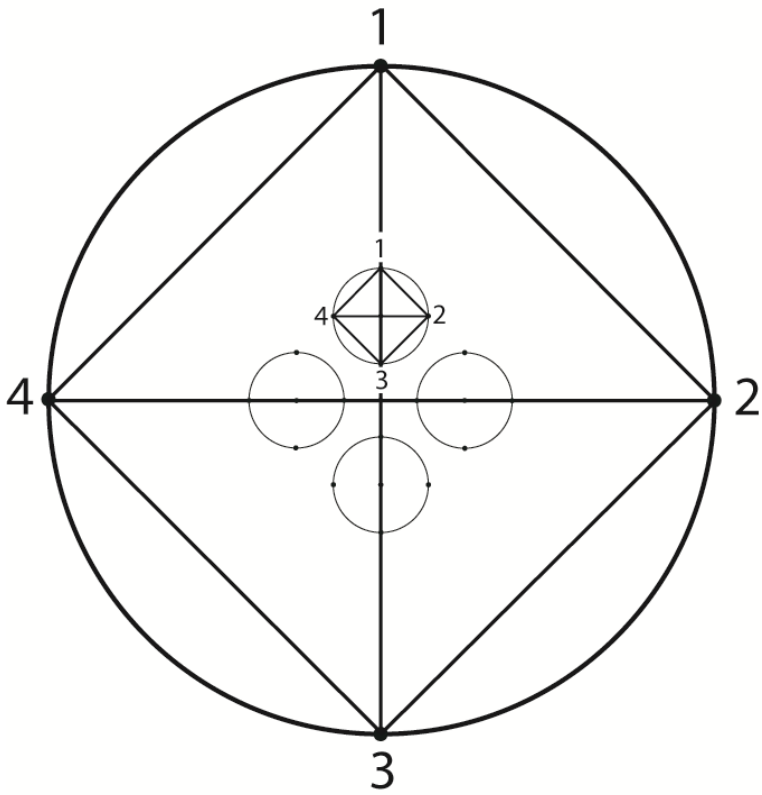


Figure A15-4U. Locating offset points from each other on the same plot.

In Case 2: Once one offset point is determined the location of the other offset points can be found 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:

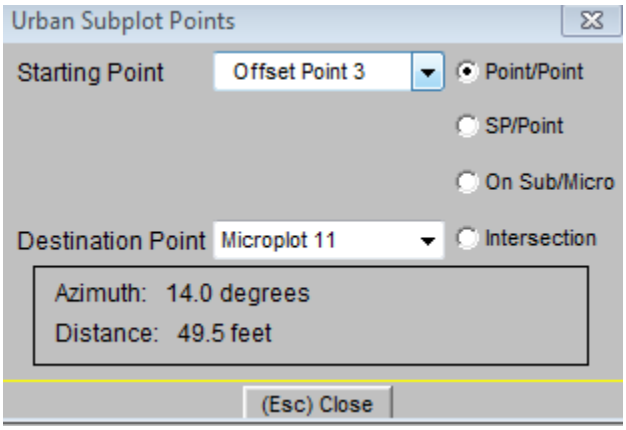


Figure A15-5U. PDR Point to Point Tool.

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 A15-6U).

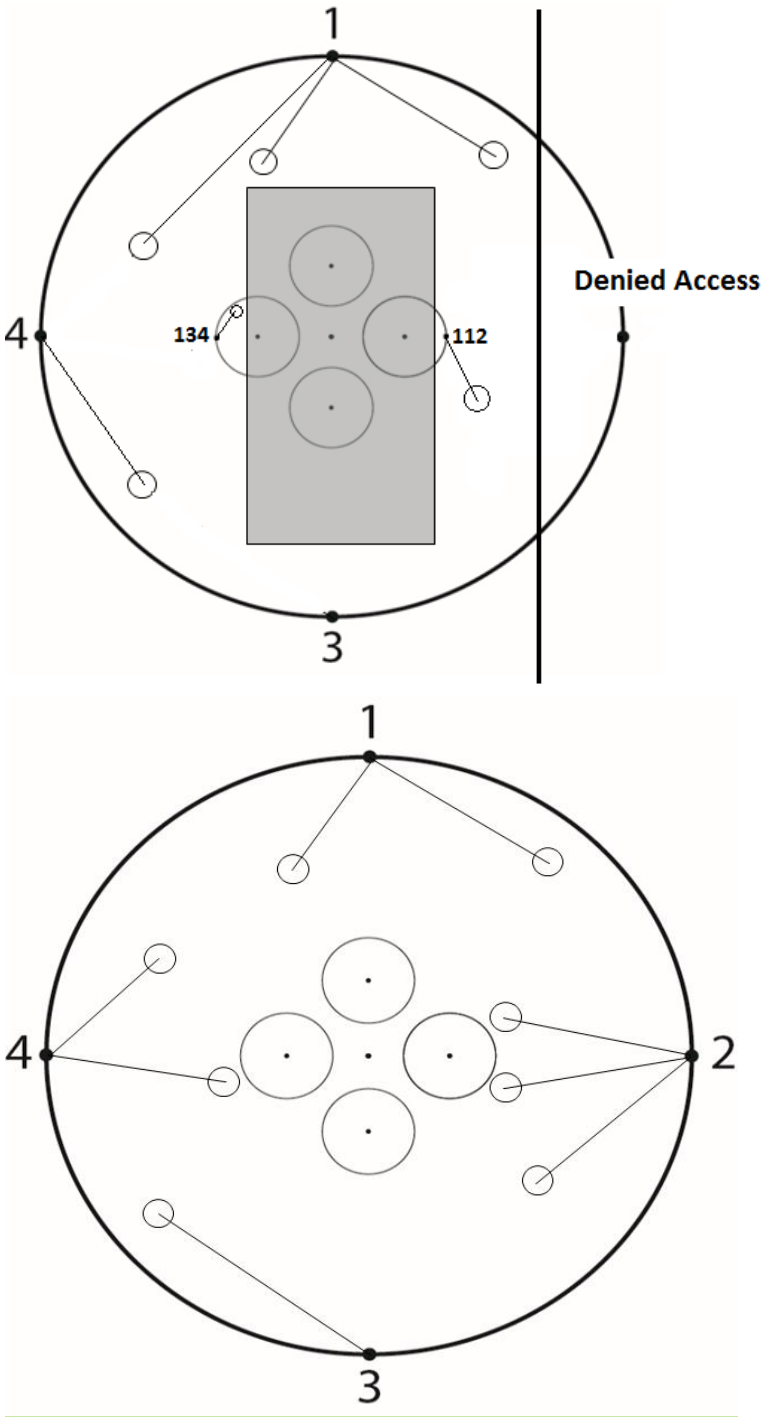


Figure A15-6U. Referencing trees to offset points.

Case 4: Checking limiting distances from offset points without a PDR.

Table A15-3U lists the angle and limiting distance to 18 perimeter points on the plot (Figure A15-7U). 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 A15-3U 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 A15-3U. Limiting Distances to 18 Points on the Plot.

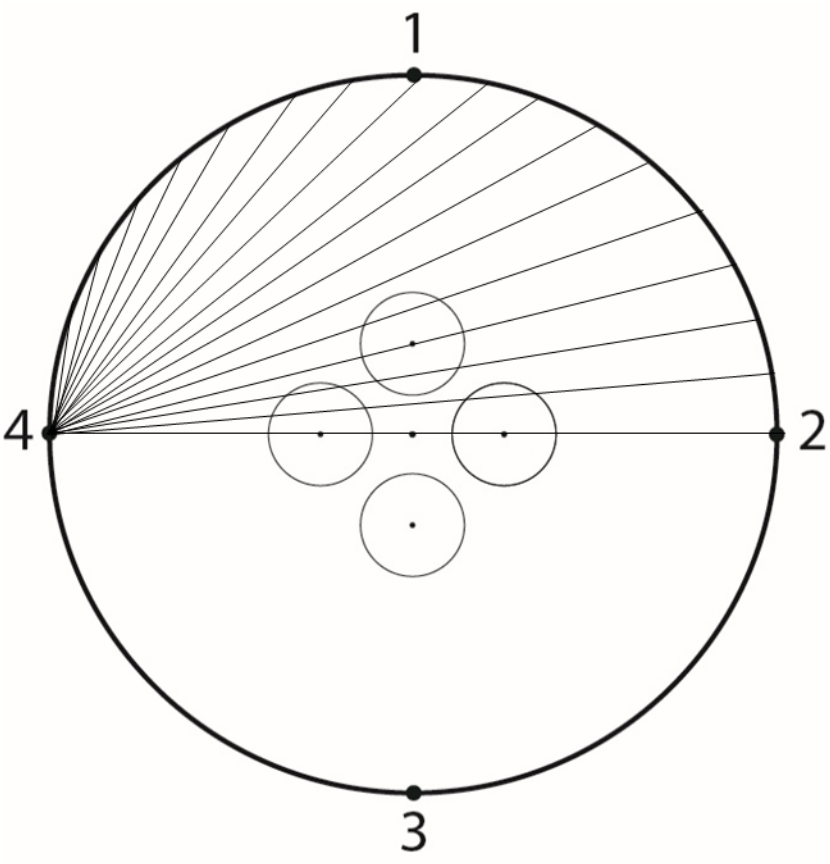


Figure A15-7U. Plot limiting distances from offset point #4

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 A15-4U. 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 A15-5U. 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

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)
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

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)
131	221	311	41	62.98	8.92
132	222	312	42	64.24	9.10
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

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)
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
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

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)
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
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

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)
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 A15-6U. 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.

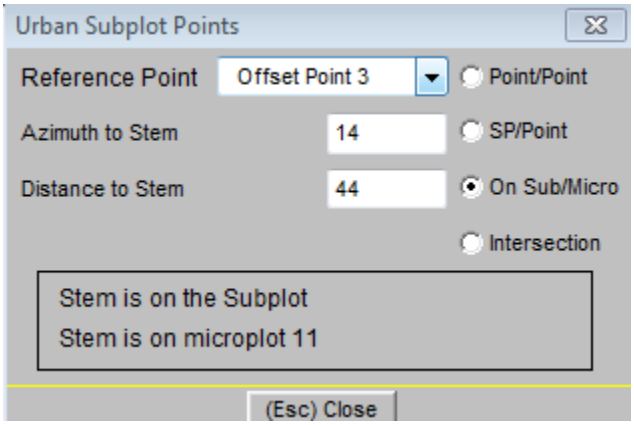
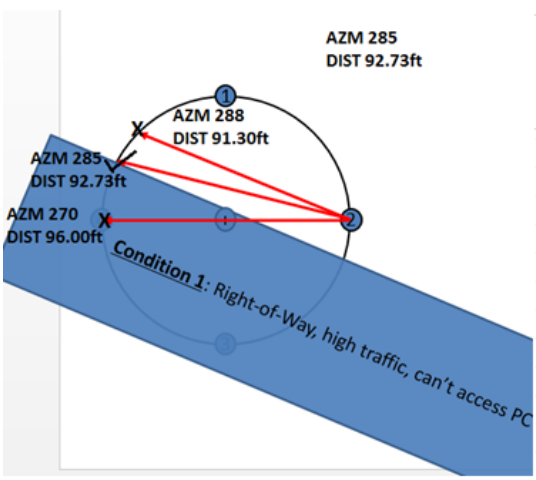


Figure A15-8U. On Sub/Micro PDR Tool.

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 A15-9U). This can be accomplished by using the PDR tools.



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 A15-9U. 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 A15-10U, 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.

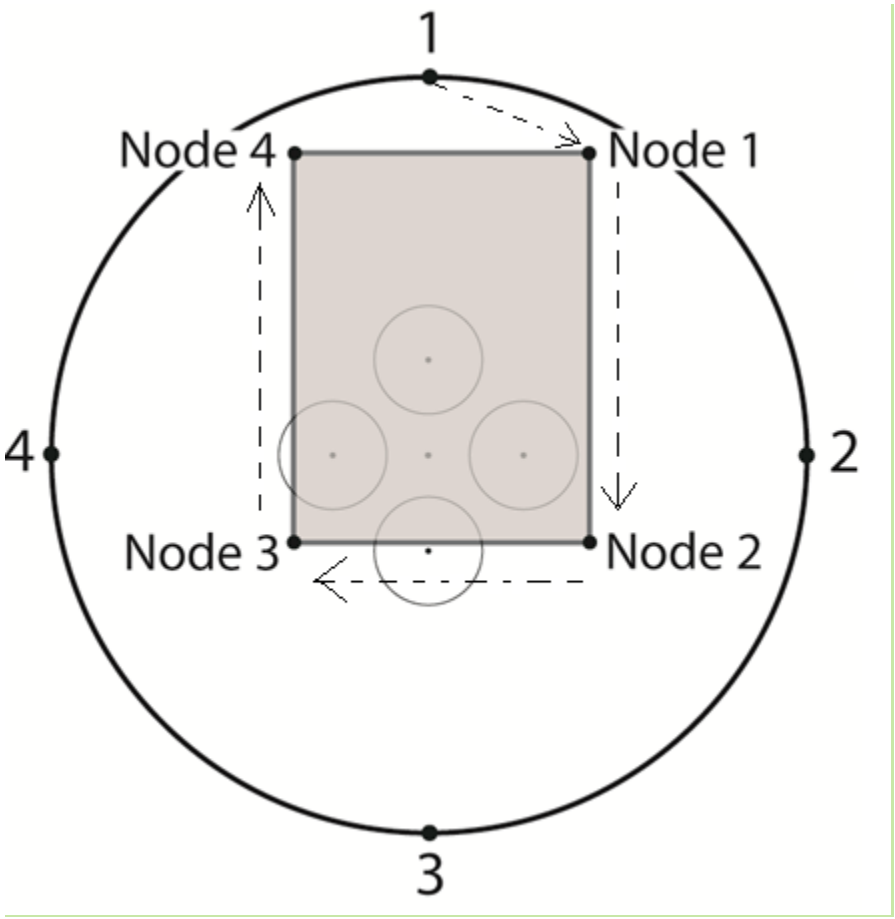


Figure A15-10U. Recording a fully enclosed boundary from offset point 1.

APPENDIX 16U. 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.

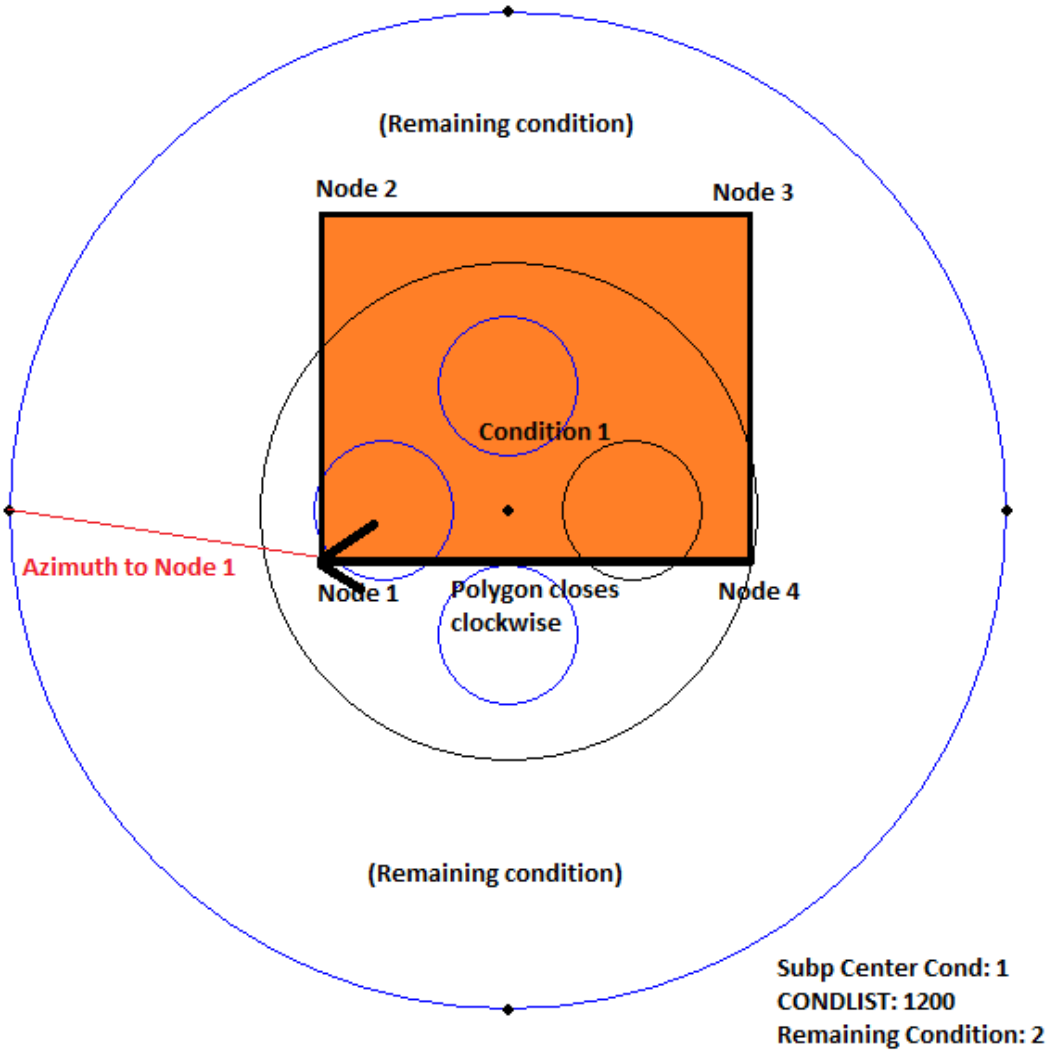


Figure A16-1U. Example 1 Subplot Diagram.

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 2a: Fully-enclosed Closed boundary (CROSSES SUBPLOT PERIMETER = 0) and a closed boundary that does cross the subplot perimeter (CROSSES SUBPLOT 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 2b.

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.

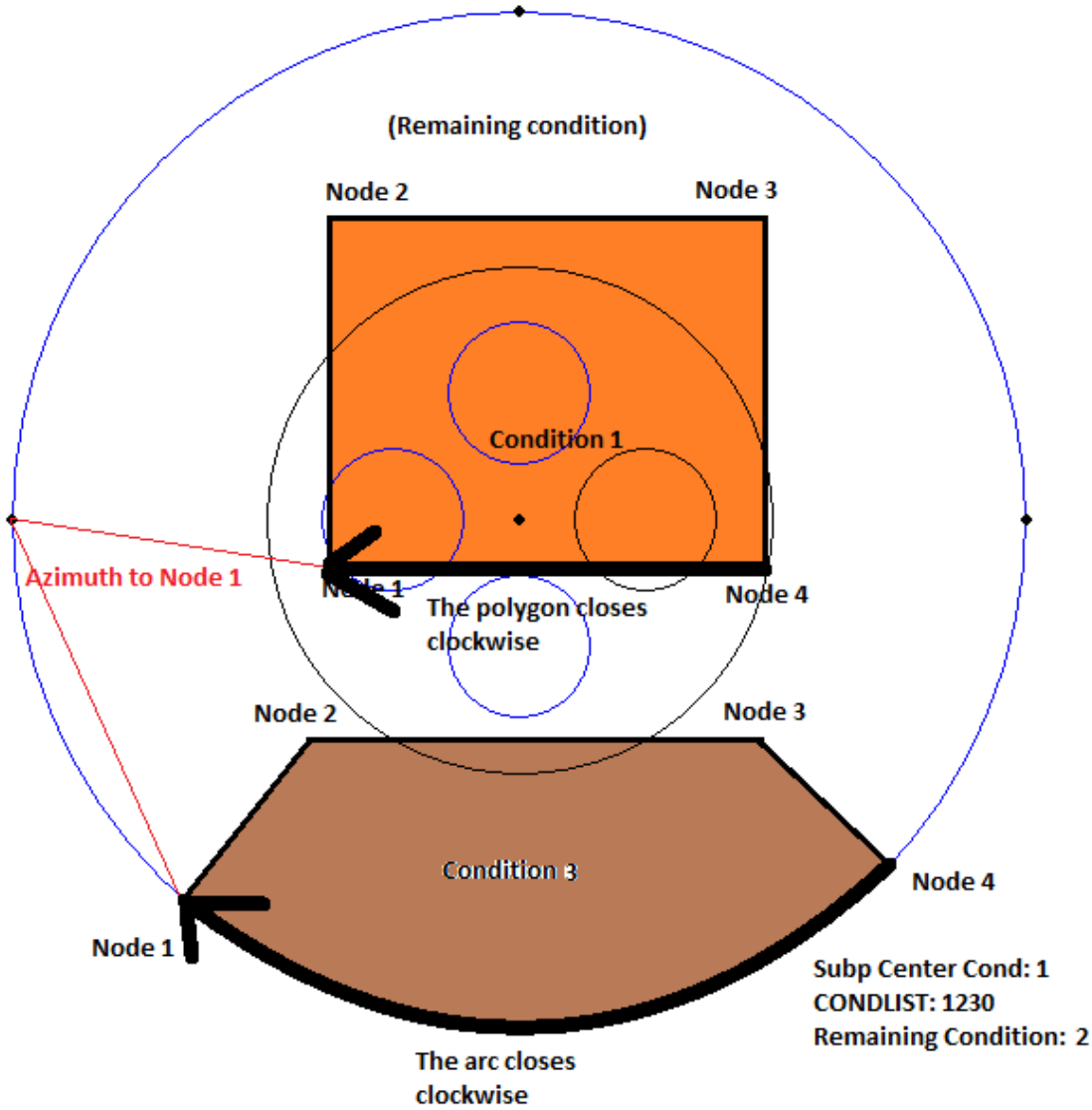


Figure A16-2U. Example 2a Subplot Diagram.

Example 2b: Fully-enclosed boundary and Multi-node boundary

This example shows an alternate solution to the scenario depicted in Example 2a. 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.

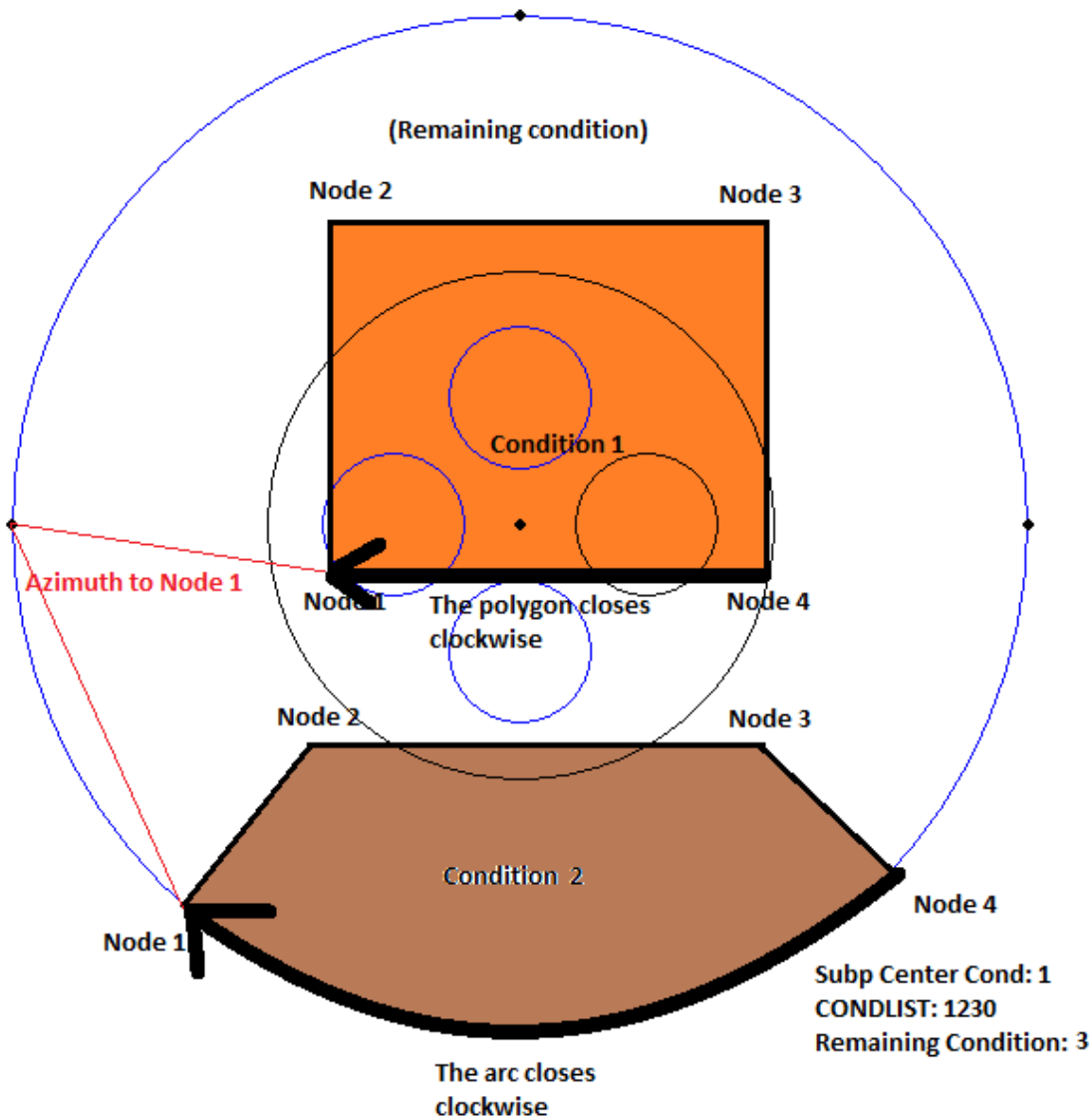


Figure A16-3U. Example 2b Subplot Diagram.

Example 3: 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.

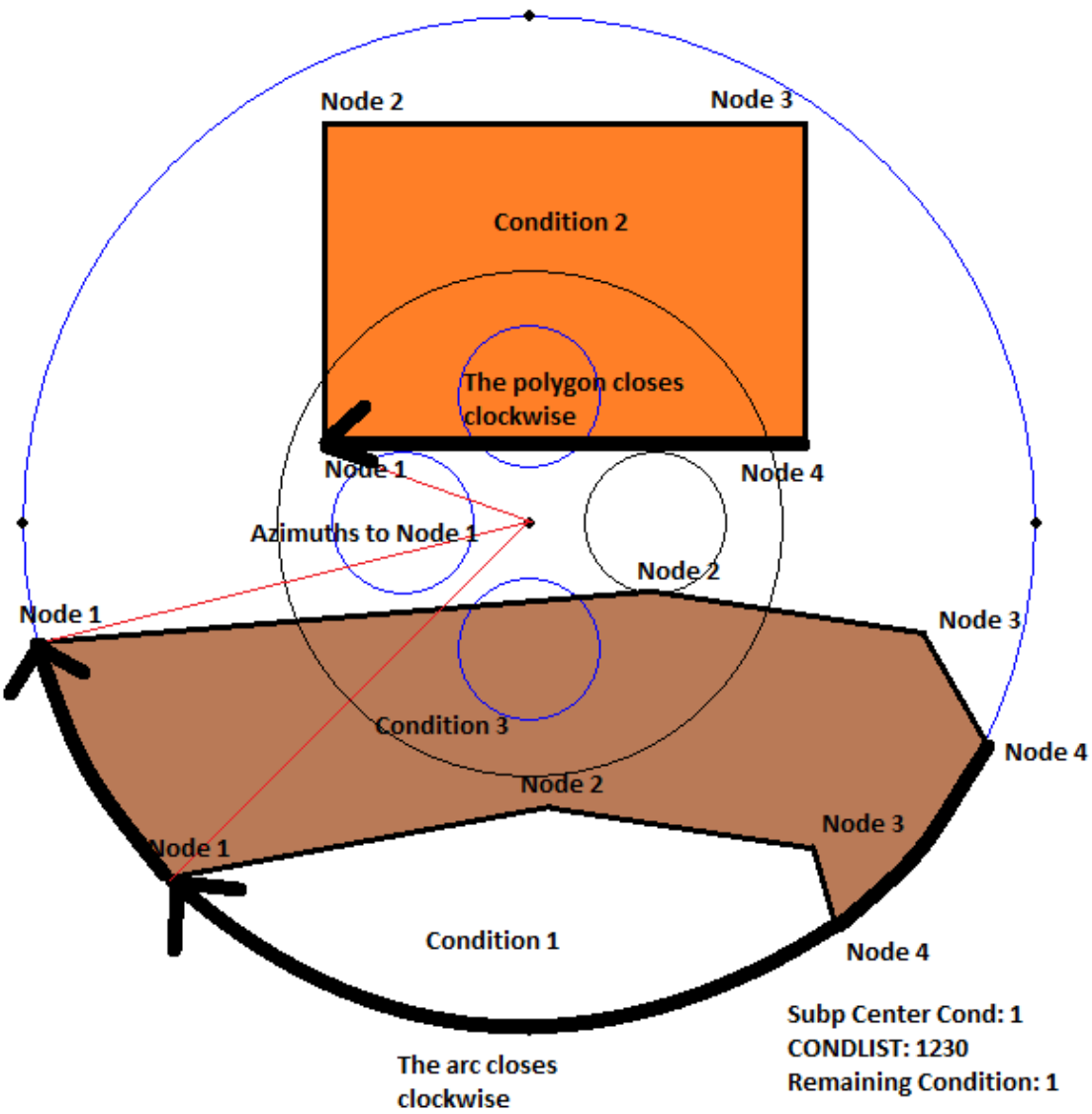


Figure A16-4U. Example 3 Subplot Diagram.

APPENDIX 17U. URBAN FIA PLOT ESTABLISHMENT AND RELOCATION PROCEDURES

Establishing a New Urban plot in a location with a previously installed P2 or P3 plot.

1. Install based on Plot Center, or plot center reference trees of the P2 / P3 plot.
2. If PC was not previously installed and contained no reference trees, install the urban plot center from a previously installed subplot by using its back azimuth and distance.

Establishing New Plots

The true location of the plot is the 'X' on the image. Plots must be established as close to this location as possible. Acceptable tolerance for the placement of newly established plots is based primarily on the relationship of the actual plot location to the prescribed location on the imagery, relative to landmarks that appear on both the ground and image. Landmarks may include, but are not limited to features such as sidewalks, roads, trails, streams, forest openings, topography, boundaries, visible changes in forest type, stand density and other easily identifiable features and landscape characteristics. Image quality can vary, but within those practical limitations the plot should be located within 10% of the distance from the nearest accessible landmarks. For plots where the only landmarks are greater than 200 feet from the plot and image location, the GPS coordinates collected at plot center will be used to determine if the plot is in the correct location. The collected coordinates must be within 50 feet of the prescribed coordinates or the plot location must be corrected.

When establishing new Urban FIA plots where PC or offset points are accessible, three methods are available and prioritized as follows:

- Visual installation
- Photo Work Installation
- GPS Installation

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. Image quality can vary, but within those practical limitations the new plots should be located within 10% of the distance from the nearest accessible landmarks.

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. Declination is ONLY a factor when VISUALLY establishing a plot based on one of its offsets.

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.

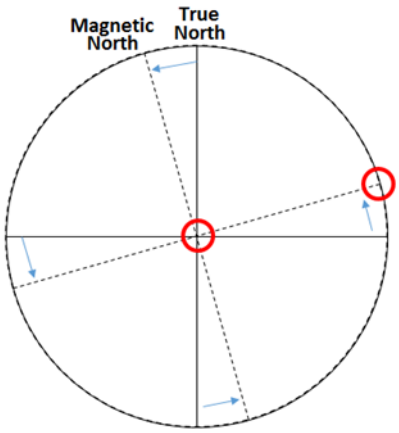


Figure A17-1U. Declination.

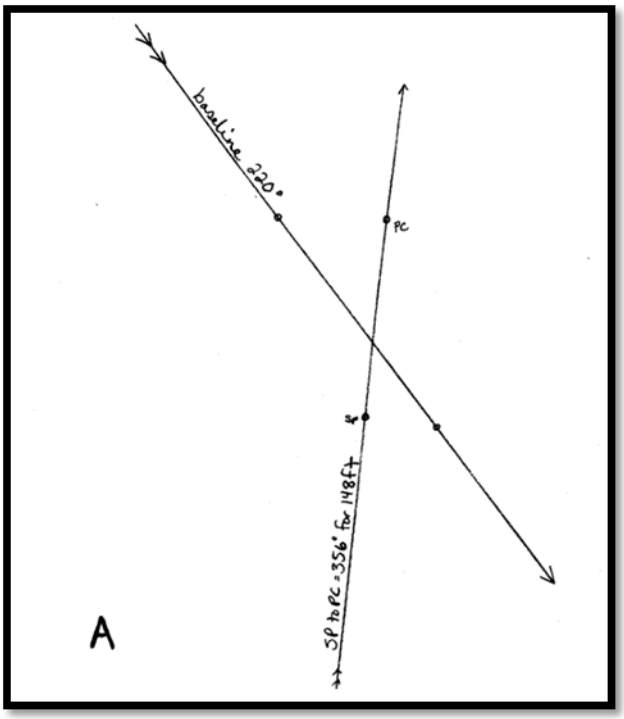
Photo Work Installation:

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. Image quality can vary, but within those practical limitations the new plots should be located within 10% of the distance from the nearest accessible landmarks.

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 A17-2U, 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 A17-2U, 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)



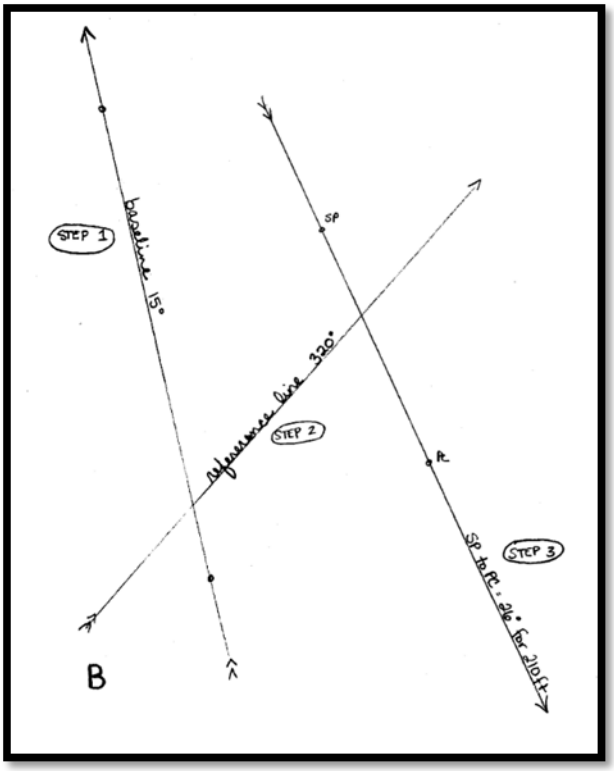


Figure A17-2U. Documentation on the back of two images. Both identify all lines drawn and include arrows on lines, identify SP and PC, and include azimuths for a Baseline and a course to sample line. The photo work in Example A did not require use of a reference line, while the photo work in Example B did require a reference line to be added.

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.

Image quality can vary, but within those practical limitations the plot should be located within 10% of the distance from the nearest accessible landmarks. For plots where the only landmarks are greater than 200 feet from the plot and image location, the GPS coordinates collected at plot center will be used to determine if the plot is in the correct location. The collected coordinates must be within 50 feet of the prescribed coordinates or the plot location must be corrected.

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.)

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 A17-2U 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.

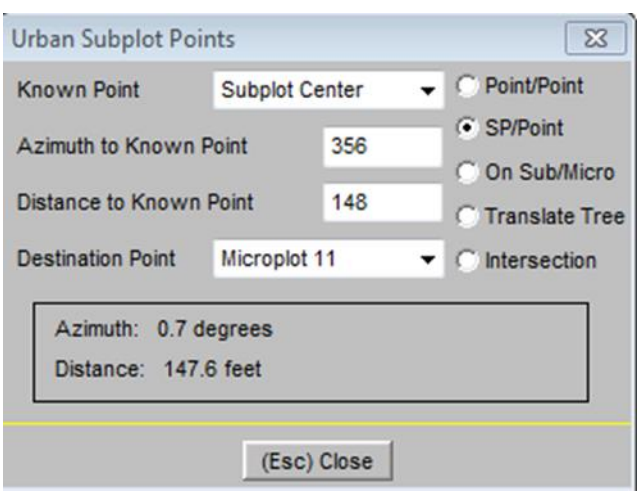


Figure A17-3U. MIDAS Urban Tools.

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.

Installing a plot when no sub/micro plot center or offset points are accessible

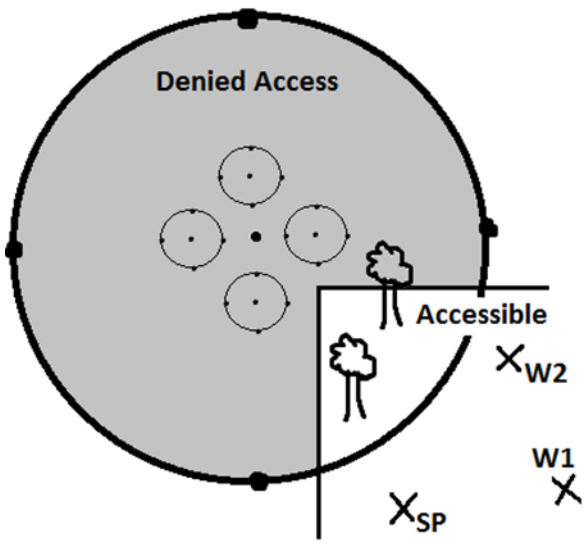


Figure A17-4U. An example of a plot that is partially accessible but which has no accessible center or offset points. The calculated Course to Sample is: SP to PC= 345° for 52 ft.

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 A17-5U 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)

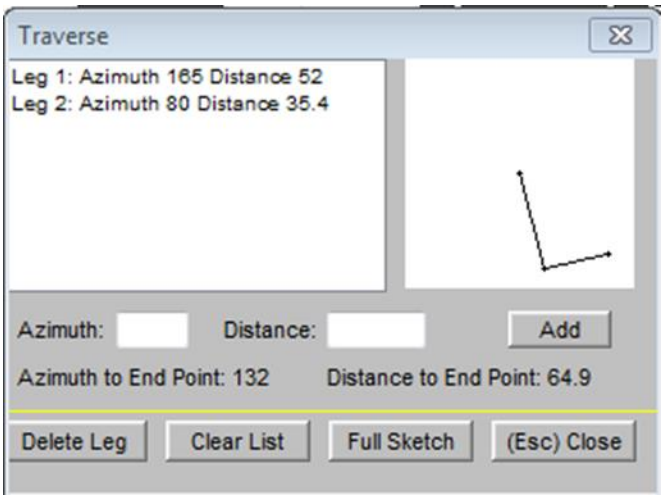


Figure A17-5U. MIDAS Traverse Tool.

- 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.

Locating Plots from a Previous Cycle

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.

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. When available, use photos, and the Plot Location Map and Plot Diagram provided by the previous crew 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 the point/s used for measurement during the previous visit. Whenever possible, work from the location from which the trees and boundaries were previously measured.

When working from the same location as the previous visit:

- If the DISTANCE/OFFSET DISTANCE and AZIMUTH/OFFSET AZIMUTH measured by the previous crew are within tolerance, do not change the values (unless, in the case of boundary measurements, real change has occurred)
- If the previous measurements are outside tolerance, change the values to reflect the correct value. If this change causes a tree to enter or drop from the sample, apply the RECONCILE CODE=7 (cruiser error)

If Monumentation or tally items are linked to a location which is no longer accessible, or additional points are necessary for measurement, use the Translate Tree or SP/Point Urban Tool in the Midas program to provide a distance and direction to a point that you can access. Pay particular attention to trees near the plot perimeter to ensure that the sample area remains the same. Monument the new location as required. Do not delete old Monument records for inaccessible location/s unless obviously incorrect or no longer present.

When working from a different location:

- If the point/s previously used may be accessible in the future, leave trees and boundaries linked to the original point and add a tree note about which point you were working from
- Link new trees and boundaries to the location from which you are working
- If the new location cannot be placed to keep all tally trees in the defined sample area, place the point to maximize the number of remeasure trees that can accurately be tied to the new location. Unless an obvious error can be confirmed (back azimuth recorded, wrong offset entered, etc.) tally any remaining remeasure tally trees, leave them linked to their original point and make a tree note to explain the situation.

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. after considering the folowing hierarchy for the plot location:

- Location marked on an aerial photo image from the previous crew
- Photos from the previous crew
- Location marked on an aerial photo image from prefield

- GPS coordinates from last crew (assuming an error was not made when collecting)
- GPS coordinates from prefield

PLOT LOCATION DATA recorded on plot sheets (URBAN OPTIONAL Collected in NRS)

PLOT LOCATION MAP (URBAN OPTIONAL Collected in NRS)

A Plot Location Map is required on all plots unless the Plot Diagram (Cluster Map) provides enough specific detail (roads, trails landmarks, etc.) to relocate the plot accurately and efficiently. The Plot Location Map should provide enough information for a plot to be relocated. Details (sidewalks, fences, buildings, patios, driveways, trails, etc.) and mileage to an easily located intersection or reference point must be included. Inspectors check the quality of these maps by attempting to locate the plot without aerial photos or GPS coordinates. A plot that can't be located efficiently due to a poor map will be considered unsatisfactory. Neatness and clarity are required. Artwork is not necessary and is not required. A good Plot Location Map should take no more than five to ten minutes to complete.

Starting Point (SP) is only required on new samples if needed for plot establishment and on remeasurement that require SP for plot relocation.

The Plot Location Map or Cluster Map (if Plot Location Map is not needed) must include:

- References to the nearest road intersection, include exit numbers when appropriate
- Names and/or numbers (if available) for all roads shown on the map along with house or box numbers, when appropriate
- Key landmarks (natural and manmade) near SP (if required), PC, and witness objects, as well as important intersections along route
- Use common symbols to represent features like fences, railroads, power lines etc.
- Include North arrow (on Plot Location Map)
- Location of SP (when SP is required), witness objects (if helpful), and PC identified
- Location for safe vehicle parking and route to PC from there
- Record distance between road intersections from an originating intersection to parking location. Distances are recorded in miles, tenths of mile, chains, or feet.
- Gates – locked or unlocked
- Off road trails/paths used to drive or hike to PC
- Changes in land ownership between parking to PC and on plot

PLOT DIAGRAM (Cluster map) (URBAN OPTIONAL Collected in NRS)

Use this space to show the location of contrasting condition classes and any unique features on or near the plot that may be helpful in relocating the plot at the next inventory. Condition class boundaries must be sketched in accurately to avoid problems on the next cycle when these boundaries will be remeasured.

In situations where the Cluster Map can be used as Plot Location Map and Cluster Map, it must also contain all information listed above for the Plot Location Map.

APPENDIX 18U. PLOT PHOTOS - (URBAN OPTIONAL COLLECTED IN NRS, PNW)

Introduction

Photos can be useful for expanding on Monument descriptions, confirming unexpected tree species and providing visual cues for proper plot relocation. The following protocol has been developed in order to: increase the ease and accuracy with which urban plots are relocated; confirm unusual tally items such as tree species changes, UNLISTED TREE SPECIES, difficult tree diameter locations etc.; and provide visual information in other situations that would help a returning field crew or analyst to better understand the situation at the time of measurement. To comply with FIA confidentiality requirements, these photos are taken solely for plot work and will not be used for publications or be publicly accessible. Up to nine photos may be added to a plot file.

Urban Plot Photo Instructions

Any plot that is occupied (PC or other point installed) will require a minimum of one photo to capture the location of one of the installed points. The photo should show the location of the point along with other identifiable landmarks that would aid in relocation of the point. Proper and complete monumentation remains critical. Sometimes photos will help find the basic location making it easier to identify the identified Monuments. At other times, triangulating from monuments will get you very close and the photo might serve to help you replace the point in exactly the same location.

- Mark the point clearly with flagging or another clearly visible item
- Identify other notable landmarks which could be captured in the photo
- Step back from the point and take the photo to include both the point being installed and the landmark/s
- Add this photo to the PLOT Attribute screen and name the file using the following convention: pt###az### where the first 3 numbers represent the 3 digit code of the point you are taking a picture of and the following three digits are the azimuth at which you are pointing the camera.
  - Examples:
    - PC pictured by pointing the camera 165 degrees- file name: “pt000az165”
    - North offset of microplot 14 pictured by pointing the camera at 125 degrees: “pt141az125”
    - PC pictured by pointing the camera 37 degrees: “pt000az037”

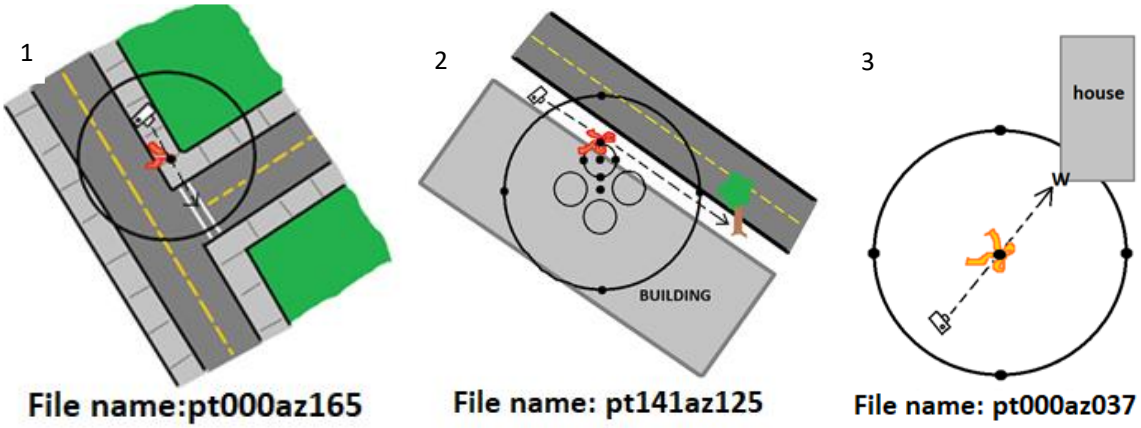


Figure A18-1U. Examples of file naming convention.

A minimum of one photo is required for each Unlisted Species recorded.

- The photo should capture a close-up of the leaf/flower/bud structure to help confirm identification.
- If possible, also take a photo from far enough away to show form and size.
- Add this photo to the Subplot Attribute screen. Name the file/s “gsppa”, “gsppb” etc. where “gspp” indicates the first letter of the Genus and the first 3 letters of the species name and the last letter differentiates photo file names of the same Unlisted Species. (ex. for Rhus typhina: “rtypa”, “rtypb”, etc.)

Additional photos are encouraged as necessary to convey information about unusual or confusing situations, including but not limited to:

- the diameter location on difficult tally trees where paint cannot be used
- unusual condition situations such as land use transitions
- temporary conditions such as flooding which may impact tally
- unusual tree species, species changes from previous visits

Add these photos from the most appropriate screen and name them carefully to convey necessary information.

When Collected: All occupied plots with PLOT STATUS 1,2,3 or 4.

Directions for adding photos in the MIDAS program

- Open the photo application on your data recorder
  - On the Allegro 2 press the Orange + C keys
  - On a Ranger use the startup menu to access the camera app
- Take the required/desired photo
- Navigate back to the MIDAS program
- Within the Plot Attribute, Subplot Attribute, Condition or Tree Screens press CTRL+N as to enter a note
- Press F5 or the “Photos F5” button on the screen

- Ensure that the “Delete Source Photo After Selection” box is checked

- Click the “Add Photo” button

- When the selection screen appears, select the appropriate photo and click “open”
- A screen will appear to rename the generically named file. Name the file using the naming conventions and press “OK”
- The photo is now automatically saved, is a part of the plot file and no further steps are required to load the photo with the plot

Photo Tips

- The most effective photos clearly show the point location and unique building, landscaping, or environmental characteristics in reference to the occupied location.
- Point locations should be marked with a brightly colored object that is clearly visible, such as a logger’s tape or flagging. 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).
- Include landmarks, landscape and permanent objects to provide context.
- Capture background reference objects.
- In areas lacking objects close to the point, include a wide area for reference.

Below are example photos with comments:

Figure A18-2U. Install point photo: This photo is helpful in that it shows the house in the background as well as the flagged point location in relation to closer objects like the trees and shrub. It is possible that including a little more of the plot area in the photo would have been helpful.

Figure A18-3U. Install point photo: Sometimes your landmark items are limited. If these rocks are large and not likely to move, they might be the best option to allow for easy relocation.

Figure A18-4U. Mark the point with bright flagging, change the perspective to include background reference objects.

Figure A18-5U. This photo includes a stormwater system cover which is a helpful landmark. You can also see the road or driveway entering on the opposite side of the road. A slightly lower angle would have allowed us to see more of that road or driveway while maintaining the view of the stormwater cover which would allow for easier identification of the locoation.

Figure A18-6U. This is a good photo that provides reference to a fixed object at an appropriate scale.

Figure A18-7U. Install point photo: A lower angle picture would allow us to see the location of the point on the concrete seam as well as a house in the background for reference. This

photo can serve to help replace the plot in exactly the same location along the seam (if nothing has changed).

Figure A18-8U. Install point photo: Step back to see close curb as well. Otherwise, this is a good photo of a clearly marked point center that includes a permanent object as a reference.

APPENDIX 19U. 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.

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

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.

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.

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?

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.

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.

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.

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.

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 A19-1U. 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.

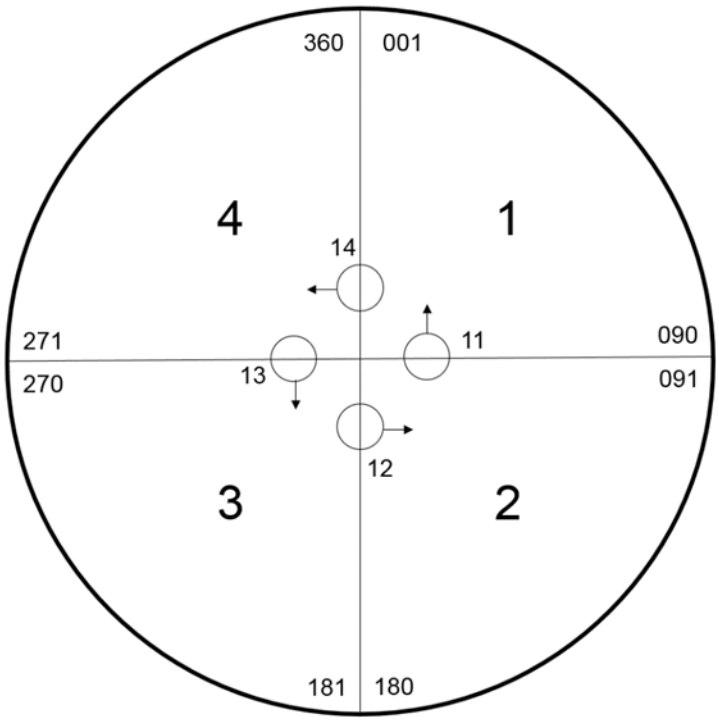


Figure A19-1U. The Urban plot is divided into 4 quadrants that include their respective microplots. Once remeasurement is started in any quadrant, that quadrant must be remeasured completely.

Urban QAQC PI Plots

Plots that were reviewed in the Prefield Photo Interpretation (PI) process and have been filtered out as “Office Visit” will require a QAQC field visit if they are selected randomly as a QAQC plot. Such plots can be measured by any crewmember Certified to collect field data in the current Urban Field Guide version.

Select the MIDAS Historical Data File labeled with ‘URBAN.QAB’. Record QA STATUS = 6 (Blind check).

The field crew must perform an on the ground visual check of the plot.

All Urban QAQC PI plots require the following information to be recorded:

- GPS coordinates for PC or established offset, or for SP/RP if the plot was not occupied
- Standard point monumentation if the plot is occupied
- Plot data
- Condition data
- Subplot data
- Subplot Condition data
- Boundaries (Traditional or Closed) data
- Ownership data

- Completed plotsheet/s following regional guidelines

The following data will NOT be recorded for Urban QAQC PI plots:

- Tree/sapling tally data
- Seedling counts
- Site tree data
- Invasive plant data

It is not a requirement to occupy the plot if the site is visible from a convenient location and the required variables can be recorded from a distance. In these cases, if preferred, an SP/RP may be established with no further monumentation required.

An Urban QAQC PI plot MUST be occupied when:

- It is possible that multiple conditions are present on the plot (boundary data is required)
- It is possible that the Subplot-Condition Vegetation Cover (PERCENT TREE/SAPLING COVER and PERCENT SHRUB/SEEDLING COVER) is ≥1%
- Any of the required variables cannot be evaluated from a distance

The presence of a Subplot-Condition Vegetation Cover ≥1% will indicate that the respective plot should have been sent to the field as a Production Visit.

The presence of a recorded Boundary will indicate that the plot should have been selected as a MOP (Midas Office Plot) and completed in MIDAS by Prefield staff.

APPENDIX 20U. URBAN FIA PALM SUPPLEMENT (2018)

Figure A20-1U. 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)

FIA Palm measurement guidelines:

Total Length = the distance parallel to the stem of the palm from the ground to the top of the highest unfurled frond. see Figure A20-2U and Figure A20-3U.

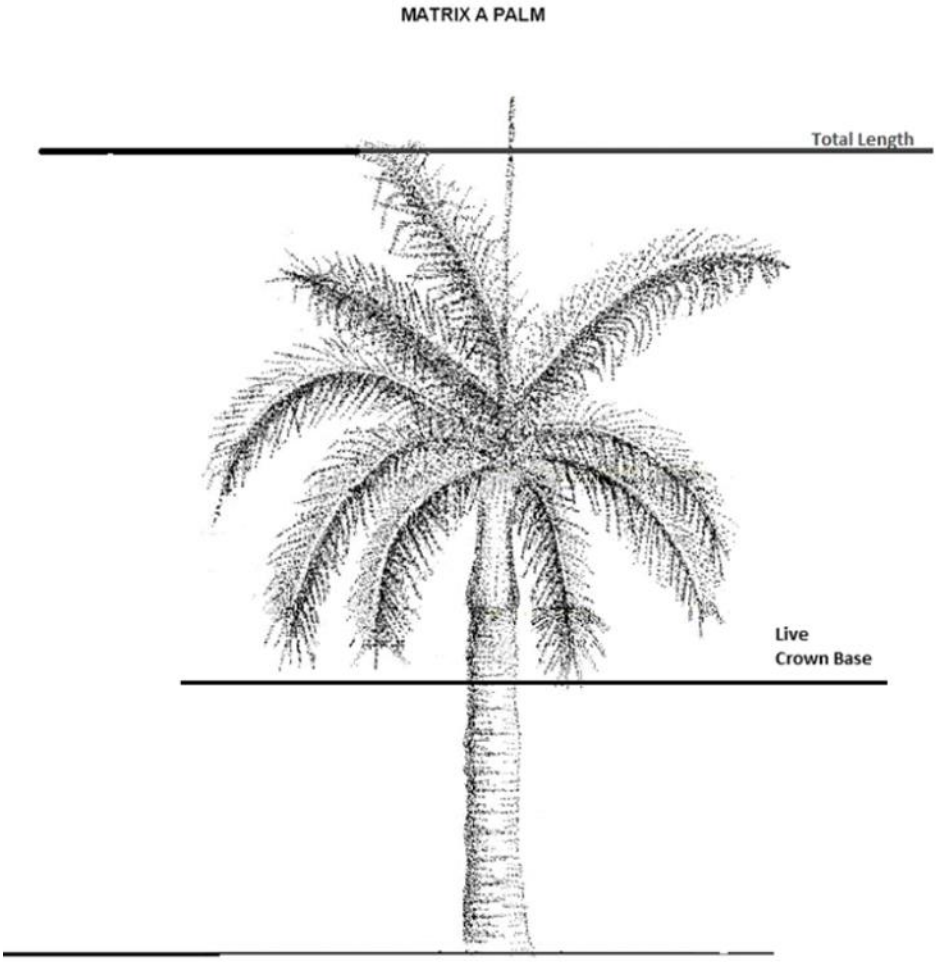


Figure A20-2U. SINGLE TRUNK, PINNATE ROYAL PALM

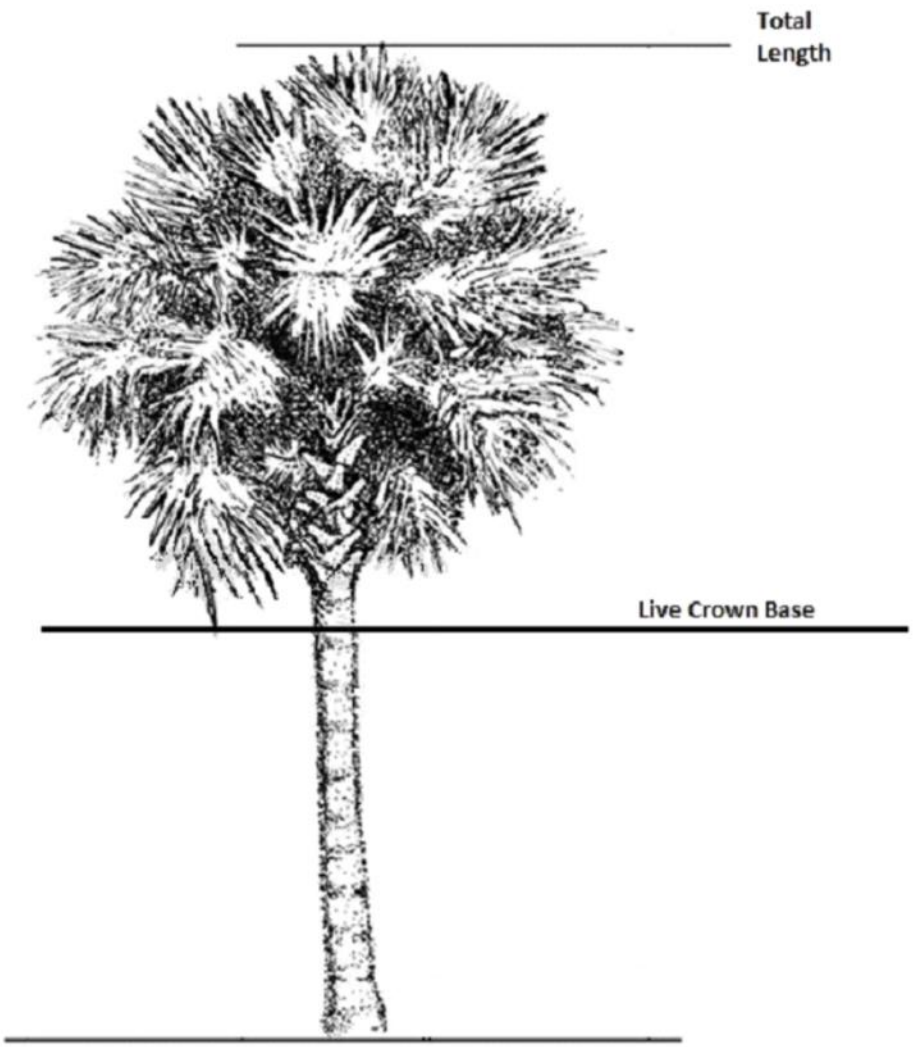


Figure A20-3U. SABAL PALM

Figure A20-4U. Acera Palm. This multi-stemmed spp will be classified by UFIA as a shrub.

APPENDIX 21U. CHANGES FROM THE URBAN FIA PLOT FIELD GUIDE VERSION 9.1 TO 9.2

These change pages are intended to highlight significant changes to the field guide.

- The numbering system for all figures was changed so that figures are now numbered consecutively within each chapter. Each figure number has the format section number-number order in the section. For example, the first figure in section 2 was changed from "Figure 2" to "Figure 2-1". Text references to figures were updated.
- INTRODUCTION. Clarified Urban FIA data collection period.
- 1.12 FIELD GUIDE REVISION. Changed the value from 9.1 to 9.2.
- 2.2 Condition Class Status Definitions. 1. Accessible Forest Land. Clarified the caption of Figure 2-8.
- 2.4.3 FOREST LAND CONDITION STATUS CHANGE – New Forest Condition or Loss of Previous Forest Condition. Clarified the text in the example part of the description.
- 2.5.7 OWNER CLASS. Clarified codes 41, 43, and 45.
- 2.5.29 URBAN TRUTH NONFOREST LAND USE. Value 910, modified the text.
- 3.20 UNLISTED TREE PRESENT. Added information relating to the changes in the Master Species List. Also clarified the instructions of when to record the variable.
- 3.23. UNLISTED TREE SPECIES COUNT. Modified the text, and changed the values from "1 to 99" to "0 to 99".
- 4.1 Reference Procedure. In the list of additional rules under paragraph 4, added a sentence at the end of rule 1.
- 5.4. AZIMUTH. Clarified the text.
- 5.7.1 RECONCILE. Clarified code 8.
- 5.8 SPECIES. Made the following changes.
  - Added text to accommodate the changes in the Master Species list.
  - Deleted the table and all references to Non-urban exclusions (NUE).
  - Deleted the table list of National Forest System (NFS) exclusions.
  - Deleted the table of Mainland Exclusions (MLE).
  - Deleted old Figure 37. National Forest System (NFS) Regions.
  - Added Figure 5-11. Description of the Master Species List.
  - Added Table 5-2. List of species separating the Island and Mainland Sub-lists; these species are referred to as Island Only Species (IOS).
  - Added Figure 5-12. Map of the nine P2/3 National Forest System Regional Boundary (NFS) Sub-list areas.
  - Added Table 5-3. List of species associated with the nine P2/3 National Forest System Regional Boundary (NFS) Sub-lists.
  - For specifics in changes to the species on each list, please see the description of Appendix 3 below or Appendix 14, or both.
- 5.9. DIAMETER. Under the section Remeasurement Trees, clarified the text in the first paragraph. Also clarified the text in exception 3, and added exception 4. Also added a new figure, Figure 5-13, to illustrate exception 4.

- 5.9.2 DIAMETER AT BREAST HEIGHT (DBH). In Item 1, replaced Figure 5-16 and clarified the caption.
- 5.9.2 DIAMETER AT BREAST HEIGHT (DBH). In item 2, clarified the text. Also clarified the caption text of Figure 5-26.

5.9.2 DIAMETER AT BREAST HEIGHT (DBH). In item 11, added a sentence to the first paragraph. Also replaced

Figure 5-35. Under the fourth bullet, added a sentence to the end of the text. Also replaced

- Figure 5-36.
- 5.14 TOTAL LENGTH. Added a clarifying sentence to the end of the text.
- 5.15 ACTUAL LENGTH. Clarified the text.
- 5.20. CROWN DIEBACK (CORE OPTIONAL P2 CORE P3). Added this variable from the old P3 field guide. Renumbered the sections following the addition.
- 5.21.1 DAMAGE AGENT 1. Code 24000. Changed the Damage Threshold from “Damage ≥20% of crown affected” back to “Damage ≥20% dieback of crown area”. Also deleted text from the Description column that was added in version 9.1. These changes correct text for code 24000 that was incorrectly modified in version 9.1.
- 5.32 STREET TREE. Modified the text.
- Appendix 3 Species List. Made the following changes.
  - Modified the first introductory paragraph above the species code list to accommodate changes in the Master Species List change proposal.
  - Changed the labels and content of the first three columns.
  - Added Islands only species (IOS) – 300
  - Deleted Islands only species – 8472 from the Master Species list but MLE was not in Appendix 3.
  - Added at least 1 NFS region under NFS Region Sub-list – 508, 772, 902, 6524, 7469, 7577, 7578, 8345, 8504
  - Deleted at least 1 NFS region under NFS Region Sub-list – 461, 463, 763, 768
  - Deleted species – 928, 5192, 5436, 7579, 7637, 8112
  - Added species 6856 (Cycas micronesica) to the species code list.
- Appendix 6. Glossary. Added definitions for the following terms: Islands Only Species (IOS), P2/3 Sub-lists, and Subplot-condition. Deleted the following terms: Mainland Exclusion (MLE), Non-Urban Exclusion (NUE). Also, modified definitions for the following terms: Master Species List, Urban areas, Bole, Inclusion, and TOTAL LENGTH.
- Appendix 13. Changed name from “Ownership Prefield Procedures” to “Syncing MIDAS Ownership/Contact Data Entry with NOMS Database Requirements”. There were many changes in this appendix because the procedures underwent a major revision. One change throughout the appendix is that there are now “paired” variables that are collected from owners or from contacts. These variables are found from: A13.11 FIRST NAME OWNER through A13.52.
- Appendix 13. The following non-paired variable was added: A13.5 RECORD TYPE.

- Appendix 13. The following variables were deleted (original variable numbers): A13.5 INVYEAR, A13.8 OWNER SHORT NAME, A13.9 AGENCY, A13.10 COMPANY, A13.11 MANAGEMNT UNIT, A13.29 DATA SOURCE (CORE OPTIONAL), A13.30 DATA SOURCE OTHER (CORE OPTIONAL), A13.44 OWNERSHIP CONTACT NAME (CORE OPTIONAL), A13.45 OWNERSHIP CONTACT ATTEMPT NUMBER (CORE OPTIONAL), A13.48 LAND POSTED (CORE OPTIONAL), A13.51 ACCESS GRANTED BY (CORE OPTIONAL), A13.55 INFORMATION REQUEST DETAILS (CORE OPTIONAL), and A13.56 INFORMATION REQUEST FULFILLED (CORE OPTIONAL).
- Appendix 13. Variable A13.9. The name was changed from “NAME” to “OWNER NAME”.
- Appendix 13. Variable A13.65. The name was changed from “OWNER NOTES” to “NOTES”.
- Appendix 13. The examples in section A13.73.1 FIA Ownership Data Recording Examples were revised.
- Appendix 14. Updated this appendix for the changes in the species code list (appendix 3) made in version 9.2 of the Master Species Code List.
- APPENDIX 17U. URBAN FIA PLOT ESTABLISHMENT AND RELOCATION PROCEDURES. Locating Plots from a Previous Cycle. Modified the text.
- APPENDIX 18U. PLOT PHOTOS. Modified the text, added figures, and updated figure captions.